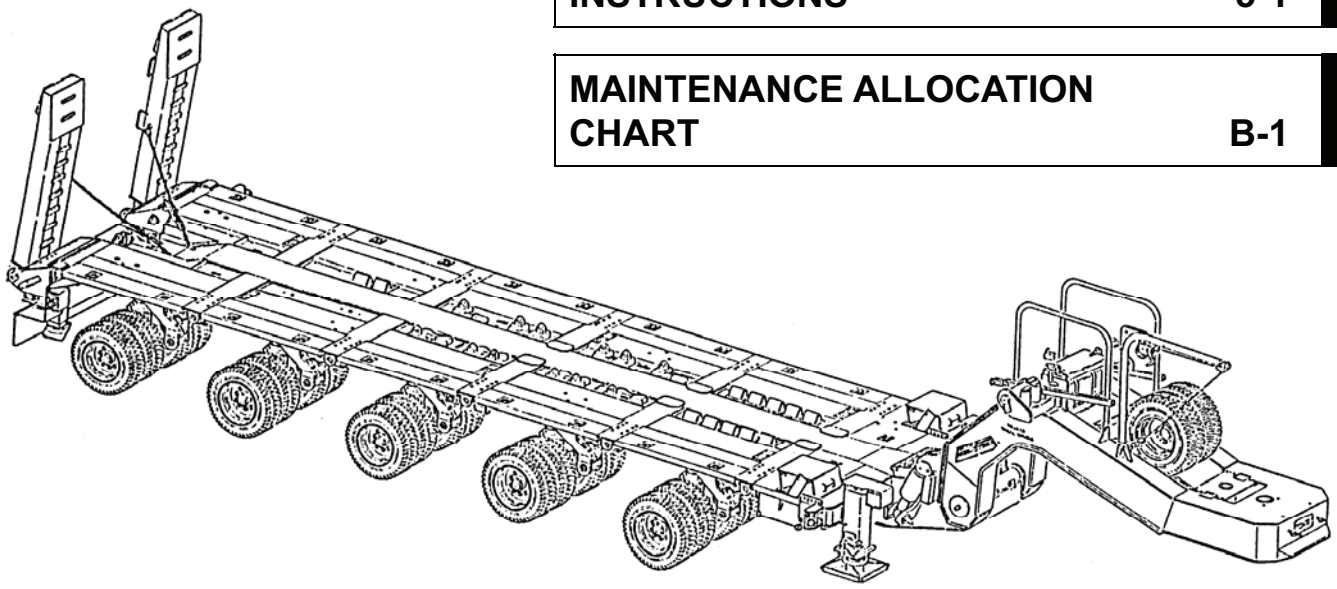
TM 9-2330-381-14

TECHNICAL MANUAL

OPERATOR'S, UNIT, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL FOR SEMITRAILER, TRANSPORTER, HEAVY EQUIPMENT 70 TON, M1000 NSN 2330-01-303-8832 (EIC: CXU)

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DISTRIBUTION STATEMENT A: Approved for Public Release; Distribution is Unlimited.

HEADQUARTERS, DEPARTMENT OF THE ARMY
NOVEMBER 1994

FOLLOWING IS A SUMMARY OF WARNINGS PRESENTED WITHIN THE OPERATION AND MAINTENANCE PARAGRAPHS OF THIS MANUAL:

WARNING

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, wash thoroughly with soap and water. Wash hands thoroughly prior to eating or smoking.

Hydraulic fluid may be hot if system has been in operation. Allow system to cool before performing maintenance or injury to personnel may result.

Residual pressure may remain in hydraulic lines. Open fittings slowly or injury to personnel may result.

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

Compressed air used for cleaning/drying can create airborne particles that can injure the eyes. Always wear eye protection. Pressure must not exceed 30 psi (207 kPa) or injury to personnel may result.

Technical alcohol is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near work area. Use skin and eye protection and work in a well-ventilated area.

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

Diesel fuel is combustible and is an irritant to the eyes, skin, and respiratory system. To avoid injury to personnel and explosion, extinguish all smoking materials and do not allow sparks or open flame near the fuel tank or the fuel system. Use skin and eye protection and work in a well-ventilated area.

Clean up fuel that spilled during fuel line removal or injury to personnel may result.

OBSERVE THE FOLLOWING PRECAUTIONS WHILE SERVICING THE BATTERY OR INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT MAY RESULT:

WARNING

- The battery gives off hydrogen gas, which is explosive. Do not smoke or allow any flames in the vicinity while checking or filling the battery.
- The battery contains sulfuric acid which will cause severe eye injury, skin burns, and damage to clothing. Wear eye protection and protective clothing and avoid spilling any acid. If contact occurs, flush affected areas immediately with large quantities of water and seek medical attention.
- Do not wear watches, rings, or other jewelry which could short out battery terminals while servicing battery.
- Always disconnect negative (black) cable first and connect negative (black) cable last.
- A frozen or completely discharged battery can explode if power is applied. Before connecting any form of external power to battery, ensure frozen battery is warmed or discharged battery is replaced.
- Welding and brazing operations produce heat, toxic fumes, radiation, metal slag, and carbon particles. Welding and brazing goggles with properly tinted lenses are required. Also, gloves, apron, and welding boots are required.
- Fluorescent penetrant may cause injury to personnel. Avoid skin contact. In case of skin contact, wash with warm water and soap.
- Soldering fumes are toxic. Avoid breathing these fumes. Work in a well-ventilated area.
- Many of the assemblies and components of the semitrailer are heavy. Always use the required number of personnel and appropriate lifting/supporting devices as specified in the initial setup.
- When on top of the gooseneck, always hold onto semitrailer with one hand to avoid falling.

OBSERVE THE FOLLOWING PRECAUTIONS DURING COUPLING/UNCOUPLING THE SEMITRAILER AND TRACTOR OR INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT MAY RESULT:

- Two personnel are required for coupling. During hookup, the operator of the tractor must know the position of the spotter at all times.
- All spotters and ground personnel around the tractor/semitrailer must stand clear of the vehicles during uncoupling.

OBSERVE THE FOLLOWING PRECAUTIONS DURING COUPLING/UNCOUPLING THE SEMITRAILER AND TRACTOR OR INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT MAY RESULT:

WARNING

- Make sure the person adjusting the steering wedge adjusting nut is clear when the steering wedge is cycled back and forth.
- Prior to adjusting gooseneck height, pull out both gooseneck isolation and suspension shut-off valve handles to the ADJUST position.
- Prior to moving the tractor from under gooseneck, place the gooseneck isolation valve handle in the ADJUST position, handle pulled outward.
- Do not uncouple tractor/semitrailer if tractor has less than normal operating air pressure, approximately 100 - 120 psi (689.5 - 827 kPa) or the semitrailer will not have sufficient air pressure to apply or release brakes.
- Do not uncouple a loaded semitrailer from the tractor for purposes of performing maintenance task on the semitrailer.

OBSERVE THE FOLLOWING PRECAUTIONS FOR ADJUSTING THE GOOSENECK/PLATFORM HEIGHT OR INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT MAY RESULT:

- If the semitrailer is uncoupled from the tractor and gooseneck needs adjusting, verify that the front support legs are lowered and supporting the platform.
- If the semitrailer is uncoupled from the tractor and gooseneck needs adjusting, ensure that both gooseneck isolation and suspension shut-off valve handles have been pulled outward to the ADJUST position.
- If the semitrailer is uncoupled from the tractor, ensure both streetside and curbside front bogie wheels of the semitrailer are chocked. After the parking brakes are released, the semitrailer may roll uncontrolled.
- If the semitrailer is coupled to a tractor, pull the suspension shut-off and gooseneck isolation valve handles outward to the ADJUST position and uncouple the semitrailer.
- If the semitrailer is coupled to a tractor, the gooseneck isolation valve handle must be in the RUN position, handle pushed inward. If the semitrailer is uncoupled and the gooseneck needs adjusting, verify that front support legs are lowered and supporting the platform and that all personnel are clear of gooseneck before operating gooseneck isolation valve.

OBSERVE THE FOLLOWING PRECAUTIONS WHEN LOWERING OR RAISING THE SEMITRAILER SUPPORT LEGS OR INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT MAY RESULT:

WARNING

- Before performing any maintenance on the platform, lower the front and rear support legs.
- When lowering the support legs, make sure that feet and hands are clear of the support leg foot as it nears the ground.
- When lowering or raising the front support legs, always install the retaining pins.

OBSERVE THE FOLLOWING PRECAUTIONS WHEN DRIVING THE TRACTOR/SEMITRAILER OR INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT MAY RESULT:

- Unlike conventional semitrailers, this semitrailer tracks the same turning radius as the M1070 tractor and does not cut the inside turning radius. When making turns, the operator needs to make tighter turns to keep the semitrailer from hitting the outer curb.
- Using the M911 or M1070 tractor, the semitrailer will not back like a normal semitrailer because of semitrailer steering system. The operator must back tractor/semitrailer by turning tractor steering wheel in opposite direction of what would be used for backing with a normal semitrailer.
- Because of minor load instability while driving with a disabled bogie, especially when carrying a payload, turning speeds must be reduced to 85 percent of the maximum safe turning speeds. (Example: A 15 mph (24 kph) maximum turn speed should be reduced to 13 mph (21 kph) maximum turn speed.)
- When manually steering the semitrailer, make many starts and stops to give spotter time to adjust steering. The tractor operator should allow even space on both sides of the tractor so that the spotter steering the semitrailer has room to make adjustments.
- Precautions must be exercised during highway travel to ensure that all bridges and underpasses can be negotiated.
- When towing a payload, check security of load and tighten tiedowns at every rest and maintenance stop.

OBSERVE THE FOLLOWING PRECAUTIONS WHEN DRIVING THE TRACTOR/SEMITRAILER OR INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT MAY RESULT:

WARNING

- Under no circumstances shall speeds exceed the following:

Highway	45 mph (72 km/h)
Secondary	40 mph (64 km/h)
Off-road	15 mph (24 km/h)

OBSERVE THE FOLLOWING PRECAUTIONS DURING FORDING OPERATIONS OR INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT MAY RESULT:

- Do not enter water at more than walking speed of 5 mph (8 kph) with an entrance or exit slope of more than 15 percent.
- Do not enter water deeper than 28 inches (71 cm), including wave height.
- Do not enter water which has ice or debris on the surface.
- Always check the stream bottom to determine that it is firm enough to support the semitrailer and that there are no obstacles under water.
- Do not enter water which has a current velocity of more than 5 mph (8 kph). This is equivalent to 7 feet per second (2 m/s).

OBSERVE THE FOLLOWING PRECAUTIONS WHILE OPERATING THE LOADING RAMPS OR INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT MAY RESULT:

- When the ramp stow chains are disconnected from the platform, do not stand behind the ramps or near the path the ramps can travel when being lowered or raised.
- The spring-assisted ramps, when raised from the lowered position, are under extreme tension and raise very quickly. When raising ramps, do not stand on the beavertail or in the path where any portion of the ramp will travel during upward travel.
- When ramps are lowered and near the horizontal position, the springs are fully compressed and under extreme pressure. Do not attempt to adjust or remove spring mechanism unless ramps are in the raised (stow) position.

OBSERVE THE FOLLOWING PRECAUTIONS DURING LOADING/UNLOADING OPERATIONS OR INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT MAY RESULT:

- If possible, provide ample clear space behind the disabled payload during loading/unloading in case the cables break while payload is being loaded/unloaded.
- All ground personnel must stand clear of winch cables except when handling the cables.

OBSERVE THE FOLLOWING PRECAUTIONS DURING LOADING/UNLOADING OPERATIONS OR INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT MAY RESULT:

WARNING

- Make sure winch cables are not kinked, clevises are secured to winch cables, and snatch blocks and shackles are in good condition and properly secured.
- Make sure winch cables are inspected in accordance with TB 43-0142.
- Extreme caution should be exercised during any operation on a slope.
- A ground spotter must stand off of curbside of semitrailer and maintain visual contact with the winch operator. The spotter must observe cables, snatch blocks, shackles, and payload position during loading/unloading operations.
- During winch-on operations on a downgrade, the payload must be restrained from the rear with some other vehicle to prevent possible loss of control of the payload.
- Do not overload tractor winches. Know the ratings of the winches being used and any protection devices (such as shear pins).
- At no time during any loading/unloading operations while the payload is being pulled on and/or off with winches should personnel be on the semitrailer platform.
- Two spotters are required for able payload loading/unloading operations. The payload operator must know the position of spotters at all times.
- Do not position a spotter on the gooseneck if payload is to be backed onto semitrailer platform.
- Always wear leather gloves when handling cable. Never allow cable to run through hands.
- A spotter is required for disabled payload loading/unloading operations. The winch operator must maintain visual contact with the spotter at all times.
- Load/unload the semitrailer on level ground whenever possible. In adverse conditions, loading/unloading can be done on grades up to 10 percent with a maximum offset angle of 10 degrees between tractor and semitrailer. Avoid exceeding these limitations to prevent payload from rolling on/off semitrailer.

OBSERVE THE FOLLOWING PRECAUTIONS DURING LOADING/UNLOADING OPERATIONS OR INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT MAY RESULT:

WARNING

- Due to semitrailers being outfitted with various chains (1/2-inch and/or 3/4-inch link sizes), all chains must be inventoried in the platform storage compartment prior to placing chains on platform. Once chains are inventoried, read and familiarize yourself with the procedures to determine tiedown needed to properly secure the payload.
- Winch operator and spotter must be completely familiar with the sequence of steps prior to using winches.
- Unnecessary personnel must stand well clear of the vehicles, especially behind the payload (engine/turbine exhaust) during loading/unloading operations. At no time during any loading/unloading operation while the payload is moving should personnel be on the semitrailer platform. The payload operator must drive the payload slowly up or down the loading ramps and onto the platform or ground.
- Failure to extend safety rail while attaching or removing payload winch cable may cause injury to personnel.
- Do not disconnect the winch cable until the platform is level and payload is chocked.
- Extreme caution must be used when removing winch cables from payload. Cable may be under tension or be twisted. If winch cable has tension when removed, slowly and carefully, using both hands, rotate cable to relieve tension. Do not allow cable to twist or whip freely.
- Make sure the winch cable is disconnected from gooseneck fairlead before moving tractor/semitrailer combination or, as the combination is moved, the winch cable can stretch and/or break.
- Winch operator must try to maintain even tension on both winch cables during entire offloading procedure. Payload adjustments, side to side (turning), must be kept to a minimum. Spotter must notify winch operator of any required payload adjustments while unloading.

OBSERVE THE FOLLOWING PRECAUTIONS DURING MAINTENANCE PROCEDURES OR INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT MAY RESULT:

- Before performing lubrication procedures on the semitrailer, raise platform to highest position, lower front and rear support legs, and close all isolation valves.
- Air system must be drained prior to pneumatic lines being disconnected to prevent inadvertent operation of the semitrailer brake valve during platform adjustments.

OBSERVE THE FOLLOWING PRECAUTIONS DURING MAINTENANCE PROCEDURES OR INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT MAY RESULT:

WARNING

- Steering and suspension system hydraulic lines are under pressure even when APU is not running. Do not attempt to tighten, loosen, adjust, or repair fittings, lines, or hoses until the semitrailer is supported by support legs and all pressure is relieved.
- The gooseneck support must be used prior to removing any hydraulic hoses from either of the gooseneck cylinders or the gooseneck may fall.
- Prior to bleeding steering cylinders, all four support legs must be lowered and supporting the platform.
- The air filter assembly has an internal spring that, when assembled, is under pressure. Use caution when removing the housing nut.
- Be sure all four support legs are lowered and supporting the platform before operating gooseneck isolation valve or any suspension isolation valve.
- Prior to inspection, if the platform was raised, no one shall go under the semitrailer unless all suspension isolation valves have been closed.
- Personnel used to remove/maneuver axle or parking brake chamber must not at any time use the caging bolt as a holding/lifting device. The caging bolt is held in place by pressure from a spring in the brake chamber.
- Hearing protection is required within 10 feet (3.1m) of the APU when the APU is running. Use eye and ear protection and protective gloves when inspecting the APU while it is running or injury could result from moving parts, excessive noise level, and engine heat.
- When checking for leaks, never open any type of fluid holding tanks during operation or while APU is under pressure. Give the systems time to cool before attempting to make any fluid checks or severe burns from the spraying of hot fluids may result.
- Remove all jewelry such as rings, dog tags, bracelets, etc., when jump starting APU. Wearing jewelry may result in electrical shock.
- Ensure that vented dummy coupling is installed on the emergency (red) gladhand prior to releasing brakes with the brake release valve. If a nonvented dummy coupling is installed, the parking brakes cannot be reapplied and injury to personnel may result.
- On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on it or trip over it.

OBSERVE THE FOLLOWING PRECAUTIONS DURING MAINTENANCE PROCEDURES OR SERIOUS INJURY OR DEATH TO PERSONNEL AND DAMAGE TO EQUIPMENT MAY RESULT:

WARNING

- Always use a snap-on chuck, an extension air hose (10 ft (3.1m) minimum),and an in-line pneumatic tire inflator gage and stay out of the sidewall trajectory area when inflating tires that are mounted on the M1000 Semitrailer.
- Always follow proper tire inflation procedures and warnings.
- Before breaking tire bead, make sure no air pressure remains in tire.
- Do not use retread tires on the M1000 Semitrailer. Only tires listed in TM 9-2330-381-24P, Repair Parts and Special Tools List (RPSTL), are authorized for use. Failure to comply may result in tire failure.
- Tire may explode. Place wheel and tire in safety cage before inflating. Stay back at least 10 feet (3.1m) from cage when inflating. Always stay out of the trajectory area. Always use an air hose extension (10 ft (3.1m) minimum), a snap-on chuck, and an in-line inflator gage.
- When wheel/tire assembly is in a safety cage, do not lean against, stand on, or reach over or into the cage.
- Never inflate tire over 40 psi (276 kPa) to seat bead. If beads do not seat, deflate, demount, and check the tire/wheel match.
- When using compressed air, always wear safety goggles to prevent dirt and debris from going into your eyes. Compressed air stream must be less than 30 psi (207 kPa).

HEADQUARTERS

Change
No. 4

DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 30 April 2008

Technical Manual

OPERATOR'S, UNIT, DIRECT SUPPORT,
AND GENERAL SUPPORT MAINTENANCE MANUAL

FOR

SEMITRAILER, TRANSPORTER HEAVY EQUIPMENT
70 TON, M1000
NSN 2330-01-303-8832(EIC:CXU)

TM 9-2330-381-14, 30 November 1994, is changed as follows:

1. This change effectively eliminates the Marine Corps as a Joint Service and TM 09295A-14/1 has been removed.

2. Remove old and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page. Changes to illustrations are indicated by miniature pointing hands.

Remove Pages	Insert Pages
LOEP A thru E/Blank	LOEP A thru F
Warnings a thru d	Warnings a thru d
Warnings g and h	Warnings g and h
None	Warnings i/(j Blank)
i and ii	i and ii
1-1 and 1-2	1-1 and 1-2
1-5 thru 1-8	1-5 thru 1-8
1-13 and 1-14	1-13 and 1-14
1-15 and 1-16	1-15/(1-16 Blank)
2-2.1/(2-2.2 Blank)	2-2.1/(2-2.2 Blank)
2-5 and 2-6	2-5 and 2-6
2-9 and 2-10	2-9 and 2-10
None	2-14.1/(2-14.2 Blank)
2-15 thru 2-32	2-15 thru 2-32
None	2-32.1/(2-32.2 Blank)
2-33 and 2-34	2-33 and 2-34
None	2-34.1/(2-34.2 Blank)
None	(2-36.1 Blank)/2-36.2
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2-55 thru 2-72	2-55 thru 2-72
2-75 and 2-76	2-75 and 2-76
2-85 and 2-86	2-85 and 2-86
2-87 and 2-88	2-87/(2-88 Blank)
2-89 and 2-90	2-89/(2-90 Blank)
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None	2-140.1/(2-140.2 Blank)
2-141 and 2-142	2-141 and 2-142
2-147 thru 2-152	2-147 thru 2-152
2-163 and 2-164	2-163/(2-164 Blank)
2-165 thru 2-200	None (Deleted)

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

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2-219 thru 2-222	2-219 thru 2-222
2-225 and 2-226	2-225/(2-226 Blank)
2-227 and 2-228	(2-227 Blank)/2-228
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(3-3 Blank)/3-4	(3-3 Blank)/3-4
None	3-4.1/(3-4.2 Blank)
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None	4-4.3 and 4-4.4
None	4-4.5/(4-4.6 Blank)
4-7 and 4-8	4-7 and 4-8
4-11 and 4-12	4-11 and 4-12
4-12.1/(4-12.2 Blank)	4-12.1/(4-12.2 Blank)
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None	4-112.1 and 4-112.2
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None	4-118.1 and 4-118.2
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None	4-122.1 thru 4-122.4
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None	4-242.1/(4-242.2 Blank)
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4-257 thru 4-260	4-257 thru 4-260
4-263 and 4-264	4-263 and 4-264
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None	4-274.1 thru 4-274.18
None	4-274.19/(4-274.20 Blank)
4-275 thru 4-280	4-275 thru 4-280
4-283 thru 4-288	4-283 thru 4-288
4-291 and 4-292	4-291 and 4-292
4-296.1/(4-296.2 Blank)	4-296.1/(4-296.2 Blank)
4-300.1/(4-300.2 Blank)	4-300.1/(4-300.2 Blank)

Remove Pages	Insert Pages
4-303 and 4-304	4-303 and 4-304
4-307 and 4-308	4-307 and 4-308
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None	4-326.1 and 4-326.2
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4-337 and 4-338	4-337 and 4-338
4-341 and 4-342	4-341 and 4-342
4-343 and 4-344	4-343/(4-344 Blank)
4-345 and 4-346	None (Deleted)
4-347 thru 4-350	4-347 thru 4-350
4-355 thru 4-360	4-355 thru 4-360
4-365 and 4-366	4-365 and 4-366
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4-433 thru 4-436	4-433 thru 4-436
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4-445 and 4-446	4-445 and 4-446
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4-467 and 4-468	4-467 and 4-468
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4-475 and 4-476	4-475 and 4-476
4-483 and 4-484	4-483 and 4-484
None	4-484.1/(4-484.2 Blank)
4-485 thru 4-488	4-485 thru 4-488
None	4-488.1/(4-488.2 Blank)
4-489 and 4-490	4-489 and 4-490
4-507 thru 4-512	4-507 thru 4-512
4-519 thru 4-528	4-519 thru 4-528
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5-7 thru 5-10	5-7 thru 5-10
5-15 thru 5-18	5-15 thru 5-18
5-25 and 5-26	5-25 and 5-26
5-29 and 5-30	5-29 and 5-30
5-47 thru 5-52	5-47 thru 5-52
5-53 and 5-54	5-53/(5-54 Blank)
5-55 thru 5-68	None (Deleted)
5-69 and 5-70	5-69 and 5-70
5-73 and 5-74	5-73 and 5-74
5-77 and 5-78	5-77 and 5-78
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5-147/(5-148 Blank)	5-147/(5-148 Blank)
A-1 and A-2	A-1 and A-2
A-3/(A-4 Blank)	A-3/(A-4 Blank)
B-3 thru B-12	B-3 thru B-12
C-3 thru C-10	C-3 thru C-10
C-11 and C-12	C-11/(C-12 Blank)
D-1/(D-2 Blank)	D-1/(D-2 Blank)
E-1 thru E-4	E-1 thru E-4
F-1 and F-2	F-1 and F-2
F-21 and F-22	F-21 and F-22
F-23/(F-24 Blank)	F-23/(F-24 Blank)
None	H-1 thru H-4

TM 9-2330-381-14
C4

Remove Pages	Insert Pages
Index 1 thru Index 14	Index 1 thru Index 14
FP-1/(FP-2 Blank)	FP-1/(FP-2 Blank)
None	FP-1.1/(FP-1.2 Blank)
FP-7/(FP-8 Blank)	FP-7/(FP-8 Blank)
FP-11/(FP-12 Blank)	FP-11/(FP-12 Blank)
2028-2 Sample Front and Back	2028-2 Sample Front and Back
2028-2 Front and Back	2028-2 Front and Back
2028-2 Front and Back	2028-2 Front and Back
2028-2 Front and Back	2028-2 Front and Back
Cover/Blank	Cover/Change 4 PIN Page

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

By Order of the Secretary of the Army:

GEORGE W. CASEY, JR.
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army

0806406

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 390990, requirements for TM 9-2330-381-14.

TM 9-2330-381-14
TM 09295A-14/1
C3

Change
No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 24 SEPTEMBER 2001

**OPERATOR'S, UNIT, DIRECT SUPPORT,
AND GENERAL SUPPORT MAINTENANCE MANUAL**

**FOR
SEMITRAILER, TRANSPORTER, HEAVY EQUIPMENT
70 TON, M1000
NSN 2330-01-303-8832 (EIC: CXU)**

TM 9-2330-381-14, November 1994, is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page. Changes to illustrations are indicated by miniature pointing hands.

Remove Pages	Insert Pages
LOEP A thru D	LOEP A thru E
e thru h	e thru h
1-11 thru 1-16	1-11 thru 1-16
2-35 and 2-36	2-35 and 2-36
2-57 thru 2-64	2-57 thru 2-64
2-179 and 2-180	2-179 and 2-180
3-9 thru 3-16	3-9 thru 3-16
4-103 thru 4-110	4-103 thru 4-110
4-179 and 4-180	4-179 and 4-180
4-257 thru 4-262	4-257 thru 4-262
None	4-262.1/(4-262 blank)
4-263 thru 4-268	4-263 thru 4-268
4-271 and 4-272	4-271 and 4-272
4-275 thru 4-278	4-275 thru 4-278
4-281 and 4-282	4-281 and 4-282
4-293 thru 4-296	4-293 thru 4-296
None	4-296.1/(4-296.2 blank)
4-297 thru 4-300	4-297 thru 4-300
4-323 thru 4-326	4-323 thru 4-326
4-367 and 4-368	4-367 and 4-368
4-455 thru 4-458	4-455 thru 4-458
4-495 and 4-496	4-495 and 4-496
4-537 and 4-538	4-537 and 4-538
5-105 thru 5-110	5-105 thru 5-110
5-113 thru 5-116	5-113 thru 5-116

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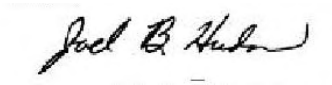
Remove Pages	Insert Pages
C-3 thru C6	C-3 thru C-6
C-11 and C-12	C-11 and C-12
E-3/(E-4 blank)	E-3 and E-4
F-1 and F-2	F-1 and F-2
F-9 and F-10	F-9 and F-10
None	F-10.1/(F-10.2 blank)

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

By Order of the Secretary of the Army:

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

Official:



JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
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TECHNICAL MANUAL **TM 9-2330-381-14**

No. 9-2330-381-14 **TM 09295A-14/1**

Change 02 **C02**

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 27 AUGUST 2001

OPERATOR'S, UNIT, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL FOR SEMITRAILER, TRANSPORTER, HEAVY EQUIPMENT 70 TON, M1000

NSN 2330-01-303-8832 (EIC: CXU)

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Remove Pages	Insert Pages
None	LOEP A-D
2-69 and 2-70	2-69 and 2-70
4-29 and 4-30	4-29 and 4-30
4-30.1/(4-30.2 blank)	4-30.1/(4-30.2 blank)
4-265 thru 4-272	4-265 thru 4-272
4-275 thru 4-282	4-275 thru 4-282
4-289 thru 4-292	4-289 thru 4-292
4-311 and 4-312	4-311 and 4-312
4-315 and 4-316	4-315 and 4-316
4-431 thru 4-434	4-431 thru 4-434
E-3/(E-4 blank)	E-3/(E-4 blank)

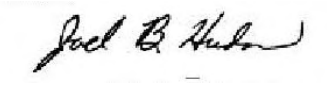
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TM 9-2330-381-14
TM 09295A-14/1
C1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., 15 June 2001

Change
No. 1

OPERATOR'S, UNIT, DIRECT SUPPORT,
AND GENERAL SUPPORT MAINTENANCE MANUAL
FOR
HEAVY EQUIPMENT TRANSPORTER SEMITRAILER
70 TON, M1000
NSN 2330-01-303-8832 (EIC: CXU)

TM 9-2330-381-14, 30 November 1994, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. A vertical bar in the margin of the page indicates new or changed material.
3. Changes to illustrations are indicated by miniature pointing hands.

Remove Pages	Insert Pages
None	A-D
i and ii	i and ii
1-5 thru 1-14	1-5 thru 1-14
2-1 and 2-2	2-1 and 2-2
None	2-2.1/(2-2.2 blank)
2-5 thru 2-16	2-5 thru 2-16
2-19 thru 2-34	2-19 thru 2-34
2-39 thru 2-48	2-39 thru 2-48
None	2-48.1/(2-48.2 blank)
2-49 thru 2-52	2-49 thru 2-52
None	(2-52.1 blank)/2-52.2
2-53 thru 2-66	2-53 thru 2-66
2-69 thru 2-84	2-69 thru 2-84
2-93 thru 2-108	2-93 thru 2-108
2-111 thru 2-114	2-111 thru 2-114
2-117 thru 2-124	2-117 thru 2-124
2-127 thru 2-142	2-127 thru 2-142
2-147 thru 2-162	2-147 thru 2-162
None	2-162.1 thru 2-162.8
None	2-162.9/(2-162.10 blank)
2-163 thru 2-202	2-163 thru 2-202
2-207 thru 2-210	2-207 thru 2-210
None	2-210.1/(2-210.2 blank)
2-221 thru 2-232	2-221 thru 2-232
None	2-233 and 2-234

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Remove Pages	Insert Pages
3-1 and 3-2	3-1 and 3-2
3-7 thru 3-18	3-7 thru 3-18
3-35 and 3-36	3-35 thru 3-36
3-39 and 3-40	3-39 thru 3-40
3-55 and 3-56	3-55 and 3-56
4-1 thru 4-4	4-1 thru 4-4
None	4-4.1 and 4-4.2
4-9 and 4-10	4-9 and 4-10
None	4-12.1/(4-12.2 blank)
4-13 and 4-14	4-13 and 4-14
4-21 and 4-22	4-21 and 4-22
None	4-30.1/(4-30.2 blank)
4-31 and 4-32	4-31 and 4-32
4-43 and 4-44	4-43 and 4-44
4-55 thru 4-58	4-55 thru 4-58
4-61 thru 4-64	4-61 thru 4-64
4-67 and 4-68	4-67 and 4-68
4-75 and 4-76	4-75 and 4-76
4-91 and 4-92	4-91 and 4-92
4-109 and 4-110	4-109 and 4-110
4-117 thru 4-120	4-117 thru 4-120
4-125 thru 4-132	4-125 thru 4-132
None	4-132.1/(4-132.2 blank)
4-133 thru 4-136	4-133 thru 4-136
4-153 thru 4-158	4-153 thru 4-158
4-167 and 4-168	4-167 and 4-168
4-171 and 4-172	4-171 and 4-172
4-201 and 4-202	4-201 and 4-202
4-215 thru 4-218	4-215 thru 4-218
4-225 thru 4-228	4-225 thru 4-228
4-237 thru 4-242	4-237 thru 4-242
4-249 thru 4-256	4-249 thru 4-256
4-259 thru 4-294	4-259 thru 4-294
4-297 thru 4-300	4-297 thru 4-300
None	4-300.1/(4-300.2 blank)
4-301 thru 4-304	4-301 thru 4-304
4-307 thru 4-320	4-307 thru 4-320
4-325 thru 4-332	4-325 thru 4-332
4-337 thru 4-344	4-337 thru 4-344
4-347 thru 4-378	4-347 thru 4-378
4-385 and 4-386	4-385 and 4-386
4-397 and 4-398	4-397 and 4-398
None	4-398.1 and 4-398.2
4-399 and 4-400	4-399 and 4-400
4-423 and 4-424	4-423 and 4-424
4-433 and 4-434	4-433 and 4-434
4-447 and 4-448	4-447 and 4-448

Remove Pages	Insert Pages
4-463 and 4-464	4-463 and 4-464
4-473 and 4-474	4-473 and 4-474
4-477 thru 4-480	4-477 thru 4-480
4-505 thru 4-512	4-505 thru 4-512
4-521 thru 4-524	4-521 thru 4-524
4-529 and 4-530	4-529 and 4-530
4-533 thru 4-538	4-533 thru 4-538
4-539 thru 4-543	None
5-5 and 5-6	5-5 and 5-6
5-51 thru 5-56	5-51 thru 5-56
5-67 thru 5-70	5-67 thru 5-70
5-73 thru 5-84	5-73 thru 5-84
5-91 and 5-92	5-91 and 5-92
5-103 and 5-104	5-103 and 5-104
5-109 thru 5-114	5-109 thru 5-114
5-147/(5-148 blank)	5-147/(5-148 bank)
C-1 thru C-10	C-1 thru C-10
None	C-11 and C-12
D-1 / (D-2 blank)	D-1/(D-2 blank)
E-1 and E-2	E-1 and E-2
E-3 / (E-4 blank)	E-3/(E-4 blank)
F-1 thru F-6	F-1 thru F-6
F-9 thru F-18	F-9 thru F-18
None	F-23/(F-24 blank)
Index 1 thru Index 4	Index 1 thru Index 4
Index 7 thru Index 14	Index 7 thru Index 14
FP-11/(FP-12 blank)	FP-11/(FP-12 blank)

4. File this change sheet in front of the publication for future purposes.

By Order of the Secretary of the Army:

ERIC K. SHINSEKI
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NOTE: The portion of the text affected by changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to wiring diagrams are indicated by shaded areas.

Dates of original and changed pages are:

Original ... 0 ... 30 November 1994
Change ... 1 ... 15 June 2001
Change ... 2 ... 27 August 2001
Change ... 3 ... 24 September 2001
Change ... 4 ... 30 April 2008

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 1,144 CONSISTING OF THE FOLLOWING:

Page No.	*Change No.
Cover/Blank	4
LOEP A thru F	4
Warnings (a)	4
Warnings (b and c)	3
Warnings (d)	4
Warnings (e thru g)	3
Warnings (h and i)	4
Warnings (j Blank)	4
i and ii	4
1-1	0
1-2	4
1-3 and 1-4	0
1-5	4
1-6	1
1-7	4
1-8 thru 1-11	1
1-12	3
1-13 thru 1-15	4
1-16 Blank	4
2-1	0
2-2	1
2-2.1	4
2-2.2 Blank	4
2-3 and 2-4	0
2-5	1
2-6	4
2-7	1
2-8	0
2-9	4
2-10 thru 2-12	1
2-13	0
2-14	1
2-14.1	4
2-14.2 Blank	4
2-15 thru 2-22	4
2-23	0
2-24	4
2-25	0
2-26 thru 2-30	4
2-31	1
2-32	4
2-32.1	4
2-32.2 Blank	4
2-33 and 2-34	4
2-34.1	4
2-34.2 Blank	4
2-35	3
2-36	0
2-36.1 Blank	4
2-36.2	4
2-37	4
2-38	0
2-39 and 2-40	4
2-41	1
2-42	4
2-43	1
2-44	4
2-45	1
2-46 and 2-47	4
2-48	1
2-48.1	1
2-48.2 Blank	1
2-49	1
2-50 thru 2-52	4
2-52.1 Blank	1
2-52.2	1
2-53	1
2-54	0
2-55	1
2-56	4
2-57	0
2-58 and 2-59	4
2-60 and 2-61	3
2-62	4
2-63	3
2-64	4
2-65	1
2-66 and 2-67	4
2-68	0
2-69	4
2-70 and 2-71	1
2-72	4
2-73	1
2-74	0
2-75	1
2-76	4
2-77	1
2-78	0

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Page No.	*Change No.
2-79 thru 2-81	1
2-82	0
2-83	1
2-84 and 2-85	0
2-86 and 2-87	4
2-88 Blank	4
2-89	4
2-90 Blank	4
2-91	4
2-92	0
2-93	4
2-94 and 2-95	1
2-96	4
2-97 thru 2-100	1
2-101 and 2-103	4
2-104 and 2-105	1
2-106	0
2-107	1
2-108 thru 2-110	0
2-111	4
2-112	0
2-113 and 2-114	4
2-115 and 2-116	0
2-117	1
2-118 thru 2-120	4
2-121 and 2-122	1
2-123	0
2-124	1
2-125 and 2-126	0
2-127 and 2-128	1
2-129	0
2-130 and 2-131	1
2-132	0
2-133	1
2-134	0
2-135	1
2-136 and 2-137	0
2-138 thru 2-140	4
2-140.1	4
2-140.2 Blank	4
2-141	4
2-142 thru 2-146	0
2-147	1
2-148 thru 2-151	4
2-152 thru 2-162	1
2-162.1 thru 2-162.9	1
2-162.10 Blank	1
2-163	4
2-164 Blank	4
2-165 thru 2-200 Deleted	4
2-201 Blank	4
2-202 and 2-203	4
2-204 and 2-205	0
2-206	4
2-207	0
2-208 thru 2-210	1
2-210.1	1
2-210.2 Blank	1
2-211 thru 2-218	0
2-219 thru 2-221	4
2-222 thru 2-224	1
2-225	4
2-226 Blank	4
2-227 Blank	4
2-228	4
2-229 thru 2-234	1
3-1 and 3-2	4
3-3 Blank	4
3-4	4
3-4.1	4
3-4.2 Blank	4
3-5 thru 3-10	4
3-11	3
3-12 and 3-13	1
3-14 and 3-15	4
3-16	1
3-17 thru 3-20	4
3-21 thru 3-28	0
3-29 thru 3-32	4
3-33	0
3-34 thru 3-37	4
3-38	0
3-39	4
3-40 and 3-41	0
3-42 and 3-43	4
3-44 thru 3-49	0
3-50	4
3-51 and 3-52	0
3-53	4
3-54 and 3-55	0
3-56	1
3-57	0
3-58	4
3-59 and 3-60	0
4-1	0
4-2 thru 4-4	1
4-4.1 thru 4-4.5	4
4-4.6 Blank	4
4-5 and 4-6	0
4-7 and 4-8	4
4-9	0
4-10	1
4-11	0
4-12	4
4-12.1	4
4-12.2 Blank	4

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Page No.	*Change No.
4-13	1
4-14 and 4-15	4
4-16	0
4-17 thru 4-19	4
4-20 and 4-21	0
4-22	4
4-23 thru 4-28	0
4-29 and 4-30	4
4-30.1	2
4-30.2 Blank	2
4-31	1
4-32 thru 4-42	0
4-43	1
4-44 thru 4-47	0
4-48 thru 4-53	4
4-54 and 4-55	0
4-56 and 4-57	1
4-58 thru 4-61	0
4-62 and 4-63	1
4-64 and 4-65	0
4-66 thru 4-68	4
4-69	0
4-70	4
4-71	0
4-72	4
4-73 thru 4-75	0
4-76	1
4-77 thru 4-79	0
4-80	4
4-81 and 4-82	0
4-83	4
4-84 thru 4-90	0
4-91 and 4-92	4
4-93	0
4-94 thru 4-100	4
4-101	0
4-102 and 4-112	4
4-112.1 and 4-112.2	4
4-113	4
4-114 and 4-115	0
4-116 thru 4-118	4
4-118.1 and 4-118.2	4
4-119	4
4-120 Blank	4
4-121 and 4-122	4
4-122.1 thru 4-122.4	4
4-123 thru 4-129	4
4-130 thru 4-132	1
4-132.1	1
4-132.2 Blank	1
4-133	4
4-134	0
4-135	4
4-136	0
4-137	4
4-138	0
4-139	4
4-140	0
4-141	4
4-142 thru 4-145	0
4-146 thru 4-148	4
4-149	0
4-150 thru 4-152	4
4-152.1 and 4-152.2	4
4-153	0
4-154	1
4-155	4
4-156 and 4-157	1
4-158	4
4-159 thru 4-165	0
4-166	4
4-167	1
4-168 thru 4-170	0
4-171 and 4-172	4
4-173 thru 4-179	0
4-180	3
4-181 thru 4-200	0
4-201 and 4-202	1
4-203 thru 4-208	0
4-209	4
4-210 thru 4-215	0
4-216 and 4-217	1
4-218	0
4-219	4
4-220 thru 4-224	0
4-225 thru 4-228	1
4-229 thru 4-233	0
4-234	4
4-235 and 4-236	0
4-237	1
4-238 and 4-239	0
4-240	1
4-241 and 4-242	4
4-242.1	4
4-242.2 Blank	4
4-243	4
4-244 thru 4-248	0
4-249 and 4-250	4
4-251	1
4-252 and 4-253	4
4-254 and 4-255	1
4-256	0
4-257	4
4-258	0
4-259 and 4-260	4
4-261 and 4-262	3

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Page No.	*Change No.
4-262.1	3
4-262.2 Blank	3
4-263 and 4-264	4
4-265 and 4-266	3
4-267	1
4-268	3
4-269	2
4-270	1
4-271	3
4-272	4
4-273	1
4-274	4
4-274.1 thru 4-274.19	4
4-274.20 Blank	4
4-275	4
4-276	1
4-277	4
4-278 and 4-279	1
4-280	4
4-281	2
4-282	3
4-283	4
4-284	1
4-285 thru 4-288	4
4-289 thru 4-291	2
4-292	4
4-293	3
4-294	0
4-295 and 4-296	3
4-296.1	4
4-296.2 Blank	4
4-297	3
4-298 and 4-299	1
4-300	3
4-300.1	4
4-300.2 Blank	4
4-301 and 4-302	1
4-303	4
4-304 thru 4-306	0
4-307	1
4-308	4
4-309 and 4-310	1
4-311	2
4-312 thru 4-314	1
4-315 and 4-316	2
4-317 thru 4-320	1
4-321	0
4-322	4
4-323	0
4-324 thru 4-326	4
4-326.1 and 4-326.2	4
4-327	1
4-328	4
4-329	1
4-330 and 4-331	0
4-332	1
4-333 thru 4-337	0
4-338	4
4-339	1
4-340	0
4-341	1
4-342 and 4-343	4
4-344 Blank	4
4-345 and 4-346 Deleted	4
4-347	4
4-348	0
4-349	4
4-350 thru 4-352	1
4-353	0
4-354	1
4-355 thru 4-359	4
4-360	1
4-361	0
4-362	1
4-363	0
4-364	1
4-365	0
4-366	4
4-367	3
4-368 and 4-369	1
4-370 and 4-371	0
4-372 thru 4-374	1
4-375	0
4-376	1
4-377	0
4-378	1
4-379 thru 4-385	0
4-386	1
4-387 thru 4-389	0
4-390	4
4-391	0
4-392	4
4-393 thru 4-396	0
4-397 and 4-398	1
4-398.1 and 4-398.2	1
4-399	1
4-400 thru 4-420	0
4-421	4
4-422 and 4-423	0
4-424	1
4-425	4
4-426 thru 4-429	0
4-430	4
4-431	2
4-432 and 4-433	0
4-434	4

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LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED PAGES.

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Page No.	*Change No.
4-435	0
4-436	4
4-437 and 4-438	0
4-439 and 4-440	4
4-441	0
4-442	4
4-443 and 4-444	0
4-445	4
4-446	0
4-447 and 4-448	1
4-449 thru 4-454	0
4-455	3
4-456	4
4-457	3
4-458 thru 4-462	0
4-463	1
4-464 thru 4-467	0
4-468	4
4-469 thru 4-471	0
4-472	4
4-473	1
4-474 and 4-475	0
4-476	4
4-477	1
4-478	0
4-479	1
4-480 thru 4-482	0
4-483 and 4-484	4
4-484.1	4
4-484.2 Blank	4
4-485	4
4-486 and 4-487	0
4-488	4
4-488.1	4
4-488.2 Blank	4
4-489	4
4-490 thru 4-494	0
4-495	3
4-496 thru 4-504	0
4-505 and 4-506	1
4-507 thru 4-509	4
4-510	1
4-511	4
4-512 thru 4-519	0
4-520 thru 4-522	4
4-523	0
4-524 thru 4-528	4
4-529	1
4-530 and 4-531	0
4-532 and 4-533	4
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4-537 and 4-538	3
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TECHNICAL MANUAL
TM 9-2330-381-14

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 30 NOVEMBER 1994

OPERATOR'S, UNIT, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL

FOR

SEMITRAILER, TRANSPORTER, HEAVY EQUIPMENT
70 TON, M1000
NSN 2330-01-303-8832 (EIC:CXU)

CURRENT AS OF 30 NOVEMBER 1994

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes, or if you know of away to improve the procedures, please let us know. Submit your DA Form 2028 (Recommended Changes to Equipment Technical Publications), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is https://aeps.ria.army.mil. The DA Form 2028 is located under the Public Applications section in the AEPS Public Home Page. Fill out the form and click on SUBMIT. Using this form on AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or e-mail your letter or DA Form 2028 directly to: U.S. ARMY TACOM Life Cycle Management Command, ATTN: AMSTA-LC-LMPP/TECH PUBS, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The e-mail address is ROCK-TACOM-TECH-PUBS@conus.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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CHAPTER 1

INTRODUCTION

SECTION NO.	TITLE
I.....	General Information
II.....	Equipment Description and Data

Section I. GENERAL INFORMATION

PARA. NO.	TITLE
1-1.....	Scope
1-2.....	Maintenance Forms, Records, and Reports
1-3.....	Destruction of Army Materiel to Prevent Enemy Use
1-4.....	Preparation for Storage or Shipment
1-5.....	Reporting Equipment Improvement Recommendations (EIR)
1-6.....	List of Abbreviations
1-7.....	Metric Units

1-1. SCOPE

1-1.1. Type of Manual. Operator/crew unit, direct support, and general support maintenance manual including a maintenance allocation chart (MAC).

1-1.2. Model Number and Equipment Name. M1000 - Heavy Equipment Transporter Semitrailer.

1-1.3. Purpose of Equipment. To load or unload and transport a battle-dressed M-1 series Main Battle Tank (MBT), able or disabled, with or without tracks, during administrative and tactical operations.

1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

Refer to TM 750-244-6.

1-4. PREPARATION FOR STORAGE OR SHIPMENT

Refer to chapter 4, section VII.

1-5. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your semitrailer needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to Commander, U.S. Army TACOM Life Cycle Management Command, ATTN: AMSTA-TR-E-PQDR, Warren, MI 43897-5000. We'll send you a reply.

1-6. LIST OF ABBREVIATIONS

HET Heavy Equipment Transporter
ISO International Standards Organization
MBT Main Battle Tank

1-7. METRIC UNITS

Metric units, in addition to English units, are included in this manual. An English to metric conversion table is included on the inside back cover of this manual.

Section II. EQUIPMENT DESCRIPTION AND DATA

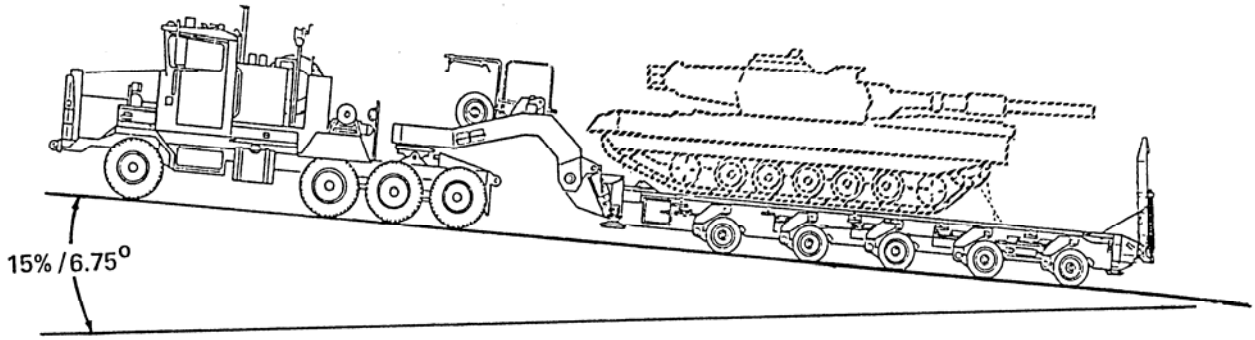
PARA. NO.	TITLE
1-8.....	Equipment Characteristics, Capabilities, and Features
1-9.....	Location and Description of Major Components
1-10.....	Deleted
1-11.....	Equipment Data
1-12.....	Safety, Care, and Handling

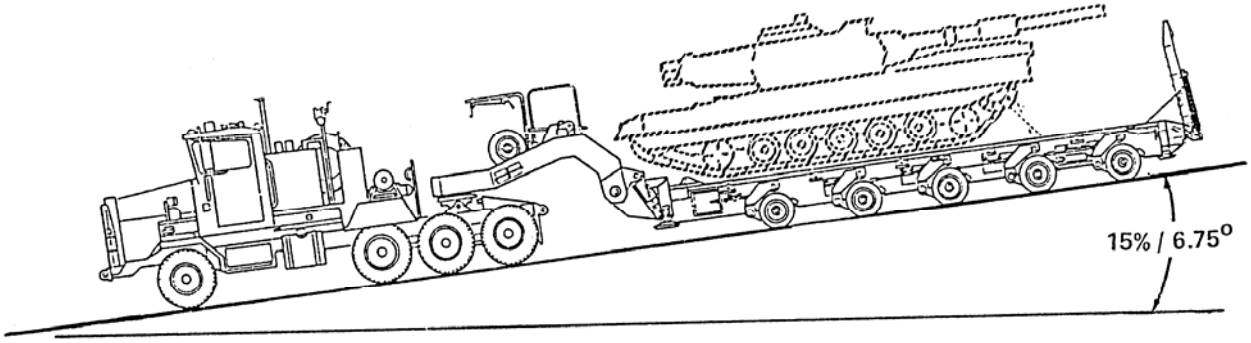
1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

a. This semitrailer is a flatbed trailer supported by five rows of axles; each row consists of two axle units (bogies) with inner and outer dual tires mounted to each bogie.

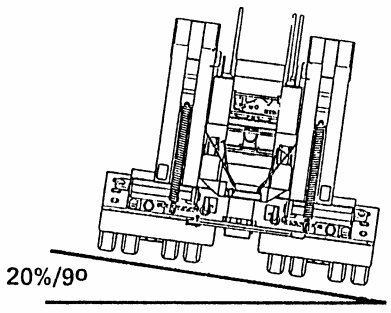
b. The semitrailer prime mover is the U.S. Army M1070 tractor; however, the adjustable gooseneck enables the semitrailer to also operate efficiently with the HET M911.

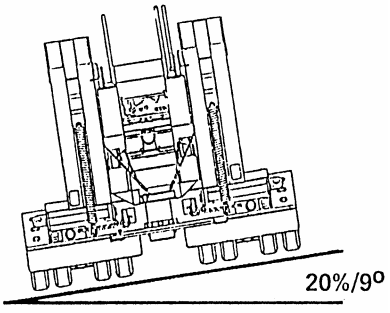
c. The tractor/semitrailer combination can operate going up or down a 15 percent grade and has a maximum towing speed of 45 mph (72.4 km/h) on primary roads, 40 mph (64.3 km/h) on secondary roads, and 15 mph (24.1 km/h) off road.





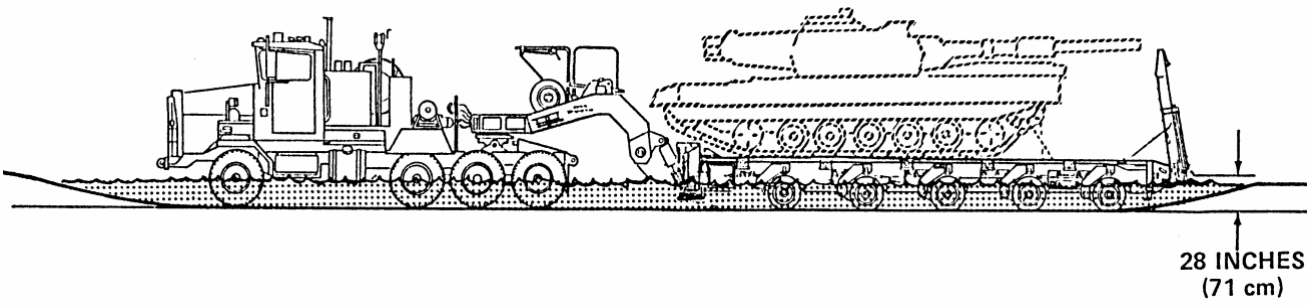
d. Fully loaded, the tractor/semitrailer combination can operate on a 20 percent side slope with either side facing upslope without tires coming off the ground or overextending the suspension assemblies.





1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES (CONT)

e. Fully loaded, the tractor/semitrailer can ford water to a maximum depth of 28 inches (71 cm), including wave height, without using additional water fording equipment.



f. Towing vehicles (tractors) provide electrical power and air brake (pneumatic) pressure to the semitrailer through standard intervehicular connections for brake lights, turn signals, blackout lights, clearance lights, and service and emergency brakes.

g. The semitrailer is automatically steered in response to turning of the tractor. When in tow, semitrailer can negotiate a 90-degree turn in one continuous motion, at an intersection from one 30-foot (9m) wide road to another 30-foot (9m) wide road.

h. The auxiliary power unit (APU) provides power for the entire hydraulic system and is used for independent adjustments of the suspension, steering, and gooseneck.

i. The bogies (suspension system, axles, brakes, and wheels) simultaneously move up and down and can be individually isolated, allowing access for tire changes or trailer movement with a disabled bogie.

NOTE

The terms used throughout this manual to describe areas and parts of the semitrailer, and their location relative to each other, are referenced as follows:

When a person stands at the loading ramp end (rear) of the semitrailer looking toward the gooseneck on the forward (front) end of the semitrailer, the side on the left is designated as the "streetside" and the side on the right is the "curbside". Locations of areas and items on or under the semitrailer platform will be identified as inboard (toward or nearest the center of the platform) or outboard (farthest from the center). For example, the hydraulic operating controls and gages are located on the curbside of the semitrailer under the front corner of the platform. The crowbar is mounted at the rear of the semitrailer under the loading ramps.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

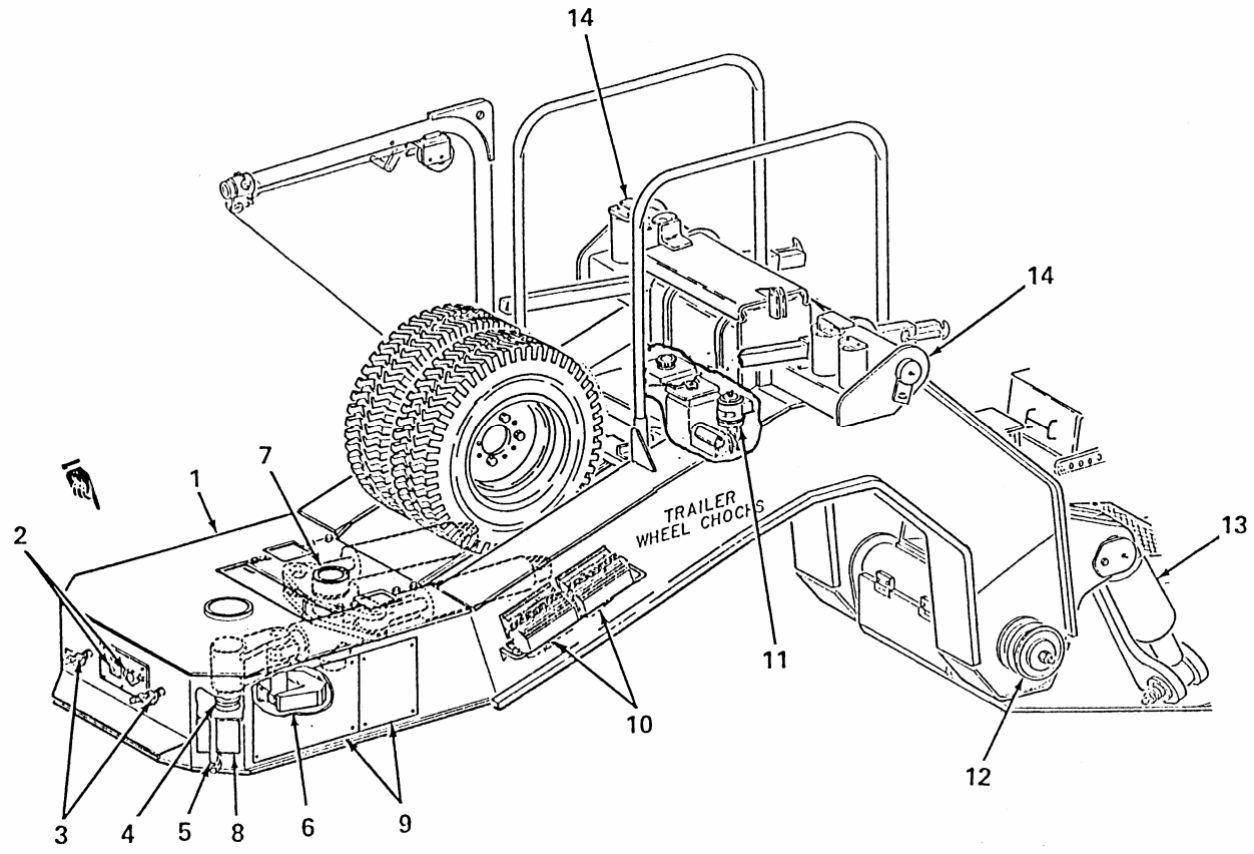
GOOSENECK ASSEMBLY (1). The gooseneck assembly (1) is the forward most part of semitrailer and provides overall hookup to a tractor.

INTERVEHICULAR CONNECTIONS (2 and 3). Two electrical connectors (2) and gladhand connectors (3) provide electrical and air brake connections between the tractor and semitrailer.

GRAB HANDLE (4). A grab handle (4), located at the front streetside of the gooseneck, is used for access to back of tractor when making intervehicle connections and when working with tractor winch cables.

KINGPIN AND STEERING WEDGE (5 and 6). The kingpin (5) and steering wedge (6), located under the front of the gooseneck assembly, provide automatic steering for the semitrailer when connected to the tractor. The kingpin is the center pivoting point for the trailer, and the steering wedge turns with the trailer and operates two master steering cylinders.

STEERING CONSOLE (7). The steering console (7), located within the gooseneck assembly, consists of a steering arm, a pivoted steering console, and two master steering hydraulic cylinders. When the steering wedge turns, it operates the steering arm which rotates the steering console. Two master hydraulic cylinders are operated by the steering console and displace hydraulic fluid to two slave cylinders on the platform.



1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT)

COUPLING DECAL (8). The coupling decal (8), located on the front streetside corner of the gooseneck, provides data required for coupling and uncoupling the semitrailer from a tractor.

DATA AND LUBE PLATES (9). The data and lube plates (9), located on the front left side of the gooseneck, descriptively identify the semitrailer and provide quick reference for lubrication.

WHEEL CHOCKS (10). Four wheel chocks (10), two on each side of the gooseneck, are used to chock the front outer bogie wheels of the semitrailer.

AUXILIARY POWER UNIT (11). The auxiliary power unit (11), hereinafter referred to as the APU, is located beneath the gooseneck steps. The APU is a liquid cooled, fuel injected, electric start, single cylinder diesel engine used to drive a hydraulic pump which powers the entire hydraulic system.

CABLE SHEAVE (12). The cable sheave (12), located on the gooseneck streetside pivot pin, is used for winching off disabled payloads. The cable sheave keeps winch cables low enough to be passed under the payload to the snatch block and back to the payload during unloading procedures.

GOOSENECK HYDRAULIC CYLINDERS (13). Two hydraulic cylinders (13), one located on each side between the gooseneck and platform, provide stability and adjustability for the gooseneck assembly when coupling the semitrailer to a tractor.

CABLE GUIDES (14). Two cable guides (14), one located on each side of the gooseneck, are used with the tractor winches to load and unload payloads.

GOOSENECK SAFETY RAIL (14.1). Two gooseneck safety rails (14.1), located on each side of the guardrails (16 and 17), allow the operator to safely connect and disconnect the winch cables from the payload while on the gooseneck steps. When in use, the safety rails are extended rearward toward the trailer platform. The safety rails must be retracted during operation to prevent interference with the payload during gooseneck movement.

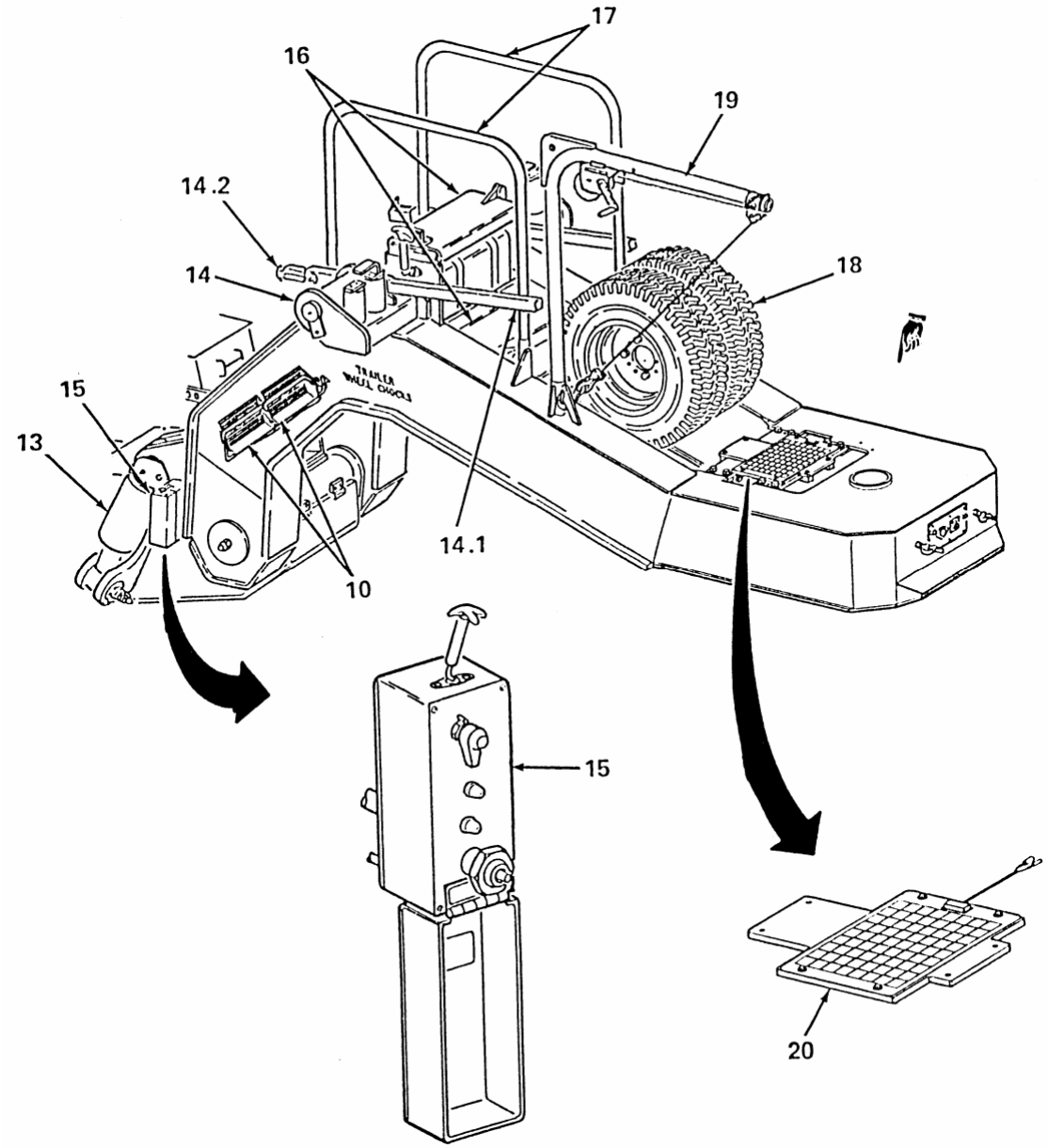
GOOSENECK SAFETY RAIL CLAMP (14.2). The gooseneck safety rails are held in the retracted position by the clamp (14.2) located on each safety rail just behind the cable guides (14).

APU CONTROL BOX (15). The APU control box (15), located on the curbside of the gooseneck, contains the controls required to start and run the APU.

STEPS AND GUARDRAILS (16 and 17). The steps (16) and two guardrails (17), mounted on top of the gooseneck assembly, allow the operator to move around safely and efficiently while on top of the gooseneck operating the APU and/or setting up for loading and unloading operations.

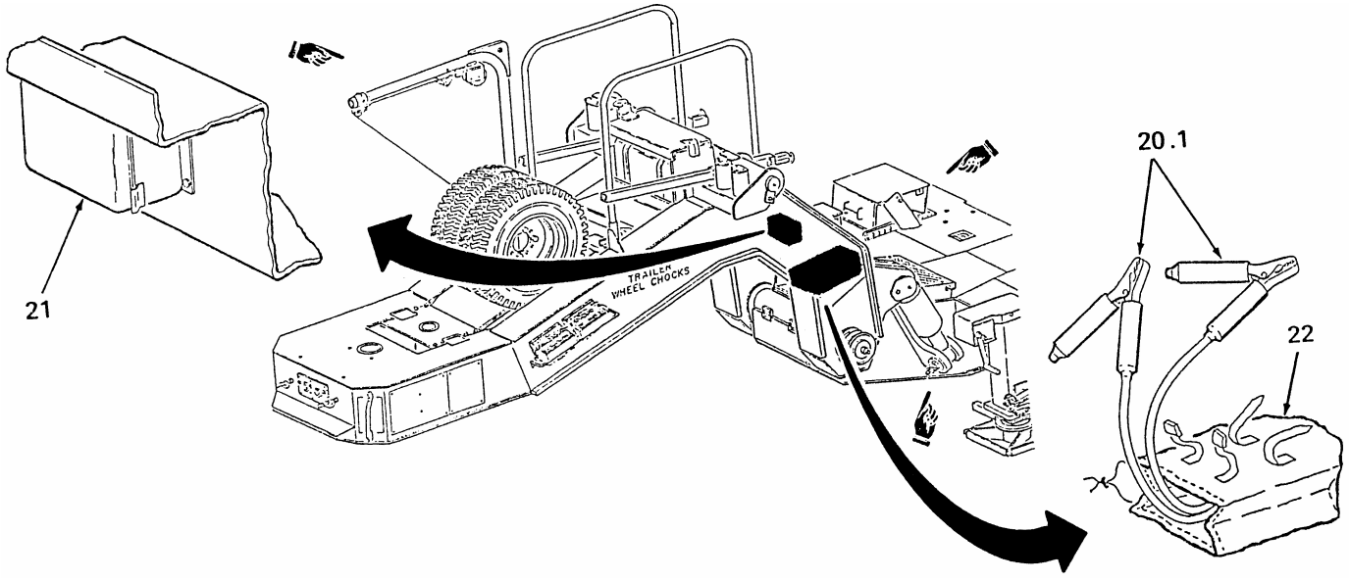
SPARE TIRES AND DAVIT (18 and 19). Two spare tires (18) are mounted to the top of the gooseneck and can be lowered to the ground with the davit (19) whenever a tire change is required.

SOLAR BATTERY CHARGER (20). On some semitrailers a solar battery charger is mounted to the top of the gooseneck directly in front of the spare tire. Its purpose is to extend battery life.



1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT)

APU AUXILIARY START CABLES (20.1), SAFETY CIRCUIT MODULE (21), AND STOWAGE BAG (22). A set of auxiliary start cables (20), and a safety circuit module (21), hereinafter referred together as the jump start system, can be used to supply 12 Vdc battery power from the tractor batteries to the APU when the APU battery does not contain sufficient charge to start the APU. The cables, when not in use, are stored in a bag (22) which is stowed under the platform steps. The safety circuit module (21) contains a switch, relay, and voltage sensor which permits a maximum of 12 Vdc to be applied to the APU electrical system.



PLATFORM ASSEMBLY (23). The platform assembly (23) is a flatbed-designed structure with a beavertail, the slanted portion at the rear of the trailer upon which payload items are loaded and unloaded.

PAYLOAD TIEDOWN RINGS (24). There are six tiedown rings (24), affixed at various points on the platform, used for payload tiedown.

ISO CONTAINER LOCK BRACKETS (25). There are eight ISO container lock brackets (25), normally stowed recessed in the center of the platform, used to secure ISO containers during transport. There are three types of ISO container lock brackets: curbside, streetside, and center. The types are identified by physical characteristics and markings. The streetside and curbside lock brackets are marked "streetside" and "curbside", respectively, and have only one F-pin attached to them. The center lock brackets are unmarked and have two F-pins attached to them.

TRANSPORT TIEDOWN RINGS (26). There are 10 transport tiedown rings (26), five along each side of the platform, used for semitrailer tiedown during shipment.

CARGO TIEDOWN RINGS (26.1). There are 14 cargo tiedown rings (26.1), affixed at various points on the platform, used for payload tiedown. When not in use, the cargo tiedown rings lie in recesses to prevent damage by tracked payloads.

LIFTING EYES (27). There are four lifting eyes (27), located on the front and the outside rear of the platform, used to lift the semitrailer.

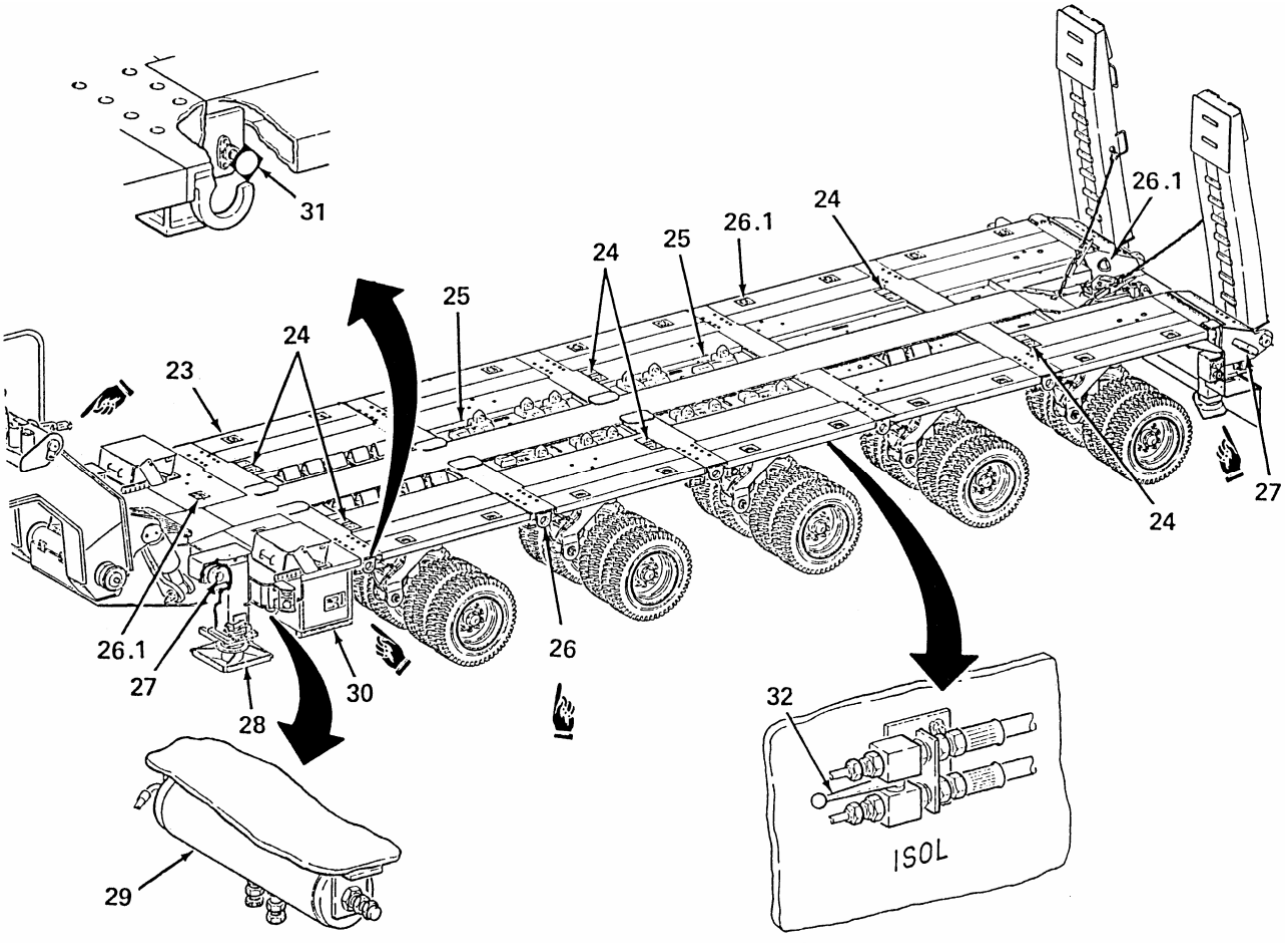
SUPPORT LEGS (28). Four manually actuated support legs (28), located at each corner of the platform assembly, are used to provide stability to support the platform during semitrailer maintenance, operation, and storage.

AIR RESERVOIR (29). An air reservoir (29), located under the platform just behind the storage compartment, is coupled to the left (streetside) gooseneck cylinder. This reservoir holds air that is displaced from the cylinder and allows the cylinder to move with gooseneck movement.

STOWAGE COMPARTMENT (30). The stowage compartment (30) contains tools and equipment necessary for the operator to operate the semitrailer.

BRAKE RELEASE VALVE (31). The brake release valve (31) is used to engage and release the parking brakes so that the semitrailer can be manually operated or moved if the brake system fails.

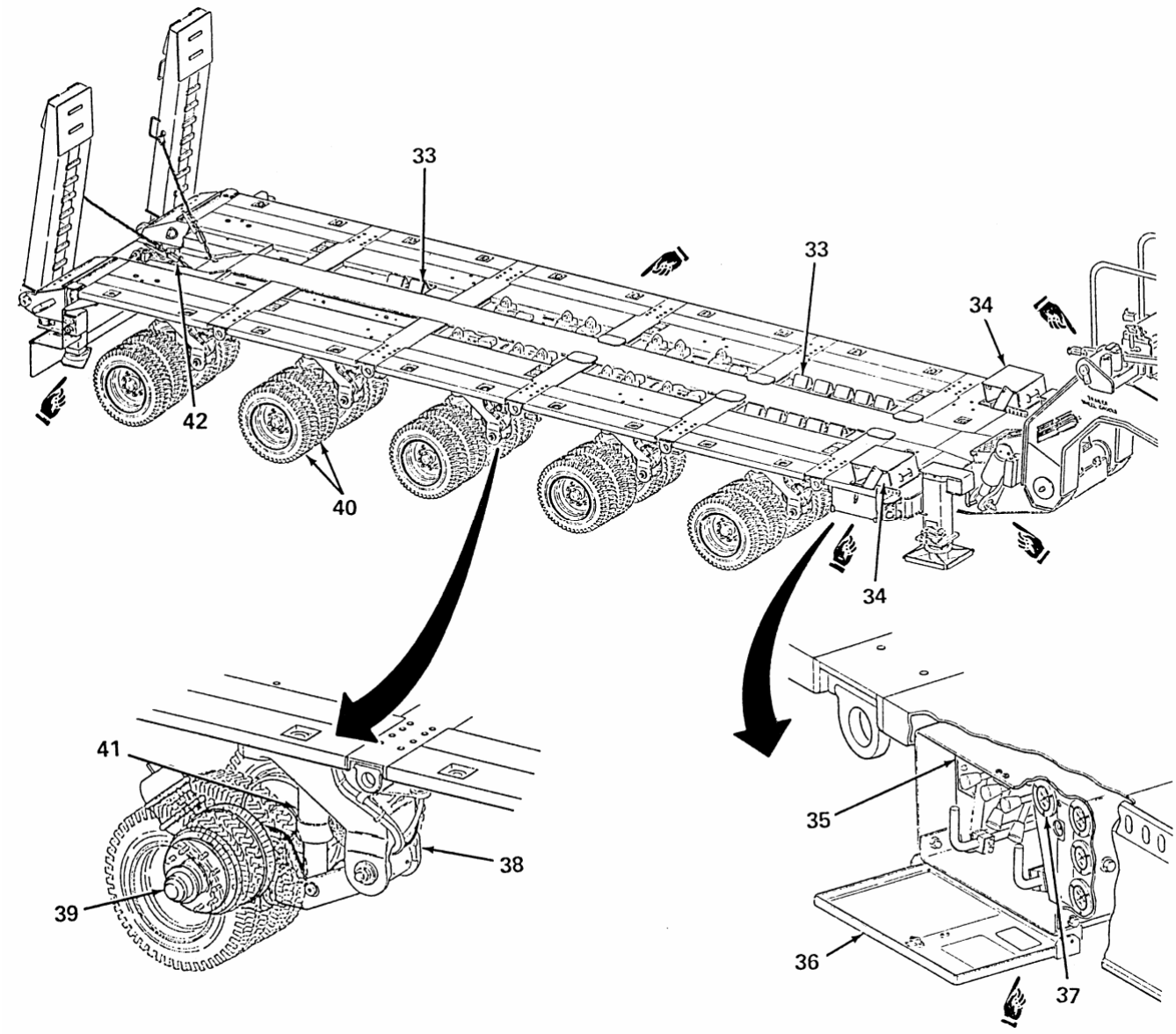
SUSPENSION ISOLATION VALVES (32). There are 10 suspension isolation valves (32), 5 on each side, located on the main longitudinal beam under the platform. These valves are used to isolate each suspension cylinder from the hydraulic system.



1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT)

TRACK CURB GUIDES (33). There are 12 track curb guides (33), normally stowed recessed in the center of the platform, used to aid in loading of tracked vehicles. Track curb guides can be placed in holes in and along the platform to match different payload span widths. The guides also aid in preventing payloads from shifting or sliding around during loading and transporting.

PAYLOAD CHOCKS (34). The four adjustable payload chocks (34), stowed at each front corner of the platform, provide stability for payload vehicles.



HYDRAULIC CONTROL MODULE (35). The hydraulic control module (35), located on the forward curbside of the semitrailer, is used in conjunction with the APU for manual steering, gooseneck adjustments, and suspension adjustments. Primary adjustments are made by operating valve handles in the five handle valve bank. Two other handles operate the gooseneck isolation valve and the platform suspension shut-off valve.

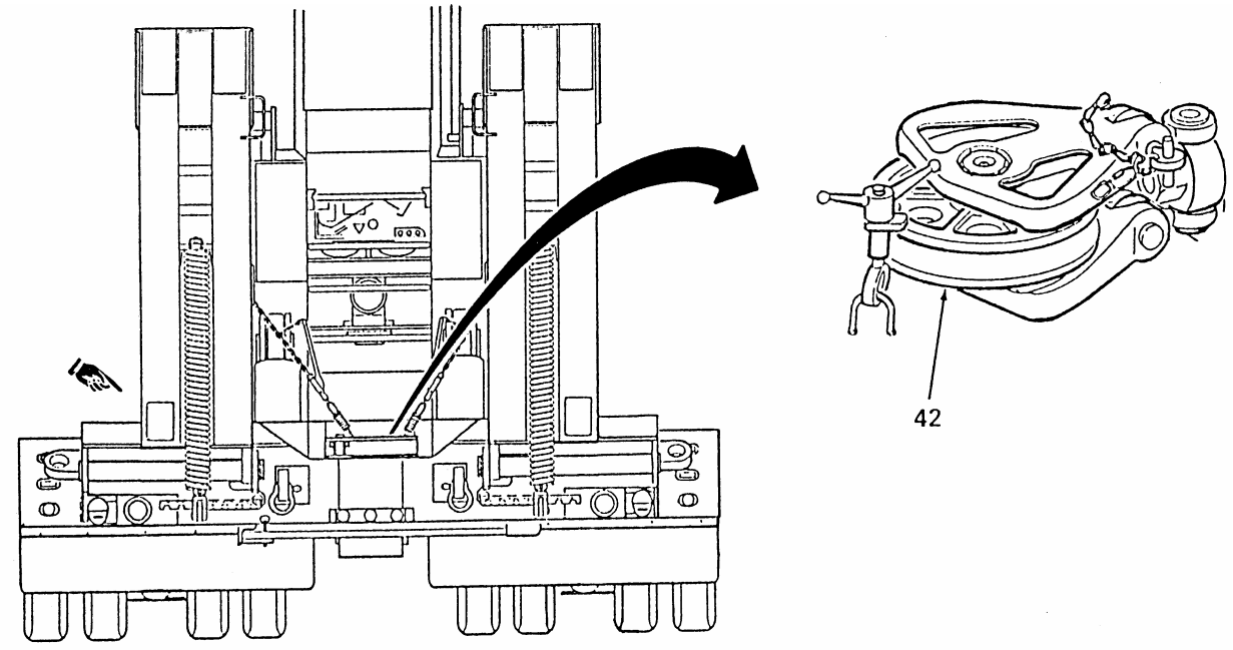
PANEL COVER (36). The panel cover (36), closed during transport, is used to protect the hydraulic controls and gage panel.

HYDRAULIC GAGE PANEL (37). The hydraulic gage panel (37) consists of a low steering pressure indicator light, a filter condition indicator, and four pressure gages. One gage measures system pressure and the others monitor each of the three legs of the suspension circuit (front curbside, front streetside, and rear). These instruments are used for monitoring proper operation, for making steering and suspension adjustments, and for fault isolation and repair of the semitrailer hydraulic system.

BOGIE ASSEMBLIES (38). The 10 bogie assemblies (38) support the platform assembly and form part of the suspension, braking, and steering systems for the semitrailer. Each bogie assembly (38) has an axle assembly (39) which houses an air brake assembly, parking and service brake chamber, two hub and drum assemblies, and two sets of dual tire assemblies (40).

HYDRAULIC SUSPENSION CYLINDERS (41). A hydraulic suspension cylinder (41), mounted between each upper and lower suspension arm of each bogie, enables the bogie assembly to act as a shock absorber and provides stability and manual adjust ability for each axle assembly.

SNATCH BLOCK (42). A snatch block (42), recessed in the center of the beavertail (slanted portion of platform at rear of semitrailer), is used for winching disabled payloads off the semitrailer.



1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT)

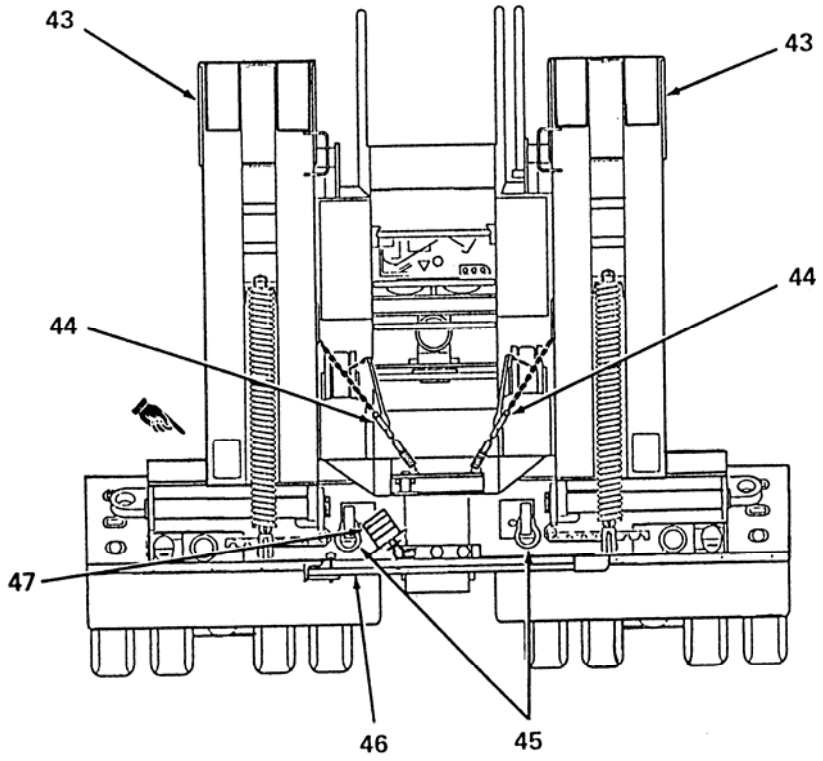
LOADING RAMPS (43). Two spring-assisted loading ramps (43), located at the rear of the semitrailer, can be manually adjusted to match the span widths of different payload vehicles.

SAFETY CHAINS (44). Two safety chains (44) with load binders, secure the ramps in an upright position during transport. Chains are attached to the ramps by a quick-link so they can be adjusted to ensure tension on the binder when closed.

TOWING SHACKLES (45). Two towing shackles (45), stored in the stowage compartment, can be installed on the rear recovery eyes of the platform to allow the platform to be recovered from the rear.

CROWBAR AND ISOLATION VALVE HANDLE EXTENSION (46). The crowbar and isolation valve handle extension (46), mounted at the rear of the semitrailer below the loading ramps (43), are used to adjust ramp span width, check platform heights, and operate the under deck mounted suspension isolation valves. The crowbar has three permanently marked dimension lines used to check platform height.

BEACON WARNING LIGHT (47). The beacon warning light (47) is mounted on the vehicular bar lamp and is on whenever the trailer is operational.



1-10. DELETED

1-11. EQUIPMENT DATA

TRAILER

Length (loading ramps up)	622 inches (1580 cm)
Length (loading ramps down)	709.48 inches (1802 cm)
Width (overall)	144 inches (366 cm)
Ground clearance (normal)	15.5 inches (39 cm)
Height	
Normal (loading ramps up)	124.8 inches (316.8 cm)
Maximum (loading ramps up)	134.8 inches (341.8 cm)
Weight (empty)	50400 lbs (22882 kg)
Weight (fully loaded)	190400 lbs (86442 kg)
Maximum payload	140000 lbs (63560 kg)
Ground pressure (maximum payload)	2200 psi (15169 kPa) per bogie axle
Maximum speed (loaded)	
Highway	45 mph (72.4 km/h)
Secondary	40 mph (64.3 km/h)
Off-road	15 mph (24.1 km/h)
Maximum grade	15%
Maximum side slope	20%
Center of gravity (empty) (from kingpin)	342 inches (868 cm)

GOOSENECK

Overall length	151 inches (384 cm)
Length (hinge pin to kingpin)	129 inches (328 cm)
Width	48 inches (122 cm)
Height, normal (when coupled to tractor)	63 inches (160 cm)
Kingpin to ground (platform at normal running height)	
Maximum	92 inches (233 cm)
Minimum	26 inches (66 cm)
Steering angle (#5 Bogie)	
Maximum right	45°
Maximum left	45°

PLATFORM

Length	416.88 inches (1058.9 cm)
Width	120 inches (305 cm)
Height	
Normal	43 inches (109 cm)
Maximum	53 inches (134 cm)
Minimum	33 inches (84 cm)

LOADING RAMPS

Width	24 inches (61 cm)
Length	93.5 inches (237 cm)
Loading span width	
Maximum (outer edges)	136 inches (345 cm)
Minimum (inner edges)	49 inches (125 cm)

1-11. EQUIPMENT DATA (CONT)

APU	
Model	Kubota EB300D-S.A.E.
Type	Water cooled, fuel injected, 4-cycle, diesel
Cylinders	1
Horsepower	
Gross	8.4 hp/3000 rpm 6.3 kW/3000 rpm
Intermittent	7 hp/3000 rpm 5.2 kW/3000 rpm
Continued	6 hp/3000 rpm 4.5 kW/3000 rpm
Fuel capacity	1.27 gl (4.8 l)
Oil capacity	1.4 qt (1.3 l)
Coolant capacity	1.3 qt (1.2 l)
AXLES	
Model	Rockwell International
Type	TN with post-121
Quantity	10
Rating	15000 lbs (6810 kg)
Brakes	
Type	Cam-Master
Shoe size	12.25 x 7.5
Lining	Type FF semimetallic
TIRES	
Type	Michelin Tire Corp
Size	215/75 R17.5
Pressure (cold)	95 psi (655 kPa)
Weight	57 lb (26 kg)
Quantity	42
HYDRAULIC SYSTEM	
System pressure	3900 psi (26891 kPa)
Fluid capacity	
Reservoir	16.5 gl (64.5 l)
System	27.0 gl (105.5 l)
Hydraulic pump	
Model	JS Barnes Corp
Type	Gear pump
ELECTRICAL SYSTEM	12/24 Vdc

AUTHORIZED PAYLOADS

M1A1	Main Battle Tank	122790 lbs (55697 kg)
M60	Series Tank	113900 lbs (51665 kg)
M88	Tracked Medium Recovery Vehicle	112000 lbs (50803 kg)
M48A3	Tracked 90 mm Combat Tank	105000 lbs (47628 kg)
M621-B	Scraper Tractor	65000 lbs (29510 kg)
M110E2	8-inch Howitzer	60200 lbs (27307 kg)
M107	175 mm Self-Propelled Gun	59200 lbs (26853 kg)
M992	Tracked 7-ton 155 Ammo Carrier	58500 lbs (26559 kg)
M110	8-inch Howitzer	57630 lbs (26141 kg)
M578	Tracked Armor Recovery Vehicle	54000 lbs (24516 kg)
LVTP	Tracked Personnel Landing Vehicle (7A1)	52770 lbs (23958 kg)
LVTR	Tracked Recovery Landing Vehicle (7A1)	52069 lbs (23639 kg)
M3	Cavalry Fighting Vehicle	48790 lbs (22131 kg)
LVTC	Tracked Command Landing Vehicle (7A1)	47517 lbs (21572 kg)
M2	Infantry Fighting Vehicle	47000 lbs (21338 kg)
M109A1	155 mm Howitzer	46800 lbs (21280 kg)
M109	155 mm Howitzer	44437 lbs (20157 kg)
M108	105 mm Howitzer	40087 lbs (18183 kg)
M9	ACV Armored Combat Earthmover	36000 lbs (16344 kg)
M981	FISTV Personnel Carrier	26900 lbs (12213 kg)
M113	Tracked Armored Personnel Carrier	24986 lbs (11884 kg)

1-12. SAFETY, CARE, AND HANDLING

Safety, care, and handling shall be in accordance with MIL-STD-1180.

CHAPTER 2

OPERATING INSTRUCTIONS

SECTION NO.	TITLE
I	Description and Use of Operator's Controls and Indicators
II	Preventive Maintenance Checks and Services (PMCS)
III	Operation Under Usual Conditions
IV	Operation Under Unusual Conditions

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

PARA. NO.	TITLE
2-1	General
2-2	Auxiliary Power Unit (APU) Control Box
2-3	APU Controls and Indicators
2-4	Hydraulic Tank Controls and Indicators
2-5	Hydraulic Pressure Gage Panel
2-6	Hydraulic Controls and Isolation Valves
2-7	Bed Height Indicators
2-8	Pneumatic Controls
2-9	Handcranks

2-1. GENERAL

You should know the location and understand the proper use of every control and indicator on the semitrailer. Use this section to learn and/or refresh your memory about each of the controls and indicators that you will be using during all phases of semitrailer operation. For a specific control or indicator, refer to the alphabetical index located at the back of this book.

2-2. AUXILIARY POWER UNIT (APU) CONTROL BOX

APU START SWITCH (1). A three-position GLOW/OFF/START switch used to provide power to the APU for electric starting and battery charging. In the GLOW position (momentary), the APU glow plug warms and prepares the APU for starting. In the OFF position, the APU charging circuit is disabled. This switch will not shut off the APU. In the START position (momentary) the starter is engaged.

NOTE

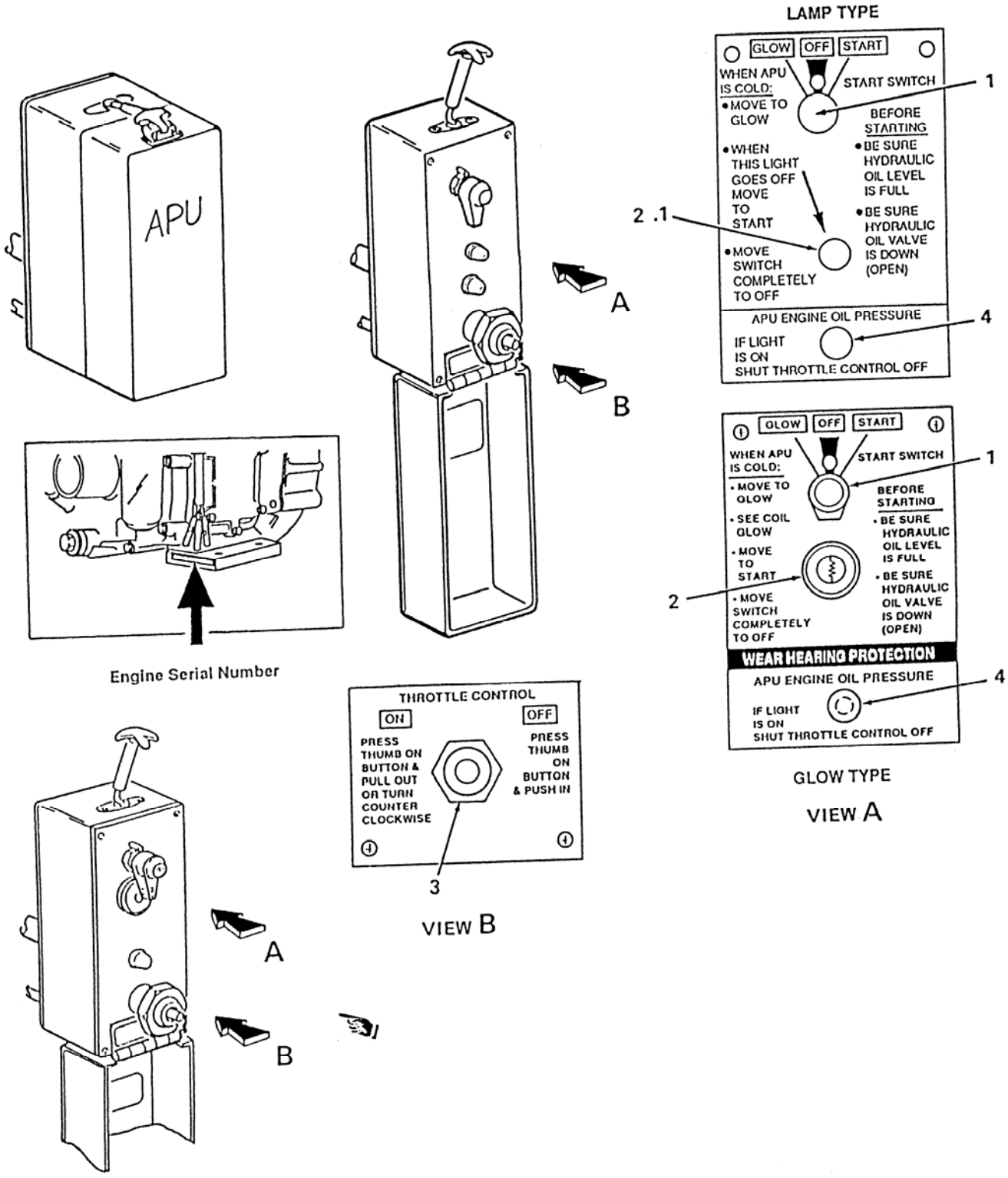
On APU with APU engine serial number 504697 and subsequent, the glow plug indicator is changed from a glow-type indicator to a lamp driven by a timer.

GLOW PLUG INDICATOR (GLOW TYPE) (2). Illuminates when the APU START SWITCH is placed and held in the GLOW position. The indicator element glows red when the glow plug conductor has become warm enough to assist in starting the APU.

GLOW PLUG INDICATOR (LAMP) (2.1). Illuminates when the APU START SWITCH is placed and held in the GLOW position. Extinguishes five seconds later to indicate that the glow plug is warm enough to assist in starting the APU.

THROTTLE CONTROL (3). A push/pull cable controller that manually adjusts the speed of the APU. To increase APU speed, press center knob and pull outward on the THROTTLE CONTROL. Fine adjustments can be made by turning THROTTLE CONTROL clockwise (to increase) or counterclockwise (to decrease). To decrease speed, push in THROTTLE CONTROL. The THROTTLE CONTROL is used to shut down the APU by pushing in THROTTLE CONTROL.

OIL PRESSURE INDICATOR (4). Illuminates when the oil in the APU has not reached normal operating pressure. Once engine operating oil pressure has been reached, the light will go out. If the oil pressure indicator does not go out within 15 seconds, a malfunction in the engine is indicated.


APU
Engine Serial Number
A
B
LAMP TYPE
GLOW
OFF
START
WHEN APU IS COLD:
• MOVE TO GLOW
START SWITCH
1
BEFORE STARTING
• WHEN THIS LIGHT GOES OFF MOVE TO START
• BE SURE HYDRAULIC OIL LEVEL IS FULL
2 .1
• BE SURE HYDRAULIC OIL VALVE IS DOWN (OPEN)
• MOVE SWITCH COMPLETELY TO OFF
APU ENGINE OIL PRESSURE
4
IF LIGHT IS ON SHUT THROTTLE CONTROL OFF
GLOW
OFF
START
WHEN APU IS COLD:
• MOVE TO GLOW
• SEE COIL GLOW
• MOVE TO START
• MOVE SWITCH COMPLETELY TO OFF
START SWITCH
1
BEFORE STARTING
• BE SURE HYDRAULIC OIL LEVEL IS FULL
• BE SURE HYDRAULIC OIL VALVE IS DOWN (OPEN)
2
WEAR HEARING PROTECTION
APU ENGINE OIL PRESSURE
4
IF LIGHT IS ON SHUT THROTTLE CONTROL OFF
GLOW TYPE
VIEW A
THROTTLE CONTROL
ON
OFF
PRESS THUMB ON BUTTON & PULL OUT OR TURN COUNTER CLOCKWISE
PRESS THUMB ON BUTTON & PUSH IN
3
VIEW B
A
B

2-3. APU CONTROLS AND INDICATORS

FUEL TANK SIGHT INDICATOR (1). A sight tube which shows how much fuel is in the fuel tank.

FUEL PETCOCK VALVE (2). A two-position valve used to allow fuel to flow to the engine in the open position and shut off fuel when in the closed position. When closed, air is vented from fuel lines and filter.

FUEL FILTER (3). Used to filter fuel coming from the tank. The clear sediment bowl enables you to check the filter for trapped particles and contaminants.

OIL LEVEL GAGE (4). A dipstick used to measure the oil level in the APU crankcase. Two marks indicate when the oil level is full or when oil needs to be added. When checking oil level, the gooseneck must be positioned at normal travel height to achieve an accurate reading.

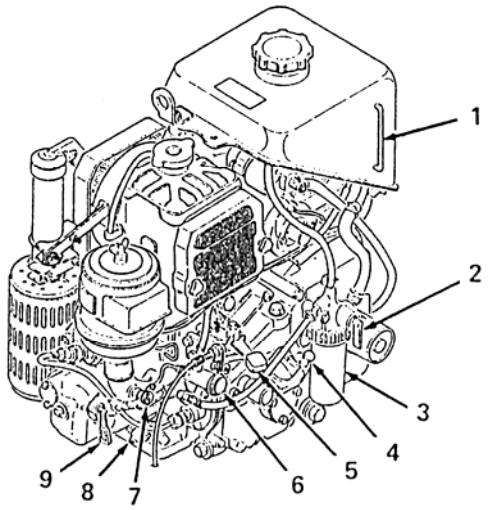
SPEED CONTROL LEVER (5). APU control box THROTTLE CONTROL cable connects to this lever and is used to throttle the speed of the APU. Also used to shut down the APU by pushing the lever to farthest right position.

JET START PLUNGER (6). A piston type pump. Pull out and push in to inject fuel into the air intake of the APU as a cold weather starting aid.

JET START COCK (7). A needle valve which controls the flow of fuel for the jet start plunger. When turned clockwise (closed), fuel is shut off to the jet start system. When turned counterclockwise (open), fuel flows from the jet start system.

DRAIN VALVE (8). Used to drain the coolant from radiator and engine block. Turn counterclockwise to drain and clockwise to close. Keep closed during APU operation.

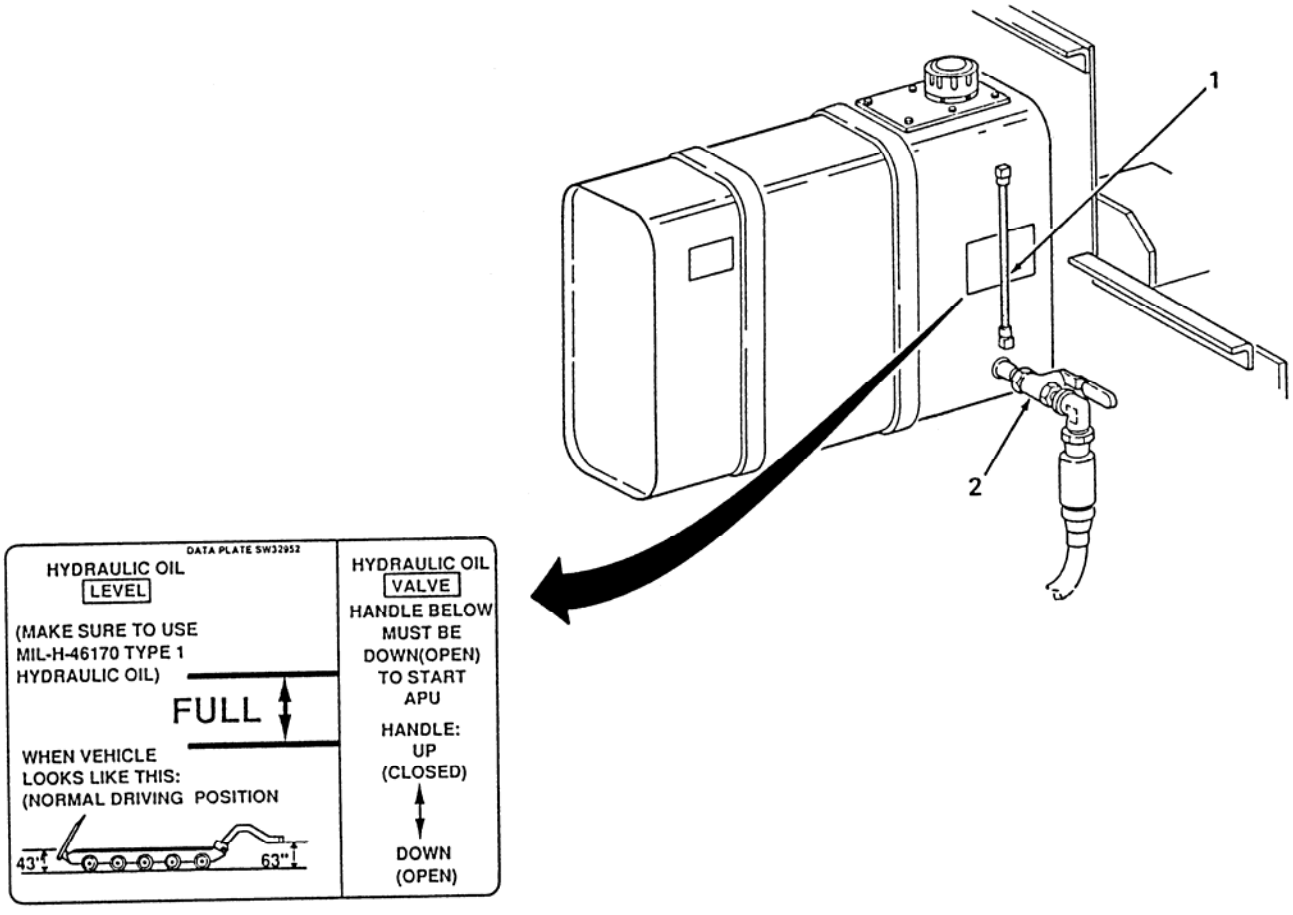
DECOMPRESSION VALVE (9). Used with APU jump start for artic weather starting of the APU. When held open (up), it partially opens the exhaust valve of the APU and compression is reduced during cranking. Normal position for this valve is spring loaded closed (handle pointing down).



2-4. HYDRAULIC TANK CONTROLS AND INDICATORS

HYDRAULIC OIL LEVEL (1). This indicator and decal identify the amount of fluid that should be in the hydraulic tank when the semitrailer is level and at normal road height.

HYDRAULIC OIL VALVE (2). A ball valve used to cut off the supply of hydraulic fluid from the hydraulic tank to the hydraulic pump. Normal position for this valve is OPEN, valve handle in line with valve body. To close the hydraulic oil valve, pull valve handle upright. This valve must be in the OPEN position prior to running the APU.



2-5. HYDRAULIC PRESSURE GAGE PANEL

CAUTION

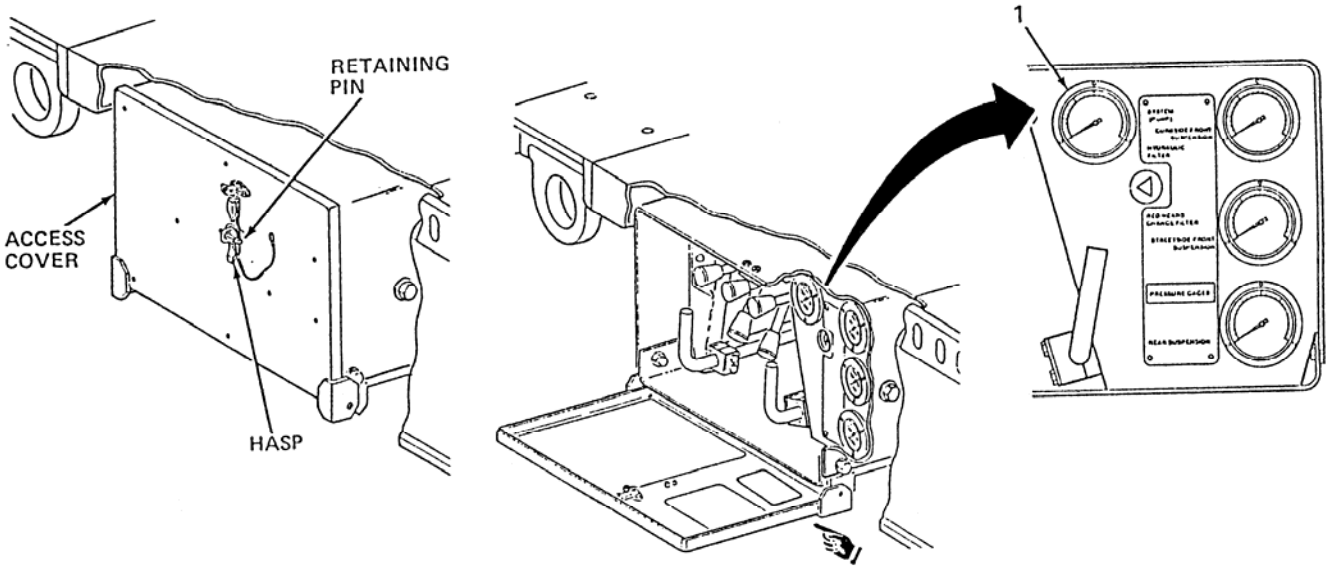
Cold weather, including extreme arctic conditions, adversely affects the semitrailer hydraulic gage readings and filter indicator. During initial start-up operations, gages will maintain higher than normal pressure readings and the filter indicator will read in the red. Ample time must be given, depending upon outside ambient temperatures, for hydraulic fluid to warm before determining that a problem exists in the hydraulic system or that the hydraulic filter is clogged.

NOTE

The hydraulic pressure gages are located behind the control module access cover. Access to the gages is obtained by removing the retaining pin, raising and turning the cover hasp, and pulling downward on the cover.

When the semitrailer is loaded, the suspension pressure gages will read 1800 - 2200 psi (12411 - 15169 kPa) while sitting idle. With the platform at road height, all suspension gages should read nearly equal pressure with no gages over 2200 psi (15169 kPa), indicating that the load center of gravity is correct.

SYSTEM PRESSURE (1). A pressure gage which indicates from 0 - 6000 psi (0 - 41370 kPa) and measures hydraulic pressure for the overall system during APU operations. With APU running and no valves activated, this gage should read approximately 0 - 200 psi (0 - 1379 kPa). When performing hydraulic adjustments, the system pressure may increase to a maximum reading of 4100 psi (28270 kPa) which is system relief pressure.



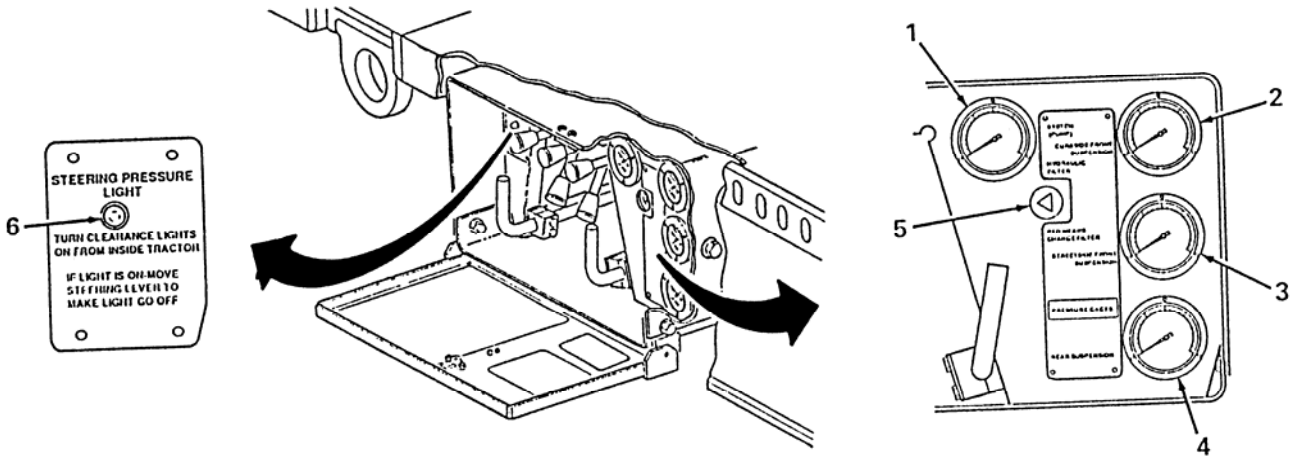
2-5. HYDRAULIC PRESSURE GAGE PANEL (CONT)

FRONT CURBSIDE SUSPENSION (2) AND FRONT STREETSIDE SUSPENSION (3). Pressure gages which indicate from 0 - 6000 psi (0 - 41370 kPa) and measure hydraulic pressure for the front curbside and front streetside suspension circuits (three front bogies and gooseneck cylinder, each side, when gooseneck isolation valve is in the RUN position). When semitrailer is unloaded and valves are not being operated, these gages normally read 700 - 1100 psi (4826 - 7585 kPa). When raising either curbside or streetside front suspension, the respective gage will increase to a maximum of 4100 psi (28270 kPa) when the suspension tops out. When lowering either curbside or streetside front suspension, the pressure will decrease to 0 psi (0 kPa) when the suspension bottoms or the weight is supported by the front and rear support legs.

REAR SUSPENSION (4). A pressure gage which indicates from 0 - 6000 psi (0 - 41370 kPa) and measures hydraulic pressure for the rear suspension circuit (four rear bogies). When semitrailer is unloaded and the rear suspension valve is not being operated, this gage normally reads 700 - 1100 psi (4826 - 7585 kPa). When raising rear suspension, the pressure will increase to a maximum of 4100 psi (28270 kPa) when the suspension tops out. When lowering rear suspension, the pressure will decrease to 0 psi (0 kPa) when suspension bottoms or weight is supported by support legs.

HYDRAULIC FILTER GAGE (5). A colored gage used to identify blockage or contamination in the hydraulic filter element. The normal indication while APU is running should be in green zone. If reading is in yellow, the element is starting to become contaminated and should be replaced no later than the next scheduled maintenance. If reading is in red zone, the filter is contaminated and should be replaced. In cold weather conditions, the gage will read out of green zone until oil has warmed to normal operating temperature.

STEERING PRESSURE INDICATOR (6). Lights when the hydraulic pressure in the automatic steering system drops below 68 psi (470 kPa) and the running light circuit is powered. Once precharge pressure is restored to the steering system, by running the APU and momentarily operating the steering control valve in both directions, the light will go out.



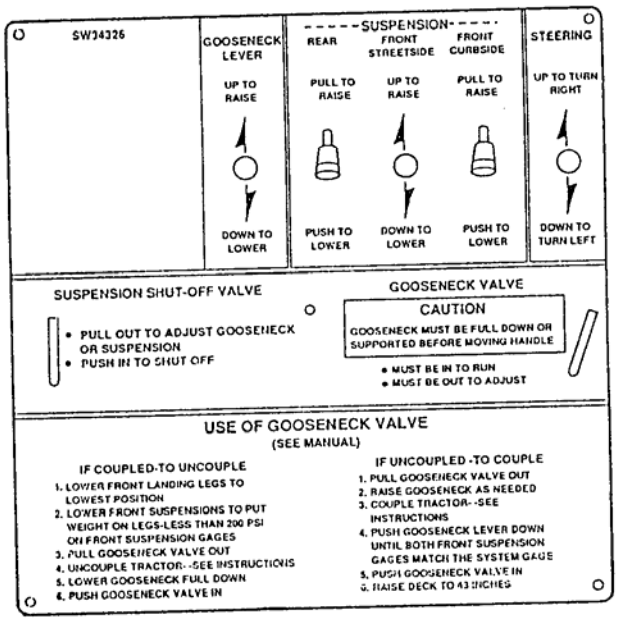
2-6. HYDRAULIC CONTROLS AND ISOLATION VALVES

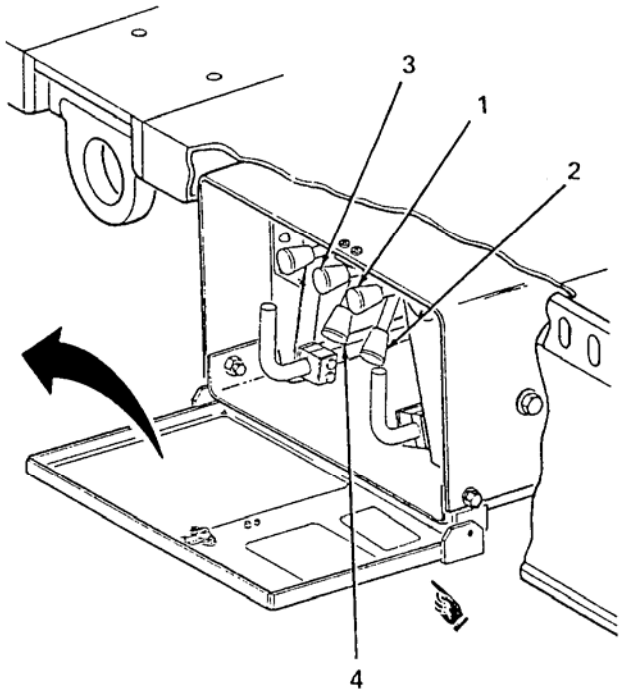
STEERING VALVE (1). A three-position hydraulic valve spring-loaded to the center (neutral) position and used to provide manual steering to the steerable bogies when coupled to a towing vehicle. When the lever is pulled up, bogies are realined for a right-hand turn; when the lever is pushed down, bogies are realined for a left-hand turn.

FRONT CURBSIDE VALVE (2). A three-position hydraulic valve spring-loaded to the center (neutral) position and used to provide hydraulic pressure for raising and lowering the three front curbside bogies. Pull up to raise front curbside of the platform, or push down to lower front curbside of the platform. This function will not operate if the suspension shut-off valve handle is pushed inward to SHUT-OFF position.

FRONT STREETSIDE VALVE (3). A three-position hydraulic valve spring-loaded to the center (neutral) position, and used to provide hydraulic pressure for raising and lowering the three front streetside bogies. Pull up to raise front streetside of the platform or push down to lower front streetside of the platform. This function will not operate if the suspension shut-off valve handle is pushed inward to SHUT-OFF position.

REAR VALVE (4). A three-position hydraulic valve spring-loaded to the center (neutral) position, and used to provide hydraulic pressure for either raising and lowering two rear left and right bogies. Pull up to raise the rear bogies or push down to lower the rear bogies. This function will not operate if the suspension shut-off valve handle is pushed inward to the SHUT-OFF position.





2-6. HYDRAULIC CONTROLS AND ISOLATION VALVES (CONT)

CAUTION

Prior to making any gooseneck adjustments, the semitrailer must be uncoupled and both the suspension shut-off valve and gooseneck isolation valve handles pulled outward to the ADJUST position or damage to equipment may result.

GOOSENECK VALVE (5). A three-position hydraulic valve which is spring-loaded to the center (neutral) position and used to provide hydraulic pressure for either raising or lowering the gooseneck. Semitrailer must be uncoupled and the gooseneck isolation valve must be in ADJUST (pulled outboard) position to make adjustments Pull up to raise the gooseneck, or push down to lower the gooseneck. This function will not operate correctly if the suspension shut-off valve handle is pushed inward to the SHUT-OFF position.

CAUTION

After starting the APU and prior to making any platform or gooseneck adjustments using the front curbside, front streetside, or rear or gooseneck valves, the suspension shut-off valve handle must be pulled out to the ADJUST position or unwanted movement and/or damage to equipment may result.

SUSPENSION SHUT-OFF VALVE (6). A series of ball valves which are used to shut off hydraulic power to the semitrailer suspension. There are two positions for this valve handle: pushed inward is SHUT-OFF, and pulled outward is ADJUST. When in SHUT-OFF position, the ball valves are closed and provide protection against unexpected suspension and/or gooseneck movement. When in ADJUST position, the ball valves are open and normal suspension and gooseneck adjustments can be made. The valve handle should be placed in the ADJUST position as soon as the APU is started and prior to making any adjustments to the platform/gooseneck. This valve must be placed in SHUT-OFF position for driving or parking/storage. If the semitrailer is to be parked/stored while uncoupled from a tractor, the gooseneck must be completely lowered before moving this valve handle from ADJUST to SHUT-OFF position.

WARNING

Before operating gooseneck isolation valve, lower the front support legs. All personnel must stand clear of the gooseneck or serious injury to personnel may result.

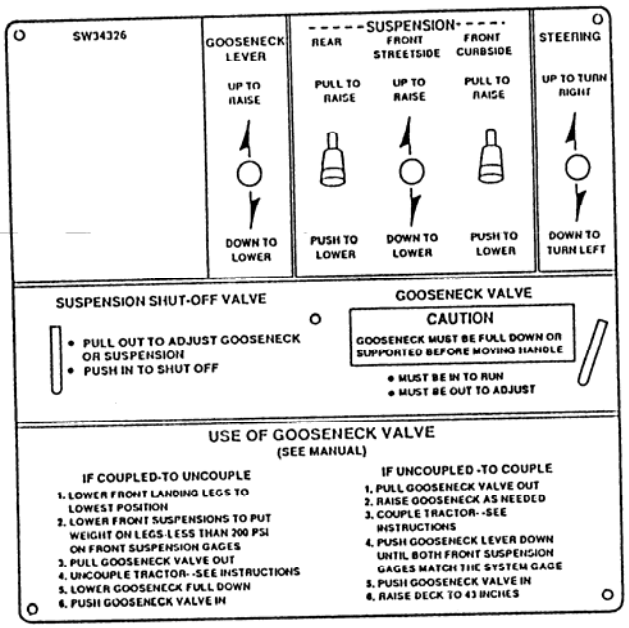
CAUTION

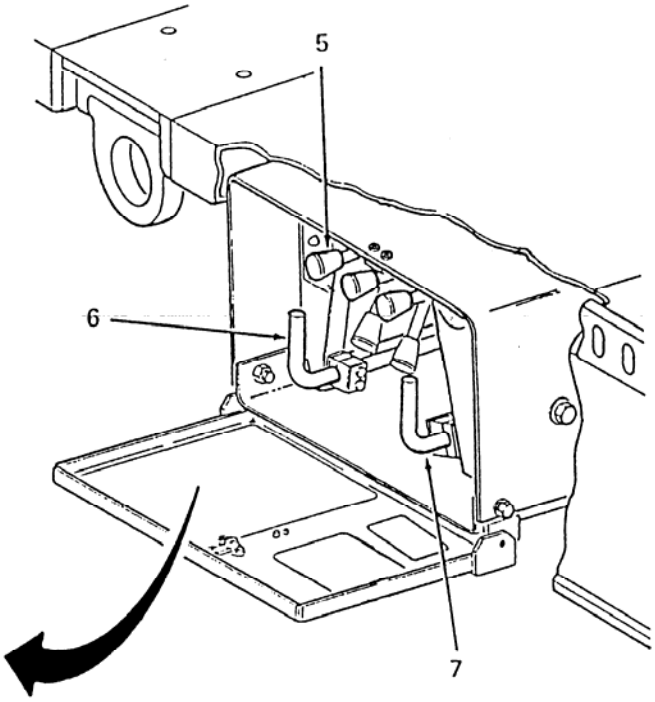
Prior to making any gooseneck adjustments while uncoupled or in process of coupling and/or uncoupling, the gooseneck isolation valve handle must be pulled out to the ADJUST position. The gooseneck isolation valve must not be in the ADJUST position when making suspension adjustments while coupled to a tractor (i.e., loading and/or unloading procedures) or unwanted movement and/or damage to equipment may result.

NOTE

If you experience binding of the gooseneck isolation valve handle that is an indication that the linkages may not be properly adjusted. If all linkages are properly adjusted and you are still experiencing binding, there is a redesigned manual control lever with a built-in offset that can prevent binding. For part number and national stock number information required to requisition the redesigned lever, refer to TM 9-2330-381-24P, Gooseneck Isolation Valve Assembly.

GOOSENECK ISOLATION VALVE (7). A series of ball valves which are used to isolate the gooseneck hydraulic cylinders from the suspension equalization system. When the gooseneck needs adjusting or the semitrailer is being uncoupled from a tractor, the gooseneck isolation valve handle must be pulled outward (ADJUST) to prevent the gooseneck from falling and damaging any equipment. When coupled to a tractor, normal position for this valve handle is the RUN (inboard) position. When uncoupled from a tractor, normal position for this valve is in the ADJUST (outward) position. This valve must be operated only when coupling/uncoupling the semitrailer from a tractor or when gooseneck adjustments are required while uncoupled from a tractor. This valve handle must be placed in RUN position for driving. If semitrailer is to be parked/stored uncoupled from a tractor, the gooseneck must be completely lowered before moving valve handle from ADJUST to RUN position.



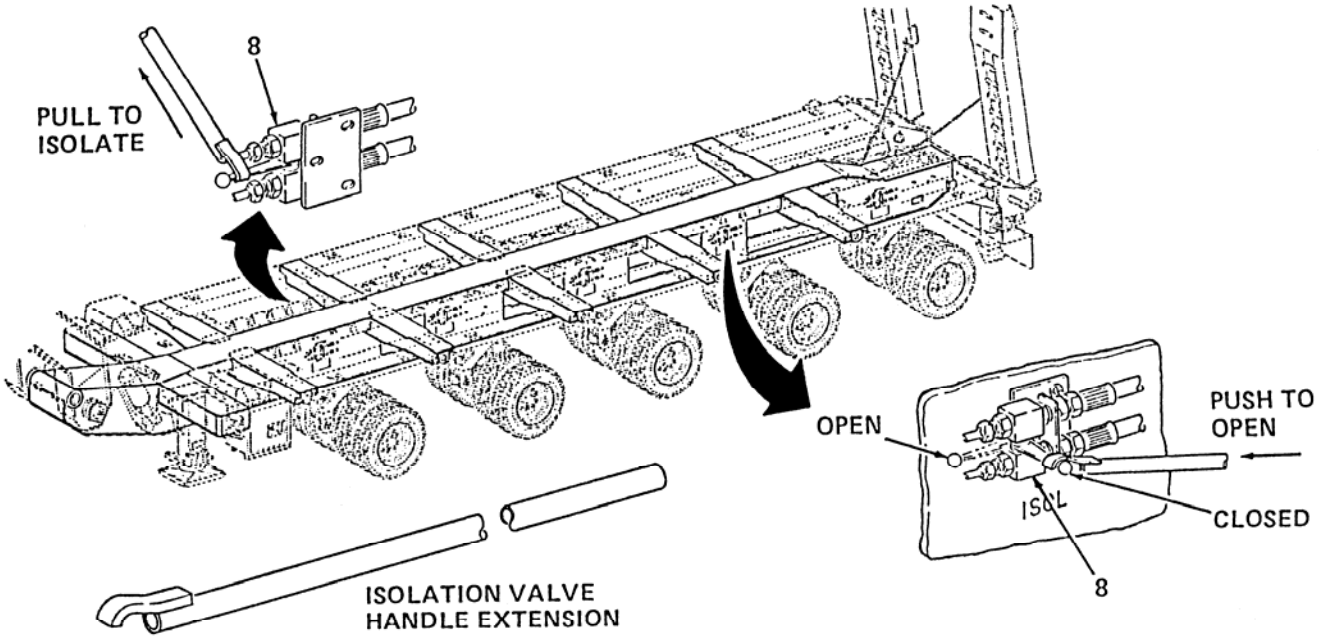


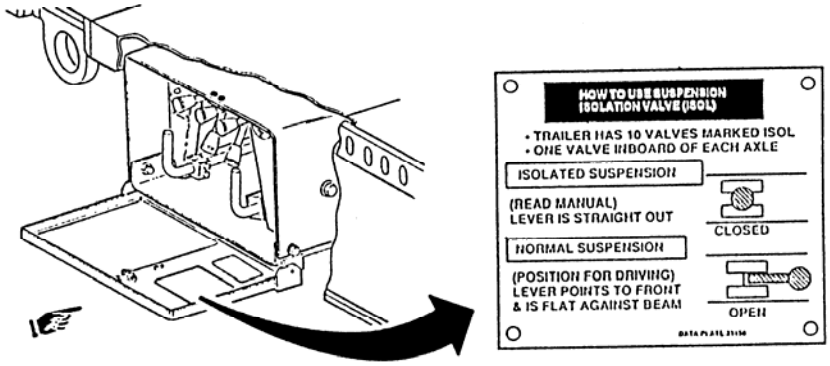
2-6. HYDRAULIC CONTROLS AND ISOLATION VALVES (CONT)

WARNING

Before operating any suspension isolation valves, lower the front and rear support legs and support the platform or injury to personnel may result.

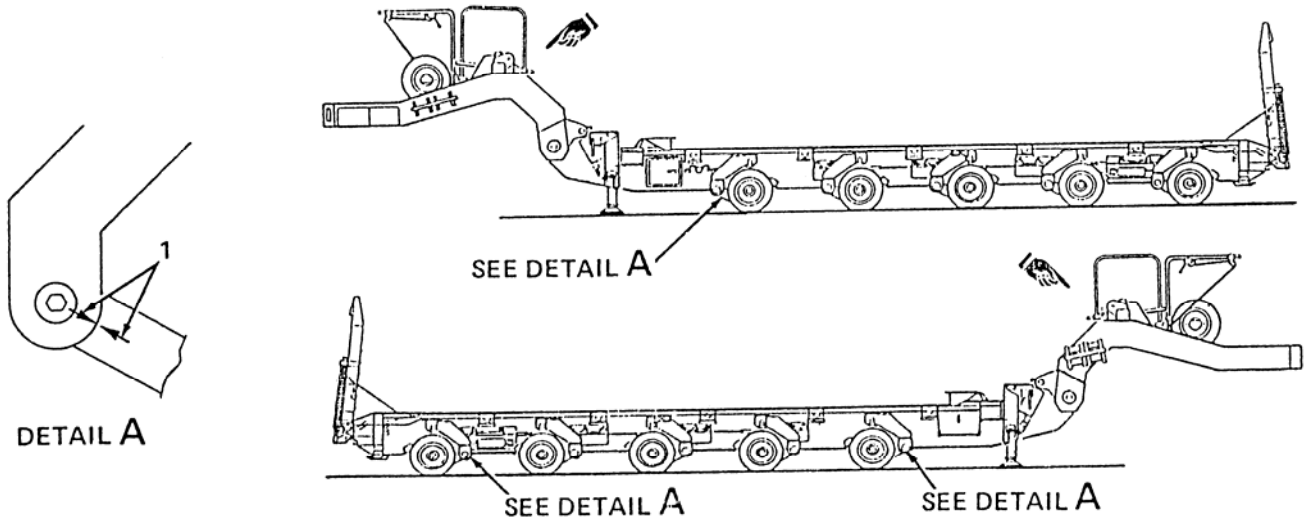
SUSPENSION ISOLATION VALVE (8). There are 10 suspension isolation valve assemblies on the semitrailer, one for each bogie unit. The suspension isolation valve is used to isolate a suspension cylinder of an affected bogie from the hydraulic system. Normal position for this valve is OPEN with the valve handle facing forward toward the front of the semitrailer. The isolation valve handle extension bar, located at rear of semitrailer below the loading ramps, should be used to open or close each suspension isolation valve. To isolate a bogie, find the appropriate isolation valve and insert the hook end of the isolation valve handle extension onto the isolation valve handle and pull the valve handle outward to the CLOSED position. To unisolate a bogie, place the hook end of the extension handle behind the CLOSED valve handle and push the valve handle forward, toward the front of the semitrailer, to the OPEN position.



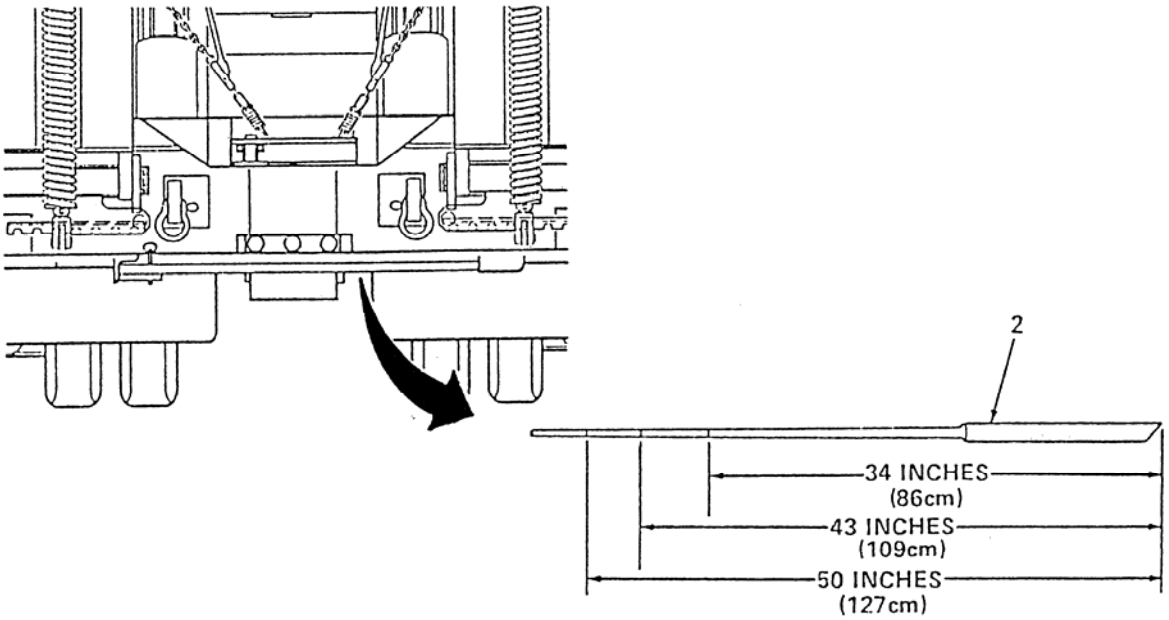


2-7. BED HEIGHT INDICATORS

BED HEIGHT INDICATOR (1). Three bed height indicators, one located on each #1 front curbside and streetside bogie and one on #5 rear curbside bogie. The bed height indicators point to each other when the platform height is set at road height, approximately 43 inches (109 cm), for that hydraulic subsystem.



CROWBAR (2). The crowbar has three permanently marked lines to measure platform heights from the ground to the top of the platform. The bottom mark is for rear platform loading position, 34 inches (86 cm). The center mark is for normal platform height, 43 inches (109 cm). The top mark is for front platform loading position, 50 inches (127 cm). The crowbar when not in use is stowed on the rear of the semitrailer below the loading ramps.

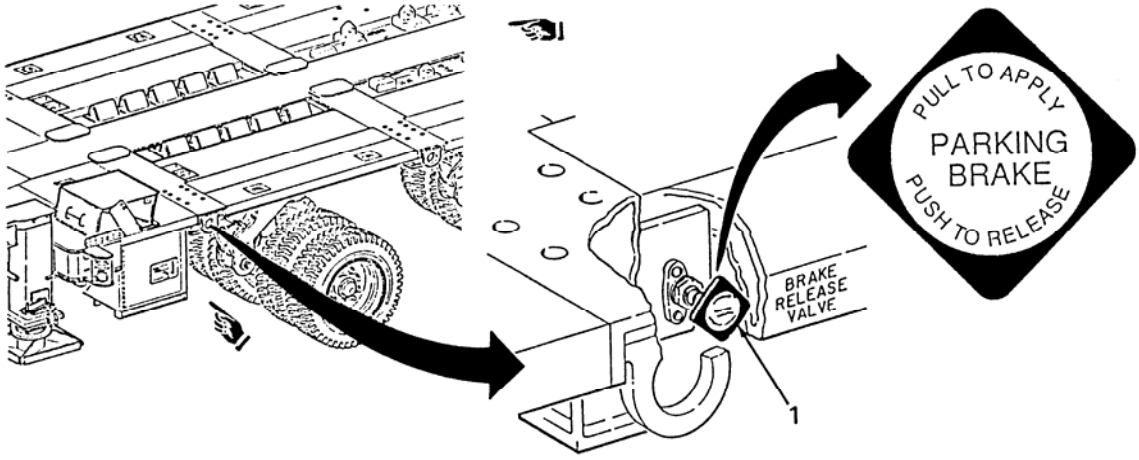


2-8. PNEUMATIC CONTROLS

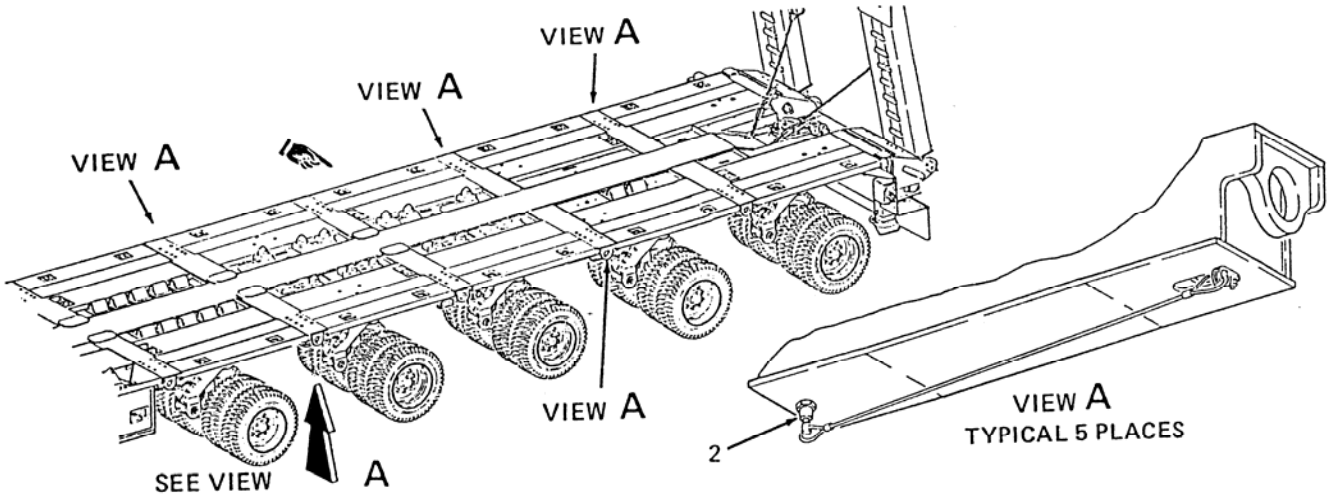
WARNING

With semitrailer uncoupled and gladhand dummy couplings installed, ensure that vented dummy coupling is installed on the emergency (red) gladhand prior to releasing brakes with the brake release valve. If a nonvented dummy coupling is installed, the parking brakes cannot be reapplied and injury to personnel may result.

BRAKE RELEASE VALVE (1). A push/pull type valve used to disengage the parking brakes when the semitrailer is not connected to a tractor. Push in the handle to charge air pressure and release the parking brakes. Pull out to release air pressure and engage parking brakes. This valve can only be cycled a few times before the air supply in the air tanks must be replenished.



AIR TANK DRAIN VALVES (2). There are five air tank drain valves on this semitrailer. Three are located on curbside of platform and two are located on streetside of platform. These drain valves are used to drain either moisture or air pressure from air tanks. Pull and hold the lanyard until moisture is no longer being discharged or until all air in that tank is released.



2-9. HANDCRANKS

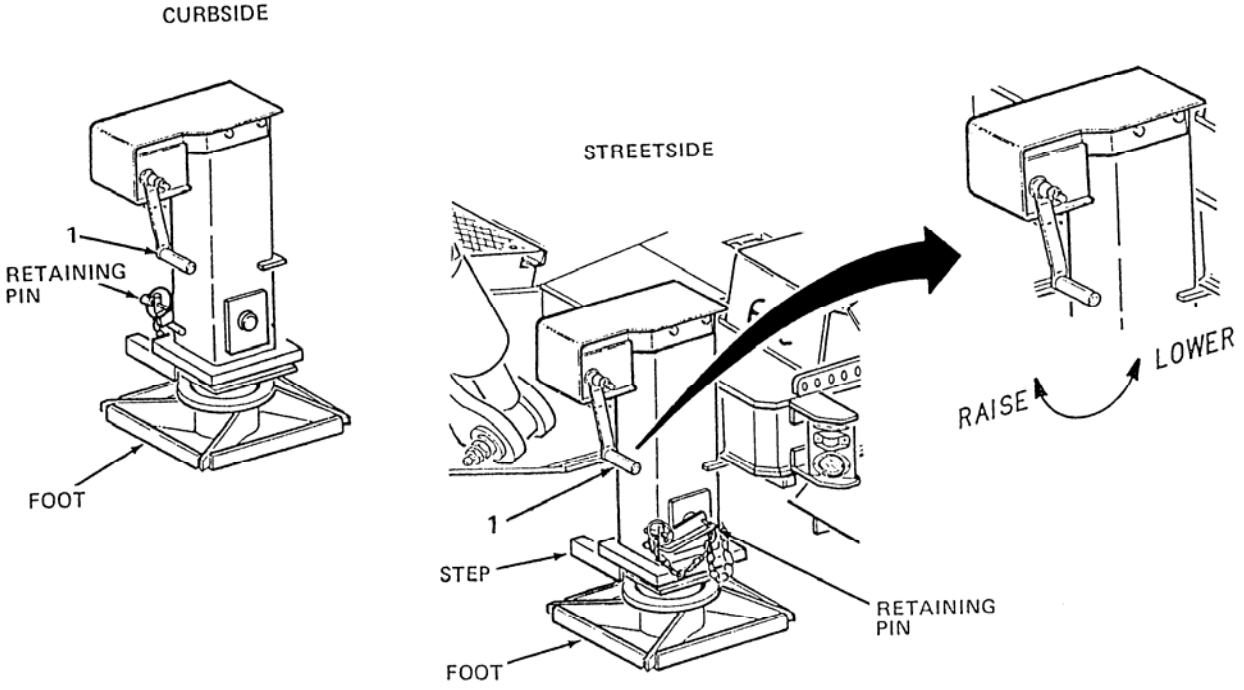
WARNING

Before performing any maintenance on the platform, lower the front and rear support legs or injury to personnel may result.

When lowering the support legs, make sure that feet and hands are clear of the support leg foot as it nears the ground or serious injury to personnel may result.

When lowering or raising the support legs, always install the retaining pins or serious injury to personnel may result.

FRONT LEG SUPPORT HANDCRANK (1). The front support legs each contain a single speed handcrank which operates an internal winch attached to a lifting strap. The handcrank (1) is used to manually raise and lower the lower shaft and foot of the support leg. A retaining pin is used to lock the lower shaft into one of four preselected height settings (holes). The bottom hole of the lower shaft is used to stow the lower leg and foot during transport. The retaining pin is installed from the outboard side of each support leg. The handcrank (1) for the curbside support leg is located on the inboard side of the leg, while the handcrank (1) for the streetside support leg is located on the outboard side of leg. The streetside support leg also contains a step which provides personnel access to the platform. To lower and secure either support leg, rotate the handcrank (1) counterclockwise until the desired retaining pin hole in the lower leg is alined with the hole in the upper housing of the support leg, and install the retaining pin. To raise either leg, rotate the handcrank (1) clockwise sufficiently to relieve tension on the retaining pin, remove the pin and continue cranking in a clockwise direction until desired selected height is reached, and insert the retaining pin.



2-9. HANDCRANKS (CONT)

WARNING

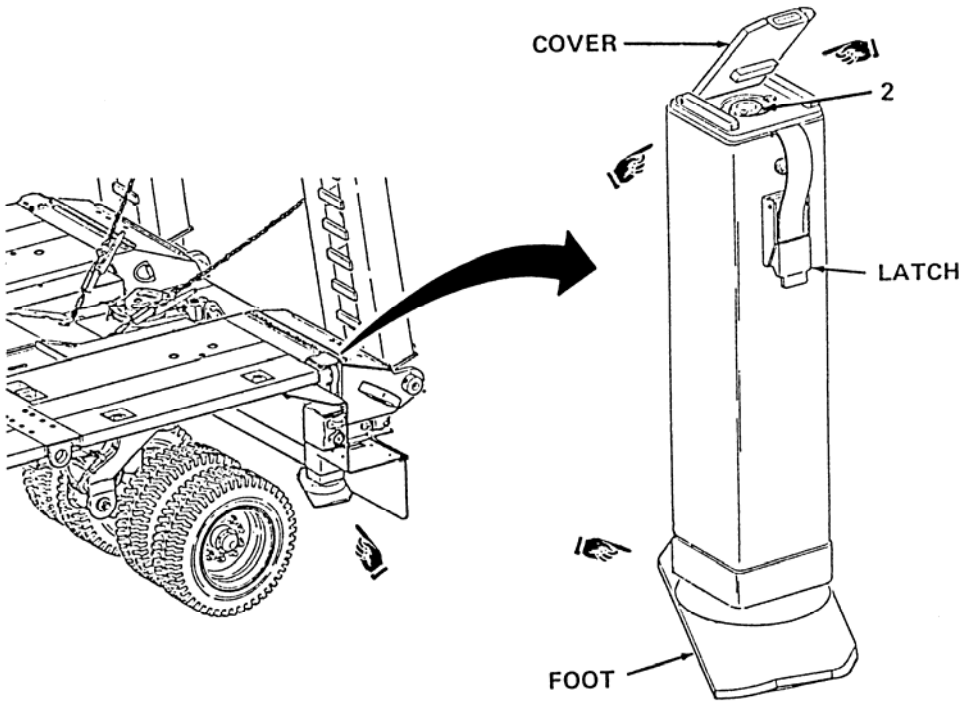
Before performing any maintenance on the platform, lower the front and rear support legs or injury to personnel may result.

When lowering the support legs, make sure that feet and hands are clear of the support leg foot as it nears the ground or serious injury to personnel may result.

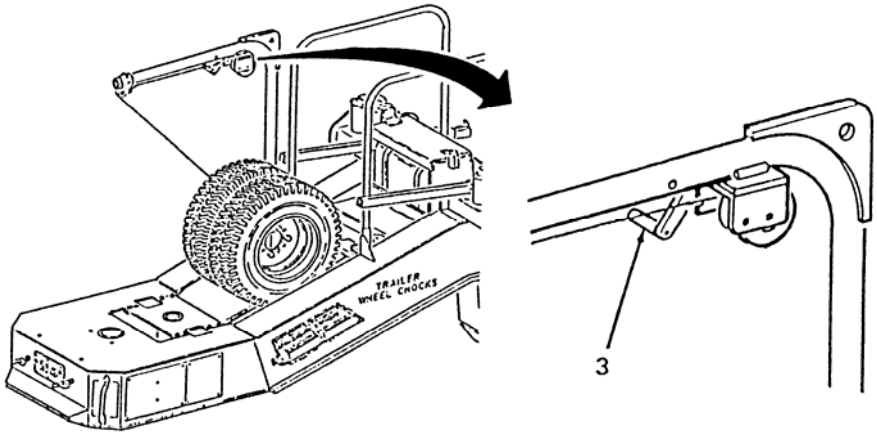
CAUTION

The socket head screw on the rear landing leg adjusting nut must be positioned outboard before the cover is closed or damage to equipment will result.

REAR SUPPORT LEG HANDCRANK (2). The rear support legs each contain an adjusting nut (2) and require a ratchet and socket to lower or raise the support leg lower tube and foot. To lower the support leg, the cover is raised and the ratchet and socket are used to rotate the adjusting nut (2) counterclockwise to lower the leg to the desired position. Clockwise rotation of adjusting nut (2) raises the leg. Access to the adjusting nut (2) is obtained by releasing the cover latch and raising the metal cover sufficiently to engage the adjusting nut with the ratchet and socket. Upon completion of the rear support leg adjustment, the cover must be put back into position and secured with the cover latch. To prevent in-transit vibration from rotating the adjusting nut and lowering the rear support leg, a socket head screw is installed on the adjusting nut which contacts a bar on the cover, preventing movement. Any time the cover is to be closed, ensure the socket head screw is positioned outboard prior to closing.



WINCH HANDCRANK (3). Used to extend and retract cable from the winch spool on the davit assembly. The winch handcrank has an antislip device to prevent unintentional payout of cable. To pay out cable, turn the winch handcrank counterclockwise while pulling on the winch cable. Turn the crank clockwise to retract the winch cable.



Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

PARA. NO.	TITLE
2-10.....	Maintenance Forms and Records
2-11.....	General
2-12.....	Common PMCS Practices
2-13.....	Special Instructions (PMCS)
2-14.....	PMCS Column Description

2-10. MAINTENANCE FORMS AND RECORDS

Every mission begins and ends with paperwork. There isn't much of it, but you must keep it up to date. The forms and records you fill out have several uses. They are a permanent record of the services, repairs, and modifications made on your semitrailer. They are reports to unit maintenance and to your commander. They are also a checklist for you when you want to know if anything went wrong when your semitrailer was last used. Also, these records will tell whether the faults, if any, have been fixed. For the information you need on these forms and records, see DA PAM 738-750, The Army Maintenance Management System (TAMMS).

NOTE

There is a 5-year service requirement for the M1000 Semitrailer. This is a very labor-intensive service and requires advance planning and budgeting. TACOM recommends that you start your advance planning and budgeting at least 24 months prior to your 5-year service due date.

In addition, proper and timely performance of all services and lubrications will help reduce the maintenance burden and parts consumption associated with performing the 5-year service.

2-11. GENERAL

a. Do your Before (B) PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) before the semitrailer leaves its containment area (motorpool or other control or dispatch point) or performs its intended mission. Pay attention to the WARNINGS and CAUTIONS.

b. Do your During (D) PMCS when the semitrailer is being used for its intended mission. During operation checks means to watch, feel, and listen to the semitrailer and its related components while they are actually being operated. Pay attention to the WARNINGS and CAUTIONS.

c. Do your After (A) PMCS after the semitrailer has been used for its intended mission. Pay attention to the WARNINGS and CAUTIONS.

d. Do your Weekly (W) PMCS once a week or if you are operating the semitrailer for the first time. Pay attention to the WARNINGS and CAUTIONS.

e. Always do your PMCS in the same order. The pattern will become habit, and with practice, anything wrong will be seen in a hurry.

f. If something does not work or is not right, troubleshoot with the instructions in this manual and notify your supervisor. Report any faults using the proper form. See DA PAM 738-750.

2-12. COMMON PMCS PRACTICES

There are some items that need to be checked that are common to all parts of the semitrailer. Check these items each time you do your (B) Before PMCS.

WARNING

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

a. Keep it clean: Dirt, grease, oil, and debris only get in the way and may cover up a serious problem. While doing your PMCS, clean as you work and as you go. Use dry cleaning solvent (item 26, appx. E) on all metal surfaces. Use soap and water when you clean rubber and plastic material.

b. Bolts, nuts, and screws: Check them for obvious looseness and missing, bent, defective, or broken condition. Don't try them all with a tool, but you can look for chipped paint, bare metal, or rust around bolt heads. If you find one that you think is loose, tighten, and report to unit maintenance.

c. Welds: Look for loose or chipped paint, rust, or gaps where parts are welded together. If you find a bad weld, report it to unit maintenance.

d. Electrical wiring and connections: Look for cracked or broken insulation, bare wires, and loose or broken connections. Tighten loose connectors and make sure the wires are in good shape.

e. Hoses and fluid lines: While doing your PMCS, look and listen for wear, damage, and leaks in all hoses and fluid lines. Make sure clamps and fittings are tight. Wet spots mean leaks. A stain around a fitting or connector can mean a leak. Look for these signs. If a leak comes from a loose fitting or connector that can be easily fixed, tighten it using the two wrench method. If you can't fix it easily or if a hose or line appears broken or worn, report it to unit maintenance.

f. Mounted accessories: Check that mounted accessories are secure and in place before you begin to operate your semitrailer.

NOTE

Keep all of the general checks in mind every time you do your PMCS. This will help you spot trouble before it starts. It will also help you and your unit's unit maintenance to keep your semitrailer operational. In time, spotting possible trouble will become automatic.

g. When you check for GOOD CONDITION: You look at the item to see if it is safe and serviceable.

h. When you check for CORRECT ASSEMBLY OR STOWAGE: You look at the item to see if it is there, installed right, and properly secured.

i. The PREVENTIVE MAINTENANCE table starts on page 2-20. It is set up so that you can make your Before operation checks as you walk around the semitrailer.

j. When you do your PREVENTIVE MAINTENANCE, look for items that appear in the blocks, "Equipment is not ready". If any of these faults are noted, do not operate your semitrailer until the repairs are made.

2-13. SPECIAL INSTRUCTIONS (PMCS)

a. It is necessary for you to know how fluid leakage affects the status of equipment. The following are definitions of the types/classes of leakage to help determine the status and condition of the semitrailer parts. Learn them and be familiar with each type of leak. Remember - when in doubt, notify your supervisor.

b. Equipment operation is allowable with minor leakage (Class I or Class II). Consideration must be given to the fluid capacity in the items being checked/inspected. When in doubt, notify your supervisor.

2-13. SPECIAL INSTRUCTIONS (PMCS) (CONT)

CAUTION

When operating with Class I or Class II leaks, continue to check fluid levels in addition to that required in PMCS. Parts without fluid will stop working and/or cause damage to the equipment.

CLASS I - Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

CLASS II - Leakage of fluid great enough to form drops but not enough to cause drops to drip from the item being checked or inspected.

CLASS III - Leakage of fluid great enough to form drops that drip from the item being checked or inspected.

c. Access APU for PMCS.

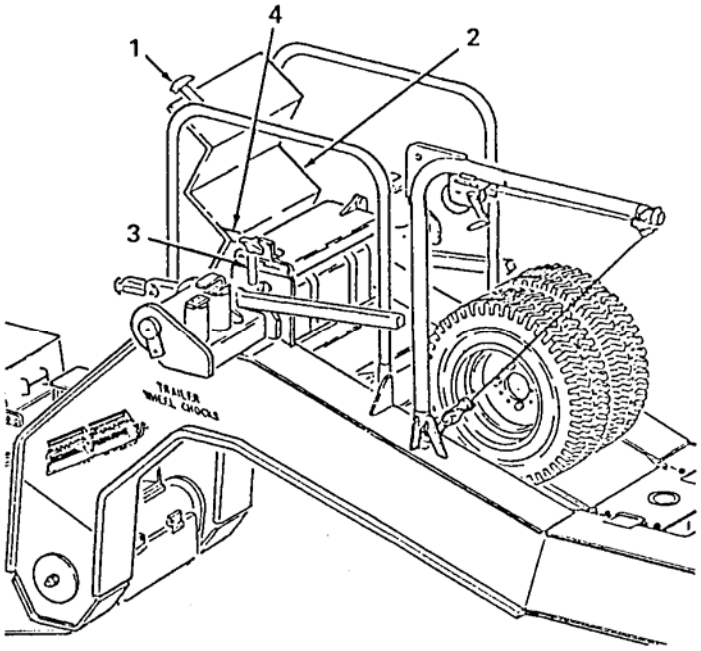
(1) At rear of gooseneck, unhook step retainer (1) and raise step section (2) up and forward.

(2) Secure step section (2) in upright position by hooking top step retainer (3) to strap (4) on step section (2).

d. Close APU cover.

(1) Unhook strap (4) and lower step section (2) to normal position.

(2) Secure step section (2) in place by hooking step retainer (1) to catch on fixed bottom step section.



e. Operate APU during PMCS.

(1) Once APU has been inspected in accordance with table 2-1, item 6 a thru g, start APU and allow it to continue running until PMCS is complete.

(2) At completion of PMCS, turn off the APU, unless it is needed for tasks such as ramp or deck adjustments, in which case allow APU to continue running.

f. Semitrailer steering and alignment. During operation on level ground, semitrailer should not wander or pull to one side. As part of your Before operation checks, always drive tractor/semitrailer forward in a straight line approximately 60 feet (20m) to check semitrailer tracking.

g. Suspension assemblies. Table 2-1, item 17c is a During operation check for failures that would make a suspension assembly nonoperational. Due to size and weight of semitrailer, failures during operation will be difficult to detect. You will need to utilize your mirrors and, if you are in a convoy, you may detect a failure on another system. If that is the case, report it immediately. Examples of failures in this category include, but are not limited to, the following:

(1) Unusual, excessive, or severe vibration. Some conditions that can cause this vibration are worn/failed ultrabushings or suspension bearings, undertorqued bogie nuts, and damaged (chunked) tires.

(2) Brake seizure. An indication that the brakes have locked up would be smoke coming from the tires. (A check of the trailer brakes is also part of the Before operation check in the M1070 PMCS. If the brakes fail to hold the tractor/trailer from moving, the system is Not Fully Mission Capable.)

(3) Impact damage. Caused by collision with other vehicles and/or objects.

2-14. PMCS COLUMN DESCRIPTION

a. The Item no. column shall be used as a source of item numbers for the "TM Number" column on DA Form 2404, Equipment Inspection and Maintenance Worksheet, in recording results of PMCS.

b. The Interval column of your PMCS table tells you when to do a certain check or service.

c. The ITEM TO BE INSPECTED Procedure column lists the checks to be performed.

d. The Equipment is not ready/available if column tells you when and why your semitrailer cannot be used.

NOTE

The terms ready/available and mission capable refer to the same status: equipment is on hand and is able to perform combat missions. (See AR 700-138.)

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services

B-Before Operation D-During Operation A-After Operation W-Weekly

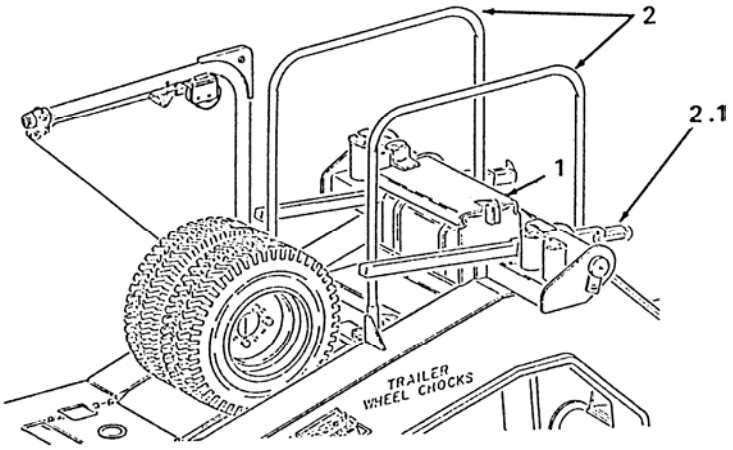
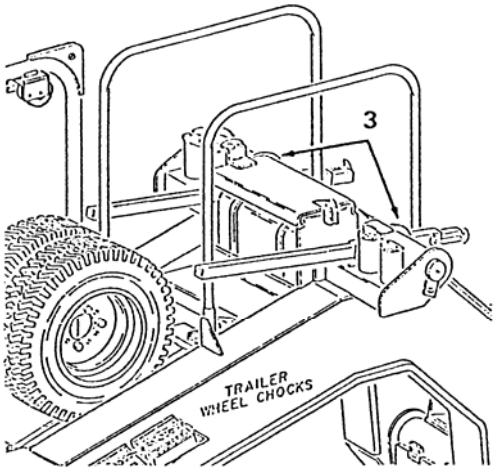
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
1					STEPS AND GUARDRAIL 	
			•		Inspect step sections (1), guardrails (2), and safety rail (2.1) for secure mounting and missing hardware.	
2					CABLE GUIDE 	For recovery of disabled vehicles:
	•	•			Inspect cable guide rollers (3) for freedom of movement and corrosion. Check for presence of lubrication.	Any rollers are so severely gouged they tear or shred the cable or will not turn.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

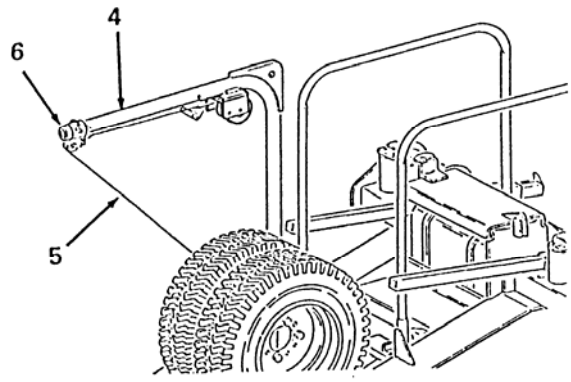
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
3					DAVIT ASSEMBLY	
						
					WARNING **On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on it or trip over it. Injury to personnel or damage to equipment may result.**	
	•	•			Inspect davit assembly (4) for secure mounting. Check cable (5) for damage and corrosion. Ensure hand winch operates properly. Ensure cable guide (6) is secured by hitch pin.	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

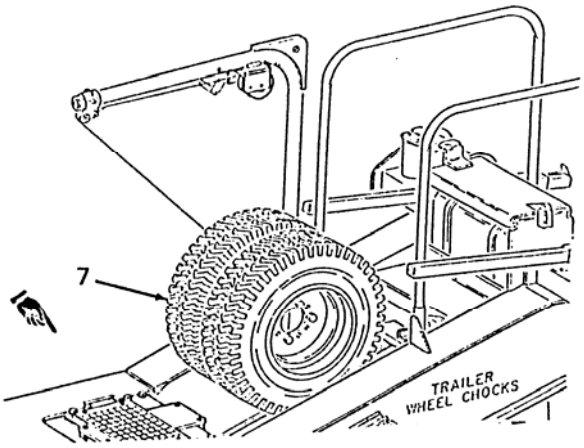
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
4					SPARE WHEEL ASSEMBLY  **WARNING** **On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on it or trip over it. Injury to personnel or damage to equipment may result.**	
	•				Ensure both spare wheel assemblies (7) are present and securely mounted. Check spare tires for tread wear, cuts, and weather deterioration. Inspect valve stems. Check if tires are flat or underinflated.	Any tire is missing.
5					DELETED	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

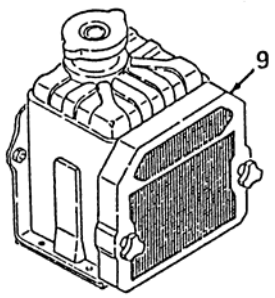
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
6					APU  **WARNING** **Use protective gloves when inspecting the APU or serious injury to personnel could result from engine heat.** **When checking for leaks, never open any type of fluid holding tanks while APU is hot or severe burns from the spraying of hot fluids may result. Give the systems time to cool before attempting to make any fluid checks.** **NOTE** **If gooseneck is lowered to lowest position, oil level in APU will appear low on dipstick. If oil is visible on dipstick, APU may be started to adjust gooseneck to normal running height.** **Prior to checking fluid levels on semi-trailer, both gooseneck and platform must be placed at normal running height for accurate readings.**	
	•				a. Check APU coolant level; if low, fill radiator (9) with coolant as required. Check cooling system for leaks. Check APU coolant for contamination.	Any Class III leaks.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

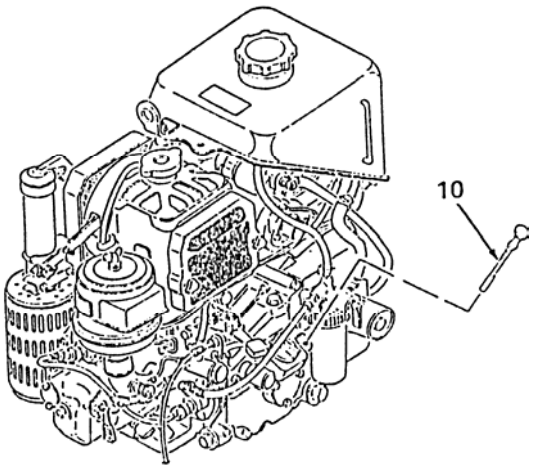
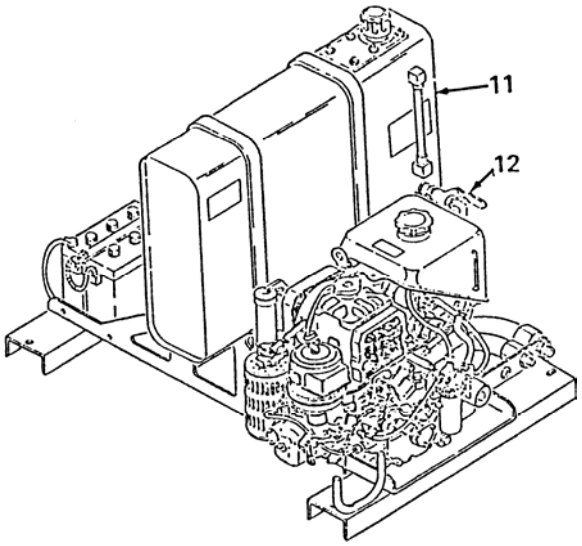
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
6 - CONT					APU - CONT	
						
	•				b. Remove oil level gage (dipstick) (10) and check APU oil level. Inspect APU for oil leaks. Add oil as required. Maintain oil level between ADD and FULL marks. DO NOT overfill.	Any Class III leaks.
						
	•				c. Inspect hydraulic tank (11) for leaks and secure mounting. Check hydraulic fluid level. Ensure valve (12) is in open position.	Any Class III leaks.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

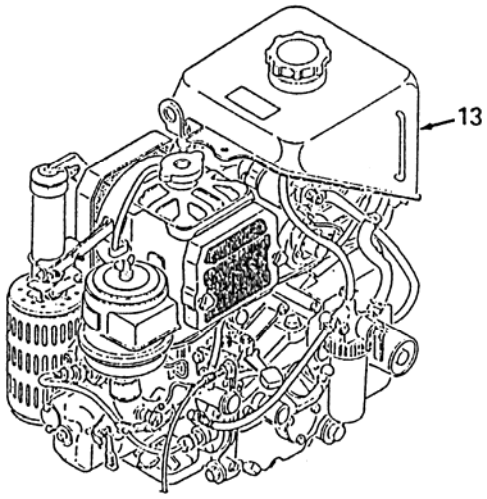
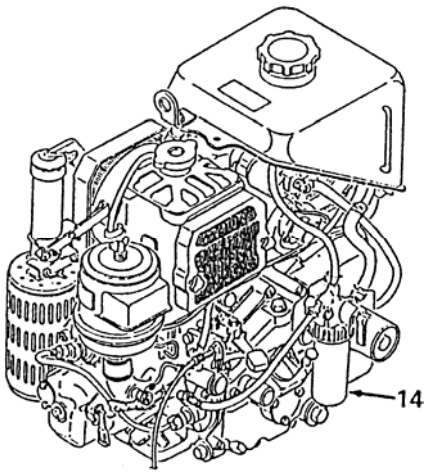
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
						
	•				d. Check APU fuel tank (13) for fuel. If fuel is not visible on sight gage, remove cap and screen and look inside tank. If fuel is low or there is an insufficient amount for intended use, refill as required.	Any Class III leaks.
						
	•		•		e. Visually check sediment bowl on fuel filter assembly (14) for contaminants and water. If contaminants are found, notify unit maintenance.	Any Class III leaks.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

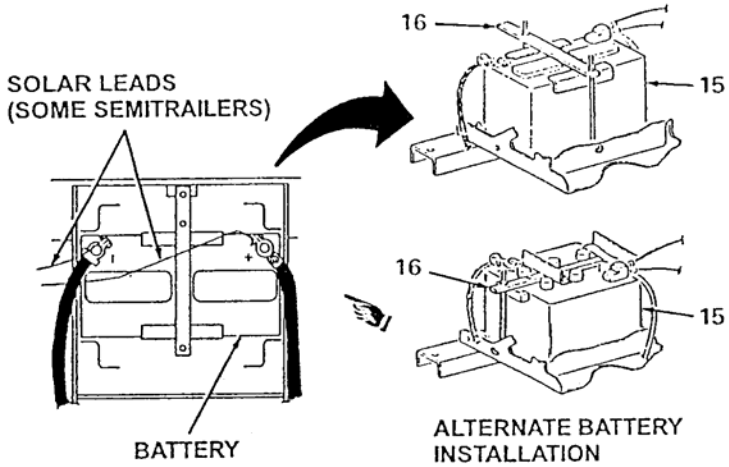
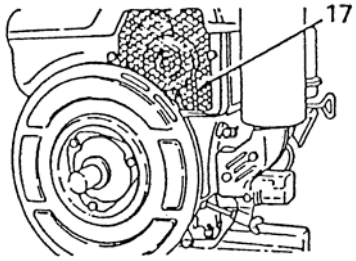
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
6 - CONT					APU - CONT	
						
					WARNING **Do not wear watches, rings, or other jewelry which could short out battery terminals while servicing the battery. Do not smoke or use open flame around batteries. Battery may explode from a spark. Battery acid is harmful to skin and eyes. Wear protective goggles to prevent injury to personnel when working with batteries.**	
	•				f. Ensure battery (15) is secured to APU frame. Ensure battery holddown bracket (16) is properly installed for the type battery used. Visually inspect battery for cracked or leaking casing and broken, burned, or corroded terminals. If solar battery charger is installed, ensure that leads are firmly attached to battery terminals.	Battery is unserviceable, missing, leaking; terminals are burnt; or holddowns are not secure.
						
	•				g. Check for presence of fan belt (17).	Fan belt is missing.
	•				h. Check APU engine for proper mounting to APU frame.	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

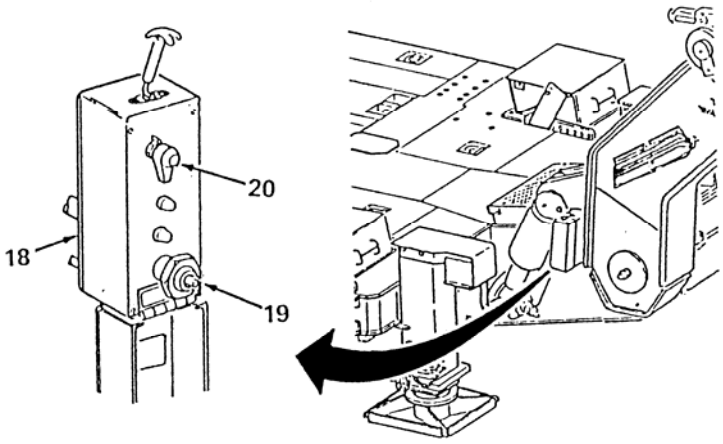
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
7					APU CONTROL BOX	
						
	•				a. Inspect APU control box (18) for secure mounting and corrosion. Ensure APU throttle control (19) and START switch (20) operate properly without binding or sticking. START switch (20) should return to OFF position when released from GLOW or START position. Ensure throttle is pushed in and START switch is in OFF position. Start APU (para. 2-16).	Controls fail to operate or APU does not start after four attempts. Oil pressure indicator light does not go off within 15 seconds of starting APU.
					WARNING **Use eye and ear protection and protective gloves when inspecting the APU while it is running or serious injury to personnel could result from moving parts, excessive noise level, and engine heat.** **When checking for leaks, never open any type of fluid holding tanks during operation or while under pressure or severe burns from the spraying of hot fluids may result.**	
	•	•			b. With APU running, check for unusual noises, excessive or discolored exhaust smoke, or fluid leaks from APU. Check for APU coolant, fuel, oil, and hydraulic leaks. Ensure APU responds to throttle. control. Leave APU running.	Any Class III leaks, excessive noise, or discolored exhaust.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

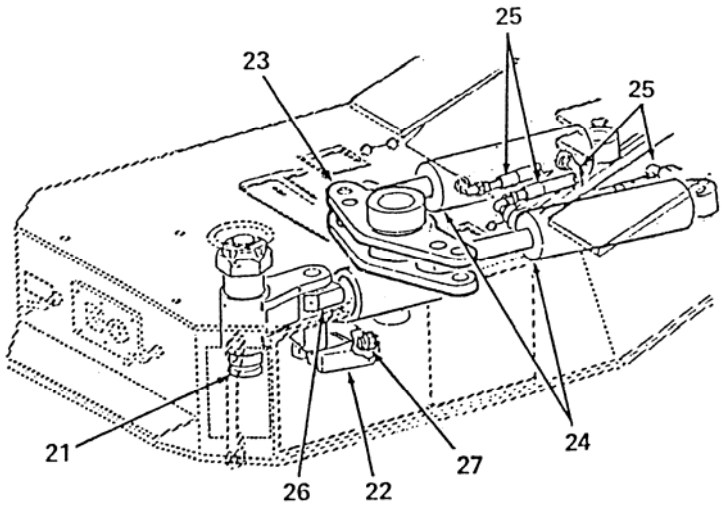
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
8					STEERING CONSOLE	
						
					NOTE **The hydraulic component/system inspection is a multiple point inspection that must be performed each time a hydraulic component/item is encountered.**	
	•				a. Inspect steering console for condition of kingpin (21), steering wedge assembly (22), steering plate (23), steering cylinders (24), hydraulic hoses (25), and slider bar (26). Check for cracks, dents, leaks, and presence of lubrication. If semitrailer is coupled to tractor, ensure that steering wedge is snugly seated in fifth wheel vee.	Any cracks or Class III leaks.
			•		b. With semitrailer uncoupled from tractor, check steering wedge lockwasher (27) for condition. If flat, cracked, or missing, obtain replacement from unit maintenance and install.	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

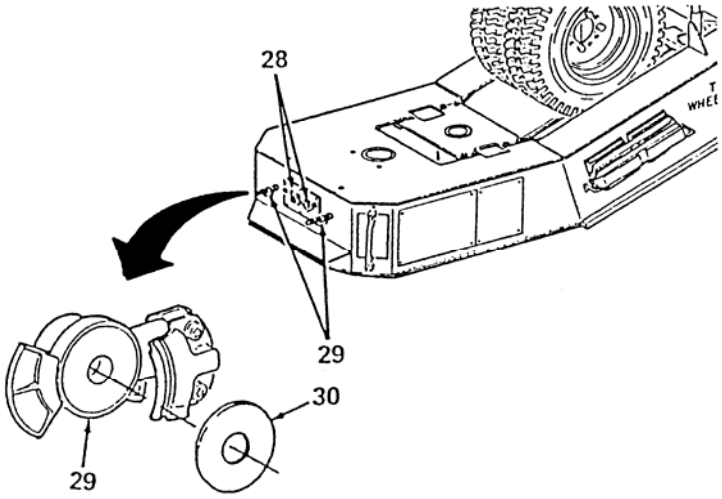
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
9					INTERVEHICULAR CONNECTIONS	
						
					NOTE **The electrical/air system component and system inspections on the semitrailer are multiple inspections that must be performed each time an electrical/air system component is encountered.**	
	•				a. Inspect two electrical connectors (28) for secure mounting and damage.	Connectors loose or damaged making them inoperable.
	•				b. Inspect pins for bent, burned, or broken condition. Look for foreign matter buildup.	
	•				c. Inspect gladhands (29) for secure mounting and for damaged or missing packing is (30).	Gladhand or packing is missing, damaged, or leaking
	•	•			d. Couple tractor and semitrailer (para. 2-24) and listen for air leaks.	Leaks exist that prevent reaching system pressure at idle.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

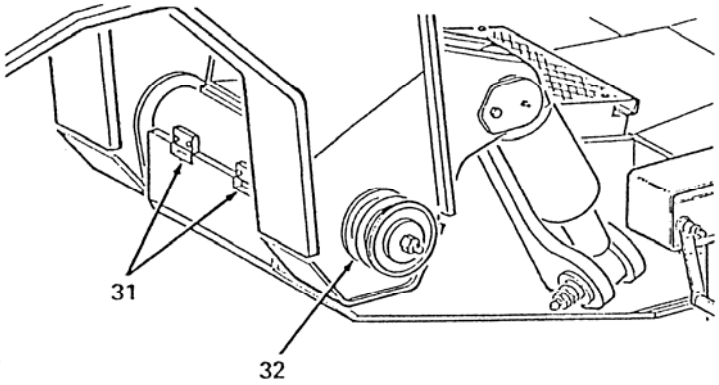
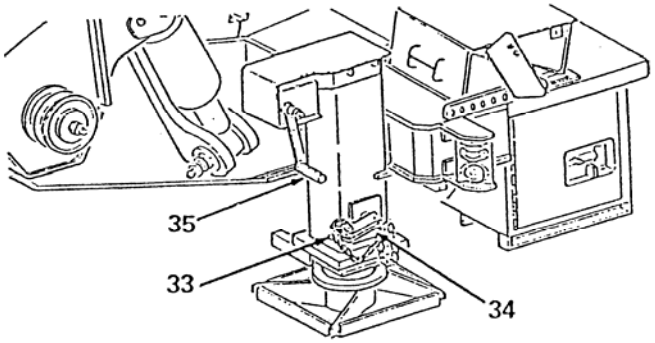
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
10					PIVOT PIN 	
	•				a. Ensure two locking pins (31) and attaching hardware in place and secure.	Hardware is missing.
						For recovery of disabled vehicles:
	•	•			b. Check cable guide pulley (32) for wear, cracks, binding, and obvious damage.	Pulley is cracked, so severely gouged that it tears or shreds cable, or will not turn.
11					FRONT SUPPORT LEGS 	
	•				Inspect front support leg welds and attaching/mounting hardware. Remove linch pin (33) and retaining pin (34). Operate handcrank (35) to ensure proper operation without binding.	Front support leg is inoperative.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

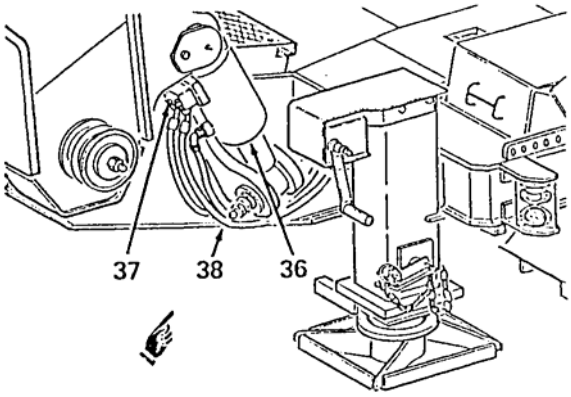
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
12					GOOSENECK PIVOT CYLINDER 	
	•		•		Inspect gooseneck pivot cylinders for damage, missing hardware, and leaks on hydraulic cylinder (36), line fracture valve (37), and hydraulic lines (38).	Any Class III leaks or damage to cylinder.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

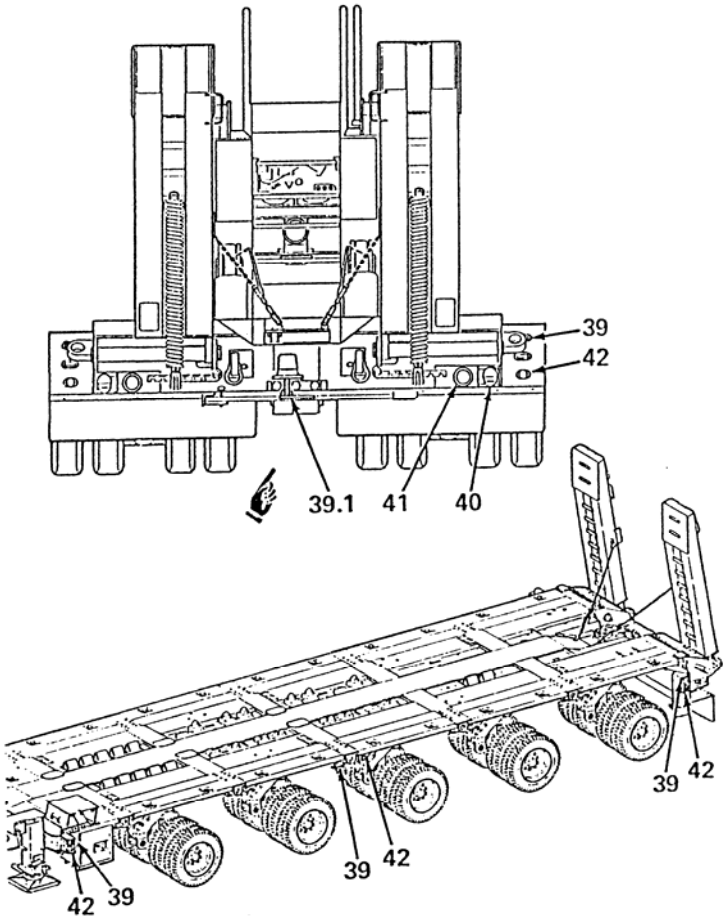
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
13					VEHICLE LIGHTS 	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
	•		•		a. Look for damage and presence of lenses for running lights (39), beacon warning light (39.1), turn indicators (40), and brake lights (41). Look for presence of and damage to reflectors (42). **NOTE** **Some semitrailers have light emitting diode (LED) lights installed.** **A helper is needed while checking the brake lights.**	
	•				b. Operate running lights (39), beacon warning light (39.1), turn indicators (40), and brake lights (41). Ensure all lights work properly, including blackout and marker lights.	Taillights or brake lights not working properly. 25% or more of diodes do not light.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

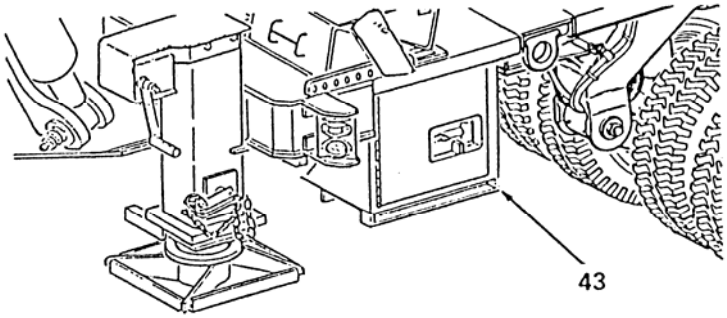
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
14					STORAGE COMPARTMENT AND BII 	
	•				a. Inspect stowage compartment (43) door hinges and latch for damaged or missing parts.	
	•				b. Inventory BII. (See appx. C.) Replace any BII that is damaged or missing.	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

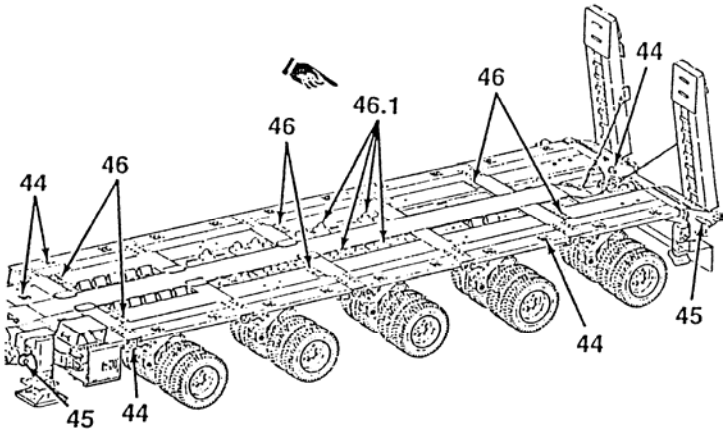
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
15					PAYLOAD/CARGO TIEDOWN RINGS AND LIFTING EYES	
						
						For missions requiring use of tiedown straps:
	•				a. Inspect 34 cargo/transport tiedown rings (44) for damage or missing hardware.	Any cargo/transport tiedown rings are broken or missing.
						For missions requiring use of tiedown chains:
	•				b. Inspect four lifting eyes (45) and six payload tiedown rings (46) for damage and excessive corrosion.	Any payload tiedown rings are broken or missing.
						For missions requiring ISO container brackets:
	•				c. Inspect eight ISO container brackets (46.1) for damage or missing parts.	Any brackets are damaged or missing parts.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

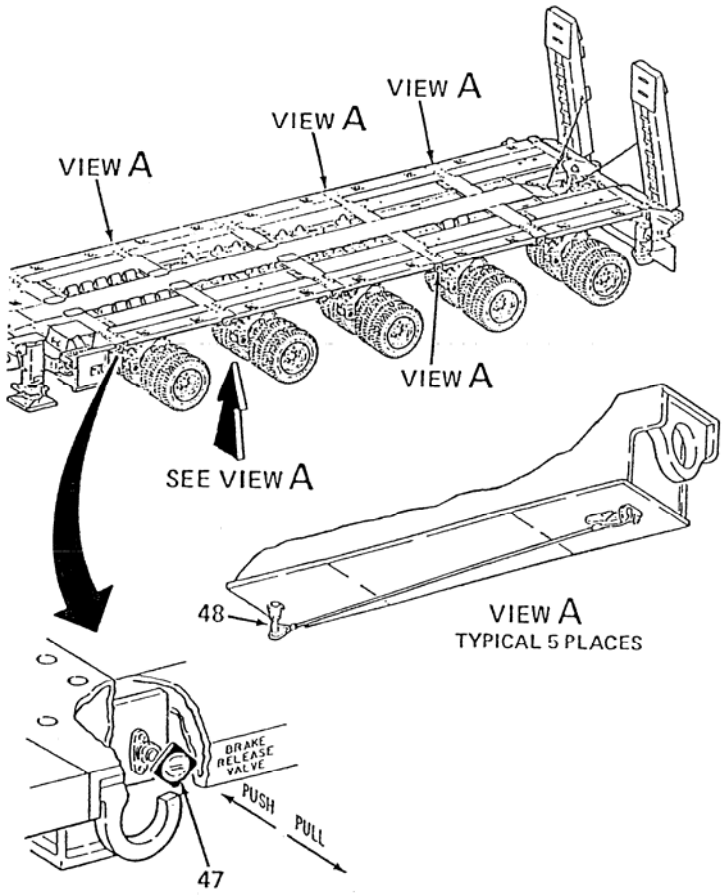
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
16					BRAKE RELEASE VALVE/DRAIN COCKS 	
	•				a. Check pneumatic brake valve (47) for leaks, damage, loose, or missing hardware.	
	•				b. Ensure that emergency gladhand is not pressurized; then, push in valve handle. Handle should stay in and release brakes. Pull out valve handle and ensure brakes engage.	Brake valve is inoperative.
		•			c. Pull and hold each of five air tank drain cock lanyards (48) until moisture is no longer being discharged or all air is released.	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

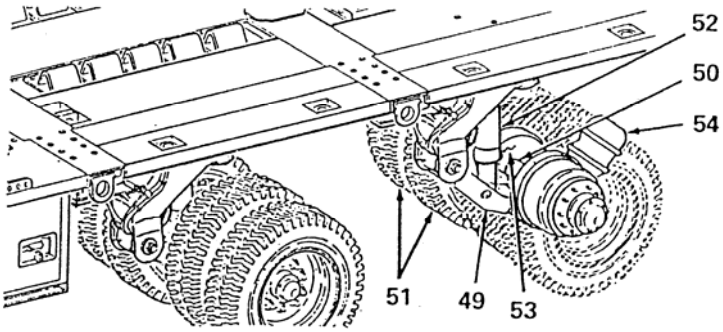
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
17					SUSPENSION SYSTEM	
						
					CAUTION **If mud or debris builds up in the lower suspension arm, it must be cleared immediately or damage to the brake air lines will result.** **If brake dust cover or brake chamber dust plugs are distorted or missing, hole should be covered with tape or other temporary means until dust plug can be replaced or damage to equipment may result.**	
					NOTE **The suspension system consists of 10 assemblies which require multiple point inspections each time a component/item is encountered.**	
	•		•		a. Inspect upper and lower suspension arms (49), axle (50), dual wheel assemblies (51), suspension cylinder (52), dust covers (53), and service/parking brake chamber (54) for leaks, damage, missing parts, and buildup of mud or debris.	Any damage or Class III leaks.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

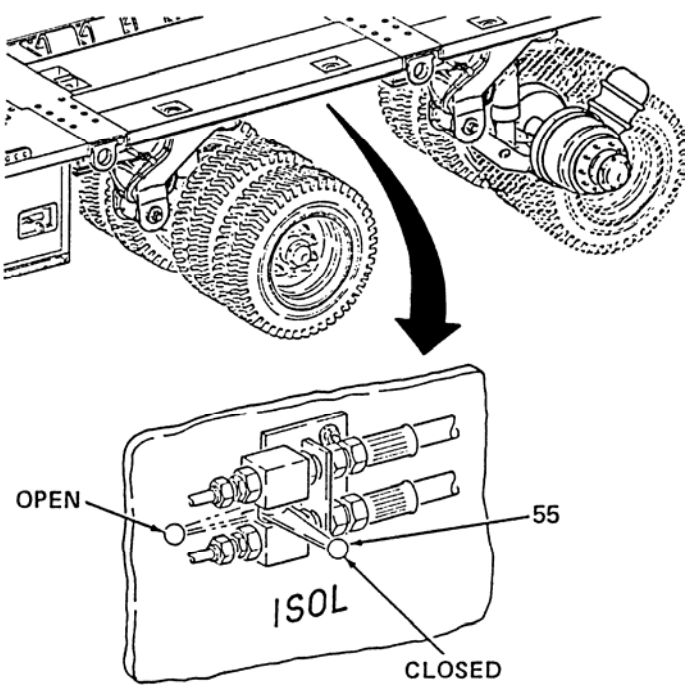
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
17 - CONT					SUSPENSION SYSTEM - CONT	
						
	•		•		b. Inspect suspension isolation valves (55) and all line fittings in the area for leaks, obvious damage, and missing hardware. Ensure handle of valve is open (pushed in toward center of semitrailer).	Any damage or Class III leaks.
		•			c. Check suspension assembly for a failure that would make a suspension assembly nonoperational. Refer to paragraph 2-34 and isolate affected suspension assembly.	More than one suspension assembly is nonoperational.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

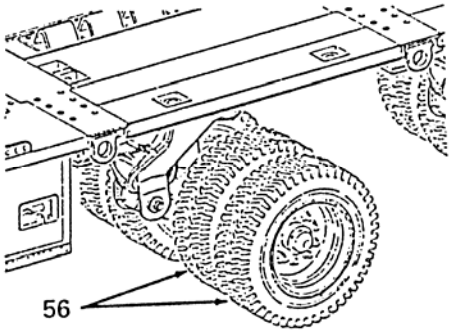
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
18					TIRE AND WHEEL	
						
					NOTE **Any of the defects identified in step a below will be considered a tire/wheel failure and count against the six tire/ wheel failures allowed in step d below.**	
	•		•		a. Inspect each tire (56) for cuts, cracks, bulges, blisters, ripples, foreign objects, unusual tread wear, or other defects (such as exposed cords or protruding filaments). Ensure all lug nuts are present and appear tight. Inspect valve stems for leaks and cuts and for the presence of valve cap. Inspect each wheel for obvious damage.	Three or more nuts are missing from any wheel.
	•		•		b. Strike tires with blunt object to identify flat or underinflated tires.	One or more flat tires that will not hold air.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
					WARNING **Always use a snap-on chuck, an extension air hose (10 ft (3.1m) minimum), and an in-line pneumatic tire inflator gage and stay out of the sidewall trajectory area when inflating tires that are mounted on the M1000 Semitrailer. Failure to do so could result in serious injury or death.** **NOTE** **Always check air pressure before moving the M1000 Semitrailer and when the tires are cold. During use, tires generate heat which increases pressure and will provide an inaccurate reading.**	
				•	c. Check tire (56) pressure (including spares) with tire gage. If tires are not inflated to proper pressure of 95 psi ±5 psi (655 kPa ±34 kPa), adjust pressure using the inflator gage with 10 ft extension airhose.	
					NOTE **This task allows for exchanging up to six tire and wheel assemblies for multiple tire/wheel failures.**	
		•			d. Check if semitrailer has multiple tire and wheel failures and existing spare tires are not enough to repair all failures. One suspension assembly may be isolated and tires on isolated suspension assembly used as required. Remove and replace tires until all defective tires/wheels are stowed on spare wheel carrier and isolated suspension assembly. Remove and replace tires and wheels (para. 3-6 thru 3-10) and isolate affected suspension assembly (para. 2-34).	More than six tires/wheels fail.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

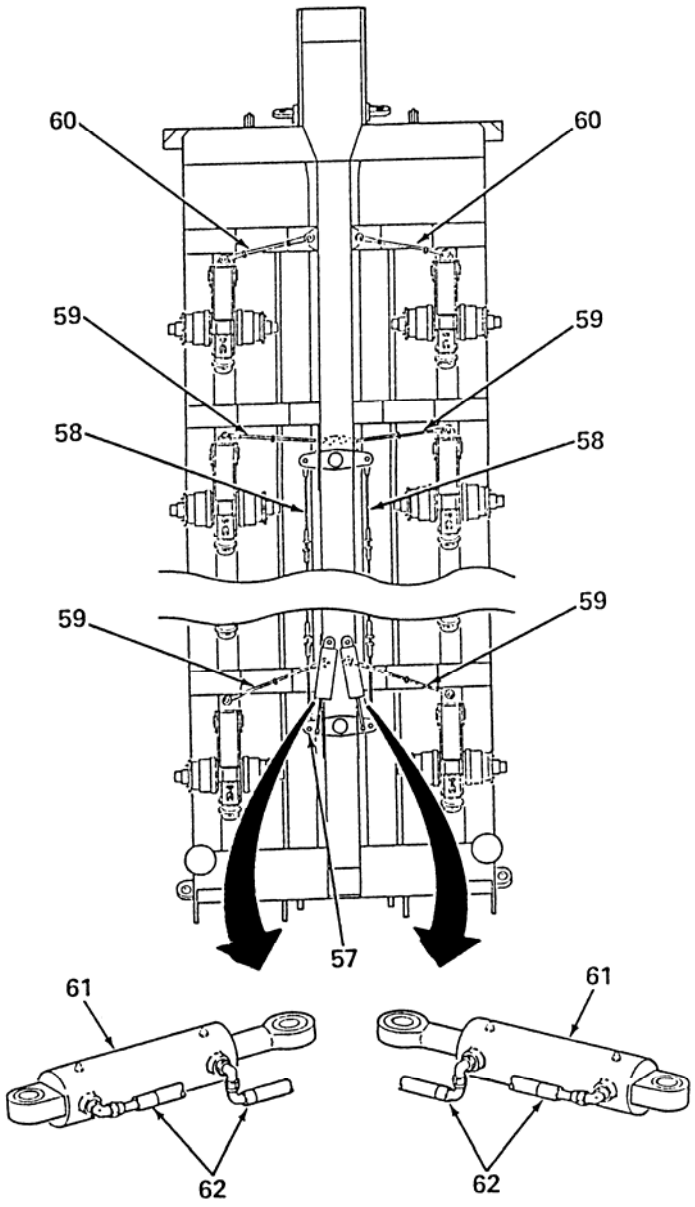
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
19					STEERING INSTALLATION 	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
					WARNING **Prior to inspection, if the platform was raised, no one shall go under the semi-trailer unless all support legs have been lowered and are supporting platform or serious injury to personnel may result.** **NOTE** **The steering installation consists of four steering plates and interconnecting linkages that require multiple point inspections each time a component/item is encountered.**	
	•				a. Check four steering plates (57), all longitudinal struts (58), all connecting links (59), and two fixed linkages (60) for breaks and secure mounting.	Any links are broken or not attached.
	•		•		b. Check steering cylinders (61) and hydraulic lines (62) for leaks, defects, and secure mounting.	Any Class III leaks.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

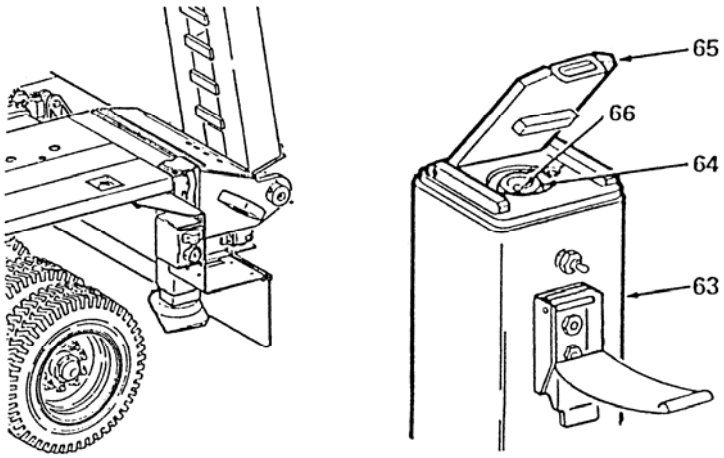
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
20					REAR SUPPORT LEGS 	
	•				a. Inspect rear support legs (63), welds, and attaching/mounting hardware. Operate handcrank (64) on each support leg to ensure proper operation without binding. Ensure protective covers (65) are in place.	Rear support legs are inoperative or missing.
	•				b. Check that rear support legs (63) are fully retracted and the cover closes freely and latches properly. Socket head screw (66) will be positioned outboard.	Legs cannot be retracted or tightened.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

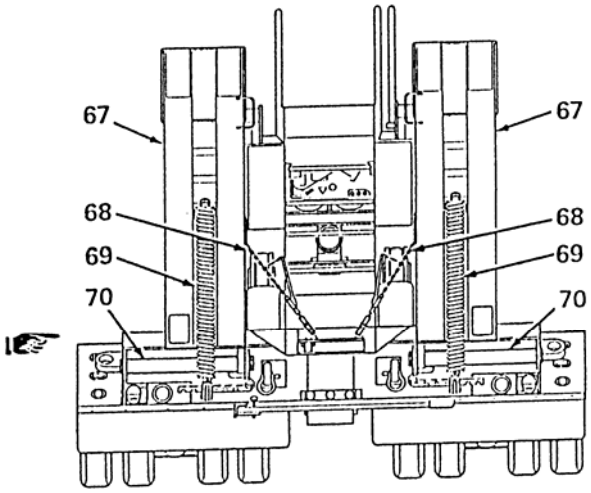
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
21					LOADING RAMPS 	
	•				a. Inspect ramps (67), tiedown chains/load binders (68), ramp spring and guide rod assembly (69), and pivot shafts (70) for obvious damage.	
	•				b. Lower and raise ramps (para. 2-20) and check for proper operation.	Ramp(s) cannot be lowered or raised properly.
	•				c. Ensure loading ramps (67) are raised and tiedown chains/load binders (68) are secured with no sag in the chain.	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

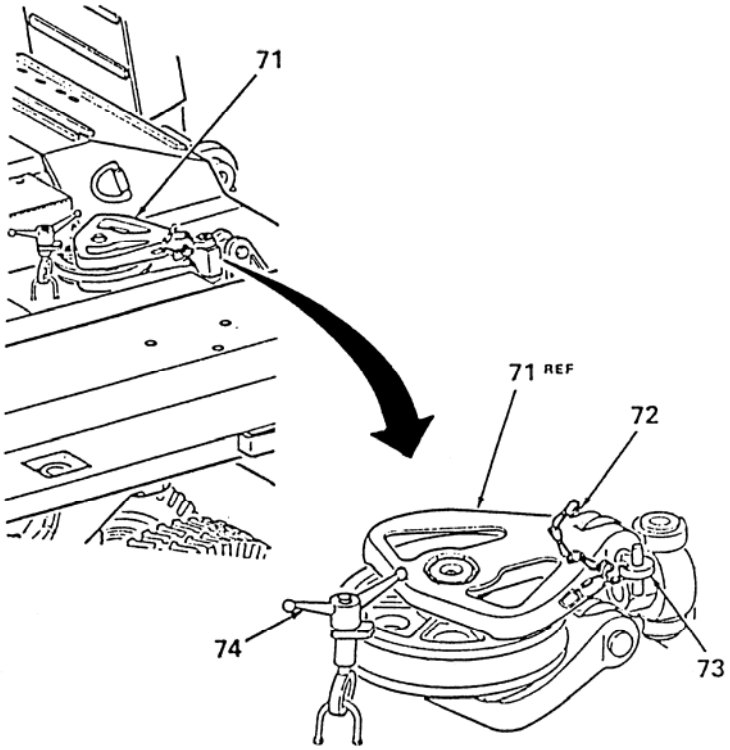
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
22					SNATCH BLOCK 	
	•	•			Inspect snatch block (71) for obvious damage and secure mounting. Make sure locking pin (linch pin) assembly (72) is properly installed to secure keeper pin (73). Check that snatch block (71) is in proper stow position and is held firmly secured by stow clamp handle (74).	For missions requiring dual winch unloading: Snatch block is cracked or gouged so severely that it tears or shreds the cable, cannot be moved, or will not operate.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

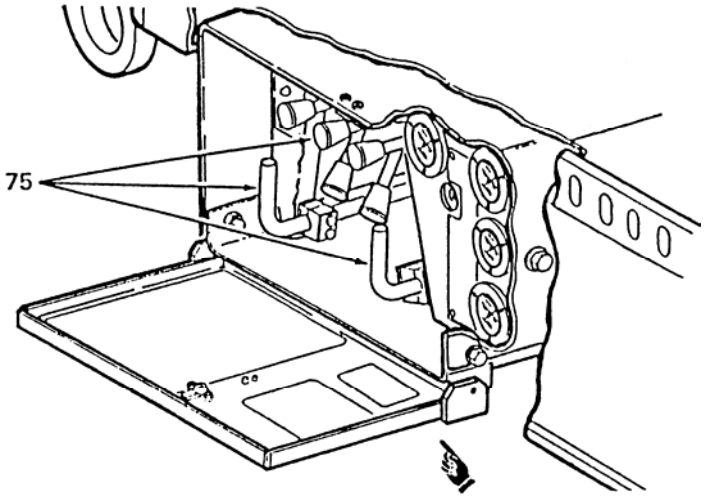
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
23					HYDRAULIC CONTROL MODULE 	
	•		•		a. Inspect hydraulic control module (75) for leaks, obvious defects, and secure mounting. Ensure control valve handles operate freely without binding or sticking.	Any Class III leaks or difficult operation of any handles.
	•				b. Operate hydraulics in accordance with chapter 2, section III. Check for leaks, erratic operation of hydraulic components, and unusual noises during operation.	Any Class III leaks or erratic operation.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

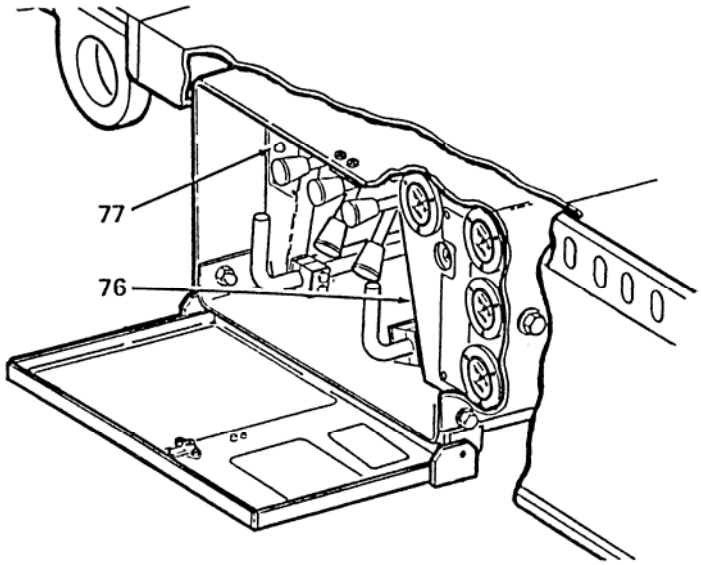
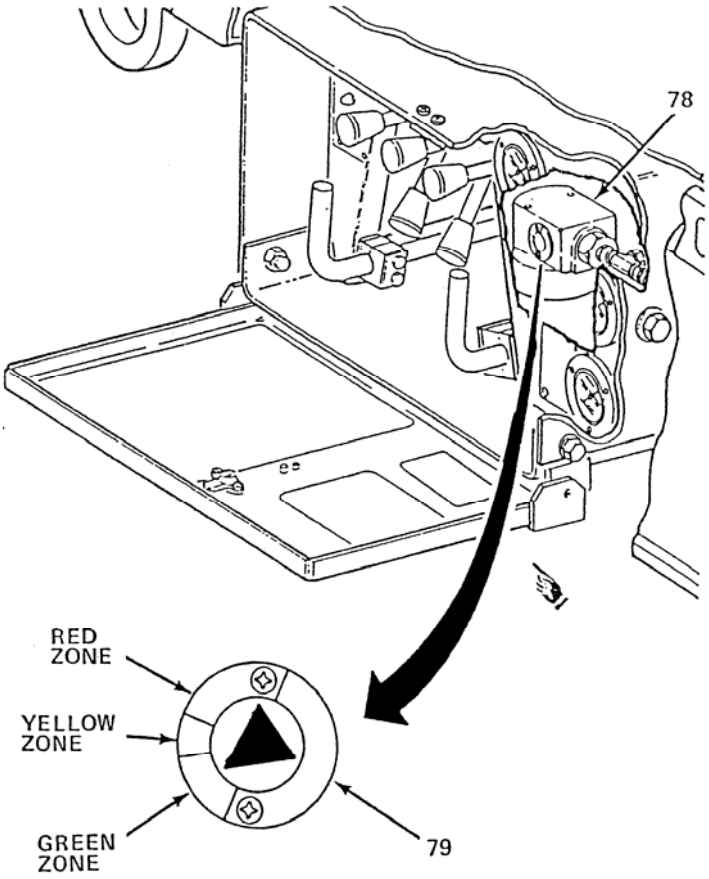
Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
24					HYDRAULIC PRESSURE GAGES 	
	•				a. Inspect hydraulic pressure gages (76) for leaks, obvious defects, and secure mounting.	Any Class III leaks, obvious discoloration of gage fluid, or bulging of gage face.
	•				b. With clearance marker lights on, check steering low pressure indicator light (77). If light is lit, recharge steering system (table 3-1, item 23, step 1).	
	•		•		c. If semitrailer is coupled to tractor, ensure that gooseneck isolation valve is in RUN position and suspension shut-off valve is in SHUT-OFF position (handle pushed inward).	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - CONT

B-Before Operation D-During Operation A-After Operation W-Weekly

Item no.	Interval B	D	A	W	ITEM TO BE INSPECTED Procedure	Equipment is not ready/ available if:
25					HYDRAULIC PRESSURE FILTER ASSEMBLY 	
	•		•		a. Inspect area around hydraulic pressure filter assembly (78) for leaks.	Any Class III leaks.
		•			b. Check position of indicator (79). Indicator should read in green zone. If reading in yellow, element should be replaced as soon as possible.	Indicator in red zone after oil has warmed to normal temperature.

Section III. OPERATION UNDER USUAL CONDITIONS

PARA. NO.	TITLE
2-15.	Initial Adjustments and Daily Checks
2-16.	APU Startup and Shutdown
2-17.	APU Cold Weather Starting
2-18.	Adjusting Gooseneck
2-19.	Adjusting Platform Height
2-20.	Operating Loading Ramps
2-21.	Operating Manual Steering
2-22.	Operating Front Support Legs
2-23.	Operating Rear Support Legs
2-24.	Tractor/Semitrailer Coupling and Uncoupling
2-25.	Highway Driving
2-26.	Loading and Unloading Able Payloads
2-27.	Dual Winch Loading and Unloading
2-28.	Deleted

2-15. INITIAL ADJUSTMENTS AND DAILY CHECKS

a. Before you operate the semitrailer, perform the Before (B) PMCS (table 2-1) and do all the required preventive maintenance.

b. Know the capabilities of the semitrailer and do not exceed them.

c. Know the capabilities and all limitations of the tractor, when coupled, and do not exceed them.

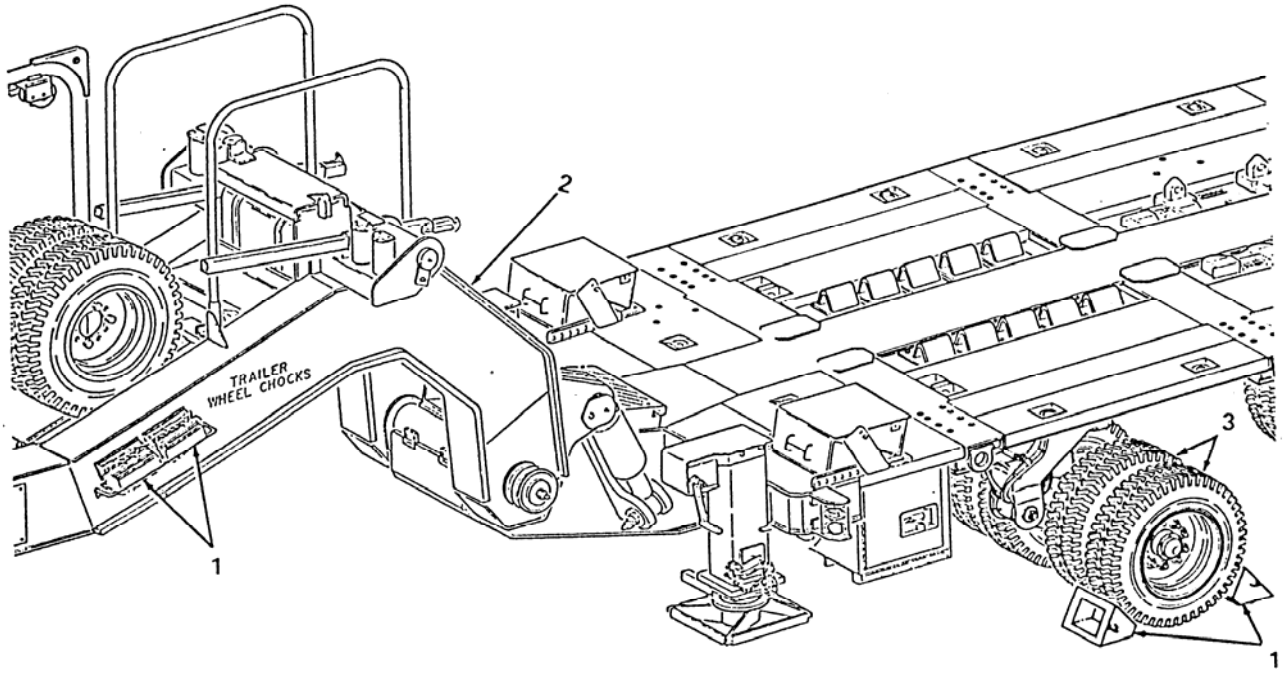
d. Know how to use the gages, indicators, and control features of the semitrailer in the safest manner.

2-16. APU STARTUP AND SHUTDOWN

a. To start the APU, proceed as follows:

(1) Ensure semitrailer is parked on level ground. If tractor and semitrailer are coupled, apply semitrailer parking brakes.

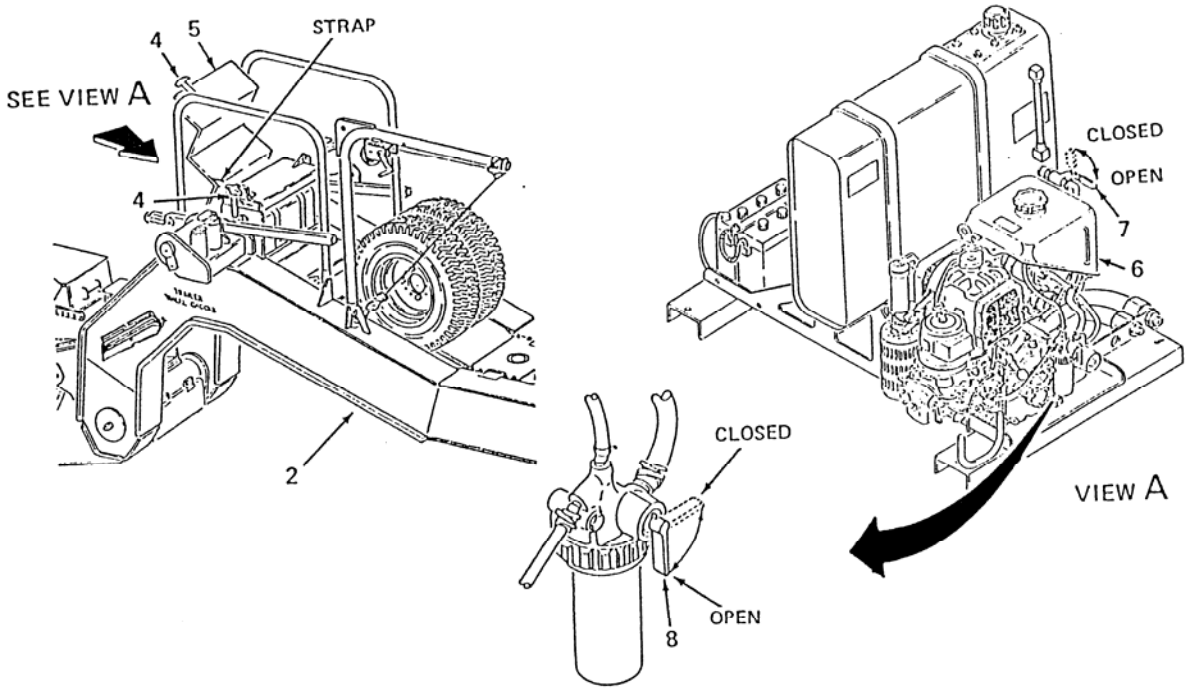
(2) Remove four wheel chocks (1) from gooseneck (2). Place wheel chocks in front and behind each outer dual tire (3) on both curbside and streetside #1 bogies.



WARNING

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on or trip over it. Injury to personnel or damage to equipment may result.

(3) At rear of gooseneck (2), gain access to APU (6) by unhooking step retainer (4) and raising step section (5) up and forward. Secure by hooking top step retainer (4) to strap on step section (5).



2-16. APU STARTUP AND SHUTDOWN (CONT)

CAUTION

The hydraulic tank oil valve must be open prior to starting the APU or serious damage to the hydraulic pump will result.

(4) Open hydraulic tank oil valve (7), handle in line with valve body.

(5) Check that fuel petcock (8) is in open position, handle in line with filter body.

(6) Unhook strap and lower step section (5) to normal position. Secure in place by hooking step retainer (4) to catch on fixed bottom step section.

WARNING

Hearing protection is required within 10 feet (3m) of the APU when the APU is running or injury to personnel may result.

(7) Open cover (9) to APU control box (10). Press knob and pull out throttle control (11) fully.

CAUTION

Oil pressure light must go out within 15 seconds. If oil pressure light stays lit, shut down APU immediately or damage to equipment may result.

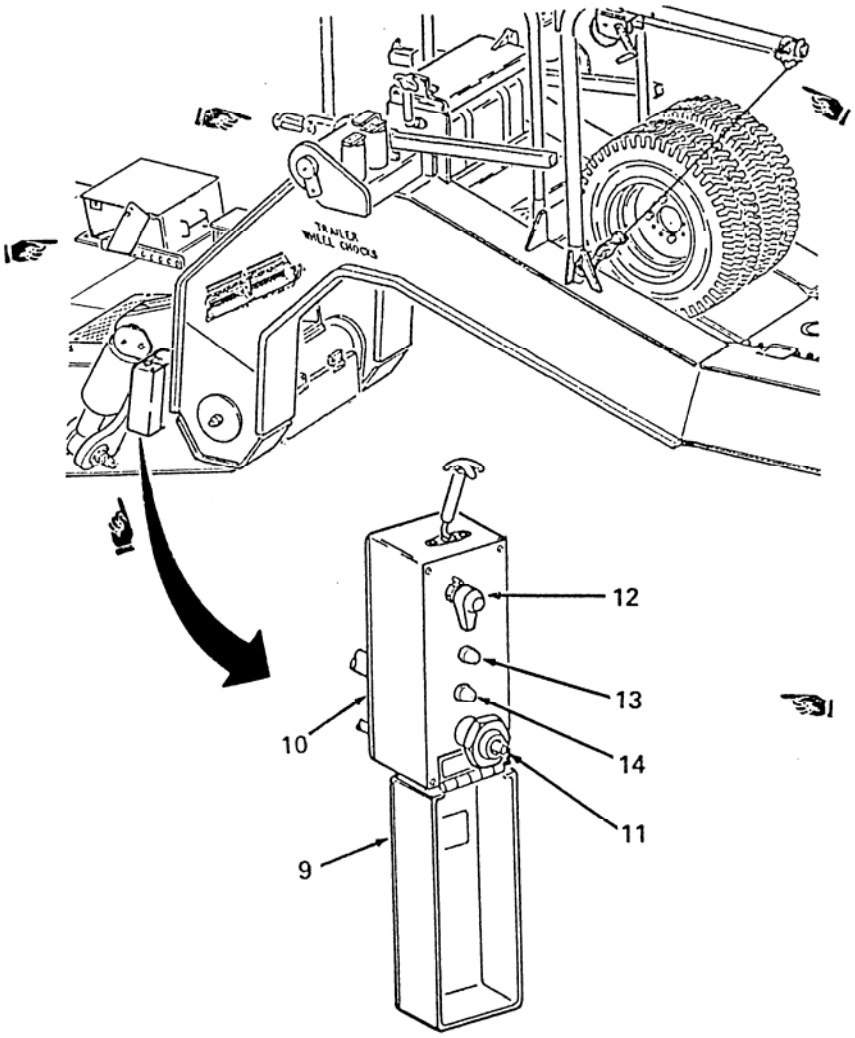
NOTE

On APU with APU engine serial number 504697 and subsequent, the glow plug indicator is changed from a glow-type indicator to a lamp driven by a timer.

(8) Turn START switch (12) counterclockwise to GLOW position and hold. Observe (a) or (b) as follows:

(a) In about 15 to 20 seconds, depending upon outside ambient temperature, the glow plug indicator (glow type) (13) will glow brightly.

(b) The glow plug indicator (lamp) (13) will light immediately. In five seconds the light will extinguish, indicating that the glow plug is warm enough to assist in starting.



CAUTION

If the APU fails to start within 15 seconds, release the switch from the START position to prevent overheating of the starter motor. Allow the starter motor to cool 1 to 2 minutes before trying again. If the APU fails to start after four tries, notify unit maintenance.

Do not rotate START switch to the START position while the starter motor is still turning from the previous try. This could result in serious damage to the starter motor and engine flywheel ring gear.

After APU has started, rotate START switch to OFF position or damage to equipment may result.

(9) Turn START switch (12) clockwise to START position and hold for 15 seconds or until APU starts.

(a) Once APU starts, immediately rotate START switch (12) to OFF position.

2-16. APU STARTUP AND SHUTDOWN (CONT)

(b) If APU fires but does not start, rotate START switch (12) to OFF position, wait for engine to stop turning, and try again.

(c) If APU fails to start after four attempts, rotate START switch (12) to OFF position and notify unit maintenance.

(10) Once APU starts, check oil pressure indicator light (14). If oil pressure indicator light (14) does not go out when APU starts and runs for 15 seconds, shut down APU by pushing in throttle control (11) all the way. Notify unit maintenance. If oil pressure indicator light (14) does go out, proceed with step (11).

2-16. APU STARTUP AND SHUTDOWN (CONT)

CAUTION

Do not subject the APU to any load until it has warmed up properly, or premature failure may occur and life of the engine may be shortened.

(11) Allow APU to run at least 3 to 5 minutes so that it will warm up properly.

(12) Reduce engine speed to idle by pushing inward on throttle control (11). APU is ready for normal operation.

(13) Whenever operations permit, allow APU to run continuously for at least 30 minutes to recharge APU battery. For example, when APU is started for PMCS, let it run until all PMCS tasks are completed. This is especially important if:

(a) The semitrailer has been stored and APU has not been started for several days.

(b) The weather is cold.

b. To shutdown APU, proceed as follows:

(1) Push in throttle control (11) completely to stop APU.

(2) Ensure low oil pressure indicator light (14) and glow plug indicator (13) are not lit. Close cover (9) to APU control box (10).

WARNING

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on or trip over it. Injury to personnel or damage to equipment may result.

NOTE

Steps (3), (4), and (5) below apply only if semitrailer is to be placed in extended (short or long term) storage.

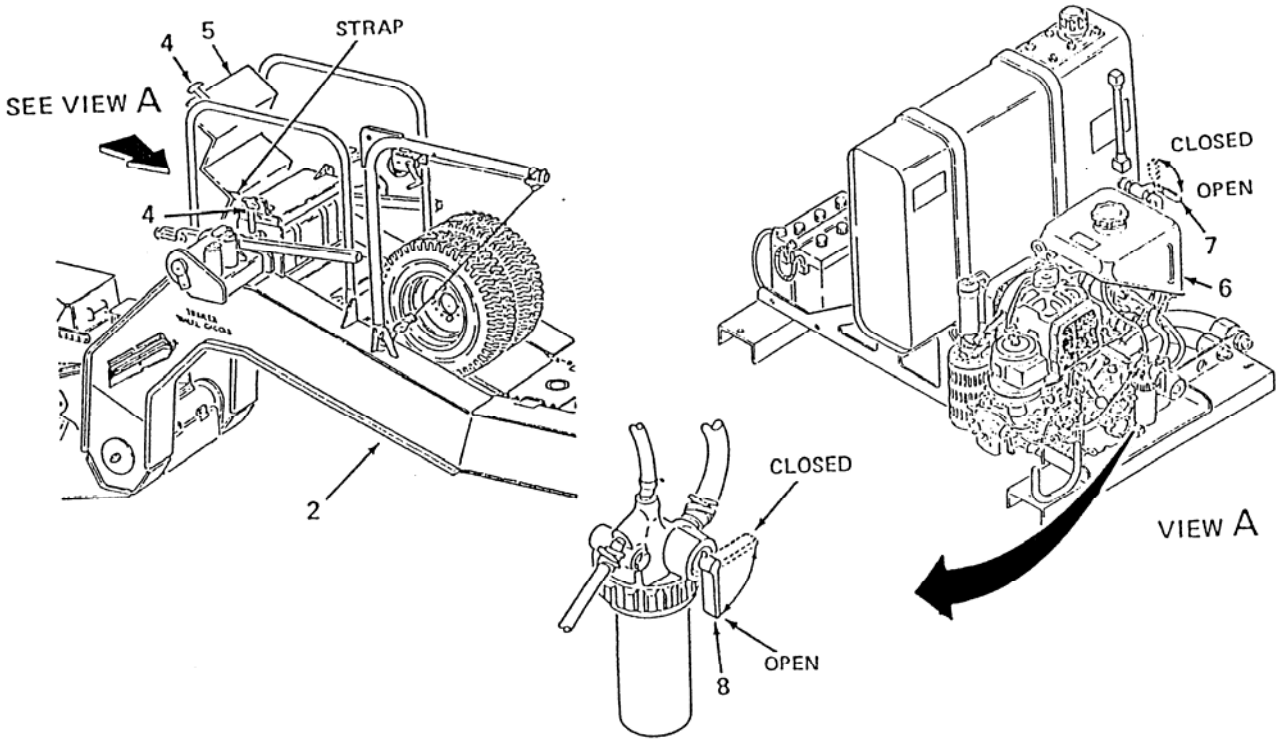
(3) At rear of gooseneck, gain access to APU (6) as follows:

(a) At rear of gooseneck (2), unhook step retainer (4) and raise step section (5) up and forward.

(b) Secure by hooking top step retainer (4) to strap on step section (5).

(4) Turn fuel petcock (8) counterclockwise to closed position.

(5) Unhook strap and lower step section (5) to normal position. Secure in place by hooking step retainer (4) to catch on fixed bottom step section.


SEE VIEW A
4
5
STRAP
4
2
CLOSED
OPEN
7
6
VIEW A
CLOSED
OPEN
8

2-17. APU COLD WEATHER STARTING

NOTE

The following procedures apply when ambient temperatures range from 40°F to -25°F (4°C to -31°C). When the temperature is below -25°F (-31°C), refer to Artic Weather APU Starting, paragraph 2-31.

For cold weather starting in temperatures 40°F to -25°F (4°C to -31°C), proceed as follows:

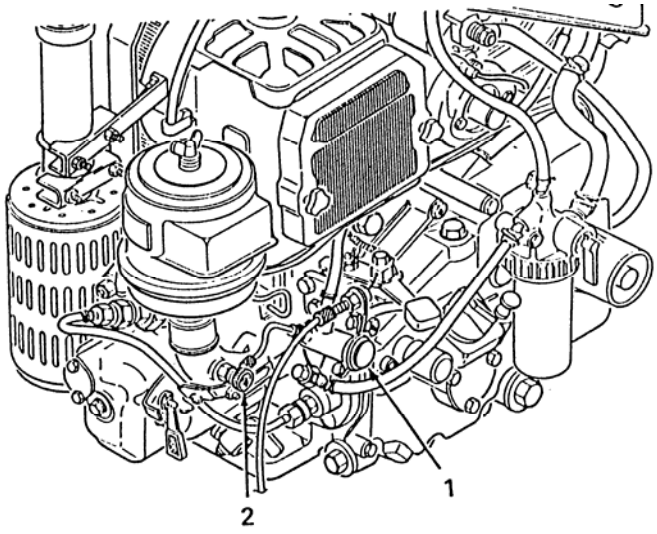
a. Perform steps (1) thru (5) of paragraph 2-16a.

b. Prime jet start by pulling jet start valve (1) knob full out with jet start petcock (2) closed. If knob does not remain out, check that jet start petcock (2) is fully closed; then, pull knob again.

c. Have second person perform paragraph 2-16a, steps (7) thru (9), to start APU.

d. When APU starts to crank over, turn jet start petcock (2) counterclockwise to open. Pump jet start valve (1) three times to prime APU. A few additional pumps may be necessary before engine runs smoothly.

e. Once engine is running smoothly, turn jet start petcock (2) clockwise to close. Secure step section in its normal position (refer to paragraph 2-16a, step (6)) and continue startup procedure in paragraph 2-16a, steps (10) thru (13).



2-18. ADJUSTING GOOSENECK

CAUTION

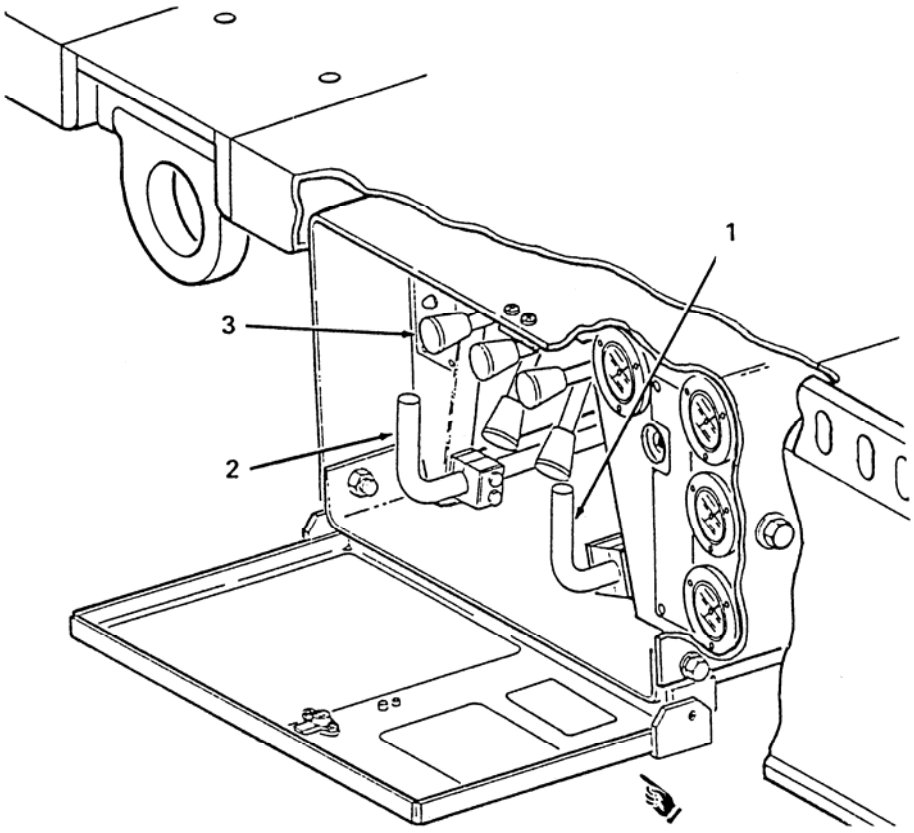
If the semitrailer is coupled to tractor, do not attempt to adjust the gooseneck or damage to equipment may result.

a. Start APU (para. 2-16). Make sure APU throttle control is pulled completely out and APU is running at full speed. Uncouple tractor and semitrailer (para. 2-24).

WARNING

If gooseneck needs adjusting, verify that the front support legs are lowered and supporting the platform or injury to personnel may result.

b. Verify that front support legs are lowered and supporting platform (para. 2-22).



WARNING

Prior to adjusting gooseneck height, ensure that both gooseneck isolation and suspension shut-off valve handles have been pulled outward to the ADJUST position or injury to personnel from unexpected movement or damage to equipment may result.

c. Make sure gooseneck isolation valve handle (1) and suspension shut-off valve handle (2) are pulled outward to ADJUST position. Make sure valve handles are pulled out as far as they will go.

d. Pull up handle of gooseneck valve (3) to raise gooseneck. Once gooseneck reaches highest position and stops, release handle of gooseneck valve (3).

e. Push down handle of gooseneck valve (3) to lower gooseneck. Once gooseneck reaches lowest position and stops, release handle of gooseneck valve (3).

NOTE

When the gooseneck is raised to an intermediate height, it may travel 1 to 3 inches (2.5 to 7.6 cm) upward after the handle is released. This is caused by air trapped in the cylinder and can be stopped immediately by momentarily moving the handle to the down position. If this occurs, it may be minimized by operating the gooseneck full up to full down for two full cycles.

f. Raise or lower gooseneck to any desired height.

g. If semitrailer is going to be parked, lower gooseneck by pushing handle of gooseneck valve (3) until gooseneck reaches lowest position and stops; then, release handle.

h. After gooseneck adjustments are complete, shut down APU (para. 2-16).

2-19. ADJUSTING PLATFORM HEIGHT

CAUTION

If the semitrailer is loaded, DO NOT make any platform adjustments while uncoupled or severe damage to equipment may result.

a. Start and run APU at full throttle (para. 2-16).

CAUTION

The suspension shut-off valve handle must be pulled outward to the ADJUST position prior to operating any platform/gooseneck valve handles. The suspension shut-off valve isolates the suspension and prevents operation. If the valve handle is not properly positioned for intended operation, severe damage to equipment may result.

b. Pull out handle of suspension shut-off valve (1) to ADJUST position (para. 2-6).

WARNING

Ensure both streetside and curbside front bogie wheels are chocked. After the parking brakes are released, the semitrailer may roll uncontrolled and cause injury to personnel or damage to equipment may result.

NOTE

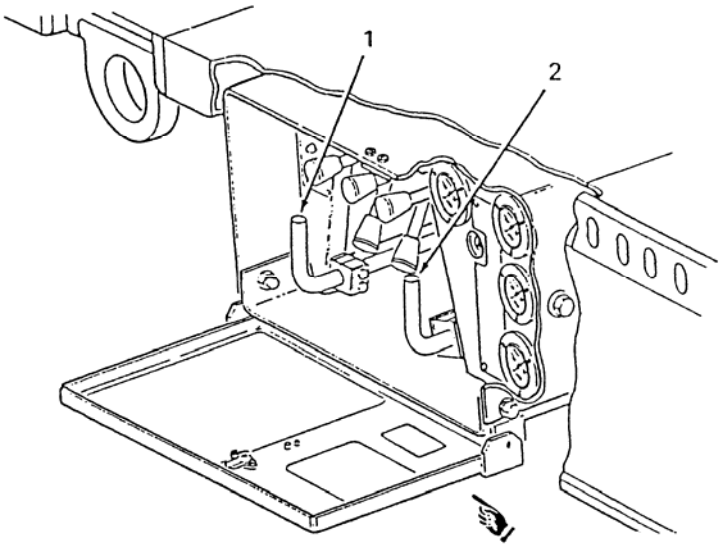
The brakes on the semitrailer should be released when making platform adjustments. If the parking brakes are not released, platform adjustments will be much slower and harder to accomplish.

c. If semitrailer is coupled, release semitrailer parking brakes. If semitrailer is uncoupled and semitrailer air tanks contain sufficient air, push in knob of brake release valve to release brakes (para. 2-8).

WARNING

If semitrailer is coupled to a tractor, the gooseneck isolation valve handle must be in the RUN position (handle pushed inward). If semitrailer is uncoupled and gooseneck needs adjusting, verify that front support legs are lowered and supporting the platform and all personnel are clear of gooseneck before operating gooseneck isolation valve or injury to personnel may result.

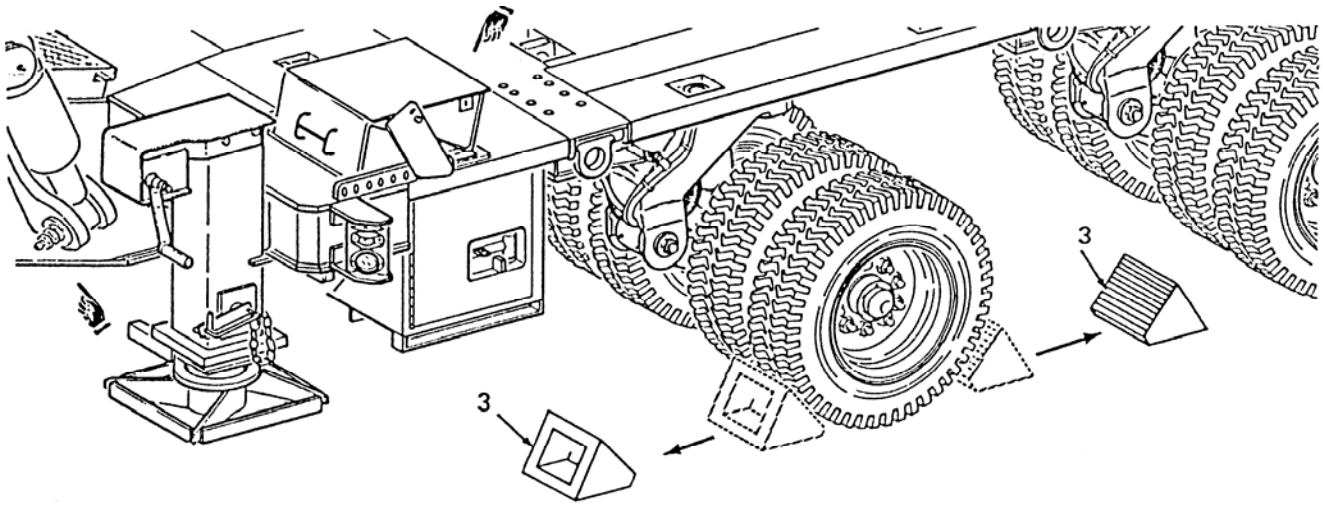
d. If semitrailer is uncoupled and gooseneck needs to be raised, ensure handle of gooseneck isolation valve (2) is in the ADJUST position, handle pulled outward. If semitrailer is coupled, ensure handle of gooseneck isolation valve (2) is in the RUN position, handle pushed inward.



CAUTION

Wheel chocks must be moved away from tires prior to adjusting platform height or damage to wheel chocks or tires may result.

e. Move all four wheel chocks (3) approximately 6 inches (15 cm) away from tires prior to adjusting platform.



2-19. ADJUSTING PLATFORM HEIGHT (CONT)

CAUTION

DO NOT leave semitrailer unattended with suspension raised to highest position. Outside temperatures can cause thermal expansion of the hydraulic fluid and create unwanted pressure build up without means to relieve pressure. Thermal expansion can cause premature failure or severe damage to equipment.

DO NOT move semitrailer with suspension raised to its highest position. Individual bogies may sustain excess load which may result in premature cylinder failure or severe damage to equipment.

NOTE

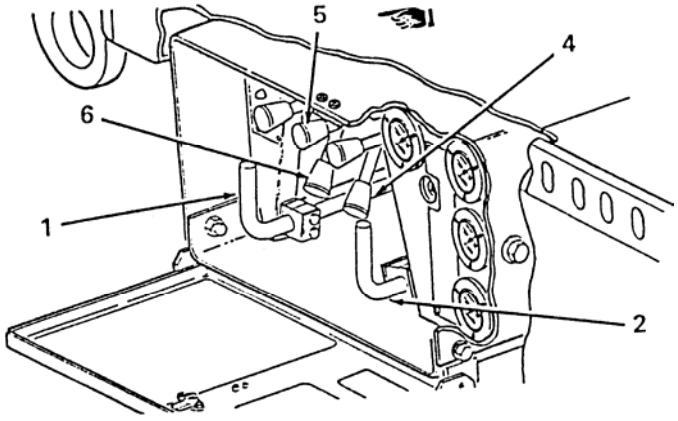
If the platform becomes uneven during adjustment, release valve handle for platform area that is leading the adjustment while holding the other two valve handles. Once the platform evens out, continue to operate all three valve handles to adjust platform.

f. To raise platform, simultaneously pull up and hold handles of front curbside (4), front streetside (5), and rear (6) suspension valves. Once platform reaches highest position, stops, and APU rpm decreases, release all three valve handles.

CAUTION

DO NOT allow suspension to completely bottom out in the lowest position (unless otherwise directed by specific operation or maintenance procedures) or individual bogies may sustain excess load and result in premature cylinder failure or severe damage to equipment. To ensure proper suspension pressure equalization, lower platform until the shortest (compression) suspension cylinder piston still has 1 inch (2.54 cm) of polished chrome exposed.

g. To lower platform, push down and hold rear suspension valve handle (6). Once rear of platform starts to lower, push down and hold handles of front curbside (4) and front streetside (5) suspension valves. Once platform reaches lowest suggested height, release all three suspension valve handles.



h. If semitrailer is uncoupled, difficulty in lowering rear of platform may be experienced due to offset weight of gooseneck. If this problem occurs, proceed as follows:

   (1) Raise platform to normal running height of 43 inches (109 cm) per step f above and lower both front support legs (para. 2-22) to support platform at running height.

   (2) Push down and hold handle of rear valve (6). As rear of platform starts to lower, push down handles for front curbside (4) and front streetside (5) suspension valves.

   (3) As front support legs contact the ground, continue to hold all three valve handles down as rear of platform goes down.

   (4) Pull up handles for front curbside and streetside (4 and 5) suspension valves to raise front of platform.

   (5) When front of platform is high enough to stow front support legs, release both suspension valve handles.

   (6) Raise and secure front support legs (para. 2-22).

   (7) Push down and hold all three valve handles for front streetside and curbside and rear valves (4, 5, and 6) until platform reaches recommended lowest height.

   (8) After lowering platform is complete, evenly raise platform (step f above) and lower platform (either step g or h above).

i. Use one person to check bed height indicators on each of three suspension assemblies (para. 2-7).

j. If necessary, use another person to make adjustments to platform, as needed, to level platform to normal road height of 43 inches (109 cm).

k. Lower front and rear support legs (para. 2-22 and 2-23) to support platform.

l. Lower platform onto support legs.

m. After all platform adjustments are completed, proceed as follows:

   (1) If semitrailer is to be parked uncoupled, lower gooseneck to lowest position (para. 2-18).

   (2) Push in handles of suspension shut-off valve (1) and gooseneck isolation valve (2), as far as they will go to SHUT-OFF and RUN positions. Close and secure cover to hydraulic control module.

   (3) Shut down APU (para. 2-16).

2-19. ADJUSTING PLATFORM HEIGHT (CONT)

WARNING

Ensure that vented dummy coupling is installed on the emergency (red) gladhand prior to releasing brakes with the brake release valve. If a nonvented dummy coupling is installed, the parking brakes cannot be reapplied and injury to personnel may result.

(4) Reapply semitrailer parking brakes using semitrailer brake valve on tractor, if coupled. Apply brakes on semitrailer by pulling knob on brake release valve (para. 2-8) outward. If no other braking applications are required, install dummy coupling onto emergency gladhand.

(5) Move wheel chocks (3) back into place in front and behind tires.

2-20. OPERATING LOADING RAMPS

WARNING

When the ramp stow chains are disconnected from the platform, do not stand behind the ramps or near the path the ramps can travel when being lowered or raised or serious injury to personnel may result.

NOTE

The loading ramps may require span width adjustment to accommodate the intended payload. Adjustment must be accomplished prior to lowering the ramps. If ramps require adjustment, perform step a. If ramps do not require adjustment, proceed to step b.

a. Adjust loading ramps as follows:

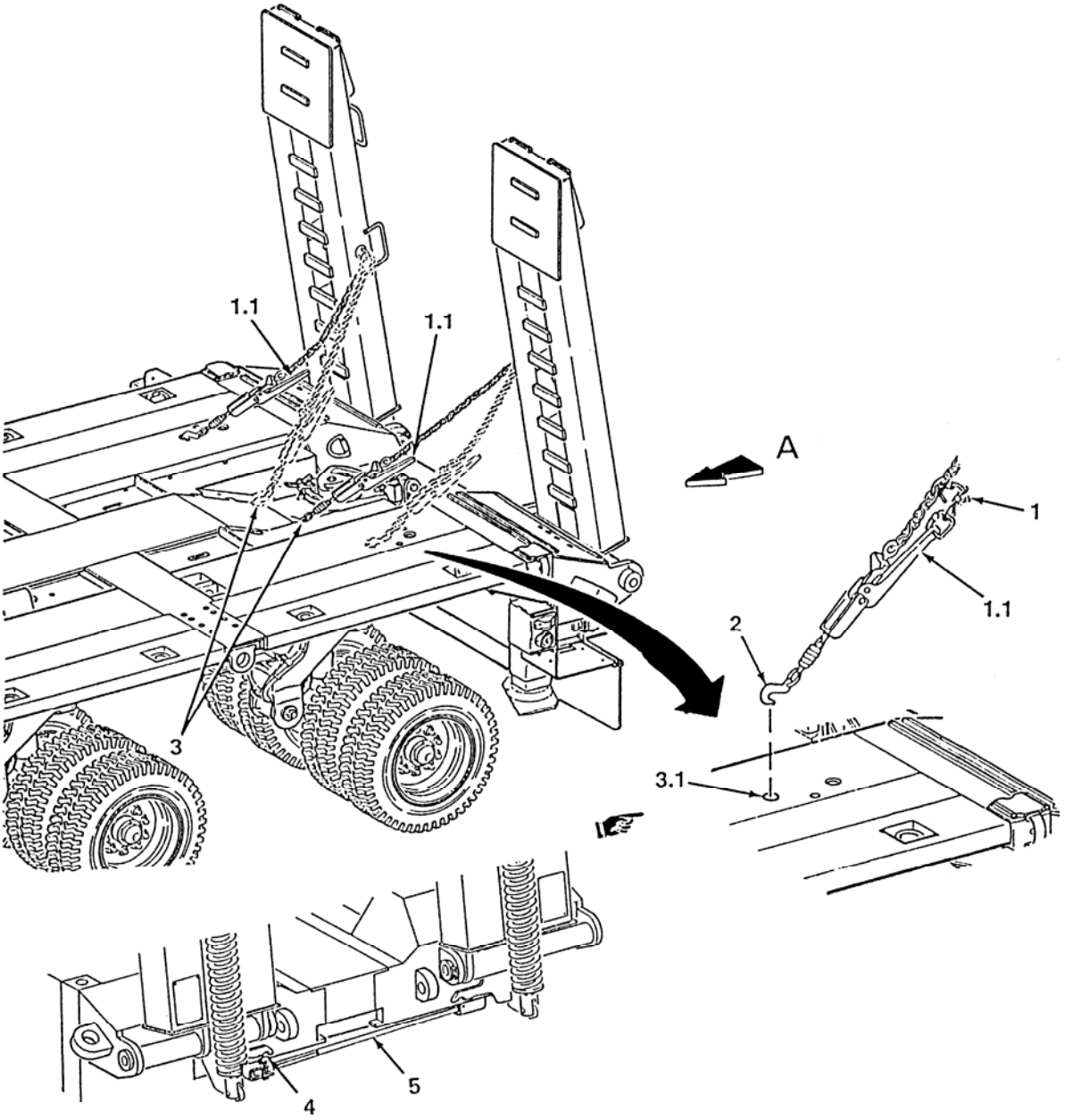
NOTE

The following steps apply to either loading ramp. Adjust ramps one at a time.

(1) Release snap (1) and load binder (1.1). Remove stow chain hook (2) from slotted hole (3) in platform.

(2) Connect stow chain hook (2) to foremost (large) mounting hole (3.1) for aft set of ISO container brackets and close load binder (1.1).

(3) Remove hitch pin (4) and crowbar (5) from rear of platform below loading ramps. Reinstall hitch pin (4) to retain remaining isolation valve handle extension.



VIEW A

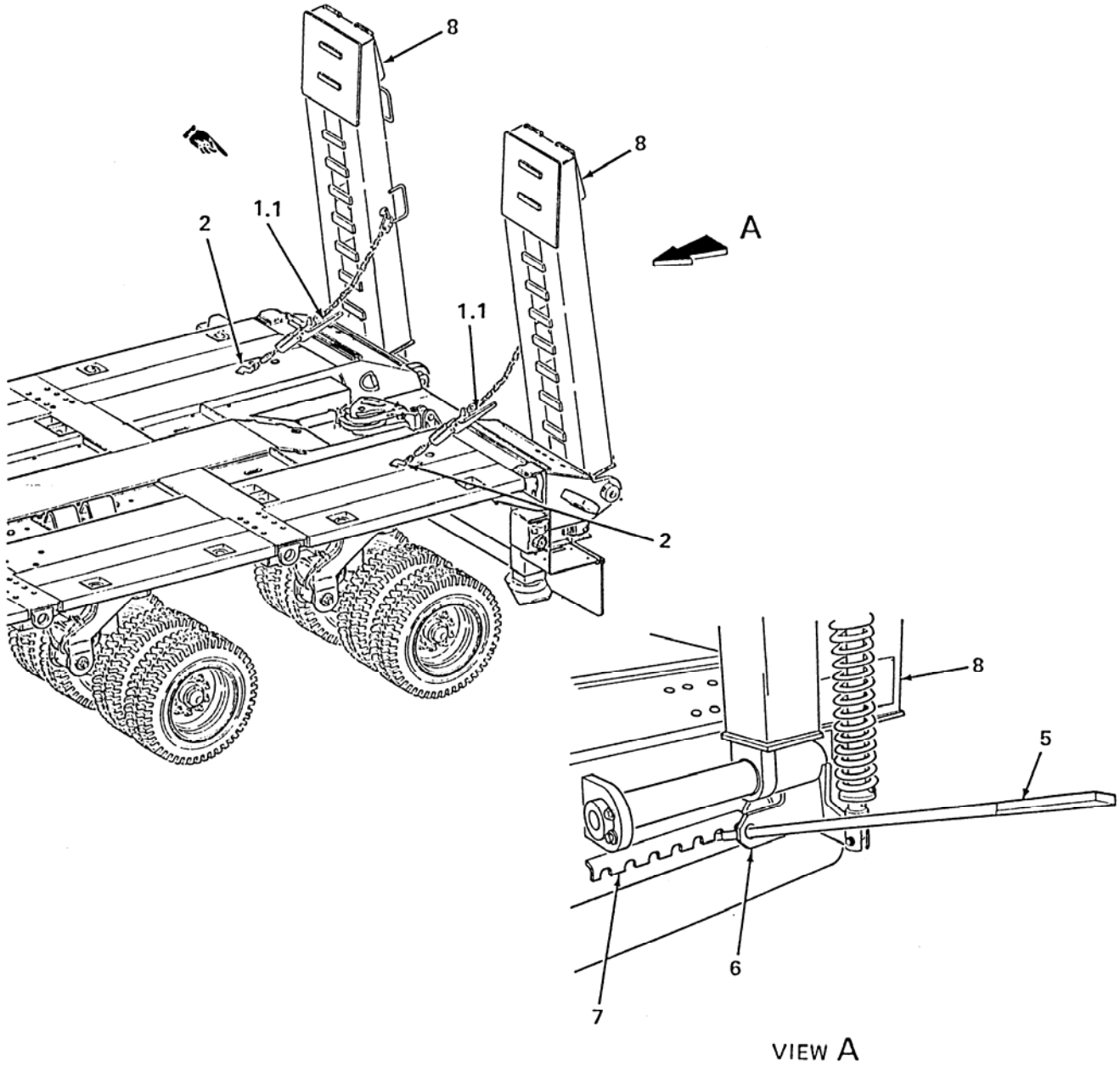
2-20. OPERATING LOADING RAMPS (CONT)

(4) Insert small end of crowbar (5) through hole in ramp lift lever (6) into bar strip (7).

(5) Position one person on rear of platform to push ramp rearward against stow chain until ramp is perpendicular to platform. Second person must push or pull on crowbar (5) in direction required to slide ramp (8) outboard from center.

(6) Continue to place crowbar (5) into holes along bar strip (7) and move ramp to furthest outboard position.

(7) Repeat steps (1) thru (6) above and adjust remaining ramp.



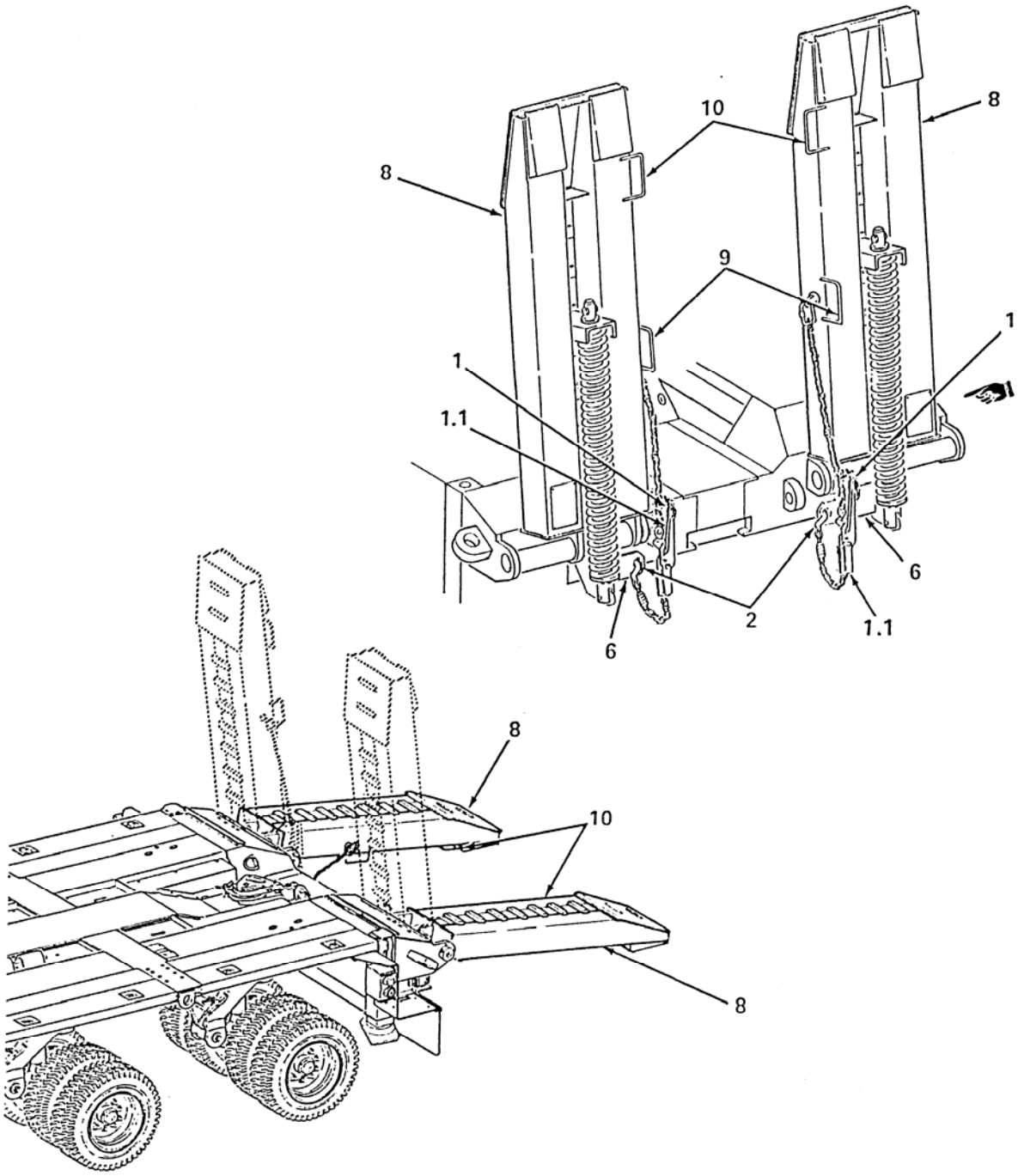
VIEW A

b. Lower ramps as follows:

NOTE

The following steps apply to either loading ramp. Lower ramps one at a time.

(1) Open snap (1) and load binder (1.1). Remove stow chain hook (2) from platform and attach hook into hole in ramp lever (6). Close load binder (1.1).



2-20. OPERATING LOADING RAMPS (CONT)

(2) Standing behind semitrailer, between both ramps, grasp lower handle (9) on loading ramp (8) and pull downward. As ramp swings downward, transition to upper handle (10) and apply pressure until ramp angle is below horizontal; then, push down until ramp is on the ground.

(3) Perform steps (1) and (2) above and lower other ramp.

c. To raise loading ramps, proceed as follows:

WARNING

The spring assisted ramps, when raised from the lowered position, are under extreme tension and raise very quickly. When raising ramps, do not stand on the beavertail or in the path where any portion of the ramp will travel during upward travel or injury to personnel may result.

NOTE

The following steps apply to either loading ramp. Raise ramps one at a time.

(1) Grasp upper handle (10) on ramp (8) and pull upward. Release upper handle (10) as ramp passes horizontal position and continues to raise from spring tension. Grasp lower handle (9) and apply pressure until ramp is firmly against beavertail.

(2) Open load binder (1.1) and unhook stow chain at ramp lifting lever (6).

NOTE

Ramps must be adjusted to furthest inboard position prior to stowing for transport. If ramps require adjustment, perform steps (3) thru (8); if no adjustment is required, proceed to step (9).

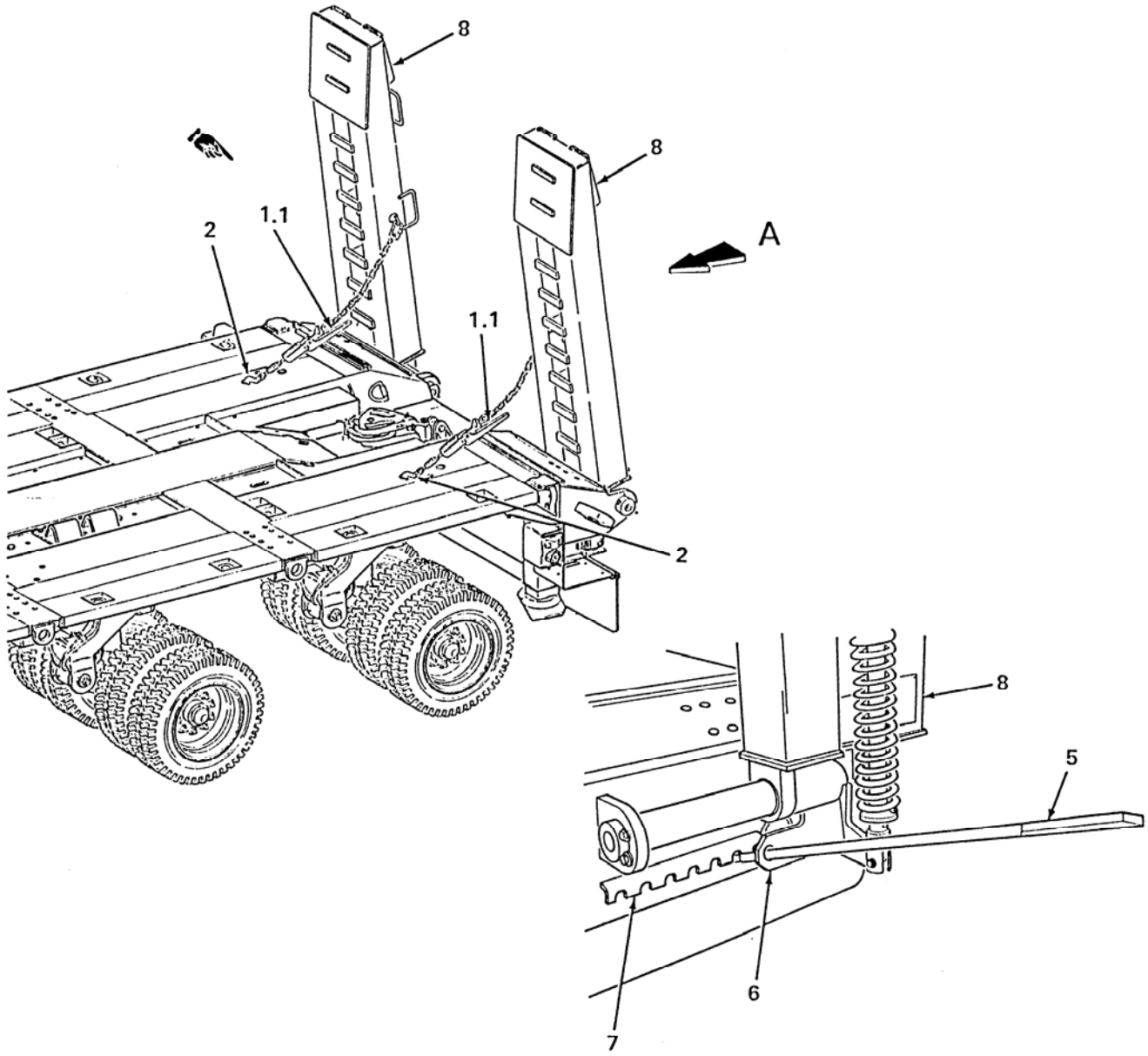
(3) Connect stow chain hook (2) to foremost (large) mounting hole (3.1) for aft set of ISO container brackets. Close load binder (1.1).

(4) Insert small end of crowbar (5) through hole in ramp lift lever (6) into bar strip (7).

(5) Position one person on rear of platform to push ramp rearward until it is perpendicular to platform. Second person must push or pull on crowbar (5) in direction required to slide ramp (8) inboard.

(6) Continue to place crowbar (5) into holes along bar strip (7) and move ramp to furthest inboard position.

(7) Repeat steps (3) thru (6) above to adjust other ramp.

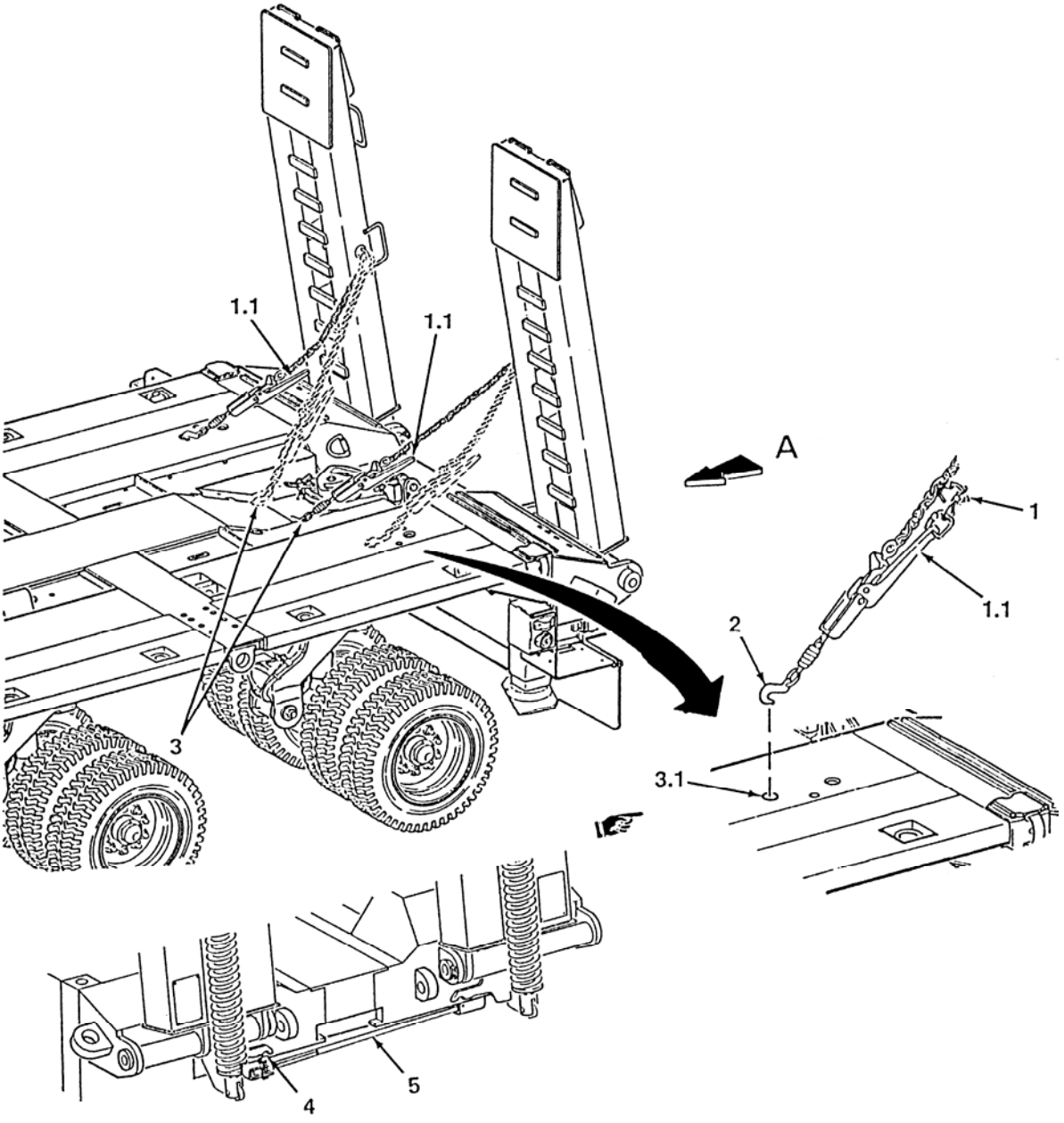


VIEW A

2-20. OPERATING LOADING RAMPS (CONT)

(8) Open load binders (1.1), remove stow chain hooks (2) from ISO container bracket holes, and connect chain hooks (2) at slotted holes (3) in center of platform. Close load binders (1.1) and engage snap (1) to prevent accidental opening. If chain sags with load binder closed, then open load binder, remove quick link at end of chain, and shorten chain until there is no sag.

(9) Remove hitch pin (4) and reinstall crowbar (5) into brackets on rear of platform. Reinstall hitch pin (4).



VIEW A

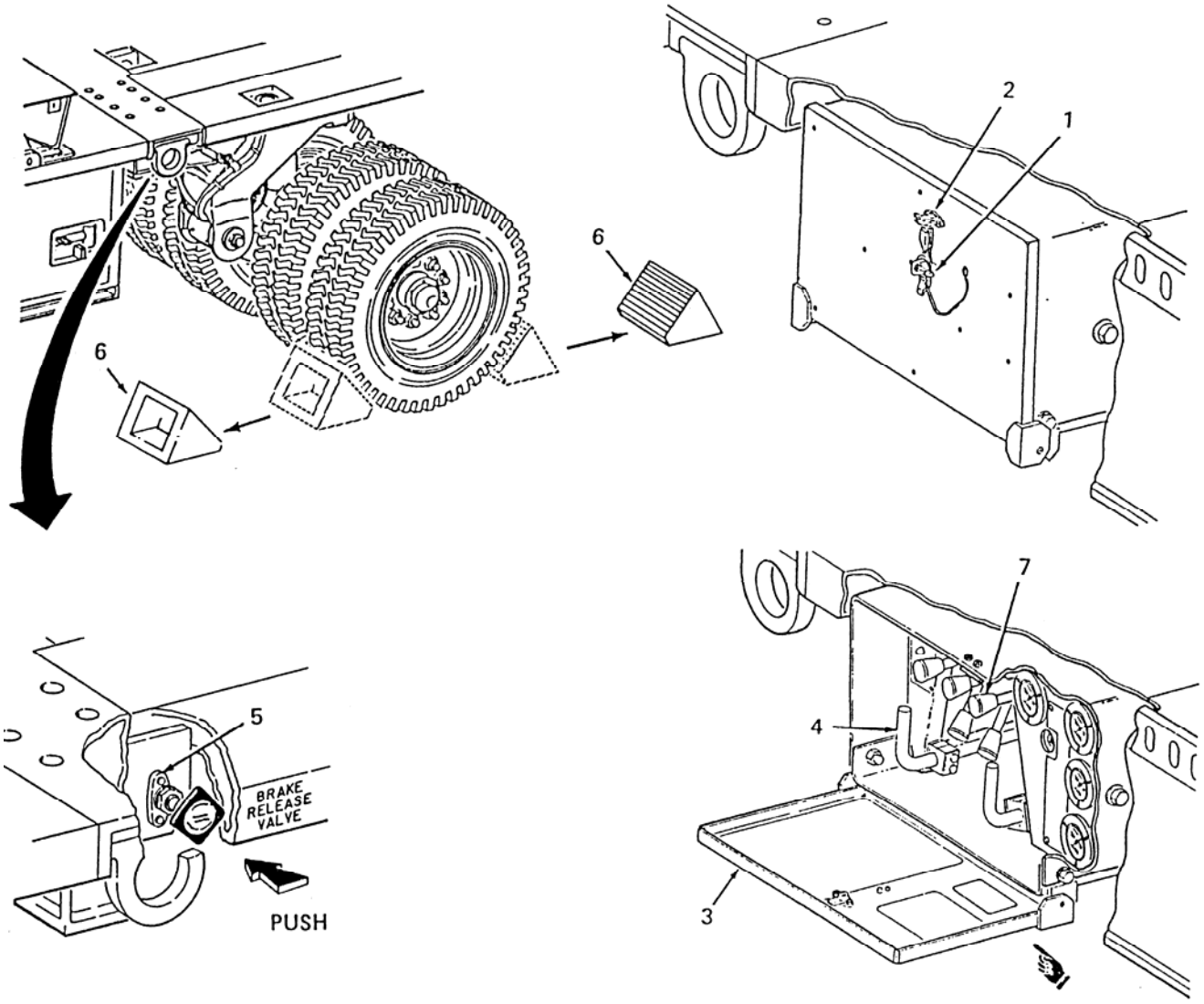
2-21. OPERATING MANUAL STEERING

a. Start and run APU (para. 2-16).

CAUTION

The suspension shut-off valve handle must be pulled outward to the ADJUST position prior to operating any valve handles. If the suspension shut-off valve handle is not properly positioned for intended operation, severe damage to equipment may result.

b. Remove pin (1) from access cover hasp (2). Rotate hasp and lower access cover (3).



2-21. OPERATING MANUAL STEERING (CONT)

c. Pull out handle of suspension shut-off valve (4) to ADJUST position (para. 2-6).

NOTE

The brakes on the semitrailer should be released when making steering adjustments. If the brakes are not released, steering adjustments will be much slower and harder to accomplish.

d. Release parking brakes by one of the following methods:

(1) With tractor/semitrailer coupled, apply tractor parking brake and push in knob of brake release valve (5) to release semitrailer parking brake.

(2) If uncoupled, push in knob of brake release valve (5).

CAUTION

If the tractor/semitrailer is uncoupled, manual steering may be used ONLY to move the steering wedge; however, manual steering of the wheels must not be attempted. Manual steering without being coupled to a tractor may cause the steering arm to move to an extreme overcenter position, which can be extremely difficult to recover, and can cause damage to equipment.

e. Ensure that semitrailer is coupled to tractor (para. 2-24) and steering wedge is secured/tight in tractor fifth wheel vee entry.

CAUTION

Wheel chocks must be moved away from tires prior to adjusting steering or damage to chocks and tires may result.

f. Move all four wheel chocks (6) approximately 6 inches (15 cm) away from tires prior to adjusting steering.

g. Push down handle of steering valve (7) to turn steerable bogies to the left. Once bogies turn completely left and stop, release handle of steering valve (7).

h. Pull up handle of steering valve (7) to turn steerable bogies to the right. Once bogies turn completely right and stop, release handle of steering valve (7).

i. Operate steering valve (7) and return steerable bogies to approximately straight position (in line with kingpin, facing forward).

j. If no other adjustments are required, proceed as follows:

WARNING

Ensure that vented dummy coupling is installed on the emergency (red) gladhand prior to releasing brakes with the brake release valve. If a nonvented dummy coupling is installed, the parking brakes cannot be reapplied and injury to personnel may result.

(1) If coupled (tractor parking brakes applied), apply semitrailer parking brakes using semitrailer brake release valve (5). If uncoupled, ensure that a vented dummy coupling is installed, or remove dummy coupling from emergency (red) gladhand. Apply brakes on semitrailer by pulling knob on brake release valve (5) outward.

(2) Move wheel chocks (6) back into place under tires to chock wheels.

(3) Push in handles of suspension shut-off valve (4) to SHUT-OFF position.

(4) Close access cover (3), rotate hasp (2) to secure cover, and install pin (1) in hasp (2).

(5) Shut down APU (para. 2-16).

2-22. OPERATING FRONT SUPPORT LEGS

WARNING

Before performing any maintenance on the platform, lower the front and rear support legs or serious injury to personnel may result.

When lowering the support legs, make sure that feet and hands are clear of the support leg foot as it nears the ground or serious injury to personnel may result.

When lowering or raising the support legs, always install the retaining pins or serious injury to personnel may result.

NOTE

The following procedures apply to either front support leg. Both support legs are identical except that the retaining pin for the curbside leg is installed from the curbside.

When preparing to lower the front support legs, ensure the ground surface texture is strong/hard enough to support the front support legs without sinking into the ground. If extra support is required, place large pieces of lumber and/or steel plate under the support legs.

a. Ensure semitrailer is on level ground, wheels are chocked, and trailer parking brakes are applied. If semitrailer is coupled to a tractor, apply semitrailer parking brake.

2-22. OPERATING FRONT SUPPORT LEGS (CONT)

b. To lower front support legs, proceed as follows:

(1) Start and run APU (para. 2-16).

(2) Pull out suspension shut-off valve (para. 2-6) to ADJUST position, making sure valve handle is pulled outward as far as possible.

(3) Raise platform (para. 2-19) until top edge of platform is 43 inches (109 cm) or higher.

(4) Open and remove linch pin (1) from retaining pin (2).

(5) Rotate handcrank (3) clockwise to raise lower support leg (4) sufficiently to relieve tension and permit removal of retaining pin (2).

(6) Rotate and remove retaining pin (2) and rotate handcrank (3) counterclockwise to lower support leg (4) and foot (5) toward the ground.

(7) Stop crank rotation when highest (4th) hole in inner support leg (4) alines with hole in outer leg housing (6). Install retaining pin (2), rotate pin to lock in place, and install linch pin (1).

(8) Repeat steps (4) thru (7) of this procedure to lower other front support leg.

(9) Lower platform (para. 2-19) firmly onto front support legs to support platform.

(10) If no other adjustments are required, push in suspension shut-off valve handle (para. 2-6) as far as possible to SHUT-OFF position.

(11) Shut down APU (para. 2-16).

c. To raise front support leg, proceed as follows:

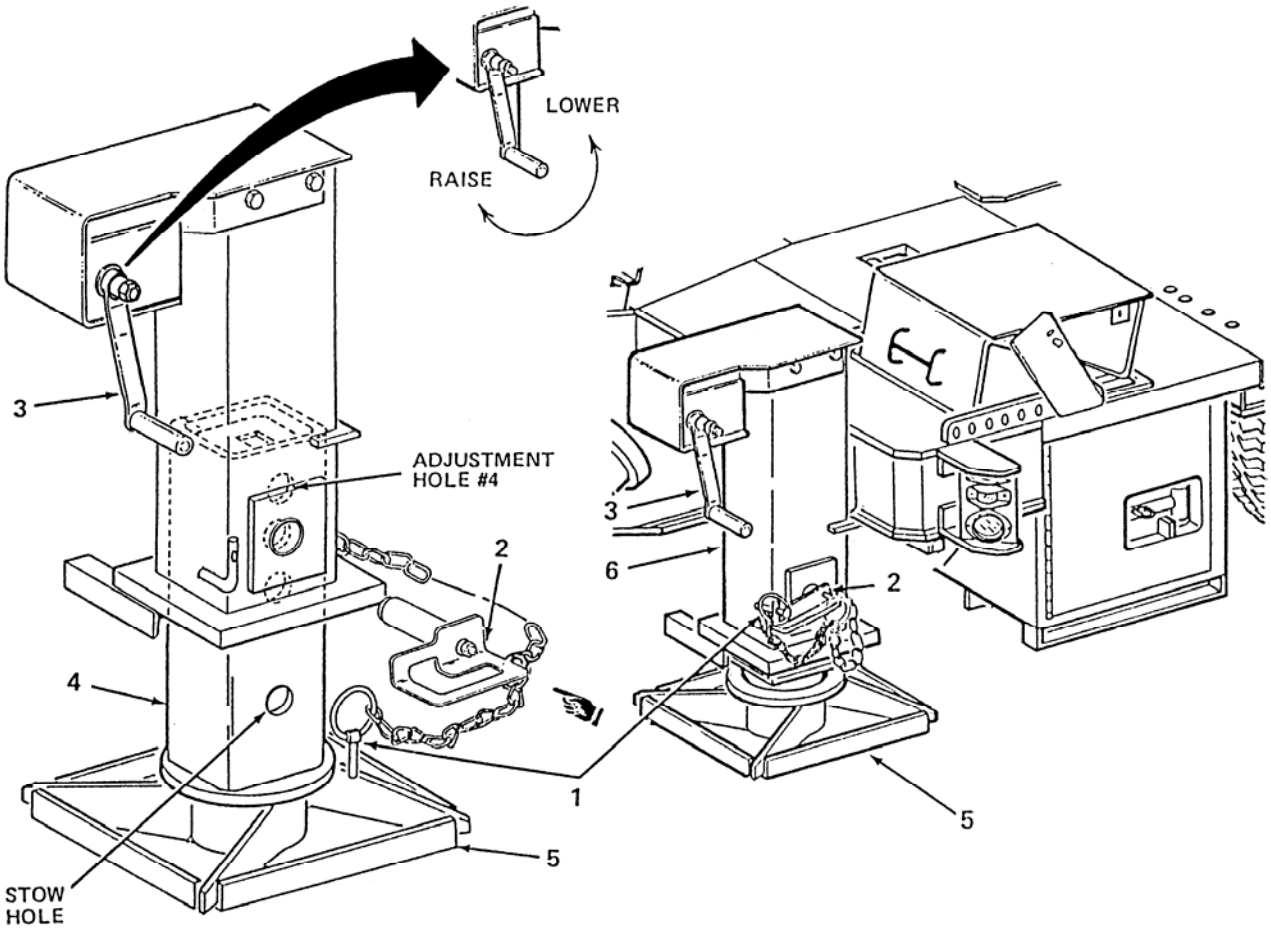
(1) Start and run APU (para. 2-16).

(2) Pull out suspension shut-off valve (para. 2-6) to ADJUST position, making sure valve handle is pulled outward as far as possible.

(3) Raise platform (para. 2-19) until bottom edge of platform is 43 inches (109 cm) or higher.

(4) Rotate handcrank (3) clockwise to raise support leg foot (6) sufficiently to permit removal of linch pin (1) and retaining pin (2).

(5) Rotate and remove retaining pin (2) and rotate handcrank (3) clockwise to raise support leg (4) and foot (5).



(6) Once support leg foot (5) is near stow position, with lowest hole in inner leg near retaining pin hole in outer leg housing (6), aline holes and install retaining pin (2). Rotate pin to lock in place and install linch pin (1).

(7) Repeat steps (4) thru (6) of this procedure to raise other front support leg.

(8) Lower platform (para. 2-19) to travel height of approximately 43 inches (109 cm).

(9) If no other adjustments are required, push in suspension shut-off valve handle (para. 2-6) as far as possible to SHUT-OFF position.

(10) Shut down APU (para. 2-16).

d. If any material was used to provide ground support for front support legs, remove and stow or dispose of material. Restow wheel chocks.

2-23. OPERATING REAR SUPPORT LEGS

WARNING

Before performing any maintenance on the platform, lower the front and rear support legs or serious injury to personnel may result.

When lowering the support legs, make sure that feet and hands are clear of the support leg foot as it nears the ground or serious injury to personnel may result.

NOTE

When preparing to lower the rear support legs, ensure the ground surface texture is strong/hard enough to support the rear support legs without sinking into the ground. If extra support is required, place large pieces of lumber and/or steel plate under the support legs.

a. Ensure semitrailer is on level ground, wheels are chocked, and trailer parking brakes applied.

b. Check bed height indicators (para. 2-7) for proper platform height. Proper height should be approximately 43 inches (109 cm). Perform adjustments as required (para. 2-19) to achieve correct height.

NOTE

The following procedure applies to either rear support leg.

c. To lower rear support leg, proceed as follows:

(1) Release latch (1) and raise protective cover (2) to gain access to adjusting nut (3).

(2) If necessary, use 3/4-inch ratchet and 1-5/8-inch socket to turn adjusting nut (3) counterclockwise until rear support leg (4) starts to lower.

(3) Remove ratchet from socket and install 1/2-inch speed wrench using 1/2-inch to 3/4-inch adapter. Turn speed wrench counterclockwise until support leg foot (5) makes contact with the ground.

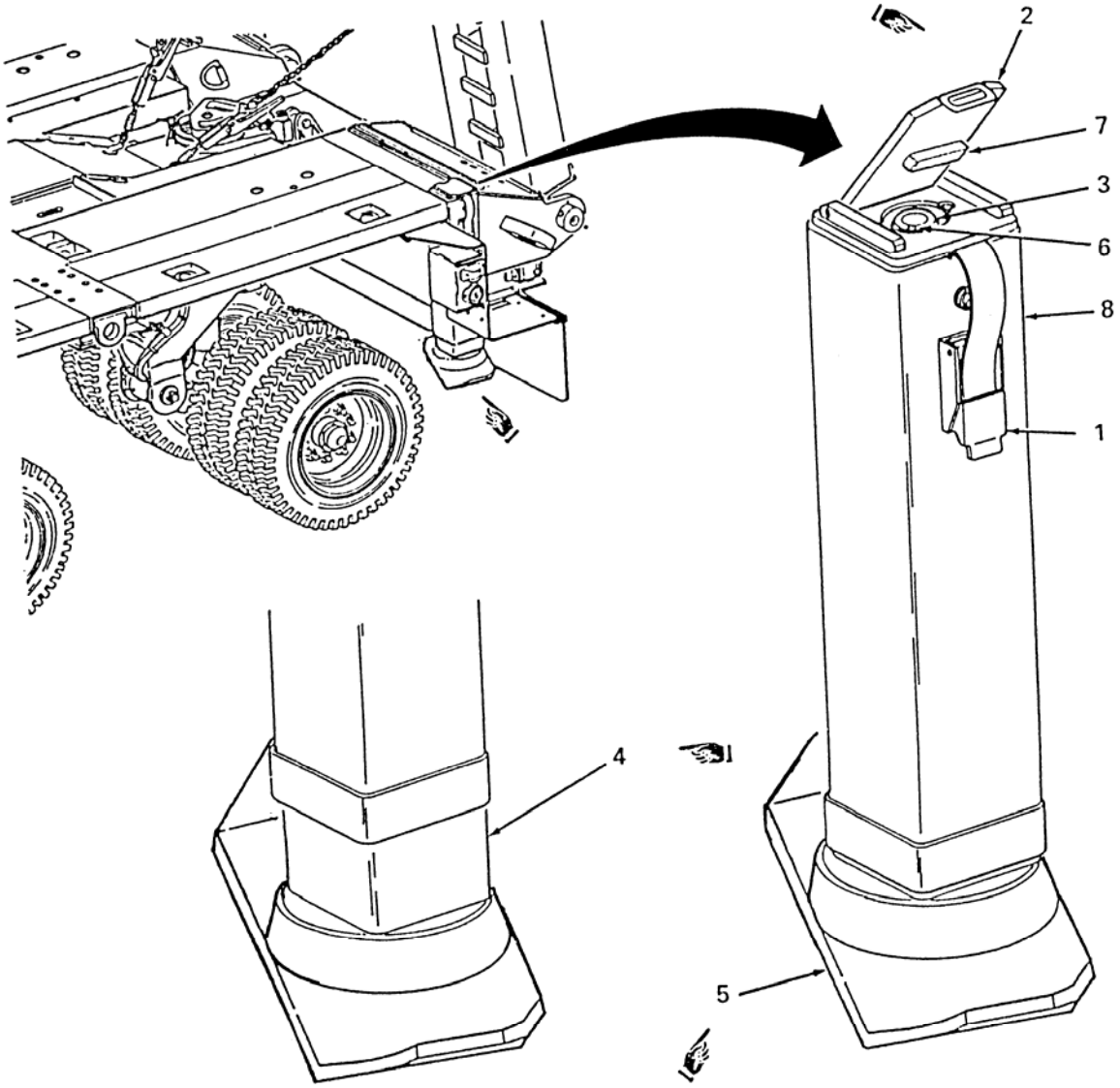
CAUTION

Ensure that socket head screw is positioned outboard and cover closes freely or damage to equipment may result.

(4) Position adjusting nut (3) so that socket head screw (6) is outboard and does not interfere with bar (7) on cover.

(5) Remove speed wrench, adapter, and socket and replace cover (2) over adjusting nut (3). Secure cover with latch (1).

(6) Repeat steps (1) thru (5) of this procedure as required to lower other rear support leg.



d. To raise rear support leg, proceed as follows:

(1) Release latch (1) and raise protective cover (2) to gain access to adjusting nut (3).

(2) Using a speed wrench, adapter, and 1-5/8-inch socket, turn adjusting nut (3) clockwise to raise support leg (4).

CAUTION

Ensure that socket head screw is positioned outboard and cover closes freely or damage to equipment may result.

(3) Raise support leg until foot (5) contacts bottom of tube weldment (8). If necessary, turn adjusting nut (3) back counterclockwise to position socket head screw (6) outboard.

2-23. OPERATING REAR SUPPORT LEGS (CONT)

(4) Remove tools, replace cover (2) over adjusting nut (3), and secure cover with latch (1). Ensure that cover closes freely with no interference between bar (7) on cover and socket head screw (6).

(5) Repeat steps (1) thru (4) of this procedure as required to raise other rear support leg.

e. Once support legs are supporting platform or retracted and stowed for transport, stow tools back into platform storage compartment.

f. If any material was used to provide ground support for rear support legs (6), remove and stow or dispose of material.

2-24. TRACTOR/SEMITRAILER COUPLING AND UNCOUPLING

a. To couple tractor/semitrailer, proceed as follows:

(1) Apply a generous amount of grease (item 12, appx. E) to contact areas of pickup plate, kingpin (1), steering wedge (2), vee entry ramps (3), and fifth wheel (4).

CAUTION

Tractor fifth wheel side-to-side oscillation lockouts must be disengaged for all tractor/semitrailer operations or severe damage to equipment may result.

(2) Ensure both fifth wheel locks (5) are set to accept kingpin (1). If tractor fifth wheel is equipped with side-to-side oscillation lockouts (e.g., M1070), ensure lockouts are disengaged.

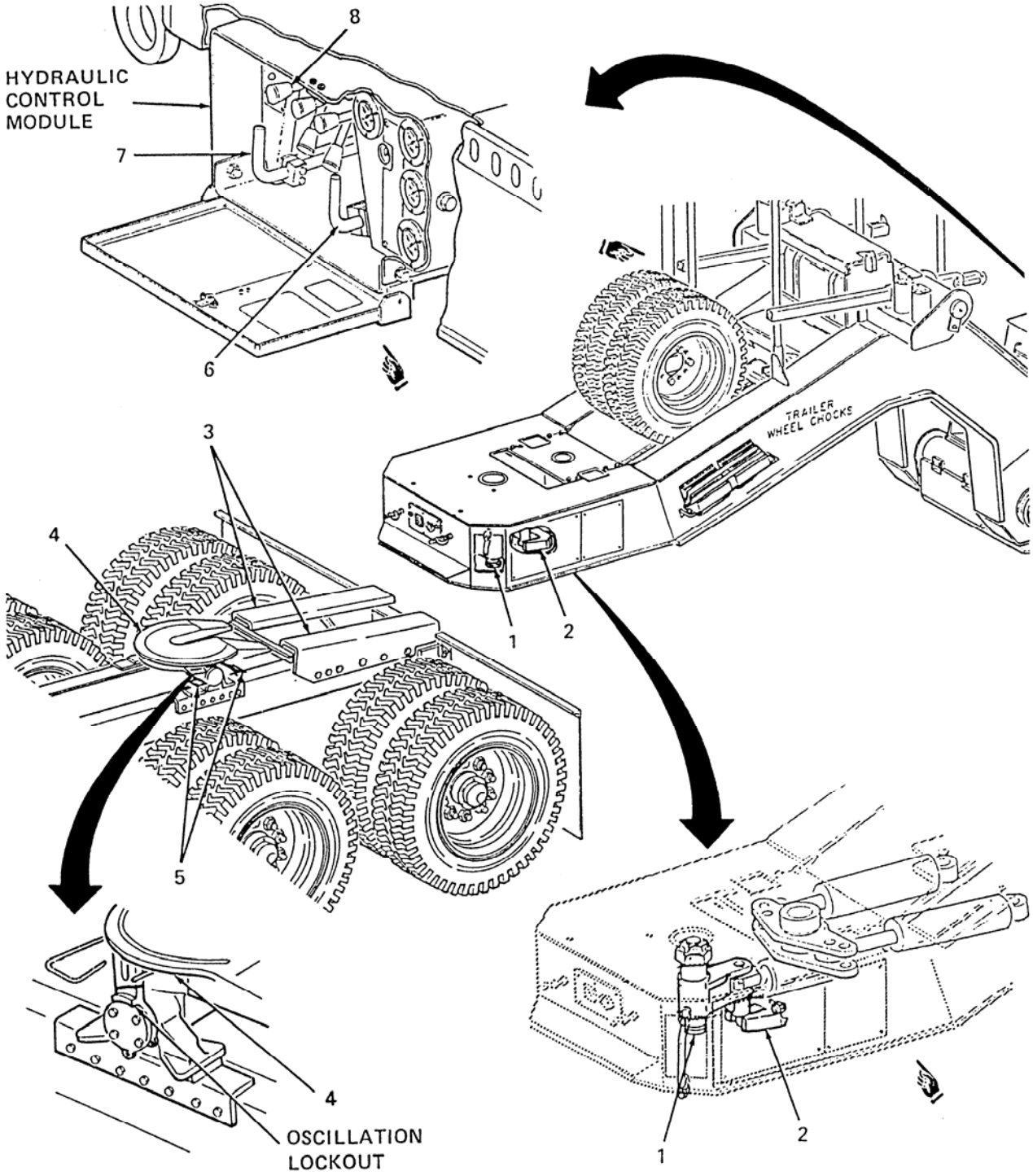
(3) Start and run APU (para. 2-16).

(4) Verify that front and rear support legs are lowered and supporting platform (para. 2-22 and 2-23).

WARNING

Prior to adjusting gooseneck height, pull out both gooseneck isolation and suspension shut-off valve handles to the ADJUST position or injury to personnel from unexpected movement and damage to equipment may result.

(5) Make sure gooseneck isolation valve handle (6) and suspension shut-off valve handle (7) are pulled outward to ADJUST positions. Make sure valve handles are pulled out as far as they will go.



NOTE

The gooseneck kingpin should be approximately the same height as the tractor fifth wheel.

(6) If required, adjust gooseneck height (para. 2-18) using gooseneck valve (8) so that kingpin and tractor fifth wheel are approximately same height.

2-24. TRACTOR/SEMITRAILER COUPLING AND UNCOUPLING (CONT)

NOTE

The optimal condition when coupling the tractor/semitrailer is with both vehicles in a straight line. Coupling can be accomplished with the tractor and semitrailer at an offset angle (not greater than 45°). To prevent the tires from moving while adjusting steering wedge, do not release brakes on semitrailer.

(7) Adjust steering wedge as follows:

(a) Manually adjust steering wedge (2) using steering valve (9) to aline with tractor fifth wheel vee entry (3).

NOTE

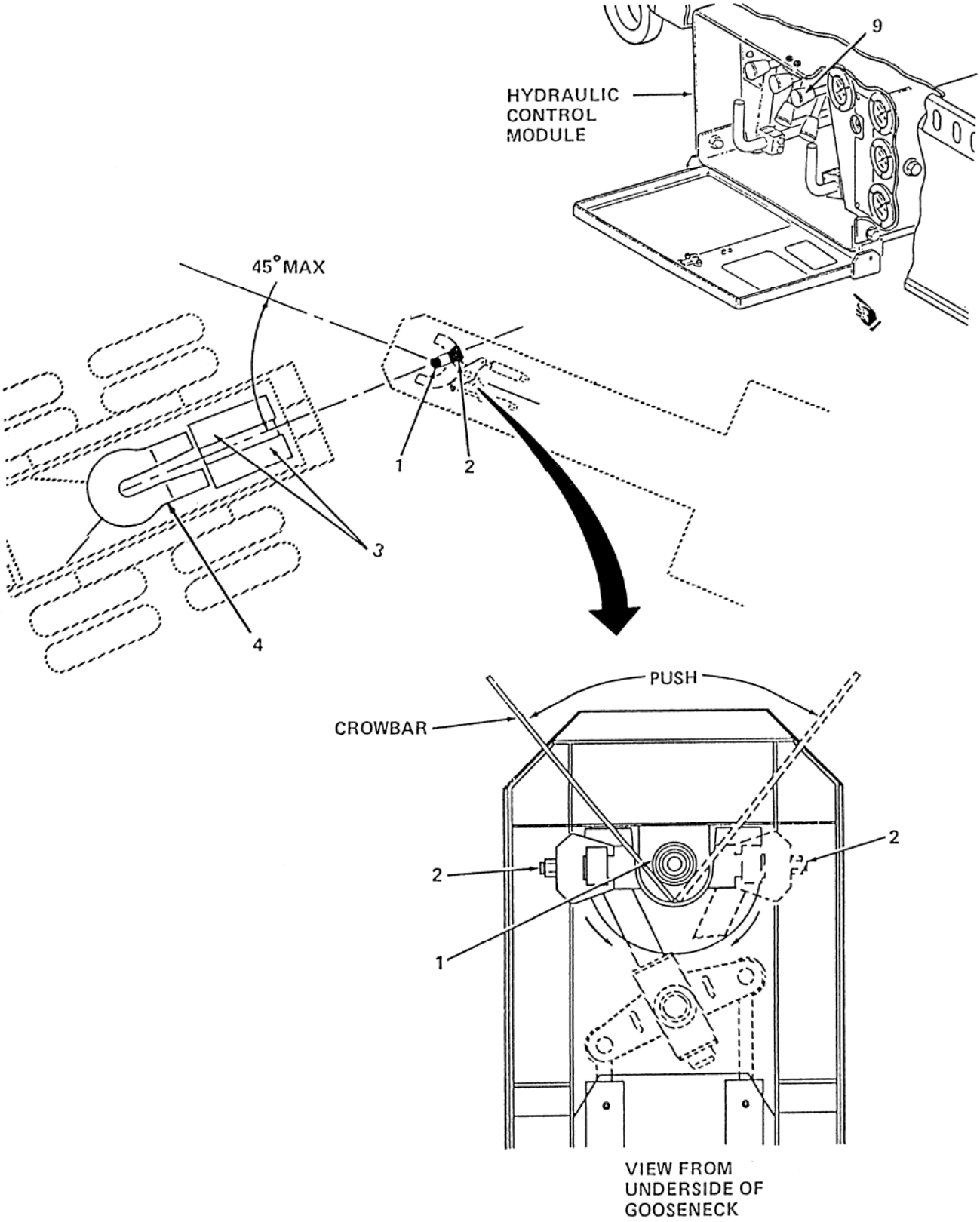
When the steering wedge is significantly offset from the previous uncoupling (more than 45°), or because of improper operation of the semitrailer, movement of the steering wedge may not respond to the operation of the steering valve. If this condition exists, continue with steps (b) and (c) as required.

(b) If steering wedge (2) does not respond to operation of steering valve (9), attempt to induce movement using crowbar and a spotter to push/pull against steering wedge while operating steering valve (9).

(c) If steering wedge (2) cannot be moved by use of crowbar and steering valve (9), it may be necessary to apply a greater force by gently bumping wedge with tractor fifth wheel (4).

(8) While continuing to operate steering valve (9), direct tractor operator to very slowly back tractor toward kingpin (1) until one side of fifth wheel vee entry contacts steering wedge (2) and pushes it toward center. Once steering wedge has started to move, stop movement of tractor and apply tractor brakes.

(9) Using steering valve (9), manually aline steering wedge (2) with kingpin (1) for entry into tractor fifth wheel (4).


9
HYDRAULIC CONTROL MODULE
45° MAX
1
2
3
4
PUSH
CROWBAR
2
2
1
VIEW FROM UNDERSIDE OF GOOSENECK

2-24. TRACTOR/SEMITRAILER COUPLING AND UNCOUPLING (CONT)

NOTE

The adjusting nut needs to be backed off only one full turn minimum when connecting the semitrailer from one tractor to another of the same type (example: M911 to M911).

The adjusting nut needs to be backed off three full turns minimum when connecting the semitrailer from one type of tractor to another (example: M911 to M1070).

(10) Using a 3/4-inch ratchet, a 3/4-inch extension, and 1-7/8-inch socket, turn adjusting nut (10) appropriate number of full turns counterclockwise. This will ensure steering wedge (2) is properly fitted and can be tightened after kingpin (1) is locked into tractor fifth wheel (4).

WARNING

Two personnel are required for coupling. During hookup, the operator of the tractor must know the position of the spotter at all times or injury to personnel may result.

(11) With a spotter positioned on streetside of semitrailer and using hand signals, aline tractor with semitrailer. A spotter must visually check tractor fifth wheel (4), vee entry ramps (3), semitrailer kingpin (1), and steering wedge (2) for alinement.

(12) Have operator continue backing so that fifth wheel is approximately 2 inches (5.0 cm) from front of gooseneck pickup plate (11) and then stop.

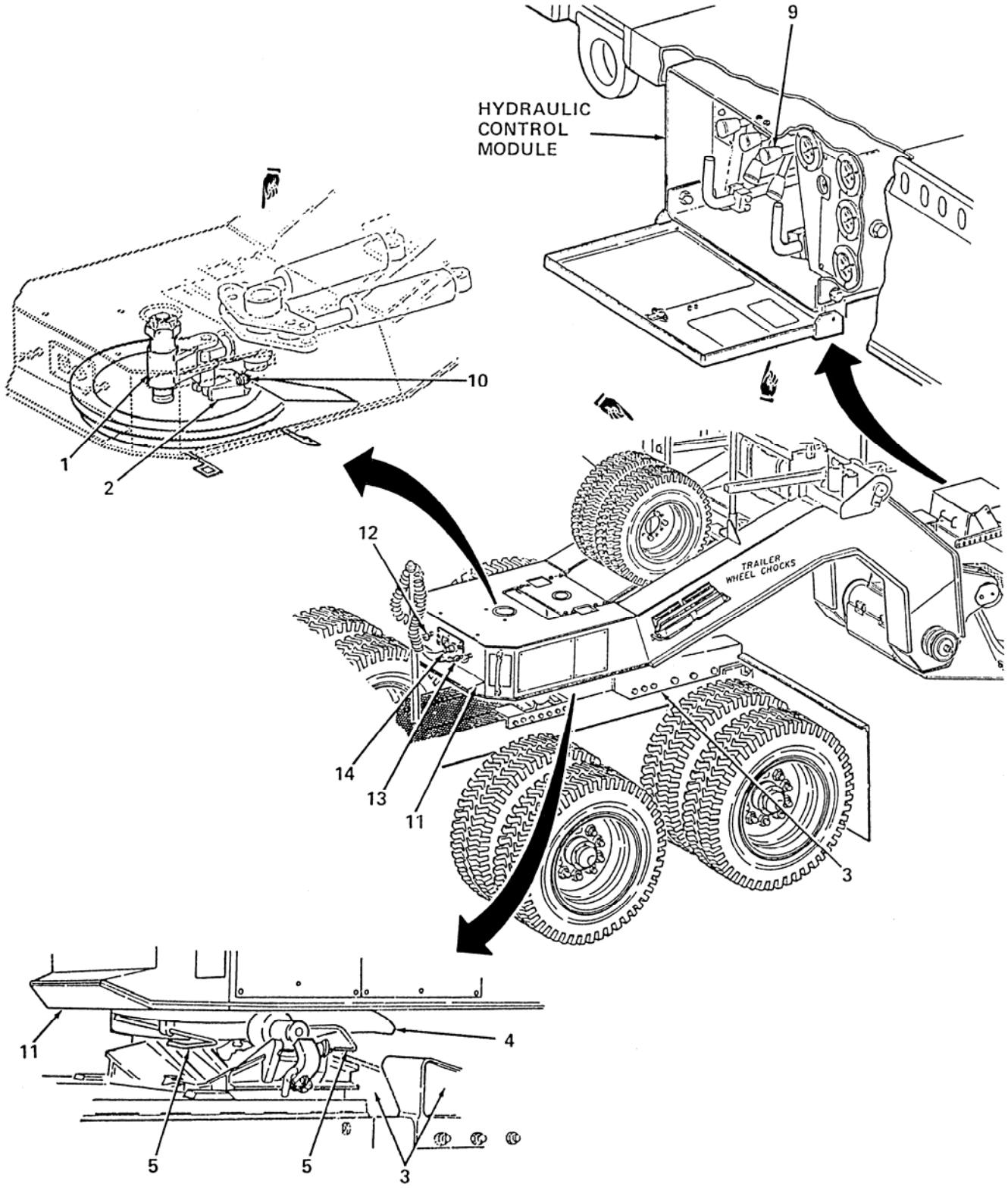
(13) Adjust gooseneck height (para. 2-18) so that gooseneck pickup plate (11) is approximately 1 to 2 inches (2.5 to 5.0 cm) lower than tractor fifth wheel (4).

CAUTION

Do not allow the kingpin to miss and/or overrun the fifth wheel or severe damage to the tractor and semitrailer may result.

(14) With a spotter positioned at semitrailer hydraulic control panel, have spotter make final adjustments to steering wedge alinement by operating steering valve (9).

(15) Have tractor operator back up until kingpin (1) is firmly in place in fifth wheel (4). Have spotter confirm that semitrailer kingpin (1) is seated and both fifth wheel locks (5) are properly engaged.


9
HYDRAULIC
CONTROL
MODULE
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2
12
TRAILER
WHEEL CHOCKS
14
13
11
3
11
4
5
5
3

2-24. TRACTOR/SEMITRAILER COUPLING AND UNCOUPLING (CONT)

CAUTION

If tractor has been coupled to an offset angle, manually steer wheels to the appropriate direction or damage to equipment may result.

(16) Have tractor operator attempt to pull forward against semitrailer to ensure kingpin is locked into tractor fifth wheel.

(17) Set parking brake on tractor. Chock tractor tires. Make sure wheel chocks for semitrailer are in place and properly secured.

(18) Disconnect both air lines from tractor dummy couplings. Remove dummy couplings from semitrailer air connectors. Apply small amount of grease (item 12, appx. E) on all rubber grommets. Connect air brake system from tractor to semitrailer by mating service (blue) air connectors (12) and emergency (red) air connectors (13).

(19) Disconnect electrical connector from tractor electrical dummy coupling. Raise cover to 12-pin electrical connector (14) and connect tractor electrical cable to electrical connector (14).

(20) Have spotter check steering wedge (2) alinement in tractor fifth wheel (4). If necessary, signal spotter to reposition steering wedge (2).

WARNING

Make sure the person adjusting the steering wedge adjusting nut is clear when the steering wedge is cycled back and forth or injury to personnel may result.

(21) Turn adjusting nut (10) clockwise until steering wedge (2) tightens securely into fifth wheel (4). Have spotter continually operate steering valve (9) slightly left and right and tighten adjusting nut (10) to remove all play.

(22) Push in trailer air supply control in tractor to provide air to semitrailer air brake system.

(23) Allow ample time for air tanks to charge and then apply brakes to ensure that brakes are working properly. Apply tractor parking brakes.

(24) Raise front and rear support legs (para. 2-22 and 2-23). Remove and stow tractor and semitrailer wheel chocks.

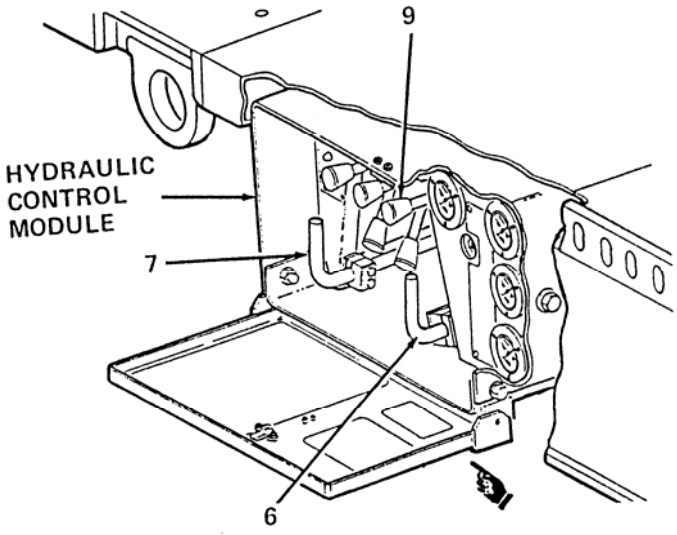
NOTE

If gooseneck isolation valve is hard to move, equalize gooseneck hydraulic pressure by raising gooseneck handle until system pressure reads 1500 psi (10343 kPa), then lowering gooseneck handle until system pressure readings equal the two front suspension gage pressures.

(25) Push in gooseneck isolation valve handle (6) to RUN position. Be sure handle is pushed inward as far as possible.

(26) If necessary, perform minor deck height adjustments front, then rear, (para. 2-19) which may be required due to platform suspension relaxing when gooseneck isolation valve handle (6) is pushed inward to RUN position.

(27) Push in suspension shut-off valve handle (7) to SHUT-OFF position. Be sure handle is pushed inward as far as possible.



(28) Have tractor operator attempt to pull forward with semitrailer brakes set to ensure steering wedge is set into tractor fifth wheel and adjusting nut is secure.

(29) Drive tractor/semitrailer ahead in a straight line approximately 60 feet (20m) to check semitrailer tracking.

NOTE

Repeat step (30) if required until semitrailer properly tracks the tractor.

(30) If semitrailer does not properly track, use manual steering valve (9) to realine steering (para. 2-21).

(31) Shut down APU (para. 2-16).

2-24. TRACTOR/SEMITRAILER COUPLING AND UNCOUPLING (CONT)

b. To uncouple tractor/semitrailer, proceed as follows:

WARNING

Do not uncouple tractor/semitrailer if tractor has less than normal operating air pressure, approximately 100 - 120 psi (689.5 - 827 kPa) or semitrailer will not have sufficient air pressure to apply or release brakes. Injury to personnel and damage to equipment may result.

Do not uncouple a loaded semitrailer from the tractor for purposes of performing maintenance tasks on the semitrailer or injury to personnel and damage to equipment may result.

CAUTION

Make sure that the trailer hand brake control (Johnny Bar) in the tractor cab is completely released prior to applying the tractor parking brakes or loss of semitrailer reserve air supply may occur.

(1) Using one spotter, maneuver tractor/semitrailer into an area for semitrailer parking. Once positioned for parking, apply tractor parking brakes.

(2) Remove four wheel chocks (15) from gooseneck (16). Position wheel chocks (15) in front and behind each outer set of dual tires (17) for right and left front bogies.

(3) Disconnect 12-pin electrical connector (14). Refer to appropriate tractor manual and restow electrical connector to dummy connector on tractor. Be sure electrical connector (14) cover on semitrailer is closed.

(4) Disconnect emergency (red) air connector (12) and service (blue) air connector (13) from semitrailer. Stow both air connectors on dummy connectors on tractor.

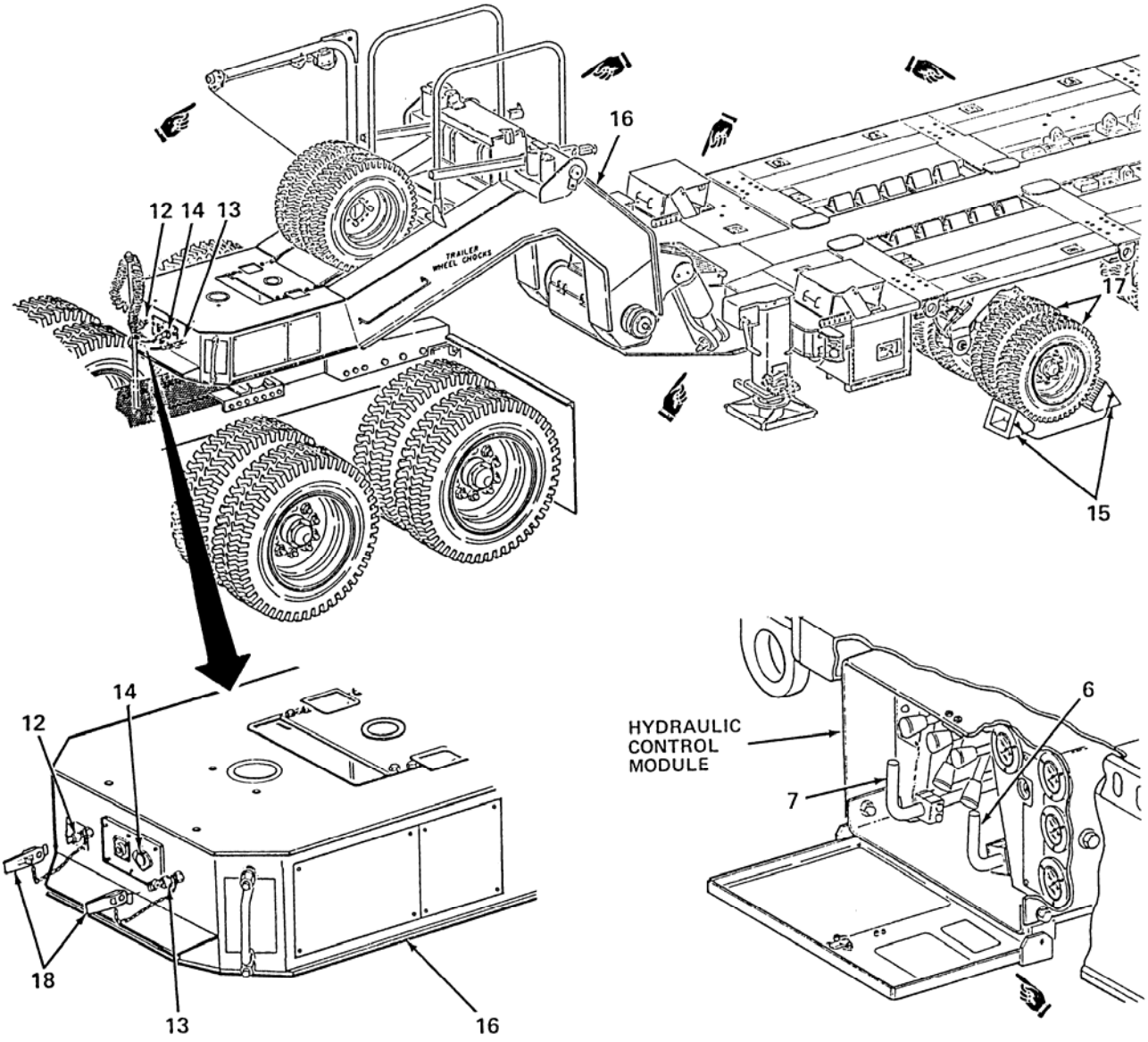
WARNING

Ensure that vented dummy coupling is installed on the emergency (red) gladhand prior to releasing brakes with the brake release valve. If a nonvented dummy coupling is installed, the parking brakes cannot be reapplied and injury to personnel may result.

(5) Install dummy connectors (18) to semitrailer emergency and service air connectors (12 and 13).

(6) Start and run APU (para. 2-16).

(7) Pull out handle of suspension shut-off valve (7) as far as possible to ADJUST position.



WARNING

The front support legs must be lowered to support the platform before operating the gooseneck isolation valve or injury to personnel from unwanted gooseneck/suspension movement and damage to equipment may result.

(8) Lower both front and rear support legs (para. 2-22 and 2-23) to support platform.

2-24. TRACTOR/SEMITRAILER COUPLING AND UNCOUPLING (CONT)

WARNING

Prior to moving the tractor from under gooseneck, place the gooseneck isolation valve handle in the ADJUST position, handle pulled outward, or personal injury and damage to equipment may result.

(9) Pull out handle of gooseneck isolation valve (6) as far as possible to ADJUST position.

(10) Loosen steering wedge adjusting nut (10) one full turn until lockwasher behind nut is no longer compressed.

NOTE

If tractor fifth wheel lock handles cannot be moved to the release position, set semitrailer parking brakes and move the tractor rearward against the semitrailer to release pressure on fifth wheel locking mechanism.

(11) If necessary, have tractor operator back tractor against semitrailer and have a spotter unlock both tractor fifth wheel locks (5).

WARNING

All spotters and ground personnel around the tractor/semitrailer must stand clear of the vehicles during uncoupling or injury to personnel may result.

(12) Signal operator to release tractor parking brakes and slowly drive forward approximately 1 foot (0.3m) until kingpin (1) is in vee entry (3) of tractor fifth wheel (4).

(13) Raise gooseneck (para. 2-18) until it is approximately 3 inches (7.6 cm) above fifth wheel (4).

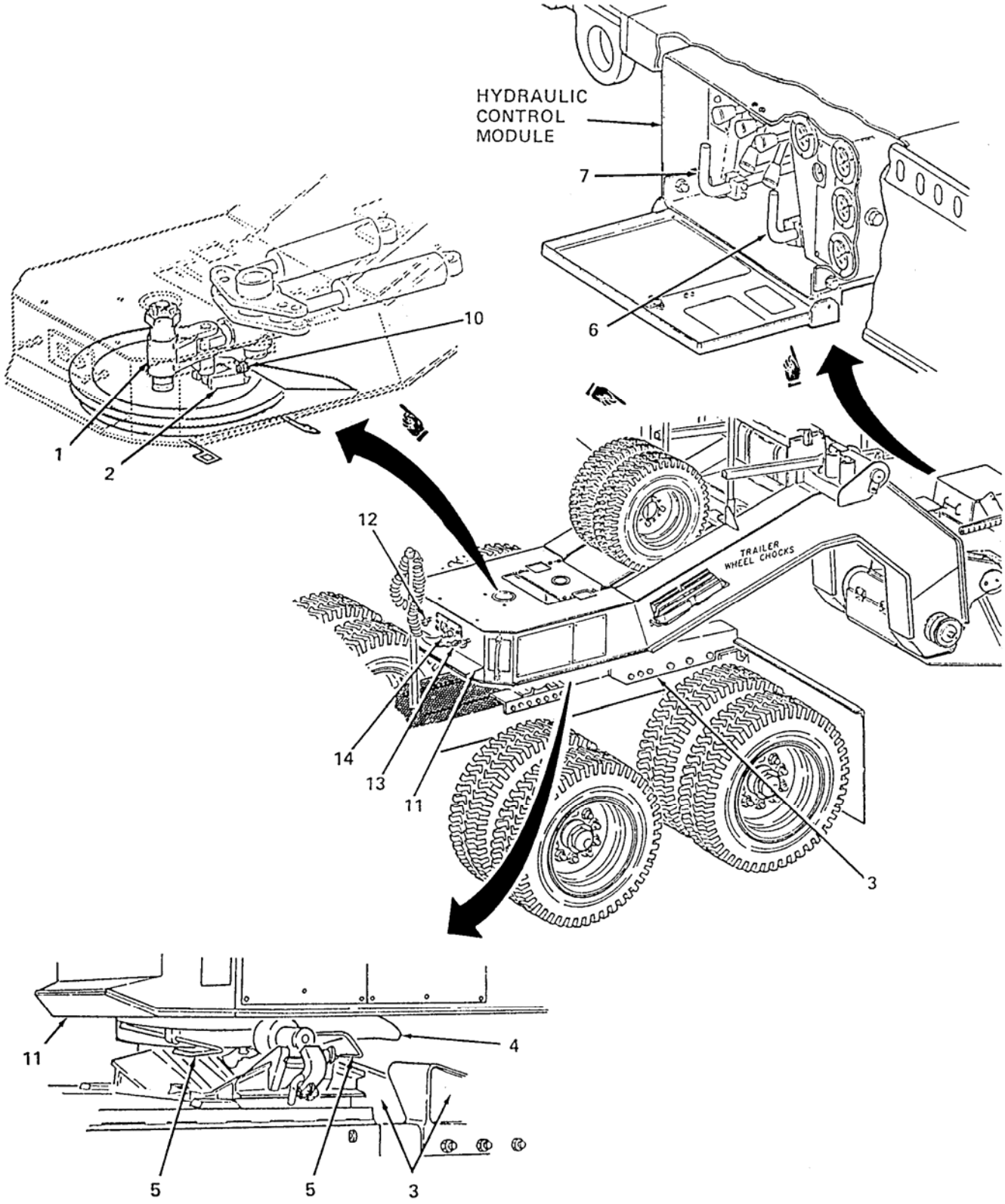
(14) Have operator drive tractor out from under semitrailer gooseneck.

(15) Lower gooseneck to lowest position (para. 2-18).

(16) Push in gooseneck isolation valve handle (6) to RUN position. Be sure valve handle is pushed in as far as possible.

(17) Push in suspension shut-off valve handle (7) to SHUT-OFF position. Be sure valve handle is pushed in as far as possible.

(18) Shut down APU (para. 2-16).


HYDRAULIC
CONTROL
MODULE
7
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TRAILER
WHEEL CHOCKS
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3

2-25. HIGHWAY DRIVING

WARNING

Precautions must be exercised during highway travel to be sure that all bridges and underpasses can be negotiated or injury to personnel and damage to equipment may result.

When towing a payload, check security of load and tighten tiedowns at every rest and maintenance stop or injury to personnel and damage to equipment may result.

Ensure position of assistant is known at all times. Failure to observe this warning may result in injury to personnel.

All safety requirements, such as hazard flags, road permits, flashing warning lights, escort vehicles, and wide load signs must be met. Failure to comply could result in injury to personnel and damage to equipment.

Under no circumstances shall speeds exceed the following:

Highway..... 45 mph (72 km/h)
Secondary..... 40 mph (64 km/h)
Off-road..... 15 mph (24 km/h)

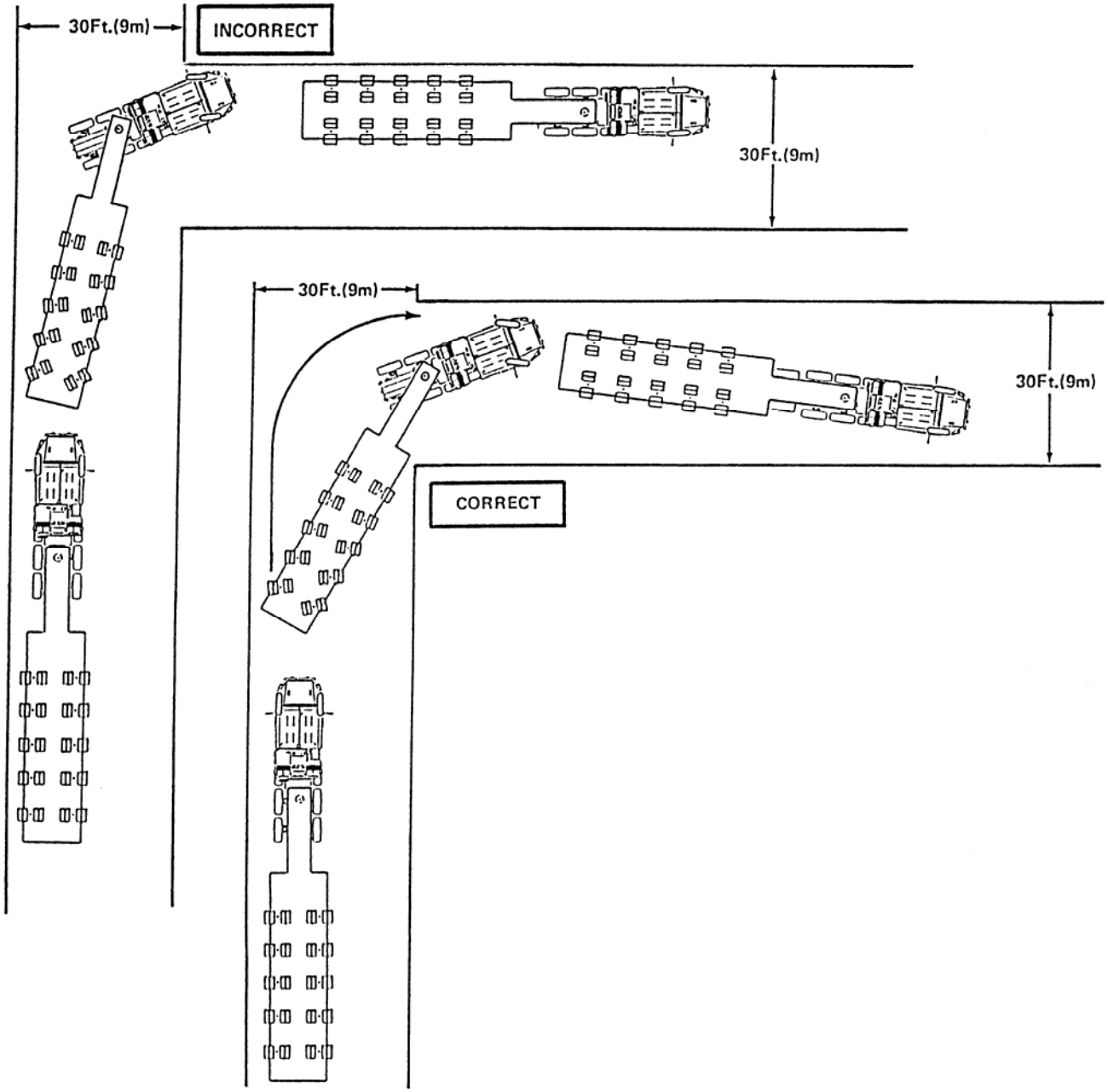
a. Driving. When towing the semitrailer, overall length of tractor and semitrailer must be kept in mind when passing other vehicles. During trailering operations, acceleration rate is reduced and stopping distance is increased.

WARNING

The HETS tractor and semitrailer combination does not track in the same way as standard or conventional tractor-trailer combinations. Operators must know and understand this prior to operating HETS on public access roads. Wide, conventional tractor-trailer turns may result in injury to personnel and damage to equipment.

When making sharp turns, the semitrailer may swing beyond normal turning radius. Failure to observe this warning may result in injury to personnel and damage to equipment.

b. Turning with M911 or M1070 tractor. With the M911 or M1070 tractor and M1000 semitrailer combination, turning the tractor also causes the semitrailer wheels to turn. The semitrailer may swing out into the lane of on-coming traffic. Operator must ensure lane is clear prior to making turn. Left and right turns should be made tighter than conventional tractor-trailer turns.


30Ft.(9m)
INCORRECT
30Ft.(9m)
30Ft.(9m)
30Ft.(9m)
CORRECT

2-25. HIGHWAY DRIVING (CONT)

c. Deleted.

WARNING

Using the M911 or M1070 tractor, semitrailer will not back like a normal semitrailer because of semitrailer steering system. The operator must back tractor/semitrailer by turning tractor steering wheel in opposite direction of what would be used for backing with a normal semitrailer or injury to personnel and damage to equipment may result.

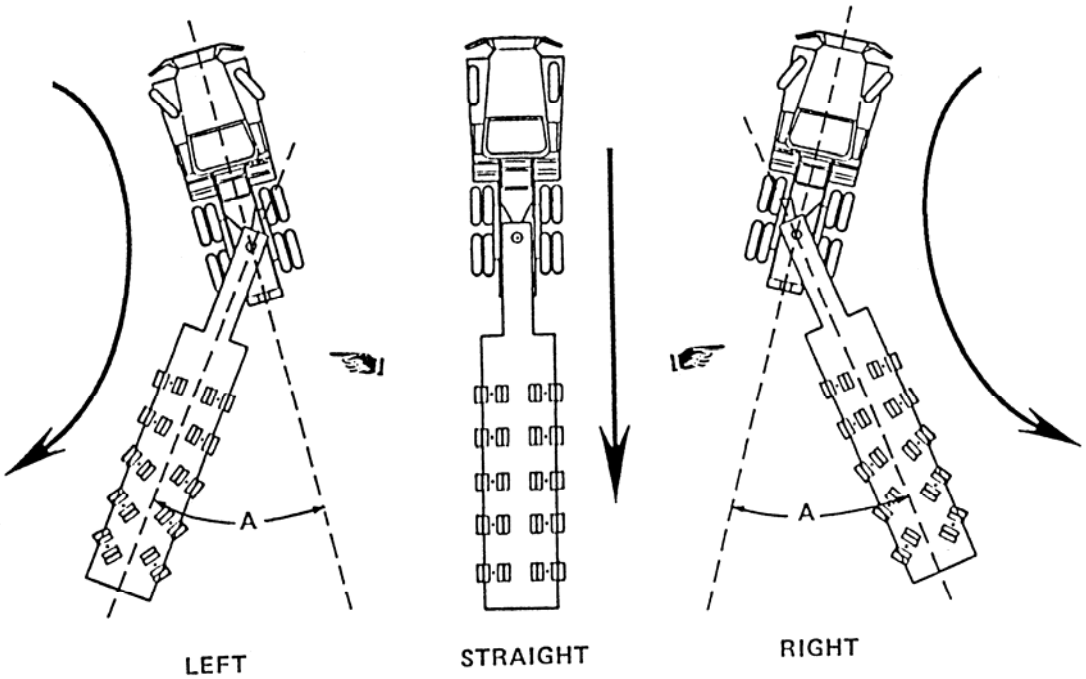
CAUTION

When backing, excessively sharp, oversteered turns will cause damage to equipment. If angle A between tractor chassis and gooseneck exceeds 60°, damage to tires may occur. If angle A exceeds 90°, severe damage to semitrailer steering components and tractor fifth wheel will occur. Extreme caution must be exercised when maneuvering tractor/semitrailer in confined spaces (i.e., motor pools, parking lots, filling stations) where oversteer angles can easily be achieved through normal driving capability of the tractor or severe damage to equipment will result.

d. Backing with M911 or M1070 tractor. When backing, always use a spotter to guide you. Always use mirrors when backing and keep spotter in sight at all times. When backing, rear of semitrailer will move in the same direction as front tractor wheels.

(1) If tractor wheels are turned right, semitrailer wheels will steer left and cause semitrailer to back to the right with the tractor.

(2) If tractor wheels are turned left, semitrailer wheels will steer right and cause semitrailer to back to the left with the tractor.



e. Deleted.

WARNING

The tractor operator must drive slowly and maintain constant visual contact with spotter or injury to personnel may result.

When manually steering semitrailer, make many starts and stops to give spotter time to adjust steering. The tractor operator should allow even space on both sides of the tractor so that spotter steering semitrailer has room to make adjustments or injury to personnel and damage to equipment may result.

f. Manually steering semitrailer. If tractor/semitrailer is in an area with limited turning ability, semitrailer can be manually steered to allow clear passage. A spotter, located at the semitrailer hydraulic control panel, can steer semitrailer (para. 2-21) left or right to make room for tractor/semitrailer to pass through a tight area.

g. Stopping. Brakes on the tractor and semitrailer are applied at the same time during normal operation when driver steps on tractor brake pedal. Brake pressure should be applied gradually and smoothly. Road conditions and good judgment should be used while stopping. Always use caution on steep downgrades and slippery surfaces.

CAUTION

Make sure that the trailer hand brake control (Johnny Bar) in the tractor cab is completely released prior to applying the tractor parking brakes or loss of semitrailer reserve air supply may result.

NOTE

If a hissing sound is heard from tractor parking brake control valve after setting parking brakes, brake pedal must be released and trailer air supply control in tractor must be pushed in and then pulled out.

h. Parking. When the tractor/semitrailer combination is to be parked and left unattended, make sure the trailer hand brake control (Johnny Bar) located on the steering column in tractor cab is completely released; then, set parking brakes. Be sure tractor engine and semitrailer APU are shut down. If hissing sound is heard from tractor parking brake control valve after setting parking brakes, release tractor brake pedal; push in, then pull out trailer air supply control in tractor. Chock wheels on tractor and semitrailer. For specific details on parking, refer to paragraph 2-35.

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2-26. LOADING AND UNLOADING ABLE PAYLOADS

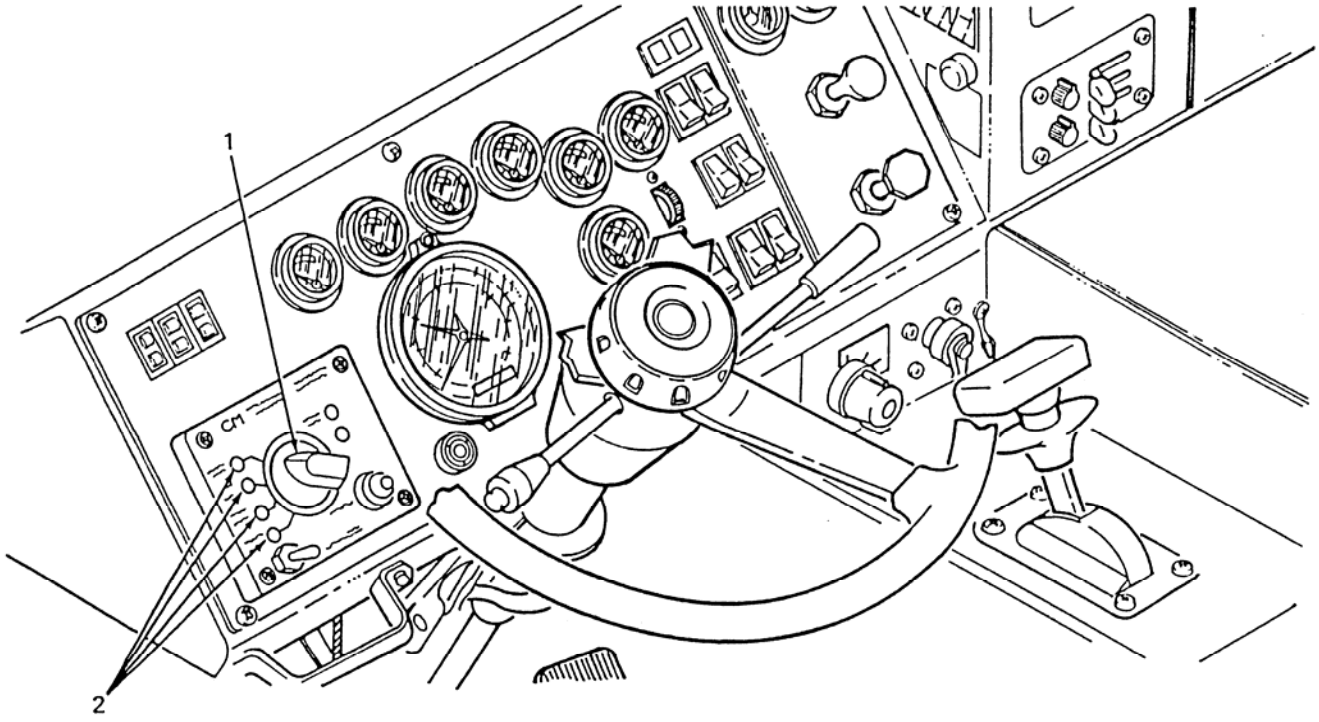
NOTE

The following procedures provide instructions for loading and unloading an able payload (M1 Series Main Battle Tank) on the M1000 Semitrailer coupled to a U.S. Army M1070 or M911 tractor. The M1070 tractor is illustrated as the prime mover throughout these instructions. Operations unique to the M1070 tractor will be identified and/or referenced to the applicable Operating Instructions technical manual (TM). Operations unique to the M911 tractor will be identified and/or referenced to the applicable Operating Instructions TM.

a. Loading an able payload. To load an able payload, proceed as follows:

(1) Start tractor per applicable tractor Operating Instructions TM.

(2) On M1070 tractor, set central tire inflation system (CTIS) switch (1) to setting for expected road/terrain conditions and allow tractor to sit until selected CTIS indicator (2) remains lit for that CTIS setting.



2-26. LOADING AND UNLOADING ABLE PAYLOADS (CONT)

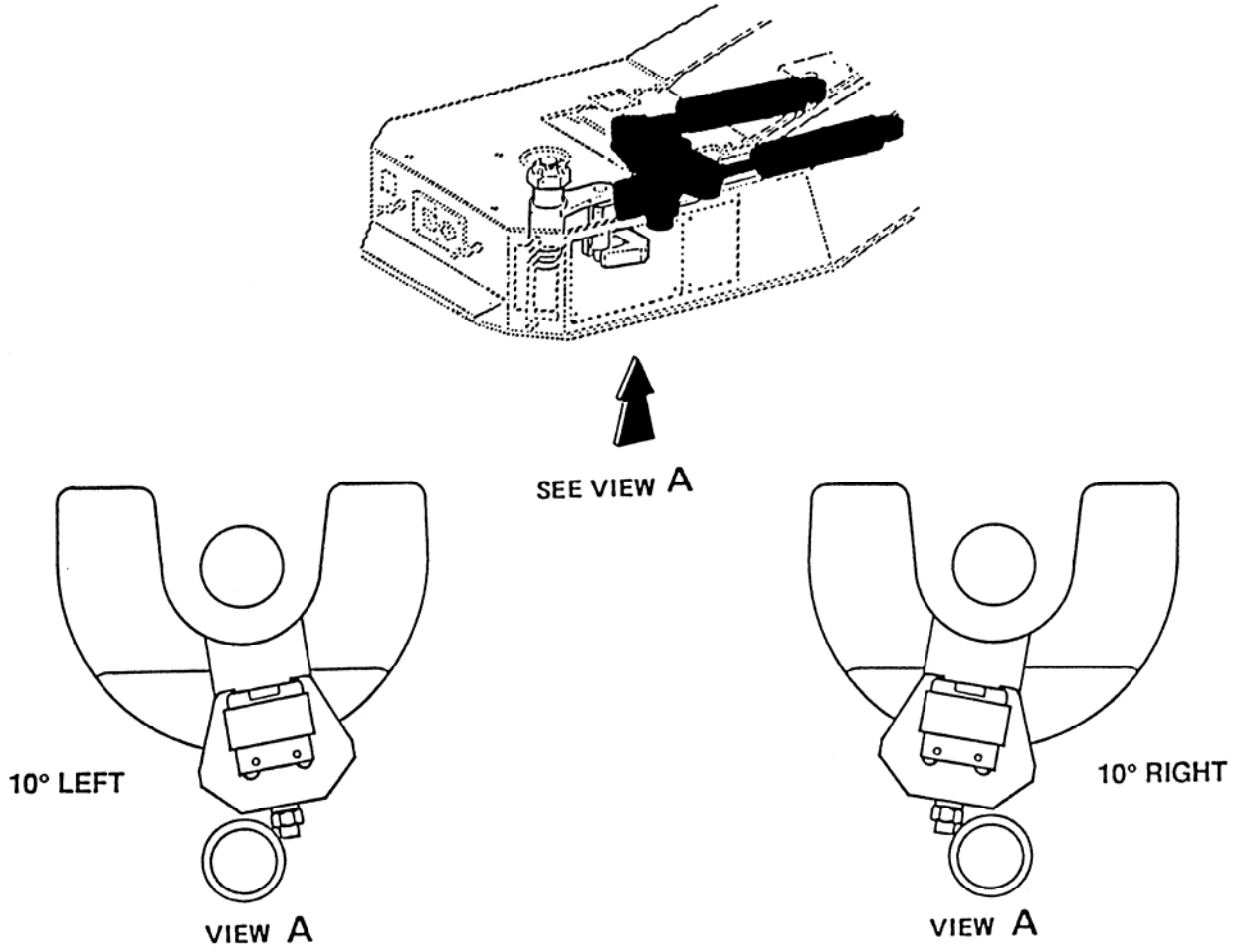
(3) Refer to paragraph 2-24 and couple tractor to semitrailer.

(4) Aline back of tractor/semitrailer combination as close as possible to payload, approximately 15 feet (4.6m), on the ground as level as possible.

WARNING

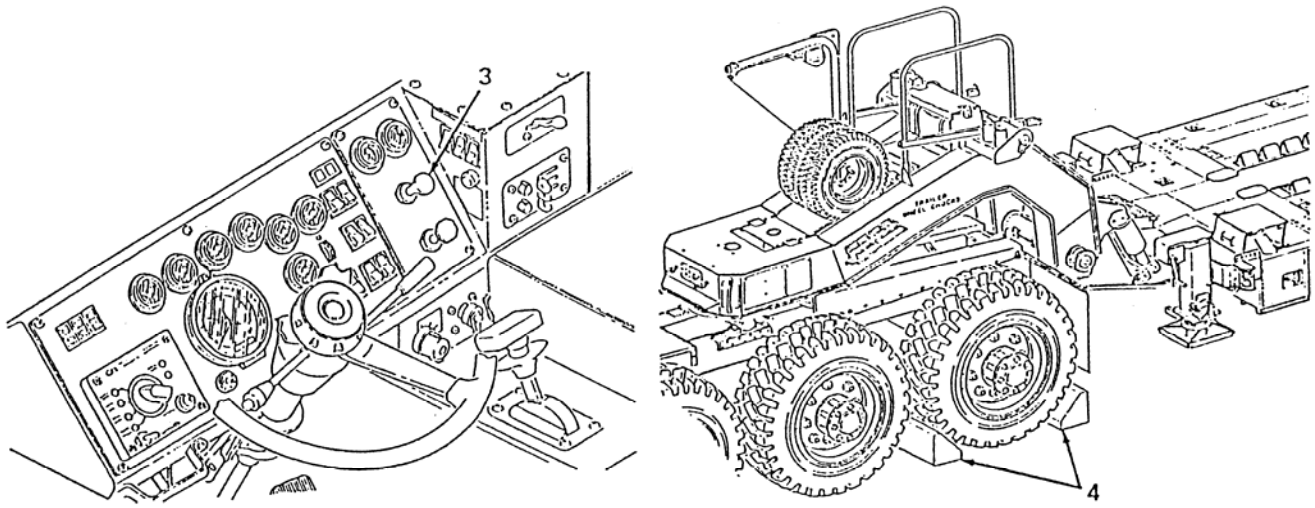
Load semitrailer on level ground whenever possible. In adverse conditions, loading can be done on grades up to 10 percent with a maximum offset angle of 10 degrees between tractor and semitrailer. Avoid exceeding these limitations to prevent payload from rolling on semitrailer and causing serious injury to personnel and damage to equipment.

(5) Visually check tractor/semitrailer offset angle by having spotter check relationship between steering wedge bolt and weld circle at bottom rear of pickup plate. If inside edge of bolt alines with outside edge of weld circle, offset angle is 10 degrees. Make any required adjustments to tractor.

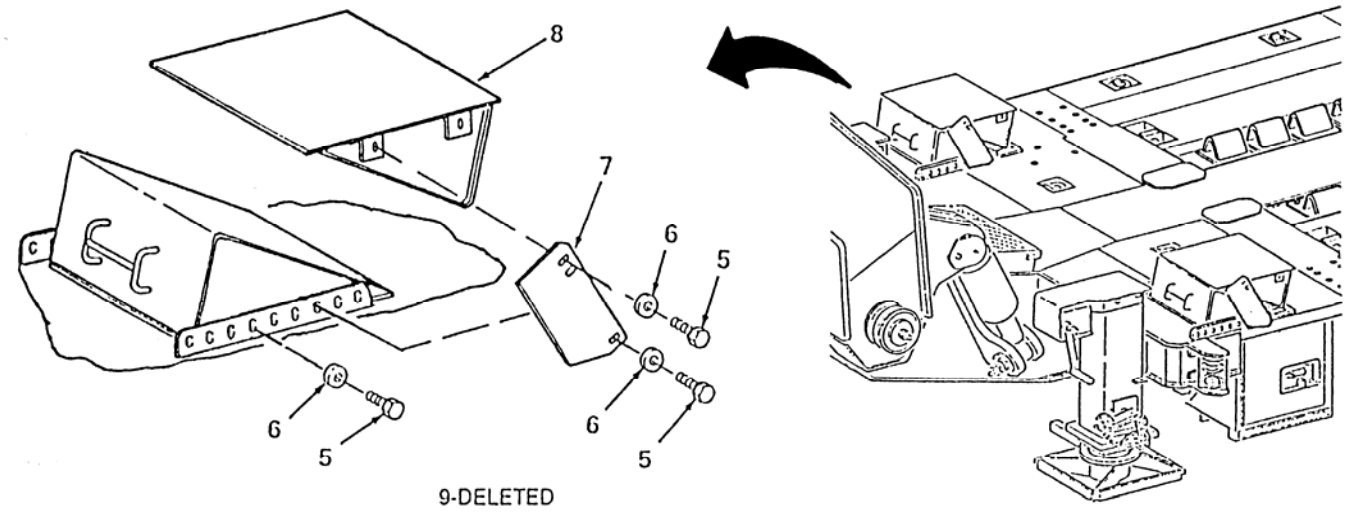


(6) Apply tractor parking brakes by pulling out parking brake valve (3).

(7) Remove four wheel chocks (4) from stowage on tractor and chock wheels on both sides of tractor.



(8) Remove 10 capscrews (5), washers (6), and 4 sheets (7) from two rear payload chocks (8), and remove two rear payload chocks (8) from platform.



9-DELETED

2-26. LOADING AND UNLOADING ABLE PAYLOADS (CONT)

NOTE

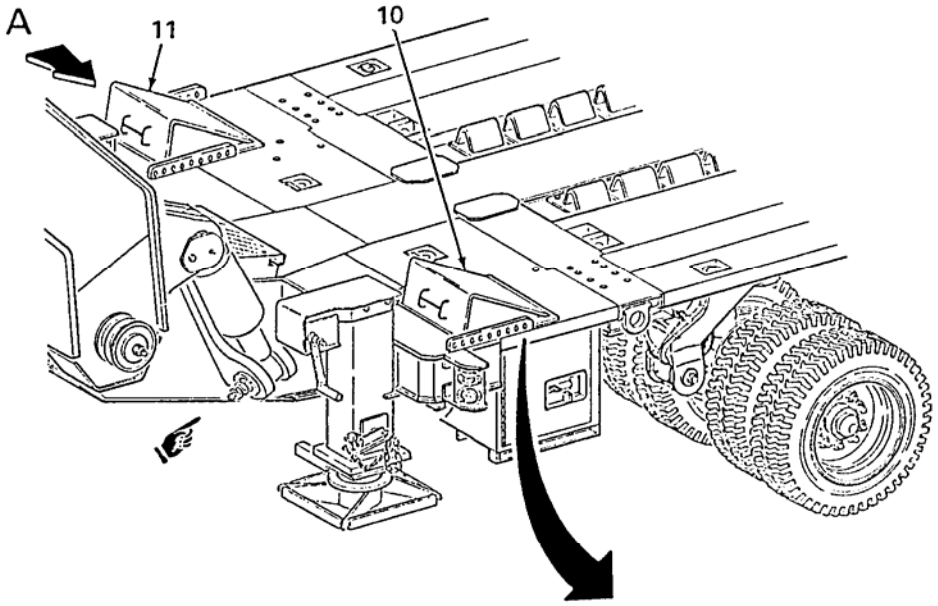
Prior to loading, front payload chocks must be adjusted to accommodate the offset of roadwheels on the M1 tank, and the tank's braking system shall be released.

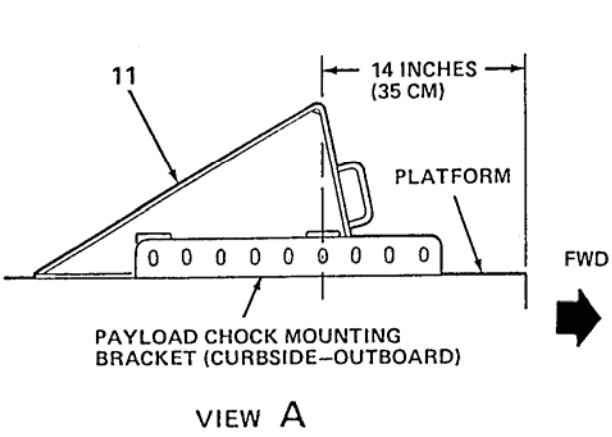
(9) Position streetside front payload chock (10) approximately 10 inches (25 cm) from forward edge of platform.

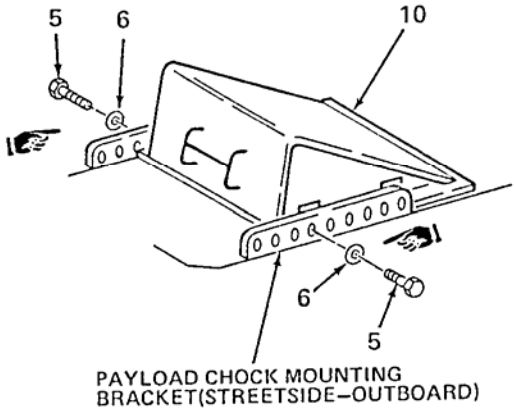
(10) Position curbside front payload chock (11) approximately 14 inches (35 cm) from forward edge of platform.

(11) Align forward mounting holes of streetside and curbside payload chocks (10 and 11) with fourth hole from front of outboard payload chock mounting brackets on platform.

(12) Secure each payload chock (10 and 11) with two capscrews (5) and washers (6).

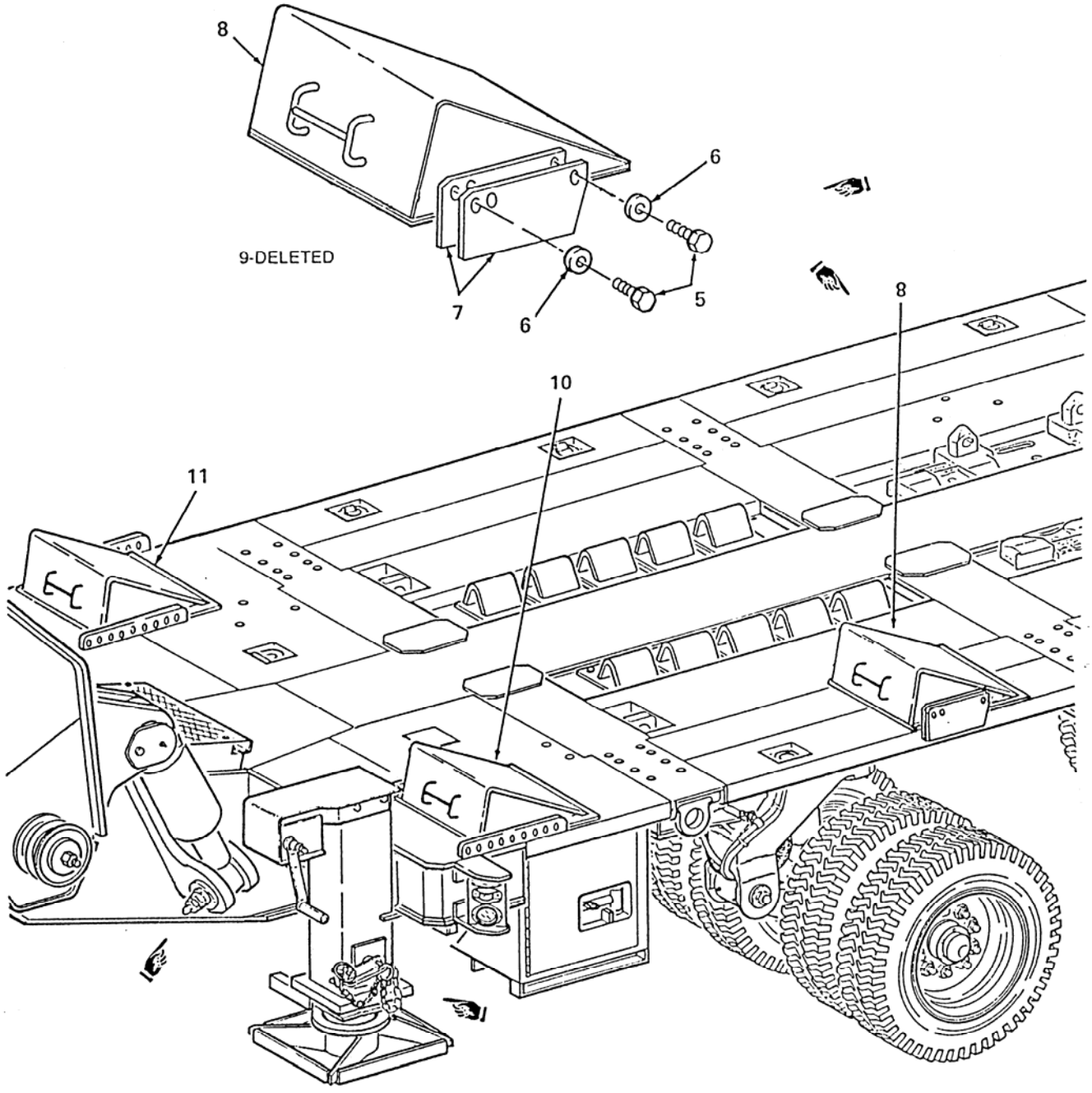






(13) Assemble two sheets (7) to outboard side of each of two rear payload chocks (8) using four capscrews (5) and washers (6).

(14) Position curbside rear payload chock (8) on streetside of platform, over first bogie. Place streetside rear payload chock (8) on the ground at streetside of semitrailer.



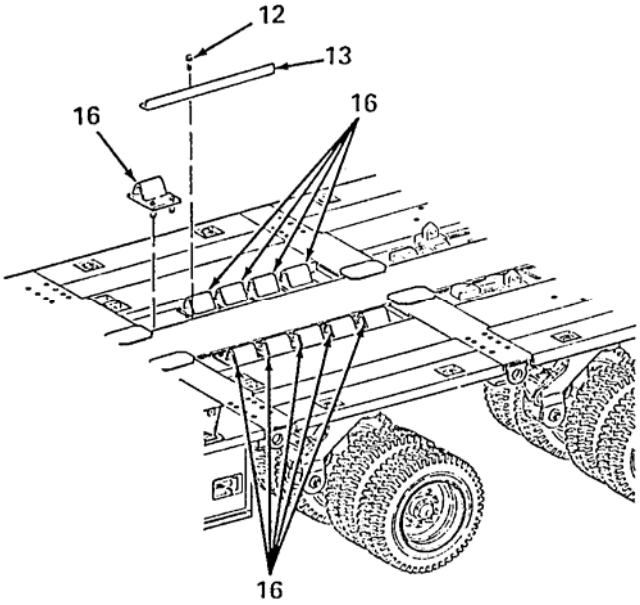
2-26. LOADING AND UNLOADING ABLE PAYLOADS (CONT)

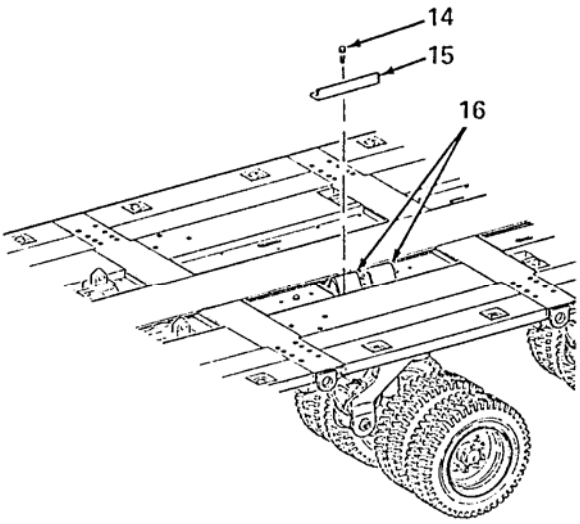
(15) From forward recessed area on platform, remove two capscrews (12) and curb guide stowage brackets (13) from platform.

(16) From aft recessed area on platform, remove capscrew (14) and curb guide stowage bracket (15) from platform.

(17) Remove all 12 curb guides (16) from stowage points on platform.

(18) Install curb guide stowage bracket (15) and capscrew (14) in forward recessed area on platform.

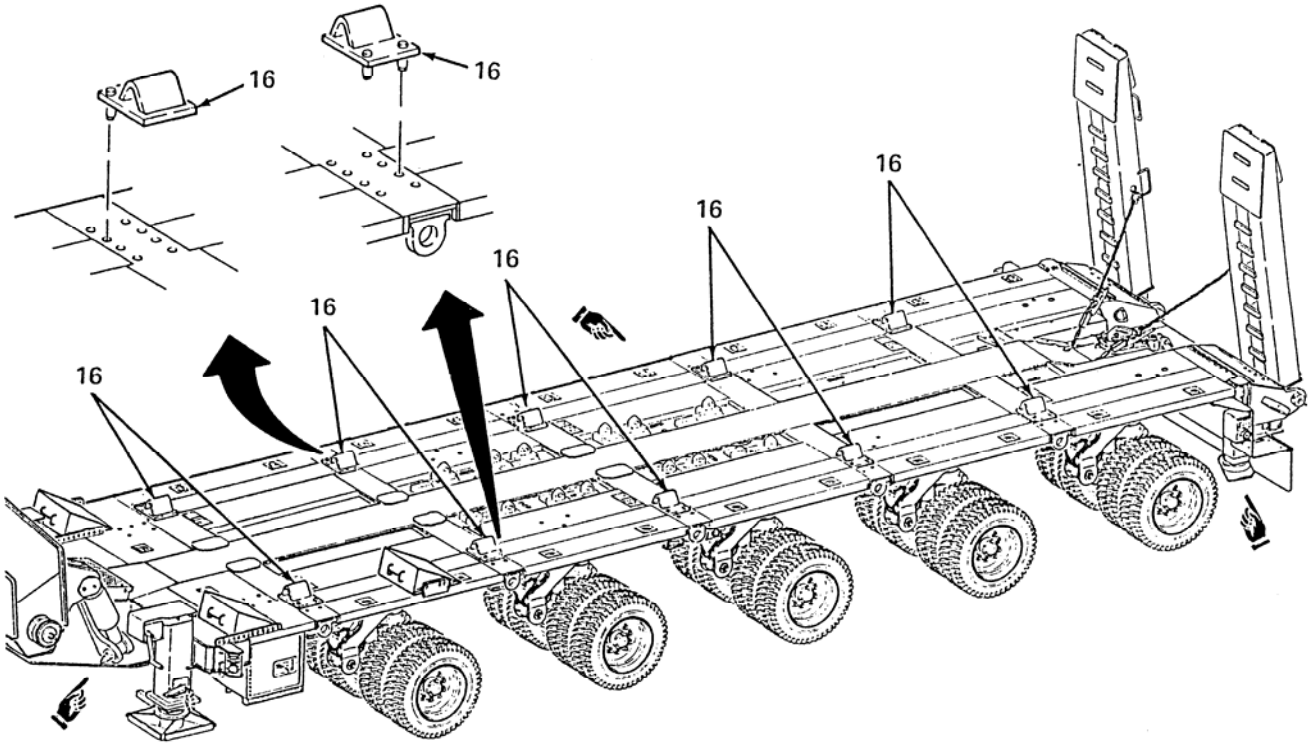




NOTE

Two curb guides (16) will be installed on beavertail after the loading ramps are lowered.

(19) Install 10 curb guides (16) (5 on each side) into second hole inboard from platform edge (pin side facing outboard from center of platform). Set two remaining curb guides (16) aside until ramps are lowered.



WARNING

Due to semitrailers being outfitted with various chains (1/2-inch and/or 3/4-inch link sizes), all chains must be inventoried in the platform storage compartment prior to placing chains on platform. Once chains are inventoried, read and familiarize yourself with the information in steps (20)(a) thru (h) to determine tiedown needed to properly secure the payload or injury to personnel and damage to equipment may result.

CAUTION

Ensure chains and load binders are positioned inboard of both curbside and streetside curb guides or damage to equipment may result when payload is loaded.

(20) Determine size of all tiedown chains. Read steps (20)(a) thru (h) to determine tiedown requirements and arrange payload tiedown chains as follows:

2-26. LOADING AND UNLOADING ABLE PAYLOADS (CONT)

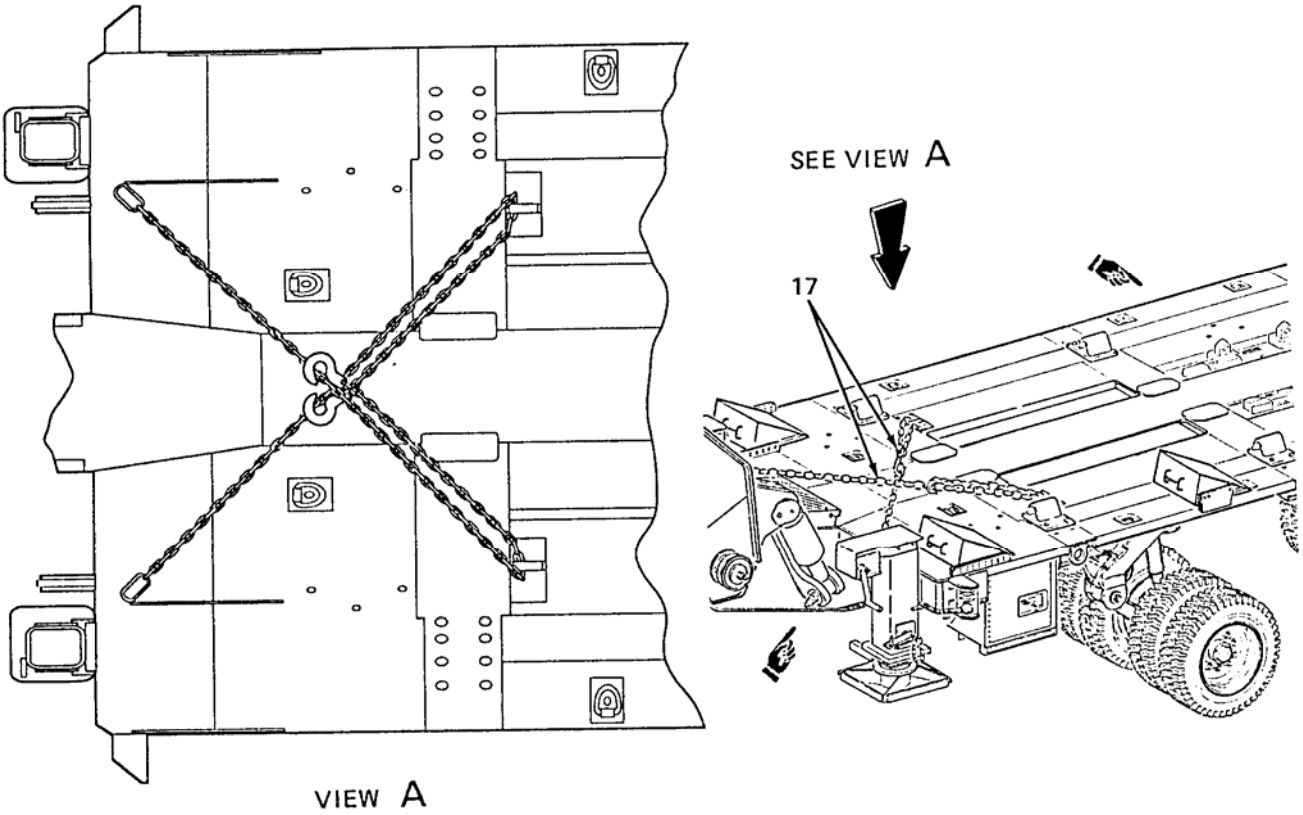
CAUTION

Chains must be the same length and must be properly laid out or loaded payload will contact gooseneck and damage to equipment may result.

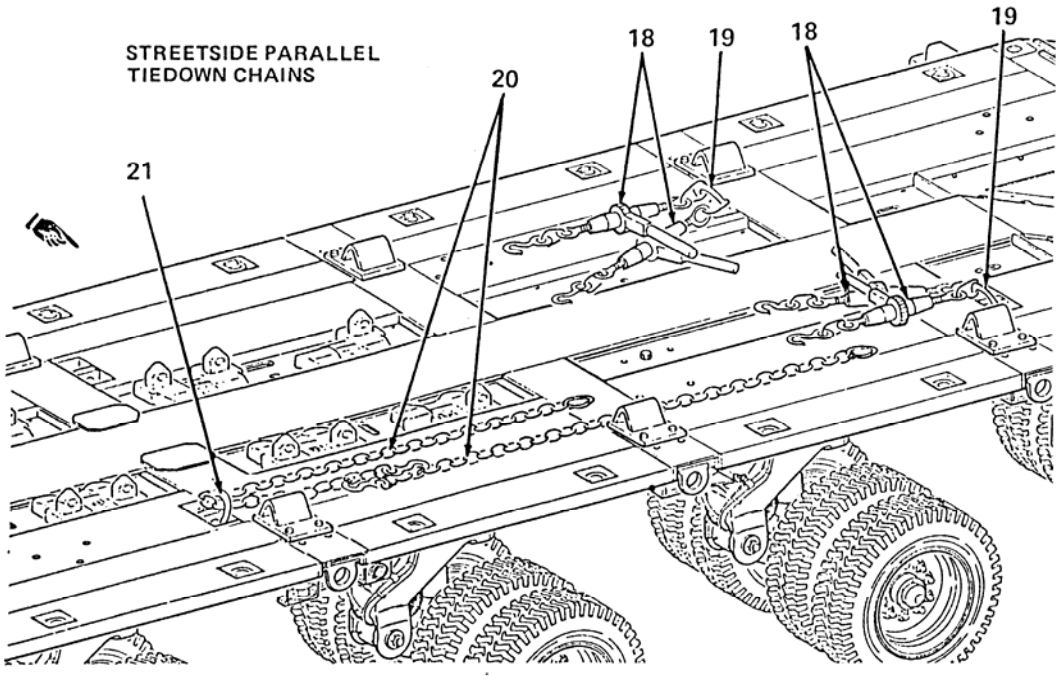
NOTE

With chains crossed, pear-shaped end link should be approximately in front of inboard payload chock stowage bracket.

(a) Loop two 11-foot front tiedown chains (17) (either 3/4-inch or 1/2-inch link size) through two front tiedown rings recessed in platform. Hook chains back to themselves such that each pear-shaped end link is approximately in front of inboard payload chock stowage bracket and that chains are the same length. Lay both chains (17) so that they are crossed near front of platform.



(b) Extend four load binders (18) to show approximately 6.5 inches (16.5 cm) of thread on both ends. Remove two shackles (19) from platform stowage compartment and position near rear payload tiedown rings, recessed in platform.



NOTE

When laying out load binders, ensure parallel load binder is on outboard side of shackle and angled load binder is on inboard side of shackle to prevent load binders from interfering with each other.

(c) Using two shackles (19), secure two load binders (18), small end of pear link toward load binder, to each rear payload tiedown ring. For each pair of load binders (18), place one load binder (18) parallel to edge of platform pointed toward front and other load binder angled toward center of platform. Position handles inboard.

(d) Lay out streetside parallel tiedown chain(s) (20) as follows:

1. If using 3/4-inch link chains, hook two 11-foot chains (20) together.

2. If using 1/2-inch link chains, select one 19-foot chain (20).

3. Route chain(s) (20) forward from streetside parallel load binder (18), parallel with edge of platform, through large shackle (21) (from platform stowage compartment) in streetside center tiedown ring.

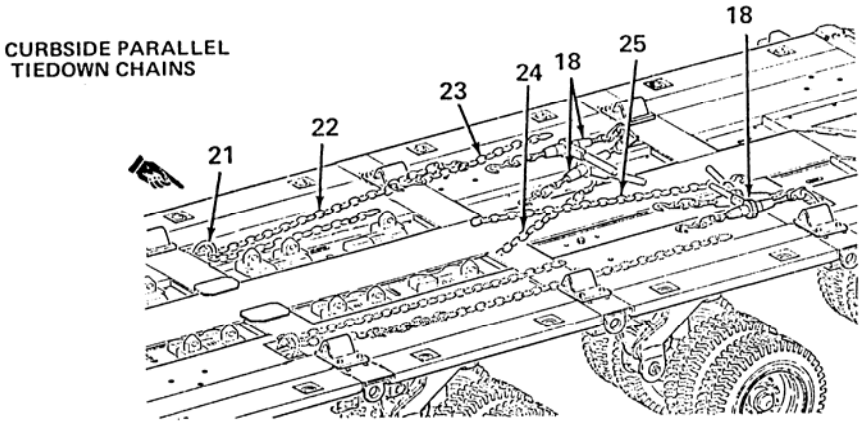
4. Pass chain(s) (20) back toward rear of platform. If using 3/4-inch chains, be sure that junction of the two 3/4-inch chains is aft of large shackle (21). Do not connect chain(s) to load binder (18).

2-26. LOADING AND UNLOADING ABLE PAYLOADS (CONT)

(e) Lay out curbside parallel tiedown chain(s) (22) as follows:

1. If using 3/4-inch link chains, hook one 11-foot chain (22) and one 4-foot chain (23) together. Lay 4-foot chain (23) along side the curbside parallel load binder (18). Route 11-foot chain (22) forward, parallel with curbside edge of platform, and inward through large shackle (21) (from platform stowage compartment) and install shackle (21) in curbside center tiedown ring.

2. If using 1/2-inch link chain, select one 19-foot chain (22). Route chain (22) forward from curbside parallel load binder (18), parallel with edge of platform, through large shackle (21) (from platform stowage compartment) and install shackle (21) in curbside center tiedown ring.



3. Pass chain(s) (22) back toward rear of platform. Do not connect chain(s) to load binder (18).

(f) Lay out curbside angle rear payload tiedown chain (24) as follows:

1. If using 3/4-inch link chain, place a 4-foot chain (24) from curbside angled load binder (18) forward toward center of platform.

2. If using 1/2-inch link chain, place a 7-foot chain (24) from curbside angled load binder (18) forward toward center of platform.

3. Do not connect angle rear tiedown chain (24) to load binder (18).

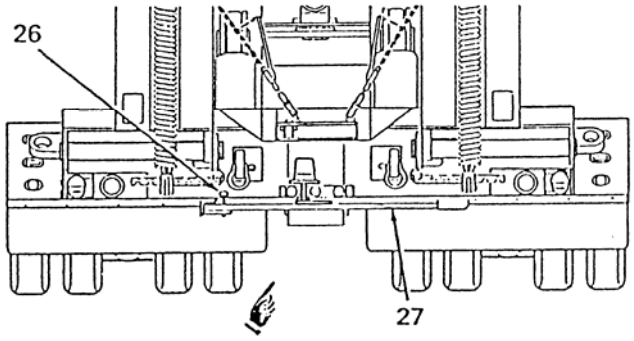
(g) Lay out streetside angle rear payload tiedown chain (25) as follows:

1. If using 3/4-inch link chain, place an 11-foot chain (25) from streetside angled load binder (18) forward toward center of platform.

2. If using 1/2-inch link chain, place a 7-foot chain (25) from streetside angled load binder (18) forward toward center of platform.

3. Do not connect angle rear tiedown chain (25) to load binder (18).

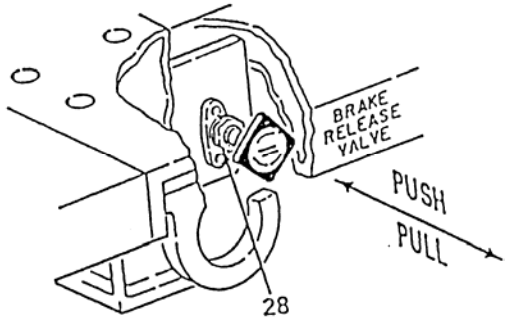
(21) Remove hitch pin (26) and crowbar (27) from rear of semitrailer below loading ramps. Reinstall hitch pin (26).



(22) Raise ramps perpendicular to platform and adjust ramp span width to match payload (para. 2-20).

(23) Start and run APU (para. 2-16).

(24) Release semitrailer parking brakes by pushing inward on knob of brake release valve (28).



(25) Adjust platform height (para. 2-19) to loading position as follows:

(a) Raise front of semitrailer to 50 inches (127 cm), top mark on crowbar.

(b) Lower rear of semitrailer to approximately 34 inches (86 cm), bottom mark on crowbar.

CAUTION

Failure to lower rear support legs while loading and unloading payloads may result in severe equipment damage (i.e., upper suspension casting cracks, blown tires).

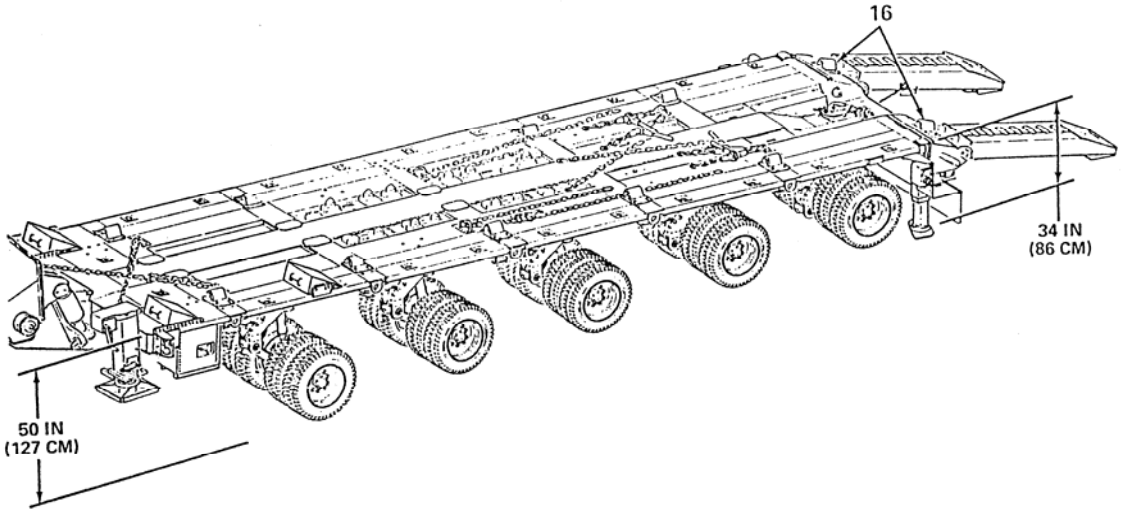
(c) Lower rear support legs until feet are in firm contact with the ground. Turn adjusting nut as necessary to position socket head screw outboard and close cover.

(26) Unhook loading ramp stow chains and lower loading ramps to the ground (para. 2-20).

2-26. LOADING AND UNLOADING ABLE PAYLOADS (CONT)

(27) Apply semitrailer parking brakes by pulling outward on knob of brake release valve (28).

(28) Aline and install two curb guides (16) into second hole inboard from platform edge at beavertail, just in front of each loading ramp. Make sure pin side of each curb guide faces outward from center of platform.



WARNING

Two spotters are required for loading and unloading operations. The payload operator must know the position of spotters at all times or injury to personnel may result.

(29) Position spotters as follows:

WARNING

Do not position a spotter on gooseneck if payload is to be backed onto semitrailer platform or injury to personnel may result.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on or trip over it. Injury to personnel or damage to equipment may result.

(a) Position one spotter on gooseneck to ensure constant visual contact with payload operator. If backing payload onto semitrailer platform, position spotter behind payload facing forward. Spotter must be in constant view with payload operator.

(b) Position one spotter on curbside of payload to maintain visual contact with spotter located either on gooseneck or at back of payload facing payload operator.

CAUTION

Ensure all chains and load binder handles are inboard of the curb guides and are clear of the payload tracks or damage to equipment may occur.

(30) Start and warm payload. Aline payload to semitrailer prior to loading (center of payload to center of semitrailer).

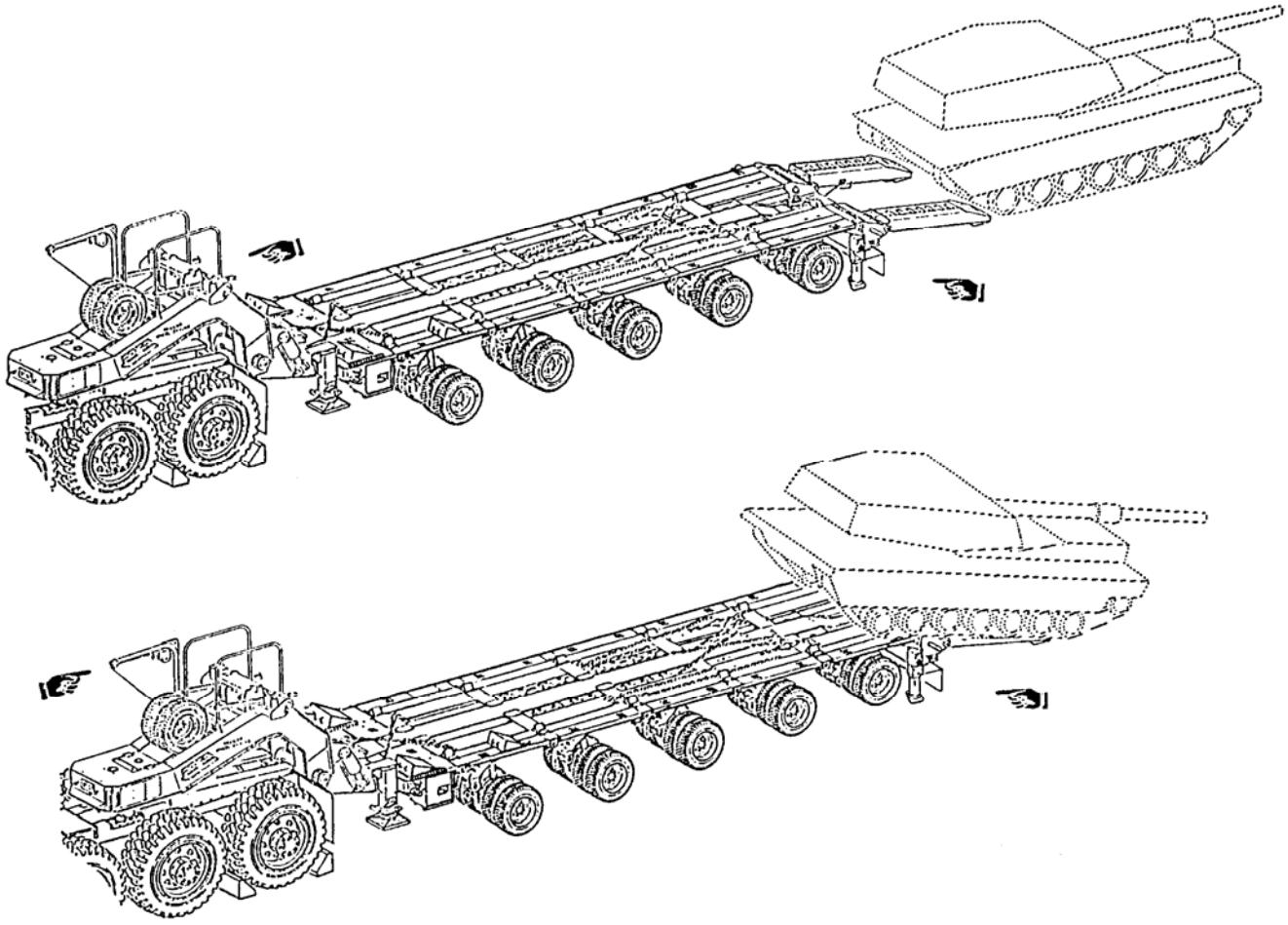
WARNING

Unnecessary personnel must stand well clear of the vehicles, especially behind the payload (engine/turbine exhaust) during loading operations. At no time during any loading operation while the payload is moving should personnel be on the semitrailer platform. The payload operator must drive the payload slowly up the loading ramps and onto the platform or injury to personnel and damage to equipment may result.

Payload adjustments, side to side (turning), must be kept to a minimum or serious injury to personnel and damage to equipment may result.

(31) Using hand signals, gooseneck/aft spotter must signal payload operator to drive payload slowly up onto platform. Curbside spotter must notify gooseneck/aft spotter of any required payload adjustments while loading.

(32) Have payload operator drive payload onto ramps and platform.



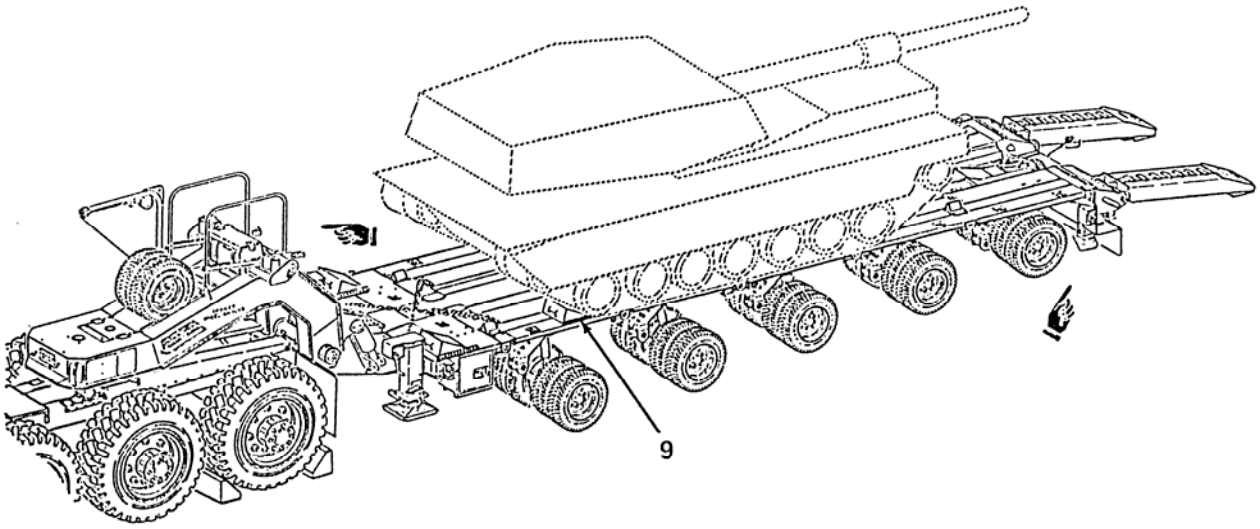
2-26. LOADING AND UNLOADING ABLE PAYLOADS (CONT)

(33) Gooseneck/aft spotter must guide payload operator until firm contact with payload chock (9) on streetside has been made.

WARNING

Failure to set the payload parking brake could allow the payload to roll backward causing injury to personnel and damage to equipment.

(34) Payload operator must apply payload parking brakes.



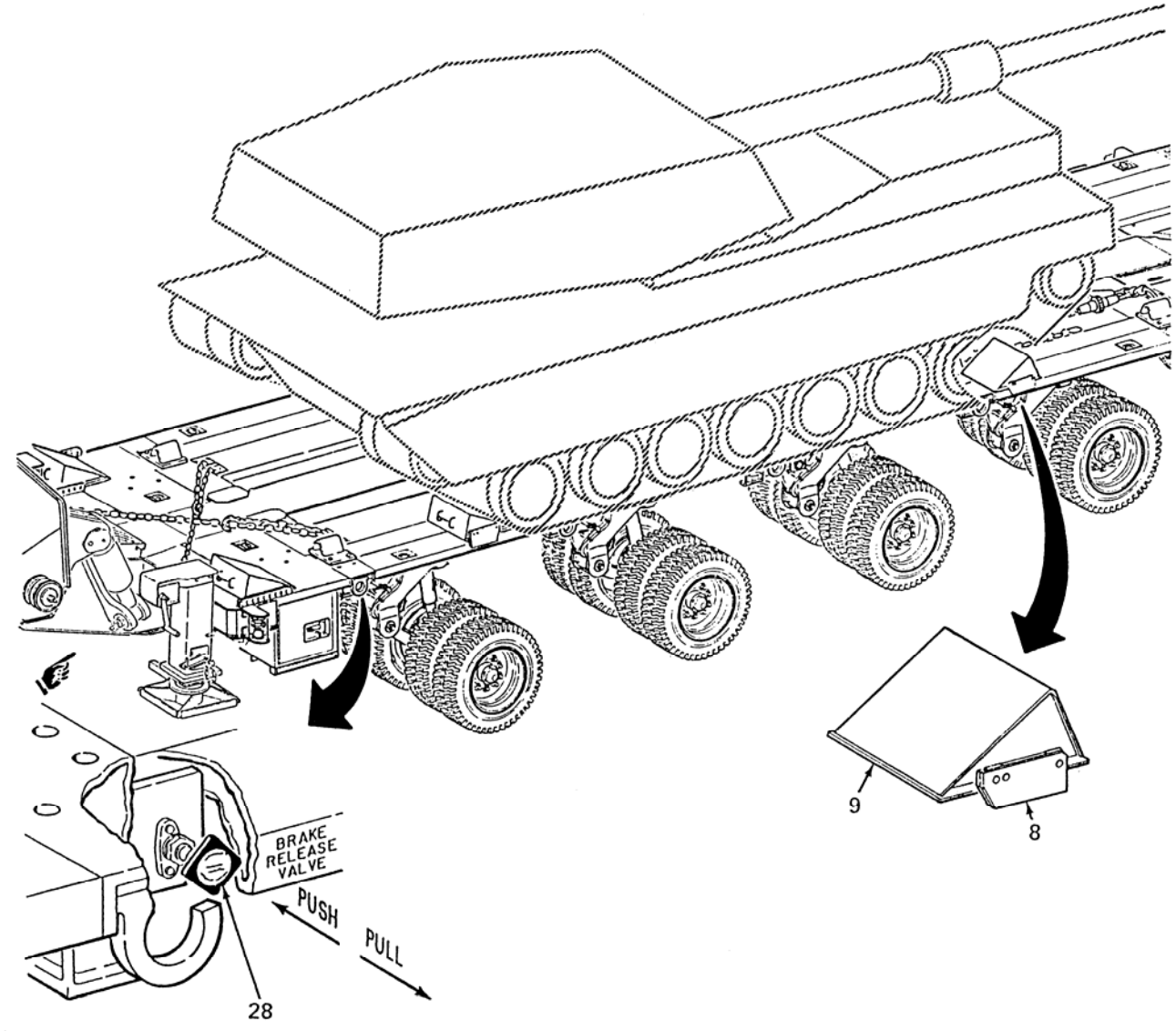
(35) Chock streetside rear of payload with rear streetside payload chock (9) with two sheets (8) attached. Make sure sheets are positioned flush against side of platform to prevent inward shifting of chocks.

(36) Adjust platform to normal running height as follows:

(a) Release semitrailer parking brakes by pushing inward on knob of brake release valve (28).

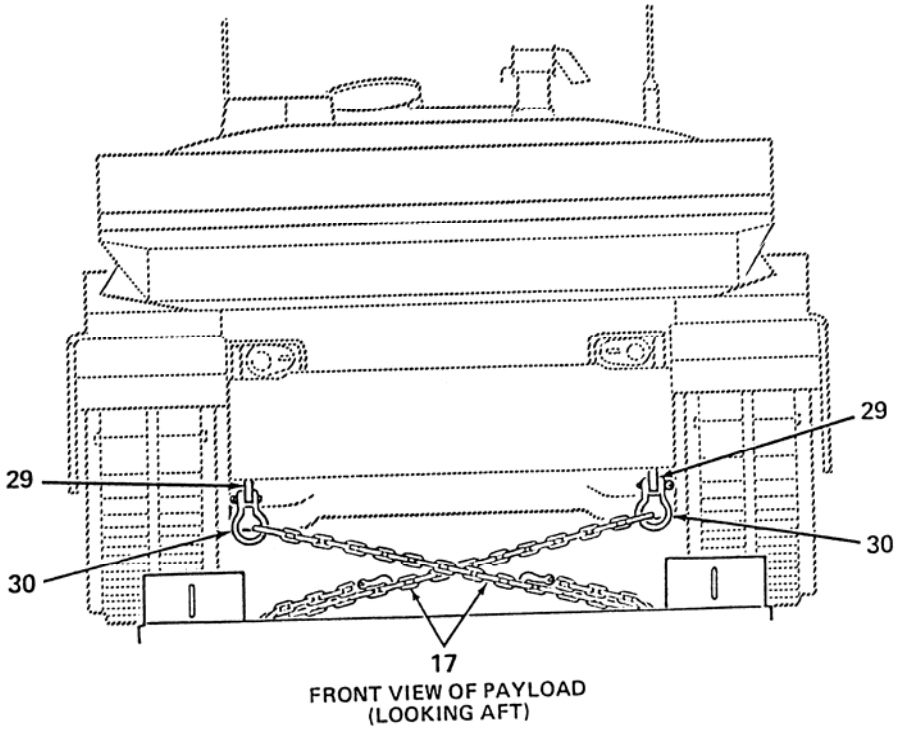
(b) Adjust platform height (para. 2-19) to normal running height of 43 inches (109 cm). Using bed height indicators, check each corner of platform for a height of 43 inches (109 cm).

(c) Apply semitrailer parking brakes by pulling outward on knob of brake release valve (28).

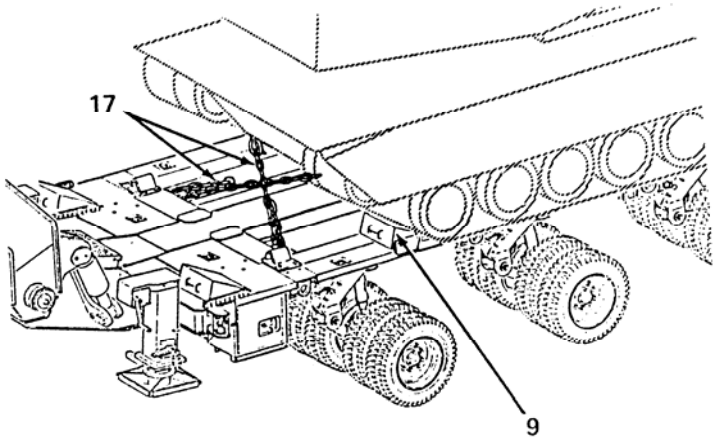

BRAKE
RELEASE
VALVE
PUSH
PULL
28
9
8

2-26. LOADING AND UNLOADING ABLE PAYLOADS (CONT)

(37) Lift two front tiedown chains (17) and attach to two front towing lugs (29) using two shackles (30) from platform stowage compartment.



FRONT VIEW OF PAYLOAD
(LOOKING AFT)



NOTE

It may be necessary to release the payload parking brake, move the rear streetside payload chock back approximately 12 inches (30 cm), and move the payload back slightly to remove the front streetside payload chock.

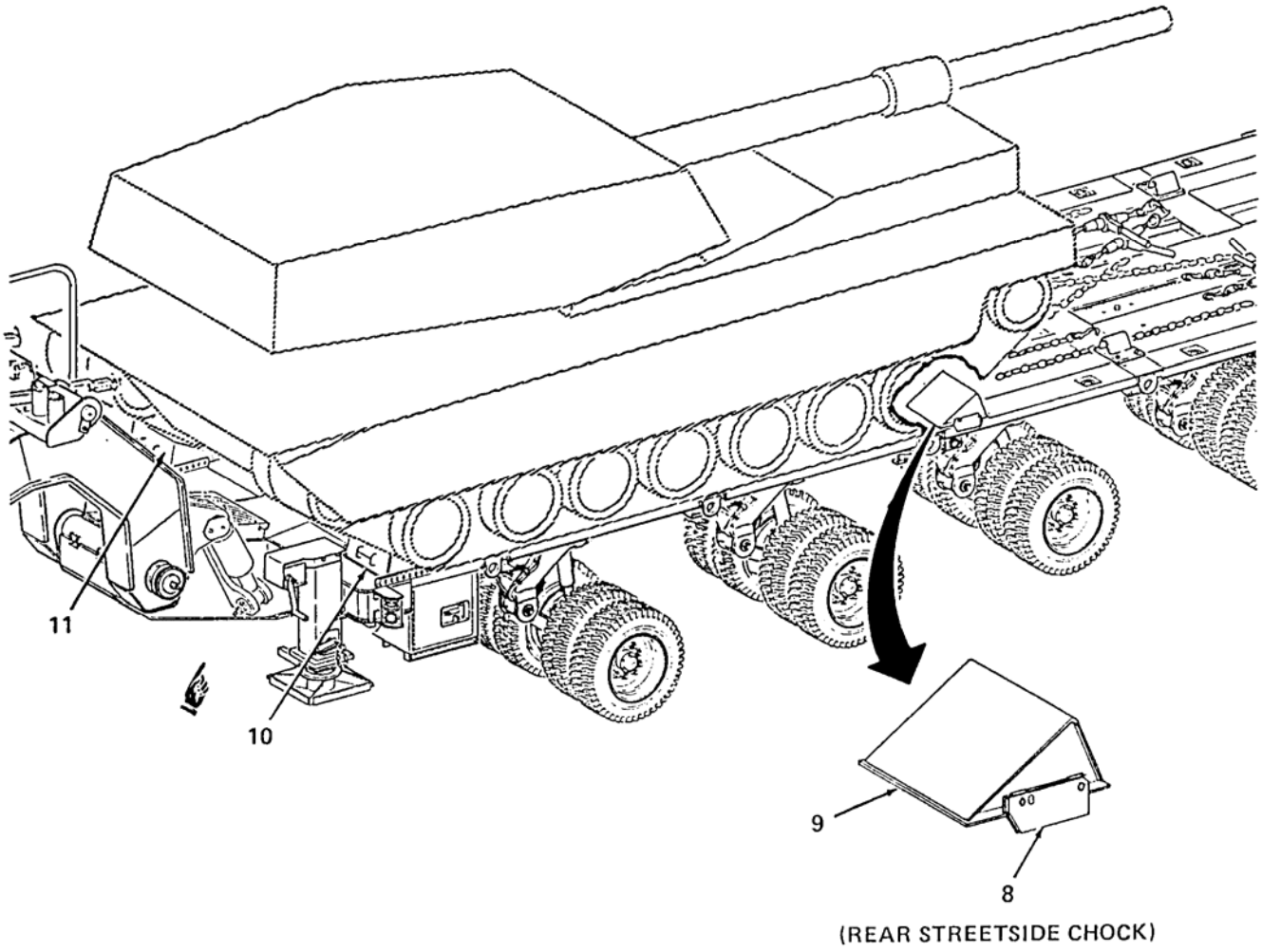
(38) Remove streetside payload chock (9) from front streetside of payload.

(39) Using hand signals, signal payload operator to drive payload slowly forward until front tiedown chains are tight and payload tracks (front roadwheels) are firmly on the front payload chocks (10 and 11). Apply payload parking brakes.

NOTE

Install payload rear chocks with sheets positioned flush against side of platform to prevent inward shifting of chocks.

(40) Place rear payload chocks (9), with sheets (8) attached, to rear curbside and streetside of payload.



2-26. LOADING AND UNLOADING ABLE PAYLOADS (CONT)

(41) Shut down payload and secure payload to semitrailer platform as follows:

(a) Remove two shackles (31) from platform stowage compartment.

NOTE

The streetside parallel chain consists of either two 11-foot 3/4-inch link chains or the 19-foot 1/2-inch link chain. The curbside angle rear payload tiedown chain consists of either the 4-foot 3/4-inch chain or the 7-foot 1/2-inch link chain.

(b) Attach streetside parallel chain (20) and curbside angle rear payload tiedown chain (24) to streetside rear towing lug (32) using shackle (31).

NOTE

The curbside parallel chain consists of either the 11-foot and 4-foot 3/4-inch link chain combination or the 19-foot 1/2-inch link chain. The streetside angle rear payload tiedown chain consists of either the 11-foot 3/4-inch link chain or the 7-foot 1/2-inch link chain.

(c) Attach curbside parallel tiedown chain(s) (22 or 22 and 23) and streetside angle rear payload tiedown chain (25) to curbside rear towing lug (32) using shackle (31).

NOTE

When attaching load binders to tiedown chains, take up as much slack as possible. The remaining slack can be taken up when load binders are operated.

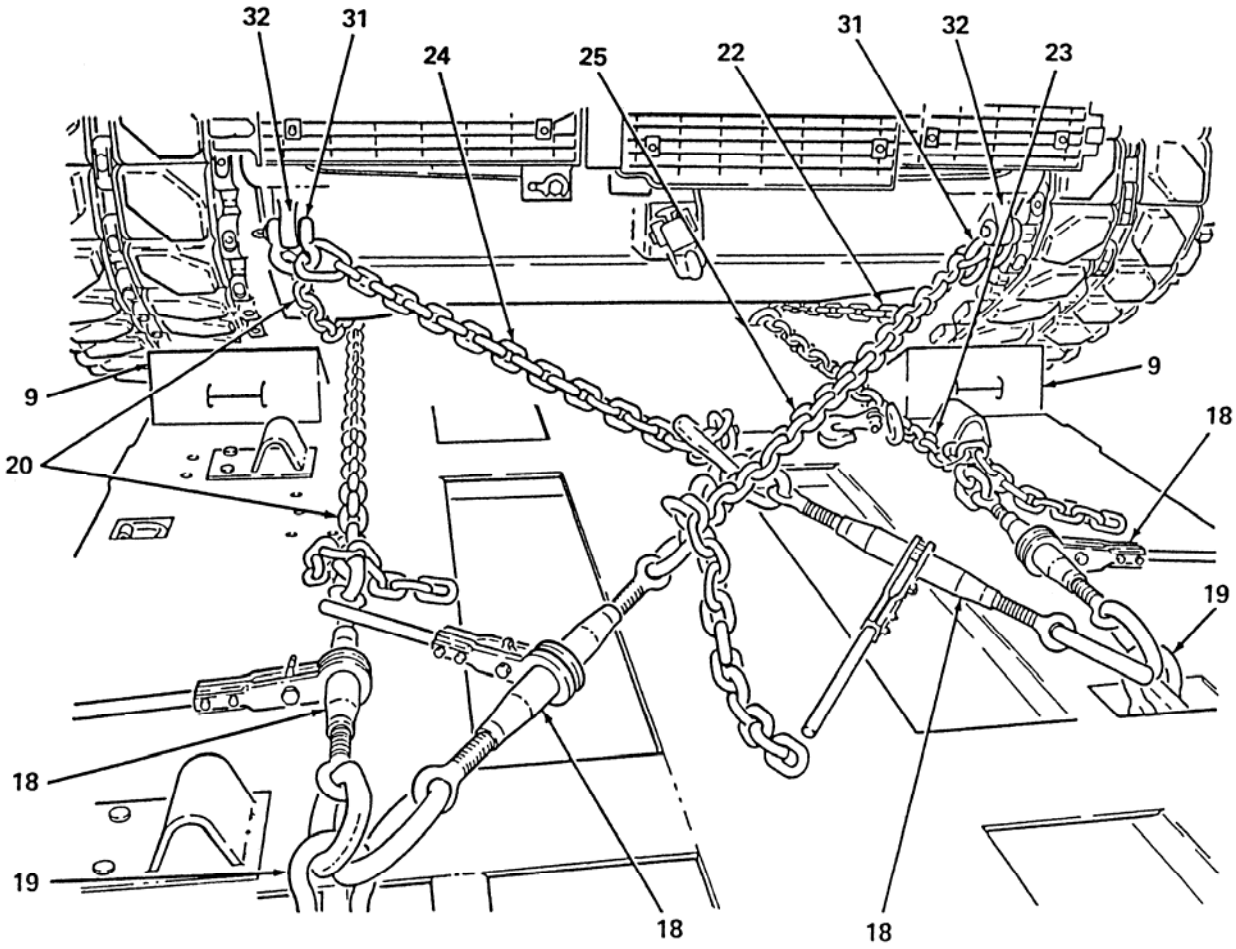
(d) Attach both parallel chains (20 and 22 or 20, 22, and 23) to parallel positioned load binders (18).

(e) Operate load binders (18) to tighten both parallel tiedown chains (20 and 22 or 20, 22, and 23).

NOTE

When attaching load binders to tiedown chains, take up as much slack as possible. The remaining slack can be taken up when load binders are operated.

(f) Attach both curbside and streetside angle rear payload tiedown chains (24 and 25) to angled load binders (18) as follows:



1. Attach free end of curbside angle rear payload tiedown chain (24) to curbside angled load binder (18).

CAUTION

The streetside angle rear payload tiedown chain must cross over the top of the curbside rear payload tiedown chain or the chains will interfere with each other and damage to equipment may result.

2. Attach free end of streetside angle rear payload tiedown chain (25), passing chain over top of curbside angle rear payload tiedown chain (24), to streetside angled load binder (18).

3. Operate both load binders (18) to tighten both angle rear payload tiedown chains (24 and 25). Be sure payload is secure against two rear payload chocks (9).

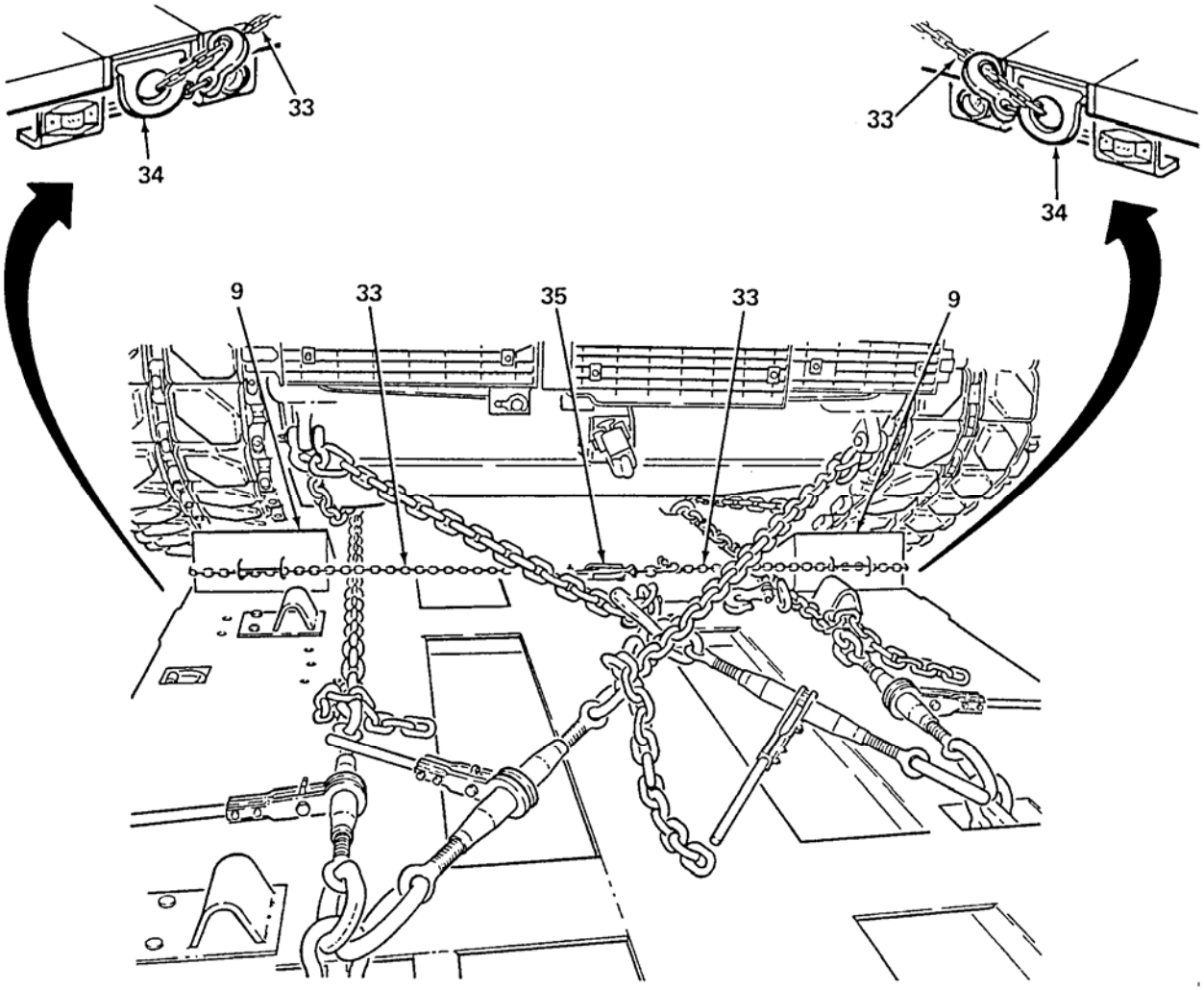
2-26. LOADING AND UNLOADING ABLE PAYLOADS (CONT)

(g) Attach two 11-foot utility chains (33) through tiedown rings (34) on each side of platform just forward of each payload chock (9) and connect hook to each chain (33).

(h) Pass free end of utility chains (33) through both handles of both rear payload chocks (9). Place free ends of both utility chains (33) at center of platform.

(i) Attach load binder (35) to both utility chains (33) taking up as much slack as possible.

(j) Operate load binder (35) to tighten both utility chains (33).

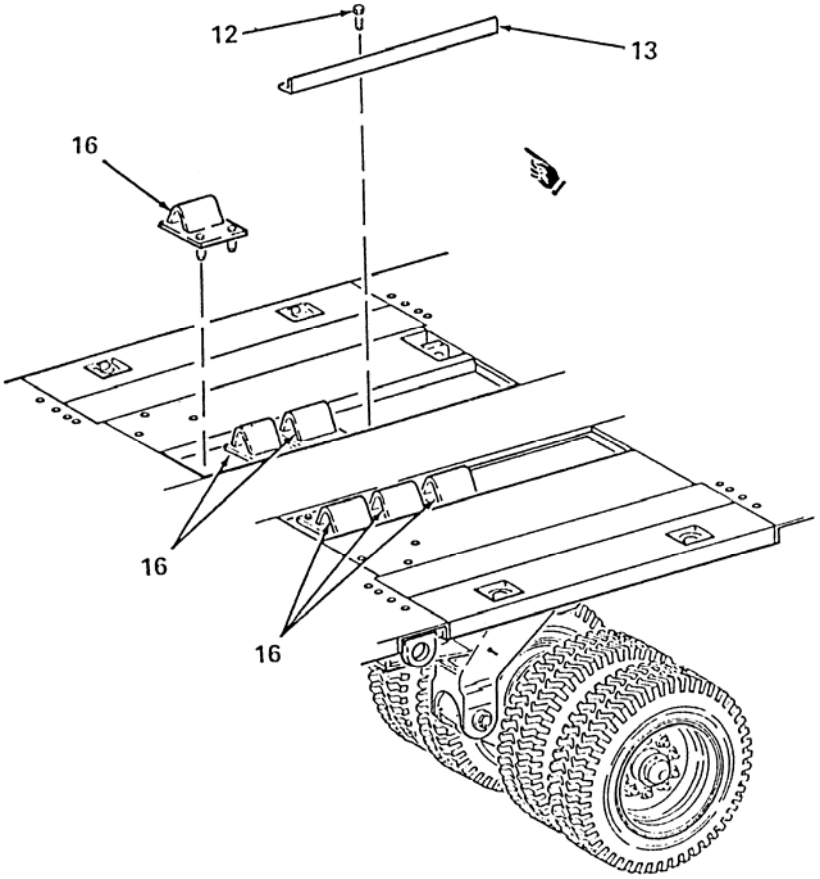


NOTE

Store curb guides in the foremost three positions on each side in the recessed areas.

(42) Remove six curb guides (16) from rear of platform and beavertail and stow in rear recessed area of platform.

(43) Secure six curb guides (16) with two curb guide stowage brackets (13) and capscrews (12).



(44) Raise ramps, adjust ramp span width to furthest inboard position and stow loading ramps for transport (para. 2-20).

(45) Shut down APU (para. 2-16).

(46) Raise rear support legs (para. 2-23).

(47) Stow crowbar at back of platform and secure in place with hitch pin. Stow all tools used during loading procedure in platform stowage compartment.

(48) Remove four wheel chocks from tractor tires and restow wheel chocks onto tractor. If applicable, also remove four semitrailer chocks and restow on semitrailer gooseneck.

2-26. LOADING AND UNLOADING ABLE PAYLOADS (CONT)

b. Unloading an able payload. To unload an able payload, proceed as follows:

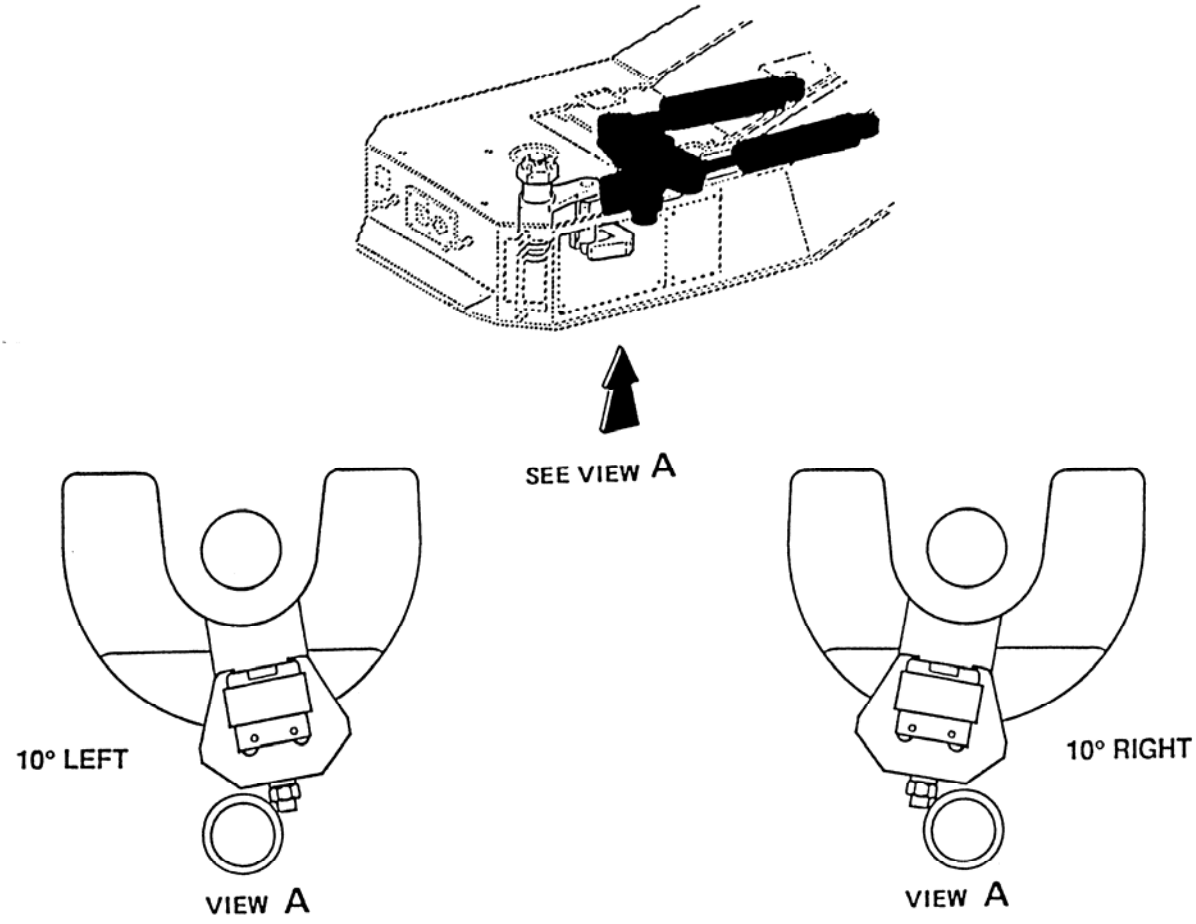
(1) If tractor and semitrailer are already coupled, proceed to step (2). If tractor/semitrailer are uncoupled, perform steps (1) thru (3) of paragraph 2-26a.

WARNING

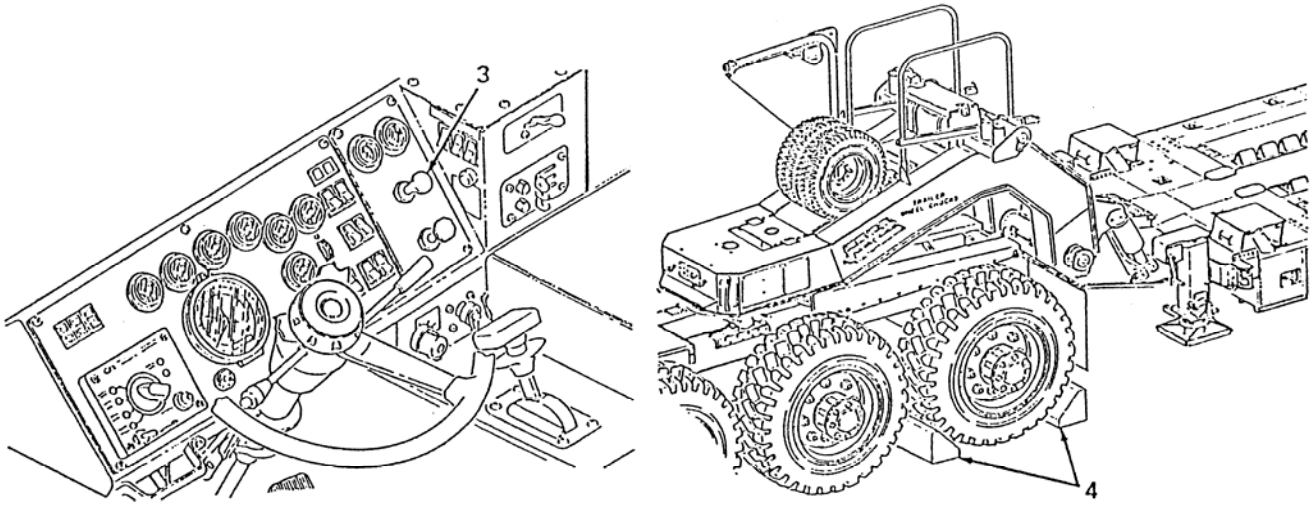
Unload semitrailer on level ground whenever possible. In adverse conditions, unloading can be done on grades up to 10 percent with a maximum offset angle of 10 degrees between tractor and semitrailer. Avoid exceeding this limitation to prevent payload from rolling off semitrailer and causing injury to personnel and damage to equipment.

(2) Aline back of tractor/semitrailer combination with area to be unloaded. Make sure ample amount of space is provided for ramps to be lowered and payload to be off loaded past end of ramps on the ground as level as possible.

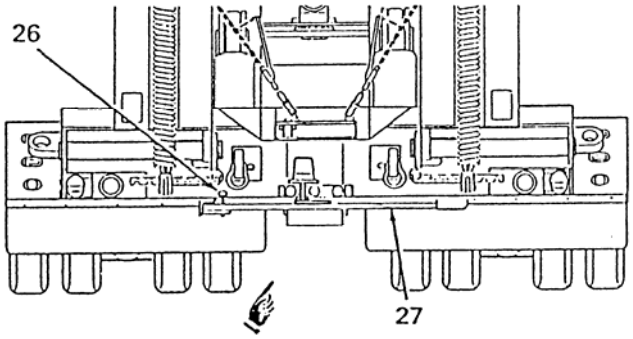
(3) Visually check tractor/semitrailer offset angle by having spotter check relationship between steering wedge bolt and weld circle at bottom rear of pickup plate. If inside edge of bolt alines with outside edge of weld circle, offset angle is 10 degrees. Make any required adjustments to tractor.



(4) Apply tractor parking brakes by pulling out parking brake valve (3). Remove four wheel chocks (4) from stowage on tractor and chock wheels on tractor.



(5) Remove hitch pin (26) and crowbar (27) from rear of semitrailer below loading ramps. Reinstall hitch pin (26).



(6) Adjust ramp span width to match payload track width as required (para. 2-20).

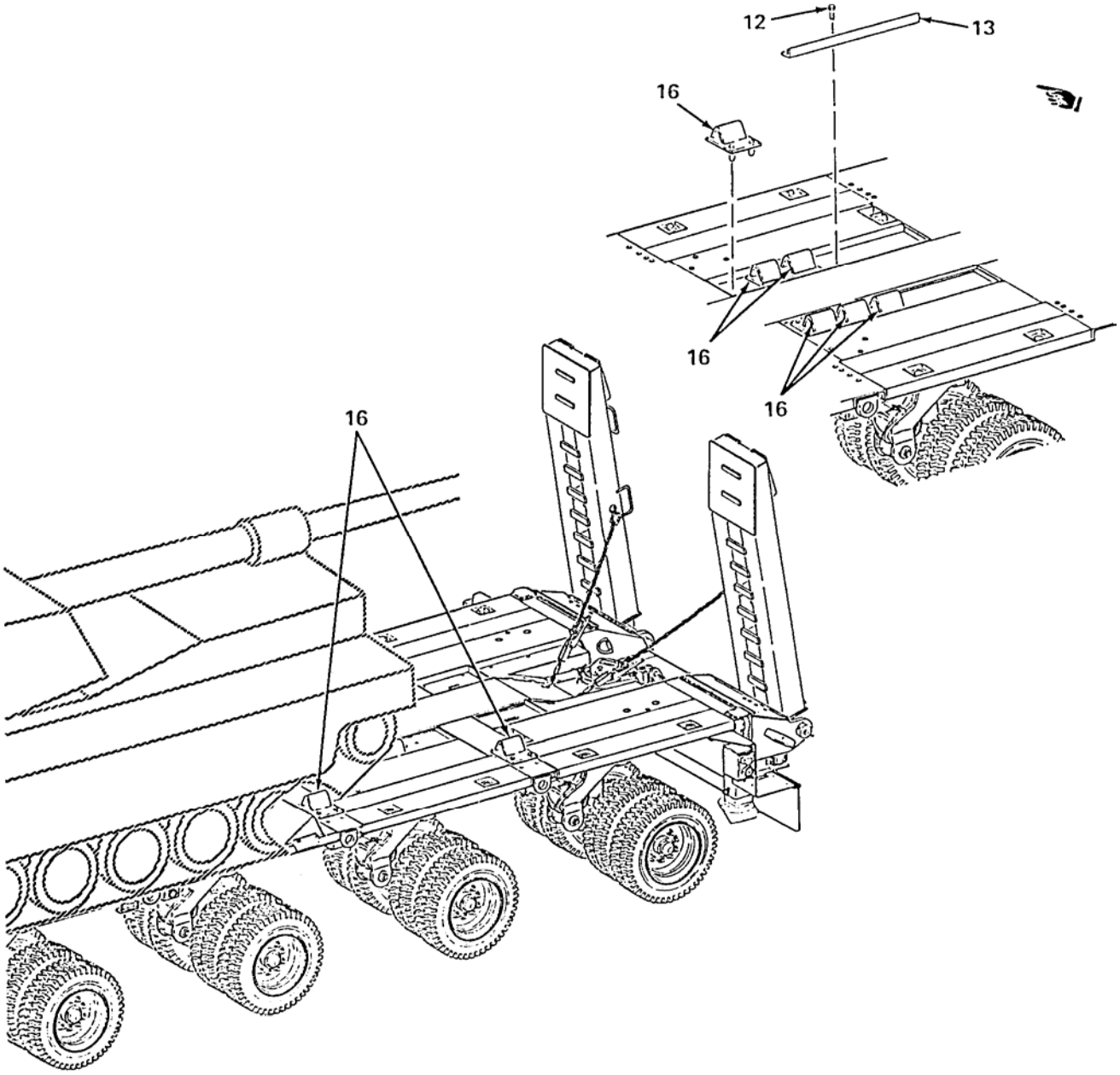
2-26. LOADING AND UNLOADING ABLE PAYLOADS (CONT)

(7) Remove six curb guides (16) from rear recessed area of platform by removing two capscrews (12) and curb guide stowage brackets (13).

NOTE

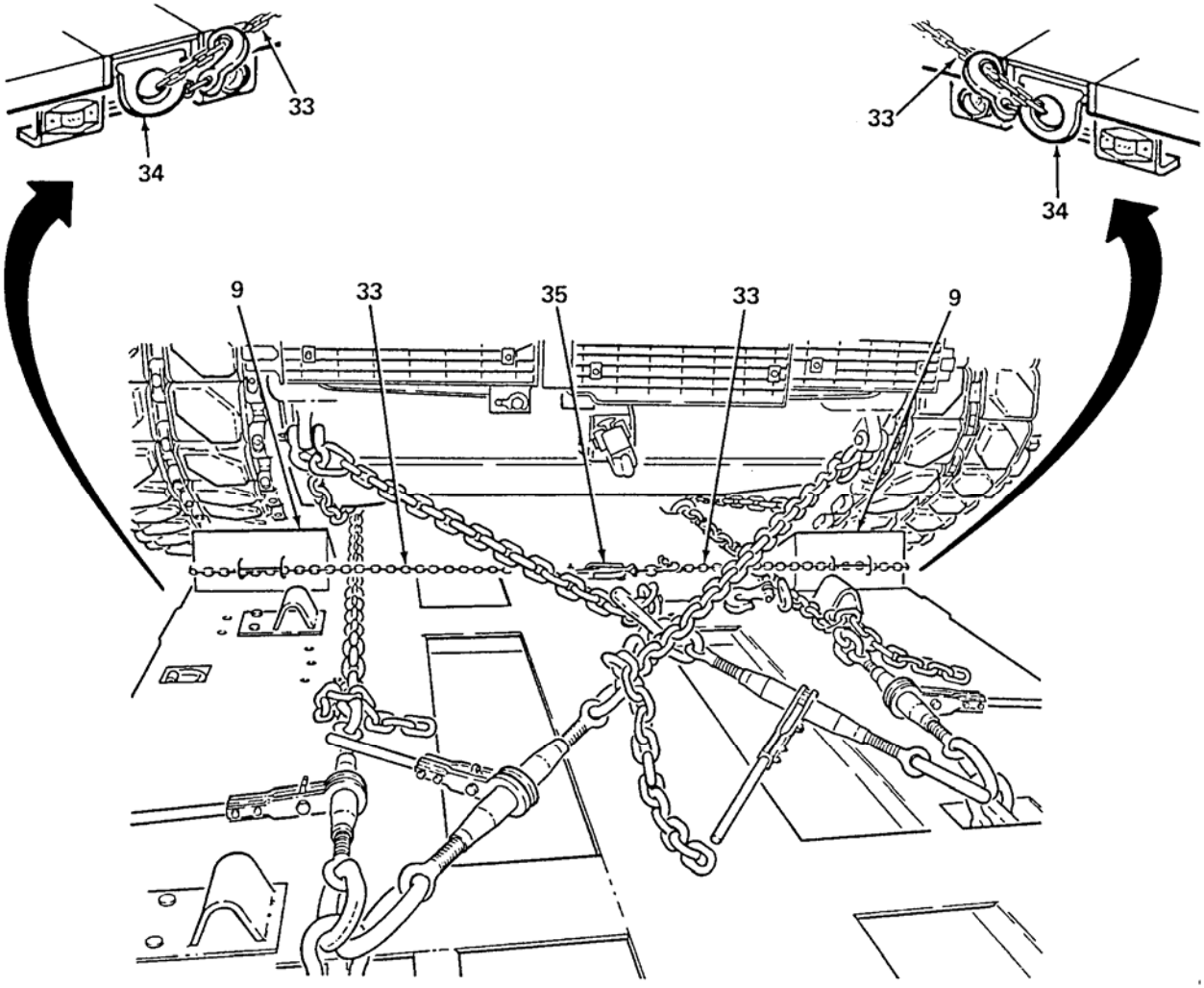
Two curb guides will be installed on beavertail after the loading ramps are lowered.

(8) Place four curb guides (16) on platform (two on each side) into second hole inboard from platform edge (pin side facing outboard from center of platform). Set two remaining curb guides (16) aside until ramps are lowered.



(9) Remove payload tiedowns and payload chock tiedowns from payload as follows:

(a) Open load binder (35) and remove two utility chains (33) from two tiedown rings (34). Remove utility chains (33) from two rear payload chocks (9). Move two utility chains (33) and load binder (35) out of the way.



2-26. LOADING AND UNLOADING ABLE PAYLOADS (CONT)

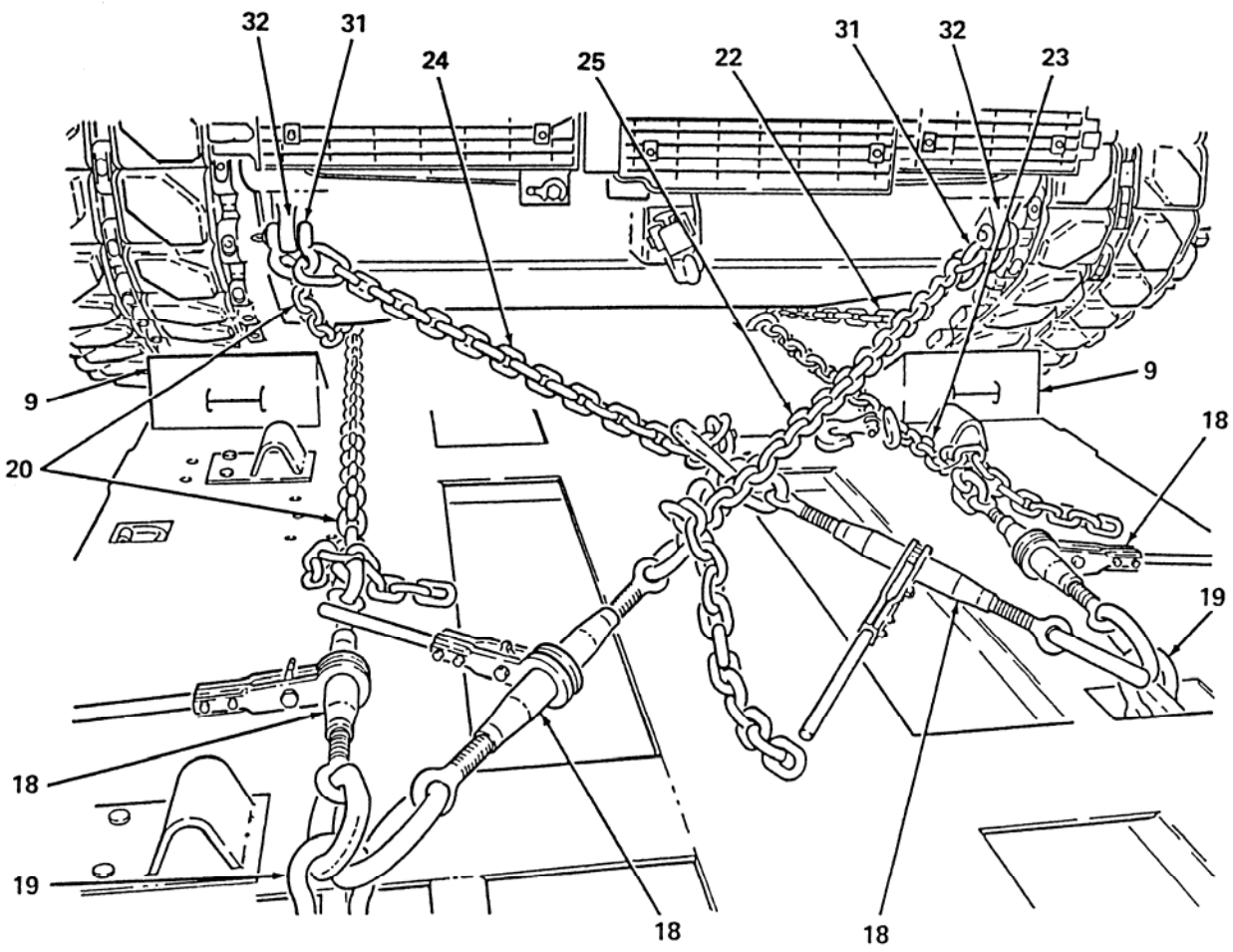
(b) Operate two angled load binders (18) to loosen two angle rear payload tiedown chains (24 and 25).

(c) Disconnect both angle chains (24 and 25) from angled load binders (18).

(d) Payload operator must release payload brakes.

(e) Operate two parallel load binders (18) to tighten both curbside and streetside tiedown chains (20 and 22 or 20, 22, and 23).

(f) Continue to tighten each load binder as tightly as possible to move payload slightly off of two rear payload chocks (9) or at least reduce pressure applied on rear chocks by payload.



(g) Payload operator must apply payload brakes.

(h) If necessary, use crowbar to help move two rear payload chocks (9) out from under payload tracks. Move rear payload chocks (9) back approximately 6 inches (15 cm) along both sides of platform.

(i) Operate two parallel load binders (18) to loosen both curbside and streetside parallel tiedown chains (20 and 22 or 20, 22, and 23). Disconnect parallel chains (20 and 22 or 20, 22, and 23) from parallel load binders (18).

(j) Remove four load binders (18) and two shackles (19) from platform.

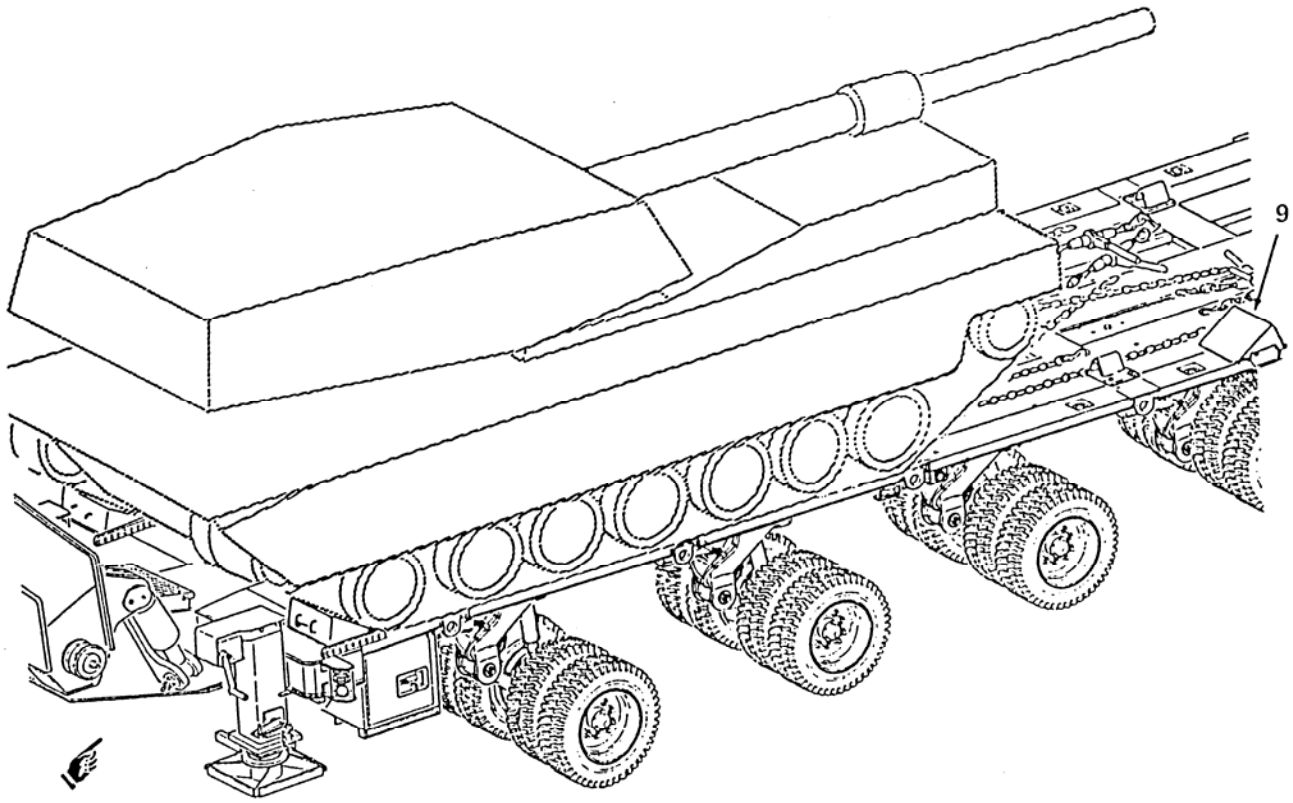
(k) Disconnect two chains (20 and 24) from streetside shackle (31) on towing lug (32) at rear of payload.

(l) Disconnect chains (25 and 23 or 25, 23, and 22) from curbside shackle (31) on towing lug (32) at rear of payload.

(m) Lay chains and load binders toward center of platform, between and clear of the payload tracks, until payload is unloaded.

(10) Payload operator must start and warm payload.

(11) Move streetside rear payload chock (9) along streetside platform over #4 bogie. Place curbside rear payload chock near front streetside of platform out of the way.



2-26. LOADING AND UNLOADING ABLE PAYLOADS (CONT)

WARNING

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on it or trip over it. Injury to personnel or damage to equipment may result.

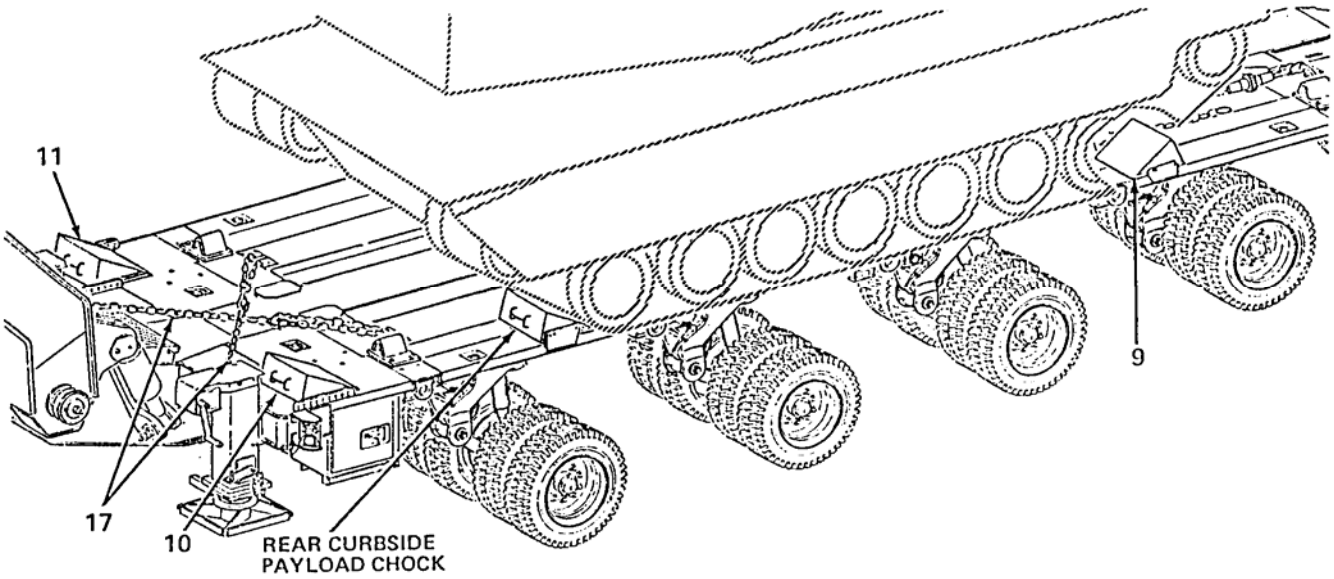
(12) Gooseneck/aft spotter must signal payload operator to release payload brakes and start slowly backing payload until payload contacts rear streetside payload chock (9).

(13) Stop payload and apply payload brakes. Place rear curbside payload chock in front of payload on streetside to chock front of payload.

(14) Remove two tiedown chains (17) from shackles on front of payload. Reinstall shackles. Lay two tiedown chains (17) forward toward center of platform.

(15) Gooseneck/aft spotter must signal payload operator to start moving forward just until rear streetside payload chock (9) can be removed. Apply payload brakes.

(16) Perform steps (23) thru (28) of paragraph 2-26a to adjust platform height to platform loading/unloading position, lower ramps, and install two remaining curb guides.



WARNING

Unnecessary personnel must stand well clear of the vehicles, especially behind the payload (engine/turbine exhaust) during unloading operations. At no time during any unloading operations while the payload is moving should personnel be on the semitrailer platform. The payload operator must drive the payload slowly down the loading ramps and onto the ground or injury to personnel and damage to equipment may result.

WARNING

Payload adjustments, side to side (turning), must be kept to a minimum or serious injury to personnel and damage to equipment may result.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on it or trip over it. Injury to personnel or damage to equipment may result.

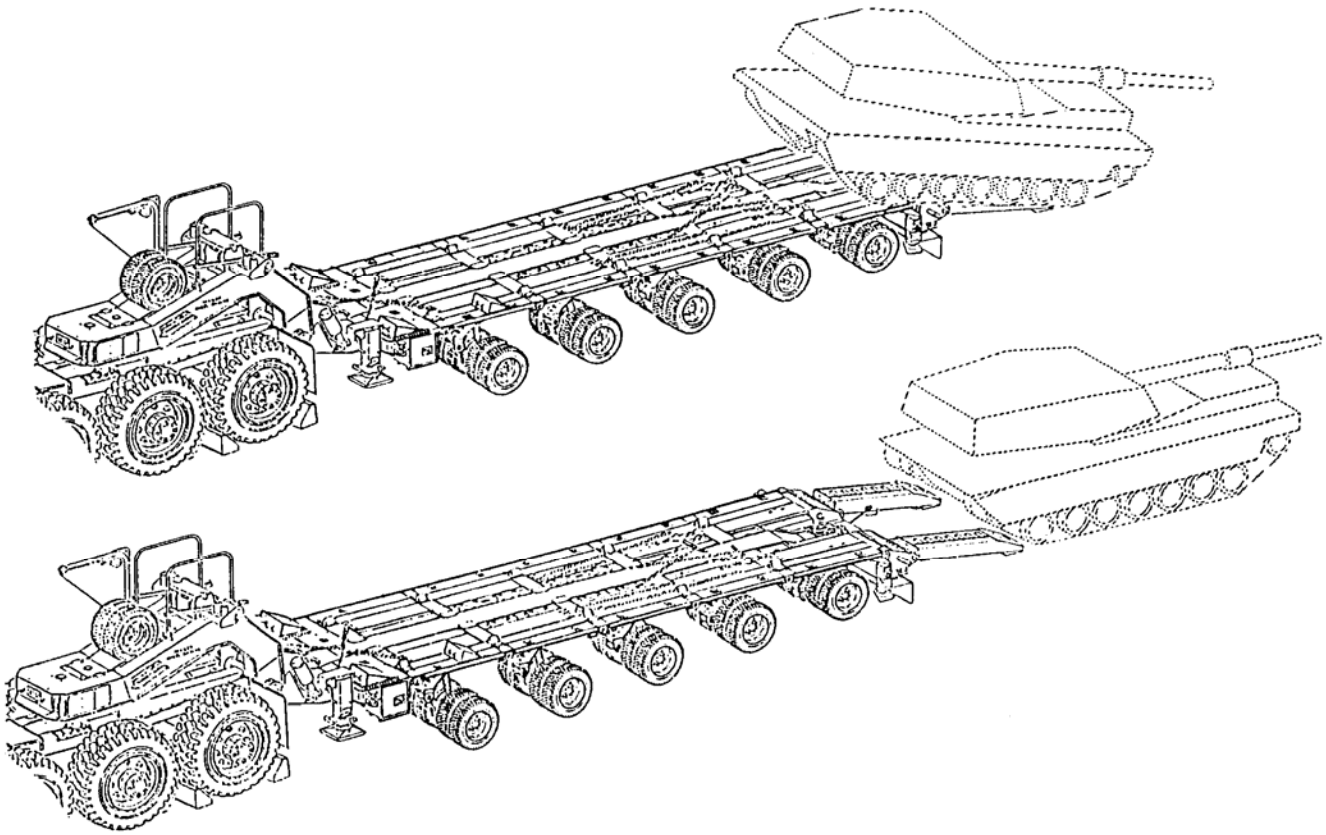
(17) Using hand signals, gooseneck/aft spotter must signal payload operator to slowly drive payload off of platform. Curbside spotter must notify gooseneck/aft spotter of any required payload adjustments while unloading.

(18) Have payload operator drive payload back an extra 5 feet (1.5m) to allow extra clearance for raising and stowing load ramps.

WARNING

Failure to set the payload parking brake may allow the payload to roll and cause injury to personnel and damage to equipment.

(19) Once payload is on the ground and clear of semitrailer, apply payload parking brake. Shut down payload.



2-26. LOADING AND UNLOADING ABLE PAYLOADS (CONT)

(20) Remove all payload and payload chock tiedown chains from platform and restow all chains, load binders, and shackles into platform stowage compartment.

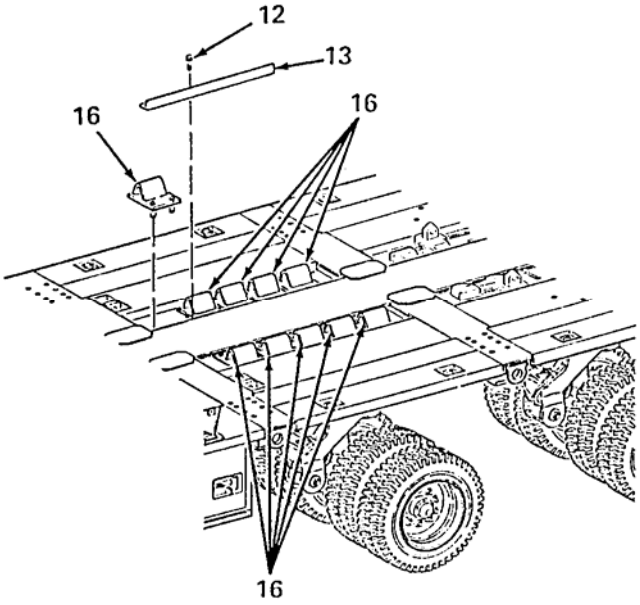
(21) Remove capscrew (12) and curb guide stowage bracket (13) from forward recessed area on platform.

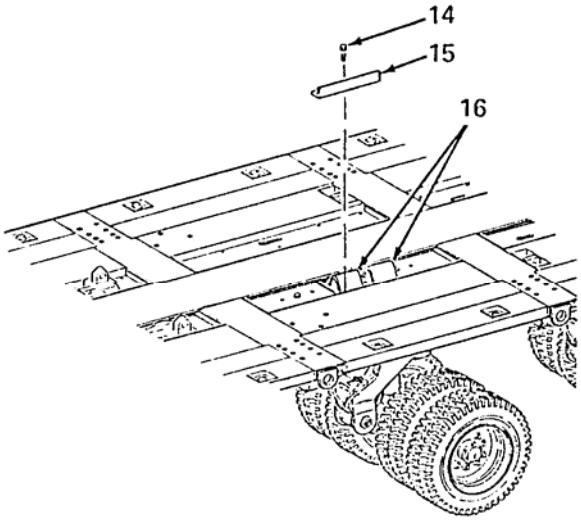
(22) Remove all 12 curb guides (16) from loading positions on platform and place in center of platform for storage (10 curb guides located forward, 2 curb guides located aft).

(23) Secure 10 curb guides (16), located forward, by installing 2 curb guide stowage brackets (13) and capscrews (12).

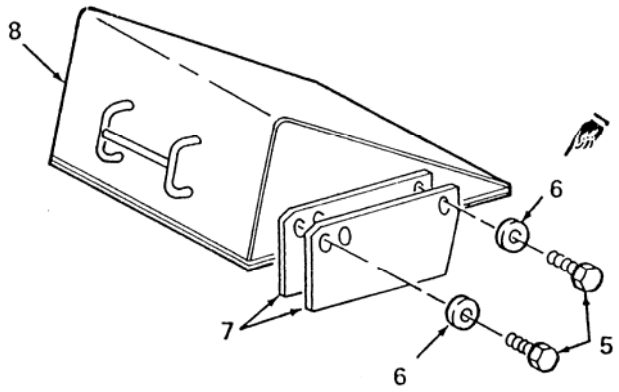
(24) Remove curb guide stowage bracket (15) and capscrew (14) from platform storage compartment.

(25) Secure two curb guides (16), located aft, by installing curb guide stowage bracket (15) and capscrew (14).





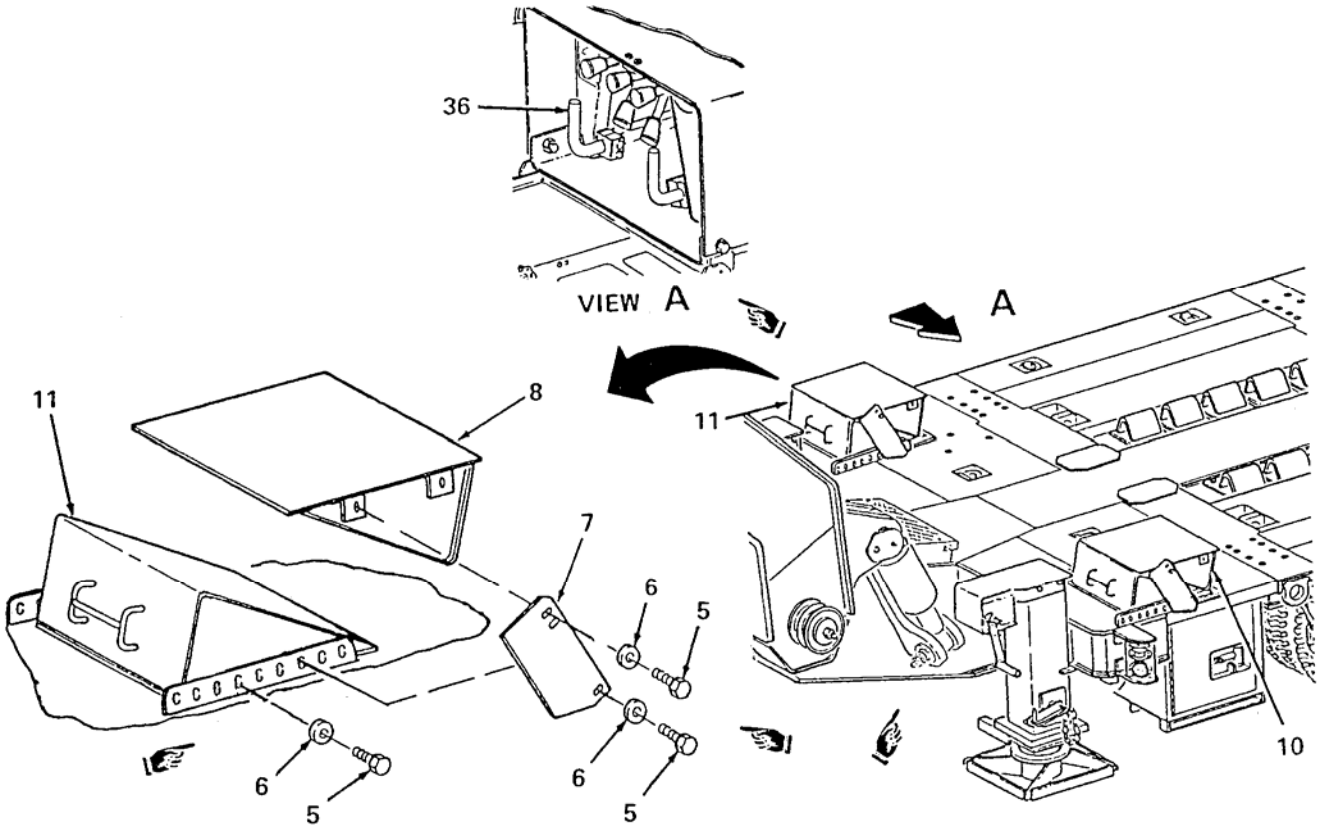
(26) Remove two capscrews (5), washers (6), and two sheets (7) from each of two rear payload chocks (8).



(27) Position two rear payload chocks (8) on top of two front payload chocks (10 and 11). Install four sheets (7), 10 capscrews (5), and washers (6).

(28) Perform step (36) of paragraph 2-26a and adjust platform to normal running height.

(29) Move suspension shutoff lever (36) to RUN position.



9-DELETED

2-26. LOADING AND UNLOADING ABLE PAYLOADS (CONT)

(30) Raise rear support legs (para. 2-23).

(31) Adjust ramp span width inboard (furthest inboard position) and stow loading ramps for transport as required (para. 2-20).

(32) Shut down APU (para. 2-16).

(33) Stow crowbar at back of platform and secure in place with hitch pin. Restow all tools and equipment used during this procedure into platform stowage compartment.

(34) If tractor/semitrailer is not going to remain parked at this time, restow tractor wheel chocks.

2-27. DUAL WINCH LOADING AND UNLOADING

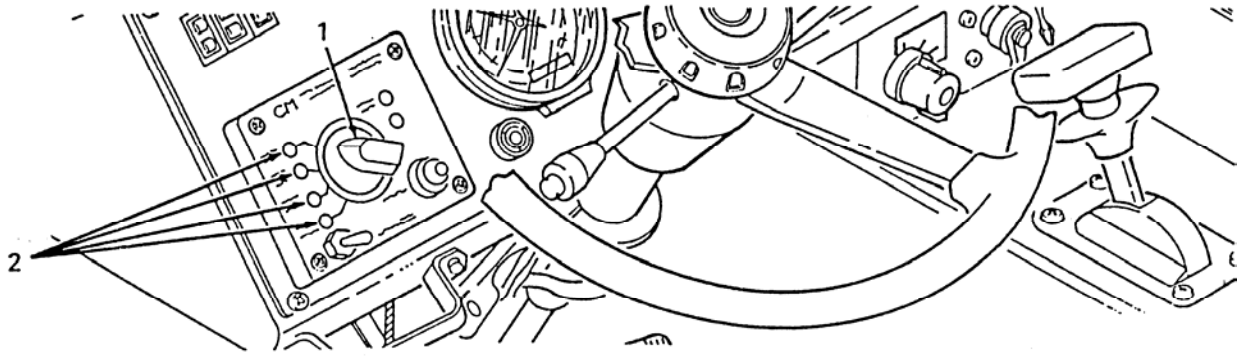
NOTE

The following procedures provide instructions for loading and unloading a disabled payload (M1 Series Main Battle Tank) on the M1000 Semitrailer coupled to a U.S. Army M1070 or M911 tractor. The M1070 tractor is illustrated as the prime mover throughout these instructions; however, unique instructions for either the M1070 or the M911 tractor will be identified where applicable. The prime difference between the M1070 and M911 tractor is that the M1070 tractor has an auxiliary winch system which is used to pull the main winch cables to the rear of the semitrailer for attachment to the payload. The operation of the M1070 winch controls is described herein. Refer to the M911 Operating Instructions TM for location, description, and operation of winch controls.

a. Dual winch loading. To load a disabled payload, proceed as follows:

(1) Start tractor per applicable tractor Operating Instructions TM.

(2) On M1070 tractor, set central tire inflation system (CTIS) switch (1) to setting for expected road or terrain conditions and allow tractor to sit until selected CTIS indicator (2) remains lit for that CTIS setting.



(3) If not already coupled, refer to paragraph 2-24 and couple tractor to semitrailer.

(4) Aline back of tractor/semitrailer combination as close as possible to payload, approximately 15 feet (4.6m) on the ground as level as possible.

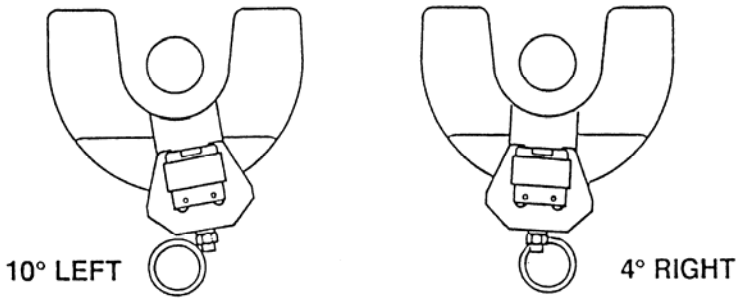
WARNING

Load semitrailer on level ground whenever possible. In adverse conditions, loading can be done on grades up to 10 percent. Due to the possibility of winch cables piling up against the end flanges of the cable drums and causing injury to personnel and damage to equipment, the following offset limits between tractor and semitrailer must be adhered to:

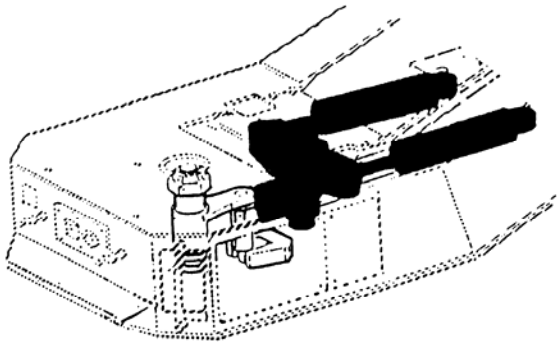
M1070 Tractor: 10° Left 4° Right

M911 Tractor: 4° Left 10° Right

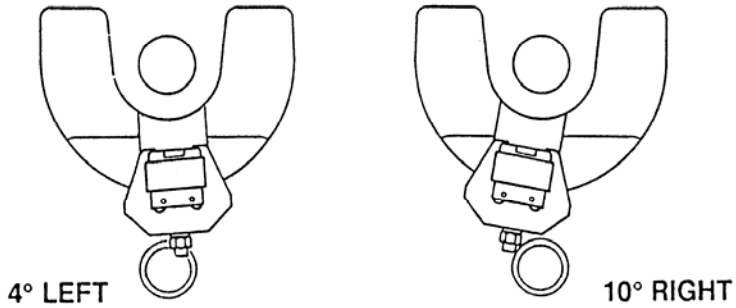
(5) Visually check tractor/semitrailer offset angle. Make any required adjustments to tractor by having spotter check relationship between steering wedge bolt and weld circle at bottom rear of pickup plate. If inside edge of bolt alines with outside edge of weld circle, offset angle is 10 degrees. Make any required adjustments to tractor.



M1070 TRACTOR



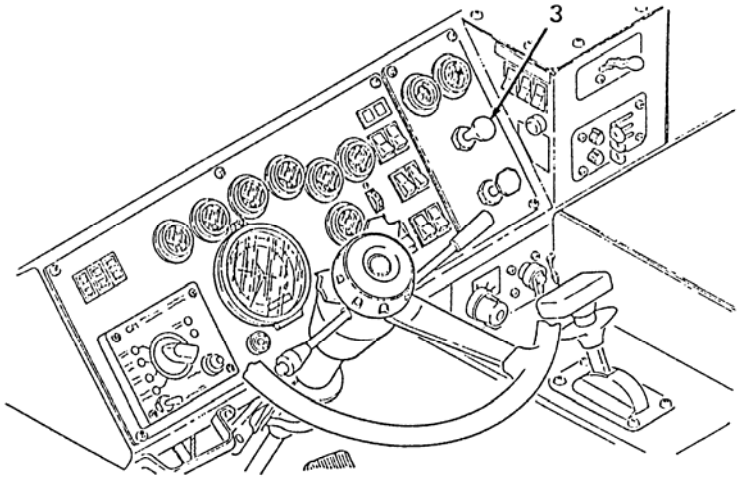
SEE VIEWS

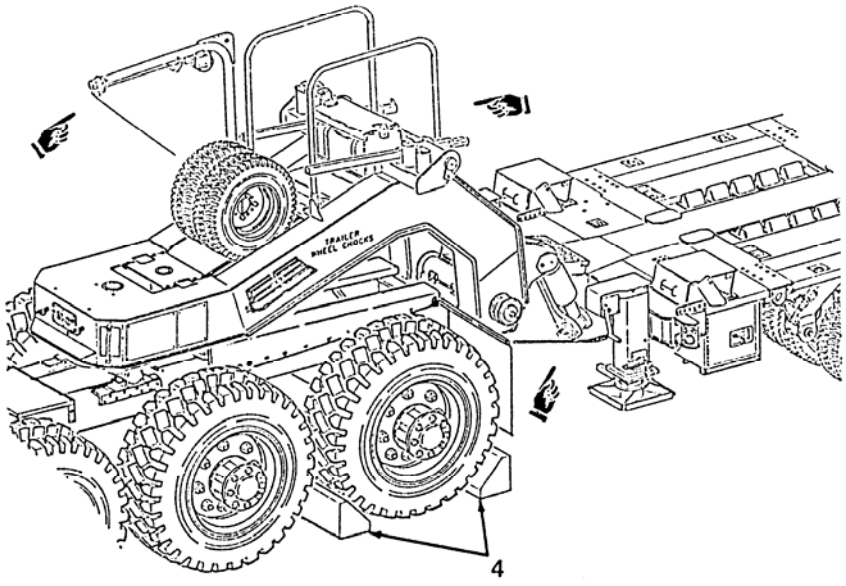


M911 TRACTOR

2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

(6) Apply tractor parking brakes by pulling out parking brake valve (3). Remove four wheel chocks (4) from stowage on tractor and chock wheels on both sides of tractor.

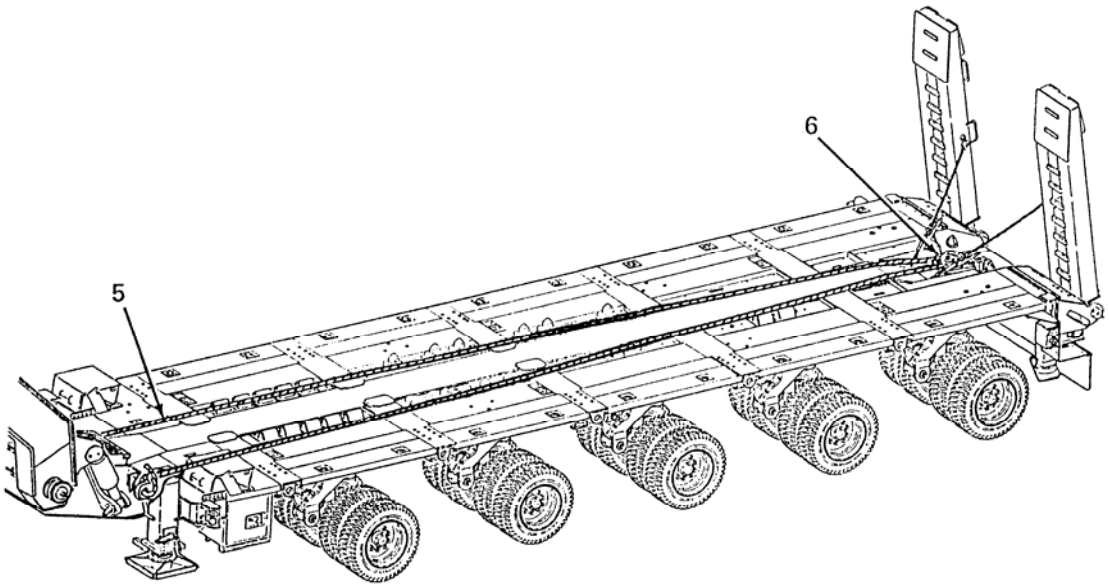




NOTE

A manila rope will be used to pull the tractor winch cable through the snatch block for use during unloading procedures.

(7) Remove manila rope (5) from platform stowage compartment. Starting from front streetside corner of platform, pull one end of manila rope (5) back and through snatch block (6) and forward to front curbside corner of platform.



(8) Tie both ends of manila rope (5) to front lifting eyes on platform (just inboard of each front support leg).

(9) Position payload chocks, curb guides, and tiedown chains; adjust platform to loading position; and lower ramps by performing steps (8) thru (28) of paragraph 26a.

WARNING

Observe the following precautions during the loading process:

If possible, provide ample clear space behind the disabled payload during loading to protect personnel and prevent damage to equipment should cables break while payload is being loaded.

Make sure winch cables are not kinked, clevises are secure to winch cables, and snatch blocks and shackles are in good condition and properly secured or injury to personnel may result.

Make sure winch cables are inspected in accordance with TB 43-0142 or injury to personnel may result.

Extreme caution should be exercised during any operation on a slope.

A ground spotter must stand off curbside of semitrailer and maintain visual contact with the winch operator. The spotter must observe cables, snatch blocks, shackles, and payload position during loading or injury to personnel may result.

Do not overload tractor winches. Know the ratings of the winches being used and any protection devices (such as shear pins) or injury to personnel may result.

2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

WARNING

All ground personnel must stand clear of winch cables except when handling or injury to personnel may result.

During winch-on operations on a downgrade, the payload must be restrained from the rear with some other vehicle to prevent possible loss of control of the payload which can cause injury to personnel and damage to equipment.

At no time during loading operations, while the payload is being pulled on with winches, should personnel be on the semitrailer platform or injury to personnel may result.

Always wear leather gloves when handling cable. Never allow cable to run through hands or injury to personnel may result.

NOTE

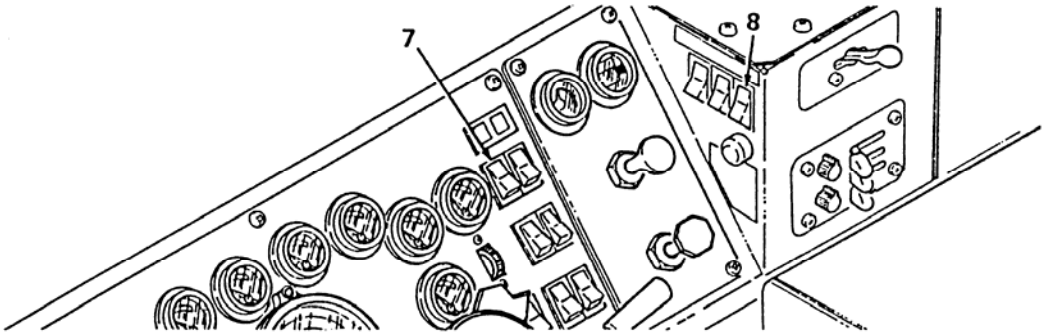
The M1070 tractor has an auxiliary winch system which is used to pay out the main winch cables to the payload. When using the M911 tractor, the main winch cables must be payed out manually.

(10) When using an M911 tractor, proceed to step (11) below. When using an M1070 tractor, use the auxiliary winch to pay out main winch cables as follows:

NOTE

Make sure that M1070 tractor parking brake is applied. PTO will not engage unless tractor parking brake is set.

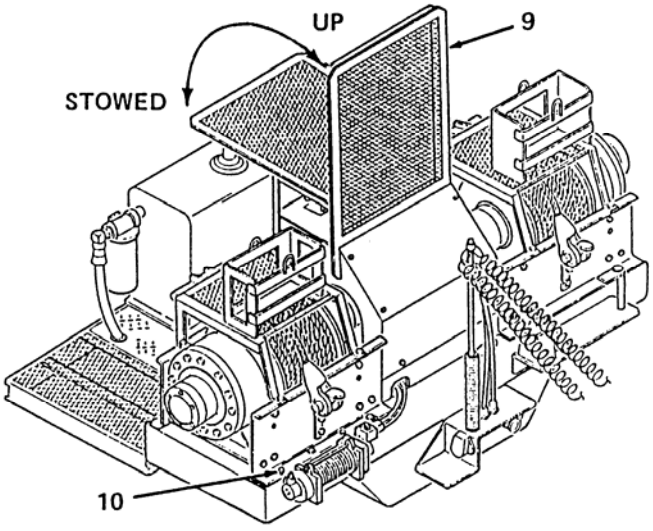
(a) Turn beacon light switch (7) to ON position. With engine idling, set PTO switch (8) to ON.



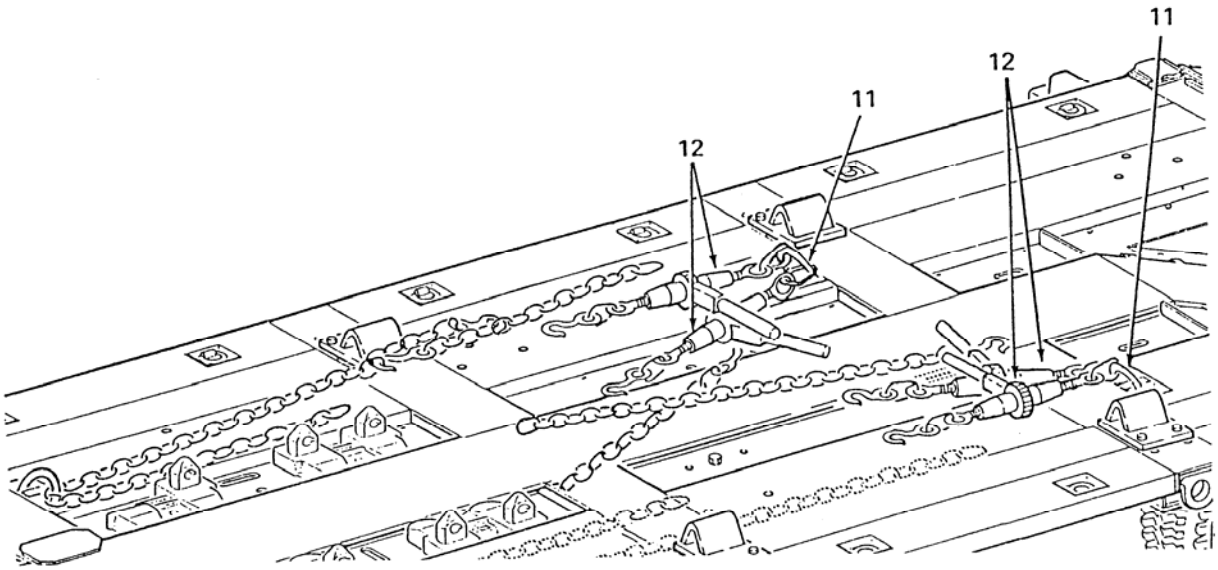
WARNING

Hearing protection must be worn when near winching station or operating winches or injury to personnel may result.

(b) Raise guard (9), lock in upright position, and release AUXILIARY WINCH KICKOUT by lifting and rotating lever (10) counterclockwise.

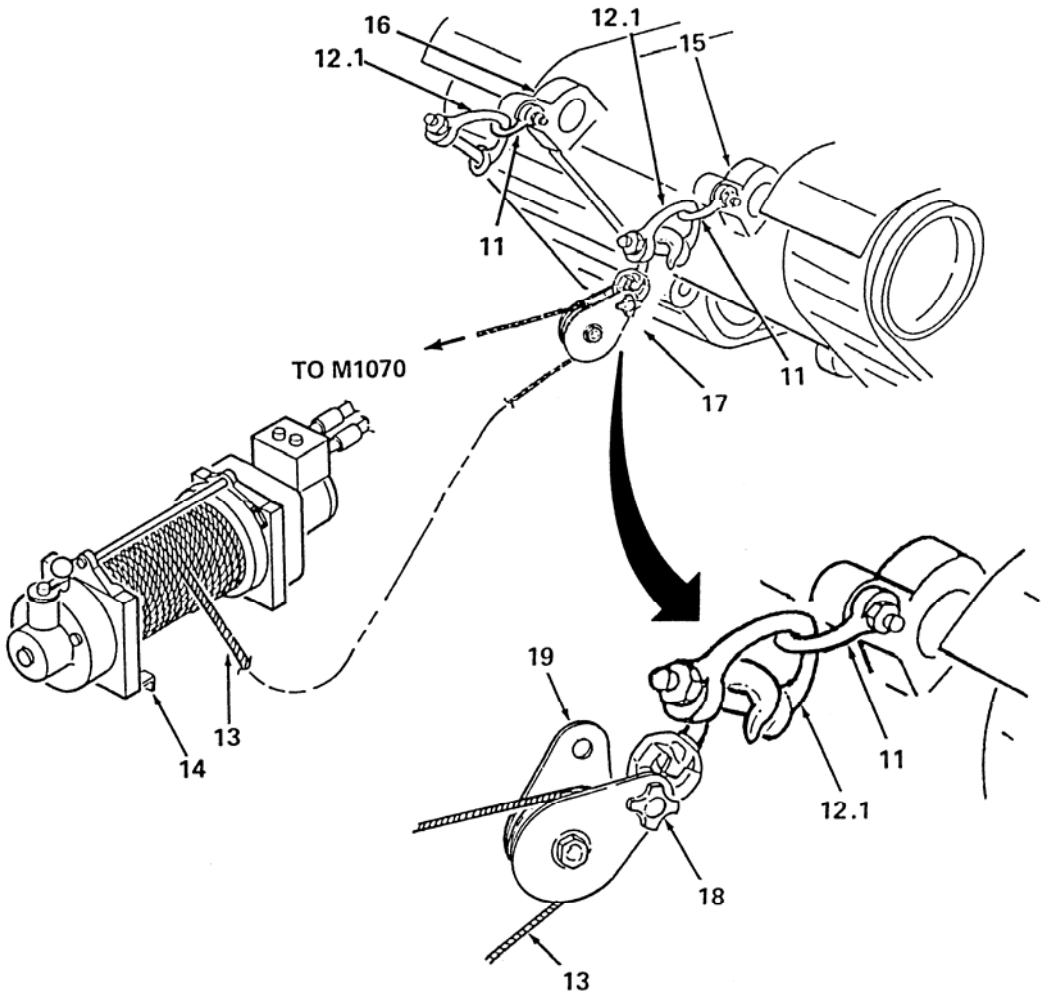


(c) Remove two large shackles (11) from rear payload tiedown rings and four load binders (12). Leave load binders (12) and chains in place on platform.



2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

(d) Remove two smaller shackles (12.1) from BII. Unhook auxiliary winch cable (13) from stow hook (14). Pull auxiliary winch cable (13) along streetside of gooseneck and over platform to front of payload.

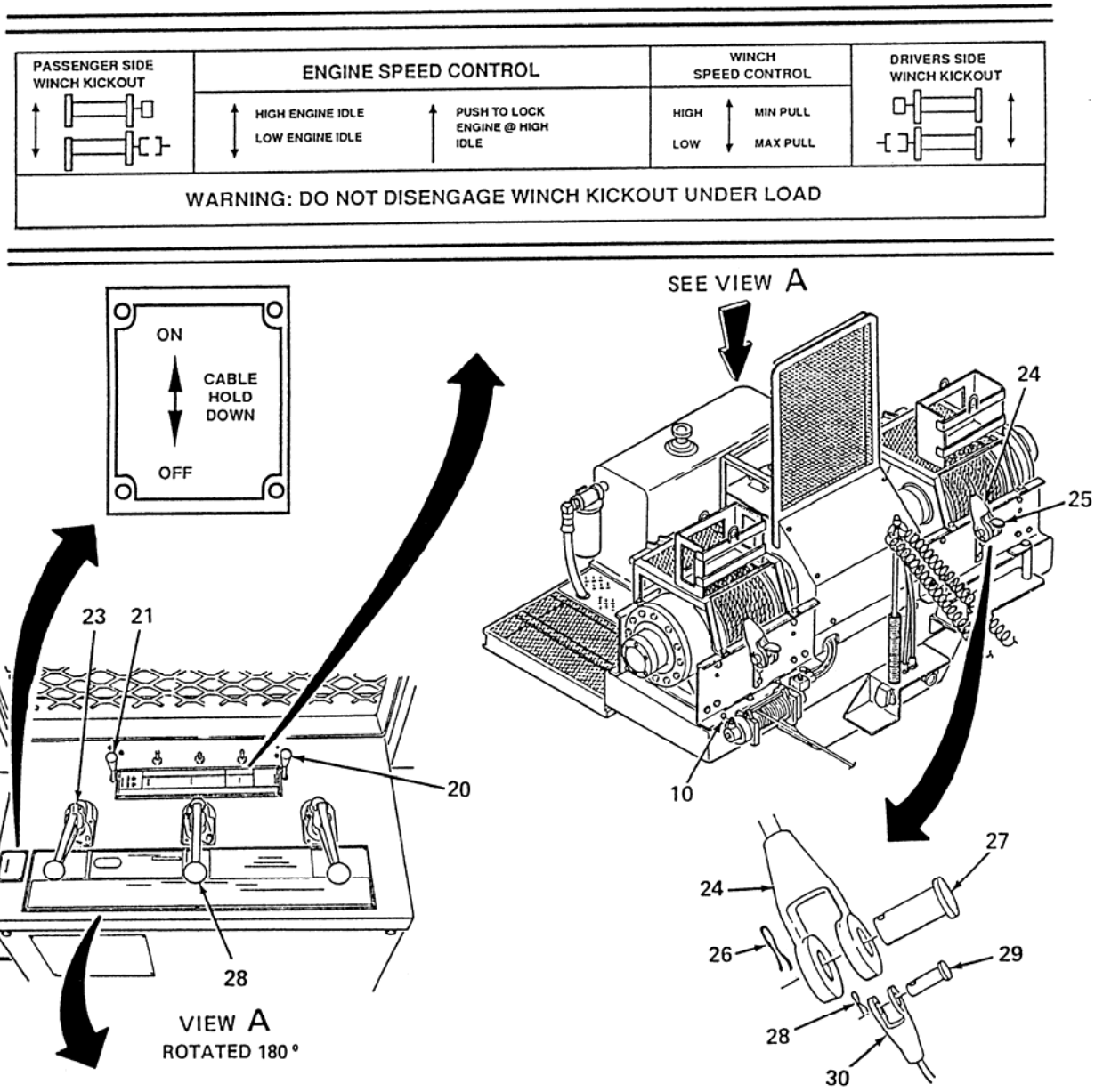


(e) Install two large shackles (11) (from platform) and two smaller shackles (12.1) (from BII) on upper left recovery eye (15) and upper right recovery eye (16). Remove auxiliary snatch block (17) from stowage on M1070 tractor. Attach auxiliary snatch block (17) to smaller shackle (12.1) on upper left recovery eye (15) of payload.

(f) Unscrew retainer bolt (18), rotate side housing (19) to open auxiliary snatch block (17), pass auxiliary winch cable (13) through auxiliary snatch block (17), and rotate side housing (19) to close. Tighten retainer bolt (18) to secure side housing (19) in closed position.

(g) Pull auxiliary winch cable (13) forward over platform and along curbside of gooseneck toward passenger side of winching station on tractor.

(h) Engage both DRIVERS SIDE WINCH KICKOUT (20) and PASSENGER SIDE WINCH KICKOUT (21) switches by pushing on each switch.



2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

(i) Push CABLE HOLD DOWN lever (22) to ON position.

(j) Pull PASSENGER SIDE WINCH lever (23) upward momentarily until there is enough slack in passenger side winch cable (24) to be removed from stow hook (25). Move clevis on winch cable (24) off of stow hook (25) to unstow winch cable. Continue paying out winch cable (24) until spotter on the ground can reach clevis. Release lever (23).

(k) Remove and retain cotter pin (26) and shouldered pin (27) from clevis on passenger side winch cable (24).

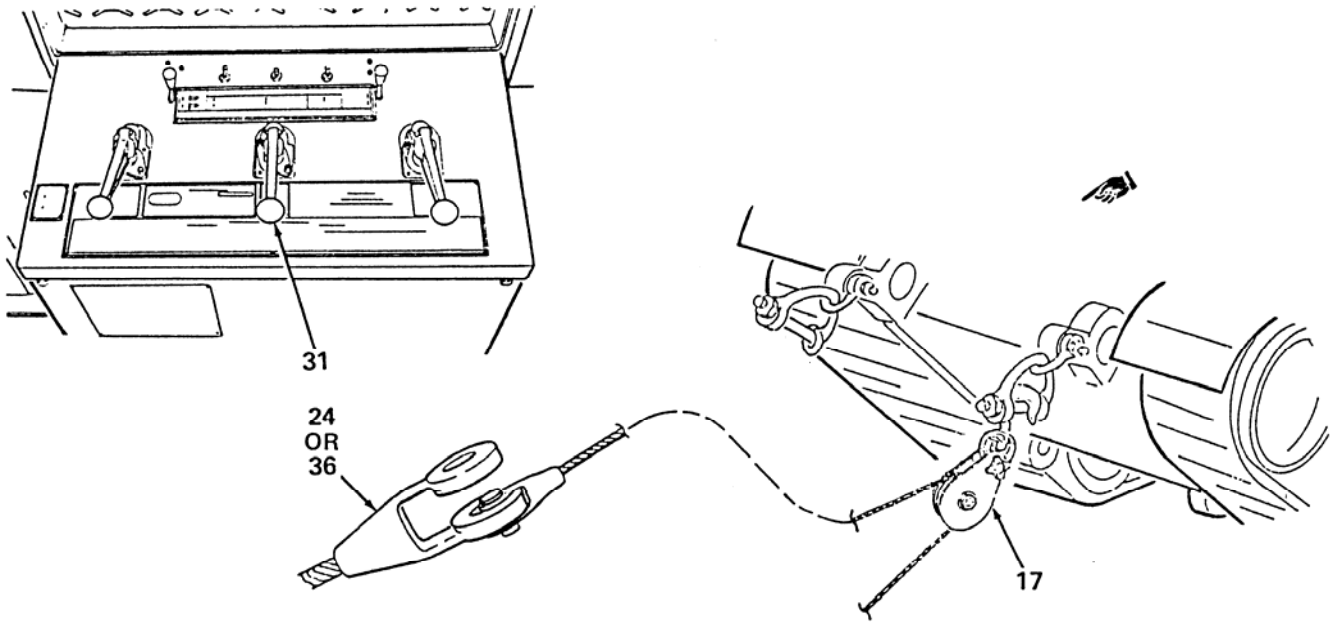
(l) Remove cotter pin (28) and shouldered pin (29) from auxiliary winch cable clevis (30). Install auxiliary winch cable clevis (30) over one ear of clevis on passenger side winch cable (24) and install shouldered pin (29) and cotter pin (28).

(m) Engage AUXILIARY WINCH KICKOUT by lifting and rotating lever (10) clockwise. Disengage PASSENGER SIDE WINCH KICKOUT (21) switch by pulling switch.

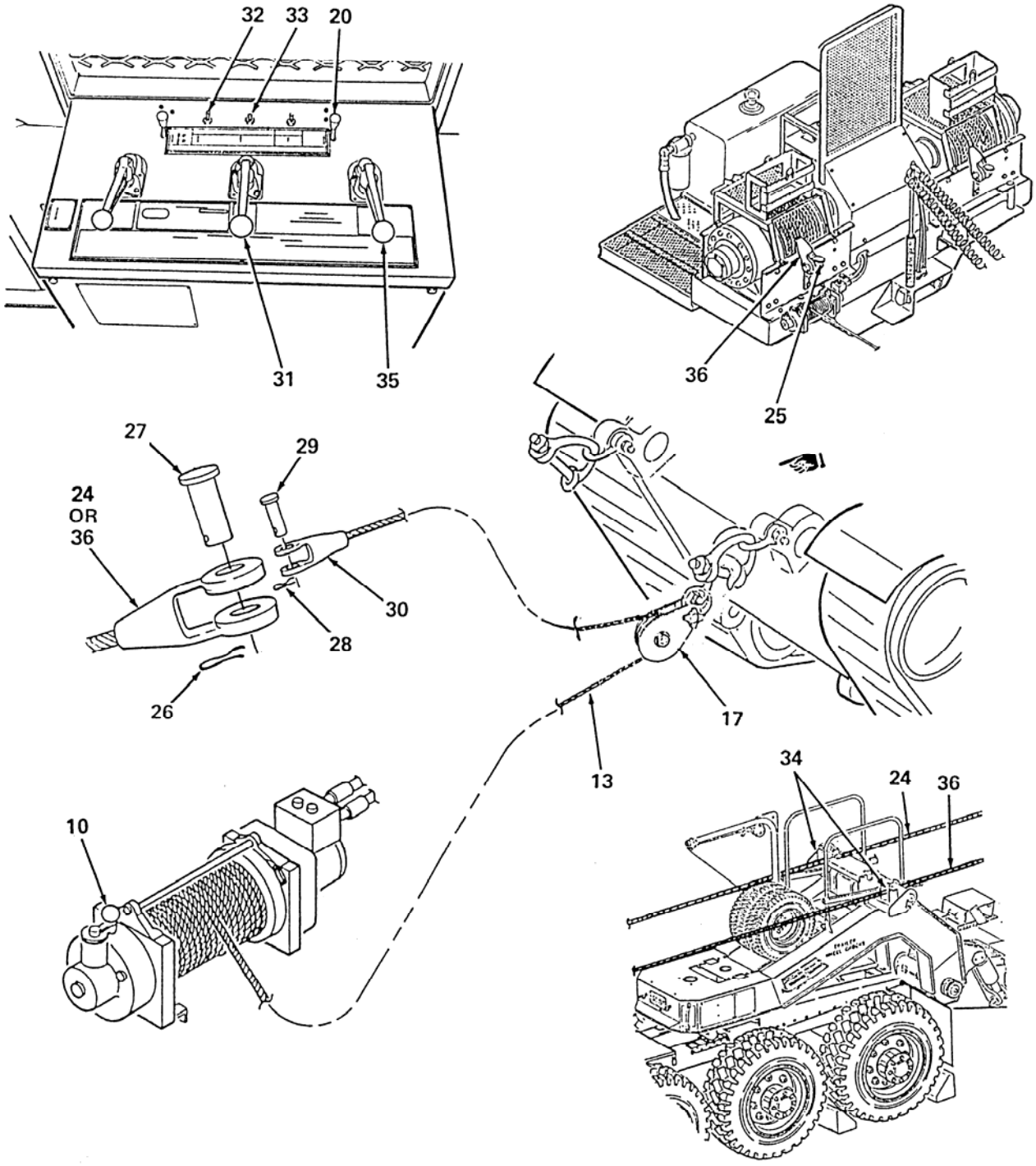
WARNING

Do not allow auxiliary winch cable to cross itself or knot up on winch or injury to personnel may result.

(n) Using one person to operate winch controls and a second person to make sure that winch cable clevises do not hang up on platform, push down on AUXILIARY WINCH lever (31) to pull passenger side winch cable (24) toward auxiliary snatch block (17).



(o) If auxiliary winch cable (13) does not pull passenger side winch cable (24), push ENGINE SPEED CONTROL switch (32) to HIGH ENGINE IDLE. Momentarily push ENGINE SPEED CONTROL switch (33) to lock engine speed at high idle (approximately 1500 rpm), and then release switch.



2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

(p) When passenger side winch cable (24) reaches front of platform, release AUXILIARY WINCH lever (31). Route passenger side winch cable (24) through gooseneck cable guide (34). Push down on AUXILIARY WINCH lever (31) and continue to pull passenger winch cable (24) to auxiliary snatch block (17).

(q) Release AUXILIARY WINCH lever (31) when passenger side winch cable (24) is approximately 12 inches (29 cm) from auxiliary snatch block (17). Spotter must continue to pull passenger side winch cable (24) until winch cable has enough slack that it touches the ground.

(r) Remove cotter pin (28) and shouldered pin (29) from auxiliary winch cable clevis (30). Separate auxiliary winch cable (13) from passenger side winch cable (24). Lay passenger side winch cable (24) on the ground in front of payload.

(s) Release AUXILIARY WINCH KICKOUT by lifting and rotating lever (10) counterclockwise.

(t) Pull auxiliary winch cable (13) forward over platform and along streetside of gooseneck toward drivers side of winching station on tractor.

(u) Pull DRIVERS SIDE WINCH lever (35) upward momentarily until there is enough slack in drivers side winch cable (36) to be removed from stow hook (25). Move clevis on winch cable (36) off of stow hook (25) to unstow winch cable. Continue paying out cable (36) until spotter on the ground can reach clevis. Release lever (35).

(v) Remove and retain cotter pin (26) and shouldered pin (27) from clevis on drivers side winch cable (36). Install auxiliary winch cable clevis (30) over one ear of clevis on drivers side winch cable (36) and install shouldered pin (29) and cotter pin (28).

(w) Engage AUXILIARY WINCH KICKOUT by lifting and rotating lever (10) clockwise. Disengage DRIVERS SIDE WINCH KICKOUT (20) switch by pulling switch.

WARNING

Do not allow auxiliary winch cable to cross itself or knot up on winch or injury to personnel may result.

(x) Using one person to operate winch controls and a second person to make sure that winch cable clevises do not hang up on platform, push down on AUXILIARY WINCH lever (31) to pull drivers side winch cable (36) to auxiliary snatch block (17).

(y) If auxiliary winch cable (13) does not pull drivers side winch cable (36), push ENGINE SPEED CONTROL switch (32) to HIGH ENGINE IDLE. Momentarily push ENGINE SPEED CONTROL switch (33) to lock engine speed at high idle (approximately 1500 rpm), and then release switch.

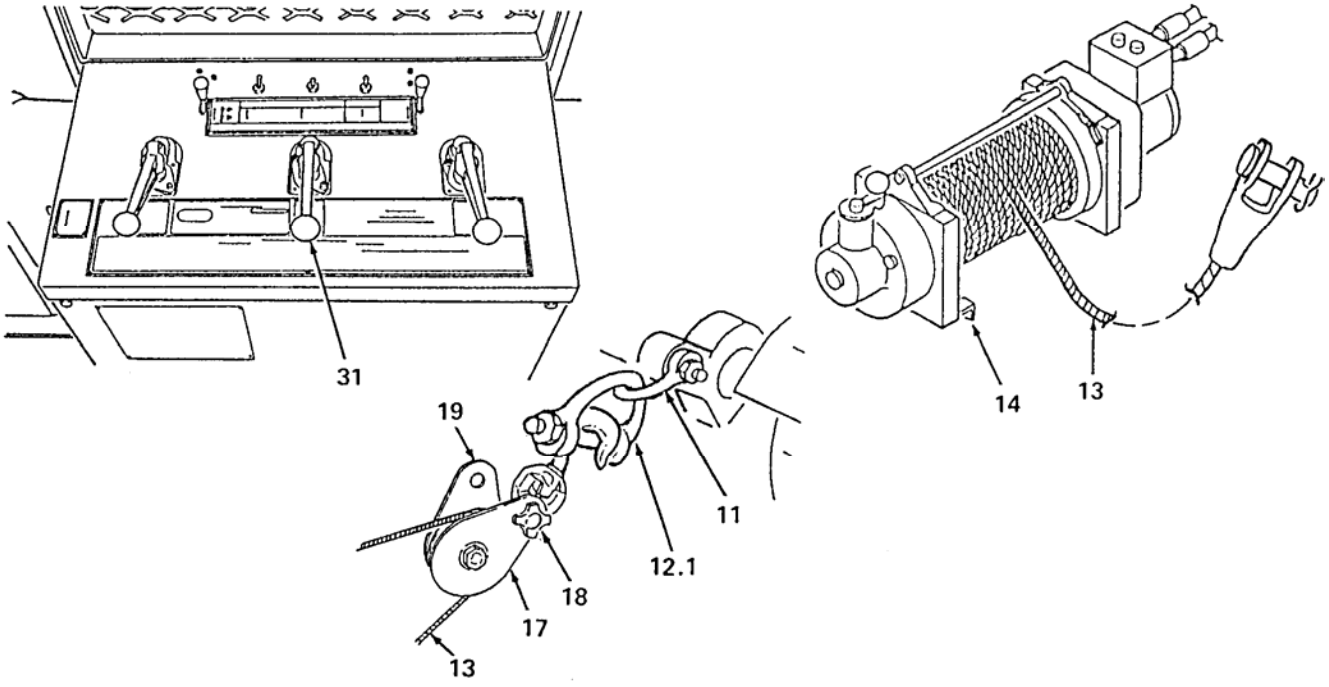
(z) When drivers side winch cable (36) reaches front of platform, release AUXILIARY WINCH lever (31). Route drivers side winch cable (36) through gooseneck cable guide (34). Push down on AUXILIARY WINCH lever (31) and continue to pull drivers side winch cable (36) to auxiliary snatch block (17).

(aa) Release AUXILIARY WINCH lever (31) when drivers side winch cable (36) is approximately 12 inches (30 cm) from auxiliary snatch block (17). Spotter must continue to pull drivers side winch cable (36) until winch cable has enough slack that it touches the ground.

(ab) Remove cotter pin (28) and shouldered pin (29) from auxiliary winch cable clevis (30). Separate auxiliary winch cable (13) from drivers side winch cable (36). Lay drivers side winch cable (36) on the ground in front of payload. Install shouldered pin (29) and cotter pin (28) into auxiliary winch cable clevis (30).

(ac) Restow snatch block and auxiliary winch cable as follows:

1. Unscrew retainer bolt (18) and rotate side housing (19) on auxiliary snatch block (17) to open snatch block.



2. Remove auxiliary winch cable (13) from auxiliary snatch block (17), rotate side housing (19) to close, and tighten retainer bolt (18) to secure side housing in closed position.

3. Remove auxiliary snatch block (17) from shackle (12.1) and place back into storage on M1070 tractor.

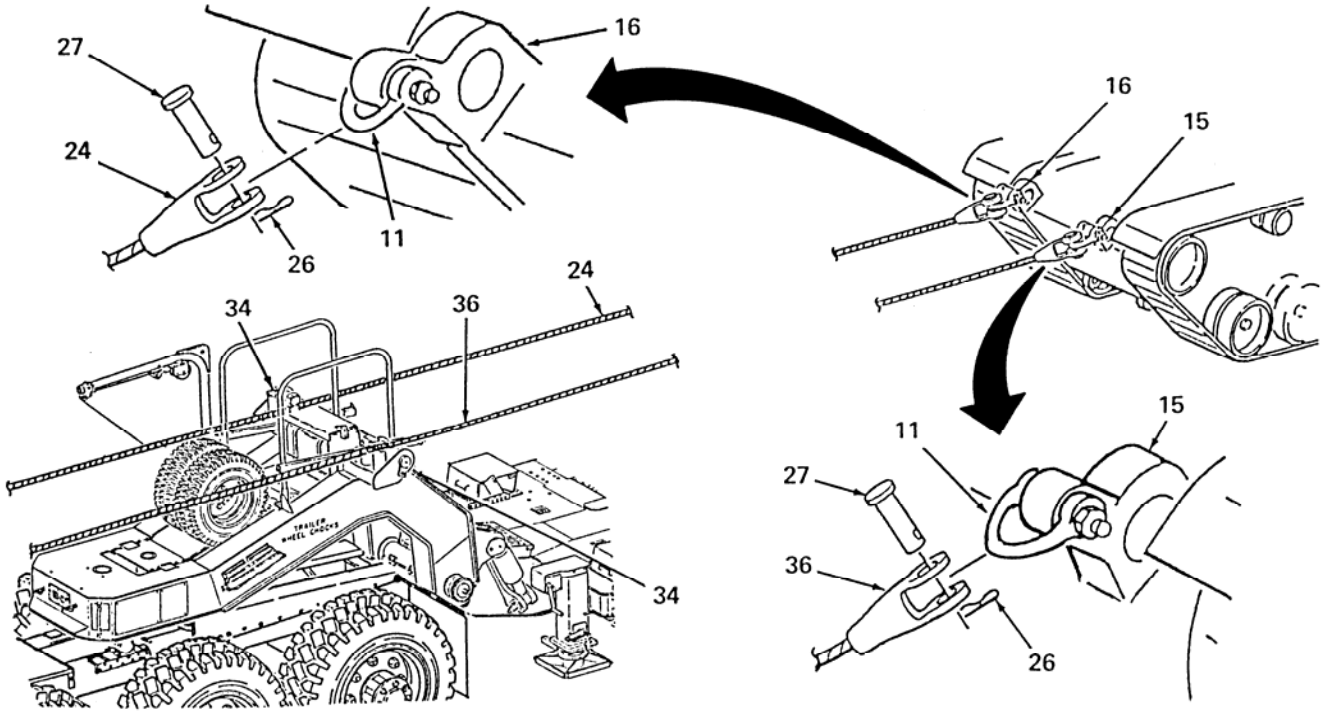
3.1. Remove two small shackles (12.1) from larger shackles (11) in upper, left and right recovery eyes. Return smaller shackles to BII.

2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

4. Using one person to push downward on AUXILIARY WINCH lever (31) and one person to maintain tension on auxiliary winch cable (13), retract winch cable (13) and restow on stow hook (14).

(11) When using M1070 tractor, proceed to step (12) below. When using an M911 tractor, pay out main winch cables to payload as follows:

(a) Unhook passenger side winch cable (24) and drivers side winch cable (36) from stowage points on tractor. Ensure clevises are secure on cables.



(b) Winch operator must pay out one cable at a time while spotter supports cable end and guides toward back of semitrailer until each cable is at least 4 feet (1.2m) past front of payload.

(c) Route both drivers and passenger side winch cables (36 and 24) through gooseneck cable guides (34).

NOTE

When winching payloads onto the semitrailer, a straight winch cable pull is the preferred method. Crossed winch cable pulls may be used if significant directional control problems are expected.

(12) Using two people, connect passenger side winch cable (24) to shackle (11) on upper right recovery eye (16) on payload and secure in place by installing shouldered pin (27) and cotter pin (26).

(13) Using two people, connect drivers side winch cable (36) to shackle (11) on upper left recovery eye (15) on payload and secure in place by installing shouldered pin (27) and cotter pin (26).

CAUTION

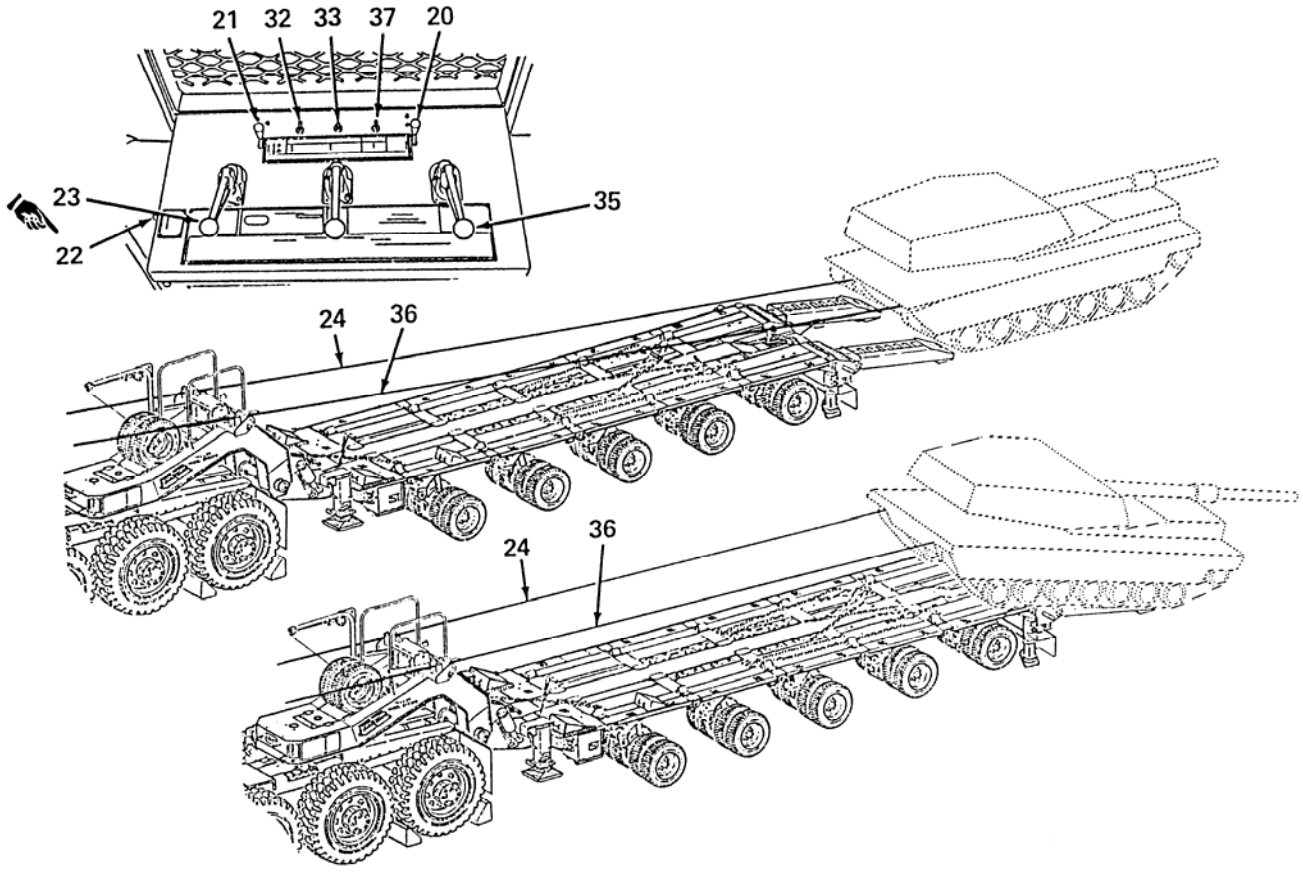
The payload brake system must be released prior to winching payload onto semitrailer or damage to equipment may result.

(14) Ensure payload brakes are released. Station ground spotter on curbside of payload to provide direction to winch operator during winching operation.

CAUTION

WINCH SPEED CONTROL must be placed in LOW for MAX PULL when loading payloads or damage to equipment may result.

(15) Pull WINCH SPEED CONTROL switch (37) to LOW. Push ENGINE SPEED CONTROL switch (32) to HIGH ENGINE IDLE. Momentarily push ENGINE SPEED CONTROL switch (33) to lock engine speed at high idle (approximately 1500 rpm), and then release switch. Engage both DRIVERS SIDE WINCH KICKOUT (20) and PASSENGER SIDE WINCH KICKOUT (21) switches by pushing on each switch. Push CABLE HOLD DOWN lever (22) to ON.



2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

(16) Winch operator must take up all slack in both drivers and passenger side winch cables (36 and 24) by pushing down on DRIVERS SIDE WINCH lever (35) and PASSENGER SIDE WINCH lever (23). Release both levers when both winch cables get tight.

NOTE

Prior to pulling payload onto the ramps, the spotter must check the alinement of the payload tracks (inboard edge) to the curb guides.

(17) Spotter must check payload for proper alinement. If adjustment is required to aline payload with platform, proceed as follows:

(a) If payload is angled toward curbside of semitrailer, proceed as follows:

1. Spotter must place scrap blocks of wood under streetside of payload, just in front of first roadwheel.

2. Winch operator must push down on PASSENGER SIDE WINCH lever (23) and pull payload into alinement with ramps, and then release lever (23).

(b) If payload is angled toward streetside of semitrailer, proceed as follows:

1. Spotter must place scrap blocks of wood under curbside of payload, just in front of first roadwheel.

2. Winch operator must push down on DRIVERS SIDE WINCH lever (35) and pull payload into alinement with ramps, and then release lever (35).

CAUTION

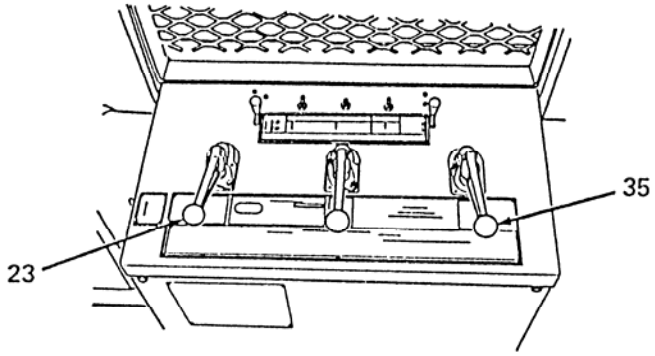
Winch operator must maintain even tension on both winch cables to keep payload centered with semitrailer as payload is loaded or damage to equipment may result.

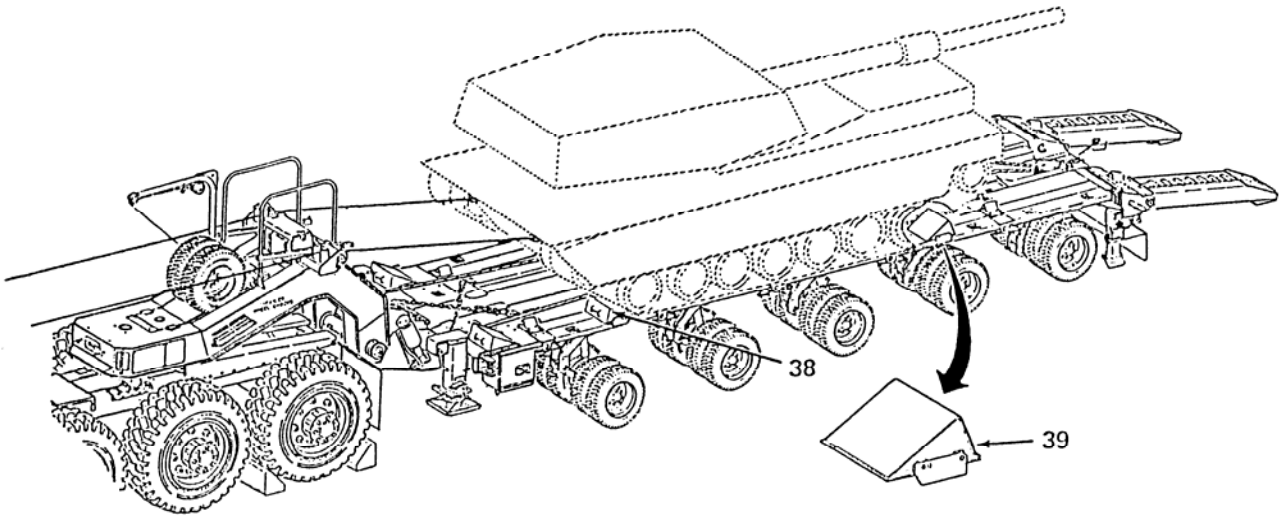
(18) Winch operator must push down both DRIVERS and PASSENGER SIDE WINCH levers (35 and 23) to pull payload slowly up ramps onto platform, adjusting pull on either cable (36 or 24) as required to maintain alignment of payload tracks to curb guides.

(19) When track on streetside of payload makes contact with curbside rear payload chock (38), winch operator must release both DRIVERS and PASSENGER SIDE WINCH levers (35 and 23) to stop payload.

(20) Chock streetside rear of payload using streetside rear payload chockÿ(39).

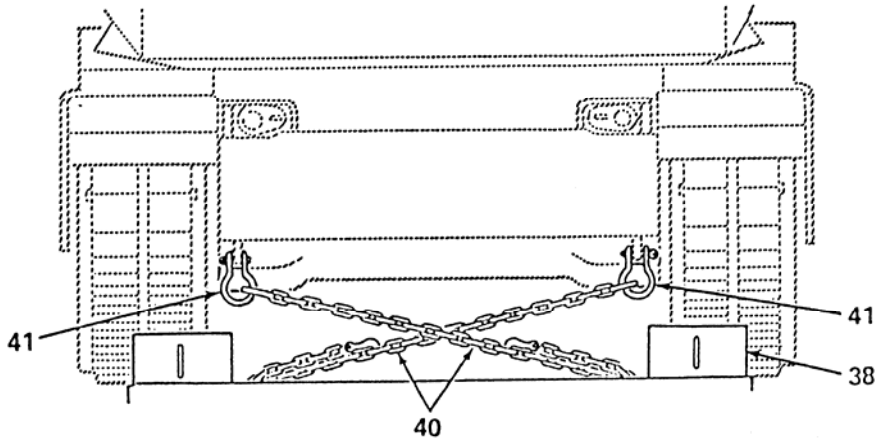
(21) Perform step (36) of paragraph 2-26a and adjust platform to normal running height.





(22) Lift two front tiedown chains (40) and attach to two front towing lugs using two shackles (41) from platform stowage compartment.

(23) Remove curbside rear payload chock (38) from front streetside of payload.



FRONT VIEW OF PAYLOAD
(LOOKING AFT)

2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

(24) Winch operator must push down on both DRIVERS and PASSENGER SIDE WINCH levers (35 and 23) until front tiedown chains are tight and payload tracks (front roadwheels) are firmly on front payload chocks (42).

(25) Place both rear payload chocks (38 and 39) to rear curbside and streetside of payload.

WARNING

Prior to removing winch cable from payload, winch operator must be sure each cable sags to top of tractor tires to relieve cable twist or injury to personnel may result.

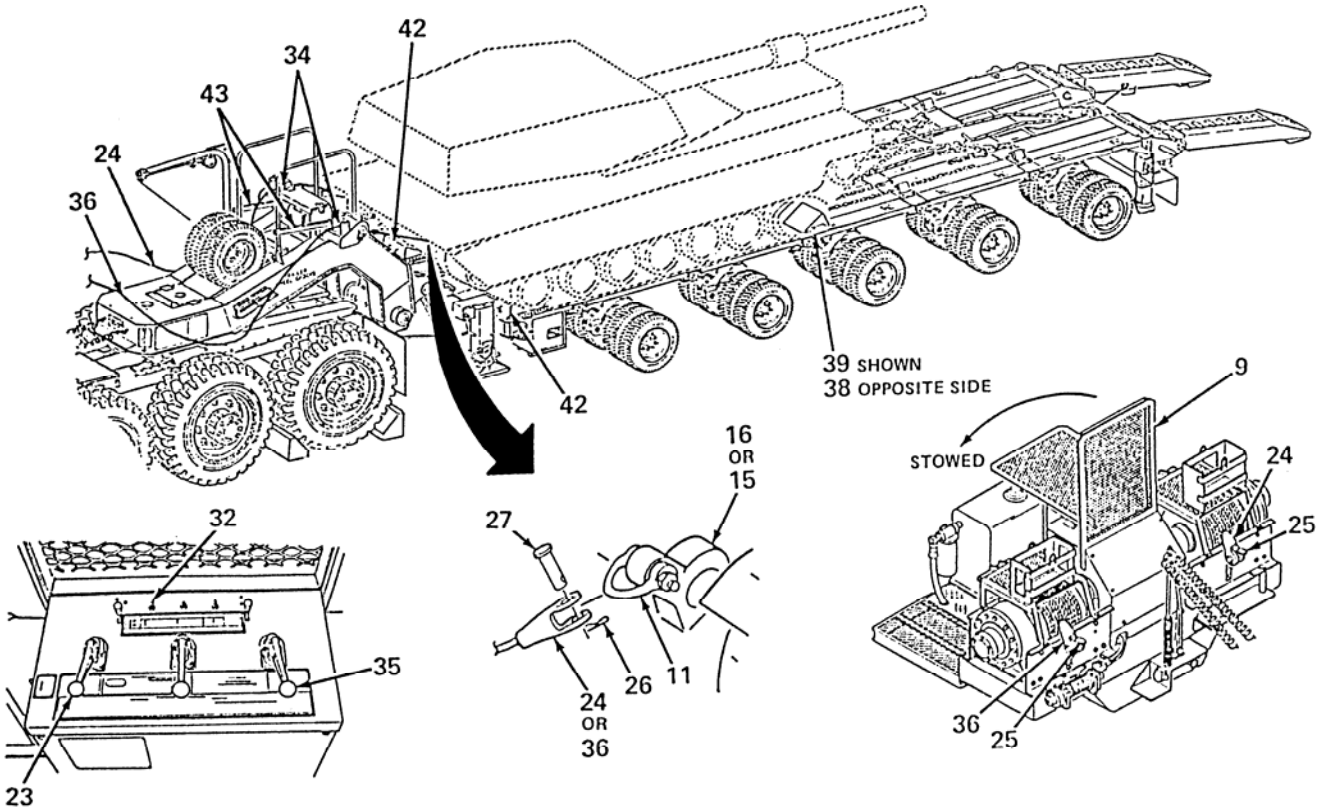
(26) Winch operator must pull up both DRIVERS and PASSENGER SIDE WINCH levers (35 and 23) until each winch cable sags to top of tractor tires.

WARNING

Failure to extend safety rail while attaching or removing payload winch cable may cause injury to personnel.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on or trip over it. Injury to personnel or damage to equipment may result.

(26.1) Unlatch and extend gooseneck safety rail (43).



(27) Check for twist in both winch cables. Remove cotter pins (26) and shouldered pins (27) from clevises on both drivers and passenger side winch cables (36 and 24) and remove cables from shackles (11) on both upper recovery eyes (15 and 16) on payload.

(28) Remove two large shackles (11) from both upper recovery eyes (15 and 16) on payload.

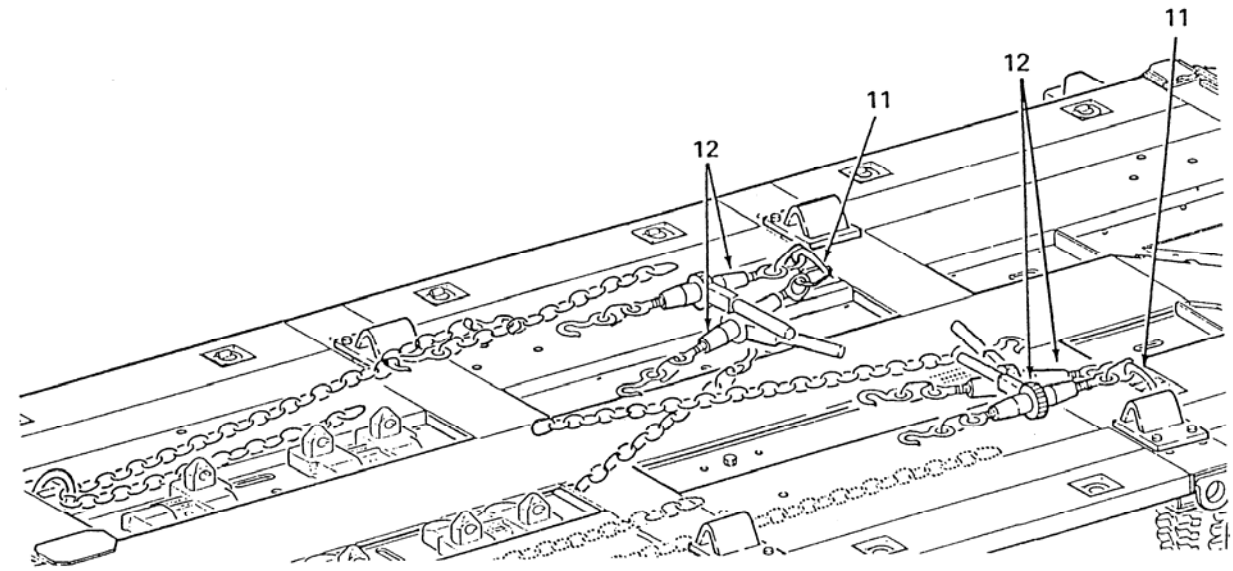
WARNING

Failure to retract and latch gooseneck safety rail before operating tractor/trailer will result in damage to equipment.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on or trip over it. Injury to personnel or damage to equipment may result.

(28.1) Retract and latch gooseneck safety rail (43).

(29) Install two large shackles (11) and four load binders (12) on rear payload tiedown rings.



(30) Perform steps 41a thru 41j of paragraph 2-26a to secure payload to semitrailer platform.

2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

(31) Install shouldered pins (27) and cotter pins (26) into clevises on winch cables (36 and 24).

(32) Remove both winch cables (36 and 24) from gooseneck cable guides (34).

WARNING

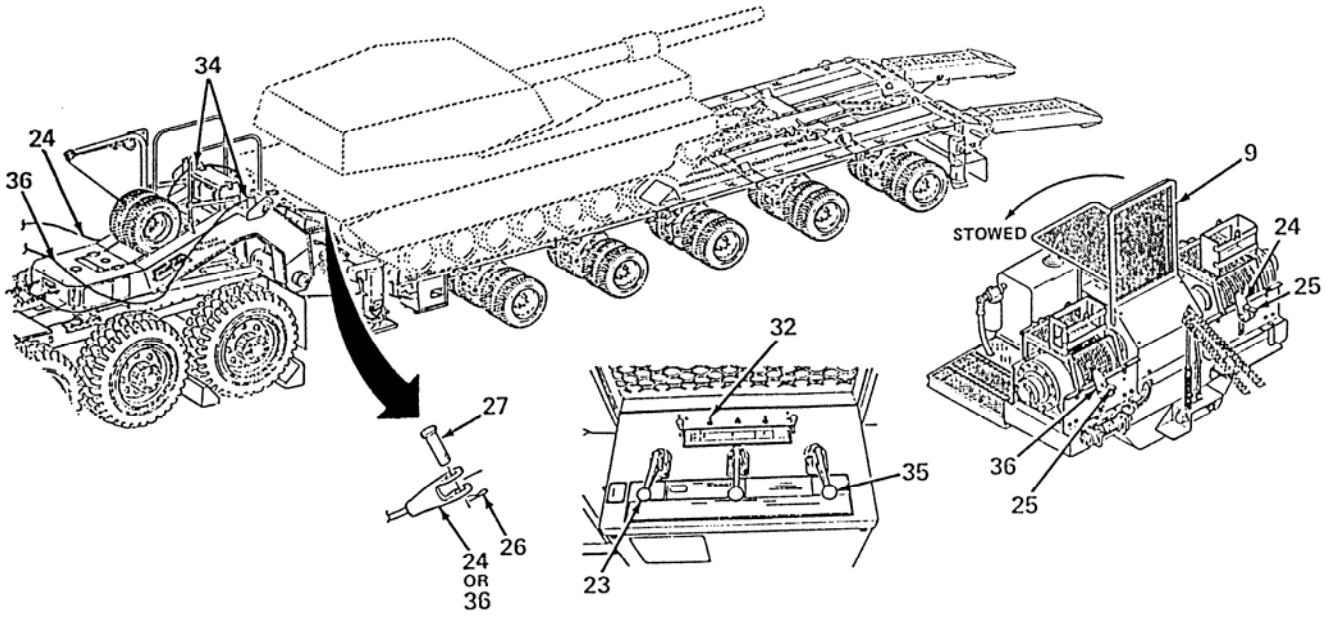
Do not allow hands to get between clevis and winch or injury to personnel may result.

(33) Using one person to push down on DRIVERS SIDE WINCH lever (35) and one person to maintain tension on drivers side winch cable (36), retract and stow winch cable (36) onto stow hook (25). Release lever (35).

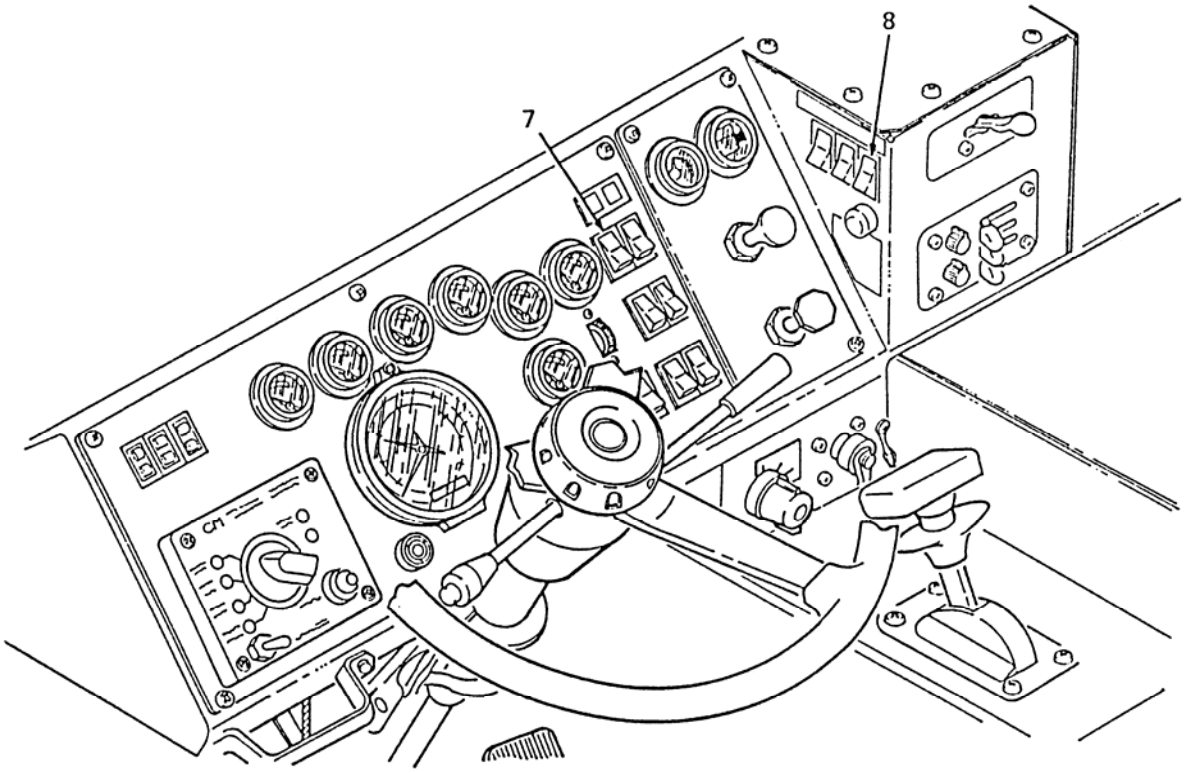
(34) Using one person to push down on PASSENGER SIDE WINCH lever (23) and one person to maintain tension on passenger side winch cable (24), retract and stow winch cable (24) onto stow hook (25). Release lever (23).

(35) Pull ENGINE SPEED CONTROL (32) switch to LOW ENGINE IDLE. Lower guard (9) and lock in place.

(36) Perform steps (42) thru (48) of paragraph 2-26a to raise and secure ramps and restow curb guides, crowbar, and all tools used during this procedure.



(37) In M1070 tractor cab, set PTO switch (8) and beacon light switch (7) to OFF position.



2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

NOTE

To unload a disabled payload which does not roll freely, proceed to paragraph 2-27b. To unload a disabled payload which rolls freely, proceed to paragraph 2-27c.

b. Dual winch unloading (nonfree-rolling payload). To unload a disabled payload which does not roll freely, proceed as follows:

(1) Perform steps (1) thru (8) of paragraph 2-26b to position tractor/semitrailer, adjust ramp span width, and position curb guides.

WARNING

Observe the following precautions during the unloading process:

If possible, provide ample clear space behind the disabled payload during unloading to protect personnel and prevent damage to equipment should cables break while payload is being unloaded.

All ground personnel must stand clear of winch cables except when handling or injury to personnel may result.

Extreme caution should be exercised during any operation on a slope.

Make sure winch cables are not kinked, clevises are secure to winch cables, and snatch blocks and shackles are in good condition and properly secured or injury to personnel may result.

Make sure winch cables are inspected in accordance with TB 43-0142 or injury to personnel may result.

A ground spotter must stand off curbside of semitrailer and maintain visual contact with the winch operator. The spotter must observe cables, snatch blocks, shackles, and payload position during unloading or injury to personnel may result.

Do not overload tractor winches. Know the ratings of the winches being used and any protection devices (such as shear pins) or injury to personnel may result.

At no time during unloading operations, while the payload is being pulled off with winches, should personnel be on the semitrailer platform or injury to personnel may result.

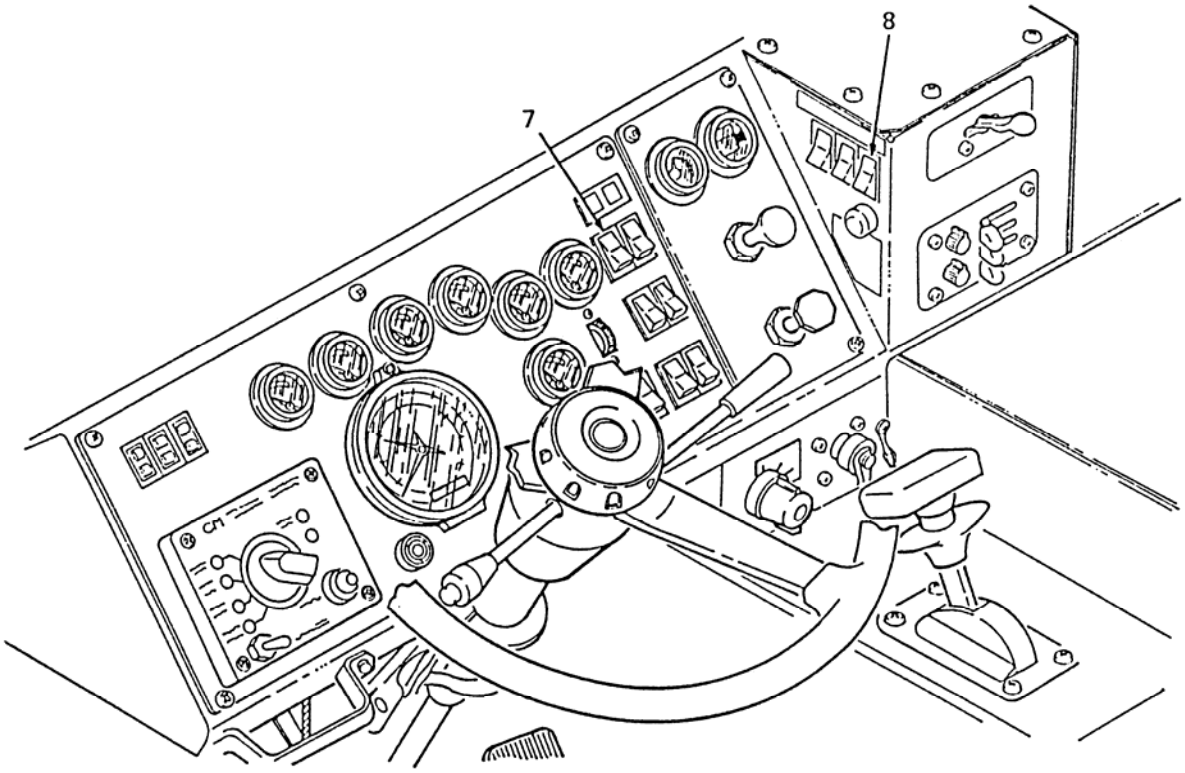
Always wear leather gloves when handling cable. Never allow cable to run through hands or injury to personnel may result.

2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

NOTE

Make sure that M1070 tractor parking brake is applied. PTO will not engage unless tractor parking brake is set.

(2) Turn beacon light switch (7) to ON position. With engine idling, set PTO switch (8) to ON.

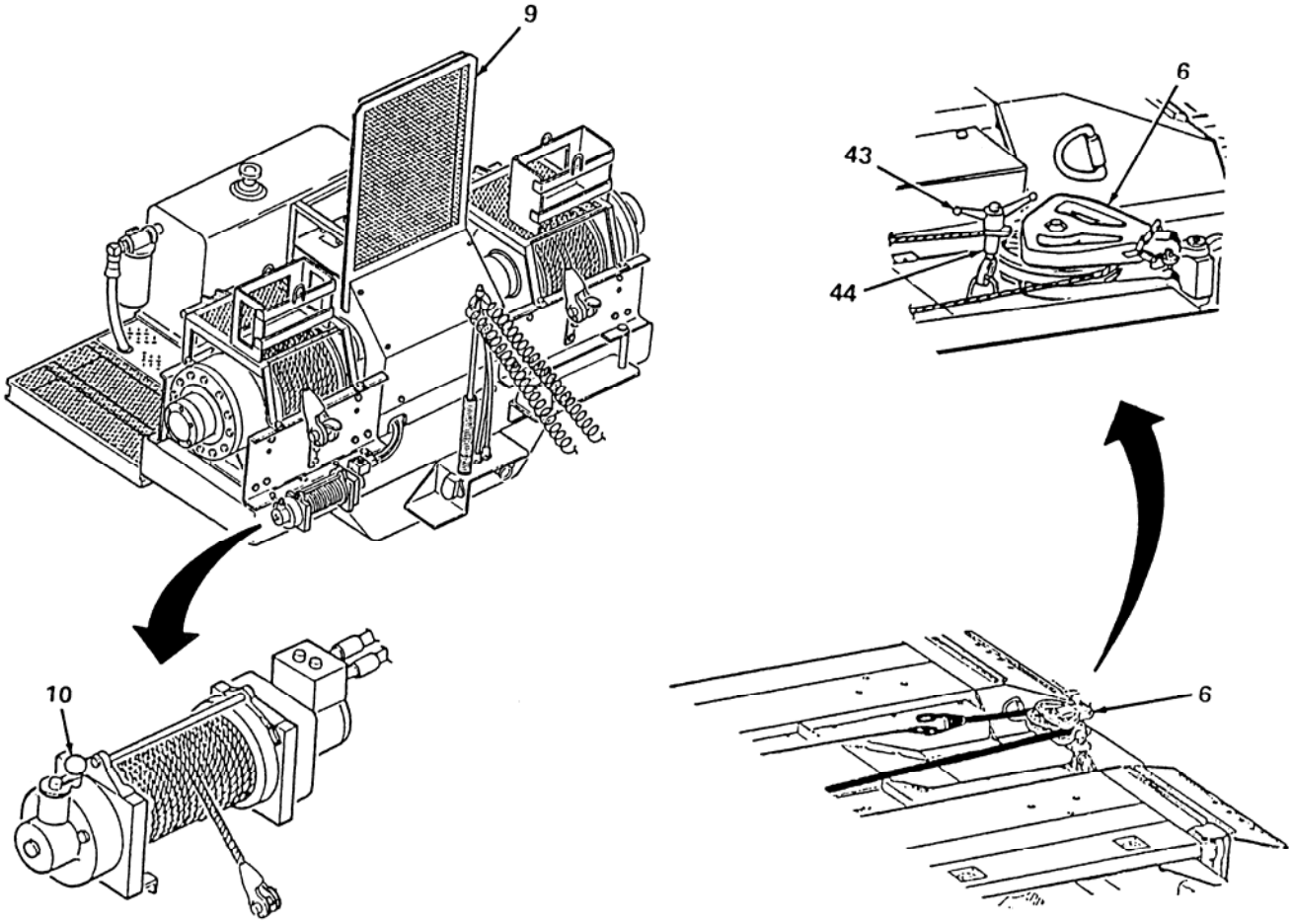


(3) Loosen handle (43) of snatch block stow clamp (44) and remove snatch block (6) from stowed position off platform stow pins.

WARNING

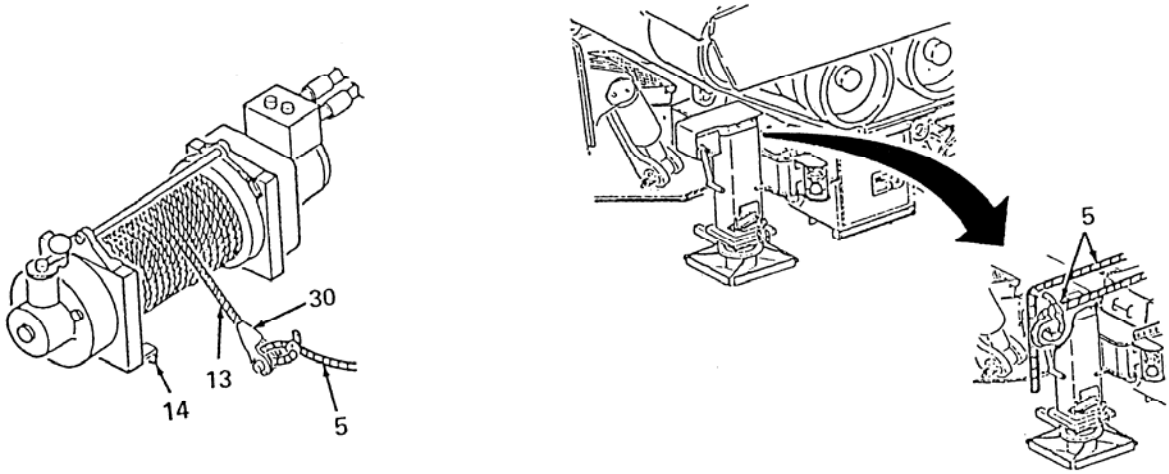
Hearing protection must be worn when near winching station or operating winches or injury to personnel may result.

(4) Raise guard (9), lock in upright position, and release AUXILIARY WINCH KICKOUT by lifting and rotating lever (10) counterclockwise.



(5) Untie manila rope (5) from curbside front lifting eye on platform and move end of rope (5) to streetside front lifting eye.

(6) Unhook auxiliary winch cable (13) from stow hook (14). Pull auxiliary winch cable (13) to free end of manila rope (5) and tie rope to auxiliary winch cable clevis (30).



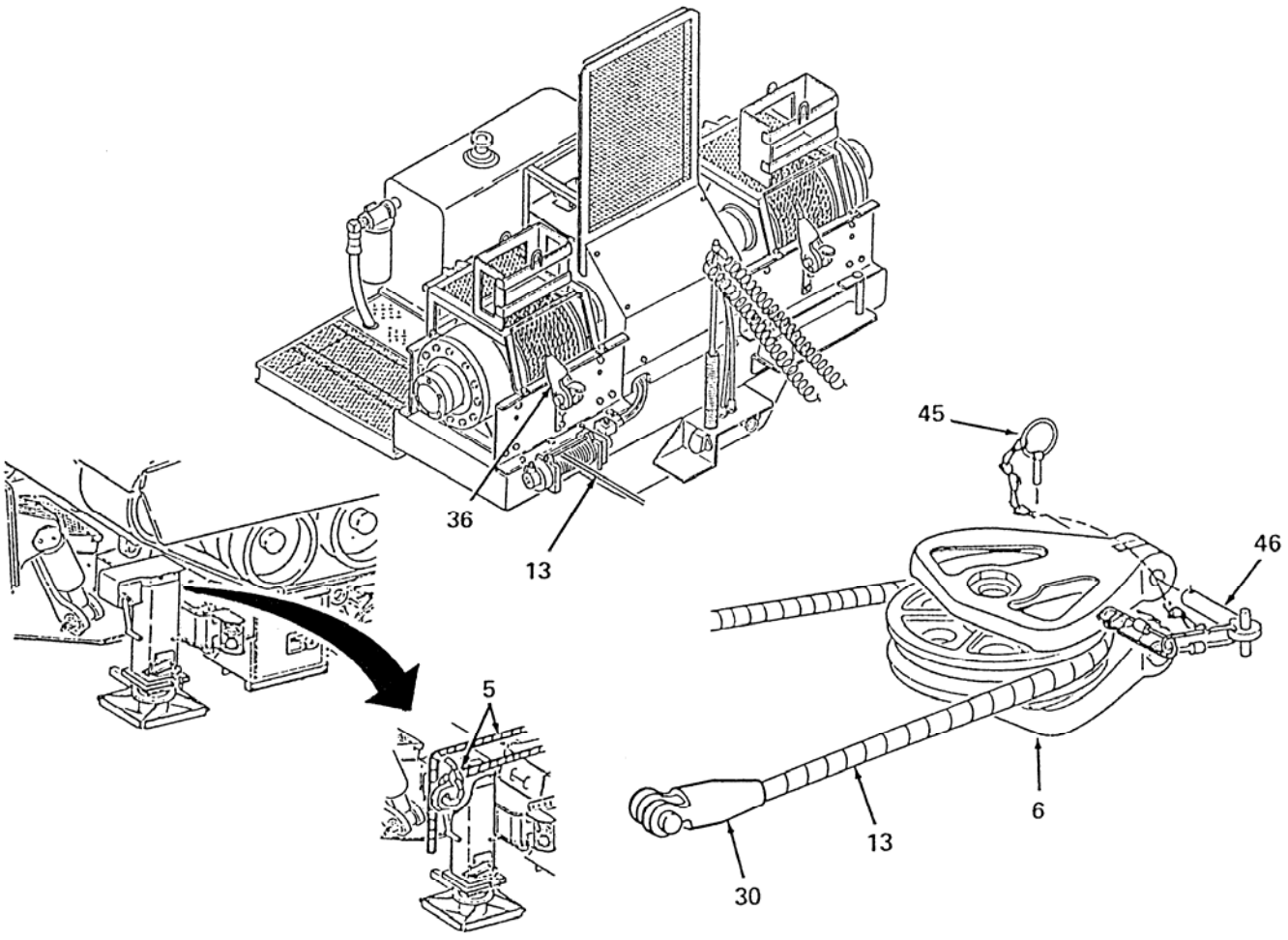
2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

(7) Untie manila rope (5) from streetside front lifting eye on platform and use manila rope (5) to pull auxiliary winch cable (13) rearward under payload to snatch block (6).

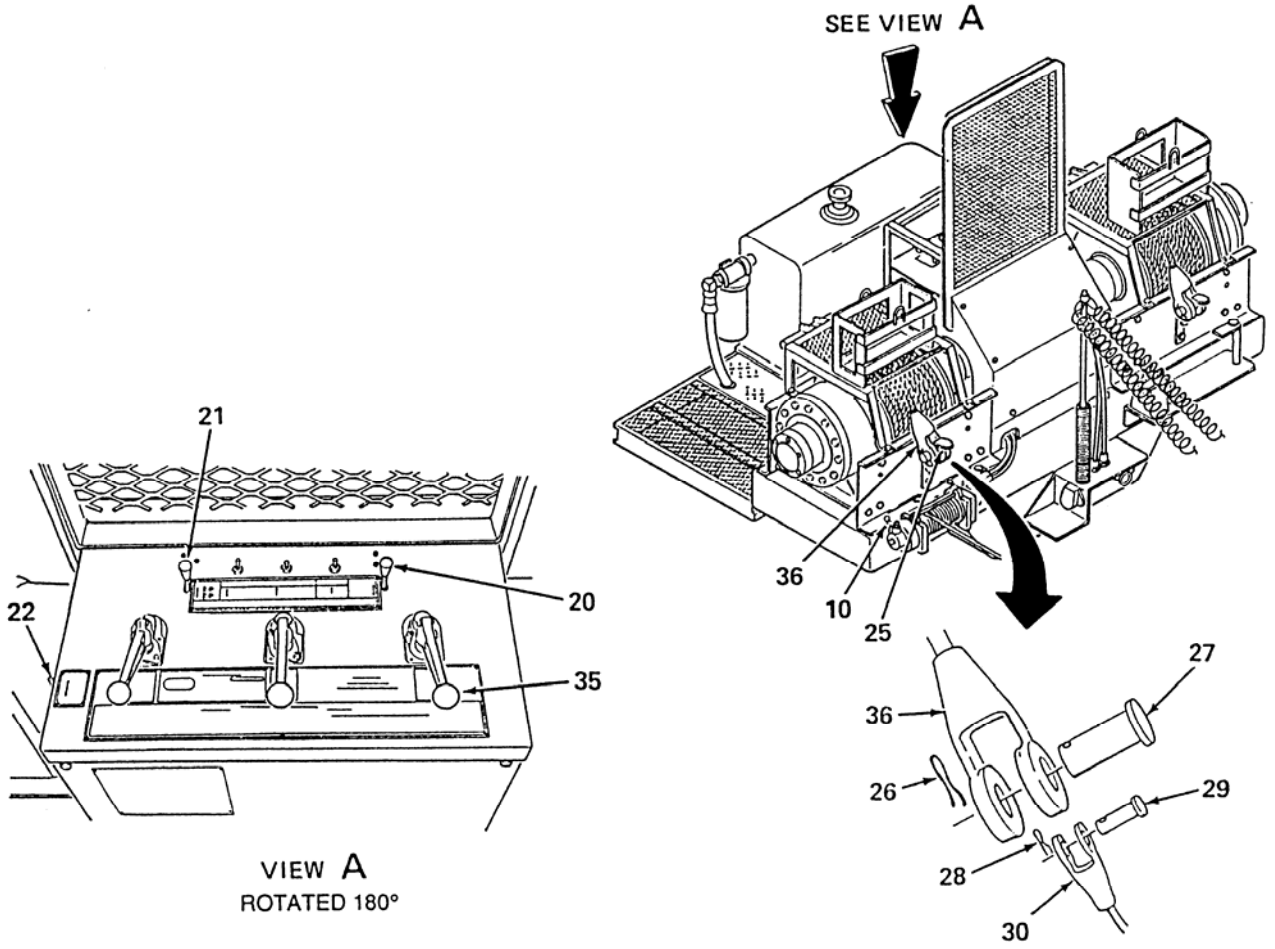
(8) Remove linch pin (45) and keeper pin (46) and open snatch block (6). Pass auxiliary winch cable (13), curbside to streetside, through snatch block.

(9) Close snatch block (6), reinstall keeper pin (46), and secure with linch pin (45).

(10) Continue pulling manila rope (5) forward until auxiliary cable winch clevis (30) reaches clevis on drivers side winch cable (36). Untie manila rope (5) from auxiliary winch cable clevis (30).



(11) Make sure both DRIVERS SIDE WINCH KICKOUT (20) and PASSENGER SIDE WINCH KICKOUT (21) switches are ENGAGED (pushed away from operator).



(12) Make sure CABLE HOLD DOWN lever (22) is ON (pushed away from operator).

(13) Pull DRIVERS SIDE WINCH lever (35) upward momentarily until there is enough slack in drivers side winch cable (36) to be removed from stow hook (25). Move clevis on winch cable (36) off of stow hook (25) to unstow winch cable. Continue paying out winch cable (36) until spotter on the ground can reach clevis. Release lever (35).

(14) Remove and retain cotter pin (26) and shouldered pin (27) from clevis on drivers side winch cable (36).

(15) Remove cotter pin (28) and shouldered pin (29) from auxiliary winch cable clevis (30). Install auxiliary winch cable clevis (30) over one ear on drivers side winch cable (36) and install shouldered pin (29) and cotter pin (28).

(16) Engage AUXILIARY WINCH KICKOUT by lifting and rotating lever (10) clockwise. Disengage DRIVERS SIDE WINCH KICKOUT (20) switch by pulling switch.

2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

WARNING

Do not allow auxiliary winch cable to cross itself or knot up on winch or injury to personnel may result.

(17) Using one person to operate winch controls and a second person to make sure that winch cable clevises do not hang up on platform, push down on AUXILIARY WINCH lever (31) to pull drivers side winch cable (36) to snatch block (6).

(18) If auxiliary winch cable (13) does not pull drivers side winch cable (36), push ENGINE SPEED CONTROL switch (32) to HIGH ENGINE IDLE. Momentarily push ENGINE SPEED CONTROL switch (33), to lock engine speed at high idle (approximately 1500 rpm), and then release switch.

NOTE

To keep winch cable clevis from becoming stuck on platform, spotter should watch clevis as it passes under the payload.

(19) Winch operator must release lever (31) when drivers side winch cable (36) reaches snatch block (6).

(20) Spotter must pull on drivers side winch cable (36) to get enough slack so that cable can be passed through snatch block (6). Unfasten linch pin (45) from keeper pin (46), remove keeper pin (46) from snatch block (6), lift and open snatch block, and pass drivers side winch cable (36) through snatch block.

(21) Once drivers side winch cable (36) is past pulley on snatch block (6), close snatch block and reinstall keeper pin (46). Secure keeper pin (46) to snatch block by installing linch pin (45).

(22) Winch operator must push down and hold AUXILIARY WINCH lever (31) to pull drivers side winch cable (36) to front streetside of payload.

(23) Winch operator must release lever (31) when winch cable (36) is approximately 12 inches (30 cm) past streetside front of platform.

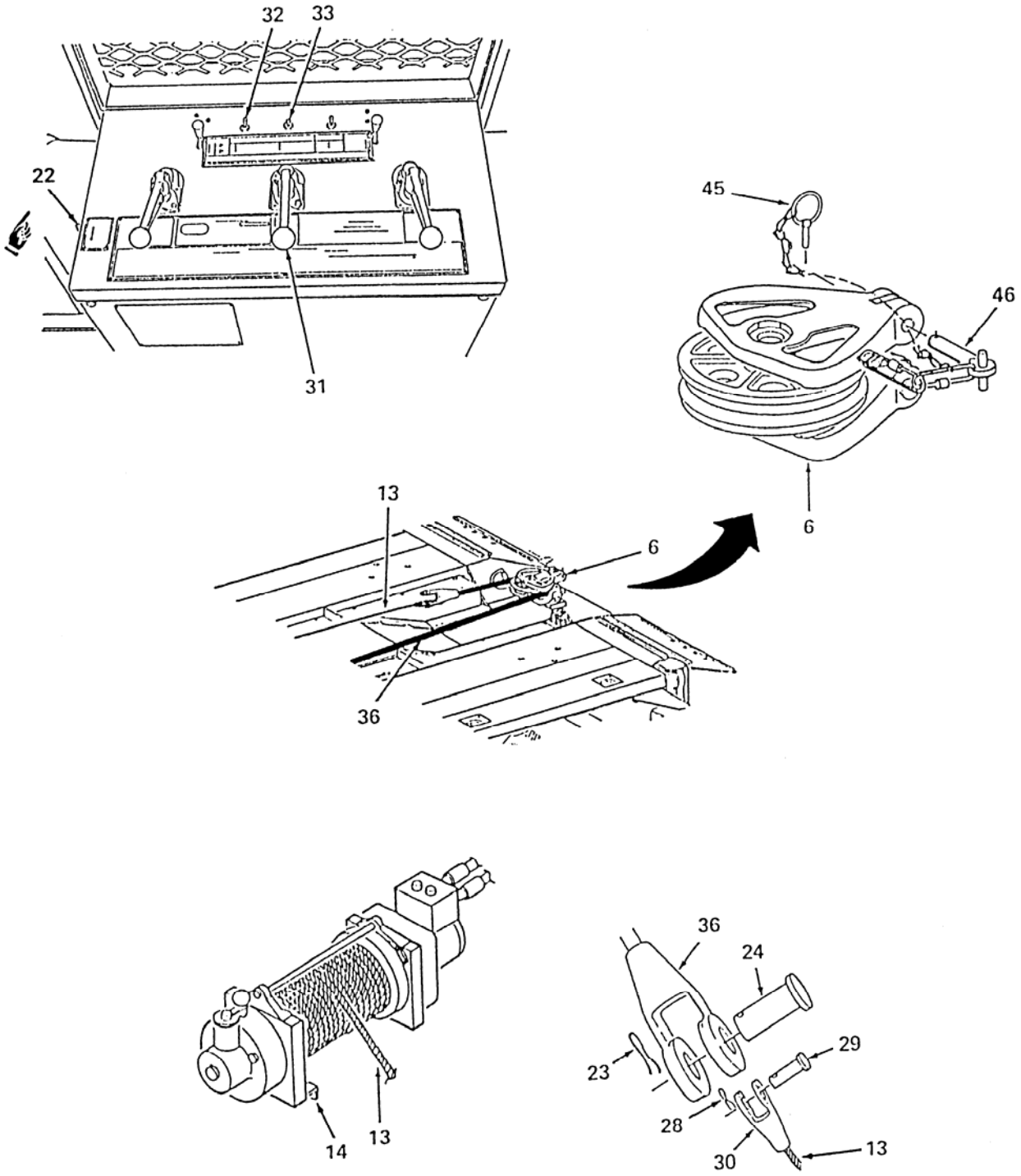
WARNING

Prior to disconnecting any winch cables, be sure each cable is not twisted. A twisted winch cable, when operated, can develop extreme tension, which may cause injury to personnel when cable clevis is removed.

(24) Remove cotter pin (28) and shouldered pin (29) from auxiliary cable clevis (30) and remove auxiliary cable clevis (30) from drivers winch cable (36).

(25) Using one person to push downward on AUXILIARY WINCH lever (31) and one person to maintain tension on auxiliary winch cable (13), retract winch cable (13) and restow on stow hook (14).

(25.1) Move CABLE HOLD DOWN lever (22) to OFF.



2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

(26) Pull drivers side winch cable (36) to curbside front of payload and route over both front tiedown chains (40).

(27) Attach clevis on drivers side winch cable (36) to pear ring on front curbside tiedown chain (40) next to shackle (41) on curbside front towing lug. Secure winch cable (36) by installing shouldered pin (27) and cotter pin (26).

(28) Route drivers side winch cable (36) through streetside gooseneck cable guide (34) and around pivot pin sheave (47).

(29) Pull PASSENGER SIDE WINCH lever (23) upward momentarily until there is enough slack in passenger side winch cable (24) to be removed from stow hook (25). Move clevis on winch cable (24) off of stow hook to unstow winch cable. Continue paying out winch cable (24) until spotter on the ground can reach clevis. Release lever (23).

(30) Disengage PASSENGER SIDE WINCH KICKOUT (21) switch by pulling on switch.

(31) Remove cotter pin (26) and shouldered pin (27) from clevis on passenger side winch cable (24).

(32) Perform step (9) of paragraph 2-26b to disconnect all rear tiedown chains from payload. Winch operator must pull WINCH SPEED CONTROL switch (37) to LOW. Push ENGINE SPEED CONTROL switch (32) to HIGH ENGINE IDLE. Momentarily push ENGINE SPEED CONTROL switch (33), to lock engine speed at high idle (approximately 1500 rpm), and then release switch.

(33) Remove two large shackles (11) from four load binders (12) and rear payload tiedown rings.

WARNING

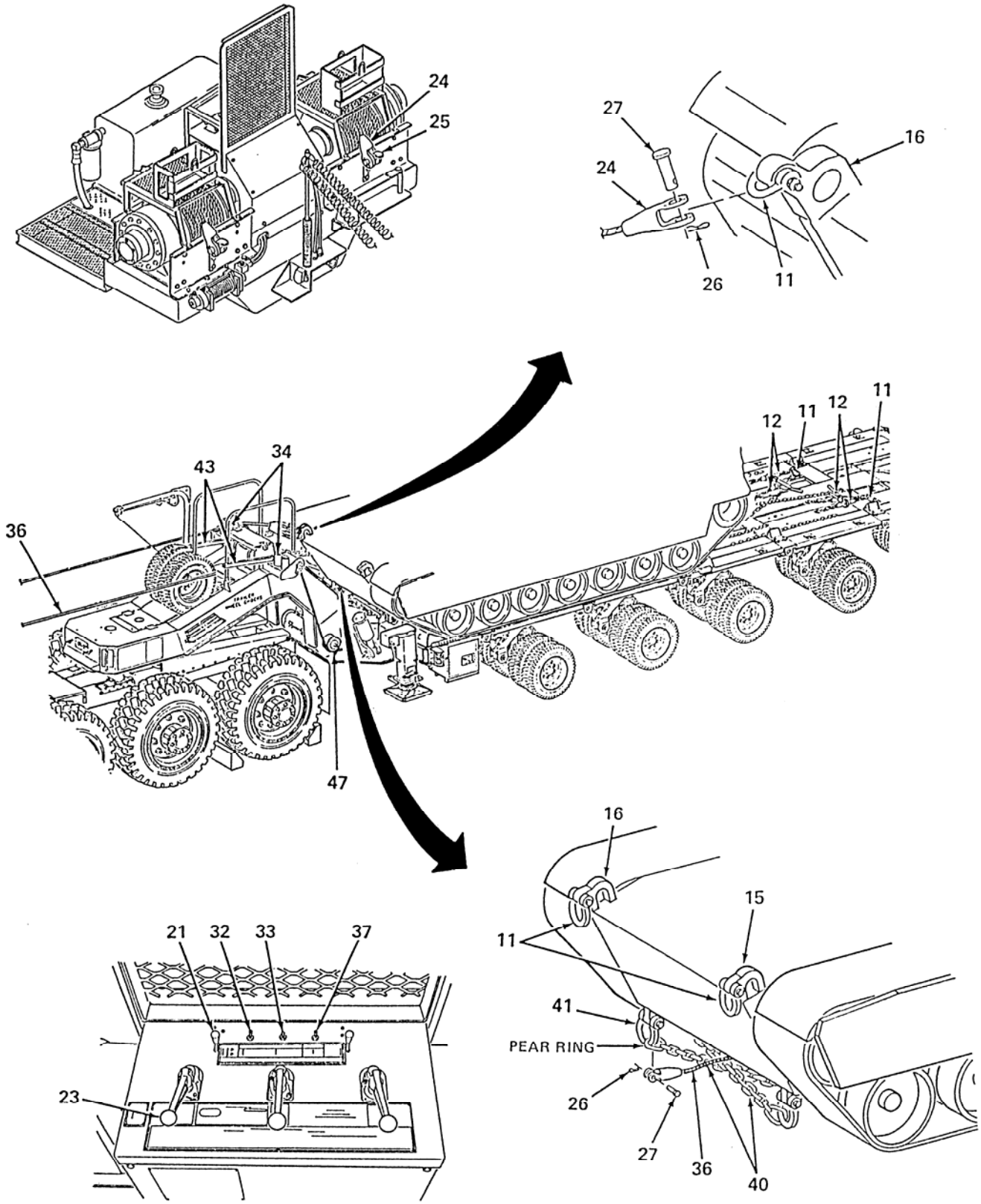
Failure to extend safety rail while attaching or removing payload winch cable may cause injury to personnel.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on or trip over it. Injury to personnel or damage to equipment may result.

(33.1) Unlatch and extend gooseneck safety rail (43).

(34) Install one large shackle (11) each to upper right recovery eye (16) and upper left recovery eye (15).

(35) Pull out passenger side winch cable (24) and attach clevis to shackle (11) on payload upper right recovery eye (16). Secure winch cable (24) by installing shouldered pin (27) and cotter pin (26).


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2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

WARNING

Failure to retract and latch gooseneck safety rail before operating tractor/trailer will result in damage to equipment.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on or trip over it. Injury to personnel or damage to equipment may result.

(35.1) Retract and latch gooseneck safety rail (43).

(36) Route passenger side winch cable (24) through gooseneck cable guide (34).

(37) Winch operator must engage PASSENGER SIDE WINCH KICKOUT (21) switch by pushing in on switch. Momentarily push down and release PASSENGER SIDE WINCH lever (23) to take up slack in passenger side winch cable (24).

(38) Spotter must move streetside rear payload chock (39) back along streetside of platform over #4 bogie. Spotter must place curbside rear payload chock (38) on the ground on streetside of platform.

WARNING

The drivers side winch cable will be used to pull back the payload and the passenger side winch cable will be used to restrain the payload. Do not allow the drivers side winch cable to pull against the passenger side winch cable or the chain will part and serious injury to personnel may result.

(39) Winch operator must engage DRIVERS SIDE WINCH KICKOUT (20) by pushing switch. Push down DRIVERS SIDE WINCH lever (35) to move payload back to streetside rear payload chock (39) and pull up PASSENGER SIDE WINCH lever (23) just enough to keep excess slack out of passenger side winch cable (24).

(40) Winch operator must release DRIVERS and PASSENGER SIDE WINCH levers (35 and 23) when payload makes firm contact with streetside rear payload chock (39). Spotter must place curbside rear payload chock (38) firmly against streetside front of payload to chock payload.

WARNING

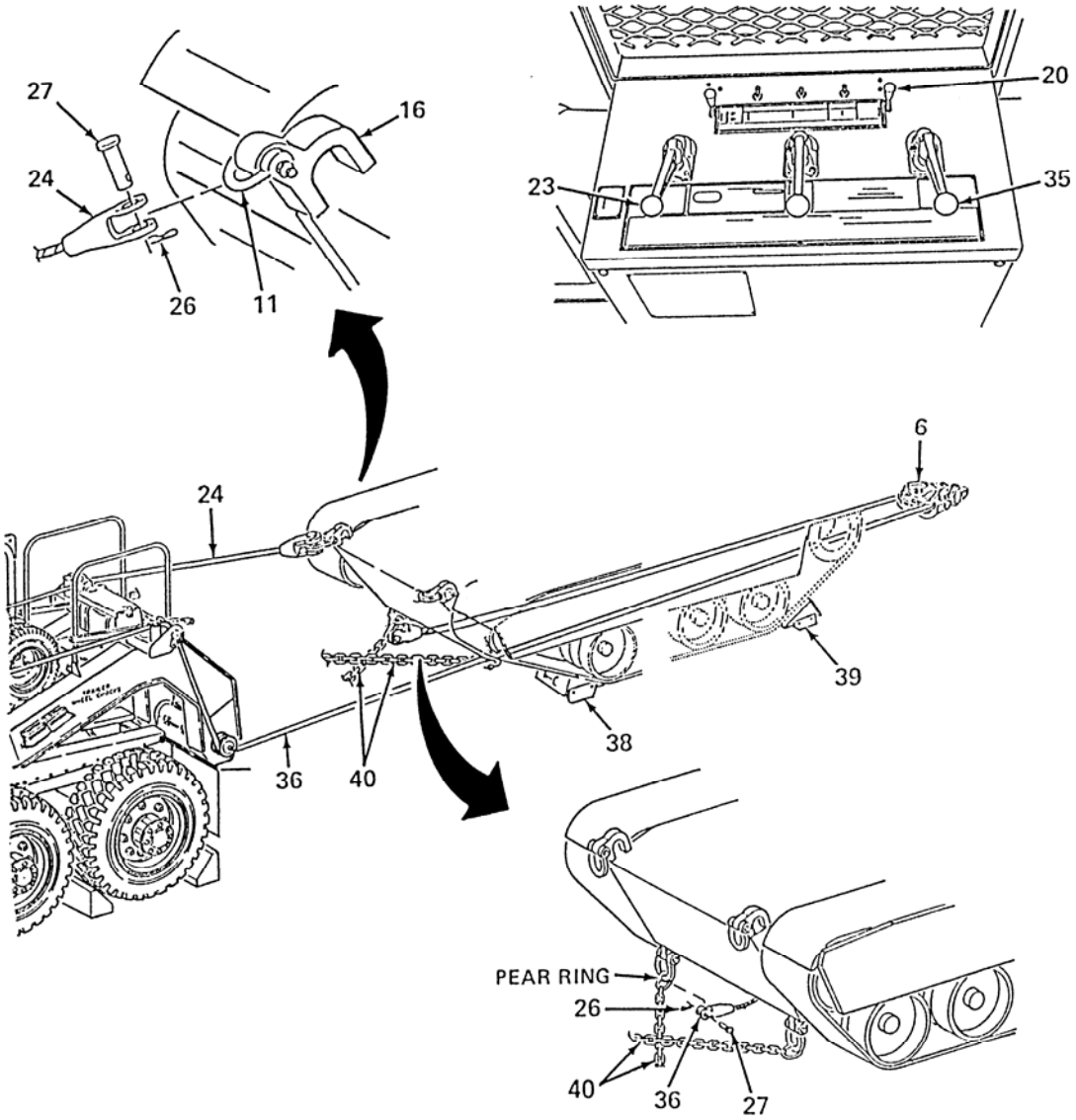
Prior to removing the winch cable from the payload, winch operator must be sure each cable sags and touches the platform to relieve cable torque or injury to personnel may result.

(41) Winch operator must pull up DRIVERS SIDE WINCH lever (35) to give slack in drivers side winch cable (36). Release lever (35) when drivers side winch cable (36) is laying on platform between front tiedown chains (40) and snatch block (6).

WARNING

Extreme caution must be used when removing winch cables. Cable may be under tension or be twisted. If winch cable has tension when removed, slowly and carefully rotate cable to relieve tension. Do not allow cable to twist or whip freely or injury to personnel may result.

(42) Check for twist in drivers side winch cable (36). Remove and retain cotter pin (26) and shouldered pin (27) from clevis on drivers side winch cable (36) and remove cable from pear ring on curbside front payload tiedown chain (40). Disconnect one payload tiedown chain (40) from payload and platform and lay chain on platform in front of payload. Disconnect other payload tiedown chain (40) from platform only and leave connected to payload.



2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

NOTE

Shackles used to tiedown payload may be removed as required and used for the following steps.

(43) Attach shackle (41) and one front payload tiedown chain (40) to payload lower tiedown lugs. Allow as much slack as possible in chain. This forms the Y-chain (48) to be used to winch payload off of platform.

CAUTION

Always connect winch cable to the center most point on the continuous portion of the Y-chain, not the wraparound portion that has a hook on the end, or the hook may disconnect under load and cause damage to equipment.

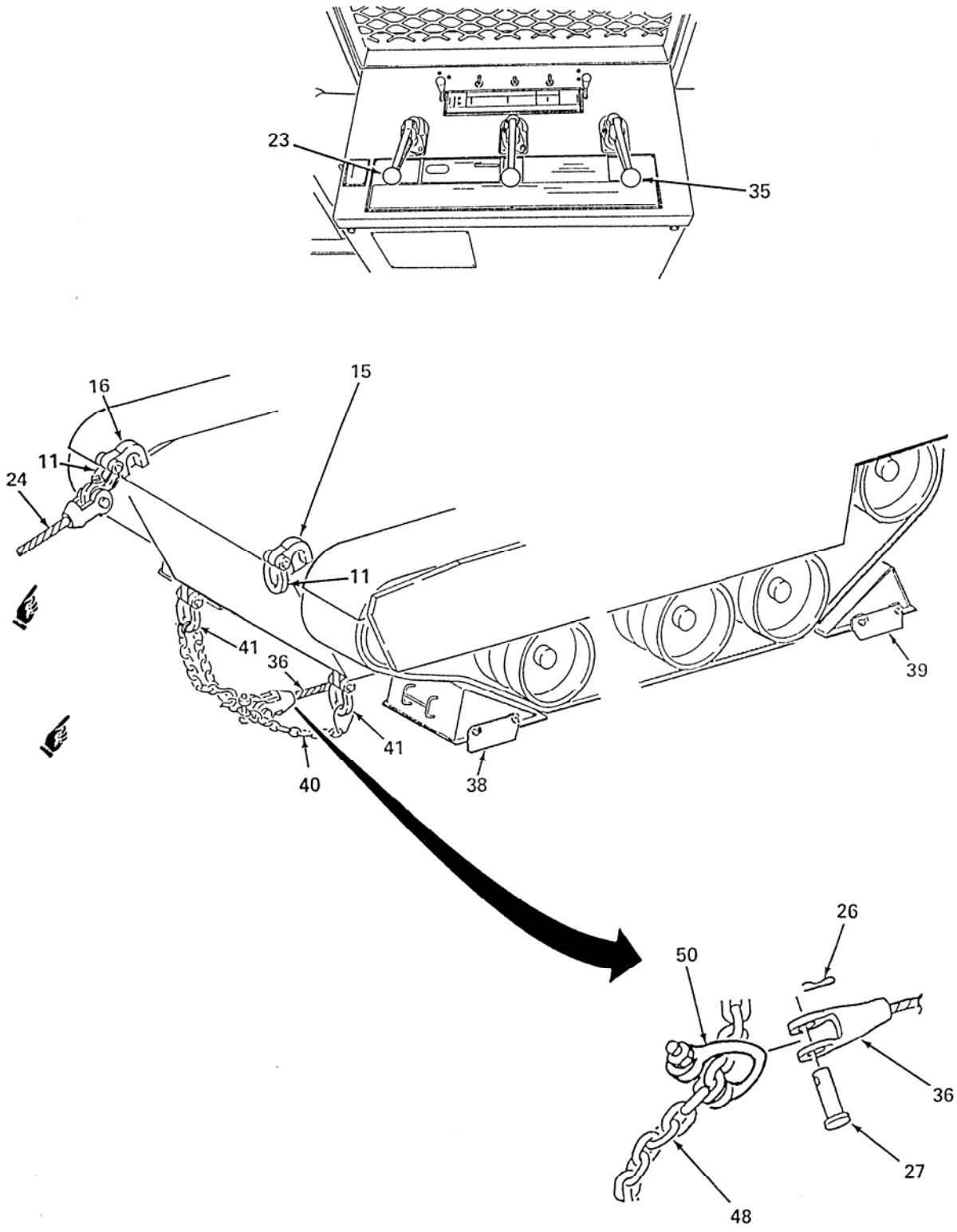
(44) Attach drivers side winch cable (36) to center of Y-chain (48) using a shackle (50). (If using 3/4 inch chains, use two shackles.) Install shouldered pin (27) and cotter pin (26). Winch operator must push down on DRIVERS SIDE WINCH lever (35) and take up slack in drivers side winch cable (36).

(45) Lower both rear support legs until slightly below mud flaps.

WARNING

A spotter is required for unloading operations. The winch operator must maintain visual contact with the spotter at all times or injury to personnel may result.

(46) Position spotter on curbside of payload to maintain visual contact with winch operator.


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2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

WARNING

Winch operator and spotter must read steps (52) thru (56) and be completely familiar with the sequence of steps prior to using winches or injury to personnel and damage to equipment may result.

Personnel must not be on the platform during the winching operation. The winch operator must offload the payload slowly or injury to personnel and damage to equipment may result.

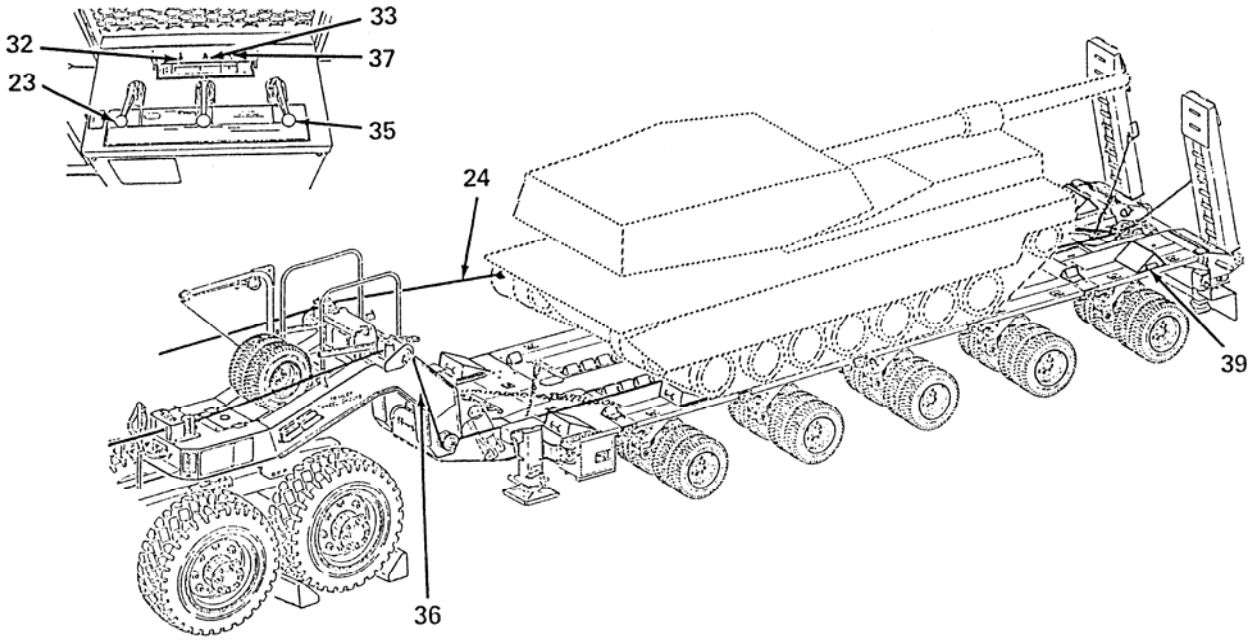
During winching operation, ensure that one cable is always under tension and the other cable has some slack so that the two winches are NEVER pulling against each other. Otherwise, injury to personnel or damage to equipment may result.

Payload adjustments, side to side (turning), must be kept to a minimum or injury to personnel and damage to equipment may result. Spotter must notify winch operator of any required payload adjustments while unloading.

(47) Pull WINCH SPEED CONTROL switch (37) to LOW. Push ENGINE SPEED CONTROL switch (32) to HIGH ENGINE IDLE. Momentarily push ENGINE SPEED CONTROL switch (33) to lock engine speed at high idle (approximately 1500 rpm), and then release switch.

(48) Winch operator must push down PASSENGER SIDE WINCH lever (23) to pull payload slightly forward, off of rear payload chocks (39). Release lever (23). Move both rear payload chocks (39) to rear of platform, just in front of beavertail and approximately in line with snatch block.

(49) Winch operator must pull up PASSENGER SIDE WINCH lever (23) to pay out passenger side winch cable (24) to restrain payload and push down DRIVERS SIDE WINCH lever (35) to take up drivers side winch cable (36). As long as drivers side cable (36) is pulling payload, winch operator must keep a slight sag in passenger side cable (24). If payload rolls on its own, winch operator must allow slack in drivers side cable (36) and keep tension on passenger side cable (24) to control speed of roll. Continue winching until payload reaches rear payload chocks (39). Release levers (23 and 35).


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2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

WARNING

Extreme caution must be used when removing winch cables from payload. Cable may be under tension or be twisted. If winch cable has tension when removed, slowly and carefully, using both hands, rotate cable to relieve tension. Do not allow cable to twist or whip freely or injury to personnel may result.

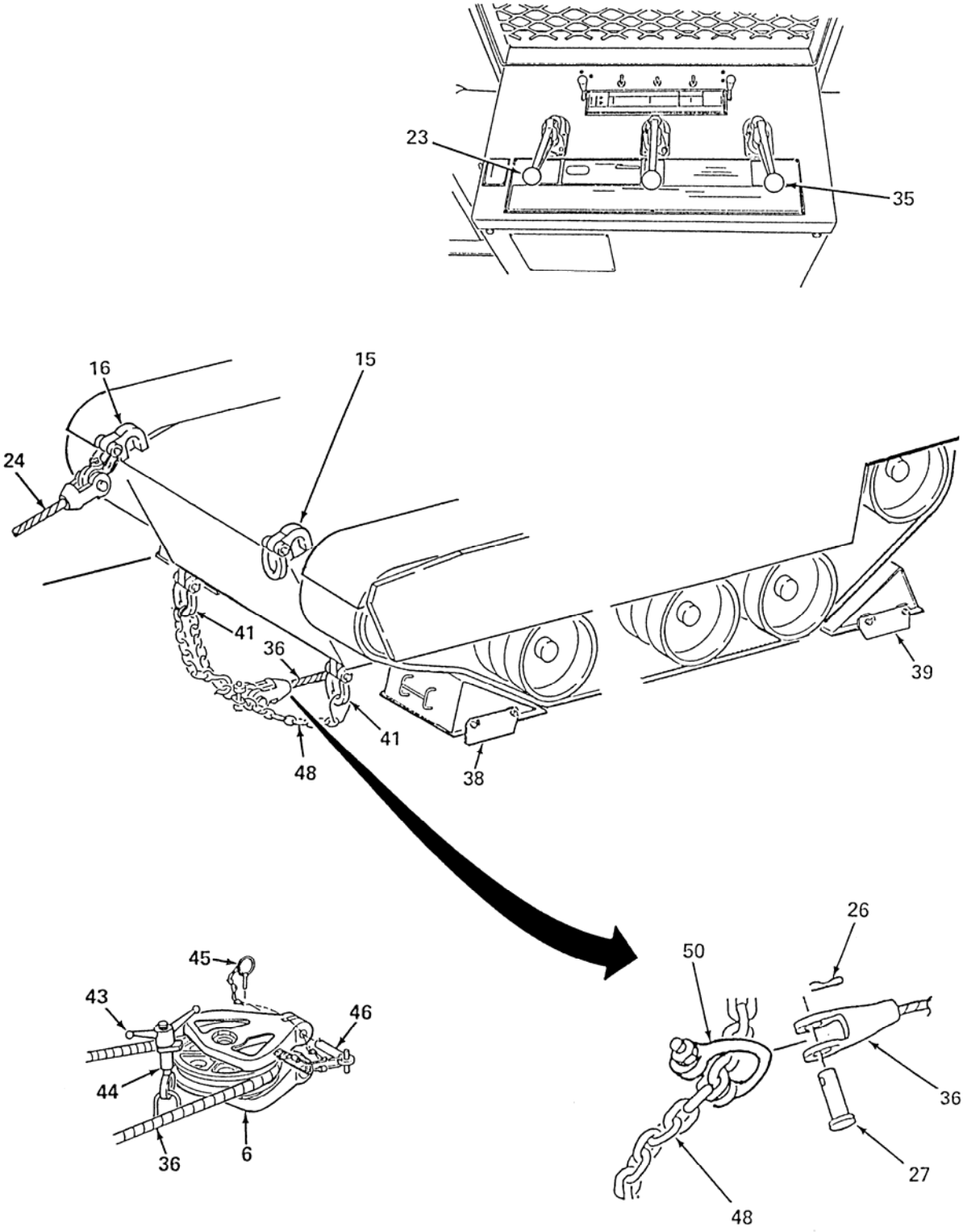
(50) Winch operator must pull up on DRIVERS SIDE WINCH lever (35) to pay out drivers side winch cable (36) until there is enough slack to relieve tension in cable. Release lever (35). Check for twist in drivers side winch cable (36). Using two persons, remove cotter pin (26) and shouldered pin (27) and remove drivers side winch cable (36) and shackle (50) from Y-chain (48).

(51) Remove y-chain (48) from payload.

(52) Remove linch pin (45) and keeper pin (46) and open snatch block (6). Remove drivers side winch cable (36), close snatch block (6), reinstall keeper pin (46), and secure with linch pin (45).

(53) Place snatch block (6) in stowage position, install stow clamp (44), and secure by tightening clamp handle (43).

(54) Attach drivers side winch clevis to upper left recovery eye (15).


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2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

(55) Remove drivers side winch cable (36) from gooseneck pivot pin sheave(47).

(56) Winch operator must push down on DRIVERS SIDE WINCH lever (35) to take up slack in cable.

(57) Lower both loading ramps.

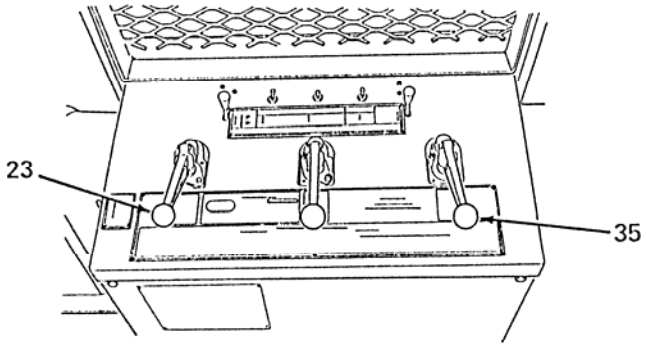
NOTE

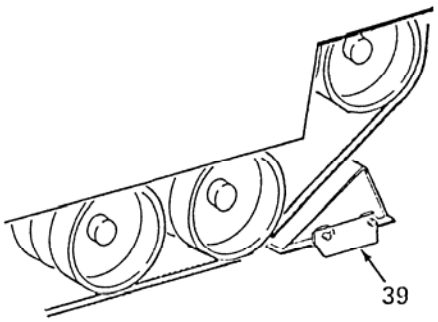
Platform angle will be slightly greater than that normally used for load/offload.

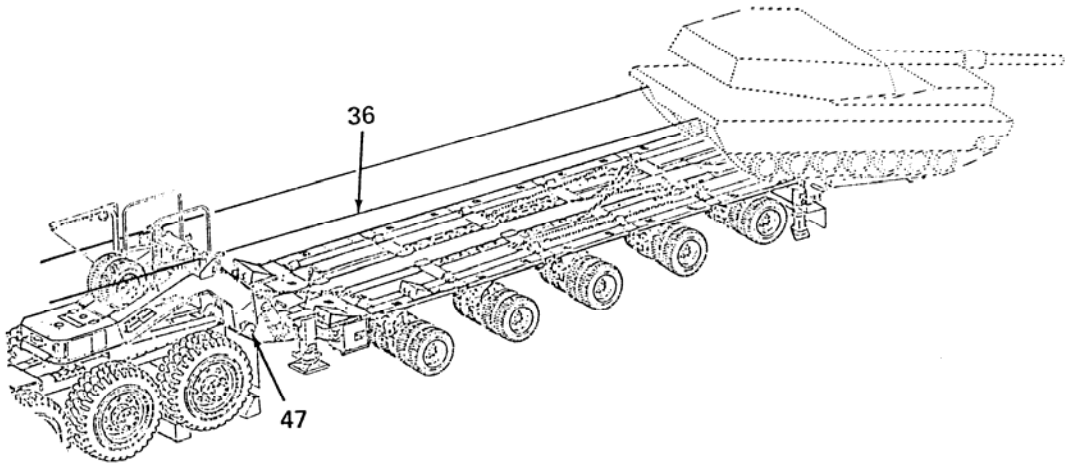
(58) With APU running, release semitrailer parking brakes and adjust platform height as follows:

(a) Raise front of semitrailer to 50 inches (top mark on crowbar) measured at #1 bogey position.

(b) Lower rear of semitrailer until rear support legs are firmly in contact with the ground. There must be at least 1 inch of polished (shiny) surface showing on rear suspension cylinders. Reapply semitrailer parking brakes.







(59) Winch operator must pull up on both DRIVERS SIDE WINCH lever (35) and PASSENGER SIDE WINCH lever (23) to pull payload slightly forward off of rear payload chocks (39). Remove both rear payload chocks (39).

NOTE

It may be necessary to pull the first set of road wheels onto front payload chocks before payload will roll back on its own.

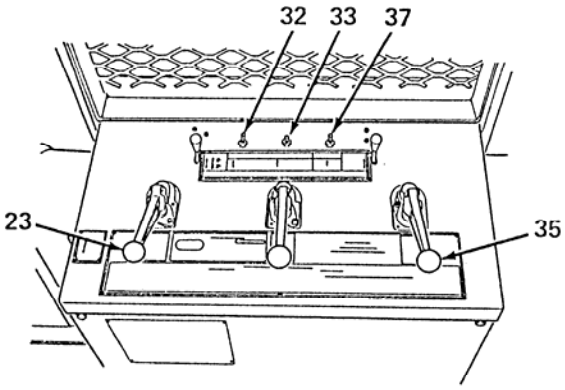
(60) Winch operator must push down on both DRIVERS SIDE WINCH lever (35) and PASSENGER SIDE WINCH lever (23) and allow payload to roll off of semitrailer. Cables may be payed out unevenly to maintain directional control.

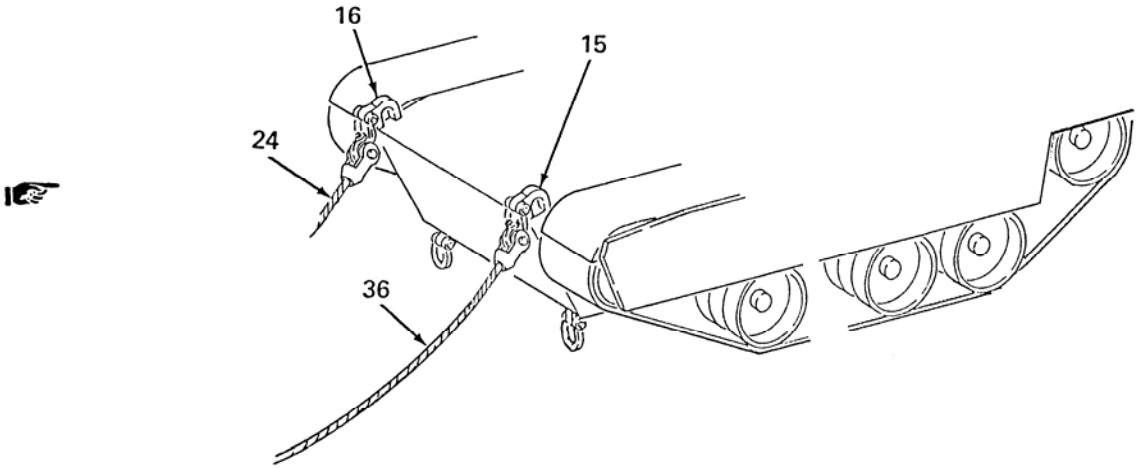
(61) Once payload clears curb guides, ensure that it rolls straight down ramps.

WARNING

Prior to removing winch cable from payload, winch operator must be sure the winch cables have enough slack to relieve tension in the cable or injury to personnel may result.

(62) Winch operator must continue to pay out both winch cables (24 and 36) until cables are touching platform. Release levers (23 and 35).





2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

WARNING

Extreme caution must be used when removing the winch cables from payload. Cable may be under tension or be twisted. If the winch cable has tension when removed, slowly and carefully, using both hands, rotate cable to relieve tension. Do not allow cable to twist or whip freely or injury to personnel may result.

(63) Check for twist in passenger side winch cable (24). Spotter must remove passenger side winch cable (24) from upper recovery eye (16) and lay winch cable (24) on platform.

(64) Check for twist in drivers side winch cable (36). Spotter must remove drivers side winch cable (36) and from upper recovery eye (15) and lay winch cable (36) on platform.

(65) Remove Y-chain (48) and two shackles (41) from payload lower towing lugs.

(66) Push ENGINE SPEED CONTROL switch (32) to HIGH ENGINE IDLE. Momentarily push ENGINE SPEED CONTROL switch (33), to lock engine speed at high idle (approximately 1500 rpm), and then release switch. Push WINCH SPEED CONTROL SWITCH (37) to HIGH.

(67) Remove drivers side winch cable (36) from gooseneck cable guide (34). Leave cable on platform.

(68) Remove passenger side winch cable (24) from gooseneck cable guide (34). Leave cable on platform.

WARNING

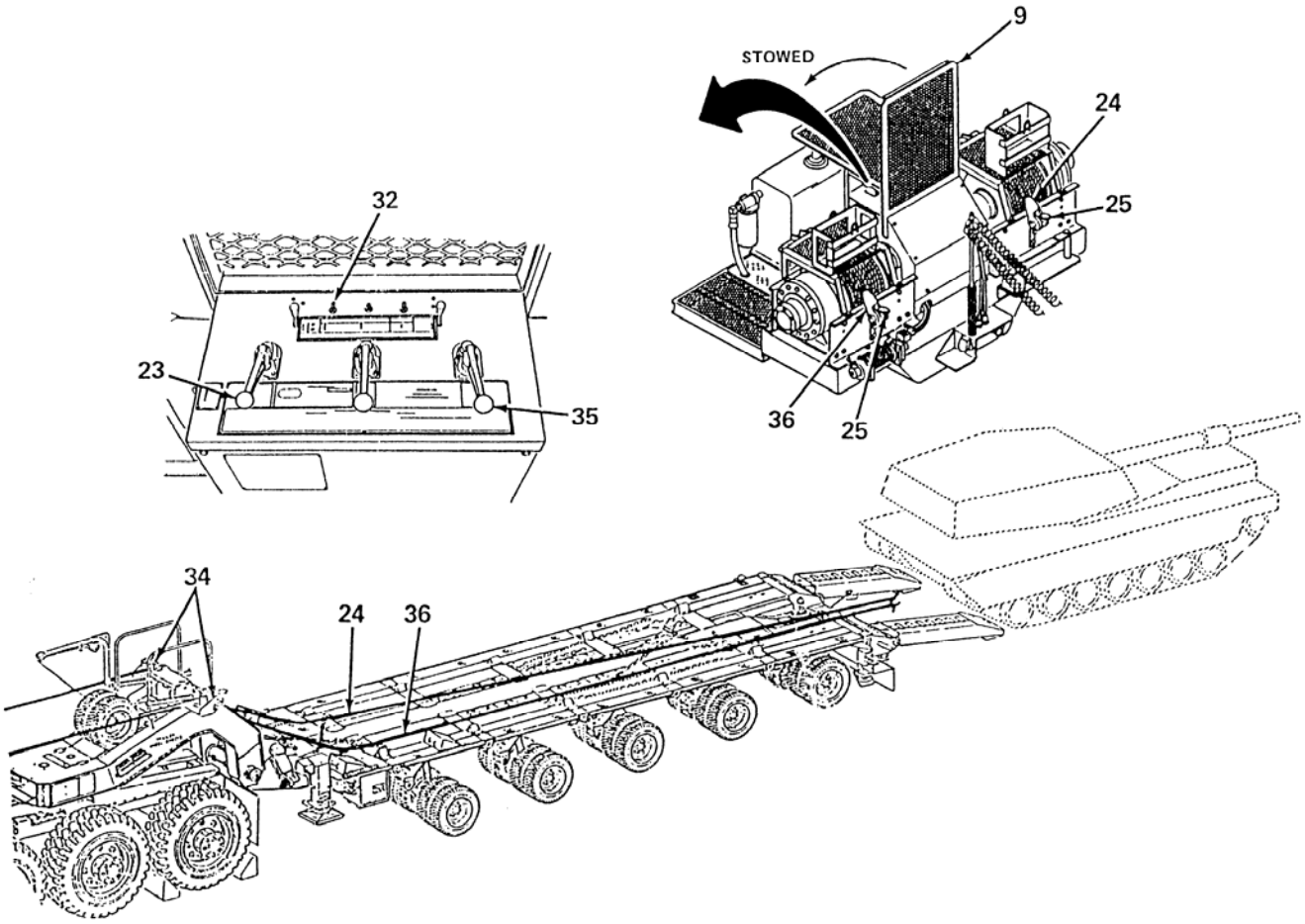
Do not allow hands to get between clevis and winch or injury to personnel may result.

(69) Using one person to push down on DRIVERS SIDE WINCH lever (35) and one person to maintain tension on drivers side winch cable (36), retract and stow winch cable (36) onto stow hook (25). Release lever (35).

(70) Using one person to push down on PASSENGER SIDE WINCH lever (23) and one person to maintain tension on passenger side winch cable (24), retract and stow winch cable (24) onto stow hook (25). Release lever (23).

(71) Pull ENGINE SPEED CONTROL switch (32) to LOW ENGINE IDLE. Lower guard (9) and lock in place.

(72) Remove all chains and load binders from platform and restow in platform storage compartment. Perform steps (20) thru (34) of paragraph 2-26b to stow equipment used during this procedure and prepare tractor and semitrailer for transport.


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2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

c. Dual winch unloading (free-rolling payload). To unload a disabled payload which rolls freely, proceed as follows:

(1) Perform steps (1) thru (8) of paragraph 2-26b to position tractor/ semitrailer, adjust ramp span width, and position curb guides.

WARNING

Observe the following precautions during the unloading process:

If possible, provide ample clear space behind the disabled payload during unloading to protect personnel and prevent damage to equipment should cables break while payload is being unloaded.

All ground personnel must stand clear of winch cables except when handling or injury to personnel may result.

Extreme caution should be exercised during any operation on a slope.

Make sure winch cables are not kinked, clevises are secure to winch cables, and snatch blocks and shackles are in good condition and properly secured or injury to personnel may result.

Make sure winch cables are inspected in accordance with TB 43-0142 or injury to personnel may result.

A ground spotter must stand off curbside of semitrailer and maintain visual contact with the winch operator. The spotter must observe cables, snatch blocks, shackles, and payload position during unloading or injury to personnel may result.

Do not overload tractor winches. Know the ratings of the winches being used and any protection devices (such as shear pins) or injury to personnel may result.

At no time during unloading operations, while the payload is being pulled off with winches, should personnel be on the semitrailer platform or injury to personnel may result.

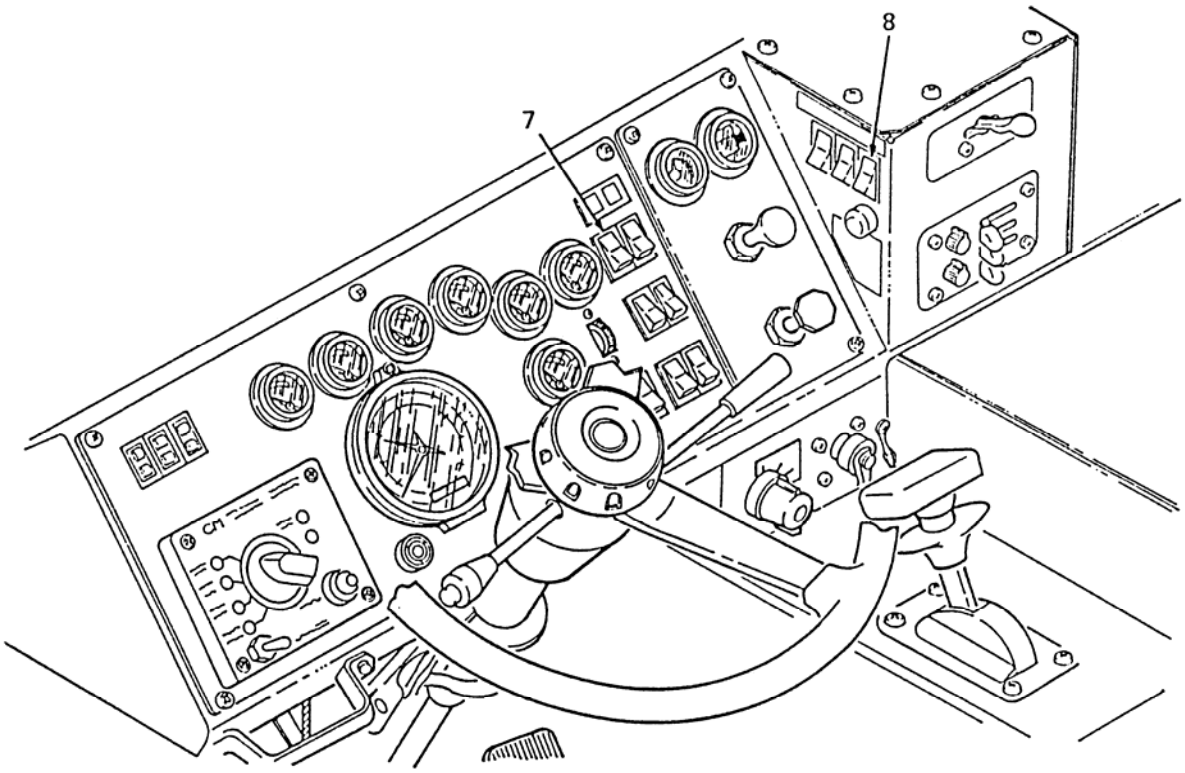
Always wear leather gloves when handling cable. Never allow cable to run through hands or injury to personnel may result.

NOTE

Make sure that M1070 tractor parking brake is applied. PTO will not engage unless tractor parking brake is set.

(2) Turn beacon light switch (7) to ON position. With engine idling, set PTO switch (8) to ON.

(3) Perform step (9) of paragraph 2-26b to disconnect all rear tiedown chains from payload.



2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

WARNING

Hearing protection must be worn when near winching station or operating winches or injury to personnel may result.

(4) Raise guard (9) and lock in upright position.

(5) Make sure both DRIVERS SIDE WINCH KICKOUT (20) and PASSENGER SIDE WINCH KICKOUT (21) switches are ENGAGED (pushed away from operator).

(6) Make sure CABLE HOLD DOWN lever (22) is ON (pushed away from operator).

(7) Pull DRIVERS SIDE WINCH lever (35) upward momentarily until there is enough slack in drivers side winch cable (36) to be removed from stow hook (25). Move clevis on winch cable (36) off of stow hook (25) to unstow winch cable. Continue paying out winch cable (36) until spotter on the ground can reach clevis. Release lever (35).

(8) Pull PASSENGER SIDE WINCH lever (23) upward momentarily until there is enough slack in passenger side winch cable (24) to be removed from stow hook (25). Move clevis on winch cable (24) off of stow hook to unstow winch cable. Continue paying out winch cable (24) until spotter on the ground can reach clevis. Release lever (23).

(9) Remove cotter pin (26) and shouldered pin (27) from clevis on passenger side winch cable (24) and drivers side winch cable (36).

(10) Remove two large shackles (11) from four load binders (12) and rear payload tiedown rings.

WARNING

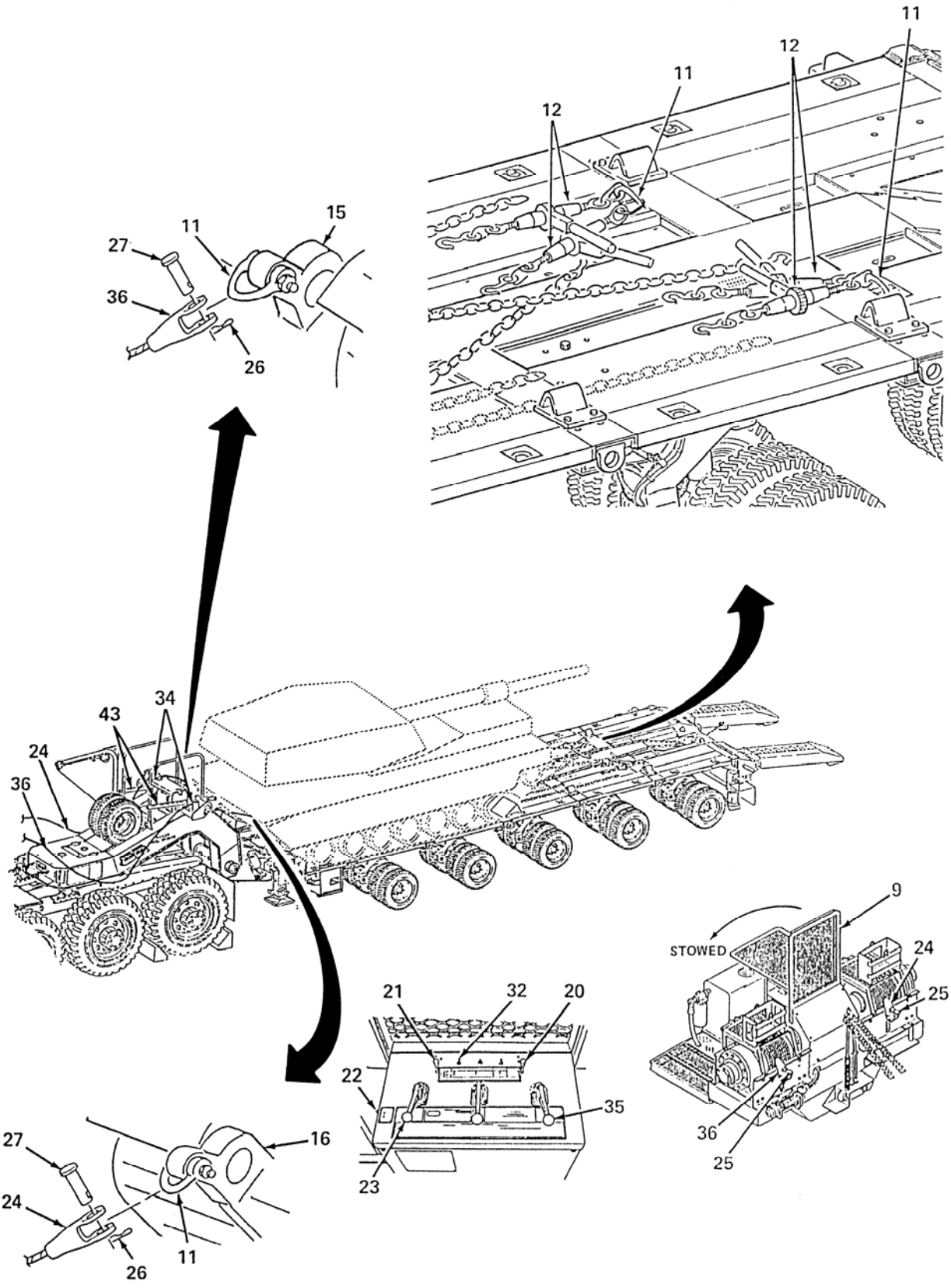
Failure to extend safety rail while attaching or removing payload winch cable may cause injury to personnel.

(11) Unlatch and extend gooseneck safety rail (43).

(12) Install one large shackle (11) each to upper right recovery eye (16) and upper left recovery eye (15).

(13) Pull out passenger side winch cable (24) and attach clevis to shackle (11) on payload upper right recovery eye (16). Secure winch cable (24) by installing shouldered pin (27) and cotter pin (26).

(14) Pull out drivers side winch cable (36) and attach clevis to shackle (11) on payload upper left recovery eye (15). Secure winch cable (36) by installing shouldered pin (27) and cotter pin (26).


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2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

(15) Route both cables through gooseneck cable guides (34). Take slack out of cables.

CAUTION

Failure to retract and latch gooseneck safety rail before operating tractor/trailer will result in damage to equipment.

(16) Retract and latch gooseneck safety rail (43).

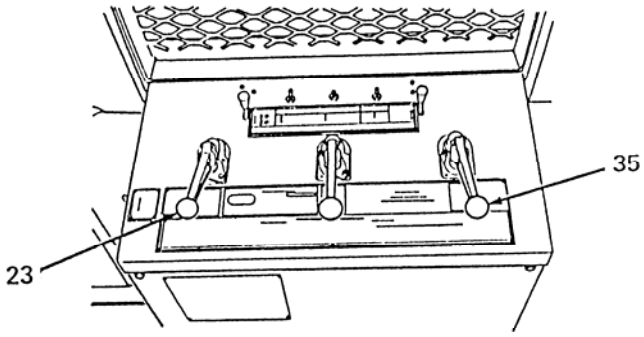
(17) Perform steps (23) thru (28) of paragraph 2-26a to adjust platform height, adjust and lower ramps, and position remaining curb guides.

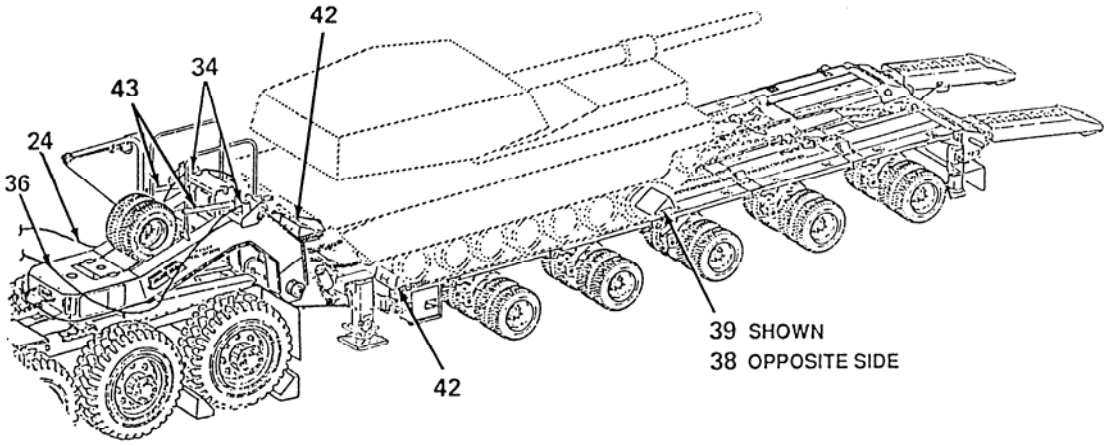
(18) With winches in low speed, winch operator must push down on both DRIVERS SIDE WINCH lever (35) and PASSENGER SIDE WINCH lever (23) to move payload slightly forward and reduce pressure on rear payload chocks (38 and 39). Release levers. Using crowbar, if necessary, remove both rear payload chocks (38 and 39) and position just in front of bogie #4.

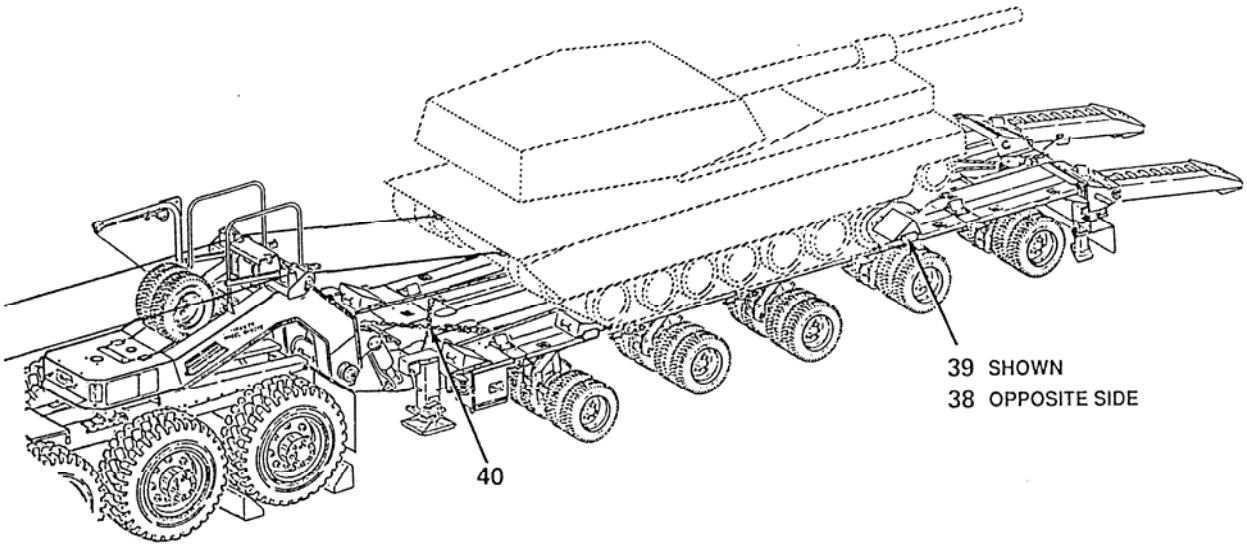
(19) Winch operator must pull up on both levers (23 and 35) to allow payload to roll back until firmly in contact with rear payload chocks (38 and 39). Release both levers (23 and 35).

(20) Disconnect front tiedown chains (40) from payload.

(21) Winch operator must push down both DRIVERS SIDE WINCH lever (35) and PASSENGER SIDE WINCH lever (23) to pull payload slightly forward off of rear payload chocks (38 and 39). Remove rear payload chocks.


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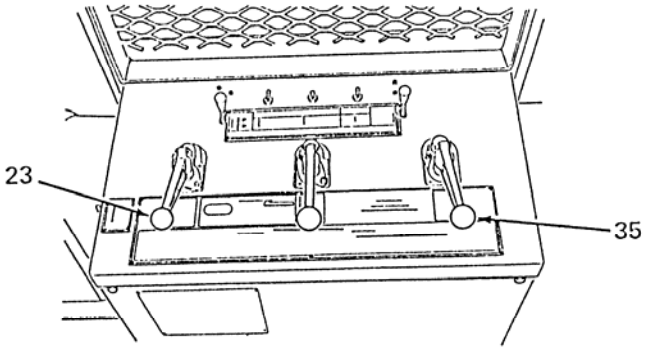

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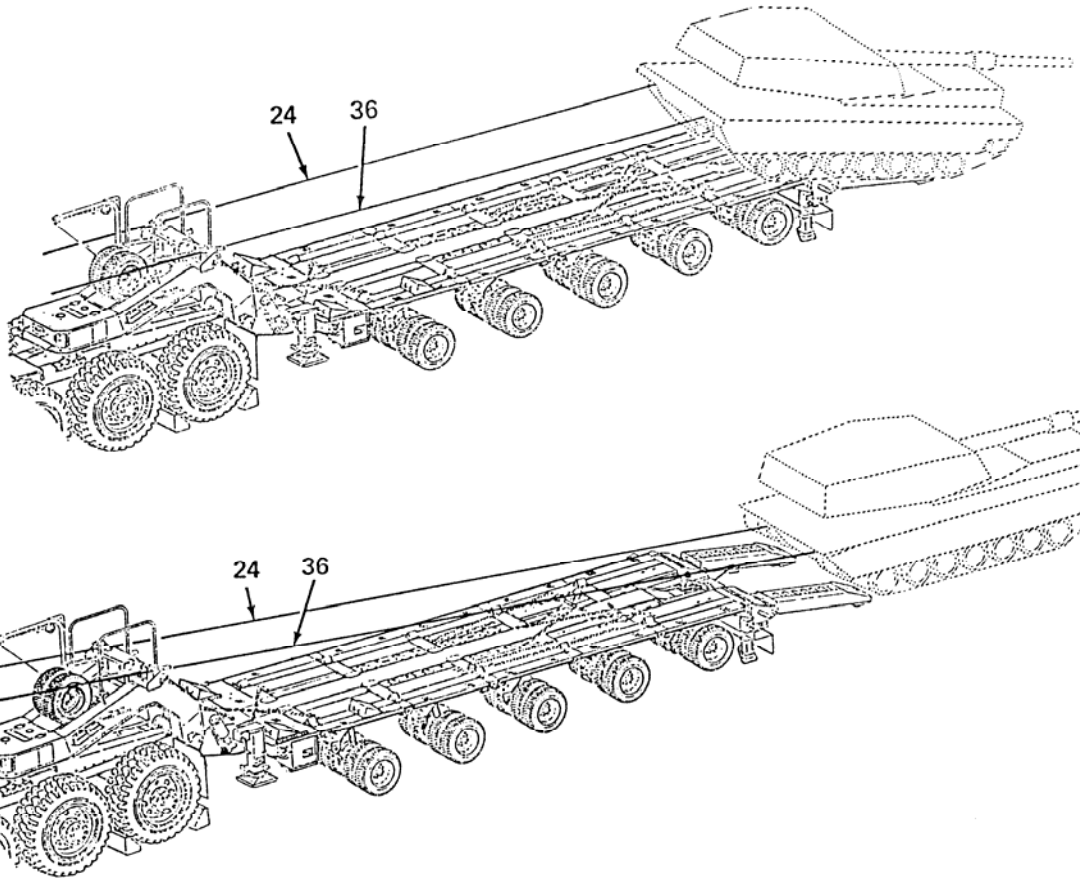

39 SHOWN
38 OPPOSITE SIDE
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2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

(22) Winch operator must pull up on both DRIVERS SIDE WINCH lever (35) and PASSENGER SIDE WINCH lever (23) to evenly pay out cables (24 and 36) and allow payload to roll off of semitrailer.

(23) Once payload clears curb guides, ensure that it rolls straight down ramps. Pay out cables unevenly if necessary for directional control.





WARNING

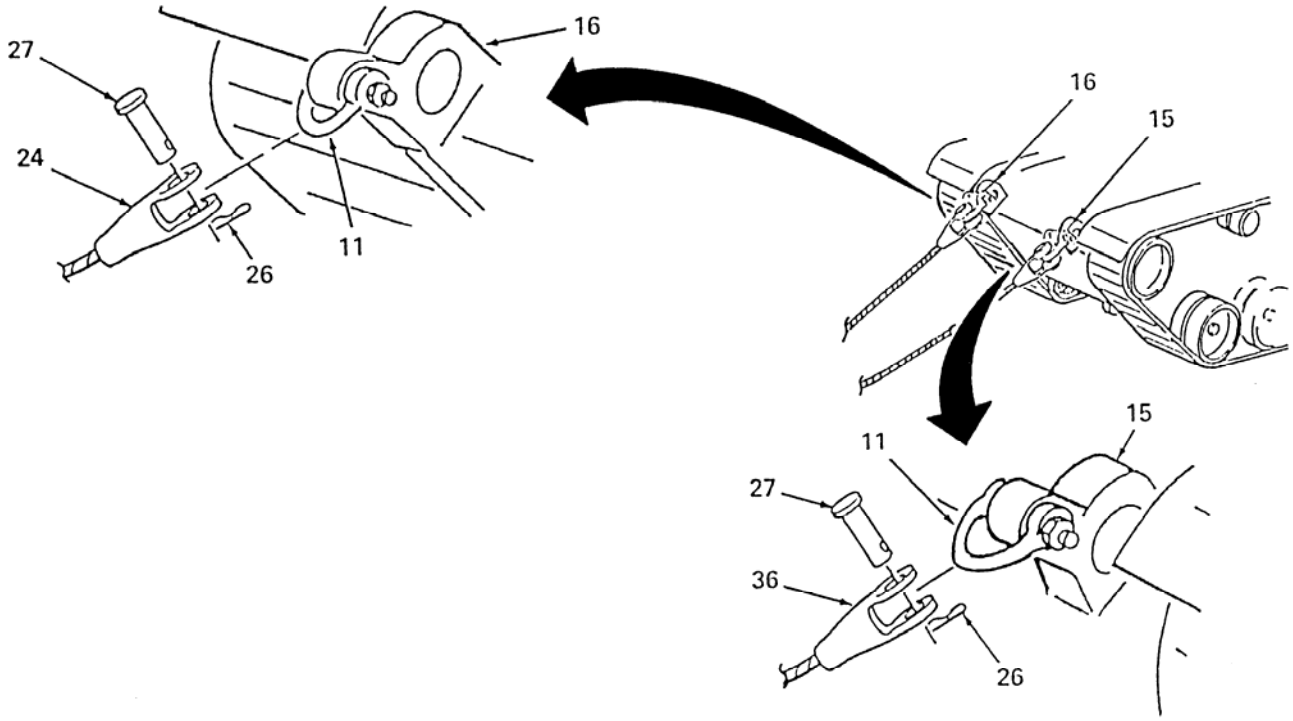
Prior to removing winch cable from payload, winch operator must be sure the winch cables have enough slack to relieve tension in the cable or injury to personnel may result.

(24) Winch operator must continue to pay out both winch cables (24 and 36) until cables are touching platform. Release levers (23 and 35).

WARNING

Extreme caution must be used when removing winch cables from payload. Cable may be under tension or be twisted. If winch cable has tension when removed, slowly and carefully, using both hands, rotate cable to relieve tension. Do not allow cable to twist or whip freely or injury to personnel may result.

(25) Check for twist in both winch cables. Remove cotter pins (26) and shouldered pins (27) from clevises on both drivers and passenger side winch cables (36 and 24) and remove cables from shackles (11) on both upper recovery eyes (15 and 16) on payload.



2-27. DUAL WINCH LOADING AND UNLOADING (CONT)

(26) Push ENGINE SPEED CONTROL switch (32) to HIGH ENGINE IDLE. Momentarily push ENGINE SPEED CONTROL switch (33), to lock engine speed at high idle (approximately 1500 rpm), and then release switch. Push WINCH SPEED CONTROL switch (37) to HIGH.

(27) Remove drivers side winch cable (36) from gooseneck cable guide (34). Leave cable on platform.

(28) Remove passenger side winch cable (24) from gooseneck cable guide (34). Leave cable on platform.

WARNING

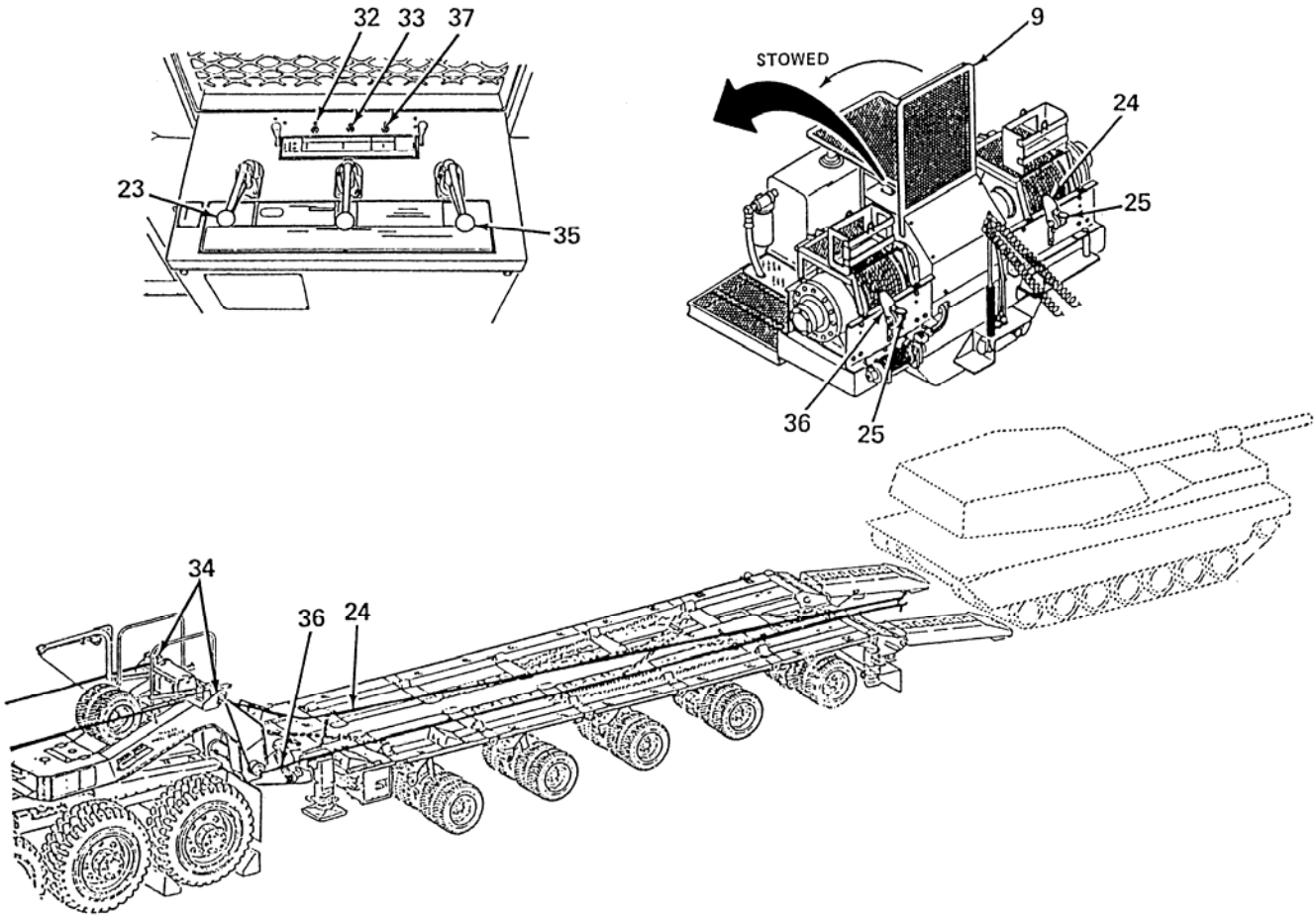
Do not allow hands to get between clevis and winch or injury to personnel may result.

(29) Using one person to push down on DRIVERS SIDE WINCH lever (35) and one person to maintain tension on drivers side winch cable (36), retract and stow winch cable (36) onto stow hook (25). Release lever (35).

(30) Using one person to push down on PASSENGER SIDE WINCH lever (23) and one person to maintain tension on passenger side winch cable (24), retract and stow winch cable (24) onto stow hook (25). Release lever (23).

(31) Pull ENGINE SPEED CONTROL switch (32) to LOW ENGINE IDLE. Lower guard (9) and lock in place.

(32) Remove all chains and load binders from platform and restow in platform storage compartment. Perform steps (20) thru (34) of paragraph 2-26b to stow equipment used during this procedure and prepare tractor and semitrailer for transport.


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2-28. DELETED

ALL DATA ON PAGES 2-163 THRU 2-201 DELETED.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

PARA. NO.	TITLE
2-29.	Fording
2-30.	APU Jump Start
2-31.	Arctic Weather APU Starting
2-32.	Operation On Grades
2-33.	Brake Caging/Uncaging
2-34.	Operation With Disabled Bogie
2-35.	Parking Loaded Semitrailer
2-36.	ISO Container Lock Brackets
2-36.1.	Deleted
2-37.	Disabled Loading Ramp Recovery

2-29. FORDING

WARNING

Failure to adhere to the following warnings may result in injury to personnel or damage to equipment:

Do not enter water at more than walking speed 5 mph (8 kph) with an entrance or exit slope of more than 15 percent.

Do not enter water deeper than 28 inches (71 cm) including wave height.

Do not enter water which has ice or debris on surface.

Always check the stream bottom to determine that it is firm enough to support the semitrailer and that there are no obstacles under water.

Do not enter water which has a current velocity of more than 5 mph (8 kph). This is equivalent to 7 feet per second (2 m/s).

The M1000 is not NBC survivable because of the large number of components and materials that are either non-decontaminable or lack sufficient hardness to survive conventional decontamination procedures. Such materials include rubber tires, hoses, mud flaps, and latches; polyester and urethane foams used for insulation; uncovered auxiliary power unit; hydraulic system components; electrical wiring harness; and lubricants. These materials will absorb and desorb agents which will present a contact and vapor hazard. The integrity of these materials will also be reduced when exposed to certain agents and decontaminants.

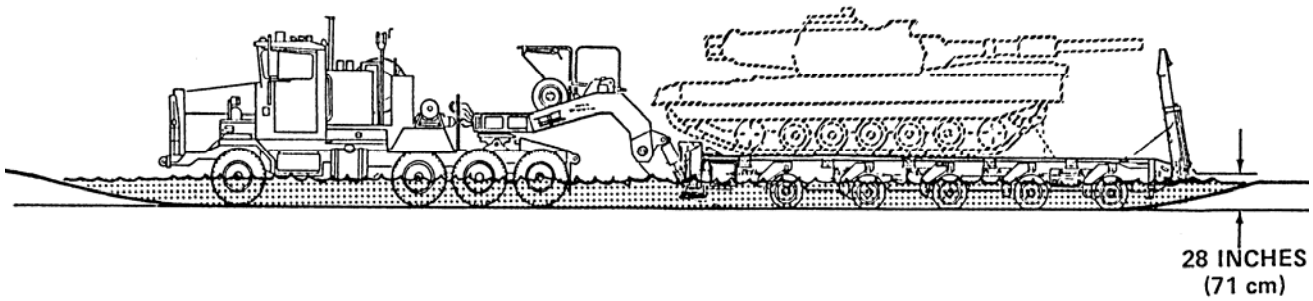
CAUTION

If tractor/semitrailer combination becomes mired (stuck) in mud or soft sand, recovery must be achieved by pulling forward. If the combination is pulled rearward, from the rear of the semitrailer, the bogies will tend to dig in deeper, and severe damage to equipment may result.

NOTE

If tractor becomes mired (stuck) while the semitrailer is still on solid surface, recovery may be achieved by pulling rearward, from the rear of the semitrailer, using a recovery vehicle.

a. No special preparation of semitrailer is required prior to fording.



b. Check both entry and exit slopes for maximum angles of 15 percent. Check both slopes for excessive or high breakovers.

c. Check bottom of stream to be sure that it is firm enough to support semitrailer and is free of underwater obstacles.

d. Enter water as perpendicular to stream as possible.

e. Keep tractor/semitrailer combination in as straight a line as possible.

f. Maintain an even speed.

g. Exit stream as perpendicular to stream as possible.

h. When clear of stream and on level terrain, make several gradual stops to clear water from brakes and to be sure brakes work properly.

i. No special maintenance of semitrailer is required after fording; however, suspension and steering components should be scheduled for lubrication as soon as practical.

2-30. APU JUMP START

When the APU battery has been discharged to a point where it cannot start the APU, proceed as follows:

a. Perform steps (1) thru (5) of paragraph 2-16a to ensure that APU is ready to be started.

WARNING

Remove all jewelry such as rings, dog tags, bracelets, etc., when jump starting APU. Wearing jewelry may result in electrical shock and injury to personnel.

Storage batteries give off hydrogen gas which is extremely explosive. Keep all open flames, sparks, and smoking materials away from batteries while connecting for jump start or injury to personnel may result.

b. If tractor is coupled to semitrailer, start tractor engine and open battery box. If tractor and semitrailer are not coupled, position tractor near gooseneck to where tractor batteries are approximately 15 to 20 feet (4.5 to 6.0m) from APU jump start cable storage bag (1). Keep tractor engine running and open tractor battery box.

c. Loosen drawstring of cable storage bag (1) and pull out jumper cables (2 and 3). The negative (-) cable (3) is approximately 9 feet (2.75m) in length and has a black clamp on the end. The positive (+) cable (2) is 28 feet (8.5m) in length and has a red clamp on the end.

NOTE

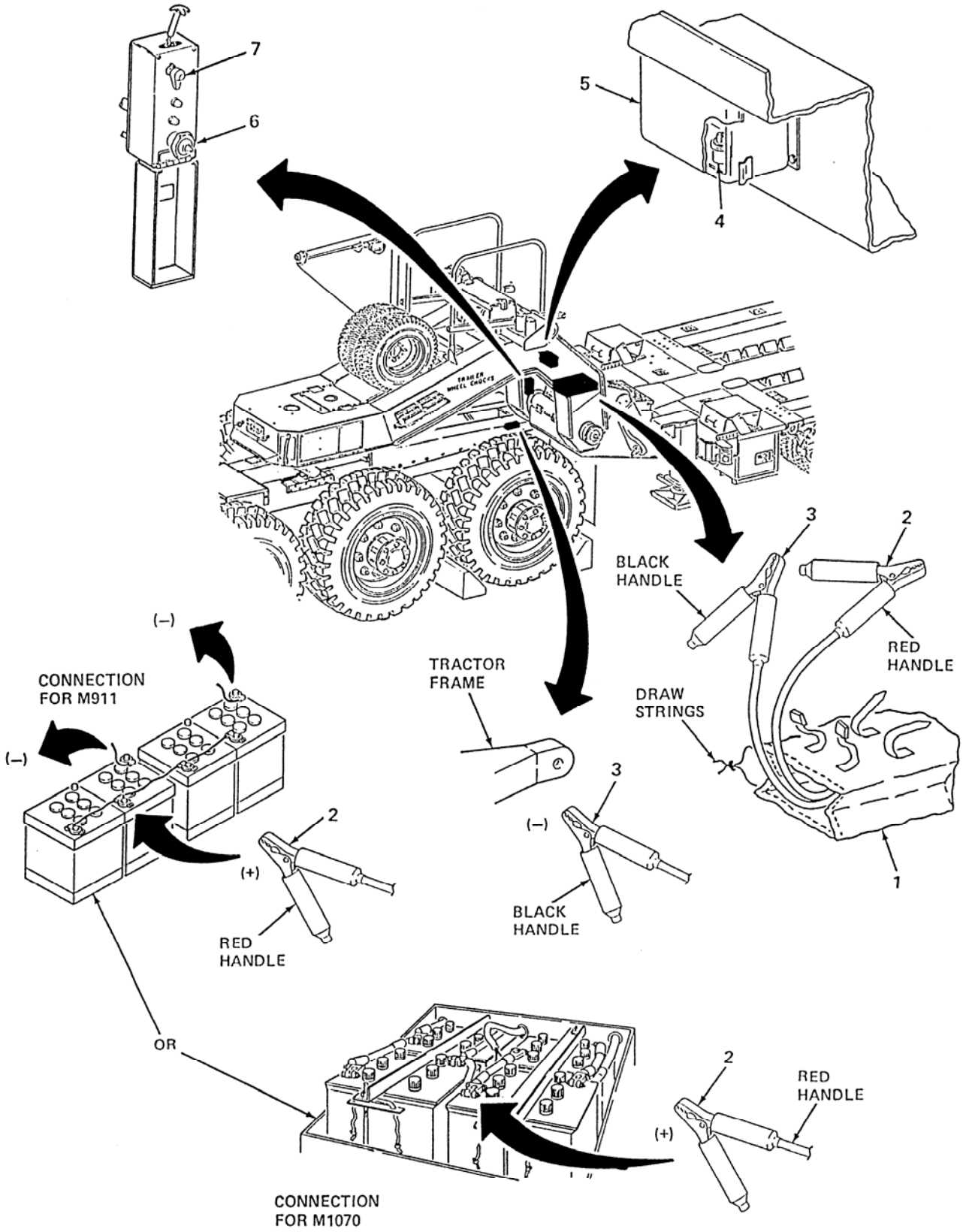
The tractor operates on 12-Vdc and 24-Vdc systems. Two tractor batteries are connected in a series for the 24-Vdc requirements, and two tractor batteries are connected in parallel for the 12-volt requirement. The APU electrical system requires only 12 Vdc, and the jump start system electrical box will not permit more than 12 Vdc to be applied to the APU. The positive (red) clamp of the APU jumper cable must be connected only to a 12-Vdc output.

d. Connect positive (red) clamps on cable (2) to positive (+) terminal on either of tractor batteries that have their positive (+) terminals connected together (parallel connections).

e. Connect negative (black) clamp on cable (3) to frame of tractor and ensure a good connection.

f. Press switch (4) on electrical box (5). If system is installed correctly, an audible click will be heard from inside electrical box.

g. Open cover on APU control box. Press knob and pull throttle control (6) full outboard.


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BLACK HANDLE
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2
RED HANDLE
DRAW STRINGS
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TRACTOR FRAME
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(–)
BLACK HANDLE
(–)
CONNECTION FOR M911
(–)
2
(+)
RED HANDLE
OR
2
RED HANDLE
(+)
CONNECTION FOR M1070

2-30. APU JUMP START (CONT)

WARNING

Hearing protection is required within 10 feet (3m) of the APU when the APU is running or injury to personnel may result.

h. Turn APU control box START switch (7) clockwise momentarily to see if starter will crank.

(1) If starter cranks, immediately rotate START switch (7) to OFF position and perform steps (8) thru (10) of paragraph 2-16a.

(2) If starter does not crank, rotate START switch (7) to OFF position and check jumper cables for proper connection.

(3) After checking connections, repeat steps f thru h.

i. After APU starts, disconnect negative (black) clamp on cable (3) from tractor frame, and disconnect positive (red) clamp on cable (2) from tractor batteries. Close battery box on tractor. Coil cables (2 and 3) and stow in stowage bag (1). Tighten drawstring on stowage bag (1).

2-31. ARCTIC WEATHER APU STARTING

NOTE

The following procedure is a timed sequence of events necessary to start the APU in arctic weather conditions. Read this procedure and strictly adhere to the steps or starting may be harder because of loss of time and exposure to cold temperatures.

APU arctic starting is accomplished in two methods. The first method of starting, without using swingfire heater, can be accomplished from 0°F to -25°F (-18°C to -31°C). The second starting method can be accomplished from -25°F to -50°F (-31°C to -46°C). The use of the swingfire heater, if available, is addressed in this procedure.

a. Perform steps b thru f of paragraph 2-30 to connect APU jump start system.

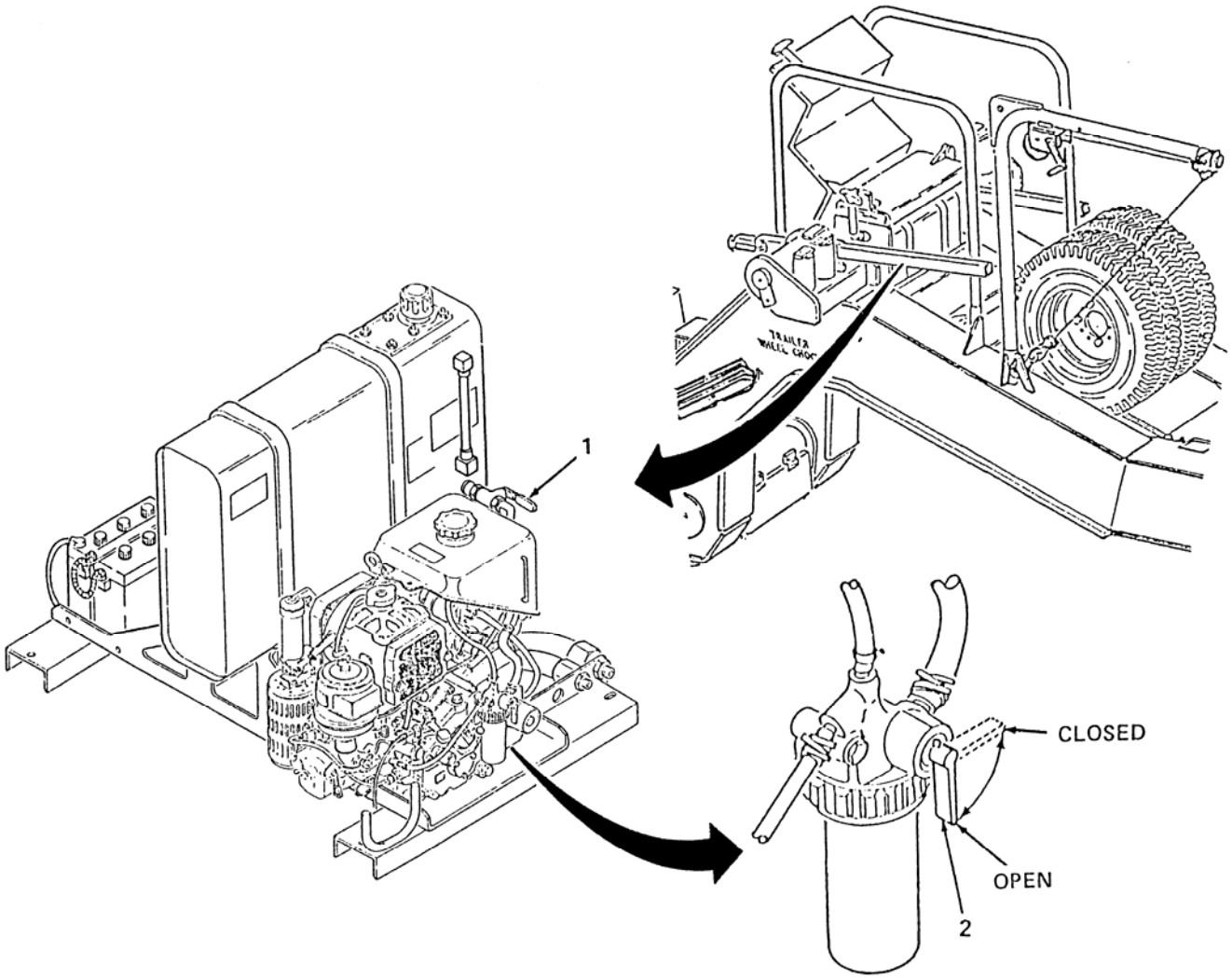
b. At rear of gooseneck, gain access to APU (para. 2-13, step c) and prepare APU for arctic starting as follows:

CAUTION

The hydraulic tank oil valve must be open prior to starting the APU or severe damage to the hydraulic pump will result.

(1) Open hydraulic tank oil valve handle (1), in line with valve body.

(2) Check that fuel petcock (2) is in open position, handle in line with filter body.



NOTE

If it is determined that the swingfire heater is going to be used, the gooseneck step section should be lowered to help contain heat applied by swingfire heater. If swingfire heater is not going to be used, skip steps c, d, and e and proceed with step g.

c. If swingfire heater is going to be used, lower and secure gooseneck step section (para. 2-13, step c).

d. If temperatures are between -25°F to -50°F (-31°C to -46°C), preheat APU crankcase (from underside of gooseneck) using swingfire heater if available as follows:

2-31. ARCTIC WEATHER APU STARTING (CONT)

CAUTION

While using the swingfire heater, the heater must be moved (played) back and forth in a constant motion and kept within 7 to 10 inches (17 to 25 cm) from the bottom of the APU crankcase or damage to equipment may result.

Do not allow swingfire heater to sit in one spot. Heat any hydraulic lines or diesel fuel line, or heat electrical wiring that may be in the general area of the APU. Use caution when operating swingfire heater such that only the APU crankcase is directly heated or severe damage to equipment may result.

(1) Preheat APU crankcase by keeping nozzle of swingfire heater approximately 7 to 10 inches (17 to 25 cm) away from bottom of crankcase and continually moving nozzle back and forth for a minimum of 15 minutes.

(2) Proceed with step e below.

e. If heating was performed using swingfire heater, gain access to APU by raising step section (para. 2-13, step c).

f. If outside temperature is above -25°F (31°C), proceed to step g below. If outside temperature is between -25°F to -50°F (-31C to -46°C), proceed as follows:

(1) Open decompression valve by pulling up and holding on decompression valve handle (3).

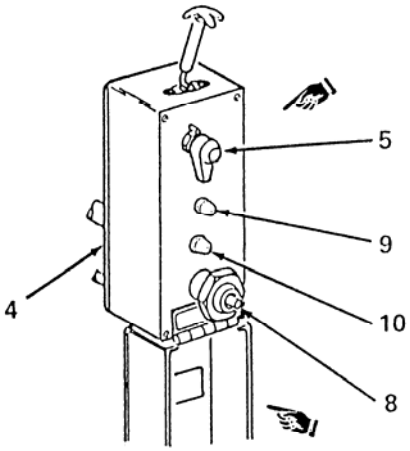
(2) Second person must open cover to APU control box (4), turn APU START switch (5) to START position, and hold for approximately 2 minutes or until APU is cranking over at normal cranking speed, and then release APU START switch (5).

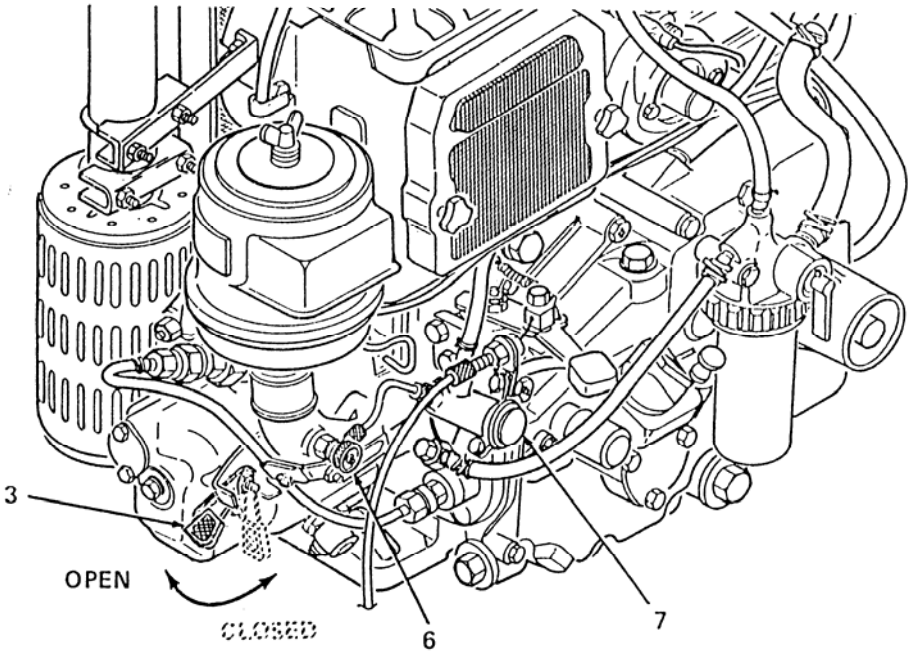
(3) With jet start petcock (6) closed, prime jet start valve (7) by pulling full out. Ensure that it stays out.

NOTE

On APU with APU engine serial number 504697 and subsequent, the glow plug indicator is changed from a glow-type indicator to a lamp driven by a timer.

(4) Second person must turn knob of APU throttle control (8) counterclockwise until fully outward. Second person must turn APU START switch (5) to GLOW position and hold until glow plug indicator (glow type) (9) illuminates brightly (15 to 20 seconds) or until glow plug indicator (lamp) (9) goes out (5 seconds).





(5) While holding decompression valve handle (3) open (up), second person must turn APU START switch (5) to START position and hold. As APU cranks over, slowly lower decompression valve handle (3). Once APU is at normal cranking speed, release decompression valve handle (3). Turn jet start petcock counterclockwise to open and pump jet start valve three times to prime APU. A few additional pumps may be necessary for the APU to run smoothly. Second person must hold APU start switch to START position until engine is running smoothly; then, return it to OFF.

(6) If APU starts, proceed to step o below. If APU does not start, repeat steps (1) thru (5) above. If APU fails to start after three attempts, notify unit maintenance.

2-31. ARCTIC WEATHER APU STARTING (CONT)

g. With jet start petcock (6) closed, prime jet start valve by pulling full out. Ensure that it stays out.

h. On curbside of gooseneck, second person must open cover on APU control box (5).

i. Second person must pull knob of APU throttle control (8) fully outward.

NOTE

On APU with APU engine serial number 504697 and subsequent, the glow plug indicator is changed from a glow-type indicator to a lamp driven by a timer.

j. Second person must turn APU START switch (5) to GLOW position and hold until glow plug indicator (glow type) (9) illuminates brightly (15 to 20 seconds) or until glow plug indicator (lamp) (9.1) extinguishes (5 seconds).

CAUTION

Do not exceed 30 seconds continuous cranking with decompression valve closed or damage to starter may result. Allow starter to cool down for at least 2 minutes between each 30-second cranking or damage to the starter may result.

k. Second person must turn start switch (7) to START position and hold for approximately 30 seconds.

l. Once APU engine starts to turn over, pump jet start valve (7) three times to prime APU.

m. When APU engine is running smoothly, turn jet start petcock (6) clockwise to close. Lower and secure step section (para. 2-13).

n. If APU starts and/or fails to start, proceed as follows:

(1) If APU starts, proceed to step o of this procedure.

(2) If APU does not start, repeat steps g and m two more times maximum.

(3) If APU still does not start, lower and secure step section (para. 2-13, step c) and repeat steps d thru m above as required for proper temperature range to which tractor/semitrailer is exposed.

(4) If APU fails to start after three attempts, notify unit maintenance.

o. Once APU starts, check oil pressure indicator light (10) as follows:

(1) If oil pressure indicator light (10) does not come on, proceed to step p below.

(2) If oil pressure indicator light (10) does not go out when APU starts and runs for approximately 30 to 45 seconds, shut down APU by pushing throttle control (8) all the way in. Close cover on APU control box (4), and notify unit maintenance.

CAUTION

Cold weather, especially arctic conditions, adversely affects the semitrailer hydraulics in areas of gage readings and hydraulic filter indicator. During initial startup, gages will maintain higher than normal pressure readings and the filter indicator will read in the red. Ample time must be given for the APU and hydraulic fluid to warm up before operating the hydraulic system or damage to equipment may result.

During initial starting, the hydraulic filter indicator will read in the red zone. The red zone means the filter is clogged and filter bypass is occurring. Filter clogging at this point is because hydraulic fluid viscosity is extremely high due to cold temperatures and will decrease as the APU warms and hydraulics begin to operate. Do not operate any hydraulic controls until APU has had time to warm up or damage to equipment may result.

2-31. ARCTIC WEATHER APU STARTING (CONT)

CAUTION

During initial starting, the hydraulic system pressure gage can read as high as 2,200 psi (15,169 kPa). As the APU runs/warms up, pressure ranges will start and continue to decrease. Do not operate the hydraulic controls until the APU has had time to warm up or damage to equipment may result.

p. Allow APU to run for 20 minutes. If outside temperatures range from -25°F to -50°F (-31°C to -46°C), filter indicator and hydraulic pressure gages will not approach normal operating parameters until semitrailer has been pulled/towed for a couple of hours. Periodically check that pressure gage and filter indicators are approaching normal conditions. If indicators gradually decrease/return to normal operating ranges, APU is ready for normal operation.

q. Perform step i of paragraph 2-30 to disconnect and stow APU jump start cables.

2-32. OPERATION ON GRADES

CAUTION

Because of the length of the tractor/semitrailer combination, one or more bogies will be lifted off of the ground when approaching or cresting a grade which is more than 15 percent. The semitrailer suspension must be adjusted during these operations to ensure that all bogies maintain contact with the ground. This provides better stability when the semitrailer is loaded and reduces strain on the platform and suspension.

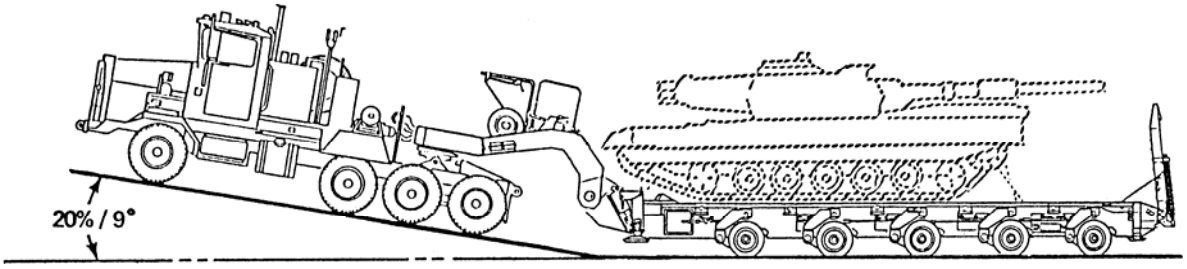
Maximum grade for fully loaded semitrailer is 20 percent. Grades up to 30 percent may be negotiated, provided the payload does not exceed 50,000 pounds (22,700 kg). Do not exceed 30 percent grade. Exceeding these limitations may cause serious damage to the semitrailer.

a. Approaching an uphill grade.

(1) Stop tractor/semitrailer combination before reaching grade.

(2) Lower platform (para. 2-19) to minimum suggested height (1 inch of suspension cylinder plunger/piston exposed).

(3) Pull onto grade.



2-32. OPERATION ON GRADES (CONT)

(4) If grade crest will be reached, proceed to paragraph 2-32b. If grade crest will not be reached, stop and raise platform (para. 2-19) to normal height of 43 inches (109 cm).

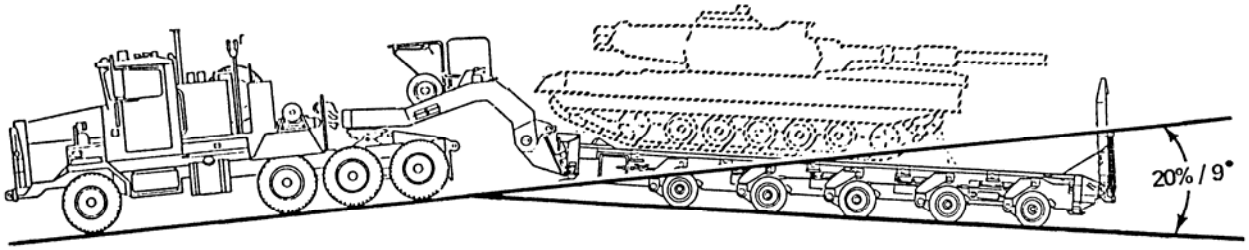
b. Cresting an uphill grade.

(1) Stop tractor/semitrailer combination before cresting grade.

(2) Raise platform (para. 2-19) to maximum suggested height of 50 inches (127 cm).

(3) Proceed over crest of grade.

(4) When semitrailer has crested grade, stop and lower platform (para. 2-19) to normal height of 43 inches (109 cm).

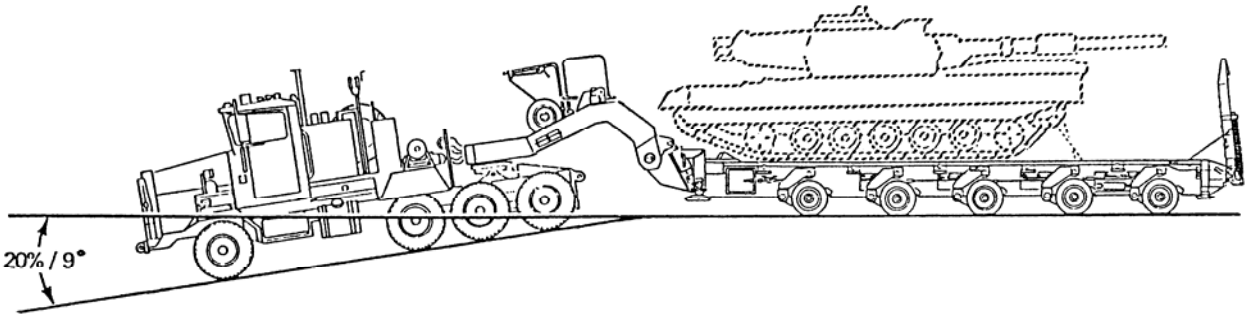


c. Approaching a downhill grade.

(1) Stop tractor/semitrailer combination before reaching grade.

(2) Raise platform (para. 2-19) to maximum suggested height of 50 inches (127 cm).

(3) Proceed down grade.



(4) If tractor/semitrailer combination will approach level ground, proceed to paragraph 2-32d. If tractor/semitrailer will not approach level ground, stop and lower platform (para. 2-19) to normal height of 43 inches (109 cm).

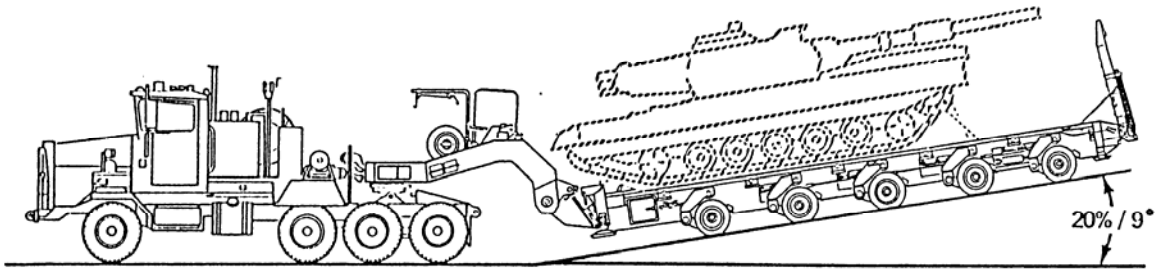
d. Approaching level ground from downhill grade.

(1) Stop tractor/semitrailer combination before reaching level ground.

(2) Lower platform (para. 2-19) to minimum suggested height (1 inch of suspension cylinder plunger/piston exposed).

(3) Pull onto level ground.

(4) When semitrailer is fully on level ground, stop and raise platform (para. 2-19) to normal height of 43 inches (109 cm).



2-33. BRAKE CAGING/UNCAGING

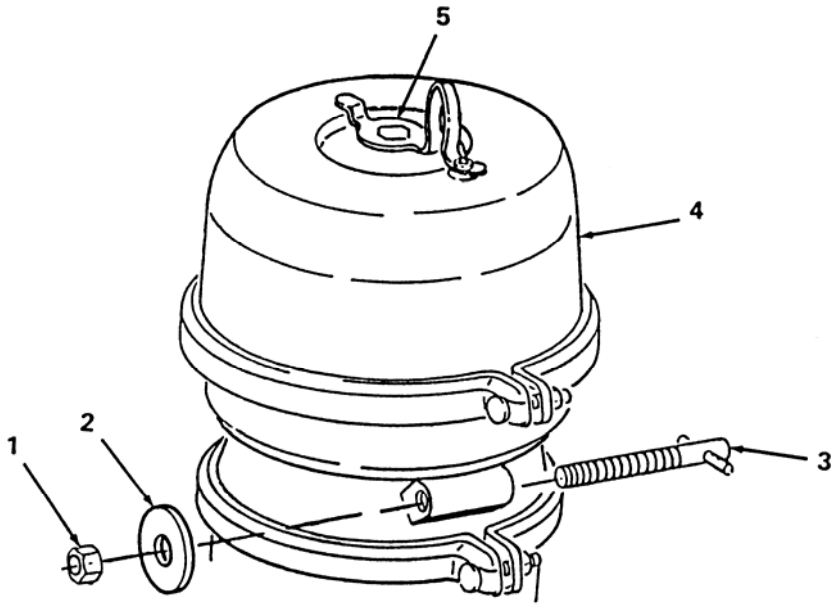
NOTE

This procedure is to be used to release the brakes in the event of system failure, tire changing, or operation with a disabled bogie due to air brake problems.

a. Make sure semitrailer is parked on level ground and front bogie wheels are chocked. If semitrailer is coupled to a towing vehicle, apply towing vehicle parking brakes.

2-33. BRAKE CAGING/UNCAGING (CONT)

b. Remove nut (1), washer (2), and caging bolt (3) from brake chamber (4).



c. Remove dust plug (5) from hole in brake chamber (4) and move dust plug aside. Check hole for caked mud and clean if necessary.

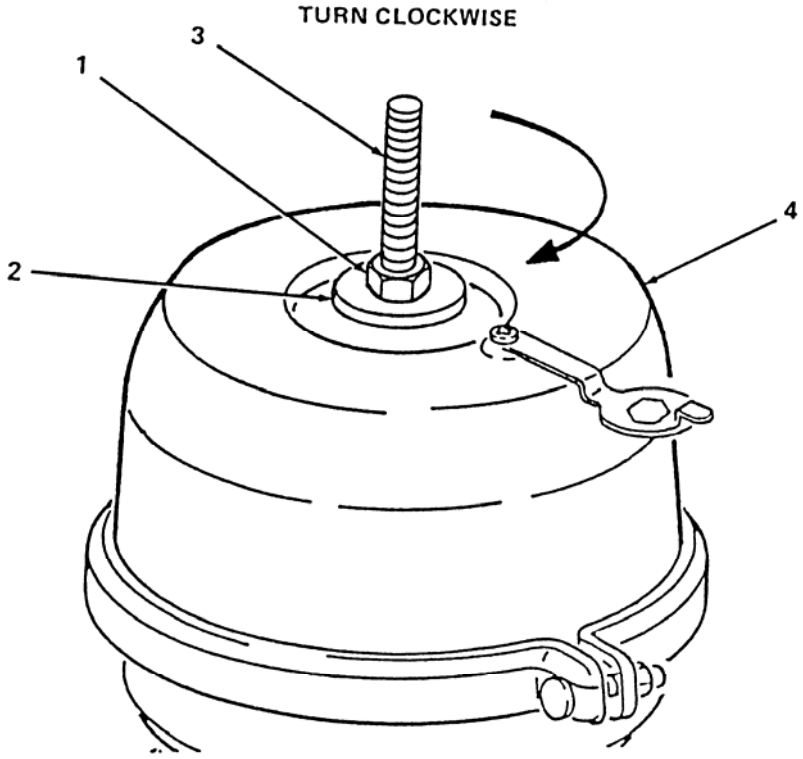
d. If air pressure is available, release semitrailer brakes to compress spring brake. This will reduce effort required to cage brakes.

e. Insert key end of caging bolt (3) as far as possible into brake chamber (4). Once bottomed out, rotate caging bolt (3) clockwise until it stops and locks into place.

f. While pulling slightly on caging bolt (3), install washer (2) and nut (1). Hand tighten nut (1) until it contacts brake chamber (4).

g. After contact, using 10-inch adjustable wrench (item 43, appx. C), tighten nut (1). As nut is tightened, caging bolt (3) will draw on parking brake spring assembly and cage (release) the brakes.

h. Visually check brake shoes for contact with brake drum. If there is no apparent contact, brakes are caged. If there is still contact, continue turning nut (1) clockwise until brake shoe contact with brake drum is broken.



NOTE

While trying to remove nut from caging bolt, the caging bolt may become unseated from brake chamber and pull out. If the caging bolt comes out, remove nut and washer from caging bolt by hand.

i. If air pressure is available, release semitrailer brakes to compress spring brake. This will reduce effort required to uncage brakes.

j. To uncage brakes, turn nut (1) counterclockwise and remove nut (1) and washer (2). This will release brakes from caged position to full operating position/condition. Rotate caging bolt (3) counterclockwise and remove from brake chamber (4).

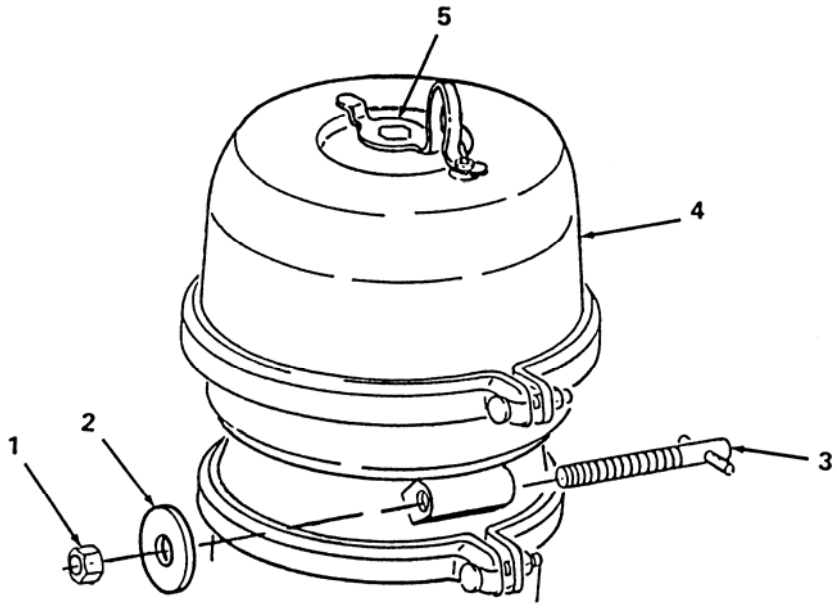
2-33. BRAKE CAGING/UNCAGING (CONT)

k. Reinstall dust plug (5) into opening in top of brake chamber (4). Make sure dust plug is properly seated in brake chamber.

NOTE

Make sure the caging bolt is returned to its stowed position on the brake chamber with the key end properly positioned.

l. Insert caging bolt (3) back into stowed position on brake chamber (4) and secure in place by installing washer (2) and nut (1).



2-34. OPERATION WITH DISABLED BOGIE

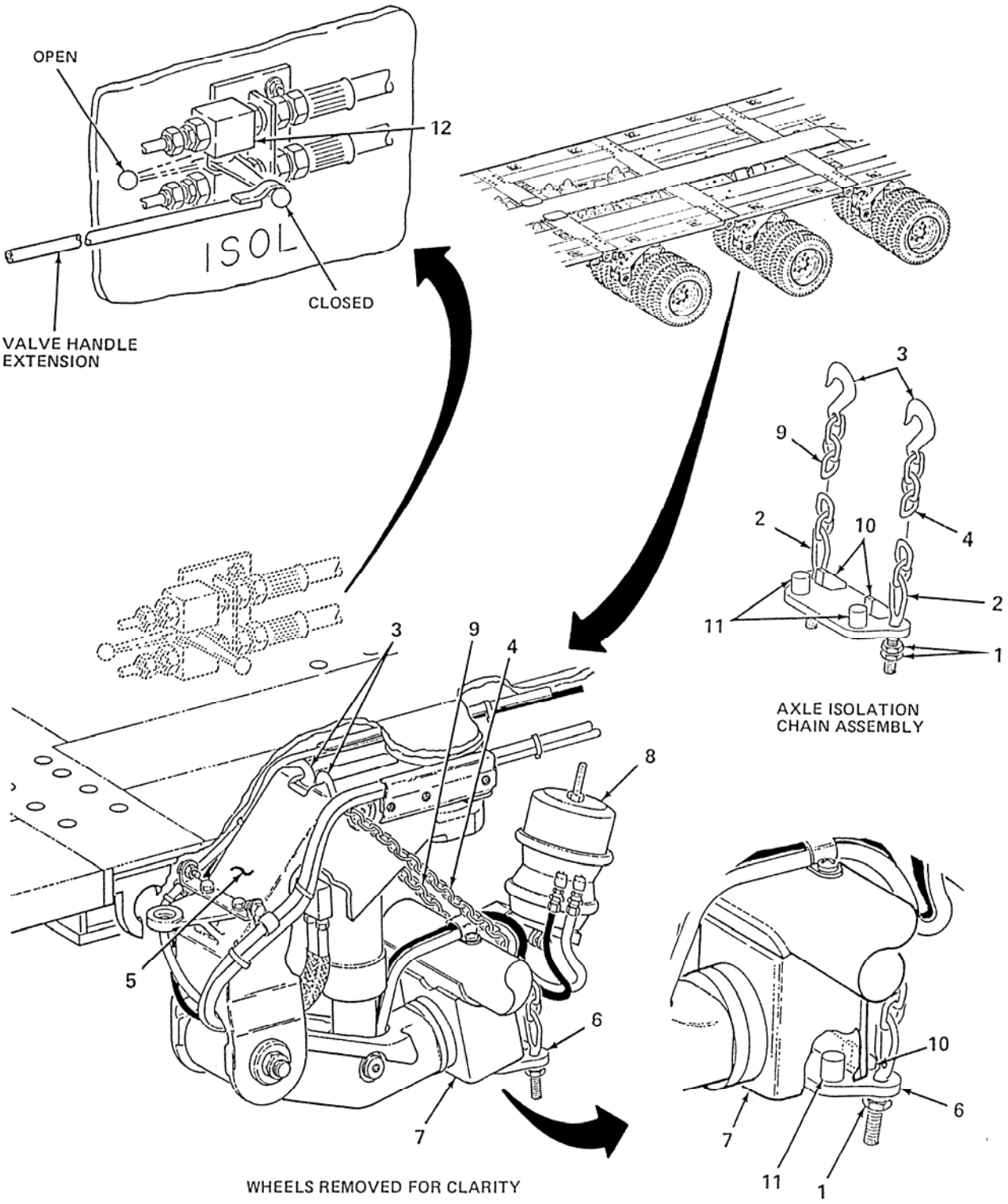
CAUTION

The tractor/semitrailer combination, either loaded or unloaded, is limited to operating with only one disabled bogie. The following procedure specifically identifies how to prepare the semitrailer for transport. If this procedure is not strictly followed, severe damage to equipment may result.

a. Refer to paragraph 2-33 and cage brakes at affected bogie.

b. Lower platform (para. 2-19) until suspension (bogie) is completely compressed.

c. Loosen and turn adjustment nuts (1) on eyebolts (2) until nuts (1) are threaded all the way down threaded portion of eyebolts (2).


OPEN
12
ISOL
CLOSED
VALVE HANDLE
EXTENSION
3
9
2
10
4
11
2
1
AXLE ISOLATION
CHAIN ASSEMBLY
3
9
4
8
5
6
7
10
6
7
11
1
WHEELS REMOVED FOR CLARITY

2-34. OPERATION WITH DISABLED BOGIE (CONT)

CAUTION

When installing the axle isolation chain assembly on the bogie, make sure that the chains do not contact any hydraulic lines or air brake hoses. Contact of chains on the lines and hoses may cause chafing or parting of lines/hoses, loss of air brake pressure, loss of hydraulic fluid, and damage to equipment.

d. Route hook (3) of streetside chain (4), along streetside of bogie between both hydraulic and air brake lines and upper suspension arm, into opening in upper suspension arm casting (5).

e. Position chain assembly bracket (6) underneath square opening of axle casting (7), making sure that streetside chain (4) is on streetside of parking brake chamber (8).

f. Route hook (3) of curbside chain (9), along curbside of bogie between both hydraulic and air brake lines and upper suspension arm, into opening in upper suspension arm casting (5).

g. Position chain assembly bracket (6) so that bottom rear edge of square axle casting (7) sits between blocks (10) and pins (11) of bracket (6).

h. Take up slack in chains by tightening adjustment nuts (1) on eyebolts (2).

WARNING

Make sure suspension isolation valve at the affected bogie is closed (handle facing outward) prior to adjusting platform height or the suspension chain can break and cause injury to personnel and damage to equipment.

i. Pull suspension valve (12) handle outboard to closed position to isolate affected bogie.

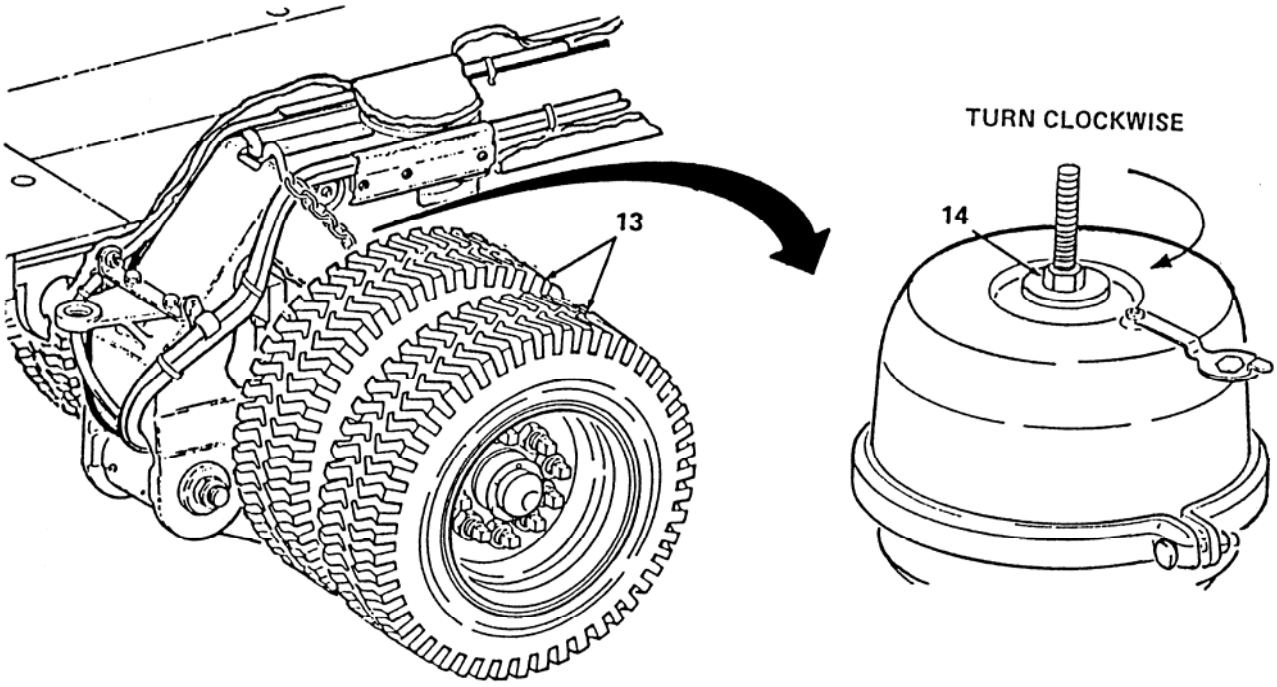
j. Except at affected bogie, ensure that all remaining suspension isolation valves (para. 2-6) are in open position (handles inboard).

k. Raise platform (para. 2-19) to normal running height of 43 inches (109 cm).

CAUTION

Brakes on the disabled bogie must be released without contacting the brake drum or damage to equipment may result.

l. Rotate dual tire assembly (13) in both directions and check for brake drag or contact with brake drum. If necessary, turn nut (14) clockwise until dual tire assembly (13) spins freely without brake drag or contact with brake drum.



WARNING

Because of minor load instability while driving with a disabled bogie, especially when carrying a payload, turning speeds must be reduced to 85 percent of the maximum safe turning speeds or injury to personnel and damage to equipment may result. (Example: A 15 mph (24 kph) maximum turn speed should be reduced to 13 mph (21 kph) maximum turn speed.)

m. The tractor/semitrailer combination with a disabled bogie, while loaded or unloaded, must be driven at reduced speeds as follows:

(1) With semitrailer tire pressure at 95 psi (655 kPa) for all tires, excluding tires on affected bogie, maximum speed must not exceed 30 mph (48 kph).

NOTE

Semitrailer tires, within the same suspension group as the affected bogie, can be inflated to 100 psi (689 kPa) to allow for a slight increase in driving ability. Suspension groups are determined using suspension controls on hydraulic control panel (para. 2-6) consisting of curbside front, streetside front, and rear.

(2) If tractor is outfitted with an external air connector to run pneumatic tools/components, proceed as follows:

(a) Inflate remaining tires in the affected suspension group, excluding tires on affected bogie, to 100 psi (689 kPa).

2-34. OPERATION WITH DISABLED BOGIE (CONT)

(b) With tire pressure at 100 psi (689 kPa) for tires within a suspension group, excluding affected bogie, maximum speed must not exceed 40 mph (64 kph).

n. Once semitrailer has reached a maintenance facility, remove isolation chain as follows:

(1) Park semitrailer, apply parking brakes, and chock wheels (para. 2-24).

(2) Lower platform (para. 2-19) until suspension (bogie) is completely compressed.

(3) Loosen and turn four adjustment nuts (1) on eyebolts (2) until nuts (1) are threaded all the way down threaded portion of eyebolts (2).

(4) Unhook two hooks (3) from opening in upper suspension arm (5). Move hooks (3) out from under hydraulic and pneumatic hoses on upper suspension arm (5).

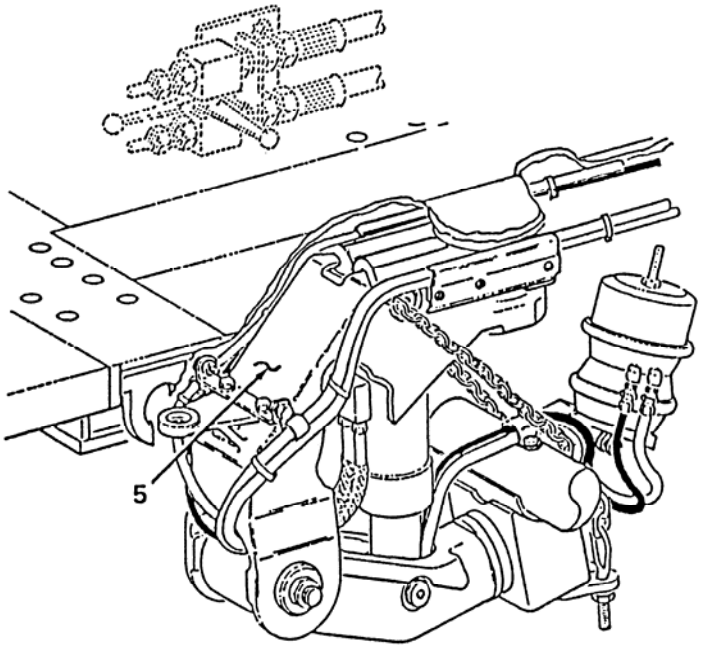
(5) Open suspension isolation valve (12), handle pushed inboard facing toward front of semitrailer (para. 2-6).

(6) Raise platform (para. 2-19) to normal running height of 43 inches (109 cm).

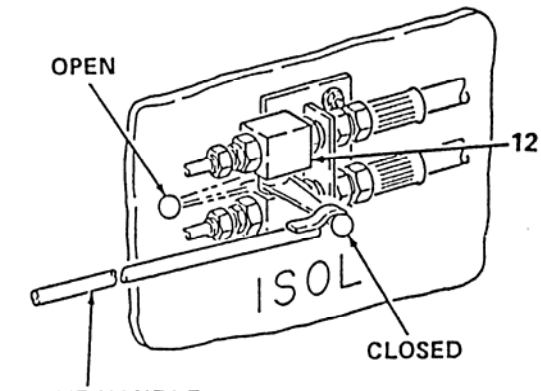
(7) Lower both front and rear support legs (para. 2-22 and 2-23).

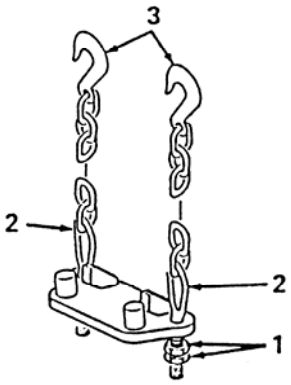
(8) Uncage brakes at affected bogie (para. 2-33).

(9) Remove axle isolation chain from bogie. Restow axle isolation chain.



WHEELS REMOVED FOR CLARITY





AXLE ISOLATION
CHAIN ASSEMBLY

2-35. PARKING LOADED SEMITRAILER

WARNING

For parking a loaded semitrailer while coupled to a tractor, perform steps a thru c or injury to personnel may result.

For parking a loaded semitrailer and uncoupling from a tractor, perform steps a thru d or injury to personnel and damage to equipment may result.

a. Apply tractor and semitrailer parking brakes.

b. Ensure semitrailer front bogie wheels are chocked in front and behind each outer set of dual tires.

c. Lower both front and rear support legs (para. 2-22 and 2-23) to support platform.

d. Uncouple tractor/semitrailer (para. 2-24) and lower gooseneck to lowest position (para. 2-18).

2-36. ISO CONTAINER LOCK BRACKETS

NOTE

Depending upon the type and quantity of containers being transported, not every International Standards Organization (ISO) container lock bracket needs to be used. Study the illustration below to determine positions and quantities of lock brackets needed to secure the type and quantity of ISO containers to be transported.

The ISO lock brackets marked "curb" and "street" have only one lug and one F-pin attached. These should always be mounted in the most forward and rearward corner positions on the platform with the lugs toward the rear. The ISO container brackets with two F-pins attached should always be used in the four center platform positions.

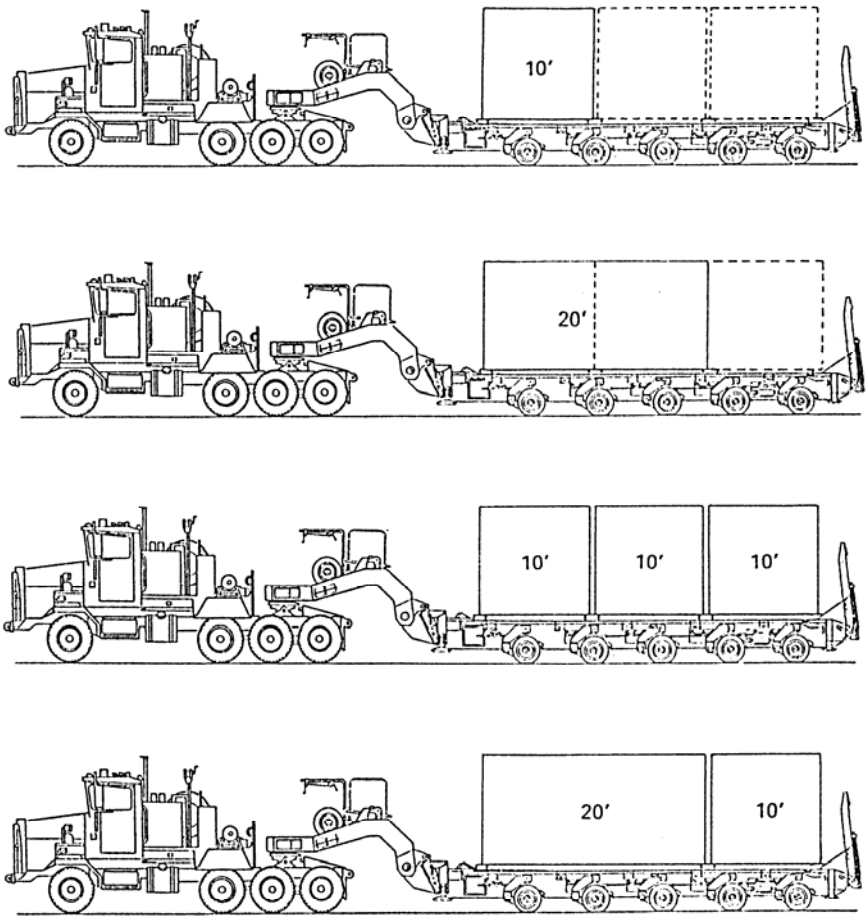
a. The semitrailer is capable of carrying the following type and quantity of ISO containers:

(1) For either a single 10-foot (3m) or 20-foot (6m) ISO container, four ISO lock brackets are required.

KEY:

—— ACTUAL LOCATIONS

----- ALTERNATE LOCATIONS



NOTE : CONTAINERS MAY BE SWITCHED

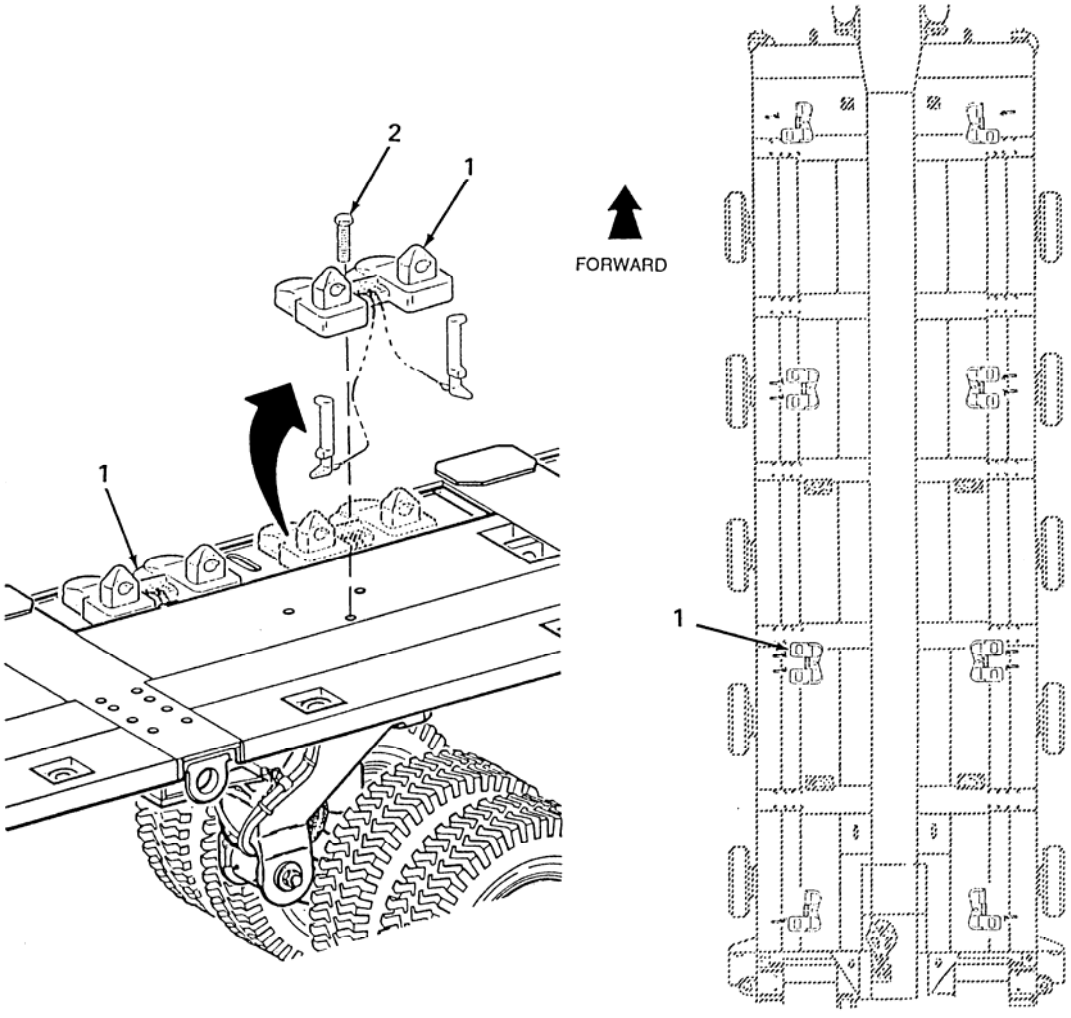
(2) For up to three 10-foot (3m) ISO containers, 8 ISO lock brackets are required.

(3) For one 20-foot (6m) and one 10-foot (3m) ISO containers, six ISO lock brackets are required.

NOTE

There is a total of eight ISO lock brackets stored on the platform. After position of ISO containers has been determined for transport, locate respective ISO lock brackets needed for proper mounting.

b. To remove an ISO lock bracket (1) from platform, remove bolt (2) and lift ISO lock bracket (1) from stowed position on platform. Remove as many ISO lock brackets as required.



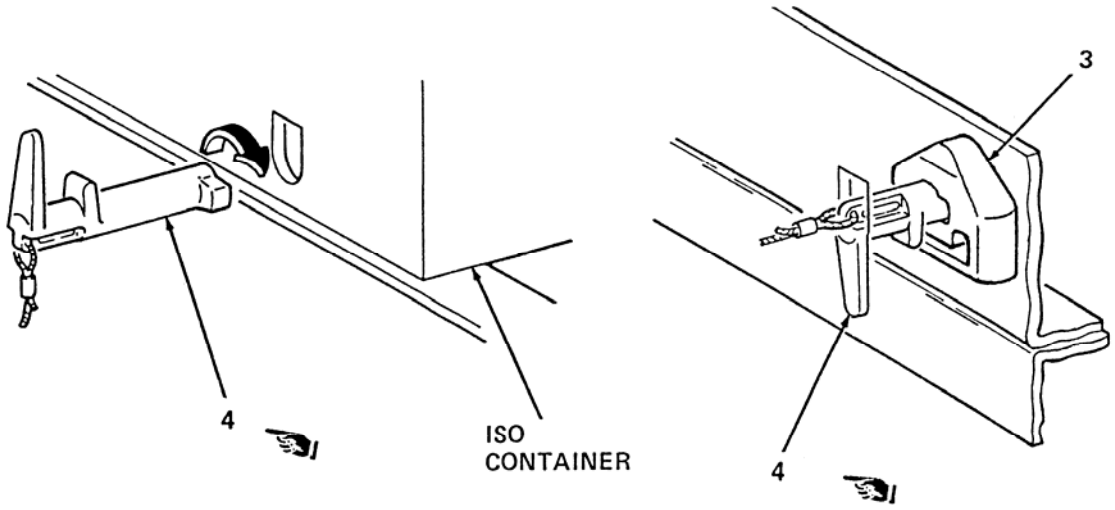
2-36. ISO CONTAINER LOCK BRACKETS (CONT)

c. Place ISO lock bracket (1) at respective points on platform as required and secure with bolt (2).

d. Aline and install ISO containers over ISO lock bracket lugs (2). Check that holes in ISO lock bracket lugs (3) are alined with holes in ISO container.

e. Secure ISO container onto platform as follows:

(1) Insert F-pin (4), small end first, through hole in ISO container and ISO lock bracket lug (3).



(2) Rotate F-pin (4) clockwise to secure ISO container.

(3) Repeat steps (1) and (2) for each ISO lock bracket lug (3) installed until all locks are secured.

f. After ISO containers have been transported, unstow ISO container as follows:

(1) Rotate F-pin (4) counterclockwise and pull pin out of both ISO container and ISO lock bracket lug (3). Repeat this step as required until all F-pins (4) are removed.

(2) Remove ISO containers from platform.

(3) Remove bolt (2) and ISO lock bracket (1) from platform. Restow ISO lock bracket (1) back in center of platform and secure with bolt (2). Repeat this step as required until all ISO lock brackets (1) are restowed.

2-36.1. DELETED

ALL DATA ON PAGES 2-225 THRU 2-227 DELETED.

2-37. DISABLED LOADING RAMP RECOVERY

WARNING

Do not attempt to perform this procedure if the semitrailer is loaded or going to be loaded or injury to personnel may result.

NOTE

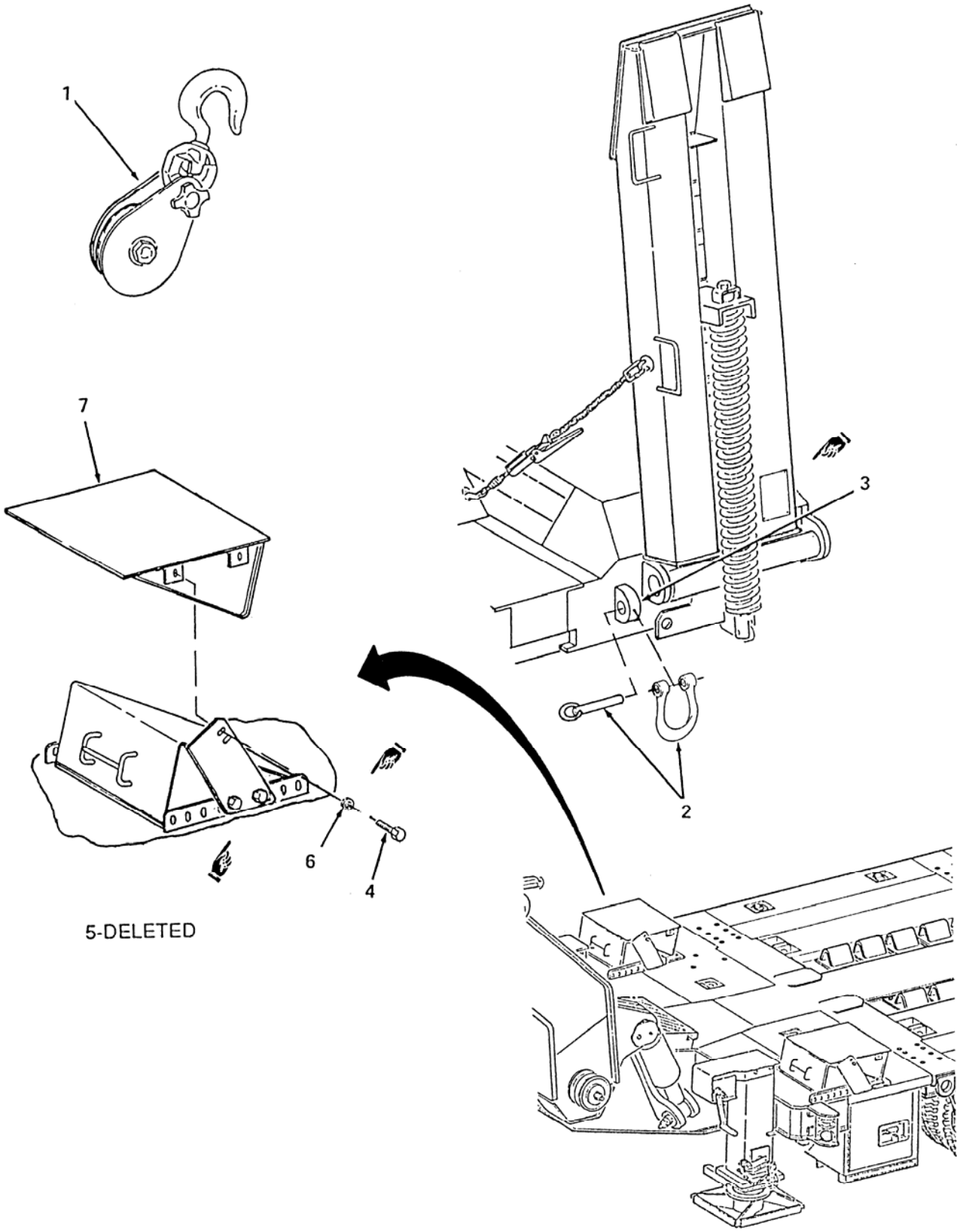
This procedure can be accomplished using the M1070 tractor.

a. Start and warm M1070 tractor. Couple M1070 tractor and semitrailer (para. 2-24). Apply parking brakes on both tractor and semitrailer by operating brake controls inside M1070 tractor.

b. Remove auxiliary snatch block (1) from storage on M1070 tractor. Place snatch block on platform near disabled ramp.

c. Remove shackle (2) from rear recovery eye (3) at back of platform. Place shackle (2) on platform near disabled ramp.

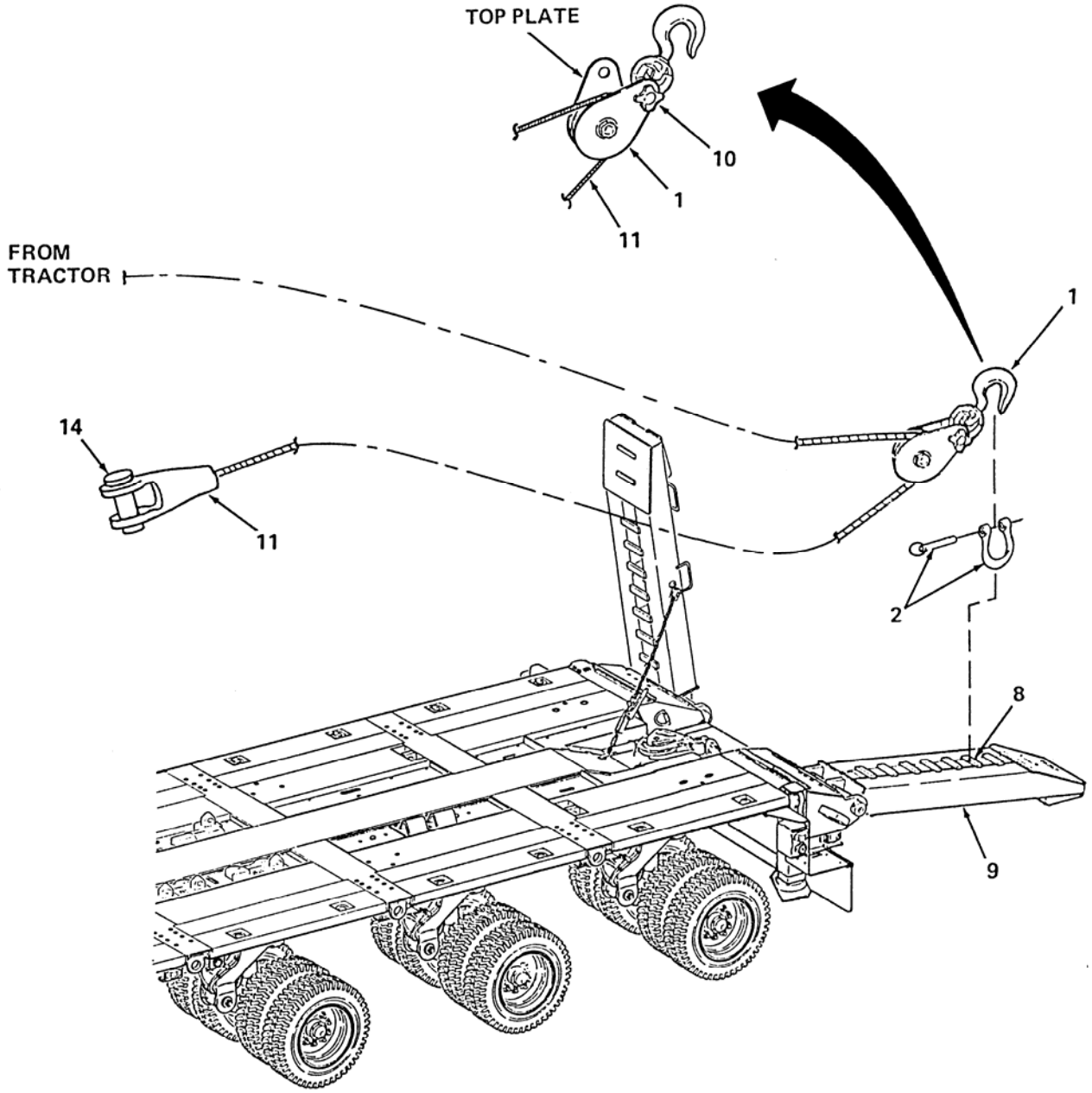
d. Remove two capscrews (4) and lockwashers (6) from payload chock (7). Remove payload chock (7) and place payload chock on platform near disabled ramp.


1
7
3
2
6
4
5-DELETED

e. Attach auxiliary snatch block (1) to second from top rung (8) on loading ramp (9) using shackle (2).

f. Unscrew retainer bolt (10) and rotate top side plate of auxiliary snatch block (1).

g. Winch operator must pay out auxiliary winch cable (11) so that clevis on winch cable (11) is approximately 4 feet (1.2m) past auxiliary snatch block (1). Pass auxiliary winch cable (11) through opened snatch block (1) and pull cable back toward gooseneck.

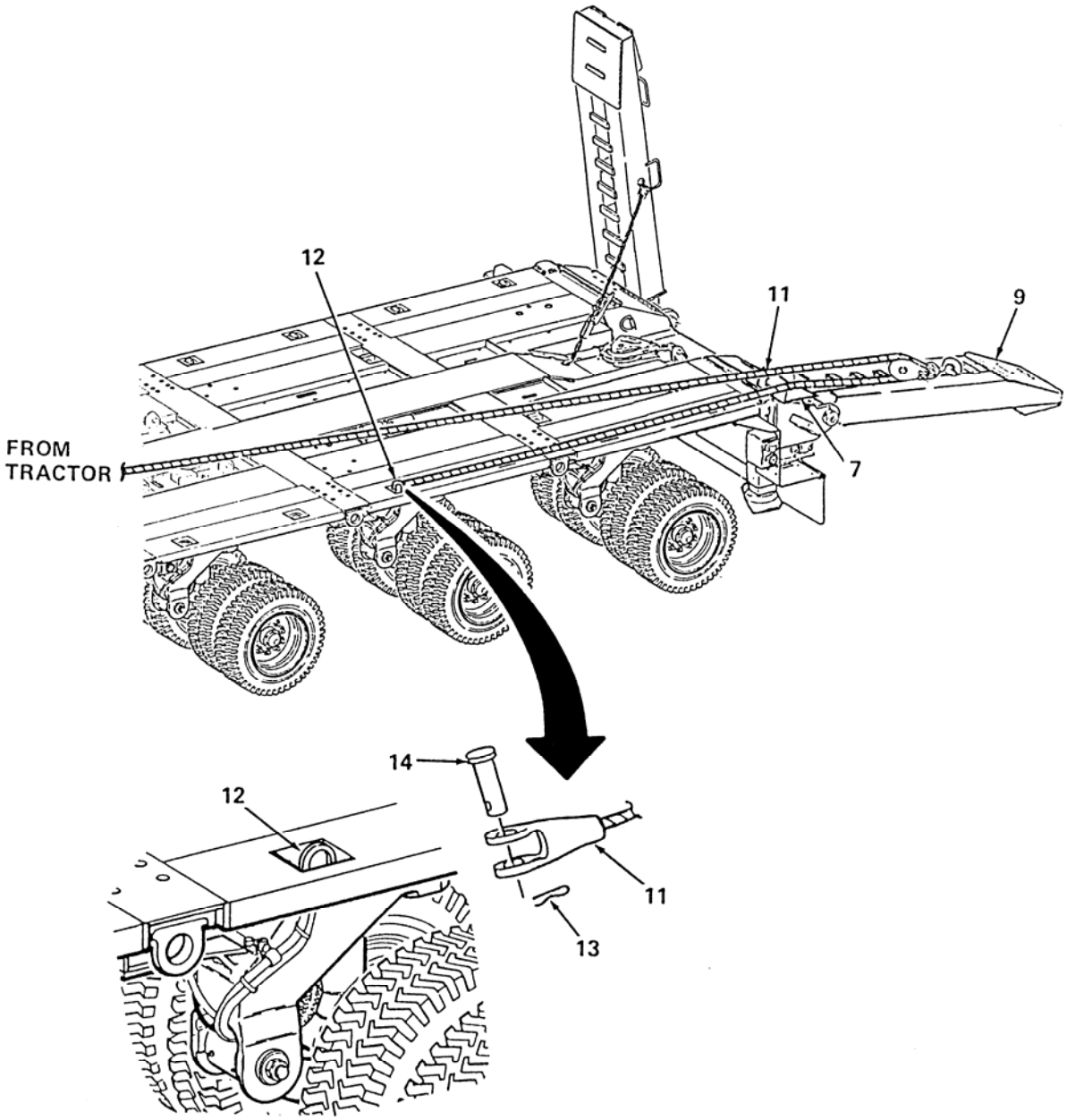


h. Rotate top plate on auxiliary snatch block (1) back to normal position and secure by tightening retainer bolt (10).

NOTE

If the curbside loading ramp is disabled, attach auxiliary winch cable clevis to platform d-ring over curbside #4 bogie. If the streetside loading ramp is disabled, attach auxiliary winch cable clevis to platform d-ring over streetside #4 bogie.

i. Winch operator must pay out auxiliary winch cable (11) until winch cable reaches d-ring (12) located over either curbside or streetside #4 bogie.



j. Remove hitch pin (13) and shouldered pin (14) from clevis of auxiliary winch cable (11). Attach clevis to d-ring (12) over #4 bogie on same side affected ramp is located.

k. Secure clevis of auxiliary winch cable (11) to d-ring (12) by installing shouldered pin (14) and hitch pin (13).

l. Winch operator must continue to pay out auxiliary winch cable (11) so that there is enough slack in cable to reach streetside gooseneck cable guide. Pass auxiliary winch cable (11) through streetside gooseneck cable guide.

NOTE

When placing payload chock into place, be sure to center the chock directly in front of the loading ramp so that both parts of the auxiliary winch cable run over the top of the chock.

m. Place payload chock (7) on down sloping portion of beavertail, directly in front of disabled ramp (9).

n. Winch operator must take up slack in auxiliary winch cable (11) and retract winch cable until disabled ramp (9) starts to raise.

NOTE

As the ramp starts to raise, it may be necessary to have a person pull upward on the ramp handle to help the ramp break over the horizontal position.

o. Winch operator must continue to retract auxiliary winch cable (11), and if necessary a second person must pull up on handle on inboard edge of ramp (9) until ramp raises to stowed position.

p. Winch operator must keep tension on auxiliary winch cable (11). Secure ramp (9) in stowed position by attaching stow chain (15) to stow point on platform.

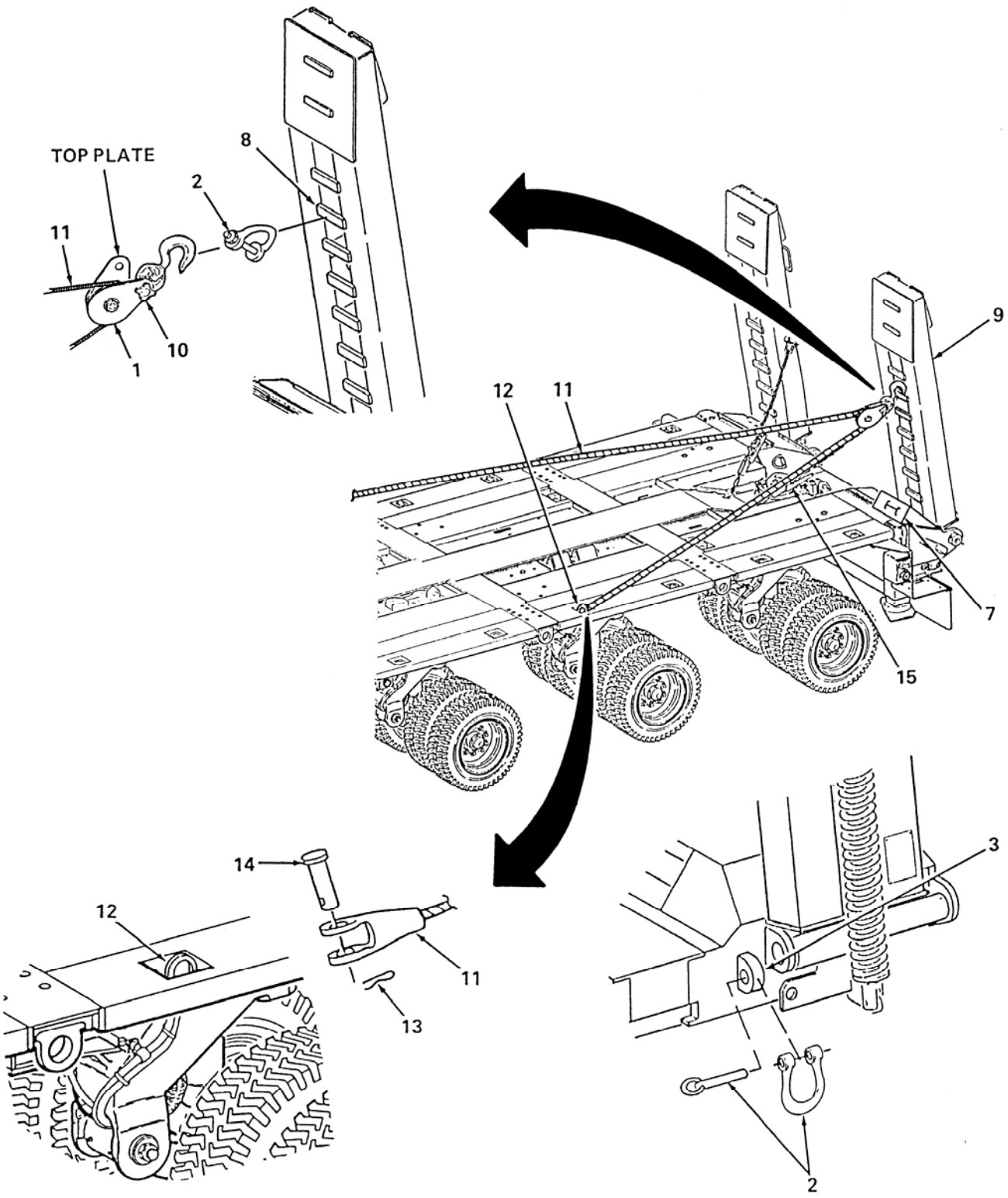
q. Once ramp (9) is stowed and secured in place with stow chain (15), winch operator must pay out slack in auxiliary winch cable.

r. Unscrew retainer bolt (10) and rotate top side plate of auxiliary snatch block (1).

s. Remove auxiliary winch cable (11) from opened snatch block (1). Rotate top plate on auxiliary snatch block (1) back to normal position and secure by tightening retaining bolt (10).

t. Remove shackle (2) and auxiliary snatch block (1) from rung (8) on ramp (9). Stow shackle (2) on rear recovery eye (3) at back of platform.

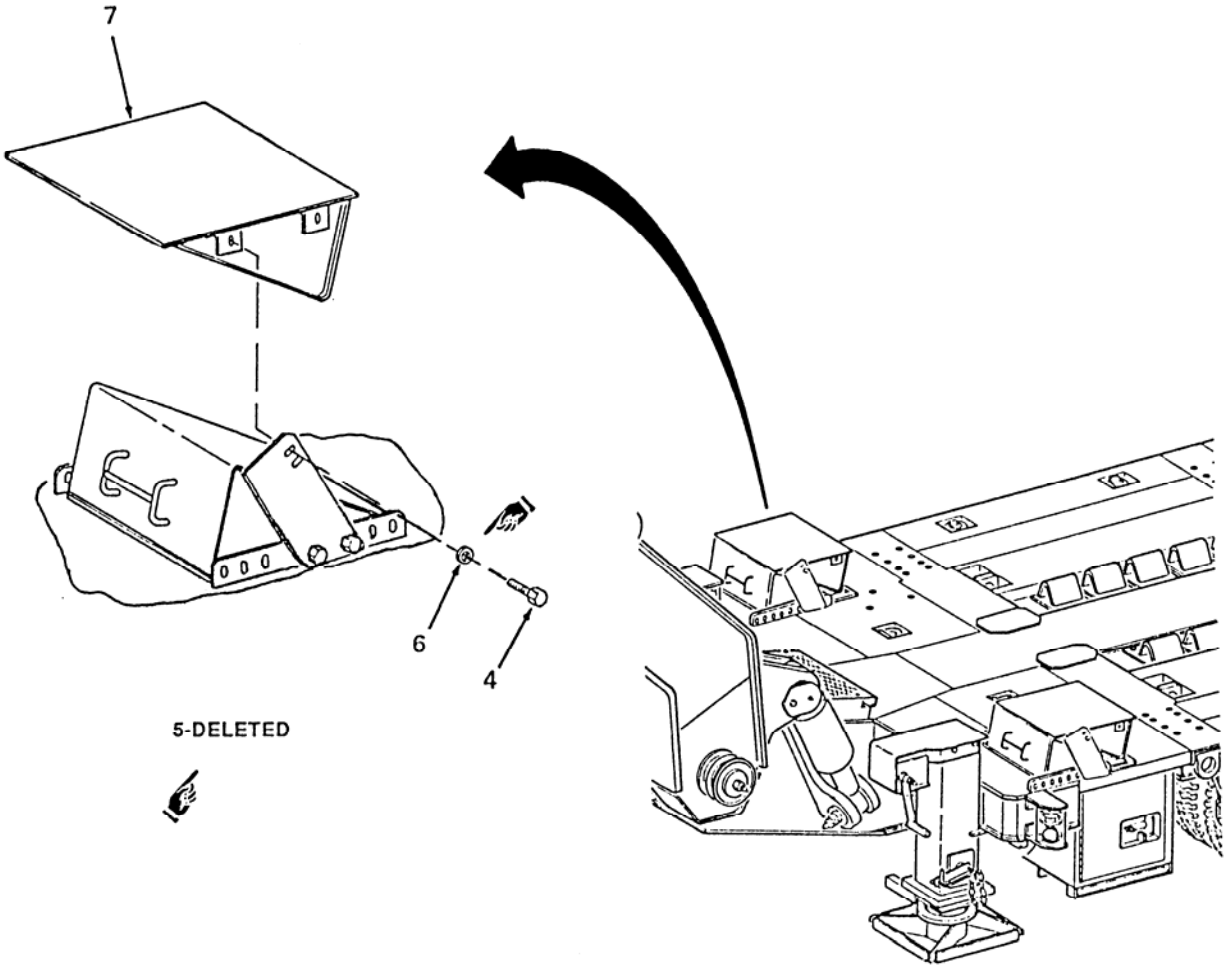
u. Remove hitch pin (13) and shouldered pin (14) from clevis of winch cable (11). Remove clevis of winch cable (11) from d-ring (12) over #4 bogie.


TOP PLATE
8
2
11
10
1
9
12
11
7
15
14
12
11
13
3
2

v. Remove auxiliary winch cable (11) from streetside gooseneck cable guide and restow auxiliary winch cable (11) on M1070 tractor.

w. Place payload chock (7) back in stowed position and secure in place with two lockwashers (6), nuts (5), and capscrew (4).

x. If ramp span width adjustment must be made, refer to paragraph 2-20 and adjust ramp span width to inboard/stowed position.



CHAPTER 3

OPERATOR/CREW MAINTENANCE INSTRUCTIONS

SECTION NO.	TITLE
I	Lubrication Instructions
II	Operator/Crew Troubleshooting Procedures
III	Operator/Crew Maintenance Instructions

3-1. SCOPE

This chapter includes a lubrication chart and instructions as well as trouble-shooting procedures to be followed by the operator/crew personnel. Those maintenance tasks that can be performed by the operator/crew are also included.

Section I. LUBRICATION INSTRUCTIONS

PARA. NO.	TITLE
3-2	Lubrication Instructions
3-3	Lubrication Chart

3-2. LUBRICATION INSTRUCTIONS

a. Lubrication instructions are mandatory. The unit maintenance officer can authorize the operator to assist in certain maintenance functions. If a lubrication fitting will not accept grease, check it to make sure everything is properly tightened. If loose, tighten. If fitting still will not accept grease, notify your supervisor.

b. Service intervals are based on normal operation.

(1) Lubricate more often during constant use.

(2) Lubricate less often during inactive periods.

(3) Lubricate twice as often in extreme dust and sand conditions.

c. Lubricate after high pressure washing, fording, or after steam cleaning.

d. Clean grease fittings before lubricating.

e. Lubricate both sides of equipment.

f. Do not overlubricate.

g. Wipe off excess lubricant.

h. Maintain a record of all lubrication tasks performed.

i. Report any problems noted during lubrication.

j. Refer to DA PAM 738-750 for maintenance forms and procedures to record and report any findings.

3-3. LUBRICATION CHART

The lubrication chart provides instructions for lubrication procedures, use of proper materials for lubing, and recommended time between lubing. Location of fittings and other points to be serviced are included.

LUBRICATION CHART

SEMITRAILER, TRANSPORTER, HEAVY EQUIPMENT

70 TON, M1000

Intervals are based on normal operation (on-condition or hard time). Change the hard time interval if you are operating the equipment under adverse operating conditions including longer-than-usual operating hours. The hard time interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken.

WARNING

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

Clean fittings before lubricating. Clean parts with dry cleaning solvent (item 26, appx. E). Dry before lubricating.

Level of Maintenance. The lowest level of maintenance authorized to lubricate a point is indicated by one of the following symbols as appropriate: Operator/crew (C); and Unit Maintenance (O).

WARNING

Before performing lubrication procedures on semitrailer, raise platform to highest position, lower front and rear support legs (para. 2-22 and 2-23), and close all isolation valves or injury to personnel may result.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on or trip over it. Injury to personnel or damage to equipment may result.

NOTE

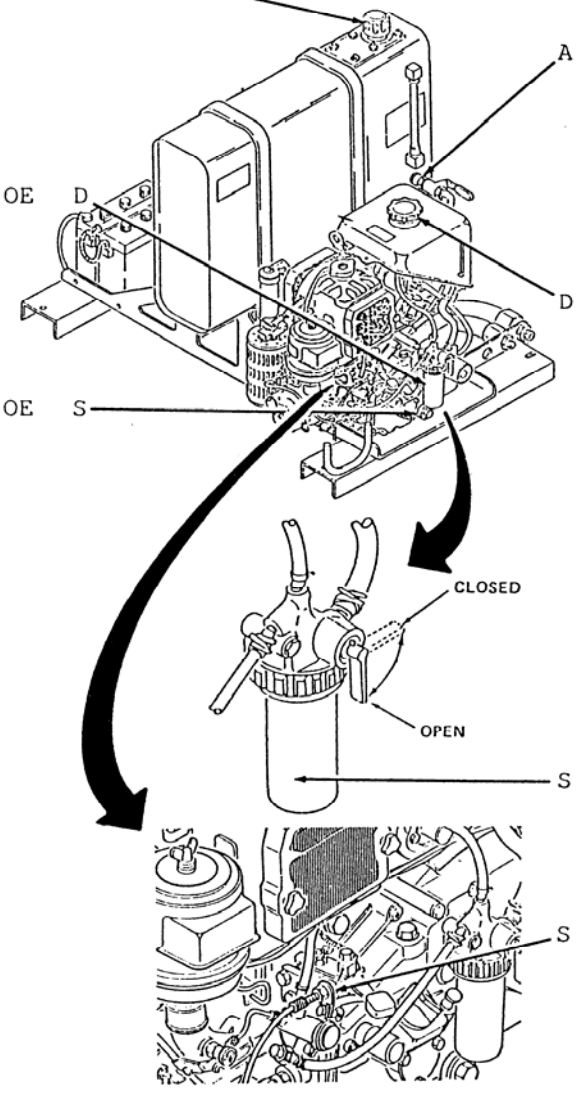
Where "Daily" services are specified, daily shall be interpreted to mean only on days when equipment is operated.

3-3. LUBRICATION CHART (CONT)

CAUTION

When adding fluid to hydraulic tank, make sure that you are using hydraulic oil, MIL-H-46170, Type I. Using any other fluid will cause damage to APU.

When refueling APU, make sure that you put the diesel fuel in the fuel tank, not the hydraulic tank. Failure to do so may cause damage to the APU.



TOTAL MAN-HR	
INTERVAL	MAN-HR
D	0.1
S	0.6
A	0.6

KEY

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		ABOVE +32°F	+40°F to -10°F	0°F to -50°F	
OE (MIL-L-2104B) OIL, ENGINE APU Crankcase	1.37 qt (1.3 l)	SAE 30	SAE 20	10W-30	D - Daily M - Monthly Q - Quarterly S - Semi-annually A - Annually
HO (MIL-H-46170, Type I) HYDRAULIC OIL, PETROLEUM BASED Hydraulic Tank	16.5 gal (62.5 l)	ALL TEMPERATURES			
JP-8 (MIL-DTL-83133) TURBINE FUEL Fuel Tank	1.27 gal (4.8 l)	ALL TEMPERATURES			
SL (NSN 6850-01-139-4040) SILICONE LUBRICANT APU Throttle Control	As req	ALL TEMPERATURES			

1. APU CRANKCASE. Semiannually change oil and clean filter. Replace filter if damaged. Remove drain plug and oil filter elements. Clean filter using cleaning solvent (item 26, appx. E). Lube filter and new gasket with oil (OE), and install with drain plug. Remove oil filter cap and add 1.37 qt (1.3 l) of oil (OE). Check oil level on dipstick.

2. HYDRAULIC TANK.

a. M1000 Semitrailer is controlled in Army Oil Analysis Program (AOAP) for hydraulic oil sampling. Active Army units, Reserve units, and National Guard activities will send an oil sample to AOAP laboratory for analysis every 365 days (annually). An AOAP laboratory may change this interval for sampling, as well as draining and refilling hydraulic oil. Refer to TB 43-0211 for additional AOAP information.

b. To gain access to hydraulic oil, place gooseneck in normal operating position (either coupled or level). Locate pipe plug on front of hydraulic tank and visually check sight gage on rear of tank to confirm that oil level is below pipe plug. If it appears that oil level is too high in tank to remove plug without spilling hydraulic oil, lower level of oil in tank by raising platform approximately 1 inch (2.5 cm). That will cause hydraulic oil to move out of tank and into system lowering level of oil in tank. Remove pipe plug located on front of hydraulic tank and insert sampling tube to pull oil sample. When reinstalling pipe plug, you must first apply pipe sealant (item 18, appx. E) to all threads of plug.

3-3. LUBRICATION CHART (CONT)

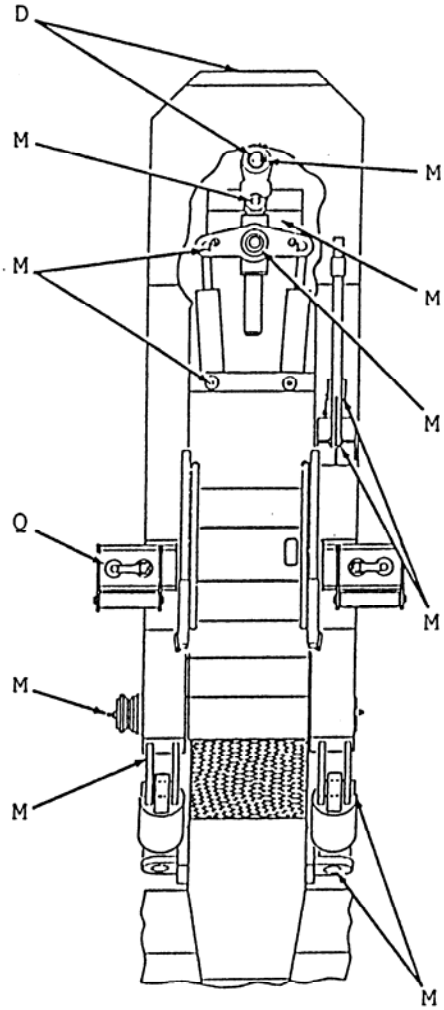
c. If AOAP laboratory support is not available, drain and refill hydraulic tank and clean filter annually. Replace filter if damaged. To drain oil, close oil tank valve and remove drain plug from hydraulic tank. Check (magnetic) drain plug for metal particles and if particles are found wipe clean with clean rag. Remove tank inlet, attaching hardware, gasket, and hydraulic tank filter. Clean filter using cleaning solvent (item 26, appx. E). Lube filter and new gasket with clean oil (HO). Install filter, gasket, tank inlet, and attaching hardware. Refill using hydraulic fluid (HO) as required and open oil tank valve.

3. FUEL FILTER. Semiannually remove and replace fuel filter. To remove, turn fuel petcock to closed position. Unscrew fuel filter housing ring and remove glass bowl and fuel filter. To replace filter, put filter on filter block, fill glass bowl half with diesel fuel (DF) as required, and install on filter block. Secure glass bowl to block by installing filter housing ring. Turn fuel petcock to open position to vent.

4. THROTTLE CABLE. Semiannually clean throttle cable and relubricate. Remove wire end from APU manual control. Clean any dirt or oil buildup from cable using rags. Spray end of cable and into cable housing with silicone lubricant. Direct spray into cable housing and allow fluid to run down into housing. Operate throttle control several times to ensure cable operates freely. Reconnect wire end of throttle control back to APU manual control.

3-3. LUBRICATION CHART (CONT)

	LUBRICANT	INTERVAL
Kingpin and Pickup Plate (See note 5) (C)	GAA	D
Slider Arm Pivot Pin (See note 6) (O)	GAA	M
Cylinder Bearing - 2 places each side (See note 6) (O)	GAA	M
Cable Guide Roller - 4 places each side (See note 8) (O)	GAA	Q
Pivot Pin Sheave (See note 6) (C)	GAA	M
Gooseneck Pivot Pin - 2 places (See note 6) (O)	GAA	M



INTERVAL	LUBRICANT	
M	GAA	Kingpin Bushing - 2 places (See note 6) (O)
M	GAA	Slider Arm Bushing - 2 places (See note 6) (O)
M	GAA	Steering Plate - 2 places (See note 6) (O)
M	GAA	Davit Mounting Cup and Winch (See note 7) (O)
M	GAA	Cylinder Bearing - 2 places each side (See note 6) (O)

GOOSENECK
TOP VIEW
LOOKING DOWN

TOTAL MAN-HR	
INTERVAL	MAN-HR
D	0.1
M	0.2
Q	0.1

KEY

LUBRICANTS		CAPACITY	EXPECTED TEMPERATURES			INTERVALS
			ABOVE +32°F	+40°F to -10°F	0°F to -50°F	
GAA (MIL-G-10924)	GREASE, AUTOMOTIVE AND ARTILLERY		ALL TEMPERATURES			D - Daily M - Monthly Q - Quarterly
	Kingpin and Pickup Plate	As req				
	Slider Arm Pivot Pin	As req				
	Cylinder Bearing	As req				
	Step Assembly Hinge	As req				
	Cable Guide Roller	As req				
	Pivot Pin Sheave	As req				
	Gooseneck Pivot Pin	As req				
	Kingpin Bushing	As req				
	Slider Arm Bushing	As req				
	Steering Plate	As req				
	Davit Cup and Winch	As req				
	Cylinder Bearing	As req				

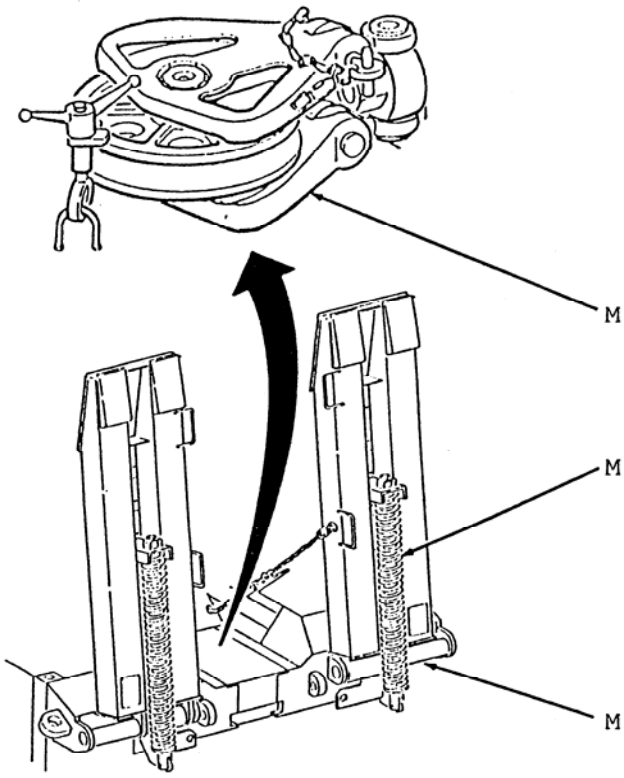
5. KINGPIN AND PICKUP PLATE. Daily, before coupling semitrailer, check for grease on kingpin and pickup plate. Scrape off any existing grease that may have built up. Clean surfaces using rags. Hand apply generous portions of grease (GAA) to contact surfaces as required.

6. GOOSENECK GREASE FITTINGS AND PIVOT PIN SHEAVE. Monthly lubricate gooseneck grease fittings and pivot pin sheave fitting. Clean surrounding areas and all fittings. DO NOT OVERFILL. Add grease (GAA) to fittings as required and wipe off excess with rag.

7. DAVIT MOUNTING CUP, WINCH, AND STEP HINGE. Monthly lubricate davit mounting cup, winch, and step hinges. Scrape off any existing grease that may have built up. Clean surfaces using rags. Hand apply generous portions of grease (GAA) to the davit, mounting cup, winch gears, and step hinges. Wipe off excess with rag.

8. CABLE GUIDES. Quarterly lubricate cable guide grease fittings. Clean surrounding areas and all fittings. DO NOT OVERFILL. Add grease (GAA) to fittings as required and wipe off excess with rag.

3-3. LUBRICATION CHART (CONT)



INTERVAL • LUBRICANT

M GAA Snatch Block
(See note 9) (0)

M SFL Spring Guide Rod - each side
(See note 10) (0)
(Spring assisted ramps)

M SFL Ramp Pivot Pin - each side
(See note 11) (0)
(Spring assisted ramps)

TOTAL MAN-HR	
INTERVAL	MAN-HR
M	0.3

KEY

LUBRICANTS		CAPACITY	EXPECTED TEMPERATURES			INTERVALS
			ABOVE +32°F	+40°F to -10°F	0°F to -50°F	
GAA (MIL-G-10924)	GREASE, AUTOMOTIVE AND ARTILLERY		ALL TEMPERATURES			M - Monthly
	Snatch Block	As req				
	Cylinder Bearing	As req				
SFL SW26723 (MIL-L-23398) (NSN 9150-01-260-2534)	SOLID FILM LUBRICANT		ALL TEMPERATURES			
	Spring Guide Rod	As req				
	Ramp Pivot Pin	As req				

9. SNATCH BLOCK. Monthly lubricate snatch block. Scrape off any existing grease and dirt that may have built up. Clean surfaces using rags. Clean surrounding areas and fittings. DO NOT OVERFILL. Lubricate sheave pin at grease fitting on bottom side of snatch block. Hand apply generous portions of grease (GAA) to all moving parts on the snatch block and contact areas and wipe off excess with rag.

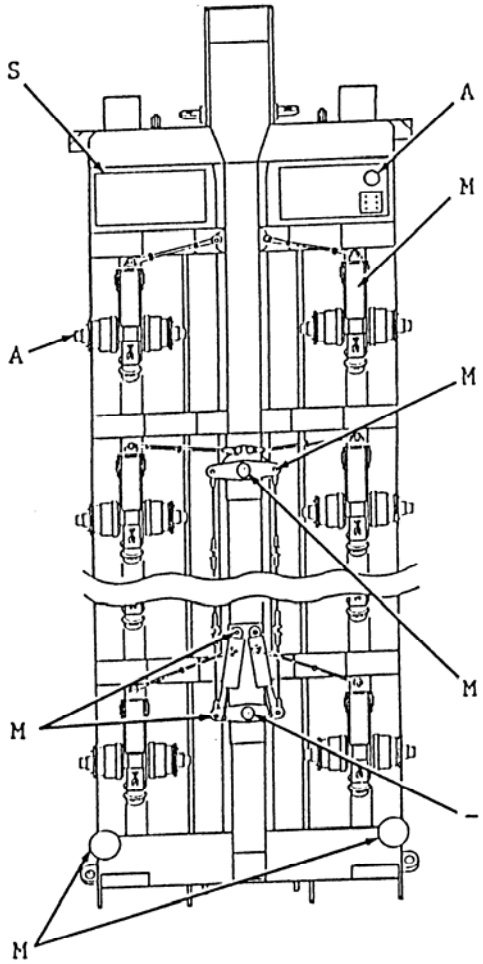
10. SPRING GUIDE ROD. Monthly lubricate ramp spring guide rods. If necessary, remove guide rod and spring assembly from ramp to scrape off any existing grease and dirt that has built up. Clean surfaces using rags. Spray generous portions of solid film lubricant (SFL) on spring rod and rod contact surfaces and wipe off excess with rag.

11. RAMP PIVOT PIN. Monthly lubricate ramp pivot pins. Scrape off any existing grease and dirt that may have built up. Clean surfaces using rags. Clean surrounding areas. Spray generous portions of solid film lubricant (SFL) to ramp pivot pin surfaces and wipe off excess with rag.

3-3. LUBRICATION CHART (CONT)

LUBRICANT • INTERVAL

INTERVAL • LUBRICANT



Storage Compartment Hinge (See note 12) (O)	GAA	S	A	HO	Hydraulic Filter (See note 14) (O)
			M	GAA	Suspension Assembly (See DETAIL C) (O)
Wheel Bearing (See DETAIL A)	GAA	A	M	GAA	Longitudinal Strut Rod End – 7 places each side (Long bearing pins have fittings in each end) (See note 13) (O)
			M	GAA	Steering Plate – 4 places (See note 13 (O)
Cylinder Bearing – 2 places each side (See note 13) (O)	GAA	M	–	GAA	Steering Plate Bearing (See DETAIL D) (O)
Rear Support Leg (See DETAIL B)	GAA	M			

TOTAL MAN-HR	
INTERVAL	MAN-HR
A	0.5
M	0.3
S	0.4

PLATFORM
BOTTOM VIEW
LOOKING UP

KEY

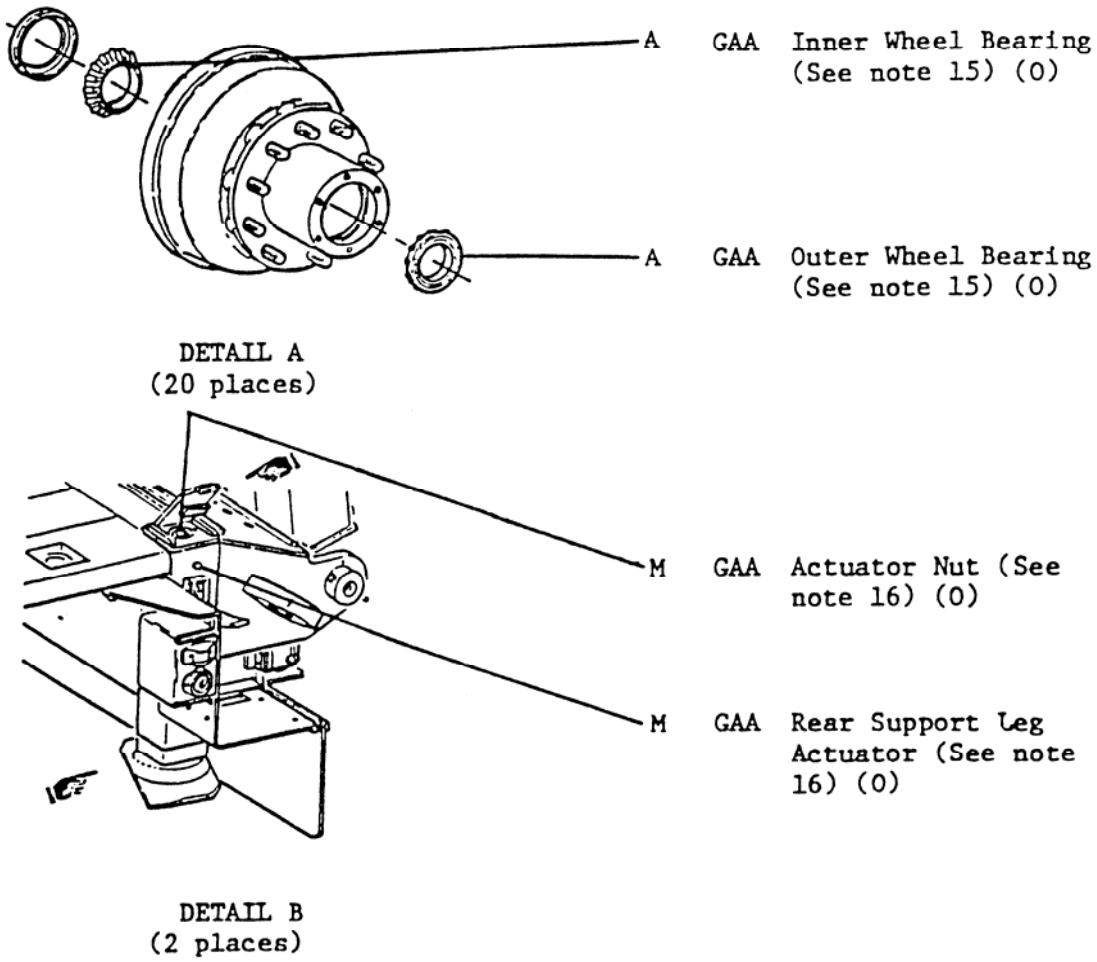
LUBRICANTS		CAPACITY	EXPECTED TEMPERATURES			INTERVALS
			ABOVE +32°F	+40°F to -10°F	0°F to -50°F	
GAA (MIL-G-10924)	GREASE, AUTOMOTIVE AND ARTILLERY		ALL TEMPERATURES			M - Monthly S - Semi-annually A - Annually
	Storage Compartment Hinge	As req				
	Fixed Steering Arm Rod End	As req				
	Wheel Bearing	As req				
	Cylinder Bearing	As req				
	Rear Support Leg	As req				
	Suspension Assembly	As req				
	Longitudinal Strut Rod End	As req				
	Steering Plate	As req				
	Steering Plate Bearing	As req				
HO (MIL-H-46170)	HYDRAULIC OIL, PETROLEUM BASED		ALL TEMPERATURES			
	Hydraulic Filter	As req				

12. STORAGE COMPARTMENT HINGE. Semiannually lubricate storage compartment hinge. Scrape off any existing grease that may have built up. Clean surfaces using rags. Hand apply generous portions of grease (GAA) to storage compartment hinge surface area and wipe off excess with rag.

13. PLATFORM GREASE FITTINGS. Monthly lubricate platform grease fittings. Clean surrounding areas and all fittings. DO NOT OVERFILL. Add grease (GAA) to fittings as required and wipe off excess with rag.

14. HYDRAULIC FILTER. Annually remove and replace hydraulic filter. To drain, close ball valve at hydraulic tank and unscrew and remove filter housing, gasket, and filter. Clean filter housing using clean fluid (HO). To fill, replace filter and gasket to filter block. Thread filter housing to filter block.

3-3. LUBRICATION CHART (CONT)



TOTAL MAN-HR	
INTERVAL	MAN-HR
M	0.1
A	10.0

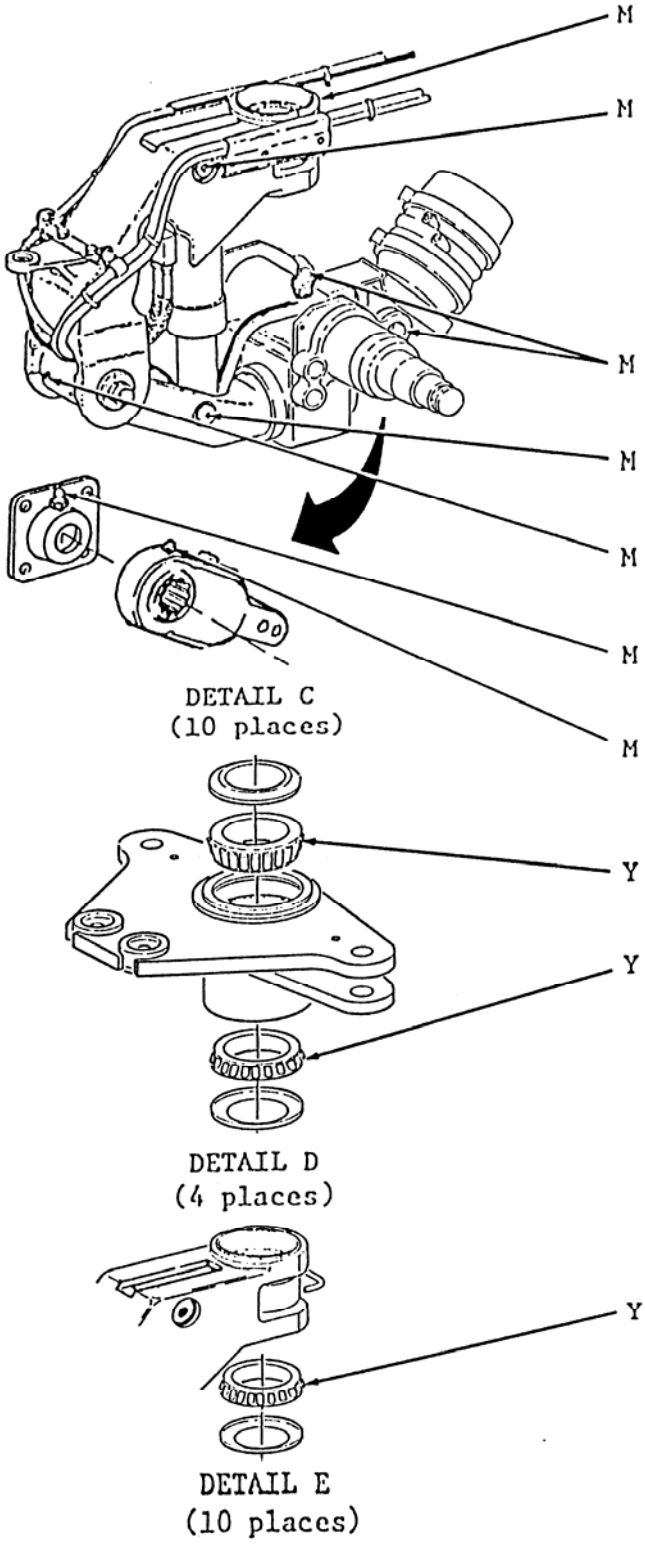
KEY

LUBRICANTS		CAPACITY	EXPECTED TEMPERATURES			INTERVALS
			ABOVE +32°F	+40°F to -10°F	0°F to -50°F	
GAA MIL-G-10924)	GREASE, AUTOMOTIVE AND ARTILLERY		ALL TEMPERATURES			M - Monthly A - Annually
	Inner Wheel Bearing	As req				
	Outer Wheel Bearing	As req				
	Actuator Nut	As req				
	Rear Support Leg Actuator	As req				

15. INNER AND OUTER WHEEL BEARINGS. Annually remove, clean, and hand or pressure pack inner and outer wheel bearings. Clean any existing grease from bearings and hub and drum assembly. Clean surfaces using rags. Hand pack or pressure pack inner and outer wheel bearings with grease (GAA) and wipe off excess with rag.

16. ACTUATOR NUT AND REAR SUPPORT LEG ACTUATOR. Monthly lubricate actuator nut and rear support leg actuator. Clean surrounding areas and all fittings. DO NOT OVERFILL. Add grease to fittings as required and wipe off excess with rag.

3-3. LUBRICATION CHART (CONT)



INTERVAL	•	LUBRICANT	
M		GAA	Upper Suspension Bearings (See note 17) (See DETAIL E) (O)
M		GAA	Upper Cylinder Bearing (See note 17) (O)
			NOTE Actuate brakes prior to lubricating this point.
M		GAA	S-Cam Bushing - 2 places (See note 17) (O)
M		GAA	Lower Cylinder Bearing (See note 17) (O)
M		GAA	Suspension Pivot Pin (See note 17) (O)
M		GAA	S-Cam Retainer (See note 17) (O)
M		GAA	Slack Adjuster - 2 places (See note 17) (O)
Y		GAA	Upper Steering Plate Bearing (See note 18) (O)
Y		GAA	Lower Steering Plate Bearing (See note 18) (O)
Y		GAA	Lower Suspension Bearing (See note 19) (O)

TOTAL MAN-HR	
INTERVAL	MAN-HR
M	0.7
Y	252.0

KEY

LUBRICANTS		CAPACITY	EXPECTED TEMPERATURES			INTERVALS
			ABOVE +32°F	+40°F to -10°F	0°F to -50°F	
GAA MIL-G-10924)	GREASE, AUTOMOTIVE AND ARTILLERY		ALL TEMPERATURES			M - Monthly Y - 5 Years
	Upper Suspension Bearing	As req				
	Upper Cylinder Bearing	As req				
	S-Cam Retainer	As req				
	Suspension Pivot Pin	As req				
	Lower Cylinder Bearing	As req				
	S-Cam Bushing	As req				
	Slack Adjuster	As req				
	Upper Steering Plate Bearing	As req				
	Lower Steering Plate Bearing	As req				
	Lower Suspension Bearing	As req				

WARNING

Excess grease must be wiped clean when lubricating S-cam bushings. Failure to do so may cause brake malfunctions and injury to personnel.

17. UPPER SUSPENSION BEARINGS AND UPPER AND LOWER CYLINDER BEARINGS, S-CAM RETAINER, S-CAM BUSHING, SLACK ADJUSTER, AND SUSPENSION PIVOT PINS. Monthly lubricate upper suspension bearings and upper and lower cylinder bearings, S-cam retainers, S-cam bushings (plug nearest axle on each brake dust shield must be removed to access S-cam bushing fitting), slack adjuster, and suspension pivot pins. Clean surrounding areas and all fittings. DO NOT OVERFILL. Apply grease (GAA) to upper suspension assembly and upper and lower cylinder bearings, brake camshafts, and suspension pivot pin fittings as required and wipe off excess with rag. The suspension pivot pin has two fittings which service the same piece. If fully serviced through one fitting, the other fitting will appear to not take grease. Deck must be in lowest position to lubricate brake camshaft and S-cam retainer.

18. UPPER AND LOWER STEERING PLATE BEARINGS. Every 5 years remove, clean, and hand or pressure pack upper and lower steering plate bearings. Clean any existing grease from bearings and steering plates. Hand pack or pressure pack bearings with grease (GAA) and wipe off excess with rag.

3-3. LUBRICATION CHART (CONT)

19. LOWER SUSPENSION BEARING. Every 5 years remove, clean, and hand or pressure pack lower suspension bearing. Clean any existing grease from bearing and upper suspension arm. Hand pack or pressure pack bearings with grease (GAA) and wipe off excess with rag.

Section II. OPERATOR/CREW TROUBLESHOOTING PROCEDURES

PARA. NO.	TITLE
3-4.....	Symptom Index
3-5.....	Operator/Crew Troubleshooting Table

3-4. SYMPTOM INDEX

Symptom	Troubleshooting procedure task no.
APU	
Engine does not crank over.....	1
Engine cranks but does not start.....	2
Engine runs rough.....	3
White, blue, black, or dark gray exhaust smoke is observed (after warmup)	4
Low oil pressure indicator light is lit.....	5
Engine overheating.....	6
Battery has low charge.....	7
Glow plug heats slowly or fails to heat.....	8
APU jump start system inoperable.....	9
HYDRAULIC SYSTEM	
General hydraulic failures.....	10
External leaks.....	11
System will not maintain normal or adequate operating pressure..	12
Excessive pump noise or pump failure.....	13
Platform suspension will not adjust or adjustments are sluggish	14
Platform suspension drifts down or drops.....	15
Suspension rides stiff and does not adjust for bumps/road hazards	16
Suspension tire change chain is over-stressed and/or breaks.....	17

Symptom	Troubleshooting procedure task no.
Gooseneck will not adjust or adjustments are sluggish.....	18
Gooseneck drifts down, drops, or will not support itself.....	19
Oil or air relieving from gooseneck cylinder air reservoir.....	20
Steering will not adjust.....	21
Steering pressure indicator light comes on.....	22
Semitrailer steering does not track properly.....	23
ELECTRICAL SYSTEM	
Steering pressure indicator does not light when pressure is low	24
All lamps do not light.....	25
One or more (but not all) lights will not light.....	26
Dim or flickering lights.....	27
WHEELS, TIRES, AND HUBS	
Wheel wobbles.....	28
Excessive or uneven tire wear.....	29
BRAKES	
No brakes or weak brakes.....	30

3-5. OPERATOR/CREW TROUBLESHOOTING TABLE

a. Table 3-1 lists the common malfunctions which may be found during the operation of the semitrailer. Perform tests/inspections and corrective maintenance in the order listed.

b. This section cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by the listed corrective actions, notify your supervisor or unit maintenance.

c. Before trying to troubleshoot the semitrailer, be sure you understand the basic operating instructions outlined in chapter 2.

Table 3-1. Operator/Crew Troubleshooting Table

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
APU
1. ENGINE DOES NOT CRANK OVER
Step 1. Check starter and battery connections for looseness or corrosion. Tighten battery connections (table 2-1, item 6, step f). If connections are corroded, notify unit maintenance.
Step 2. Check fluid level in battery. If fluid level is low, notify unit maintenance.
Step 3. Turn starter switch to START and listen for starter to engage. If starter does not engage or appears to be defective, or if the above steps do not correct malfunction, notify unit maintenance.
2. ENGINE CRANKS BUT DOES NOT START
Step 1. Check fuel level in fuel tank (para. 3-3). Add proper grade of fuel to fuel tank.
Step 2. Check for fuel in fuel filter (para. 2-3, item 3). Turn fuel petcock to open position (para. 2-3, item 2).
Step 3. Check for loose jet start cock on air intake manifold. Tighten thumbscrew on jet start cock (para. 2-3, item 7).
Step 4. Visually check fuel sediment bowl for contaminates. If fuel is contaminated, notify unit maintenance.
3. ENGINE RUNS ROUGH
Step 1. Check fuel level in fuel tank. Add proper grade of fuel to fuel tank (para. 3-3).
Step 2. Check for fuel in fuel filter. Turn fuel petcock to open position (para. 2-3, item 2).

Table 3-1. Operator/Crew Troubleshooting Table - CONT

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

APU - CONT

Step 3. Check for loose jet start cock on air intake manifold.

Tighten thumbscrew on jet start cock (para. 2-3, item 7).

Step 4. Check that decompression valve handle is downward in closed position.

Turn decompression valve handle downward to closed position (para. 2-3, item 9).

4. WHITE, BLUE, BLACK, OR DARK GRAY EXHAUST SMOKE IS OBSERVED (AFTER WARMUP)

Notify unit maintenance.

5. LOW OIL PRESSURE INDICATOR LIGHT IS LIT

Check for low oil level in crankcase.

a. Replenish with proper grade of oil (para. 3-3). The level should be between bottom and top marks on oil level gage (dipstick).

b. If oil was added and oil pressure indicator light is lit, notify unit maintenance to check for low oil pressure.

6. ENGINE OVERHEATING

Step 1. Check engine coolant level.

If coolant level is low, add coolant as required.

Step 2. Check for low oil level in crankcase.

Replenish with proper grade of oil (para. 3-3). The level should be between bottom and top marks on oil level gage (dipstick).

7. BATTERY HAS LOW CHARGE

Step 1. Check battery connections for looseness or corrosion.

Tighten connections (table 2-1, item 6, step f). If corroded, notify unit maintenance.

Table 3-1. Operator/Crew Troubleshooting Table - CONT

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

APU - CONT

7. BATTERY HAS LOW CHARGE - CONT

Step 2. Check fluid level in battery.

If fluid level is low, notify unit maintenance.

8. GLOW PLUG HEATS SLOWLY OR FAILS TO HEAT

Step 1. Check battery connections for looseness or corrosion.

Tighten connectors (table 2-1, item 6, step f). If corroded, notify unit maintenance.

Step 2. Check fluid level in battery.

If fluid level is low, notify unit maintenance.

Step 3. Turn APU start switch to GLOW and observe GLOW indicator (para. 2-2, item 1).

If GLOW indicator lamp does not light within 15 to 20 seconds, notify unit maintenance.

9. APU JUMP START SYSTEM INOPERABLE

Step 1. Check operation of the auxiliary start system safety circuit module.

a. Press test switch button on safety circuit module. If an audible "click" is not heard, proceed to step 2, below.

b. If an audible "click" is heard and APU does not crank over, notify unit maintenance.

Step 2. Check for proper 12 Vdc connection at tractor 12/24 Vdc series-parallel battery installation (para. 2-30).

Step 3. Check clamp connections to tractor batteries. Make sure red positive (+) clamp is making good connection to battery terminal and that black negative clamp (-) is making good connection to tractor frame.

Table 3-1. Operator/Crew Troubleshooting Table - CONT

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

HYDRAULIC SYSTEM

10. GENERAL HYDRAULIC FAILURES

Step 1. Check that APU is running.

Start and run APU (para. 2-16).

Step 2. Check that hydraulic tank shut-off valve is open (para. 2-4).

CAUTION

If APU has run longer than 30 seconds with the hydraulic tank shut-off valve closed, the pump may be damaged and the hydraulic system, including filters, may be contaminated with metal particles.

If valve is closed, shut down APU and notify unit maintenance.

Step 3. Check fluid level in hydraulic tank.

Fill tank as required (para. 3-3). Operate trailer and recheck fluid level. If fluid level drops, notify unit maintenance.

Step 4. Check hydraulic filter indicator (para. 2-4).

Indicator should read in green; if not, notify unit maintenance.

Step 5. Check hydraulic tank breather cap for restrictions (item 10, para. 4-11, item 10).

If cap is clogged or seal is defective, notify unit maintenance.

Step 6. Check for external leaks at hydraulic fittings/joints.

Refer to symptom 11 to check hydraulic leaks.

Table 3-1. Operator/Crew Troubleshooting Table - CONT

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

11. EXTERNAL LEAKS

WARNING

Steering and suspension system hydraulic lines are under pressure even when APU is not running. Do not attempt to tighten, loosen, adjust, or repair fittings, lines, or hoses until semitrailer is supported by support legs (para. 2-22 and 2-23) and all pressure is relieved or injury to personnel may result.

Step 1. Check hydraulic fittings/joints for leaks.

Check tightness of fittings and tighten. If tight and leaking, notify unit maintenance.

Step 2. Inspect for split or ruptured hydraulic hoses and lines.

If a split or ruptured line is found, notify unit maintenance.

Step 3. Check for external cylinder leaks.

If fluid is leaking out around cylinder rod, wipe down with rag and exercise affected cylinder full travel in each direction for three cycles. If leakage slows/stops, monitor. If leakage continues, notify unit maintenance.

12. SYSTEM WILL NOT MAINTAIN NORMAL OR ADEQUATE OPERATING PRESSURE

Step 1. Check for general hydraulic failures.

Refer to symptom 10 for general hydraulic failures.

Step 2. Check for external leaks at hydraulic fittings/joints.

Refer to symptom 11 for checking external leaks.

Step 3. After initial start up, check that system pressure gage (para. 2-5) reads up to 500 psi (3448 kPa) without hydraulic controls operated.

Check if outside ambient temperature is below 30°F (-1°C). Hydraulic pressure will normally be higher until hydraulic fluid warms to normal operating temperature. A gradual decrease in pressure should occur as hydraulic systems are operated.

Table 3-1. Operator/Crew Troubleshooting Table - CONT

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
HYDRAULIC SYSTEM - CONT
Step 4. Check that all suspension isolation valves are in open position (para. 2-6). Operate suspension isolation valves to open position with handle facing forward.
Step 5. Check that platform, with or without payload, is not level. Lower front and rear support legs (para. 2-22 and 2-23). Readjust platform height to have weight supported by support legs and ensure platform is as level as possible.
Step 6. Check that gooseneck isolation valve (para. 2-6) is in proper position for load conditions. a. If semitrailer was moved or loaded while in ADJUST mode, suspension circuits may be overloaded. Lower all four support legs (para. 2-22 and 2-23) and relieve pressure from suspension circuits by lowering platform onto support legs. b. If in ADJUST mode, check that front support legs are lowered to the ground and supporting most of the load.
Step 7. Check for partially shifted or stuck control valve handles on steering and suspension control valves (para. 2-6). Operate hydraulic control valves and check that valves return to center (neutral position). Be sure valve handles move freely and do not bind.
Step 8. Operate all hydraulic controls. Adjust gooseneck (para. 2-18), platform (para. 2-19), and manually adjust steering (para. 2-21). Identify which hydraulic control is unable to achieve normal hydraulic pressure during operation and use Symptom Index for quick reference to continue troubleshooting.

Table 3-1. Operator/Crew Troubleshooting Table - CONT

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

13. EXCESSIVE PUMP NOISE OR PUMP FAILURE

Step 1. Check that hydraulic tank shut-off valve is OPEN (para. 2-4).

CAUTION

If APU has run longer than 30 seconds, with the hydraulic tank shut-off valve closed, pump may be damaged and the hydraulic system, including filters, may be contaminated with metal particles.

If valve is closed, shut down APU (para. 2-16) and notify unit maintenance.

Step 2. Check for general hydraulic failures.

Refer to symptom 10 for general hydraulic failures.

Step 3. Check for external leaks at hydraulic fittings/joints.

Refer to symptom 11 to continue checking for external leaks.

14. PLATFORM SUSPENSION WILL NOT ADJUST OR ADJUSTMENTS ARE SLUGGISH

Step 1. Check for general hydraulic failures.

Refer to symptom 10 for general hydraulic failures.

Step 2. Check that all suspension isolation valves (para. 2-6) are in OPEN position.

Position isolation valves in open position, handles pushed inboard and facing toward front of semitrailer.

Step 3. Check that suspension shut-off and gooseneck isolation valves (para. 2-6) are in correct position.

a. If coupled to a tractor, suspension shut-off and gooseneck isolation valve handles should be in RUN position, both handles pushed inward. The suspension shut-off valve must be pulled out to make platform adjustments.

b. If uncoupled from a tractor, suspension shut-off valve handle and gooseneck isolation valve handle should be in ADJUST position, both handles pulled outward.

Table 3-1. Operator/Crew Troubleshooting Table - CONT

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
HYDRAULIC SYSTEM - CONT
Step 4. Check for external leaks at hydraulic fittings/joints. Refer to symptom 11 to continue checking for external leaks.
15. PLATFORM SUSPENSION DRIFTS DOWN OR DROPS
Step 1. Check for general hydraulic failures. Refer to symptom 10 for general hydraulic failures.
Step 2. Check for external leaks at hydraulic fittings/joints. Refer to symptom 11 to continue checking for external leaks.
Step 3. Check for evidence of leakage at suspension cylinder, line fracture valves, suspension shut-off and isolation valves, suspension valves, gooseneck cylinders, and hydraulic gages. If leaks are found, notify unit maintenance.
16. SUSPENSION RIDES STIFF AND DOES NOT ADJUST FOR BUMPS/ROAD HAZARDS
Step 1. Check for proper platform height over rough/rugged terrain. Check platform height. Height should be 43 inches (109 cm). Make required adjustments to platform (para. 2-19).
Step 2. Check that affected suspension isolation valve is open. Open isolation valve, handles facing forward towards front of semitrailer (para. 2-6).
Step 3. For highway driving or when semitrailer is coupled to tractor, gooseneck isolation and suspension shut-off valve handles should be pushed inboard to RUN position. Check that both gooseneck isolation and suspension shut-off valve handles are pushed inboard to RUN position (para. 2-6).
Step 4. Check for damage or mechanical binding at suspension arms and suspension cylinders and at gooseneck pivot pin and gooseneck cylinders. If damage is found, notify unit maintenance.

Table 3-1. Operator/Crew Troubleshooting Table - CONT

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

17. SUSPENSION TIRE CHANGE CHAIN IS OVER-STRESSED AND/OR BREAKS

Step 1. Check that affected suspension isolation valve is closed.

Close affected valve, handle facing outboard from center of trailer (para. 2-6).

WARNING

Be sure all four support legs are down and supporting the platform prior to checking the suspension isolation valves for leaks or injury to personnel may result.

Step 2. Check for possible leakage at suspension isolation valve.

WARNING

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

Check for external leaks at suspension isolation valve fittings, stem area, or hoses. If leaking, notify unit maintenance.

18. GOOSENECK WILL NOT ADJUST OR ADJUSTMENTS ARE SLUGGISH

CAUTION

Do not attempt to adjust gooseneck while coupled to a tractor. The gooseneck may lift the tractor/front of platform and may cause damage to equipment.

Step 1. Check that semitrailer kingpin is completely uncoupled and is clear of tractor fifth wheel.

If kingpin is hitting fifth wheel, pull tractor ahead slightly to allow kingpin to clear fifth wheel and vee-entry ramps without binding.

Table 3-1. Operator/Crew Troubleshooting Table - CONT

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

Step 2. Check that suspension shut-off and gooseneck isolation valves (para. 2-6) are in correct position.

Suspension shut-off valve handle and gooseneck isolation valve handle should be in ADJUST position, both handles pulled outboard.

Step 3. Check for general hydraulic failures.

Refer to symptom 10 for general hydraulic failures.

19. GOOSENECK DRIFTS DOWN, DROPS, OR WILL NOT SUPPORT ITSELF

Step 1. Check that gooseneck isolation valve is in correct position.

If uncoupled from a tractor, gooseneck isolation valve handle should be in ADJUST position (para. 2-6).

Step 2. Check for evidence of leakage at gooseneck cylinder rod seals, line fracture valves, gooseneck control valve, and gooseneck isolation valves.

If leaks are found, notify unit maintenance.

20. OIL OR AIR RELIEVING FROM GOOSENECK CYLINDER AIR RESERVOIR

NOTE

The air reservoir contains a small amount of oil to minimize corrosion. Some of the oil may escape through the relief valve or air breather valve during operation. Therefore, occasional dripping is not considered a malfunction.

Step 1. Check for damaged gooseneck cylinder air reservoir.

Check for dents, cracks and damage to reservoir. If damaged, notify unit maintenance.

Step 2. Check that oil is dripping or running from relief valve or air breather/check valve at gooseneck cylinder air reservoir.

Check air reservoir for leaks. Tighten fittings if necessary. If joint still leaks, notify unit maintenance.

Table 3-1. Operator/Crew Troubleshooting Table - CONT

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
HYDRAULIC SYSTEM - CONT
21. STEERING WILL NOT ADJUST
Step 1. Check that brakes are released and steerable axles are not blocked or obstructed. a. Release semitrailer brakes by operating brake release valve (para. 2-8). b. Move wheel chocks away from tires or remove any debris or materials that may block the steerable axles from turning.
Step 2. If coupled, check that steering wedge is properly seated with tractor fifth wheel. Refer to paragraph 2-24 and recouple tractor/semitrailer.
Step 3. If uncoupled, check that steering wedge is not offset to extreme limits of travel. If steering wedge is locked at extreme limits, refer to paragraph 2-24 and adjust steering wedge.
Step 4. Check for normal steering pressure at systems gage for adjusting steering. Normal pressures should read 1000 - 2500 psi (6895 - 17238 kPa) when steering wedge is approximately straight ahead and pressure should rise up to 3000 - 3900 psi (20685 - 26891 kPa) when positioned for an extreme turn. If system pressure gage reads higher than normal, check for mechanical binding, damage, hydraulic leaks, or misalinements of platform and gooseneck steering components. If defects are found, notify unit maintenance.
22. STEERING PRESSURE INDICATOR LIGHT COMES ON
Step 1. Check that indicator light comes on and semitrailer also has other malfunction symptoms, such as poor tracking behind tractor or steering will not adjust. a. Start APU and recharge steering hydraulic circuit (para. 2-16). Operate steering control valve (para. 2-6) in both directions for approximately 10 seconds. b. Check for general hydraulic failures that would limit fluid flow to hydraulic controls. Refer to symptom 10.

Table 3-1. Operator/Crew Troubleshooting Table - CONT

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

Step 2. Check for external leaks at hydraulic fittings/joints.

Refer to symptom 11 for checking external leaks.

23. SEMITRAILER STEERING DOES NOT TRACK PROPERLY

Step 1. Check that steering wedge is properly fitted and secure in the tractor fifth wheel.

Uncouple tractor/semitrailer and recouple (para. 2-24).

Step 2. Check for hydraulic leaks at steering cylinder, fittings, joints, and hoses.

Refer to symptom 11 and check for external leaks.

Step 3. Check that steering pressure indicator light is not lit.

If lit, recharge hydraulic pressure to steering circuit by starting APU (para. 2-16) and operating steering control valve in both directions (para. 2-6).

ELECTRICAL SYSTEM

24. STEERING PRESSURE INDICATOR DOES NOT LIGHT WHEN PRESSURE IS LOW

Check that power is supplied from tractor to running lights.

Couple tractor/semitrailer (para. 2-24). Turn on semitrailer running lights. If lights do not come on, check electrical connector for bent or missing pins and check electrical cable for pinched or broken lines or other damage. If damage is found, notify unit maintenance.

25. ALL LAMPS DO NOT LIGHT

Step 1. Check lights on tractor, including turn signals and stop lights.

If towing vehicle lights do not light, notify unit maintenance.

Step 2. Check intervehicular cable (para. 2-24).

If cable is not properly connected, reconnect cable (para. 2-24).

Table 3-1. Operator/Crew Troubleshooting Table - CONT

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
ELECTRICAL SYSTEM - CONT
25. ALL LAMPS DO NOT LIGHT - CONT
Step 3. Check connectors for dirty, corroded, or damaged pins (table 2-1, item 9). If pins are dirty, corroded, or damaged, notify unit maintenance.
26. ONE OR MORE (BUT NOT ALL) LIGHTS WILL NOT LIGHT
Step 1. Check for burned out or defective lamps (table 2-1, item 13). If lamps are burned out or defective, notify unit maintenance.
Step 2. Check for broken lead wires or loose connections. a. If connections are loose, tighten connections (para. 2-12, step d). b. If lead wires are broken, notify unit maintenance.
Step 3. Check light assembly for damage (table 2-1, item 13). If light assembly is damaged, notify unit maintenance.
27. DIM OR FLICKERING LIGHTS
Step 1. Check electrical connections for loose, dirty, or corroded pins. a. If connections are loose, tighten connections (para. 2-12, step d). b. If connector pins are dirty or corroded, notify unit maintenance.
Step 2. Check for defective lamp (table 2-1, item 13). If lamp is defective, notify unit maintenance.
Step 3. Check towing vehicle lights. If tractor has dim or flickering lights, notify unit maintenance.

Table 3-1. Operator/Crew Troubleshooting Table - CONT

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

WHEELS, TIRES, AND HUBS

28. WHEEL WOBBLES

Step 1. Check for loose or missing lug nuts and missing or broken lugs (table 2-1, item 18, step a).

a. If lug nuts are loose, tighten and notify unit maintenance that nuts require torquing.

b. If lug nuts or lug studs are broken or missing, notify unit maintenance.

Step 2. Check for bent wheel.

a. If wheel is bent, notify unit maintenance.

b. If replaced wheel still wobbles after replacement, notify unit maintenance.

29. EXCESSIVE OR UNEVEN TIRE WEAR

NOTE

Only tires listed in TM 9-2330-381-24P, Repair Parts and Special Tools List (RPSTL), are authorized for use.

Step 1. Check tires for proper size and type.

If a tire is not a 215/75 R17.5 or if more than one tire is incorrect size, notify unit maintenance.

Step 2. Check tire air pressure (table 2-1, item 19, step c).

WARNING

Always follow proper tire inflation procedures and warnings. Failure to do so could cause serious injury or death.

a. If pressure is low, inflate tires to 95 psi (655 kPa).

b. If tire will not hold pressure, notify unit maintenance.

Step 3. Check for bent wheel (table 2-1, item 18, step a).

If wheel is bent, notify unit maintenance.

Table 3-1. Operator/Crew Troubleshooting Table - CONT

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
WHEELS, TIRES, AND HUBS - CONT
29. EXCESSIVE OR UNEVEN TIRE WEAR - CONT
Step 4. Check for loose wheel (table 2-1, item 18, step a). a. If lug nuts are loose, tighten and notify unit maintenance that lug nuts require torquing. b. If reason for tire wear has not been found, notify unit maintenance.
BRAKES
30. NO BRAKES OR WEAK BRAKES
Step 1. Check tractor air pressure. If air pressure is low, notify unit maintenance.
Step 2. Check gladhands for proper connection (para. 2-24), service to service and emergency to emergency, and make sure connections are tight. a. If improperly connected, reconnect (para. 2-24) service to service and emergency to emergency. b. If properly connected, ensure connections are tight (para. 2-24). If symptom still exists, notify unit maintenance.

Section III. OPERATOR/CREW MAINTENANCE INSTRUCTIONS

PARA. NO.	TITLE
3-6.....	Spare Tire
3-7.....	Outer/Outer Wheel
3-8.....	Outer/Inner Wheel
3-9.....	Inner/Outer Wheel
3-10.....	Inner/Inner Wheel

3-6. SPARE TIRE

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

Socket wrench handle (ratchet), 3/4-inch drive, item 15, appx. C
8-inch extension, 3/4-inch drive, item 12, appx. C
Socket (lug), 1-1/2-inch hex and 13/16-inch square nut, 3/4-inch drive, item 25, appx. C
Socket 1-1/8-inch, 3/4-inch drive, item 22, appx. C

Personnel Required: 2

Equipment Condition

Platform set at normal road height (para. 2-19)
Gooseneck lowered to lowest position, if uncoupled (para. 2-18)

3-6. SPARE TIRE (CONT)

REMOVAL

WARNING

The spare tire is heavy. Use the davit, as described below, to raise or lower spare tire to/from gooseneck. When on top of gooseneck and removing or installing spare tire, always hold onto handrail or davit with one hand to avoid falling and causing injury to personnel.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on or trip over it. Injury to personnel or damage to equipment may result.

NOTE

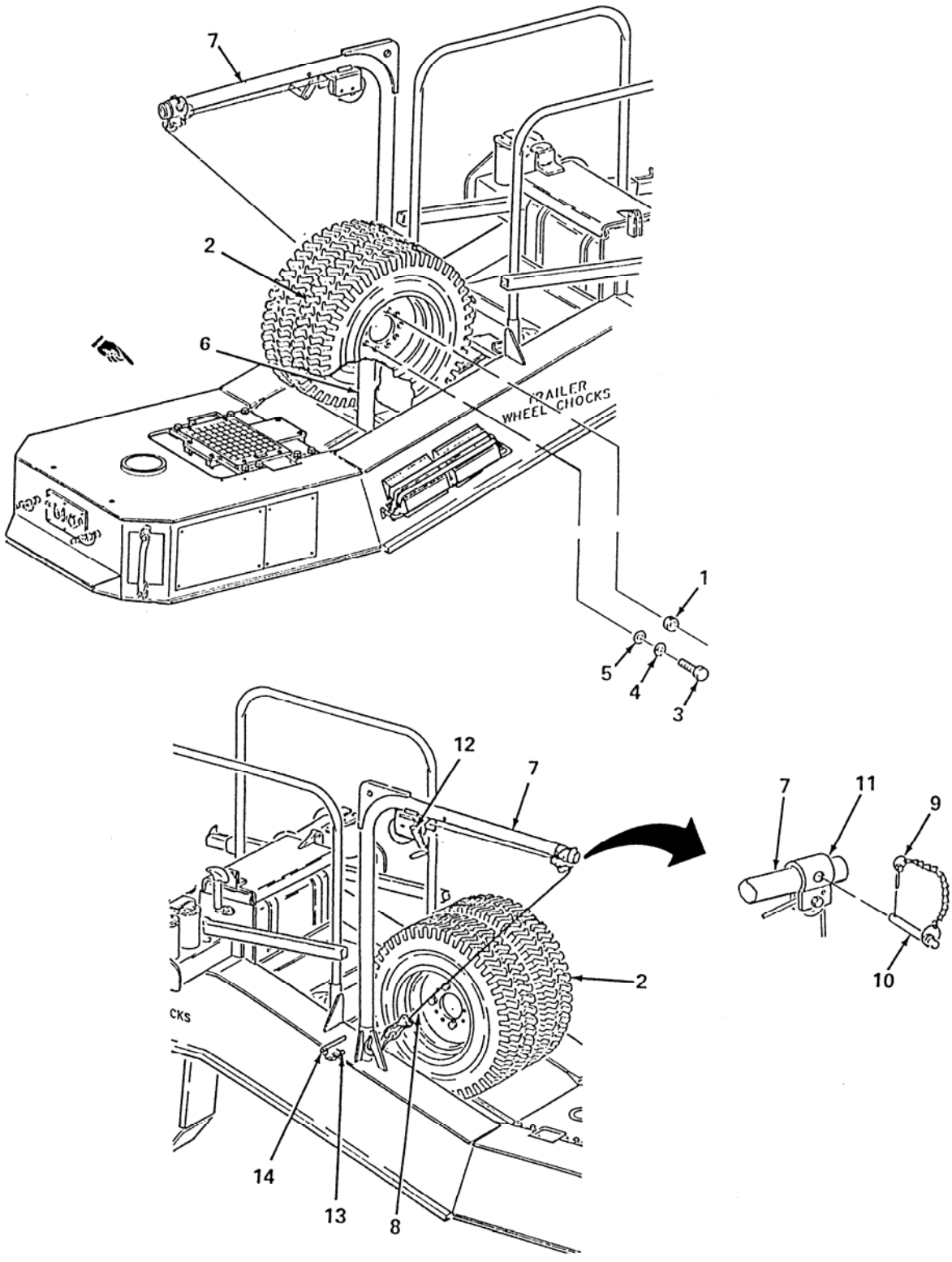
The following procedures apply to either the curbside or streetside spare tires as mounted on the gooseneck.

1. Using ratchet, extension, and lug socket, remove right-hand threaded lug nut (1) from spare tire (2).
2. Using ratchet, extension, and 1-1/8-inch socket, remove two capscrews (3), lockwashers (4), and washers (5) which secure spare tire (2) to spare tire bracket (6).

WARNING

Always use leather gloves when handling cable. Should cable become frayed during use, injury to personnel may result.

3. Unhook davit winch cable (8) from stow point on davit (7) base.
4. Remove linch pin (9) from hitch pin (10) on winch cable pulley clamp (11) and reposition pulley clamp on davit (7) arm near the davit winch (12). Insert hitch pin (10) and linch pin (9) to secure pulley clamp.
5. Remove linch pin (13) from hitch pin (14) at base of davit and swing davit arm and winch (12) over spare tire (2).


7
2
6
TRAILER
WHEEL CHOCKS
1
5
4
3
12
7
2
14
13
8
7
11
9
10

3-6. SPARE TIRE (CONT)

6. Attach winch cable (8) to spare tire (2) by passing hook end of cable through center of tire rim and hooking back onto cable (8) atop spare tire.

WARNING

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on or trip over it. Injury to personnel or damage to equipment may result.

7. Operate davit winch (12) to lift spare tire (2) off of bracket (6). Swing davit arm and spare tire out over curbside of gooseneck and operate winch (12) to lower spare tire to ground.

8. Once on the ground, spotter must remove winch cable (8) from spare tire (2).

INSTALLATION

WARNING

Always use leather gloves when handling cable. Should cable become frayed during use, injury to personnel may result.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on or trip over it. Injury to personnel or damage to equipment may result.

1. On curbside of gooseneck, on ground, attach winch cable (8) from davit (7) to spare tire (2) by passing hook end of cable through center of tire rim and hooking back on cable atop spare tire.

WARNING

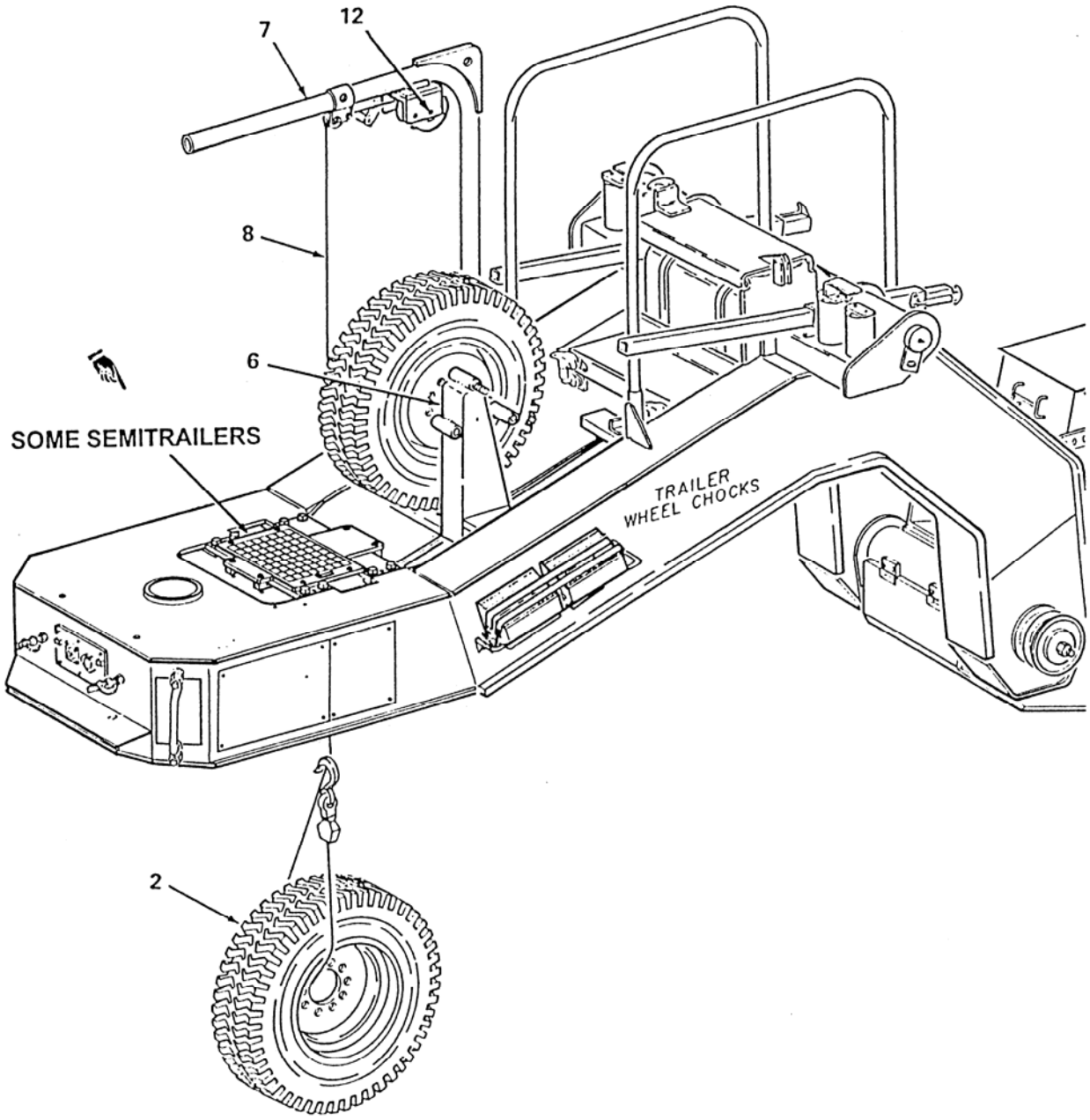
The spare tire is heavy. Use the davit, as described below, to raise or lower spare tire to/from gooseneck. When on top of gooseneck and removing or installing spare tire, always hold onto handrail or davit with one hand to avoid falling and causing injury to personnel.

2. Using davit winch (12), raise up spare tire (2) onto gooseneck.

3. Swing davit (7) arm and winch cable (8) with spare tire over into position on spare tire bracket (6).

4. Aline spare tire (2) onto studs on spare tire bracket (6).

5. Install right-hand lug nut (1), two capscrews (3), lockwashers (4), and washers (5) onto spare tire bracket (2).


7
12
8
6
SOME SEMITRAILERS
TRAILER
WHEEL CHOCKS
2

3-6. SPARE TIRE (CONT)

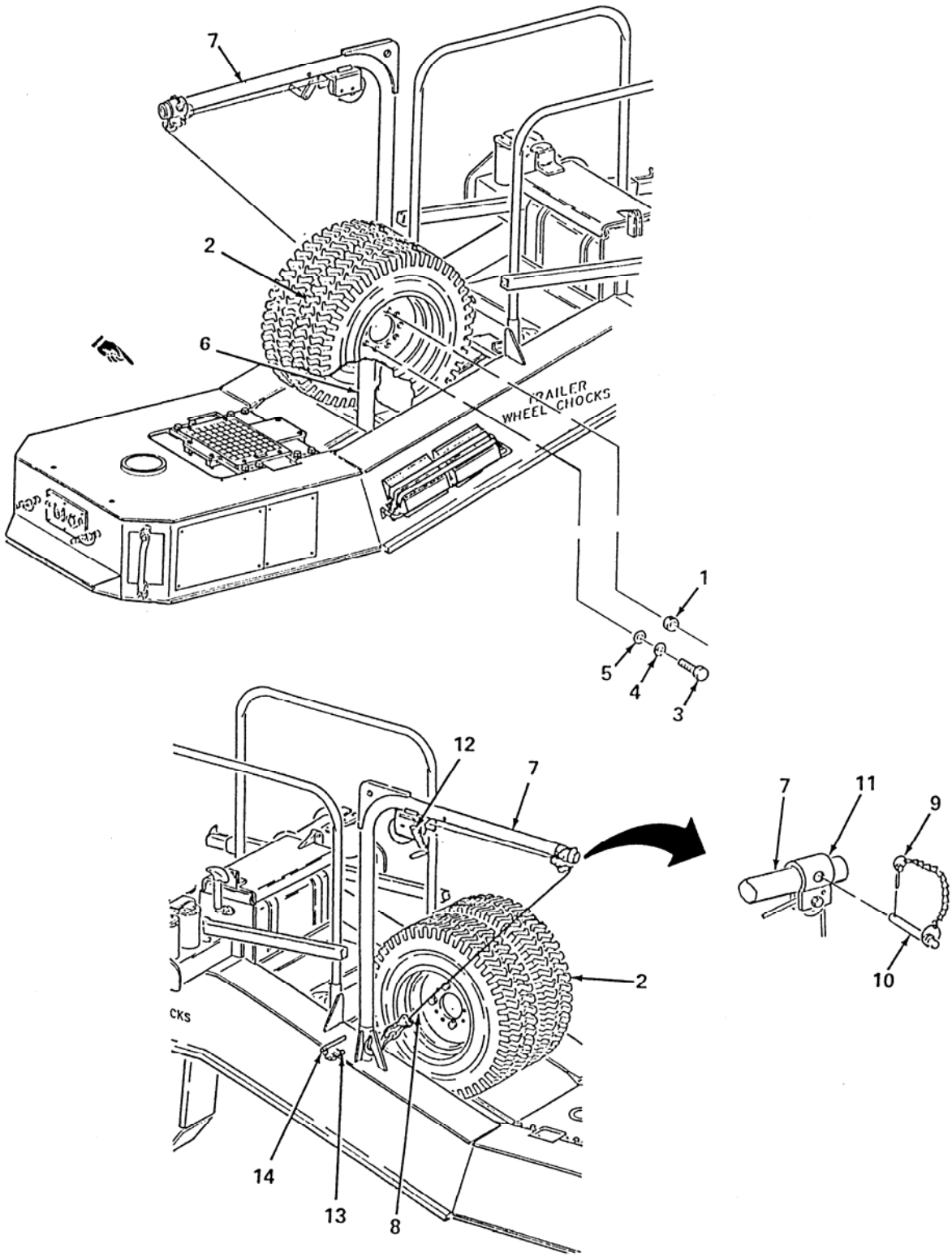
6. Remove winch cable (8) from spare tire.

7. Remove hitch pin (10) from winch cable pulley clamp (11) and move pulley clamp to stow position at end of davit arm. Install hitch pin (10) and secure with linch pin (9).

8. Reposition davit arm (7) to stow position, install hitch pin (14), and secure with linch pin (13).

9. Attach winch cable (8) hook at base of davit (7) and take up slack in cable.

10. Restow all tools and equipment used during this procedure.


7
2
6
TRAILER
WHEEL CHOCKS
1
5
4
3
12
7
2
14
13
8
7
11
9
10

3-7. OUTER/OUTER WHEEL

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

Socket wrench handle (ratchet), 3/4-inch drive, item 15, appx. C
8-inch extension, 3/4-inch drive, item 12, appx. C
Socket (lug), 1-1/2-inch hex and 13/16-inch square nuts, 3/4-inch drive, item 25, appx. C
Suspension chain, item 10, appx. C
Metallic tube, item 6, appx. C

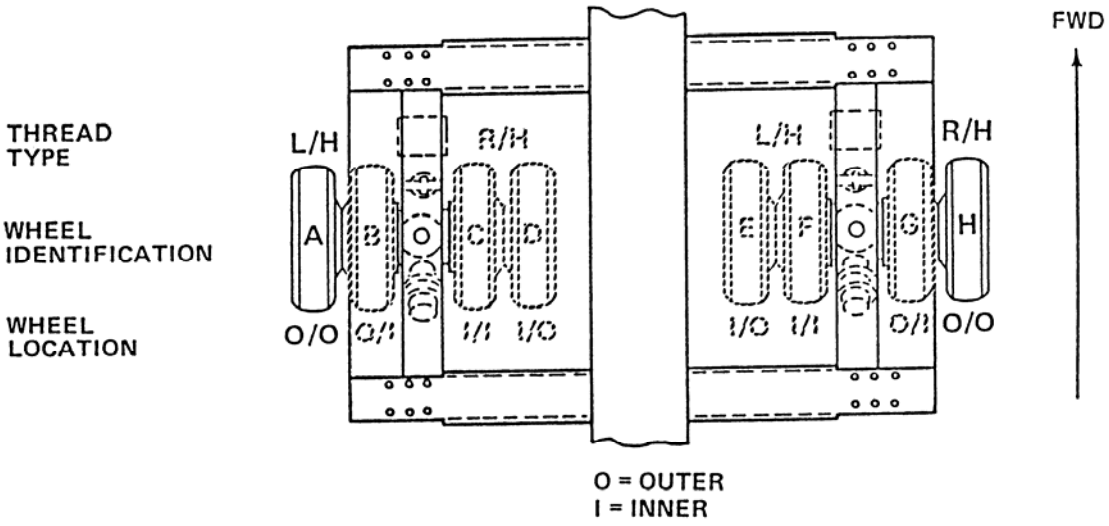
Personnel Required: 2

Equipment Condition

Gooseneck lowered to lowest position, if uncoupled (para. 2-18)
If necessary, spare tire removed (para. 3-6)

NOTE

Wheel removal/installation is divided into four separate procedures. Refer to diagram for location, wheel designation, and thread types. Within each procedure, notes will identify wheels, and right-hand and left-hand lug nuts or lug studs.



REMOVAL

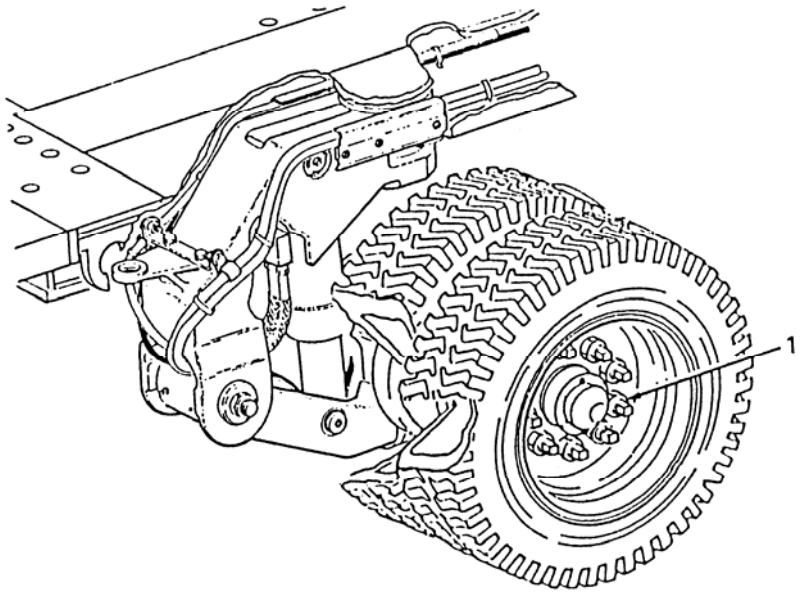
1. Start and run APU (para. 2-16).

2. Adjust platform (para. 2-19) to normal road height. Leave APU running to recharge battery.

CAUTION

Wheel A has left-hand threaded lug nuts. Wheel H has right-hand threaded lug nuts. During removal, use correct rotation for each type thread or damage to lug nuts and lug studs may result.

3. Using ratchet, 8-inch extension, metallic tube, and lug socket, loosen 10 lug nuts (1).



3-7. OUTER/OUTER WHEEL (CONT)

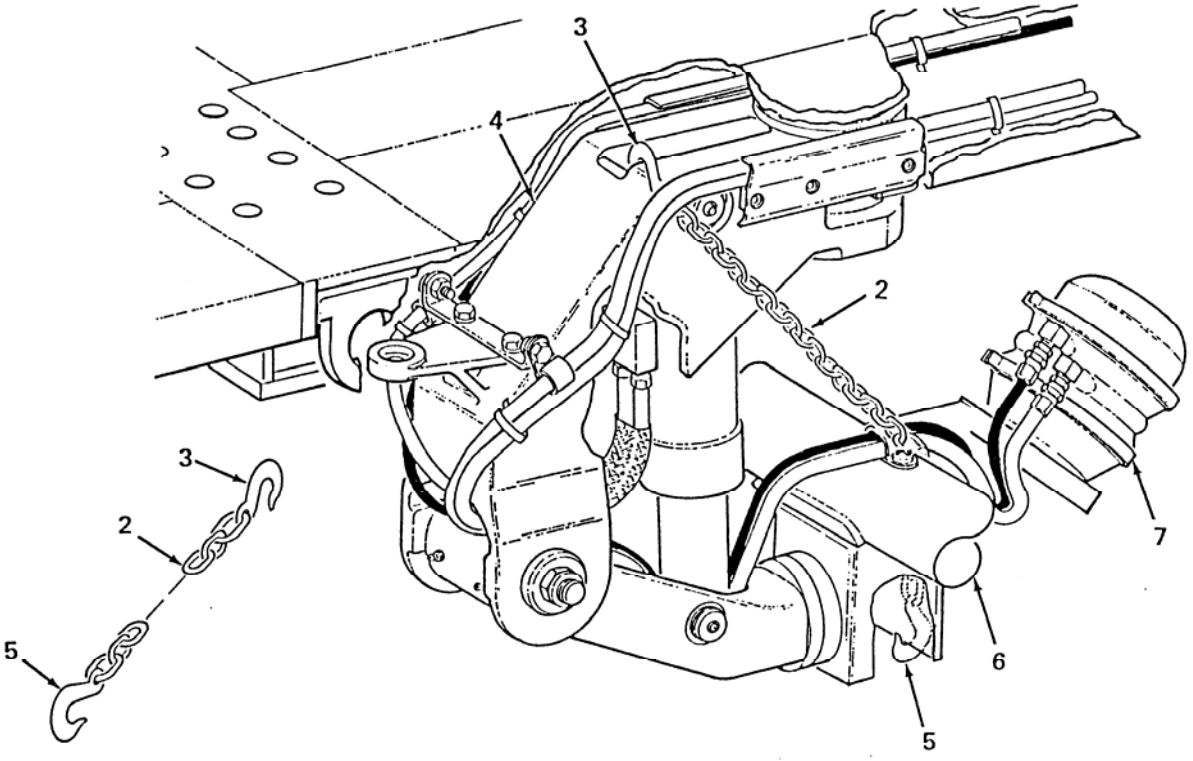
4. Attach suspension chain (2) to bogie as follows:

CAUTION

When securing hook to axle, make sure that suspension chain does not cross over any hydraulic lines or air brake hoses. If chain crosses over lines, chafing of a line/hose, loss of air brake pressure, loss of hydraulic fluid, or damage to equipment may result.

(a) Attach end (top) hook (3) of suspension chain (2), along outboard side of bogie, beneath both hydraulic and air brake lines, into opening in upper suspension arm casting of bogie (4).

(b) Attach bottom hook (5) of suspension chain (2) onto back end of square casting under axle (6) outboard of parking brake chamber (7).



WHEELS REMOVED FOR CLARITY

WARNING

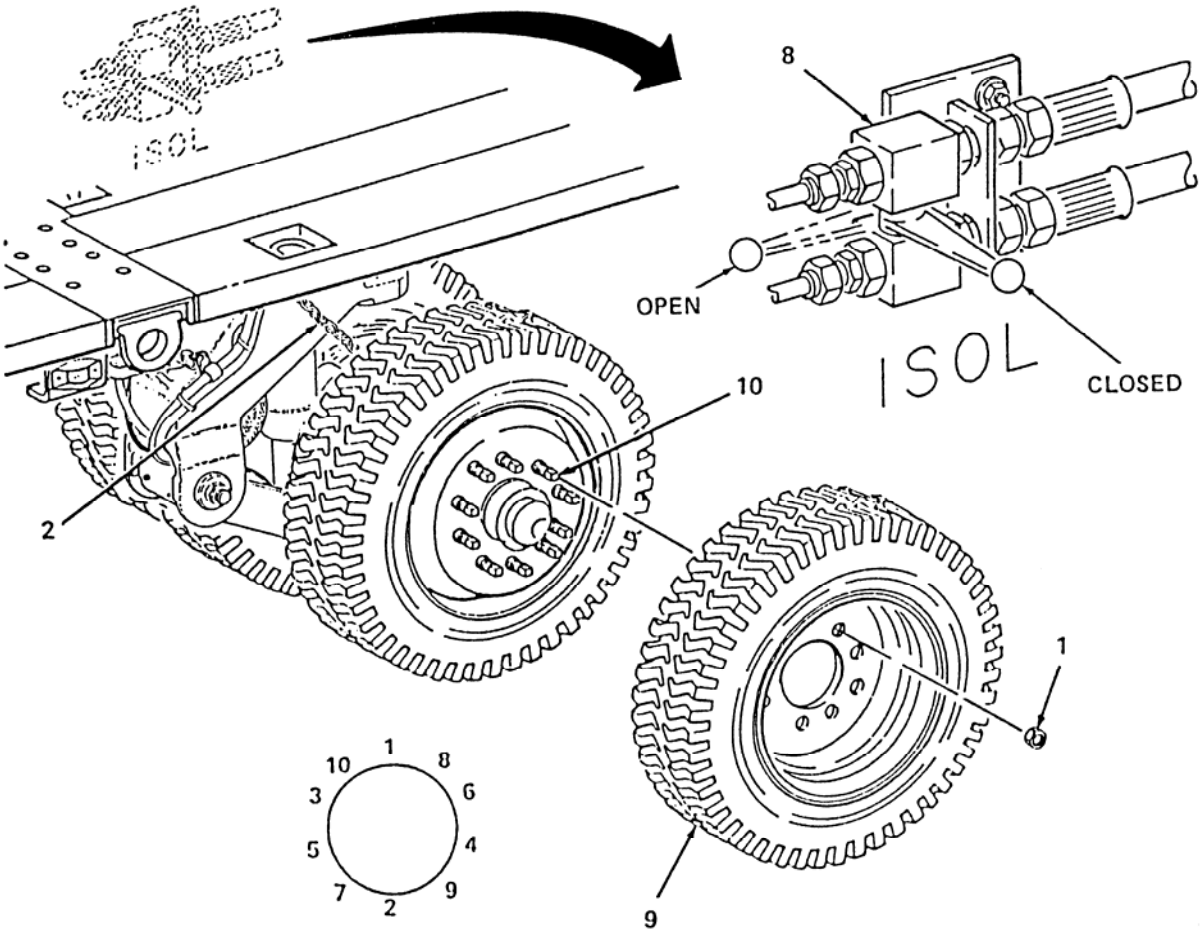
Make sure suspension isolation valve at the affected bogie is closed (handle facing outward) prior to adjusting platform height or the suspension chain can break and cause injury to personnel and damage to equipment.

5. At affected bogie, close suspension isolation valve (8), handle facing outboard from center of platform.

6. Raise platform (para. 2-19) until all tires for affected bogie are off of the ground.

7. Remove lug nuts (1) and outer/outer wheel (9) from lug studs (10) on affected bogie.

8. If other tire maintenance procedures are to be performed, let APU run to charge battery.



NUT TIGHTENING SEQUENCE
FOR OUTER DUAL

3-7. OUTER/OUTER WHEEL (CONT)

INSTALLATION

1. Start APU (para. 2-16) if not running.
2. Inspect wheels for damage. Inspect stud holes for debris and clean if necessary.
3. Clean all threads on studs and nuts.
4. Aline outer/outer wheel (9) so that valve stem is 180 degrees opposite valve stem on inner wheel.
5. Install top and bottom lug nuts (1) finger tight to seat wheel properly.
6. Install and hand tighten 8 remaining lug nuts (1) and hand tighten all 10 lug nuts (1) in sequence shown.
7. Lower platform (para. 2-19) until all tires on affected bogie come in contact with the ground.
8. Using ratchet, 8-inch extension, and lug socket, continue to tighten lug nuts (1) in sequence shown. Notify unit maintenance that lug nuts (1) need to be torqued to 450 - 500 lb-ft (610 - 680 Nm). Torque in sequence shown.
9. Open suspension isolation valve (8) (para. 2-6) at affected bogie (handle facing inboard toward front of semitrailer).
10. Continue to lower platform (para. 2-19) until there is enough clearance for chain (2) to be removed from affected bogie.
11. If other tire maintenance procedures are to be performed, let APU run to charge battery.
12. Remove suspension chain (2) from affected bogie.
13. Restow all tools and equipment used during this procedure.

FOLLOW-ON MAINTENANCE

Notify unit maintenance that wheel on affected bogie requires torquing.

3-8. OUTER/INNER WHEEL

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

Socket wrench handle (ratchet), 3/4-inch drive, item 15, appx. C
8-inch extension, 3/4-inch drive, item 12, appx. C
Socket (lug), 1-1/2-inch hex and 13/16-inch square nuts, 3/4-inch drive, item 25, appx. C
Suspension chain, item 10, appx. C
Metallic tube, item 6, appx. C

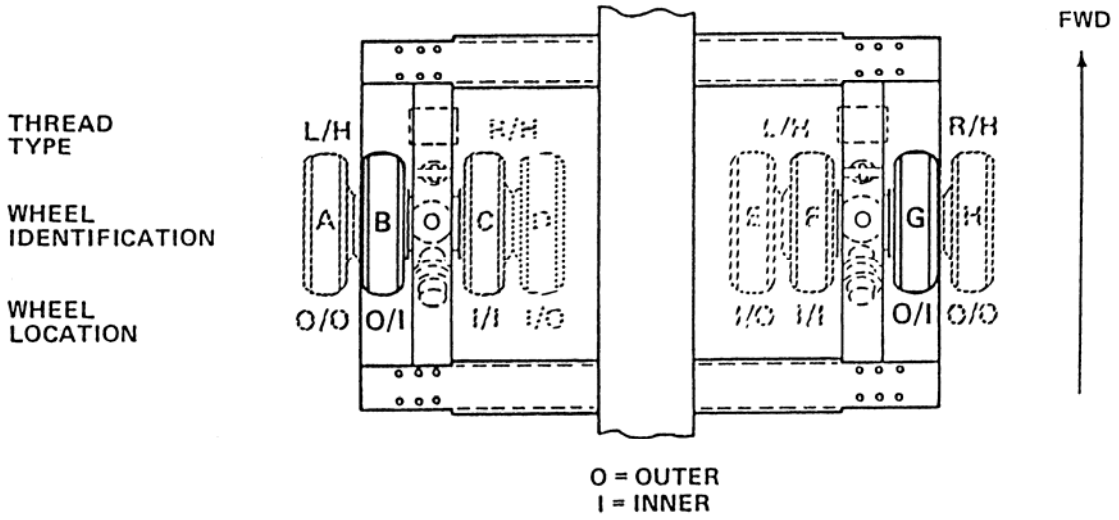
Personnel Required: 2

Equipment Condition

Outer/outer wheel removed (para. 3-7)
If necessary, spare tire removed (para. 3-6)

NOTE

Wheel removal/installation is divided into four separate procedures. Refer to diagram for location, wheel designation, and thread types. Within each procedure, notes will identify wheels, and right-hand left-hand lug nuts or lug studs.



3-8. OUTER/INNER WHEEL (CONT)

REMOVAL

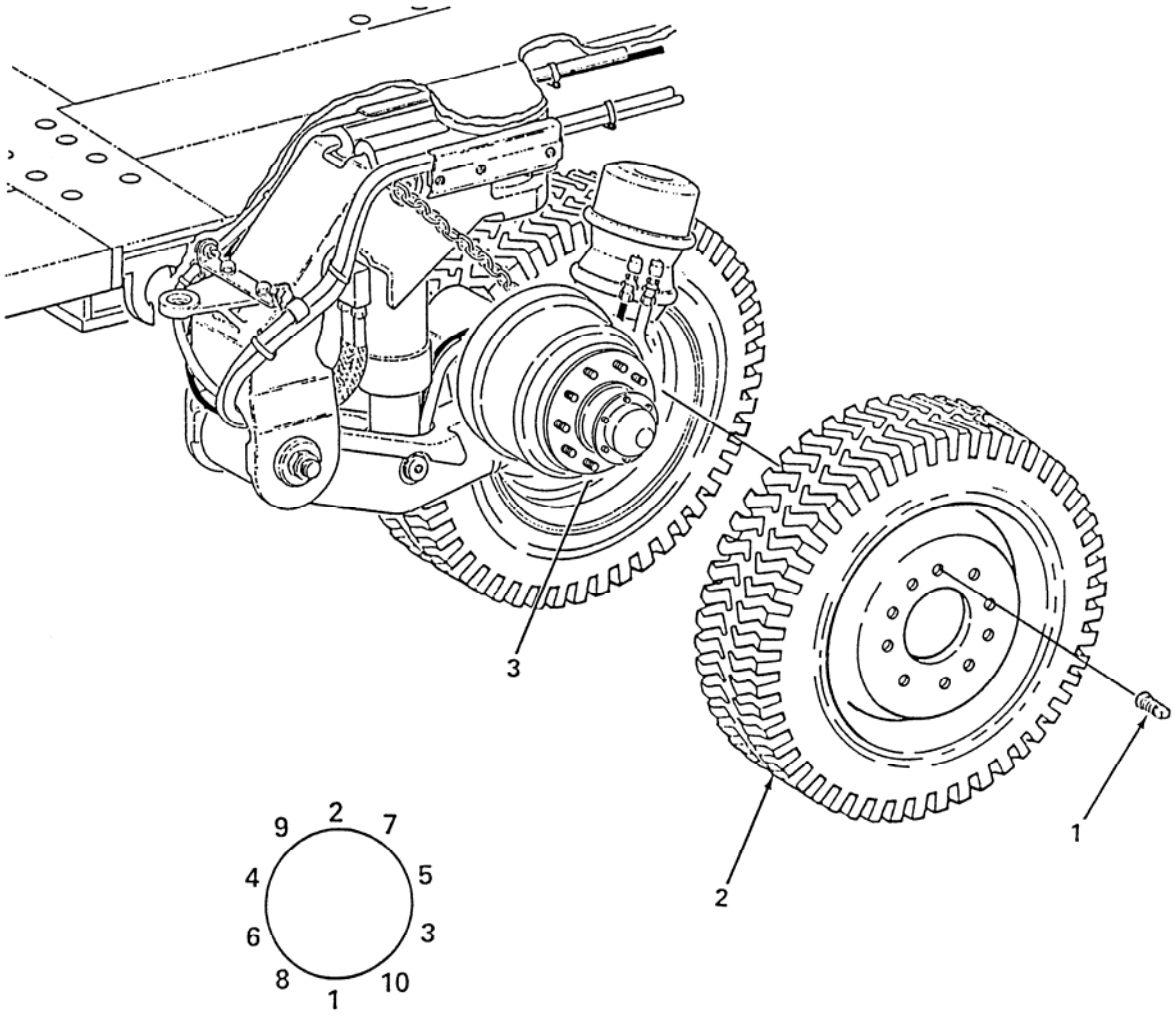
1. Start and run APU (para. 2-16) if not running.

2. Lower platform (para. 2-19) until all tires on affected bogie are on ground.

CAUTION

Wheel B has left-hand threaded lug studs. Wheel G has right-hand threaded lug studs. During removal, use correct rotation for each type thread or damage to lug nuts and lug studs may result.

3. Using ratchet, 8-inch extension, metallic tube, and lug socket, remove 10 lug studs (1).



NUT TIGHTENING SEQUENCE
FOR INNER DUAL

4. Raise platform (para. 2-19) until all tires for affected bogie are off the ground.

5. Remove 10 lug studs (1) and outer/inner wheel (2) from studs (3) on affected bogie. Clean lug studs and studs.

6. If other tire maintenance is to be performed, let APU run to charge battery.

INSTALLATION

1. Aline and install outer/inner wheel (2) onto hub studs (3) at affected bogie.

CAUTION

Wheel B has left-hand threaded lug studs. Wheel G has right-hand threaded lug studs. Use correct rotation for each type thread or damage to lug studs and hub studs may result.

2. Using ratchet, 8-inch extension, and lug socket, install 10 lug studs (1) onto hub studs (3) in sequence shown.

3. Start APU if not already running (para. 2-16).

4. Lower platform (para. 2-19) until all tires on affected bogie come in contact with the ground.

5. Using ratchet, 8-inch extension, and lug socket, continue to tighten lug studs (1) in sequence shown. Notify unit maintenance that lug studs (1) need to be torqued to 450 - 500 lb-ft (610 - 680 Nm). Torque in sequence shown.

6. Raise platform (para. 2-19) until all tires for affected bogie are off the ground.

7. Shut down APU (para. 2-16).

FOLLOW-ON MAINTENANCE

1. Install outer/outer wheel (para. 3-7).

2. Notify unit maintenance that wheel on affected bogie requires torquing.

3-9. INNER/OUTER WHEEL

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

Socket wrench handle (ratchet), 3/4-inch drive, item 15, appx. C
8-inch extension, 3/4-inch drive, item 12, appx. C
Socket (lug), 1-1/2-inch hex and 13/16-inch square nuts, 3/4-inch drive, item 25, appx. C
Suspension chain, item 10, appx. C
1-1/8-inch socket, 3/4-inch drive, item 22, appx. C
Adjustable open end wrench, 10-inch, item 26, appx. C
Metallic tube, item 6, appx. C

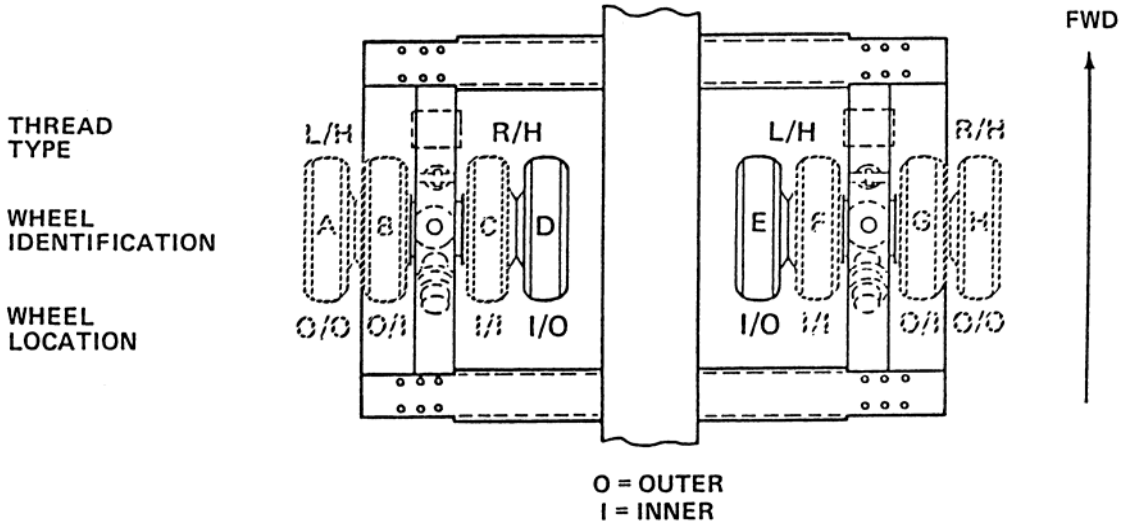
Personnel Required: 2

Equipment Condition

Platform set at normal road height (para. 2-19)
Gooseneck lowered to lowest position, if uncoupled (para. 2-18)
If necessary, spare tire removed (para. 3-6)

NOTE

Wheel removal/installation is divided into four separate procedures. Refer to diagram for location, wheel designation, and thread types. Within each procedure, notes will identify wheels, and right-hand and left-hand lug nuts or lug studs.



REMOVAL

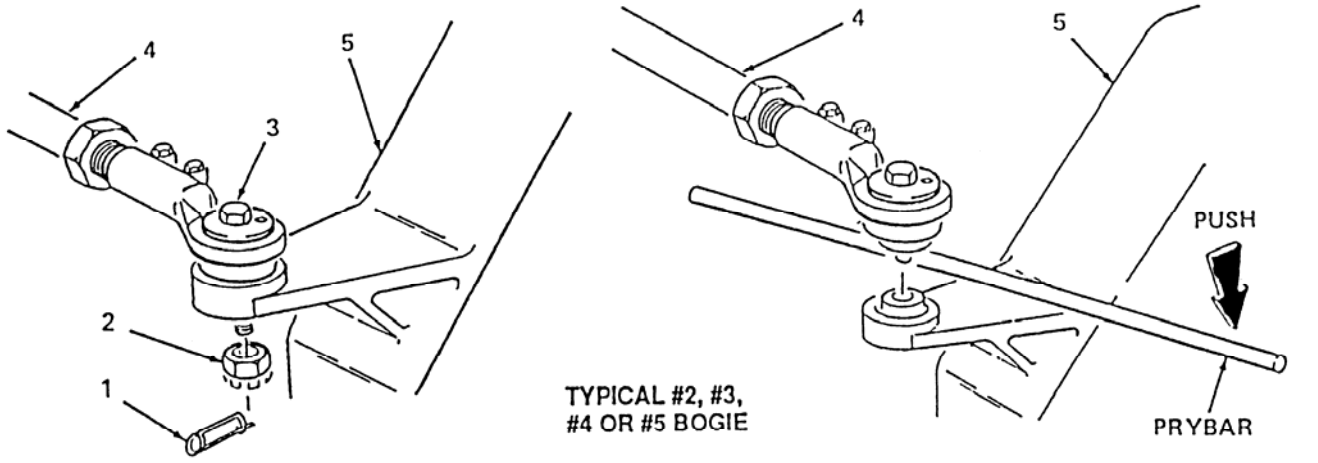
CAUTION

Push steering or nonsteering connecting link forward, toward front of semitrailer, to allow clearance for suspension assembly to be rotated or damage to equipment may result.

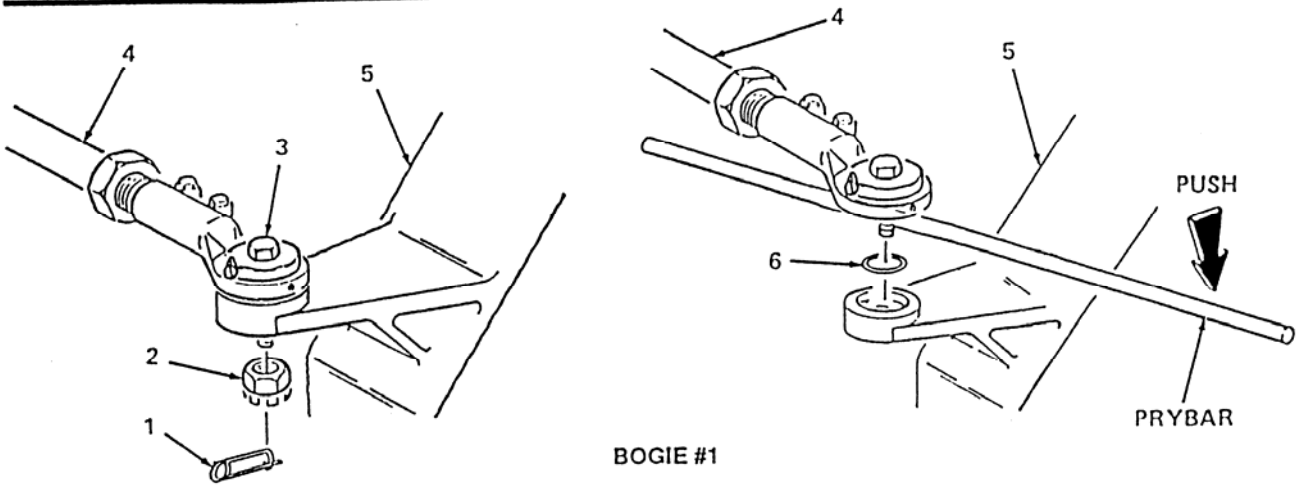
1. Using 1-1/8-inch socket, ratchet, and adjustable wrench, loosen and remove safety pin (1) and nut (2) from capscrew (3). Leave capscrew (3) inside of connecting link (4).

2. Using a suitable prying device, lift and remove connecting link (4) from affected bogie (5). Once connecting link (4) is pushed out of the way, aline and install nut (2) and safety pin (1) back onto bolt (3) for temporary storage.

3. If the #1 bogie connecting link (4) was disconnected, remove preformed packing (6).



TYPICAL #2, #3, #4 OR #5 BOGIE



BOGIE #1

3-9. INNER/OUTER WHEEL (CONT)

4. Start and run APU (para. 2-16).

5. Lower platform (para. 2-19) to normal road height. Leave APU running to recharge battery.

CAUTION

When securing hook to axle, make sure that suspension chain does not contact any hydraulic lines or air brake hoses. If contact is made, chafing of a line/hose, loss of air brake pressure, loss of hydraulic fluid, or damage to equipment may result.

6. Attach suspension chain (7) to bogie as follows:

   (a) Attach end (top) hook (8) of suspension chain (7), along outboard side of bogie, beneath both hydraulic and air brake lines, into opening in upper suspension arm casting of bogie (5).

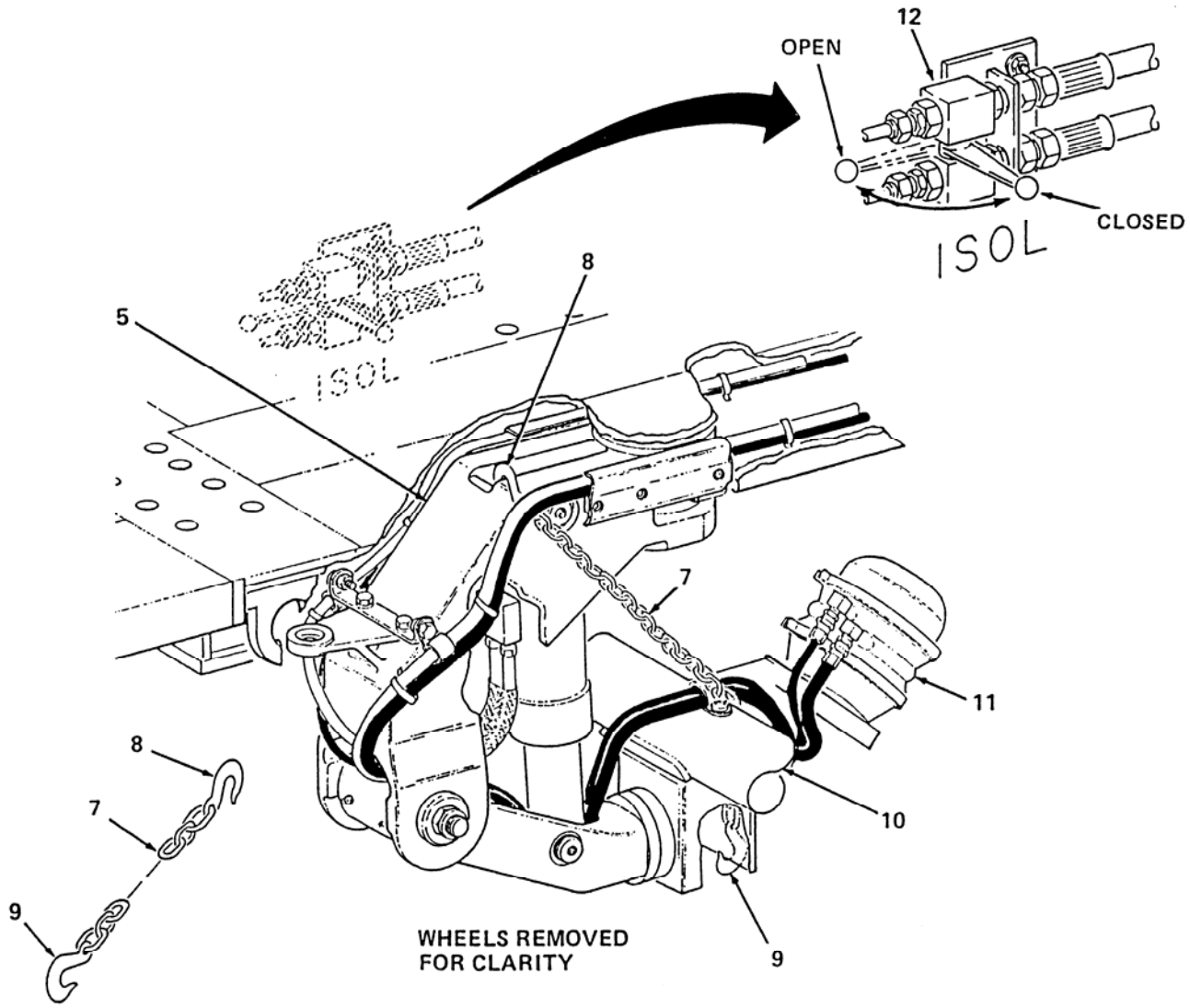
   (b) Attach bottom hook (9) of suspension chain (7) onto back end of square casting under axle (10) outboard of parking brake chamber (11).

WARNING

Make sure suspension isolation valve at the affected bogie is closed (handle facing outward) prior to adjusting platform height or the suspension chain can break and cause injury to personnel and damage to equipment.

7. At affected bogie, close suspension isolation valve (12), handle facing outboard from center of platform.

8. Raise platform (para. 2-19) until all tires for affected bogie are off the ground.


12
OPEN
CLOSED
ISOL
ISOL
5
8
7
11
10
9
8
7
9
WHEELS REMOVED
FOR CLARITY

3-9. INNER/OUTER WHEEL (CONT)

CAUTION

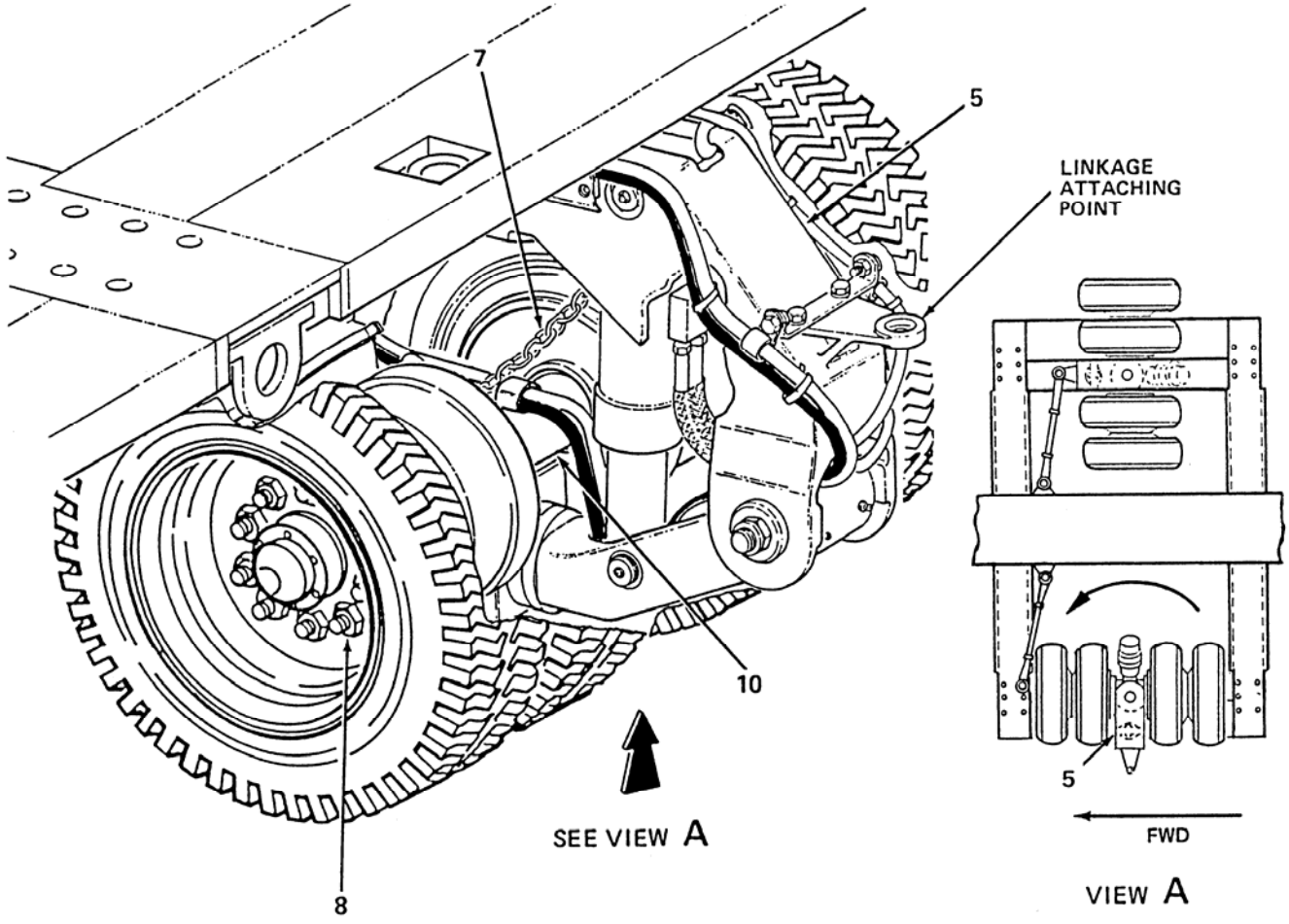
The bogie must be rotated outward from its normal position so that the linkage attaching point is outboard of the platform edge or damage to the hydraulic and/or pneumatic lines may result.

9. Start to turn bogie outboard away from center of platform. Be sure that no sharp bends, kinks, or excess strain exist on two hydraulic lines and air brake lines routed to affected bogie.

CAUTION

Do not turn bogie more than 90 degrees outboard from center of platform or damage to hydraulic and/or pneumatic lines may result.

10. Continue to turn bogie (5) until bogie linkage attaching point is outboard of the platform edge and the bogie axle (10) is parallel with that side of platform, not to exceed 90 degrees from original forward position.



11. Lower platform (para. 2-19) until all tires on affected bogie come in contact with the ground.

CAUTION

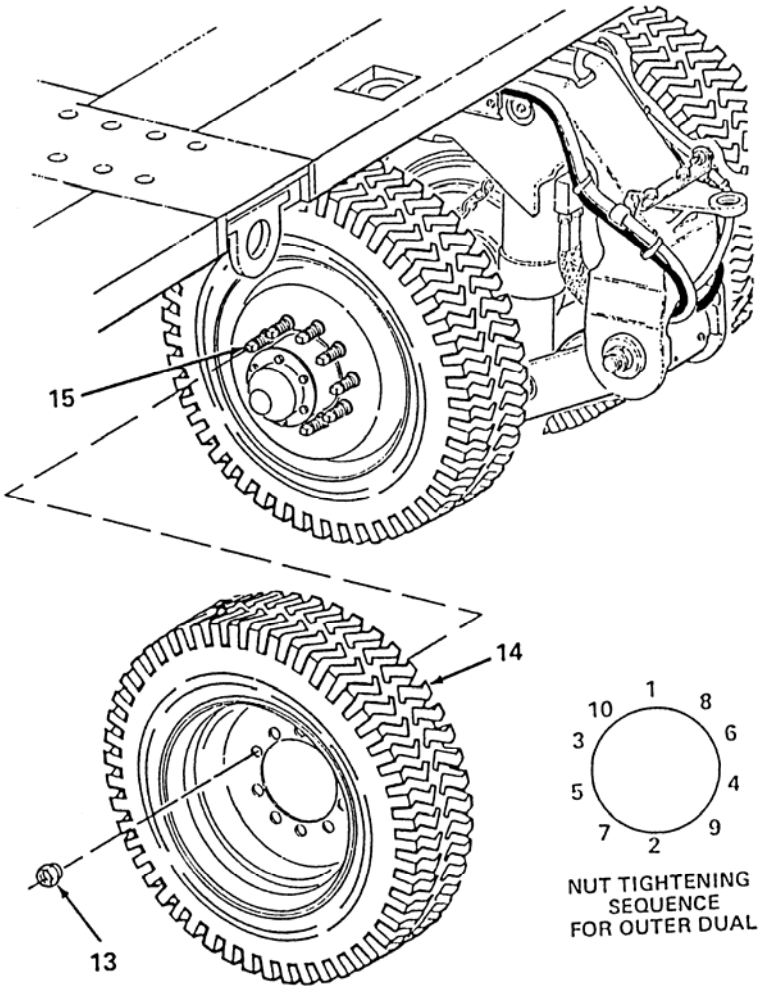
Wheel E has left-hand threaded lug nuts. Wheel D has right-hand threaded lug nuts. During removal, use correct rotation for each type thread or damage to lug nuts and lug studs may result.

12. Using ratchet, 8-inch extension, metallic tube, and lug socket, loosen 10 lug nuts (8).

13. Raise platform (para. 2-19) until all tires for affected bogie are off the ground.

14. Remove lug nuts (13) and inner/outer wheel (14) from lug studs (15) on affected bogie.

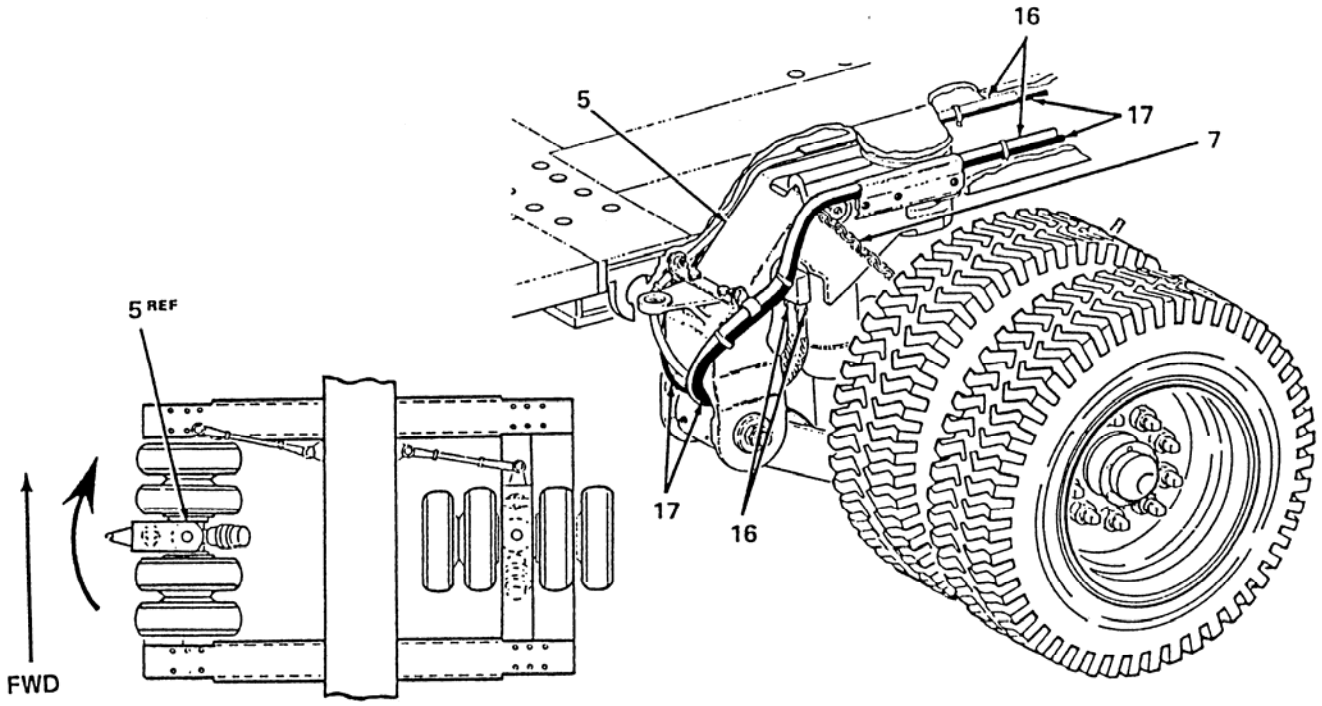
15. If other tire maintenance procedures are to be performed, leave APU running to charge battery.



3-9. INNER/OUTER WHEEL (CONT)

INSTALLATION

1. Start APU (para. 2-16) if not running.
2. Inspect wheels for damage. Inspect stud holes for debris and clean if necessary.
3. Clean all threads on studs and nuts.
4. Aline inner/outer wheel (14) onto lug studs (15) so that valve stem is 180 degree opposite valve stem on inner wheel.
5. Install top and bottom lug nuts (13) finger tight to seat wheel properly.
6. Install and hand tighten 8 remaining lug nuts (13) and hand tighten all 10 lug nuts (13) in sequence shown.
7. Lower platform (para. 2-19) until all tires on affected bogie come in contact with the ground.
8. Using ratchet, 8-inch extension, and lug socket, continue to tighten lug nuts (13) in sequence shown. Notify unit maintenance that lug nuts (13) need to be torqued to 450 - 500 lb-ft (610 - 680 Nm). Torque in sequence shown.
9. Raise platform (para. 2-19) until all tires on affected bogie are off the ground.
10. Rotate bogie (5) and pull towards semitrailer gooseneck so that linkage attaching point faces forward.



CAUTION

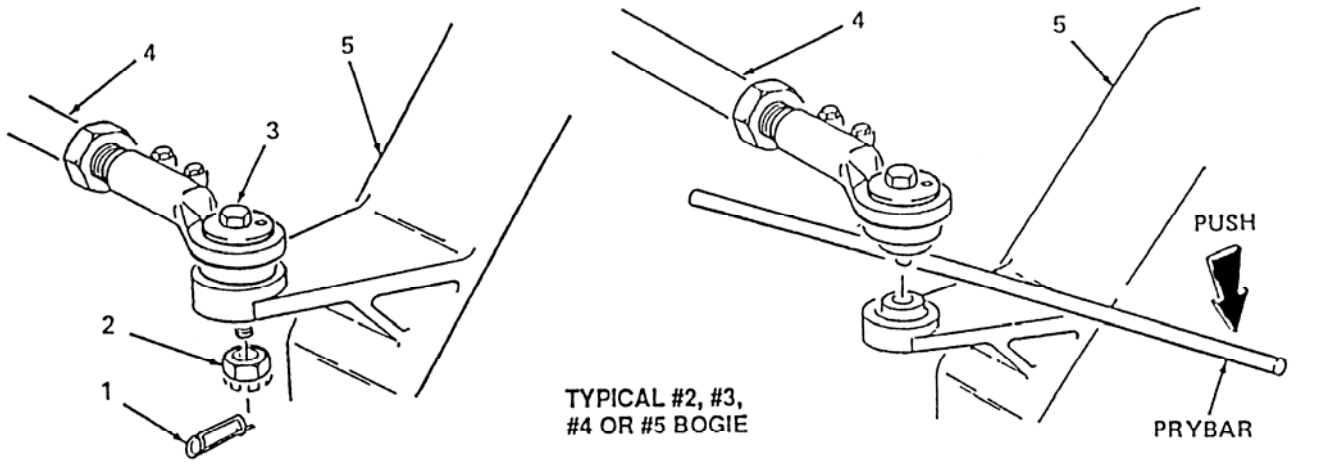
Ensure that hydraulic and air brake lines are securely mounted on bogie or damage to equipment may result.

11. Check that two hydraulic lines (16) and air brake lines (17) are not chafed, broken, or missing any electrical tiewraps at affected bogie (5). If any defects exist or items are missing, notify unit maintenance.

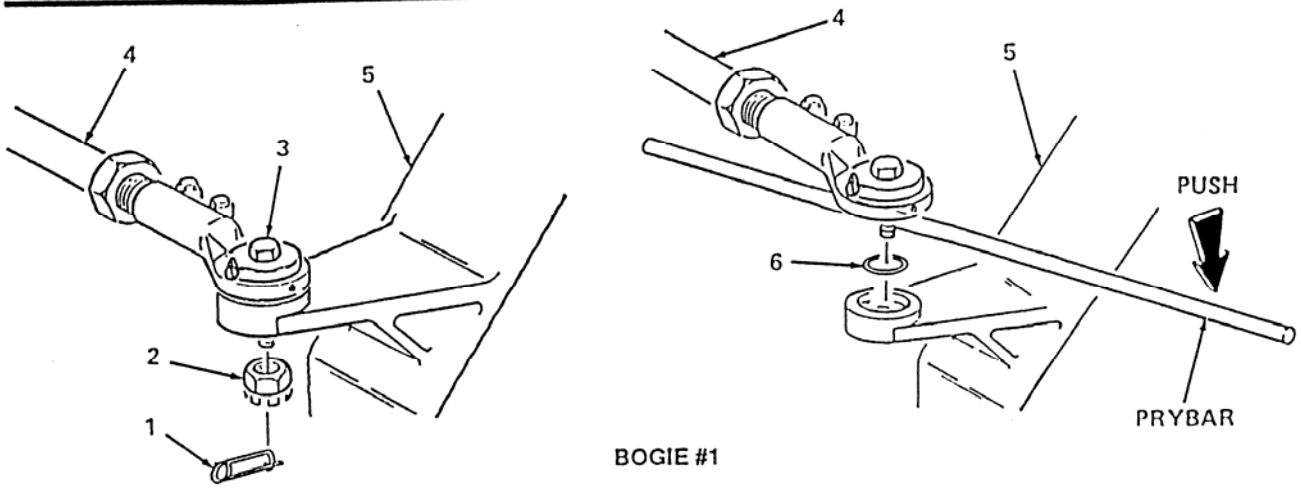
12. Continue to move bogie (5) as required until linkage attaching point on bogie (5) is approximately alined with connecting link (4).

13. For #1 bogie only, aline and install preformed packing (6) onto bogie (5).

14. Remove safety pin (1) and nut (2) from capscrew (3). Aline and install connecting link (4) onto linkage attaching point on bogie (5). Secure in place by installing capscrew (3) and nut (2).



TYPICAL #2, #3, #4 OR #5 BOGIE



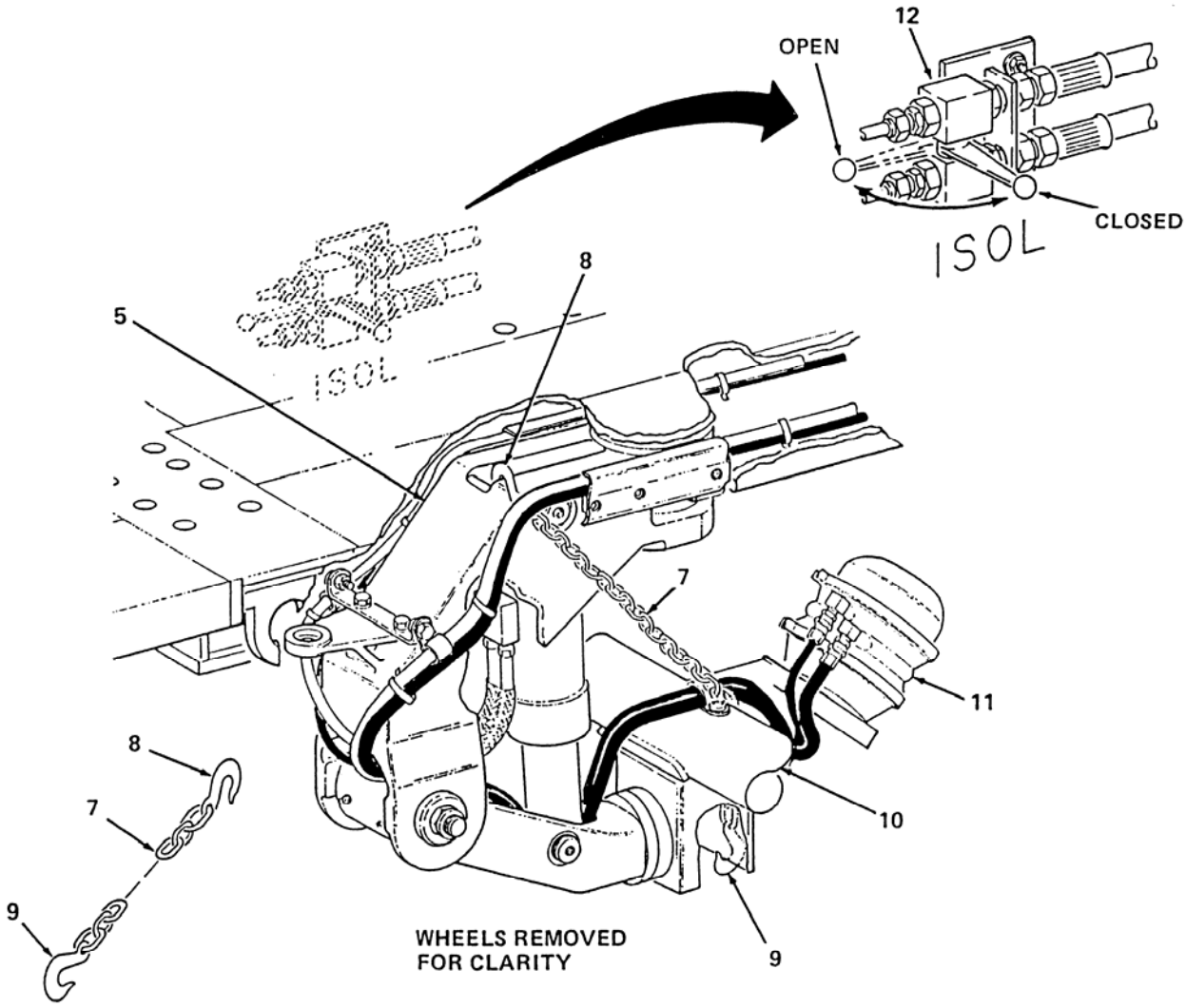
BOGIE #1

3-9. INNER/OUTER WHEEL (CONT)

15. Using adjustable wrench, ratchet, and 1-1/8-inch socket, continue to tighten nut (2) until hole in capscrew (3) is alined with slot in nut (2). Install safety pin (1). Notify unit maintenance that nut (2) needs to be torqued to a minimum of 205 lb-ft (278 Nm). Then, continue to tighten nut (2) until first available slot is aligned with hole and safety pin (1) can be installed.

16. Lower platform (para. 2-19) until all tires on affected bogie touch ground.

17. Open suspension isolation valve (12) at affected bogie (handle facing inboard towards front of semitrailer).



18. Continue to lower platform (para. 2-19) until there is enough clearance to remove suspension chain (7) from affected bogie.

19. Re-adjust platform height (para. 2-19) to 43 inches (109 cm).

20. Shut down APU (para. 2-16).

21. Restow all tools and equipment used during this procedure.

FOLLOW-ON MAINTENANCE

Notify unit maintenance that wheel nuts and nut on outboard end of connecting link of affected bogie require torquing.

3-10. INNER/INNER WHEEL

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

Socket wrench handle (ratchet), 3/4-inch drive, item 15, appx. C
8-inch extension, 3/4-inch drive, item 12, appx. C
Socket (lug), 1-1/2-inch hex and 13/16-inch square nuts, 3/4-inch drive, item 25, appx. C
Suspension chain, item 10, appx. C
Metallic tube, item 6, appx. C

Personnel Required: 2

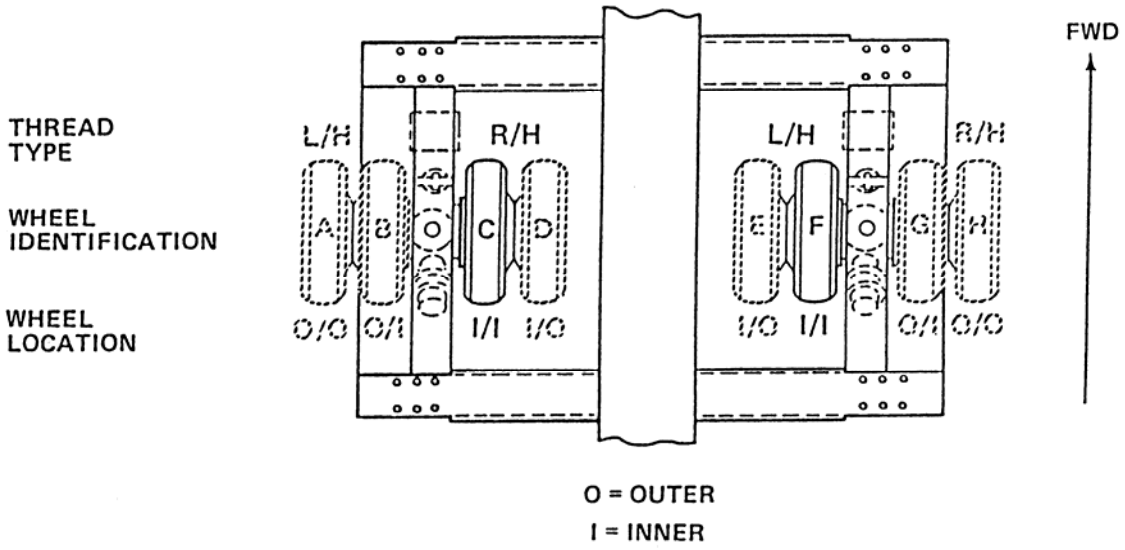
Equipment Condition

Inner/outer wheel removed (para. 3-9)
If necessary, spare tire removed (para. 3-6)

3-10. INNER/INNER WHEEL (CONT)

NOTE

Wheel removal/installation is divided into four separate procedures. Refer to diagram for location, wheel designation, and thread types. Within each procedure, notes will identify wheels, and right-hand and left-hand lug nuts or lug studs.



REMOVAL

1. Start and run APU (para. 2-16), if not running.

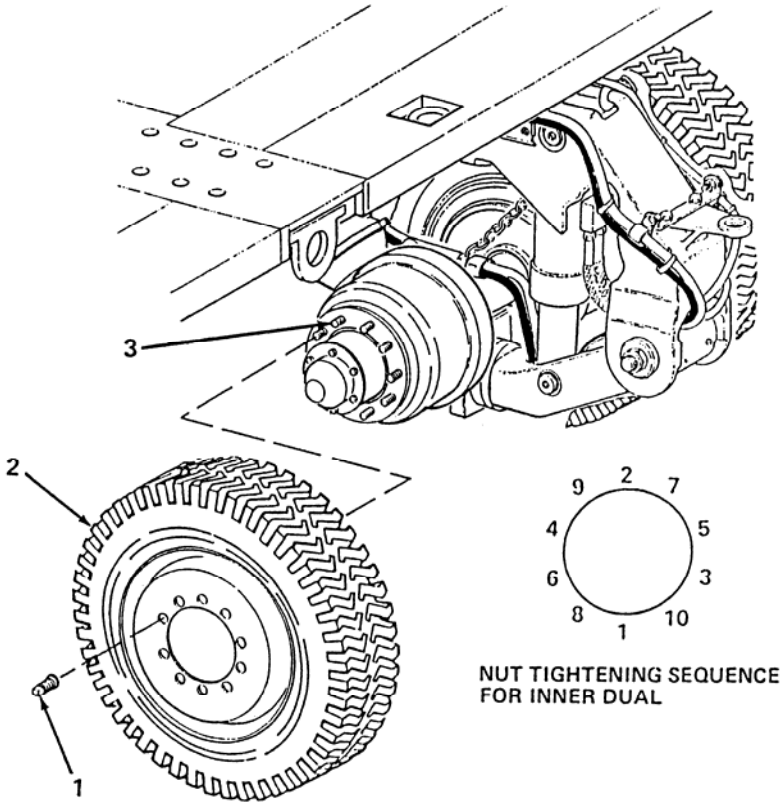
2. Lower platform (para. 2-19) until all tires for affected bogie are on the ground.

CAUTION

Wheel F has left-hand threaded lug studs. Wheel C has right-hand threaded lug studs. During removal, use correct rotation for each type thread or damage to lug studs and hub studs may result.

3. Using ratchet, 8-inch extension, metallic tube, and lug socket, loosen 10 lug nuts (1).

4. Raise platform (para. 2-19) until all tires for affected bogie are off the ground.



5. Remove 10 lug nuts (1) and inner/inner wheel (2) from studs (3) on affected bogie. Clean lug studs and studs.

6. If other tire maintenance is to be performed, let APU run to charge battery.

INSTALLATION

1. Aline and install inner/inner wheel (2) onto hub studs (3) at affected bogie.

CAUTION

Wheel B has left-hand threaded lug studs. Wheel G has right-hand threaded lug studs. Use correct rotation for each type thread or damage to lug studs and hub studs may result.

2. Using ratchet, 8-inch extension, and lug socket, install 10 lug studs (1) onto hub studs (3) in sequence shown.

3. Start APU (para. 2-16) if not already running.

4. Lower platform (para. 2-19) until all tires on affected bogie come in contact with the ground.

3-10. INNER/INNER WHEEL (CONT)

5. Using ratchet, 8-inch extension, and lug socket, continue to tighten lug studs (1) in sequence shown. Notify unit maintenance that lug studs (1) need to be torqued to 450 - 500 lb-ft (610 - 680 Nm). Torque in sequence shown.

6. Raise platform (para. 2-19) until all tires for affected bogie are off the ground.

FOLLOW-ON MAINTENANCE

1. Install inner/outer wheel (para. 3-9).

2. Notify unit maintenance that wheels on affected bogie require torquing.

CHAPTER 4

UNIT MAINTENANCE INSTRUCTIONS

SECTION NO.	TITLE
I	Repair Parts, Special Tools, TMDE, and Support Equipment
II	Service Upon Receipt
III	Unit Preventive Maintenance Checks and Services (PMCS)
IV	Unit Troubleshooting
V	General Maintenance Instructions
VI	Unit Maintenance Instructions
VII	Preparation for Storage or Shipment

4-1. SCOPE

This chapter provides all maintenance tasks to be performed by unit maintenance personnel.

Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

PARA. NO.	TITLE
4-2	Common Tools and Equipment
4-3	Special Tools, TMDE, and Support Equipment
4-4	Repair Parts

4-2. COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment, refer to the Table of Organization and Equipment (TOE) or the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

4-3. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Refer to TM 9-2330-381-24P for special tools to support the semitrailer.

4-4. REPAIR PARTS

Refer to TM 9-2330-381-24P for repair parts for the semitrailer.

Section II. SERVICE UPON RECEIPT

PARA. NO.	TITLE
4-5.....	Unpacking
4-6.....	Inspection/Servicing
4-7.....	Operational Check

4-5. UNPACKING

a. Check information on all storage and shipment labels on the semitrailer; then, remove labels.

b. Remove documents from platform stowage compartment (1).

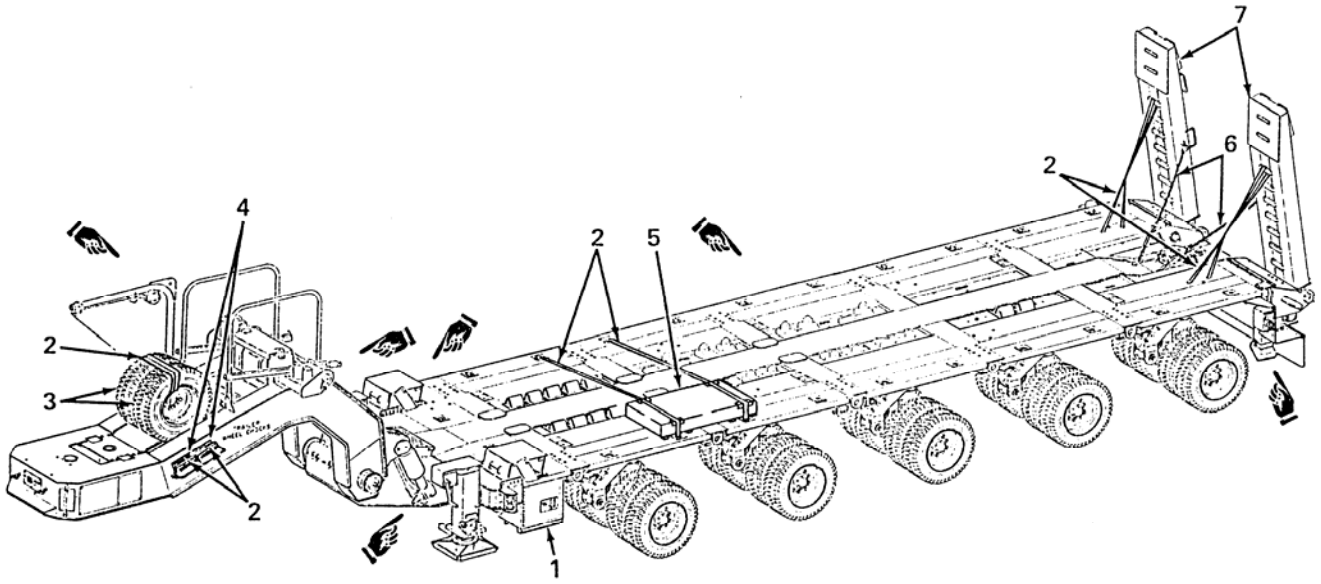
c. Cut and remove steel strapping (2) from spare tires (3), wheel chocks (4), two mounted on each side of gooseneck, and Basic Issue Items (BII)/On Vehicle Equipment (OVE) shipping box (5).

d. Make sure that safety chains (6) of loading ramps (7) are properly connected to platform (para. 2-20); then, cut and remove steel straping (2) from each loading ramp.

e. Open wooden BII/OVE shipping box (5) and remove, unwrap, and inspect each item as it is unpacked. Remove preservative materials from items using a wiping rag (item 19, appx. E).

f. Inspect items for rust, corrosion, or damage. Discard individual wrappings and cushioning materials; however, shipping box should be retained for future use.

g. Refer to Appendix C BII and OVE listings to inventory all items removed from shipping box and/or shipped mounted on semitrailer. Report missing items in accordance with DA PAM 738-750. Report damaged items on DD Form 6, Packaging Improvement Report.



h. Install two shackles (8) on two recovery eyes (9) on rear of semitrailer platform.

i. Alter crowbar (10) using pedestal grinder (item 17, appx. B) to scribe three platform height markings as follows:

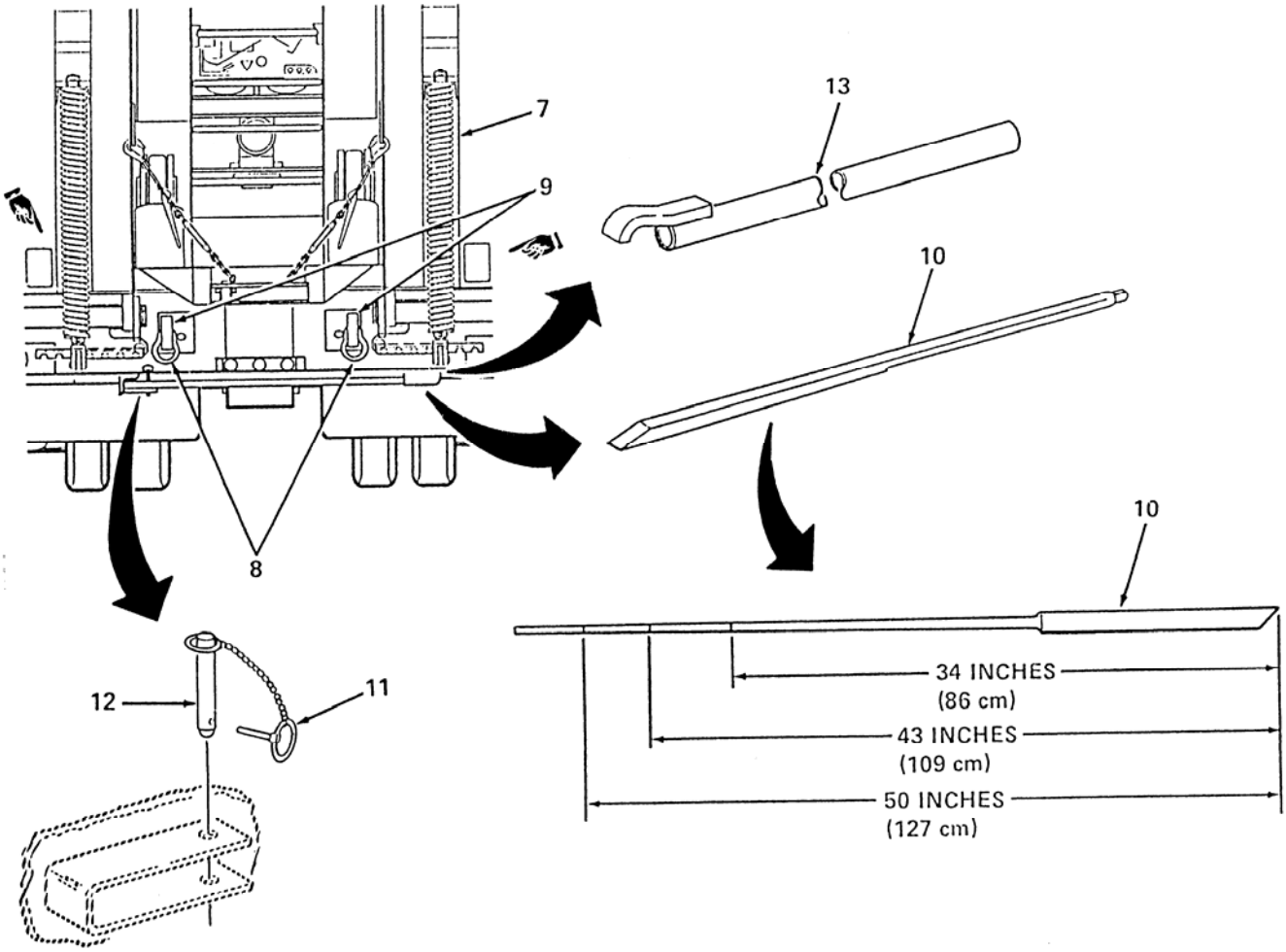
(1) Make first mark at 34 inches (86 cm) from knife edge of crowbar.

(2) Make second mark at 43 inches (109 cm) from knife edge of crowbar.

(3) Make third mark at 50 inches (127 cm) from knife edge of crowbar.

(4) Repaint grinded areas as required.

j. Unfasten linch pin (11) and remove hitch pin (12) from mounting bracket at rear of platform beneath loading ramps (7). Install crowbar (10) and isolation valve handle extension (13) in mounting brackets. Reinstall hitch pin (12) and secure with linch pin (11).



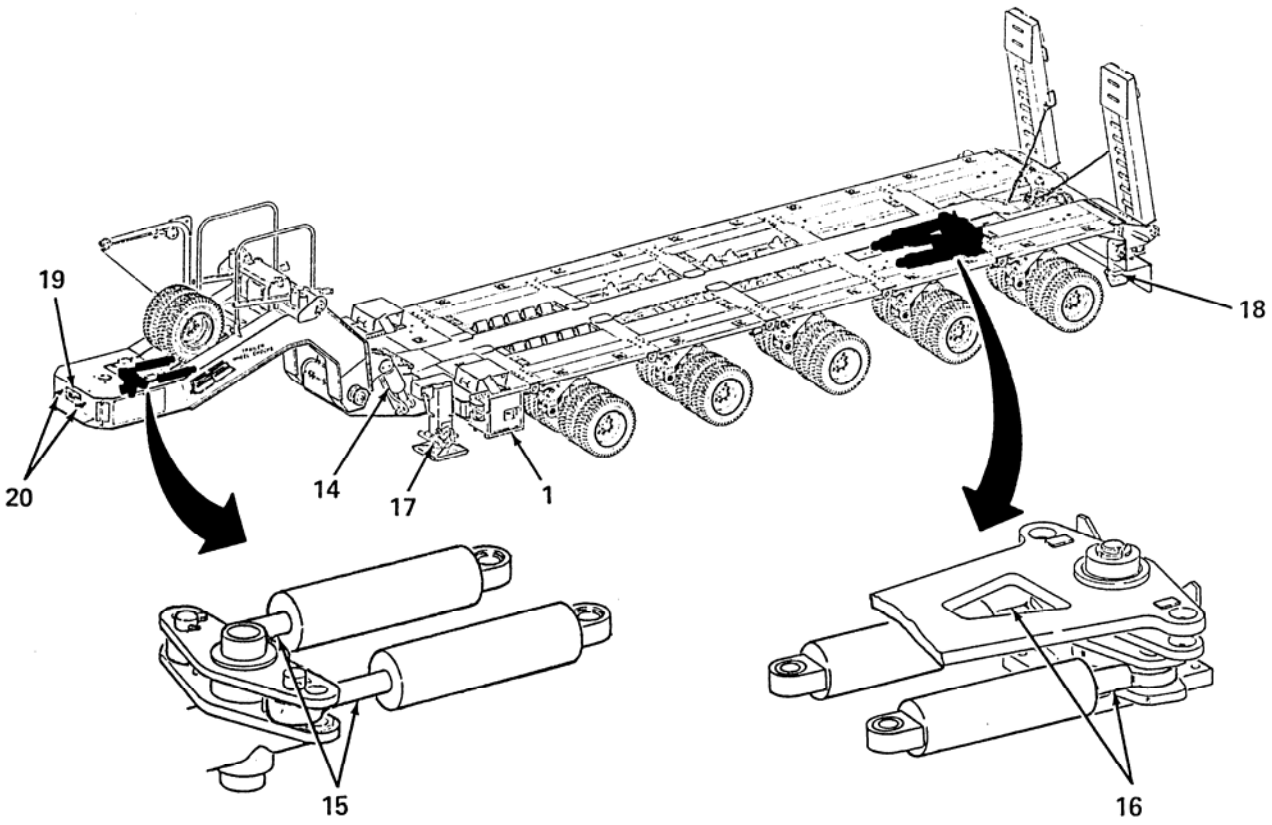
4-5. UNPACKING (CONT)

k. Deleted.

l. Remove preservative material from pistons on two gooseneck pivot cylinders (14), two gooseneck mounted steering cylinders (15), and two platform mounted steering cylinders (16) with a wiping rag (item 19, appx. E).

m. Refer to paragraph 2-22 and 2-23 and lower both front support legs (17) and rear support legs (18). Remove preservative material from support leg extensions using a wiping rag (item 19, appx. E). Return all support legs to stowed position (para. 2-22 and 2-23).

n. At front of gooseneck, remove tape from around dummy couplings (19) and gladhand connections (20). Discard tape.



o. Install beacon warning light to vehicular bar lamp mount and connect to electrical harness at streetside deflector as follows:

(1) Secure the following components from the warning light kit (item 50, appx. C):

Lockwasher (2), P/N MS35338-48
Clamp, P/N 12296644
Pole mount bracket, P/N 12296643
L-bracket, P/N 12296641
Triangle plate, P/N 12296642
Adapter (2), P/N MS27147-1
Ground cable assembly, P/N 12296578-1
Pipe, P/N 12296639-1
Bolt (3), P/N 12296638
Bolt (2), P/N MS90726-115
Bolt (2), P/N MS90726-38
Lead (2), P/N 8762797
Cable assembly, P/N 12296577

4-5. UNPACKING (CONT)

(2) Secure the following components from strobe light assembly (item 49, appx. C):

Strobe light assembly
Screw (3)
Gasket
Locknut (3)

(3) Disconnect intervehicular cable from semitrailer.

(4) Assemble clamp (21), L-bracket (22), and pole mount bracket (23) with two bolts (24) and lockwashers (25).

CAUTION

Be sure clamp does not contact lens on vehicular bar lamp or damage may result.

(5) Install three bolts (26) on clamp (21) and install entire clamp assembly, single mounting bolt side up, onto lower edge of vehicular bar lamp mount between streetside and center lamps and tighten three bolts (26) evenly.

CAUTION

Be sure leads are not crimped between light and gasket or damage may result.

(6) Install beacon warning light (27) and gasket (28) onto triangle plate (29) and secure with three screws (30) and locknuts (31).

(7) Use hacksaw (item 17, appx. B) and cut pipe (32) to length of 2-1/2 inches (6.4 cm), including threads. Thread pipe (32) into bottom of triangle plate (29) and tighten.

(8) Insert pipe (32) into pole mount bracket (23). With wires facing toward front of semitrailer, tighten two screws (33) to secure beacon warning light.

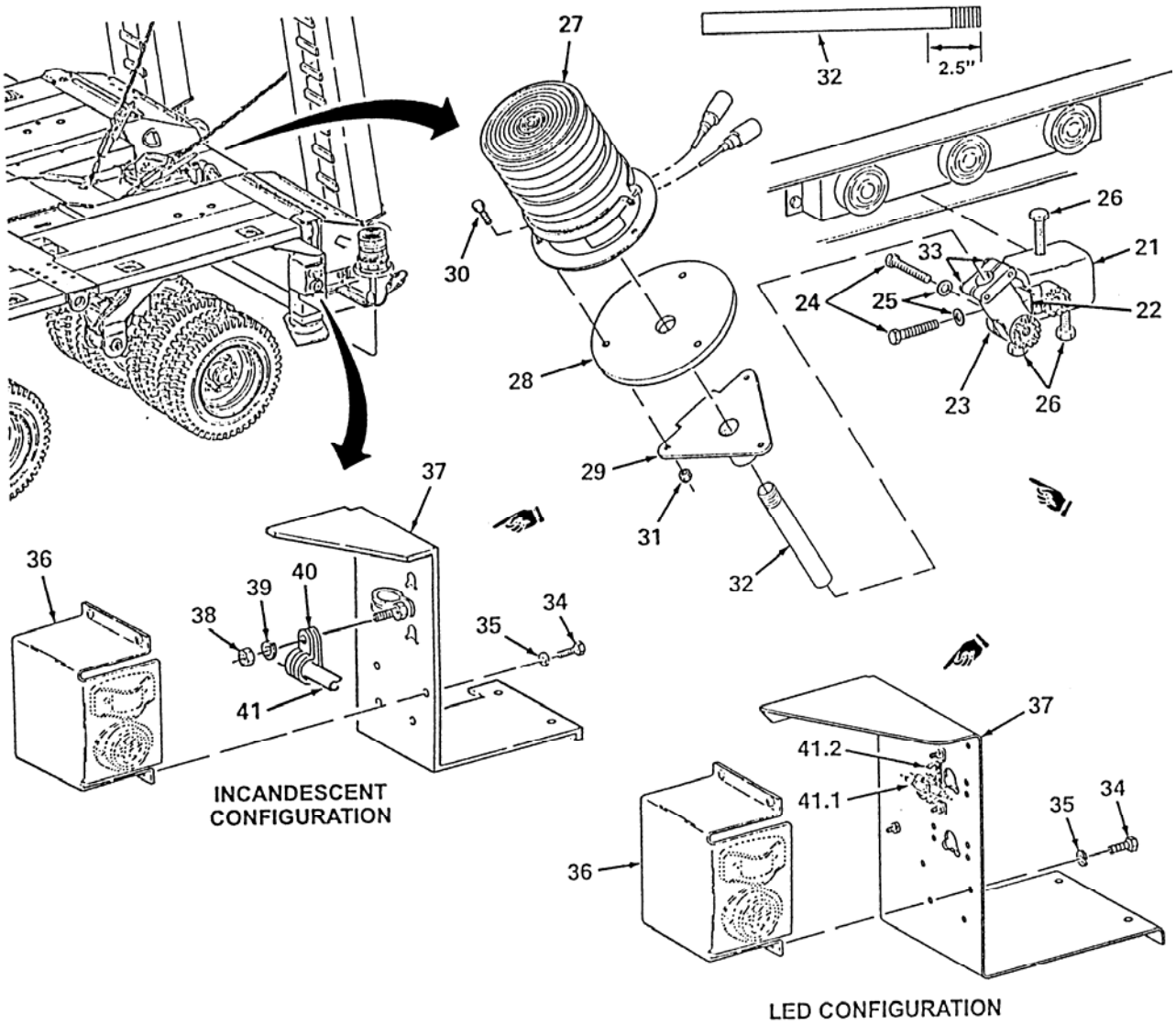
NOTE

Ensure intervehicular cable (electrical cable) is not connected to semitrailer.

(9) Remove four capscrews (34), lockwashers (35), and access cover (36) from streetside deflector (37). Disconnect side clearance light wire from harness (41) and move access cover (36), with clearance light installed, out of the way.

(a) For incandescent lights, remove locknut (38), lockwasher (39), and clamp loop (40) securing harness (41) to deflector (37). Discard locknut (38) and lockwasher (39). Reinstall clamp loop without harness.

(b) For light emitting diode (LED) lights, remove center connector (41.1) from connector clip (41.2).


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INCANDESCENT CONFIGURATION
37
41.2
41.1
35
34
36
LED CONFIGURATION

4-5. UNPACKING (CONT)

(10) At rear clearance light, disconnect clearance light wire #489 (42) from harness wire #21-489 (43) and install jumper lead (44) and adapter (43).

(11) Install ground lead (52) as follows:

(a) For incandescent lights, remove two screws (46) and lens cover (47) from rear clearance light (48). Locate clearance light mounting screw (49) with externally toothed lockwasher (50) under locknut (51). Remove screw (49), locknut (51), and lockwasher (50). Discard lockwasher (50) and locknut (51).

(b) For incandescent lights, install screw (49), ground lead (52), lockwasher (50), and locknut (51). Ensure ground lead (52) is in contact with bare metal and that ground lead (52) is positioned not to interfere with installation of access cover (36).

(c) Install lens cover (47) and secure with two screws (46).

(d) For LED lights, remove locknut (51.1) and screw (51.2) from bottom mount hole of connector clip (41.2). Discard locknut.

(e) For LED lights, install screw (51.2), ground lead (52), and locknut (51.1) to bottom mount hole of connector clip (41.2). Ensure ground lead (52) is in contact with bare metal and that ground lead (52) is positioned not to interfere with installation of access cover (36).

(12) Install screw (49), ground lead (52), lockwasher (50), and locknut (51). Ensure ground lead (52) is in contact with bare metal and that ground lead (52) is positioned not to interfere with installation of access cover (36).

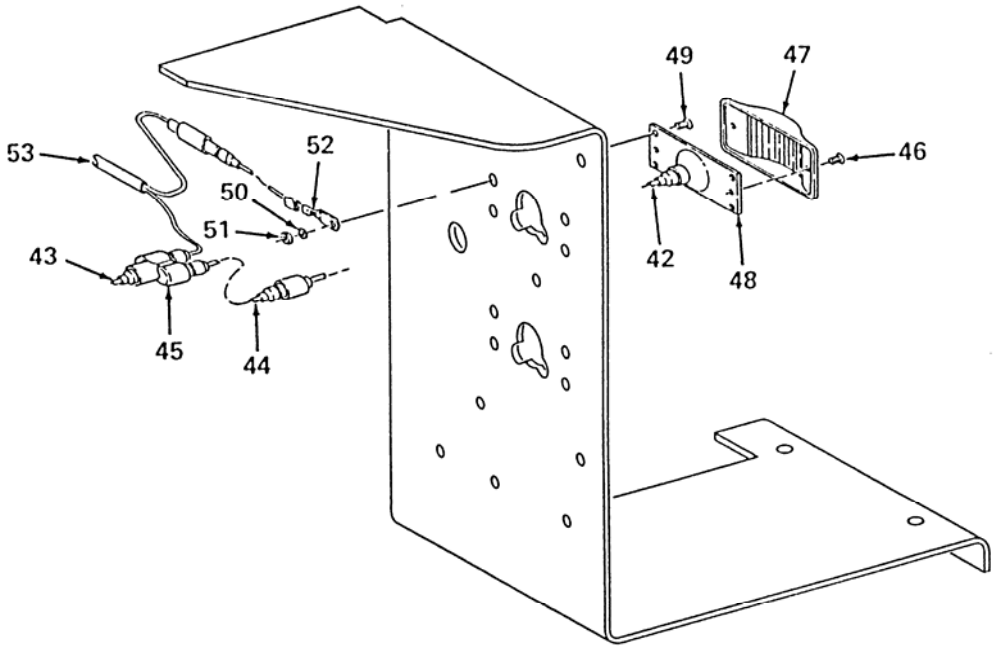
(13) Secure adapter (45) as follows:

(a) For incandescent lights, attach adapter (45) to outside clamp loop (40) and secure with wire ties.

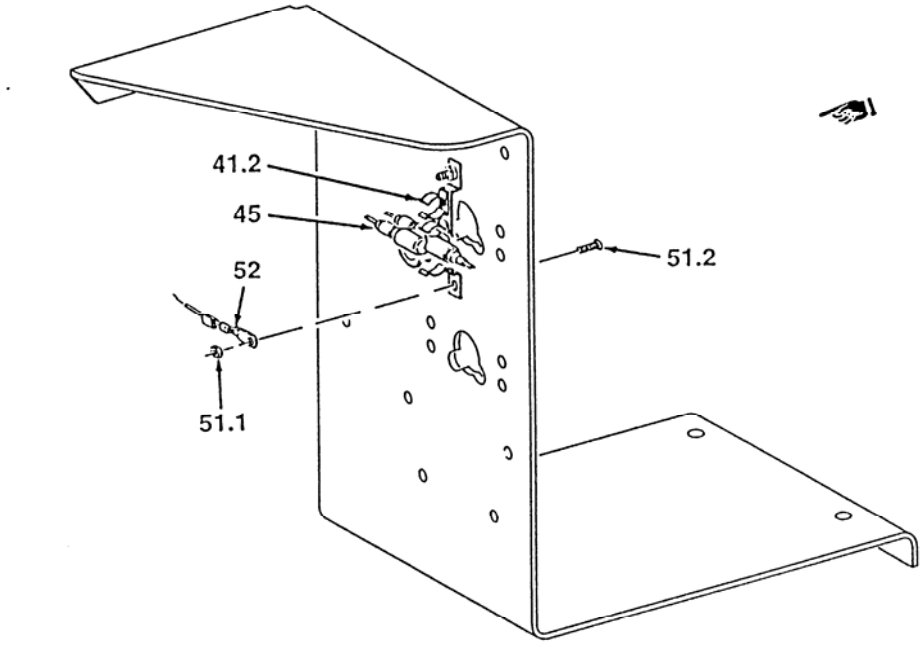
(b) For LED lights, insert adapter (45) into center clip of connector clip (41.2).

(14) Install access cover (36) and secure with four lockwashers (35) and capscrews (34).

p. Return remaining items removed from shipping box to unit supply.



INCANDESCENT
CONFIGURATION



LED CONFIGURATION

4-6. INSPECTION/SERVICING

a. Service APU as follows:

(1) Gain access to APU on gooseneck (para. 2-13).

(2) Check tag on APU crankcase dipstick to determine if oil requires changing. If required, change oil and filter (para. 3-3).

(3) Remove tag from radiator (2) neck. Check coolant level (para. 4-110) and replenish, if required, with equal parts of water and antifreeze (item 2, appx. E).

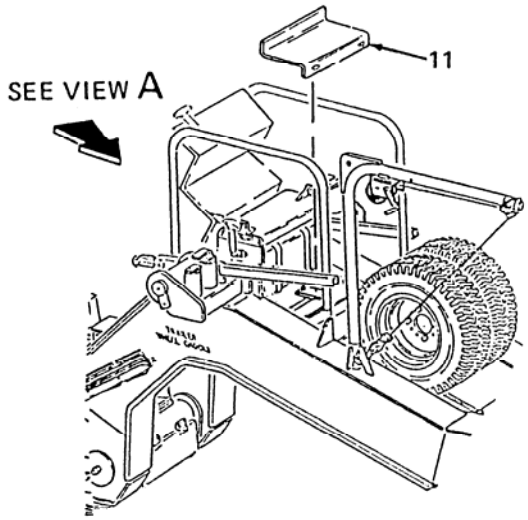
WARNING

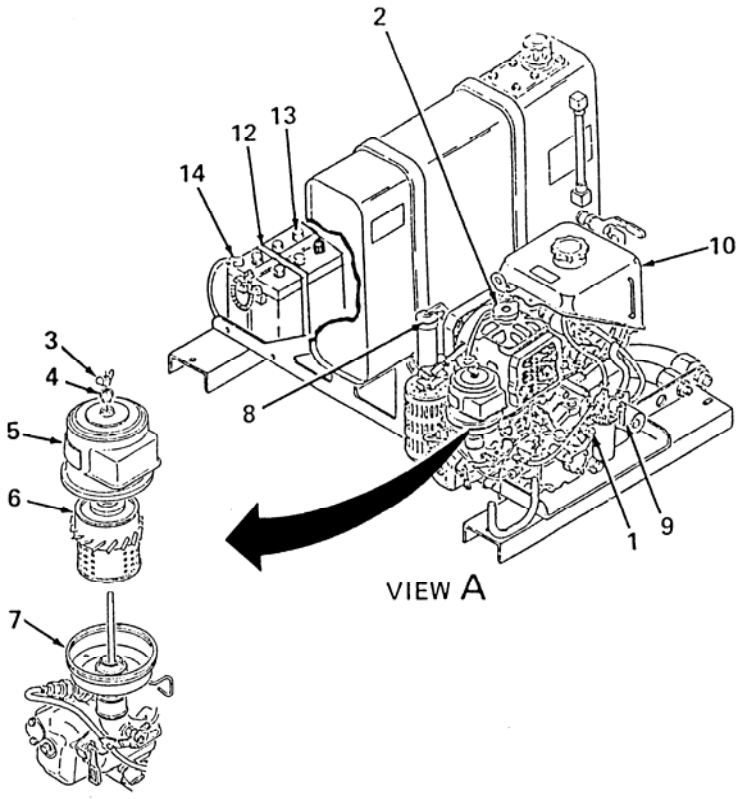
If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

(4) Remove wingnut (3), grommet (4), air cleaner cover (5), and air filter (6). Remove tape and paper from opening of air inlet (7).

(5) Remove tape from exhaust pipe opening under rain cap (8).

(6) Remove tag from fuel filter petcock (9). Remove fuel filter element (para. 4-105) and drain preservative oil. Install new filter element.





4-6. INSPECTION/SERVICING (CONT)

(7) Drain fuel tank (para. 4-104). Refill APU fuel tank with proper grade of fuel (para. 3-3).

WARNING

Do not wear watches, rings, or other jewelry which could short out battery terminals while servicing battery. Do not smoke or use open flame around battery. Battery may explode from a spark. Battery acid is harmful to skin and eyes. Wear protective goggles to prevent injury to personnel when working with battery.

b. Remove forward step assembly (11) from gooseneck (para. 4-56) to gain access to battery.

c. Cut and remove steel straping (12) from around battery.

d. Remove battery filler caps (13) and barrier material. Check level of electrolyte. Top off fluid level with distilled water. Check electrolyte with hydrometer (item 17, appx. B). Charge battery, if required, using battery charger (item 17, appx. B). Replace filler caps (13). Inspect and clean battery terminals and cables (14); then, reconnect battery cables (para. 4-30).

e. Perform monthly (M) lubrication (para. 3-3).

f. Perform semiannual (S) and annual (A) preventive maintenance checks and services (PMCS) (para. 4-10).

4-7. OPERATIONAL CHECK

Perform the following checks and observe for binding, jerky movement, and unusual noises. If any malfunction occurs, stop the operation and investigate the cause. If after all checks have been completed the semitrailer does not malfunction, the semitrailer is ready for full operation.

a. Perform operator/crew before (B) PMCS (para. 2-14).

b. Start and run APU (para. 2-16 or 2-17) to remove preservative oil. Run APU at half throttle until remaining preservative oil has run through fuel system. When engine operation (running) smooths out and excessive smoking stops, proceed with remaining checks.

c. Adjust gooseneck (para. 2-18) and adjust platform height (para. 2-19).

d. Operate spring ramps (para. 2-20).

e. Couple tractor/semitrailer (para. 2-24).

f. Operate manual steering (para. 2-21).

g. Tow semitrailer and adjust tracking (para. 2-24).

Section III. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

PARA. NO.	TITLE
4-8.....	General
4-9.....	PMCS Column Description
4-10.....	PMCS

4-8. GENERAL

Ensure the semitrailer is ready for operation at all times. Inspect it within specified intervals so that defects are found and corrected before any serious damage or failure occurs. This section contains a listing of PMCS to be performed. Record all deficiencies, as well as the corrective action taken, on DA Form 2404, Equipment Inspection and Maintenance Worksheet, as soon as you can. Perform all operator/crew PMCS before performing these procedures.

a. Item numbers in the PMCS table indicate the PMCS sequence. Use these item numbers for the "TM Number" column on DA Form 2404.

b. If a part or component does not operate as it should, troubleshoot it using the procedures in this manual and notify your supervisor.

c. Always perform preventive maintenance in the same order so that it gets to be a habit. Once you have had some practice, you will spot anything wrong in a hurry.

d. If something appears to be wrong and you cannot repair it, write it down on your DA Form 2404. If you find something seriously wrong, report it to Direct Support (DS) maintenance as soon as possible.

WARNING

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

(1) Keep it clean: Dirt, grease, oil, and debris may cover a serious problem. Clean as you work and as needed. Use dry cleaning solvent (item 26, appx. E) to clean metal surfaces. Use soap and water when you clean rubber or plastic materials.

(2) Bolts, nuts, and screws: Check to be sure that bolts, nuts, and screws are not loose, missing, bent, or broken. Although it is not necessary to check them all with a tool, look for chipped paint, bare metal, or rust around bolt heads. Tighten all loose hardware.

(3) Welds: Inspect welds for chipped paint, rust, or gaps where parts are welded together. Bad welds must be reported to DS maintenance.

4-8. GENERAL (CONT)

(4) Electrical wires and connectors: Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connections and make sure wires are in good condition.

(5) Hoses and fluid lines: Inspect hoses and fluid lines for wear, damage, and leaks. Make sure clamps and fittings are tight. Wet spots and stains around a fitting or connector can mean a leak. If a leak is caused by a loose fitting or connector, tighten the fitting or connector. If a part is broken or worn out, either correct the problem or report it to DS maintenance; refer to the Maintenance Allocation Chart (appx. B).

e. It is necessary to know how fluid leaks affect the status of equipment. The following are definitions of types or classes of leaks used to determine the status of the equipment. Become familiar with them, and remember, when in doubt, notify your supervisor.

CLASS I - Seepage of fluid (indicated by wetness or discoloration) not great enough to form drops.

CLASS II - Leakage of fluid great enough to form drops, but not enough to cause drops to drip from the item being checked or inspected.

CLASS III - Leakage of fluid great enough to form drops that drip from the item being checked or inspected.

4-9. PMCS COLUMN DESCRIPTION

a. The Item no. column shall be used as a source of item numbers for the "TM Number" column on DA Form 2404, Equipment Inspections and Maintenance Worksheet, in recording results of PMCS.

b. The Interval column of your PMCS table tells you when to do a certain check or service.

c. The Item to be inspected Procedure column lists the checks to be performed.

NOTE

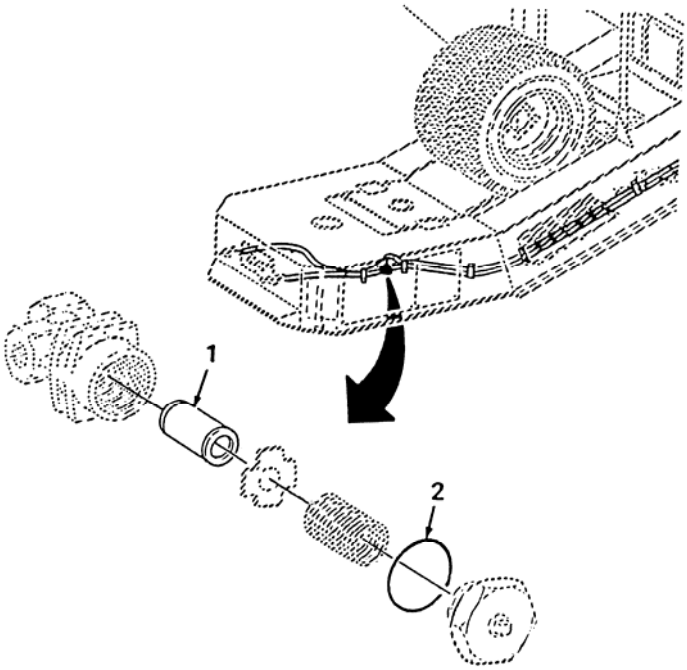
There is a 5-year service requirement for the M1000 Semitrailer. This is a very labor-intensive service and requires advance planning and budgeting. TACOM recommends that you start your advance planning and budgeting at least 24 months prior to your 5-year service due date.

In addition, proper and timely performance of all services and lubrications will help reduce the maintenance burden and parts consumption associated with performing the 5-year service.

4-10. PMCS

Q - Quarterly S - Semiannually A - Annually

Item no.	Interval Q	S	A	ITEM TO BE INSPECTED Procedure
1				GOOSENECK PNEUMATIC INSTALLATION



			•	Check connections, lines, and hoses for fraying, nicks, cuts, abrasion, and leaks. Replace worn or damaged parts (para. 4-48).

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

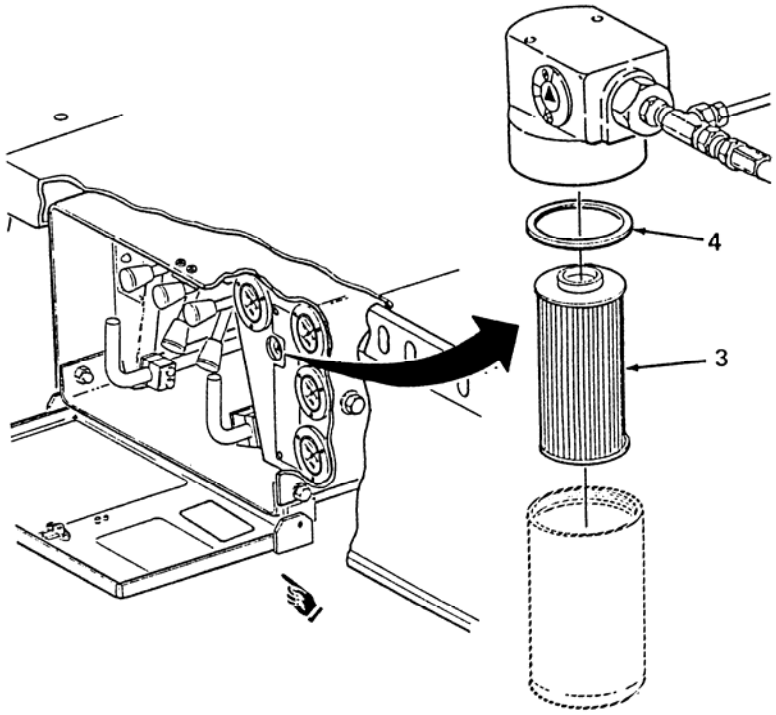
The air filter contains a spring which is under pressure. To avoid injury, be careful when removing nut. Wear eye protection.

			•	Replace filter element (1) and preformed packing (2) (para. 4-47).

4-10. PMCS (CONT)

Q - Quarterly S - Semiannually A - Annually

Item no.	Interval Q	S	A	ITEM TO BE INSPECTED Procedure
2				PLATFORM HYDRAULIC INSTALLATION



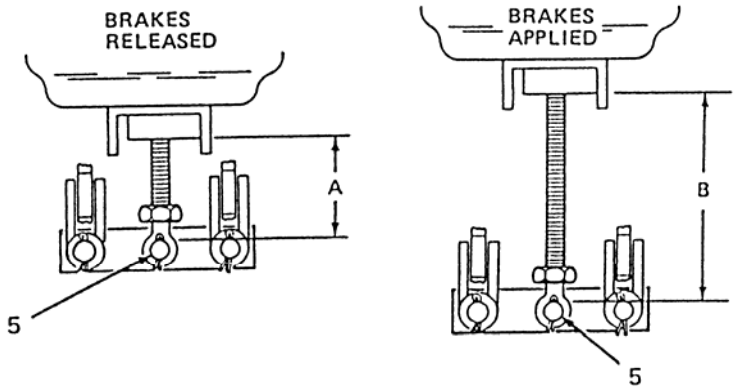
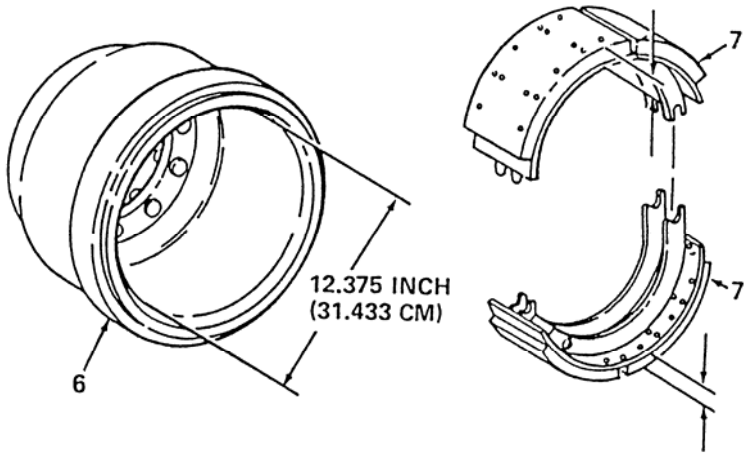
- Check hoses, lines, and connections for cuts, nicks, chafing, and leaks. Replace worn or damaged parts (para. 4-92 and/or 4-93).
- Replace filter element (3) and gasket (4) (para. 4-89) and fill filter with clean hydraulic fluid (para. 3-3).

NOTE

Inspect all 10 suspension assemblies.

- Check suspension hydraulic hoses, lines, and fittings for cuts, nicks, corrosion, and signs of chafing or leaks. Replace worn or damaged parts (para. 4-92).

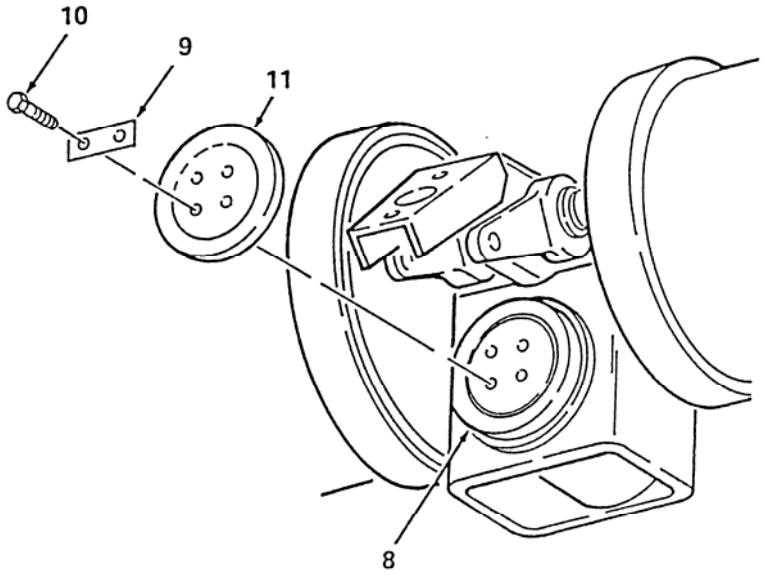
Q - Quarterly S - Semiannually A - Annually

Item no.	Interval Q	S	A	ITEM TO BE INSPECTED Procedure
3				AXLE ASSEMBLY
				
	•			On all 10 suspensions, measure travel of brake chamber clevis (5) from fully released "A" position to fully applied "B" position. If travel distance of clevis (5) is 2.0 inches (5.1 cm) or more, perform brake adjustment (para. 4-15) as required.
				
			•	Check brake drums (6) and brake shoes (7) for excessive/ unusual wear and scoring. Drums (6) (para. 4-50) must have a maximum ID less than 12.375 inches (31.433 cm). Brake shoes (7) (para. 4-43), measured at center of each shoe, must be a minimum of 0.46 inch (1.17 cm) thick. If any rivets are flush with or higher than any portion of brake lining, that brake shoe assembly must be replaced. Replace or repair brake shoe as necessary.

4-10. PMCS (CONT)

Q - Quarterly S - Semiannually A - Annually

Item no.	Interval Q	S	A	ITEM TO BE INSPECTED Procedure
3 - CONT				AXLE ASSEMBLY - CONT



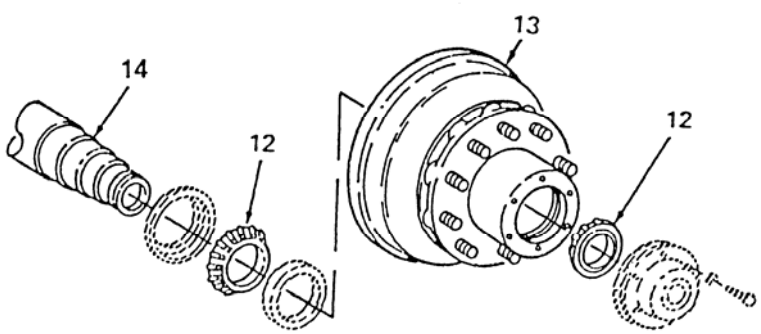
PARTS REMOVED FOR CLARITY

NOTE

Some fraying of a new ultra bushing may occur as a new bushing wears in. Minor fraying of the urethane part of the bushing protruding beyond the axle housing over the trunnion cap is common and should be removed when found.

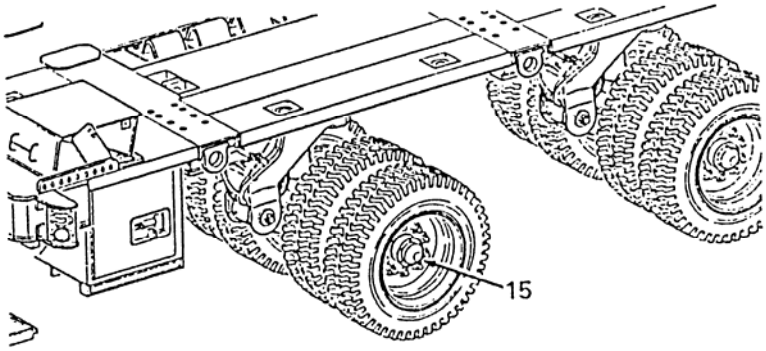
			•	On all 10 suspension assemblies, check ultra bushing (8) for signs of deterioration and fraying of urethane part of bushing. If urethane portions of ultra bushing (8) are frayed, straighten two corners of each lock plate (9). Remove four capscrews (10), two lock plates (9), and trunnion cap (11). Using a knife, trim all frayed strands off of ultra bushing (8). If a gap of 1/8 inch or more exists between urethane and either metal shell at top of ultra bushing (8), notify DS maintenance. After trimming is complete, install trunnion cap (11) and secure with two lock plates (9) and four capscrews (10). Using a torque wrench (item 17, appx. B), torque capscrews (10) to 230-250 lb-ft (312-339 Nm). Bend one corner at each end of lock plate (9) against a flat side of capscrew (10) to secure each capscrew.

Q - Quarterly S - Semiannually A - Annually

Item no.	Interval Q	S	A	ITEM TO BE INSPECTED Procedure
				

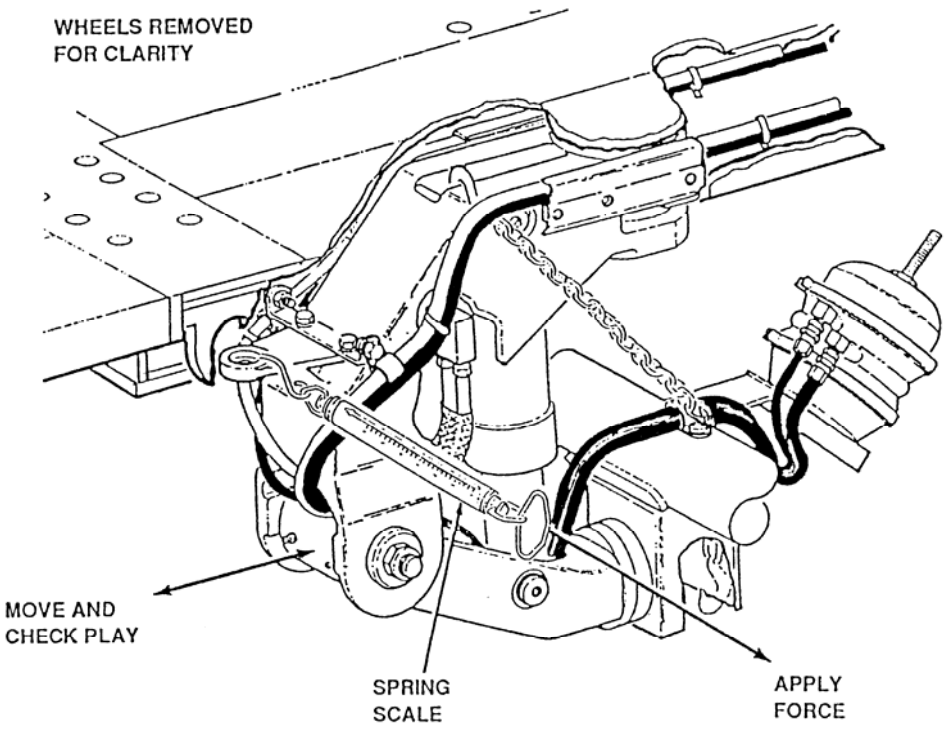
WARNING

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

			•	Disassemble wheel assemblies (para. 4-50). Clean bearings (12), hubs (13), and spindles (14) with dry cleaning solvent (item 26, appx. E). Inspect parts removed for wear, scoring and discoloration, scratches, and burrs. Repack bearings (12) with grease (item 12, appx. E).
				
			•	Check lug nuts and lug studs (15) for proper torque of 450-500 lb-ft (610-678 Nm). Using a torque wrench (item 17, appx. B), torque as required if loose (para. 3-7, 3-8, 3-9, or 3-10).

Q - Quarterly S - Semiannually A - Annually

Item no.	Interval Q	S	A	ITEM TO BE INSPECTED Procedure
3.1				SUSPENSION SPINDLE BEARING



With each bogie isolated and chained up and connecting link disconnected (para. 3-9), check the following:

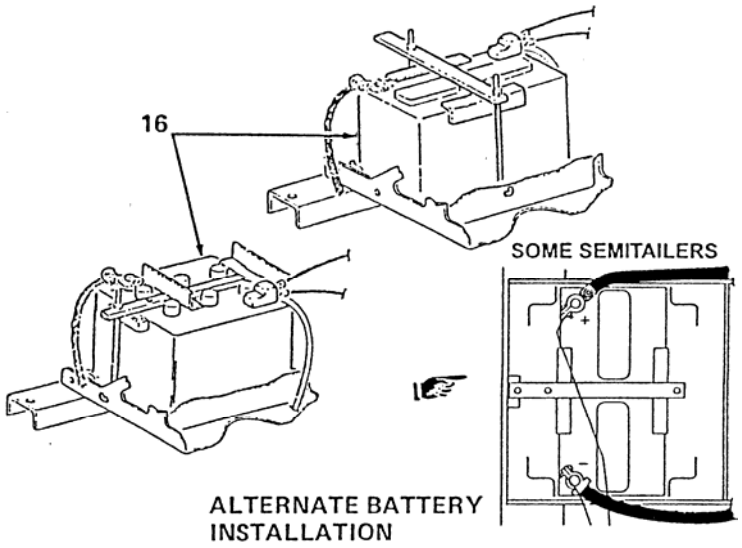
• a. Apply force to bogie using spring scale as shown. Suspension must turn with no more than 100 pounds (45.4 kg) force applied. If more than 100 pounds (45.4 kg) force is required to turn suspension, check lubrication and looseness.

• b. Attempt to move upper suspension/lower suspension arm joint in fore and aft direction to check for play. Repeat with bogie turned 90 degrees. If movement exceeds 1/4 inch (0.6 cm), release spindle nut setscrew and check spindle nut torque (para. 4-40). If torque is correct and movement remains or if tightening spanner nut causes turning force to exceed 100 pounds (45.4 kg), bearing is defective.

4-10. PMCS (CONT)

Q - Quarterly S - Semiannually A - Annually

Item no.	Interval Q	S	A	ITEM TO BE INSPECTED Procedure
4				PLATFORM WELDMENT
			•	Check entire platform for wear, cracks, broken or defective welds, loose or missing hardware, deformed components, rust, or corrosion. Repair as required. Refer defective welds to DS maintenance.
5				BATTERY



WARNING

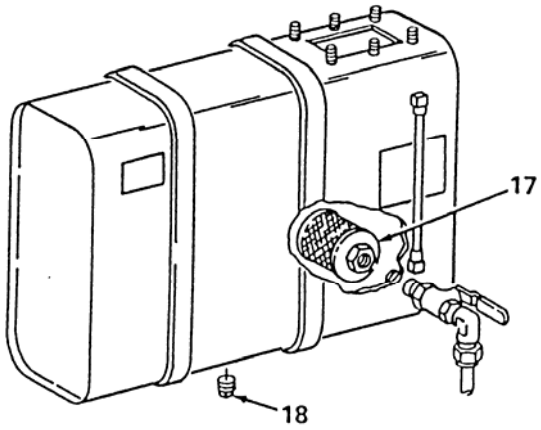
Do not wear watches, rings, or other jewelry which could short out battery terminals while servicing battery. Do not smoke or use open flame around batteries. Battery may explode from a spark. Battery acid is harmful to skin and eyes. Wear protective goggles to prevent injury to personnel when working with batteries.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of goose-neck must take EXTREME care not to step on it or trip over it. Injury to personnel or damage to equipment may result.

			•	Disconnect or remove battery (16) as required (para. 4-30). Check terminals for corrosion. If necessary, remove corrosion with wire brush, followed by a solution of sodium bicarbonate (item 22, appx. E) and water. After cleaning, apply petroleum jelly (item 17, appx. E) to terminals. Reconnect or install battery (16) as required (para. 4-30). If solar battery charger is installed, ensure that leads are securely attached to battery terminals.

Q - Quarterly S - Semiannually A - Annually

Item no.	Interval Q	S	A	ITEM TO BE INSPECTED Procedure
			•	Visually check electrolyte level. Level of electrolyte should cover plates. If necessary, add distilled water until electrolyte level has reached proper level.
			•	Check specific gravity of electrolyte in each cell using hydrometer (item 17, appx. B). Refer to TM 9-6140-200-14.
6				HYDRAULIC TANK



WARNING

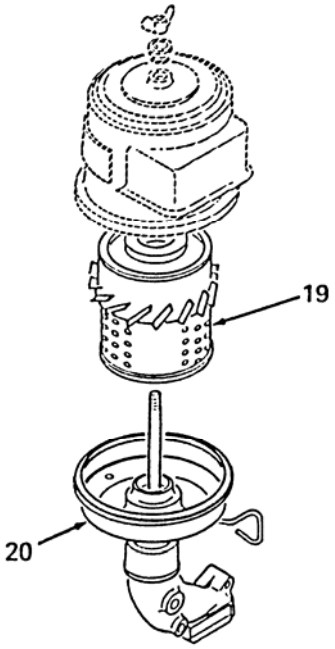
Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

			•	Drain hydraulic tank (para. 4-18). Remove tank filter (para. 4-91). Clean filter (17) using dry cleaning solvent (item 26, appx. E) from inside outward. Replace filter if damaged or clogged. Check drain plug (18) for metal particles and clean with rag (item 19, appx. E).

4-10. PMCS (CONT)

Q - Quarterly S - Semiannually A - Annually

Item no.	Interval Q	S	A	ITEM TO BE INSPECTED Procedure
7				AIR FILTER

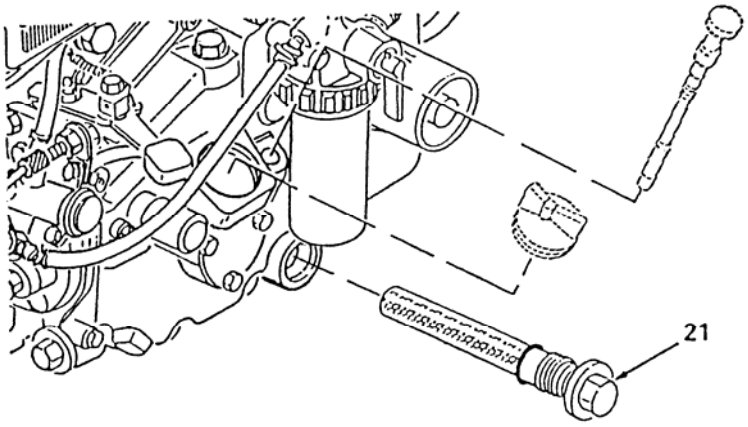
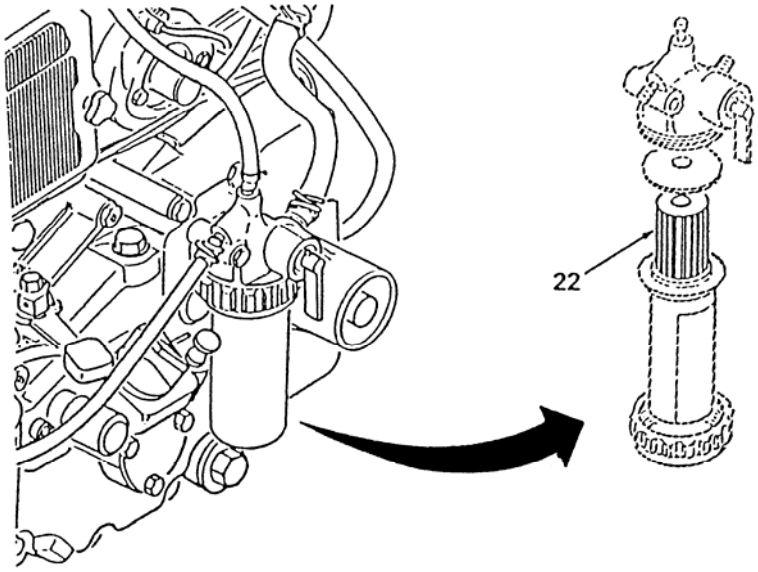


WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

			•	Replace filter element (19) if damaged or clogged. Wipe out component body (20) with clean rag (item 19, appx. E).

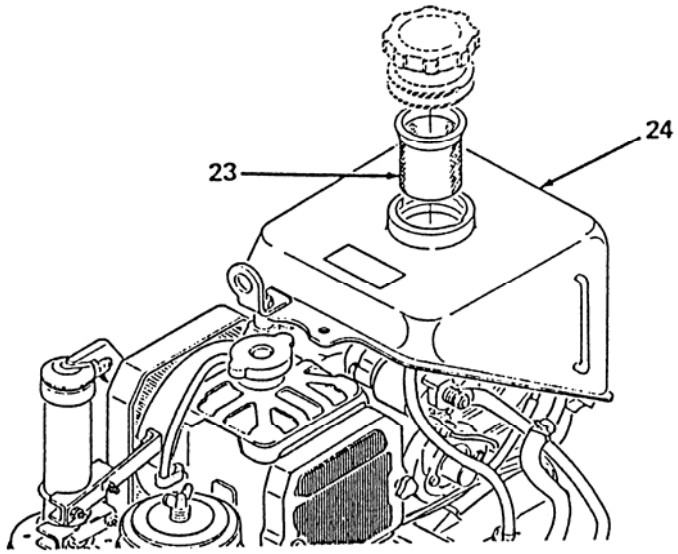
Q - Quarterly S - Semiannually A - Annually

Item no.	Interval Q	S	A	ITEM TO BE INSPECTED Procedure
8				OIL FILTER
				
			•	Clean oil filter (21) and change oil (para. 4-99). Replace oil filter (21) if damaged or defective (para. 4-100).
9				FUEL FILTER
				
				WARNING **Fuel is flammable. To avoid serious injury, keep all smoking materials, sparks, or open flames away from the fuel tank and fuel system.**
			•	Replace fuel filter (22) (para. 4-105).

4-10. PMCS (CONT)

Q - Quarterly S - Semiannually A - Annually

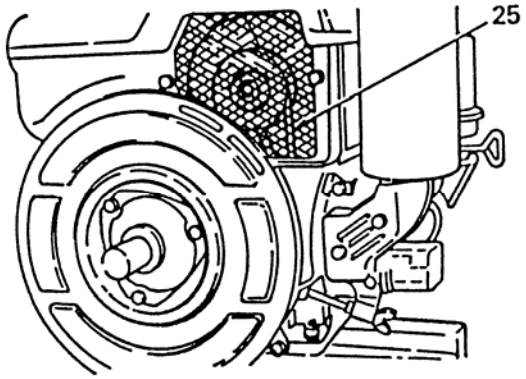
Item no.	Interval Q	S	A	ITEM TO BE INSPECTED Procedure
10				FUEL TANK



WARNING

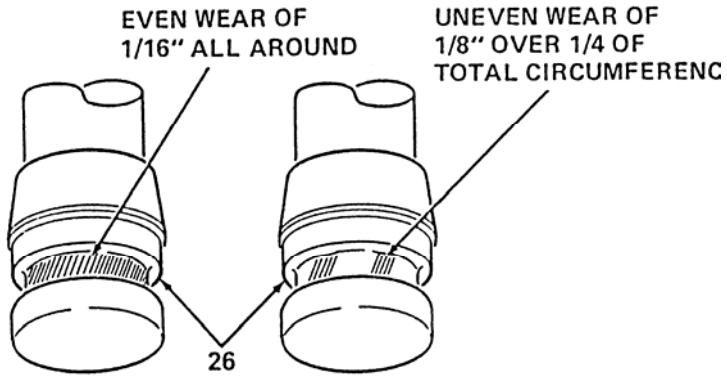
Fuel is flammable. To avoid serious injury, keep all smoking materials, sparks, or open flames away from the fuel tank and fuel system.

			•	Clean filter (23) with clean diesel fuel (item 11, appx. E) (para. 4-104). Replace filter (23) if damaged.
			•	Check exterior and interior of fuel tank (24) for contamination or corrosion. Flush, if necessary, with diesel fuel (item 11, appx. E) (para. 4-104).
11				FAN BELT



Q - Quarterly S - Semiannually A - Annually

Item no.	Interval Q	S	A	ITEM TO BE INSPECTED Procedure
			•	Check fan belt (25) for wear and deterioration (para. 4-111). Check tension of fan belt (25). Adjust or replace as necessary (para. 4-111).
12				KINGPIN



WARNING

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

NOTE

Original dimension of the kingpin groove is 3.5 inches (8.9 cm).

• Clean kingpin (26) wear surfaces using rags and dry cleaning solvent (item 26, appx. E), and inspect condition of kingpin (26). Notify DS maintenance that kingpin (26) must be replaced if any of the following conditions exist:

a. Uneven wear on one or more sides of kingpin wear surface resulting in wear of 1/8 inch (3.2 mm) over 1/4 of circumference of kingpin.

4-10. PMCS (CONT)

Q - Quarterly S - Semiannually A - Annually

Item no.	Interval Q	S	A	ITEM TO BE INSPECTED Procedure
12 - CONT				KINGPIN - CONT b. Even wear over kingpin surface causing diameter to be reduced by 1/8 inch (3.2 mm). c. A crack of any size is noted anywhere on kingpin. d. A nick, chip, or gouge deeper than 1/4 inch (6.4 mm) is found anywhere on kingpin wear surface.

Section IV. UNIT TROUBLESHOOTING

PARA. NO.	TITLE
4-11.	General
4-12.	Symptom Index
4-13.	Troubleshooting

4-11. GENERAL

a. This section contains troubleshooting information for unit level maintenance of the semitrailer and its components. Use these troubleshooting procedures to help locate and correct faults in the equipment. For best results, perform tests, inspections, and corrective actions in the order listed.

b. Before performing unit level maintenance, verify operator/crew troubleshooting has been completed and a failed condition does exist. Further verify all other indications are normal except for suspected fail condition. Once fault has been isolated, repair or replace failed component.

c. The troubleshooting procedures are grouped by major categories. Become familiar with these major equipment categories. Use the symptom index (para. 4-12) to more easily locate the fault in question.

d. These procedures cannot list all faults that may occur, nor all tests or inspections and corrective actions. If a fault should occur that is not listed, notify DS maintenance.

4-12. SYMPTOM INDEX

Symptom	Symptom no.
APU	
Engine does not crank over	1
Engine cranks but does not start	2
Engine runs rough	3
White or blue exhaust smoke is observed after warmup	4
Black or dark gray exhaust smoke is observed after warmup	5
Insufficient engine output "low power"	6
Excessive oil consumption (over 1 pint (0.5 l) per 250 hours of operation)	7
Fuel mixed into lubricant oil	8
Engine coolant mixed into lubricant oil	9

4-12. SYMPTOM INDEX

Symptom	Symptom no.
APU - CONT	
Low oil pressure	10
Engine overheating	11
Battery will not hold charge	12
APU charging circuit fails to keep battery charged	13
Glow plug heats slowly or fails to heat	14
APU jump start system inoperable	15
HYDRAULIC SYSTEM	
General hydraulic failures	16
External leaks	17
System will not maintain normal or adequate operating pressure	18
Excessive pump noise or pump failure	19
Platform suspension will not adjust or adjustments are sluggish	20
Platform suspension drifts down or drops	21
Suspension rides stiff and does not adjust for bumps/road hazards	22
Suspension tire change chain is over-stressed and/or breaks	23
Gooseneck will not adjust or adjustments are sluggish	24
Gooseneck drifts down, drops, or will not support itself	25
Oil or air relieving from gooseneck cylinder air reservoir	26
Steering will not adjust	27
Steering pressure indicator light comes on	28
Semitrailer steering does not track properly	29
ELECTRICAL SYSTEM	
Steering pressure indicator does not light	30
All lamps do not light	31
One or more (but not all) lights will not light	32
Dim or flickering lights	33
WHEELS, TIRES, AND HUBS	
Wheel wobbles	34
Excessive or uneven tire wear	35
In tow, semitrailer wanders or pulls to one side (on level ground)	36
BRAKES	
No brakes or weak brakes	37
Slow brake application or slow release	38
Brakes grab	39

4-13. TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

APU

1. ENGINE DOES NOT CRANK OVER

Step 1. Check battery.

a. Check battery cables for defects and corrosion and clean or replace battery (para. 4-30).

b. Check electrolyte level and specific gravity. Refill and recharge battery as required (para. 4-30).

c. If battery is defective, replace battery (para. 4-30).

Step 2. Turn starter switch to START position and listen for starter to engage.

a. Check APU wiring harness at starter for loose or corroded connections or broken wires. Tighten connections or replace harness (para. 4-39).

b. If starter does not engage, refer to APU electrical schematic (figure FO-4) and, using multimeter (item 17, appx. B), check continuity of starter solenoid, starter switch, and starter switch wiring.

c. If starter engages but does not turn over, remove and replace starter (para. 4-114).

d. If engine does not turn over, if flywheel is suspected to be binding, or if above steps do not correct malfunction, notify DS maintenance.

2. ENGINE CRANKS BUT DOES NOT START

Step 1. Check for contaminated fuel filter or clogged filter block.

Disassemble fuel filter and filter block and check for blockage. If blocked, clear passages, replace fuel filter, and reinstall fuel filter and filter block (para. 4-105).

4-13. TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

APU - CONT

2. ENGINE CRANKS BUT DOES NOT START - CONT

Step 2. Visually check for clogged or dirty air cleaner.

If clogged or dirty, clean or replace air cleaner (para. 4-103).

Step 3. Check nozzle holder for looseness and blockage.

Tighten or remove nozzle holder. Clear any blocked passages and reinstall or replace nozzle holder (para. 4-102).

Step 4. Check for blockage in fuel lines.

Remove fuel lines and check for blockage. Clear blockage or replace fuel lines (para. 4-104).

Step 5. Visually check for leaking or loose injection pump.

If injection pump is leaking or loose, notify DS maintenance.

Step 6. Visually check for blockage or holes in air intake manifold.

Disassemble air intake manifold. Inspect, clear blocked passages, or replace intake manifold as required (para. 4-103).

Step 7. Check for contaminated fuel in fuel system (para. 3-3).

Drain and flush tank. Change fuel filter and refill tank with proper grade of fuel (para. 4-105).

Step 8. Check for low compression by listening for compression leaks.

a. Check glow plug for looseness. Tighten or replace as necessary (para. 4-97).

b. Visually check for cracks and listen for leaks around cylinder head. Notify DS maintenance if a leak is found.

c. Visually check for cracks and listen for leaks around engine block. If any defects are found, or if above steps do not correct malfunction, notify DS maintenance.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

APU - CONT

3. ENGINE RUNS ROUGH

Step 1. Check for contaminated fuel filter or clogged filter block.

Disassemble fuel filter and filter block and check for blockage. If blocked, clear passages, replace fuel filter, and reinstall fuel filter and filter block (para. 4-105).

Step 2. Visually check for clogged or dirty air cleaner.

If clogged or dirty, clean or replace air cleaner (para. 4-103).

Step 3. Check for blockage in fuel lines.

Remove fuel lines and check for blockage. Clear blockage or replace fuel lines (para. 4-104).

Step 4. Visually check for blockage or holes in air intake manifold.

Disassemble air intake manifold. Inspect, clear blocked passages, or replace intake manifold as required (para. 4-103).

Step 5. Check nozzle holder for looseness and blockage.

Tighten or remove nozzle holder. Clear any blocked passages and reinstall or replace nozzle holder (para. 4-102).

Step 6. Check for low compression by listening for compression leaks.

a. Check glow plug for looseness. Tighten or replace as necessary (para. 4-97).

b. Visually check for cracks and listen for leaks around cylinder head. Notify DS maintenance if a leak is found.

c. Visually check for cracks and listen for leaks around engine block. If any defects are found, or if above steps do not correct malfunction, notify DS maintenance.

4-13. TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

APU - CONT

4. WHITE OR BLUE EXHAUST SMOKE IS OBSERVED AFTER WARMUP

Step 1. Inspect oil dipstick for excessive engine oil in crankcase.

Drain oil to correct level (para. 4-100). Check oil for odor of fuel. If fuel odor is found, notify DS maintenance.

Step 2. Check for low compression by listening for compression leaks.

a. Check glow plug for looseness. Tighten or replace as necessary (para. 4-97).

b. Visually check for cracks and listen for leaks around cylinder head. Notify DS maintenance if a leak is found.

c. Visually check for cracks and listen for leaks around engine block. If any defects are found, or if above steps do not correct malfunction, notify DS maintenance.

5. BLACK OR DARK GRAY EXHAUST SMOKE IS OBSERVED AFTER WARMUP

Step 1. Visually check for contaminated or discolored fuel.

Drain and flush tank. Replace fuel filter and refill fuel tank with proper grade of fuel (para. 3-3).

Step 2. Check for blockage in fuel lines.

Remove fuel lines and check for blockage. Clear blockage or replace fuel lines (para. 4-104).

Step 3. Check for contaminated fuel filter or clogged filter block.

Disassemble fuel filter and filter block and check for blockage. If blocked, clear passages, replace fuel filter, and reinstall fuel filter and filter block (para. 4-105).

6. INSUFFICIENT ENGINE OUTPUT "LOW POWER"

Step 1. Check for contaminated fuel filter or clogged filter block.

Disassemble fuel filter and filter block and check for blockage. If blocked, clear passages, replace fuel filter, and reinstall fuel filter and filter block (para. 4-105).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

APU - CONT

Step 2. Visually check for contaminated or discolored fuel.

Drain and flush tank. Change fuel filter and refill fuel tank with proper grade of fuel (para. 3-3).

Step 3. Check for loose or leaking injector pump.

If injector pump is loose or leaking, or if above steps do not correct malfunction, notify DS maintenance.

7. EXCESSIVE OIL CONSUMPTION (OVER 1 PINT (0.5 L) PER 250 HOURS OF OPERATION)

Visually check for oil leaks at head, gear covers, and access plate gaskets.

If any leaks are found, replace APU (para. 4-96).

8. FUEL MIXED INTO LUBRICANT OIL

Pull out dipstick and check for odor of diesel fuel (para. 4-10).

If engine oil smells like diesel fuel, notify DS maintenance.

9. ENGINE COOLANT MIXED INTO LUBRICANT OIL

Drain and remove radiator (para. 4-110). Visually check for defective head gasket and cracks in cylinder block and cylinder head.

If engine oil is contaminated by coolant, replace APU (para. 4-96).

10. LOW OIL PRESSURE

Step 1. Pull out engine oil dipstick and check oil level (para. 4-10).

Add or change engine oil with proper grade oil (para. 3-3).

Step 2. Check for clogged oil filter.

Remove oil filter and check for cloggs and debris. If clogged, clean or replace oil filter (para. 4-100).

Step 3. Visually check for oil leaks at head, oil pump, gear covers, and access plate gaskets.

If any leaks are found, replace APU (para. 4-96).

4-13. TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

APU - CONT

10. LOW OIL PRESSURE - CONT

Step 4. Check for low compression and listen for compression leaks.

a. Check glow plug for looseness. Tighten or replace as necessary (para. 4-97).

b. Check nozzle holder for looseness. Tighten or replace as necessary (para. 4-102).

c. Visually check for cracks in cylinder head and in engine block. If any cracks are found, replace APU (para. 4-95).

11. ENGINE OVERHEATING

Step 1. Check for improper engine coolant mixture (para. 4-10) with hydrometer (item 17, appx. B).

Add antifreeze or water as required (para. 4-110).

Step 2. Visually check for dirt and debris in radiator or fan dynamo.

Clean and/or replace radiator and fan dynamo (para. 4-110 and 4-112).

Step 3. Visually check radiator cap for leakage and worn cap or gasket.

If any defects are found, replace radiator cap (para. 4-110).

Step 4. Check inside of radiator and inspect coolant solution for corrosion, rust, or discoloration.

Drain fluid from radiator (para. 4-110). Flush radiator and check for internal corrosion and deterioration. If damaged, replace radiator. Refill radiator with proper coolant mixture.

Step 5. Check for loose or broken fan belt.

Adjust or replace fan belt (para. 4-111).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

APU - CONT

Step 6. Check for odor of fuel or oil mixed in engine coolant.

Drain engine coolant (para. 4-110) and inspect for fuel and oil contamination in engine coolant. If contaminates are found, replace APU (para. 4-96).

Step 7. Remove radiator and check engine water jacket for corrosion.

a. Flush and clean engine water jacket (para. 4-110).

b. If above steps do not correct malfunction, replace APU (para. 4-96).

12. BATTERY WILL NOT HOLD CHARGE

Step 1. Check electrolyte level and specific gravity in each cell.

a. Replenish battery cells to proper level with distilled water and recharge as required (para. 4-10, item 5).

b. Check battery electrolyte for improper specific gravity with hydrometer (item 17, appx. B). Charge or replace battery (para. 4-30).

Step 2. Check for fan belt slippage (excessive wear or noisy operation).

Adjust belt tension or replace belt (para. 4-111).

Step 3. Check for noisy or vibrating fan dynamo.

Remove and replace fan dynamo (para. 4-112).

Step 4. Check APU harness for breaks, corrosion, and burns on harness.

a. Remove and repair or replace APU wiring harness (para. 4-39).

b. If solar battery charger is installed, ensure that leads are securely attached to battery terminals.

4-13. TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

APU - CONT

12. BATTERY WILL NOT HOLD CHARGE - CONT

Step 5. Using an electrical tester (multimeter) (item 17, appx. B) on appropriate setting to read 1k - 1.4k resistance, check current limiter for conductivity by tagging, disconnecting, and probing three current limiter leads in APU control box:

Negative Lead	Positive Lead	Results (ohms)
Red/white	Red	Nonconductive
	Blue	1k - 1.4k
	Case	Nonconductive
Red	Blue	Nonconductive
	Case	Nonconductive
Blue	Case	Nonconductive

If results are different than specified above, remove and replace current limiter (para. 4-108).

13. APU CHARGING CIRCUIT FAILS TO KEEP BATTERY CHARGED

Step 1. Check that battery will hold a charge.

Refer to symptom 12, step 1, and check that battery will hold a charge.

NOTE

APU must be allowed to run for several minutes for charging circuit to stabilize; otherwise, indications measured may not be accurate.

Step 2. Start and run APU (para. 2-16). Using an electrical tester (multimeter) (item 17, appx. B) on a 20 Vdc setting or greater, measure battery voltage by placing negative (-) probe on battery ground post (-) and placing positive (+) probe on battery positive (+) post.

a. Check that battery voltage (with APU running) measures 13 Vdc ±2 Vdc. If battery voltage measures less than 11 Vdc, check fan dynamo ac output by disconnecting leads from dynamo and measuring minimum of 13 Vac between each of two yellow leads and red lead. If voltages are not present, shut down APU and remove and replace fan dynamo (para. 4-112). If voltages are present, proceed to step 3, and check bridge rectifier.

b. If solar battery charger is installed, ensure that leads are securely attached to battery terminals.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

APU - CONT

Step 3. With APU control box cover removed (para. 4-32), tag and disconnect four leads (red, red, white, and blue) from bridge rectifier. Check conductivity across diodes within rectifier with an electrical tester (multimeter) (item 17, appx. B) set on lowest resistance setting. Probe four bridge rectifier leads as follows:

Negative Lead	Positive Lead	Results
Red (both leads)	White	Nonconductive
White	Red (both leads)	Conductive
Blue	Red (both leads)	Nonconductive
Red (both leads)	Blue	Conductive

If actual readings are different than specified above, remove and replace bridge rectifier (para. 4-108).

14. GLOW PLUG HEATS SLOWLY OR FAILS TO HEAT

Step 1. Check for discharged or defective battery (para. 4-10, item 5).

Charge or replace battery (para. 4-30).

NOTE

On APU with APU engine serial number 504697 and subsequent, the glow plug indicator is changed from glow-type indicator to lamp driven by a timer.

Step 2.1 For glow-type glow plug indicator, hold starter switch in GLOW position and observe glow plug indicator element (para. 2-2). If glow plug indicator element fails to glow within 20 seconds (will take noticeably longer in very cold weather), remove wire from glow plug and hold wire terminal to APU frame to ground that wire.

a. If element fails to glow, replace APU control box glow plug indicator (para. 4-108).

b. If element glows, replace glow plug (para. 4-97).

4-13. TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

APU - CONT

14. GLOW PLUG HEATS SLOWLY OR FAILS TO HEAT - CONT

Step 2.2 For lamp-type glow plug indicator, hold starter switch in GLOW position for more than 5 seconds. Glow plug indicator will light, remain lit for about 5 seconds, and then extinguish. Observe a, b, or c:

a. If glow plug does not heat up, use multimeter to check for +12 Vdc at glow plug terminal with respect to engine or frame. If voltage is present, replace glow plug. If voltage is not present, proceed to step 3.

b. If glow plug indicator does not light, check bulb, electrical connections, and timer.

c. If glow plug indicator lights and does not extinguish in approximately 5 seconds, replace timer.

Step 3. Check APU wiring harness for broken, corroded, and burned wiring and loose electrical connections.

Repair or replace APU wiring harness (para. 4-39).

Step 4. Using an electrical tester (multimeter) (item 17, appx. B) and APU electrical schematic (figure FO-4), check APU control box for defective starter switch.

Replace starter switch (para. 4-108).

15. APU JUMP START SYSTEM INOPERABLE

Step 1. Check jumper cables for loose clamps and connectors, fraying and corrosion, kinks, and damage.

Remove and repair or replace defective cables (para. 4-113).

4-13. TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

APU - CONT

15. APU JUMP START SYSTEM INOPERABLE - CONT

Step 2. Check APU jump start electrical cables connected to APU (grounding) and battery (positive terminal) for corrosion, loose clamps and connectors, and fraying.

Clean off corrosion and tighten any loose connections, and/or remove and replace defective electrical cables (para. 4-113).

Step 3. Check that APU jump start electrical box and internal components are working properly by pressing test switch button on electrical box (para. 2-30).

If an audible clicking sound is not heard and all of above checks/inspections have not corrected problem, remove and replace APU jump start electrical box (para. 4-113).

HYDRAULIC SYSTEM

16. GENERAL HYDRAULIC FAILURES

Step 1. Check that hydraulic tank shut-off valve is open (para. 2-4).

CAUTION

If APU has run longer than 30 seconds, with the hydraulic tank shut-off valve closed, pump may be damage and the hydraulic system, including filters, may be contaminated with metal particles.

Refer to symptom 19 to continue troubleshooting.

Step 2. Check fluid level in hydraulic tank (para. 4-17).

Check and/or fill hydraulic tank as required (para. 4-19).

Step 3. Check hydraulic filter indicator (para. 2-5).

Indicator should read in green; if not, remove and replace filter (para. 4-89).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

Step 4. Check for external leaks at hydraulic fittings/joints.

Refer to symptom 17 to check hydraulic leaks.

Step 5. Check hydraulic tank breather cap for restrictions.

Replace cap if necessary (para. 4-94).

Step 6. Using hydraulic schematic (figure FO-3) as a guide, operate all semitrailer hydraulics and check hydraulic hoses for internal collapse or obstructions.

Remove and repair or replace hoses as necessary.

Step 7. Check that system pressure gage (para. 2-5) is not reading higher than 200 psi (1379 kPa) without hydraulic controls being operated.

If system pressure is higher than 200 psi (1379 kPa), refer to symptom 18, steps 3 thru 6, to continue checking pressure.

Step 8. Check that system pressure gage is not reading less than 100 psi (690 kPa) without hydraulic controls being operated.

Check hydraulic tank filter for obstructions or contamination. Clean or replace hydraulic tank filter (para. 4-91).

Step 9. Check hydraulic pump ability to develop pressure by operating front curbside suspension handle downward (para. 2-6). Monitor system pressure gage. Hydraulic pressure should quickly rise to 3800 - 4500 psi (26201 - 31027 kPa).

a. If pressure rises quickly but fails to reach 3800 - 4500 psi (26201 - 31027 kPa), go to symptom 18, steps 3, 4, and 5.

b. If pressure rises quickly, check nonoperating function by using Symptom Index to continue troubleshooting.

4-13. TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

17. EXTERNAL LEAKS

WARNING

Steering and suspension system hydraulic lines are under pressure even when APU is not running. Do not attempt to tighten, loosen, adjust, or repair fittings, lines, or hoses until semitrailer is supported by support legs (para. 2-22 and 2-23) and all pressure is relieved or injury to personnel may result.

Step 1. Hydraulic fitting/joint leaks.

a. Check tightness of fittings and tighten. If tight and leaking, continue with next corrective action.

CAUTION

While performing hydraulic maintenance, it is important to accurately tag both ends of a hose or tube and associated fittings. When removing or installing any hydraulic hoses or tubes, use two wrenches, one to hold the fitting, and one to turn the hose or tube or damage to equipment may result.

b. Disassemble and inspect for fittings metal-to-metal seal problems, defects in surface texture of flares, and pitting or breaks. Reassemble joints using pipe sealant (item 18, appx. E) as required for pipe threaded fittings. If joint still leaks, replace parts as necessary.

Step 2. Check hydraulic system for split or ruptured hydraulic hoses and tubes.

a. Replace all defective tubes.

b. If a hose needs to be repaired or replaced, remove defective hose and notify DS maintenance.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

18. SYSTEM WILL NOT MAINTAIN NORMAL OR ADEQUATE OPERATING PRESSURE

Step 1. Check for general hydraulic failures.

Refer to symptom 16 for general hydraulic failures.

Step 2. Check for external leaks at hydraulic fittings/joints.

Refer to symptom 17 for checking external leaks.

Step 3. After initial startup, system pressure gage (para. 2-5) reads up to 500 psi (3448 kPa) without hydraulic controls operated.

If outside ambient temperature is below 30°F (-1°C), hydraulic pressure will normally be higher until hydraulic fluid warms to normal operating temperature. A gradual decrease in pressure should occur as hydraulic system is operated.

Step 4. Check that all isolation valves are in normal operating position (para. 2-6).

Ensure valve handle operates all associated valve stems. If a valve stem is rounded off or valve is defective, replace valve as required.

Step 5. Check for partially shifted or stuck control valve handles on steering, gooseneck, and suspension control (para. 2-6).

a. Operate hydraulic control valves and check for ability of valves to return to center (neutral position). Be sure valve handles move freely and do not bind.

b. Operate suspected control valve slowly and monitor gage for pressure changes. If pressure changes occur, valve body may be contaminated, defective, or leaking internally. Perform general system flushing (para. 4-20) to try and move any contaminants further into system. If symptom still exists, remove and repair or replace as required.

Step 6. Operate all hydraulic controls, adjust gooseneck (para. 2-18), adjust platform (para. 2-19), and manually adjust steering (para. 2-21).

Identify which hydraulic control is unable to achieve normal hydraulic pressure during operation and use Symptom Index for quick reference to continue troubleshooting.

4-13. TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

19. EXCESSIVE PUMP NOISE OR PUMP FAILURE

Step 1. Check that hydraulic tank shut-off valve is open (para. 2-4).

CAUTION

If APU has run longer than 30 seconds, with the hydraulic tank shut-off valve closed, pump may be damage and the hydraulic system, including filters, may be contaminated with metal particles.

a. If hydraulic tank shut-off valve was closed with APU running, check hydraulic filter indicator (para. 2-5) to determine how much contamination has moved away from hydraulic pump. If filter is not clogged, contamination has not reached filter. Remove filter supply line, filter assembly, and supply hoses from pump, gooseneck, and step assembly. Remove and replace pump (para. 4-76). Clean all fittings, hoses, and filter parts. Replace all parts as required.

b. If contamination has clogged filter, some contamination may have passed filter and moved into hydraulic system. Refer to hydraulic flushing procedure (para. 4-20) and flush hydraulic system.

Step 2. Check that hydraulic system will maintain proper operating pressure.

Refer to symptom 18, steps 3, 4, and 5, for hydraulic failures.

20. PLATFORM SUSPENSION WILL NOT ADJUST OR ADJUSTMENTS ARE SLUGGISH

Step 1. Check for general hydraulic failures.

Refer to symptom 16 for general hydraulic failures.

Step 2. Check for external leaks at hydraulic fittings/joints.

Refer to symptom 16 to continue checking for external leaks.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

Step 3. Check suspension pressure while trying to adjust platform (para. 2-19).

a. If all three suspension gages fail to reach pressures above 3800 psi (26201 kPa), or if system pressure gage reads lower than suspension gages or lower than normal pressure for current payload condition while trying to adjust platform, check system supply (symptom 18, steps 3, 4, and 5).

b. If only one suspension circuit fails to reach 3800 psi (26201 kPa), and other two operate normally, check for signs of external leakage or ruptured hoses (symptom 16). Identify failed hydraulic circuit and use Symptom Index to continue troubleshooting.

WARNING

Be sure all four support legs (para. 2-22 and 2-23) are lowered and supporting the platform prior to checking the gooseneck isolation valve handles for proper operation or injury to personnel may result.

Step 4. Check linkage at gooseneck isolation valve (para. 2-6).

a. Linkage should be tight and adjusted so that all valve handles move the same distance and open each valve equally. Adjust valve linkage as required (para. 4-84).

b. Check each valve handle to be sure both valves are being operated. Tighten or remove and replace defective parts (para. 4-84).

Step 5. Suspension adjustments are sluggish or slow within a suspension circuit.

a. Counter balance valves may be dirty, leaking, or defective. Remove counter balance valves CB1 (front suspension curbside), CB2 (front suspension streetside), or CB3 (rear suspension) from suspension control manifold. Clean and/or replace items removed (para. 4-79).

b. Flow control valves may be dirty or defective. Remove flow control valves FC1 (front suspension curbside), FC2 (front suspension streetside), or FC3 (rear suspension) from suspension control manifold. Clean and/or replace items removed (para. 4-79).

4-13. TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
HYDRAULIC SYSTEM - CONT
20. PLATFORM SUSPENSION WILL NOT ADJUST OR ADJUSTMENTS ARE SLUGGISH - CONT
Step 6. Check for leaking or damaged hydraulic cylinder. If cylinder is damaged, remove and replace suspension hydraulic cylinder (para. 4-41). If cylinder is leaking, notify DS maintenance.
21. PLATFORM SUSPENSION DRIFTS DOWN OR DROPS
Step 1. Check for general hydraulic failures. Refer to symptom 16 for general hydraulic failures.
Step 2. Check for external leaks at hydraulic fittings/joints. Refer to symptom 16 for checking external leaks.
Step 3. Check for evidence of leakage at suspension cylinder, line fracture valves, suspension isolation valves, suspension valves, gooseneck cylinders, and hydraulic gages. If components are damaged, remove and replace components as required. If cylinders are leaking, notify DS maintenance.
Step 4. Check drift between gooseneck cylinders and front suspension cylinders while gooseneck isolation valve is in ADJUST mode only. If gooseneck cylinders extend about 0.25 - 0.5 inch (0.6 - 1.2 cm) at the same rate as suspension cylinders retract, gooseneck isolation valve may be leaking internally. Remove gooseneck isolation valve and check and replace parts found defective (para. 4-84).

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

Step 5. Check platform drift in front suspension while gooseneck isolation valve is in RUN mode by uncoupling tractor and semitrailer while in ADJUST mode with front support legs 3 inches (7.6 cm) off the ground. Pilot check valves in suspension control manifold may be contaminated or leaking.

a. Clear contamination by raising platform (para. 2-19) to near full height and lowering platform to near fully lowered for three or more full cycles of operation. While raising and lowering platform, abruptly release and reverse handles several times each cycle.

b. If platform drifts downward at a steady or even rate, counter balance valves CB1 (curbside) and CB2 (streetside) may be leaking internally or around valves. Remove and clean valves. Reinstall valves (para. 4-79) and recheck operation.

c. Remove suspension control manifold (para. 4-79). Clean and repair or replace parts as necessary.

22. SUSPENSION RIDES STIFF AND DOES NOT ADJUST FOR BUMPS/ROAD HAZARDS

Step 1. Check that axle suspension isolation valves are open.

Check that suspension isolation valve handle operates both valves equally and is secure. Tighten or remove and replace defective parts (para. 4-92).

Step 2. For highway driving or when semitrailer and tractor are coupled, gooseneck isolation valve should be pushed inboard to RUN position (para. 2-6).

WARNING

Be sure all four support legs (para. 2-22 and 2-23) are lowered and supporting the platform prior to checking the gooseneck isolation valve handles for proper operation or injury to personnel may result.

a. Linkage should be tight and adjusted so that all valve handles move the same distance and open each valve equally. Adjust valve linkage as required (para. 4-84).

b. Check each valve handle to be sure both valves are being operated. Tighten or remove and replace defective parts (para. 4-84).

4-13. TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

22. SUSPENSION RIDES STIFF AND DOES NOT ADJUST FOR BUMPS/ROAD HAZARDS - CONT

Step 3. Check for damage or mechanical binding at suspension arms and suspension cylinders and at gooseneck pivot pin and gooseneck cylinders.

Inspect areas of damage, try to determine probable cause, and repair and/or replace parts as necessary.

23. SUSPENSION TIRE CHANGE CHAIN IS OVER-STRESSED AND/OR BREAKS

Step 1. Check that affected suspension isolation valve is closed (para. 2-6).

Operate affected suspension isolation valve and check that valve handle operates both valves equally and is secure. Tighten or remove and replace defective parts (para. 4-92).

WARNING

Be sure all four support legs (para. 2-22 and 2-23) are lowered and supporting the platform prior to checking the suspension isolation valves for leaks or injury to personnel may result.

Step 2. Check for possible leakage at suspension isolation valve (para. 2-6).

WARNING

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

Disassemble hose/tube from fittings and reassemble using pipe sealant (item 18, appx. E). If joint still leaks, replace parts as necessary.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

24. GOOSENECK WILL NOT ADJUST OR ADJUSTMENTS ARE SLUGGISH

Step 1. Check for general hydraulic failures.

Refer to symptom 16 for general hydraulic failures.

WARNING

Be sure all four support legs (para. 2-22 and 2-23) are lowered and supporting the platform prior to checking the gooseneck isolation valve handles for proper operation or injury to personnel may result.

Step 2. Check linkage at gooseneck isolation valve for binding, missing parts, loose connections, and improper linkage travel.

a. Linkage should be tight and adjusted so that all valve handles move the same distance and open each valve equally. Adjust valve linkage as required (para. 4-84).

b. Check each valve handle to be sure both valves are being operated. Tighten or remove and replace defective parts (para. 4-84).

CAUTION

External leakage in the gooseneck/suspension system may have caused one or more line fracture valves to close. Further operation without resetting the line fracture valve may cause component overload and premature failure.

Step 3. Check for possible closed line fracture valve on a suspected gooseneck cylinder by checking both hoses for equal pressure (stiffness) by bending and observing suspected hoses.

If unequal pressure is found in one of the hoses, one side of line fracture valve may have closed. Check for external leaks in gooseneck cylinder and reset line fracture valve by lowering gooseneck to lowest position and holding in downward position for a minimum of 15 seconds (para. 2-18). If line fracture valve cannot be reset, remove and replace line fracture valve (para. 4-80).

4-13. TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

24. GOOSENECK WILL NOT ADJUST OR ADJUSTMENTS ARE SLUGGISH - CONT

Step 4. Check that system pressure gage reads less than 1000 psi (6895 kPa) while trying to lower gooseneck.

Check gooseneck control valve section of 4-way directional control valve for internal leaks or contamination. Remove, clean, and repair or replace parts as necessary (para. 4-77).

Step 5. Check that system pressure does not exceed 1500 psi (10342 kPa) while trying to raise gooseneck (para. 2-18).

Check for mechanical obstructions or damage to gooseneck cylinders or gooseneck pivot. If defective, notify DS maintenance.

25. GOOSENECK DRIFTS DOWN, DROPS OR WILL NOT SUPPORT ITSELF

Step 1. Check for evidence of leakage at gooseneck cylinder, line fracture valves, gooseneck control valve, and gooseneck isolation valve.

Repair or replace parts found defective as required. If gooseneck cylinder is leaking, notify DS maintenance.

WARNING

Be sure all four support legs (para. 2-22 and 2-23) are lowered and supporting the platform prior to checking the gooseneck isolation valve handles for proper operation or injury to personnel may result.

Step 2. Check linkage at gooseneck isolation valve for binding, missing parts, loose connections, and improper linkage travel.

a. Linkage should be tight and adjusted so that all valve handles move the same distance and open each valve equally. Adjust valve linkage as required (para. 4-84).

b. Check each valve handle to be sure both valves are being operated. Tighten or remove and replace defective parts (para. 4-84).

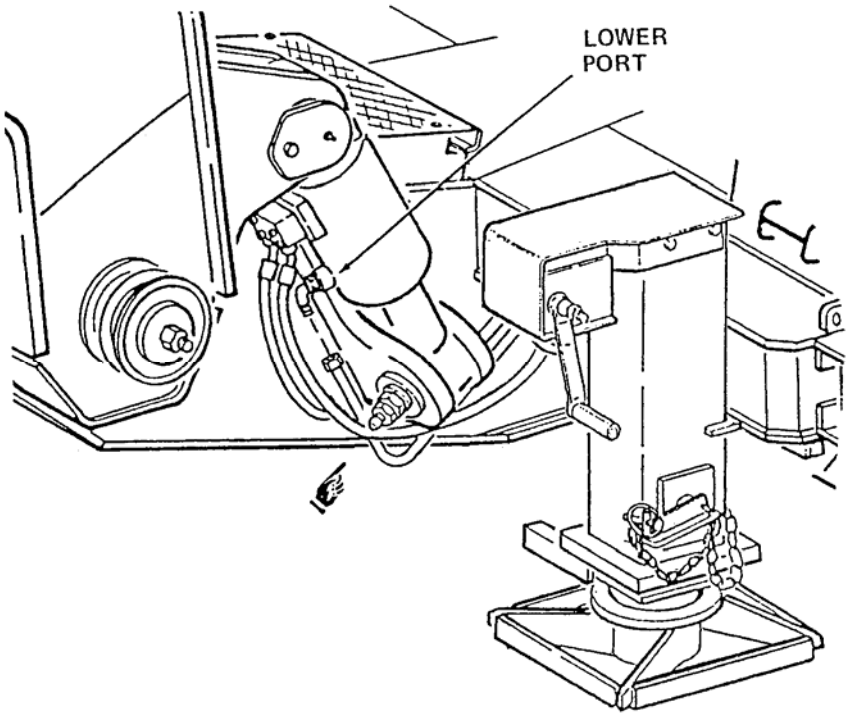
MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

Step 3. Check gooseneck drift, while in the ADJUST mode, by observing front suspension.

a. Lower front suspension (para. 2-19). If front suspension, streetside and/or curbside is two or three times slower than normal cylinder speed, remove and inspect each respective side of gooseneck isolation valve (para. 4-84) and replace parts as necessary.

b. If gooseneck drifts and front suspension does not, check gooseneck cylinder for internal leakage as follows: couple tractor/semitrailer (para. 2-24), operate gooseneck isolation valve handle to RUN position (para. 2-6), close hydraulic tank shut-off valve, remove lower hose from each gooseneck cylinder and cap lines to prevent fluid loss, check cylinder port for fluid loss while watching for platform drift down, remove cap from line, reconnect hoses to cylinder, open hydraulic tank shut-off valve. If platform drifted and fluid loss from cylinder port was approximately the same rate, cylinder(s) are leaking internally. Notify DS maintenance to repair or replace gooseneck cylinder(s).



4-13. TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

26. OIL OR AIR RELIEVING FROM GOOSENECK CYLINDER AIR RESERVOIR

Step 1. Check for damaged gooseneck cylinder air reservoir.

If air reservoir is damaged, remove and replace air reservoir (para. 4-95).

Step 2. Check that oil is dripping or running from relief valve or air breather/check valve at gooseneck cylinder air reservoir.

a. Check reservoir for leaks. If fittings are leaking, remove and reinstall using pipe sealant (item 18, appx. E). If joint still leaks, replace parts as required (para. 4-95).

b. If excessive oil relieves from air reservoir, it is possible that streetside gooseneck cylinder may be leaking internally. Refer to symptom 25, step 3b, and check streetside gooseneck cylinder for internal leaks.

27. STEERING WILL NOT ADJUST

Step 1. Check for normal steering pressure at system gage for adjusting steering. Normal pressures should read 1000 - 2500 psi (6895 - 17238 kPa) when steering wedge is approximately straight ahead and pressure should rise up to 3000 - 3900 psi (20685 - 26891 kPa) when positioned for an extreme turn.

a. If mechanical binding, damage, leaks, or misalinement is found, adjust, repair, or replace parts as required.

b. If system pressure gage reads normal but will not adjust when steering valve handle is operated, refer to symptom 18, steps 3, 4, and 5, and check system ability to maintain proper operating pressure.

Step 2. If system pressure is low and steering will not adjust but semitrailer tracks tractor steering, check each steering cylinder for internal leakage.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

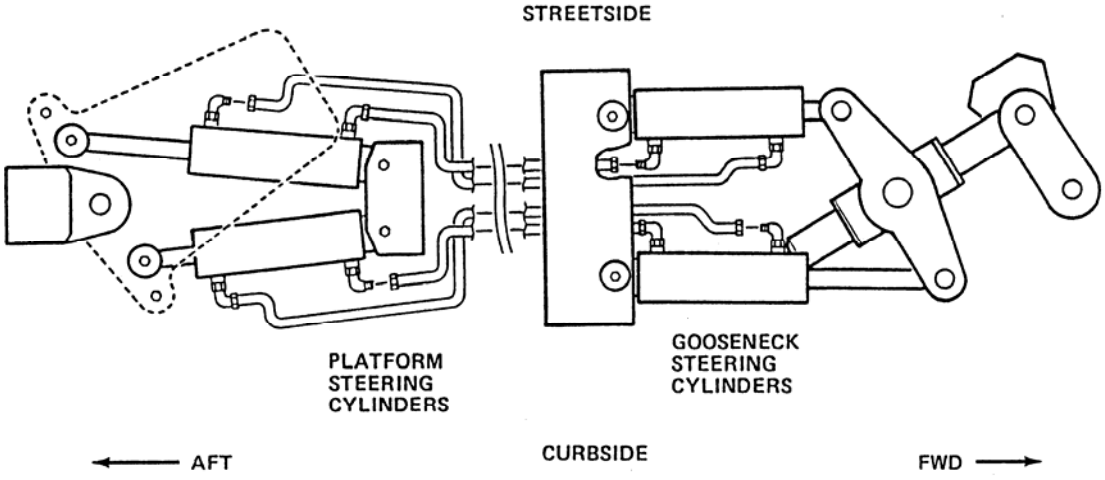
HYDRAULIC SYSTEM - CONT

WARNING

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

When checking for leaks, keep hands and face away from cylinder openings while under pressure or injury to personnel may result.

Manually steer semitrailer into a full right turn (para. 2-21). Disconnect and plug hydraulic hoses from aft port on streetside gooseneck cylinder and curbside platform cylinder. Disconnect and plug hoses from forward port on curbside gooseneck cylinder and streetside platform cylinder. Continue to steer a right turn until system pressure gage reads between 3800 - 4500 psi (26201 - 31027 kPa). Check open ports for excess fluid leakage. If excess fluid loss is detected, remove leaking cylinder (para. 4-54 or 4-55) and notify DS maintenance. Remove plugs and reconnect hoses to cylinders.



4-13. TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
HYDRAULIC SYSTEM - CONT
27. STEERING WILL NOT ADJUST - CONT
Step 3. Check that steering system steers in one direction but system pressure gage reads over 3800 psi (26201 kPa) and still does not adjust in the other direction. a. Steering manifold pilot check valves PO1 thru PO4 may be leaking, may be defective, or may be failing to pilot. Remove pilot check valves, clean, repair, or replace parts as required (para. 4-78). b. Steering manifold resistance valve RV1 thru RV8 may be stuck closed and/or open, and dirty or defective. Remove resistance valves, clean, repair, or replace parts as required (para. 4-78).
28. STEERING PRESSURE INDICATOR LIGHT COMES ON
Step 1. Indicator light comes on and semitrailer also has other malfunction symptoms, such as poor tracking behind tractor or steering will not adjust. Check for general hydraulic failures that would limit fluid flow to hydraulic controls. (Refer to symptom 16.)
Step 2. Check for external leaks at hydraulic fittings/joints. Refer to symptom 16 for checking external leaks.
Step 3. Indicator light remains lit after numerous general hydraulic checks. a. Bleed and recharge hydraulic system to remove possible air trapped in hydraulic system. Refer to paragraph 4-19.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

b. If relief valve R1 is not leaking or defective, or steering pressure indicator stays lit while adjusting steering with steering control valve or comes on immediately when handle is released, using multimeter (item 17, appx. B), check which pressure switch closes first. If pressure switch PS5 closes first, check valve PO1 may be defective or leaking. If pressure switch PS6 closes first check valve PO2 may be defective or leaking. If pressure switch PS7 closes first, check valve PO3 may be defective or leaking. If pressure switch PS8 closes first, check valve PO4 may be defective or leaking. Refer to paragraph 4-78 and repair or replace parts as required.

29. SEMITRAILER STEERING DOES NOT TRACK PROPERLY

Step 1. Check for hydraulic leaks at steering cylinder, fittings, joints, and hoses.

Refer to symptom 16 and check for external leaks.

Step 2. If steering pressure indicator was not on, check indicator light for proper operation.

Refer to symptom 30 to check steering indicator.

Step 3. Check for excessive air in hydraulic system.

Bleed steering system (para. 4-19) and test for proper tracking.

Step 4. If steering pressure indicator still comes on.

Refer to symptom 27 and troubleshoot indicator light and pressure switches.

Step 5. If steering pressure indicator stays off and semitrailer still does not track the tractor properly, check platform steering installation.

Refer to paragraph 4-16 and check platform steering installation for loose, misalined, or broken parts and perform platform steering alinement as required.

Step 6. Check steering cylinders for leaks.

Refer to symptom 27 and check steering hydraulic cylinders for leaks.

4-13. TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ELECTRICAL SYSTEM

30. STEERING PRESSURE INDICATOR DOES NOT LIGHT

Step 1. Check that power is supplied from tractor to running lights.

If steering pressure indicator fails to light, refer to symptom 31 and check tractor/semitrailer electrical.

Step 2. Check that steering pressure indicator light bulb is working.

Using a 12 Vdc battery and jumper leads, connect leads to poles of bulb. If bulb is defective, replace bulb (para. 4-28).

Step 3. Check wiring to pressure switches.

Check jumper wires to four pressure switches and check wiring harness W3 for breaks, pinched or missing wires. Repair or replace wiring (para. 4-34 and 4-37).

Step 4. Using an electrical tester (multimeter) (item 17, appx. B), check for defective pressure switch on suspension manifold.

NOTE

Make sure the tractor/semitrailer is coupled and running lights are turned on.

If checking more than one pressure switch, recharge the steering circuit between each check by running the APU and operating the steering valve for 10 seconds in both directions until indicator light goes out.

a. Using an ohm meter, connect leads to poles of pressure switch PS5. Reading on meter should be infinity (open). Check operation of pressure switch PS5 by slightly opening aft bleed valve on curbside platform cylinder. Allow only residual pressure to be bled from cylinder. Once pressure is relieved from cylinder, close bleed valve and check indicator light. Indicator light should be lit and ohm reading should be zero (closed). If indicator light is not lit or ohm reading is not zero, replace pressure switch PS5 (para. 4-78).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ELECTRICAL SYSTEM - CONT

b. Using an ohm meter, connect leads to poles of pressure switch PS6. Reading on meter should be infinity (open). Check operation of pressure switch PS6 by slightly opening forward bleed valve on curbside platform cylinder. Allow only residual pressure to be bled from cylinder. Once pressure is relieved from cylinder, close bleed valve and check indicator light. Indicator light should be lit and ohm reading should be zero (closed). If indicator light is not lit or ohm reading is not zero, replace pressure switch PS6 (para. 4-78).

c. Using an ohm meter, connect leads to poles of pressure switch PS7. Reading on meter should be infinity (open). Check operation of pressure switch PS7 by slightly opening forward bleed valve on streetside platform cylinder. Allow only residual pressure to be bled from cylinder. Once pressure is relieved from cylinder, close bleed valve and check indicator light. Indicator light should be lit and ohm reading should be zero (closed). If indicator light is not lit or ohm reading is not zero, replace pressure switch PS7 (para. 4-78).

d. Using an ohm meter, connect leads to poles of pressure switch PS8. Reading on meter should be infinity (open). Check operation of pressure switch PS8 by slightly opening aft bleed valve on streetside platform cylinder. Allow only residual pressure to be bled from cylinder. Once pressure is relieved from cylinder, close bleed valve and check indicator light. Indicator light should be lit and ohm reading should be zero (closed). If indicator light is not lit or ohm reading is not zero, replace pressure switch PS8 (para. 4-78).

31. ALL LAMPS DO NOT LIGHT

Step 1. Check intervehicular cables/connectors for corrosion and defects.

a. Using a multimeter (item 17, appx. B) and semitrailer electrical schematic (figure FO-1) as a guide, check for corroded intervehicle cable hookups. If cables are corroded, clean cables and reconnect as required.

b. If cables are defective, replace cable as required.

4-13. TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

ELECTRICAL SYSTEM - CONT

31. ALL LAMPS DO NOT LIGHT - CONT

Step 2. Using a multimeter (item 17, appx. B) and semitrailer electrical schematic (figure FO-1) as a guide, check for ground or open circuit in wiring.

If wiring has a ground or open circuit, repair or replace wiring as required.

32. ONE OR MORE (BUT NOT ALL) LIGHTS WILL NOT LIGHT

Step 1. Check for defective light assembly.

Repair or replace defective light assemblies (para. 4-24 thru 4-29).

Step 2. Using an electrical tester (multimeter) (item 17, appx. B) and semitrailer electrical schematic (figure FO-1) as a guide, remove tractor intervehicle connectors and check semitrailer connectors J1 and J2 at gooseneck component assembly (para. 4-22).

a. At connector J1, using a multimeter on lowest ohm setting, connect common lead to ground. At connector, probe pins A, B, C, E, F, and H. Results should reflect greater than 3 ohms. Probe pins K, L, M, and N. Results should reflect open circuit. Probe pin D. Results should reflect ground.

b. At connector J2, using a multimeter on lowest ohm setting, connect common lead to ground. At connector, probe pins 2 thru 6. Results should reflect 1 ohm or greater. Probe pin 1. Results should reflect ground. Probe pin 7. Results should reflect open circuit.

Step 3. Check for broken wires and corroded and loose connections.

a. If connections are loose, tighten connections.

b. If connections are corroded, clean connectors as required or if wires are broken, repair lead wires as required.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ELECTRICAL SYSTEM - CONT

Step 4. Using semitrailer electrical schematic (figure FO-1), check for open circuit in wiring or terminal board.

If wiring or terminal board has a ground or open circuit, repair or replace as required.

Step 5. At gooseneck component assembly, using an electrical tester (multimeter) (item 17, appx. b), check resistors and diodes for open circuit. Remove six bolts and carefully remove gooseneck component assembly from gooseneck. Turn component assembly upside down for accessibility (para. 4-22).

a. Probe pins J1-B to J2-3; results should reflect 7 ohms. Probe pins J1-J to J2-5; results should reflect 7 ohms. Probe pins J1-E to TB2-1; results should reflect 2 ohms.

a.1. For LED lights, this step is not applicable.

b. Probe terminal boards TB2-1 to TB2-2; results should reflect continuity in one direction. Reverse leads and results should reflect resistance in other direction.

c. Remove jumper wire from terminal board TB2-3 and probe pins TB2-1 to TB2-3. Results should reflect continuity in one direction. Reverse leads and results should reflect resistance in other direction. Reinstall jumper wire to pin 3.

c.1. For LED lights, probe terminals TB2-10 to TB2-2 for current flow. In the 10-2 direction, current should flow unresisted. In the 2-10 direction, less than 12 volts should give an open circuit and greater than 12 volts should give a closed circuit.

d. Remove and replace resistors and/or diodes (para. 4-22).

e. For LED lights, remove and replace diodes and/or zener lead assembly.

33. DIM OR FLICKERING LIGHTS

Step 1. Inspect for proper output from tractor.

Repair or replace any defects found as required.

Step 2. Check light assemblies for corrosion, missing parts, and burned bulbs.

Repair or replace defective light assemblies (para. 4-24 thru 4-29).

Step 3. Using semitrailer electrical schematic (figure FO-1) and multimeter (item 17, appx. B), check for intermittent ground or open circuit.

If wiring is defective, repair or replace as required.

4-13. TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

WHEELS, TIRES, AND HUBS

34. WHEEL WOBBLES

Step 1. Check for loose or missing lug nuts and missing or broken lugs.

a. If lug nuts are loose or missing, replace, tighten, and torque as required (para. 4-50).

b. If lug studs are broken or stripped, replace defective parts (para. 4-50).

Step 2. Check for bent wheel.

If wheel is bent, remove tire and wheel and install spare in place (para. 3-6 and 3-7, 3-8, 3-9, or 3-10). Remove tire from bent wheel and replace wheel (para. 4-51).

NOTE

Only tires listed in TM 9-2330-381-24P, Repair Parts and Special Tools List (RPSTL), are authorized for use.

Step 3. Check tires for improper size and type.

If tire is not 215/75 R17.5, remove tire. Check spare for correct size and type; then, install spare in place of improper tire (para. 3-6 and 3-7, 3-8, 3-9, or 3-10).

Step 4. Check steering linkages for looseness and improper adjustments.

Adjust and tighten steering linkages (para. 4-16).

35. EXCESSIVE OR UNEVEN TIRE WEAR

Step 1. Check for loose or missing lug nuts and missing or broken lugs.

If lug nuts are loose or missing, replace, tighten, and torque as required (para. 4-50).

Step 2. Check for bent wheel.

If wheel is bent, remove tire and wheel and install spare in place (para. 3-6 and 3-7, 3-8, 3-9, or 3-10). Remove tire from bent wheel and replace wheel (para. 4-51).

NOTE

Only tires listed in TM 9-2330-381-24P, Repair Parts and Special Tools List (RPSTL), are authorized for use.

Step 3. Check tires for improper size and type.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

WHEELS, WIRES, AND HUBS - CONT

If tire is not 215/75 R17.5, remove tire. Check spare for correct size and type; then, install spare in place of improper tire (para. 3-6 and 3-7, 3-8, 3-9, or 3-10).

Step 4. Check steering linkages for looseness and improper adjustments.

Adjust and tighten steering linkages (para. 4-16).

WARNING

Always follow proper tire inflation procedures and warnings. Failure to do so could cause serious injury or death.

Step 5. Check tires for proper inflation.

Inflate tires to correct pressure of 95 psi ±5 psi (655 kPa ±34 kPa).

36. IN TOW, SEMITRAILER WANDERS OR PULLS TO ONE SIDE (ON LEVEL GROUND)

Step 1. Check steering linkages for looseness and improper adjustment.

Adjust and/or tighten steering linkages (para. 4-16).

Step 2. After platform steering alinement is complete semitrailer still wanders or pulls to one side (on level ground).

Troubleshoot semitrailer for improper tracking (symptom 29).

BRAKES

37. NO BRAKES OR WEAK BRAKES

Step 1. Check air cleaner for clogged or dirty filter.

Remove and replace air cleaner (para. 4-47).

Step 2. Check air lines/connectors, brake chamber, and valves for leaks and defects.

a. If air lines/connectors are leaking, tighten, repair, or replace as required (para. 4-48 and 4-49).

b. If a multifunction valve is leaking, replace multifunction valve (para. 4-49).

c. If a relay valve is leaking, replace relay valve (para. 4-49).

d. If an air brake chamber is defective or is leaking, remove and replace air brake chamber (para. 4-49).

4-13. TROUBLESHOOTING (CONT)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

BRAKES - CONT

37. NO BRAKES OR WEAK BRAKES - CONT

Step 3. Check brakes for improper adjustment.

Perform service brake adjustment (para. 4-15).

Step 4. Check for grease on brake linings.

If grease is present on brake lining, replace inner bearing oil seal and replace brake shoes (para. 4-43) as required.

Step 5. Check for worn brake linings.

If brake linings are worn, replace brake shoes (para. 4-43).

Step 6. Check for relay valve operation by observing air brake chamber.

a. If left and right bogies (#1) air brake chambers do not operate, replace relay valve #1 (para. 4-49).

b. If left and right bogies (#2) air brake chambers do not operate, replace relay valve #2 (para. 4-49).

c. If left and right bogies (#3) air brake chambers do not operate, replace relay valve #3 (para. 4-49).

d. If left and right bogies (#4) air brake chambers do not operate, replace relay valve #4 (para. 4-49).

e. If left and right bogies (#5) air brake chambers do not operate, replace relay valve #5 (para. 4-49).

f. If a single air brake chamber does not operate properly, remove and replace defective chamber (para. 4-49).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

BRAKES - CONT

38. SLOW BRAKE APPLICATION OR SLOW RELEASE

Step 1. Check for low air pressure (leakage at connections, air lines, or valves).

a. If air lines/connections are leaking, repair or replace as needed (para. 4-48 and 4-49).

b. If a valve is leaking, remove and replace valve (para. 4-49).

Step 2. Check for restrictions in air lines and hoses.

If air lines are restricted, clean or replace lines (para. 4-48 and 4-49).

Step 3. Check air brake chamber operation.

a. If a single air brake chamber does not operate properly, remove and replace defective chamber (para. 4-49).

b. If a set of air brake chambers does not operate properly, remove and replace a relay valve (para. 4-49).

39. BRAKES GRAB

Step 1. Check for uneven brake adjustment (para. 4-10, item 3).

If brakes are out of adjustment, adjust brakes (para. 4-15).

Step 2. Check for grease on brake linings.

If grease is on linings, replace brake shoes (para. 4-43) and replace inner bearing oil seal (para. 4-50).

Step 3. Check for worn or loose brake linings (para. 4-10, item 3).

If brake linings are worn or loose, replace brake shoes (para. 4-43).

Step 4. Check for excessively scored, cracked, or out-of-round brake drum (para. 4-10, item 3).

If brake drum is defective or if above steps do not correct malfunction, notify DS maintenance.

Section V. GENERAL MAINTENANCE INSTRUCTIONS

PARA. NO.	TITLE
4-14	General
4-15	Service Brake Adjustment
4-16	Platform Steering Alinement
4-17	Hydraulic System Check and Fill
4-18	Hydraulic Tank Draining
4-19	Hydraulic System Bleeding
4-20	Hydraulic System Flushing

4-14. GENERAL

This section contains general maintenance instructions that will be referred to in other parts of this manual.

4-15. SERVICE BRAKE ADJUSTMENT

This task covers service brake adjustment.

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Equipment Condition

Platform set at road height (para. 2-19)
Semitrailer parked on level ground and coupled to tractor (para. 2-24)

General Safety Instructions

CAUTION

Brake adjustments are mandatory after installing new brakes or performing maintenance on brakes. Brake adjustments must also be accomplished if any of the following conditions exist:

The slack adjusters are not level to each other when brakes are applied.

Brake chamber clevis moves more than 2 inches (5.1 cm) from fully released condition to fully engaged condition (para. 4-10, item no. 3).

CAUTION

Brake drum temperature is cool to the touch after heavy braking operations have been performed.

SERVICE BRAKE ADJUSTMENT

NOTE

Regardless of position of tractor's TRAILER AIR SUPPLY valve knob, the tractor will NOT be able to supply air to semitrailer air tanks if the tractor's PARKING BRAKE knob is pulled out (parking brakes set).

Brake adjustments must be done after the suspension assembly has been completely reassembled and air pressure restored to the system or an improper adjustment might be made.

1. Chock wheels on both tractor and semitrailer. Inside cab of tractor, push in both black knob for PARKING BRAKE and red knob for TRAILER AIR SUPPLY.

CAUTION

Brake adjustments require that the semitrailer air tanks be fully charged to ensure that each brake chamber push rod is fully retracted. With less than a fully charged system, the brakes may release but not fully retract giving a false indication of the caged position. If the brakes are not fully retracted, proper brake adjustment cannot be completed.

2. Allow tractor air system pressure gage to reach 100 psi (689.5 kPa). Wait an additional 10 minutes to ensure that semitrailer air system is fully charged and all brake chamber push rods are fully retracted.

4-15. SERVICE BRAKE ADJUSTMENT (CONT)

3. Locate left-hand slack adjuster (1), right-hand slack adjuster (2), and parking/service brake chamber (3) on affected suspension assembly (4).

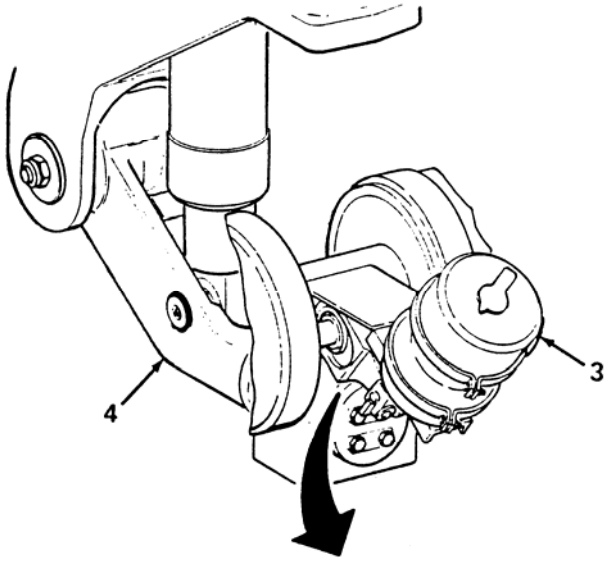
CAUTION

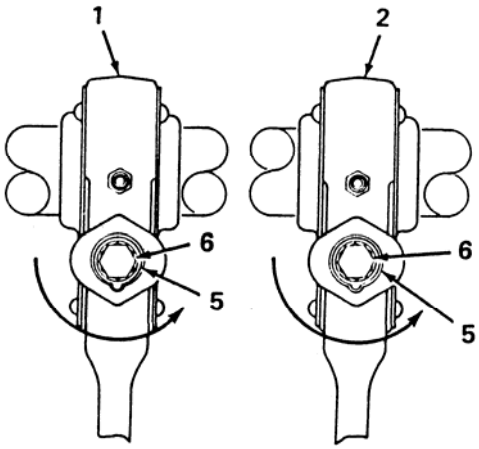
Be sure each locking ring moves freely, in and out, prior to adjusting the slack adjuster or damage to equipment may result.

4. Press in on locking ring (5) on left-hand slack adjuster (1). Using moderate force, turn adjusting nut (6) counterclockwise as far as possible.

5. Press in on locking ring (5) on right-hand slack adjuster (2). Using moderate force, turn adjusting nut (6) counterclockwise as far as possible.

6. Repeat steps 4 and 5 until adjusting nuts (6) on both left- and right-hand slack adjusters (1 and 2) cannot be turned counterclockwise any further. This ensures that both sets of brake shoes are firmly in contact with each brake drum.





7. Check that left- and right-hand slack adjusters (1 and 2) are approximately parallel to each other and that mending plate (7) is approximately parallel to the ground.

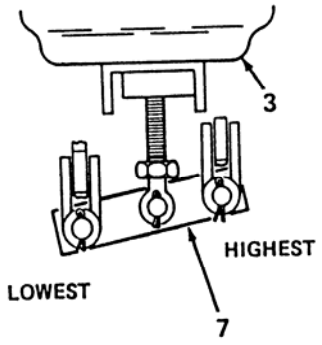
8. If slack adjusters (1 and 2) are parallel to each other and mending plate (7) is parallel to the ground, proceed to step 9. If slack adjusters (1 and 2) are not parallel to each other or mending plate (7) is not parallel to the ground, proceed as follows:

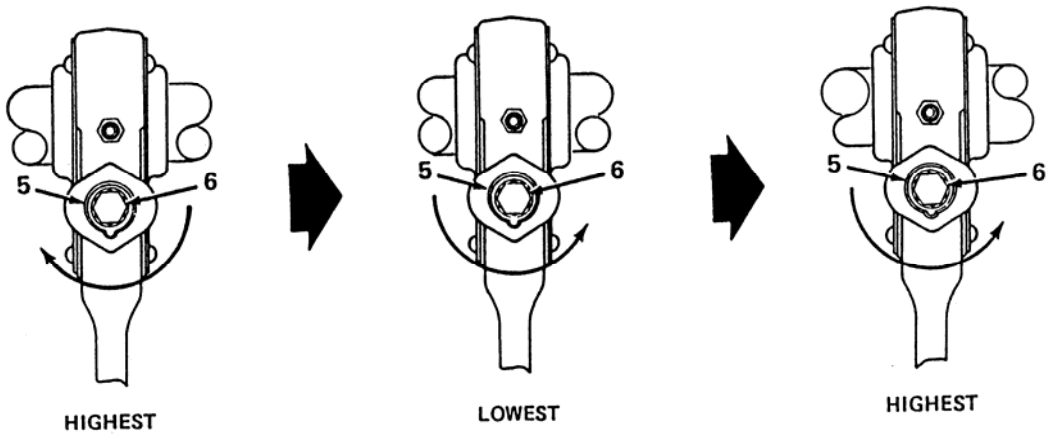
   a. On highest slack adjuster (1 or 2), press in on locking ring (5) and turn adjusting nut (6) clockwise until highest slack adjuster (1 or 2) is only slightly higher than other slack adjuster.

   b. On lowest slack adjuster (1 or 2), press in on locking ring (5) and turn adjusting nut (6) counterclockwise until brake shoes are firmly against brake drum.

   c. On highest slack adjuster (1 or 2), press in on locking ring (5) and turn adjusting nut (6) counterclockwise until brake shoes are firmly against brake drum.

   d. Repeat steps a, b, and c until both sets of brake shoes are firmly against brake drums and mending plate (7) is approximately parallel to the ground.



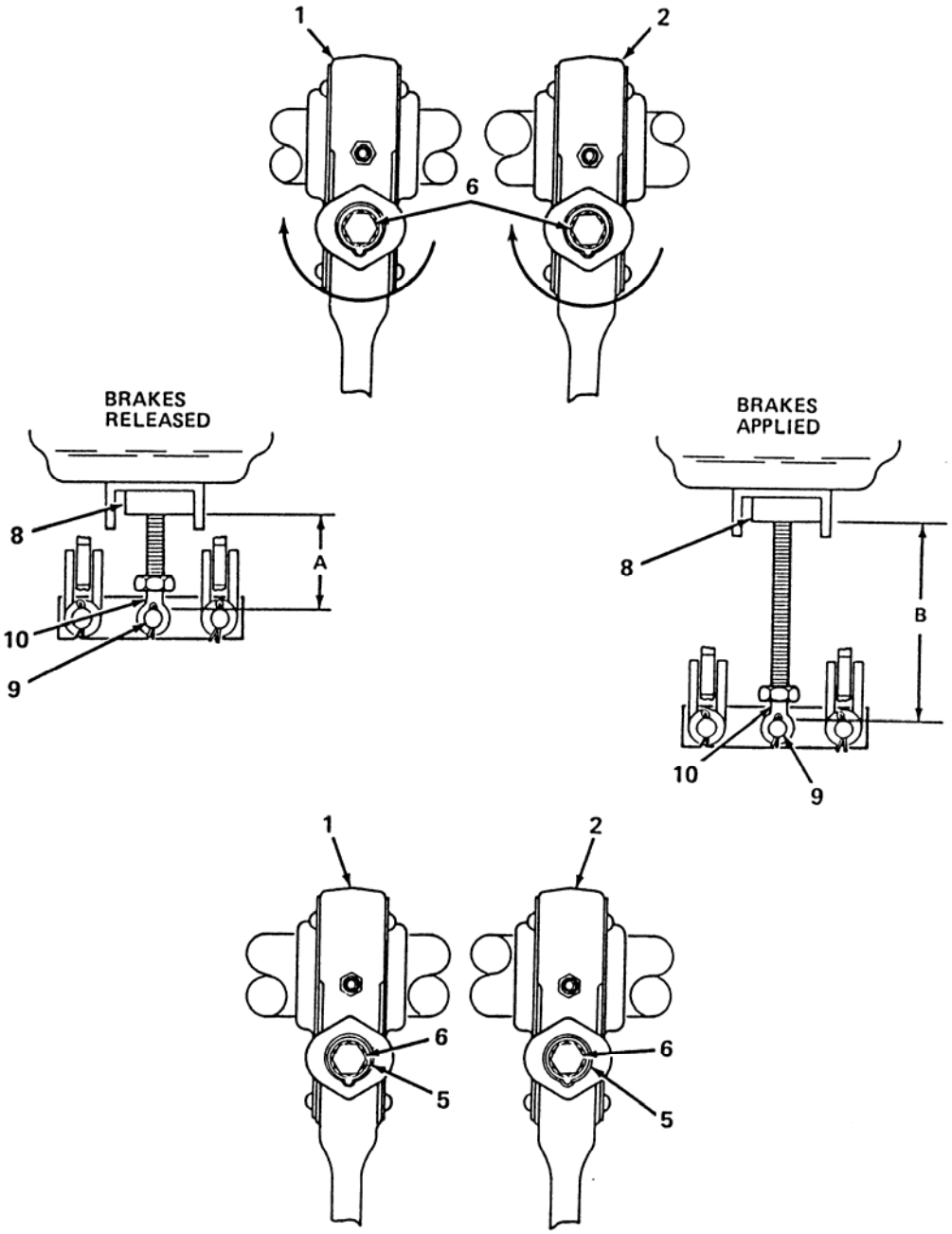


4-15. SERVICE BRAKE ADJUSTMENT (CONT)

9. Press in on locking ring (5) and turn adjusting nut (6) on both slack adjusters (1 and 2) 1/4 turn clockwise. The brake shoes are now just clear of brake drums.

10. Measure distance from bottom of brake chamber bracket (8) to top of straight headless pin (9) on clevis (10) (dimension A). Document measurement.

11. Apply semitrailer parking brakes by pulling out on knob of brake release valve (para. 2-9).



12. Measure distance from bottom of brake chamber bracket (8) to top of straight headless pin (9) on clevis (10) (dimension B). Document measurement.

13. If difference between two measurements taken is less than 1 inch (2.5 cm) and both slack adjusters (1 and 2) are still approximately parallel to each other and the ground, brake adjustment is complete. If not, repeat steps 4 thru 12, as required.

14. After all adjustments have been completed, verify that locking ring (5) on each slack adjuster (1 and 2) is popped outward to lock adjusting nut (6). Rotate adjusting nut (6) on either slack adjuster (1 or 2) counterclockwise until each locking ring (5) has positively locked each adjusting nut (6), as required.

FOLLOW-ON MAINTENANCE

Operate and/or drive tractor/semitrailer and check for proper brake operation (para. 2-25).

4-16. PLATFORM STEERING ALINEMENT

This task covers platform steering alinement.

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Adjustable automotive wrench, item 17, appx. B

Personnel Required: 2

Equipment Condition

Tractor/semitrailer coupled and tractor parking brakes applied (para. 2-24)
Platform adjusted to 43-inch (127 cm) height (para. 2-19)
Front and rear support legs lowered supporting platform (para. 2-22 and 2-23)

PLATFORM STEERING ALINEMENT

1. Release semitrailer parking brakes by pushing inward on knob of parking brake valve (para. 2-8).

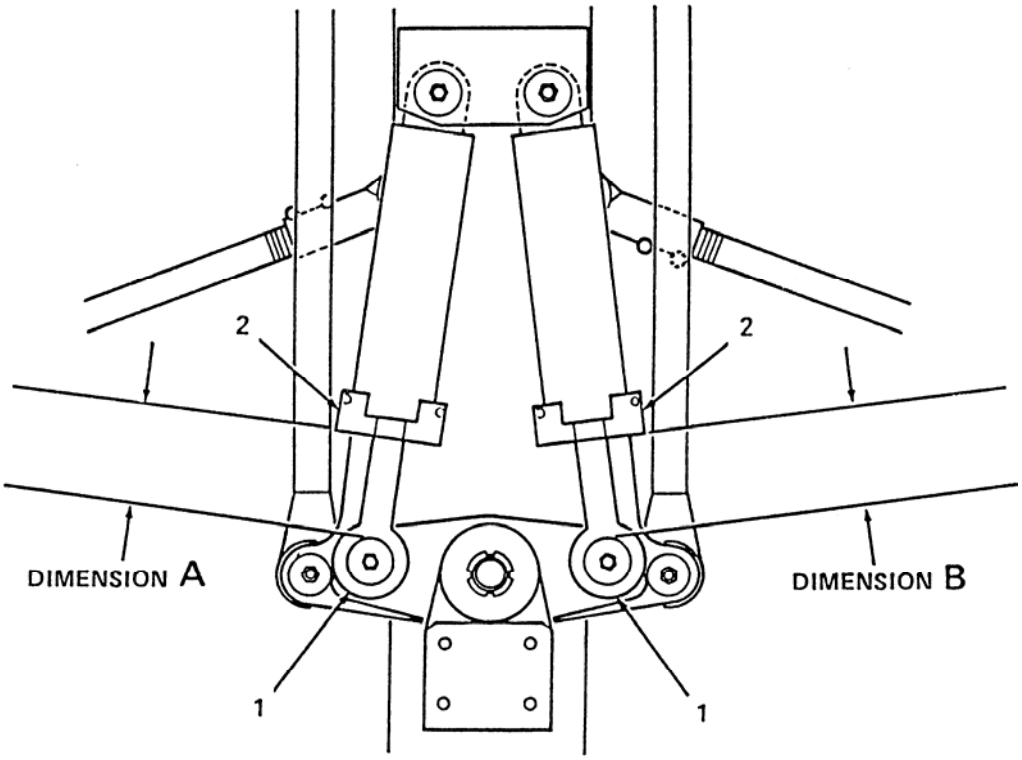
4-16. PLATFORM STEERING ALINEMENT (CONT)

NOTE

Steering stop blocks and associated hardware are not used on vehicles with manufacturer's serial numbers 526 and subsequent. Manufacturer's serial number is stamped in front of platform main beam under the gooseneck.

2. Take and document measurements (dimensions A and B) at both steering plate cylinder mounts (1) to both steering cylinder stops (2) or to ends of cylinders. Compare measurements.

3. If necessary, manually steer semitrailer (para. 2-21) and recheck measurement. Steer bogies, as required, until both measurements are the same, within 0.125 inch (0.3 cm).

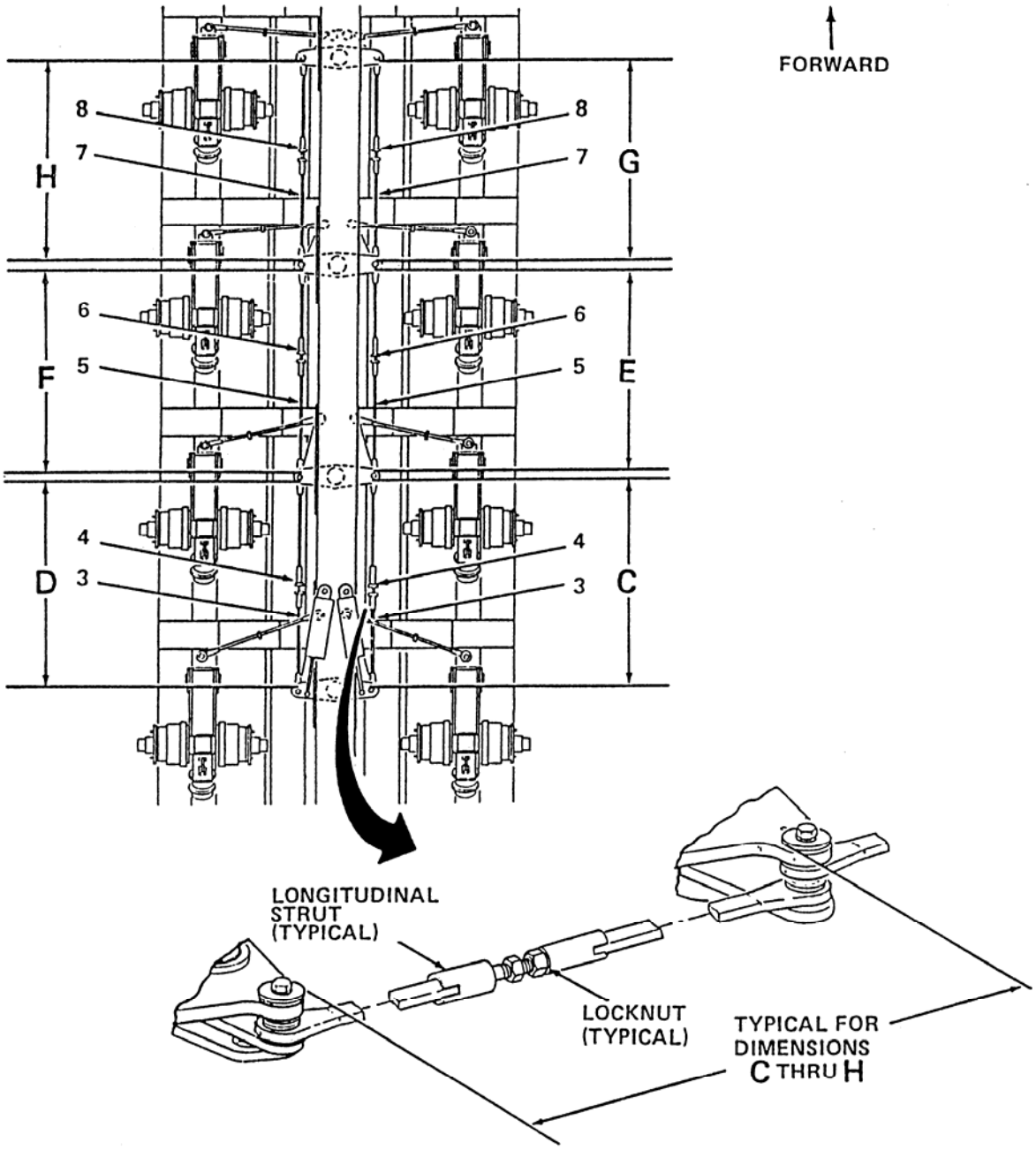


4. Take and document length measurements (dimensions C and D) of both streetside and curbside longitudinal struts #3 (3).

CAUTION

Before adjusting any longitudinal struts, slack must be removed. While adjusting longitudinal struts, tension must be maintained or a proper alinement will not be achieved.

5. Using an adjustable automotive wrench, loosen two locknuts (4) and adjust both longitudinal struts #3 (3) until struts are same length, within 0.125 inch (0.3 cm). Retighten two locknuts (4).



6. Take and document measurements (dimensions E and F) of both streetside and curbside longitudinal struts #2 (5).

7. Using an adjustable automotive wrench, loosen two locknuts (6) and adjust both longitudinal struts #2 (5) until struts are same length, within 0.125 inch (0.3 cm). Retighten two locknuts (6).

8. Take and document measurements (dimensions G and H) of both streetside and curbside longitudinal struts #1 (7).

9. Loosen two locknuts (8) and adjust both longitudinal struts #1 (7) until struts are same length, within 0.125 inch (0.3 cm). Retighten two locknuts (8).

4-16. PLATFORM STEERING ALINEMENT (CONT)

NOTE

Both nonsteering bogies must be alined prior to alining the remaining steerable bogies. Measurement must be taken from rim of each nonsteering bogie inner/outer wheel to longitudinal beam.

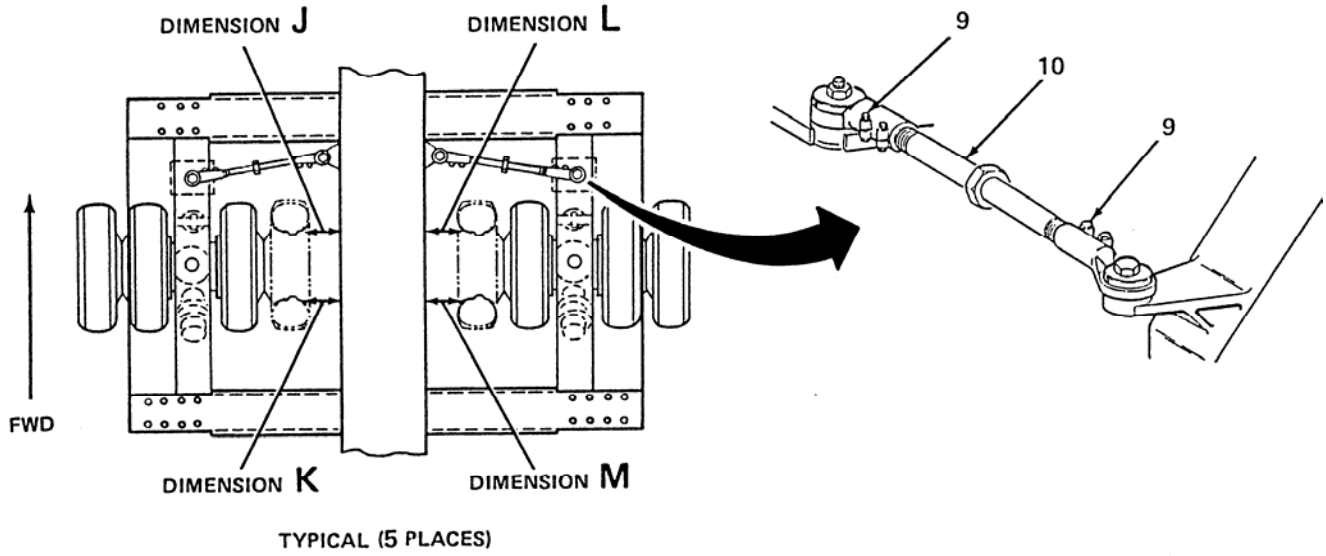
10. Take and document measurement from foremost and rearmost points on each inner/outer rim (dimensions J, K, L, and M) for both #1 (nonsteering) bogies to longitudinal beam.

11. If necessary, loosen two bolts (9) on each fixed connecting link (10) and, using an adjustable automotive wrench, adjust connecting link so that dimensions J and K are equal and dimensions L and M are equal.

12. Recheck measurement and document results. Once measurement is even for each rim, retighten two bolts (9) on each connecting link (10).

13. Repeat steps 10 thru 12 for both curbside and streetside bogies #2 thru #5.

14. Apply semitrailer parking brakes by pulling out knob of parking brake valve (para. 2-8).



FOLLOW-ON MAINTENANCE

Drive tractor/semitrailer and check semitrailer tracking (para. 2-25).

4-17. HYDRAULIC SYSTEM CHECK AND FILL

This task covers: a. System Check b. Fluid Fill

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Drain pan, 4 gl, item 17, appx. B

Materials/Parts

Hydraulic fluid, item 13, appx. E
Cap and plug set, item 5, appx. E

Personnel Required: 2

Equipment Condition

Tractor coupled to semitrailer or gooseneck supported (para. 2-24)
APU running (para. 2-16)

General Safety Instructions

WARNING

Hydraulic fluid may be hot if system has been in operation. Allow system to cool before performing maintenance or injury to personnel may result.

Hydraulic fluid may be under pressure. Use caution when disconnecting hydraulic components or injury to personnel may result.

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

SYSTEM CHECK

1. Check semitrailer hydraulic fluid level as follows:

   a. Park tractor/semitrailer on level ground with no side slopes (para. 2-24).

   b. Check platform height (para. 2-19). Platform should be at normal road height of 43 inches (109 cm) and gooseneck should be approximately 63 inches (160 cm).

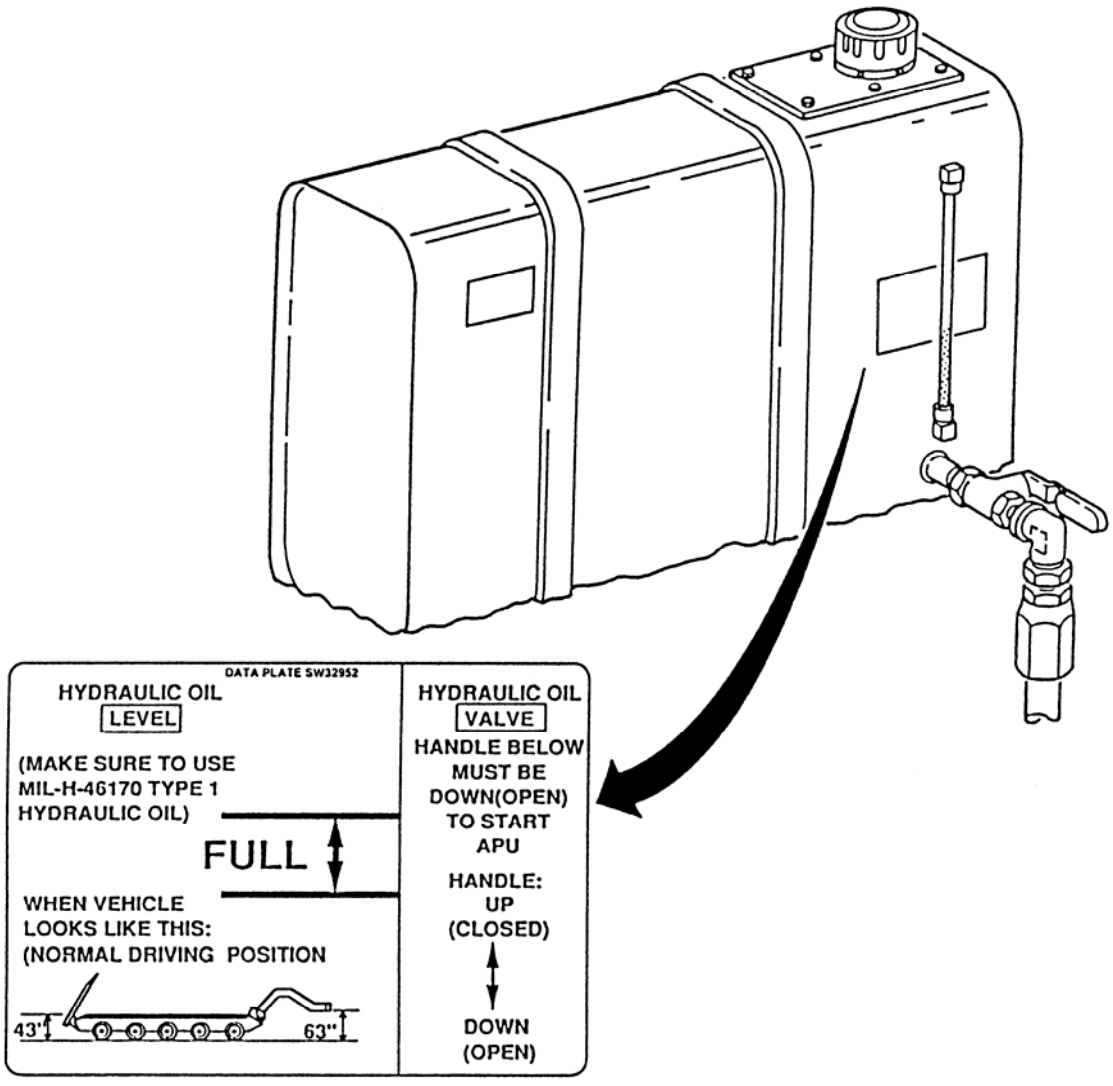
4-17. HYDRAULIC SYSTEM CHECK AND FILL (CONT)

c. Shut down APU (para. 2-16).

NOTE

Fluid levels can measure differently at different times due to hydraulic fluid temperature, air in the system, or unlevel ground surface.

d. Check fluid level in hydraulic tank. The fluid in indicator tube should measure within FULL mark range on hydraulic tank decal.



2. If fluid level is above top line of FULL mark, system is overfilled. First check for proper gooseneck and platform heights. Readjust if semitrailer is not properly adjusted. If fluid level is more than 1 inch over top line of FULL mark, proceed as follows:

a. Operate semitrailer (chapter 2, section III) and check for sluggish or slow operation which may be caused by air trapped in hydraulic system.

b. If improper operations are found, refer to bleeding procedure and bleed hydraulic system (para. 4-19).

c. If all operations are normal and hydraulic fluid level is still high, proceed as follows:

WARNING

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on it or trip over it. Injury to personnel or damage to equipment may result.

NOTE

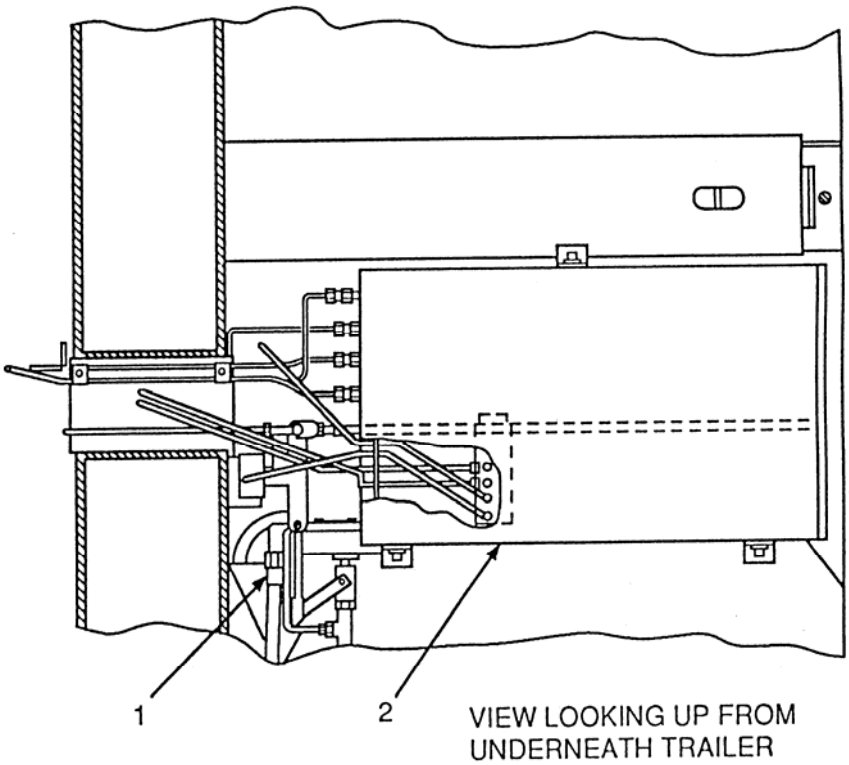
One person should monitor fluid level indicator while on top of gooseneck while other person drains fluid from rear of hydraulic control panel.

(1) Drain fluid from hydraulic tank by loosening hose fitting (1) at rear of hydraulic control module (2).

(2) Allow fluid to drain from hydraulic tank into drain pan until fluid level is approximately in middle of FULL mark.

(3) Tighten hose fitting (1).

(4) If too much hydraulic fluid was drained, refill to proper level per following fluid fill procedure.



4-17. HYDRAULIC SYSTEM CHECK AND FILL (CONT)

FLUID FILL

1. To fill hydraulic tank, level semitrailer as follows:

   a. Park tractor/semitrailer on level ground with no side slopes (para. 2-24).

   b. Check platform height (para. 2-19). Platform should be at normal road height of 43 inches (109 cm) and gooseneck should be approximately 63 inches (160 cm).

   c. Shut down APU (para. 2-16).

WARNING

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on it or trip over it. Injury to personnel or damage to equipment may result.

CAUTION

If the fluid level is more than 1 inch (2.5 cm) below the bottom of the FULL mark, then fluid must be added before operating the APU or damage to equipment may result.

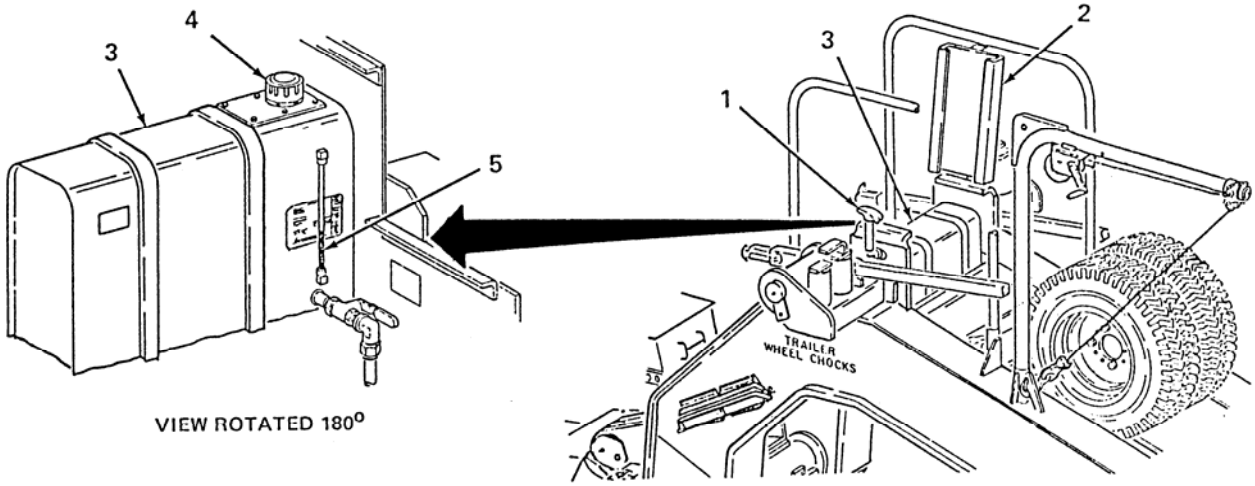
NOTE

If more than 1 inch (2.5 cm) of fluid must be added, check the entire hydraulic system for leaks, and service as required.

2. If fluid level is below FULL mark on hydraulic tank, add hydraulic fluid to tank as follows:

   a. Unhook latch (1) on gooseneck and raise top step (2) to gain access to top of hydraulic tank (3).

   b. Wipe dirt from around hydraulic tank breather cap (4) and around top of hydraulic tank (3).



NOTE

Do not to let foreign material enter the hydraulic tank or touch the bottom of the breather cap.

c. Remove breather cap (4). Minimize time breather cap is off of hydraulic tank (3) and replace immediately after filling is complete.

NOTE

Monitor fluid level while filling to prevent overfilling tank.

d. Using new/clean hydraulic fluid, fill tank until fluid in sight indicator (5) reaches approximately center of FULL mark.

e. Install breather cap (4) to hydraulic tank (3).

f. Lower step (2) and secure by hooking latch (1) to step.

CAUTION

If fluid was added due to damage or repair, the hydraulic system must be bled. Recheck fluid level prior to operating any hydraulic controls or damage to equipment may result.

3. If loss of hydraulic fluid was caused by damage or a repair, air may have entered hydraulic system. Refer to paragraph 4-19 and bleed affected hydraulic system.

4. If no repairs were made and more than 3 inches (7.6 cm) of fluid was added or if fluid had been added daily, refer to troubleshooting (para. 4-13) to determine source of leak.

4-18. HYDRAULIC TANK DRAINING

This task covers hydraulic tank draining.

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Drain pan, 4 gl, item 17, appx. B
Extension light, 24 ft, item 17, appx. B

Materials/Parts

Cap and plug set, item 5, appx. E
Pipe sealant, item 18, appx. E
Hydraulic fluid, approximately 10 gl (39 l), item 13, appx. E

4-18. HYDRAULIC TANK DRAINING (CONT)

Personal Required: 2

Equipment Condition

Gooseneck set at coupling height, 64 inches (163 cm) (para. 2-18)
Front and rear support legs lowered supporting platform (para. 2-22 and 2-23)
Platform lowered onto, and firmly supported by, support legs (para. 2-19)

General Safety Instructions

WARNING

Hydraulic fluid may be hot if system has been in operation. Allow system to cool before performing maintenance or injury to personnel may result.

Hydraulic fluid may be under pressure. Use caution when disconnecting hydraulic components or injury to personnel may result.

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

CAUTION

Throughout this procedure, all fittings and openings must be capped or plugged immediately after opening to prevent dirt and moisture or foreign material from entering the hydraulic system or damage to equipment may result.

NOTE

The hydraulic tank has a capacity of 16.5 gl (62.5 l). With the platform at road height and gooseneck at coupling height, the hydraulic tank should contain approximately 8 gl (30 l) of hydraulic fluid.

HYDRAULIC TANK DRAINING

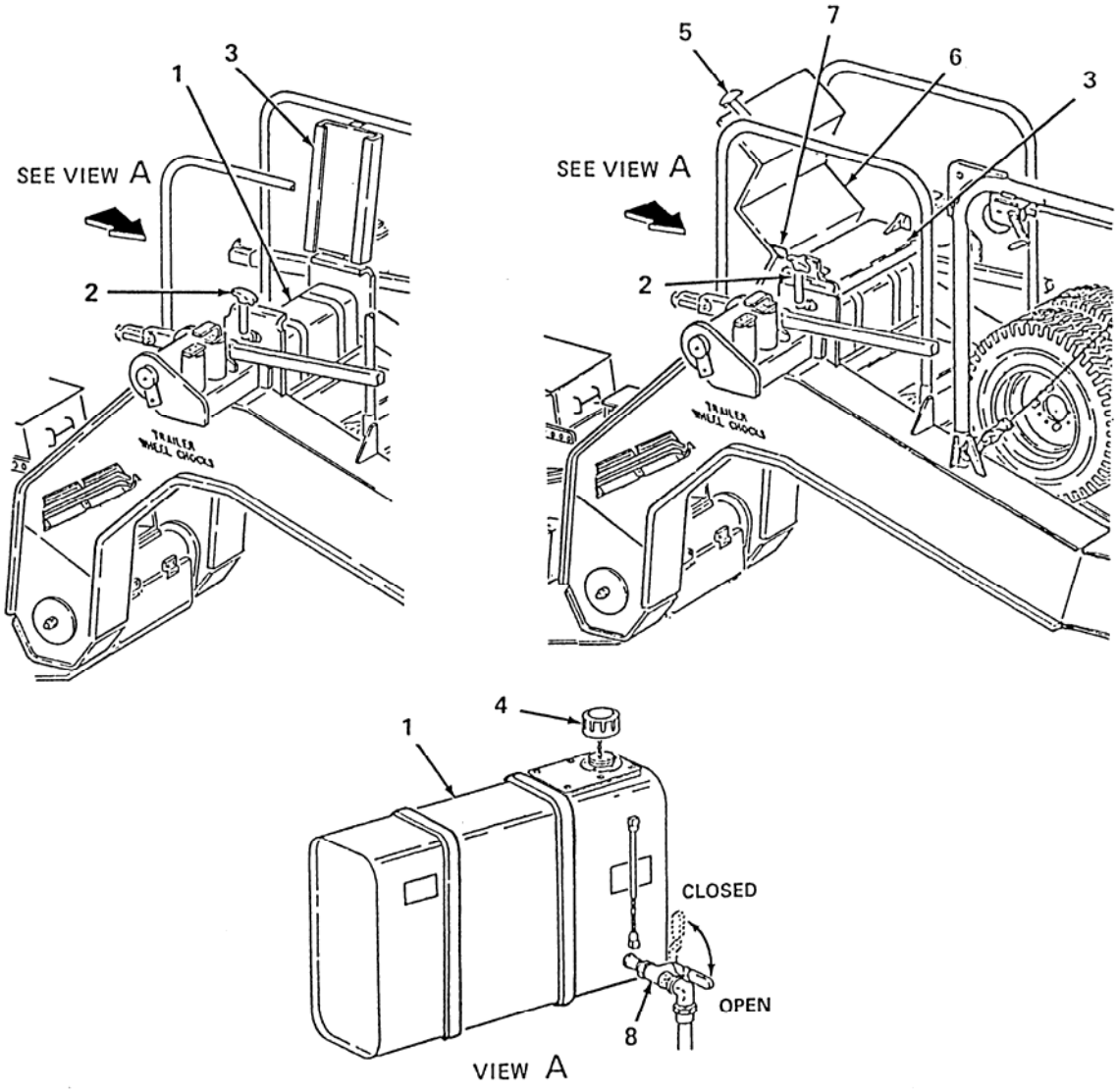
WARNING

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on it or trip over it. Injury to personnel or damage to equipment may result.

1. At rear of gooseneck, access top of hydraulic tank (1) by unhooking step retainer (2) and raising top step (3) toward streetside of gooseneck.

2. While holding top step (3) upright, unscrew and remove breather cap (4) from hydraulic tank (1). Lower top step (3) onto step frame on gooseneck.

3. Unhook step retainer (5) and pull upward on step section (6). Continue to push step section (6) until step contacts with top step (3).



4. Secure step section (6) in upright position by attaching step retainer (2) to metal strap (7) on step section (6).

5. Pull handle of oil valve (8) on hydraulic tank (1) to close valve. Valve handle should appear vertical to valve body of oil valve (8) when in CLOSED position.

NOTE

The general mechanics tool kit rolling tool cabinet should be placed directly beneath the hydraulic tank oil valve under the gooseneck. This provides bench space on which to place the drain pan during this task.

6. Roll GMTK tool cabinet under gooseneck directly below oil valve (8). Place drain pan with opening in pan under oil valve (8).

4-18. HYDRAULIC TANK DRAINING (CONT)

7. With a person standing under gooseneck and using two wrenches, tag and disconnect hydraulic hose (9) from straight adapter (10). Allow all fluid in hose (9) to drain into drain pan. Install caps/plugs into all openings.

WARNING

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on it or trip over it. Injury to personnel or damage to equipment may result.

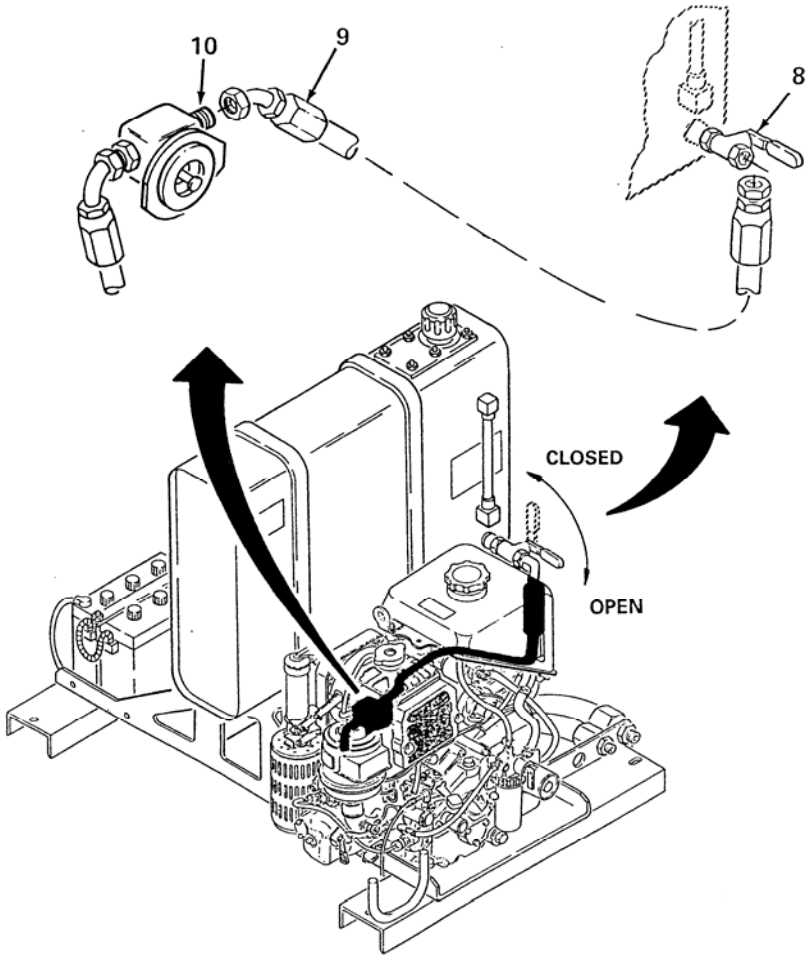
NOTE

The following steps required two people, one person positioned on the gooseneck at the hydraulic tank oil valve and the second person positioned under the gooseneck at the drain pan.

8. Using two people, drain hydraulic fluid from hydraulic tank (1) as follows:

   a. Remove cap/plug from hydraulic hose (9) and insert end of hose into opening in drain pan.

   b. Signal person on gooseneck to OPEN oil valve (8) moving valve handle in-line with valve body and allow fluid to drain from hydraulic tank (1).



c. Continually monitor fluid level in drain pan and, when drain pan is approximately full, signal person on gooseneck to CLOSE oil valve (8). Install caps/plugs into hose.

d. Dispose of hydraulic fluid in accordance with standard shop practices.

e. Position drain pan on tool cabinet with opening in drain pan under oil valve (8).

f. Repeat steps a thru d as required until all fluid that can be drained from this hose has been drained.

9. Remove caps/plugs installed and connect hydraulic hose (9) to straight adapter (10).

10. The hydraulic tank has been sufficiently drained for maintenance to be performed on the system. If fluid change is required due to contamination, proceed with step 11.

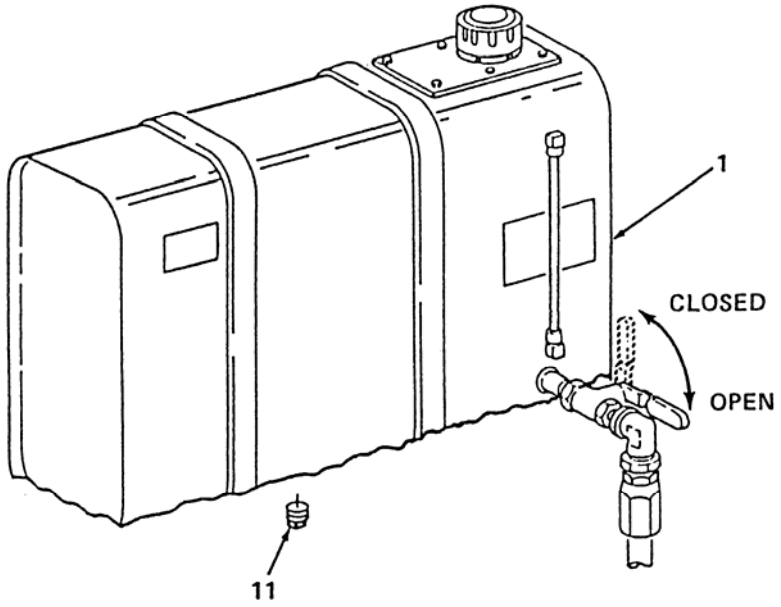
11. Using two people to empty hydraulic tank, proceed as follows:

a. Position rolling tool cabinet under semitrailer gooseneck so that cabinet is under APU hydraulic pump.

b. Position opening in drain pan centered under drain plug (11) on bottom of hydraulic tank (1), located just aft of APU pump.

c. Move all hydraulic lines and electrical ground straps clear of fluid drain path.

d. With a person standing under gooseneck, remove drain plug (11) from bottom of hydraulic tank (1).



4-18. HYDRAULIC TANK DRAINING (CONT)

e. Allow all fluid in hydraulic tank (1), approximately 0.5 - 1.0 gl (1.9 - 3.8 l) of fluid, to drain into drain pan.

f. Inspect drain plug (11) for contaminates, metal particles, and corrosion. Clean drain plug with clean hydraulic fluid.

g. Apply pipe sealant to male threads of pipe plug (11) and install drain plug (11) to hydraulic tank (1).

FOLLOW-ON MAINTENANCE

1. Refill hydraulic tank (para. 4-17) as required.

2. Bleed hydraulic system (para. 4-19) as required.

4-19. HYDRAULIC SYSTEM BLEEDING

This task covers: a. Steering Circuit Bleeding b. Suspension Circuit Bleeding c. Gooseneck Circuit Bleeding

---

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Drain pan, 4 gl, item 17, appx. B

Materials/Parts

Cap and plug set, item 5, appx. E
Pipe sealant, item 18, appx. E
Hose, clear (2), 36 inch (91 cm)

Personal Required: 3

Equipment Condition

Tractor/semitrailer coupled and parked on level ground (para. 2-24)
Platform set at road height (para. 2-19)
APU shut down (para. 2-16)

General Safety Instructions

WARNING

Hydraulic fluid may be hot if system has been in operation. Allow system to cool before performing maintenance or injury to personnel may result.

Hydraulic fluid may be under pressure. Use caution when disconnecting hydraulic components or injury to personnel may result.

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

CAUTION

Throughout this procedure, all fittings and openings must be capped or plugged immediately after opening to prevent dirt and moisture or foreign material from entering the hydraulic system or damage to equipment may result.

To avoid premature failure of hydraulic components or system failure, bleeding of the hydraulic system must be performed if one of the following conditions exists:

A system leak, failure, maintenance, or repair that has drained fluid from the system or allowed air to enter the system.

Any symptom occurs that would be caused by air in the system such as steering off tracking, suspension, or gooseneck drop.

NOTE

This bleed procedure can be done completely in the order listed. If a specific symptom or failure is isolated to one area, then this procedure can be done in parts. Complete parts necessary to bleed the hydraulic system and remove all air.

STEERING CIRCUIT BLEEDING

WARNING

Prior to bleeding steering cylinders, all four support legs must be lowered and support the platform or injury to personnel may result.

1. Lower both front and rear support legs (para. 2-22 and 2-23).

2. Release brakes on semitrailer by pushing inward on brake release valve (para. 2-8).

4-19. HYDRAULIC SYSTEM BLEEDING (CONT)

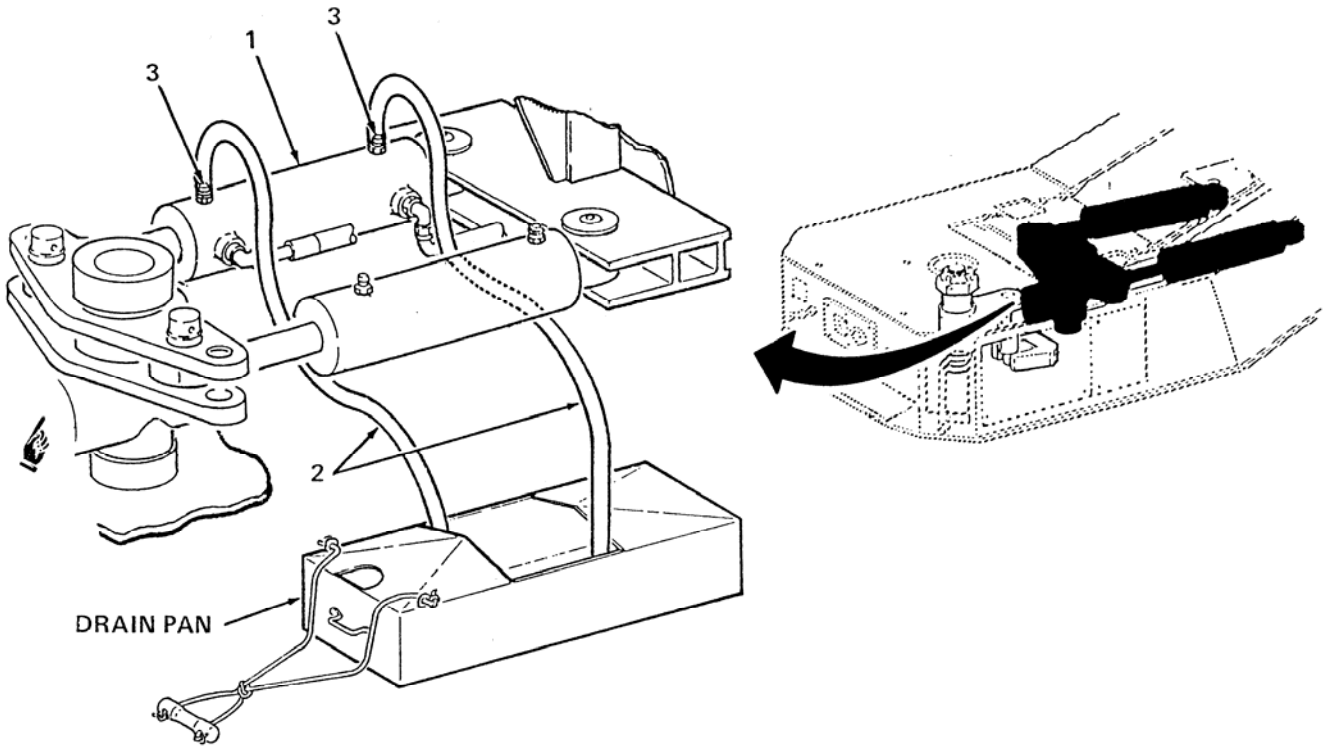
3. Start APU (para. 2-16).

4. Operate semitrailer steering (para. 2-21) full left, full right, and back to center.

5. Place drain pan beneath curbside gooseneck on steering cylinder (1).

6. Attach a 36-inch (91 cm) tube (2) to each bleed valve (3). Point both tubes into drain pan.

7. Slowly, open both bleed valves (3) on curbside gooseneck steering cylinder (1).



WARNING

To avoid injury to personnel when bleeding gooseneck steering cylinders, use two personnel to perform these steps. One person is required to operate steering valve and a second person is required to check fluid/air flow out of the bleed tubes.

NOTE

Apply only enough pressure on cylinders to force fluid/air out of cylinders. Do not allow steerable axles to move or too much pressure has been applied.

8. Slowly operate steering valve for a right turn. Use caution not to turn any of the steerable axles. Observe fluid/air flow out of one tube (2). Continue to hold pressure on steering valve (para. 2-6) until a steady stream of hydraulic fluid flows out of tube (2) for approximately 10 seconds; then, close that bleed valve (3). Release steering valve.

9. Slowly operate steering valve for a left turn. Use caution not to turn any of the steerable axles. Observe fluid/air flow out of other tube (2). Continue to hold pressure on steering valve (para. 2-6) until a steady stream of hydraulic fluid flows out of other tube (2) for approximately 10 seconds; then, close that bleed valve (3). Release steering valve.

10. Remove both tubes (2) from bleed valves (3).

11. Repeat steps 5 thru 10 for bleeding streetside gooseneck steering cylinder.

WARNING

To avoid injury to personnel when bleeding platform steering cylinders, use three people to perform the following steps. One person is required to operated steering valve, a second person is required to check fluid/air flow out of the bleed tubes, and a third person is required to relay signals between the other two.

12. Repeat steps 5 thru 10 for bleeding curbside platform steering cylinder.

13. Repeat steps 5 thru 10 for bleeding streetside platform steering cylinder.

14. Shut down APU (para. 2-16) and check fluid level in hydraulic tank (para. 4-19) and refill as necessary.

15. Release semitrailer brakes. Start APU (para. 2-16). Turn on tractor clearance lights and manually steer full left and full right several times and return steering to center. Steering pressure indicator light should not be lit.

16. If steering pressure indicator is lit, rebleed steering hydraulic system.

4-19. HYDRAULIC SYSTEM BLEEDING (CONT)

SUSPENSION CIRCUIT BLEEDING

1. Start APU (para. 2-16).

CAUTION

When lowering platform, do not allow suspension cylinders to be completely compressed or bottomed out. Allow a minimum of 1 inch (2.5 cm) of cylinder plunger/piston rod to remain exposed or damage to equipment may result.

2. Operate all three suspension controls (para. 2-19) and lower suspension to approximately 1 inch (2.5 cm) from being fully lowered. Deck height should be approximately 34 inches (86 cm).

3. Raise platform (para. 2-19) to approximately 52 inches (132 cm). This is approximately 1 inch (2.5 cm) less than its maximum height.

4. Repeat steps 2 and 3 until platform operates smoothly (approximately 30 cycles).

NOTE

If tactical situations permit, allow semitrailer to sit undisturbed for 8 hours or overnight as outlined in step 5. If not, skip step 5 and continue with step 7.

5. If semitrailer is allowed to sit undisturbed for 8 hours, continue as follows:

   a. Evenly raise platform to a height of 52 inches (132 cm).

   b. Shut down APU (para. 2-16).

   c. Allow trailer to sit for 8 hours or overnight.

   d. If semitrailer has not settled, proceed to step 6. If semitrailer has settled, proceed to step e.

   e. Start APU (para. 2-16).

   f. Repeat steps 2 and 3 approximately 15 cycles.

   g. Repeat step 5.

6. Lower platform to normal road height (para. 2-19) and shut down APU (para. 2-16).

7. Perform gooseneck circuit bleeding.

8. Check hydraulic tank fluid level (para. 4-17) and refill if necessary.

GOOSENECK CIRCUIT BLEEDING

1. Uncouple tractor/semitrailer (para. 2-24) and pull tractor out and away from gooseneck. Keep APU running after uncoupled. Leave gooseneck isolation valve pulled out in ADJUST position.

2. Lower front support legs to the ground (para. 2-22) to support platform.

3. Operate gooseneck valve and lower gooseneck to lowest position (para. 2-18).

4. Operate gooseneck valve and raise gooseneck to highest position (para. 2-18).

5. Repeat steps 3 and 4 until gooseneck works smoothly (approximately 15 cycles).

6. Lower gooseneck to approximately 63 inches (160 cm) and couple tractor/semitrailer (para. 2-24).

7. Raise front support legs (para. 2-22).

8. Adjust platform to normal road height (para. 2-19).

9. Shut down APU (para. 2-16) and check fluid level in hydraulic tank (para. 4-17). Refill, if necessary, to complete bleeding procedure.

4-20. HYDRAULIC SYSTEM FLUSHING

This task covers:
a. Preparation
b. Hydraulic Tank Flushing
c. Suspension System Flushing
d. Steering System Flushing
e. Gooseneck Cylinder Flushing
f. Steering Cylinder Flushing
g. Restoration

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Drain pan, 4 gl, item 17, appx. B
Extension light, 24 ft, item 17, appx. B
Adjustable automotive wrench, item 17, appx. B
Flush hose kit, figure F-8, appx. F
Waste oil receptacle

4-20. HYDRAULIC SYSTEM FLUSHING (CONT)

Materials/Parts

Electrical tiedown straps, item 26, appx. E
Cap and plug set, item 5, appx. E
Wiping rags, lint-free, item 19, appx. E
Hydraulic fluid, 10 gl, (37.9 l), item 13, appx. E
Dry cleaning solvent, item 26, appx. E
Gasket

Personnel Required: 2

Equipment Condition

Front support legs lowered to first opening past stow position (para. 2-22)
Front of platform lowered onto front support legs and rear of platform lowered as far as possible (para. 2-19) and rear support legs lowered (para. 2-23)
Gooseneck raised to highest position and supported (para. 2-18)
Top step and first upper stair section (for accessing APU area) removed from gooseneck (para. 4-55)
Semitrailer parking brakes set (brake release valve pulled out) (para. 2-8)
Flush kit obtained from DS maintenance (appx. F)

General Safety Instructions

WARNING

Hydraulic fluid may be hot if system has been in operation. Allow system to cool before performing maintenance or severe injury to personnel may result.

Residual pressure may remain in hydraulic lines. Open fittings slowly to avoid injury to personnel.

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

CAUTION

Throughout the entire flushing procedure, continually check filter indicator on system filter. If an indicator shows that the filter is contaminated, stop the procedure and replace filter element; then, continue with flushing procedure or damage to equipment may result.

Check fluid level in hydraulic tank. Do not allow fluid level to drop more than 2 inches (5 cm) below bottom line of FULL mark or damage to equipment may result.

CAUTION

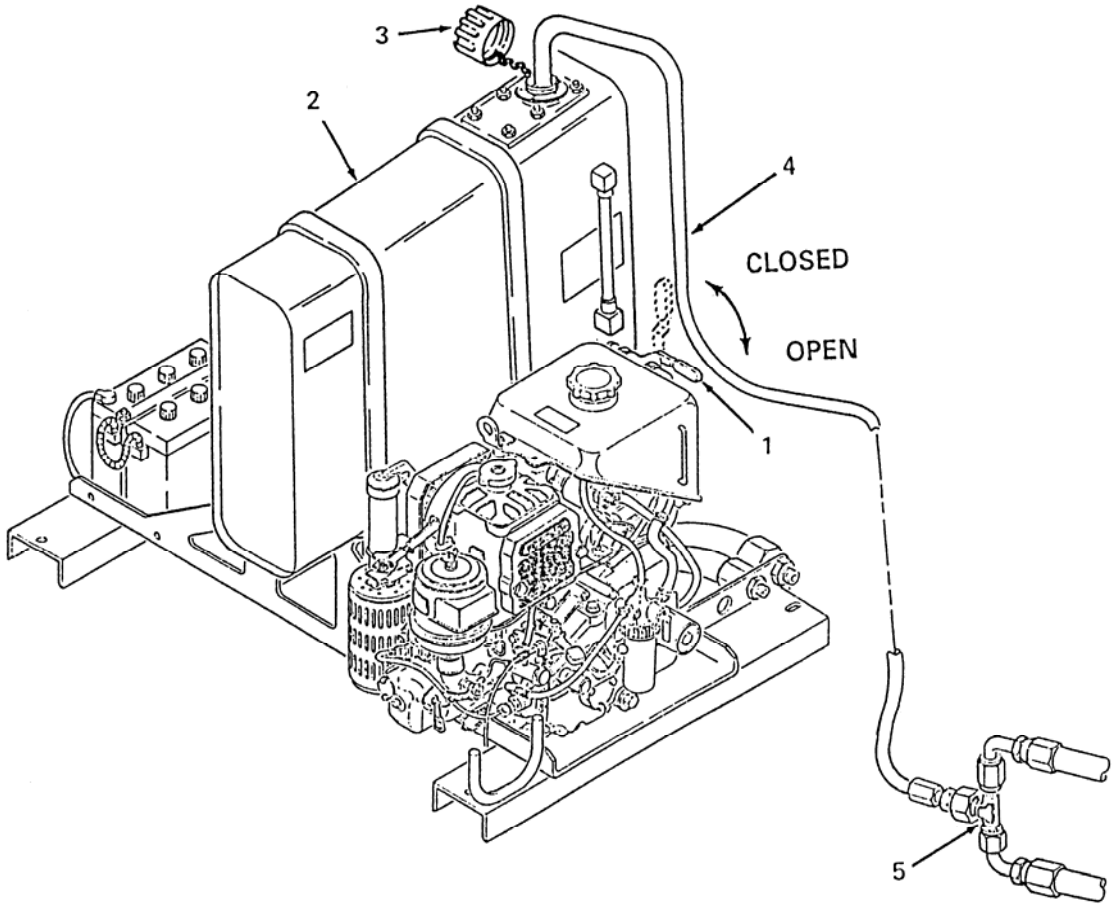
Throughout this procedure, all fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the hydraulic system or damage to equipment may result.

PREPARATION

NOTE

This preparation procedure requires the use of a Y-hose and flushing filter element from the flush hose kit.

1. Close oil valve (1) on hydraulic tank (2).
2. Remove filter element from system filter and replace with element from flush hose kit (para. 4-89).
3. Open oil valve (1) on hydraulic tank (2).
4. Close all suspension isolation valves, handles facing outboard (para. 2-6). Pull handle of gooseneck isolation valve and suspension shut-off valve to ADJUST position (para. 2-6).



4-20. HYDRAULIC SYSTEM FLUSHING (CONT)

5. Remove hydraulic tank cap (3) from filler neck on hydraulic tank (2).

6. Insert open end of 75-foot (22.9 m) return hose assembly (4) of Y-hose assembly (5) into filler neck of hydraulic tank (2).

7. Using electrical tiedown straps, secure end of return hose assembly (4) into top of hydraulic tank (2) to support weight of hose and prevent hose from being dropped or pulled away from hydraulic tank.

8. Start APU (para. 2-16).

HYDRAULIC TANK FLUSHING

1. Shut down APU (para. 2-16).

NOTE

To avoid damage to equipment, do not attempt to make any adjustments to the platform, steering, or gooseneck until all hydraulic systems are bled and air is removed from the system. If adjustments are attempted, air pockets may move through the system and may cause unexpected movements or premature component failure.

2. Refer to paragraph 4-18, steps 6 thru 11, and drain hydraulic tank with gooseneck and platform set at their existing positions.

3. Cut and remove electrical tiedown straps used to secure Y-hose return line to hydraulic tank. Remove return hose from hydraulic tank filler neck and set aside, clear of work area.

CAUTION

Take care not to allow dust, dirt, or other contaminants to enter the open hydraulic tank or hydraulic fluid may be recontaminated and damage to equipment may result.

4. Access hydraulic tank (2) for flushing as follows:

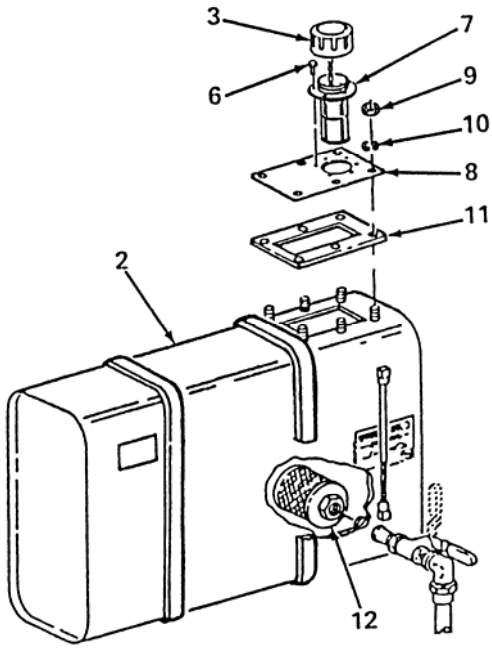
   a. Remove six screws (6) and filler neck assembly (7) from access cover (8).

   b. Remove six nuts (9), washers (10), access cover (8), and gasket (11) from hydraulic tank (2). Discard gasket.

CAUTION

Lint-free rags used for cleaning should be rotated or turned to prevent contaminants from being re-exposed to clean surfaces.

5. Clean inside of hydraulic tank (2) using lint-free wiping rags. Clean all parts removed using lint-free wiping rags.



6. Using an adjustable automotive wrench, unscrew and remove hydraulic tank filter (12).

WARNING

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

7. Clean hydraulic tank filter (12) using dry cleaning solvent. Reinstall hydraulic tank filter (12) back into hydraulic tank (2).

8. Reassemble hydraulic tank (2) as follows:

   a. Install gasket (11) and access cover (8) to hydraulic tank (2) and secure with six washers (10) and nuts (9).

   b. Install filler neck assembly (7) to access cover (8) and secure with six screws (6).

9. Fill hydraulic tank (2) with new hydraulic fluid. Install hydraulic tank cap (3) onto filler neck assembly (7).

4-20. HYDRAULIC SYSTEM FLUSHING (CONT)

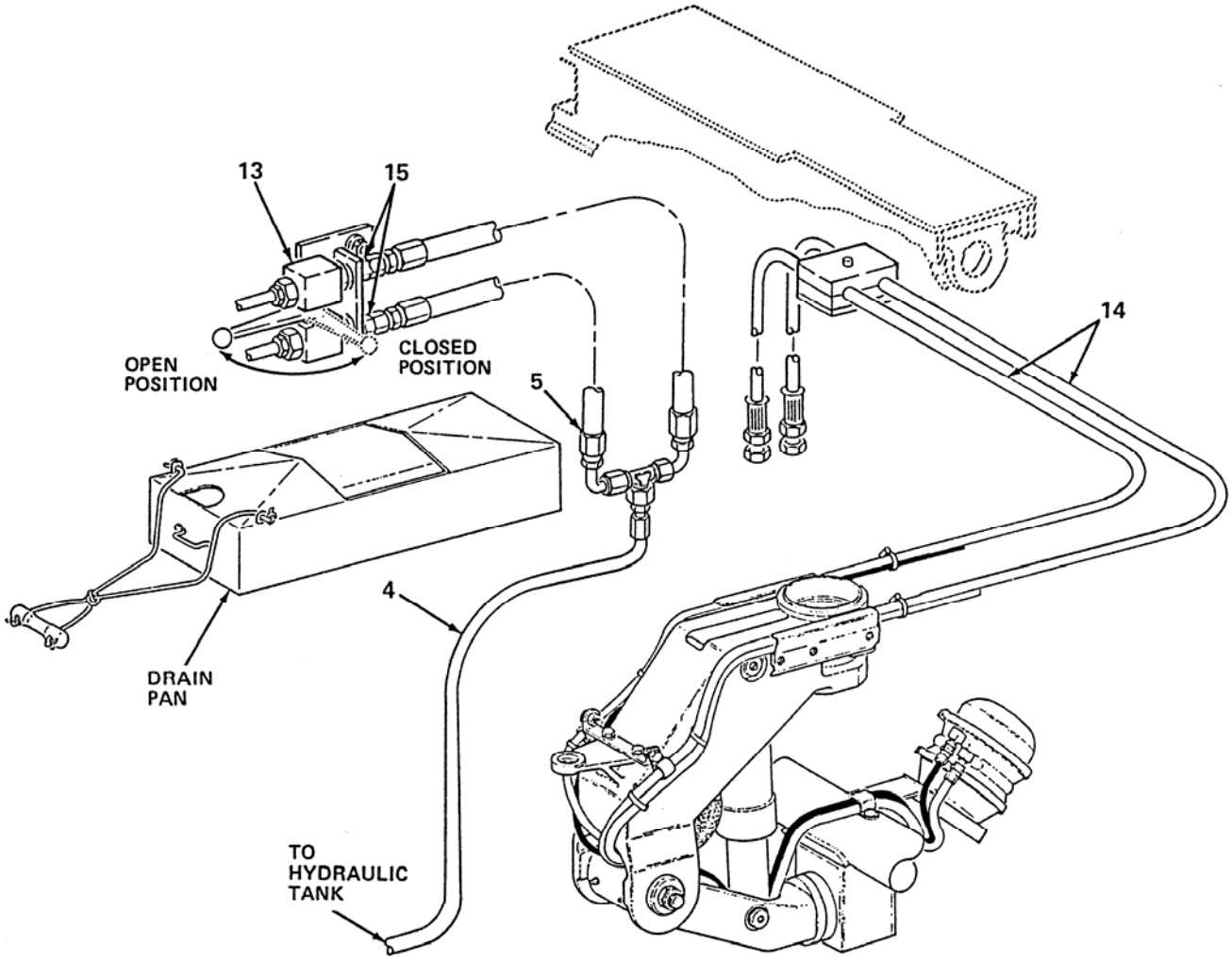
SUSPENSION SYSTEM FLUSHING

NOTE

This procedure requires use of a Y-hose.

A drain pan must be placed to catch excess fluid drainage. Fluid collected into drain pan should be drained into waste oil receptacle as often as needed.

1. Place drain pan under #1 streetside suspension isolation valve (13).
2. At #1 streetside suspension assembly, remove two suspension hoses (14) from tube nipples (15). Install caps/plugs into hoses.
3. Remove caps/plugs installed and connect free ends of Y-hose assembly (5) to tube nipples (15) on suspension isolation valve (13).
4. Open suspension isolation valve (13) at affected suspension assembly, handle facing forward toward front of semitrailer.
5. Pull up and hold front suspension streetside valve handle (para. 2-6). Have a person check hydraulic tank for fluid flowing back through return hose (4).
6. Hold valve handle for 15 minutes after fluid starts flowing back into hydraulic tank; then, release valve handle. Monitor filter indicator.
7. Close affected suspension isolation valve (13), handle facing outboard.
8. At #1 forward streetside suspension assembly, remove Y-hose assembly (5) from tube nipples (15). Install caps/plugs into hoses.
9. Remove caps/plugs installed into suspension hose assemblies (14) and reconnect suspension hose assemblies (14) to tube nipples (15).
10. Repeat steps 1 thru 9 of this procedure for each suspension assembly until all 10 suspension assemblies have been flushed. Operate appropriate valve handles for each suspension assembly as required (para. 2-6). Monitor filter indicator.
11. After all 10 suspension hose assemblies and isolation valves are flushed, install caps/plugs onto Y-hose assembly (5). Leave return hose assembly (4) secured to hydraulic tank.


13
15
OPEN POSITION
CLOSED POSITION
5
14
4
DRAIN PAN
TO HYDRAULIC TANK

4-20. HYDRAULIC SYSTEM FLUSHING (CONT)

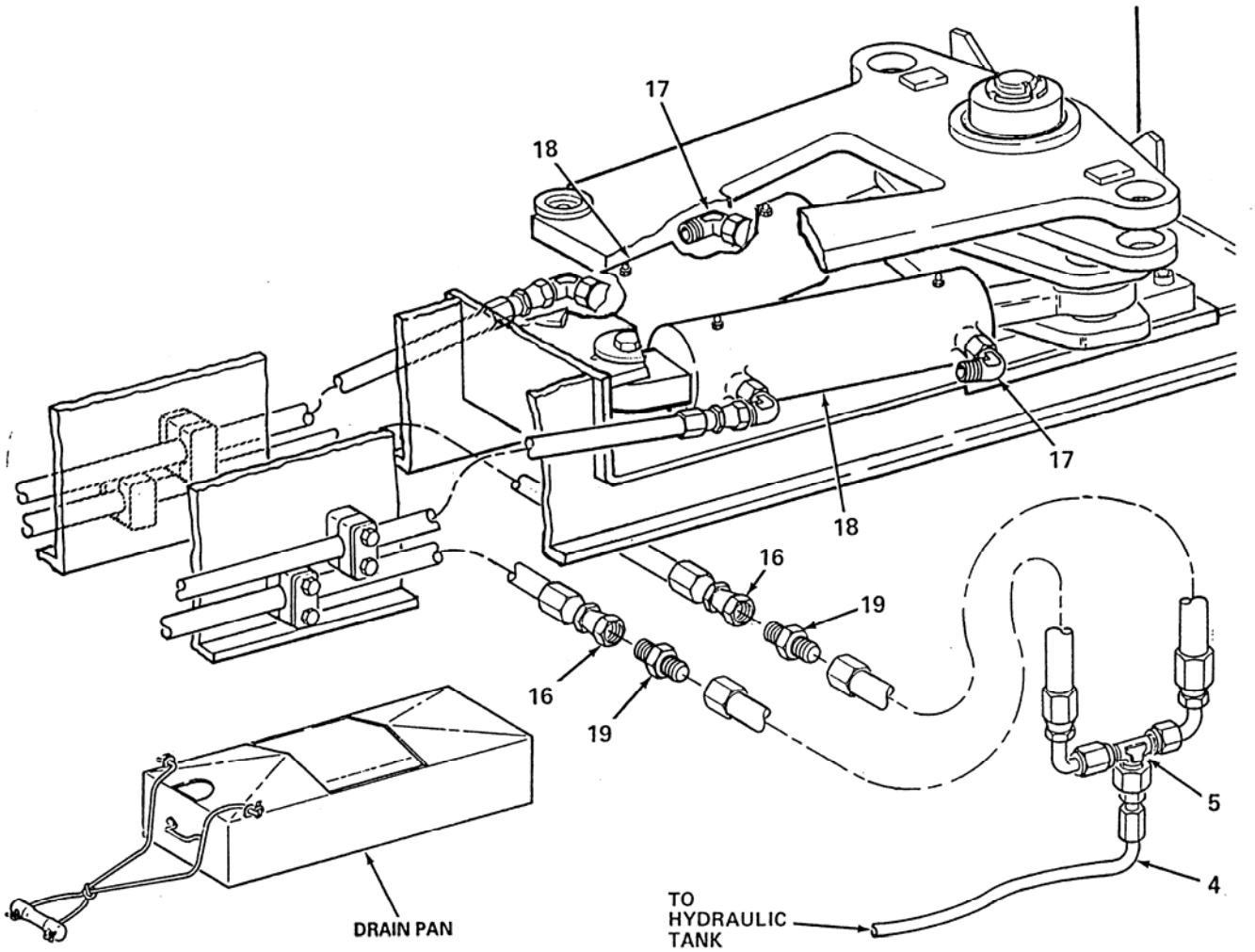
STEERING SYSTEM FLUSHING

NOTE

This procedure requires use of a Y-hose and two 5/8-3/4-inch straight adapters.

A drain pan must be placed to collect excess fluid drainage. Fluid collected into drain pan should be drained into waste oil receptacle as often as needed.

1. Place drain pan below hose assemblies (16) at aft elbow fittings (17) on both platform steering cylinders (18).
2. Tag and disconnect two hose assemblies (16) from aft elbow fittings (17) on both platform steering cylinders (18). Install caps onto each elbow fitting.
3. Connect a 5/8-3/4-inch straight adapter (19) to each hose assembly (16). Remove caps/plugs installed and connect free ends of Y-hose (5) to straight adapters (19).
4. Pull up and hold handle of steering control valve (para. 2-6). Have a second person check return hose (4) at hydraulic tank filler neck to ensure hydraulic fluid is flowing back into hydraulic tank.
5. Continue to hold handle of steering control valve for a minimum of 10 minutes; then, release valve handle. Monitor filter indicator.
6. Push down and hold handle of steering control valve. Have a second person check return hose (4) at hydraulic tank filler neck to ensure hydraulic fluid is flowing back into hydraulic tank.
7. Continue to hold handle of steering control valve for a minimum of 10 minutes; then, release valve handle. Monitor filter indicator.
8. Remove ends of Y-hose (5) from two straight adapters (19) and install caps/plugs into end of Y-hose.
9. Remove two straight adapters (19) from two hose assemblies (16). Install caps/plugs onto straight adapters.
10. Remove caps/plugs installed on elbow fittings (17) on aft port of steering cylinders (18). Connect two hose assemblies (16) back onto elbow fittings (17).



11. Repeat steps 1 thru 10 for front hoses/fittings on both platform steering cylinders. Monitor filter indicator.

12. Repeat steps 1 thru 10 for rear hoses/fittings on both gooseneck steering cylinders. Monitor filter indicator.

13. Repeat steps 1 thru 10 for front hoses/fittings on both gooseneck steering cylinders. Monitor filter indicator.

14. Leave return hose assembly secured to hydraulic tank.

GOOSENECK CYLINDER FLUSHING

NOTE

This procedure does not require use of the Y-hose.

1. Pull up and hold handle of gooseneck control valve (para. 2-6) and raise gooseneck as high as it will go. Release handle.

2. Move gooseneck support out from under gooseneck.

4-20. HYDRAULIC SYSTEM FLUSHING (CONT)

3. Push down and hold handle of gooseneck control valve (para. 2-6) and lower gooseneck as low as it will go. Release handle.

4. Repeat steps 1 and 3 five times to flush gooseneck cylinders. Monitor filter indicator.

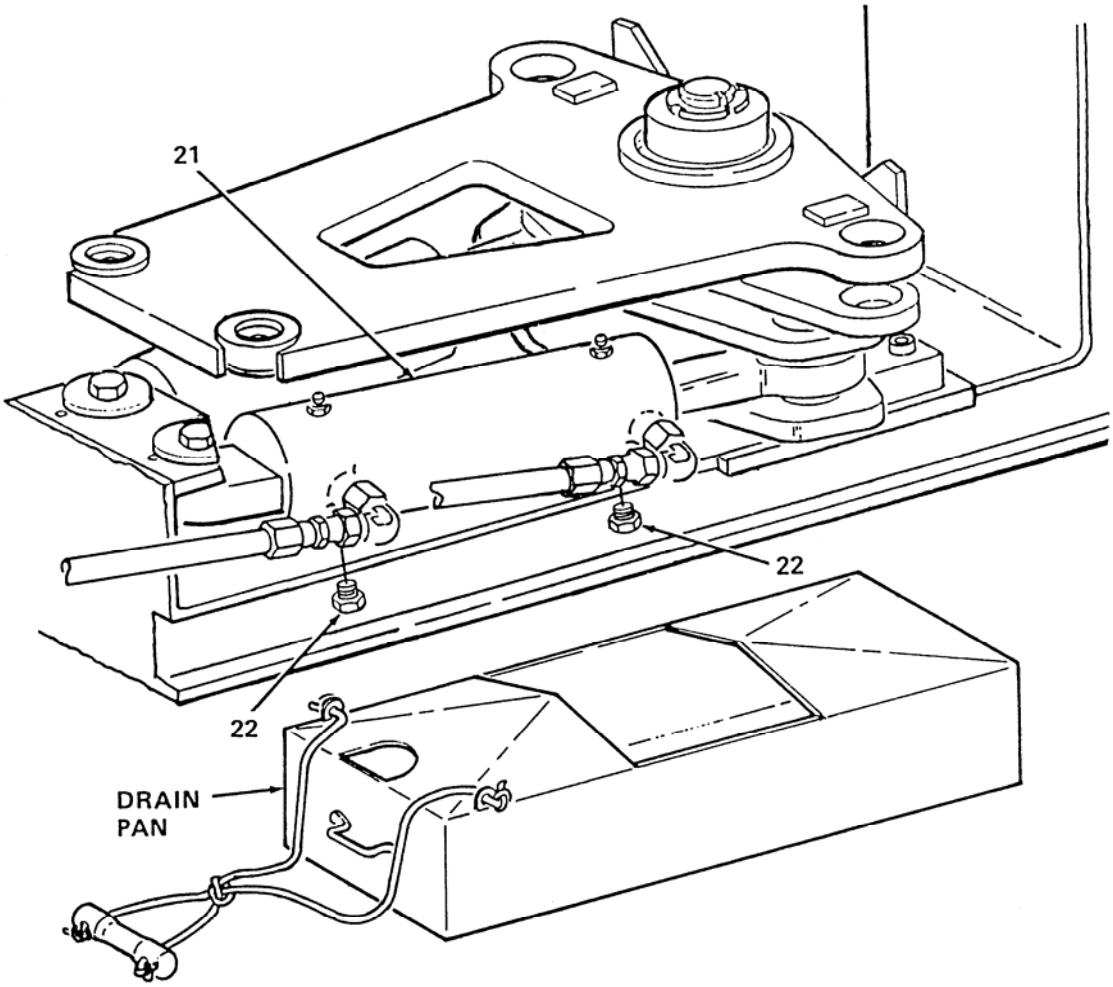
5. Raise gooseneck to normal running height (para. 2-18). Place gooseneck support under gooseneck and lower gooseneck onto support.

STEERING CYLINDER FLUSHING

NOTE

A drain pan must be placed to collect excess fluid drainage. Fluid collected into drain pan should be drained into waste oil receptacle as often as needed.

1. Place drain pan on the ground beneath streetside platform steering cylinder (20) and partially under mainbeam to help collect fluid that will drain onto the mainbeam and out of cylinder.



2. At bottom of streetside platform steering cylinder (21), slowly loosen and then remove two pipe plugs (22).

3. Allow fluid to drain from steering cylinder (21) onto mainbeam and into drain pan until most of fluid stops draining from cylinder.

WARNING

Person operating steering valve at the hydraulic control module, must operate steering valve so that enough pressure is applied to the cylinder to force fluid out of the cylinder. Do not allow steerable axles to move or too much pressure will be applied and serious injury to personnel may result.

Person watching fluid drain from cylinder must stand back away from platform, keeping the cylinder in full sight, to avoid fluid from being sprayed onto them or injury to personnel may result.

NOTE

In order to adequately perform the following steps, one person must operate steering valve while another person checks fluid draining out of cylinder.

4. Using one person stationed at hydraulic control module, slowly operate steering valve for a left turn (para. 2-6). Use caution not to turn any of the steerable axles. If axles start to move, release steering valve handle; then, operate handle again until axles do not move. Observe fluid draining out of cylinder (21).

5. Continue to hold pressure on steering valve (para. 2-6) until a steady stream of hydraulic fluid flows out of cylinder (21) for approximately 10 seconds. Then, release steering valve handle. Monitor hydraulic tank fluid indicator.

6. Slowly operate steering valve for a right turn (para. 2-6) being careful not to turn any of the steerable axles. If axles start to move, release steering valve handle. Then, operate handle again until axles do not move. Second person must observe fluid draining out of cylinder (21).

7. Continue to hold handle for steering valve (para. 2-6) until a steady stream of hydraulic fluid flows out of steering cylinder (21) for approximately 10 seconds. Then, release handle of steering valve. Monitor hydraulic tank fluid indicator.

8. Allow all fluid inside steering cylinder (21) to drain into drain pan until fluid stops.

9. Install two pipe plugs (22) into bottom of steering hydraulic cylinder (21).

4-20. HYDRAULIC SYSTEM FLUSHING (CONT)

10. Check fluid level in hydraulic tank and refill with new hydraulic fluid as necessary (para. 4-19).

11. Repeat steps 1 thru 10 for curbside platform steering cylinder. Monitor hydraulic tank fluid indicator.

12. Repeat steps 1 thru 10 for curbside gooseneck steering cylinder. Monitor hydraulic tank fluid indicator.

13. Repeat steps 1 thru 10 for streetside gooseneck steering cylinder. Monitor hydraulic tank fluid and filter indicators.

RESTORATION

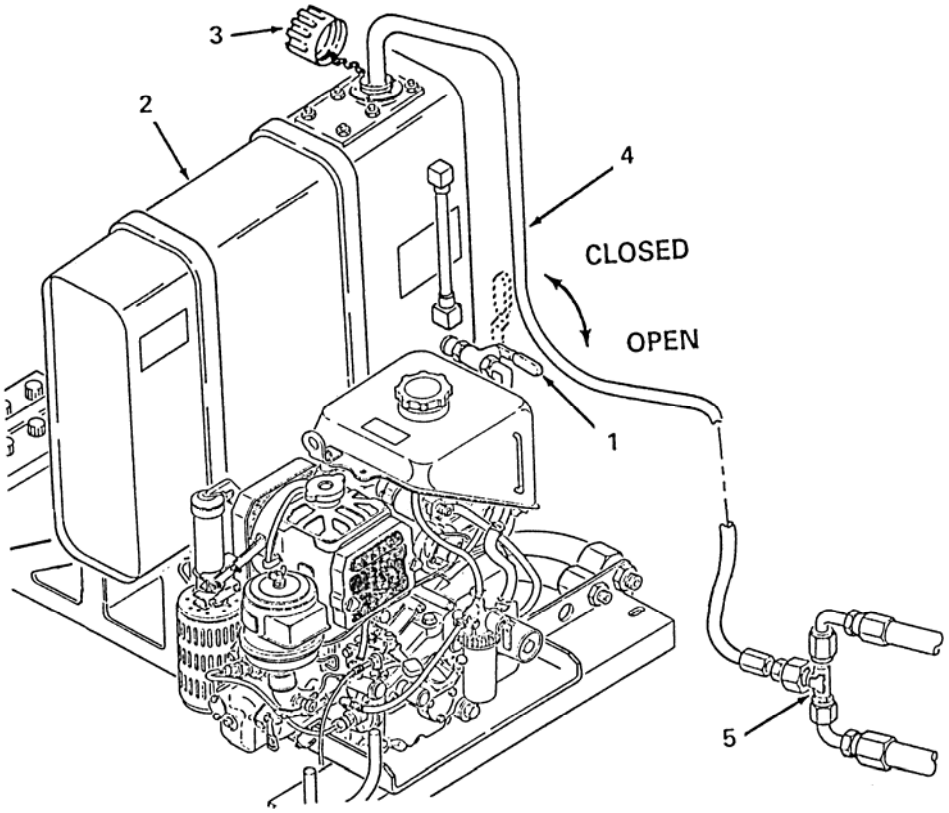
1. Perform hydraulic tank flushing to remove any remaining contaminates in hydraulic tank.

2. If required, shut down APU (para. 2-16).

3. Close oil valve (1) on hydraulic tank (2).

4. Remove flushing filter from system and install new system filter (para. 4-89).

5. Open oil valve (1) on hydraulic tank (2).



6. Remove return hose (4) from hydraulic tank (2). Remove all flush kit parts. Clean flush kit parts as required and make sure all openings have caps/plugs installed.

7. Open all 10 suspension isolation valves (para. 2-6).

8. Start APU (para. 2-16).

9. Adjust platform height (para. 2-19) to remove trapped air.

10. Operate gooseneck system (para. 2-18) to remove trapped air.

11. Adjust platform (para. 2-19) to normal road height of 43 inches (109 cm).

12. Shut down APU (para. 2-16).

FOLLOW-ON MAINTENANCE

Bleed hydraulic system as required (para. 4-19).

Section VI. UNIT MAINTENANCE INSTRUCTIONS

PARA. NO.	TITLE
4-21	General
4-22	Gooseneck Component Assembly
4-23	Junction Boxes
4-24	Composite Marker Light
4-25	Vehicular Bar Lamp
4-26	Stop Light/Taillight
4-27	Clearance Light/Blackout Light
4-28	Steering Pressure Indicator Light
4-29	Indicator Lights - Oil Pressure and Glow Plug
4-30	Battery Installation
4-30.1	Solar Battery Charger Installation (Some Semitrailers)
4-31	Wiring Harness Clamp and Grommet Installation
4-32	APU Control Box Jumper Wires and Timer Harness
4-33	Hydraulic Control Module Jumper Wires
4-34	Junction Box Jumper Wires
4-35	W1 Harness
4-36	W2 Harness
4-37	W3 Harness
4-38	W4 Harness
4-38.1	W5 Harness (Some Semitrailers)
4-39	APU Wiring Harness
4-40	Suspension Assembly/Bogie
4-41	Suspension Cylinder
4-42	Upper Suspension Arm
4-43	Service Brakes
4-44	S-Cam
4-45	S-Cam Retainer Assembly
4-46	Slack Adjuster
4-47	Air Cleaner Assembly
4-48	Gooseneck Pneumatic Installation
4-49	Platform Pneumatics Installation
4-50	Hub and Drum

PARA. NO.	TITLE
4-51	Tire
4-52	Connecting Link
4-53	Longitudinal Strut
4-54	Platform Steering Cylinder
4-54.1	Steering Plate
4-55	Gooseneck Steering Cylinder
4-56	Gooseneck Steps
4-57	Gooseneck Guardrails
4-58	Grab Handle
4-59	Platform Steps and Service Covers
4-60	Loading Ramp
4-61	APU Frame
4-62	Pivot Pin Sheave
4-63	Spare Wheel Carrier
4-64	Front Support Legs
4-65	Rear Support Legs
4-66	Splash Guards
4-67	Covers
4-68	Deflectors
4-68.1	Front Clearance Light Bracket (Some Semitrailers)
4-69	Stowage Compartment
4-70	Davit Assembly
4-71	Snatch Block
4-72	Cable Guide
4-73	Deleted
4-74	Reflectors
4-75	Data Plates, Decals, and Stencils
4-76	Hydraulic Pump
4-77	Four-Way Directional Control Valve Bank
4-78	Steering Control Manifold
4-79	Suspension Control Manifold
4-80	Line Fracture Valve
4-81	Valve Handles
4-82	Suspension Isolation Valve Assembly
4-83	Suspension Shut-Off Valve Assembly
4-84	Gooseneck Isolation Valve Assembly
4-85	Gooseneck Hydraulics
4-86	APU Hydraulics
4-87	Step Hydraulics
4-88	Hydraulic Pressure Gages
4-89	Hydraulic Filter
4-90	Gooseneck Cylinder Hydraulics
4-91	Hydraulic Tank Filter
4-92	Platform Suspension Hydraulics
4-93	Platform Steering Hydraulics
4-94	Hydraulic Tank Assembly
4-95	Gooseneck Cylinder Air Reservoir
4-96	APU
4-97	Glow Plug
4-98	Drain Cock
4-99	Cylinder Head Cover
4-100	Oil Filter and Dipstick
4-101	Oil Sending Unit
4-102	Nozzle Holder Assembly
4-103	Air Cleaner Assembly

PARA. NO.	TITLE
4-104	Fuel Tank Assembly
4-105	Fuel Filter Assembly
4-106	Engine Priming System
4-107	Mechanical Throttle Control
4-108	APU Control Box
4-109	Engine Exhaust
4-110	Radiator
4-111	Fan Belt
4-112	Fan Dynamo
4-113	APU Jump Start System
4-114	Starter

4-21. GENERAL

This section contains those tasks to be performed by unit maintenance personnel.

4-22. GOOSENECK COMPONENT ASSEMBLY

This task covers: a. Removal b. Disassembly c. Inspection d. Repair e. Assembly f. Installation

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INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 2, item 18, appx. B:

- Digital multimeter
- Electrical repair kit
- Extension light, 24 ft
- Goggles, industrial
- Soldering gun
- Measuring tape
- Gloves, chemical and oil protective

Materials/Parts

Solder, item 24, appx. E
Solvent, dry cleaning, item 26, appx. E
Wiping rag, item 19, appx. E
Lockwasher (6)
Locknut (1)
Locknut (4)
Locknut (4)
Locknut (6)
Locknut (8)
Tiedown straps (as required), item 27, appx. E

Equipment Condition

Intervehicular cables disconnected (para. 2-24)
Gooseneck lowered to approximately 48 inches (122 cm) (para. 2-18)

4-22. GOOSENECK COMPONENT ASSEMBLY (CONT)

REMOVAL

NOTE

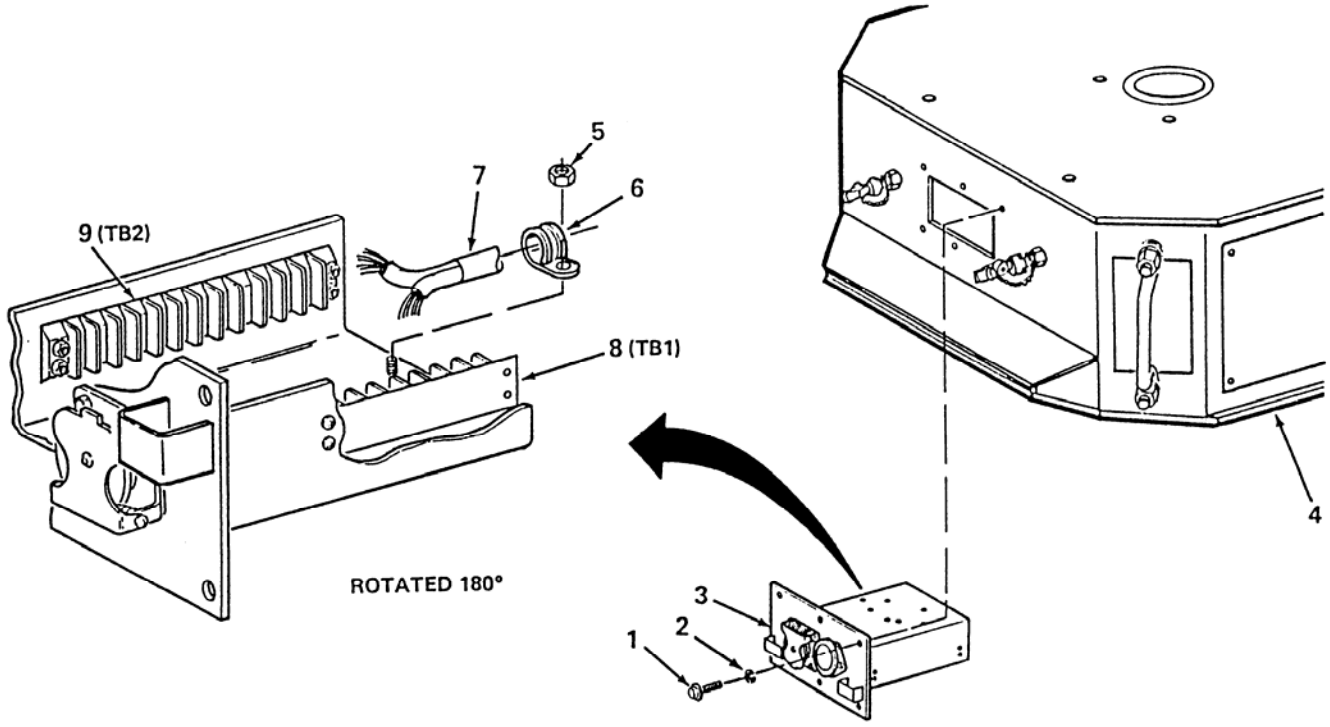
Pull gooseneck component assembly out of gooseneck approximately 3 inches (7.6 cm) and twist component assembly 180 degrees. Place component assembly partially back into gooseneck with terminal boards exposed so that the W1 harness can be disconnected.

1. Remove six screws (1) and lockwashers (2) and slide gooseneck component assembly (3) out of gooseneck (4). Reinsert component assembly (3) upside down into gooseneck. Discard lockwashers.

2. Remove locknut (5) and clamp (6) from W1 harness (7) and gooseneck component assembly (3). Discard locknut.

3. Refer to electrical schematic figure FO-1 for incandescent lights or figure FO-1.1 for LED lights and tag and disconnect W1 harness from B side of terminal boards TB1 (8) and TB2 (9).

4. Remove gooseneck component assembly (3) from gooseneck (4).

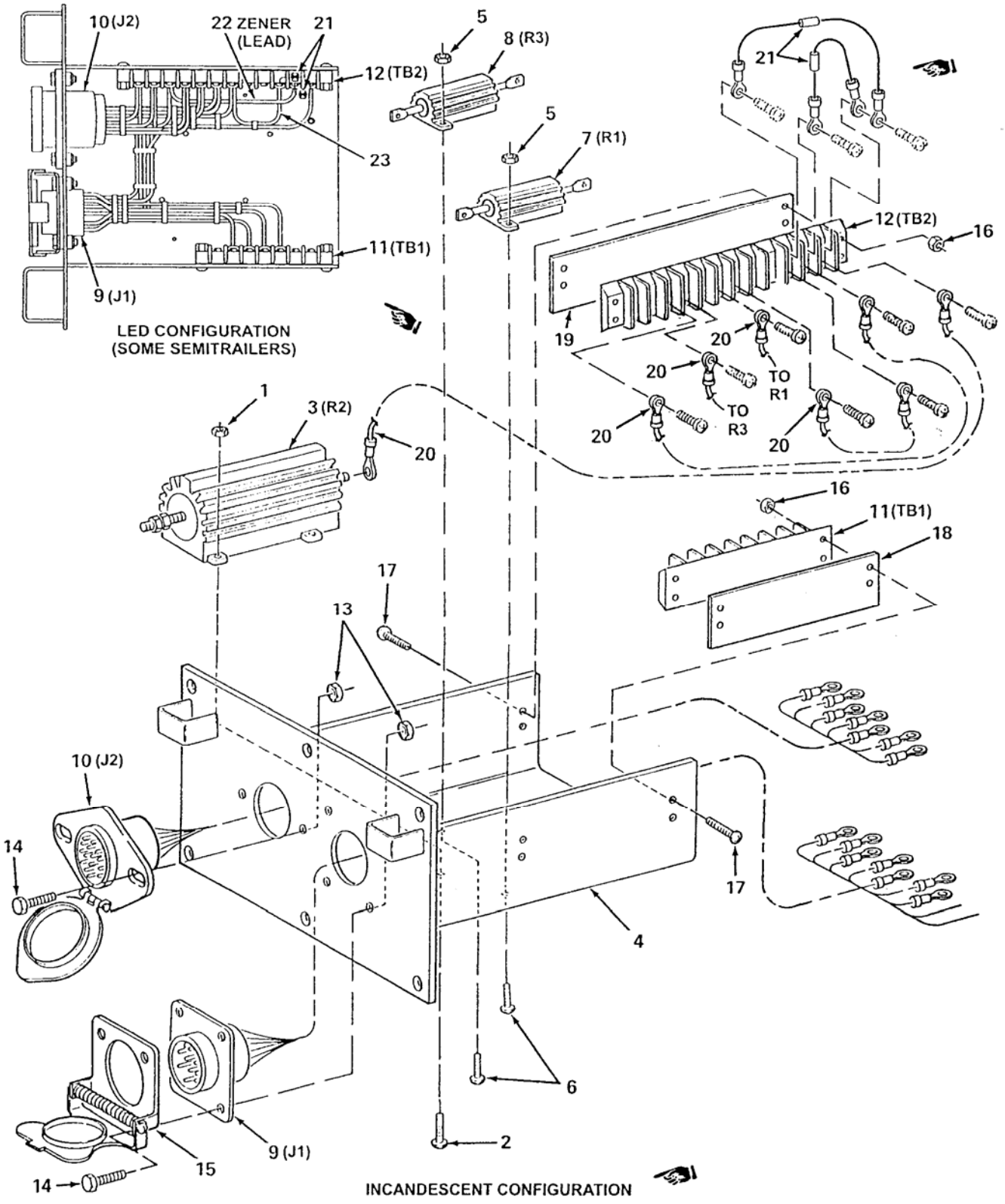


DISASSEMBLY

NOTE

For semitrailers with LED lights, disregard steps 1 thru 5 below.

1. Remove four locknuts (1) and screws (2) and lift fixed resistor R2 (3) off of gooseneck component assembly (4). Discard locknuts.


10 (J2)
22 ZENER (LEAD)
21
12 (TB2)
23
11 (TB1)
9 (J1)
LED CONFIGURATION (SOME SEMITRAILERS)
5
8 (R3)
5
7 (R1)
21
12 (TB2)
16
19
20
20
TO R1
20
TO R3
20
1
3 (R2)
20
16
11 (TB1)
18
17
13
10 (J2)
14
17
4
6
2
9 (J1)
15
14
INCANDESCENT CONFIGURATION

4-22. GOOSENECK COMPONENT ASSEMBLY (CONT)

2. Tag and disconnect wires from both sides of fixed resistor R2 (3) and remove resistor R2 from gooseneck component assembly (4).

3. Remove two locknuts (5) and screws (6) and lift fixed resistor R1 (7) off of gooseneck component assembly (4). Discard locknuts.

4. Remove two locknuts (5) and screws (6) and lift fixed resistor R3 (8) off of gooseneck component assembly (4). Discard locknuts.

WARNING

Soldering fumes are toxic. Avoid breathing these fumes. Work in a well-ventilated area or injury to personnel may result.

CAUTION

Rosin core solder contains flux which is corrosive. All soldered connections must be cleaned of all flux residue or damage to equipment may result.

5. Cut and remove tiedown straps securing electrical wires. Discard tiedown straps. Using a soldering gun, tag and unsolder electrical wires from both fixed resistors R1 and R3. Remove both fixed resistors R1 (7) and R3 (8) from gooseneck component assembly (4).

6. Refer to electrical schematic figure FO-1 for incandescent lights or figure FO-1.1 for LED lights and tag and disconnect electrical leads for connectors J1 (9) and J2 (10) from terminal boards TB1 (11) and TB2 (12).

7. Refer to electrical schematic figure F0-1 for incandescent lights and tag and disconnect five point-to-point jumper wires (20) and two diodes (21) from terminal board TB2 (12). Proceed to steps 8 thru 11.

7.1. Refer to electrical schematic figure FO-1.1 for LED lights and tag and disconnect Zener lead assembly (22) from terminal board TB2 (12).

7.2. Refer to electrical schematic figure FO-1.1 for LED lights and tag and disconnect point-to-point jumper wire (23) and two diodes (21) from terminal board TB2 (12). Proceed to steps 8 thru 11.

8. Remove six locknuts (13), capscrews (14), and receptacle cover (15) from gooseneck component assembly (4). Discard locknuts.

9. Remove connectors J1 (9) and J2 (10) from gooseneck component assembly (4).

10. Remove four locknuts (16), screws (17), terminal board TB1 (11), and terminal marker strip (18) from gooseneck component assembly (4). Discard locknuts.

11. Remove four locknuts (16), screws (17), terminal board TB2 (12), and terminal marker strip (19) from gooseneck component assembly (4). Discard locknuts.

INSPECTION

1. Inspect connectors J1 and J2 for frayed or broken wires and defective or loose terminal lugs. If defects exist, replace connector as required.

2. Inspect for missing or unreadable wire markers and terminal marker strips. If defective, restamp or replace wire markers and terminal marker strips. Use electrical schematic figure FO-1 for proper wire markings.

3. Inspect jumper wires for frayed or broken wires and loose terminal lugs. If defective, use electrical repair kit and repair or replace point-to-point wire(s) (appx. F).

4. Inspect for missing, cracked, or nonsealing receptacle cover. If defective or missing, replace cover.

5. Use digital multimeter and check resistance of diodes in both directions, and inspect diodes for defects. (Refer to para. 4-13, symptom 32, step 5.) If diodes fail resistance check or are defective, replace diodes.

6. For incandescent lights, use digital multimeter and check resistance of all three fixed resistors. Readings for fixed resistors R1 and R3 should be 7.0 ohms ±1.0 percent. Reading for fixed resistor R2 should be 2.0 ohms ±1.0 percent. If a reading is not correct for a fixed resistor, replace as required.

6.1. For LED lights, use digital multimeter to probe Zener lead assembly for current flow. Locate ends that attach to terminals TB2-10 and TB2-2 and probe in both directions. In the 10-2 direction, current should flow unresisted. In the 2-10 direction, 12 volts or less should flow unresisted and greater than 12 volts should be clipped to approximately 12 volts.

WARNING

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

7. Inspect terminal boards TB1 and TB2 for missing screws, breaks, cracks, and excessive corrosion. If corroded, clean using dry cleaning solvent as required. If defective, replace as required.

8. Inspect all components for corrosion. If corrosion is found, clean using dry cleaning solvent as required.

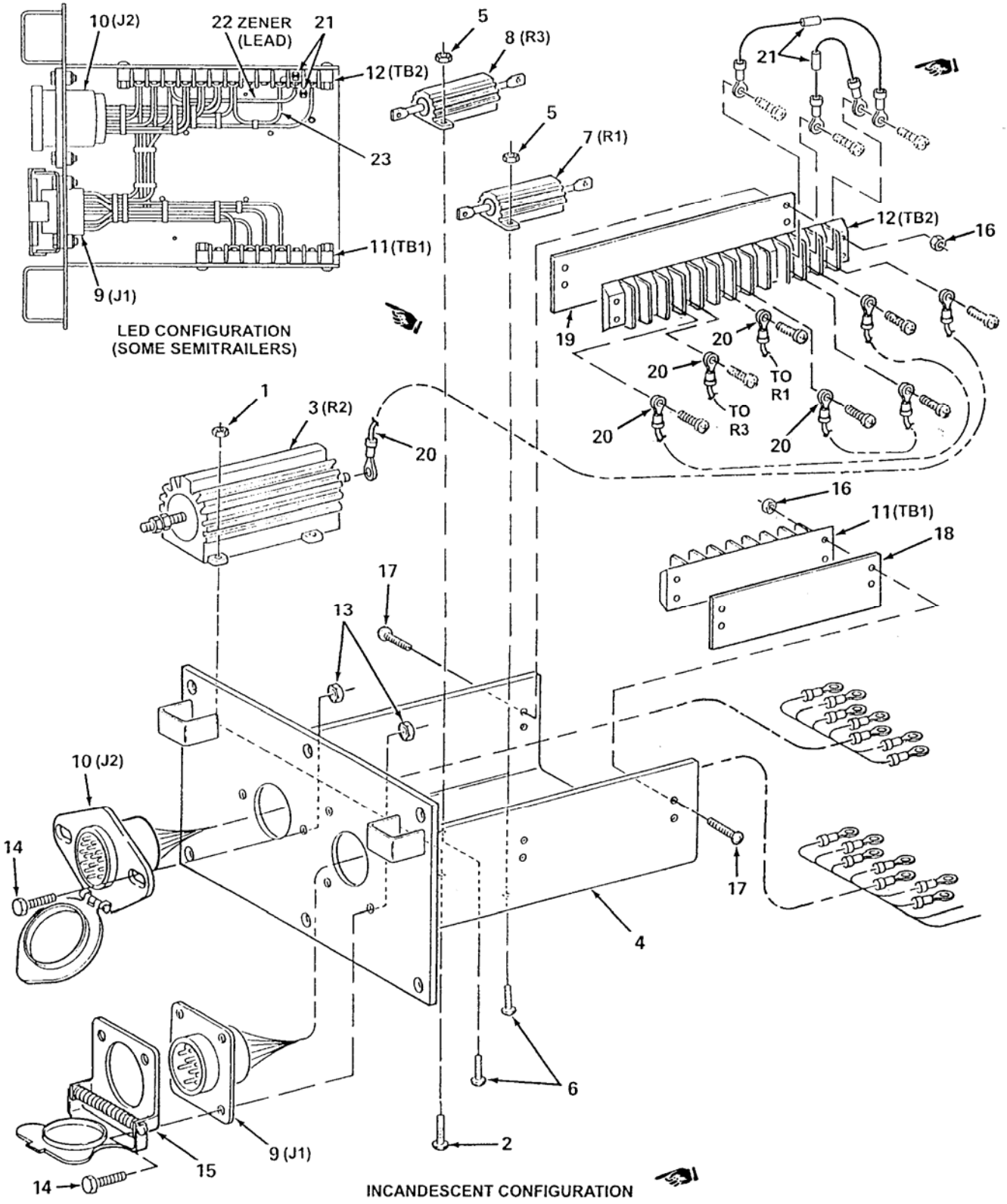
REPAIR

1. Refer to appendix F and, using electrical repair kit and measuring tape, fabricate new point-to-point wires for gooseneck component assembly as required.

2. Using wire stripper, strip fabricated wires to designated length and allow for terminals to be installed or wires to be soldered.

3. Using electrical repair kit, crimp new terminal lugs onto point-to-point wires as required.

4-22. GOOSENECK COMPONENT ASSEMBLY (CONT)



ASSEMBLY

1. Refer to electrical schematic figure FO-1 for incandescent lights and reconnect five point-to-point jumper wires (20) and two diodes (21) to terminal board TB2 (12). Proceed to steps 2 thru 13.

1.1. Refer to electrical schematic figure FO-1.1 for LED lights and reconnect one point-to-point jumper wire (23), one Zener lead assembly (22), and two diodes (21) to terminal board TB2 (12). Proceed to steps 2 thru 7.

2. Aline terminal board TB2 (12) and terminal marker strip (19) and install onto gooseneck component assembly (4). Secure with four screws (17) and locknuts (16).

3. Aline terminal board TB1 (11) and terminal marker strip (18) and install onto gooseneck component assembly (4). Secure with four screws (17) and locknuts (16).

4. Install electrical leads for connectors J1 (9) and J2 (10) through gooseneck component assembly (4).

5. Aline receptacle cover (15) to connector J1 (9) and gooseneck component assembly (4). Secure with four capscrews (14) and locknuts (13).

6. Aline connector J2 (10) to gooseneck component assembly (4). Secure with two capscrews (14) and locknuts (13).

7. Refer to electrical schematic figure FO-1 for incandescent lights or figure FO-1.1 for LED lights and connect electrical leads from connectors J1 (9) and J2 (10) to terminal boards TB1 (11) and TB2 (12).

WARNING

Soldering fumes are toxic. Avoid breathing these fumes. Work in a well-ventilated area or injury to personnel may result.

CAUTION

Rosin core solder contains flux which is corrosive. All soldered connections must be cleaned of all flux residue or damage to equipment may result.

NOTE

For semitrailers with LED lights, disregard steps 8 thru 13.

8. Refer to electrical schematic figure FO-1 and use a soldering gun to solder two wires from connector J1 (9) to fixed resistors R1 (7) and R3 (8). Clean all flux residue from solder joint.

9. Refer to electrical schematic figure FO-1 and use a soldering gun to solder two point-to-point jumper wires from terminal board TB2 (12) to fixed resistors R1 (7) and R3 (8). Clean all flux residue from solder joint. Secure electrical wires with tiedown straps as required.

10. Aline and install fixed resistor R1 (7) to gooseneck component assembly (4) and secure with two screws (6) and locknuts (5).

4-22. GOOSENECK COMPONENT ASSEMBLY (CONT)

11. Aline and install fixed resistor R3 (8) to gooseneck component assembly (4) and secure with two screws (6) and locknuts (5).

12. Refer to electrical schematic figure FO-1 and connect point-to-point jumper wire from terminal board TB2 (12) to fixed resistor R2 (3).

13. Aline and install fixed resistor R2 (3) to gooseneck component assembly (4) and secure with four screws (2) and locknuts (1).

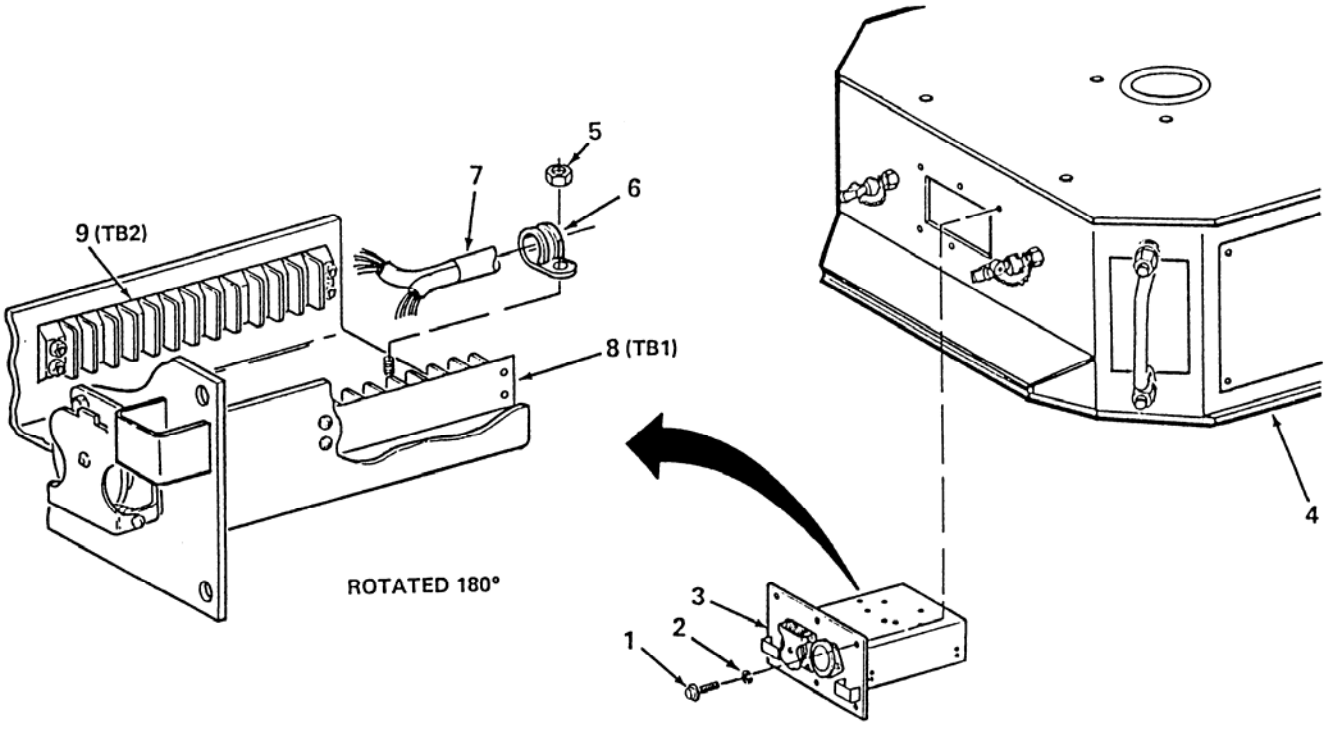
INSTALLATION

NOTE

Reinstall gooseneck component assembly upside down at first into gooseneck so that the W1 harness can be reconnected to terminal boards TB1 and TB2.

1. Aline and install gooseneck component assembly (3) upside down and partially into gooseneck (4).

2. Refer to electrical schematic figure FO-1 for incandescent lights or figure FO-1.1 for LED lights and reconnect W1 harness (7) to B side of terminal boards TB1 (8) and TB2 (9).



3. Perform troubleshooting procedures, paragraph 4-13, symptom 32, steps 2 and 5.

4. Place W1 harness (7) into clamp (6) and secure to gooseneck component assembly (3) using locknut (5).

5. Rotate component assembly 180 degrees and slide gooseneck component assembly (3) completely into gooseneck (4). Secure with six screws (1) and lockwashers (2).

FOLLOW-ON MAINTENANCE

Reconnect intervehicular electrical cable and check all lights, including steering pressure indicator light (para. 2-24).

4-23. JUNCTION BOXES

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Electrical repair kit, item 18, appx. B
Extension light, 24 ft, item 18, appx. B
Creeper, mechanic's, item 18, appx. B

Materials/Parts

Solvent, dry cleaning, item 26, appx. E
Electrical tape, item 28, appx. E
Lockwasher (2)

Equipment Condition

Platform at road height (para. 2-19)
Front and rear support legs lowered supporting platform (para. 2-22 and 2-23)
Intervehicular cables disconnected (para. 2-24)

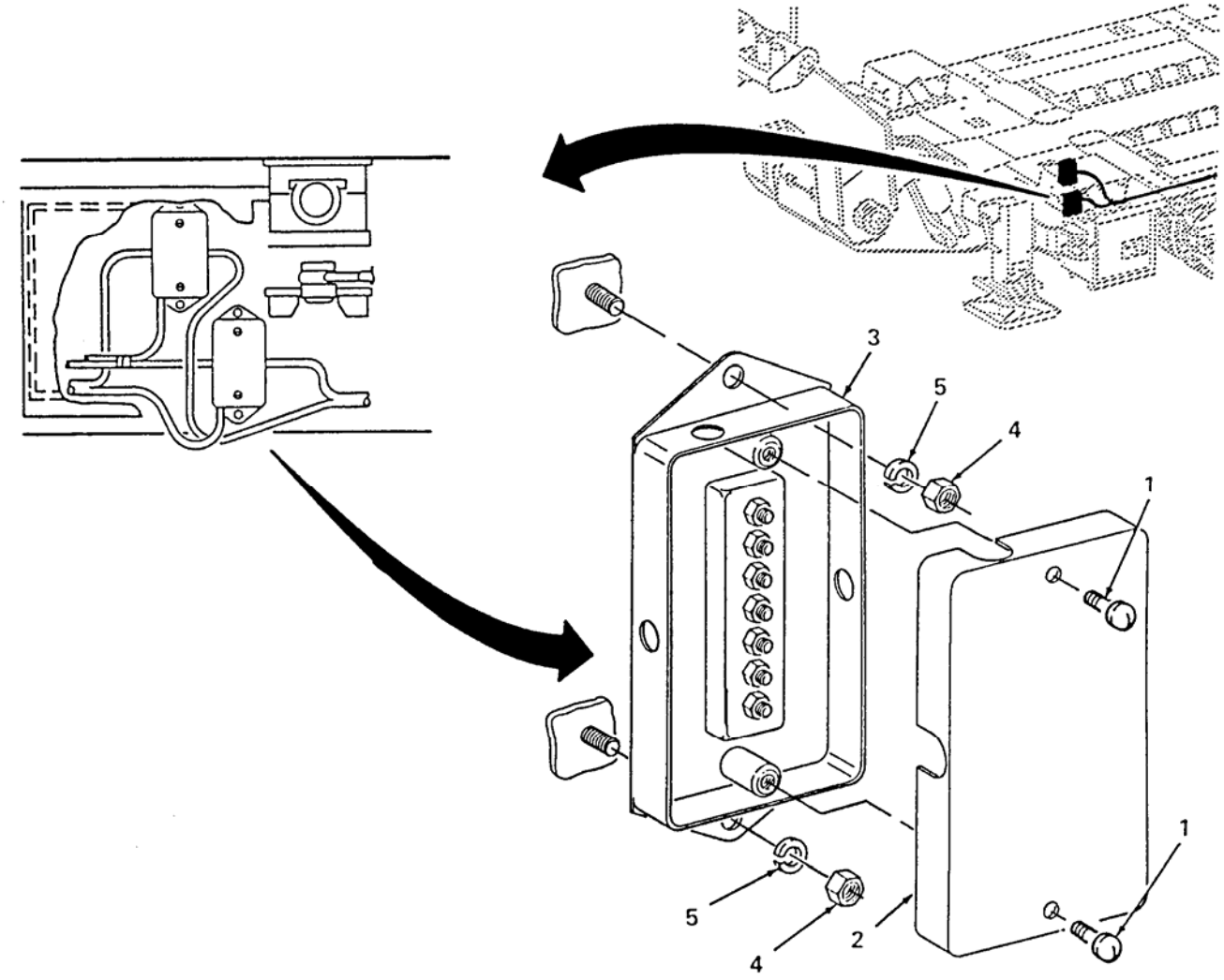
4-23. JUNCTION BOXES (CONT)

NOTE

The following procedure is to be used for either platform junction box TB1 or TB2. To repair or replace either platform junction box TB1 or TB2, repeat this procedure as necessary.

REMOVAL

1. Remove two screws (1) and junction box cover (2) from junction box assembly (3).
2. Refer to electrical schematic figure FO-1 for incandescent lights or figure FO-1.1 for LED lights and tag and disconnect W1, W2, W3, and W4 harnesses and jumper wires from junction box (3).
3. Remove two nuts (4), lockwashers (5), and junction box (3) from platform. Discard lockwashers.



INSPECTION

WARNING

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

1. Inspect junction boxes for corrosion, breaks, cracked or missing grommets, or defective cover. If corroded, clean using dry cleaning solvent as required. If defects exist, replace junction box.

2. Inspect jumper wires and wiring harness terminal lugs for corrosion, frayed or broken wires, and looseness. If defective, use electrical repair kit and replace defective terminal lugs, jumper wires, and/or wiring harnesses.

3. Inspect for missing or unreadable wire markers. If defect exists, replace or restamp wire marker. Use electrical schematic figure FO-1 for incandescent lights or figure FO-1.1 for LED lights for proper wire markings.

4. Inspect loom surrounding wire bundle for fraying, cuts, and damage. If defective, use electrical tape over affected area as required to keep water from settling into harness.

INSTALLATION

1. Aline and install junction box (3) to platform and secure with two lockwashers (5) and nuts (4).

2. Refer to electrical schematic figure FO-1 for incandescent lights or figure FO-1.1 for LED lights and reconnect jumper wires and W1, W2, W3, and W4 harnesses to junction box (3).

3. Install cover (2) onto junction box (3) and secure with two screws (1).

FOLLOW-ON MAINTENANCE

Reconnect intervehicular electrical cable and check all lights, including steering pressure indicator light, for proper operation (para. 2-24).

4-24. COMPOSITE MARKER LIGHT

This task covers: a. Removal b. Disassembly c. Inspection d. Assembly e. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Electrical repair kit, item 18, appx. B

Equipment Condition

Semitrailer parked on level ground, parking brakes applied, and inter-vehicular cables disconnected (para. 2-24)

Materials/Parts

Wiping rag, item 19, appx. E
Gasket
Lockwasher (2)
Locknut (2)

CAUTION

Some semitrailers are equipped with one piece LED composite marker lights. No repair is authorized on these lights and they are not interchangeable with reparable lights.

NOTE

The following procedure is to be used for either the curbside or streetside composite marker light. To repair or replace both lights, repeat this procedure as necessary.

REMOVAL

1. Refer to electrical schematic figure FO-1 for incandescent lights and tag and disconnect four electrical connectors (1) from W2 harness. Proceed to steps 2 and 3.
2. Remove two locknuts (2), screws (3), and composite marker light (4) with attached mounting bracket (7) from platform. Discard locknuts.
3. Remove two screws (5), lockwashers (6), and mounting bracket (7) from composite marker light (4). Discard lockwashers.
4. Refer to electrical schematic FO-1.1 for LED lights and tag and disconnect four connectors from W2 harness and one connector from ground lead. Proceed to step 5.
5. Remove four screws (5A), locknuts (5B), and light (4A) from mounting bracket (7A) on platform. Discard locknuts and light.

DISASSEMBLY

NOTE

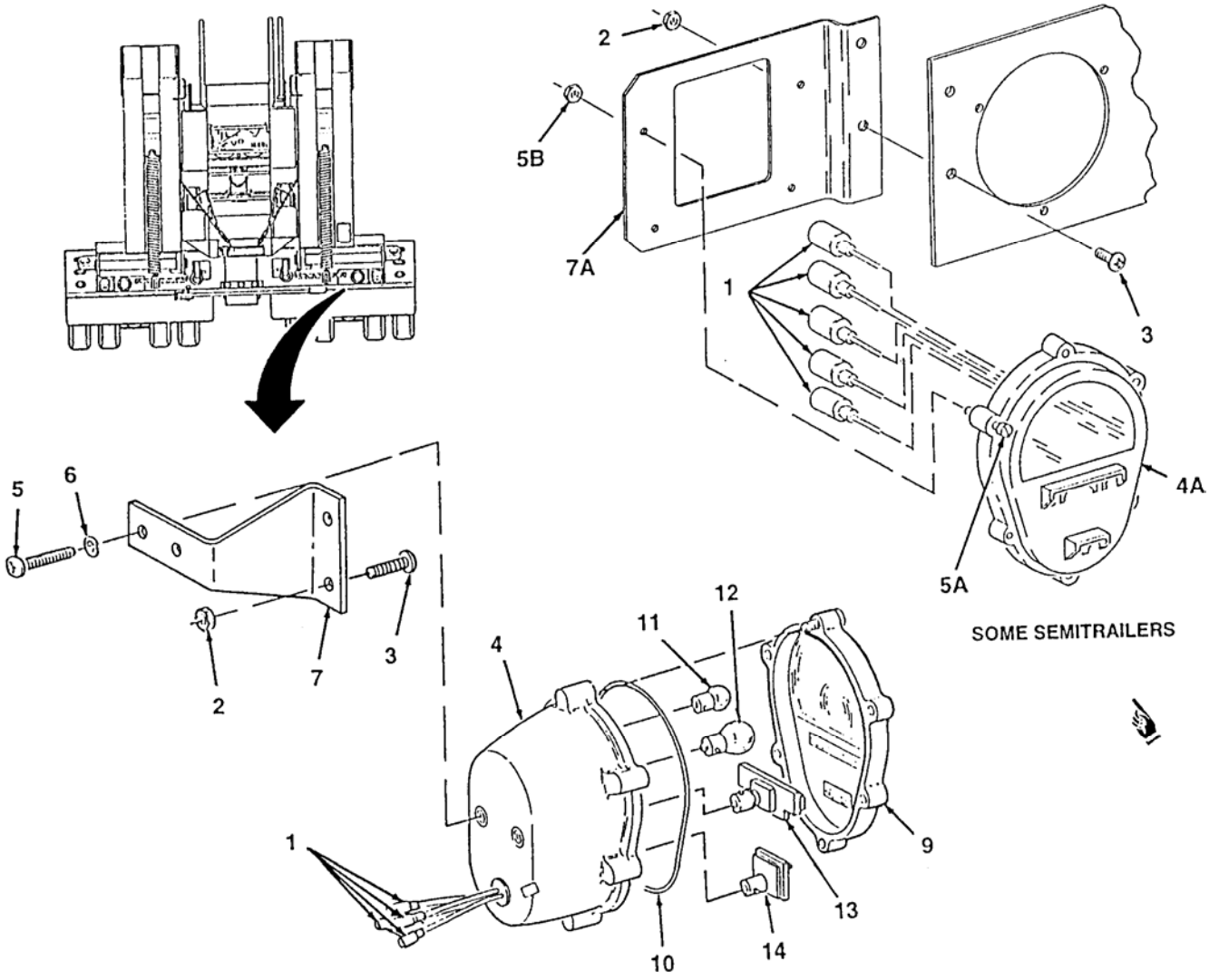
There is no disassembly of one piece LED composite marker lights.

1. Loosen six captive screws (8) and remove light lens (9) and gasket (10) from incandescent composite marker light (4). Discard gasket.

NOTE

Some semitrailers have bulbs in the two lower positions (blackout lights) on the composite marker light. These bulbs should be replaced with LED.

2. Remove bulb (11), bulb (12), LED (13), and LED (14) from incandescent composite marker light (4).



4-24. COMPOSITE MARKER LIGHT (CONT)

INSPECTION

1. For incandescent lights, inspect wires and socket connectors for corrosion, frayed or broken wires, and looseness. If socket connectors are defective, use electrical repair kit and replace as required. If wires are frayed or broken, replace composite marker light. Proceed to steps 2 thru 4.
2. Inspect bulb socket for corrosion and defects. If corroded, clean bulb socket by wiping with a wiping rag. If socket cannot be cleaned or if socket is defective, replace composite marker light.
3. Inspect for missing or cracked light lens. If defective, replace light lens.
4. Inspect light bulbs and LED for defects. If defective, replace light bulbs.
5. For LED lights, inspect wires and socket connectors for corrosion, frayed or broken wires, and looseness. Inspect light for cracks and/or defective LED. If wires or light is defective or more than 25% of LED does not emit light, replace light.

ASSEMBLY

NOTE

There is no assembly of one piece LED composite marker lights.

1. Install LED (14), LED (13), bulb (12), and bulb (11) into incandescent composite marker light (4).
2. Install gasket (10) and light lens (9) onto incandescent composite marker light (4). Secure by tightening six captive screws (8). Torque six screws (8) to 20-25 in.-lb (2.2-2.7 Nm).

INSTALLATION

1. For one piece LED composite marker light, align light (4A) to mounting bracket (7A) on platform and secure with four screws (5A) and locknuts (5B). Proceed to step 2.
2. Refer to electrical schematic figure FO-1.1 for LED lights and reconnect four connectors to W2 harness and one connector to ground lead.
3. For incandescent composite marker light, aline light (4) to mounting bracket (7) and secure with two screws (5) and lockwashers (6). Proceed to steps 4 and 5.
4. Aline and install composite marker light (4) to platform and secure with two screws (3) and locknuts (2).
5. Refer to electrical schematic figure FO-1 for incandescent lights and reconnect four electrical connectors (1) to W2 harness.

FOLLOW-ON MAINTENANCE

Reconnect intervehicular electrical cable, turn on tractor/semitrailer lights, and check composite marker light for proper operation (para. 2-24).

4-25. VEHICULAR BAR LAMP

This task covers: a. Disassembly b. Inspection c. Assembly

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Electrical repair kit, item 18, appx. B

Materials/Parts

Wiping rag, item 19, appx. E
Lockwasher (4)

Equipment Condition

Semitrailer parked on level ground, parking brakes applied, and intervehicular cables disconnected (para. 2-24)

4-25. VEHICULAR BAR LAMP (CONT)

DISASSEMBLY

CAUTION

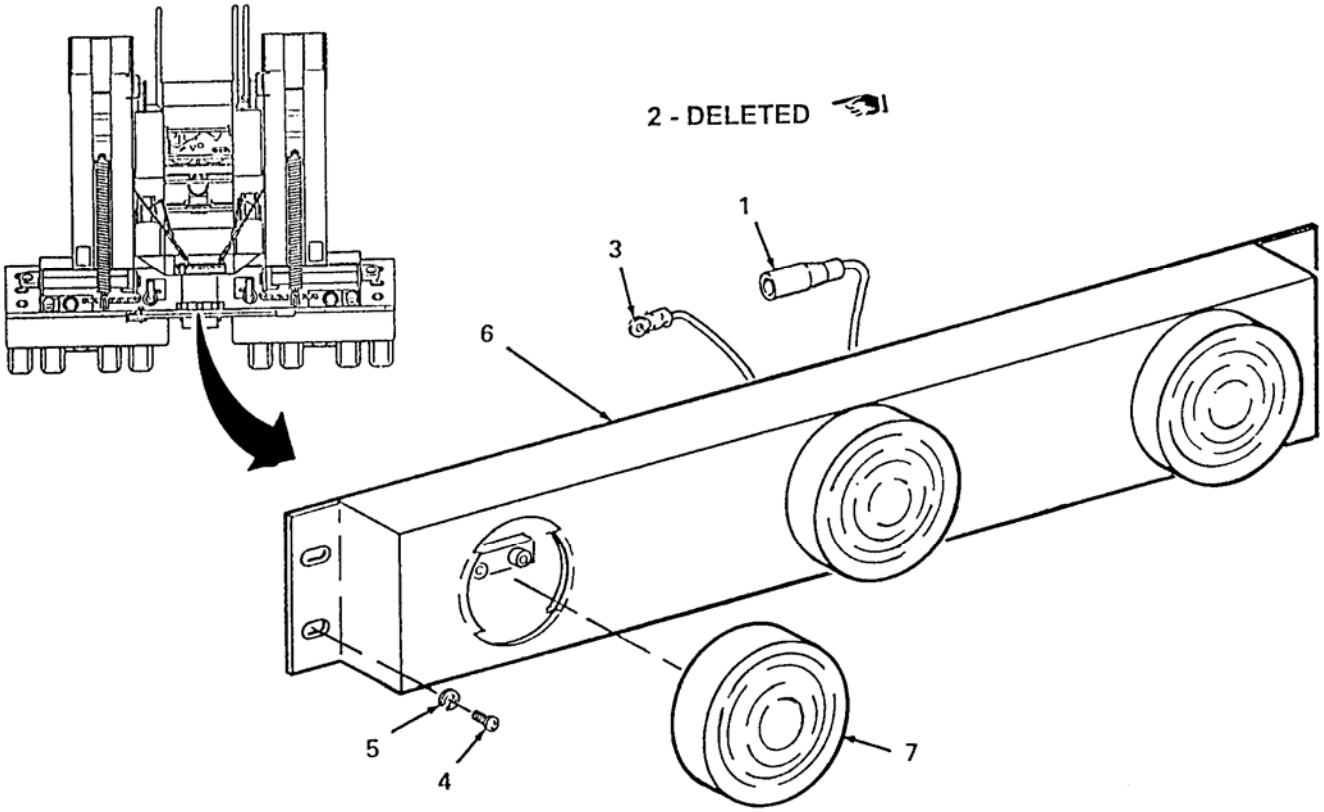
Some semitrailers are equipped with LED vehicular bar lamps. These lamps are very similar in appearance to incandescent vehicular bar lamps but the marker clearance lights are not interchangeable. Substitution will cause damage to equipment.

1. Refer to electrical schematic figure FO-1 for incandescent lights and tag and disconnect socket connector (1) from W2 harness. Refer to electrical schematic figure FO-1.1 for LED lights and tag and disconnect socket connector from W2 harness.

2. Locate mount screw (4) with terminal lug of white wire (3) (ground) under head. Remove that screw (4) and lockwasher (5) from platform and tag white wire (3).

3. Remove remaining three screws (4) and lockwashers (5) and remove vehicular bar lamp (6) from platform. Discard lockwashers.

4. Remove three marker clearance lights (7) from bar lamp (6) by turning and/or twisting marker clearance lights (7).



INSPECTION

1. Inspect wires, terminal lug, and socket connectors for corrosion, frayed or broken wires, and looseness. If socket connectors or terminal lugs are defective, use electrical repair kit and replace as required. If wires are frayed or broken, replace vehicular bar lamp.

2. Inspect marker clearance light sockets for corrosion and defects. If corroded, clean sockets by wiping with a wiping rag. If sockets cannot be cleaned or if sockets are defective, replace vehicular bar lamp.

3. Inspect for burned out, missing, cracked, or nonsealing marker clearance lights. If defective, replace marker clearance lights.

ASSEMBLY

NOTE

If installing new vehicular bar lamp, the four mounting holes must be drilled out to 0.200-0.211 inch (0.508-0.535 cm) diameter.

1. Aline and install, by turning and/or twisting, marker clearance lights (7) onto vehicular bar lamp (6).

2. Aline and install vehicular bar lamp (6) to platform. Secure using three lockwashers (5) and screws (4).

3. Reconnect terminal lug (3) on white wire (ground) to platform using fourth lockwasher (5) and screw (4). Before installing screw, ensure contact area is free of paint and/or corrosion.

4. Refer to electrical schematic figure FO-1 for incandescent lights and reconnect socket connector (1) to W2 harness. Refer to electrical schematic figure FO-1.1 for LED lights and connect socket connector to W2 harness.

FOLLOW-ON MAINTENANCE

Reconnect intervehicular electrical cable (para. 2-24), turn on tractor/semitrailer lights, and check vehicular bar lamp for proper operation.

4-26. STOP LIGHT/TAILLIGHT

This task covers: a. Disassembly b. Inspection c. Assembly

INITIAL SETUP

Tools

General mechanics tool kit,
  item 16, appx. B
Electrical repair kit,
  item 18, appx. B

Equipment Condition

Semitrailer parked on level ground,
  parking brakes applied, and
  intervehicular cables disconnected
  (para. 2-24)

Materials/Parts

Wiping rag, item 19, appx. E
Locknut (3)
Electrical insulation sleeving,
  item 22.1, appx. E
Electrical insulation sleeving,
  item 22.2, appx. E

NOTE

The following procedure is to be used for either the curbside or streetside stop light/taillight. To repair or replace both lights, repeat this procedure as necessary.

DISASSEMBLY

NOTE

Some semitrailers are equipped with one piece LED stop lights/tail-lights. These lights have a removable three-lead electrical harness. The power lead is fitted with a plug connector, the ground lead is fitted with a lug terminal, and the third lead is capped (not used). These lights are not interchangeable with bulb-type stop lights.

1. Refer to electrical schematic figure FO-1 for incandescent lights or figure FO-1.1 for LED lights and tag and disconnect stop light/taillight socket connector (1) from W2 harness.

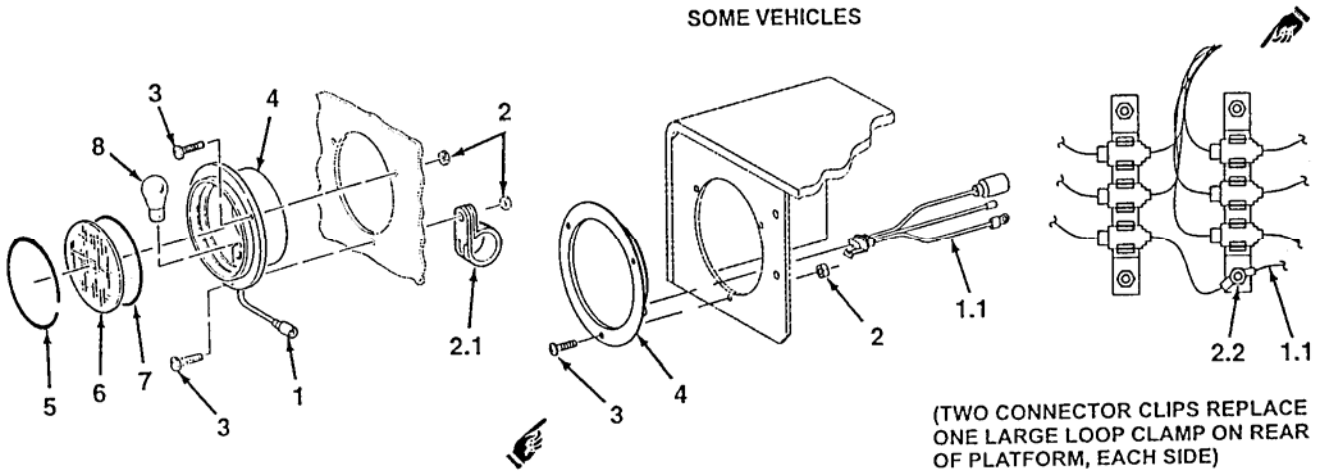
1.1. For LED light, also disconnect ground lead (1.1) from connector clip mount stud (2.2).

2. Remove three locknuts (2), clamp (2.1), and three screws (3) and remove stop light/taillight (4) from platform. Discard locknuts.

2.1. For LED light, remove three-lead harness from socket on back of light. No other disassembly is authorized.

3. Remove retaining ring (5), light lens (6), and gasket (7) from stop light/taillight (4). Do not discard gasket at this time.

4. Remove bulb (8) from stop light/taillight (4).



INSPECTION

1. Inspect wire and socket connector for corrosion, frayed or broken wire, and looseness. If socket connector is defective, use electrical repair kit and replace as required. If wire is frayed or broken, replace stop light/taillight. Use two layers of shrinkable sleeve insulation to form a seal between connector shell and stop light lead.

1.1. For LED light, if wires are frayed, replace three-lead harness.

2. Inspect bulb socket for corrosion and defects. If corroded, clean bulb socket by wiping with a wiping rag. If socket cannot be cleaned or if socket is defective, replace stop light/taillight.

2.1. For LED light, inspect for cracks and/or defective LED. If light is defective or more than 25% of LEDs do not emit light, replace one piece stop light/taillight.

3. Inspect for burned out bulb. If defective, replace bulb.

4. Inspect for missing, cracked, or nonsealing light lens and gasket. If light lens is defective, replace lens. If gasket is defective, replace stop light/taillight.

ASSEMBLY

NOTE

Some semitrailers are equipped with one piece LED stop lights/tail-lights. These lights have a removable three-lead electrical harness. The power lead is fitted with a plug connector, the ground lead is fitted with a lug terminal, and the third lead is capped (not used). These lights are not interchangeable with bulb-type stop lights.

1. Install bulb (8) into stop light/taillight (4).

1.1. For LED light, install three-lead harness to socket on back of light. No other assembly is authorized.

4-26. STOP LIGHT/TAILLIGHT (CONT)

2. Install gasket (7), light lens (6), and retaining ring (5) into stop light/taillight (4).

3. Aline and install stop light/taillight (4) to platform. Secure in place with three screws (3), clamp (2.1), and three locknuts (2).

3.1. Refer to electrical schematic figure FO-1.1 for LED lights and reconnect wire with connector to W2 harness and ground lead (1.1) to connector clip mount stud (2.2). If necessary, secure capped wire with wire tie.

4. Refer to electrical schematic FO-1 for incandescent lights or figure FO-1.1 for LED lights and reconnect stop light/taillight socket connector (1) to W2 harness.

FOLLOW-ON MAINTENANCE

Reconnect intervehicular electrical cable and check stop light/taillight for proper operation (para. 2-24).

4-27. CLEARANCE LIGHT/BLACKOUT LIGHT

This task covers: a. Disassembly b. Inspection c. Assembly

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

Preformed felt
Locknut (4)
Lockwasher
Lockwasher

Equipment Condition

Semitrailer parked on level ground, parking brakes applied, and intervehicular cables disconnected (para. 2-24)

NOTE

The following procedure is to be used for all clearance lights located on either the curbside or streetside of platform. To repair or replace all clearance lights, repeat this procedure as necessary.

If semitrailer is equipped with LED clearance lights, there are differences between clearance lights and blackout lights. Both are addressed in this procedure.

DISASSEMBLY

1. Refer to electrical schematic figure FO-1 for incandescent lights and tag and disconnect clearance light socket connector (1) from platform wiring harness. Proceed to steps 2 thru 5.

2. Remove two screws (2) and retainer lens (3) from lamp holder mounting plate (4).

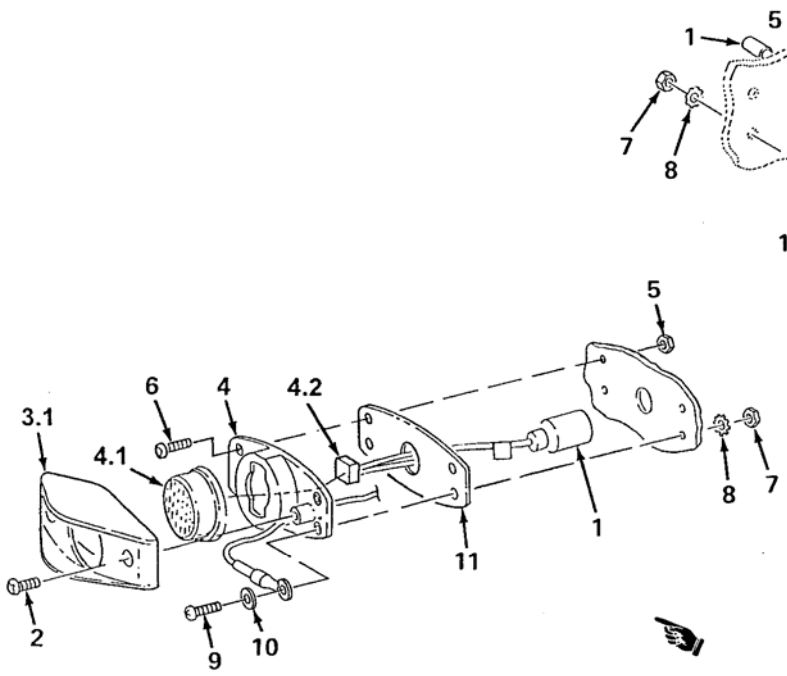
3. Remove three locknuts (5) and three screws (6). Remove locknut (7), external tooth lockwasher (8), screw (9), lockwasher (10), preformed felt (11), and lamp holder mounting plate (4) from platform. Discard locknuts, lockwashers, and preformed felt.

4. Remove two push-on nuts (12) and separate light lens (13) from lens retainer (3).

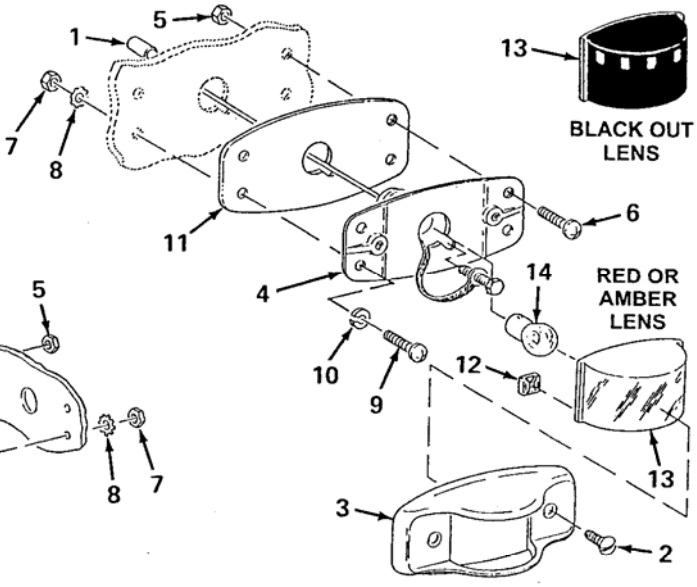
5. Remove bulb (14) from lamp holder mounting plate (4). Loosen screw on lamp holder mounting plate (4) and allow to hang loose.

6. For LED blackout light, remove two screws (2) and retainer lens (3). For LED clearance light, remove two screws (2) and armored bracket (3.1).

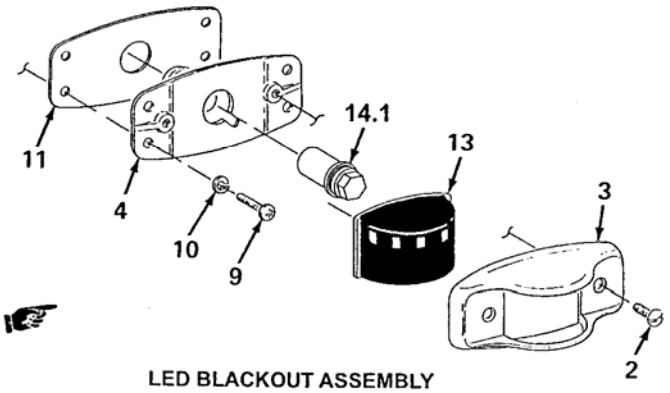
7. For LED clearance light, remove LED element (4.1) by turning clockwise and pulling out; then, disconnect lead (4.2) from base of element. For LED blackout light, remove LED element (14.1) from lamp holder mounting plate (4).



LED LIGHT ASSEMBLY
(SOME SEMITRAILERS)



INCANDESCENT LIGHT ASSEMBLY



LED BLACKOUT ASSEMBLY
(SOME SEMITRAILERS)

4-27. CLEARANCE LIGHT/BLACKOUT LIGHT (CONT)

8. Remove three locknuts (5), screws (6), locknut (7), external tooth lockwasher (8), screw (9), lockwasher (10), preformed felt (11), and lamp holder mounting plate (4) from platform. Discard locknuts, lockwashers, and preformed felt.

INSPECTION

1. Inspect wire and socket connector for corrosion, frayed or broken wire, and looseness. If defects exist, replace clearance light assembly.

2. Inspect for missing, cracked, or nonsealing lens retainer, mounting plate, or lens. If defective, replace clearance light assembly.

3. Inspect bulb socket (element socket for LED blackout light) for corrosion and defects. If socket cannot be cleaned or socket is defective, replace clearance light assembly.

4. For LED clearance light, inspect connector for corrosion and defects.

ASSEMBLY

NOTE

For LED clearance light, disregard steps 1, 1.1, 2, and 4.

1. Install bulb (14) to lamp holder mounting plate (4). Install screw on lamp holder mounting plate (4).

1.1. For LED blackout light, install LED element (14.1) to lamp holder mounting plate (4).

1.2. For LED clearance light, connect lead (4.2) to LED element (4.1). Install LED element into lamp holder mounting plate (4) and turn counterclockwise.

2. Aline light lens (13) to lens retainer (3) and secure with two push-on nuts (12).

3. Aline and install lamp holder mounting plate (4) and preformed felt (11) to platform. Secure with three screws (6), three locknuts (5), screw (9), lockwasher (10), external tooth lockwasher (8), and locknut (7).

3.1. For LED clearance light, ensure that ground lead terminal lug is under head of screw (9) with lockwasher (10).

4. Install retainer lens (3) to lamp holder mounting plate (4) and secure with two screws (2).

4.1. For LED clearance light, install armored bracket (3.1) to lamp holder mounting plate (4) and secure with two screws (2).

5. Reconnect clearance light socket connector (1) to platform wiring harness.

FOLLOW-ON MAINTENANCE

Reconnect intervehicular electrical cable (para. 2-24) and check clearance and blackout lights for proper operation.

4-28. STEERING PRESSURE INDICATOR LIGHT

This task covers: a. Disassembly b. Inspection c. Assembly

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Electrical repair kit, item 18, appx. B
Soldering gun, item 18, appx. B

Materials/Parts

Preformed packing
Lockwasher (6)
Solder, item 24, appx. E
Tiedown straps (as required), item 27, appx. E
Wiping rag, item 19, appx. E
Electrical insulation sleeving, item 22, appx. E

Personnel Required: 2

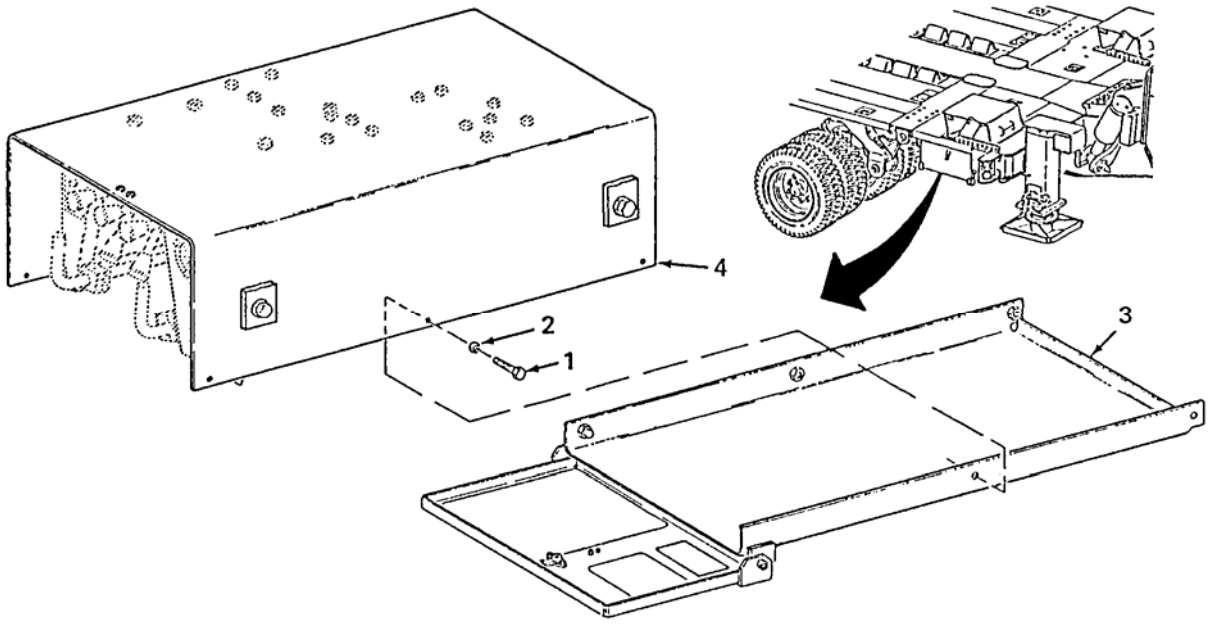
Equipment Condition

Semitrailer parked on level ground, wheels chocked, parking brakes applied, and intervehicular cables disconnected (para. 2-24)

DISASSEMBLY

1. Make sure hydraulic control module access cover is lowered (para. 2-5).

2. Using two people, remove six capscrews (1), lockwashers (2), and lower panel (3) from hydraulic control module (4). Carefully remove lower panel (3), with access cover attached, out from under semitrailer and place on platform. Discard lockwashers.

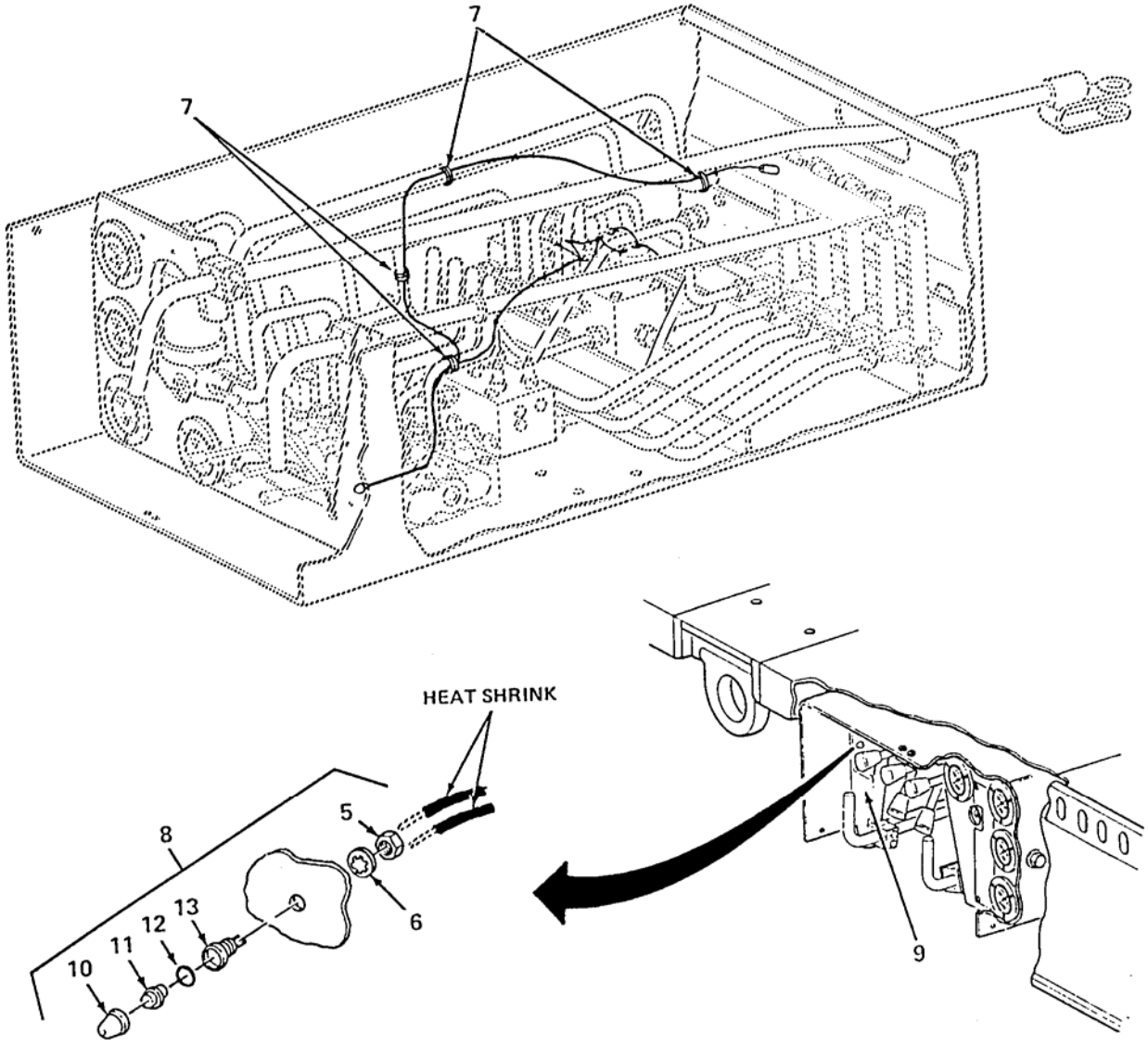


4-28. STEERING PRESSURE INDICATOR LIGHT (CONT)

CAUTION

When cutting tiedown straps and sliding steering pressure indicator light out to expose solder connections, use caution so that wires do not get cut, caught, or pulled on the frame or damage to equipment may result.

3. Remove nut (5) and lockwasher (6). Carefully cut and remove tiedown straps (7) as required and slide steering pressure indicator light (8) out and away from hydraulic control module gage panel (9). Move steering pressure indicator light (8) only enough to expose soldered contact points. Discard tiedown straps.



WARNING

Soldering fumes are toxic. Avoid breathing these fumes. Work in a well-ventilated area or injury to personnel may result.

CAUTION

Rosin core solder contains flux which is corrosive. All soldered connections must be cleaned of all flux residue or damage to equipment may result.

4. Cut and remove heat shrink tubing on wire leads to steering pressure indicator light (8). Refer to electrical schematic figure FO-1 for incandescent lights and tag and unsolder jumper wires from steering pressure indicator light (8).

5. Remove lens (10). Remove incandescent lamp (11) and preformed packing (12) from indicator base (13). Discard preformed packing.

INSPECTION

WARNING

Soldering fumes are toxic. Avoid breathing these fumes. Work in a well-ventilated area or injury to personnel may result.

CAUTION

Rosin core solder contains flux which is corrosive. All soldered connections must be cleaned of all flux residue or damage to equipment may result.

1. Inspect bulb socket for bad solder connections, corrosion, and defects. If corroded, clean bulb socket by wiping with a wiping rag. If a bad solder exists, resolder. If bulb socket cannot be cleaned or socket is defective, replace steering pressure indicator light assembly.

2. Inspect steering indicator light wires and terminals for corrosion, looseness, and frayed or broken wires. If wires or terminals are defective or loose, refer to repair paragraph of this procedure.

3. Inspect for burned out incandescent bulbs. If bulbs are burned out, replace as necessary.

4. Inspect for defective bulb sockets or lens. If found defective, replace steering pressure indicator light assembly.

ASSEMBLY

1. Install preformed packing (12), incandescent lamp (11), and lens (10) to indicator base (13).

2. Pass jumper wires through nut (5), lockwasher (6), and opening in hydraulic control module gage panel (9). Install heat shrink electrical insulation onto jumper wires.

4-28. STEERING PRESSURE INDICATOR LIGHT (CONT)

WARNING

Soldering fumes are toxic. Avoid breathing these fumes. Work in a well-ventilated area or injury to personnel may result.

CAUTION

Rosin core solder contains flux which is corrosive. All soldered connections must be cleaned of all flux residue or damage to equipment may result.

3. Refer to electrical schematic figure FO-1 for incandescent lights and aline jumper wires with steering pressure indicator light (8) and, using soldering gun, solder the two leads to steering pressure indicator light (8). Using soldering torch kit, shrink heat shrink over soldered joint.

4. Insert steering pressure indicator light (8) to hydraulic control module gage panel (9). Secure in place by installing and tightening nut (5).

NOTE

Tiedown straps should be placed in a logical position to secure wiring.

5. Reinstall new tiedown straps (7) as required.

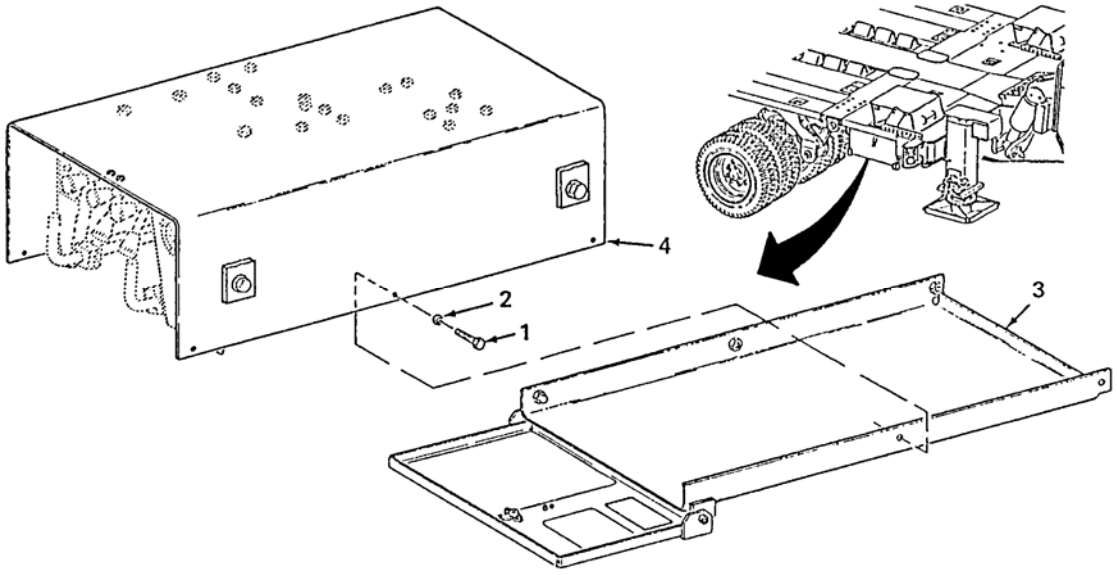
6. Using two people, carefully position lower panel (3), with access cover attached, over hydraulic control module (4) on underside of semitrailer. Secure with six lockwashers (2) and capscrews (l).

7. Raise hydraulic control module door panel (para. 2-5).

FOLLOW-ON MAINTENANCE

1. Start APU (para. 2-16).

2. Reconnect intervehicular electrical cable (para. 2-24) and check steering pressure indicator light while manually adjusting steering (para. 2-21).



4-29. INDICATOR LIGHTS - OIL PRESSURE AND GLOW PLUG

This task covers: a. Disassembly c. Assembly
b. Inspection d. Assembly

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Electrical repair kit, item 18, appx. B
Soldering gun, item 18, appx. B
Measuring tape, item 18, appx. B

Materials/Parts

Preformed packing
Lockwasher (4)
Solder, item 24, appx. E
Tiedown straps (as required), item 27, appx. E
Wiping rag, item 19, appx. E
Electrical insulation sleeving, item 22, appx. E

Equipment Condition

Semitrailer parked on level ground, wheels chocked, parking brakes applied, and intervehicular cables disconnected (para. 2-24)
Negative lead from battery disconnected (para. 4-30)

4-29. INDICATOR LIGHTS - OIL PRESSURE AND GLOW PLUG (CONT)

DISASSEMBLY

NOTE

On APU with APU engine serial number 504697 and subsequent, the glow plug indicator is changed from a glow-type indicator to a lamp driven by a timer.

1. Open cover to APU control box by lifting up retainer (1) and lowering cover weldment (2).

2. Remove four screws (3), lockwashers (4), and access plate (5) from APU control box. Discard lockwashers.

3. Refer to APU electrical schematic figure FO-4 and proceed as follows:

   a. For lamp-type indicator:

      (1) Tag and disconnect APU wiring harness leads from two quick-disconnect terminals (6) on indicator light (7).

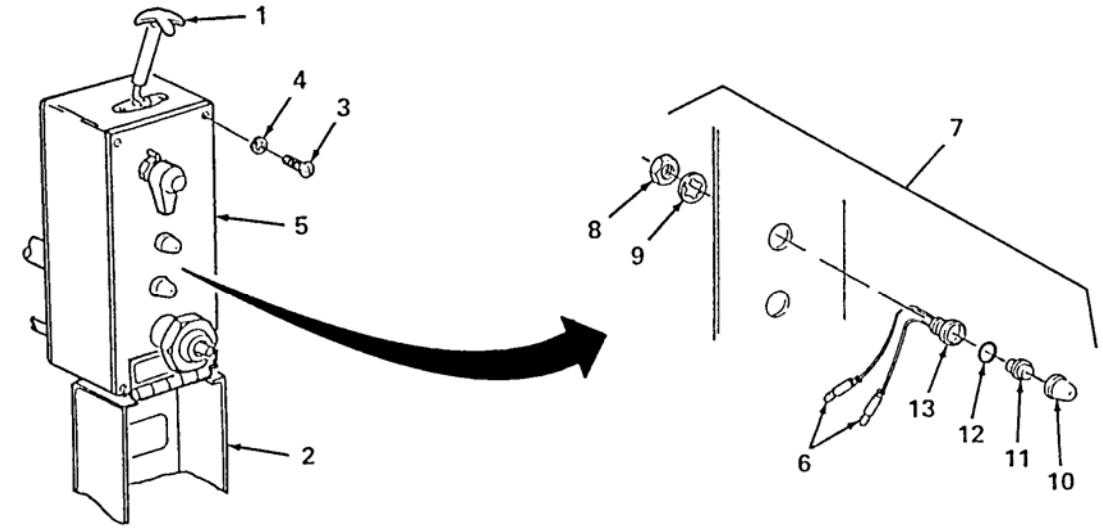
      (2) Remove nut (8), lockwasher (9), and indicator light (7) from access plate (5). Discard lockwasher.

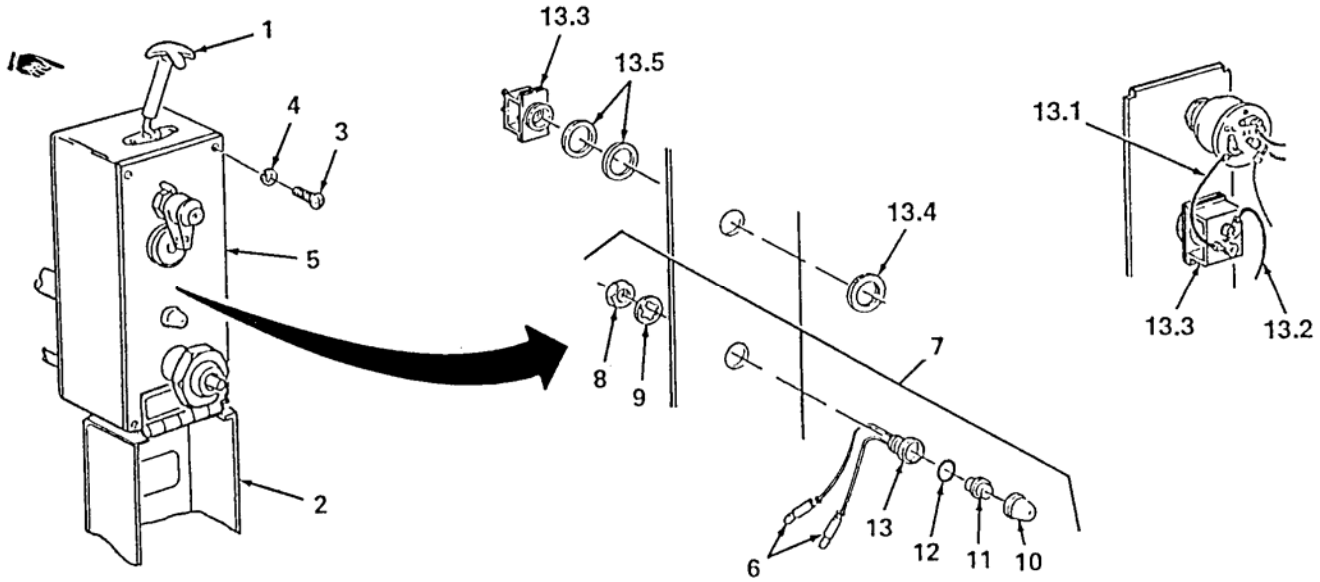
      (3) Remove lens (10). Remove incandescent lamp (11) and preformed packing (12) from indicator base (13). Discard preformed packing.

   b. For glow-type glow plug indicators:

      (1) Tag and disconnect jumper wire (13.1) and APU cable assembly (13.2) from back of glow plug indicator (13.3).

      (2) Unscrew and remove retainer ring (13.4), two washers (13.5), and glow plug indicator (13.3) from access plate (5).


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13.3
13.2

4-29. INDICATOR LIGHTS - OIL PRESSURE AND GLOW PLUG (CONT)

INSPECTION

WARNING

Soldering fumes are toxic. Avoid breathing these fumes. Work in a well-ventilated area or injury to personnel may result.

CAUTION

Rosin core solder contains flux which is corrosive. All soldered connections must be cleaned of all flux residue or damage to equipment may result.

NOTE

This inspection procedure is valid only for lamp-type glow plug indicators.

1. Inspect bulb socket for bad solder connections, corrosion, and defects. If corroded, clean bulb socket by wiping with a wiping rag. If a bad solder exists, resolder. If bulb socket cannot be cleaned or socket is defective, replace indicator light assembly.
2. Inspect indicator light wires and quick-disconnect terminals for corrosion, looseness, and frayed or broken wires. If wires or terminals are defective or loose, refer to repair paragraph of this procedure.
3. Inspect for burned out incandescent bulbs. If bulbs are burned out, replace as necessary.
4. Inspect for defective bulb sockets or lens. If found defective, replace indicator light assembly.

REPAIR

WARNING

Soldering fumes are toxic. Avoid breathing these fumes. Work in a well-ventilated area or injury to personnel may result.

CAUTION

Rosin core solder contains flux which is corrosive. All soldered connections must be cleaned of all flux residue or damage to equipment may result.

NOTE

This inspection procedure is valid only for lamp-type glow plug indicators.

1. Cut and remove heat shrink tubing from two wires (14). Using soldering gun, unsolder and remove two wires (14) from indicator base (13).
2. Refer to appendix F and, using electrical repair kit and measuring tape, fabricate new wire(s) (14) as required.

3. Using wire stripper, strip fabricated wires to designated length and allow for terminals to be installed or wires to be soldered.

4. Using electrical repair kit, crimp two quick-disconnect terminals (6) onto wires (14). Install heat shrink tubing onto two wires (14).

5. Using soldering gun, solder wires (14) to indicator base (13). Clean all flux residue from solder joint. Using soldering torch kit, shrink heat shrink tubing over soldered joint.

ASSEMBLY

NOTE

On APU with APU engine serial number 504697 and subsequent, the glow plug indicator is changed from a glow-type indicator to a lamp driven by a timer.

1. For lamp-type indicators:

   a. Install preformed packing (12), incandescent lamp (11), and lens (10) to indicator base (13).

   b. Pass two wires (14) through access plate (5) and install indicator light (7) onto access plate (5).

   c. Pass two wires (14) through lockwasher (9) and nut (8). Secure indicator light (7) to access plate (5) by tightening nut (8).

   d. Refer to APU electrical schematic figure FO-4 and reconnect APU wiring harness to two quick-disconnect terminals (6) on indicator light (7).

2. For glow-type indicators:

   a. Install glow-plug indicator (13.3) and two washers (13.5) onto access plate (5) and secure with retaining ring (13.4).

   b. Refer to APU electrical schematic figure FO-4 and reconnect APU cable assembly (13.2) and jumper wire (13.1) to back of glow plug indicator (13.3).

3. Aline and install access plate (5) to APU control box and secure with four screws (3) and lockwashers (4).

4. Raise cover weldment (2) and secure to APU control box by rehooking retainer (1) to cover.

FOLLOW-ON MAINTENANCE

Start APU (para. 2-16) and check indicator lights.

4-30. BATTERY INSTALLATION

This task covers: a. Removal c. Charging
b. Inspection d. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 2, item 18, appx. B:

- Apron
- Goggles, industrial
- Gloves, chemical and oil protective
- Battery carrier
- Battery charger
- Battery terminal cleaner
- Battery filler
- Battery tester (electrolyte)

Material/Parts

Locknut (2)
Petroleum jelly, item 17, appx. E
Sodium bicarbonate, item 23, appx. E
Water, battery, item 30, appx. E

Equipment Condition

Gooseneck adjusted to approximately 64 inch (l62.5 cm) height (para. 2-18) or coupled to tractor (para. 2-24)

General Safety Instructions

WARNING

Storage batteries contain sulfuric acid which will cause severe eye injury, skin burns, and damage to clothing. Wear eye protection and protective clothing and avoid spilling any acid. If contact occurs, flush affected areas immediately with large quantities of water and seek medical attention.

Storage batteries give off hydrogen gas, which is extremely explosive. Keep all open flames, sparks, and smoking materials away from batteries or serious personal injury may result.

Always disconnect negative (-) cable first and connect negative (-) cable last or serious injury may result.

A frozen or completely discharged battery can explode if power is applied. Before connecting any form of external power to battery, ensure frozen battery is warmed or discharged battery is replaced or injury to personnel may result.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on it or trip over it. Injury to personnel or damage to equipment may result.

4-30. BATTERY INSTALLATION (CONT)

REMOVAL

1. Unhook two fasteners (1) and raise and remove stair (2) to gain access to battery (3).

CAUTION

Some semitrailers have solar battery charger leads connected to negative and positive battery terminals. Ensure these leads are not damaged when disconnecting terminals from battery posts.

2. Disconnect negative (-) terminal (4) from negative (-) post on battery (3). Disconnect positive (+) terminal (5) from positive (+) post on battery (3).

3. Remove two locknuts (6), washers (7), and holddown bracket (8) from battery (3). Discard locknuts.

4. Using battery carrier if necessary, lift battery (3) from frame and remove two bolts (9).

INSPECTION

1. Using a battery terminal cleaner, followed by sodium bicarbonate and water, clean corrosion from both battery terminals and battery posts.

2. After cleaning, apply coat of petroleum jelly to both the battery terminals and battery posts.

3. Perform all inspections and authorized repairs in accordance with TM 9-6140-200-14 (appx. A).

CHARGING

1. Remove battery cell caps from battery.

2. Inspect electrolyte level in each cell. If low, add distilled water using battery filler.

3. Using battery tester, take reading of electrolyte in each cell. If reading is low, charge battery. If level does not reach adequate reading, replace battery.

4. Attach battery charger to battery. Follow instructions on battery charger.

5. After charging battery, install battery cell caps onto battery.

INSTALLATION

1. Install two bolts (9) and, using battery carrier if necessary, place battery (3) on frame.

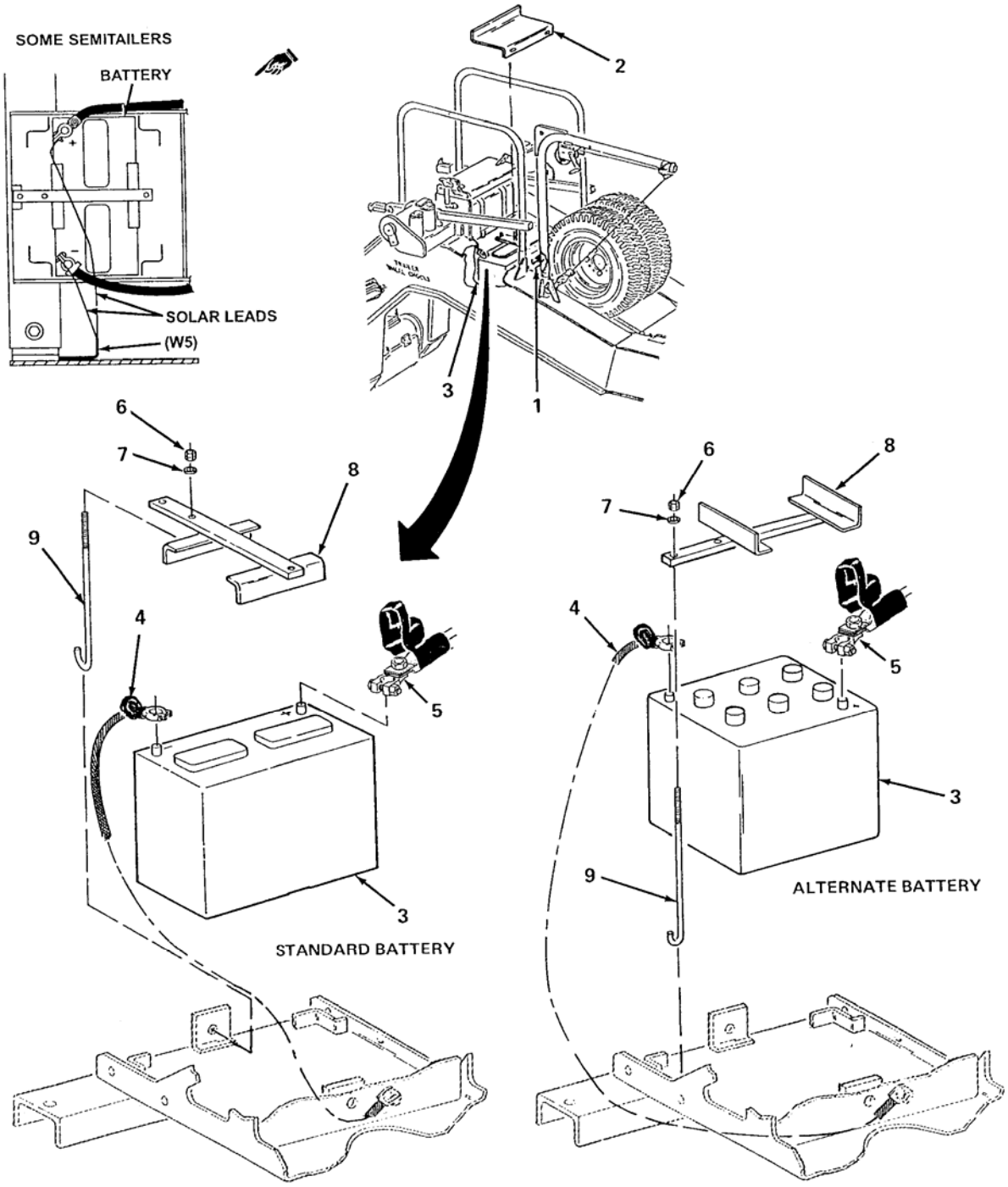
2. Install holddown bracket (8) over battery (3) and secure with two washers (7) and locknuts (6).

CAUTION

Some semitrailers have solar battery charger leads connected to negative and positive battery terminals. Ensure these leads are not damaged when disconnecting terminals from battery posts.

3. Connect positive (+) terminal (5) to positive (+) post on battery (3), and connect negative (-) terminal (4) to negative (-) post on battery (3).

4. Position stair (2) on frame and hook two fasteners (1).



4-30.1. SOLAR BATTERY CHARGER INSTALLATION (SOME SEMITRAILERS)

This task covers: a. Removal c. Assembly
b. Disassembly d. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Material/Parts

Lockwasher (4)

Equipment Condition

Gooseneck adjusted fully down (para. 2-18) or coupled to tractor (para. 2-24)

General Safety Instructions

WARNING

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on it or trip over it. Injury to personnel or damage to equipment may result.

REMOVAL

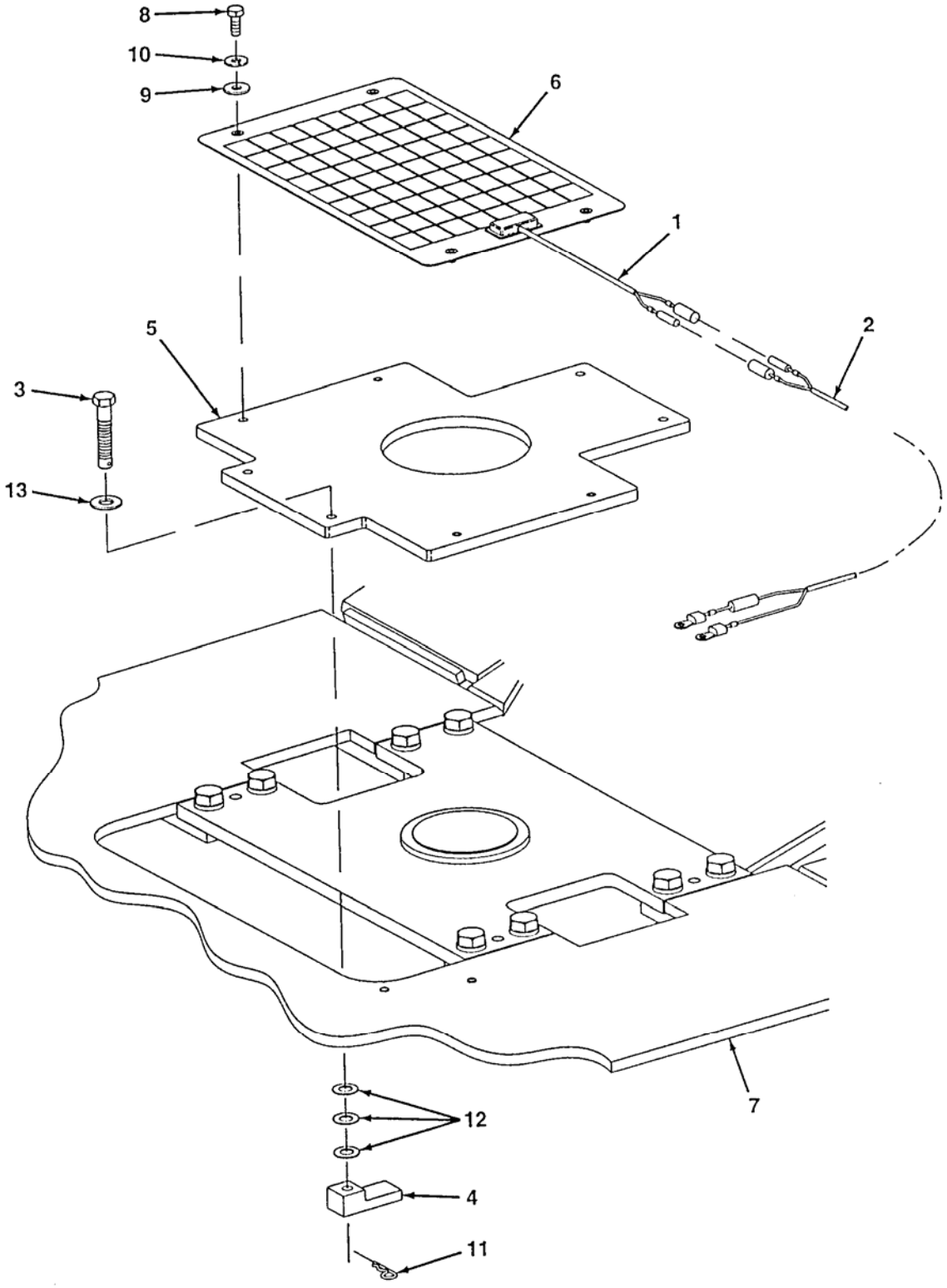
1. Disconnect solar panel leads (1) from W5 harness (2).
2. Loosen four bolts (3) and turn four toe clamps (4) 90° from clamping position.
3. Lift mounting plate (5), with solar panel (6) attached, and remove from gooseneck (7).

DISASSEMBLY

NOTE

Lockwashers may not be present. They are not used on initial assembly but are needed for reassembly.

1. Remove four capscrews (8), washers (9), lockwashers (10) if present, and solar panel (6) from mounting plate (5). Discard lockwashers (10).
2. Remove four hairpin cotters (11) from four bolts (3) and screw four clamps (4) off bolts (3).


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4-30.1. SOLAR BATTERY CHARGER INSTALLATION (SOME SEMITRAILERS) (CONT)

ASSEMBLY

1. Align solar panel (6) to mounting plate (5) such that bolt holes align with threaded inserts in mounting plate (5) and solar panel leads (1) are to left side when viewed from long end of mounting plate (5). Secure solar panel (6) to mounting plate (5) with four capscrews (8), lockwashers (10), and washers (9).

2. Install four washers (13) onto four bolts (3). Insert bolts into mounting plate (5) with bolt heads on solar panel side. Install three spring washers (12) to each bolt (3), positioned opposite each other for greatest extension. Screw four toes clamps (4) onto four bolts (3) and install four hairpin cotter (11) into four bolts (3) .

INSTALLATION

1. Lift mounting plate (5), with solar panel (6) attached, onto gooseneck (7) and position onto steering retainer assembly (14) with short end forward and solar panel leads (1) to streetside of semitrailer.

2. Turn four toe clamps (4) to clamping position (aligned fore and aft) and tighten four bolts (3) until toe clamps firmly engage steering retainer assembly (14).

3. Connect solar panel leads (1) to W5 harness (2).

4-31. WIRING HARNESS CLAMP AND GROMMET INSTALLATION

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials

Locknut (6) semitrailer with incandescent lights
(8) semitrailer with LED lights
Locknut (4)
Lockwasher (54) semitrailer with incandescent lights
(50) semitrailer with LED lights
Nonmetallic grommet (2)
Nonmetallic grommet (2)
Nonmetallic grommet (1)

Equipment Condition

Gooseneck pneumatic lines removed from gladhands (para. 4-48)
Clearance light access cover removed from deflector (streetside or curbside, as applicable) (para. 4-68)

NOTE

The following procedures identify typical clamp and grommet installations for each lettered area identified on the locator illustration. At various locations, the clamps may also secure pneumatic lines or hydraulic lines with the wiring harness bundle. Perform the following procedures, or any portion of the procedures, as required to complete the necessary repair.

4-31. WIRING HARNESS CLAMP AND GROMMET INSTALLATION (CONT)

REMOVAL

1. Location A: Remove locknut (1) and loop clamp (2) from weld stud. Discard locknut.

1.1 Location AA: Remove locknut (1), loop clamp (1.1), and screw (1.2) from top of gooseneck. Discard locknut.

2. Location B: Remove screw (3), nut (4), lockwasher (5), and loop clamp (6) from platform. Discard lockwasher.

3. Location C: Remove nut (4), lockwasher (5), and loop clamp (6) from weld stud. Discard lockwasher.

4. Location D: Remove nut (4), lockwasher (5), and loop clamp (7) from weld stud. Discard lockwasher.

5. Location E: Remove nut (4), lockwasher (5), and loop clamp (8) from weld stud. Discard lockwasher.

NOTE

On some semitrailers, three loop clamps are replaced by three connector clips.

6. Location F: Remove three loop clamps (6), loop clamp (12), and grommet (13) as follows:

   a. Disconnect W2 harness leads to clearance and marker lights.

   b. Remove nut (4), lockwasher (5), and loop clamp (6) from weld stud. Discard lockwasher. Some semitrailers, remove four locknuts (4.1) and two connector clips (6.1) from weld studs. Discard locknuts.

   c. Remove screw (9), nut (4), lockwasher (5), and loop clamp (6) from deflector (10). Discard lockwasher.

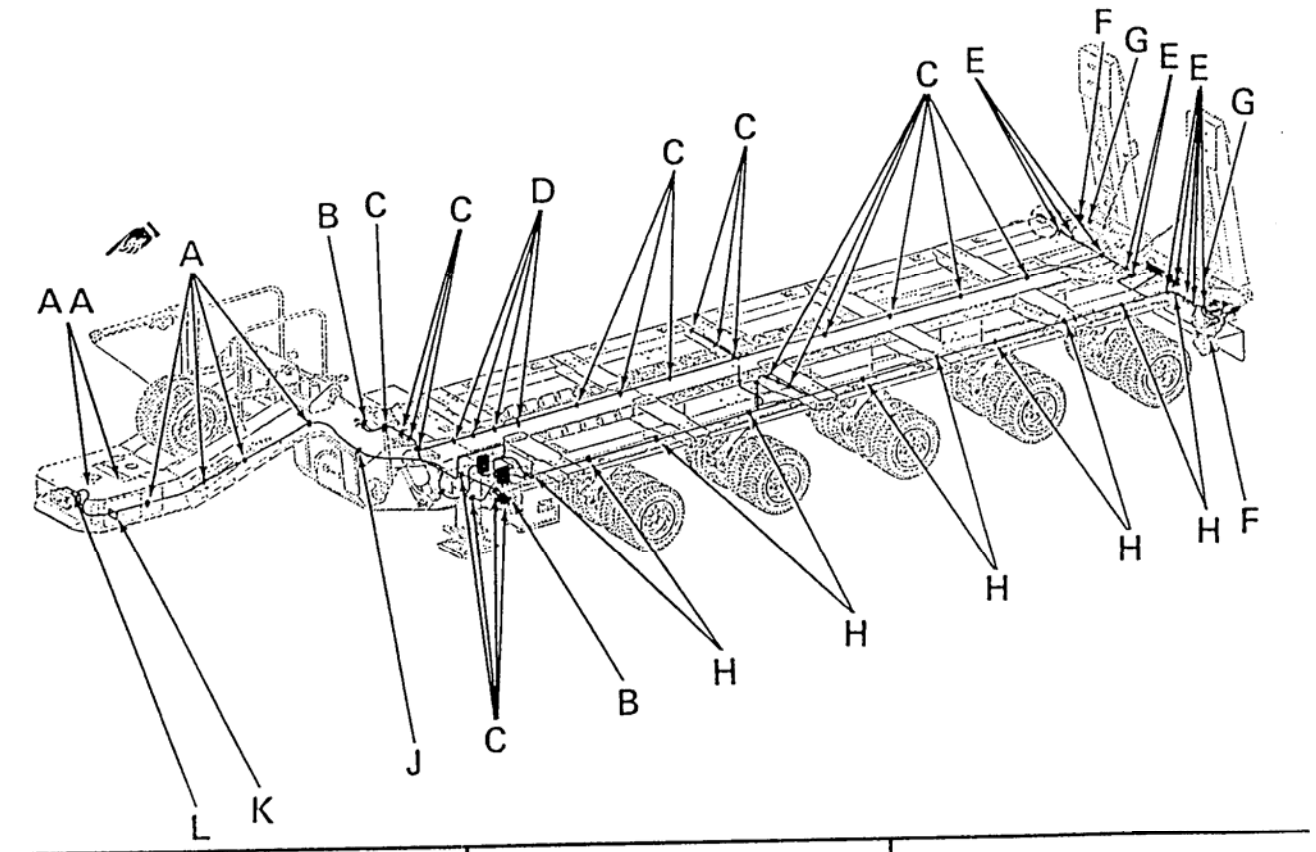
   d. Remove screw (11), nut (4), lockwasher (5), loop clamp (12), nut (4), lockwasher (5), and loop clamp (6) from deflector (10). Discard lockwashers. Some semitrailers, remove two screws (11), locknuts (4.1), and connector clip (6.1) from deflector (10). Discard lockwashers.

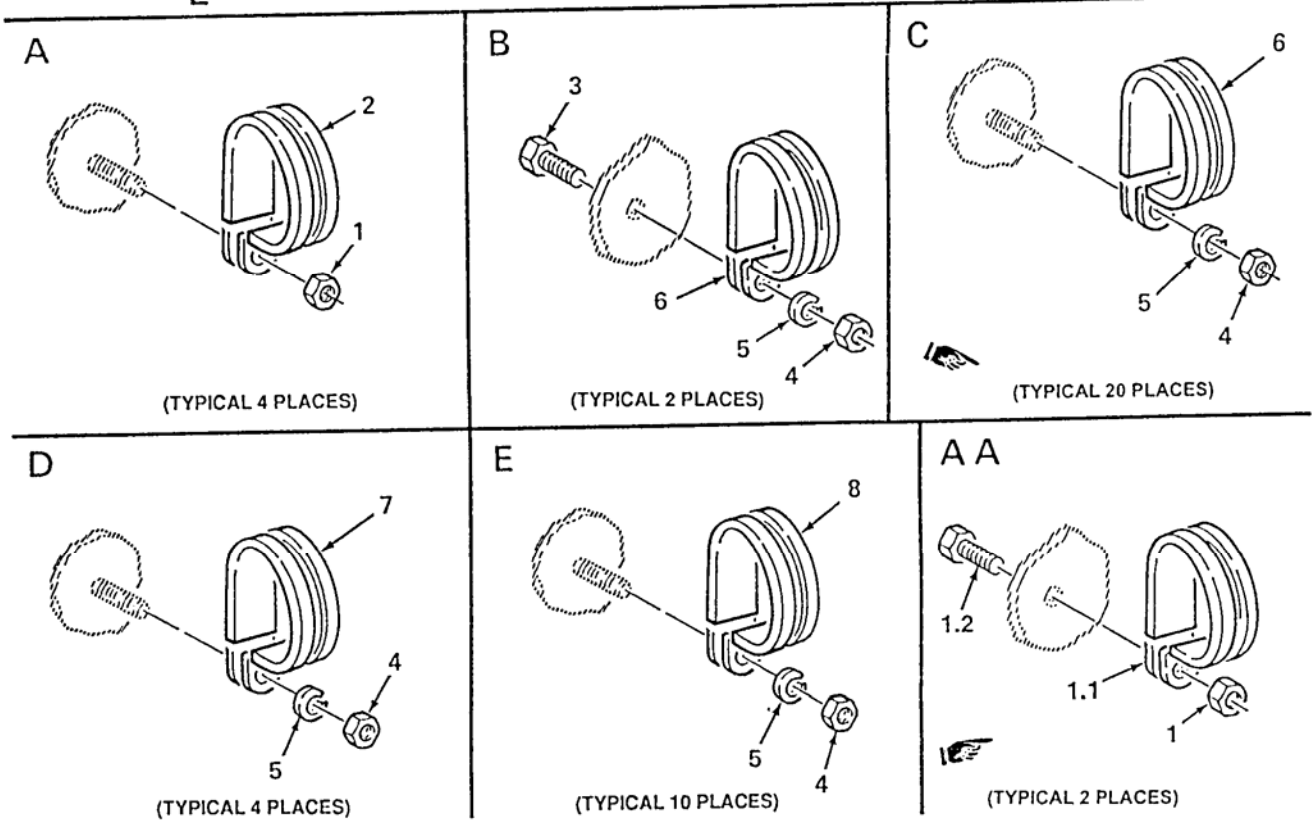
   e. Pull W2 harness leads through grommet (12) and remove grommet (13) and deflector (10). Discard grommet.

7. Location G: Remove locknut (14), screw (15), and loop clamp (16) from beavertail. Discard locknut.

8. Location H: Remove nut (4), lockwasher (5), and loop clamp (2) from weld stud. Discard lockwasher.

9. Location J: Remove locknut (1) and loop clamp (17) from weld stud. Discard locknut.


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L


A
2
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(TYPICAL 4 PLACES)
B
3
6
5
4
(TYPICAL 2 PLACES)
C
6
5
4
(TYPICAL 20 PLACES)
D
7
4
5
(TYPICAL 4 PLACES)
E
8
5
4
(TYPICAL 10 PLACES)
A A
1.2
1.1
1
(TYPICAL 2 PLACES)

4-31. WIRING HARNESS CLAMP AND GROMMET INSTALLATION (CONT)

CAUTION

During mounting plate removal, the air lines and W1 harness must be allowed to slide in the grommets or damage to equipment may result.

10. Location K: Remove mounting plate and grommets as follows:

    a. Remove four locknuts (18) and mounting plate (19) from weld studs. Discard locknuts.

    b. Loosen and slide two grommets (20) and grommet (21) forward along two air lines and W1 harness.

    c. Pull two grommets (20) and grommet (21) from two air lines and W1 harness. Discard grommets.

11. Location L: Remove locknut (1) and loop clamp (22) from gooseneck component assembly (23).

INSPECTION

1. Inspect loop clamps and connector clips (some semitrailers) for excessive wear, cracks, or other apparent damage. If any defects are found, replace as necessary.

2. Inspect all harnesses for chafing, cuts, breaks, or signs of excessive wear. If defects are found, refer to applicable paragraph and replace harness as required.

INSTALLATION

1. Location L: Install loop clamp (22) to gooseneck component assembly (23) and secure with locknut (1).

1.1. Location K: Install mounting plate and grommets as follows:

    a. Slide two grommets (20) and grommet (21) over two air lines and W1 harness.

    b. Slide grommets up to and install grommets in mounting plate (19), ensuring each grommet is secure to mounting plate.

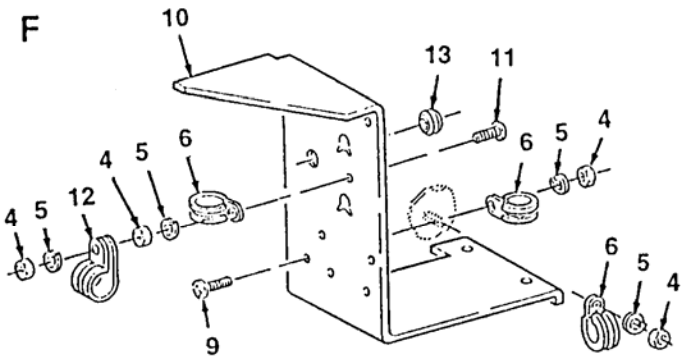
    c. Install mounting plate (19) onto weld studs and secure with four locknuts (18).

2. Location J: Install loop clamp (17) to weld stud and secure with locknut (1).

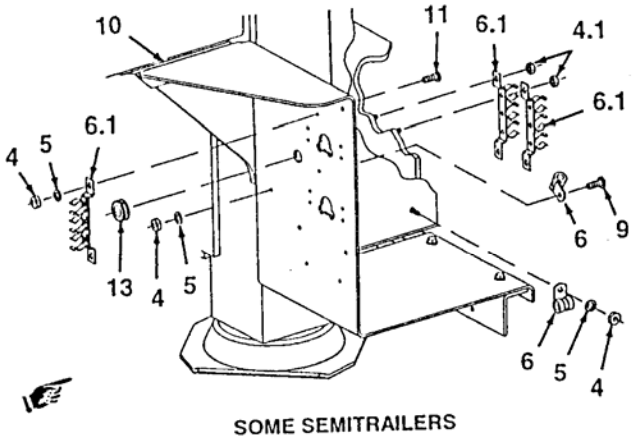
3. Location H: Install loop clamp (2) to weld stud and secure with lockwasher (5) and nut (4).

4. Location G: Install loop clamp (16) onto beavertail and secure with screw (15) and locknut (14).

F

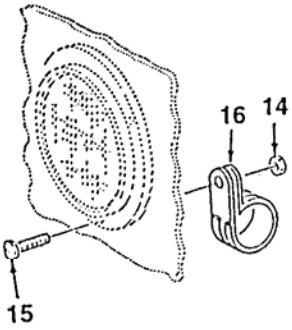


(STREETSIDE SHOWN)
(CURBSIDE OPPOSITE)



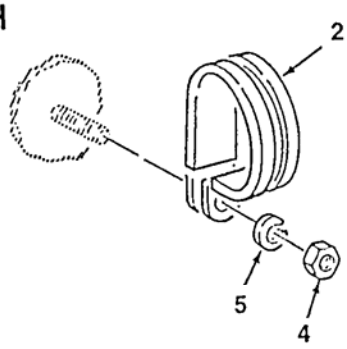
SOME SEMITRAILERS

G



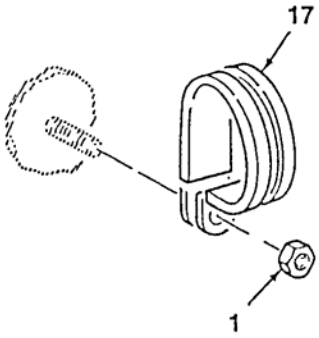
(TYPICAL 2 PLACES)

H

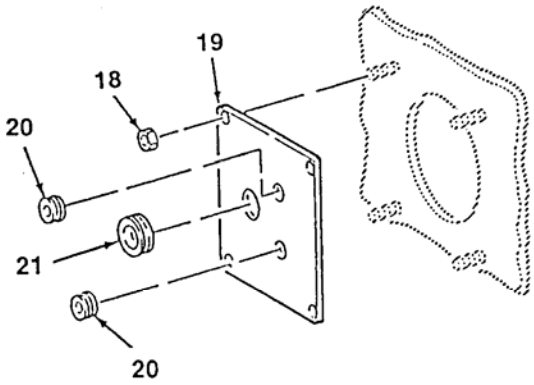


(TYPICAL 10 PLACES)

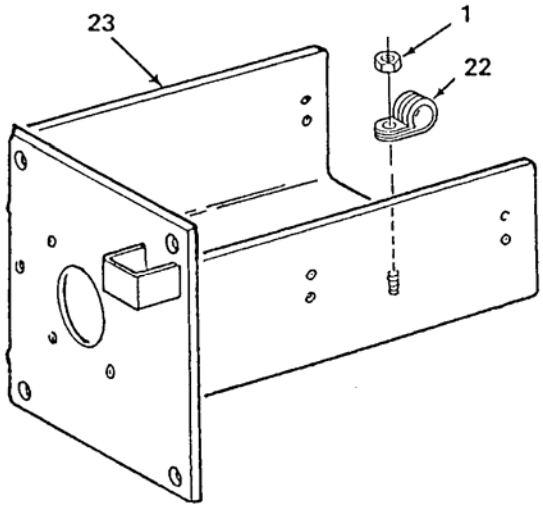
J



K



L



4-31. WIRING HARNESS CLAMP AND GROMMET INSTALLATION (CONT)

5. Location F: Install three loop clamps (6), loop clamp (12), and grommet (13) as follows:

   a. Install grommet (13) in deflector (10) and pull W2 harness leads through grommet.

   b. Position loop clamp (6) at proper mounting hole on deflector (10) and secure with screw (11), lockwasher (5), nut (4), loop clamp (12), lockwasher (5), and nut (4). Some semitrailers, position connector clip (6.1) at proper mounting holes on deflector (10) and secure with two screws (11) and locknuts (4.1).

   c. Position loop clamp (6) at proper mounting hole on deflector (10) and secure with screw (9), lockwasher (5), and nut (4).

   d. Install loop clamp (6) on weld stud and secure with lockwasher (5) and nut(4). Some semitrailers, install two connector clips (6.1) to four weld studs and secure with four locknuts (4.1).

   e. Reconnect W2 harness leads to clearance and marker lights.

   f. Install clearance light access cover to deflector (10) per paragraph 4-68.

6. Location E: Install loop clamp (8) on weld stud and secure with lockwasher (5) and nut (4).

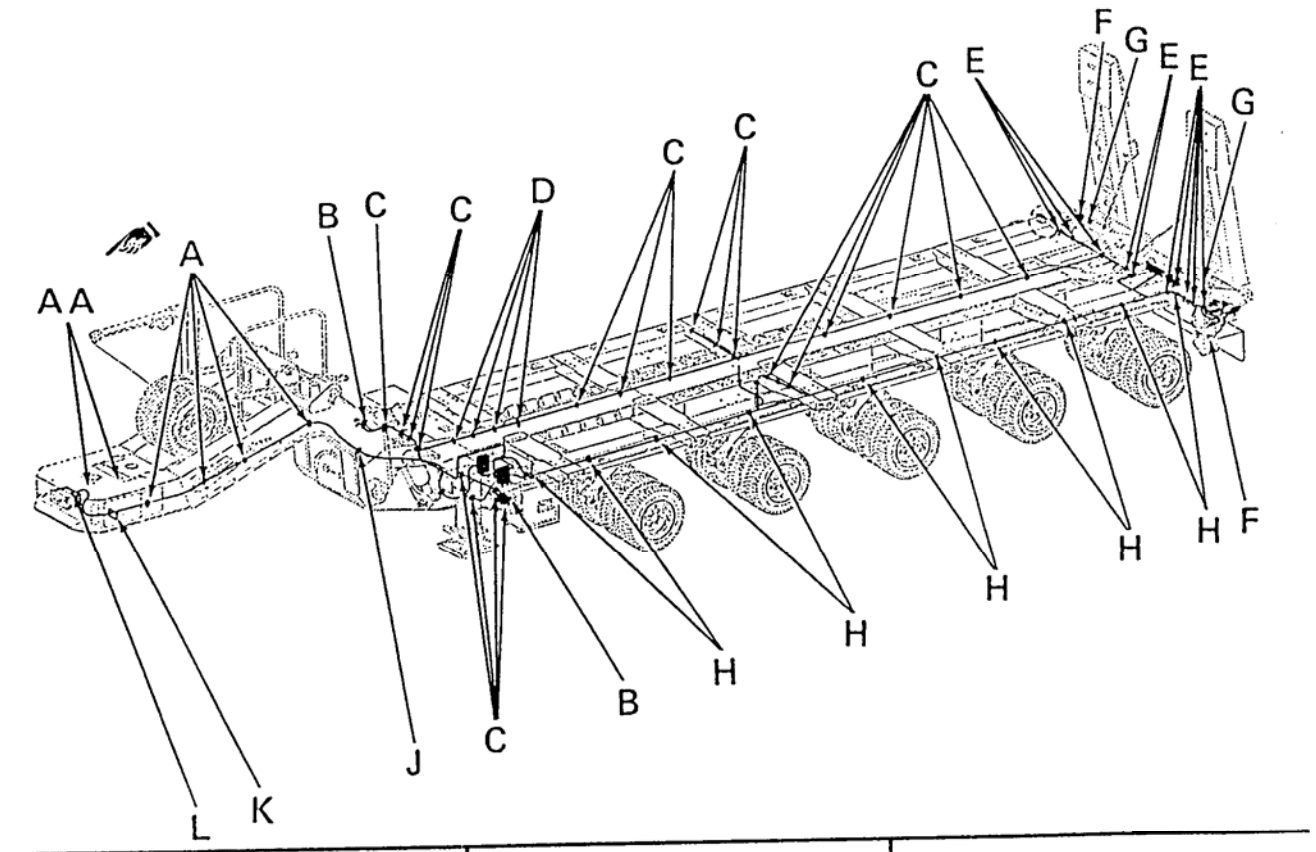
7. Location D: Install loop clamp (7) on weld stud and secure with lockwasher (5) and nut (4).

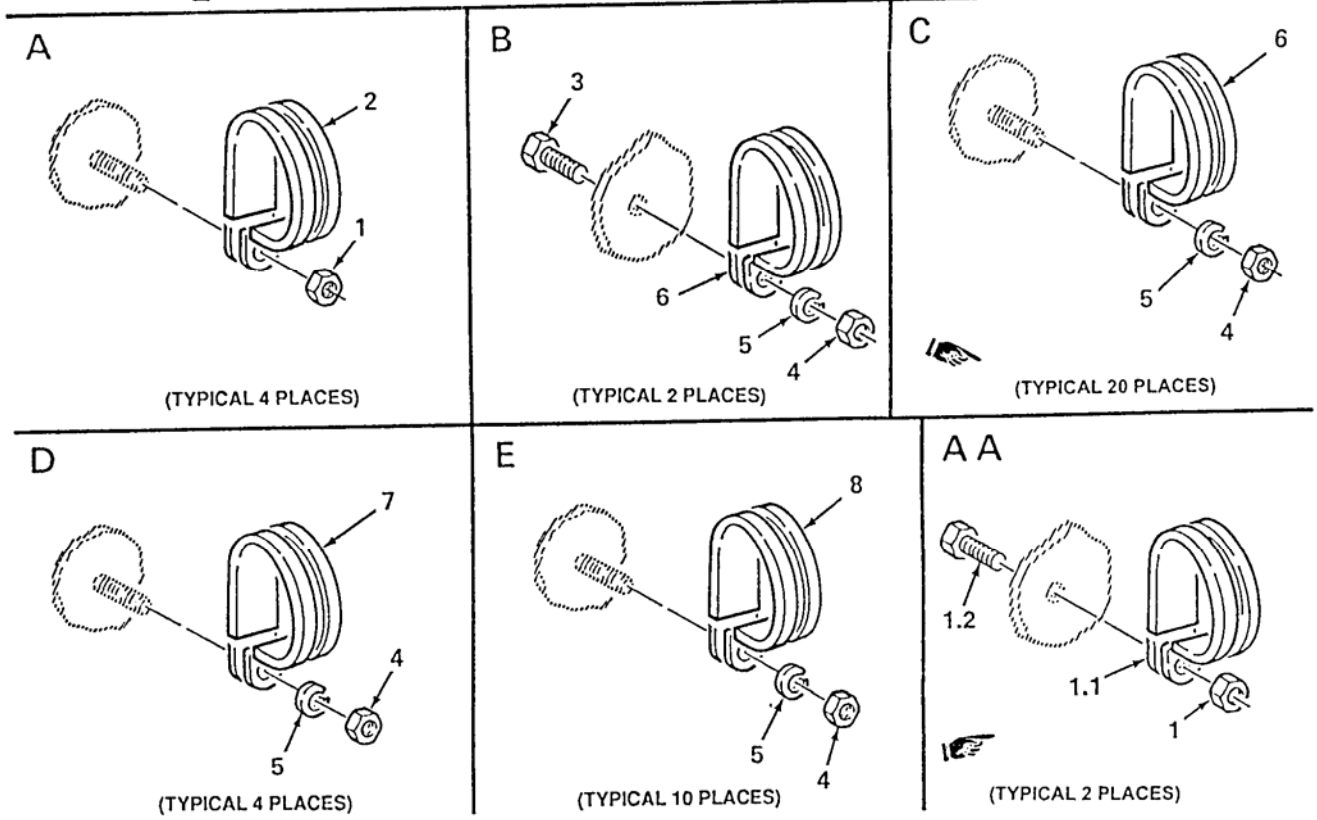
8. Location C: Install loop clamp (6) on weld stud and secure with lockwasher (5) and nut (4).

9. Location B: Position loop clamp (6) on platform and secure with screw (3), lockwasher (5), and nut (4).

10. Location A: Install loop clamp (2) on weld stud and secure with locknut (1).

11. Location AA: Install loop clamp (1.1) on top of gooseneck and secure with screw (1.2) and locknut (1).


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(TYPICAL 2 PLACES)

4-32. APU CONTROL BOX JUMPER WIRES AND TIMER HARNESS

This task covers: a. Removal c. Repair
b. Inspection d. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 2, item 18, appx. B:
Digital multimeter
Electrical repair kit
Extension light, 24 ft
Measuring tape
Soldering torch kit

Materials

Lockwasher (4)
Electrical insulation sleeving, item 22, appx. E

Equipment Condition

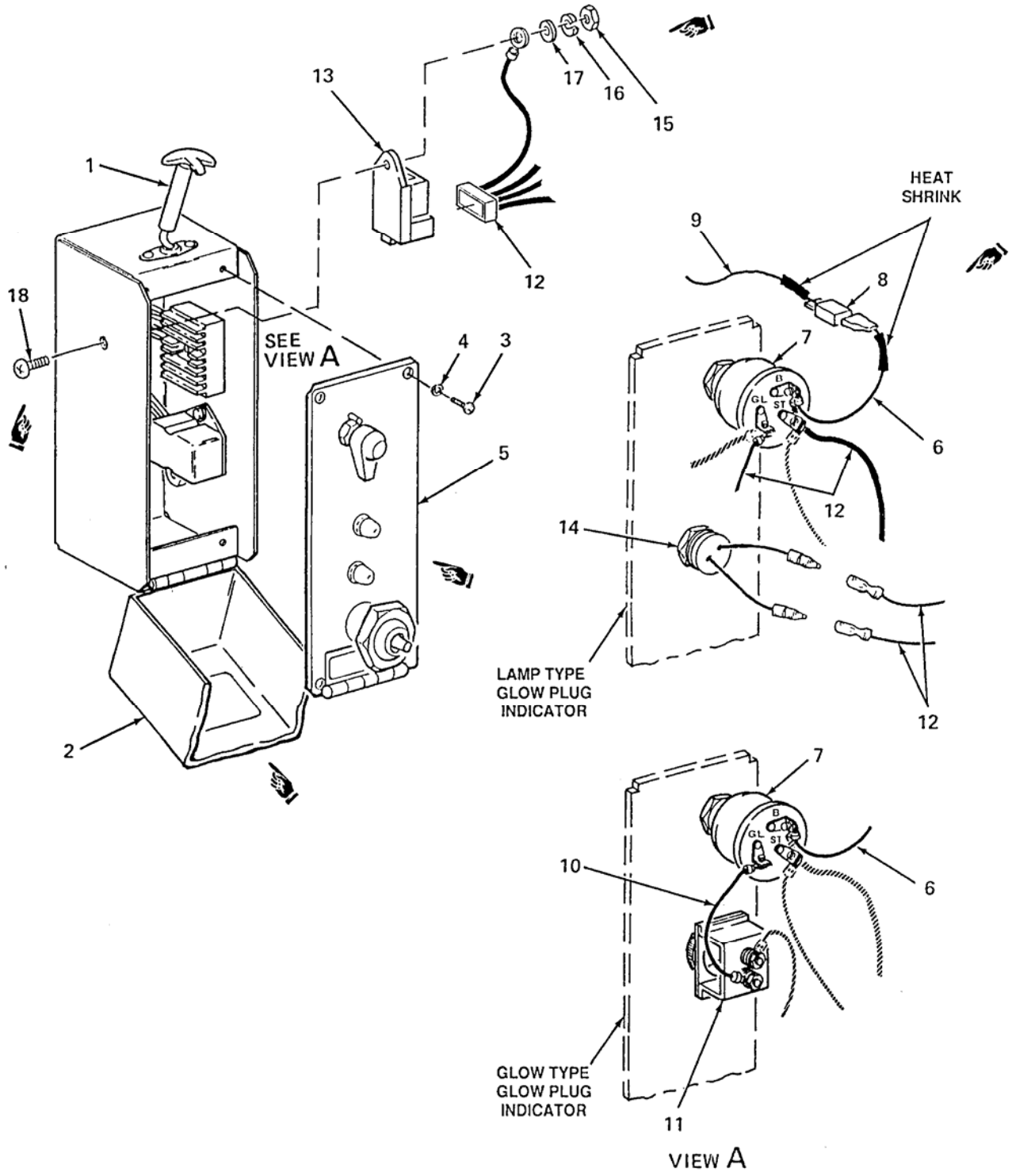
Negative lead from battery disconnected (para. 4-30).

REMOVAL

NOTE

On APU with APU engine serial number 504697 and subsequent, the glow plug indicator is changed from a glow-type indicator to a lamp driven by a timer.

1. Open cover to APU control box by lifting up retainer (1) and lowering cover weldment (2).
2. Remove four screws (3), lockwashers (4), and access plate (5) from APU control box. Discard lockwashers.
3. Using APU electrical schematic (figure FO-4) as a guide, tag and disconnect jumper wire (6) from starter switch (7) terminal B.
4. Cut existing heat shrink tubing and disconnect diode (8) from jumper wire (6) and APU wiring harness (9).
5. On glow-type glow plug indicator only, tag and disconnect jumper wire (10) from starter switch (7) terminal GL and glow plug indicator (11).
6. On lamp-type glow plug indicator, unplug timer harness connector (12) from timer (13). Unplug timer harness wires (12) from glow plug indicator (14).
7. Using APU electrical schematic (figure FO-4) as a guide, tag and disconnect timer harness wires (12) from starter switch (7) terminals GL and ST.


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15
16
17
18
SEE VIEW A
HEAT SHRINK
LAMP TYPE GLOW PLUG INDICATOR
GLOW TYPE GLOW PLUG INDICATOR
B
GL
ST
VIEW A

4-32 APU CONTROL BOX JUMPER WIRES AND TIMER HARNESS (CONT)

8. Remove one nut (15), lockwasher (16), and washer (17) and remove timer harness (12).

INSPECTION

1. Inspect APU control box jumper wires for missing or unreadable wire markers. If defective, apply new markings or replace wire markers. Use APU electrical schematic (figure FO-4) as a guide for proper wire markings.

2. Inspect APU control box jumper wires and timer harness for frayed or broken wires and loose terminal lugs. If defects exist, use electrical repair kit and replace defective terminal lugs, jumper wire assembly, or timer harness.

3. Using an ohmmeter, check resistance of diode in both directions. If diode fails resistance check, replace diode.

REPAIR

1. Refer to appendix F and, using electrical repair kit and measuring tape, fabricate new APU control box jumper wires as required.

2. Using wire stripper, strip wires to designated length to allow for terminals to be installed.

3. Using electrical repair kit, crimp terminal lugs onto fabricated jumper wires as required.

INSTALLATION

NOTE

On APU with APU engine serial number 504697 and subsequent, the glow plug indicator is changed from a glow-type indicator to a lamp driven by a timer.

1. On lamp-type glow plug indicator, install ground wire on timer harness (12) and secure using screw (18), timer (13), washer (17), lockwasher (16), and nut (15).

2. Plug timer harness (12) into timer (13).

3. Using APU electrical schematic (figure FO-4) as a guide, connect tagged timer harness wires (12) to starter switch (7) terminals GL and ST.

4. Plug timer harness wires (12) to glow plug indicator (14) wires.

5. Slide a 3-inch (7.6 cm) piece of heat shrink tubing over quick-disconnect plug on APU wiring harness (9).

6. Using APU electrical schematic (figure FO-4) as a guide, reconnect diode (8) to jumper wire (6). Reconnect jumper wire (6) to starter switch (7) terminal B.

7. Reconnect open end of diode (8) to existing APU harness wire (9).

8. Slide heat shrink tubing over both quick-disconnect plugs and diode (8). Using soldering torch kit, shrink heat shrink tubing over quick-disconnect plugs and diode.

9. On glow-plug type indicator, Refer to APU electrical schematic figure FO-4 and reconnect jumper wire (10) to glow plug indicator (11) and starter switch (7) terminal GL.

10. Aline and install access plate (5) to APU control box and secure with four screws (3) and lockwashers (4).

11. Raise cover weldment (2) and secure to APU control box by rehooking retainer (1).

FOLLOW-ON MAINTENANCE

Perform APU starting and check glow plug indicator for proper operation (para. 2-16).

4-33. HYDRAULIC CONTROL MODULE JUMPER WIRES

This task covers: a. Removal c. Repair
b. Inspection d. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 2, item 18, appx. B:

Digital multimeter	Soldering gun
Electrical repair kit	Creeper, mechanics
Extension light, 24 ft	Soldering torch kit
Measuring tape	

Materials

Lockwasher (4)
Lockwasher
Electrical insulation sleeving, item 22, appx. E
Solder, item 24, appx. E

Personnel Required: 2

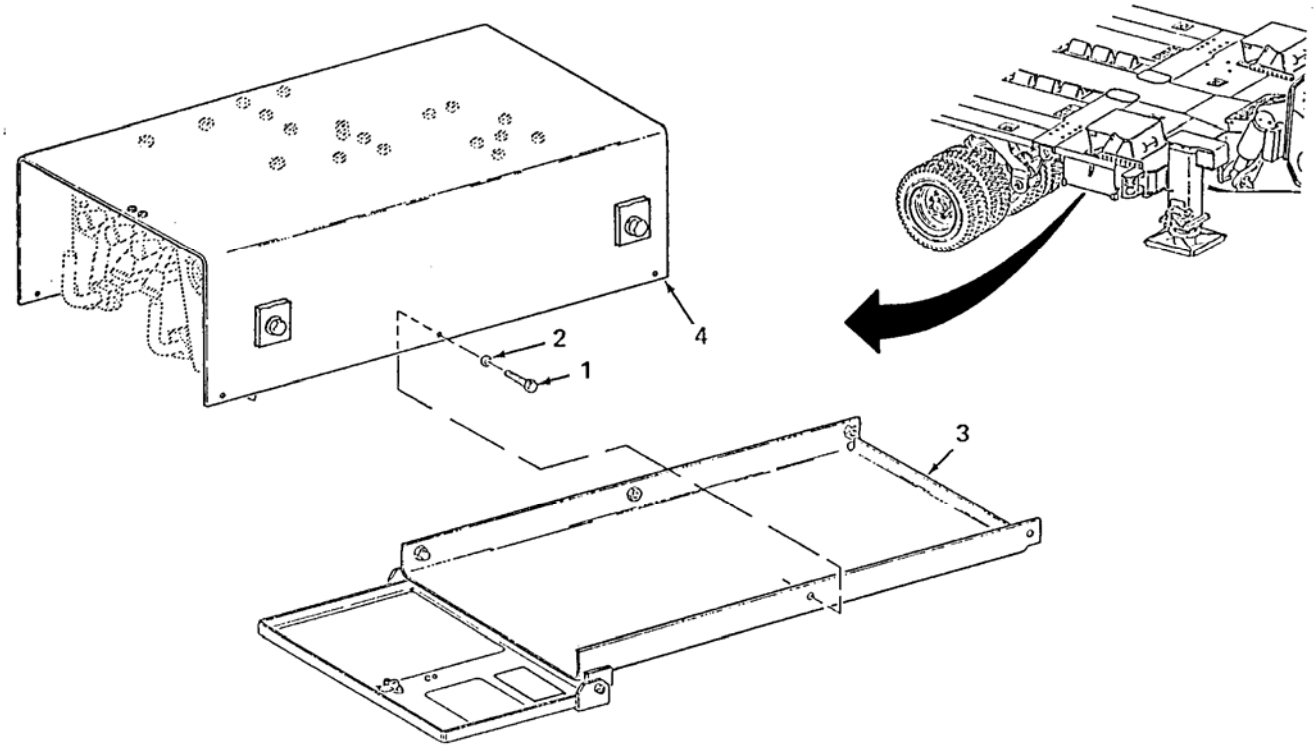
Equipment Condition

Intervehicular cables disconnected, wheels chocked, and front and rear support legs lowered supporting platform (para. 2-24)

4-33. HYDRAULIC CONTROL MODULE JUMPER WIRES (CONT)

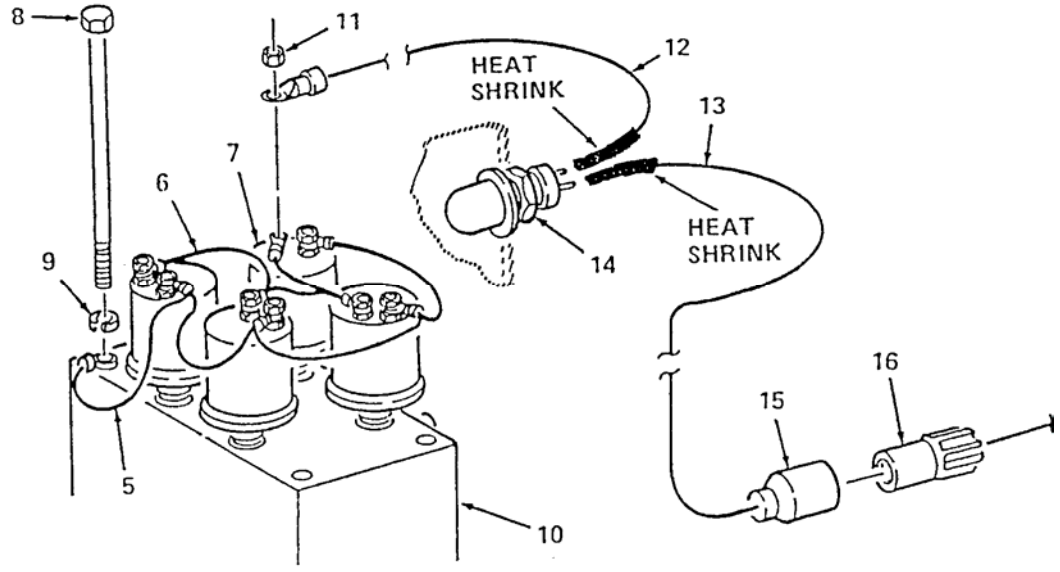
REMOVAL

1. Make sure hydraulic control module door panel is lowered (para. 2-5).



2. Using two people, remove six capscrews (1), lockwashers (2), and lower panel (3) from hydraulic control module (4). Carefully remove lower panel (3), with panel door attached, out from under semitrailer and place on platform. Discard lockwashers.

3. Refer to electrical schematic figure FO-1 and tag and disconnect jumper wires (5 and 6) from four pressure switches (7).



4-33. HYDRAULIC CONTROL MODULE JUMPER WIRES (CONT)

4. Remove screw (8) and lockwasher (9) and remove wire (5) from steering control manifold (10). Discard lockwasher.

5. Remove nut (11) and tag and disconnect wire (12) from pressure switch (7).

WARNING

Soldering fumes are toxic. Avoid breathing these fumes. Work in a well-ventilated area or injury to personnel may result.

CAUTION

Rosin core solder contains flux which is corrosive. All soldered connections must be cleaned of all flux residue or damage to equipment may result.

6. Using a soldering gun, unsolder wires (12 and 13) from steering pressure indicator light (14).

7. Refer to electrical schematic figure FO-1 and tag and disconnect socket connector (15) from W3 harness (16).

INSPECTION

1. Inspect hydraulic control module jumper wires for missing or unreadable wire markers. If defective, apply new markings or replace wire markers. Use electrical schematic figure FO-1 for proper wire markings.

2. Inspect hydraulic control module jumper wires for frayed or broken wires and loose terminal lugs. If defects exist, use electrical repair kit and replace defective terminal lugs or entire jumper wire assembly.

REPAIR

1. Refer to appendix F and, using electrical repair kit and measuring tape, fabricate new hydraulic control module jumper wires as required.

2. Using wire stripper, strip wires to designated length to allow for terminals to be installed.

3. Using electrical repair kit, crimp terminal lugs onto fabricated jumper wires as required.

INSTALLATION

1. Aline ground lead of jumper wire (5) with steering control manifold (10) and secure in place by loosely installing lockwasher (9) and screw (8).

2. Refer to electrical schematic figure FO-1 and reconnect wire (12) to pressure switch (7) and secure with nut (11).

WARNING

Soldering fumes are toxic. Avoid breathing these fumes. Work in a well-ventilated area or injury to personnel may result.

CAUTION

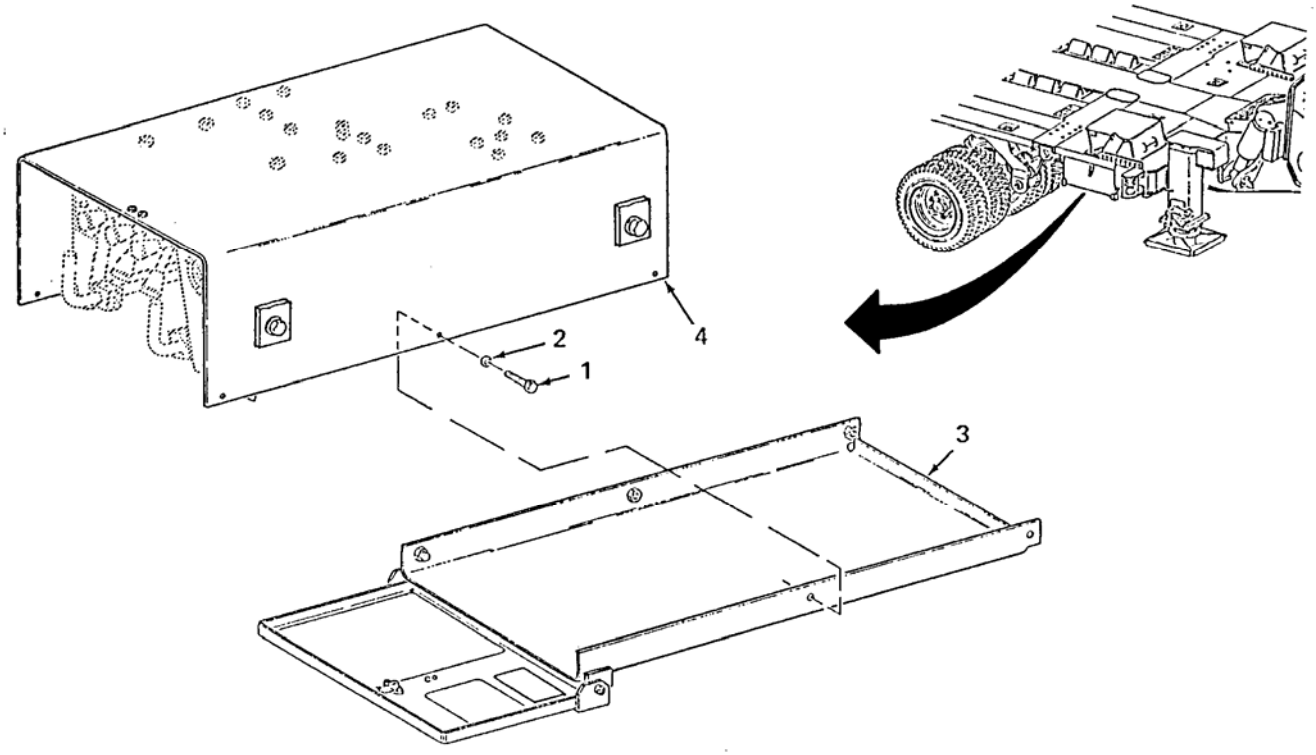
Rosin core solder contains flux which is corrosive. All soldered connections must be cleaned of all flux residue or damage to equipment may result.

3. Install heat shrink insulation over wires (12 and 13). Refer to electrical schematic figure FO-1 and use soldering gun to solder wires (12 and 13) to steering pressure indicator light (14). Use soldering torch kit and shrink heat shrink tubing onto soldered joints.

4. Refer to electrical schematic figure FO-1 and connect socket connector (15) to W3 harness (16).

5. Refer to electrical schematic figure FO-1 and reconnect both jumper wires (5 and 6) to four pressure switches (7). Tighten screw (8).

6. Using two people, carefully position lower panel (3), with panel door attached, over hydraulic control module (4) on underside of semitrailer. Secure with six lockwashers (2) and capscrews (1).



7. Raise hydraulic control module door panel (para. 2-5).

4-33. HYDRAULIC CONTROL MODULE JUMPER WIRES (CONT)

FOLLOW-ON MAINTENANCE

1. Start APU (para. 2-16).

2. Connect intervehicular cables and turn on semitrailer running lights and check steering pressure indicator light for proper operation (para. 2-24).

4-34. JUNCTION BOX JUMPER WIRES

This task covers: a. Removal c. Repair
b. Inspection d. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 2, item 18, appx. B:

Electrical repair kit	Measuring tape
Extension light, 24 ft	Creeper, mechanics

Materials

Dry cleaning solvent, item 26, appx. E

Equipment Condition

Intervehicular cables disconnected, wheels chocked, and front and rear support legs lowered supporting platform (para. 2-24)

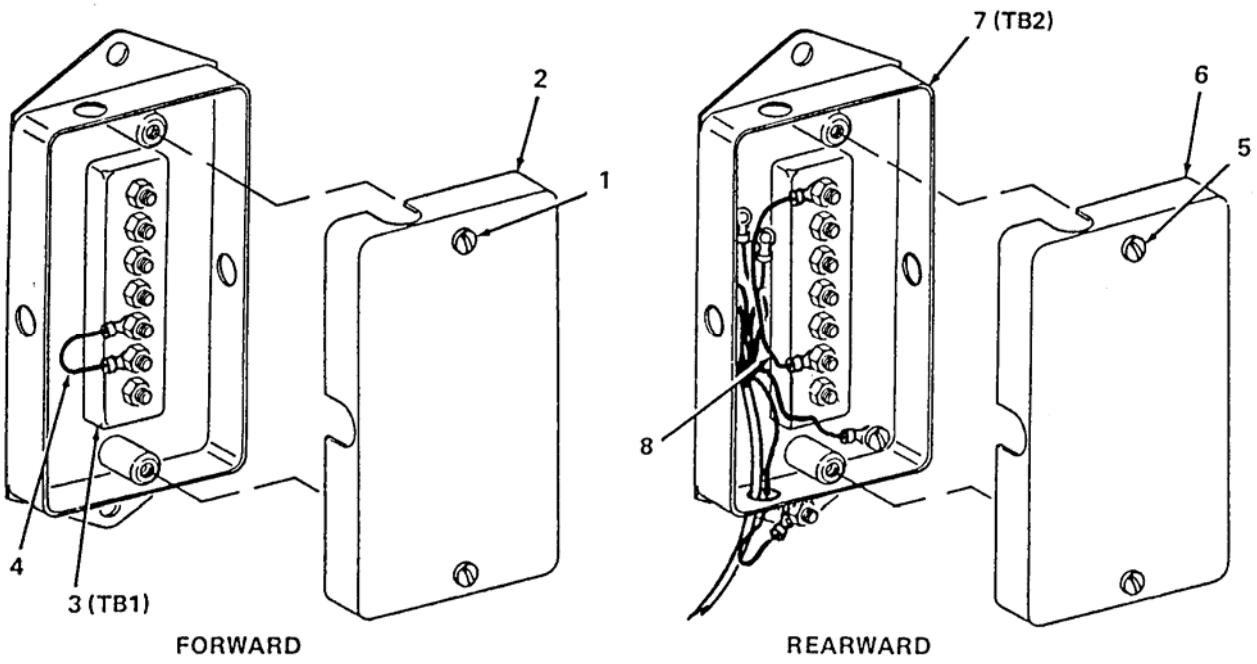
REMOVAL

1. Unscrew two captive screws (1) and access cover (2) from junction box TB1 (3).

2. Refer to electrical schematic figure FO-1 and tag and disconnect jumper wire (4) from junction box TB1 (3) terminals TB1-YEL and TB1-BLK.

3. Unscrew two captive screws (5) and remove access cover (6) from junction box TB2 (7).

4. Refer to electrical schematic figure FO-1 and tag and disconnect jumper wire (8) from junction box TB2 (7) terminals TB2-BLU and TB2-BLK.



INSPECTION

1. Inspect junction box jumper wires for missing or unreadable wire markers. If defective, apply new markings or replace wire markers. Use semitrailer electrical schematic (figure FO-1) as a guide for proper wire markings.

2. Inspect junction box jumper wires for frayed or broken wires and loose terminal lugs. If defects exist, use electrical repair kit and replace defective terminal lugs or entire jumper wire assembly.

WARNING

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

3. Inspect terminal boards TB1 and TB2 for missing screws, breaks, cracks, excessive corrosion. If corroded, clean using dry cleaning solvent as required. If defective, replace as required.

REPAIR

1. Refer to appendix F and, using electrical repair kit and measuring tape, fabricate new junction box jumper wires as required.

2. Using wire stripper, strip wires to designated length to allow for terminals to be installed.

3. Using electrical repair kit, crimp terminal lugs onto fabricated jumper wires as required.

4-34. JUNCTION BOX JUMPER WIRES (CONT)

INSTALLATION

1. Refer to electrical schematic figure FO-1 and reconnect jumper wire (8) to junction box TB2 (7) terminals TB2-BLU and TB2-BLK.

2. Install access cover (6) to junction box TB2 (7) and secure with two captive screws (5).

3. Refer to electrical schematic figure FO-1 and reconnect jumper wire (4) to junction box TB1 (3) terminals TB1-YEL and TB1-BLK.

4. Install access cover (2) to junction box TB1 (3) and secure with two captive screws (1).

FOLLOW-ON MAINTENANCE

1. Start APU (para. 2-16).

2. Connect intervehicular cables and turn on semitrailer running lights and check semitrailer running lights and blackout lights for proper operation (para. 2-24).

4-35. W1 HARNESS

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Electrical repair kit, item 18, appx. B
Creeper, mechanics, item 18, appx. B
Extension light, 24 ft, item 18, appx. B

Materials/Parts

Wiping rag, item 19, appx. E
Electrical tape, item 28, appx. E
Tiedown straps (as required), item 27, appx. E
Lockwasher

Equipment Condition

Gooseneck component assembly removed and W1 harness disconnected from gooseneck component assembly terminal boards TB1 and TB2 (para. 4-22)
Platform adjusted to 50 inch (127 cm) height (para. 2-19)
Suspension isolation valves located at four corners of platform isolated (closed) (para. 2-6)

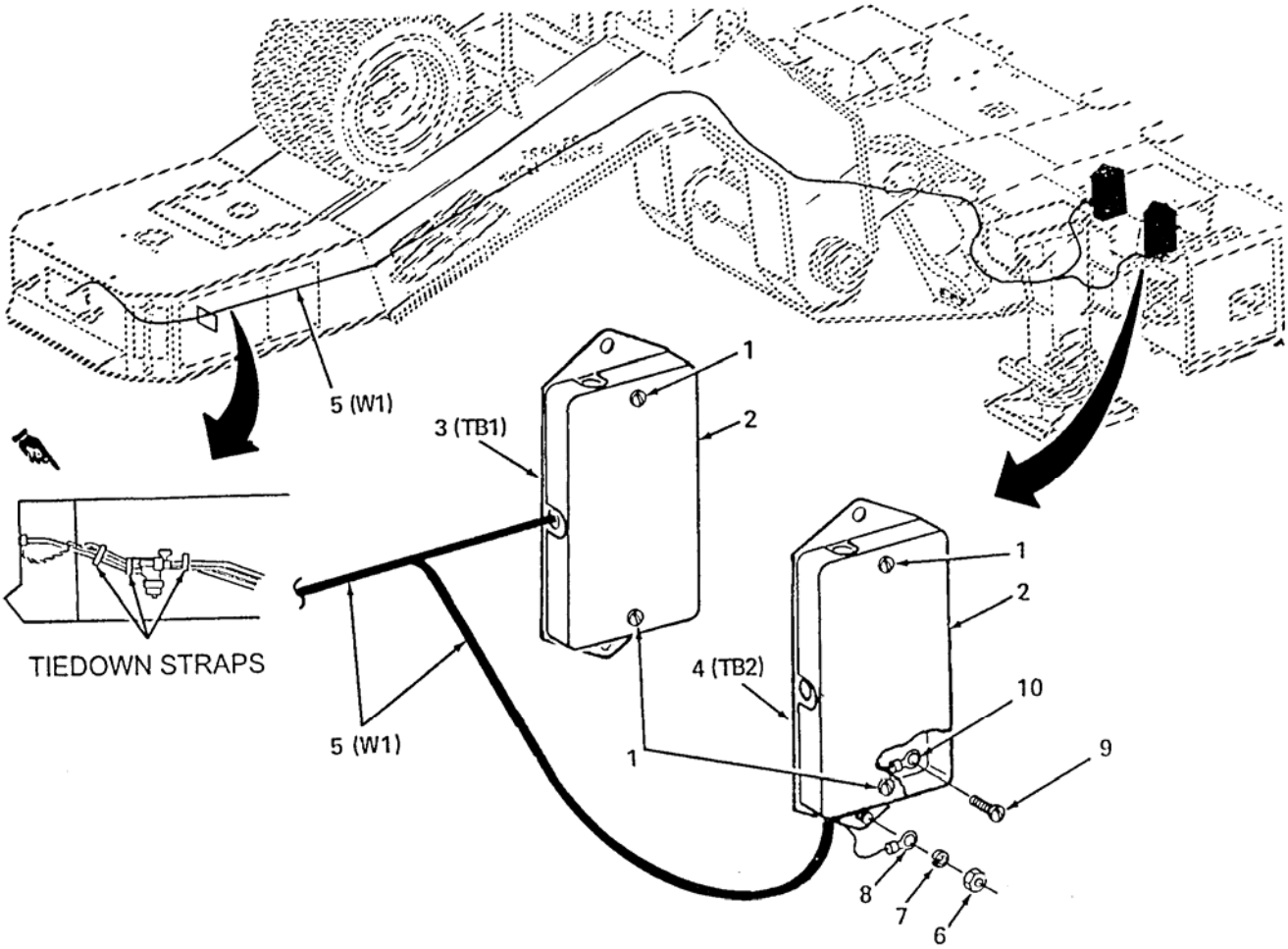
REMOVAL

1. Unscrew four captive screws (1) and remove two covers (2) from junction boxes TB1 (3) and TB2 (4).

2. Refer to electrical schematic figure FO-1 and tag and disconnect W1 harness (5) from platform junction box terminal boards TB1 (3) and TB2 (4).

3. Remove nut (6) and lockwasher (7) from junction box TB2 (4) mounting stud and remove white ground lead (8) of W1 harness (5). Discard lockwasher.

4. Remove screw (9) securing white/blue ground lead (10) of W1 harness (5).



4-35. W1 HARNESS (CONT)

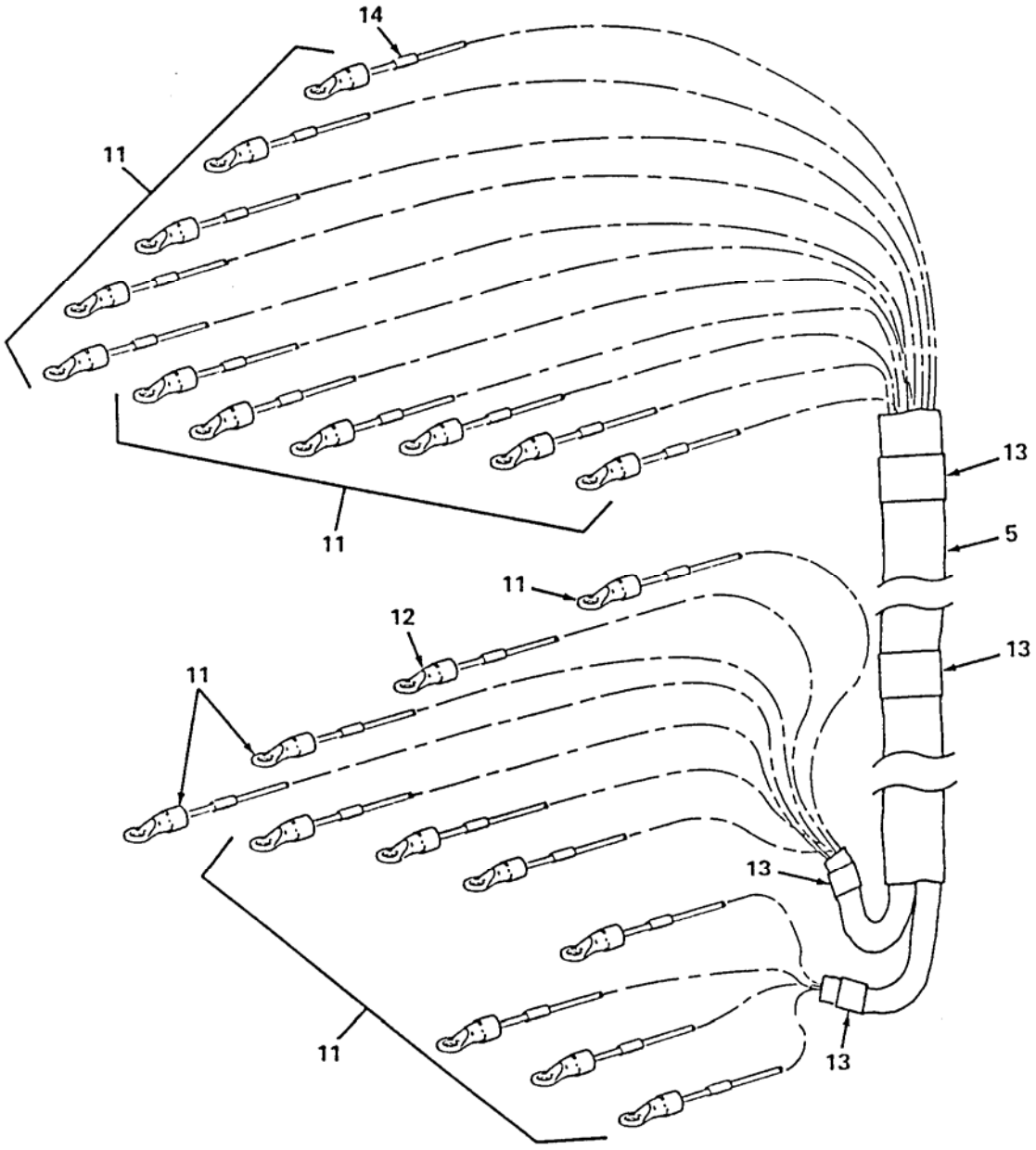
5. Cut and remove tiedown straps from W1 harness (5) as required. Discard tiedown straps.

6. Remove all loop clamps from W1 harness (5) (para. 4-31).

7. Remove W1 harness (5) from semitrailer.

INSPECTION

1. Inspect terminal lugs (11 and 12) for looseness. Clean as required by wiping with a wiping rag. If loose, use electrical repair kit and remove and replace terminal lugs as required.



2. Inspect loom for breaks, cracks, and damage. If defective, replace loom portions as required. Use electrical tape at split end of loom as required.

3. Inspect for missing or unreadable harness and wire markers (13 and 14). If defective, apply new markings or replace markers. Refer to electrical schematic figure FO-1 for proper wire markings.

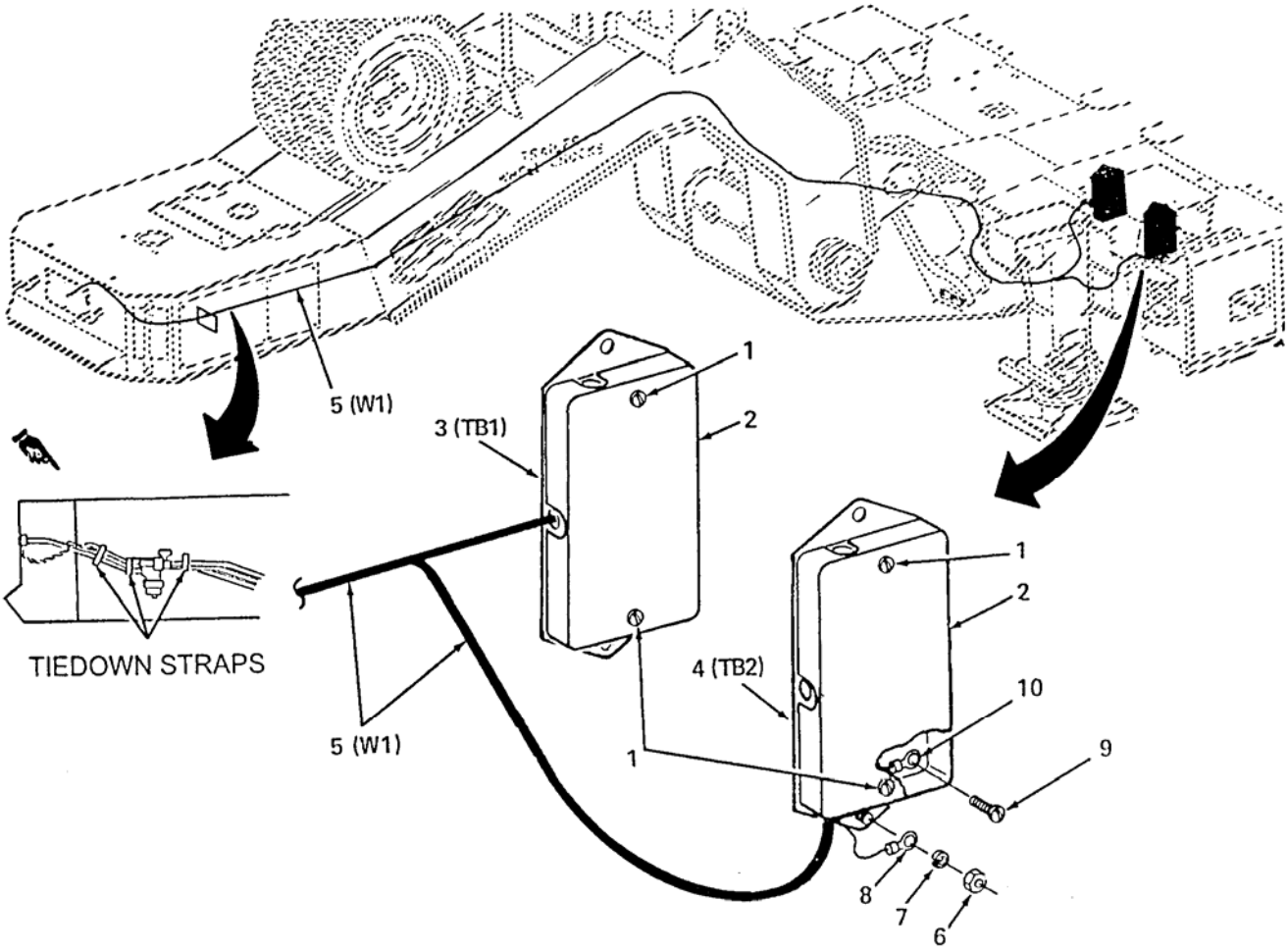
INSTALLATION

NOTE

Pull W1 harness out approximately 12 inches (30 cm) past front of gooseneck prior to securing the cable clamps.

Tiedown straps should be placed approximately as shown to secure wiring harness to air lines near the air filter. Additional tiedown straps may be installed as required.

1. Install W1 harness (5) onto gooseneck and platform.



4-35. W1 HARNESS (CONT)

2. Refer to electrical schematic figure FO-1 and reconnect W1 harness (5) to platform junction box terminal boards TB1 (3) and TB2 (4).

3. Attach white/blue ground lead (10) of W1 harness (5) to junction box TB2 (4) using screw (9).

4. Attach white ground lead (8) of W1 harness (5) to junction box TB2 (4) mounting stud with lockwasher (7) and nut (6).

5. Reinstall new tiedown straps as required.

6. Secure harness in place by installing harness back into loop clamps (para. 4-31).

7. Install two covers (2) and secure with four captive screws (1).

FOLLOW-ON MAINTENANCE

Connect intervehicular cables and check all lights on semitrailer for proper operation (para. 2-24).

4-36. W2 HARNESS

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Electrical repair kit, item 18, appx. B
Extension light, 24 ft, item 18, appx. B
Creeper, mechanics, item 18, appx. B

Materials/Parts

Wiping rag, item 19, appx. E
Electrical tape, item 28, appx. E
Tiedown straps (as required), item 27, appx. E

Equipment Condition

Intervehicular cable disconnected (para. 2-24)
Platform adjusted to 50 inch (127 cm) height (para. 2-19)
Suspension isolation valves located at four corners of platform isolated (closed) (para. 2-6)

REMOVAL

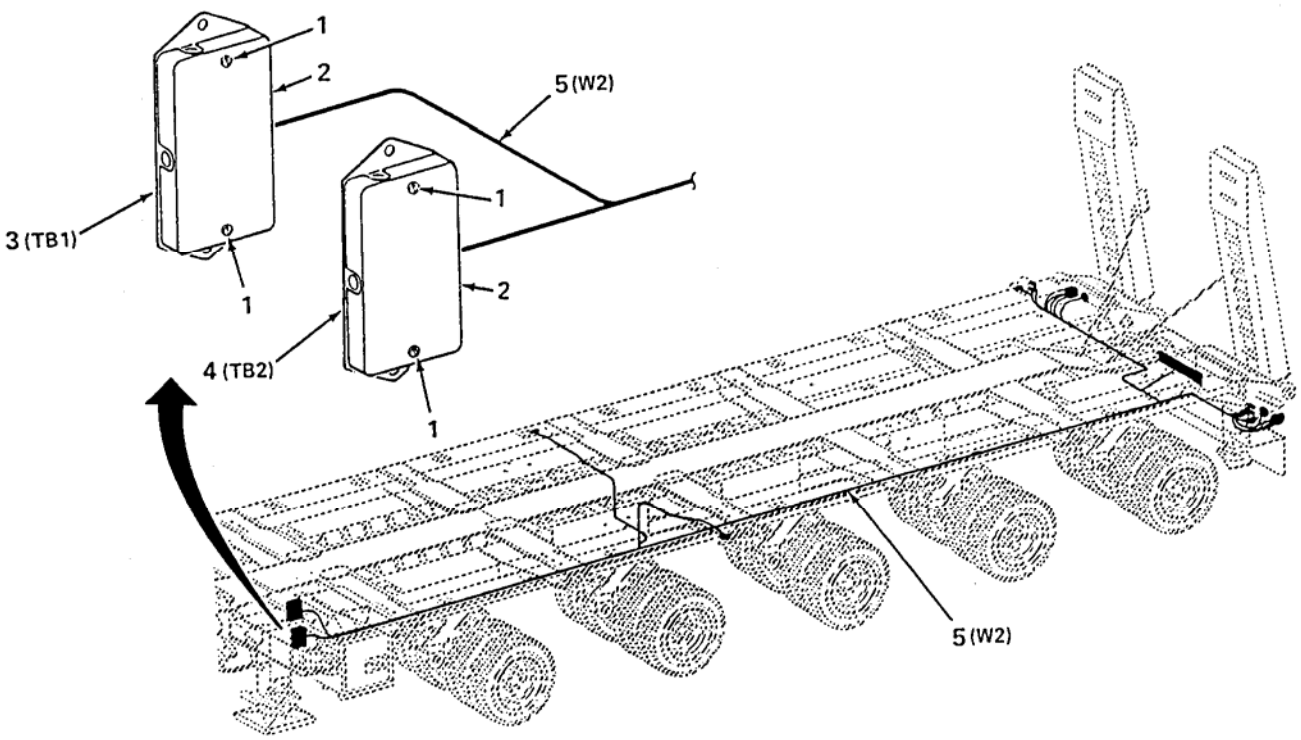
1. Unscrew four captive screws (1) and remove two covers (2) to junction boxes TB1 (3) and TB2 (4).

2. Refer to electrical schematic figure FO-1 and tag and disconnect W2 harness (5) from platform junction box terminal boards TB1 (3) and TB2 (4).

3. Cut and remove tiedown straps from W2 harness (5) as required. Discard tiedown straps.

4. Remove all loop clamps from W2 harness (5) (para. 4-31).

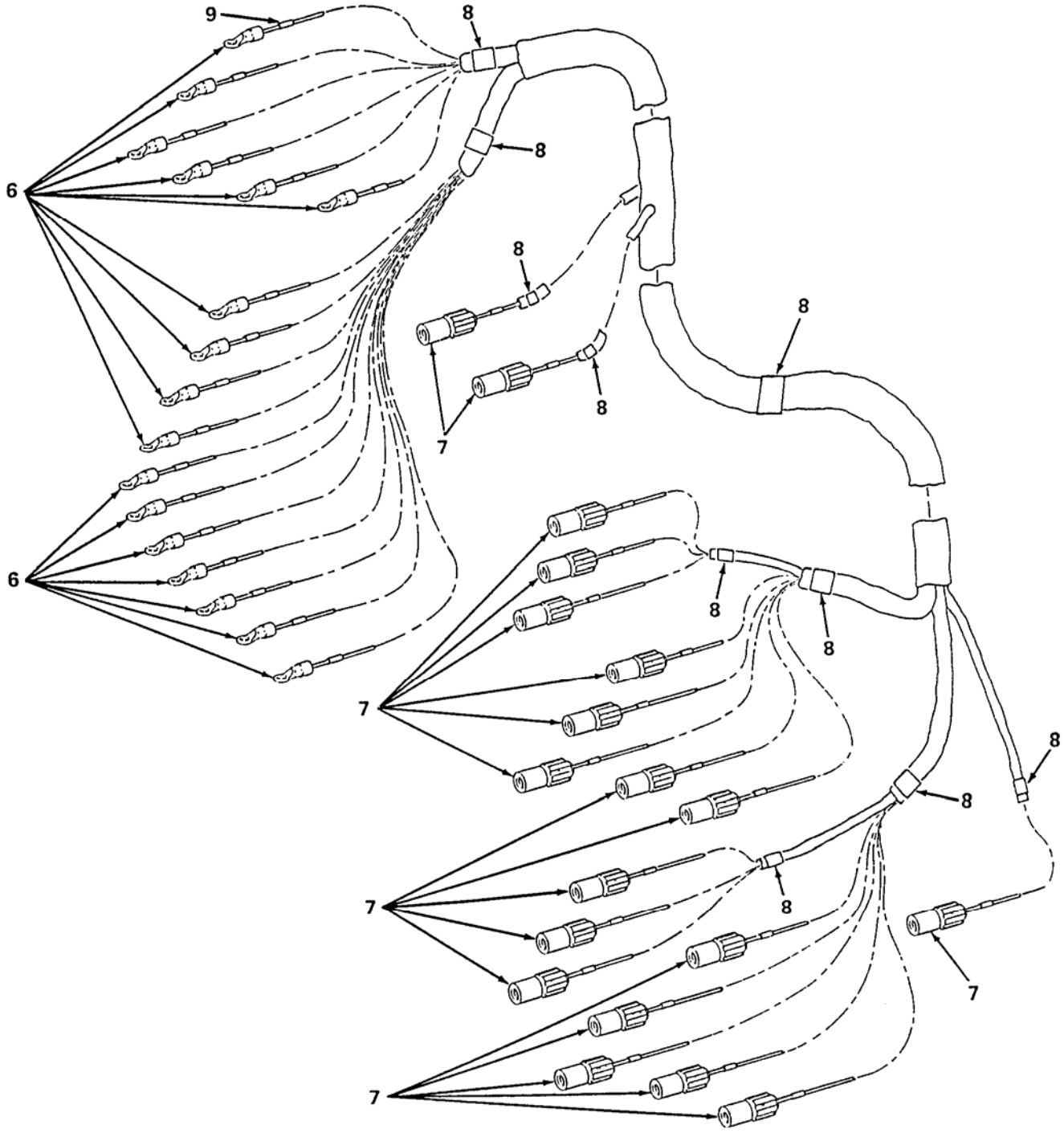
5. Remove W2 harness (5) from semitrailer.



4-36. W2 HARNESS (CONT)

INSPECTION

1. Inspect terminal lugs (6) and electrical plug connectors (7) for looseness. Clean as required by wiping with a wiping rag. If loose or defective, apply new markings and, using electrical repair kit, replace terminal lugs and/or electrical plug connectors.



2. Inspect loom for breaks, cracks, and damage. If defective, replace loom portions as required. Use electrical tape at split ends of loom as required.

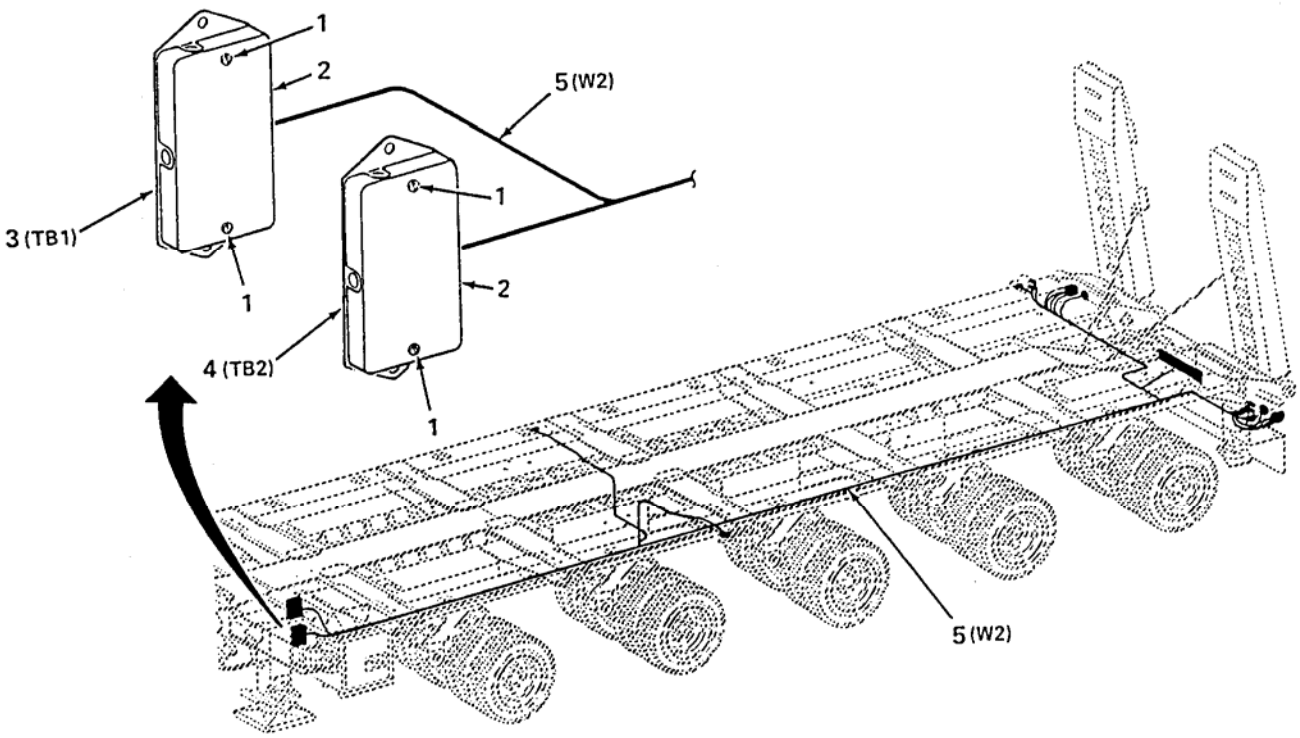
3. Inspect for missing or unreadable harness and wire markers (8 and 9). If defective, apply new markings or replace markers. Use semitrailer electrical schematic (figure FO-1) as a guide for proper wire markings.

INSTALLATION

NOTE

Tiedown straps should be placed in a logical position to secure wiring harness.

1. Install W2 harness (5) onto platform.



2. Refer to electrical schematic figure FO-1 and reconnect socket connectors for W2 harness (5) to platform lights.

3. Refer to electrical schematic figure FO-1 and reconnect W2 harness (3) to platform junction box terminal boards TB1 (4) and TB2 (5).

4. Reinstall new tiedown straps as required.

5. Secure harness in place by installing harness back into loop clamps (para. 4-31).

6. Install two covers (2) on junction boxes (3 and 4) and secure with four captive screws (1).

4-36. W2 HARNESS (CONT)

FOLLOW-ON MAINTENANCE

Connect intervehicular cables and check all lights on semitrailer for proper operation (para. 2-24).

4-37. W3 HARNESS

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Electrical repair kit, item 18, appx. B
Creeper, mechanics, item 18, appx. B
Extension light, 24 ft, item 18, appx. B

Materials/Parts

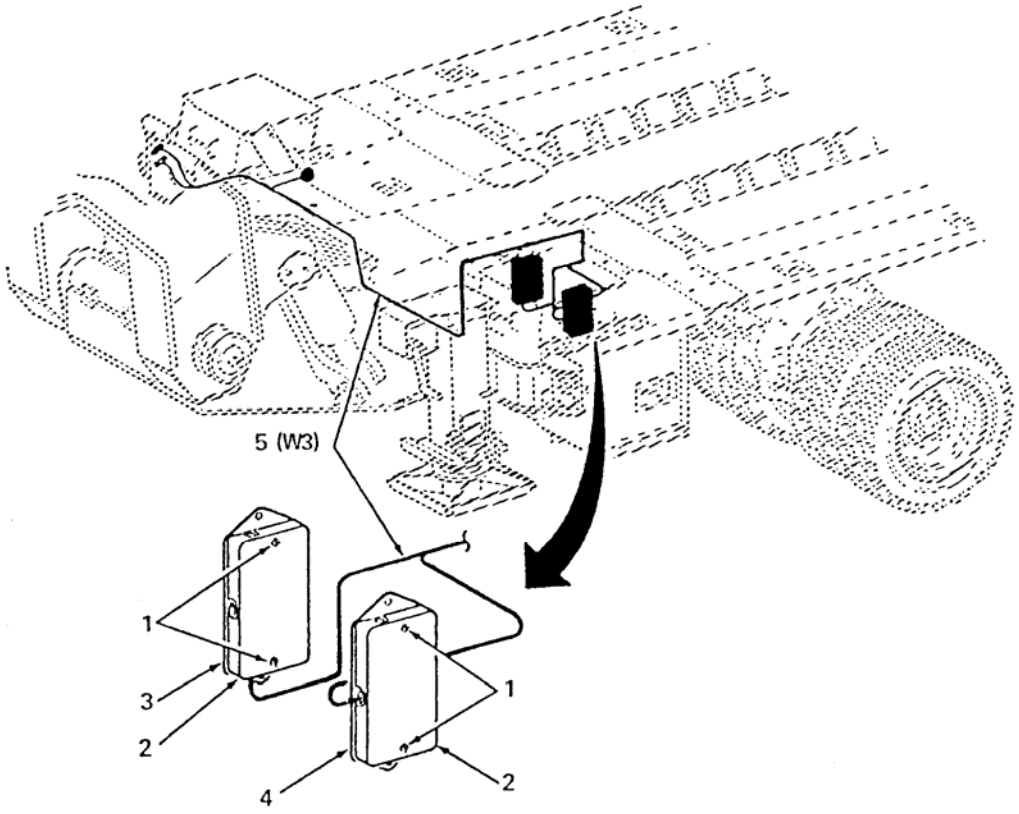
Wiping rag, item 19, appx. E
Electrical tape, item 28, appx. E
Tiedown straps (as required), item 27, appx. E

Equipment Condition

Platform adjusted to 50 inch (127 cm) height (para. 2-19)
Suspension isolation valves located at four corners of platform isolated (closed) (para. 2-6)

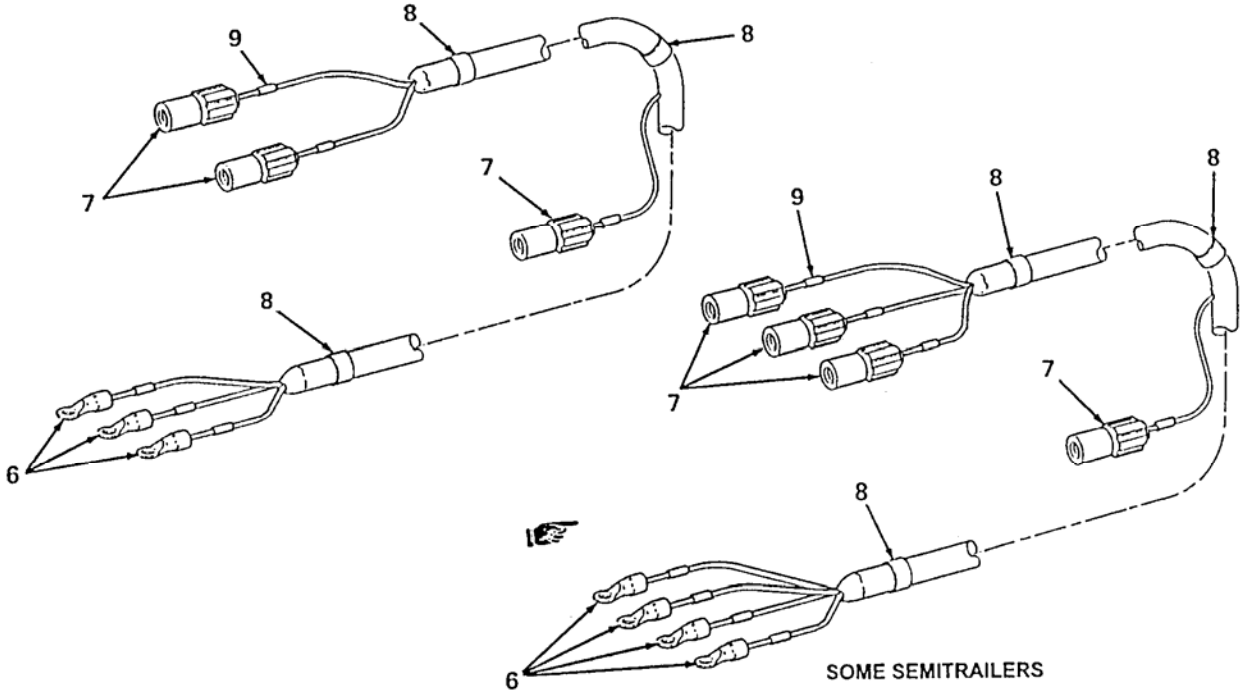
REMOVAL

1. Unscrew four captive screws (1) and remove two covers (2) from junction boxes TB1 (3) and TB2 (4).
2. Refer to electrical schematic figure FO-1 for incandescent lights or figure FO-1.1 for LED lights and tag and disconnect W3 harness (5) from platform junction box terminal boards TB1 (3) and TB2 (4).
3. Tag and disconnect socket connectors for W3 harness (5) from platform lighting.
4. Remove all loop clamps from W3 harness (5) (para. 4-31).
5. Cut and remove tiedown straps from W3 harness (5) as required. Discard tiedown straps.
6. Remove W3 harness (5) from semitrailer.



INSPECTION

1. Inspect terminal lugs (6) and electrical plug connectors (7) for frayed or broken wires and looseness. Clean as required by wiping with a wiping rag. If defective, use electrical repair kit and replace as required.



4-37. W3 HARNESS (CONT)

2. Inspect loom for breaks, cracks, and damage. If defective, repair defective loom as required. Use electrical tape at split ends of loom as required.

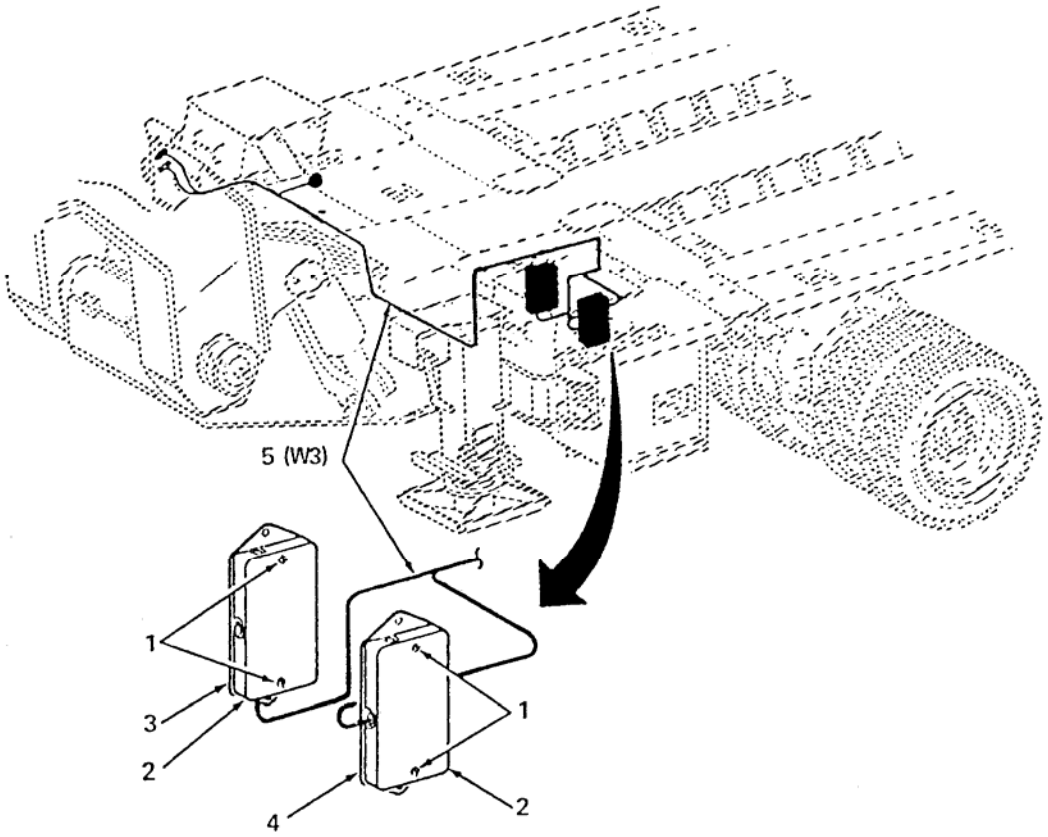
3. Inspect for missing or unreadable harness and wire markers (8 and 9). If defective, apply new markings or replace markers. Use electrical schematic figure FO-1 for incandescent lights or figure FO-1.1 for LED lights for proper wire markings.

INSTALLATION

1. Install W3 harness (5) onto platform.

2. Refer to electrical schematic figure FO-1 for incandescent lights or figure FO-1.1 for LED lights and reconnect socket connectors for W3 harness (5) to platform lighting.

3. Refer to electrical schematic figure FO-1 for incandescent lights or figure FO-1.1 for LED lights and reconnect W3 harness (5) to platform junction box terminal boards TB1 (3) and TB2 (4).



NOTE

Tiedown straps should be placed in a logical position to secure wiring harness.

4. Reinstall new tiedown straps as required.

5. Secure harness in place by installing harness back into loop clamps (para. 4-31).

6. Install two covers (2) on junction boxes TB1 (3) and TB2 (4) and secure with four captive screws (1).

FOLLOW-ON MAINTENANCE

Couple semitrailer and towing vehicle (para. 2-24) and check lights for proper operation.

4-38. W4 HARNESS

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Electrical repair kit, item 18, appx. B
Creeper, mechanics, item 18, appx. B
Extension light, 24 ft, item 18, appx. B

Materials/Parts

Tiedown straps (as required), item 27, appx. E
Electrical tape, item 28, appx. E
Wiping rag, item 19, appx. E

Equipment Condition

Intervehicular cable disconnected (para. 2-24)
Platform adjusted to 50 inch (127 cm) height (para. 2-19)
Suspension isolation valves located at four corners of platform isolated (closed) (para. 2-6)

4-38. W4 HARNESS (CONT)

REMOVAL

1. Unscrew four captive screws (1) and remove two covers (2) from junction boxes TB1 (3) and TB2 (4).

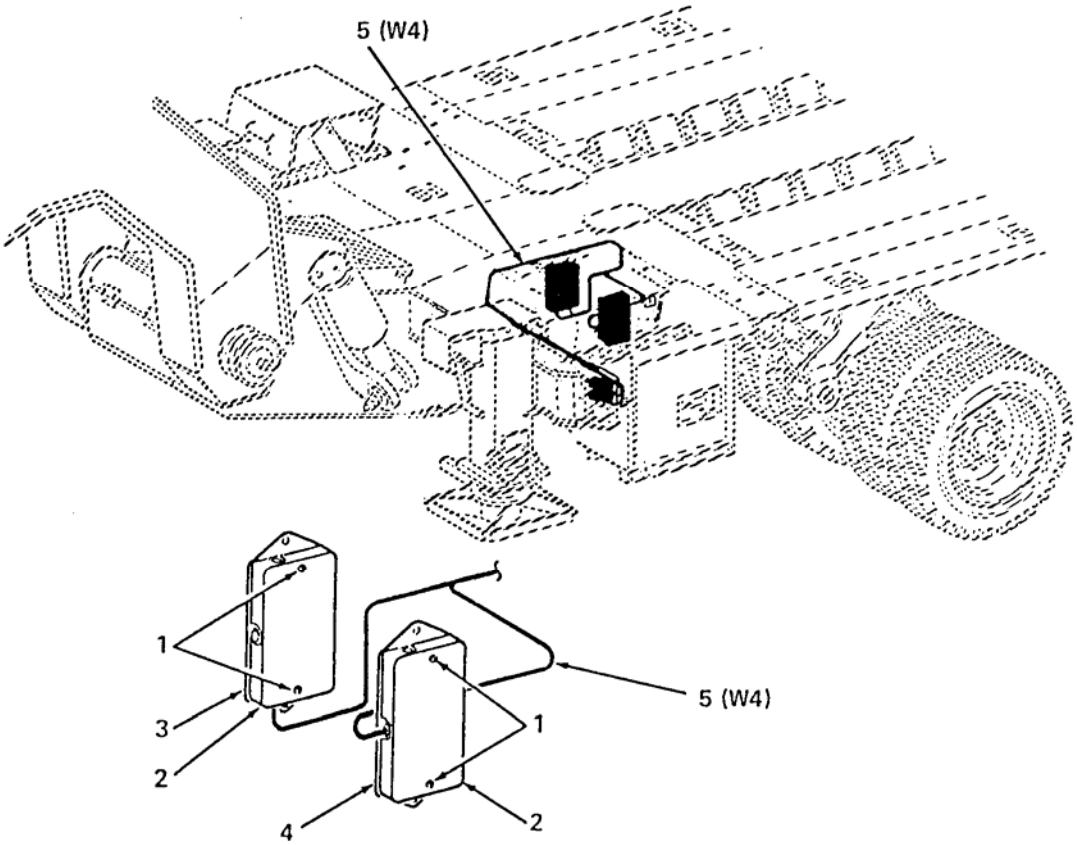
2. Refer to electrical schematic figure FO-1 for incandescent lights or figure FO-1.1 for LED lights and tag and disconnect W4 harness (5) from platform junction box terminal boards TB1 (3) and TB2 (4).

3. Tag and disconnect socket connectors for W4 harness (5) from platform lighting.

4. Remove all loop clamps from W4 harness (5) (para. 4-31).

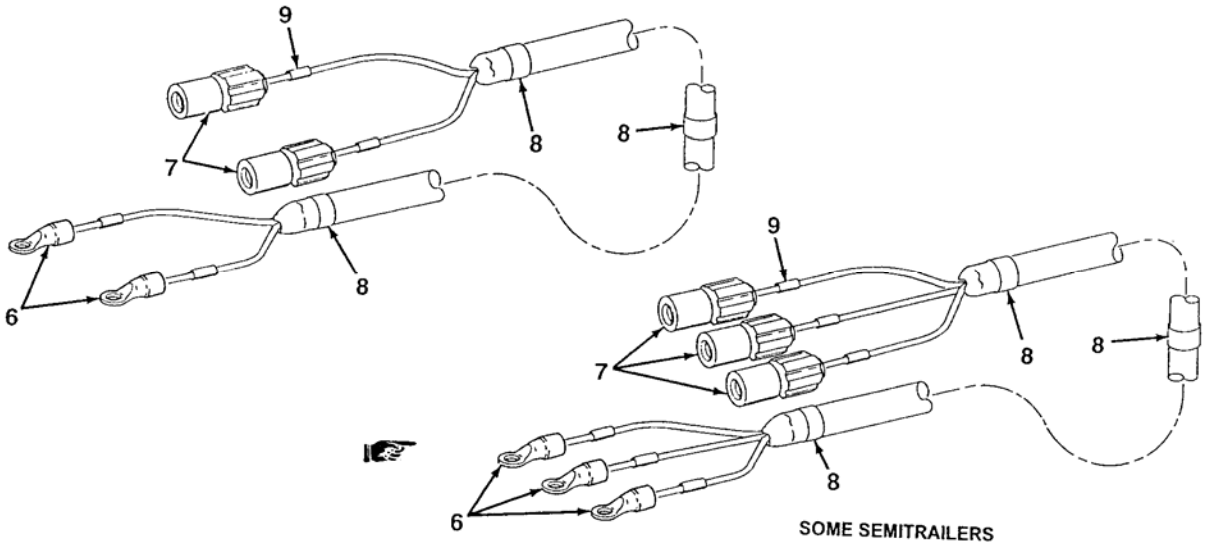
5. Cut and remove all tiedown straps from W4 harness (5) as required. Discard tiedown straps.

6. Remove W4 harness (5) from semitrailer platform.



INSPECTION

1. Inspect terminal lugs (6) and electrical plug connectors (7) for frayed or broken wires and looseness. Clean as required by wiping with a wiping rag. If defective, use electrical repair kit and replace as required.

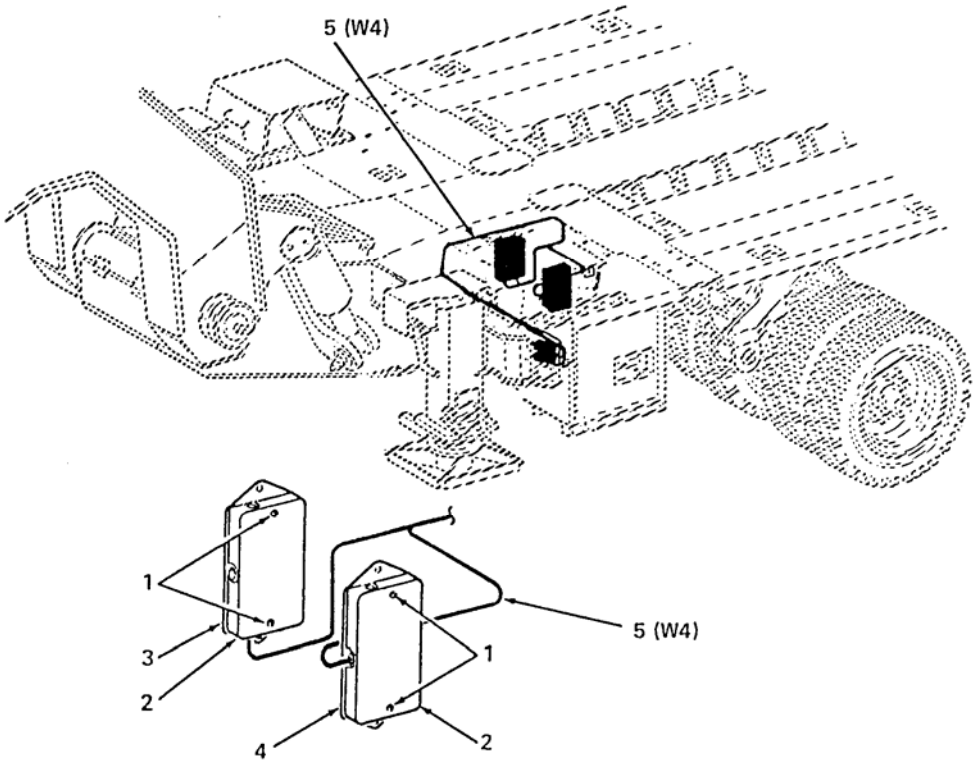


2. Inspect loom for breaks, cracks, and damage. If defective, repair defective loom as required. Use electrical tape at split ends of loom as required.

3. Inspect for missing or unreadable harness and wire markers (8 and 9). If defective, apply new markings or replace markers. Refer to electrical schematic figure FO-1 for incandescent lights or figure FO-1.1 for LED lights for proper wire markings.

INSTALLATION

1. Install W4 harness (5) onto platform.



4-38. W4 HARNESS (CONT)

2. Refer to electrical schematic figure FO-1 for incandescent lights or figure FO-1.1 for LED lights and reconnect socket connectors for W4 harness (3) to platform lighting.

3. Refer to electrical schematic figure FO-1 for incandescent lights or figure FO-1.1 for LED lights and reconnect W4 harness (5) to platform junction box terminal boards TB1 (3) and TB2 (4).

NOTE

Tiedown straps should be placed in a logical position to secure wiring harness.

4. Reinstall new tiedown straps as required.

5. Secure harness in place by installing harness back into loop clamps (para. 4-31).

6. Install two covers (2) on junction boxes TB1 (3) and TB2 (4) and secure with four captive screws (1).

FOLLOW-ON MAINTENANCE

Couple semitrailer and towing vehicle (para. 2-24) and check lights for proper operation.

4-38.1. W5 HARNESS (SOME SEMITRAILERS)

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Electrical repair kit, item 18, appx. B

Materials/Parts

Tiedown straps (as required), item 27, appx. B
Electrical tape, item 28, appx. E
Wiping rag, item 19, appx. E
Locknut (2)

Equipment Condition

Intervehicular cable disconnected (para. 2-24)
Gooseneck adjusted fully down (para. 2-18) or coupled to tractor (para. 2-24)

General Safety Instructions

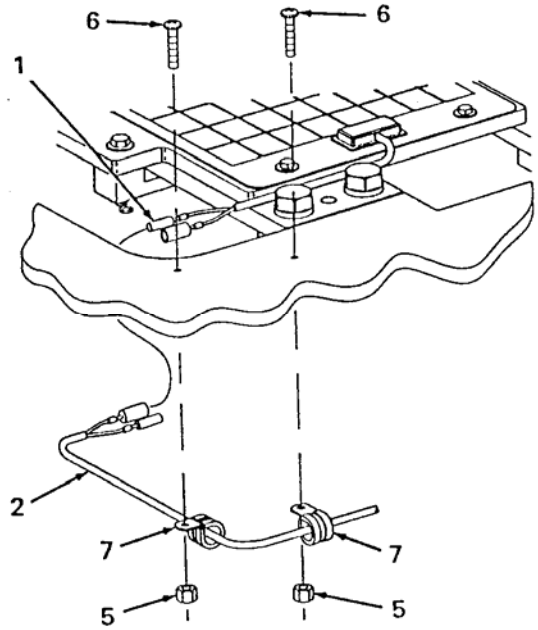
WARNING

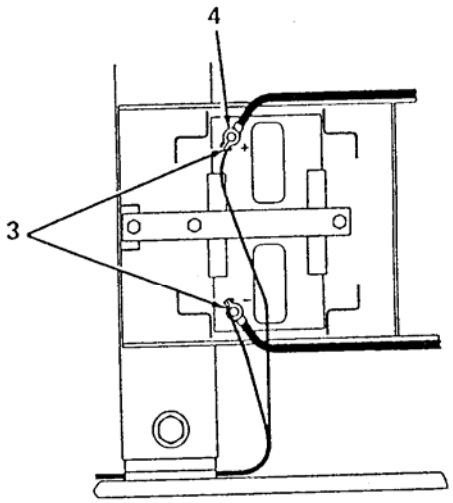
On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on it or trip over it. Injury to personnel or damage to equipment may result.

REMOVAL

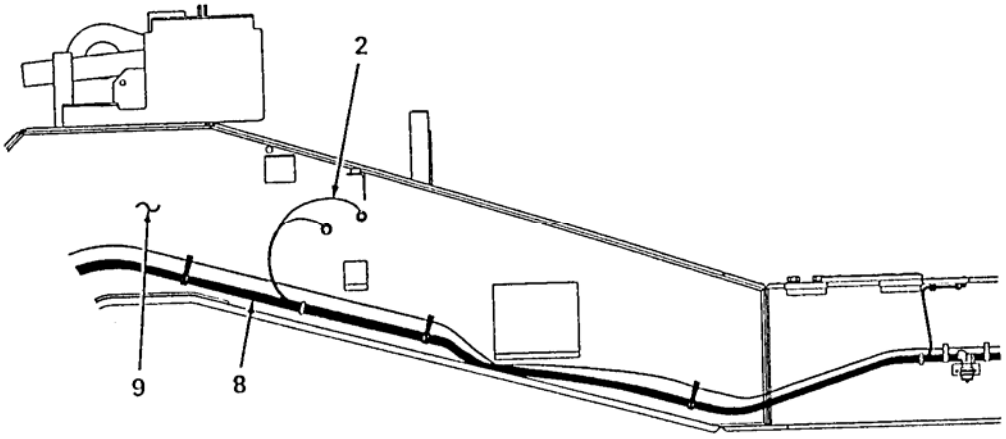
1. Refer to electrical schematic figure FO-4 and disconnect solar panel leads (1) from W5 harness (2). At battery, disconnect W5 harness leads (3) from battery terminals (4).

2. Remove two locknuts (5), screws (6), and clamps (7) from W5 harness (2). Discard locknuts.





3. Cut tiedown straps securing W5 harness (2) to W1 harness (8). Remove W5 harness (2) from gooseneck (9).



4-38.1. W5 HARNESS (SOME SEMITRAILERS (CONT)

INSPECTION

1. Inspect terminal lugs and electrical plug connectors for frayed or broken wires and looseness. Clean by wiping with a rag. If defective, use electrical repair kit and replace as required.

2. Inspect loom for breaks, cracks, and damage. If defective, repair defective loom as required. Use electrical tape at split ends of loom as required.

3. Inspect for missing or unreadable harness and wire markers. If defective, apply new markers or replace markers. Use electrical schematic figure FO-4 for proper wire markings.

INSTALLATION

1. Position W5 harness (2) in gooseneck (9) and loosely fasten to W1 harness with tiedown straps.

2. Refer to electrical schematic figure FO-4 and connect solar panel leads (1) to W5 harness (2). At battery, connect W5 harness leads (3) to battery terminals (4).

3. Install two clamps (7) to W5 harness and secure using two screws (6) and locknuts (5).

4. Secure W5 harness to W1 harness using tiedown straps as required.

4-39. APU WIRING HARNESS

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Electrical repair kit, item 18, appx. B

Materials/Parts

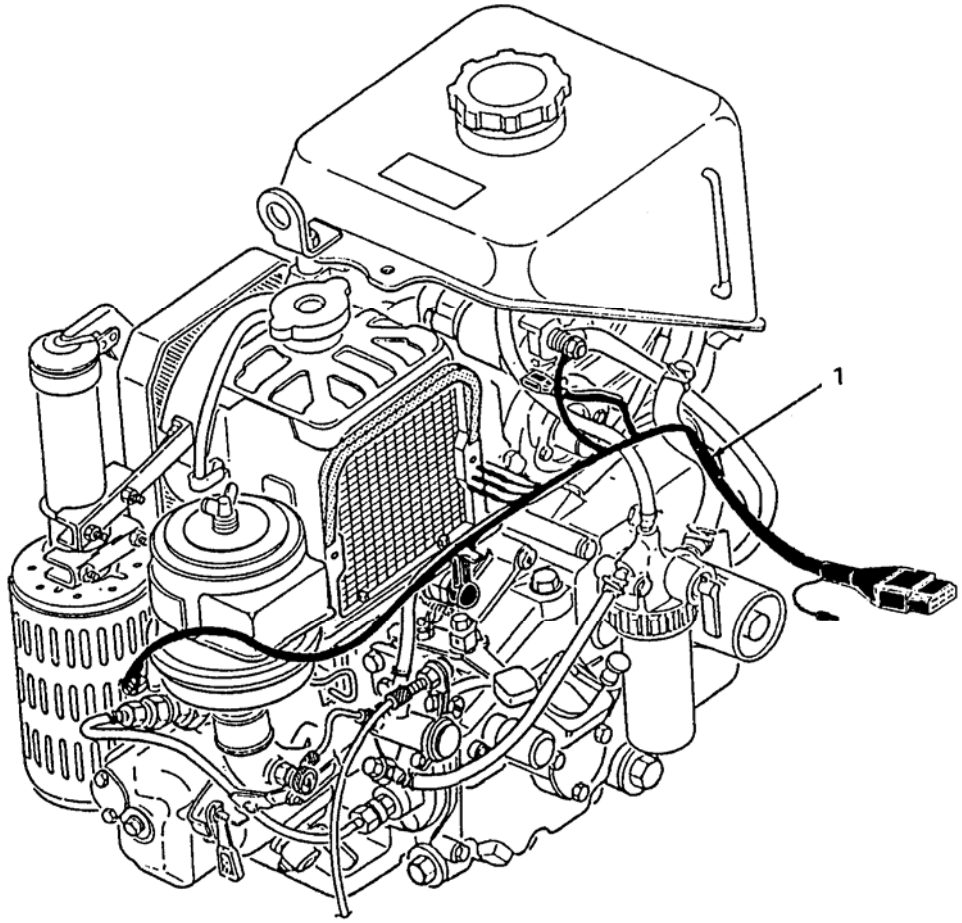
Wiping rag, item 19, appx. E
Tiedown straps (as required), item 27, appx. E
Electrical tape, item 28, appx. E
Sealant, item 20, appx. E

Equipment Condition

Battery ground wire removed from APU pump flange (para. 4-30)
Jumper wires removed from APU control box (para. 4-34)

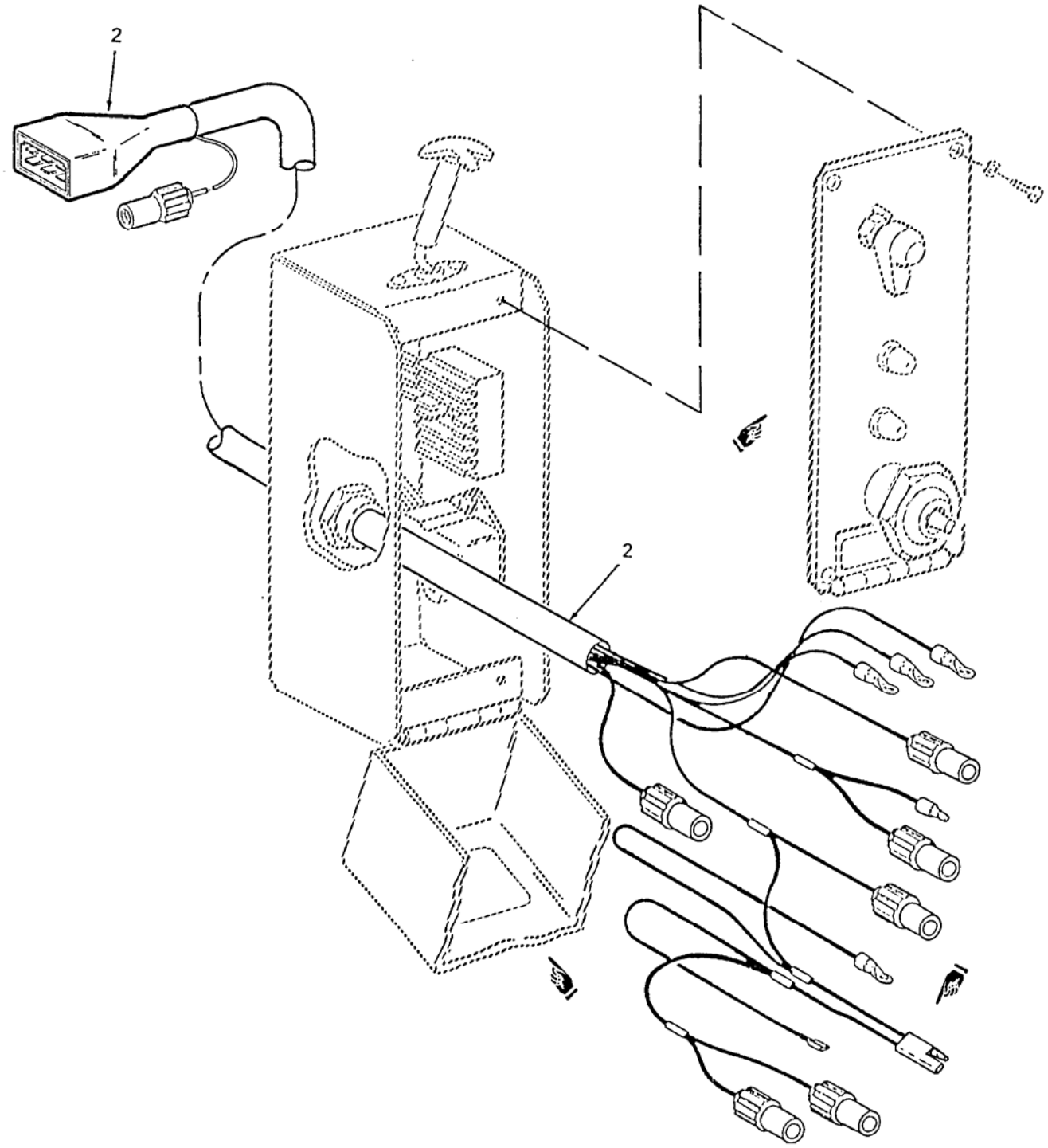
REMOVAL

1. Using APU electrical schematic (figure FO-4) as a guide, tag and disconnect APU wiring harness (1) from APU starter, vanaxial fan, glow plug, and oil pressure sending unit.



4-39. APU WIRING HARNESS (CONT)

2. Using APU electrical schematic (figure FO-4) as a guide, tag and disconnect APU wiring harness (2) from APU control box starter switch, glow plug indicator, low oil pressure indicator, current limiter, and current rectifier if applicable.

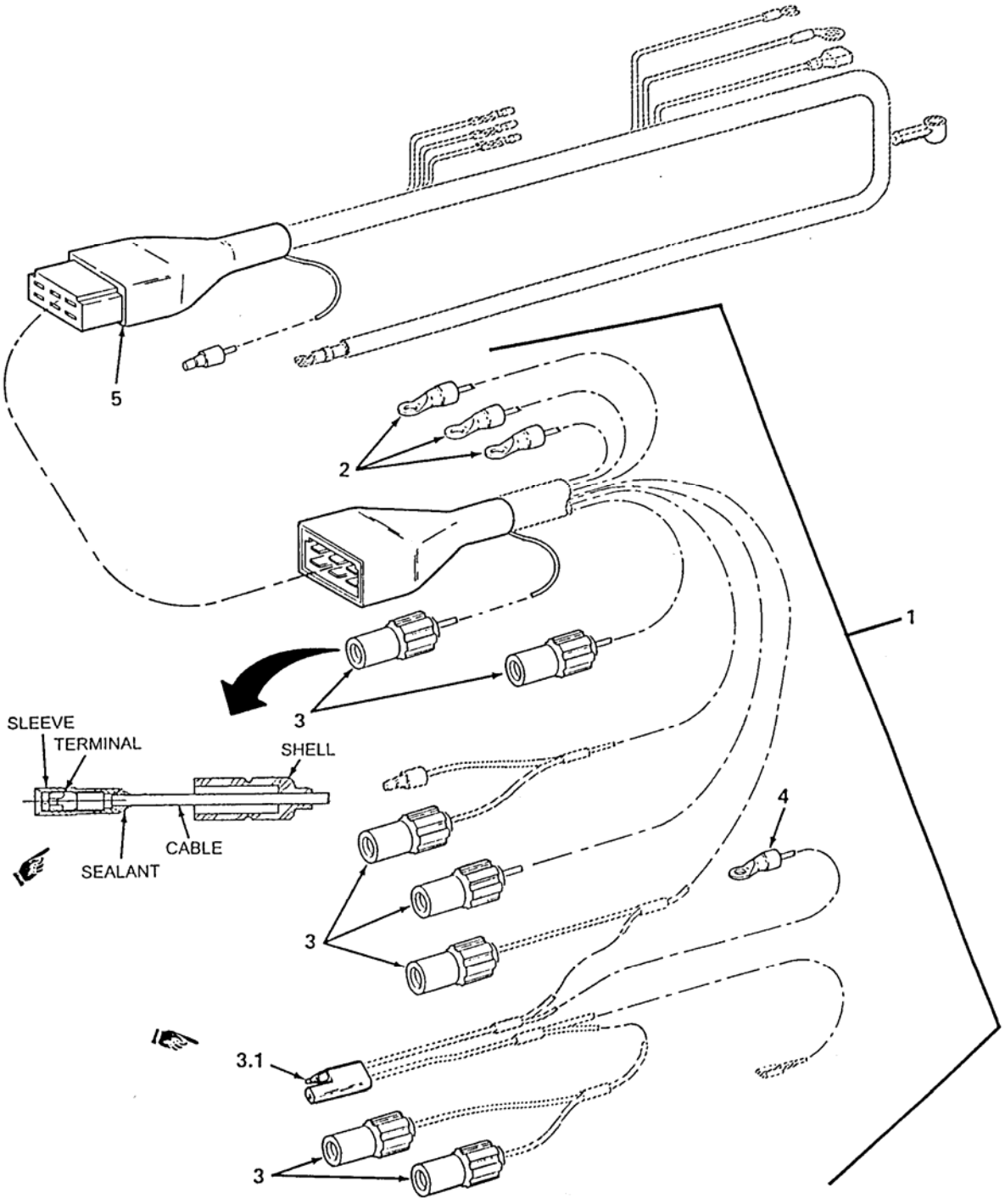


3. Refer to paragraph 4-108 and remove all loop clamps from APU wiring harness.

4. Remove APU wiring harnesses (1 and 2) from semitrailer gooseneck.

INSPECTION

1. Inspect APU control box wiring harness (1), terminal lugs (2), connectors (3), two-position connector (3.1), terminal lug (4), and APU wiring harness (5) for frayed or broken wires and looseness. Clean as required by wiping with a wiping rag. If defective, use electrical repair kit and replace terminal lugs, electrical plug connectors, and two-position connector as required. When repairing connector (3) apply sealant around perimeter of terminal sleeve as shown; then, slide shell into position and let sealant dry.

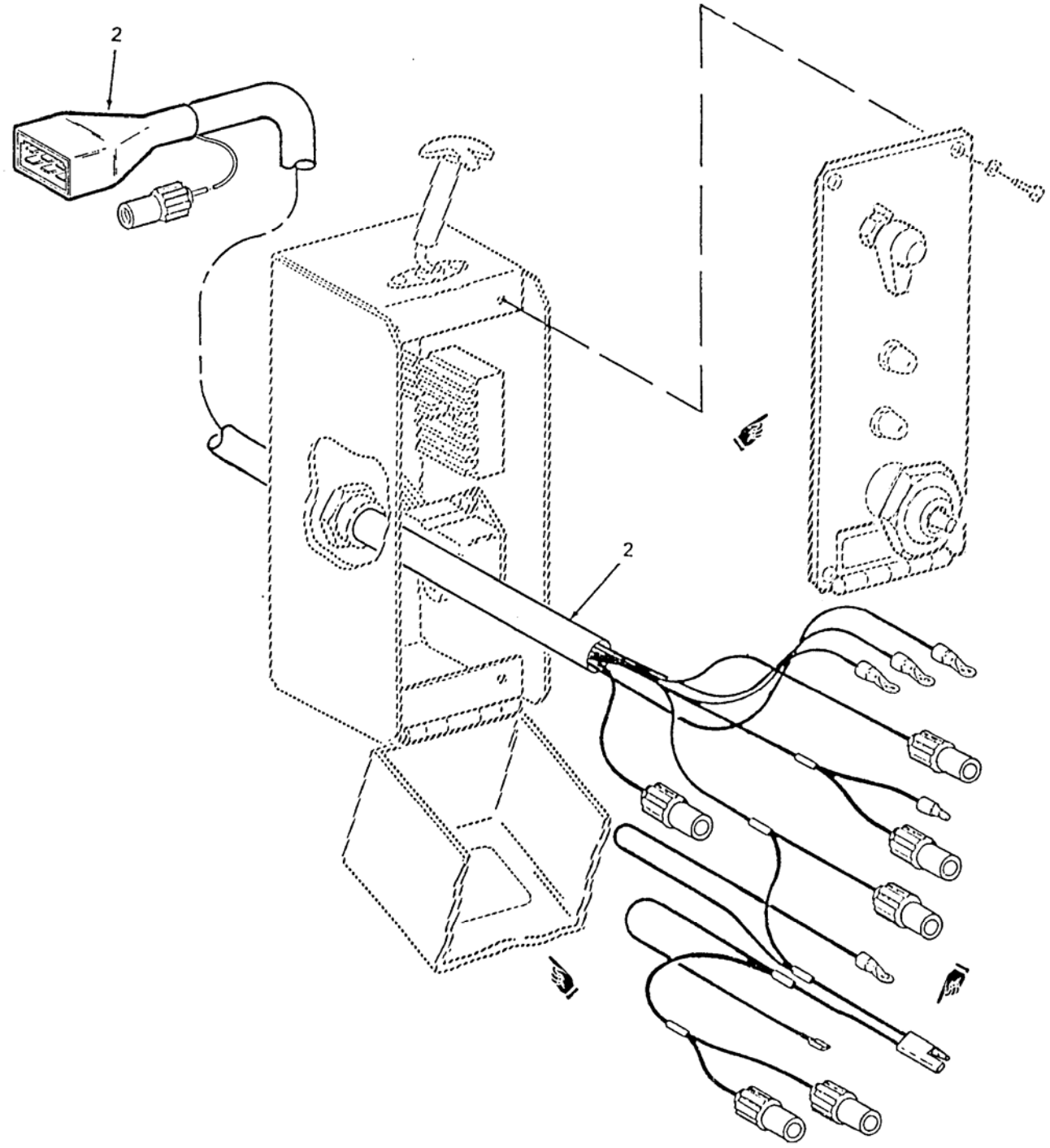


4-39. APU WIRING HARNESS (CONT)

2. Inspect both male and female harness connectors for APU control box harness (1) and APU wiring harness (5) for frayed or broken wires and looseness. Clean as required by wiping with a wiping rag. If defective, replace the applicable APU wiring harness (1 and/or 5) as required.

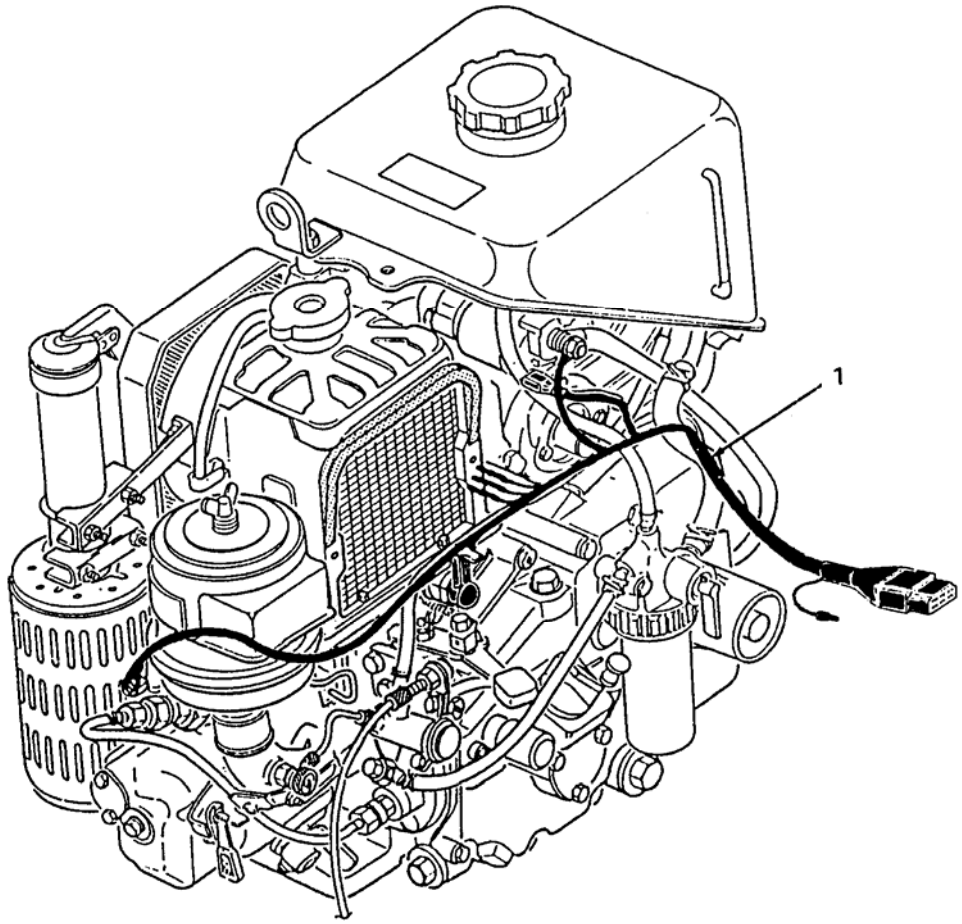
INSTALLATION

1. Install both APU wiring harnesses (1 and 2) onto gooseneck.



2. Using APU electrical schematic (figure FO-4) as a guide, reconnect APU wiring harness (2) to APU control box starter switch, glow plug indicator, oil pressure indicator, current limiter, and current rectifier, if applicable.

3. Using APU electrical schematic (figure FO-4) as a guide, reconnect APU wiring harness (1) to APU starter, vanaxial fan, glow plug, and oil pressure sending unit.



NOTE

Tiedown straps should be placed in a logical position to secure wiring harness.

4. Reinstall new tiedown straps as required.

5. Secure both harnesses in place by installing each harness into loop clamps (para. 4-108).

4-39. APU WIRING HARNESS (CONT)

FOLLOW-ON MAINTENANCE

1. Reinstall jumper wires to APU control box (para. 4-34).
2. Reconnect battery ground wire to APU pump flange (para. 4-30).
3. Start and run APU and check for proper operation (para. 2-16).

4-40. SUSPENSION ASSEMBLY/BOGIE

This task covers: a. Removal c. Lubrication
b. Inspection d. Installation

INITIAL SETUP

Tools

Overhead lifting device (5000 lb (2270 kg) minimum capacity) or equivalent
Lifting strap (2), item 31, appx. B
Isolation valve handle extension, item 1, appx. B
Spanner socket, item 4, appx. B
Suspension chain, item 8, appx. B
General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 2, item 18, appx. B:

Drain pan, 4 gl	Torque multiplier, 5 to l, 3/4" drive
Torque wrench, 3/4" drive	Gloves, chemical and oil protective
Ratchet, 3/4" drive	Goggles, industrial
Extension light, 24 ft	Measuring tape, 50 ft
Crowbar	Degreaser tank, 20 gl
Bearing lubricant packer	Lubricating handgun

Materials/Parts

Grease, item 12, appx. E
Cap and plug set, item 5, appx. E
Wiping rag, item 19, appx. E
Solvent, cleaning compound, item 25, appx. E
Tape, masking, item 29, appx. E
Locknut
Setscrew
Oil seal
Preformed packing

Personnel Required: 3

Equipment Condition

Gooseneck isolation valve handle pulled out to ADJUST position (para. 2-6)
Suspension shut-off valve handle pulled out to ADJUST position (para. 2-6)
Platform adjusted to 50 inch (127 cm) height (para. 2-19)
Gooseneck lowered to lowest position, if uncoupled (para. 2-18)
Brakes caged for affected suspension assembly (para. 2-33)
Semitrailer parking brakes applied (para. 2-8)

General Safety Instructions

WARNING

Hydraulic fluid may be hot if system has been in operation. Allow time to cool before performing maintenance or severe injury or burns to personnel may result.

Hydraulic fluid may be under pressure. Use caution when disconnecting hydraulic lines or components. Face shields or goggles must be worn or serious injury to personnel may result.

Hydraulic fluid can be absorbed through the skin. Wear long sleeves, gloves, goggles, or face shield. If hydraulic fluid gets into eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, thoroughly wash with soap and water. Wash hands prior to eating or smoking.

The suspension assembly, hereinafter referred to as bogie, weighs approximately 2500 pounds (1135 kg). Extreme caution must be used during removal and installation of bogie or serious injury to personnel or damage to equipment may result.

The bogie must be supported with an overhead lifting device during removal and installation procedure or serious injury to personnel or damage to equipment may result.

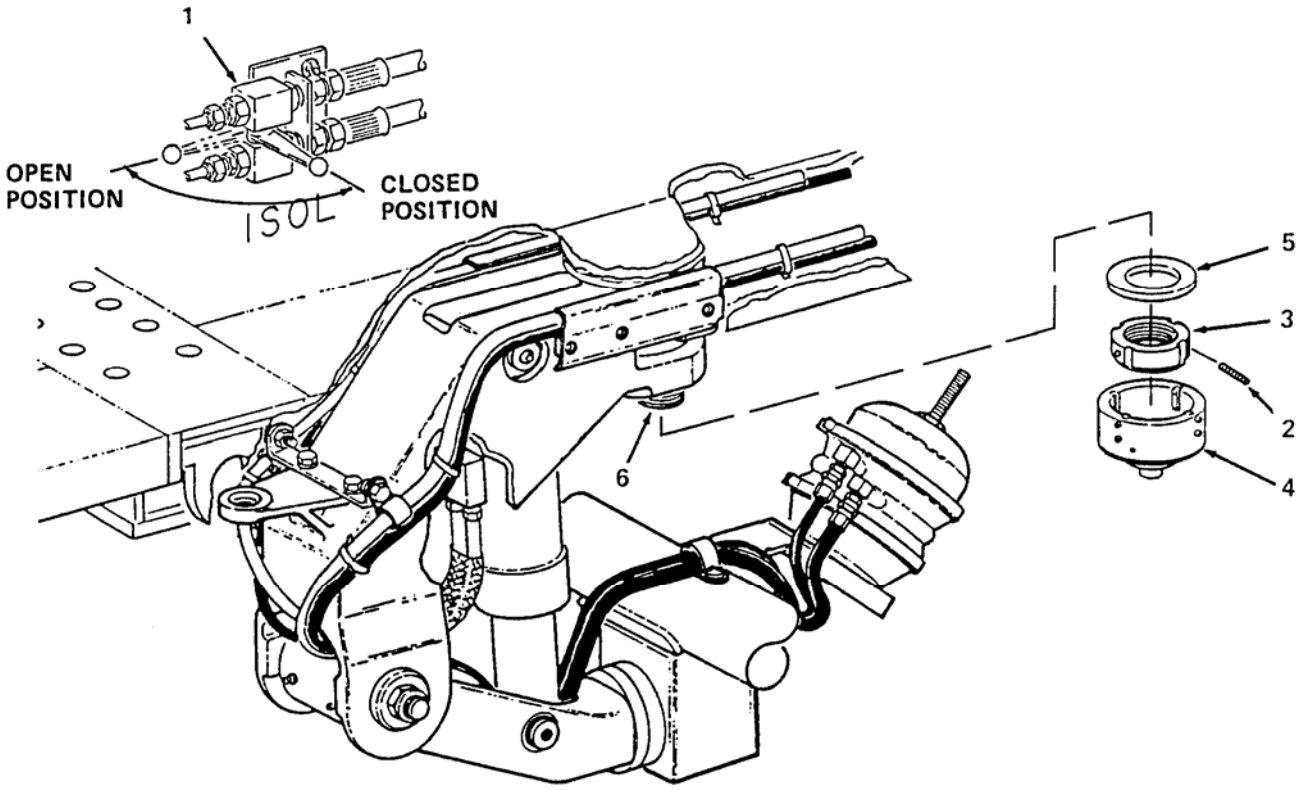
4-40. SUSPENSION ASSEMBLY/BOGIE (CONT)

REMOVAL

WARNING

Suspension isolation valves must be closed at four corners of the platform (#1 and #5 curbside and #1 and #5 streetside bogies) or injury to personnel may result. If the affected bogie is one of the four corner bogies, close valve at next adjacent bogie.

1. Using isolation valve handle extension, isolate bogies at four corners by closing suspension isolation valves (1), handles facing outboard from center of platform.



2. Loosen and remove setscrew (2) from spanner nut (3). Discard setscrew.

WARNING

While installing spanner socket on spanner nut, use one person to hold spanner socket in place or the spanner socket may fall causing injury to personnel or damage to equipment.

3. Install spanner socket (4) onto spanner nut (3). Using one person, hold spanner socket (4) in place and install torque multiplier and torque wrench.

4. Loosen spanner nut (3) until spanner socket (4) can be turned by hand. Remove torque wrench and torque multiplier from spanner socket (4); then, loosen spanner nut (3) using a ratchet only.

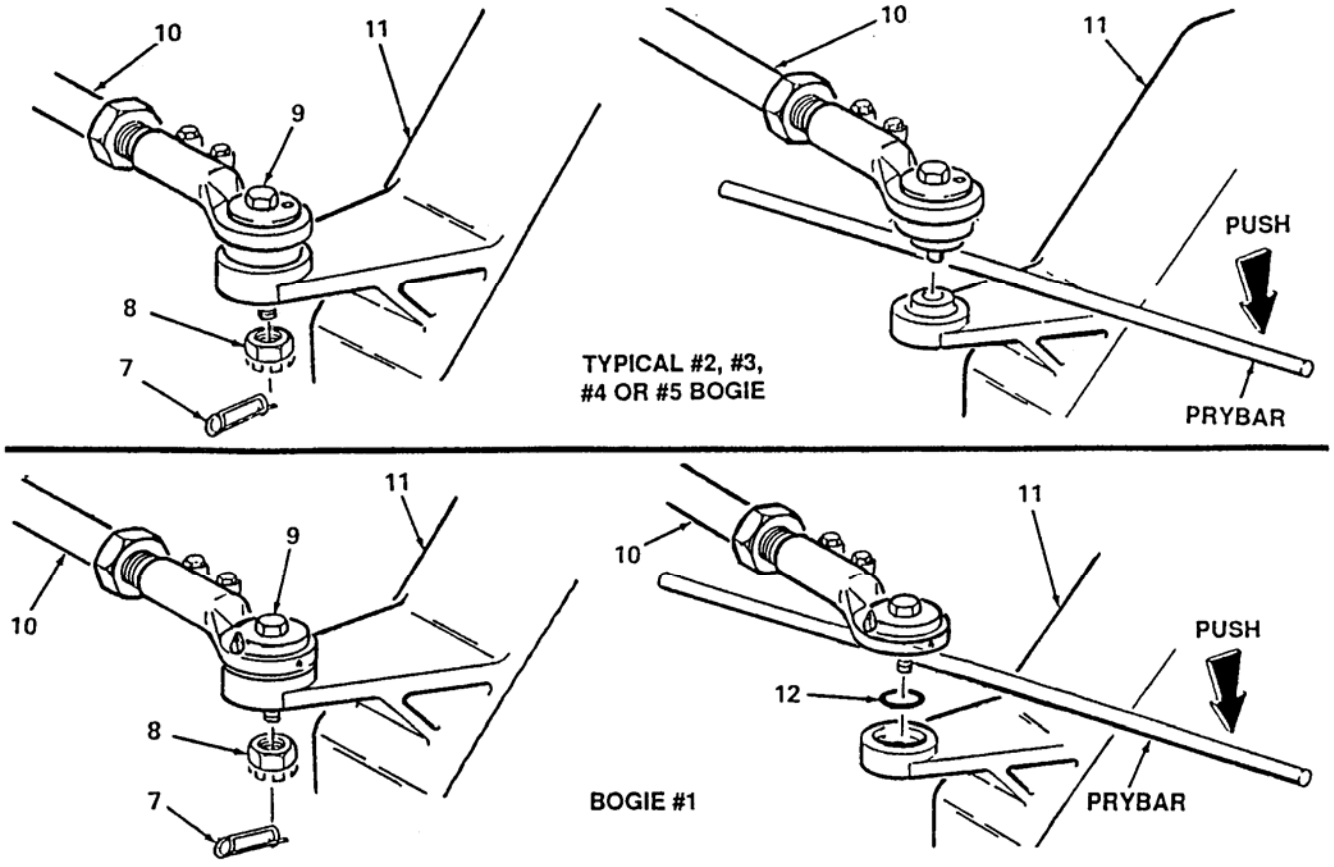
5. Remove ratchet, spanner socket (4), spanner nut (3), and spacer (5) from platform spindle (6).

CAUTION

Threads on the platform spindle must be protected prior removal of to the lower suspension bearing or damage to the spindle may result.

6. Apply masking tape to the threads of the platform spindle (6) to protect the threads from accidental damage.

7. Remove safety pin (7), nut (8), and capscrew (9) from connecting link (10).



CAUTION

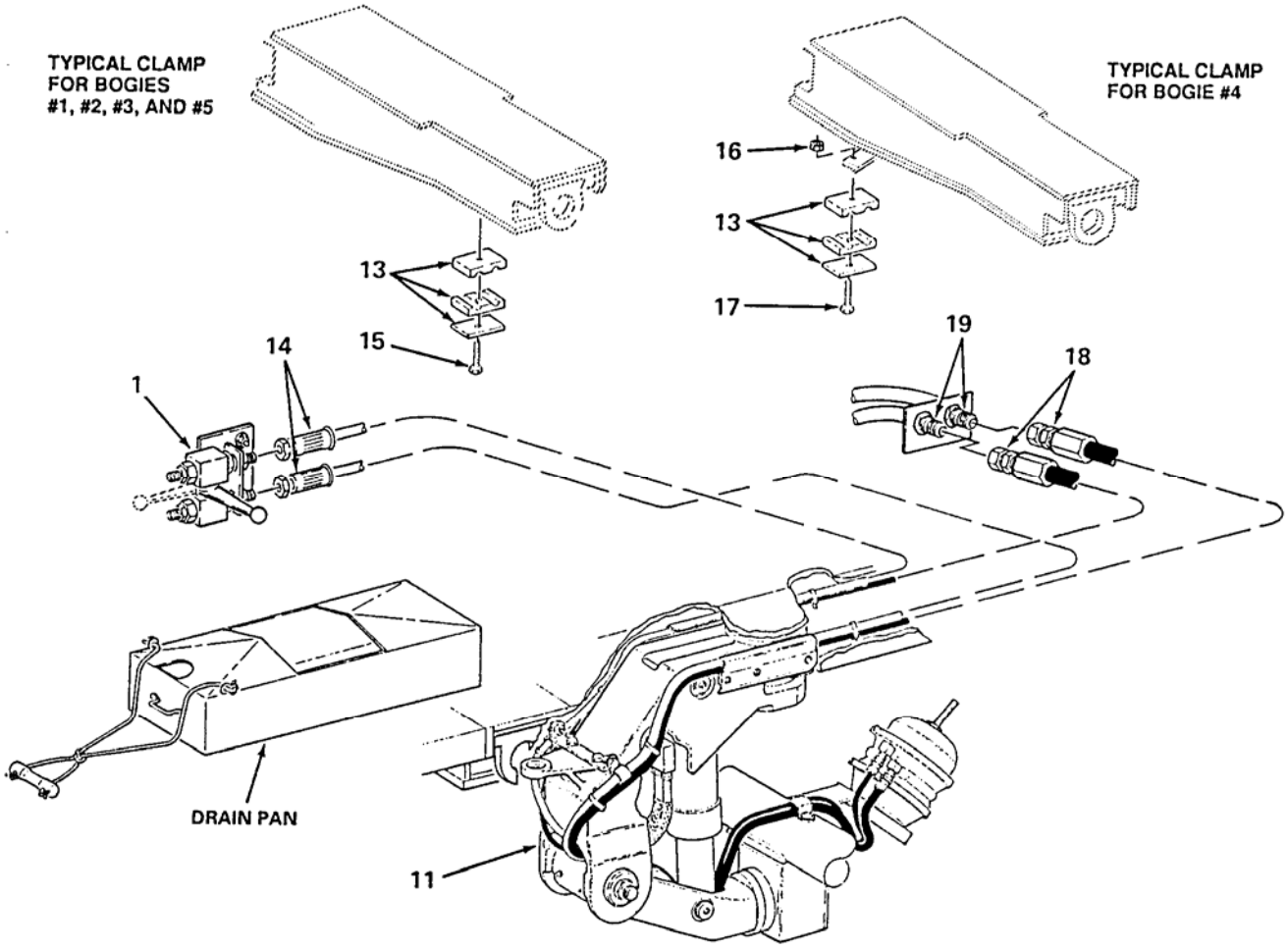
Push steering or nonsteering connecting link forward, toward front of semitrailer, to allow bogie to rotate or damage to equipment may result.

8. Using a pry bar, pry up and move connecting link (10) off of affected bogie (11). Push connecting link (10) forward, out of the way of bogie, and aline and install capscrew (9), nut (8), and safety pin (7) back onto connecting link (10) for temporary storage.

4-40. SUSPENSION ASSEMBLY/BOGIE (CONT)

9. If #1 bogie connecting link (10) was disconnected, remove preformed packing (12). Discard preformed packing.

10. Remove block clamp (13) from two hydraulic hoses (14) as follows:



a. For bogies #1, 2, 3, or 5, remove capscrew (15) and block clamp sections (13).

b. For bogie #4, remove locknut (16), capscrew (17), and block clamp sections (13). Discard locknut.

11. Using isolation valve handle extension, open isolation valves (1) at all four corners of platform (para. 2-6).

12. Start APU (para. 2-16). Using a measuring tape, lower platform height to approximately 41 inches (108 cm) (para. 2-19).

WARNING

Air system must be drained prior to pneumatic lines being disconnected or inadvertent operation of the semitrailer brake valve during platform adjustments may result in injury to personnel.

13. Operate brake valve (para. 2-8) several times until all reserve air is drained from air tanks.

14. At affected bogie, using isolation valve handle extension, close suspension isolation valve (1), handle facing outboard from center of platform.

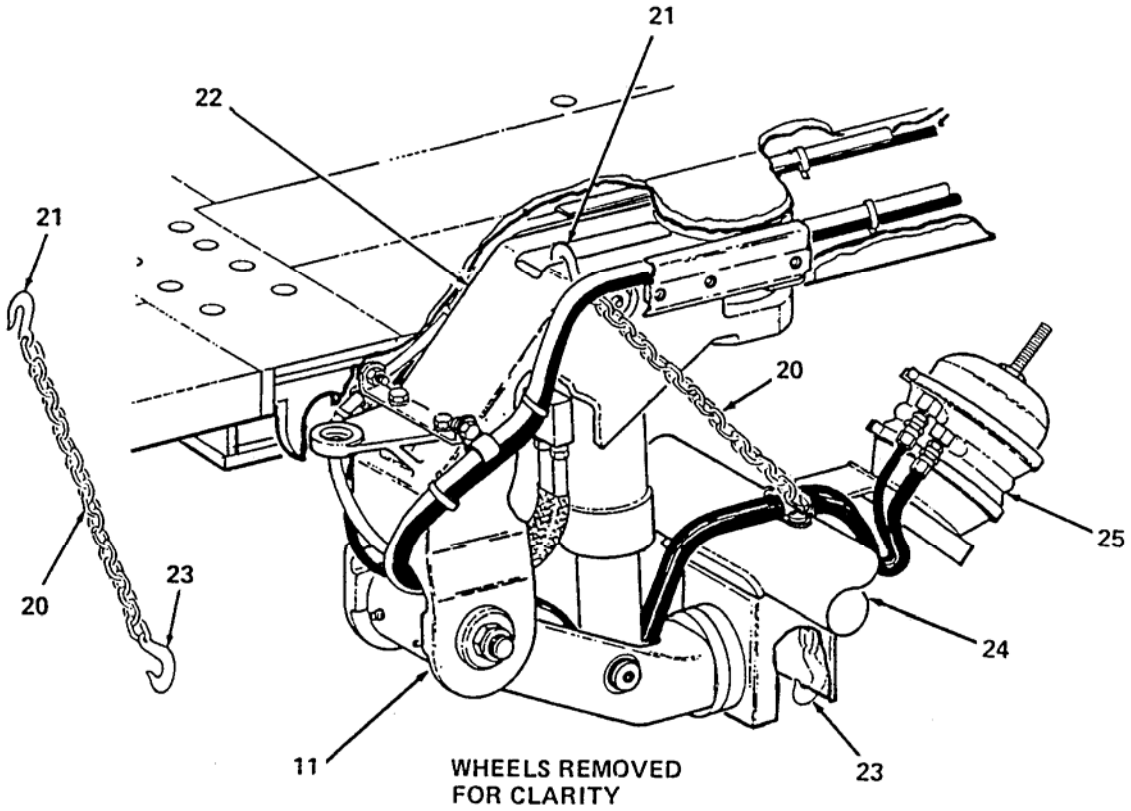
CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the hydraulic or pneumatic systems or damage to equipment may result.

15. Place drain pan under suspension isolation valve (1). Tag and disconnect two hydraulic hoses (14) from suspension isolation valve (1) at affected bogie (11). Install caps/plugs into openings on isolation valve (1). Place ends of hose into opening in drain pan and secure in place using masking tape.

16. Tag and disconnect two pneumatic hoses (18) from two bulkhead fittings (19). Install caps/plugs into all openings.

17. Attach suspension chain (20) to affected bogie (11) as follows:



4-40. SUSPENSION ASSEMBLY/BOGIE (CONT)

CAUTION

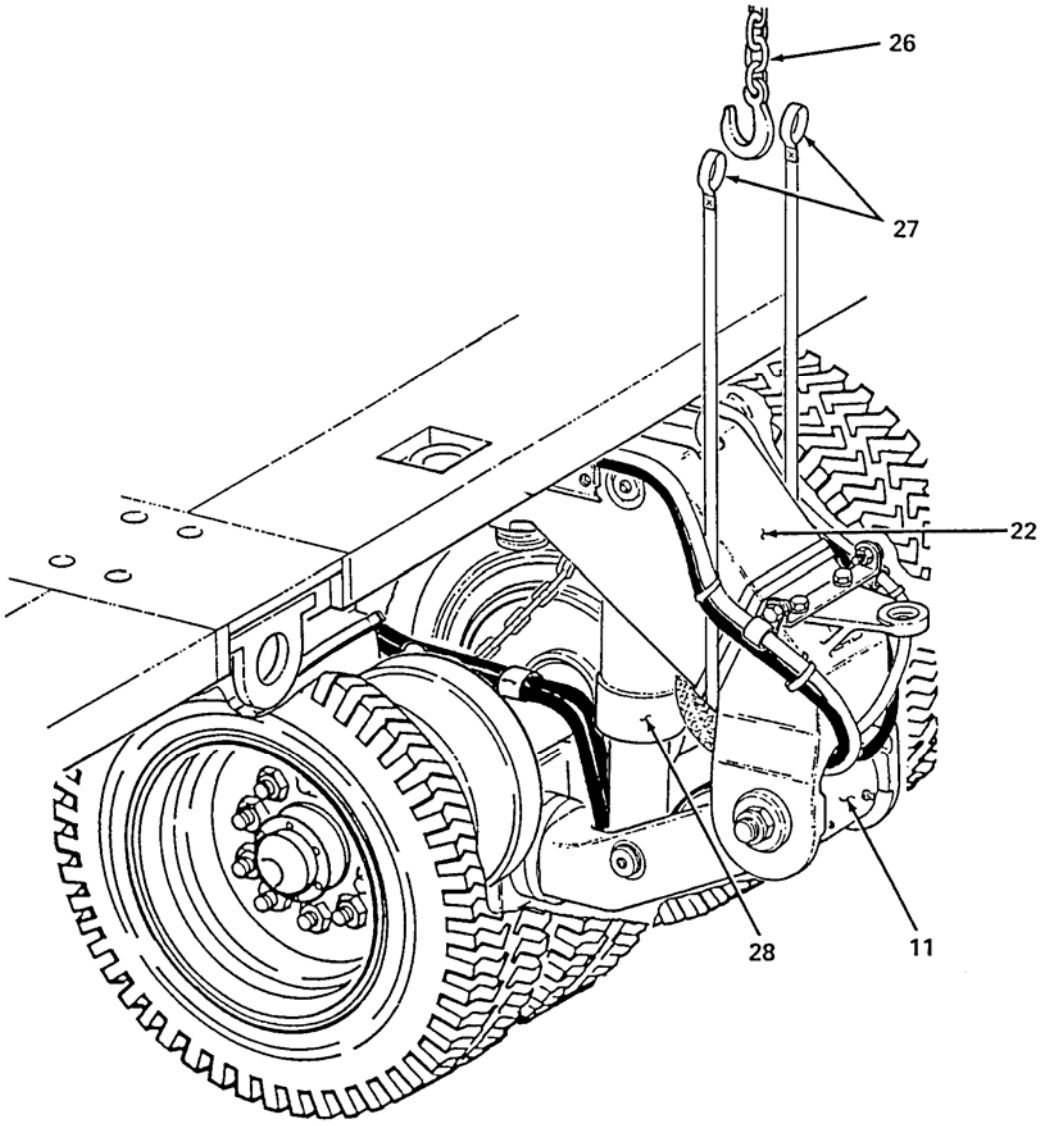
When securing hook to upper suspension arm, make sure that suspension chain does not contact any hydraulic or pneumatic hoses. If contact is made, chafing or parting of a line/hose, loss of air brake pressure, loss of hydraulic fluid, or damage to equipment may result.

a. Attach top hook (21) of suspension chain (20), along outboard side of bogie (11), beneath both hydraulic and pneumatic hoses, into opening on top of upper suspension arm (22).

b. Attach bottom hook (23) of suspension chain (20) onto back end of square under axle (24) outboard of parking brake chamber (25).

18. Raise platform (para. 2-19) until bogie can be turned.

19. Start to turn bogie (11) outboard, away from center of platform.



20. Continue to rotate bogie (11) until axle is approximately parallel with side edge of platform.

21. Position overhead lifting device (26) over outboard edge of platform directly above upper suspension arm (22) of bogie (11).

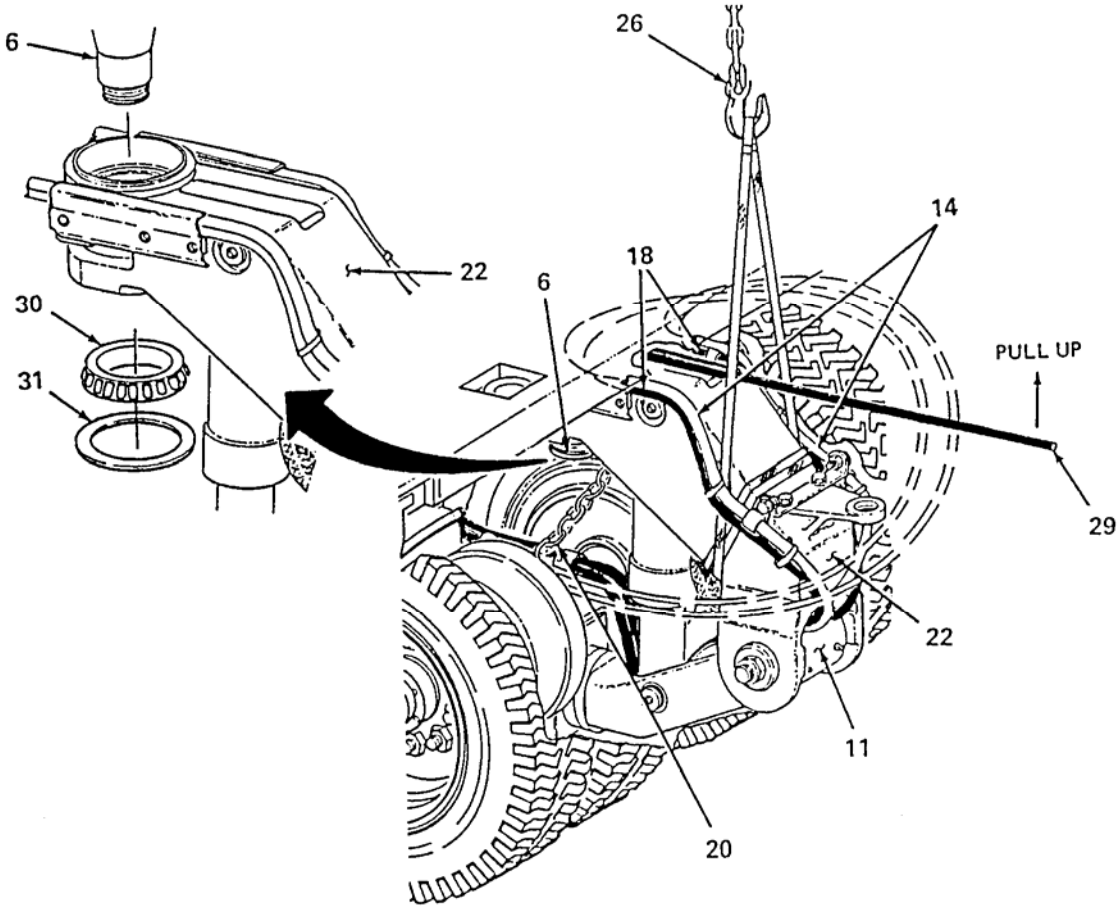
22. Using two lifting straps, pass one end of each lifting strap (27) between upper suspension arm (22) and suspension cylinder (28).

23. Continue to wrap lifting straps (27), under all hoses, a minimum of two times around upper suspension arm (22). Connect both ends of each lifting strap (27) to overhead lifting device (26). Take up slack in lifting strap (27).

NOTE

It may be necessary to use a crowbar to unseat lower bearing on bogie as overhead lifting device is lowered.

24. Using one person stationed at hydraulic control module, start to raise platform slowly (para. 2-19). Second person must insert crowbar (29) above upper suspension arm (22) to pry upper suspension arm downward away from spindle (6). A third person must be used to lower overhead lifting device (26) slightly to prevent upper suspension arm from rising with platform.



4-40. SUSPENSION ASSEMBLY/BOGIE (CONT)

CAUTION

Extreme caution must be used to make sure that the upper suspension arm does not make contact with the platform spindle or damage to equipment may result.

25. Continue to pry upward on crowbar (29) and raise platform until upper suspension arm (22) is separated and clear of platform spindle (6). Using isolation valve handle extension, close suspension isolation valves at four corners of platform (para. 2-6).

26. Remove two hydraulic hoses (14) from drain pan and wrap hydraulic hoses and two pneumatic hoses (18) around upper suspension arm (22).

WARNING

Personnel moving bogie out from under platform must not, at any time, use caging bolt as a holding device. The caging bolt is held in place by pressure from spring in brake chamber. If caging bolt becomes unseated from inside brake chamber, injury to personnel may result.

27. With two people positioned at each set of dual tires on bogie (11) and a third person guiding/operating overhead lifting device (26), slowly roll bogie (11) out from under platform.

CAUTION

Alternate driving points on inner race of lower suspension bearing cone or damage to equipment may result.

28. Using a hammer and brass drift, drive lower bearing cone (30) and oil seal (31) from upper suspension arm (22). Discard oil seal.

29. Remove suspension chain (20).

30. Shut down APU (para. 2-16).

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials, and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Using wiping rags, clean all grease from inside of upper suspension arm cavity, platform spindle, and associated parts. Clean all parts using degreaser tank with cleaning solvent. Inspect upper suspension arm, platform spindle, upper and lower bearing cups, lower bearing cone, spacer, and attaching hardware for cracks, scoring, gouges, bends, and corrosion. Replace all defective parts.

2. Inspect suspension arm upper bearing cone, still on platform spindle, for defects. If defective, notify DS maintenance.

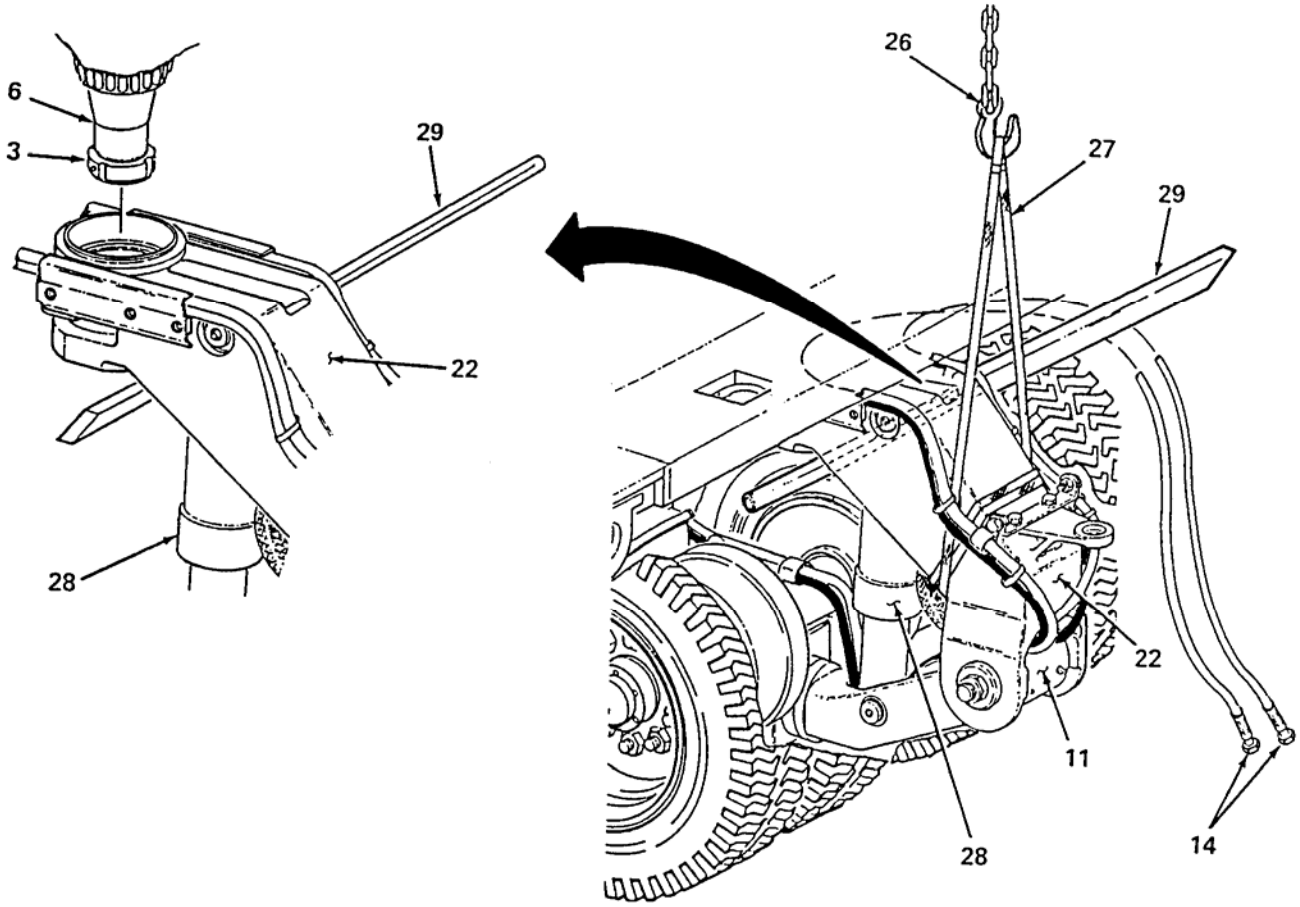
3. Inspect threads on spindle for roughness and deformation. Using a thread file, dress threads as necessary to ensure smooth re-installation of spanner nut.

LUBRICATION

Using grease, lubricating handgun, and a lubricant bearing packer, pack upper suspension bearing cone per lubrication instructions (para. 3-3).

INSTALLATION

1. If lifting straps (27) were removed from bogie (11), proceed as follows:



a. Position overhead lifting device (26) above upper suspension arm (22) of bogie (11).

b. Pass one end of each lifting strap (27) between upper suspension arm (22) and suspension cylinder (28).

c. Continue to wrap lifting straps (27) a minimum of two times around upper suspension arm (22) and connect both ends of each lifting strap (27) to overhead lifting device (26). Take up slack in lifting strap (27) until upper cavity is level.

4-40. SUSPENSION ASSEMBLY/BOGIE (CONT)

2. Remove masking tape from platform spindle (6) and install spanner nut (3) partially onto spindle to protect threads. Continue to thread spanner nut (3) onto platform spindle (6) until spanner nut is flush with bottom of spindle. Discard masking tape.

WARNING

Personnel moving bogie under platform must not, at any time, use caging bolt as a holding device. Caging bolt is held in place by pressure parking brake spring. If caging bolt becomes unseated from brake chamber, injury to personnel may result.

3. With two people positioned at bogie (11) and a third person to guide overhead lifting device (26), slowly roll bogie (11) under platform and into alinement under platform spindle (6).

4. Use crowbar (29) to center bearing cavity in upper suspension arm (22) with platform spindle (6).

5. Remove caps/plugs installed on two hydraulic hoses (14) to allow suspension cylinder (28) to draw in air as suspension cylinder expands.

NOTE

It may be necessary to use the crowbar to help start to raise the upper suspension arm as the overhead lifting device is raised.

Use the crowbar to pry the upper suspension arm upward and use one of the dual sets of tires on bogie to pry against.

A floor jack placed under bogie may be used to assist in getting upper suspension arm alined with spindle.

6. Place crowbar (29) just behind suspension cylinder (28) and on top of one of the sets of dual tires on bogie (11).

CAUTION

When raising upper suspension arm, make sure that the upper suspension arm does not contact the platform spindle or damage to equipment may result.

NOTE

The following task will require three people. One person to operate the overhead lifting device, one person to adjust position of upper suspension arm with crowbar, and one person to check and assist in alinement of the bogie upper suspension arm with the platform spindle.

7. Using one person to carefully push down on crowbar (29) and one person operating overhead lifting device (26), start raising upper suspension arm (22) onto platform spindle (6).

CAUTION

The upper suspension arm must be raised slowly. Adjust position of arm as necessary to center the upper suspension arm bearing cavity under the platform spindle to make sure that platform spindle does not make contact with bearing cups or damage to equipment may result.

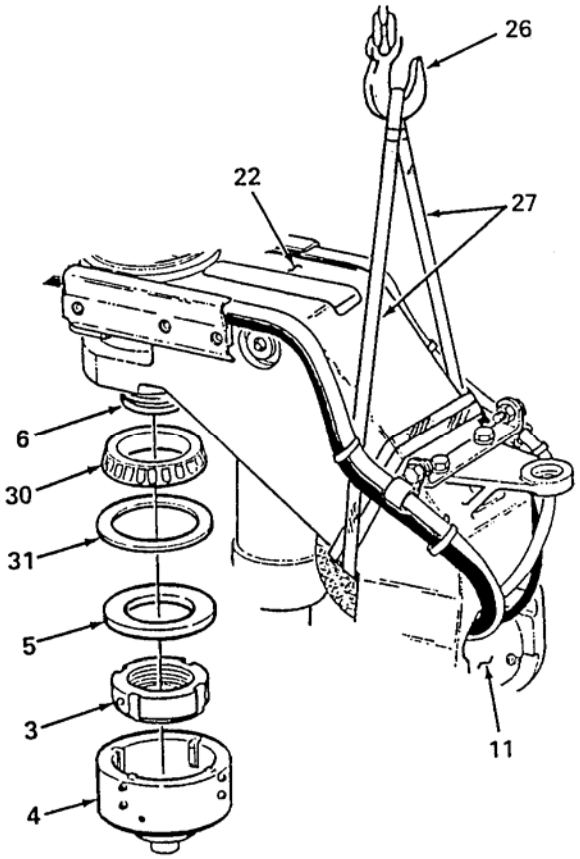
8. As two people continue to check and adjust position of upper suspension arm (22) with crowbar (29), third person must continue to slowly raise overhead lifting device (26) until upper suspension arm (22) raises onto platform spindle (6).

WARNING

If the platform must be lowered onto bogie to seat the upper suspension arm bearing, use caution not to apply too much force against the lifting straps and overhead lifting device. Excess force against the lifting devices used to pull/hold the upper suspension arm upward can break the straps or strain the lifting device and injury to personnel and damage to equipment may result.

9. If necessary, carefully lower platform (para. 2-19), as required, to facilitate final seating of upper bearing within upper suspension arm. Once seated, shut down APU (para. 2-16).

10. Remove spanner nut (3) from spindle (6).



4-40. SUSPENSION ASSEMBLY/BOGIE (CONT)

11. Aline and install lower bearing cone (30) on spindle (6) by hand. Push up lower bearing cone (30) as far as possible.

12. Using a ratchet and spanner socket (4), install spanner nut (3) and tighten to seat upper suspension arm (22) onto platform spindle (6).

13. Hold lower bearing cone (30) by hand and remove ratchet, spanner socket (4), and spanner nut (3).

CAUTION

Spacer must be centered and not hung up on the lip of the spindle or damage to equipment may result.

14. While holding lower bearing cone (30) in place inside of upper suspension arm (22), install spacer (5) and spanner nut (3).

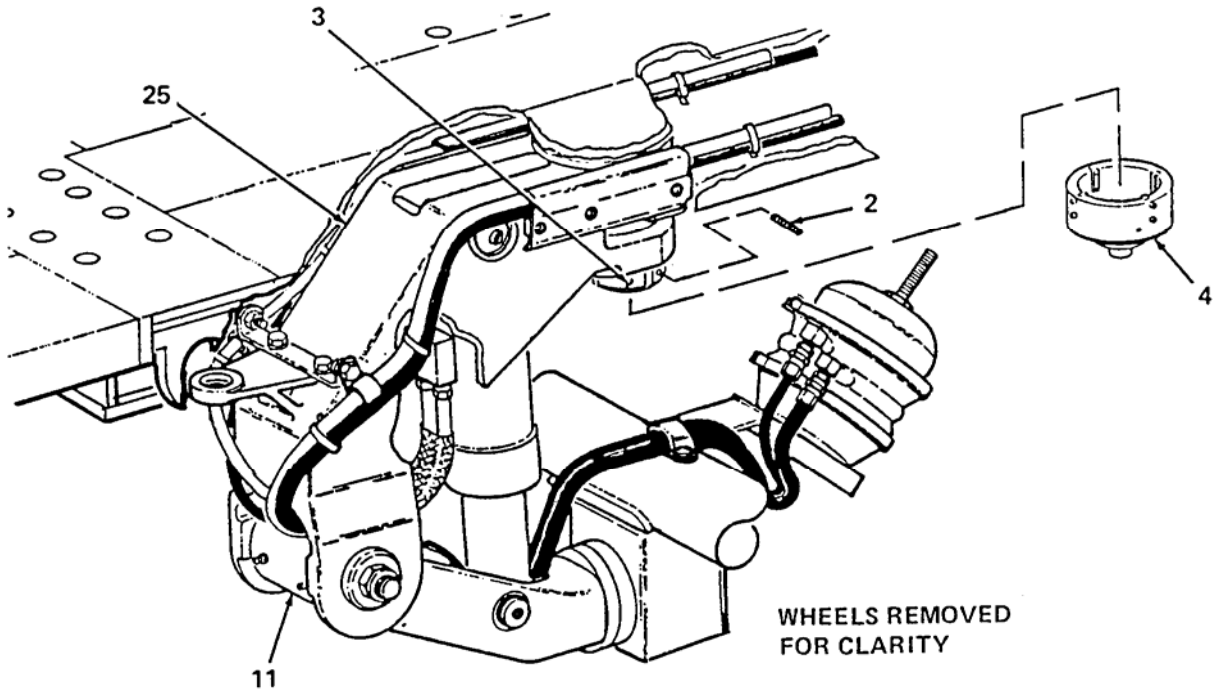
15. Attach a ratchet and spanner socket (4) to spanner nut (3) and tighten spanner nut (3) to seat lower suspension bearing cone (30) into upper suspension arm (22).

16. Using two people, continue to tighten spanner nut (3) as much as possible. Remove spanner socket (4) and ratchet.

17. Using a hammer, drive oil seal (31) into upper suspension arm (22).

18. Lower lifting device (26) and remove lifting strap (27) from upper suspension arm (22).

19. Using two people, rotate bogie (11) inboard to its original forward position, facing toward front of semitrailer.

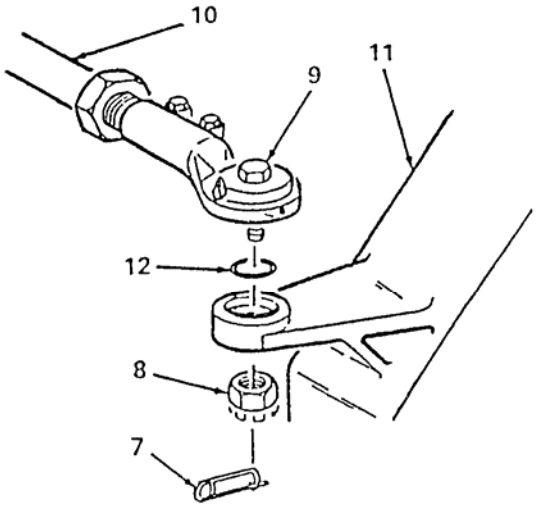


20. Using two people, a ratchet, torque wrench, torque multiplier, and spanner socket (4), torque spanner nut (3) to 850 lb-ft ±50 lb-ft (1153 Nm ±67 Nm).

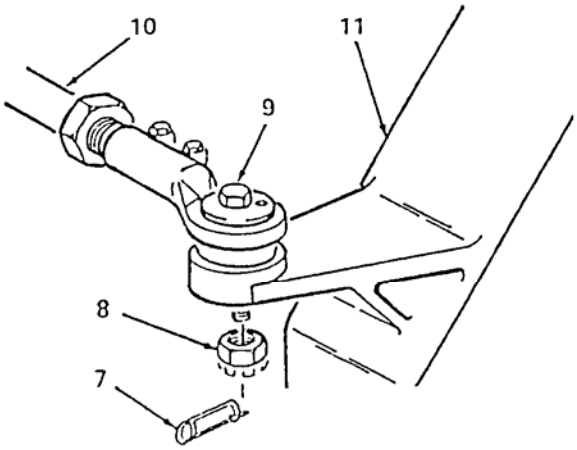
21. Remove torque wrench, torque multiplier, and spanner socket (4) from spanner nut (3).

22. Install setscrew (2) into spanner nut (3).

23. Make sure bogie (11) is positioned in original forward position, facing toward front of semitrailer.



BOGIE #1



TYPICAL #2, #3,
#4, OR #5 BOGIE

24. For #1 bogie only, aline and install preformed packing (12) onto bogie (11).

25. Remove safety pin (7), nut (8), and capscrew (9) from connecting link (10). Aline and install connecting link (10) onto linkage attaching point on bogie (11). Secure in place by installing capscrew (9) and nut (8).

26. Using a torque wrench, torque nut (8) to 205 lb-ft (278 Nm) and then continue to tighten nut (8) until first available slot is aligned with hole and safety pin (7) can be installed.

27. Reconnect two hydraulic hoses (14) to suspension isolation valve (1).

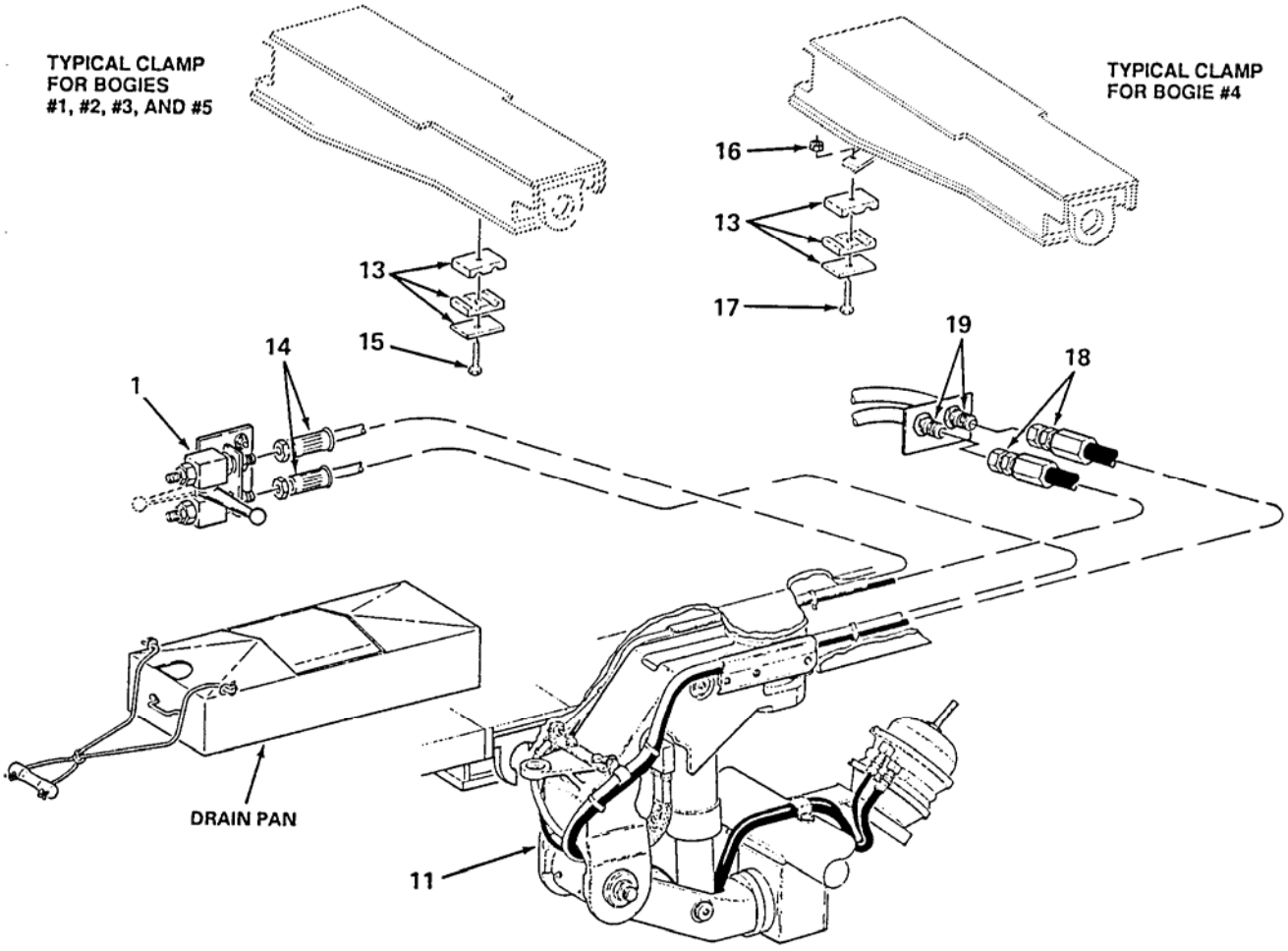
28. Secure two hydraulic hoses (14) with block clamp (13) as follows:

    a. For bogies #1, #2, #3, and #5, install sections of block clamp (13) over both hydraulic hoses (14) and secure with capscrew (15). Torque capscrew (15) to 70-80 in.-lb (7.9-9.0 Nm).

4-40. SUSPENSION ASSEMBLY/BOGIE (CONT)

b. For bogie #4, install sections of block clamp (13) over both hydraulic hoses (14) and secure with capscrew (17) and locknut (16). Torque capscrew (17) to 70-80 in.-lb (7.9-9.0 Nm).

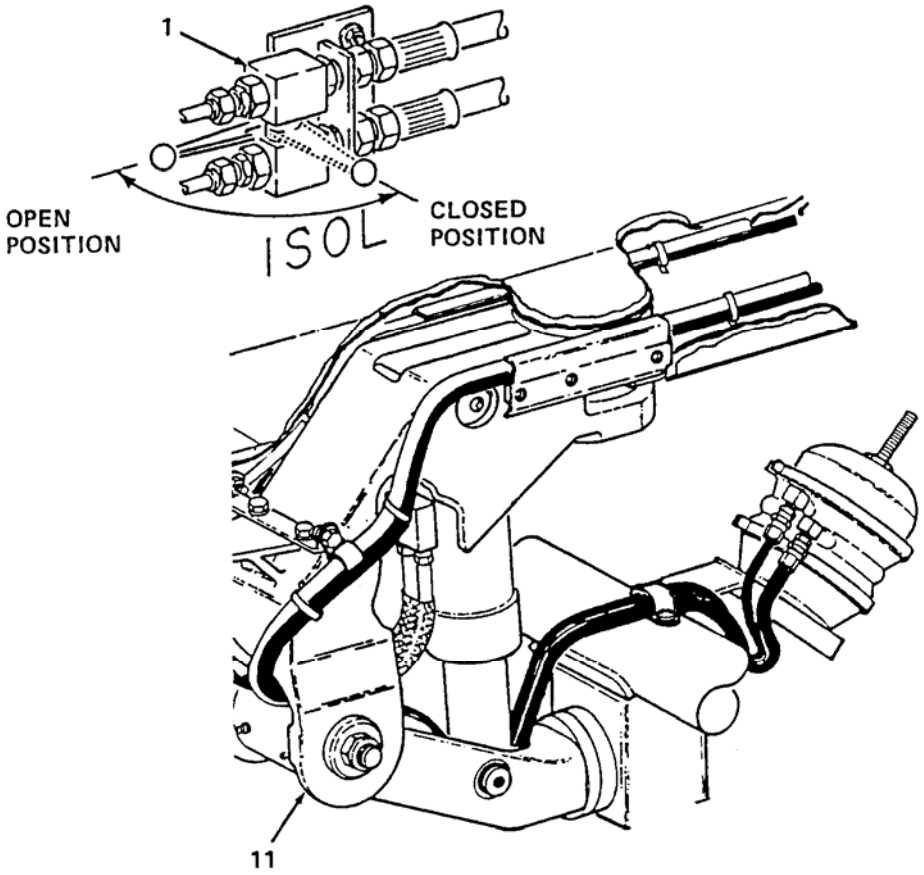
29. Remove caps/plugs and reconnect two pneumatic hoses (18) to two bulkhead fittings (19).



30. Couple tractor and semitrailer to recharge semitrailer air brake system (para. 2-24). Start APU (para. 2-16).

31. Using isolation valve handle extension, open suspension isolation valves at four corners of platform (para. 2-6), handles pushed inward facing toward front of semitrailer.

32. Open suspension isolation valve (1) at affected bogie (11), handle pushed inward facing toward front of semitrailer (para. 2-6).



WHEELS REMOVED
FOR CLARITY

33. Continue to lower platform (2-19) to lowest suggested height. Then, raise and lower platform several times to bleed any air trapped in suspension cylinder.

34. Adjust platform (para. 2-19) to normal running height of 43 inches (109 cm).

35. Shut down APU (para. 2-16).

FOLLOW-ON MAINTENANCE

1. Perform required lubrication to the bogie (para. 3-3).

2. Bleed suspension hydraulic circuit as required (para. 4-19).

4-41. SUSPENSION CYLINDER

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

Removal tool, figure F-14, appx. F
Isolation valve handle extension, item 1, appx. B
Suspension mandrel, item 6, appx. B
Suspension chain, item 8, appx. B
General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 2, item 18, appx. B:

Drain pan, 4 gl capacity	Sledge hammer, 12 lb
Measuring tape, 50 ft	Jack, floor, hydraulic, 10 ton
Goggles, Industrial	Gloves, chemical and oil protective
Extension light, 24 ft	Lubricating handgun
Retaining ring pliers, external	Degreaser tank, 20 gl capacity

Materials/Parts

Cleaning compound solvent, item 25, appx. E
Antiseize compound, item 3, appx. E
Grease, item 12, appx. E
Cap and plug set, item 5, appx. E
Wiping rag, item 19, appx. E
Strap, electrical tiedown, item 27, appx. E
Abrasive crocus cloth, item 6, appx. E
Ring spacer assembly (4)
Lockwasher (6)
Locknut (2)
Locknut
Locknut
Locknut

Personnel Required: 2

Equipment Condition

Outer/inner wheel removed (para. 3-8)
Inner/inner wheel removed (para. 3-10)

General Safety Instructions

WARNING

Hydraulic fluid may be hot if system has been in operation. Allow time to cool before performing maintenance or injury to personnel may result.

WARNING

Hydraulic fluid may be under pressure. Two wrenches must be used when disconnecting hydraulic lines or components or injury to personnel and damage to equipment may result.

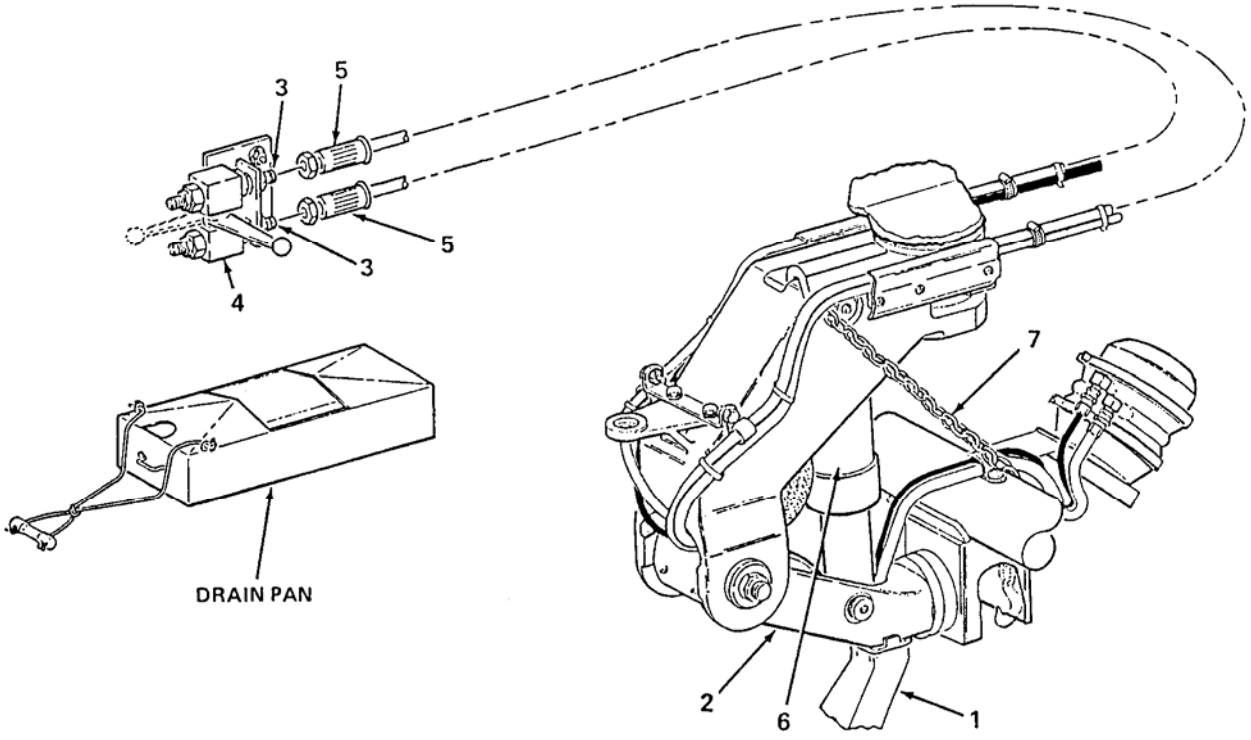
Hydraulic fluid can be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into eyes, flush immediately with water and seek medical attention. If hydraulic fluid gets on skin, wash thoroughly with soap and water. Wash hands thoroughly prior to eating or smoking.

REMOVAL

1. Raise platform height to 50 inches (127 cm) (para. 2-19). Shut down APU (para. 2-16).

2. Using isolation valve handle extension, close all suspension isolation valves (para. 2-6).

3. Place hydraulic floor jack (1) under lower suspension arm (2) and operate floor jack until it makes firm contact with lower suspension arm.



4-41. SUSPENSION CYLINDER (CONT)

WARNING

The hydraulic lines and cylinder may be under pressure. Use caution when loosening hydraulic lines to avoid any spraying of hydraulic fluid or injury to personnel may result.

4. Place a drain pan under straight adapter fittings (3) on suspension isolation valve (4) and proceed as follows:

CAUTION

When disconnecting hydraulic lines and fittings, it is important to use two wrenches, one to hold the fitting and one to turn the hose, or damage to equipment may result.

a. Using two wrenches, slowly loosen two hydraulic hoses (5) enough so that pressure will bleed from suspension cylinder (6) and hydraulic hoses (5).

b. Once fluid starts to bleed, hold hoses in place and allow all pressure to vent before removing hydraulic hoses (5) from straight adapter fittings (3).

5. Operate hydraulic floor jack (1) and raise the lower suspension arm (2) enough to allow suspension chain (7) to be removed.

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the hydraulic system or damage to equipment may result.

6. Tag and disconnect two hydraulic hoses (5) from straight adapter fittings (3) on suspension isolation valve (4). Install caps/plugs into openings.

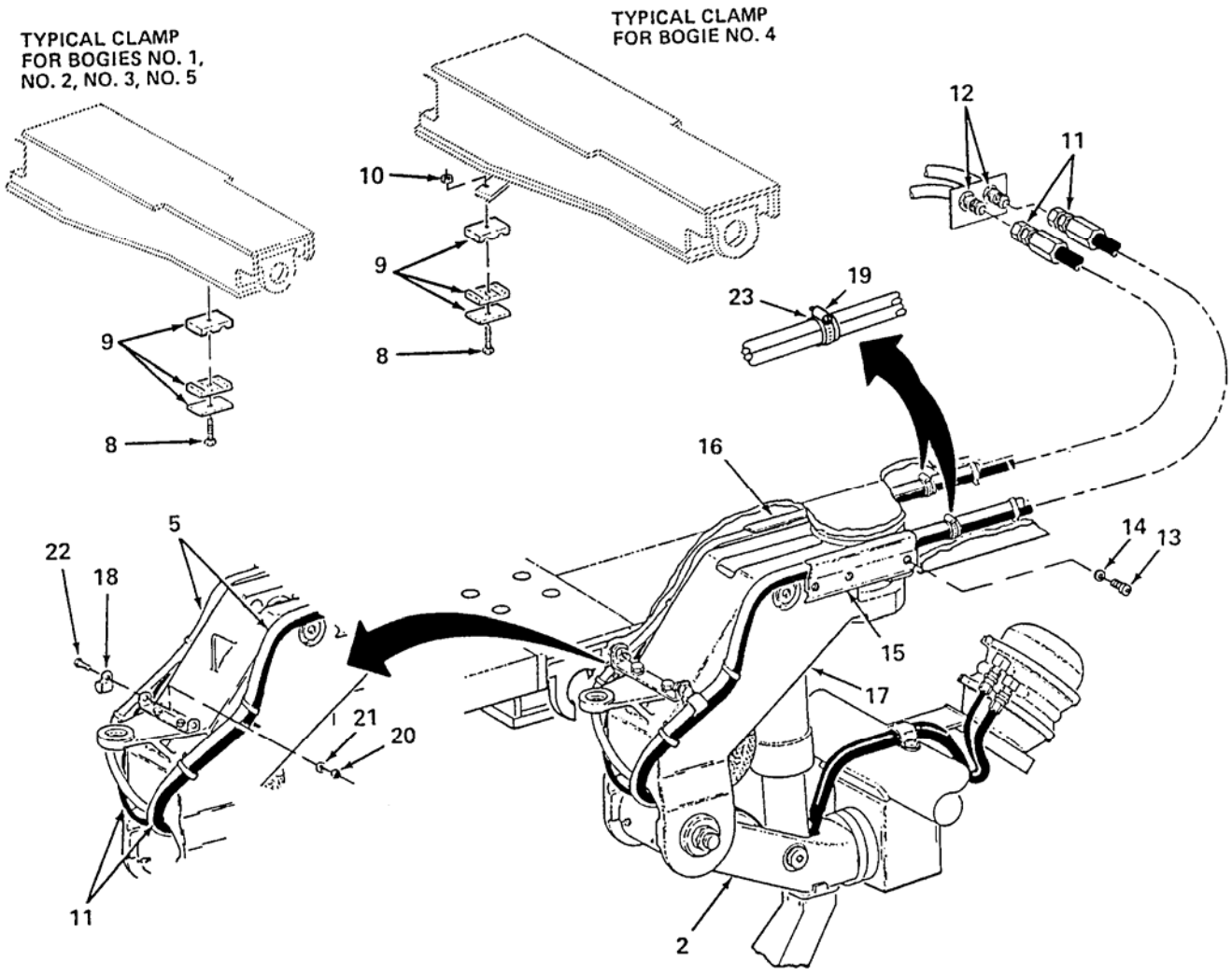
7. Remove screw (8), block clamp (9), and, if necessary, self-locking nut (10) (#4 bogie only). If removed, discard self-locking nut.

8. Tag and disconnect two air hoses (11) from fittings (12) at bulkhead. Install caps/plugs into openings/fittings.

9. Remove six capscrews (13), lockwashers (14), hose shield (15), and hose shield (16) from upper suspension arm (17). Discard lockwashers.

10. Mark location of both hose clamps (18) and hose clamps (19) on hydraulic hoses (5).

11. Remove two locknuts (20), washers (21), capscrews (22), and hose clamps (18) from upper suspension arm (17). Discard locknuts.

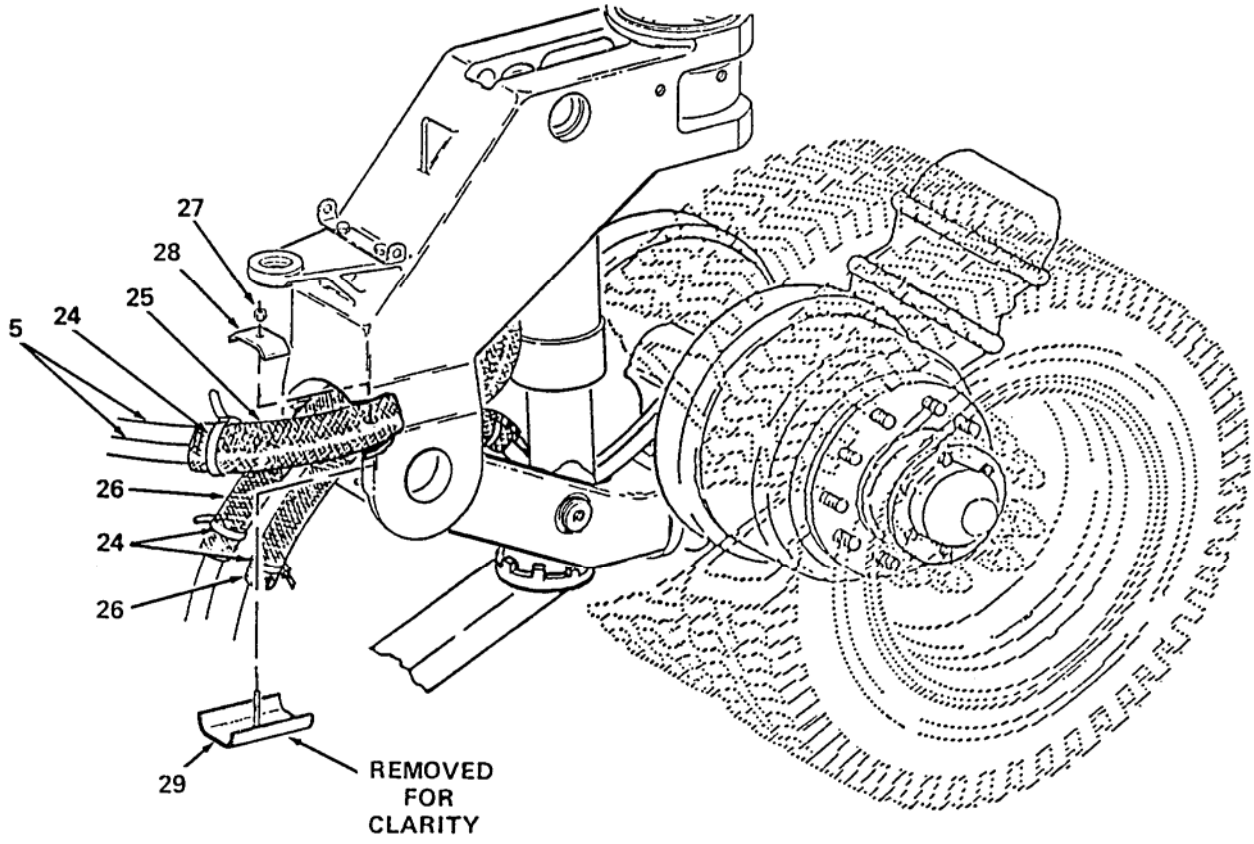


12. Remove two hose clamps (19) and protective moldings (23) from two hydraulic and air hoses (5 and 11).

13. Lay both sets of hydraulic hoses (5) and air hoses (11) in a straight line forward of lower suspension arm (2).

4-41. SUSPENSION CYLINDER (CONT)

14. Mark locations of all electrical tiedown straps (24) and mark starting and ending points for each protective loom (25 and 26) on each hose with chalk. Cut and remove all accessible electrical tiedown straps (24).



15. Remove locknut (27), loop clamp (28) from skid assembly (29) and two hydraulic hoses (5). Discard locknut.

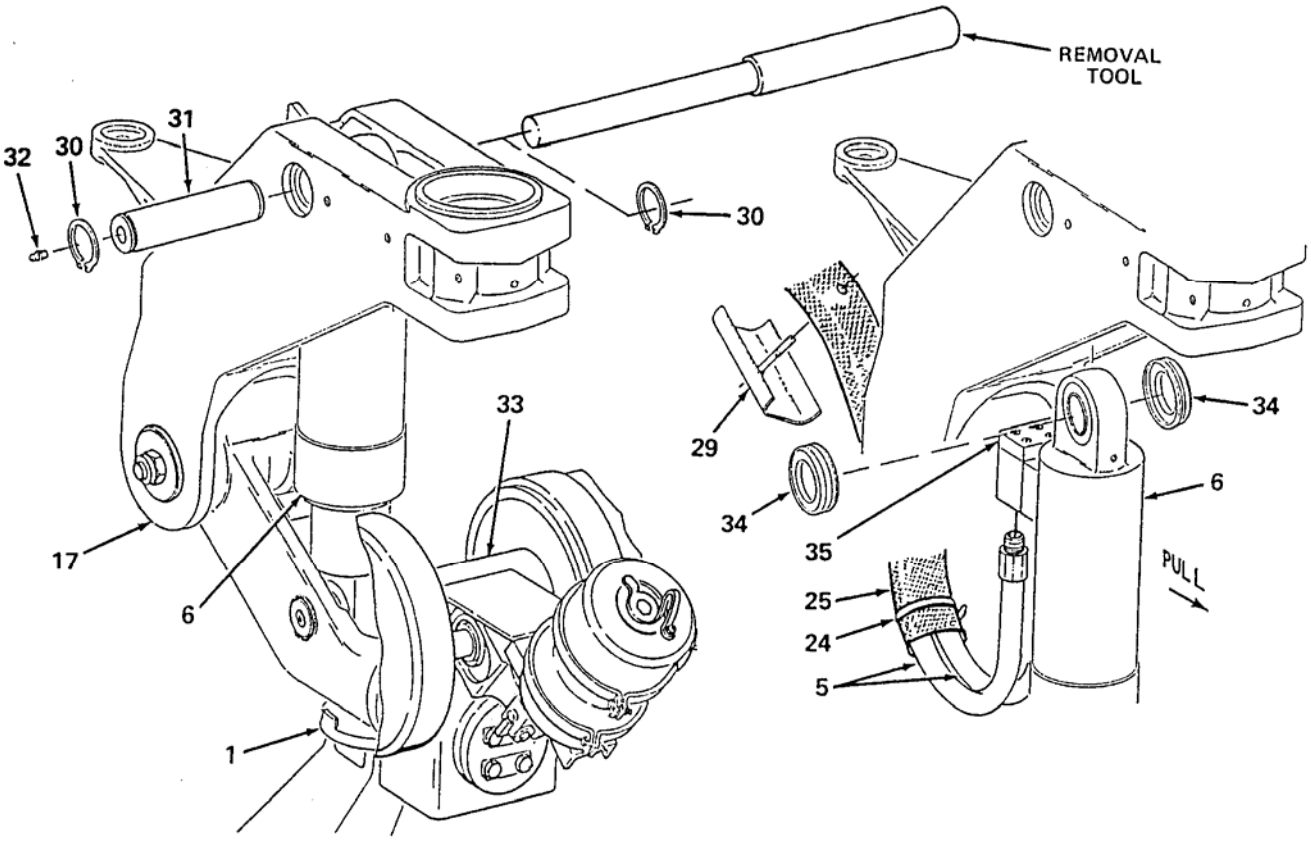
16. Using external retaining ring pliers, remove two retaining rings (30) from upper pin (31). Remove lubrication fitting (32) from upper pin (31).

17. Using sledge hammer and removal tool, drive upper pin (31) out of upper suspension arm (17) and suspension cylinder (6).

NOTE

As the suspension cylinder is lowered out of the upper suspension arm, ring spacer assemblies will probably fall to the ground.

18. Once upper pin (31) has been removed, lower hydraulic floor jack (1), compress suspension cylinder (6) fully and then pull on suspension cylinder (6) so that cylinder rests back against axle (33).



19. If two ring spacer assemblies (34) have fallen, pick up and discard ring spacer assemblies.

20. Cut and remove electrical tiedown straps (24) from loom (25). Remove skid assembly (29) from loom (25).

CAUTION

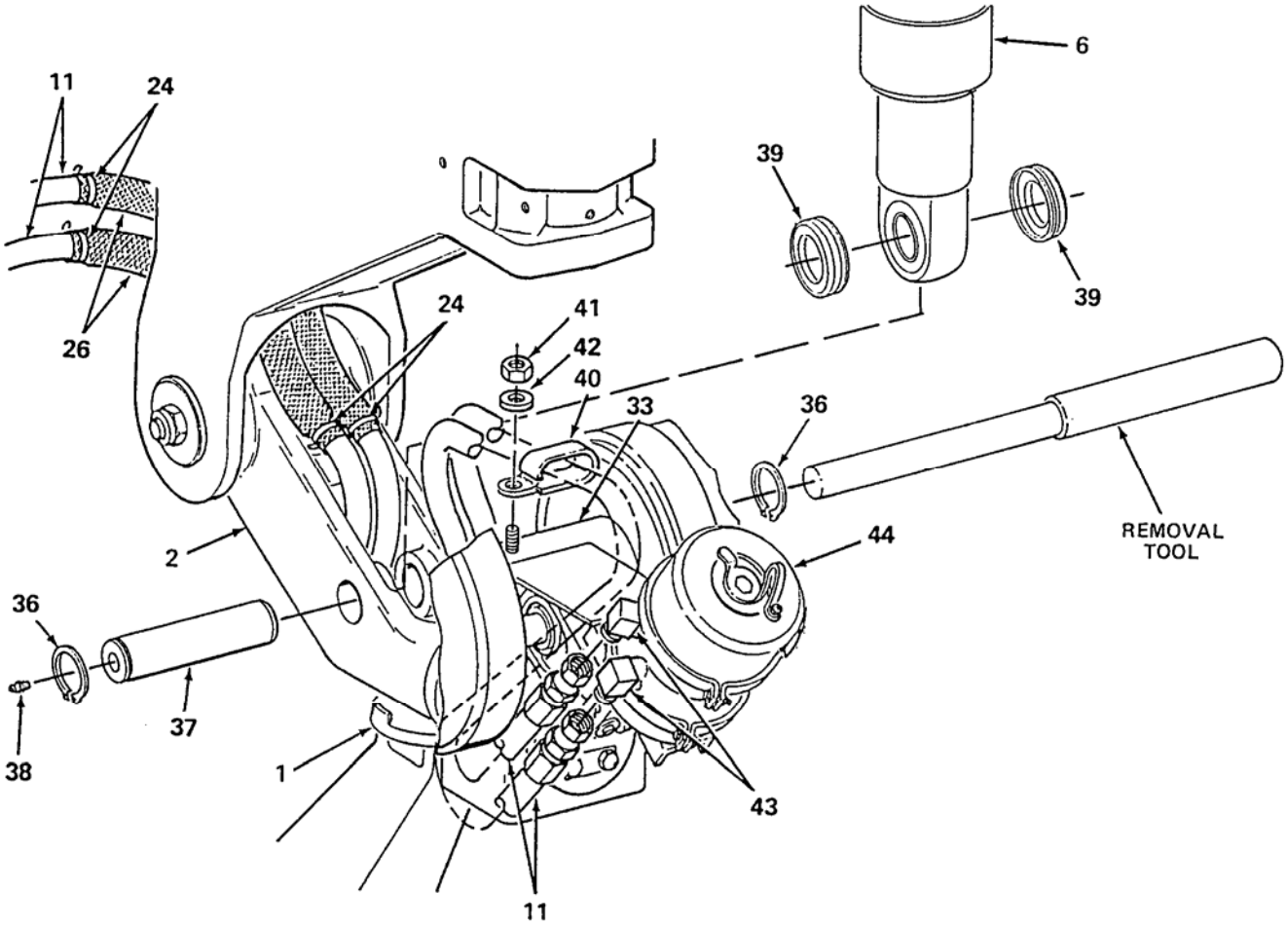
The ends of each hydraulic hose connected to the suspension cylinder line fracture valve do not have swivel fittings. During removal, each entire hose must be turned counterclockwise at the same rate as the end fitting is turned or damage to equipment may result.

21. Using one person to loosen each hose and one person to turn each hose (5) counterclockwise, tag and disconnect two hydraulic hoses (5) from line fracture valve (35).

22. Remove two hydraulic hoses (5) from bogie. Measure and document hole in loom (25) for skid assembly. Remove loom (25) from both hydraulic hoses (5).

4-41. SUSPENSION CYLINDER (CONT)

23. Using external retaining ring pliers, remove two retaining rings (36) from lower pin (37). Remove lubrication fitting (38) from lower pin (37).



CAUTION

Do not use excessive force when attempting to remove lower pin or damage to equipment may result. If lower pin cannot be removed after several attempts, notify DS maintenance.

24. Using sledge hammer and removal tool, use moderate driving force and drive lower pin (37) out of lower suspension arm (2) and suspension cylinder (6). If lower pin cannot be removed after several attempts, request DS maintenance perform procedures in paragraph 5-14 to remove pin.

WARNING

The suspension cylinder weighs approximately 85 pounds (39 kg) empty. Two people must be used to lift suspension cylinder out of the lower suspension arm or injury to personnel may result.

25. If necessary, lower hydraulic floor jack (1) and, using two people, remove suspension cylinder (6) from lower suspension arm (2).

26. Remove and discard two ring spacer assemblies (39) from suspension cylinder (6) or lower suspension arm (2).

27. Mark location of hose clamp (40) on two air hoses (11). Remove locknut (41), washer (42), and hose clamp (40) from axle (33). Discard locknut.

28. Tag and disconnect two air hoses (11) from elbow fittings (43) on brake chamber (44).

29. Remove two air hoses (11) from lower suspension arm (2). Install caps/plugs into openings/fittings. Cut and remove electrical tiedown straps (24) from loom (26) if necessary, and remove loom (26) from each air hose (11).

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials, and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Using degreaser tank with cleaning compound solvent, clean suspension cylinder, upper and lower suspension arms, upper and lower pins, and attaching hardware. Crocus cloth may be used to remove any excess buildup on upper or lower pins.

2. Use a 1/8-inch (0.3 cm) wire to work dirt out of lubrication fitting and grease holes in center and at end of lower pin.

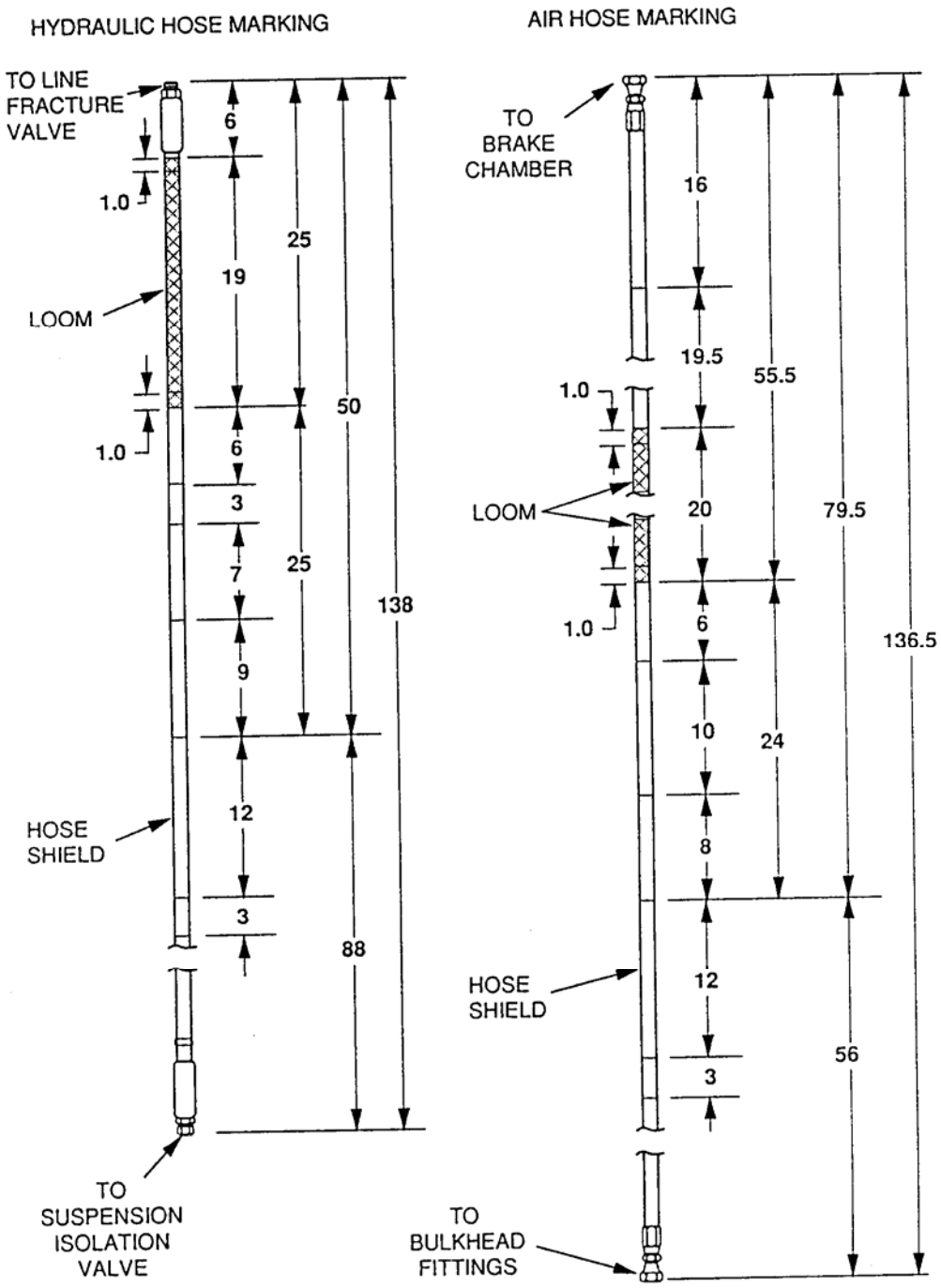
3. Clean bore of bearings in cylinder with a crocus cloth and solvent. Use welding tip cleaner set to clean out two grease holes and grease groove in bore of bearing.

4. After bearings and pin have been cleaned, install lubrication fitting into lower pin and install lower pin into lower cylinder bearing. Use lubricating handgun to apply grease to lubrication fitting. If grease does not come out between spherical bearing and outer shell of bearing, more cleaning is necessary.

4-41. SUSPENSION CYLINDER (CONT)

5. Inspect hoses for defects, kinks, chafing, and deterioration. If one or more hydraulic and/or air hose needs to be replaced, proceed as follows:

   a. Place defective hose(s) on a work bench so that each hose is flat and straight.



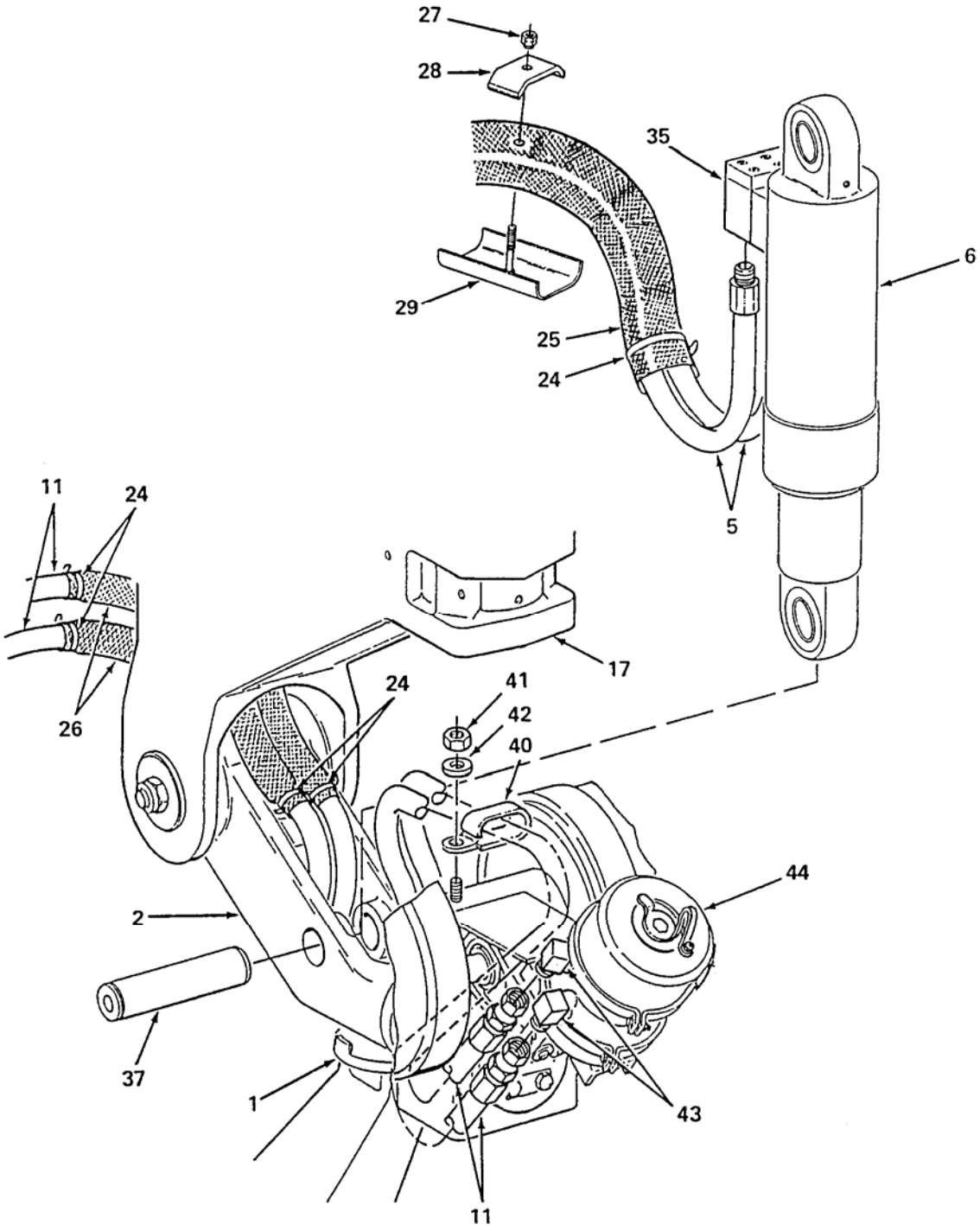
   b. Obtain replacement hydraulic hose(s) or fabricate replacement air hose(s) (para. 4-49 or 4-92).

c. Lay replacement hose(s) next to defective hose(s).

d. Transfer all chalk marks made on defective hose(s) to same locations on replacement hose(s) or mark new hoses as marked on illustration.

INSTALLATION

1. Install two looms (26) on air hoses (11) at positions previously marked.



4-41. SUSPENSION CYLINDER (CONT)

2. Secure each loom (26) in place on each air hose (11) by installing one electrical tiedown strap (24) onto each end of loom (26) approximately 1 inch (2.5 cm) from each end of loom.

3. Route air hoses (11) thru knee joint for lower suspension arm (2) and under inner casting mounts for lower cylinder pin (37).

4. Remove caps/plugs installed and connect two air hoses (11) to elbow fittings (43) on brake chamber (44).

5. Install hose clamp (40) over both air hoses (11) at position previously marked. Secure clamp (40) in place with washer (42) and locknut (41).

CAUTION

The ends of each hydraulic hose connected to the suspension cylinder line fracture valve do not have swivel fittings. During installation, each hose must be turned clockwise at the same rate as the end fitting is turned or damage to equipment may result.

6. Position suspension hydraulic cylinder (6) on ground near lower suspension arm (2).

7. Remove caps/plugs installed and, using one person to tighten each hydraulic hose (5) using two wrenches and one person to turn each hose (5) clockwise, connect two hydraulic hoses (5) to fittings (35) on suspension cylinder line fracture valve.

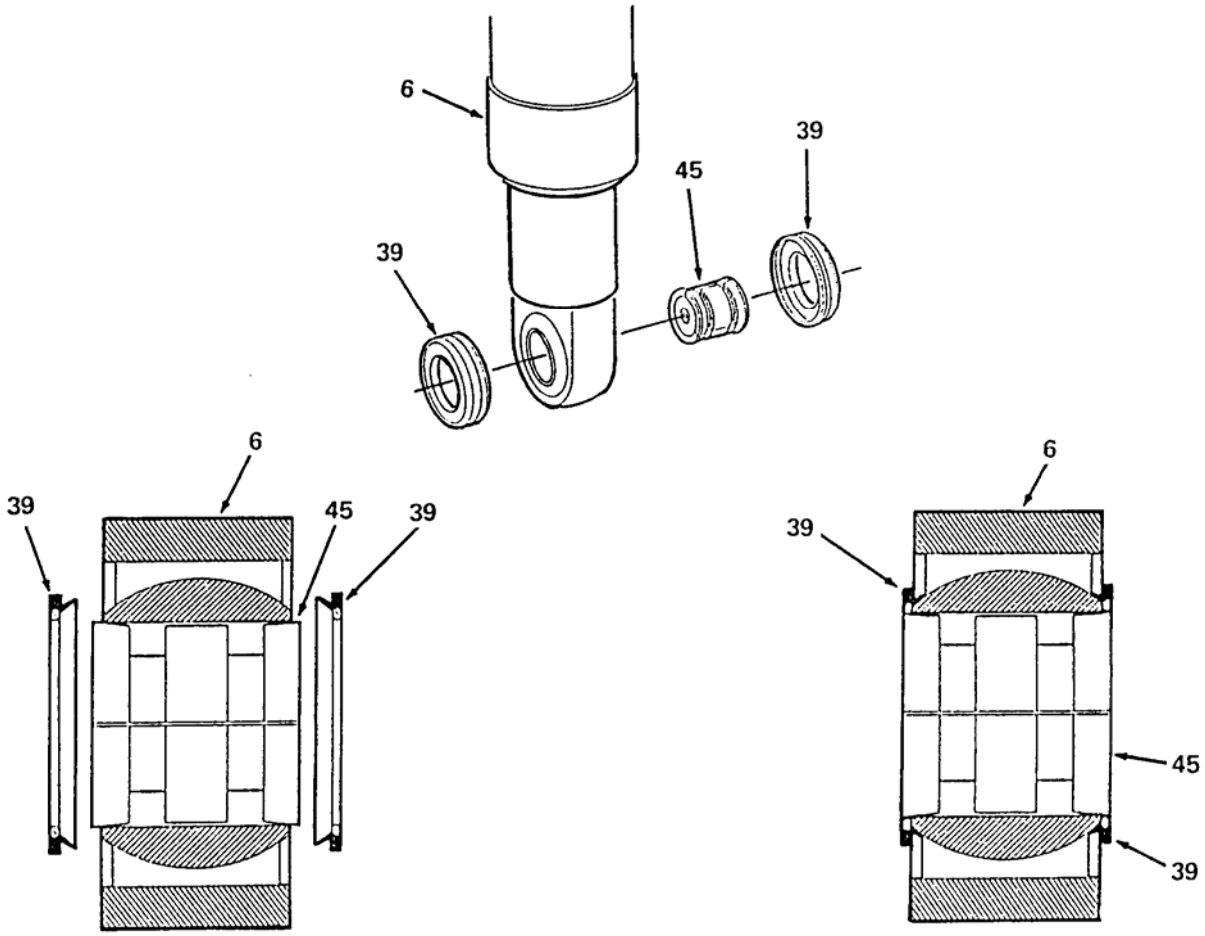
8. Install loom (25) on both hydraulic hoses (5) at position previously marked. Secure loom (25) in place by installing one electrical tiedown strap (24) onto each end of loom (25) approximately 1 inch (2.5 cm) from each end of loom.

9. Install skid assembly (29) at position previously identified and secure with loop clamp (28) and locknut (27).

CAUTION

Each ring spacer is made up of two pieces. Make sure both pieces remain together or equipment damage may result. Use suspension mandrel to hold ring spacer assemblies in place. Ensure ring spacer assemblies are tightly compressed on tool or there will not be enough clearance for installation.

10. Insert suspension mandrel (45) through lower spherical bearing on suspension cylinder (6). Install two ring spacer assemblies (39) onto lower bearing of cylinder.



CAUTION

When compressing ring spacer assemblies onto spherical bearings, make sure that tapered part of seal fits spherical bearing and ring spacer is compressed against the bearing or damage to the ring spacer assemblies may result.

11. Two people are required for this step. One person must carefully compress two ring spacer assemblies (39) onto lower spherical bearing while a second person tightens suspension mandrel (45) to hold both spacers (39) in place on lower bearing.

4-41. SUSPENSION CYLINDER (CONT)

CAUTION

When installing suspension cylinder into lower suspension arm casting, be sure ring spacer assemblies do not work loose or become misalined. If spacers are misalined or work loose, stop installation and remove cylinder or damage to ring spacer assemblies may result. It may take a few attempts to accomplish proper ring spacer installation.

When installing suspension cylinder into lower suspension arm, make sure the cylinder does not contact, pinch, or chafe any hydraulic or pneumatic hoses or damage to equipment may result.

NOTE

During installation of the cylinder, one person should observe the position of the cylinder by looking through hole in the sides of the lower suspension arm for the lower pin.

During installation, the suspension cylinder can rest against the lower suspension arm to help support the cylinder.

12. Using two people, maneuver suspension cylinder (6) into alinement with lower suspension arm (2). Carefully lower cylinder (6) into lower suspension arm (2). Check condition of ring spacer assemblies (39) during entire installation.

13. While checking position of ring spacer assemblies (39) and suspension cylinder (6), make any required adjustments to aline first ring spacer assembly (39) with hole in lower suspension arm (2). Loosen suspension mandrel (45).

14. Apply antiseize compound to lower pin (37).

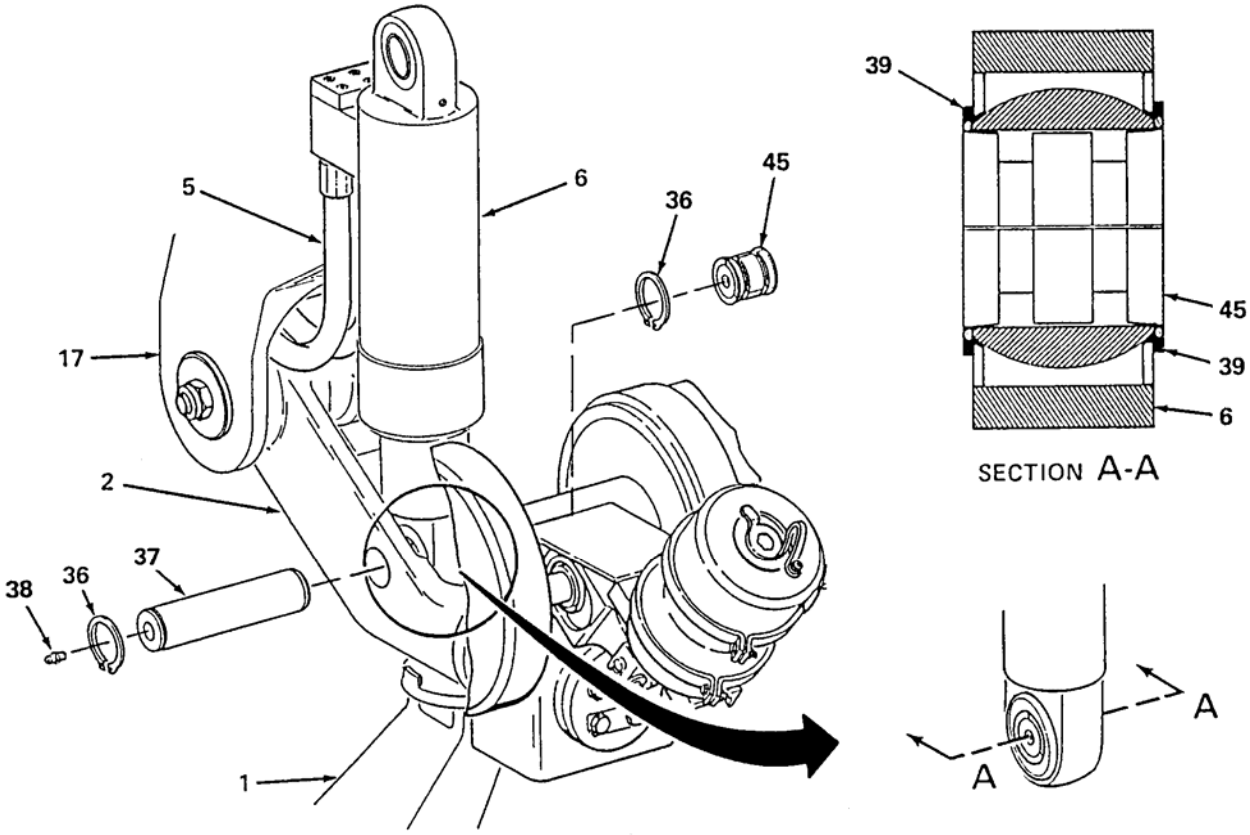
15. With ring spacer assemblies (39) alined, install lower pin (37) into lower suspension arm (2). Using softfaced hammer, slowly drive lower pin (37) through lower suspension arm (2) and suspension cylinder (6), driving suspension mandrel (45) out of cylinder.

16. Continue to drive lower pin (37) through suspension cylinder (6) and lower suspension arm (2). Stop driving lower pin (37) when lower pin is properly positioned (centered in lower suspension arm).

17. Using external retaining ring pliers, install two retaining rings (36) onto lower pin (37).

18. Install lubrication fitting (38) onto lower pin (37).

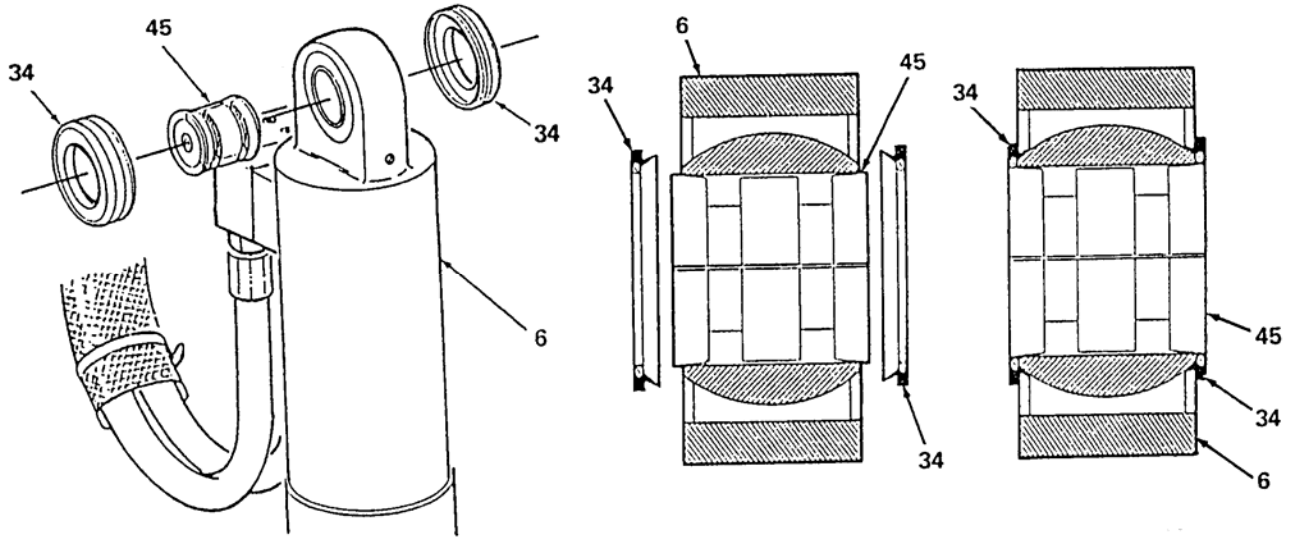
19. Route two hydraulic hoses (5) through knee joint of upper and lower suspension arms (17 and 2).



CAUTION

Each ring spacer is made up of two pieces. Make sure both pieces remain together or damage to equipment may result. Use suspension mandrel to hold ring spacer assemblies in place. Ensure ring spacers are tightly compressed on tool or there will not be enough clearance for installation.

20. Insert suspension mandrel (45) through upper spherical bearing on suspension cylinder (6). Install two ring spacer assemblies (34) onto upper bearing on suspension cylinder (6).



4-41. SUSPENSION CYLINDER (CONT)

CAUTION

When compressing ring spacer assemblies onto spherical bearings, make sure that tapered part of seal properly fits spherical bearing and ring spacer is compressed against the bearing or damage to the ring spacer assemblies may result.

21. Using two people, one person must carefully compress two ring spacer assemblies (34) onto upper spherical bearing while a second person tightens suspension mandrel (45) to hold both ring spacer assemblies (34) in place on upper bearing.

CAUTION

When installing suspension cylinder into upper suspension arm casting, be sure ring spacer assemblies do not work loose or become misalined. If spacers are misalined or work loose, stop installation and lower cylinder out of upper suspension arm or damage to ring spacer assemblies may result. It may take a few attempts to accomplish proper ring spacer installation.

NOTE

During installation of the cylinder, one person should observe the position of the cylinder by looking through hole in the sides of the upper suspension arm for the upper pin.

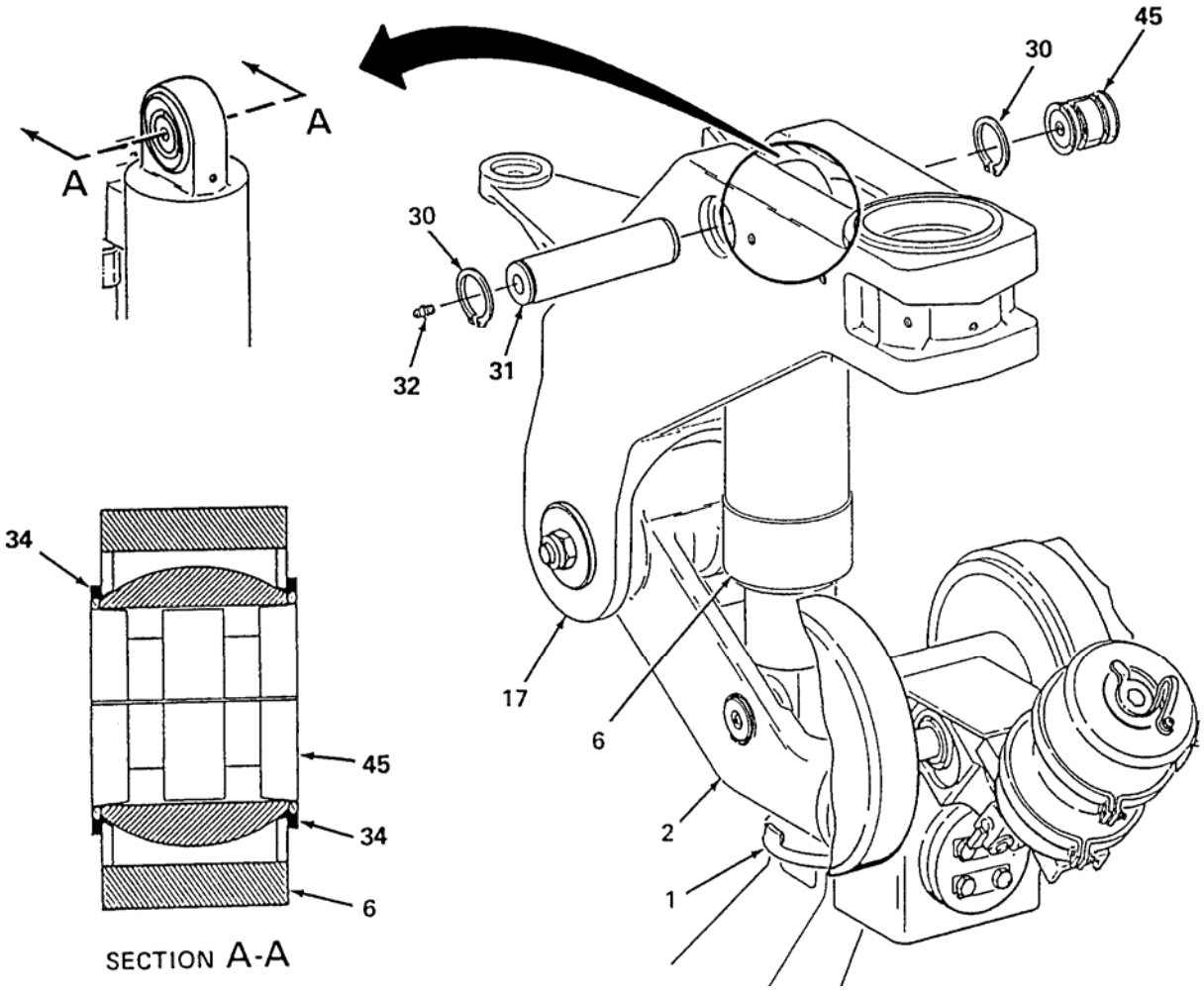
22. Using two people, maneuver suspension cylinder (6) into alinement with upper suspension arm (17).

23. Using hydraulic floor jack (1), carefully raise cylinder (6) into upper suspension arm (17). Check condition of ring spacer assemblies (34) during entire installation.

24. While checking position of ring spacer assemblies (34) and suspension cylinder (6), make any required adjustments to aline first ring spacer assembly (34) with hole in upper suspension arm (17). Loosen suspension mandrel (45).

25. Apply antiseize compound to upper pin (31).

26. With ring spacer assemblies (34) alined, install upper pin (31) into upper suspension arm (17).



27. Using softfaced hammer, slowly drive upper pin (31) through upper suspension arm (17) and suspension cylinder (6), driving suspension mandrel (45) out of cylinder.

28. Continue to drive upper pin (31) through suspension cylinder (6) and upper suspension arm (17).

29. Stop driving upper pin (31) when upper pin is properly positioned (centered in upper suspension arm).

30. Using external retaining ring pliers, install two retaining rings (30) onto upper pin (31).

31. Install lubrication fitting (32) onto upper pin (31).

4-41. SUSPENSION CYLINDER (CONT)

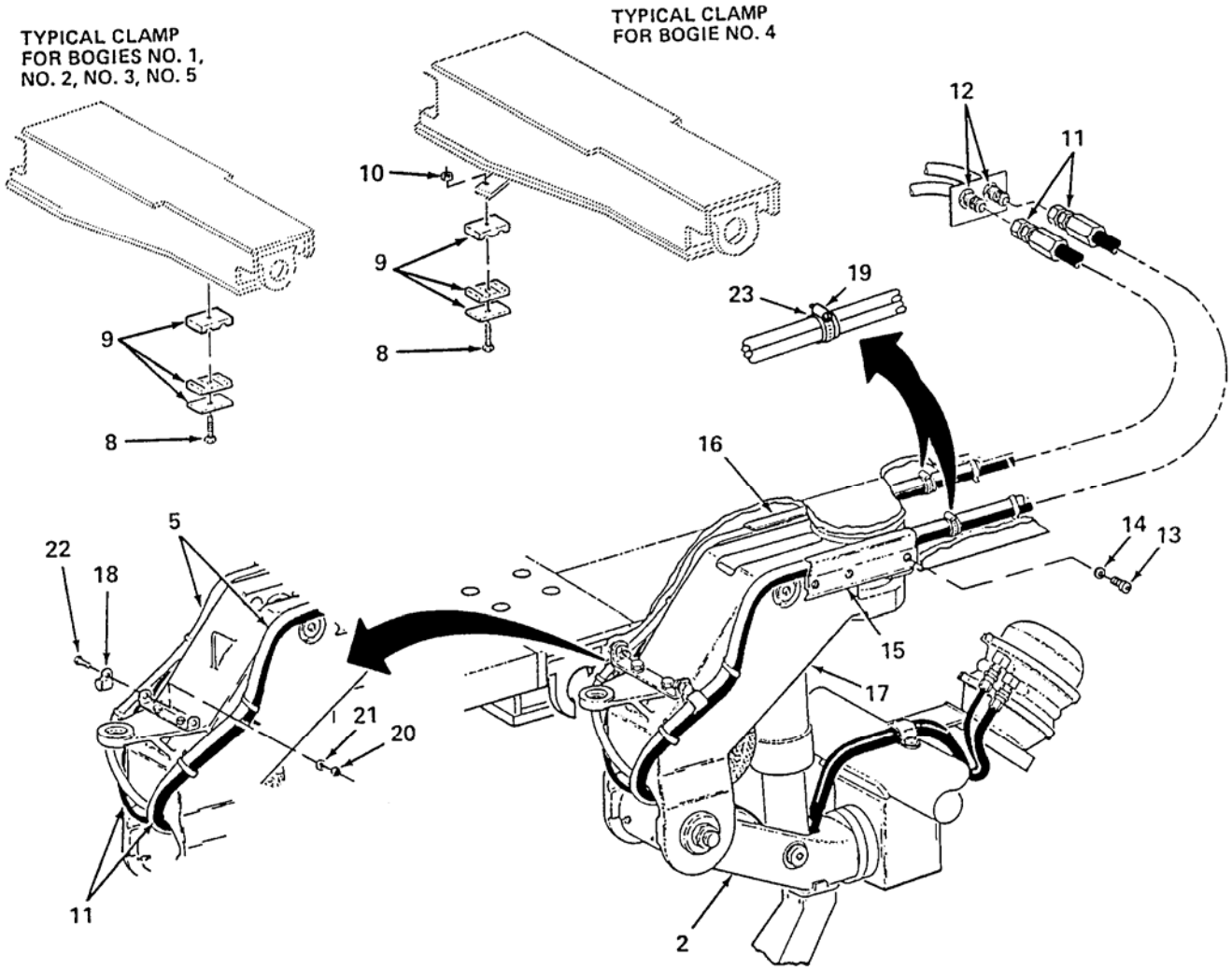
32. Install block clamp (9) and secure with screw (8) and, if necessary, self-locking nut (10) (#4 bogie only).

33. Remove caps/plugs installed and connect two air hoses (11) to fittings (12).

34. Using one person to hold both hydraulic hoses (5) in place, install two hose clamps (18) on hydraulic hoses (5) at positions previously marked. Secure hose clamps (18) in place by installing two capscrews (22), washers (21), and locknuts (20).

35. Route both hydraulic hoses (5) and air hoses (11) along each respective side of upper suspension arm (17) and place each set of hoses into hose shields (16 and 15).

36. Check position of shields (16 and 15) on each set of hoses. Move each hose (5 and/or 11) as required so that marks previously applied are alined with edges of both shields (16 and 15).

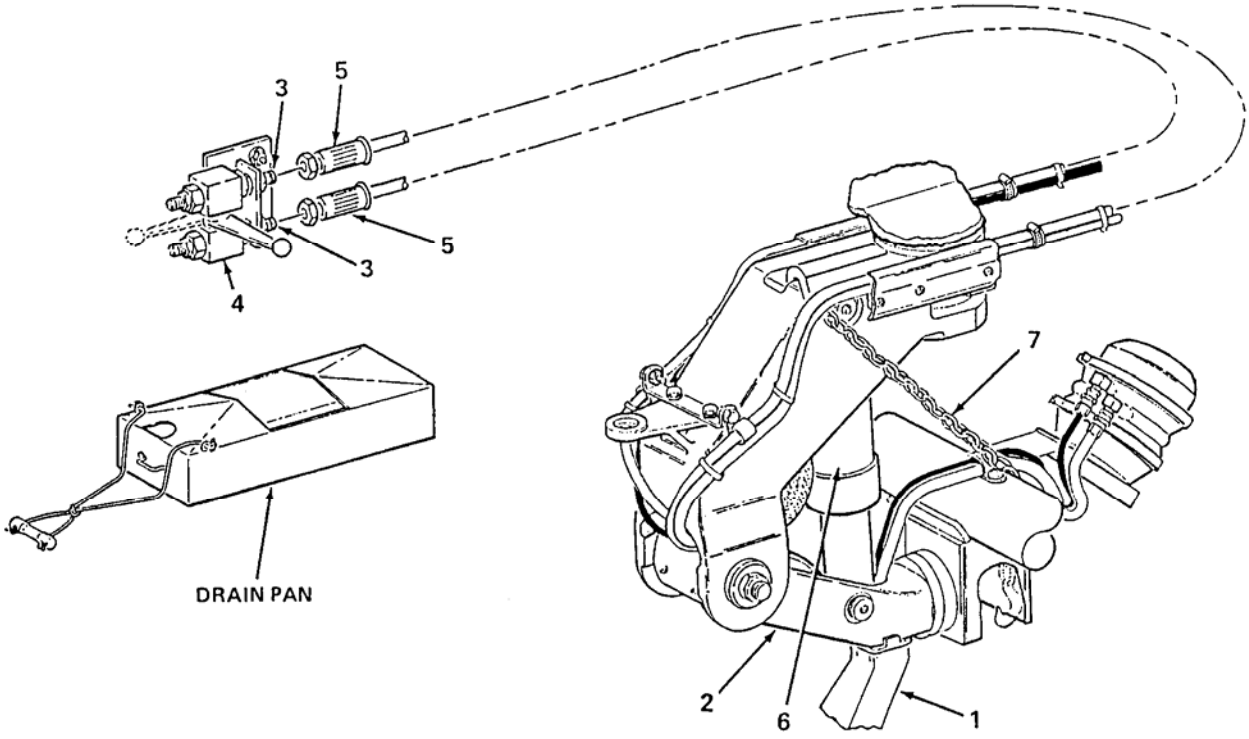


37. Install two shields (16 and 15), with hoses attached, to upper suspension arm (17) and secure each shield with three lockwashers (14) and capscrews (13).

38. Install electrical tiedown straps (24) on hydraulic hoses (5) and air hoses (11) at all remaining positions previously marked as required.

39. Install protective moldings (23) and hose clamps (19) onto hydraulic and air hoses (5 and 11) at positions previously marked.

40. Using hydraulic floor jack (1), raise or lower the lower suspension arm (2) to height needed to install suspension chain (7).



41. Remove caps/plugs installed and connect two hydraulic hoses (5) to straight adapter fittings (3) on suspension isolation valve (4).

CAUTION

When securing hook to axle, make sure that suspension chain does not contact any hydraulic or air hoses. If contact is made, chafing or parting of the hoses, loss of air brake pressure, loss of hydraulic fluid, or damage to equipment may result.

42. Install suspension chain (7) as follows:

    a. Attach end (top) hook of suspension chain (7) along outboard side of bogie between both hydraulic and air brake hoses and upper suspension arm into opening in upper suspension arm.

4-41. SUSPENSION CYLINDER (CONT)

b. Attach bottom hook of suspension chain (7) onto back end of square casting under axle outboard of parking brake chamber on axle.

43. Lower floor jack (1) and move floor jack clear of work area.

FOLLOW-ON MAINTENANCE

1. Aline and install inner/outer wheel (para. 3-9).

2. Aline and install outer/outer wheel (para. 3-7).

3. Perform required lubrication (para. 3-3).

4. Perform suspension circuit bleeding (para. 4-21).

5. Adjust platform height and check for proper operation (para. 2-19).

4-42. UPPER SUSPENSION ARM

This task covers: a. Removal b. Disassembly c. Inspection d. Lubrication e. Assembly f. Installation

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INITIAL SETUP

Tools

Lifting strap (2) item 31, appx. B
Overhead lifting device, 5000 lb (2270 kg) minimum capacity, or equivalent
General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 2, item 18, appx. B:

Combination wrench, 1-1/2"	Socket, 1-1/2", 3/4" drive
Ratchet, 3/4" drive	Feeler gage set, 20 blade set
Drain pan, 4 gl	Lubricating handgun
Degreaser tank, 20 gl	Goggles, industrial
Extension light, 24 ft	Measuring tape, 50 ft
Crowbar	Gloves, chemical and oil protective
Bearing lubricant packer	

Materials/Parts

Antiseize compound, item 3, appx. E
Crocus cloth, item 6, appx. E
Grease, item 12, appx. E
Wiping rag, item 19, appx. E
Cleaning compound solvent, item 25, appx. E
Lockwasher (6)
Locknut (4)
Locknut
Nonmetallic seal

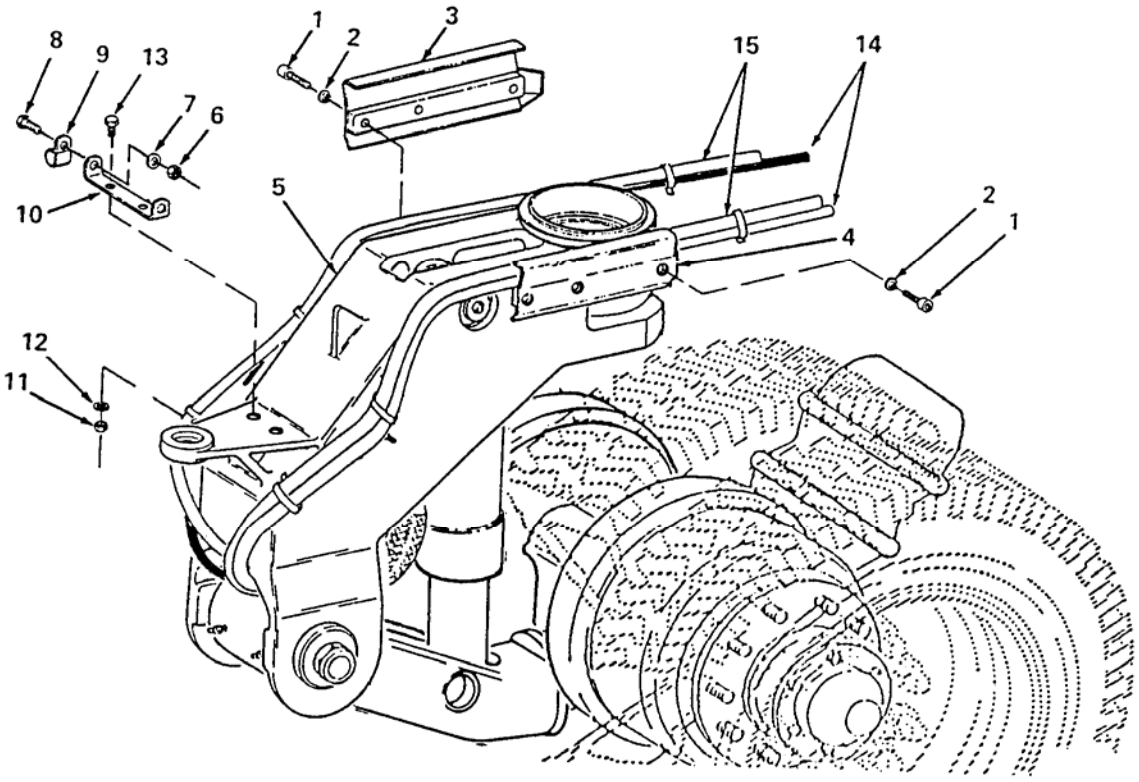
Personnel Required: 3

Equipment Condition

Suspension assembly removed from semitrailer (para. 4-40)

REMOVAL

1. Remove six capscrews (1), lockwashers (2), hose shield (3), and hose shield (4) from upper suspension arm (5). Discard lockwashers.



2. Remove two locknuts (6), washers (7), capscrews (8), and hose clamps (9) from hose clamp bar (10). Discard locknuts.

3. Remove two locknuts (11), flat washers (12), capscrews (13), and hose clamp bar (10) from upper suspension arm (5). Discard locknuts.

4. Move two air lines (14) and two hydraulic hoses (15) down and away from upper suspension arm (5).

NOTE

Wrap lifting strap(s) through the upper suspension arm casting to make sure the upper suspension arm will not accidentally slip or become misalined.

5. Attach lifting strap(s) (16) to upper suspension arm (5). Attach lifting strap(s) to overhead lifting device.

4-42. UPPER SUSPENSION ARM (CONT)

NOTE

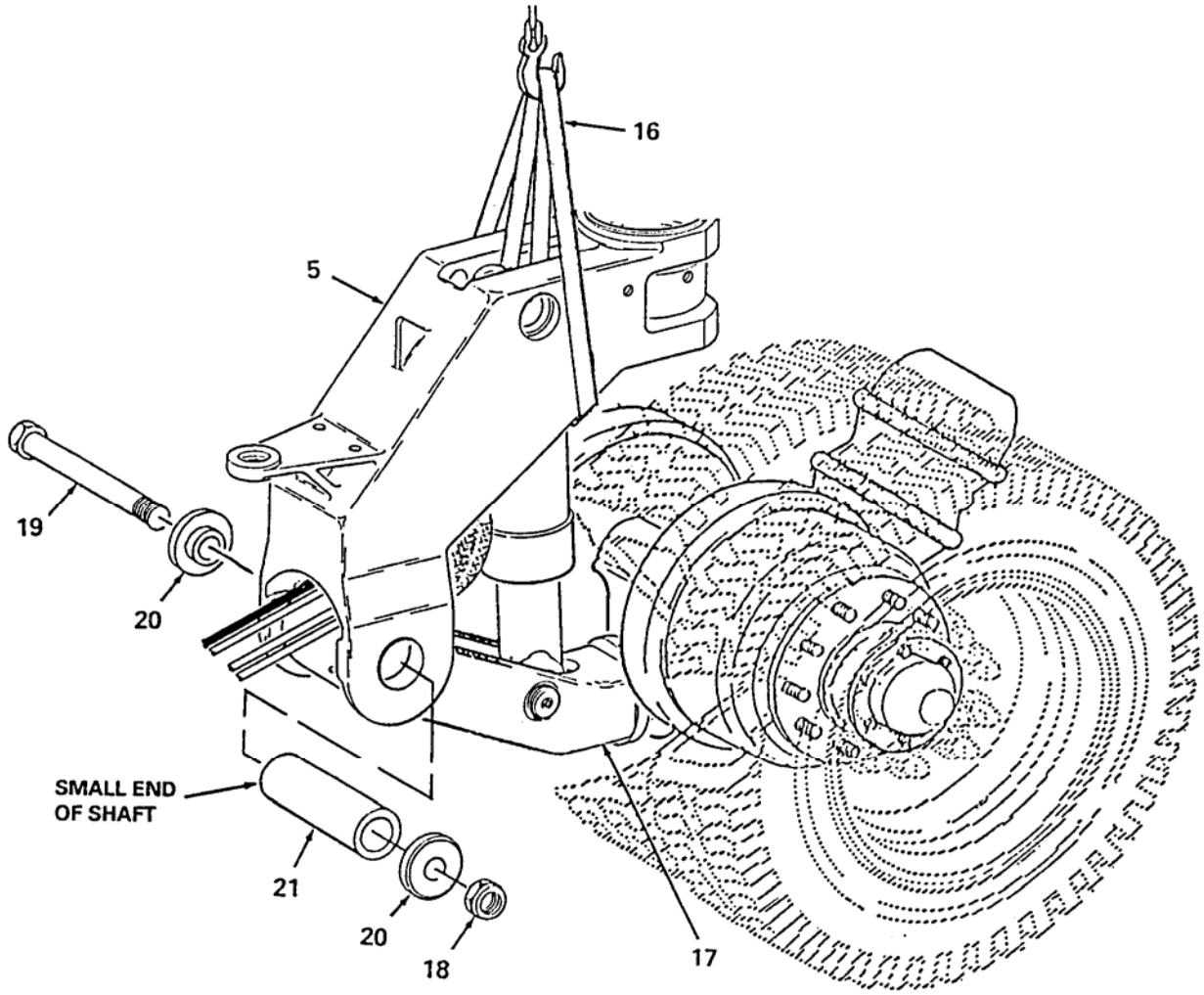
It may be necessary to use the crowbar to help raise the upper suspension arm. Once upper movement has started, the crowbar should no longer be necessary.

6. Operate overhead lifting device to start to raise up upper suspension arm (5) from lower suspension arm (17). If necessary, use crowbar to help upper suspension arm (5) to start moving.

7. Raise upper suspension arm (5) enough so that top of arm is approximately parallel to the ground.

8. Disconnect upper pin and spacer assemblies on suspension cylinder from upper suspension arm (5) (para. 4-41).

9. Using a 1-1/2-inch socket, 3/4-inch drive ratchet, 1-1/2-inch combination wrench, and two people, remove locknut (18), capscrew (19), and two access covers (20) from upper and lower suspension arms (5 and 17). Discard locknut.



NOTE

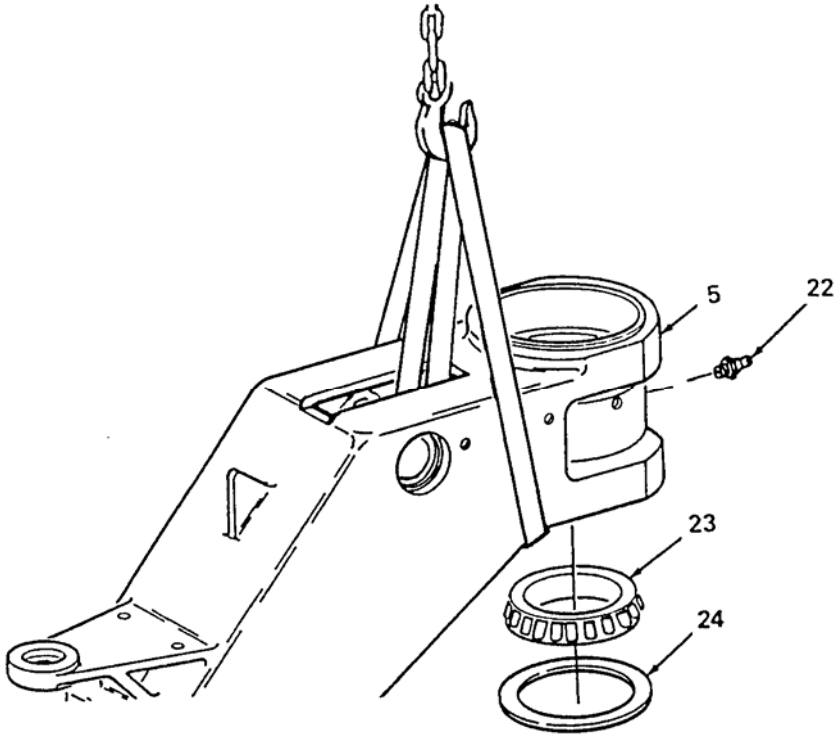
The suspension, when in its normally installed position, mounts the smaller end of the shouldered shaft toward the right-hand side of the suspension assembly. Thus, the shouldered shaft must be driven out starting from the right-hand side driving toward the left-hand side.

10. Using a hammer and brass drift, drive shouldered shaft (21) from left-hand side of lower suspension arm (17) and remove from upper and lower suspension arms (5 and 17).

11. Using two people to maneuver overhead lifting device and upper suspension arm (5) and one person holding/supporting lower suspension arm (17), separate lower suspension arm (17) from upper suspension arm (5) by pulling overhead lifting device away from lower suspension arm (17).

DISASSEMBLY

1. Remove lubrication fitting (22) from upper suspension arm (5).



2. Using a hammer and brass drift, drive lower bearing cone (23) and nonmetallic seal (24) out of bottom side of upper suspension arm (5). Discard seal.

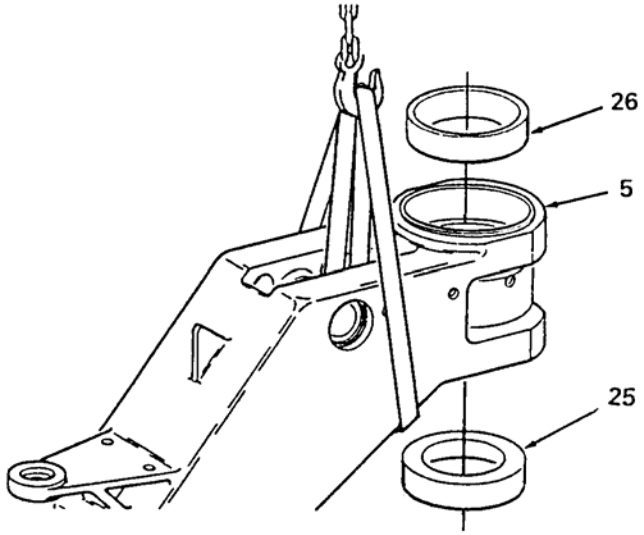
4-42. UPPER SUSPENSION ARM (CONT)

CAUTION

Alternate driving points on inner race of lower bearing cone when driving out lower bearing cone and nonmetallic seal or damage to equipment may result.

Alternate driving points on bearing cups during removal or damage to equipment may result.

3. If necessary, using a hammer and brass drift, drive lower bearing cup (25) from upper suspension arm (5).



4. If necessary, using a hammer and brass drift, drive upper bearing cup (26) from upper suspension arm (5).

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Using wiping rags, clean all grease from inside of upper suspension arm cavity and all associated parts. Clean all parts removed using degreaser tank with cleaning solvent. Inspect upper and lower suspension arm castings; upper and lower bearing cups; lower bearing cone; and attaching hardware for cracks, gouges in castings, and corrosion. Replace any parts found defective.

2. Using an abrasive crocus cloth, remove nicks and polish scored surfaces. If casting has defects, replace casting.

3. Inspect upper suspension bearing cone and platform spindle for cracks, gouges, scoring, excessive wear, and bent or loose bearing cage. If defects exist, notify DS maintenance.

LUBRICATION

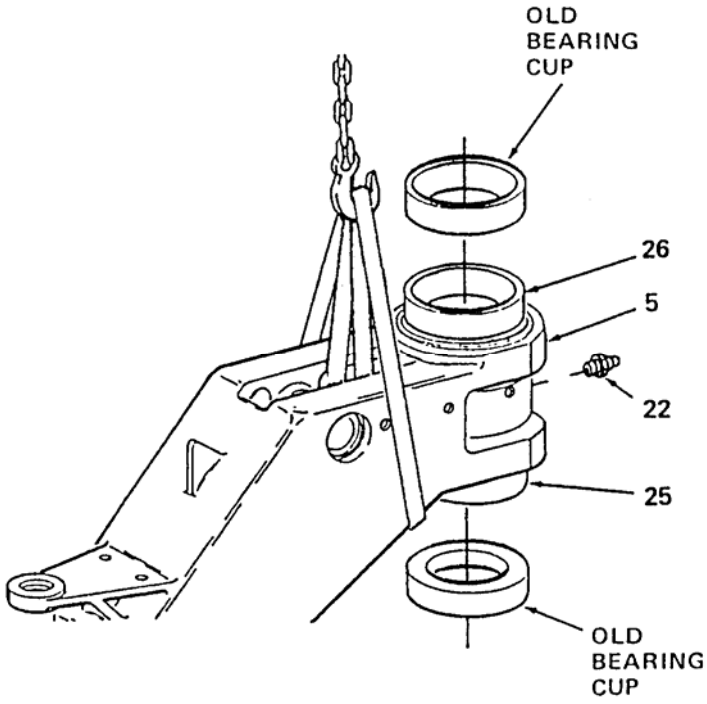
Using grease, bearing lubricant packer, and lubricating handgun, pressure pack lower suspension bearing cone per lubrication chart (para. 3-3).

ASSEMBLY

CAUTION

Use upper bearing cup removed during disassembly to help seat new bearing cup or damage to new bearing cup may result.

1. Aline upper bearing cup (26) with upper suspension arm (5) and, using a softface hammer, start seating upper bearing cup (26).



CAUTION

Alternate driving points on upper bearing cup or damage to equipment may result.

2. Aline existing bearing cup over new upper bearing cup (26) and, using a hammer, start driving bearing cup (26) into upper suspension arm (5).

4-42. UPPER SUSPENSION ARM (CONT)

3. Continue to drive upper bearing cup (26) into upper suspension arm (5) until firmly seated into casting of upper suspension arm (5).

CAUTION

Use lower bearing cup removed during disassembly to help seat new bearing cup or damage to new bearing cup may result.

4. Aline lower bearing cup (25) with upper suspension arm (2) and, using a hammer, start seating lower bearing cup (25).

CAUTION

Alternate driving points on lower bearing cup during installation or damage to equipment may result.

5. Aline existing bearing cup over new lower bearing cup (25) and, using a hammer, start driving bearing cup (25) into upper suspension arm (5).

6. Continue to drive lower bearing cup (25) into upper suspension arm (5) until firmly seated into casting of upper suspension arm (5).

NOTE

Lower bearing cone and nonmetallic seal will not be reassembled in this procedure. The suspension assembly must be reinstalled onto the semitrailer platform and installation of the above stated parts will be installed during that procedure (para. 4-40).

7. Install lubrication fitting (22) to upper suspension arm (5).

INSTALLATION

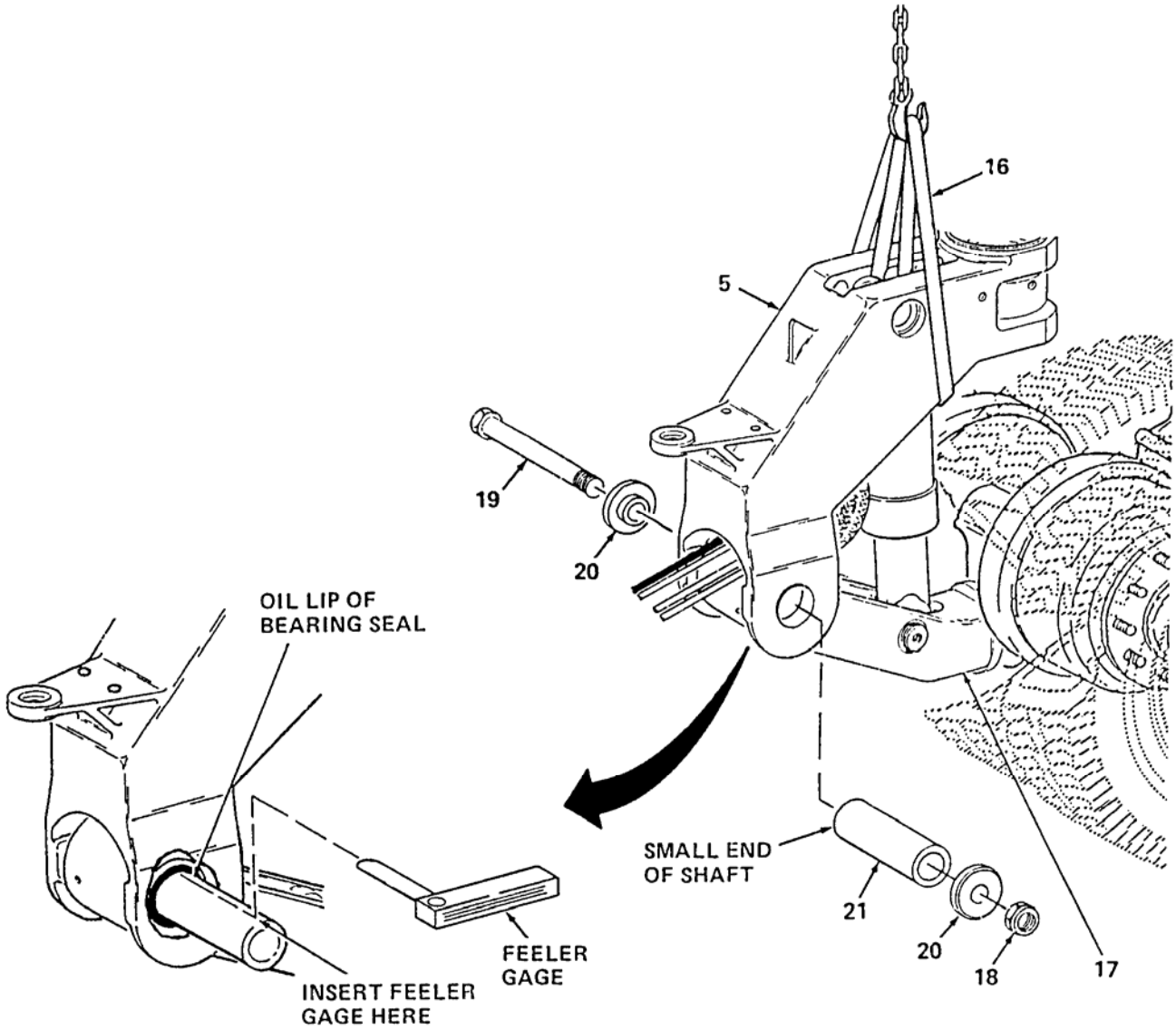
1. Using two people to maneuver overhead lifting device and upper suspension arm (5) and one person to hold/support lower suspension arm (17), aline upper suspension arm (5) with lower suspension arm (17).

2. Apply antiseize compound to inside bore of assembly joint for both upper and lower suspension arms (5 and 17) and to exterior of shouldered shaft (21).

NOTE

The shouldered shaft is 0.063 inches (1.6 mm) larger at one end. It may be necessary to measure both ends with accurate scale to determine which is the smaller end.

3. Insert smaller end of shouldered shaft (21) through larger bore in upper suspension arm (5) and into bore in lower suspension arm (17) until shaft movement is stopped by lip at bearing oil seal.



4. Using a 0.015-inch blade, on 20-blade feeler gage set, inserted into smaller bore of upper suspension arm (5), carefully adjust position of lip of bearing oil seal up onto small end of shouldered shaft (21).

CAUTION

If shouldered shaft is driven with excessive force, damage to the seals may result.

5. Drive shouldered shaft (21) until smaller end extends through bearing oil seal and upper suspension arm (5) bore.

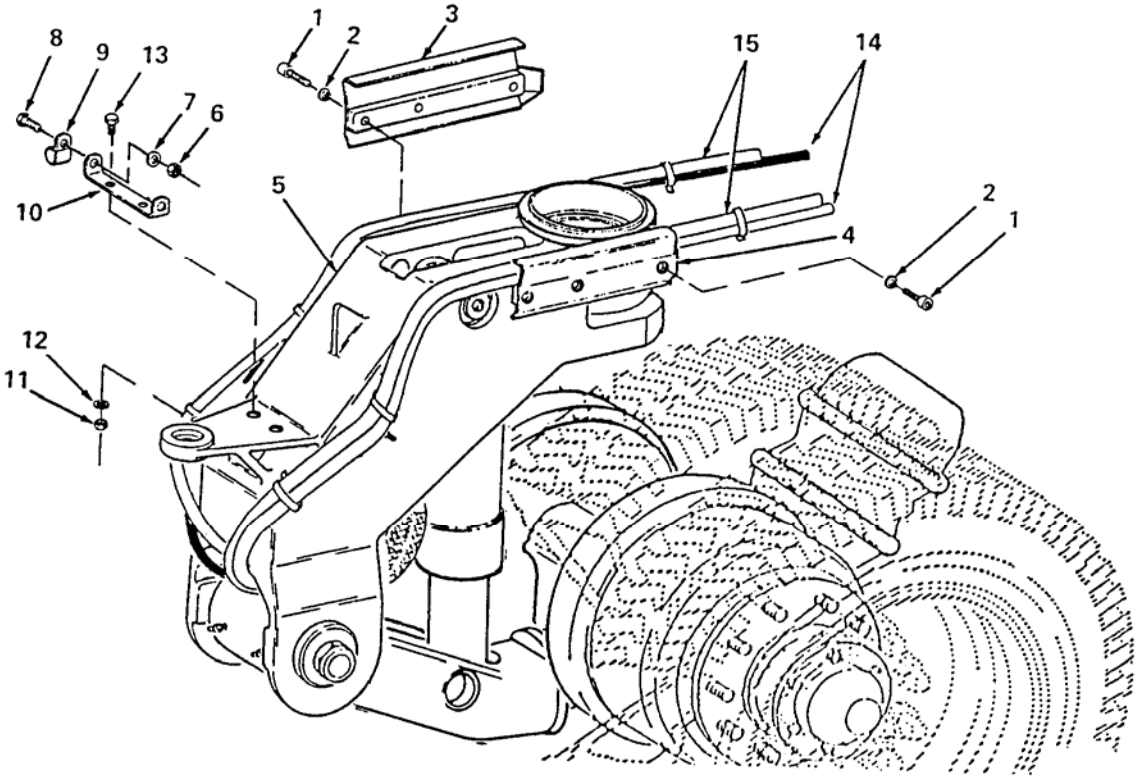
6. Using a 1-1/2-inch socket, 3/4-inch drive ratchet, 1-1/2-inch combination wrench, and two people, install two access covers (20), capscrew (19), and locknut (18) to upper and lower suspension arms (5 and 17).

4-42. UPPER SUSPENSION ARM (CONT)

7. Aline and install suspension cylinder into upper suspension arm (5) and secure with upper pin and spacer assemblies (para. 4-41).

8. Remove lifting strap(s) (16) and overhead lifting device from upper suspension arm (5).

9. Aline two hydraulic hoses (15) and air brake hoses (14) into place on upper suspension arm (5). Use one person to hold hoses until hose shields (3 and 4) are installed and secured in place.



10. Aline and install two hose shields (3 and 4) onto upper suspension arm (5), securing both air lines (14) and hydraulic hoses (15) in place. Secure hose shields (3 and 4) in place by installing and loosely hand-tightening six capscrews (1) and lockwashers (2).

11. Aline hose clamp bar (10) over upper suspension arm (5) and secure in place with two capscrews (13), flat washers (12), and locknuts (11).

12. Install two hose clamps (9) onto two hydraulic lines (15) and secure in place by installing two capscrews (8), washers (7), and locknuts (6).

13. Pull on both air lines (14) and hydraulic hoses (15) to remove excess slack in lines.

14. Tighten six capscrews (1) to secure hose shields (3 and 4).

FOLLOW-ON MAINTENANCE

1. Install suspension assembly onto platform (para. 4-40).

2. Perform required lubrication to suspension assembly (para. 3-3).

4-43. SERVICE BRAKES

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Extension light, 24 ft, item 18, appx. B
Brake repair pliers, item 18, appx. B
Degreaser tank, 20 gl, item 18, appx. B
Retaining ring pliers, item 18, appx. B

Materials/Parts

Crocus cloth, item 6, appx. E
Cleaning compound solvent, item 25, appx. E
Lockwasher (4)

Equipment Condition

Hub and drum removed (para. 4-50)

General Safety Instructions

CAUTION

Brake adjustments (para. 4-15) are mandatory after installing new brakes or performing maintenance on brakes. Brake adjustments must also be accomplished if any of the following conditions exist:

The slack adjusters are not level to each other when brakes are applied.

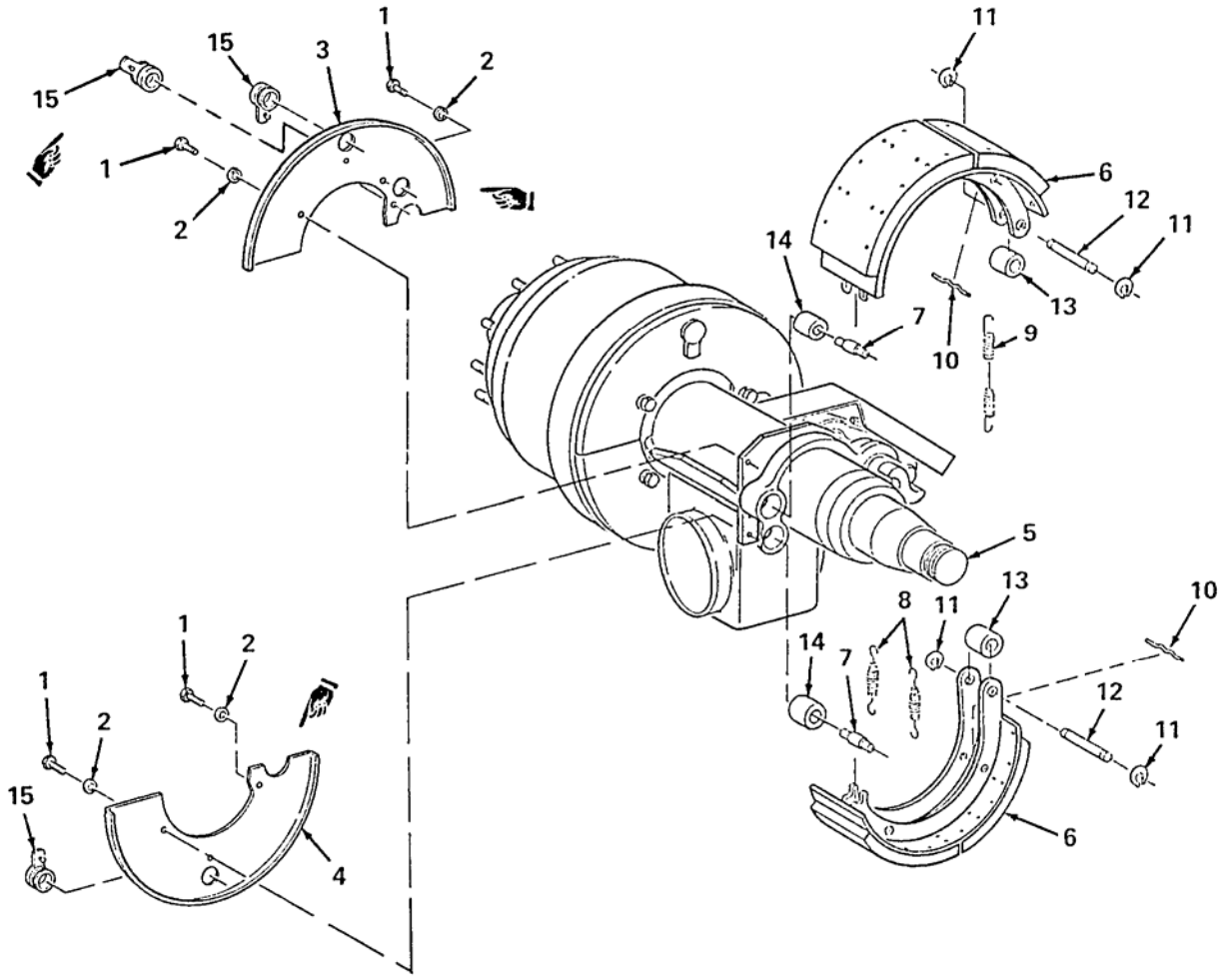
Brake chamber clevis moves more than 2 inches (5.1 cm) from fully released condition to fully engaged condition (para. 4-10, item no. 3).

Brake drum temperature is cool to the touch after heavy braking operations have been performed.

4-43. SERVICE BRAKES (CONT)

REMOVAL

1. Remove four capscrews (1), lockwashers (2), upper dust shield (3), and lower dust shield (4) from axle assembly (5). Discard lockwashers.



2. Lift or lower each brake shoe (6) from headless shoulder pins (7) mounted on axle assembly (5) and drive out two headless shoulder pins (7).

3. Using brake repair pliers, remove two helical extension springs (8) from brake shoes (6).

4. Pull and remove two brake shoes (6) from axle assembly (5). Remove helical extension spring (9) from brake shoes (6) and separate brake shoes.

5. Remove two return spring pins (10) from brake shoes (6).

6. Using retaining ring pliers, remove four retaining rings (11), two headless grooved pins (12), and rollers (13) from brake shoes (7).

7. Inspect anchor pin bushings (14) for gouges, scoring, and defects. If required, drive two anchor pin bushings (14) from axle assembly (5).

8. If necessary, remove three plugs (15) from dust shields (3 and 4).

INSPECTION

1. Inspect dust shields for cracks, deformation, missing hardware, and damaged or missing plugs. Replace dust shields if defects are found.

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

2. Clean all parts removed in degreaser tank with cleaning compound solvent. Remove any burrs and scoring from polished surfaces using crocus cloth. Inspect brake shoe linings for uneven wear, improper lining grind, bent shoes, scratches, breaks, or cracks. If any defects exist, replace brake shoe assembly.

3. Measure overall shoe lining thickness. If shoe linings are less than 0.46 inch (0.76 cm) thick, replace brake shoe assembly.

INSTALLATION

1. If removed, install three dust plugs (15) into dust shields (3 and 4).

2. If removed, install two anchor pin bushings (14) into axle assembly (5).

3. Install two rollers (13) onto brake shoes (7) and insert two headless grooved pins (12) through two rollers (13) to hold in place.

4. Using retaining ring pliers, install four retaining rings (11) onto two headless grooved pins (12) to secure rollers (13) in place.

5. Aline and install two return spring pins (10) into brake shoes (6).

6. Install helical extension spring (9) between both brake shoes (6) onto return spring pins (10).

7. Aline and install two brake shoes (6) so that each roller (13) seats on s-cam on axle assembly (5).

8. Using brake repair pliers, install two helical extension springs (8) on brake shoes (6).

9. Lift or lower each brake shoe (6) until headless shoulder pins can be installed and install two headless shoulder pins (7) into anchor pin bushings (14).

10. Aline and install both upper and lower dust shields (3 and 4) onto axle assembly (5) and secure with four lockwashers (2) and capscrews (1).

4-43. SERVICE BRAKES (CONT)

FOLLOW-ON MAINTENANCE

1. Reinstall hub and drum (para. 4-50).

2. Perform service brake adjustment (para. 4-15).

3. If brakes were adjusted, operate tractor/semitrailer and check for proper brake operation (para. 2-25).

4-44. S-CAM

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 2, item 18, appx. B:

Retaining ring pliers, external	Hammer, soft plastic head
Extension light, 24 ft	Creeper, mechanics
Degreaser tank, 20 gl	Lubricating handgun

Materials/Parts

Antiseize compound, item 3, appx. E
Crocus cloth, item 6, appx. E
Grease, item 12, appx. E
Wiping rag, item 19, appx. E
Cleaning compound solvent, item 25, appx. E
Cotter pin
Nonmetallic seal (2)
Preformed packing (2)

Equipment Condition

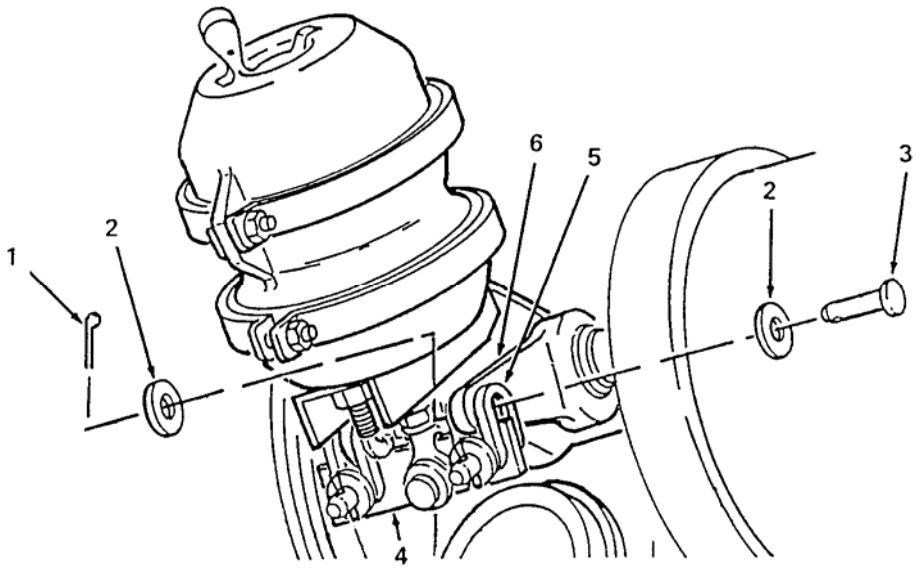
Hub and drum removed (para. 4-50)
Brakes assembly removed (para. 4-43)

NOTE

The following procedure is to be used for either the left-hand or right-hand s-cam. Repeat this procedure as required to complete the necessary repairs.

REMOVAL

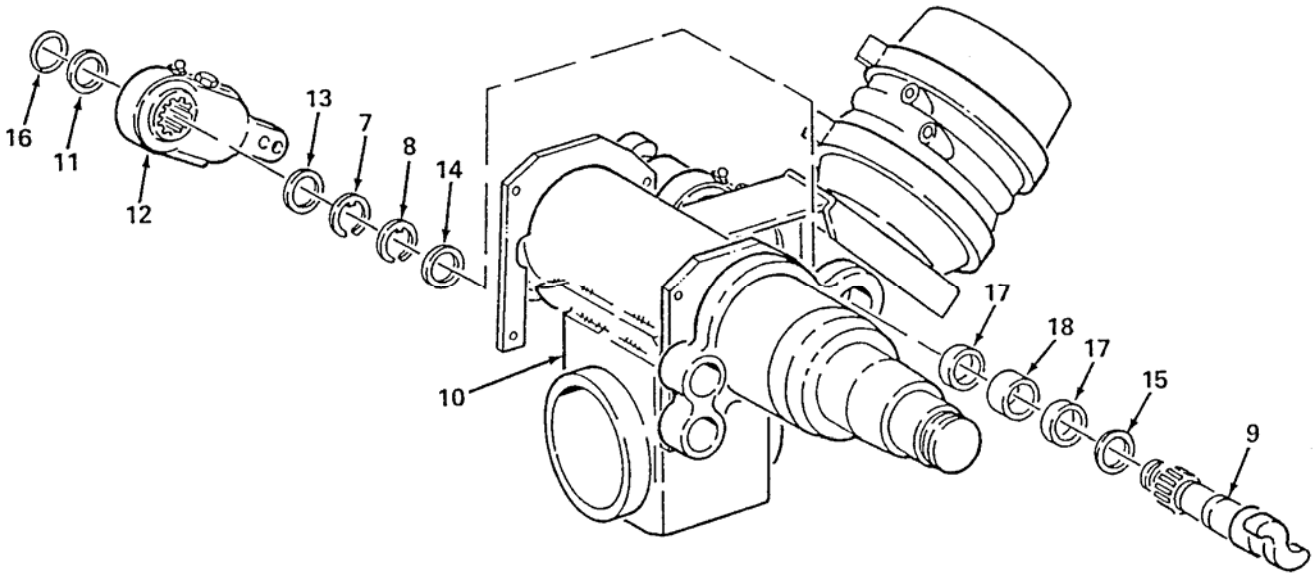
1. Remove cotter pin (1), two flat washers (2), and headed shoulder pin (3) from mending plate (4), rod end clevis (5), and slack adjuster (6). Discard cotter pin.



CAUTION

The s-cam has parts that are removed as the s-cam is removed. During removal, be sure that none of the washers become lost or lodged in retaining ring groove or damage to the equipment may result.

2. Remove retainer ring (7) and retainer ring (8) from brake actuating s-cam (9). Using a soft plastic head hammer, drive s-cam (9) from axle (10).



4-44. S-CAM (CONT)

3. As s-cam (9) is removed, remove flat washer (11), slack adjuster (12), spacer (13), flat washer (14), flat washer (15), and preformed packing (16). Discard preformed packing.

4. Remove two nonmetallic seals (17) from axle (10). Discard seals.

5. Remove bushing (18) from axle (10).

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

INSPECTION

1. Inspect bushings, spacers, and washers for wear, out-of-round, corrosion, nicks, and burrs. Clean all parts removed in degreaser tank with cleaning compound solvent. Remove burrs, nicks, and scoring on polished surfaces using crocus cloth. Replace all defective parts.

2. Inspect brake operating s-cam camshaft and related parts for wear, worn gear, broken cam, scoring, out-of-round, corrosion, nicks, and burrs. Clean all corroded parts in degreaser tank with cleaning compound solvent. Remove burrs, nicks, and scoring on polished surfaces using crocus cloth. Replace all defective parts.

INSTALLATION

1. Install bushing (18) into axle (10).

2. Apply a light coating of grease to two nonmetallic seals (17) and install two nonmetallic seals (17) onto axle (10).

3. Install preformed packing (16) and flat washer (14) onto s-cam (9).

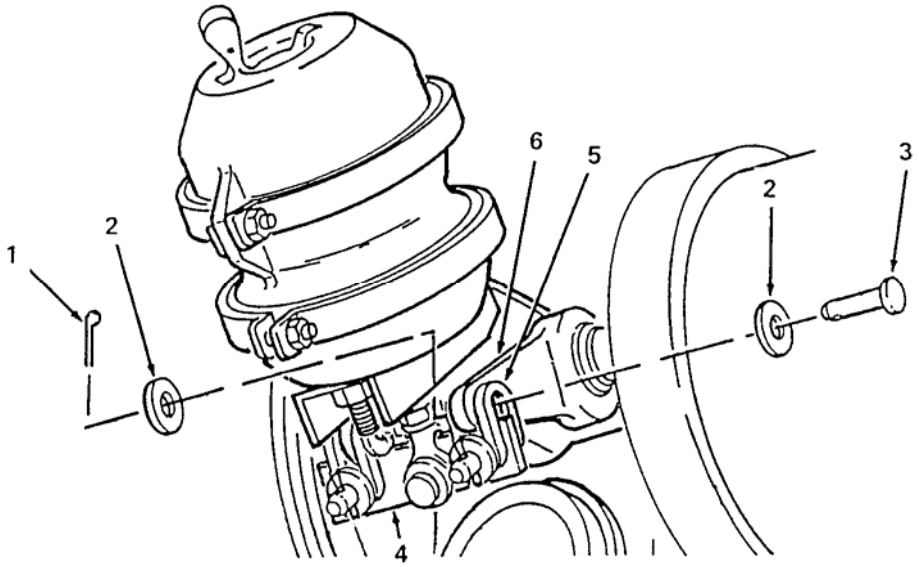
4. Aline and install s-cam (9) into axle (10). Once s-cam passes through nonmetallic seals (17), install flat washer (15) and flat washer (14).

5. Place slack adjuster (12) near axle (10) and aline with s-cam (9). Push s-cam (9) through slack adjuster (12) and install flat washer (11) onto s-cam as it clears slack adjuster (12).

6. Continue pushing s-cam (9) until s-cam and flat washer (11) are flush against s-cam retainer assembly on axle (10).

7. Install retainer ring (8) and retainer ring (7) onto s-cam (9).

8. Aline mending plate (4) with rod end clevis (5) and slack adjuster (6). Secure with headed shoulder pin (3), two flat washers (2), and cotter pin (1).



FOLLOW-ON MAINTENANCE

1. Lubricate axle as required (para. 3-3).

2. Operate tractor/semitrailer and check for proper brake operation (para. 2-25).

4-45. S-CAM RETAINER ASSEMBLY

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Torque wrench, 1/2" drive item 17, appx. B
Lubricating handgun, item 17, appx. B

Materials/Parts

Grease, item 12, appx. E
Petroleum jelly, item 17, appx. B
Wiping rag, item 19, appx. E
Preformed packing (2)

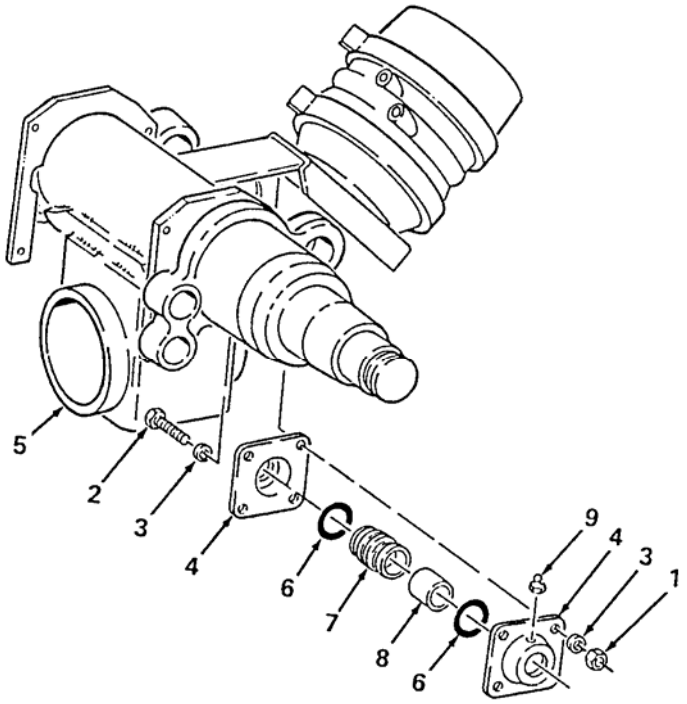
4-45. S-CAM RETAINER ASSEMBLY (CONT)

Equipment Condition

Left-hand and right-hand s-cam and slack adjusters removed (para. 4-44)

REMOVAL

1. Remove four nuts (1), capscrews (2), and eight flat washers (3) from s-cam retainer assembly (4) and axle (5).



2. Remove s-cam retainer assembly (4) from axle (5).

3. Separate two halves of s-cam retainer assembly (4). Remove two preformed packings (6), sleeve bushing (7), and camshaft bushing (8). Discard preformed packings.

4. Remove lubrication fitting (9) from s-cam retainer assembly (4).

INSTALLATION

1. Install lubrication fitting (9) on s-cam retainer assembly (4).

2. Install camshaft bushing (8), sleeve bushing (7), and two preformed packings (6); then, assemble two halves of s-cam retainer assembly (4).

3. Install s-cam retainer assembly (4) onto axle (5) and install four capscrews (3), eight flat washers (2), and four nuts (1). Using a torque wrench, torque nuts (1) to 30 - 40 lb-ft (41 - 54 Nm).

FOLLOW-ON MAINTENANCE

Install left-hand and right-hand s-cam and slack adjusters (para. 4-44).

4-46. SLACK ADJUSTER

This task covers inspection.

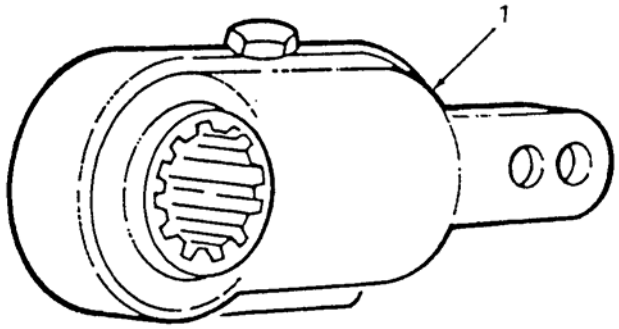
INITIAL SETUP

Equipment Condition

S-cam for defective slack adjuster removed (para. 4-44)

INSPECTION

Inspect slack adjuster (1) for wear, worn or broken gear teeth, broken/cracked housing, scoring, out-of-round, corrosion, burrs, broken or bent locking tabs, rounded off or stripped adjusting nuts, or broken/missing lubrication fittings. If defective, replace (para. 4-44) with new slack adjuster during installation of s-cam.



4-47. AIR CLEANER ASSEMBLY

This task covers: a. Removal c. Inspection e. Installation
b. Disassembly d. Assembly

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Torque wrench, 3/8" drive, item 17, appx. B

4-47. AIR CLEANER ASSEMBLY (CONT)

Material/Parts

Cap and plug set, item 5, appx. E
Petroleum jelly, item 17, appx. E
Pipe sealant, item 18, appx. E
Preformed packing
Filter element

Equipment Condition

Gooseneck lowered to lowest position, if uncoupled (para. 2-18)
Front and rear support legs lowered supporting platform (para. 2-22 and 2-23)

REMOVAL

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the air brake system or damage to equipment may result.

1. Tag and disconnect two nonmetallic hoses (1 and 2) from straight adapters (3) on air filter assembly (4). Install caps/plugs into hose openings.

2. Remove two nuts for U-bolt (5) and remove U-bolt (5) and air filter assembly (4) from gooseneck.

3. Remove two straight adapters (3) from air filter assembly (4). Install caps/plugs into all remaining openings.

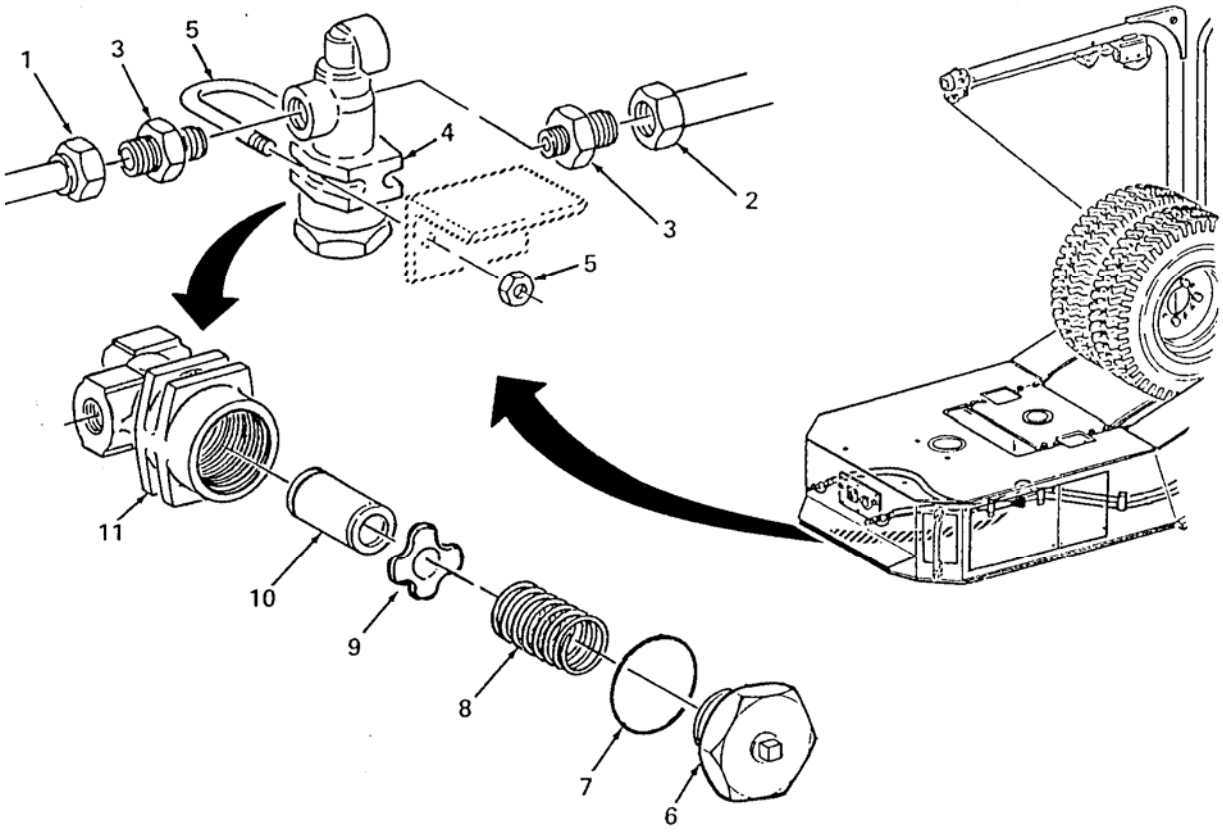
DISASSEMBLY

WARNING

The air filter assembly has an internal spring that, when assembled, is under pressure. Use caution when removing the housing nut or injury to personnel may result.

1. Remove housing nut (6), preformed packing (7), spring (8), and washer (9) from air filter housing (11). Discard preformed packing.

2. Pull air filter element (10) out of air filter housing (11). Discard air filter element.



INSPECTION

1. Inspect air filter assembly for broken or cracked housing, cracked or stripped threads, and corrosion. If corroded, clean as required. If defective, replace as required.

2. Inspect internal components of air filter assembly for defects. Replace all parts found defective.

ASSEMBLY

1. Install air filter element (10) into air filter housing (11).

2. Apply petroleum jelly to preformed packing (7). Install preformed packing (7) onto housing nut (6).

3. Install washer (9) and spring (8) into air filter housing (11) and secure in place with housing nut (6). Using a torque wrench, torque housing nut (6) to 10 - 50 lb-ft (13.5 - 68 Nm).

4-47. AIR CLEANER ASSEMBLY (CONT)

INSTALLATION

1. Apply pipe sealant to threads of two straight adapters (3). Aline and install two straight adapters (3) into air filter assembly (4).

2. Aline air filter assembly (4) with mounting bracket on gooseneck and install U-bolt with two nuts (5).

3. Aline and install two nonmetallic hoses (1 and 2) onto two straight adapters (3).

FOLLOW-ON MAINTENANCE

1. Couple tractor/semitrailer (para. 2-24).

2. Drive tractor/semitrailer (para. 2-25) and check for proper brake operation and air leaks.

4-48. GOOSENECK PNEUMATIC INSTALLATION

This task covers: a. Removal c. Repair
b. Inspection d. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Material/Parts

Cap and plug set, item 5, appx. E
Petroleum jelly, item 17, appx. E
Pipe sealant, item 18, appx. E
Locknut (5)
Preformed packing (2)

Equipment Condition

Air cleaner assembly removed (para. 4-47)
Gooseneck component assembly pulled out of gooseneck, not removed (para. 4-22)

General Instructions

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the pneumatic system or damage to equipment may result.

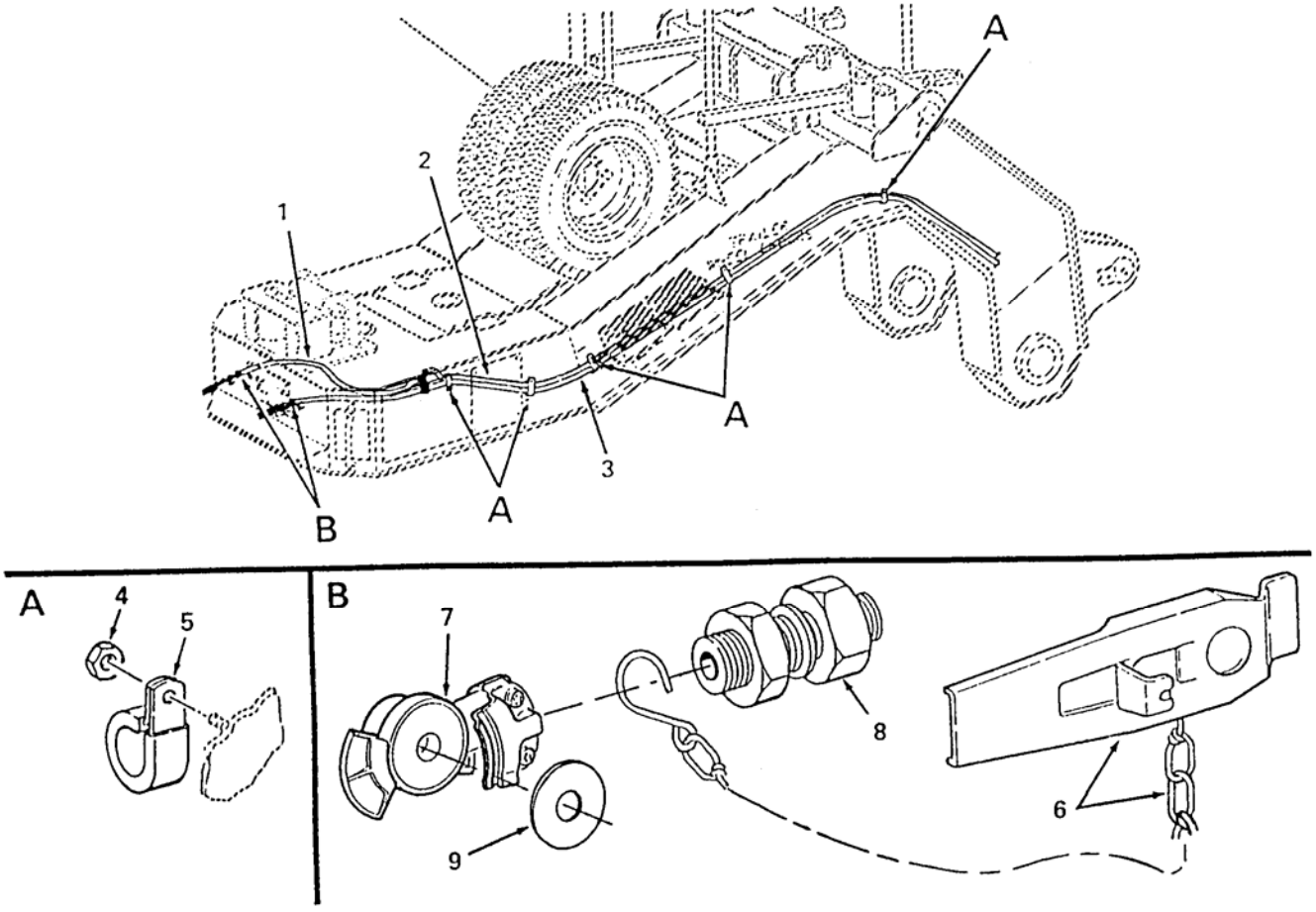
NOTE

Perform this procedure, or any portion of this procedure, as required, to complete the necessary repair.

Nonmetallic hoses are all manufactured items and are addressed in appendix F. The following procedures call out removal/installation of associated pneumatic fittings only.

REMOVAL

1. Tag and disconnect three nonmetallic hoses (1, 2, and 3) on gooseneck (para. 4-23). Install caps/plugs into all openings.



2. Remove five locknuts (4) and clamp loops (5). Discard locknuts.

3. Remove three nonmetallic hoses (1, 2, and 3) from gooseneck.

4. Remove two dummy couplings (6) from quick-disconnect couplings (7).

4-48. GOOSENECK PNEUMATIC INSTALLATION (CONT)

5. Remove two quick-disconnect couplings (7) and dummy couplings (6) from two straight adapters (8).

6. Remove two preformed packings (9) from two quick-disconnect couplings (7). Discard preformed packings.

7. Remove nuts on two straight adapters (8) and remove two straight adapters (8) from gooseneck. Reinstall nuts to straight adapters.

INSPECTION

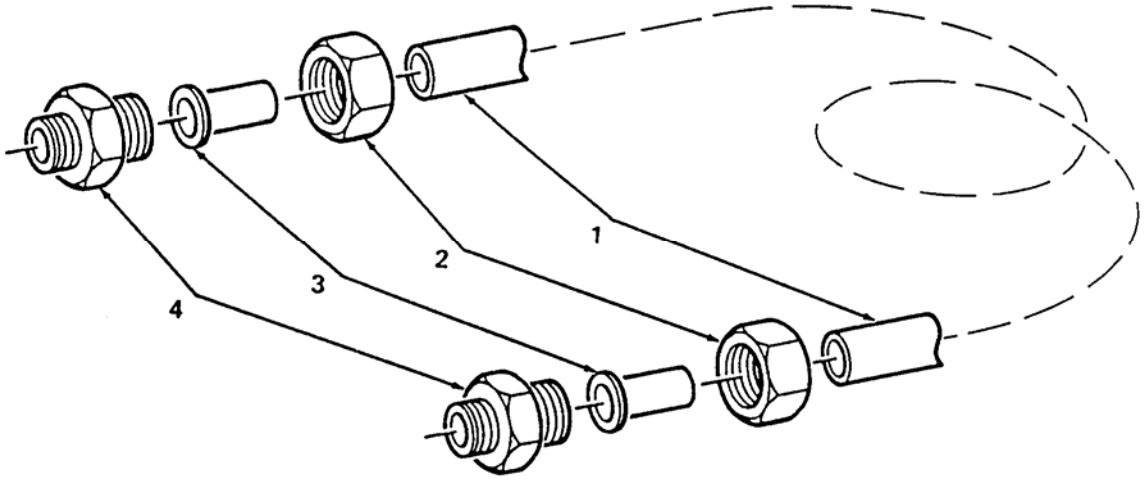
1. Inspect nonmetallic hoses removed for kinks, splits, deterioration, chaffing, cuts, and loose fittings. If hoses are defective, repair hoses and fittings.

2. Inspect fittings, dummy couplings, and quick-disconnect couplings for nicks, burrs, corrosion, stripped or cracked threads, broken castings, and pitting. If parts are defective, replace as required.

REPAIR

1. Obtain new fittings and bulk nonmetallic hose.

2. Refer to appendix F and cut new nonmetallic hose (1) to specified length.



3. Install fitting nut (2), small opening first, onto nonmetallic hose (1). Install sleeve fitting (3) onto end of nonmetallic hose (1).

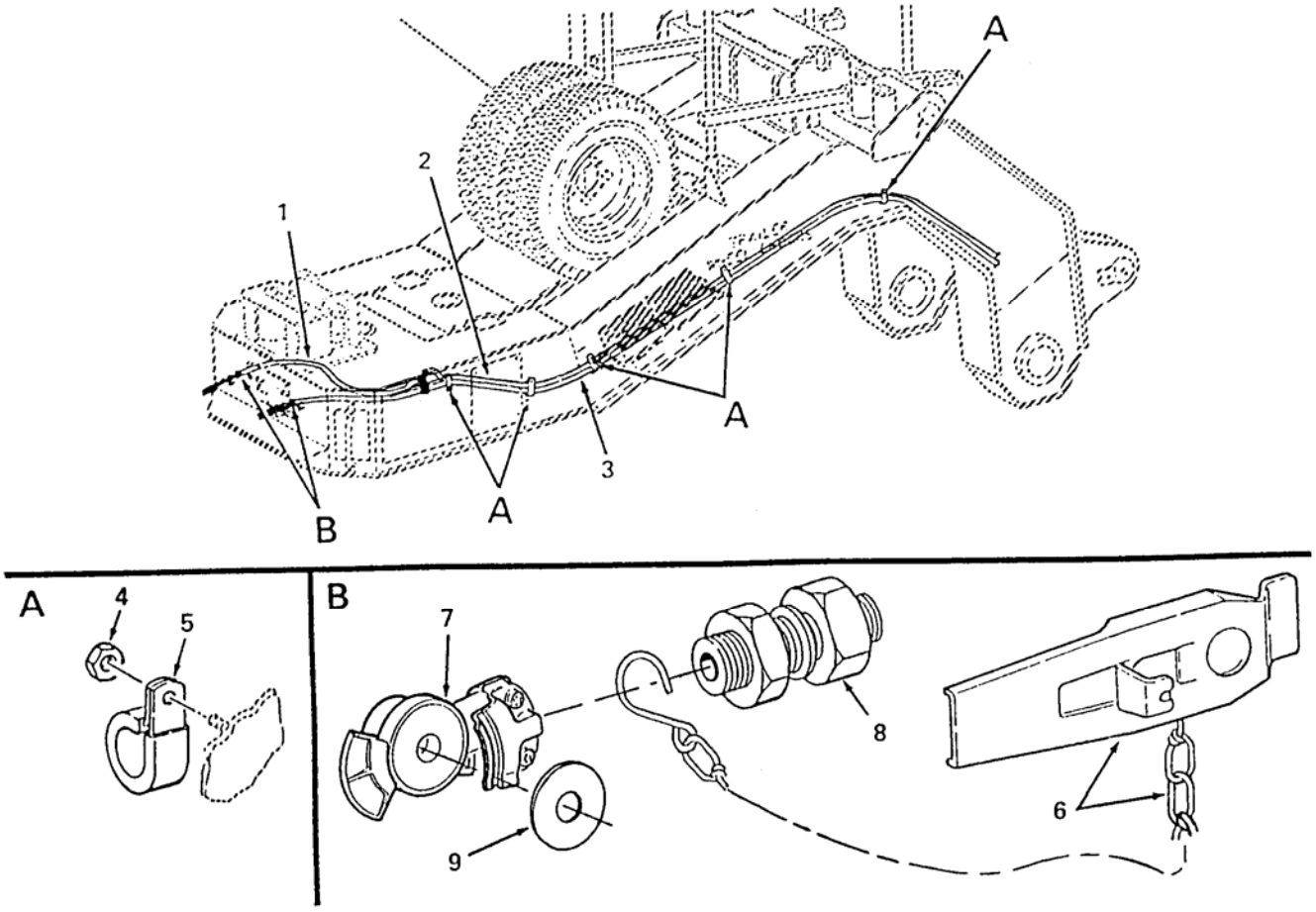
4. Push adapter fitting (4) over sleeve fitting (3) and nonmetallic hose (1) as far as possible by hand, and tighten fitting nut (2) to adapter fitting(4).

5. Install caps and plugs into openings in manufactured hose until ready for installation.

6. Repeat steps 3 thru 5 to install new fittings onto other end of nonmetallic hose (1).

INSTALLATION

1. Remove nuts on two straight adapters (8) and aline and install two straight adapters (8) onto gooseneck. Reinstall nuts onto adapters.



2. Apply pipe sealant to both ends of two straight adapters (8). Aline and install two quick-disconnect couplings (7) and secure chain from two dummy couplings (6) onto two straight adapters (8).

3. Apply petroleum jelly to two preformed packings (9) and install two preformed packings (9) onto two quick-disconnect couplings (7).

4. Install three nonmetallic hoses (1, 2, and 3) onto gooseneck.

4-48. GOOSENECK PNEUMATIC INSTALLATION (CONT)

NOTE

Insert nearby nonmetallic hoses into clamp loops as the clamp loops are installed/secured to gooseneck.

5. Aline and install five clamp loops (5) and secure in place with locknuts (4).

6. Apply pipe sealant to threads of three nonmetallic hoses (1, 2, and 3) and aline and install three nonmetallic hoses.

FOLLOW-ON MAINTENANCE

1. Couple tractor/semitrailer (para. 2-24).

2. Drive tractor/semitrailer (para. 2-25) and check for proper brake operation and air leaks.

4-49. PLATFORM PNEUMATICS INSTALLATION

This task covers: a. Removal c. Repair
b. Inspection d. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Socket set, deepwell, 1/2" drive, item 18, appx. B
Torque wrench, 3/8" drive 0-200 in-lb, item 18, appx. B
Torque wrench, 1/2" drive 0-170 lb-ft, item 18, appx. B

Materials/Parts

Cap and plug set, item 5, appx. E
Pipe sealant, item 18, appx. E
Electrical tiedown strap(s) (as required), item 27, appx. E
Lockwasher (4)
Locknut (12)
Lockwasher (5)
Lockwasher (18)
Cotter pin (10)

Equipment Condition

Platform adjusted to 50 inch (127 cm) height (para. 2-19)
Suspension isolation valves closed at four corner bogies (para. 2-6)
Brake chambers caged (para. 2-33)
Gooseneck lowered to lowest position, if uncoupled (para. 2-18)
All five air tanks drained by pulling on air tank lanyards (item 3, para. 2-8)
Platform steps and service covers removed (para. 4-59)

General Safety Instructions

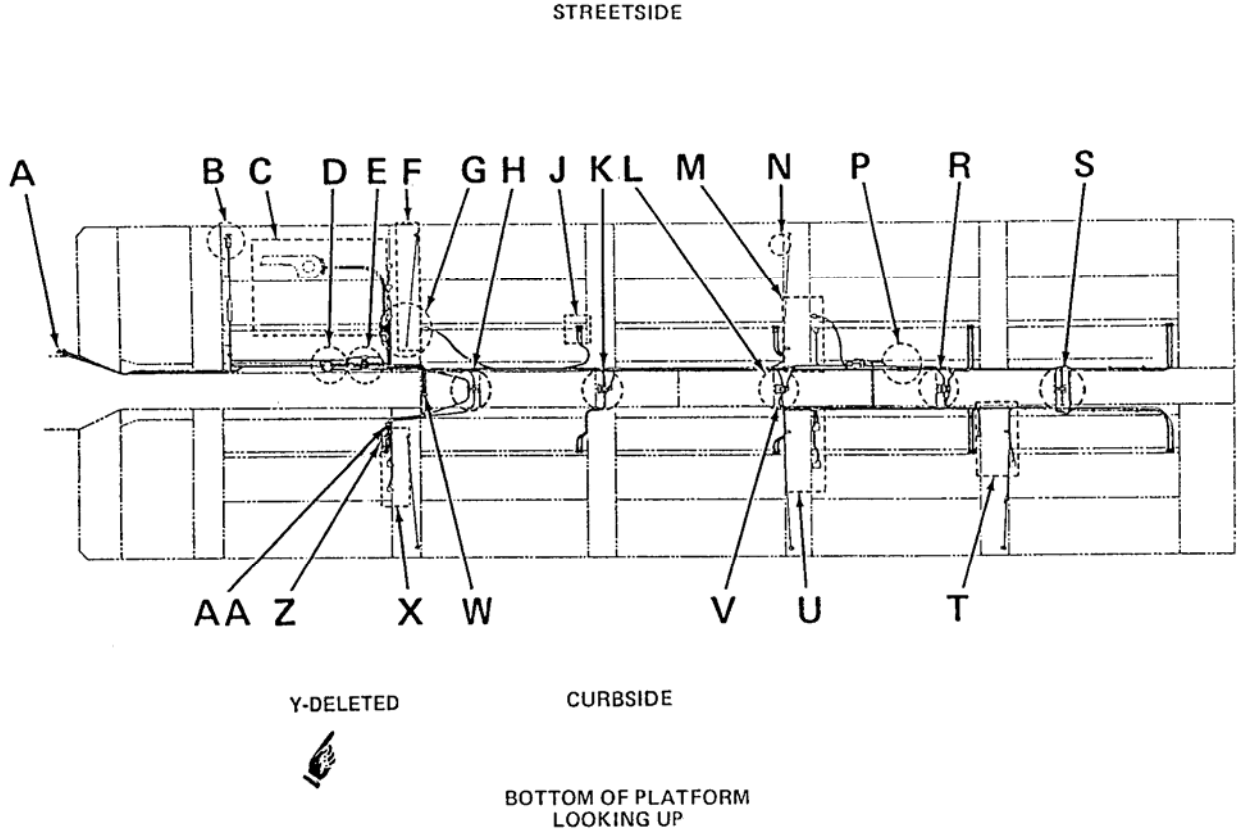
CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the platform pneumatic system or damage to equipment may result.

NOTE

This procedure is for removal/installation of all platform pneumatic components. Perform this procedure or any portion of this procedure, as required, to complete the necessary repair.

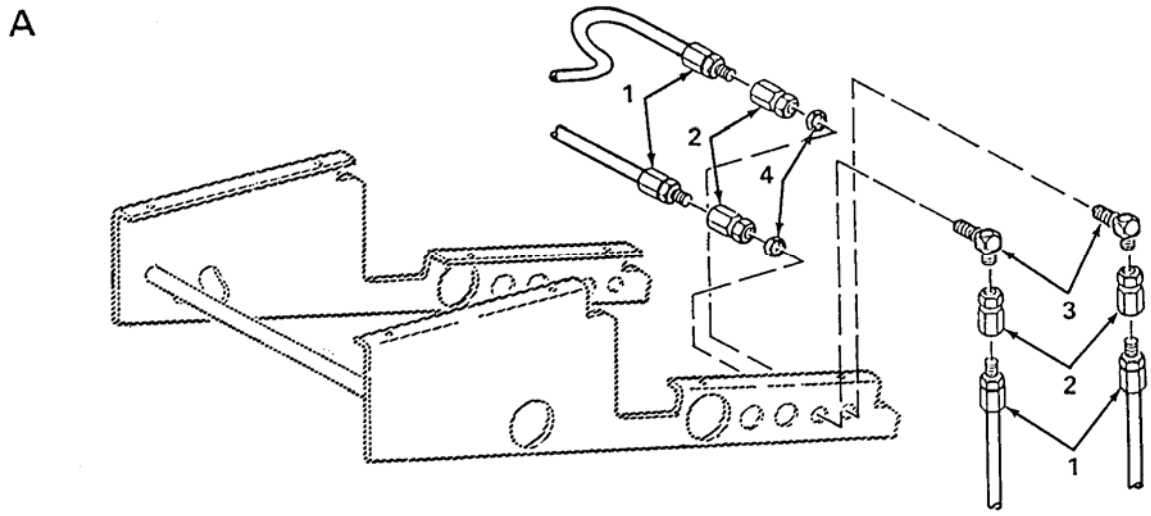
Nonmetallic hoses are all manufactured items and are addressed in appendix F. The following procedure calls out removal/installation of associated pneumatic fittings only. Use the pneumatic schematic (figure FO-2) as a general guide for hose routing.



4-49. PLATFORM PNEUMATICS INSTALLATION (CONT)

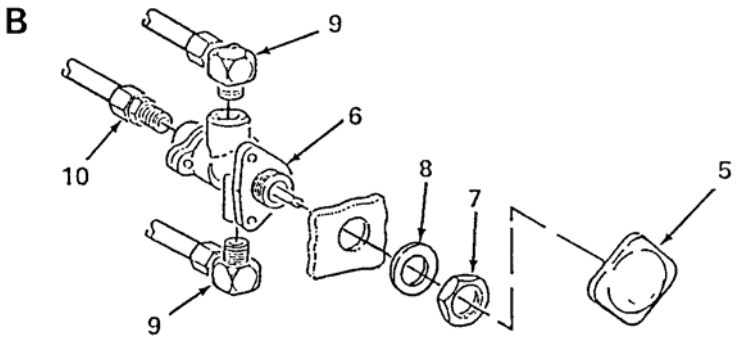
REMOVAL

1. Tag and disconnect four straight pipe-to-tube adapters (1) and straight pipe-to-hose adapters (2) from two tube elbows (3). Install caps/plugs into openings.



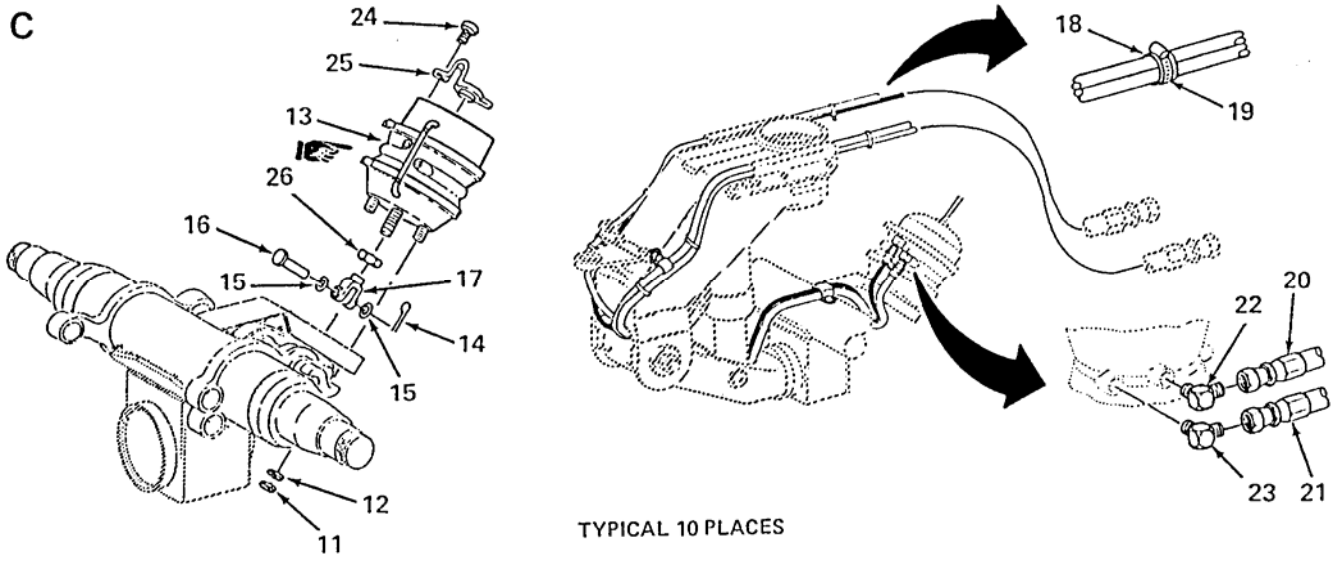
2. Remove two tube locknuts (4) and tube elbows (3) from platform weldment. Install caps/plugs into openings.

3. Remove knob (5) from brake valve (6). Remove nut (7) and washer (8) securing brake valve (6) and remove brake valve from platform.



4. Remove two pipe-to-tube elbows (9) and straight pipe-to-tube adapter (10) from brake valve (6). Install caps/plugs into openings.

5. Using a 15/16-inch deepwell socket, remove two nuts (11) and washers (12) from brake chamber assembly (13).



6. Remove cotter pin (14), two flat washers (15), and headless pin (16) from rod end clevis (17). Discard cotter pin.

7. Remove two nonmetallic channel (18) and hose clamps (19). Tag and disconnect two nonmetallic hoses (20 and 21) from elbow fittings (22 and 23). Install caps/plugs into openings.

8. Remove two elbow fittings (22 and 23) from brake chamber assembly (13). Install caps/plugs into openings.

9. Remove brake chamber assembly (13) from axle. Remove screw (24) and seal plug (25) from brake chamber assembly (13).

10. Count and record number of turns to remove rod end clevis (17). Unscrew and remove rod end clevis (17) and nut (26) from brake chamber assembly (13).

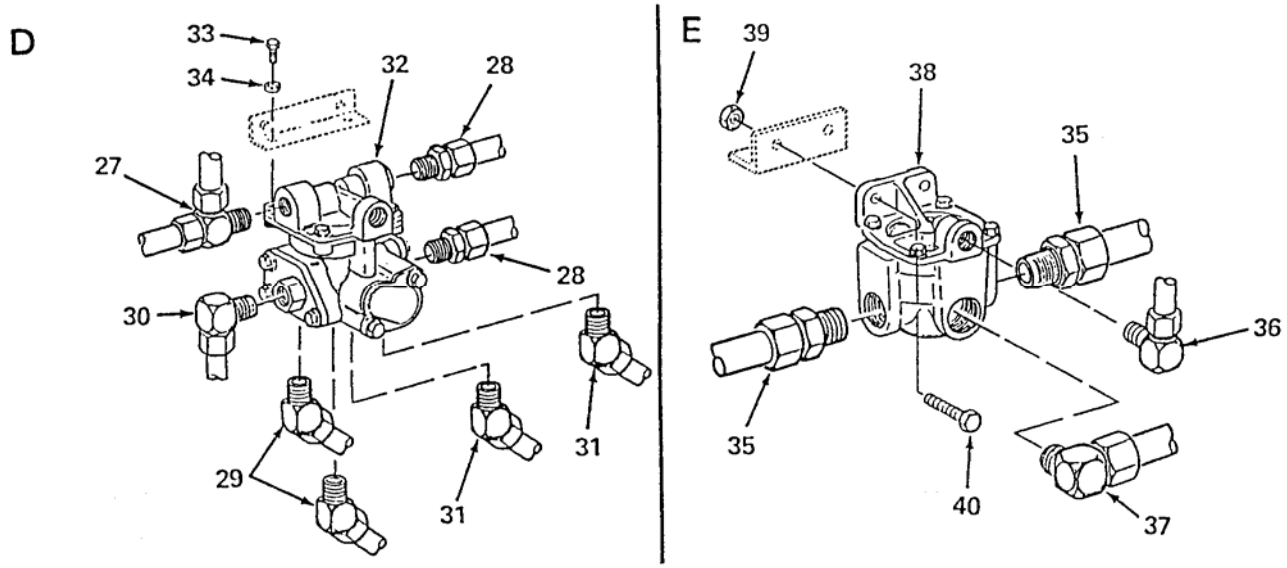
4-49. PLATFORM PNEUMATICS INSTALLATION (CONT)

11. Remove pipe-to-tube tee (27), two straight pipe-to-tube adapters (28), three pipe-to-tube elbows (29 and 30), and two pipe-to-tube elbows (31) from air pressure relay (multifunction) valve (32). Install caps/plugs into openings.

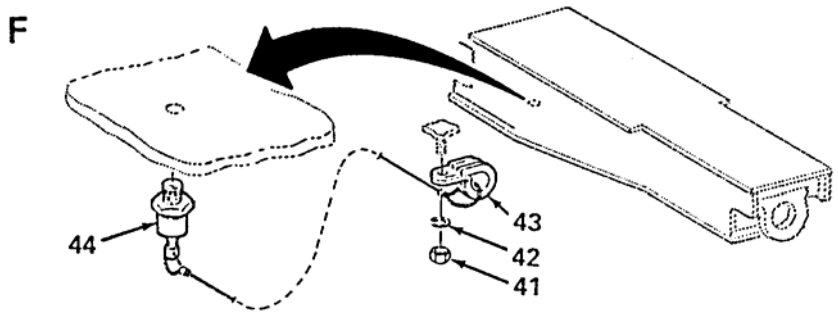
12. Remove two screws (33), lockwashers (34), and air pressure relay (multifunction) valve (32). Discard lockwashers.

13. Remove two straight pipe-to-tube adapters (35) and two pipe-to-tube elbows (36 and 37) from air pressure relay valve (38). Install caps/plugs into openings.

14. Remove two locknuts (39) and screws (40) and remove air pressure relay valve (38). Discard two locknuts.



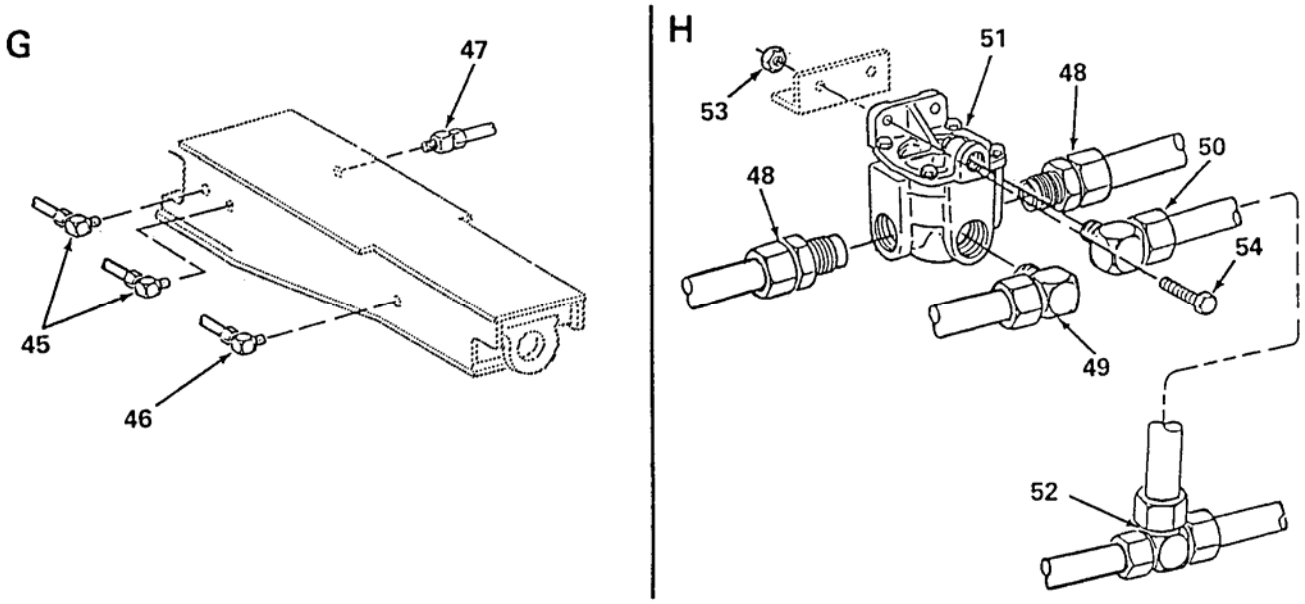
15. Remove nut (41), lockwasher (42), and loop clamp (43) from weld stud. Discard lockwasher.



TYPICAL 5 PLACES

16. Open clamp loop (43) and remove lanyard. Unscrew and remove drain cock (44) and lanyard from platform (air tank) weldment. Install plug into opening.

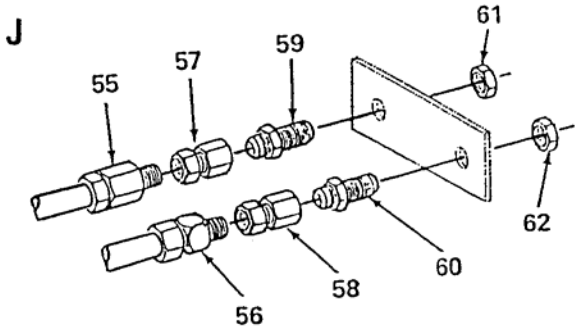
17. Remove three pipe-to-tube elbows (45 and 46) and straight pipe-to-tube adapter (47) from platform (air tank) weldment. Install caps/plugs into openings.



18. Remove two straight pipe-to-tube adapters (48) and two pipe-to-tube elbows (49 and 50) from air pressure relay valve (51). Remove tube tee (52). Install caps/plugs into openings.

19. Remove two locknuts (53) and screws (54) and remove air pressure relay valve (51). Discard two locknuts.

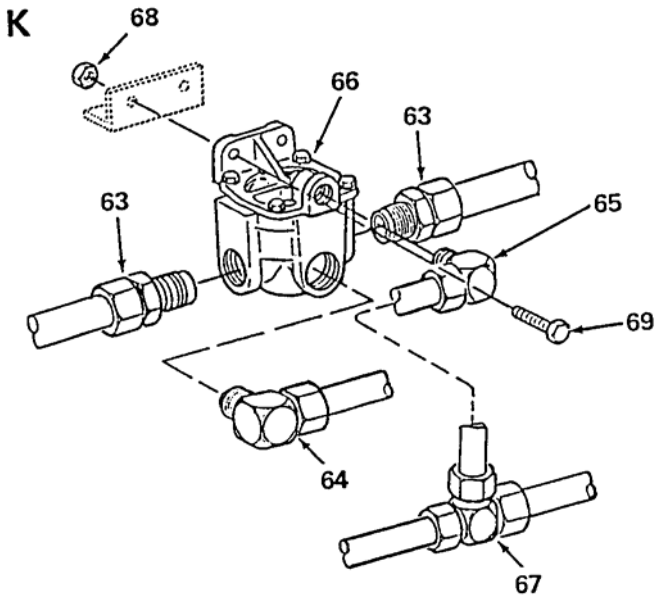
20. Remove straight pipe-to-tube adapters (55 and 56) and two straight pipe-to-hose adapters (57 and 58) from tube nipples (59 and 60). Remove two tube locknuts (61 and 62) and two tube nipples (59 and 60) from platform weldment. Install caps/plugs into openings.



TYPICAL 10 PLACES

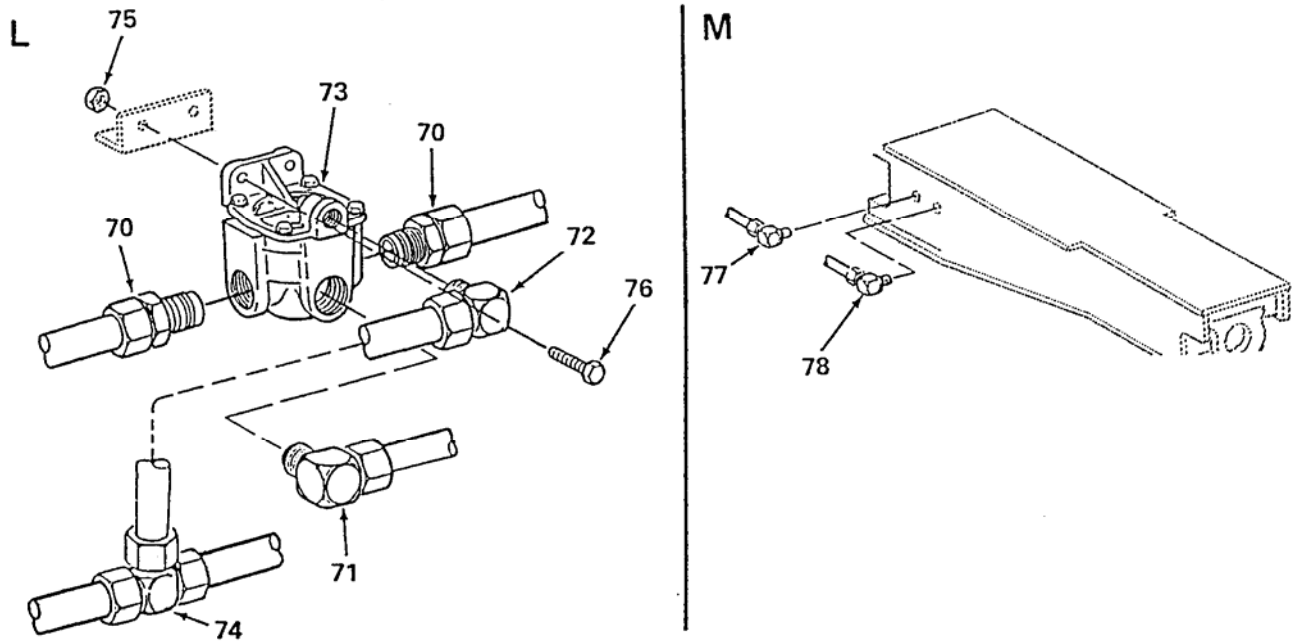
4-49. PLATFORM PNEUMATICS INSTALLATION (CONT)

21. Remove two straight pipe-to-tube adapters (63) and two pipe-to-tube elbows (64 and 65) from air pressure relay valve (66). Remove pipe-to-tube tee (67). Install caps/plugs into openings.



22. Remove two locknuts (68) and screws (69) and remove air pressure relay valve (66). Discard two locknuts.

23. Remove two straight pipe-to-tube adapters (70) and two pipe-to-tube elbows (71 and 72) from air pressure relay valve (73). Remove pipe-to-tube tee (74). Install caps/plugs into openings.

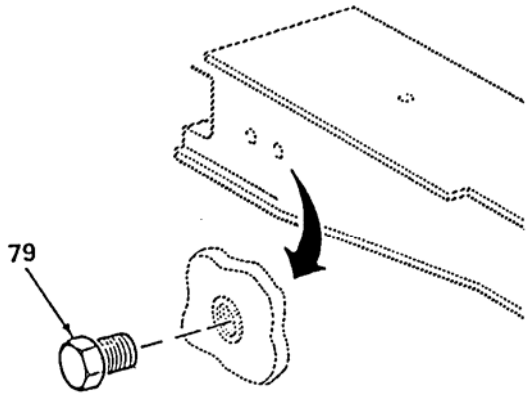


24. Remove two locknuts (75) and screws (76) and remove air pressure relay valve (73). Discard two locknuts.

25. Remove two pipe-to-tube elbows (77 and 78) from platform (air tank) weldment. Install caps/plugs into openings.

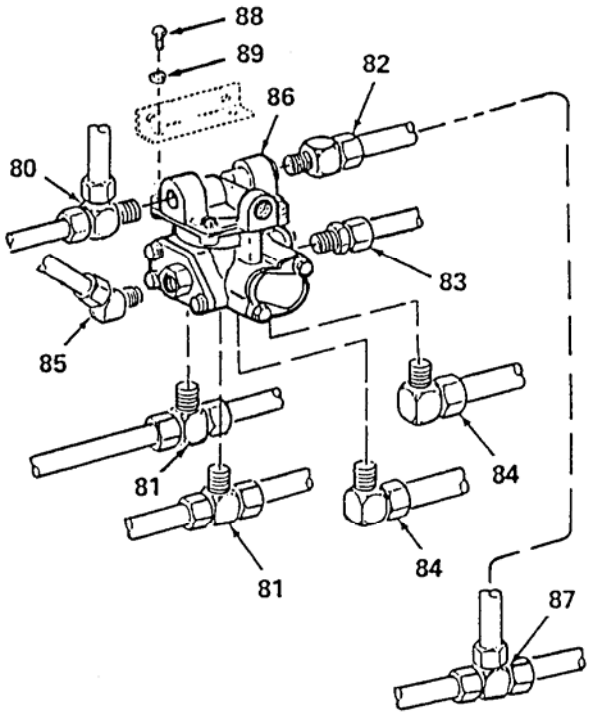
26. Remove pipe plug (79) from platform weldment. Install plugs.

N



(REF ALL AIRTANKS UNUSED PORTS)
(TYPICAL 18 PLACES)

P

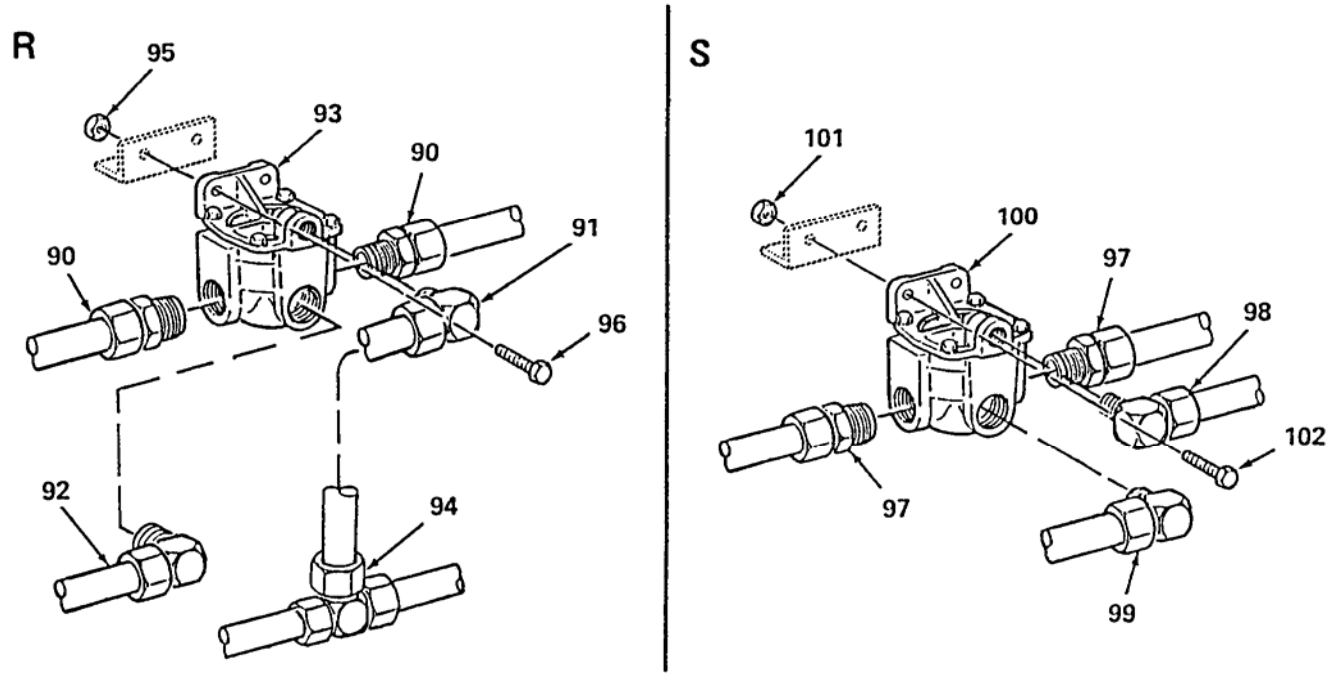


27. Remove three pipe-to-tube tees (80 and 81), two straight pipe-to-tube adapters (82 and 83), and three pipe-to-tube elbows (84 and 85) from air pressure relay (multifunction) valve (86). Remove pipe-to-tube tee (87). Install caps/plugs into openings.

28. Remove two screws (88), lockwashers (89), and air pressure relay (multifunction) valve (86). Discard lockwashers.

4-49. PLATFORM PNEUMATICS INSTALLATION (CONT)

29. Remove two straight pipe-to-tube adapters (90) and pipe-to-tube elbows (91 and 92) from air pressure relay valve (93). Remove pipe-to-tube tee (94). Install caps/plugs into openings.



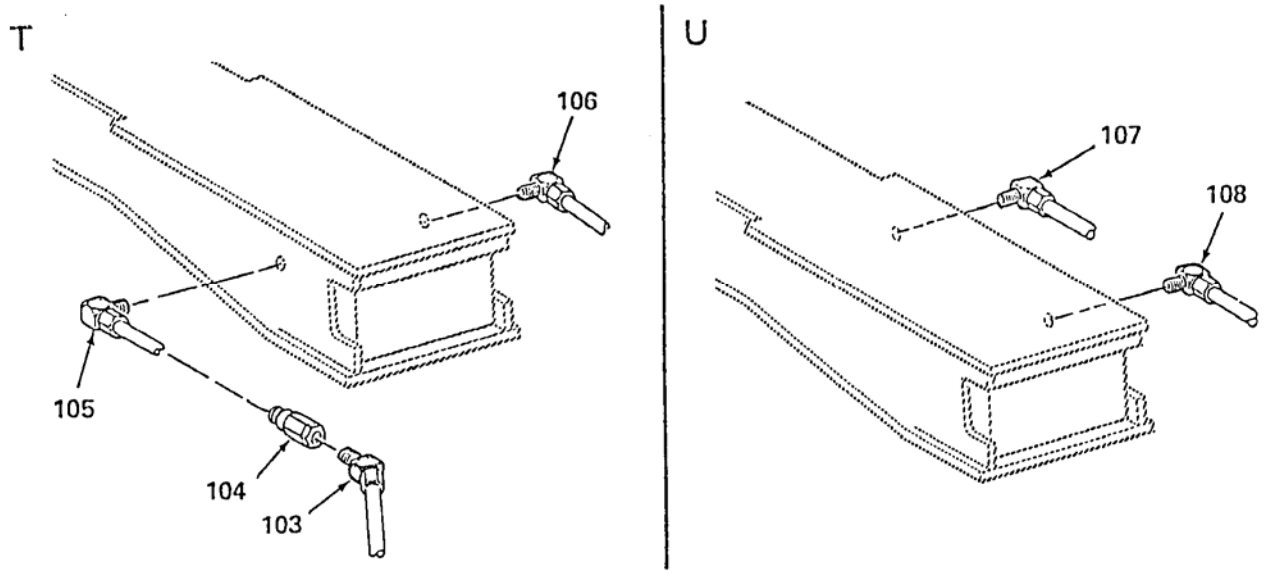
30. Remove two locknuts (95) and screws (96) and remove air pressure relay valve (93). Discard two locknuts.

31. Remove two straight pipe-to-tube adapters (97) and pipe-to-tube elbows (98 and 99) from air pressure relay valve (100). Install caps/plugs into openings.

32. Remove two locknuts (101) and screws (102) and remove air pressure relay valve (100). Discard two locknuts.

33. Remove pipe-to-tube elbow (103) from check valve (104). Remove check valve (104), pipe elbow (105), and pipe-to-tube elbow (106) from platform (air tank) weldment. Install caps/plugs into openings.

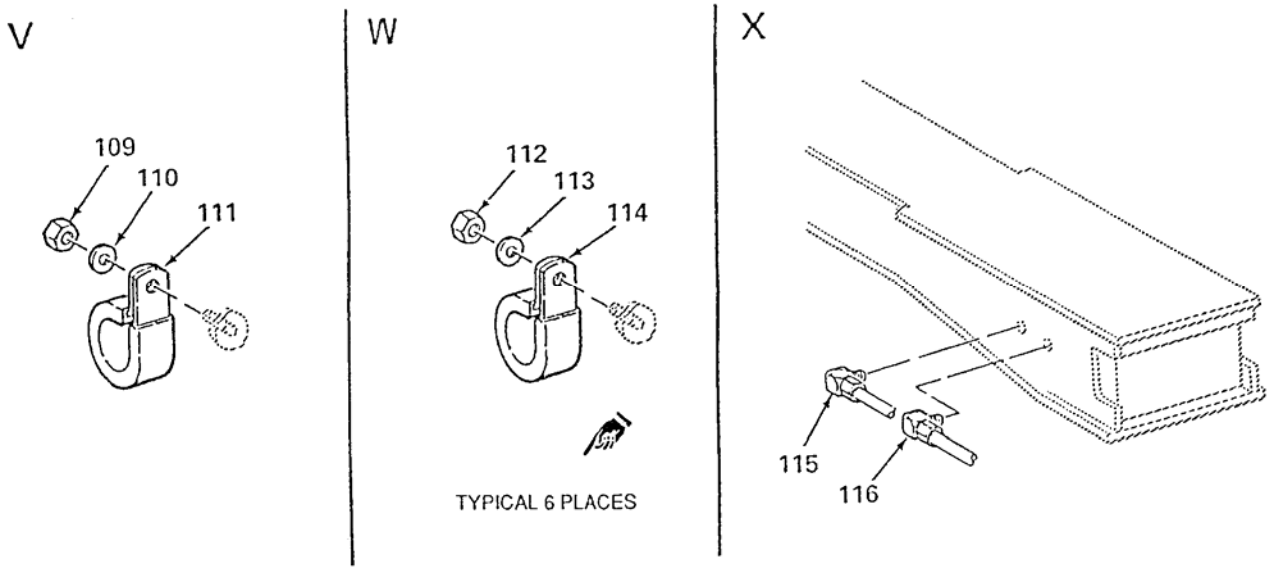
34. Remove two pipe-to-tube elbows (107 and 108) from platform (air tank) weldment. Install caps/plugs into openings.



NOTE

There may be one or more loop clamps stacked onto one weld stud. Note the orientation of the clamps prior to removal so that all clamps can be properly reinstalled.

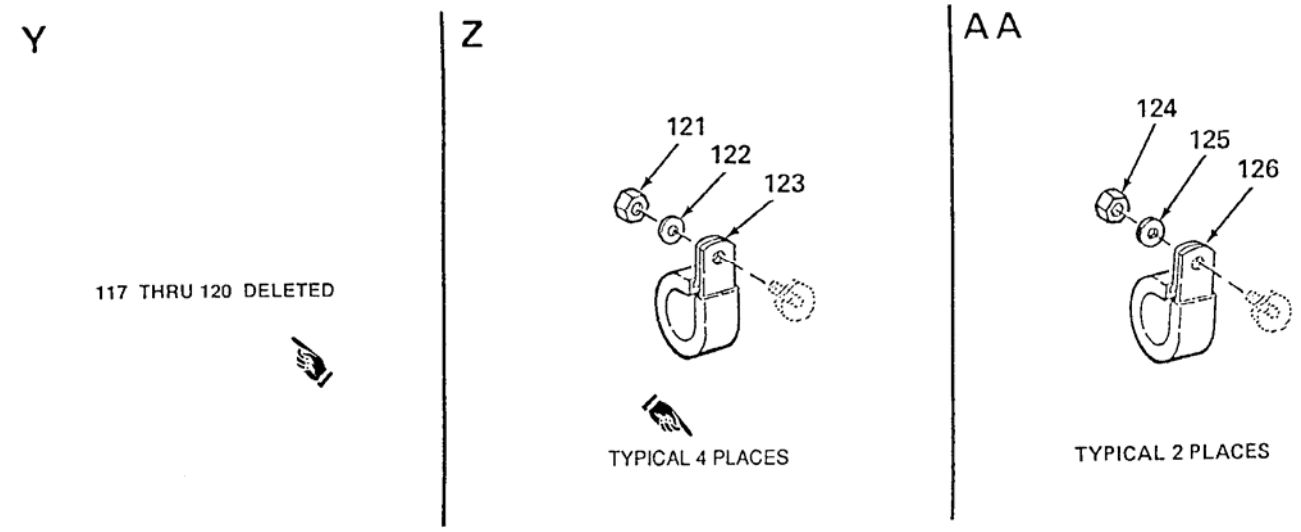
35. Remove nut (109), lockwasher (110), and loop clamp (111) from weld stud. Discard lockwasher.



36. Remove six nuts (112), lockwashers (113), and loop clamps (114) from weld studs. Discard lockwashers.

37. Remove two pipe-to-tube elbows (115 and 116) from platform (air tank) weldment. Install caps/plugs into openings.

4-49. PLATFORM PNEUMATICS INSTALLATION (CONT)



38. Remove four nuts (121), lockwashers (122), and loop clamps (123) from weld studs. Discard lockwashers.

39. Remove two nuts (124), lockwashers (125), and loop clamps (126) from weld studs. Discard lockwashers.

INSPECTION

1. Inspect nonmetallic hoses removed for kinks, splits, deterioration, chaffing, cuts, and loose fittings. If any nonmetallic hoses are defective, repair hoses and replace fittings as required.

2. Inspect air pressure relay valves, air pressure relay (multifunction) valves, drain cocks, and air brake valves for air leaks, broken housings, cracked or stripped threads, and corrosion. If corroded, clean as required. If defective, replace as required.

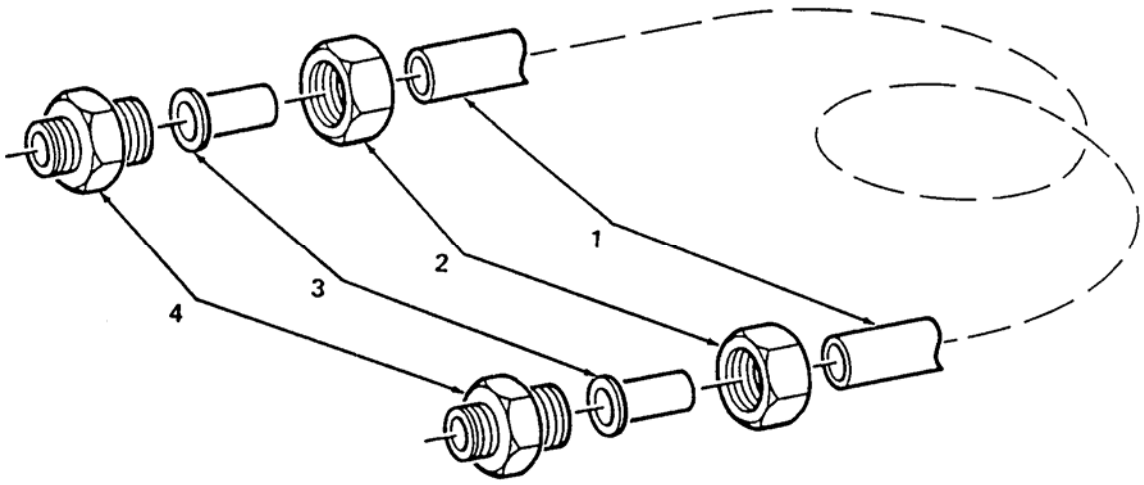
REPAIR

1. Obtain new fittings and bulk nonmetallic hose.

2. Refer to appendix F and cut new nonmetallic hose (1) to specified length.

3. Install fitting nut (2), small opening first, onto nonmetallic hose (1). Install sleeve fitting (3) onto end of nonmetallic hose (1).

4. Push adapter fitting (4) over sleeve fitting (3) and nonmetallic hose (1) as far as possible by hand and tighten fitting nut (2) to adapter fitting(4).

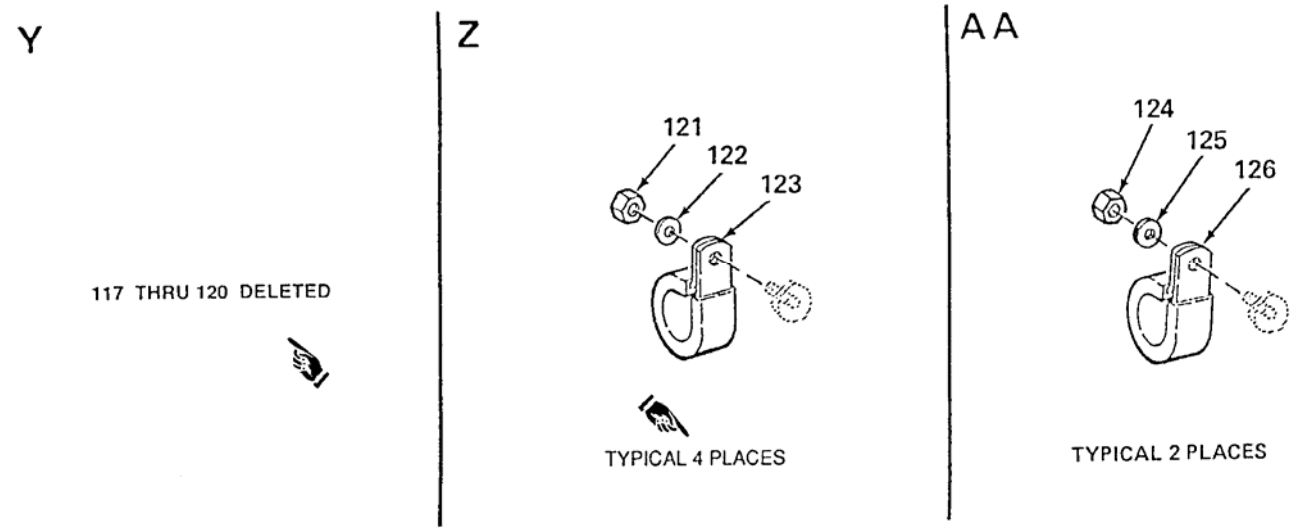


5. Install caps and plugs on manufactured hose until ready for installation.

6. Repeat steps 3 thru 5 and install fitting onto other end of nonmetallic hose (1).

INSTALLATION

1. Aline and install two loop clamps (126) onto weld studs and secure with two lockwashers (125) and nuts (124).



2. Aline and install four loop clamps (123) onto weld studs and secure with four lockwashers (122) and nuts (121).

3. Deleted.

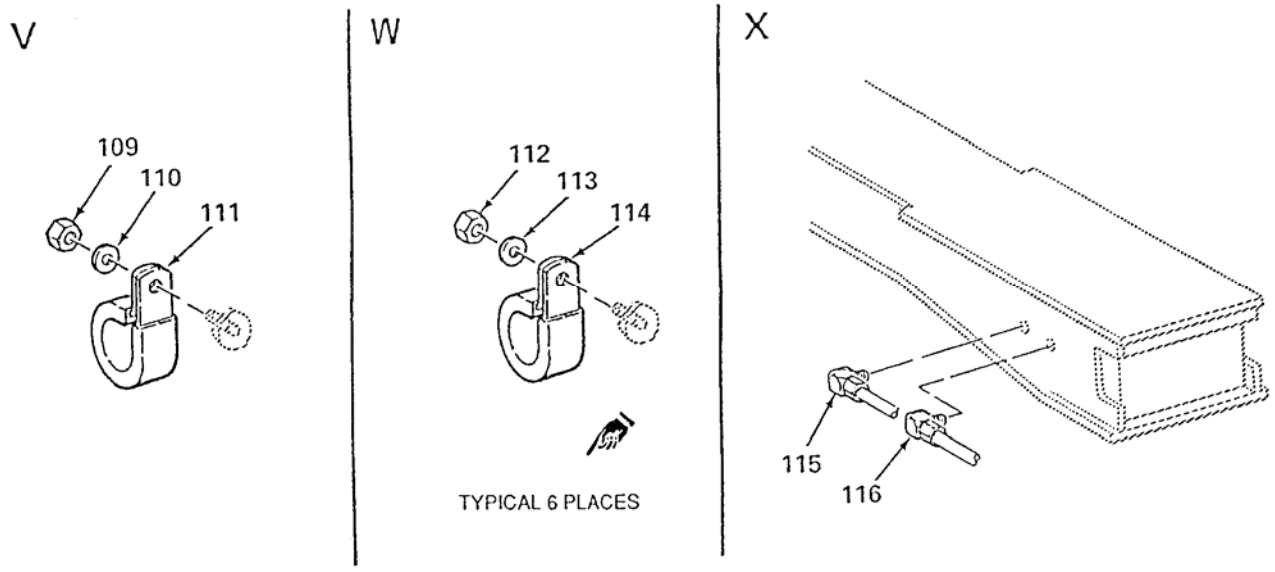
4-49. PLATFORM PNEUMATICS INSTALLATION (CONT)

CAUTION

Apply pipe sealant compound to the all male pipe threads of pneumatic fittings, using only enough compound to coat the threads. Do not allow compound to enter a component/fitting or the compound may restrict/block air passages and damage to equipment or equipment failure may result.

Note positioning/orientation of fittings on the illustrations. It is important to have the tightened fittings positioned as shown so that hoses are not too short and fittings do not interfere with one another or damage to equipment may result.

4. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install two pipe-to-tube elbows (116 and 115) to platform (air tank) weldment.

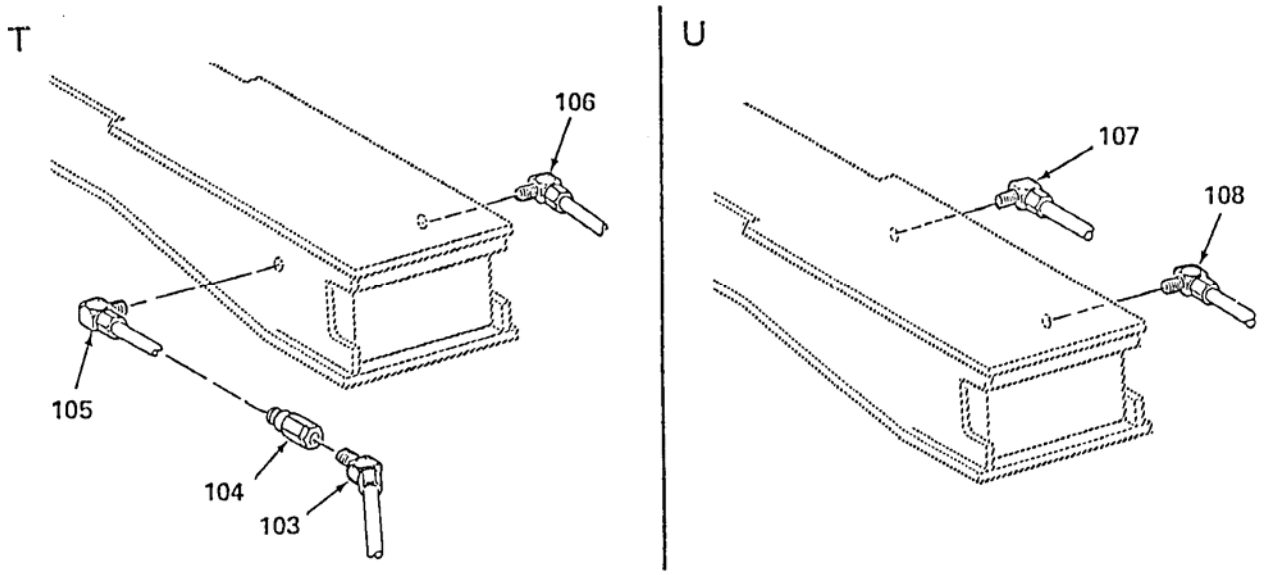


5. Aline and install two loop clamps (114) onto weld studs and secure with two lockwashers (113) and nuts (112).

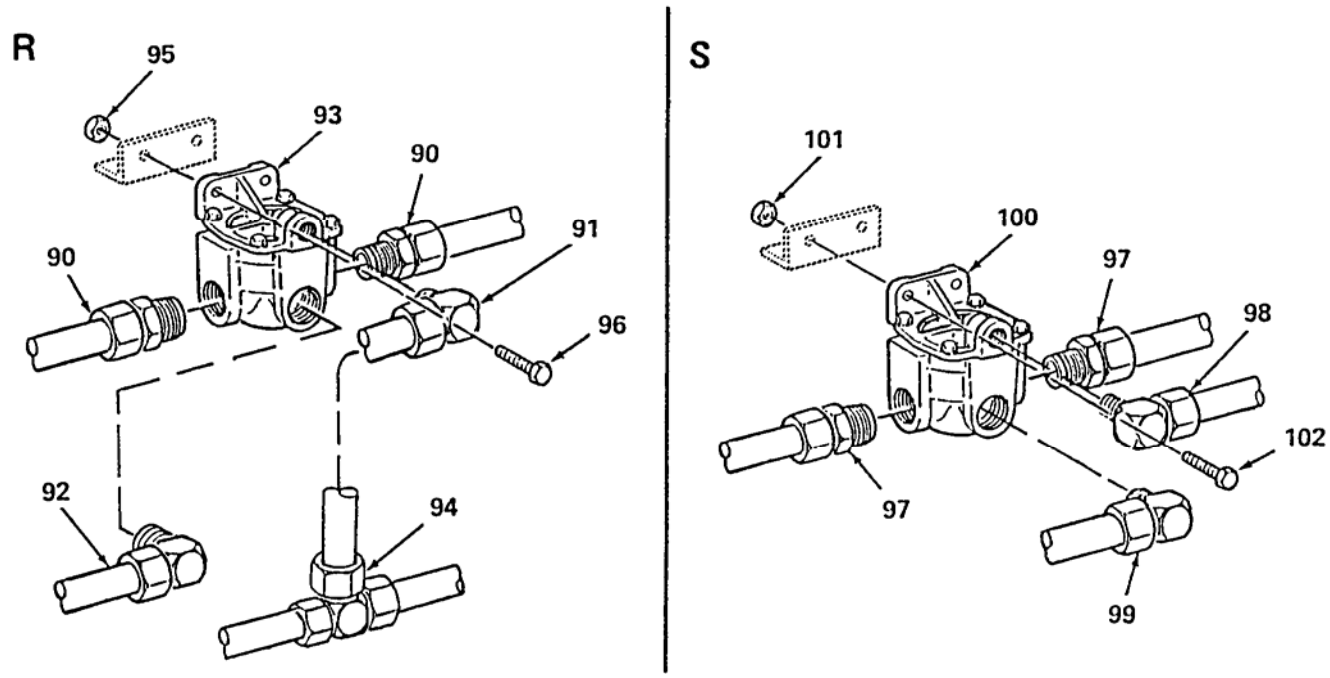
6. Aline and install two loop clamps (111) onto weld studs and secure with two lockwashers (110) and nuts (109).

7. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install two pipe-to-tube elbows (108 and 107) to platform (air tank) weldment.

8. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install pipe-to-tube elbow (106), pipe elbow (105), check valve (104), and pipe-to-tube elbow (103) to platform (air tank) weldment.



9. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install two pipe-to-tube elbows (99 and 98) and two straight pipe-to-tube adapters (97) to air pressure relay valve (100).



10. Install air pressure relay valve (100) to platform weldment and secure with two screws (102) and locknuts (101).

11. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install two pipe-to-tube elbow (92 and 91) and two straight pipe-to-tube adapters (90) to air pressure relay valve (93).

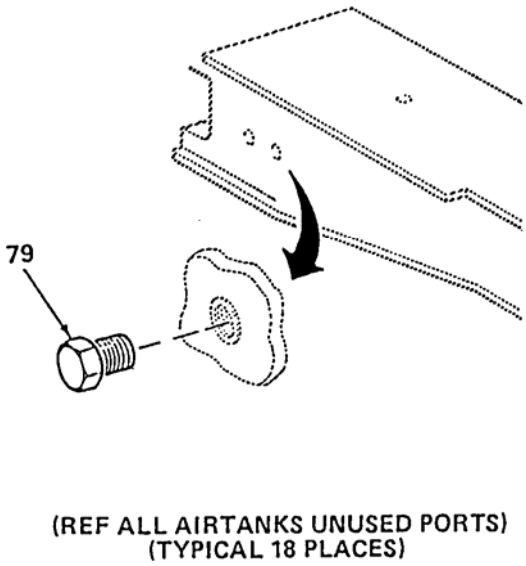
12. Install air pressure relay valve (93) to platform weldment and secure with two screws (96) and locknuts (95).

4-49. PLATFORM PNEUMATICS INSTALLATION (CONT)

13. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install tube tee (94).

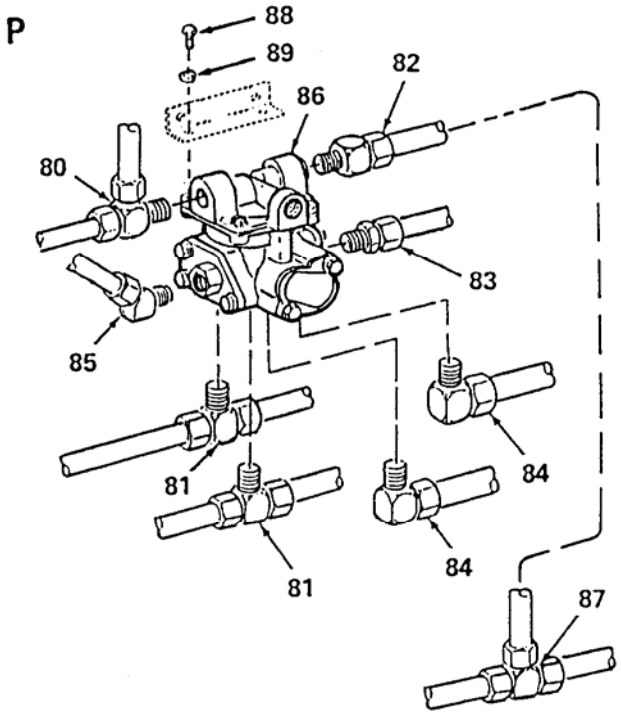
14. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install three pipe-to-tube elbows (85 and 84), two straight pipe-to-tube adapters (83 and 82), and three pipe-to-tube tees (81 and 80) to air pressure (multifunction) relay valve (86).

N



(REF ALL AIRTANKS UNUSED PORTS)
(TYPICAL 18 PLACES)

P



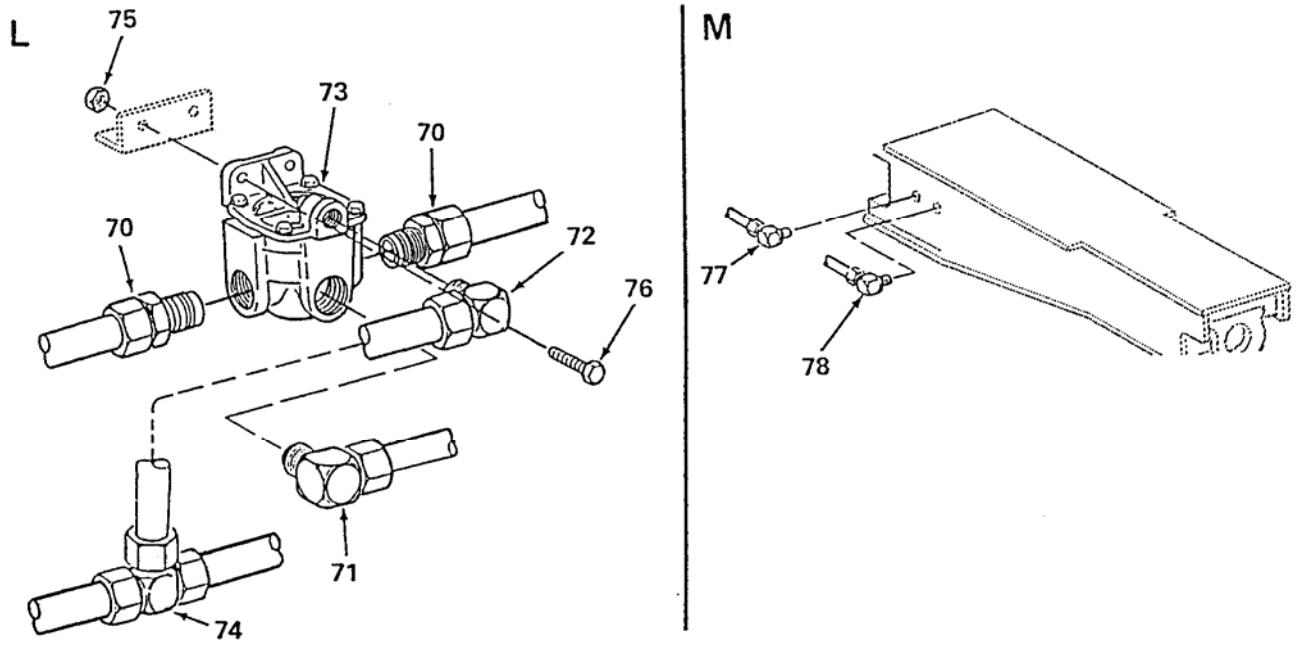
15. Install air pressure (multifunction) relay valve (86) to platform weldment and secure with two lockwashers (89) and screws (88). Using a torque wrench, torque screws (88) to 50 - 70 in.-lb (5.5 - 8.0 Nm).

16. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install tube tee (87).

17. Apply pipe sealant compound to male threads of pipe plug. Remove plugs and install pipe plug (79) to platform weldment.

18. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install two pipe-to-tube elbows (78 and 77) to platform (air tank) weldment.

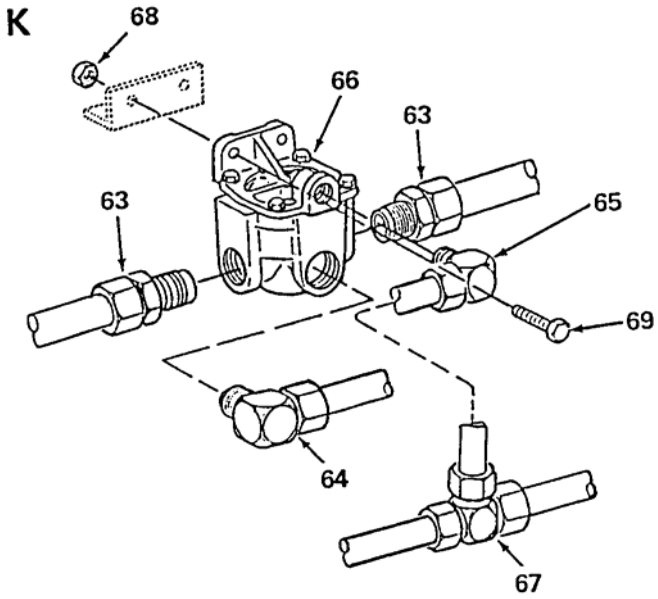
19. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install two pipe-to-tube elbows (72 and 71) and two straight pipe-to-tube adapters (70) to air pressure relay valve (73).



20. Install air pressure relay valve (73) to platform weldment and secure with two screws (76) and locknuts (75).

21 Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install pipe-to-tube tee (74).

22. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install two pipe-to-tube elbows (65 and 64) and two straight pipe-to-tube adapters (63) to air pressure relay valve (66).

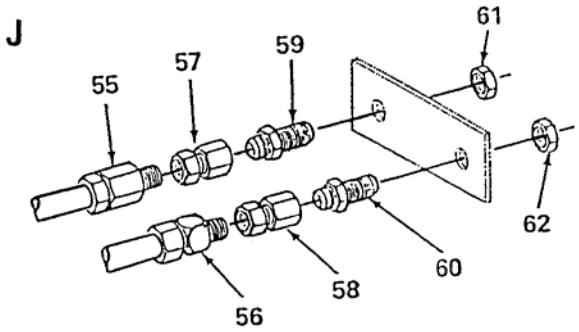


23. Install air pressure relay valve (66) to platform weldment and secure with two screws (69) and locknuts (68).

4-49. PLATFORM PNEUMATICS INSTALLATION (CONT)

24. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install pipe-to-tube tee (67).

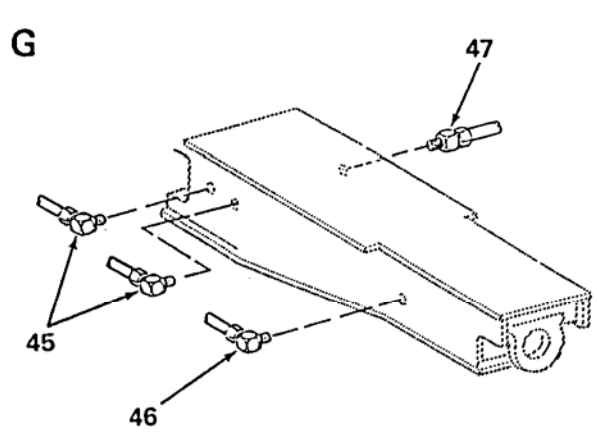
25. Install two tube nipples (60 and 59) to platform weldment and secure with two tube locknuts (61 and 62).

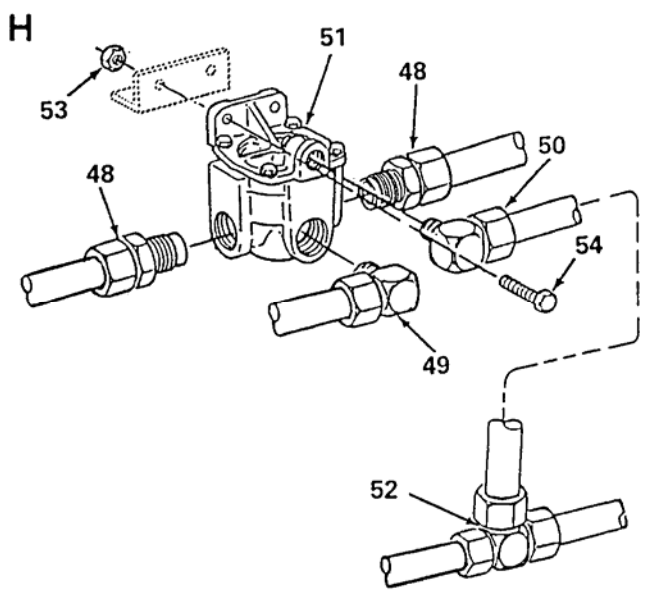


TYPICAL 10 PLACES

26. Apply pipe sealant compound to male threads of fittings and install two straight pipe-to-hose adapters (58 and 57) and straight pipe-to-tube adapters (56 and 55) to two tube nipples (60 and 59).

27. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install two pipe-to-tube elbows (50 and 49) and two straight pipe-to-tube adapters (48) to air pressure relay valve (51).



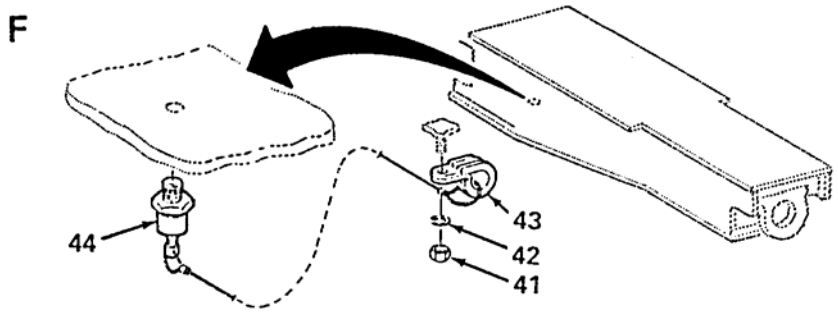


28. Install air pressure relay valve (51) to platform weldment and secure with two screws (54) and locknuts (53).

29. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install tube tee (52).

30. Apply pipe sealant compound to male threads of fittings and install straight pipe to tube adapter (47) and three pipe-to-tube elbows (46 and 45) to platform (air tank) weldment.

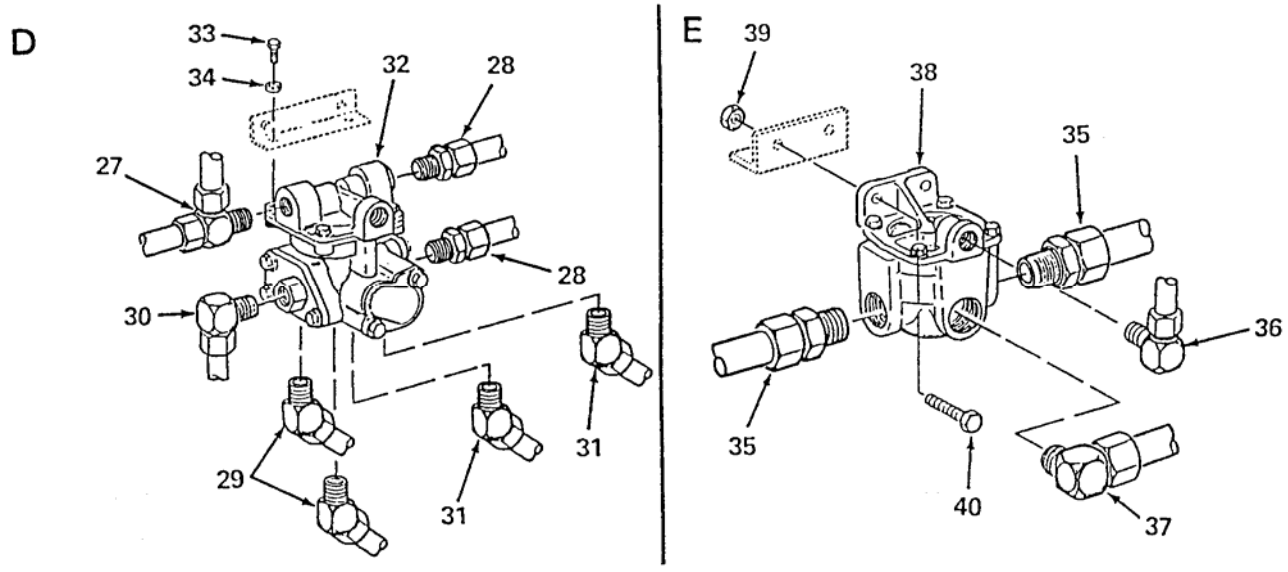
31. Apply pipe sealant compound to male threads of drain cock and install drain cock (44) to platform (air tank) weldment. Open loop clamp (43) and place loop end of lanyard for drain cock (44) into loop clamp (43).



TYPICAL 5 PLACES

32. Aline and install loop clamp (43) to weld stud and secure with lockwasher (42) and nut (41).

33. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install two pipe-to-tube elbows (37 and 36) and two straight pipe-to-tube adapters (35) to air pressure relay valve (38).



34. Install air pressure relay valve (38) to platform weldment and secure with two screws (40) and locknuts (39).

4-49. PLATFORM PNEUMATICS INSTALLATION (CONT)

35. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install two pipe-to-tube elbows (31), three pipe-to-tube elbows (30 and 29), two straight pipe-to-tube adapter (28), and pipe-to-tube tee (27) to air pressure (multifunction) relay valve (32).

36. Install air pressure (multifunction) relay valve (32) to platform weldment and secure with two screws (33) and lockwashers (34). Using a torque wrench, torque screws (33) to 50 - 75 in.-lb (5.5 - 8.0 Nm).

37. Aline and install nut (26) and rod end clevis (17) onto brake chamber assembly (13). Install nut and clevis to same number of turns recorded during removal.

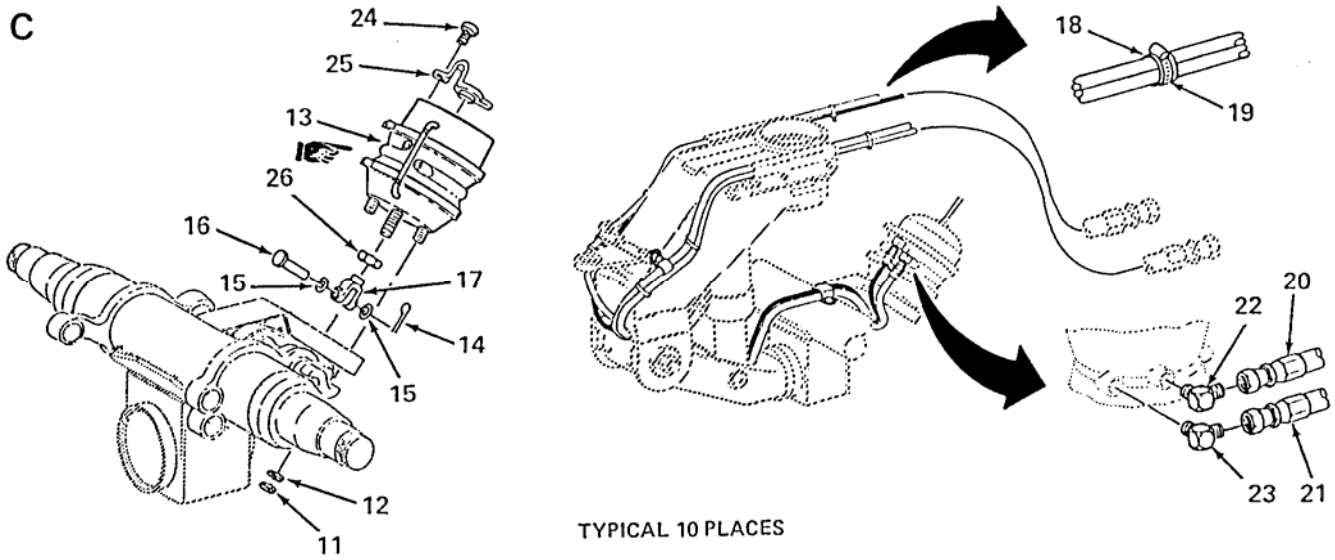
38. Install seal plug (25) and screw (24) to brake chamber assembly (13) and aline and install brake chamber assembly (13) onto axle.

39. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install two elbow fittings (23 and 22) to brake chamber (13). Connect two nonmetallic hoses (21 and 20) to elbow fittings (23 and 22).

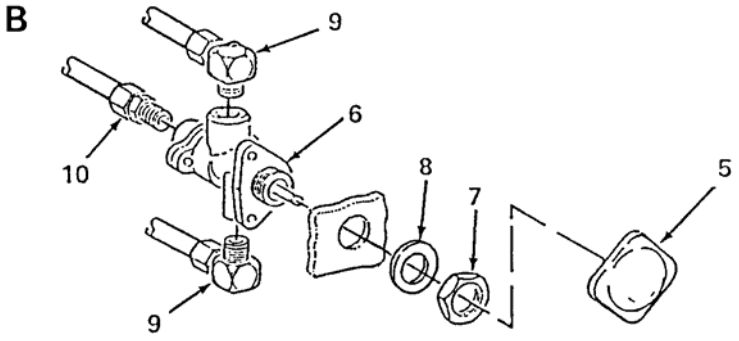
40. Install two hose clamps (19) and nonmetallic channels (18) onto two nonmetallic hoses (21 and 20).

41. Using a 15/16-inch deepwell socket, secure brake chamber assembly (13) to axle by installing two lockwashers (12) and nuts (11). Using a torque wrench, torque nuts (11) to 80 - 125 lb-ft (108.5 - 169.5 Nm).

42. Aline and install headless pin (16), two flat washers (15), and cotter pin (21) to rod end clevis (17).

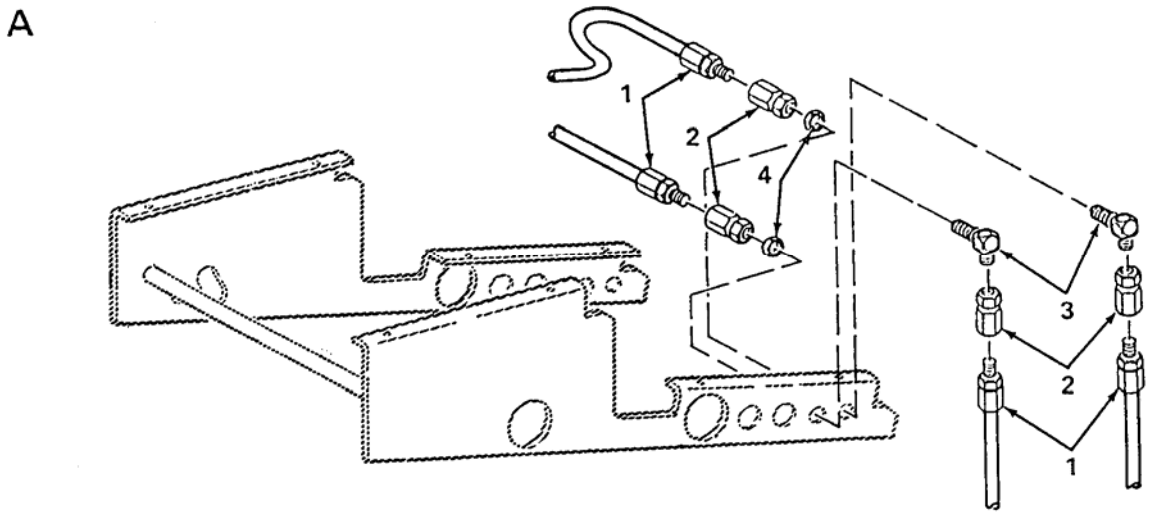


43. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install straight pipe to tube adapter (10) and two pipe-to-tube elbows (9) to brake valve (6).



44. Aline and install brake valve (6) to platform weldment and secure with washer (8) and retainer nut (7). Install knob (5) onto brake valve (6).

45. Remove caps/plugs and install two tube elbows (3) to platform weldment. Secure tube elbows (3) in place using fitting nuts (4).



46. Apply pipe sealant compound to male threads of fittings. Remove caps/plugs and install four straight pipe-to-hose adapters (2) and straight pipe-to-tube adapters (1) onto two tube elbows (3).

FOLLOW-ON MAINTENANCE

1. Couple tractor/semitrailer, charge air system, and check for leaks (para. 2-24).

2. Perform highway driving and check brake operations (para. 2-25).

4-50. HUB AND DRUM

This task covers: a. Removal b. Disassembly c. Lubrication d. Assembly e. Installation

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INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools are found in common tool kit no. 1, item 17, appx. B:

- Socket set, wheel bearing, 3/4" drive
- Degreaser tank, 20 gal
- Hammer, softfaced
- Lubrication gun
- Ratchet, 3/4" drive
- Torque wrench, 3/4" drive 0-600 lb-ft
- Extension light, 24 ft
- Torque wrench, 1/2" drive 0-170 lb-ft
- Bearing pressure packer

Materials/Parts

Grease, item 12, appx. E
Cleaning compound solvent, item 25, appx. E
Rear hub oil seal
Gasket
Lockwasher (6)

Personnel Required: 2

Equipment Condition

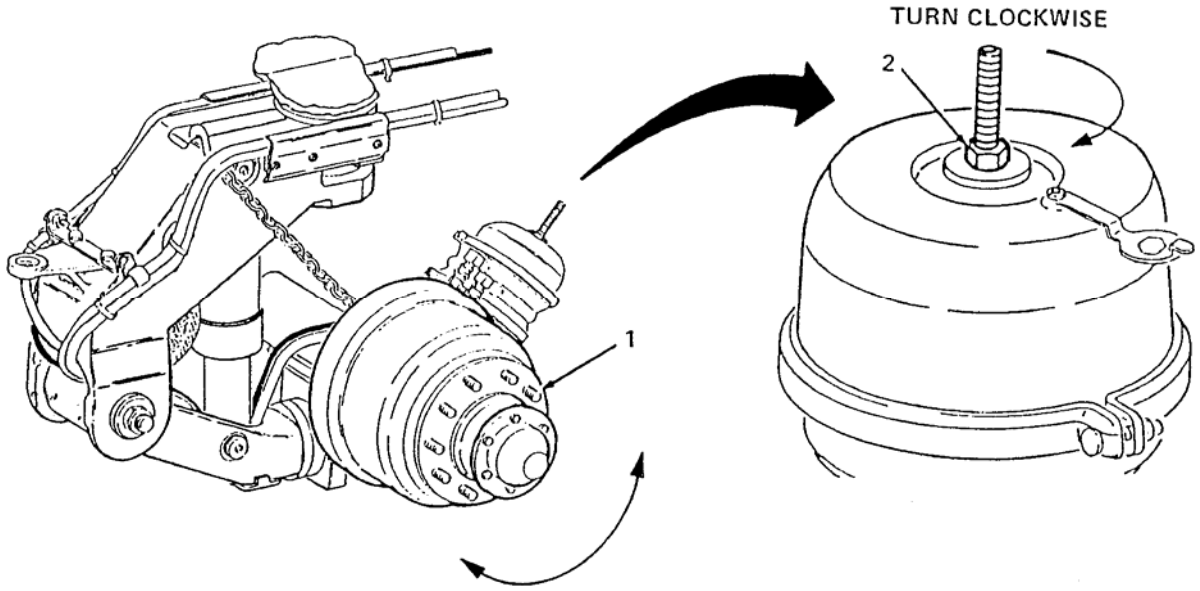
Wheels removed from affected bogie (para. 3-7 and 3-8, or 3-9 and 3-10)
Brakes caged (para. 2-33)

REMOVAL

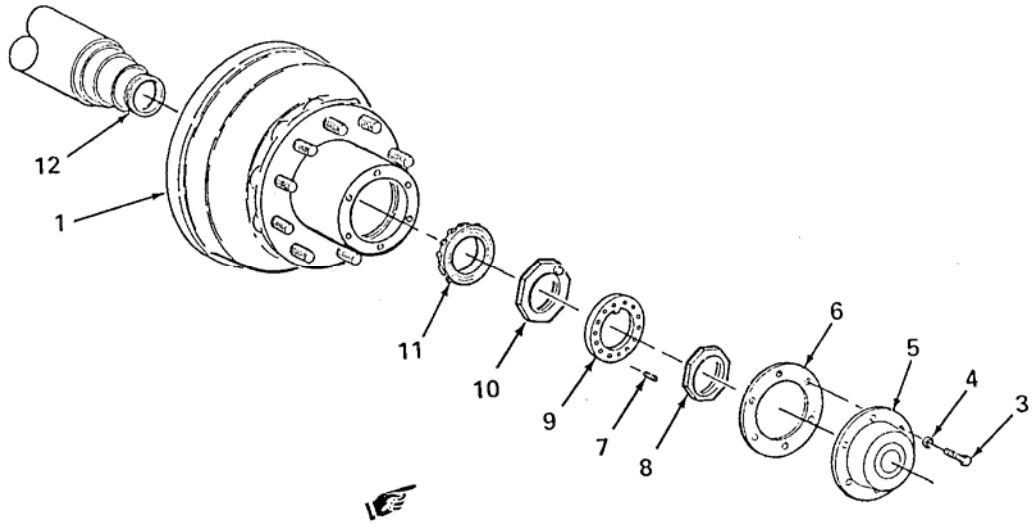
1. To ensure brakes are properly caged, rotate hub and drum assembly (1) in both directions.

   a. If hub and drum assembly (1) spins freely, brakes are properly caged.

   b. If hub and drum assembly drags on brake shoes, turn nut (2) clockwise until hub and drum assembly (1) spins freely.



2. Remove six capscrews (3), lockwashers (4), wheel hub cap (5), and gasket (6) from hub and drum assembly (1). Discard lockwashers and gasket.



3. Remove setscrew (7). Using a 3/4-inch drive ratchet and 3-1/4-inch and 3-7/8-inch wheel bearing sockets, loosen and remove wheel bearing jam nut (8), locking washer assembly (9), and wheel bearing adjusting nut (10).

WARNING

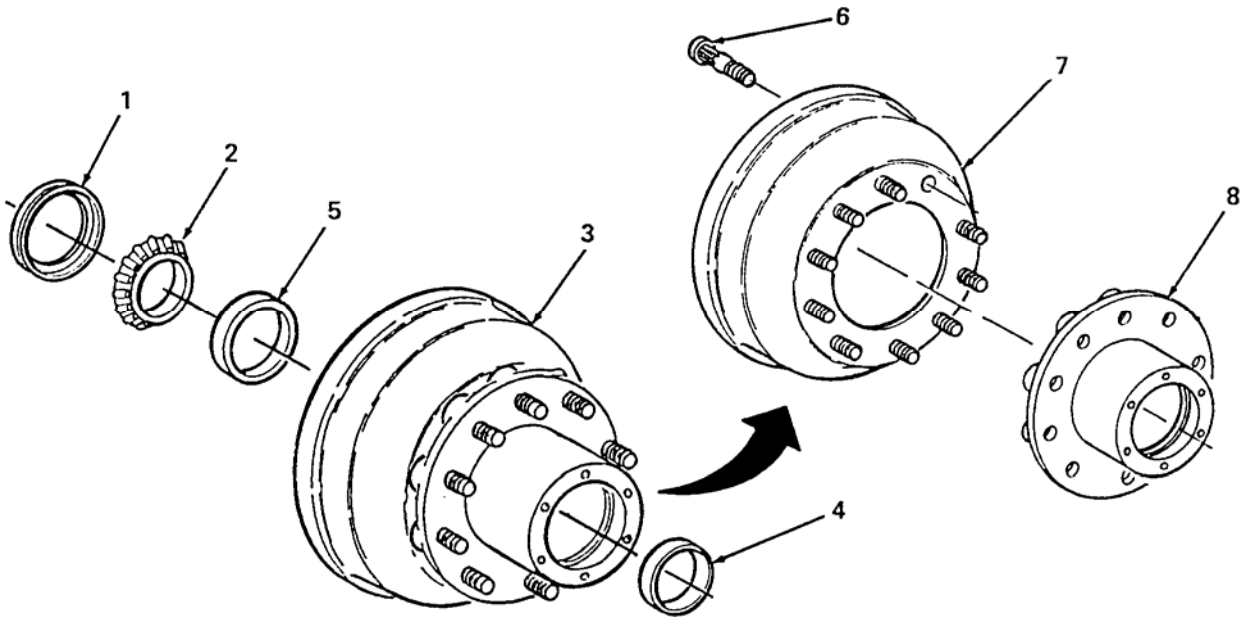
When removing hub and drum assembly from the axle, two persons are required. One person removes parts, and one person supports hub and drum assembly in place on the axle or injury to personnel may result.

4. Using two persons, remove outer tapered roller bearing (11) and hub and drum assembly (1) from axle (12).

4-50. HUB AND DRUM (CONT)

DISASSEMBLY

1. Remove plain encased seal (1) and inner tapered roller bearing cone (2) from hub and drum assembly (3). Discard seal.



2. Drive out outer tapered roller bearing cup (4) from inner axle side of hub and drum assembly (3).

3. From wheel hub cap side of hub and drum assembly (3), drive out inner tapered roller bearing cup (5).

CAUTION

Note thread type of the studs removed, either right-hand or left-hand. The same type studs must be reinstalled when replacing studs or damage to equipment may result.

NOTE

If the drum must be turned/repaired, the wheel hub assembly and brake drum must be separated.

4. Drive 10 studs (6) from hub and drum assembly (3).

5. Separate brake drum (7) and wheel hub (8).

LUBRICATION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

NOTE

To ensure enough bearing grease has been packed into the bearing cones, examine small side of the cone to see if grease has passed through and correctly filled the bearing cavities.

1. Clean all grease from parts removed in degreasing tank using cleaning solvent compound. Using grease, a lubrication gun, and a bearing packer, pack inner and outer wheel bearing cones, forcing grease into wheel bearing cavities between rollers from large end of cones.

2. Liberally hand apply grease to axle.

ASSEMBLY

1. Aline wheel hub (8) and brake drum assembly (7) and drive 10 studs (6) through brake drum (7) and into wheel hub (8).

CAUTION

When installing inner and outer bearing cups, apply driving force to outer edges of cup. Rotate driving points to ensure bearing cups are being installed evenly and correctly or damage to cup may result.

2. Place hub and drum assembly (3) on flat surface and install inner tapered roller bearing cup (5).

3. Install outer tapered roller bearing cup (4) into hub and drum assembly (3).

NOTE

When installing plain encased seal, apply driving force to outer edges of seal. Rotate driving points to ensure the seal is being installed evenly and correctly or damage to the seal may result.

4. Install inner tapered roller bearing cone (2) into hub and drum assembly (3) and, using a softfaced hammer, install plain encased seal (1).

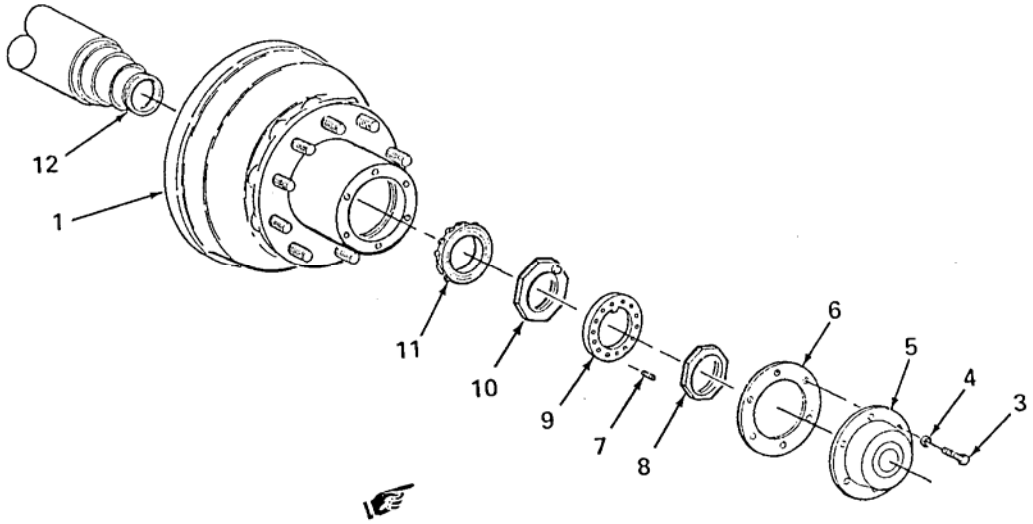
4-50. HUB AND DRUM (CONT)

INSTALLATION

WARNING

To avoid serious injury to personnel when removing hub and drum assembly from the axle, two persons are required. One person removes parts, and one person supports hub and drum assembly in place on the axle.

1. Using two persons, aline and install hub and drum assembly (1) onto axle (12).



2. Install outer tapered roller bearing cone (11) onto axle (12). Install wheel bearing adjusting nut (10).

3. Using a 0 - 600-lb-ft torque wrench and a 3-7/8-inch wheel bearing socket, torque wheel bearing adjusting nut (10) to 100 lb-ft (135 Nm) while rotating hub and drum assembly (1) in both directions. This will ensure all bearing surfaces come in full contact and that the seal seats completely.

4. Loosen wheel bearing adjusting nut (10) completely and retorque to 50 lb-ft (68 Nm).

CAUTION

Failure to back off wheel bearing adjusting nut as specified will result in premature failure of the wheel bearing and damage to equipment.

5. Loosen wheel bearing adjusting nut (10) 1/6 to 1/4 turn so that dowel on wheel bearing adjusting nut will aline with one of several large unthreaded holes in locking washer (9).

6. Install locking washer (9). Ensure that dowel on wheel bearing adjusting nut (10) fully engages an unthreaded hole in locking washer.

7. Install wheel bearing jam nut (8) onto axle (12). Using 0 - 600-lb-ft torque wrench and 3-1/4-inch wheel bearing socket, torque wheel bearing jam nut (8) to 250 - 300 lb-ft (339 - 407 Nm).

8. Install setscrew (7) into one of the four small threaded holes in locking washer and tighten until it firmly bottoms out against adjusting nut (10). Approximately 1/8 inch of setscrew will protrude out over flat of jam nut.

9. Install gasket (6) and hubcap (5) onto hub and drum assembly (1). Install six lockwashers (4) and capscrews (3). Using a 1/2-inch drive torque wrench, torque six capscrews (3) to 15 - 20 lb-ft (20-27 Nm).

FOLLOW-ON MAINTENANCE

1. Install wheels (para. 3-7, 3-8, 3-9, and 3-10).

2. Brakes uncaged (para. 2-33).

4-51. TIRE

This task covers: a. Disassembly b. Inspection c. Assembly

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Tire inflation safety cage, item 32, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:
- Vehicle wheel balancer
- Valve stem fishing tool
- Tire iron, 33 inch, bead breaker
- Inflator gage (with 10 ft hose)
- Reciprocating air compressor unit
- Pneumatic tire valve repair tool
- Tire iron, 37 inch, double ended

Personnel Required: 2

References

TM 9-2330-381-24P
TM 9-2610-200-14
TM 9-4910-743-14&P

4-51. TIRE (CONT)

Equipment Condition

Wheel and tire removed from semitrailer (para. 3-6, 3-7, 3-8, 3-9, or 3-10)

DISASSEMBLY

1. Remove valve cap from valve stem (1).

2. Use pneumatic tire valve repair tool and remove valve from valve stem (1). Run a piece of wire through valve stem (1) to ensure that it is not plugged. Allow all air from inside of tire to escape.

WARNING

Before breaking tire bead, make sure no air pressure remains in tire. Serious injury or death could result.

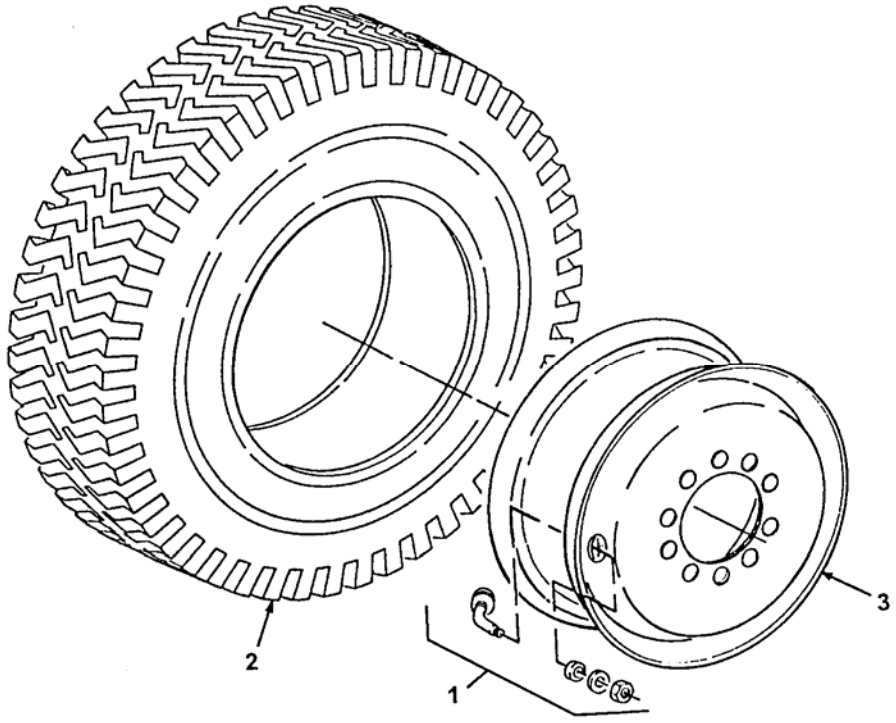
CAUTION

Use tire and rim lubricant as necessary to avoid damaging tire beads when disassembling tire from wheel.

Never use petroleum-based products such as oil or grease when disassembling tires from wheels. Petroleum-based products can damage tires. Use only approved tire and rim lubricant.

3. Using two people, a bead breaker tire iron, and double-ended tire iron, break bead on tire and remove tire (2) from wheel (3).

4. Remove valve stem (1) from wheel (3).



INSPECTION

1. Inspect wheel for damage, cracks, corrosion, dents, and warpage. Check for elongated mounting holes in wheel. If defective, replace wheel. Remove rust, oil, and lubricant residue from wheel.

2. Inspect valve stem for leaky valve, corrosion, cuts or nicks, blockage, dents, or nonsealing surface. If defects exist, replace valve stem.

3. Inspect tire beads, sidewalls, treads, and shoulders in accordance with paragraph 2-23 of TM 9-2610-200-14. If defects are found, repair tire in accordance with TM 9-2610-200-14.

4. Inspect complete inside surface of tire/inner liner for imperfections, discoloration, holes, or irregular surface areas. Remove any foreign material such as paper, stones, dirt, water, etc.

ASSEMBLY

1. Use valve stem fishing tool and install valve stem (1) onto wheel (3). Ensure valve has been removed from inside valve stem (1).

WARNING

Do not use retreads on the M1000 Semitrailer. Only tires listed in TM 9-2330-381-24P, Repair Parts and Special Tools List (RPSTL), are authorized for use. Failure to comply may result in tire failure and may cause equipment damage and serious injury or death.

2. Use two people, a bead breaker tire iron, and double-ended tire iron and install tire (2) onto wheel (3).

WARNING

Tire may explode. Place wheel and tire in safety cage before inflating. Stay back at least 10 feet (3.1m) from cage when inflating. Always stay out of the trajectory area. Always use an air hose extension (10 ft (3.1m) minimum), a snap-on chuck, and an in-line inflator gage. Serious injury or death could result.

When wheel/tire assembly is in safety cage, do not lean against, stand on, or reach over into the cage. Serious injury or death could result.

Never inflate tire over 40 psi (276 kPa) to seat bead. If beads do not seat, deflate, demount, and check the tire/wheel match. Failure to comply may result in serious injury or death.

When using compressed air, always wear safety goggles to prevent dirt and debris from going into your eyes. Compressed air stream must be less than 30 psi (207 kPa).

3. Use an air compressor and inflator gage and inflate tire to reseal tire bead. Once tire bead is established, use a pneumatic valve repair tool and insert valve into valve stem (1).

4. Fill tire to 95 psi ±5 psi (655 kPa ±34 kPa).

4-51. TIRE (CONT)

5. Pour water onto valve stem (1) and inner and outer beads of tire to check for leaks.

6. Balance wheel using vehicle wheel balancer as required in accordance with TM 9-4910-743-14&P.

FOLLOW-ON MAINTENANCE

Install wheel onto semitrailer (para. 3-6, 3-7, 3-8, 3-9, or 3-10).

4-52. CONNECTING LINK

This task covers: a. Removal b. Disassembly c. Inspection d. Assembly e. Installation f. Urethane Bushing Repair

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INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Urethane bushing removal/installation tool, figure F-18, appx. F
The following tools can be found in common tool kit no. 1, item 18, appx. B:
Torque wrench, 0-600 lb-ft, 3/4" drive
Socket, 1-1/2", 3/4" drive
Wrench, combination, 1-1/8"
Wrench, adjustable automotive
Ratchet, 3/4" drive
Extension light, 24 ft
Machinists vise, 4"
Degreaser tank, 20 gal

4-52. CONNECTING LINK (CONT)

Materials/Parts

Antiseize compound, item 3, appx. E
Crocus cloth, item 6, appx. E
Grease, item 12, appx. E
Cleaning compound solvent, item 25, appx. E
Locknut (8)
Preformed packing (5)
Cotter pin (2)
Nonmetallic seal (2)
Wood block, 12-inch x 12-inch (4)

Equipment Condition

Platform adjusted to 50 inch (127 cm) height (para. 2-19)
Front and rear support legs lowered onto wood blocks supporting platform (para. 2-22 and 2-23)
For connecting links attached to #5 steering plate only, manually adjust steering (para. 2-21) for a one-half left turn

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REMOVAL

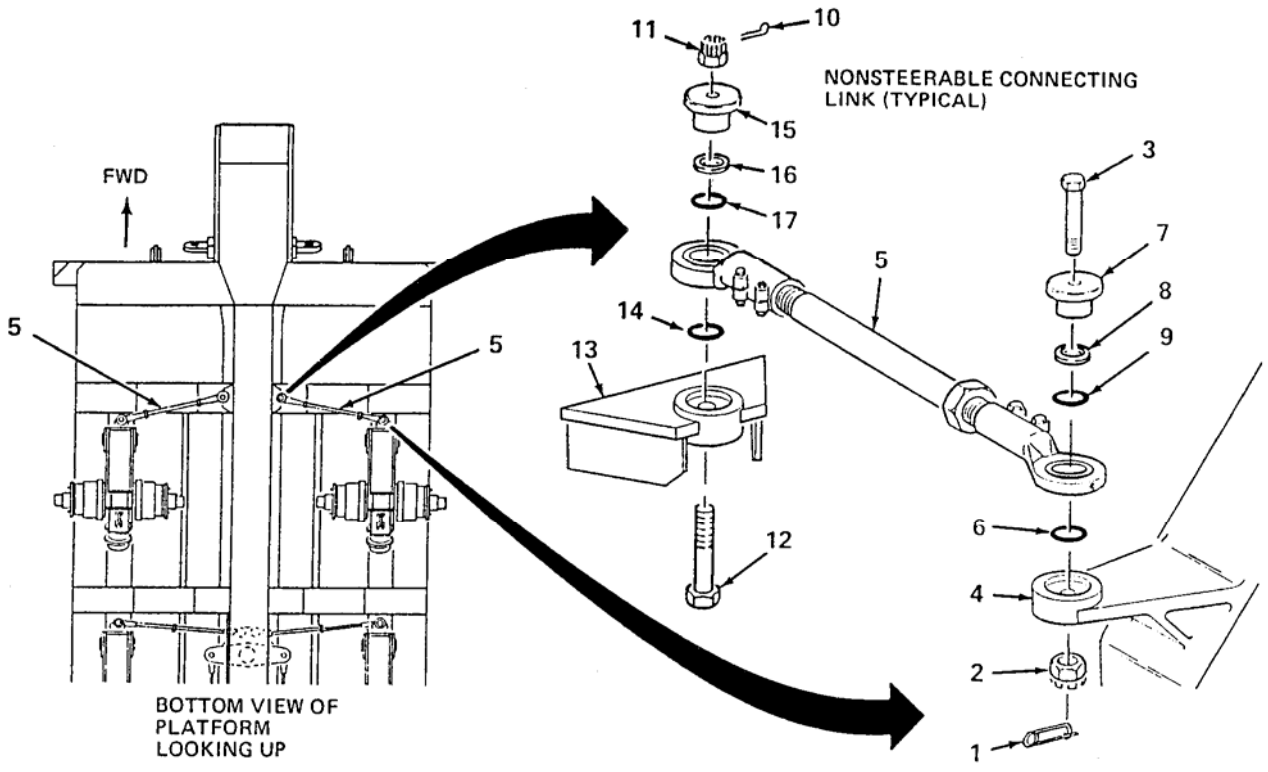
NOTE

There are 10 connecting links, 2 connecting links connect the nonsteerable #1 bogies to a rigid platform mount and the remaining 8 connecting links connect steerable bogies #2 thru #5 to their respective steering plates. To remove a nonsteerable connecting link, perform steps 1 thru 6. To remove a steerable connecting link, perform steps 7 thru 11.

1. Remove special pin (1) from slotted nut (2). Using a 3/4-inch ratchet, 1-1/8-inch socket, and 1-1/8-inch combination wrench, remove slotted nut (2) and capscrew (3) from upper suspension arm (4) and connecting link (5).

2. Using a prybar, pry end of connecting link (5) up and out of linkage attaching point on upper suspension arm (4). Remove and discard preformed packing (6).

3. Remove sleeve bushing (7), ring spacer (8), and preformed packing (9) from connecting link (5). Discard preformed packing.



4. Remove cotter pin (10) from slotted nut (11). Using a 3/4-inch ratchet, 1-1/8-inch socket, and 1-1/8-inch combination wrench, remove slotted nut (11) and capscrew (12) from connecting link (5) and rigid platform mount (13). Discard cotter pin.

5. Using a prybar, pry end of connecting link (5) up and out of linkage attaching point on rigid platform mount (13). Remove preformed packing (14). Discard preformed packing.

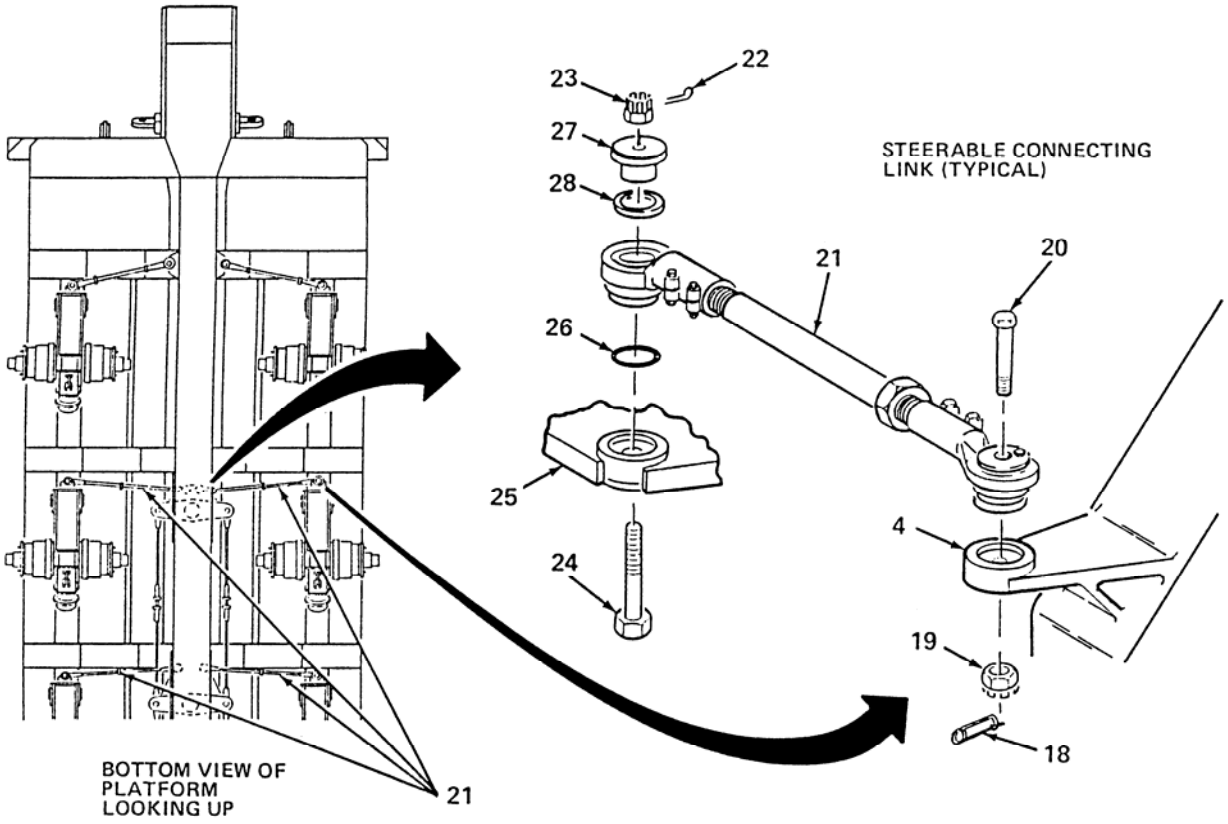
6. Remove sleeve bushing (15), ring spacer (16), and preformed packing (17) from connecting link (5). Discard preformed packing.

4-52. CONNECTING LINK (CONT)

NOTE

Removal procedures for the eight steerable bogie connecting links are the same except for #5 bogie. Make sure the steering plate is set for a one-half left turn or there will not be enough room, between the #5 steering plate and platform steering cylinders, to remove the steering plate connecting link bolt.

7. Remove special pin (18) from slotted nut (19). Using a 3/4-inch ratchet, 1-1/8-inch socket, and 1-1/8-inch combination wrench, remove slotted nut (19) and capscrew (20) from upper suspension arm (4) and steerable connecting link (21).



8. Using a prybar, pry end of connecting link (21) up and out of linkage attaching point on upper suspension arm (4).

9. Remove cotter pin (22) from slotted nut (23). Using a 3/4-inch ratchet, 1-1/8-inch socket, and 1-1/8-inch combination wrench, remove slotted nut (23) and capscrew (24) from connecting link (21) and steering plate (25). Discard cotter pin.

10. Using a prybar, pry end of connecting link (21) up and out of linkage attaching point on steering plate (25). Remove preformed packing (26). Discard preformed packing.

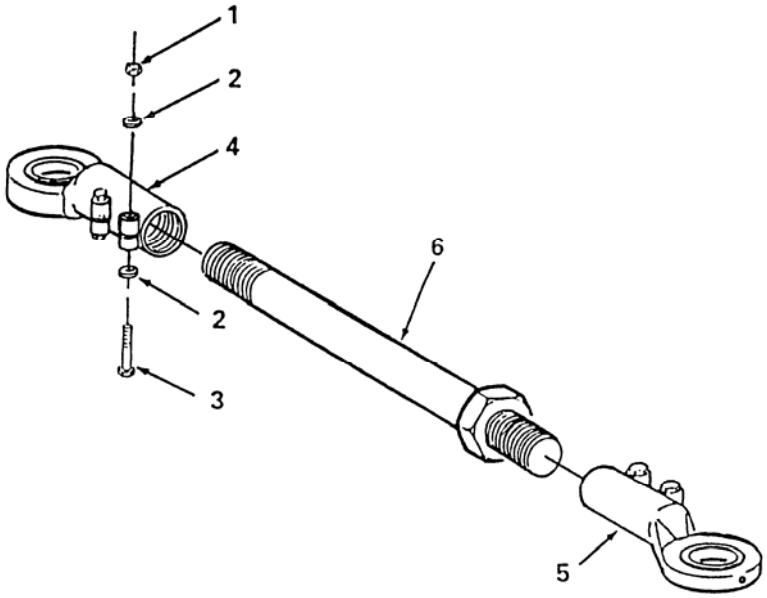
11. Remove sleeve bushing (27) and ring spacer (28) from connecting link (21).

DISASSEMBLY

NOTE

Perform only the steps necessary to disassemble a connecting link to the point required for repair. To disassemble a nonsteerable connecting link, perform steps 1 and 2. To disassemble a steerable connecting link, perform steps 3 thru 5.

1. Remove two locknuts (1), four washers (2), and two capscrews (3) from each rod end (4 and 5). Discard locknuts.



NOTE

When removing the rod ends from the connecting link rod, count and document the number of turns required to unscrew each rod. This recorded information will be required during assembly of the connecting link assembly.

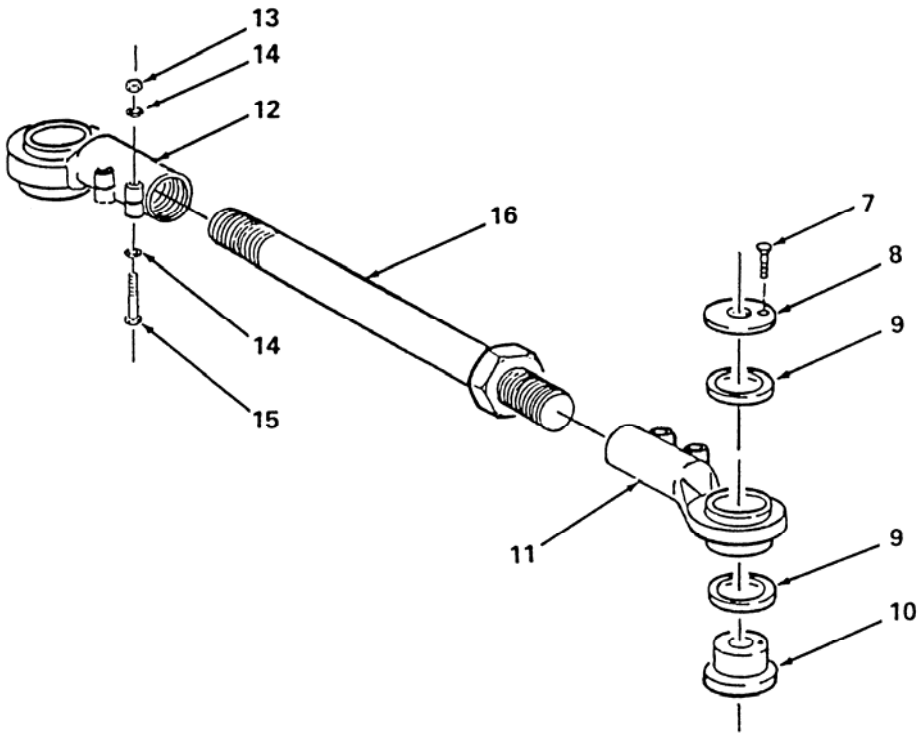
2. Place rigid link (6) in a machinists vise and, using an adjustable automotive wrench, unscrew and remove rod ends (4 and 5) from rigid link (6). Remove rigid link (6) from vise.

4-52. CONNECTING LINK (CONT)

NOTE

To disassemble any of the eight steerable connecting link assemblies, perform steps 3 thru 5.

3. Remove screw (7), retaining ring (8), two nonmetallic seals (9), and shouldered pin (10) from rod ends (11 and 12). Discard nonmetallic seals.



4. Remove two locknuts (13), four washers (14), and two capscrews (15) from each rod end (11 and 12). Discard locknuts.

NOTE

When removing the rod ends from the connecting link rod, count and document the number of turns required to unscrew each rod. This recorded information will be required during assembly of the connecting link assembly.

5. Secure rigid link (16) in a machinists vise and, using an adjustable automotive wrench, unscrew and remove rod ends (11 and 12) from rigid link (16). Remove rigid link (16) from vise.

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Clean all parts removed in degreaser tank with cleaning compound solvent and wire brush as necessary. Remove any nicks, burrs, or corrosion from polished surfaces using crocus cloth.

2. Inspect all parts removed for broken welds, nicks, burrs, pitting, and scoring. Clean parts as required and replace any parts found defective.

3. Inspect sleeve bushing in both ends of connecting link for worn/distorted urethane. If urethane is worn/distorted, replace sleeve bushing.

ASSEMBLY

NOTE

To assemble steerable connecting link, perform steps 1 thru 3. To assemble a nonsteerable connecting link, perform steps 4 and 5.

1. Apply a thin coat of antiseize compound to threaded ends of rigid link (16). Secure rigid link (16) in a machinists vise and, using an adjustable automotive wrench, aline and install rod ends (12 and 11) onto rigid link (16), threading each rod end the number of turns recorded during disassembly.

2. Secure each rod end (12 and 11) in place by installing two capscrews (15), four washers (14), and two locknuts (13). Remove rigid link (16) from machinists vise.

3. Apply thin coat of grease to two nonmetallic seals (9) and a thin coat of antiseize compound to wear surfaces of shouldered pin (10). Install shouldered pin (10), two nonmetallic seals (9), retaining ring (8), and screw (7).

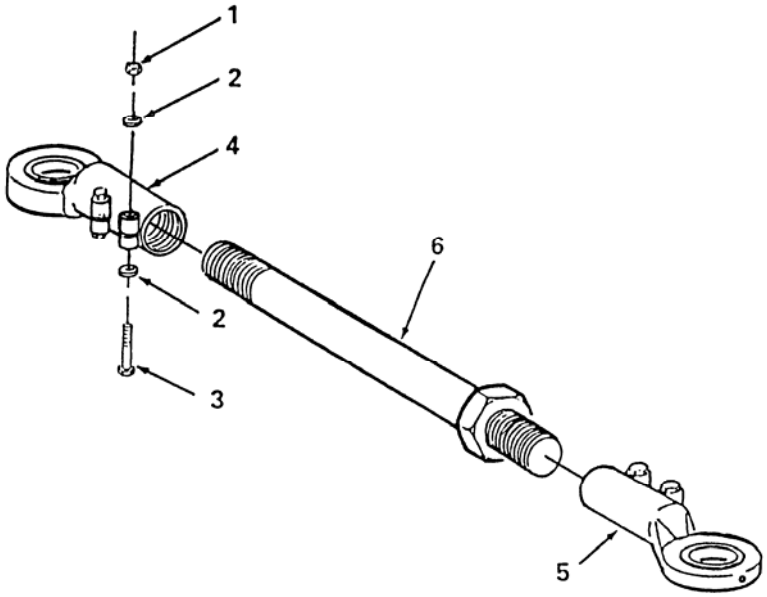
4-52. CONNECTING LINK (CONT)

NOTE

To assemble nonsteerable connecting link, perform steps 4 and 5.

4. Apply a thin coat of antiseize compound to threaded ends of rigid link (6). Secure rigid link (6) in a machinists vise and, using an adjustable automotive wrench, aline and install rod ends (5 and 4) onto rigid link (6), threading each rod end the number of turns recorded during disassembly.

5. Secure each rod end (5 and 4) in place by installing two capscrews (3), four washers (2), and two locknuts (1). Remove rigid link (6) from machinists vise.



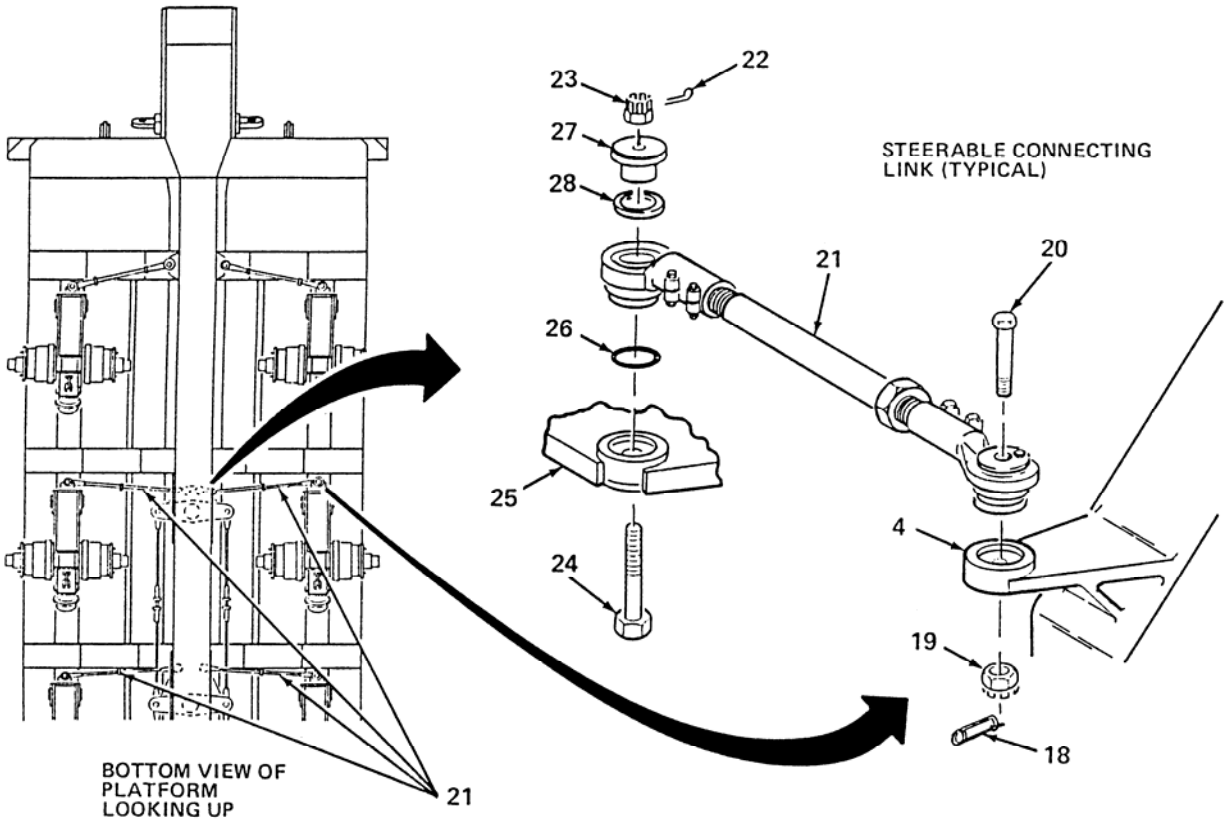
INSTALLATION

NOTE

Installation procedures for the eight steerable bogie connecting links are the same except for #5 bogie. Make sure the #5 steering plate is set for a one-half left turn or there will not be enough room to install the connecting link bolt between the steering cylinder and steering plate. To install a steerable connecting link, perform steps 1 thru 6. To install a nonsteerable connecting link, perform steps 7 thru 14.

1. Lubricate preformed packing (26) with grease and install under connecting link (21) rod end at linkage attaching point on steering plate (25).

2. Apply a thin coat of antiseize compound to wear surfaces of sleeve bushing (27). Install ring spacer (28) and sleeve bushing (27) onto connecting link (21). Install capscrew (24) from underside, through connecting link (21) rod end and steering plate (25).



NOTE

Torque wrench and socket should be used to hold capscrew, and combination wrench should be used to hold slotted nut when applying final torque to connecting link attaching hardware.

3. Install slotted nut (23) onto capscrew (24). Using a torque wrench, 1-1/8-inch socket, and 1-1/8-inch combination wrench, torque slotted nut (23) to 205 lb-ft (278 Nm). Tighten slotted nut (23), additionally as required to aline first available slot with hole in shank of capscrew (24) and install cotter pin (22).

4. Position connecting link (21) rod end at linkage attaching point on upper suspension arm (4).

5. Install capscrew (20) from topside through rod end of link assembly (21) and upper suspension arm (4).

NOTE

Torque wrench and socket should be used to hold capscrew, and combination wrench should be used to hold slotted nut when applying final torque to connecting link attaching hardware.

4-52. CONNECTING LINK (CONT)

6. Install slotted nut (19) onto capscrew (20). Using a torque wrench, 1-1/8-inch socket, and 1-1/8-inch combination wrench, torque slotted nut (19) to 205 lb-ft (278 Nm). Tighten slotted nut (19), additionally as required, to aline first available slot with hole in shank of capscrew (20) and install special pin (18).

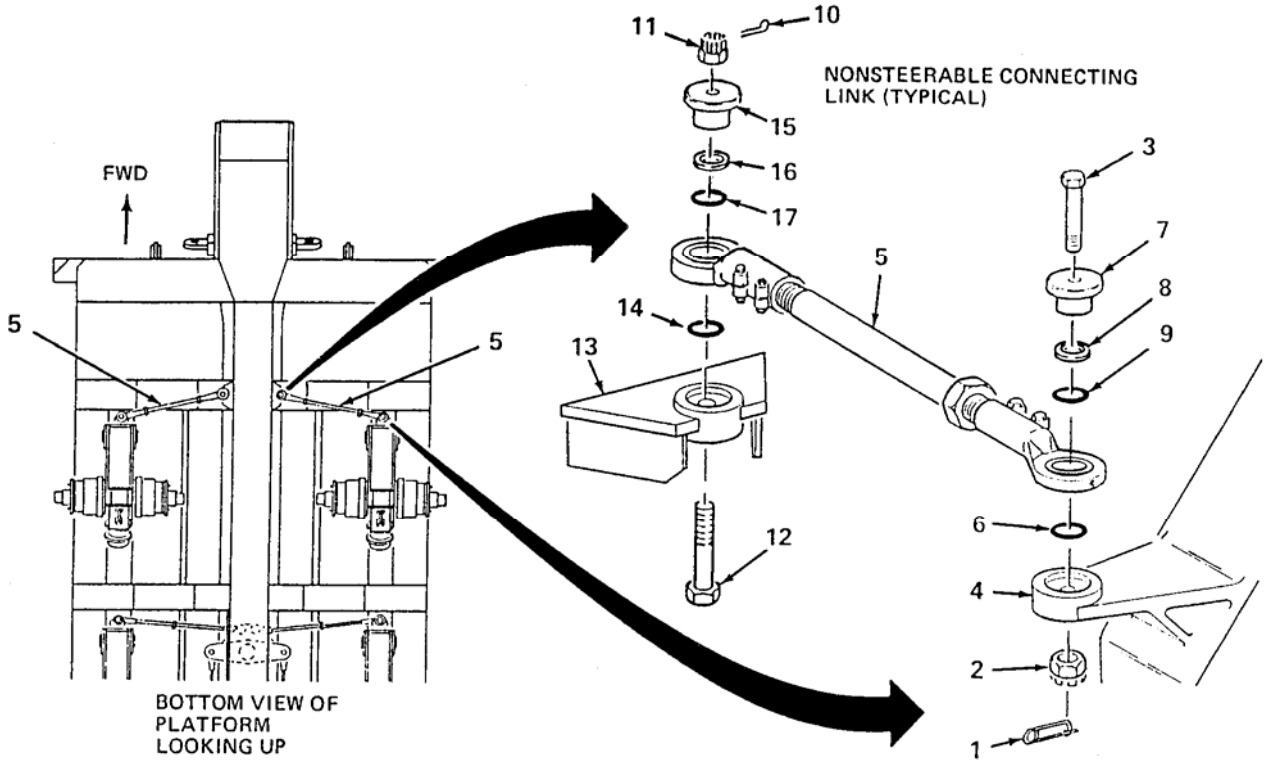
NOTE

To install a nonsteerable connecting link, perform steps 7 thru 14.

7. Lubricate preformed packing (14) with grease and install under connecting link (5) rod end at linkage attaching point on fixed platform mount (13).

8. Lubricate preformed packing (17) with grease and apply a thin coat of anti-seize compound to wear surfaces of sleeve bushing (15). Install preformed packing (17) with ring spacer (16) and sleeve bushing (15).

9. Install capscrew (12) from underside through connecting link (5) rod end and rigid platform mount (13).



NOTE

Torque wrench and socket should be used to hold capscrew, and combination wrench should be used to hold slotted nut when applying final torque to connecting link attaching hardware.

10. Install slotted nut (11) onto capscrew (12). Using a torque wrench, 1-1/8-inch socket, and 1-1/8 inch combination wrench, torque slotted nut (11) to 205 lb-ft (278 Nm). Tighten slotted nut (11), additionally as required, to aline first available slot with hole in shank of capscrew (12) and install cotter pin (10).

11. Lubricate preformed packing (6) with grease and install under connecting link (5) rod end at linkage attaching point on upper suspension arm (4).

12. Lubricate preformed packing (9) with grease and apply a thin coat of antiseize compound to wear surfaces of sleeve bushing (7). Install preformed packing (9) with ring spacer (8) and sleeve bushing (7).

13. Install capscrew (3) from topside through rod end of link assembly (5) and upper suspension arm (4).

NOTE

Torque wrench and socket should be used to hold capscrew, and combination wrench should be used to hold slotted nut when applying final torque to connecting link attaching hardware.

14. Install slotted nut (2) onto capscrew (3). Using a torque wrench, 1-1/8-inch socket, and 1-1/8 inch combination wrench, torque slotted nut (2) to 205 lb-ft (278 Nm). Tighten slotted nut (2), additionally as required, to aline first available slot with hole in shank of capscrew (1) and install special pin (1).

URETHANE BUSHING REPAIR

NOTE

This task is for the removal of outboard urethane bushing on outboard end of connecting links for bogies #2, #3, #4, and #5.

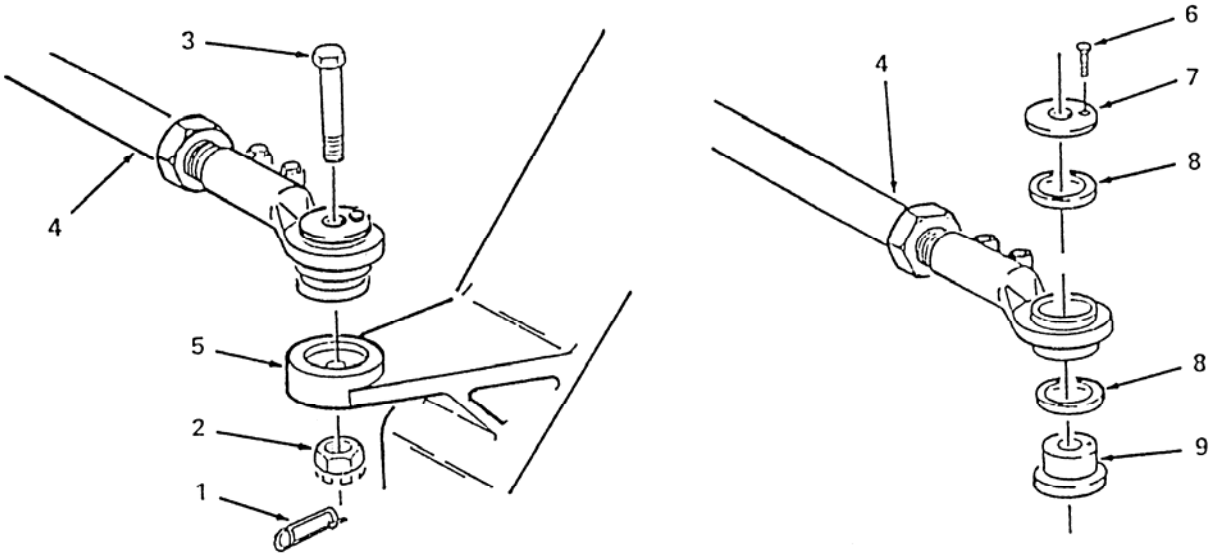
1. If connecting link is already removed, proceed to step 2. If connecting link is connected to bogie, proceed as follows:

   a. Adjust platform (para. 2-19) to 50 inch height (127 cm).

   b. Close suspension isolation valves (para. 2-6) at four corners of platform, handles facing outward.

4-52. CONNECTING LINK (CONT)

c. Remove safety pin (1), nut (2), and capscrew (3) from connecting link (4).



d. Pry up and move connecting link (4) off of upper suspension arm (5) on bogie.

2. Remove screw (6), retaining ring (7), two nonmetallic seals (8), and shouldered pin (9) from connecting link (4). Discard nonmetallic seals.

3. Center bushing cap (10) and washer (11) over urethane bushing (12) on connecting link (4).

4. Install threaded rod (13) up through bottom of urethane bushing (12) and through bushing cap (10) and washer (11).

5. Install nut (14) onto top of threaded rod (13). Thread nut (14) until approximately three threads of threaded rod (13) protrude past end of nut(14).

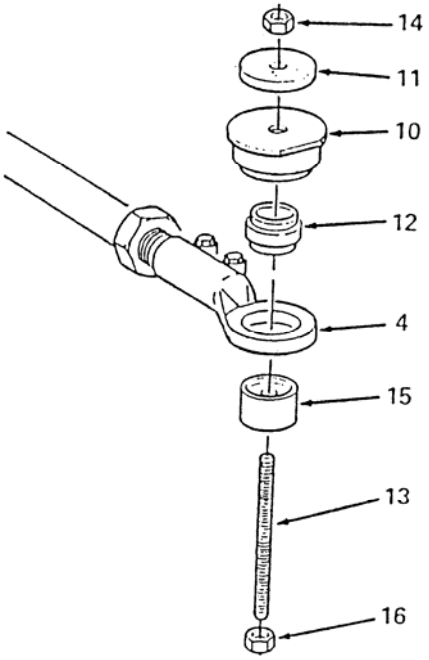
6. Install spacer (15) with recessed side facing upward, onto threaded rod (13) from under side of connecting link (4).

7. Install nut (16) onto threaded rod (13). Tighten nut (16) against spacer(15).

8. Center bushing cap (10) and spacer (15) over urethane bushing (12) on connecting link (4).

9. Using a 3/4-inch ratchet, 1-1/8-inch socket, and 1-1/8-inch combination wrench, tighten nuts (14 and 16). Continue to tighten nuts (14 and 16) until urethane bushing (12) is removed from connecting link (4).

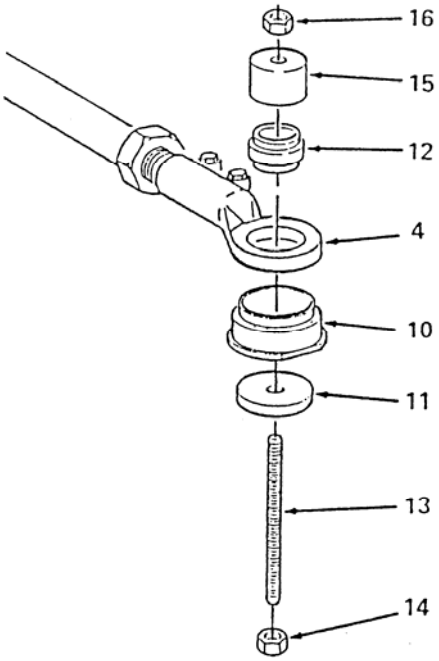
10. Remove tool from connecting link (4). Remove nut (16), spacer (15), and urethane bushing (12) from threaded rod (13). Discard urethane bushing.



CAUTION

Urethane bushing is not symmetrical. One side has more urethane material protruding beyond the outer steel sleeve. Ensure that the side with the most material is pointing downward.

11. Insert new urethane bushing (12) into opening on top of connecting link (4). Install spacer (15) over urethane bushing (12). Make sure spacer (15) is properly seated onto urethane bushing (12).



12. Turn threaded rod (13) over so that bushing cap (10) and washer (11) are held in place by nut (14).

4-52. CONNECTING LINK (CONT)

13. Install threaded rod (13) up through connecting link (4), urethane bushing (12) and spacer (15). Install nut (16) onto threaded rod (13) so that approximately three threads of threaded rod (13) protrude past end of nut(16).

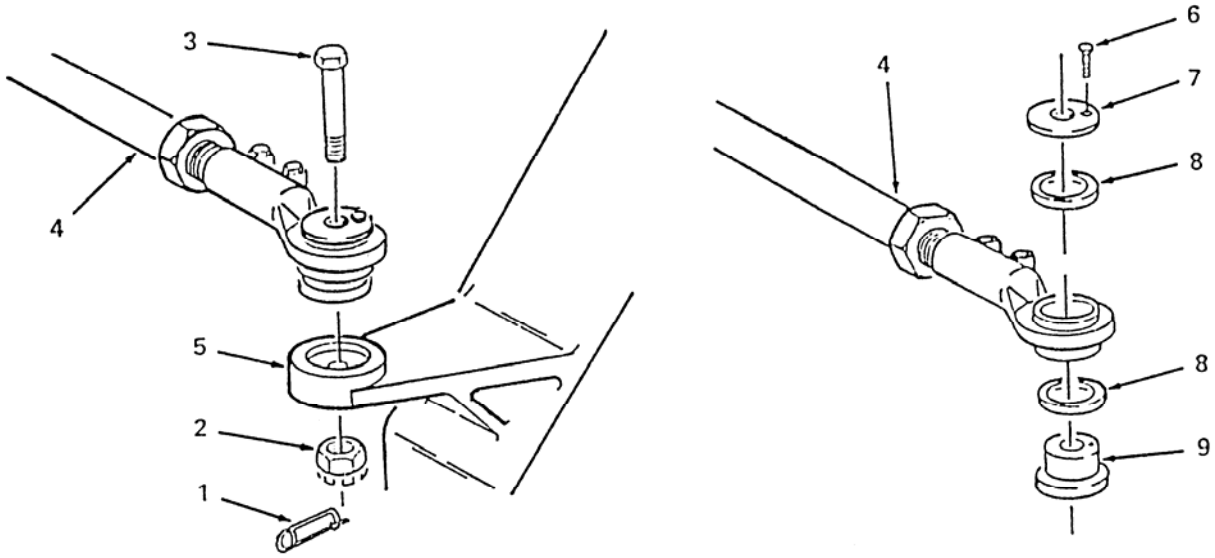
14. Center bushing tool onto urethane bushing (12) and opening of connecting link (4). Tighten nut (14).

15. Using a 3/4-inch ratchet, 1-1/8-inch socket, and 1-1/8-inch combination wrench, tighten nuts (14 and 16). Continue to tighten nuts (14 and 16) until urethane bushing (12) is centered in top and bottom of connecting link (4).

16. Remove nuts (14 and 16) from threaded rod (13) and removed pieces of bushing tool.

17. Install shouldered pin (9), two nonmetallic seals (8), and retaining ring (7) onto connecting link (4), and secure with screw (6).

18. If connecting link (4) was removed, refer to installation procedure and install connecting link (4). If connecting link (4) was disconnected from bogie, proceed as follows:



a. Position connecting link (4) onto upper suspension arm (5).

b. Install capscrew (3) through connecting link (4) and upper suspension arm (5). Install nut (2) onto capscrew (3).

c. Using a torque wrench, 1-1/8-inch socket, and 1-1/8-inch combination wrench, torque nut (2) to 205 - 225 lb/ft (278 - 305 Nm). Tighten nut (2) additionally as required, to aline nut with hole in shank of capscrew (3). Install safety pin (1) into capscrew (3).

FOLLOW-ON MAINTENANCE

1. Perform required lubrication (para. 3-3).

2. Perform platform steering alinement (para. 4-16).

4-53. LONGITUDINAL STRUT

This task covers: a. Removal c. Inspection e. Installation
b. Disassembly d. Assembly

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:
Wrench, adjustable automotive
Torque wrench, 1/2" drive,
0-200 lb-ft
Extension light, 24 ft
Degreaser tank, 20 gal

Materials/Parts

Antiseize compound, item 3, appx. E
Crocus cloth, item 6, appx. E
Grease, item 12, appx. E
Thread locking compound, item 21, appx. E
Cleaning compound solvent, item 25, appx. E
Lockwasher (1)
Packing retainer (6)
Wood block, 12 inch x 12 inch (4)
Special bolt, self-locking (2)

Personnel Required: 2

Equipment Condition

Semitrailer parked on level ground (para. 2-25)
Platform adjusted to 50 inch (127 cm) height (para. 2-19)
Parking brakes applied and wheels chocked (para. 2-24)
Front and rear support legs lowered onto wood blocks supporting platform (para. 2-22 and 2-23)

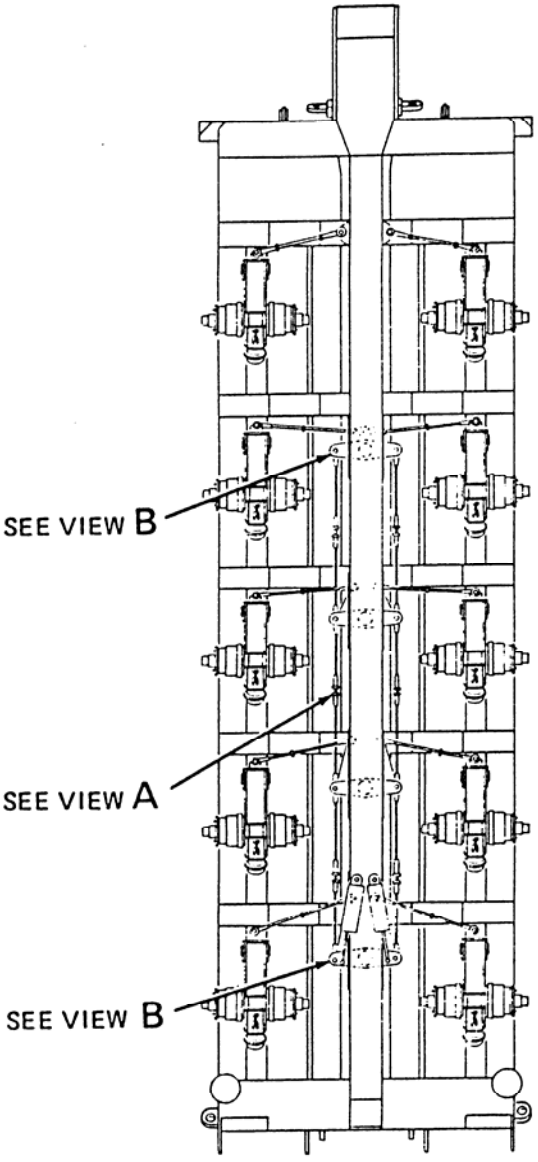
4-53. LONGITUDINAL STRUT (CONT)

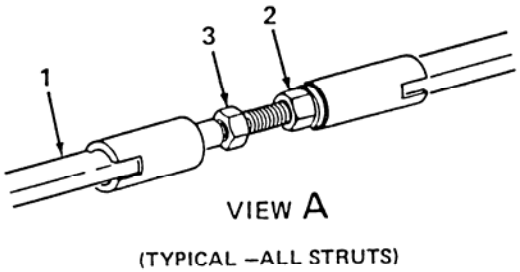
REMOVAL

NOTE

Loosening the adjusting nut on the longitudinal strut relieves tension on both end pin assemblies and allows for easier removal.

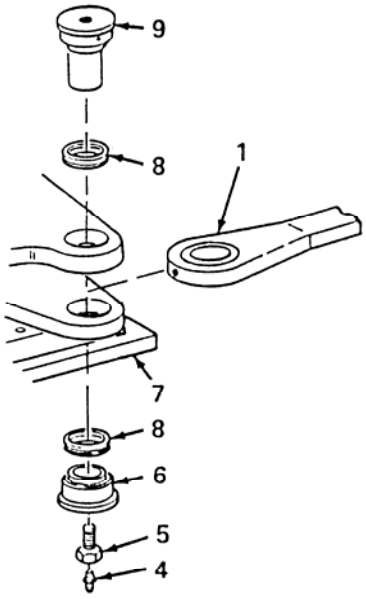
1. Using an adjustable automotive wrench, at center of longitudinal strut (1), loosen nut (2) two full turns. Then, loosen adjusting nut (3) one and one-half turns counterclockwise.





VIEW A

(TYPICAL –ALL STRUTS)



VIEW B

(TYPICAL AT #2 AND #5 STEERING PLATES)

NOTE

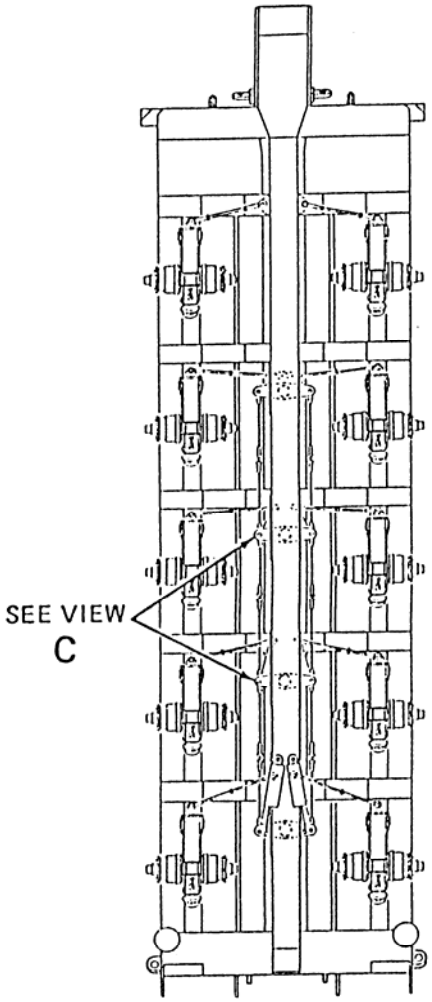
Four ends of the six longitudinal struts which attach to steering plates #2 and #5 are identical. Perform steps 2 thru 5 to remove one end of a longitudinal strut from #2 or #5 steering plate.

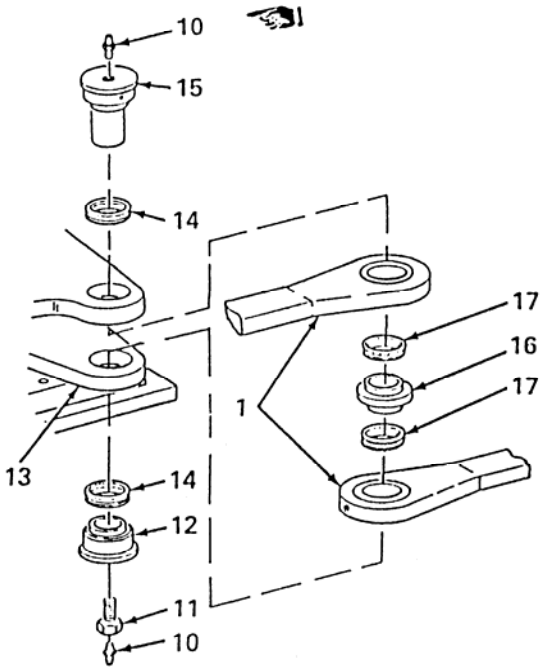
2. Remove lubrication fitting (4) and special bolt (5) from sleeve bushing (6). Discard special bolt.
3. Remove sleeve bushing (6) from steering plate (7). Remove packing retainer (8) from sleeve bushing (6). Discard packing retainer.
4. Remove pin assembly (9) from steering plate (7) and longitudinal strut (1).
5. Remove packing retainer (8) from pin assembly (9). Discard packing retainer.

NOTE

Eight ends of the six longitudinal struts that attach to steering plates on bogies #3 and #4 are identical. Perform steps 6 thru 11 to remove one end of a longitudinal strut from #3 or #4 steering plate.

6. Remove lubrication fitting (10) and special bolt (11) from sleeve bushing (12). Discard special bolt.





VIEW C
(TYPICAL AT #3 AND #4 STEERING PLATES)

4-53. LONGITUDINAL STRUT (CONT)

7. Remove sleeve bushing (12) from steering plate (13). Remove packing retainer (14) from sleeve bushing (12). Discard packing retainer.

8. Remove pin assembly (15) from steering plate (13) and longitudinal strut(1).

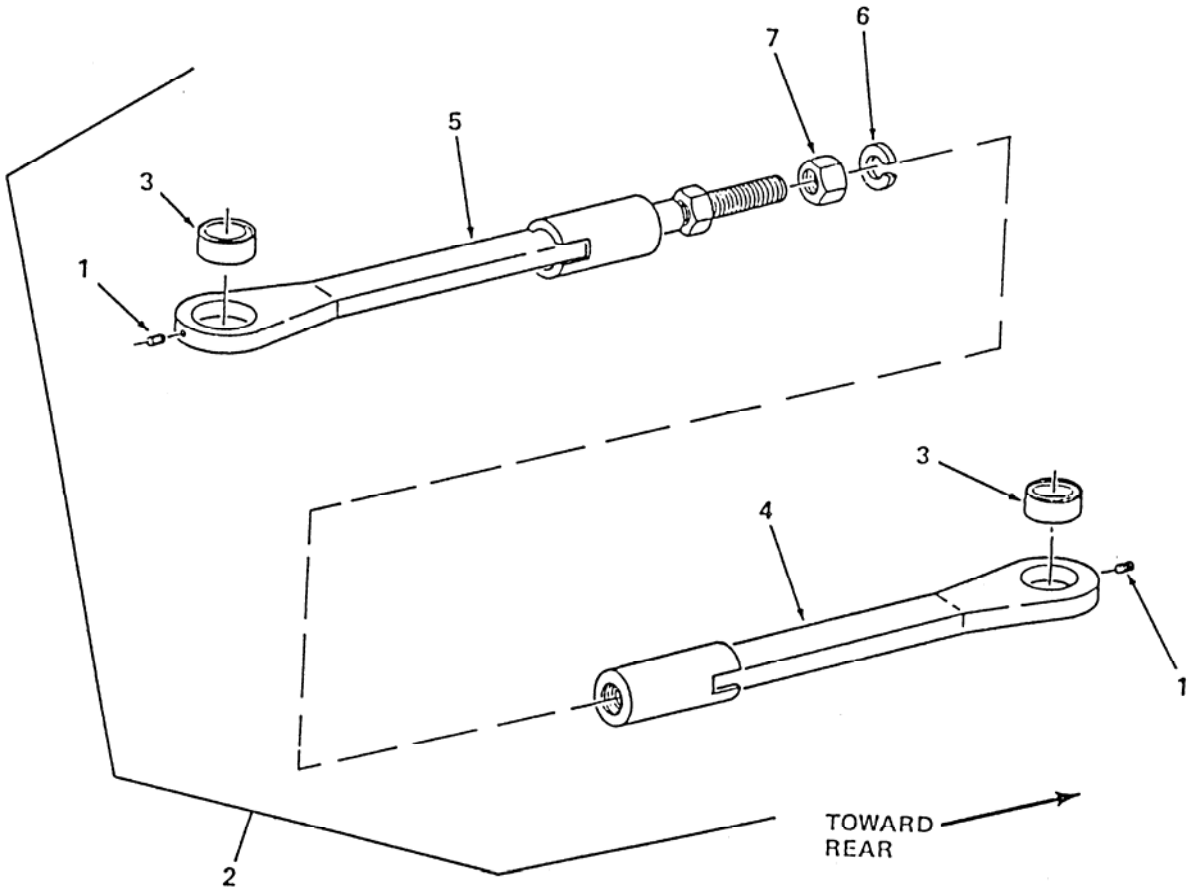
9. Remove packing retainer (14) and lubrication fitting (10) from pin assembly (15). Discard packing retainer.

10. Using two people, pull ends of both longitudinal struts (1) out and away from steering plate (13).

11. Separate two longitudinal struts (1) and remove spacer sleeve (16) and two packing retainers (17). Discard two packing retainers.

DISASSEMBLY

1. If applicable, remove setscrew (1) from each end of longitudinal strut(2).



2. Using a hammer and brass drift, drive two plain bearings (3) from longitudinal strut (2).

3. Using an adjustable automotive wrench, unscrew, count, and document number of turns required, and separate two machined sockets (4 and 5).

4. Remove lockwasher (6) and nut (7) from machined socket (5). Discard lockwasher.

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Clean all parts removed in degreaser tank with cleaning compound solvent and wire brush as necessary. Remove any nicks, burrs, or corrosion from polished surfaces using crocus cloth.

2. Inspect all parts removed for broken welds, nicks, burrs, pitting, and scoring. Clean parts as required and replace any parts found defective.

ASSEMBLY

1. Thread nut (7) onto machined socket (5) and install lockwasher (6).

NOTE

When assembling sockets together, hold the machined socket with "jam" nut and lockwasher stationary and thread other machined socket clockwise until properly positioned.

2. Assemble two machined sockets (5 and 4), threading machined socket (4) the same number of turns recorded during disassembly.

3. Once both machined sockets (5 and 4) are assembled, tighten nut (7).

4-53. LONGITUDINAL STRUT (CONT)

NOTE

Longitudinal struts may be either weldments without setscrews, weldments with setscrews on the end (centerlines) (illustrated), forgings without setscrews, or forgings with setscrews offset 30 degrees from the centerline (illustrated). The end of the weldment is slightly thicker than the outer race of the bearing. The end of the forging is approximately the same thickness as the outer race. Bearing installation will vary slightly between configurations.

4. Remove corrosion preventive coating from outer diameter of new bearings before installation.

NOTE

Do not orient fracture in bearing outer ring in line with setscrew hole.

5. Install plain bearing (3) into each end of longitudinal strut (2). If strut is weldment, make sure outer race of plain bearing is centered in socket within 0.30 inch. If strut is forging with setscrews, make sure outer race is flush with side of strut that has punched countersink or X reference mark. Forgings without setscrews do not have reference marks. Ensure that outer race is centered in strut and does not protrude from either side.

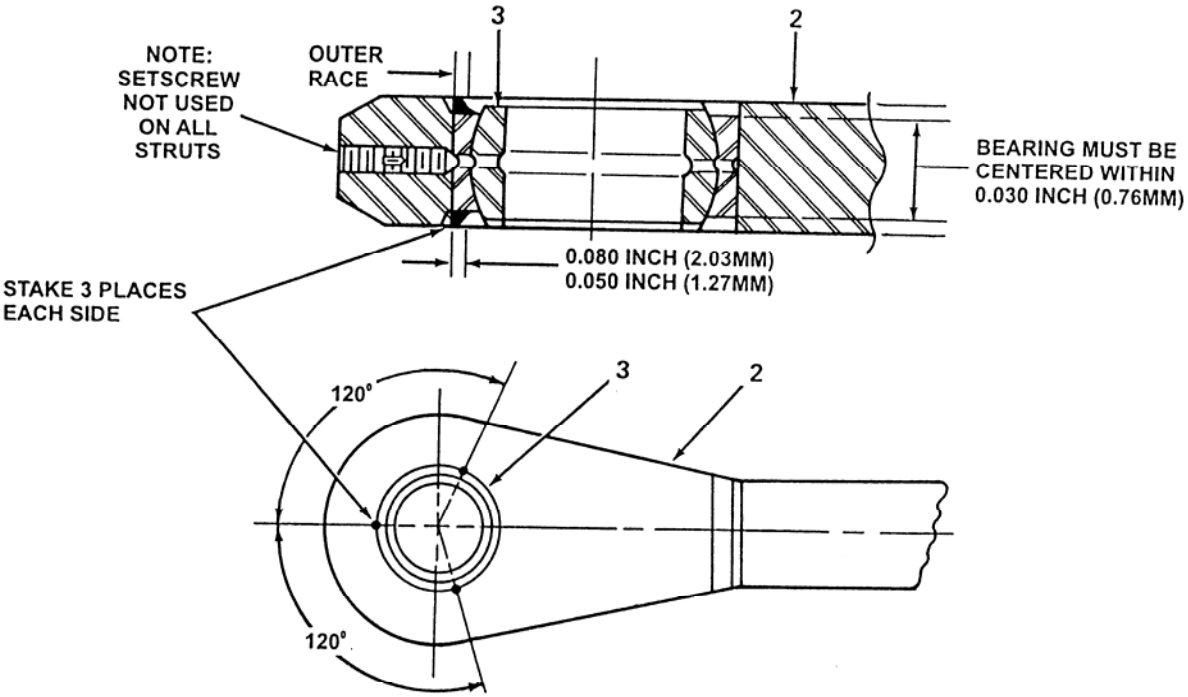
6. Apply thread locking compound to two setscrews (1), if applicable, and install setscrews (1) into longitudinal strut (2) to secure plain bearings (3). If strut is forging, torque setscrews to 50 - 70 in.-lb (5.5 - 7.7 Nm).

CAUTION

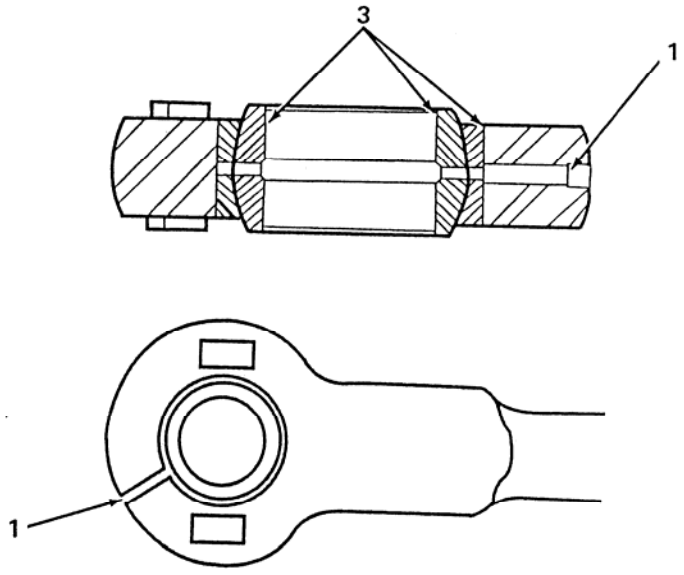
When staking plain bearings, use fixtures as necessary to support strut rod ends and bearings, or the bearing may be forced out of centered position in rod end, causing damage.

7. If desired, using a center punch, stake each plain bearing (3) in three places, 120 degrees apart on each side of longitudinal strut (2). Peen material from strut rod end over edge of outer race.

WELDMENT



FORGING



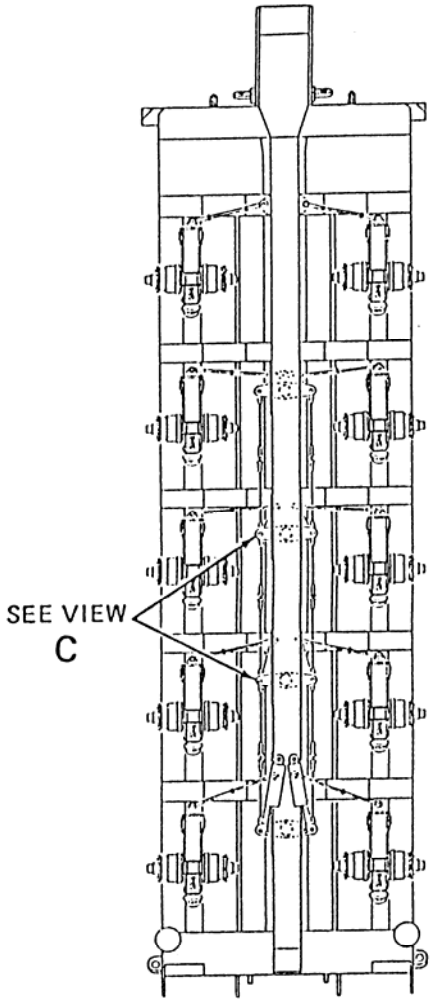
4-53. LONGITUDINAL STRUT (CONT)

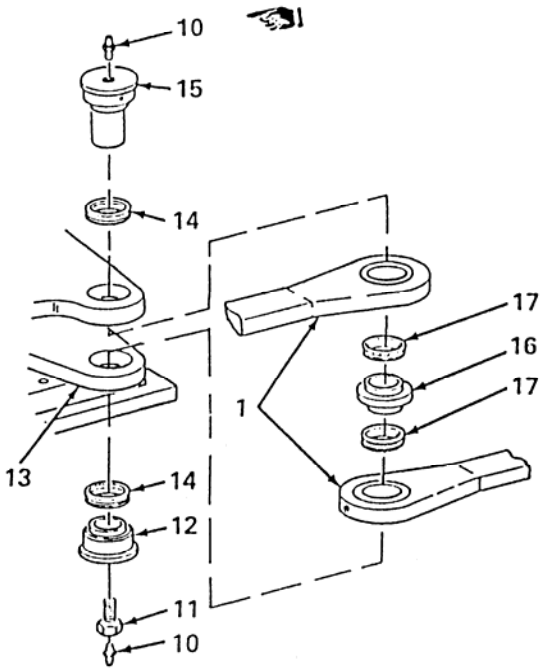
INSTALLATION

NOTE

Eight ends of the six longitudinal struts that attach to steering plates on bogies #3 and #4 are identical. Perform steps 1 thru 7 to install one end of longitudinal strut to #3 or #4 steering plate.

1. Apply grease to two retainer packings (17) and apply antiseize compound to spacer sleeve (16). Assemble two retainer packings (17) onto spacer sleeve (16).





VIEW C
(TYPICAL AT #3 AND #4 STEERING PLATES)

4-53. LONGITUDINAL STRUT (CONT)

CAUTION

Ensure longitudinal struts running from steering plates #2 and #5 are above longitudinal struts running between steering plates #3 and #4 or damage to equipment may result.

NOTE

Arrange longitudinal struts onto semitrailer so that the "jam" nut is facing toward the rear of the semitrailer.

2. Using two people, aline and install spacer sleeve (16) between two longitudinal struts (1) and set in place on steering plate (13). Make sure "jam" nut end of longitudinal strut (1) faces toward rear of semitrailer.

3. Apply grease to a retainer packing (14). Apply antiseize compound to pin assembly (15). Install retainer packing (14) to pin assembly (15).

4. Install pin assembly (15) into steering plate (13) through two longitudinal struts (1). Check that flat on pin assembly (15) is alined with stop tab on top of steering plate (13) and continue to drive pin assembly (15) until flush with steering plate. Install lubrication fitting (10) into pin assembly (15).

5. Apply grease to retainer packing (14). Apply antiseize compound to sleeve bushing (12). Assemble retainer packing (14) onto sleeve bushing (12).

6. Install sleeve bushing (12). Install new self-locking special bolt(11) to secure sleeve bushing (12).

7. Using a torque wrench, torque special bolt (11) to 100 - 110 lb-ft (136 - 149 Nm). Install lubrication fitting (10) into special bolt (11).

NOTE

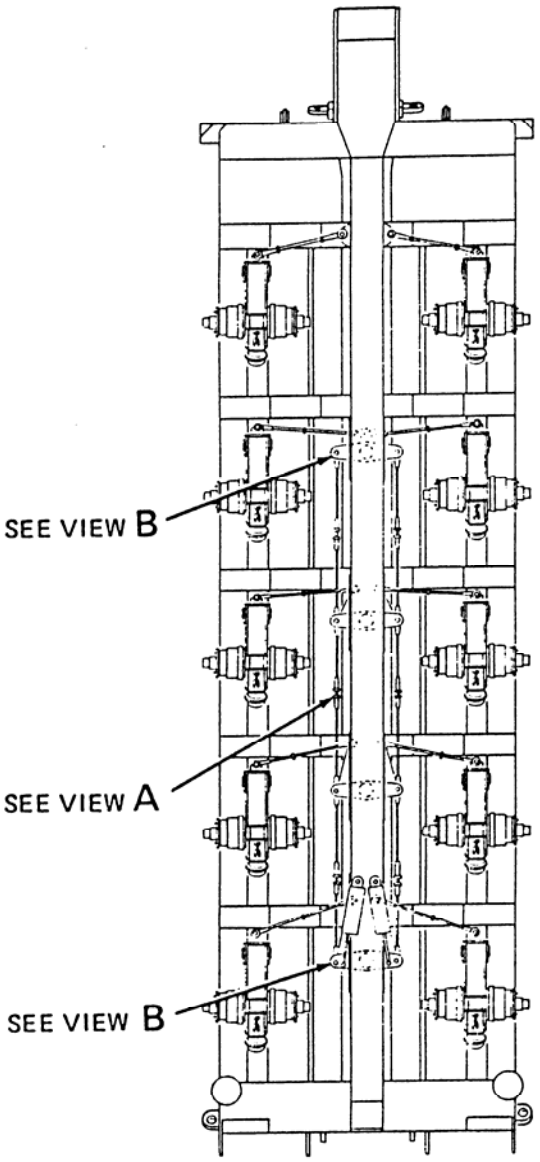
Four ends of the six longitudinal struts which attach to steering plates #2 and #5 are identical. Perform steps 8 thru 13 to install one end of longitudinal strut to #2 or #5 steering plate.

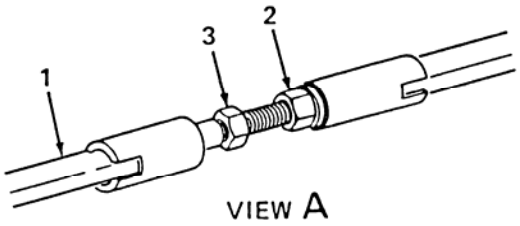
8. Apply grease to retainer packing (8). Apply antiseize compound to pin assembly (9). Install retainer packing (8) on pin assembly (9).

NOTE

When installing a pin assembly into a steering plate, it may be necessary to use a prybar to ease the installation. Use the prybar to pry the pin assembly downward into the steering plate.

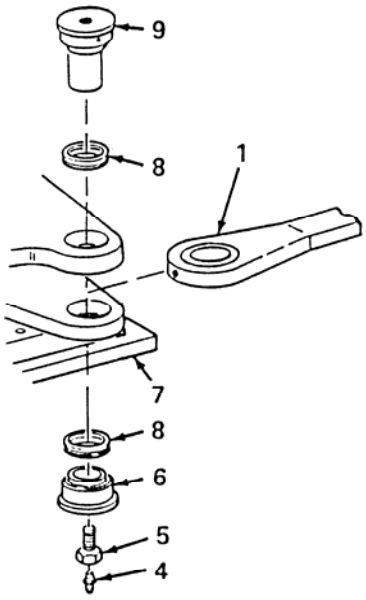
9. Place longitudinal strut (1) in place on steering plate (7). Use a hammer and prybar if necessary, and install pin assembly (9) into steering plate (7) through longitudinal strut (1). Check that flat on pin assembly (9) is alined with stop tab on top of steering plate (7) and continue to drive pin assembly (9) until flush with steering plate.





VIEW A

(TYPICAL –ALL STRUTS)



VIEW B

(TYPICAL AT #2 AND #5 STEERING PLATES)

CAUTION

Do not apply antiseize compound to inner wear surface of sleeve bushing. It may get onto bolt threads, minimizing the effect of self-locking feature, causing damage to equipment.

10. Apply grease to retainer packing (8). Apply antiseize compound to outside wear surface of sleeve bushing (6). Assemble retainer packing (8) onto sleeve bushing (6).

11. Using a hammer, install sleeve bushing (6). Install new self-locking special bolt (5) and secure sleeve bushing (6).

4-53. LONGITUDINAL STRUT (CONT)

12. Using a torque wrench, torque special bolt (5) to 100 - 110 lb-ft (136 - 149 Nm). Install lubrication fitting (4) into special bolt (5).

13. Tighten adjusting nut (3) one and one-half turns. Then tighten "jam" nut (2) to secure the longitudinal strut (1).

FOLLOW-ON MAINTENANCE

1. Perform required lubrication (para. 3-3).

2. Perform platform steering alinement (para. 4-16).

4-54. PLATFORM STEERING CYLINDER

This task covers: a. Removal c. Installation
b. Inspection d. Cylinder stop adjustment

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Crows foot adapter, 15/16", 1/2" drive
The following tools can be found in common tool kit no. 2, item 18, appx. B:

Torque wrench 1/2" drive, 0.200 lb-ft	Degreaser tank, 20 gal
Drain pan, 4 gl	Measuring tape 50 ft
Extension light, 24 ft	Hammer, softfaced
Gloves, chemical and oil protective	Goggles, industrial
	Creeper, mechanics

Materials/Parts

Antiseize compound, item 3, appx. E	Lockwasher (2)
Cap and plug set, item 5, appx. E	Lockwasher (1)
Grease, item 12, appx. E	Seal (4)
Pipe sealant, item 18, appx. E	Hose, clear, 36" long (2)
Cleaning compound solvent, item 25, appx. E	Thread locking compound, item 21, appx. E
	Bolt, self-locking (2)
	Special bolt, self-locking (2)

Personnel Required: 2

Equipment Condition

Manual steering set straight (para. 2-21)
Longitudinal struts removed (para. 4-53)

General Safety Instructions

WARNING

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or serious injury to personnel may result.

Hydraulic fluid may be under pressure. Use caution when disconnecting hydraulic lines or components. Face shields or goggles must be worn or serious injury to personnel may result.

Hydraulic fluid may be absorbed through the skin. Avoid prolonged exposure to skin and wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, wash thoroughly with soap and water. Wash hands thoroughly prior to eating or smoking.

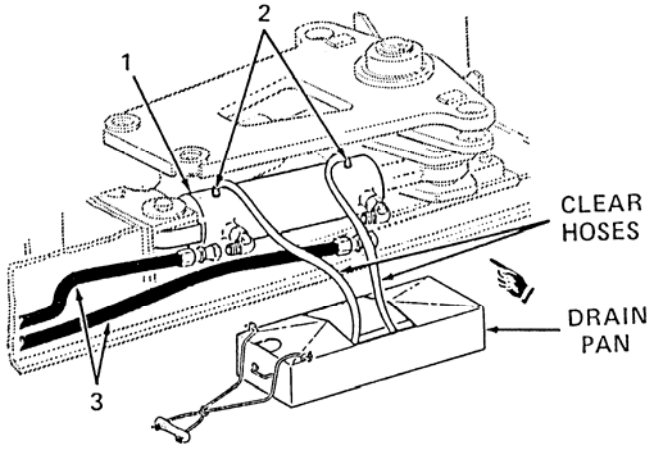
A steering hydraulic cylinder weighs (empty) 110 pounds (50 kg). Two people must support and lift cylinders from attaching points on platform cylinder mount and steering plate #5 or serious injury to personnel may result.

NOTE

The following procedure is to be used for either streetside or curbside platform steering cylinder. Repeat this procedure as necessary for other cylinder repairs.

REMOVAL

1. Using two 36-inch (91 cm) clear hoses and a drain pan, bleed steering cylinder (1) at bleed valves (2) to relieve hydraulic pressure (para. 4-19). Once pressure is bled, remove two 36-inch (91 cm) clear hoses.



4-54. PLATFORM STEERING CYLINDER (CONT)

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the hydraulic system or damage to equipment may result.

2. Tag and disconnect two hydraulic lines (3) from steering cylinder (1). Allow fluid to drain from lines into a drain pan and install caps/plugs into all openings.

3. Remove grease fitting (4) and special bolt (5) from shouldered pin (7). Discard special bolt. Discard lockwasher if present.

4. Remove capscrew (8) from sleeve bushing (10). Discard capscrew. Discard lockwasher if present.

5. Using a prybar, pry up on sleeve bushing (10) and remove sleeve bushing (10) with seal (11) from steering plate #5 (12). Remove seal (11) from sleeve bushing (10). Discard seal.

6. Using a prybar, pry down on shouldered pin (7) and remove pin with seal (11) from steering plate #5 (12). Remove seal (11) from shouldered pin (7). Discard seal.

7. Remove capscrew (13) from sleeve bushing (15). Discard capscrew. Discard lockwasher if present.

CAUTION

A steering hydraulic cylinder weighs (empty) 110 pounds (50 kg). Two people must support and lift cylinders from attaching points on platform cylinder mount and steering plate #5 or serious injury to personnel may result.

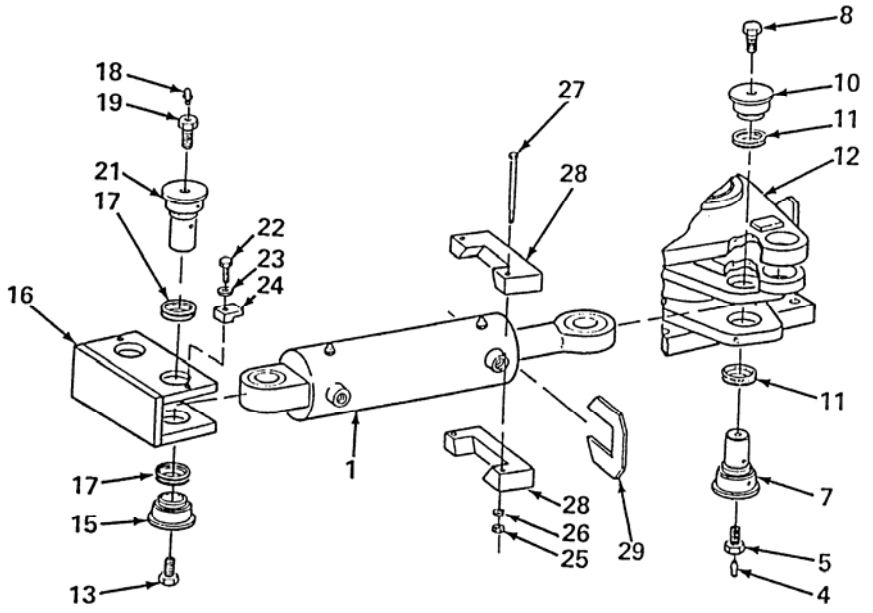
8. Using a prybar, pry down on sleeve bushing (15) and remove sleeve bushing (15) from platform cylinder mount (16). Remove seal (17) from sleeve bushing (15). Discard seal.

9. Remove grease fitting (18) and special bolt (19) from shouldered pin (21). Discard special bolt. Discard lockwasher if present.

10. Remove screw (22), lockwasher (23), and clamp (24) from platform cylinder mount (16). Discard lockwasher.

11. Using a prybar, pry up on shouldered pin (21) and remove pin from platform cylinder mount (16). Remove seal (17) from shouldered pin (21). Discard seal.

12. Using two people, lift steering cylinder (1) off of platform cylinder mount (16) and steering plate #5 (12) and move cylinder out from under platform. Place steering cylinder (1) onto platform.



NOTE

Steering stop blocks and associated hardware are not used on vehicles with manufacturer's serial numbers 526 and subsequent. Manufacturer's serial number is stamped in front of platform main beam under the gooseneck.

13. Remove two nuts (25), lockwashers (26), capscrews (27), two steering stop blocks (28), and spacer plate (29) from steering cylinder (1). Discard lockwashers.

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Clean all parts removed in degreaser tank using cleaning compound solvent. Use a crocus cloth to remove any nicks, scoring, or burrs from polished or machined surfaces.

2. Inspect steering cylinder and related parts for gouges, cracks, bends, and defects. Replace related parts if found defective. If steering cylinder is defective, notify DS maintenance.

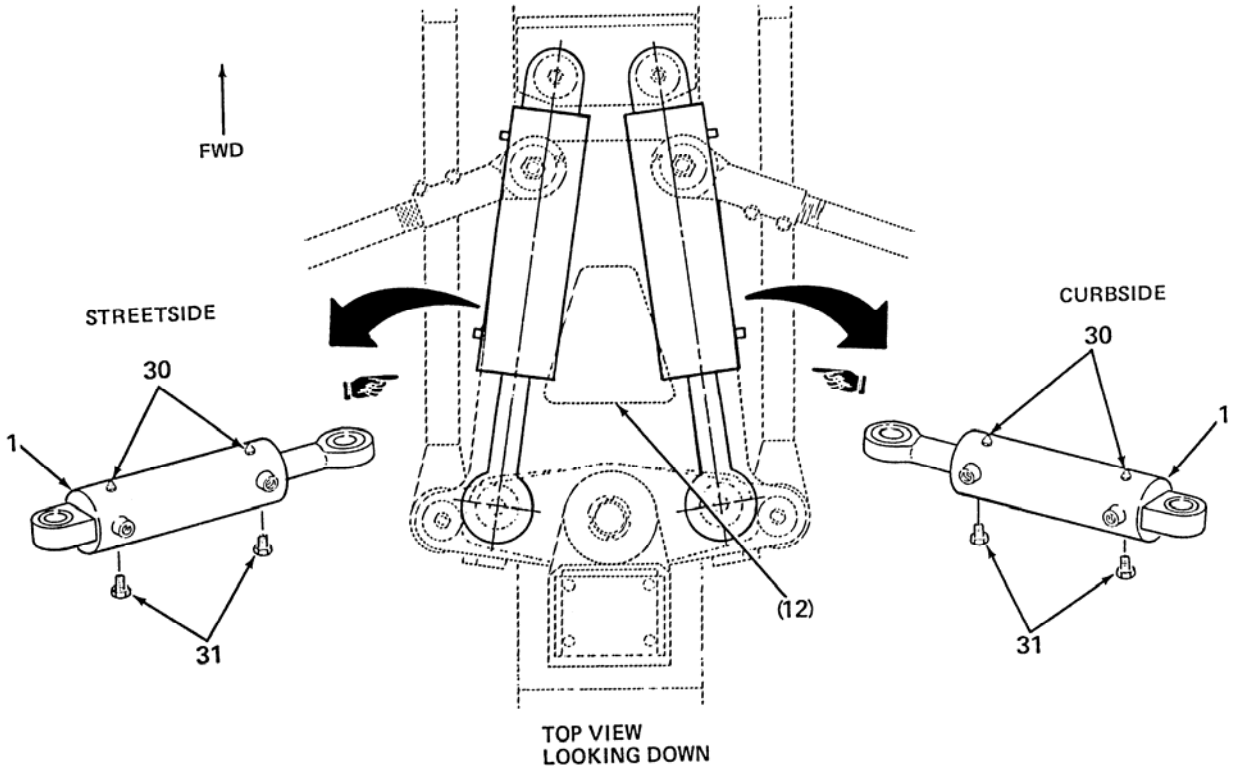
4-54. PLATFORM STEERING CYLINDER (CONT)

INSTALLATION

NOTE

A new steering cylinder has four bleed valves installed. Two of the bleed valves must be removed and replaced with two pipe plugs. The location of pipe plugs is determined by location of the steering cylinder. Refer to the procedure below to check for proper bleed valve and pipe plug orientation.

1. Check steering cylinder bleed valve (30) and pipe plug (31) orientation as follows:



a. If a steering cylinder (1) is to be installed on curbside of steering plate #5 (12), hydraulic lines should face curbside (outboard of #5 plate) with pipe plugs (31) located on bottom of cylinder and bleed valves (30) located on top of cylinder.

b. If a steering cylinder (1) is to be installed on streetside of steering plate #5 (12), hydraulic lines should face streetside (outboard of #5 plate) with pipe plugs (31) located on bottom of cylinder and bleed valves (30) located on top of cylinder.

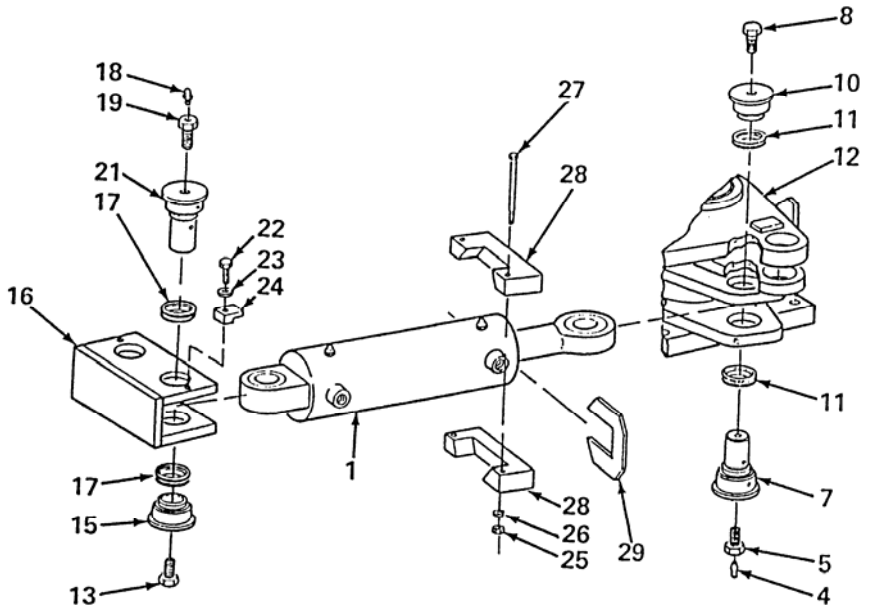
c. After determining on what side of steering plate #5 (12) the steering cylinder (1) is to be installed (see steps a and b above), remove two bleed valves (30) from bottom of steering cylinder (1). Apply pipe sealant to male threads of two pipe plugs (31). Install two pipe plugs (31) into bottom of steering cylinder (1).

NOTE

The nuts securing the cylinder stop blocks are to be hand tightened only. Following installation of the cylinder, stop block adjustment (shimming) is required.

Steering stop blocks and associated hardware are not used on vehicles with manufacturer's serial numbers 526 and subsequent. Manufacturer's serial number is stamped in front of platform main beam under the gooseneck.

2. Install spacer plate (29) and steering stop blocks (28) onto steering cylinder (1). Secure in place with two capscrews (27), lockwashers (26), and nuts (25).



CAUTION

Do not apply antiseize compound to inner wear surface of sleeve bushing. It may get onto bolt threads, minimizing the effect of self-locking feature, causing damage to equipment.

3. Apply antiseize compound to inner bore of bearings on steering cylinder (1), outside wear surfaces of two pin assemblies (7 and 21), and outside wear surfaces of sleeve bushings (10 and 15). Apply grease to four seals (11 and 17).

4. Using two people, lift hydraulic cylinder (1) into alinement with platform cylinder mount (16) and #5 steering plate (12).

5. Install seal (17) on sleeve bushing (15). Install seal (17) on shouldered pin (21).

6. Using a softfaced hammer, drive shouldered pin (21) through platform cylinder mount (16) and hydraulic cylinder (1). Check alinement of flat on shouldered pin (21) and readjust position, as required, until flat is alined with mounting hole for clamp (24). Continue to drive shouldered pin (21) until flush on platform cylinder mount (16).

4-54. PLATFORM STEERING CYLINDER (CONT)

7. Using a prybar, install and pry up on sleeve bushing (15) through platform cylinder mount (16) and onto shouldered pin (21). Continue to pry up on sleeve bushing (15) until flush on platform cylinder mount (16).

8. Secure shouldered pin (21) to platform cylinder mount (16) by installing clamp (24), lockwasher (23), and screw (22).

9. Secure sleeve bushing (15) to shouldered pin (21) by installing self-locking capscrew (13). Using a torque wrench, torque capscrew (13) to 100 - 110 lb-ft (136 - 149 Nm).

10. Install self-locking special bolt (19) onto shouldered pin (21). Install lubrication fitting (18) into special bolt (19).

11. Install seal (11) on sleeve bushing (10). Install seal (11) on shouldered pin (7).

12. Using a prybar, install and pry up on shouldered pin (7) through steering plate #5 (12) and hydraulic cylinder (1). Check alinement of flat on shouldered pin (7) and readjust position, as required, until flat is alined with stop tab on bottom of steering plate #5 (12). Continue to pry up on shouldered pin (21) until pin is flush on platform cylinder steering plate #5 (12).

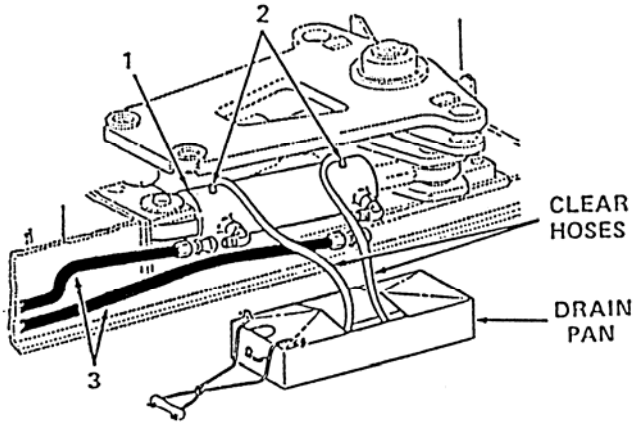
13. Install sleeve bushing (10) over shouldered pin (7) on steering plate #5 (12). Using a prybar, pry down on sleeve bushing (10) to install bushing through steering plate #5 (12) and onto shouldered pin (7). Continue to pry down on sleeve bushing until bushing is flush on steering plate #5 (12).

14. Secure sleeve bushing (10) to shouldered pin (7) by installing self-locking capscrew (8). Using a torque wrench and a 15/16-inch crows foot adapter, torque capscrew (8) to 100 - 110 lb-ft (136 - 149 Nm).

15. Install self-locking special bolt (5) onto shouldered pin (7). Install lubrication fitting (4) into special bolt (5).

16. Remove caps/plugs installed and reconnect two hydraulic lines (3) to steering hydraulic cylinder (1). Close bleed valves (2) and remove clear hoses.

17. Perform cylinder stop adjustment, if necessary.

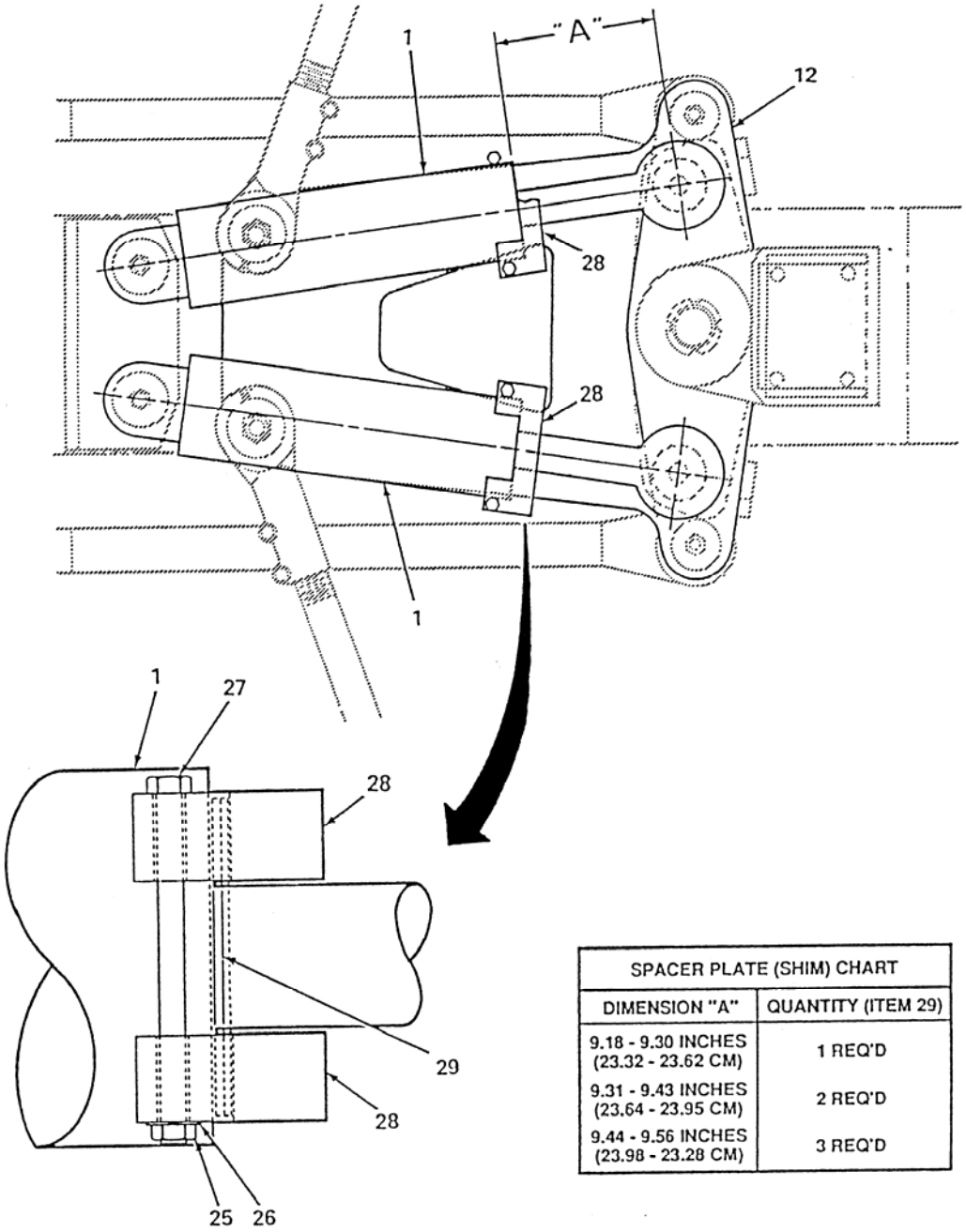


CYLINDER STOP ADJUSTMENT

NOTE

Steering stop blocks and associated hardware are not used on vehicles with manufacturer's serial numbers 526 and subsequent. Manufacturer's serial number is stamped in front of platform main beam under the goose-neck. On units without cylinder stops, this procedure is unnecessary.

1. On both cylinders (1), measure distance (dimension "A") between cylinder piston attaching point on #5 steering plate (12) and piston end of cylinder body. If dimension "A" is the same for both cylinders, go to step 3. If dimension "A" is not the same, go to step 2.



SPACER PLATE (SHIM) CHART	
DIMENSION "A"	QUANTITY (ITEM 29)
9.18 - 9.30 INCHES (23.32 - 23.62 CM)	1 REQ'D
9.31 - 9.43 INCHES (23.64 - 23.95 CM)	2 REQ'D
9.44 - 9.56 INCHES (23.98 - 23.28 CM)	3 REQ'D

4-54. PLATFORM STEERING CYLINDER (CONT)

2. Perform manual steering (para. 2-21) to move steering plate #5 (12) until both dimensions are the same; then, go to step 3.

3. Compare dimension "A" with "shim" chart and determine quantity of spacer plates (29) required for each cylinder.

4. Loosen nuts (25) sufficiently to move stop blocks (28) off of cylinders and insert required number of spacer plates (29).

5. Install stop blocks (28) on each cylinder (1) and secure stop blocks on cylinders with capscrews (27), lockwashers (26), and nuts (25).

FOLLOW-ON MAINTENANCE

1. Install longitudinal strut (para. 4-53).

2. Perform required lubrication (para. 3-3).

3. Perform hydraulic system bleeding to remove air from hydraulic steering system (para. 4-19).

4. Perform platform steering alignment (para. 4-16).

4-54.1. STEERING PLATE

This task covers: a. Removal b. Disassembly c. Cleaning d. Inspection e. Lubrication f. Assembly g. Installation

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INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Lifting device, overhead
Steel bar stock, 1″ diameter, 24″ long
Utility chain (2), item 9, appx. B
Spanner, adjustable hook, item 28, appx. B
The following tools can be found in common tool kit no. 2, item 18, appx. B:
- Crowbar
- Creeper, mechanic's
- Key, socket head screw, 1/2″
- Jack, hydraulic
- Extension light
- Measuring tape, 50 ft
- Torque wrench, 1/2″ dr, 0-200 lb-ft

Materials/Parts

Grease, item 12, appx. E
Lockwasher (6)
Wood pieces, scrap, 3/4-inch to l-inch thick
Wood block, 12″ x 12″ x 24″ (4)
Dry cleaning solvent, item 26, appx. E
Thread locking compound, item 21, appx. E
Antiseize compound, item 3, appx. E

Personnel Required: 3

Equipment Condition

Gooseneck lowered to lowest position, if uncoupled (para. 2-18)
Connecting links removed at affected bogies (para. 4-52)
Inner/inner wheels (streetside and curbside) removed from affected bogie (para. 3-9 and 3-10)
Platform adjusted to 50 inch (143 cm) height (para. 2-19)
Suspension isolation valves closed at four corner bogies (para. 2-6)
Longitudinal struts removed at affected bogies (para. 4-53)
Platform steering cylinders removed or disconnected from steering plate (para. 4-54) (#5 bogie only)

4-54.1. STEERING PLATE (CONT)

General Safety Instructions

WARNING

Steering plates weigh in excess of 250 pounds (223 kg) and must be supported the entire time work is performed on the steering plate or injury to personnel may result.

NOTE

All four steering plates are similar and are removed and installed in the same manner.

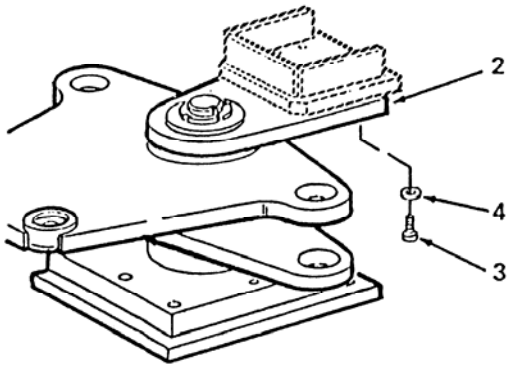
REMOVAL

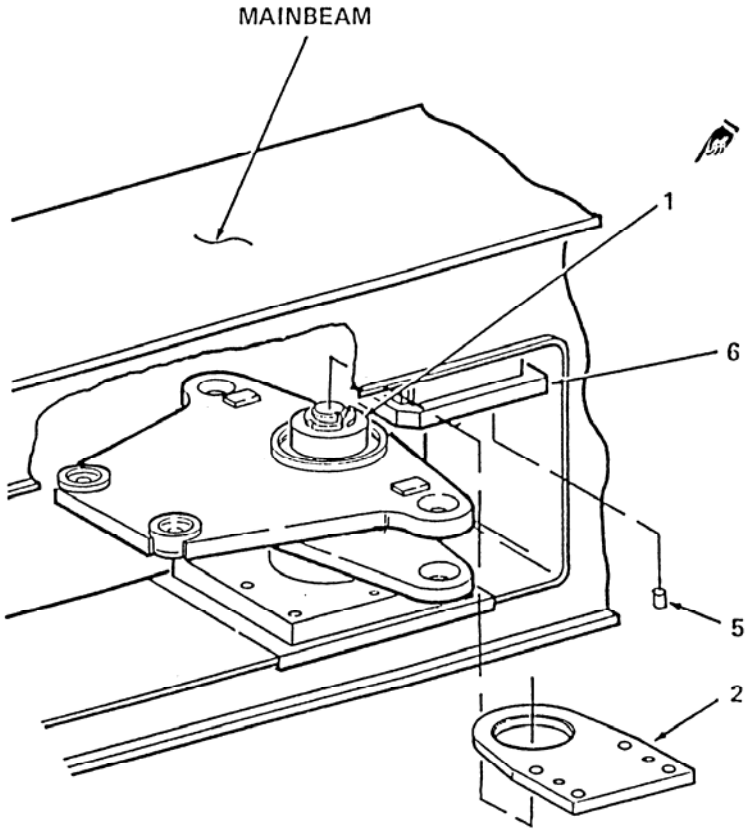
1. Clean all dirt from steering plate spacer (1) and retainer plate (2).
2. Remove four capscrews (3) and lockwashers (4) from retainer plate (2). Discard lockwashers.
3. Check position of two straight pins (5) and retainer plate (2). If pins (5) are near bottom of retainer plate (2), drive pins upward approximately 0.25 inch (6.35 mm) into mainbeam weldment (6).

NOTE

It is necessary to pry evenly both the front and back of retainer plate down onto the steering plate spacer so that the retainer plate can be lowered clear of the pins.

4. Using two people and a crowbar or a low-profile hydraulic jack if available, pry down on retainer plate (2) until retainer plate moves down on steering plate spacer (1) and is clear of two straight pins (5).
5. Rotate retainer plate (2) 90 degrees clockwise facing streetside; then, pry up and remove retainer plate (2) from steering plate spacer (1).

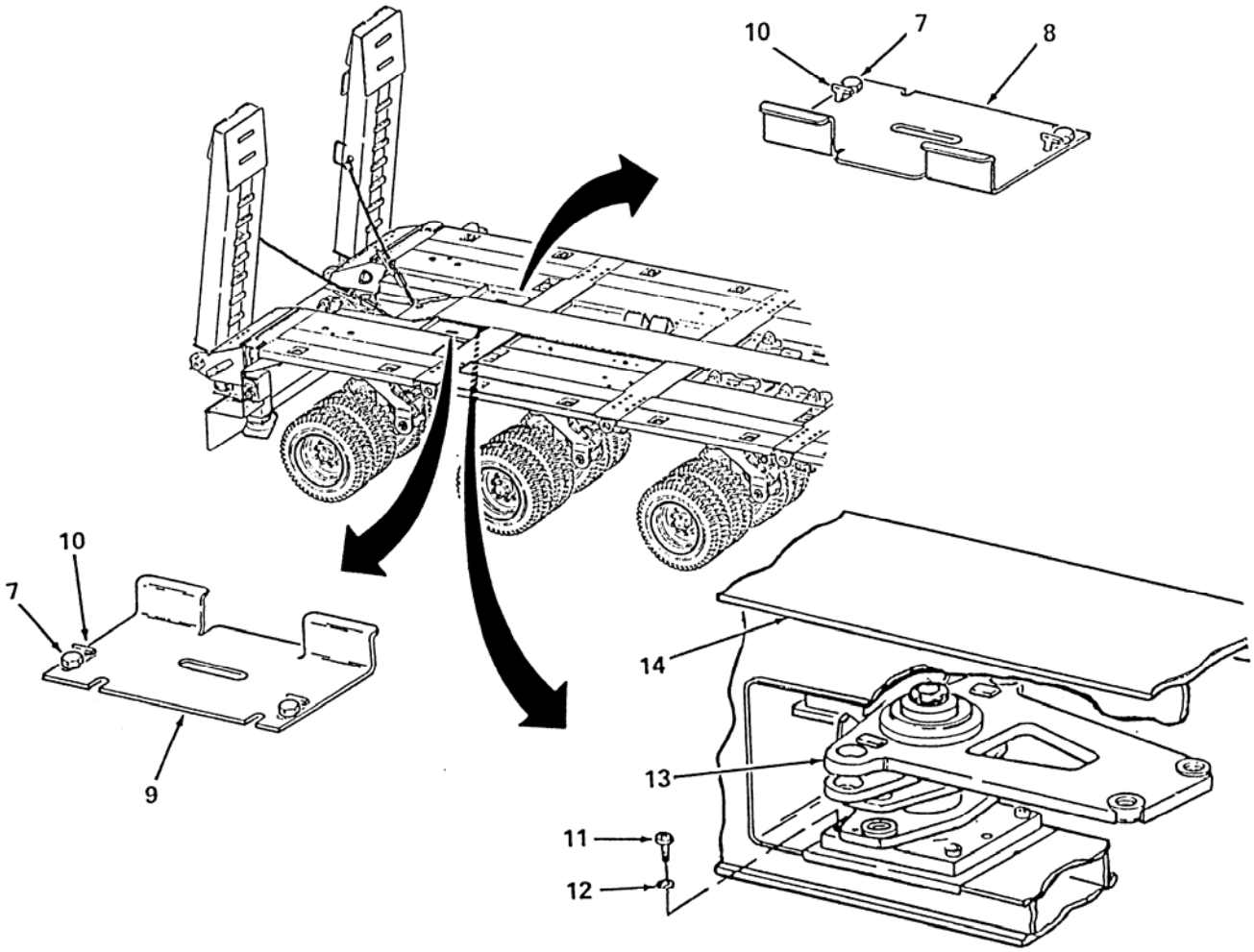

2
4
3


MAINBEAM
1
6
5
2

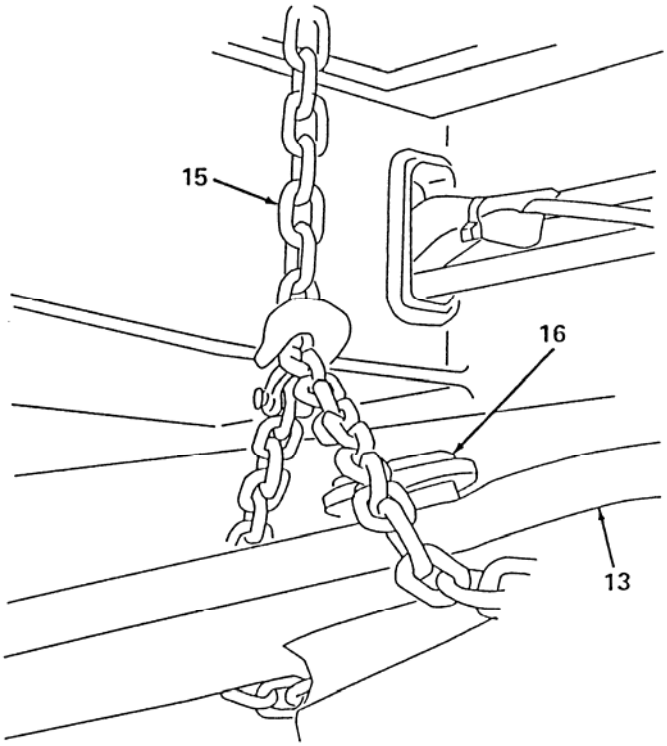
4-54.1. STEERING PLATE (CONT)

6. Loosen two bolts (7) on service covers (8 and 9) and slide retainers (10) inboard to release and remove service covers from platform.

7. Remove six capscrews (11) and lockwashers (12) from steering plate (13) and mainbeam (14). Discard six 1ockwashers.



8. Place chain (15) under rear portion of top of steering plate (13). Bring chain forward and up on both sides and hook it back to itself above top of steering plate just forward of spindle (16).



4-54.1. STEERING PLATE (CONT)

WARNING

When using lifting device to lift steering plate, all personnel under the platform must keep hands clear of the steering plate and support equipment or injury to personnel may result.

CAUTION

When lifting steering plate off mainbeam, lift the steering plate upward as straight as possible and have one person use a crowbar to keep forward part of steering plate level or damage to the straight pins may result.

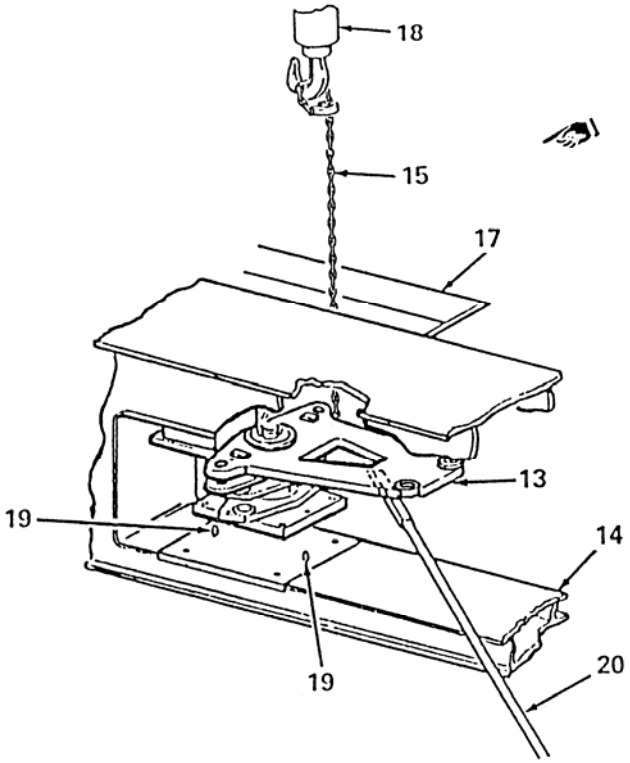
As the steering plate is moved, it must be guided away from the air relay valve in the same window. Otherwise, damage to equipment may result.

Be sure chains do not contact hydraulic or pneumatic lines along mainbeam or damage to equipment may result.

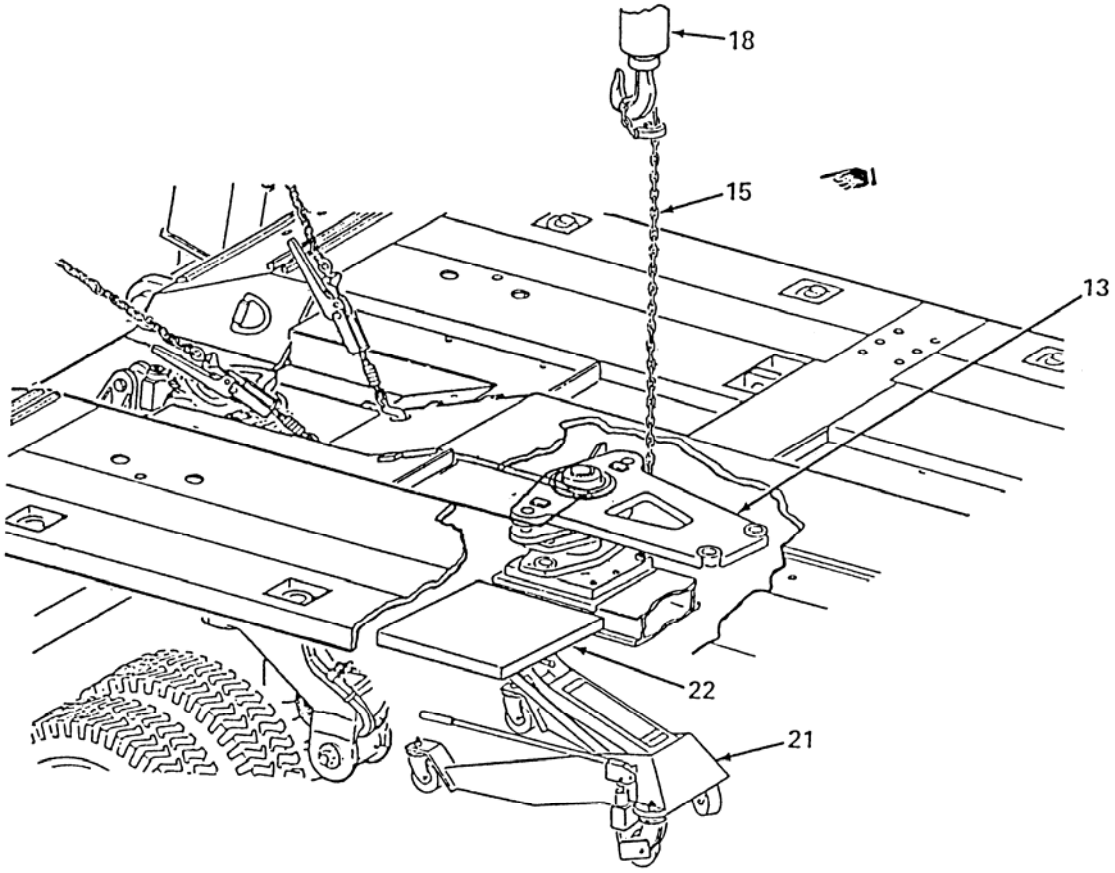
9. Above platform (17), where service covers were removed, position suitable lifting device (18).

10. Route chain (15) up through platform (17) and attach to lifting device (18). Apply just enough lifting force to bring base of steering plate (13) up off straight pins (19) that position it.

11. As steering plate (13) comes up, guide it carefully to avoid contact with air relay valve in that window. Use crowbar (20) to keep forward part of steering plate level.



12. From curbside of trailer, position hydraulic jack (21) near curbside of steering plate (13). Raise hydraulic jack so that pallet (22) is even with bottom of steering plate.



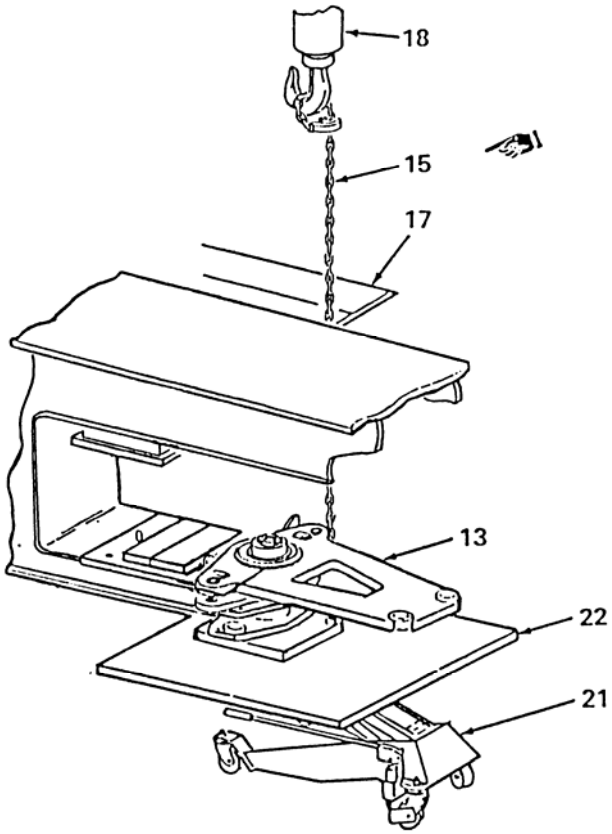
4-54.1. STEERING PLATE (CONT)

13. Using suitable lifting device (18), raise steering plate (13) and maneuver steering plate over onto hydraulic jack (21).

14. Lower steering plate (13) so that it rests on pallet (22) of hydraulic jack (21). Remove chain (15) from steering plate (13).

15. Using one person to keep steering plate (13) from turning, lower hydraulic jack (21) and move out and away from platform (17).

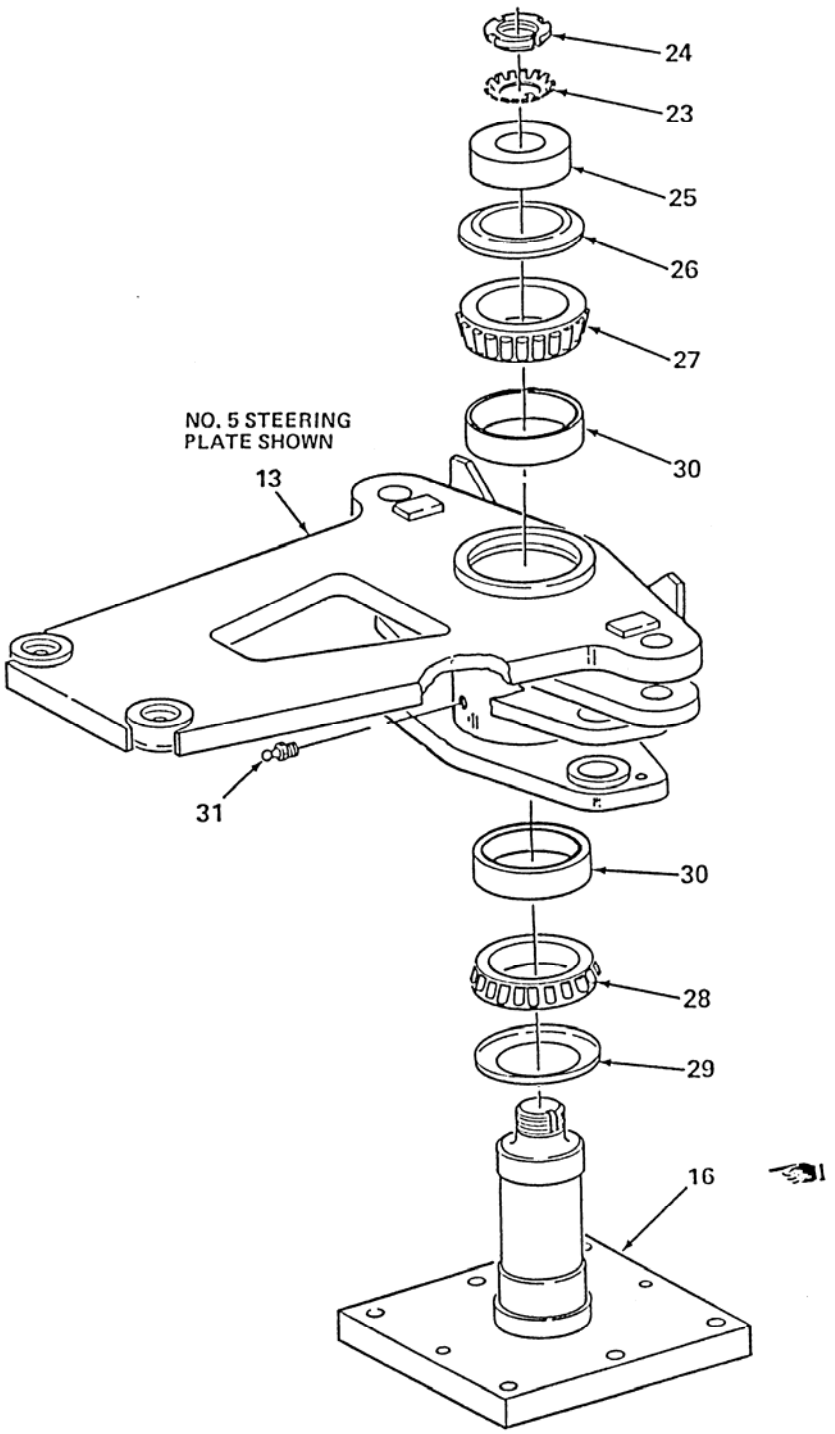
16. Using three people, lift steering plate (13) off of hydraulic jack (21) and place on the ground.



DISASSEMBLY

1. Straighten bent tab on key washer (23) and, using spanner socket, remove nut (24) and key washer.

2. Remove ring spacer (25), upper metal seal (26), and upper roller bearing cone (27). Discard upper seal.



4-54.1. STEERING PLATE (CONT)

WARNING

Use two people to lift steering plate off of spindle or serious injury to personnel may result.

3. Using two people, remove steering plate (13) from spindle (16).
4. Remove lower bearing cone (28) from spindle (16).
5. Remove lower metal seal (29) from spindle (16). Discard lower seal.
6. Using hammer and steel drift, drive two bearing cups (30) from steering plate (13).
7. Remove lubrication fitting (31) from steering plate (13).

CLEANING

WARNING

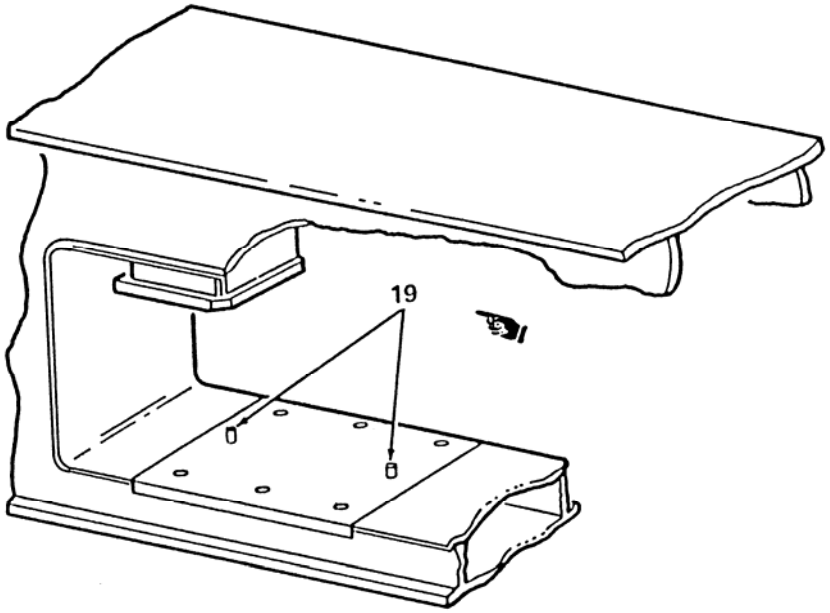
Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials, and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

1. Clean all components with dry cleaning solvent and rags.
2. Clean corrosion with crocus cloth.

INSPECTION

1. Inspect casting on steering plate for broken welds, cracks, bends, and corrosion. Replace defective parts.

2. Inspect for cracked, bent, or missing straight pins (19). If pins are damaged, remove and replace two straight pins (19).



LUBRICATION

Pack bearings according to lubrication instructions (para. 3-3).

4-54.1. STEERING PLATE (CONT)

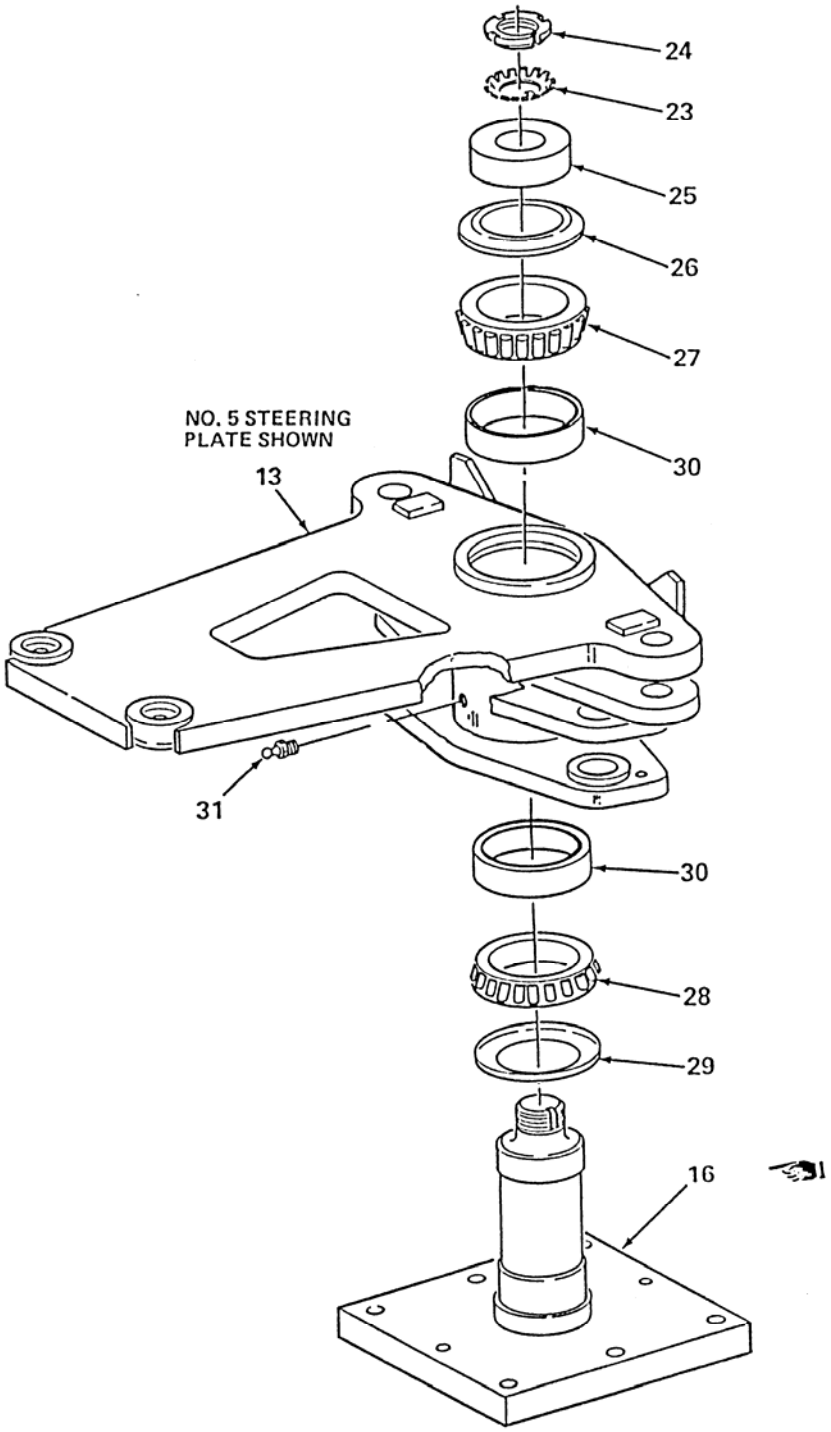
ASSEMBLY

1. Install lubrication fitting (31) on steering plate (13).
2. Drive two bearing cups (30) into steering plate (13).
3. Install lower metal seal (29) onto spindle (16).

CAUTION

Use caution when installing lower bearing cone onto spindle or damage to cone or spindle may result. Apply all force to inner race of bearing cone during installation.

4. Install lower bearing cone (28) onto spindle (16).
5. Install steering plate (13) onto spindle (16).
6. Install upper bearing cone (27), upper metal seal (26), and ring spacer (25) with shoulder facing down to steering plate (13).
7. Install key washer (23) and nut (24) onto spindle (16).
8. Slowly tighten nut (24) until all side play between steering plate (13) and spindle (16) is gone.
9. Bend one tab of key washer (23) to secure nut (24).


24
23
25
26
27
NO. 5 STEERING
PLATE SHOWN
13
30
31
30
28
29
16

4-54.1. STEERING PLATE (CONT)

INSTALLATION

1. Using three people, lift steering plate (13) off of the ground and place on pallet (22) of hydraulic jack (21).

2. Using one person to keep steering plate (13) from turning, maneuver hydraulic jack (21) under platform (17) for installation.

3. Raise hydraulic jack (21) so that pallet (22) is even with mainbeam (14).

4. Above platform (17), where streetside service cover (8) was removed, position suitable lifting device (18).

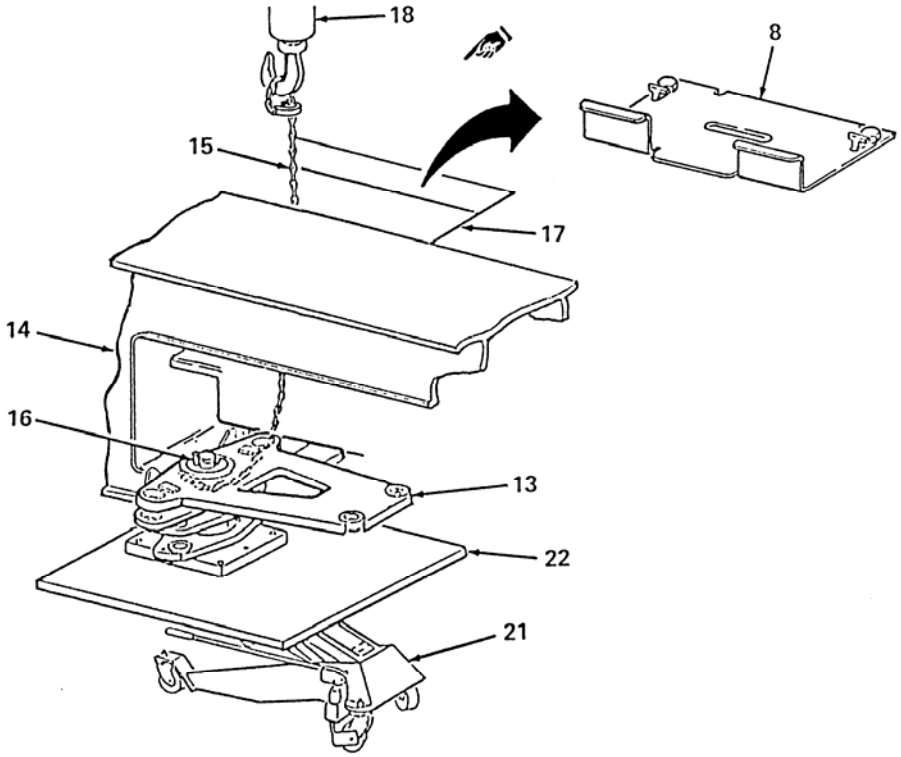
5. Lower chain (15) through streetside opening in platform (17).

6. Place chain (15) under rear portion of top of steering plate (13). Bring chain forward and up on both sides and hook it back to itself above top plate just forward of spindle (16).

WARNING

When using lifting device to lift steering plate, all personnel under platform must keep hands clear of the steering plate and support equipment or injury to personnel may result.

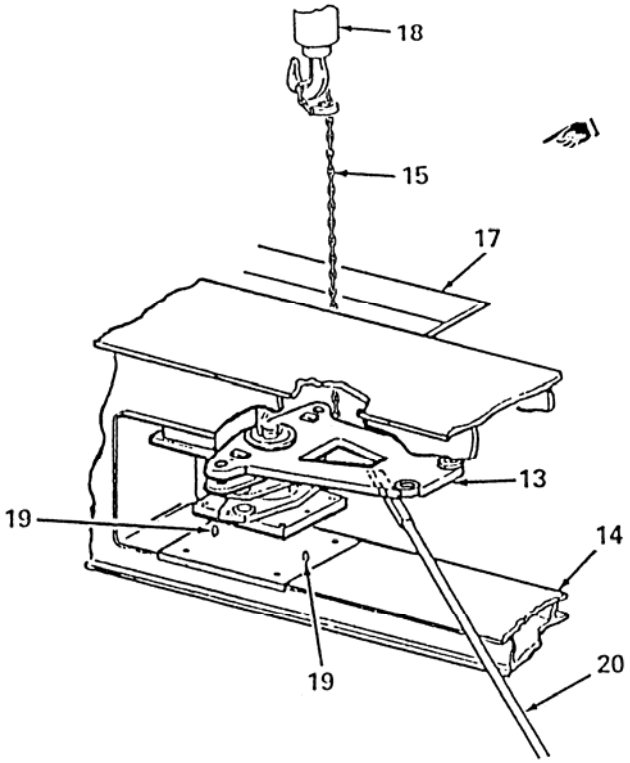
7. Use one person to support front part of steering plate (13) and use lifting device (18) to carefully lift steering plate (13) off of hydraulic jack (21). Move hydraulic jack out of the way.



CAUTION

Be sure chains do not contact hydraulic or pneumatic lines along the mainbeam or damage to equipment may result.

8. Maneuver steering plate (13) over mainbeam (14) and into alinement over two straight pins (19).



4-54.1. STEERING PLATE (CONT)

CAUTION

When lowering steering plate onto straight pins, make sure steering plate is as level as possible and allow straight pins to guide steering plate into place or damage to equipment may result.

9. Using lifting device (18), carefully lower steering plate (13) onto mainbeam (14) and two straight pins (19).

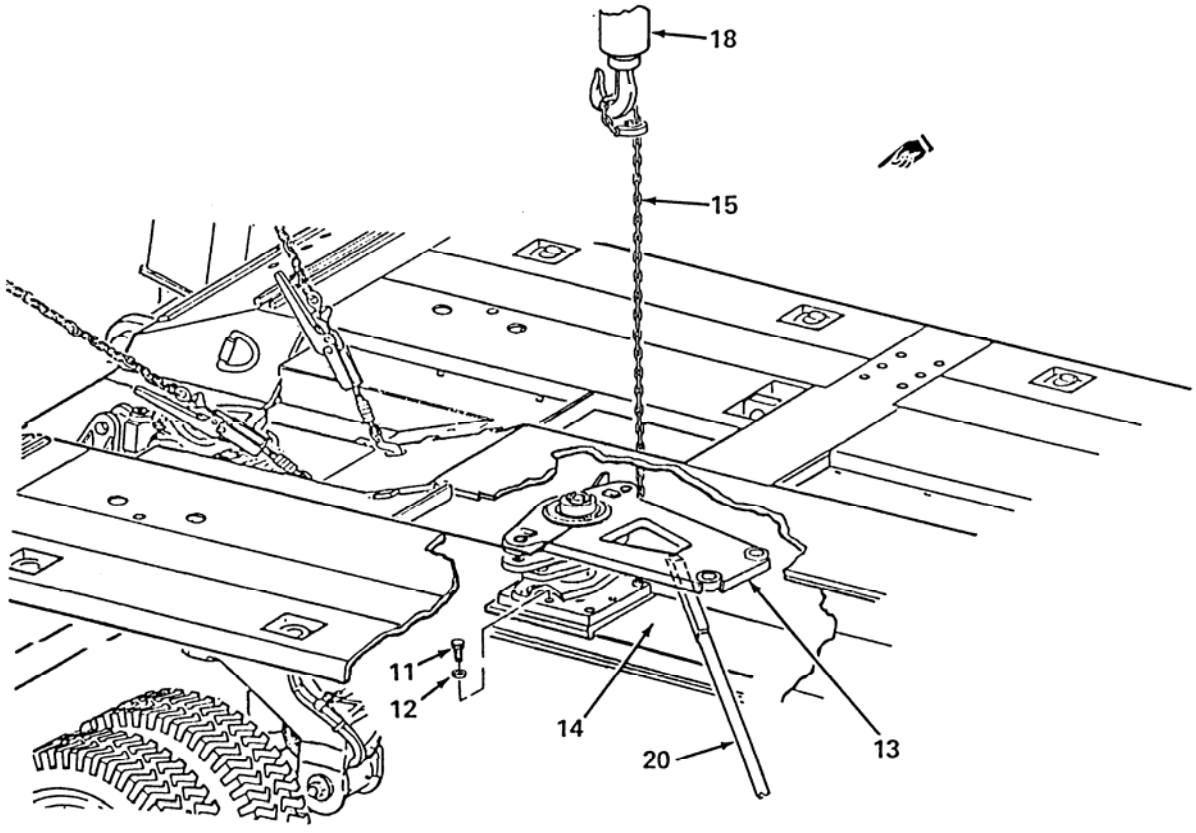
NOTE

Steering plate must be turned sufficiently to permit removal of capscrews installed at center sides of mounting plate.

10. While keeping tension on chains (15) and using crowbar (20) for support, rotate steering plate (13) as required and loosely install a capscrew (11) and lockwasher (12) in center hole on each side of steering plate.

11. Lower lifting device (18) to allow slack in chain (15) and remove chain from steering plate (13).

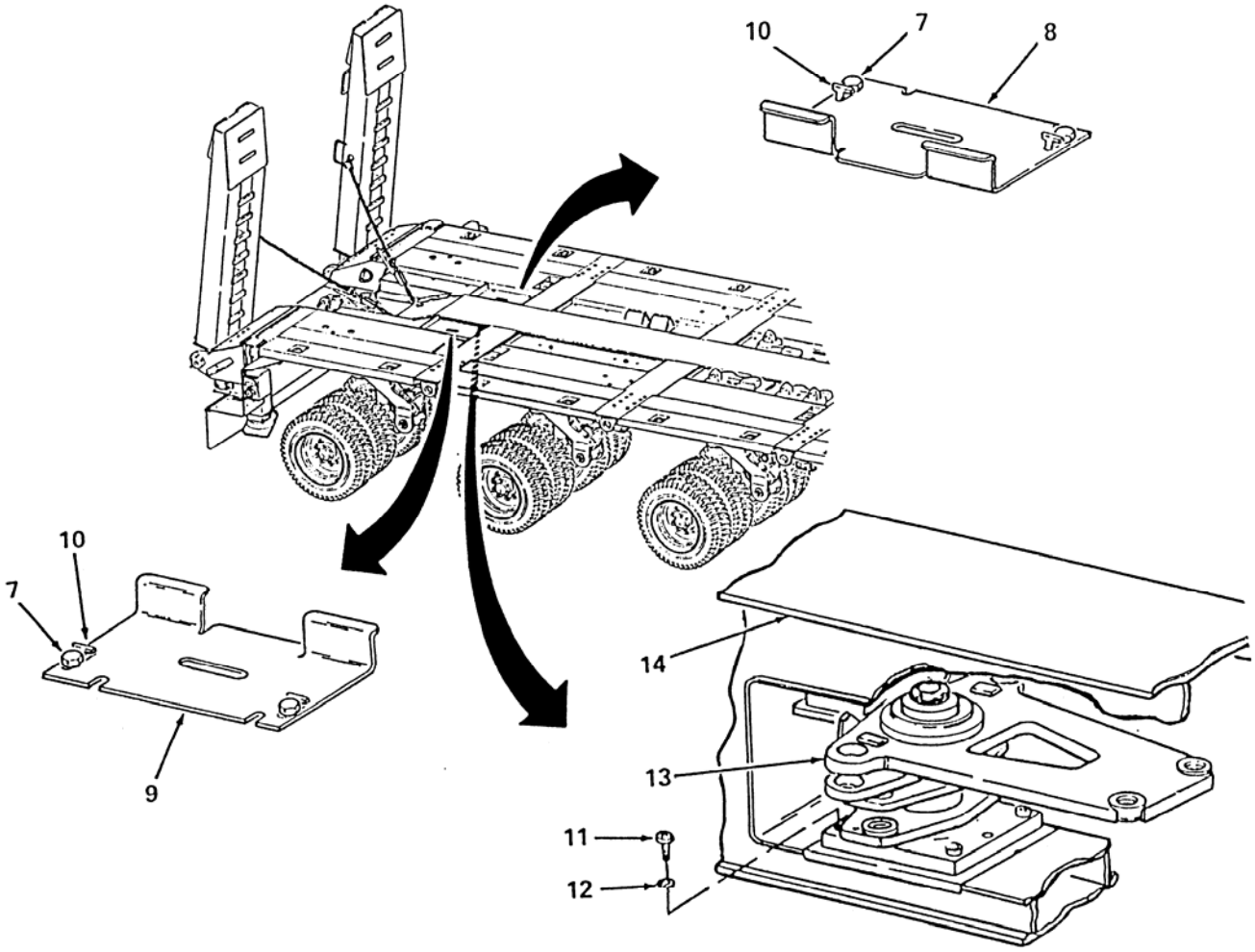
12. Remove and restow chain (15) and lifting device (18).



13. Rotate steering plate (13) to center position and loosely install four remaining capscrews (11) and lockwashers (12).

14. Torque all six capscrews (11) to 150 - 160 lb-ft (151 - 217 Nm).

15. Install two service covers (8 and 9) to platform and secure in place by sliding retainers (10) in outboard direction and tightening bolts (7).



4-54.1. STEERING PLATE (CONT)

16. If either straight pin (5) has been driven out, install pin (5) into mainbeam.

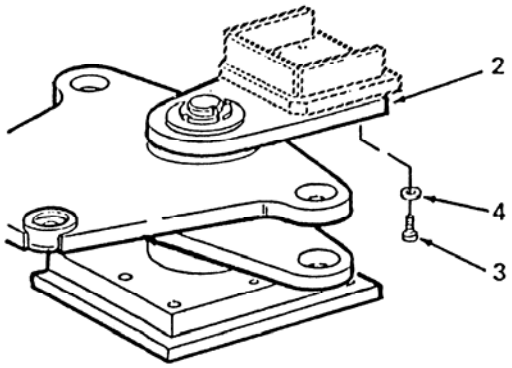
17. Apply antiseize compound to inside of large opening in retainer plate (2) and to exterior of steering plate spacer (1).

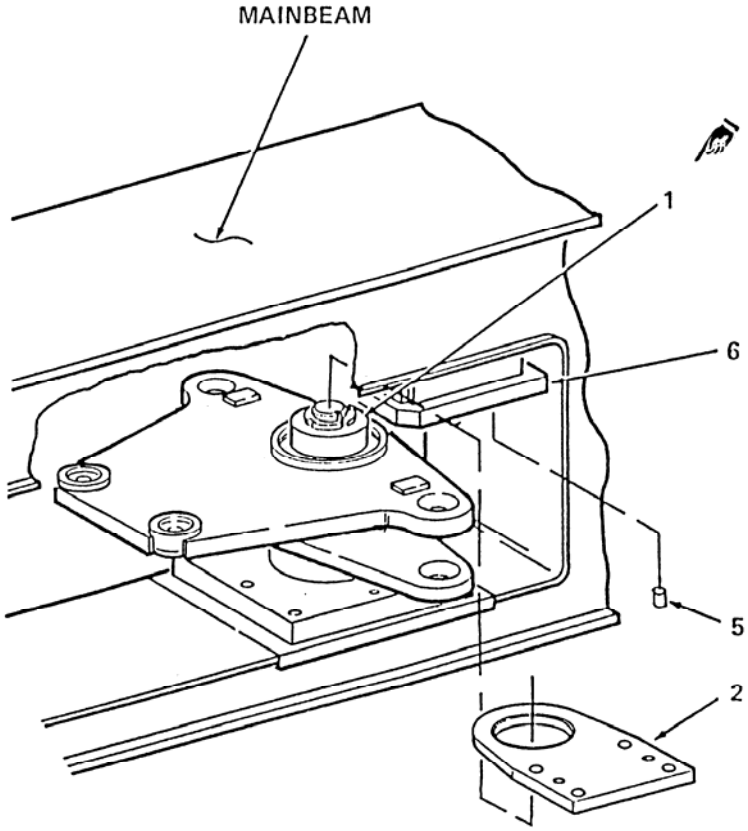
18. Position retainer plate (2) facing streetside. Aline and install retainer plate (2) over steering plate spacer (1).

19. Rotate retainer plate (2) 90 degrees counterclockwise until alined with two straight pins (5) in weldment (6).

20. Using two people and a crowbar, pry up and drive retainer plate (2) onto pins (5).

21. Apply locking compound to threads on four capscrews (3). Install four capscrews (3) and lockwashers (4). Torque four capscrews (3) to 150 - 160 lb-ft (151 - 217 Nm).





FOLLOW-ON MAINTENANCE

1. Perform required lubrication (para. 3-3).

2. Perform platform steering alinement (para. 4-16).

3. If not already coupled, couple tractor/semitrailer (para. 2-24).

4-55. GOOSENECK STEERING CYLINDER

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Suspension mandrel, item 6, appx. B
Davit, item 1, appx. C
Lifting strap, 1000 lb (454 kg) capacity minimum
The following tools can be found in common tool kit no. 2, item 18, appx. B:
    Torque wrench 1/2" drive, 0-200 lb-ft
    Drain pan, 4 gl
    Extension light, 24 ft
    Degreaser tank, 20 gal
    Crowbar
    Goggles, industrial
    Gloves, chemical and oil protective

Materials/Parts

Antiseize compound, item 3, appx. E
Cap and plug set, item 5, appx. E
Grease, item 12, appx. E
Pipe sealant, item 18, appx. E
Cleaning compound solvent, item 25, appx. E
Lockwasher
Ring spacer (2)
Nonmetallic seal (2)
Special bolt, self-locking

Personnel Required: 2

Equipment Condition

Spare tires removed from gooseneck (para. 3-6)
Manual steering straight (para. 2-21)
Semitrailer uncoupled from tractor (para. 2-24)
Gooseneck lowered to lowest position, if uncoupled (para. 2-18)
Front of platform lowered to 36 inches (91.4 cm) (para. 2-19)

4-55. GOOSENECK STEERING CYLINDER (CONT)

General Safety Instructions

WARNING

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or serious injury to personnel may result.

Hydraulic fluid may be under pressure. Use caution when disconnecting hydraulic lines or components. Face shields or goggles must be worn or serious injury to personnel may result.

Hydraulic fluid may be absorbed through the skin. Avoid prolonged exposure to skin and wear long sleeves, gloves and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, wash thoroughly with soap and water. Wash hands thoroughly prior to eating or smoking.

A steering hydraulic cylinder weighs (empty) 110 pounds (50 kg). Two people must support and lift cylinders from attaching points on gooseneck cylinder mount and spare wheel carrier or serious injury to personnel may result.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on it or trip over it. Injury to personnel or damage to equipment may result.

CAUTION

All fittings and openings must be capped and plugged immediately after opening to prevent dirt, moisture or foreign material from entering the hydraulic system or damage to equipment may result.

4-55. GOOSENECK STEERING CYLINDER (CONT)

NOTE

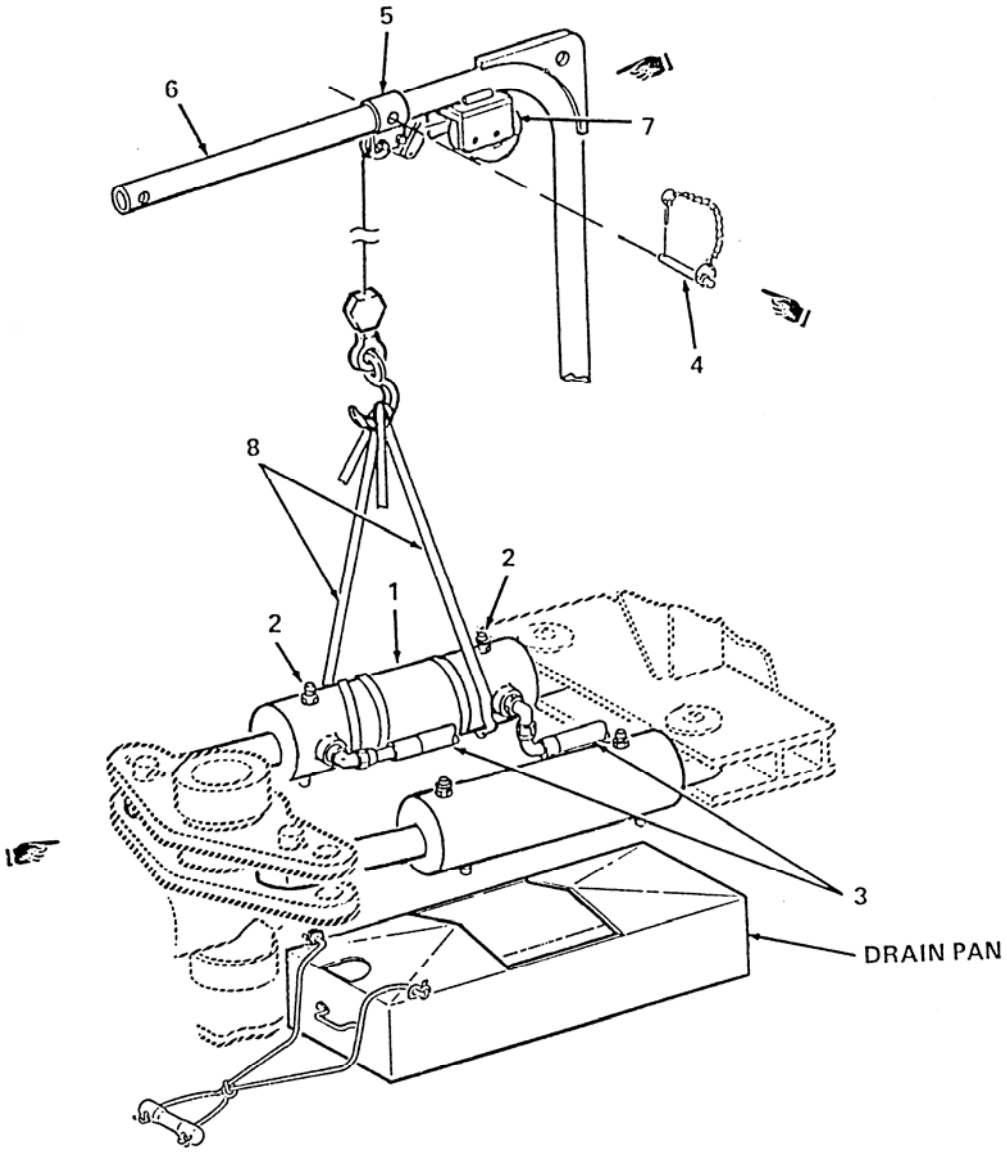
The following procedure is to be used for either curbside or streetside gooseneck steering cylinder. Repeat this procedure as necessary for other cylinder repairs.

REMOVAL

WARNING

Use caution during cylinder removal to avoid hands becoming pinched or injury to personnel may result.

1. Place a drain pan under gooseneck steering cylinders (1). Loosen two bleed valves (2) on steering cylinder (1) to relieve pressure from cylinder.



2. Position a drain pan under steering cylinder (1). Tag, disconnect, and drain two nonmetallic hoses (3). Install caps/plugs into all openings.

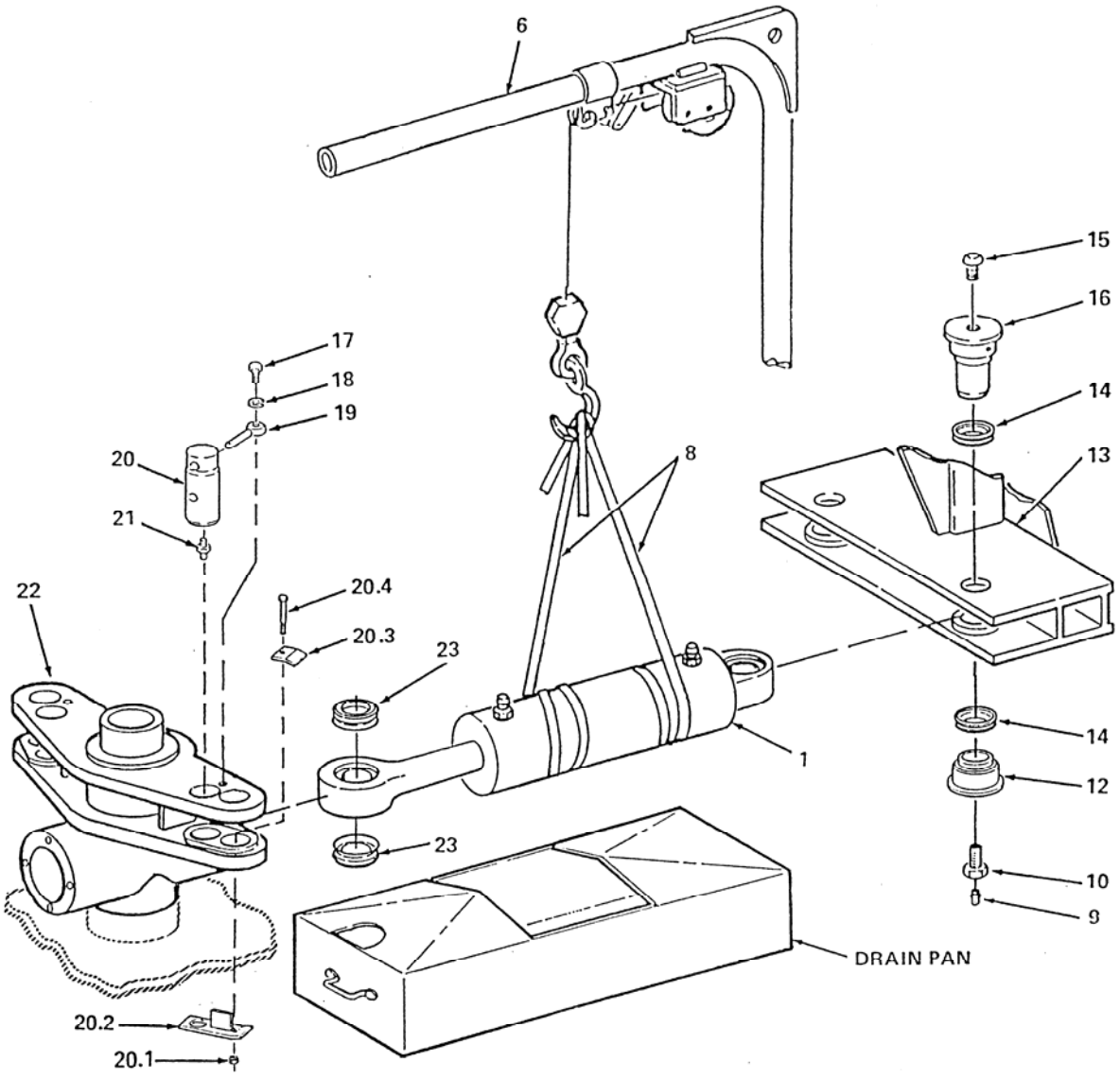
WARNING

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on it or trip over it. Injury to personnel or damage to equipment may result.

3. Remove hitch pin (4) from winch cable pulley clamp (5) and reposition pulley clamp (5) on davit (6) near davit winch (7). Insert hitch pin (4) to secure pulley clamp (5).

4. Wrap lifting strap (8) around steering cylinder (2) between cylinder ports. Attach lifting strap (8) to hook from davit (6).

5. Remove lubrication fitting (9), special bolt (10), and sleeve bushing (12) from spare wheel carrier (13). Discard special bolt. Discard lockwasher if present.



4-55. GOOSENECK STEERING CYLINDER (CONT)

6. Remove nonmetallic seal (14) from sleeve bushing (12). Discard nonmetallic seal.

7. Remove button-head screw (15) from pin assembly (16). Drive pin assembly (16) out of spare wheel carrier (13).

8. Remove nonmetallic seal (14) from pin assembly (16). Discard nonmetallic seal.

9. Remove screw (17), lockwasher (18), and rod end connector (19) from straight shouldered pin (20). Discard lockwasher.

9.1. Remove self-locking nut (20.1), pin support (20.2), top clamp (20.3), and bolt (20.4).

10. Remove lubrication fitting (21) from straight shouldered pin (20).

11. Drive straight shouldered pin (20) from steering cylinder (1) and steering column housing (22).

NOTE

The steering cylinder may need to be compressed slightly to allow for removal.

12. If necessary, remove caps from both ports on steering cylinder (1). Allow fluid to drain from cylinder into drain pan and, using a crowbar, compress steering cylinder (1). Reinstall caps onto ports on steering cylinder (1).

NOTE

The two ring spacers may fall to the ground while steering cylinder is being removed.

13. Using two people and davit (6), maneuver steering cylinder (1) down and away from steering column housing (22) and spare wheel carrier (13).

14. Pick up or remove two ring spacers (23) from steering cylinder (1). Discard ring spacers.

15. Continue lowering steering cylinder (1) down to the ground and remove strap (8).

INSPECTION

WARNING

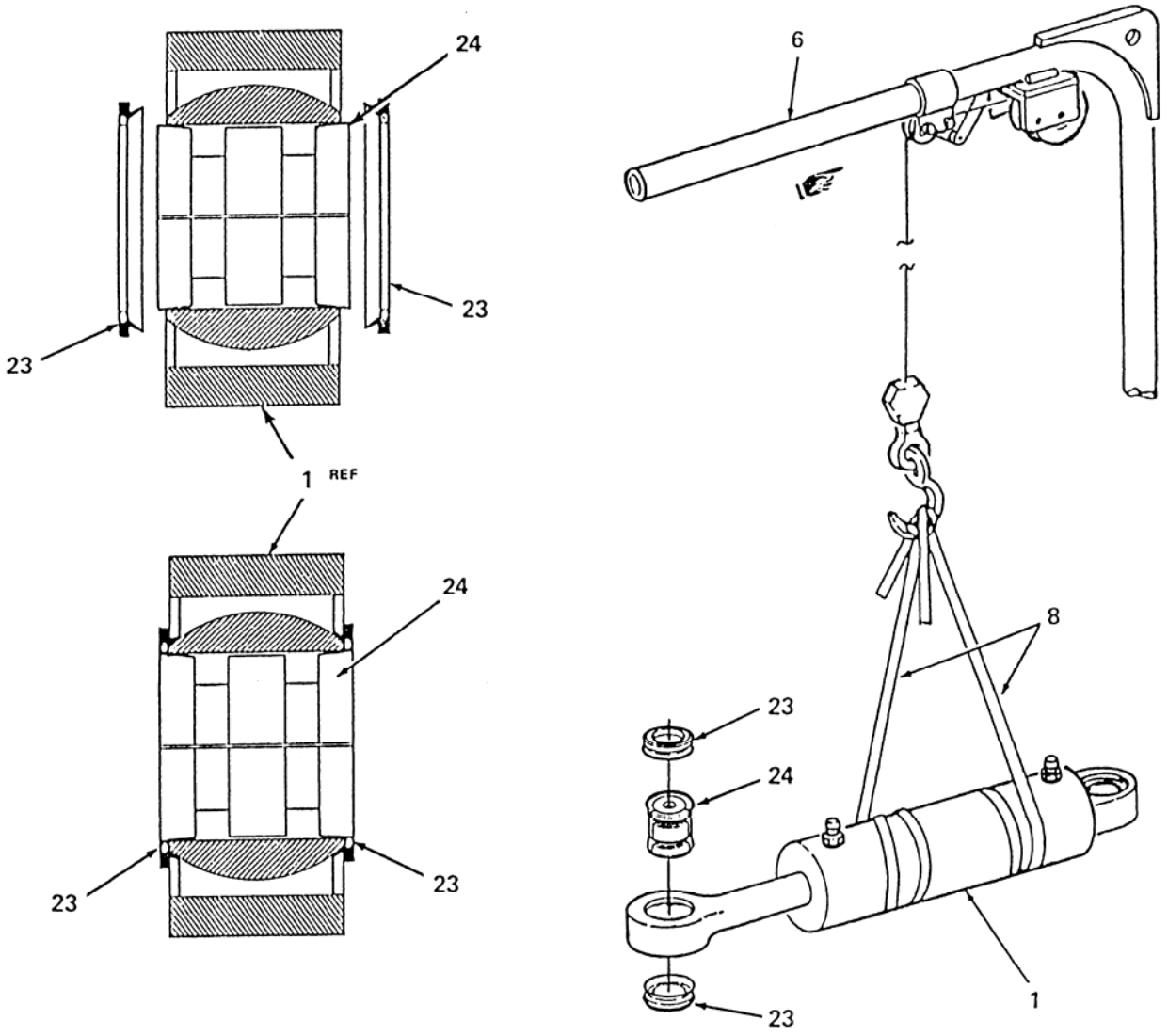
Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Clean all parts removed in degreaser tank using cleaning compound solvent. Use a crocus cloth to remove any nicks, scoring, or burrs from polished or machined surfaces.

2. Inspect steering cylinder and related parts for gouges, cracks, bends, and defects. Replace related parts if found defective. If steering cylinder is defective, notify DS maintenance.

INSTALLATION

1. Wrap lifting strap (8) around steering cylinder (1) and attach both ends of strap to hook on davit (6).



2. Aline and install suspension mandrel (24) into piston side of steering cylinder (1).

4-55. GOOSENECK STEERING CYLINDER (CONT)

CAUTION

Both ring spacers must be completely compressed and must uniformly cover/expand over bearing of steering cylinder prior to tightening suspension mandrel or there will not be enough clearance available for installation and damage to equipment may result.

NOTE

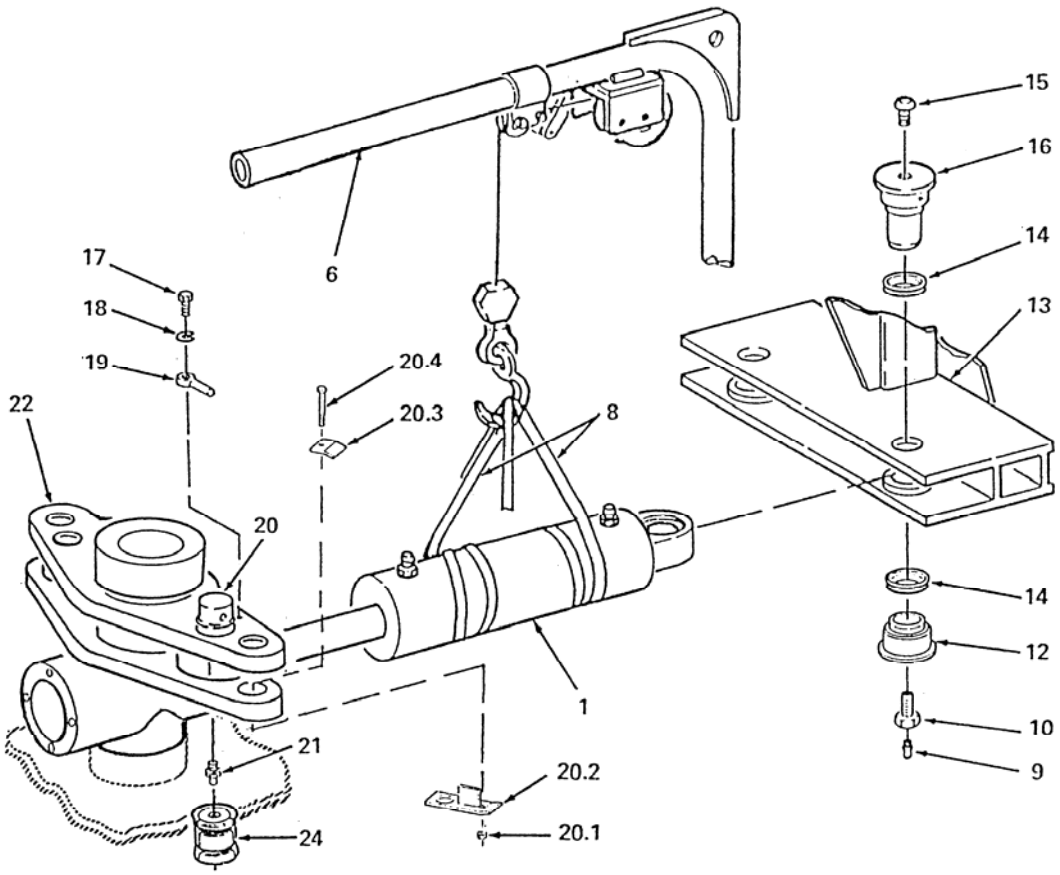
Each ring spacer is actually made of two pieces that can be separated if not handled carefully.

3. Aline two ring spacers (23) over each end of suspension mandrel (24). Compress each ring spacer (23) flush onto bearing of steering cylinder (1) and tighten adjusting bolt on suspension mandrel (24) to secure spacers in place.

WARNING

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on it or trip over it. Injury to personnel or damage to equipment may result.

4. Using two people and davit (6), maneuver steering cylinder (1) to a height even with cylinder mounts on both steering column housing (22) and spare wheel carrier (13).



CAUTION

When installing the steering cylinder to the steering column housing, be sure ring spacers do not work loose or become misalined. If spacers are misalined or work loose, stop the installation and remove the steering cylinder or damage to the spacers may result. It may take a few attempts to accomplish proper spacer installation.

5. Carefully maneuver piston end of steering cylinder (1) into steering column housing (22). Check condition of both ring spacers during entire installation.

NOTE

During installation of piston end of steering cylinder, one person can observe the position of the cylinder by looking through the hole in the steering column housing.

6. Once steering cylinder (1) is in place, loosen adjusting bolt on suspension mandrel (24).

NOTE

After the suspension mandrel is loosened, the mandrel will be driven out of the steering cylinder while installing the straight shouldered pin.

7. Apply antiseize compound to straight shouldered pin (20). Aline and install rod end connector (19) into straight shouldered pin (20). Position pin so that hole for rod end connector is alined. Install straight shouldered pin (20) through inboard hole in top of steering column housing (22) and steering cylinder (1). Remove suspension mandrel (24).

8. Secure rod end connector (19) with screw (17) and lockwasher (18).

9. Install lubrication fitting (21) into straight shouldered pin (20).

9.1. Install top clamp (20.3), bolt (20.4), pin support (20.2), and self-locking nut (20.1).

10. Remove caps from both ports on steering cylinder (1) and, using a crowbar and two people, extend steering cylinder (1) so that bearing in steering cylinder (1) is approximately alined with holes in spare wheel carrier (13).

11. Install caps onto ports of steering cylinder (1).

12. Using two people, maneuver steering cylinder (1) into spare wheel carrier (13).

CAUTION

Do not apply antiseize compound to inner wear surface of sleeve bushing. It may get onto bolt threads, reversing the effect of thread locking compound, causing damage to equipment.

13. Install button-head screw (15) into pin assembly (16). Apply grease to two nonmetallic seals (14) and apply antiseize compound to exterior of pin assembly (16) and exterior of sleeve bushing (12).

14. Install a nonmetallic seal (14) onto pin assembly (16) and sleeve bushing (12).

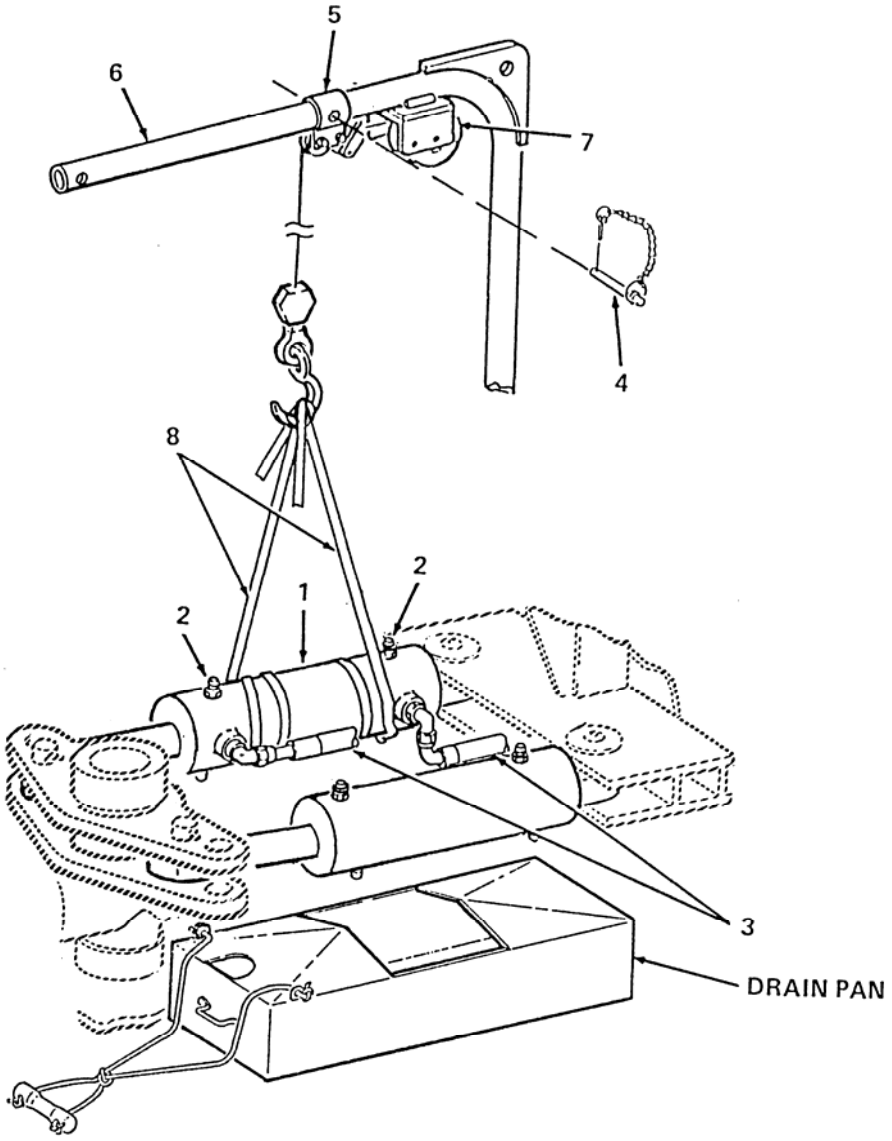
4-55. GOOSENECK STEERING CYLINDER (CONT)

15. Aline and install pin assembly (16) through spare wheel carrier (13) and steering cylinder (1).

16. Install sleeve bushing (12) onto pin assembly (16). Secure sleeve bushing by installing self-locking special bolt (10). Using a torque wrench, torque special bolt (10) to 100 - 110 lb-ft (136 - 149 Nm).

17. Install lubrication fitting (9) into special bolt (10).

18. Remove strap (8) from steering cylinder (1) and hook on davit (6).



19. Remove hitch pin (4) from winch cable pulley clamp (5) and move pulley clamp (5) to stow position at end of davit (6). Install hitch pin (4) and secure.

20. Remove caps/plugs and reconnect two nonmetallic hoses (3) to steering cylinder (1). Close bleed valves (2).

FOLLOW-ON MAINTENANCE

1. Bleed air from hydraulic system (para. 4-19).

2. Perform required lubrication (para. 3-3).

3. Couple tractor/semitrailer (para. 2-24).

4. Operate steering and check for improper operation (para. 2-21).

5. Install spare tires (para. 3-6).

4-56. GOOSENECK STEPS

This task covers: a. Removal c. Assembly
b. Disassembly d. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

Cotter pin
Cotter pin (2)
Locknut (2)
Locknut (6
Locknut (2)
Locknut (2)

Equipment Condition

Gooseneck adjusted to 64 inch (162.5 cm) height (para. 2-18) or coupled to tractor (para. 2-24)

General Safety Instructions

WARNING

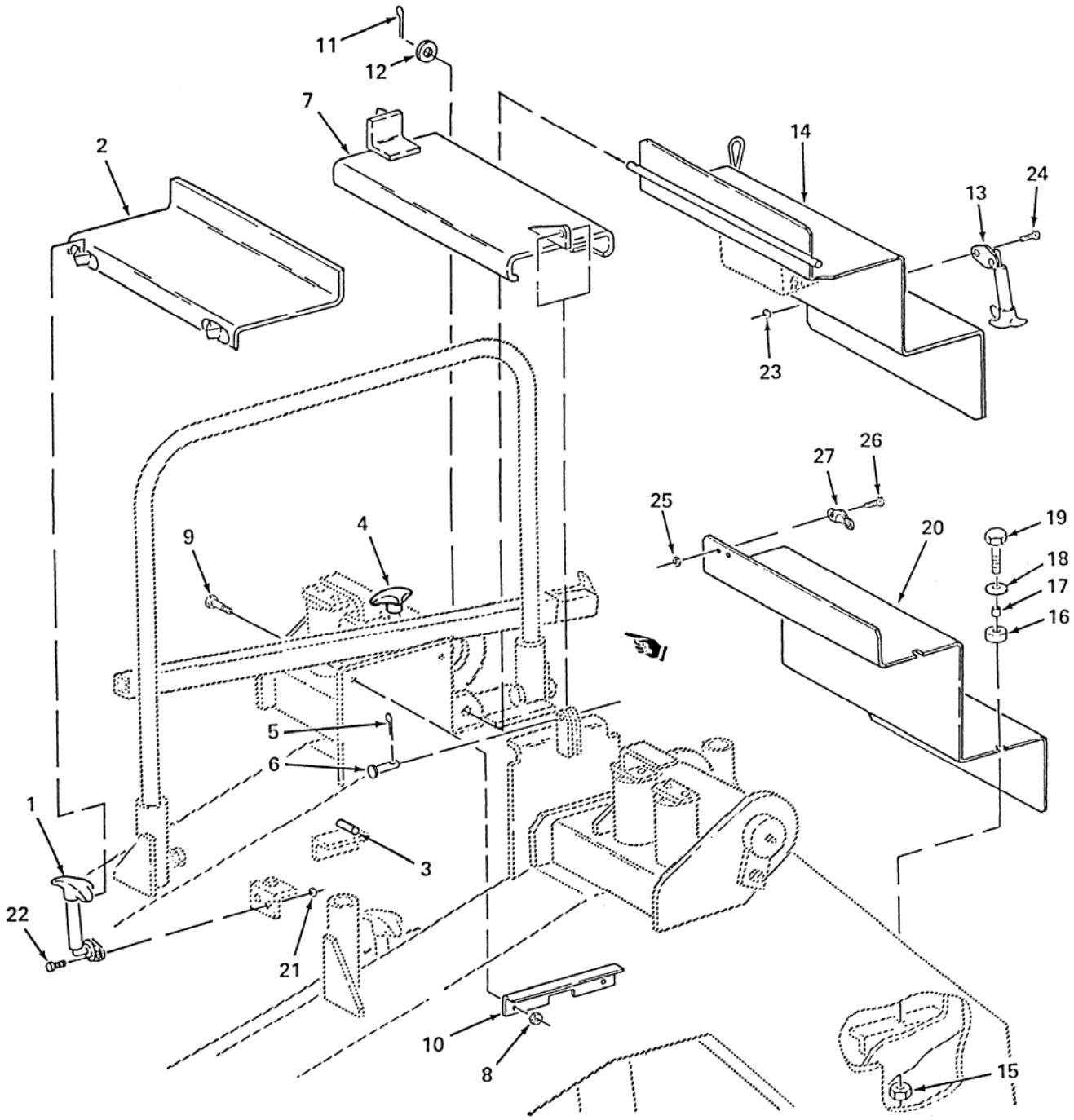
When on top of gooseneck and removing or installing gooseneck steps, always hold onto semitrailer with one hand or injury to personnel may result.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on it or trip over it. Injury to personnel or damage to equipment may result.

4-56. GOOSENECK STEPS (CONT)

REMOVAL

1. Unhook two latches (1) from step assembly (2). Lift forward edge of step assembly (2) up and pull forward to disengage step from pins (3).



2. Unhook latch (4). Remove cotter pin (5), pin (6), and step assembly (7). Discard cotter pin.

3. Remove two locknuts (8), bolts (9), and step support (10) from gooseneck weldment. Discard locknuts.

4. Remove two cotter pins (11) and washers (12). Unhook latch (13) and remove upper step section (14). Discard cotter pins.

5. Remove three nuts (15), spacers (16), spacers (17), washers (18), screws (19), and lower step section (20).

DISASSEMBLY

1. Remove six locknuts (21), screws (22), two latches (1), and latch (4) attached to gooseneck weldments. Discard locknuts.

2. Remove two locknuts (23), screws (24), and latch (13) from upper step section (14). Discard locknuts.

3. Remove two locknuts (25), screws (26), and plate (27) from lower step section (20). Discard locknuts.

ASSEMBLY

1. Position plate (27) on lower step section (20) and secure with two screws (26) and locknuts (25).

2. Position latch (13) on upper step section (14) and secure with two screws (24) and locknuts (23).

3. Position two latches (1) on gooseneck weldment bracket and secure each latch with two screws (22) and locknuts (21).

4. Position latch (4) on gooseneck step weldment and secure with two screws (22) and locknuts (21).

INSTALLATION

1. Install lower step section (20) and secure with three screws (19), washers (18), spacers (17), spacers (16), and nuts (15).

NOTE

On newer upper step sections, the mounting rod may have two holes in each end. In this case, install two washers and two cotter pins at streetside only.

2. Install upper step section (14) and secure with two washers (12) and cotter pins (11). Hook latch (13) onto plate (27).

3. Position step support (10) on gooseneck step weldment and secure with two bolts (9) and locknuts (8).

4. Install step (7) and secure with pin (6) and cotter pin (5). Hook latch (4) onto step (7).

5. Install step (2) by inserting rear lip under pins (3) and rotating step downward. Secure step (2) by hooking two latches (1).

4-57. GOOSENECK GUARDRAILS

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

Lockwasher (2)
Self-locking nut (2)
Self-locking nut (2)

Equipment Condition

Gooseneck lowered to lowest position, if uncoupled (para. 2-18)

General Safety Instructions

WARNING

When on top of gooseneck and removing or installing guardrails, always hold onto semitrailer with one hand or injury to personnel may result.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on it or trip over it. Injury to personnel or damage to equipment may result.

NOTE

The following procedure is to be used for either streetside or curbside guardrail. Repeat this procedure as required to complete the necessary repairs.

REMOVAL

1. Remove nut (1), lockwasher (2), and capscrew (3) from gooseneck. Discard lockwasher.

2. Loosen jam nut (4) and remove capscrew (5) with jam nut (4) from gooseneck.

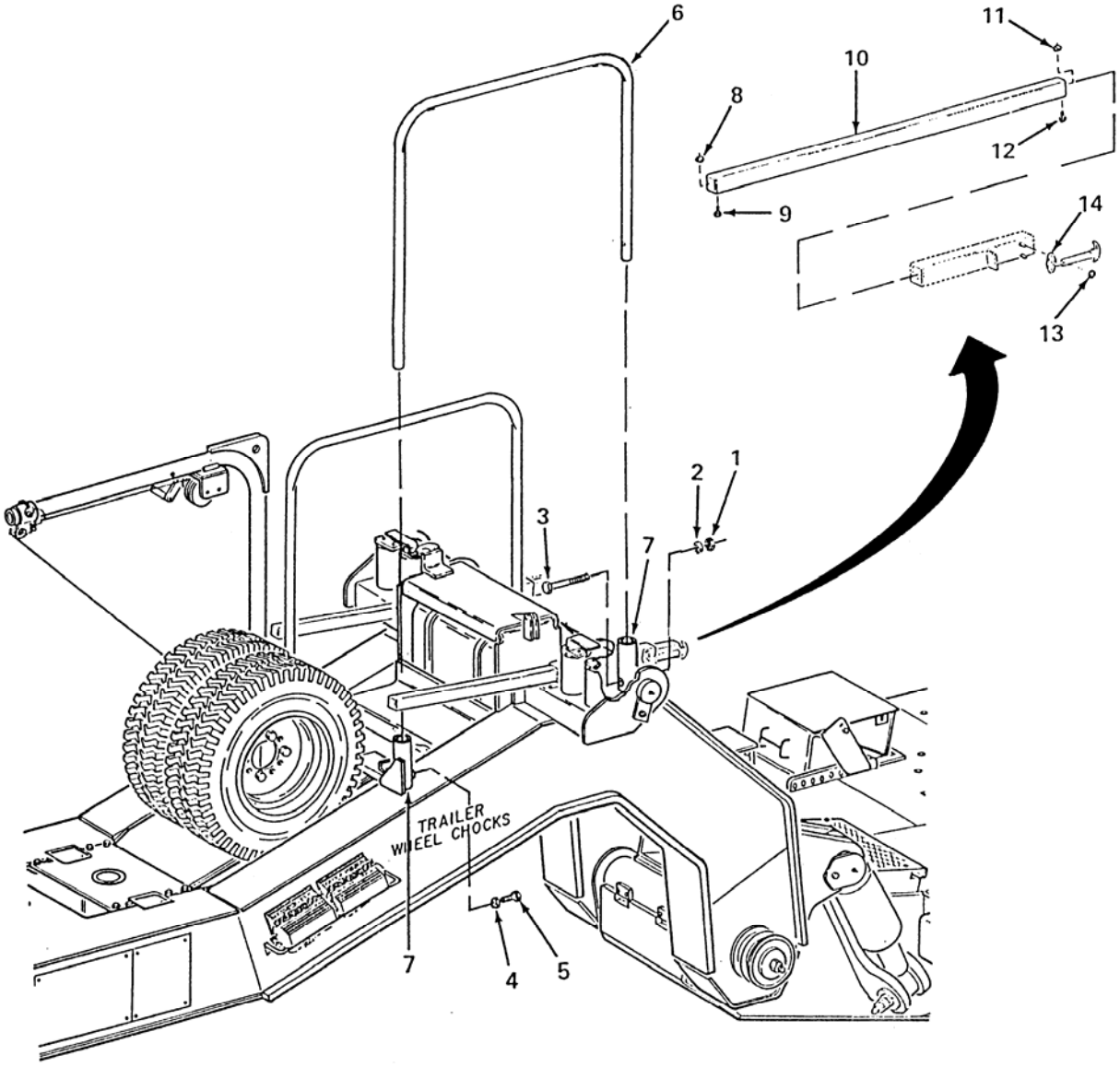
3. Lift guardrail (6) straight up out of gooseneck support weldments (7) on gooseneck.

4. Remove self-locking nut (8) and bolt (9). Remove gooseneck safety rail (10) from weldment. Discard self-locking nut.

5. Remove self-locking nut (11), bolt (12), two self-locking nuts (13), and latch (14). Discard self-locking nuts.

INSTALLATION

1. Insert legs of guardrail (6) in gooseneck support weldments (7) on gooseneck.
2. Place jam nut (4) on capscrew (5) and install capscrew (5) on gooseneck.
3. Install capscrew (3), lockwasher (2), and nut (1) on gooseneck.
4. Install latch (14), two self-locking nuts (13), bolt (12), and self-locking nut (11).
5. Install gooseneck safety rail (10) into weldment and install bolt (9) and self-locking nut (8).



4-58. GRAB HANDLE

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

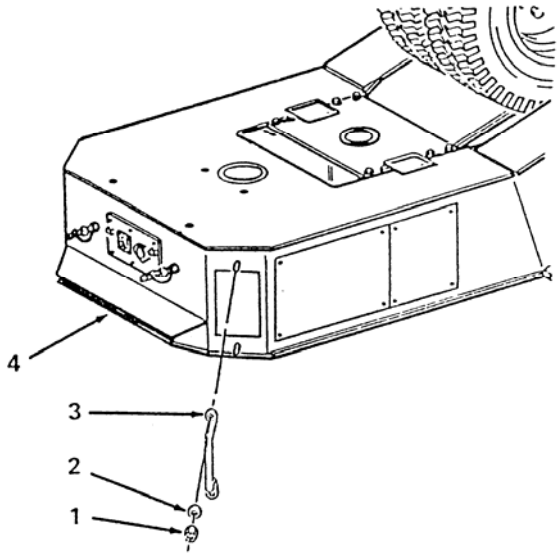
Locknut (2)

Equipment Condition

Gooseneck lowered as required so that grab handle can be reached (para. 2-18)

REMOVAL

Remove two locknuts (1), washers (2), and grab handle (3) from gooseneck (4). Discard locknuts.



INSTALLATION

Install grab handle (3) onto gooseneck (4) and secure in place with two washers (2) and locknuts (1).

4-59. PLATFORM STEPS AND SERVICE COVERS

This task covers: a. Removal c. Assembly
b. Disassembly d. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

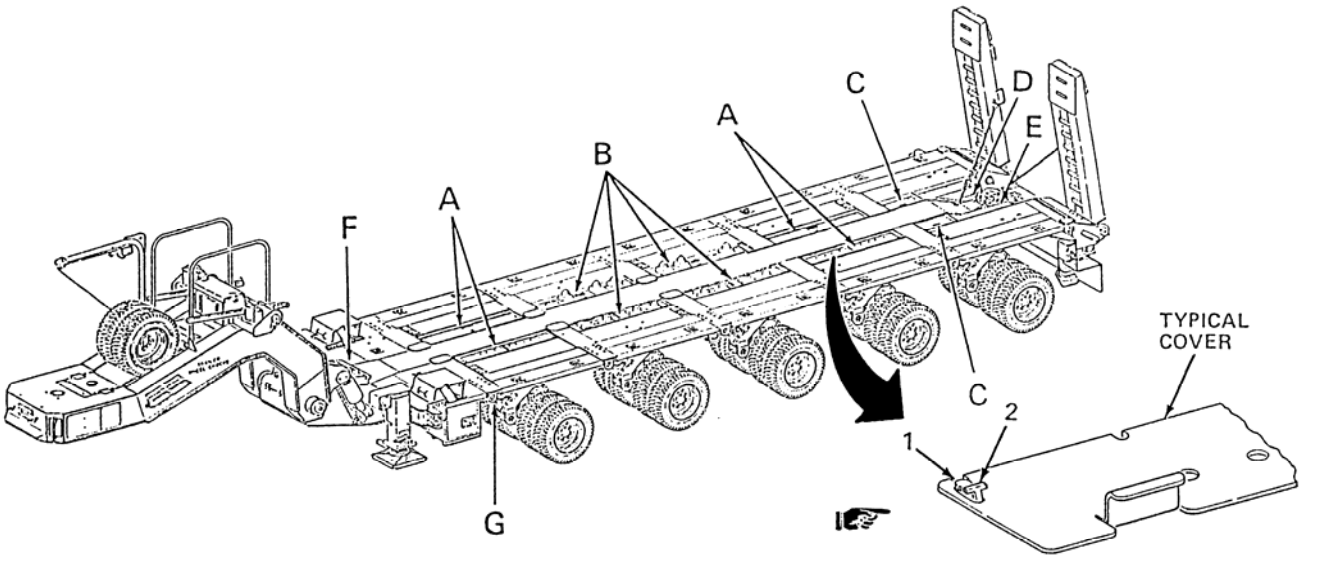
Cotter pin (24)
Lockwasher (32)

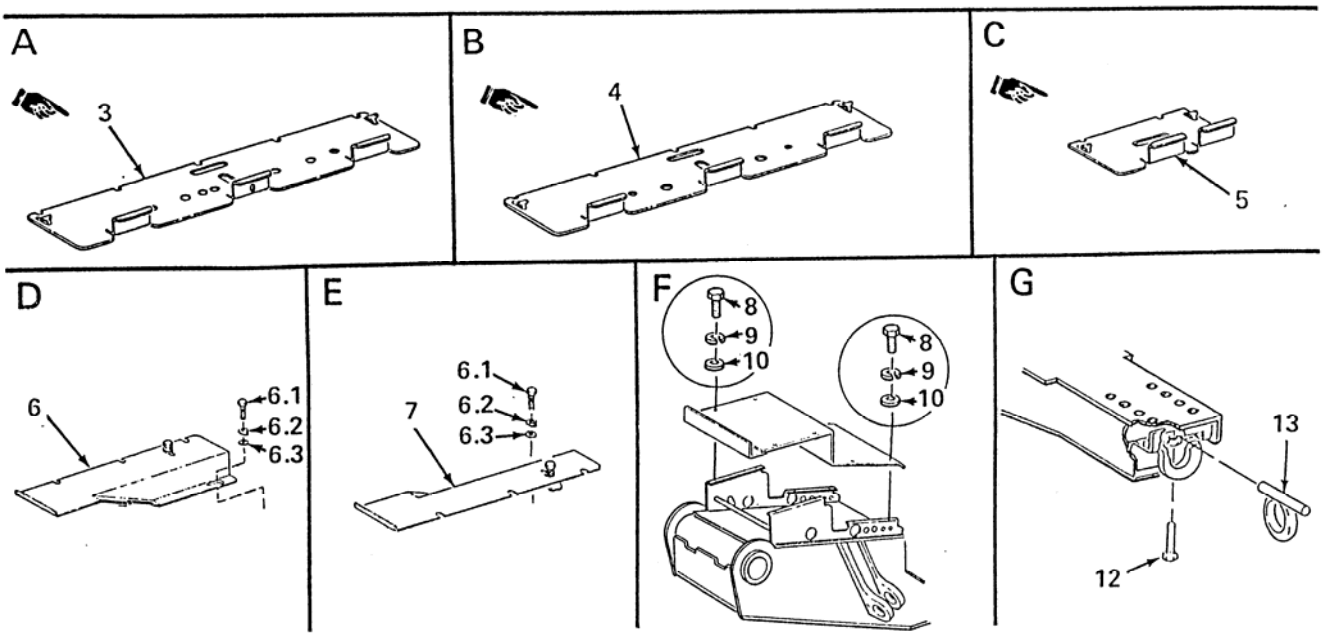
Equipment Condition

ISO container lock mounts removed from platform (para. 2-36)
Curb guides removed from platform (para. 2-26)

REMOVAL

1. Loosen capscrew (1) and slide retainer (2) inboard and lift up and remove four service covers (3), four service covers (4), or two service covers (5). Repeat this step as necessary for each service cover to be removed.





4-59. PLATFORM STEPS AND SERVICE COVERS (CONT)

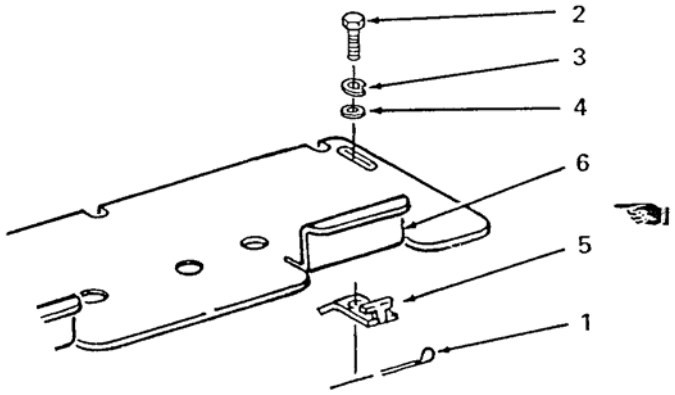
2. Loosen capscrew (1) and slide retainer (2) inboard. Remove capscrew (6.1), lockwasher (6.2), and washer (6.3) and lift up and remove service cover (6) or service cover (7). Repeat this step as necessary for each service cover to be removed.

3. Remove eight capscrews (8), lockwashers (9), and washers (10) and from platform step section (11). Remove platform step section (11) from platform weldment. Discard lockwashers.

4. Remove screw (12) and lift-twist Dee ring (13) to remove from platform weldment. Repeat this step as required for each Dee ring to be removed.

DISASSEMBLY

Remove cotter pin (1), capscrew (2), lockwasher (3), washer (4), and retainer (5) from service cover (6). Discard lockwasher and cotter pin. Repeat this step as necessary for each service cover being disassembled.



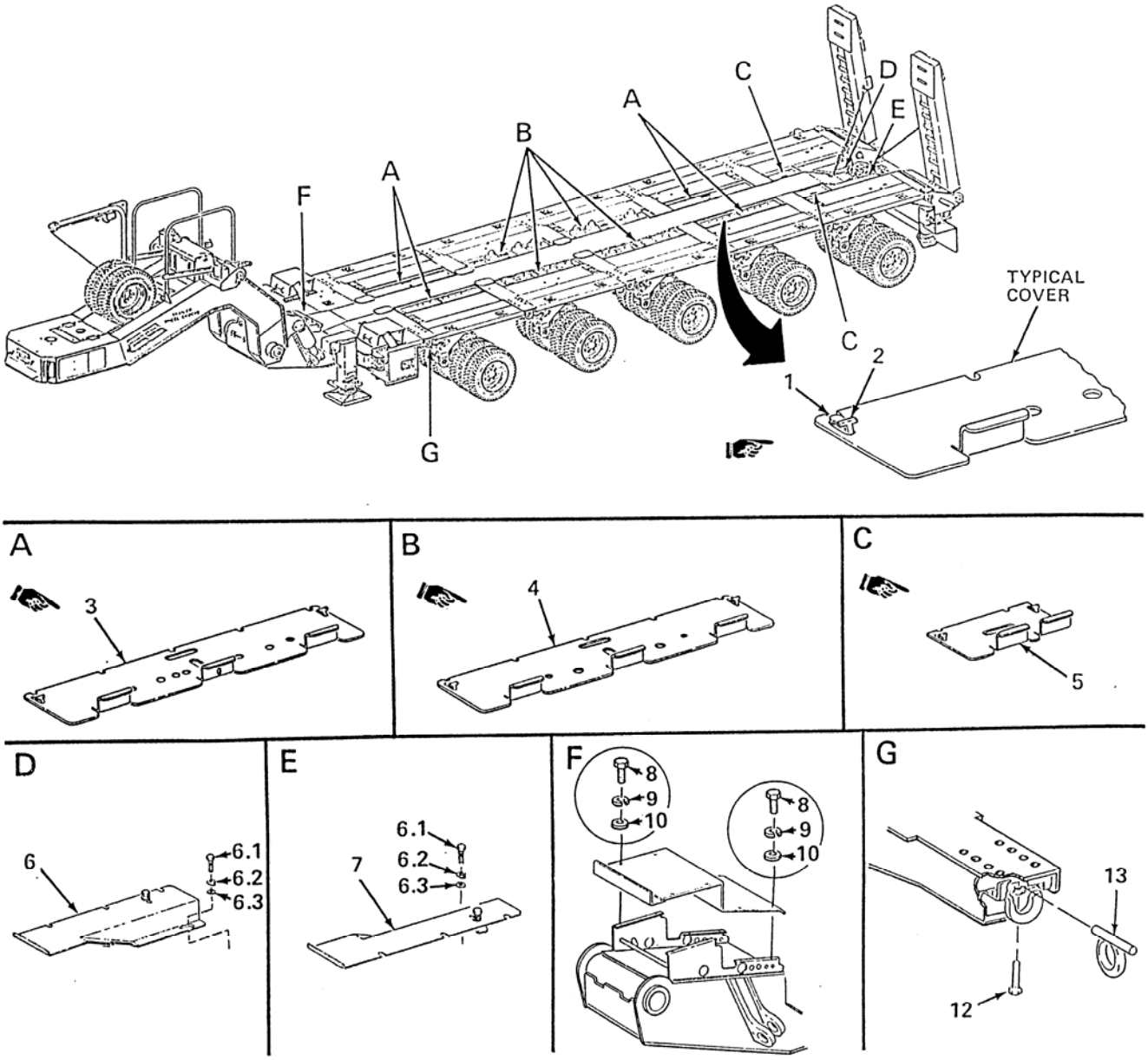
ASSEMBLY

Install retainer (5) to service cover (6) and secure with washer (4), lockwasher (3), and loosely install capscrew (2). Aline and install cotter pin (1) into capscrew (2). Repeat this step for each service cover that was disassembled.

INSTALLATION

1. Install Dee ring (13) in position on platform weldment and secure with screw (12). Repeat this step for each Dee ring to be installed.

2. Install platform step section (11) in position on platform weldment. Secure step section (11) in place by installing eight washers (10), lockwashers (9), and capscrews (8).



3. To install service cover (6 or 7), position specific cover in appropriate platform opening and slide each retainer (2) aft and outboard until latch secures under edge of platform weldment. Tighten each capscrew (1). Install capscrew (6.1), lockwasher (6.2), and washer (6.3) to secure cover in place. Repeat this procedure for each access cover installed.

4. To install service cover (3, 4, or 5), position specific cover in appropriate platform opening and slide two retainers (2) outboard until latch secures under edge of platform weldment. Tighten each capscrew (1) to secure cover in place. Repeat this procedure for each access cover installed.

4-59. PLATFORM STEPS AND SERVICE COVERS (CONT)

FOLLOW-ON MAINTENANCE

1. Install curb guides (para. 2-26).

2. Install ISO container locks (para. 2-36).

4-60. LOADING RAMP

This task covers: a. Removal c. Installation
b. Inspection d. Adjustment

INITIAL SETUP

Tools

Overhead lifting device, 5000 lb (2270 kg) capacity minimum or equivalent
Chain, 5/16 inch link, item 9, appx. B
General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:
Degreaser tank, 20 gl
Sledge hammer, 12 lb
Wrench, pipe, adjustable
Gloves, chemical and oil protective
Goggles, industrial

Material/Parts

Antiseize compound, item 3, appx. E
Crocus cloth, item 6, appx. E
Cleaning compound solvent, item 25, appx. E
Wood block, 2-inch x 4-inch
Lock nut (4)
Cotter pin (2)
Lockwasher (4)

Personnel Required: 3

Equipment Condition

Platform at road height (para. 2-19)
Gooseneck lowered to lowest position, if uncoupled (para. 2-18)
Front and rear support legs lowered supporting platform (para. 2-22 and 2-23)
Crowbar and isolation valve handle extension removed (para. 1-9)

General Safety Instructions

WARNING

Do not stand behind the ramps or in the path the ramps can travel when being lowered and raised or serious injury to personnel may result.

WARNING

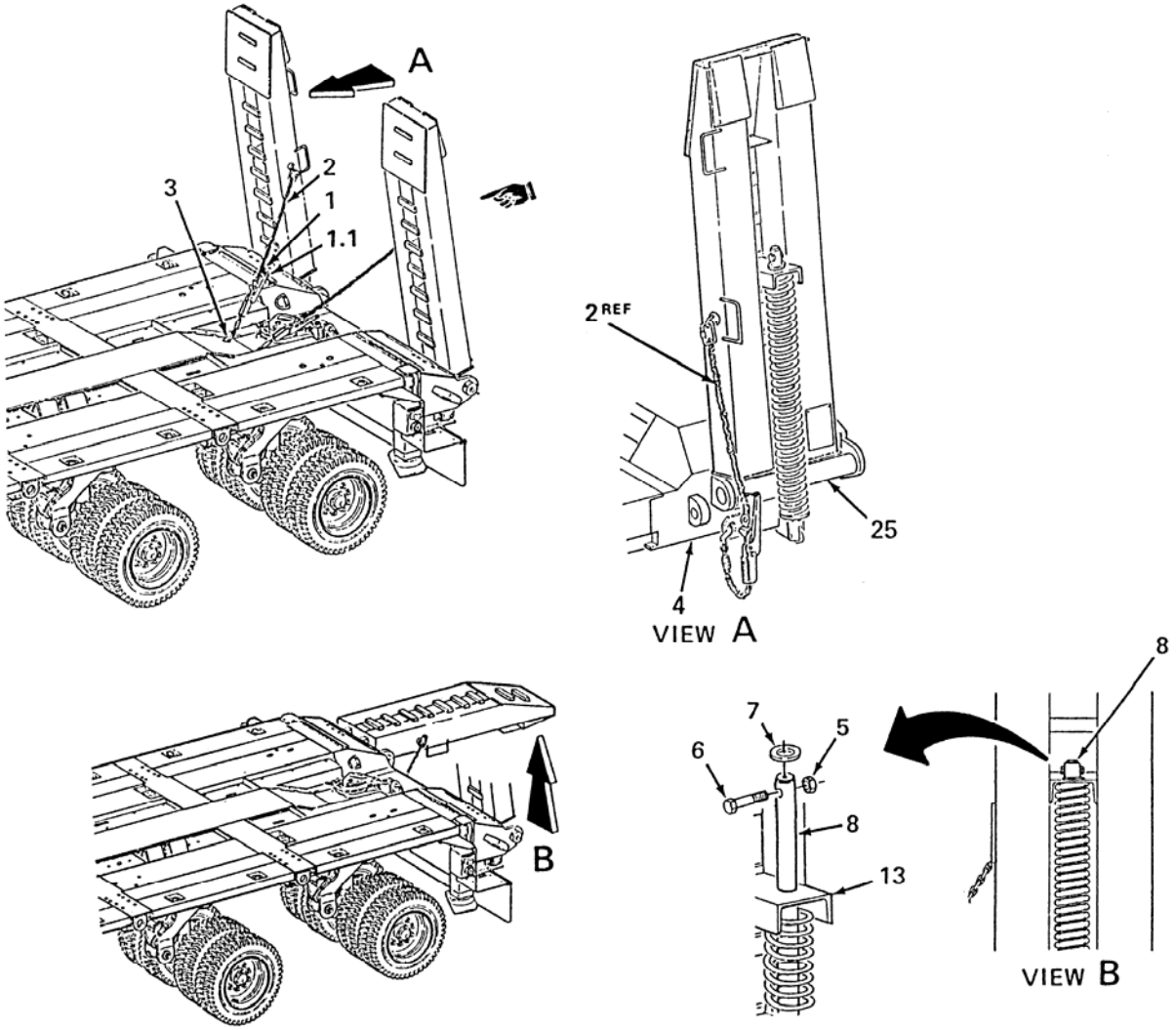
When ramps are lowered and are near the horizontal position, the springs are fully compressed and under extreme pressure. Do not attempt to adjust or remove spring mechanism unless ramps are in the raised (stow) position or serious injury to personnel may result.

NOTE

The procedures for removal/installation of either the curbside or streetside ramps are identical. This procedure represents the curbside ramp. To remove only the ramp spring and associated components, perform steps 1 thru 8.

REMOVAL

1. Open snap (1) and load binder (1.1) of chain assembly (2) and remove chain hook from hole (3) in platform. Attach chain hook in hole on ramp lift lever (4).



4-60. LOADING RAMP (CONT)

NOTE

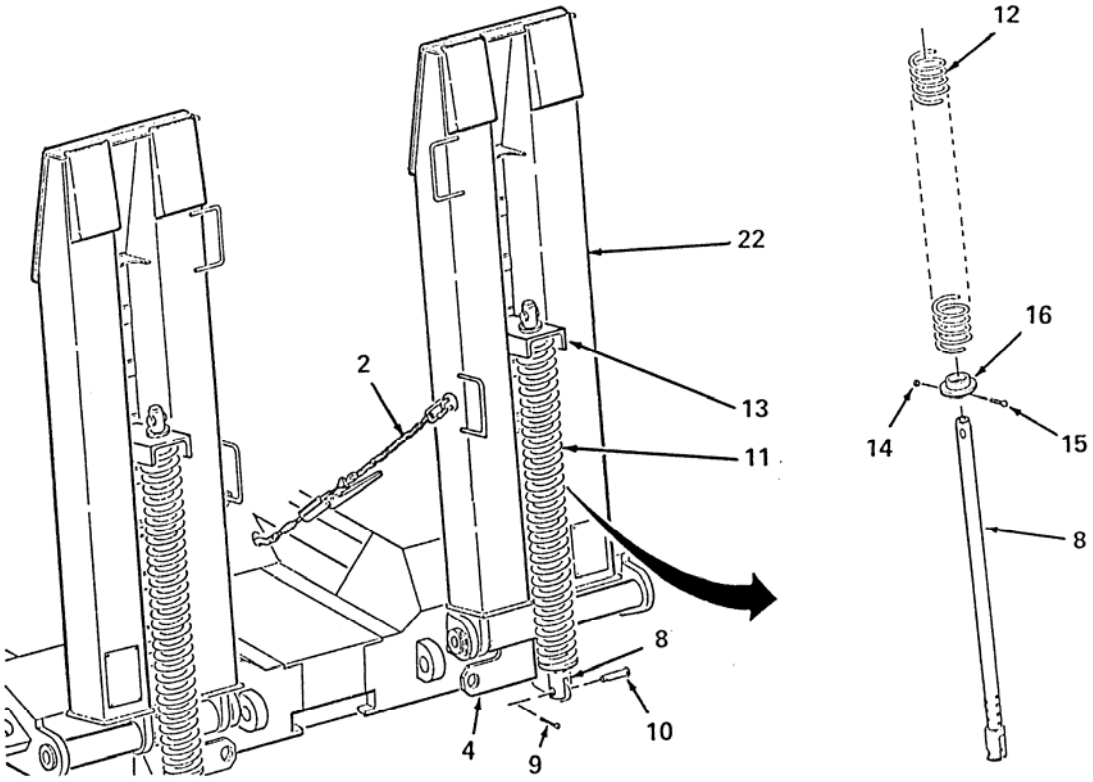
Ramp is lowered to horizontal position to permit removal of the capscrew installed through the top end of the spring guide rod.

2. Lower ramp to horizontal position (para. 2-20).

3. Remove locknut (5), capscrew (6), and washer (7) from upper end of spring guide rod (8). Discard locknut.

4. Return ramp to raised (stow) position (para. 2-20) and reconnect chain assembly (2) to platform.

5. Remove cotter pin (9) and shouldered pin (10) from lower end of spring guide rod (8) and ramp lift lever (4). Discard cotter pin.

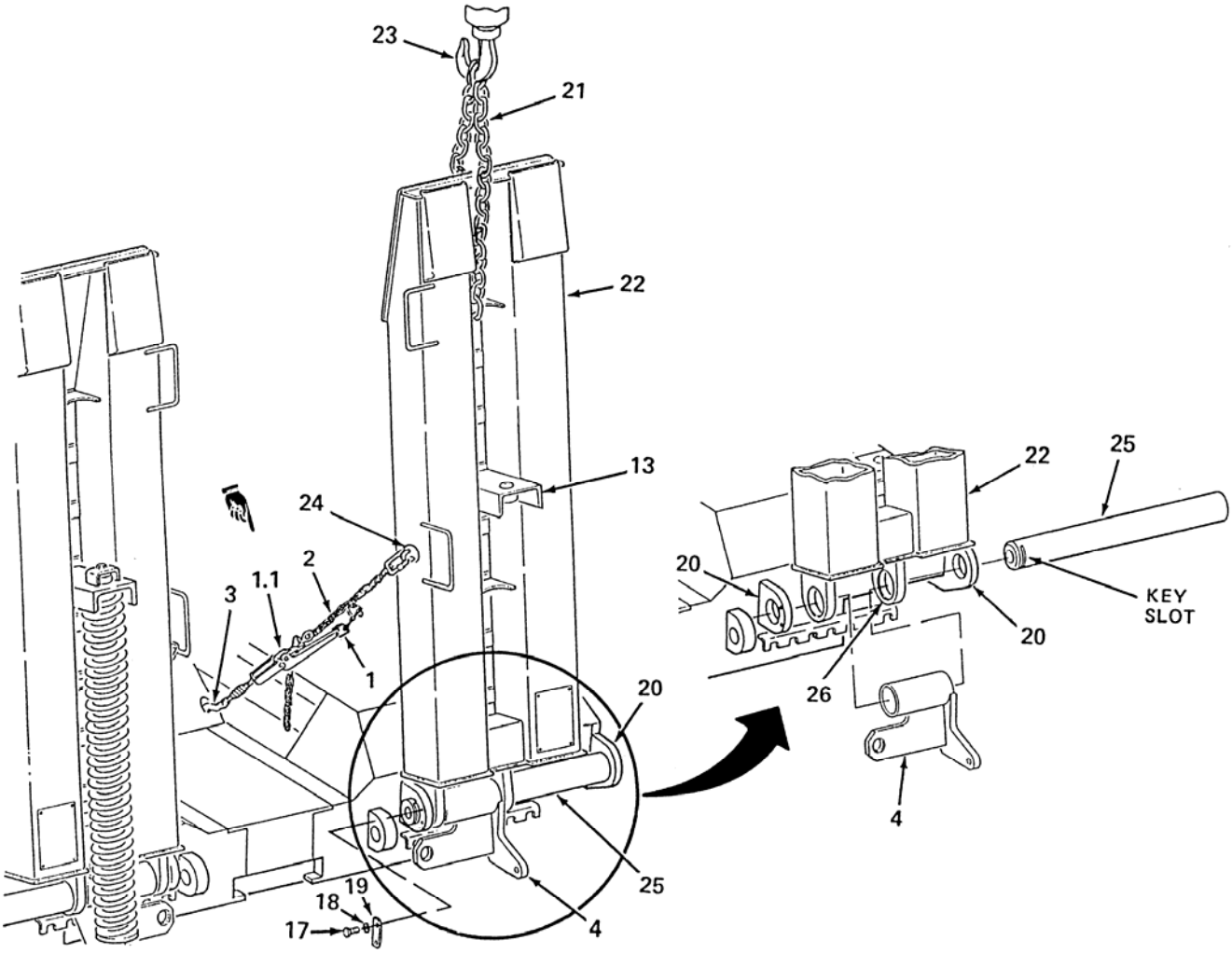


6. Using two people, remove spring and guide rod assembly (11) from ramp by lifting forked end of guide rod (8) off of ramp lift lever (4) and lowering spring and rod assembly (11) until top of guide rod (8) is free of weldment bracket (13).

7. Remove spring guide rod (8) from helical compression spring (12).

8. Remove nut (14), capscrew (15), and adjustment fitting (16) from rod (8).

9. Remove two capscrews (17), lockwashers (18), and plate (19) from platform lug weldment (20). Discard lockwashers.



10. Install lifting chain (21) through opening at top of ramp weldment (22) and attach lifting chain to a suitable overhead lifting device (23).

11. Operate lifting device (23) to take up slack in lifting chain (21).

12. Open snap (1) and load binder (1.1) of chain assembly (2) and remove chain hook from hole (3) in platform. Open quick-link (24) and remove chain assembly (2) from attachment lug on side of ramp. Lay chain assembly (2) on platform.

4-60. LOADING RAMP (CONT)

13. Operate lifting device (23) to take weight of ramp (22) off of ramp pivot shaft (25). Keep tension on lifting chain (21).

14. Using sledge hammer and short length of 2-inch x 4-inch lumber, drive ramp pivot shaft (25), from inboard side of ramp, out of platform weldment (20).

WARNING

The ramp pivot shaft weighs in excess of 140 pounds (63.5 kg). Use two people when removing pivot shaft from platform weldment or injury to personnel may result.

15. Using one person to drive out pivot shaft (25) and one person to support ramp lever (4), continue to drive out ramp pivot shaft (25), in outboard direction, until ramp lever (4) and ramp lug weldments (26) are free of pivot shaft (25).

16. Using two people, remove ramp pivot shaft (25) from remaining platform outboard lug weldment (20).

17. Operate lifting device (23) to lower ramp (22) onto platform or suitable pallet. Remove lifting device (23) and chain (21) from ramp.

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Clean all parts removed in degreaser tank with cleaning compound solvent and wire brush as necessary. Remove any nicks, burrs, or corrosion from polished surfaces using crocus cloth. Replace defective parts as required.

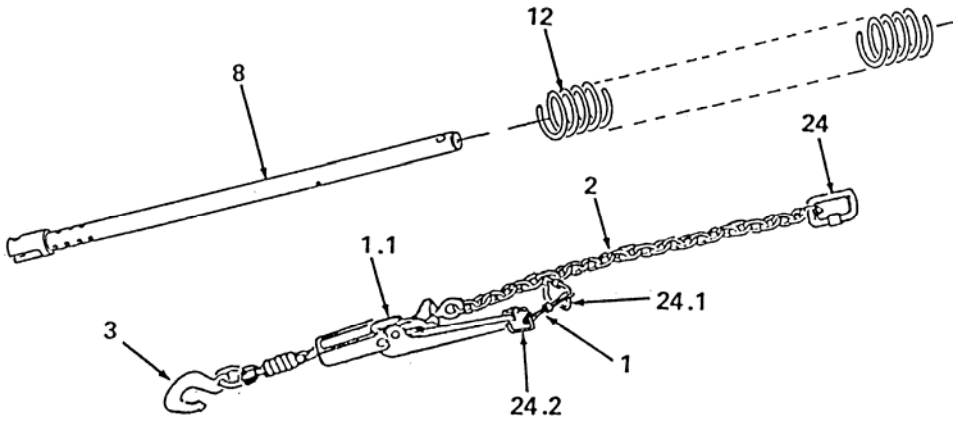
2. Inspect machined surfaces on ramp pivot pin (25), ID of lift lever (4), and shouldered pin (10) for surface deterioration, burrs, scratches, or gouges that could interfere with mounting or mating components and cause rough, sticking, or irregular operation.

3. Inspect spring (12) and guide rod (8) for corrosion, evidence of warping, cracks, excessive dents, gouges, or wear. Check for loose, missing, or damaged attaching hardware. Replace defective components as required.

NOTE

If the snap (1) must be replaced and is attached to the load binder handle with a welded link, the welded link must be cut off and replaced with a quick-link.

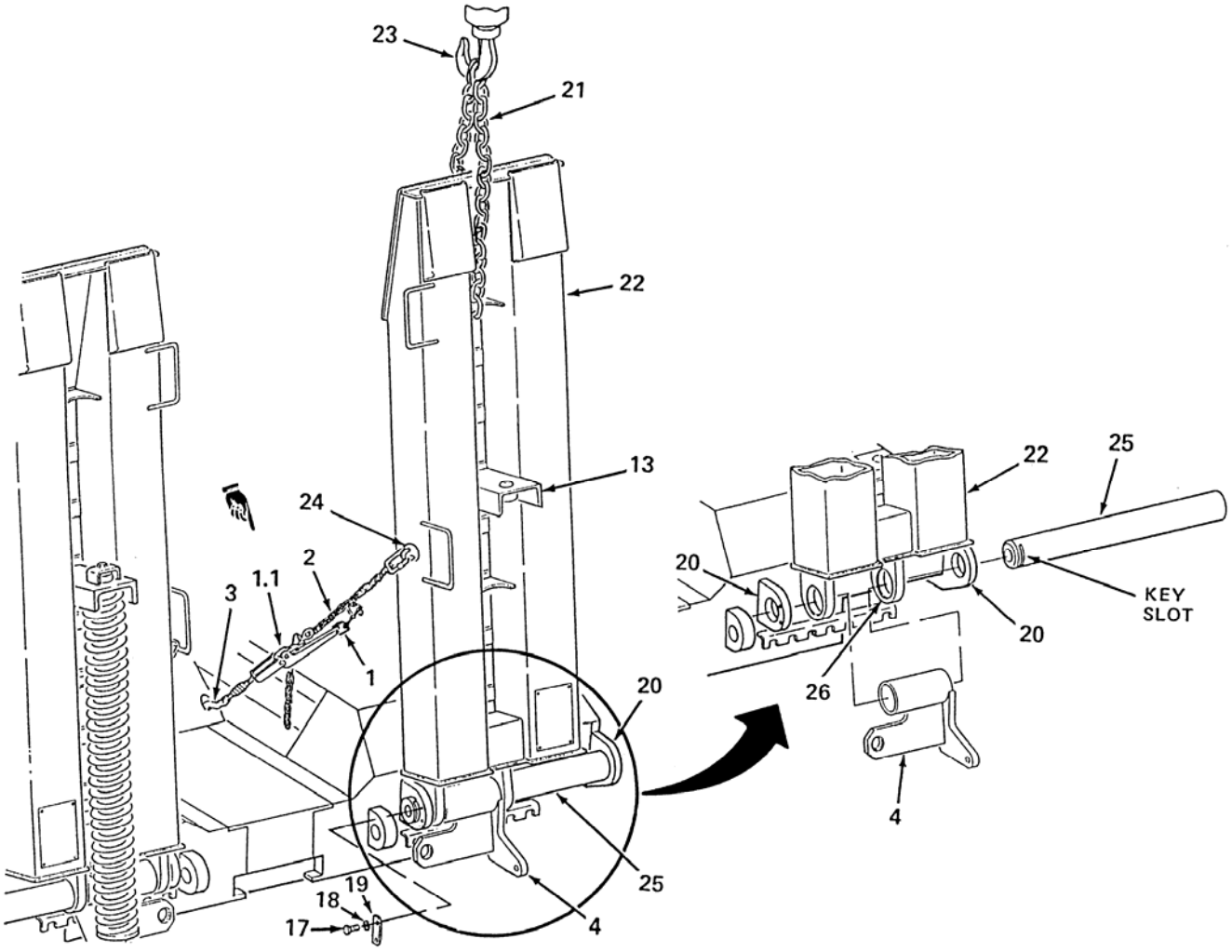
4. Inspect chain assembly (2) for proper operation of load binder (1.1), quick-links (24, 24.1, and 24.2), snap (1), and chain hook (3). Replace quick-links (24, 24.1, and 24.2), snap (1), and chain assembly (2) if any components are defective.



4-60. LOADING RAMP (CONT)

INSTALLATION

1. Install lifting chain (21) through opening at top of ramp weldment (22) and attach lifting chain to a suitable overhead lifting device (23).



4-60. LOADING RAMP (CONT)

2. Using one person to operate lifting device (23) and a second person to steady and guide ramp weldment (22), raise and position ramp at rear of semitrailer with ramp pivot shaft lug weldments (26) alined with platform lug weldment (20).

WARNING

The ramp pivot shaft weighs in excess of 140 pounds (63.5 kg). Use two people when installing shaft or serious injury to personnel may result.

NOTE

Prior to installing ramp pivot shaft, be sure keyed end of shaft is pointed toward outboard side of platform.

3. Using two people, place leading edge of ramp pivot shaft (25) through outboard platform lug weldment (20) and starts to enter outboard ramp weldment (26).

4. Position ramp lift lever (4) between ramp lug weldments (26) and aline with pivot shaft (25). Check alinement of pivot shaft (25), lift lever (4), and outboard lug weldments on ramp and platform. If necessary, operate overhead lifting device as required to obtain proper alinement.

5. With all components alined and, using a sledge hammer, continue driving pivot shaft (25) inboard through lift lever (4), inboard ramp lug weldment, and through inboard platform lug weldment (20) until key slot in end of pivot shaft (25) is properly positioned. If necessary, using a pipe wrench, turn pivot shaft (25) so that key slot is properly alined.

6. Install key plate (19) into key slot of pivot shaft (25) and secure with two lockwashers (18) and capscrews (17).

7. Install quick-link (24) of chain assembly (2) to inboard side of ramp (22). Move lifting device as required until ramp is in the forward stowed position. Insert chain hook in hole (3) on platform.

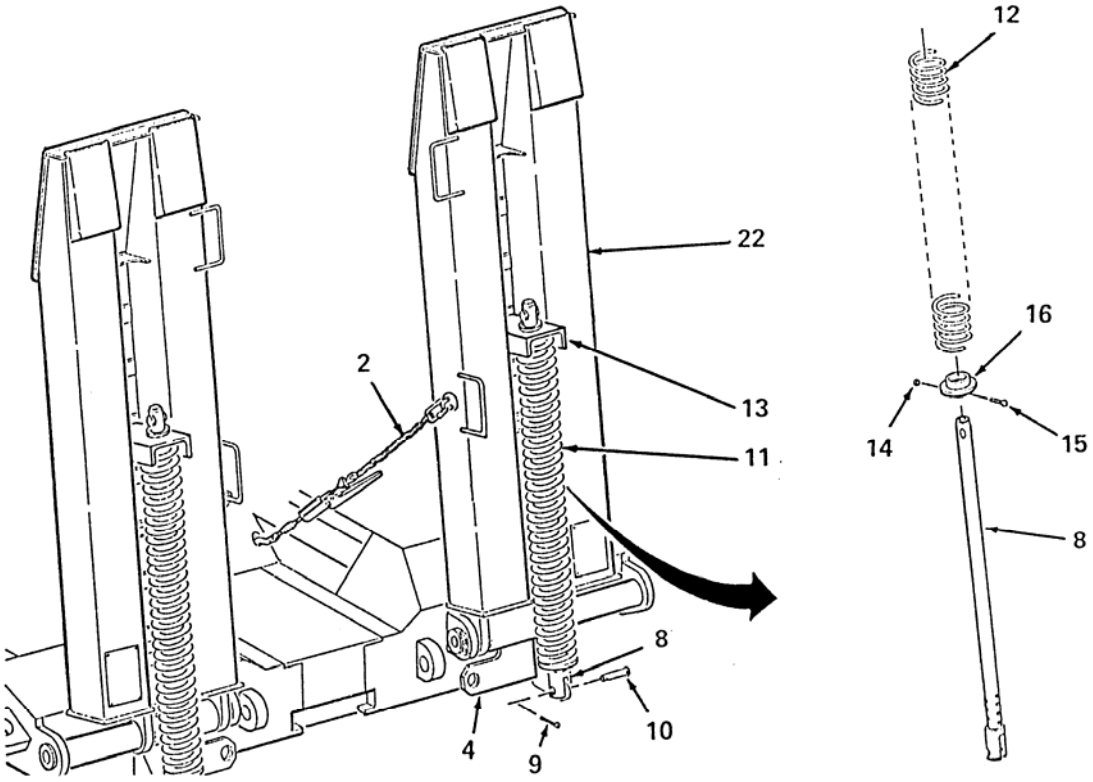
8. Remove overhead lifting device (23) and lifting chain (21) from ramp.

9. Slide adjustment fitting (16) onto spring guide rod (8), but do not install capscrew (15) and nut (14) at this time.

10. Slide helical spring (12) onto spring guide rod (8).

11. Using two people, lift and position spring and guide rod assembly (11) onto ramp (22) with upper end of guide rod (8) inserted through bracket weldment (13) and lower end of guide rod (8) on ramp lever (4).

12. Apply antiseize compound to shouldered pin (10) and install pin through guide rod (8) and ramp lever (4). Secure with cotter pin (9).



4-60. LOADING RAMP (CONT)

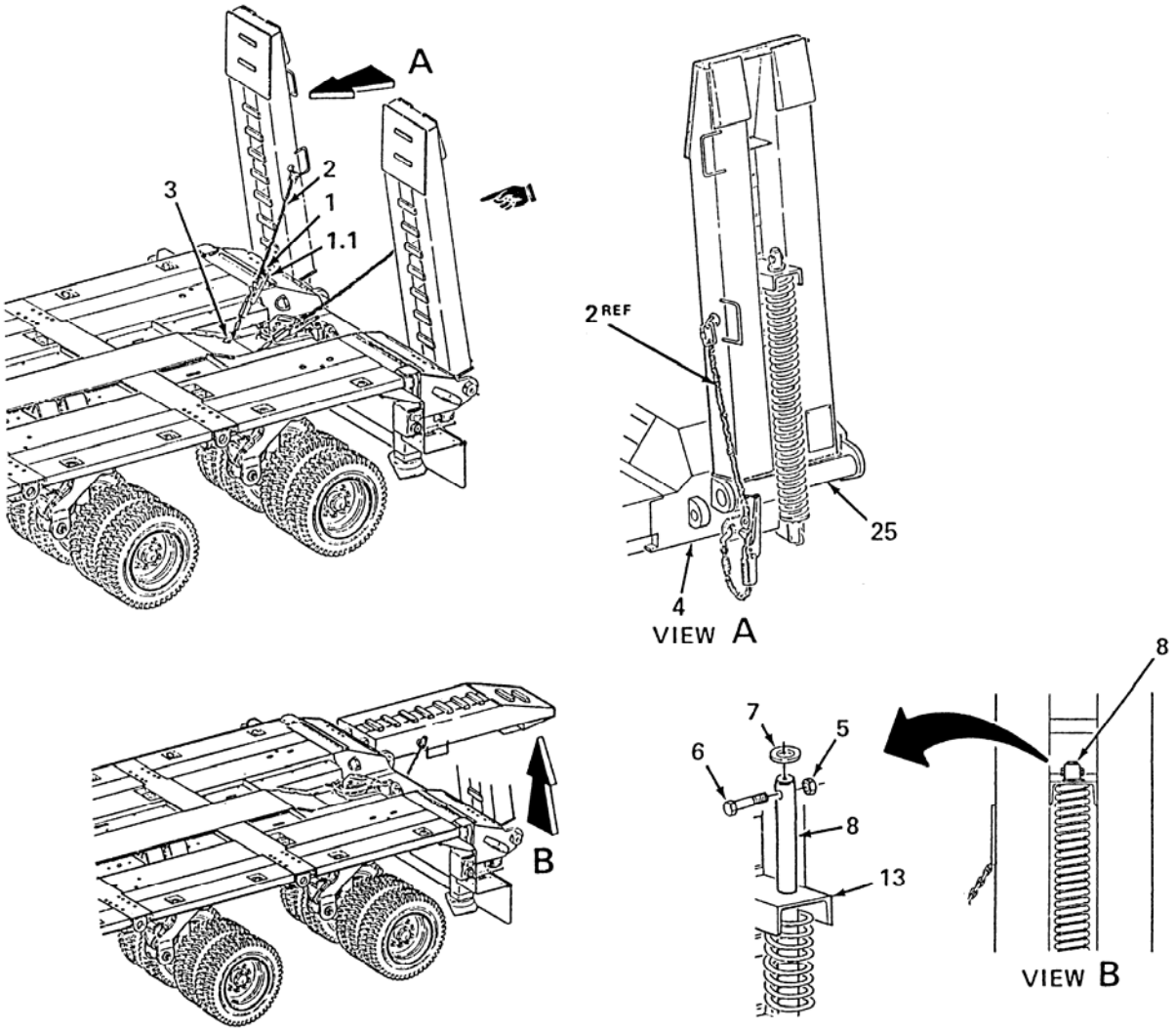
NOTE

Ramp is lowered toward horizontal position to permit installation of the capscrew and washer installed on top end of the spring guide rod.

13. Unhook chain assembly (2) from platform and reconnect hook to hole in ramp lift lever (4). Make sure guide rod is alined in ramp weldment bracket and lower ramp until spring supports weight of ramp.

14. Install washer (7) over end of guide rod (8) protruding through top of bracket (13). Install capscrew (6) through hole in guide rod (8) and secure capscrew (6) with locknut (5).

15. Return ramp to raised (stow) position (para. 2-20). If chain sags with load binder closed, open load binder, remove quick-link, and shorten chain until there is no sag.



16. Using two people, slide adjustment fitting (16) and spring (12) upward on guide rod (8) until top of spring is positioned even with bottom of tube guide (27) located on underside of weldment bracket (13).

WARNING

Ramps with almost full width traction bars are heavy. If ramp spring is not adjusted properly, they will fall to the ground quickly, possibly causing injury to personnel or damage to equipment.

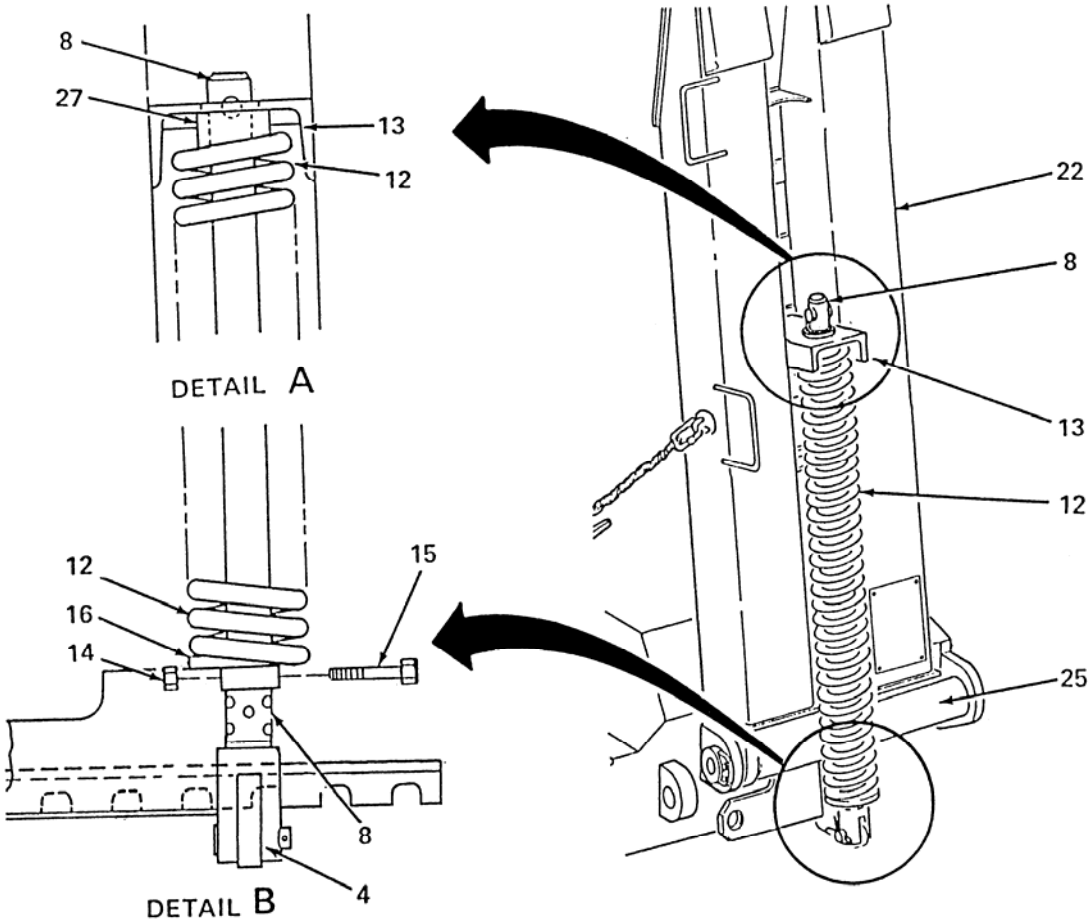
NOTE

Vertical pattern of seven holes through lower end of guide rod are staggered and spaced 0.5 inch (1.27 cm) apart.

17. If seven traction bars on ramp are just slightly longer than width of gap between two tubes, aline holes in adjustment fitting (16) with hole in rod (8), which places top of spring within 0.75 inch (1.9 cm) of underside of weldment bracket without touching. If seven traction bars on ramp reach almost full width of ramps, compress spring (12) and aline holes on adjustment fitting (16) with fourth of seven holes in rod (8). Install capscrew (15) and locknut (14).

18. Lubricate pivot shaft (25) and spring rod (8) (para. 3-3).

19. Check spring adjustment.



4-60. LOADING RAMP (CONT)

ADJUSTMENT

1. Adjust rear of platform to 36 inches (91.4 cm) high (para. 2-19).

2. Operate spring assisted ramps (para. 2-20) and check for proper tension of spring (12) adjustment as follows:

   a. When lowering ramps, the ramp ends, upon first contact with the ground, should remain on the ground or rise not more that 6 inches (15 cm) from bottom of ramp to ground. If ramp ends rise higher, spring tension may be too great. To reduce spring tension, proceed to step 3 below.

   b. When lowering ramps, the ramp ends, without downward push from operator, should not forcefully strike the ground and remain there. Raising of ramp should not require extreme effort by one operator. If above conditions are observed, ramp springs do not have sufficient tension. Refer to step 4 to increase spring tension.

   c. If ramp meets requirements of steps a and b, ramps are properly adjusted.

3. Reduce spring tension as follows:

   a. Raise ramps and attach chain assemblies to platform (para. 2-20).

   b. One person must hold spring (12) in place while second person removes locknut (14) and capscrew (15) from adjustment fitting (16).

   c. Lower fitting (16) on guide rod (8) and aline with next available hole in rod (8). Insert capscrew (15) and secure with locknut (14).

   d. Operate ramps and check for proper tension on spring. Repeat steps 3a and 3b as required.

4-60. LOADING RAMP (CONT)

4. Increase spring tension as follows:

   a. Raise ramps and attach chain assemblies (2) to platform (para. 2-20).

   b. One person must hold spring (12) in place while second person removes locknut (14) and capscrew (15) from adjustment fitting (16).

   c. Slide spring (12) and adjustment fitting (16) upward on rod (8) and aline adjustment fitting with next available hole in rod (8). Install capscrew (15) and secure capscrew with locknut (14).

   d. Operate ramps and check for proper tension on spring. Repeat steps 4a and 4b as required.

4-61. APU FRAME

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

Locknuts (2)
Locknuts (2)

Personnel Required: 2

Equipment Condition

APU removed (para. 4-96)
APU hydraulic lines and fittings removed (para. 4-86)
Hydraulic tank assembly removed (para. 4-94)

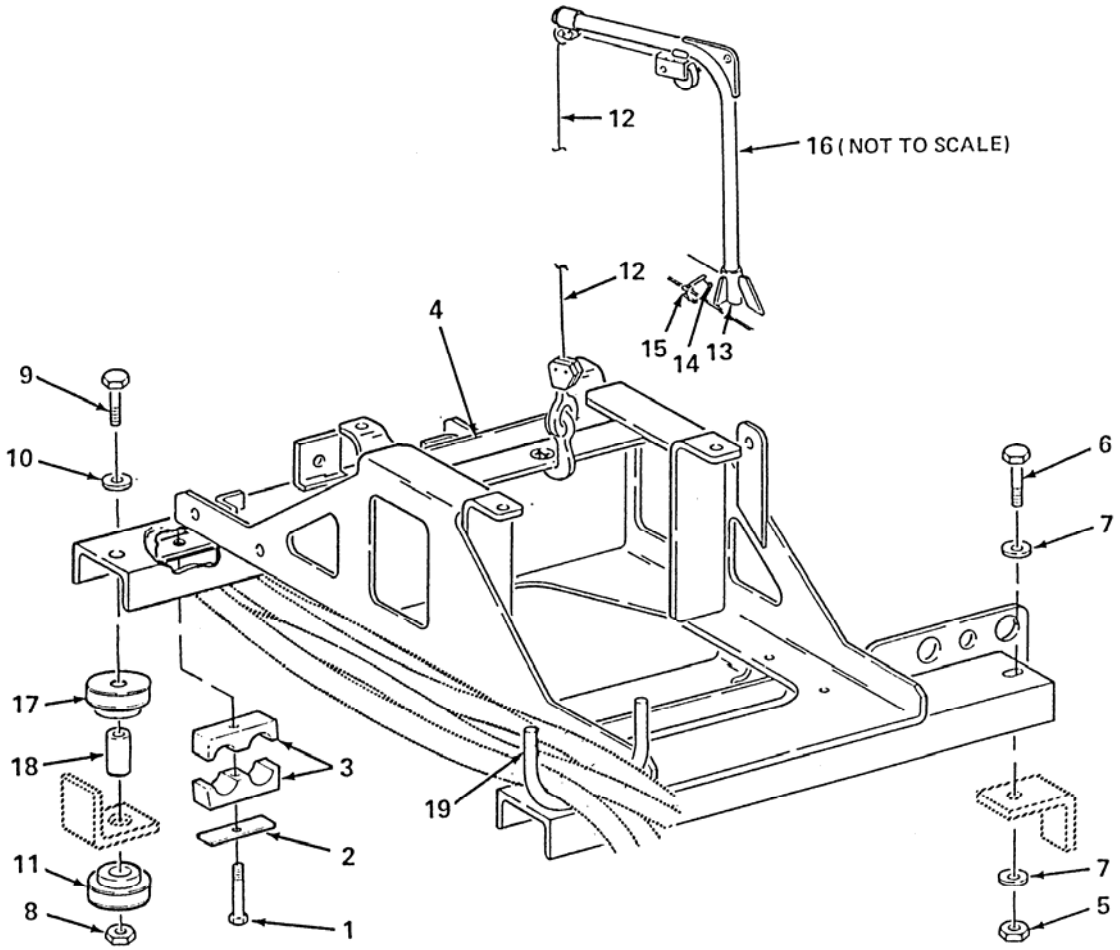
WARNING

When on top of gooseneck with gooseneck guardrail and steps removed, always hold onto other guardrail and davit with one hand or injury to personnel may result.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on or trip over it. Injury to personnel or damage to equipment may result.

REMOVAL

1. Remove two bolts (1), two retaining plates (2), and sections of two block clamps (3) from APU frame (4).
2. Remove two locknuts (5), capscrews (6), and four washers (7) securing APU frame (4) to weldment brackets on curbside of gooseneck.
3. Remove two locknuts (8), capscrews (9), washers (10), and lower portion of resilient mount (11) securing APU frame (4) to weldment brackets on streetside of gooseneck.
4. Unhook davit cable (12) hook from davit base (13) on gooseneck.



4-61. APU FRAME (CONT)

5. Unfasten linch pin (14) and remove hitch pin (15) from davit base (13). Swing davit arm (16) toward curbside and continue turning until davit winch cable (12) hook is above APU frame (4).

6. Operate davit winch to lower davit winch cable (12) hook to APU frame (4).

7. Attach davit winch cable (1) hook to hole at center of APU frame (4).

8. Operate davit winch to raise APU frame (4) approximately 6 inches (15 cm) and remove upper resilient mount (17) and sleeve bushing (18).

NOTE

The gooseneck steering hydraulic hoses must be removed from the U-shaped bracket on the APU frame and then repositioned under the APU frame. The APU frame will need to be lifted slightly so that hoses can be moved.

9. Carefully remove hydraulic hoses, one at a time, from U-shaped bracket (19) and reposition under APU frame.

10. Using one person to steady and guide APU frame (4) and a second person to operate winch on davit (16), raise APU frame (4) until it can clear gooseneck step support weldments.

11. Carefully swing davit arm (16) until APU frame (4) is suspended over curbside of gooseneck.

12. With one person stationed on the ground near gooseneck, second person must operate winch on davit (16) to lower APU frame (4) to the ground.

13. Unhook davit winch cable (12) from APU frame (4).

INSTALLATION

1. Place APU frame (4) on ground near curbside of gooseneck.

2. Attach davit winch cable (12) hook to hole at center of APU frame (4).

3. Using one person on the ground to steady and guide APU frame (4) and a second person to operate winch on davit (16), raise APU frame (4) up above gooseneck weldments.

4. With two people on gooseneck, one person must steady and guide APU frame (4) while second person swings davit arm (16) with APU frame toward rear of gooseneck until frame is positioned approximately above weldment mounting brackets in gooseneck.

5. Operate winch on davit (16) to lower APU frame (4) to approximately 6 inches (15 cm) above gooseneck weldment mounting brackets.

NOTE

The gooseneck steering hydraulic hoses must be repositioned under forward end of APU frame and placed in the U-shaped bracket on top of aft end of APU frame. The APU frame may need to be tilted slightly to permit repositioning of the hoses.

6. Carefully move hydraulic hoses, one at a time, from beneath aft end of APU frame (4) and place each hose in U-shaped retaining bracket (19) on top of APU frame (4).

7. From underside of gooseneck, position two upper portions of resilient mounts (14) on streetside mounting brackets on gooseneck.

8. One person must operate winch on davit (16) to lower APU frame (4) while second person steadies and guides APU frame into position on resilient mounts (17) and curbside mounting brackets.

9. Install two capscrews (9) and washers (10) through top of APU frame (4), upper resilient mount (17).

10. From underside of gooseneck, install two sleeve bushings (18) and lower resilient mounts (11) on sleeve bushings (18) protruding through mounting brackets. Install locknuts (8) on capscrews (9) but do not tighten.

11. Install two capscrews (6), four washers (7), and two locknuts (5) securing APU frame (4) to weldment brackets on curbside of gooseneck. Tighten locknuts (8) onto capscrews (9).

12. Remove davit winch cable (12) hook from APU frame (4), retract winch cable, and swing davit (16) back to stow position. Install hitch pin (15) in davit base (13) and secure with linch pin (14). Attach winch cable (12) hook to davit base (13).

13. Position hydraulic hoses under forward end of APU frame (4) near block clamp (3) mounting position. Install two block clamps (3) and retainer plates (2) onto hydraulic hoses and secure to APU frame (4) with two bolts (1).

FOLLOW-ON MAINTENANCE

Start and run APU (para. 2-16) and check that resilient mounts are properly seated.

4-62. PIVOT PIN SHEAVE

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Degreaser tank, 20 gl, item 17, appx. B
Gloves, chemical and oil protective, item 17, appx. B
Goggles, industrial, item 17, appx. B

Materials/Parts

Crocus cloth, item 6, appx. E
Grease, item 12, appx. E
Cleaning compound solvent, item 25, appx. E
Locknut

Personnel Required: 2

Equipment Condition

Gooseneck lowered to lowest position, if uncoupled (para. 2-18)

NOTE

A second person must be used to hold locknut on curbside of gooseneck while removing the streetside locknut, cover, and pulley to prevent the threaded rod from turning in the pivot pin assembly.

REMOVAL

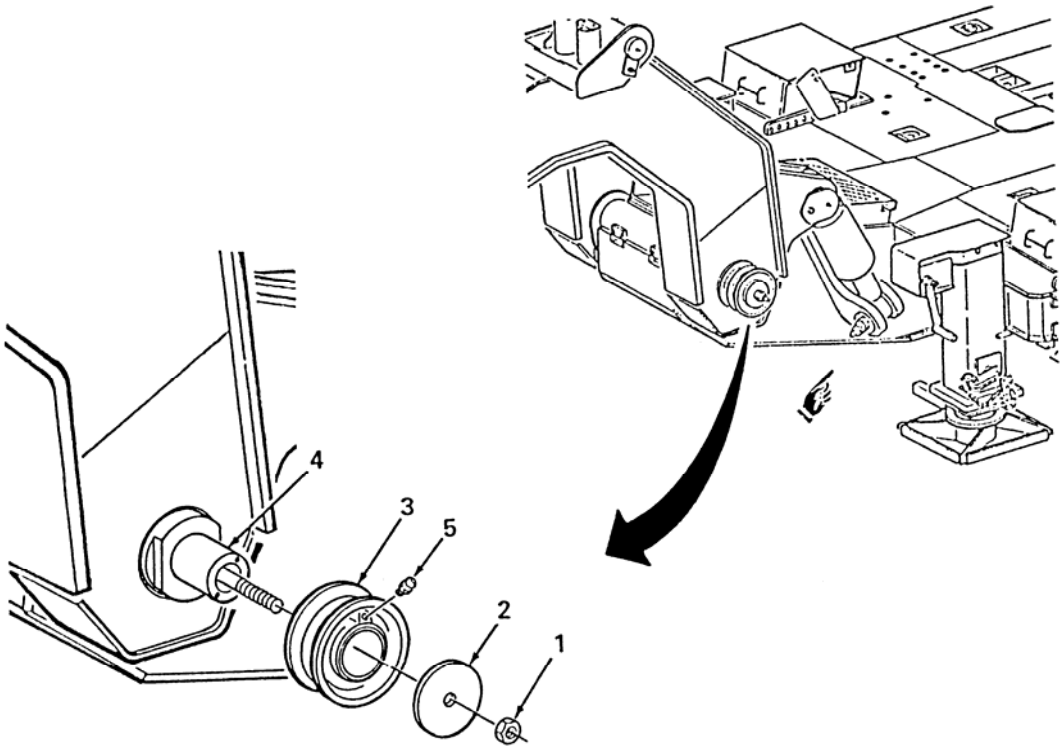
1. Remove locknut (1), cover (2), and pulley (3) from pivot pin assembly (4). Discard locknut.

2. Remove lubrication fitting (5) from pulley (3).

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.



1. Clean all parts removed in degreaser tank with cleaning compound solvent and wire brush as necessary.

2. Inspect pulley (3) for corrosion, evidence of cracks, excessive dents, gouges, warping, and peeling of painted surfaces. Remove any nicks, burrs, or corrosion from inner diameter of pulley (3) with crocus cloth. Check for loose, missing, or damaged attaching hardware. Replace defective or missing components as required.

3. Inspect machined surface of pivot pin shaft (4) for surface deterioration, burrs, scratches, or gouges that could interfere with mating inner diameter of pulley (3) and cause sticking or irregular operation. If pivot pin shaft (4) has any of the above, notify DS Maintenance.

INSTALLATION

1. Install lubrication fitting (5) into pulley (3) and apply grease to inner diameter of pulley (3) of pivot pin assembly (5).

2. Apply grease to surface of pivot pin shaft (4) and install pulley (3) on shaft.

3. Install cover (2) and locknut (1).

4. Wipe off excess grease with rag.

FOLLOW-ON MAINTENANCE

Lubricate pivot pin sheave (para. 3-3).

4-63. SPARE WHEEL CARRIER

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Gloves, chemical and oil protective, item 17, appx. B
Goggles, industrial, item 17, appx. B

Materials/Parts

Scrub brush, item 4, appx. E
Detergent, general purpose, item 8, appx. E
Wiping rag, item 19, appx.
Cleaning compound solvent, item 25, appx. E
Cotter pin (4)
Washer (8) and as required

Personnel Required: 2

Equipment Condition

Spare tires removed (para. 3-6)
Steering hydraulic cylinders removed (para. 4-55)

General Safety Instructions

WARNING

When on top of gooseneck, always hold guardrail with one hand to avoid falling and causing injury to personnel.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on or trip over it. Injury to personnel or damage to equipment may result.

REMOVAL

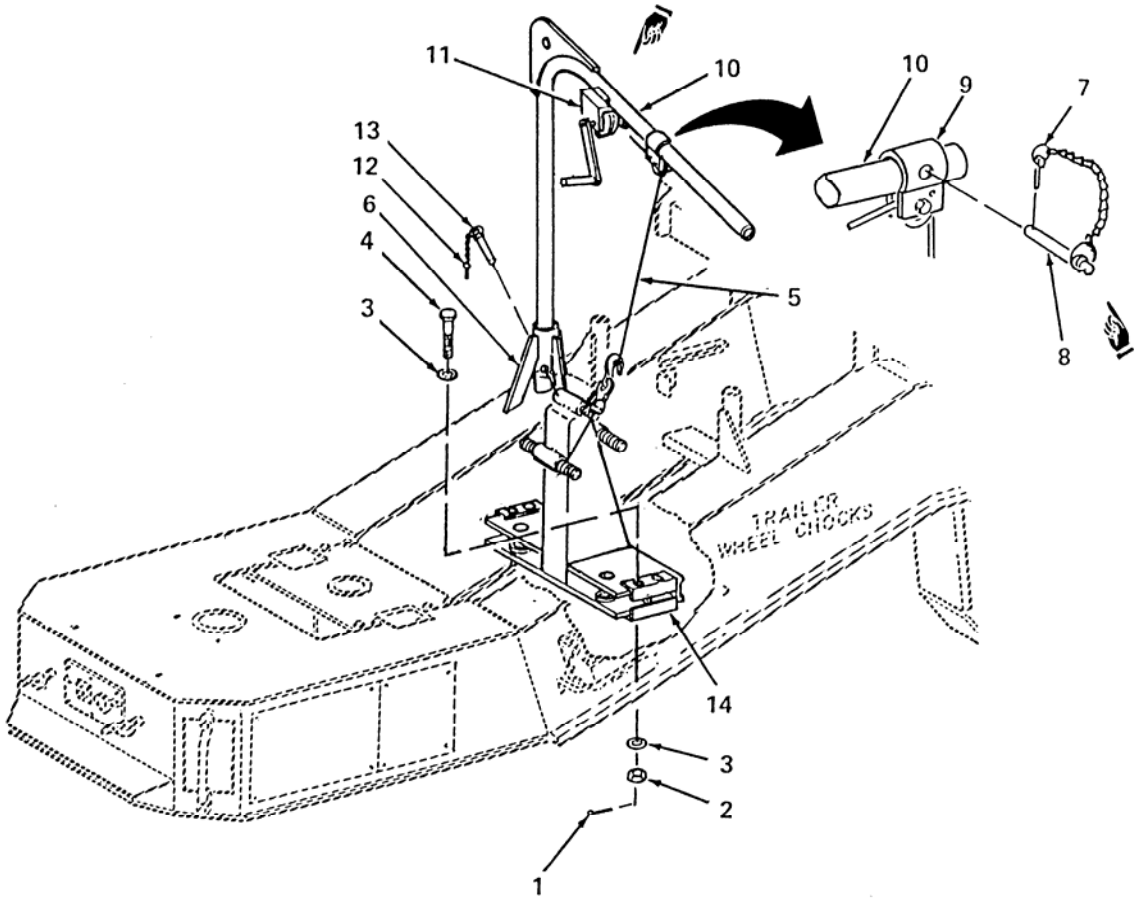
1. Remove four cotter pins (1), slotted nuts (2), eight washers (3), and four capscrews (4). Discard cotter pins.

2. Unhook davit winch cable (5) from stow point on davit base (6).

3. Release linch pin (7) and remove hitch pin (8) from pulley clamp (9) and reposition pulley clamp on davit arm (10) near davit winch (11). Insert hitch pin (8) and secure with linch pin (7).

4. Release linch pin (12) and remove hitch pin (13) at davit base (6) and swing davit arm (10) and winch (11) over spare wheel carrier (14).

5. Attach winch cable (5) to spare wheel carrier (14) by wrapping cable under wheel supports and attaching hook over cable to form a loop.



6. Operate davit winch (11) to lift spare wheel carrier (14) out of gooseneck. Swing davit arm and spare wheel carrier out over curbside of gooseneck and operate winch to lower spare wheel carrier to the ground. Once on the ground, remove winch cable from spare wheel carrier.

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Clean spare wheel carrier using general purpose detergent and scrub brush. Use cleaning solvent, wire brush, and crocus cloth for degreasing and removal of corrosion.

2. Inspect spare wheel carrier and carrier mounts on gooseneck for broken welds, warped or bent metal, and defective studs. Inspect for defective or missing mounting hardware. Replace parts as required.

4-63. SPARE WHEEL CARRIER (CONT)

INSTALLATION

1. Attach winch cable (5) to spare wheel carrier (14) by wrapping cable under wheel supports and attaching hook over cable to form loop.

2. Operate davit winch (11) to lift spare wheel carrier (14) to clear gooseneck.

3. Swing davit arm (10) and winch cable with spare wheel carrier (14) into position on gooseneck.

4. Install four bolts (4), eight washers (3), and four slotted nuts (2). Torque slotted nuts (2) to 420 lb-ft (570 Nm). Then, tighten further to aline next available slot with cotter pin hole. If necessary, install additional washers (3) under slotted nuts (2) to properly aline slotted nuts and cotter pin holes for full engagement of cotter pins (1) when slotted nuts are properly torqued. Install four cotter pins (1) to secure nuts.

5. Remove winch cable (5) from spare wheel carrier (14).

6. Return pulley clamp (9) back to stow position at end of davit arm (10), install hitch pin (8), and secure with linch pin (7).

7. Return davit arm (10) to stow position, install hitch pin (13) through davit base (6), and secure with linch pin (12).

8. Attach winch cable (5) hook on davit base (6) and take up slack in cable.

FOLLOW-ON MAINTENANCE

1. Install steering hydraulic cylinders (para. 4-55).

2. Install spare tires (para. 3-6).

4-64. FRONT SUPPORT LEGS

This task covers: a. Disassembly b. Inspection c. Assembly

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Degreaser tank, 20 gl, item 17, appx. B
Gloves, chemical and oil protective, item 17, appx. B
Goggles, industrial, item 17, appx. B
Socket set, 3/4" dr, item 18, appx. B
Socket set, 3/4" dr impact, item 18, appx. B

Materials/Parts

Crocus cloth, item 6, appx. E
Wiping rag, item 19, appx. E
Cleaning compound solvent, item 25, appx. E
Cotter pin
Lockwasher (4)
Cotter pin
Cotter pin
Locknut (4)

Personnel Required: 2

Equipment Condition

Platform adjusted to 51 inch (130 cm) height (para. 2-19)
If semitrailer is uncoupled, couple, or support gooseneck (para. 2-24)

NOTE

The following procedure is to be used for either curbside or streetside front support legs. Repeat this procedure as required to complete the necessary repairs.

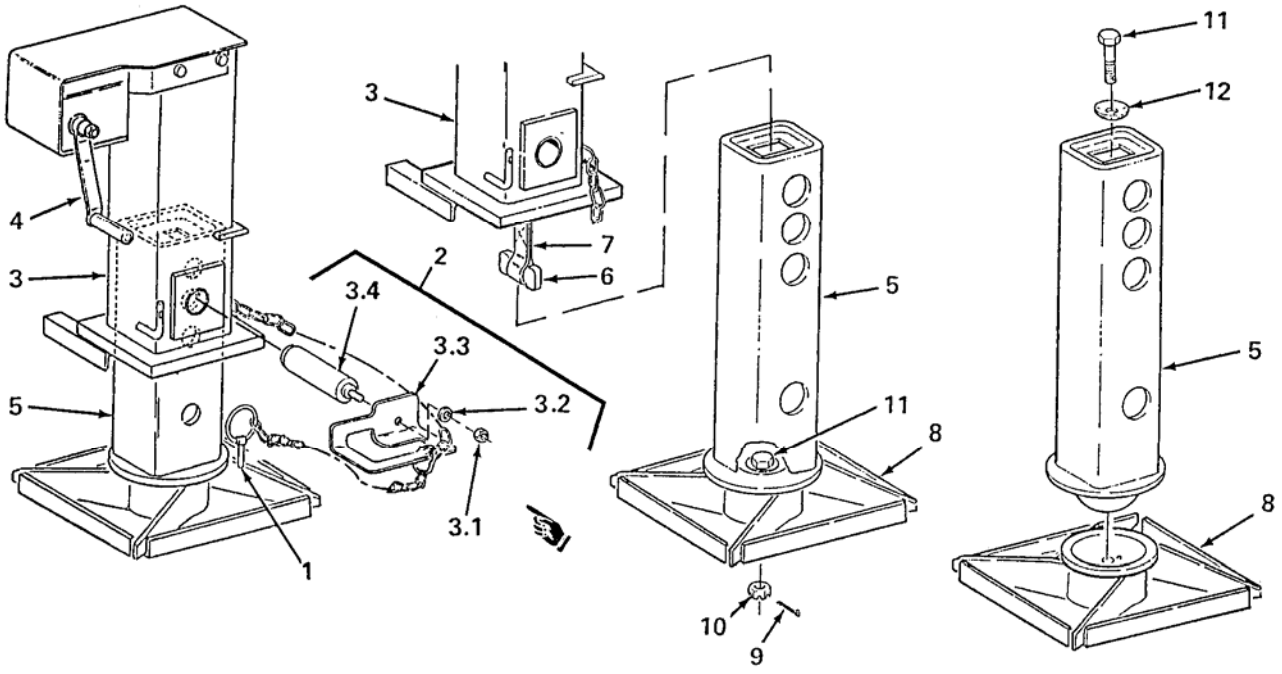
DISASSEMBLY

NOTE

When removing latch pin out of support tube, it may be necessary to rotate handcrank slightly in either direction to relieve pressure so that pin may be extracted.

1. Unfasten linch pin (1), rotate latch pin (2), and pull latch pin out of support tube (3).

1.1. If required, remove nut (3.1), washer (3.2), and handle (3.3) from pin (3.4).



4-64. FRONT SUPPORT LEGS (CONT)

2. Turn handcrank (4) counterclockwise and lower the inner tube assembly (5) until it comes all the way out of support tube (3).

WARNING

The inner tube and foot weldment are heavy. Use two people to support and move the assembly or injury to personnel may result.

3. Using two people, move inner tube assembly (5) away from platform far enough to permit removal of anchor (6) and strap (7) from top of inner tube assembly (5). Remove anchor (6) and strap (7) by rotating anchor slightly until it can be extracted through rectangular opening at top of inner leg.

4. Using two people, lay inner tube assembly (5) on a suitable work bench with foot weldment (8) hanging over end or side of bench.

5. Remove cotter pin (9) from nut (10) on bottom side of foot weldment (8).

6. Using extensions, 1-1/8-inch socket, and socket wrench, insert extensions with socket through top of inner tube assembly and seat socket on head of bolt (11).

7. One person must use socket wrench attached to extension and socket to hold bolt (11), and second person, using a 1-1/8-inch impact socket and socket wrench, must remove slotted nut (10) and foot weldment (8) from inner tube(5).

8. Remove loose bolt (11) and shim (12) from inner tube (5).

WARNING

The cover assembly containing the drum winch is unevenly balanced. Use one person to support cover assembly while second person removes attaching hardware or injury to personnel may result.

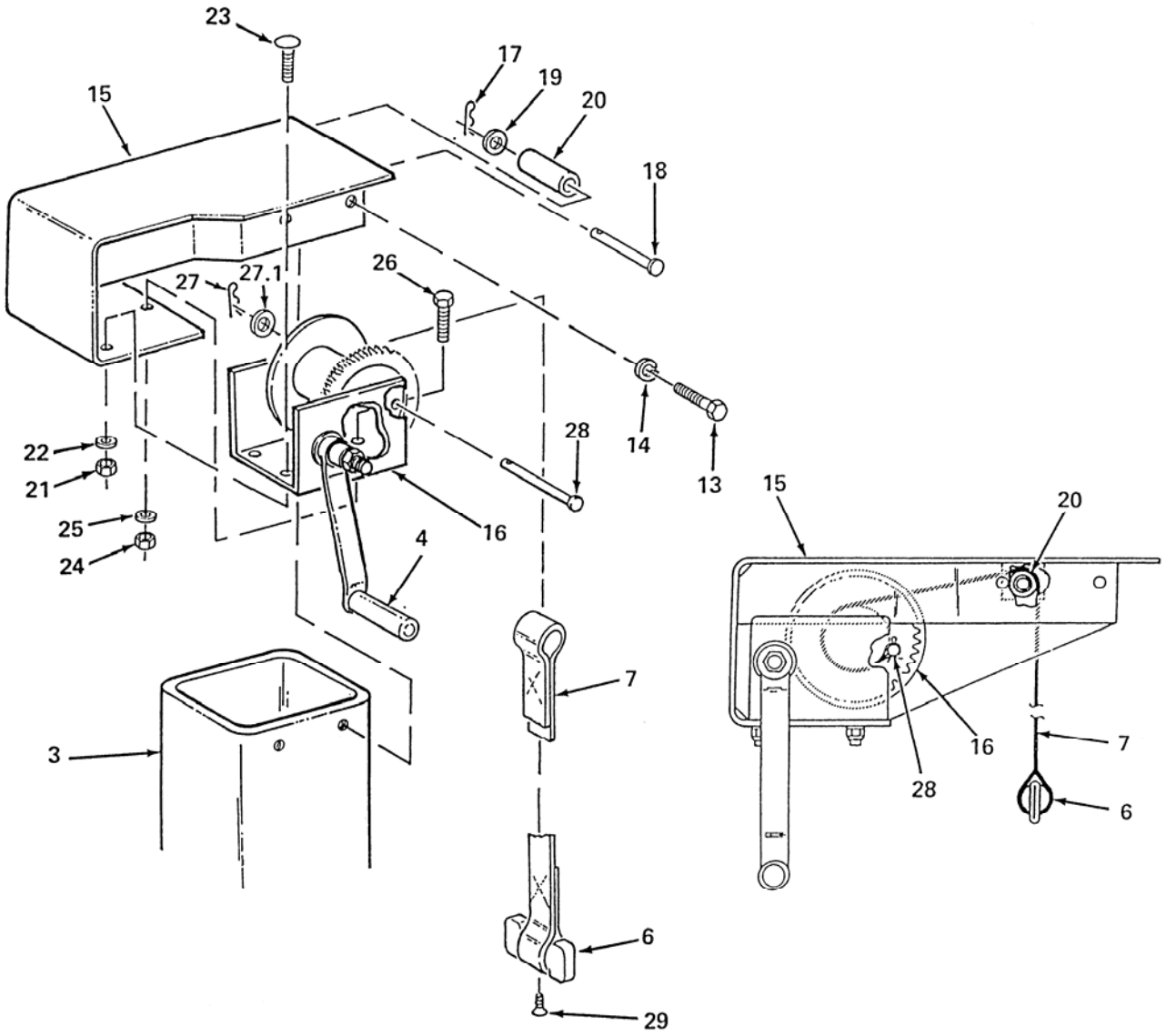
9. Remove four screws (13), lockwashers (14), and cover assembly (15) containing drum winch (16). Discard lockwashers.

10. Remove cotter pin (17), pin (18), washer (19), and roller (20). Discard cotter pin.

11. Remove two locknuts (21), washers (22), and carriage bolts (23). Remove locknut (24), washer (25), capscrew (26), and drum winch (16) from cover assembly (15). Discard locknuts.

12. Remove cotter pin (27), washer (27.1), and pin (28). Discard cotter pin.

13. Pull strap (7) from drum winch (16). If strap (7) or anchor (6) require replacement, remove screw (29) which secures strap to anchor.



INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Clean inner tube (5), foot weldment (8), and cover (15). Use cleaning solvent, wire brush, and crocus cloth for degreasing and removal of corrosion.

4-64. FRONT SUPPORT LEGS (CONT)

2. Clean all parts removed from cover assembly (15) in degreaser tank with cleaning compound solvent and wire brush as necessary. Remove corrosion using wire brush and crocus cloth.

3. Check drum winch assembly as follows:

   a. Visually check that ratchet mechanism spring is not deformed or broken.

   b. Check that ratchet mechanism lever is not worn, bent, or broken. Ensure ratchet mechanism locks into gear when winch drum is not turning. Ensure excess paint and other foreign materials have been cleaned from ratchet gear.

   c. Check that winch drum rotates without binding or slipping when handcrank is turned. Replace drum winch (16) if improper operation is observed or any parts are defective.

4. Check lifting strap (7) for evidence of wear, fraying, cuts, separation, and other forms of deterioration. Replace strap or anchor if defective.

5. Check inner tube assembly (5) as follows:

   a. Check tube weldment for cracks, broken welds, or warping. Inspect ball joint surface at bottom of tube for gouges or burrs which could restrict movement of foot weldment (8).

   b. Inspect foot weldment for cracks, broken welds, gouges, and burrs.

6. Inspect upper support (3) weldment for cracks, broken welds, or warping. Inspect latch pin (2), linch pin (1), and split ring (30). Replace any defective parts.

ASSEMBLY

1. If anchor (6) was removed from strap (7), install anchor (6) into open end of strap (7) and secure with screw (29). Install strap (7) on winch (16) and insert pin (28) through side of winch (16) and loop on end of strap (7). Secure pin (28) with washer (27.1) and cotter pin (27).

2. Install drum winch (16) on cover assembly (15) and secure with capscrew (26), washer (25), locknut (24), two carriage bolts (23), washers (22), and locknuts (21).

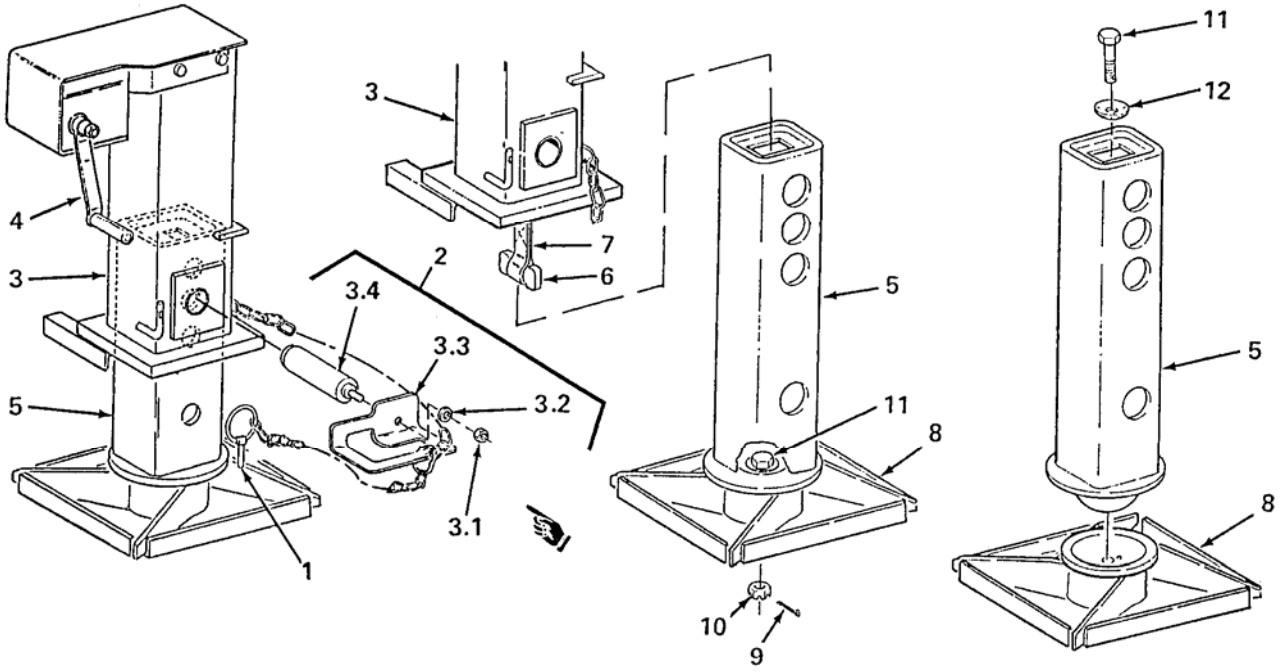
3. Pass strap (7) over roller (20) and install roller (20) with pin (18), washer (19), and cotter pin (17) on cover assembly (15).

WARNING

The cover assembly containing the drum winch is unevenly balanced. Use one person to support cover assembly while second person installs attaching hardware or injury to personnel may result.

4. Install cover assembly (15) onto support tube (3) passing foot end of strap (7) with anchor (6) down through support tube. One person must support cover assembly and second person must install four capscrews (13) and lockwashers (14) to secure cover assembly.

5. Assemble shim (12) on bolt (11) with convex side of shim downward and, working through stow hole located near bottom of inner tube (5), insert threaded end of bolt through hole at bottom of inner tube ball joint.



6. Using extensions, 1-1/8-inch socket, and socket wrench, insert extensions with socket through top of inner tube assembly and seat socket on head of bolt (11).

7. One person must use socket wrench, extensions, and socket to hold bolt (11) and second person must position foot weldment (8) on ball joint of inner tube (5) so that threaded end of bolt (11) protrudes through mating surface of foot weldment. Second person, using a 1-1/8-inch impact socket and socket wrench, must install slotted nut (10) and cotter pin (9).

4-64. FRONT SUPPORT LEGS (CONT)

WARNING

The inner tube and foot weldment are heavy. Use two people to support and move the assembly or injury to personnel may result.

8. Place inner tube assembly (5) under support tube (3). Insert anchor (6) and strap (7) through slot in inner tube assembly (5). Raise inner tube assembly (5) and aline with support tube (3). Turn handcrank (4) clockwise to raise inner tube assembly (5).

8.1. If required, assemble handle (3.3), washer (3.2), and nut (3.1) to pin (3.4).

9. When holes are alined, install latch pin (2) and turn to lock in place. Install linch pin (1) to secure latch pin.

4-65. REAR SUPPORT LEGS

This task covers: a. Disassembly c. Repair
b. Inspection d. Assembly

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Screw threading set, tap and die, item 18, appx. B
Jack, hydraulic floor, item 18, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:
Hammer, 3 lb
Degreaser tank, 20 gl
Goggles, industrial
Wrench set, socket, 3/4" dr
Gloves, chemical and oil protective

Materials/Parts

Scrub brush, item 4, appx. E
Crocus cloth, item 6, appx. E
Detergent, general purpose, item 8, appx. E
Grease, item 12, appx. E
Wiping rag, item 19, appx. E
Cleaning compound solvent, item 25, appx. E
Packing
Packing
Locknut
Quick-link

Personnel Required: 2

Equipment Condition

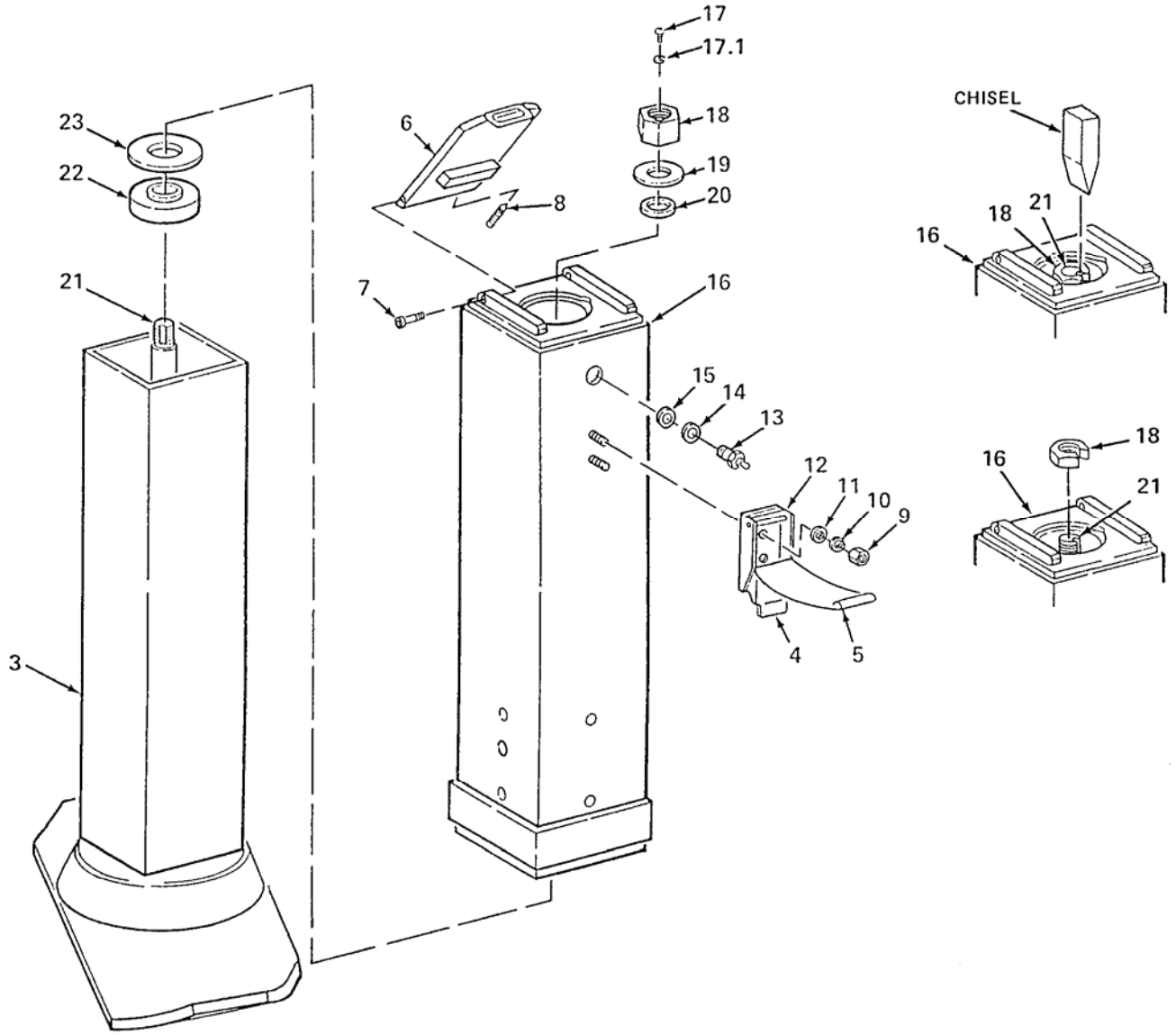
Platform lowered to lowest position (para. 2-19)
APU running (para. 2-16)
Rear support legs retracted (para. 2-23)

NOTE

The following procedure is to be used for either streetside or curbside rear support leg. Repeat this procedure as required to complete the necessary repairs.

DISASSEMBLY

1. Pull out latch handle (4) and pull latch (5) out of loop on cover (6).



4-65. REAR SUPPORT LEGS (CONT)

2. Remove two capscrews (7) and cover (6). Remove setscrew (8) from cover.

3. Remove two nuts (9), lockwashers (10), washers (11), and latch (12).

4. Remove lubrication fitting (13), washer (14), and packing (15) from support leg weldment (16). Discard packing.

WARNING

The retractable inner support leg is heavy. Keep feet and hands from under the support leg foot when raising, lowering, or operating the support leg. Use two people when supporting or lifting the leg or injury to personnel may result.

NOTE

Place a hydraulic floor jack under the inner support leg foot to prevent dropping of inner support leg to the ground when actuating nut is removed.

5. Place a hydraulic floor jack under foot of inner support leg (3) and raise jack to within approximately 2 inches (3.1 cm) from bottom of foot.

6. One person must hold inner support leg (3) and second person must remove socket head screw (17), lockwasher (17.1), and actuating nut (18) from inner support leg screw shaft (21). If socket head screw (17) is sheared or otherwise damaged and cannot be removed from nut and shaft, proceed as follows:

   a. Using a cold chisel and 3-pound hammer, proceed to split nut (18) at setscrew screw hole.

   b. When nut (18) has been split through, leave chisel in split and use a second chisel to spread nut until screw shaft (21) of inner support leg drops from nut (18).

7. Remove actuating nut (18), washer (19), and packing (20) from inner support leg (3). Discard packing.

8. Raise platform to highest position (para. 2-19).

9. One person must hold and steady inner support leg (3) and second person must lower front of platform opposite affected rear support leg until inner support leg (3) is clear of upper support leg weldment (16). Two people must move inner support leg (3) away from platform.

10. Shut down APU (para. 2-16).

11. Remove sleeve bearing (22) and washer (23) from inner support leg screw shaft (21).

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Clean inner support leg weldment (3) and upper support weldment (16) using general purpose detergent and scrub brush. Use cleaning solvent, wire brush, and crocus cloth for degreasing and removal of corrosion.

2. Inspect inner support leg (3) for cracks, broken welds, warping, peeling of paint, and corrosion.

3. Inspect upper support weldment (16) for cracks, broken welds, or warping. Replace any defective parts.

REPAIR

1. Repair of rear support leg is limited to replacement of defective cover (6), latch (12), and lubrication fitting (13).

2. Additional repair, required only if actuating nut (18) is destroyed during disassembly, consists of restoration of threaded top end of screw shaft (21) prior to installation of a new nut and socket head screw (17). To repair screw shaft (21), proceed as follows:

   a. Using a 1.0 - 14 UNF thread cutting die, restore threads damaged during removal of actuating nut. Clean off metal particles with wire brush and wiping rag.

   b. Install a new nut (18) on threaded end of screw shaft (21) and thread on nut until top of nut is flush with top of shaft and setscrew slot in nut is alined with setscrew slot in shaft.

   c. Using a 0.3215 - 18 thread cutting tap, restore threads in shaft slot which were damaged during removal of nut (18) and setscrew. Remove nut and clean off metal particles with wire brush and wiping rag.

   d. Proceed to step 1 of assembly.

4-65. REAR SUPPORT LEGS (CONT)

ASSEMBLY

1. Apply generous amount of grease to inside top of inner support (3). Using hammer and drift, install sleeve bearing (22) and washer (23).

2. Start APU (para. 2-16).

3. With platform raised to highest position (para. 2-19) and front of platform opposite affected rear support leg lowered, two people must raise inner support leg (3)) into upper support weldment (16).

4. Lower platform to lowest position (para. 2-19).

5. Shut down APU (para. 2-19).

CAUTION

Do not use excessive force when installing socket head screw. Socket head screw may break, requiring replacement of actuating nut.

6. Install packing (20), washer (19), and actuating nut (18). Torque nut (18) to 40 - 50 lb-ft (55 - 68 Nm) with setscrew slot in nut alined with slot in threaded shaft (21). Install lockwasher (17.1) and socket head screw (17).

7. Install packing (15), washer (14), and lubrication fitting (13).

8. Position latch (12) on studs of upper support weldment (16) and secure with two washers (11), lockwashers (10), and nuts (9).

9. Install setscrew (8) in cover (6) and install cover with two capscrews (7). Adjust setscrew (8) so that cover (7) cannot be opened past 90 degrees vertically. Check that cover, when released at full open vertical position, returns to closed position.

10. Retract inner support leg (para. 2-23). Position adjusting nut so that socket head screw is outboard; then, close cover.

FOLLOW-ON MAINTENANCE

1. Lubricate lubrication fitting and actuating nut (para. 3-3).

2. Operate rear support leg and check for proper operation (para. 2-23).

4-66. SPLASH GUARDS

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

Lockwasher (12)

Equipment Condition

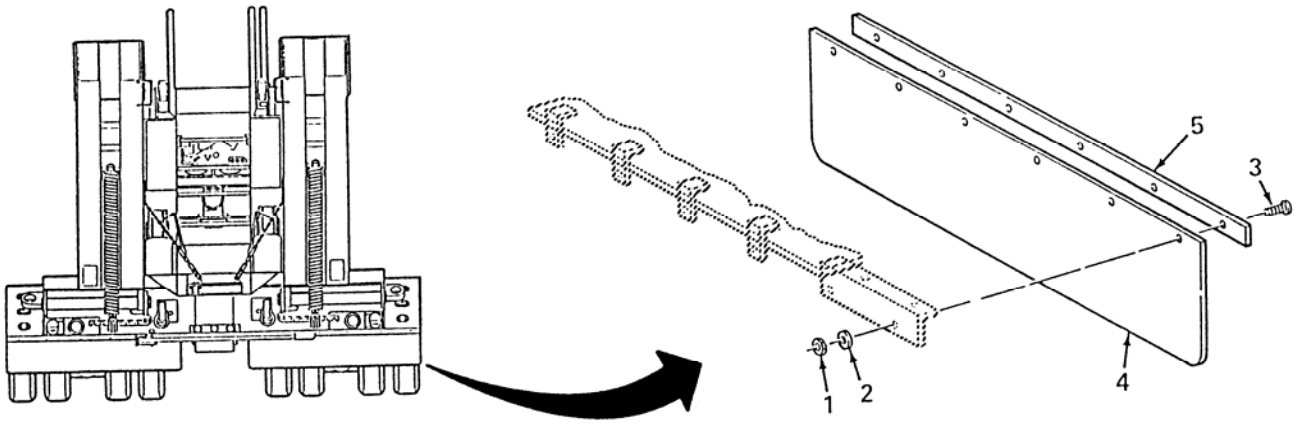
Platform adjusted to 50 inch (127 cm) height (para. 2-19)
Bogies isolated at all four corners (para. 2-6)

NOTE

The following procedure is to be used for either curbside or streetside splash guards. Repeat this procedure as required to complete the necessary repairs.

REMOVAL

Remove six nuts (1), lockwashers (2), screws (3), and curbside splash guard (4) with mending plate (5). Discard lockwashers.



INSTALLATION

Aline mending plate (5) and curbside splash guard (4) with weldment brackets on platform and secure with six screws (3), lockwashers (2), and nuts (1).

4-67. COVERS

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

Lockwasher (6)
Lockwasher (3)
Locknut (2)
Locknut (2)
Locknut
Screw, self-locking (2)

Equipment Condition

Platform adjusted to 50 inch (127 cm) height (para. 2-19)
Bogies isolated at all four corners (para. 2-6)
Parking brakes applied and semitrailer wheels chocked (para. 2-24)
Gooseneck isolation valve handle removed (para. 4-84)

REMOVAL

1. Remove cotter pin (1) from hasp (2). Rotate hasp (2) and lower the door panel (3). Remove cotter pin (1) from door panel (3).

2. Remove two self-locking screws (4) and door panel (3) from lower panel (5). Discard self-locking screws.

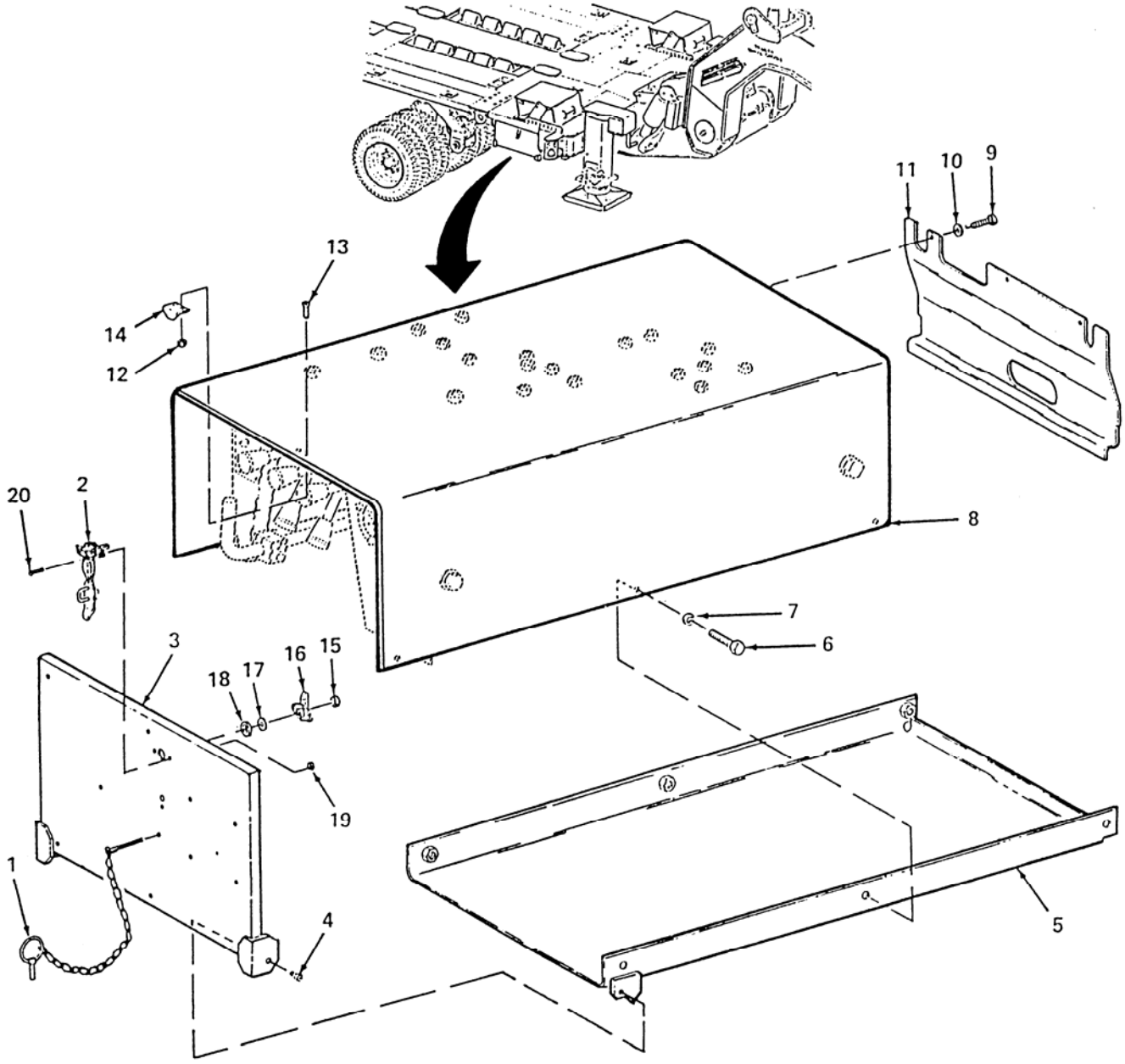
3. Using two people, remove six bolts (6), lockwashers (7), and lower panel (5) from hydraulic control module frame (8). Move lower panel (5) out from under semitrailer. Discard lockwashers.

4. Remove three screws (9), lockwashers (10), and rear panel (11) from hydraulic control module frame (8). Discard lockwashers.

5. Remove two locknuts (12), screws (13), and angle bracket (14) from hydraulic control module frame (8). Discard locknuts.

6. Remove locknut (15) from hasp (2). Remove hasp locking mechanism (16), spring tension washer (17), and flat washer (18) from hasp (2). Discard locknut.

7. Remove two locknuts (19), screws (20), and hasp (2) from door panel (3). Discard locknuts.



INSTALLATION

1. Install hasp (2) onto door panel (3) and secure with two screws (20) and locknuts (19).

2. Install flat washers (18), spring tension washer (17), and hasp locking mechanism (16) onto hasp (2) on door panel (3). Secure in place by installing locknut (15).

3. Install two screws (13) through top of hydraulic control module frame (8). Install angle bracket (14) onto two screws (13) and secure with two locknuts (12).

4-67. COVERS (CONT)

4. Aline and install rear panel (11) onto hydraulic control module frame (8) and secure with three lockwashers (10) and screws (9).

5. Using two people, aline and install lower panel (5) onto hydraulic control module frame (8) and secure with six lockwashers (7) and bolts (6).

6. Aline and install door panel (3) with lower panel (5) and secure with two self-locking screws (4).

7. Install cotter pin (1) onto door panel (3). Close door panel (3) and rotate hasp (2) to secure in place. Install cotter pin (1) onto hasp (2).

4-68. DEFLECTORS

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

Locknut (8)
Lockwasher (8)

Equipment Condition

Tractor/semitrailer uncoupled (para. 2-24)

NOTE

The following procedure is to be used for either curbside or streetside deflectors. Repeat this procedure as required to complete the necessary repairs.

REMOVAL

1. Tag and disconnect electrical leads from clearance lights on deflector and access cover.

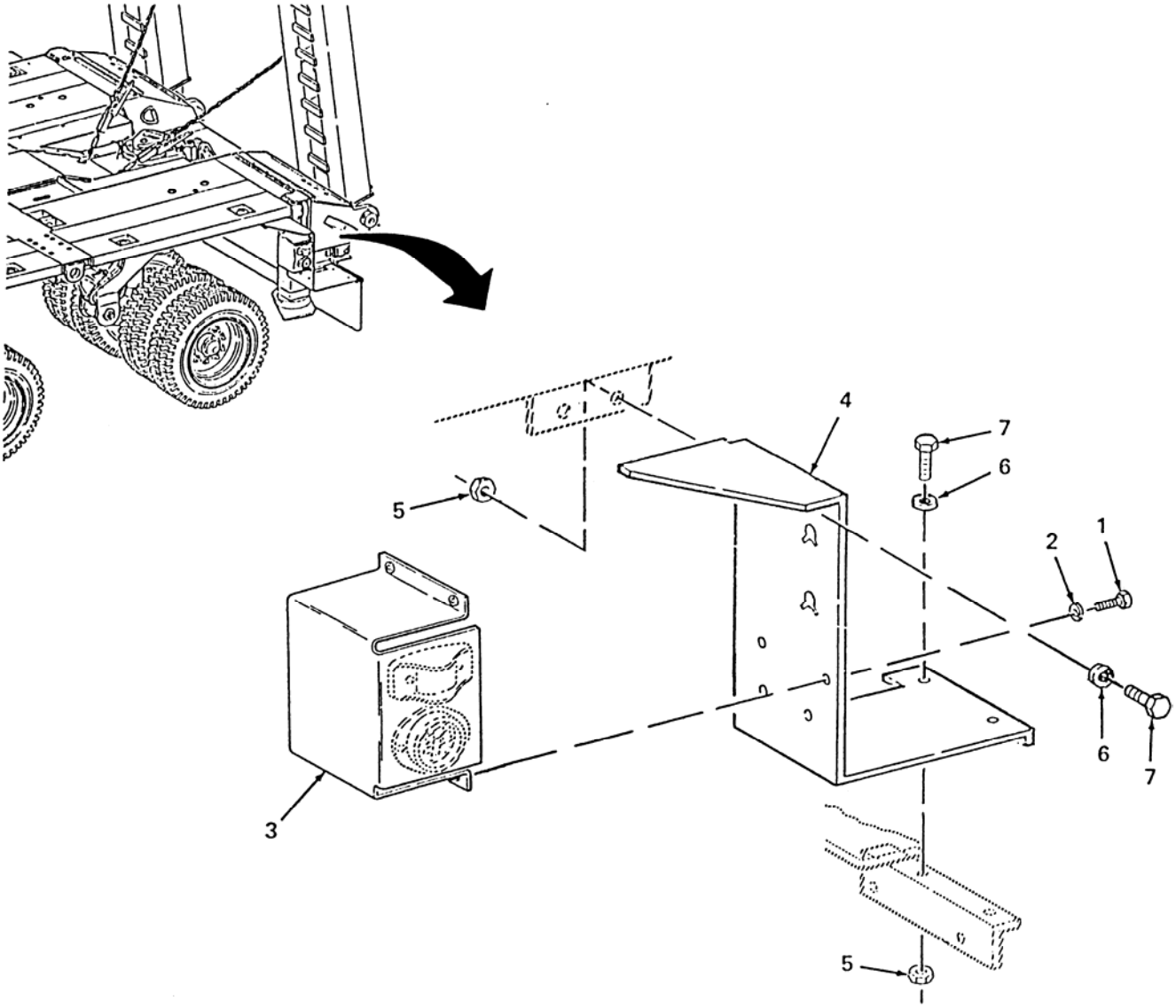
2. Remove four capscrews (1) and lockwashers (2) which secure access cover (3) to deflector (4). Discard lockwashers.

3. Separate access cover (3) from deflector (4) and remove clearance lights from access cover and deflector (para. 4-27).

4. Remove cable clamps (connector clips on semitrailer with LED lights) and W2 wiring harness leads and remove grommets from deflector (4) (para. 4-31 and 4-36).

5. Remove reflectors from access cover and deflector (para. 4-74).

6. Remove four locknuts (5), washers (6), capscrews (7), and deflector (4) from platform weldment brackets. Discard locknuts.



INSTALLATION

1. Install reflectors on access cover and deflector (para. 4-74).

2. Install wiring harness grommets, W2 wiring harness leads, and harness clamps (connector clips on semitrailer with LED lights) (para. 4-31).

3. Install clearance lights (para. 4-27).

4-68. DEFLECTORS (CONT)

4. Position deflector (4) on platform weldment brackets and secure with four capscrews (7), washers (6), and locknuts (5).

5. Position access cover (3) on deflector (4) and install four lockwashers (2) and capscrews (1).

6. Reconnect electrical leads to clearance lights mounted on access cover and deflector.

4-68.1. FRONT CLEARANCE LIGHT BRACKET (SOME SEMITRAILERS)

This task covers: a. Removal d. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

Locknut (4)
Lockwasher

Equipment Condition

Tractor/semitrailer uncoupled (para. 2-24)

NOTE

The following procedure is to be used for either curbside or street-side front clearance light brackets (some semitrailers). Repeat this procedure as required to complete the necessary repairs.

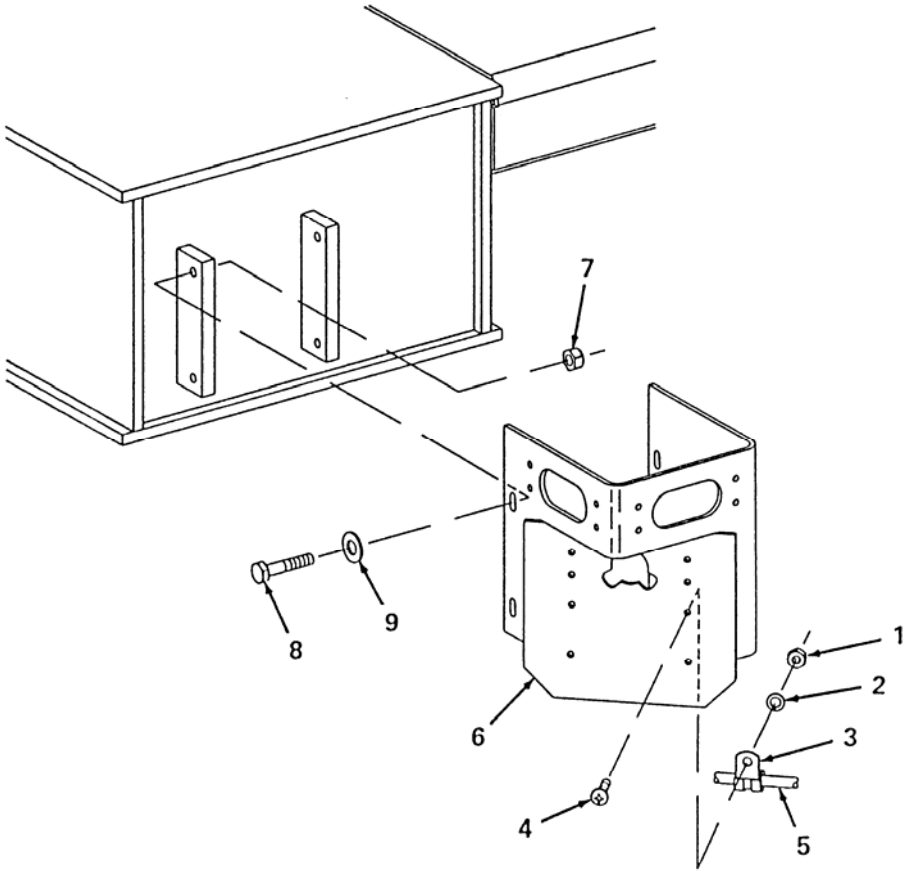
REMOVAL

1. Remove clearance/blackout lights from bracket (para. 4-27).

2. Remove nut (1), lockwasher (2), cable clamp (3), screw (4), and wiring harness (5) from bracket (6). Discard lockwasher.

3. Remove four locknuts (7), capscrews (8), washers (9), and bracket (6) from platform weldment brackets. Discard locknuts.

4. Remove reflector from bracket (para. 4-74).



INSTALLATION

1. Install reflector to bracket (6) (para. 4-74).

2. Position bracket (6) to platform weldment brackets and aline bolt holes. Secure with four capscrews (8), washers (9), and locknuts (7).

3. Install wiring harness (5), screw (4), cable clamp (3), lockwasher (2), and nut (1) to bracket (6).

4. Install clearance/blackout lights to bracket (6) (para. 4-27).

FOLLOW-ON MAINTENANCE

Reconnect intervehicular electrical cable and check clearance/blackout lights for proper operation (para. 4-27).

4-69. STOWAGE COMPARTMENT

This task covers: a. Removal c. Assembly
b. Disassembly d. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Jack, hydraulic floor, 10 ton, item 18, appx. B

Materials/Parts

Lockwasher (4)
Self-locking nut

Personnel Required: 2

Equipment Condition

BII removed from stowage box and inventoried (table 2-1)

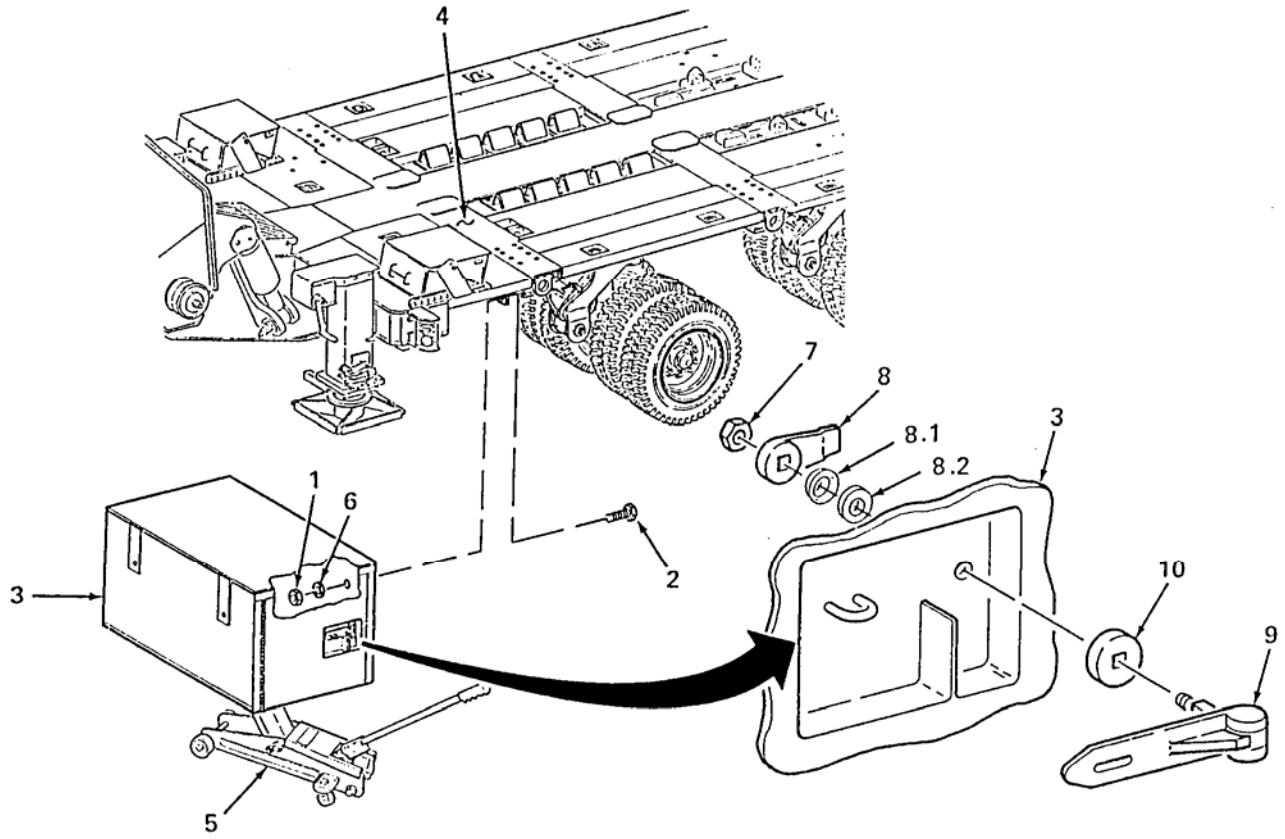
REMOVAL

1. Loosen four nuts (1) and screws (2) securing platform stowage compartment (3) to platform (4).

2. Position hydraulic floor jack (5) under stowage compartment (3) and raise jack until jack makes firm contact with bottom of stowage compartment.

3. Remove four nuts (1), lockwashers (6), and screws (2) securing stowage compartment to platform (4). Discard lockwashers.

4. Using two people, steady stowage compartment (3) on pedestal of hydraulic floor jack (5), lower jack as necessary, and pull jack with stowage compartment from under platform (4).



DISASSEMBLY

Remove self-locking nut (7), lock tab (8), spring washer (8.1), flat washer (8.2), handle (9), and retainer washer (10) from door of stowage compartment (3). Discard self-locking nut.

ASSEMBLY

Discard nut supplied with replacement handle assembly. Install retainer washer (10) onto handle (9). Install handle into door of stowage compartment (3) and secure flat washer (8.2), spring washer (8.1), lock tab (8), and self-locking nut (7).

INSTALLATION

1. Using two people, place stowage compartment (3) on pedestal of hydraulic floor jack (5) and position under platform (4). Raise stowage compartment with jack and position until compartment mounting holes are alined with mounting holes in platform (4).

4-69. STOWAGE COMPARTMENT (CONT)

2. Install four screws (2), lockwashers (6), and nuts (1) to secure stowage compartment (3) to platform (4). Lower floor jack (5) and remove from under platform (6).

FOLLOW-ON MAINTENANCE

Install BII (appx. C).

4-70. DAVIT ASSEMBLY

This task covers: a. Removal b. Disassembly c. Inspection d. Assembly e. Installation

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INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Degreaser tank, 20 gl, item 17, appx. B
Gloves, chemical and oil protective, item 17, appx. B
Goggles, industrial, item 17, appx. B

Materials/Parts

Crocus cloth, item 6, appx. E
Grease, item 12, appx. E
Cleaning compound, solvent, item 25, appx. E
Lockwasher
Lockwasher (3)
Locknut

Equipment Condition

Gooseneck supported, if uncoupled (para. 2-18)

General Safety Instructions

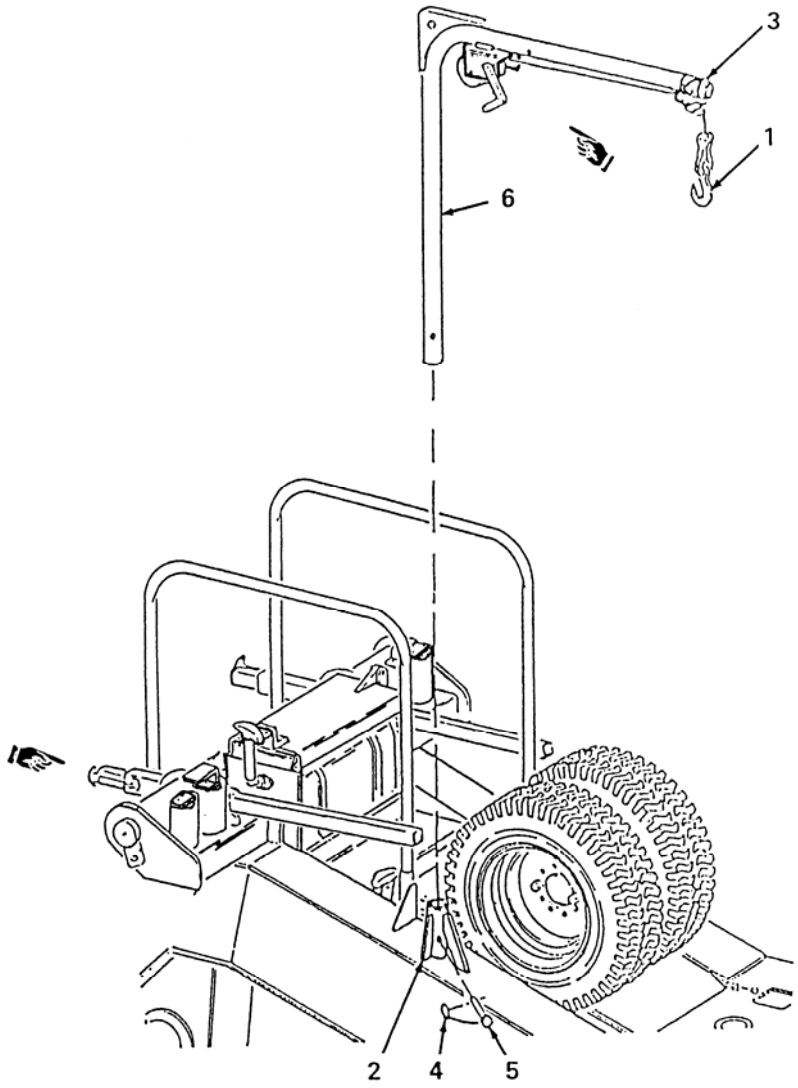
WARNING

When on top of gooseneck and removing or installing davit assembly, always hold onto guardrails with one hand to avoid falling or injury to personnel may result.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on or trip over it. Injury to personnel or damage to equipment may result.

REMOVAL

1. Unhook davit cable hook (1) from stow position on davit base (2) and operate davit winch to raise hook up to clamp pulley (3).



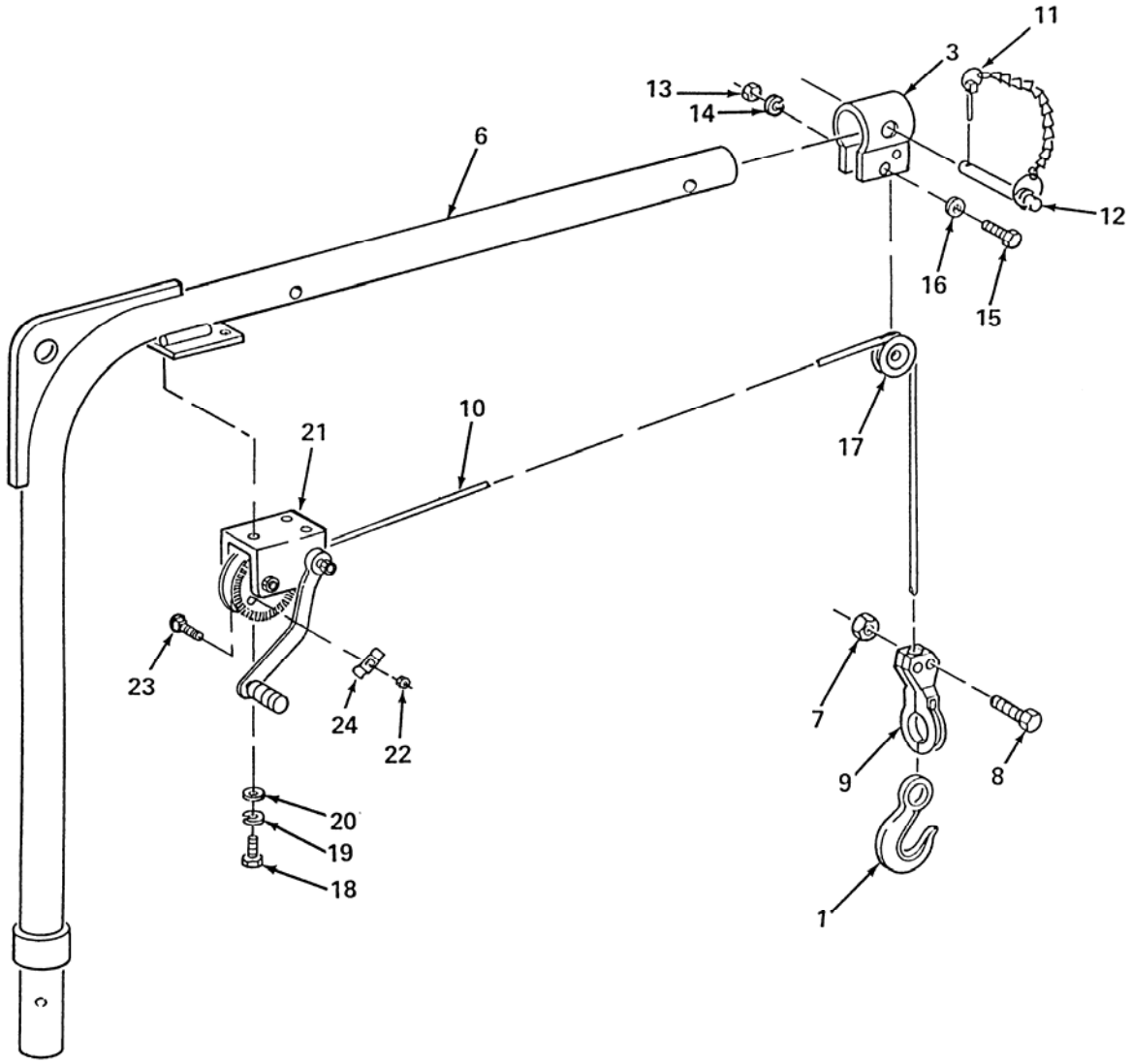
2. Remove linch pin (4) and pull hitch pin (5) from davit base (2) and davit assembly (6).

3. Lift davit assembly (6) out of davit base (2).

4-70. DAVIT ASSEMBLY (CONT)

DISASSEMBLY

1. Remove two nuts (7), bolts (8), and clamp (9) from cable (10). Separate clamp (9) and remove hook (1).



2. Remove linch pin (11) from hitch pin (12) and remove hitch pin from pulley clamp (3) and davit arm (6).

3. Remove pulley clamp (3) from end of davit arm (6).

4. Remove nut (13), lockwasher (14), bolt (15), washer (16), and pulley (17) from pulley clamp (3). Discard lockwasher.

5. Remove three screws (18), lockwashers (19), washers (20), and winch assembly (21) from davit assembly (6). Discard lockwashers.

6. Remove nut (22), bolt (23), cable clamp (24), and cable (10) from drum of winch assembly (21).

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Clean all parts removed in degreaser tank with cleaning compound solvent and wire brush as necessary. Remove corrosion using wire brush and crocus cloth.

2. Inspect davit and davit base for corrosion, broken welds, cracks, evidence of warping, excessive dents, and peeling of painted surfaces. Repair or replace defective davit.

3. Check winch assembly as follows:

   a. Visually check that ratchet mechanism spring is not deformed or broken.

   b. Check that ratchet mechanism lever is not worn, bent, or broken. Ensure ratchet mechanism locks when winch drum is not being turned. Ensure excess paint and other foreign materials have been cleaned from ratchet gear and spring. Check that winch drum rotates without binding or slipping when handcrank is turned. Replace winch if improper operation is observed or any parts are defective.

   c. Check pulley clamp and ensure pulley rotates freely.

   d. Check winch cable for evidence of wear, fraying, separation, and other forms of deterioration. Replace cable or anchor if defective.

4. Check hitch pin assemblies. Ensure linch pins are attached by lanyards and can be locked to secure hitch pins.

ASSEMBLY

1. Pass end of cable (10) through front of winch assembly (21) over ratchet gearshaft and around winch drum. Stick end of cable through hole on side of winch drum and secure cable to side of drum with cable clamp (24), screw (23), and nut (22).

2. Position winch assembly (21) on davit assembly (6) bracket weldment and install three washers (20), lockwashers (19), and screws (18).

3. Pass other end of winch cable (10) over pulley (17) and position pulley in pulley clamp (3). Install bolt (15) with washer (16), lockwasher (14), and nut (13).

4-70. DAVIT ASSEMBLY (CONT)

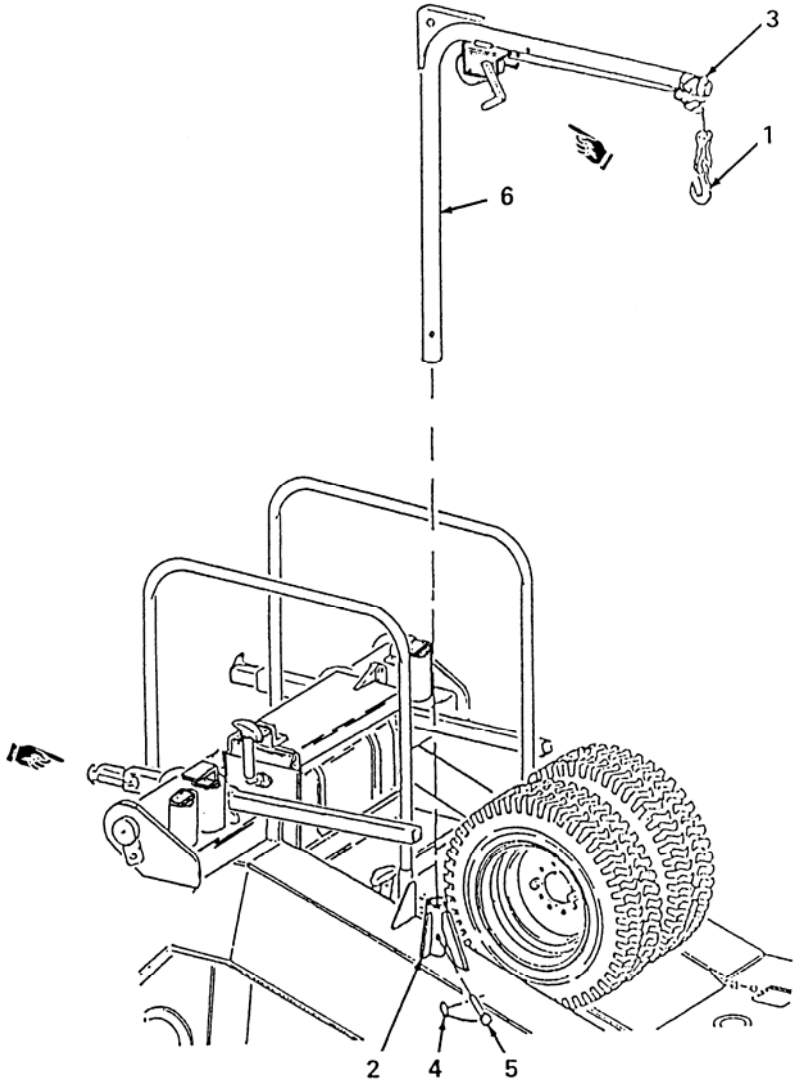
4. Install pulley clamp (3) on end of davit arm (6) and insert hitch pin (12) through pulley clamp and davit arm. Secure hitch pin with linch pin (11).

5. Install hook (1) in clamp (9), insert end of cable (10) in clamp, and install two bolts (8) and nuts (7).

6. Operate davit winch to raise hook (1) up to pulley clamp (3).

INSTALLATION

1. Install davit assembly (6) into davit base (2) on gooseneck.



2. Install hitch pin (5) through davit base (2) and davit (6). Secure with linch pin (4).

3. Operate winch assembly to lower hook (1). Rehook to stow position on davit base (2).

4-71. SNATCH BLOCK

This task covers: a. Removal c. Inspection e. Installation
b. Disassembly d. Assembly

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:
- Degreaser tank, 20 gl
- Gloves, chemical and oil protective
- Goggles, industrial
- Hammer, 3 lb
- Machinist's vise, 4"
- Soft-jawed vise caps

Materials/Parts

Antiseize compound, item 3, appx. E
Crocus cloth, item 6, appx. E
Grease, item 12, appx. E
Cleaning compound solvent, item 25, appx. E
Locknut (2)
Cotter pin
Lockwasher
Cotter pin

Personnel Required: 2

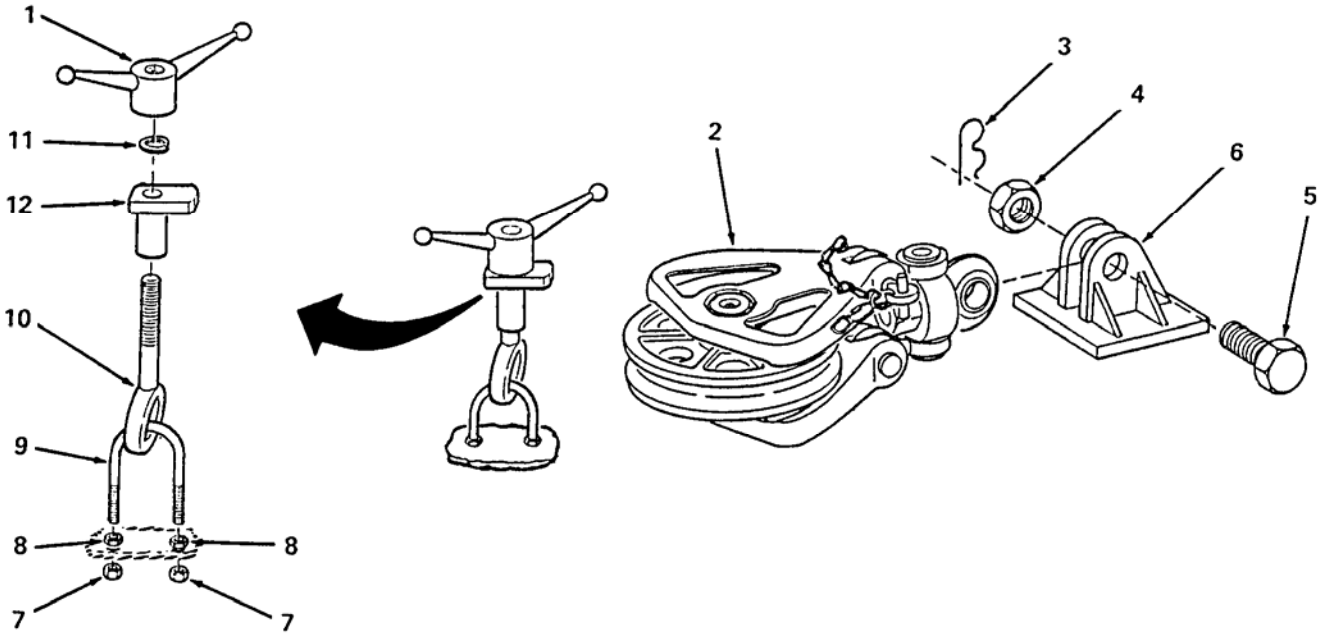
4-71. SNATCH BLOCK (CONT)

REMOVAL

WARNING

Snatch block weighs in excess of 150 pounds (68 kg). Always use two persons when lifting snatch block or injury to personnel may result.

1. Unscrew clamp handle (1) to unstow snatch block (2) from platform.



2. Remove hitch pin (3), nut (4), bolt (5), and snatch block (2) from platform weldment mounting block (6).

3. Remove two locknuts nuts (7) and U-bolt (9) from platform.

4. Remove two nuts (8) from U-bolt (9) and remove U-bolt (9) from eyebolt (10).

NOTE

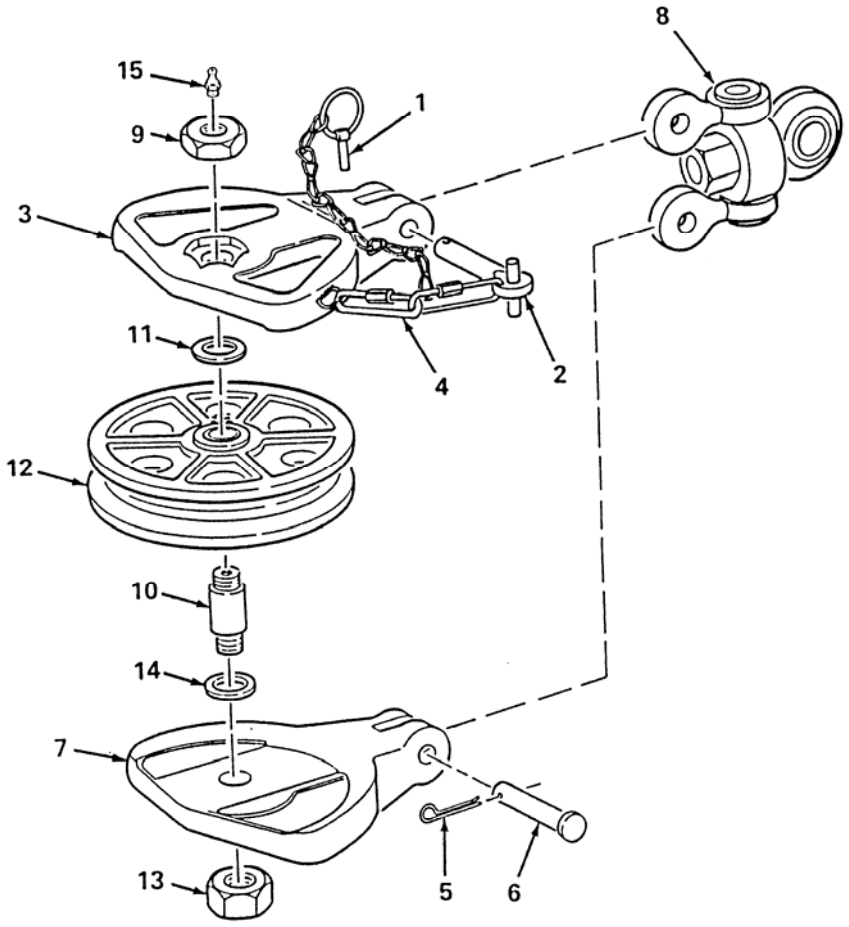
The threads on the end of the eyebolt have been deformed during installation to prevent clamp handle from unscrewing from eyebolt unless excessive torque is applied.

5. Unscrew clamp handle (1) from eyebolt (10). Apply torque as required to unscrew handle of end threads which were deformed to retain clamp handle.

6. Remove lockwasher (11) and clamp tab (12) from eyebolt (10).

DISASSEMBLY

1. Remove linch pin (1) from keeper pin assembly (2) and pull keeper pin from upper block side (3).



2. Unfasten quick-disconnect links (4) and remove keeper pin assembly (2).

3. Remove cotter pin (5) and extract headed pin (6) from lower block side (7).

4. Remove swivel and eye assembly (8) from lower block side (7).

5. Secure lower block side (7) in a machinist's vise with vise jaw caps.

6. Using hammer, rotate upper block side (3) counterclockwise to loosen and remove captive nut (9) and upper block side (3) from pulley pin (10).

7. Remove thrust washer (11) and pulley (12).

8. Rotate lower block side (7) and secure pulley pin (10) in vise.

9. Using hammer, rotate lower block side (7) counterclockwise to loosen and remove capture nut (13).

4-71. SNATCH BLOCK (CONT)

10. Remove capture nut (13), lower block side (7), and thrust washer (14) from pulley pin (10).

11. Remove pulley pin (10) from vise and remove lubrication fitting (15) from end of pulley pin (10).

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Clean all parts removed in degreaser tank with cleaning compound solvent and wire brush as necessary. Remove corrosion using wire brush and crocus cloth.

2. Inspect upper and lower block sides (3 and 7), swivel and link assembly (8), and mounting bracket weldment on platform for cracks, broken welds, or warping. Inspect keeper pin assembly (2) and quick-disconnect links (4). Replace any defective parts.

3. Inspect snatch block stow clamp, handle, and attaching parts. Replace any missing or defective parts.

4. Inspect snatch block pulley for any evidence of cracks or excessive wear. Check sleeve bushing installed in hub of pulley. If bushing shows signs of wear or other forms of deterioration, notify DS maintenance.

ASSEMBLY

1. Install grease fitting (15) into pulley pin (10).

2. Place pulley pin (10), orientated with lubrication fitting (15) down, into a machinist's vise with vise jaw caps.

3. Install thrust washer (14) and lower block side (7). Install capture nut (13) and rotate lower block side (7) clockwise until captive nut and block side are tight.

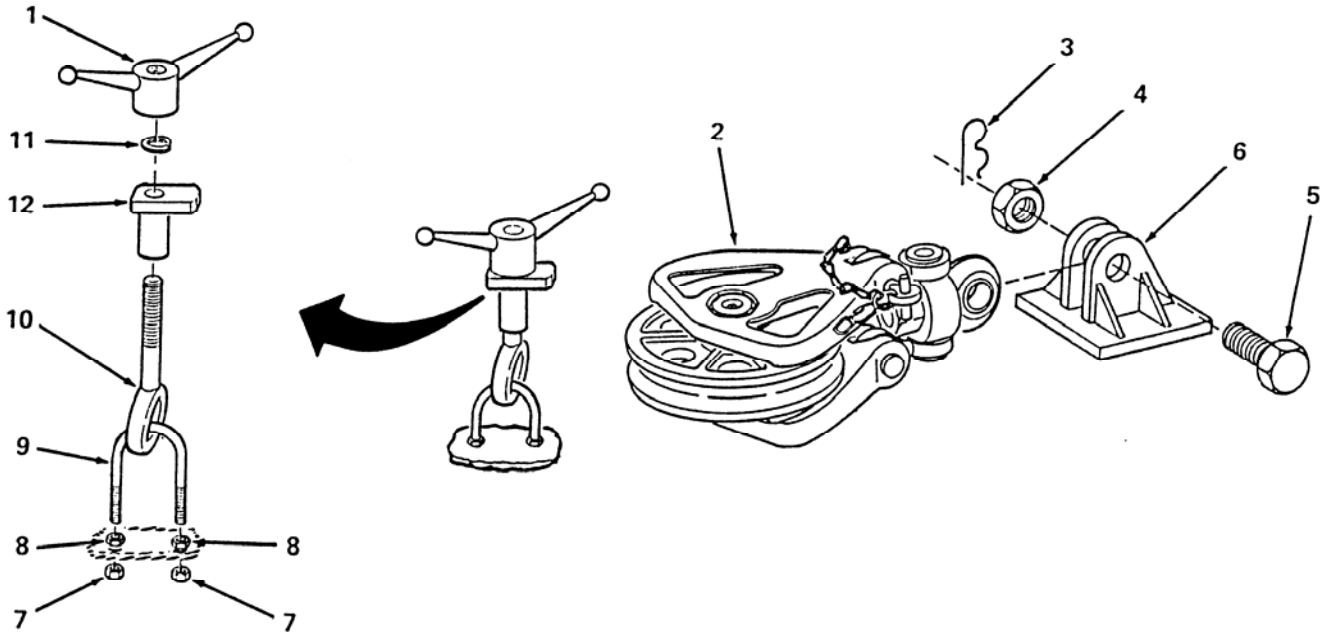
4. Remove block side (7) and pulley pin from vise and secure lower block side (7) in vise with pulley pin orientated upward. Install pulley (12) and thrust washer (11).

5. Place upper block side (3) onto pulley pin (10) and install capture nut (9). Rotate upper block side (3) clockwise to tighten capture nut on pulley pin (10). Ensure pulley (12) rotates freely on pulley pin (10).

6. Position swivel eye assembly (8) and install headed pin (6) and cotter pin (5). Install keeper pin (2) and secure with linch pin (1). Attach quick-disconnect links (4) to upper block side (3). Secure keeper pin in place by installing two quick-links (7) and lynch pin (5) with chain to keeper pin (6).

INSTALLATION

1. Install clamp tab (12), lockwasher (11), and clamp handle (1) onto eyebolt (10). Using a hammer, peen over the end threads of eyebolt (10) to prevent handle (1) from spinning off eyebolt when loosening clamp tab.



2. Pass one end of U-bolt (9) through eye of eyebolt (10). Install two nuts (8) onto U-bolt (9).

3. Pass U-bolt (9) through mounting holes in platform and secure in place by installing two locknuts (7).

WARNING

Snatch block weighs in excess of 150 pounds (68 kg). Always use two persons when lifting snatch block or injury to personnel may result.

4. Position snatch block (2) on platform and install bolt (5) through mounting bracket weldment (6) and eye of swivel and link assembly. Install nut (4) and hitch pin (3).

5. Restow snatch block (2) on platform and aline clamp tab (12) over snatch block. Secure by tightening clamp handle (1).

4-72. CABLE GUIDE

This task covers: a. Removal b. Disassembly c. Inspection d. Assembly e. Installation

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INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Degreaser tank, 20 gl, item 17, appx. B
Gloves, chemical and oil protective, item 17, appx. B
Goggles, industrial, item 17, appx. B

Materials/Parts

Crocus cloth, item 6, appx. E
Grease, item 12, appx. E
Cleaning compound solvent, item 25, appx. E
Lockwasher (8)
Locknut (2)

Personnel Required: 2

Equipment Condition

Gooseneck lowered to lowest position (para. 2-18)
Platform lowered to lowest position (para. 2-19)

General Safety Instructions

WARNING

When on top of gooseneck and removing or installing cable guides, always hold onto guardrails with one hand to avoid falling or injury to personnel may result.

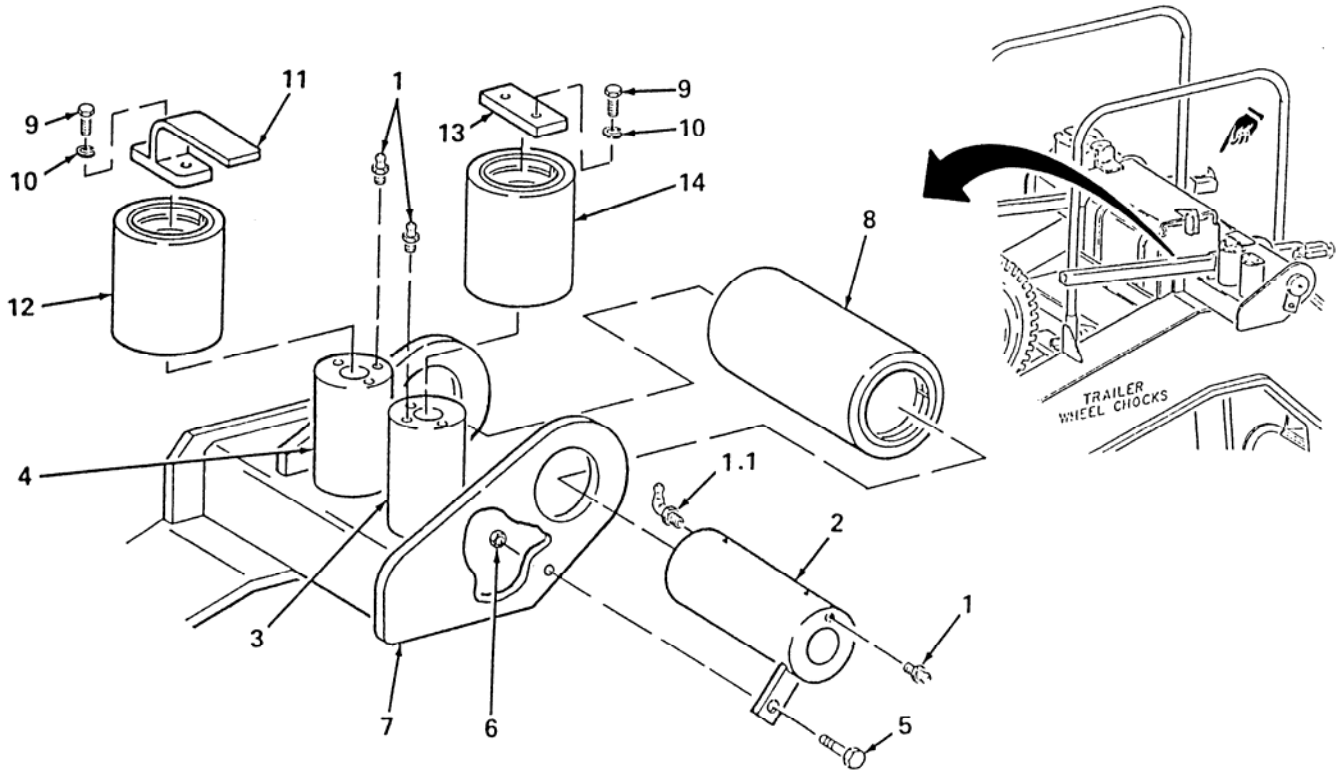
On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on or trip over it. Injury to personnel or damage to equipment may result.

REMOVAL

NOTE

The following procedure is to be used for either streetside or curbside cable guides. Repeat this procedure as required to complete the necessary repairs.

1. Remove two lubrication fittings (1 and 1.1) from roller shaft (2).
2. Remove a lubrication fitting (1) from top of each roller shaft (3 and 4).
3. Remove capscrew (5) and locknut (6) securing roller shaft (2) to gooseneck weldment bracket (7). Discard locknut.



WARNING

The roller assemblies are heavy. Use extreme caution when handling roller assemblies or injury to personnel may result.

4. Remove roller shaft (2) from roller assembly (8) through bracket (7).

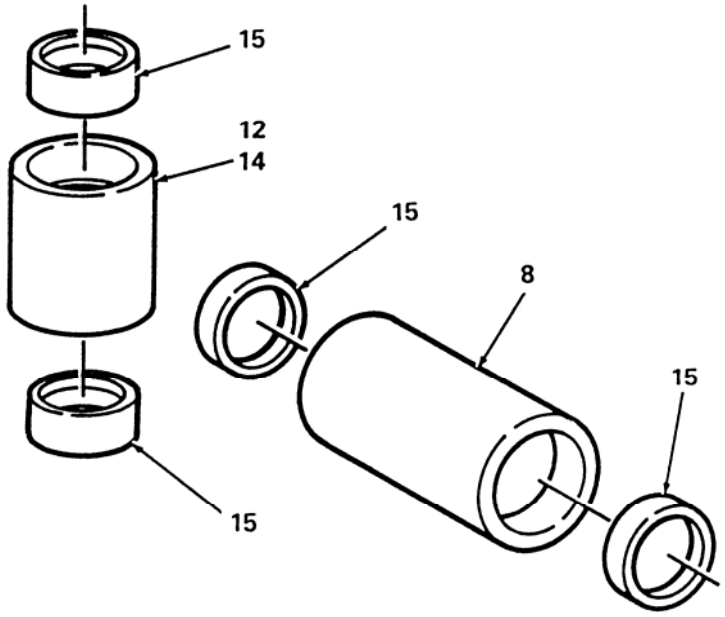
5. Remove two capscrews (9), lockwashers (10), and plate clamp (11). Remove roller assembly (12) from roller shaft (4). Discard lockwashers.

6. Remove two capscrews (9), lockwashers (10), and plate clamp (13). Remove roller assembly (14) from roller shaft (3). Discard Lockwashers.

4-72. CABLE GUIDE (CONT)

DISASSEMBLY

1. Remove two bearings (15) from roller assembly (8).



2. Remove two bearings (15) from each roller assembly (12 and 14).

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Clean all parts removed in degreaser tank with cleaning compound solvent and wire brush as necessary. Remove corrosion using wire brush and crocus cloth.

2. Inspect rollers and roller shafts for surface deterioration, scratches, scoring, pitting, burrs, or gouging that could interfere with mounting or mating components or bearings.

3. Inspect bracket weldments for broken welds, cracks, and evidence of warping, and peeling of paint.

4. Check sleeve bearings for surface defects, indications that bearing may be rotating about shaft, evidence of overheating, and signs of improper lubrication.

5. Check condition of plate clamps and all attaching hardware. Replace any defective or missing components and hardware.

ASSEMBLY

1. Lubricate six bearings (13) with grease before assembly.

NOTE

When bearing is seated correctly, approximately 0.25 inch (6.4 mm) of bearing will be exposed from end of roller assembly.

2. Install two bearings (15) in each roller assembly (12 and 14).

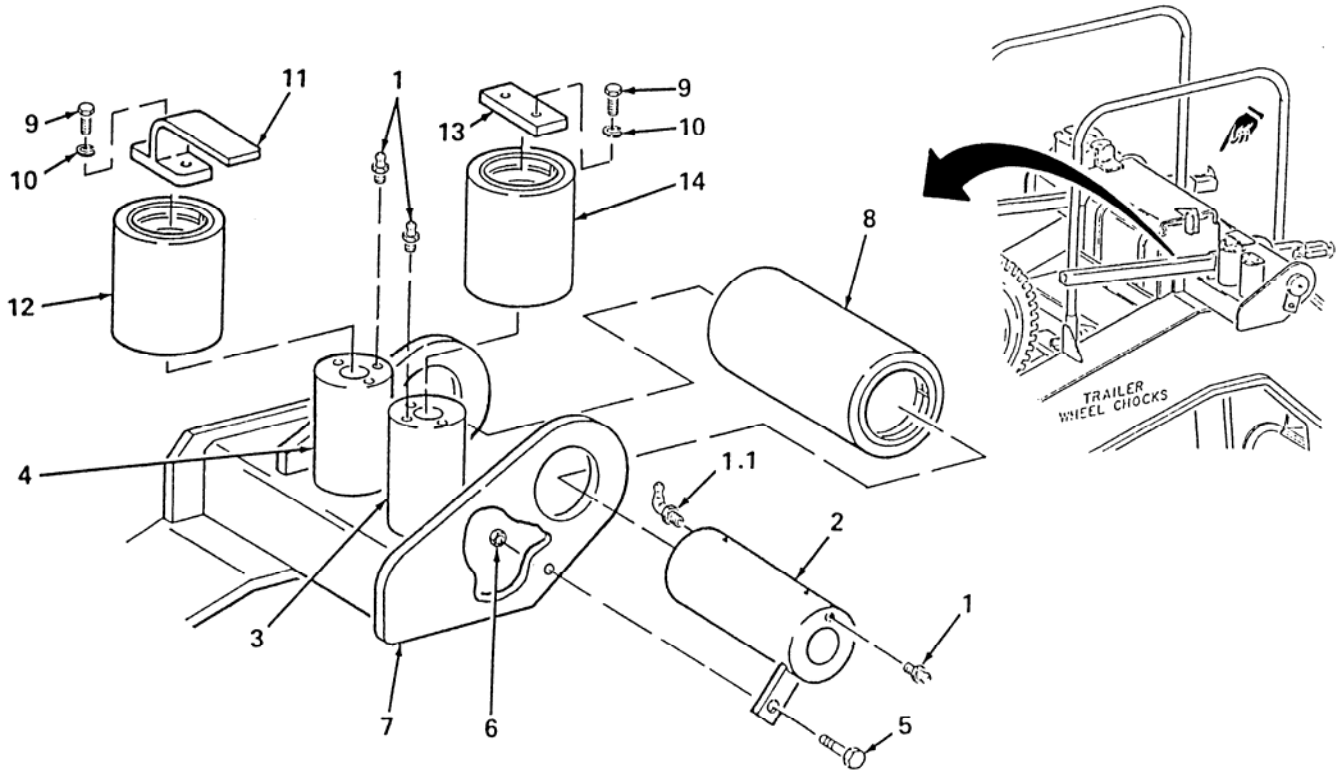
3. Install two bearings (15) in roller assembly (8).

INSTALLATION

WARNING

The roller assemblies are heavy. Use extreme caution when handling roller assemblies or injury to personnel may result.

1. Install roller assembly (12) onto roller shaft (4) and install clamp plate (11), two lockwashers (10), and capscrews (9) onto roller shaft (4).



4-72. CABLE GUIDE (CONT)

2. Install roller assembly (14) onto roller shaft (3) and install clamp plate (13), two lockwashers (10), and capscrews (9) onto roller shaft (3).

3. Position roller assembly (8) in gooseneck weldment bracket (7) and install roller shaft (2). Secure roller shaft (2) to bracket (7) with capscrew (5) and locknut (6).

4. Install grease fittings (1 and 1.1) on all three roller shafts (3, 4, and 2).

FOLLOW-ON MAINTENANCE

Lubricate cable guides (para. 3-3).

4-73. DELETED

ALL DATA ON PAGES 4-343 THRU 4-346 DELETED.

4-74. REFLECTORS

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

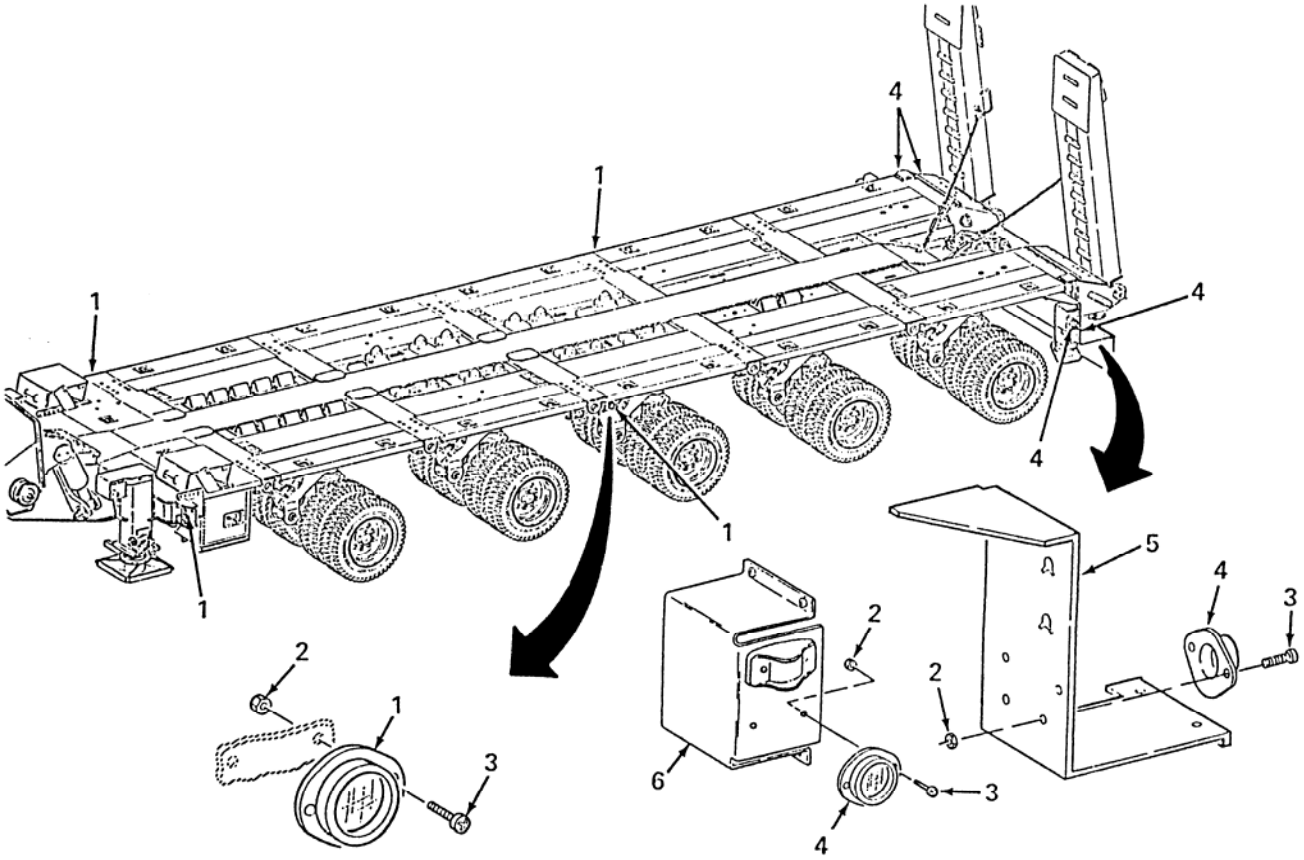
Materials/Parts

Locknut (16)

4-74. REFLECTORS (CONT)

REMOVAL

1. To remove any one of four amber reflectors (1), remove two locknuts (2) screws (3), and reflector (1) from platform weldment. Discard locknuts.



2. To remove either of two red reflectors (4) located at rear of platform on streetside or curbside deflectors (5), remove two locknuts (2), screws (3) and reflector (4) from deflector (5). Discard locknuts.

3. To remove either curbside or streetside rear red reflectors (4), remove access cover (6) from deflector (5) (para. 4-68). Remove two locknuts (2), screws (3) and reflectors (4) from access cover (6). Discard locknuts.

INSTALLATION

1. To install any one of four amber reflectors (1), position reflector (1) in appropriate location on platform weldment, aline mounting holes, and secure reflector with two screws (3) and locknuts (2).

2. To install either of two red reflectors (4) located at rear of platform on streetside or curbside deflectors (5), position reflector (4) on deflector (5), aline mounting holes, and secure reflector with two screws (3) and locknuts (2).

3. To install either curbside or streetside rear red reflector assemblies (4), position reflector (4) on access cover (6), aline mounting holes, and secure with two screws (3) and locknuts (2). Assemble access cover (6) to deflector (5) (para. 4-68).

4-75. DATA PLATES, DECALS, AND STENCILS

This task covers: a. Removal b. Cleaning c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:

Gloves, chemical and oil protective	Stencil brush
	Stencil set
Goggles, industrial	Riveter, blind, hand

Materials/Parts

Technical alcohol, item 1, appx. E	Rivet (4)
	Rivet (5)
Wiping rag, item 19, appx. E	Rivet (2)
Dry cleaning solvent, item 26, appx. E	Locknut (2)
	Locknut (4)
Tape, double-sided, item 27.1, appx. E	Locknut (4)
	Locknut (10)
Rivet (4)	Locknut (4)
Rivet (4)	Washer

Equipment Condition

Tractor/semitrailer uncoupled (para. 2-24)
Gooseneck lowered to lowest position, if uncoupled (para. 2-18)
Platform adjusted to 43 inch height (109 cm) (para. 2-19)

General Safety Instructions

WARNING

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

Drilling operations are hazardous to the eyes. Always wear eye protection when drilling or injury to personnel may result.

4-75. DATA PLATES, DECALS, AND STENCILS (CONT)

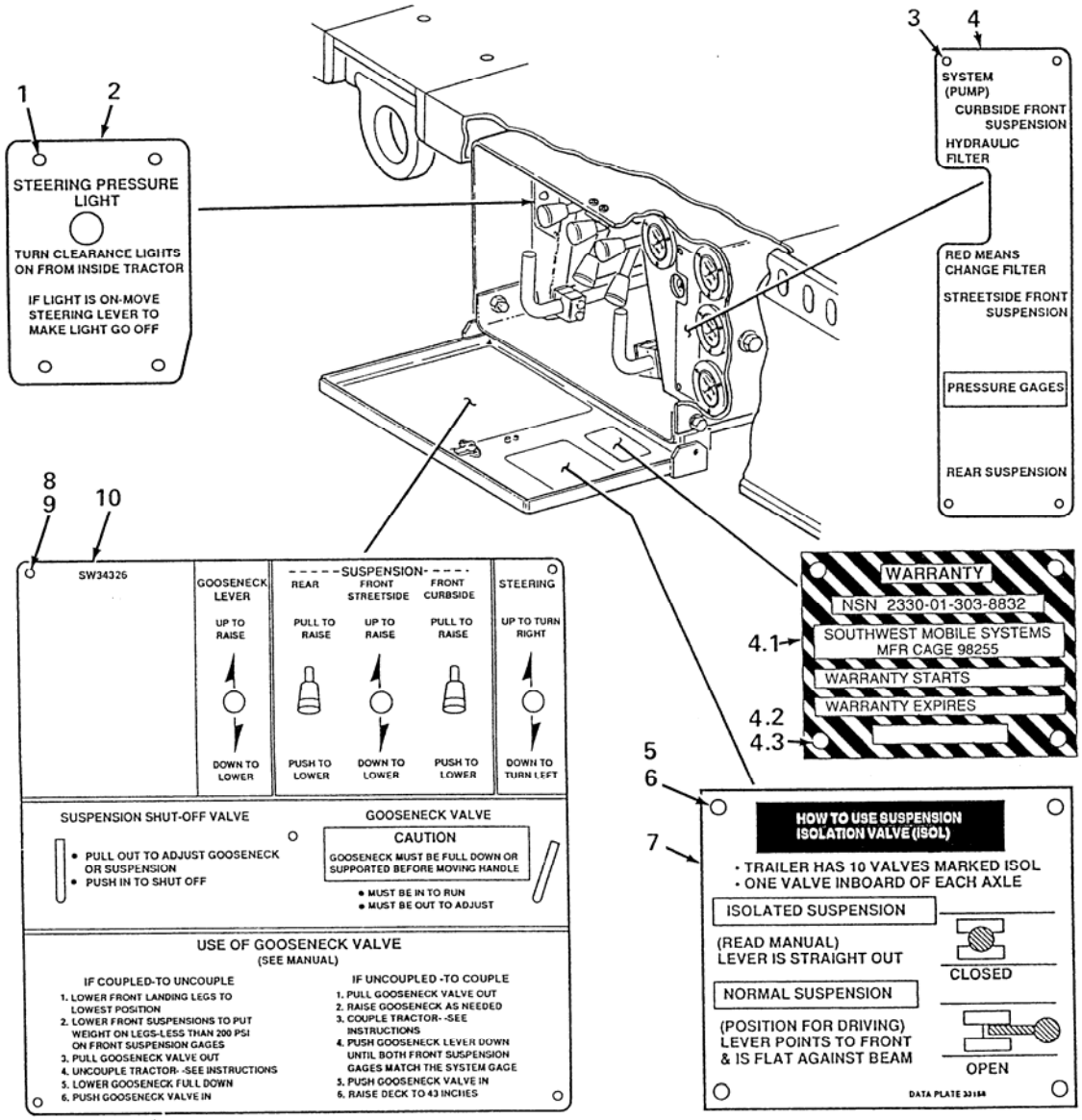
REMOVAL

1. To remove decal (2), use 5/32-inch drill and drill out four rivets (1) and remove decal.

2. To remove decal (4), use 5/32-inch drill and drill out four rivets (3) and remove decal.

2.1. To remove decal (4.1), use 5/32-inch drill and drill out four rivets (4.2). Remove four washers (4.3) and decal (4.1).

3. To remove decal (7), use 5/32-inch drill and drill out four rivets (5). Remove four washers (6) and decal (7).



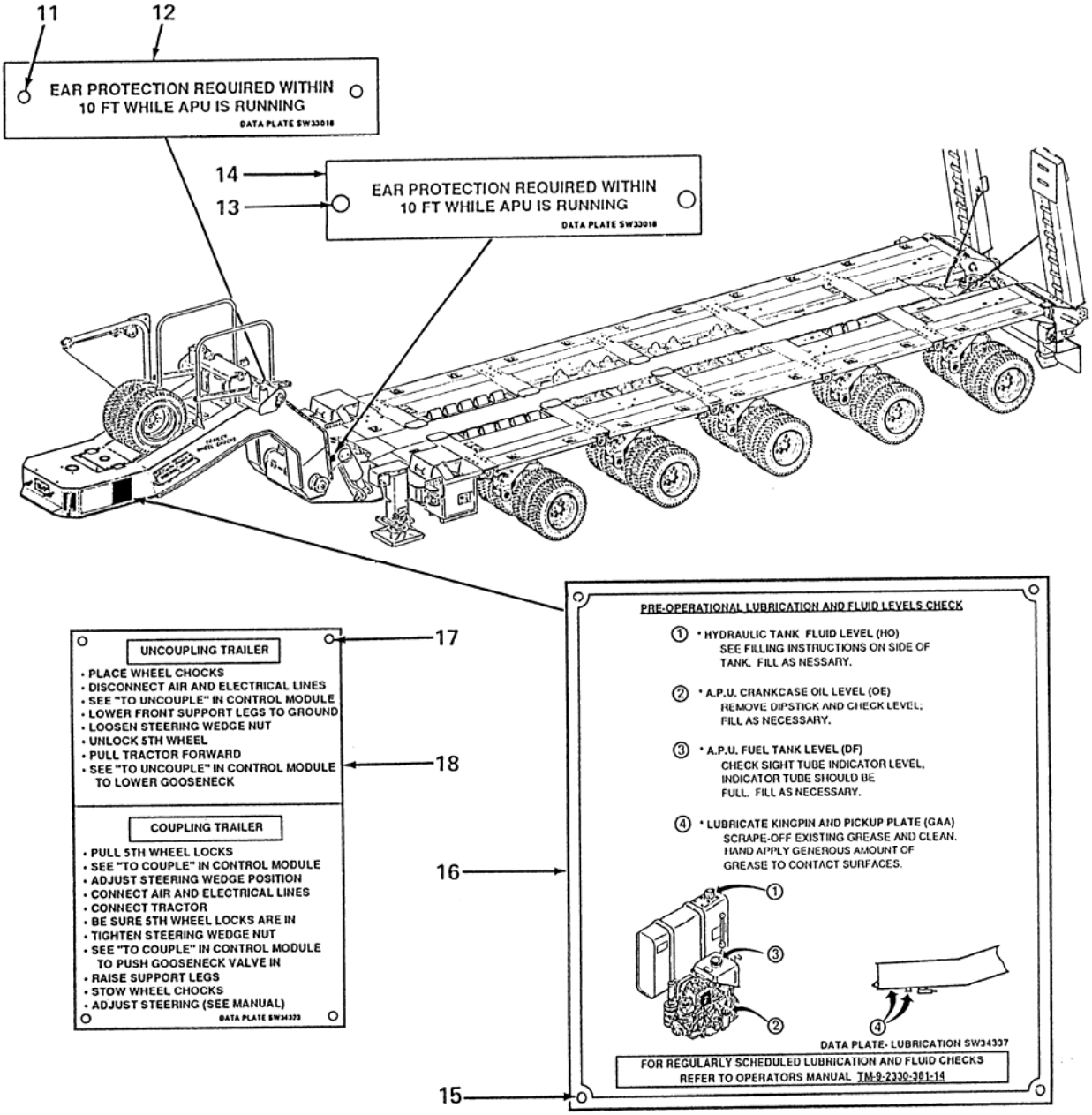
4. To remove identification marker (10), use 5/32-inch drill and drill out four rivets (8). Remove four washers (9) and marker (10).

5. To remove identification plate (12), use 3/16-inch drill and drill out two rivets (11) and remove plate.

6. To remove identification plate (14), remove two locknuts (13) and remove plate. Discard locknuts.

7. To remove decal (16), remove four locknuts (15) and remove decal. Discard locknuts.

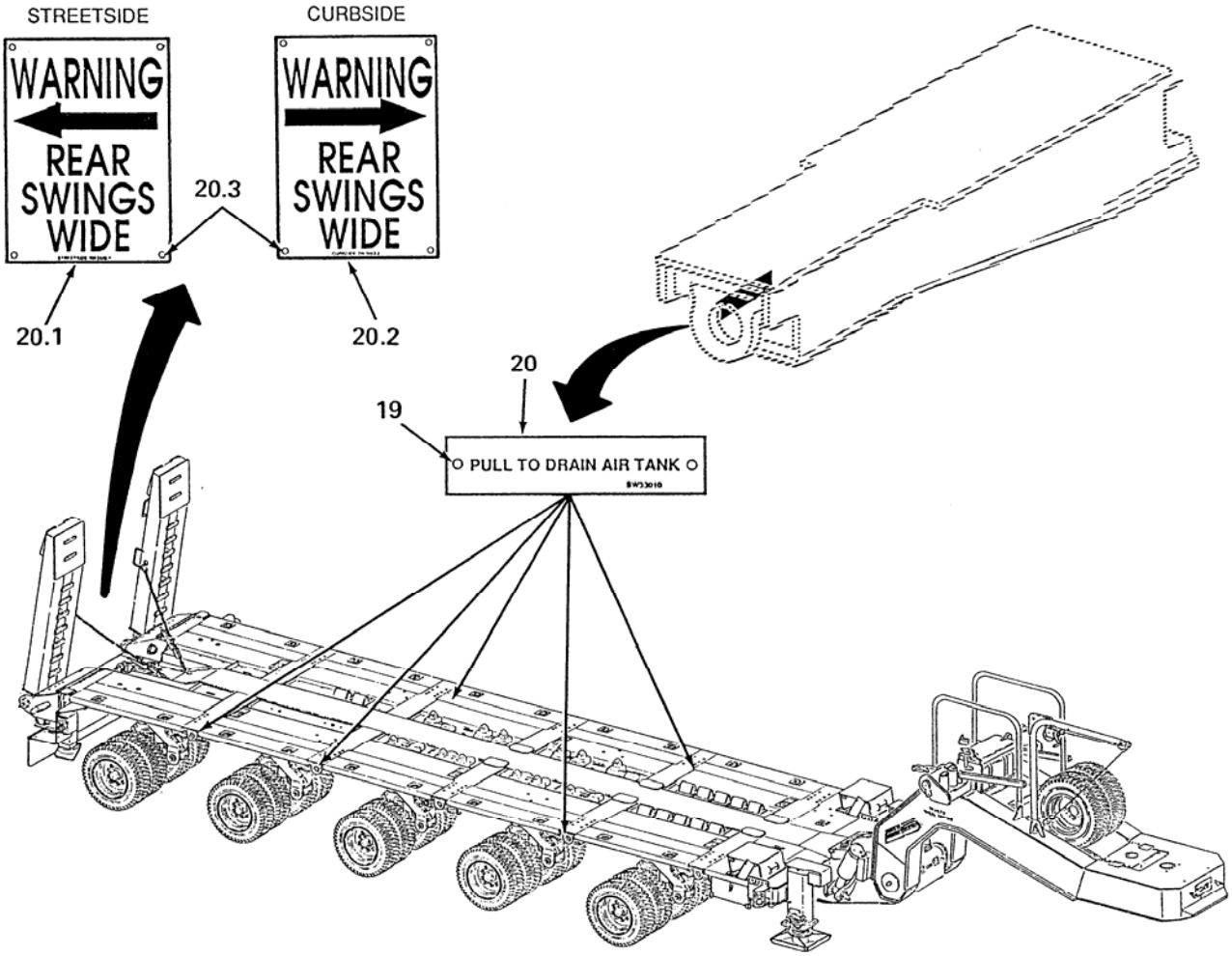
8. To remove identification plate (18), remove four locknuts (17) and remove plate. Discard locknuts.



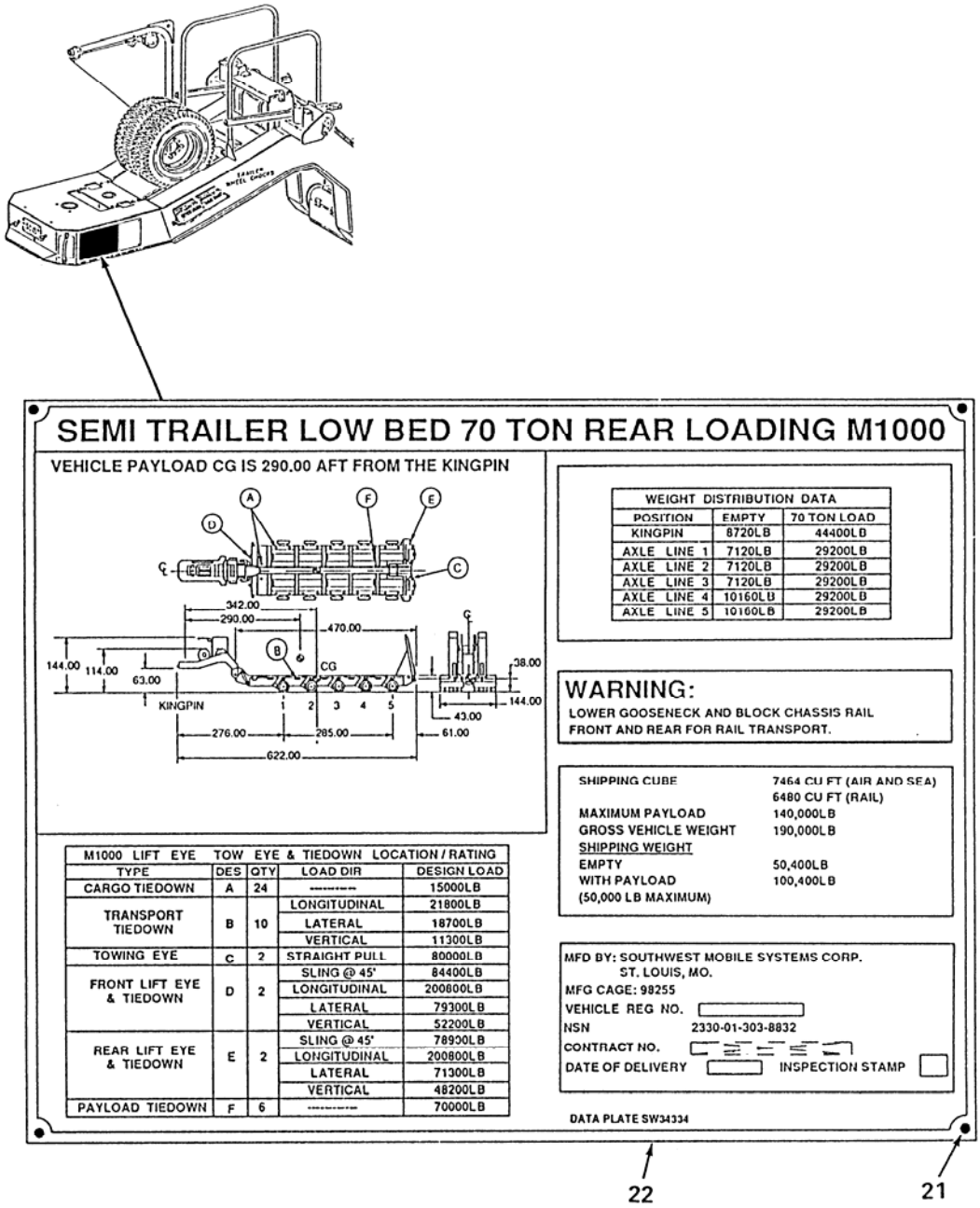
4-75. DATA PLATES, DECALS, AND STENCILS (CONT)

9. To remove any of five identification markers (20), remove two locknuts (19) and remove marker. Discard locknuts.

9.1. To remove decal (20.1 or 20.2), use 5/32-inch drill and drill out four rivets (20.3) and remove decal (20.1 or 20.2).



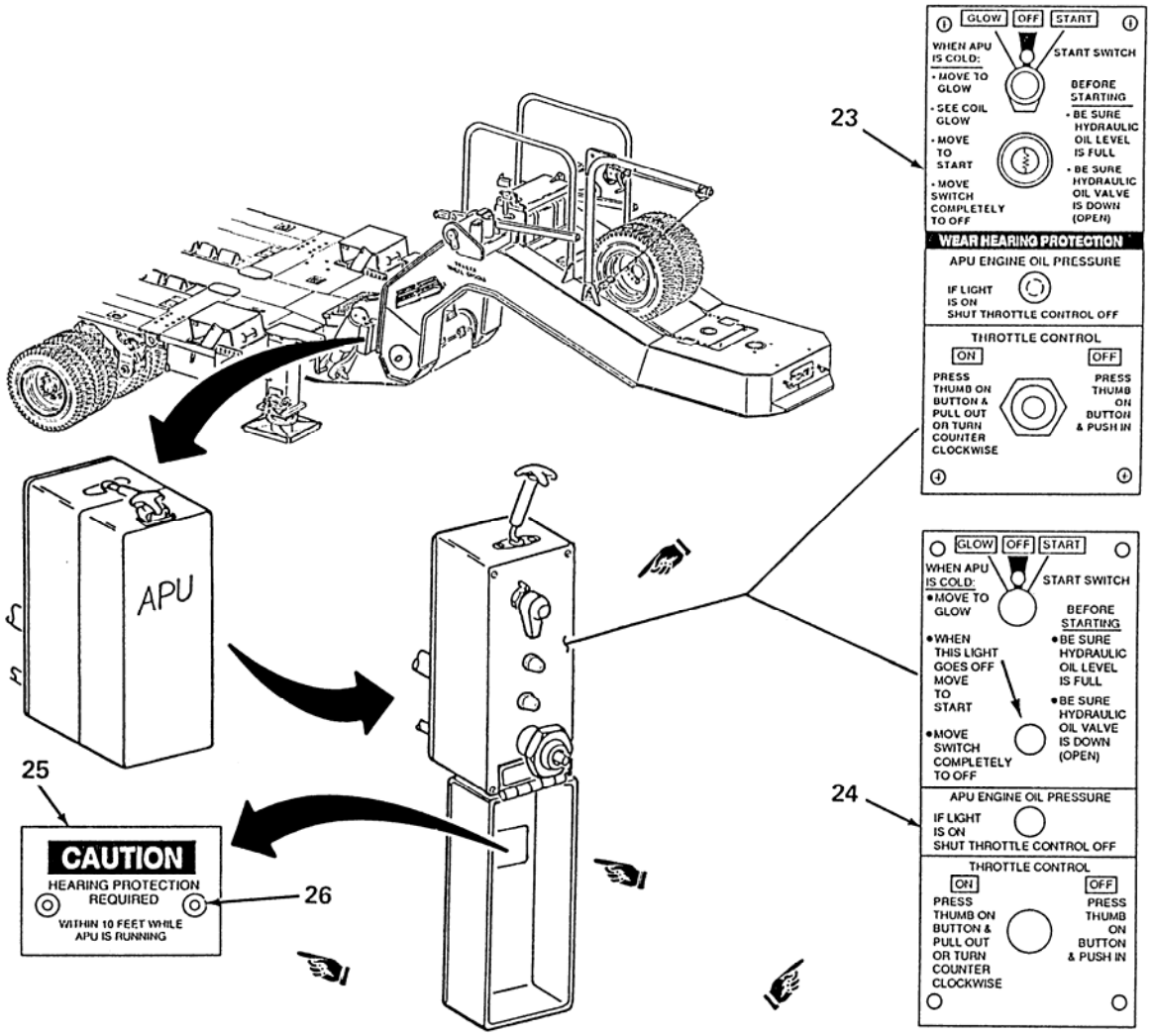
10. To remove identification plate (22), remove four locknuts (21) and remove plate. Discard locknuts.



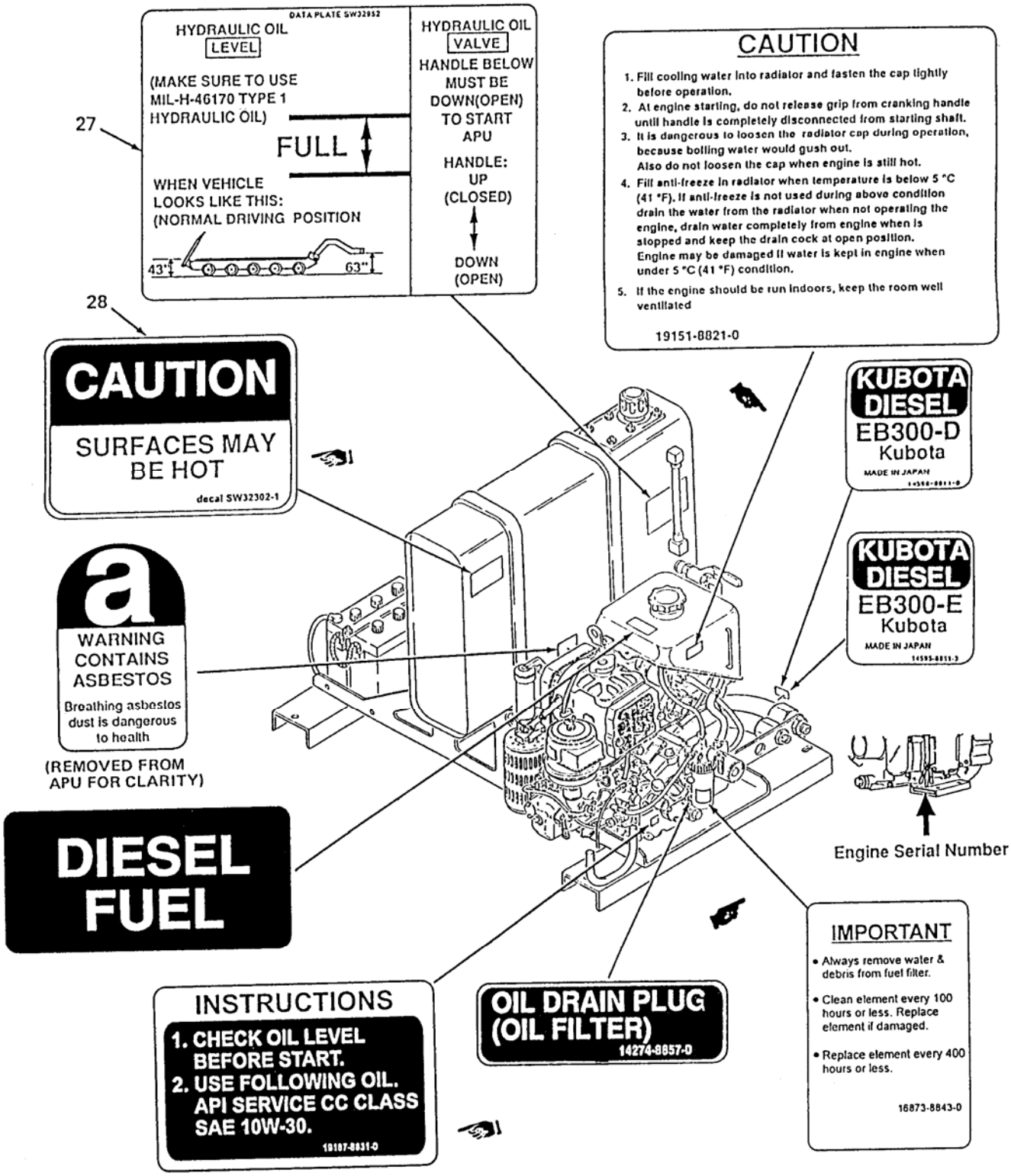
4-75. DATA PLATES, DECALS, AND STENCILS (CONT)

11. Decal (23 or 24) is removed during disassembly of APU control box (para. 4-105).

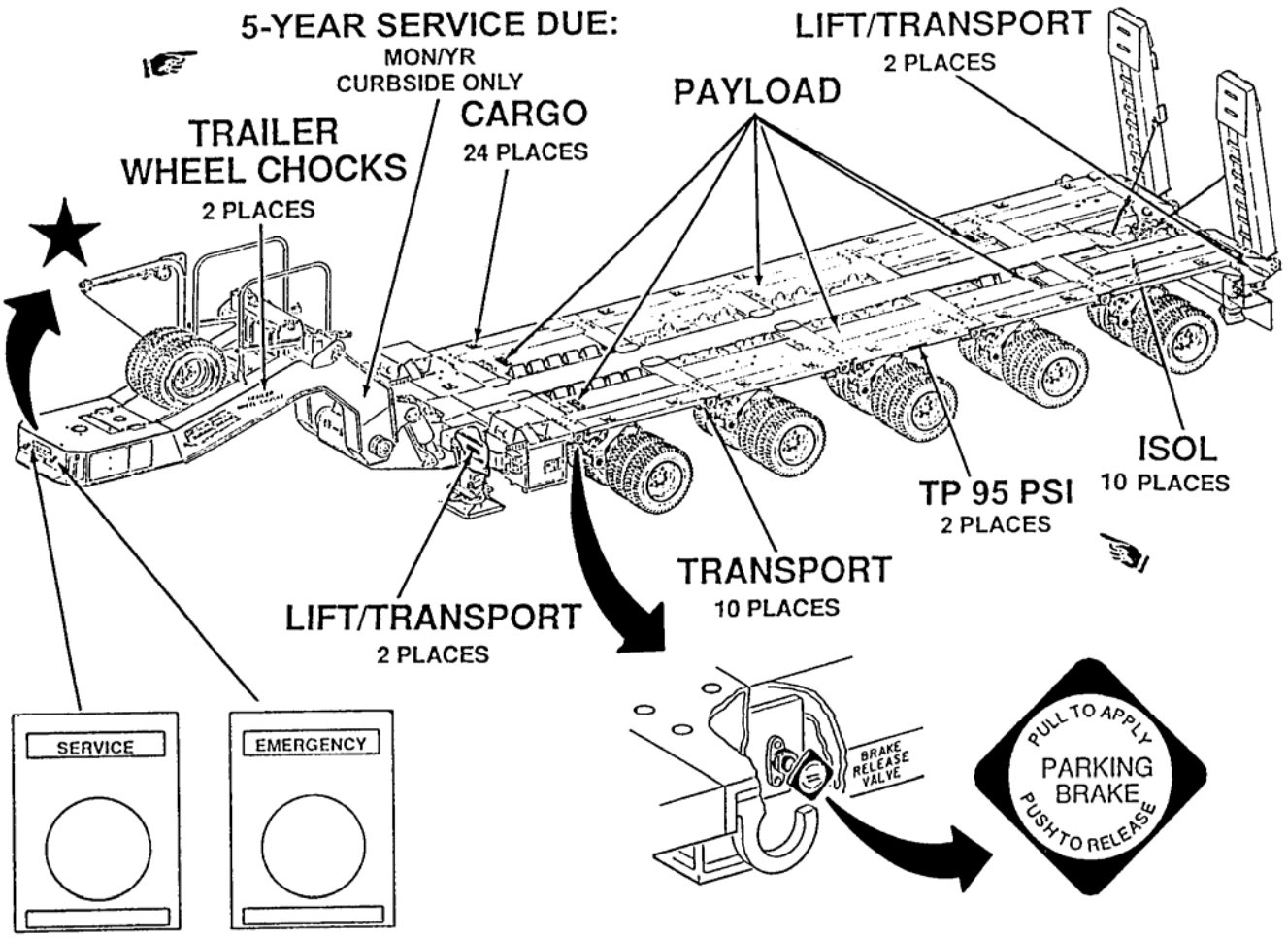
11.1. To remove decal (25), use 5/32-inch drill and drill out two rivets (26) and remove decal (25).

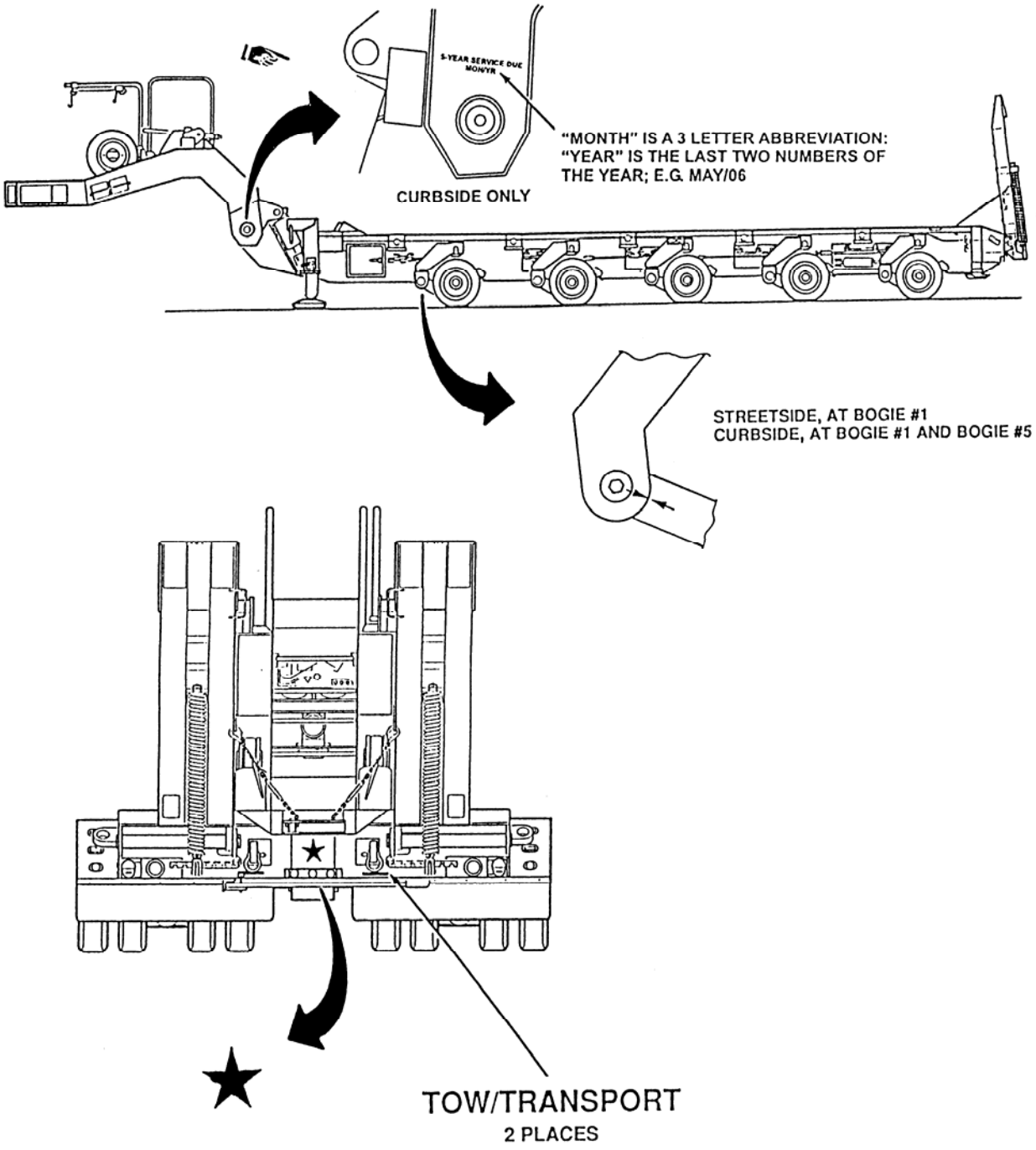


12. Using scraper, carefully scrape decals and stencils as required. Decals (27 and 28) are installed with double-sided tape. Ensure that tape residue is removed completely.



4-75. DATA PLATES, DECALS, AND STENCILS (CONT)




5-YEAR SERVICE DUE MONYR
"MONTH" IS A 3 LETTER ABBREVIATION:
"YEAR" IS THE LAST TWO NUMBERS OF
THE YEAR; E.G. MAY/06
CURBSIDE ONLY
STREETSIDE, AT BOGIE #1
CURBSIDE, AT BOGIE #1 AND BOGIE #5
TOW/TRANSPORT
2 PLACES

4-75. DATA PLATES, DECALS, AND STENCILS (CONT)

CLEANING

1. Clean surfaces with alcohol to remove glue and residue.

2. Using dry cleaning solvent, clean corrosion from all surfaces on which stencil, decal, or data plate will be installed.

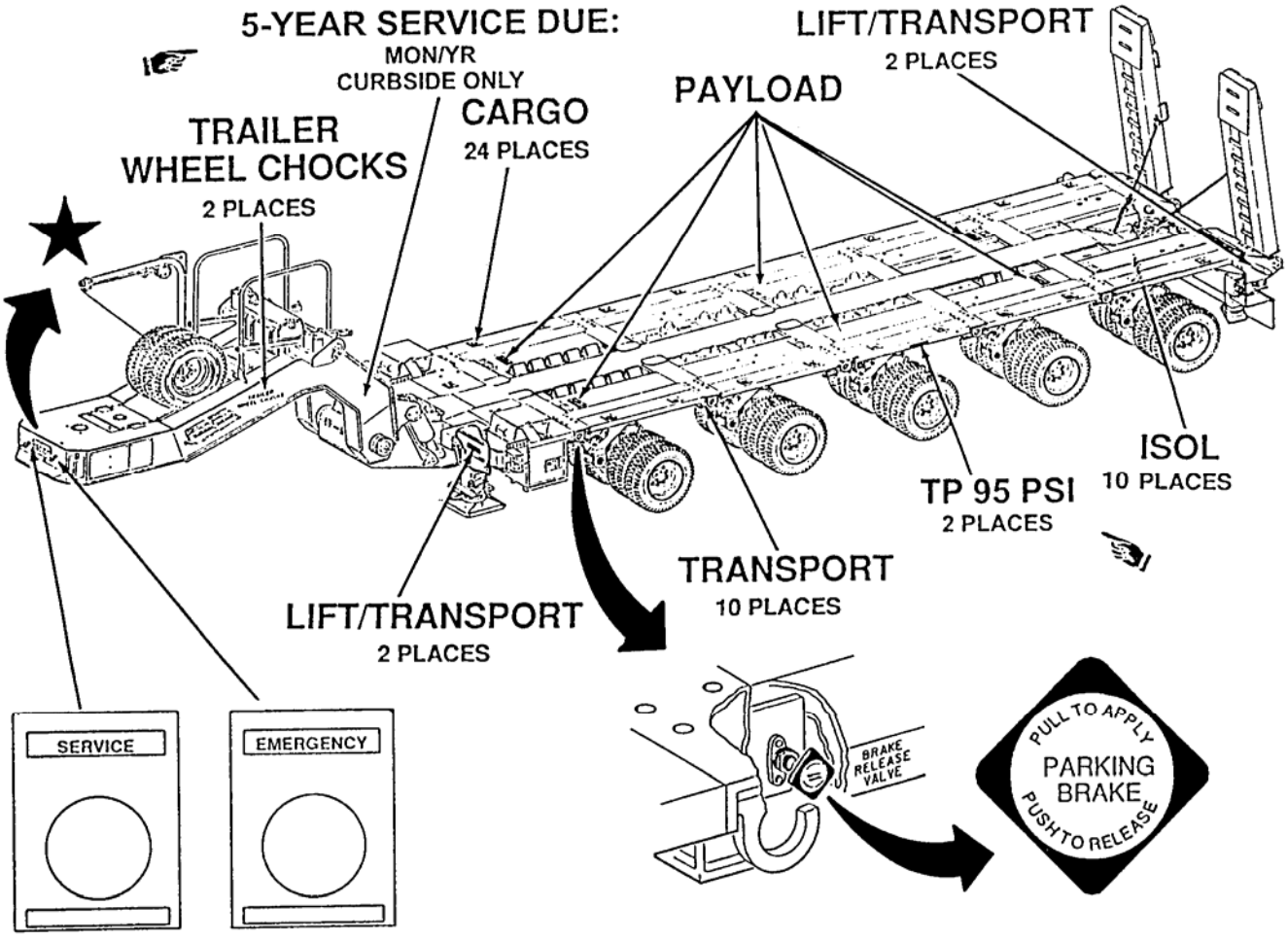
3. Touch up all bare surfaces with primer paint.

INSTALLATION

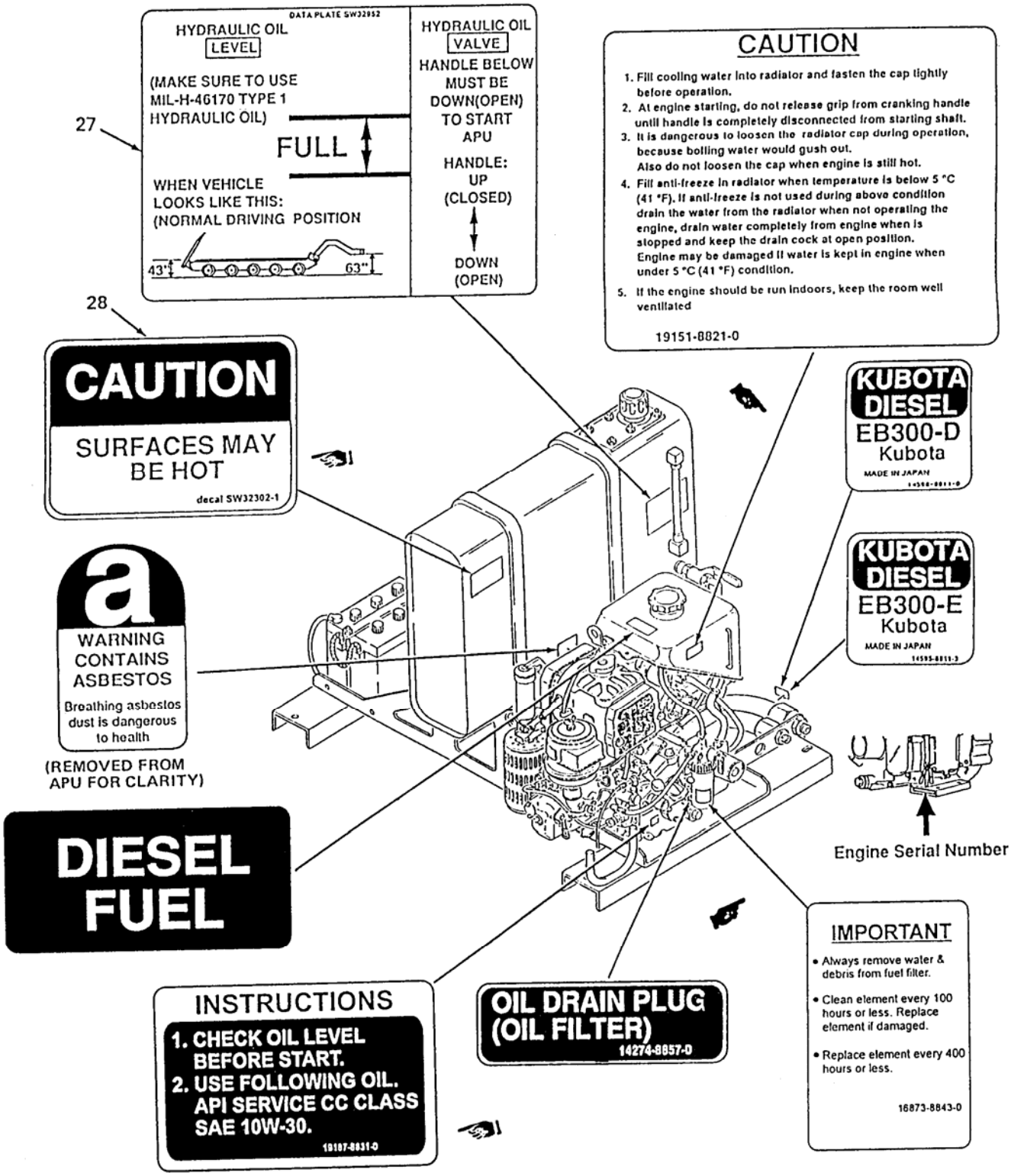
1. Using stencil set and paint, apply or touch up stencils as necessary.

2. Install decals to trailer as required.

2.1. Install decals (27 and 28) using double-side tape.



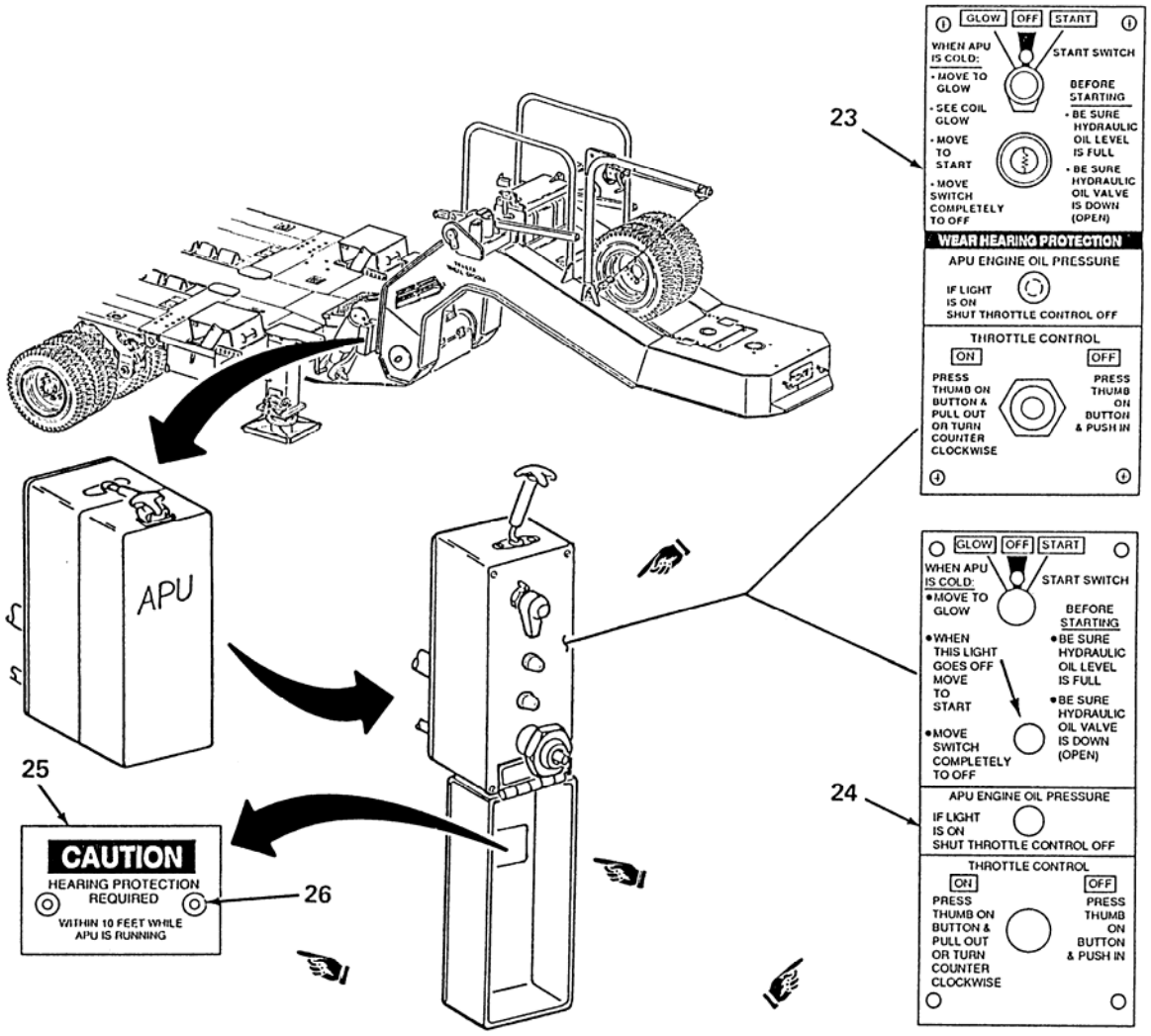
3. Clean data plate with alcohol and apply black paint to areas on data plate to be stenciled. Using stencil set, apply markings as required to data plate.



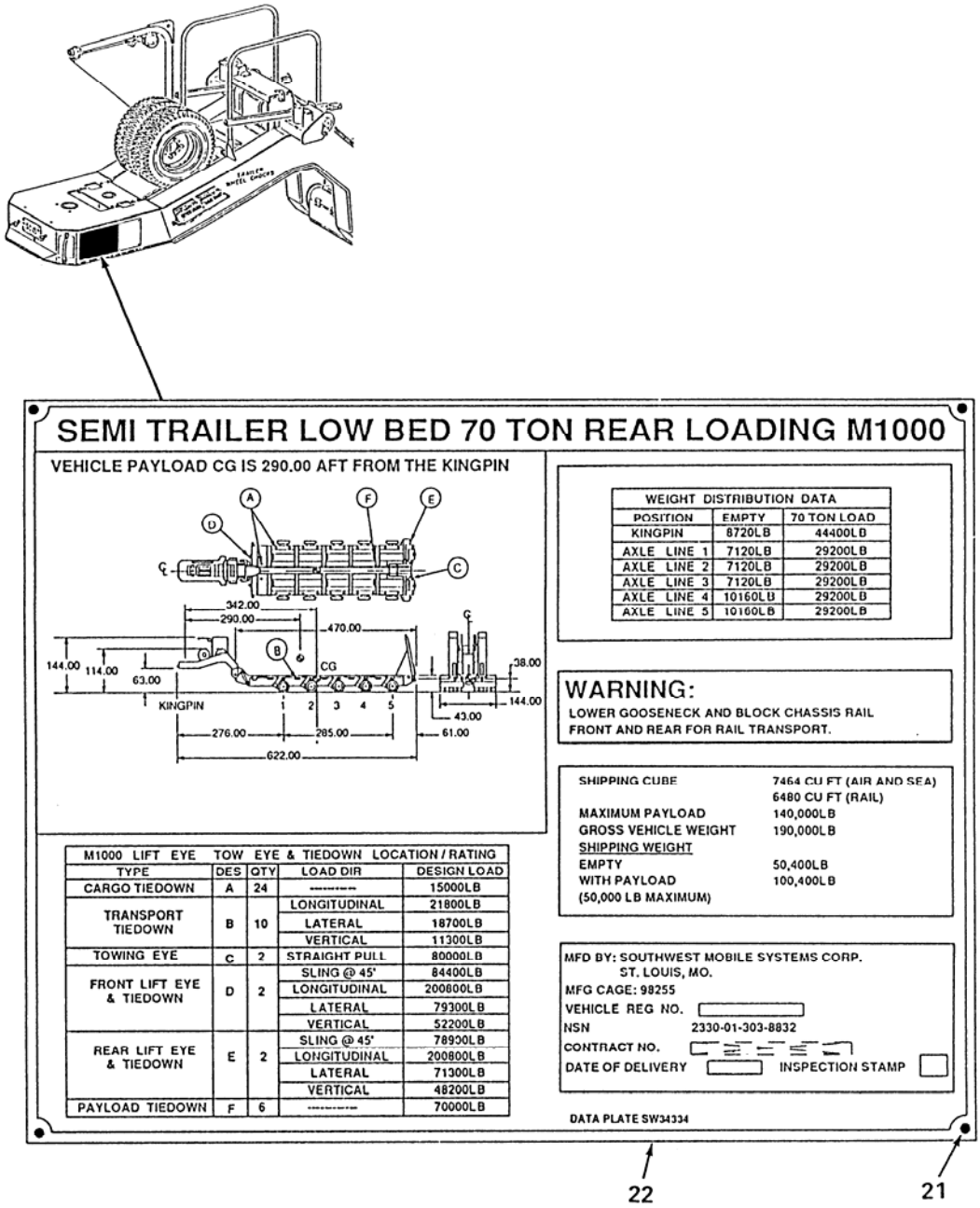
4-75. DATA PLATES, DECALS, AND STENCILS (CONT)

4. To install decal (23 or 24), refer to paragraph 4-105.

4.1. To install decal (25), position in APU control box cover and, using hand riveter, secure with two rivets (26).



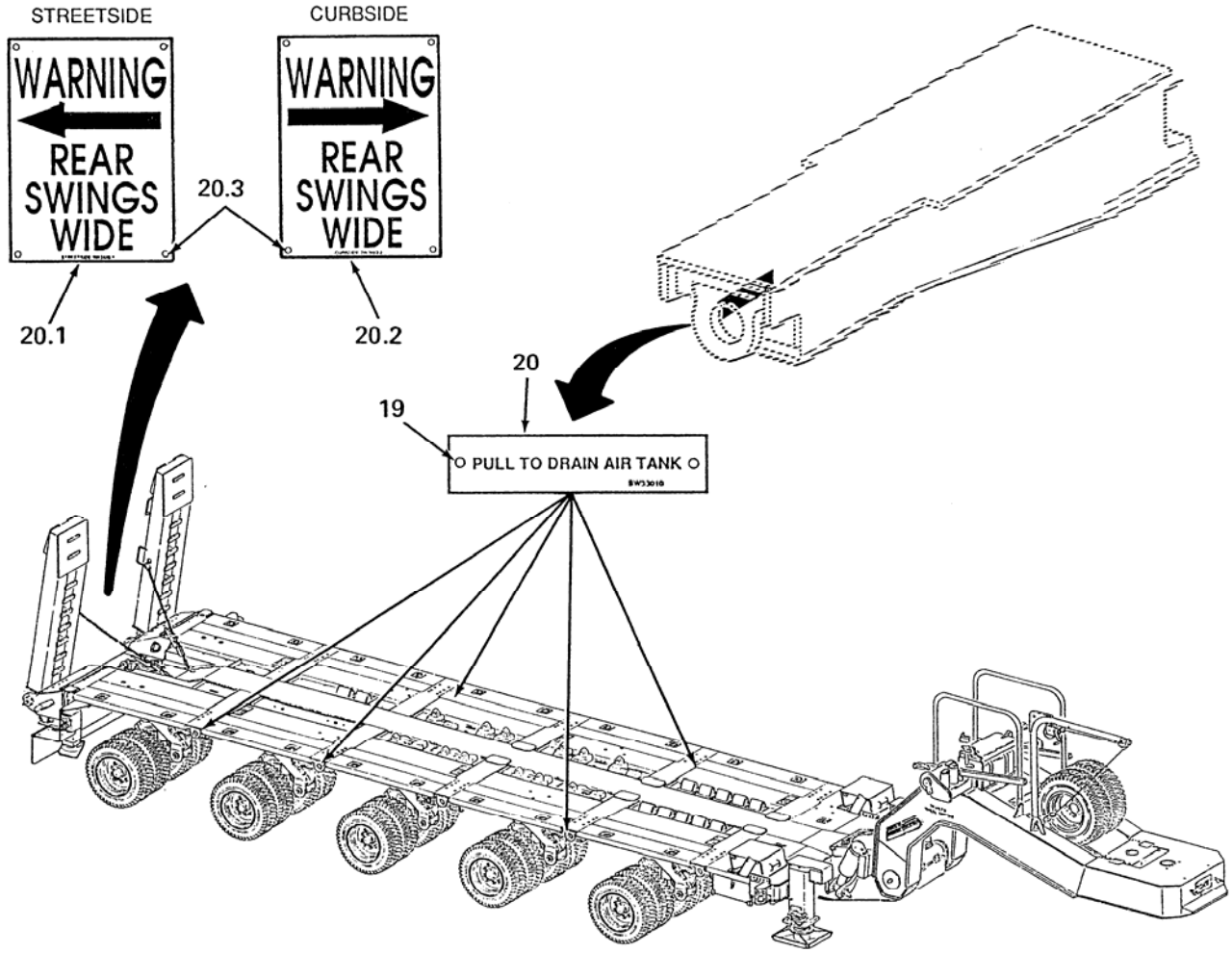
5. To install identification plate (22), position plate on used weld studs and secure with four locknuts (21).



4-75. DATA PLATES, DECALS, AND STENCILS (CONT)

5.1. To install decal (20.1 or 20.2), position decal on ramp and, using hand riveter, secure with four rivets (20.3).

6. To install any of five identification markers (20), position marker on weld studs and secure with two locknuts (19).

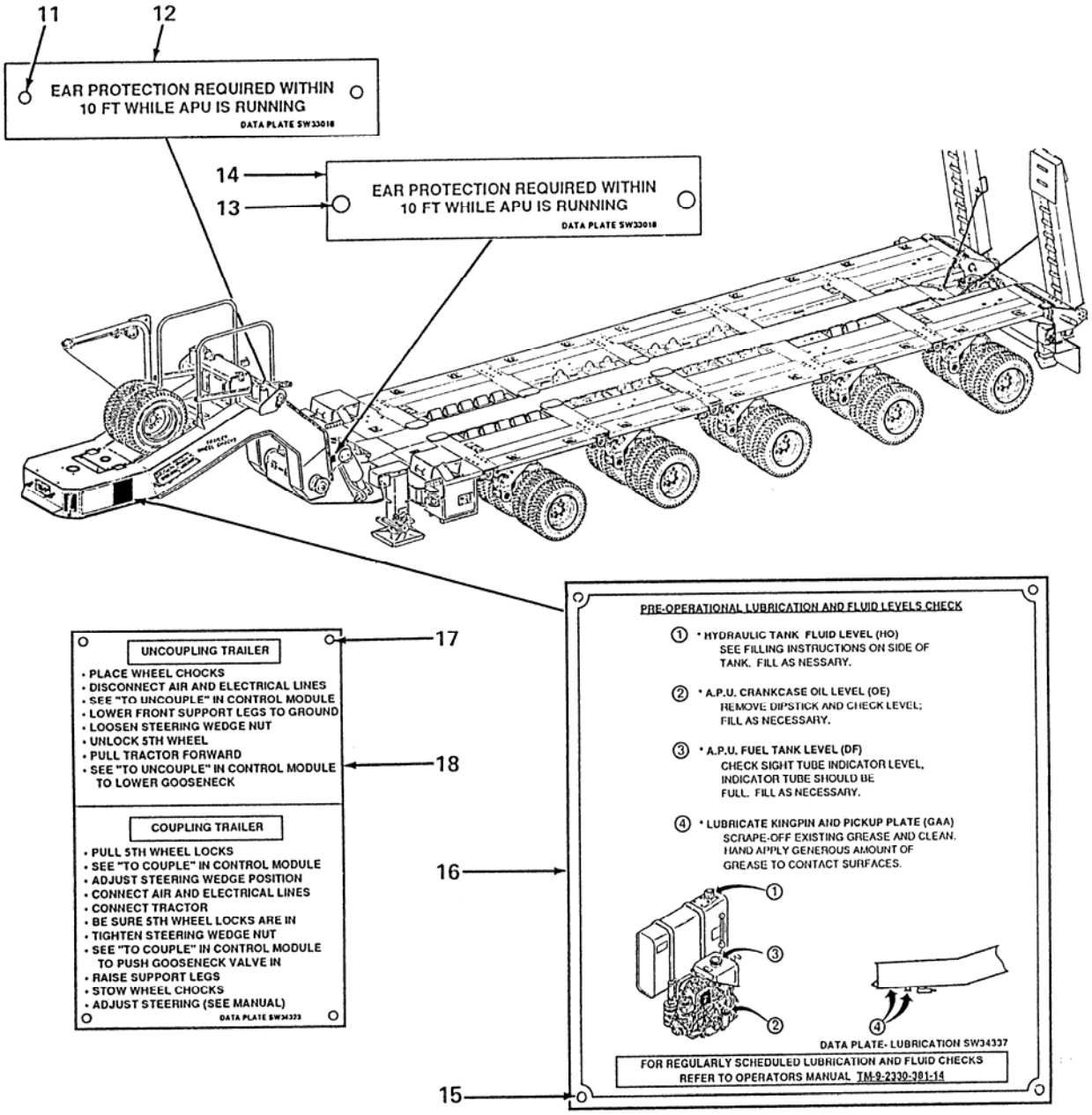


7. To install identification plate (18), position plate on weld studs and secure with four locknuts (17).

8. To install decal (16), position decal on weld studs and secure with four locknuts (15).

9. To install identification plate (14), position plate on weld studs and secure with two locknuts (13).

10. To install identification plate (12), position plate on gooseneck and, using hand riveter, secure with two rivets (11).



4-75. DATA PLATES, DECALS, AND STENCILS (CONT)

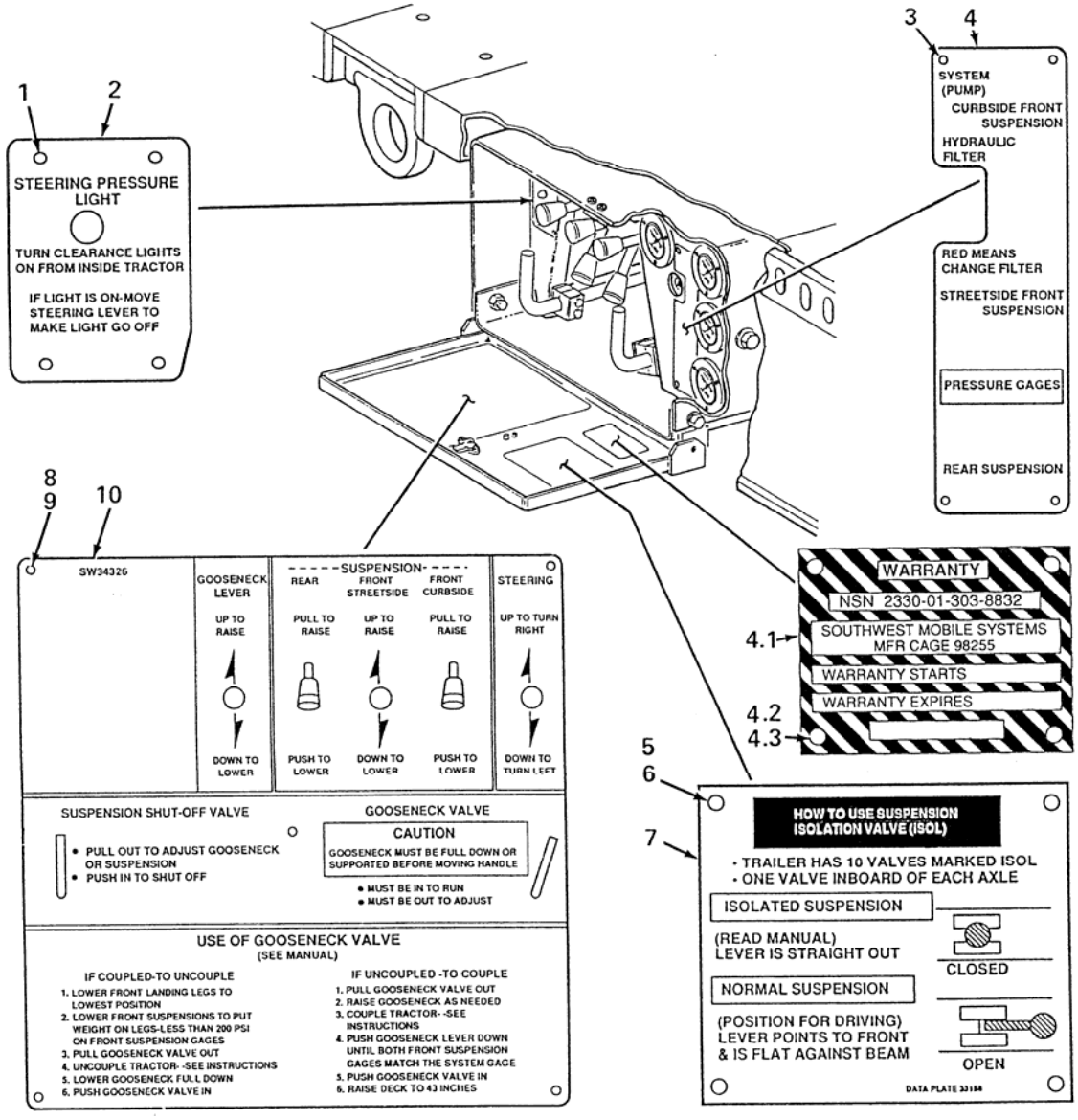
11. To install identification marker (10), position marker on inside of hydraulic control module access cover and, using hand riveter, secure with four washers (9) and four rivets (8).

12. To install decal (7), position decal on inside of hydraulic control module access cover and, using hand riveter, secure with four washers (6) and four rivets (5).

13. To install decal (4), position decal inside hydraulic control module and, using hand riveter, secure with four rivets (3).

13.1. To install decal (4.1), position decal on inside of hydraulic control module and, using hand riveter, secure with four washers (4.3) and rivets (4.2).

14. To install decal (2), position decal inside hydraulic control module and, using hand riveter, secure with four rivets (1).



4-76. HYDRAULIC PUMP

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

The following tools can be found in common tool kit no. 1, item 17, appx. B:
- Drain pan, 4 gl
- Extension light, 24 ft
- Wrench, 1-1/4" combination
- Goggles, industrial
- Gloves, chemical and oil protective

Materials/Parts

Cap and plug set, item 5, appx. E
Petroleum jelly, item 17, appx. E
Preformed packing (2)
Lockwasher (2)

Equipment Condition

Gooseneck supported at 64 inch (162.6 cm) height, if uncoupled (para. 2-18)
Battery negative (black) terminal disconnected from battery (para. 4-30)

General Safety Instructions

WARNING

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

Residual pressure may remain in hydraulic lines. Open fittings slowly or injury to personnel may result.

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

4-76. HYDRAULIC PUMP (CONT)

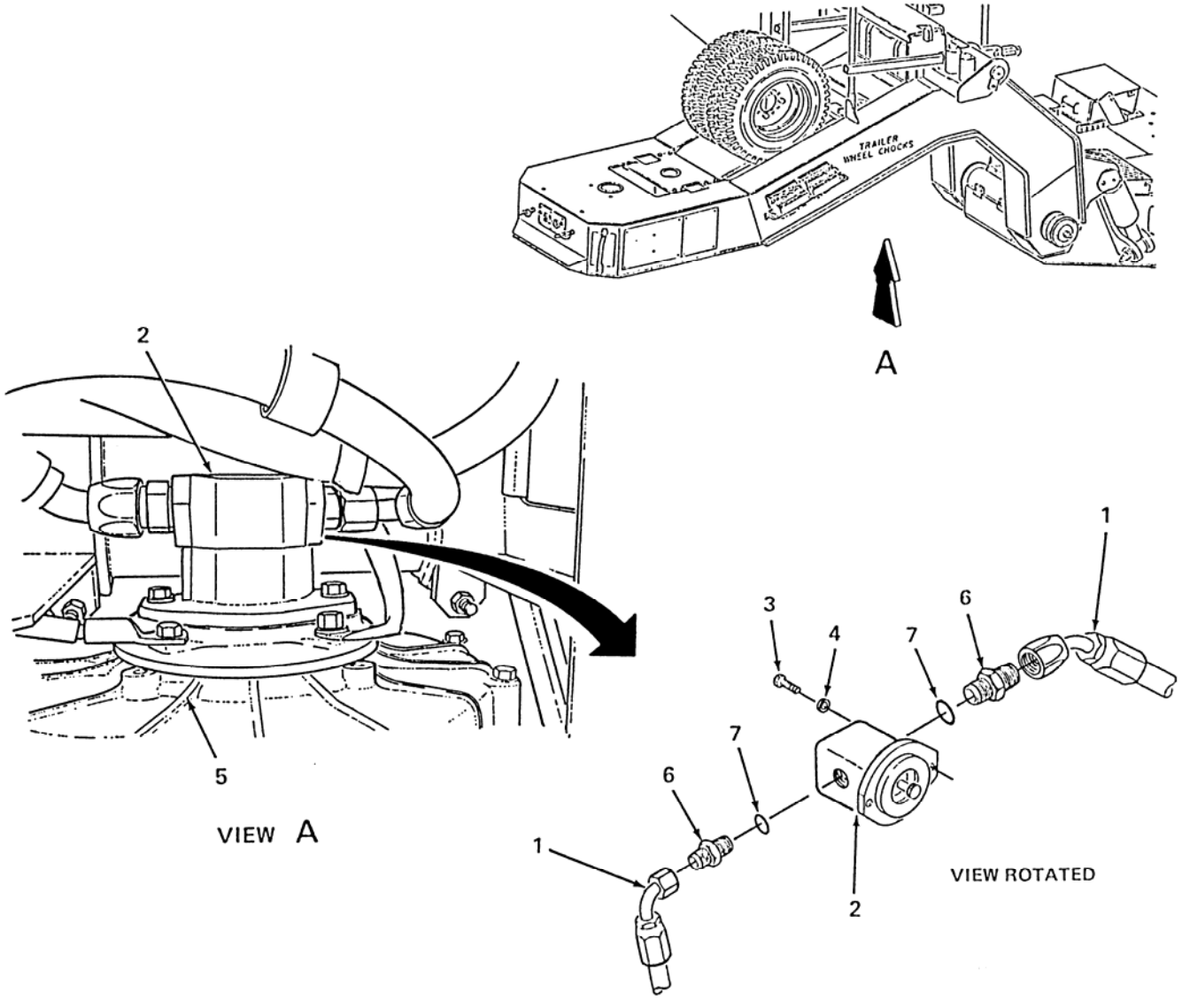
REMOVAL

1. Close hydraulic tank oil valve (para. 2-4).

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the hydraulic system or damage to equipment may result.

Both hydraulic lines must be capped immediately and secured at tank fluid level height or higher to prevent hydraulic fluid from siphoning from system.



2. Using a 1-1/4-inch combination wrench and a drain pan, tag and disconnect two hydraulic lines (1) from hydraulic pump (2). Install caps/plugs into hydraulic lines (1).

2.1. Use rope or tie wraps to secure ends of both hydraulic lines (1) at pump height or higher.

3. Remove two capscrews (3), lockwashers (4), and hydraulic pump (2) from APU (5). Discard lockwashers

4. Remove two straight pipe-to-tube adapters (6) from pump (2).

5. Remove preformed packings (7) from two straight pipe-to-tube adapters (6). Install caps/plugs into openings and discard two preformed packings.

INSPECTION

Inspect hydraulic pump for cracked housing, bent rotor shaft, broken or marred spline on rotor shaft, or seal leaks in area of rotor shaft. Replace hydraulic pump if any defects are found.

INSTALLATION

1. Lubricate two preformed packings (7) with petroleum jelly. Remove caps/plugs installed and install two preformed packings (7) onto two straight pipe-to-tube adapters (6).

2. Remove caps/plugs on two hydraulic hoses and install two straight pipe-to-tube adapters (6) and two hydraulic lines (1) to hydraulic pump (3).

3. Aline and install hydraulic pump (2) onto APU (5).

4. Secure hydraulic pump (2) to APU (5) with two lockwashers (4) and capscrews (5).

5. Open hydraulic tank oil valve (para. 2-6).

FOLLOW-ON MAINTENANCE

1. Reconnect battery negative (black) cable to battery (para. 4-30).

2. Perform hydraulic system check/fill (para. 4-17).

4-77. FOUR-WAY DIRECTIONAL CONTROL VALVE BANK

This task covers: a. Removal b. Disassembly c. Inspection d. Repair e. Assembly f. Installation

INITIAL SETUP

Tools

Isolation valve handle extension, item 1, appx. B
General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:

- Drain pan, 4 gl
- Extension light, 24 ft
- Wrench, 1-1/4" combination
- Degreaser tank, 20 gl
- Goggles, industrial
- Gloves, chemical and oil protective
- Creeper, mechanics
- Wrench, torque, 1/2" drive, 0-170 lb-ft

Materials/Parts

- Cap and plug set, item 5, appx. E
- Hydraulic fluid, item 13, appx. E
- Petroleum jelly, item 17, appx. E
- Cleaning compound solvent, item 25, appx. E
- Lockwasher (3)
- Preformed packing (10)
- Preformed packing (2)
- Lockwasher (6)
- Valve section repair kit (6)

Personnel Required: 2

Equipment Condition

Platform adjusted to 50 inch (127 cm) height (para. 2-19)
Suspension isolation valves at four corners of platform closed, handles facing outward (para. 2-6)
Hydraulic tank drained below system return line (para. 4-18)

General Safety Instructions

WARNING

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

Residual pressure may remain in hydraulic lines. Open fittings slowly or injury to personnel may result.

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

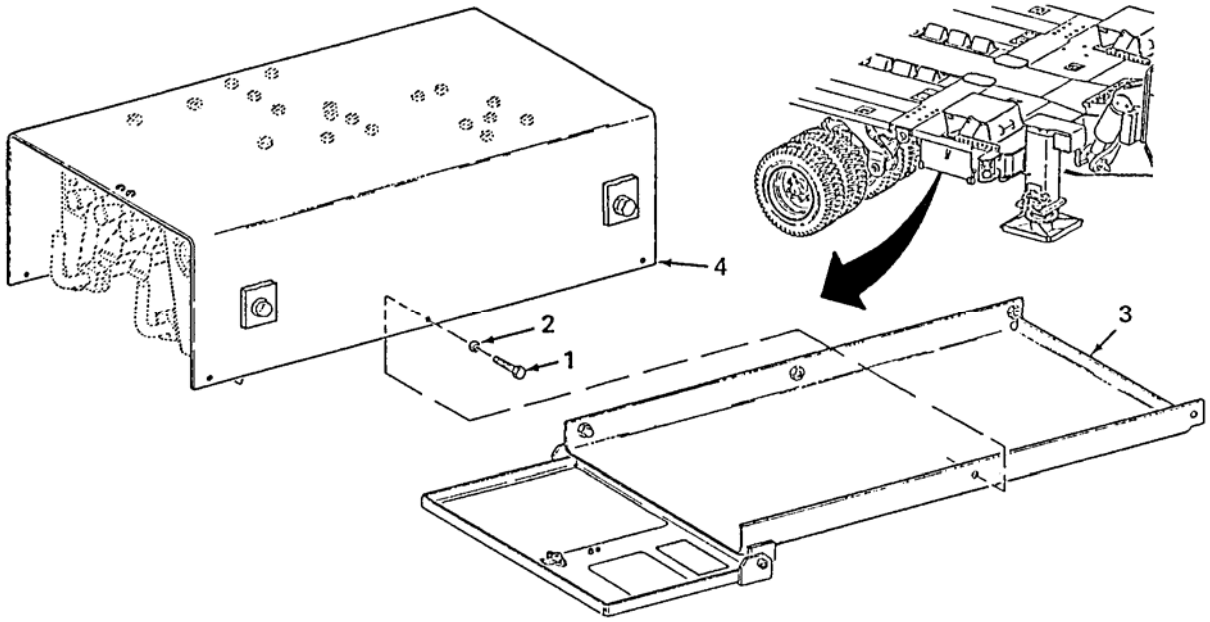
NOTE

When performing maintenance on hydraulic tubes and fittings, it is important to tag both ends of a tube or hose and tag all associated fittings with item numbers shown on the illustration. This method of tagging will ease installation.

REMOVAL

1. Make sure hydraulic control module door panel is lowered (para. 2-6).

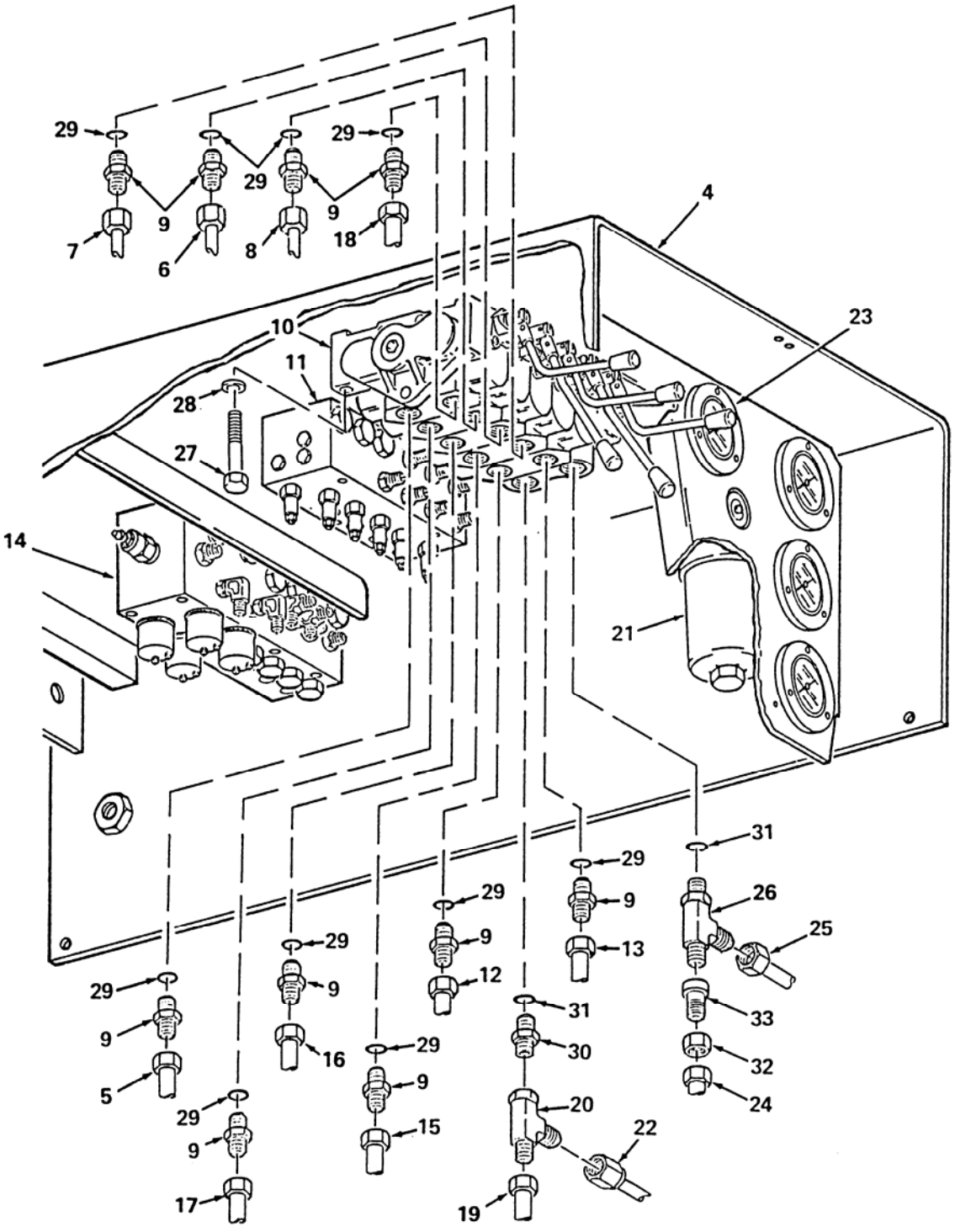
2. Using two people, remove six capscrews (1), lockwashers (2), and lower panel (3) from hydraulic control module (4). Carefully remove lower panel (3), with panel door attached, out from under semitrailer and place on platform. Discard six lockwashers.



3. Deleted.

4-77. FOUR-WAY DIRECTIONAL CONTROL VALVE BANK (CONT)

4. Position drain pan under hydraulic control module (4). Tag and disconnect four hydraulic tubes (5, 6, 7, and 8) from straight pipe to tube adapters (9) on 4-way directional control valve (10) and suspension manifold (11). Install caps/plugs into tube openings.



5. Tag and disconnect hydraulic tubes (12 and 13) from straight pipe-to-tube adapter (9) on 4-way directional control valve (10) and from steering manifold (14). Install caps/plugs into tube openings.

6. Tag and disconnect four hydraulic tubes (15, 16, 17, and 18) from four straight pipe-to-tube adapters (9) on 4-way directional control valve (10) and suspension manifold (11). Install caps/plugs into tube openings.

7. Tag and disconnect hydraulic tube (19) from tube tee (20) and from hydraulic filter (21). Using two wrenches, tag and disconnect hydraulic tube (22) from tube tee (20) on 4-way directional control valve (10) and from pressure gage (23). Install caps/plugs into tube openings.

8. Tag and disconnect hydraulic tubes (24 and 25) from tube to boss tee (26) on 4-way directional control valve (10) and from steering manifold (14). Install caps/plugs into tube openings.

9. Using one person, support 4-way directional control valve bank (10); using a second person, remove three capscrews (27), lockwashers (28), and 4-way directional control valve bank (10) from hydraulic control module (4). Discard lockwashers.

10. Using two people, move 4-way directional control valve bank (10) out from under hydraulic control module (4) and set on top of platform.

11. Remove 10 straight pipe-to-tube adapters (9) and preformed packings (29) from 4-way directional control valve bank (10). Discard preformed packings. Install caps/plug onto fittings and into valve bank openings.

12. Remove tube tee (13), pipe adapter (30), and preformed packing (31) from 4-way directional control valve bank (10). Discard preformed packing. Install caps/plug onto fitting and into valve bank opening.

13. Using a 1-1/4 inch wrench, remove tube coupling nut (32), tube reducer (33), tube to boss tee (22) and preformed packing (31) from 4-way directional control valve bank (10). Discard preformed packing. Install caps/plug onto fittings and into valve bank opening.

14. Remove all five valve handles from 4-way directional control valve bank (para. 4-81).

DISASSEMBLY

CAUTION

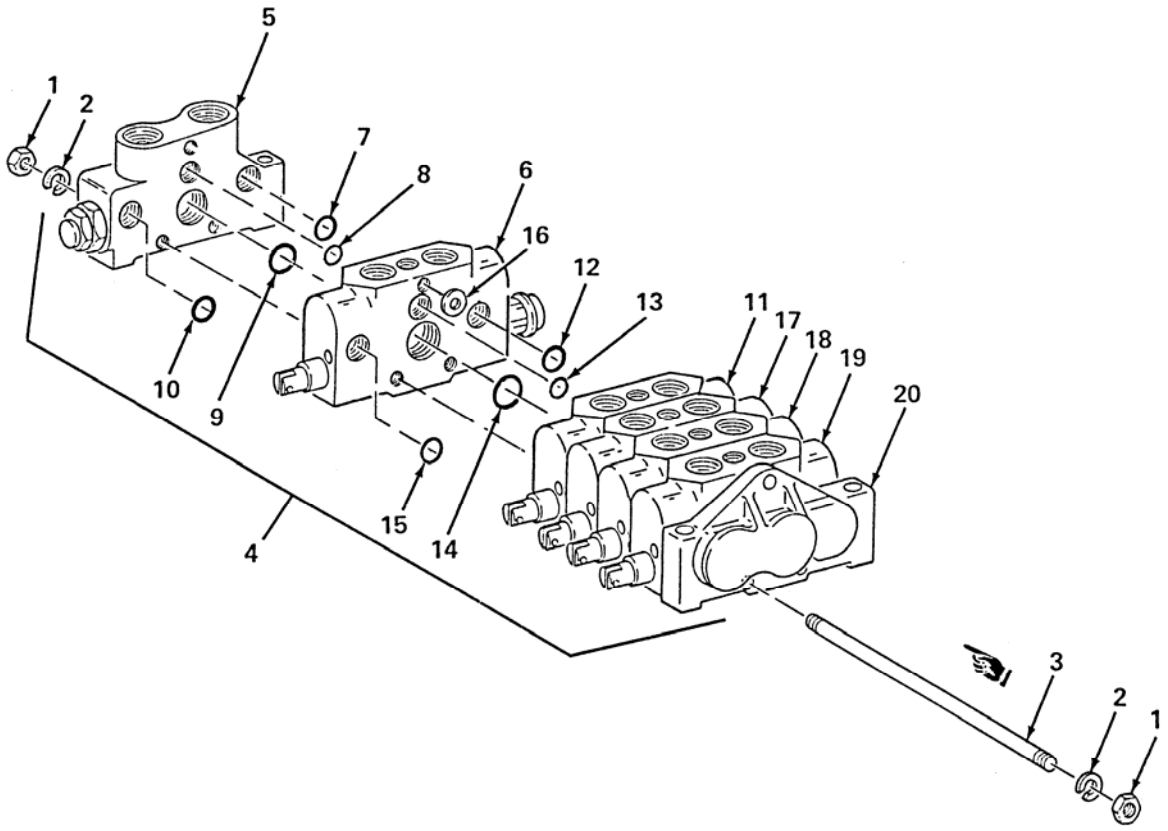
A clean area must be maintained during disassembly of the 4-way directional control valve bank or contaminates may enter one of the valve sections and cause premature failure of the valve bank or damage to equipment may result.

4-77. FOUR-WAY DIRECTIONAL CONTROL VALVE BANK (CONT)

NOTE

The stud assembly has a nut and lockwasher on each end. Use a tool at each end to hold one nut and loosen the other during removal of stud assembly.

1. Remove three nuts (1), lockwashers (2), and stud assemblies (3) from valve bank (4). Discard all lockwashers from stud assemblies (3).



2. Using a suitable prying device, carefully pry valve inlet (5) from linear directional control valve (6). Remove preformed packings (7, 8, 9, and 10) from valve inlet (5). Discard preformed packings.

3. Using a suitable prying device, carefully pry linear directional control valve (6) from linear directional control valve (11). Remove preformed packings (12, 13, 14, and 15) and shim (16) from linear directional control valve (6). Discard preformed packings and shim.

4. Repeat step 3 for disassembly/removal of all preformed packings/shims between linear directional control valves (11, 17, 18, and 19) and valve outlet (20). Remove and discard all preformed packings and shims.

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Clean all tubes, fittings, attaching hardware, linear directional control valves, valve inlet, and valve outlet sections in degreaser tank with cleaning compound solvent.

2. Inspect linear directional control valves, valve inlet, and valve outlet for pitting, cracks, and wear. If defective, replace valve sections as required.

WARNING

Compressed air used for cleaning/drying can create airborne particles that can injure the eyes. Always wear eye protection. Pressure must not exceed 30 psi (207 kPa) or injury to personnel may result.

3. Inspect all valve ports and openings for foreign objects, dirt, and clogged passageways. Use compressed air to clear clogged passageways.

4. Inspect all hydraulic tubes removed for kinks, pin hole leaks, pitted and split flares, and clogged passageways. Use compressed air to clear clogged passageways. Replace any defective tubes.

5. Pour clean hydraulic fluid onto linear directional control valves, valve inlet, and valve outlet to flush out contaminants.

REPAIR

Replace all parts found defective and replace all preformed packings and shims using respective repair kits.

4-77. FOUR-WAY DIRECTIONAL CONTROL VALVE BANK (CONT)

ASSEMBLY

1. Apply petroleum jelly to preformed packings (7, 8, 9, and 10). Install preformed packings (7, 8, 9, and 10) onto valve inlet (5).

CAUTION

One person must be used to hold the assembled pieces together during the entire assembly process until the stud assembly can be installed, or misalinement or damage to preformed packings may result.

2. Assemble valve inlet (5) to linear directional control valve (6). Once valve inlet (5) and control valve (6) are assembled, use one person to hold pieces together.

3. Apply petroleum jelly to preformed packings (12, 13, 14, and 15) and shim (16). Install preformed packings (12, 13, 14, and 15) and shim (16) onto linear directional control valve (6).

4. Assemble linear directional control valve (6) to linear directional control valve (11). Once linear directional control valve (6) and linear directional control valve (11) are assembled, use one person to hold all pieces together.

5. Repeat steps 3 and 4 as required to place all preformed packings (12, 13, 14, and 15) and shims (16) between linear directional control valves (17, 18, and 19) and valve outlet (20).

6. Aline and install three stud assemblies (3) through 4-way directional control valve bank (4) and secure with three nuts (1) and lockwashers (2). Using a torque wrench, torque three nuts (1) to 19 - 21 lb-ft (25.8 - 28.4 Nm).

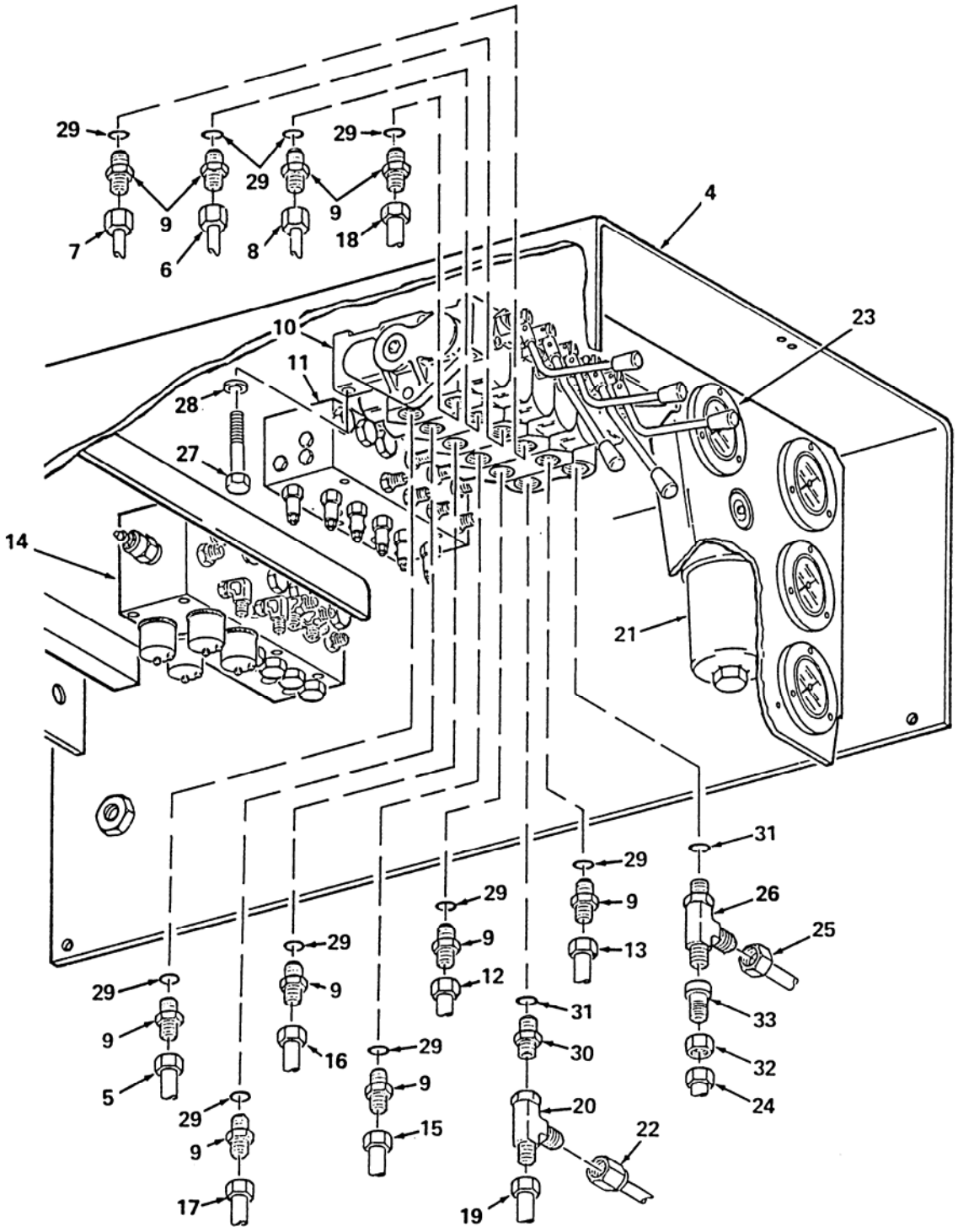
INSTALLATION

1. Aline and install all five valve handles to bank valve (para. 4-81).

2. Apply petroleum jelly to preformed packing (31). Remove caps/plugs installed and install preformed packing (31), tube to boss (32), tube reducer (33), and tube coupling nut (32) onto 4-way directional control valve bank (10).

3. Apply petroleum jelly to preformed packing (31). Remove caps/plugs installed and install preformed packing (31), pipe adapter (30), and tube tee (13) onto 4-way directional control valve bank (10).

4. Apply petroleum jelly to 10 preformed packings (29). Remove caps/plugs installed and install 10 preformed packings (29) and straight pipe to tube adapters (9) onto 4-way directional control valve bank (10).



5. Using one person, aline and support 4-way directional control valve bank (10) with hydraulic control module frame (4).

6. Using one person, hold the 4-way directional control valve bank (10) in place; using a second person, install three capscrews (22) and lockwashers (28).

4-77. FOUR-WAY DIRECTIONAL CONTROL VALVE BANK (CONT)

7. Remove caps/plugs installed in tubes (24 and 25). Install two hydraulic tubes (24 and 25) onto tube to boss tee (26) on 4-way directional control valve bank (10) and steering manifold (14).

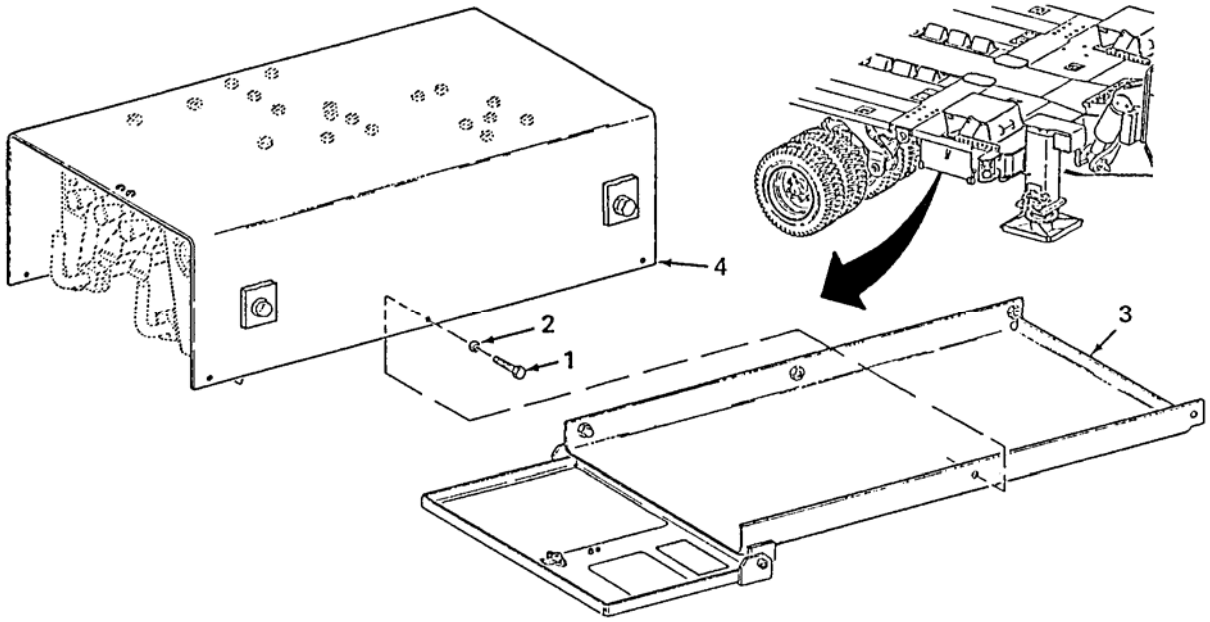
8. Remove caps/plugs installed in tubes (22 and 19). Using two wrenches, install hydraulic tube (22) onto tube tee (20) on 4-way directional control valve bank (10) and pressure gage (23). Install hydraulic tube (19) onto tube tee (20) on 4-way directional control valve bank (10) and hydraulic filter (21).

9. Remove caps/plugs installed in tubes (18, 17, 16, and 15). Install four hydraulic tubes (18, 17, 16, and 15) onto straight pipe-to-tube adapters (9) on 4-way directional control valve bank (10) and suspension manifold (11).

10. Remove caps/plugs installed in tubes (13 and 12). Install two hydraulic tubes (13 and 12) onto two straight pipe-to-tube adapters (9) on 4-way directional control valve bank (10) and steering manifold (14).

11. Remove caps/plugs installed in tubes (8, 7, 6, and 5). Install four hydraulic tubes (8, 7, 6, and 5) onto straight pipe-to-tube adapters (9) on 4-way directional control valve bank (10) and suspension manifold (11).

12. Using two people, aline and install lower panel (3), with door panel attached, onto hydraulic control module (4). Secure lower panel in place by installing six lockwashers (2) and capscrews (1).



FOLLOW-ON MAINTENANCE

1. Perform hydraulic system check/fill and refill hydraulic tank (para. 4-17).

2. Operate all hydraulic controls on 4-way directional control valve bank through several cycles and check for proper operation (chapter 2, section II).

3. Bleed air from hydraulic system (para. 4-19).

4-78. STEERING CONTROL MANIFOLD

This task covers: a. Removal b. Disassembly c. Inspection d. Repair e. Assembly f. Installation

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INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:
- Drain pan, 4 gl
- Extension light, 24 ft
- Creeper, mechanics
- Degreaser tank, 20 gl
- Goggles, industrial
- Gloves, chemical and oil protective
- Wrench, torque, 1/2" drive, 0-170 lb-ft

Materials/Parts

Cap and plug set, item 5, appx. E
Hydraulic fluid, item 13, appx. E
Petroleum jelly, item 17, appx. E
Cleaning compound solvent, item 25, appx. E
Lockwasher (4)
Preformed packing (4)
Preformed packing (13)
Check valve repair kit (4)
Check valve repair kit
Check valve repair kit (8)
Check valve repair kit (4)

Personnel Required: 2

4-78. STEERING CONTROL MANIFOLD (CONT)

Equipment Condition

Platform adjusted to 50 inch (127 cm) height (para. 2-19)
Suspension isolation valves at four corners of platform closed, handles facing outward (para. 2-6)
Hydraulic tank drained below system return line (para. 4-18)
Bottom cover of hydraulic control module removed and jumper wires to pressure switches removed (para. 4-33)

General Safety Instructions

WARNING

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

Residual pressure may remain in hydraulic lines. Open fittings slowly or injury to personnel may result.

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

NOTE

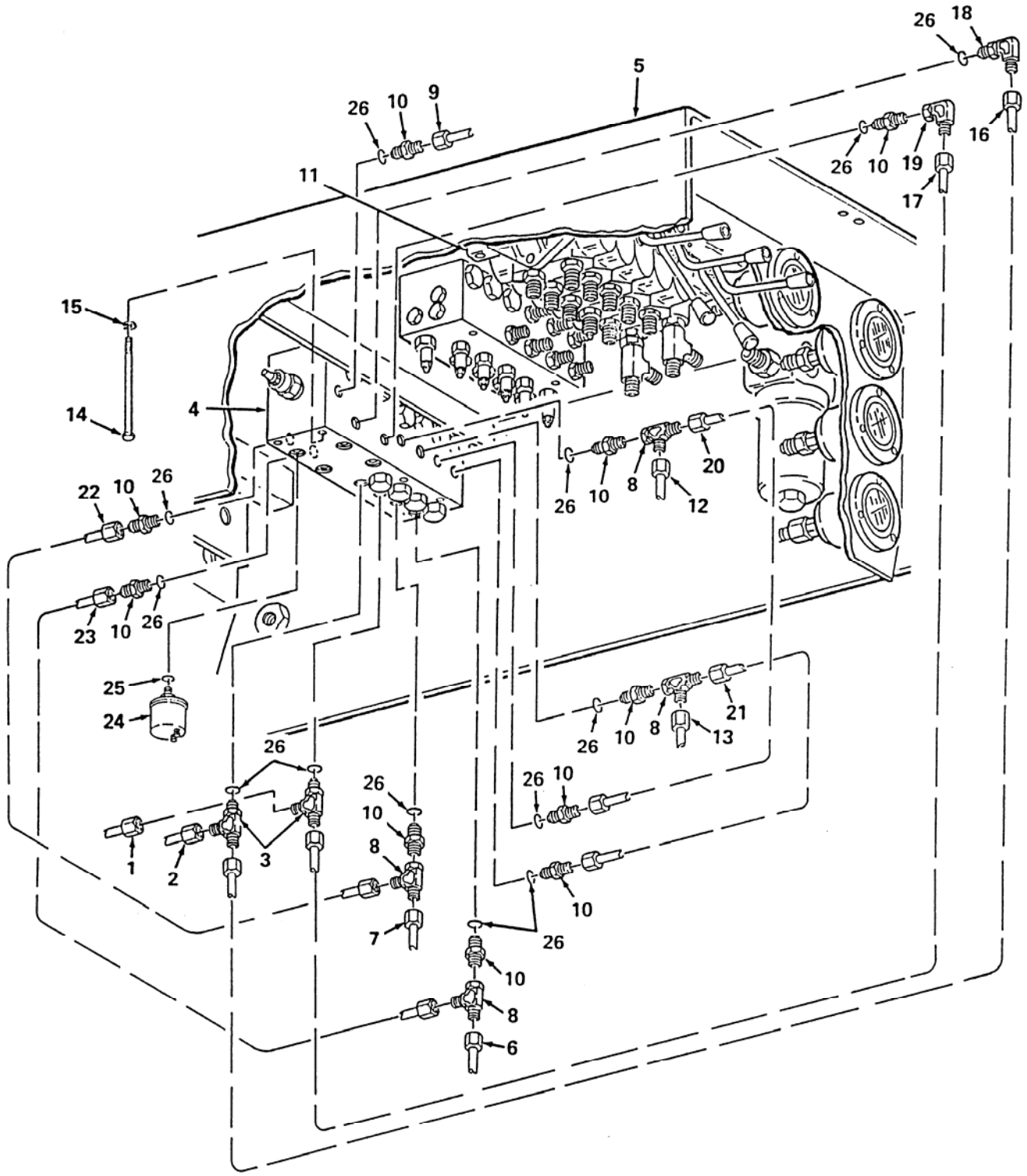
When performing maintenance on hydraulic tubes and fittings, it is important to tag both ends of a tube or hose and tag all associated fittings with item numbers shown on the illustration. This method of tagging will ease installation.

REMOVAL

1. Using a drain pan, tag and disconnect two hydraulic tubes (1 and 2) from two tube to boss tees (3) on steering manifold (4) on hydraulic control module (5). Install caps/plugs into openings.

2. Tag and disconnect two hydraulic tubes (6 and 7) from two tube tees (8) on steering manifold (4). Install caps/plugs into openings.

3. Tag and disconnect hydraulic tube (9) from straight pipe-to-tube adapter (10) on steering control manifold (4) and 4-way directional control valve bank (11). Install caps/plugs into openings.



4. Tag and disconnect two hydraulic tubes (12 and 13) from tube tees (8) on steering control manifold (4) and 4-way directional control valve bank (11). Install caps/plugs into openings.

4-78. STEERING CONTROL MANIFOLD (CONT)

5. Using one person, support steering control manifold (4); using a second person, remove four capscrews (14), lockwashers (15), and steering control manifold (4) from hydraulic control module frame (5). Set steering control manifold (4) onto platform. Discard lockwashers.

6. Tag and disconnect two hydraulic tubes (16 and 17) from two tube tees (3), tube-to-boss elbow (18), and tube elbow (19) on steering control manifold (4). Install caps/plugs into openings.

7. Tag and disconnect two hydraulic tubes (20 and 21) from two tube tees (8) and straight pipe-to-tube adapters (10) on steering control manifold (4). Install caps/plugs into openings.

8. Tag and disconnect two hydraulic tubes (22 and 23) from two tube tees (8) and straight pipe-to-tube adapters (10) on steering control manifold (4). Install caps/plugs into openings.

9. Tag and disconnect four pressure switches (24) and preformed packings (25) from steering control manifold (4). Discard preformed packings. Install caps/plugs into openings.

10. Unscrew and remove four tube tees (8) and tube elbow (19) from five straight pipe-to-tube adapters (10). Install caps/plugs onto fittings.

11. Unscrew and remove two tube-to-boss tees (3) and preformed packings (26) from steering control manifold (4). Discard preformed packings and install caps/plugs onto tube to boss tees.

12. Tag and disconnect 10 straight pipe-to-tube adapters (11) and remove 10 preformed packings (26). Tag and remove tube-to-boss elbow (18) and preformed packing (26). Discard preformed packings and install caps/plugs into openings and onto fittings.

DISASSEMBLY

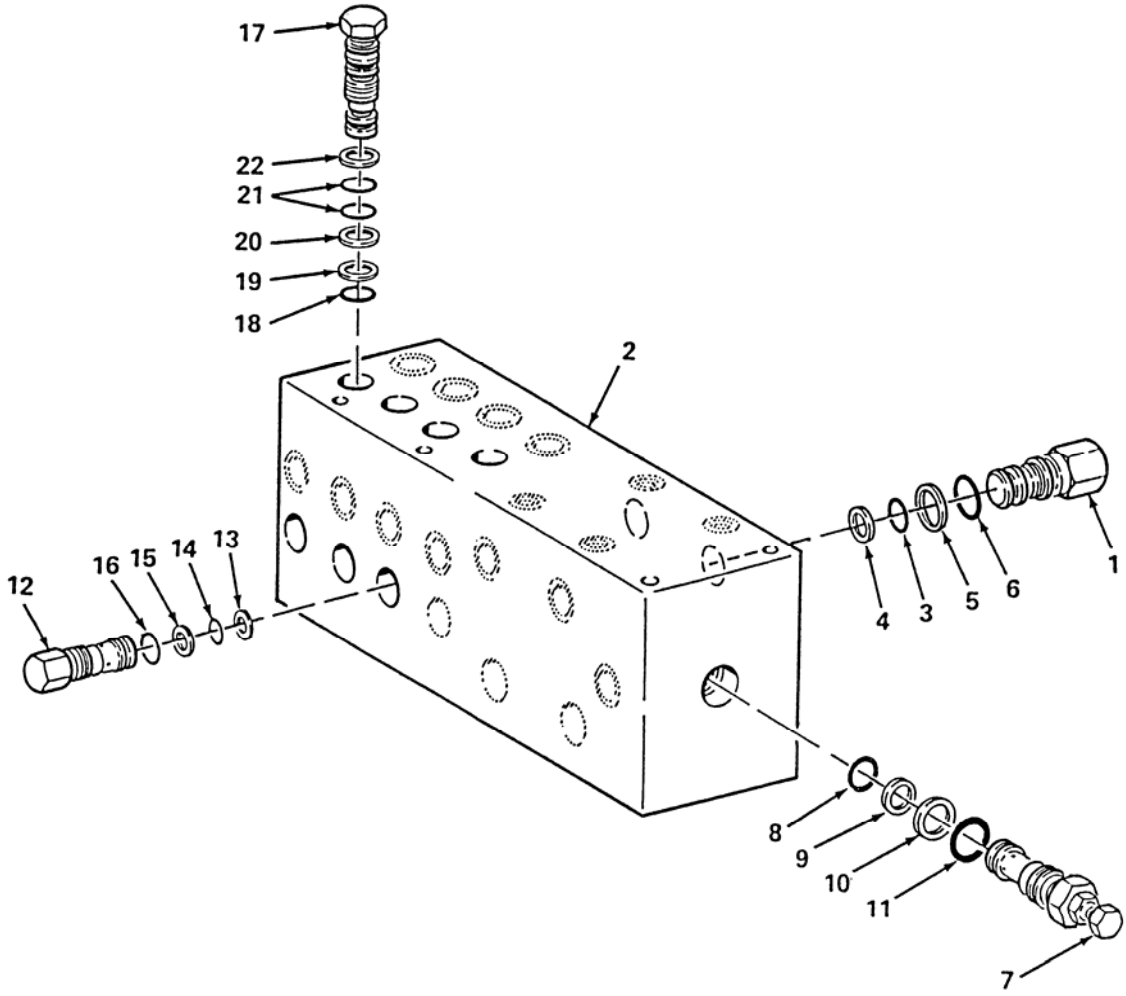
CAUTION

A clean area must be maintained during disassembly of the steering control manifold or contaminates may enter one of the cartridges and cause premature failure of the manifold.

1. Remove four CXDA XAN check valves (1), as required, from steering control manifold (2). Install caps/plugs into all openings.

2. Disassemble CXDA XAN check valve (1) as follows:

   a. Remove backup ring (3), preformed packing (4), backup ring (5), and preformed packing (6) from CXDA XAN check valve (1). Discard preformed packings and backup rings.



b. Repeat step a as required for disassembly of remaining CXDA XAN check valves (1).

3. Remove RPEC LCN safety relief valve (7) from steering control manifold (2). Install caps/plugs into openings.

4. Disassemble RPEC LCN safety relief valve (7) by removing preformed packing (8), backup ring (9), backup ring (10), and preformed packing (11) from RPEC LCN safety relief valve (7). Discard preformed packings and backup rings.

5. Remove eight check valves (12) as required from steering control manifold (2). Install caps/plugs into openings.

6. Disassemble check valve (12) as follows:

a. Remove backup ring (13), preformed packing (14), backup ring (15), and preformed packing (16) from check valve (12). Discard preformed packings and backup rings.

b. Repeat step a as required for disassembly of remaining check valves (12).

4-78. STEERING CONTROL MANIFOLD (CONT)

7. Remove four CKCB XCN check valves (17) as required from steering control manifold (2). Install caps/plugs into all openings.

8. Disassemble CKCB XCN check valve (17) as follows:

   a. Remove preformed packing (18), backup rings (19 and 20), two preformed packings (21), and backup ring (22) from CKCB XCN check valve (17). Discard preformed packings and backup rings.

   b. Repeat step a as required for disassembly of remaining CKCB XCN check valves (17).

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Clean all tubes, fittings, attaching hardware, steering control manifold, safety relief valve, and all check valves in degreaser tank with cleaning compound solvent.

2. Inspect safety relief valve and all check valves for pitting, cracks, and wear. If defective, replace parts as required.

WARNING

Compressed air used for cleaning/drying can create airborne particles that can injure the eyes. Always wear eye protection. Pressure must not exceed 30 psi (207 kPa) or injury to personnel may result.

3. Inspect all ports and openings in steering control manifold, safety relief valve, and all check valves for foreign objects, dirt, and clogged passageways. Use compressed air to clear clogged passageways.

4. Inspect all hydraulic tubes removed for kinks, pin hole leaks, pitted and split flares, and clogged passageways. Use compressed air to clear clogged passageways. Replace any defective tubes.

5. Pour clean hydraulic fluid into steering control manifold, safety relieve valve, and all check valves to flush out contaminants.

REPAIR

Replace all parts found defective and replace all preformed packings and backup rings using respective repair kits.

ASSEMBLY

CAUTION

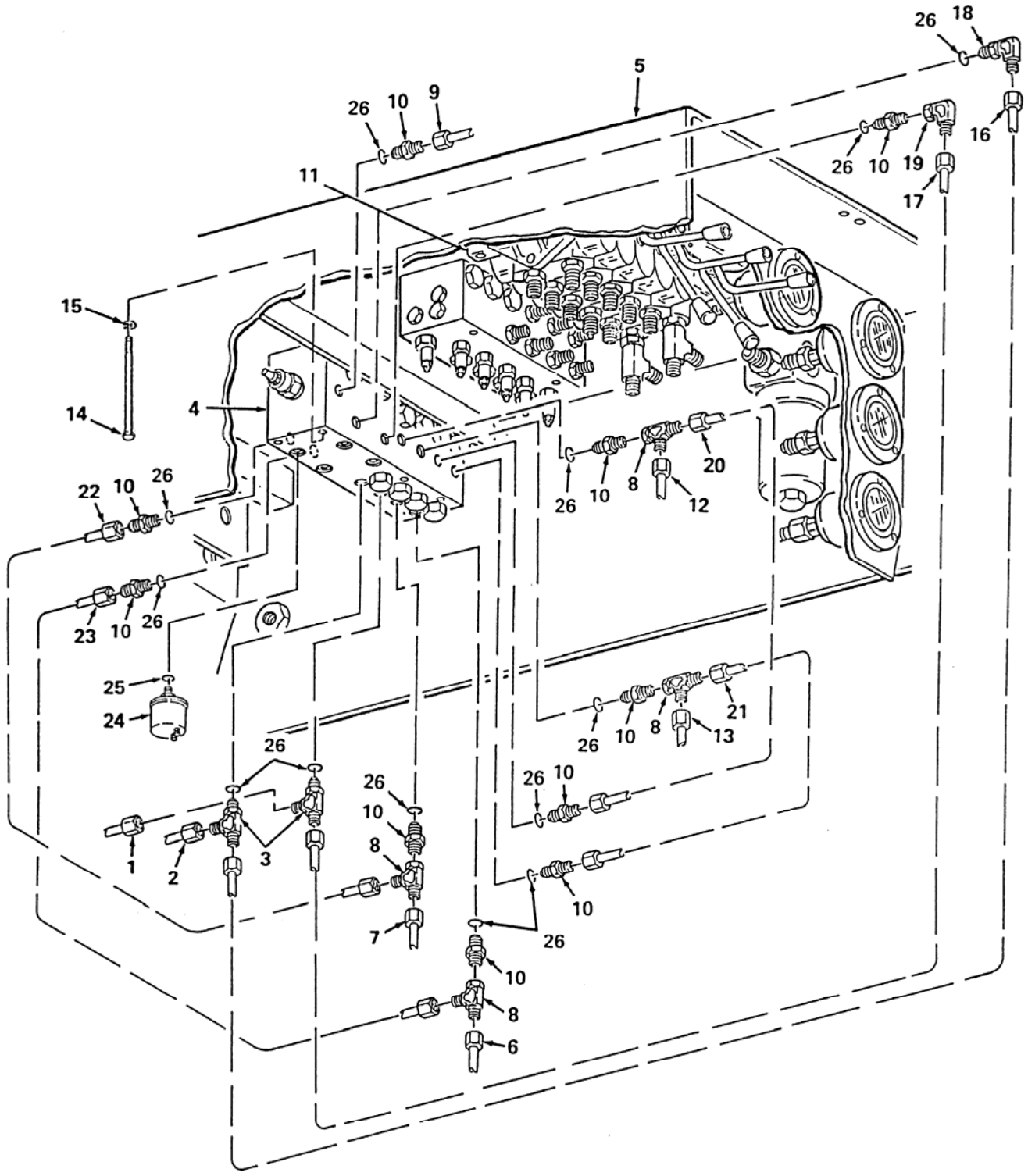
As the safety relief valve and check valves are assembled, the arrangement of preformed packings and backup rings is extremely important. If the preformed packing and backup rings are improperly installed, internal leakage or premature equipment failure may result. Use the illustration shown for proper arrangement of parts.

1. Apply petroleum jelly to preformed packings (21 and 18) and backup rings (22, 20, and 19).
2. Install backup ring (22), two preformed packings (21), backup rings (20 and 19), and preformed packing (18) onto CKCB XCN check valve (17).
3. Repeat steps 1 and 2 as required for all CKCB XCN check valves (17) disassembled.
4. Remove caps/plugs installed into steering control manifold (2) and install four CKCB XCN check valves (17) as required into steering control manifold (2).
5. Apply petroleum jelly to preformed packings (16 and 14) and backup rings (15 and 13).
6. Install preformed packing (16), backup ring (15), preformed packing (14), and backup ring (13) onto check valve (12).
7. Repeat steps 5 and 6 as required for all check valves (12) disassembled.
8. Remove caps/plugs installed into steering control manifold (2) and install eight check valves (12) as required into steering control manifold (2).
9. Apply petroleum jelly to preformed packings (11 and 8) and backup rings (10 and 9).
10. Install preformed packing (11), backup ring (10), backup ring (9), and preformed packing (8) onto RPEC LCN safety relief valve (7).
11. Remove caps/plugs installed into steering control manifold (2) and install RPEC LCN safety relief valve (7) into steering control manifold (2).
12. Apply petroleum jelly to preformed packings (6 and 4) and backup rings (5 and 3).
13. Install preformed packing (6), backup ring (5), preformed packing (4), and backup ring (3) onto CXDA XAN check valve (1).
14. Repeat steps 12 and 13 as required for all CXDA XAN check valves (1) disassembled.
15. Remove caps/plugs installed into steering control manifold (2) and install four CXDA XAN check valves (1) as required into steering control manifold (2).

4-78. STEERING CONTROL MANIFOLD (CONT)

INSTALLATION

1. Apply petroleum jelly to 13 preformed packings (26) and 4 preformed packings (25).



2. Remove caps/plugs installed into fitting ports on steering control manifold (4) and on tube-to-boss elbow (18). Install preformed packing (26) onto tube-to-boss elbow (18). Install tube-to-boss elbow (18) into steering control manifold (4).

3. Remove caps/plugs installed into fitting ports on steering control manifold (4) and onto straight pipe-to-tube adapters (10). Install 10 preformed packings (26) onto straight pipe-to-tube adapters (10). Install 10 straight pipe-to-tube adapters (10) into place on steering control manifold (4).

4. Remove caps/plugs installed into fitting ports on steering control manifold (4) and on tube-to-boss tees (3). Install two preformed packings (26) onto tube to boss tees (3). Install two tube-to-boss tees (3) into steering control manifold (4).

5. Remove caps/plugs installed onto four tube tees (8) and tube elbow (19). Install four tube tees (8) and tube elbow (19) onto five straight pipe-to-tube adapters (10) on steering control manifold (4).

6. Remove caps/plugs installed into fitting ports on steering control manifold (4) and four pressure switches (24). Install four preformed packings (25) onto four pressure switches (24) and install four pressure switches (23) into steering control manifold (4).

7. Remove caps/plugs installed on two hydraulic tubes (23 and 22). Install two hydraulic tubes (23 and 22) between two tube tees (8) and straight pipe-to-tube adapters (10).

8. Remove caps/plugs installed on two hydraulic tubes (21 and 20). Install two hydraulic tubes (21 and 20) between two tube tees (8) and straight pipe-to-tube adapters (10).

9. Remove caps/plugs installed on two hydraulic tubes (17 and 16). Install two hydraulic tubes (17 and 16) between two tube tees (3) and tube elbow (19) and tube-to-boss elbow (18).

10. Using one person, aline and support steering control manifold (4) with hydraulic control module frame (5).

11. With first person holding steering control manifold (4) in place, use a second person to install three capscrews (14) and lockwashers (15).

12. Remove caps/plugs installed on two hydraulic tubes (13 and 12). Install two hydraulic tubes (13 and 12) onto two tube tees (8) on steering control manifold (4) and 4-way directional control valve bank (11).

13. Remove caps/plugs installed in hydraulic tube (9). Install hydraulic tube (9) onto straight pipe-to-tube adapter (10) on steering control manifold (4) and 4-way directional control valve bank (11).

14. Remove caps/plugs installed on two hydraulic tubes (6 and 7). Connect two hydraulic tubes (6 and 7) onto two tube tees (8) on steering control manifold (4).

4-78. STEERING CONTROL MANIFOLD (CONT)

15. Remove caps/plugs installed on two hydraulic tubes (2 and 1). Connect two hydraulic tubes (2 and 1) onto two tube-to-boss tees (3) on steering control manifold (4).

FOLLOW-ON MAINTENANCE

1. Perform hydraulic system check/fill and refill hydraulic tank (para. 4-17).

2. Manually adjust steering (para. 2-18) and check for proper operation.

3. Bleed air from hydraulic system (para. 4-19).

4-79. SUSPENSION CONTROL MANIFOLD

This task covers: a. Removal b. Disassembly c. Inspection d. Repair e. Assembly f. Installation

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INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:

Drain pan, 4 gl	Goggles, industrial
Extension light, 24 ft	Gloves, chemical and oil protective
Creeper, mechanics	Degreaser tank, 20 gl

Materials/Parts

Cap and plug set, item 5, appx. E
Hydraulic fluid, item 13, appx. E
Petroleum jelly, item 17, appx. E
Cleaning compound solvent, item 25, appx. E
Lockwasher (3)
Preformed packing (20)
Cartridge repair kit (5)
Cartridge repair kit (1)
Cartridge repair kit (4)

Personnel Required: 2

Equipment Condition

Platform adjusted to 50 inch (127 cm) height (para. 2-19)
Suspension isolation valves at four corners of platform closed, handles facing outward (para. 2-6)
Hydraulic tank drained below system return line (para. 4-18)

General Safety Instructions

WARNING

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

Residual pressure may remain in hydraulic lines. Open fittings slowly or injury to personnel may result.

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

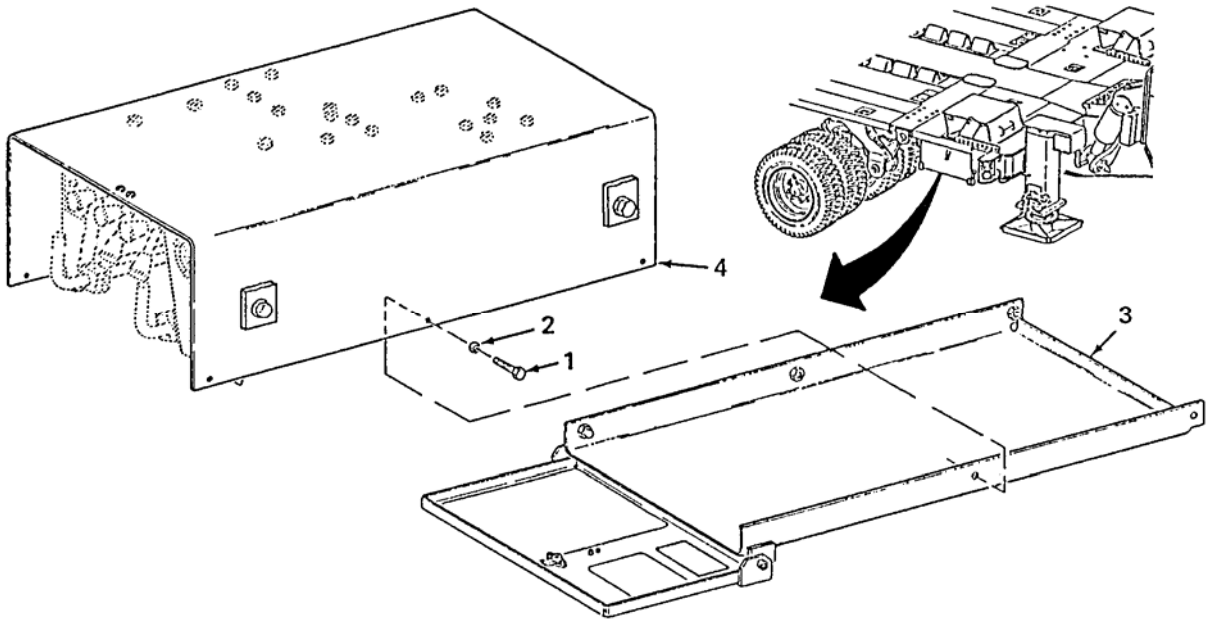
NOTE

When performing maintenance on hydraulic tubes and fittings, it is important to tag both ends of a tube or hose and tag all associated fittings with item numbers shown on the illustration. This method of tagging will ease installation.

REMOVAL

1. Make sure hydraulic control module door panel is lowered (para. 2-6).

2. Using two people, remove six capscrews (1), lockwashers (2), and lower panel (3) from hydraulic control module (4). Carefully remove lower panel (3), with panel door attached, out from under semitrailer and place on platform. Discard six lockwashers.



4-79. SUSPENSION CONTROL MANIFOLD (CONT)

3. Remove clamp block and handle of suspension shut-off valve from hydraulic control module (para. 4-84).

4. Using a drain pan, tag and disconnect four hydraulic tubes (5, 6, 7, and 8) from four straight pipe-to-tube adapters (9) on suspension control manifold (10) and 4-way directional control valve bank (11). Install caps/plugs into tube openings.

5. Tag and disconnect five hydraulic tubes (12, 13, 14, 15, and 16) from five straight pipe-to-tube adapters (9) on suspension control manifold (10) and suspension shut-off valve (17). Install caps/plugs into tube openings.

6. Tag and disconnect hydraulic tube (18) from straight pipe-to-tube adapter (9) on suspension control manifold (10) and bulkhead fitting at back of control module (4). Install caps/plugs into tube.

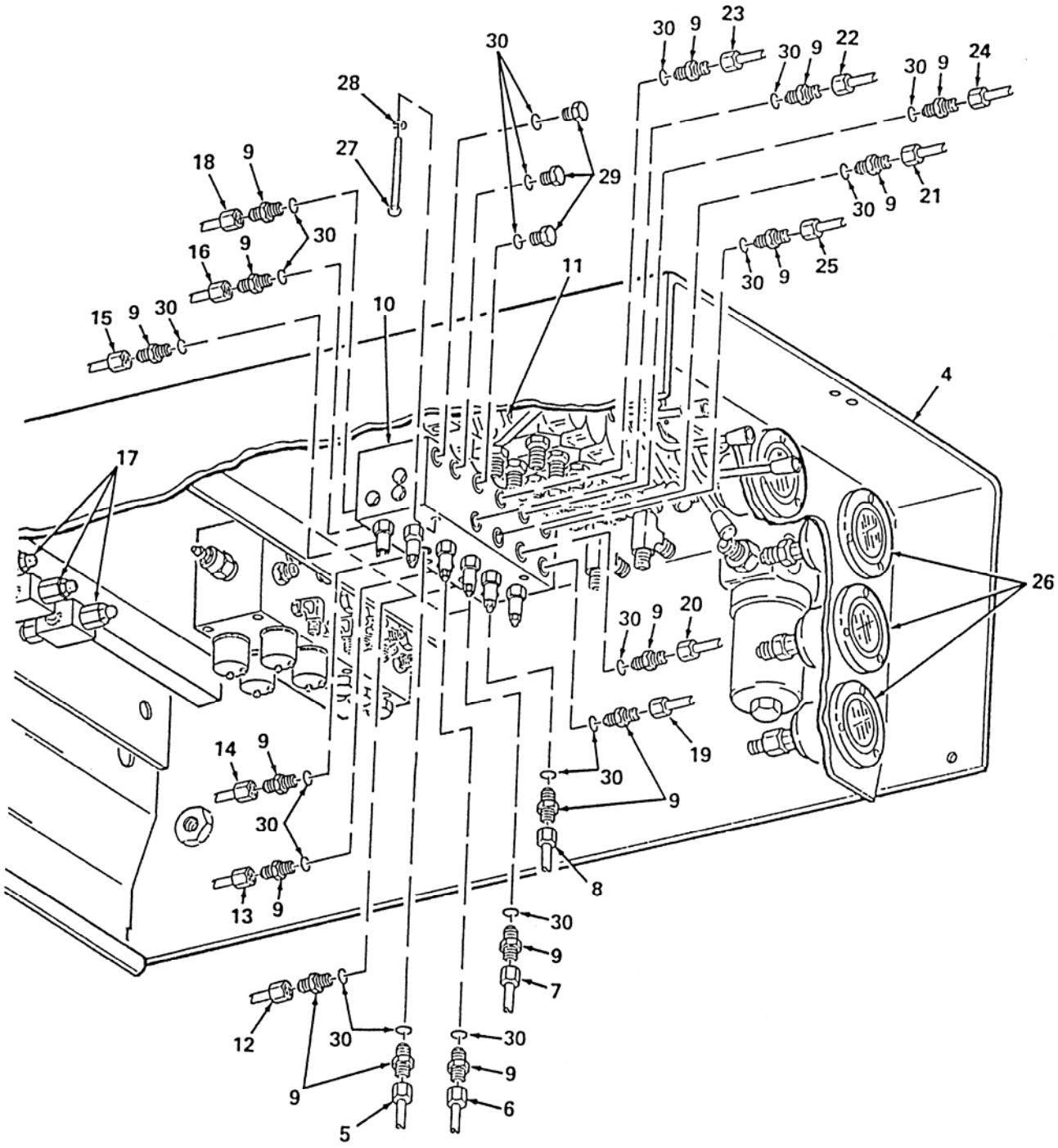
7. Tag and disconnect four hydraulic tubes (19, 20, 21, and 22) from four straight pipe-to-tube adapters (9) on suspension control manifold (10) and 4-way directional control valve bank (11). Install caps/plugs into tube openings.

8. Using two wrenches, tag and disconnect three hydraulic tubes (23, 24, and 25) from three straight pipe-to-tube adapters (9) on suspension control manifold and fittings on three pressure gages (26). Install caps/plugs into tubes and onto gage fittings.

9. Using one person, support suspension control manifold (10); using a second person, remove three capscrews (27), lockwashers (28), and suspension control manifold (10) from hydraulic control module frame (4). Set suspension control manifold (10) on platform. Discard lockwashers.

10. Remove three tube fitting plugs (29) and three preformed packings (30). Discard preformed packings and install caps/plugs into openings.

11. Remove 17 straight pipe-to-tube adapters (9) and preformed packings (30) from suspension control manifold (10). Discard preformed packings and install caps/plugs into manifold openings and onto fittings.


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4-79. SUSPENSION CONTROL MANIFOLD (CONT)

DISASSEMBLY

CAUTION

A clean area must be maintained during disassembly of the suspension control manifold or contaminates may enter one of the cartridges and cause premature failure of the manifold.

1. Remove five CBCG LCN cartridge valves (1) from suspension control manifold (2). Install caps/plugs into all openings.

2. Disassemble CBCG LCN cartridge valve (1) as follows:

   a. Remove preformed packing (3), backup rings (4 and 5), preformed packings (6 and 7), and backup ring (8). Discard preformed packings and backup rings.

   b. Repeat step a as required for disassembly of remaining CBCG LCN cartridge valves (1).

3. Remove CBCA LAN cartridge valve (9) from suspension control manifold (2). Install caps/plugs into all openings.

4. Disassemble CBCA LAN cartridge valve (9) by removing preformed packing (10), backup rings (11 and 12), preformed packings (13 and 14), and backup ring (15). Discard preformed packings and backup rings.

5. Remove four FCCB XAN flow regulating valves (16) from suspension control manifold (2). Install caps/plugs into all openings.

6. Disassemble FCCB XAN flow regulating valve (16) as follows:

   a. Remove preformed packing (17), backup rings (18 and 19), and preformed packing (20). Discard preformed packings and backup rings.

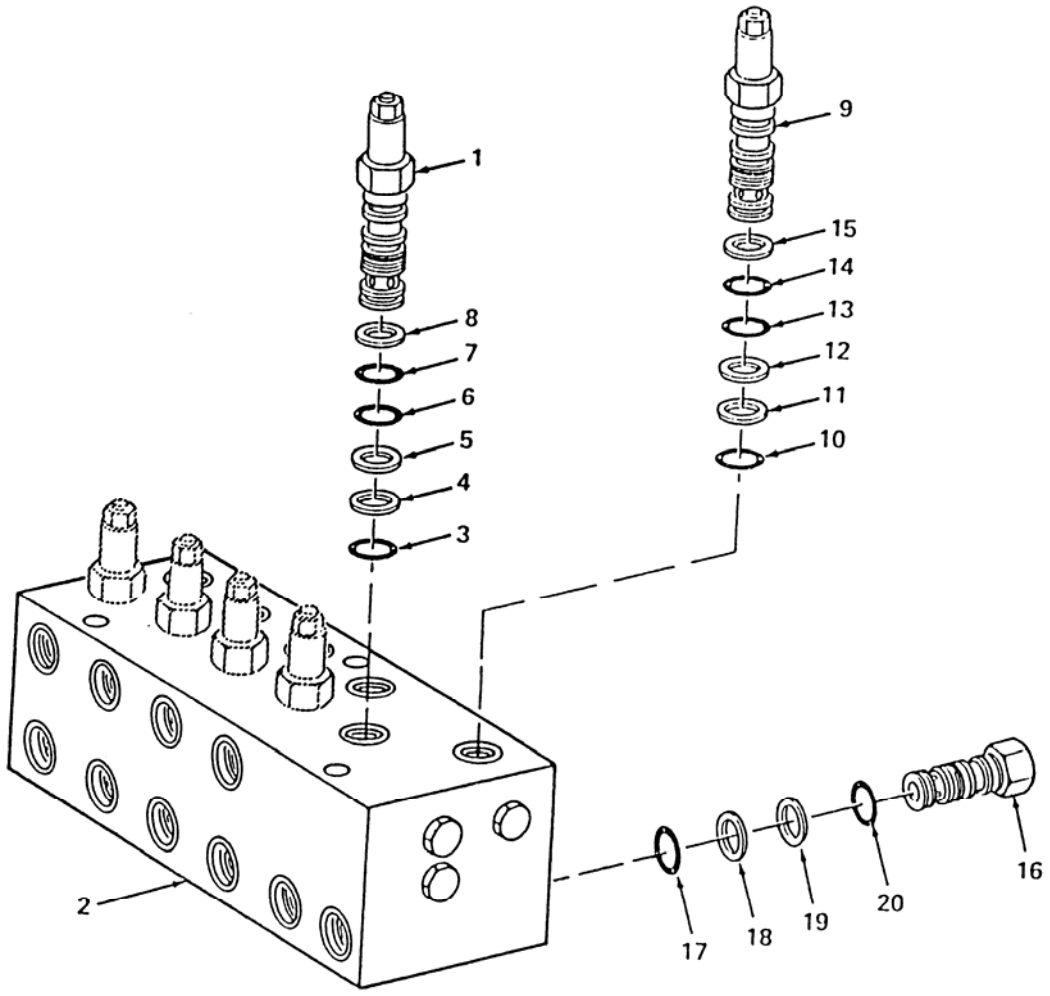
   b. Repeat step a as required for disassembly of remaining FCCB XAN flow regulating valves (16).

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Clean all tubes, fittings, attaching hardware, suspension control manifold and cartridge, and flow regulating valves in degreaser tank with cleaning compound solvent.



2. Inspect cartridge and flow regulating valves for pitting, cracks, and wear. If defective, replace parts as required.

WARNING

Compressed air used for cleaning/drying can create airborne particles that can injure the eyes. Always wear eye protection. Pressure must not exceed 30 psi (207 kPa) or injury to personnel may result.

3. Inspect all ports and openings in suspension control manifold and cartridge and flow regulating valves for foreign objects, dirt, and clogged passageways. Use compressed air to clear clogged passageways.

4. Inspect all hydraulic tubes removed for kinks, pin hole leaks, pitted and split flares, and clogged passageways. Use compressed air to clear clogged passageways. Replace any defective tubes.

5. Pour clean hydraulic fluid into suspension control manifold and cartridge and flow regulating valves to flush out contaminants.

4-79. SUSPENSION CONTROL MANIFOLD (CONT)

REPAIR

Replace all parts found defective and replace all preformed packings and backup rings using respective repair kits.

ASSEMBLY

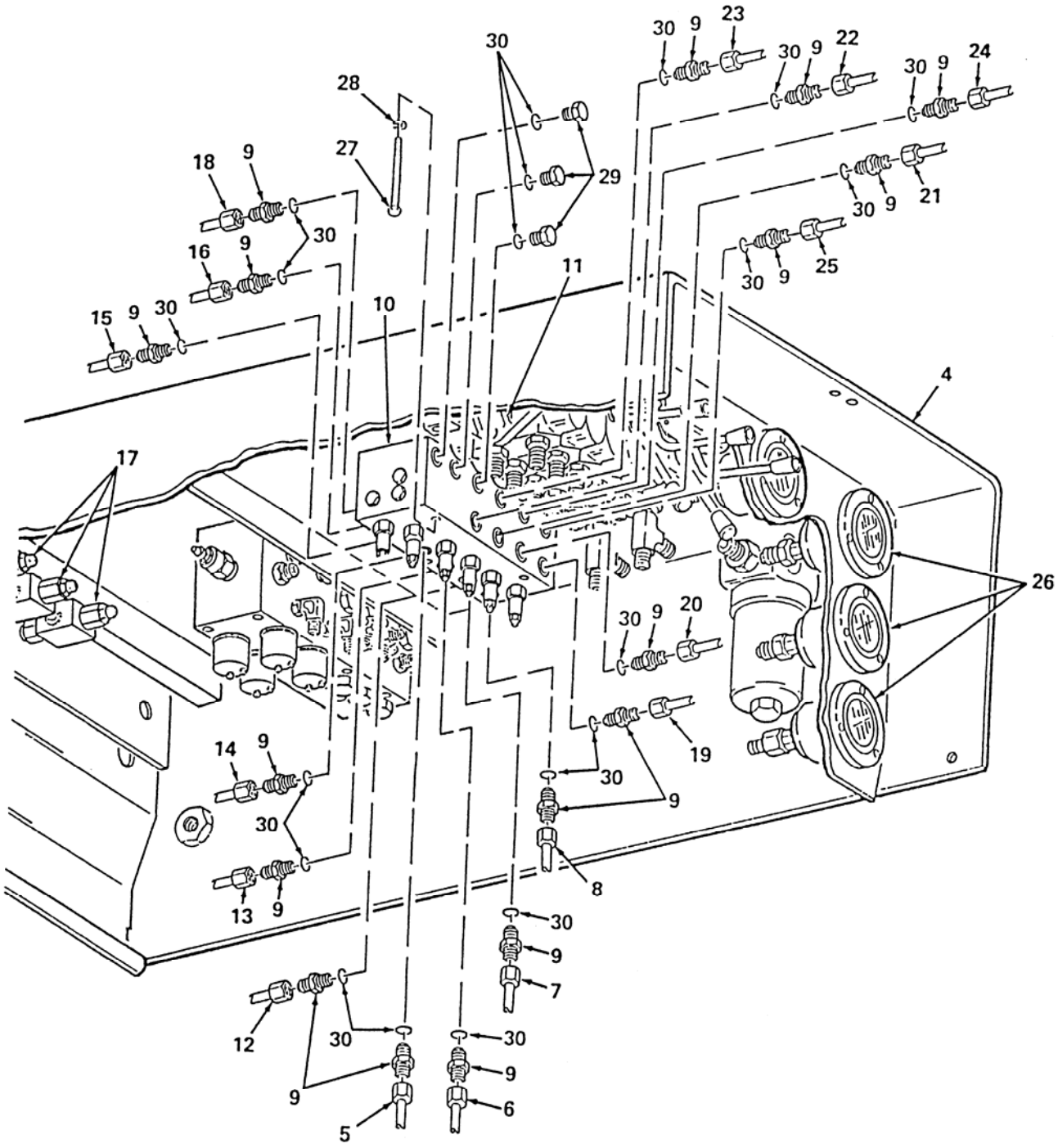
CAUTION

As the flow regulating and cartridge valves are assembled, the arrangement of preformed packings and backup rings is extremely important. If the preformed packing and backup rings are improperly installed, internal leakage or premature equipment failure may result. Use the illustration shown for proper arrangement of parts.

1. Apply petroleum jelly to preformed packings (17 and 20) and backup rings (18 and 19).
2. Remove caps/plugs and install preformed packing (20), backup rings (18 and 19), and preformed packing (17) onto FCCB XAN flow regulating valve (16). Repeat this step as required for all FCCB XAN flow regulating valves (16).
3. Remove caps/plugs and aline and install four FCCB XAN flow regulating valves (16) into suspension manifold (2).
4. Apply petroleum jelly to preformed packings (10, 13, and 14) and backup rings (11, 12, and 15).
5. Install backup ring (15), preformed packings (14 and 13), backup rings (12 and 11), and preformed packing (10) onto CBCA LAN cartridge valve (9).
6. Remove caps/plugs and aline and install CBCA LAN cartridge valve (9) into suspension manifold (2).
7. Apply petroleum jelly to preformed packings (3, 6, and 7) and backup rings (4, 5, and 8).
8. Install backup ring (8), preformed packings (7 and 6), backup rings (5 and 4), and preformed packing (3) onto CBCG LCN cartridge valve (1). Repeat this step as required for all CBCG LCN cartridge valves (1).
9. Remove caps/plugs and aline and install five CBCG LCN cartridge valves (1) into suspension manifold (2).

INSTALLATION

1. Apply petroleum jelly to 20 preformed packings (30). Install 17 preformed packings (30) onto 17 straight pipe-to-tube adapters (9). Install three preformed packings (30) onto three tube fitting plugs (29).



2. Remove caps/plugs installed and install three tube fitting plugs (29) into suspension control manifold (10).

3. Remove caps/plugs installed and install 17 straight pipe-to-tube adapters (9) into suspension control manifold (10).

4-79. SUSPENSION CONTROL MANIFOLD (CONT)

4. Using one person, aline and support suspension control manifold (10) with hydraulic control module frame (4).

5. With first person holding suspension control manifold (10), use a second person to install three capscrews (27) and lockwashers (26).

6. Remove caps/plugs installed into three hydraulic tubes (25, 24, and 23). Using two wrenches, install three hydraulic tubes (25, 24, and 23) between three straight pipe-to-tube adapters (9) on suspension control manifold (10) and fittings on three pressure gages (26).

7. Remove caps/plugs installed into four hydraulic tubes (22, 21, 20, and 19). Install four hydraulic tubes (22, 21, 20, and 19) between four straight pipe-to-tube adapters (9) on suspension control manifold (10) and fittings on 4-way directional control valve bank (11).

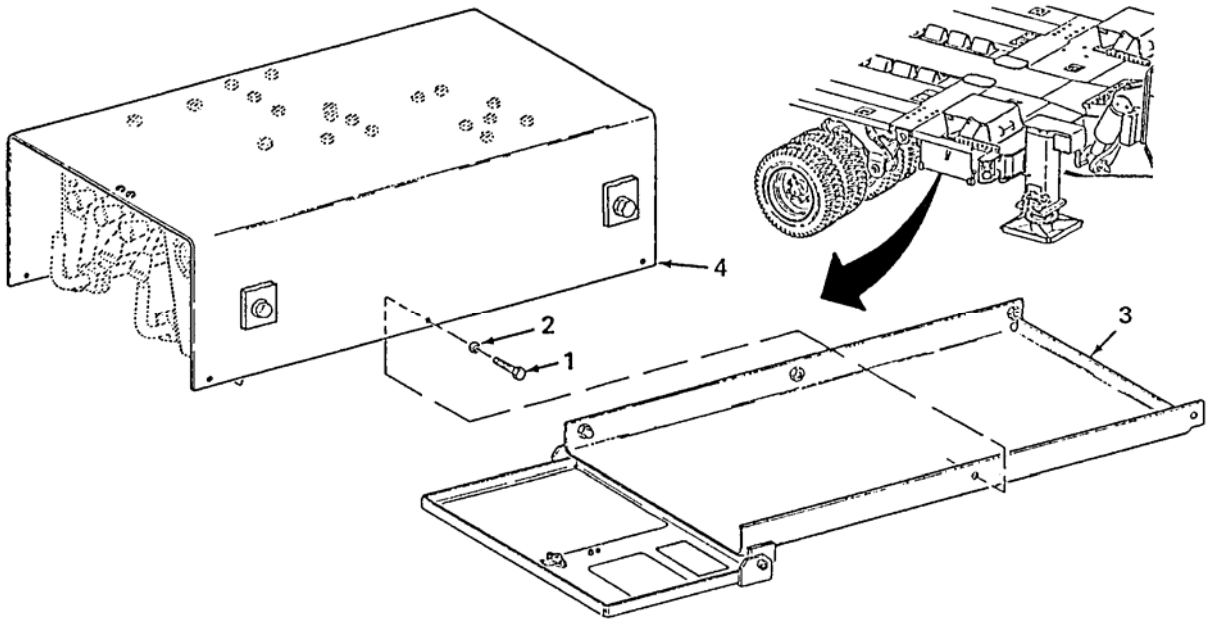
8. Remove caps/plugs installed into hydraulic tube (18). Install hydraulic tube (18) between straight pipe-to-tube adapter (9) on suspension control manifold (10) and bulkhead fitting on back of hydraulic control module (4).

9. Remove caps/plugs installed into five hydraulic tubes (16, 15, 14, 13, and 12). Install four hydraulic tubes (16, 15, 14, 13, and 12) between five straight pipe-to-tube adapters (9) on suspension control manifold (10) and fittings on suspension shut-off valve (17).

10. Remove caps/plugs installed into four hydraulic tubes (8, 7, 6, and 5). Install four hydraulic tubes (8, 7, 6, and 5) between four straight pipe-to-tube adapters (9) on suspension control manifold (10) and fittings on 4-way directional control valve bank (11).

11. Aline and install handle of suspension shut-off valve and clamp block back into place on hydraulic control module (para. 4-84).

12. Using two people, aline and install lower panel (3), with door panel attached, onto hydraulic control module (4). Secure lower panel in place by installing six lockwashers (2) and capscrews (1).



FOLLOW-ON MAINTENANCE

1. Perform hydraulic system check/fill and refill hydraulic tank (para. 4-17).
2. Adjust platform height through several cycles and check for proper operation (para. 2-19).
3. Bleed air from hydraulic system (para. 4-19).

4-80. LINE FRACTURE VALVE

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

Cap and plug set, item 5, appx. E
Petroleum jelly, item 17, appx. E
Lockwasher (4)
Preformed packing

4-80. LINE FRACTURE VALVE (CONT)

Equipment Condition

If repairing a gooseneck cylinder line fracture valve, proceed as follows:
- Tractor and semitrailer coupled to support gooseneck (para. 2-24)
- Gooseneck and suspension shut-off valve handles pulled out to ADJUST position (para. 2-6)
- Hydraulic hoses and fittings removed from line fracture valve (para. 4-90)

If repairing a suspension cylinder line fracture valve, proceed as follows:
- Gooseneck and suspension shut-off valve handles pulled out to ADJUST position (para. 2-6)
- Suspension cylinder disconnected from upper suspension arm (para. 4-41)
- Suspension hoses unscrewed and removed from line fracture valve (para. 4-41)

General Safety Instructions

WARNING

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, and gloves or goggles. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

REMOVAL

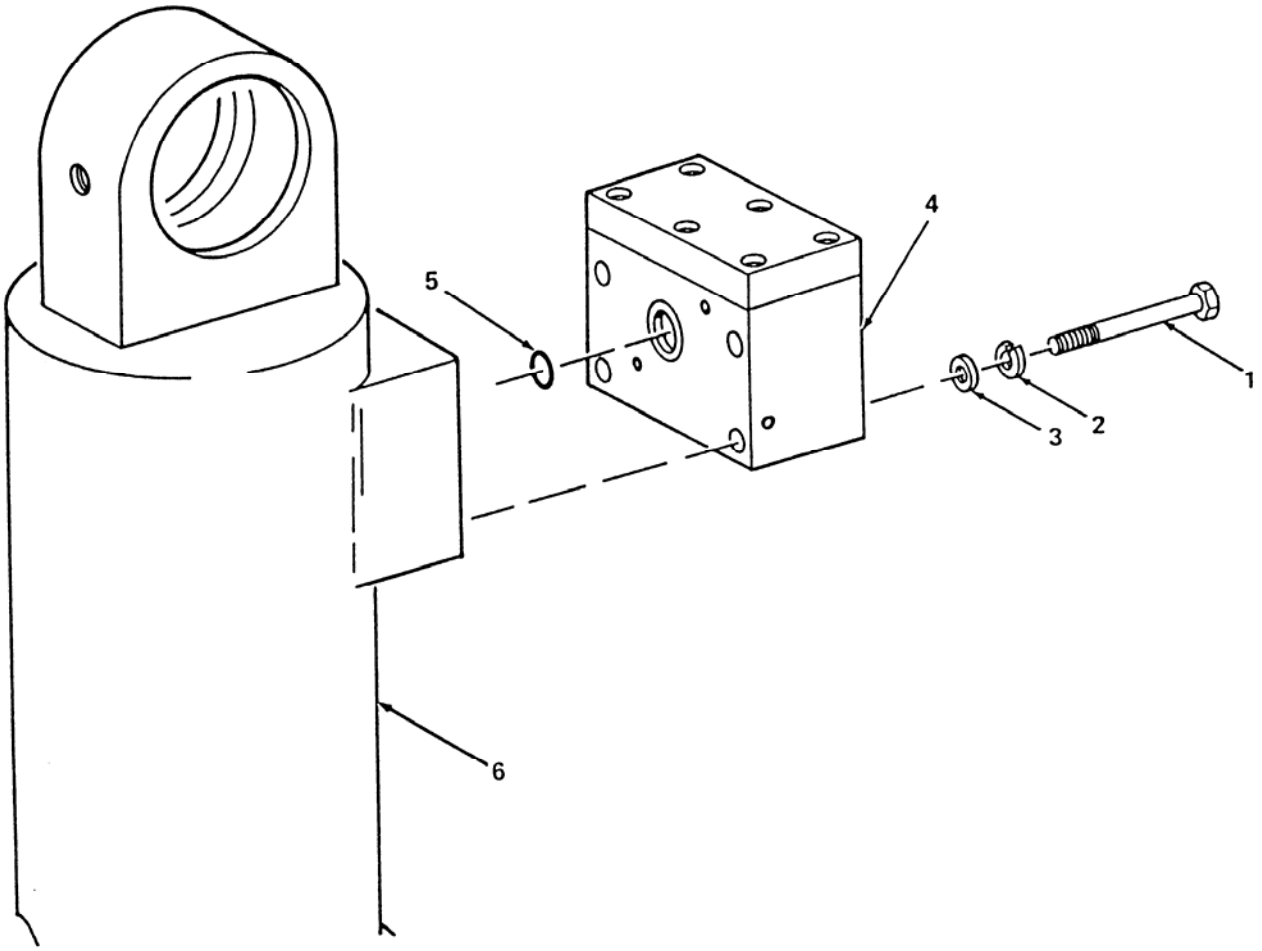
Remove four capscrews (1), lockwashers (2), and washers (3), line fracture valve (4), and preformed packing (5) from cylinder (6). Discard lockwashers and preformed packing. Install plug into back of line fracture valve.

INSTALLATION

1. Lubricate preformed packing (5) with petroleum jelly.

2. Remove plug and install preformed packing (5) onto back of line fracture valve (4).

3. Aline line fracture valve (4) with cylinder (6) and secure with four capscrews (1), lockwashers (2), and washers (3).



FOLLOW-ON MAINTENANCE

1. If a repair was made to gooseneck cylinder line fracture valve, reconnect hydraulic hoses/fittings to cylinders (para. 2-90). Uncouple tractor from semitrailer (para. 2-24). Operate gooseneck (para. 2-18) and check for proper operation.

2. If a repair was made to a suspension cylinder line fracture valve, install suspension cylinder and hydraulic hoses onto upper suspension arm (para. 4-41). Adjust platform height (para. 2-19). Check for proper operation.

4-81. VALVE HANDLES

NOTE

There are two configurations of valve handles on the semitrailers, configuration A and configuration B. Handles are not interchangeable between configurations.

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

Cotter pin (6) (configuration A only)

Equipment Condition

Front access panel on hydraulic control module lowered (para. 2-5)

REMOVAL - CONFIGURATION A

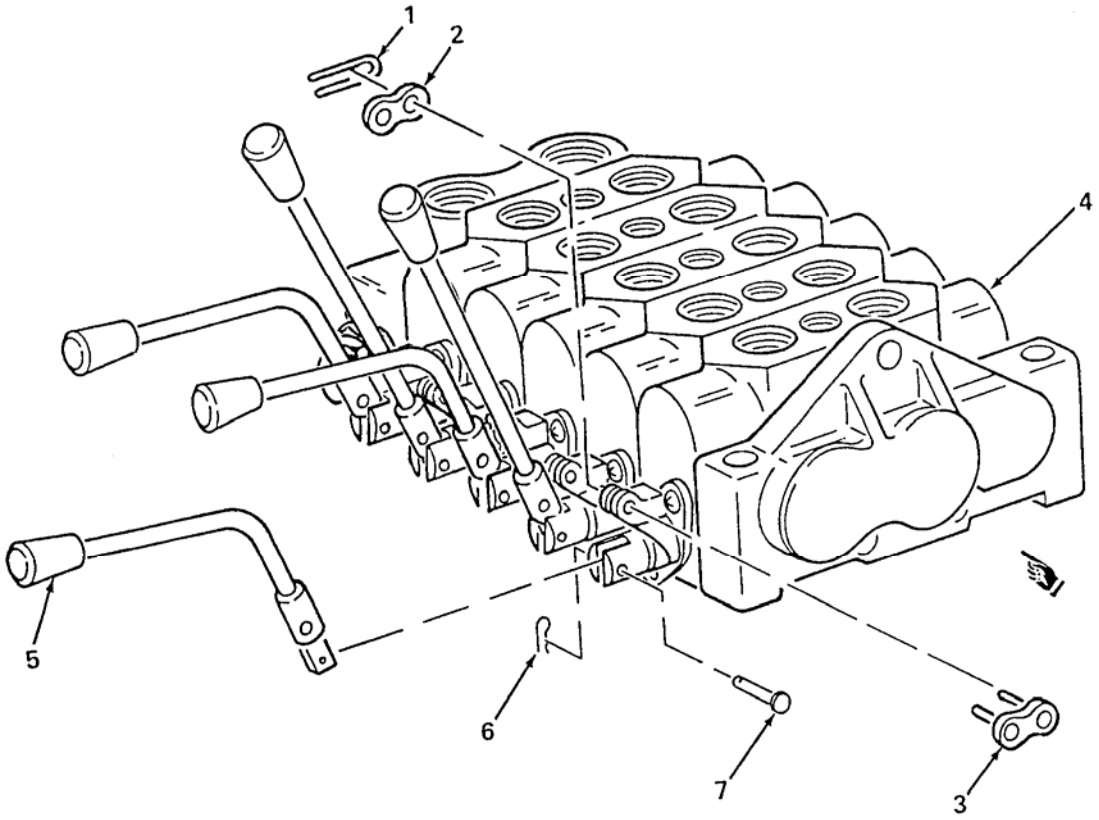
1. Remove link key (1), link plate (2), and link (3) from valve body (4) and valve handle (5).
2. Remove cotter pin (6), shouldered pin (7), and valve handle (5) from valve body (4). Discard cotter pin.
3. Repeat steps 1 and 2 as required for each valve handle (5) to be removed.

INSPECTION - CONFIGURATION A

Inspect valve handles for cracks, wear, and corrosion. If corroded, clean as required. If defective, replace as required.

INSTALLATION - CONFIGURATION A

1. Aline valve handle (5) with valve body (4) and secure with shouldered pin (7) and cotter pin (6).
2. Install link (3) to valve body (4) and valve handle (5). Secure link (3) in place by installing link plate (2) and link key (1).
3. Repeat steps 1 and 2 as required for each valve handle (5) to be installed.


1
2
4
5
6
7
3

4-81. VALVE HANDLES (CONT)

REMOVAL - CONFIGURATION B

1. Push back on ears of clip (1) and unsnap from clevis (2).

2. Remove clip (1), pin (3), and handle (4) from valve (5).

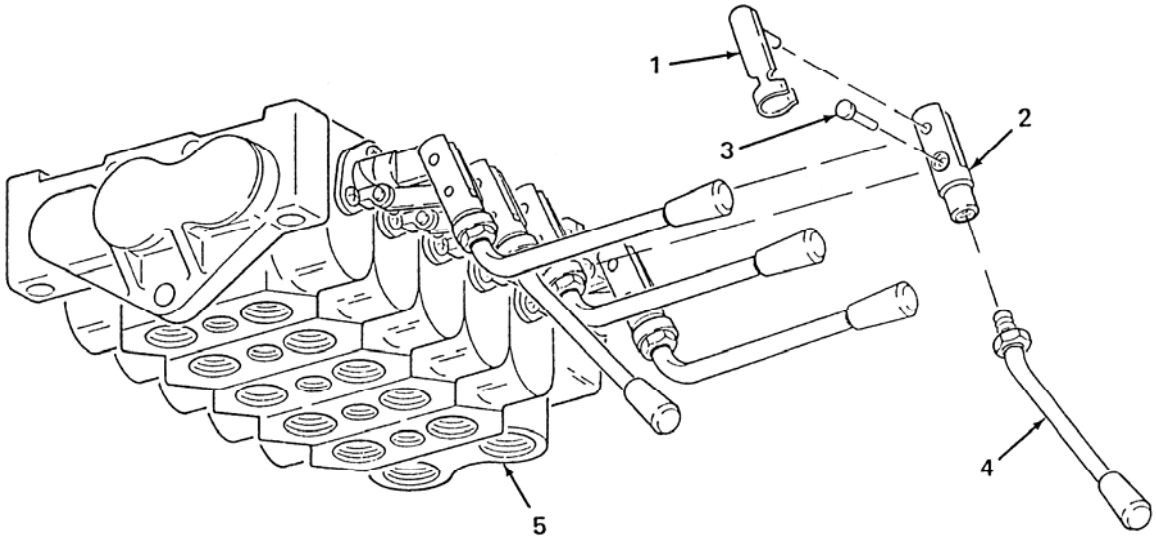
INSPECTION - CONFIGURATION B

Inspect valve handles for cracks, wear, and corrosion. If corroded, clean as required. If defective, replace as required.

INSTALLATION - CONFIGURATION B

1. Install handle (4) to valve (5) and insert pin (3) into side of clevis (2) with head of pin in recess in clevis.

2. Insert pin or clip (1) into clevis (2) and rotate clip until ears on pin snap in place on clevis (2) and capture pin (3).



FOLLOW-ON MAINTENANCE

Operate valve handles and check for proper operation (para. 2-6).

4-82. SUSPENSION ISOLATION VALVE ASSEMBLY

This task covers: a. Disassembly b. Inspection c. Assembly

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

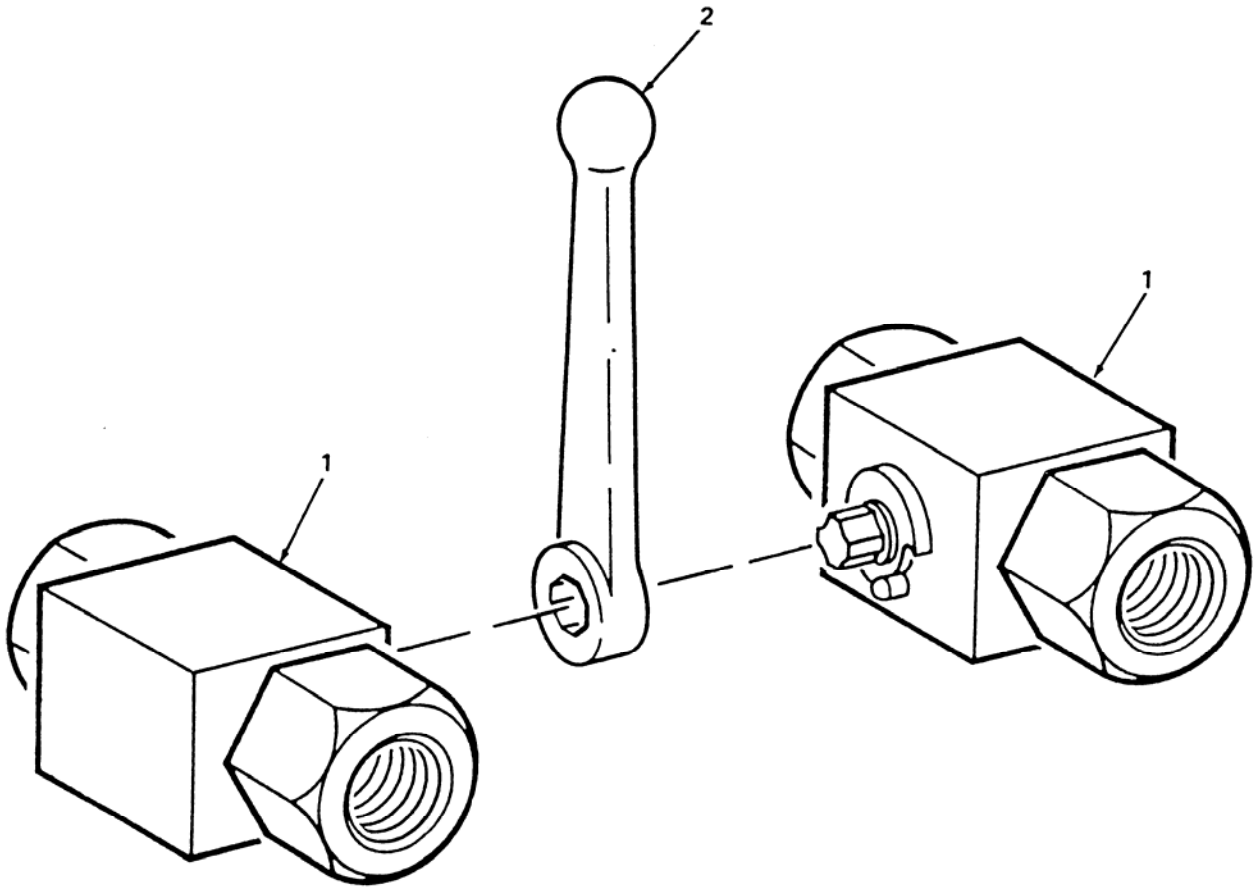
Equipment Condition

Suspension isolation valve assembly removed (para. 4-92)

4-82. SUSPENSION ISOLATION VALVE ASSEMBLY (CONT)

DISASSEMBLY

Separate two ball valves (1) and remove valve handle (2).



INSPECTION

Inspect suspension isolation ball valves and valve handle for cracks, wear, and corrosion. If defective, replace as required.

ASSEMBLY

CAUTION

The ball valves must be arranged so that both ball valves operate in the same direction or damage to equipment may result.

1. Place two ball valves (1) so that valve stems face each other and check that both valves are closed. Close one of the ball valves (1), if necessary, so that both valves are the same and will operate in the same direction by valve handle (2).

2. Aline valve handle (1) such that valve handle (1) is parallel between two ball valves (4) and push two valves (1) into valve handle (2).

FOLLOW-ON MAINTENANCE

1. Ensure suspension isolation valve assembly is installed and hydraulic lines and fittings are reconnected to valve assembly (para. 4-92).

2. Operate suspension isolation valve handle and check for proper operation (para. 2-6).

4-83. SUSPENSION SHUT-OFF VALVE ASSEMBLY

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

Suspension isolation valve handle extension, item 1, appx. B
General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:

Drain pan, 4 gl	Goggles, industrial
Extension light, 24 ft	Gloves, chemical and oil protective
Wrench, 1-1/4" combination	Degreaser tank, 20 gl
Creeper, mechanics	

Materials/Parts

Cap and plug set, item 5, appx. E
Hydraulic fluid, item 13, appx. E
Petroleum jelly, item 17, appx. E
Cleaning compound solvent, item 25, appx. E
Lockwasher (6)
Locknut (5)
Preformed packing (10)
Lockwasher (5)

Personnel Required: 2

Equipment Condition

Platform adjusted to 50 inch (127 cm) height (para. 2-19)
All suspension isolation valves closed (para. 2-6)
Hydraulic tank drained (para. 4-18)

4-83. SUSPENSION SHUT-OFF VALVE ASSEMBLY (CONT)

General Safety Instructions

WARNING

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

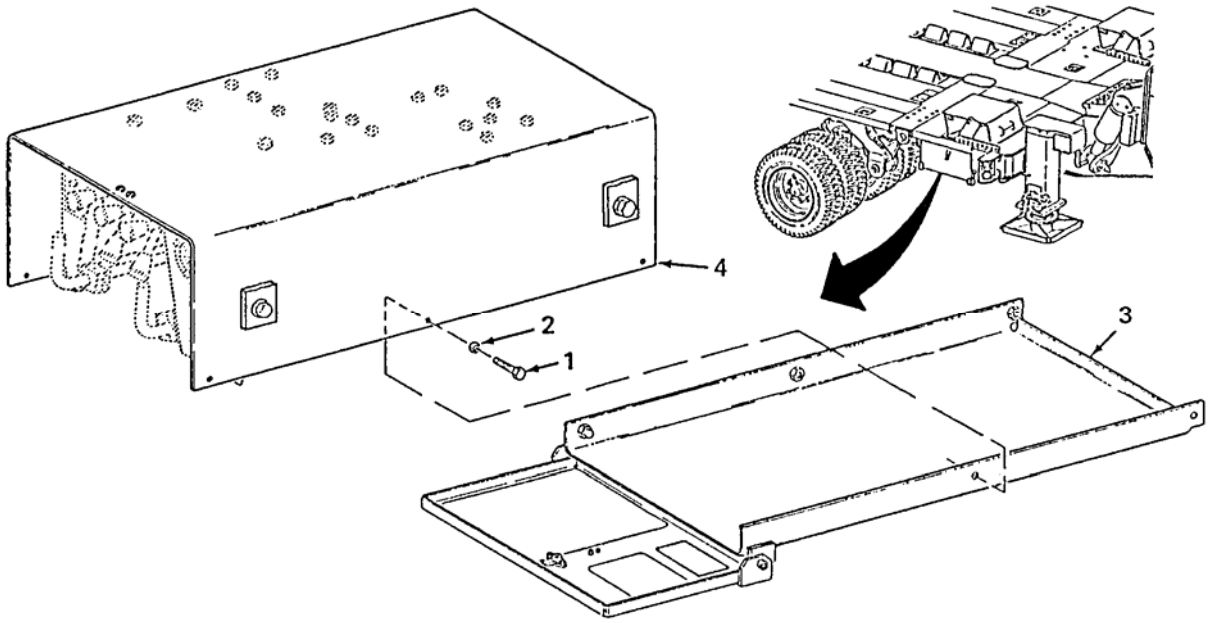
Residual pressure may remain in hydraulic lines. Open fittings slowly or injury to personnel may result.

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

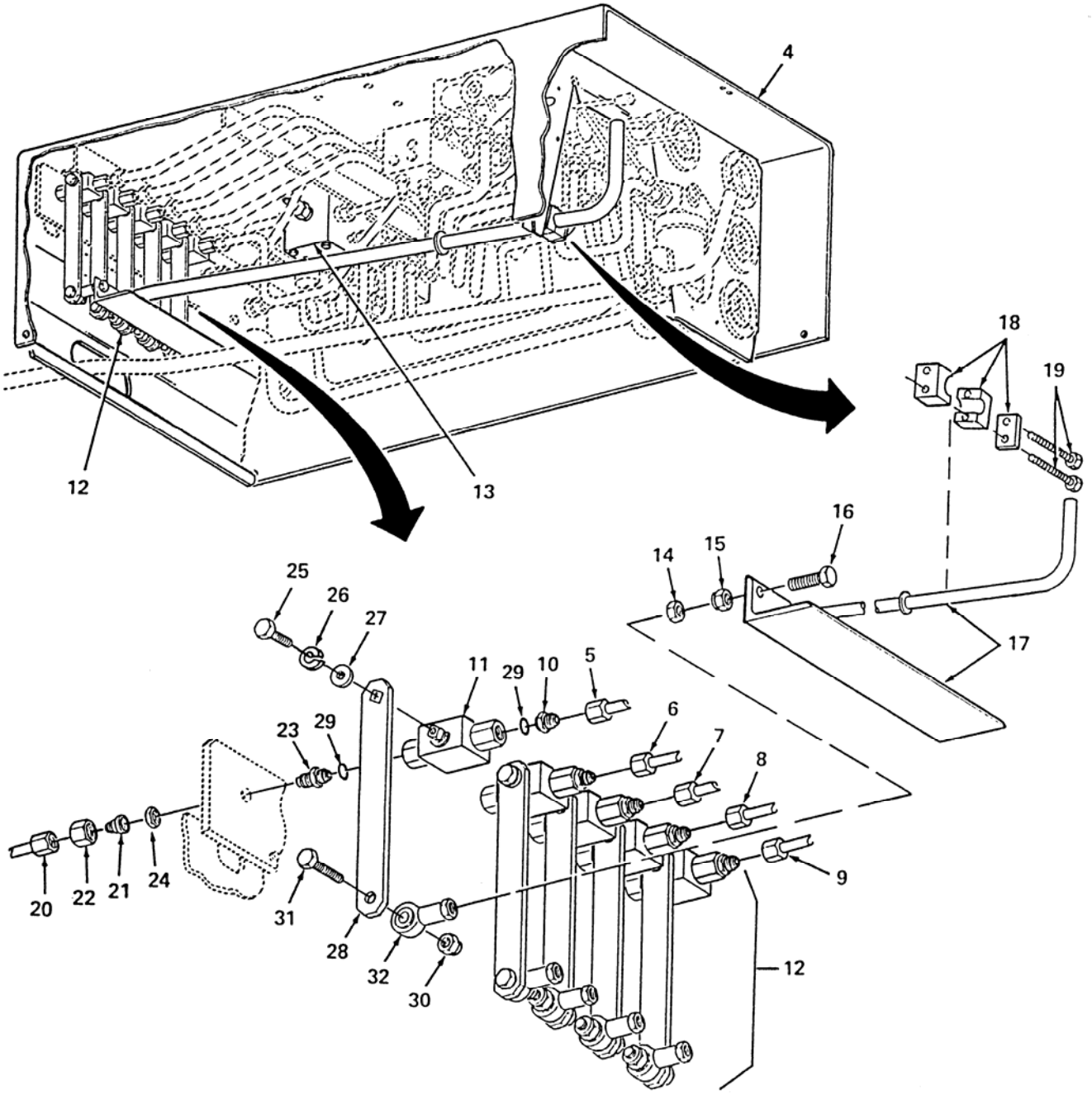
REMOVAL

1. Make sure hydraulic control module door panel is lowered (para. 2-6).

2. Using two people, remove six capscrews (1), lockwashers (2), and lower panel (3) from hydraulic control module (4). Carefully remove lower panel (3), with panel door attached, out from under semitrailer and place on platform. Discard six lockwashers.



3. Using a drain pan, tag and disconnect five hydraulic tubes (5, 6, 7, 8, and 9) from five straight tube-to-boss adapters (10) on five ball valves (11) on suspension shut-off valve (12) and from fittings on suspension control manifold (13). Install caps/plugs into tube openings.



4-83. SUSPENSION SHUT-OFF VALVE ASSEMBLY (CONT)

4. Remove five jam nuts (14), locknuts (15), and bolts (16) from valve handle weldment (17). Discard locknut.

5. Remove two bolts (18) and clamp sections (19) from valve handle weldment (17) and hydraulic control module (4).

6. Tag and disconnect five hydraulic tubes (20) from five tube reducers (21) on back side of hydraulic control module (4) between module frame and platform mainbeam. Install caps/plugs into tube openings.

CAUTION

The orientation of ball valves on the suspension shut-off valve assembly is important. Each ball valve must be installed back in the proper place and direction or damage to equipment may result.

7. Remove five tube coupling nuts (22) and tube reducers (21) from straight pipe-to-tube adapters (23). Remove five fitting nuts (24) from straight pipe-to-tube adapters (23). Document position and flow direction of each ball valve (11) and remove five ball valves (11) with attached parts.

8. Remove capscrew (25), lockwasher (26), washer (27), and actuating lever (28) from ball valve (11). Repeat this step for the four remaining actuating levers (28). Discard lockwashers.

9. Remove 5 straight tube-to-boss reducers (10), 5 straight pipe-to-tube adapters (23), and 10 preformed packings (29) from 5 ball valves (11). Install caps/plugs into openings and discard preformed packings.

10. Remove five locknuts (30) and capscrews (31) from actuating levers (28) and rod ends (32). Discard locknuts.

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Clean all tubes, fittings, attaching hardware, and pieces of suspension shut-off valve in degreaser tank with cleaning compound solvent.

2. Inspect each ball valve for pitting, cracks, and wear. If defective, replace parts as required.

WARNING

Compressed air used for cleaning/drying can create airborne particles that can injure the eyes. Always wear eye protection. Pressure must not exceed 30 psi (207 kPa) or injury to personnel may result.

3. Inspect all ports and openings in each ball valve for foreign objects, dirt, and clogged passageways. Use compressed air to clear clogged passageways.

4. Inspect all hydraulic tubes removed for kinks, pin hole leaks, pitted and split flares, and clogged passageways. Use compressed air to clear clogged passageways. Replace any defective tubes.

5. Pour clean hydraulic fluid into each ball valve to flush out contaminants.

INSTALLATION

1. Aline five rod ends (32) with five actuating levers (28). Install five capscrews (31) through actuating levers (28) and rod ends (32) and secure with five locknuts (30).

2. Lubricate 10 preformed packings (29) with petroleum jelly. Install five preformed packings (29) onto five straight pipe-to-tube adapters (23). Install five preformed packings (29) onto five straight tube-to-boss reducers (10).

3. Remove caps/plugs installed and install five straight pipe-to-tube adapters (23) and five straight tube-to-boss reducers (10) onto five ball valves (11).

CAUTION

The ball valves must be arranged so that all ball valves operate in the same direction or damage to equipment or premature system failure may result.

4. Check that ball valves (11) are preset with each ball open and arranged such that all valves will close when operated in the same direction.

CAUTION

The actuating levers must be arranged so that all ball valves operate in the same direction or damage to equipment or premature system failure may result.

5. Check position of ball in ball valve (11) and install actuating lever (28) onto valve stem on ball valve (11). Secure each actuating lever (28) in place by installing washer (27), lockwasher (26), and capscrew (25).

6. Aline and install five fitting nuts (24), tube reducers (21), and tube coupling nuts (22) onto straight pipe-to-tube adapters (23).

7. Remove caps/plugs installed on five hydraulic tubes (20). Connect five hydraulic tubes (20) onto tube reducers (21).

4-83. SUSPENSION SHUT-OFF VALVE ASSEMBLY (CONT)

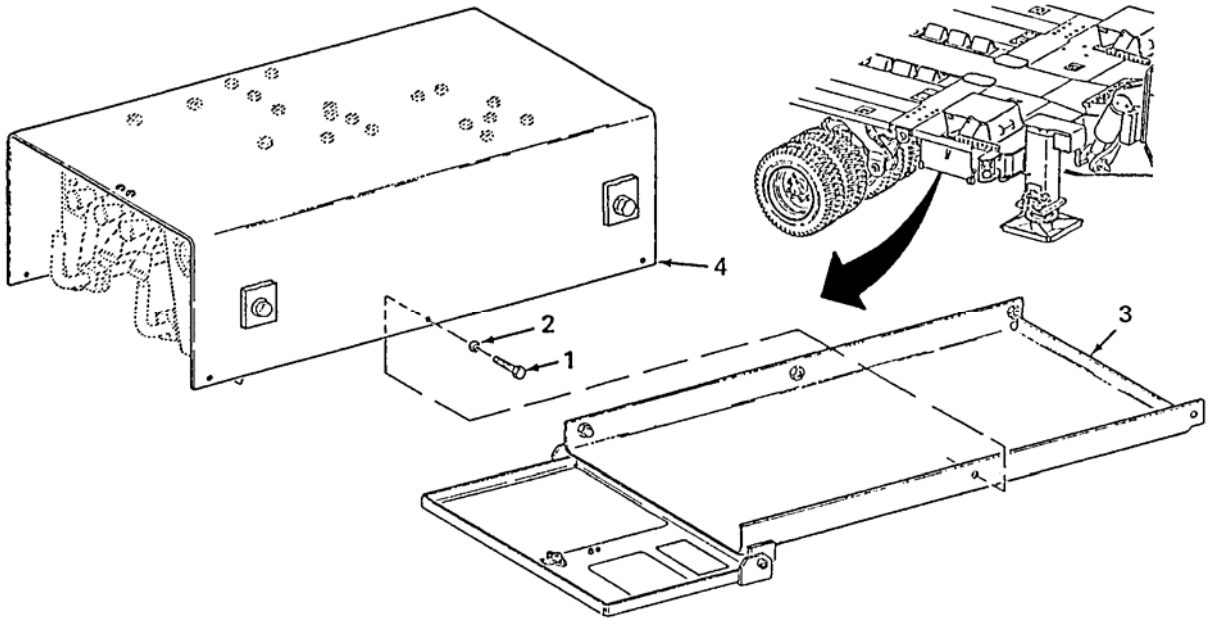
8. Install five bolts (16) into valve handle weldment (17) and secure in place by installing locknuts (15). Thread five jam nuts (14) onto bolts (16) up to and against locknuts (15).

9. Aline clamp sections (18) and valve handle weldment (17) with hydraulic control module (4) and secure in place with two bolts (19).

10. Remove caps/plugs installed on five hydraulic tubes (9, 8, 7, 6, and 5). Connect five hydraulic tubes (9, 8, 7, 6, and 5) to straight tube-to-boss adapters (10) on suspension shut-off valve (12) and fittings on suspension control manifold (13).

11. Tighten five jam nuts (14) against rod ends (32).

12. Using two people, aline and install lower panel (3), with door panel attached, onto hydraulic control module (4). Secure lower panel in place by installing six lockwashers (2) and capscrews (1).



FOLLOW-ON MAINTENANCE

1. Operate suspension shut-off valve and check for binding (para. 2-6).

2. Adjust platform height and check for proper operation (para. 2-19).

3. Couple tractor/semitrailer (para. 2-24) and perform highway driving (para. 2-25). Check that suspension operates properly.

4-84. GOOSENECK ISOLATION VALVE ASSEMBLY

This task covers: a. Removal b. Disassembly c. Inspection d. Assembly e. Installation

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INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:
- Drain pan, 4 gl
- Extension light, 24 ft
- Wrench, automotive adjustable
- Creeper, mechanics
- Goggles, industrial
- Gloves, chemical and oil protective
- Degreaser tank, 20 gl

Materials/Parts

Cap and plug set, item 5, appx. E
Hydraulic fluid, item 13, appx. E
Petroleum jelly, item 17, appx. E
Cleaning compound solvent, item 25, appx. E
Cotter pin (5)
Self-locking bolt (4)
Preformed packing (5)

Personnel Required: 2

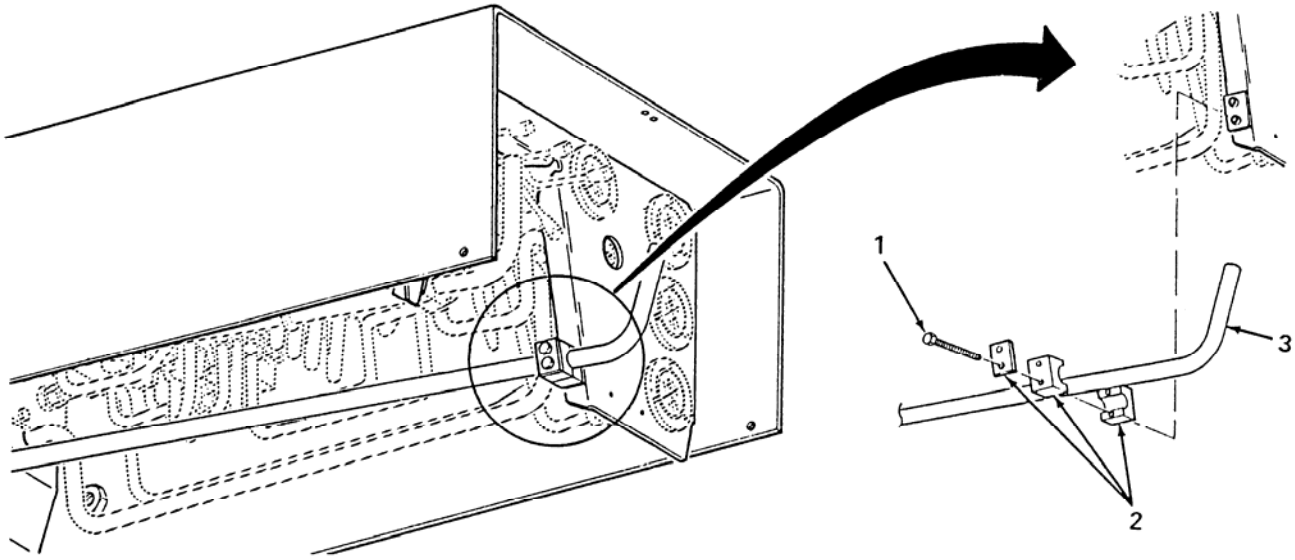
Equipment Condition

Front and rear support legs lowered supporting platform (para. 2-22 and 2-23)
Hydraulic tank drained (para. 4-18)
Except for bulkhead fittings holding each ball valve onto platform, remove all remaining hydraulic lines, fittings, and clamps from gooseneck isolation valve assembly as required (para. 4-92)
Gooseneck isolation valve handle in RUN position (para. 2-6)

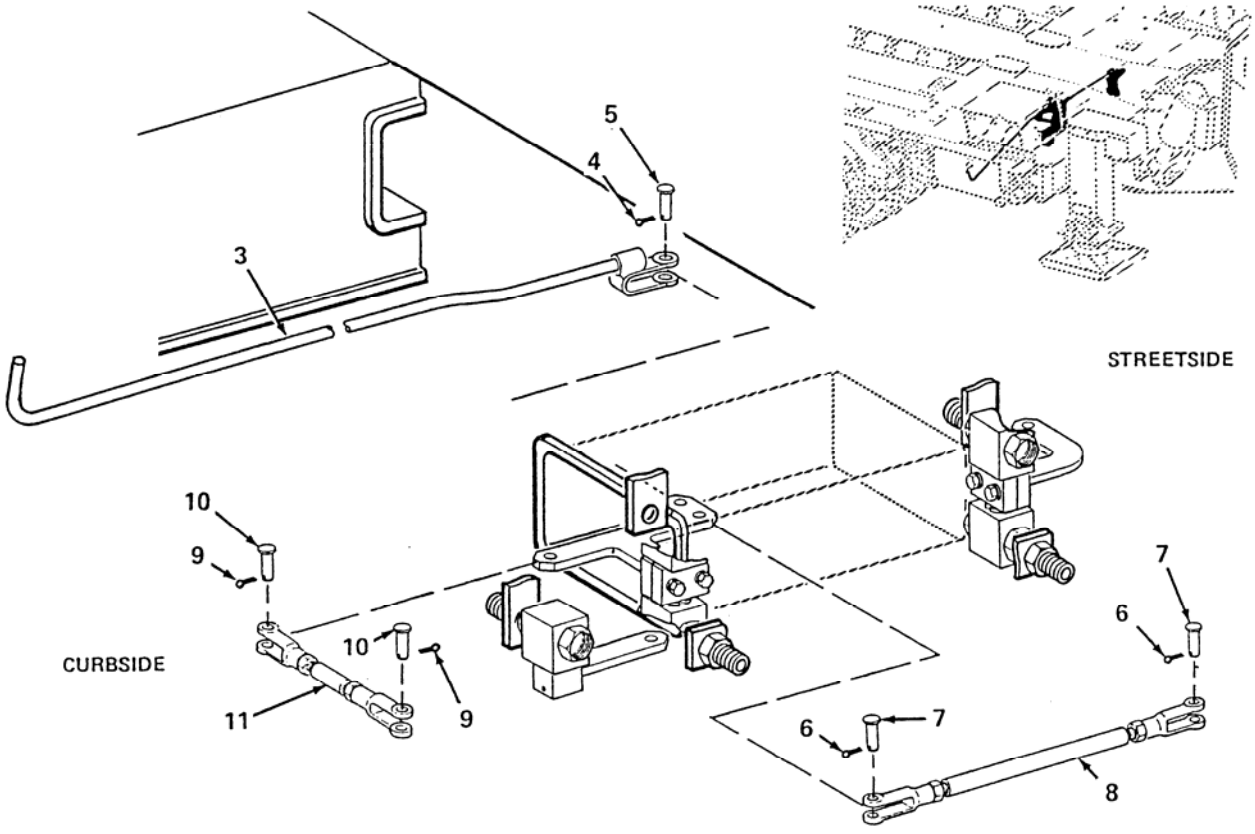
4-84. GOOSENECK ISOLATION VALVE ASSEMBLY (CONT)

REMOVAL

1. Remove two bolts (1) and clamp (2) from manual control lever (3).



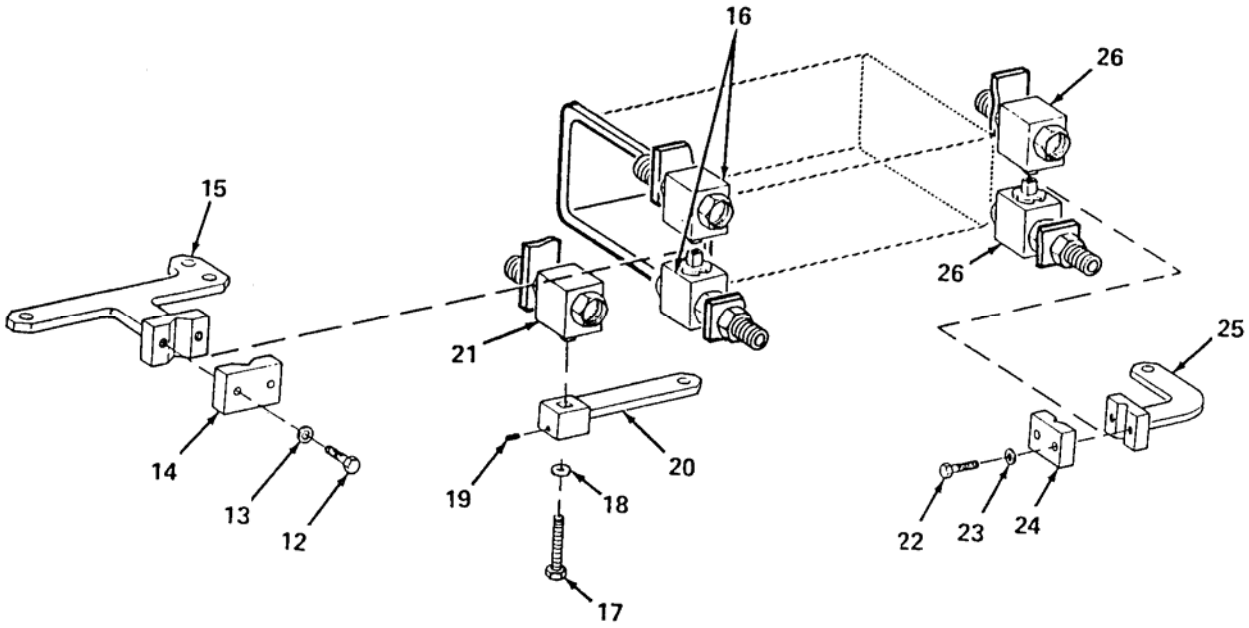
2. Remove cotter pin (4), straight shouldered pin (5), and manual control rod (3). Discard cotter pin.



3. Remove two cotter pins (6), straight shouldered pin (7), and rigid connecting link assembly (8) from platform. Discard cotter pins.

4. Remove two cotter pins (9), straight shouldered pin (10), and steering tie rod assembly (11) from platform. Discard cotter pins.

5. Remove two self-locking bolts (12), washers (13), clamp bridge (14), and manual control lever (15) from two ball valves (16). Discard self-locking bolts.



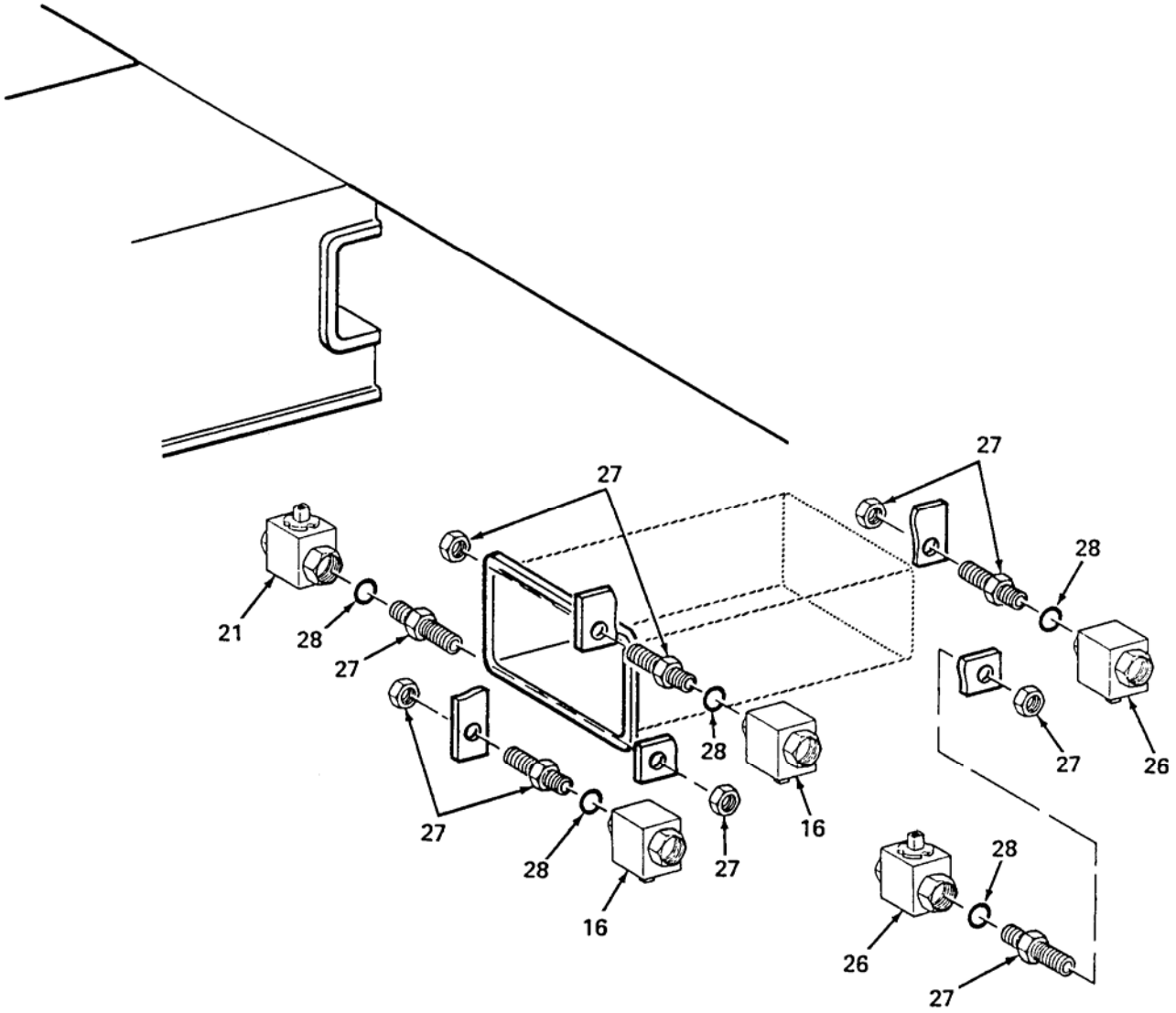
6. Remove capscrew (17), washer (18), and setscrew (19) from manual control lever (20).

7. Using a suitable prying device, pry up and remove manual control lever (20) from ball valve (21).

8. Remove two self-locking bolts (22), washers (23), clamp bridge (24), and manual control lever (25) from two ball valves (26). Discard self-locking bolts.

4-84. GOOSENECK ISOLATION VALVE ASSEMBLY (CONT)

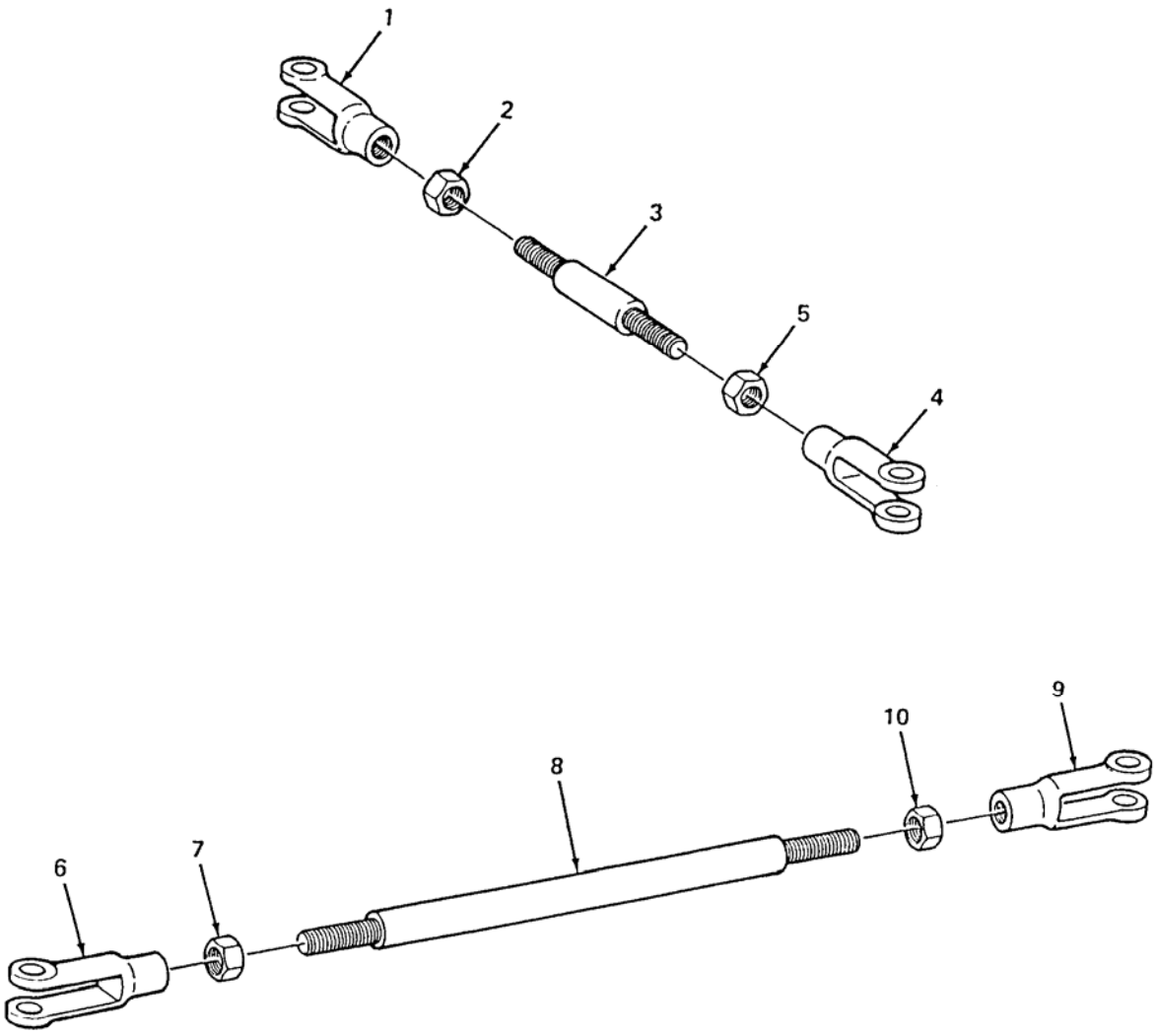
9. Remove five bulkhead fittings (27) and preformed packings (28) from five ball valves (16, 21, and 26). Discard preformed packings.



DISASSEMBLY

1. Count and document number of turns required to remove rod end clevis (1). Loosen jam nut (2) and unscrew and remove rod end clevis (1) from steering tie rod (3).

2. Count and document number of turns required to remove rod end clevis (4). Loosen jam nut (5) and unscrew and remove rod end clevis (4) from steering tie rod (3).



3. Count and document number of turns required to remove rod end clevis (6). Loosen jam nut (7) and unscrew and remove rod end clevis (6) from steering tie rod (8).

4. Count and document number of turns required to remove rod end clevis (9). Loosen jam nut (10) and unscrew and remove rod end clevis (9) from steering tie rod (8).

INSPECTION

WARNING

Cleaning compound solvent is used to clean parts and is potentially dangerous to personnel. Extinguish all smoking materials and do not allow sparks or open flame near the work area. Use skin and eye protection and work in a well-ventilated area.

1. Clean all parts removed in degreaser tank with cleaning compound solvent.

4-84. GOOSENECK ISOLATION VALVE ASSEMBLY (CONT)

2. Inspect all manual control levers, steering tie rod assembly, rigid connecting link assembly, and all associated parts for cracks, wear, bent levers, and cracked or broken rod end clevis. If any parts are found defective, replace as required.

WARNING

Compressed air used for cleaning/drying can create airborne particles that can injure the eyes. Always wear eye protection. Pressure must not exceed 30 psi (207 kPa) or injury to personnel may result.

3. Inspect openings in ball valves for foreign objects, dirt, and clogged passageways. Use compressed air to clear clogged passageways.

4. Inspect all hydraulic tubes removed for kinks, pin hole leaks, pitted and split flares, and clogged passageways. Use compressed air to clear clogged passageways. Replace any defective tubes.

5. Pour clean hydraulic fluid into ball valves to flush out contaminants.

ASSEMBLY

1. Install jam nut (10) onto steering tie rod (8) and thread jam nut (10) all the way onto steering tie rod (8).

2. Aline and install rod end clevis (9) onto steering tie rod (8) to same number of threads documented during removal. Tighten jam nut (10) against rod end clevis (9) to secure in place.

3. Install jam nut (7) onto steering tie rod (8) and thread jam nut (7) all the way onto steering tie rod (8).

4. Aline and install rod end clevis (6) onto steering tie rod (8) to same number of threads documented during removal. Tighten jam nut (7) against rod end clevis (6) to secure in place.

5. Install jam nut (5) onto steering tie rod (3) and thread jam nut (5) all the way onto steering tie rod (3).

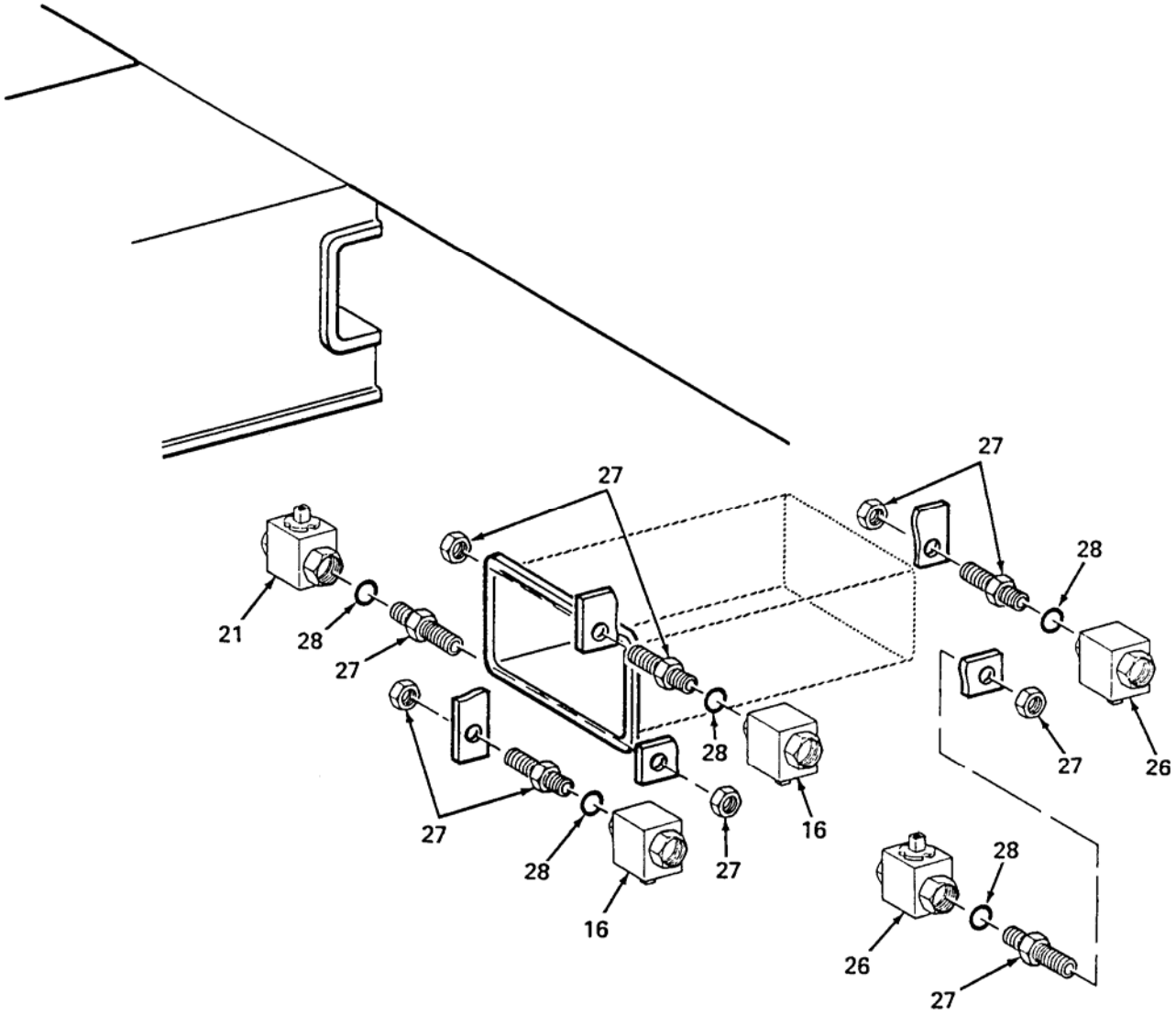
6. Aline and install rod end clevis (4) onto steering tie rod (3) to same number of threads documented during removal. Tighten jam nut (5) against rod end clevis (4) to secure in place.

7. Install jam nut (2) onto steering tie rod (3) and thread jam nut (2) all the way onto steering rod.

8. Aline and install rod end clevis (1) onto steering tie rod (3) to same number of threads disconnected during removal. Tighten jam nut (2) against rod end clevis (1) to secure in place.

INSTALLATION

1. Lubricate five preformed packings (28) with petroleum jelly. Install five preformed packings (28) onto five bulkhead fittings (27).



NOTE

Be sure to check the direction in which the ball valve is to be placed on the platform to make sure the bulkhead will be installed on the proper side of the ball valve.

2. Install five bulkhead fittings (27), preformed packing side first, into five ball valves (26, 21, and 16).

4-84. GOOSENECK ISOLATION VALVE ASSEMBLY (CONT)

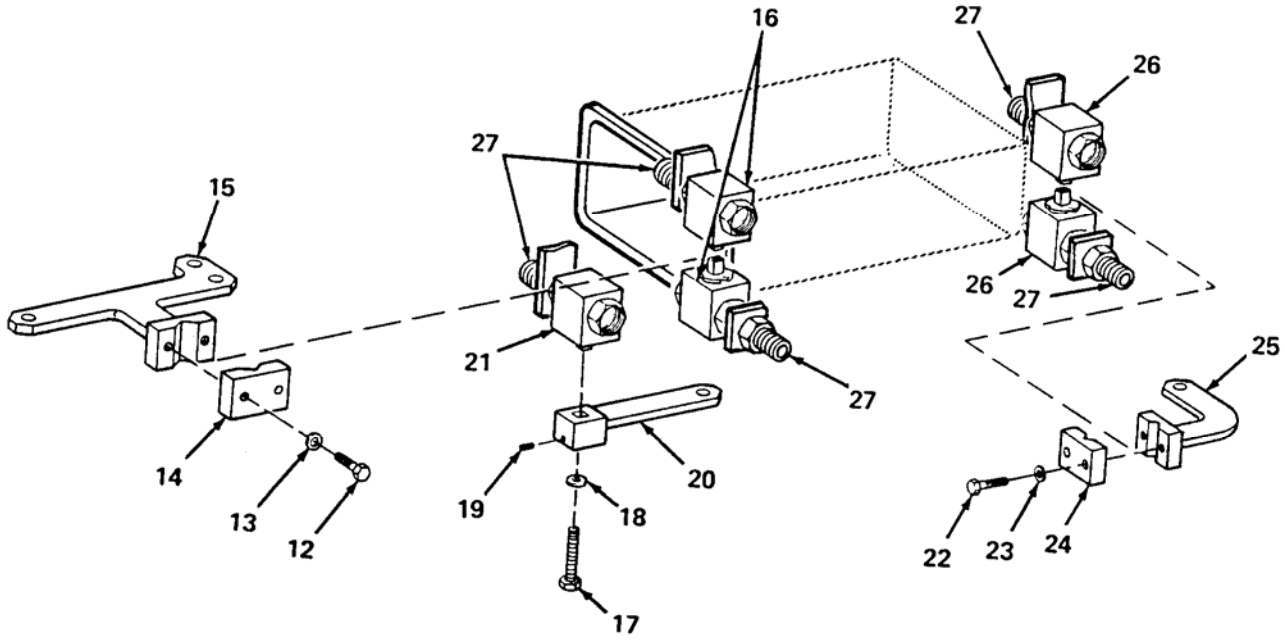
CAUTION

The ball valves must be arranged so that all ball valves operate in the same direction or damage to equipment or premature system failure may result.

3. Check that all five ball valves (16, 21, and 26) are set with each ball in open position.

4. Aline and install five ball valves (26, 21, and 16) onto platform weldment, passing five bulkhead fittings (27) to platform mounting plates. Hand tighten jam nut on each of five bulkhead fittings (27) so that ball valves can move slightly.

5. Aline manual control lever (25) and clamp bridge (24) between two ball valves (26) and secure in place by installing two washers (23) and self-locking bolts (22).



NOTE

Check position of each ball valve by looking through one of the ports on the valve as the valves are operated.

6. Operate manual control lever (25) and check that ball in each ball valve (26) is moving the same amount and in the same direction.

   a. If each ball in ball valves (26) works properly, tighten down nut on each bulkhead fitting (27) for both ball valves (26).

b. If each ball in ball valves does not work properly, refer to disassembly steps and remove valve. Then, aline and install ball valves (26) until valves work properly.

7. Install manual control lever (20) onto ball valve (21). Secure manual control lever (20) in place by installing setscrew (19), washer (18), and capscrew (17).

NOTE

Check position of ball valve by looking through one of the ports on the valve as the valve is operated.

8. Operate manual control lever (20) and check that ball in ball valve (21) is moving in proper direction.

   a. If ball in ball valve (21) works properly, tighten down nut on bulkhead fitting (27) for ball valves (21).

   b. If each ball in ball valves does not work properly, refer to disassembly steps and remove valve. Then, aline and install ball valves (26) until valves work properly.

9. Aline manual control lever (15) and clamp bridge (14) between two ball valves (16) and secure in place by installing two washers (13) and self-locking bolts (12).

NOTE

Check position of each ball valve by looking through one of the ports on the valve as the valves are operated.

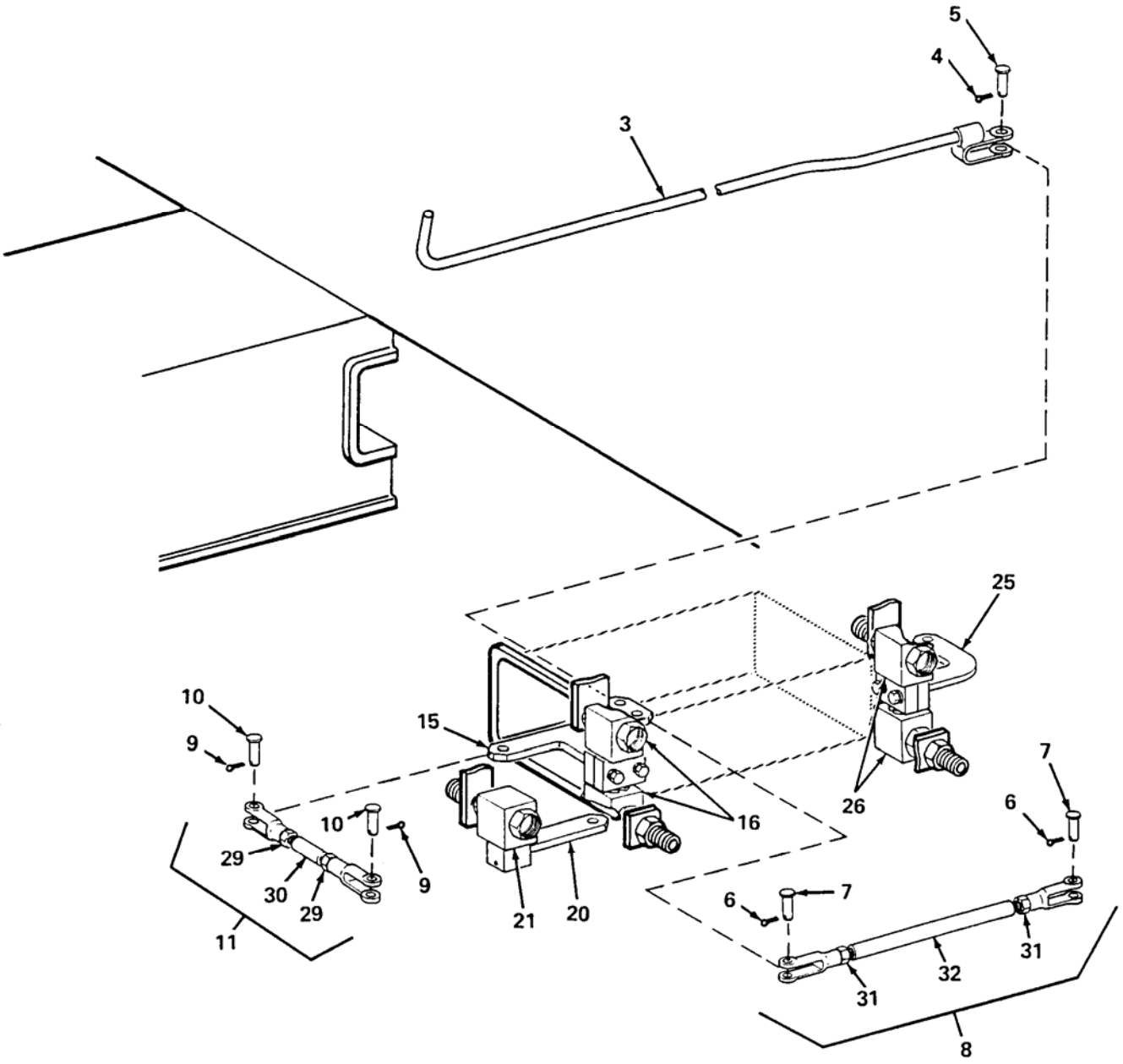
10. Operate manual control lever (15) and check that ball in each ball valve (16) is moving the same amount and in the same direction.

    a. If each ball in ball valves (16) works properly, tighten down nut on each bulkhead fitting (27) for both ball valves (16).

    b. If each ball in ball valves (16) does not work properly, refer to disassembly steps and remove valve. Then, aline and install ball valves (16) until valves work properly.

4-84. GOOSENECK ISOLATION VALVE ASSEMBLY (CONT)

11. Aline and install steering tie rod assembly (11) between manual control lever (20) and manual control lever (15). Secure in place by installing two straight shouldered pins (10) and cotter pins (9).



12. Operate steering tie rod assembly (11) and check for operation and binding.

    a. Check that each of manual control levers (15 and 20) moves ball in each ball valve (16) from full open to full close positions.

b. If adjustment is required, loosen jam nut (29) on each end of steering tie rod assembly (11) and rotate steering tie rod (30) either clockwise to shorten or counterclockwise to lengthen, as necessary.

c. If adjustment was made, tighten jam nut (29) on both ends of steering tie rod assembly (11). Repeat step 12 and check for full range of operation and/or binding.

d. If no adjustments were made, proceed to step 13.

13. Aline and install rigid connecting link assembly (8) between manual control lever (25) and manual control lever (15). Secure in place by installing two straight shouldered pins (7) and cotter pins (6).

14. Operate rigid connecting link assembly (8) and check for full range of operation and binding.

a. Check that each of manual control levers (25 and 15) moves ball in each ball valve (26) from full open to full close positions.

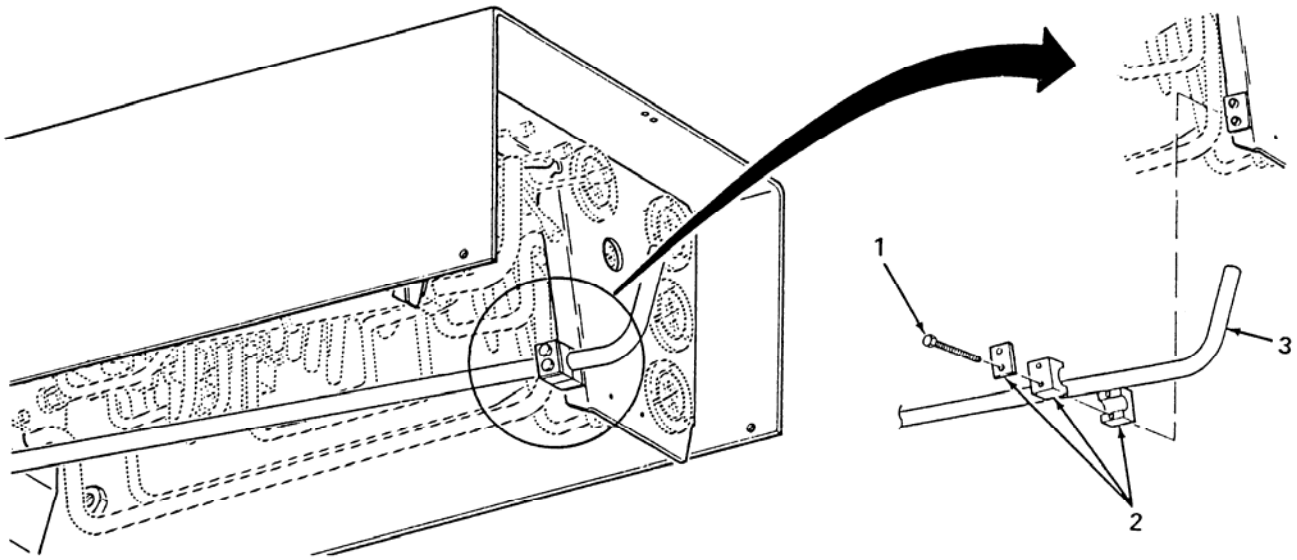
b. If adjustment is required, loosen jam nut (31) on each end of rigid connecting link assembly (8) and rotate steering tie rod (32) either clockwise to shorten or counterclockwise to lengthen, as necessary.

c. If adjustment was made, tighten jam nut (31) on both ends of steering tie rod assembly (8). Repeat step 14 and check for full range of operation and/or binding.

d. If no adjustments were made, proceed to step 15.

15. Pass manual control lever (3) through hydraulic control module and secure manual control lever (3) to manual control lever (15) using straight shouldered pin (5) and cotter pin (4).

16. Aline clamp (2) over manual control lever (3) and secure by installing two bolts (1).



4-84. GOOSENECK ISOLATION VALVE ASSEMBLY (CONT)

17. Operate manual control lever (3) and check for full range of operation and binding. If any binding occurs or full range of operation is not accomplished, repeat steps 12 and 14 as required.

FOLLOW-ON MAINTENANCE

1. Ensure hydraulic lines, fittings, and clamps are reconnected to gooseneck isolation valve assembly as required (para. 4-92).

2. Refill hydraulic tank (para. 4-17).

3. Operate gooseneck isolation valve and check for binding (para. 2-6).

4. Perform gooseneck adjustments and check for proper operation (para. 2-18).

5. Couple tractor/semitrailer (para. 2-24) and perform highway driving. Check that suspension and gooseneck cylinders operate properly.

4-85. GOOSENECK HYDRAULICS

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:

Drain pan, 4 gl	Wrench, automotive adjustable
Gloves, industrial	Goggles, chemical and oil protective

Materials/Parts

Cap and plug set, item 5, appx. E
Pipe sealant, item 18, appx. E
Petroleum jelly, item 17, appx. E
Dry cleaning solvent, item 26, appx. E
Preformed packing (4)
Wiping rag, item 19, appx. B

Equipment Condition

Platform step removed (para. 4-59)
Gooseneck lowered to lowest position if uncoupled (para. 2-18)
Front and rear support legs lowered supporting platform (para. 2-22 and 2-23)
Hydraulic tank drained (para. 4-18)

General Instructions

WARNING

Hydraulic fluid may be absorbed through the skin. Avoid prolonged exposure to skin and wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, wash thoroughly with soap and water. Wash hands thoroughly prior to eating or smoking.

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

Residual pressure may remain in hydraulic lines. Open fittings slowly or injury to personnel may result.

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the hydraulic system or damage to equipment may result.

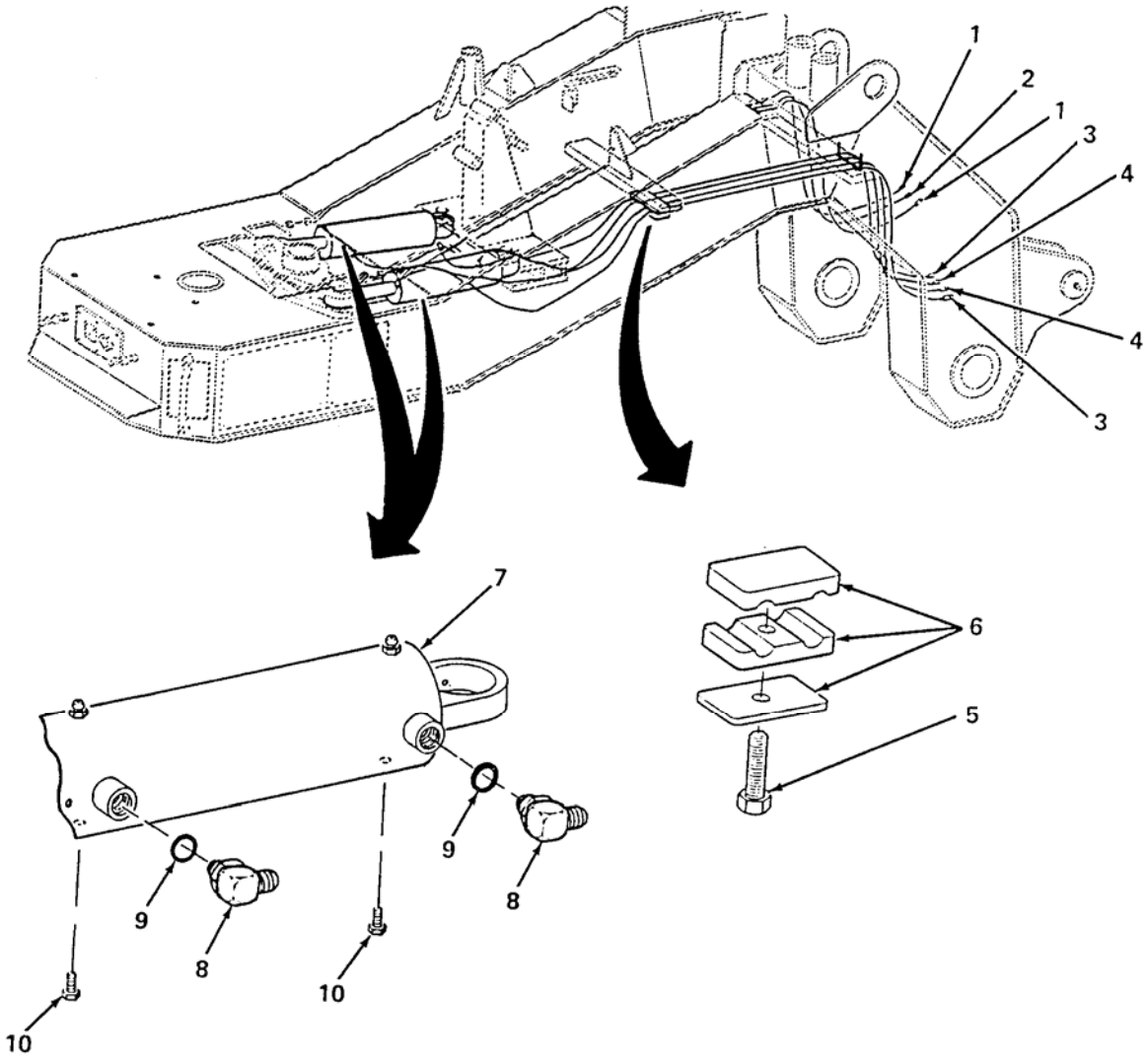
NOTE

This procedure is for removal/installation of all gooseneck hydraulic components. Perform this procedure, or any portion of this procedure, as required to complete necessary repairs. Use the hydraulic schematic (figure FO-3) as a general guide for hose routing.

4-85. GOOSENECK HYDRAULICS (CONT)

REMOVAL

1. Place a drain pan under gooseneck and tag and remove two hoses (1) and hose (2). Allow fluid to drain; then, install caps/plugs into all openings.



2. Tag and disconnect two hoses (3) and two hoses (4). Allow fluid to drain into drain pan; then, install caps/plugs into all openings.

3. Remove two bolts (5) and block clamps (6).

4. Remove two hoses (3) and two hoses (4).

5. Place drain pan under gooseneck steering cylinder (7). Remove two elbows (8), preformed packings (9), and pipe plugs (10) from steering cylinder (7). Repeat this step for other steering cylinder (7). Install caps/plugs into all openings. Discard preformed packings.

INSPECTION

WARNING

Compressed air used for cleaning/drying can create airborne particles that can injure the eyes. Always wear eye protection. Pressure must not exceed 30 psi (207 kPa) or injury to personnel may result.

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

1. Clean inside of hoses with compressed air. Clean outside of hoses with wiping rags. Clean all other components with dry cleaning solvent.

2. Inspect hoses for kinks, splits, deterioration, chafing, cuts, and loose fittings. If hose is defective, replace hose.

3. Inspect other components for nicks, burrs, corrosion, stripped threads, broken castings, and pitting. If parts are defective, replace as required.

INSTALLATION

CAUTION

Apply pipe sealant compound to the all male pipe threaded hydraulic fittings, using only enough compound to coat the threads. Do not allow compound to enter a component/fitting or the compound may restrict fluid passages and damage to equipment or equipment failure may result.

Note positioning/orientation of fittings on the illustrations. It is important to have the tightened fittings positioned as shown so that hoses are not too short and fittings do not interfere with one another or damage to equipment may result.

1. Remove caps/plugs, apply pipe sealant to male threads of two pipe plugs (10), and install into each gooseneck steering cylinder (7).

2. Remove caps/plugs. Apply petroleum jelly to two preformed packings (9) and pipe sealant to male threads of two elbows (8) and install preformed packings (9) and elbows (8) into each gooseneck steering cylinder (7).

3. Remove caps/plugs and install two hoses (4), two hoses (3), hose (2), and two hoses (1).

4. Install two block clamps (6) and bolts (5).

4-85. GOOSENECK HYDRAULICS (CONT)

FOLLOW-ON MAINTENANCE

1. Refill hydraulic tank as required (para. 4-17).

2. Perform hydraulic system bleeding as required (para. 4-19).

3. Install platform step (para. 4-59).

4-86. APU HYDRAULICS

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:
- Drain pan, 4 gl
- Gloves, industrial
- Wrench, 1-1/4" combination
- Wrench, automotive adjustable
- Goggles, chemical and oil protective

Materials/Parts

Cap and plug set, item 5, appx. E
Petroleum jelly, item 17, appx. E
Pipe sealant, item 18, appx. E
Dry cleaning solvent, item 26, appx. E
Preformed packing
Preformed packing
Wiping rag, item 19, appx. B

Equipment Condition

Hydraulic tank drained (para. 4-18)
Gooseneck steps removed from over top of battery and APU (para. 4-56)

General Safety Instructions

WARNING

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, wash thoroughly with soap and water. Wash hands thoroughly prior to eating or smoking.

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

Residual pressure may remain in hydraulic lines. Open fittings slowly or injury to personnel may result.

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the hydraulic system or damage to equipment may result.

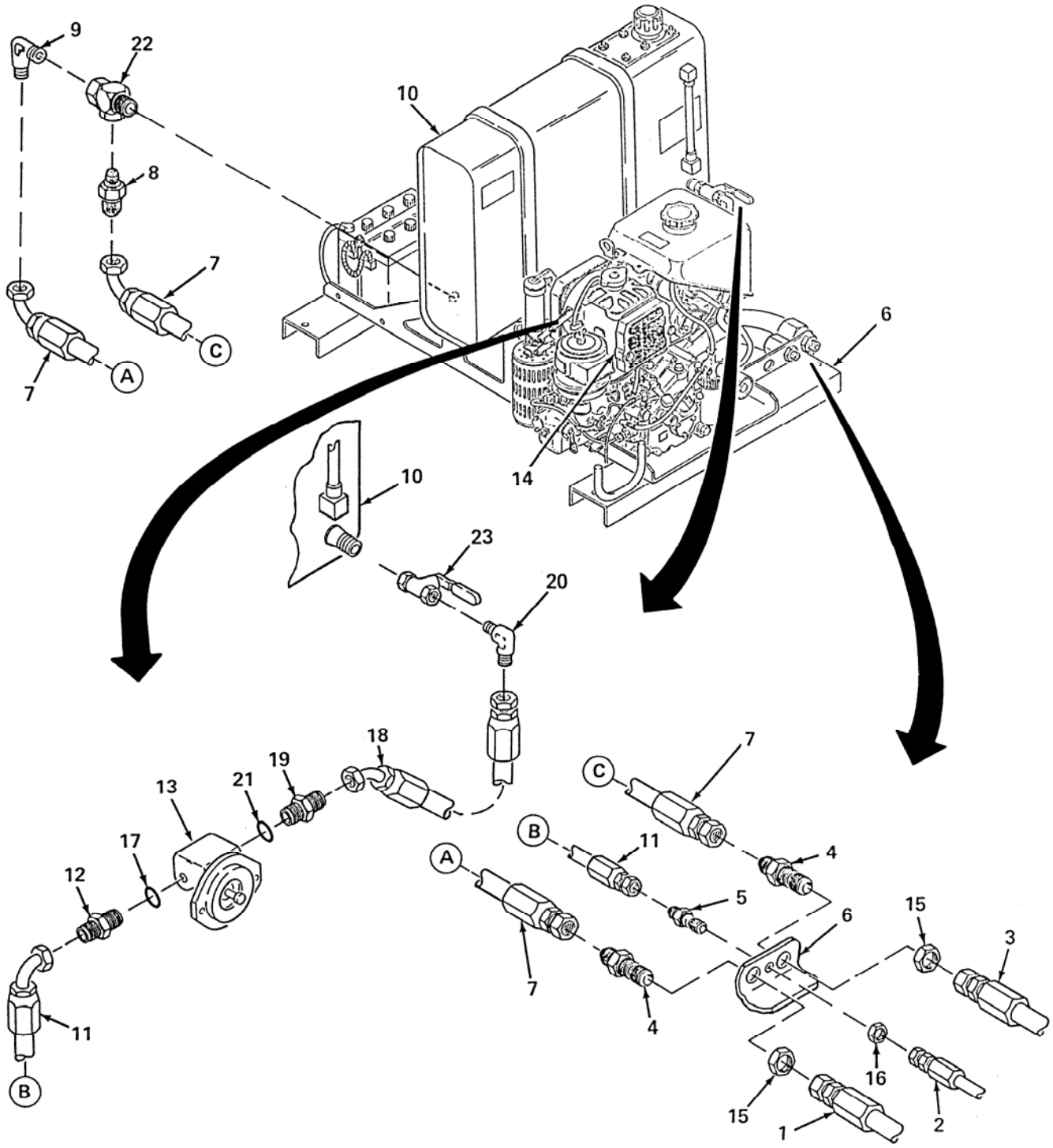
NOTE

This procedure is for removal/installation of all APU hydraulics components. Perform this procedure, or any portion of this procedure, as required to complete necessary repairs. Use hydraulic schematic (figure FO-3) as a general guide for hose routing.

4-86. APU HYDRAULICS (CONT)

REMOVAL

1. Place a drain pan under gooseneck and tag and disconnect three hydraulic hoses (1, 2, and 3) from two tube nipples (4) and tube nipple (5) on APU frame (6). Install caps/plugs into hose openings.



2. Tag and remove two hydraulic hoses (7) from two tube nipples (4) and straight pipe-to-tube adapter (8) and elbow fitting (9) on hydraulic tank (10). Install caps/plugs into hose openings.

3. Tag and disconnect hydraulic hose (11) from tube nipple (5) and straight pipe-to-tube adapter (12) on streetside of hydraulic pump (13) on APU (14). Install caps/plugs into hose openings.

4. Remove two fitting nuts (15), two tube nipples (4), fitting nut (16), and tube nipple (5) from APU frame (6). Install caps/plugs onto fittings.

5. Remove straight pipe-to-tube adapter (12) and preformed packing (17) from streetside of hydraulic pump (13). Install caps/plugs into openings and discard preformed packing.

6. Tag and disconnect hydraulic hose (18) from straight pipe-to-tube adapter (19) on curbside of hydraulic pump (13) and tube elbow (20). Install caps/plugs into hose.

7. Remove straight pipe-to-tube adapter (19) and preformed packing (21) from curbside of hydraulic pump (13). Discard preformed packing and install caps/plugs into openings.

8. Remove straight pipe-to-tube adapter (8) and tube elbow (9) from tube tee (22) from hydraulic tank (10). Install caps/plugs into openings.

9. If necessary, refer to paragraph 4-91 and loosen or remove hydraulic tank and remove pipe elbow (20) and ball valve (23) from hydraulic tank (10). Install caps/plugs into openings.

INSPECTION

WARNING

Compressed air used for cleaning/drying can create airborne particles that can injure the eyes. Always wear eye protection. Pressure must not exceed 30 psi (207 kPa) or injury to personnel may result.

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

1. Clean inside of hoses with compressed air. Clean outside of hoses with wiping rags. Clean all other components with dry cleaning solvent.

2. Inspect hoses for kinks, splits, deterioration, chafing, cuts, and loose fittings. If hose is defective, replace hose.

3. Inspect other components for nicks, burrs, corrosion, stripped threads, and pitting. If parts are defective, replace as required.

4-86. APU HYDRAULICS (CONT)

INSTALLATION

CAUTION

Apply pipe sealant compound to the all male pipe threaded hydraulic fittings, using only enough compound to coat the threads. Do not allow compound to enter a component/fitting or the compound may restrict fluid passages and damage to equipment or premature equipment failure may result.

Note positioning/orientation of fittings on the illustrations. It is important to have the tightened fittings positioned as shown so that hoses are not too short and fittings do not interfere with one another or damage to equipment may result.

1. Remove caps/plugs installed and apply pipe sealant to male threads of fittings. Install ball valve (23) and pipe elbow (20) onto hydraulic tank (10). If necessary, reinstall hydraulic tank (para. 4-91).

2. Remove caps/plugs and apply pipe sealant to male pipe threads of tube tee (22) and install tube tee (22) onto hydraulic tank (10). Install tube elbow (9) and straight pipe-to-tube adapter (8) onto tube tee (22).

3. Lubricate preformed packing (21 and 17) with petroleum jelly. Install preformed packing (21) onto straight pipe-to-tube adapter (19). Install preformed packing (17) onto straight pipe-to-tube adapter (12).

4. Remove caps/plugs and install straight pipe to tube adapter (19) into curbside of hydraulic pump (13).

5. Remove caps/plugs and install straight pipe-to-tube adapter (12) into streetside of hydraulic pump (13).

6. Remove caps/plugs and install hydraulic hose (18) between tube elbow (20) and straight pipe-to-tube adapter (19).

7. Remove caps/plugs and install tube nipple (5) onto APU frame (6) and secure with fitting nut (16).

8. Remove caps/plugs and install two tube nipples (4) onto APU frame (6) and secure with two fitting nuts (15).

9. Remove caps/plug and install hydraulic hose (11) on straight pipe-to-tube adapter (12) on streetside of hydraulic pump (13) and tube nipple (5) on APU frame (6).

10. Remove caps/plugs and install two hydraulic hoses (7) from tube tee (9) and straight pipe-to-tube adapter (8) on hydraulic tank (10) to two tube nipples (4) on APU frame (6).

11. Remove caps/plugs and install three hydraulic hoses (3, 2, and 1) onto two tube nipples (4) and tube nipple (5).

FOLLOW-ON MAINTENANCE

1. Refill hydraulic tank as required (para. 4-17).

2. Perform hydraulic system bleeding as required (para. 4-19).

4-87. STEP HYDRAULICS

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:
- Drain pan, 4 gl
- Gloves, industrial
- Wrench, 1-1/4" combination
- Wrench, automotive adjustable
- Goggles, chemical and oil protective

Materials/Parts

Cap and plug set, item 5, appx. E
Dry cleaning solvent, item 26, appx. E
Wiping rag, item 19, appx. B

Equipment Condition

Hydraulic tank drained (para. 4-18)
Front and rear support legs lowered supporting platform (para. 2-22 and 2-23)
Platform step removed (para. 4-59)

General Safety Instructions

WARNING

Hydraulic fluid may be absorbed through the skin. Avoid prolonged exposure to skin and wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, wash thoroughly with soap and water. Wash hands thoroughly prior to eating or smoking.

Residual pressure may remain in hydraulic lines. Open fittings slowly or injury to personnel may result.

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

4-87. STEP HYDRAULICS (CONT)

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the hydraulic system or damage to equipment may result.

NOTE

This procedure is for removal/installation of step hydraulic components. Perform this procedure, or any portion of this procedure, as required to complete necessary repairs. Use hydraulic schematic (figure FO-3) as a general guide for hose routing.

REMOVAL

1. Using a drain pan, tag and disconnect seven hoses (1) from fittings on step weldment (2). Install caps/plugs into hoses disconnected.

2. Tag and remove two hydraulic tubes (3) from elbow fittings (4) and tee fittings (5). Remove two fitting nuts (6) and elbow fittings (4) from step weldment (2). Install caps/plugs into openings.

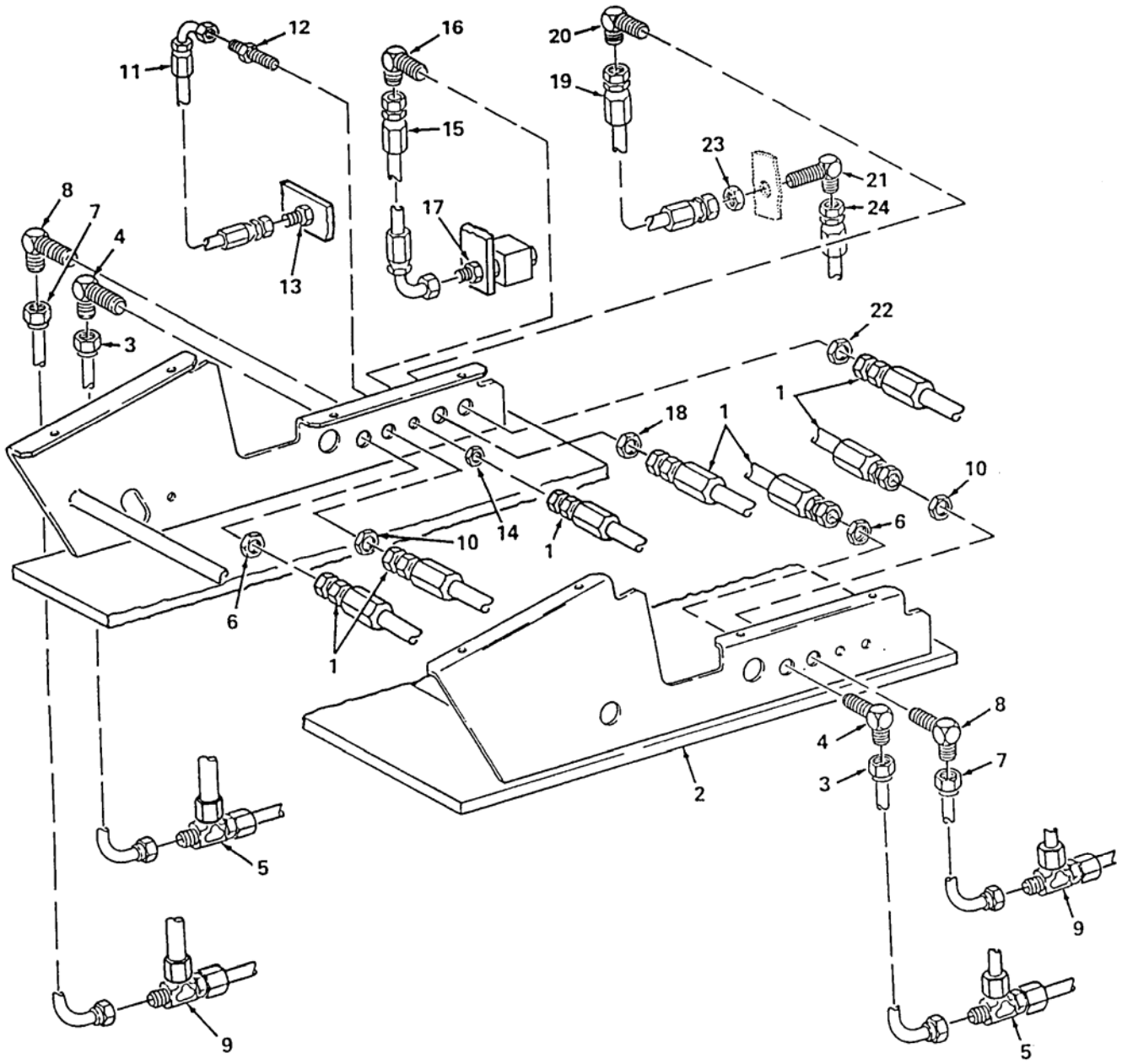
3. Tag and remove two hydraulic tubes (7) from elbow fittings (8) and tee fittings (9). Remove two fitting nuts (10) and elbow fittings (8) from step weldment (2). Install caps/plugs into openings.

4. Tag and remove hydraulic hose (11) from tube nipple (12) and reducer adapter (13) on hydraulic control module. Remove fitting nut (14) and tube nipple (12) from step weldment (2). Install caps/plugs into openings.

5. Tag and remove hydraulic hose (15) from elbow fitting (16) and bulkhead fitting (17) on gooseneck isolation valve. Remove fitting nut (18) and elbow fitting (16) from step weldment (2). Install caps/plugs into openings.

6. Tag and remove hydraulic hose (19) from elbow fitting (20) on step weldment (2) and elbow fitting (21) on hydraulic control module. Remove fitting nut (22) and elbow fitting (20) from step weldment (2). Install caps/plugs into openings.

7. Tag and disconnect hydraulic tube (24) from elbow fitting (21). Install caps/plugs into tube. Remove fitting nut (23) and elbow fitting (21) from hydraulic control module. Install caps/plugs into openings.



INSPECTION

WARNING

Compressed air used for cleaning/drying can create airborne particles that can injure the eyes. Always wear eye protection. Pressure must not exceed 30 psi (207 kPa) or injury to personnel may result.

4-87. STEP HYDRAULICS (CONT)

WARNING

Compressed air used for cleaning/drying can create airborne particles that can injure the eyes. Always wear eye protection. Pressure must not exceed 30 psi (207 kPa) or injury to personnel may result.

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

1. Clean inside of hoses and tubes with compressed air. Clean outside of hoses with wiping rags. Clean all other components with dry cleaning solvent.
2. Inspect hoses for kinks, splits, deterioration, chafing, cuts, and loose fittings. If hose is defective, replace hose.
3. Inspect other components for nicks, burrs, corrosion, stripped threads, broken castings, and pitting. If parts are defective, replace as required.

INSTALLATION

CAUTION

Note positioning/orientation of fittings on the illustrations. It is important to have the tightened fittings positioned as shown so that hoses are not too short and fittings do not interfere with one another or damage to equipment may result.

1. Remove caps/plugs and install elbow fitting (21) onto hydraulic control module and secure with fitting nut (23).
2. Remove caps/plugs and install elbow fitting (20) onto step weldment (2) and secure with fitting nut (22).
3. Remove caps/plugs and connect hydraulic tube (24) to elbow fitting (21). Remove caps/plugs and install hydraulic hose (19) between elbow fitting (20) and elbow fitting (21).
4. Remove caps/plugs and install elbow fitting (16) onto step weldment (2) and secure in place with fitting nut (18).
5. Remove caps/plugs and install hydraulic hose (15) between elbow fitting (16) on step weldment (2) and bulkhead fitting (17) on gooseneck isolation valve.
6. Remove caps/plugs and install tube nipple (12) onto step weldment (2) and secure in place with fitting nut (14).
7. Remove caps/plugs and install hydraulic hose (15) between tube nipple (12) on step weldment (2) and reducer adapter (13) on hydraulic control module.

8. Remove caps/plugs and install two tube elbows (8) onto step weldment (2) and secure in place with fitting nuts (10).

9. Remove caps/plugs and install two hydraulic tubes (7) between tube elbows (8) on step weldment (2) and tee fittings (9).

10. Remove caps/plugs and install two tube elbows (4) onto step weldment (2) and secure in place with fitting nuts (6).

11. Remove caps/plugs and install two hydraulic tubes (3) between tube elbows (4) on step weldment (2) and tee fittings (5).

12. Remove caps/plugs and install seven hydraulic hoses (1) onto fittings on step weldment (2).

FOLLOW-ON MAINTENANCE

1. Refill hydraulic tank as required (para. 4-17).

2. Perform hydraulic system bleeding as required (para. 4-19).

4-88. HYDRAULIC PRESSURE GAGES

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:
Drain pan, 4 gl
Extension light, 24 ft
Gloves, industrial
Goggles, chemical and oil protective

Materials/Parts

Cap and plug set, item 5, appx. E
Wiping rag, item 19, appx. E
Dry cleaning solvent, item 26, appx. E
Self-locking nut (12)
Pipe sealant, item 18, appx. E
Teflon tape, item 29.1, appx. E

Personnel Required: 2

4-88. HYDRAULIC PRESSURE GAGES (CONT)

Equipment Condition

Platform adjusted to 50 inch (127 cm) height (para. 2-19)
Suspension isolation valve handle placed in ADJUST position (para. 2-6)
Gooseneck isolation valve handle placed in ADJUST position (para. 2-6)
Suspension isolation valves isolated at four corner bogies (para. 2-6)
All pressure gages reading 0 psi (0 kPa) (para. 2-5)

General Safety Instructions

WARNING

Hydraulic fluid may be absorbed through the skin. Avoid prolonged exposure to skin and wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, wash thoroughly with soap and water. Wash hands thoroughly prior to eating or smoking.

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

Residual pressure may remain in hydraulic lines. Open fittings slowly or injury to personnel may result.

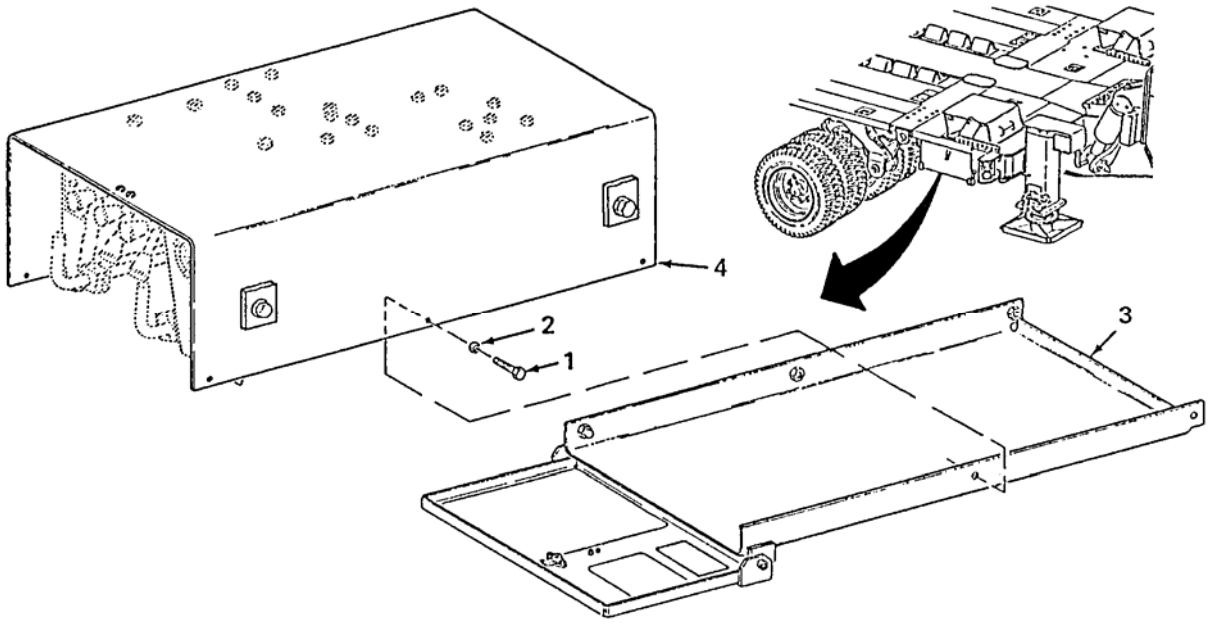
CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the hydraulic system or damage to equipment may result.

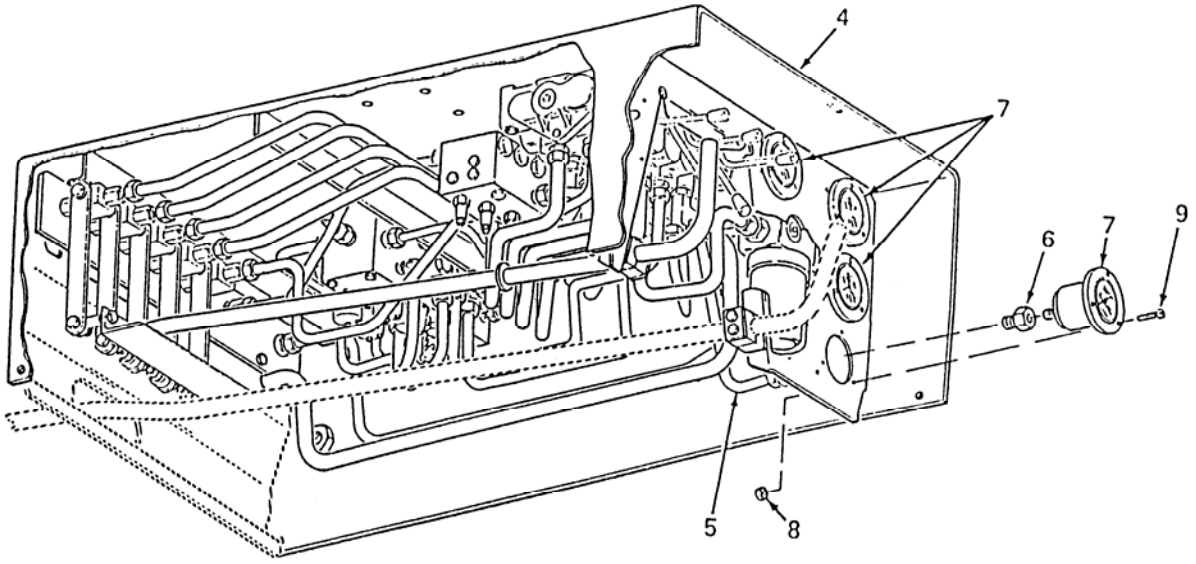
REMOVAL

1. Make sure hydraulic control module door panel is lowered (para. 2-6).

2. Using two people, remove six capscrews (1), lockwashers (2), and lower panel (3) from hydraulic control module (4). Carefully remove lower panel (3), with panel door attached, out from under semitrailer and place on platform. Discard six lockwashers.



3. Using a drain pan, tag and disconnect hydraulic tube (5) from straight pipe-to-tube adapter (6) on pressure gage (7).



4. Remove three self-locking nuts (8), screws (9), and pressure gage (7). Remove straight pipe-to-tube adapter (6) from pressure gage (7). Discard self-locking nuts. Install caps/plugs into openings.

5. Repeat steps 4 and 5 to remove three remaining pressure gages (7), as required.

4-88. HYDRAULIC PRESSURE GAGES (CONT)

INSPECTION

WARNING

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

1. Clean pressure gages with wiping rags. Clean all other components with dry cleaning solvent.

2. Inspect pressure gages for cracked or broken glass, bent needles, stripped threads, or evidence of leakage. Replace any defective gages.

INSTALLATION

1. Prepare threads of pressure gage (7) in accordance with step a or step b:

   a. Apply pipe sealant to threads, except for last two threads at open end.

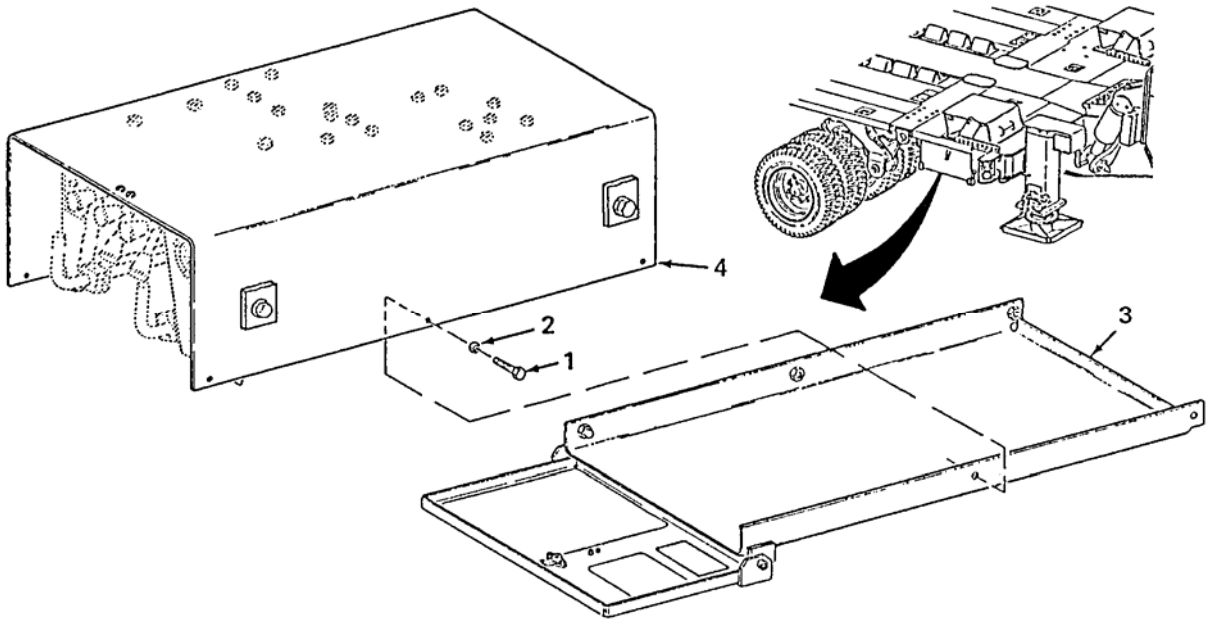
   b. Apply two turns of Teflon tape to threads leaving last two threads at open end uncovered.

1.1. Install straight pipe-to-tube adapter (6) onto pressure gage (7). Aline and install pressure gage (10) and secure with three screws (9) and self-locking nuts (8).

2. Remove caps/plug and connect hydraulic tube (5) onto straight pipe-to-tube adapter (6) on pressure gage (7).

3. Repeat steps 2 and 3 to install and connect all pressure gages removed, as required.

4. Using two people, aline and install lower panel (3), with door panel attached, onto hydraulic control module (4). Secure lower panel in place by installing six lockwashers (2) and capscrews (1).



FOLLOW-ON MAINTENANCE

1. Perform hydraulic system bleeding as required (para. 4-19).

2. Operate suspension and check pressure gage reading for proper operation (para. 2-6).

4-89. HYDRAULIC FILTER

This task covers: a. Element Change b. Removal c. Inspection d. Installation

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INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:
- Drain pan, 4 gl
- Gloves, industrial
- Wrench, 1-1/4", combination
- Goggles, chemical and oil protective
- Extension light, 24 ft

4-89. HYDRAULIC FILTER (CONT)

Materials/Parts

Cap and plug set, item 5, appx. E
Hydraulic fluid, item 12, appx. E
Petroleum jelly, item 17, appx. E
Pipe sealant, item 18, appx. E
Wiping rag, item 19, appx. E
Dry cleaning solvent, item 26, appx. E
Preformed packing (2)
Preformed packing
Filter element

Personnel Required: 2

Equipment Condition

Hydraulic oil valve at reservoir closed (handle upright)
One suspension valve (hydraulic control console) secured in full up position

General Safety Instructions

WARNING

Hydraulic fluid may be absorbed through the skin. Avoid prolonged exposure to skin and wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, wash thoroughly with soap and water. Wash hands thoroughly prior to eating or smoking.

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

Residual pressure may remain in hydraulic lines. Open fittings slowly or injury to personnel may result.

CAUTION

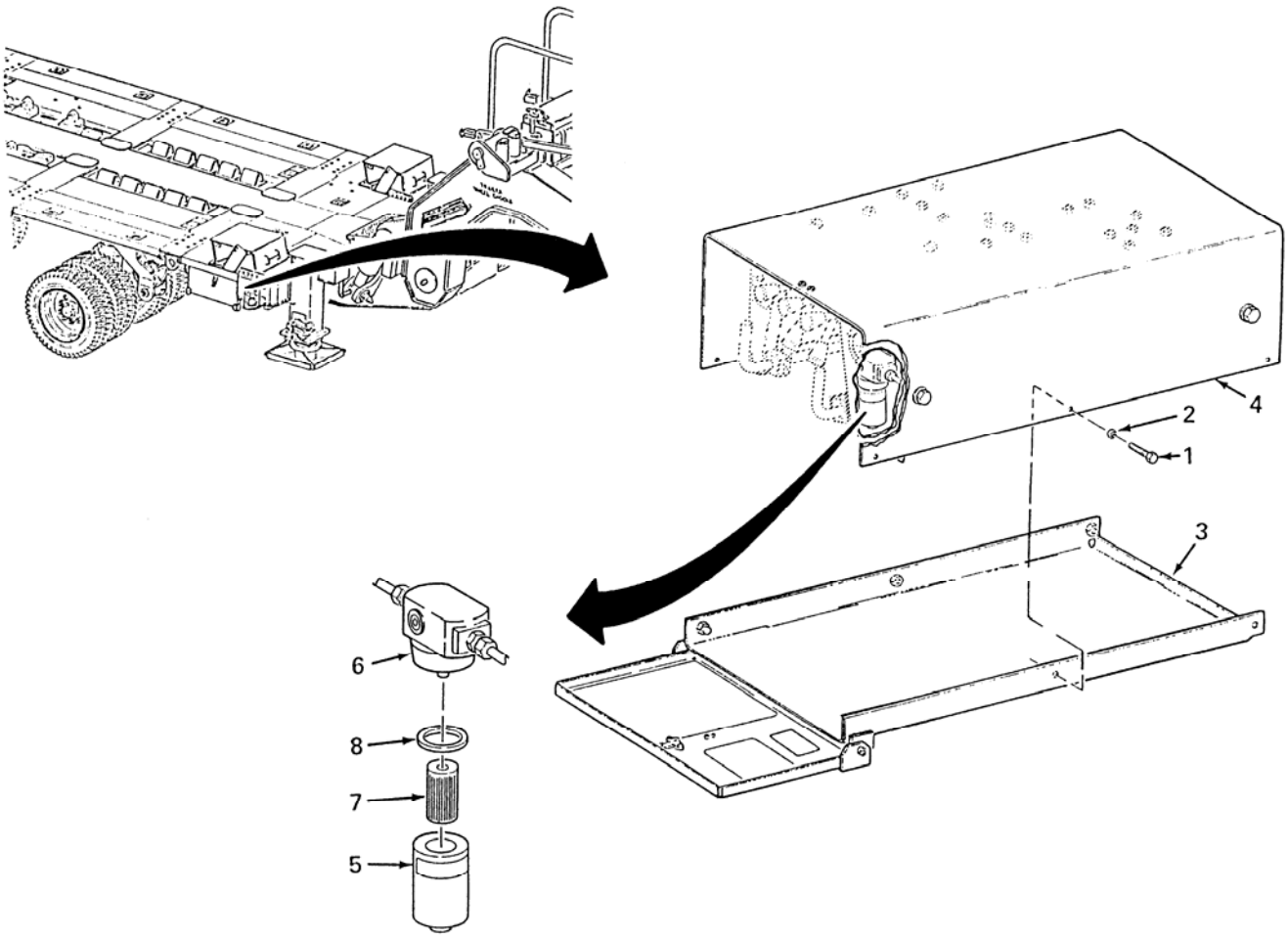
All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the hydraulic system or damage to equipment may result.

ELEMENT CHANGE

1. Make sure hydraulic control module door panel is lowered (para. 2-6).

2. Using two people, remove six capscrews (1), lockwashers (2), and lower panel (3) from hydraulic control module (4). Carefully remove lower panel (3), with panel door attached, out from under semitrailer and place on platform. Discard six lockwashers.

3. Using a drain pan and 1-1/4-inch wrench, unscrew and remove filter element housing (5) from filter block (6).



4. Remove filter element (7) and preformed packing (8). Discard filter element and preformed packing. Pour fluid inside of filter element housing (5) into drain pan.

5. Install new filter element (7) into filter element housing (5). Apply a thin coat of petroleum jelly onto preformed packing (8). Install preformed packing (8) onto filter block (5).

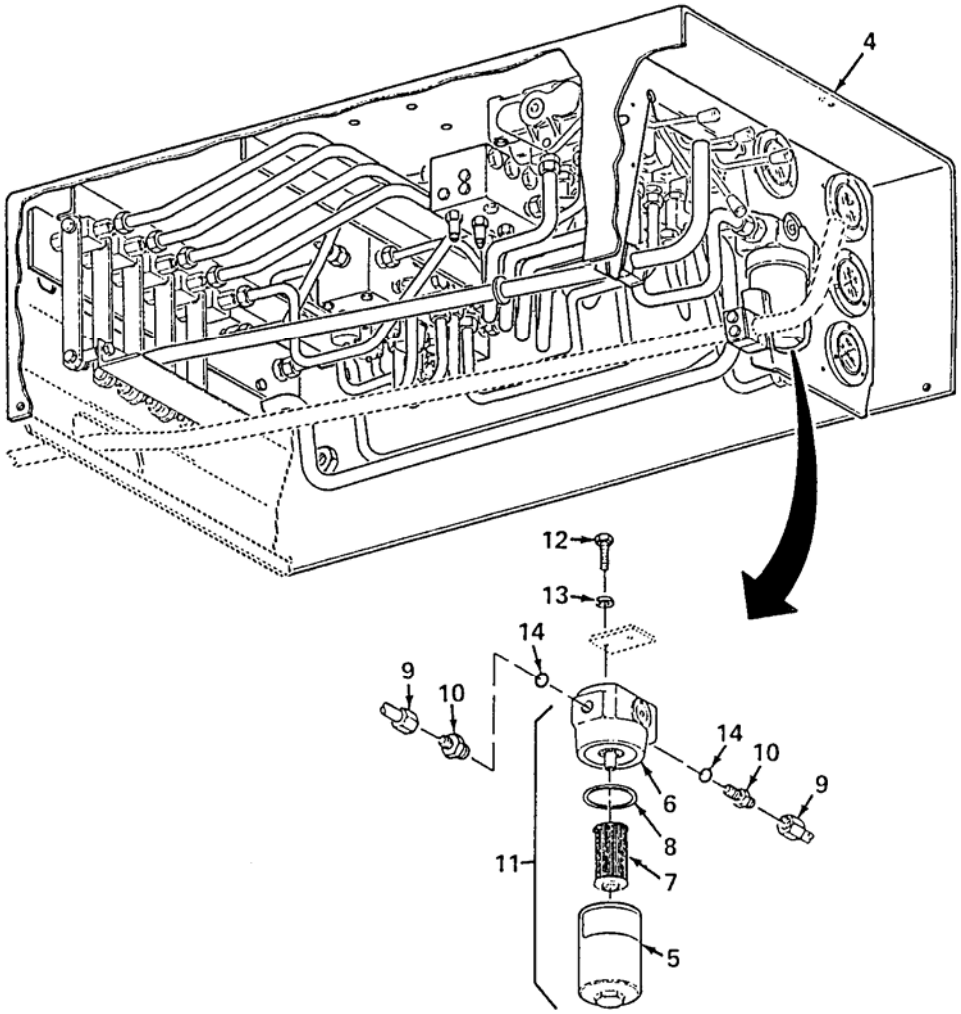
6. Install filter element housing (5), with filter element and preformed packing attached, to filter block (6). Using a 1-1/4-inch wrench, tighten filter element housing (5) onto filter block (6).

7. Using two people, aline and install lower panel (3), with door panel attached, onto hydraulic control module (4). Secure lower panel in place by installing six lockwashers (2) and capscrews (1). Close door panel.

REMOVAL

1. Perform steps 1 and 2 of element changes.

4-89. HYDRAULIC FILTER (CONT)



2. Using a drain pan, tag and disconnect two hydraulic tubes (9) from straight pipe-to-tube adapters (10) on hydraulic filter (11).

3. Remove two bolts (12), lockwashers (13), and hydraulic filter (11) from hydraulic control module (4). Discard lockwashers.

4. Remove two straight pipe-to-tube adapters (10) and two preformed packings (14) from hydraulic filter (11). Install caps/plugs into all openings. Discard preformed packings.

5. If hydraulic filter (11) needs to be disassembled, proceed as follows:

   a. Using a drain pan and 1-1/4-inch wrench, unscrew and remove filter element housing (5) from filter block (6).

   b. Remove filter element (7) and preformed packing (8). Discard filter element and preformed packing.

   c. Pour fluid inside of filter element housing (5) into drain pan.

INSPECTION

WARNING

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

1. Clean filter housing with wiping rags. Clean all other components with dry cleaning solvent.

2. Inspect filter assembly for cracked or broken sight gage, stripped threads, deformed preformed packing grooves, nicks, cracks, dents, or evidence of leakage. Replace defective components as required.

INSTALLATION

1. If hydraulic filter was not disassembled during removal, proceed to step 2. If filter was disassembled during removal, proceed as follows:

   a. Install new filter element (7) into filter element housing (5). Apply a thin coat of petroleum jelly onto preformed packing (8). Install preformed packing (8) onto filter block (6).

   b. Install filter element housing (5), with filter element (7) and preformed packing (8) attached, to filter block (6).

   c. Using a 1-1/4-inch wrench, tighten filter element housing (5) onto filter block (6).

2. Remove caps/plugs and apply petroleum jelly to two preformed packings (14) and install packings (14) onto two straight pipe-to-tube adapters (10).

3. Install filter assembly (11) onto hydraulic control module (4) and secure with two lockwashers (13) and bolts (12).

CAUTION

Apply pipe sealant compound to the all male threads of hydraulic pipe threads, using only enough compound to coat the threads. Do not allow compound to enter a component/fitting or the compound may restrict fluid passages and damage to equipment or equipment failure may result.

4. Remove caps/plugs and apply pipe sealant to male pipe threads of two straight adapters (10).

5. Remove caps/plugs from two hydraulic tubes (9) and reconnect two tubes to two straight pipe-to-tube adapters (10).

6. Using two people, refer to step 7 of element change and aline and install lower panel, with door panel attached, onto hydraulic control module (4).

4-89. HYDRAULIC FILTER (CONT)

FOLLOW-ON MAINTENANCE

1. Refill hydraulic tank as required (para. 4-17).
2. Open hydraulic oil valve at reservoir.
3. Release suspension valve (hydraulic control console) to center position.
4. Perform hydraulic system bleeding as required (para. 4-19).

4-90. GOOSENECK CYLINDER HYDRAULICS

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:
Drain pan, 4 gl
Extension light, 24 ft
Wrench, automotive, adjustable
Goggles, industrial
Gloves, chemical and oil protective

Materials/Parts

Cap and plug set, item 5, appx. E
Petroleum jelly, item 17, appx. E
Dry cleaning solvent, item 26, appx. E
Wiping rag, item 19, appx. B
Preformed packing (4)
Preformed packing (2)

Equipment Condition

Suspension shut-off valve pulled out to ADJUST position (para. 2-6)
Gooseneck isolation valve pulled out to ADJUST position (para. 2-6)
Gooseneck lowered to lowest position (para. 2-18)
Platform adjusted to 50 inch (127 cm) height (para. 2-19)
Suspension isolation valves at four corners of platform closed (para. 2-6)

General Safety Instructions

WARNING

Hydraulic fluid may be absorbed through the skin. Avoid prolonged exposure to skin and wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, wash thoroughly with soap and water. Wash hands thoroughly prior to eating or smoking.

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

Residual pressure may remain in hydraulic lines. Open fittings slowly or injury to personnel may result.

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the hydraulic system or damage to equipment may result.

NOTE

This procedure is for removal/installation of all gooseneck cylinder hydraulic components. Perform this procedure, or any portion of this procedure, as required to complete necessary repairs. Use the hydraulic schematic (figure FO-3) as a guide for hose routing.

4-90. GOOSENECK CYLINDER HYDRAULICS (CONT)

REMOVAL

1. On streetside of semitrailer, remove screw (1) and two block clamp halves (2).
2. Tag and remove two hoses (3) and hose (4). Install caps/plugs into all openings.
3. Remove two straight adapters (5) and preformed packings (6), elbow (7), and preformed packing (8). Install caps/plugs into all openings. Discard preformed packings.
4. On curbside of semitrailer, remove screw (9) and two block clamp halves (10).
5. Tag and remove two hoses (11) and hose (12). Install caps/plugs into all openings.
6. Remove two straight adapters (13) and preformed packings (14), elbow (15), and preformed packing (16). Install caps/plugs into all openings. Discard preformed packings.

INSPECTION

WARNING

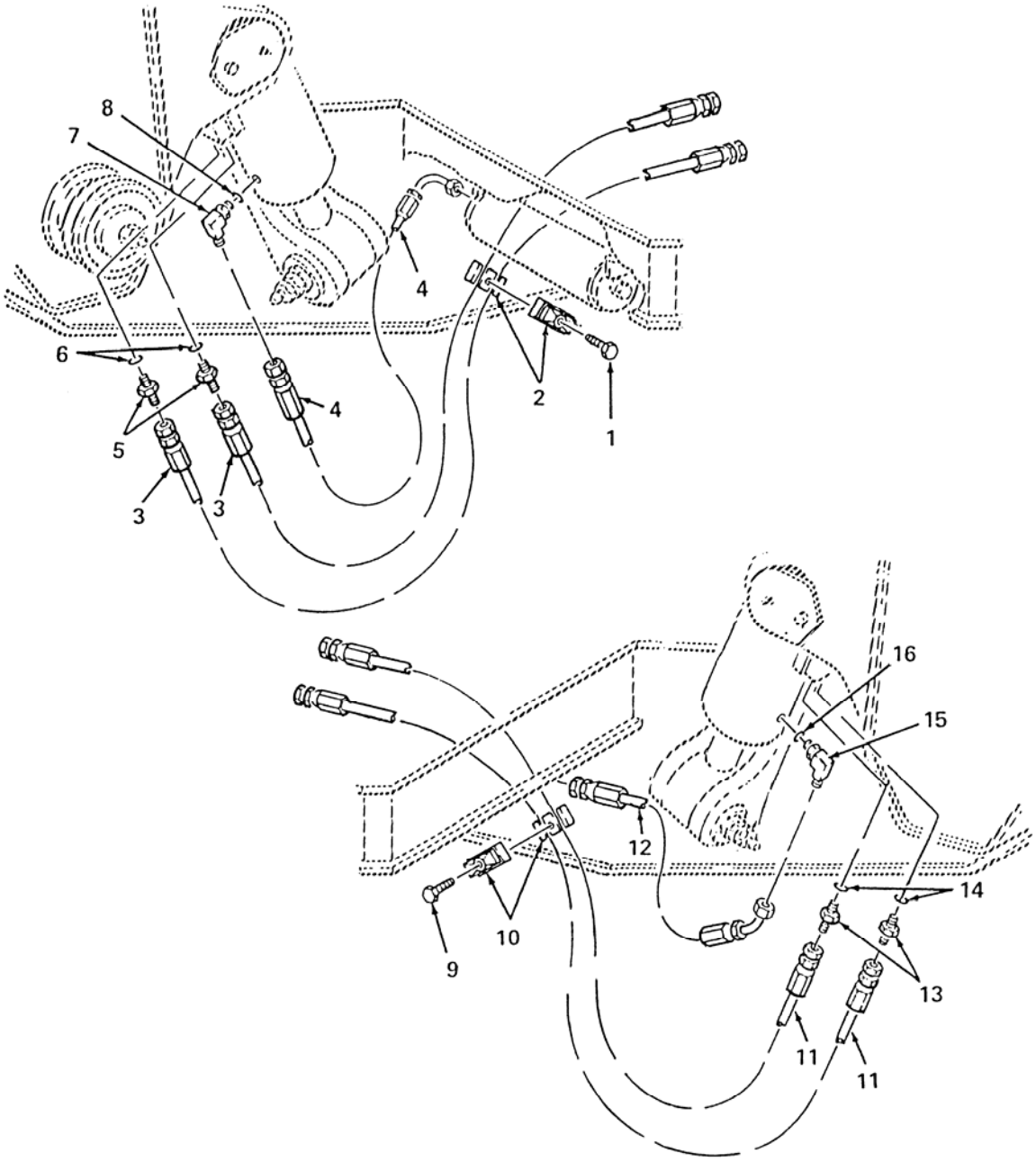
Compressed air used for cleaning/drying can create airborne particles that can injure the eyes. Always wear eye protection. Pressure must not exceed 30 psi (207 kPa) or injury to personnel may result.

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

1. Clean inside of hoses with compressed air. Clean outside of hoses with wiping rags. Clean all other components with dry cleaning solvent.
2. Inspect hoses for kinks, splits, deterioration, chafing, cuts, and loose fittings. If hose is defective, replace hose.
3. Inspect other components for nicks, burrs, corrosion, stripped threads, and pitting. If parts are defective, replace as required.

INSTALLATION

1. Remove caps/plugs. Apply petroleum jelly to preformed packing (16) and two preformed packings (14).
2. On curbside of semitrailer, install preformed packing (16), elbow (15), two preformed packings (14), and two straight adapters (13).



3. Remove caps/plugs and install hose (12) and two hoses (11).

4. Install two clamp block halves (10) and secure with screw (9).

5. Remove caps/plugs. Apply petroleum jelly to preformed packing (8) and two preformed packings (6).

6. On streetside of semitrailer, install preformed packing (8), elbow (7), two preformed packings (6), and two straight adapters (5).

7. Remove caps/plugs and install hose (4) and two hoses (3).

8. Install two clamp block halves (2) and secure with screw (1).

4-90. GOOSENECK CYLINDER HYDRAULICS (CONT)

FOLLOW-ON MAINTENANCE

1. Check/fill hydraulic tank (para. 4-17).
2. Perform hydraulic system bleeding (para. 4-19).
3. Operate gooseneck to check for proper operation (para. 2-18).

4-91. HYDRAULIC TANK FILTER

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Wrench, adjustable, automotive, item 17, appx. B

Materials/Parts

Dry cleaning solvent, item 26, appx. E

Equipment Condition

Hydraulic tank assembly disassembled (para. 4-94)

General Safety Instructions

WARNING

Hydraulic fluid may be absorbed through the skin. Avoid prolonged exposure to skin and wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, wash thoroughly with soap and water. Wash hands thoroughly prior to eating or smoking.

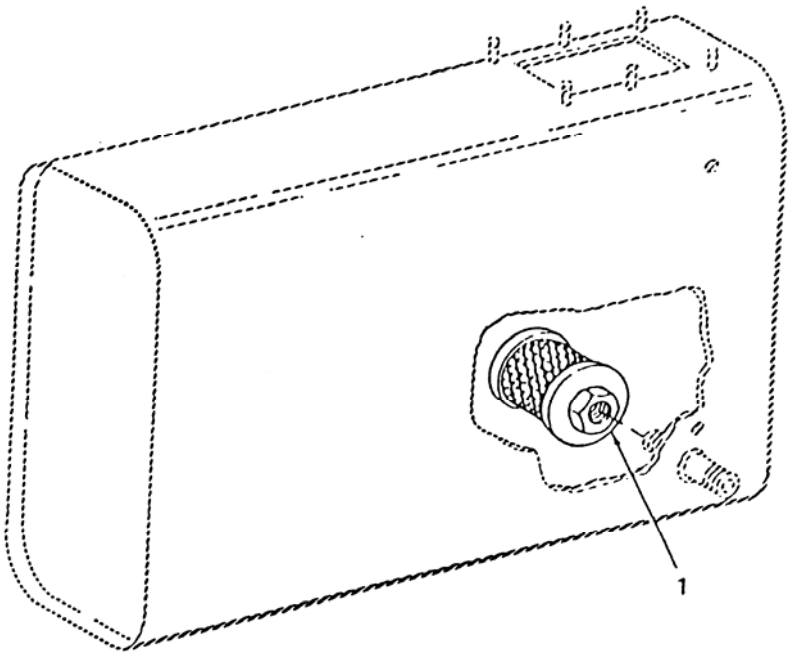
Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the hydraulic system or damage to equipment may result.

REMOVAL

Using an automotive adjustable wrench, unscrew and remove hydraulic tank filter (1).



INSPECTION

WARNING

Compressed air used for cleaning/drying can create airborne particles that can injure the eyes. Always wear eye protection. Pressure must not exceed 30 psi (207 kPa) or injury to personnel may result.

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

1. Clean hydraulic filter with dry cleaning solvent and dry with compressed air.

2. Inspect hydraulic filter for holes, corrosion, clogging, or evidence of collapse. Replace if required.

INSTALLATION

Using an automotive adjustable wrench, thread hydraulic filter (1) onto fitting inside hydraulic tank.

4-91. HYDRAULIC TANK FILTER (CONT)

FOLLOW-ON MAINTENANCE

Assemble hydraulic tank assembly (para. 4-94).

4-92. PLATFORM SUSPENSION HYDRAULICS

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 1, item 17, appx. B:

Drain pan, 4 gl	Goggles, industrial
Extension light, 24 ft	Gloves, chemical and oil protective
Wrench, automotive adjustable	Wrench, combination, 1-1/4"

Materials/Parts

Cap and plug set, item 5, appx. E
Petroleum jelly, item 17, appx. E
Pipe sealant, item 18, appx. E
Wiping rag, item 19, appx. B
Dry cleaning solvent, item 26, appx. E
Tiedown straps (AR), item 27, appx. E
Preformed packing (20)
Preformed packing (7)
Self-locking nut (2)
Self-locking nut (2)

Equipment Condition

Gooseneck lowered to lowest position, if uncoupled (para. 2-18)
Front and rear support legs lowered supporting platform (para. 2-22 and 2-23)
Platform lowered onto support legs to relieve all pressure on suspension gages (para. 2-19)
Gooseneck isolation and suspension isolation shut-off valves pulled out to ADJUST position (para. 2-6)

General Safety Instructions

WARNING

Hydraulic fluid may be absorbed through the skin. Avoid prolonged exposure to skin and wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, wash thoroughly with soap and water. Wash hands thoroughly prior to eating or smoking.

WARNING

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

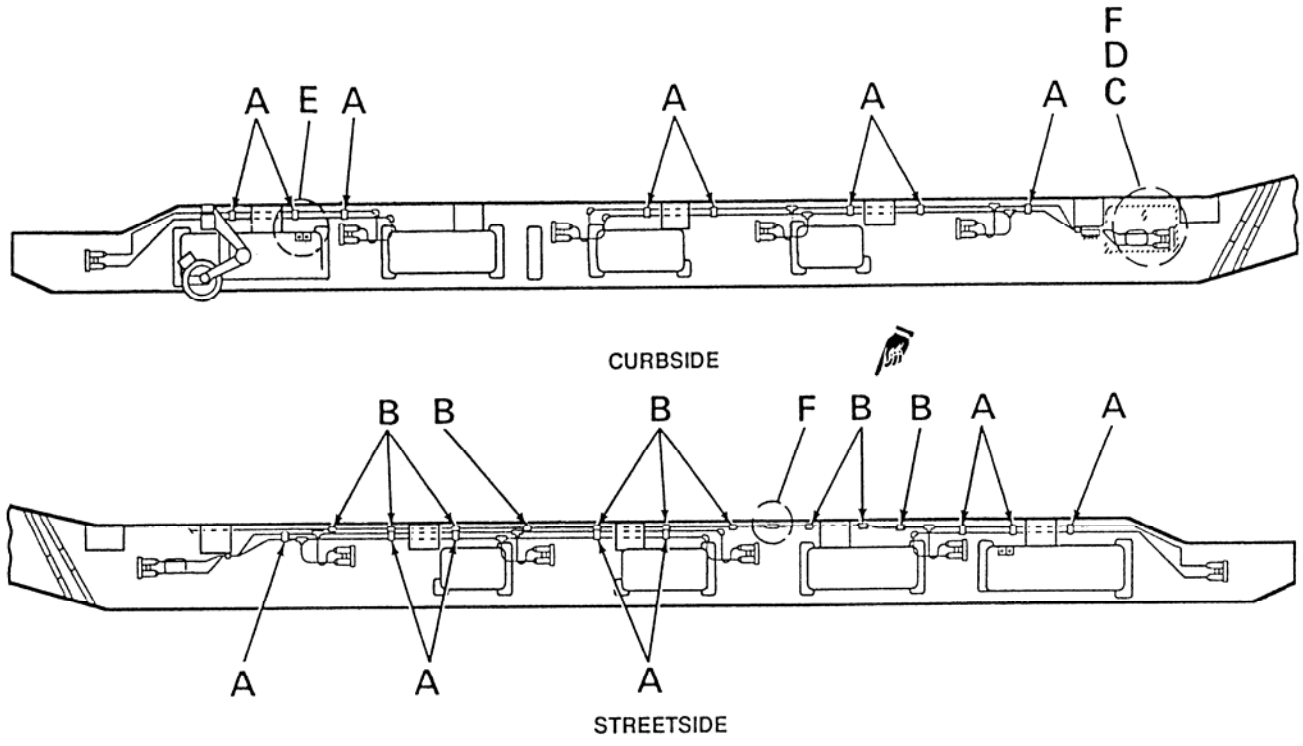
Residual pressure may remain in hydraulic lines. Open fittings slowly or injury to personnel may result.

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the hydraulic system or damage to equipment may result.

NOTE

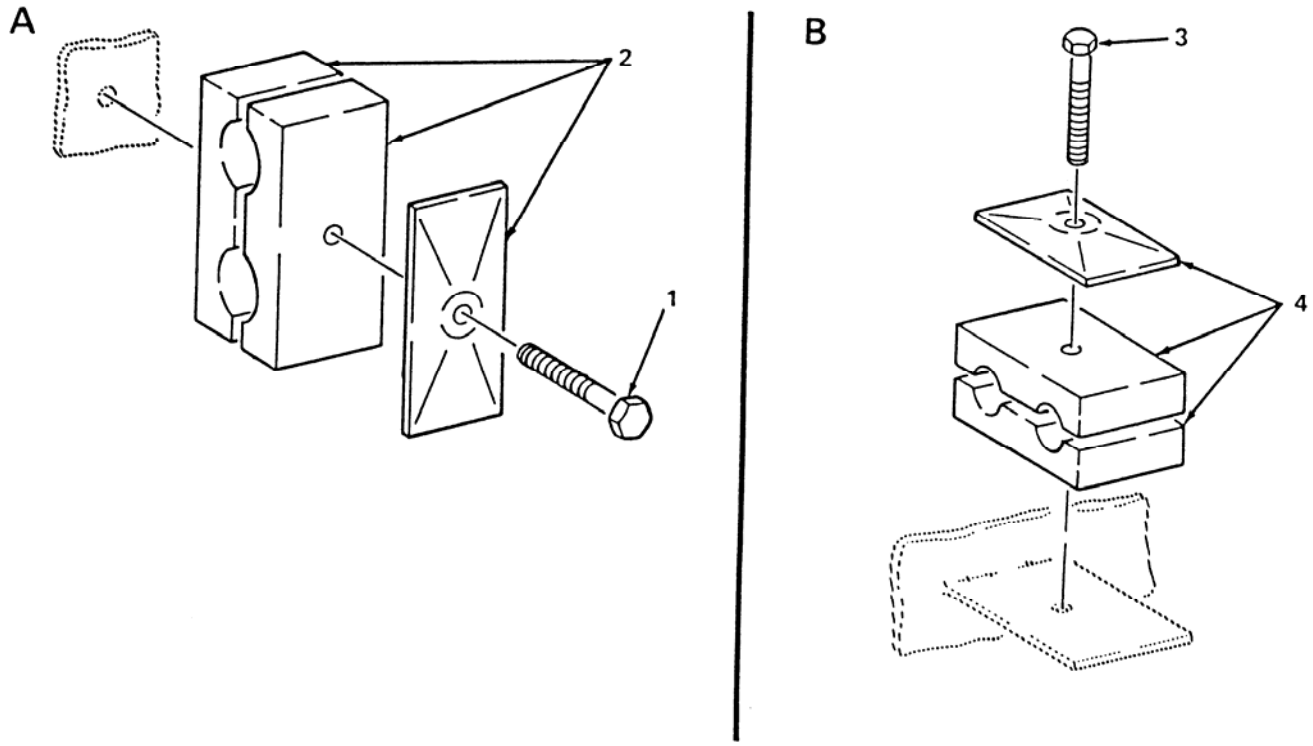
This procedure is for removal/installation of all platform suspension hydraulics components. Perform this procedure, or any portion of this procedure, as required to complete the necessary repair. Use the hydraulic schematic (figure FO-3) as a guide for hose routing.



4-92. PLATFORM SUSPENSION HYDRAULICS (CONT)

REMOVAL

1. At 16 places, 8 curbside and 8 streetside, remove screw (1) and block clamp (2).



2. At ten places, streetside, remove screw (3) and block clamp (4).

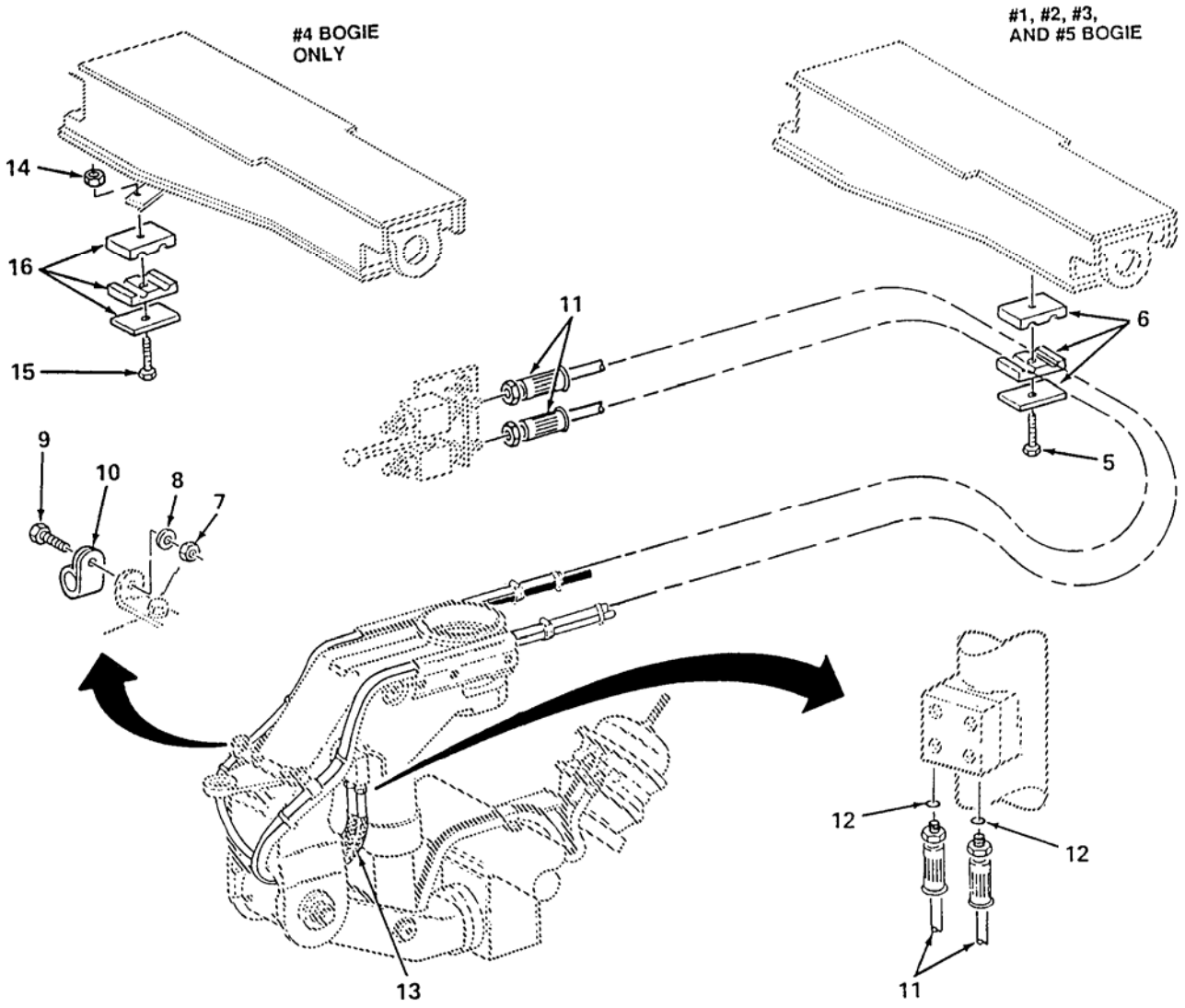
3. At #1, #2, #3, and #5 bogies, curbside and streetside, proceed as follows:

   a. Remove screw (5) and block clamp (6).

   b. Remove tiewraps as required. Remove two self-locking nuts (7), washers (8), screws (9), and clamps (10). Discard tiewraps and self-locking nuts.

   c. Remove two hose shields (para. 4-41).

   d. Tag and remove two hoses (11) and preformed packings (12). Remove loom (13) from two hoses (11). Install caps/plugs into all openings. Discard preformed packings.



4. At #4 bogies, curbside and streetside, proceed as follows:

   a. Remove nut (14), screw (15), and block clamp (16).

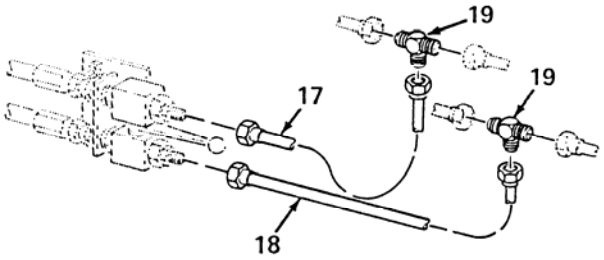
   b. Remove tiewraps as required. Remove two self-locking nuts (7), washers (8), screws (9), and clamps (10). Discard tiewraps and self-locking nuts.

   c. Remove two hose shields (para. 4-41).

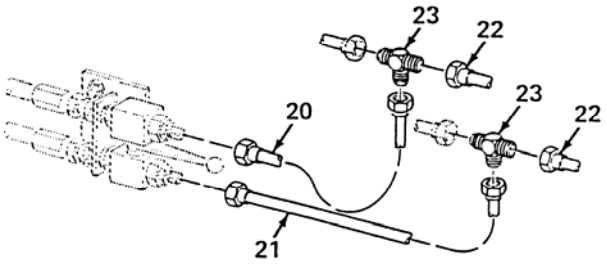
   d. Tag and remove two hoses (11) and preformed packings (12). Remove loom (13) from two hoses (11). Install caps/plugs into all openings. Discard preformed packings.

4-92. PLATFORM SUSPENSION HYDRAULICS (CONT)

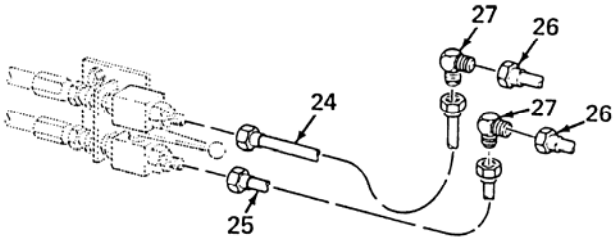
5. At curbside #1 bogie, tag and remove two tubes (17 and 18) and tube tees (19). Install caps/plugs into all openings.



CURBSIDE #1 BOGIE



CURBSIDE #2 BOGIE



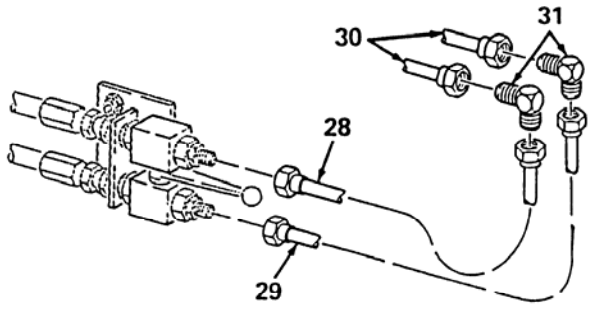
CURBSIDE #3 BOGIE

6. At curbside #2 bogie, tag and remove two tubes (20 and 21), tubes (22), and tube tees (23). Install caps/plugs into all openings.

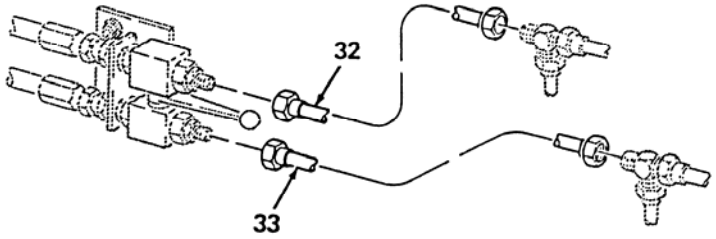
7. At curbside #3 bogie, tag and remove two tubes (24 and 25), tubes (26), and elbows (27). Install caps/plugs into all openings.

8. At curbside #4 bogie, tag and remove two tubes (28 and 29), tubes (30), and elbows (31). Install caps/plugs into all openings.

9. At curbside #5 bogie, tag and remove two tubes (32 and 33). Install caps/plugs into all openings.

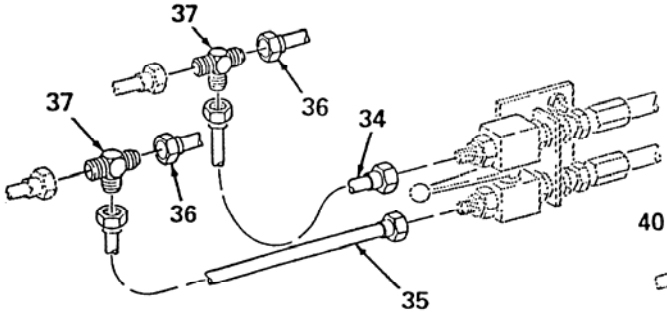


CURBSIDE #4 BOGIE

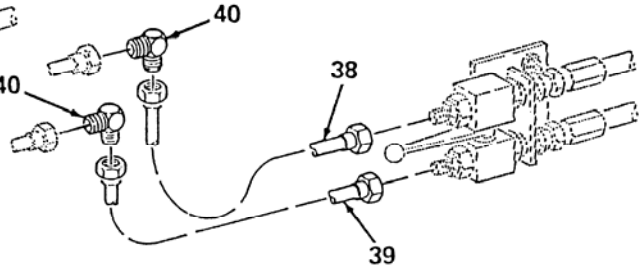


CURBSIDE #5 BOGIE

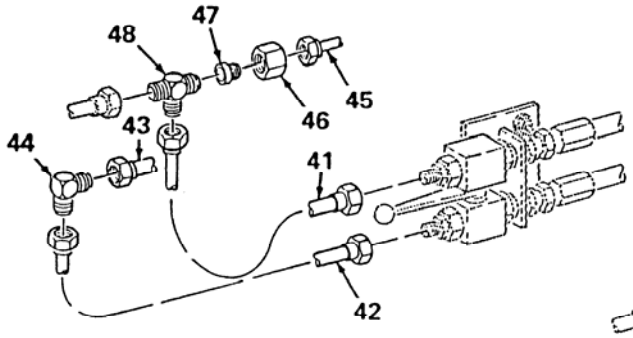
10. At streetside #1 and #2 bogies, tag and remove two tubes (34 and 35), tubes (36), and tube tees (37). Install caps/plugs into all openings.



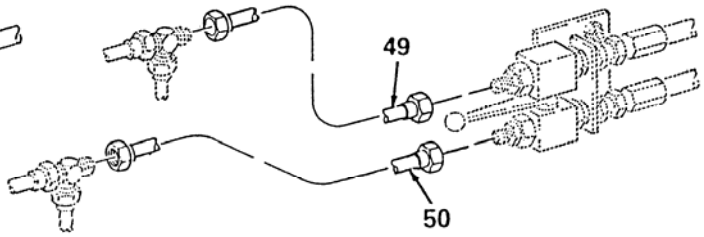
STREETSIDE #1 AND #2 BOGIE



STREETSIDE #3 BOGIE



STREETSIDE #4 BOGIE



STREETSIDE #5 BOGIE

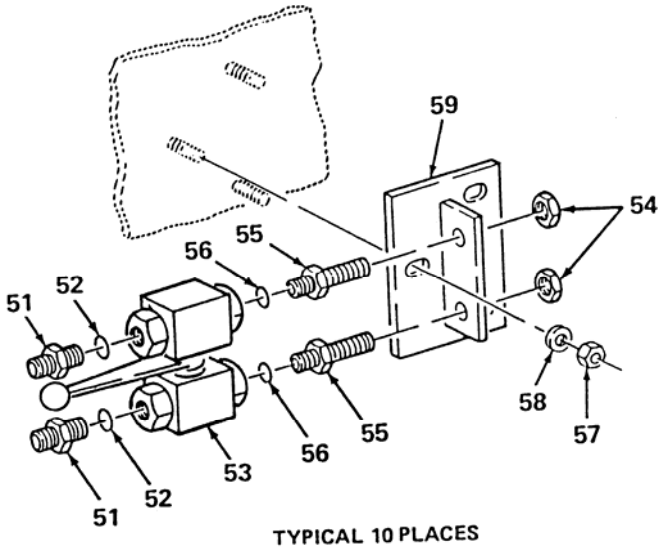
4-92. PLATFORM SUSPENSION HYDRAULICS (CONT)

11. At streetside #3 bogie, tag and remove two tubes (38 and 39) and elbows (40). Install caps/plugs into all openings.

12. At streetside #4 bogie, tag and remove three tubes (41, 42, and 43), elbow (44), tube (45), coupling nut (46), reducer (47), and tee (48). Install caps/plugs into all openings.

13. At streetside #5 bogie, tag and remove two tubes (49 and 50). Install caps/plugs into all openings.

14. Just aft of each bogie, curbside and streetside, remove two straight adapters (51) and preformed packings (52) from suspension isolation valve assembly (53). Remove two nuts (54), nipples (55), preformed packings (56), and suspension isolation valve assembly (53). Remove three self-locking nuts (57), washers (58), and T bracket (59). Install caps/plugs into all openings. Discard preformed packings and self-locking nuts.



TYPICAL 10 PLACES

15. At curbside front, remove four screws (60) and two block clamps (61).

16. Tag and remove three tubes (62, 63, and 64), coupling nut (65), reducer (66), and tee (67). Install caps/plugs into all openings.

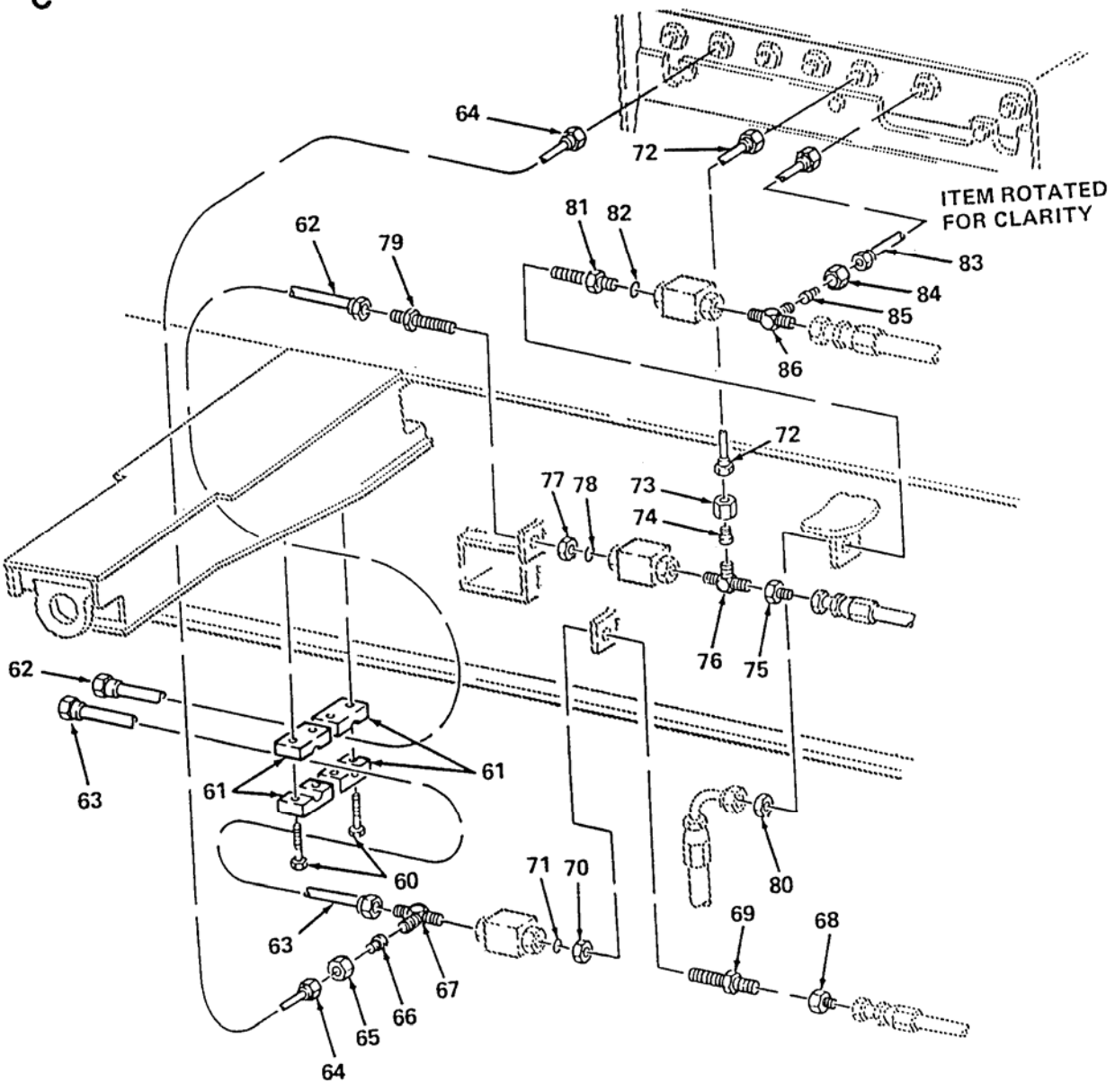
17. Remove reducer (68), tube nipple (69), nut (70), and preformed packing (71). Install caps/plugs into all openings. Discard preformed packing.

18. Tag and remove tube (72), coupling nut (73), reducer (74), reducer (75), tee (76), nut (77), preformed packing (78), and tube nipple (79). Install caps/plugs into all openings. Discard preformed packing.

19. Remove nut (80), tube nipple (81), and preformed packing (82). Install caps/plugs into all openings. Discard preformed packing.

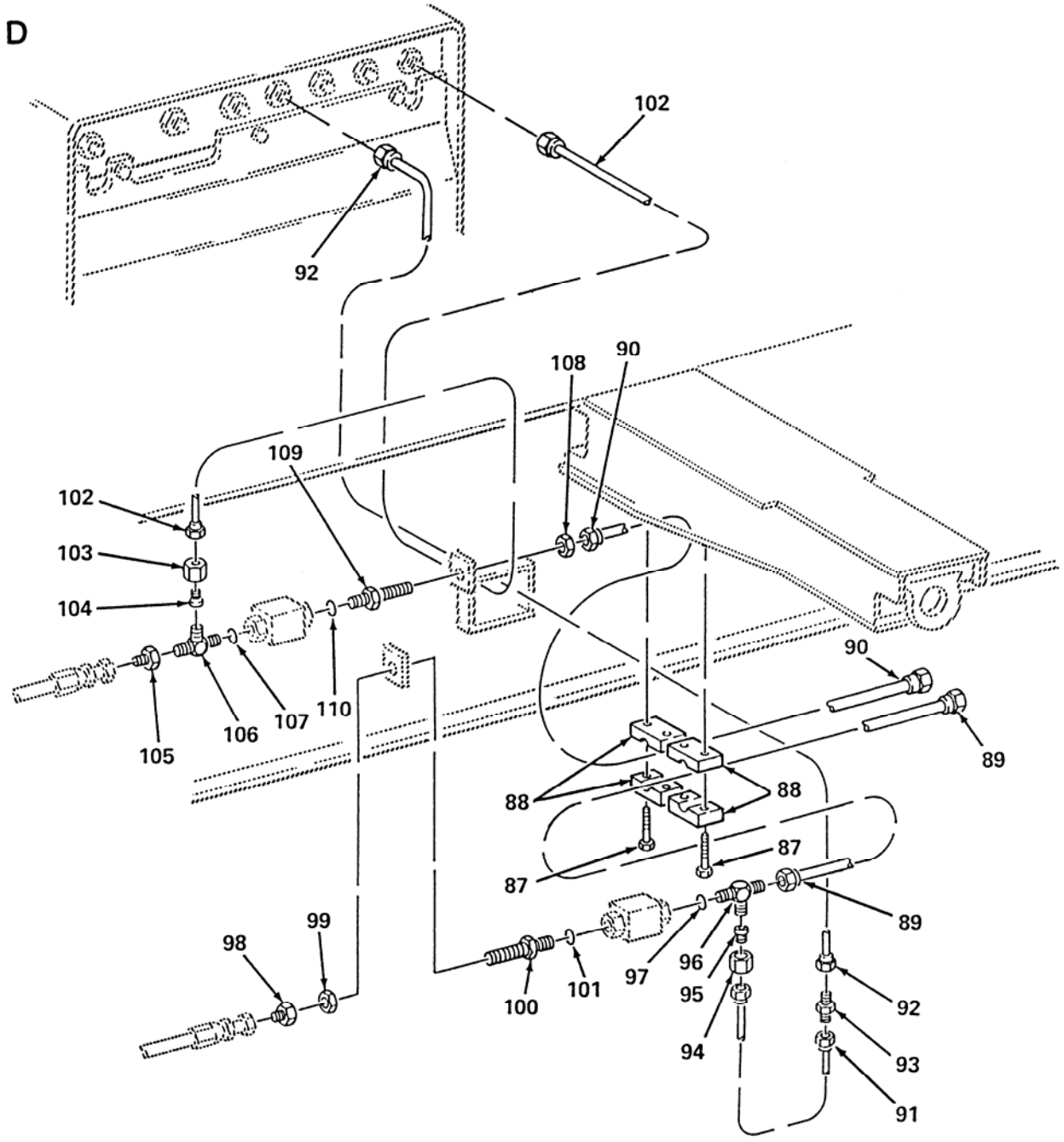
20. Tag and remove tube (83), coupling nut (84), reducer (85), and tee (86). Install caps/plugs into all openings.

C



4-92. PLATFORM SUSPENSION HYDRAULICS (CONT)

21. At streetside front, remove four screws (87) and two block clamps (88).

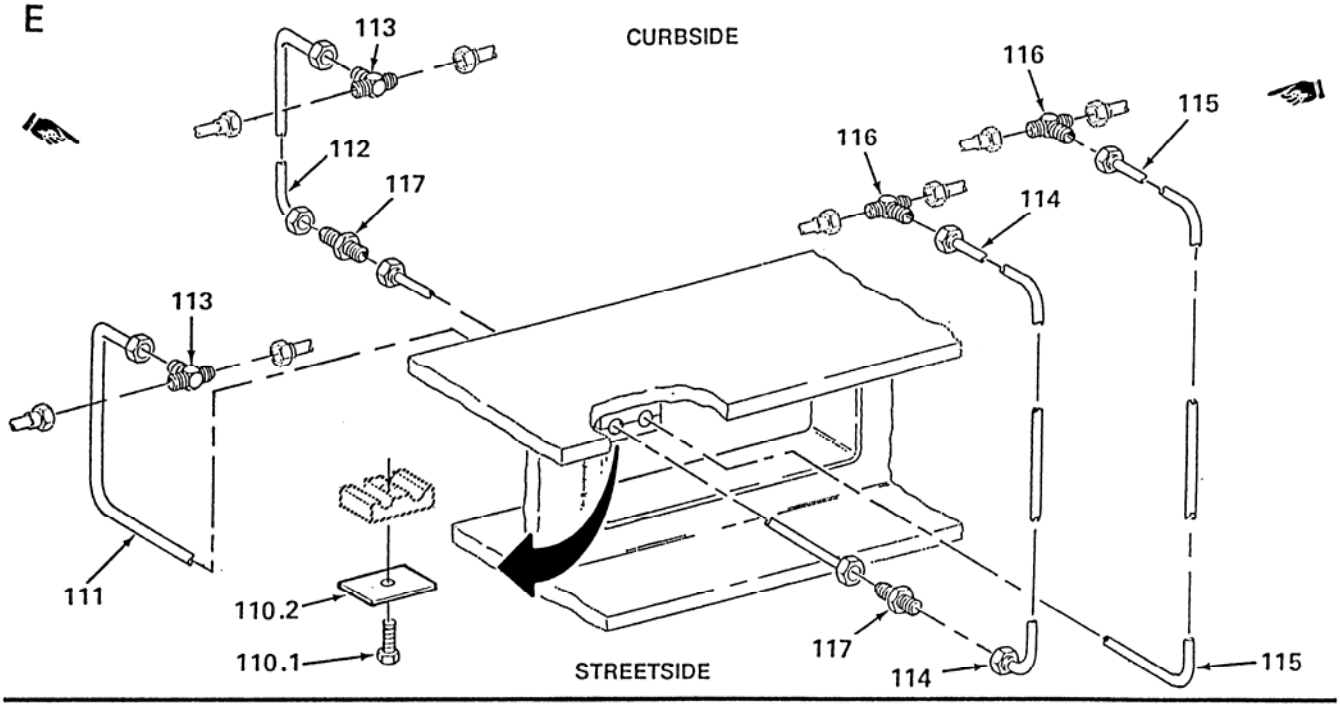


22. Tag and remove four tubes (89, 90, 91, and 92). Remove tube nipple (93), coupling nut (94), reducer (95), tee (96), and preformed packing (97). Remove reducer (98), nut (99), tube nipple (100), and preformed packing (101). Install caps/plugs into all openings. Discard preformed packings.

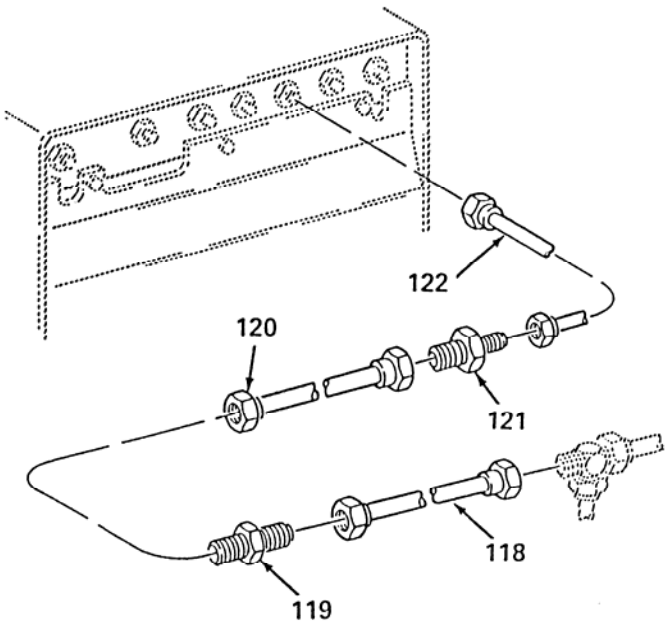
23. Tag and remove tube (102). Remove coupling nut (103), reducer (104), reducer (105), tee (106), and preformed packing (107). Remove nut (108), tube nipple (109), and preformed packing (110). Install caps/plugs into all openings. Discard preformed packings.

24. At curbside, remove screw (110.1) and block clamp (110.2) . Tag and remove two tubes (111 and 112) and tube tees (113). Install caps/plugs into all openings.

E



F



25. Tag and remove two tubes (114 and 115), tube tees (116), and adapters (117). Install caps/plugs into all openings.

4-92. PLATFORM SUSPENSION HYDRAULICS (CONT)

26. Tag and remove tube (118), tube nipple (119), tube (120), reducer (121), and tube (122). Install caps/plugs into all openings.

INSPECTION

WARNING

Compressed air used for cleaning/drying can create airborne particles that can injure the eyes. Always wear eye protection. Pressure must not exceed 30 psi (207 kPa) or injury to personnel may result.

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

1. Clean inside of hoses with compressed air. Clean outside of hoses with wiping rags. Clean all other components with dry cleaning solvent.

2. Inspect hoses for kinks, splits, deterioration, chafing, cuts, and loose fittings. If hose is defective, replace hose.

3. Inspect tubes for kinks, deterioration, chafing, gouges, and loose fittings. If tube is damaged, replace tube.

4. Inspect other components for nicks, burrs, corrosion, stripped threads, broken castings, and pitting. If parts are defective, replace as required.

INSTALLATION

CAUTION

Apply pipe sealant compound to the all male pipe threads of hydraulic fittings, using only enough compound to coat the threads. Do not allow compound to enter a component/fitting or the compound may restrict fluid passages and damage to equipment or equipment failure may result.

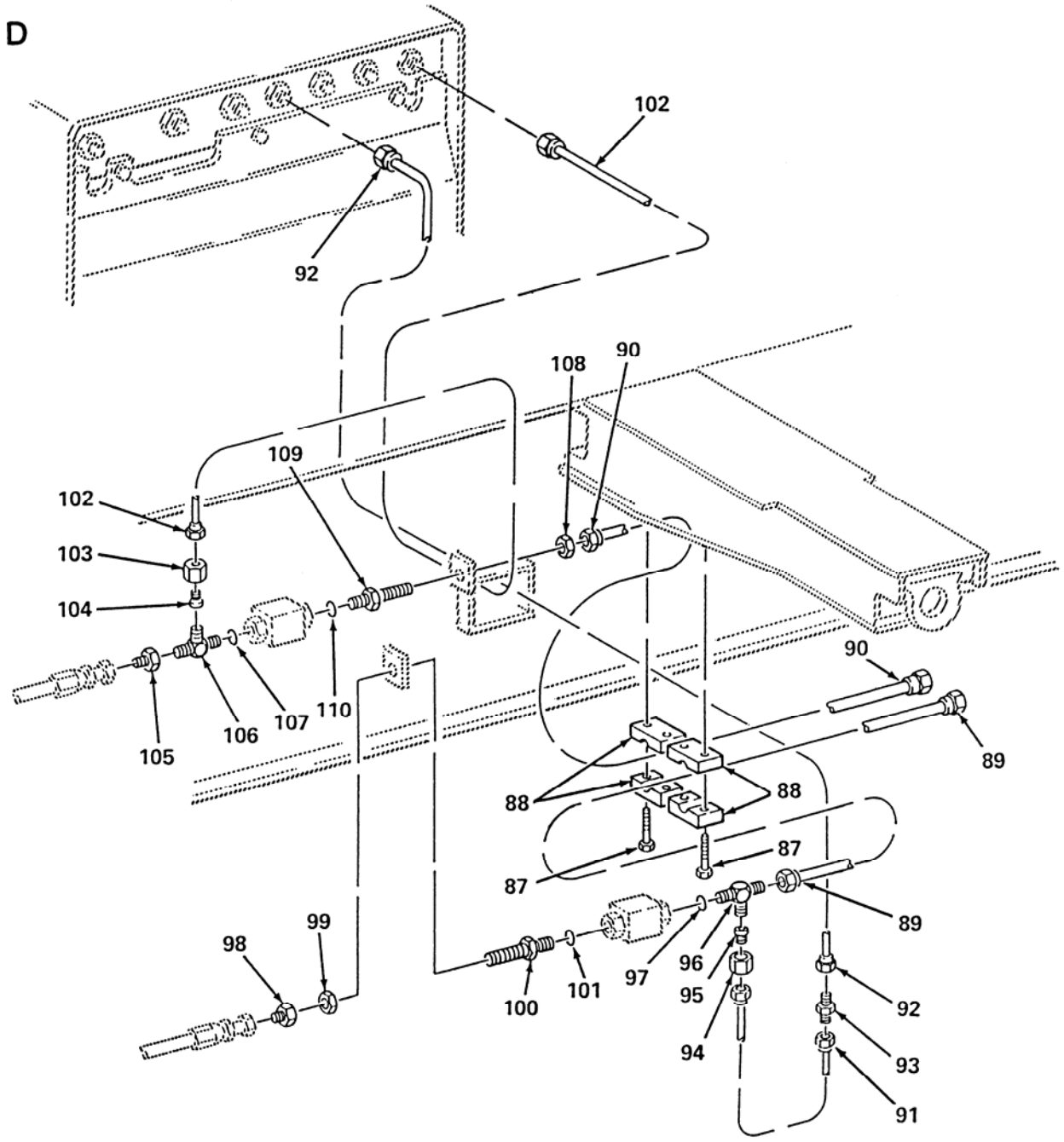
Note positioning/orientation of fittings on the illustrations. It is important to have the tightened fittings positioned as shown so that hoses are not too short and fittings do not interfere with one another or damage to equipment may result.

1. At curbside, remove caps/plugs. Apply pipe sealant to male threads. Install tube (122), reducer (121), tube (120), tube nipple (119), and tube (118).

2. Remove caps/plugs. Apply pipe sealant to male threads. Install two adapters (117), tube tees (116), and tubes (115 and 114).

3. Remove caps/plugs. Apply pipe sealant to male threads. Install two tube tees (113) and tubes (112 and 111). Install block clamp (110.2) and screw (110.1).

4. At streetside front, remove caps/plugs. Apply petroleum jelly to two preformed packings (110 and 107). Apply pipe sealant to all male threads. Install preformed packing (110), tube nipple (109), and nut (108). Install preformed packing (107), tee (106), reducer (105), reducer (104), coupling nut (103), and tube (102).

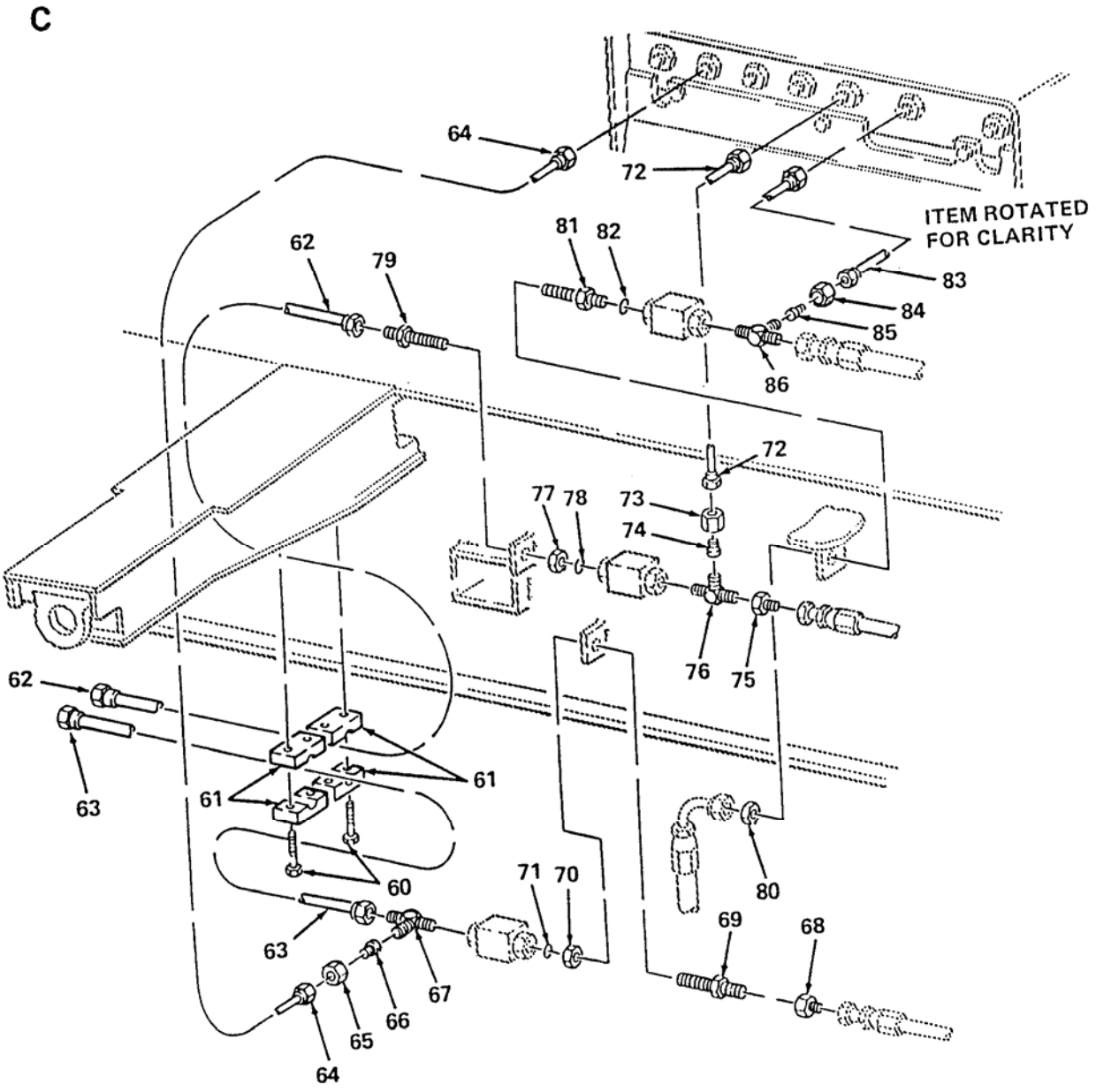


4-92. PLATFORM SUSPENSION HYDRAULICS (CONT)

5. Remove caps/plugs. Apply petroleum jelly to two preformed packings (101 and 97). Apply pipe sealant to all male threads. Install preformed packing (101), tube nipple (100), nut (99), and reducer (98). Install preformed packing (97), tee (96), reducer (95), coupling nut (94), tube (91), and tube nipple (93). Install four tubes (92, 90, and 89).

6. Install two block clamps (88) and secure with four screws (87).

7. At curbside front, remove caps/plugs. Apply pipe sealant to all male threads. Install tee (86), reducer (85), coupling nut (84), and tube (83).



8. Remove caps/plugs. Apply petroleum jelly to preformed packing (82). Apply pipe sealant to all male threads. Install preformed packing (82), tube nipple (81), and nut (80).

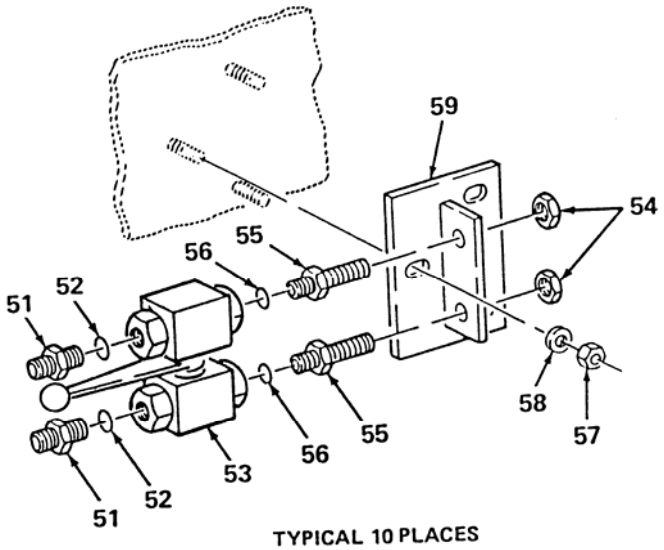
9. Remove caps/plugs. Apply petroleum jelly to preformed packing (78). Apply pipe sealant to all male threads. Install tube nipple (79), preformed packing (78), nut (77), tee (76), reducer (75), reducer (74), coupling nut (73), and tube (72).

10. Remove caps/plugs. Apply petroleum jelly to preformed packing (71). Apply pipe sealant to all male threads. Install preformed packing (71), nut (70), tube nipple (69), and reducer (68).

11. Remove caps/plugs. Apply pipe sealant to all male threads. Install tee (67), reducer (66), coupling nut (65), and three tubes (64, 63, and 62).

12. Install two block clamps (61) and secure with four screws (60).

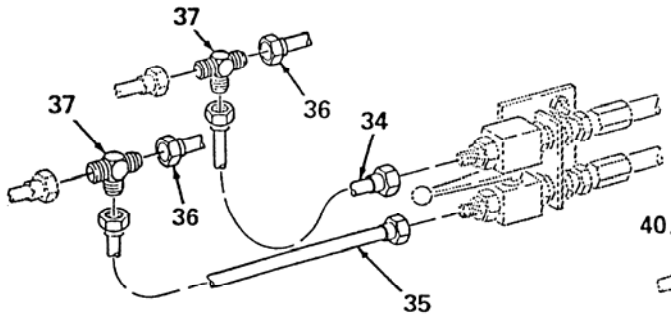
13. Remove caps/plugs. Apply petroleum jelly to two preformed packings (56) and two preformed packings (52). Apply pipe sealant to all male threads. Just aft of each bogie, curbside and streetside, install T bracket (59) and secure with three washers (58) and self-locking nuts (57). Install suspension isolation valve assembly (53), two preformed packings (56), nipples (55), and nuts (54). Install two preformed packings (52) and straight adapters (51).



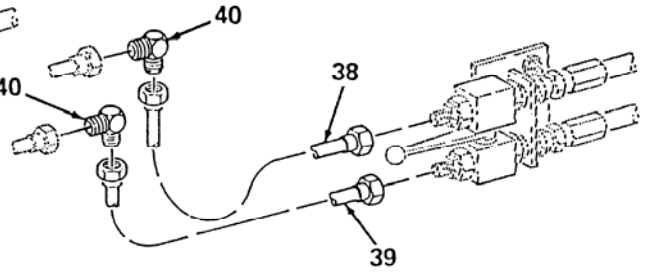
TYPICAL 10 PLACES

4-92. PLATFORM SUSPENSION HYDRAULICS (CONT)

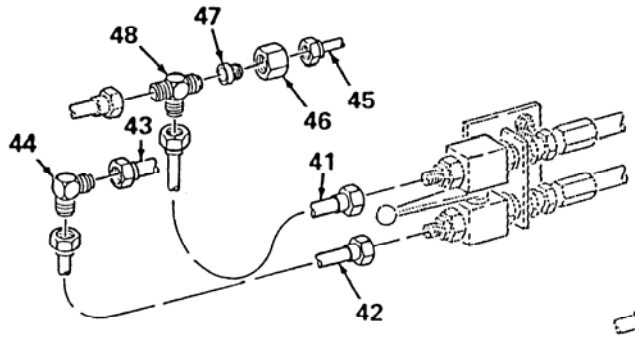
14. At streetside #5 bogie, remove caps/plugs. Install two tubes (50 and 49).



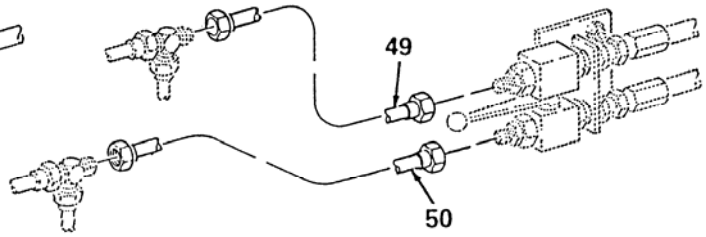
STREETSIDE #1 AND #2 BOGIE



STREETSIDE #3 BOGIE



STREETSIDE #4 BOGIE



STREETSIDE #5 BOGIE

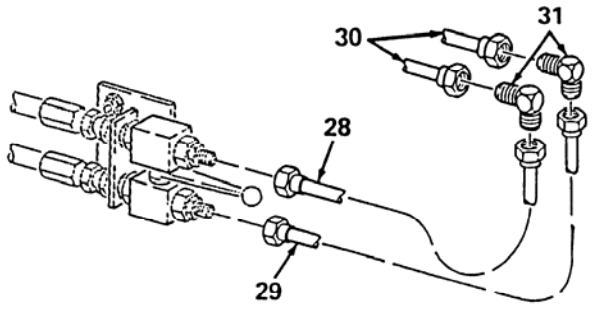
15. At streetside #4 bogie, remove caps/plugs. Apply pipe sealant to all male threads. Install tee (48), reducer (47), coupling nut (46), tube (45), elbow (44), and three tubes (43, 42, and 41).

16. At streetside #3 bogie, remove caps/plugs. Apply pipe sealant to all male threads. Install two elbows (40) and tubes (39 and 38).

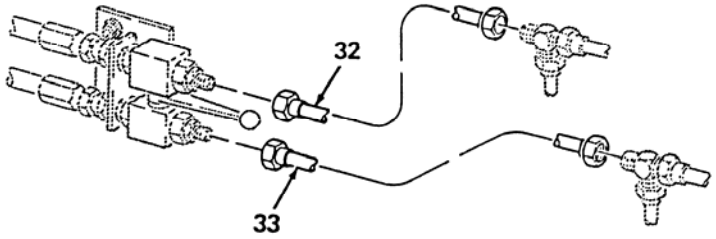
17. At streetside #2 and #1 bogies, remove caps/plugs. Apply pipe sealant to all male threads. Install two tube tees (37), tubes (36), and tubes (35 and 34).

18. At curbside #5 bogie, remove caps/plugs. Install two tubes (33 and 32).

19. At curbside #4 bogie, remove caps/plugs. Apply pipe sealant to all male threads. Install two elbows (31), tubes (30), and tubes (29 and 28).

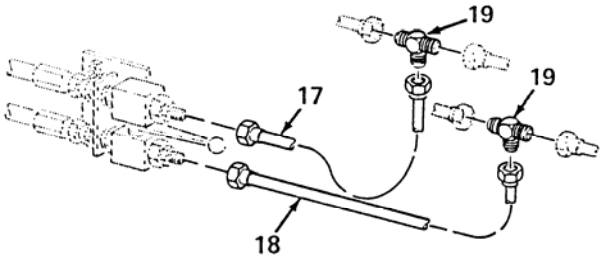


CURBSIDE #4 BOGIE

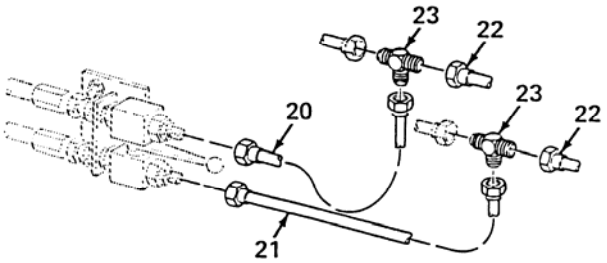


CURBSIDE #5 BOGIE

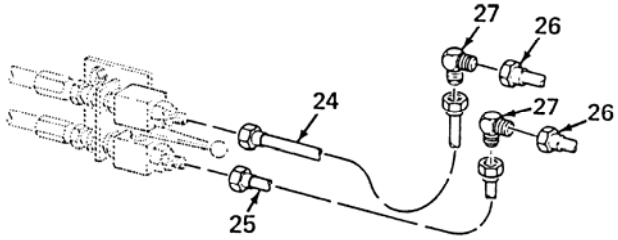
20. At curbside #3 bogie, remove caps/plugs. Apply pipe sealant to all male threads. Install two elbows (27), tubes (26), and tubes (25 and 24).



CURBSIDE #1 BOGIE



CURBSIDE #2 BOGIE



CURBSIDE #3 BOGIE

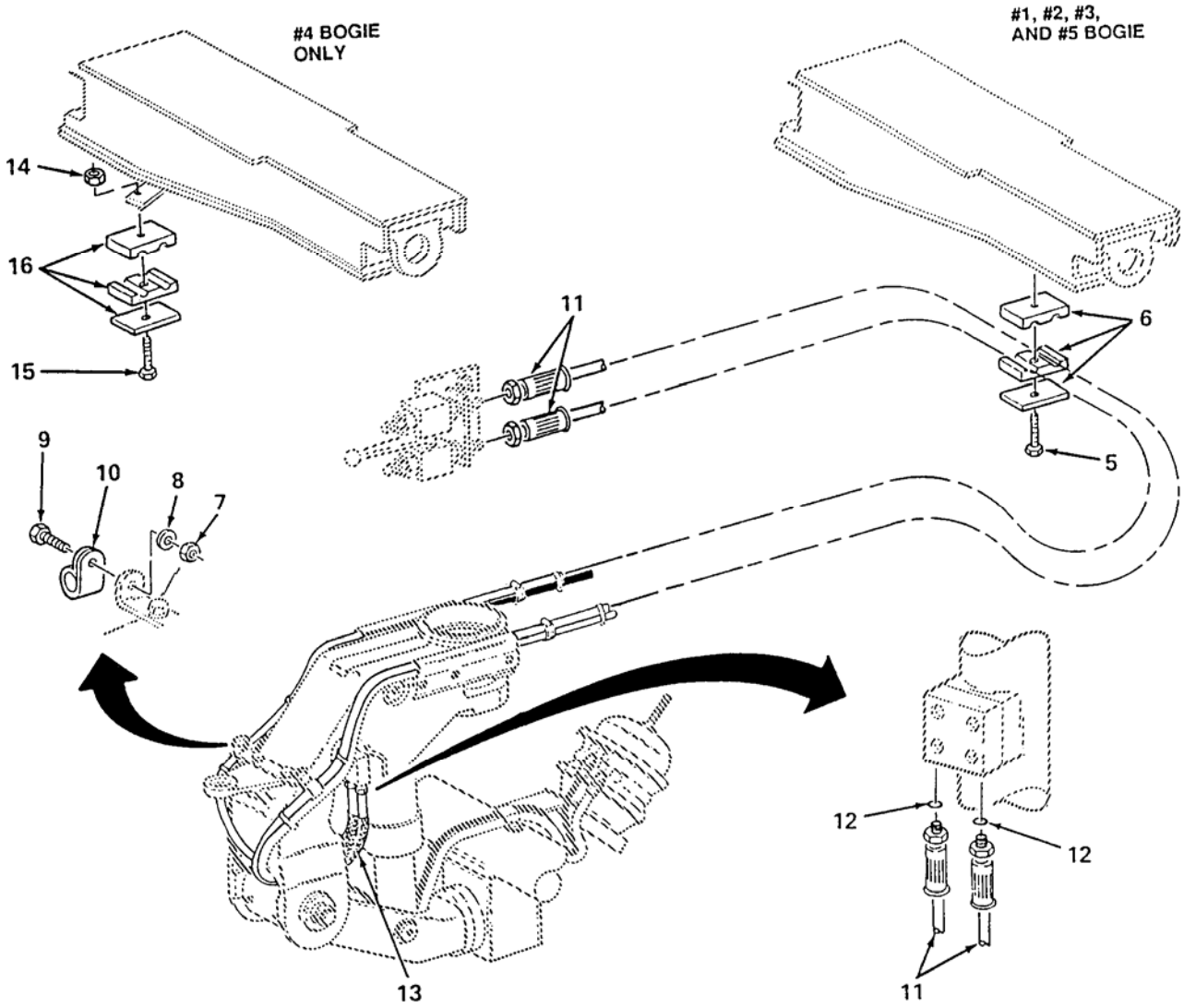
21. At curbside #2 bogie, remove caps/plugs. Apply pipe sealant to all male threads. Install two tube tees (23), tubes (22), and tubes (21 and 20).

4-92. PLATFORM SUSPENSION HYDRAULICS (CONT)

22. At curbside #1 bogie, remove caps/plugs. Apply pipe sealant to all male threads. Install two tube tees (19) and tubes (18 and 17).

23. At #4 bogies, curbside and streetside, proceed as follows:

    a. Remove caps/plugs. Apply petroleum jelly to two preformed packings (12). Slide loom (13) onto two hoses (11). Install two preformed packings (12) and hoses (11).



    b. Install two hose shields (para. 4-41).

    c. Install two clamps (10) and secure with two screws (9), washers (8), and self-locking nuts (7). Install tiewraps as required.

d. Install block clamp (16) and secure with screw (15) and nut (14).

24. At #5, #3, #2, and #1 bogies, curbside and streetside, proceed as follows:

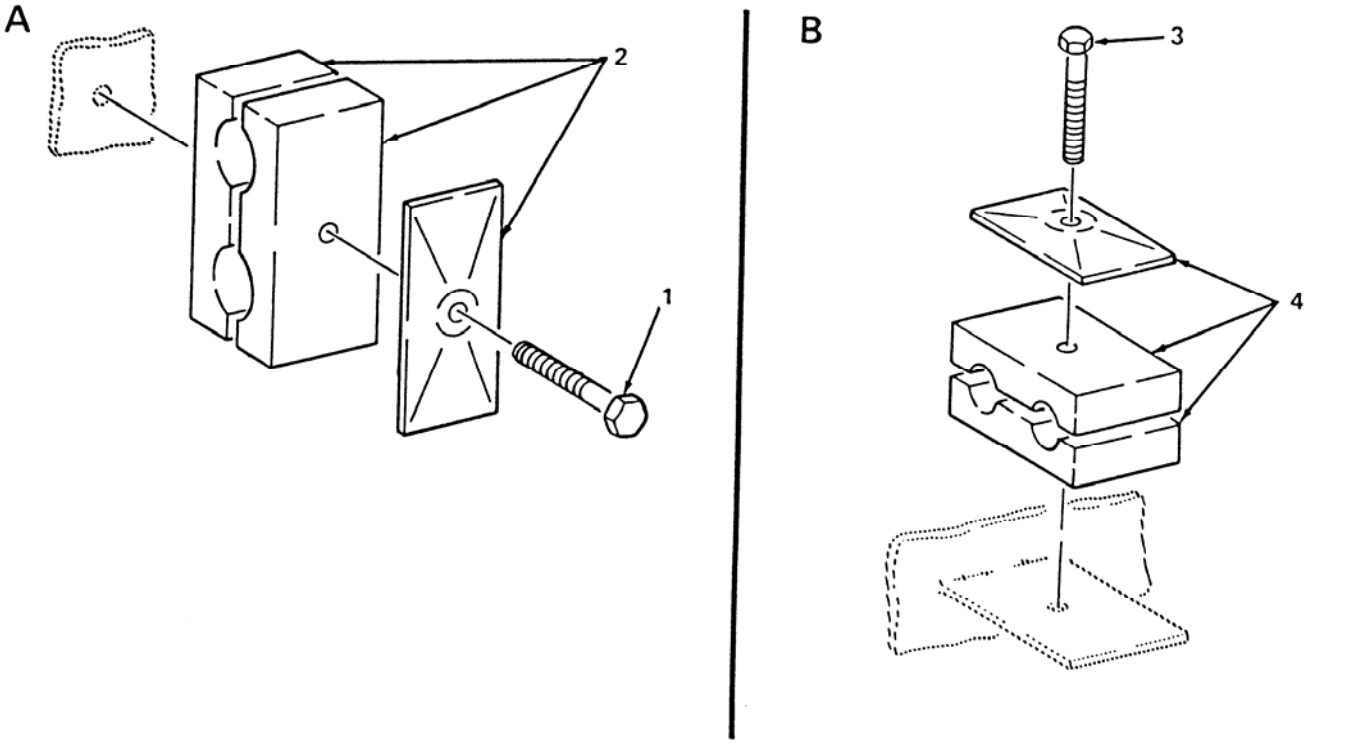
a. Remove caps/plugs. Apply petroleum jelly to two preformed packings (12). Slide loom (13) onto two hoses (11). Install two preformed packings (12) and hoses (11).

b. Install two hose shields (para. 4-41).

c. Install two clamps (10) and secure with two screws (9), washers (8), and self-locking nuts (7). Install tiewraps as required.

d. Install block clamp (6) and secure with screw (5).

25. At ten places streetside, install block clamp (4) and secure with screw (3).



26. At 16 places, 8 curbside and 8 streetside, install block clamp (2) and secure with screw (1).

FOLLOW-ON MAINTENANCE

1. Refill hydraulic tank as required (para. 2-17).

2. Perform hydraulic system bleeding as required (para. 2-19).

3. Adjust platform and check for proper operation (para. 2-19).

4-93. PLATFORM STEERING HYDRAULICS

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

Cap and plug set, item 5, appx. E
Petroleum jelly, item 17, appx. E
Pipe sealant, item 18, appx. E
Wiping rag, item 19, appx. B
Dry cleaning solvent, item 26, appx. E
Preformed packing (4)

Equipment Condition

Front and rear support legs lowered supporting platform (para. 2-22 and 2-23)
Steering system hydraulic bled to relieve pressure (para. 4-19)

General Safety Instructions

WARNING

Hydraulic fluid may be absorbed through the skin. Avoid prolonged exposure to skin and wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, wash thoroughly with soap and water. Wash hands thoroughly prior to eating or smoking.

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

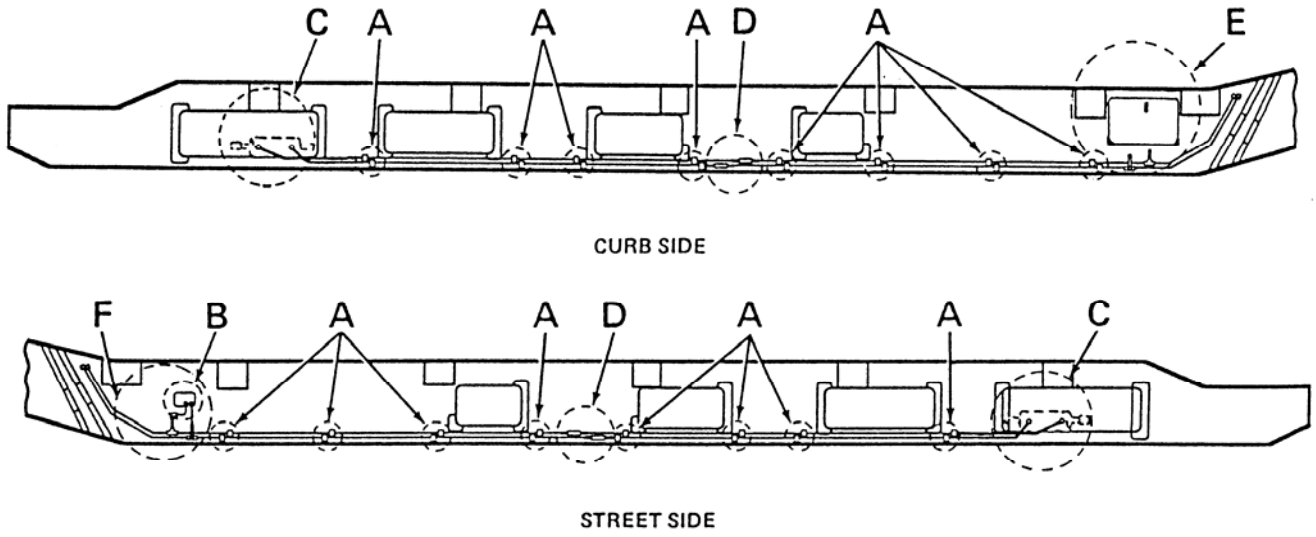
Residual pressure may remain in hydraulic lines. Open fittings slowly or injury to personnel may result.

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the hydraulic system or damage to equipment may result.

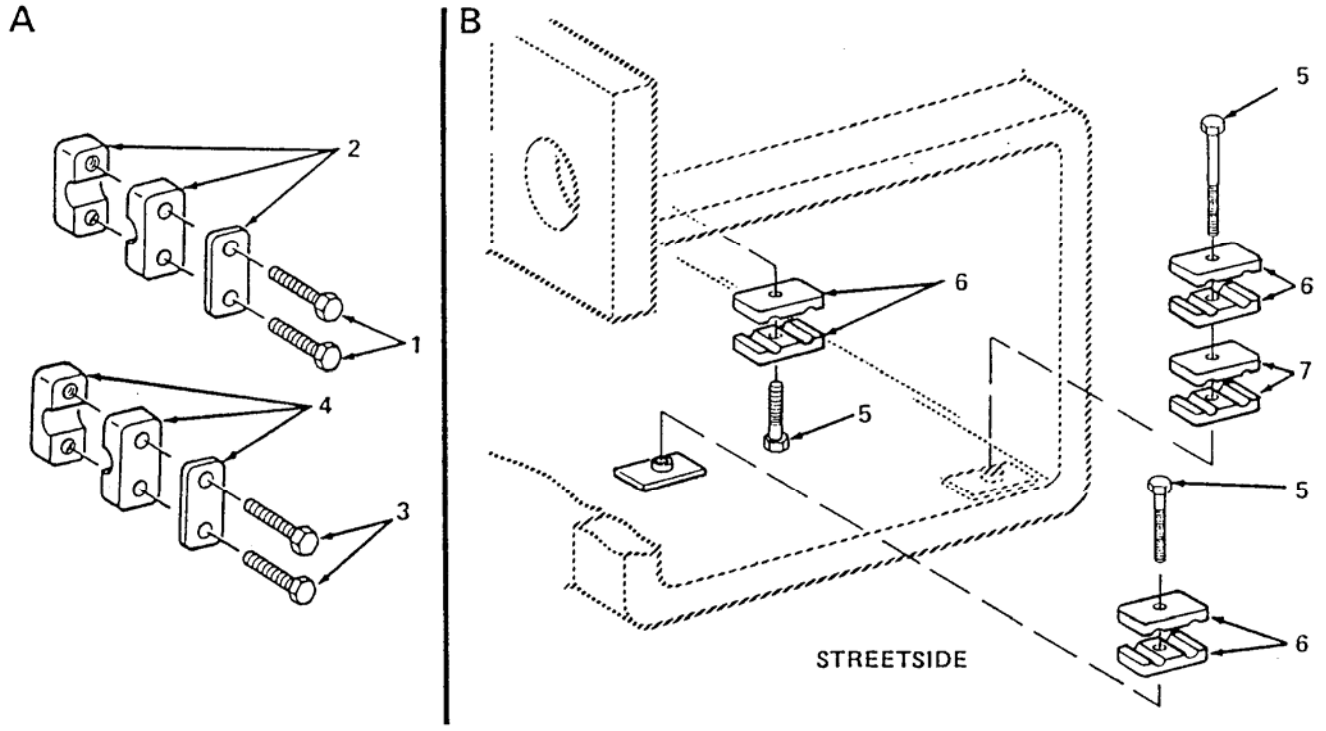
NOTE

This procedure is for removal/installation of all platform steering hydraulics components. Perform this procedure, or any portion of this procedure, as required to complete the necessary repair. Use the hydraulic schematic (figure FO-3) as a guide for hose routing.



REMOVAL

1. At 16 places, 8 curbside and 8 streetside, remove two screws (1), block clamp (2), 2 screws (3), and block clamp (4).

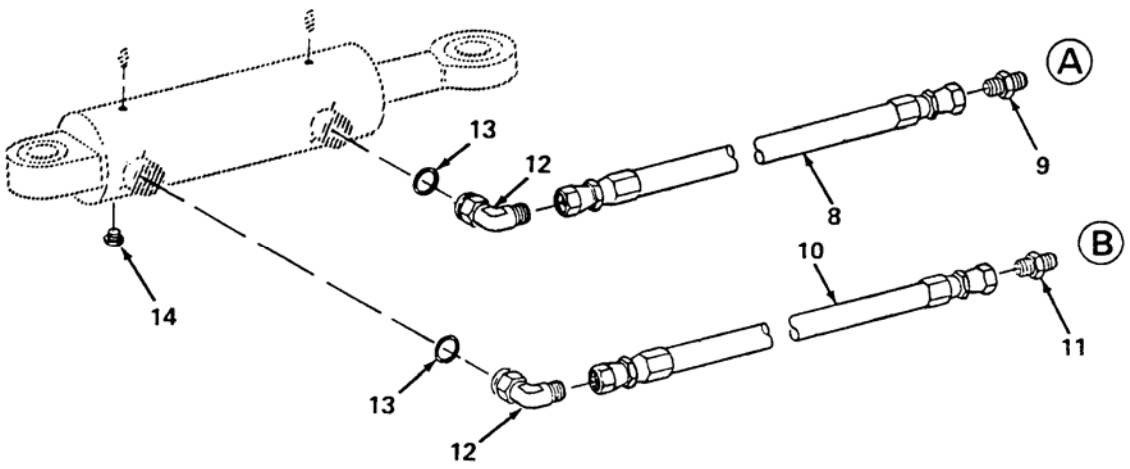


2. At streetside front, remove three screws (5), block clamps (6), and clamp (7).

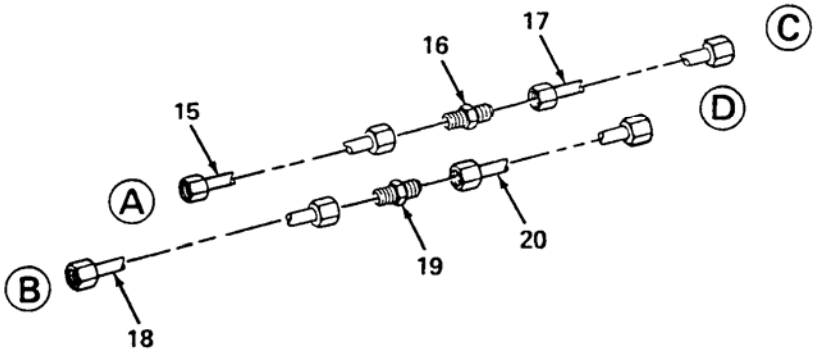
4-93. PLATFORM STEERING HYDRAULICS (CONT)

3. At curbside rear and streetside rear, tag and remove hose (8), boss coupling (9), hose (10), tube nipple (11), two tube elbows (12), two preformed packings (13), and pipe plug (14). Install caps/plugs into all openings. Discard preformed packings.

C

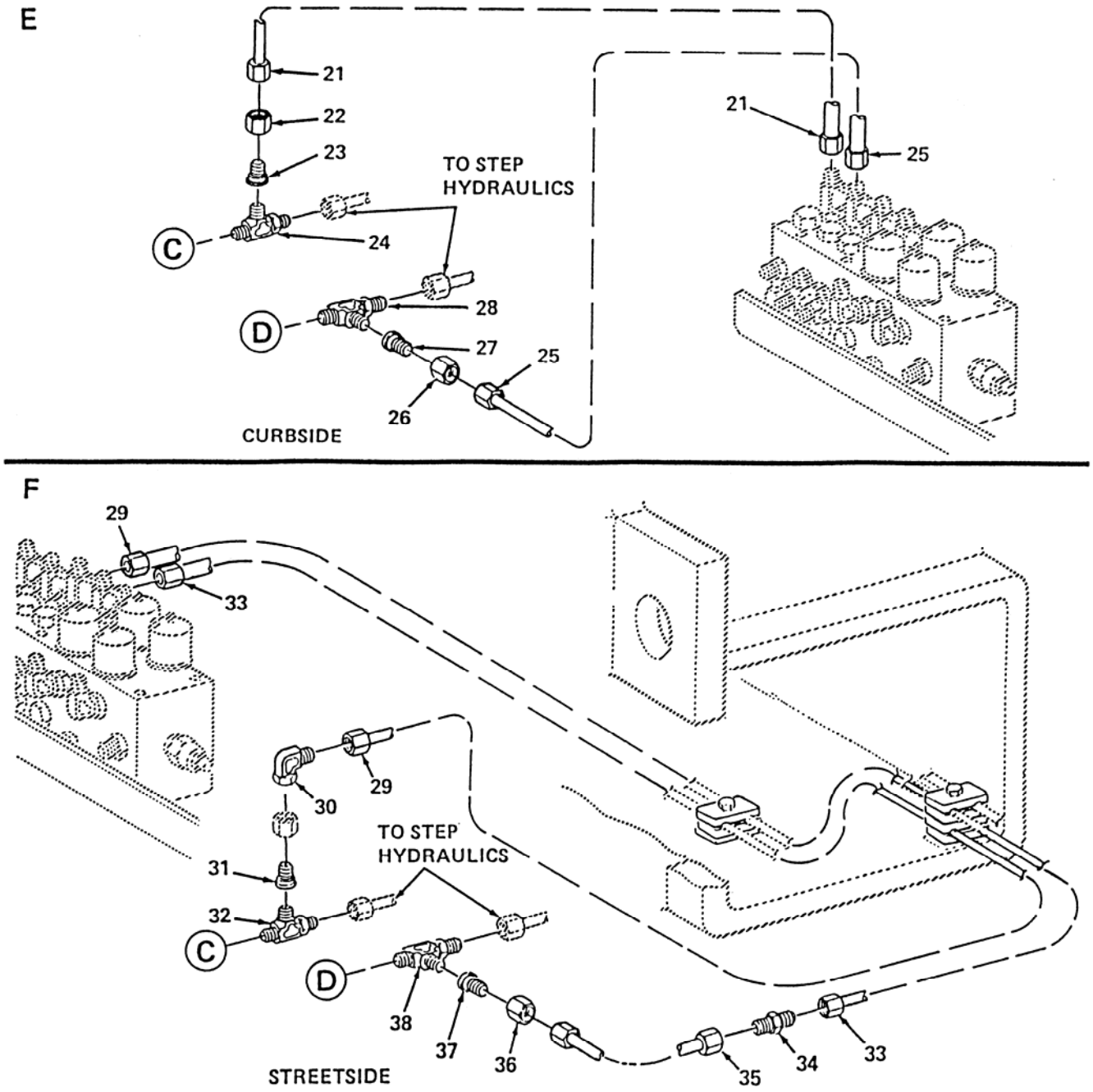


D



4. At curbside and streetside, tag and remove tube (15), boss coupling (16), tube (17), tube (18), tube nipple (19), and tube (20). Install caps/plugs into all openings.

5. At curbside front, tag and remove tube (21), coupling nut (22), reducer (23), and tube tee (24). Remove tube (25), coupling nut (26), reducer (27), and tube tee (28). Install caps/plugs into all openings.



6. At streetside front, tag and remove tube (29), tube elbow (30), reducer (31), and tube tee (32). Remove tube (33), tube nipple (34), tube (35), coupling nut (36), reducer (37), and tube tee (38). Install caps/plugs into all openings.

4-93. PLATFORM STEERING HYDRAULICS (CONT)

INSPECTION

WARNING

Compressed air used for cleaning/drying can create airborne particles that can injure the eyes. Always wear eye protection. Pressure must not exceed 30 psi (207 kPa) or injury to personnel may result.

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

1. Clean inside of hoses with compressed air. Clean outside of hoses with wiping rags. Clean all other components with dry cleaning solvent.
2. Inspect hoses for kinks, splits, deterioration, chafing, cuts, and loose fittings. If hose is defective, replace hose.
3. Inspect tubes for kinks, deterioration, chafing, gouges, and loose fittings. If tube is damaged, replace tube.
4. Inspect other components for nicks, burrs, corrosion, stripped threads, broken castings, and pitting. If parts are defective, replace as required.

INSTALLATION

CAUTION

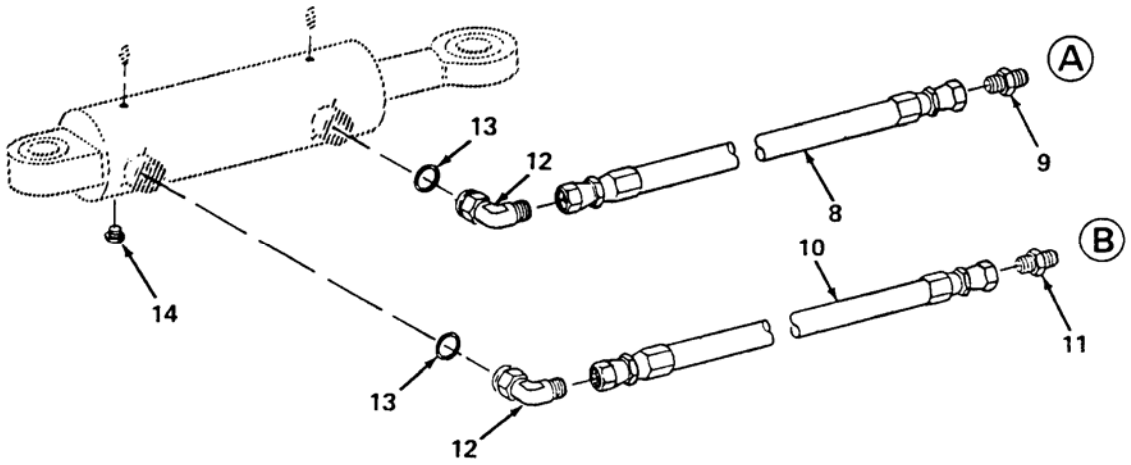
Apply pipe sealant compound to the all male pipe threads of hydraulic fittings, using only enough compound to coat the threads. Do not allow compound to enter a component/fitting or the compound may restrict or block fluid passages and damage to equipment or equipment failure may result.

Note positioning/orientation of fittings on the illustrations. It is important to have the tightened fittings positioned as shown so that hoses are not too short and fittings do not interfere with one another or damage to equipment may result.

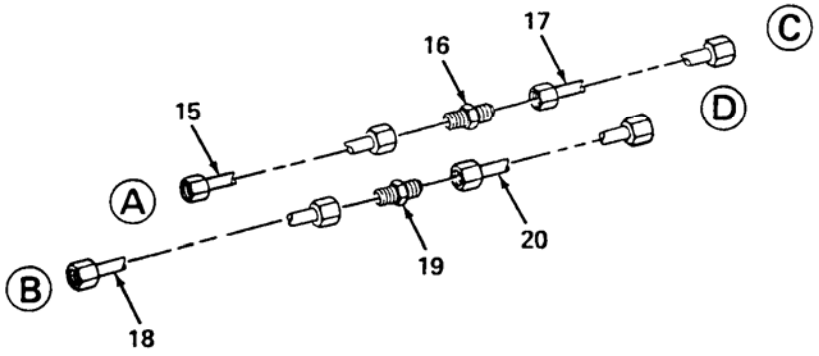
1. At streetside front, remove caps/plugs. Apply pipe sealant to all male threads. Install tube tee (38), reducer (37), coupling nut (36), tube (35), tube nipple (34), and tube (33). Install tube tee (32), reducer (31), tube elbow (30), and tube (29).
2. At curbside front, remove caps/plugs. Apply pipe sealant to all male threads. Install tube tee (28), reducer (27), coupling nut (26), and tube (25). Install tube tee (24), reducer (23), coupling nut (22), and tube (21).

3. At curbside and streetside, remove caps/plugs. Apply pipe sealant to all male threads. Install tube (20), tube nipple (19), tube (18), tube (17), boss coupling (16), and tube (15).

C



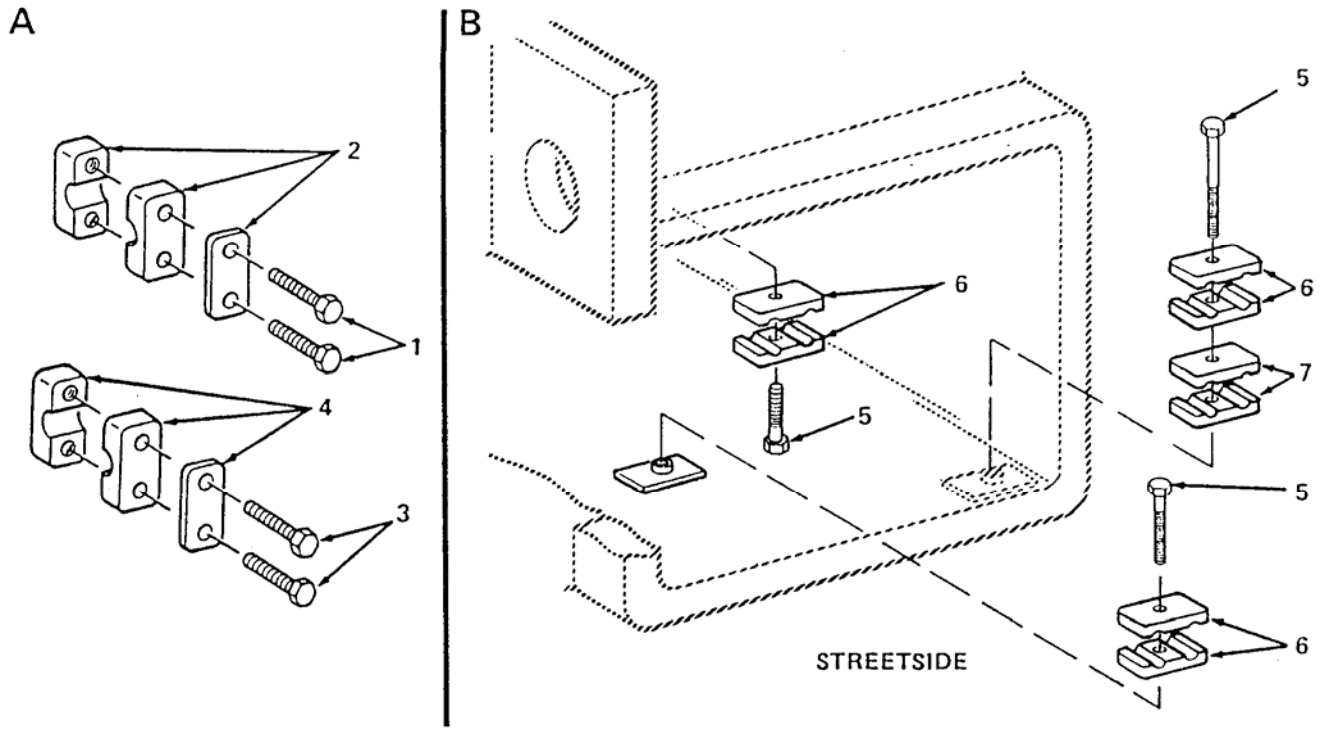
D



4. At curbside and streetside rear, remove caps/plugs. Apply petroleum jelly to preformed packings (13). Apply pipe sealant to all male threads. Install pipe plug (14), two preformed packings (13), tube elbows (12), tube nipple (11), hose (10), boss coupling (9), and hose (8).

4-93. PLATFORM STEERING HYDRAULICS (CONT)

5. At streetside front, install clamp (7) and block clamp (6) and secure with screw (5). Install two block clamps (6) and secure with screws (5).



6. At 16 places, 8 curbside and 8 streetside, install block clamp (4) and secure with 2 screws (3). Install block clamp (2) and secure with two screws (1).

FOLLOW-ON MAINTENANCE

1. Check/fill hydraulic tank as required (para. 4-17).

2. Perform steering cylinder bleeding as required (para. 4-19).

3. Operate steering system and check for proper operation (para. 2-21).

4-94. HYDRAULIC TANK ASSEMBLY

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Drain pan, item 17, appx. B

Materials/Parts

Cap and plug set, item 5, appx. E
Pipe sealant, item 18, appx. E
Wiping rag, item 19, appx. E
Dry cleaning solvent, item 26, appx. E
Lockwasher (8)
Preformed packing (2)
Gasket

Personnel Required: 2

Equipment Condition

Gooseneck steps removed (para. 4-56)
Battery removed (para. 4-30)
APU hydraulic lines removed from hydraulic tank (para. 4-86)

General Safety Instructions

WARNING

Hydraulic fluid may be absorbed through the skin. Avoid prolonged exposure to skin and wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, wash thoroughly with soap and water. Wash hands thoroughly prior to eating or smoking.

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the hydraulic system or damage to equipment may result.

4-94. HYDRAULIC TANK ASSEMBLY (CONT)

REMOVAL

1. From underside of hydraulic tank (1), remove four nuts (2), eight lockwashers (3), four nuts (4), two clamp bolt assemblies (5), and two clamp bolt (protective molding) assemblies (6). Discard lockwashers.

2. Slant hydraulic tank (1) forward and remove hydraulic tank (1).

3. Remove two retaining (protective molding) straps (7). If necessary, remove six moldings (8).

4. If required, remove filler cap (9), six screws (10), filler neck (11), gasket (12), and filter (13) from hydraulic tank (1). Cover opening with a wiping rag. Discard gasket if removed.

5. Remove six nuts (14), washers (15), access cover (16), and gasket (17). Cover opening with a wiping rag. Discard gasket.

6. Remove two nuts (18), sight indicator (19), and two preformed packings (20). Remove pipe plug (21). Install caps/plugs into all openings. Discard preformed packings.

7. If necessary, remove pipe plug (22) from hydraulic tank (1). Install cap/plug into tank opening. If necessary, unscrew and remove filter (para. 4-91).

INSPECTION

WARNING

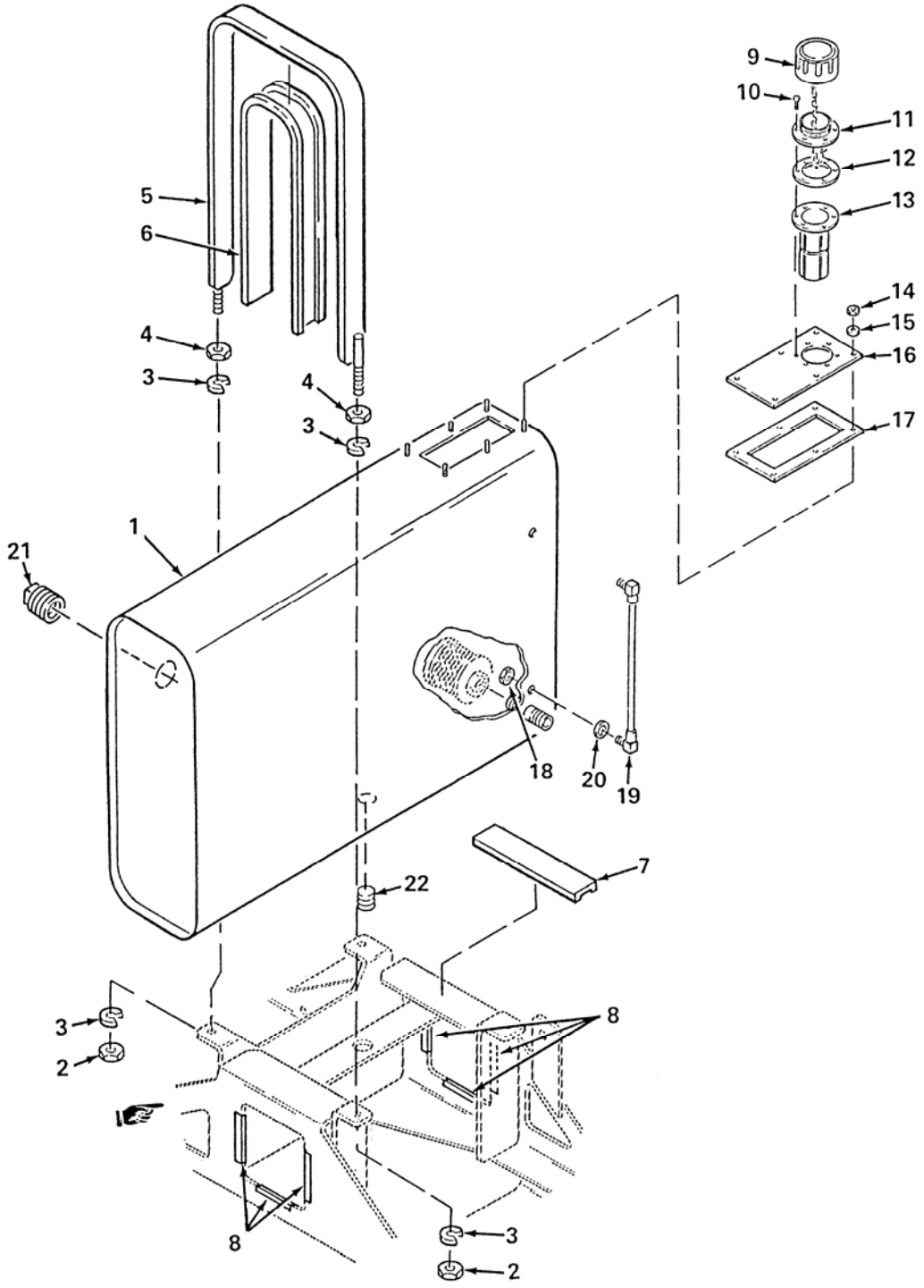
Compressed air used for cleaning/drying can create airborne particles that can injure the eyes. Always wear eye protection. Pressure must not exceed 30 psi (207 kPa) or injury to personnel may result.

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

1. Clean hydraulic tank and all other components with dry cleaning solvent, wiping rags, and compressed air.

2. Inspect all components for nicks, burrs, corrosion, stripped threads, broken castings, and pitting. Clean all polished surfaces using crocus cloth. If parts are defective, replace as required.

3. Inspect magnetic pipe plug for metal particles which may indicate impending failure in hydraulic system.


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4-94. HYDRAULIC TANK ASSEMBLY (CONT)

INSTALLATION

CAUTION

Apply pipe sealant compound to the all male pipe threads of hydraulic fittings, using only enough compound to coat the threads. Do not allow compound to enter a component/fitting or the compound may restrict or block fluid passages and damage to equipment or equipment failure may result.

Note positioning/orientation of fittings on the illustrations. It is important to have the tightened fittings positioned as shown so that hoses are not too short and fittings do not interfere with one another or damage to equipment may result.

1. If removed, apply pipe sealant to threads of pipe plugs (22). Remove cap/plug installed in bottom of hydraulic tank (1) and install pipe plug (22). If removed, install filter (para. 4-91).

2. Apply pipe sealant to all threads of pipe plug (21). Remove caps/plugs on hydraulic tank (1) and install pipe plug (21).

3. Lubricate two preformed packings (20) with petroleum jelly. Remove caps/plugs and install two preformed packings (20) and sight indicator (19) onto hydraulic tank (1) and secure with two nuts (18).

4. Remove wiping rag and install gasket (17) and access cover (16) onto hydraulic tank (1) and secure with six washers (15) and nuts (14).

5. If removed, install filter (13), gasket (12), and filler neck (11) onto access cover (16) and secure with six screws (10). Install filler cap (9).

6. Install six moldings (8) and two retaining (protective molding) straps (7) onto APU frame.

7. Install hydraulic tank (1), slant bottom of tank rearward, and set into place on APU frame.

8. Install four nuts (4) onto two clamp bolt assemblies (5). By hand, thread four nuts upward onto clamp bolts assemblies (5).

9. Install two clamp bolt (protective molding) assemblies (6) into position on hydraulic tank (1). Install two clamp bolt assemblies (5) over clamp bolt (protective molding) assemblies (6) and use one person to hold in place over mounting holes on APU frame.

10. Install four lockwashers (3) onto two clamp bolt assemblies (5); then, lower two clamp bolt assemblies (5) down onto APU frame.

11. Secure hydraulic tank (1) in place with four nuts (2) and lockwashers (3). Tighten four nuts (2) on two clamp bolt assemblies (5) and tighten four nuts (4) on two clamp bolt assemblies (5) down firmly against APU frame.

FOLLOW-ON MAINTENANCE

1. Reconnect APU hydraulics to hydraulic tank (para. 4-86).
2. Install gooseneck steps removed (para. 4-56).
3. Check/fill hydraulic tank as required (para. 4-17).
4. Install battery (para. 4-30).
5. Perform hydraulic system bleeding (para. 4-19).

4-95. GOOSENECK CYLINDER AIR RESERVOIR

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Drain pan, item 17, appx. B

Materials/Parts

Cap and plug set, item 5, appx. E
Hydraulic fluid, item 12, appx. E
Pipe sealant, item 18, appx. E
Dry cleaning solvent, item 26, appx. E
Lockwasher (4)

Equipment Condition

Gooseneck coupled to tractor or supported by gooseneck stand (para. 2-24)

General Safety Instructions

WARNING

Hydraulic fluid may be absorbed through the skin. Avoid prolonged exposure to skin and wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, wash thoroughly with soap and water. Wash hands thoroughly prior to eating or smoking.

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

4-95. GOOSENECK CYLINDER AIR RESERVOIR (CONT)

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the hydraulic system or damage to equipment may result.

REMOVAL

1. Using a drain pan, tag and disconnect hydraulic hose (1) from straight pipe-to-tube adapter (2) on reservoir (3). Allow fluid to drain from reservoir into drain pan. Install caps/plugs into hose opening.
2. Remove breather valve (4) and check valve (5) from reservoir (3). Allow all fluid in reservoir (3) to drain into drain pan. Install caps/plugs into openings.
3. Remove safety relief valve (6) and straight pipe-to-tube adapter (2) from reservoir (3). Install caps/plugs into all openings.
4. While supporting reservoir (3), remove four nuts (7), lockwashers (8), and reservoir (1). Discard lockwashers.

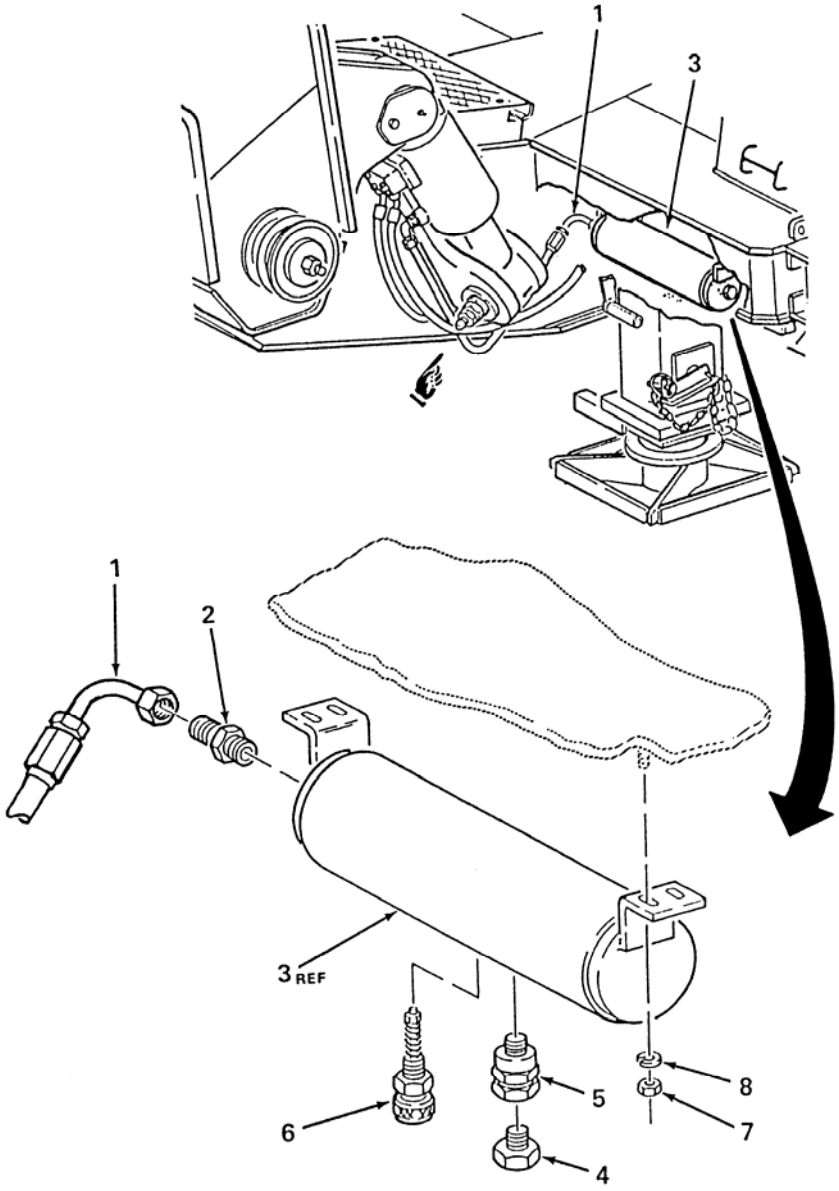
INSPECTION

1. Strain drained hydraulic fluid and check for evidence of metal or gasket particles which may indicate impending failure of streetside gooseneck cylinder.

WARNING

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

2. Inspect interior of tank for mold, mildew, or fungus. Clean interior of tank thoroughly with dry cleaning solvent to ensure all mold, mildew, and fungus have been removed. Clean all parts removed with dry cleaning solvent.
3. Inspect all components for nicks, burrs, dents, corrosion, stripped threads, broken castings, and pitting. If parts are defective, replace as required.



INSTALLATION

CAUTION

Apply pipe sealant compound to the all male pipe threads of hydraulic fittings, using only enough compound to coat the threads. Do not allow compound to enter a component/fitting or the compound may restrict or block fluid passages and damage to equipment or equipment failure may result.

1. Apply pipe sealant to all male threads. Remove caps/plugs and install check valve (5), breather (4), and safety relief valve (6) to air reservoir (3).

2. Pour approximately 1/2 cup (0.2 l) hydraulic fluid into reservoir (3) and roll reservoir (3) around so that interior of reservoir is coated with hydraulic fluid.

4-95. GOOSENECK CYLINDER AIR RESERVOIR (CONT)

3. Apply pipe sealant to all male threads. Remove caps/plugs and install straight pipe-to-tube adapter (2) to reservoir (3).

4. Install reservoir (3) onto platform and secure with four lockwashers (8) and nuts (7).

5. Remove caps/plugs and install hydraulic hose (1) onto straight pipe-to-tube adapter (2) on reservoir (3)

FOLLOW-ON MAINTENANCE

Adjust gooseneck and check for leakage at reservoir (para. 2-18).

4-96. APU

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

Locknut
Locknut (4)

Personnel Required: 2

Equipment Condition

Two bolts and hydraulic pump (with hoses attached) removed from APU (para. 4-76)
Throttle cable disconnected from speed control lever (para. 4-107)
APU wiring harness uncoupled (para. 4-39)
Battery cables disconnected from battery and removed from APU (para. 4-30)
Handrails removed (para. 4-57)
Top and rear hinged steps removed (para. 4-56)
Gooseneck coupled (para. 2-24) or supported at 64 inch (162.6 cm) height

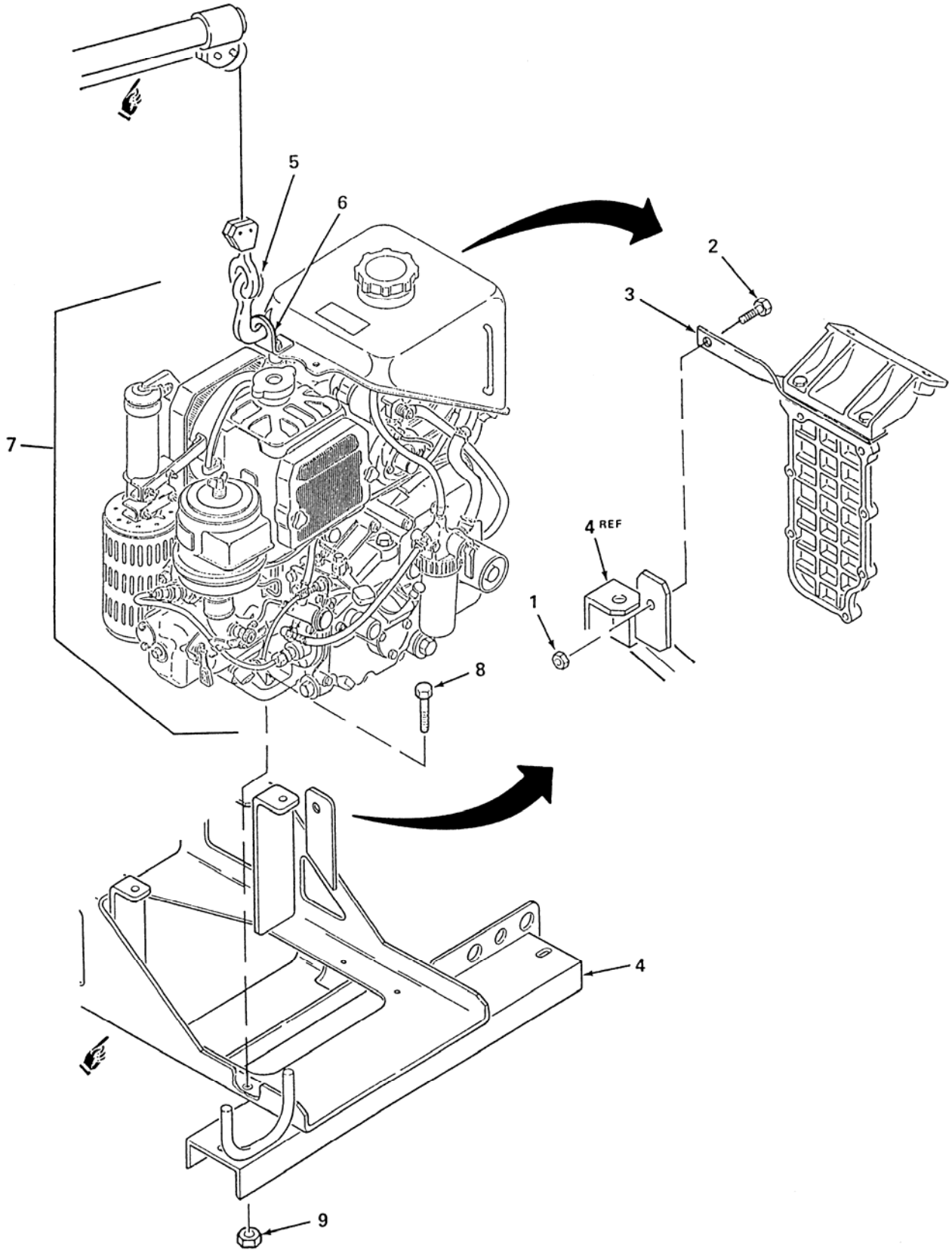
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REMOVAL

WARNING

APU must be cool before removal or you may be burned and injury to personnel may result.

1. Remove locknut (1) and bolt (2) from APU fuel tank bracket (3) and APU frame (4). Discard locknut.


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4-96. APU (CONT)

2. Attach davit hook (5) to lifting eye (6) on APU (7).

3. Remove four bolts (8) and locknuts (9). Discard locknuts.

CAUTION

When removing/installing APU, extreme caution must be used to prevent the APU from contacting the hydraulic tank or damage to equipment may result.

4. Lift APU (7) from APU frame (4) and lower APU (7) to ground. If necessary remove davit hook (5) from lifting eye (6) on APU (7).

INSTALLATION

1. If removed, attach davit hook (5) to lifting eye (6) on APU (7).

CAUTION

When removing/installing APU, extreme caution must be used to prevent the APU from contacting the hydraulic tank or damage to equipment may result.

2. Raise APU (7) above gooseneck and lower into position on APU frame (4). Secure APU (7) with four bolts (8) and locknuts (9).

3. Remove davit hook (5) from lifting eye (6) on APU (7).

4. Aline fuel tank bracket (3) with APU frame (4) and secure in place by installing bolt (2) and locknut (1).

4-97. GLOW PLUG

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

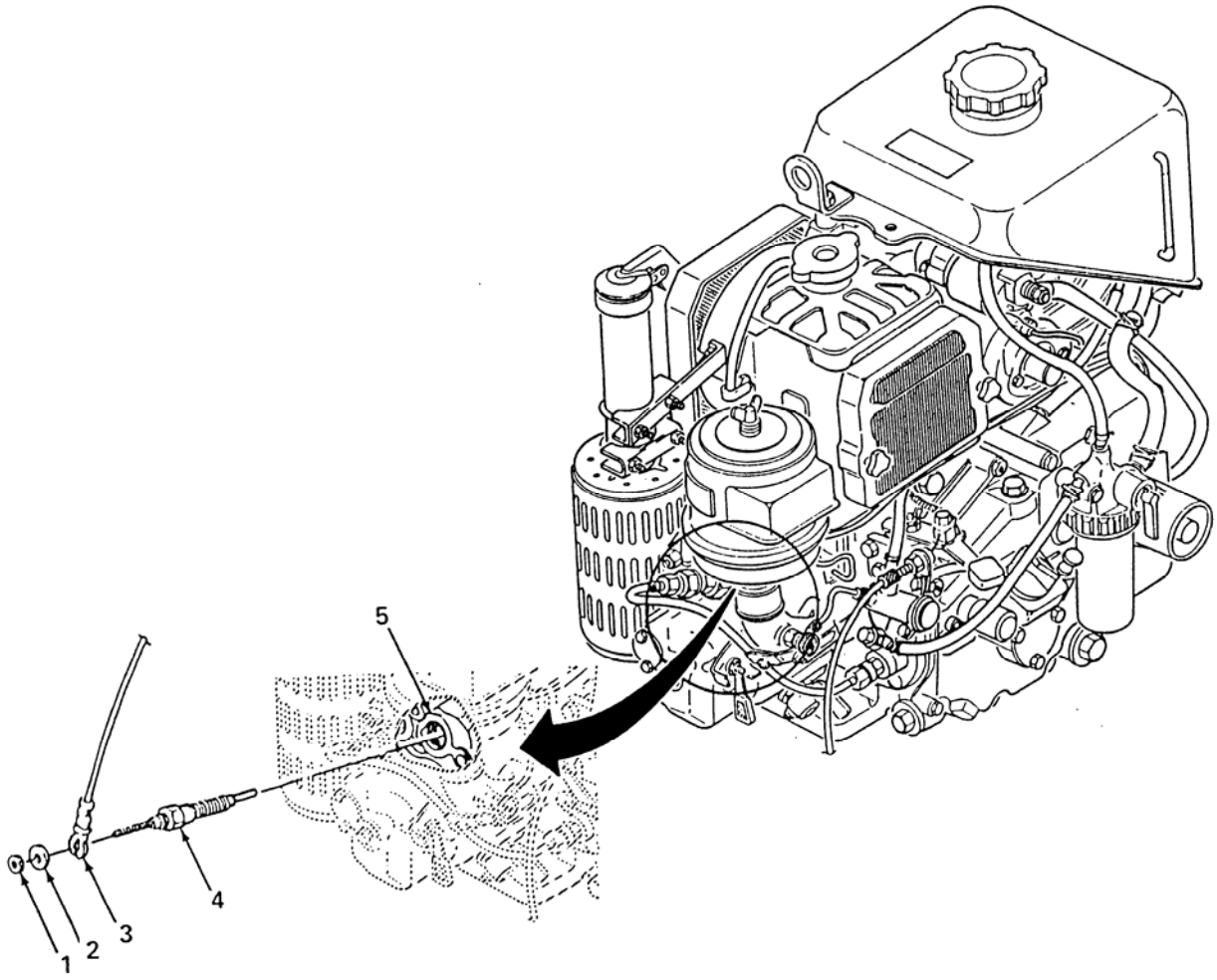
General mechanics tool kit, item 16, appx. B

Equipment Condition

Step assembly raised (para. 2-13)

REMOVAL

1. Remove nut (1) and washer (2) and disconnect wiring harness (3) from glow plug (4).



2. Remove glow plug (4) from cylinder head (5).

INSTALLATION

1. Install glow plug (4) into cylinder head (5).

2. Connect wiring harness (3) to glow plug (4) and secure with washer (2) and nut (1).

FOLLOW-ON MAINTENANCE

Start APU and check glow plug for operation (para. 2-16).

4-98. DRAIN COCK

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

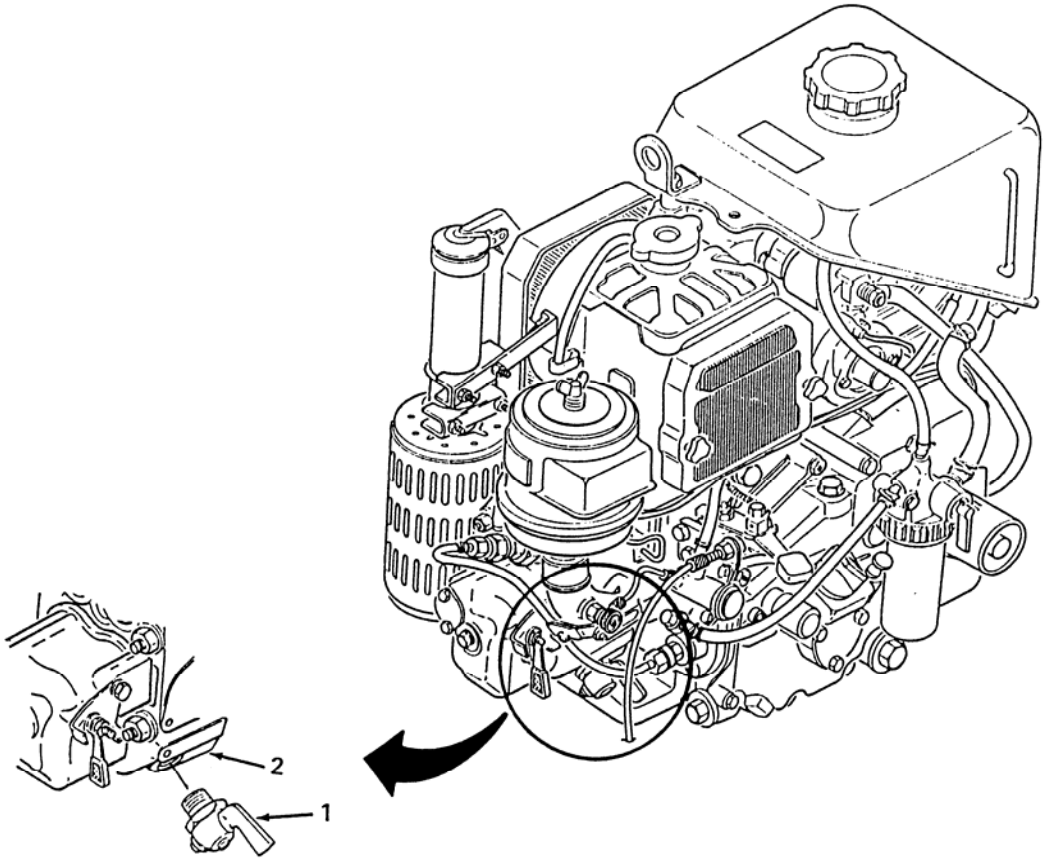
General mechanics tool kit, item 16, appx. B

Equipment Condition

Radiator drained (para. 4-110)

REMOVAL

Remove drain cock (1) from cylinder head (2).



INSTALLATION

Install drain cock (1) into cylinder head (2).

FOLLOW-ON MAINTENANCE

Fill radiator with coolant (para. 4-110).

4-99. CYLINDER HEAD COVER

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Ratchet, 3/8" dr, item 18, appx. B
Socket, socket wrench, 10 mm, 3/8" dr, item 18, appx. B
Torque wrench, 3/8" dr, 0-200 in-lb, item 18, appx. B

Materials/Parts

Gasket
Gasket
Gasket
Lockwasher
Preformed packing
Self-locking nut
Oil, item 15, appx. E

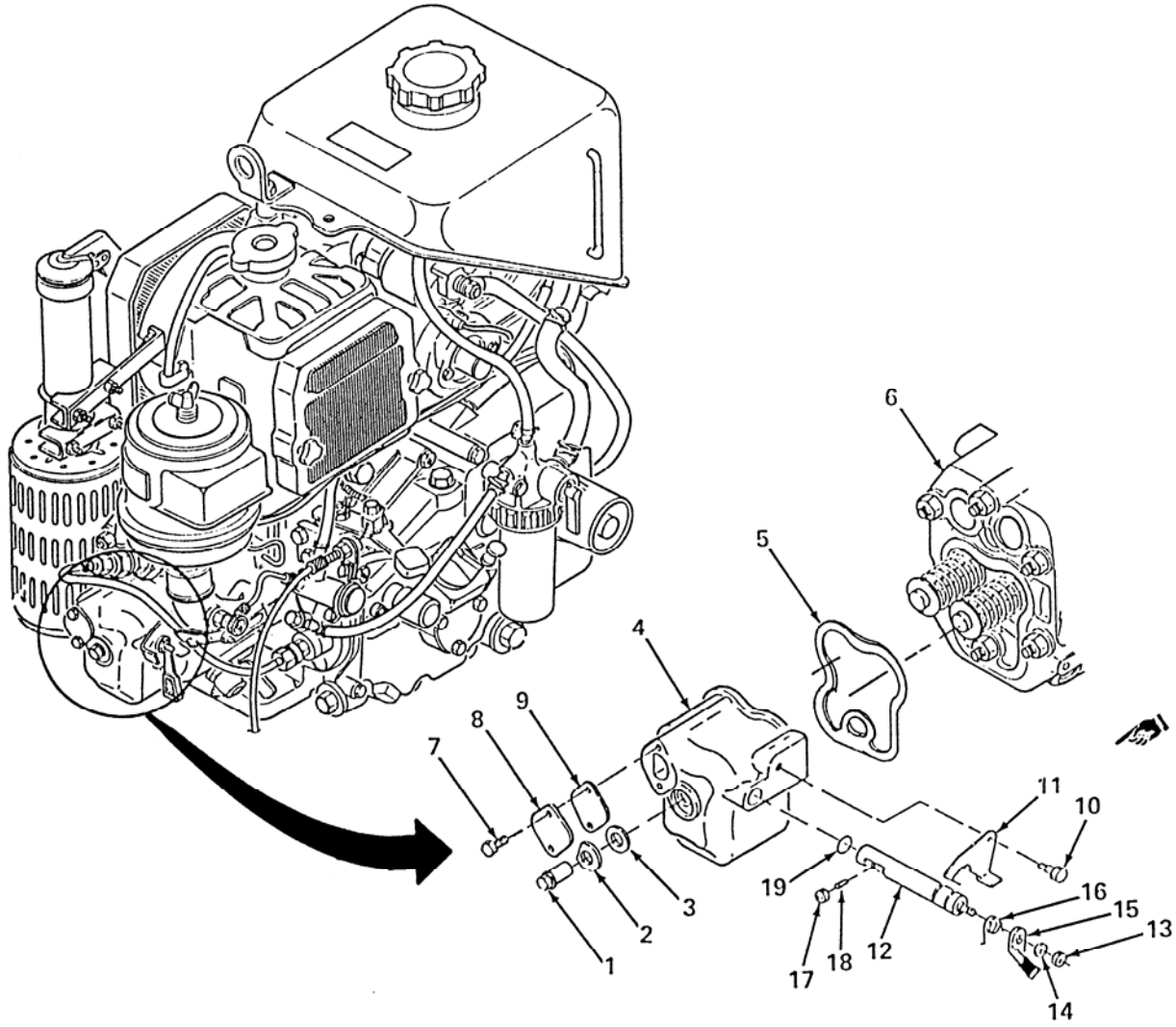
Equipment Condition

Engine oil drained (para. 4-100)

4-99. CYLINDER HEAD COVER (CONT)

REMOVAL

1. Remove sleeve nut (1), washer (2), and gasket (3). Discard gasket.
2. Remove cylinder head cover (4) and gasket (5) from cylinder head (6). Discard gasket.
3. Remove two bolts (7), decompression hole cover (8), and gasket (9). Discard gasket.
4. Remove bolt (10), retaining plate (11), and straight shaft (12) from cylinder cover (4).
5. Disassemble nut (13), lockwasher (14), manual control lever (15), spring (16), self-locking nut (17), setscrew (18), and preformed packing (19) from straight shaft (12). Discard lockwasher, self-locking nut, and preformed packing.



INSTALLATION

1. Assemble preformed packing (19), setscrew (18), self-locking nut (17), spring (16), manual control lever (15), lockwasher (14), and nut (13) to straight shaft (12).

2. Install straight shaft (12), retaining plate (11), and bolt (10) to cylinder head cover (4).

3. Install gasket (5) and cylinder head cover (4) on cylinder head (6).

4. Install gasket (3), washer (2), and sleeve nut (1). Torque sleeve nut (1) to 86 - 96 in.-lb (9.8 - 10.8 Nm).

5. Install gasket (9), decompression hole cover (8), and two bolts (7).

FOLLOW-ON MAINTENANCE

Fill crankcase with engine oil (para. 4-100).

4-100. OIL FILTER AND DIPSTICK

This task covers: a. Removal b. Cleaning c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Drain pan, item 17, appx. B

Materials/Parts

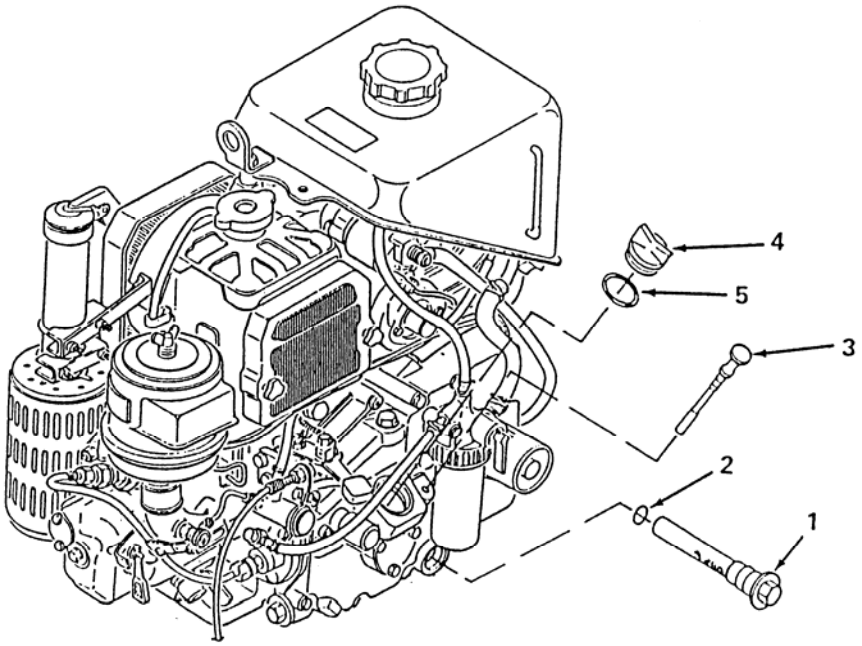
Preformed packing
Preformed packing
Oil, item 15, appx. E

Equipment Condition

Step assembly raised (para. 4-13)

REMOVAL

1. Remove oil filter (1) and drain engine oil into drain pan. Slide preformed packing (2) off of oil filter. Discard preformed packing.



4-100. OIL FILTER AND DIPSTICK (CONT)

2. Remove oil dipstick (3) and oil filler plug (4) from engine cover (5). Remove preformed packing (6) from oil filler plug. Discard preformed packing.

CLEANING

Clean oil filter with clean oil.

INSTALLATION

1. Install preformed packing (6) on oil filler plug (4). Install oil filler plug and oil dipstick (3) on engine cover (5).

2. Slide preformed packing (2) onto oil filter (1) and install oil filter.

3. Fill crankcase with engine oil (approximately 1.37 qt (1.3 1)).

FOLLOW-ON MAINTENANCE

Start APU and check oil pressure indicator (para. 2-16).

4-101. OIL SENDING UNIT

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

Generals mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 2, item 18, appx. B:

Ratchet, 3/8" dr	Socket, socket wrench, 24 mm, 3/8" dr
Torque wrench, 0-200 in-lb	Socket, socket wrench, 17 mm, 3/8" dr

Materials/Parts

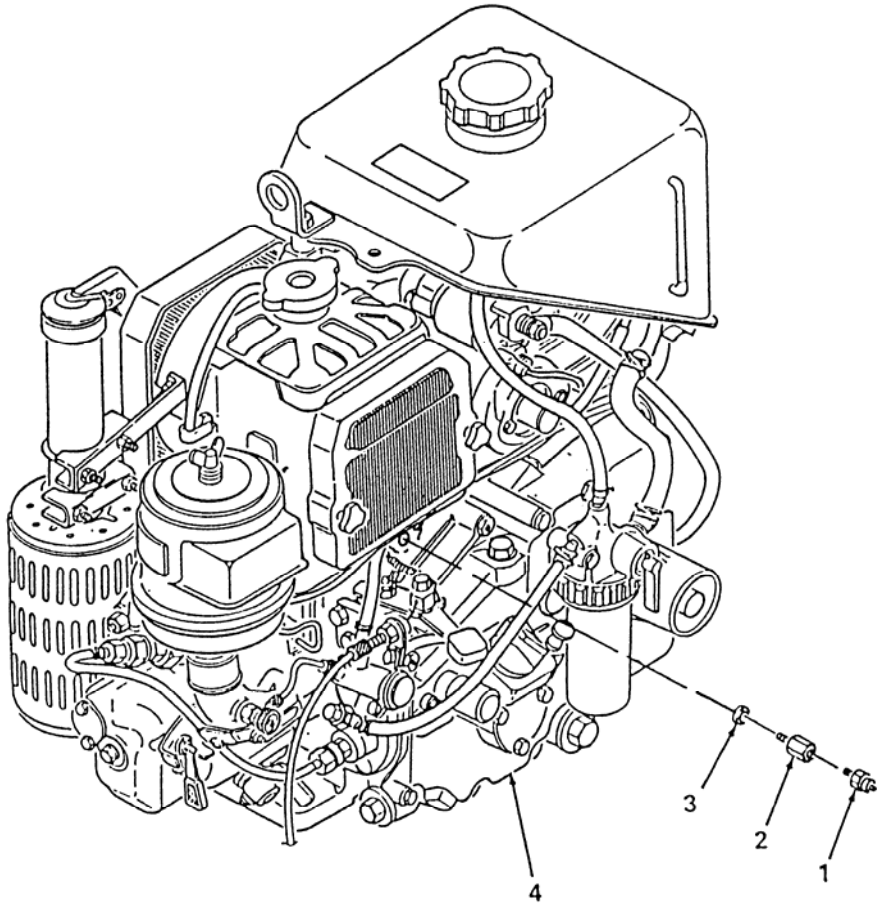
Gasket

Equipment Condition

APU wiring harness disconnected (para. 4-39)

REMOVAL

Remove oil pressure transducer (1), electrical connector retainer (2), and gasket (3) from crankcase (4). Discard gasket.



INSTALLATION

1. Install gasket (3) and electrical connector retainer (2) into crankcase (4). Torque electrical connector retainer (2) to 129 - 174 in-lb (14.6 - 19.7 Nm).

2. Install oil pressure transducer (1) onto electrical connector retainer (2) and torque to 60 - 86 in-lb (6.7 - 9.8 Nm).

4-102. NOZZLE HOLDER ASSEMBLY

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Drain pan, item 18, appx. B
Gloves, chemical and oil protective, item 18, appx. B
Goggles, industrial, item 18, appx. B

Materials/Parts

Seal
Gasket
Cap and plug set, item 5, appx. B

Equipment Condition

Fuel tank drained (para. 4-104)

General Safety Instructions

WARNING

Diesel fuel is combustible and is an irritant to the eyes, skin, and respiratory system. To avoid injury to personnel and explosion, extinguish all smoking materials and do not allow sparks or open flame near the fuel tank or the fuel system. Use skin and eye protection and work in a well-ventilated area.

Clean up any fuel that is spilled during fuel line/tank removal or injury to personnel may result.

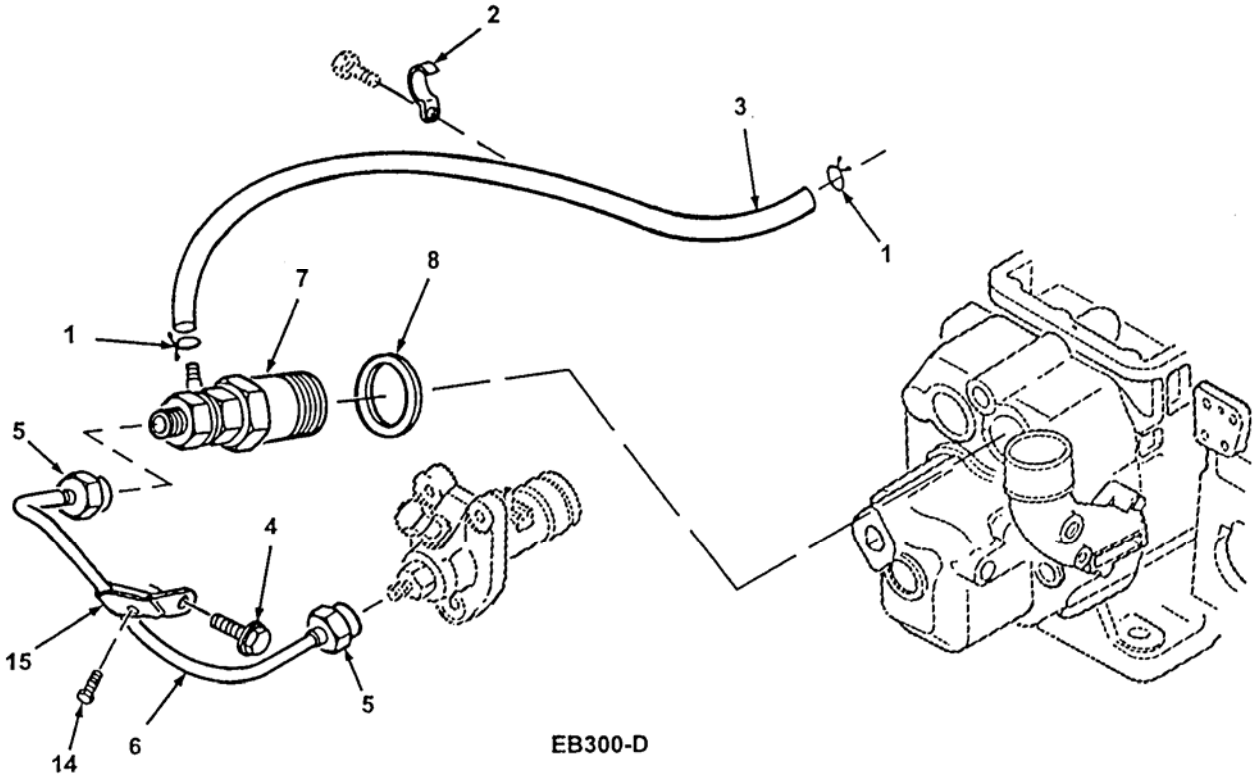
CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or other foreign material from entering the fuel system or damage to equipment may result.

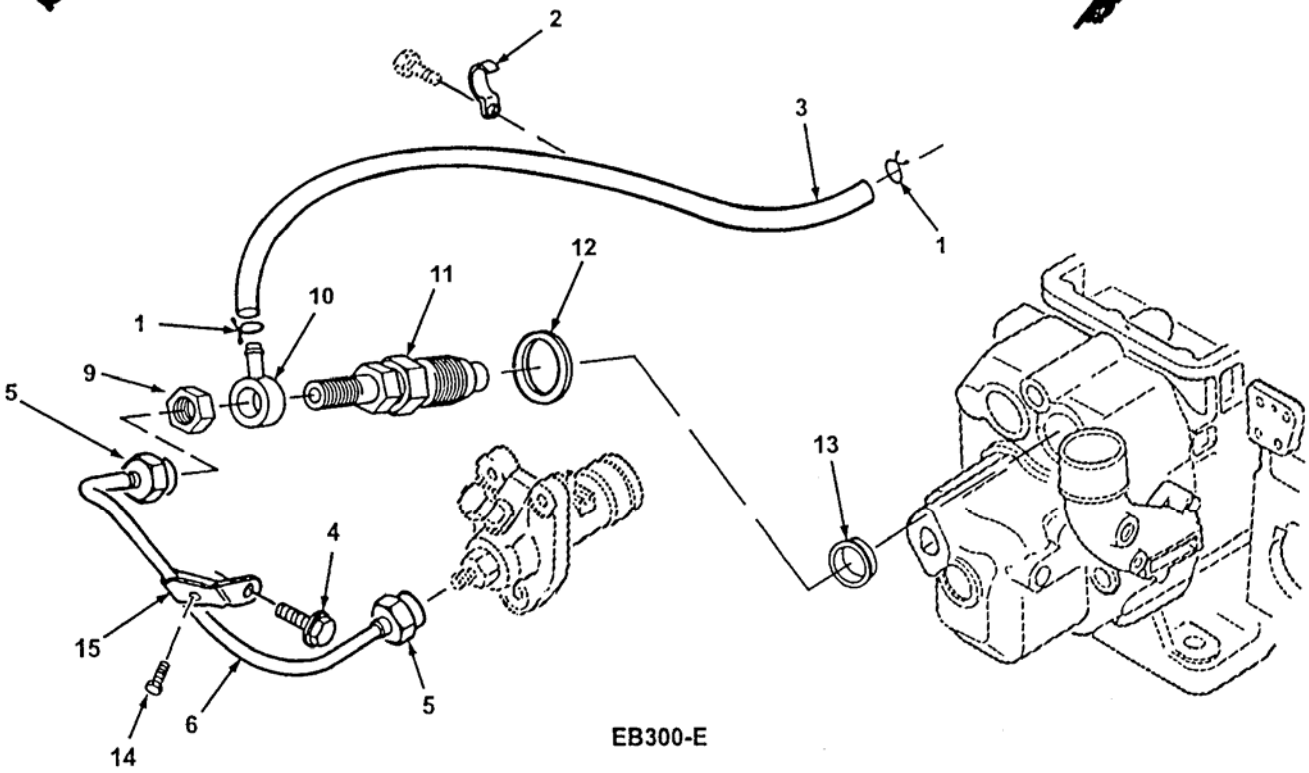
REMOVAL

1. Loosen two hose clamps (1), straighten hose clamp (2), and remove hose (3). Collect excess fuel in hose into drain pan and cap/plug hose.

2. Remove screw (4), two nuts (5), and metallic tube (6). Collect excess fuel in hose into drain pan and cap/plug tube.



EB300-D



EB300-E

4-102. NOZZLE HOLDER ASSEMBLY (CONT)

3. On engine model EB300-D, remove fuel injector holder (7) and gasket (8). Discard gasket.

4. On engine model EB300-E, remove nut (9), nozzle holder (10), fuel injector holder (11), gasket (12), and seal (13). Discard seal.

5. Remove screw (14) and loop clamp (15) from metallic tube (6).

INSTALLATION

1. Install loop clamp (15) and screw (14) to metallic tube (6).

2. On engine model EB300-E, install seal (13), gasket (12), fuel injector holder (11), nozzle holder (10), and nut (9). Tighten nut.

3. On engine model EB300-D, install gasket (8) and fuel injector holder (7) and tighten fuel injector holder.

4. Remove caps/plugs, install metallic tube (6), tighten two nuts (7), and install screw (4).

5. Remove caps/plugs, install hose (3), and secure with two hose clamps (1).

6. Secure hose (3) with hose clamp (2).

FOLLOW-ON MAINTENANCE

Fill fuel tank with diesel fuel (para. 3-3).

4-103. AIR CLEANER ASSEMBLY

This task covers: a. Removal b. Cleaning c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Compressor unit, reciprocating, item 18, appx. B
Gun, air blow, item 18, appx. B
Goggles, industrial, item 18, appx. B

Materials/Parts

Gasket
Gasket
Wiping rag, item 19, appx. E

Equipment Condition

Step assembly raised (para. 2-16)

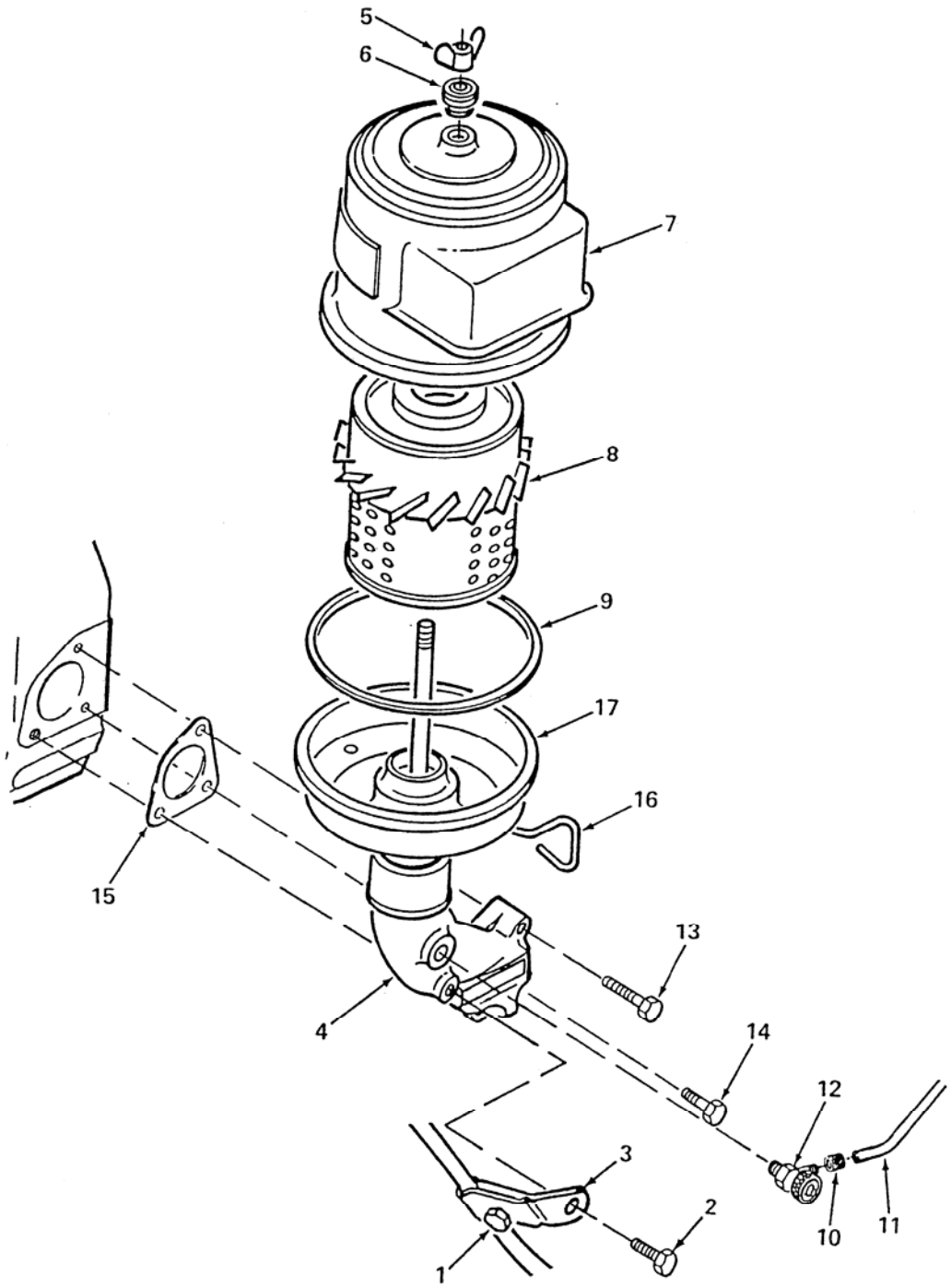
General Safety Instructions

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

REMOVAL

1. Loosen bolt (1) and remove bolt (2) and bracket (3) from flange (4).
2. Remove wingnut (5), grommet (6), cap assembly (7), air filter element (8), and gasket (9). Discard gasket.
3. Loosen and slide compression fitting (10) up hose (11) and disconnect hose from flow valve (12).
4. Remove two bolts (13), bolt (14), flange (4), and gasket (15). Discard gasket.
5. Loosen setting bolt (16) and remove body (17) from flange (4).
6. Remove flow valve (12) from flange (4).



CLEANING

WARNING

To avoid eye or skin injury, do not clean with compressed air in excess of 30 psi (207 kPa). Wear goggles or face shield.

Clean filter element with low-pressure compressed air from inside toward outside. Wipe out body with wiping rag.

4-103. AIR CLEANER ASSEMBLY (CONT)

INSTALLATION

1. Install flow valve (12) to flange (4).

2. Install body (17) to flange (4) and tighten setting bolt (16).

3. Install gasket (15) and flange (4) and secure with bolt (14) and two bolts (13). Torque bolts (14 and 13) to 2.2 - 3.6 lb-ft (2.9 - 4.9 Nm).

4. Connect hose (11) to flow valve (12), slide compression fitting (10) up to flow valve, and tighten compression fitting.

5. Install gasket (9), air filter element (8), cap assembly (7), and grommet (6) and secure with wingnut (5).

6. Secure bracket (3) to flange (4) with bolt (2). Tighten bolt (1).

4-104. FUEL TANK ASSEMBLY

This task covers: a. Removal b. Disassembly c. Cleaning d. Assembly e. Installation

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INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Drain pan, item 18, appx. B
Gloves, chemical and oil protective, item 18, appx. B
Goggles, industrial, item 18, appx. B

Materials/Parts

Diesel fuel, item 9, 10, or 11, appx. E
Cap and plug set, item 5, appx. E
Lockwasher (2)

Equipment Condition

Step assembly raised (para. 2-13)

General Safety Instructions

WARNING

Diesel fuel is combustible and is an irritant to the eyes, skin, and respiratory system. To avoid injury to personnel and explosion, extinguish all smoking materials and do not allow sparks or open flame near the fuel tank or the fuel system. Use skin and eye protection and work in a well-ventilated area.

WARNING

Clean up any fuel that spilled during fuel line/tank removal or injury to personnel may result.

CAUTION

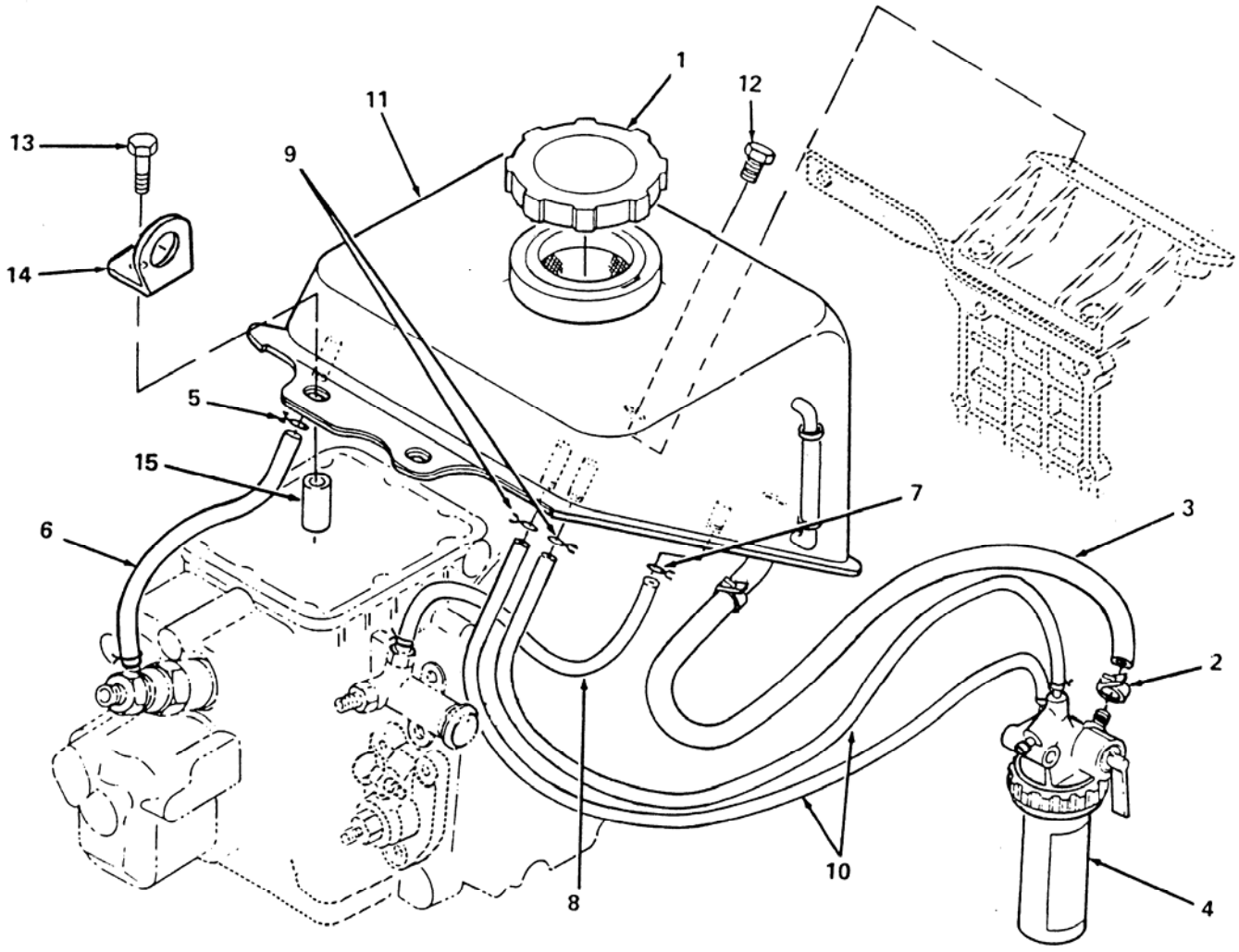
All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or other foreign material from entering the fuel system or damage to equipment may result.

REMOVAL

NOTE

Fuel tank capacity is 1.3 gallons (4.8 l).

1. Remove filler cap (1). Loosen hose clamp (2) and disconnect hose (3) from fuel filter (4). Drain fuel into drain pan. Remove hose clamp and cap/plug hose.



4-104. FUEL TANK ASSEMBLY (CONT)

2. Loosen hose clamp (5) and disconnect hose (6). Remove hose clamp and cap/plug hose.

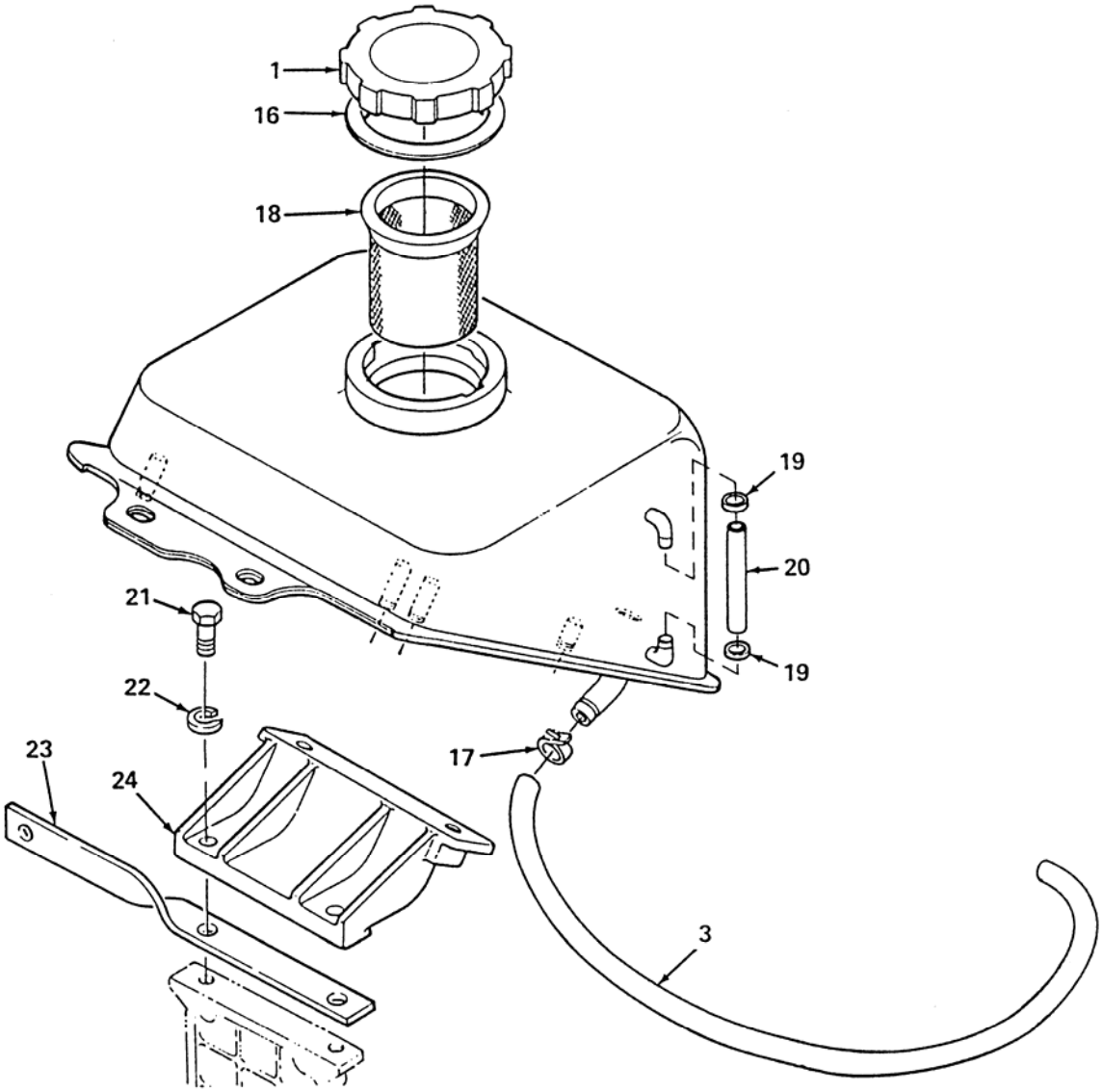
3. Loosen hose clamp (7) and disconnect hose (8). Remove hose clamp and cap/plug hose.

4. Loosen two hose clamps (9) and disconnect two hoses (10) from fuel tank (11). Remove two hose clamps and cap/plug hoses.

5. Remove two bolts (12), bolt (13), and lifting eye (14). Remove fuel tank (11) and spacer (15).

DISASSEMBLY

1. Remove shield (16) from filler cap (1).



2. Loosen hose clamp (17) and remove hose (3). Remove hose clamp (17) and cap/plug hose.

3. Remove strainer element (18) from fuel tank (11).

4. Loosen two spring clips (19), remove sight tubing (20), and install caps/plugs. Remove two spring clips (19).

5. Remove two bolts (21), lockwashers (22), retaining strap (23), and mounting bracket (24).

CLEANING

Clean strainer element (18) with clean diesel fuel from outside toward inside.

ASSEMBLY

1. Attach mounting bracket (24) and retaining strap (23) to APU with two lockwashers (22) and bolts (21).

2. Remove caps/plugs and install two spring clips (19) on sight tubing (20). Install sight tubing and tighten two spring clips.

3. Install strainer element (18) into fuel tank (11).

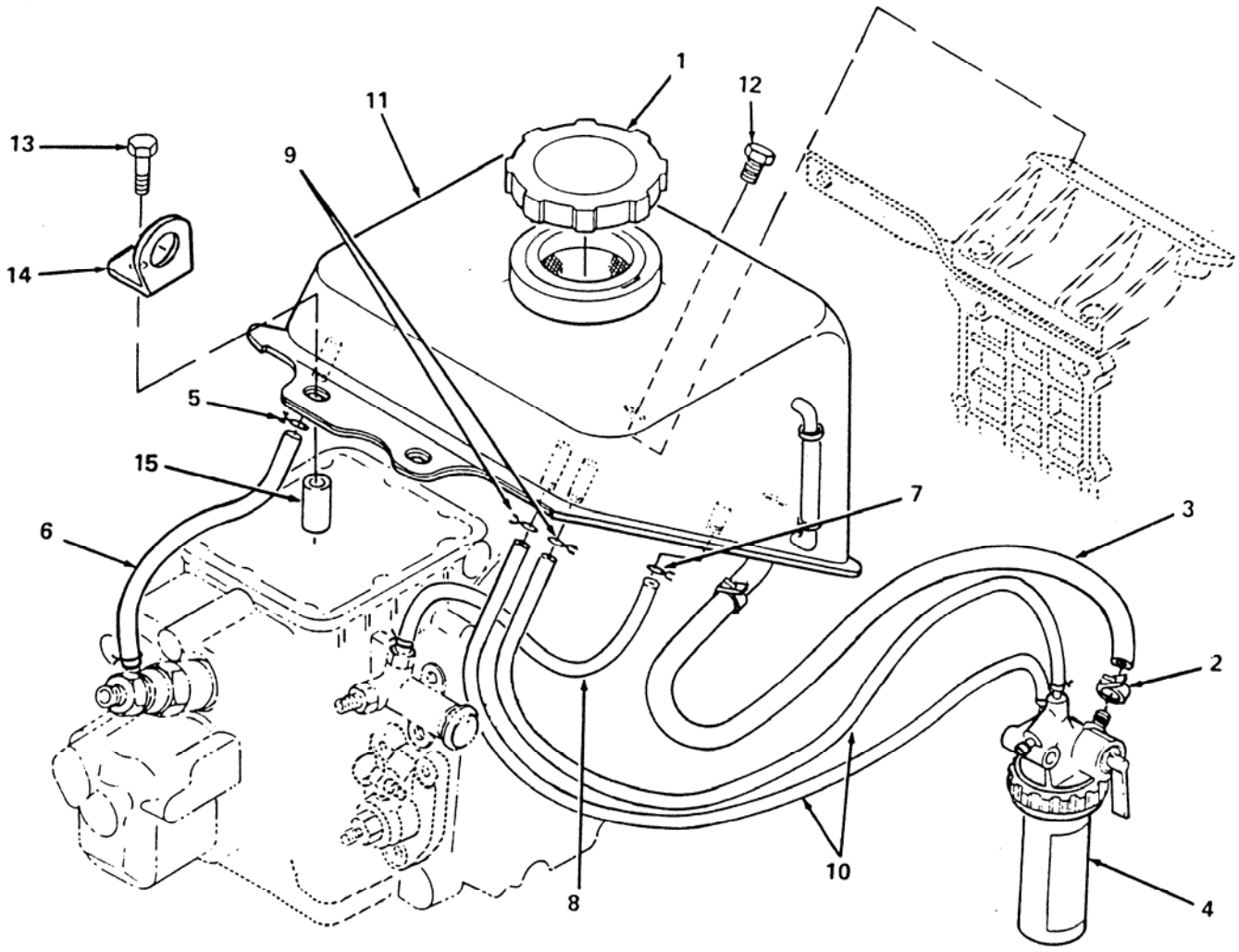
4. Remove caps/plugs, install hose clamp (17) onto hose (3), and install hose onto fuel tank (11). Tighten hose clamp at fuel tank.

5. Install shield (16) onto filler cap (1).

4-104. FUEL TANK ASSEMBLY (CONT)

INSTALLATION

1. Install spacer (15), fuel tank (11), lifting eye (14), bolt (13), and two bolts (12).



2. Remove caps/plugs, install two hose clamps (9) onto two hoses (10), and connect two hoses to fuel tank (11). Tighten two hose clamps.

3. Remove cap/plug, install hose clamp (7) onto hose (8), and connect hose. Tighten hose clamp.

4. Remove cap/plug, install hose clamp (5) onto hose (6), and connect hose. Tighten hose clamp.

5. Remove cap/plug, install hose clamp (2) onto hose (3), and connect hose to fuel filter (4). Tighten hose clamp.

6. Fill fuel tank with diesel fuel (para. 3-3).

7. Install filler cap (1).

FOLLOW-ON MAINTENANCE

Operate APU (para. 2-16).

4-105. FUEL FILTER ASSEMBLY

This task covers: a. Removal c. Assembly
b. Disassembly d. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Drain pan, item 18, appx. B
Gloves, chemical and oil protective, item 18, appx. B
Goggles, industrial, item 18, appx. B

Materials/Parts

Filter element
Preformed packing
Preformed packing
Diesel fuel, item 9, 10, or 11, appx. E
Cap and plug set, item 5, appx. E

Equipment Condition

Fuel tank drained (para. 4-104)

General Safety Instructions

WARNING

Diesel fuel is combustible and is an irritant to the eyes, skin, and respiratory system. To avoid injury to personnel and explosion, extinguish all smoking materials and do not allow sparks or open flame near the fuel tank or the fuel system. Use skin and eye protection and work in a well-ventilated area.

Clean up any fuel that is spilled during fuel line/filter removal or injury to personnel may result.

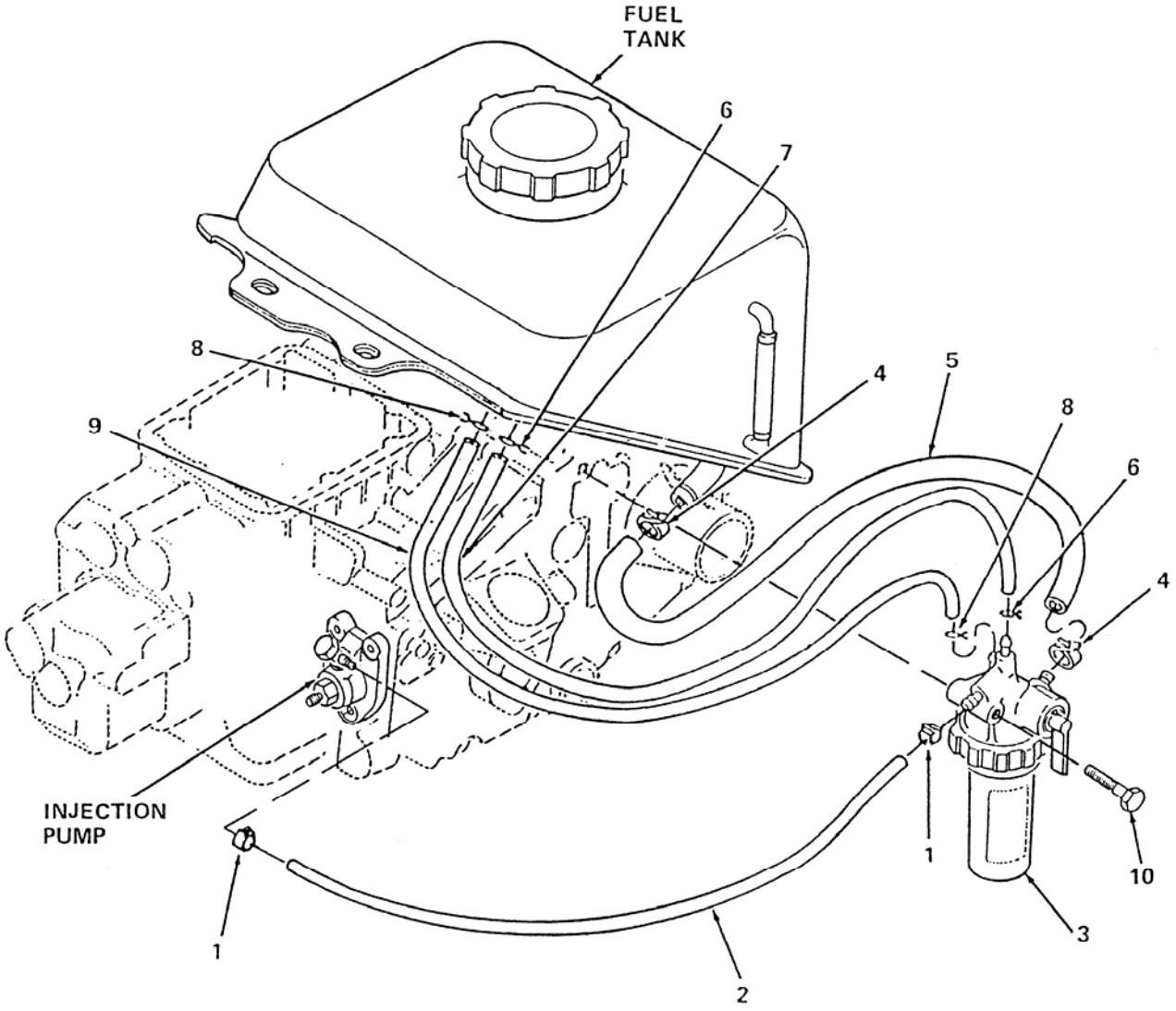
CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or other foreign material from entering the fuel system or damage to equipment may result.

4-105. FUEL FILTER ASSEMBLY (CONT)

REMOVAL

1. Loosen two hose clamps (1) and disconnect hose (2) from injection pump fitting and fuel filter (3). Collect excess fuel in hose into drain pan. Remove two hose clamps (1) and cap/plug hose.



2. Loosen two hose clamps (4) and disconnect hose (5) from fuel tank fitting and fuel filter (3). Collect excess fuel in hose into drain pan. Remove two hose clamps (4) and cap/plug hose.

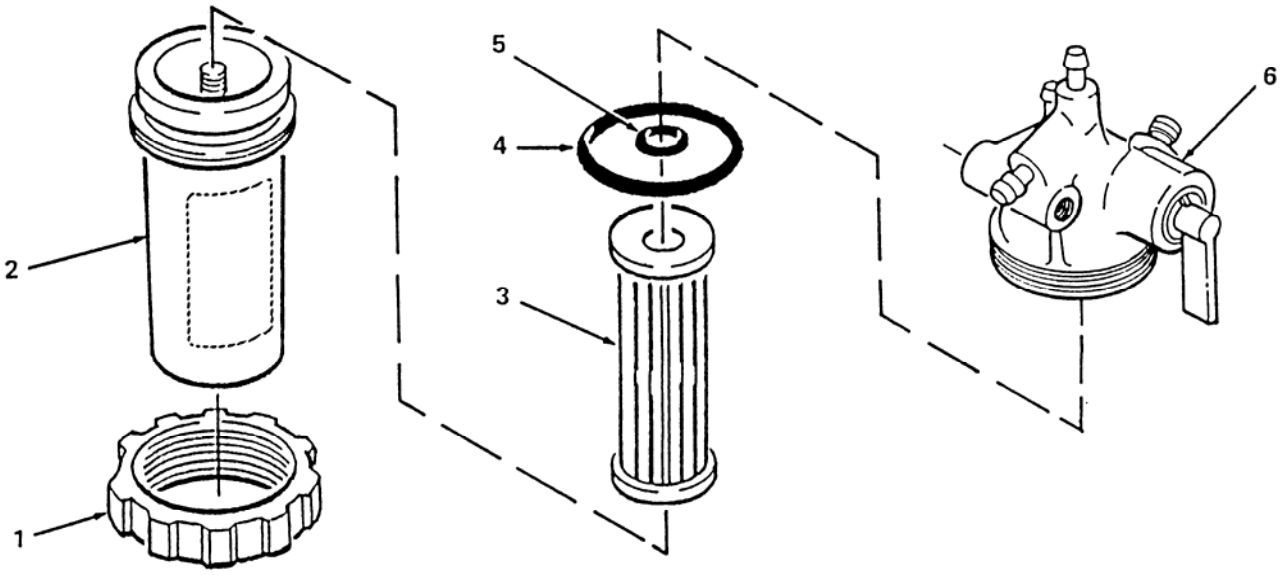
3. Loosen two hose clamps (6) and disconnect hose (7) from fuel tank fitting and fuel filter (3). Collect excess fuel in hose into drain pan. Remove two hose clamps (6) and cap/plug hose.

4. Loosen two hose clamps (8) and disconnect hose (9) from fuel tank fitting and fuel filter (3). Collect excess fuel in hose into drain pan. Remove two hose clamps (8) and cap/plug hose.

5. Remove bolt (10) and fuel filter assembly (3).

DISASSEMBLY

1. Unscrew retaining ring (1) and remove filter body (2) and filter element (3). Discard filter element.



2. Drain fuel from filter body (2) into drain pan.

3. Remove preformed packing (4) and preformed packing (5) from filter cup (6). Discard filter element and preformed packings.

ASSEMBLY

1. Install preformed packing (5) and preformed packing (4) onto filter cup (6).

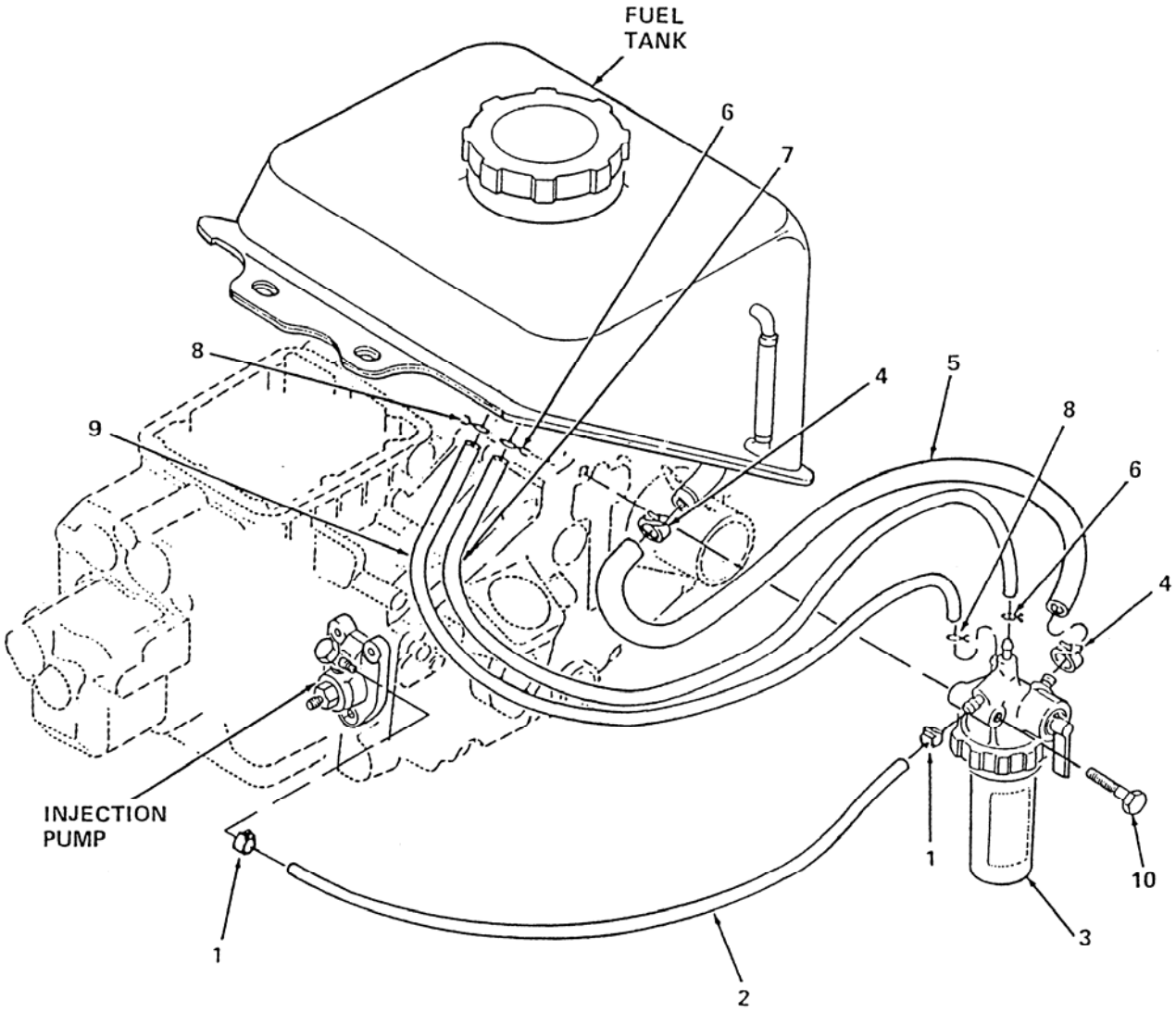
2. Install filter element (3) into filter body (2).

3. Install filter body (2) onto filter cup (6) and secure by screwing on retaining ring (1).

4-105. FUEL FILTER ASSEMBLY (CONT)

INSTALLATION

1. Install fuel filter assembly (3) on APU and secure with bolt (10).



2. Remove caps/plugs, install two hose clamps (8) onto hose (9), and connect hose to fuel tank fitting and fuel filter (3). Tighten two hose clamps.

3. Remove caps/plugs, install two hose clamps (6) onto hose (7), and connect hose to fuel tank fitting and fuel filter (3). Tighten two hose clamps.

4. Remove caps/plugs, install two hose clamps (4) onto hose (5), and connect hose to fuel tank fitting and fuel filter (3). Tighten two hose clamps.

5. Remove caps/plugs, install two hose clamps (1) onto hose (2), and connect hose to injection pump and fuel filter. Tighten two hose clamps.

FOLLOW-ON MAINTENANCE

Fill fuel tank with diesel fuel (para. 3-3).

4-106. ENGINE PRIMING SYSTEM

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Drain pan, item 18, appx. B
Gloves, chemical and oil protective, item 18, appx. B
Goggles, industrial, item 18, appx. B

Materials/Parts

Cap and plug set, item 5, appx. E

Equipment Condition

Fuel tank drained (para. 4-104)
Throttle cable removed (para. 4-107)

General Safety Instructions

WARNING

Diesel fuel is combustible and is an irritant to the eyes, skin, and respiratory system. To avoid injury to personnel and explosion, extinguish all smoking materials and do not allow sparks or open flame near the fuel tank or the fuel system. Use skin and eye protection and work in a well-ventilated area.

Clean up any fuel that is spilled during fuel line removal or injury to personnel may result.

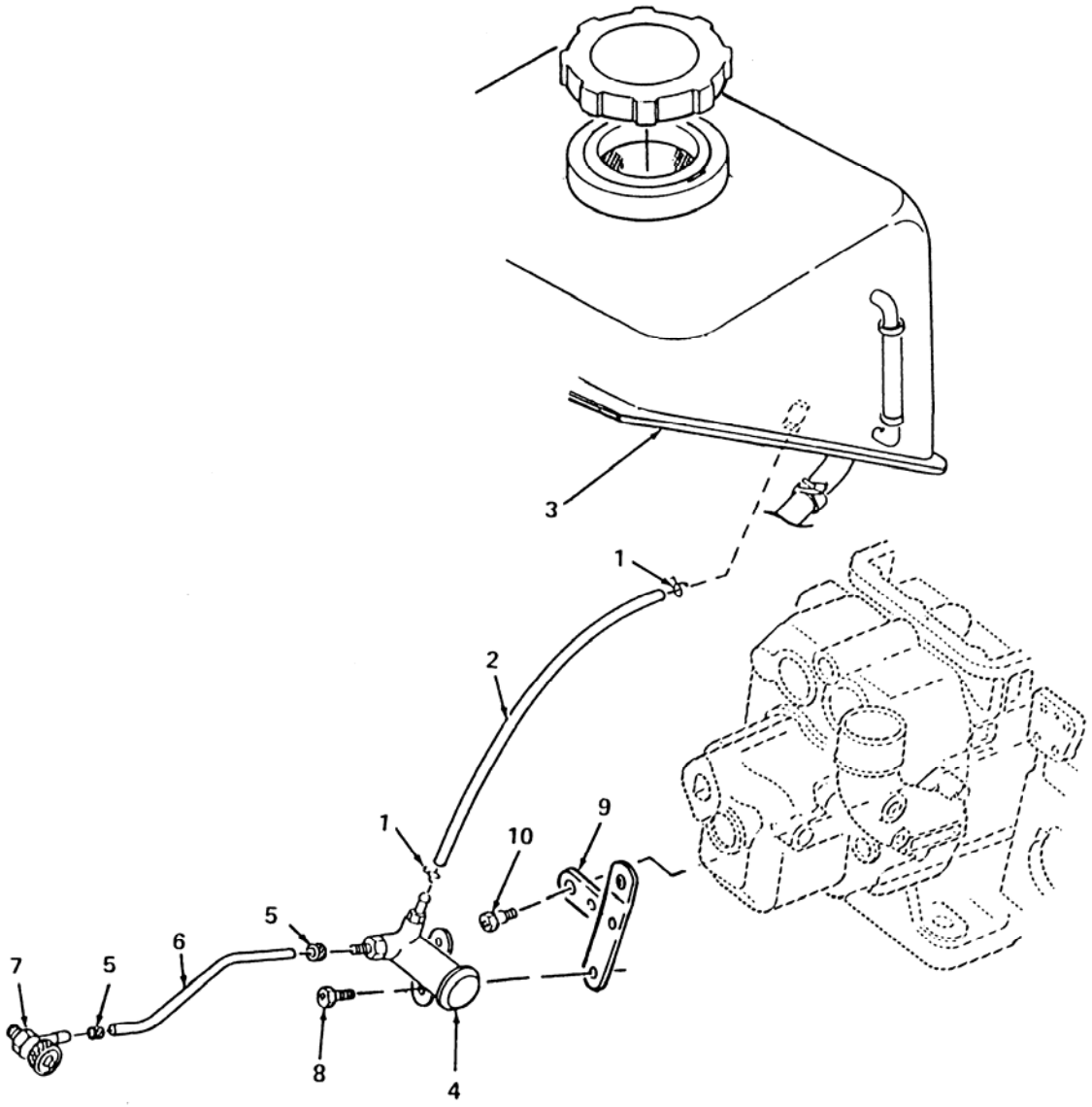
CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or other foreign material from entering the fuel system or damage to equipment may result.

4-106. ENGINE PRIMING SYSTEM (CONT)

REMOVAL

1. Loosen two hose clamps (1) and remove hose (2) from fuel tank (3) and starting aid (4). Collect excess fuel in hose into drain pan. Remove two hose clamps and cap/plug hose.



2. Loosen and slide two coupling nuts (5) up hose (6) and remove hose with coupling nuts. Collect excess fuel in hose into drain pan. Remove flow valve (7) and cap/plug hose.

3. Remove two bolts (8) and starting aid (4) from bracket (9).

4. Remove two bolts (10) and remove bracket (9).

INSTALLATION

1. Install bracket (9) and two bolts (10).

2. Install starting aid (4) on bracket (9) with two bolts (8).

3. Install flow valve (7).

4. Remove caps/plugs from hose (6). Position two coupling nuts (5) on hose and install hose onto flow valve (7) and starting aid (4). Tighten two coupling nuts.

5. Remove caps/plugs from hose (2). Install two hose clamps (1) onto hose and install hose onto fuel tank (3) and starting aid (4). Secure hose with two hose clamps.

FOLLOW-ON MAINTENANCE

1. Install throttle cable (para. 4-107).

2. Fill fuel tank with diesel fuel (para. 3-3).

4-107. MECHANICAL THROTTLE CONTROL

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

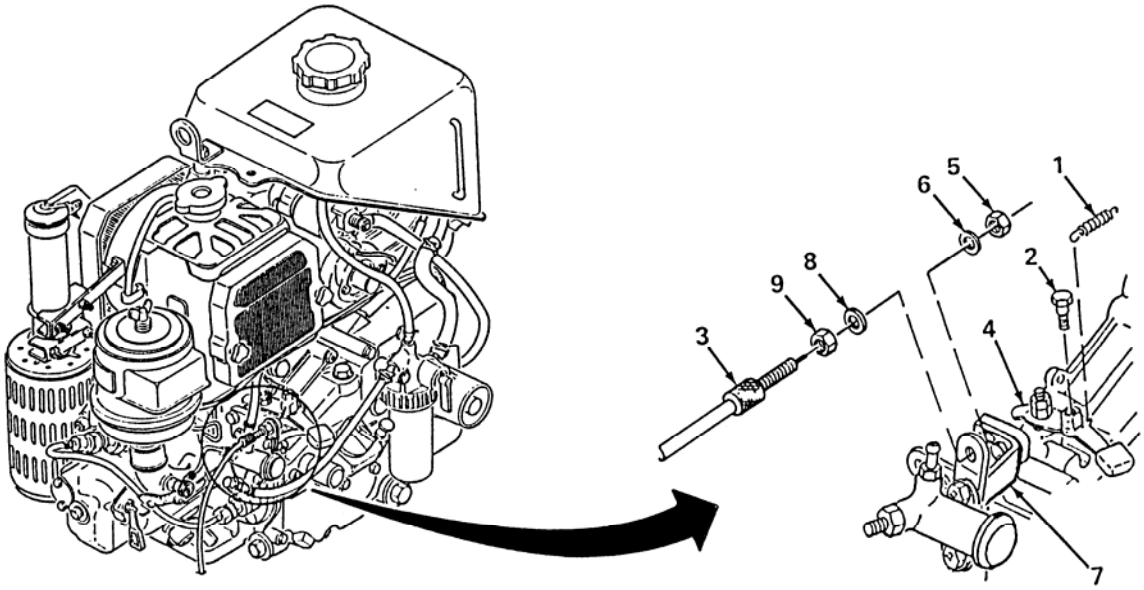
Equipment Condition

Step assembly raised (para. 2-16)

4-107. MECHANICAL THROTTLE CONTROL (CONT)

REMOVAL

1. Remove spring (1).



2. Loosen bolt (2) and disconnect throttle cable (3) from control lever (4).

3. Remove nut (5) and washer (6) from throttle cable (3).

4. Pull throttle cable (3) from bracket (7). Remove washer (8) and nut (9) from throttle cable (3).

INSTALLATION

1. Install nut (9) and washer (8) on throttle cable (3).

2. Push throttle cable (3) through bracket (7) and install washer (6) and nut (5). Insert throttle cable (3) into control lever (4) and tighten bolt (2).

3. Install spring (1).

FOLLOW-ON MAINTENANCE

Lower step assembly (para. 2-16).

4-108. APU CONTROL BOX

This task covers: a. Removal c. Assembly
b. Disassembly d. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

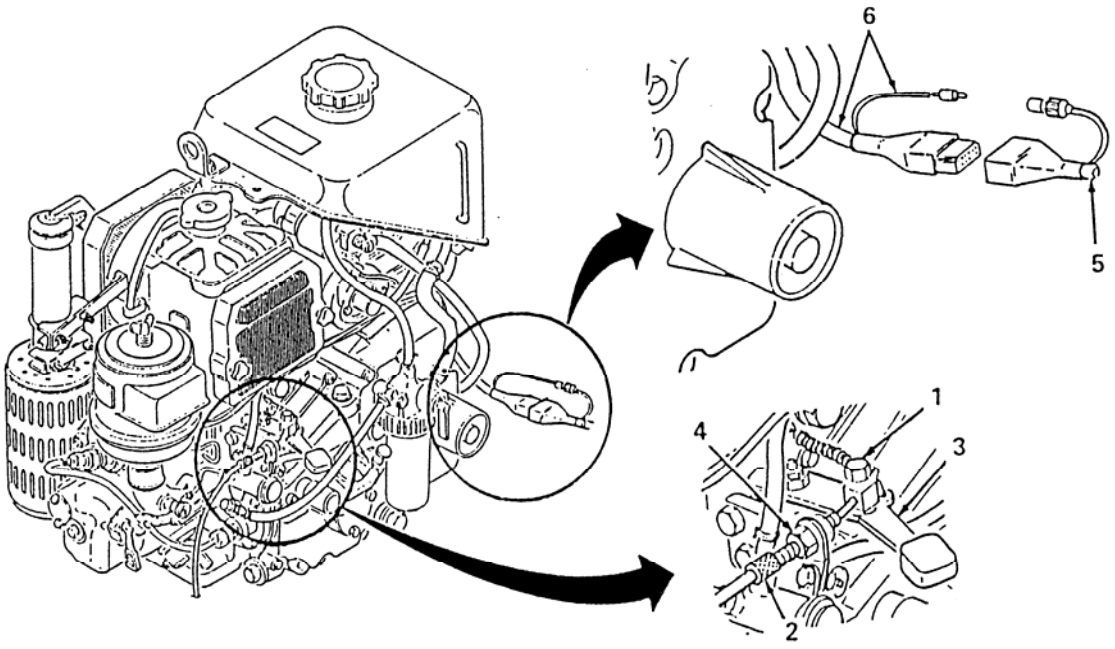
Locknut (3)
Lockwasher (2)
Lockwasher (2)
Lockwasher (4)
Lockwasher
Lockwasher (2)
Lockwasher
Rubber seal

Equipment Condition

Step assembly raised (para. 2-16)

REMOVAL

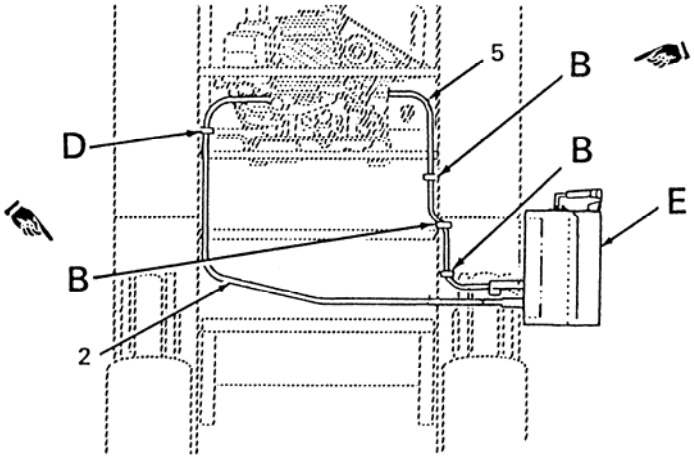
1. Loosen bolt (1) and disconnect throttle cable (2) from speed control lever (3). Loosen throttle cable adjustment nut (4).



4-108. APU CONTROL BOX (CONT)

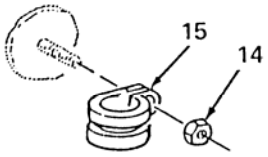
2. Tag and disconnect APU cable assembly (5) from APU wiring harness (6).

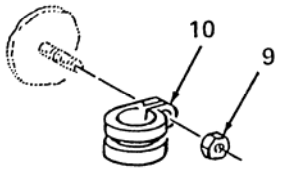
3. Remove three locknuts (9), clamp (10), and APU cable assembly (5) from gooseneck assembly. Discard locknuts.



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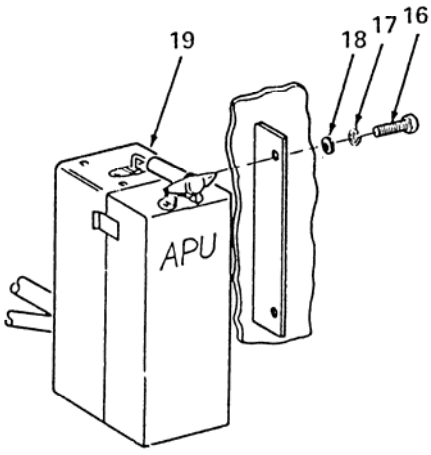
7 AND 8 DELETED





C

11 THRU 13 DELETED

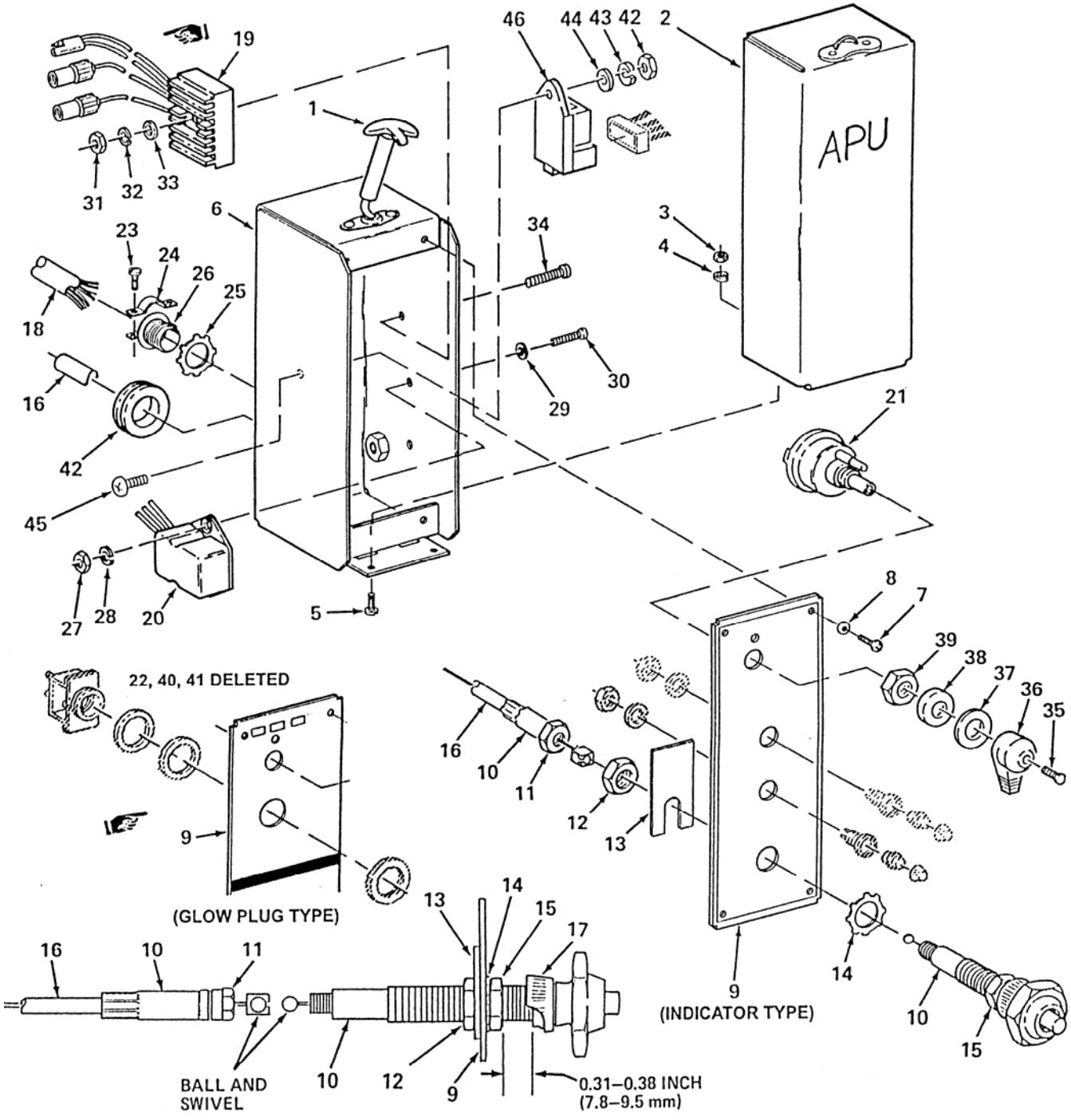


4. Remove locknut (14), clamp (15), and throttle cable (2) from gooseneck assembly. Discard locknut.

5. Remove two capscrews (16), lockwashers (17), washers (18), and control box (19) from gooseneck assembly. Discard lockwashers.

DISASSEMBLY

1. Lift clamp assembly (1), open cover (2), and remove two nuts (3), lockwashers (4), screws (5), and cover from housing (6). Discard lockwashers.



4-108. APU CONTROL BOX (CONT)

2. Remove four thread-cutting screws (7) and lockwashers (8) and pull plate (9) away from housing (6). Discard lockwashers.

3. Remove push-pull throttle control assembly (10) as follows:

   a. Loosen nut (11) on push-pull control assembly (10) sufficiently to separate and disconnect control assembly (10) at ball and swivel.

   b. Remove nut (12) and housing lock (13) and pull front portion of push-pull control assembly (10) from plate (9). Retain lockwasher (14) and nut (15) on control assembly (10).

   c. Push back portion of control assembly (10) and throttle cable (16) out through opening in rear of housing (6).

4. Tag and disconnect APU cable assembly (18) from rectifier (19) and regulator (20).

4.1. Refer to paragraph 4-29 and remove indicator light(s) and glow plug indicator, if applicable.

5. Tag and disconnect APU cable assembly (18) from rotary switch (21).

6. Remove two screws (23) and clamp half (24) and unscrew and remove nut (25) and bulkhead cable clamp (26).

7. Remove two nuts (27), lockwashers (28), washers (29), screws (30), and regulator (20) from housing (6). Discard lockwashers.

8. Remove nut (31), lockwasher (32), washer (33), screw (34), and rectifier (19). Discard lockwasher.

NOTE

Two-position connectors on rectifier and APU cable assembly must be a perfect match if replaced.

8.1. Refer to paragraph 4-39 and replace two-position connectors as required.

9. Remove setscrew (35), knob (36), rubber seal (37), washer (38), nut (39), and rotary switch (21) from plate (9). Discard rubber seal.

9.1. Refer to paragraph 4-32 and remove control box jumper wires and timer harness.

9.2 If applicable, remove nut (42), lockwasher (43), washer (44), screw (45), and glow plug timer (46).

10. Deleted.

ASSEMBLY

1. Deleted.

2. Install rotary switch (21) onto plate (9) and secure with nut (39).

3. Install rubber seal (37), washer (38), knob (36), and setscrew (35).

4. Install rectifier (19), screw (34), washer (33), lockwasher (32), and nut (31) onto housing (6).

5. Install regulator (20), two screws (30), washers (29), lockwashers (28), and nuts (27) onto housing (6).

6. Install bulkhead cable clamp (26), with APU cable assembly (18) attached, onto housing (6) and secure with nut (25). Install clamp half (24) and two screws (23) onto cable clamp (26).

7. Connect APU cable assembly (18) to rotary switch (21).

8. Connect APU cable assembly (18) to rectifier (19) and regulator (20).

8.1. Refer to paragraph 4-29 and install indicator light(s) and glow plug indicator, if applicable.

8.2. If applicable, install glow plug timer (46) and secure using screw (45), washer (44), lockwasher (43), and nut (42).

8.3. Refer to paragraph 4-32 and install control box jumper wires and timer harness.

9. Install push-pull throttle control assembly (10) as follows:

   a. Unscrew knurled nut (17) on control assembly (10) until threaded end of control assembly is accessible.

   b. Insert control assembly (10) through mounting hole on plate (9) and adjust jam nut (15) until distance between edge of jam nut (15) and end of control assembly (10) shaft measures between 0.31 - 0.38 inch (7.8 - 9.5 mm).

   c. Install housing lock (13) and nut (12) from rear of panel (9) to secure front portion of control assembly (10).

   d. Screw knurled nut (17) back onto control assembly (10).

   e. Pass back portion of control assembly (10) with throttle cable (16) through housing (6) and connect to front portion of control assembly (10) at ball and swivel. Secure connection by tightening nut (11) on control assembly (10).

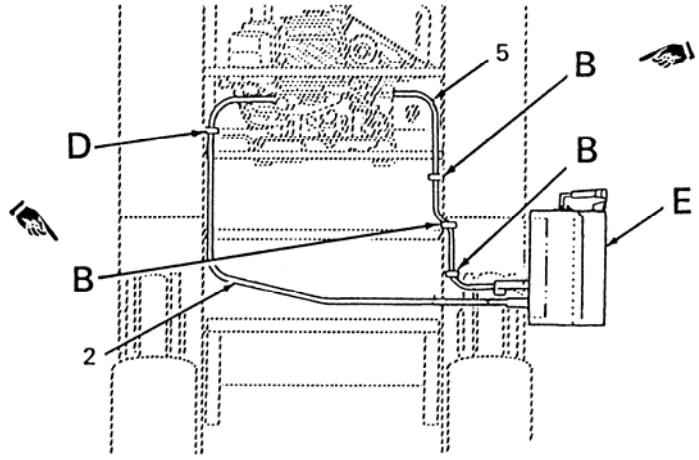
10. Install plate (9) onto housing (6) and secure with four lockwashers (8) and thread-cutting screws (7).

11. Install cover (2) onto housing (6) and secure with two screws (5), lockwashers (4), and nuts (3). Lift clamp assembly (1) and close cover (2).

4-108. APU CONTROL BOX (CONT)

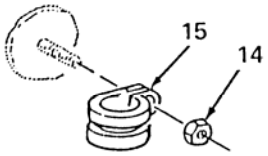
INSTALLATION

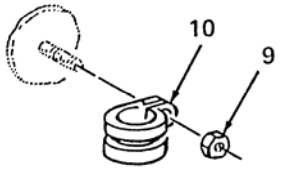
1. Install control box (19) onto gooseneck assembly and secure with two washers (18), lockwashers (17), and capscrews (16).



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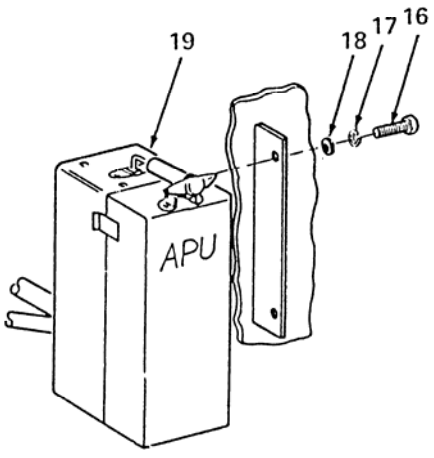
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C

11 THRU 13 DELETED

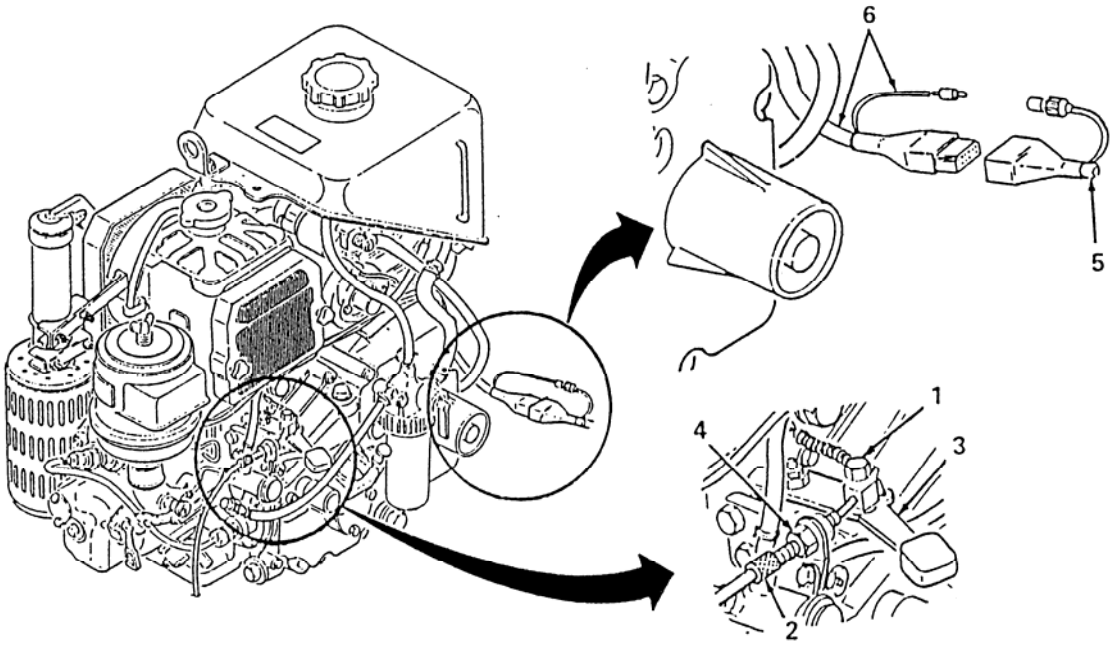


2. Install throttle cable (2) onto gooseneck assembly and secure with clamp (15) and locknut (14).

3. Install APU cable assembly (5) onto gooseneck assembly and secure with three clamps (10) and locknuts (9).

4. Connect APU cable assembly (5) to APU wiring harness (6).

5. Connect throttle cable (2) to speed control lever (3). Adjust throttle cable adjustment nut (4) and tighten bolt (1).



FOLLOW-ON MAINTENANCE

1. Start and run APU (para. 2-16).

2. Lower step assembly.

4-109. ENGINE EXHAUST

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Torque wrench, 0-170 lb-ft, item 17, appx. B

Materials/Parts

Lockwasher
Locknut (3)
Gasket

4-109. ENGINE EXHAUST (CONT)

Equipment Condition

Step assembly raised (para. 2-16)

WARNING

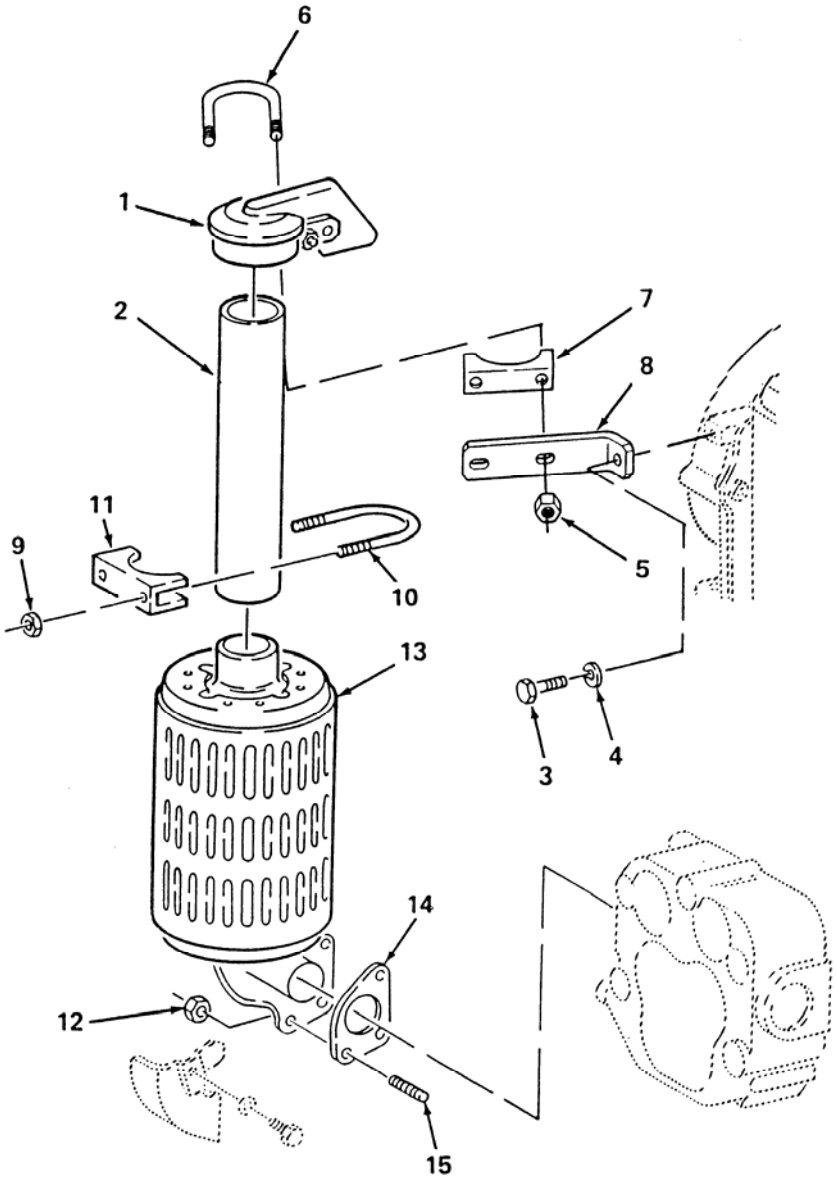
Ensure APU is cool and exhaust pipe is cool to the touch or injury to personnel may result.

REMOVAL

1. Remove cap (1) from exhaust pipe (2).
2. Remove screw (3) and lockwasher (4). Discard lockwasher.
3. Remove two nuts (5), U-bolt (6), clamp (7), and bracket (8).
4. Remove two nuts (9), U-bolt (10), clamp (11), and exhaust pipe (2).
5. Remove three locknuts (12), muffler (13), and gasket (14). Discard locknuts and gasket.
6. If necessary, remove three studs (15).

INSTALLATION

1. If removed, install three studs (15).
2. Install gasket (14), steel side toward muffler (13), muffler, and three locknuts (12). Torque nuts (12) to 17.4 - 20.3 lb-ft (23.5 - 27.5 Nm).
3. Install exhaust pipe (2), clamp (11), U-bolt (10), and two nuts (9).
4. Install clamp (7), U-bolt (6), bracket (8), and two nuts (5).
5. Install lockwasher (4) and screw (3).
6. Install cap (1) on exhaust pipe (2).



4-110. RADIATOR

This task covers: a. Removal b. Inspection c. Repair d. Installation e. Fluid fill

---

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
The following tools can be found in common tool kit no. 2, item 18, appx. B:
Compressor unit, reciprocating
Drain pan, gl
Gun, air blow
Goggles, industrial
Gloves, chemical and oil protective

4-110. RADIATOR (CONT)

Materials/Parts

Antifreeze, item 2, appx. E
Sealant, item 20, appx. E
Thread locking compound, item 21, appx. E
Gasket
Gasket
Lockwasher (4)

Equipment Condition

Fan dynamo removed (para. 4-112)

General Safety Instructions

WARNING

Ethylene glycol is toxic to skin, eyes, and respiratory tract. Avoid skin and eye contact. Good general ventilation is normally adequate.

REMOVAL

WARNING

When hot, radiator temperature can exceed 210°F (100°C) and maintain pressure up to 16 psi (108 kPa). Do not open radiator while hot or injury to personnel may result.

1. Using drain pan, drain radiator (1) by removing radiator cap (2) and opening drain cock (3) on cylinder head (4).

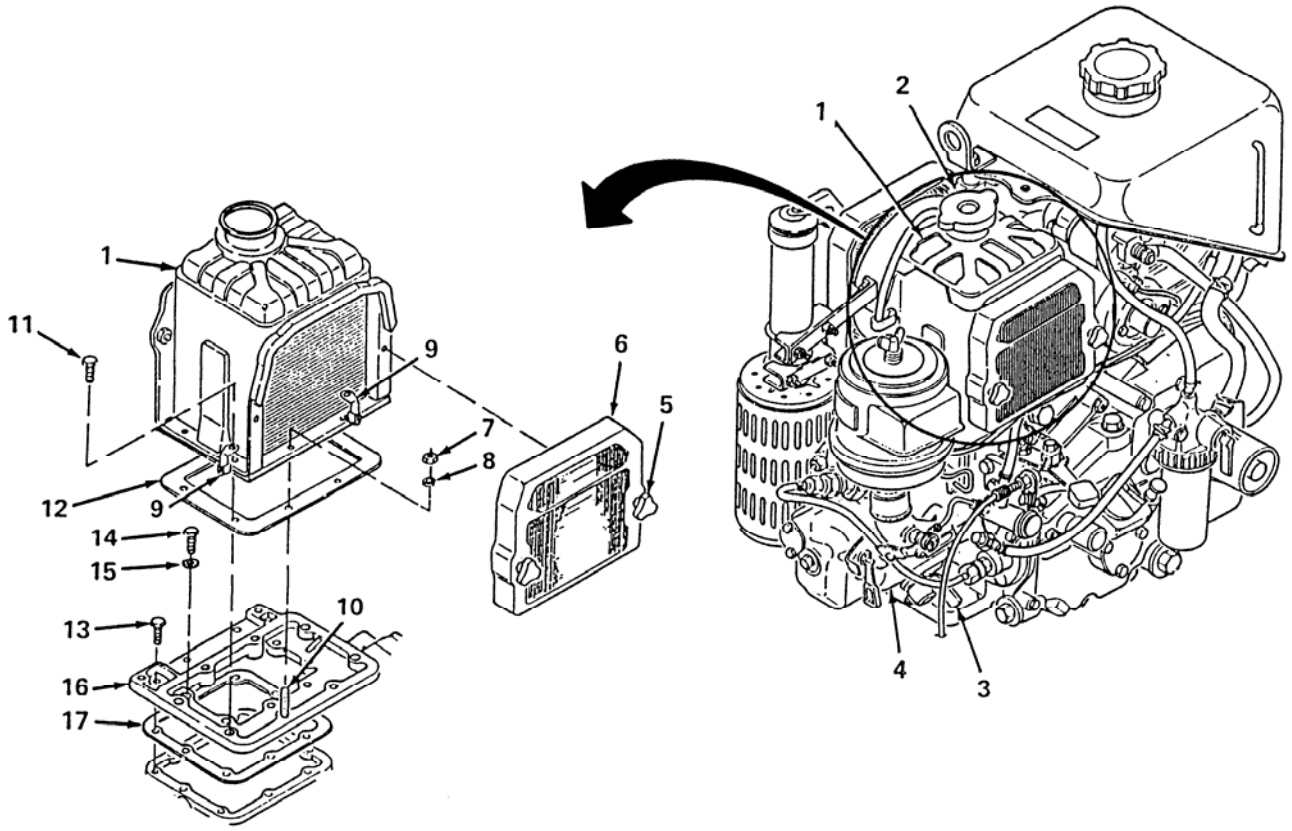
2. Loosen two captive thumbscrews (5) and remove shroud (6).

3. Remove three nuts (7), lockwashers (8), and retaining strap (9) from three studs (10). Discard lockwashers.

4. Remove four bolts (11), retaining strap (9), radiator (1), and gasket (12). Discard gasket.

5. Remove four bolts (13), eight bolts (14), washers (15), radiator base plate (16), and gasket (17) from crankcase (18). Discard gasket.

6. If necessary, remove three studs (10) from radiator base plate (16).



INSPECTION

1. Inspect radiator (1) for bent or missing fins and excessive dirt that could inhibit flow of air to cooling fins.

2. Inspect radiator (1) and block interior for excess scaling and corrosion.

REPAIR

WARNING

To avoid eye or skin injury, do not clean with compressed air in excess of 30 psi (207 kPa). Wear goggles or face shield.

1. Straighten fins and clean radiator fins with compressed air.

2. If radiator is corroded, flush cooling system with hot water.

INSTALLATION

1. Apply thread locking compound to three studs (10) and install three studs in radiator base plate (16).

4-110. RADIATOR (CONT)

2. Apply sealant to both surfaces of gasket (17) and install gasket, radiator base plate (16), six washers (15), bolts (14), and four bolts (13) on crankcase (18).

3. Apply sealant to both surfaces of gasket (12) and install gasket, radiator (1), retaining strap (9), and four bolts (11).

4. Install retaining strap (9), three lockwashers (8), and three nuts (7) onto three studs (10).

5. Install shroud (6) and tighten two captive thumbscrews (5).

6. Close drain cock (3) and replace radiator cap (2).

FLUID FILL

1. Remove radiator cap (2).

2. Fill radiator (1) with 1.3 quarts (1.2 l) of 70/30 mixture (70 percent antifreeze and 30 percent water).

3. Install radiator cap (2).

4-111. FAN BELT

This task covers: a. Removal b. Adjustment c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

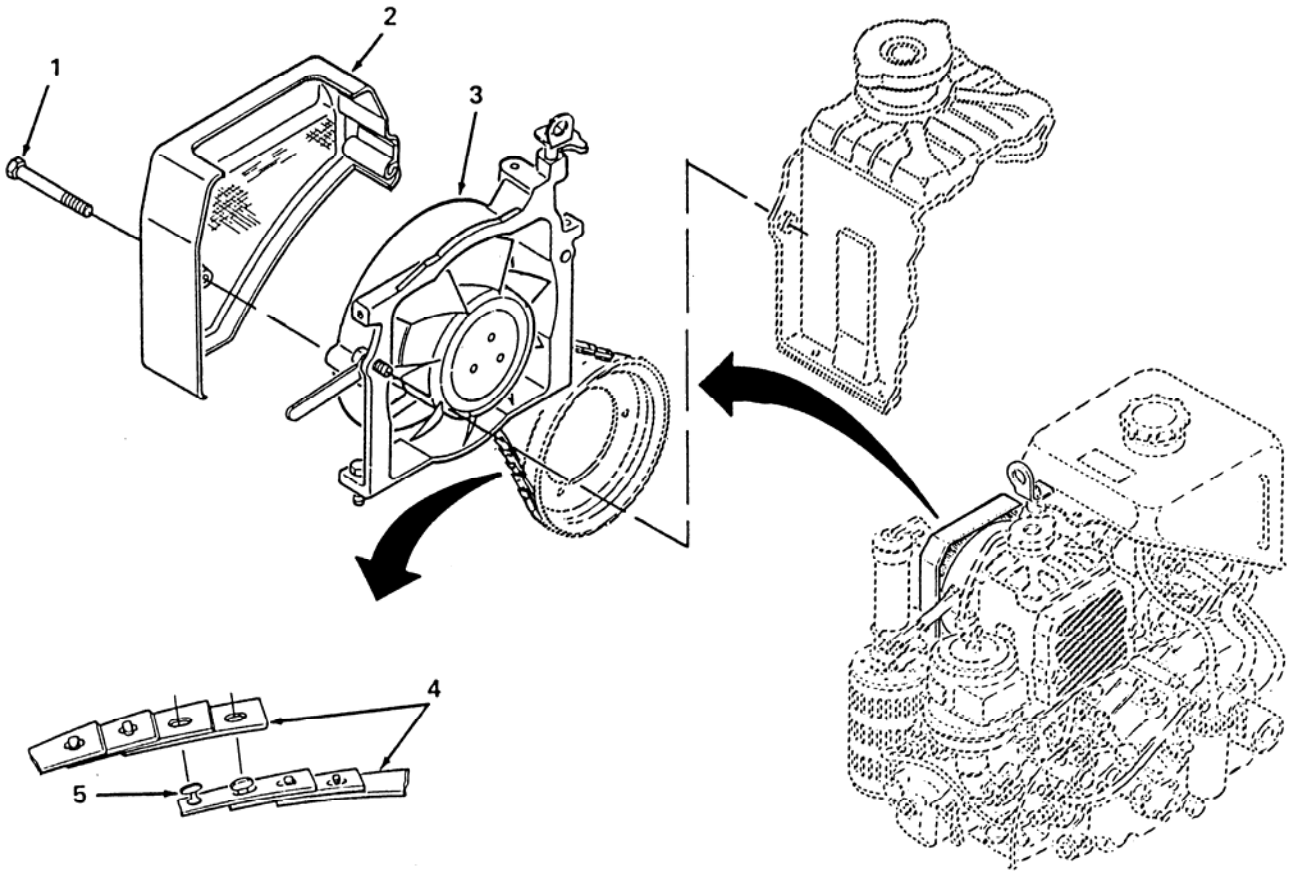
Personnel Required: 2

Equipment Condition

Starter removed (para. 4-114)
APU wiring harness disconnected from fan dynamo (para. 4-39)
Hydraulic tank removed (para. 4-94)

REMOVAL

1. Remove two bolts (1) and fan cover (2) from fan dynamo (3).



CAUTION

Use caution when removing fan belt so as not to lose or catch belt lock pins in the flywheel or flywheel housing or damage to equipment and unnecessary work may result.

2. Using two people and manual handcrank, slowly turn motor over while carefully prying belt (4) off of fan pulley with screwdriver.

3. Turn two locking tabs (5) 90 degrees so that tabs are parallel with belt (4). Pry top layer of belt off of one locking tab. Pry remaining belt layer off of two locking tabs.

4. Remove belt (4).

ADJUSTMENT

1. If belt has excessive play from previous inspections, belt must be adjusted.

NOTE

Recommended belt length is 43 links. Inside of belt points to the direction of travel of the belt.

2. Turn one tab and pry one link off of belt if necessary.

4-111. FAN BELT (CONT)

3. Turn any number of locking tabs needed to remove same number of links. Reassemble belt and check tension of belt after installation.

INSTALLATION

CAUTION

Ensure inner belt links are facing counterclockwise during installation or belt will be improperly installed, causing excess belt slippage.

1. Slide belt (4) around flywheel pulley. Re-attach links to two locking tabs (5) and turn both locking tabs 90 degrees to secure belt.

2. Using handcrank, slowly turn engine over and carefully pull belt (4) over fan pulley.

3. Install fan cover (2) on fan dynamo (3) and secure with two bolts (1).

FOLLOW-ON MAINTENANCE

1. Start and run APU.

2. Check electrical connections (para. 2-16).

4-112. FAN DYNAMO

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

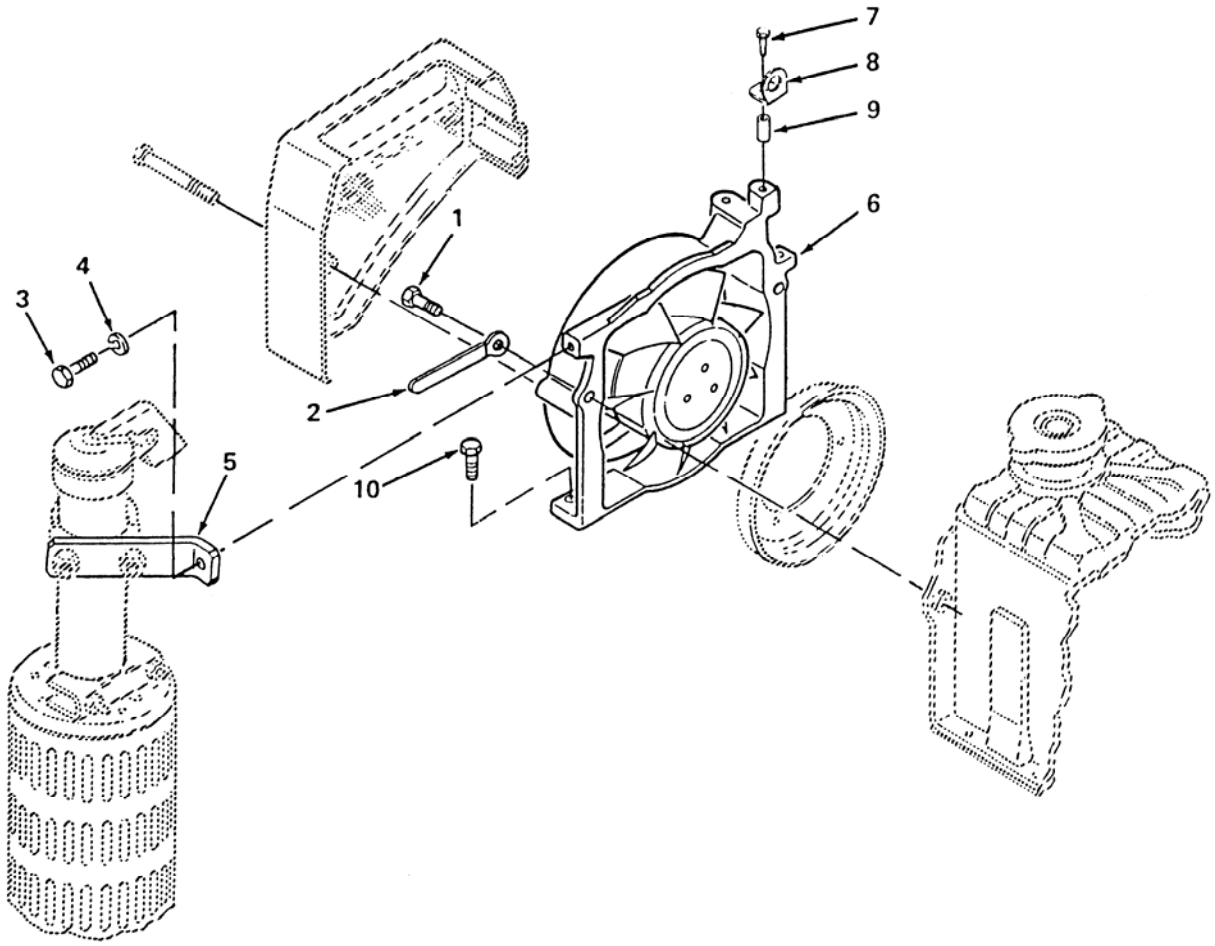
Lockwasher
Lockwasher

Equipment Condition

APU removed (para. 4-96)
Starter removed (para. 4-114)
APU wiring harness disconnected from fan dynamo (para. 4-39)
Hydraulic tank removed (para. 4-94)
Fan belt removed (para. 4-111)

REMOVAL

1. Remove two bolts (1) and retaining strap (2).



2. Remove bolt (3) and lockwasher (4) to disconnect bracket (5) from fan dynamo (6). Discard lockwasher.

3. Remove bolt (7), lifting eye (8), and spacer (9).

4. Remove two bolts (10) and fan dynamo (6).

INSTALLATION

1. Install fan dynamo (6) and two bolts (10).

2. Install spacer (9), lifting eye (8), and bolt (7).

3. Connect bracket (5) to fan dynamo (6) and secure with lockwasher (4) and bolt (3).

4. Install retaining strap (2) and two bolts (1).

4-112. FAN DYNAMO (CONT)

FOLLOW-ON MAINTENANCE

1. Start and run APU (para. 2-16).

2. Check electrical connections (para. 2-16).

4-113. APU JUMP START SYSTEM

This task covers: a. Removal c. Installation
b. Inspection d. Preoperational Check

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Electrical repair kit, item 18, appx. B

Materials/Parts

Grommet (2)
Locknut (2)
Locknut (4)
Lockwasher (1)
Lockwasher (1)
Lockwasher (1)
Wiping rag, item 19, appx. E

Personnel Required: 2

Equipment Condition

Parked on level ground, gooseneck supported if uncoupled, and wheels chocked (para. 2-24)

REMOVAL

WARNING

Disconnect power source before performing any corrective maintenance actions. Do not wear watches and jewelry while working on battery or other electrical components. Always disconnect negative (-) cable first and connect it last or injury to personnel may result. Make sure polarity (red (+) and black (-) is not reversed.

CAUTION

Some semitrailers have solar battery charger leads connected to negative and positive battery terminals. Ensure these leads are not damaged when disconnecting terminals from battery posts.

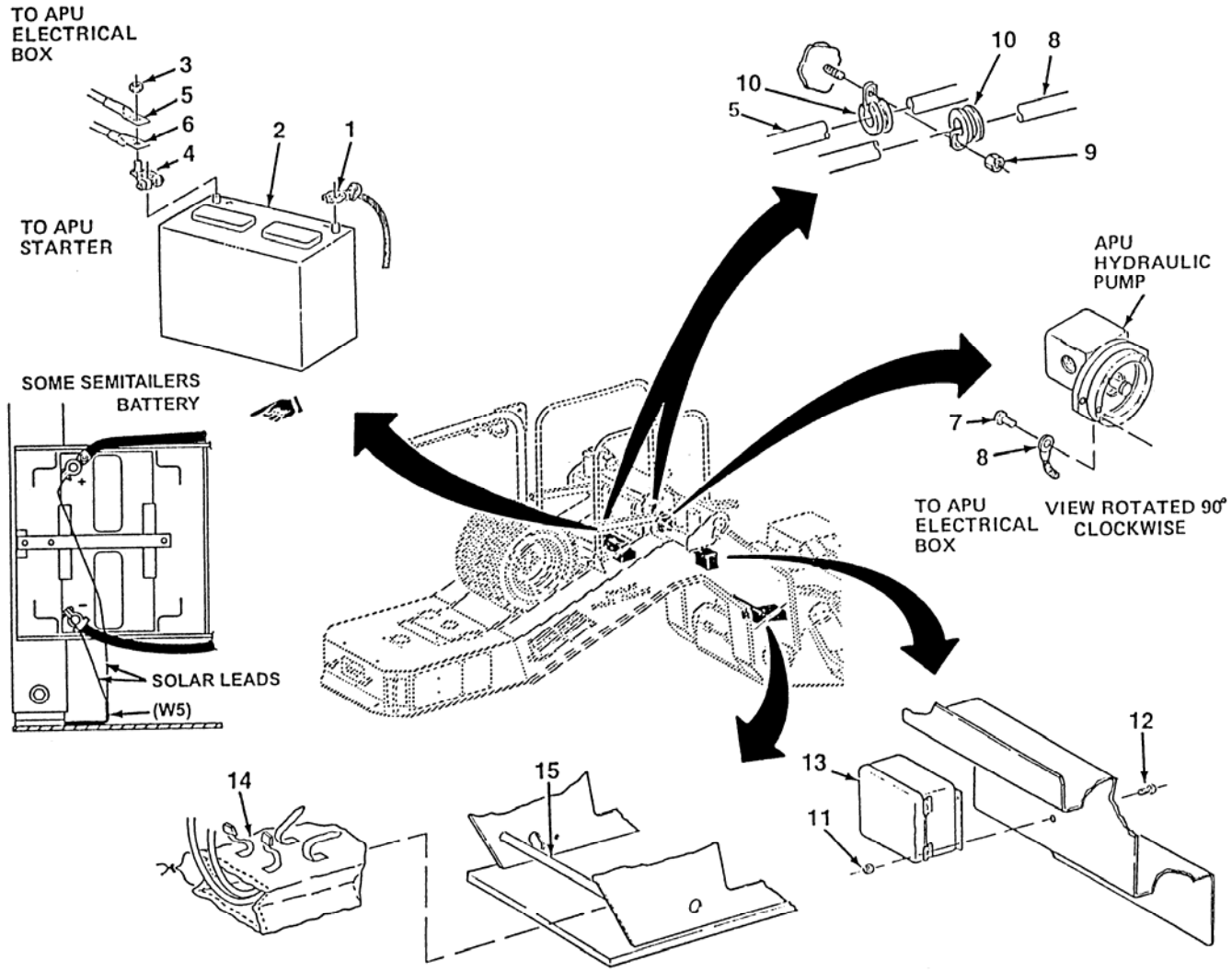
1. Tag and disconnect negative (-) cable (1) from negative (-) pole on battery (2).

2. Remove nut (3) from terminal (4) on positive (+) pole on battery (2) and tag and remove positive (+) cables (5 and 6) from terminal (4).

NOTE

If a fault is limited to the APU jump start system's electrical box, the existing cable which connects the battery and APU starter can be left installed so that the semitrailer is still mission ready.

3. If necessary, reconnect positive (+) cable (6), which connects battery to APU starter, onto terminal (4) on positive (+) post of battery and secure with nut (3).



4-113. APU JUMP START SYSTEM (CONT)

4. Remove bolt (7) and tag and remove cable (8) from streetside of APU hydraulic pump. Reinstall and tighten bolt (7).

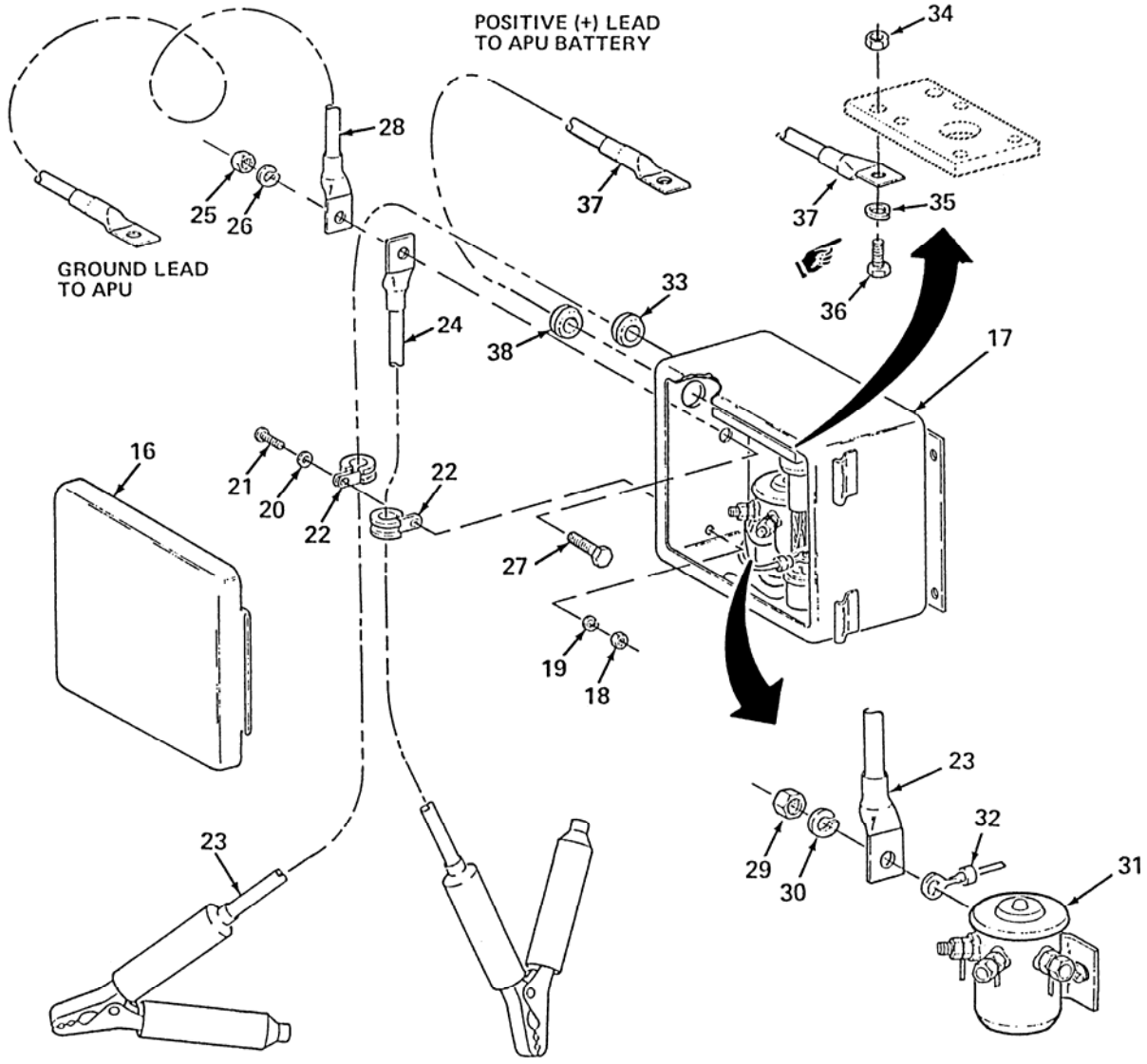
5. If semitrailer is needed for a mission, connect negative (-) cable (1) to negative (-) pole on battery (2). If not needed for a mission, proceed to step 6.

6. Remove two locknuts (9) and four cable clamps (10) from cables (5 and 8). Discard locknuts.

7. Remove four locknuts (11) and bolts (12) and remove electrical box (13) from gooseneck. Discard locknuts.

8. Using two people, remove bag (14) from crossbar (15) with jump start cables still coiled in bag, for ease of transport.

9. Remove cover (16) from electrical box (17).



10. Remove nut (18), lockwasher (19), washer (20), screw (21), and two cable clamps (22) from cables (23 and 24). Discard lockwasher.

11. Remove nut (25) and lockwasher (26) from bolt (27). Tag and remove cables (24 and 28). Remove bolt (27) and tag and remove wire. Discard lockwasher.

12. Remove nut (29) and lockwasher (30) from stud #4 of solenoid (31). Tag and remove cable (23) and jumper (32). Retain lockwasher. Remove and discard grommet (33).

13. Remove nut (34), lockwasher (35), and capscrew (36) from cable (37) and electrical box (17). Tag and remove cable (37) and grommet (38). Discard lockwasher and grommet.

INSPECTION

1. Inspect cables for corrosion, frayed or broken wires, and defective terminal lugs and battery clamps. If corroded, clean as required by wiping with a wiping rag. If loose, remove and replace terminal lugs as required using electrical repair kit. If defect exists, use electrical repair kit and replace defective terminal lug, battery clamp, and/or wiring harness.

2. Inspect for damage to protective covering and missing or unreadable wire markers. If defect exists, replace markers as required.

3. Inspect jumper wires for frayed or broken wires and loose terminal lugs. If defect exists, replace defective terminal lugs using electrical repair kit or replace entire jumper wire assembly.

INSTALLATION

1. Insert cable (37) and grommet (38) into electrical box (17).

2. Attach cable (37) with capscrew (36), lockwasher (35), and nut (34).

3. Insert grommet (33) and cable (23) into electrical box (17).

4. Reconnect jumper (32) and cable (23) to stud #4 of solenoid (31) and secure with lockwasher (30) and nut (29).

5. Reconnect wire to bolt (27) and insert bolt (27) through side of electrical box (17).

6. Attach cables (24 and 28) to bolt (27) and secure with lockwasher (26) and nut (25).

7. Install two cable clamps (22) to cables (23 and 24) and secure with screw (21), washer (20), lockwasher (19), and nut (18).

8. Install cover (16) to electrical box (17).

4-113. APU JUMP START SYSTEM (CONT)

WARNING

Disconnect power source before performing any corrective maintenance actions. Do not wear watches and jewelry while working on battery or other electrical components. Always disconnect negative (-) cable first and connect it last or injury to personnel may result. Make sure polarity (red (+) and black (-) is not reversed.

CAUTION

Some semitrailers have solar battery charger leads connected to negative and positive battery terminals. Ensure these leads are not damaged when disconnecting terminals from battery posts.

9. If necessary, tag and disconnect negative (-) cable (1) from negative (-) pole of battery (2).

10. Using two people, secure bag (14) to crossbar (15) with straps. Ensure bag opening is facing toward front of gooseneck.

11. Aline and install electrical box (13) to underside of gooseneck step and secure with four bolts (12) and locknuts (11).

12. Secure cables (5 and 8) to inner gooseneck wall with four cable clamps (10) and two locknuts (9).

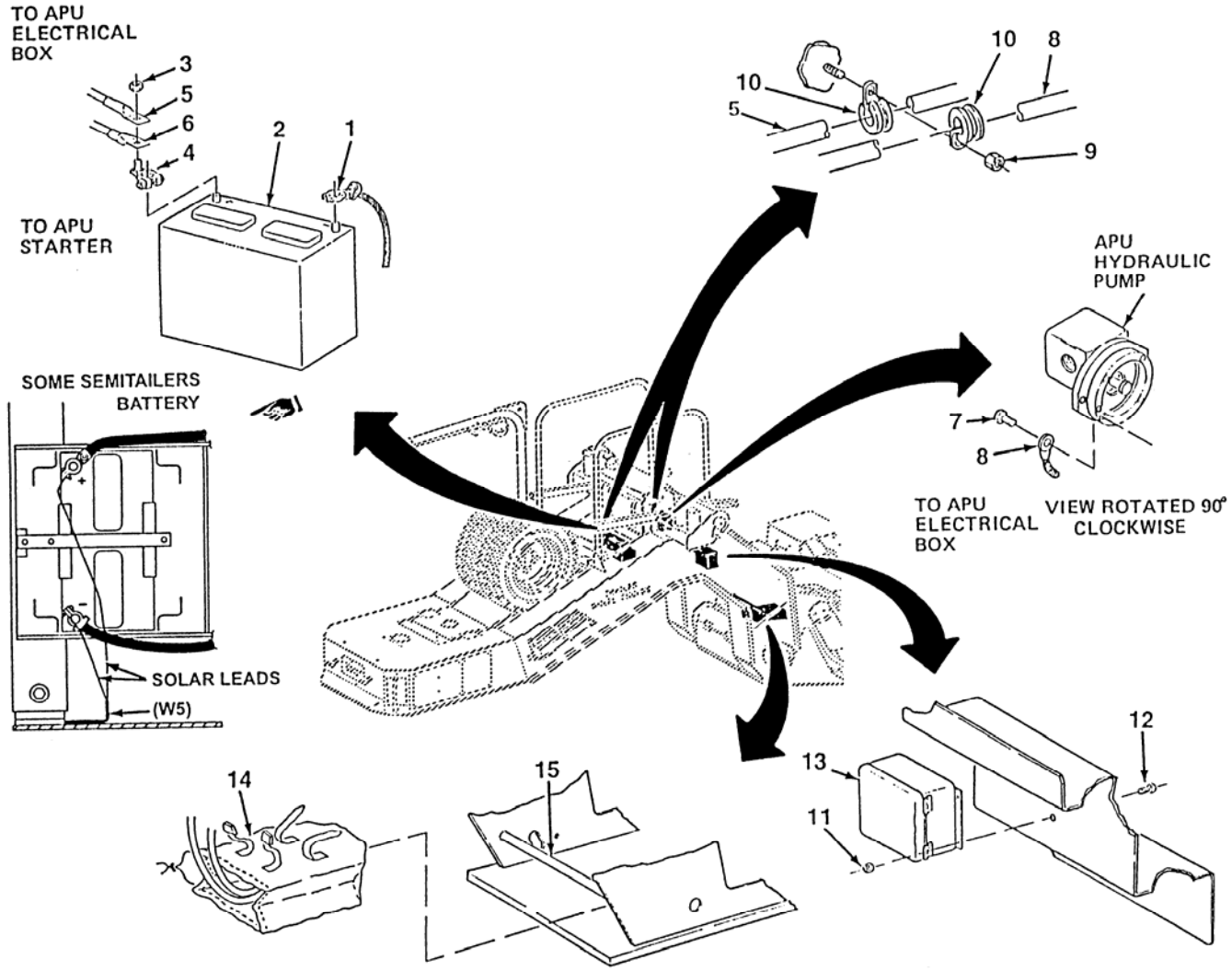
13. Remove bolt (7) from streetside of APU hydraulic pump. Install cable (8) with bolt (7) to streetside of APU hydraulic pump.

CAUTION

Take care not to exceed torque when installing nut. Threaded post on terminal is soft material and threads will strip easily causing damage to equipment.

14. Remove nut (3) from terminal (4) on positive (+) post of battery (2). Leave existing cable on terminal and install positive (+) cable (5) on terminal (4) and secure with nut (3). Torque nut (3) to 10 - 12 lb-ft (13.5 - 16.3 Nm).

15. Reconnect negative (-) cable (1) to negative (-) pole of battery (2).



PREOPERATIONAL CHECK

NOTE

The following is a preoperational check of the APU jump start system.

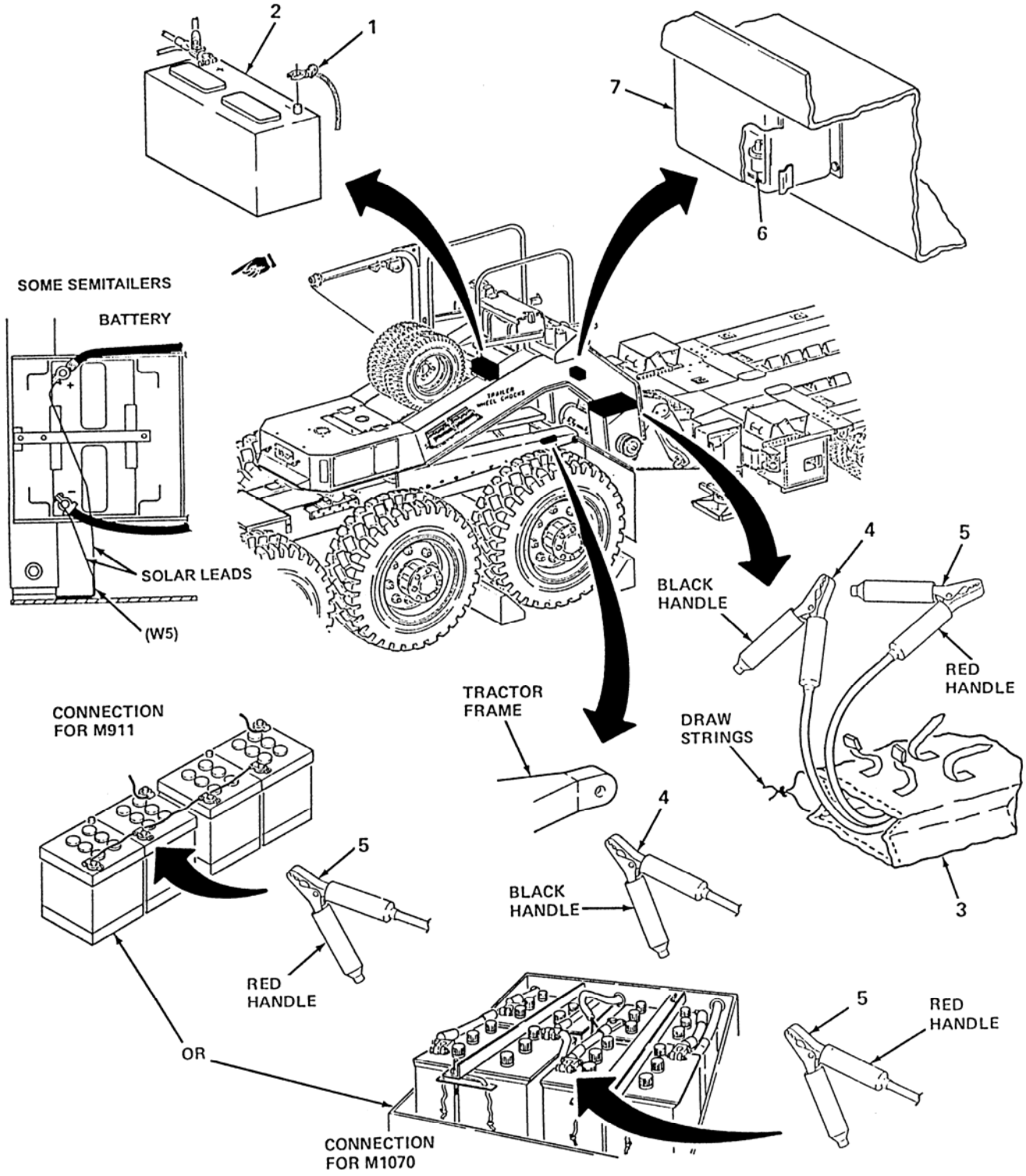
1. If tractor is coupled to trailer, start tractor engine and open battery box. If tractor is not coupled to tractor trailer, drive tractor to a point near gooseneck where tractor batteries can be easily reached. Keep tractor engine running and open battery box.

CAUTION

Some semitrailers have solar battery charger leads connected to negative and positive battery terminals. Ensure these leads are not damaged when disconnecting terminals from battery posts.

4-113. APU JUMP START SYSTEM (CONT)

2. Disconnect negative (-) cable (1) from negative (-) pole of battery (2).



3. Loosen drawstring of cable storage bag (3) and pull out jumper cables (4 and 5). Negative (-) cable (4) is approximately 9 ft (2.75m) in length and has a black clamp on end. Positive (+) cable (5) is approximately 28 ft (8.5m) in length and has a red clamp on end.

4. Positive (+) cable (5) must be connected to 12 Vdc terminal on parallel side of tractor's series/parallel battery installation to be used to jump start APU.

5. Connect negative (-) cable (4) to frame of tractor and ensure a good connection.

6. Press switch (6) on electrical box (7) and listen for the following:

a. If system is installed correctly, an audible click will be heard as solenoid engages when switch (6) is pushed on electrical box (7).

b. If system is installed incorrectly or jumper cables receive improper voltage, solenoid will not engage and APU starter will not function.

7. Disconnect negative (black) clamp (-) on cable (4) from tractor chassis and positive (red) clamp (+) on cable (5) from positive (+) terminal of tractor battery and restore in stowage bag (3).

8. Reconnect negative (-) cable (1) to negative (-) pole of APU battery (2).

4-114. STARTER

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

Tiedown straps (as required), item 27, appx. E
Lockwasher

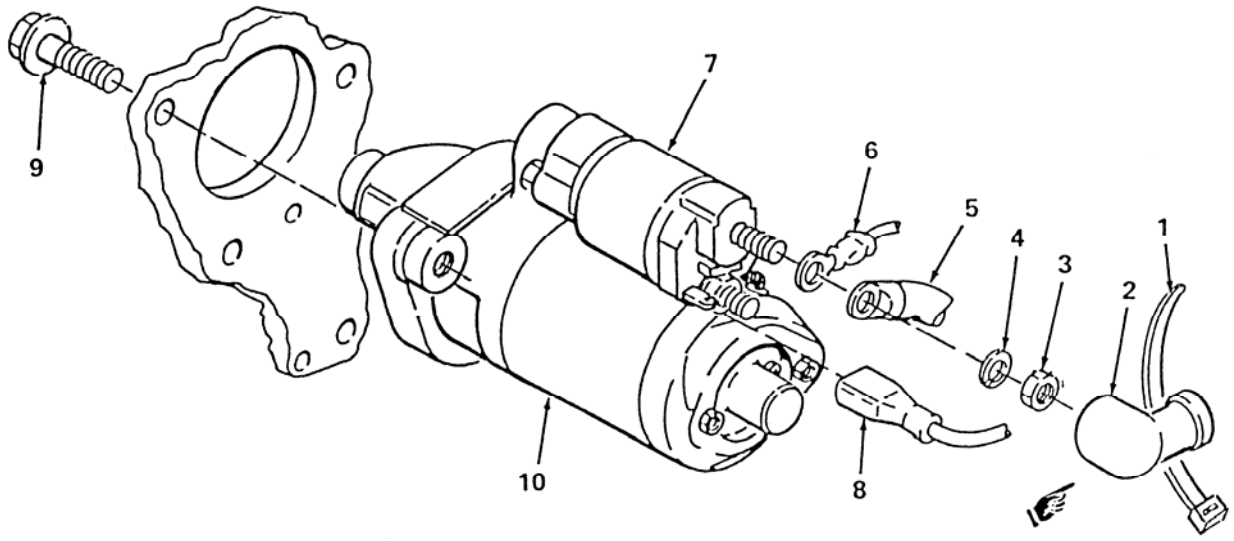
Equipment Condition

Battery cables disconnected at battery (para. 4-30)

4-114. STARTER (CONT)

REMOVAL

1. If applicable, remove tiedown strap (1) and pull terminal cover (2) back. Remove nut (3) and lockwasher (4) and disconnect battery cable (5) and starter (hot) wire (6) from solenoid (7). Discard lockwasher.
2. Disconnect starter wire (8) from solenoid (7).
3. Remove two bolts (9) and remove starter assembly (10).



INSTALLATION

1. Install starter assembly (10) and secure with two bolts (9).
2. Reconnect starter wire (8) to solenoid (7).

CAUTION

Take care not to exceed torque when installing nut. Threaded post on terminal is soft material and threads will strip easily causing damage to equipment.

3. Connect starter (hot) wire (6) and battery cable (5) to solenoid (7). Install lockwasher (4) and nut (3). Torque nut (3) to 6 - 8 lb-ft (8.2 - 10.9 Nm). Push terminal cover (2) over nut and secure with tiedown strap (1).

FOLLOW-ON MAINTENANCE

Start and run APU (para. 2-16).

Section VII. PREPARATION FOR STORAGE OR SHIPMENT

PARA. NO.	TITLE
4-115	General
4-116	Storage and Shipment Materials
4-117	Preparation Procedures
4-118	BII Preparation
4-119	Stowage Procedures
4-120	APU Preparation
4-121	Beacon Warning Light

4-115. GENERAL

These procedures cover the processing of the semitrailer prior to storage or shipment to Level A or Level B as required. Determination of the level of protection required is made based on the following criteria:

Level A - Processing for domestic or overseas shipments and any storage outside of buildings in excess of 90 days from date of processing with periodic care and preservation during storage required.

Level B - Limited processing for immediate shipment and use, domestic or overseas, excluding open-deck loading, and for any storage not to exceed 90 days from date of processing.

4-116. STORAGE AND SHIPMENT MATERIALS

Materials required for storage and shipment of the semitrailer are listed in table 4-1. These items are in addition to those listed in appendix E.

Table 4-1. Storage and Shipment Materials

Item	Specification	Description
1	MIL-B-117	Bag, Type I, Class B, Style 2
2	MIL-B-121	Barrier material, greaseproofed, waterproofed, flexible
3	PPP-B-636	Box, shipping, fiberboard, Type CF, Grade W6C, Class WR, weather-resistant
4	PPP P-291	Cushion, cardboard
5	PPP-B-601	Box, wood, nailed, Style 1, Grade B, Type 3, load size 63-1/2 inches x 24 inches x 13 inches, with four lumber strips across width of box.
6	-	Plywood, Grade CDX, 1/2-inch thick.

4-116. STORAGE AND SHIPMENT MATERIALS (CONT)

Table 4-1. Storage and Shipment Materials - CONT

Item	Specification	Description
7	MIL-L-21260	Preservative oil, Grade PE 10-1
8	MIL-L-21260	Preservative oil, Grade 30
9	MIL-C-16173	Preservative, Grade 4
10	QQ-S-781	Strapping, steel and seals, Type I, Class I, Finish A, 1-1/4 inch wide, 0.031 inch thick
11	QQ-S-781	Strapping, steel and seals, Type I, Class I, Finish B, 3/4 inch wide, 0.035 inch thick
12	UU-T-81	Tag, shipping, paper, Type B, Size 6
13	PPP-T-60 or MIL-T-22087	Tape, packaging, waterproof, Type III, Class I. Tape, packaging, waterproof, Type II.

4-117. PREPARATION PROCEDURES

NOTE

These procedures apply to both Level A and Level B.

The semitrailer weldment and BII mounted on the semitrailer require very little surface preparation since many of the surfaces are painted. However, due to extensive use and handling, some paint chipping will occur, allowing rust and/or corrosion to start. All BII and painted surfaces of the semitrailer must be thoroughly cleaned to remove all rust and corrosion, and touch-up paint applied as needed to restore surface protection.

a. Remove all rust and corrosion from semitrailer weldment surfaces and trailer-mounted BII, using a wire brush (item 16, appx. B), crocus cloth (item 6, appx. E), and general purpose detergent (item 8, appx. E) and water.

b. Thoroughly wash semitrailer and allow to dry.

c. Spot paint surface areas where paint has worn or chipped off.

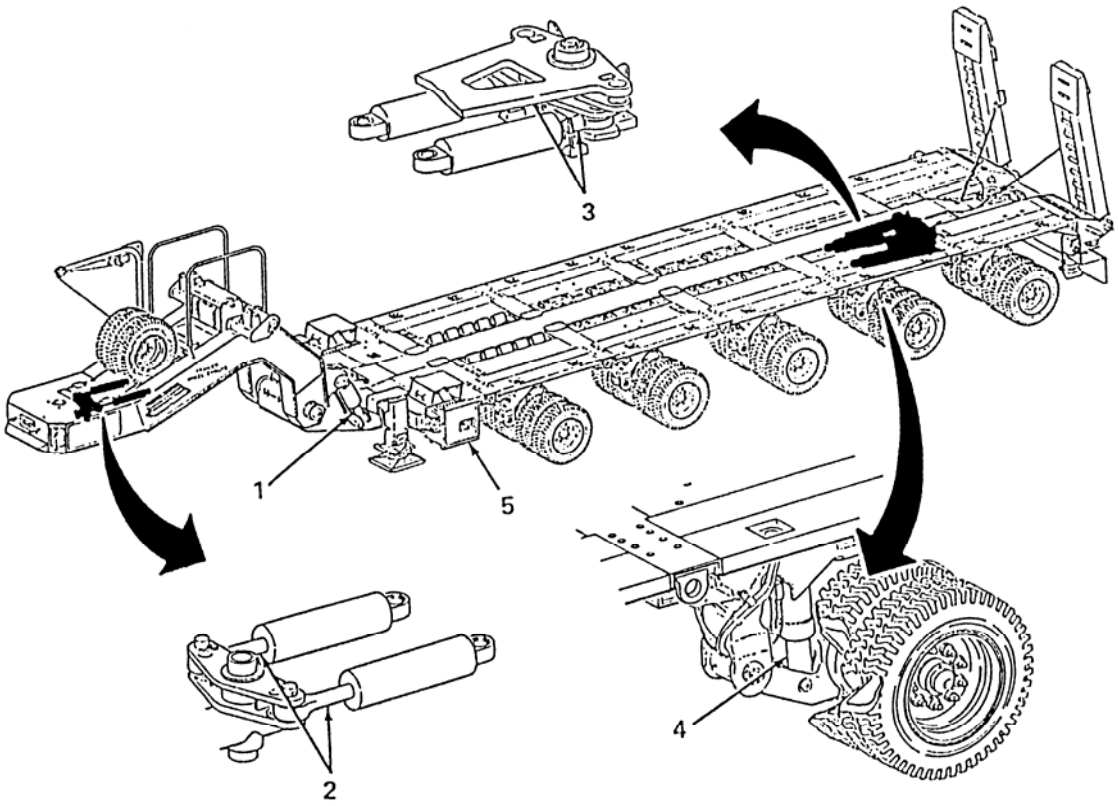
d. Perform semiannual lubrication of entire semitrailer (para. 3-3).

e. Lower front and rear support legs (para. 2-22 and 2-23). Apply grease (item 12, appx. E) to all exposed bare metal surfaces. Return all support legs to stowed position (para. 2-22 and 2-23).

NOTE

Grease should be applied to exposed metal surfaces of all hydraulic cylinders, but only after final deck height adjustment has been made as described in paragraph 4-119.

f. Apply grease (item 12, appx. E) to all exposed bare metal surfaces on two gooseneck pivot cylinders (1), gooseneck steering cylinders (2), and platform steering cylinders (3).



g. Apply grease (item 12, appx. E) to all exposed metal surfaces on 10 suspension cylinders (4).

CAUTION

Do not apply tape directly to bare polished metal surfaces. Attempts to remove any residue left from tape may cause damage to polished surface.

h. For long-term storage, shield exposed bare metal rods with barrier material (item 2, table 4-1) and secure with tape (item 13, table 4-1). Make sure tape does not contact exposed bare metal surfaces.

4-118. BII PREPARATION

NOTE

The BII components require very little surface preparation since many of the surfaces are painted. However, due to extensive use and handling, some paint chipping will occur, allowing rust and/or corrosion to start. All items must be thoroughly cleaned to remove all rust and corrosion, and touch-up paint applied as needed to restore surface protection.

These procedures apply to both Level A and Level B. Each item, as it is prepared, must be tagged for identification.

a. Remove all BII items from platform stowage compartment (5) and inventory against appendix C listings.

b. Remove all rust and corrosion from BII using a wire brush (item 16, appx. B), crocus cloth (item 6, appx. E), general purpose detergent (item 8, appx. E), and water.

c. Spot paint surface areas where paint has worn and/or chipped off.

d. Coil all chain assemblies as small as possible and identify and tag (item 12, table 4-1) each chain. Wrap each chain with cardboard cushion (item 4, table 4-1) and secure with tape (item 13, table 4-1).

e. Place each shackle in a bag (item 1, table 4-1) and heat seal bag.

f. Wrap individual ends of crowbar, IS0L handle extension bar, and wrecking bar with cardboard cushion (item 4, table 4-1) and secure with tape (item 13, table 4-1).

g. Coil manila rope to approximately 10-inch (25 cm) diameter. Place rope in a bag (item 1, table 4-1) and heat seal bag. Place bag in a 10-1/2-inch x 10-1/2-inch x 6-inch (27 x 27 x 15-1/2 cm) fiberboard container (item 3, table 4-1) and secure with tape (item 13, table 4-1).

h. Deleted.

i. Wrap each load binder with cardboard cushion material (item 4, table 4-1) and secure with tape (item 13, table 4-1).

j. Apply preservative (item 9, table 4-1) to unpainted surfaces of the sledge hammer. Wrap head of hammer with barrier material (item 2, table 4-1) and secure with tape (item 13, table 4-1).

k. Place cheater bar in bag (item 1, table 4-1) and heat seal bag.

l. Place all remaining tools into individual bags (item 1, table 4-1). Heat seal each bag and attach identification tags (item 12, table 4-1).

m. Place TM 9-2330-381-14 and TM 9-2330-381-24P in plastic bags (item 1, table 4-1) and heat seal bags.

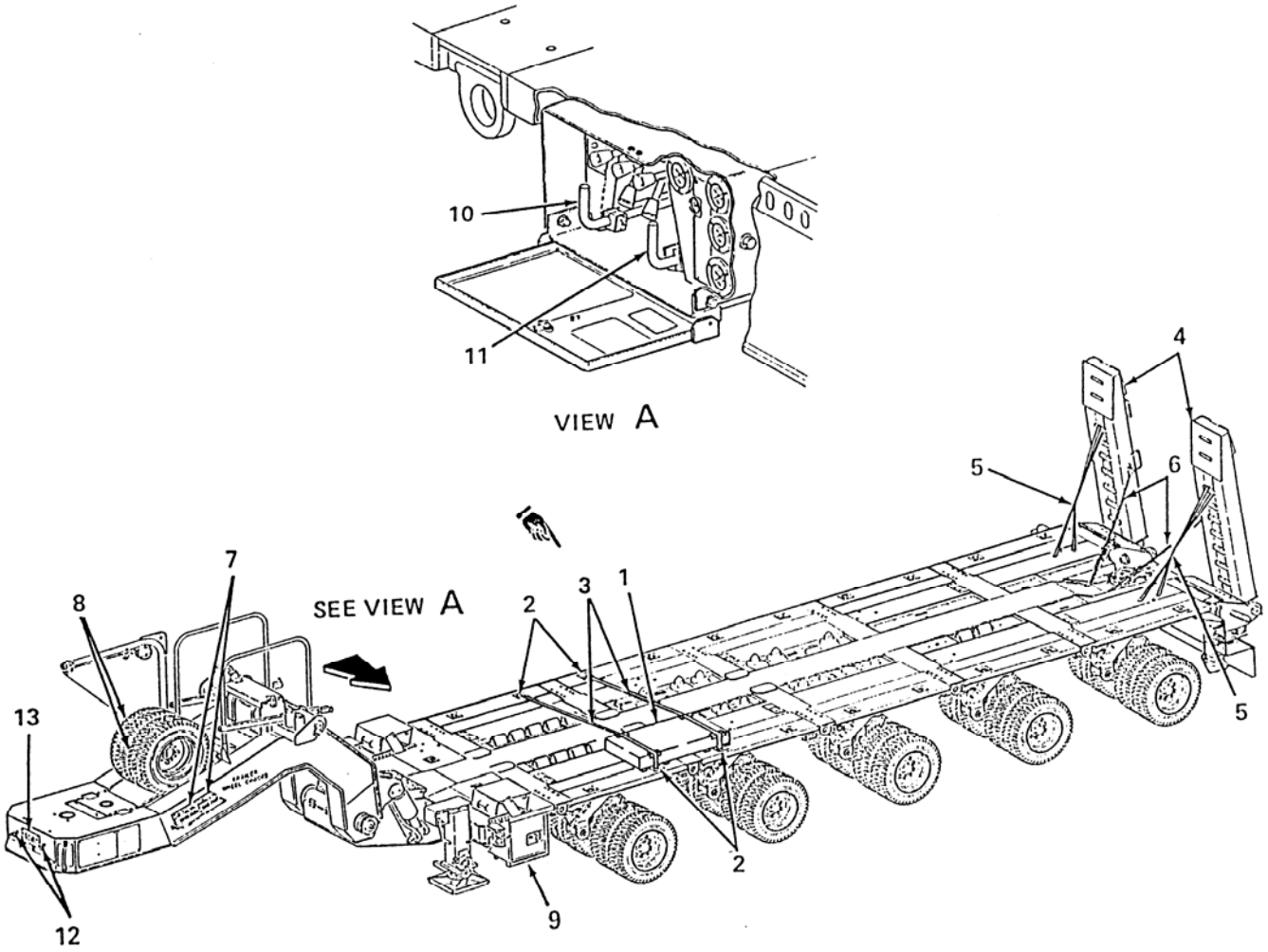
n. Prepare a wooden box (item 5, table 4-1) and place all items prepared and tagged in steps a thru m above, into box. Place cardboard cushion (item 4, table 4-1) between layers of items as they are packed into box.

4-119. STOWAGE PROCEDURES

NOTE

These procedures apply to both Level A and Level B.

a. Load BII box (1) onto semitrailer platform. Position box on streetside of semitrailer just forward of bogie #2 and inboard of the second and third tiedown rings (2). Secure BII box to platform deck with steel strapping (item 11, table 4-1) Pass strapping (3) through the streetside and curbside tiedown rings (2).



4-119. STOWAGE PROCEDURES (CONT)

b. Secure each loading ramp (4) with steel strapping (item 10, table 4-1). Pass strapping (5) through ramp support weldments and ISO container bracket mounting holes in platform deck. Make sure the ramp safety chains (6) are properly connected (para. 2-20) and load binders closed.

c. Apply steel strapping (item 11, table 4-1) around each of four wheel chocks (7) mounted on gooseneck. Wrap tape (item 13, table 4-1) around bungie cord hooks to secure hooks in place.

d. Apply steel strapping (item 11, table 4-1) around two spare tires (8) mounted on gooseneck.

e. Place vehicle log book, DD Form 1348 or DD Form 250, and DA Form 2258 in bag (item 1, table 4-1) and heat seal bag. Place bag in semitrailer stowage compartment (9).

f. For Level A, prepare a 2.5- x 20-inch (7 x 50 cm) label with 0.5-inch (1.3 cm) high letters with the following information:

   (1) Level of protection and date of processing

   (2) Gross weight and outside dimensions

   (3) Contractor's name or depot symbol and address

   (4) When processed in accordance with manufacturer's standard practice, the statement "not processed for storage" shall be added to the label.

g. Waterproof label by applying suitable waterproofing coating. For CONUS Level A, apply label near rear of semitrailer platform.

h. For overseas shipment, prepare a 6- x 20-inch (15 x 50 cm) address label with 0.75-inch (2 cm) high letters. Waterproof label with suitable waterproofing coating. Apply label near rear of semitrailer platform.

i. When semitrailer has been positioned in place at the storage site or loaded onto a shipping conveyance, lower platform to a 36-inch (91.4 cm) height (para. 2-19) and lower gooseneck to lowest position (para. 2-18). Place suspension shutoff valve (10) and gooseneck isolation valve (11) in RUN position.

j. Proceed to complete preservation procedures (para. 4-117, steps f thru h) which could not be accomplished until after final platform and gooseneck adjustments.

k. Drain all air reservoirs (para. 2-8). Apply tape (item 15, table 4-1) to gladhand connectors (12) and dummy couplings (13) to hold them in place.

l. Prepare APU for shipment (para. 4-120).

4-120. APU PREPARATION

NOTE

These procedures apply to Level A only and must be performed only after the semitrailer has been positioned in storage or on shipping conveyance and final platform and gooseneck height adjustments have been made.

a. Raise gooseneck step sections to gain access to APU (para. 2-13).

b. Drain cooling system (para. 4-110) and fill radiator with 50/50 mixture of water and antifreeze (item 2, appx. E). Run engine for 5 minutes to allow mixture to circulate properly.

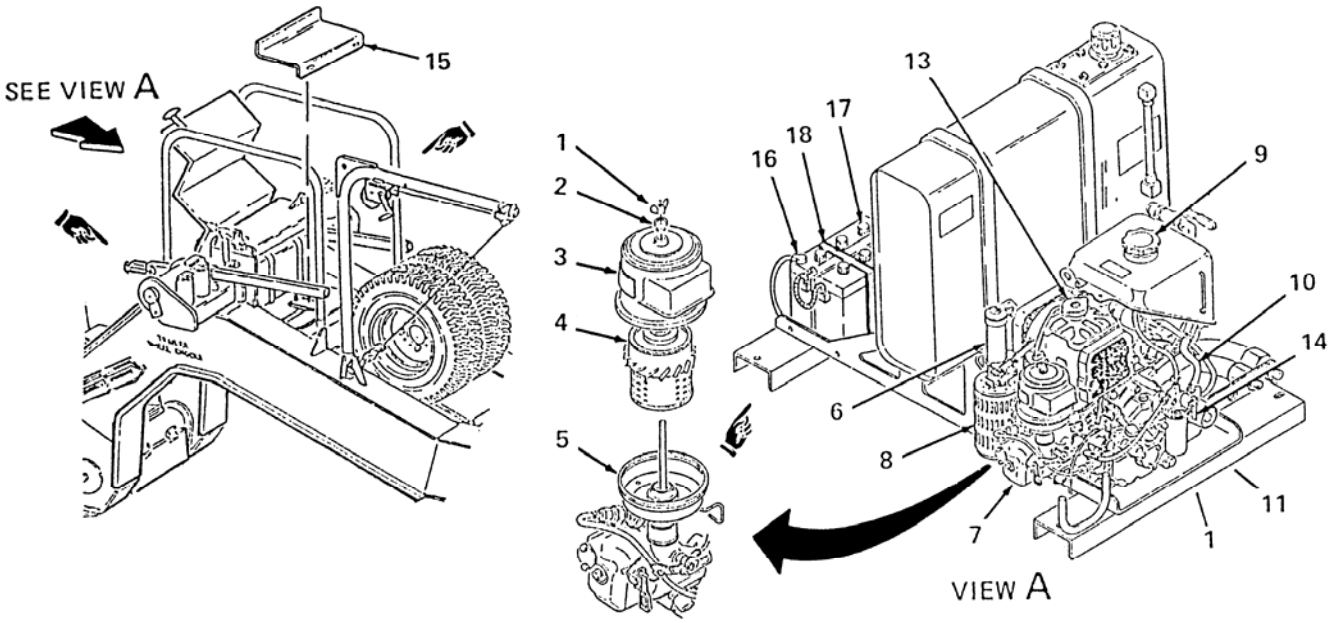
c. Drain engine oil from crankcase (para. 4-100) and refill with preservative oil (item 8, table 4-1).

d. Drain fuel tank (para. 4-104). Add 1 quart (0.95 l) of preservative oil (item 7, table 4-1). Run APU for 30 minutes; then, shut down APU (para. 2-16). Allow APU to cool.

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

e. Remove wingnut (1), grommet (2), air cleaner cover (3), and air filter (4). Spray a light coat of preservative oil (item 8, table 4-1) into air inlet (5). Seal opening of air inlet (5) with small piece of heavy paper and tape (item 13, table 4-1). Replace air filter (4), cover (3), grommet (2), and wingnut (1). Apply tape (item 13, table 4-1) to air cleaner cover (3) inlet, making sure all openings are sealed.



4-120. APU PREPARATION (CONT)

f. Remove rust and scale from exhaust pipe (6), manifold (7), and muffler (8) using a wire brush (item 16, appx. B). Apply touch-up paint to chipped and scratched surfaces. Apply tape (item 13, table 4-1) to opening of exhaust pipe (6) under rain cap.

g. Remove filler cap (9) and strainer element from fuel tank. Remove fuel supply line (10) at fuel filter (11) and drain preservative oil from tank. Lightly spray interior of fuel tank with preservative oil (item 8, table 4-1). Reinstall supply line (10).

h. Prepare tag (item 12, table 4-1): "THIS CRANKCASE FILLED TO OPERATING LEVEL WITH PRESERVATIVE LUBRICATING OIL. GOOD FOR OPERATION UNTIL FIRST REQUIRED LUBRICANT CHANGE. DO NOT DRAIN. CHECK OIL LEVEL. IF LOW, ELEVATE TO OPERATING LEVEL WITH OIL MIL-L-2104, GRADE 10W30." Attach tag to crankcase dipstick (12).

i. Prepare tag (item 12, table 4-1): "COOLING SYSTEM FILLED WITH WATER AND ANTIFREEZE SOLUTION IN EQUAL PARTS BY VOLUME. DO NOT DRAIN. CHECK COOLANT LEVEL. IF LOW, ADD COOLANT OF SAME MIXTURE." Attach tag to radiator neck (13).

j. Prepare tag (item 12, table 4-1): "FUEL SYSTEM PRESERVED WITH PRESERVATIVE OIL MIL-L-21260, GRADE PE 10-1. DRAIN FUEL LINES BEFORE OPERATING. CHANGE FUEL FILTER AFTER 1 HOUR OF OPERATION. NO FURTHER DEPROCESSING IS REQUIRED." Attach tag to fuel filter petcock (14).

k. Remove gooseneck step (15) to gain access to APU battery (para. 4-56).

l. Disconnect both battery terminals (para. 4-30). Apply preservative (item 9, table 4-1) to battery terminals. Use tape (item 13, table 4-1) to secure battery cables (16) in place away from battery. Remove filler caps (17), place pieces of barrier material (item 2, table 4-1) on top of filler holes, and then install filler caps.

m. Secure battery to APU frame with steel strapping (item 11, table 4-1) using cardboard cushion material (item 4, table 4-1) to protect battery casing from steel strapping (18).

n. Install step section (15) back on gooseneck and secure gooseneck steps over APU (para. 2-13).

4-121. BEACON WARNING LIGHT

This task covers: a. Disassembly b. Inspection c. Assembly

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B

Materials/Parts

Locknuts (3)

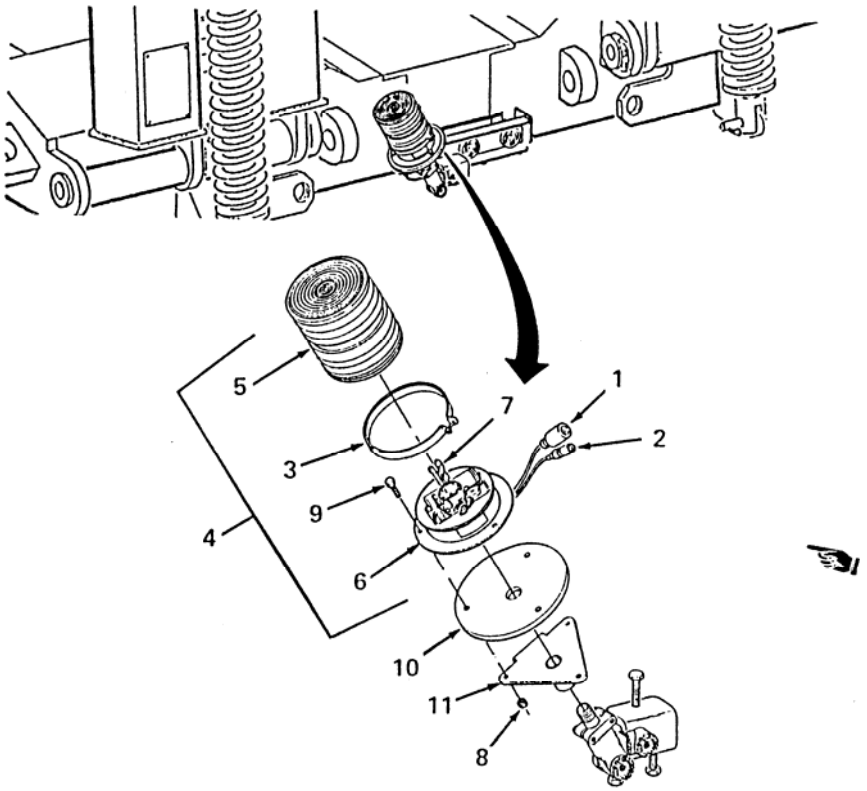
Equipment Condition

Semitrailer parked on level ground, adjusted to road height, parking brakes applied, uncoupled from tractor (para. 2-24) or coupled with intervehicular cable disconnected.

DISASSEMBLY

1. Tag and disconnect beacon warning light leads (1 and 2).

2. Loosen band clamp (3) on beacon warning light (4) and remove lens (5) and band clamp (3) from base (6).



4-121. BEACON WARNING LIGHT (CONT)

3. Remove bulb (7) from socket in base (6).

4. Remove three locknuts (8), bolts (9), light base (6), and gasket (10) from bracket (11). Discard locknuts.

INSPECTION

1. Inspect wires and socket connectors for corrosion, frayed or broken wires, and looseness. If electrical connector is defective, use electrical repair kit and replace as required. If wires are frayed or broken, replace light assembly.

2. Inspect bulb socket for corrosion or defects. Inspect internal components of light base for obvious damage or evidence of overheating. If bulb socket is corroded, clean by wiping with a clean rag. If socket cannot be cleaned, or is defective, or if internal components are defective, replace light assembly.

3. Inspect for burned out bulb. If defective, replace bulb.

4. Inspect for missing, cracked, or distorted lens and band clamp. If either is defective, replace.

5. Inspect gasket for signs of deterioration. Replace as required.

ASSEMBLY

1. Install gasket (10) and light base (6) onto bracket (11) and secure using three bolts (9) and locknuts (8). Ensure electrical leads (1 and 2) are between light base (6) and gasket (10) and pointed toward rear of trailer.

2. Install bulb (7) into socket in base (6).

3. Install lens (5) and secure with band clamp (3).

4. Connect wires (1 and 2) on beacon warning light and, if necessary, secure cable with cable tie.

FOLLOW-ON MAINTENANCE

Reconnect intervehicular electrical cable and check beacon warning light for proper operation by activating clearance lights.

CHAPTER 5

DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

SECTION NO.	TITLE
I.....	Repair Parts, Special Tools, TMDE, and Support Equipment
II.....	Direct Support Troubleshooting
III.....	Direct Support Maintenance Procedures

5-1. SCOPE

This chapter provides instructions for those tasks to be performed by direct support (DS) maintenance personnel. Also included are references for repair parts; special tools; test, measurement, and diagnostic equipment (TMDE); and support equipment.

Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

PARA. NO.	TITLE
5-2.....	Common Tools and Equipment
5-3.....	Special Tools, TMDE, and Support Equipment
5-4.....	Repair Parts

5-2. COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment, refer to the Table of Organization and Equipment (TOE) or the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

5-3. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Refer to TM 9-2330-381-24P for special tools to support the semitrailer.

5-4. REPAIR PARTS

Refer to TM 9-2330-381-24P for repair parts for the semitrailer.

Section II. DIRECT SUPPORT TROUBLESHOOTING

PARA. NO.	TITLE
5-5.....	General
5-6.....	Symptom Index
5-7.....	Troubleshooting

5-5. GENERAL

a. This section contains troubleshooting information for DS level maintenance of the semitrailer and its components. Use these troubleshooting procedures to help locate and correct faults in the equipment. For best results, perform tests, inspections, and corrective actions in the order listed.

b. Before performing DS level maintenance, verify that unit troubleshooting has been completed and a failed condition does exist. Further verify that all other indications are normal except for suspected fail condition. Once a fault has been isolated, repair or replace the failed component.

c. The troubleshooting procedures are grouped by major categories. Become familiar with these major equipment categories. Use the Symptom Index (para. 5-6) to more easily locate the fault in question.

d. These procedures cannot list all faults that may occur, nor all tests or inspections and corrective actions. If a fault should occur that is not listed, notify your supervisor.

e. If replacing the suspected faulty component does not correct fault, install the original component and notify your supervisor.

5-6. SYMPTOM INDEX

Symptom	Symptom no.
APU	
Engine does not crank over.....	1
Engine cranks but does not start.....	2
Engine runs rough.....	3
White or blue exhaust smoke is observed after warmup.....	4
Insufficient engine output "low power".....	5
Fuel mixed into lubricant oil.....	6

Symptom	Symptom no.
HYDRAULIC SYSTEM	
Platform suspension will not adjust or adjustments are sluggish...	7
Platform suspension drifts down or drops.....	8
Gooseneck will not adjust or adjustments are sluggish.....	9
Gooseneck drifts down, drops, or will not support itself.....	10
BRAKES	
Brakes grab.....	11

5-7. TROUBLESHOOTING

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

APU

1. ENGINE DOES NOT CRANK OVER

Use handcrank (item 23, appx. B), attempt to crank engine, and check for seizing.

a. If engine does not turn over and flywheel is suspected to be binding, replace flywheel (para. 5-27).

b. If above step does not correct problem, replace APU.

2. ENGINE CRANKS BUT DOES NOT START

Step 1. Visually check for leaking or loose injection pump.

If injection pump is leaking or loose, replace injection pump (para. 5-28).

Step 2. Visually check for cracks and listen for compression leaks around cylinder head or engine block.

If cracks or leaks are found, replace APU.

5-7. TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

APU - CONT

3. ENGINE RUNS ROUGH

Step 1. Check for leaking injection pump.

If injection pump is leaking, replace injection pump (para. 5-28).

Step 2. Visually check for cracks and listen for compression leaks around cylinder head or engine block.

If a leak is found, replace APU.

4. WHITE OR BLUE EXHAUST SMOKE IS OBSERVED AFTER WARMUP

Visually check for cracks and listen for leaks around cylinder head.

If a leak is found, replace APU.

5. INSUFFICIENT ENGINE OUTPUT "LOW POWER"

Check for loose or leaking injector pump.

If injector pump is loose or leaking, replace injector pump (para. 5-28).

6. FUEL MIXED INTO LUBRICANT OIL

Check for leaking injector pump.

If pump is leaking, replace injector pump (para. 5-28).

HYDRAULIC SYSTEM

7. PLATFORM SUSPENSION WILL NOT ADJUST OR ADJUSTMENTS ARE SLUGGISH

Check for leaking or damage hydraulic cylinder.

If cylinder is leaking, repair hydraulic cylinder (para. 5-25).

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

8. PLATFORM SUSPENSION DRIFTS DOWN OR DROPS

Check for evidence of leakage at suspension cylinders, line fracture valves, and gooseneck cylinders.

If cylinders are leaking, repair cylinders (para. 5-25, 5-26).

9. GOOSENECK WILL NOT ADJUST OR ADJUSTMENTS ARE SLUGGISH

If system pressure exceeds 1,500 psi (10,342 kPa) while trying to raise gooseneck (para. 2-18), check for mechanical obstructions or damage to gooseneck cylinders or gooseneck pivot.

If defective, repair gooseneck cylinder (para. 5-26) or pivot pin (para. 5-24).

10. GOOSENECK DRIFTS DOWN, DROPS, OR WILL NOT SUPPORT ITSELF

Step 1. Check for evidence of leakage at gooseneck cylinders or line fracture valves.

Repair or replace parts found defective (para. 5-23).

5-7. TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HYDRAULIC SYSTEM - CONT

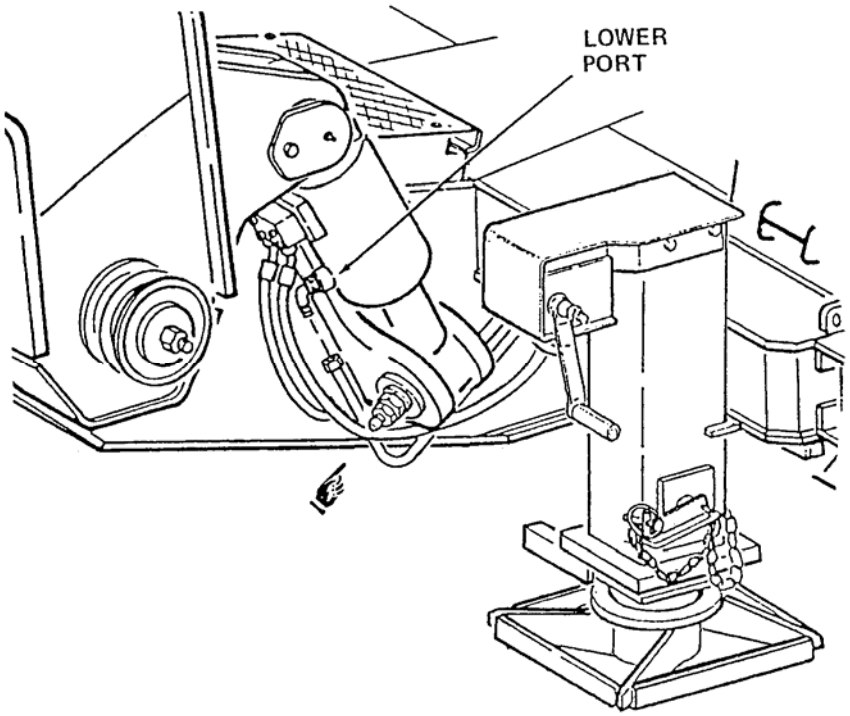
10. GOOSENECK DRIFTS DOWN, DROPS, OR WILL NOT SUPPORT ITSELF - CONT

WARNING

Be sure all four support legs are down and supporting the platform prior to checking the gooseneck isolation valve handles for proper operation or injury to personnel may result.

Step 2. Check gooseneck drift, while in ADJUST mode, by observing front suspension.

If gooseneck drifts and front suspension does not, check gooseneck cylinder for internal leakage as follows: couple tractor/semitrailer (para. 2-24), operate gooseneck isolation valve handle to RUN position (para. 2-6), close hydraulic tank shut-off valve, remove lower hose from each gooseneck cylinder and cap lines to prevent fluid loss, check cylinder port for fluid loss while watching for platform drift down, remove cap from line, reconnect hoses to cylinder, open hydraulic tank shut-off valve. If platform drifted and fluid loss from cylinder port was approximately the same rate, cylinder(s) are leaking internally. Repair gooseneck cylinder(s) (para. 5-26).



MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	BRAKES	
11. BRAKES GRAB		
	Check for excessively scored, cracked, or out-of-round brake drum.	
		If brake drum is defective, turn or replace brake drum (para. 5-11).

Section III. DIRECT SUPPORT MAINTENANCE PROCEDURES

PARA. NO.	TITLE
5-8	General
5-9	Welding/Nondestructive Testing
5-10	Upper Suspension Arm Bearing
5-11	Drum Turning
5-12	Axle Assembly
5-13	Ultra Bushing
5-14	Lower Suspension Arm Cylinder Pin
5-15	Lower Suspension Arm
5-16	Connecting Link
5-17	Deleted
5-18	Steering Console and Slide Shaft Assembly
5-19	Kingpin and Steering Arm
5-20	Hydraulic Steering Cylinder
5-21	Hydraulic Control Module Frame
5-22	Snatch Block Sheave Bushing
5-23	Gooseneck Cylinder
5-24	Gooseneck/Pivot Pin
5-25	Suspension Hydraulic Cylinder
5-26	Gooseneck Hydraulic Cylinder
5-27	Flywheel
5-28	Injection Pump

5-8. GENERAL

This section contains those tasks to be performed by DS maintenance personnel.

5-9. WELDING/NONDESTRUCTIVE TESTING

This task covers: a. Welding b. Nondestructive Testing

INITIAL SETUP

References

TM 9-237, MIL-STD-410, MIL-I-6870, MIL-STD-6866

WELDING

WARNING

Welding and brazing operations produce heat, toxic fumes, radiation, metal slag, and carbon particles. Welding and brazing goggles with properly tinted lenses are required. Also, gloves, apron, and welding boots are required or injury to personnel may result.

Welding and brazing processes may be used to repair cracks in steel parts such as brackets, panels, and light framework; however, the time required, the difficulty of working with the metal, and the chance of embrittlement and subsequent failure make such repairs of questionable value. Hence, welding and brazing should only be attempted when replacement parts are not available. Since the semitrailer is designed to carry greatly concentrated loads, most of the structure requires specialized welding procedures. Any personnel performing repair welding on the semitrailer must be properly trained and certified to conduct all phases of the welding procedure. After any welding, an inspection must be conducted.

NONDESTRUCTIVE TESTING

WARNING

Fluorescent penetrant may cause injury to personnel. Avoid skin contact. In case of skin contact, wash with warm water and soap.

1. Fluorescent penetrant inspection. A fluorescent penetrant inspection must be performed on metallic components which have been welded. After fluorescent penetrant has been applied and a pattern has developed, any evidence of cracks is cause for rejection. This inspection should be performed on parts as prescribed in MIL-I-6870 by operators and inspectors certified in accordance with MIL-STD-410, with equipment according to MIL-STD-6866.

2. Magnetic particle inspection. This inspection should be performed on steel parts when possible. Steel parts that have been reworked or reground and parts containing areas of fatigue should be tested. Shear sections and reground contact surfaces must show no defects. Any evidence of cracks is cause for rejection. Since some stainless steel cannot be magnetized, do not perform this test on such components. This inspection must be performed as specified in MIL-I-6870 and MIL-STD-6866 by qualified operators and inspected by qualified inspectors. On completion of inspection, pass parts through a demagnetizing field. Wash and allow to air dry. Parts must be rejected if there are indications of nonmetallic foreign solids longer than 1 inch (2.54 cm). Parts shall also be rejected if the following patterns appear:

   a. Bursts - scattered, short, sharp lines caused by high temperatures. Such discontinuities usually are internal and are seldom detected by magnetic particle inspection until surface is cut to expose burst area.

   b. Flakes - separate, short, wavy lines, usually in the same general direction, caused by improper cooling. Flakes are usually internal and are seldom detected by magnetic particle inspection until surface has been cut to expose the flake area.

   c. Grinding cracks - fine, sharp lines, tightly packed. In some surfaces, cracks may be shallow and hard to see. Grinding cracks are usually caused by a glazed wheel, resulting in overheating. These cracks are similar to heat-treat and hardening cracks. Grinding cracks may also be caused by too little coolant, too much feed, or too much speed.

5-10. UPPER SUSPENSION ARM BEARING

This task covers: a. Removal b. Lubrication c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Fire extinguisher, item 20, appx. B
Welder's helmet, item 21, appx. B
Leather apron, item 22, appx. B
Bearing seating tool, figure F-4, appx. F
The following tools can be found in field maintenance basic tool kit, item 14, appx. B:

Torch set, cutting and welding	Friction igniter
Hand truck, two-wheeled	Regulating valve, oxygen
Duplex rubber hose	Regulating valve, acetylene
Cylinder, acetylene	Welder's gloves
Cylinder, oxygen	Hydraulic floor jack, 10 ton
Hammer, sledge, 10 lb	Goggles, Industrial

5-10. UPPER SUSPENSION ARM BEARING (CONT)

Materials/Parts

Grease, item 12, appx. E
Bearing cone (upper suspension arm)
Crocus cloth, item 6, appx. E
Wiping rag, item 19, appx. E
Wood block, 4-inch x 4-inch x 12-inch lg

Personnel Required: 2

Equipment Condition

Suspension assembly removed (para. 4-40)

REMOVAL

CAUTION

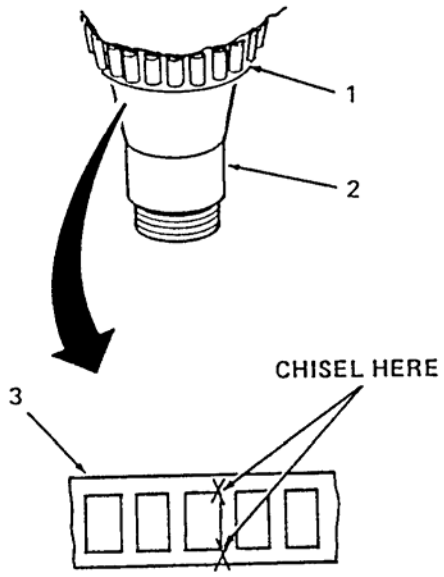
The upper suspension bearing cone will be destroyed during removal. Pay close attention to the following steps or serious damage to platform spindle may result.

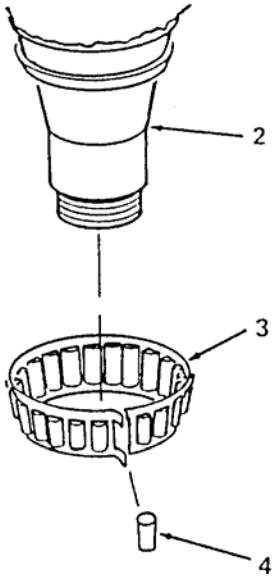
Remove upper suspension bearing cone (1) from platform spindle (2) as follows:

a. Using a hammer and cold chisel, break bearing cage (3) at two points.

b. Once bearing cage (3) is broken, remove all bearing rollers (4).

c. Clean all grease from spindle and surrounding area with wiping rag.





WARNING

While using the oxygen/acetylene gas welding/cutting unit, wear properly tinted goggles and protective gloves or serious burns or injury to personal may result.

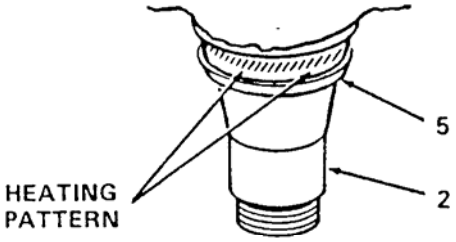
Once the inner bearing cone of upper suspension bearing is heated, it will expand and fall off of platform spindle. Position both personnel so that heated cone does not come in contact with your person or severe burns or injury to personnel may result.

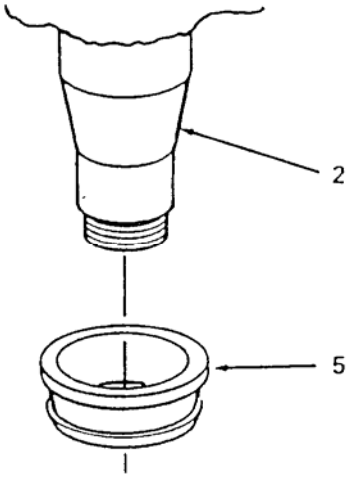
The ground under the platform spindle must be free of flammable material prior to heating the upper bearing cone. Place burn cloth on the ground beneath the platform spindle or injury to personnel may result.

CAUTION

Use two people to heat the upper suspension bearing's inner bearing cone by applying heat to the middle of the inner bearing cone around the entire cone. Do not allow torch to heat platform spindle or serious damage to equipment may result.

d. Using an oxygen/acetylene unit, pass a torch between two people and evenly heat entire inner bearing cone (5) at middle of cone. When inner bearing cone (5) is uniformly heated, it will expand and drop off of platform spindle (2).





WARNING

Do not pick up the inner bearing cone while hot or severe burns or injury to personnel may result.

e. Allow inner bearing cone (5) to cool and discard all parts of upper suspension bearing.

LUBRICATION

Hand pack upper suspension bearing cone with grease.

5-10. UPPER SUSPENSION ARM BEARING (CONT)

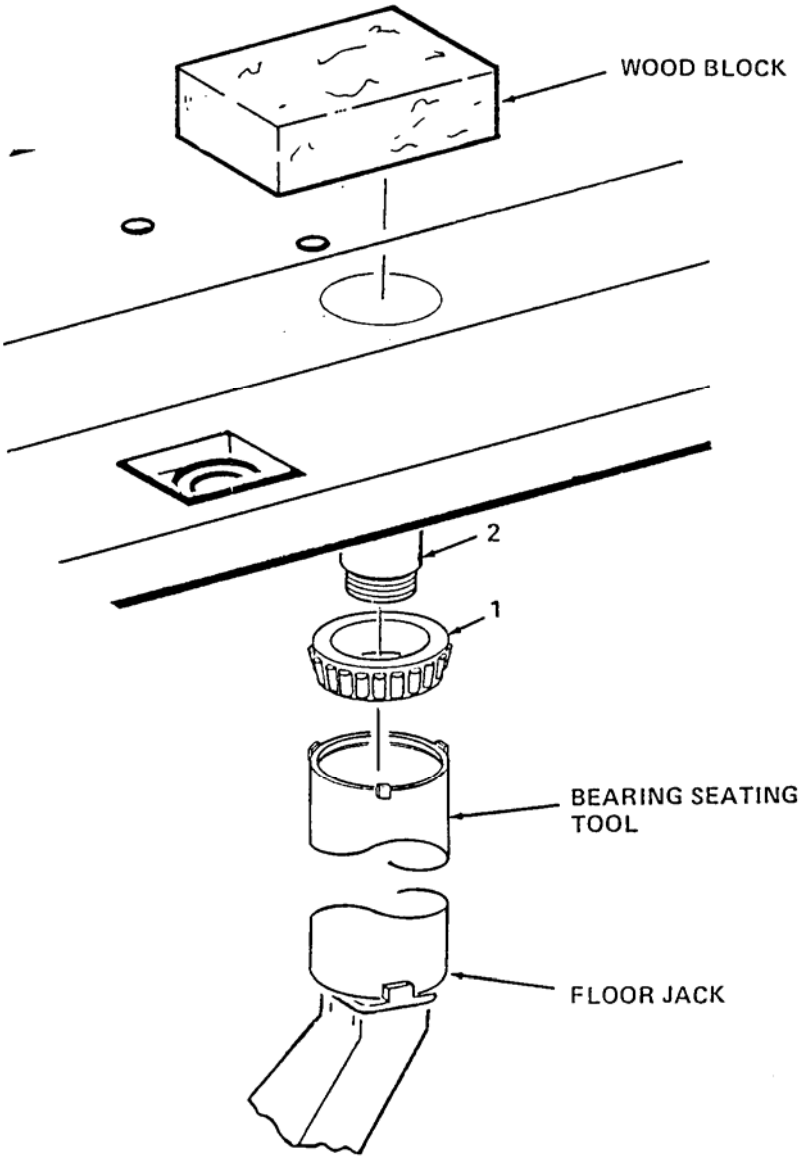
INSTALLATION

1. Position upper suspension bearing cone (1) onto platform spindle (2). Tap lightly into place with a hammer.

CAUTION

Position bearing seating tool carefully on floor jack and make sure tool is as vertical as possible or damage to spindle may result.

2. Position bearing seating tool, with tabs up, under upper suspension bearing cone (1). Position hydraulic floor jack under bearing seating tool, and raise floor jack until tool is flush against bearing.



CAUTION

During this entire task, continually check that the top of the bearing seating tool remains parallel to the platform. The bearing must be installed as level to the platform as possible or damage to equipment may result.

3. With bearing cone (1) level, and centered at bottom of spindle (2), slowly raise floor jack to push bearing onto spindle.

4. If platform starts to rise from movement of floor jack before bearing cone (1) is properly seated on spindle (2), proceed as follows:

   a. Place a block of wood on top of platform, centered over top of spindle (2).

   b. Using a 10-pound sledge hammer, one person must proceed to strike wood block as second person raises floor jack. Repeat as necessary until bearing cone (1) is properly seated on spindle (2).

   c. Lower floor jack and remove bearing seating tool.

5-11. DRUM TURNING

This task covers: a. Inspection b. Repair

INITIAL SETUP

Tools

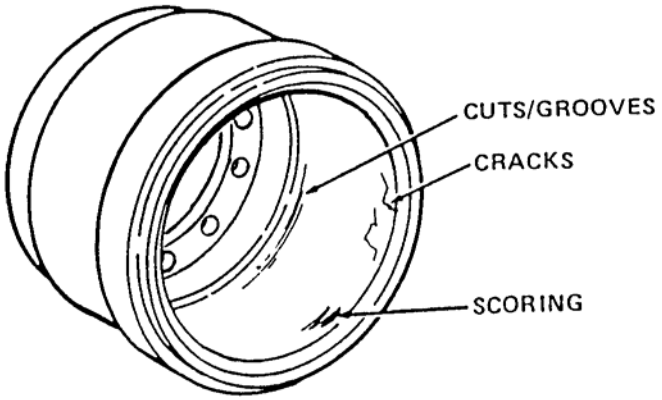
Brake drum lathe, item 14, appx. B
Brake drum gage, item 14, appx. B

Equipment Condition

Hub and drum disassembled and separated (para. 4-50)

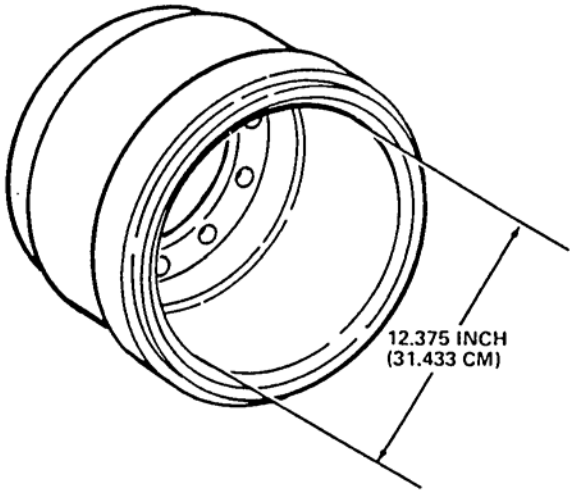
INSPECTION

1. Inspect machined surface texture of drum for grooves, cuts, scoring, surface cracks, and out-of-roundness.



5-11. DRUM TURNING (CONT)

2. Using a brake drum gage, measure inner diameter of drum. If inside diameter of drum is greater than 12.375 inches (31.433 cm), replace drum. If inside diameter is less than 12.375 inches (31.433 cm) and any defects are found, drum must be turned (machined).



REPAIR

1. Install drum on brake drum lathe and turn drum as required until a smooth finish can be obtained. If after a series of attempts a smooth finish cannot be obtained, discard drum.

2. If a smooth finish is obtained, remeasure inside diameter. If inside diameter exceeds 12.375 inches (31.433 cm), discard drum and replace.

3. If a smooth finish is obtained and maximum inside diameter is less than 12.375 inches (31.433 cm), the drum has been repaired.

5-12. AXLE ASSEMBLY

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Portable hydraulic ram, 50 ton, item 30, appx. B
Hydraulic hose, item 2, appx. B
Hydraulic power source, item 2, appx. B
Crowbar, item 14, appx. B
Axle removal/installation kit, item 25, appx. B

Cylinder hone, item 13, appx. B
Hydraulic floor jack, 10 ton, item 14, appx. B
Socket, deep-well, 15/16", item 18, appx. B
Torque wrench, 3/4" dr, 0-600 lb-ft, item 14, appx. B

Materials/Parts

4-inch x 4-inch wood blocks (5) or equivalent
Cap and plug set, item 5, appx. E
Antiseize compound, item 3, appx. E
Dry cleaning solvent, item 26, appx. E
Crocus cloth, item 6, appx. E
Mounting plate (2)
Cotter pin (3)
Self-locking nut (2)
Hexagon stock, 1/2 inch, figure F-21, appx. F
Bolt (4)
Trunnion cap

Personnel Required: 2

Equipment Condition

Semitrailer parked on level ground, coupled to tractor (para. 2-24) or if not coupled, wheels chocked
If gooseneck not supported, gooseneck isolation valve set in ADJUST position (para. 2-6)
If supported, gooseneck isolation valve set in RUN position (para. 2-6)
Platform set at road height (para. 2-19)
Support legs set at 41 inches (104 cm) (para. 2-22 and 2-23)

General Safety Instructions

WARNING

The axle weighs approximately 850 pounds (386 kg) with tires and wheels installed. Extreme caution must be used during removal and installation of axle or serious injury to personnel may result.

REMOVAL

NOTE

Removing/installing axles should normally be done with wheels and tires installed for ease of handling. If axle is being removed to perform other maintenance tasks on the axle, it will be necessary to remove wheels and tires after the axle assembly has been separated from the bogie.

If axle is being removed to perform ultra bushing maintenance task, it will be necessary to replace trunnion cap.

1. Release semitrailer parking brakes by pushing in brake release valve (para. 2-8).

2. Cage brakes at affected bogie (para. 2-33).

5-12. AXLE ASSEMBLY (CONT)

3. Start APU (para. 2-16).

4. Lower platform until resting on front and rear support legs (para. 2-19).

5. Close suspension isolation valve for affected bogie with handle facing outward from center of semitrailer (para. 2-6).

6. Raise platform to approximately 45 inches (para. 2-19) until lower suspension arm spindle on affected bogie appears to be level. Install semitrailer wheel chocks.

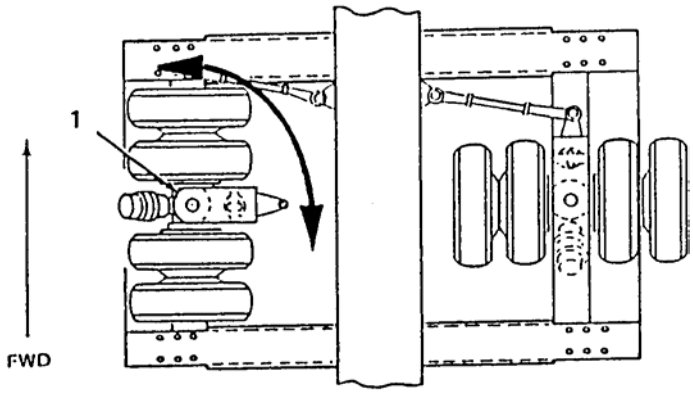
7. Place pieces of 4-inch x 4-inch wood under each support leg. Lower platform (para. 2-19) support legs so that legs are sitting on wood blocks.

8. Apply parking brakes by pulling out brake release valve (para. 2-8) and shut down APU (para. 2-16).

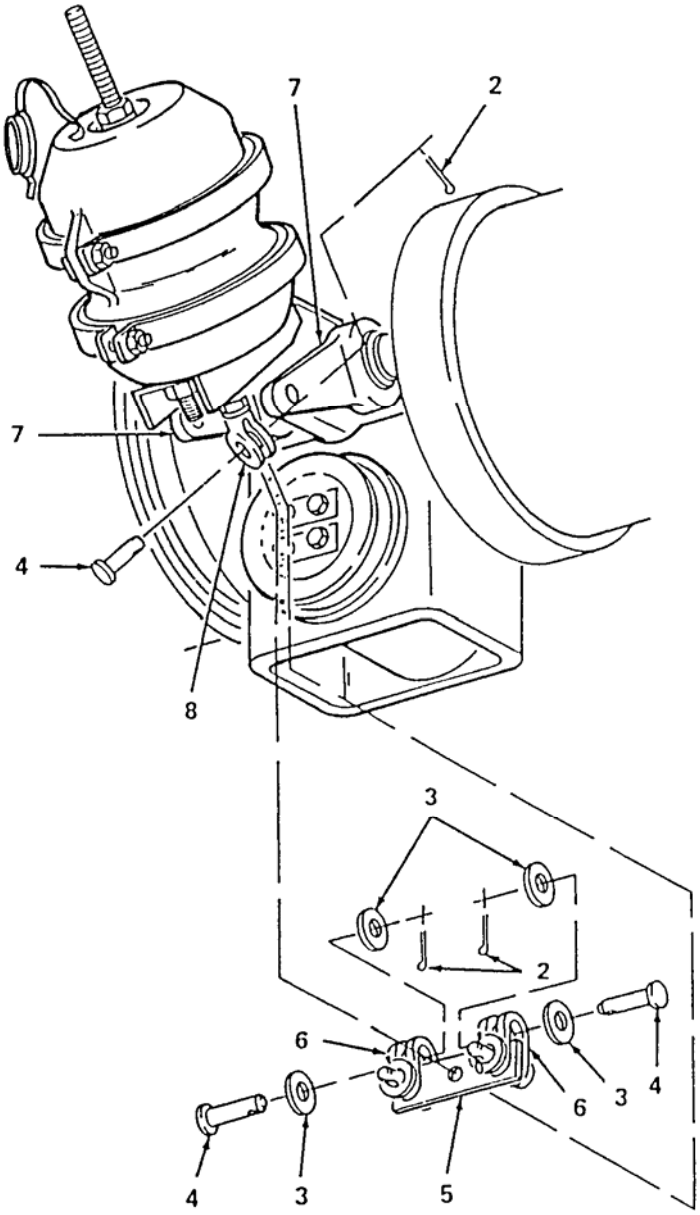
9. Remove upper and lower brake dust shields from affected bogie (para. 4-43).

10. Disconnect connecting link from affected bogie (para. 4-52).

11. Rotate affected bogie (1) inboard as far as practical, ensuring that suspension hydraulic and pneumatic hoses are not under any tension.



12. Remove three cotter pins (2), four washers (3), three pins (4), and crossbar (5) with two clevises (6) from two slack adjusters (7) and brake chamber clevis (8). Discard cotter pins.



5-12. AXLE ASSEMBLY (CONT)

CAUTION

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the pneumatic system or damage to equipment may result.

13. Tag and disconnect two air lines (9) from service/parking brake chamber (10). Install caps/plugs onto fittings and hoses.

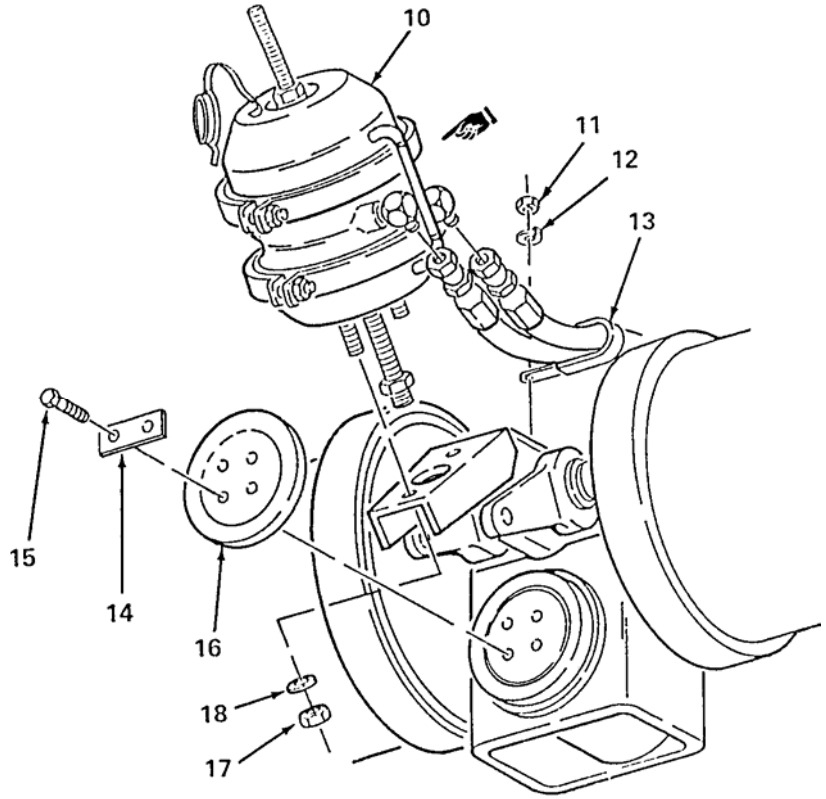
14. Remove nut (11), lockwasher (12), and loop clamp (13) from axle. Move two air brake lines (9) toward center of semitrailer platform, inward away from axle.

15. Straighten corners of two mounting plates (14) which lock four bolts (15). Remove four bolts (15), two mounting plates (14), and trunnion cap (16). Discard bolts and mounting plates. Discard cap if defective.

WARNING

Personnel used to remove/maneuver axle or parking brake chamber must not, at any time, use the caging bolt as a holding/lifting device. The caging bolt is held in place by pressure from a spring in the brake chamber. If caging bolt becomes unseated inside brake chamber, serious injury to personnel may result.

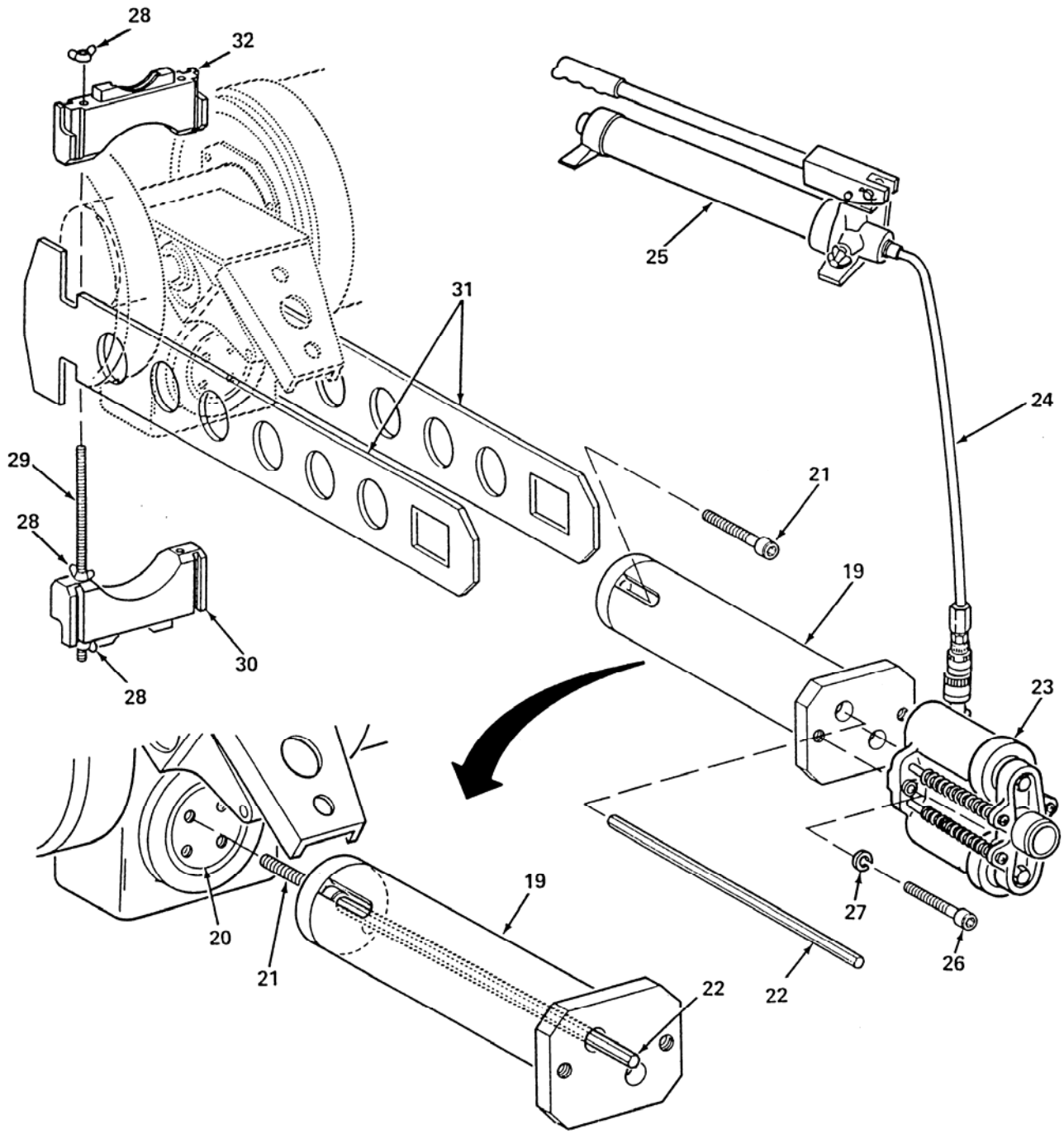
16. Using 15/16-inch deep-well socket, remove two self-locking nuts (17), two washers (18), and brake chamber (10) from axle. Discard self-locking nuts.



NOTE

The extender must be alined so that mounting bolt holes in the extender line up with upper left and lower right holes in the spindle. This alinement ensures that the hydraulic ram will be properly mounted.

17. Aline extender (19) with upper left and lower right holes on spindle (20). Using one person to hold extender (19) in place, have second person insert 2-5/8-inch long capscrew (21) into extender (19) approximately over bolt hole in spindle.



5-12. AXLE ASSEMBLY (CONT)

18. Using 1/2-inch hex stock, pass hex stock (22) through opening in ram end of extender (19). Insert hex stock (22) into capscrew (21) and install and tighten first capscrew (21) into upper left mounting hole on spindle. Remove hex stock (22) from extender (19).

19. Insert another capscrew (21) into opening in side of extender (19) approximately over lower right bolt hole on extender (19).

20. Pass hex stock (22) through lower right hole in extender (19) and install and tighten second capscrew (21). Remove hex stock (22).

21. Prepare hydraulic ram (23) as follows:

    a. Assemble hydraulic hose (24) to hand pump (25).

    b. Fill hydraulic pump (25) with hydraulic fluid as required in accordance with manufacturer's specifications.

    c. Connect hydraulic hose (24) to hydraulic ram (23).

    d. Place hydraulic ram (23) on the ground with ram extender facing up.

    e. Hold hydraulic pump (25) as high as possible without kinking hydraulic hose (24) or lifting ram (23) off the ground.

    f. Operate hydraulic pump (25) until ram (23) is fully extended with approximately 3 inches (7.6 cm) of ram piston showing.

    g. Open relief valve on hydraulic pump (25) to allow hydraulic ram (23) to retract. Close relief valve on hydraulic pump (25).

22. Using two people, aline hydraulic ram (23), with hose connection on ram pointing upward, to extender (19). Secure hydraulic ram (23) to extender (19) by installing two 3-inch long capscrews (26) and lockwashers (27).

23. Set hydraulic pump (25) on platform over affected bogie to keep hydraulic hose (24) and hydraulic pump (25) out of the way.

24. Install one wingnut (28) onto threaded rod (29) so that approximately three threads of threaded rod (29) are showing. Repeat this step for other threaded rod.

25. Install two threaded rods (29) into tie bar (30) as shown on illustration. Once both threaded rods (29) are in place, secure by installing two wingnuts (28) flush against tie bar. These assembled parts create the lower tie bar (30).

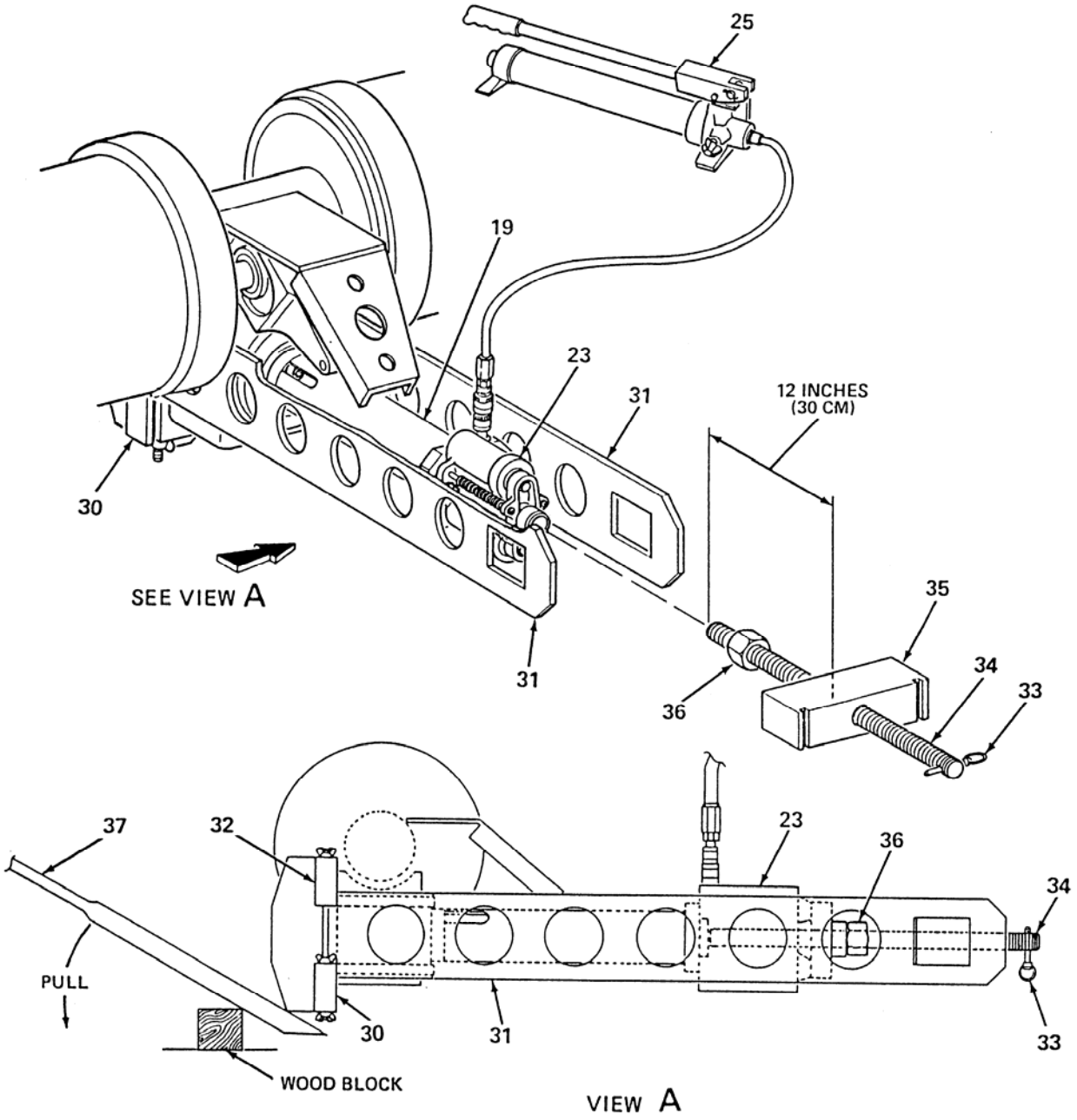
26. Place two side plates (31) flat on the ground. Push first side plate (31), T-end first, under axle. Once under axle, rotate side plate (31) vertically next to left-hand brake drum. Push second side plate (31) under axle and rotate vertically next to right-hand brake drum.

27. Using one person to lift both side plates (31), have second person aline and install lower tie bar (30) into place between both side plates (31).

28. While still holding both side plates (31) upward, aline and install upper tie bar (32) over two threaded rods (29) and into slots in both side plates (31).

29. Secure upper tie bar (32) in place by installing two wingnuts (28) onto threaded rods (29).

30. Install detent pin (33) into adjustment rod (34). Thread adjustment rod (34), pin end of rod on same side as slotted end of thrust bar (35), so that approximately 12 inches (30 cm) of adjustment rod (34) stick out of flat side of thrust bar (35).



5-12. AXLE ASSEMBLY (CONT)

31. Install hex nut (36) onto adjustment rod (34). Loosely tighten hex nut (36) against flat side of thrust bar (35).

32. Install hex nut end of adjustment rod (34) into hydraulic ram (23). Push adjustment rod (34) all the way into hydraulic ram (23).

33. Using two people, lift upward on both side plates (31) so that square cutout is approximately alined with thrust bar (35). Then, maneuver side plates as required so that thrust bar (35) mounts into both side plates (31). Make sure groove in thrust bar (35) is properly seated in each square cutout in both side plates (31).

34. While holding side plates (31) parallel to hydraulic ram (23), tighten hex nut (36) against hydraulic ram (23) until snug.

35. Position one person under platform in front of affected bogie. Place a 4-inch x 4-inch block of wood on the ground directly under suspension cylinder on affected bogie. Place chisel end of crowbar (37) under lower tie bar (30) and rest crowbar on block of wood.

CAUTION

The upper and lower tie bars must be manually centered over ultra bushing using crowbar or a misalinement may occur and damage to equipment may result.

36. Using one person, pull down on crowbar (37) and aline both upper and lower tie bars (30 and 32) over ultra bushing/spindle. While holding up both tie bars (30 and 32) with crowbar (37), hand tighten hex nut (36) firmly against ram (23) as snug as possible.

NOTE

If ultra bushing separates/tears in half during removal, continue procedure. Ultra bushing inner race can be removed after axle removal is completed.

37. Operate hydraulic pump until axle moves the full 3-inch (7.6 cm) stroke of hydraulic ram (23).

38. Relieve pressure in hydraulic pump (25) and screw threaded rod (34) through thrust bar (35) until hex nut (36) is firm against hydraulic ram (23). Lift tie bars (30 and 32) and hand tighten hex nut (36) to maintain alinement.

39. Again operate hydraulic pump (25) until axle moves the full 3-inch stroke of hydraulic ram (23).

NOTE

Use one person to continue to jam the hex nut against the hydraulic ram as the ram cylinders compress. This will keep the axle puller tight against the axle to prevent having to re-aline the upper and lower tie bars.

40. Using one person to continue to thread hex nut (36) against hydraulic ram (23), have second person slowly relieve pressure in hydraulic pump (25) until hydraulic ram (23) is completely retracted.

41. Remove wood block and crowbar (37) from under affected bogie. Position hydraulic floor jack beneath lower suspension arm to maintain height of spindle parallel to the ground when axle is pulled clear of spindle.

WARNING

Once ultra bushing is clear of spindle, side plates may separate from thrust bar, allowing either side plates or thrust bar to fall to ground. Keep hands and feet clear or injury to personnel may result.

NOTE

This operation takes slightly less than three ram strokes. Stroke of hydraulic ram is 3 inches (7.62 cm) and length of ultra bushing is 8 inches (20.32 cm).

42. Repeat steps 37 thru 40 until ultra bushing is clear of spindle (20) and axle is completely on extender (19). Relieve pressure on hydraulic pump until hydraulic ram (23) is fully retracted.

43. Using two people, spread ends of two side plates (31) and unseat and remove thrust bar (35). Unscrew and remove hex nut (36) and adjustment rod (34) from thrust bar (35). Remove detent pin (33) from adjustment rod (34).

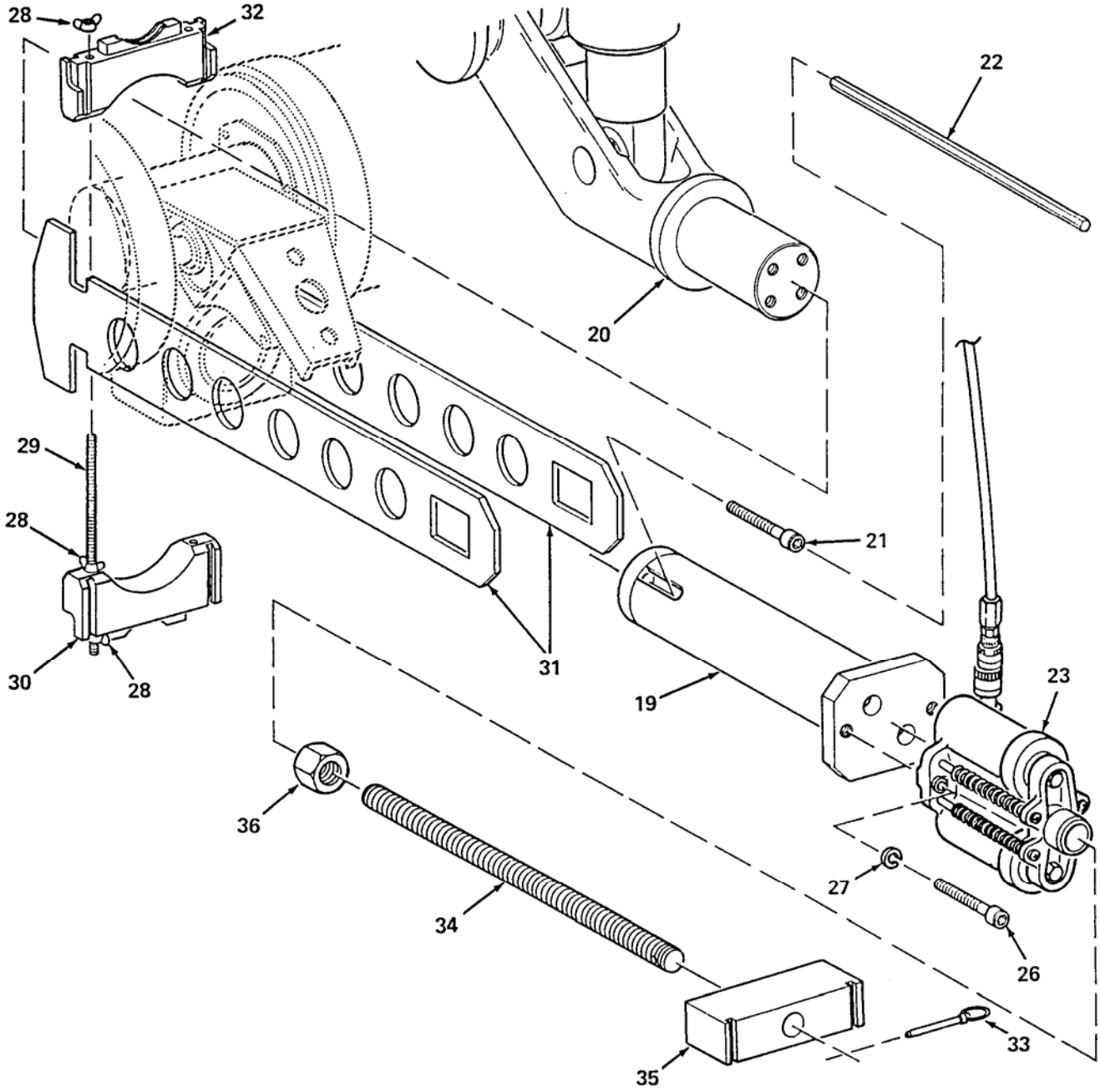
44. Roll axle away from work area.

5-12. AXLE ASSEMBLY (CONT)

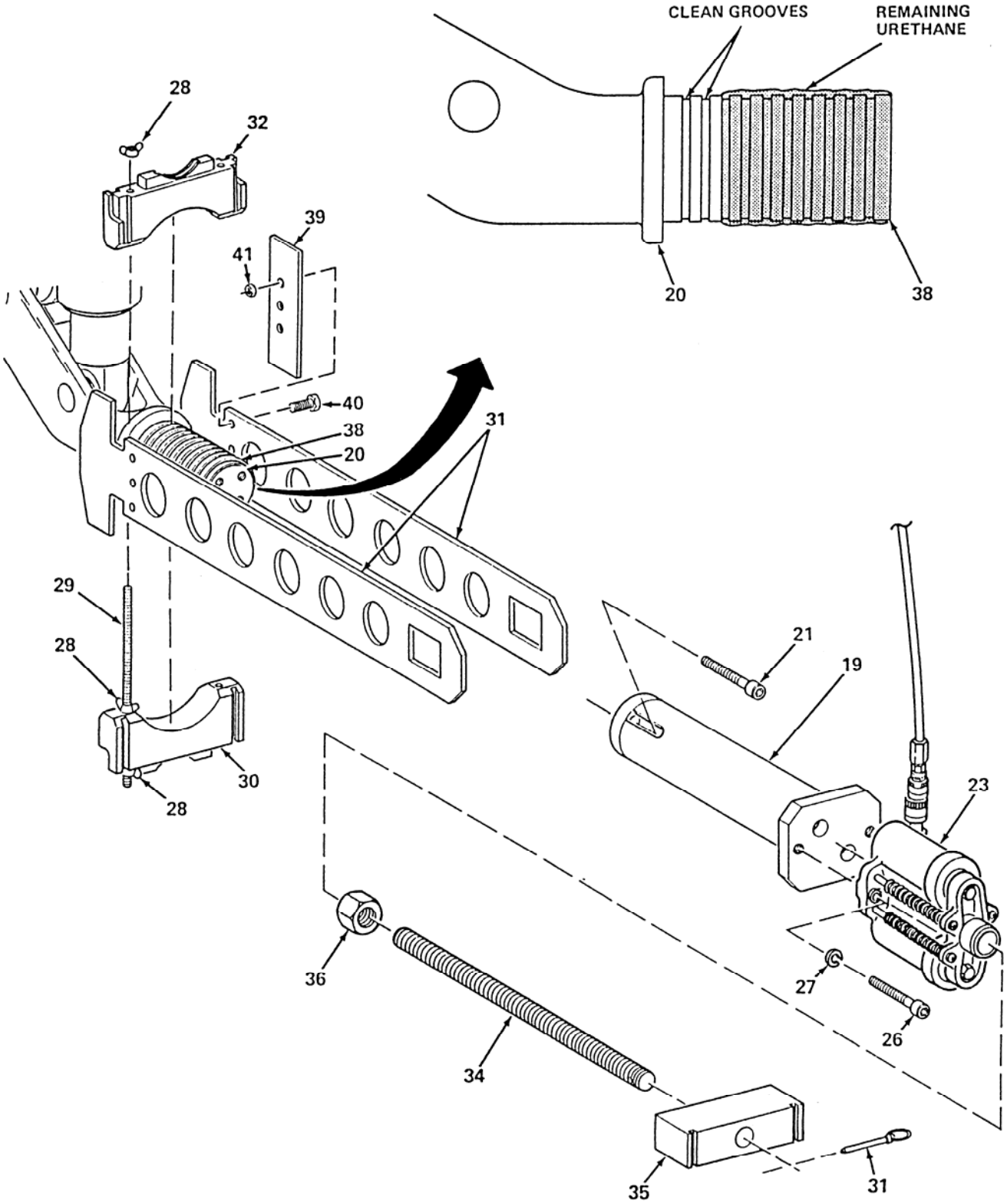
45. Using two people and hex stock (22), remove two capscrews (26), lockwashers (27), and hydraulic ram (23) from extender (19).

46. Using hex stock (22), remove two capscrews (21) and extender (19) from spindle (20). Remove extender (19) from within axle.

47. Using two people, remove two wingnuts (28), upper tie bar (32), lower tie bar (30), and two side plates (31) from axle. Remove four wingnuts (28) and two threaded rods (29) from lower tie bar (30).



48. If, during removal procedure, the ultra bushing tore/separated and inner race (38) remained on spindle (20), proceed as follows:



5-12. AXLE ASSEMBLY (CONT)

a. On inner race (38) clean two grooves which are closest to suspension cylinder.

b. Install two side bars (39) on two side plates (31) using three bolts (40) and nuts (41) each.

c. Reinstall axle puller parts with upper and lower tie bars (32 and 30) inverted, flipped over 180 degrees, engaging two cleaned grooves and repeat steps 17 thru 47 as required to remove inner race (38) from spindle (20).

INSPECTION

WARNING

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials, and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

1. Inspect axle and parking/service brake chamber bracket for broken welds, broken casting, bends, or excessive corrosion. Clean corrosion with dry cleaning solvent and rags. Replace defective parts as required.

2. Inspect lower suspension arm spindle, spindle cap, and ultra bushing bore for nicks, burrs, scratches, scoring, and corrosion. Clean with dry cleaning solvent and rags. If defects are found, use a fine grade of crocus cloth to polish spindle.

3. Check ultra bushing bore for grooves, scratches, corrosion, cracks, or unusual wear. Hone, if necessary, to restore interior finish.

INSTALLATION

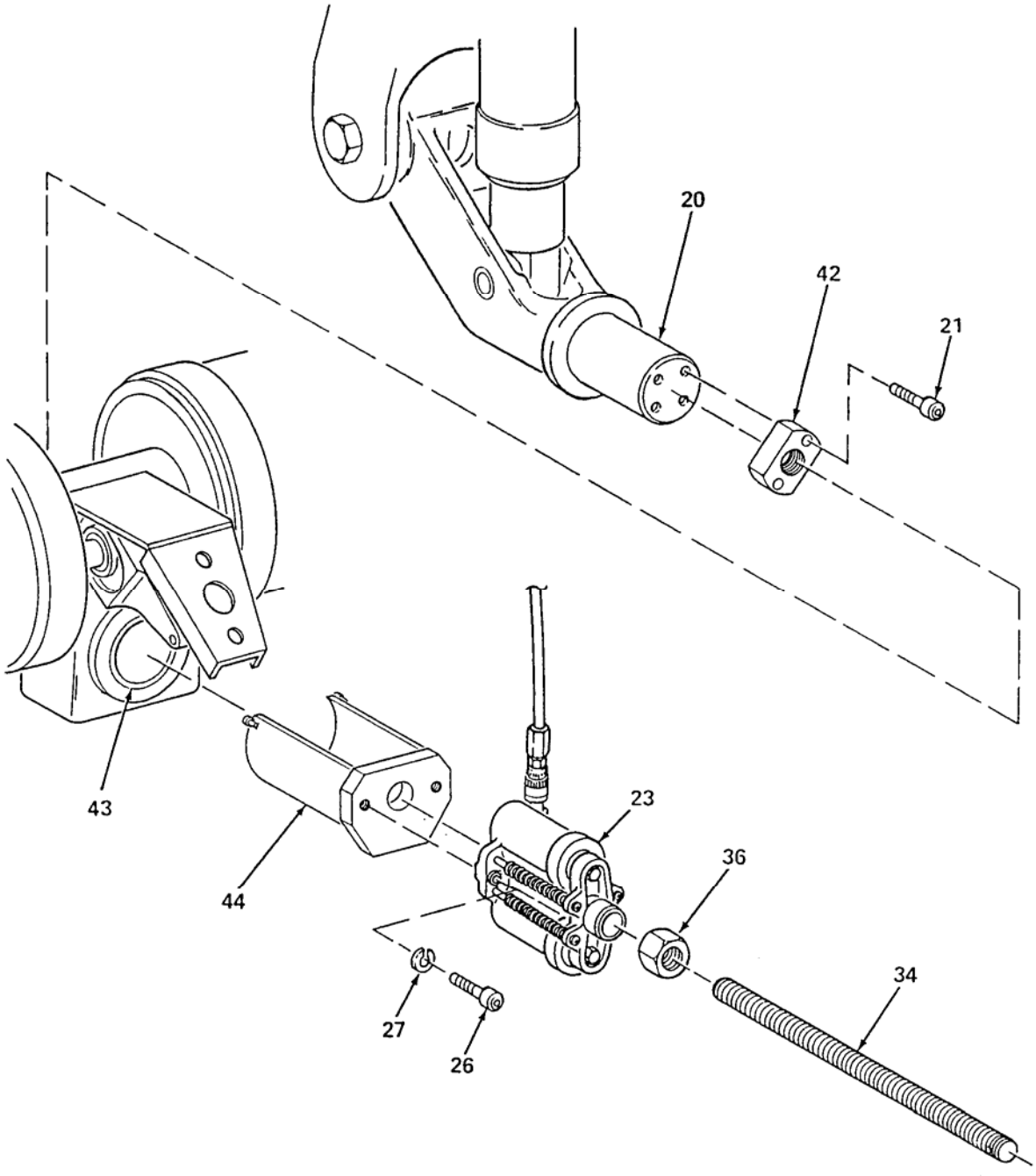
1. If not already done, install all wheels and tires on axle assembly (para. 3-10, 3-9, 3-8, and 3-7).

2. Install trunnion fitting (42) onto spindle (20) using two socket head bolts (21).

3. Check that spindle (20) is parallel to the ground. Make any required adjustments to hydraulic floor jack. If ultra bushing is new, remove anti-corrosion material from inner bore. Apply antiseize compound to entire surface of ultra bushing inner bore and lower suspension arm spindle.

4. Using two people, roll axle assembly in place over spindle (20).

5. Aline spindle (20) with ultra bushing (43) until end of spindle starts into end of ultra bushing.



6. Screw adjustment rod (34) onto trunnion fitting (42) until it bottoms out against spindle (20).

7. Assemble spacer (44) onto base of hydraulic ram (23) using two lockwashers (27) and capscrews (26).

8. Install spacer (44), hydraulic ram (23), and hex nut (36) onto adjustment rod (34). Hand tighten hex nut (36) to remove slack.

5-12. AXLE ASSEMBLY (CONT)

CAUTION

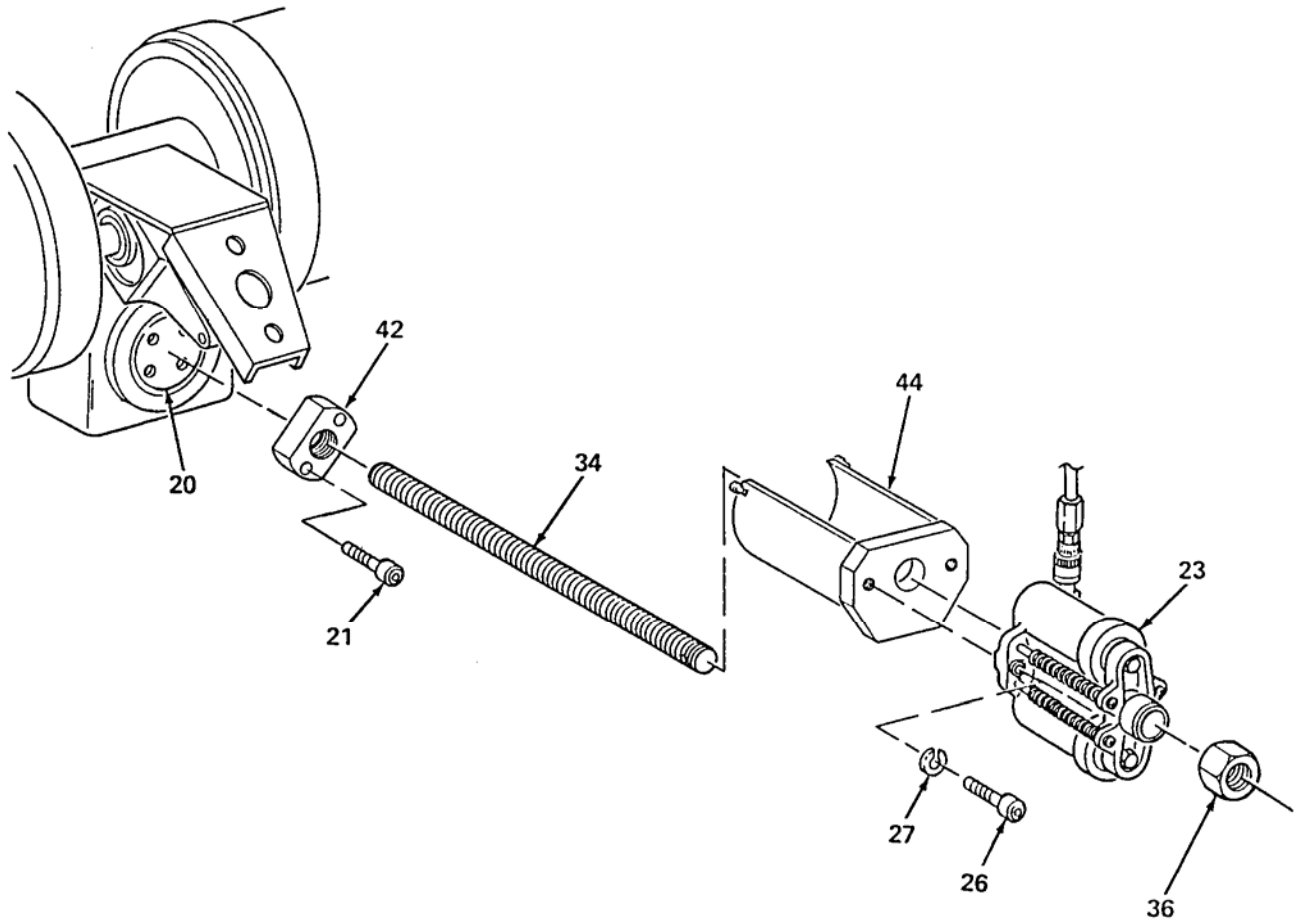
Be sure ultra bushing and spindle are properly alined or damage to equipment may result.

9. Operate hydraulic hand pump until hydraulic ram (23) extends to its full travel of 3 inches (7.62 cm).

10. Release pressure on hydraulic hand pump and allow hydraulic ram (23) to relax to retracted position. Hand tighten hex nut (36) to remove slack.

11. Repeat steps 9 and 10 until ultra bushing (43) is fully onto spindle.

12. Release pressure on hydraulic hand pump and allow hydraulic ram (23) to relax to retracted position. Remove hex nut (36) and hydraulic ram (23) from adjustment rod (34).



13. Remove two capscrews (26), lockwashers (27), and spacer (44) from hydraulic ram (23).

14. Remove adjustment rod (34), two capscrews (21), and trunnion fitting (42) from spindle (20).

WARNING

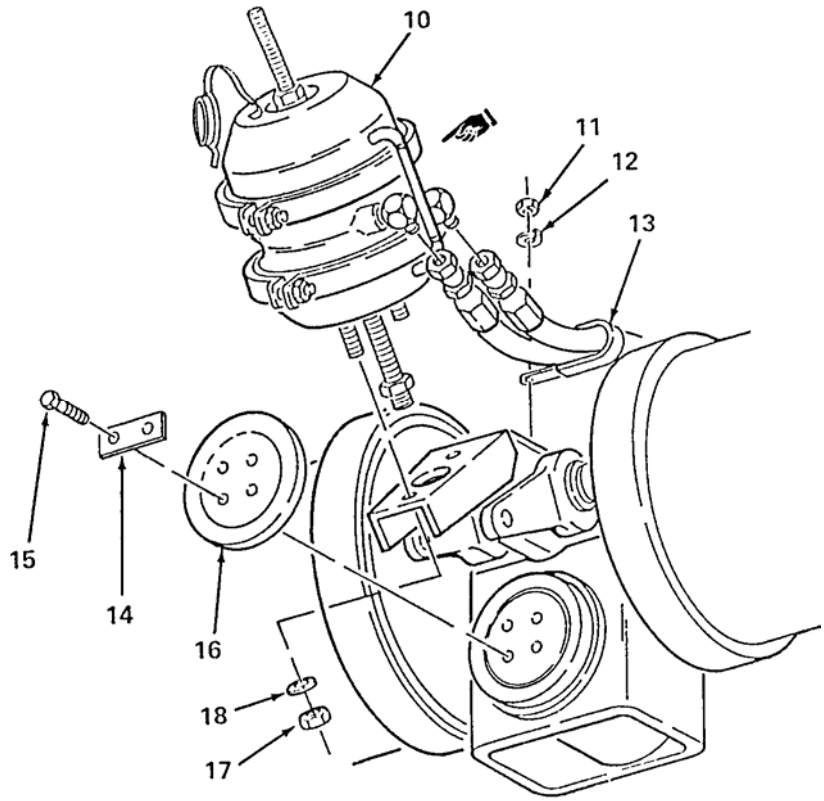
Person supporting parking/service brake chamber on axle must not at any time use caging bolt as a holding device. The caging bolt is held in place by pressure from spring in brake chamber. If caging bolt becomes unseated inside brake chamber, serious injury to personnel may result.

15. Install brake chamber (10) and, using a 15/16-inch deep-well socket, secure with two washers (18) and two nuts (17).

NOTE

Bend ends of mounting plates up slightly before installation. Otherwise, they will be very difficult to bend.

16. Install trunnion cap (16) and two mounting plates (14). Secure with four bolts (15). Using a torque wrench, torque bolts (15) to 240 lb-ft (325 Nm) and bend one corner of each end of mounting plate (14) up against flats of bolt heads.

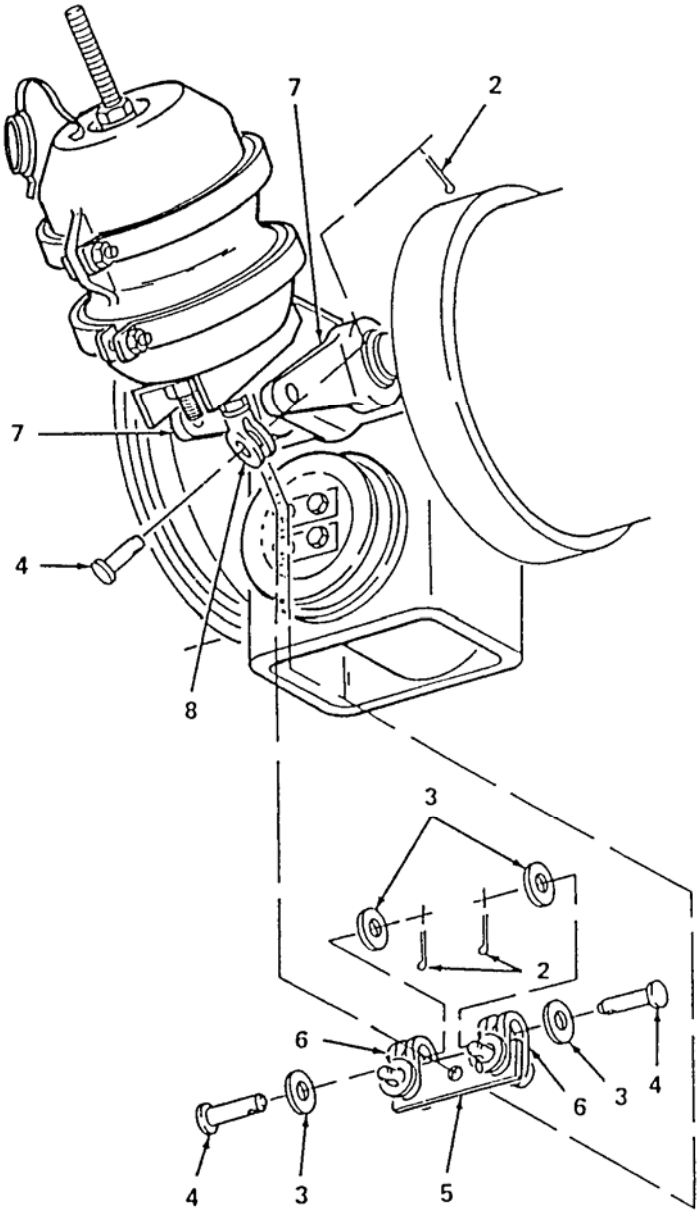


5-12. AXLE ASSEMBLY (CONT)

17. Reposition two air brake lines (9) and secure to axle with loop clamp (13), lockwasher (12), and nut (11).

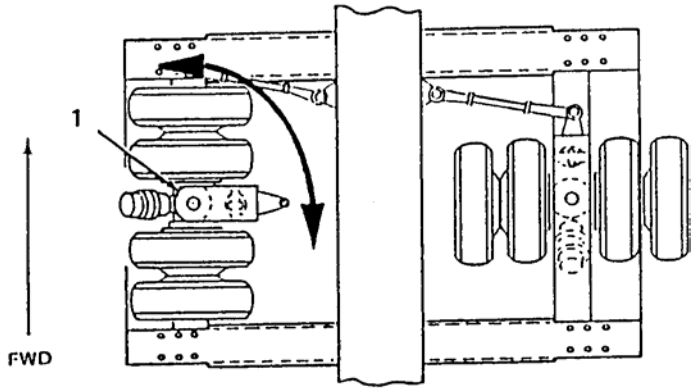
18. Remove caps/plugs and connect two air lines (9) to brake chamber (10).

19. Install crossbar (5) with two clevises (6) to two slack adjusters (7) and brake chamber clevis (8) with three pins (4), four washers (3), and three cotter pins (2).



20. Install upper and lower brake dust shields (para. 4-43).

21. Rotate bogie (1) into normal position. Connect connecting link to bogie (para. 4-51).



22. Open suspension isolation valve with handle facing toward front of semitrailer (para. 2-6) and start APU (para. 2-16).

23. Couple semitrailer to tractor and charge semitrailer air brake system (para. 2-24). Release parking brakes by pushing in brake release valve (para. 2-8); then, apply parking brakes by pulling out brake release valve. Uncage brakes and restow caging bolt (para. 2-33).

24. Adjust platform to road height (para. 2-19).

25. Stow front and rear support legs (para. 2-22 and 2-23).

FOLLOW-ON MAINTENANCE

Adjust brakes as required (para. 4-15).

5-13. ULTRA BUSHING

This task covers: a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Ultra bushing removal/installation kit, item 24, appx. B
Portable hydraulic ram, 50 ton, item 30, appx. B
Portable hydraulic ram, 30 ton, item 2, appx. B
Hydraulic power source, 10,000 psi (68,950 kPa) capacity, item 2, appx. B
Hydraulic hose, item 2, appx. B

5-13. ULTRA BUSHING (CONT)

Materials/Parts

Cotter pin (3)
Grease, item 12, appx. E
Crocus cloth, item 6, appx. E

Personnel Required: 2

Equipment Condition

Axle removed from semitrailer (para. 5-12)
Wheels removed from axle (para. 3-7 thru 3-10)

REMOVAL

WARNING

Do not hold caging bolt or injury to personnel may result.

CAUTION

Do not allow caging bolt to rest or fall to the ground or damage to equipment may result.

1. Position axle with end of brake chamber on pieces of wood so that ultra bushing is as parallel to the ground as possible and caging bolt does not rest on the ground.

2. Chock axle front and back using pieces of wood.

NOTE

Pin on brake chamber clevis is shorter than the other two pins.

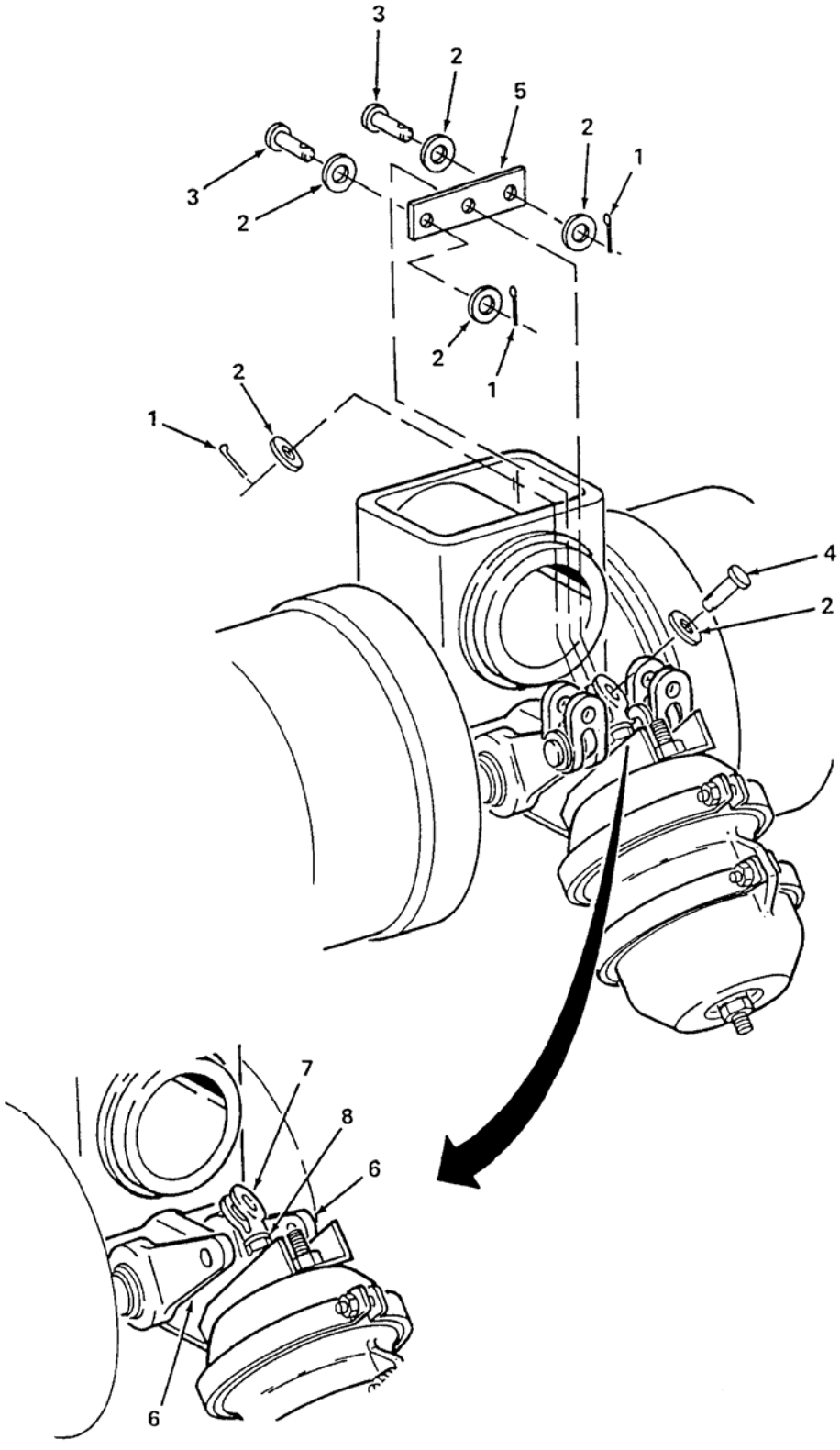
3. Remove three cotter pins (1), six washers (2), two pins (3), pin (4), and crossbar (5) from two slack adjusters (6) and brake chamber clevis (7). Discard cotter pins.

4. Cage brakes (para. 2-33) to move brake chamber clevis (7) out of the way.

CAUTION

Do not allow jam nut to move or brakes will be out of adjustment and damage to equipment may result.

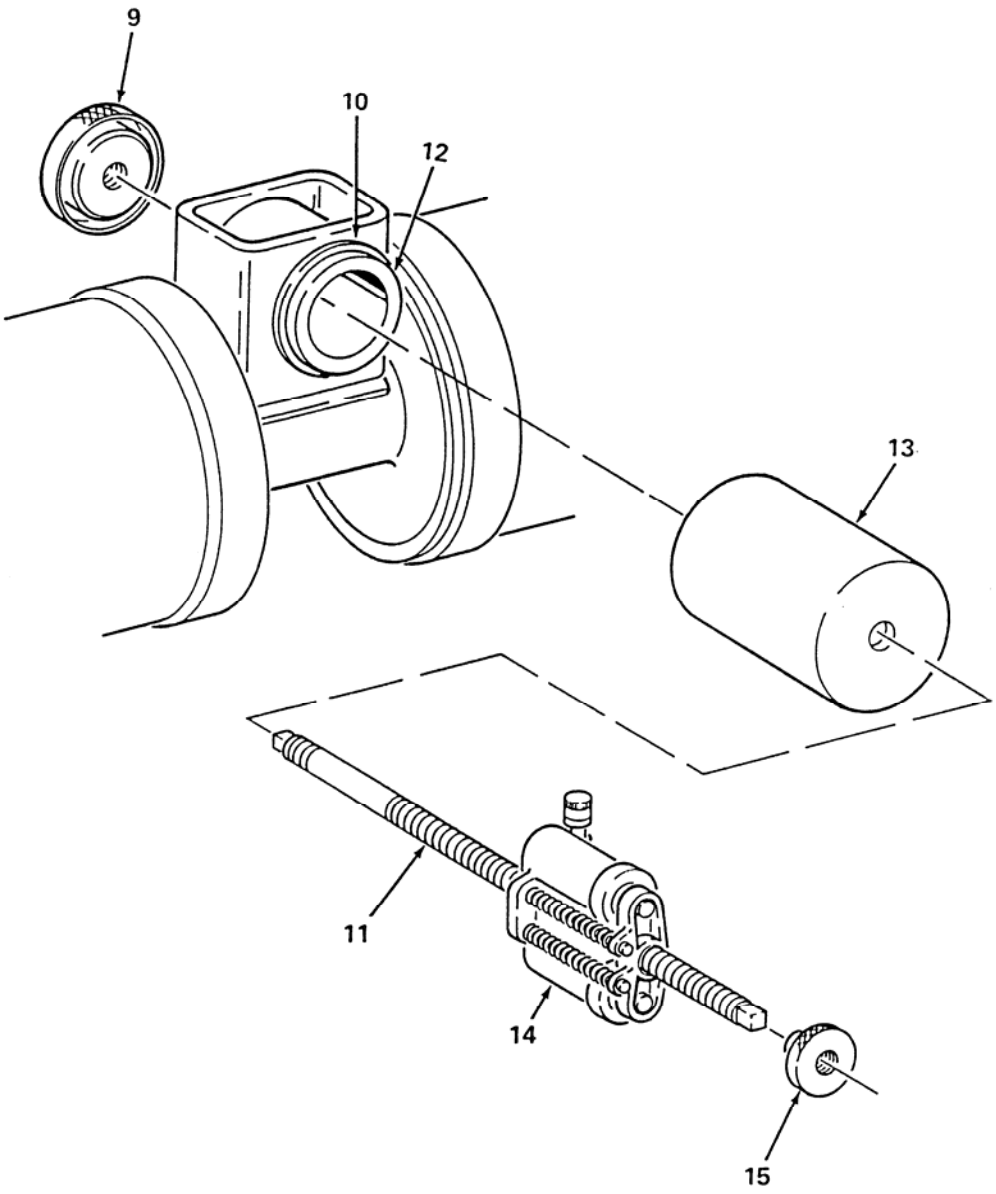
5. While holding jam nut (8) in place, remove brake chamber clevis (7).



PARTS REMOVED FOR CLARITY

5-13. ULTRA BUSHING (CONT)

6. Fit puller (9) into place over end of ultra bushing housing (10) on same side as brake chamber. Insert shaft (11), short threaded end first, through ultra bushing housing (10) and ultra bushing (12) from side opposite brake chamber, and thread into puller (9). Tighten puller (9) onto shaft (11) until puller (9) bottoms out. At least one full thread should be showing.



7. Fit cannister (13) over shaft (11) onto ultra bushing housing (10) on side opposite brake chamber.

NOTE

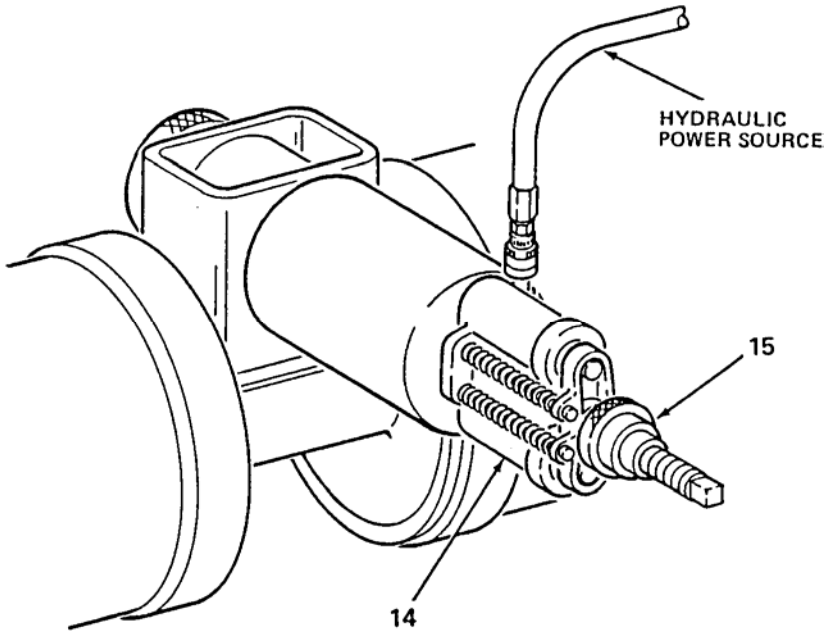
The 50-ton hydraulic ram must be used to remove the ultra bushing because additional pressure is required to break the ultra bushing free.

8. Install 50-ton hydraulic ram (14) and adjuster (15) onto shaft (11). Ensure puller (9) is seated squarely in bore of ultra bushing (12) and cannister (13) is seated squarely on ultra bushing housing (10). Hand tighten adjuster (15) snugly against hydraulic ram (14).

WARNING

Hydraulic fluid can be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

9. Connect hydraulic power source to hydraulic ram (14) and apply pressure until hydraulic ram (14) extends full stroke. Recheck all tools for proper seating and alinement.



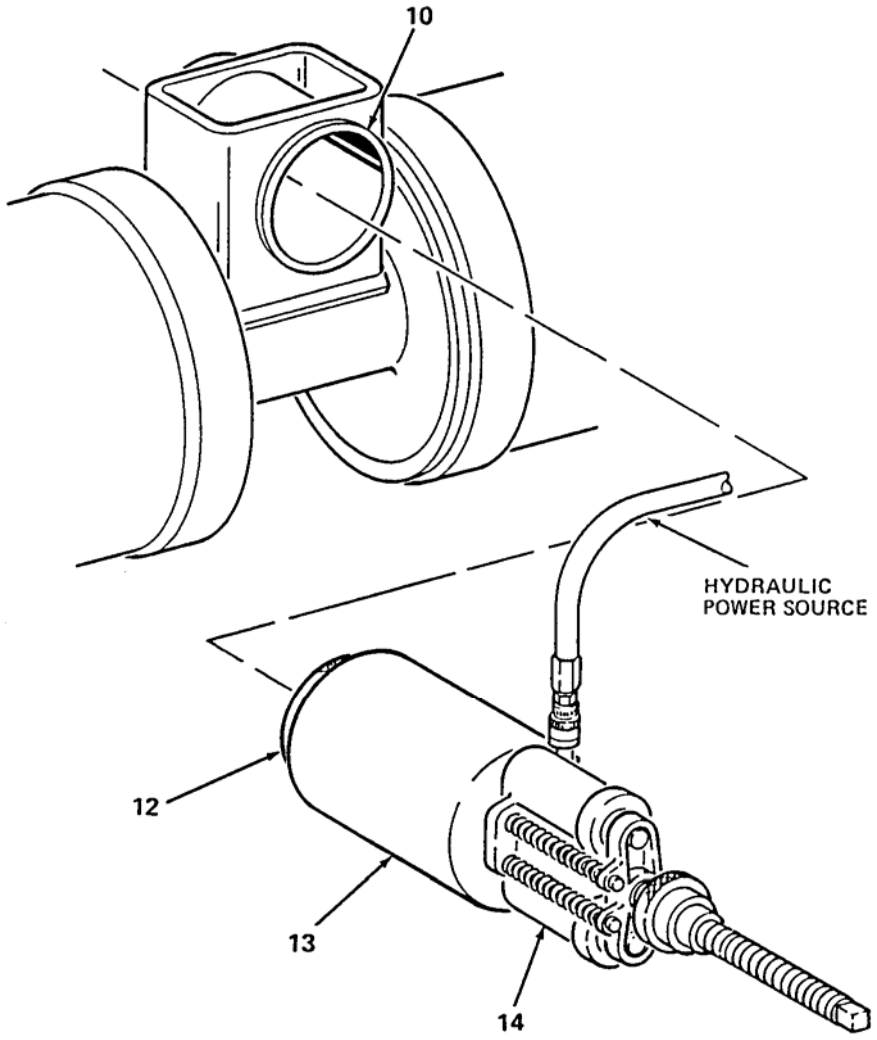
10. Relieve hydraulic pressure and let return springs retract ram. Tighten adjuster (15) against hydraulic ram (14) and apply hydraulic pressure.

5-13. ULTRA BUSHING (CONT)

WARNING

Combined weight of cannister, shaft, puller, ultra bushing, and hydraulic ram requires two persons. Cannister may fall off of axle after third ram stroke. Do not allow end of shaft to scratch interior bore of ultra bushing housing. Be prepared and use two persons or injury to personnel and damage to equipment may result.

11. Repeat step 10 as necessary (approximately three times) until ultra bushing (12) is completely clear of housing (10) and is inside cannister (13).



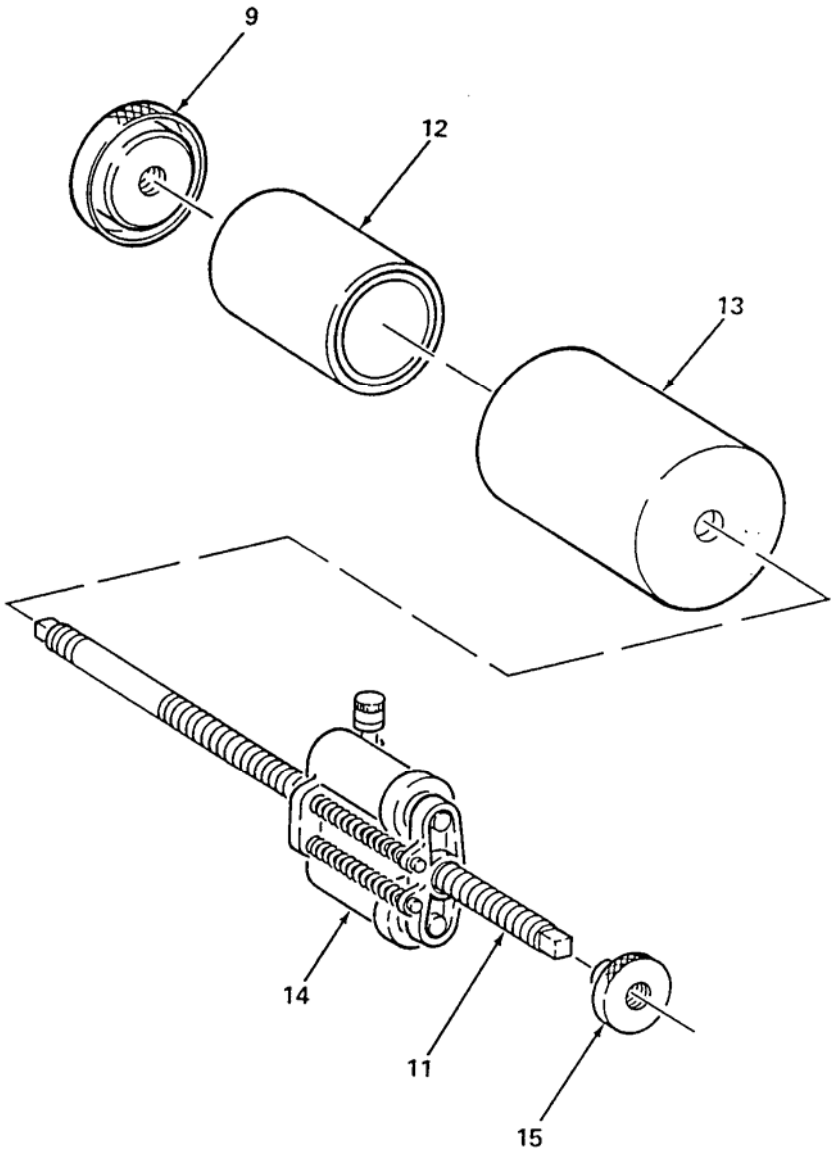
12. Using two persons, firmly hold cannister (13), tap lightly to loosen from housing (10), and carefully lower to the ground.

WARNING

Residual pressure may remain in hydraulic lines. Open fittings slowly and use caution when disconnecting power source from hydraulic ram or injury to personnel may result.

13. Disconnect hydraulic power source from hydraulic ram (14).

14. Remove adjuster (15), hydraulic ram (14), and cannister (13) from shaft (11). Remove puller (9) from shaft (11). Remove ultra bushing (12) from cannister (13).



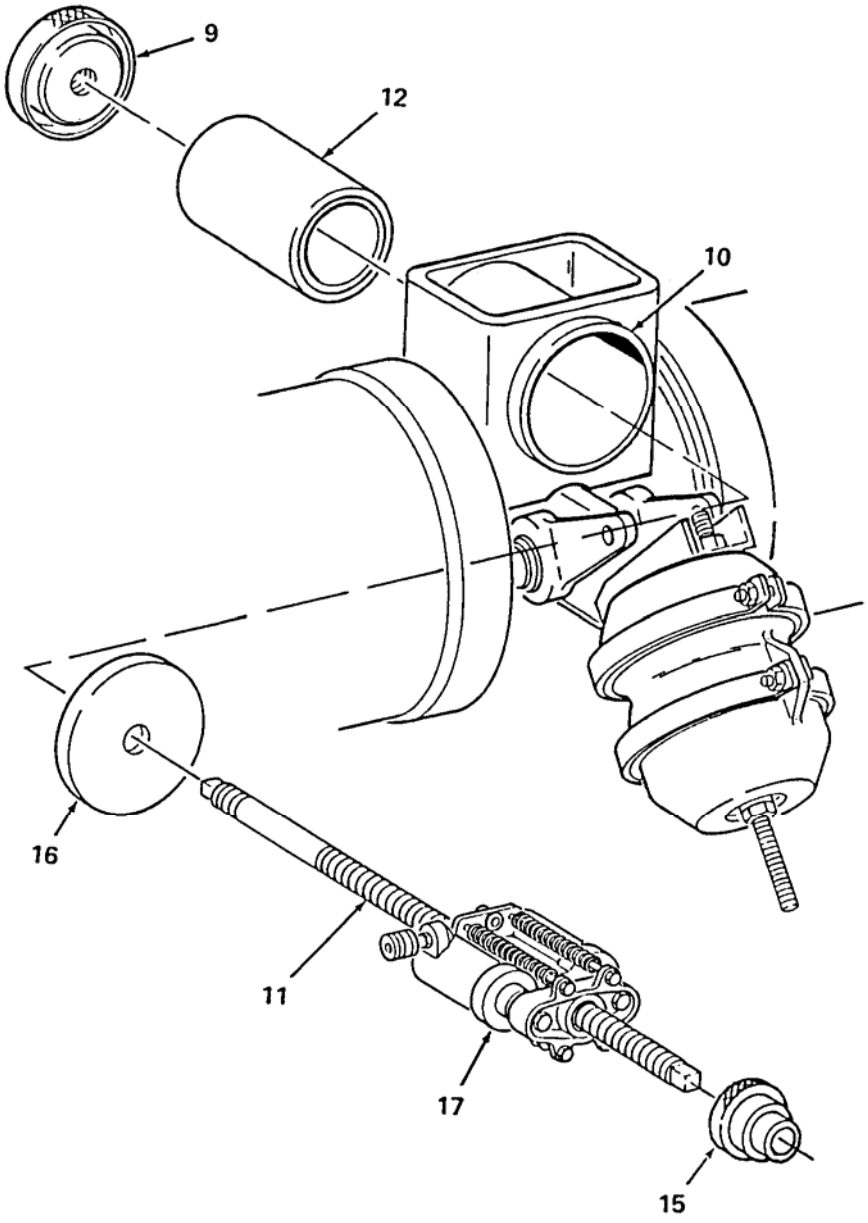
INSPECTION

Check axle bore and ultra bushing exterior and interior for grooves, scratches, corrosion, cracks, or unusual wear. If necessary, use a fine grade of crocus cloth to polish and restore surface finish. Replace ultra bushing as necessary.

5-13. ULTRA BUSHING (CONT)

INSTALLATION

1. Apply grease to inside of housing (10) and outside of ultra bushing (12).



NOTE

Grooved side of backing plate fits over ultra bushing housing; hydraulic ram will snug up to smooth side.

2. Position backing plate (16) onto brake chamber end of ultra bushing housing (10).

3. Insert short threaded end of shaft (11) through backing plate (16) and ultra bushing housing (10) on brake chamber side of axle.

4. Position ultra bushing (12) and puller (9) on ultra bushing housing (10) opposite brake chamber and thread puller (9) on short threaded end of shaft (11) until it bottoms out. At least one thread should be showing.

CAUTION

Use only the 30-ton hydraulic ram for installing the ultra bushing. The 50-ton ram is too large and may damage the brake chamber and mounting bracket.

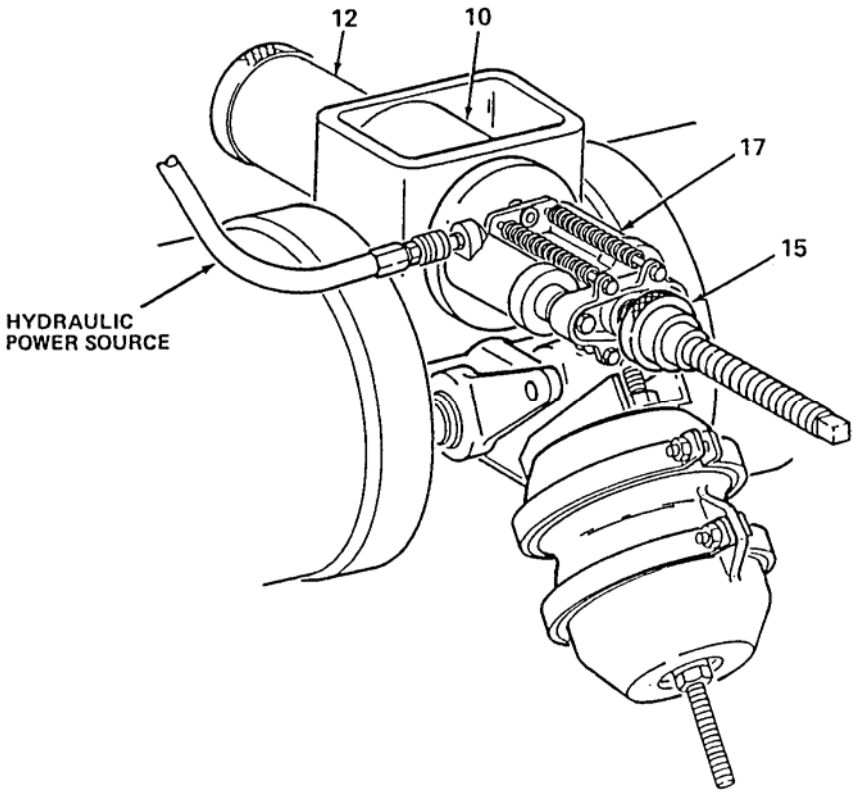
The 30-ton hydraulic ram must be turned parallel to the ground or the hydraulic ram will damage the brake chamber bracket.

5. Install 30-ton hydraulic ram (17) and adjuster (15) onto long threaded end of shaft (11).

CAUTION

Be sure ultra bushing and hydraulic ram are squarely alined with housing to avoid damage to equipment.

6. Tighten adjuster (15) until entire assembly is snug. Be sure ultra bushing (12) and hydraulic ram (17) are squarely alined with ultra bushing housing (10).



5-13. ULTRA BUSHING (CONT)

WARNING

Hydraulic fluid can be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

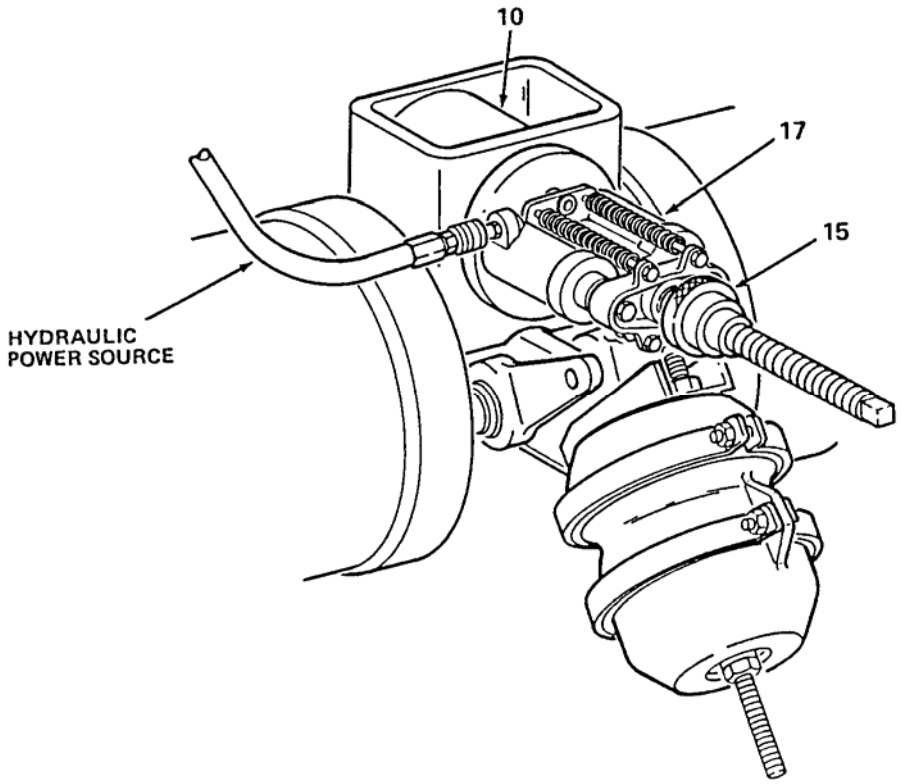
7. Connect hydraulic power source to hydraulic ram (17).

WARNING

Adjuster will be very close to brake chamber bracket. Keep fingers clear of adjuster and brake chamber bracket or injury to personnel may result.

8. Gradually apply hydraulic pressure to hydraulic ram (17) until ultra bushing (12) just starts into housing (10). Stop ram and recheck fixture alinement and interference between hydraulic ram (17) and brake chamber bracket. If misalined, release hydraulic pressure and re-adjust fixtures. Apply pressure until ram (17) has extended full stroke.

9. Relieve pressure and allow return springs to retract ram (17). Tighten adjuster (15) until snug. Reapply pressure until ram (17) extends full stroke. Repeat as required (approximately three times) until ram bottoms out and ultra bushing is centered in ultra bushing housing (10).



WARNING

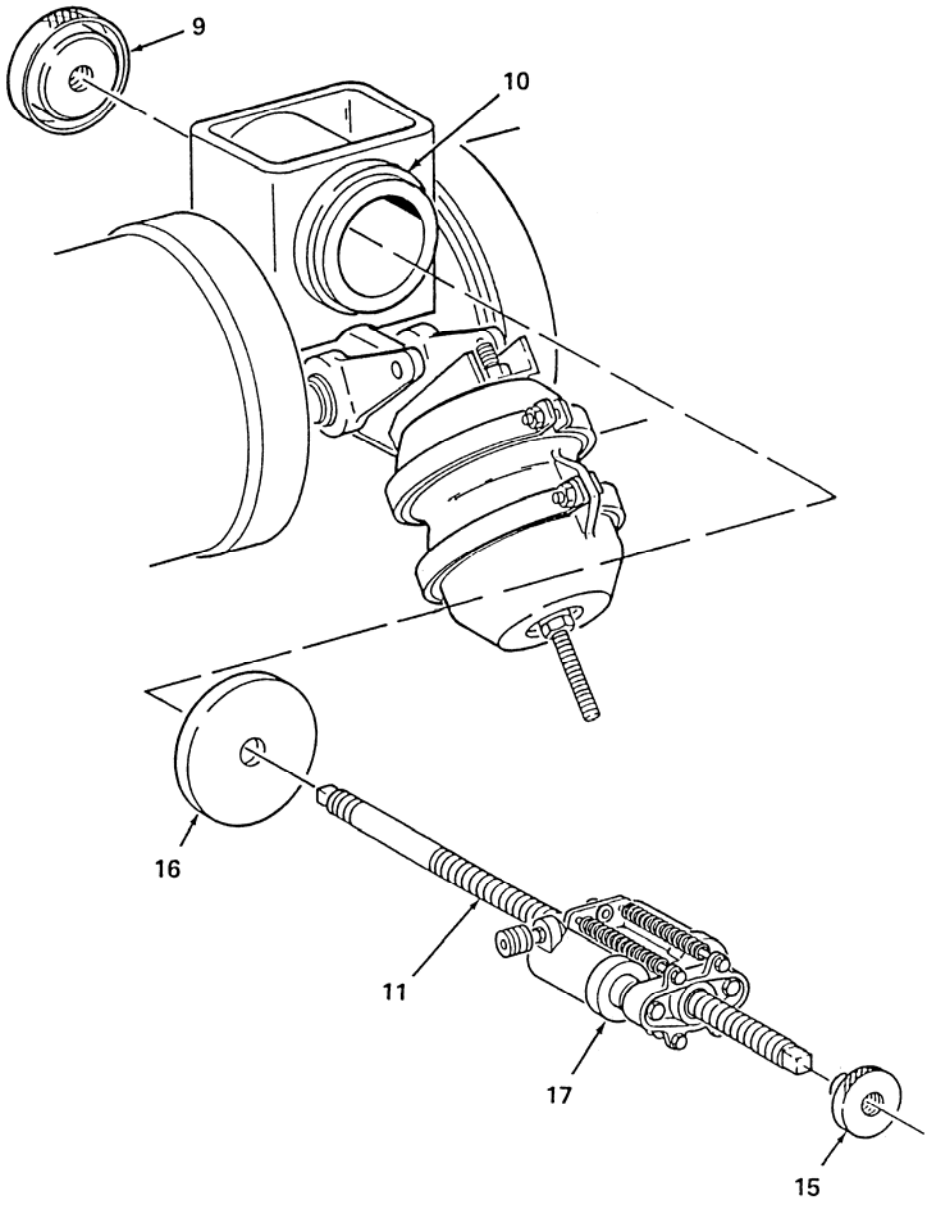
Residual pressure may remain in hydraulic lines. Open fittings slowly and use caution when disconnecting power source from hydraulic ram or injury to personnel may result.

10. Disconnect hydraulic power source from hydraulic ram (17).

CAUTION

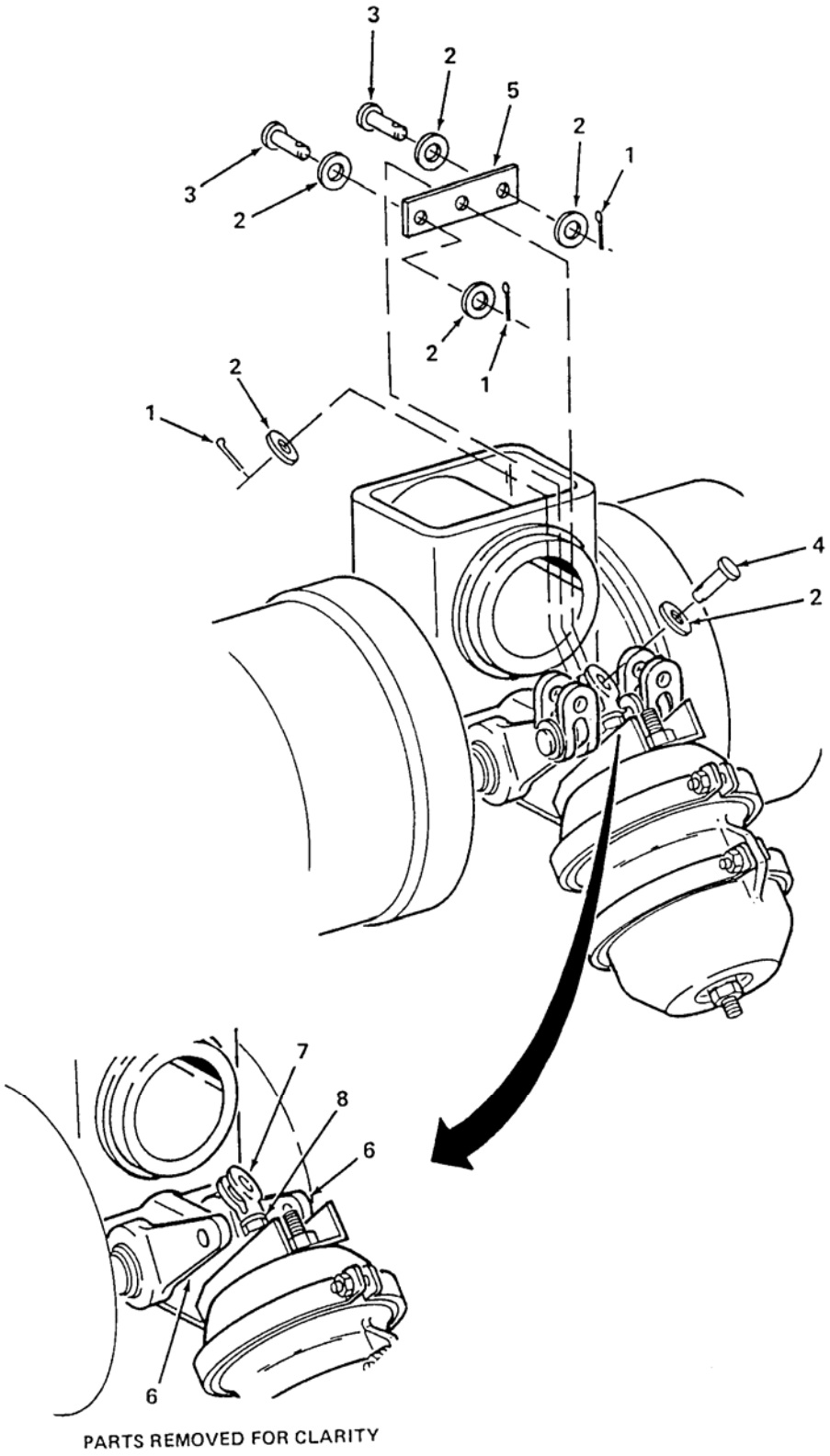
Do not allow shaft to scratch inside bore of ultra bushing or premature failure or damage to equipment may result.

11. Remove puller (9) and adjuster (15) from shaft (11). Remove hydraulic ram (17), backing plate (16), and shaft (11) from ultra bushing housing (10).



5-13. ULTRA BUSHING (CONT)

12. While holding jam nut (8), install and tighten brake chamber clevis (7).



NOTE

Pin (4), which goes through the brake chamber clevis (7), is shorter than the other two pins (3).

13. Install crossbar (5) on two slack adjusters (6) and brake chamber clevis (7) and secure with pin (4), two pins (3), six washers (2), and three cotter pins (1).

14. Uncage brakes (para. 2-33).

FOLLOW-ON MAINTENANCE

1. Install axle (para. 5-12).

2. Install wheels (para. 3-7 thru 3-10).

3. Adjust brakes (para. 4-15).

5-14. LOWER SUSPENSION ARM CYLINDER PIN

This task covers removal.

INITIAL SETUP

Tools

Lower suspension arm cylinder pin removal kit, item 26, appx. B
Portable hydraulic ram, 50 ton, item 30, appx. B
Hydraulic power source, item 2, appx. B
Hydraulic hose, item 2, appx. B
The following tools can be found in field maintenance basic tool kit, item 14, appx. B:

Extension light, 24 ft	Wrench, 1-5/16"
Lubricating handgun	Sledge hammer, 10 lb
Degreaser tank, 20 gl	Goggles, industrial
Hydraulic floor jack, 10 ton	Gloves, chemical and oil protective

Personnel Required: 2

Equipment Condition

Platform adjusted to 50 inch (127 cm) height (para. 2-19)
All suspension isolation valves closed (para. 2-6)
All four wheels removed from affected bogie (para. 3-7 thru 3-10)
Paragraph 4-41, steps 1 thru 22 performed

5-14. LOWER SUSPENSION ARM CYLINDER PIN (CONT)

NOTE

The following procedure is to be performed by DS maintenance if the lower suspension arm cylinder pin cannot be removed by unit maintenance.

At this point, the affected bogie should be turned outboard, a hydraulic jack should be supporting the bogie, and 2 - 3 inches of suspension cylinder shaft should be exposed.

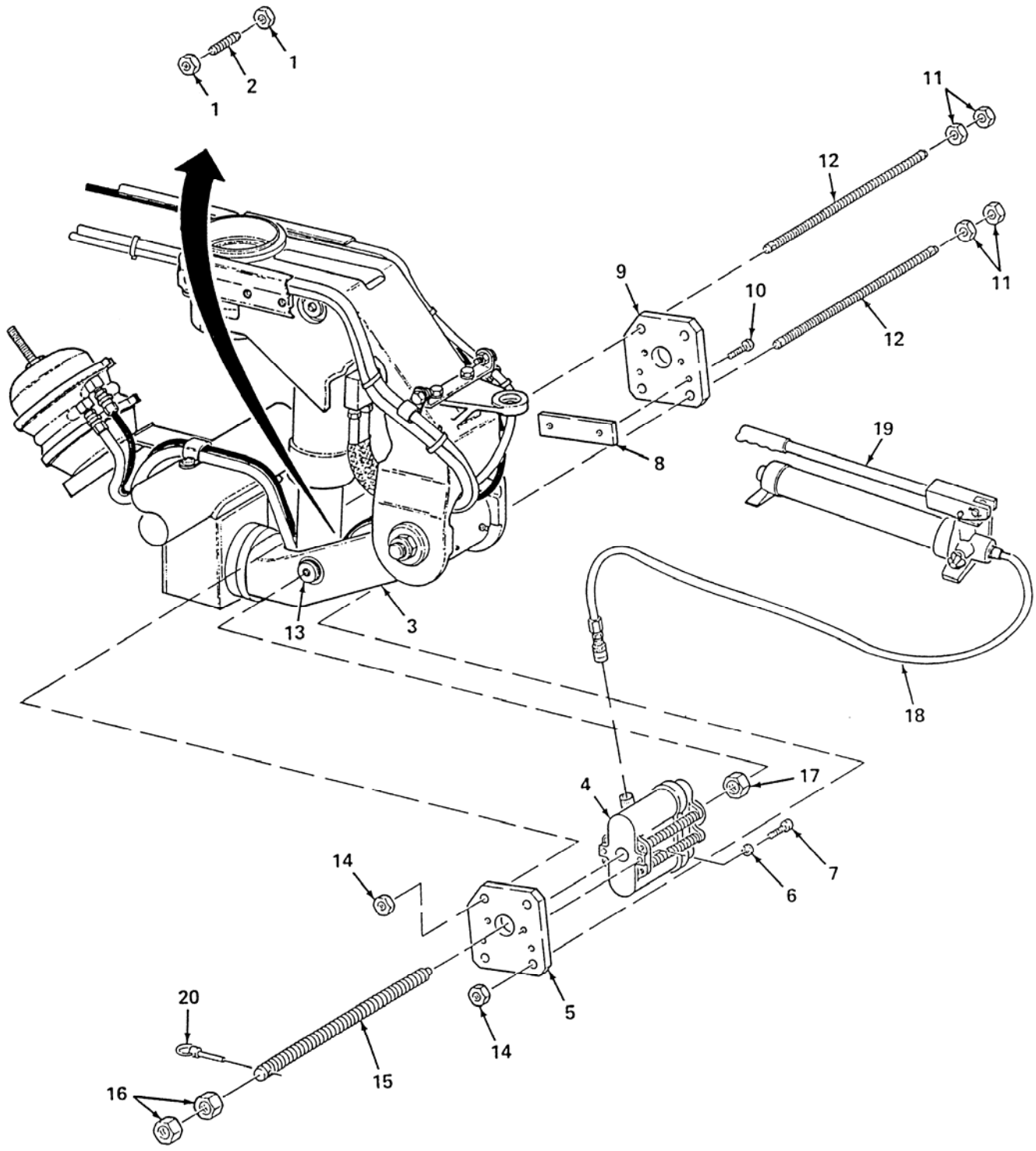
REMOVAL

1. Install two nuts (1) on spreader (2) and install in lower suspension arm (3). Tighten two nuts (1) finger tight.
2. Install ram (4) on plate (5) and secure with two lockwashers (6) and screws (7).
3. Install spacer (8) on plate (9) and secure with two screws (10).
4. Install two nuts (11) just inside of holes on each of two upper rods (12); then, slide both rods (12) through plate (9).
5. Place plate (9) and two upper rods (12) over lower suspension arm (3).

WARNING

The cylinder pin removal kit, when assembled, weighs in excess of 80 pounds (36.3 kg). Use two persons to lift the assembled kit or injury to personnel may result.

6. Using two persons, raise ram (4) into position with moving part of ram toward grease fitting hole in lower suspension arm cylinder pin (13), and slide upper holes in plate (5) over two upper rods (12) and secure with nut (14) on each rod (12).
7. Install two nuts (11) just inside of holes on each of two lower rods (12); then, slide both rods (12) through plate (9) and plate (5). Install two nuts (14).
8. Position rod (15) so that extended tip will seat into grease fitting cavity in lower suspension arm cylinder pin (13) and slide adjustment rod (15) through ram (4). Install two nuts (16) and push adjustment rod (15) into grease fitting cavity. Install nut (17) and tighten against ram (4).
9. Tighten four nuts (14) evenly.
10. Using a 1-5/16-inch wrench, tighten nuts (16) against each other just inside pin hole in adjustment rod (15).



11. Connect hose (18) and hand pump (19) to ram (4). Operate hand pump and apply slight pressure to adjustment rod (15). Check alinement of all parts to ensure lower suspension arm cylinder pin (13) is in center of hole in plate (9).

5-14. LOWER SUSPENSION ARM CYLINDER PIN (CONT)

WARNING

When the ram is under pressure, keep personnel away from hole in plate. Cylinder pin could come out suddenly and injury to personnel may result.

12. Operate hand pump (19). When ram (4) extends full length, release pressure. As operator bleeds off hydraulic pressure on hand pump, hand tighten nut (17) against ram (4) and use pin (20) to turn adjustment rod (15), keeping rod snug in grease fitting cavity. Tighten nut (17) against ram (4).

13. If ram is unable to start cylinder pin (13) moving, remove pin (20) and position two nuts (16) flush with end of rod adjustment (15) and lock (jam) together. Strike end of adjustment rod (15) with a 10-pound sledge hammer until pin (13) begins moving.

14. Operate hand pump (19) through two full extensions of ram (4) until cylinder pin (13) is removed.

15. Disconnect hand pump (19) and hose (18).

16. Remove nut (17) from adjustment rod (15), remove pin (20), and then remove two nuts (16).

17. Remove nut (14) from each lower rod (12) and remove both lower rods (12). Remove two nuts (11) from each lower rod (12).

18. Remove nut (14) from each upper rod (12). Use two persons to hold ram (4) and slide ram (4) off of two upper rods (12). Remove two nuts (11) from each upper rod (12).

19. Remove two screws (7), lockwashers (6), and ram (4) from plate (5).

20. Remove two screws (10) and spacer (8) from plate (9).

21. Remove spreader (2) and two nuts (1) from lower suspension arm (3).

5-15. LOWER SUSPENSION ARM

This task covers: a. Removal b. Disassembly c. Inspection d. Assembly e. Installation

---

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Chain or strap, item 9 or 31, appx. B
Softfaced hammer, item 14, appx. B
Hydraulic floor jack, 10 ton, item 14, appx. B
Measuring tape, 6 ft, item 14, appx. B
Feeler gage set, 20 blade set, item 18, appx. B

Materials/Parts

Wood block
Antiseize compound, item 3, appx. E
Locknut
Plain seal (2)
Crocus cloth, item 6, appx. E
Dry cleaning solvent, item 26, appx. E
Pipe sealant, item 18, appx. E

Personnel Required: 2

Equipment Condition

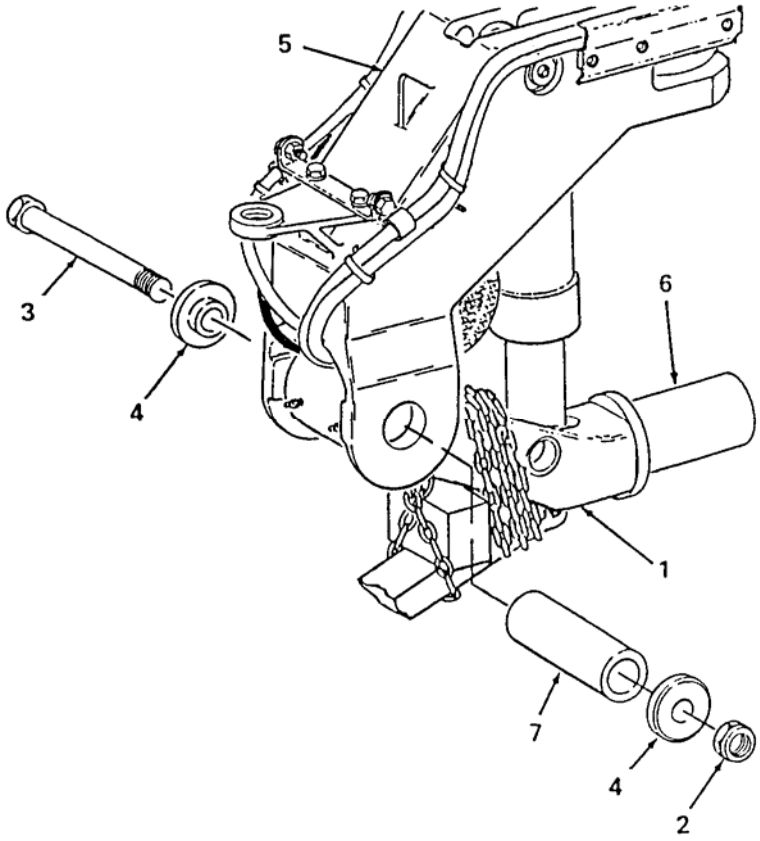
Axle removed (para. 5-12)
If axle remains installed, wheels removed (para. 3-7 thru 3-10)

REMOVAL

WARNING

Ensure floor jack is properly supporting lower suspension arm during removal or injury to personnel may result.

1. Place wood block under lower suspension arm (1) and secure wood block and lower suspension arm (1) to hydraulic floor jack with chain or strap.



5-15. LOWER SUSPENSION ARM (CONT)

2. Check position of hydraulic floor jack and make adjustments as necessary.

3. Remove suspension cylinder lower cylinder mounting pin from lower suspension arm (para. 4-41).

4. Remove locknut (2), hex head screw (3), and two access covers (4) from upper and lower suspension arms (5 and 1). Discard locknut.

5. Using tape measure, measure from ground to top of spindle (6). Record measurement.

NOTE

With suspension in its normally installed position, the smaller end of the shouldered shaft points toward curbside. Thus, on curbside suspensions, the smaller end will be outboard, and on streetside suspensions, the smaller end will be inboard.

6. Using hammer and drift, drive shouldered shaft (7) from lower suspension arm (1).

7. Using two people, separate lower suspension arm (1) from upper suspension arm (5) by pulling hydraulic jack, with lower suspension arm (1) attached, away from upper suspension arm (5).

DISASSEMBLY

1. Remove two plain seals (8) from lower suspension arm (1). Discard plain seals.

2. Using hammer and brass drift, drive two sleeve bearings (9) from lower suspension arm (1).

3. Remove two grease fittings (10) from lower suspension arm (1).

INSPECTION

WARNING

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials, and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

1. Inspect lower suspension arm casting and attaching hardware for cracks, gouges, bends, and corrosion. Clean with dry cleaning solvent. Replace any parts found defective.

2. Remove nicks and polish scored spindle surface with crocus cloth. If casting has defects, replace casting.

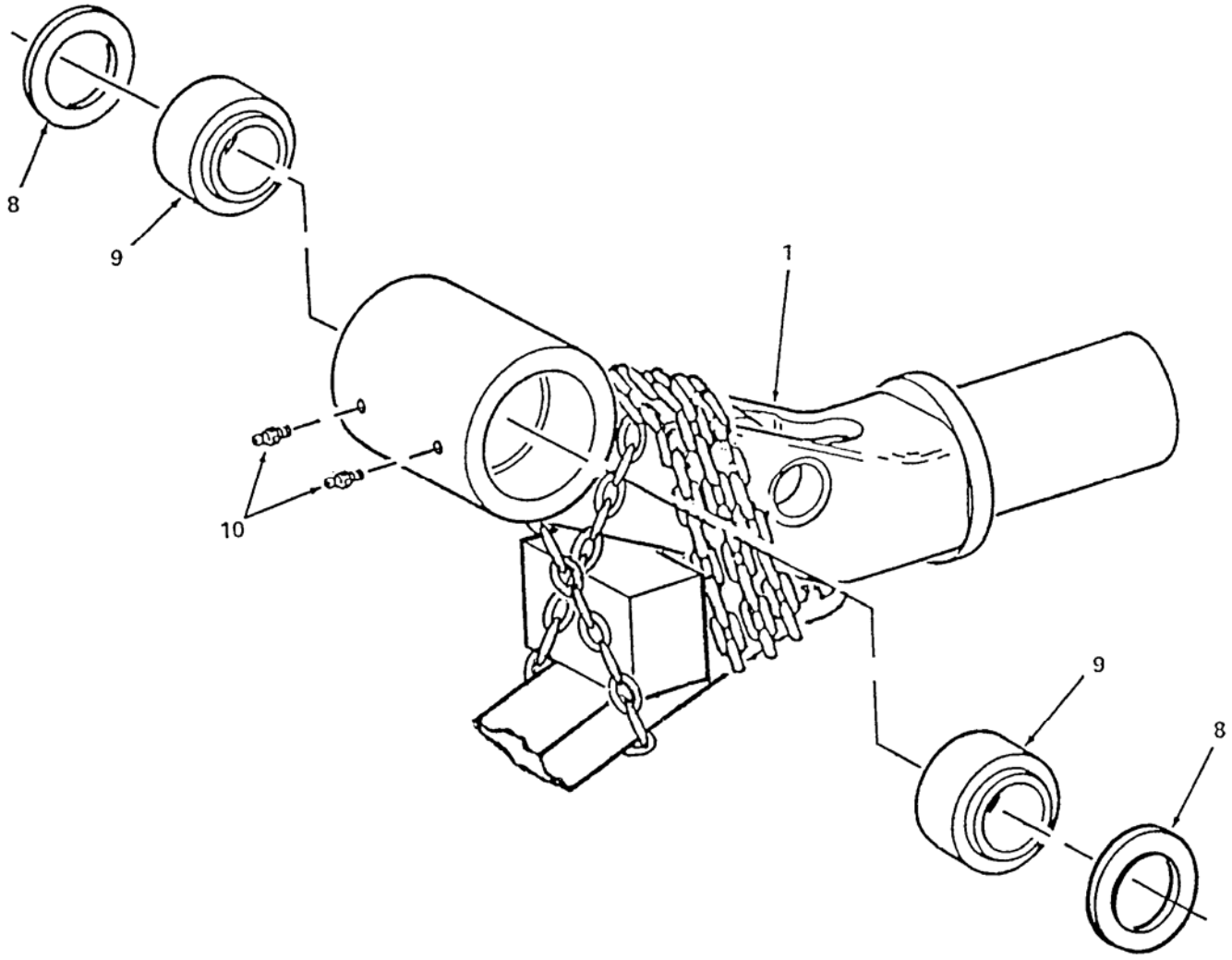
ASSEMBLY

1. Apply pipe sealant to threads of two grease fittings (10); then, install in lower suspension arm (1). When fittings are tight, nipples must point upward.

2. Apply antiseize compound to two sleeve bearings (9) and bore of lower suspension arm (1).

3. Using softfaced hammer, install two sleeve bearings (9) into lower suspension arm (1).

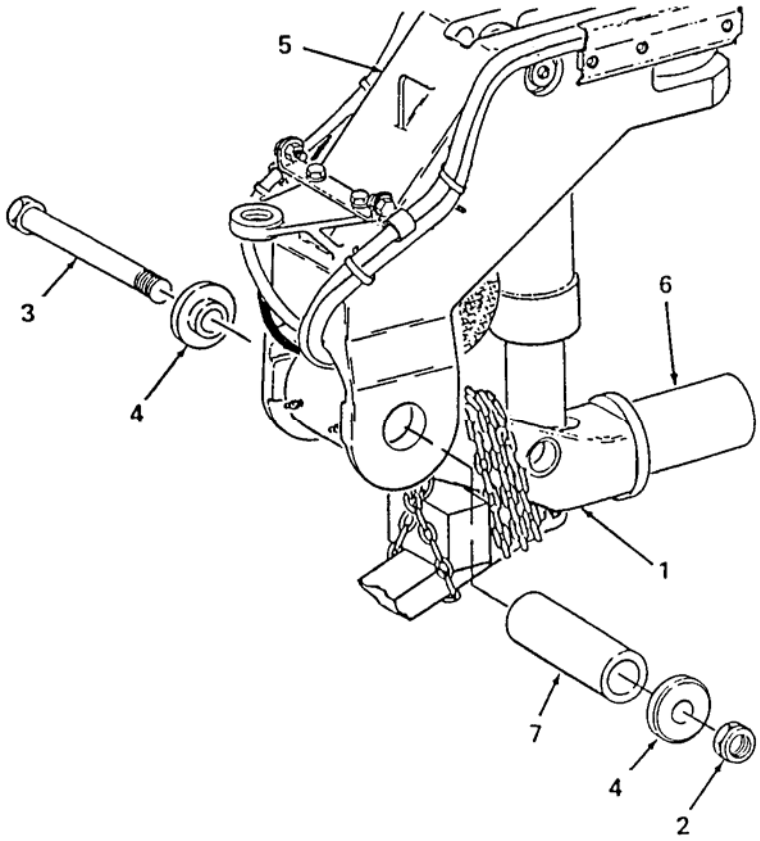
4. Install two plain seals (8) to lower suspension arm (1).



5-15. LOWER SUSPENSION ARM (CONT)

INSTALLATION

1. Using two people to maneuver hydraulic jack supporting lower suspension arm (1), aline lower suspension arm (1) with upper suspension arm (5).



2. Apply antiseize compound to inside bore of assembly joint for both upper and lower suspension arms (5 and 1) and to exterior of shouldered shaft (6).

3. Insert smaller end of shouldered shaft (7) through larger bore in upper suspension arm (5) and into bore in lower suspension arm (1) until shaft movement is stopped by lip at bearing oil seal.

4. Using a 0.015-inch blade, on 20-blade feeler gage set, inserted in smaller bore of upper suspension arm (5), carefully adjust position of lip of bearing oil seal up onto small end of shouldered shaft (7).

5. Using softfaced hammer, drive shouldered shaft (7) into upper and lower suspension arms (5 and 1).

6. Install two access covers (4), hex head screw (3), and locknut (2) to upper and lower suspension arms (5 and 1).

NOTE

Cylinder may have to be compressed using hydraulic jack to allow pin installation.

7. Aline and install suspension cylinder lower cylinder mounting pin to lower suspension arm (1) (para. 4-41).

8. Remove chain or strap and wood block. Leave hydraulic jack in place.

9. Using hydraulic jack, adjust height of spindle to measurement previously recorded.

FOLLOW-ON MAINTENANCE

1. Install axle (para. 5-12).

2. Perform required lubrication to suspension assembly (para. 3-3).

5-16. CONNECTING LINK

This task covers: a. Disassembly b. Assembly

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Arbor press, item 14, appx. B

Materials/Parts

Antiseize compound, item 3, appx. E
Thread locking compound, item 21, appx. E

Equipment Condition

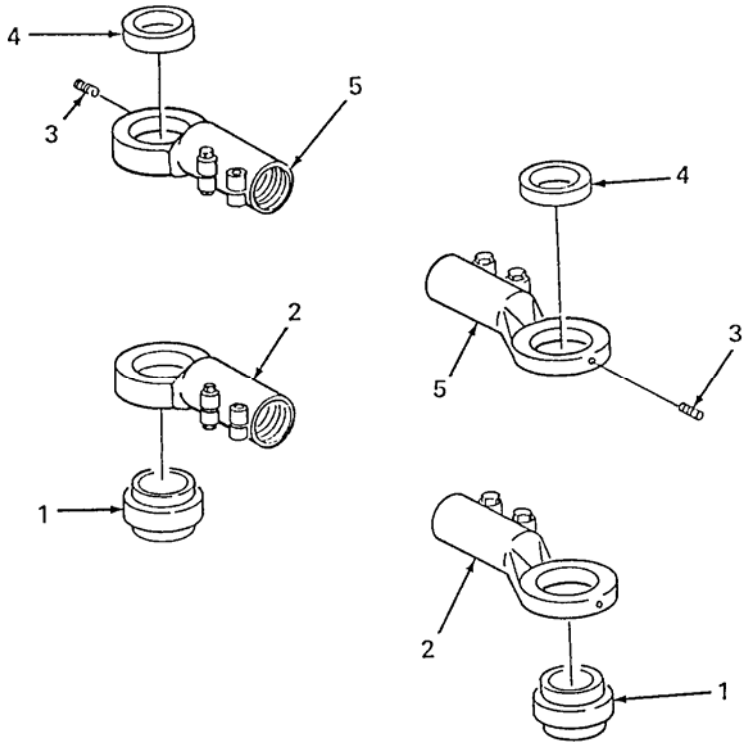
Connecting link removed (para. 4-52)

5-16. CONNECTING LINK (CONT)

DISASSEMBLY

1. On steering connecting link, use an arbor press to press two sleeve bearings (1) from connecting link rod ends (2).

2. On nonsteering connecting link, remove two setscrews (3) and use an arbor press to press two plain bearings (4) from connecting rod ends (5).



ASSEMBLY

1. On nonsteering connecting rods, apply antiseize compound to two plain bearings (4) and use an arbor press to install in connecting link rod ends (5).

2. Apply thread locking compound to two setscrews (3) and install setscrews (3) into connecting link rod end (5).

NOTE

The sleeve bearings are not symmetrical. One side has more urethane material protruding from the steel sleeve. Ensure that the side with more material is pointed down when installed.

3. On steering connecting rods, use an arbor press to install two sleeve bearings (1) into connection link rod ends (2).

FOLLOW-ON MAINTENANCE

Install axle (para. 5-12).

5-17. DELETED

ALL DATA ON PAGES 5-53 THRU 5-68 DELETED.

5-18. STEERING CONSOLE AND SLIDE SHAFT ASSEMBLY

This task covers: a. Removal c. Inspection e. Installation
b. Disassembly d. Assembly

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Suspension mandrel, item 6, appx. B
Chain or strap, item 9 or 31, appx. B
Softfaced hammer, item 14, appx. B
Arbor press, item 14, appx. B
Crowbar, item 14, appx. B

Materials/Parts

Grease, item 12, appx. E
Thread locking compound, item 21, appx. E
Antiseize compound, item 3, appx. E
Electrical tiedown strap (as required), item 27, appx. E
Crocus cloth, item 6, appx. E
Dry cleaning solvent, item 26, appx. E
Lockwasher
Ring spacer (2)
Recessed spacer
Lockwasher (8)
Lockwasher (8)

Personnel Required: 2

Equipment Condition

Both gooseneck steering cylinders removed (para. 4-55)
Solar battery charger removed (some semitrailers) (para. 4-30.1)

General Safety Instructions

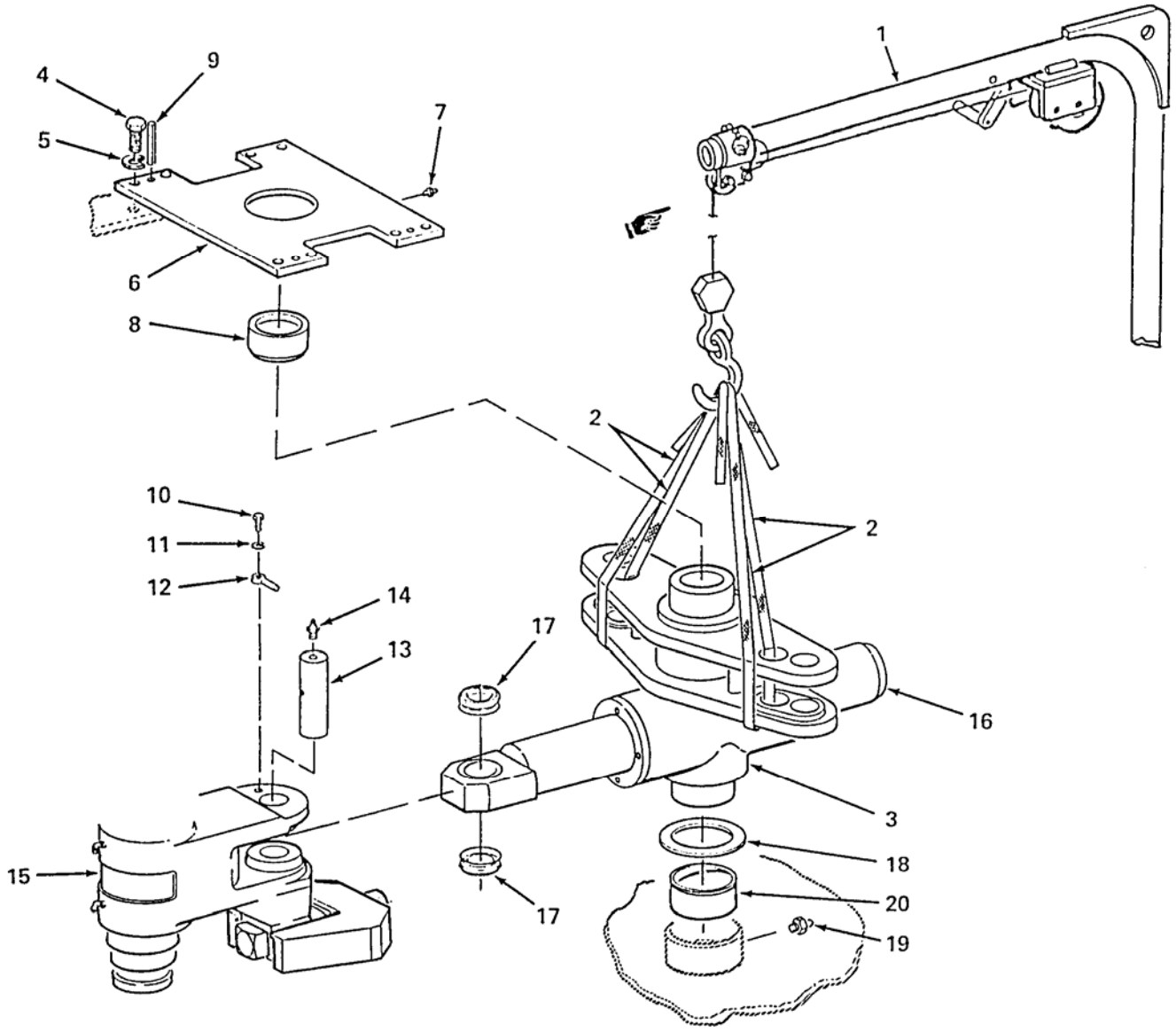
WARNING

The steering column housing is heavy and must be supported the entire time work is performed or injury to personnel may result.

5-18. STEERING CONSOLE AND SLIDE SHAFT ASSEMBLY (CONT)

REMOVAL

1. Using davit (1) and two lifting straps (2), wrap two lifting straps (2) through inside eyes of steering column housing (3). Attach one end of each lifting strap (2) to hook on davit (1) and take up slack in straps.



2. Remove eight capscrews (4) and lockwashers (5) from gooseneck. Discard lockwashers.

3. Using crowbar and two people, pry up and remove mending plate (6) from top of gooseneck and remove lubrication fitting (7) from mending plate (6).

NOTE

If sleeve bearing is to be removed, the sleeve bushing must be replaced.

4. If necessary, using a hammer and brass drift, remove sleeve bushing (8) from mending plate (6). If removed, discard sleeve bearing.

5. If damaged, drive three spring pins (9) from gooseneck.

6. Remove bolt (10), lockwasher (11), and rod end connector (12) from straight shouldered pin (13). Discard lockwasher.

7. Remove lubrication fitting (14) from straight shouldered pin (13).

NOTE

Pins must be pulled upward through steering gear arm opening.

8. Grip top of straight shouldered pin (13) and, while twisting pin side to side, pull up and remove straight shouldered pin (13) from steering gear arm (15).

NOTE

The two ring spacers may fall to the ground while slide shaft assembly is being removed.

9. Rotate steering column housing (3) so that slide shaft assembly (16) clears steering gear arm (15). Pick up or remove two ring spacers (17) from slide shaft assembly (16). Discard two ring spacers.

10. Push steering gear arm (15) as far as possible toward curbside of gooseneck.

11. Secure slide shaft assembly (16) to steering column housing (3) using electrical tiedown straps.

12. Rotate steering column housing (3) toward streetside of gooseneck and, using two people, davit (1), and crowbar, pry up and hoist steering column housing (3) up and out of gooseneck.

13. Using two people and davit (1), maneuver and lower steering column housing (3) to the ground. Remove two straps (2) from hook on davit (1).

14. Remove recessed spacer (18) and lubrication fitting (19) from gooseneck. Discard recessed spacer.

15. Remove electrical tiedown straps from slide shaft assembly (16) and steering column housing (3). Using two people, pull slide shaft assembly (16) completely out of steering column housing (3).

5-18. STEERING CONSOLE AND SLIDE SHAFT ASSEMBLY (CONT)

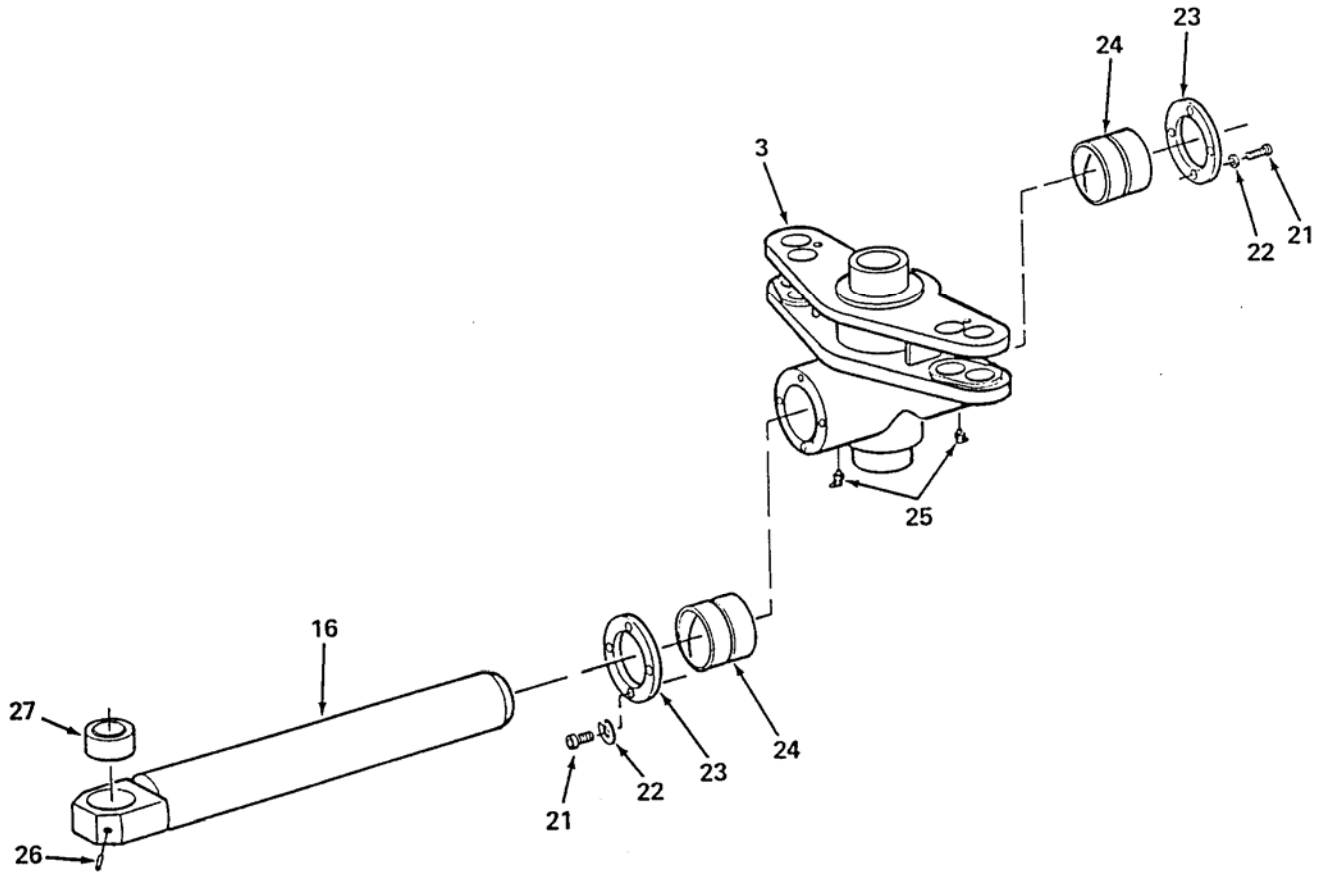
NOTE

If sleeve bearing is removed, the sleeve bearing must be replaced.

16. If necessary, remove sleeve bearing (20) from gooseneck. If removed, discard sleeve bearing.

DISASSEMBLY

1. Remove eight capscrews (21), lockwashers (22), and two access covers (23) from steering column housing (3). Discard lockwashers.



2. Drive two sleeve bearings (24) from steering column housing (3). Remove two lubrication fittings (25) from steering column housing (3).

3. Remove setscrew (26) and, using an arbor press, press bearing (27) from slide shaft assembly (16).

INSPECTION

1. Inspect steering column housing and related parts for corrosion, nicked surfaces, scored bearing surfaces, and any breaks in casting.

WARNING

Dry cleaning solvent MIL-PRF-680 is used to clean parts and is potentially dangerous to personnel and property. Extinguish all smoking materials, and do not allow sparks or open flames near the work area. Use skin and eye protection and work in a well-ventilated area. Flash point of dry cleaning solvent is 200°F (93°C).

2. Clean all components with dry cleaning solvent and rags.

3. Clean corrosion with crocus cloth.

ASSEMBLY

1. Apply antiseize compound to exterior and interior of bearing (27) and, using an arbor press, press bearing (27) into slide shaft assembly (16).

2. Apply thread locking compound to threads of setscrew (26) and install setscrew (26) into slide shaft assembly (16) to secure bearing (27).

3. Install two lubrication fittings (25) onto steering column housing (3).

4. Apply grease to inner bore of steering column housing (3) and interior and exterior of two sleeve bushings (24). Install two sleeve bushings (24) into steering column housing (3).

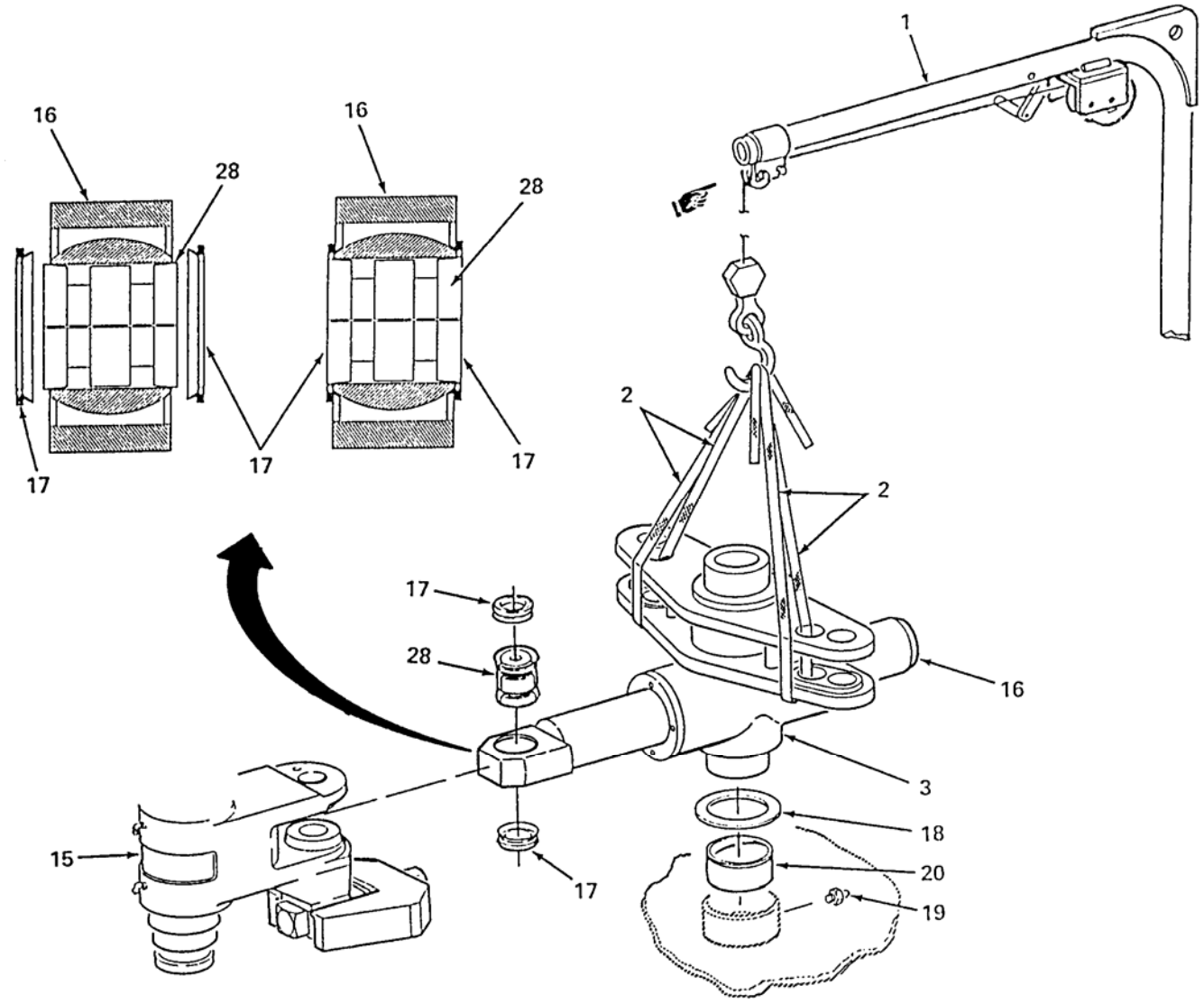
5. Install two access covers (23) onto steering column housing (3) and secure with eight capscrews (21) and lockwashers (22).

6. Apply grease to slide shaft assembly (16) and install slide shaft assembly (16) into steering column housing (3).

5-18. STEERING CONSOLE AND SLIDE SHAFT ASSEMBLY (CONT)

INSTALLATION

1. Apply antiseize compound to exterior of sleeve bushing (20) and, using a softfaced hammer, drive sleeve bushing (20) into gooseneck.



NOTE

A large amount of grease applied to recessed spacer helps to hold the spacer in place during installation of steering column housing.

2. Liberally apply grease to recessed spacer (18) and place recessed spacer (18) over sleeve bushing (20).

3. Install lubrication fitting (19) into gooseneck.

4. Aline and install suspension mandrel (28) into bearing of slide shaft assembly (16).

CAUTION

Both ring spacers must be completely compressed and must uniformly cover/expand over bearing of slide shaft assembly prior to tightening suspension mandrel or not enough clearance will be available for installation and damage to equipment may result.

NOTE

Each ring spacer is actually made of two pieces which if not handled carefully can be separated.

5. Aline two ring spacers (17) over each end of suspension mandrel (28). Compress each ring spacer (17) flush onto bearing of slide shaft assembly (16) and tighten adjusting bolt in suspension mandrel (28) to secure both ring spacers in place.

6. Using two people and davit (1), raise steering column housing (3) up above gooseneck. Then, rotate davit (1) and lower steering column housing (3) back down into place in gooseneck.

7. Position slide shaft assembly (16) to a height even with slide shaft assembly mounting point on steering gear arm (15).

CAUTION

When installing slide shaft assembly to steering gear arm, be sure ring spacers do not work loose or become misalined. If spacers are misalined or work loose, stop the installation and remove slide shaft assembly or damage to the spacers may result. It may take a few attempts to accomplish proper spacer installation.

Be sure head of suspension mandrel adjusting bolt, in center of the mandrel, faces upward during installation or you will be unable to loosen the bolt and/or remove the mandrel once slide shaft assembly is in place.

8. Using two people, carefully maneuver bearing end of slide shaft assembly (16) into steering arm gear (15) making sure head of adjusting bolt inside suspension mandrel (28) is facing upward. Check condition of both ring spacers (17) during entire installation.

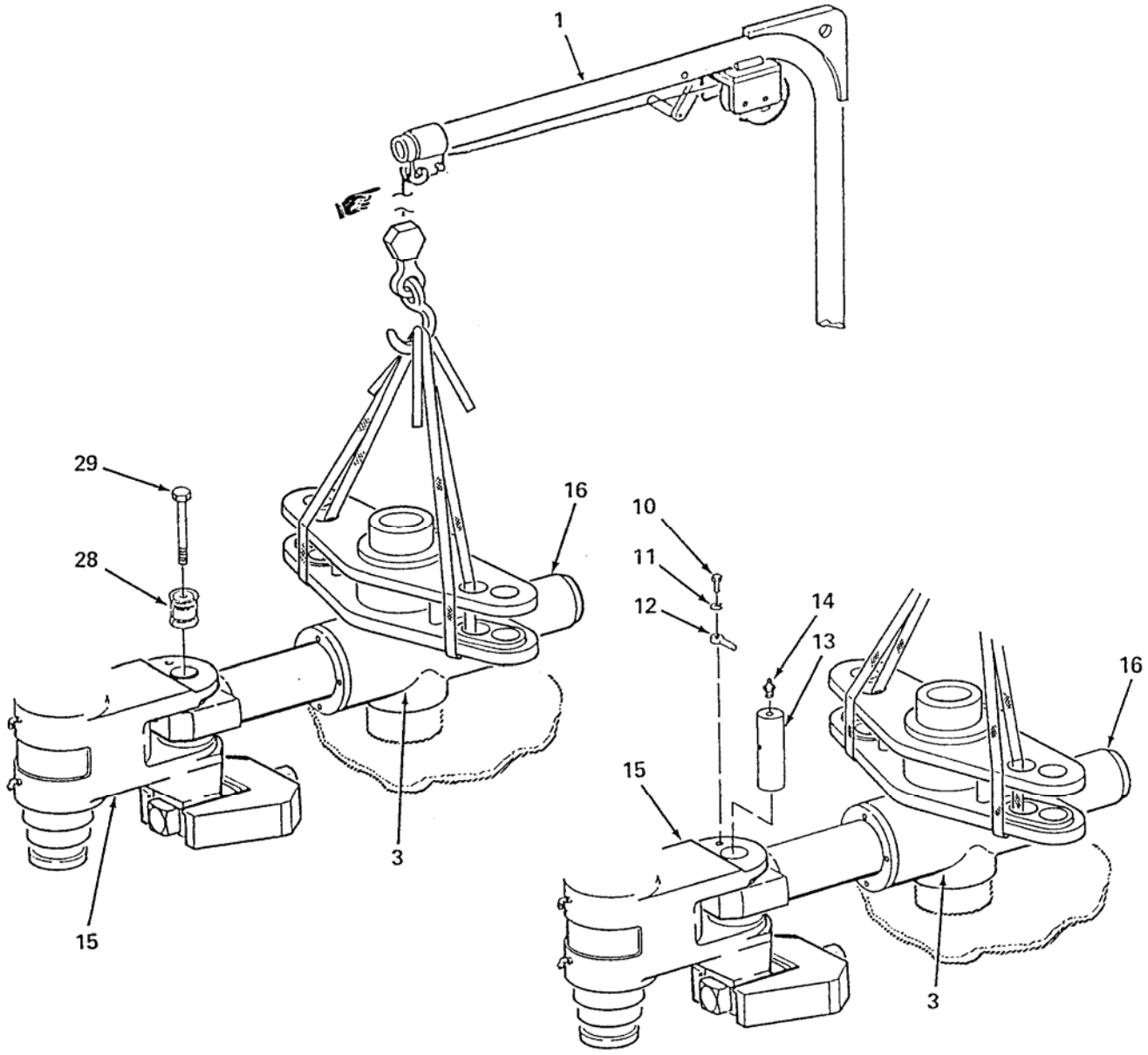
NOTE

During installation of bearing end of slide shaft assembly, one person can observe the position of the cylinder by looking through the hole at the top of steering gear arm.

9. Once slide shaft assembly (16) is in place, loosen and remove adjusting bolt from suspension mandrel (28).

5-18. STEERING CONSOLE AND SLIDE SHAFT ASSEMBLY (CONT)

10. Aline and install special bolt (29) into suspension mandrel (28). Start to tighten special bolt (29) into mandrel.



11. Once threads of special bolt (29) start to engage into suspension mandrel (28), pull up on special bolt (29) and remove both special bolt (29) and suspension mandrel (28) from steering gear arm (15).

12. Remove special bolt (29) from suspension mandrel (28) and reinstall original bolt back into mandrel.

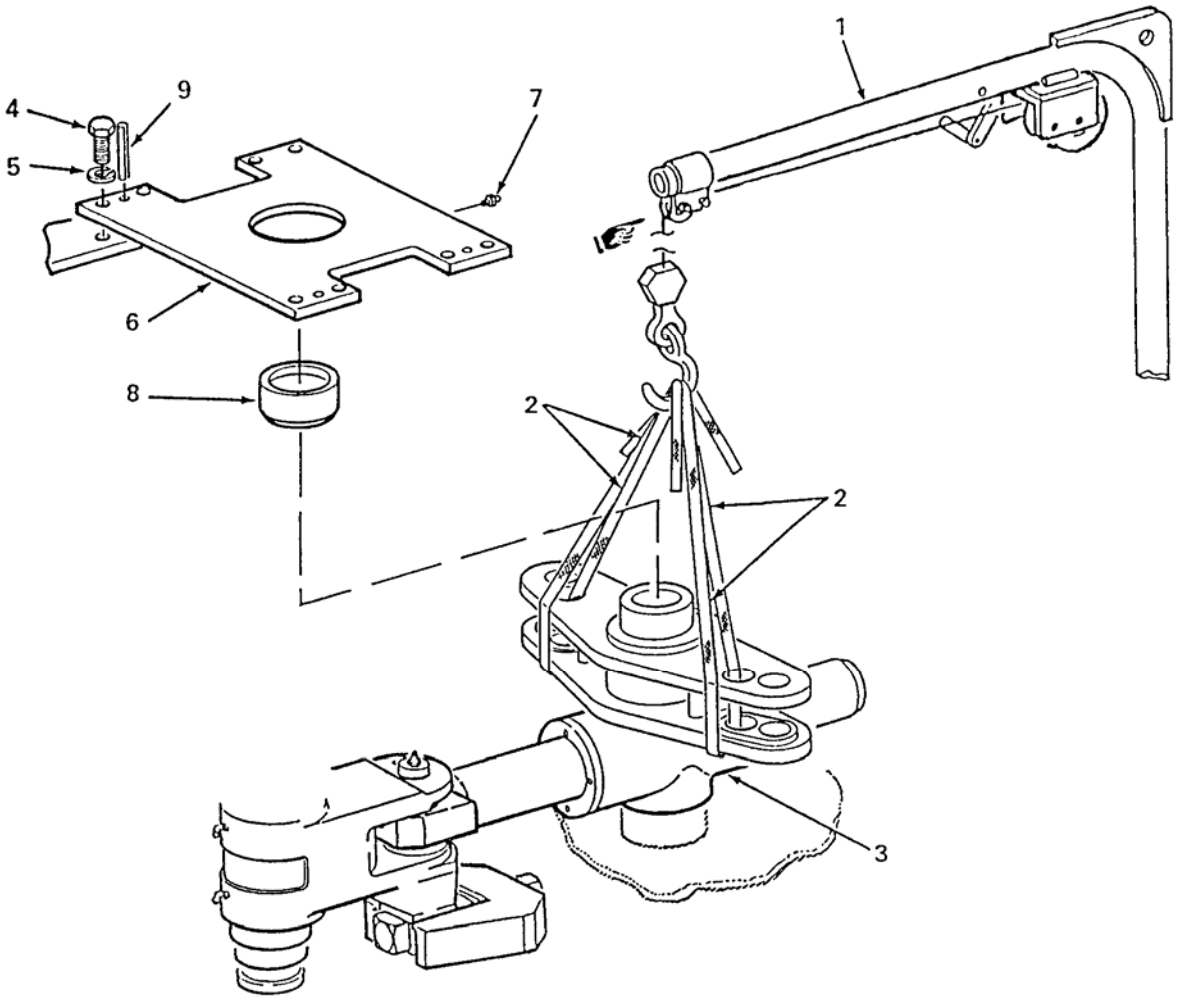
13. Apply antiseize compound to straight shouldered pin (13) and position pin so that hole for rod end connector (12) is in alinement.

14. Aline and install rod end connector (12) into straight shouldered pin (13) and, using a softfaced hammer, drive straight shouldered pin (13) through top of steering gear arm (15) and into slide shaft assembly (16).

15. Secure rod end connector (12) with screw (10) and lockwasher (11).

16. Install lubrication fitting (14) into straight shouldered pin (13).

17. Remove two lifting straps (2) and davit (1) from steering column housing (3). Restow davit (1).



18. Install three spring pins (9) to gooseneck.

19. Apply antiseize compound to exterior of sleeve bushing (8) and, using a softfaced hammer, drive sleeve bushing (8) into mending plate (6).

20. Install lubrication fitting (7) into mending plate (6).

21. Aline mending plate (6) over steering column housing (3) and three spring pins (9). Using two people, lower mending plate (6) onto three spring pins (9) and steering column housing (3).

22. Secure mending plate (6) to gooseneck by installing eight lockwashers (5) and capscrews (4).

5-18. STEERING CONSOLE AND SLIDE SHAFT ASSEMBLY (CONT)

FOLLOW-ON MAINTENANCE

1. Install steering (master) cylinders (para. 4-55).

1.1. Install solar panel (some semitrailers) (para. 4-30.1).

2. Perform required lubrication (para. 3-3).

3. Couple tractor/semitrailer (para. 2-24).

4. Manually steer semitrailer and check for proper operation (para. 2-21).

5-19. KINGPIN AND STEERING ARM

This task covers: a. Removal b. Disassembly c. Inspection d. Assembly e. Installation

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INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Lifting strap, item 31, appx. B
The following tools can be found in field maintenance basic tool kit, item 14, appx. B:
- Torque wrench, 3/4", 0-600 lb-ft
- Adapter, socket, 3/4" female-1" male
- Socket, 1" drive, 3" opening
- Socket wrench set, 1" drive

Materials/Parts

Grease, item 12, appx. E
Antiseize compound, item 3, appx. E
Crocus cloth, item 6, appx. E
Lockwasher
Lockwasher (2)
Lockwasher
Suspension spacer (2)

Personnel Required: 2

Equipment Condition

Steering console and slide shaft assembly removed (para. 5-18)

General Safety Instructions

WARNING

The kingpin and steering arm are heavy and must be supported the entire time work is performed or injury to personnel may result.

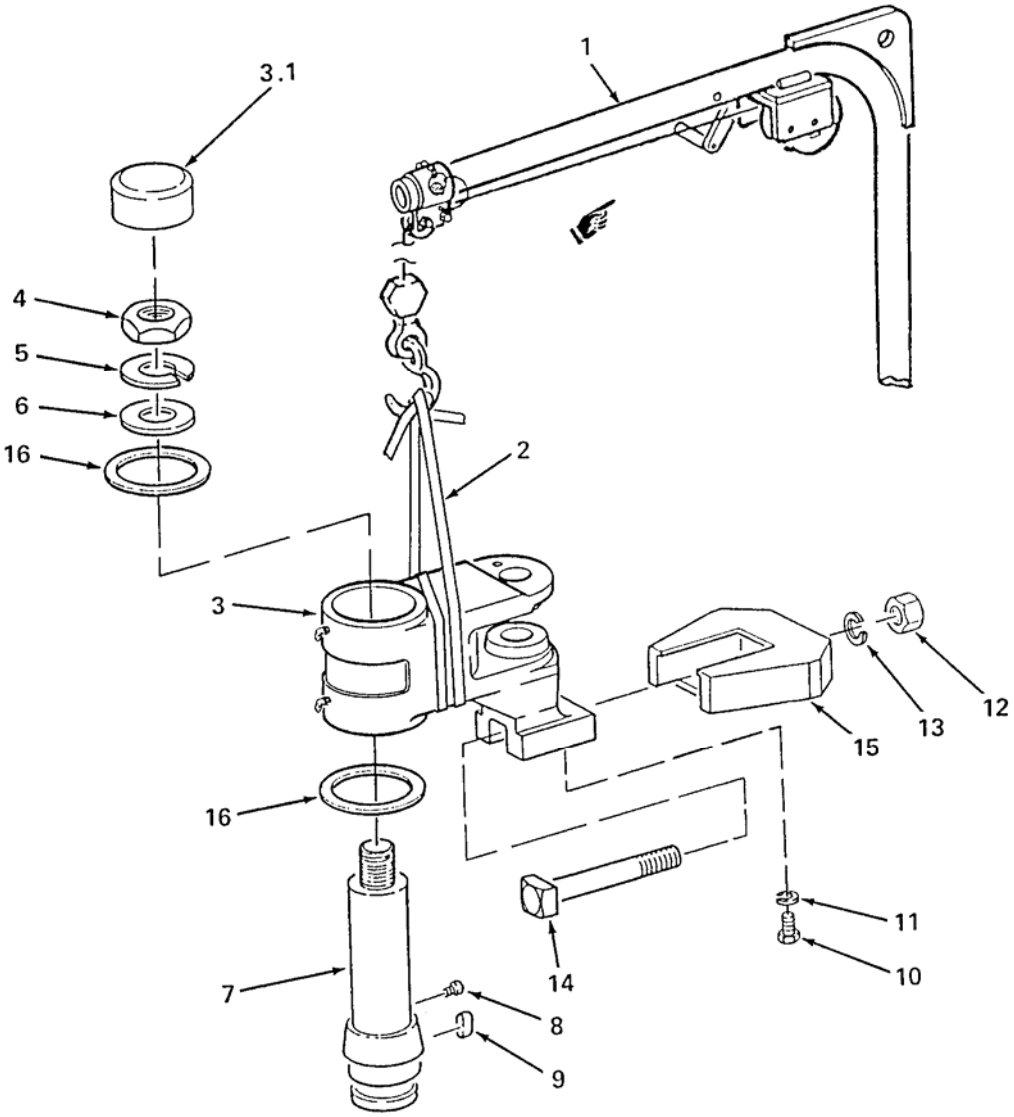
When on top of gooseneck, always hold the handrail with one hand to avoid falling or injury to personnel may result.

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on or trip over it. Injury to personnel or damage to equipment may result.

REMOVAL

1. Using davit (1) and lifting strap (2), wrap lifting strap (2) around steering gear arm (3). Attach lifting strap (2) to hook from davit (1).

1.1. Remove protective cap (3.1) from kingpin nut (4).



WARNING

Exercise caution during removal of the kingpin. Support the kingpin from the bottom side of the gooseneck during removal or the kingpin may fall and injury to personnel may result.

2. Using a 1-inch drive ratchet, extension, and 3-inch socket, remove nut (4), lockwasher (5), and flat washer (6) and drive kingpin (7) from gooseneck. Discard lockwasher.

3. Remove capscrew (8) and machine key (9) from kingpin (7).

5-19. KINGPIN AND STEERING ARM (CONT)

4. If installed, remove two capscrews (10) and lockwashers (11) from steering gear arm (3). Discard lockwashers.

5. Remove nut (12), lockwasher (13), and capscrew (14) from steering gear arm (3). Discard lockwasher.

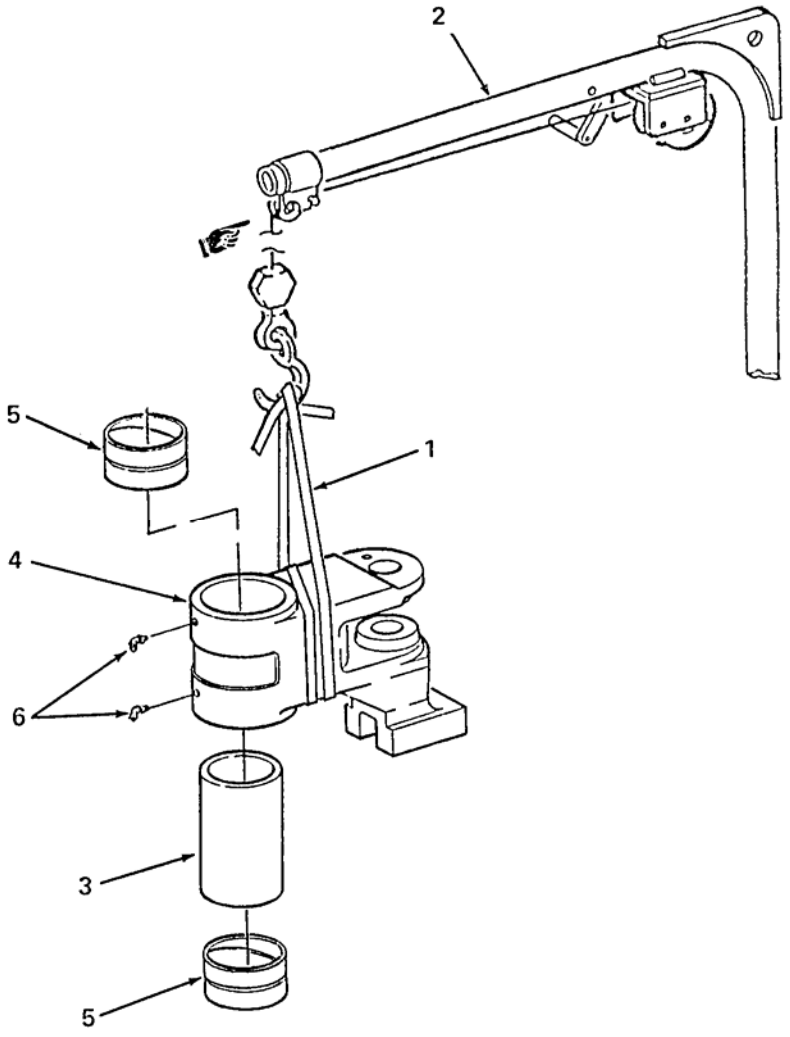
6. Slide steering wedge (15) off of steering gear arm (3).

7. Using two people and davit (1), remove steering gear arm (3) from gooseneck. Raise steering gear arm (3) up and out of gooseneck; then, lower steering gear arm to the ground for further disassembly.

8. Remove two suspension spacers (16) from gooseneck after steering gear arm (3) is out and away from gooseneck. Discard two suspension spacers.

DISASSEMBLY

1. Remove lifting strap (1) from hook on davit (2).



2. Using a hammer and brass drift, drive sleeve bushing (3) out of steering gear arm (4).

3. Drive two sleeve bearings (5) out of steering gear arm (4).

4. Remove two lubrication fittings (6) from steering gear arm (4).

INSPECTION

Inspect steering gear arm, kingpin, and related parts for corrosion, nicked surfaces, scored bearing surfaces, and any breaks in casting. If corroded, clean with crocus cloth. If parts are found defective, replace as necessary.

ASSEMBLY

1. Install two lubrication fittings (6) into steering gear arm (4).

2. Apply antiseize compound to both interior and exterior of two sleeve bearings (5) and sleeve bushing (3).

3. Drive two sleeve bearings (5) into steering gear arm (4).

NOTE

The slot, cut out in sleeve bushing, must be placed so that it faces aft when installed into the steering gear arm. The position of the sleeve bushing slot provides alinement for the kingpin.

4. Aline slot in sleeve bushing (3) so that it is positioned aft in steering gear arm. Drive sleeve bushing (3), slot end first with slot facing aft, into steering arm gear (4).

5. Wrap a lifting strap (1) around steering gear arm (4) and attach each end of lifting strap (1) to hook on davit (2).

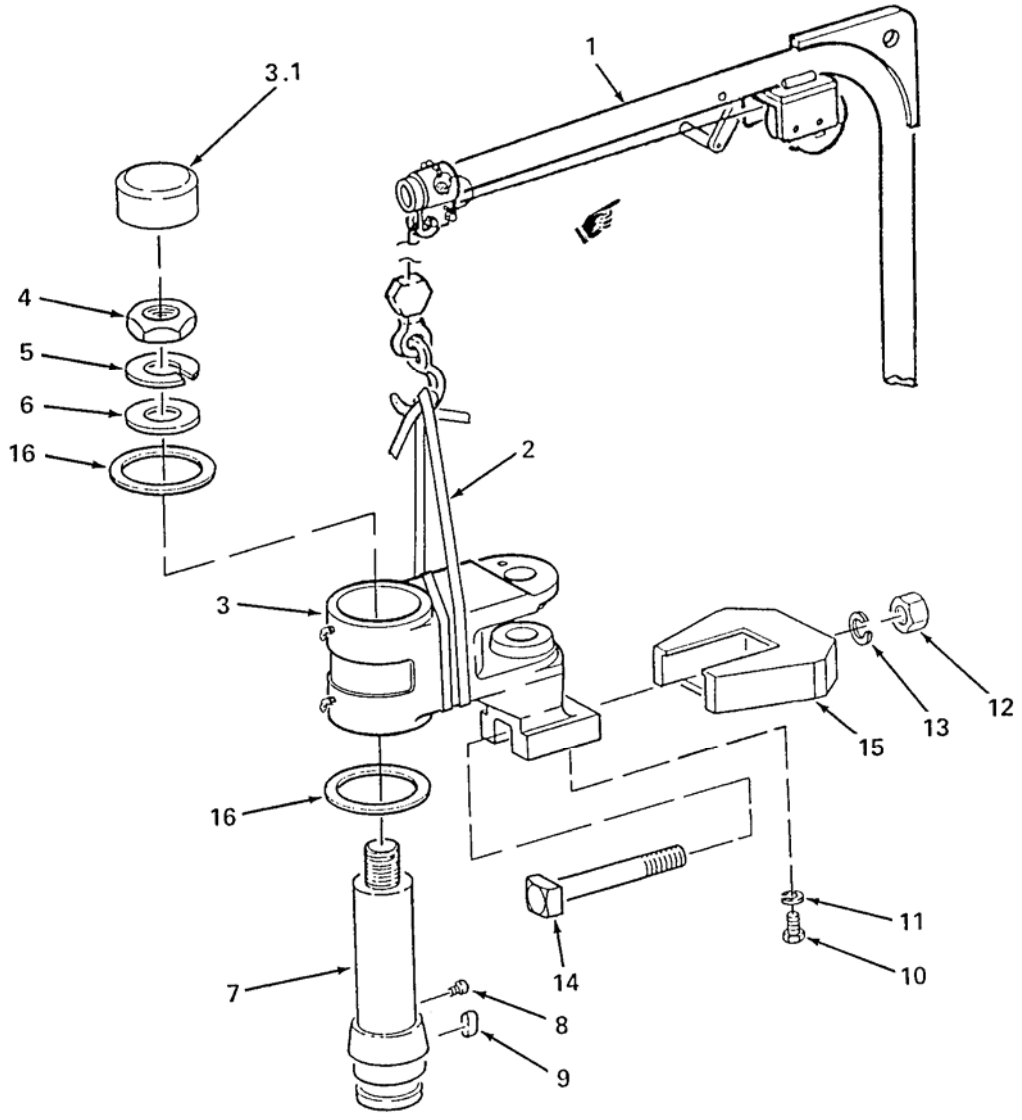
5-19. KINGPIN AND STEERING ARM (CONT)

INSTALLATION

NOTE

A large amount of grease applied to suspension spacers helps to hold the spacer in place during installation of steering gear arm.

1. Liberally apply grease onto two suspension spacers (16). Install suspension spacer (16) onto bottom of steering gear arm (3).



NOTE

When installing steering gear arm into gooseneck, make sure the bottom suspension spacer stays in place on steering gear arm.

2. Using two people and davit (1), aline and install steering gear arm (3) into gooseneck. Check that first suspension spacer (16), on bottom of steering gear arm (3), is properly positioned on arm and alined with hole in bottom of gooseneck for kingpin.

3. Aline and tap second suspension spacer (16) into place on top of steering gear arm (3). Continue to tap suspension spacer (16) until spacer is alined with hole in top of gooseneck for kingpin.

4. Aline and install steering wedge (15) onto steering gear arm (3). Push steering wedge (15) forward against steering gear arm (3).

5. Install capscrew (14) into steering gear arm (3). Install lockwasher (13) onto capscrew (14) and nut (12) onto capscrew (14); hand tighten nut.

5.1 Install two lockwashers (11) and capscrews (10).

6. Install capscrew (8) and machine key (9) into kingpin (7).

7. Apply antiseize compound to bearing surface of kingpin (7).

8. Using two people, aline capscrew (8) with slot of sleeve bushing inside steering gear arm (3) and install kingpin (7) into gooseneck through steering gear arm (3).

NOTE

Top of kingpin threaded portion will be below top of nut when tightened. Distance from top of nut to top of kingpin must not exceed 0.200 inches (0.50 cm) (approximately 2-1/3 threads) when properly installed and torqued.

9. While one person holds kingpin (7) from bottom and second person is positioned on top of gooseneck, install flat washer (6), lockwasher (5), and nut (4). Using a torque wrench, extension, adapter, and 3-inch socket, torque nut (4) to 420 - 460 lb-ft (570 - 624 Nm).

9.1 Install protective cap (3.1) on kingpin nut (4).

10. Remove lifting strap (2) from steering gear arm (3) and hook on davit (1).

FOLLOW-ON MAINTENANCE

1. Install steering console and slide shaft assembly (para. 5-18).

2. Perform required lubrication (para. 3-3).

3. Couple tractor/semitrailer (para. 2-24).

4. Manually steer semitrailer and check for proper operation (para. 2-21).

5-20. HYDRAULIC STEERING CYLINDER

This task covers: a. Disassembly c. Repair
b. Inspection d. Assembly

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Cylinder hone, item 13, appx. B
The following tools can be found in field maintenance basic tool kit, item 14, appx. B:

Machinist's vise	Torque wrench, 3/4", 0-600 lb-ft
Socket wrench set, 1" drive	Socket, 1" drive, 2-3/8" opening
Socket adapter, 3/4" female 1" male	Soft-jawed vise caps
Open-faced spanner wrench	Arbor press

Materials/Parts

Nylon ball
Bronze bushing
Grease, item 12, appx. E
Petroleum jelly, item 17, appx. E
Hydraulic cylinder repair kit
Thread locking compound, item 21, appx. E
Hydraulic fluid, item 13, appx. E
Crocus cloth, item 6, appx. E

Personnel Required: 2

Equipment Condition

Steering cylinder removed (para. 4-54 or 4-55)

DISASSEMBLY

1. Secure assembly in a machinist's vise.

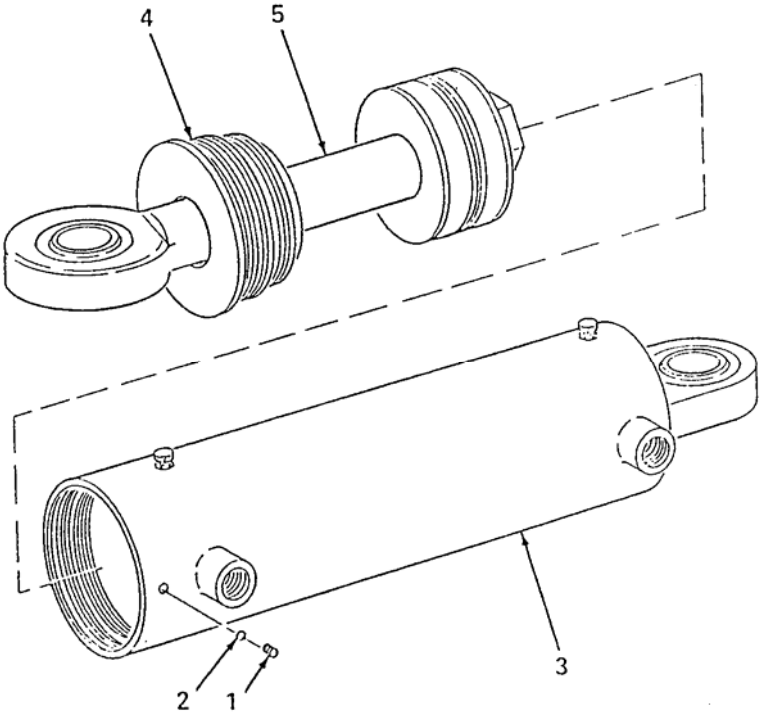
NOTE

Nylon ball may not be able to be removed at this time.

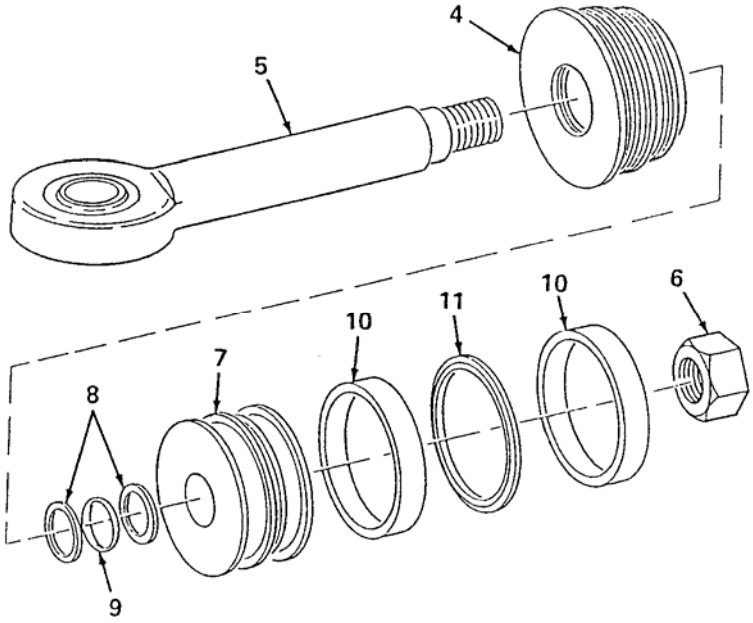
2. Remove setscrew (1) which retains nylon ball (2) in main cylinder assembly (3).

3. Using open-face spanner, unscrew stuffing box (4) and carefully remove plunger (5) and attached components from main cylinder assembly (3).

4. Remove nylon ball (2) from cylinder assembly (3) and discard ball.



5. Using an open-face spanner to hold piston and 1-inch ratchet and 2-3/8-inch socket, remove locknut (6) from plunger (5). Discard locknut.



6. Unscrew and remove piston (7), two seal retainers (8), and preformed packing (9) from plunger (5). Discard two seal retainers and preformed packing.

5-20. HYDRAULIC STEERING CYLINDER (CONT)

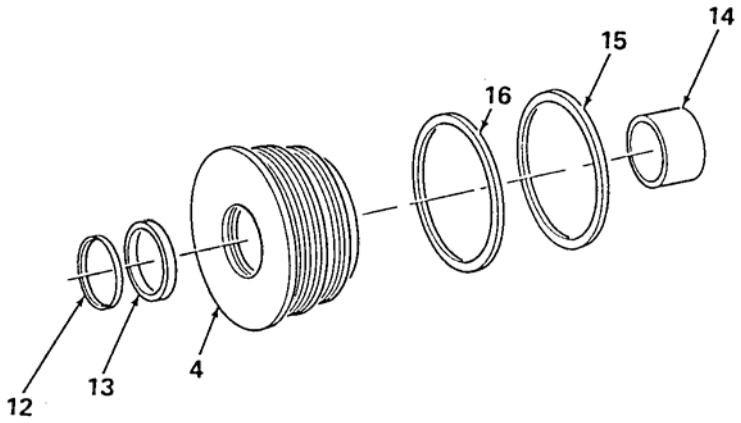
7. Remove two bearing rings (10) and piston seal (11) from piston (7). Discard bearing rings and piston seal.

8. Slide stuffing box (4) off of plunger (5). Disassemble stuffing box (4) as follows:

CAUTION

Use caution when securing steering cylinder stuffing box into machinist's vise. Use vise jaw caps to protect threads and machined surfaces or damage to stuffing box may result.

a. Secure stuffing box (4) into machinist's vise protected with soft-jaw vise caps.



b. Using a hammer and small chisel, remove wiping ring (12) from stuffing box (4).

c. Using a hammer and screwdriver, carefully drive tip of screwdriver into top edge of seal (13). Pry seal (13) out of stuffing box (4). Discard seal.

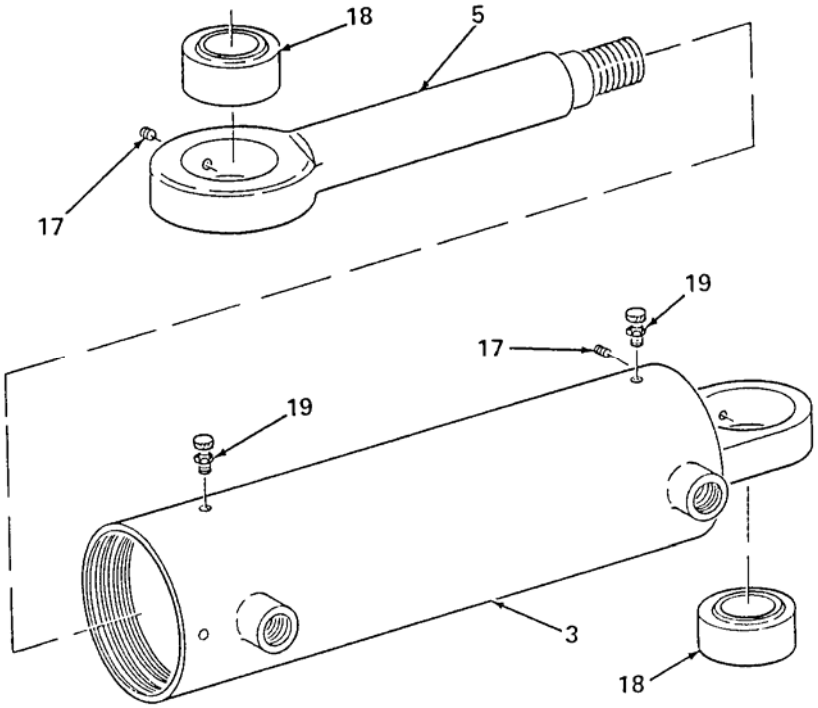
CAUTION

Bronze bushing must be destroyed to be removed. Examine the bushing for wear, scratches, gouges, and scoring to determine if bronze bushing needs replacing. If the bushing must be replaced, use caution and do not allow the chisel to hit the stuffing box or damage to equipment may result.

d. Using a hammer and a large cold chisel, make two driving points approximately 180 degrees apart at top of bronze bushing (14).

e. Continue to drive chisel into bronze bushing (14), alternating driving points until bushing comes out of stuffing box (4).

9. Remove seal retainer (15) and preformed packing (16) from stuffing box (4). Discard retainer and preformed packing.



10. Remove two setscrews (17) and, using an arbor press, remove two bushings (18) from plunger (5) and cylinder assembly (3).

11. Remove two air release valves (19).

INSPECTION

Check interior of cylinder for grooves, scratches, corrosion, cracks, or unusual wear. Using an adjustable cylinder hone, hone if necessary to restore interior finish. Use crocus cloth to clean all machined surfaces of stuffing box.

REPAIR

Repair hydraulic cylinder assembly using hydraulic cylinder repair kit to replace parts discarded during disassembly. Replace other unserviceable parts as required.

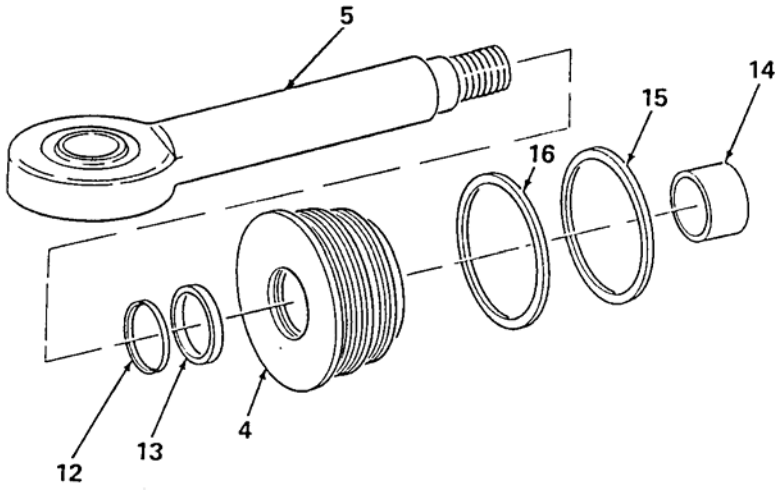
5-20. HYDRAULIC STEERING CYLINDER (CONT)

ASSEMBLY

1. Install and tighten two air release valves (19).

2. Apply grease to two bushings (18) and, using an arbor press, install one bushing (18) in plunger (5) and one bushing (18) in cylinder assembly (3). Apply thread locking compound to two setscrews (17) and install two setscrews (17) to secure both bushings (18).

3. Apply petroleum jelly to preformed packing (16) and seal retainer (15). Install on stuffing box (4).

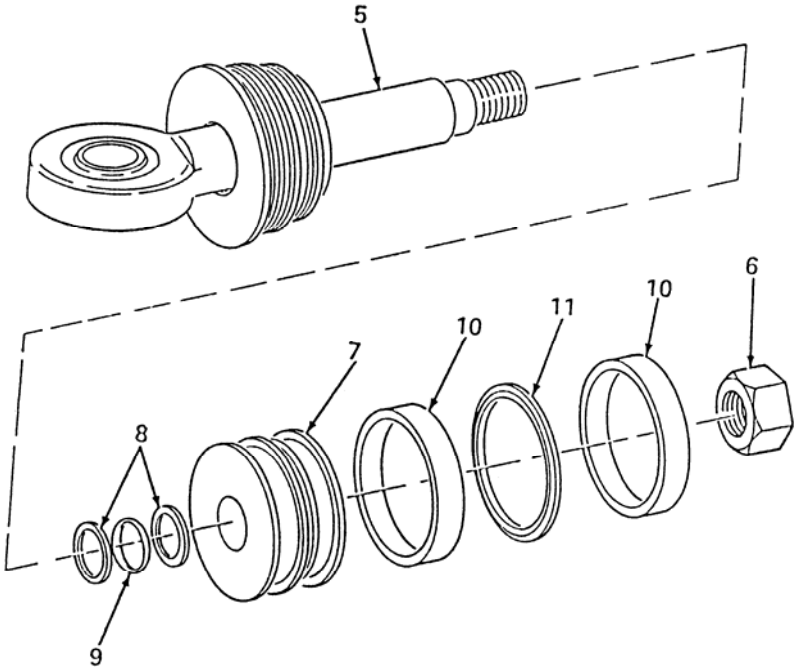


4. Apply hydraulic fluid to seal (13) and wiping ring (12) and install into stuffing box (4). Using an arbor press, press bronze bushing (14) into stuffing box (4). Install stuffing box (4) onto plunger (5).

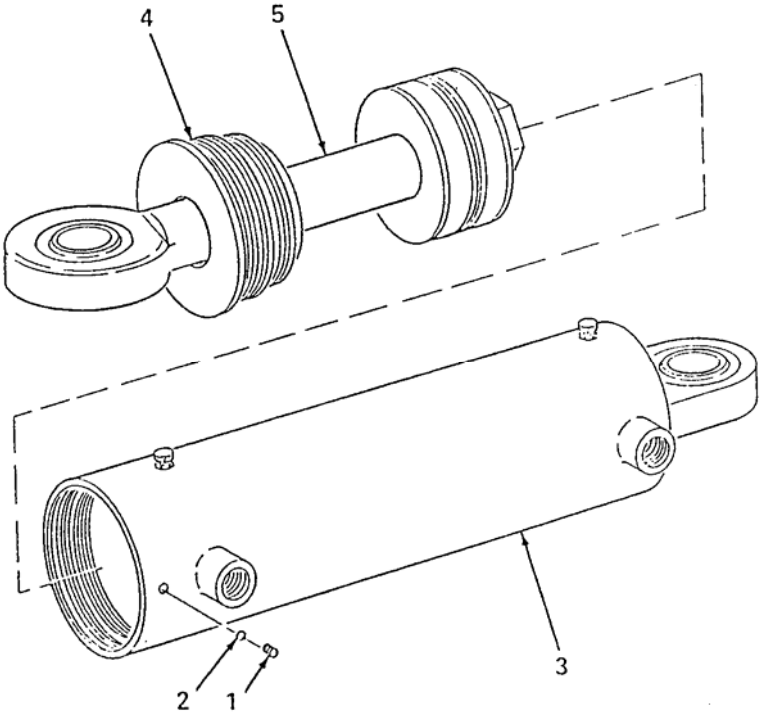
5. Apply petroleum jelly to all three parts of piston seal (11) and two bearing rings (10). Install all three parts of piston seal (11) and two bearing rings (10) onto piston (7).

6. Apply petroleum jelly to preformed packing (9) and two seal retainers (8). Install preformed packing (9) and two seal retainers (8) into piston (7). Install piston (7) onto plunger (5).

7. Install nut (6) on plunger (5). Using a 3/4-inch torque wrench, adapter, 2-3/8-inch socket, and an open-face spanner to hold piston (7), torque nut (6) to 500 lb-ft (678 Nm).



8. Carefully install plunger (5) with attached components in cylinder assembly (3). Thread stuffing box (4) into cylinder assembly (3).



9. Using open-face spanner, tighten stuffing box (4) into cylinder assembly (3).

10. Apply thread locking compound to setscrew (1). Install nylon ball (2) and setscrew (1).

5-21. HYDRAULIC CONTROL MODULE FRAME

This task covers: a. Removal c. Assembly
b. Disassembly d. Installation

INITIAL SETUP

Tools

Suitable lifting device, 2,000 lb minimum capacity
General mechanics tool kit, item 16, appx. B
Utility chain, item 9, appx. B
The following tools can be found in field maintenance basic tool kit, item 14, appx. B:
- Drain pan, 4 gal capacity
- Creeper, mechanic's
- Extension light, 24 ft
- Goggles, industrial
- Wrench, combination, 1-1/4"
- Gloves, chemical and oil protective
- Jack, hydraulic, transmission

Materials/Parts

Cap and plug set, item 5, appx. E
Lockwasher (6)
Lockwasher (3)
Lockwasher (3)
Cotter pin

Personnel Required: 2

Equipment Condition

Front and rear support legs lowered supporting platform (para. 2-22 and 2-23)
Gooseneck supported (para. 2-18)
Hydraulic tank drained (para. 4-18)

General Safety Instructions

WARNING

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury or burns to personnel may result.

Residual pressure may remain in hydraulic lines. Open fittings slowly or injury to personnel may result.

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking.

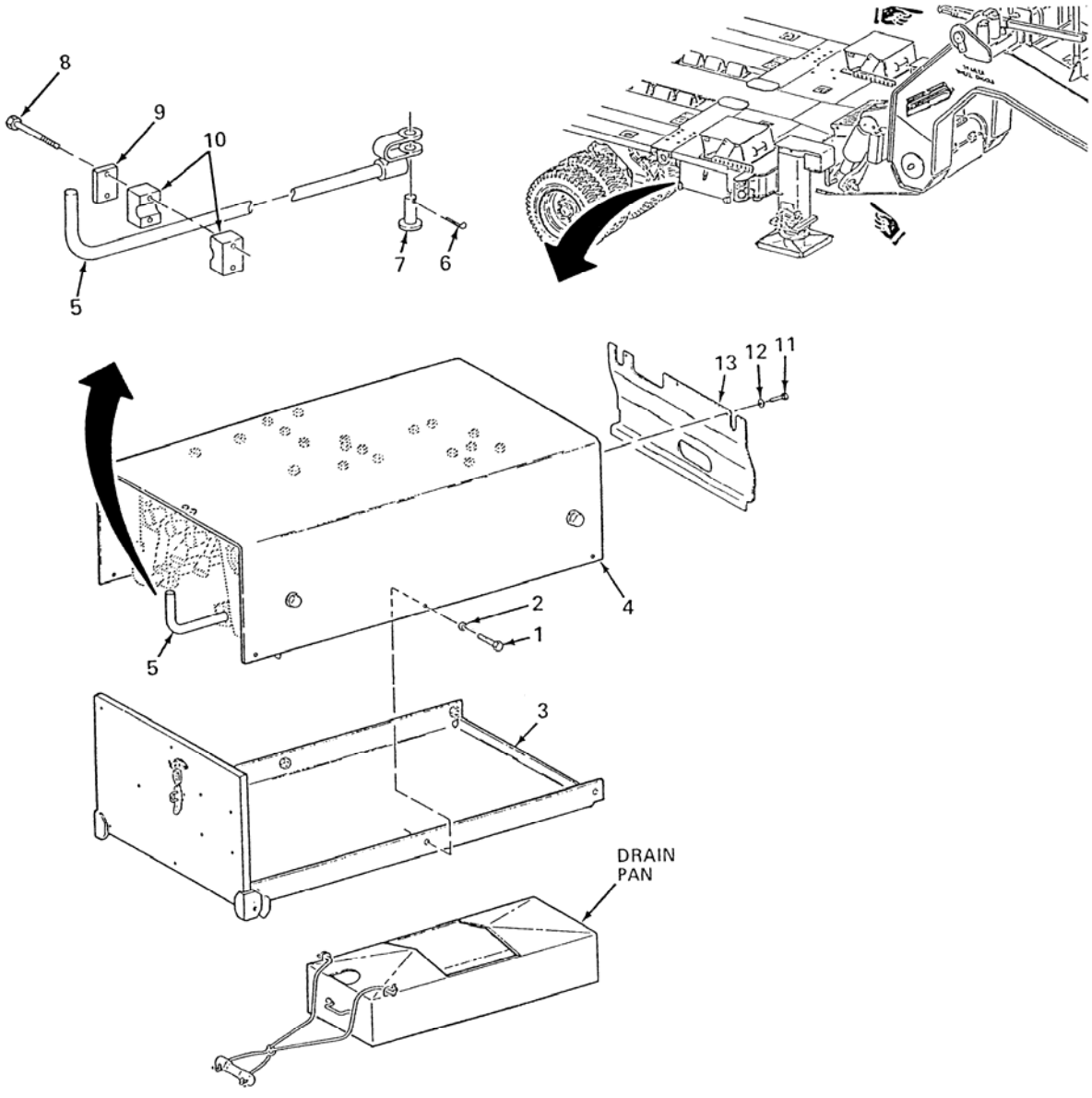
WARNING

The hydraulic control module, with all components installed, weighs in excess of 300 pounds (136 kg). Extreme caution must be used during removal and installation of control module or injury to personnel and damage to equipment may result.

The control module must be supported with a hydraulic transmission jack during removal and installation procedure or injury to personnel and damage to equipment may result.

REMOVAL

1. Using two people, remove six capscrews (1), lockwashers (2), and bottom cover assembly (3) from hydraulic control module frame (4). Discard lockwashers.



5-21. HYDRAULIC CONTROL MODULE FRAME (CONT)

2. Pull gooseneck isolation valve handle (5) outward to ADJUST position (para. 2-6). Remove cotter pin (6) and shouldered pin (7) from gooseneck isolation valve handle (5). Discard cotter pin.

3. Remove two screws (8), spacer (9), block clamp (10), and gooseneck isolation valve handle (5) from hydraulic control module frame (4).

4. Remove three screws (11), lockwashers (12), and rear cover (13) from hydraulic control module frame (4). Discard lockwashers.

5. Place a drain pan under hydraulic control module frame (4).

CAUTION

Metallic tubes must have both ends loosened before the tube can be moved or damage to tube may result.

All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or foreign material from entering the hydraulic system or damage to equipment may result.

6. Tag and remove two hydraulic tubes (14 and 15) from tube tees (16 and 17) on steering control manifold (18). Install caps/plugs into tube and fitting openings.

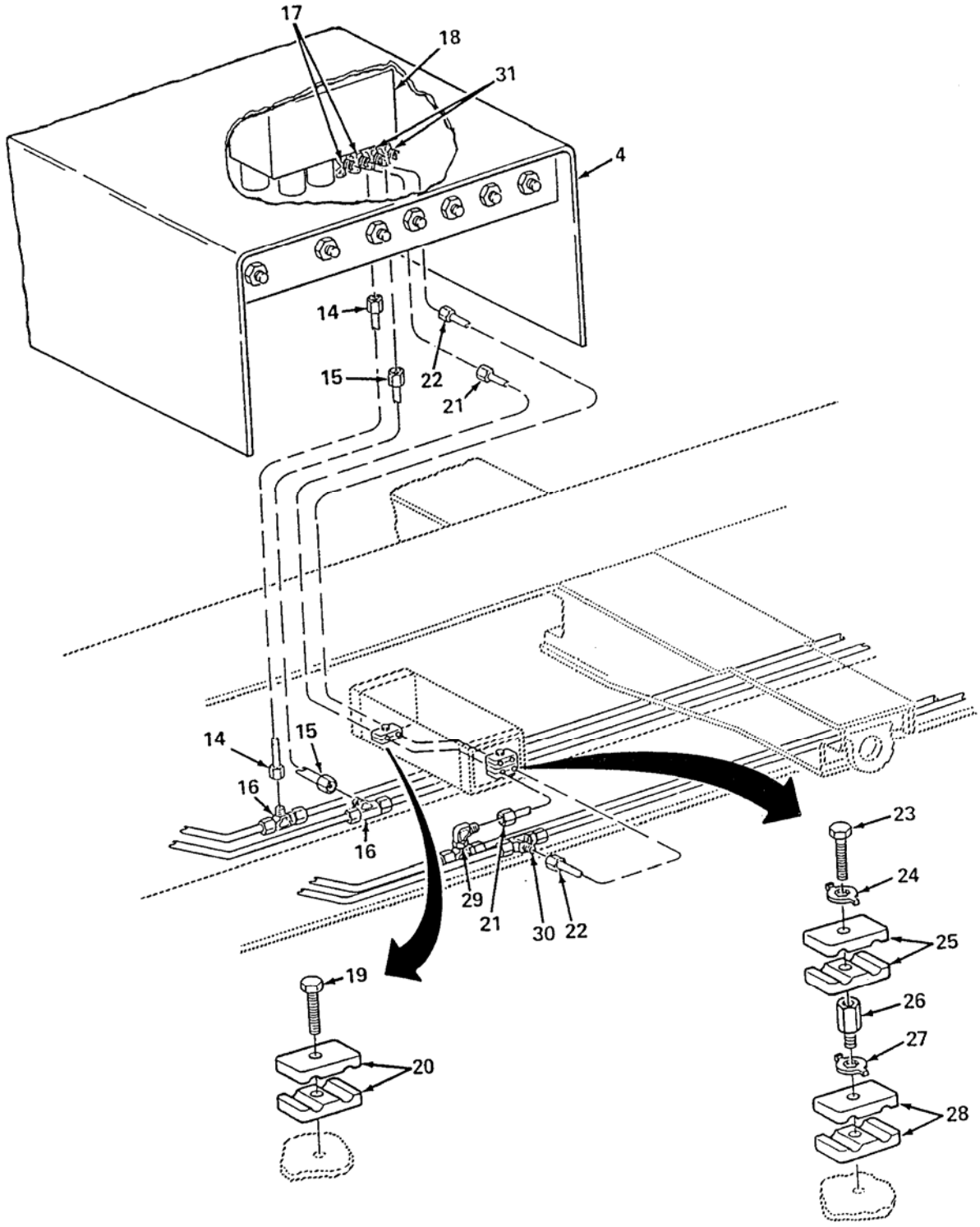
7. Remove capscrew (19) and both sections of block clamp (20) from two hydraulic tubes (21 and 22). Remove capscrew (23), retainer (24), both sections of block clamp (25), stacking bolt (26), retainer (27), and both sections of block clamp (28) from two hydraulic tubes (21 and 22).

8. On streetside of platform, between platform storage compartment and mainbeam, tag and disconnect two hydraulic tubes (21 and 22) from swivel tube elbow (29) and tube tee (30). Tag and disconnect two hydraulic tubes (21 and 22) from two tube tees (31) on steering manifold (18). Install caps/plugs into tube and fitting openings.

NOTE

It will be necessary to move two hydraulic tubes out of the way of the hydraulic control module frame so that the frame can be lowered. There is not ample clearance with the platform storage compartment installed to remove tubes from platform.

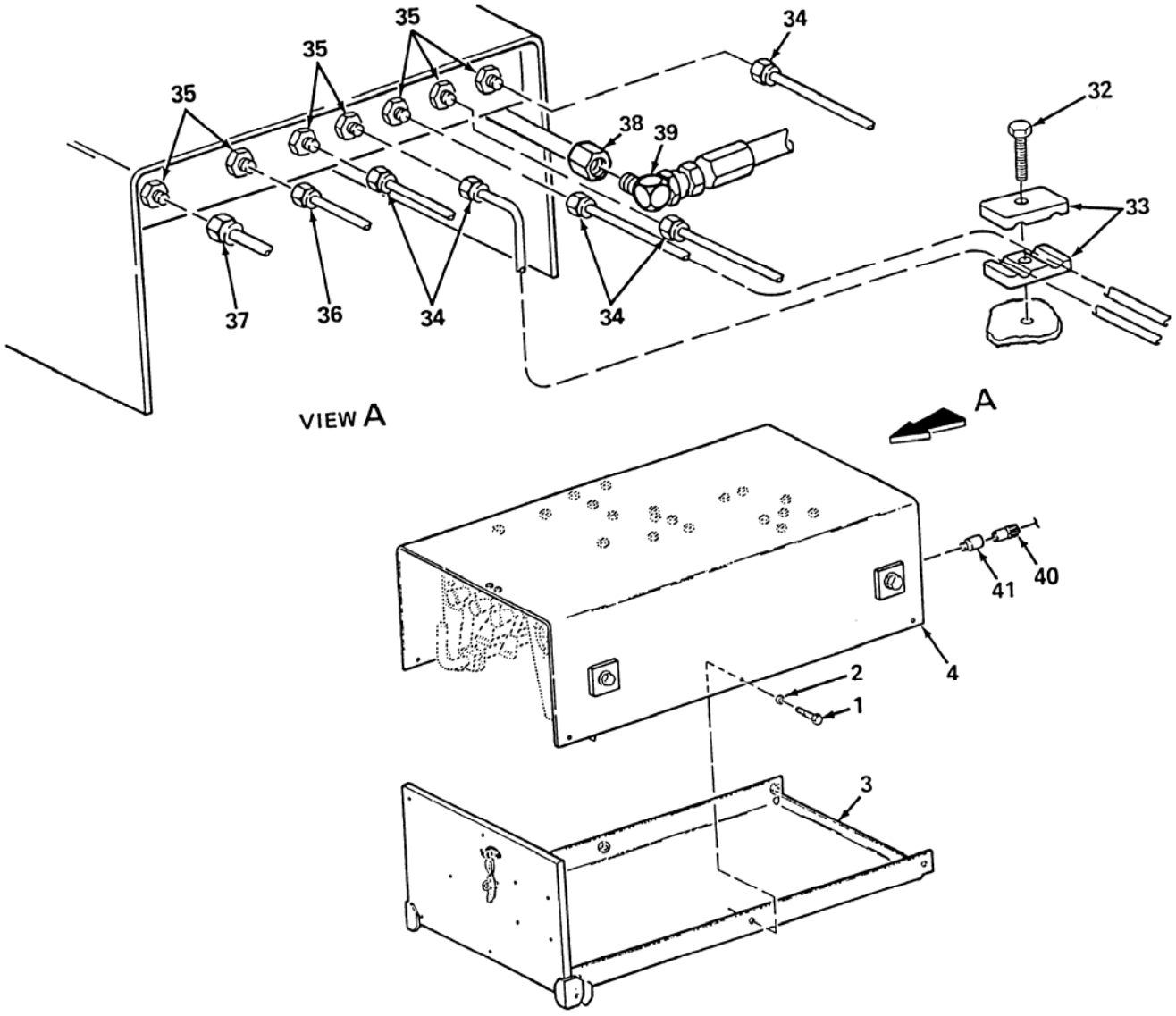
9. Carefully move, as much as possible, two hydraulic tubes (21 and 22) out of the way of hydraulic control module frame (4). Tubes should be moved inward toward mainbeam.


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5-21. HYDRAULIC CONTROL MODULE FRAME (CONT)

10. Remove capscrew (32) and both sections of block clamp (33) from opening in platform mainbeam.

11. Tag and disconnect five hydraulic tubes (34) from bulkhead fittings (35). Loosen other end of each tube so that tubes may be moved slightly and caps/plugs can be installed. Carefully move lines and install caps/plugs into openings.



12. Tag and disconnect hydraulic tube (36) and hydraulic hose (37) from bulkhead fittings (35). Loosen other end of each tube and hose so that tubes and hose can be moved slightly and caps/plugs installed. Carefully move lines and install caps/plugs into openings.

13. Using 1-1/4-inch combination wrench, tag and disconnect hydraulic tube (38) from tube elbow (39). Install caps/plugs into openings. Move drain pan out from under platform.

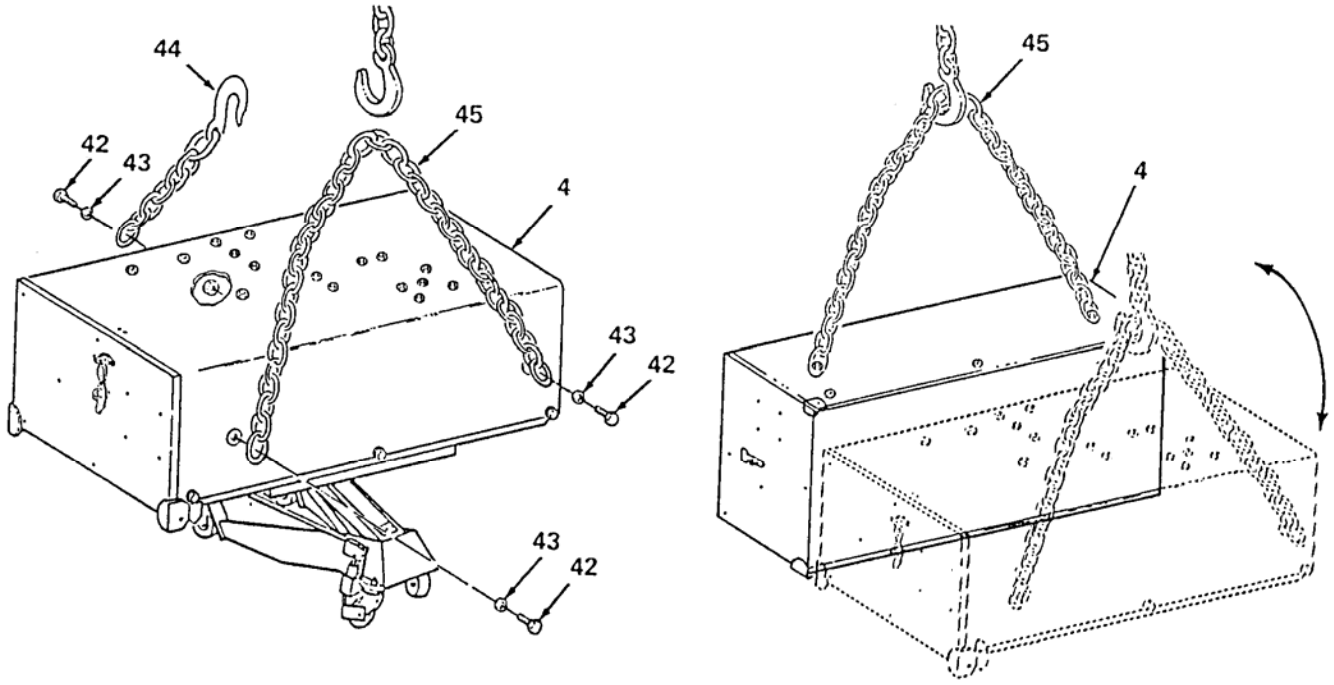
14. Tag and disconnect electrical connector (40) from electrical lead (41).

15. Using two people, install bottom cover assembly (3) onto hydraulic control module frame (4). Secure cover in place by installing six capscrews (1). Close and secure hinged cover of bottom cover assembly (3).

NOTE

Center of gravity for hydraulic control module frame is approximately the center of the assembly (both side to side and front to back).

16. Position hydraulic transmission jack centered under hydraulic control module frame (4). Operate jack until jack makes firm contact with bottom cover assembly (3).



17. Remove three screws (42) and lockwashers (43) from hydraulic control module frame (4). Discard lockwashers.

CAUTION

When lowering transmission jack, be sure hydraulic lines do not catch on hydraulic control module or damage to equipment may result.

18. Lower hydraulic transmission jack until hydraulic control module frame (4) is clear of semitrailer platform.

5-21. HYDRAULIC CONTROL MODULE FRAME (CONT)

19. Using two people, carefully pull hydraulic transmission jack and hydraulic control module frame (4) out from under and clear of platform.

20. Position overhead lifting device over hydraulic control module frame (4). Install 24-inch hooked chain (44) onto hydraulic control module frame (4) on side with only one mounting hole. Secure chains in place by installing capscrew (42).

21. Install 64-inch hooked chain (45) onto hydraulic control module frame (4) on side with two mounting holes. Secure chain in place by installing two capscrews (42).

22. Connect hook on chain (44) to center of chain (45). Attach overhead lifting device to both chains (44 and 45). Take up slack in lifting device.

23. Lift hydraulic control module frame (4) off of hydraulic transmission jack. Move jack clear of module frame. If necessary, using overhead lifting device, transport module frame to clear area (or shop bench) for further maintenance.

24. Lower lifting device and place hydraulic control module frame (4) firmly on the ground or work bench area. Lower lifting device and unhook hook end of chain (44) from chain (45). Allow chain (44) to hang and take up slack in lifting device.

CAUTION

Be sure that there is enough room for the hydraulic control module frame to be rolled or damage to equipment may result.

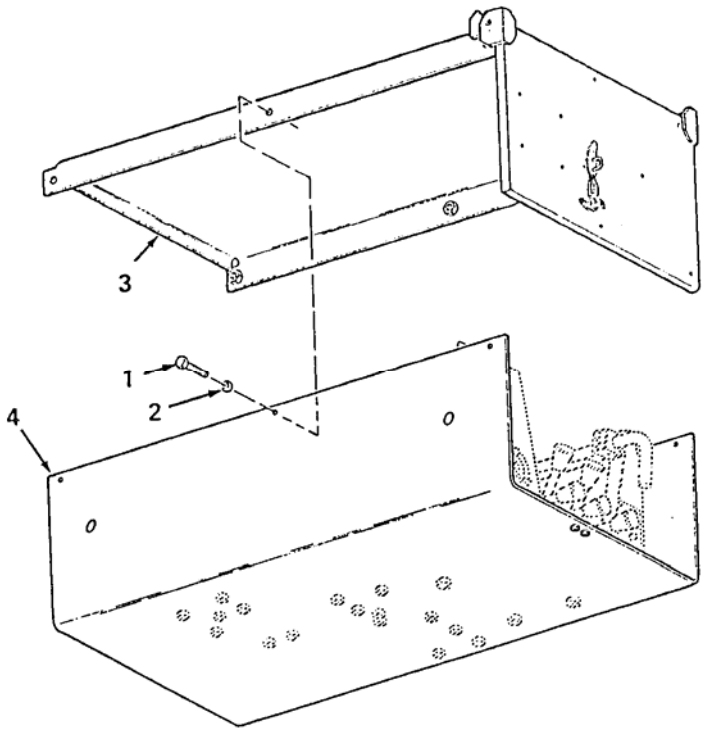
25. If necessary, clear work area so that control module frame (4) has enough space to be rolled over.

26. Operate lifting device and start to pick up side of hydraulic control module frame (4). Continue to operate lifting device until frame has rolled over onto its side.

27. Continue to reposition lifting device and roll hydraulic control module frame (4) until frame has rolled off its side and onto its top. Make sure frame is resting firmly on flat surface.

28. Remove three capscrews (42) and remove 24-inch chain (44) and 64-inch chain (45) from hydraulic control module frame (4) and lifting device.

29. Lower door on bottom cover assembly (3) and remove six capscrews (1) and, using two people, remove bottom cover assembly (3) from hydraulic control module frame (4).



DISASSEMBLY

Disassemble hydraulic control module frame by removing the following:

a. Hydraulic control module jumper wires (para. 4-33).

b. Steering pressure indicator light (para. 4-28).

c. 4-way directional control manifold (para. 4-77).

d. Suspension control manifold (para. 4-79).

e. Suspension shut-off valve (para. 4-83).

f. Steering control manifold (para. 4-78).

g. Hydraulic pressure gages (para. 4-88).

h. Hydraulic filter (para. 4-89).

i. Data plates (para. 4-75).

ASSEMBLY

Assemble hydraulic control module frame by installing the following:

a. Data plates (para. 4-75).

b. Hydraulic filter (para. 4-89).

5-21. HYDRAULIC CONTROL MODULE FRAME (CONT)

c. Hydraulic pressure gages (para. 4-88).

d. Steering control manifold (para. 4-78).

e. Suspension shut-off valve (para. 4-83).

f. Suspension control manifold (para. 4-79).

g. 4-way directional control manifold (para. 4-77).

h. Steering pressure indicator light (para. 4-28).

i. Hydraulic control module jumper wires (para. 4-33).

INSTALLATION

1. Using two people, install bottom cover assembly (3) onto hydraulic control module frame (4). Secure cover in place by installing six capscrews (1).

2. Position overhead lifting device over hydraulic control module frame (4). Install 24-inch hooked chain (44) onto hydraulic control module frame (4) on side with only one mounting hole. Secure chains in place by installing capscrew (42).

3. Install 64-inch hooked chain (45) onto hydraulic control module frame (4) on side with two mounting holes. Secure chain in place by installing two capscrews (42).

4. Connect lifting device to chain (45) on hydraulic control module frame (4) and lifting device. Take up slack in chain.

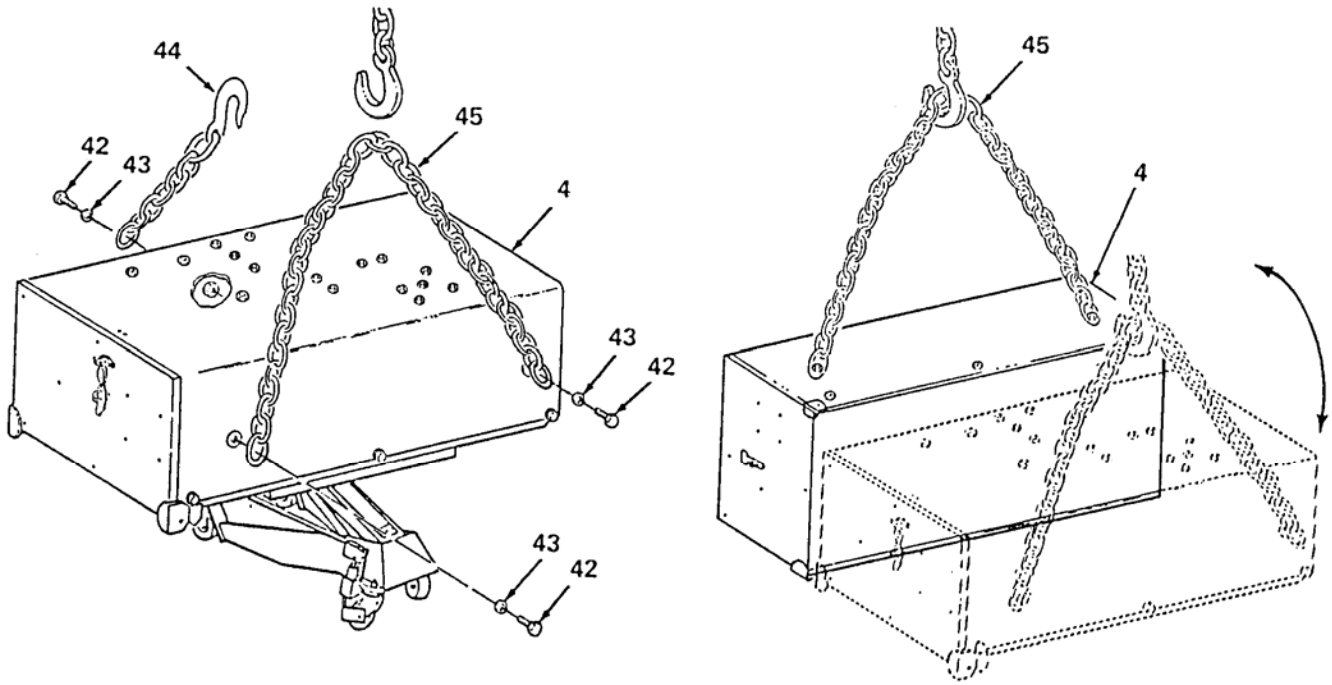
5. Operate lifting device and start to pick up one side of hydraulic control module frame (4). Continue to operate lifting device until frame has rolled over onto its side.

6. Continue to reposition lifting device and roll hydraulic control module frame (4) until frame has rolled off its side and onto bottom cover assembly (3).

7. Make sure hydraulic control module frame is sitting firmly on bottom cover assembly. Lower lifting device and unhook lifting device from chain (30).

8. Connect hook on chain (44) to center of chain (45). Attach overhead lifting device to both chains (44 and 45). Take up slack in lifting device.

9. Raise lifting device and, if necessary, transport hydraulic control module frame (4) near front curbside of platform for installation.



10. Place a hydraulic floor jack near curbside of platform for hydraulic control module frame to be lowered onto. Center lifting device over hydraulic transmission jack and lower hydraulic control module frame (4) onto jack.

11. Make sure hydraulic control module frame (4) is sitting firmly on hydraulic transmission jack. Lower lifting device and disconnect lifting device from two chains (44 and 45). Move lifting device clear of platform and module frame.

12. Remove three capscrews (42) and chains (44 and 45) from hydraulic control module frame (4). Set chains on top of platform.

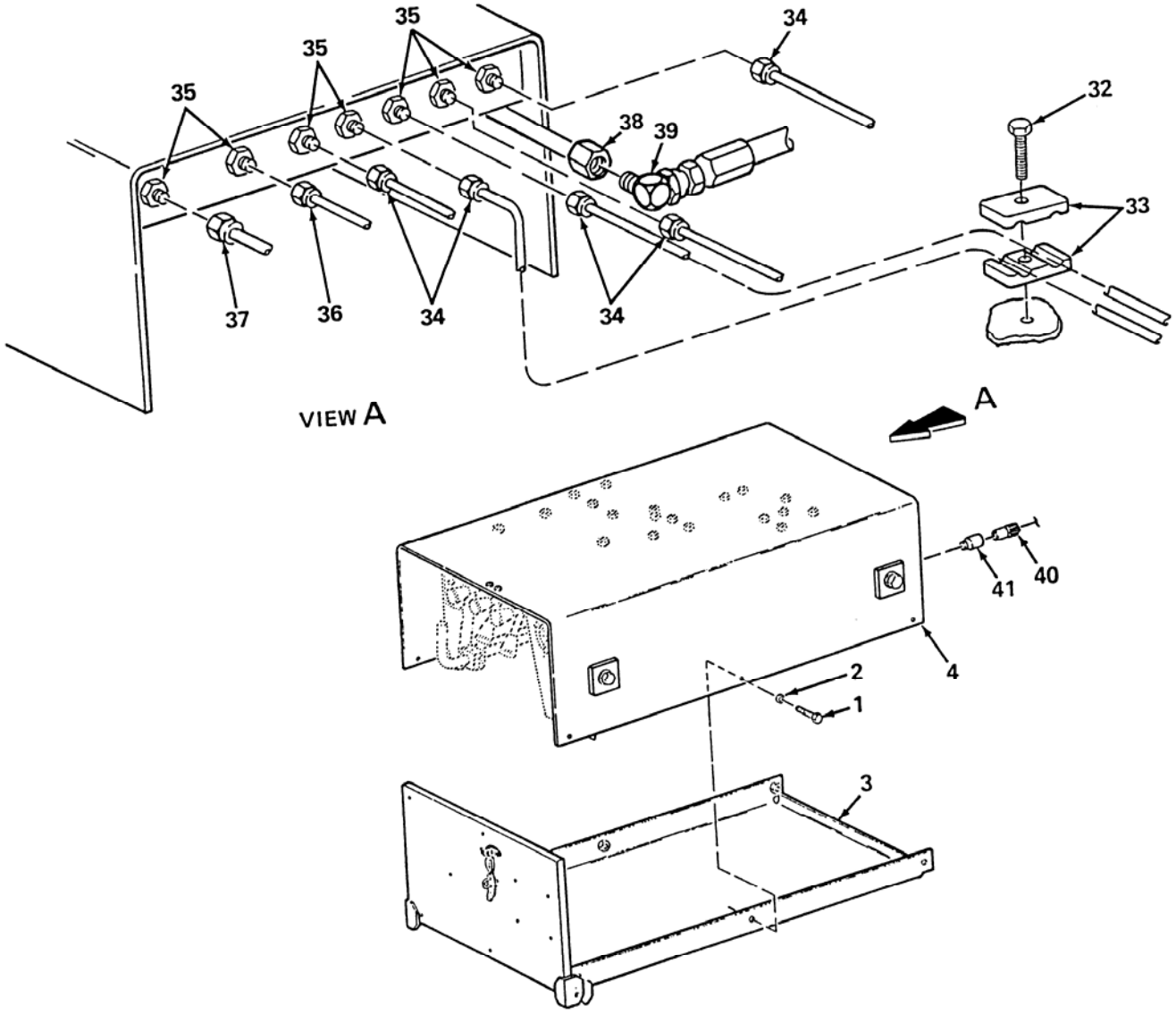
13. Using two people, move hydraulic transmission jack and hydraulic control module frame into position under platform. Operate jack and raise module frame into alinement with mounting brackets.

14. Install three screws (42) and lockwashers (43) to secure hydraulic control module frame (4) in place.

15. Lower hydraulic transmission jack and move jack clear of work area.

5-21. HYDRAULIC CONTROL MODULE FRAME (CONT)

16. Using two people, remove six capscrews (1) and bottom cover assembly (3) from hydraulic control module frame (4).



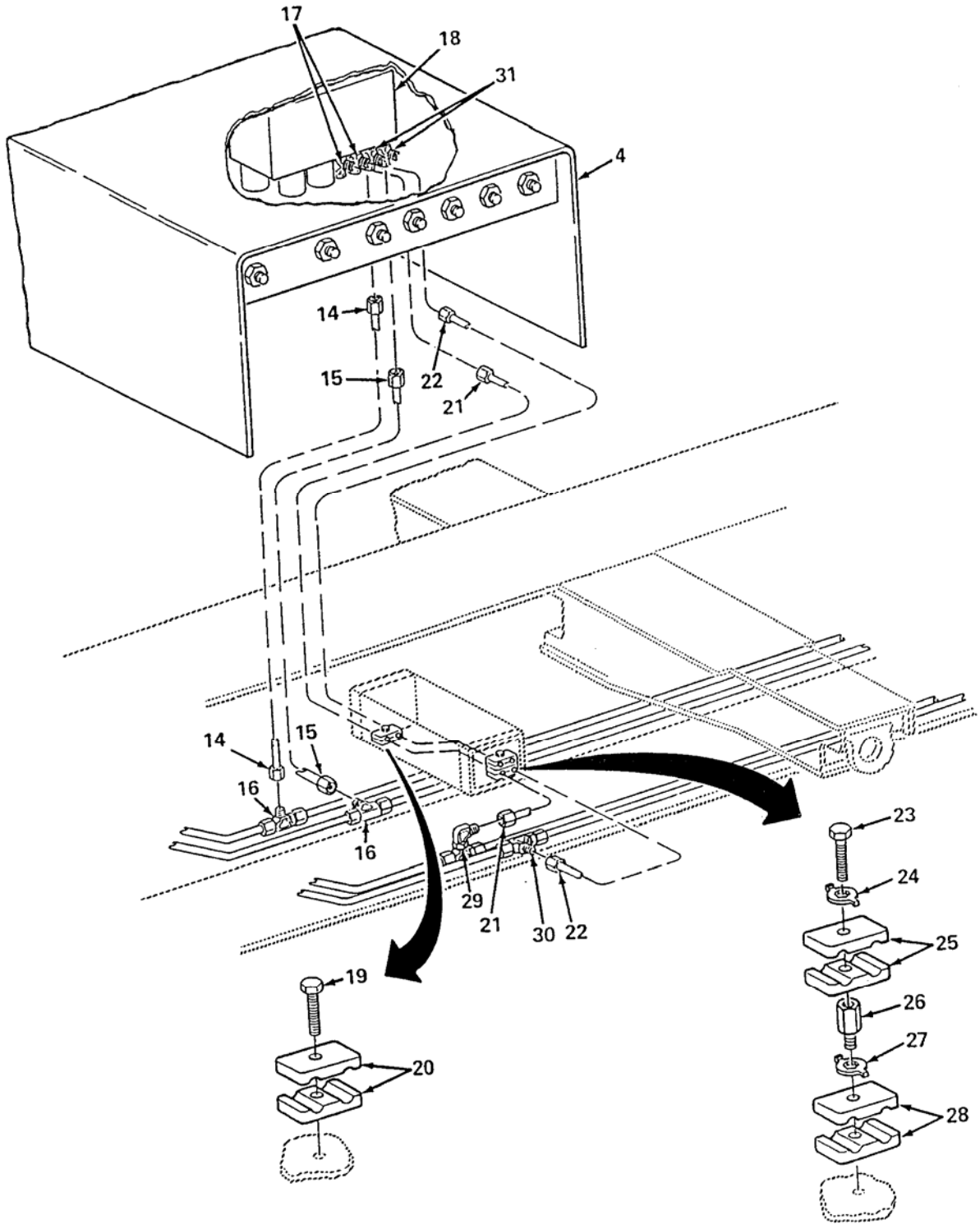
17. Remove caps/plugs installed and, using a 1-1/4-inch combination wrench, connect hydraulic tube (38) to tube elbow (39).

18. Remove caps/plugs installed and connect hydraulic tube (36) and hydraulic hose (37) to two bulkhead fittings (35).

19. Remove caps/plugs installed and connect five hydraulic tubes (34) to bulkhead fittings (35).

20. Remove caps/plugs installed and, using two people, position two hydraulic tubes (22 and 21) over swivel tube elbow (29) and tube tee (30) located on streetside of platform. Hold tubes over fittings.

21. Remove caps/plugs installed and connect two hydraulic tubes (22 and 21) to two tube tees (31) on steering manifold (18). Hand tighten both ends of tubes onto fittings.



5-21. HYDRAULIC CONTROL MODULE FRAME (CONT)

22. Insert both sections of block clamp (28), retainer (27), stacking bolt (26), both sections of block clamp (25), retainer (24), and capscrew (23) onto two hydraulic tubes (22 and 21).

23. Install both sections of block clamp (33) and secure in place with capscrew (32).

24. Insect sections of block clamp (20) onto two hydraulic tubes (22 and 21). Temporarily hold block clamp (20) in place by loosely installing capscrew (19). Tighten both ends of two hydraulic tubes (22 and 21). Tighten capscrews (19) to secure block clamps (20) in place.

25. Remove caps/plugs installed and connect two hydraulic tubes (15 and 14) between two tube tees (17) on steering manifold (18) and tube tees (16).

26. Reconnect electrical connector (40) to electrical lead (41).

27. Install rear cover (13) onto hydraulic control module frame (4) and secure with three screws (11) and lockwashers (12).

28. Install gooseneck isolation valve handle (5) through rear cover (13) and install shouldered pin (7) and cotter pin (6).

29. Aline gooseneck isolation valve handle (5) with clamp mount on hydraulic control module frame (4) and secure in place by installing block clamp (10), spacer (9), and two screws (8).

30. Using two people, install bottom cover assembly (3) into place on hydraulic control module frame (4) and secure with six capscrews (1) and lockwashers (2).

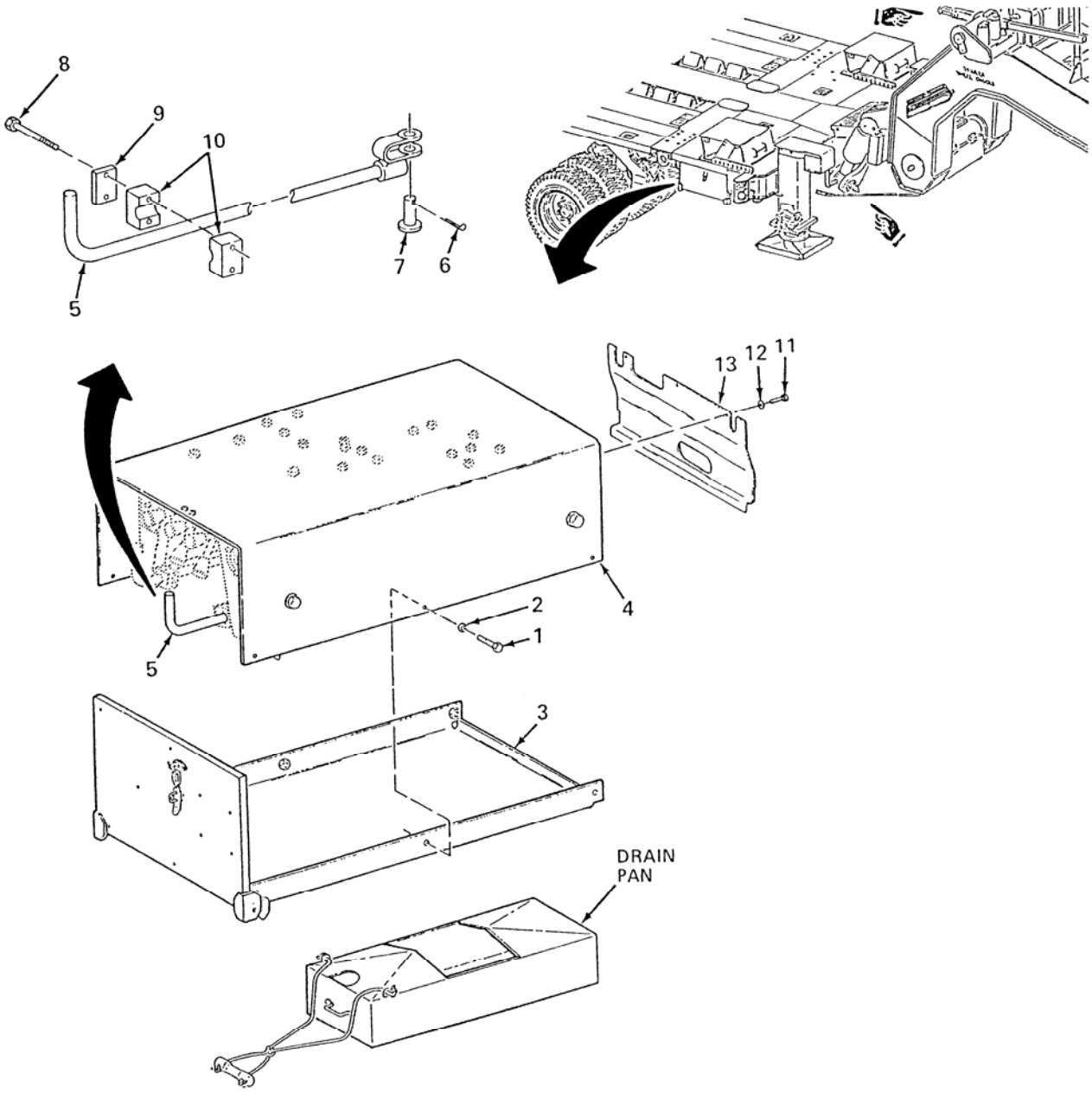
FOLLOW-ON MAINTENANCE

1. Open hydraulic tank shut-off valve (para. 2-6).

2. Check and fill hydraulic tank as required (para. 4-17).

3. Perform hydraulic system bleeding as required (para. 4-19).

4. Operate hydraulic controls and check for leaks.


8
9
10
7
6
5
13
12
11
2
1
4
5
3
DRAIN
PAN

5-22. SNATCH BLOCK SHEAVE BUSHING

This task covers: a. Removal b. Lubrication c. Installation

INITIAL SETUP

Tools

Arbor press, item 14, appx. B

Materials/Parts

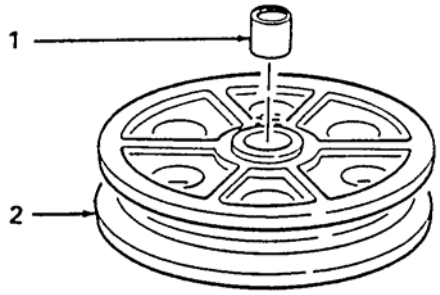
Grease, item 12, appx. E

Equipment Condition

Snatch block disassembled (para. 4-71)

REMOVAL

Using arbor press, press bushing (1) from sheave (2).



LUBRICATION

Lubricate outside of bushing with grease.

INSTALLATION

Using arbor press, press bushing (1) into sheave (2) until bushing seats flush with both sides of sheave.

5-23. GOOSENECK CYLINDER

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B.
Lifting strap, item 31, appx. B
Suitable lifting device, 1000 lb (454 kg) minimum capacity or equivalent
Stand, gooseneck support, figure F-9, appx. F
The following tools can be found in field maintenance basic tool kit, item 14, appx. B:

- Hydraulic transmission jack
- Drain pan, 4 gl
- Crowbar
- Gloves, chemical and oil protective
- Goggles, industrial
- Socket wrench set, 3/4" drive
- Torque wrench, 3/4" dr, 0-600 lb-ft

Materials/Parts

Cap and plug set, item 5, appx. E
Antiseize compound, item 3, appx. E
Lockwasher
Lockwasher
V-ring seal (4)
Bolt, 2"
Bolt, 4"
Screw, self-locking
Bolt, lubrication, self-locking

Personnel Required: 3

Equipment Condition

Front and rear support legs lowered supporting platform (para. 2-22 and para. 2-23)
If removing curbside gooseneck cylinder, APU control box removed (para. 4-108)

General Safety Instructions

WARNING

Gooseneck cylinder weighs in excess of 400 pounds (182 kg). Be sure cylinder and gooseneck are adequately supported during removal or injury to personnel may result.

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

5-23. GOOSENECK CYLINDER (CONT)

WARNING

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, wash thoroughly with soap and water. Wash hands thoroughly prior to eating or smoking.

REMOVAL

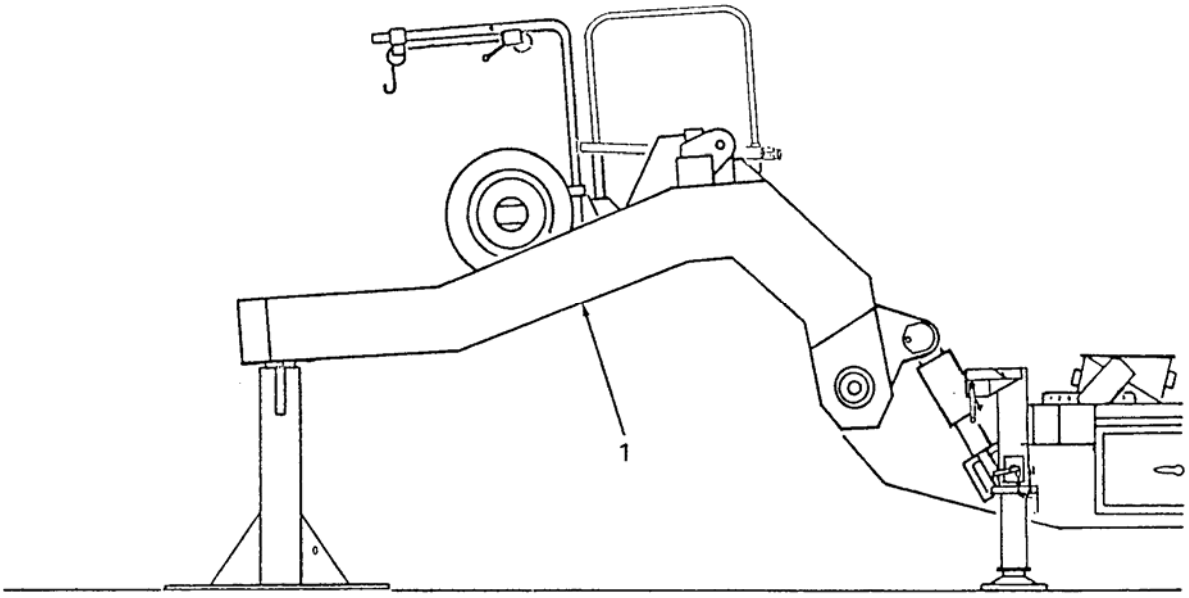
1. Start APU (para 2-16).

2. Pull out handle of suspension shut-off valve to ADJUST position (para. 2-6). Be sure handle of gooseneck isolation valve is in ADJUST position (para. 2-18).

NOTE

When gooseneck is lowered onto gooseneck support, both gooseneck cylinders should be almost completely extended to accommodate removal of the upper cylinder pin mounting hardware.

3. Lower gooseneck (1) onto gooseneck support approximately 37 inches (94 cm) high (para. 2-18). Shut down APU (para. 2-16).



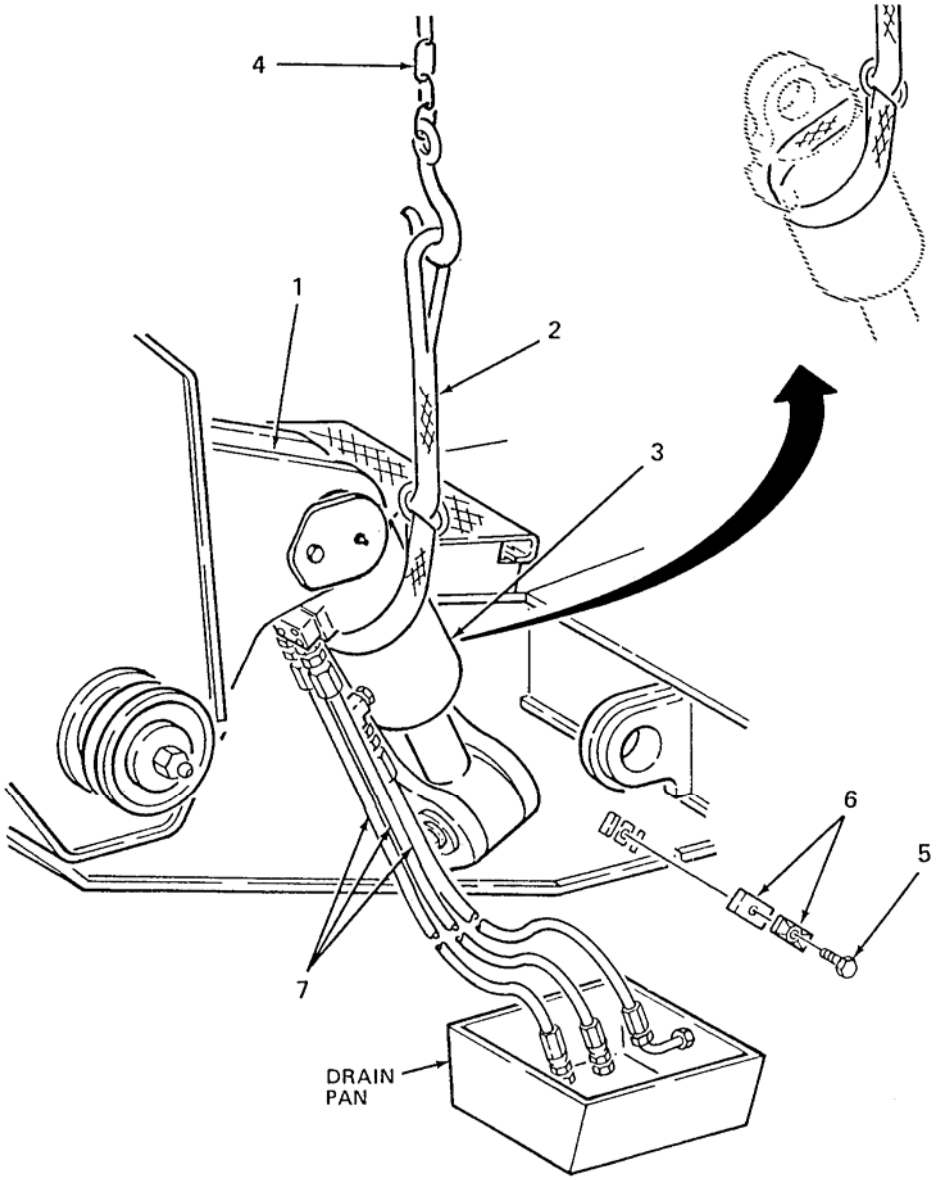
WARNING

Lifting strap must be placed around gooseneck cylinder in noose to prevent injury to personnel.

NOTE

The following steps allow for the removal of one gooseneck cylinder. Repeat steps as required to remove the other gooseneck cylinder.

4. Attach a lifting strap (2) to gooseneck cylinder (3). Wrap lifting strap (2) around gooseneck cylinder (3) and through loop in strap (2) to form slip-hook (noose).



5-23. GOOSENECK CYLINDER (CONT)

5. Position suitable lifting device (4) directly over top of gooseneck cylinder (3). Lower hook of lifting device (4) and attach end of lifting strap (2) to lifting device (4).

CAUTION

Do not apply too much force when taking up slack or excess pressure will be applied on upper cylinder pin and removal may be complicated and damage to equipment may result.

6. Take up slack in lifting strap (2). Slant lifting strap (2) toward center line of gooseneck lug (1).

7. Place a drain pan under front edge of platform near cylinder hydraulic lines and valve connection points beneath platform.

WARNING

Residual pressure may remain in hydraulic lines. Open fittings slowly or injury to personnel may result.

CAUTION

All fittings and openings must be capped or plugged immediately after opening, to prevent dirt, moisture, or foreign material from entering the hydraulic system or damage to equipment may result.

NOTE

Remove small hex fitting from large hex fitting.

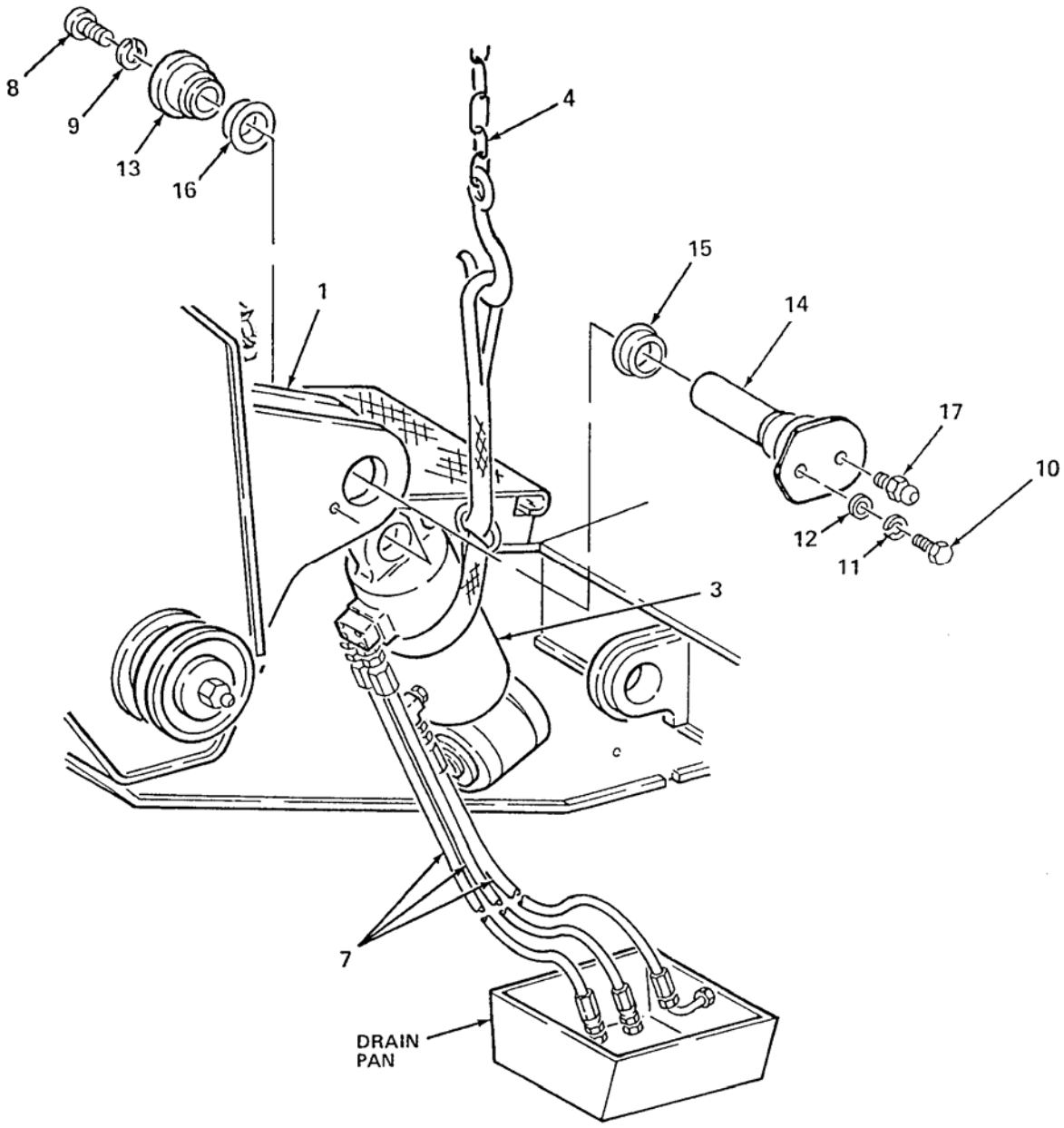
8. Remove screw (5) and block clamp (6). Tag and slowly disconnect three hydraulics lines (7) from three hydraulic valves under platform. Install protective caps/plugs into valves only.

NOTE

Make sure ends of hydraulic lines are secured to drain pan and are pointing directly into the drain pan to prevent hydraulic fluid from spraying as the gooseneck cylinder is compressed. To prevent siphoning, do not allow ends of hoses to get into hydraulic fluid.

9. Place ends of hydraulic lines (7) into drain pan and secure to drain pan using duct tape to prevent lines from pulling out under pressure as cylinder is compressed.

10. Remove screw (8) and lockwasher (9) if present. Remove bolt (10), lockwasher (11), and washer (12). Discard screw and lockwashers.



CAUTION

Bolt must be fully engaged (bottomed out) in pin prior to striking with hammer or damage to equipment may result.

11. Install 2-inch (5.1 cm) hardened bolt into hole in bushing (13). Strike bolt with hammer. When bolt no longer can be struck, remove bolt and install 4-inch (10.2 cm) hardened bolt. Drive out upper cylinder pin (14). Remove and discard V-ring seal (15).

12. Drive bushing (13) out of gooseneck cylinder (3) and gooseneck (1). Remove V-ring seal (16) from upper bushing (13). Discard V-ring seal.

13. Remove lubrication fitting (17) from upper cylinder pin (14).

5-23. GOOSENECK CYLINDER (CONT)

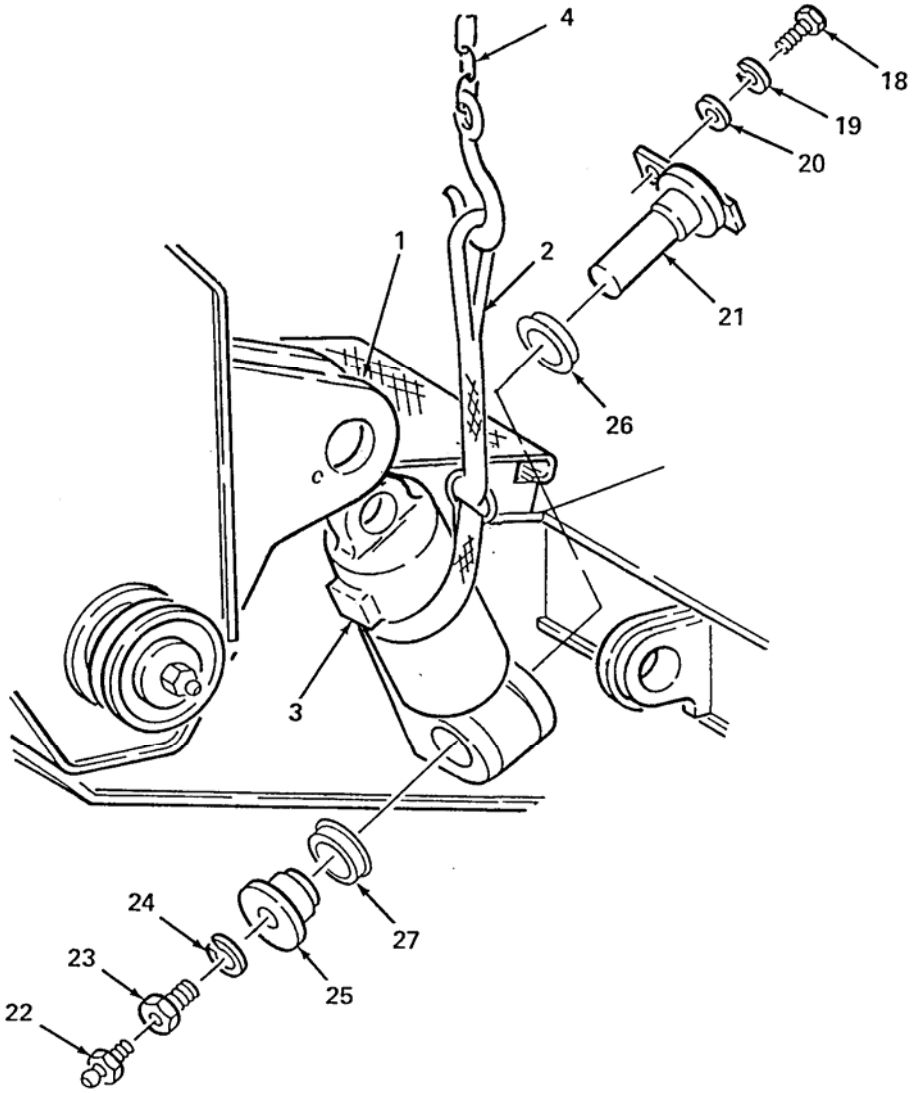
14. Use crowbar to pry downward on gooseneck cylinder (3) while lowering lifting device (4) and allow cylinder to start to compress. Check that fluid is draining into drain pan.

15. Continue to lower lifting device (4) and pry downward on cylinder until upper bearing casting on gooseneck cylinder (3) is lower than cylinder mount on gooseneck lug (1).

16. Make sure gooseneck cylinder (3) is secured by keeping tension on lifting device (4).

17. Disconnect three hydraulic lines (7) from gooseneck cylinder (3). Install caps/plugs into lines and gooseneck cylinder (3).

18. Remove screw (18), lockwasher (19), and washer (20) from lower cylinder pin (21). Remove lubrication fitting (22), bolt (23), and lockwasher (24) if present. Discard bolt and lockwashers.



CAUTION

Bolt must be fully engaged (bottomed out) in pin prior to striking with hammer or damage to equipment will result.

19. Install a 2-inch (5.1 cm) hardened bolt into hole in bushing (25). Strike bolt with hammer. When bolt can no longer be struck, remove bolt and install a 4-inch (10.2 cm) hardened bolt. Drive out lower cylinder pin (21). Remove and discard V-ring seal (26).

WARNING

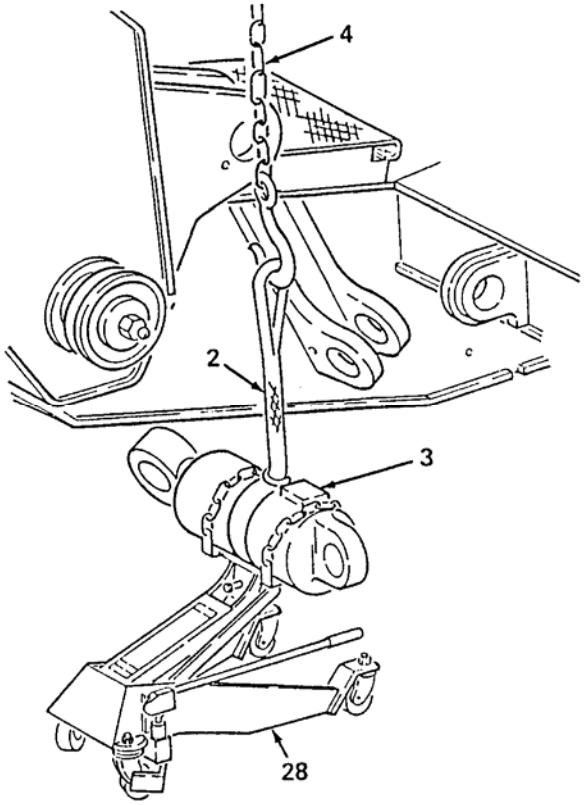
All personnel in area of gooseneck cylinder must stand clear of cylinder and lifting device while lifting device is repositioned or injury to personnel may result.

20. Drive bushing (25) out of gooseneck cylinder (3) and platform lug weldment. Remove V-ring seal (27) from bushing (25). Discard V-ring seal.

CAUTION

Top of gooseneck cylinder may start to move outward, away from platform, as lifting device is repositioned/centered over transmission jack. Lifting device operator must pay out slack to lifting strap as the lifting device is moved to prevent excess strain on lifting straps or damage to equipment may result.

21. While maintaining tension on lifting strap (2), reposition lifting device (4) over top of transmission jack (28).



5-23. GOOSENECK CYLINDER (CONT)

22. Lower lifting device (4) until gooseneck cylinder (3) is supported on transmission jack (28).

23. Secure gooseneck cylinder (3) to transmission jack (28).

24. Loosen and remove lifting strap (2) from hook of lifting device (4). Leave lifting strap (2) on gooseneck cylinder (3).

INSTALLATION

WARNING

Lifting strap must be placed around gooseneck cylinder in noose to prevent injury to personnel.

1. If not already installed, wrap lifting strap (2) around gooseneck cylinder (3) through loop to form slip-hook (noose). If necessary, secure gooseneck cylinder (3) onto transmission jack (28).

2. Maneuver transmission jack (28) near platform lug weldment.

3. Raise cylinder (3) into position and push transmission jack (28) out of the way.

4. Raise and install gooseneck cylinder (3) into lug weldment. Make sure cylinder bearings are approximately straight and ready for lower cylinder pin installation.

5. Apply antiseize compound to lower cylinder pin (21) and bushing (25). Install V-ring seal (26) onto lower cylinder pin (21) and V-ring seal (27) onto bushing (25).

6. Hand install lower cylinder pin (21) through platform lug weldment until pin is partially started into bearing on gooseneck cylinder (3).

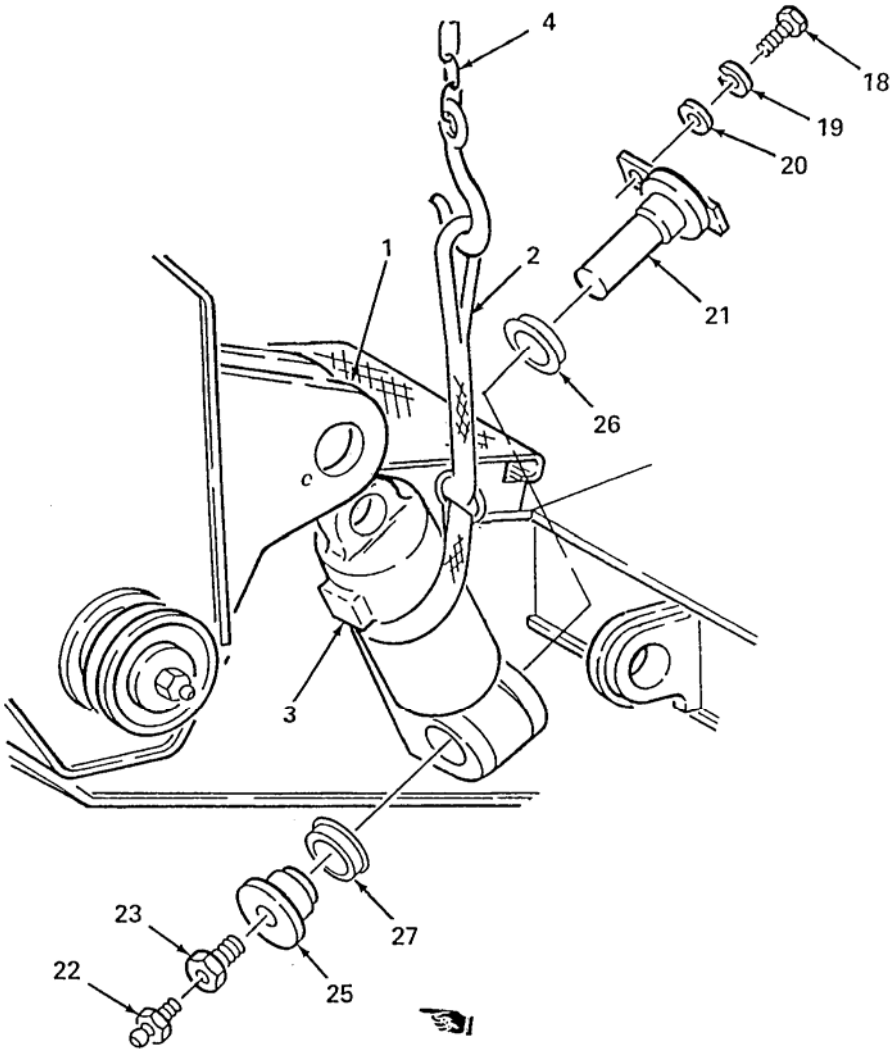
CAUTION

When driving lower cylinder pin through cylinder and platform lug weldment, use caution so that the pin is driven in straight or cylinder bearing may turn the pin and cause damage to lower cylinder pin or V-ring seal.

7. Tap lower cylinder pin (21) with hammer or heavy object until pin (21) is through platform lug weldment and lower bearing on gooseneck cylinder (3).

8. Aline hole in end of lower cylinder pin (21) with hole in platform lug weldment and secure lower cylinder pin (21) with washer (20), lockwasher (19), and bolt (18).

9. Install bushing (25) onto lower cylinder pin (21) and secure with self-locking lube-bolt (23). Use torque wrench to torque lube-bolt (23) to 100 - 110 lb-ft (136 - 149 Nm). Install lubrication fitting (22) into lube-bolt (23).



5-23. GOOSENECK CYLINDER (CONT)

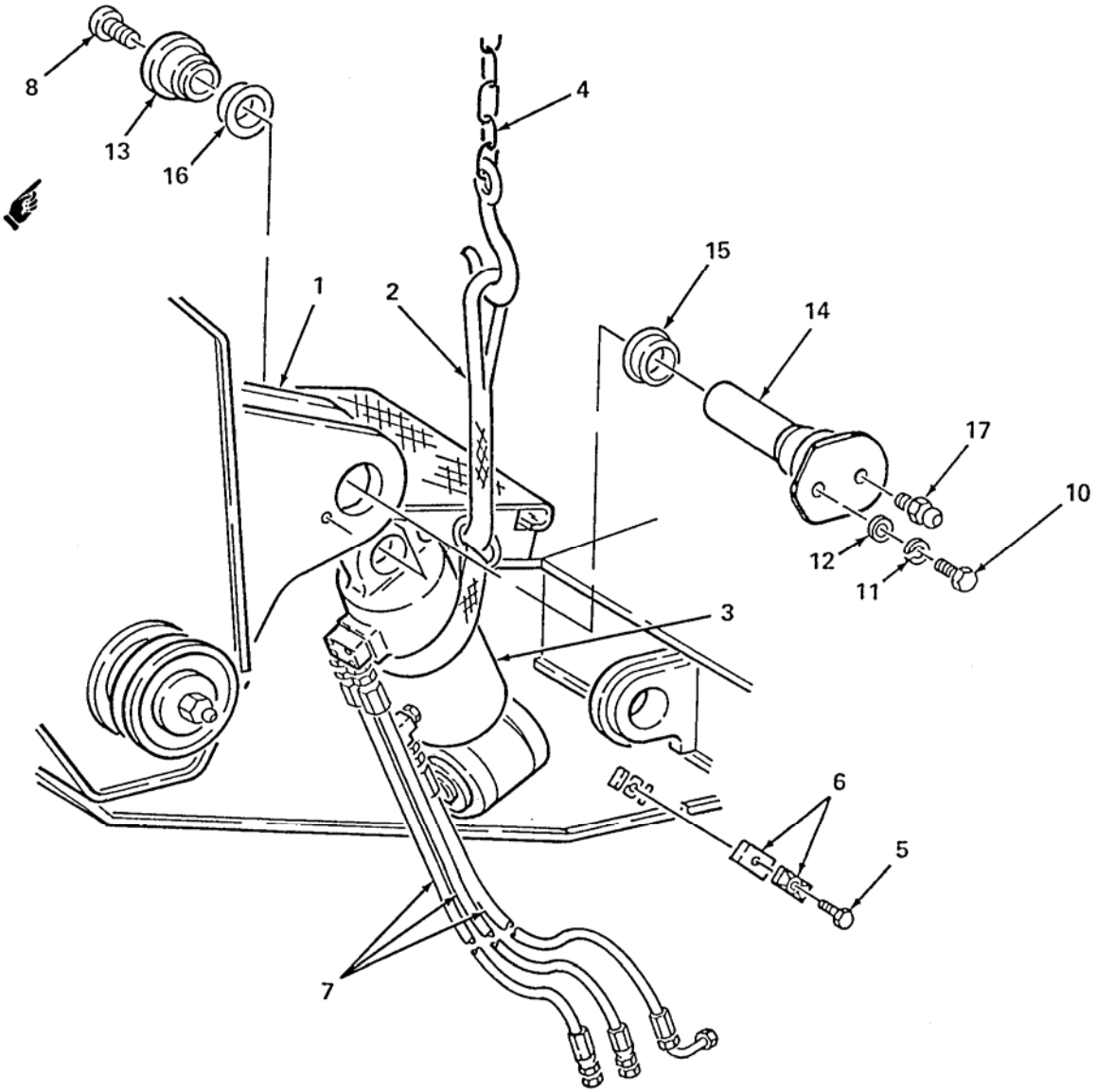
CAUTION

One person must be positioned on the platform with a crowbar to prevent the gooseneck cylinder from making contact with platform step pneumatic or hydraulic lines or damage to equipment may result.

10. Position a person on the platform with crowbar to be used to prevent gooseneck cylinder (3) from hitting platform step hydraulic or pneumatic lines.

11. Using lifting device (4), raise gooseneck cylinder (3) into gooseneck lug (1).

12. Use crowbar and lifting device (4) to aline upper bearing of gooseneck cylinder (3) between gooseneck lugs.



13. Maintain tension on lifting strap (2) with lifting device (4).

14. Apply antiseize compound to upper cylinder pin (14) and bushing (13). Install a V-ring seal (15) onto upper cylinder pin (14) and V-ring seal (16) onto bushing (13).

15. Hand install upper cylinder pin (14) through gooseneck mounting lug (1) until pin is partially started into bearing on gooseneck cylinder (3).

CAUTION

When driving upper cylinder pin through cylinder and mounting lug on gooseneck, use caution so that the pin is driven in straight or cylinder bearing may turn the pin and cause damage to upper cylinder pin or V-ring seal.

16. Drive upper cylinder pin (14) through gooseneck mounting lug (1) and upper bearing on gooseneck cylinder (3).

17. Aline hole in end of upper cylinder pin (14) with gooseneck mounting lug (1) and secure upper cylinder pin (14) with washer (12), lockwasher (11), and bolt (10). Use a torque wrench to torque bolt (10) to 325 - 375 lb-ft (441 - 509 Nm).

18. Install bushing (13) onto upper cylinder pin (14) and secure with self-locking screw (8). Use torque wrench to torque screw (8) to 100 - 110 lb-ft (136 - 149 Nm).

19. Install lubrication fitting (17) into upper cylinder pin (14).

20. Lower lifting device (4) and remove lifting strap (2).

21. Unwrap lifting strap (2) from gooseneck cylinder (3).

22. Remove caps/plugs and install three hydraulic lines (7) onto gooseneck cylinder (3) and three hydraulic valves under platform. Install block clamp (6) and screw (5).

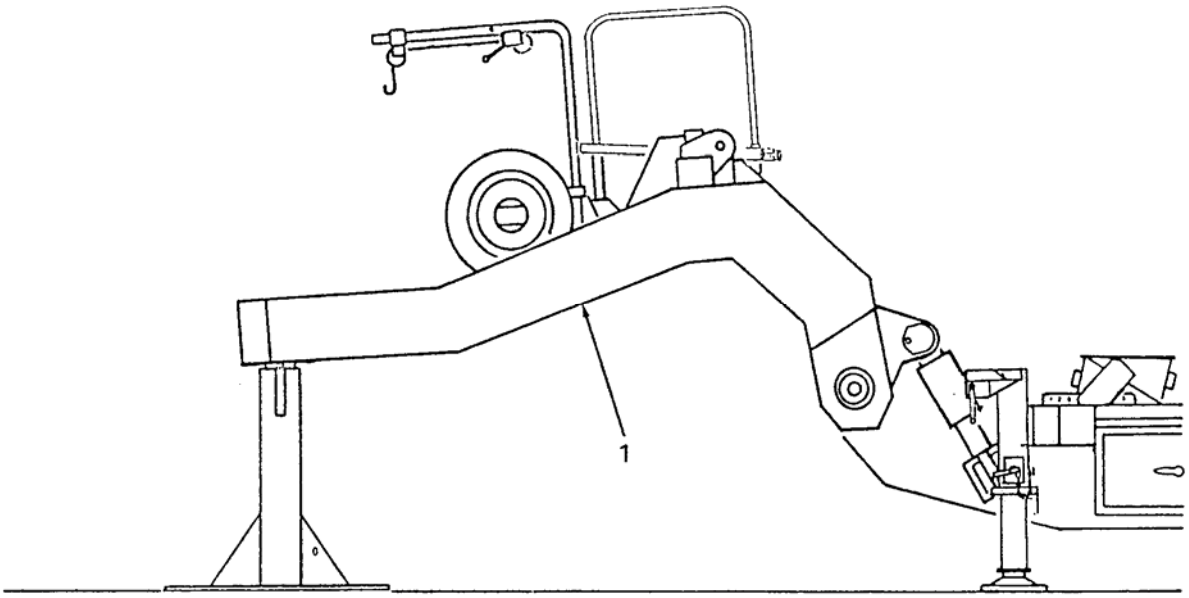
23. Refill hydraulic reservoir (para. 4-17).

24. Start APU (para. 2-16).

25. Operate gooseneck valve handle (para. 2-6) and operate gooseneck (para. 2-18) to remove air bubbles from hydraulic lines.

5-23. GOOSENECK CYLINDER (CONT)

26. Remove gooseneck support from under gooseneck.



FOLLOW-ON MAINTENANCE

Refer to paragraph 4-19 and bleed gooseneck hydraulics.

5-24. GOOSENECK/PIVOT PIN

This task covers: a. Removal c. Repair
b. Inspection d. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Lifting device, 7,500 lb (3405 kg) minimum capacity
Lifting chain (4), item 9, appx. B
3-inch (7.62 cm) cold rolled steel rod, 66 inches (167.6 cm) minimum length
Cylinder hone, item 13, appx. B
Sledge hammer, item 14, appx. B
Drill, motor, 1/2-inch, item 14, appx. B

Materials/Parts

Locknut (2)
Mount (2)
Spacer (3)
Spacer
Spacer
Grease, item 12, appx. E
Antiseize compound, item 3, appx. E
Tape, item 29, appx. E

Personnel Required: 3

Equipment Condition

Gooseneck hydraulic cylinder removed (para. 5-23)
Gooseneck hydraulic lines disconnected from support step (para. 4-87)
Gooseneck pneumatic lines disconnected from support step (para. 4-49)
W1 harness disconnected from platform junction boxes (para. 4-23)
Guardrails removed (para. 4-57)
Davit assembly removed (para. 4-70)
Spare tires removed if necessary (para. 3-6)
Steering wedge centered (para. 2-21)
Solar panel removed (some semitrailers) (para. 4-30.1)

General Safety Instructions

WARNING

Gooseneck weighs in excess of 6,200 pounds (2815 kg). Be sure gooseneck is adequately supported during removal or injury to personnel may result.

REMOVAL

WARNING

For lifting purposes, the overhead lifting point for the gooseneck is approximately centered above both gooseneck fairleads. Make sure lifting device is approximately centered, side to side, over the fairleads or injury to personnel and damage to equipment may result.

CAUTION

Equipment used to support the front of the gooseneck during gooseneck cylinder removal must remain in place during this entire procedure to help support the gooseneck or damage to equipment may result.

1. Make sure existing gooseneck support is firmly supporting gooseneck prior to connecting chains for pivot pin removal.

5-24. GOOSENECK/PIVOT PIN (CONT)

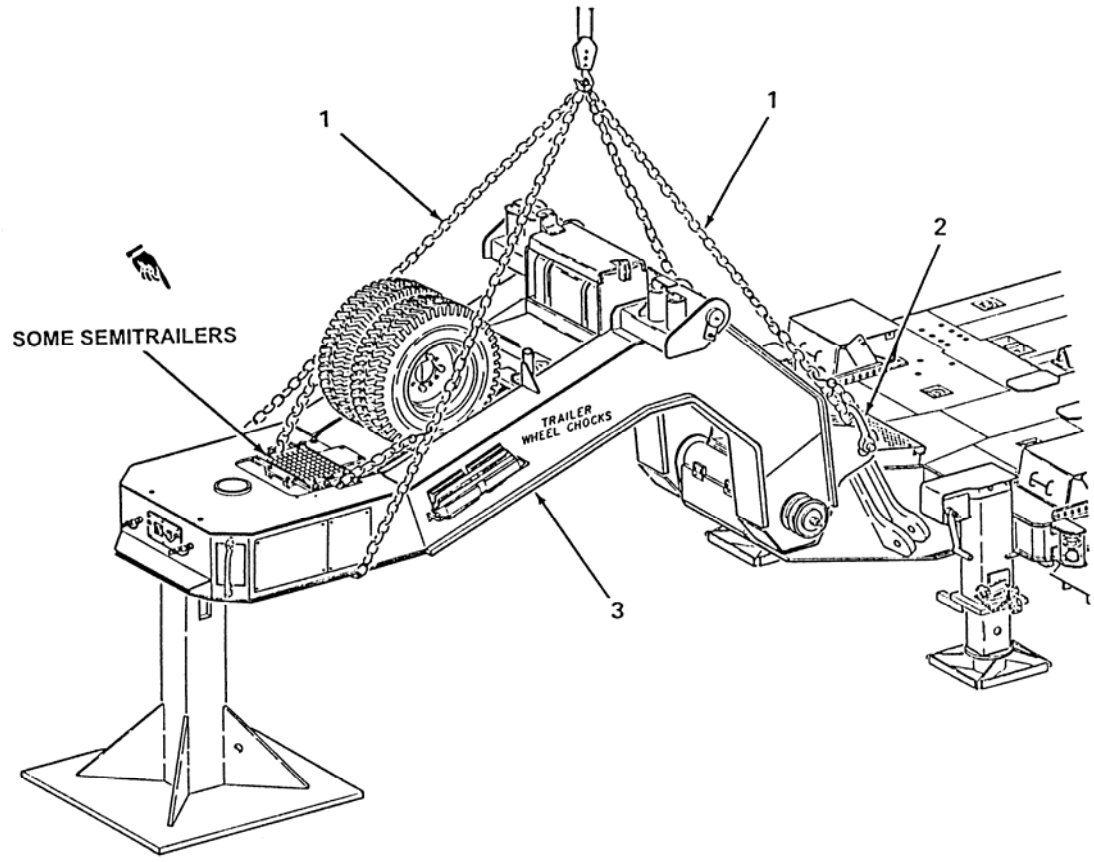
WARNING

On some semitrailers a solar battery charger is mounted to top of gooseneck directly in front of spare tires. Persons working on top of gooseneck must take EXTREME care not to step on or trip over it. Injury to personnel or damage to equipment may result.

CAUTION

An overhead lifting device, four chains, and two clevises will be used to support/transport gooseneck to work area after pivot pin has been removed. Protect gooseneck bracket holes by applying tape to clevises or clevises will damage bracket holes.

2. Using suitable lifting device, four chains (1), two clevises (2), and tape, support gooseneck (3) by attaching one chain (1) and taped clevis (2) through each gooseneck cylinder mounting bracket and two chains (1) through kingpin box weldment adjacent to steering wedge. Take up slack in chains.



3. Remove four screws (4), two access covers (5), two mounts (6), and two keys (7). Discard mounts.

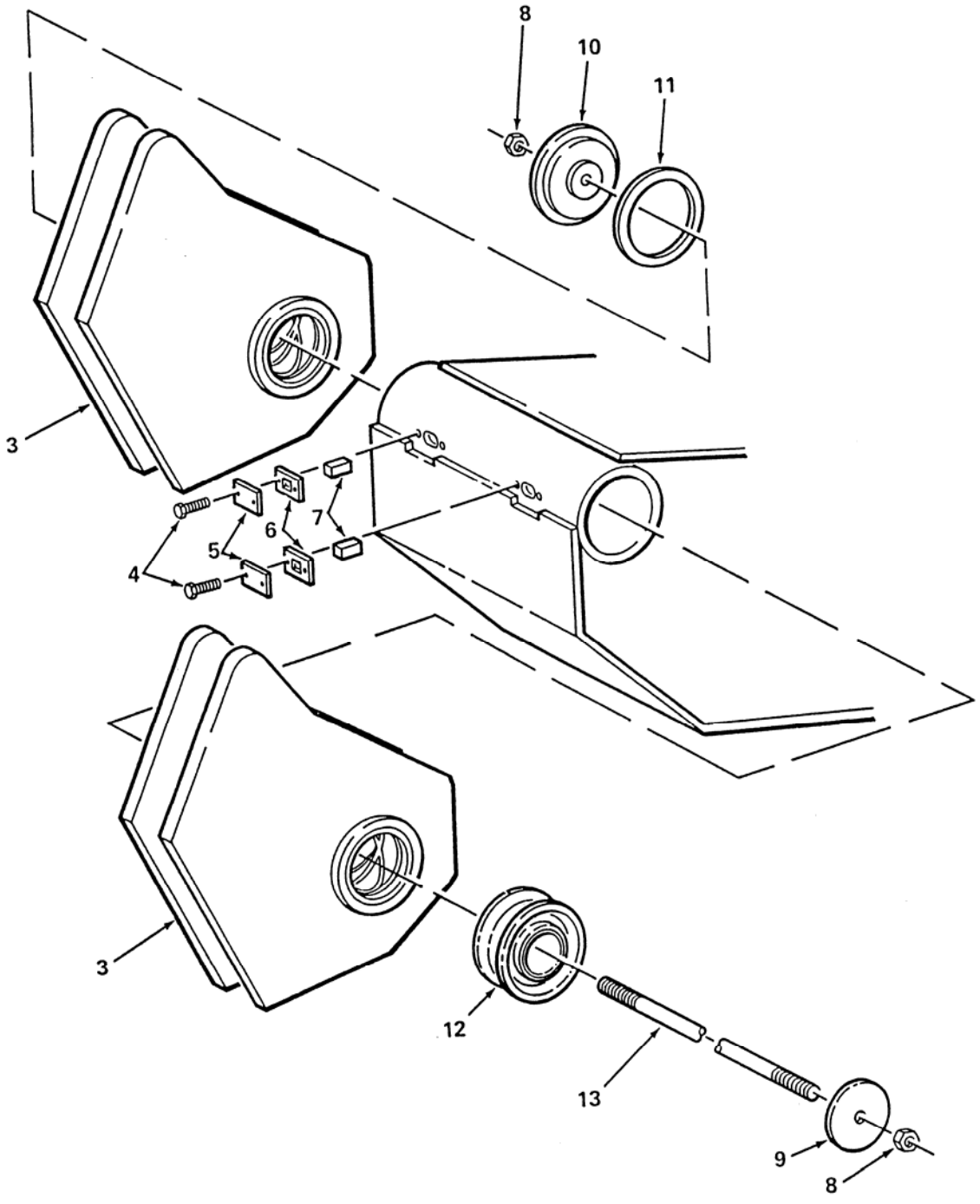
4. Remove two locknuts (8), two covers (9 and 10), and spacer (11). Discard locknuts and spacer.

5. Remove pulley (12) and threaded rod (13) from gooseneck (3).

CAUTION

Use caution not to apply too much tension on lifting chains. Allow only enough tension to support gooseneck or lifting chains will pull against gooseneck pivot pin and complicate removal or damage to equipment may result.

6. Adjust lifting device and chains until gooseneck is level side to side.



5-24. GOOSENECK/PIVOT PIN (CONT)

WARNING

Eye protection and face shields must be worn when using steel rod to prevent metal shavings or chips of metal hitting personnel or injury to personnel may result.

There should be no slack in chains during removal of gooseneck pivot pins or injury to personnel may result.

During pivot pin removal, the weight of the gooseneck will be shifted from side to side when each half of the pivot pin is removed. Extra care must be taken to assure that gooseneck is properly balanced during this procedure or injury to personnel and damage to equipment may result.

Steel rod is heavy. Two or more persons must be used to handle, support, and drive steel rod or injury to personnel may result.

Pivot pins can be slick and hard to handle. Care must be exercised when handling or injury to personnel may result.

Do not use sledge hammer while another person is holding steel rod or injury to personnel may result.

Use safety chain to keep pivot pins from coming out of gooseneck unexpectedly or injury to personnel may result.

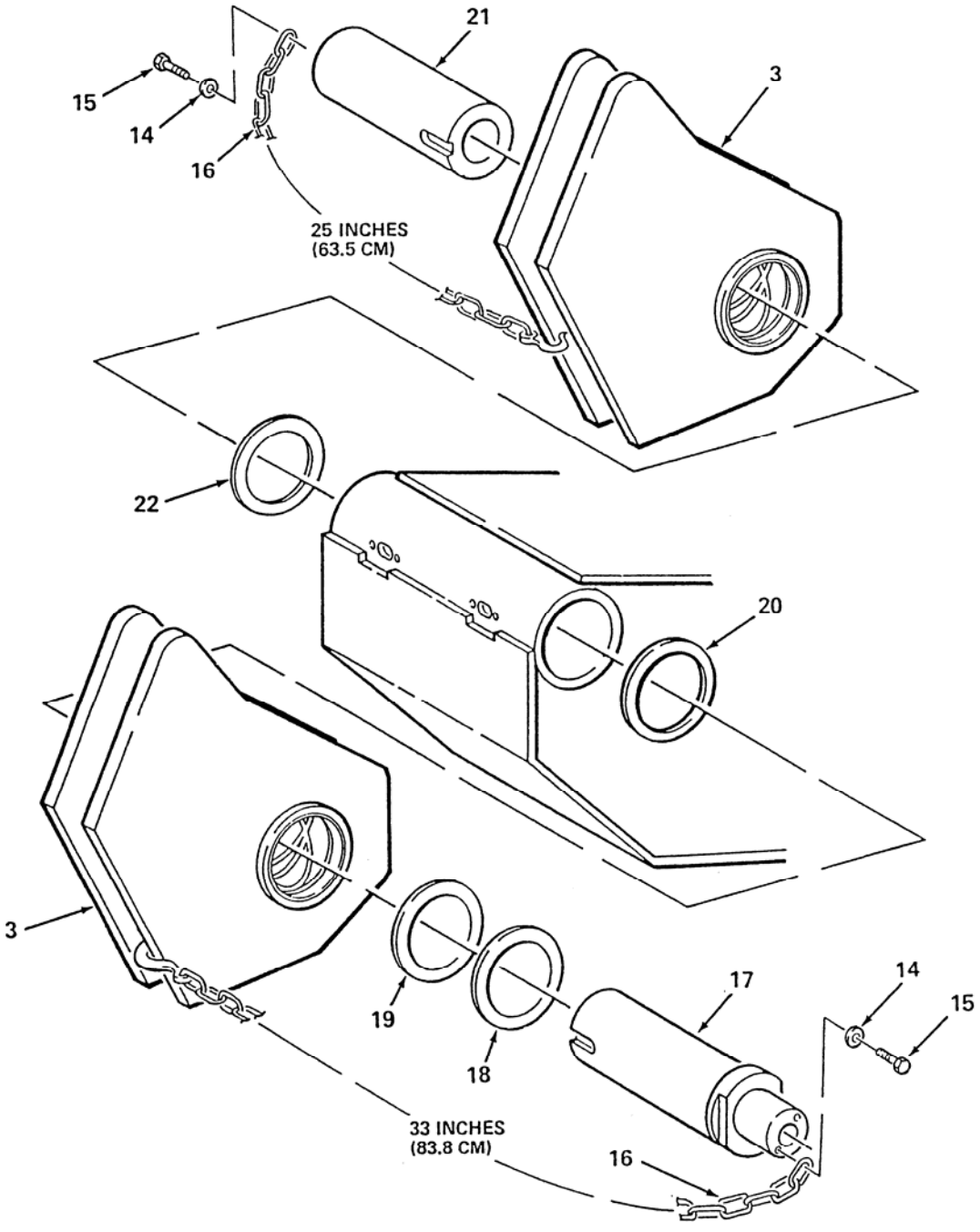
7. At streetside of gooseneck, assemble washer (14) on 3/8-16 screw (15) and insert through 33-inch (83.8 cm) length of chain (16). Install screw (15) into threaded hole in streetside pivot pin (17). Hook free end of chain (16) to gooseneck (3).

8. From curbside of gooseneck, using a 3-inch (7.62 cm) cold rolled steel round stock, 66 inches (167.6 cm) long, drive out streetside pivot pin (17) until safety chain (16) is taut. Remove chain (16) and carefully remove streetside pivot pin (17) and three spacers (18, 19, and 20). Discard spacers.

9. At curbside of gooseneck, assemble washer (14) on 3/8-16 screw (15) and insert through 25-inch (63.5 cm) length of chain (16). Install screw (15) into threaded hole in curbside pivot pin (21). Hook free end of chain (16) to gooseneck (3).

10. From streetside of gooseneck, using a 3-inch (7.62 cm) cold rolled steel round stock, 66-inches (167.6 cm) long, drive out curbside pivot pin (21) until safety chain (16) is taut. Remove chain (16) and carefully remove curbside pivot pin (21) and spacer (22). Discard spacer.

11. Separate gooseneck from platform and move gooseneck to work area.



INSPECTION

1. Clean pivot pins and platform weldment pivot pin bore with rags.

2. Check platform weldment pivot pin bore for pits, scoring, uneven wear, and excess corrosion.

3. Inspect pivot pin bearings in gooseneck for corrosion, uneven wear, and scoring.

5-24. GOOSENECK/PIVOT PIN (CONT)

REPAIR

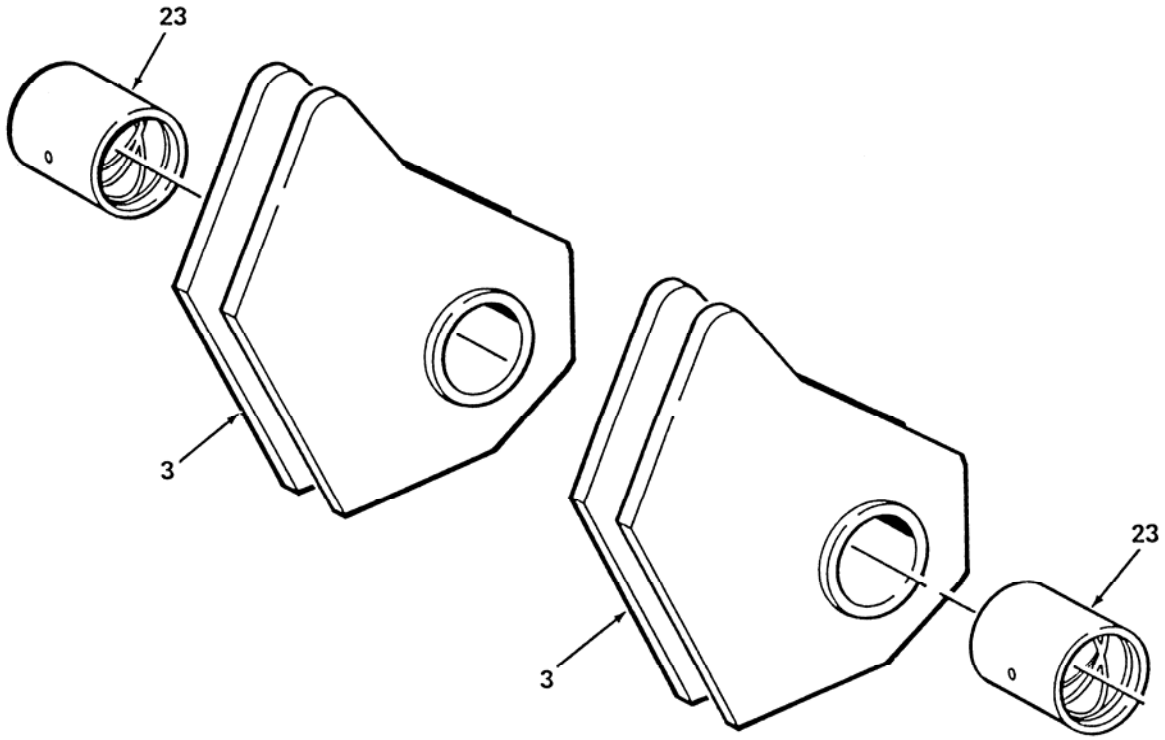
CAUTION

Do not allow hone to cut the bearing cavity surfaces or cavity may become too large and result in premature pivot pin failure.

1. Clean pivot pin bore using a drill motor, cylinder hone, and cutting oil. Hone pivot pin cavity to polish inside surfaces only.

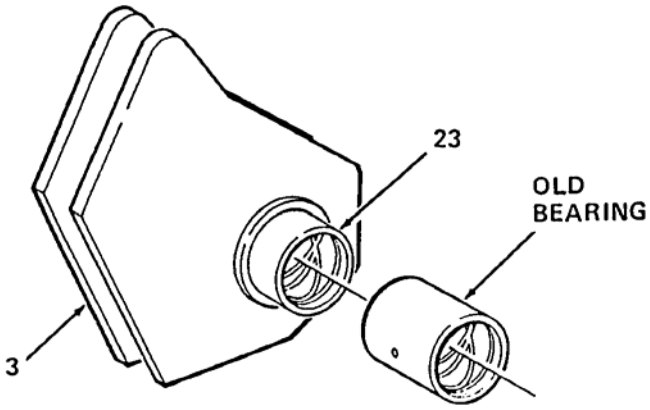
2. If bearings are scored or slightly corroded, clean inside bearing surfaces using a power drill and cylinder hone. Hone bearing cavity to polish inside surfaces only. If bearings are unevenly worn, pitted, or defective, replace bearings as follows:

   a. Using a hammer and brass drift, drive old bearings (23) out of bearing cavity.



   b. Using a drill motor and cylinder hone, hone bearing cavity in gooseneck. Hone gooseneck bearing cavity to polish inside surface only.

   c. Aline new bearings with bore in gooseneck. Using old bearing and hammer, drive new bearings (23) into gooseneck (3) by hammering against old bearing.



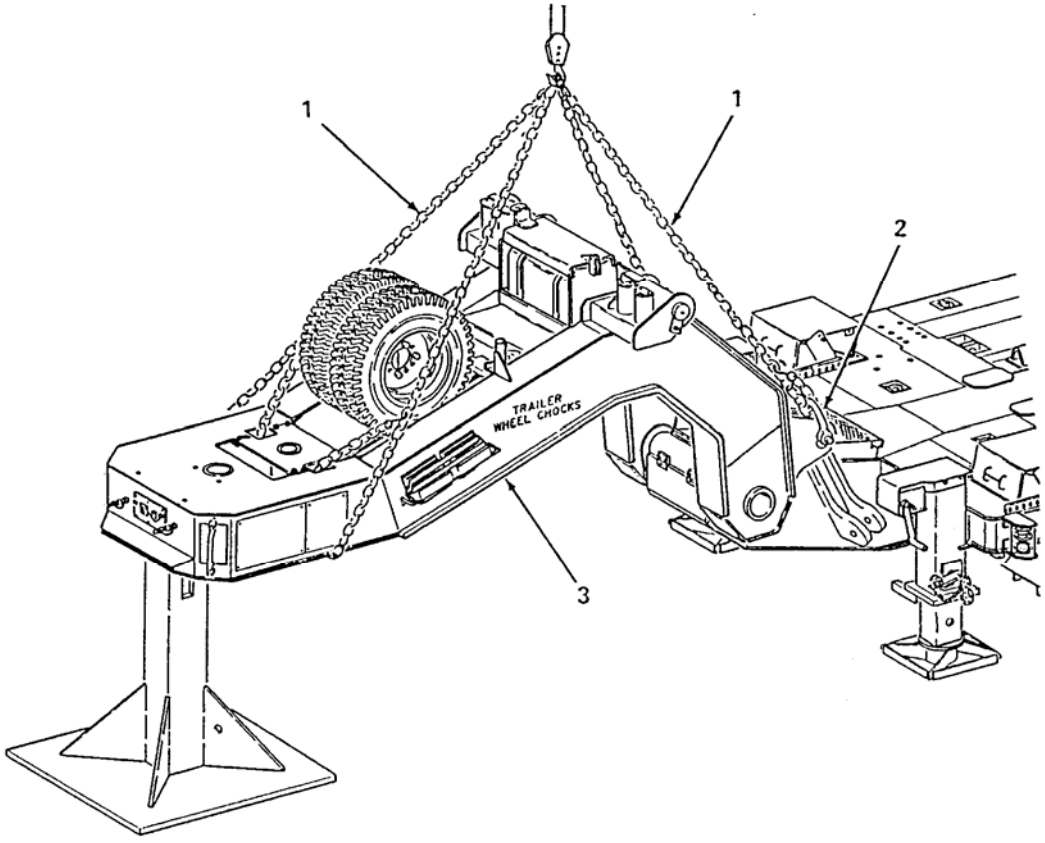
INSTALLATION

WARNING

Gooseneck weighs in excess of 6,200 pounds (2,815 kg). Be sure goose-neck is adequately supported during installation or injury to personnel may result.

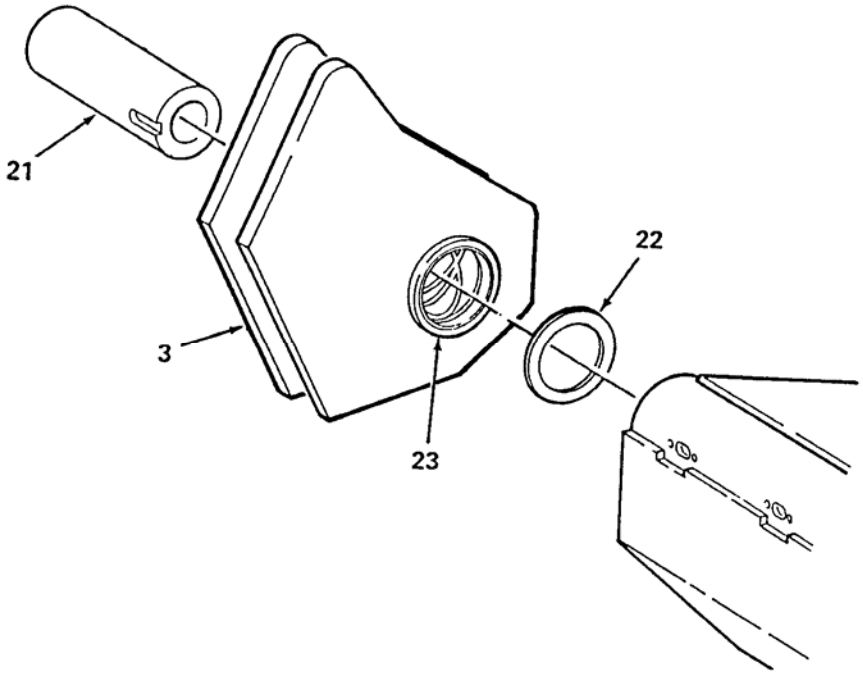
Do not allow personnel under gooseneck until one pivot pin has engaged platform or injury to personnel may result.

1. Using suitable lifting device and with chains (1) and clevises (2) still attached, carefully position gooseneck (3) over platform and aline holes in gooseneck to holes in platform.



5-24. GOOSENECK/PIVOT PIN (CONT)

2. Apply antiseize compound to inner surfaces of bearing (23), exterior of curbside pivot pin (21), and inner surfaces of pivot pin mount in platform.



CAUTION

Hammer against a piece of wood when driving in pivot pin or damage to equipment may result.

NOTE

While driving either pivot pin into platform, observe pivot pin through key slots in platform. If pivot pin keyway does not aline with key slots in platform or gets rotated during installation, the pivot pin must be removed, re-alined, and re-installed.

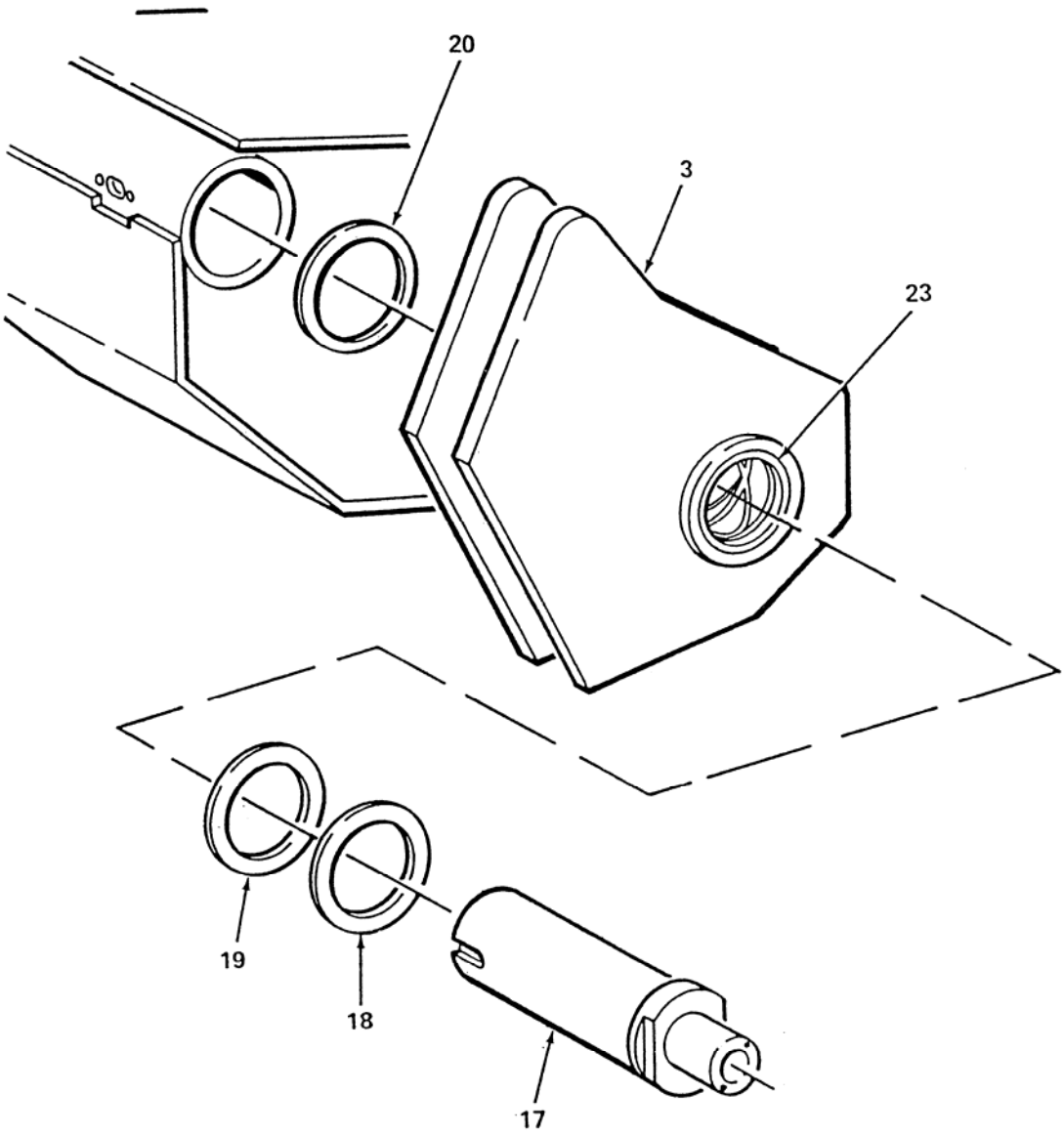
3. Make sure keyway in curbside pivot pin (21) is alined with key slots in platform. Using a sledge hammer and piece of wood, drive curbside pivot pin (21) to inboard edge of bearing (23).

NOTE

Grease will help to hold spacer in place during installation.

4. Apply grease liberally to spacer (22) and install between inboard edge of curbside pivot pin (21) and platform. Make sure spacer (22) is alined to allow curbside pivot pin (21) to be driven through spacer (22) into platform and continue driving curbside pivot pin (21) into platform.

5. Apply antiseize compound to inner surfaces of bearing (23), exterior of streetside pivot pin (17), and inner surfaces of pivot pin mount in platform.



NOTE

Spacer (18) is thicker than spacer (19). Spacer (18) goes on pivot pin (17) first.

6. Install spacers (18 and 19) onto streetside pivot pin (17). Make sure keyway in streetside pivot pin (17) is alined with key slots in platform. Using a sledge hammer and piece of wood, drive streetside pivot pin (17) to inboard edge of bearing (23).

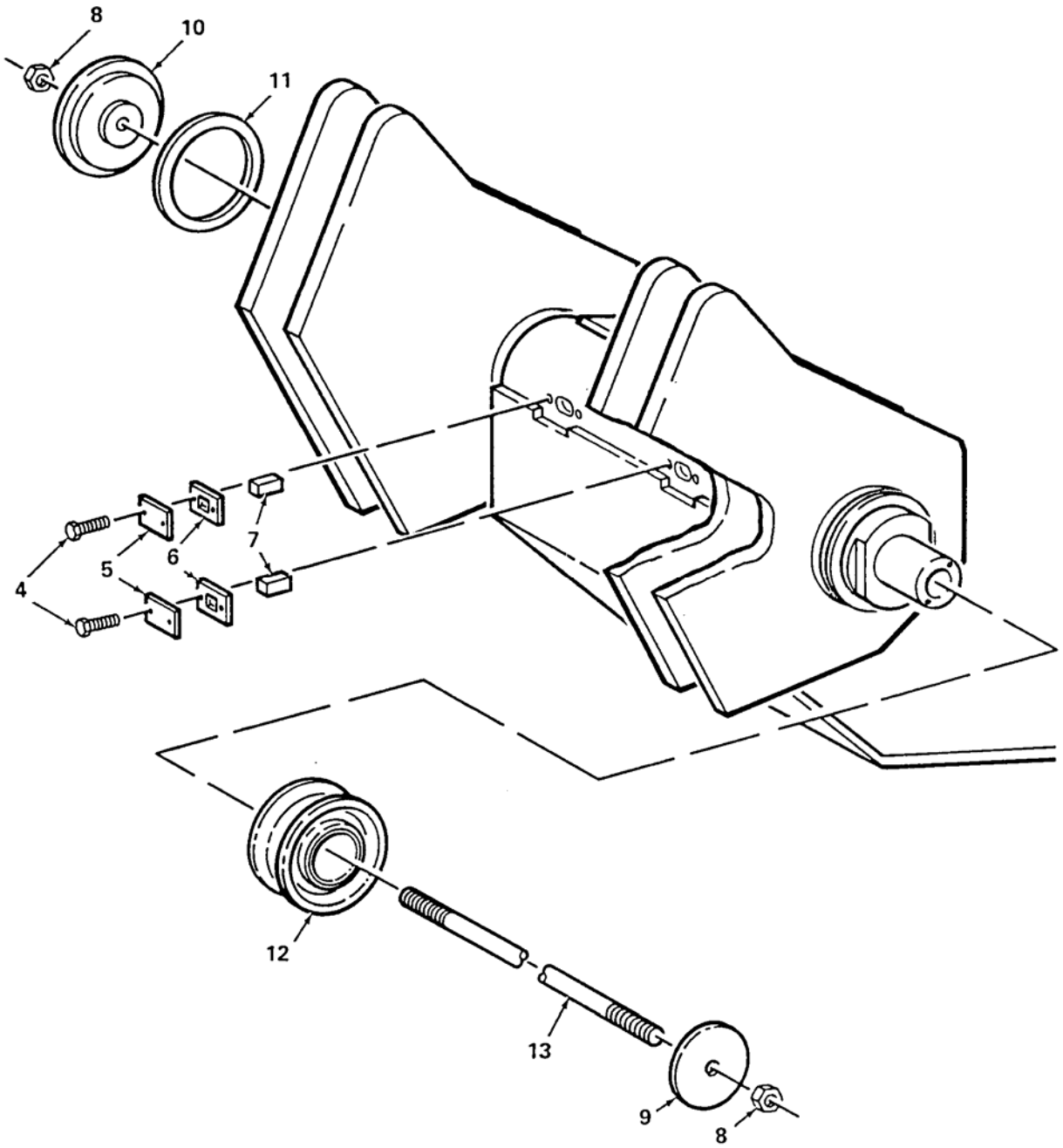
NOTE

Grease will help to hold spacer in place during installation.

7. Apply grease liberally to spacer (20) and install between inboard edge of streetside pivot pin (17) and platform. Make sure spacer (20) is alined to allow streetside pivot pin (17) to be driven through spacer (20) into platform, and continue driving streetside pivot pin (17) into platform.

5-24. GOOSENECK/PIVOT PIN (CONT)

8. Install two keys (7), mounts (6), access covers (5), and four screws (4).



9. Install pulley (12) onto pivot pin (17).

10. Install threaded rod (13). Install cover (9), spacer (11), and cover (10) on threaded rod (13).

11. Secure covers (9 and 10) in place with two self-locking nuts (8). Torque nuts (8) to 300 lb-ft (407 Nm).

FOLLOW-ON MAINTENANCE

1. Lubricate pivot pin (para. 3-3).

1.1. Install solar panel (some semitrailers) (para. 4-30.1).

2. Start APU and check operation of gooseneck/pivot pin installation (para. 2-18).

5-25. SUSPENSION HYDRAULIC CYLINDER

This task covers: a. Disassembly b. Repair c. Assembly

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Spanner, adjustable hook, 6.5-inch, item 28, appx. B
Stop ring tool, item 7, appx. B
Cylinder hone, item 13, appx. B
Drill motor, 1/2-inch, item 14, appx. B

Materials/Parts

Suspension cylinder repair kit
Tape, item 28, appx. E
Petroleum jelly, item 17, appx. E
Thread locking compound, item 21, appx. E
Hydraulic fluid, item 13, appx. E

Equipment Condition

Suspension hydraulic cylinder removed (para. 4-41)

General Safety Instructions

WARNING

Hydraulic fluid may be hot if system has been in operation. Allow time for system to cool before performing maintenance or injury to personnel may result.

Hydraulic fluid may be absorbed through the skin. Wear long sleeves, gloves, and goggles or face shield. If hydraulic fluid gets into the eyes, flush them immediately with water and seek medical attention. If hydraulic fluid gets on skin, wash thoroughly with soap and water. Wash hands thoroughly prior to eating or smoking.

5-25. SUSPENSION HYDRAULIC CYLINDER (CONT)

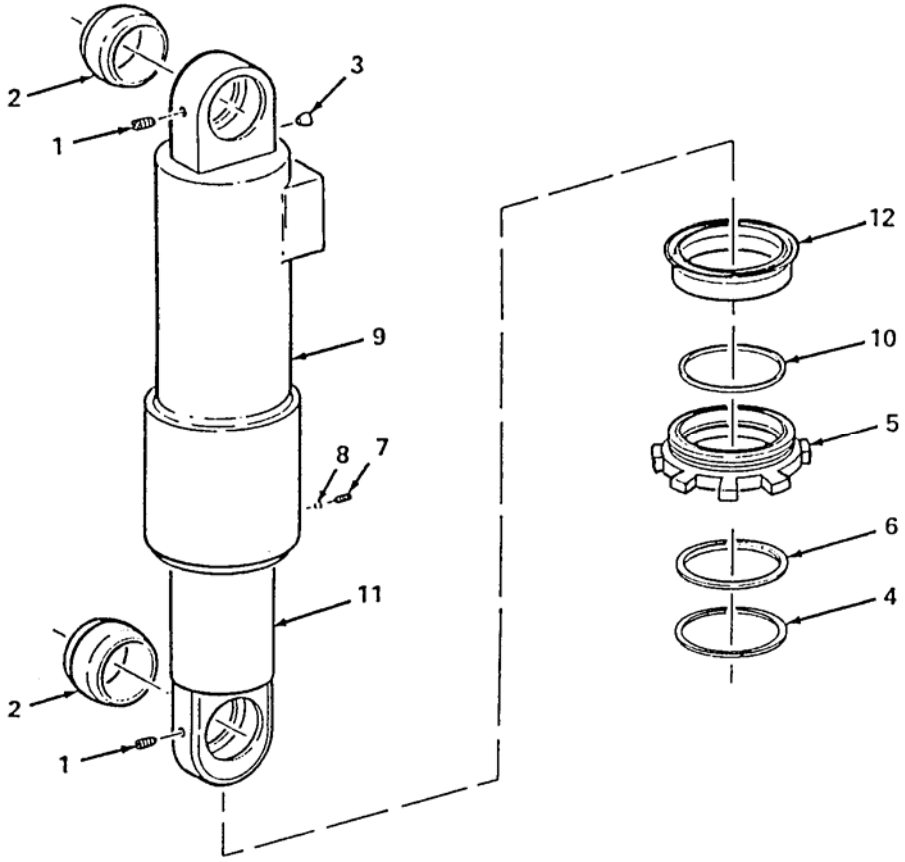
DISASSEMBLY

1. Remove two setscrews (1), two bushings (2), and pipe plug (3) if present.
2. Using a flat-tip screwdriver, pry retaining ring (4) if present in a circular motion and remove from packing nut (5).
3. Remove wiper ring (6) from packing nut (5). Discard wiper ring.

NOTE

Nylon ball may not come out until piston ring is removed.

4. Remove setscrew (7) and nylon ball (8) from cylinder assembly (9). Discard nylon ball.
5. Using spanner wrench, remove packing nut (5) from cylinder assembly (9). Remove vacuum seal (10) from packing nut (5). Discard vacuum seal.



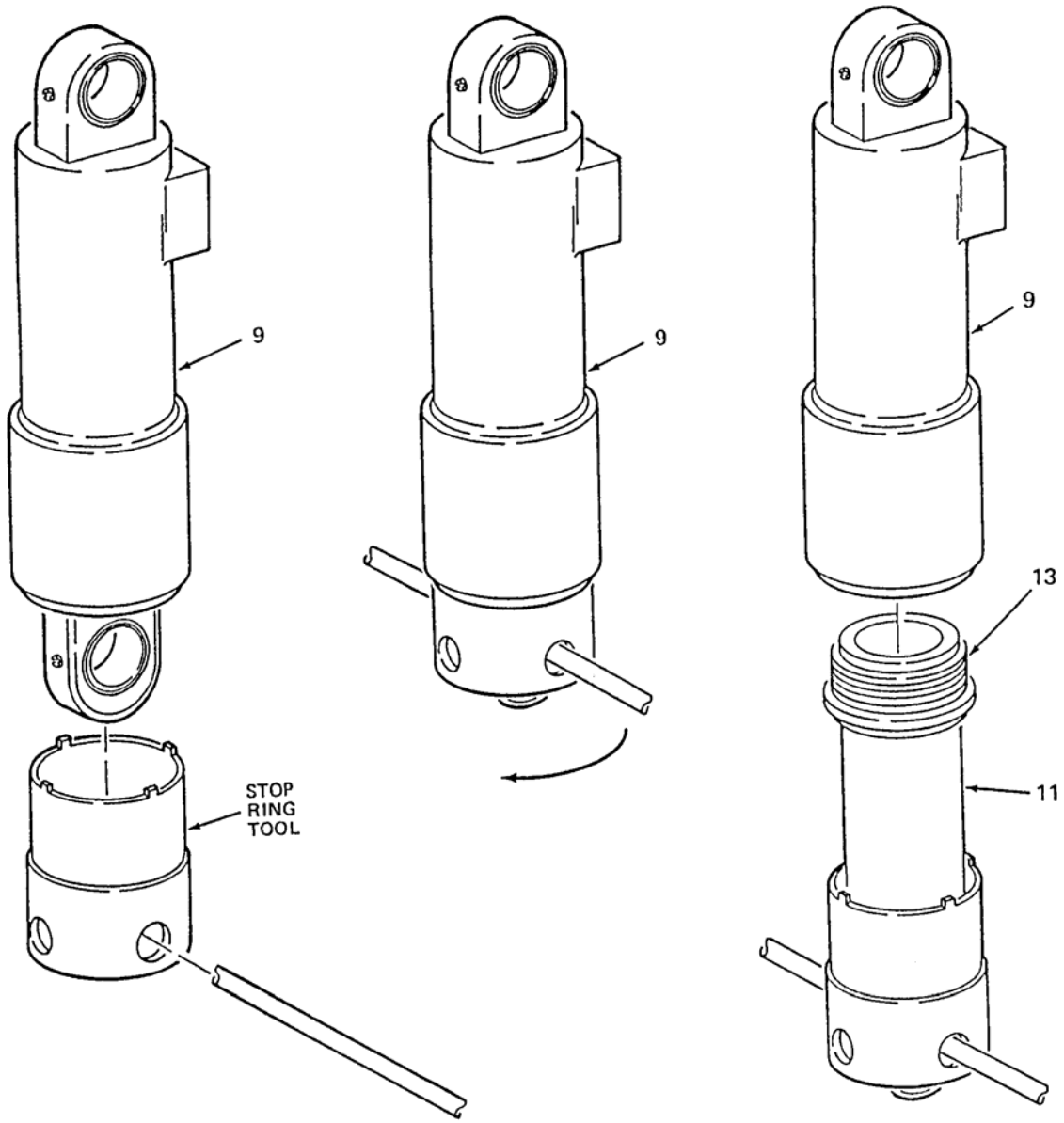
6. Fully extend plunger rod (11) and clean a 3-inch (7.6 cm) area around middle of plunger rod. Apply two or three layers of tape to cleaned surface of plunger rod (11).

NOTE

Rod seal may be in four parts, one clear and three black. It may be necessary to remove tape each time a part is removed. If so, re-apply tape and continue removing parts until entire rod seal is removed.

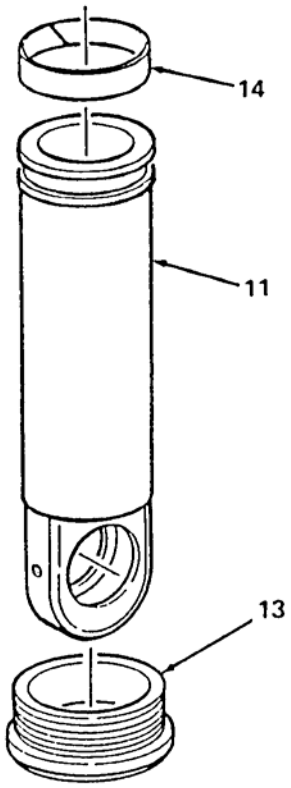
7. Using moderate force, push plunger rod (11) into cylinder assembly (9). Extend plunger rod (11) and remove tape and all parts of rod seal (12). Discard rod seal and tape.

8. Compress cylinder and insert stop ring tool and suitable prybar onto cylinder assembly (9). Unscrew piston ring (13) and remove plunger rod (11) from cylinder assembly (9). Remove stop ring tool.



5-25. SUSPENSION HYDRAULIC CYLINDER (CONT)

9. Remove piston ring (13) from plunger rod (11). If not removed earlier, remove nylon ball from cylinder and discard nylon ball.



10. Using suitable prying device, open bearing ring (14) and remove from plunger rod (11). Discard bearing ring.

REPAIR

1. Repair suspension hydraulic cylinder assembly, using hydraulic cylinder repair kit to replace parts discarded during disassembly. Replace other unserviceable parts as required.

CAUTION

Honing is for polishing surfaces only. Do not allow hone to cut the cylinder cavity surfaces or cavity may become too large and result in premature cylinder failure.

2. Check interior surface of cylinder bore for pits, scoring, uneven wear, and corrosion. Hone bore using a drill motor, cylinder hone, and cutting oil only to polish inside surface.

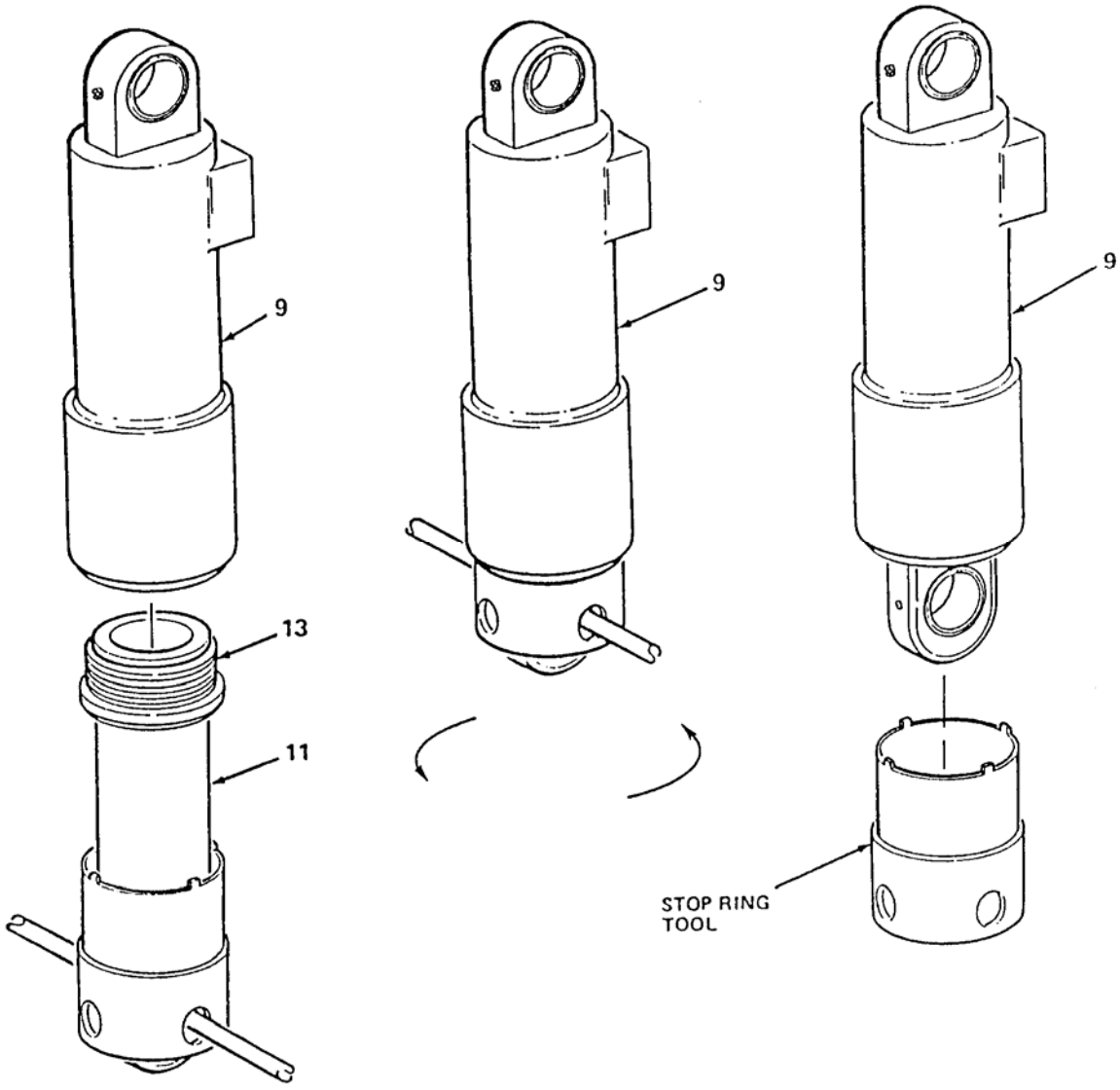
ASSEMBLY

1. Lubricate bearing ring (14) with petroleum jelly. Open bearing ring (14), and install on plunger rod (11).

2. Lubricate piston ring (13) with petroleum jelly and install piston ring (13) on plunger rod (11).

3. Lubricate interior of cylinder assembly (9) with hydraulic fluid. Using stop ring tool and suitable prybar, insert plunger rod (11) onto cylinder assembly (9) and screw in piston ring (13) as far as it will go. Remove stop ring tool.

4. Assemble rod seal (12). Apply a coat of petroleum jelly to rod seal (12) and seal inserter (part of repair kit). ▌

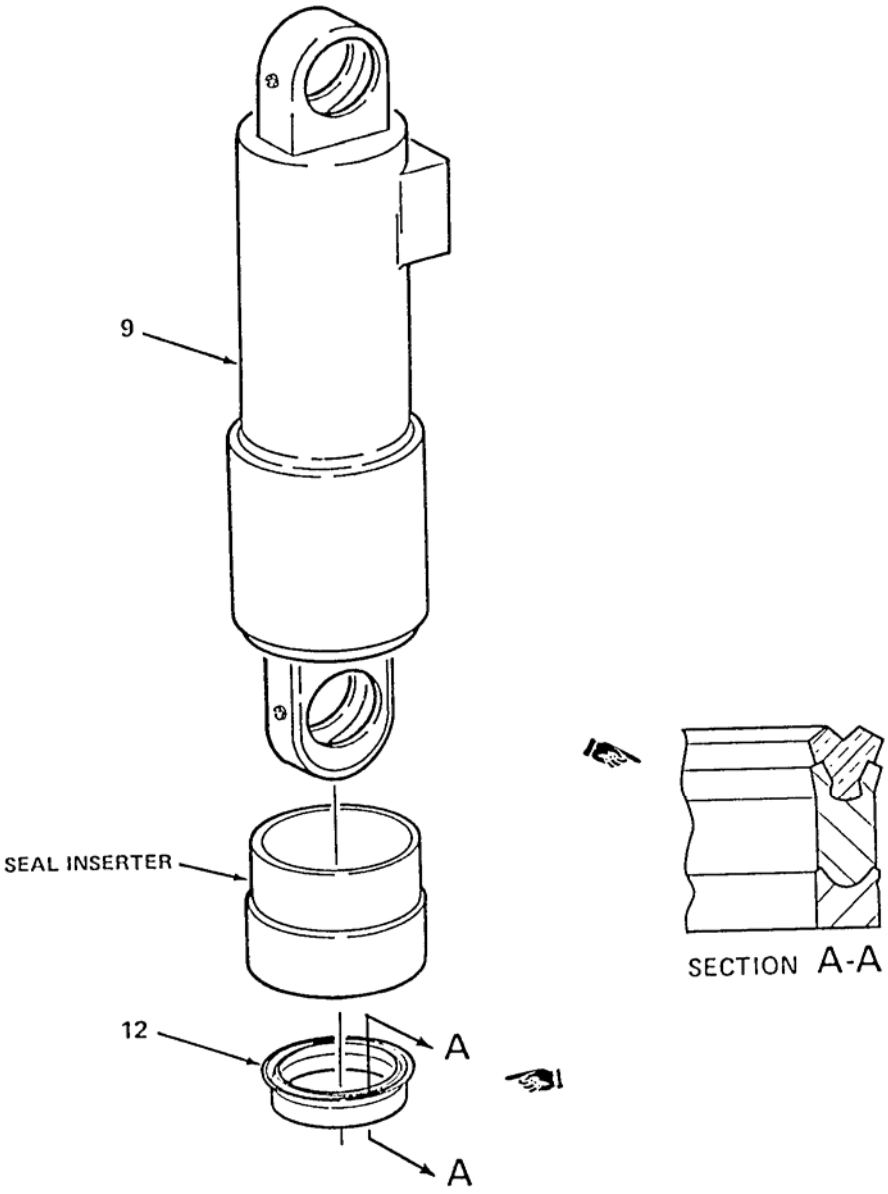


5-25. SUSPENSION HYDRAULIC CYLINDER (CONT)

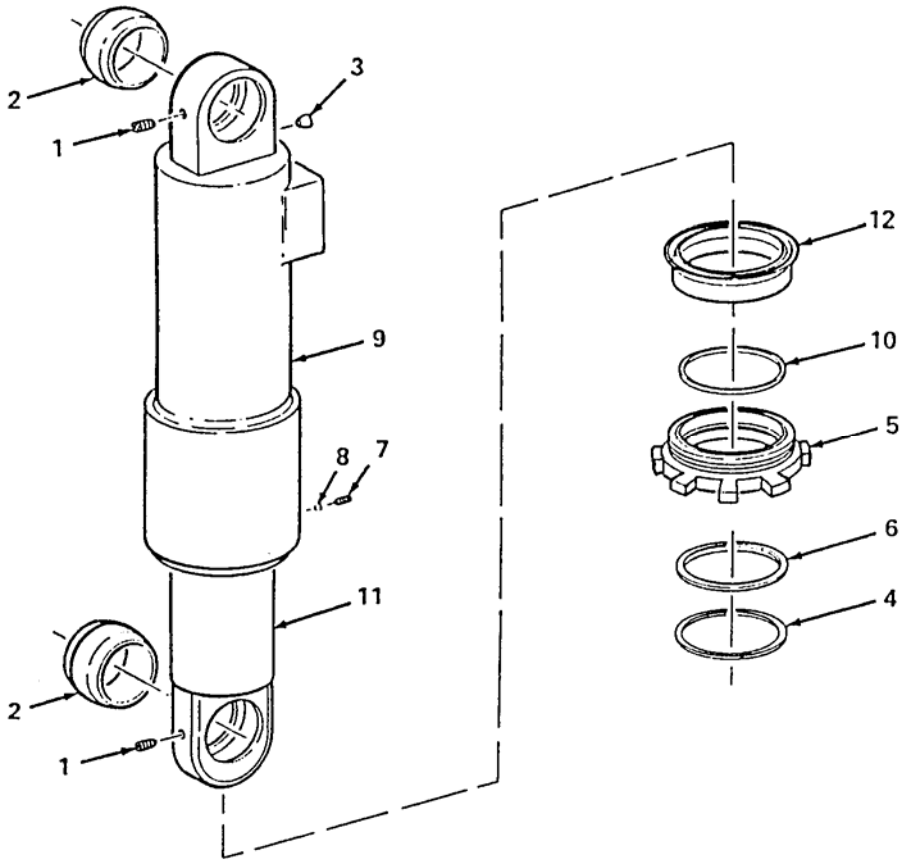
CAUTION

Be sure dowel has no sharp edges or rod seal may be damaged. Use caution when hammering or plunger rod may be damaged.

5. Install seal inserter into cylinder assembly (9). Using a blunt dowel and hammer, install rod seal (12), with formed lip entering cylinder (9) first, by tapping around edge of rod seal (12). Remove seal inserter.



6. Lubricate vacuum seal (10) with petroleum jelly, install vacuum seal (10) on packing nut (5), and install packing nut in cylinder assembly (9) using spanner wrench.



7. Install wiper ring (6) with lip away from packing nut (5). Install retaining ring (4) on packing nut (5) by inserting a flat-tip screwdriver under end of ring and working around ring.

8. Apply thread locking compound to setscrew (7). Lubricate nylon ball (8) with petroleum jelly and install nylon ball (8) and setscrew (7).

9. Apply thread locking compound to two setscrews (1). Install pipe plug (3), two bushings (2), and two setscrews (1).

5-26. GOOSENECK HYDRAULIC CYLINDER

This task covers: a. Disassembly b. Repair c. Assembly

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Arc welder, item 19, appx. B
Fire extinguisher, item 20, appx. B
Welder's helmet, item 21, appx. B
Leather apron, item 22, appx. B
Burn cloth
Spanner wrench, item 5, appx. B
The following tools can be found in field maintenance basis tool kit, item 14, appx. B:
- Adjustable hook spanner wrench
- Machinist's vise
- Soft-jaw vise caps
- Grinder, pneumatic, right angle

Materials/Parts

Antiseize compound, item 3, appx. E
Hydraulic cylinder repair kit
Petroleum jelly, item 17, appx. E
Thread locking compound, item 21, appx. E
Hydraulic fluid, item 13, appx. E
Wire, electrode, welding, item 31, appx. E
Lock bar

Personnel Required: 2

Equipment Condition

Line fracture valve removed (para. 4-80)
Gooseneck hydraulic cylinder removed (para. 4-23)

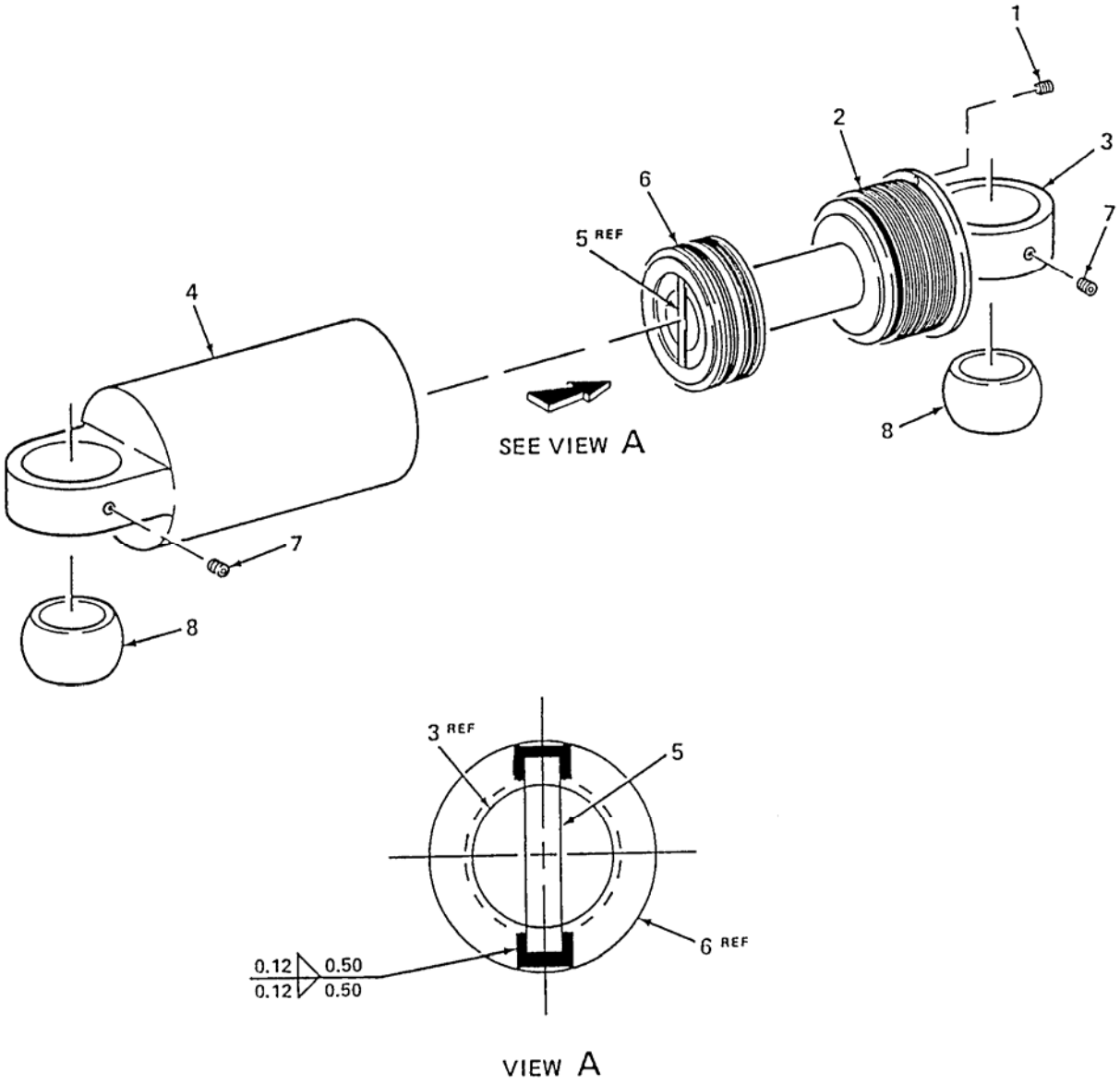
General Safety Instructions

WARNING

Gooseneck hydraulic cylinder weighs in excess of 400 pounds (182 kg). Be sure cylinder is adequately supported or injury to personnel may result.

DISASSEMBLY

1. Remove setscrew (1) from stuffing box (2).



2. Using spanner wrench, unscrew stuffing box (2) and carefully remove piston rod (3) and attached components from cylinder (4).

CAUTION

When placing piston and attached components into a vise or other suitable holding device, be sure to protect the polished surface of the piston or damage to equipment may result.

3. Place piston rod (3) into a machinist's vise with soft-jaw vise caps and secure in place. Wrap entire assembly, except parts to be ground, with burn cloth or equivalent to protect parts.

5-26. GOOSENECK HYDRAULIC CYLINDER (CONT)

CAUTION

When grinding off tack welds, avoid grinding into compressor piston except to remove remaining tack welds. Destructive grinding should be done to lock bar; then, use grinder to clean/dress area on compressor piston or damage to equipment will result.

4. Using a pneumatic grinder, grind off two tack welds from lock bar (5) and compressor piston (6). Remove lockbar (5) and discard.

WARNING

Compressed air used for cleaning or drying must not exceed 30 psi (206 kPa). Wear safety glasses when drying parts with compressed air. Failure to do so could cause serious injury to eyes. If your eyes are harmed or a foreign object is blown into your eyes, seek medical attention immediately.

5. Clean piston rod (3) and attached parts to remove powder or granulated deposits left from grinding. Use compressed air to dry all parts.

6. Unscrew and remove compressor piston (6) and pull piston rod (3) from stuffing box (2).

7. Remove two setscrews (7) and bushings (8) from rod (3) and cylinder (4).

8. Remove two preformed packings (9) from threaded end of piston rod (3). Discard preformed packings.

9. Remove preformed packing (10) and seal retainer (11) from stuffing box (2). Discard preformed packing and seal retainer.

10. Remove capscrew (12) from stuffing box (2) and use an adjustable hook spanner wrench to unscrew packing nut (13) from inside of stuffing box (2).

NOTE

The number of shims may vary among cylinders. Count shims removed to ensure the same number are reinstalled.

11. Remove four shims (14), seal set (15), and sleeve bushing (16) from stuffing box (2). Discard seals and shims.

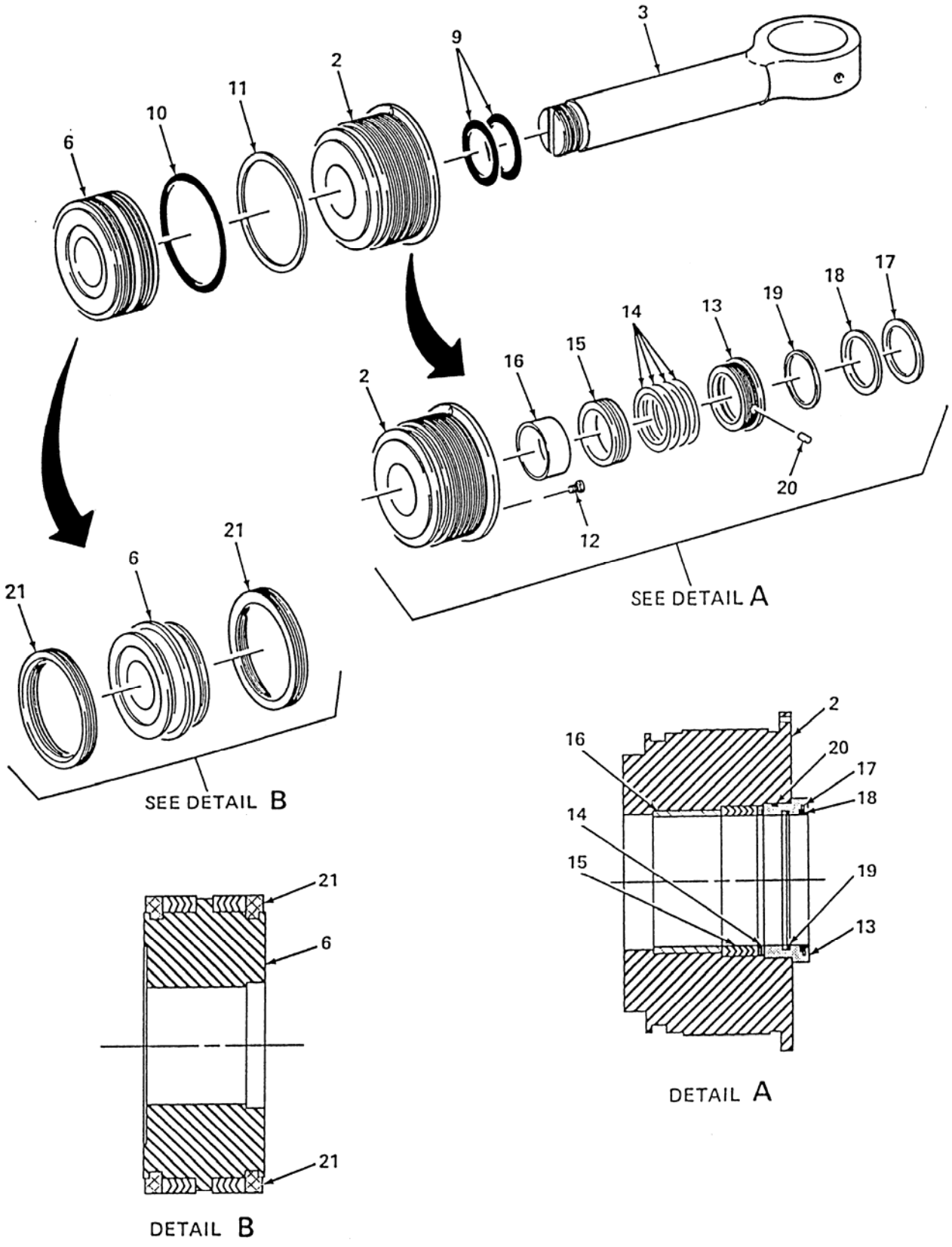
12. Remove retaining ring (17), wiper ring (18), and rod seal (19). Discard rod seal and wiper ring.

13. Remove nylon plug (20) from packing nut (13). Discard nylon plug.

14. Remove two seal sets (21) from compression ring (6). Discard seal sets.

REPAIR

Repair gooseneck hydraulic cylinder using hydraulic cylinder repair kit to replace parts discarded during disassembly. Replace other unserviceable parts as required.


3
9
2
11
10
6
17
18
19
13
14
15
16
2
20
12
SEE DETAIL A
21
6
21
21
SEE DETAIL B
2
16
20
17
18
14
15
19
13
DETAIL A
21
6
21
DETAIL B

5-26. GOOSENECK HYDRAULIC CYLINDER (CONT)

ASSEMBLY

1. Apply petroleum jelly to retaining ring (17), wiper ring (18), and rod seal (19) and install on packing nut (13). Slide packing nut (13) onto piston rod (3) and install nylon plug (20) into packing nut (13).

NOTE

The number of shims may vary among different cylinders. Ensure the same number that were removed are installed.

2. Apply petroleum jelly to seal set (15) and install sleeve bushing (16), seal set (15), and four shims (14) in stuffing box (2) as shown in Detail A.

3. Slide stuffing box (2) onto piston rod (3).

NOTE

When installing packing nut, tighten to a position where one of the tabs on the packing nut is approximately 15 to 20 degrees past the capscrew hole as shown in Detail B.

4. Install packing nut (13) in stuffing box (2). Apply thread locking compound to threads of capscrew (12) and install capscrew into top of stuffing box (2).

5. Apply petroleum jelly to seal retainer (11) and preformed packing (10) and install onto stuffing box (2).

6. Apply petroleum jelly to two preformed packings (9) and install onto threaded end of piston rod (3).

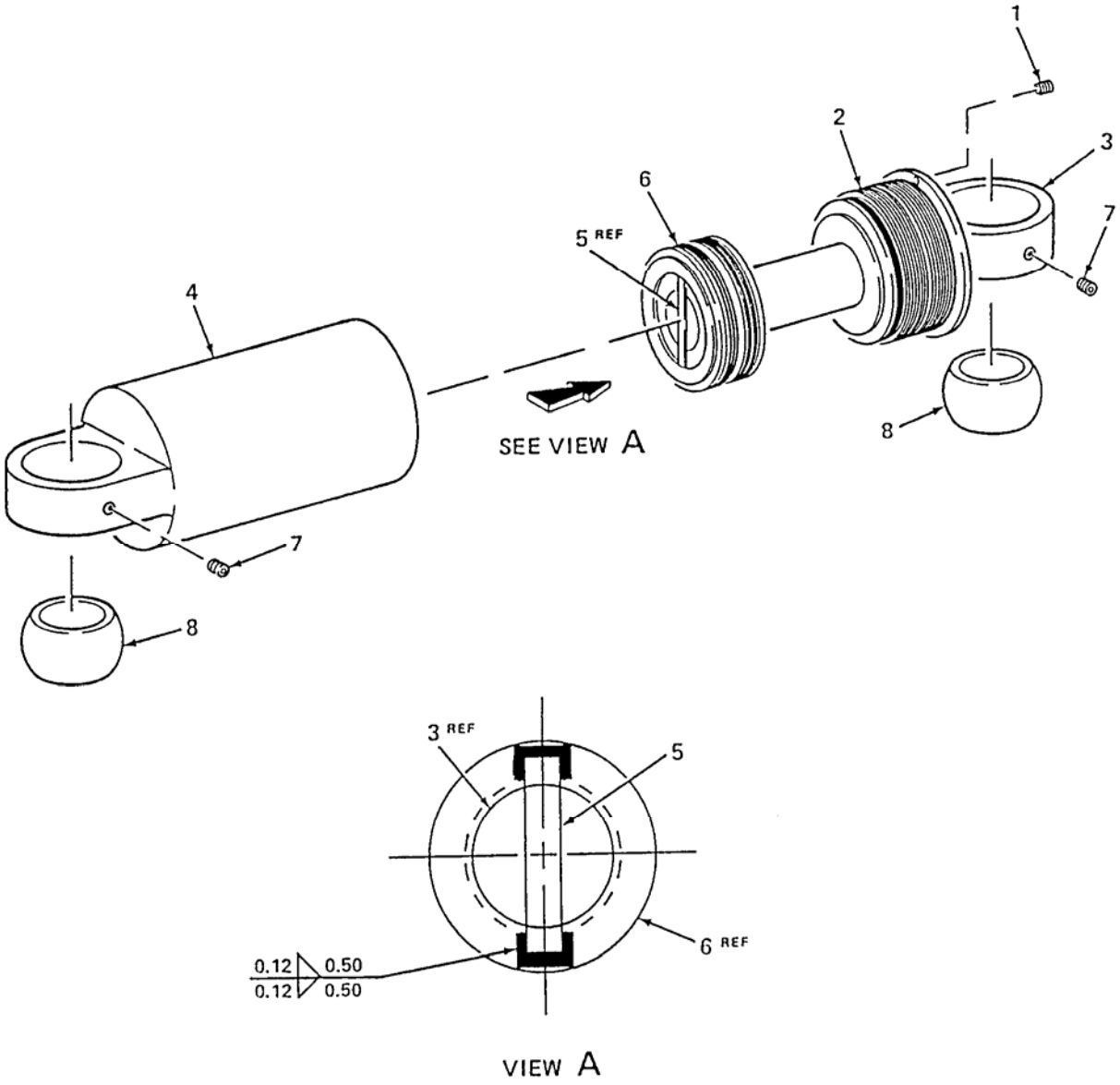
7. Apply petroleum jelly to two seal sets (21) and install seal sets onto compression piston (6) as shown in Detail B.

CAUTION

When placing piston and attached components into a vise or other suitable holding device, be sure to protect the polished surface of the piston or damage to equipment may result.

8. Place piston rod (3) into a vise or other suitable holding device and secure in place. Wrap entire piston, except parts to be welded, with burn cloth or equivalent to protect all parts. Thread compression piston (6) onto piston rod (3).

9. Center lock bar (5) into slot in end of piston rod (3). Be sure lock bar contacts bottom face of compressor piston (6).



WARNING

Welding operations produce heat, toxic fumes, radiation, metal slag, and carbon particles. Welding helmet with properly tinted lenses, gloves, apron, and welding boots are required or injury to personnel may result.

CAUTION

Do not strike an arc on the piston or compressor piston. Make initial strike on lock bar, moving the electrode into place over end of lock bar or severe damage to equipment may result.

10. Apply a 0.12-inch (0.30 cm) fillet, approximately 0.5 inch (1.3 cm) long, tack weld to both ends of lock bar (5) to secure lock bar to compressor piston (6).

5-26. GOOSENECK HYDRAULIC CYLINDER (CONT)

11. Chip off slag and, using a pneumatic grinder, remove all weld spatter and excess buildup. Grind off all weld metal that is higher than lock bar. Grind/dress both starts and stops of each tack weld.

12. Remove burn cloth from piston rod (3) and remove piston from vise and clean parts to remove any residue/contaminant collected on seals, gaskets, or packings. If necessary, apply petroleum jelly to cleaned parts.

CAUTION

Antiseize compound must be applied only to upper half of threads on stuffing box. Do not allow compound to contact seal surfaces or damage to equipment may result.

13. Apply hydraulic fluid to inner bore of cylinder (4). Apply antiseize compound to upper half of threads on stuffing box (2). Thread stuffing box (2) into cylinder (4).

14. Apply thread locking compound to setscrew (1) and install to lock stuffing box (2) in cylinder (4).

15. Apply thread locking compound to two setscrews (7). Install two bushings (8) in cylinder end (4) and piston rod (3) and secure with setscrews (7).

5-27. FLYWHEEL

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Torque wrench, 0-170 lb-ft, item 14, appx. B

Materials/Parts

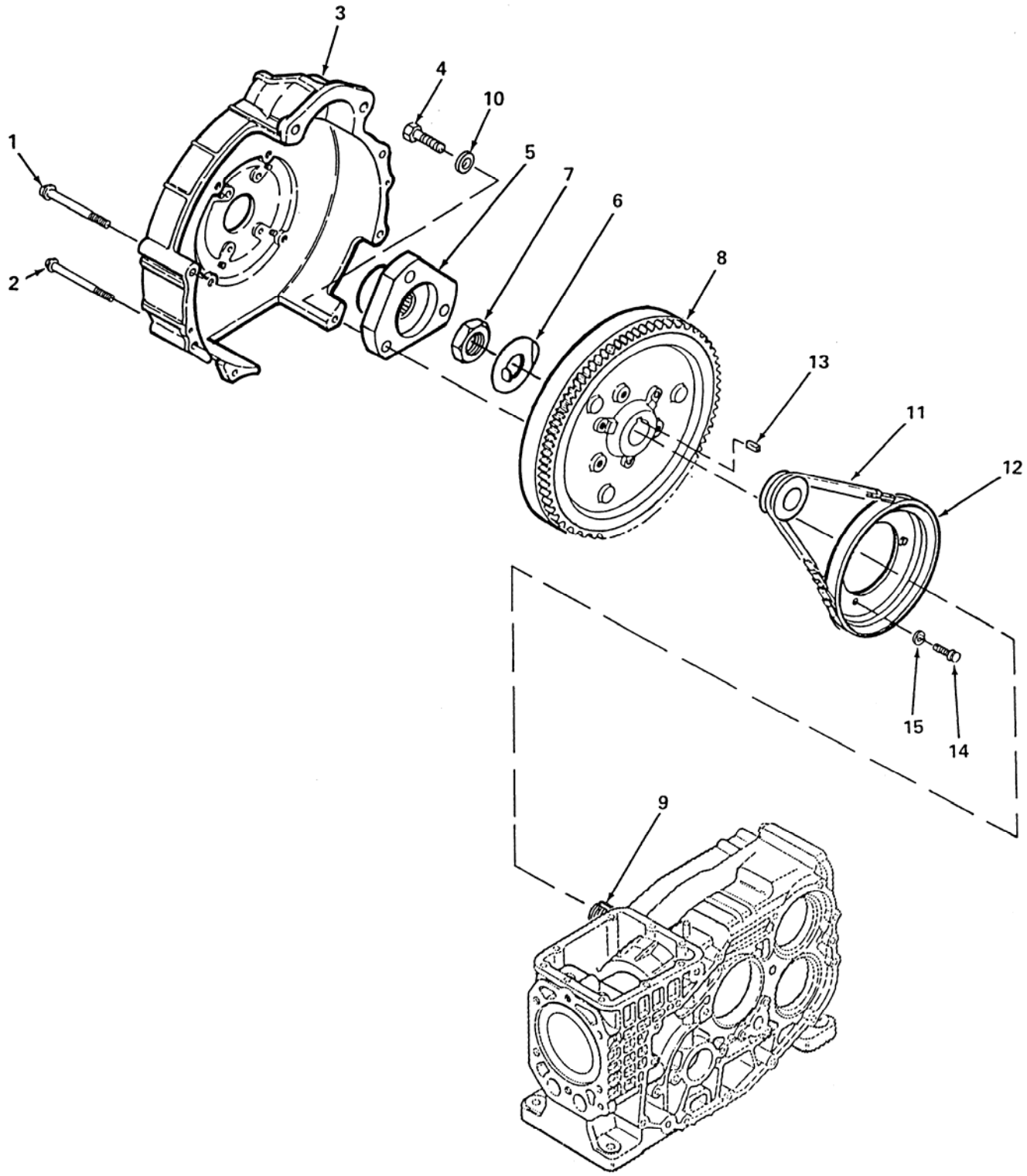
Thread locking compound, item 21, appx. E
Key washer
Lockwasher (3)

Equipment Condition

APU removed (para. 4-96)
Starter removed (para. 4-114)
Hydraulic pump removed (para. 4-76)

REMOVAL

1. Remove four bolts (1), two bolts (2), and flywheel housing (3).



5-27. FLYWHEEL (CONT)

2. Using a block of wood to prevent flywheel from turning, remove three bolts (4) and shaft coupling (5).

3. Straighten tab on key washer (6) and, using a block of wood to keep the flywheel from turning, remove nut (7) and key washer (6). Discard key washer.

4. To pull flywheel from crankshaft, proceed as follows:

   a. Install nut (7) onto crankshaft (9) so that nut (7) is flush with end of crankshaft (9).

   b. Remove three fender washers (10) from pump side of pump adapter (5). Install three washers (10) over guide bushings on flywheel side of pump adapter (5).

NOTE

Three of the four long bolts used to secure the flywheel housing to the engine block are required for the next step.

   c. Using three long bolts, insert bolts (1) through fender washers (10) from flywheel side of pump adapter (5).

   d. Aline pump adapter (5) with end of crankshaft (9). Aline and tighten three bolts (1) into flywheel (8), keeping pump adapter (5) even with face of flywheel (8).

   e. Using alternating tightening sequence, start to tighten all three bolts (1).

   f. Continue to tighten all three bolts (1) until flywheel (8) becomes unseated. If all three bolts (1) become extremely tight, use a hammer to strike inside cupped area of pump adapter (5) to help unseat flywheel (8).

   g. Once flywheel (8) is unseated, remove three bolts (1), fender washers (10), and pump adapter (5) from flywheel (8).

   h. Remove nut (7) from crankshaft (9). Start to pull flywheel (8) off of crankshaft (9). Remove V-belt (11) from pulley (12) on flywheel (8) and remove flywheel (8) and key (13) from crankshaft (9).

   i. Install three washers (10) over guide bushings on pump side of pump adapter (5).

5. Remove three bolts (14), lockwashers (15), pulley (12), and belt (11). Discard lockwashers.

INSTALLATION

1. Install pulley (12) and flywheel (8) on crankshaft (9) and secure with three lockwashers (15) and bolts (14).

2. Install key (13), flywheel (8), and key washer (6) on crankshaft (9). Install belt (11) over pulley (12).

3. Apply thread locking compound to threads of nut (7) and install.

4. Using a block of wood to prevent flywheel (8) from turning and a torque wrench, torque nut (7) to 101 - 116 lb-ft (137 - 157 Nm). Bend key washer (6) to meet one face of nut (7).

5. Install shaft coupling (5) and secure with three bolts (4).

6. Install flywheel housing (3) and secure with two bolts (2) and four bolts (1).

5-28. INJECTION PUMP

This task covers: a. Removal b. Installation c. Adjustment

INITIAL SETUP

Tools

General mechanics tool kit, item 16, appx. B
Handcrank, item 23, appx. B
Torque wrench, 3/8" drive, 0-150 in.-lb, item 14, appx. B

Materials/Parts

Gasket
Gasket
Shim
Shim(s)
Cap and plug set, item 5, appx. E
Lubricating oil, item 15, appx. E

Personnel Required: 2

Equipment Condition

Fuel tank drained (para. 4-104)
APU removed (para. 4-96)
Air cleaner assembly removed (para. 4-103)

5-28. INJECTION PUMP (CONT)

General Safety Instructions

WARNING

Diesel fuel is combustible and is an irritant to the eyes, skin, and respiratory system. To avoid injury to personnel and explosion, extinguish all smoking materials and do not allow sparks or open flame near the fuel tank or the fuel system. Use skin and eye protection and work in a well-ventilated area.

Clean up fuel that spilled during fuel line removal or injury to personnel may result.

CAUTION

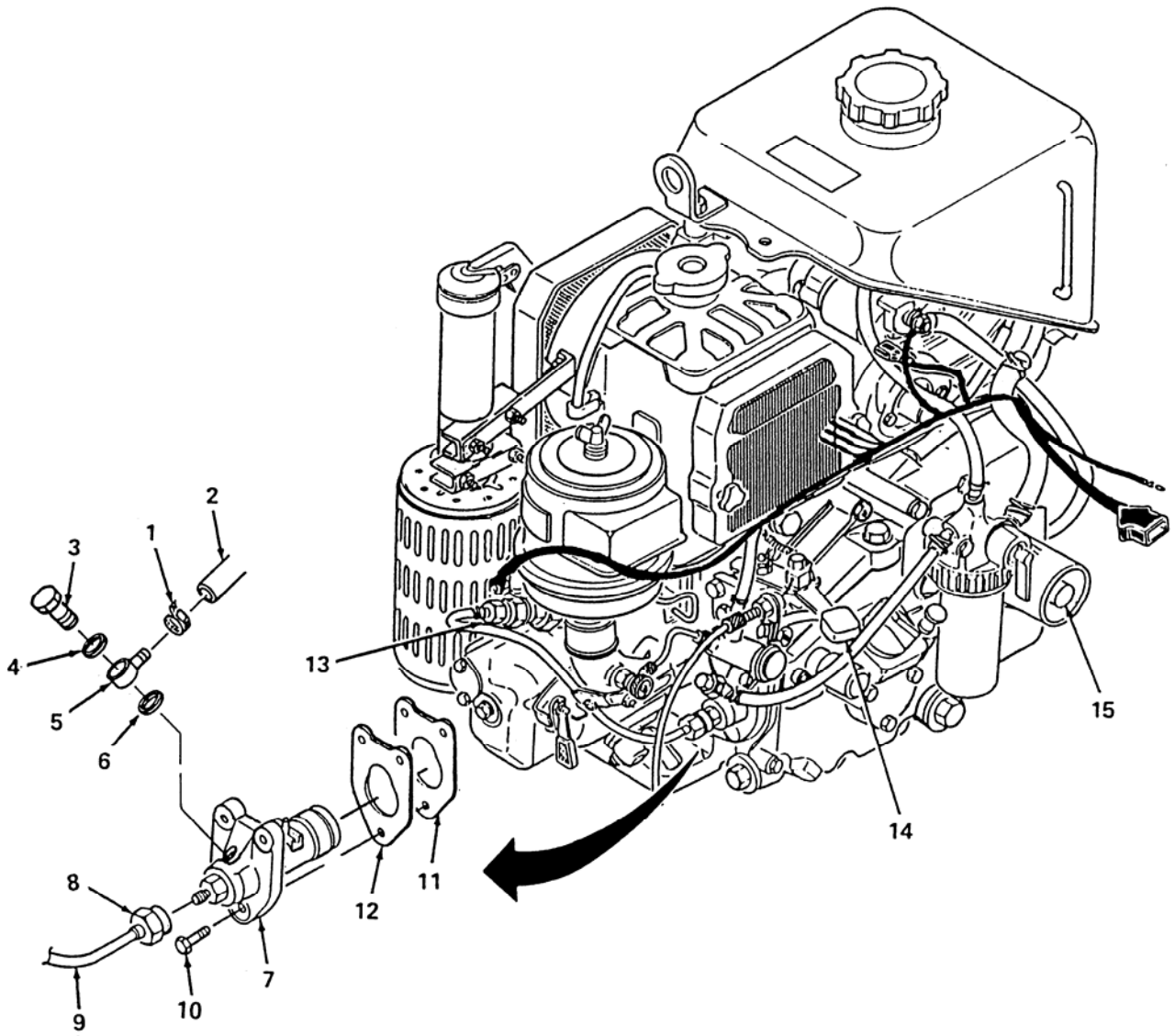
All fittings and openings must be capped or plugged immediately after opening to prevent dirt, moisture, or other foreign material from entering the fuel system or damage to equipment may result.

REMOVAL

1. Remove hose clamp (1) and disconnect hose (2). Cap/plug hose.
2. Remove bolt (3), gasket (4), adapter bushing (5), and gasket (6) from injection pump (7). Discard gaskets.
3. Unscrew nut (8) and disconnect metallic tube (9) from injection pump (7) and nozzle. Cap/plug metallic tube.
4. Remove three bolts (10), injection pump (7), shim (11), and shims (12). Count and discard shims (12). Discard shim (11).

INSTALLATION

1. Apply a thin coat of oil to both sides of shims (12).
2. Adjust cam lobe to lowest portion.
3. Install same quantity of shims (12) as removed and install shim (11).
4. Aline fuel control rod and slot on speed control lever and install injection pump (7) and three bolts (10). Using a torque wrench, torque bolts (10) to 87 - 99 in.-lb (9.9 - 11.2 Nm).



5. Remove cap/plug and connect metallic tube (9) to injection pump (7) and tighten nut (8).

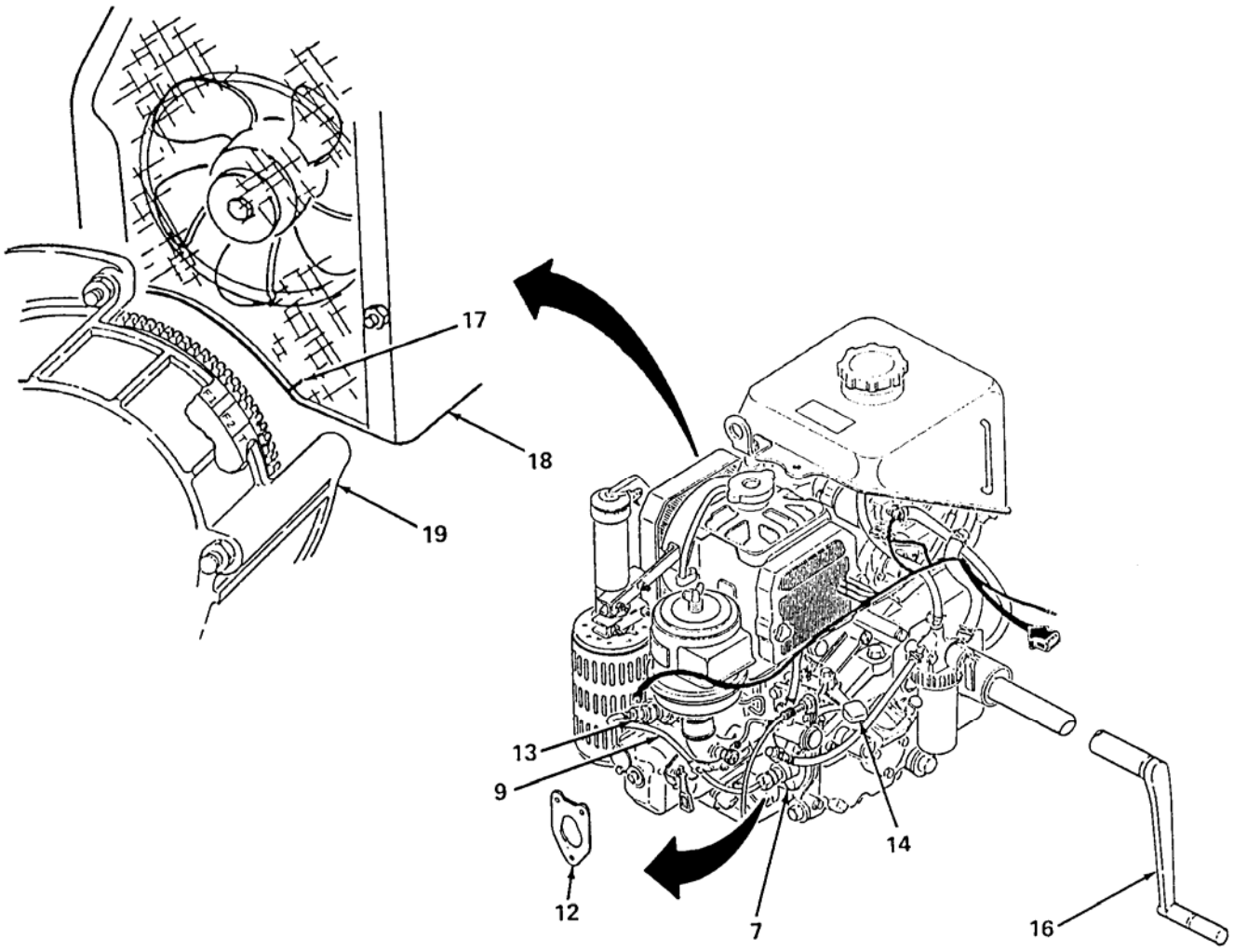
6. Install gasket (6), adapter bushing (5), gasket (4), and bolt (3) on injection pump (7). Using a torque wrench, torque bolt (3) to 18 - 21 lb-ft (25 - 29 Nm).

7. Remove cap/plug and connect hose (2) to injection pump (7) and secure with hose clamp (1).

5-28. INJECTION PUMP (CONT)

ADJUSTMENT

1. Unscrew and disconnect metallic tube (9) from fuel injector nozzle holder (13).



2. Loosen metallic tube (9) from injection pump (7) and rotate tube toward front of APU.

3. Adjust speed control lever (14) to maximum speed position by pulling toward air cleaner.

4. Lift and hold decompression valve (15) and, using manual handcrank (16), turn engine slowly until fuel comes out tip of metallic tube (9).

5. Using chalk or china marker, transfer timing mark (17) on fan cover (18) to flywheel housing (19).

CAUTION

The following steps are critical for proper timing of APU. Repeat steps as required until proper timing is achieved or damage to equipment may result.

6. Remove fan cover (para. 4-111).

7. With decompression valve (15) held open, turn manual handcrank (16) so that F1 mark is just below timing mark on flywheel housing (19).

8. With decompression valve (15) held open, slowly turn manual handcrank (16) and stop when fuel level rises at tip of tube. Timing mark and F1 mark should now be in alinement.

9. If timing is incorrect, adjust with shims (12). (Refer to installation procedure above.)

NOTE

Shims are available in 0.1 mm, 0.15 mm, and 0.5 mm thickness. Adding or removing one 0.15 mm shim varies the crank angle by approximately 1 degree. To advance timing, add shim(s). To retard timing, remove shim(s).

10. Install fan cover (para. 4-111).

11. Install and reconnect all parts removed during adjustment procedure. (Refer to installation procedure in this paragraph.)

FOLLOW-ON MAINTENANCE

Fill fuel tank with fuel (para. 3-3).

APPENDIX A

REFERENCES

A-1. SCOPE

This appendix lists forms, field manuals, technical manuals, and other publications referenced in this manual and which apply to operation and maintenance of the M1000 Semitrailer.

A-2. DEPARTMENT OF THE ARMY PAMPHLETS

Consolidated Index of Army Publications and Blank Forms	DA PAM 25-30
Unit Supply - Manual Procedures (Unit Supply UPDATE)	DA PAM 710-2-1
The Army Maintenance Management System (TAMMS)	DA PAM 738-750

A-3. FORMS

Recommended Changes to Publications and Blank Forms	DA Form 2028
Recommended Changes to Equipment Technical Publications	DA Form 2028-2
Organizational Control Record for Equipment	DA Form 2401
Equipment Inspection and Maintenance Worksheet	DA Form 2404
Maintenance Request	DA Form 2407
Preventive Maintenance Schedule and Record	DD Form 314
Product Quality Deficiency Report (NSN 7540-00-105-0078)	SF 369

A-4. FIELD MANUALS

NBC Contamination Avoidance	FM 3-3
NBC Protection	FM 3-4
NBC Decontamination	FM 3-5
Camouflage	FM 20-3
Operation and Maintenance of Ordnance Materiel in Cold Weather (O Deg to Minus 65 Deg F)	FM 9-207

A-4. FIELD MANUALS (CONT)

First Aid for Soldiers	FM 21-11
Manual for the Wheeled Vehicle Driver	FM 21-305
Basic Cold Weather Manual	FM 31-70
Northern Operations	FM 31-71
Army Motor Transport Units and Operations	FM 55-30
Desert Operations (How to Fight)	FM 90-3
Mountain Operations (How to Fight)	FM 90-6

A-5. TECHNICAL BULLETINS

Tactical Wheeled Vehicles: Repair of Frames	TB 9-2300-247-40
Equipment Improvement Report and Maintenance Digest (US Army Tank-Automotive Command) Tank-Automotive Equipment	TB 43-0001-39 Series
Safety Inspection and Testing of Lifting Devices	TB 43-0142
Color, Marking, and Camouflage Painting of Military Vehicles, Construction Equipment, and Materials Handling Equipment	TB 43-0209
Army Oil Analysis Program	TB 43-0211
Maintenance in the Desert	TB 43-0239
CARC Spot Painting	TB 43-0242
Description, Use, Bonding Techniques, and Properties of Adhesives	TB ORD 1032

A-6. TECHNICAL MANUALS

Inspection, Care, and Maintenance of Antifriction Bearings	TM 9-214
Operator's Manual for Welding Theory and Application	TM 9-237
Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordnance Materiel and Related Materiels, Including Chemicals	TM 9-247
Organizational, Direct Support, and General Support Repair Parts and Special Tools List for Semitrailer, Heavy Equipment, 70 Ton, M1000	TM 9-2330-381-24P
Operator's Manual for Truck, Tractor, M1070, 8 X 8, Heavy Equipment Transporter (HET)	TM 9-2320-360-10

Operator's Manual for Truck, Tractor, Commercial Heavy Equipment Transporter (C-HET), 85,000 GVWR, 8 X 6, M911	TM 9-2320-270-10
Operator’s, Unit, Direct Support, and General Support Maintenance Manual for Care, Maintenance, Repair, and Inspection of Pneumatic Tires and Inner Tubes	TM 9-2610-200-14
Operator, Organizational, Direct Support and General Support Maintenance Manual Including Repair Parts List for Balancer, Vehicle Wheel, Model M-76	TM 9-4910-743-14&P
Operator's, Unit, Direct Support, and General Support Maintenance Manual for Lead-Acid Storage Batteries	TM 9-6140-200-14
Painting Instructions for Army Materiel	TM 43-0139
Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use	TM 750-244-6

A-7. SPECIFICATIONS AND STANDARDS

Dry Cleaning Solvent	Fed Spec P-D-680
Methyl Ethyl Ketone	TT-M-261
Inspection, Liquid Penetrant Methods	MIL-I-6866
Inspection Process, Magnetic Particles	MIL-I-6868
Human Engineering Design Criteria for Military Systems, Equipment and Facilities	MIL-STD-1472

A-8. OTHER PUBLICATIONS

Army Medical Department Expendable/Durable Items	CTA 8-100
Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items)	CTA 50-970

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. GENERAL

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance categories.

b. The Maintenance Allocation Chart (MAC) in section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions upon the end item or component will be consistent with the capacities and capabilities of the designated maintenance categories.

c. Section III lists the tools and test equipment required (both special tools and common tool sets) for each maintenance function as referenced from section II.

B-2. MAINTENANCE FUNCTIONS

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate, when required), to preserve; to drain; to paint; or to replenish fuel, lubricants, chemical fluids, or gases.

d. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper or exact position or by setting the operating characteristics to specified parameters.

e. Aline. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

B-2. MAINTENANCE FUNCTIONS (CONT)

g. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the 3d position code of the SMR code.

i. Repair. The application of maintenance service, including fault location/ troubleshooting, removal/installation, disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipments/components.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II

a. Column 1, Group Number. Column 1 lists functional group numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group number shall be “00”.

b. Column 2, Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Function. Column 3 lists the functions to be performed on an item listed in Column 2. (For detailed explanation of these functions, see paragraph B-2.)

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate work time figures will be shown for each category.

The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the MAC. The symbol designations for the various maintenance categories are as follows:

C.....	Operator or crew
O.....	Unit maintenance
F.....	Direct support maintenance
H.....	General support maintenance
D.....	Depot maintenance

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

f. Column 6, Remarks. Column 6 shall, when applicable, contain a letter code, in alphabetic order, which shall be keyed to the remarks contained in section IV.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III

a. Column 1, Tool or Test Equipment Reference (Ref) Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. Column 2, Maintenance Category. The lowest category of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National/NATO Stock Number. The National/NATO stock number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV

a. Column 1, Reference Code. The code recorded in column 6, Section II.

b. Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
06	ELECTRICAL SYSTEM								
0608	Gooseneck Compo-nent Assembly	Replace		.4				16,18	
		Repair		.6				16,18	
	Junction Boxes	Replace		1.5				16,18	
0609	Composite Marker Light	Replace		.2				16	
		Repair		.1				16,18	
	Vehicular Bar Lamp	Replace		.2				16	
		Repair		.2				16,18	
	Stop Light-Tail Light	Replace		.2				16	
		Repair		.2				16,18	
	Clearance Lights	Replace		.2				16	
		Repair		.2				16	
	Indicator Lights	Replace		.3				16,18	
		Repair		.2				16,18	
0612	Battery Installa-tion	Inspect	.1	.1				18	
		Service		.2				16,18	
		Replace		.2				16,18	
	Solar Battery Charger	Inspect	.1	.1				16	
		Replace		.5				16	
		Repair		.5				16	
0613	Gooseneck Electrical	Inspect	.1					16	
	Platform Electrical	Inspect	.3					16	
	Wiring Harness Clamp and Grommet Inst	Replace		1.0				16	
	Jumper Wires	Repair		1.0				16,18	
	Wiring Harness W1	Replace		1.4				16,18	
		Repair		.3				16,18	
	Wiring Harness W2	Replace		1.5				16,18	
		Repair		.5				16,18	
	Wiring Harness W3	Replace		.4				16,18	
		Repair		.3				16,18	
	Wiring Harness W4	Replace		.4				16,18	
		Repair		.2				16,18	
	APU Wiring Harness	Replace		1.5				16	
		Repair		.3				16,18	

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
11	REAR AXLE								
1100	Axle Suspension Installation	Inspect	.5	.7				1,16	
		Service		1.0				1,16,17	
	Suspension Assembly	Replace		4.0				1,4,8,16, 18,31	
		Repair		4.5				1,4,8,16, 18,31	
	Axle Assembly	Replace			3.0			13,14,16, 25,30	
	Ultra Bushing	Inspect		.1					
		Replace			2.0			2,16,24,29, 30	
	Lower Suspension Arm	Replace			1.2			9,14,16,31	
		Repair			1.4			14,16	
		Remove			.4			2,3,14,26	
	Upper Suspension Arm	Replace		3.0				16,18,31	
		Repair		3.2	.5			2,14,16,20, 21,22	
	Suspension Hydraulic Cylinder	Replace		2.0	.5			1,2,6,8,16, 18,26	
12	BRAKES								
1202	Service Brake Installation	Inspect		.9				16	
		Adjust		.5				16	
		Replace		1.4				16,18	
1206	Slack Adjuster	Inspect		.1					
1208	Gooseneck Pneumatic Installation	Inspect	.1	.1					
		Service		.5				16,17	
		Replace		.9				16	
		Repair		1.5				16,17	
	Platform Pneumatic Installation	Inspect	.2						
		Replace		7.0				16,18	
		Repair		2.5				16,18	
13	WHEELS AND TRACKS								
1311	Wheel Assembly	Inspect	.3	.4					
		Service	.1						B
		Replace	1.0						
		Remove	.5						
		Install	.5						
	Hub and Drum	Inspect		.5	.2			27	
		Service		1.0				17	
		Replace		2.0				16,17	
		Repair		2.0	.5			14,16,17,18	
	Spare Wheel Assembly	Inspect	.1						
		Service	.1						B
		Remove	.3						
		Install	.3						

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
1313	Tire	Inspect		.1				16,17,32	
		Replace		1.0				16,17,32	
		Repair		1.7					
14	STEERING								
1401	Platform Steering Installation	Inspect	.3						
		Service		1.0				17	
		Aline		2.0				16,17	
	Connecting Link	Replace		.7				16,18	
		Repair		1.5				16,18	
		Repair			.5			14,16	
	Longitudinal Strut	Replace		.7				16	
		Repair		1.5				16,17	
	Platform Steering Cylinder Installation	Service		1.2				1,2,16,18	
		Replace		2.0				16,18,31	
		Adjust		.5				16	
	Steering Plates	Replace		3.0				9,16,28	
		Repair		1.5				9,16,28	
1405	Steering Console Installation	Inspect	.2						
		Service		.2				17	
	Gooseneck Steering Cylinder Installation	Service		1.2				1,16,18	
		Replace		2.0				6,16,18,31	
	Steering Console and Slide Shaft Assembly	Replace			1.5			6,9,14,16, 31	
		Repair			1.7			6,9,14,16, 31	
	Kingpin and Steering Arm	Inspect	.2						
		Replace			1.5			14,16	
		Repair			1.7			14,16,31	
1412	Steering Cylinder Assembly	Repair			1.0			13,14,16,29	
15	FRAME, TOWING ATTACHMENTS AND DRAWBARS								
1501	Semitrailer Assembly	Inspect	.8	1.3					
		Service	.8	1.3				17	
	Ramp Installation	Adjust		.1				16	
		Replace		1.5				16,17	
		Repair		1.5				16,17	
	APU Frame	Replace		2.0				16,17	
	Control Module Frame	Replace			3.0			9,14,16	A
	Cargo Tiedown Ring	Insect			.1				
		Replace			4.0				

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
1503	Gooseneck Pivot Installation	Inspect	.1	.1					
		Service	.1	.3				17	
		Replace		.3				16,17	
	Gooseneck Cylinder	Replace			2.0			14,16,28,31	
	Pivot Pin/ Gooseneck	Replace			2.0			9,10,11,13, 14,16,29	
		Repair			0.5			13,14,16	
1504	Spare Wheel Carrier	Inspect	.1						
		Replace		.6				16,17	
1507	Front Support Legs	Inspect	.1						
		Service		.1				17	
		Repair		2.5				16,17	
	Rear Support Legs	Inspect	.1						
		Service		.1				17	
		Repair		2.0				16,17,18	
18	BODY, CAB, HOOD, AND HULL								
1801	Splash Guards	Inspect	.1						
		Replace		.3				16	
	Covers	Inspect	.1						
		Replace		.5				16	
1802	Deflectors	Inspect	.1						
		Replace		.5				16,17	
1808	Platform Stowage Compartment	Inspect	.1						
		Replace		1.0				16,18	
20	HOIST, WINCH, CAPSTAN, WINDLASS, POWER CONTROL UNIT, AND POWER TAKE OFF								
2001	Davit Assembly	Inspect	.1						
		Service		.1				17	
		Replace		.1				16	
		Repair		1.0				16,17	
2007	Snatch Block Assembly	Inspect	.1						
		Service	.1	.1				17	
		Replace		.2				16,17	
		Repair		1.0	.7			14,16,17	
	Cable Guide Assembly	Inspect	.1						
		Service		.1				17	
		Replace		.3				16	
		Repair		.5				16,17	

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
22	BODY, CHASSIS, AND HULL ACCESSORY ITEMS								
2202	Reflectors	Inspect	.1						
		Replace		.1				16	
2210	Data Plates and Stencils	Inspect	.1						
		Replace		4.0				16,17	
24	HYDRAULIC LIFT COMPONENTS								
2401	Hydraulic Pump	Inspect	.1						
		Replace		.3				16,17	
2402	4-Way Directional Control Valve Bank	Inspect	.1						
		Replace		.4				16,17	
		Repair		1.5				16,17	
2402	Steering Control Manifold	Inspect	.1						
		Replace		.8				16,17	
		Repair		1.2				16,17	
	Suspension Control Manifold	Inspect	.1						
		Replace		.5				1,16,17	
		Repair		1.0				16,17	
	Line Fracture Valve	Inspect	.1						
		Replace		.5				16	
2403	Valve Handles	Inspect	.1						
		Replace		.3				16	
	Suspension Isola-tion Valve Assembly	Inspect	.1						
		Replace		.6				16	
	Suspension Shut-off Valve Assembly	Inspect	.1						
		Replace		1.5				16,17	
	Gooseneck Isola-tion Valve Assembly	Inspect	.1						
		Replace		1.5				16,17	
		Repair		1.0				16,17	
2406	Gooseneck Hydraulics	Inspect	.1						
		Service		.3				16	
		Replace		1.5				16,17	
		Repair			1.0			14,15	
	APU Hydraulics	Inspect	.1						
		Service		.6				16	
		Replace		1.0				16,17	
		Repair			1.0			14,15	
2406	Step Hydraulics	Inspect	.1						
		Replace		.4				16,17	
		Repair			1.0			14,15	

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
	Control Module Hydraulics	Inspect	.1						
	Pressure Gage	Inspect	.1						
		Replace		.5				16,17	
	Hydraulic Filter	Inspect	.1	.1					
		Service		.3				16,17	
		Replace		.5				16,17	
	Gooseneck Cylinder Hydraulics	Inspect	.1						
		Replace		.5				16,17	
		Repair			1.0			14,15	
	Hydraulic Tank Filter	Service		1.0				16,17	
		Replace		.5				16,17	
	Platform Suspension Hydraulics	Inspect	.3	.3					
		Service		3.0				1,16,17	
		Replace		4.0				16,17	
		Repair			1.0			14,15	
	Platform Steering Hydraulics	Inspect	.3						
		Service		1.0				1,16,17	
		Replace		4.0				16,17	
		Repair			1.0			14,15	
2407	Suspension Hydraulic Cylinder	Repair			2.0			7,13,14, 16,31	
	Gooseneck Hydraulic Cylinder	Repair			2.0			5,14,16,19, 20,21,22	
2408	Hydraulic Tank Assembly	Inspect	.1						
		Service		1.5				16,17	
		Replace		1.0				16,17	
	Gooseneck Cylinder Air Reservoir	Replace		.5				16,17	
29	AUXILIARY GENERATOR AND ENGINE CONTROL								
2901	APU Engine	Inspect	.1	.1					
		Service		.5				16,17	
		Replace		1.0				16	
2911	Engine Block and Cylinder Head	Repair		.3				16,18	
2913	Flywheel	Replace			2.0			14,16	
2915	Engine Timing Components	Replace		.5				16,17	
2916	Lubrication Components	Inspect	.1	.1					
		Replace		.2				16,17,18	

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT	(6) REMARKS
2922	Nozzle Holder Assembly	Replace		.4				16,18	
2932	Injection Pump	Adjust			.3			16,23	
		Replace			.5			14,16	
2933	Air Cleaner Assembly	Service		.2				16	
		Replace		.4				16,18	
2935	Fuel Tank Assembly	Inspect	.1	.2					
		Service	.1						
		Replace		.5				16,18	
		Repair		.3				16,18	
2937	Fuel Filter Installation	Inspect	.1	.1					
		Service		.1				16	
		Replace		.3				16,18	
2938	Engine Priming System	Inspect	.1						
		Replace		.5				16,18	
2939	Mechanical Throttle Control	Inspect	.1						
		Replace		.5				16	
	APU Control Box Installation	Inspect	.1						
		Replace		1.2				16	
2941	Engine Exhaust	Inspect		.1					
		Replace		.4				16,17	
2951	Engine Radiator	Inspect	.1	.1					
		Service		.2				18	
		Replace		.5				16,18	
		Repair		.2				16	
2955	Fan Belt	Inspect	.1	.1					
		Service		.5				16	
		Replace		.6				16	
	Fan Dynamo	Inspect	.1	.1					
		Replace		.4				16	
2963	Starter	Inspect	.1	.1					
		Replace		.3				16	
	Jump Start System	Inspect	.1	.1					
		Remove Install		1.2				16,18	
31	BASIC ISSUE ITEMS, MANUFACTURER INSTALLED								
3100	Basic Issue Items	Inspect	.1						
	On-vehicle Equipment	Inspect	.1						
		Replace	.1						

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

TEST OR TEST EQUIPMENT REF CODE	MAINTE-NANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O	HANDLE, EXT, SPNSN ISOL VALVE	5340-01-386-2114	-
2	F	SHOP EQUIP, GEN PURPOSE REPAIR	4940-00-287-4894	-
3	F	SOCKET, 2-3/8", 1" DR	5120-00-261-2844	-
4	O	SOCKET, SUSPENSION BRG NUT	5120-01-358-3054	-
5	F	WRENCH, SPANNER	5120-01-358-3085	-
6	O	MANDREL, SUSPENSION	2530-01-355-3091	-
7	F	SUSPENSION STOP RING TOOL	5120-01-358-3102	-
8	O	CHAIN ASSY, 5/16" LK, 46 IN. L	4010-01-386-1008	-
9	O	CHAIN ASSY, 5/16" LK, 11 FT L	4010-01-361-7267	-
10	F	CHAIN ASSY, 1/2" LK, 11 FT L	4010-01-371-5772	-
11	F	SHACKLE, TOWING	4030-00-169-9297	-
12	O	SOCKET, 1-1/2" HEX X 13/16" SQ	5120-01-300-1363	-
13	F	HONE, CYLINDER 2"-7" PORT	5130-00-991-0699	-
14	F	TOOL KIT, FIELD MAINT, BASIC	4910-00-754-0705	-
15	F	TOOL KIT, FIELD MAINT, SUPPL #1	4910-00-754-0706	-
16	O	TOOL KIT, GEN MECHANICS	5180-00-177-7033	-
17	O	TOOL KIT, COM #1	4910-00-754-0654	-
18	O	TOOL KIT, COM #2	4910-00-754-0650	-
19	F	ARC WELDER	3431-01-032-6289	-
20	F	FIRE EXTINGUISHER	4210-00-202-7858	-
21	F	WELDER'S HELMET	4240-00-540-0623	-
22	F	APRON, LEATHER	9415-00-234-9254	-
23	F	CRANK, HAND APU	5340-01-321-0542	-
24	F	KIT, ULTRA BUSHING REM/INSTL	2530-01-381-9847	-
25	F	KIT, AXLE REM/INSTL	2530-01-381-9902	-
26	F	KIT, SPNSN CYL REMOVAL	5120-01-383-6487	-
27	F	GAGE, BRAKE DRUM	5210-00-861-9117	-
28	O	SPANNER, ADJUSTABLE HOOK	5120-00-277-9076	-
29	F	SPANNER, FACE PIN	5120-00-264-3777	-
30	F	RAM, HYD, 50-TON PORTABLE	4320-00-810-6776	4122
31	O	LIFTING STRAP	-	EE2801

TEST OR TEST EQUIPMENT REF CODE	MAINTE-NANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
32	O	TIRE INFLATION SAFETY GAGE	4910-01-373-0267	-
33		ANGLE HAND GRINDER	5130-01-397-9684	9503BHZ

Section IV. REMARKS

REFERENCE CODE	REMARKS
A	Tool must be manufactured in accordance with appendix F prior to starting procedure.
B	Airborne and gage are available in the M1070 Tractor BII.

APPENDIX C

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

C-1. SCOPE

This appendix lists basic issue items (BII) for the M1000 Semitrailer. The list is intended to help you inventory items required for safe and efficient operation.

C-2. GENERAL

Section II. Basic Issue Items. These are the minimum essential items required to operate the semitrailer and perform emergency repairs. Although some of the items are separately packaged when shipped, BII must be with the semitrailer during operation and whenever it is transferred between property accounts. The illustrations will assist in identification of the items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of end items.

C-3. EXPLANATION OF COLUMNS

The following gives an explanation of columns found in the listings:

a. Column (1) - Illustration Number (Illus No.). This column indicates the number of the illustration in which the item is shown.

b. Column (2) - National Stock Number. Indicates the national stock number assigned to the end item and will be used for requisitioning purposes.

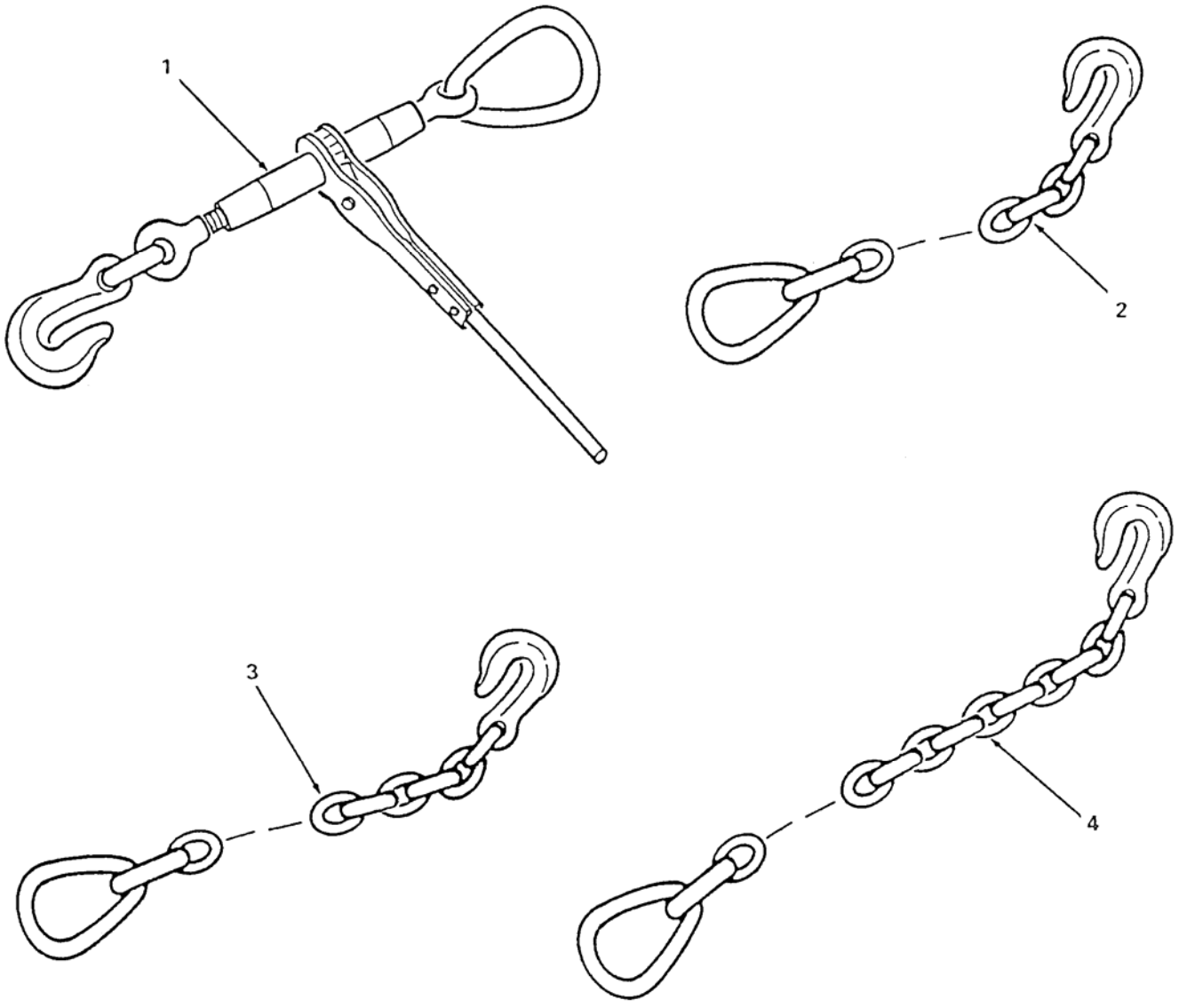
c. Column (3) - Description CAGE and Part Number. Indicates the federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the CAGE (in parentheses) followed by the part number. Usable on code is not used for the M1000 Semitrailer.

C-3. EXPLANATION OF COLUMNS (CONT)

d. Column (4) - Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr).

e. Column (5) - Quantity Required (Qty Req'd). Indicates the quantity of the item authorized to be used with/on the equipment.

Section II. BASIC ISSUE ITEMS



(1) ILLUS NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	(4) U/M	(5) QTY REQ'D
		BII ITEMS (Stowed in platform stowage compartment)		
1	3990-01-440-5975	Binder, Load, 1/2" LK, (Payload Tiedown) (0V272), 61208 SW33304 (See note)	EA	4
2	4010-01-361-8378	Chain Assembly, 1/2" LK, 7 ft L (Payload Tiedown) (ONXJ2), 1900-03410 SW33303-1 (See note)	EA	2
3	4010-01-371-5772	Chain Assembly, 1/2" LK, 11 ft L (Payload Tiedown) (ONXJ2), 1900-03430 SW33303-2 (See note)	EA	2
4	4010-01-385-5974	Chain Assembly, 1/2" LK, 19 ft L (Payload Tiedown) (ONXJ2), 1900-03450 SW33303-3 (See note)	EA	2
-	3990-00-401-1503	Binder, Load, 3/4" LK, (Payload Tiedown),(84081), 4178A (See note)	EA	4
-	*	Chain Assembly, 3/4" LK, 11 ft L (Payload Tiedown), SW31952-1 (See note)	EA	4
-	*	Chain Assembly, 3/4" LK, 4 ft L (Payload Tiedown), SW31952-2 (See note)	EA	2

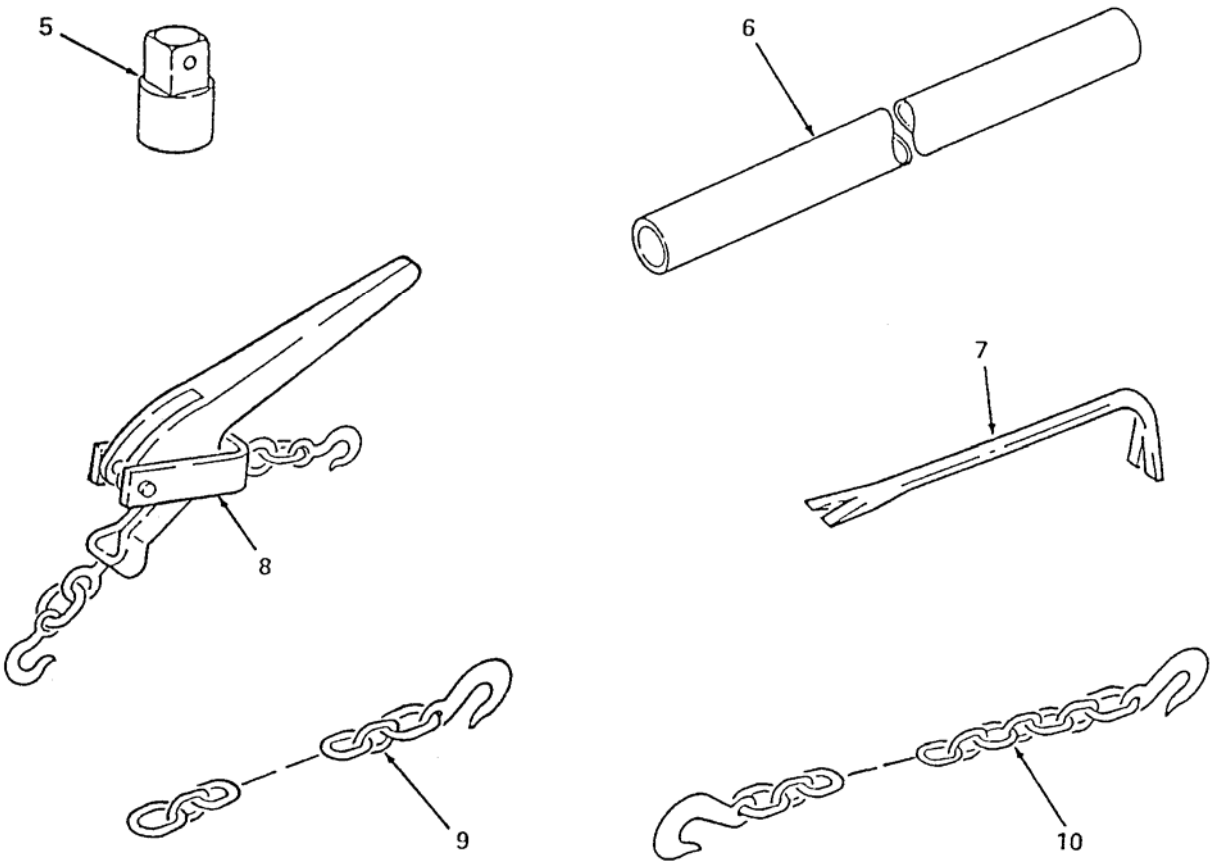
NOTE*

The BII will always contain 2 each 11-foot, 1/2-inch link chains for the front tiedowns.

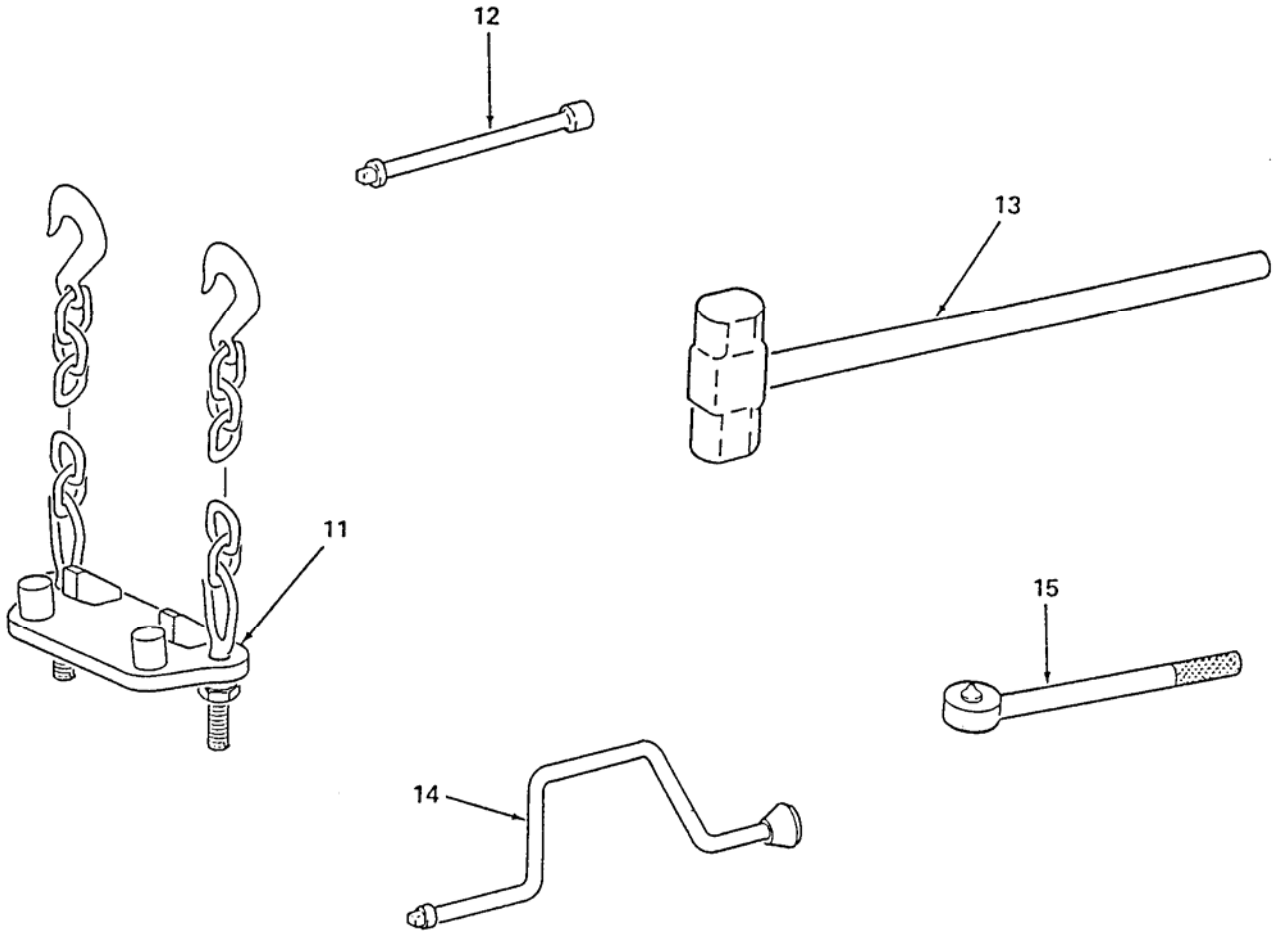
On some semitrailers the BII inventory may contain a set of 3/4-inch link payload tiedown chains and load binders, for the rear tiedown, in lieu of all 1/2-inch chains and load binders. The 3/4-inch set consists of the following:

3/4-inch link chain assemblies, 4 ft long, 2 each
3/4-inch link chain assemblies, 11 ft long, 4 each
3/4-inch link load binders, 4 each

The 3/4-inch chains and load binders are initial issue only. When reordering any replacements for 3/4-inch chains or load binders, all 3/4-inch chains and load binders are to be replaced by 1/2-inch chains and load binders. (Reference items 1, 2, 3, and 4.)

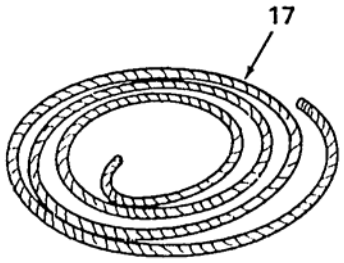


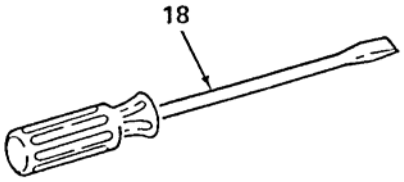
(1) ILLUS NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	(4) U/M	(5) QTY REQ'D
5	5120-00-144-5207	Adapter, Socket Wrench, 1/2" DR to 3/4" DR (80204), B107.10M	EA	1
6	4710-01-360-4273	Tube, metallic, 36"L (98255), SW26621	EA	1
7	5120-00-293-0665	Bar, Wrecking, 30"L (57068), 55-130	EA	1
8	3990-01-360-9669	Binder, Load, 5/16" LK, (Chock Tiedown) (OV272), 01201	EA	2
9	4010-01-361-7267	Chain Assembly, 5/16" LK, 11 ft L (Chock Tiedown) (98255), SW30512-2	EA	4
10	4010-01-386-1008	Chain Assembly, Tire Changing, 5/16" LK, 46"L (98255), SW34206	EA	1

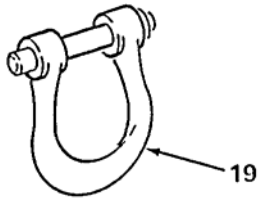


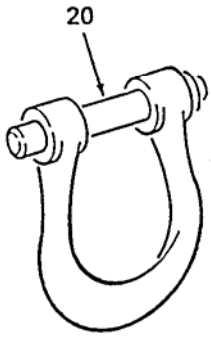
(1) ILLUS NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	(4) U/M	(5) QTY REQ'D
11	4010-01-361-8379	Chain Assembly, Axle Isolation, Transporting (98255), SW34205	EA	1
12	5120-00-227-8079	Extension, 3/4" DR, 8"L (C7127), L122	EA	1
13	5120-00-293-0887	Hammer, Hand, 12 LB (34871), FAC 1038	EA	1
14	5120-00-104-1736	Handle, Socket Wrench, 1/2" DR (55719), SN4A	EA	1
15	5120-00-249-1076	Handle, Socket Wrench, 3/4" DR (80064), 1940708	EA	1

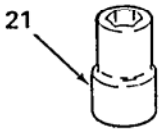
16-DELETED

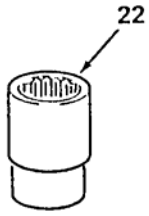




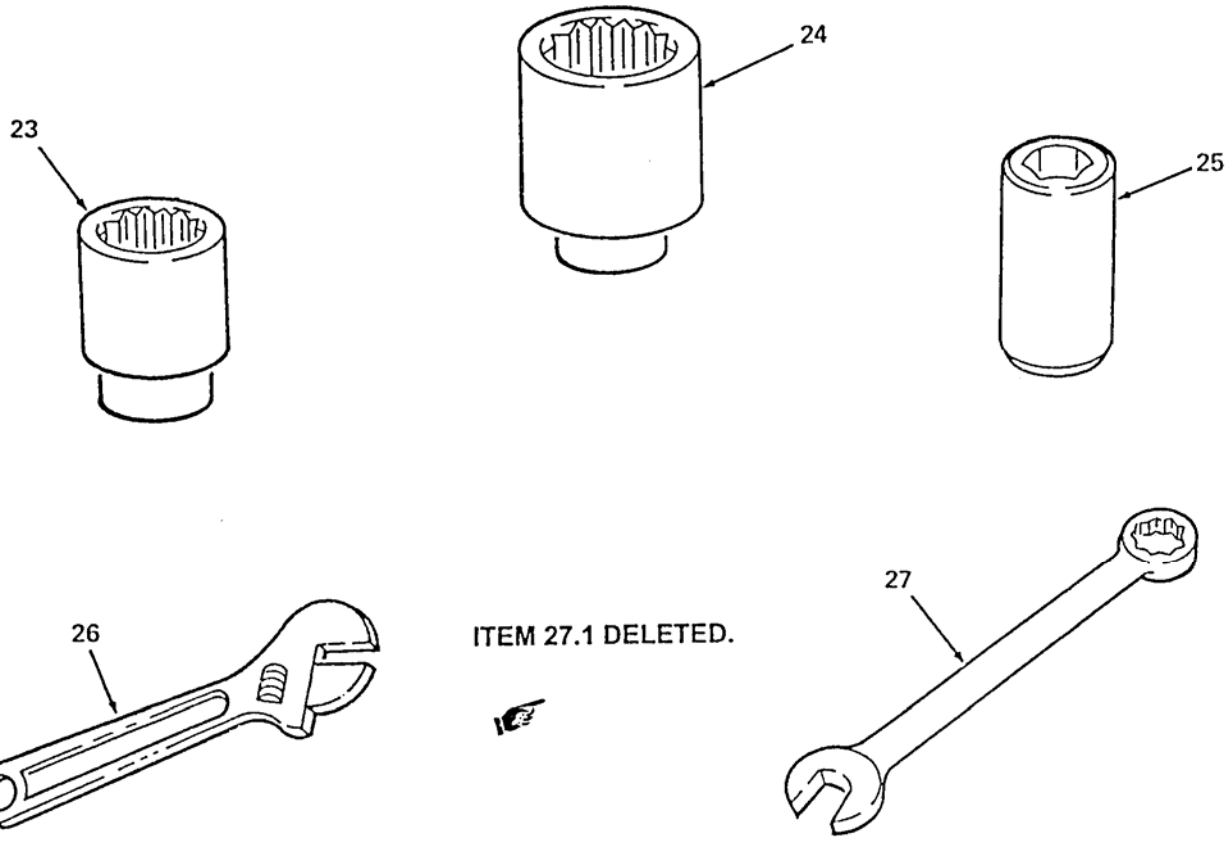




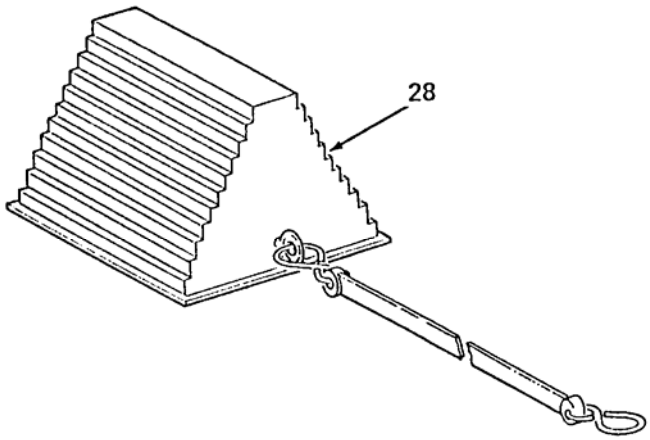


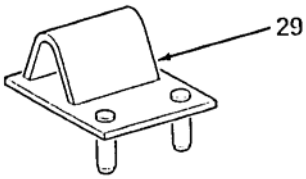


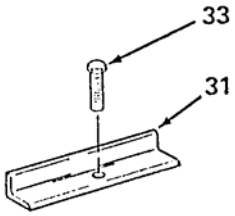
(1) ILLUS NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	(4) U/M	(5) QTY REQ'D
16	-	Deleted	-	-
17	4020-00-477-3734	Rope, Fibrous 1/2", 75 ft L (19207), CPR102915	EA	1
18	5120-00-222-8852	Screwdriver, Flat Tip (77948), 225498	EA	1
19	4030-00-533-3900	Shackle (Payload Tiedown) (19207), 8387707-1 or (90202), M655	EA	4
20	4030-00-169-9297	Shackle, Towing (90202), M666A	EA	4
21	5120-00-189-7932	Socket, Socket Wrench 9/16", 1/2" DR (19207), 11677025-1	EA	1
22	5120-00-239-0021	Socket, Socket Wrench 1-1/8", 3/4" DR (60043), 1818	EA	1

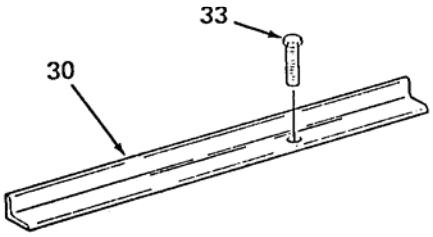


(1) ILLUS NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	(4) U/M	(5) QTY REQ'D
23	5120-00-199-7765	Socket, Socket Wrench 1-5/8", 3/4" DR (93389), 5552	EA	1
24	5120-00-199-7769	Socket, Socket Wrench 1-7/8", 3/4" DR (65814), 050442	EA	1
25	5130-01-389-8450	Socket, 1-1/2" HEX x 13/16" Square Nut, 3/4" DR (55719), BWD 482 SW31873	EA	1
26	5120-00-449-8083	Wrench, Open End, Adjustable, 10" (15073), 5385A14	EA	1
27	5120-01-300-1363	Wrench, Combination, 15-Degree Offset, 13/16" (55719), GOEX26	EA	1
27.1	-	Deleted	-	-



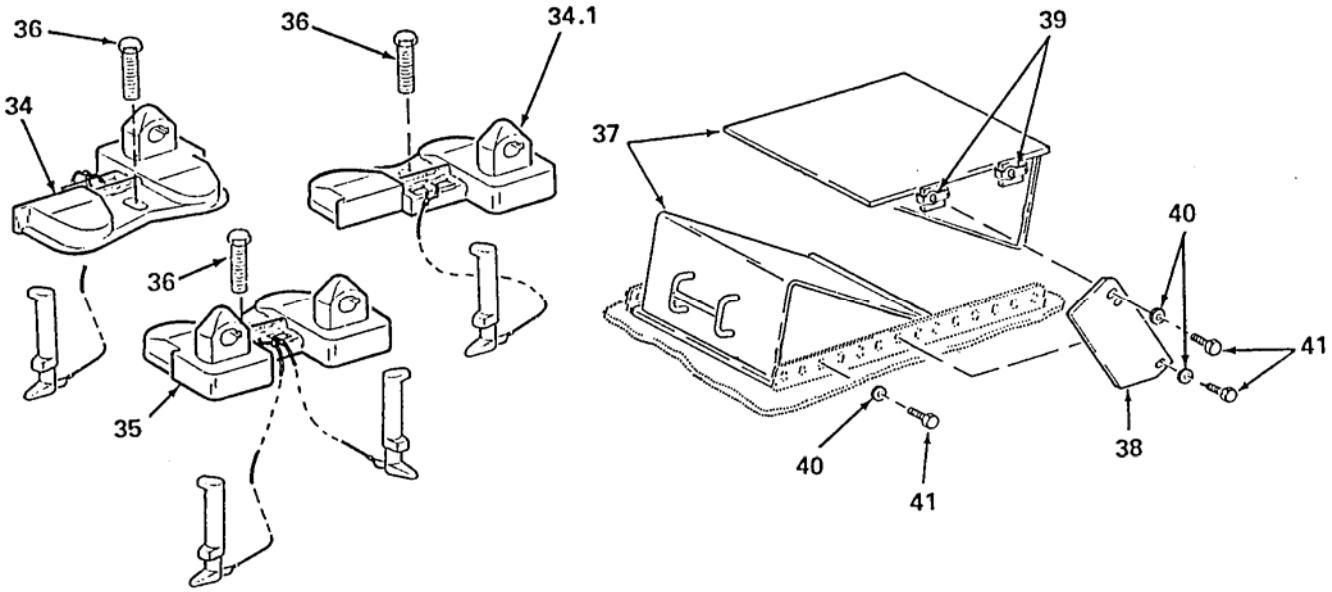




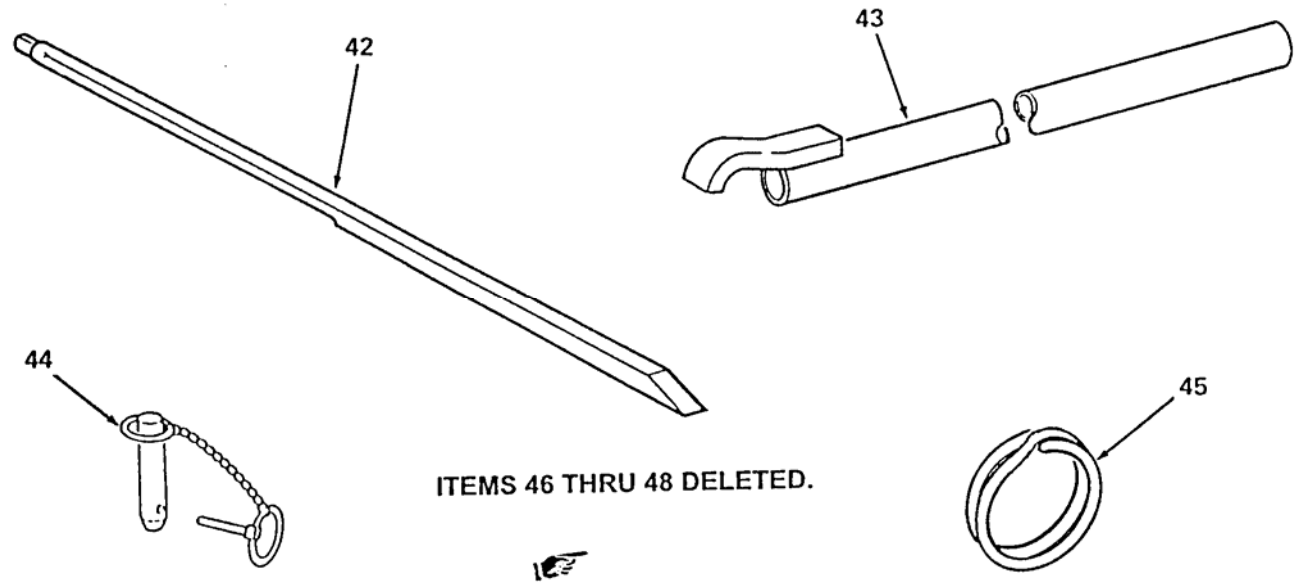


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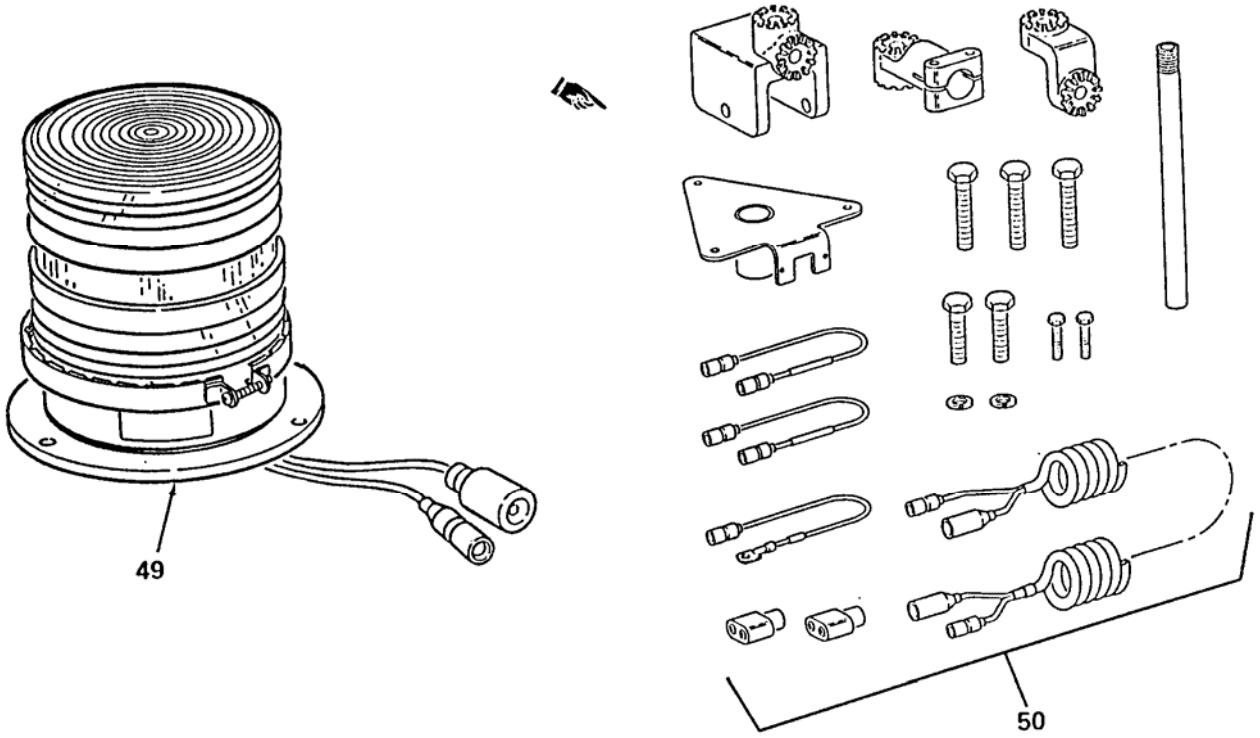
(1) ILLUS NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	(4) U/M	(5) QTY REQ'D
		OVE ITEMS (Stowed at functional locations)		
28	2540-01-324-9404	Chock, Wheel-Track (Located Streetside/Curbside of Gooseneck) (98255), SW34369	EA	4
29	2540-00-490-0769	Block, Chock (Curbguide) (Secured in Center Recess of Platform) (19207), CPR101269	EA	12
30	5340-01-332-7379	Angle Bracket (Curbguide Retainer) (98255), SW30912	EA	2
31	5340-01-385-9887	Bracket, Angle (Curbguide Retainer) (98255), SW30912-1	EA	1
32	-	Deleted	-	-
33	5305-00-990-8382	Screw, Cap, HEX HD, (Bracket Mounting) (80204), B1821BH100C275N	EA	3



(1) ILLUS NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	(4) U/M	(5) QTY REQ'D
34	5340-01-440-2222	Bracket, Locking, Curb (Secured in Center Recess of Platform) (98255), SW34446-2	EA	2
34.1	5340-01-472-5712	Bracket, Locking, Street (Secured in Center Recess of Platform) (98255), SW34446-3	EA	2
35	5340-01-440-2221	Bracket, Locking, Center (Secured in Center Recess of Platform) (98255), SW34446-1	EA	4
36	5305-00-990-8382	Screw, Cap, HEX HD (Bracket Mounting) (80204), B1821BH100C275N	EA	8
37	2540-01-324-9403	Chock, Wheel-Track (Payload) (Stowed on Front Corners of Platform) (98255), SW34394	EA	4
38	5340-01-346-8064	Plate, Mounting (Chock Mounting) (98255), SW30241	EA	4
39	5310-01-448-1089	Nut, Clip-on (72800), C30664-3816-3B	EA	16
40	5310-00-080-6004	Washer, Flat (Chock Mounting) (96906), MS27183-14	EA	10
41	5305-00-543-2419	Screw, Cap, HEX HD (Chock Mounting) (80204), B1821BH038C113N	EA	10



(1) ILLUS NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	(4) U/M	(5) QTY REQ'D
42	5120-00-224-1390	Crowbar, 60"L (Stowed on Rear Platform under Ramps) (18876), 9150189 (Alter per Appx. F)	EA	1
43	5340-01-386-2114	Handle, Extension, Suspension Isol Valve (Stowed on Rear of Platform under Ramps) (98255), SW32948	EA	1
44	5315-01-301-3888	Pin, Straight, Headed (Crowbar Stowage) (97403), 13228E2053	EA	1
45	5365-01-154-8557	Ring, Retaining (Crowbar Stowage) (96652), 29-10	EA	1
46	-	Deleted	-	-
47	-	Deleted	-	-
48	-	Deleted	-	-



(1) ILLUS NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGE AND PART NUMBER	(4) U/M	(5) QTY REQ'D
49	6220-01-442-2652	Light Assembly, Strobe, 12V (82485), 200SGT	EA	1
50	2590-01-107-9696	Kit, Warning Light (19207), 12296622 Use the following parts: Washer, Lock (2), P/N MS35338-48 Pipe, P/N 12296639-1 (Saw 2 1/2 in. off one end) Clamp, P/N 12296644 Bolt (3), P/N 12296638 Pole Mount Bracket, P/N 12296643 Bolt (2), P/N MS90726-115 L-Bracket, P/N 12296641 Bolt (2), P/N MS90726-38 Plate, Triangle, P/N 12296642 Cable Assembly, ground, P/N 12296578-1 Lead (2), P/N 8762797 Adapter (2), P/N MS27147-1 Cable Assembly, P/N 12296577 Remaining parts in kit are NOT used.	EA	1

APPENDIX D

ADDITIONAL AUTHORIZATION LIST

NOT AUTHORIZED

APPENDIX E

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

E-1. SCOPE

This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/ Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

E-2. EXPLANATION OF COLUMNS

a. Column (1) - Item Number. This number is assigned to the entry in the listing and is referenced in the INITIAL SETUP of each maintenance task (e.g., cleaning compound, item 19, appx. E).

b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item.

C-Operator/Crew
O-Unit Maintenance
F-Direct Support Maintenance
H-General Support Maintenance

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 CAGE and Part Number. Identifies the federal item name and, if required, a description to identify the item. The last line for each item indicates the Contractor and Government Entity (CAGE) in parentheses followed by the part number.

e. Column (5) - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (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/DURABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION CAGE AND PART NUMBER	(5) U/M
1	O	6810-00-286-5435	Alcohol, Technical (81348), TT-I-735	gl
2	O	6850-00-181-7929	Antifreeze, Glycol, Inhibited (81349), MIL-A-46153	gl
3	O	8030-01-142-2558	Antiseize Compound (49003), 6PE	pt
4	O	7920-00-061-0037	Brush, Scrub (58536), A-A-2074	ea
5	O	5340-00-450-5718	Cap and Plug Set (19207), 10935405	kt
5.1	F	2940-01-415-5891	Cleaner, surface (02731), TT-C-490	qt
6	O	5350-00-221-0872	Cloth, Abrasive, Crocus (58536), A-A-1206	pg
6.1	F	8030-00-165-8577	Coating Compound, Metal Pretreatment (81349), DOD-P-15328	gl
6.2	F	8010-01-055-2319	Coating, Polyurethane (81349), MIL-C-46168	kt
6.3	F	8010-01-229-7540	Coating, Polyurethane (81349), MIL-C-53039	qt
7	O	8030-00-221-1835	Corrosion Preventive Compound, Cold Application (81349), MIL-C-83933	gl
8	O	7930-00-093-4909	Detergent, General Purpose (81348), P-D-220	bx
8.1	F	8010-00-264-8866	Epoxy Primer Coating Kit (81349), MIL-P-53030	kt
9	C	9140-00-286-5283	Fuel, Oil, Diesel, DFA, Arctic Grade (81348), VV-F-800, GRADEDFAAR	gl
10	C	9140-00-286-5286	Fuel, Oil, Diesel, DF1, Winter Grade (81348), VV-F-800, GRADEDF1W1	gl
11	C	9140-00-286-5294	Fuel, Oil, Diesel, DF2, Regular Grade (81348), VV-F-800, GRADEDF2RE	gl
12	C	9150-00-190-0905	Grease, Automotive and Artillery (81349), MIL-G-10924	cn

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION CAGE AND PART NUMBER	(5) U/M
13	O	9150-00-111-6254	Hydraulic Fluid, Rust Inhibited Fire Resistant Synthetic, Hydrocarbon Base (81349), MIL-H-46170	gl
14	O	9150-01-260-2534	Lubricant, Solid Film, Air Cured, Corrosion Inhibiting (81349), MIL-L-23398, Type II	cn
14.1	O	2640-00-256-5526	Lubricant, Tire and Rim, Quart Can (96980) AA 17	qt
15	C	9150-00-186-6699	Oil, Lubricating, SAE 10W-30 (81349), MIL-L-46152	qt
16	O	6850-01-043-8511	Penetrating Fluid (81349), MIL-P-24548	cn
17	O	9150-00-250-0926	Petroleum Jelly, VV-P-236 (81348)	lb
18	O	5330-01-188-0919	Pipe Sealant (61078), LH050	tu
19	C	7920-00-205-3571	Rag, Wiping, Cotton and Cotton Synthetic (81348), DDD-R-0030, Grade B	bx
20	O	8040-00-833-9563	Sealant, Adhesive, Silicone RTV (81349), MIL-A-46106, Type I	tu
21	O	8030-00-148-9833	Sealing Compound, Thread Locking (81349), MIL-S-46163, Type II, Grade N	qt
22	O	5970-01-142-2282	Sleeving, Electrical Insulation, Shrinkable	in
22.1	O	5970-00-812-2969	Sleeving, Electrical Insulation, Shrinkable (81349) M23053/5-104-0	in
22.2	O	5970-00-954-1622	Sleeving, Electrical Insulation, Shrinkable (81349) M23053/5-105-0	in
23	O	6810-00-264-6618	Sodium Bicarbonate: Technical (Baking Soda) (81348), O-S-576	lb
24	O	3439-01-153-2077	Solder, Tin-lead Alloy, (03051), SN60, Type R, QQ-S-571	lb
25	O	6850-00-209-7947	Solvent, Cleaning Compound (81348), O-C-1889	dr
26	O	6850-01-474-2320	Solvent, Dry Cleaning (81349), (MIL-PRF-680)	5 gl
27	O	5975-00-903-2284	Strap, Tiedown, Electrical (96906), MS3367-4-0	bg

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION CAGE AND PART NUMBER	(5) U/M
27.1	O	5975-00-133-8687	Strap, Tiedown, Electrical (96906), MS33567-5-0	bg
27.2	O	7510-01-308-0549	Tape, Double-Sided (52152), 4930	rl
28	F	5970-00-644-2636	Tape, Insulation, Electrical, Pressure Sensitive Adhesive, 0.75-inch Wide, Black (81348), HH-I-595-B-66-0	rl
29	O	7510-00-266-6709	Tape, Pressure Sensitive, Adhesive, Masking (26066), A-A-883, Type I	rl
29.1	0	3610-01-085-2357	Tape, Teflon (83616), 0.250-inch Wide	rl
30	O	6810-00-297-9540	Water, Battery (81348), O-B-41	gl
31	F	3439-00-853-2714	Wire, Welding (81349), MIL-E-7018, Class A	cn

APPENDIX F

ILLUSTRATED LIST OF MANUFACTURED ITEMS

F-1. INTRODUCTION

This appendix includes complete instructions for making items authorized to be manufactured or fabricated.

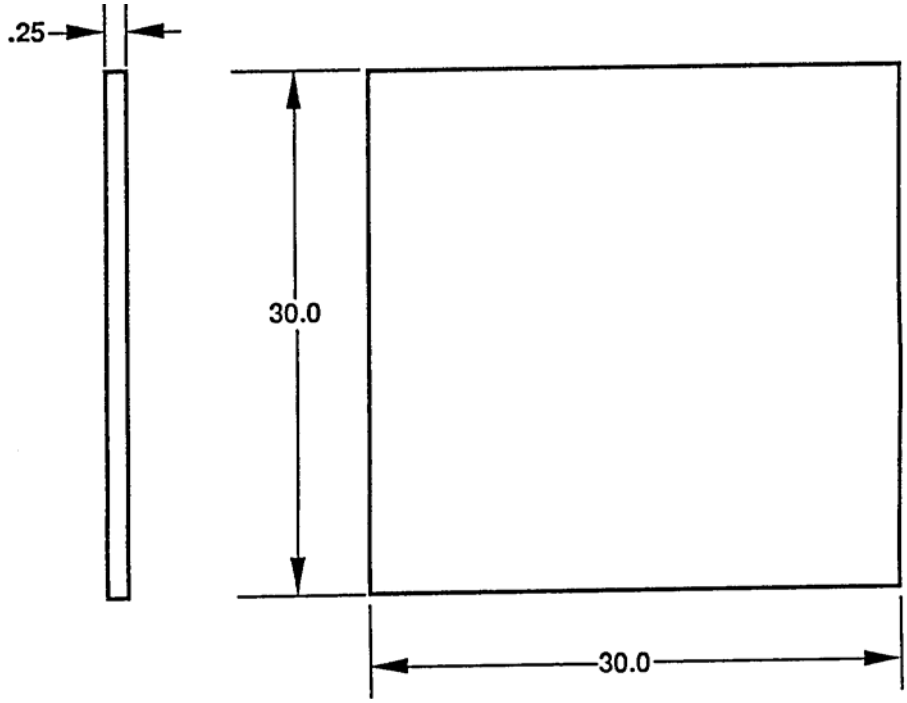
a. A part number index in alphanumeric order is provided for cross-referencing the part number of the item to be manufactured to the figure which covers fabrication criteria.

b. All bulk materials needed for manufacture of an item are listed by part number or specification number on each figure.

c. To maintain accuracy and tolerances, metric equivalents have been omitted, except for figure F-20.

F-2. MANUFACTURED ITEMS PART NUMBER INDEX

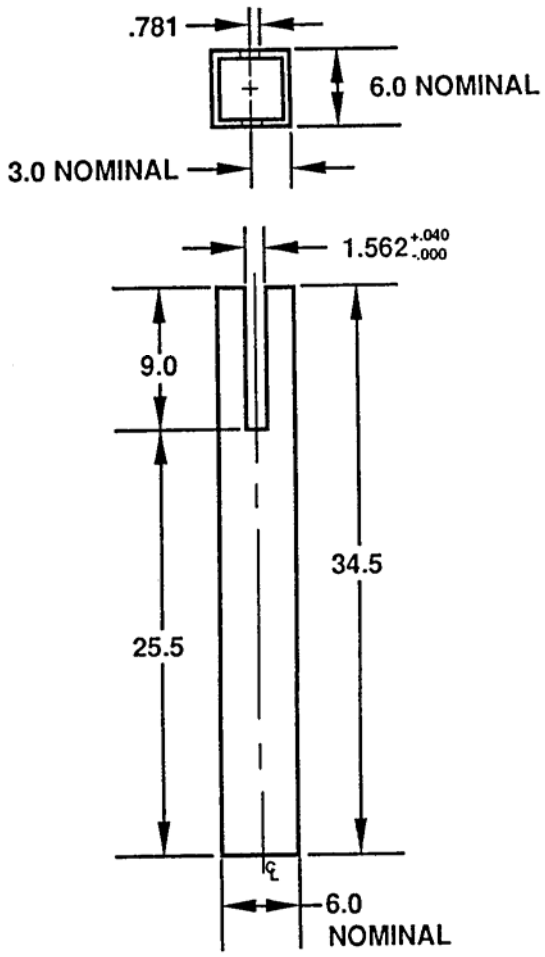
PART NO.	DESCRIPTION	FIGURE
SW32540	Crowbar	F-6
SW32910	Double Loop Clamp	F-7
SW34329	Battery Terminal Cover	F-3
SW34348	Urethane Bushing Removal/Installation Tool	F-18
SW34348-3	Bushing Puller	F-5
SW34348-5	Washer	F-19
SW34348-7	Threaded Rod	F-17
SW34353-2	Fuel Gage Tube	F-8.1
SW34434	Flushing Hose Kit	F-8
SW34435	Hydraulic Control Module Removal/Installation Chain Set	F-13
SW34436	Removal Tool (Suspension Cylinder Pin)	F-14
-	Gooseneck Support Stand	F-9
-	Retainer Pin	F-15
-	Handle	F-12
-	Gusset	F-10
-	Gusset	F-11
-	Base Plate	F-1
-	Base Tube	F-2
-	Support Tube	F-16
T4249	Bearing Seating Tool	F-4
-	Wire Assembly	F-20
-	Hexagon Stock, 1/2-Inch	F-21
Deleted	Deleted	F-22



NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS WITHOUT TOLERANCES ARE NOT CONSIDERED CRITICAL.
3. REMOVE ALL BURRS AND SHARP EDGES.
4. FABRICATE FROM: STEEL PLATE, C-1045 (.250) IN. THICK.

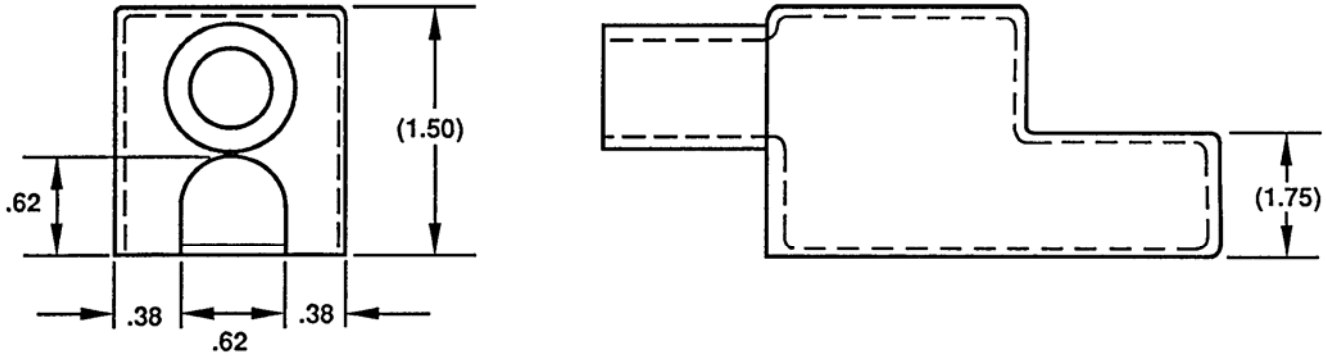
Figure F-1. Base Plate



NOTES:

1. ALL DIMENSIONS ARE IN INCHES EXCEPT AS NOTED.
2. DIMENSIONS WITHOUT TOLERANCES ARE NOT CONSIDERED CRITICAL.
3. REMOVE ALL BURRS AND SHARP EDGES.
4. FABRICATE FROM: STEEL TUBE, SQUARE ASTM-A513, 6 IN. X 6 IN. X 3/8 IN. (.375) WALL.

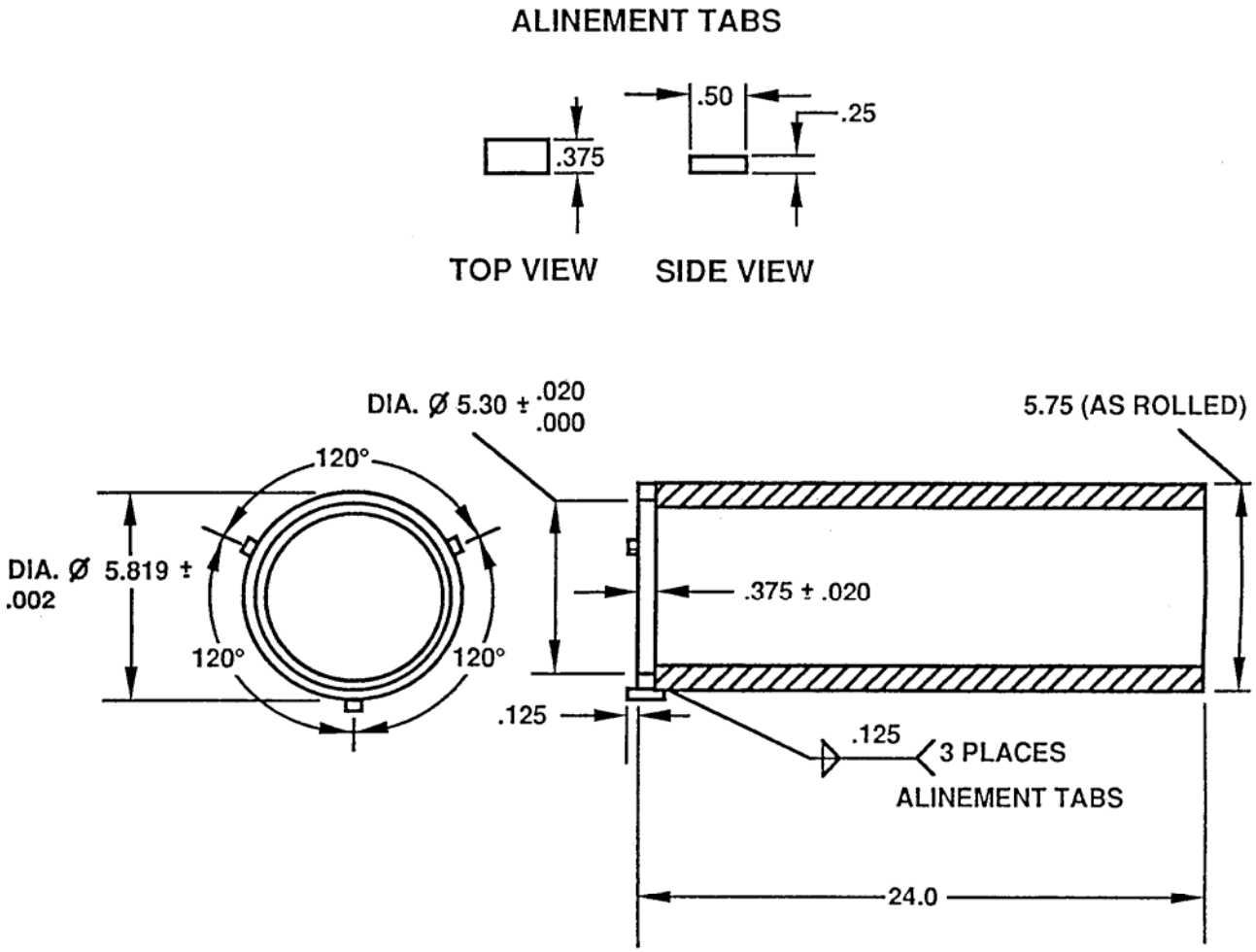
Figure F-2. Base Tube



NOTES:

1. ALTER COVER AS SHOWN.
2. MAKE FROM: WAYTEK PART NUMBER 23513 BATTERY CABLE BOOT (COLOR: RED) (CAGE 58961) NSN (GFI-TBS).

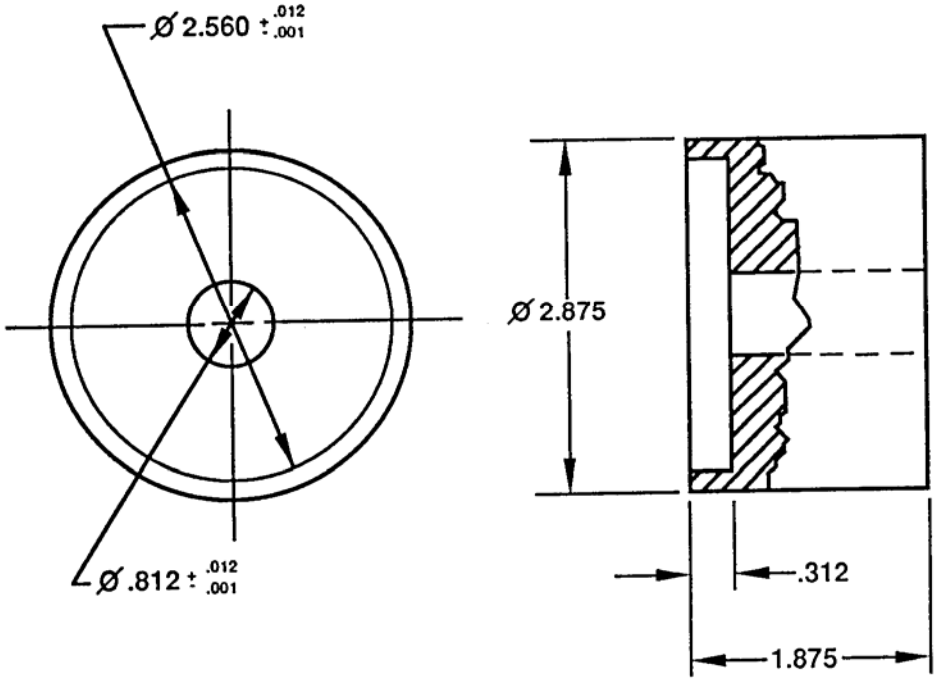
Figure F-3. Battery Terminal Cover (SW34329)



NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS WITHOUT TOLERANCES ARE NOT CONSIDERED CRITICAL.
3. REMOVE ALL BURRS AND SHARP EDGES.
4. FABRICATE FROM: TUBE STEEL, ROUND ASTM-A513 5 3/4 (5.750) IN. DIA. X 1/4 (.250) IN WALL. TAB NSN: STEEL, PLATE, C-1045 1/4 (.250) IN. THICK.
5. ALL MACHINED SURFACES SHOULD HAVE A MINIMUM OF 125 FINISH.
6. MAKE ALL WELDS PER AWS-1.1.

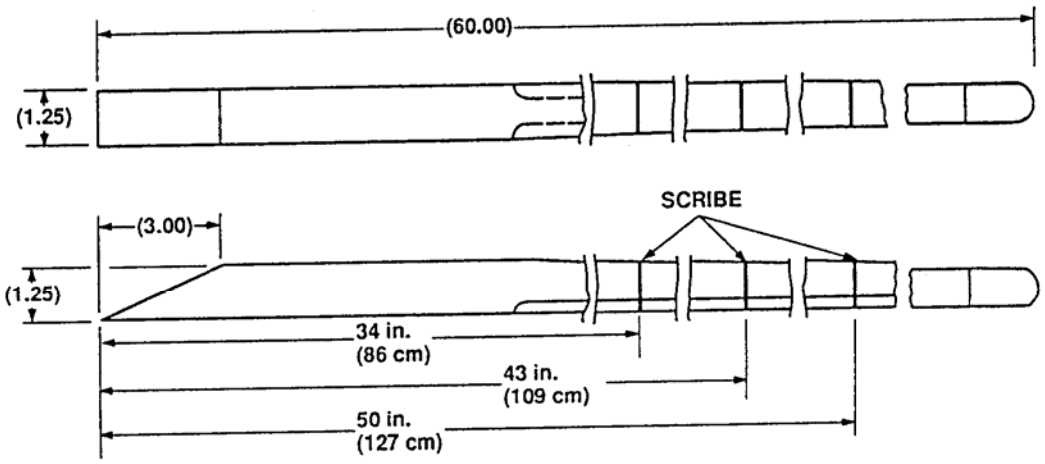
Figure F-4. Bearing Seating Tool (T4249)



NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS WITHOUT TOLERANCES ARE NOT CONSIDERED CRITICAL.
3. REMOVE ALL BURRS AND SHARP EDGES.
4. ALL MACHINED SURFACES SHOULD HAVE A MINIMUM OF 125 FINISH.
5. FABRICATE FROM: STEEL BAR ASTM A108, DIA. 2.875
   NSN (GFI-TBS).

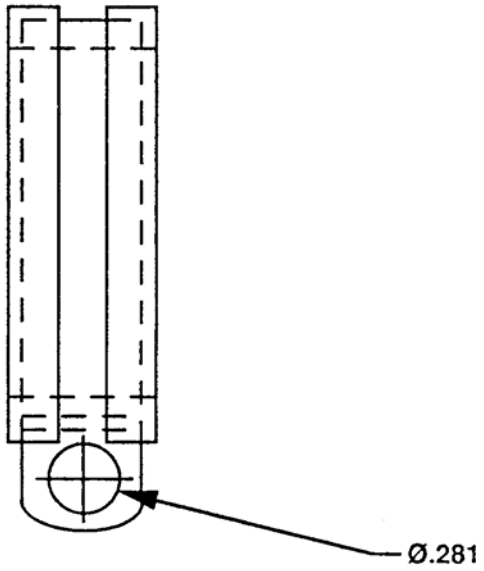
Figure F-5. Bushing Puller (SW34348-3)



NOTES:

1. ALL DIMENSIONS ARE IN INCHES EXCEPT AS NOTED.
2. DIMENSIONS WITHOUT TOLERANCES ARE NOT CONSIDERED CRITICAL.
3. REMOVE ALL BURRS AND SHARP EDGES.
4. FABRICATE FROM: NSN 5120-00-224-1390.
5. SCRIBE THE ENTIRE CIRCUMFERENCE AT THREE LOCATIONS SHOWN, USING PNEUMATIC GRINDER WITH A 1/8 INCH (0.318 CM) CUTTING WHEEL. THESE MARKS ARE USED FOR MEASURING VARIOUS PLATFORM HEIGHTS DURING NORMAL OPERATIONS.

Figure F-6. Crowbar (SW32540)



NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS WITHOUT TOLERANCES ARE NOT CONSIDERED CRITICAL
3. REMOVE ALL BURRS AND SHARP EDGES.
4. FABRICATE FROM: CLAMP, DOUBLE LOOP, MS21334-32.

Figure F-7. Double Loop Clamp (SW32910)

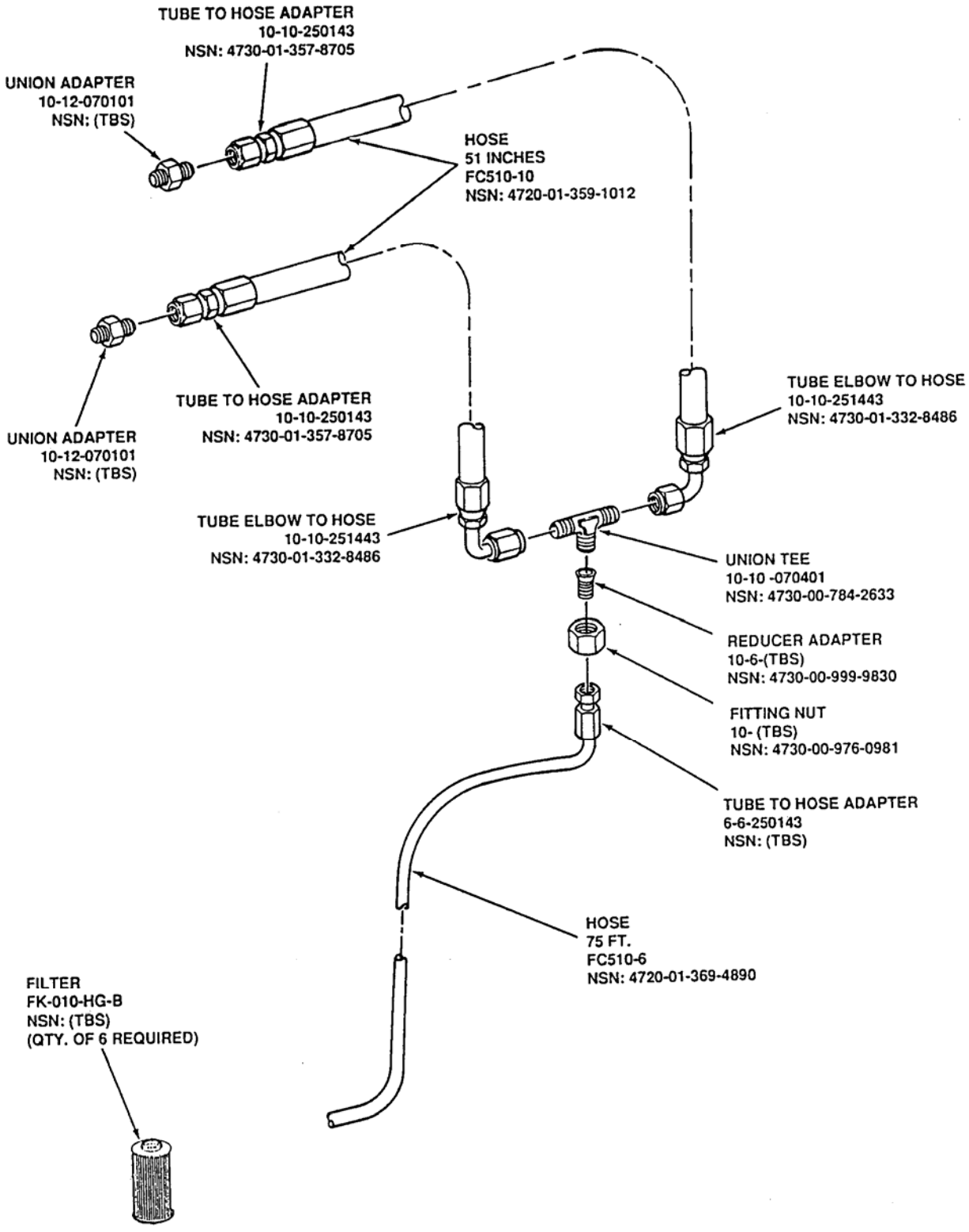
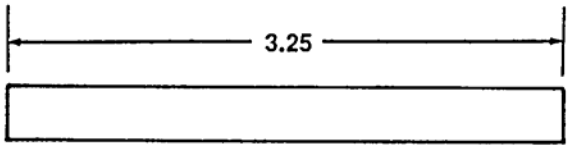


Figure F-8. Flushing Hose Kit (SW34434)



NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS WITHOUT TOLERANCES ARE NOT CONSIDERED CRITICAL.
3. FABRICATE FROM: THERMOPLASTIC, TRANSLUCENT YELLOW, (CAGE 1 DS07) AAG00012.

Figure F-8.1. Fuel Gage Tube (SW34353-2)

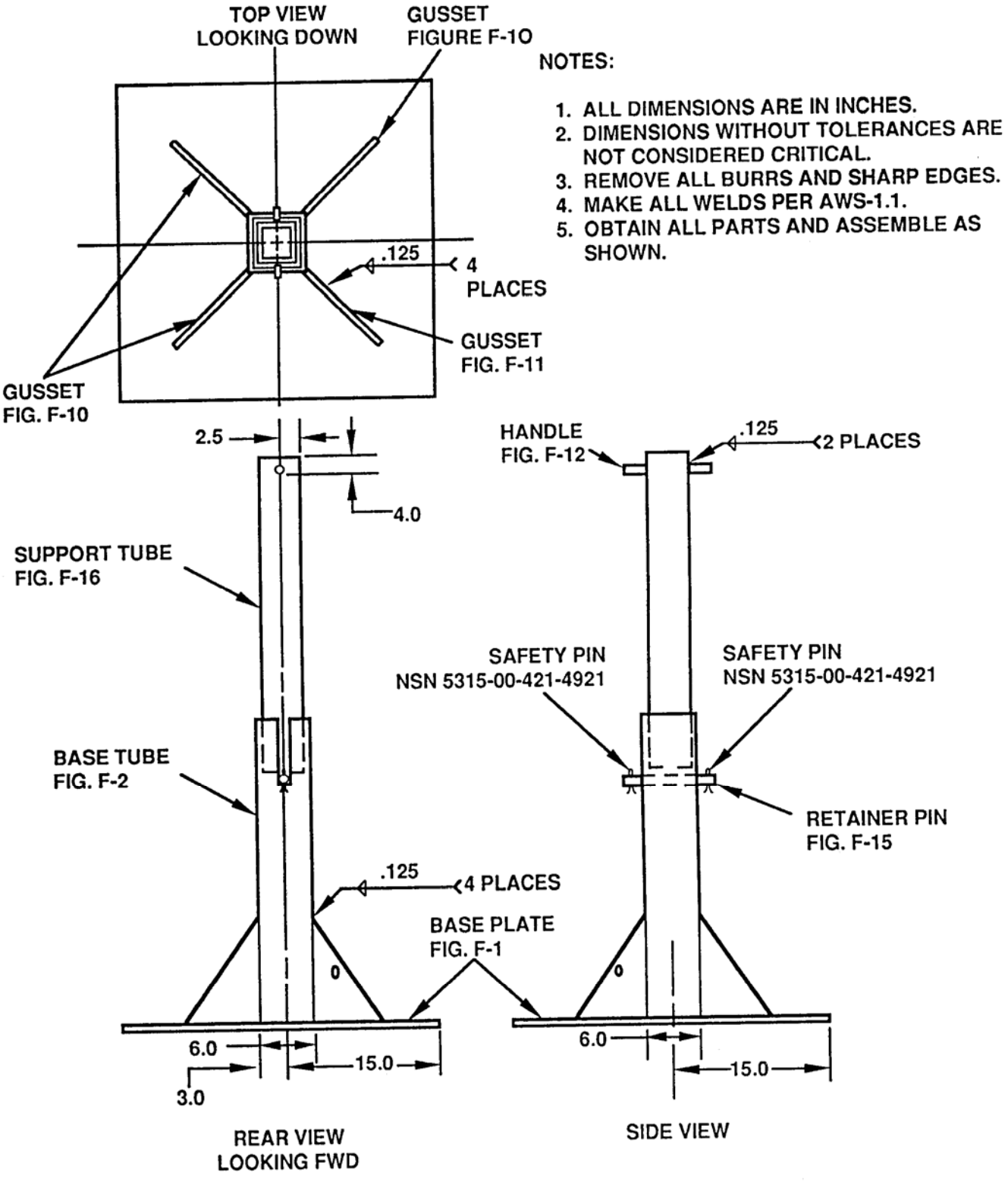
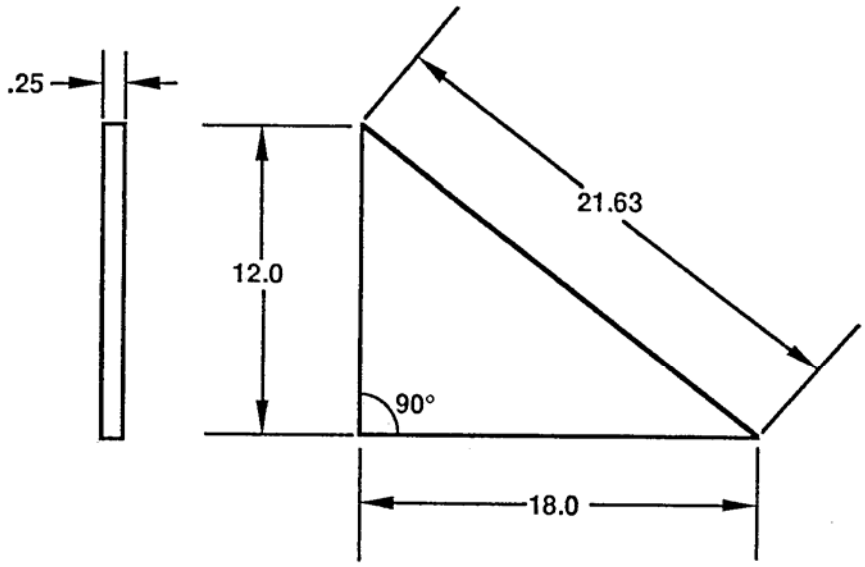


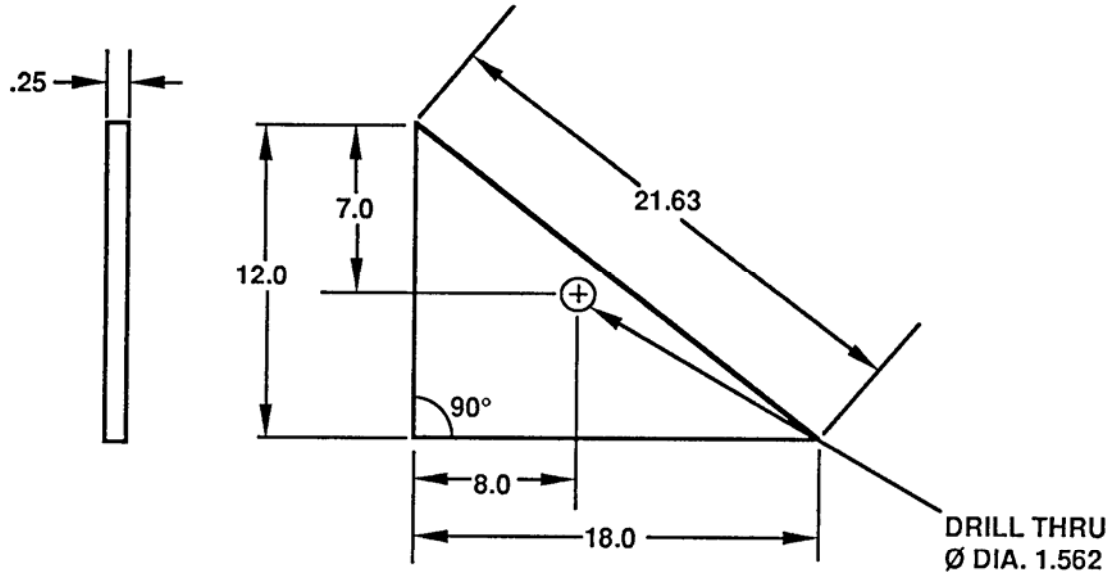
Figure F-9. Gooseneck Support Stand



NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS WITHOUT TOLERANCES ARE NOT CONSIDERED CRITICAL.
3. REMOVE ALL BURRS AND SHARP EDGES.
4. FABRICATE FROM: STEEL PLATE, C-1045, 1/4 (.250) IN. THICK.

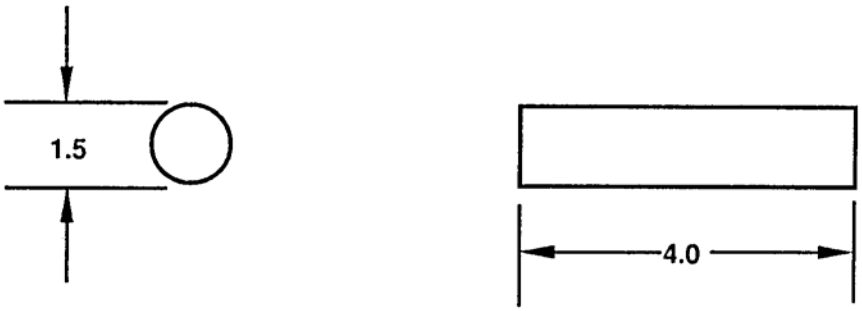
Figure F-10. Gusset



NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS WITHOUT TOLERANCES ARE NOT CONSIDERED CRITICAL.
3. REMOVE ALL BURRS AND SHARP EDGES.
4. FABRICATE FROM: PLATE, STEEL, C-1045, 1/4 (.250) IN. THICK.

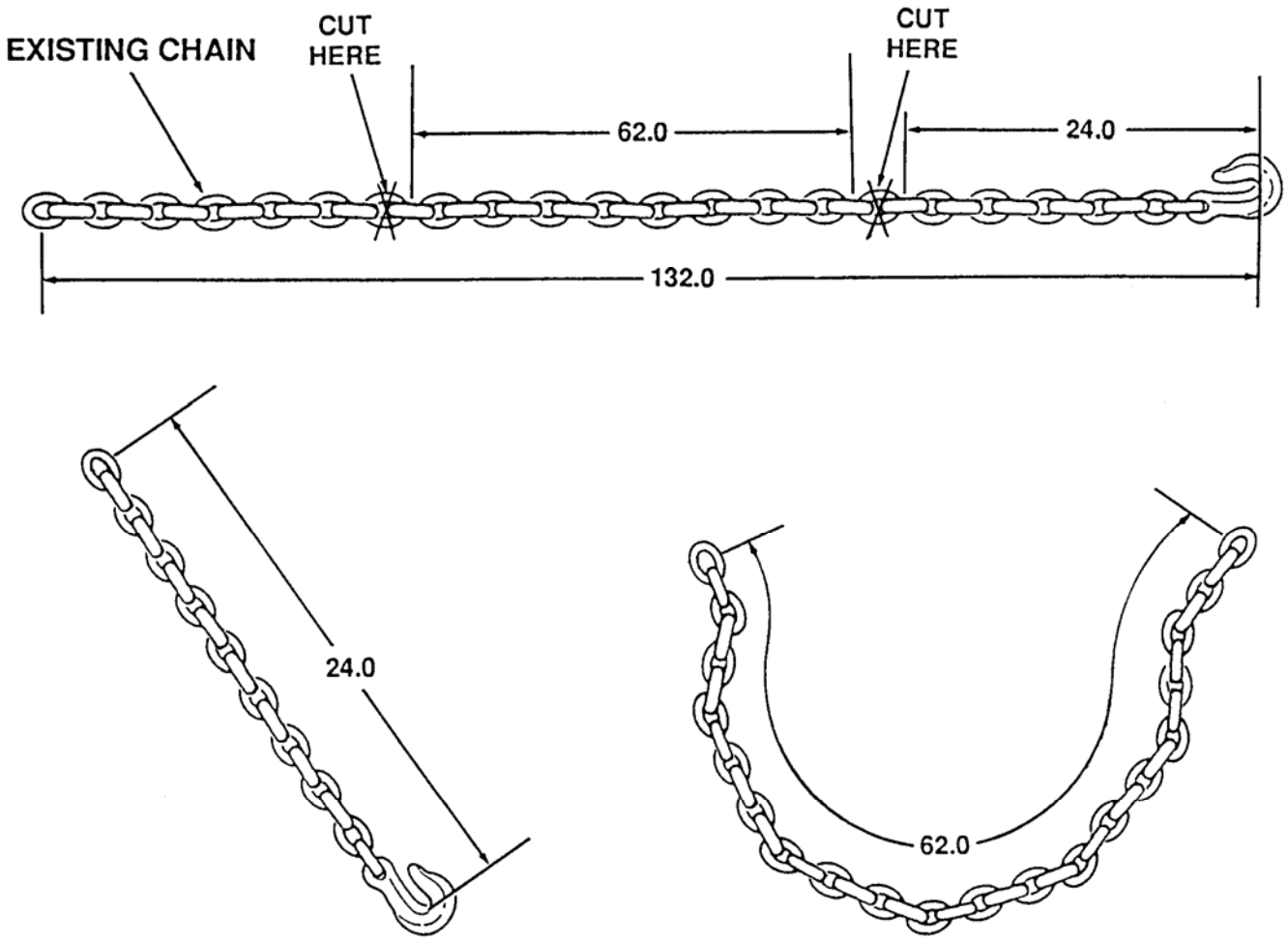
Figure F-11. Gusset



NOTES:

1. ALL DIMENSIONS ARE IN INCHES EXCEPT AS NOTED.
2. DIMENSIONS WITHOUT TOLERANCES ARE NOT CONSIDERED CRITICAL.
3. REMOVE ALL BURRS AND SHARP EDGES.
4. FABRICATE FROM: NSN 9510-00-061-6607.

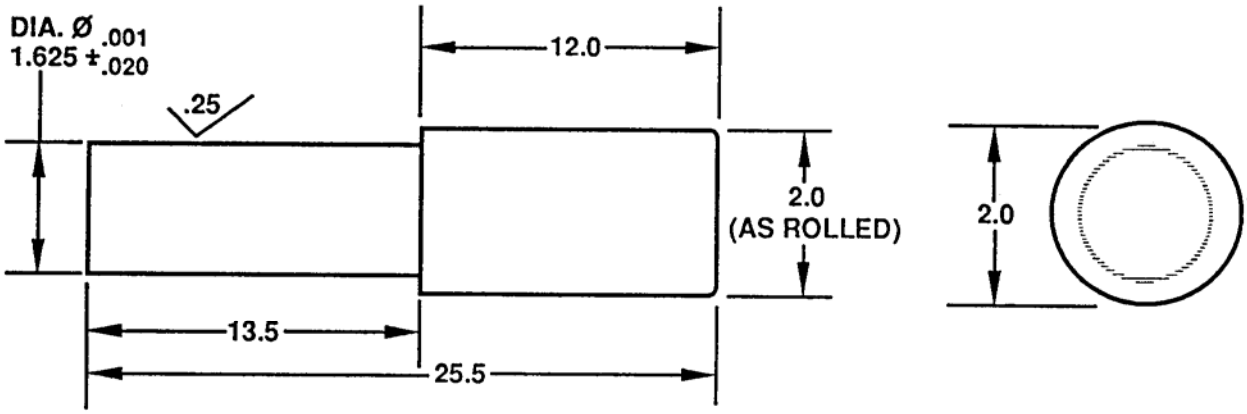
Figure F-12. Handle



NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. FABRICATE FROM: NSN 4010-01-361-7267.
3. CUT CHAIN INTO TWO PIECES AS ILLUSTRATED
4. DISCARD EXCESS CHAIN.

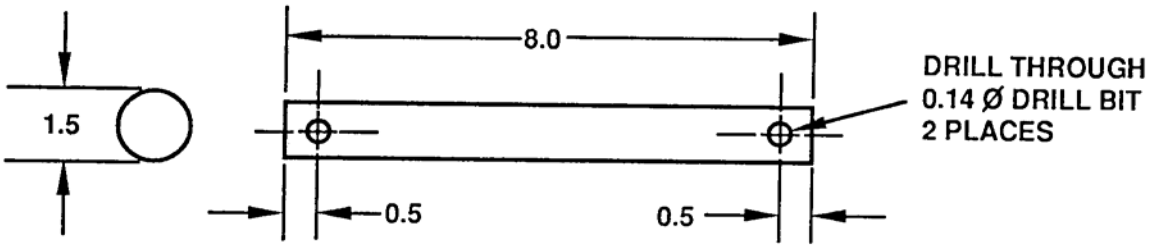
Figure F-13. Hydraulic Control Module Removal/Installation Chain Set (SW34435)



NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS WITHOUT TOLERANCES ARE NOT CONSIDERED CRITICAL.
3. REMOVE ALL BURRS AND SHARP EDGES.
4. FABRICATE FROM: NSN 5910-00-229-4835.
5. ALL MACHINED SURFACES SHOULD HAVE A MINIMUM OF 125 FINISH.

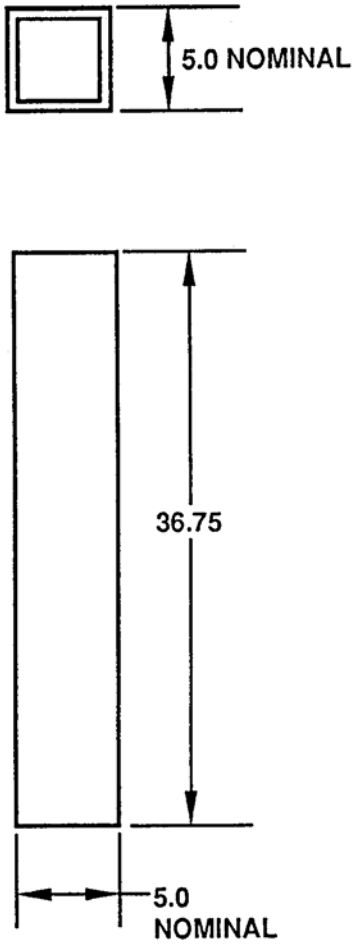
Figure F-14. Removal Tool (Suspension Cylinder Pin) (SW34436)



NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS WITHOUT TOLERANCES ARE NOT CONCIDERED CRITICAL.
3. REMOVE ALL BURRS AND SHARP EDGES.
4. FABRICATE FROM: NSN 9510-00-061-6607.

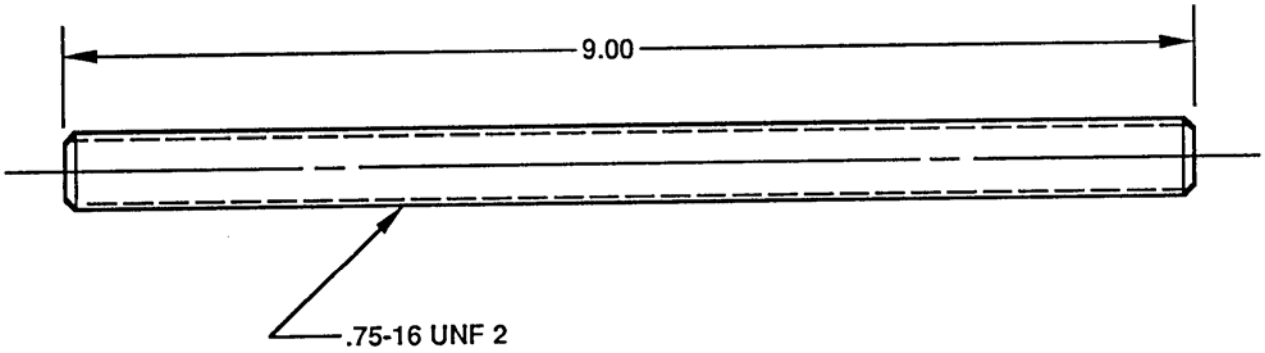
Figure F-15. Retainer Pin



NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS WITHOUT TOLERANCES ARE NOT CONSIDERED CRITICAL.
3. REMOVE ALL BURRS AND SHARP EDGES.
4. FABRICATE FROM: STEEL TUBE, SQUARE, ASTM-A513, 5 IN. X 5 IN. X 3/8 (.375) IN. WALL.

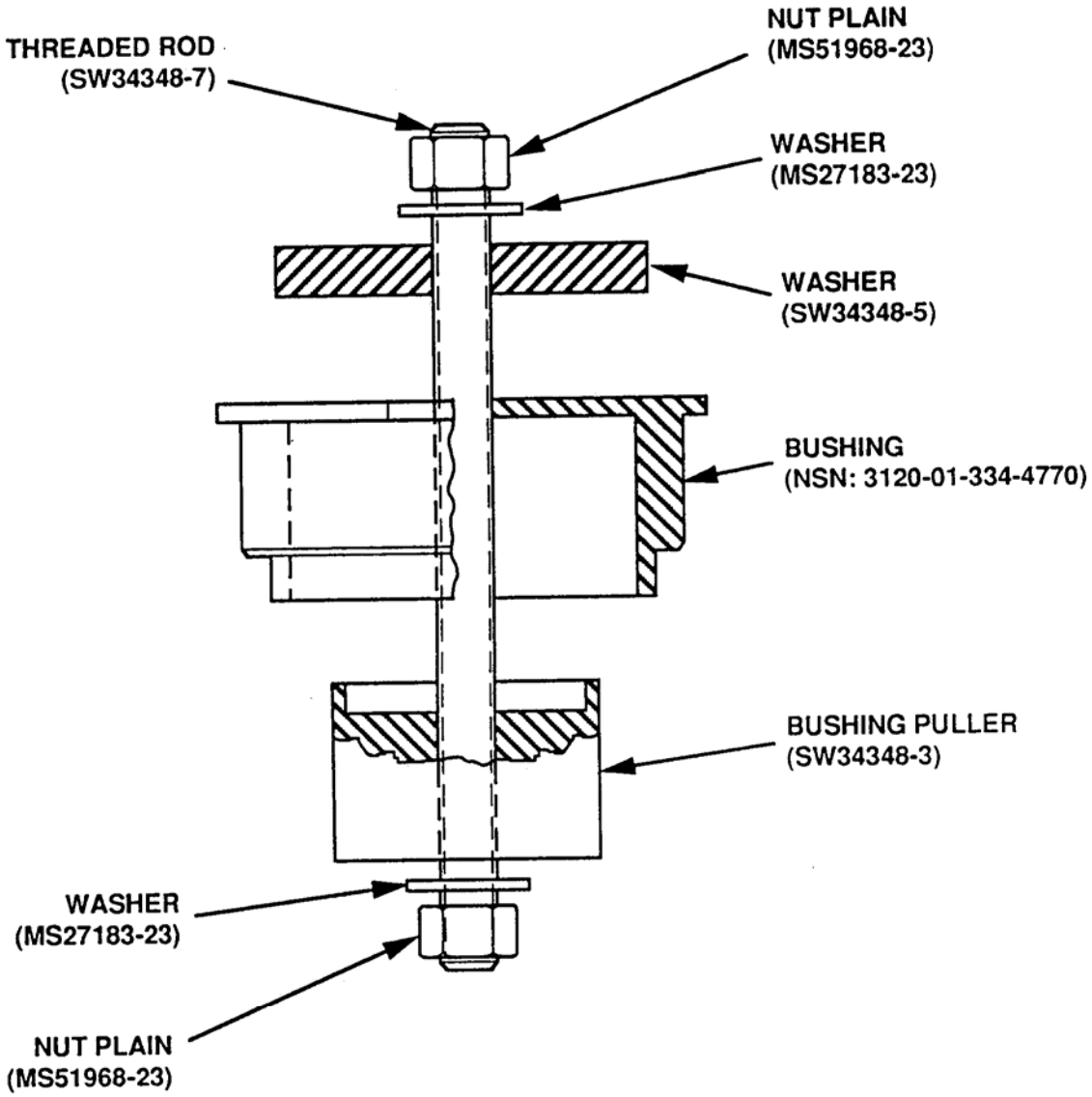
Figure F-16. Support Tube



NOTES:

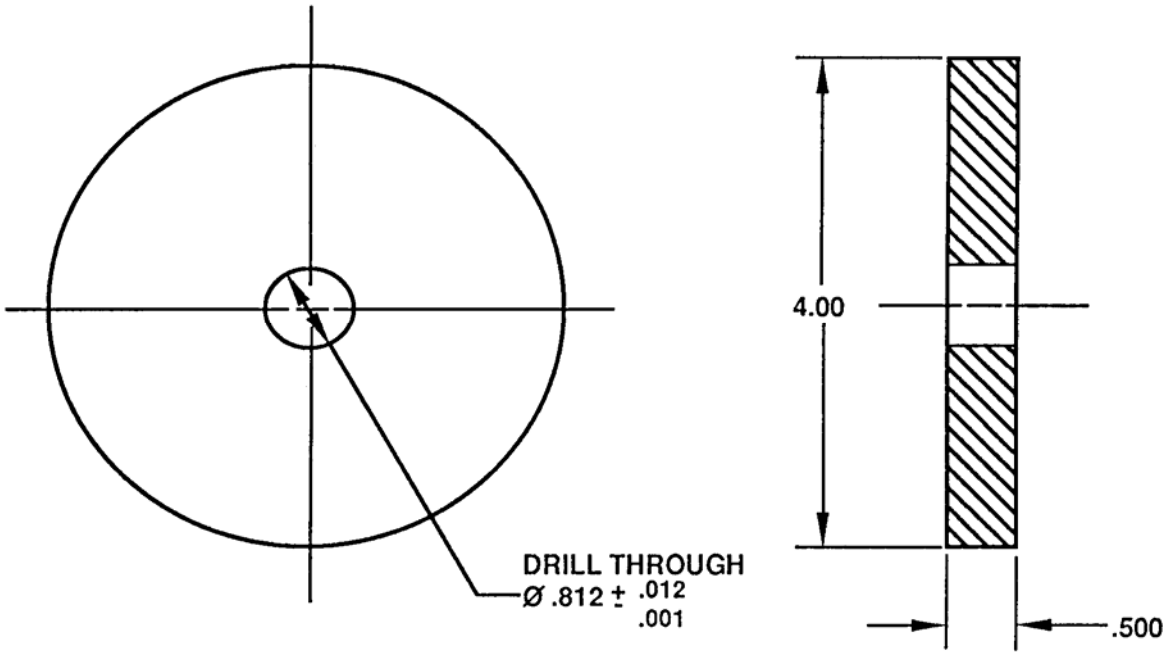
1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS WITHOUT TOLERANCES ARE NOT CONSIDERED CRITICAL.
3. REMOVE ALL BURRS AND SHARP EDGES.
4. FABRICATE FROM: NSN 5306-00-286-9258.

Figure F-17. Threaded Rod (SW34348-7)



NOTE:
OBTAIN ALL PARTS AND ASSEMBLE AS ILLUSTRATED.

Figure F-18. Urethane Bushing Removal/Installation Tool (SW34348)



NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS WITHOUT TOLERANCES ARE NOT CONSIDERED CRITICAL.
3. REMOVE ALL BURRS AND SHARP EDGES.
4. ALL MACHINED SURFACES SHOULD HAVE A MINIMUM OF 125 FINISH.
5. FABRICATE FROM: NSN 9510-00-229-4840.

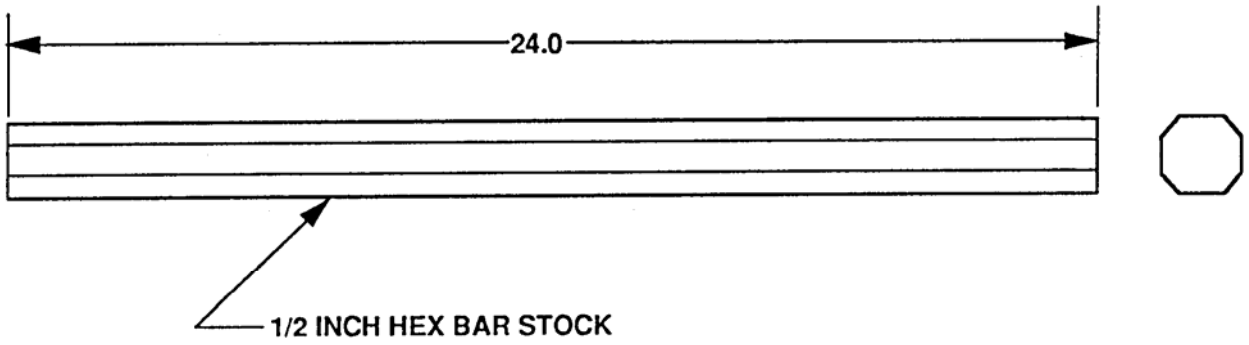
Figure F-19. Washer (SW34348-5)

FROM	BEGINNING CONNECTOR TYPE	AWG	COLOR	LENGTH INCHES (CM)	BULK WIRE PART NUMBER	ENDING CONNECTOR TYPE	TO
			GOOSENECK COMPONENT ASSEMBLY				
R1-2	A	#12	WHT/YEL	14.0 (35.6)	M16878/2BlE94	C	TB2-A7
R2-2	B	#12	WHT/BRN	8.0 (20.3)	M16878/2BLE91	C	TB2-A1
R3-2	A	#12	WHT/GRN	9.0 (22.9)	M16878/2BLE95	C	TB2-A9
TB2-A6	C	#12	WHT/BLK	6.0 (15.2)	M16878/2BLE90	C	TB2-A3
TB2-A10	C	#12	WHT/BRN	6.0 (15.2)	M16878/2BLE91	C	TB2-A2
			APU CONTROL BOX				
DIODE	E	#14	RED	6.0 (15.2)	R-59083	D	START SWITCH B
START SWITCH GL	C	#10	BLK/RED	8.0 (20.3)	R-60934	C	GLOW PLUG INDICATOR
			INDICATOR LIGHT				
OIL PR SEND UNIT	F	#14	BLU	3.0 (7.6)	R-59138	A	INDICATOR BASE
CURRENT LIMITER	F	#14	RED	3.0 (7.6)	R-59083	A	INDICATOR BASE

CONNECTOR TYPES:

A OPEN END SOLDERED
B MS25036-154
C MS25036-112
D MS25036-108
E 42643-2
F 324225

Figure F-20. Wire Assemblies



NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS WITHOUT TOLERANCES ARE NOT CONSIDERED CRITICAL.
3. REMOVE ALL BURRS AND SHARP EDGES.
4. FABRICATE FROM : 9510-00-204-1035 OR 9510-00-294-9665

Figure F-21. Hexagon Stock, 1/2-Inch

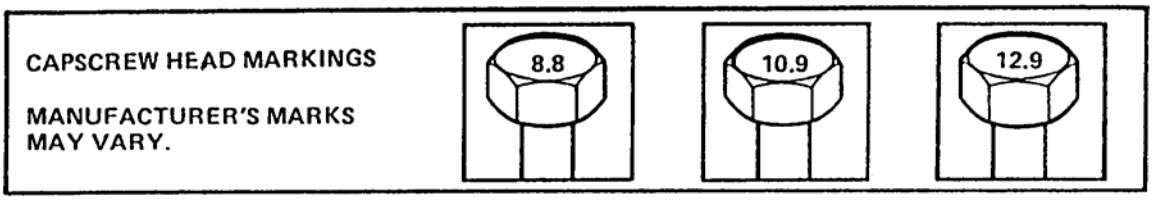
Figure F-22. Deleted

APPENDIX G

TORQUE LIMITS

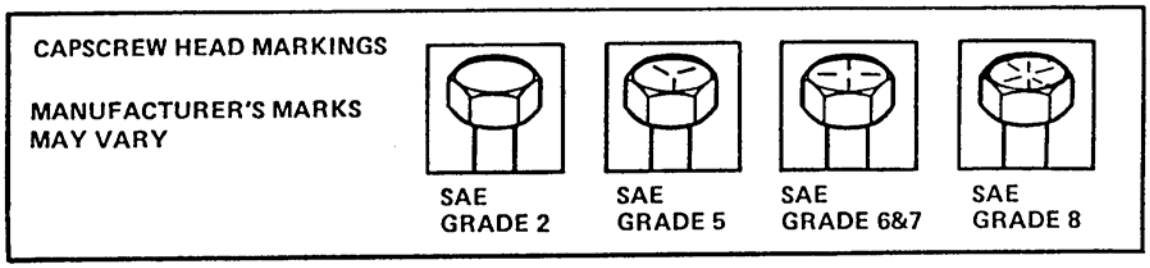
This appendix lists standard torque values. Special torque values and sequence are listed in specific maintenance procedures.

DRY TORQUE LIMITS FOR METRIC FASTENERS



SIZE		METRIC GRADE 8.8		METRIC GRADE 10.9		METRIC GRADE 12.9	
DIA IN	DIA MM	LB-FT	Nm	LB-FT	Nm	LB-FT	Nm
0.157	4	2	3	3	4	4	5
0.197	5	4	5	6	8	7	9
0.237	6	7	9	10	14	11	15
0.276	7	11	15	16	32	20	27
0.315	8	18	24	25	34	29	39
0.394	10	32	43	47	64	58	79
0.473	12	58	79	83	113	100	136
0.630	16	144	195	196	266	235	319
0.709	18	190	258	269	365	323	438
0.788	20	260	353	366	496	440	597
0.867	22	368	499	520	705	678	919
0.946	24	470	637	664	900	794	1077
1.064	27	707	959	996	1351	1235	1675
1.182	30	967	1311	1357	1840	1630	2210

DRY TORQUE LIMITS FOR SAE FASTENERS



SIZE			SAE GRADE NO. 2		SAE GRADE NO. 5		SAE GRADE NO. 6 OR 7		SAE GRADE NO. 8	
DIA IN	THREADS PER INCH	DIA MM	LB-FT	NM	LB-FT	NM	LB-FT	NM	LB-FT	NM
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	90	108
1/2	13	12.70	50	68	75	102	95	129	110	149
1/2	20		55	75	90	122	100	135	120	163
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7/8	9	22.23	140	190	400	542	520	705	600	814
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1	8	25.40	220	298	580	786	800	1085	900	1220
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APPENDIX H

CARGO TIEDOWN RING REPLACEMENT

H-1. INTRODUCTION

This appendix includes instructions for field replacement of broken cargo tiedown rings for M1000 Semitrailers. This procedure is to be performed by certified welding personnel only per ASW D1.1, alternate MIL-STD-1595.

H-2. TOOLS REQUIRED

Angle hand grinder, item 33, appx. B
Leather apron, item 22, appx. B
Welder's helmet, item 21, appx. B
Wire brush, item 14, appx. B
Welding machine(s):
  Primary welding machine MIG (GMAW):
    18V-20V, 130A-150A and/or 18V-21V, 140A-160A
    Welding gas mix: 75% Argon, 25% CO2
    Welding wire, ER80SD2, 0.035-inch diameter
  Alternate stick welding machine (SMAW):
    21V-25V, 110A-130A
    Welding rod, E8018-B2L, 1/8-inch diameter
    Welding rod oven, 80°F to 125°F

H-3. MATERIALS REQUIRED

Coating compound, item 6.1, appx. E
Crocus cloth, item 6, appx. E
Epoxy primer, item 8.1, appx. E
Polyurethane coating, item 6.2 or 6.3, appx. E
Surface cleaner, item 5.1, appx. E

The items listed below are required for replacement of one cargo tiedown ring.

Procedure SWOM1000-0101 (item 1; quantity 1)
D-ring PN SW28517 (item 2; quantity 1)
D-ring retainer PN SW33956-5 (item 3; quantity 1)

H-4. CARGO TIEDOWN RING REPLACEMENT PROCEDURE

WARNING

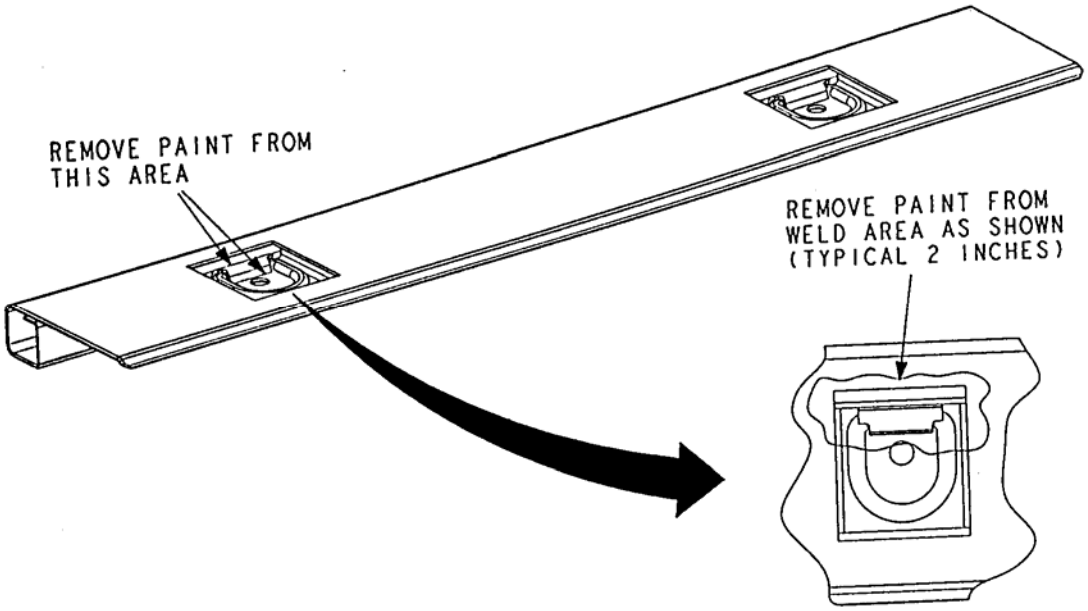
Always use appropriate personal protective equipment (PPE) or injury to personnel may result.

NOTE

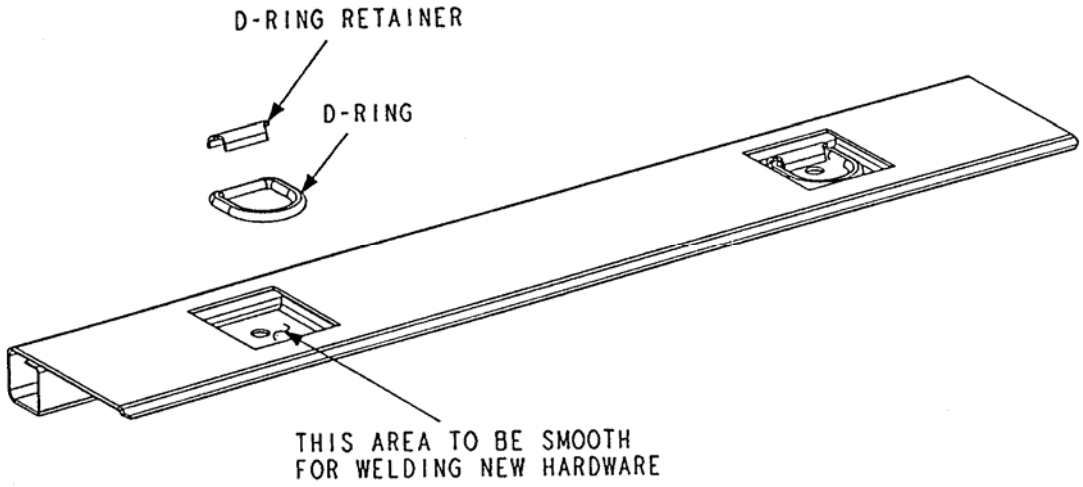
The preferred method for removing paint it to use a wire brush. Chemical removal is an acceptable alternative based on facility regulations.

H-4. CARGO TIEDOWN RING REPLACEMENT PROCEDURE (CONT)

1. Remove paint from D-ring pocket 2 inches (5.08 cm) diametrically from affected weld area using wire brush.



2. Remove broken D-ring and its retainer by grinding. Remove carbon deposits and grind or sand base metal to smooth flush surface. Weld repair any gouges.



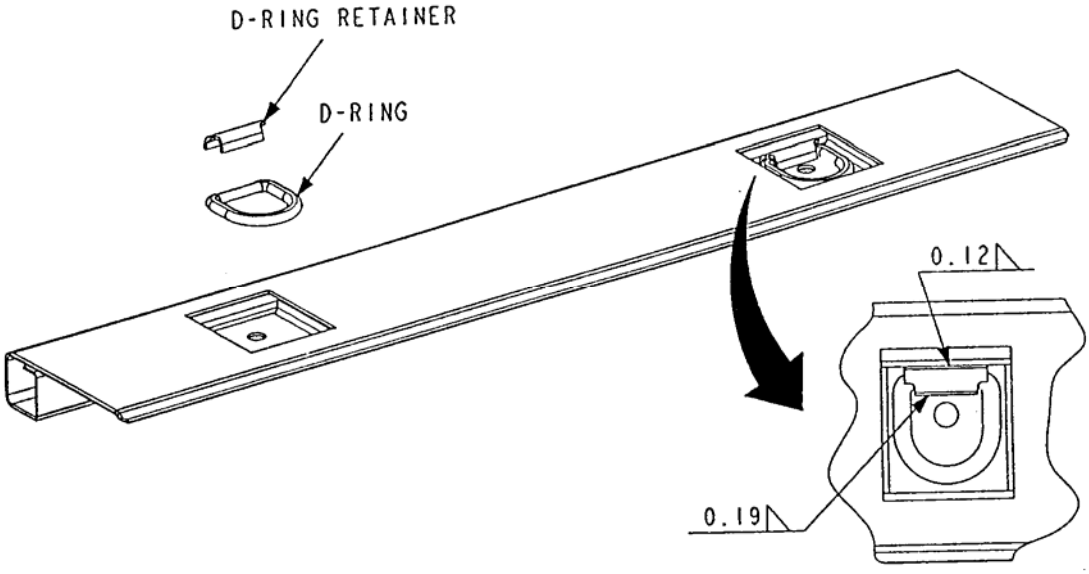
3. Locate D-ring and retainer and weld in place using following settings:

NOTE

Preheat temperature is 70°F (21°C) minimum. Interpass temperature is 300°F (149°C) maximum.

Primary short arc welder settings (GMAW):
- Welding wire type:
  - ER80SD2, 0.035-inch diameter
  - 18V-21V, 130A-160A, 1 pass
  - Gas mix: 75% Argon, 25% CO2
  - Positions: flat/horizontal/vertical/overhead

Alternate stick welder settings (SMAW)
- Welding rod type:
  - E8018-B2L, 1/8-inch diameter
  - 21V-25V, 110A-130A, 1 pass
  - Positions: horizontal/vertical



H-5. CLEANING AND PREPARATION FOR PAINTING

WARNING

Check facility regulations for paint removal processes. Always use appropriate PPE or injury to personnel may result.

1. Prior to painting, visually inspect welds per MIL-STD-1261 to ensure that there are no cracks.

2. Clean and prepare for painting as follows:

   a. Clean area thoroughly, removing all weld slag and spatter.

   b. Feather edges of paint using clean wiping rag.

NOTE

Acetate based products or enamel reducers are preferable. Check local regulations.

   c. Hand wipe area using solvent and clean wiping rag.

3. Touch up paint per TB 43-0242 and following procedures:

   a. Use brush or sponge and pretreat area using coating compound or surface cleaner. Apply thin coat (no puddles). Allow 30 minutes dry time.

   b. Use brush or spray application and prime area using epoxy primer. Desired dry film thickness is 1.0 MIL to 1.5 MILS. Allow 2 to 4 hours dry time.

   c. Use brush or spray application and topcoat using polyurethane coating. Specify color by pattern: black, color chip no. 37030; brown, color chip no. 30051; green, color chip no. 34094. Desired dry film thickness is 1.8 MILS to 3.2 MILS. Allow 3 to 4 hours dry time.

H-6. DISPOSITION OF PARTS

Locally dispose of all removed parts.

H-7. INSPECTION REQUIREMENTS

Visually inspect for cracks and quality of welds.

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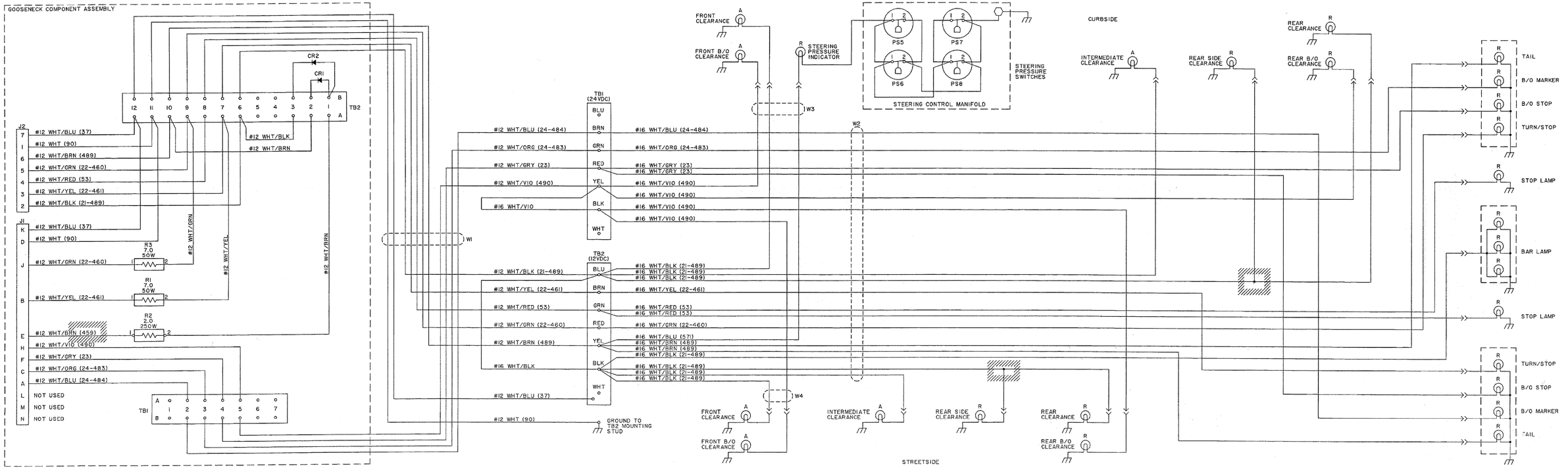


Figure FO-1. Semitrailer Electrical Schematic

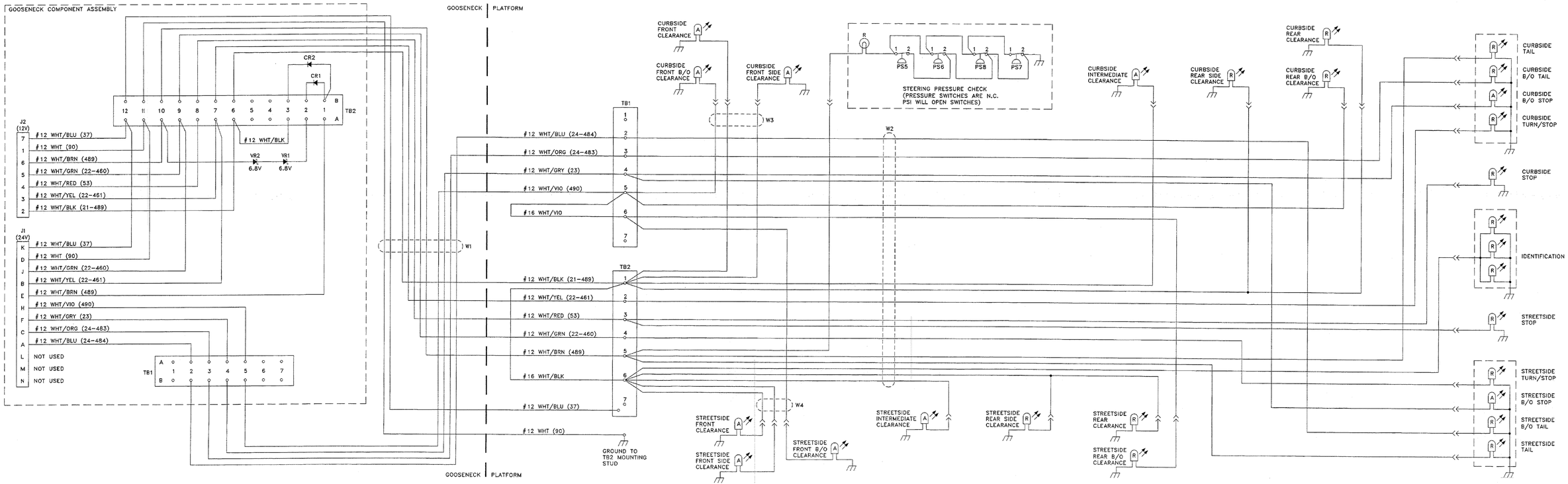


Figure FO-1.1. Semitrailer Electrical Schematic (LED)

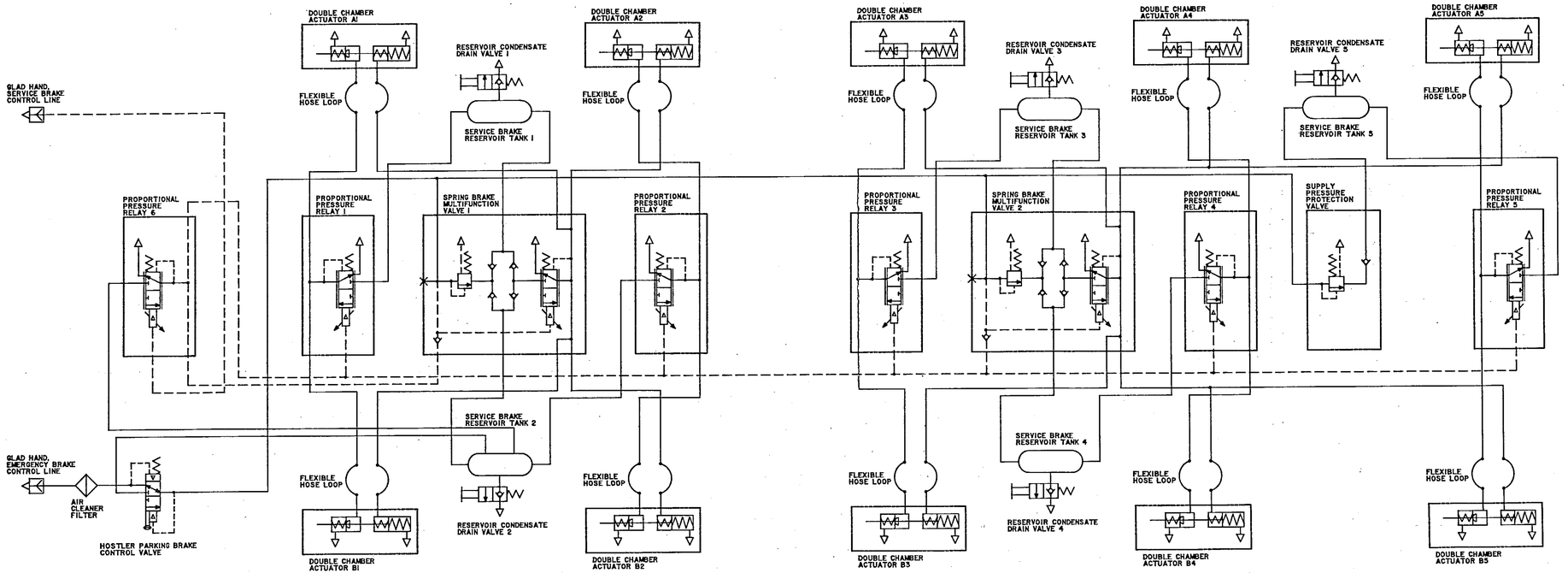


Figure FO-2. Semitrailer Pneumatic Schematic (Sheet 1 of 2)

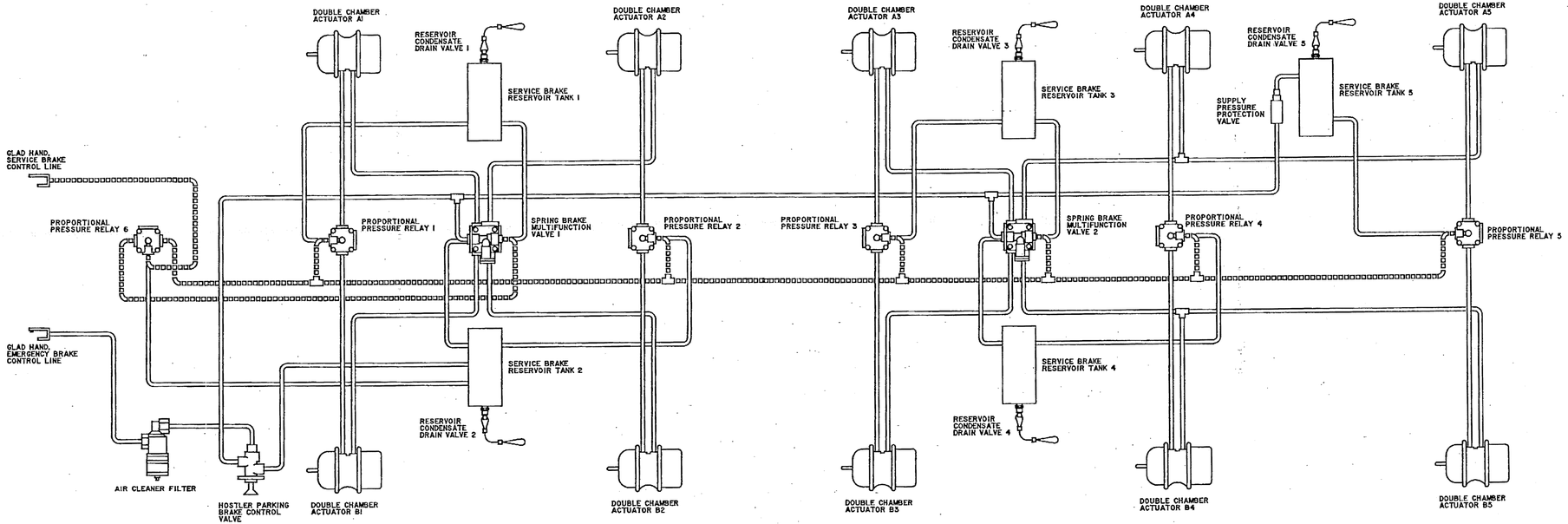


Figure FO-2. Semitrailer Pneumatic Schematic (Sheet 2 of 2)

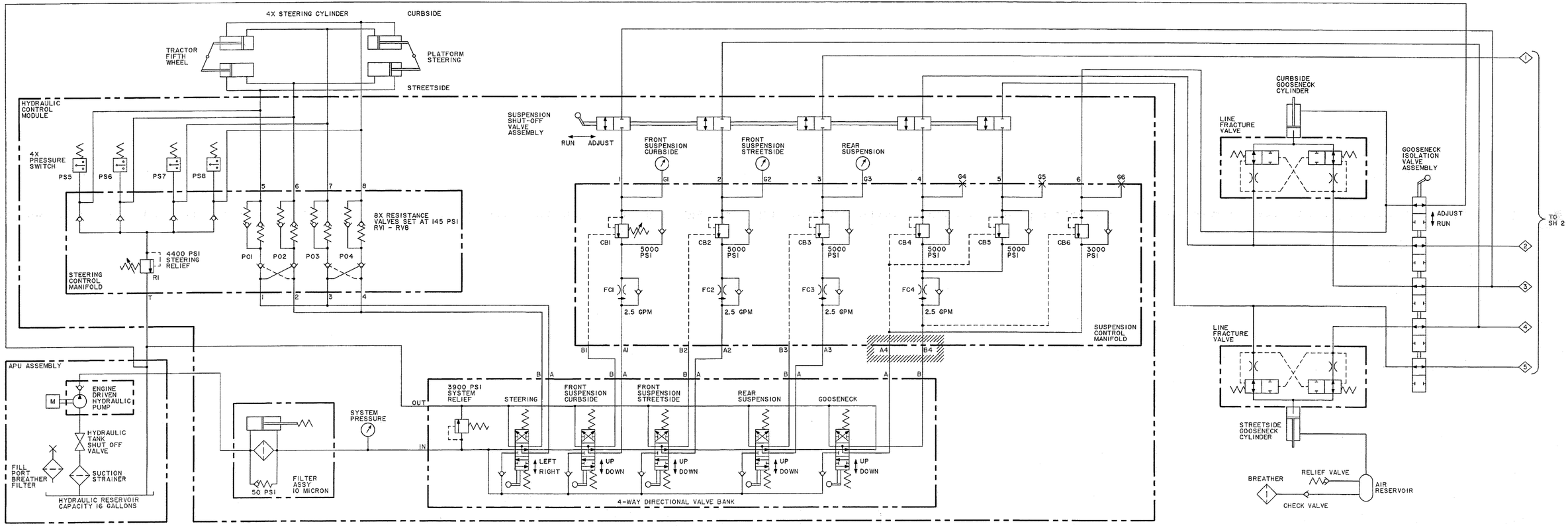


Figure FO-3. Semitrailer Hydraulic Schematic (Sheet 1 of 2)

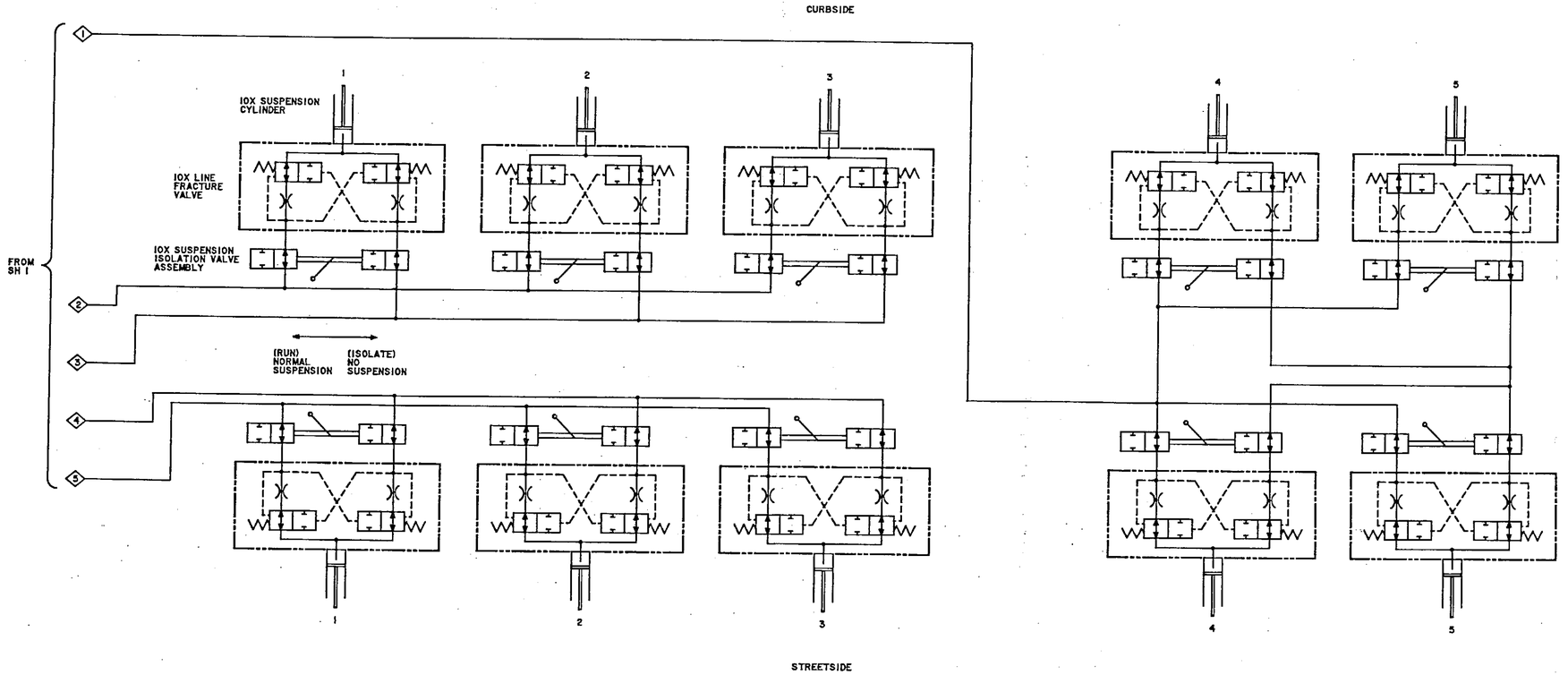


Figure FO-3. Semitrailer Hydraulic Schematic (Sheet 2 of 2)

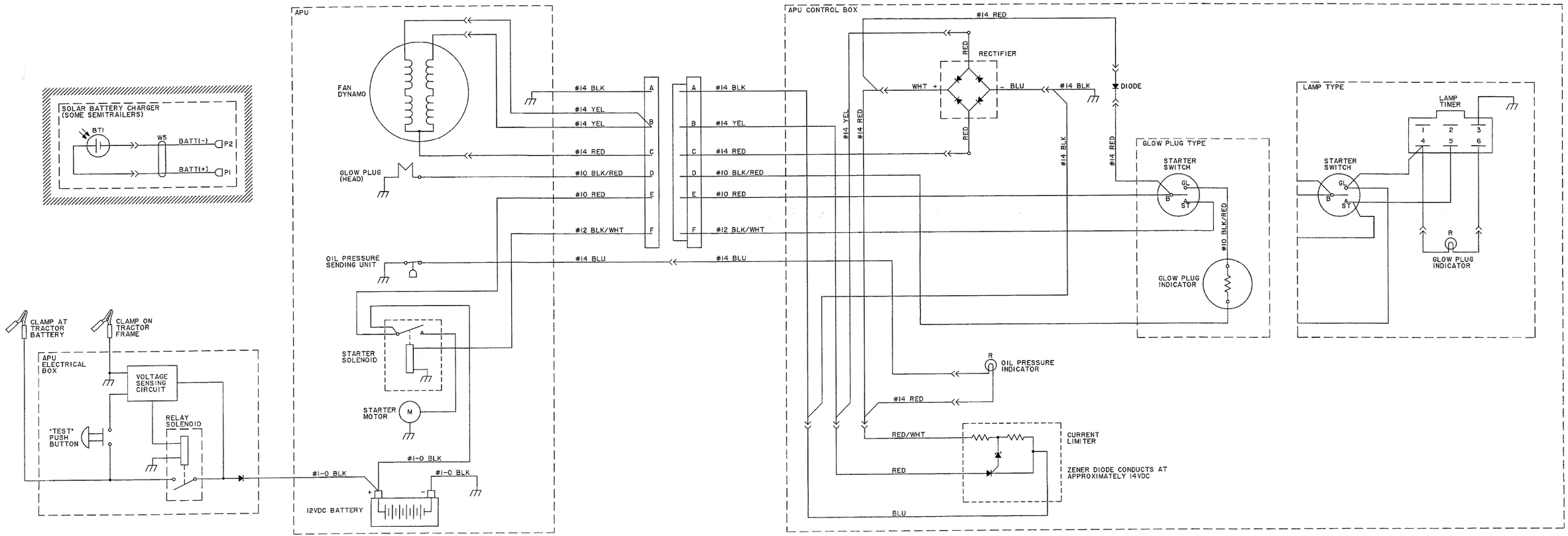
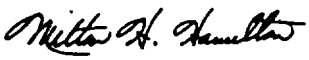


Figure FO-4. APU Electrical Schematic

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General United States Army
Chief of Staff

Official:



MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
07657

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PUBLICATION/FORM NUMBER	DATE	Title
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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).

SAMPLE

**Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	Signature
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PUBLICATION NUMBER	DATE	TITLE
TM 9-2330-381-14	30 Nov 94	Semitrailer, Transporter, Heavy Equipment

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

SAMPLE

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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

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

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

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

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

TEMPERATURE

$5/9\ (^{o}F - 32) = {}^{o}C$
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
$9/5\ C^{o} + 32 = F^{o}$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
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 per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.741
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 Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

