

**TECHNICAL MANUAL  
MAINTENANCE INSTRUCTIONS  
ORGANIZATIONAL MAINTENANCE**

**M977 SERIES 8 x 8 HEAVY  
EXPANDED MOBILITY  
TACTICAL TRUCKS (HEMTT)**

MODEL	NSN
TRUCK, CARGO, WITH WINCH, M977	2320-01-097-0260
TRUCK, CARGO, WITH WINCH, M977A2	2320-01-493-3774
TRUCK, CARGO, WITH WINCH, M977A2R1	2320-01-493-3782
TRUCK, CARGO, WITHOUT WINCH, M977	2320-01-099-6426
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**WARNING**

CARBON MONOXIDE (EXHAUST GAS) CAN CAUSE DEATH.

Carbon monoxide is without color or smell, but can cause death. Breathing air with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Brain damage or death can result from heavy exposure. Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal combustion engines. Carbon monoxide can become dangerously concentrated under conditions of no ventilation. Precautions must be followed to ensure crew safety when the personnel heater or engine of any vehicle is operated for any purpose.

1. DO NOT operate personnel heater or engine of vehicle in a closed place without proper ventilation.
2. DO NOT drive any vehicle with inspection plates, cover plates, or engine compartment covers removed unless necessary for maintenance purposes.
3. BE ALERT at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present, IMMEDIATELY VENTILATE personnel compartments. If symptoms persist, remove affected crew to fresh air and keep warm. DO NOT PERMIT PHYSICAL EXERCISE. If necessary, give artificial respiration and get immediate medical attention. For artificial respiration, refer to FM 21-11.
4. BE AWARE that the gas particulate filter unit or the field protection mask for nuclear-biological-chemical protection WILL NOT offer safety from carbon monoxide poisoning.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS GOOD VENTILATION.

**WARNING**

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

**WARNING**

Never use the parking brake for normal braking or wheels will lock up causing severe skid. Skidding vehicle could result in serious injury or death.

**WARNING**

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of vehicle.

**WARNING**

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around vehicle. Jewelry can catch on equipment and cause injury, or may short across an electrical circuit and cause severe burns or electrical shock.

**WARNING**

The radiator is very hot and pressurized during vehicle operation. Let radiator cool before removing cap. Failure to do so can result in serious burns.

**WARNING**

The exhaust pipe and muffler can become very hot during vehicle operation. Be careful not to touch these parts with bare hands, or allow body to come in contact with pipe or muffler. Exhaust system parts can become hot enough to cause serious burns.

**WARNING**

Do not use trailer brakes as parking brake. Trailer brakes may not hold a loaded vehicle and trailer on a grade. A runaway vehicle may cause severe personal injury or death.

**WARNING**

Always use seatbelts when operating vehicle. Failure to use seatbelt can result in serious injury in case of accident.

**WARNING**

Avoid quick, jerking, winch operation. Keep other personnel well away from vehicles involved in winching operations. A snapped cable or shifting load can cause serious injury or death.

**WARNING**

Always wear heavy gloves when handling winch cables. Never let cable run through hands; frayed cables can cut. Never operate winch with less than five wraps-of cable on winch drum.

**WARNING**

If operating crane under powerlines, do not allow vehicle to contact high-voltage connections. Death on contact can result. If possible, keep one hand away from equipment to reduce the hazard of current flowing through vital organs of the body.

**WARNING**

When working inside the vehicle with power off, be sure to ground every capacitor likely to hold a dangerous voltage potential.

**WARNING**

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment.

**WARNING**

Be careful when working on or with electrical equipment. Do not be misled by the term "low voltage". Voltages as low as 50 volts may cause death. For artificial respiration, refer to FM 21-11.

**WARNING**

Be careful not to short out battery terminals. Do not smoke or use open flame near batteries. Batteries may explode from a spark. Battery acid is harmful to skin and eyes.

**WARNING**

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

**WARNING**

Starting fluid is toxic and flammable. Do not store in cab and do not breathe fumes. Do not puncture or burn containers. Dispose of container following manufacturer's recommendations on the container.

**WARNING**

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment, goggles, shield, and gloves.

**WARNING**

After Nuclear, Biological, or Chemical (NBC) exposure of vehicle, all air filters shall be handled with extreme caution. Unprotected personnel can experience injury or death if residual toxic agents or radioactive material are present. If vehicle is exposed to chemical or biological agents, servicing personnel shall wear protective mask, hood, protective overgarments, and chemical protective gloves and boots in accordance with TM 10-277. All contaminated air filters shall be placed in double-lined plastic bags and moved swiftly to a segregation-area away from the worksite. The same procedure applies for radioactive dust contamination. The Company NBC team should measure the radiation prior to filter removal to determine the extent of safety procedures required per the NBC Annex to the unit Standard Operating Procedures (SOP). The segregation area in which the contaminated air filters are temporarily stored shall be marked with appropriate NBC placards. Final disposal of contaminated air filters shall be in accordance with local SOP. Decontamination operation shall be in accordance with TM 3-220 and local SOP.

**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.

**WARNING**

- Drycleaning solvent (P-D-680) is TOXIC and flammable. Wear protective goggles, face shield, and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breathe vapors. Keep away from heat or flame. Never smoke when using solvent; the flashpoint for type I drycleaning solvent is 100°F (38°C) and for type II is 140°F (60°C). Failure to do so may result in injury or death to personnel.
- If personnel become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts skin or clothes, flush with cold water. If solvent contacts eyes, immediately flush eyes with water and get immediate medical attention.

**WARNING**

Do not check tire pressure before referring to TM 9-2320-279-10 for proper tire pressure checking procedure. Personal injury or death could result.

**WARNING**

When inflating tires mounted on the vehicle, all personnel must remain out of trajectory of the side ring and lockring as shown by the areas indicated. Failure to follow proper procedures may result in serious injury or death to personnel.

**WARNING**

During pressure tests, ensure air pressure is drained to 0 psi (0 kPa) before taking off any components. If pressure is not released, plates or line could blow off and harm personnel. Do not drain air from tank with any part of body in air spray path. Skin embolisms and/or debris in eyes can occur from released pressure.

**WARNING**

Always completely deflate tire by removing valve core from valve stem before attempting demounting operation. After air has finished exhausting from valve stem, carefully run a piece of wire through valve stem to ensure it is not plugged and tire is completely deflated. Failure to comply may result in injury to personnel.

**WARNING**

High air pressure may be released from valve stem when valve core is removed. Stay clear of valve stem after core is removed. Ensure all personnel wear suitable eye protection. Failure to comply may result in injury to personnel.

**WARNING**

Stand clear of trajectory area during deflation or personal injury or death may result.

**WARNING**

Lockring is under tension. If lockring breaks loose it could cause injury to personnel. Keep hands and fingers away from lockring when removing.

**WARNING**

When lockring snaps into position it could pinch hands and fingers. Do not allow hands or fingers to get between lockring and lockring groove when installing lockring or injury to personnel may result.

**WARNING**

Raised notch on lockring must face away from wheel or lockring will not seat properly in lockring groove causing lockring to unseat possibly causing injury to personnel.

**WARNING**

Cracked, broken, bent or otherwise damaged rim components shall not be reworked, welded, brazed, or otherwise heated or damage or personal injury or death may result.

**WARNING**

No heat shall be applied to a multi-piece wheel or wheel component or damage or injury or death may result.

**WARNING**

Lockring must be fully seated in lockring groove around the entire circumference or lockring could unseat during tire inflation causing serious injury to personnel.

**WARNING**

Failure to place wheel/tire assembly in safety cage prior to initial inflation could result in serious injury or death to personnel.

**WARNING**

When a wheel/tire is in a restraining device, do not rest or lean any part of body or equipment on or against the restraining device, or injury or death could result.

**WARNING**

While changing tires or while performing tire maintenance, stay out of the trajectory as shown by the area indicated. Failure to follow proper procedures may result in injury or death to personnel.

**WARNING**

Improperly seated lockrings and side rings may blow off at any time. Never attempt to seat a lockring or side ring during or after inflation. Failure to comply may result in serious injury or death.

**WARNING**

When inflating tires, always use an inflation hose with an in-line gage and a clip-on chuck. The gage and valve must be mounted a minimum of 10 feet (3.10 m) away from air chuck.

**WARNING**

All personnel must remain a minimum of 10 feet (3.10 m) away from tire and not in possible path of lockring or side ring. Failure to comply may result in serious injury or death.

**WARNING**

Do not inflate above 3 psi (21 kPa) or personal injury or death may result.

**WARNING**

Never inflate tires over 40 psi (276 kPa) to seat tire beads. If beads do not seat, deflate, demount, and check the tire/rim parts. Relubricate and remount tire. Serious injury or death could result if these procedures are not followed.

**WARNING**

Never inflate the wheel/tire assembly unless all 16 outer wheel nuts have been properly torqued or personal injury could result.

**WARNING**

If lockring ends touch, deflate wheel/tire assembly by removing valve core, then replace lockring, or serious injury or death to personnel may result. Destroy defective lockring so it cannot be reused.



CHANGE

NO. 8

**HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON D.C.**  
July 2005

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20-31 thru 20-38	None
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25-93 and 25-94	25-93 and 25-94
25-115 thru 25-118	25-115 thru 25-118
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B-25 and B-26	B-25 and B-26
C-1 thru C-6	C-1 thru C-6
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F-15 and F-16	F-15 and F-16
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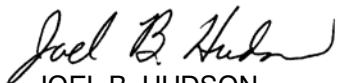
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None	B-20.1/(B-20.2 blank)
B-21 and B-22	B-21 and B-22
B-25 and B-26	B-25 and B-26
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FP 2-3/(FP 2-4 blank)	FP 2-3/(FP 2-4 blank)
Cover	Cover

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JOEL B. HUDSON

*Administrative Assistant to the  
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*Chief of Staff*

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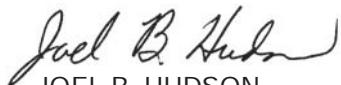
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18-9 and 18-10	18-9 and 18-10
None	18-20.1 thru 18-20.20
22-5 and 22-6	22-5 and 22-6

Remove Pages	Insert Pages
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25-53 and 25-54	25-53 and 25-54
25-61 and 25-62	25-61 and 25-62
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CHANGE

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TRUCK, TANK, FUEL, WITHOUT WINCH, M978	2320-01-100-7672
TRUCK, TRACTOR, WITH WINCH, WITHOUT CRANE, M983	2320-01-097-0247
TRUCK, TRACTOR, WITH WINCH, WITH CRANE, M983	2320-01-099-6421
TRUCK, WRECKER-RECOVERY, M984	2320-01-097-0248
TRUCK, WRECKER-RECOVERY, M984E1	2320-01-195-7641
TRUCK, CARGO, WITH WINCH, M985	2320-01-097-0261
TRUCK, CARGO, WITHOUT WINCH, M985	2320-01-100-7673
TRUCK, CARGO, WITH WINCH, M985E1	2320-01-194-7032
TRUCK, CARGO, WITHOUT WINCH, M985E1	2320-01-194-7031

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4. Illustrations that are new or that have major revisions are indicated by a vertical bar adjacent to the illustration.

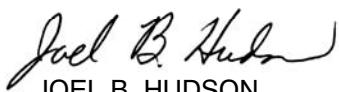
<b>Remove Pages</b>	<b>Insert Pages</b>
i - ii	i - ii
18-1 - 18-2	18-1 - 18-2
18-4.1/(18-4.2 blank)	18-4.1/(18-4.2 blank)
18-5 - 18-6	18-5 - 18-6
none	18-20.1 - 18-20.2
18-21 - 18-22	18-21 - 18-22

Remove Pages	Insert Pages
18-24.1 - 18-24.4	18-24.1
18-75 - 18-78	18-75 - 18-78
19-29 - 19-30	19-29 - 19-30
19-33 - 19-34	19-33 - 19-34
19-73 - 19-74	19-73 - 19-74
none	19-74.1/(19-74.2 blank)
19-78.1/(19-78.2 blank)	19-78.1 - 19-78.2
19-79 - 20-1	19-79 - 20-1
25-35 - 25-38	25-35 - 25-38
25-75 - 25-78	25-75 - 25-78
25-101 - 25-102	25-101 - 25-102
25-105 - 25-106	25-105 - 25-106
25-149 - 25-150	25-149 - 25-150
none	25-150.1/(25-150.2 blank)
25-151 - 25-152	25-151 - 25-152
B-24.1/(B-24.2 blank)	B-24.1/(B-24.2 blank)
C-1 - C-2	C-1 - C-2
C-5 - C-6	C-5 - C-6
F-3 - F-6	F-3 - F-6
F-6.1 - F-6.2	F-6.1 - F-6.2
F-7 - F-8	F-7 - F-8
F-11 - F-12	F-11 - F-12
F-15 - F-22	F-15 - F-22
F-24.1/(F-24.2 blank)	F-24.1/(F-24.2 blank)
F-25 - F-26	F-25 - F-26
F-31 - F-32	F-31 - F-32
FP-2.1/(FP-2.2 blank)	FP-2.1/(FP-2.2 blank)
FP-2.3/(FP-2.4 blank)	FP-2.3/(FP-2.4 blank)
FP-5/(FP-6 blank)	FP-5/(FP-6 blank)
FP-14.1/(FP-14.2 blank)	FP-14.1/(FP-14.2 blank)
FP-14.3/(FP-14.4 blank)	FP-14.3/(FP-14.4 blank)
FP-14.5/(FP-14.6 blank)	FP-14.5/(FP-14.6 blank)
none	FP-14.7/(FP-14.8 blank)

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

By Order of the Secretary of the Army:

Official:



JOEL B. HUDSON

*Administrative Assistant to the  
Secretary of the Army*

0115508

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

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CHANGE  
NO. 4

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 15 December, 2000

TECHNICAL MANUAL  
MAINTENANCE INSTRUCTIONS  
ORGANIZATIONAL MAINTENANCE  
M977 SERIES, 8 X 8 HEAVY EXPANDED MOBILITY  
TACTICAL TRUCKS (HEMTT)

MODEL	NSN
TRUCK, CARGO, WITH WINCH, M977	2320-01-097-0260
TRUCK, CARGO, WITHOUT WINCH, M977	2320-01-099-6426
TRUCK, TANK, FUEL, WITH WINCH, M978	2320-01-097-0249
TRUCK, TANK, FUEL, WITHOUT WINCH, M978	2320-01-100-7672
TRUCK, TRACTOR, WITH WINCH, WITHOUT CRANE, M983	2320-01-097-0247
TRUCK, TRACTOR, WITH WINCH, WITH CRANE, M983	2320-01-099-6421
TRUCK, WRECKER-RECOVERY, M984	2320-01-097-0248
TRUCK, WRECKER-RECOVERY, M984E1	2320-01-195-7641
TRUCK, CARGO, WITH WINCH, M985	2320-01-097-0261
TRUCK, CARGO, WITHOUT WINCH, M985	2320-01-100-7673
TRUCK, CARGO, WITH WINCH, M985E1	2320-01-194-7032
TRUCK, CARGO, WITHOUT WINCH, M985E1	2320-01-194-7031

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4. Illustrations that are new or that have major revisions are indicated by a vertical bar adjacent to the illustration.

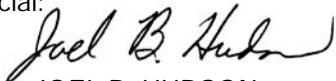
Remove Pages	Insert Pages
e/(f blank)	e/(f blank)
19-73 thru 19-78	19-73 thru 19-78
none	19-78.1/(19-78.2 blank)
23-6.1 thru 23-6.5/(23-6.6 blank)	23-6.1 thru 23-6.5/(23-6.6 blank)
23-7 thru 23-8	23-7 thru 23-8
23-25 and 23-26	23-25 and 23-26
23-37 thru 23-39/(23-40 blank)	23-37 thru 23-40

Remove Pages	Insert Pages
25-1 and 25-2	25-1 and 25-2
25-35 thru 25-38	25-35 thru 25-38
25-53 and 25-54	25-53 and 25-54
none	25-54.1/(25-54.2 blank)
25-57 thru 25-62	25-57 thru 25-62
25-65 and 25-66	25-65 and 25-66
25-83 thru 25-86	25-83 thru 25-86
25-105 thru 25-110	25-105 thru 25-110
25-119 thru 25-122	25-119 thru 25-122
25-137 thru 25-144	25-137 thru 25-144
none	25-144.1 thru 25-144.4
25-145 and 146	25-145 and 25-146
25-153 thru 25-154	25-153 thru 25-154
C-3 thru C-6	C-3 thru C-6
F-3 and F-4	F-3 and F-4
F-6.1/(F-6.2 blank)	F-6.1 and F-6.2
F-7 and F-8	F-7 and F-8
F-13 and F-14	F-13 and F-14
F-14.1/(F-14.2 blank)	F-14.1/(F-14.2 blank)
F-15 and F-16	F-15 and F-16
F-24.1/(F-24.2 blank)	F-24.1/(F-24.2 blank)
F-27 and F-28	F-27 and F-28
FP-1/(FP-2 blank)	FP-1/(FP-2 blank)
FP-2.1/(FP-2.2 blank)	FP-2.1/(FP-2.2 blank)
FP-2.3/(FP-2.4 blank)	FP-2.3/(FP-2.4 blank)
FP-25/(FP-26 blank)	FP-25/(FP-26 blank)

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By Order of the Secretary of the Army:

Official:



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

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

0026312

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CHANGE  
NO. 3

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, D. C., 15 December 1998

TECHNICAL MANUAL  
MAINTENANCE INSTRUCTIONS  
ORGANIZATIONAL MAINTENANCE  
**M977 SERIES, 8 X 8 HEAVY EXPANDED MOBILITY  
TACTICAL TRUCKS (HEMTT)**

MODEL	NSN
TRUCK, CARGO, WITH WINCH, M977	2320-01-097-0260
TRUCK, CARGO, WITHOUT WINCH, M977	2320-01-099-6426
TRUCK, TANK, FUEL, WITH WINCH, M978	2320-01-097-0249
TRUCK, TANK, FUEL, WITHOUT WINCH, M978	2320-01-100-7672
TRUCK, TRACTOR, WITH WINCH, WITHOUT CRANE, M983	2320-01-097-0247
TRUCK, TRACTOR, WITH WINCH, WITH CRANE, M983	2320-01-099-6421
TRUCK, WRECKER-RECOVERY, M984	2320-01-097-0248
TRUCK, WRECKER-RECOVERY, M984E1	2320-01-195-7641
TRUCK, CARGO, WITH WINCH, M985	2320-01-097-0261
TRUCK, CARGO, WITHOUT WINCH, M985	2320-01-100-7673
TRUCK, CARGO, WITH WINCH, M985E1	2320-01-194-7032
TRUCK, CARGO, WITHOUT WINCH, M985E1	2320-01-194-7031

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3. Minor changes to illustrations are indicated by a miniature pointing hand.
4. Illustrations that are new or that have major revisions are indicated by a vertical bar adjacent to the illustration.
5. Changes on cover are: Removed VOLUME NO. 3 and added distribution statement.

Remove Pages	Insert Pages
c/d blank	c thru e/(f blank)
i thru iv	i thru iv
18-1 thru 18-4	18-1 thru 18-4
none	18-4.1/(18-4.2 blank)
18-5 thru 18-8	18-5 thru 18-8

Remove Pages	Insert Pages
none	18-12.1/18.2 blank)
18-17 thru 18-20	18-17 thru 18-20
none	18-8.1 and 18-8.2
18-9 and 18-10	18-9 and 18-10
none	18-10.1/(18-10.2 blank)
18-11 and 18-12	18-11 and 18-12
none	18-24.1 thru 18-24.3/(18-24.4 blank)
18-31 thru 18-34	18-31 thru 18-34
18-37 and 18-38	18-37 and 18-38
18-73 thru 18-78	18-73 thru 18-78
19-1 and 19-2	19-1 and 19-2
19-7 thru 19-10	19-7 thru 19-10
none	19-10.1/(19-10.2 blank)
19-11 and 19-12	19-11 and 19-12
19-29 thru 19-32	19-29 thru 19-32
none	19-32.1/(19-32.2 blank)
19-33 and 19-34	19-33 and 19-34
19-39 thru 19-42	19-39 thru 19-42
19-49 and 19-50	19-49 and 19-50
19-53 thru 19-60	19-53 thru 19-60
19-65 thru 19-70	19-65 thru 19-70
19-75 thru 19-78	19-75 thru 19-78
22-5 and 22-6	22-5 and 22-6
23-1 thru 23-6	23-1 thru 23-6
none	23-6.1 thru 23-6.5/(23-6.6 blank)
23-7 thru 23-22	23-7 thru 23-39/(23-40 blank)
25-1 thru 25-4	25-1 thru 25-4
25-27 thru 25-30	25-27 thru 25-30
25-129 thru 25-132	25-129 thru 25-132
25-145 and 25-146	25-145 and 25-146
25-169/(25-170 blank)	25-169 thru 25-174
A-1 and A-2	A-1 and A-2
B-1 thru B-15	B-1 thru B-15
B-19 thru B-24	B-19 thru B-24
none	B-24.1/(B-24.2 blank)
B-25 thru B-27	B-25 thru B-27
C-1 thru C-5/(C-6 blank)	C-1 thru C-6.1/(C-6.2 blank)
F-1 thru F-6	F-1 thru F-6
none	F-6.1/(F-6.2 blank)
F-7 thru F-14	F-7 thru F-14
none	F-14.1/(F-14.2 blank)
F-15 thru F-24	F-15 thru F-24
none	F-24.1/(F-24.2 blank)
F-25 thru F-28	F-25 thru F-28
F-31 thru F-31/(F-32 blank)	F-31 thru F-33/(F-34 blank)

Remove Pages	Insert Pages
FP-1/(FP-2 blank)	FP-1/(FP-2 blank)
none	FP-2.1/(FP-2.2 blank)
none	FP-2.3/(FP-2.4 blank)
none	FP-14.1/(FP-14.2 blank)
none	FP-14.3/(FP-14.4 blank)
none	FP-14.5/(FP-14.6 blank)
FP-15/(FP-16 blank)	FP-15/(FP-16 blank)
thru FP-27/(FP-28 blank)	thru FP-27/(FP-28 blank)
DA 2028 sample F & B	DA 2028 sample F & B
DA 2028 F & B	DA 2028 F & B
DA 2028 F & B	DA 2028 F & B
DA 2028 F & B	DA 2028 F & B
Cover	Cover

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By Order of the Secretary of the Army:

DENNIS J. REIMER  
General, United States Army  
Chief of Staff

Official



JOEL B. HUDSON

*Administrative Assistant to the  
Secretary of the Army  
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CHANGE

NO. 2

HEADQUARTERS  
 DEPARTMENT OF THE ARMY  
 Washington D.C., 20 April 1993

## TECHNICAL MANUAL

## MAINTENANCE INSTRUCTIONS

## ORGANIZATIONAL MAINTENANCE

M977 SERIES, 8X8 HEAVY EXPANDED MOBILITY  
 TACTICAL TRUCKS (HEMTT)

MODEL	NSN
TRUCK, CARGO, WITH WINCH, M977	2320-01-097-0250
TRUCK, CARGO, WITHOUT WINCH, M977	2320-01-099-6426
TRUCK, TANK, FUEL, WITH WINCH, M978	2320-01-097-0249
TRUCK, TANK, FUEL, WITHOUT WINCH, M978	2320-01-100-7672
TRUCK, TRACTOR, WITH WINCH, WITH CRANE, M983	2320-01-099-6421
TRUCK, TRACTOR, WITH WINCH, WITHOUT CRANE, M983	2320-01-097-0247
TRUCK, WRECKER-RECOVERY, M984	2320-01-097-0248
TRUCK, WRECKER-RECOVERY, M984E1	2320-01-195-7641
TRUCK, CARGO WITH WINCH, M985	2320-01-097-0261
TRUCK, CARGO, WITHOUT WINCH, M985	2320-01-100-7673
TRUCK, CARGO WITH WINCH, M985E1	2320-01-194-7032
TRUCK, CARGO, WITHOUT WINCH, M985E1	2320-01-194-7031

TM 9-2320-279-20-3 dated 8 April 1987, is changed as follows:

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4. Illustrations that are new or that have major revisions are indicated by a vertical bar adjacent to the illustration identification number.
5. Changes to diagrams or schematics are indicated by screening.

Remove Pages	Insert Pages
i thru iV	i thru iV
20-1 thru 20-38	20-1 thru 20-29/(20-30 blank)
20-30 thru 20-68	none
25-163 and 25-164	25-163 and 25-164
B-21 and B-22	B-21 and B-22
B-25 thru B-28	B-25 thru B-28

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*Remove Pages*

C-1 thru C-5/(C-6 blank)  
F-1 thru F-10  
F-13 thru F-18  
F-21 thru F-24  
none  
Index 1 thru Index 6  
FP-1/(FP-2 blank)

*Insert Pages*

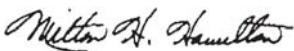
C-1 thru C-5/(C-6 blank)  
F-1 thru F-10  
F-13 thru F-18  
F-21 thru F-24  
F-31/(F-32 blank)  
Index 1 thru Index 6  
FP-1/(FP-2 blank)

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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*  
04048

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for TM 9-2320-279-20-3.

CHANGE  
NO. 1

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, D.C., 31 October 1988

## MAINTENANCE INSTRUCTIONS

## ORGANIZATIONAL

M977 SERIES, 8 X 8 HEAVY EXPANDED MOBILITY  
TACTICAL TRUCKS (HEMTT)

MODEL	NSN
TRUCK, CARGO, WITH WINCH M977	2320-01-097-0260
TRUCK, CARGO, WITHOUT WINCH M977	2320-01-099-6426
TRUCK, TANK, FUEL, WITH WINCH M978	2320-01-097-0249
TRUCK, TANK, FUEL, WITHOUT WINCH M978	2320-01-100-7672
TRUCK, TRACTOR, WITH WINCH, WITHOUT CRANE M983	2320-01-097-0247
TRUCK, TRACTOR, WITH WINCH, WITH CRANE M983	2320-01-099-6421
TRUCK, WRECKER-RECOVERY M984	2320-01-097-0248
TRUCK, WRECKER-RECOVERY M984E1	2320-01-195-7641
TRUCK, CARGO, WITH WINCH M985	2320-01-097-0261
TRUCK, CARGO, WITHOUT WINCH M985	2320-01-100-7673
TRUCK, CARGO WITH WINCH M985E1	2320-01-194-7032
TRUCK, CARGO, WITHOUT WINCH M985E1	2320-01-194-7031

TM 9-2320-279-20-3, 8 April 1987, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. New or changed material is indicated by a vertical bar in the margin of the page.

Remove Pages	Insert Pages
i through iv	i through iv
Index 5 and 6	F-1 through F-30 Index 5 and 6

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By Order of the Secretary of the Army:

Official:

CARL E. VUONO  
*General, United States Army*  
*Chief of Staff*

WILLIAM J. MEEHAN II  
*Brigadier General, United States Army*  
*The Adjutant General*

Distribution:

To be distributed in accordance with DA Form 12-38-R, Unit Maintenance requirements for Truck, Cargo, 10-ton, 8x8, Heavy Expanded Mobility Tactical Truck, HEMTT, M977, M978, M983, M984, M985.

INSERT LATEST UPDATED PAGES/WORK PACKAGES, DESTROY SUPERSEDED DATE

## LIST OF EFFECTIVE PAGES/WORK PACKAGES

**NOTE:** The portion of text affected by the updates is indicated by a vertical line in the outer margins of the page. Updates to illustrations are indicated by miniature pointing hands. Updates to wiring diagrams are indicated by shaded areas.

Dates of issue for original and updated pages/work packages are:

Original . . . 0 . . . . .	8 April 1987	Change . . . 5 . . . . .	15 February 2002
Change . . . 1 . . . . .	31 October 1988	Change . . . 6 . . . . .	15 March 2003
Change . . . 2 . . . . .	20 April 1993	Change . . . 7 . . . . .	15 December 2003
Change . . . 3 . . . . .	15 December 1998	Change . . . 8 . . . . .	1 July 2005
Change . . . 4 . . . . .	15 December 2000		

**TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 726  
CONSISTING OF THE FOLLOWING:**

Page/WP No.	*Change No.	Page/WP No.	*Change No.	Page/WP No.	*Change No.
Cover	8	18-9 - 18-10	6	18-35 - 18-37	0
Blank	0	18-10.1	3	18-38	3
a - b	0	18-10.2 Blank	3	18-39 - 18-73	0
c - d	3	18-11 - 18-12	3	18-74 - 18-75	3
e	4	18-12.1	3	18-76 - 18-77	5
f Blank	4	18-12.2 Blank	3	18-78	3
i - ii	7	18-13 - 18-16	0	18-79	0
iii	3	18-17 - 18-20	3	18-80 Blank	0
iv	8	18-20.1 - 18-20.20	6	19-1	3
18-1	6	18-21	5	19-2 - 19-7	0
18-2	0	18-22	0	19-8 - 19-10	3
18-3	3	18-23 - 18-24	8	19-10.1	3
18-4	0	18-24.1	5	19-10.2 Blank	3
18-4.1	5	18-24.2 - 18-24.4		19-11	3
18-4.2 Blank	5	Deleted	5	19-12 - 19-29	0
18-5	3	18-25 - 18-30	0	19-30	5
18-6	5	18-31	2	19-31 - 19-32	3
18-7 - 18-8	3	18-32 - 18-33	0	19-32.1	3
18-8.1 - 18-8.2	3	18-34	3	19-32.2 Blank	3
				19-33	5

\* Zero in this column indicates an original page.

INSERT LATEST UPDATED PAGES/WORK PACKAGES, DESTROY SUPERSEDED DATE

Page/WP No.	*Change No.	Page/WP No.	*Change No.	Page/WP No.	*Change No.
19-34 - 19-38	0	20-8	8	23-5	0
19-39 - 19-41	3	20-9	2	23-6	3
19-42 - 19-49	0	20-10	8	23-6.1	3
19-50	3	20-11	2	23-6.2 - 23-6.3	4
19-51 - 19-53	0	20-12	8	23-6.4	3
19-54	3	20-13	2	23-6.5	6
19-55	0	20-14	8	23-6.6 Blank	6
19-56	3	20-15	2	23-7	4
19-57	0	20-16	8	23-8	3
19-58	3	20-17	2	23-9	0
19-59	0	20-18	8	23-10	3
19-60	8	20-19	2	23-11	0
19-61 - 19-65	0	20-20	8	23-12	3
19-66	3	20-21	2	23-13	0
19-67	0	20-22	8	23-14	3
19-68	3	20-23	2	23-15	0
19-69	0	20-24	8	23-16	3
19-70	3	20-25	2	23-17	0
19-71 - 19-73	0	20-26	8	23-18	3
19-74	5	20-27	2	23-19	0
19-74.1	5	20-28 - 20-29	8	23-20	3
19-74.2 Blank	5	20-30 Blank	2	23-21	0
19-75	0	20-31 - 20-38 Deleted	8	23-22 - 23-25	3
19-76 - 19-78	4	20-39 - 20-64	7	23-26	4
19-78.1	5	20-65 Blank	7	23-27 - 23-37	3
19-78.2	5	21-1 - 21-11	0	23-38 - 23-40	4
19-79	5	21-12 Blank	0	24-1 - 24-10	0
19-80 Blank	5	22-1 - 22-5	0	25-1	4
20-1 - 20-2	8	22-6	8	25-2 - 25-3	0
20-3	2	22-7	0	25-4	3
20-4	8	22-8 Blank	0	25-5 - 25-27	0
20-5	2	23-1	3	25-28 - 25-29	3
20-6	8	23-2 - 23-3	0	25-30 - 25-34	0
20-7	2	23-4	3	25-35	5

\* Zero in this column indicates an original page.

INSERT LATEST UPDATED PAGES/WORK PACKAGES, DESTROY SUPERSEDED DATE

Page/WP No.	*Change No.	Page/WP No.	*Change No.	Page/WP No.	*Change No.
25-36 - 25-37	0	25-138 - 25-140	4	B-21.2 Blank	7
25-38	5	25-141	0	B-21	7
25-39 - 25-52	0	25-142 - 25-144	4	B-22	8
25-53	6	25-144.1 - 25-144.4	4	B-23	0
25-54	4	25-145	4	B-24	8
25-54.1	4	25-146 - 25-149	0	B-24.1	5
25-54.2 Blank	4	25-150	5	B-24.2 Blank	5
25-55 - 25-57	0	25-150.1	5	B-25	7
25-58 - 25-60	4	25-150.2 Blank	5	B-26	8
25-61	6	25-151	5	B-27	3
25-62	4	25-152	0	B-28	0
25-63 - 25-64	0	25-153 - 25-154	4	C-1	5
25-65	4	25-155 - 25-163	0	C-2 - C-6	8
25-66 - 25-74	0	25-164	2	C-6.1	8
25-75	5	25-165 - 25-168	0	C-6.2 Blank	8
25-76	0	25-169 - 25-174	3	D-1 - D-2	0
25-77	5	26-1 - 26-27	0	E-1 - E-4	0
25-78 - 25-82	0	26-28 Blank	0	F-1 - F-2	3
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25-87 - 25-92	0	27-4 Blank	0	F-5	3
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25-119 - 25-121	4	B-16 - B-18	0	F-14.2 Blank	4
25-122 - 25-128	0	B-19	8	F-15	4
25-129	3	B-20	3	F-16	8
25-130	0	B-20.1	8	F-17	5
25-131	3	B-20.2 Blank	8	F-18	3
25-132 - 25-137	0	B-21.1	7		

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F-19 - F-20	5	FP-2.2 Blank	5	FP-14.5	5
F-21	3	FP-2.3	8	FP-14.6 Blank	5
F-22	5	FP-2.4 Blank	8	FP-14.7	5
F-23 - F-24	3	FP-3	0	FP-14.8 Blank	5
F-24.1	5	FP-4 Blank	0	FP-15	3
F-24.2 Blank	5	FP-5	5	FP-16 Blank	3
F-25	5	FP-6 Blank	5	FP-17	3
F-26	1	FP-7	5	FP-18 Blank	3
F-27	4	FP-8 Blank	5	FP-19	3
F-28 - F-30	1	FP-9	0	FP-20 Blank	3
F-31	3	FP-10 Blank	0	FP-21	3
F-32 - F-34	8	FP-11	0	FP-22 Blank	3
Index 1	2	FP-12 Blank	0	FP-23	3
Index 2 - Index 3	0	FP-13	0	FP-24 Blank	3
Index 4 - Index 6	2	FP-14 Blank	0	FP-25	4
Index 7 - Index 10	0	FP-14.1	8	FP-26 Blank	4
FP-1	4	FP-14.2 Blank	8	FP-27	3
FP-2 Blank	4	FP-14.3	5	FP-28 Blank	3
FP-2.1	5	FP-14.4 Blank	5		

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## TECHNICAL MANUAL

No. 9-2320-279-20-3

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, DC, 8 April 1987

## MAINTENANCE INSTRUCTIONS

### ORGANIZATIONAL

#### M977 SERIES, 8 X 8 HEAVY EXPANDED MOBILITY TACTICAL TRUCKS (HEMTT)

MODEL	NSN
TRUCK, CARGO, WITH WINCH, M977	2320-01-097-0260
TRUCK, CARGO, WITH WINCH, M977A2	2320-01-493-3774
TRUCK, CARGO, WITH WINCH, M977A2R1	2320-01-493-3782
TRUCK, CARGO, WITHOUT WINCH, M977	2320-01-099-6426
TRUCK, CARGO, WITHOUT WINCH, M977A2	2320-01-493-3779
TRUCK, CARGO, WITHOUT WINCH, M977A2R1	2320-01-493-3785
TRUCK, TANK, FUEL, WITH WINCH, M978	2320-01-097-0249
TRUCK, TANK, FUEL, WITH WINCH, M978A2	2320-01-492-8216
TRUCK, TANK, FUEL, WITH WINCH, M978A2R1	2320-01-492-8226
TRUCK, TANK, FUEL, WITHOUT WINCH, M978	2320-01-100-7672
TRUCK, TANK, FUEL, WITHOUT WINCH, M978A2	2320-01-492-8215
TRUCK, TANK, FUEL, WITHOUT WINCH, M978A2R1	2320-01-492-8225
TRUCK, TRACTOR, WITH WINCH, WITHOUT CRANE, M983	2320-01-097-0247
TRUCK, TRACTOR, WITH WINCH, WITHOUT CRANE, M983A2	2320-01-492-8223
TRUCK, TRACTOR, WITH WINCH, WITHOUT CRANE, M983A2R1	2320-01-492-8231
TRUCK, TRACTOR, WITH WINCH, WITH CRANE, M983	2320-01-099-6421
TRUCK, WRECKER-RECOVERY, M984	2320-01-097-0248
TRUCK, WRECKER-RECOVERY, M984A1	2320-01-195-7641
TRUCK, WRECKER-RECOVERY, M984A2	2320-01-492-8224
TRUCK, WRECKER-RECOVERY, M984A2R1	2320-01-492-8233
TRUCK, CARGO, WITH WINCH, M985	2320-01-097-0261
TRUCK, CARGO, WITH WINCH, M985A2	2320-01-492-8214
TRUCK, CARGO, WITH WINCH, M985A2R1	2320-01-493-3787
TRUCK, CARGO, WITHOUT WINCH, M985	2320-01-100-7673
TRUCK, CARGO, WITHOUT WINCH, M985A2	2320-01-492-8201
TRUCK, CARGO, WITHOUT WINCH, M985A2R1	2320-01-493-3789
TRUCK, CARGO, WITH WINCH, M985E1	2320-01-194-7032
TRUCK, CARGO, WITH WINCH, M985E1A2	2320-01-493-3790
TRUCK, CARGO, WITH WINCH, M985E1A2R1	2320-01-493-3792

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## REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

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

M983 with crane and M985E1 without winch are no longer in the fleet. Ignore all references to these vehicles. The M984E1 and M984A1 are the same vehicle. All references to M984E1 shall be interpreted as the M984A1 model. All references to M977 series vehicles shall be interpreted to include A2 and A2R1 models, unless otherwise noted.

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## CHAPTER 18

### BODY ACCESSORY MAINTENANCE

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#### Section I. INTRODUCTION

**[18-1. GENERAL.]** This chapter contains maintenance instructions for removing, replacing, and installing accessory components authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

## Body Accessory Maintenance Instructions (Cont)

## Section II. WINDSHIELD WIPER/WASHER MAINTENANCE

## Body Accessory Maintenance Instructions

**18-2. WINDSHIELD WIPER BLADE AND ARM REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*TM or Para      Condition      Description  
TM 9-2320-279-10 Shut off engine.*Special Tools*

None

*Special Environmental Conditions**Supplies*

None

None

*Personnel Required*

MOS 63S. Heavy wheel vehicle mechanic

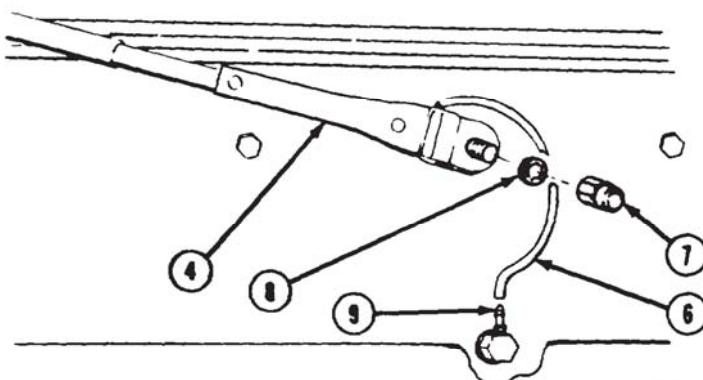
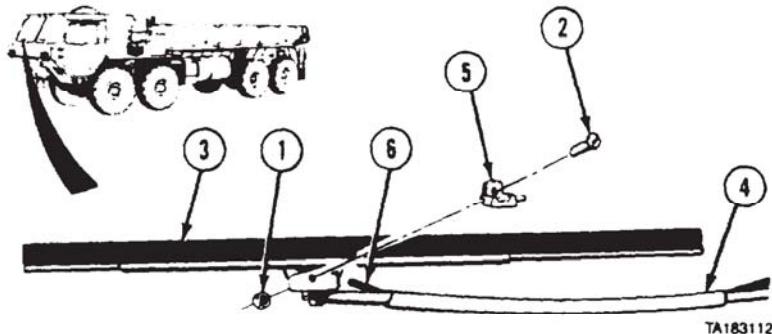
*General Safety Instructions*

None

**a. Removal.****NOTE**

Removal procedure is the same for both wipers.

- (1) Remove locknut (1) and screw (2).
- (2) Remove blade (3) from wiper arm (4).
- (3) Remove nozzle (5) from hose (6).
- (4) Remove nut (7) and lockwasher (8).
- (5) Disconnect hose (6) from nipple (9).
- (6) Remove wiper arm (4).
- (7) Remove hose (6) from wiper arm (4).

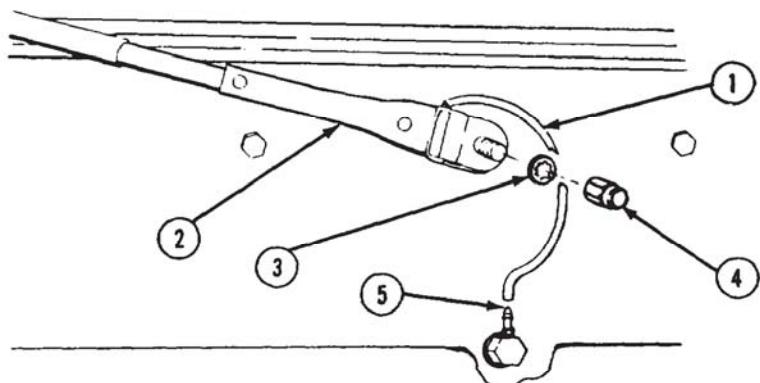


## Body Accessory Maintenance Instructions (Cont)

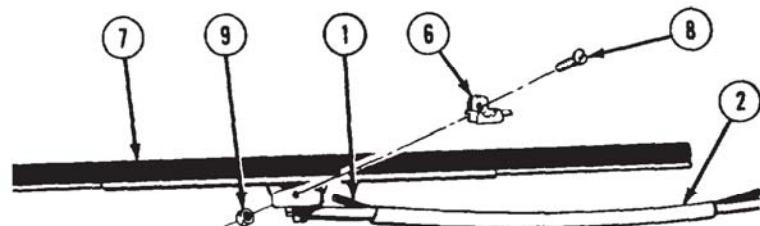
**b. Installation****NOTE**

Installation procedure is the same for both wipers.

- (1) Install hose (1) in wiper arm (2).
- (2) Install wiper arm (2) with lockwasher (3) and nut (4). Tighten nut to 90 to 110 in-lb (10.2 to 12.4 Nom).
- (3) Connect hose (1) to nipple (5).
  
- (4) Install nozzle (6) on hose (1).
- (5) Install wiper blade (7) and nozzle (6) on wiper arm (2).

**NOTE**

Do not overtighten locknut. Tighten locknut enough to allow for movement of blade in bracket without excessive play.



- (6) Install screw (8) and locknut (9).

**C. Follow-On Maintenance.** Check operation of wiper arm (TM 9-2320-279-10).

**END OF TASK**

<b>18-3. WINDSHIELD WIPER MOTOR REMOVAL/INSTALLATION.</b>
---

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

<b>INITIAL SETUP</b>
----------------------

**Models**

All

**References**

None

**Test Equipment**

None

**Equipment Condition**

**TM or Para**      **Condition Description**

TM 9-2320-279-10 Shut off engine.

TM 9-2320-279-10 Air system drained.

Para 18-2

Windshield wiper blade and arm removed.

**Special Tools**

None

**Supplies**

Adhesive-Sealant, silicone RTV, general purpose, Item 4, Appendix C

Compound, sealing, pipe thread, Item 18, Appendix C

Tag, identification, Item 48, Appendix C

**Personnel Required**

MOS 63S, Heavy wheel vehicle mechanic

**Special Environmental Conditions**

None

**General Safety Instructions**

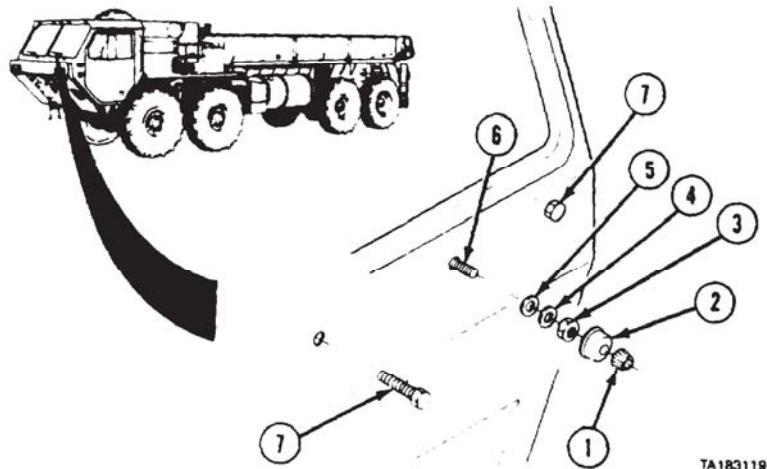
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## Body Accessory Maintenance Instructions (Cont)

**18-3. WINDSHIELD WIPER MOTOR REMOVAL/INSTALLATION (CONT.).****a. Removal.****NOTE**

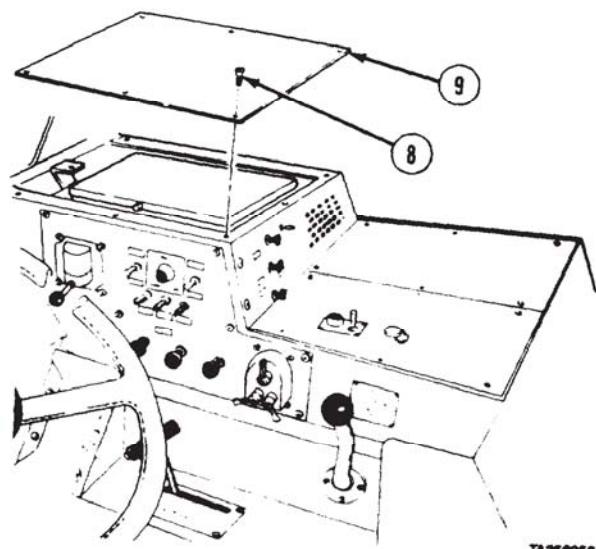
Roth windshield wipers are removed in a similar manner.

- (1) Remove splined drive cone (1), rubber boot (2), nut (3), washer (4), and seal washer (5) from wiper motor shaft (6).
- (2) Remove two screws (7).



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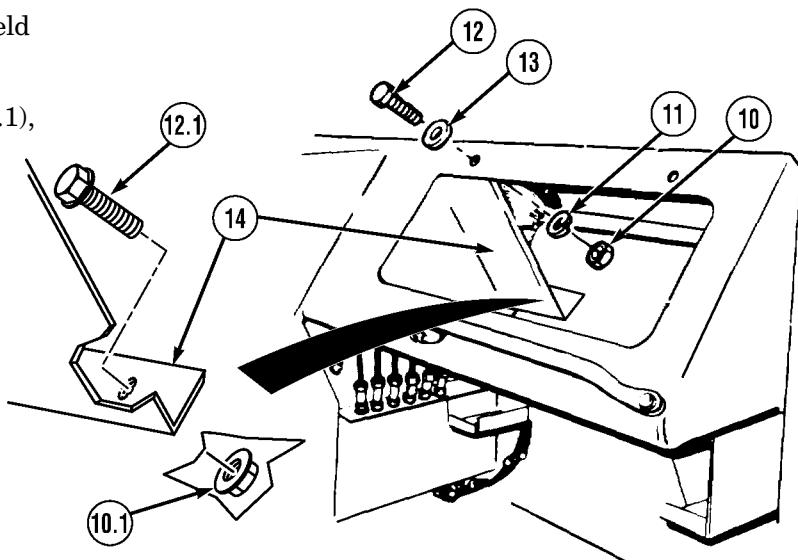
- (3) Remove eight screws (8) and heater cover (9).



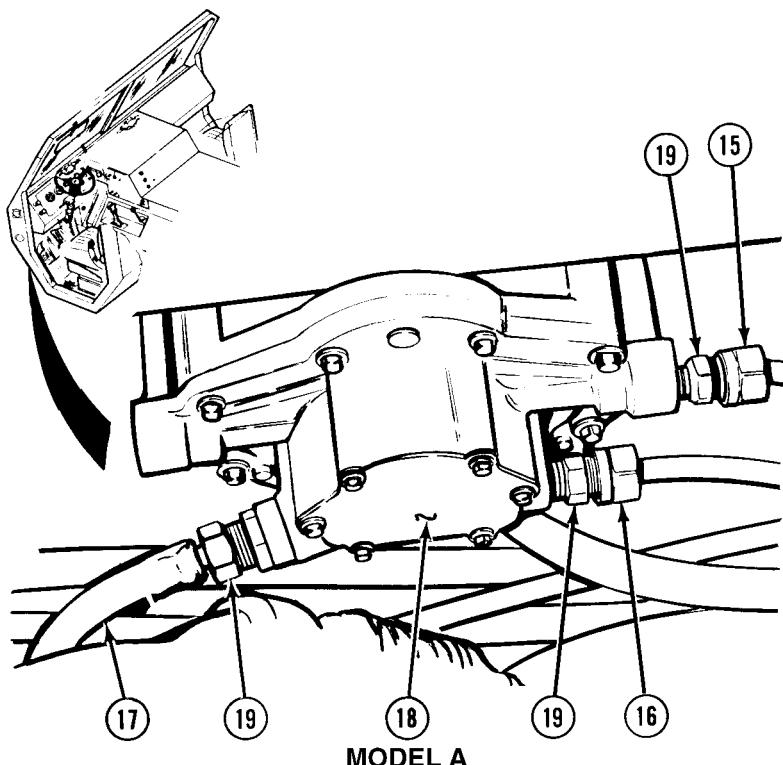
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**M978 Tanker Maintenance Instructions (Cont)****NOTE**

- Do step (4) for right windshield wiper motor only.
- Not all vehicles have nut (10.1), screw (12.1), or washer (13).
- (4) Remove nuts (10 and 10.1), lockwasher (11), screws (12 and 12.1), and washer (13) to remove defroster tube guard (14).

**NOTE**

- Tag and mark hoses before removal. There are different markings on the Model B motor. PK is the same as Park and IN is the same as Run.
- There are two kinds of wiper motors. Model A has two hoses on the right side. Model B has hoses on the bottom. Both are removed the same way. If a Model A motor must be replaced with a Model B motor, then the control valve must be changed also. Refer to TM 9-2320-279-24P for proper identification of parts.
- Air hoses for Model A may not be long enough for Model B. If hoses are not long enough, refer to Appendix F and TM 9-2320-279-24P for proper identification of parts.



- (5) Disconnect airhoses (15 and 16) and rubber hose (17) from motor (18).
- (6) Remove motor (18).
- (7) Mark location of three fittings (19) and remove three fittings (19) from motor (18).



## Body Accessory Maintenance instructions (Cont)

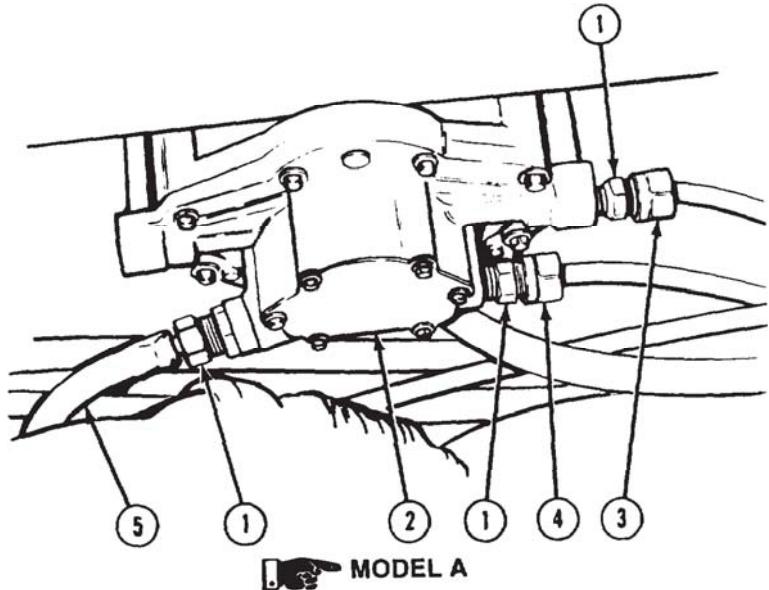
*b. Installation.***WARNING**

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

**NOTE**

- There are two kinds of wiper motors. Model A has two hoses on the right side. Model B has hoses on the bottom. Both are removed the same way. If a Model A motor must be replaced with a Model B motor, then the control valve must be changed also. Refer to TM 9-2320-279-24P for proper identification of parts.
- Air hoses for Model A may not be long enough for Model B. If hoses are not long enough refer to Appendix F and TM 9-2320-279-24P for proper identification of parts.
- Do steps (1) through (3) for Model A. Do steps (3.1) through (3.3) for Model B.

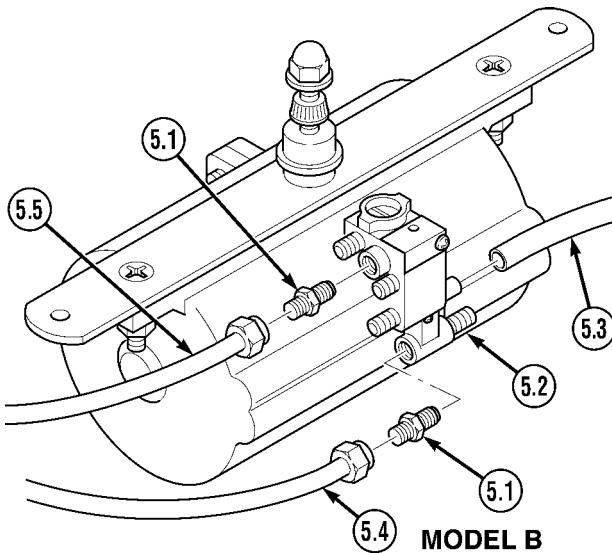
- (1) Coat threads of fittings (1) with pipe thread sealing compound and install fittings in motor (2).
- (2) Position motor (2).
- (3) Connect air hoses (3 and 4) and rubber hose (5) to motor (2).



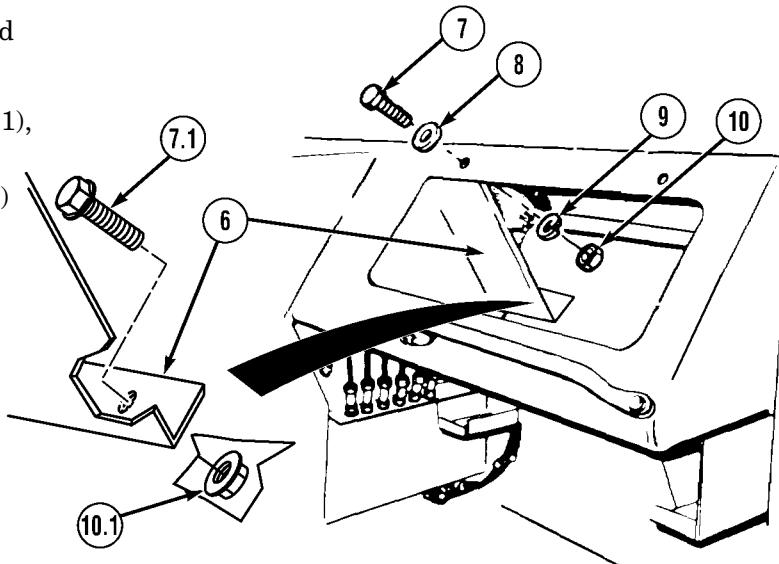
## Body Accessory Maintenance Instructions (Cont)

**18-3. WINDSHIELD WIPER MOTOR REMOVAL/INSTALLATION (CONT).**

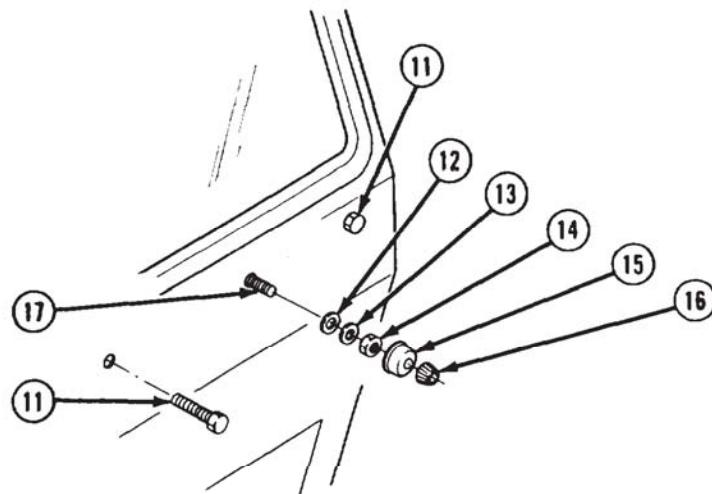
- (3.1) Coat threads of fittings (5.1) with pipe thread sealing compound and install fittings in motor (5.2).
- (3.2) Connect rubber hose (5.3) and air hoses (5.4) and (5.5) to motor (5.2).
- (3.3) Position motor (5.2).

**NOTE**

- Do step (4) for right windshield wiper motor only.
  - Not all vehicles have screw (7.1), washer (8), or nut (10.1).
- (4) Install defroster tube guard (6) with screws (7 and 7.1), washer (8), lockwasher (9), and nuts (10 and 10.1).



## Body Accessory Maintenance Instructions (Cont)

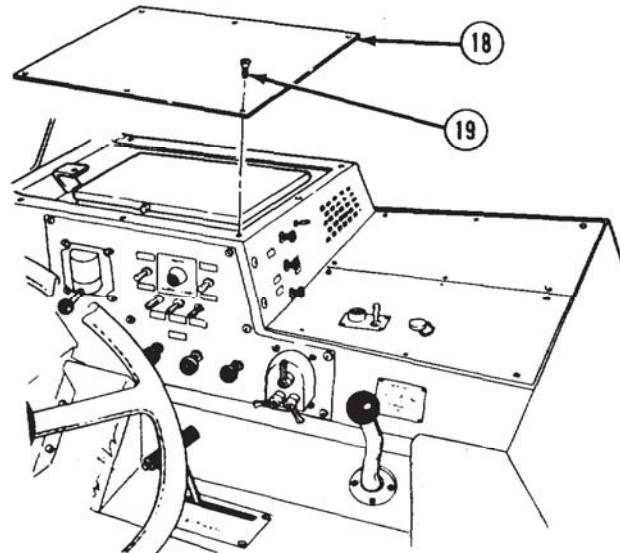


- (5) Attach motor to vehicle with two screws (11) and apply adhesive-sealant.
- (6) Install seal washer (12), washer (13), and nut (14). Tighten nut to 140 to 180 in-lb. (15.8 to 20.34 N·m).
- (7) Install rubber boot (15) and splined drive cone (16) on motor shaft (17).
- (8) Install heater cover (18) with eight screws (19).

*c. Follow-on Maintenance.*

- (1) Install windshield wiper blade and arm (para 18-20).
- (2) Install instrument panel (para 7-19) (left windshield wiper motor only).
- (3) Connect batteries (para 7-91).
- (4) Start engine and build up air pressure to 90 psi (621 kPa) (TM 9-2320-279-10).
- (5) Operate wipers and check connections for air leaks.

**END OF TASK**



## Body Accessory Maintenance Instructions (Cont)

**18-4. WINDSHIELD WASHER RESERVOIR, HOSES, AND NOZZLES  
REMOVAL/INSTALLATION.**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*

TM or Para

*Condition Description*

Para 7-91

Batteries disconnected.

*Special Tools*

None

*Supplies*

Tag, identification, Item 48, Appendix C

*Special Environmental Conditions*

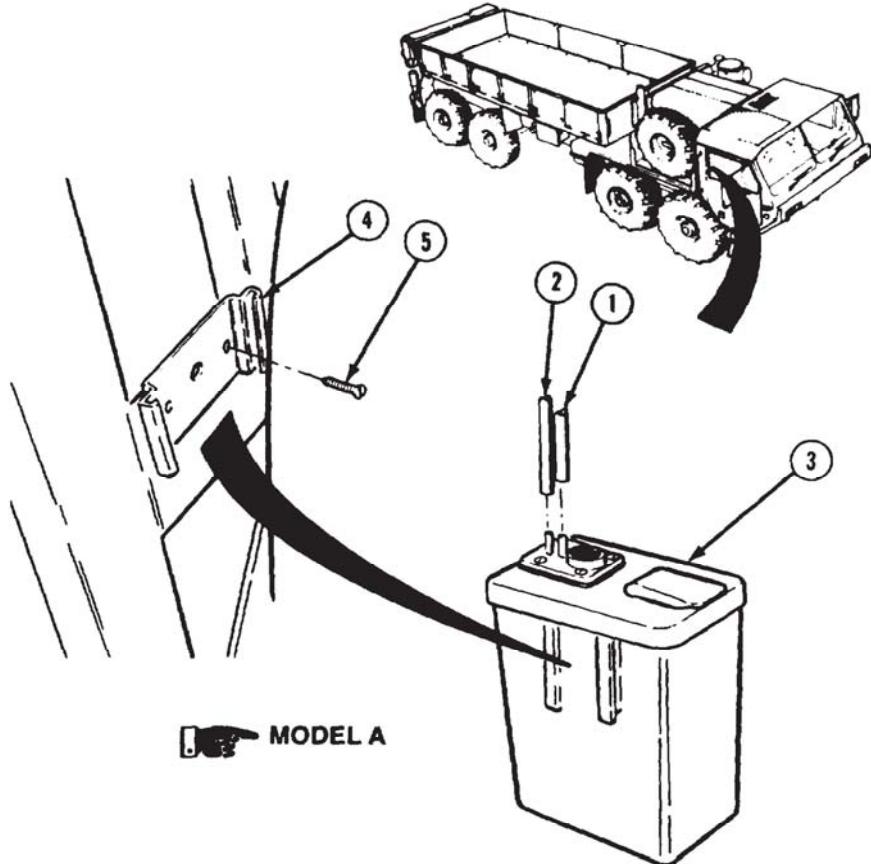
None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic (2)

*General Safety Instructions*

None

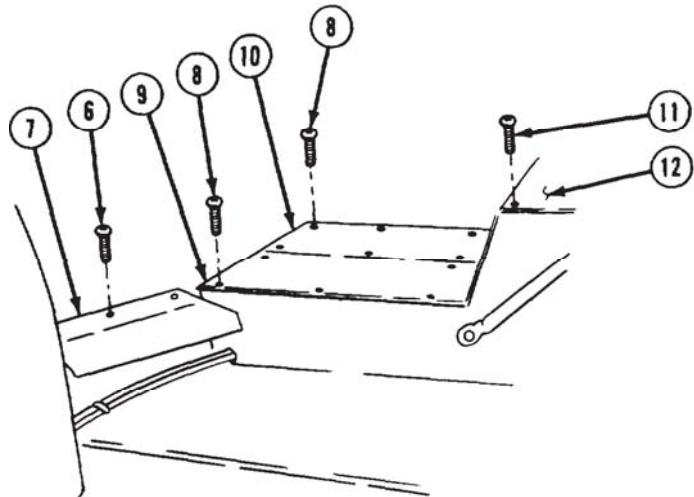
**a. Removal.**

## Body Accessory Maintenance Instructions (Cont)

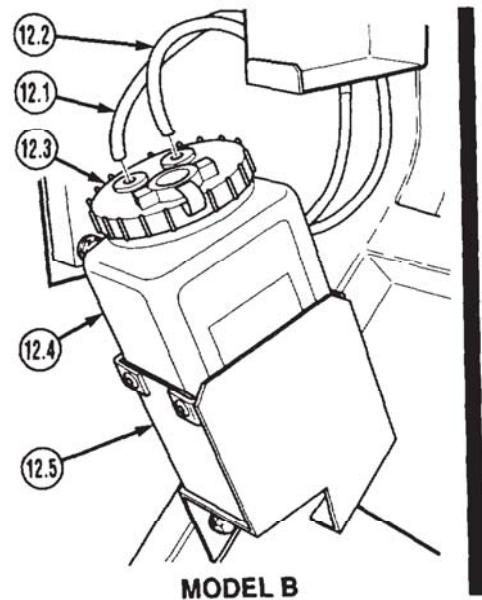
## NOTE

- The Model B windshield washer reservoir is mounted under the dash on the left side of the passenger seat. If a Model A reservoir must be replaced by a Model B reservoir, the control valve must be replaced and the hoses rerouted in front of heater and around to control valve.
- Tag and mark hoses before removal.
- For Model A, do steps (1) through (7).
- For Model B, do steps (7.1) through (7.4).

- (1) Remove air hose (1) and fluid hose (2) from top of reservoir (3).
- (2) Remove reservoir (3) from bracket (4).
- (3) Remove two screws (5) and bracket (4).
- (4) Remove three screws (6) and hose cover panel (7).
- (5) Remove 11 screws (8) from right heater compartment cover (9) and left heater compartment cover (10).
- (6) Remove right heater compartment cover (9) and left heater compartment cover (10).
- (7) Remove eight screws (11) and heater compartment cover (12).



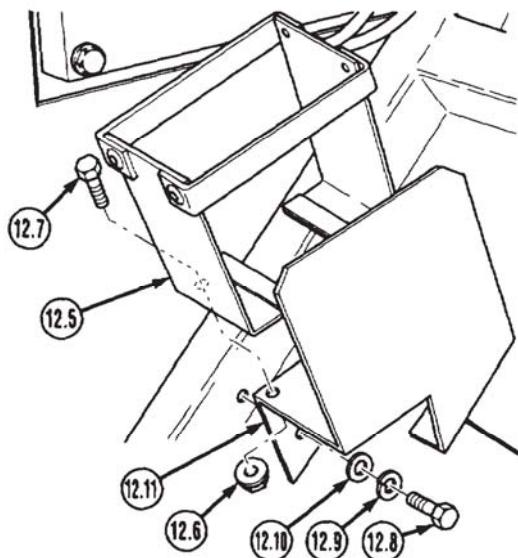
- (7.1) Remove fluid hose (12.1) and air hose (12.2) from top of reservoir (12.3).
- (7.2) Remove reservoir (12.4) from bracket (12.5).



Body Accessory Maintenance Instructions (Cont)

**18-4. WINDSHIELD WASHER RESERVOIR, HOSES, AND NOZZLES  
REMOVAL/INSTALLATION (CONT).**

- (7.3) Remove three locknuts (12.6), three screws (12.7), and bracket (12.5).
- (7.4) Remove two screws (12.8), two lockwashers (12.9), two washers (12.10), and bracket (12.11).

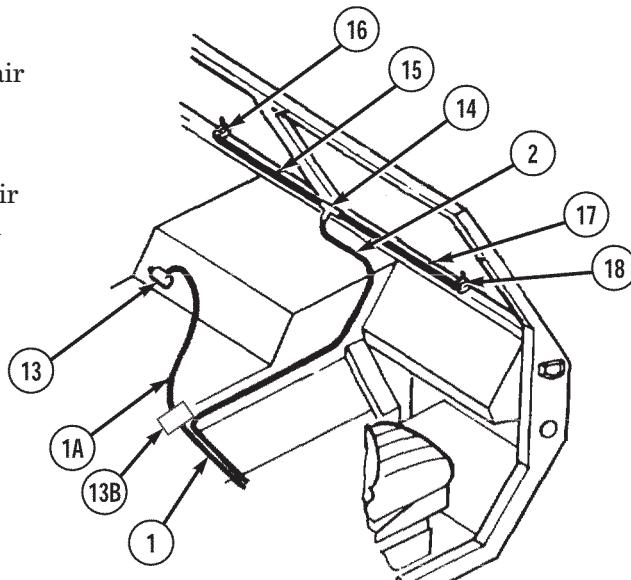


## Body Accessory Maintenance Instructions (Cont)

## NOTE

- Vehicles are equipped with either air controlled wipers or 24V electric wipers.
- Perform step (8) on vehicles with air controlled wipers, and step (8.1) on vehicles with 24V electric wipers.
- (8) Remove air hose (1A) from washer control valve (13).

(8.1) Remove air hose (1A) from windshield washer solenoid (13A).



AIR CONTROLLED WIPERS

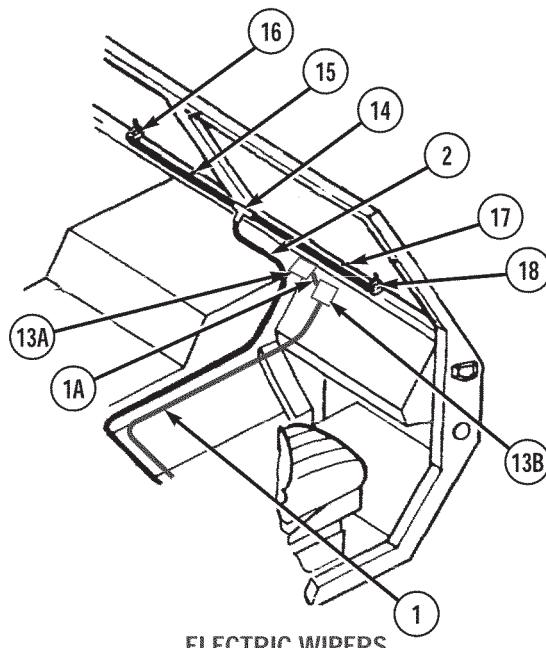
(8.2) Remove air hose (1A) from pressure relief valve (13B).

(8.3) Remove pressure relief valve (13B) from air hose (1).

(9) Remove fluid hose (2) from T-fitting (14).

(10) Remove hose (15) from T-fitting (14) and left nozzle (16).

(11) Remove hose (17) from T-fitting (14) and right nozzle (18).



ELECTRIC WIPERS

## Body Accessory Maintenance Instructions (Cont)

**18-4. WINDSHIELD WASHER RESERVOIR, HOSES, AND NOZZLES  
REMOVAL/INSTALLATION (CONT).**
**CAUTION**

Use care when removing nozzles.  
Excessive force may damage nozzle.

- (12) Soldier A holds left nozzle (16) in place while Soldier B removes nut (19) from left nozzle.
- (13) Remove left nozzle (16) and gasket (20). Remove hose (21) from left nozzle.
- (14) Soldier A holds right nozzle (18) in place while soldier B removes nut (22) from right nozzle.
- (15) Remove right nozzle (18) and gasket (23). Remove hose (24) from right nozzle.

## b. Installation.

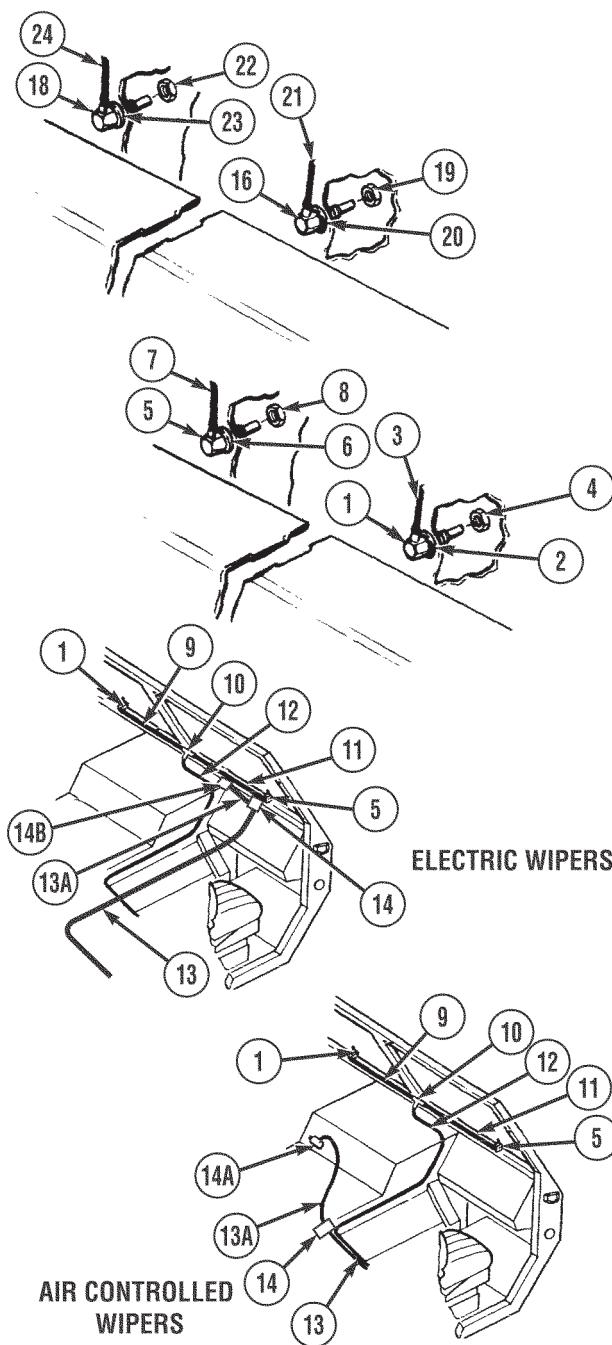
**CAUTION**

Use care when installing nozzles.  
Excessive force may damage nozzle.

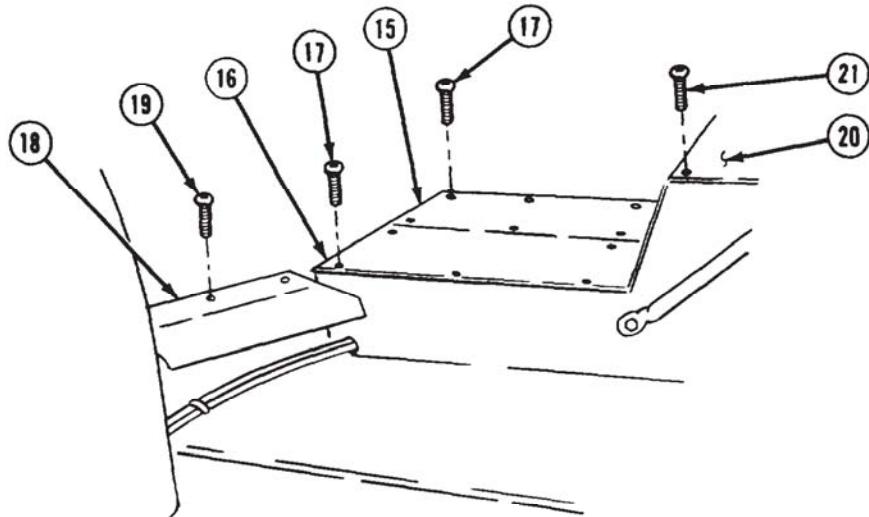
- (1) Soldier A installs left nozzle (1), gasket (2), and hose (3).
- (2) Soldier A holds left nozzle (1) in place while Soldier B installs nut (4) on left nozzle.
- (3) Soldier A installs right nozzle (5), gasket (6), and hose (7).
- (4) Soldier A holds right nozzle (5) in place while Soldier B installs nut (8) on right nozzle.
- (5) Install hose (9) on T-fitting (10) and left nozzle (1).
- (6) Install hose (11) on T-fitting (10) and right nozzle (5).
- (7) Install fluid hose (12) on T-fitting (10).
- (8) Install air hose (13) on pressure relief valve (14).
- (8.1) Install pressure relief valve (14) on air hose (13A).

**NOTE**

- Vehicles are equipped with either air controlled wipers or 24V electric wipers.
  - Perform step (8.2) on vehicles with air controlled wipers, and step (8.3) on vehicles with 24V electric wipers.
- (8.2) Install air hose (13A) on washer control valve (14A).
  - (8.3) Install air hose (13A) on windshield washer solenoid (14B).

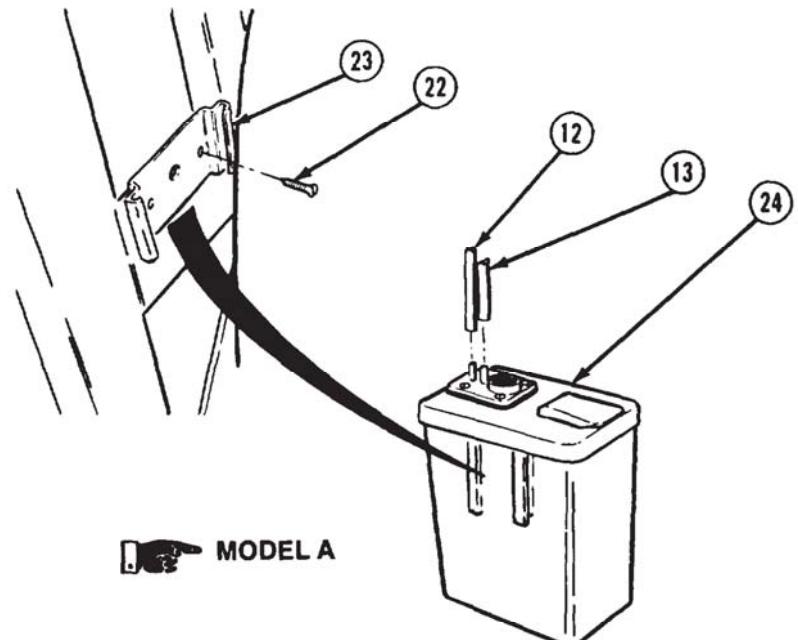


## Body Accessory Maintenance Instructions (Cont)

**NOTE**

For Model A do steps (9) thru (14). For Model B do steps (15) thru (18).

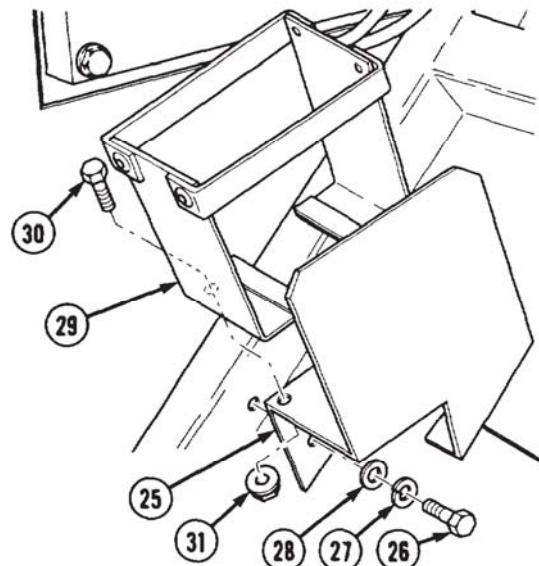
- (9) Install left heater compartment cover (15) and right heater compartment cover (16) with 11 screws (17).
- (10) Install hose cover panel (18) with three screws (19).
- (11) Install heater compartment cover (20) with eight screws (21).
- (12) Install two screws (22) and bracket (23).
- (13) Install reservoir (24) in bracket (23).
- (14) Install air hose (13) and fluid hose (12) on reservoir (24).





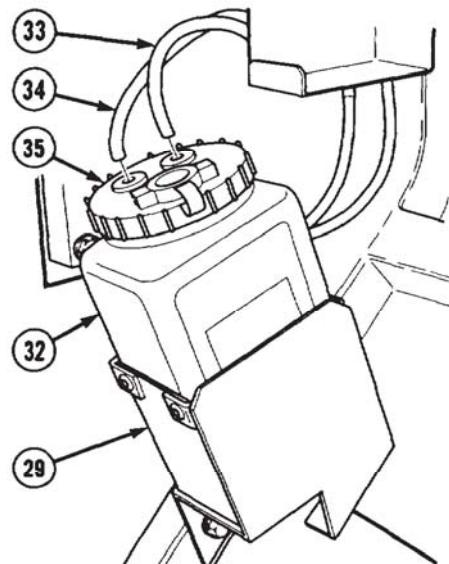
## Body Accessory Maintenance Instructions (Cont)

- (15) Install bracket (25) with two screws (26), two lockwashers (27), and two washers (28).
- (16) Install bracket (29) with three screws (30) and three locknuts (31).



MODEL B

- (17) Install reservoir (32) in bracket (29).
- (18) Install air hose (33) and fluid hose (34) on top (35) of reservoir (32).



MODEL B

c. *Follow-on Maintenance.*

- (1) Fill washer reservoir with windshield washer fluid (LO 9-2320-279-12).
- (2) Connect batteries (para 7-91).
- (3) Check operation of windshield washer (TM 9-2320-279-10).

END OF TASK

## Body Accessory Maintenance Instructions (Cont)

**18-5. WINDSHIELD WASHER ASSEMBLY REPAIR (MODEL A).**

This task covers:

- a. Disassembly
- b. Cleaning/Inspection
- c. Assembly
- d. Follow-on Maintenance

**INITIAL SETUP****Models**

All

**References**

None

**Test Equipment**

None

**Equipment Condition****TM or Para****Condition Description**

Para 18-4

Windshield washer assembly  
(removed and empty) on clean  
work surface.**Special Tools**

None

**Special Environmental Conditions**

None

**Supplies**

None

**General Safety Instructions**

None

**Personnel Required**

MOS 63S, Heavy wheel vehicle mechanic

**a. Disassembly.**

- (1) Remove washer cover (1) from washer jar (2).
- (2) Remove pump (3), two hoses (4), and hose (5).
- (3) Remove gaskets (6 and 7).

**b. Cleaning/Inspection.**

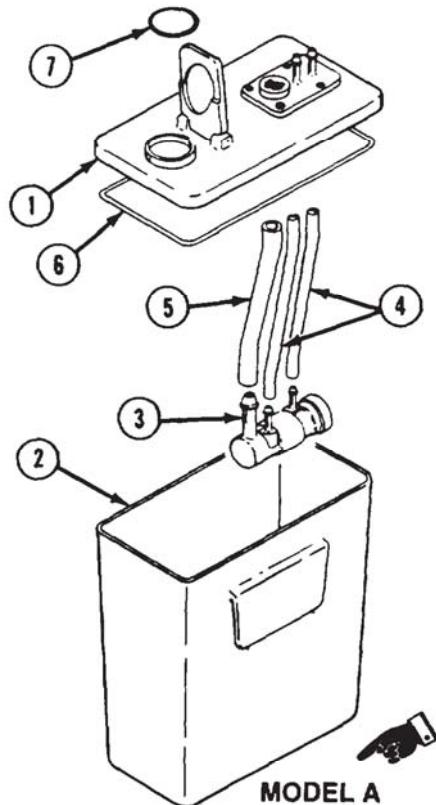
- (1) Using water, rinse sediment from bottom of washer jar and from pump screen.
- (2) Inspect to make sure hoses are not cracked or plugged and that hoses fit firmly on cover and pump.
- (3) Inspect cover and washer jar for cracks and other damage.
- (4) Inspect for damaged or missing sections of gaskets.

**c. Assembly.**

- (1) Install gaskets (6 and 7) in washer cover (1).
- (2) Install two hoses (4) and hose (5) to washer cover (1) and pump (3).
- (3) Install pump (3).
- (4) Install washer cover (1) on washer jar (2).

**d. Follow-on Maintenance.**

- (1) Install and fill windshield washer assembly with fluid (para 18-4).
- (2) Check operation of windshield washer (TM 9-2320-279-10).

**END OF TASK**

## Body Accessory Maintenance Instructions (Cont)

**18-5.1 WINDSHIELD WASHER ASSEMBLY REPAIR (MODEL B).**

This task covers:

- a. Disassembly
- b. Cleaning/Inspection
- c. Assembly
- d. Follow-on Maintenance

**INITIAL SETUP**

<i>Models</i>	<i>References</i>
All	None
<i>Test Equipment</i>	<i>Equipment Condition</i>
None	TM or Para
<i>Special Tools</i>	<i>Condition Description</i>
None	Para 18-4
<i>Supplies</i>	<i>Windshield washer assembly (removed and empty) on clean work surface.</i>
None	None
<i>Personnel Required</i>	<i>Special Environmental Conditions</i>
MOS 63S, Heavy wheel vehicle mechanic	None
	<i>General Safety Instructions</i>
	None

**a. Disassembly.**

- (1) Remove washer cover (1) from washer jar (2).
- (2) Remove pump (3), two hoses (4 and 5), and two connectors (6).
- (3) Remove two grommets (7) and umbrella valve (8) from cover (9).

**b. Cleaning/Inspection.**

- (1) Using water, rinse sediment from bottom of washer jar and from pump screen.
- (2) Inspect to make sure hoses are not cracked or plugged and that hoses fit firmly on **cover** and pump.
- (3) Inspect cover and washer jar for cracks and other damage.
- (4) Inspect for damaged or missing sections of gaskets.

**c. Assembly.**

- (1) Install umbrella valve (8), two grommets (7), and hoses (4) and (5) into cover (9).
- (2) Install pump (3) and two connectors (6) on hoses (4) and (5).
- (3) Install washer cover (1) on washer jar (2).

**d. Follow-on Maintenance.**

- (1) Install and fill windshield washer assembly with fluid (para 18-4).
- (2) Check operation of windshield washer (TM 9-2320-279-10).

**END OF TASK**



## Body Accessory Maintenance Instructions (Cont)

## Section III. SAFETY ACCESSORIES

**18-6. AIR HORN CONTROL VALVE REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
TM 9-2320-279-10	Shut off engine.
TM 9-2320-279-10	Air system drained.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*Compound, sealing, pipe thread, Item 18,  
Appendix C*General Safety Instructions*

Tags, identification, Item 48, Appendix C

None

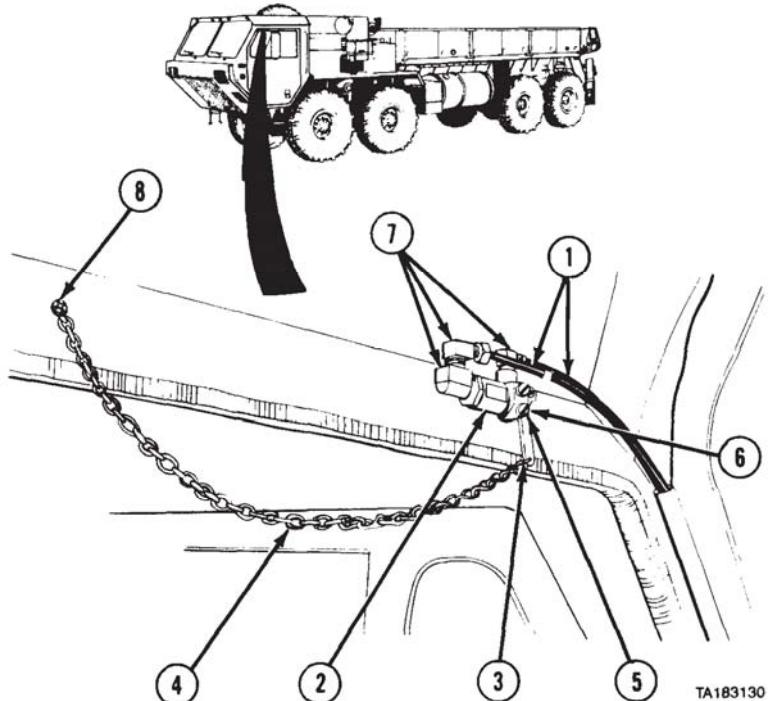
*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

**a. Removal.****NOTE**

Tag and mark air lines before removal.

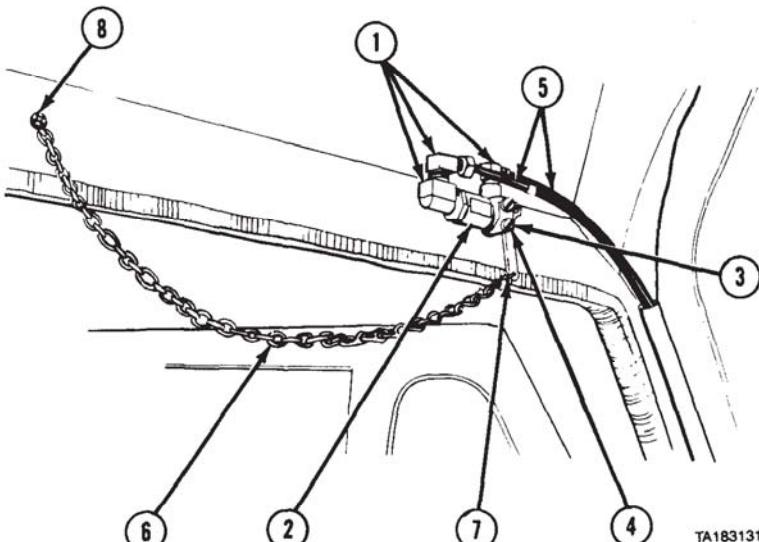
- (1) Disconnect two air lines (1) from valve (2).
- (2) Spread link (3) and disconnect chain (4) from valve (2).
- (3) Remove two screws (5) and lockwashers (6) and remove valve (2).
- (4) Remove fittings (7) from valve (2).
- (5) Remove screw (8) and chain (4).



## Body Accessory Maintenance Instructions (Cont)

**18-6. AIR HORN CONTROL VALVE REMOVAL/INSTALLATION (CONT).****b. Installation.****WARNING**

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



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- (1) Coat threads of fittings (1) with pipe thread sealing compound, and install fittings in valve (2).
- (2) Install valve (2) with two lockwashers (3) and screws (4).
- (3) Connect two air lines (5) to valve (2).
- (4) Attach chain (6) to valve (2) and close link (7).
- (5) Position chain (6) and install screw (8).

**c. Follow-on Maintenance.**

- (1) Start engine and build-up system air pressure to 90 psi (621 kPa) (TM 9-2320-279-10).
- (2) Check horn operation.
- (3) Check connections for leaks.
- (4) Shut off engine (TM 9-2320-279-10).

**END OF TASK**

## Body Accessory Maintenance Instructions (Cont)

**18-7. AIR HORN REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*

*TM or Para      Condition Description*

TM 9-2320-279-10 Shut off engine.

TM 9-2320-279-10 Air system drained.

Para 14-5 Skid plate grille removed.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

Compound, sealing, pipe thread, Item 18,  
Appendix C

*General Safety Instructions*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

## Body Accessory Maintenance Instructions (Cont)

**18-7. AIR HORN REMOVAL/INSTALLATION (CONT).****a. Removal.**

- (1) Disconnect air line (1) from fitting (2). Remove fitting.
- (2) Remove nut (3), washer (4), lockwasher (5), and screw (6) to remove ground wire (7) from bracket (8).
- (3) Remove nut (9) and washer (10). Remove horn (11) from bracket (8).

**b. Installation.**

- (1) Install horn (11) on bracket (8) with washer (10) and nut (9).
- (2) Connect ground wire (7) to bracket (8) with lockwasher (5), screw (6), washer (4), and nut (3).

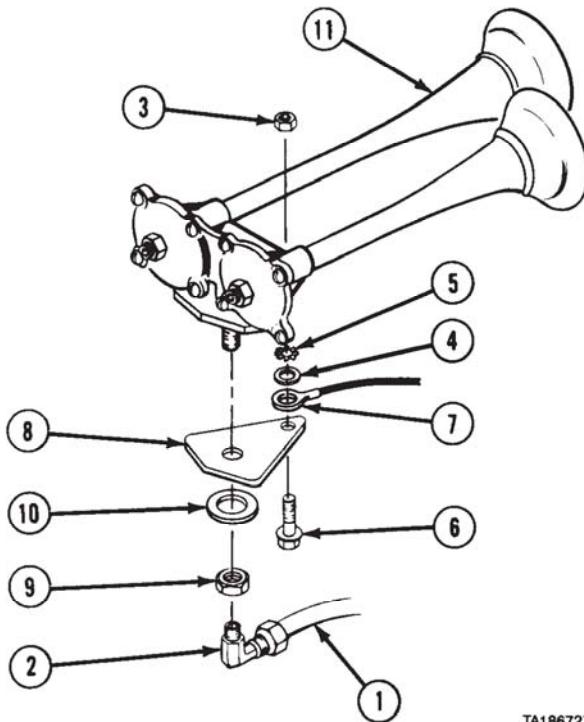
**WARNING**

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

- (3) Coat threads of fitting (2) with pipe thread sealing compound, and install fitting in horn (11).
- (4) Connect air line (1) to fitting (2).

**c. Follow-on Maintenance.**

- (1) Start engine and build up system air pressure to 90 psi (620 kPa) (TM 9-2320-279-10).
- (2) Check horn operation.
- (3) Check connections for leaks.
- (4) Shut off engine (TM 9-2320-279-10).
- (5) Install skid plate grille (para 14-5).

**END OF TASK**

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**Body Accessory Maintenance Instructions (Cont)**

<b>18-8. WINDSHIELD WASHER CONTROL VALVE REMOVAL/INSTALLATION.</b>	
This task covers:	
a. Removal b. Installation	c. Follow-on Maintenance
<b>INITIAL SETUP</b>	
<i>Models</i> All	<i>References</i> None
<i>Test Equipment</i> None	<i>Equipment Condition</i> TM or Para <i>Condition Description</i> TM 9-2320-279-10 Shut off engine. Para 7-91      Batteries disconnected. TM 9-2320-279-10 Air system drained.
<i>Special Tools</i> None	
<i>Supplies</i> Compound, sealing, pipe thread, Item 18, Appendix C Tag, identification, Item 48, Appendix C	<i>Special Environmental Conditions</i> None
<i>Personnel Required</i> MOS 638. Heavy wheel vehicle mechanic	<i>General Safety Instructions</i> None

**NOTE**

There are two kinds of washer control valves. Model A is used with the washer reservoir mounted behind the passenger seat. Model B is used with the washer mounted under the dash. If a Model A control valve must be replaced with a Model B control valve, the washer reservoirs must be changed also. Refer to TM 9-2320-279-24P for proper identification of parts.

## Body Accessory Maintenance Instructions (Cont)

## 18-8. WINDSHIELD WASHER CONTROL VALVE REMOVAL/INSTALLATION (CONT).

*a. Removal.*

- (1) Remove eight screws (1) and panel (2).

**NOTE**

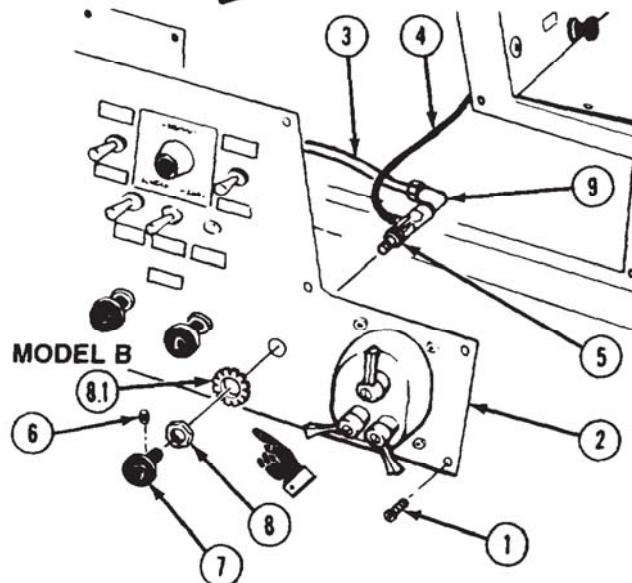
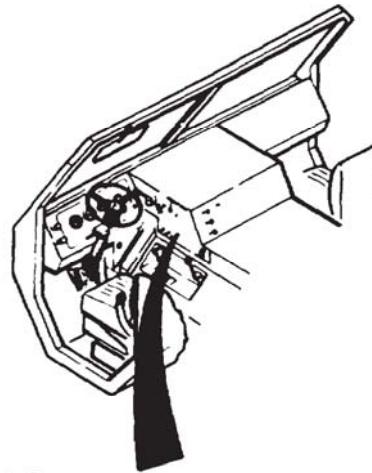
Tag and mark air lines before removal.

- (2) Disconnect air lines (3 and 4) from windshield washer control valve (5).  
 (3) Loosen screw (6) and remove knob (7).

**NOTE**

There are two models of windshield washer control valves. Model A has no lockwasher. Model B uses a lockwasher. Do step (4) for Model A. Do step (4.1) for Model B.

- (4) Remove nut (8) and pull windshield washer control valve (5) out of panel (2).  
 (4.1) Remove nut (8) and lockwasher (8.1) and pull windshield washer control valve (5) out of panel (2).  
 (5) Remove elbow (9) from windshield washer control valve (5).

*b. Installation***WARNING**

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

**NOTE**

There are two kinds of washer control valves. Model A is used with the washer reservoir mounted behind the passenger seat. Model B is used with the washer mounted under the dash. If a Model A control valve must be replaced with a Model B control valve, the washer reservoirs must be changed also. Refer to TM 9-2320-279-24P for proper identification of parts.

- (1) Coat threads of elbow (9) with pipe thread sealing compound and install elbow in windshield washer control valve (5).

**NOTE**

Do step (2) for Model A. Do step (2.1) for Model B.

- (2) Position windshield washer control valve (5) in panel (2). Install and tighten nut (8).  
 (2.1) Install windshield washer control valve (5) in panel (2) with lockwasher (8.1) and nut (8).  
 (3) Install knob (7) on windshield washer control valve (5) and tighten screw (6).

**Body Accessory Maintenance Instructions (Cont)**

- (4) Connect air lines (3 and 4).
- (5) Install panel (2).
- (6) Install and tighten eight screws (1).

**c. Follow-on Maintenance.**

- (1) Connect batteries (para 7-91).
- (2) Start engine and build up air pressure (TM 9-2320-279-10).
- (3) Check for air leaks.
- (4) Check operation of windshield washer control valve (TM 9-2320-279-10).
- (5) Shut off engine (TM 9-2320-279-10).

**END OF TASK**

<b>18-9. LEFT AND RIGHT WINDSHIELD WIPER CONTROL VALVE REMOVAL INSTALLATION.</b>	
This task covers:	
a. Removal	c. Follow-on Maintenance
b. Installation	
<b>INITIAL SETUP</b>	
<i>Models</i>	<i>References</i>
All	None
<i>Test Equipment</i>	<i>Equipment Condition</i>
None	TM or Para <i>Condition Description</i> TM 9-2320-279-10 Shut off engine.
<i>Special Tools</i>	Para 7-91                    Batteries disconnected. TM 9-2320-279-10 Air system drained.
<i>Supplies</i>	<i>Special Environmental Conditions</i>
Compound, sealing, pipe thread, Item 18, Appendix C	None
Tags, identification, Item 48, Appendix C	
<i>Personnel Required</i>	<i>General Safety Instructions</i>
MOS 63S. Heavy wheel vehicle mechanic	None

**NOTE**

There are two kinds of washer control valves. Model A pulls out to start wipers. Model B turns clockwise to start wipers. If a Model A control valve must be replaced with a Model B control valve, the wiper motor for that valve and some fittings must be replaced also. Refer to TM 9-2320-279-24P for proper identification of parts.

## Body Accessory Maintenance Instructions (Cont)

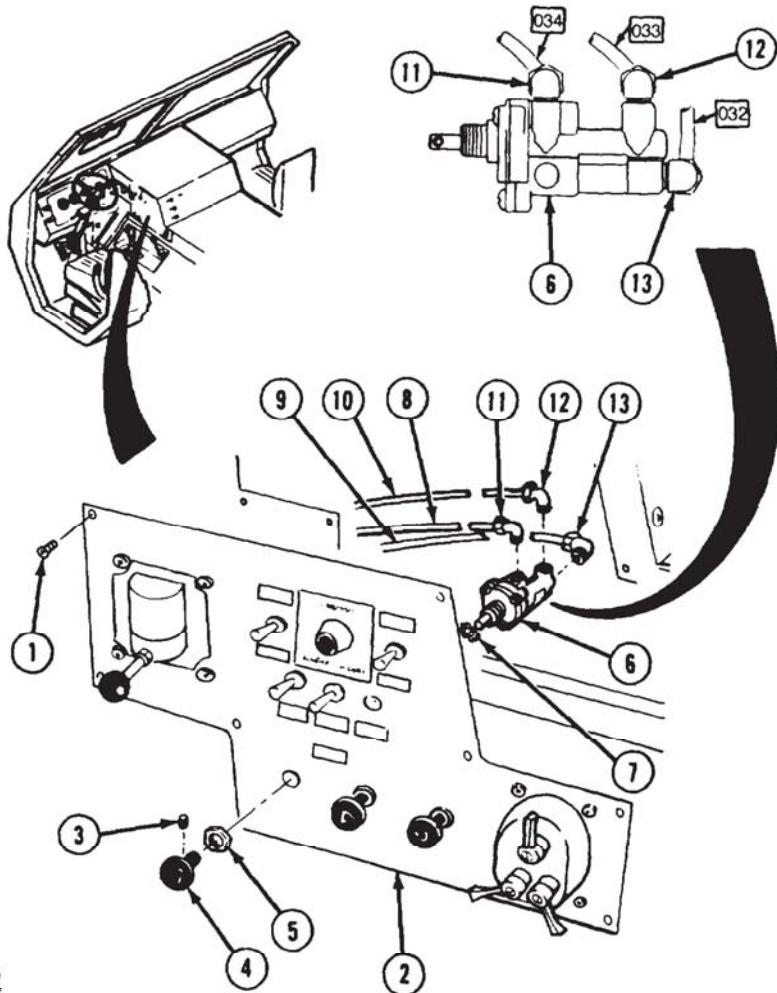
**18.9. LEFT AND RIGHT WINDSHIELD WIPER CONTROL REMOVAL/INSTALLATION (CONT.)****a. Removal.**

- (1) Remove screws (1) and remove side panel (2).
- (2) Loosen screw (3) and remove knob (4).
- (3) Remove nut (5), wiper valve (6) and lockwasher (7) from side panel (2).

**NOTE**

Tag and mark air lines before removal.

- (4) Disconnect three air lines (8, 9, and 10).
- (5) Remove elbows (11, 12, and 13) from wiper valve (6).

**b. Installation.****WARNING**

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

**NOTE**

There are two kinds of washer control valves. Model A pulls out to start wipers. Model B turns clockwise to start wipers. If a Model

A control valve must be replaced with a Model B control valve, the wiper motor for that valve and some fittings must be replaced also. Refer to TM 9-2302-279-24P for proper identification of parts.

- (1) Coat threads of elbows (13, 12, and 11) with pipe thread sealing compound and install elbows in wiper valve (6).
- (2) Connect air lines (10, 9, and 8).
- (3) Install wiper valve (6) and lockwasher (7) through side panel (2). Install and tighten nut (5).
- (4) Install knob (4) and tighten screw (3).
- (5) Position side panel (2) with all wires behind panel.
- (6) Install screws (1).

**c. Follow-on Maintenance.**

- (1) Connect batteries (para 7-91).
- (2) Start engine and build up air pressure (TM 9-2320-279-10).
- (3) Check for leaks.
- (4) Check operation of wiper valve (TM 9-2320-279-10).
- (5) Shut off engine (TM 9-2320-279-10).

END OF TASK

## Body Accessory Maintenance Instructions (Cont)

**18-9.1. WINDSHIELD WASHER SOLENOID VALVE (24V) REMOVAL/INSTALLATION.****This task covers:**

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

**INITIAL SETUP****Models**

All

**Test Equipment**

None

**Special Tools**

None

**Supplies**

Compound, sealing, pipe thread, Item 18,  
Appendix C  
Tags, identification, Item 48, Appendix C

**Personnel Required**

MOS 63S, Heavy wheel vehicle mechanic

**References**

None

**Equipment Condition**

<i>TM or Para</i>	<i>Condition Description</i>
TM 9-2320-279-10	Shut off engine.
Para 7-91	Batteries disconnected.
TM 9-2320-279-10	Air system drained.

**Special Environmental Conditions**

None

**General Safety Instructions**

None

- a. Removal.

**NOTE**

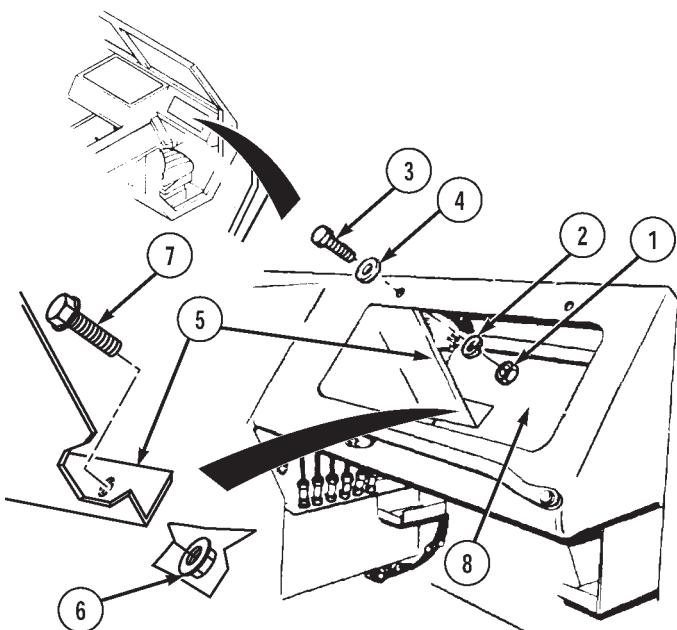
Solenoid valve is mounted on back side of defroster tube guard.

- (1) Remove nut (1), lockwasher (2), screw (3), and washer (4) from defroster tube guard (5).

**NOTE**

Not all vehicles have locknut (6) or screw (7).

- (2) Remove locknut (6), screw (7), and place defroster tube guard (5) inside glove box compartment (8).



## Body Accessory Maintenance Instructions (Cont)

## 18-9.1. WINDSHIELD WASHER SOLENOID VALVE (24V) REMOVAL/INSTALLATION (CONT).

## NOTE

Tag and mark lines and fittings prior to removal to ensure proper installation.

- (3) Loosen screw (9) and remove wiper/washer harness connector (10) from solenoid valve (11).
- (4) Remove air line (12) from elbow (13).
- (5) Remove exhaust hose (14) from elbow (15).
- (6) Remove two elbows (13 and 15) from solenoid valve (11).
- (7) Remove two screws (16), lockwashers (17), and solenoid valve (11) from defroster tube guard (5).

## b. Installation.

WARNING

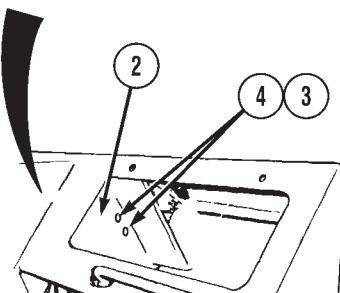
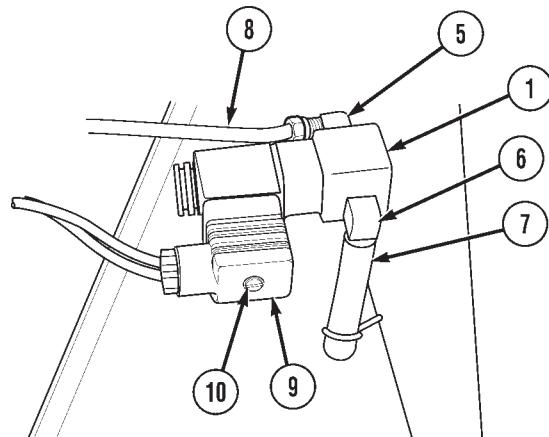
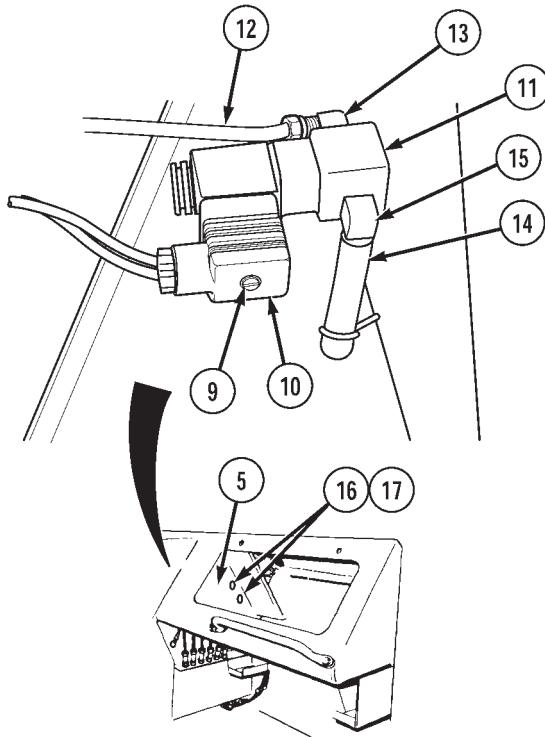
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (1) Install solenoid valve (1) on defroster tube guard (2) with two lockwashers (3) and screws (4).
- (2) Coat threads of two elbows (5 and 6) with sealing compound.

## NOTE

Install lines and fittings as noted prior to removal.

- (3) Install two elbows (5 and 6) on solenoid valve (1).
- (4) Install exhaust hose (7) on elbow (6).
- (5) Install air line (8) on elbow (5).
- (6) Connect wiper/washer harness connector (9) to solenoid valve (1) and tighten screw (10).

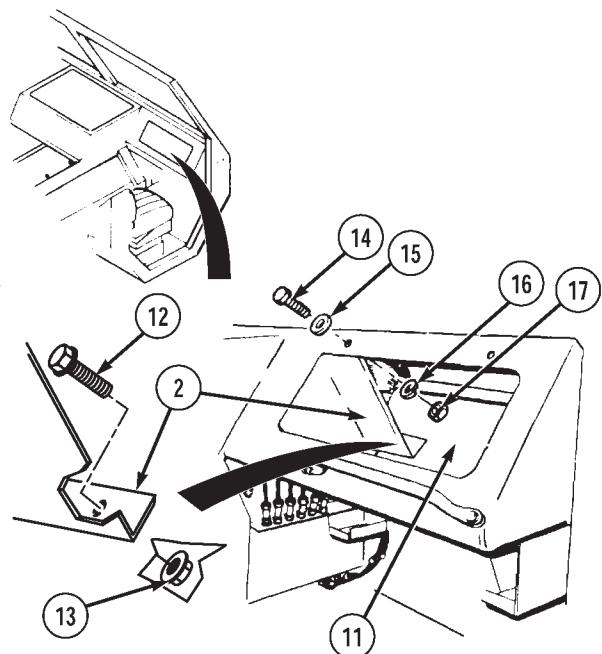


## Body Accessory Maintenance Instructions (Cont)

## NOTE

Not all vehicles have locknut (13) or screw (12).

- (7) Position defroster tube guard (2) inside glove box compartment (11) and install with screw (12), locknut (13), screw (14), washer (15), lockwasher (16), and nut (17).



## c. Follow-on Maintenance.

- (1) Connect batteries (para 7-91).
- (2) Start engine and build up air pressure (TM 9-2320-279-10).
- (3) Check for air leaks.
- (4) Shut off engine (TM 9-2320-279-10).

END OF TASK

## Body Accessory Maintenance Instructions (Cont)

**18-9.2. WINDSHIELD WIPER IDLER SHAFT REMOVAL/INSTALLATION.****This task covers:**

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

**INITIAL SETUP****Models**

All

**Test Equipment**

None

**Special Tools**

None

**Supplies**

None

**References**

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
TM 9-2320-279-10	Shut off engine.
Para 18-2	Windshield wiper blade and arm removed.
Para 7-19	Instrument panel removed (left idler shaft only).

*Special Environmental Conditions*

None

**Personnel Required**

MOS 63S, Heavy wheel vehicle mechanic

**General Safety Instructions**

None

**a. Removal.****NOTE**

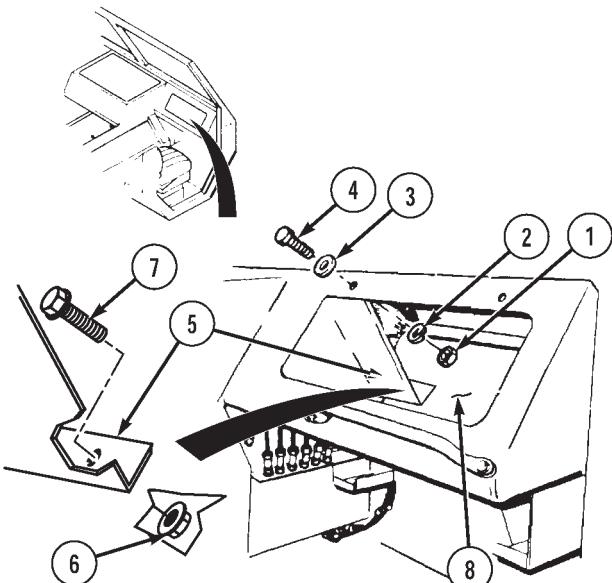
Do steps (1) and (2) for right side only.

- (1) Remove nut (1), lockwasher (2), washer (3), and screw (4) from defroster tube guard (5).

**NOTE**

Not all vehicles have locknut (6) or screw (7).

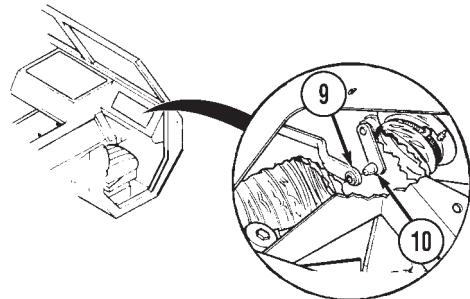
- (2) Remove locknut (6), screw (7), and place defroster tube guard (5) inside glove box compartment (8).



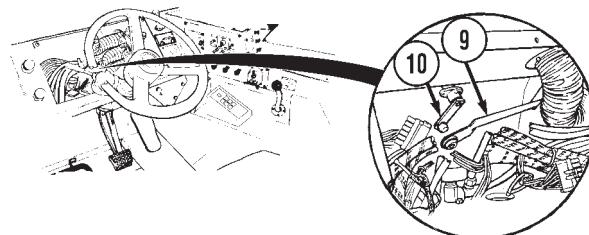
## Body Accessory Maintenance Instructions (Cont)

## NOTE

Conlinks are disconnected from idler shafts by prying off.



- (3) Disconnect two conlinks (9) from idler shafts (10).



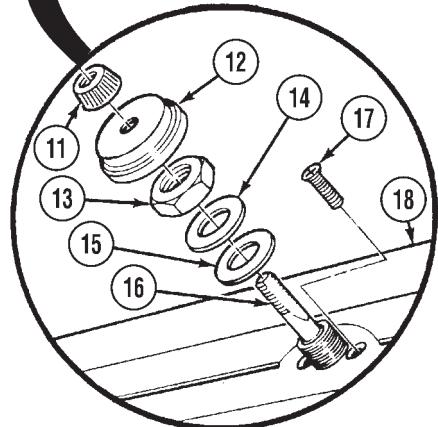
- (4) Remove splined drive cone (11), rubber boot (12), nut (13), washer (14), and seal washer (15) from idler shaft (16).



## NOTE

When screws are removed, idler shaft will drop to floor of cab.

- (5) Remove two screws (17) and idler shaft (16) from cab shell (18).



## Body Accessory Maintenance Instructions (Cont)

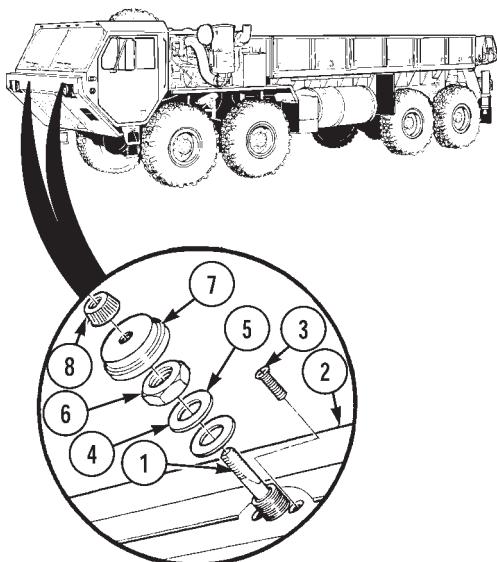
## 18-9.2. WINDSHIELD WIPER IDLER SHAFT REMOVAL/INSTALLATION (CONT).

## b. Installation.

## NOTE

Position idler shaft to stay in cab shell without support.

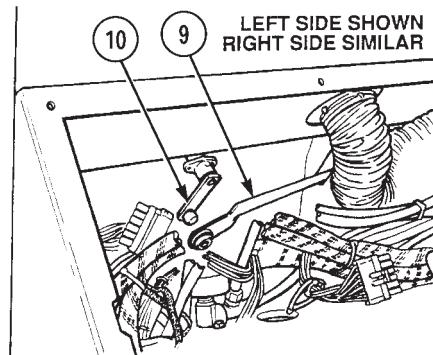
- (1) Install idler shaft (1) in cab shell (2) with two screws (3).
- (2) Install seal washer (4), washer (5), and nut (6) on idler shaft (1).
- (3) Install rubber boot (7) and splined drive cone (8) on idler shaft (1).



## NOTE

Conlinks are connected by snapping on idler shafts.

- (4) Connect two conlinks (9) on idler shafts (10).

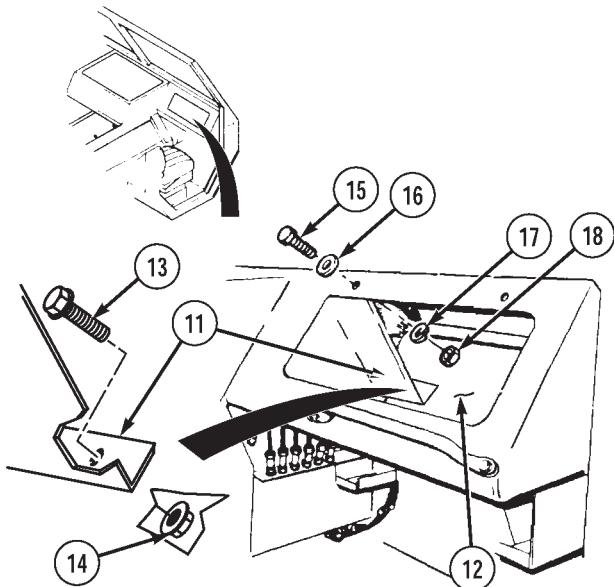


## Body Accessory Maintenance Instructions (Cont)

## NOTE

- Do steps (5) and (6) for right side only.
- Not all vehicles have locknut (14) or screw (13).

- (5) Position defroster tube guard (11) inside glove box compartment (12) and install with screw (13), locknut (14), screw (15), washer (16), lockwasher (17), and nut (18).



## c. Follow-on Maintenance.

- (1) Install windshield wiper blade and arm (para 18-2).
- (2) Install instrument panel (left idler shaft only) (para 7-19).
- (3) Check operation of wipers (TM 9-2320-279-10).

END OF TASK

## Body Accessory Maintenance Instructions (Cont)

**18-9.3. WINDSHIELD WIPER MOTOR (24V) REMOVAL/INSTALLATION.****This task covers:**

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

**INITIAL SETUP****Models**

All

**Test Equipment**

None

**Special Tools**

None

**Supplies**

None

**Personnel Required**

MOS 63S, Heavy wheel vehicle mechanic

**References**

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
TM 9-2320-279-10	Shut off engine.
Para 7-91	Batteries disconnected.
Para 7-19	Instrument panel removed.
Para 18-21	Heater assembly removed.

*Special Environmental Conditions*

None

**General Safety Instructions**

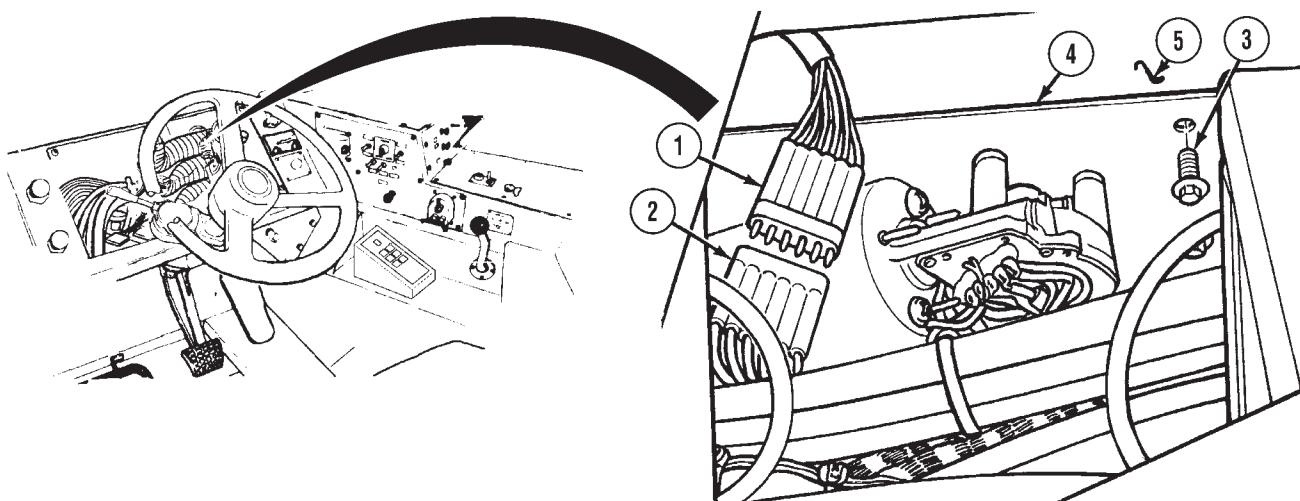
None

- a. Removal.

**NOTE**

Remove cable ties as required.

- (1) Disconnect windshield wiper/washer harness connector (1) from wiper motor connector (2).
- (2) Remove four screws (3) from wiper motor mounting plate (4) and bracket (5).



## Body Accessory Maintenance Instructions (Cont)

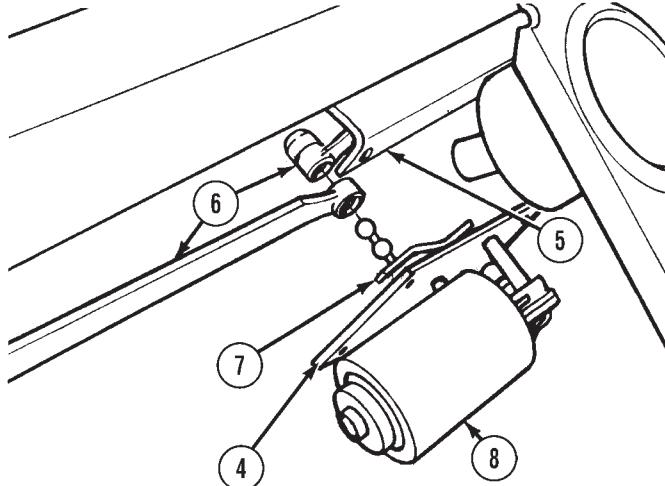
CAUTION

Conlinks are disconnected from crank assembly by prying arms off.

- (3) Disconnect two conlinks (6) from wiper motor crank assembly (7).

CAUTION

Do not remove windshield wiper motor from wiper motor mounting plate. Failure to comply may cause damage to equipment.



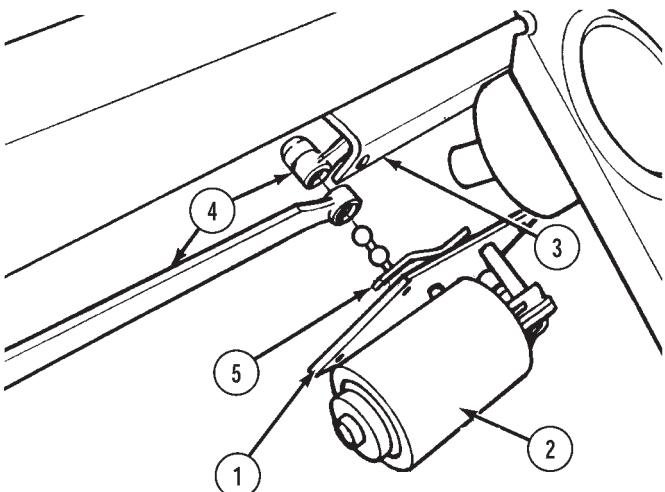
- (4) Remove wiper motor mounting plate (4) and windshield wiper motor (8) from bracket (5).

## b. Installation.

- (1) Position wiper motor mounting plate (1) and windshield wiper motor (2) on bracket (3).

NOTE

Left wiper arm is installed first.



- (2) Connect two conlinks (4) to wiper motor crank assembly (5).

## Body Accessory Maintenance Instructions (Cont)

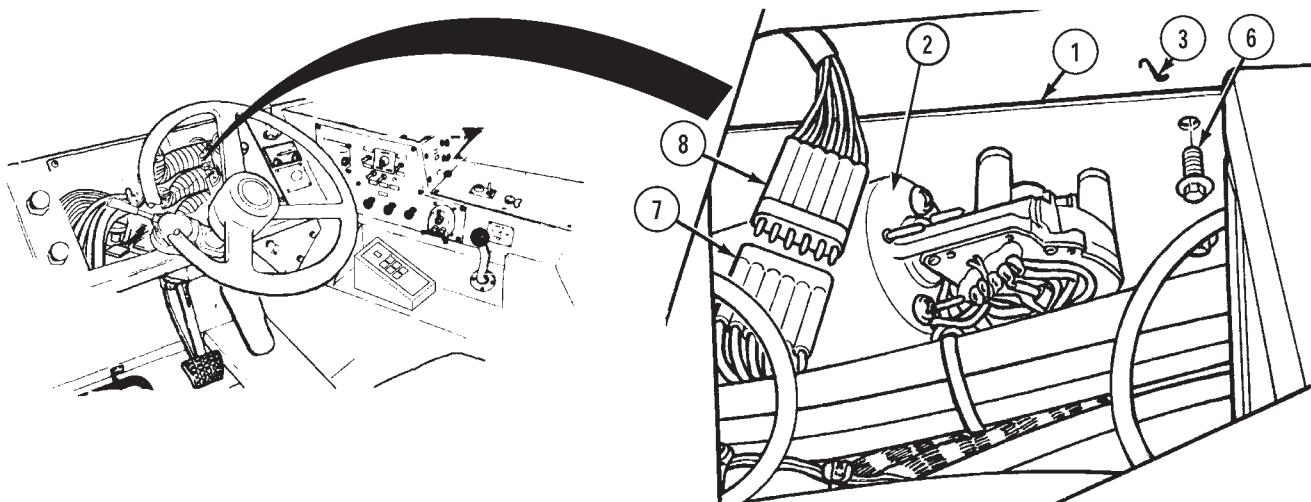
## 18-9.3. WINDSHIELD WIPER MOTOR (24V) REMOVAL/INSTALLATION (CONT).

- (3) Install wiper motor mounting plate (1) and windshield wiper motor (2) on bracket (3) using four screws (6).

## NOTE

Install cable ties as required.

- (4) Connect wiper motor connector (7) to windshield wiper/washer harness connector (8).



## c. Follow-on Maintenance.

- (1) Install instrument panel (para 7-19).
- (2) Connect batteries (para 7-91).
- (3) Check operation of wipers (TM 9-2320-279-10).

END OF TASK

## Body Accessory Maintenance Instructions (Cont)

**18-9.4. WINDSHIELD WIPER/WASHER HARNESS (24V) REMOVAL/INSTALLATION.****This task covers:**

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

**INITIAL SETUP****Models**

All

**References**

None

**Test Equipment**

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
TM 9-2320-279-10	Shut off engine.
Para 7-19	Instrument panel removed.

**Special Tools**

None

**Supplies**

None

*Special Environmental Conditions*

None

**Personnel Required**

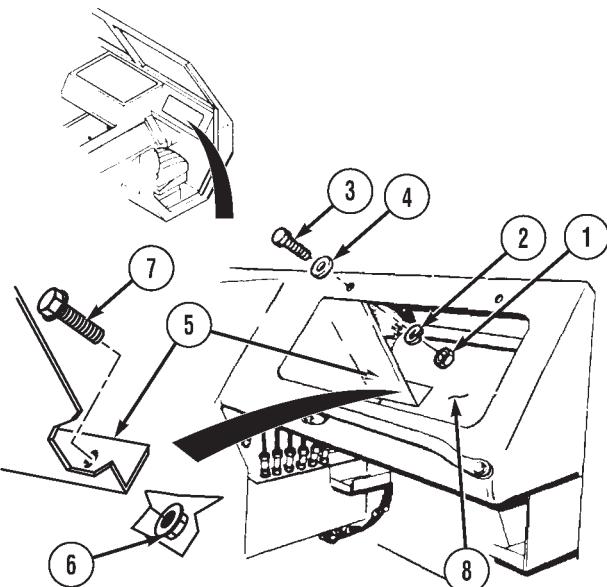
MOS 63S, Heavy wheel vehicle mechanic

**General Safety Instructions**

None

**a. Removal.****NOTE**

- Remove cable ties as required.
- Solenoid valve is mounted on back side of defroster tube guard.

**NOTE**

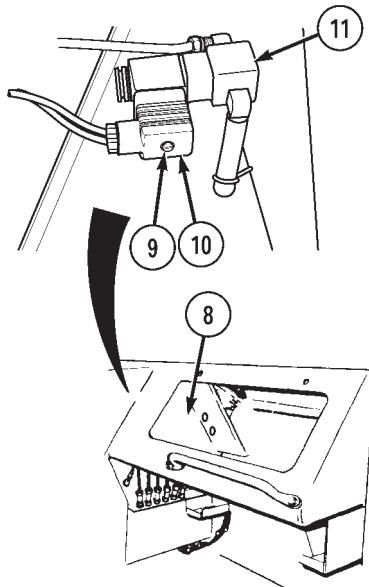
Not all vehicles have locknut (6) or screw (7).

- (1) Remove nut (1), lockwasher (2), screw (3), and washer (4) from defroster tube guard (5).
- (2) Remove locknut (6), screw (7), and place defroster tube guard (5) inside glove box compartment (8).

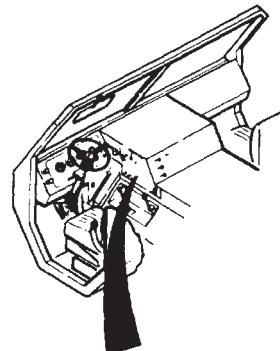
## Body Accessory Maintenance Instructions (Cont)

## 18-9.4. WINDSHIELD WIPER/WASHER HARNESS (24V) REMOVAL/INSTALLATION (CONT).

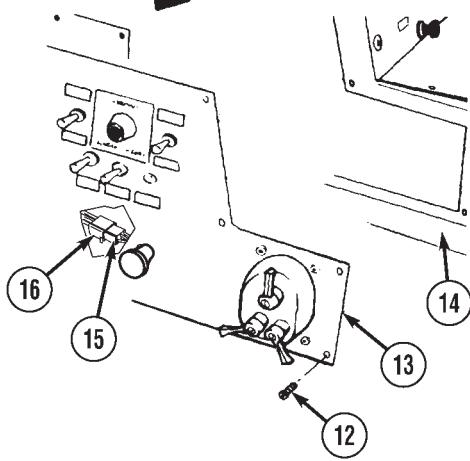
- (3) Loosen screw (9) and remove wiper/washer harness connector (10) from solenoid valve (11).



- (4) Remove eight screws (12) and panel (13) from center console (14).

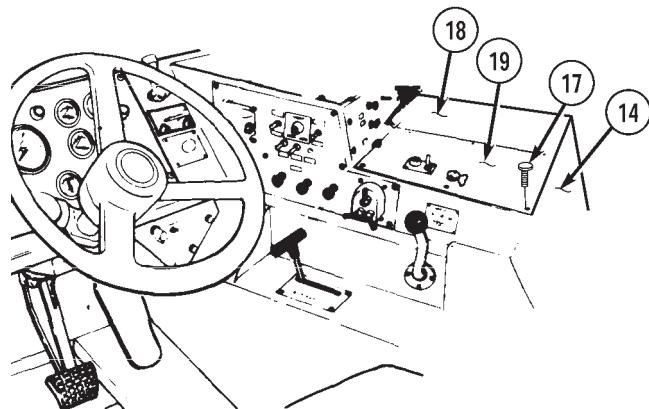


- (5) Disconnect windshield wiper/washer control switch connector (15) from windshield wiper/washer harness connector (16).

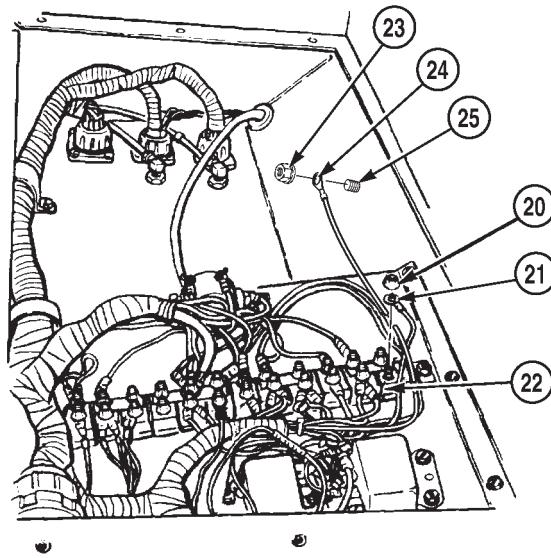


## Body Accessory Maintenance Instructions (Cont)

- (6) Remove 11 screws (17) and two center console covers (18 and 19) from center console (14).

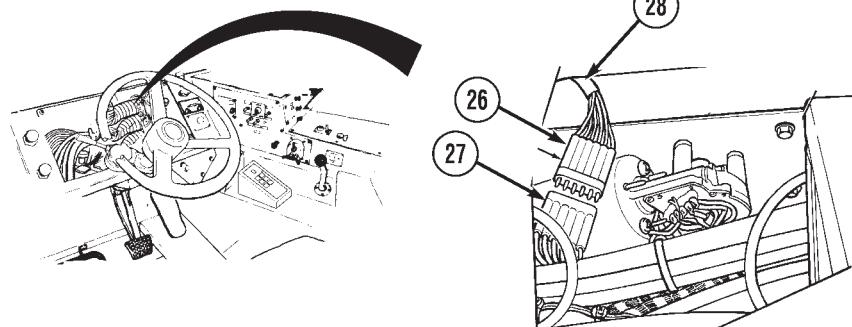


- (7) Remove nut (20) and wire (21) from circuit breaker (22).



- (9) Disconnect windshield wiper/washer harness connector (26) from wiper motor connector (27).

- (10) Remove windshield wiper/washer wire harness (28) from vehicle.



## Body Accessory Maintenance Instructions (Cont)

## 18-9.4. WINDSHIELD WIPER/WASHER HARNESS (24V) REMOVAL/INSTALLATION (CONT).

## b. Installation.

## NOTE

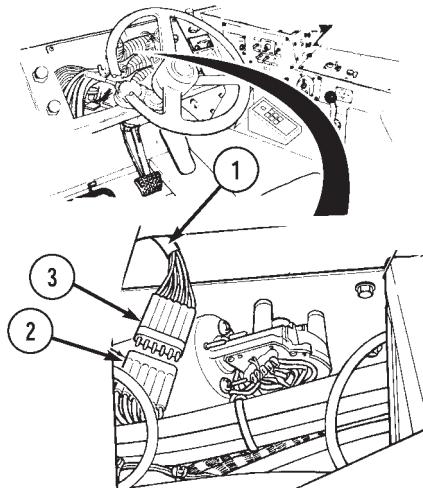
Install wire and connectors as noted prior to removal.

- (1) Position windshield wiper/washer wire harness (1) in vehicle.

## NOTE

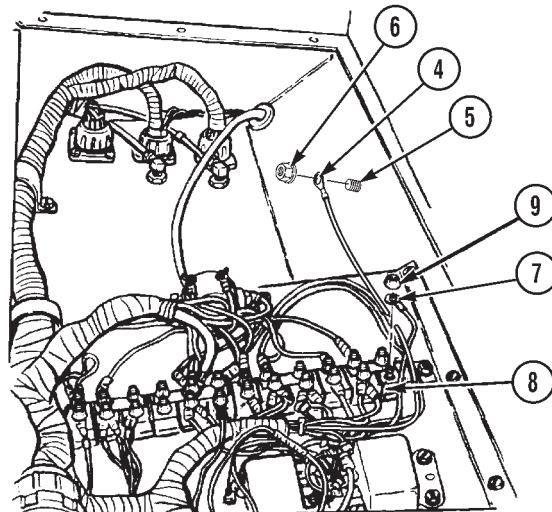
Install cable ties as required.

- (2) Connect wiper motor connector (2) to windshield wiper/washer harness connector (3).

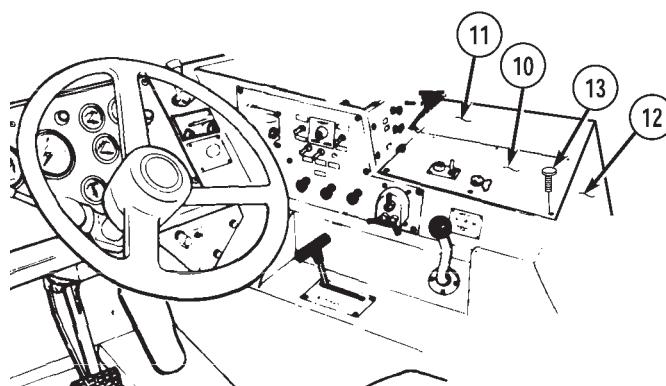


- (3) Install ground wire (4) on stud (5) with nut (6).

- (4) Install wire (7) on circuit breaker (8) with nut (9).

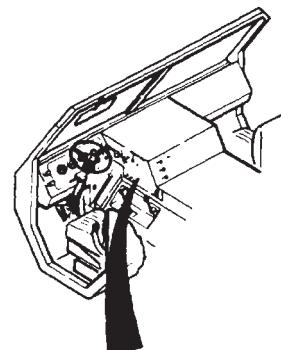


- (5) Install two center console covers (10 and 11) on center console (12) with 11 screws (13).

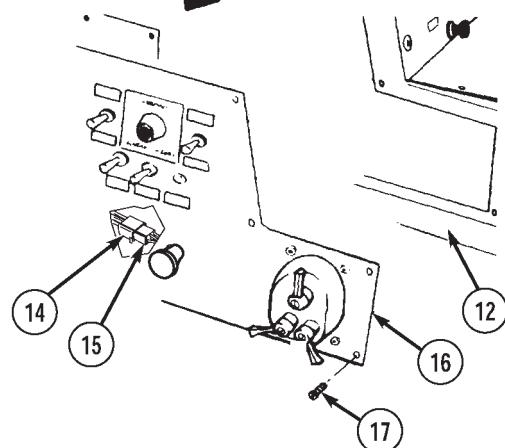


## Body Accessory Maintenance Instructions (Cont)

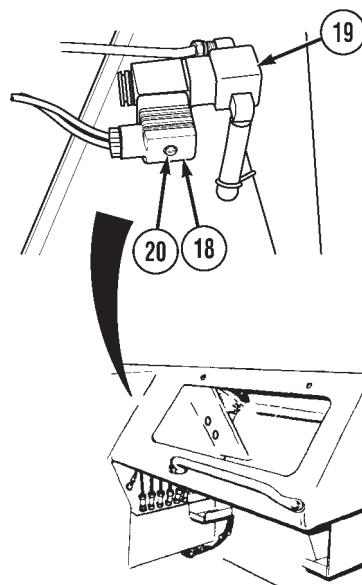
- (6) Connect windshield wiper/washer harness connector (14) to windshield wiper/washer control switch connector (15).



- (7) Install panel (16) on center console (12) with eight screws (17).



- (8) Install wiper/washer harness connector (18) on solenoid valve (19) and tighten screw (20).



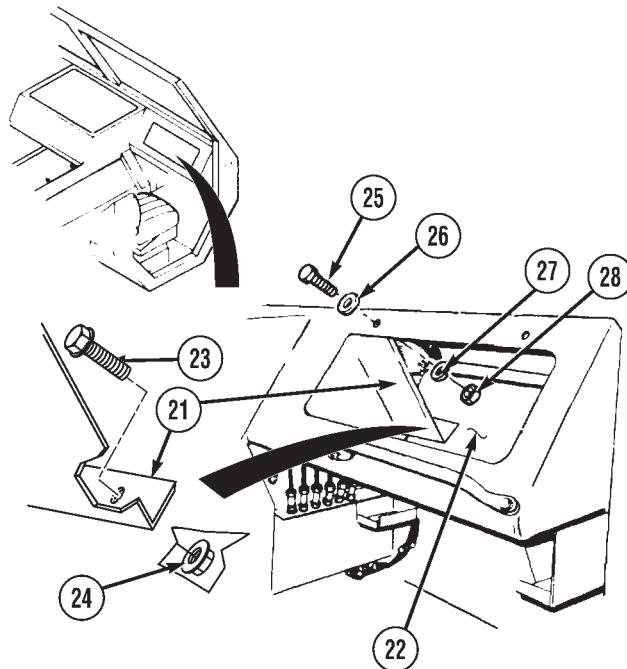
## Body Accessory Maintenance Instructions (Cont)

## 18-9.4. WINDSHIELD WIPER/WASHER HARNESS (24V) REMOVAL/INSTALLATION (CONT).

## NOTE

Not all vehicles have locknut (24) or screw (23).

- (9) Position defroster tube guard (21) inside glove box compartment (22) and install with screw (23), locknut (24), screw (25), washer (26), lockwasher (27), and nut (28).



## c. Follow-on Maintenance.

- (1) Install instrument panel (para 7-19).
- (2) Check operation of wipers (TM 9-2320-279-10).

END OF TASK

## Body Accessory Maintenance Instructions (Cont)

**18-9.5. WINDSHIELD WIPER/WASHER CONTROL SWITCH (24V)  
REMOVAL/INSTALLATION.**
**This task covers:**

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

**INITIAL SETUP****Models**

All

**Test Equipment**

None

**Special Tools**

None

**Supplies**

None

**References**

None

*Equipment Condition**TM or Para      Condition Description*

TM 9-2320-279-10 Shut off engine.

Para 7-91 Batteries disconnected.

*Special Environmental Conditions*

None

**Personnel Required**

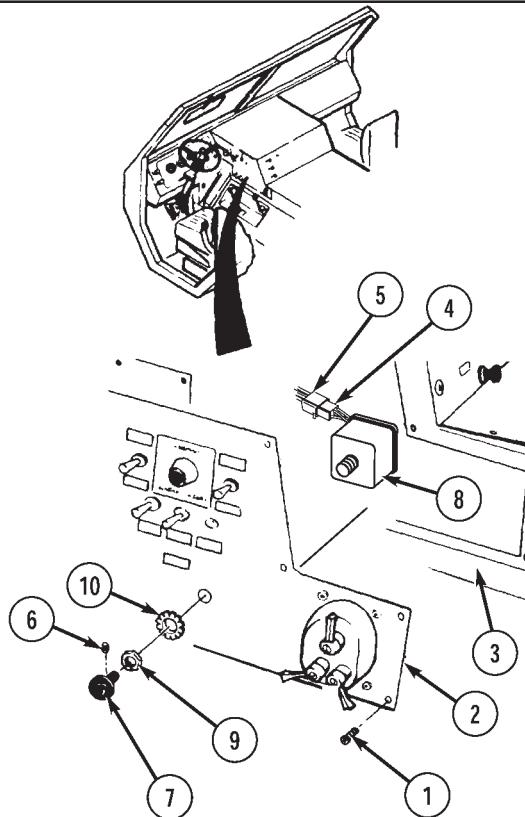
MOS 63S, Heavy wheel vehicle mechanic

**General Safety Instructions**

None

**a. Removal.**

- (1) Remove eight screws (1), and panel (2) from center console (3).
- (2) Disconnect windshield wiper/washer control switch connector (4) from windshield wiper/washer harness connector (5).
- (3) Loosen set screw (6) and remove knob (7) from windshield wiper/washer control switch (8).
- (4) Remove nut (9) and lockwasher (10), and pull windshield wiper/washer control switch (8) out from panel (2).

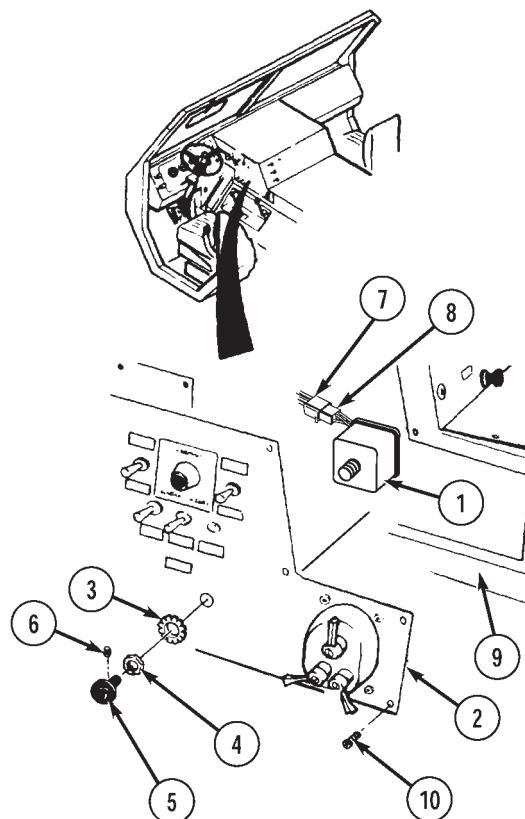


## Body Accessory Maintenance Instructions (Cont)

18-9.5. WINDSHIELD WIPER/WASHER CONTROL SWITCH (24V)  
REMOVAL/INSTALLATION (CONT).

## b. Installation.

- (1) Install windshield wiper/washer control switch (1) on panel (2) with lockwasher (3) and nut (4).
- (2) Install knob (5) on windshield wiper/washer control switch (1) and tighten set screw (6).
- (3) Connect windshield wiper/washer harness connector (7) to windshield wiper/washer control switch connector (8).
- (4) Install panel (2) on center console (9) with eight screws (10).



## c. Follow-on Maintenance.

- (1) Connect batteries (para 7-91).
- (2) Start engine (TM 9-2320-279-10).
- (3) Check operation of windshield wiper/washer control switch (TM 9-2320-279-10).
- (4) Shut off engine (TM 9-2320-279-10).

END OF TASK

## Body Accessory Maintenance Instructions (Cont.)

## 18-10. MIRROR ASSEMBLY REMOVAL/REPAIR/INSTALLATION.

This task covers:

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

## INITIAL SETUP

## Models

All

## References

None

## Test Equipment

None

## Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

## Special Tools

None

## Special Environmental Conditions

None

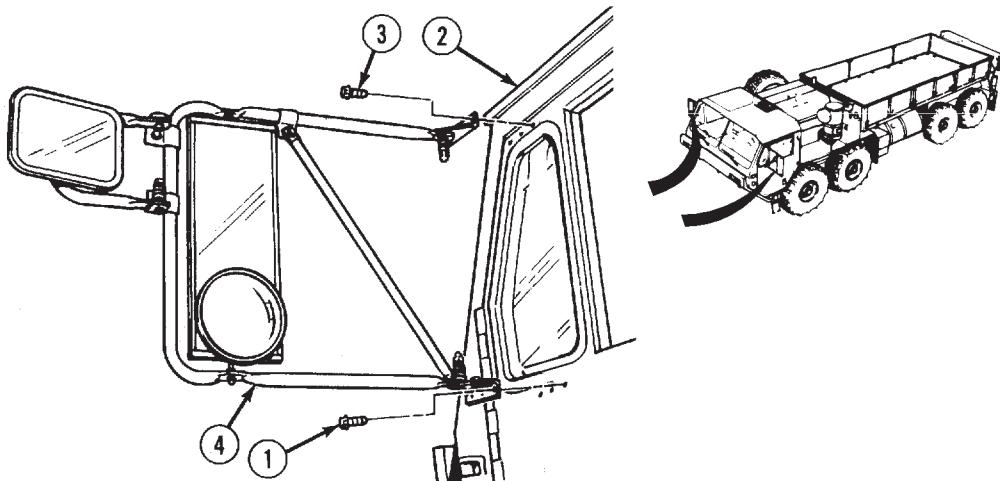
## Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

## General Safety Instructions

None

- a. Removal.



## NOTE

Left and right mirror assemblies are removed the same way.

- (1) Remove three screws (1) from cab door (2).

CAUTION

Ensure mirror assembly is fully supported prior to step (2) or mirror assembly may fall and damage to parts may occur.

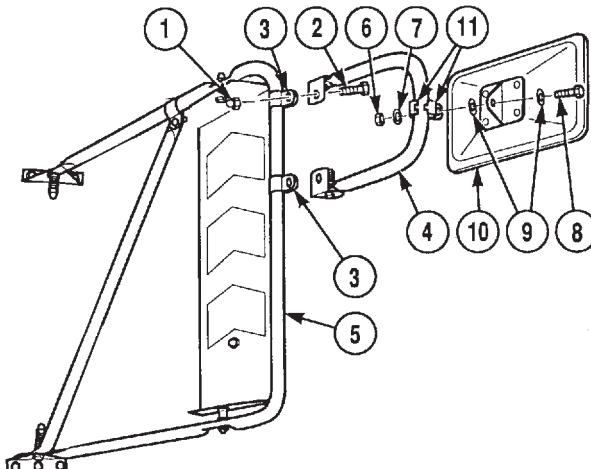
- (2) Remove three screws (3) and mirror assembly (4) from cab door (2).

## Body Accessory Maintenance Instructions (Cont.)

## b. Disassembly.

## NOTE

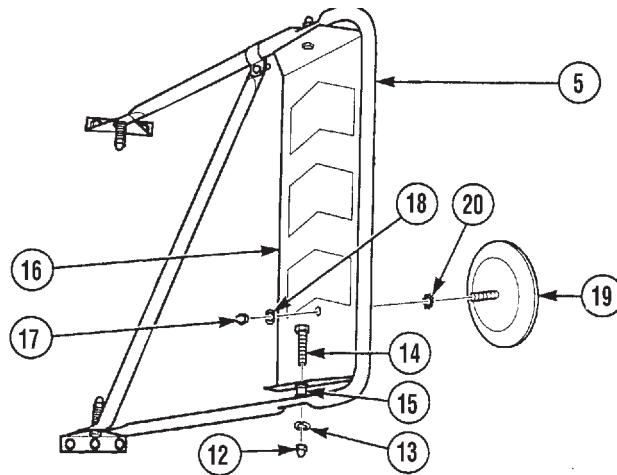
- Perform steps (1) through (5) for Wrecker, LHS, and CBT trucks that have side mirror extensions.
  - Perform steps (4) and (5) for all others.
- (1) Remove two locknuts (1) and screws (2) from clamps (3). Discard locknuts.
  - (2) Remove loop (4) and clamps (3) from bracket assembly (5).
  - (3) Remove nut (6), lockwashers (7), screw (8), two washers (9), mirror head (10), and clamp (11) from loop (4).
  - (4) Remove two nuts (12), lockwashers (13), screws (14), spacers (15), and mirror head (16) from bracket assembly (5).



## NOTE

Some assemblies have self-adhesive spotter mirror.

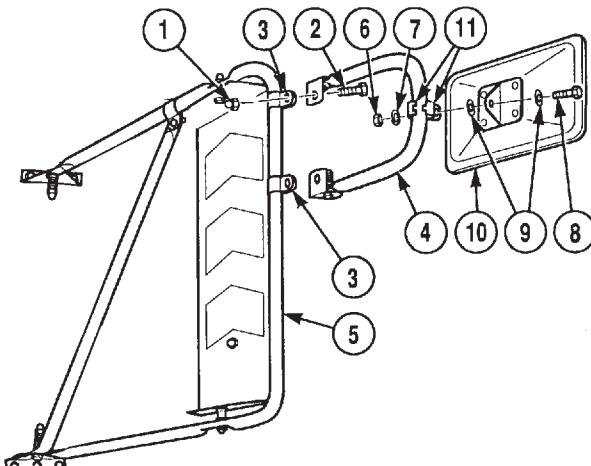
- (5) Remove nut (17), washers (18), mirror head (19), and lockwasher (20) from mirror head (16).



## c. Assembly.

## NOTE

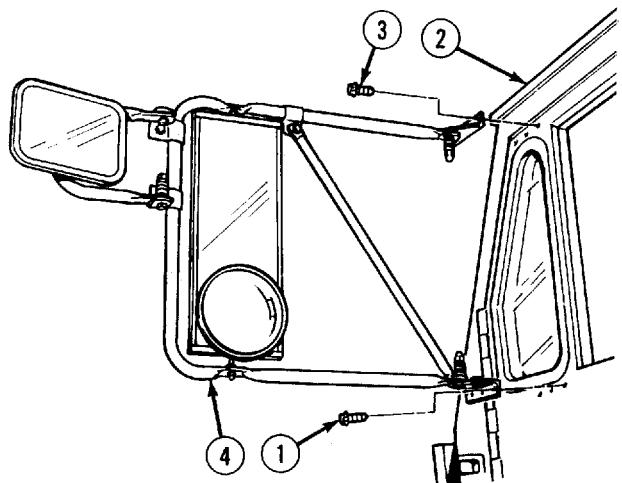
- Perform steps (1) through (4) for Wrecker, LHS, and CBT trucks that have side mirror extensions.
  - Perform steps (3) and (4) for all others.
  - Some assemblies have self-adhesive spotter mirror.
- (1) Install mirror head (19) on mirror head (16) with lockwasher (20), washer (18), and nut (17).
  - (2) Install mirror head (16) on bracket assembly (5) with two spacers (15), screws (14), lockwashers (13), and nuts (12).
  - (3) Position clamp (11) on loop (4) and install mirror head (10) with two washers (9), screw (8), lockwasher (7), and nut (6).
  - (4) Position clamps (3) on bracket assembly (5) and install loop (4) on clamps with two screws (2) and locknuts (1).



**Body Accessory Maintenance Instructions (Cont)****18-10. MIRROR ASSEMBLY REMOVAL/REPAIR/INSTALLATION (CONT).****d. Installation.****NOTE**

Left and right mirror assemblies are installed the same way.

- (1) Position mirror assembly (4) and three screws (3) on cab door (2).
- (2) Position three screws (1) in cab door (2).
- (3) Tighten screws (1) and (3).

**e. Follow-on Maintenance.** None.**END OF TASK**

## Body Accessory Maintenance Instructions (Cont)

**18-11. SIDE MIRROR BRACKET REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition**Special Tools*

None

<i>TM or Para</i>	<i>Condition Description</i>
TM 9-2320-279-10	Shut off engine.
Para 18-10	Mirror assembly removed.

*Supplies*

None

*Special Environmental Conditions*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

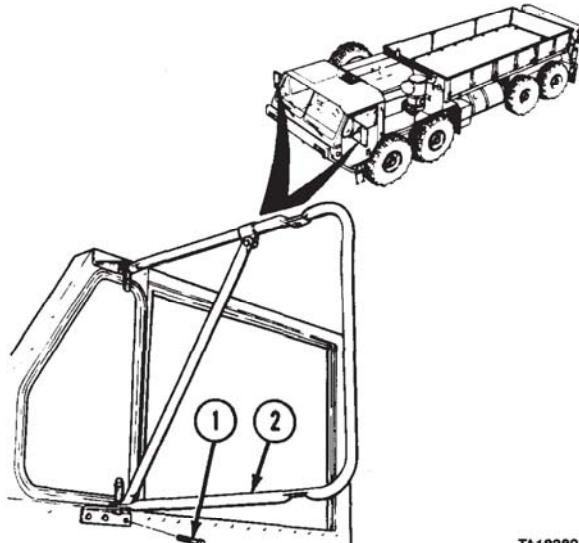
*General Safety Instructions*

None

**a. Removal.****NOTE**

Both side mirror brackets are removed in a similar manner.

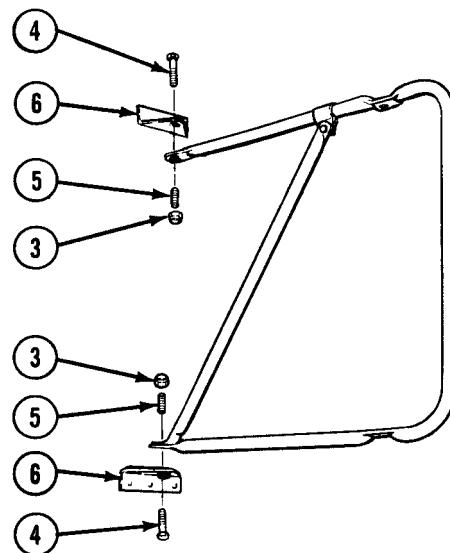
- (1) Remove six screws (1) and bracket assembly (2).



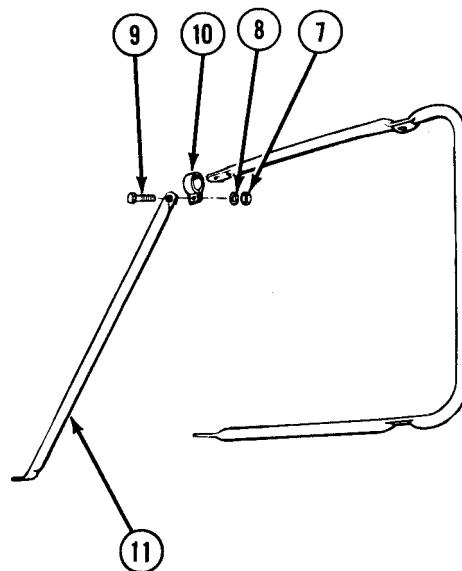
TA183824

### Body Accessory Maintenance Instructions (Cont)

- (2) Remove two locknuts (3), screws (4), springs (5), and mounting brackets (6).



- (3) Remove nut (7), lockwasher (8), screw (9), clamp (10), and crossbar (11).

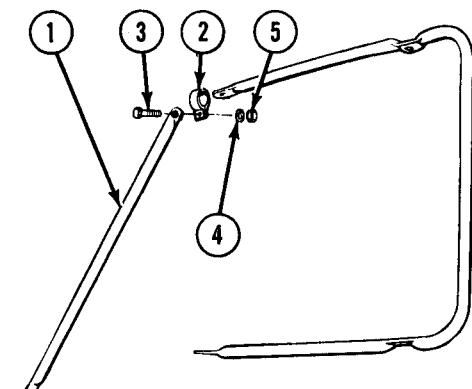


**b. Installation.**

**NOTE**

Both side mirror brackets are installed in a similar manner.

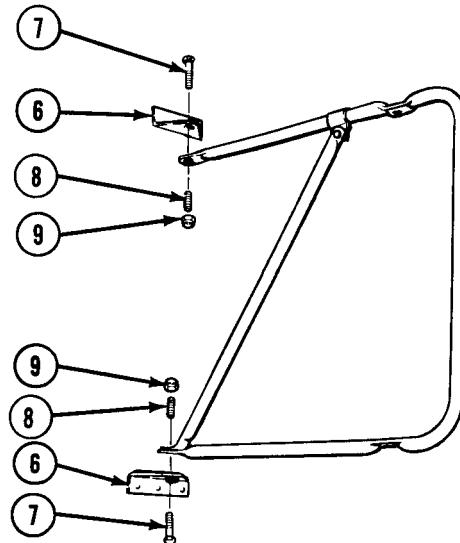
- (1) Install crossbar (1) and clamp (2) with screw (3) lockwasher (4) and nut (5).



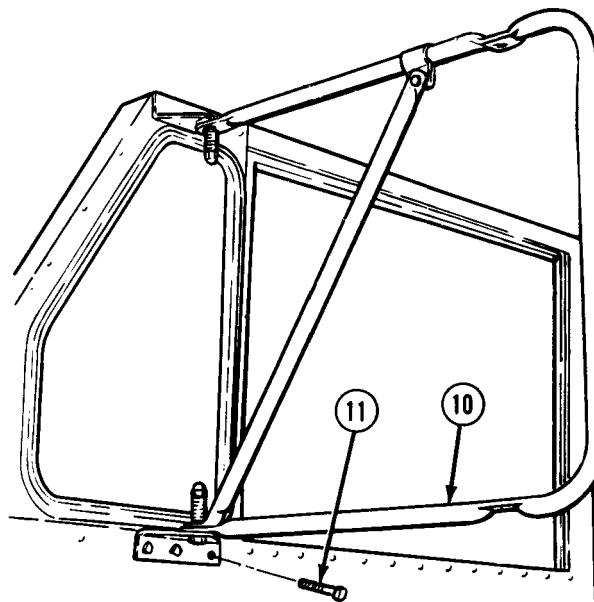
## Body Accessory Maintenance Instructions (Cont)

**18-11. SIDE MIRROR REMOVAL/INSTALLATION (CONT).**

- (2) Install two mounting brackets (6) with two screws (7), springs (8), and locknuts (9). Tighten screws (7) to 145 to 175 lb-in (16 to 20 N·m).



- (3) Install bracket assembly (10) with six screws (11).

**c. Follow-on Maintenance.**

- (1) Install mirror assembly (para 18-10).  
 (2) Adjust mirror (TM 9-2320-279-10).

**END OF TASK**

**Body Accessory Maintenance Instructions (Cont)**

**18-11.1 DELETED.**



## Body Accessory Maintenance Instructions (Cont)

**18-12. RED REFLECTOR AND BRACKET REMOVAL/INSTALLATION.**

This task covers:

- a. Removal (M977, M985)
- b. Installation (M977, M985)
- c. Removal (M978)
- d. Installation (M978)
- e. Removal (M983)
- f. Installation (M983)
- g. Removal (M984)
- h. Installation (M984)
- i. Removal (M984E1)
- j. Installation (M984E1)
- k. Follow-on Maintenance

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
TM 9-2320-279-10	Shut off engine.
Para 7-66	Side and back clearance lights removed (M984).

*Special Tools*

None

*Supplies*

None

*Personnel Required*

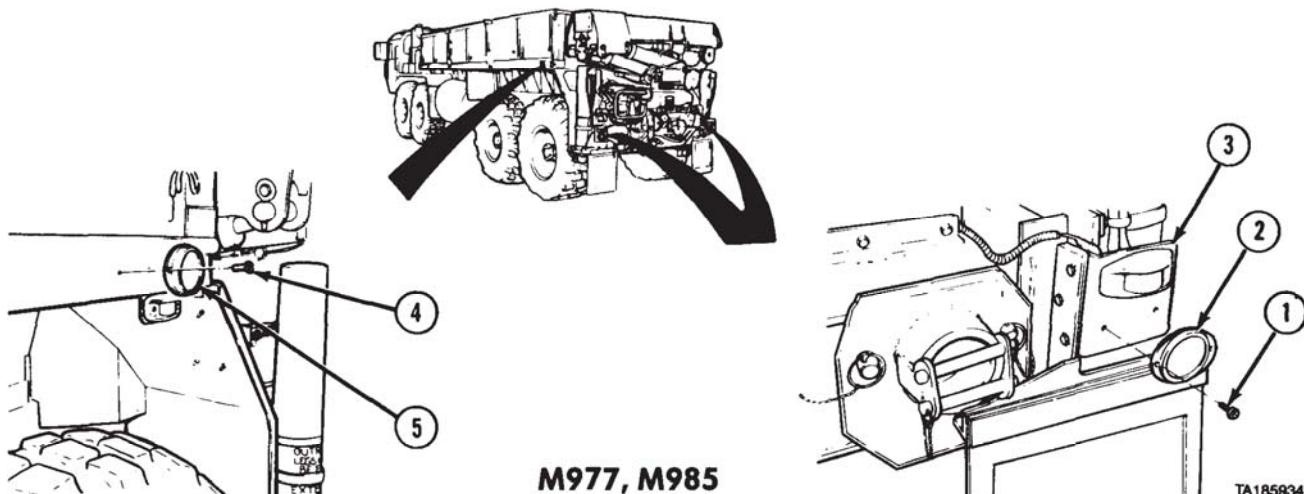
MOS 63S, Heavy wheel vehicle mechanic

*Special Environmental Conditions*

None

*General Safety Instructions*

None

**a. Removal (M977, M985).****NOTE**

- One red reflector is required on each rear side and two red reflectors are required on rear end of vehicle.
- Left and right reflectors are removed and installed the same way.

- (1) Remove two screws (1) and red reflector (2) from bracket (3).
- (2) Remove two screws (4) and red reflector (5).

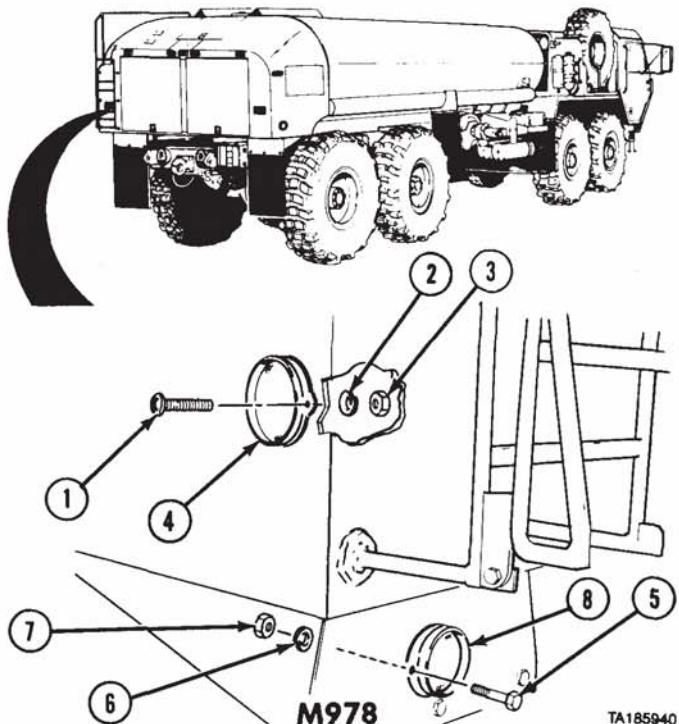
**b. Installation (M977, M985).**

- (1) Install red reflector (2) on bracket (3) with two screws (1).
- (2) Install red reflector (5) with two screws (4).

## Body Accessory Maintenance Instructions (Cont)

**18-12. RED REFLECTOR AND BRACKET REMOVAL/INSTALLATION (CONT).****c. Removal (M978).****NOTE**

- One red reflector is required on each rear side and two red reflectors are required on rear end of vehicle.
  - Left and right rear and side reflectors are removed and installed the same way.
- (1) Remove two screws (1), lockwashers (2), and nuts (3).  
 (2) Remove red reflector (4).  
 (3) Remove two screws (5), lockwashers (6), and nuts (7).  
 (4) Remove red reflector (8).



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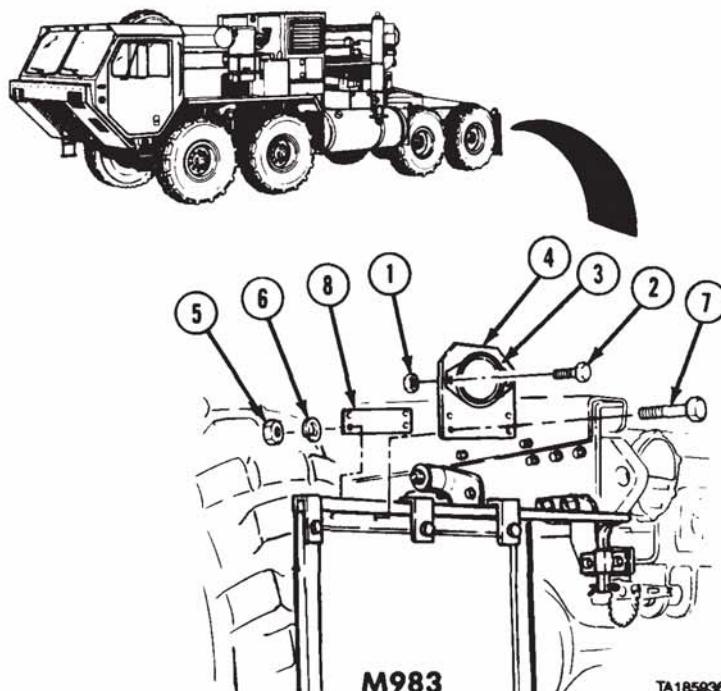
**d. Installation (M978).**

- (1) Position red reflector (8).  
 (2) Install two screws (5), lockwashers (6), and nuts (7).  
 (3) Position red reflector (4).  
 (4) Install two screws (1), lockwashers (2), and nuts (3).

**e. Removal (M983).****NOTE**

Left and right red reflectors and brackets are removed and installed the same way.

- (1) Remove two locknuts (1) and screws (2).  
 (2) Remove red reflector (3) from bracket (4).  
 (3) Remove four nuts (5), lockwashers (6), and screws (7).  
 (4) Remove retainer plate (8) and bracket (4).



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**f. Installation (M983).**

- (1) Install bracket (4) and retainer plate (8) with four screws (7), lockwashers (6), and nuts (5).  
 (2) Position red reflector (3) on bracket (4).  
 (3) Install two screws (2) and locknuts (1).

## Body Accessory Maintenance Instructions (Cont)

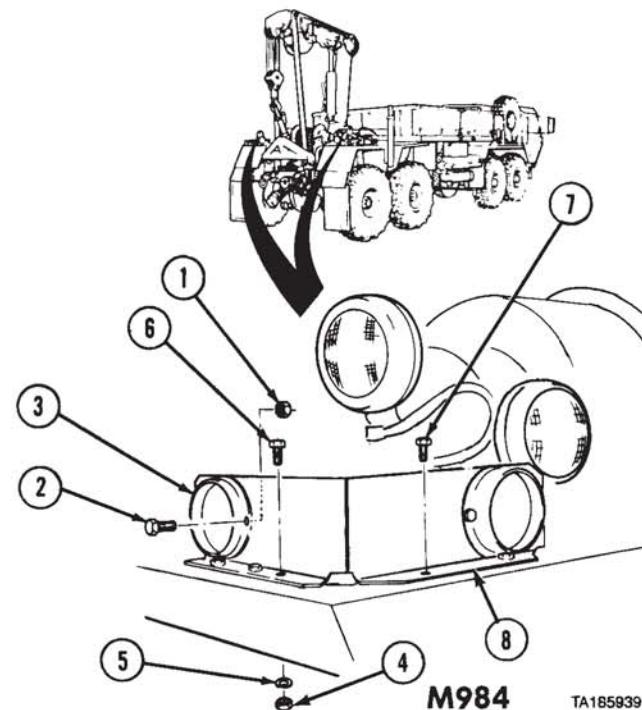
**g. Removal (M984).****NOTE**

- One red reflector is required on each rear side and two red reflectors are required on rear end of vehicle.
- Left and right rear and side reflectors and bracket are removed and installed the same way.

- (1) Remove two locknuts (1) and screws (2).
- (2) Remove red reflector (3).
- (3) Remove three nuts (4), lockwashers (5), and screws (6).
- (4) Remove two screws (7) and bracket (8).

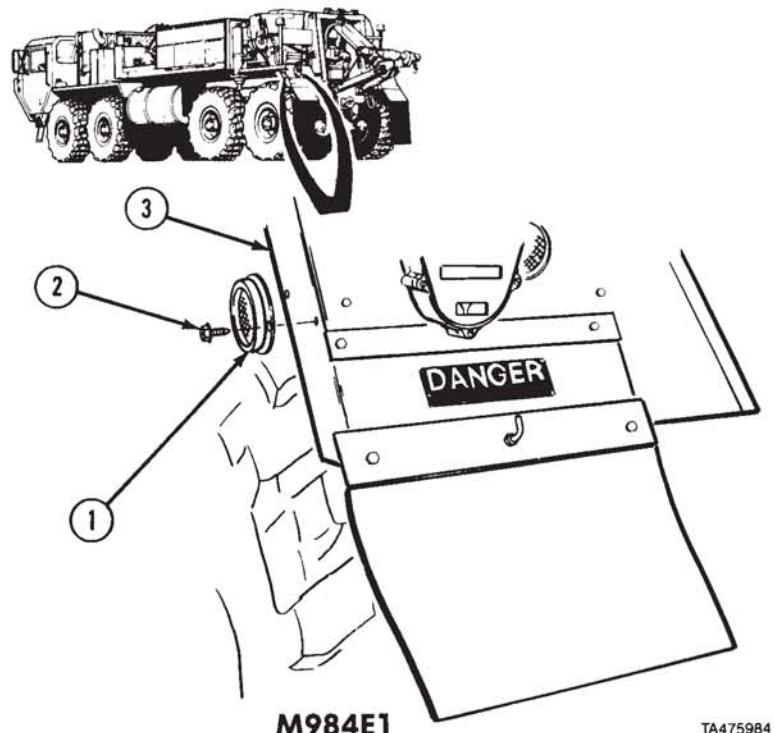
**h. Installation (M984).**

- (1) Install bracket (8) with two screws (7).
- (2) Install three screws (6), lockwashers (5), and nuts (4).
- (3) Install red reflector (3) with two screws (2) and locknuts (1).

**i. Removal (M984E1).****NOTE**

- One red reflector is required on each rear side and two red reflectors are required on rear end of vehicle.
  - Left and right rear and side reflector are removed and installed the same way.
- Remove two screws (1) and red reflector (2) from fender (3).

**j. Installation (M984E1).** Install red reflector (2) on fender (3) with two screws (1).



**k. Follow-on Maintenance.** Install side and back clearance lights (M984) (para 7-66).

**END OF TASK**

## Body Accessory Maintenance Instructions (Cont)

**18-13. AMBER REFLECTORS REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
TM 9-2320-279-10	Shut off engine.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

None

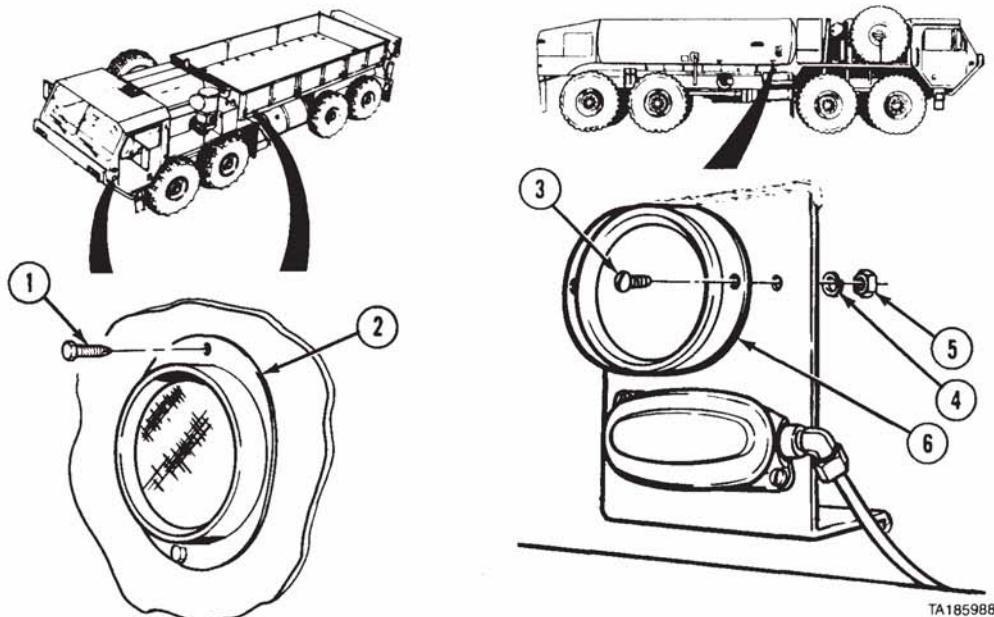
*General Safety Instructions*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

## Body Accessory Maintenance Instructions (Cont)

**18-13. AMBER REFLECTORS REMOVAL/INSTALLATION (CONT).****a. Removal.****NOTE**

All vehicles have two amber reflectors on sides of cab. M977, M978, and M985 also have two amber reflectors on middle of vehicle.

- (1) Remove two screws (1) from reflector (2).
- (2) Remove reflector (2).

**NOTE**

Do steps (3) and (4) to remove middle reflectors on M978.

- (3) Remove two screws (3), lockwashers (4), and nuts (5) from reflector (6).
- (4) Remove reflector (6).

**b. Installation.**

- (1) Position reflector (2).
- (2) Install two screws (1).

**NOTE**

Do steps (3) and (4) to install middle reflectors on M978.

- (3) Position reflector (6).
- (4) Install two screws (3), lockwashers (4), and nuts (5).

**c. Follow-on Maintenance.** None.**END OF TASK**

## Body Accessory Maintenance Instructions (Cont)

**Section IV. FUEL HOSES, NOZZLES, AND CONTROL VALVES****18-14. FUEL NOZZLE ASSEMBLY REMOVAL/INSTALLATION (M978).**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

**INITIAL SETUP**

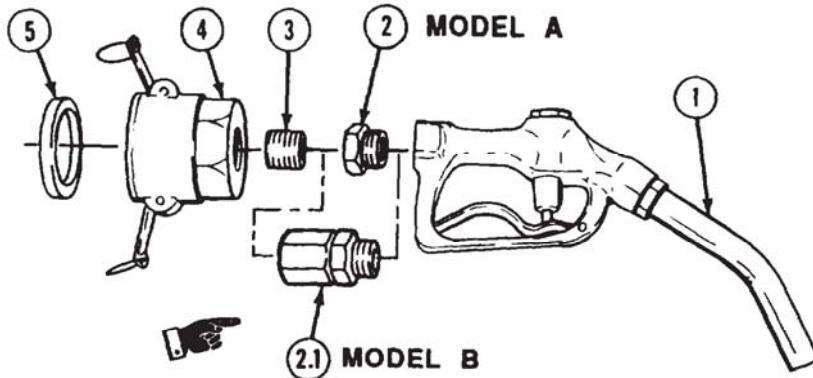
<i>Models</i>	<i>References</i>	
M978	None	
<i>Test Equipment</i>	<i>Equipment Condition</i>	
None	TM or Para	Condition Description
<i>Special Tools</i>	TM 9-2320-279-10	Nozzle removed from fuel transfer hose.
None	TM 9-2320-279-10	Drain fuel hose.
<i>Supplies</i>	<i>Special Environmental Conditions</i>	
Compound, sealing, pipe thread, Item 18, Appendix C	None	
<i>Personnel Required</i>	<i>General Safety Instructions</i>	
MOS 63S, Heavy wheel vehicle mechanic	None	

## Body Accessory Maintenance Instructions (Cont)

### a. Removal

#### NOTE

- There are two types of fuel nozzle assemblies. Model B does not have a bushing.
- Perform steps (1) and (2) for Model A. Perform steps (3) and (4) for Model B.



- (1) Remove fuel nozzle assembly (1) from bushing (2).
- (2) Remove bushing (2), pipe nipple (3), coupling (4), and gasket (5).
- (3) Remove fuel nozzle assembly (1) from swivel (2.1).
- (4) Remove swivel (2.1), pipe nipple (3), coupling (4), and gasket (5).

### b. Installation.

#### WARNING

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

#### NOTE

Perform steps (1) through (3) for Model A. Perform steps (4) through (6) for Model B.

- (1) Apply pipe thread sealing compound to threads of pipe nipple (3) and bushing (2).
- (2) Install bushing (2), pipe nipple (3), coupling (4), and gasket (5).
- (3) Install fuel nozzle assembly (1) on bushing (2).
- (4) Apply pipe thread sealing compound to threads of pipe nipple (3).
- (5) Install swivel (2.1), pipe nipple (3), coupling (4), and gasket (5).
- (6) Install fuel nozzle assembly (1) on swivel (2.1).

### c. Follow-on Maintenance.

- (1) Install nozzle on transfer hose (TM 9-2320-279-10).
- (2) Check operation of nozzle (TM 9-2320-279-10).

**END OF TASK**

## Body Accessory Maintenance Instructions (Cont)

**18-15. FUEL TRANSFER HOSE REMOVAL/INSTALLATION (M978).**

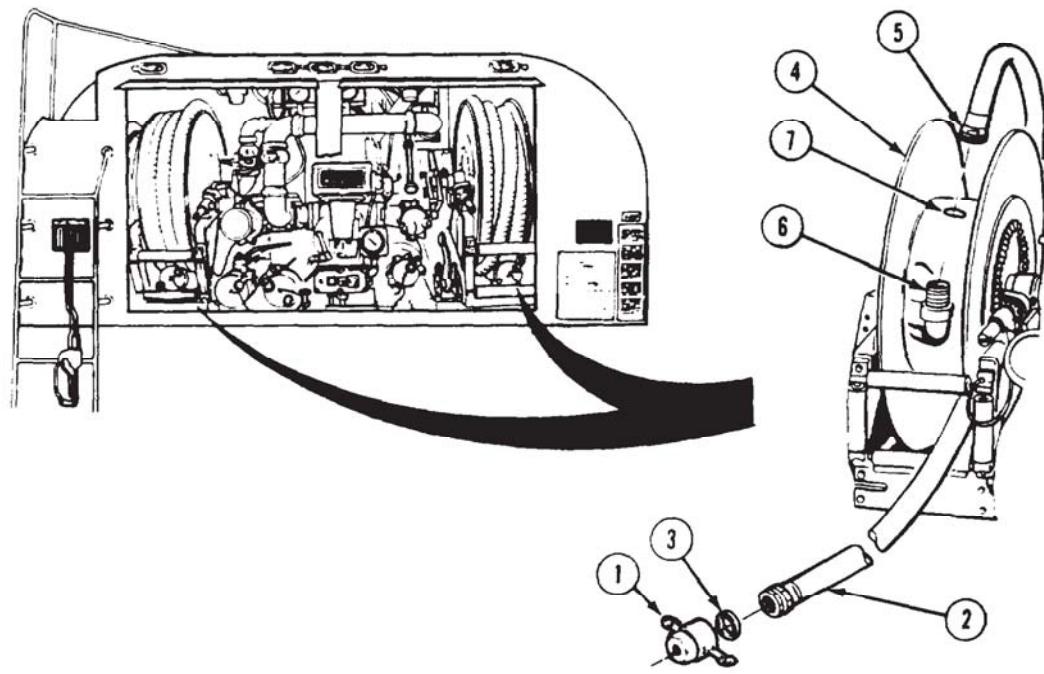
This task covers:

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

**INITIAL SETUP**

<i>Models</i>	<i>Equipment Condition</i>	
M978		
<i>Test Equipment</i>	<i>TM or Para</i>	<i>Condition Description</i>
None	TM 9-2320-279-10	Shut off engine.
<i>Special Tools</i>	<i>Special Environmental Conditions</i>	
None	None	
<i>Supplies</i>	<i>General Safety instructions</i>	
None	No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of fuel hose reel.	
<i>Personnel Required</i>		
MOS 63S, Heavy wheel vehicle mechanic		
<i>References</i>		
None		

## Body Accessory Maintenance Instructions (Cont)

**18-15. FUEL TRANSFER HOSE REMOVAL/INSTALLATION (M978) (CONT).****a. Removal.**

TA183614

**NOTE**

Both fuel transfer hoses are removed and installed the same way.

- (1) Remove cap (1) from hose (2).
- (2) Remove gasket (3) from cap (1).
- (3) Unwind hose (2) from fuel hose reel (4) and drain hose.
- (4) Using chain wrench, unscrew hose fitting (5) from nipple (6).
- (5) Remove gasket (7) from hose fitting (5).

**b. Installation.**

- (1) Install gasket (7) in hose fitting (5).
- (2) Using chain wrench, install hose fitting (5) on nipple (6).
- (3) Rewind hose (2) on fuel hose reel (4).
- (4) Install gasket (3) in cap (1).
- (5) Install cap (1) on hose (2).

**c. Follow-on Maintenance.** Close pump module rear access doors (TM 9-2320-279-10).

END OF TASK

## Body Accessory Maintenance Instructions (Cont)

**8-16. HAV HAND ACTUATED CONTROL VALVE AND AIRHOSE ASSEMBLY  
REMOVAL/REPAIR/INSTALLATION (M978)**

This task covers:

- |                        |                          |
|------------------------|--------------------------|
| a. Removal             | d. Assembly              |
| b. Disassembly         | e. Installation          |
| c. Cleaning/Inspection | f. Follow-on Maintenance |

**INITIAL SETUP***Models*

M978

*Test Equipment*

None

*Special Tools*

None

*Supplies*

Compound, sealing, pipe thread, Item 18, Appendix C  
 Solvent, drycleaning, Item 47, Appendix C  
 Tags, identification, Item 48, Appendix C

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*References*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
TM 9-2320-279-10	Shut off engine.
TM 9-2320-279-10	HA. HAND ACTUATED CONTROL VALVE hose unwound from reel.
TM 9-2320-279-10	Air system drained.
TM 9-2320-279-10	Pump module rear access doors opened.
Para 16-48	Left side access panel removed.

*Special Environmental Conditions*

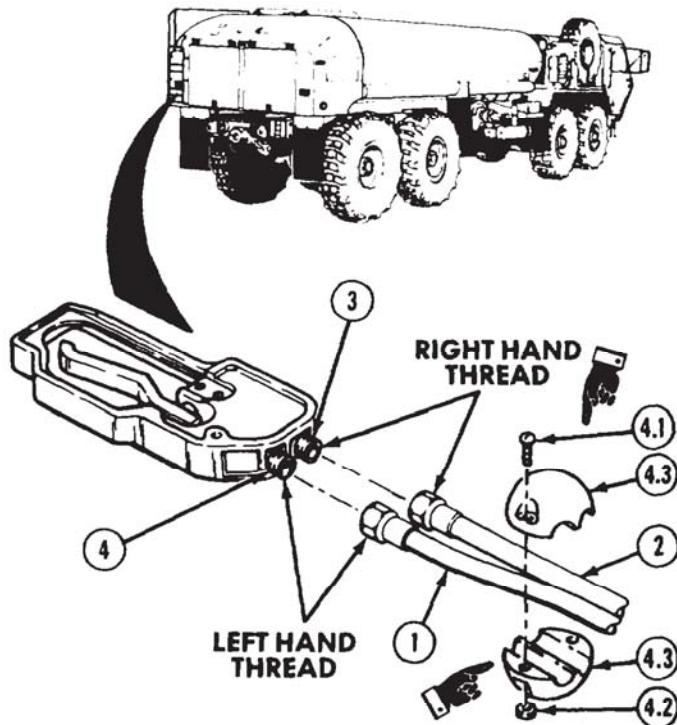
None

*General Safety Instructions*

No smoking, flames, sparks, hot or glowing objects within 50 ft (15 m) of vehicle.

**a. Removal****NOTE**

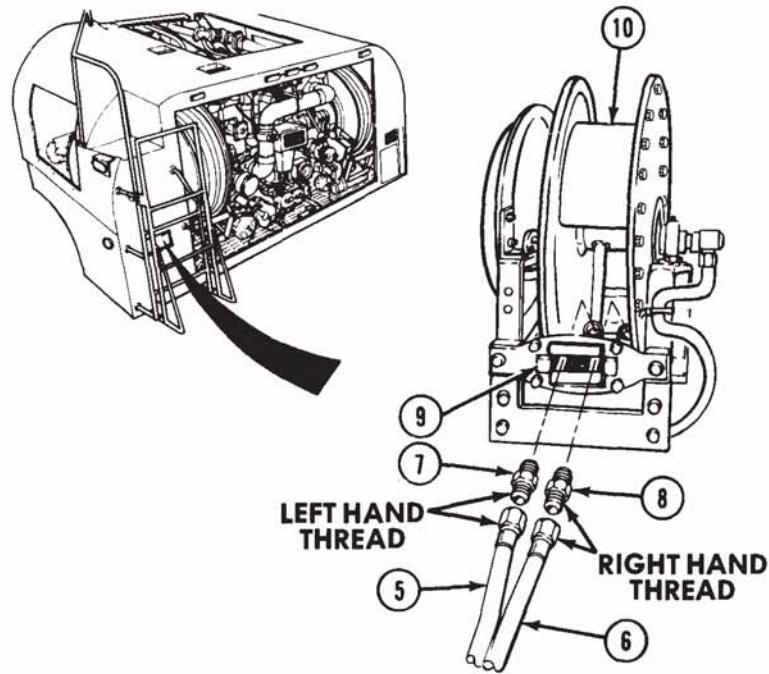
- Tag and mark hoses and fittings before removal.
  - Trucks with ball stop, perform steps (1) and (1.1). Trucks without ball stop, perform step (1).
- (1) Disconnect two hoses (1 and 2) from two coupling fittings (3 and 4).
- (1.1) Remove two screws (4.1), nuts (4.2), and ball stop (4.3).



## Body Accessory Maintenance Instructions (Cont)

**18-16. HAV HAND ACTUATED CONTROL VALVE AND AIRHOSE ASSEMBLY REMOVAL/REPAIR/INSTALLATION (M978) (CONT).**

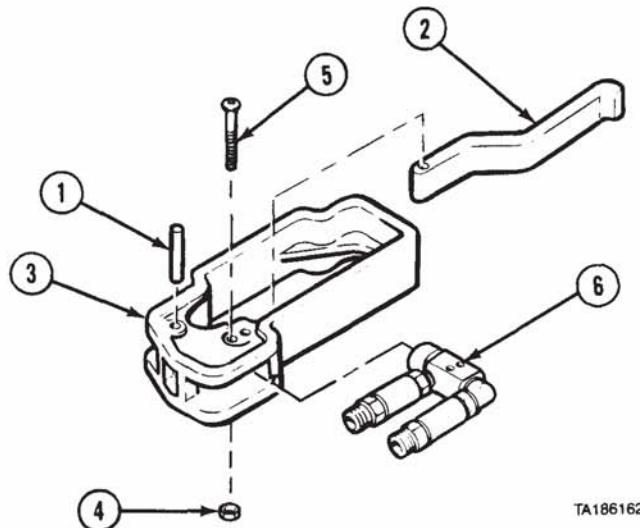
- (2) Disconnect two airhoses (5 and 6) from coupling fittings (7 and 8).
- (3) Remove airhoses (5 and 6) from roller guide (9).
- (4) Remove coupling fittings (7 and 8) from air hose reel (10).



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**b. Disassembly.**

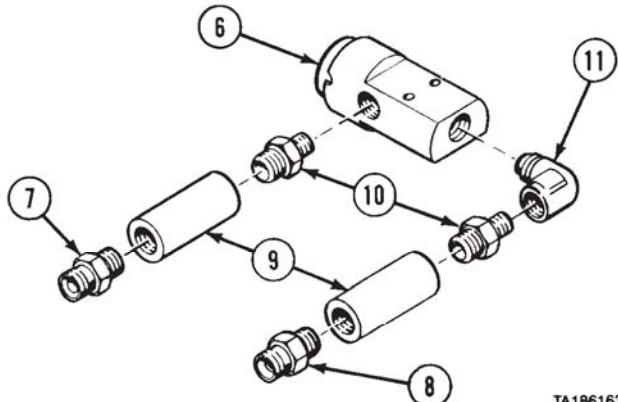
- (1) Remove pin (1) and lever (2) from handle (3).
- (2) Remove two locknuts (4), screws (5), and air valve (6).



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## Body Accessory Maintenance Instructions (Cont)

- (3) Remove two coupling fittings (7 and 8), sleeves (9), adapters (10), and elbow (11) from air valve (6).



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**c. Cleaning/Inspection.****WARNING**

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

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

**WARNING**

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment, goggles, shield, and gloves.

- (2) Dry metal parts with compressed air.  
 (3) Inspect all metal parts for bends, breaks, cracks, and sharp edges.  
 (4) Inspect springs for cracks and distortion.  
 (5) Replace damaged parts.

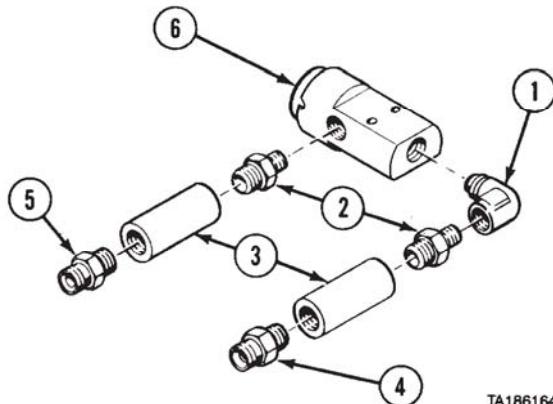
**d. Assembly.****WARNING**

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

**NOTE**

Apply pipe thread sealing compound to all connections.

- (1) Install elbow (1), two adapters (2), sleeves (3), and coupling fittings (4 and 5) in air valve (6).

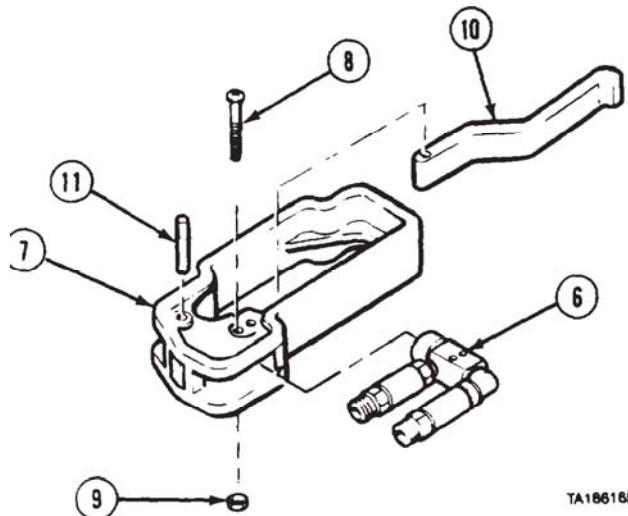


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## Body Accessory Maintenance Instructions (Cont)

**18-16. HAV HAND ACTUATED CONTROL VALVE AND AIRHOSE ASSEMBLY  
REMOVAL/REPAIR/INSTALLATION (M978) (CONT).**

- (2) Install air valve (6) in handle (7) with two screws (8) and locknuts (9).
- (3) Install lever (10) in handle (7) with pin (11).



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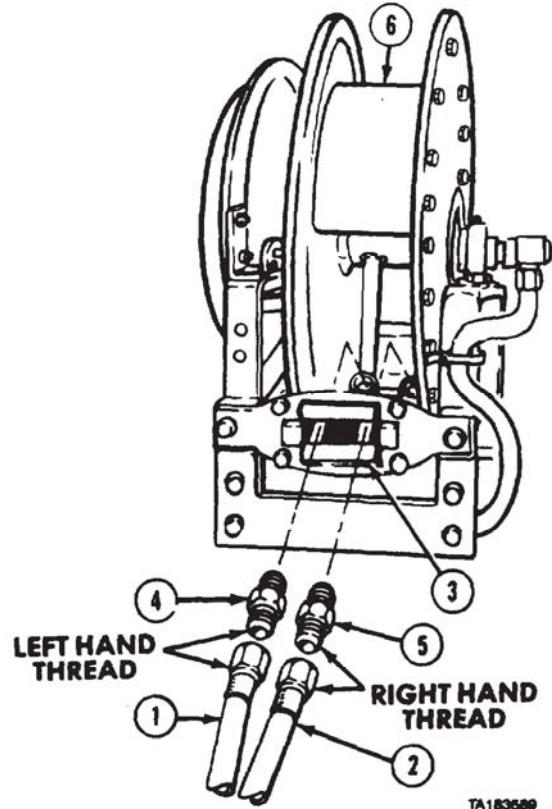
**e. Installation.**

- (1) Insert airhoses (1 and 2) through roller guide (3).

**WARNING**

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

- (2) Apply pipe thread sealing compound to threads of coupling fittings (4 and 5) and install in air hose reel (6).
- (3) Connect airhoses (1 and 2) to air hose reel (6).



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## Body Accessory Maintenance Instructions (Cont)

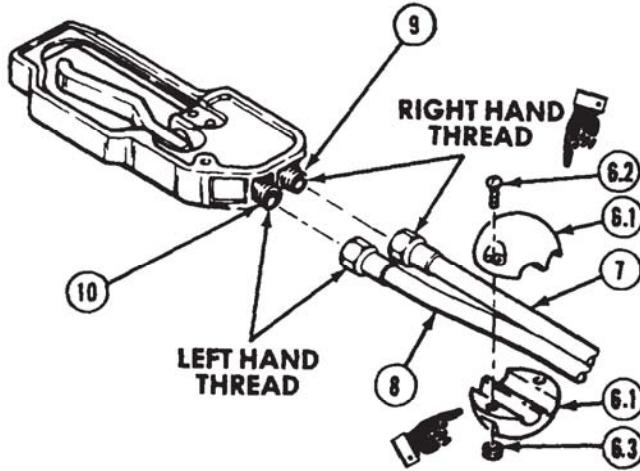
**18-16. HAV HAND ACTUATED CONTROL VALVE AND AIRHOSE ASSEMBLY REMOVAL/INSTALLATION (CONT).****NOTE**

Trucks with ball stop, perform steps (3.1) and (4). Trucks without ball stop perform step (4).

- (3.1) Install ball stop (6.1) approximately 2.5 inches (6.35 cm) from hose end with two screws (6.2) and nuts (6.3).
- (4) Connect air hoses (7 and 8) to coupling fittings (9 and 10).

**f. Follow-on Maintenance.**

- (1) Start engine and build up air pressure (TM 9-2320-279-10).
- (2) Check control valve assembly for leaks.
- (3) Check operation of HAV HAND ACTUATED CONTROL VALVE (TM 9-2320-279-10).
- (4) Check HAV HAND ACTUATED CONTROL VALVE air hose for leaks.
- (5) Rewind HAV HAND ACTUATED CONTROL VALVE air hose on air hose reel (TM 9-2320-279-10).
- (6) Install pump module left side access panel (para 16-48).
- (7) Close pump module rear access doors (TM 9-2320-279-10).



END OF TASK

**Section V. HEATER AND DEFROSTER****18-17. HEATER HOSE REMOVAL/INSTALLATION.**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

*Special Tools*

None

Para 6-2 Cooling system drained.

*Supplies*Tags, identification, Item 48, Appendix C  
Ties, cable, plastic, Item 52, Appendix C*Special Environmental Conditions*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

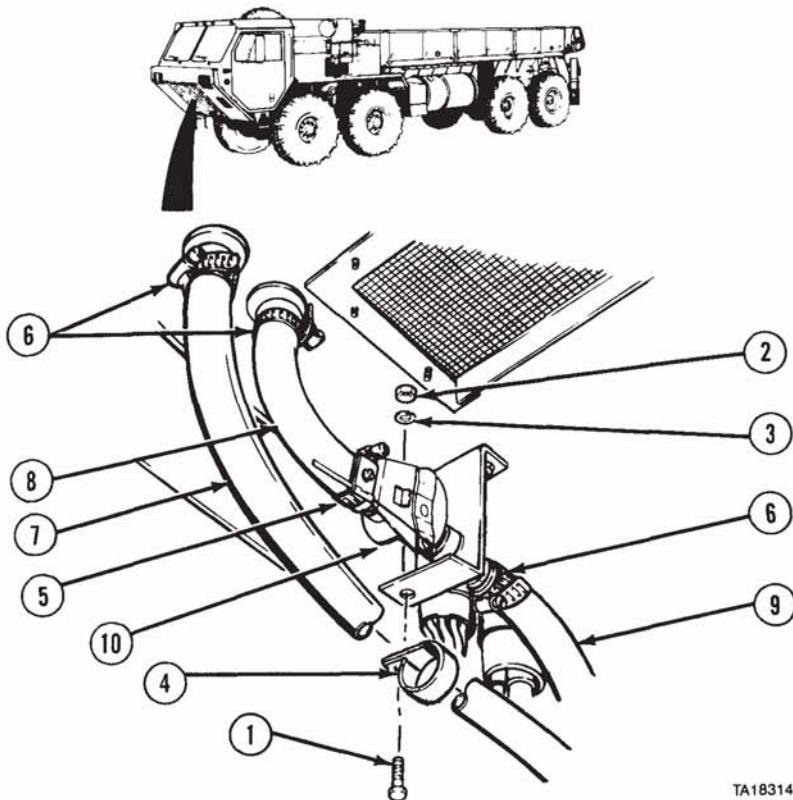
*General Safety Instructions*

None

## Body Accessory Maintenance Instructions (Cont)

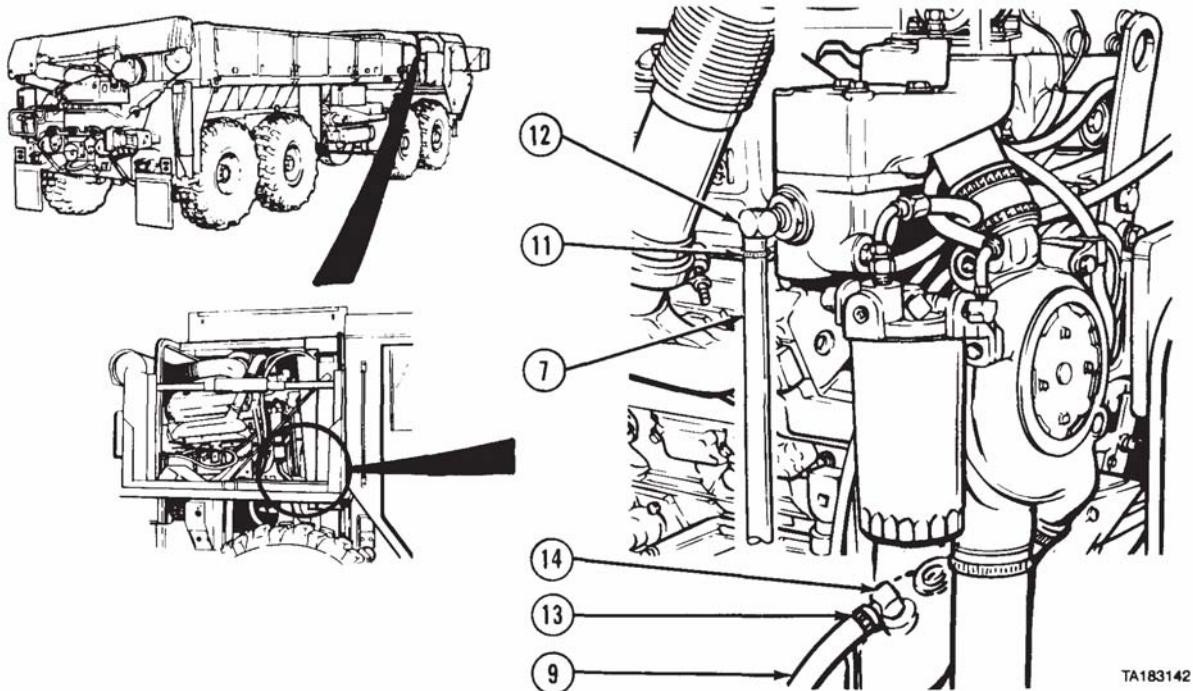
**18-17. HEATER HOSE REMOVAL/INSTALLATION (CONT.).****a. Removal.****NOTE**

- Tag, mark, and note routing of hoses before removal.
  - Cut plastic cable ties as necessary.
- (1) Remove screw (1), nut (2), and lockwasher (3) from clamp (4).
  - (2) Loosen hose clamp (5) and three hose clamps (6).
  - (3) Remove return hose (7) and elbow hose (8).
  - (4) Remove feed hose (9) from valve (10).
  - (5) Remove hose clamps (5 and 6) from hoses (7, 8, and 9).



TA183140

## Body Accessory Maintenance Instructions (Cont)

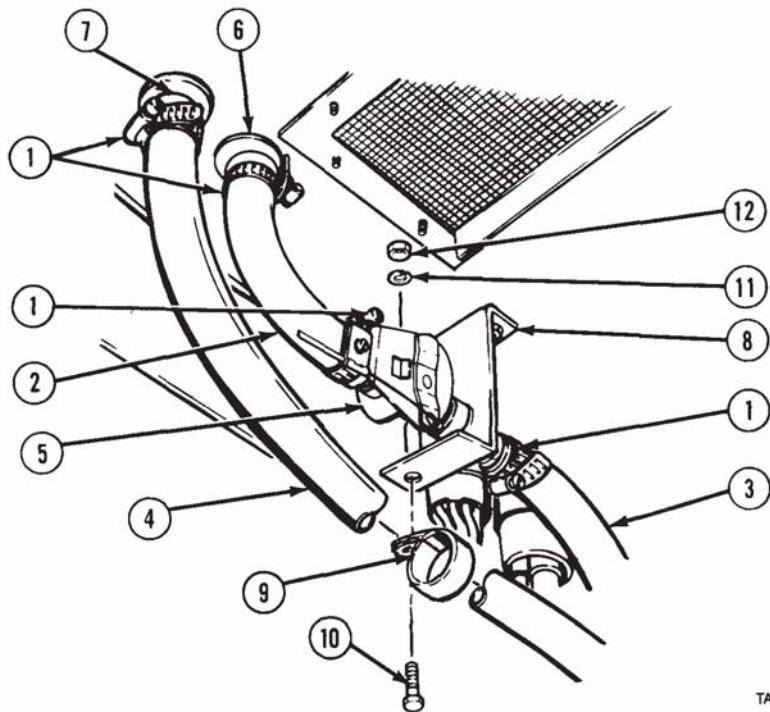


- (6) Loosen hose clamp (11). Remove return hose (7) from elbow (12) and remove hose clamp.
- (7) Loosen hose clamp (13). Remove feed hose (9) from elbow (14).
- (8) Remove hoses (7 and 9).

**b. Installation.****NOTE**

Heater hoses should be routed as noted in removal.

- (1) Install hose clamps (1) on hoses (2, 3, and 4).
- (2) Install elbow hose (2) on valve (5) and heater inlet tube (6). Tighten clamps (1) on elbow hose.
- (3) Install one end of feed hose (3) to valve (5) and tighten clamp (1) on feed hose.
- (4) Install return hose (4) to heater return tube (7) and tighten clamp (1) on return hose.
- (5) Install hose (4) to bracket (8) with clamp (9), screw (10), lockwasher (11), and nut (12).



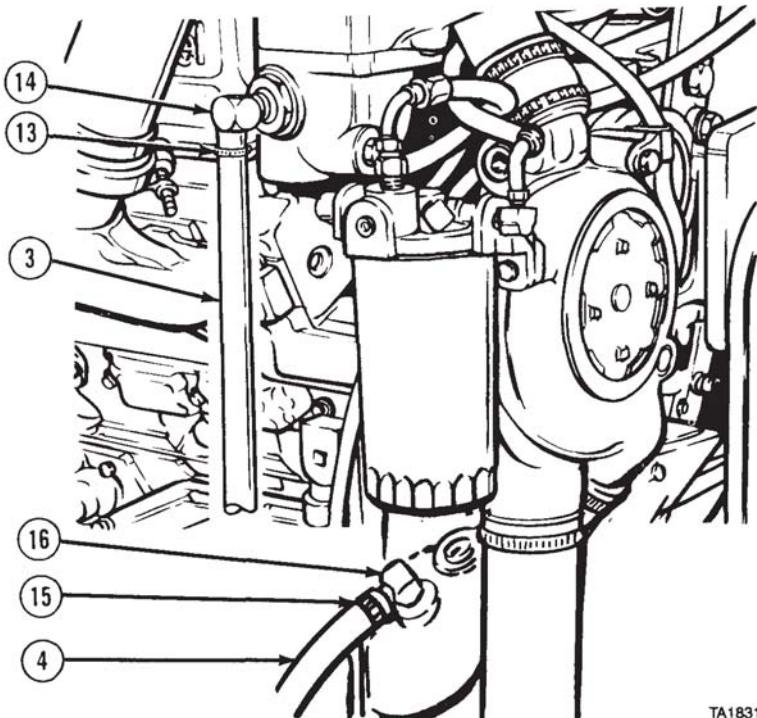
## Body Accessory Maintenance Instructions (Cont)

**18-17. HEATER HOSE REMOVAL/INSTALLATION (CONT.).**

- (6) Install end of feed hose (3) and clamp (13) to elbow (14). Tighten clamp.
- (7) Install end of return hose (4) and clamp (15) to elbow (16). Tighten clamp.
- (8) Install plastic cable ties to support feed hose (3) and return hose (4).

**c. Follow-on Maintenance.**

- (1) Fill cooling system (para 6-2).
- (2) Start engine and warm up to normal operating temperature (TM 9-2320-279-10).
- (3) Check operation of heater.
- (4) Check heater hoses for leaks.
- (5) Shut off engine (TM 9-2320-279-10).

**END OF TASK**

TA183143

**18-18. HEATER CONTROL VALVE REMOVAL/INSTALLATION.**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*

TM or Para

*Condition Description*

TM 9-2320-279-10

Shut off engine.

Para 6-2

Cooling system drained.

Para 16-11

Heater compartment cover removed.

*Special Tools*

None

*Supplies*Compound, sealing, pipe thread, Item 18,  
Appendix C*Special Environmental Conditions*

Tags, identification, Item 48, Appendix C

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic (2)

*General Safety Instructions*

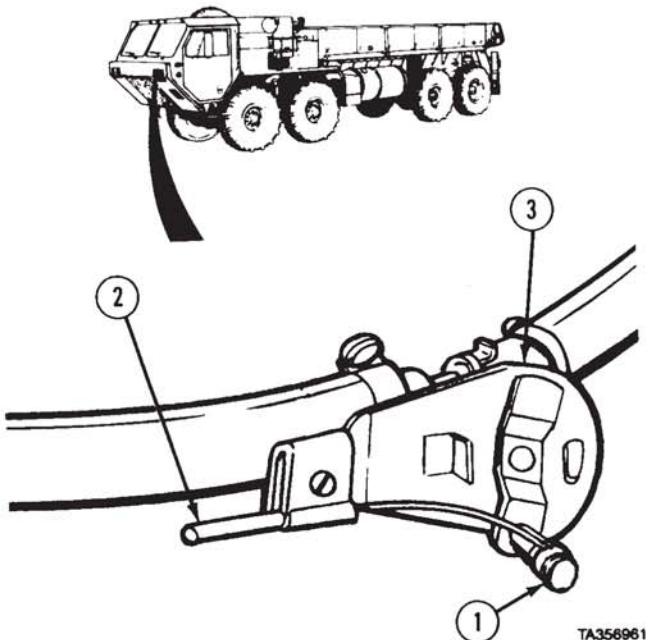
None

## Body Accessory Maintenance Instructions (Cont)

**a. Removal.****NOTE**

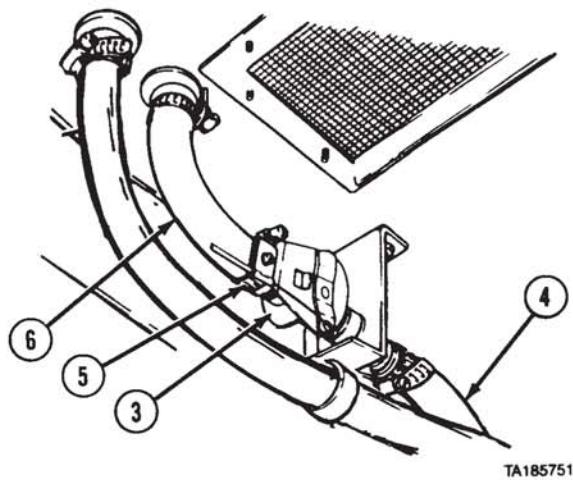
Step (1) will be done behind grille.

- (1) Remove looped end (1) of control cable (2) from control valve (3).

**NOTE**

Tag and mark hoses before removal.

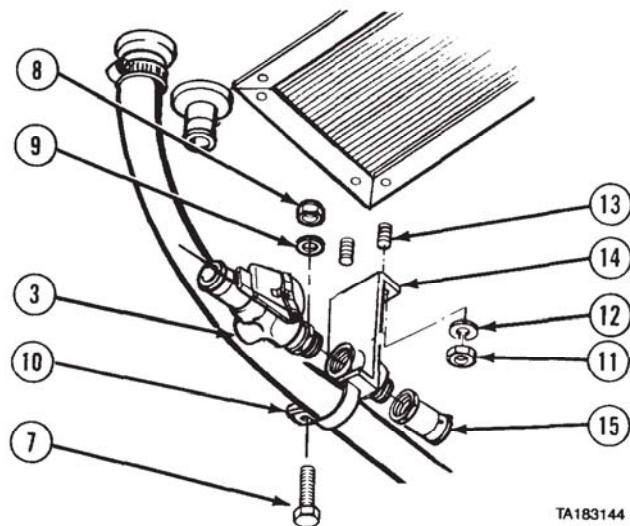
- (2) Remove feeder hose (4) from control valve (3).
- (3) Loosen clamp (5) and remove elbow hose (6) from control valve (3).



## Body Accessory Maintenance Instructions (Cont)

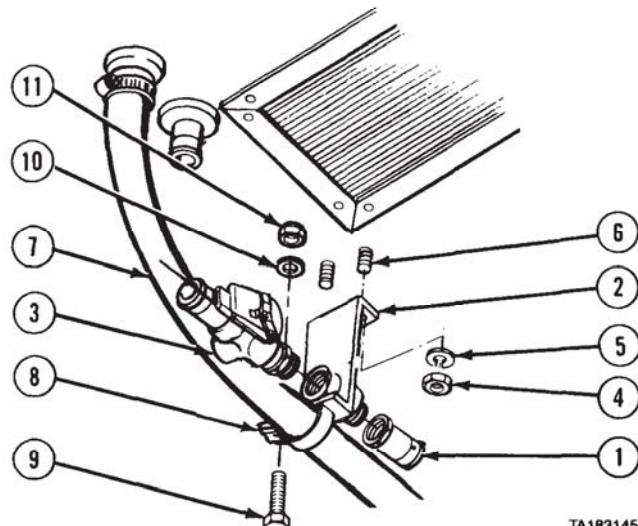
**18-18. HEATER CONTROL VALVE REMOVAL/INSTALLATION (CONT.).**

- (4) Remove screw (7), nut (8), and lockwasher (9) from clamp (10).
- (5) Soldier A removes two nuts (11) and lockwashers (12) while Soldier B holds screws (13) inside heater compartment.
- (6) Remove control valve (3) and bracket assembly (14).
- (7) Remove control valve (3) from bracket assembly (14).
- (8) Remove fitting (15) from bracket assembly (14).

**b. Installation.****WARNING**

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

- (1) Coat threads of fitting (1) with pipe thread sealing compound and install fitting on bracket assembly (2).
- (2) Coat threads of control valve (3) with pipe thread sealing compound and install control valve on bracket assembly (2).
- (3) Soldier A installs control valve (3) and bracket assembly (2) with two nuts (4) and lockwashers (5) while Soldier B holds screws (6) inside heater compartment.
- (4) Install hose (7) to bracket assembly (2) with clamp (8), screw (9), lockwasher (10), and nut (11).

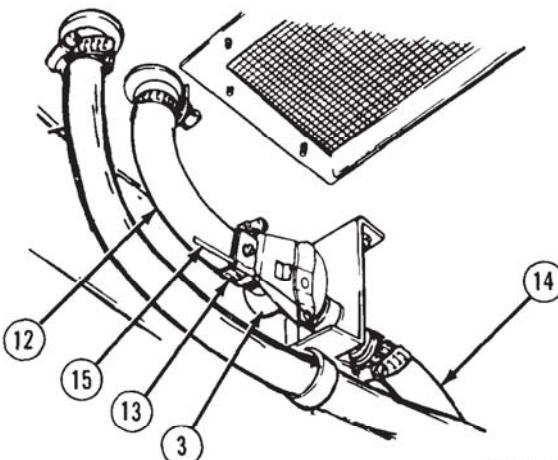


## Body Accessory Maintenance Instructions (Cont)

- (5) Install elbow hose (12) to control valve (3) and tighten clamp (13).
- (6) Connect feeder hose (14) to control valve (3).
- (7) Connect control cable (15) to control valve (3).

**c. Follow-on Maintenance.**

- (1) Fill cooling system (para 6-2).
- (2) Install heater compartment cover (para 16-11).
- (3) Start engine and warm up to normal operating temperature (TM 9-2320-279-10).
- (4) Check for warm air out of heater.
- (5) Check heater hoses for leaks.
- (6) Shut off engine (TM 9-2320-279-10).



TA185752

**END OF TASK****18-19. HEATER RESISTOR REMOVAL/INSTALLATION.**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
Para 7-91	Batteries disconnected.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

None

*General Safety Instructions*

None

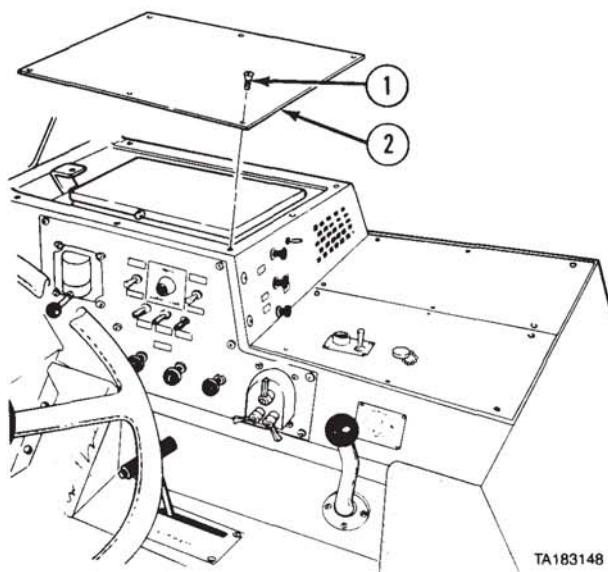
*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

Body Accessory Maintenance Instructions (Cont)

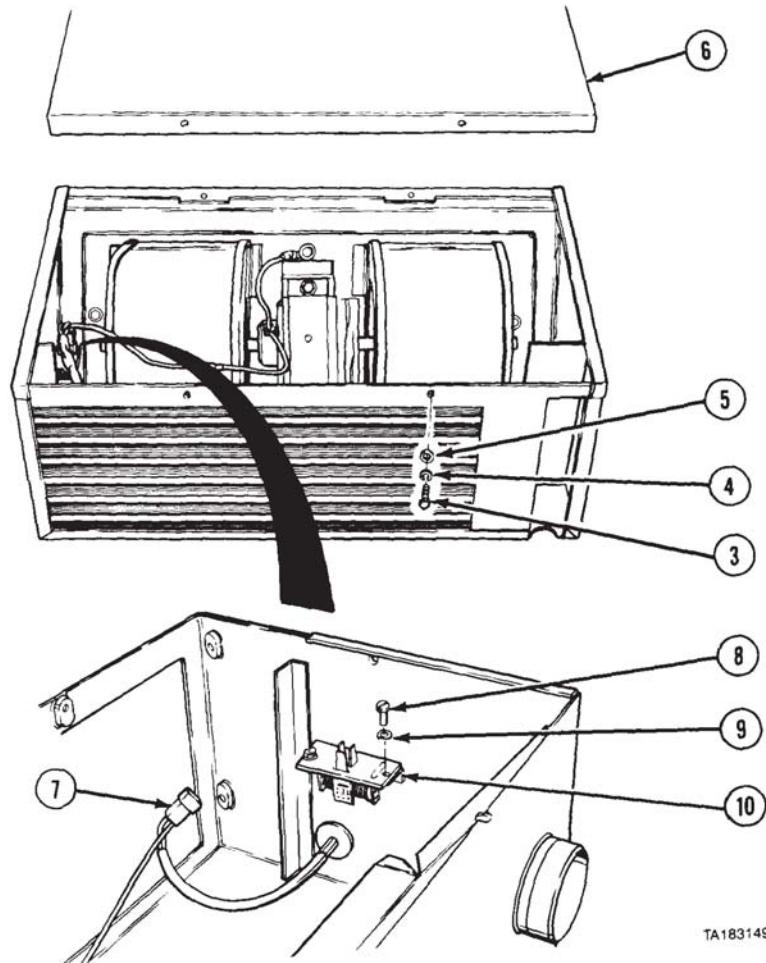
**18-19. HEATER RESISTOR REMOVAL/INSTALLATION (CONT.).**

*a. Removal.*



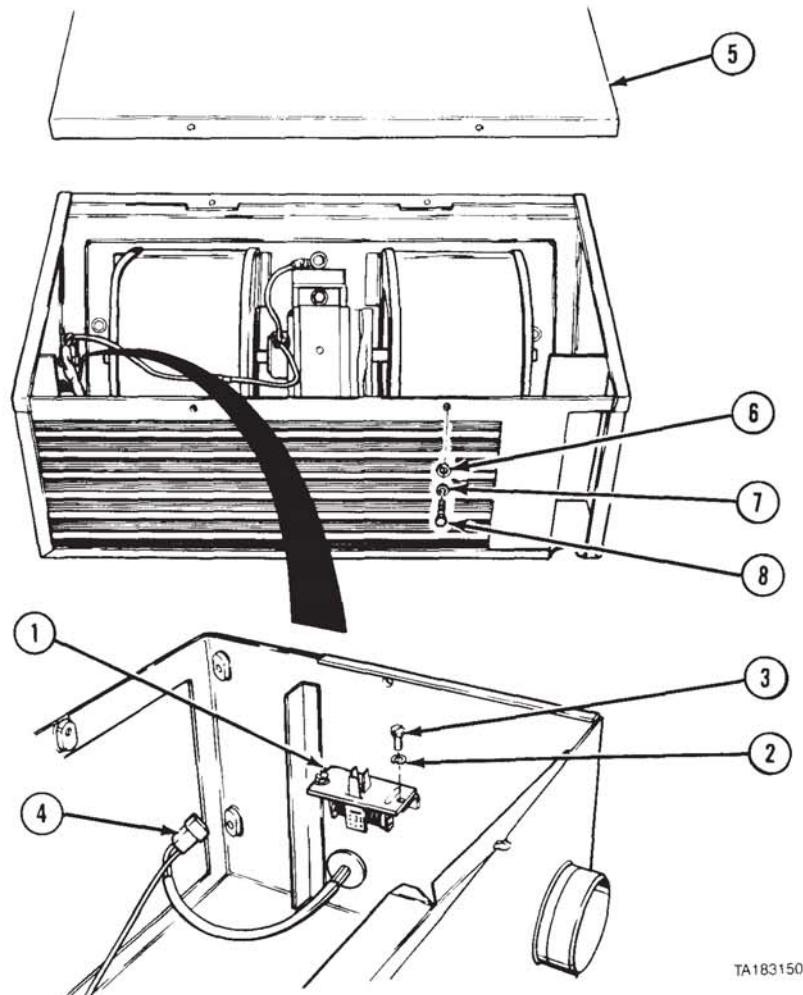
(1) Remove eight screws (1) and heater compartment cover (2).

## Body Accessory Maintenance Instructions (Cont)



- (2) Remove six screws (3), lockwashers (4), and washers (5). Remove top heater cover (6).
- (2) Remove six screws (3), lockwashers (4), and washers (5). Remove top heater cover (6).
- (3) Disconnect wire connector (7).
- (4) Remove two screws (8) and washers (9).
- (5) Remove heater resistor (10).

## Body Accessory Maintenance Instructions (Cont)

**18-19. HEATER RESISTOR REMOVAL/INSTALLATION (CONT.).****b. Installation.**

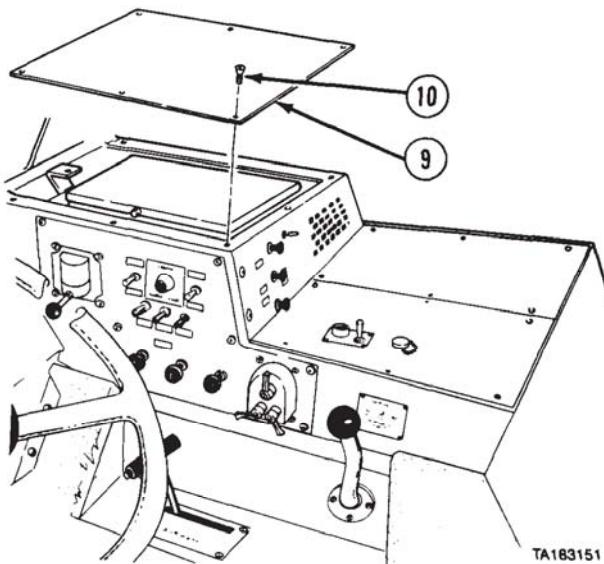
- (1) Install heater resistor (1) with two washers (2) and screws (3).
- (2) Install wire connector (4).
- (3) Install top heater cover (5) with six washers (6), lockwashers (7), and screws (8).

## Body Accessory Maintenance Instructions (Cont)

- (4) Install heater compartment cover (9) with eight screws (10).

**c. Follow-on Maintenance.**

- (1) Connect batteries (para 7-91).  
 (2) Check operation of heater  
 (TM 9-2320-279-10).

**END OF TASK****18-20. HEATER MOTOR AND COIL REMOVAL/INSTALLATION.**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
Para 7-91	Batteries disconnected.
Para 6-2	Cooling system drained.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

Tags, identification, Item 48, Appendix C

*General Safety Instructions*

None

*Personnel Required*

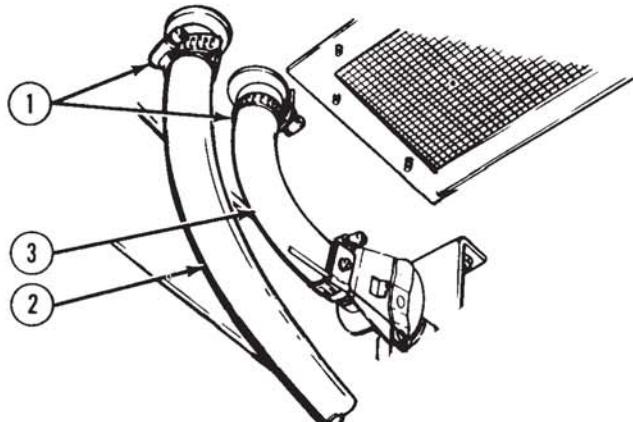
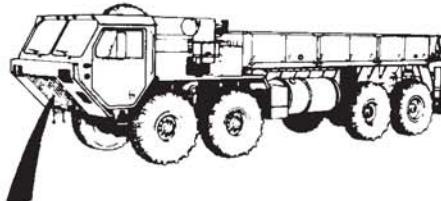
MOS 63S, Heavy wheel vehicle mechanic

## Body Accessory Maintenance Instructions (Cont)

**18-20. HEATER MOTOR AND COIL REMOVAL/INSTALLATION (CONT).****a. Removal.****NOTE**

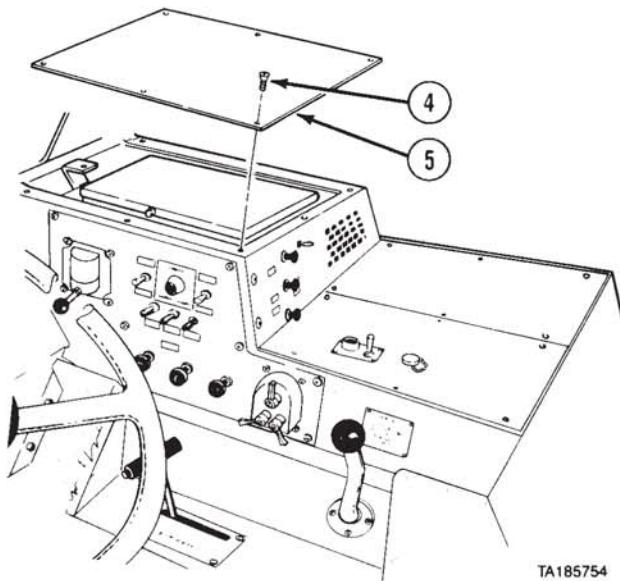
Tag and mark wires and hoses before removal.

- (1) Loosen hose clamps (1).
- (2) Remove return hose (2) and elbow hose (3).



TA185749

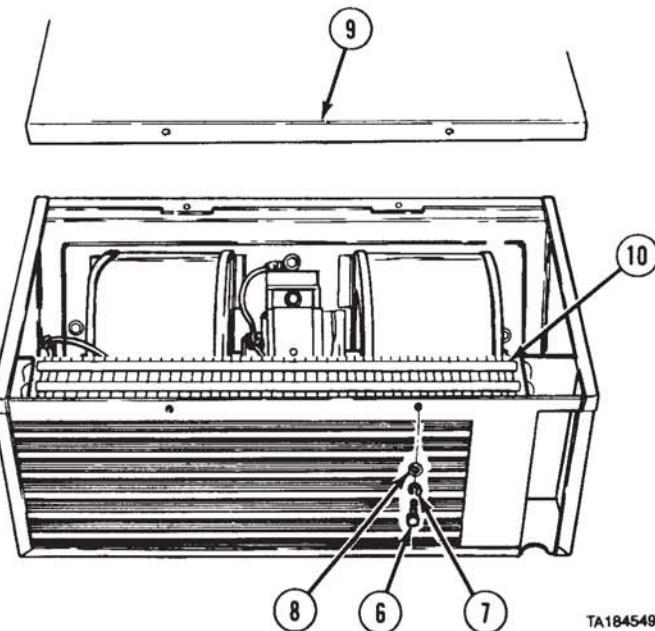
- (3) Remove eight screws (4) and heater compartment cover (5).



TA185754

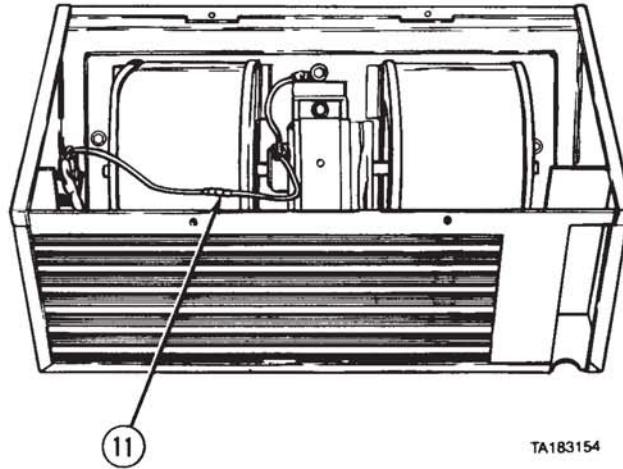
## Body Accessory Maintenance Instructions (Cont)

- (4) Remove six screws (6), lockwashers (7), and washers (8). Remove heater cover (9).
- (5) Lift heater coil (10) out of heater housing.



TA184549

- (6) Disconnect motor lead wire (11).

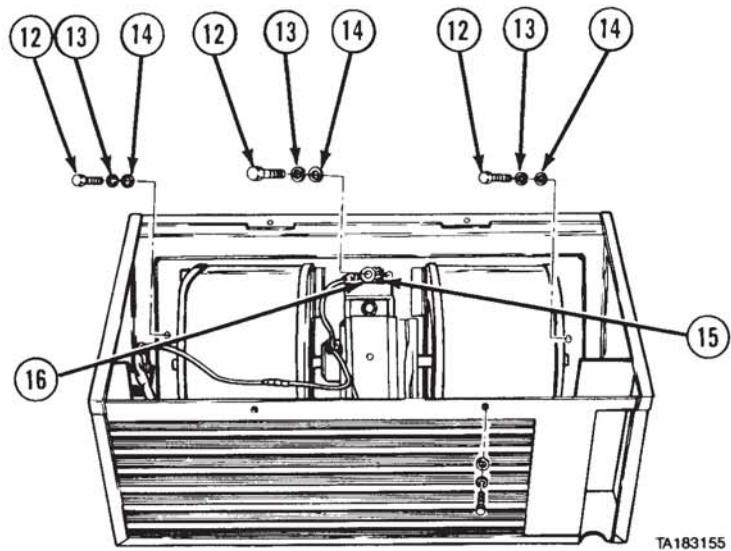


TA183154

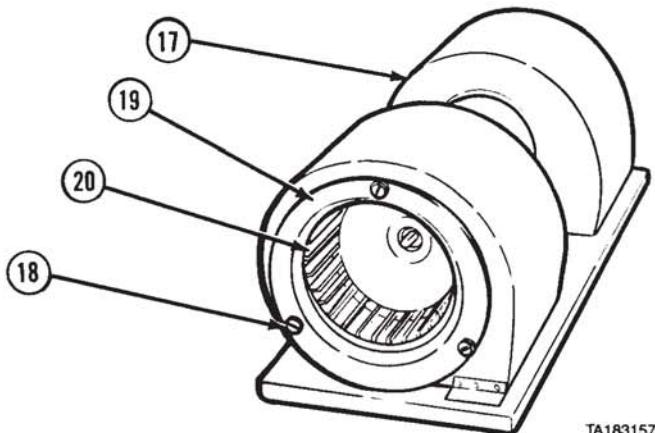
## Body Accessory Maintenance Instructions (Cont)

**18-20. HEATER MOTOR AND COIL REMOVAL/INSTALLATION (CONT).**

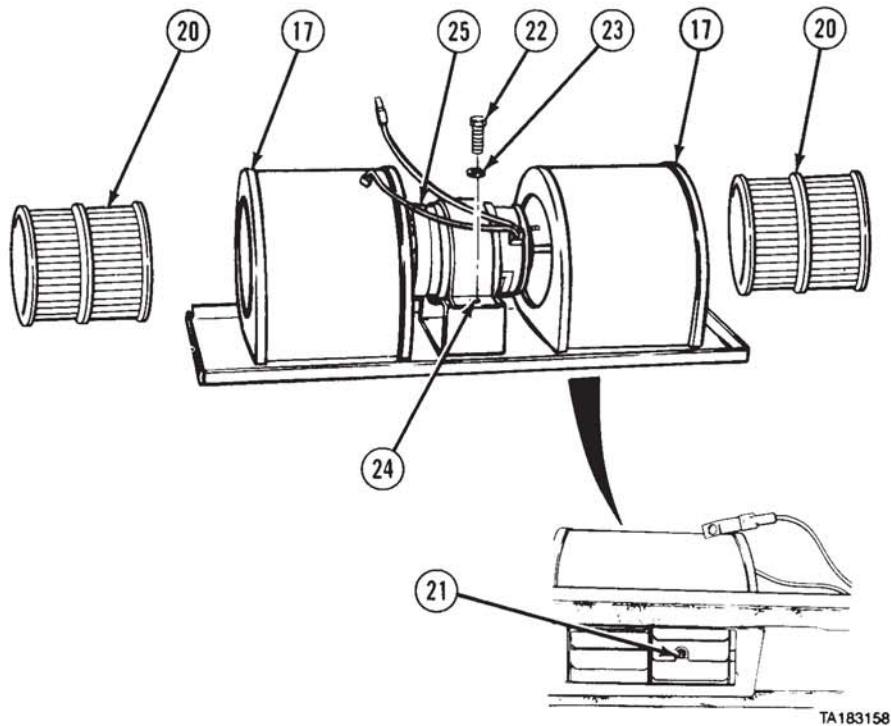
- (7) Remove three screws (12), lockwashers (13), and washers (14). Lockwashers (15) and ground wire (16) will come free.



- (8) Lift out blower assembly housing (17) from heater housing.  
 (9) Remove six screws (18) and two foils (19) from blower assembly housing (17).  
 (10) Matchmark location of blower wheels (20).



## TextBody Accessory Maintenance Instructions (Cont)



(11) Loosen two screws (21).

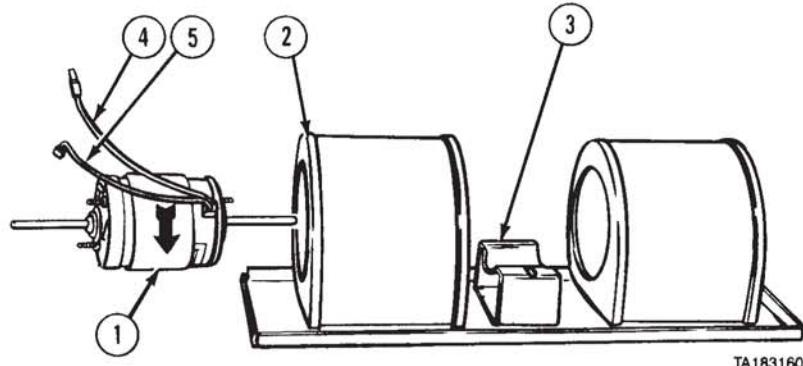
(12) Remove blower wheels (20) from blower assembly housing (17).

**NOTE**

Note direction of rotation arrow on motor.

(13) Remove screw (22), washer (23), and motor strap (24). Remove motor (25) through blower assembly housing (17).

**b. Installation.**

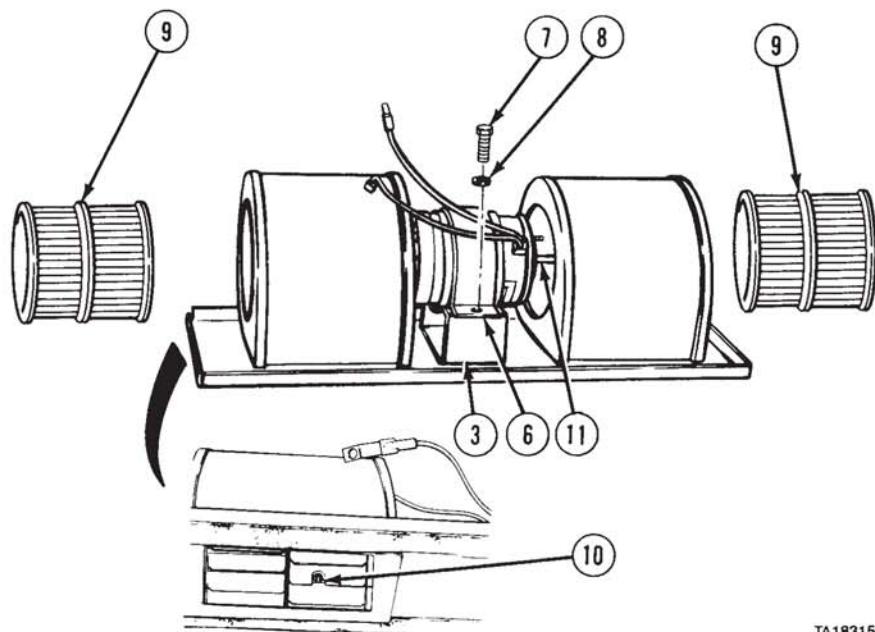


**NOTE**

Note direction of rotation arrow on motor.

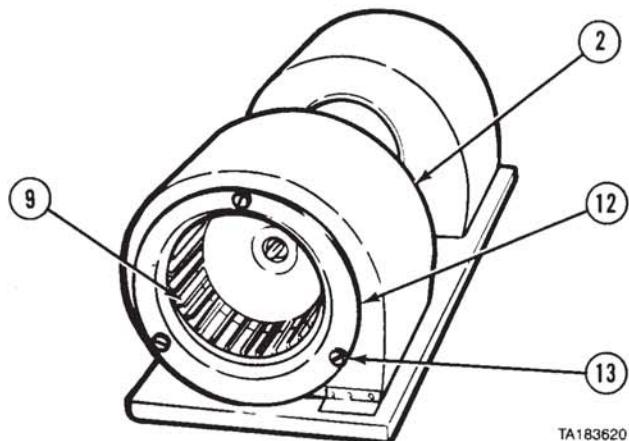
(1) Install motor (1) through blower assembly housing (2). Seat motor in mount (3) with ground wire (4) and motor lead wire (5) on top.

## Body Accessory Maintenance Instructions (Cont)

**18-20. HEATER MOTOR AND COIL REMOVAL/INSTALLATION (CONT.).**

TA183159

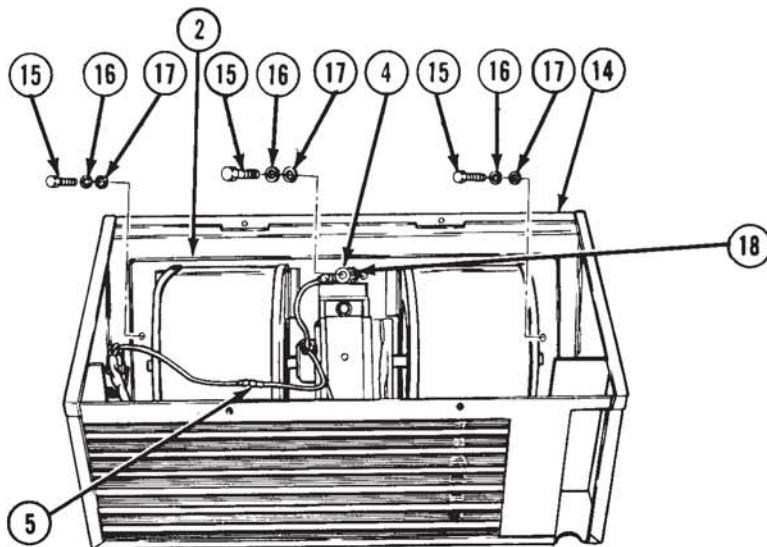
- (2) Hook motor strap (6) into notch in mount (3) and install screw (7) and washer (8). Tighten only enough to hold parts together.
- (3) Install blower wheels (9). Tighten two screws (10) to lock blower wheels on motor shaft (11).
- (4) Spin blower wheels (9) to be sure wheels turn freely.
- (5) Tighten screw (7).
- (6) Install two foils (12) on blower assembly housing (2) with six screws (13). Spin blower wheels (9) to make sure they turn freely.



TA183620

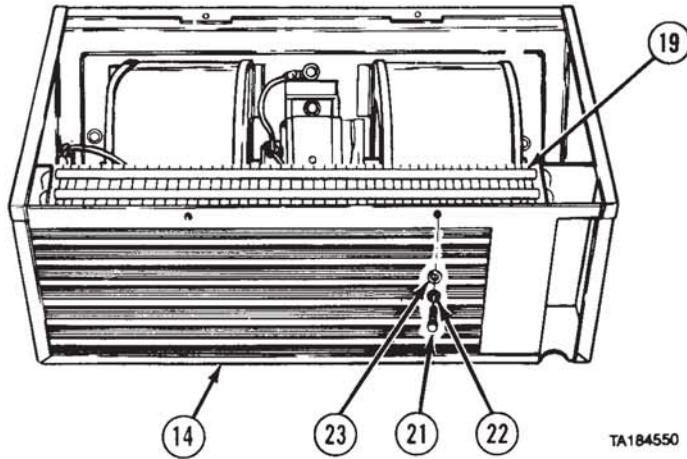
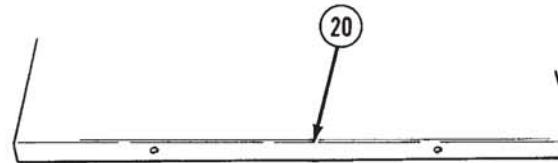
## Body Accessory Maintenance Instructions (Cont)

- (7) Install blower assembly housing (2) in heater housing (14) with three screws (15), lockwashers (16), and washers (17). Install lockwasher (18) and ground wire (4) with middle screw.  
 (8) Connect motor lead wire (5).



TA183156

- (9) Lower heater coil (19) straight down into heater housing (14).  
 (10) Install heater cover (20) with six screws (21), lockwashers (22), and washers (23).

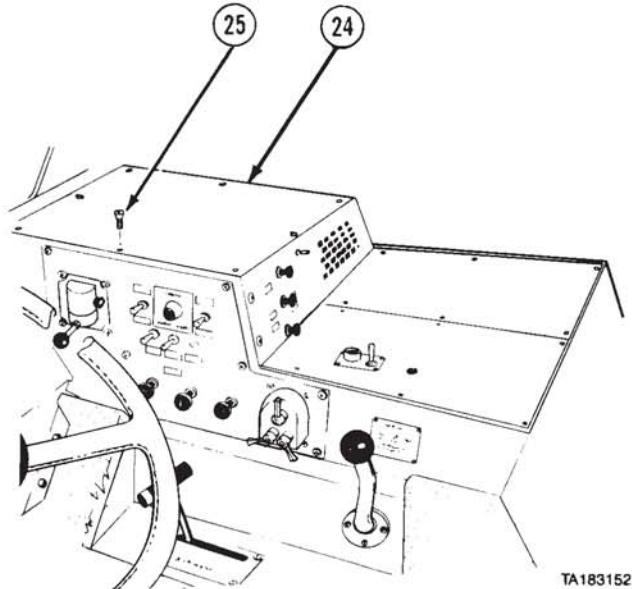


TA184550

## Body Accessory Maintenance Instructions (Cont)

**18-20. HEATER MOTOR AND COIL REMOVAL/INSTALLATION (CONT).**

- (11) Install heater compartment cover (24) with eight screws (25).



TA183152

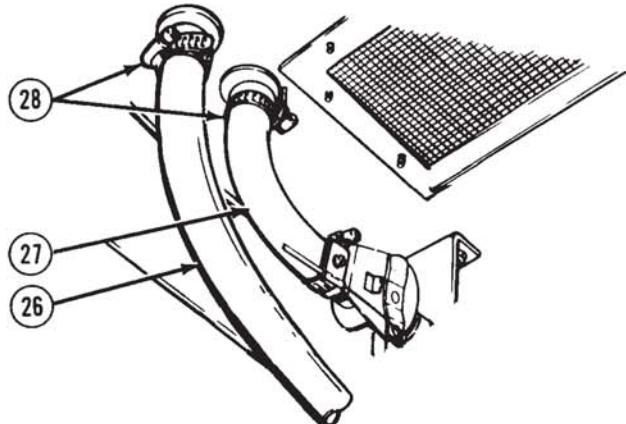
- (12) Install return hose (26) and elbow hose (27).

- (13) Tighten hose clamps (28).

**c. Follow-on Maintenance.**

- (1) Fill cooling system (para 6-2).
- (2) Check for leaks.
- (3) Connect batteries (para 7-91).
- (4) Check operation of heater (TM 9-2320-279-10).

**END OF TASK**



TA185750

## Body Accessory Maintenance Instructions (Cont)

**18-21. HEATER ASSEMBLY REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
TM 9-2320-279-10	Shut off engine.
Para 6-2	Cooling system drained.
Para 7-91	Batteries disconnected.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

Ties, cable, plastic, Item 52, Appendix C

*General Safety Instructions*

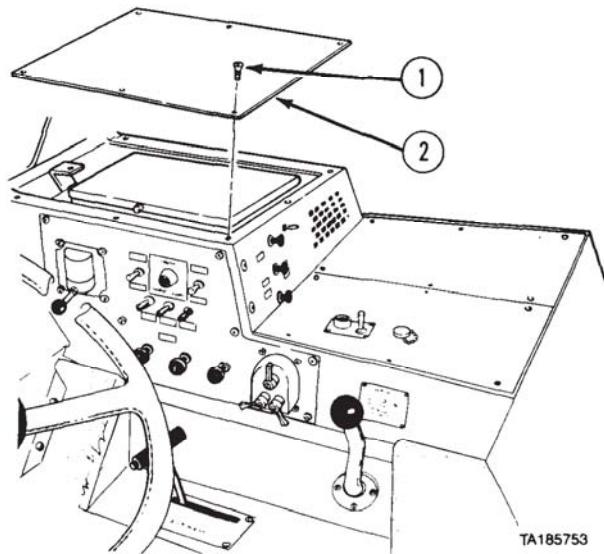
None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

**a. Removal.**

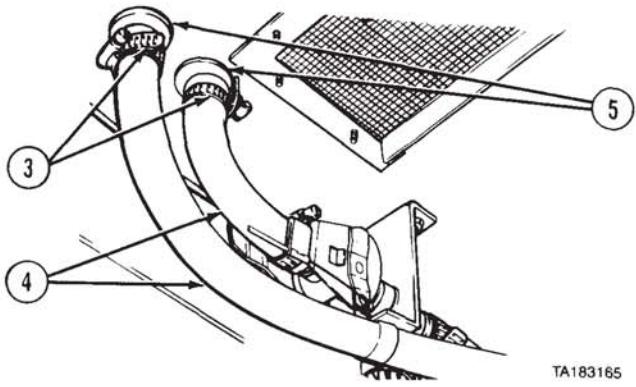
- (1) Remove eight screws (1) and heater cover (2).



## Body Accessory Maintenance Instructions (Cont)

**18-21. HEATER ASSEMBLY REMOVAL/INSTALLATION (CONT.).**

- (2) Loosen clamps (3).
- (3) Disconnect heater hoses (4) from flanges (5).

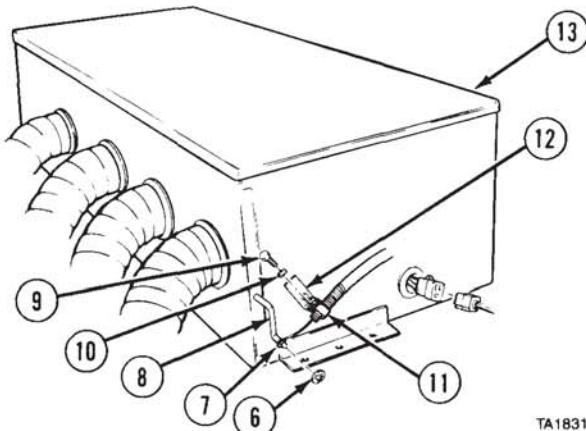


TA183165

**NOTE**

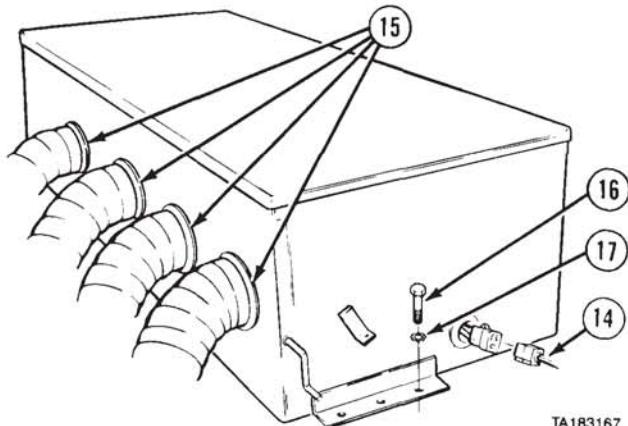
Steps (4) through (8) will be done from left side of heater.

- (4) Remove retainer (6) and pull looped end of defrost control cable (7) off defroster control arm (8).
- (5) Remove screw (9) and lockwasher (10). Remove clamp (11) from anchor bracket (12) on heater case (13).



TA183166

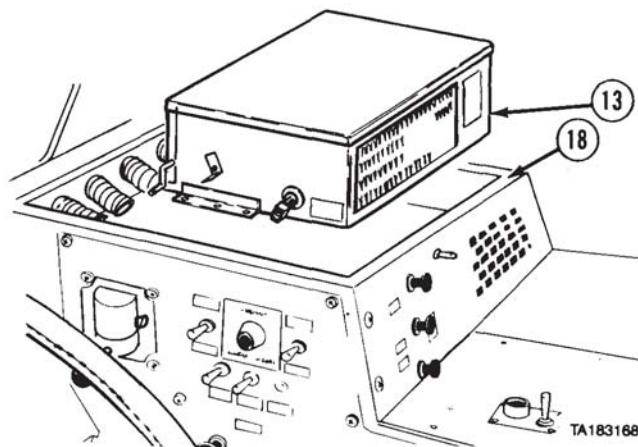
- (6) Disconnect electrical connector (14).
- (7) Disconnect four heater ducts (15).
- (8) Remove six screws (16) and lockwashers (17).



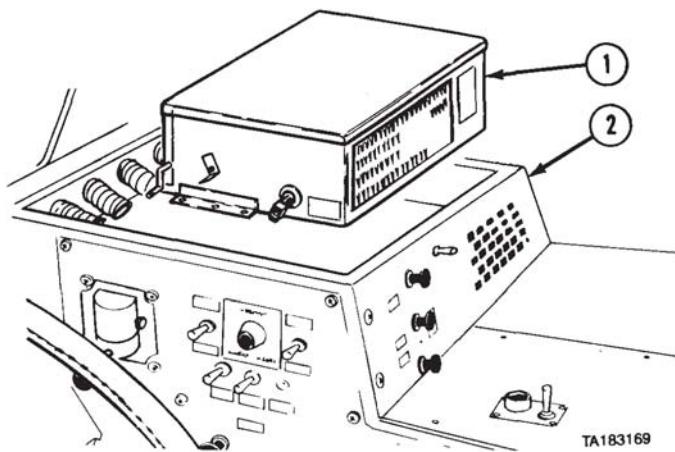
TA183167

## Body Accessory Maintenance Instructions (Cont)

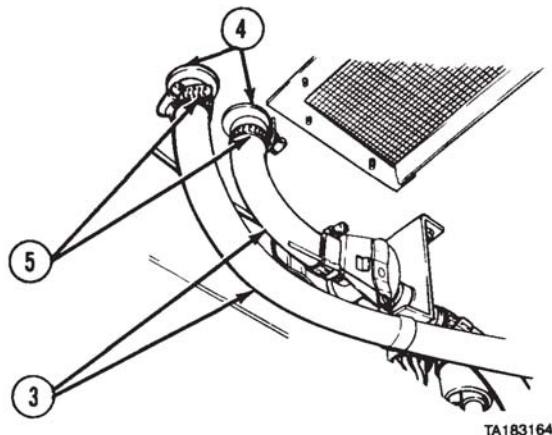
- (9) Remove heater case (13) from heater compartment (18).

**b. Installation.**

- (1) Position heater case (1) in heater compartment (2).



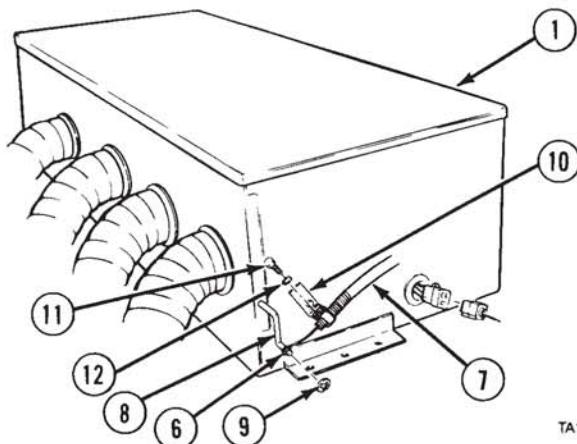
- (2) Install heater hoses (3) on flanges (4) with clamps (5).



## Body Accessory Maintenance Instructions (Cont)

**18-21. HEATER ASSEMBLY REMOVAL/INSTALLATION (CONT.).**

- (3) Connect looped end (6) of defrost control cable (7) to defroster control arm (8) and install retainer (9). Anchor defrost control cable to side of heater case (1) with clamp (10), screw (11), and lockwasher (12).



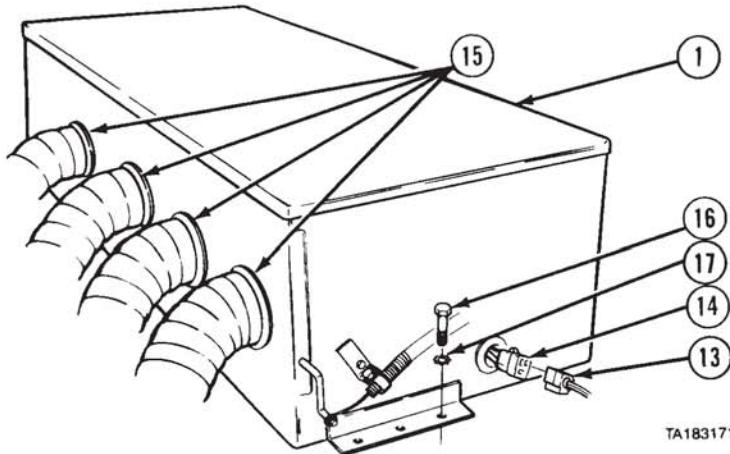
TA183170

- (4) Connect electrical connector (13) in plug (14).  
 (5) Connect four heater ducts (15).

**NOTE**

Plastic cable ties are installed as needed.

- (6) Install six screws (16) and lockwashers (17) to attach heater case (1) to heater compartment.

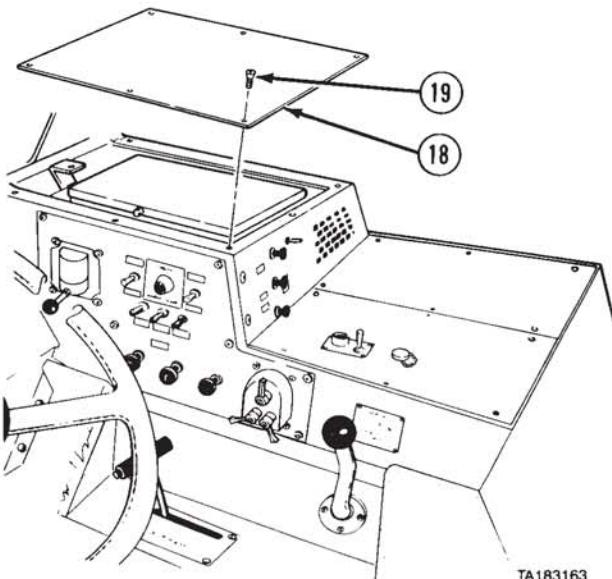


TA183171

- (7) Install heater compartment cover (18) and eight screws (19).

**c. Follow-on Maintenance.**

- (1) Fill cooling system (para 6-2).
- (2) Connect batteries (para 7-91).
- (3) Start engine and warm up to normal operating temperature (TM 9-2320-279-10).
- (4) Check operation of heater (TM 9-2320-279-10).
- (5) Check heater hoses for leaks.
- (6) Shut off engine (TM 9-2320-279-10).

**END OF TASK**

TA183163

## Body Accessory Maintenance Instructions (Cont)

**18-22. CAB AIR VENT BOX AND SCREEN REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition**TM or Para*

Condition Description

Para 7-91

Batteries disconnected.

Para 18-21

Heater assembly removed.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

Adhesive-sealant, silicone, Item 4, Appendix C

*General Safety Instructions*

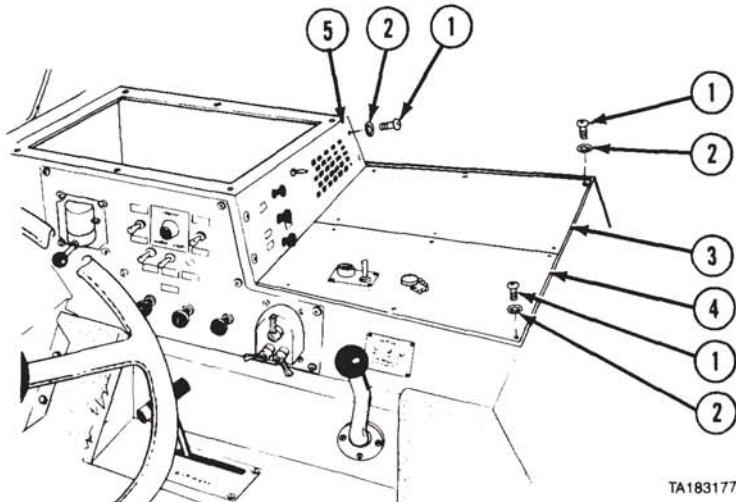
None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic (2)

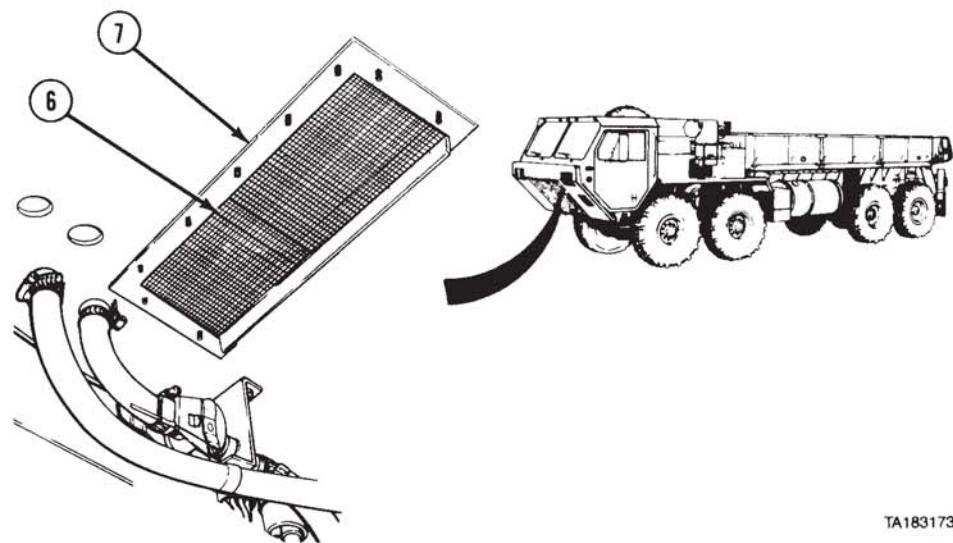
**a. Removal.**

- (1) Remove 15 screws (1) and lockwashers (2).
- (2) Remove panels (3, 4, and 5).



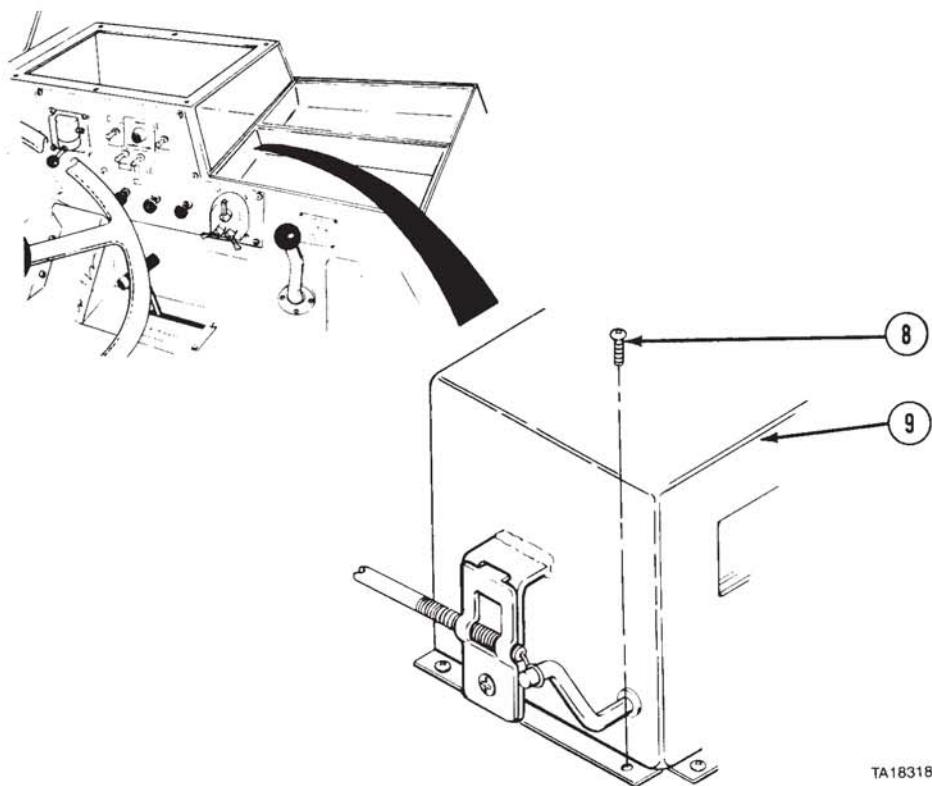
TA183177

## Body Accessory Maintenance Instructions (Cont)

**18-22. CAB AIR VENT BOX AND SCREEN REMOVAL/INSTALLATION (CONT).**

TA183173

- (3) Soldier A holds and removes screen (6) and bracket (7) while Soldier B does step (4).

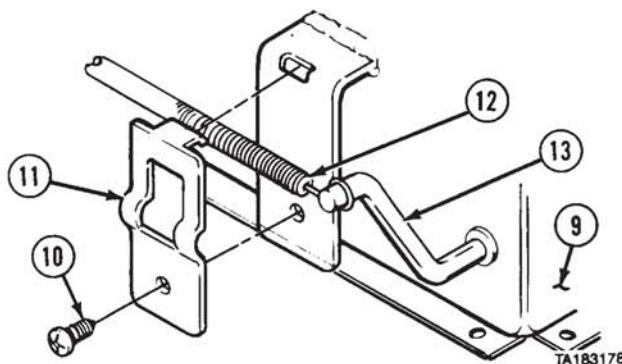


TA183180

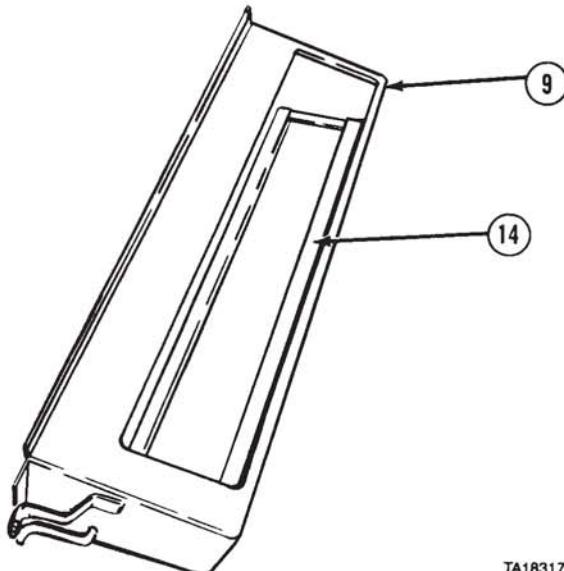
- (4) Remove 14 screws (8) from cab air vent box (9).

## Body Accessory Maintenance Instructions (Cont)

- (5) Remove screw (10) and cable bracket (11).
- (6) Remove cable end (12) from lever (13).
- (7) Remove cab air vent box (9).

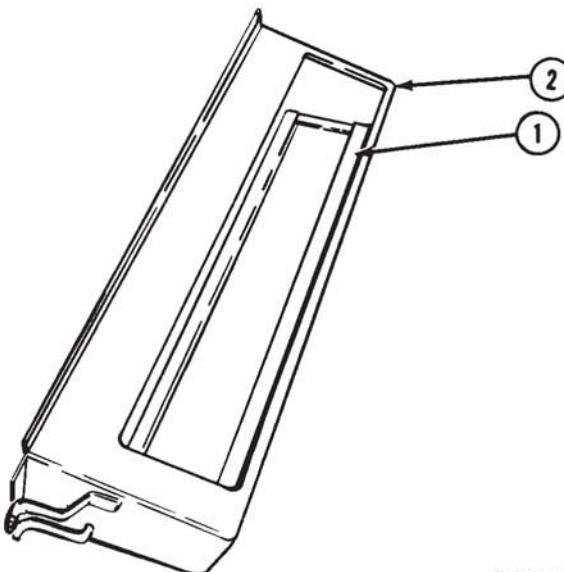


- (8) Remove two-piece seal (14) from cab air vent box (9).

**b. Installation.****WARNING**

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

- (1) Install two-piece seal (1) in cab air vent box (2) using silicone sealant.

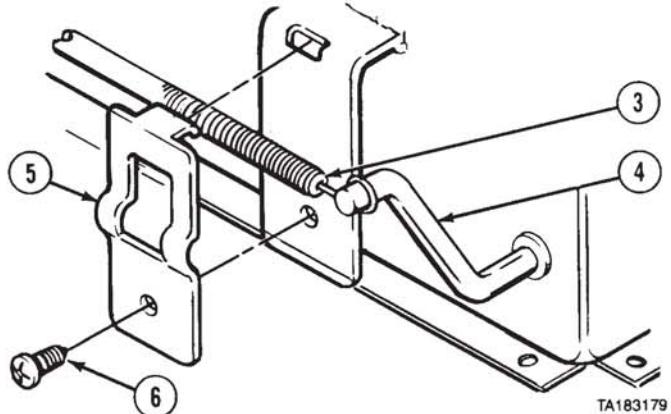


## Body Accessory Maintenance Instruction (Cont)

**18-22. CAB AIR VENT BOX AND SCREEN REMOVAL/INSTALLATION (CONT.).****NOTE**

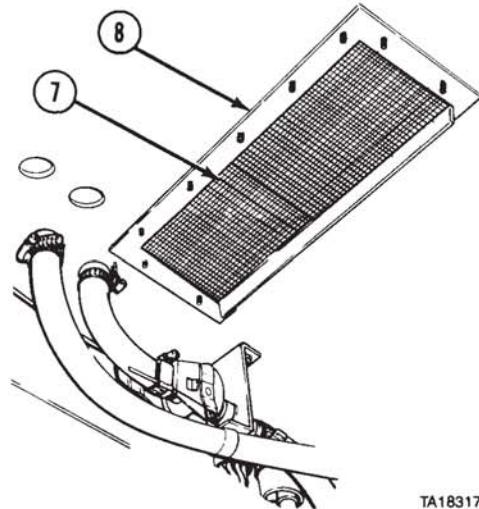
Door will be in closed position for proper adjustment.

- (2) Install cable end (3) on lever (4).
- (3) Install cable bracket (5) with screw (6).



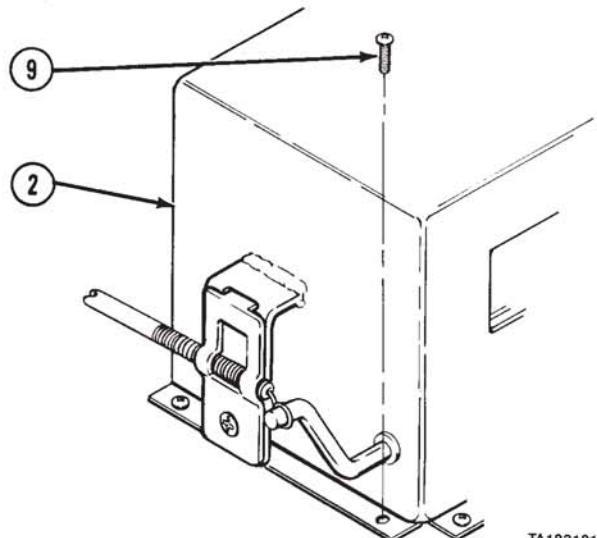
TA183179

- (4) Soldier A holds screen (7) and bracket (8) while Soldier B does step (5).



TA183172

- (5) Install cab air vent box (2) with 14 screws (9).



TA183181

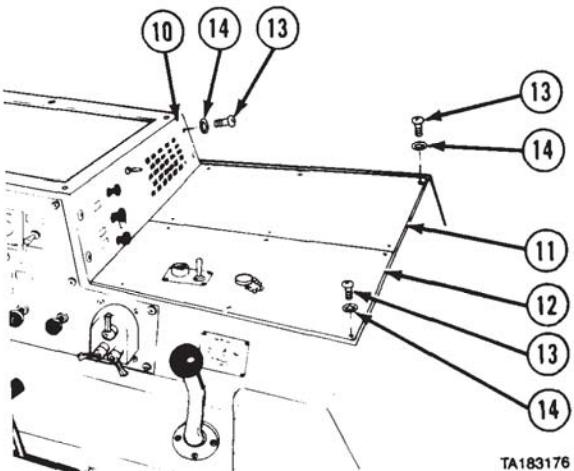
## Body Accessory Maintenance Instructions (Cont)

- (6) Install panels (10, 11, and 12) with 15 screws (13) and lockwashers (14).

**c. Follow-on Maintenance.**

- (1) Install heater assembly (para 18-21).
- (2) Connect batteries (para 7-91).
- (3) Start engine and warm up to normal operating temperature (TM 9-2320-279-10).
- (4) Check operation of heater (TM 9-2320-279-10).
- (5) Check heater hoses for leaks.
- (6) Shut off engine (TM 9-2320-279-10).

**END OF TASK**



TA183176

### 18-23. HEATER CONTROL CABLE ASSEMBLY REMOVAL/INSTALLATION.

This task covers:

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

#### INITIAL SETUP

*Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
Para 7-91	Batteries disconnected.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

Ties, cable, plastic, Item 52, Appendix C

*General Safety Instructions*

None

*Personnel Required*

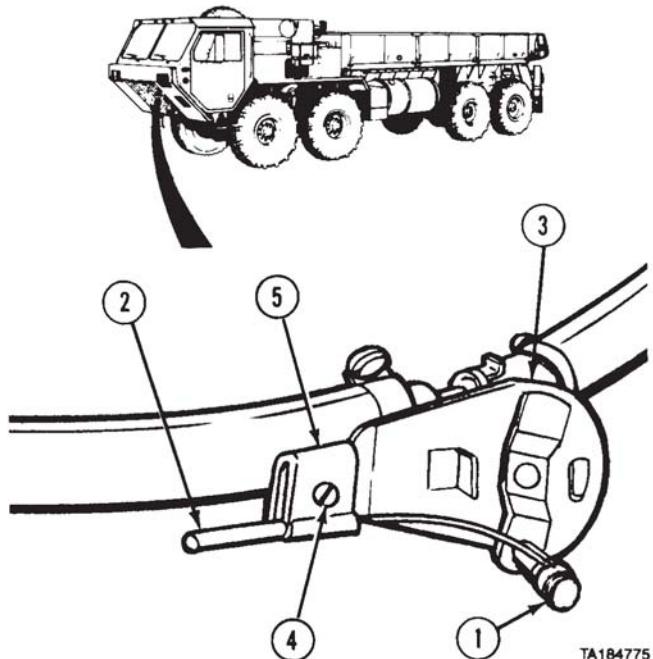
MOS 63S, Heavy wheel vehicle mechanic

## Body Accessory Maintenance Instructions (Cont)

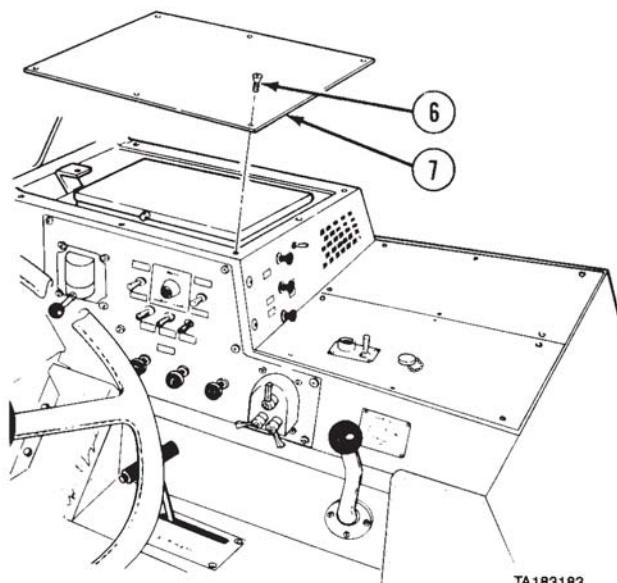
**18-23. HEATER CONTROL CABLE ASSEMBLY REMOVAL/INSTALLATION (CONT).****a. Removal.****NOTE**

Step (1) will be done behind grille.

- (1) Remove looped end (1) of control cable (2) from heater control valve (3).
- (2) Loosen screw (4) to loosen retainer (5) and free control cable (2).
- (3) Pull control cable (2) from retainer (5).



- (4) Remove eight screws (6) and heater compartment cover (7).

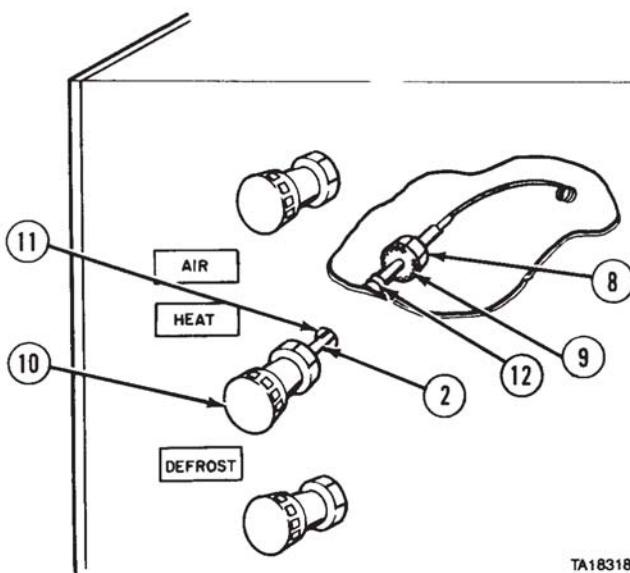


## Body Accessory Maintenance Instructions (Cont)

**NOTE**

Cut plastic cable ties as required.

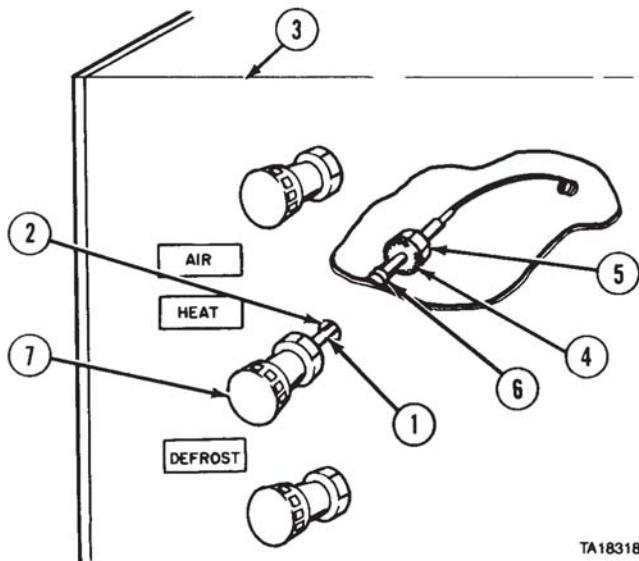
- (5) Remove jamnut (8) and lockwasher (9) from threads on control cable (2).
- (6) Remove control cable (2), lockwasher (9), and jamnut (8) by pulling control knob (10) from mounting hole (11) and grommet (12).



TA183185

**b. Installation.**

- (1) Install control cable (1) through mounting hole (2) in heater compartment (3).
- (2) Install lockwasher (4) and jamnut (5) on control cable (1) in heater compartment (3).
- (3) Install control cable (1) through grommet (6) in heater compartment (3).
- (4) Tighten jamnut (5) and lockwasher (4) to install control knob (7) in heater compartment (3) mounting hole (2).

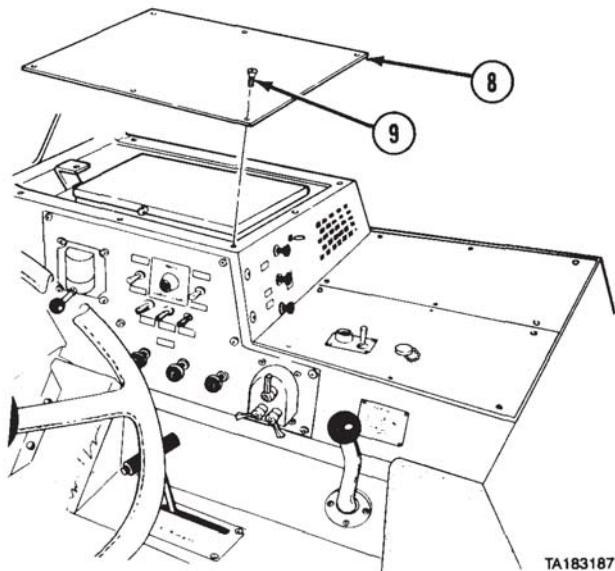


TA183186

## Body Accessory Maintenance Instructions (Cont)

**18-23. HEATER CONTROL CABLE ASSEMBLY REMOVAL/INSTALLATION (CONT).**

- (5) Install heater compartment cover (8) with eight screws (9).

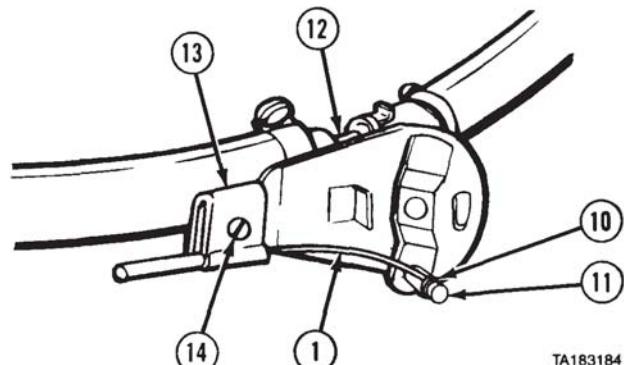
**NOTE**

Replace plastic cable ties as required.

- (6) Install looped end (10) of control cable (1) on shaft (11) of heater control valve (12).  
 (7) Place control cable (1) in retainer (13) and tighten screw (14).

**c. Follow-on Maintenance.**

- (1) Connect batteries (para 7-91).
- (2) Start engine and warm up to normal operating temperature (TM 9-2320-279-10).
- (3) Check operation of heater control (TM 9-2320-279-10).
- (4) Shut off engine (TM 9-2320-279-10).



**END OF TASK**

## Body Accessory Maintenance Instructions (Cont)

**18-24. DEFROSTER CONTROL CABLE REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition**TM or Para*

Para 7-91

*Condition Description*

Batteries disconnected.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

None

*General Safety Instructions*

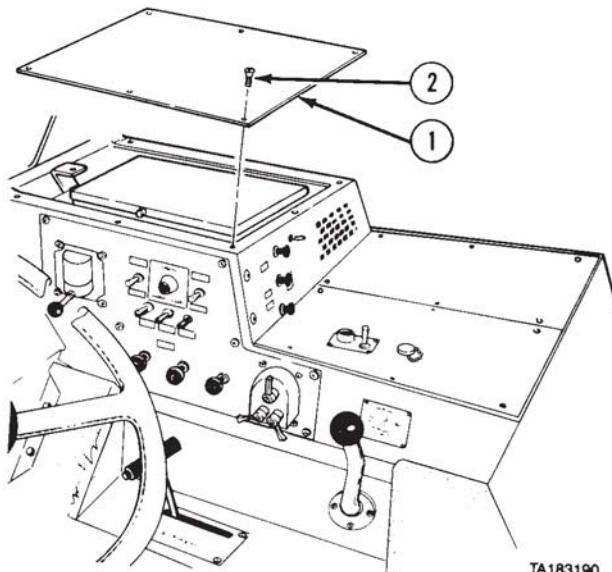
None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

**a. Removal.**

- (1) Remove eight screws (1) and heater compartment cover (2).

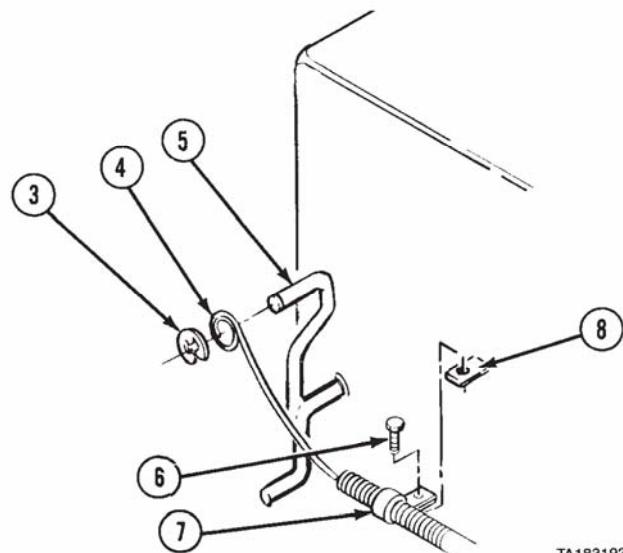


TA183190

## Body Accessory Maintenance Instructions (Cont)

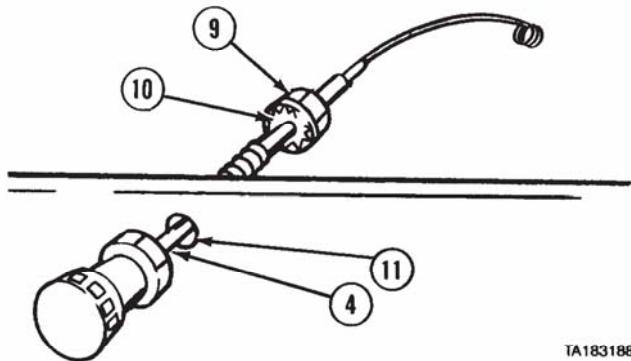
**18-24. DEFROSTER CONTROL CABLE REMOVAL/INSTALLATION (CONT).**

- (2) Remove retainer (3) and pull looped end of defroster control cable (4) off defroster control arm (5).
- (3) Remove screw (6) and clamp (7) from anchor bracket (8).
- (4) Remove clamp (7) from defroster control cable (4).



TA183193

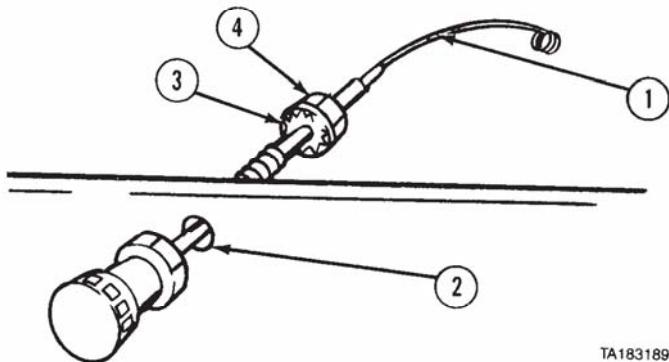
- (5) Remove jamnut (9) and lockwasher (10).
- (6) Remove defroster control cable (4) from mounting hole (11).



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**b. Installation.**

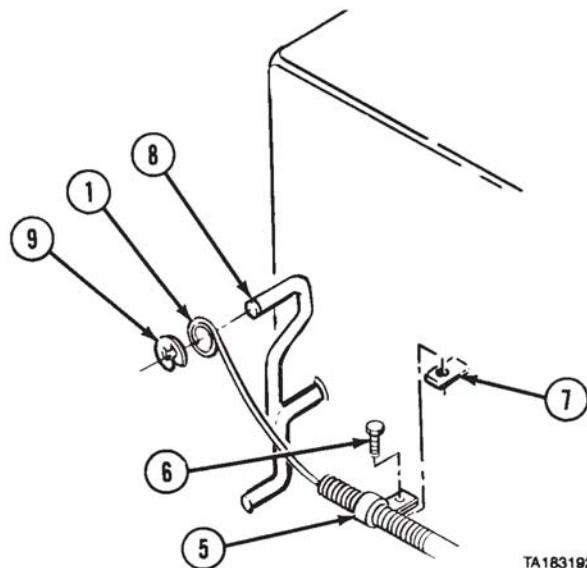
- (1) Install looped end of defroster control cable (1) through mounting hole (2).
- (2) Install lockwasher (3) and jamnut (4) on defroster control cable (1).



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## Body Accessory Maintenance Instructions (Cont)

- (3) Install clamp (5) with screw (6) on anchor bracket (7).
- (4) Install looped end of defroster control cable (1) on defroster control arm (8).
- (5) Install retainer (9) on defroster control arm (8).

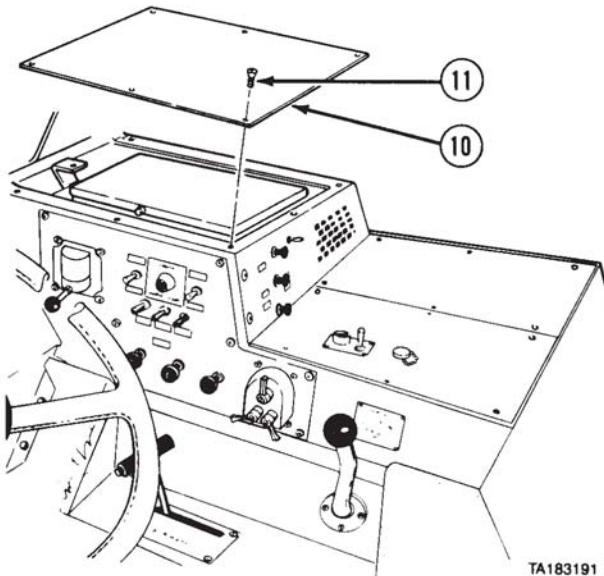


TA183192

- (6) Install heater compartment cover (10) with eight screws (11).

**c. Follow-on Maintenance.**

- (1) Connect batteries (para 7-91).
- (2) Start engine and warm up to normal operating temperature (TM 9-2320-279-10).
- (3) Check operation of defroster control (TM 9-2320-279-10).
- (4) Shut off engine (TM 9-2320-279-10).

**END OF TASK**

TA183191

## Body Accessory Maintenance Instructions (Cont)

**18-25. AIR CONTROL KNOB AND CABLE ASSEMBLY REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition**Special Tools*

TM or Para

*Condition Description*

Para 7-91

Batteries disconnected.

None

*Special Environmental Conditions**Supplies*

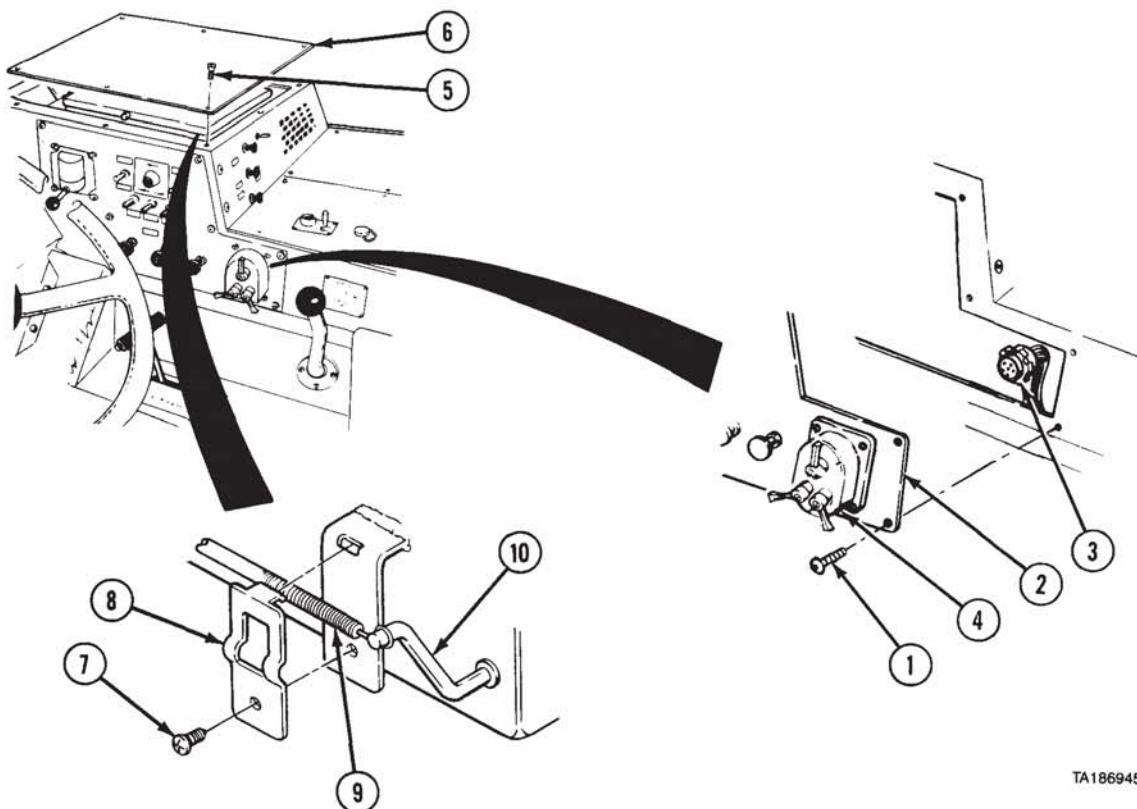
None

None

*General Safety Instructions**Personnel Required*

None

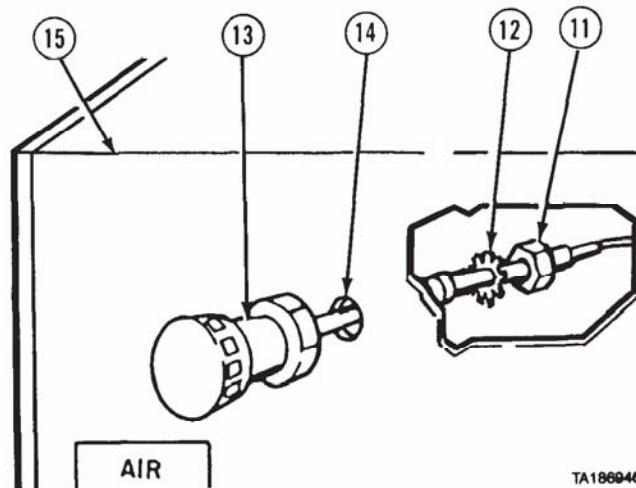
MOS 63S, Heavy wheel vehicle mechanic

**a. Removal.**

- (1) Remove eight screws (1) and panel (2).
- (2) Disconnect plug (3) from main switch (4).
- (3) Remove eight screws (5) and heater compartment cover (6).
- (4) Remove screw (7) and clip (8) to free air control cable (9).
- (5) Remove looped end of air control cable (9) from control lever (10).

## Body Accessory Maintenance Instructions (Cont)

- (6) Remove jamnut (11) and lockwasher (12) from air control knob and cable assembly (13).
- (7) Remove air control knob and cable assembly (13) from mounting hole (14) in panel (15).

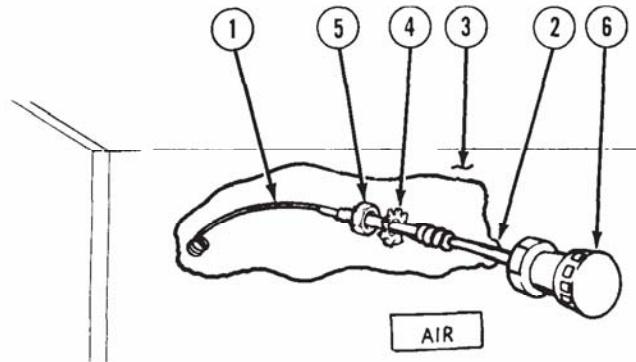


TA186946

**b. Installation.****NOTE**

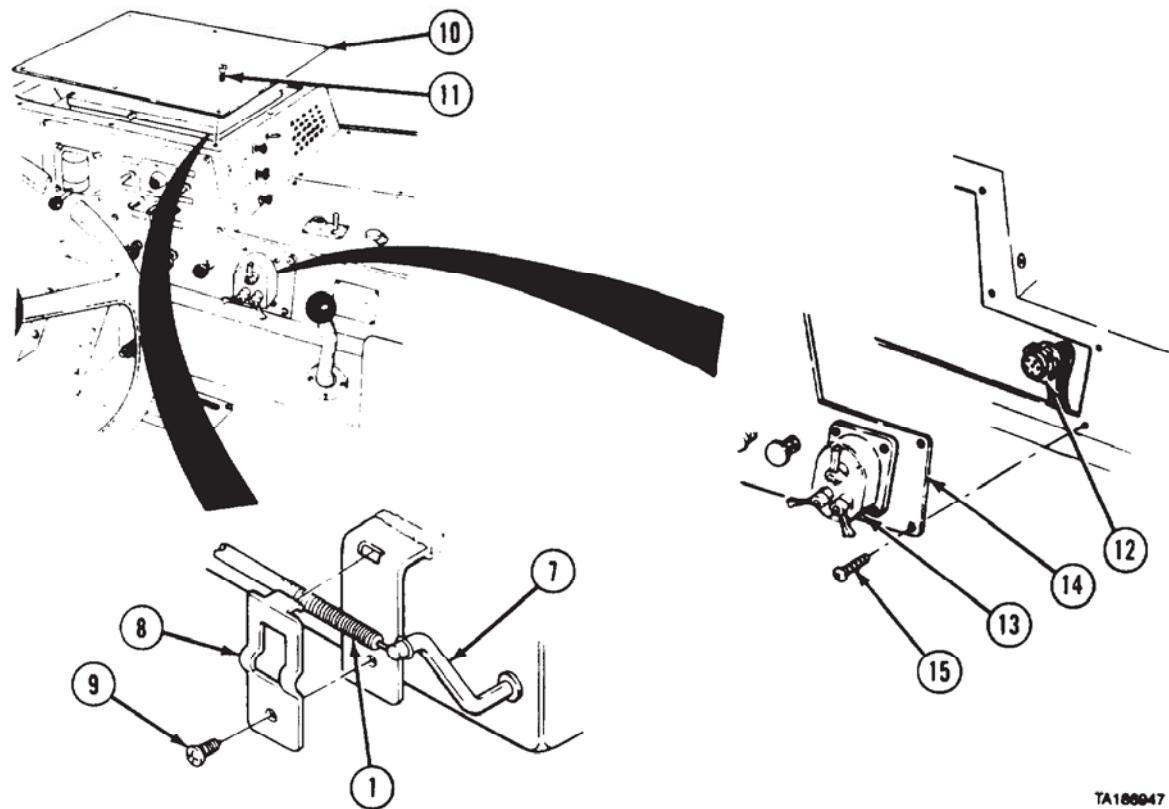
Close air intake manually.

- (1) Install looped end of air control cable (1) through mounting hole (2) in panel (3).
- (2) Slide lockwasher (4) and jamnut (5) on air control cable (1). Thread jamnut (5) on air control knob (6).
- (3) Tighten nut (5) to lock air control knob (6) on panel (3).



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## Body Accessory Maintenance Instructions (Cont)

**18-25. AIR CONTROL KNOB AND CABLE ASSEMBLY REMOVAL/INSTALLATION (CONT).**

- (4) Install looped end of air control cable (1) on control lever (7).
- (5) Place clip (8) over air control cable (1) and install screw (9).
- (6) Install heater compartment cover (10) with eight screws (11).
- (7) Connect plug (12) to main switch (13).
- (8) Install panel (14) with eight screws (15).

**c. Follow-on Maintenance.**

- (1) Connect batteries (para 7-91).
- (2) Check operation of air control (TM 9-2320-279-10).

**END OF TASK**

## Body Accessory Maintenance Instructions (Cont)

**18-26. DEFROSTER HOSES REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition**TM or Para*

Para 7-91

*Condition Description*

Batteries disconnected.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

Ties, cable, plastic, Item 52, Appendix C  
Adhesive, Item 3.2, Appendix C

*General Safety Instructions*

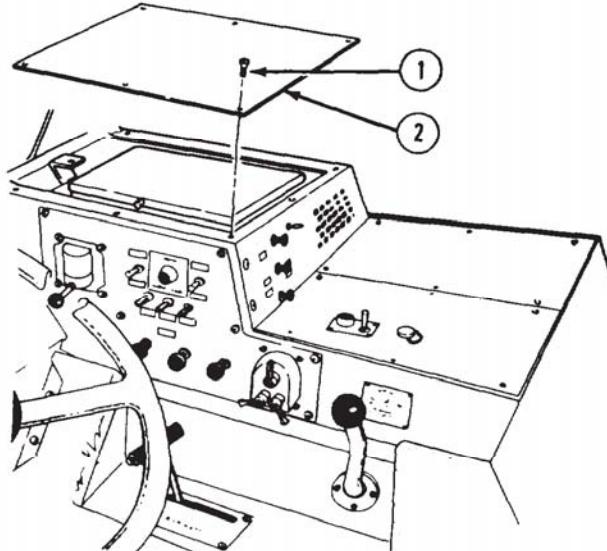
None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

**a. Removal**

- (1) Remove eight screws (1) and heater compartment cover (2).

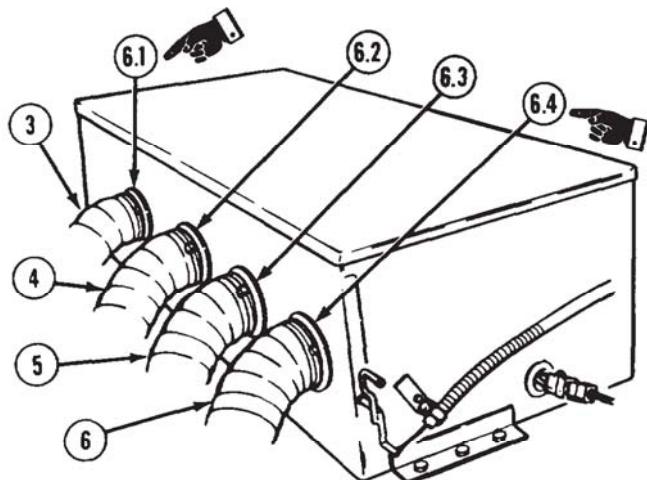


## Body Accessory Maintenance Instructions (Cont)

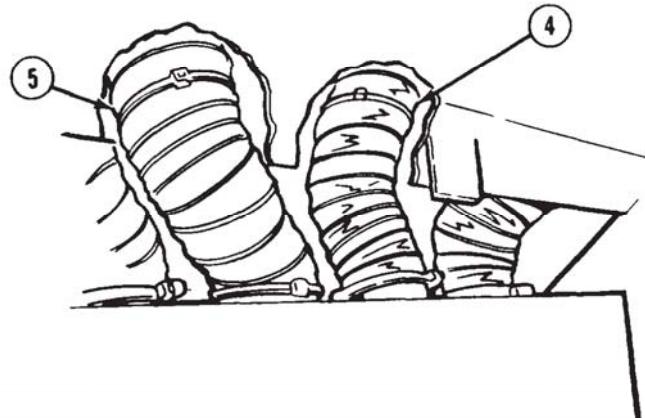
**NOTE**

Cut plastic cable ties as needed.

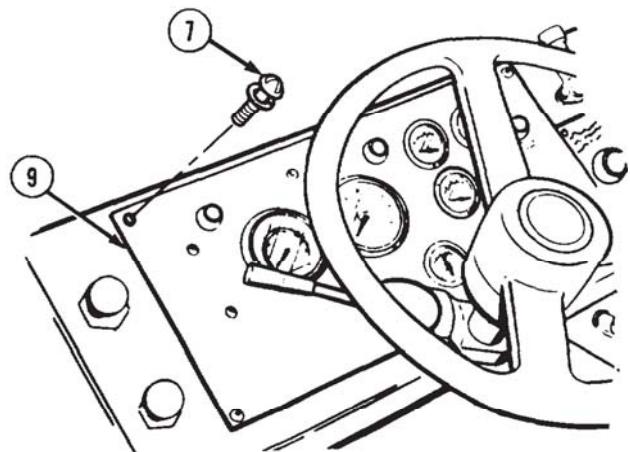
- (2) Disconnect four hoses (3, 4, 5, and 6) from heater flanges (6.1, 6.2, 6.3, and 6.4).



- (3) Remove two hoses (4 and 5).



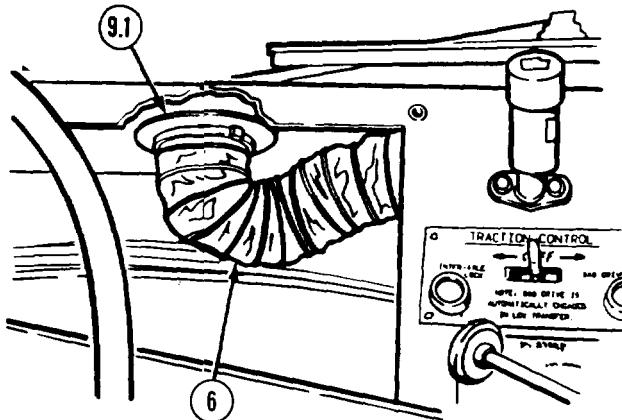
- (4) Remove six screws (7) from instrument panel (9). Move instrument panel aside.



## Body Accessory Maintenance Instructions (Cont)

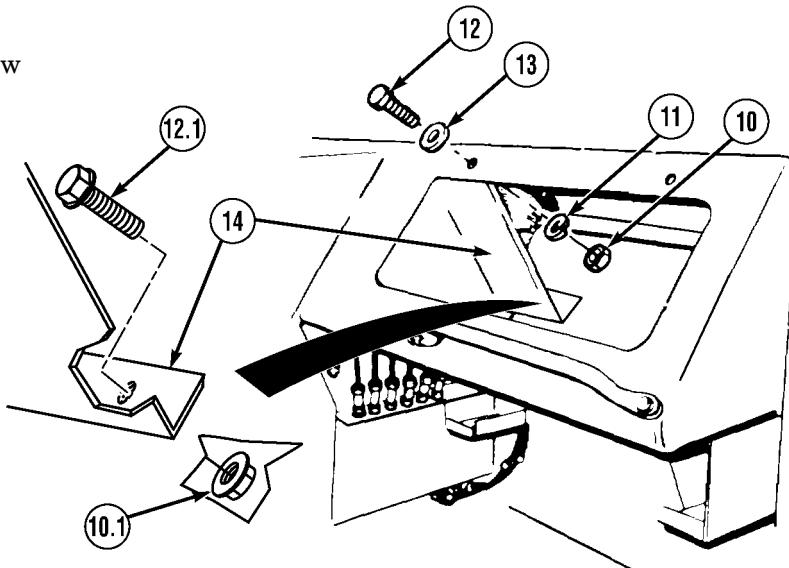
**18-26. DEFROSTER HOSES REMOVAL/INSTALLATION (CONT).**

- (5) Remove defroster hose (6) from flange (9.1).

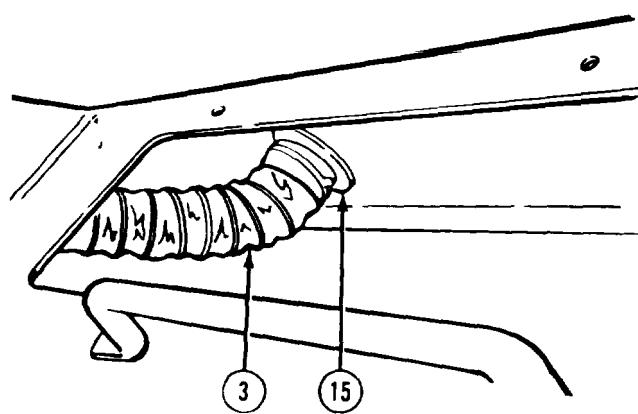
**NOTE**

Not all vehicles have nut (10.1), screw (12.1), or washer (13).

- (6) Remove nuts (10 and 10.1), lockwasher (11), screws (12 and 12.1), washer (13), and defroster hose guard (14).



- (7) Remove defroster hose (3) from flange (15).



## Body Accessory Maintenance Instructions (Cont)

### b. Installation.

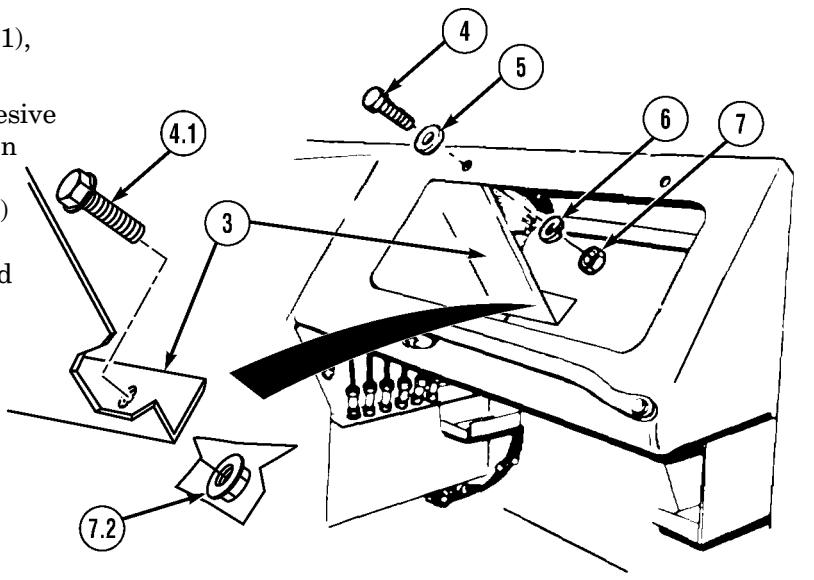
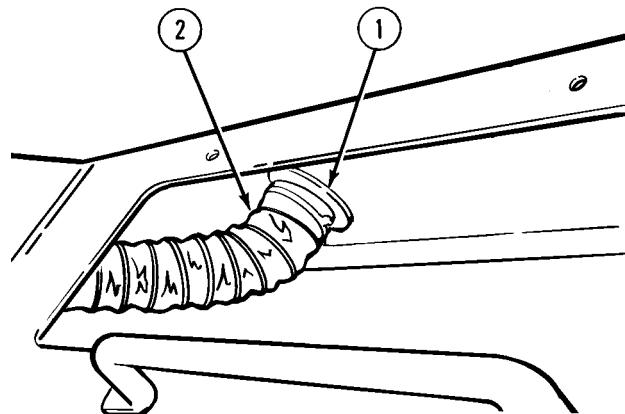
#### **WARNING**

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

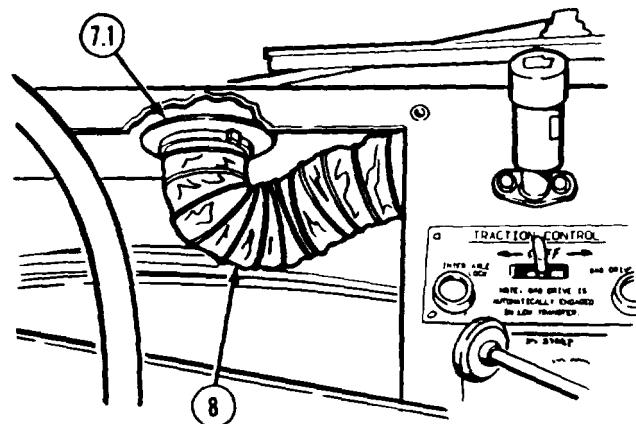
#### **NOTE**

- Coat flanges with light coat of adhesive and fasten hoses with plastic cable ties as needed.
- Not all vehicles have screw (4.1), washer (5), or nut (7.2).

- (1) Coat lip of flange (1) with adhesive and install defroster hose (2) on flange.
- (2) Install defroster hose guard (3) with screws (4 and 4.1), washer (5), lockwasher (6), and nuts (7 and 7.2).



- (3) Coat lip of flange (7.1) with adhesive and install defroster hose (8) on flange.



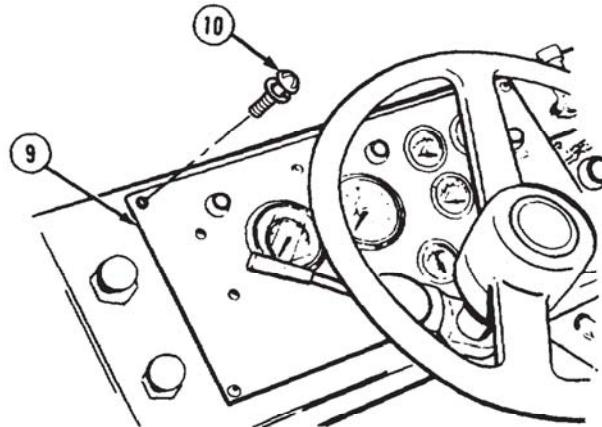
## Body Accessory Maintenance Instructions (Cont)

**18-26. DEFROSTER HOSES REMOVAL/INSTALLATION (CONT)**

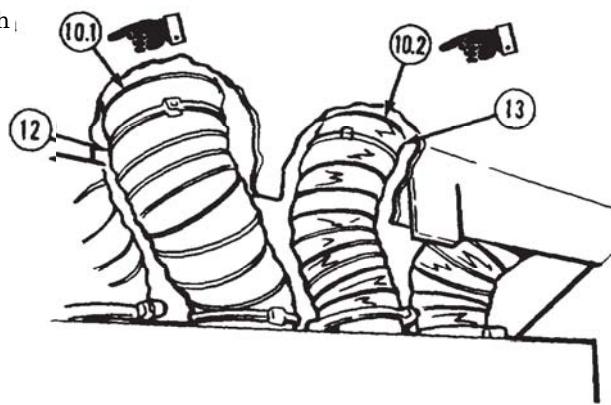
- (4) Install instrument panel (9) with six screws (10).

**WARNING**

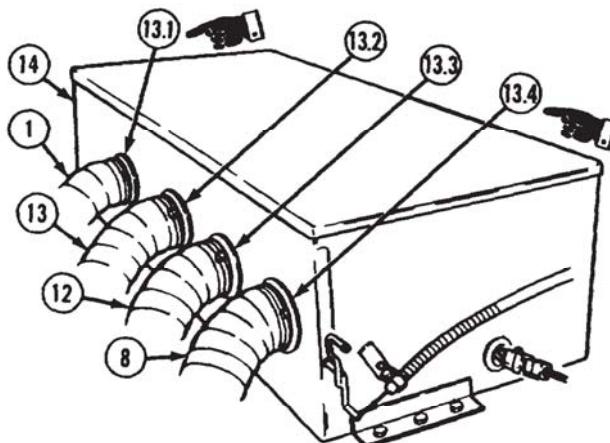
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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



- (5) Coat lips of two flanges (10.1 and 10.2) with adhesive and install two hoses (12 and 13).



- (6) Coat lips of four heater flanges (13.1, 13.2, 13.3, and 13.4) with adhesive and install four hoses (1, 8, 12, and 13) on flanges.



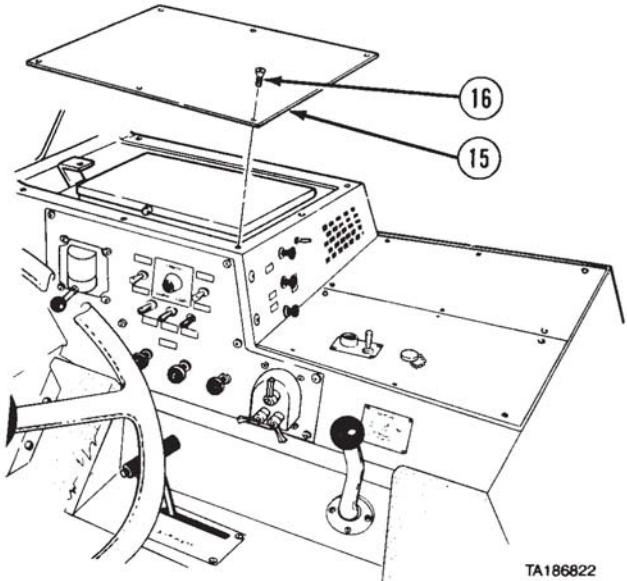
## Body Accessory Maintenance Instructions (Cont)

**18-26. DEFROSTER HOSES REMOVAL/INSTALLATION (CONT.).**

- (7) Install heater compartment cover (15) with eight screws (16).

c. **Follow-on Maintenance.** Connect batteries (para 7-91).

**END OF TASK**



TA186822



# CHAPTER 19

## HYDRAULIC SYSTEMS MAINTENANCE

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### Section I. INTRODUCTION

**19-1. GENERAL.** This chapter contains maintenance instructions for removing, replacing, repairing, and installing hydraulic system components authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

## Section II. HYDRAULIC HAND PUMP

### Hydraulic System Maintenance Instructions

#### **19-2. HYDRAULIC HAND PUMP REMOVAL/INSTALLATION (M983).**

This task covers:

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

#### **INITIAL SETUP**

*Models*

M983

*References*

None

*Test Equipment*

None

*Equipment Condition*

TM or Para      Condition      Description

TM 9-2320-279-10 Shut off engine.

LO 9-2320-279-12 Hydraulic system drained.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

Compound, sealing, pipe thread. Item 18.

Appendix C

Tags, identification. Item 48. Appendix C

*General Safety Instructions*

None

*Personnel Required*

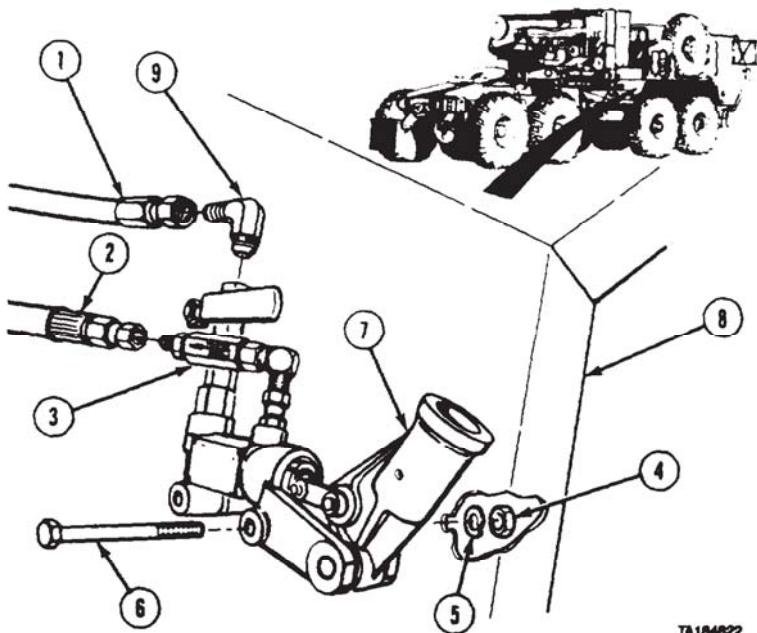
MOS 63S, Heavy wheel vehicle mechanic

#### **a. Removal.**

**NOTE**

Tag and mark hoses before removal.

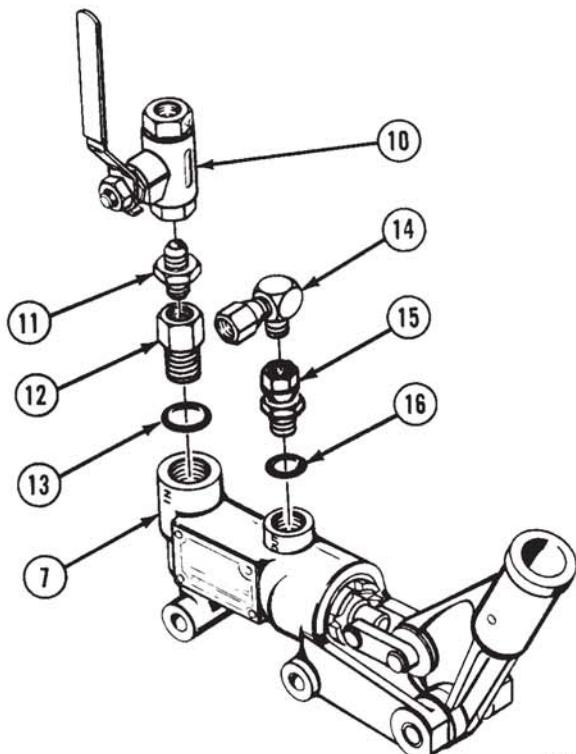
- (1) Disconnect two hoses (1 and 2).
- (2) Note direction of arrow and remove check valve (3).
- (3) Remove two nuts (4), lockwashers (5), screws (6) and hydraulic hand pump (7) from fender (8).
- (4) Remove elbow (9).



TA164622

## Hydraulic System Maintenance Instructions (Cont)

- (5) Remove ball valve (10), nipple (11), adapter (12), and preformed packing (13).
- (6) Remove elbow (14), adapter (15), and preformed packing (16) from hydraulic hand pump (7).

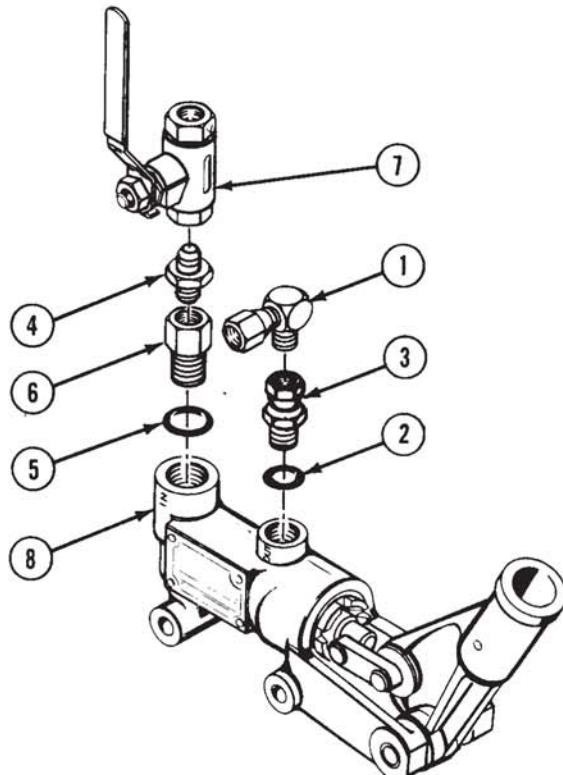


TA184824

**b. Installation.****WARNING**

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

- (1) Coat threads of elbow (1) with pipe thread sealing compound. Install preformed packing (2), adapter (3), and elbow (1). Do not tighten.
- (2) Coat threads of nipple (4) with pipe thread sealing compound. Install preformed packing (5), adapter (6), nipple (4), and ball valve (7) on hydraulic hand pump (8).



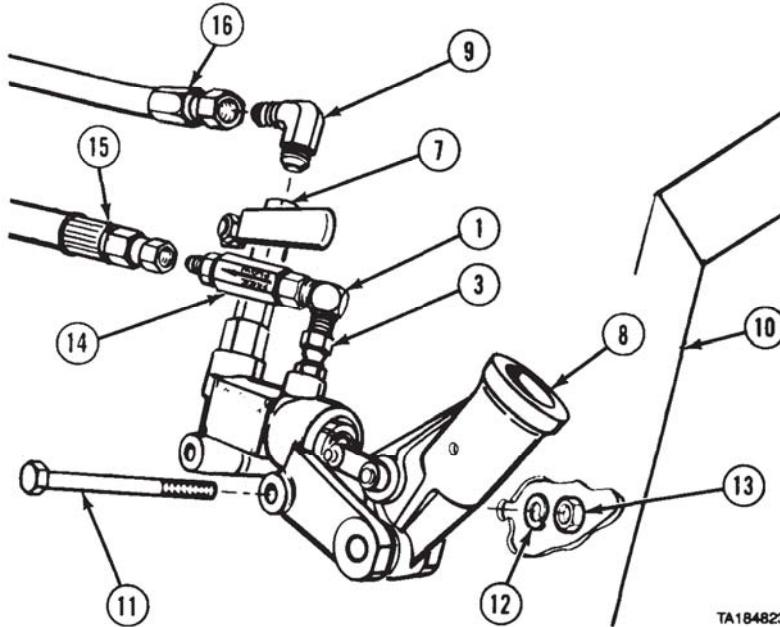
TA184825

## Hydraulic System Maintenance Instructions (Cont)

**19-2. HYDRAULIC HAND PUMP REMOVAL/INSTALLATION (M983) (CONT.).****WARNING**

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

- (3) Coat threads of elbow (9) with pipe thread sealing compound and install in ball valve (7).
- (4) Position hydraulic hand pump (8) on fender (10). Install hydraulic hand pump with two screws (11), lockwashers (12), and nuts (13).
- (5) Install check valve (14) and tighten adapter (3) and elbow (1) so that check valve clears ball valve (7).
- (6) Install two hoses (15 and 16).



TA184823

**c. Follow-on Maintenance.**

- (1) Fill hydraulic system (LO 9-2320-279-12).
- (2) Check hydraulic hand pump operation (TM 9-2320-279-10).

**END OF TASK**

## Hydraulic System Maintenance Instructions (Cont)

## Section III. HYDRAULIC CONTROL VALVES

**19-3. SELF-RECOVERY WINCH CONTROL LEVER REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

All (with self-recovery winch)

*References*

None

*Test Equipment*

None

*Equipment Condition*

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.  
Para 14-5 Skid plate grille removed.*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

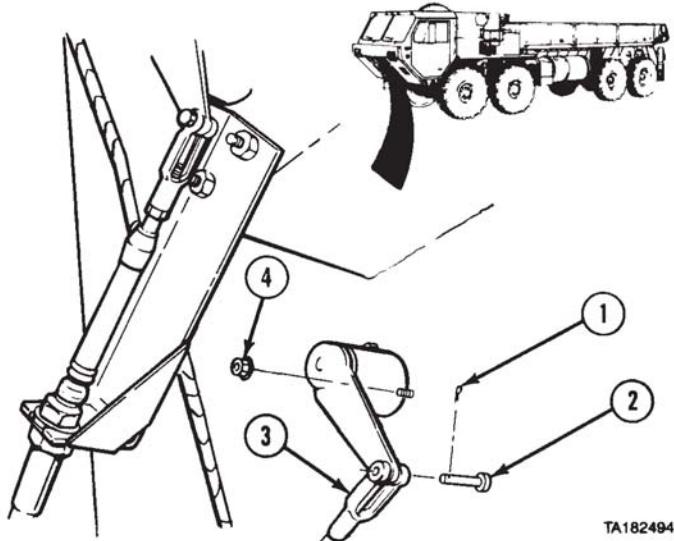
None

*General Safety Instructions*

None

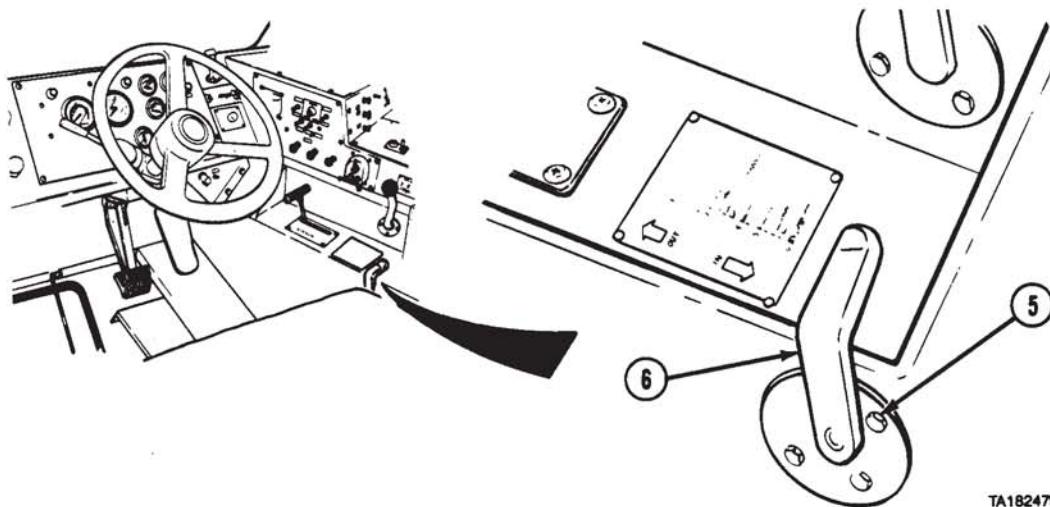
*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic (2)

**a. Removal.**

- (1) Remove cotter pin (1) from yoke pin (2).
- (2) Remove yoke pin (2) from yoke (3).
- (3) Soldier A holds assembly in place in cab while Soldier B removes three nuts (4).

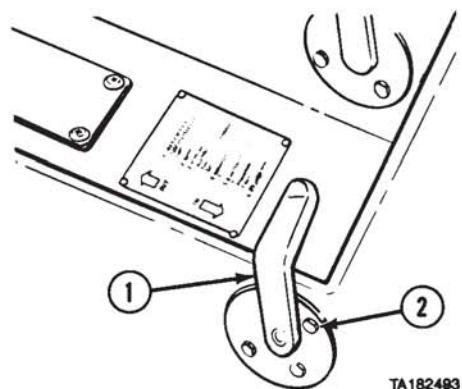
## Hydraulic System Maintenance Instructions (Cont)

**19-3. SELF-RECOVERY WINCH CONTROL LEVER REMOVAL/INSTALLATION (CONT.).**

- (4) Remove three screws (5).  
 (5) Remove shift lever assembly (6) from cab.

**b. Installation.**

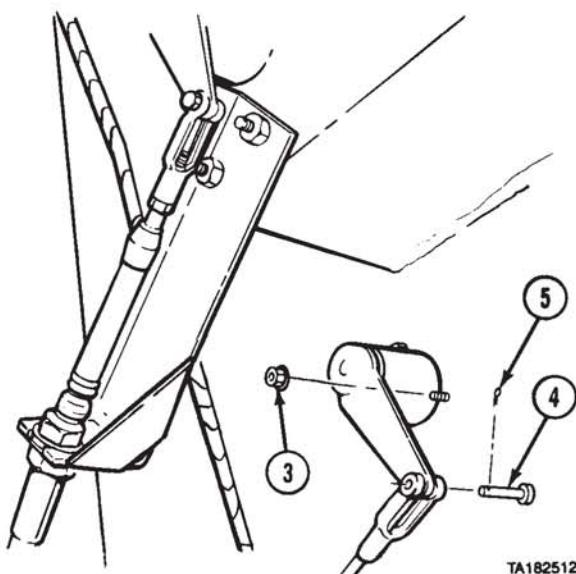
- (1) Install shift lever assembly (1) through mounting plate and cab wall.  
 (2) Install three screws (2) through cab wall.



- (3) Install and tighten three nuts (3).  
 (4) Insert yoke pin (4) and cotter pin (5).

**c. Follow-on Maintenance.** Install skid plate grille (para 14-5).

**END OF TASK**



## Hydraulic System Maintenance Instructions (Cont)

**19-4. HYDRAULIC RELIEF VALVE REMOVAL/REPAIR/INSTALLATION.**

This task covers:

- a. Removal
- b. Disassembly
- c. Cleaning/Inspection
- d. Assembly
- e. Installation
- f. Follow-on Maintenance

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*TM or Para Condition Description  
TM 9-2320-279-10 Shut off engine.*Special Tools*

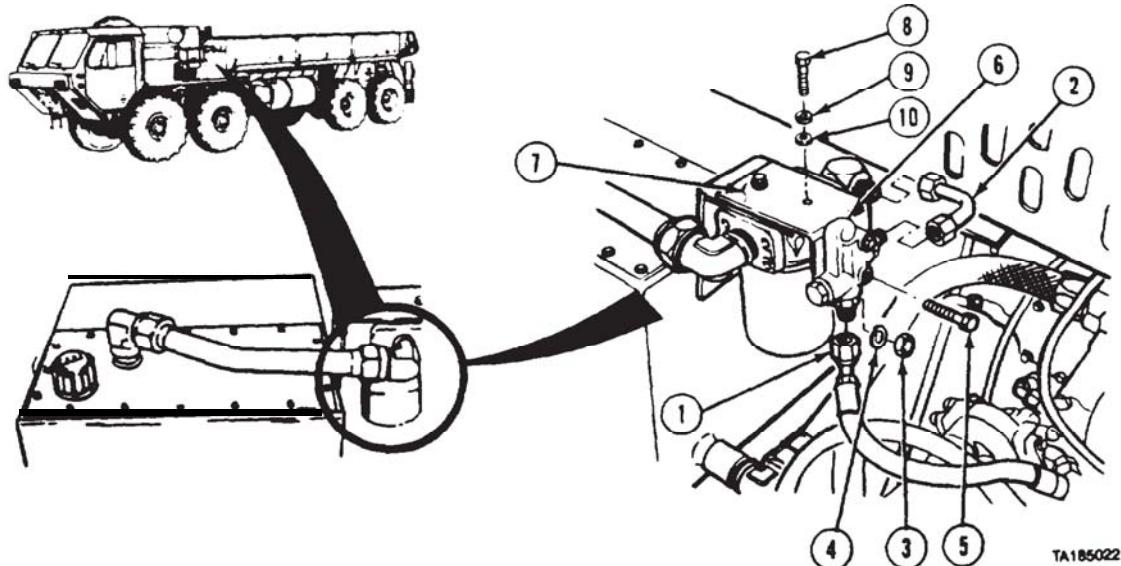
None

*Special Environmental Conditions*

None

*Supplies*Solvent, dry cleaning, Item 47, Appendix C  
Compound, sealing, pipe thread, Item 18.  
Appendix C*General Safety Instructions*  
None*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

**a. Removal.**

(1) Disconnect hose (1).

(2) Remove tube (2).

(3) Remove two nuts (3), lockwashers (4), screws (5), and pressure relief valve (6) from bracket (7).

(4) Remove two Screws (8), lockwashers (9), washers (10), and bracket (7).

## Hydraulic System Maintenance Instructions (Cont)

**19-4. HYDRAULIC RELIEF VALVE REMOVAL/REPAIR/INSTALLATION (CONT).****b. Disassembly.****NOTE**

Heat may be required to remove two plugs,

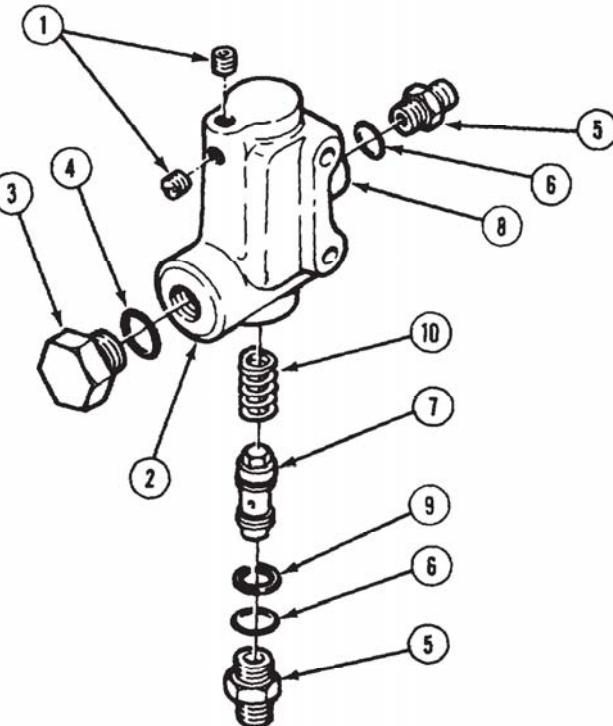
- (1) Remove two plugs (1) from hydraulic relief valve (2).
- (2) Remove plug (3) and preformed packing (4).
- (3) Remove two adapters (5) and preformed packings (6).

**WARNING**

Wear safety glasses when removing retaining rings to prevent injury or blindness.

**NOTE**  
M1977-CBT has a different control valve which is removed and installed the same way. Refer to TM 9-2320-279-24P for proper identification of parts.

- (4) Hold control valve (7) through port (8) and remove retaining ring (9).

**WARNING**

Spring is under pressure. Release control valve slowly or personal injury may result from flying parts.

- (5) Remove control valve (7) and spring (10) from hydraulic relief valve (2).

**c. Cleaning/Inspection.****WARNING**

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

- (1) Clean metal parts in drycleaning solvent.

**WARNING**

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment, goggles, shield, and gloves.

- (2) Dry metal parts with compressed air.
- (3) Inspect each part for damage.
- (4) Replace damaged parts.

## Hydraulic System Maintenance Instructions (Cont)

*d. Assembly.***WARNING**

Wear safety glasses when installing retaining rings to prevent injury or blindness.

**NOTE**

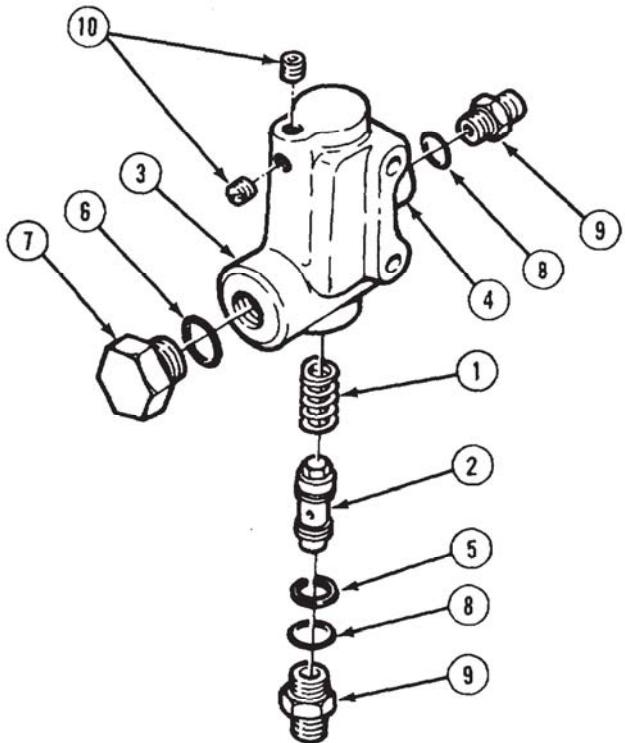
M1977-CBT has a different control valve which is removed and installed the same way. Refer to TM 9-2320-279-24P for proper identification of parts.

- (1) Install spring (1) and control valve (2) in hydraulic relief valve (3).
- (2) Hold control valve (2) through port (4) and install retaining ring (5).
- (3) Install preformed packing (6) and plug (7).
- (4) Install two preformed packings (8) on adapters (9) and install adapters in hydraulic relief valve (3).

**WARNING**

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

- (5) Coat threads of two plugs (10) with pipe thread sealing compound and install in hydraulic relief valve (3).



## Hydraulic System Maintenance Instructions (Cont)

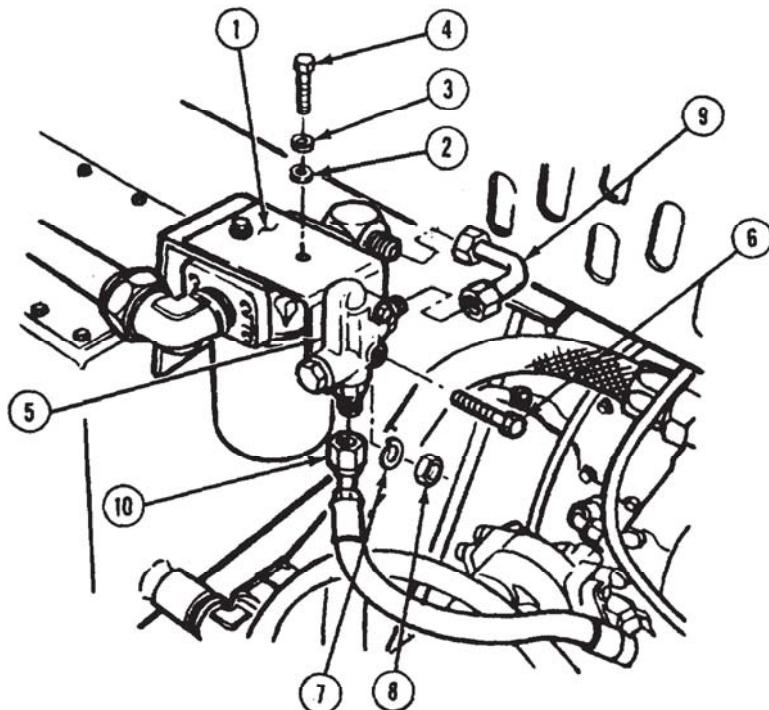
**19-4. HYDRAULIC RELIEF VALVE REMOVAL/REPAIR/INSTALLATION (CONT).***e. Installation.*

- (1) Install bracket (1) with two washers (2), lockwashers (3), and screws (4).
- (2) Install relief valve (5) on bracket (1) with two screws (6), lockwashers (7), and nuts (8).
- (3) Install tube (9).
- (4) Connect hose (10).

*f. Follow-on Maintenance.*

- (1) Start engine  
TM 9-2320-279-10).
- (2) Check for leaks.
- (3) Shut off engine  
TM 9-2320-279-10).

END OF TASK



## Hydraulic System Maintenance Instructions (Cont)

**19-5. FLOW PRIORITY VALVE REMOVAL/INSTALLATION (M978, M984, M1977-CBT).**

This task covers:

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

**INITIAL SETUP***Models*

M978, M984, M1977-CBT

*References*

None

*Test Equipment*

None

*Equipment Condition*

TM or Para

LO 9-2320-279-12 Hydraulic reservoir drained.

*Condition Description*

Para 16-34

Stowage box removed (M978).

Para 7-91

Batteries disconnected.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

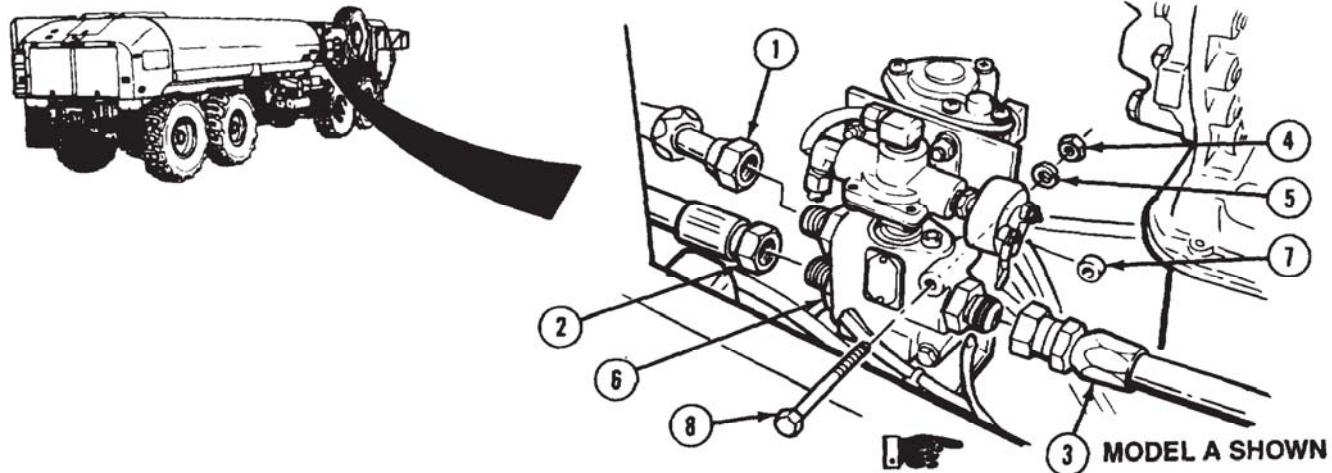
Tags, identification, Item 48, Appendix C

*General Safety Instructions*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*a. Removal.***NOTE**

- There are two kinds of valves. Model A uses spacers and 3 in. (76 mm) mounting screws. Model B does not use spacers and has 2 in. (51 mm) mounting screws. Both valves are removed the same way.
- Spacers are mounted between valve and bracket on Model A only.
- Tag and mark hoses before removal.

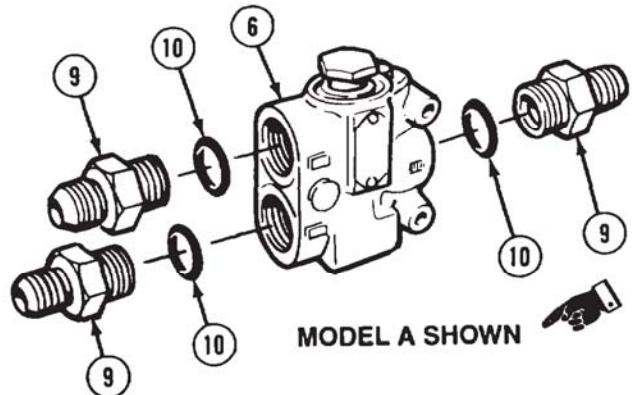
(1) Disconnect three hoses (1, 2, and 3).

(2) Remove two nuts (4), lockwashers (5), valve (6), two spacers (7), and screws (8).



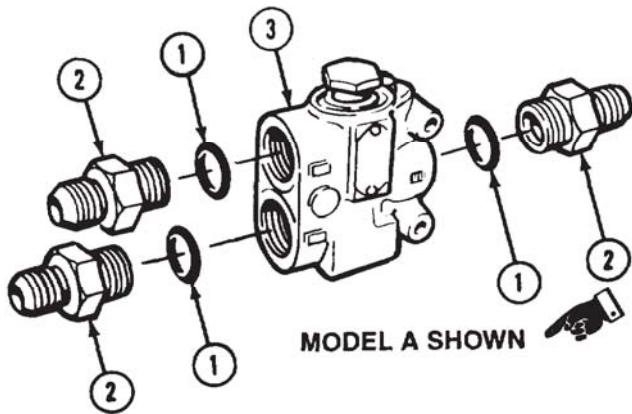
## Hydraulic System Maintenance Instructions (Cont)

- (3) Remove three adapters (9) and preformed packings (10) from valve (6).

**b. Installation.****NOTE**

There are two kinds of valves. Model A uses spacers and 3 in. (76 mm) mounting screws. Model B does not use spacers and has 2 in. (51 mm) mounting screws. Both valves are removed the same way.

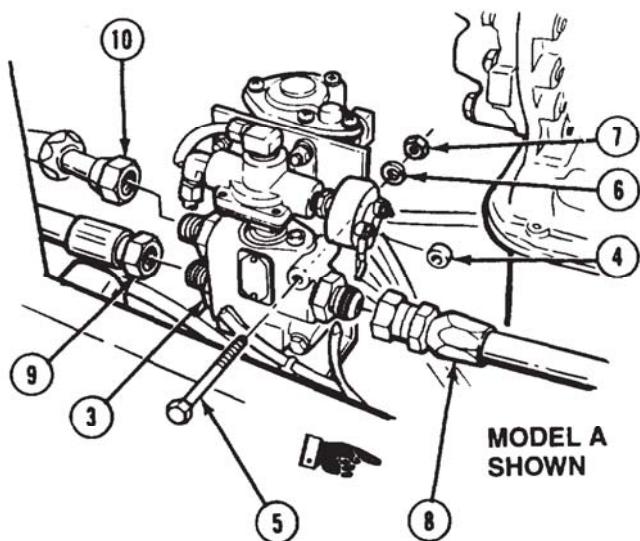
- (1) Install three preformed packings (1) and adapters (2) in valve (3).

**NOTE**

Spacers mount between valve and bracket on Model A only.

- (2) Install valve (3) and two spacers (4) with two screws (5), lockwashers (6), and nuts (7).  
 (3) Connect three hoses (8, 9, and 10).
- c. Follow-on Maintenance.
- (1) Fill hydraulic reservoir  
(LO 9-2320-279-121).
  - (2) Check connections for leaks.
  - (3) Install stowage box (M978) (para 16-34).
  - (4) Connect batteries (para 7-91).

**END OF TASK**



## Hydraulic System Maintenance Instructions (Cont)

**19-6. CONTROL VALVE CABLE AND BRACKETS REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

All (with self-recovery winch)

*References*

None

*Test Equipment*

None

*Equipment Condition*TM or Para Condition Description  
TM 9-2320-279-10 Shut off engine.*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

None

*General Safety Instructions*

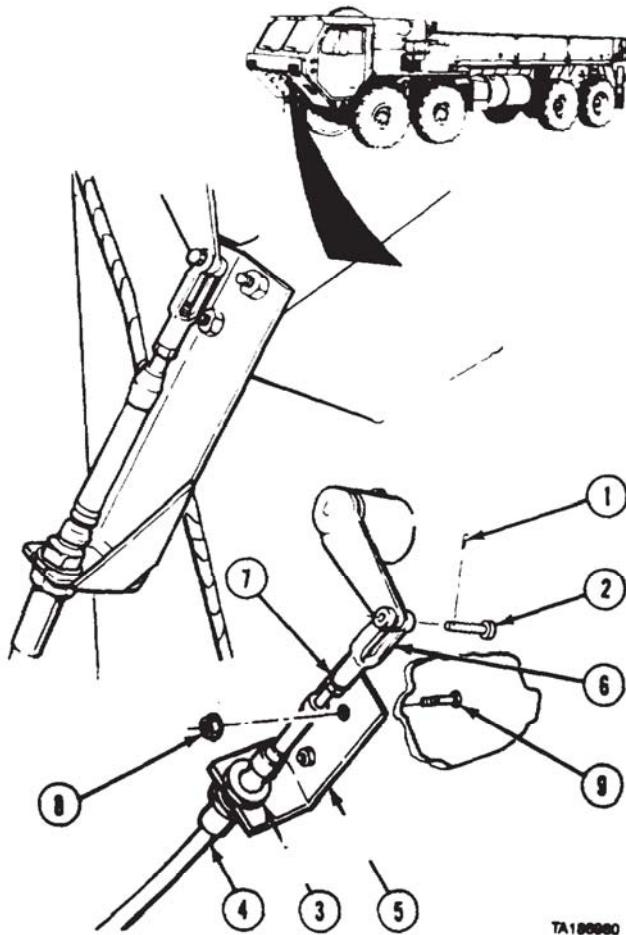
None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic (2)

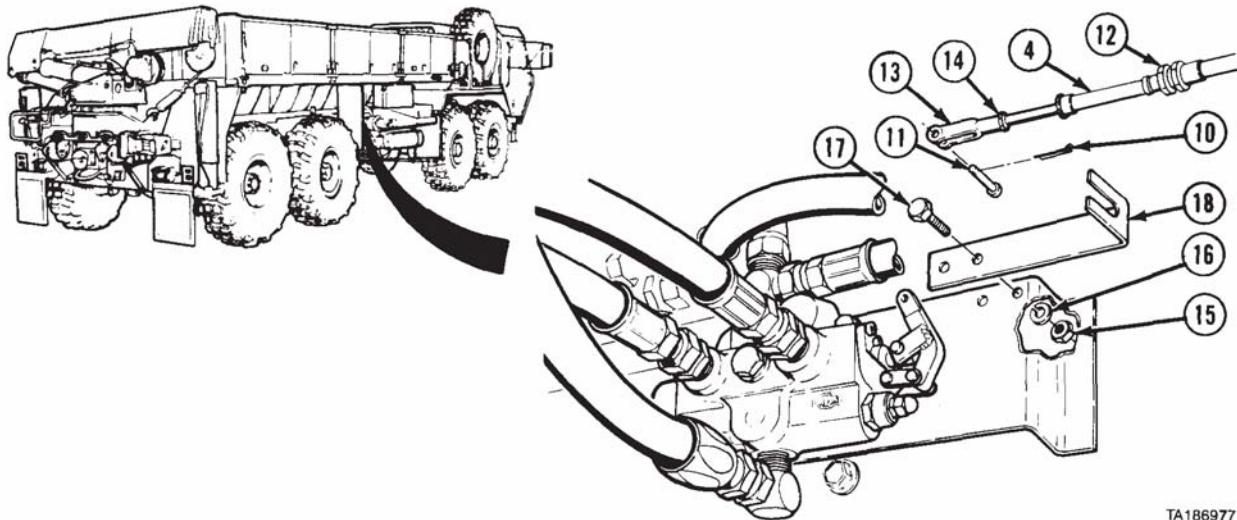
***a. Removal.***

- (1) Remove cotter pin (1) and yoke pin (2).
- (2) Loosen nut (2) and remove cable (3) from bracket (5).
- (3) Remove yoke (6) and nut (7).
- (4) Soldier A removes two nuts (8) and bracket (5) while Soldier B holds two screws (9).



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## Hydraulic System Maintenance Instructions (Cont)

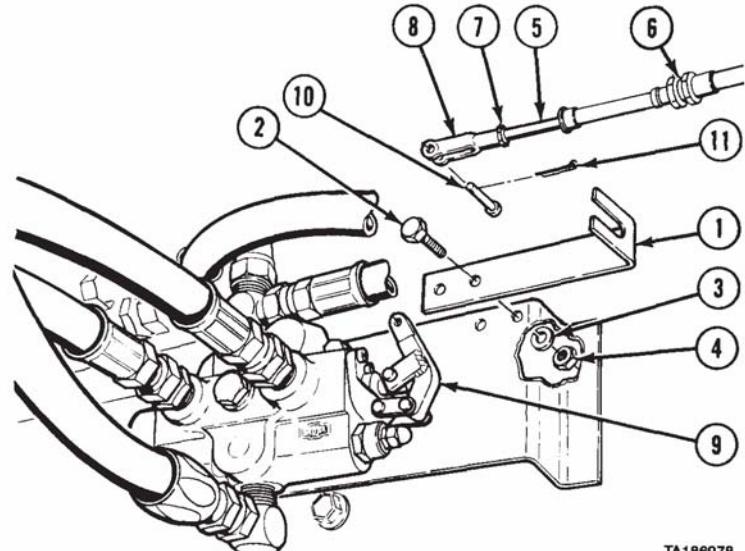


TA186977

- (5) Remove cotter pin (10) and yoke pin (11).
- (6) Loosen nut (12) and remove cable (4).
- (7) Remove yoke (13) and nut (14).
- (8) Remove two nuts (15), lockwashers (16), screws (17), and bracket (18).

**b. Installation.**

- (1) Install bracket (1) with two screws (2), lockwashers (3), and nuts (4).
- (2) Install cable (5) and nut (6). Tighten nut.
- (3) Install nut (7) and yoke (8).
- (4) Adjust yoke (8) to align with linkage (9) and tighten nut (7).
- (5) Install yoke pin (10) and cotter pin (11).



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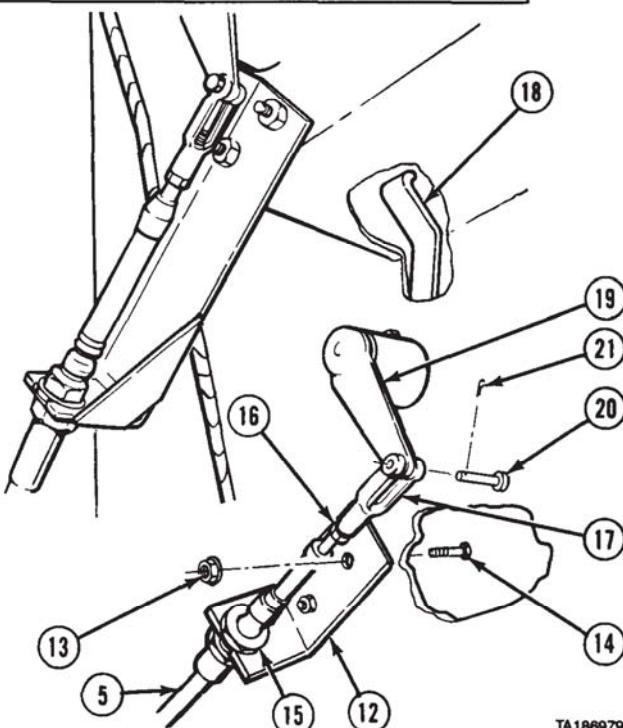
## Hydraulic System Maintenance Instructions (Cont)

**19-6. CONTROL VALVE CABLE AND BRACKETS REMOVAL/INSTALLATION (CONT.).**

- (6) Soldier A installs bracket (12) with two nuts (13) while Soldier B installs two screws (14).
- (7) Install cable (5) and nut (15). Tighten nut.
- (8) Install nut (16) and yoke (17).
- (9) Soldier A holds upper shift lever (18) in center position while Soldier B adjusts yoke (17) to align with lower shift lever (19) and tightens nut (16).
- (10) Install yoke pin (20) and cotter pin (21).

**c. Follow-on Maintenance.** Check operation of winch (TM 9-2320-279-10).

**END OF TASK**

**19-7. SELF-RECOVERY WINCH CONTROL VALVE REMOVAL/INSTALLATION.**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

**INITIAL SETUP***Models*

All (with self-recovery winch)

*References*

None

*Test Equipment*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
TM 9-2320-279-10	Shut off engine.
LO 9-2320-279-12	Hydraulic reservoir drained.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

Tags, identification, Item 48, Appendix C  
Compound, sealing, pipe thread, Item 18,  
Appendix C

*General Safety Instructions*

None

*Personnel Required*

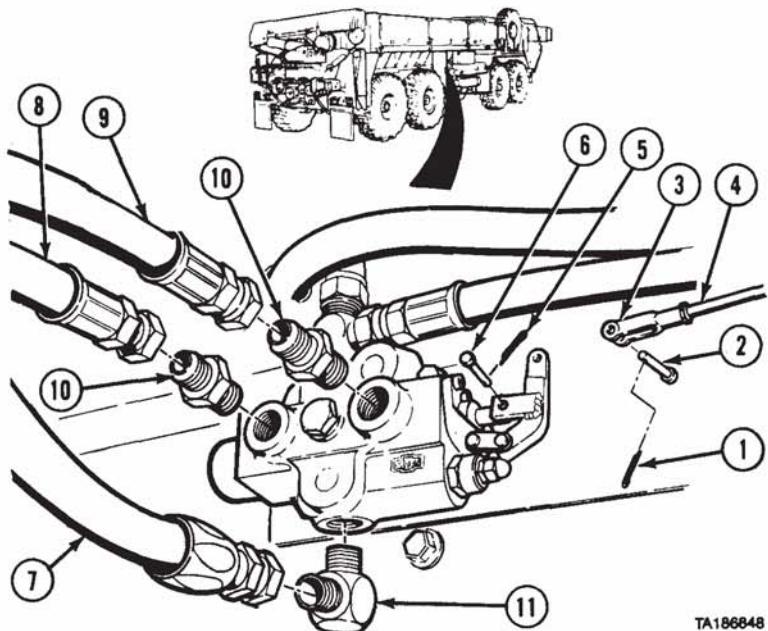
MOS 63S, Heavy wheel vehicle mechanic

## Hydraulic System Maintenance Instructions (Cont)

**a. Removal.****NOTE**

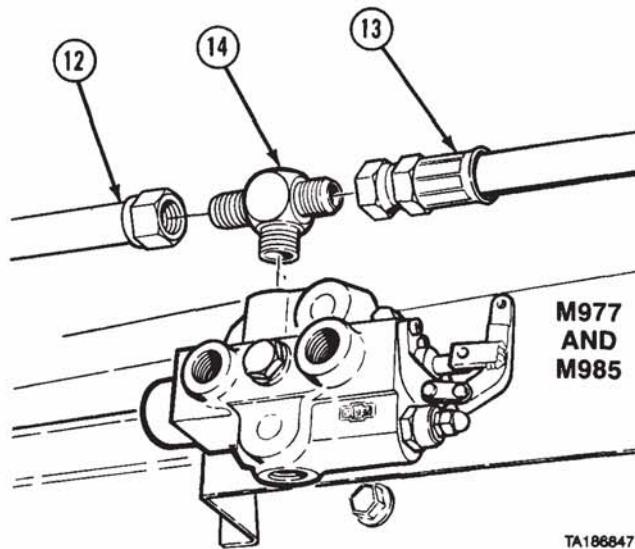
Tag and mark hoses before removal.

- (1) Remove cotter pin (1) and yoke pin (2). Move yoke (3) and cable (4) out of way.
- (2) Remove cotter pin (5) and pin (6).
- (3) Disconnect three hoses (7, 8, and 9).
- (4) Remove two adapters (10).
- (5) Remove elbow (11).

**NOTE**

There are different combinations of hoses and fittings for each vehicle. Do steps (6) and (7) for models M977 and M985. Do steps (8) and (9) for models M978, M983 w/o crane, and M984. Do steps (10) and (11) for model M983 w/crane.

- (6) Disconnect tube (12) and hose (13).
- (7) Remove fitting (14).

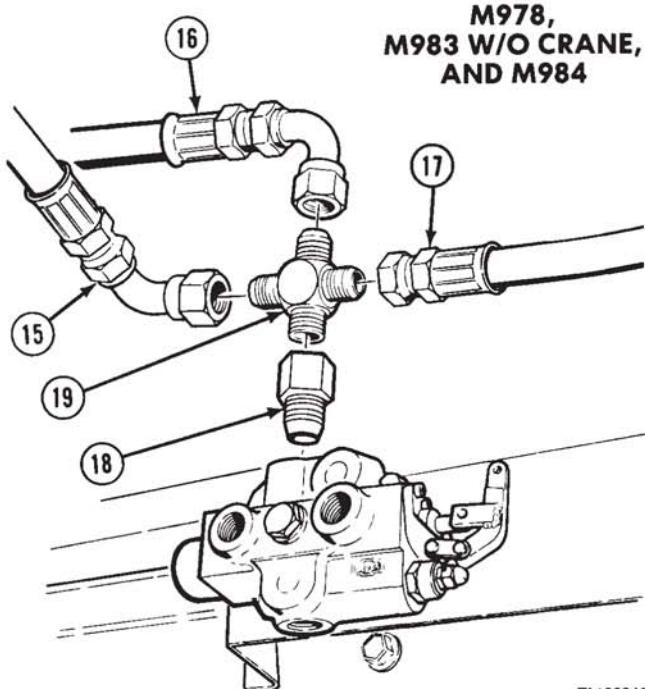


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## Hydraulic System Maintenance Instructions (Cont)

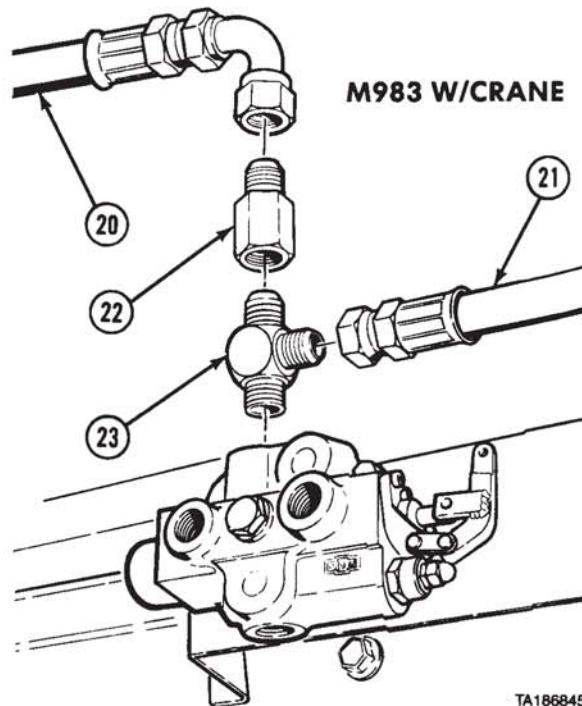
**19-7. SELF-RECOVERY WINCH CONTROL VALVE REMOVAL/INSTALLATION (CONT).**

- (8) Disconnect three hoses (15, 16, and 17).  
 (9) Remove adapter (18) and fitting (19).



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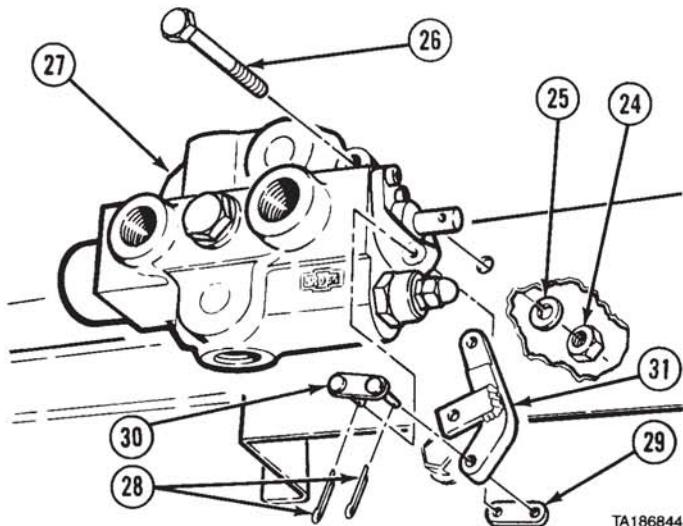
- (10) Disconnect two hoses (20 and 21).  
 (11) Remove adapter (22) and fitting (23).



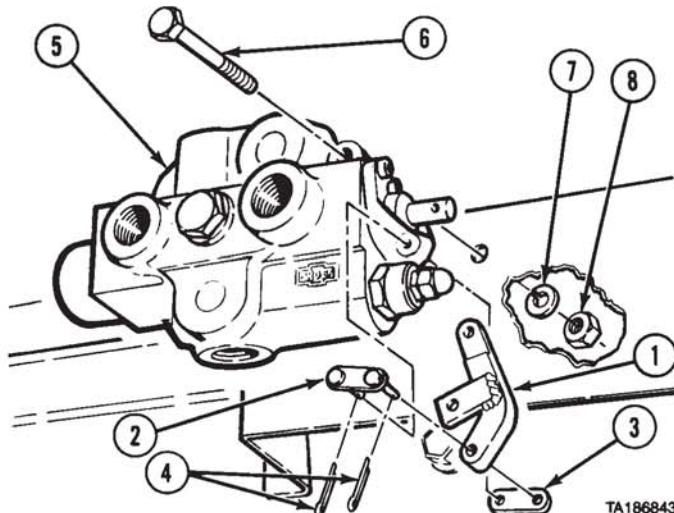
TA186845

## Hydraulic System Maintenance Instructions (Cont)

- (12) Remove three nuts (24), lockwashers (25), screws (26), and control valve (27).
- (13) Remove two cotter pins (28), plate (29), link (30), and lever (31).

**b. Installation.**

- (1) Install lever (1), link (2), and plate (3) with two cotter pins (4).
- (2) Install control valve (5) with three screws (6), lockwashers (7), and nuts (8).

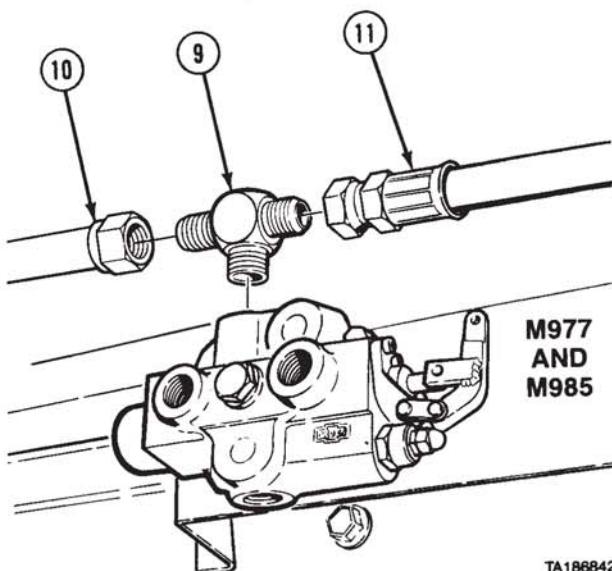
**WARNING**

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

**NOTE**

Do steps (3) and (4) for models M977 and M985. Do steps (5) and (6) for models M978, M983 w/o crane, and M984. Do steps (7) and (8) for model M983 w/crane.

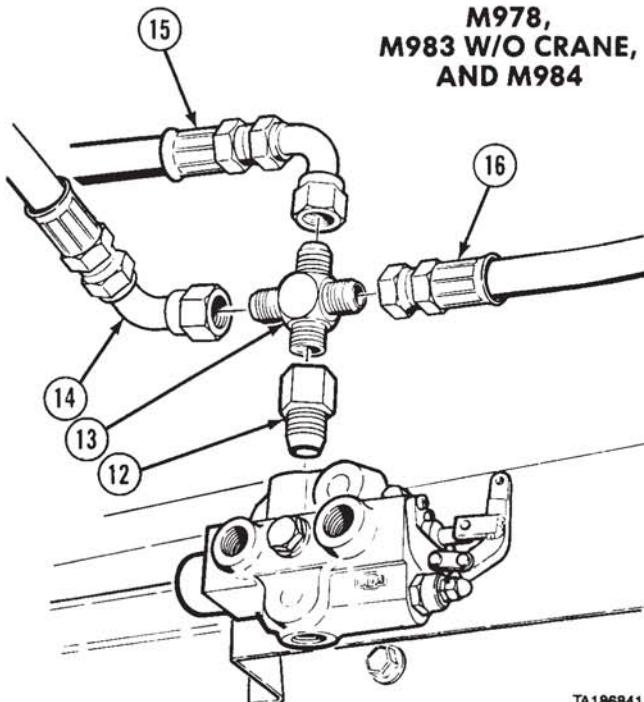
- (3) Apply pipe thread sealing compound and install fitting (9).
- (4) Connect hose (10) and tube (11).



## Hydraulic System Maintenance Instructions (Cont)

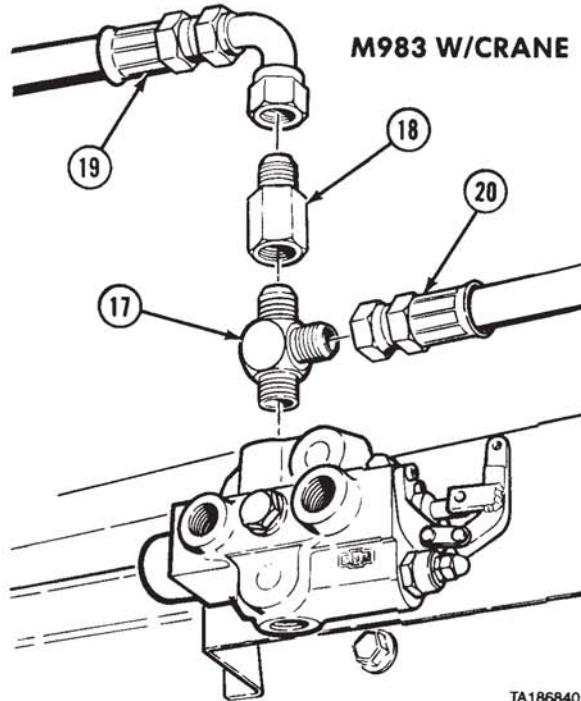
**19-7. SELF-RECOVERY WINCH CONTROL VALVE REMOVAL/INSTALLATION (CONT.).**

- (5) Apply pipe thread sealing compound and install adapter (12) and fitting (13).  
 (6) Connect three hoses (14, 15, and 16).



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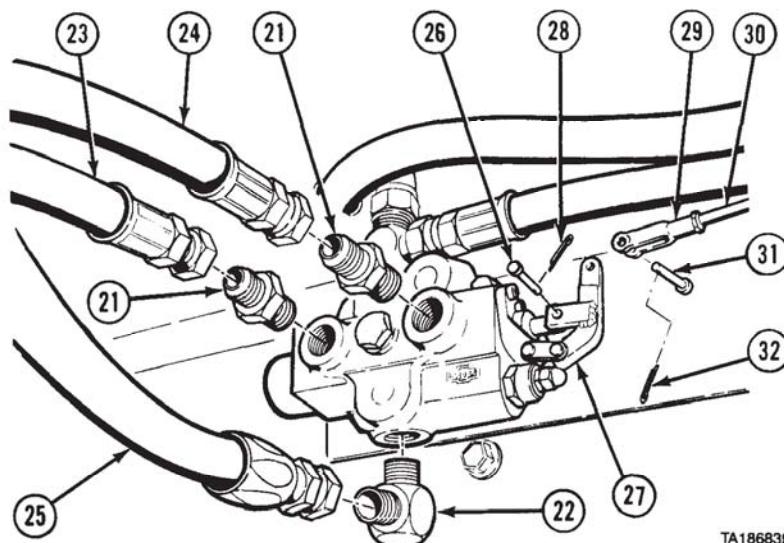
- (7) Apply pipe thread sealing compound and install fitting (17) and adapter (18).  
 (8) Connect two hoses (19 and 20).



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## Hydraulic System Maintenance Instructions (Cont)

- (9) Apply pipe thread sealing compound and install two adapters (21).
- (10) Apply pipe thread sealing compound and install elbow (22).
- (11) Connect three hoses (23, 24, and 25).
- (12) Install pin (26) into lever (27) with cotter pin (28).
- (13) Secure yoke (29) and cable (30) with yoke pin (31) and cotter pin (32).



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**c. Follow-on Maintenance.**

- (1) Fill hydraulic reservoir (LO 9-2320-279-12).
- (2) Check operation of winch (TM 9-2320-279-10).

**END OF TASK****19-8. CONTROL VALVE BRACKET REMOVAL/INSTALLATION.**

This task covers:

- a. Removal
- b. Installation

- c. Follow-on Maintenance

**INITIAL SETUP***Models*

All (with self-recovery winch)

*References*

None

*Test Equipment*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
Para 19-7	Control valve removed.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

None

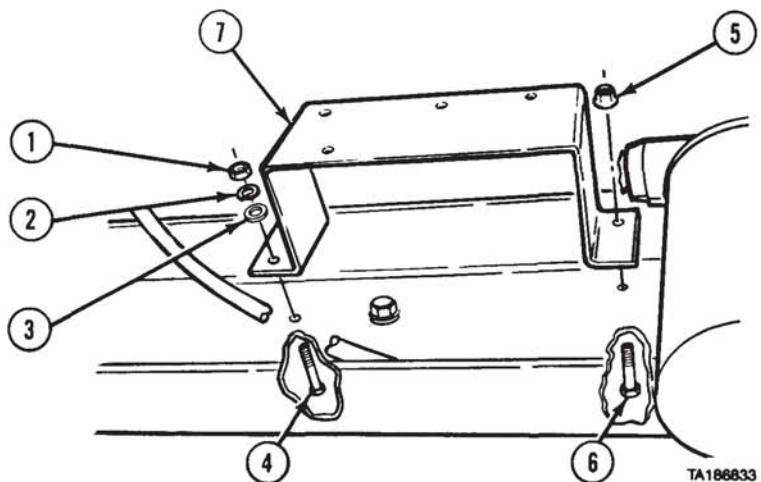
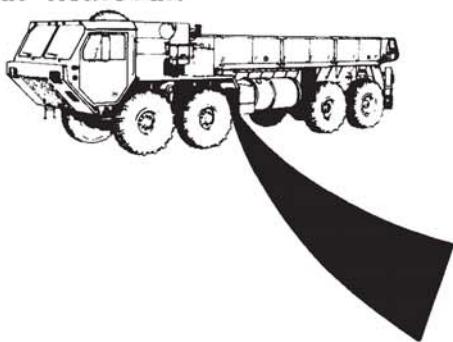
*General Safety Instructions*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

## Hydraulic System Maintenance Instructions (Cont)

**19-8. CONTROL VALVE BRACKET REMOVAL/INSTALLATION (CONT.).****a. Removal.**

(1) Remove two nuts (1), lockwashers (2), washers (3), and screws (4).

(2) Remove locknut (5), screw (6), and bracket (7).

**b. Installation.**

(1) Install bracket (7) with two screws (4), washers (3), lockwashers (2), and nuts (1).

(2) Install screw (6) and locknut (5).

**c. Follow-on Maintenance.** Install control valve (para 19-7).

**END OF TASK**

**19-9. WINCH AND AUXILIARY HYDRAULIC RELIEF VALVES REMOVAL/INSTALLATION (M983, M984).**

This task covers:

- |                                      |                          |
|--------------------------------------|--------------------------|
| a. Removal (M983 without crane)      | d. Installation (M984)   |
| b. Installation (M983 without crane) | e. Follow-on Maintenance |
| c. Removal (M984)                    |                          |

**INITIAL SETUP***Models*

M983 without crane, M984

*References*

None

*Test Equipment*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
LO 9-2320-279-12	Hydraulic reservoir drained.
Para 17-12	Heavy-duty winch hydraulic tubes removed (M984).

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

Tags, identification, Item 48, Appendix C

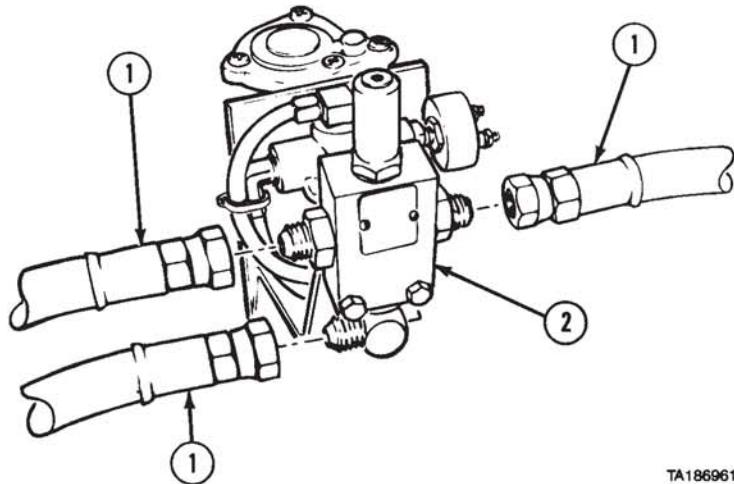
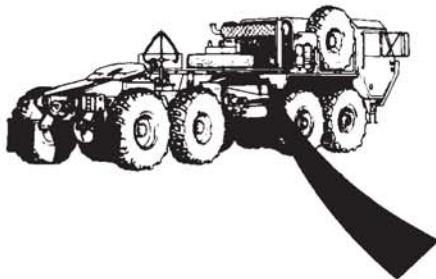
*General Safety Instructions*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

## Hydraulic System Maintenance Instructions (Cont)

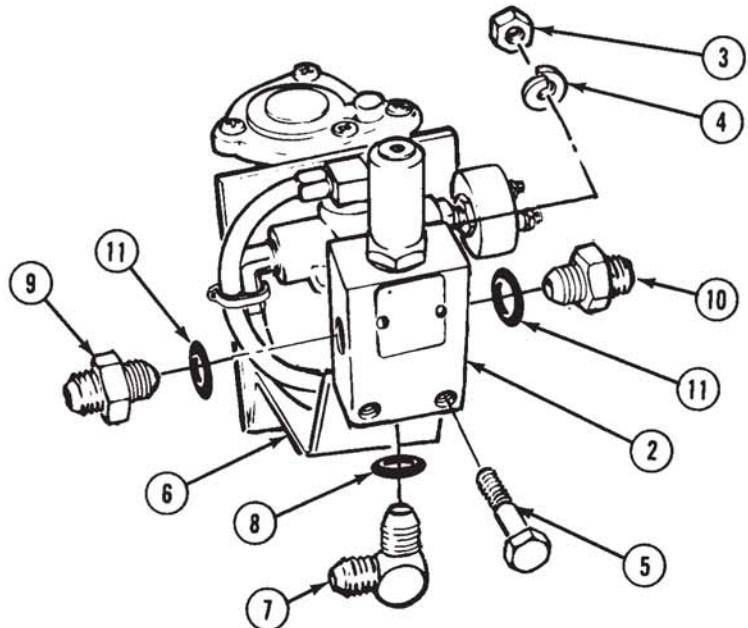
**a. Removal (M983 Without Crane).**

TA186961

**NOTE**

Tag and mark hoses, fittings, and elbows before removal.

- (1) Disconnect three hydraulic hoses (1) from relief valve body (2).
- (2) Remove two nuts (3), lockwashers (4), and screws (5) from relief valve body (2).
- (3) Remove relief valve body (2) from bracket (6).
- (4) Remove elbow (7) and preformed packing (8).
- (5) Remove fittings (9 and 10) and two preformed packings (11).

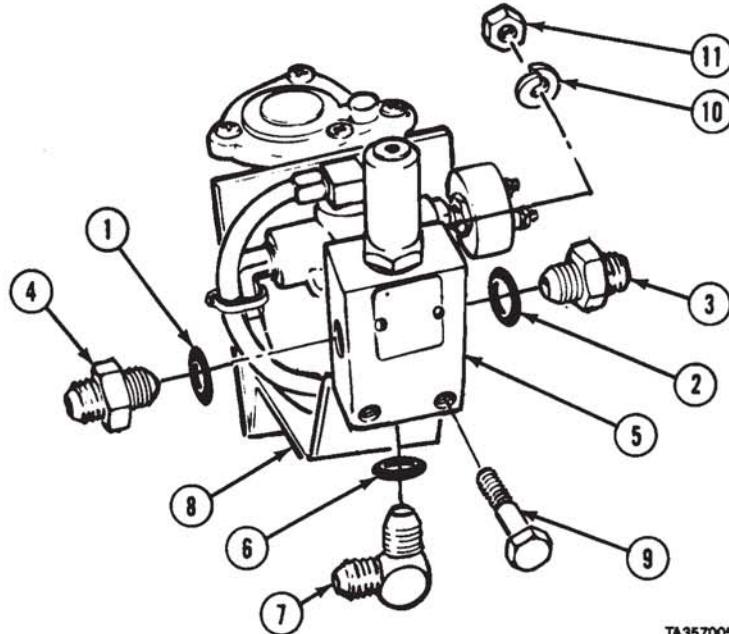


TA357004

## Hydraulic System Maintenance Instructions (Cont)

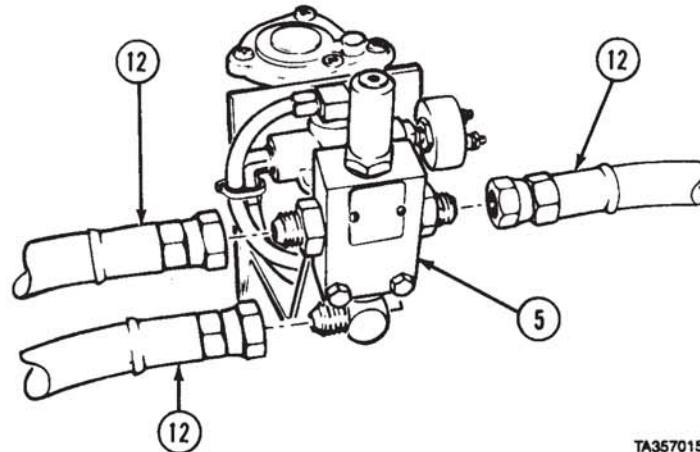
**19-9. WINCH AND AUXILIARY HYDRAULIC RELIEF VALVES REMOVAL/INSTALLATION (M983, M984) (CONT).****b. Installation (M983 Without Crane).**

- (1) Coat preformed packings (1 and 2) with oil and install on fittings (3 and 4).
- (2) Install fittings (3 and 4) on relief valve body (5).
- (3) Coat preformed packing (6) with oil and install on elbow (7).
- (4) Install elbow (7) on relief valve body (5).
- (5) Install relief valve body (5) on bracket (8) with two screws (9), lockwashers (10), and nuts (11).



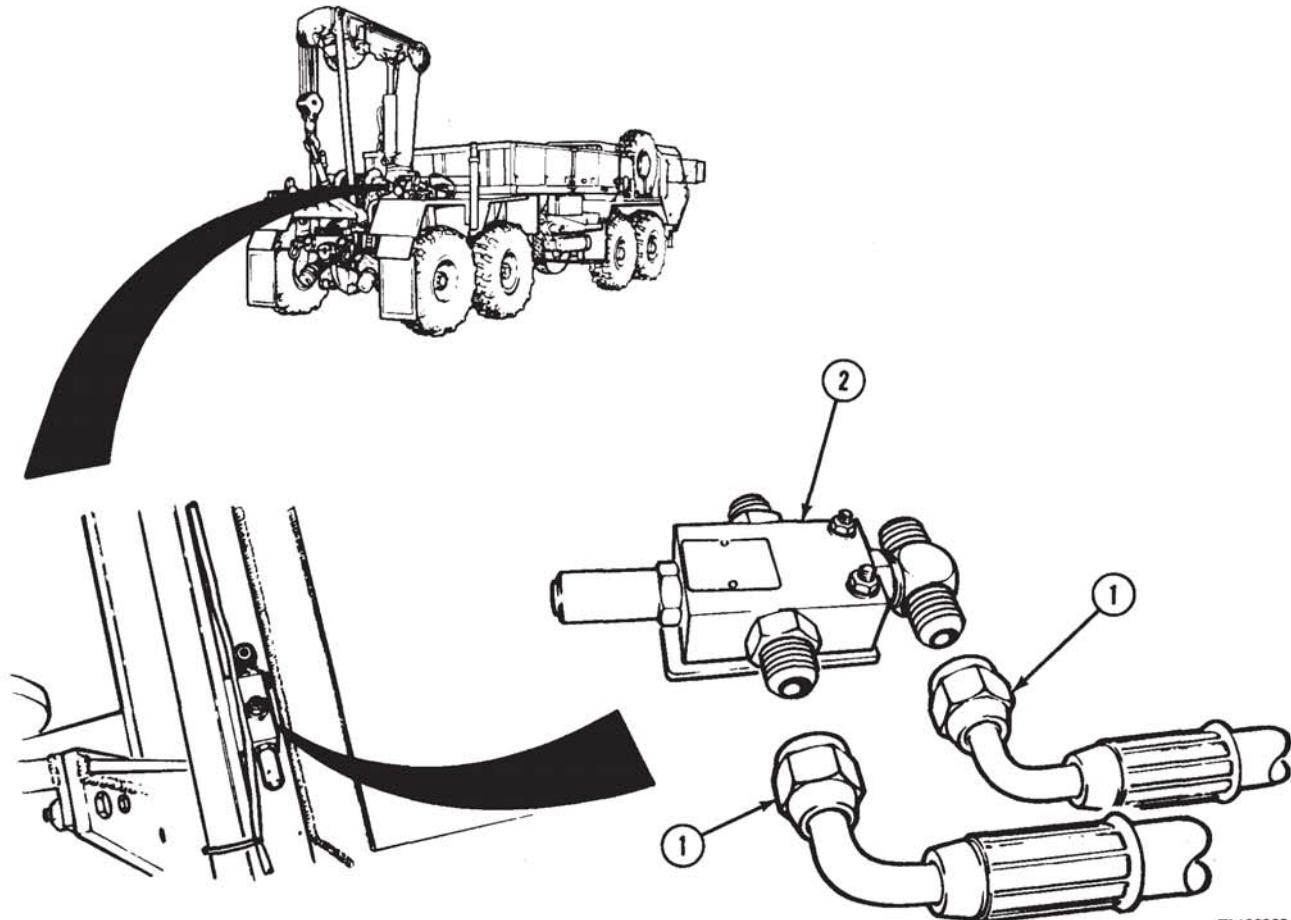
TA357005

- (6) Connect three hydraulic hoses (12) to relief valve body (5).



TA357015

## Hydraulic System Maintenance Instructions (Cont)

**c. Removal (M984).**

TA186963

**NOTE**

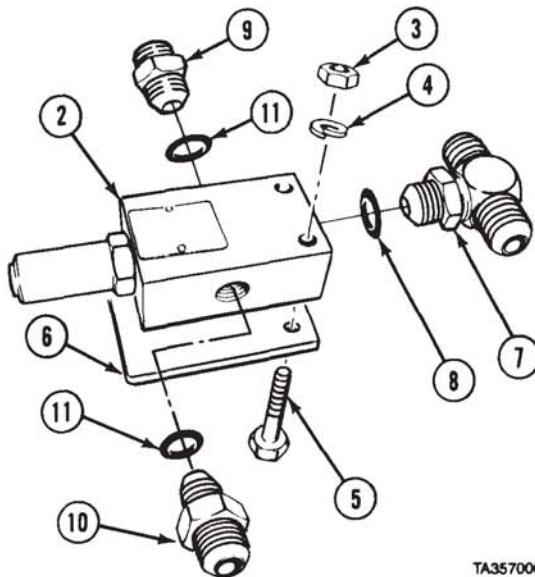
Tag and mark hoses and fittings before removal.

(1) Disconnect two hydraulic hoses (1) from relief valve body (2).

## Hydraulic System Maintenance Instructions (Cont)

**19-9. WINCH AND AUXILIARY HYDRAULIC RELIEF VALVES REMOVAL/INSTALLATION (M983, M984) (CONT).**

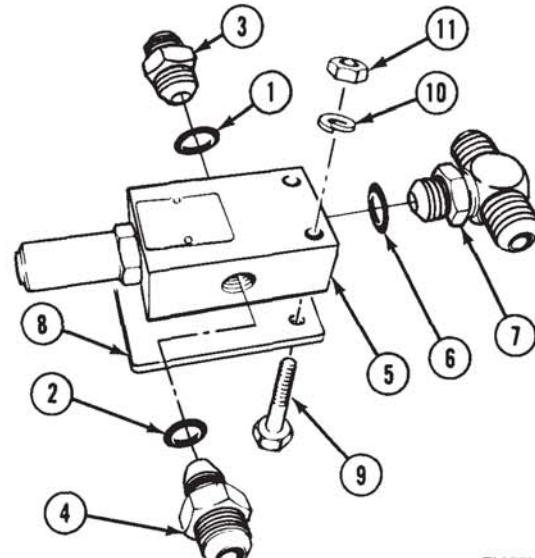
- (2) Remove two nuts (3), lockwashers (4), and screws (5) from relief valve body (2).
- (3) Remove relief valve body (2) from bracket (6).
- (4) Remove tee (7) and performed packing (8).
- (5) Remove fittings (9 and 10) and two preformed packings (11).



TA357006

**d. Installation (M984).**

- (1) Coat preformed packings (1 and 2) with oil and install on fittings (3 and 4).
- (2) Install fittings (3 and 4) on relief valve body (5).
- (3) Coat preformed packing (6) with oil and install on elbow (7).
- (4) Install elbow (7) on relief valve body (5).
- (5) Install relief valve body (5) on bracket (8) with two screws (9), lockwashers (10), and nuts (11).

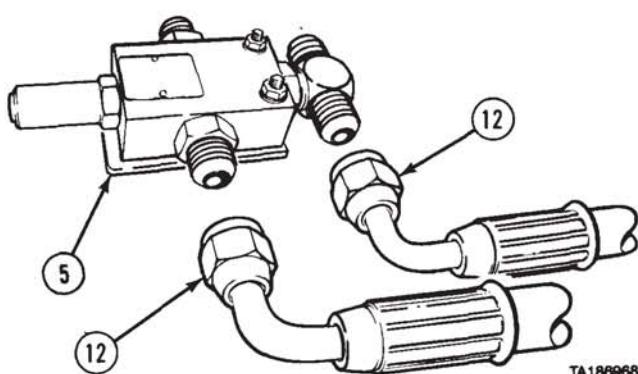


TA357007

- (6) Connect two hydraulic hoses (12) to relief valve body (5).

**e. Follow-on Maintenance.**

- (1) Install heavy-duty winch hydraulic tubes (M984) (para 17-12).
- (2) Fill hydraulic reservoir (LO 9-2320-279-12).

**END OF TASK**

TA188968

## Hydraulic System Maintenance Instructions (Cont)

**19-10. WINCH AND AUXILIARY HYDRAULIC RELIEF VALVE BRACKET REMOVAL/INSTALLATION (M983, M984).**

This task covers:

- a. Removal (M983 without crane)
- b. Installation (M983 without crane)
- c. Removal (M984)
- d. Installation (M984)
- e. Follow-on Maintenance

**INITIAL SETUP***Models*

M983 without crane, M984

*References*

None

*Test Equipment*

None

*Equipment Condition**TM or Para*

Para 19-9

*Condition Description*

Winch and auxiliary hydraulics relief valves removed.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

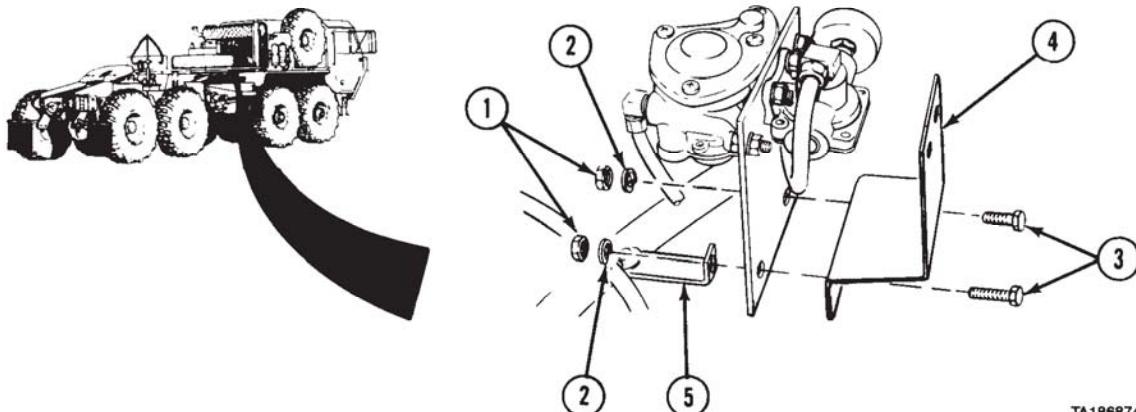
None

*General Safety Instructions*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

**a. Removal (M983 Without Crane).**

TA186874

- (1) Remove two nuts (1), lockwashers (2), and screws (3) from auxiliary hydraulics relief valve bracket (4).
- (2) Remove auxiliary hydraulics relief valve bracket (4) and brace (5).

**b. Installation (M983 Without Crane).** Install auxiliary hydraulics relief valve bracket (4) and brace (5) with two screws (3), lockwashers (2), and nuts (1).

## Hydraulic System Maintenance Instructions (Cont)

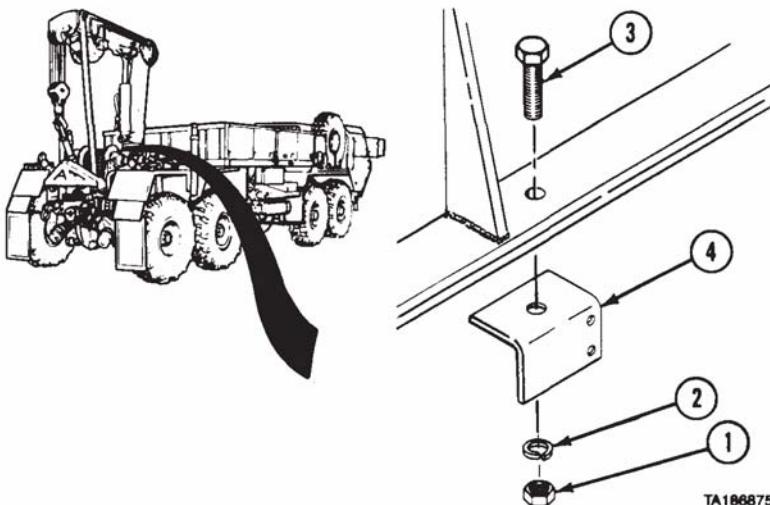
**19-10. WINCH AND AUXILIARY HYDRAULIC RELIEF VALVE BRACKET REMOVAL/INSTALLATION (M983, M984) (CONT).****c. Removal (M984).**

- (1) Remove nut (1), lockwasher (2), and screw (3) from winch relief valve bracket (4).
- (2) Remove winch relief valve bracket (4).

**d. Installation (M984).** Install winch relief valve bracket (4) with screw (3), lockwasher (2), and nut (1).

**e. Follow-on Maintenance.**

Install winch and auxiliary hydraulics relief valves (para 19-9).

**END OF TASK**

TA186875

**19-11. HEAVY-DUTY SELECTOR VALVE AND MOUNTING BRACKET REMOVAL/INSTALLATION (M984).**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

**INITIAL SETUP***Models*

M984

*References*

None

*Test Equipment*

None

*Equipment Condition*

TM or Para      Condition Description

*Special Tools*

None

TM 9-2320-279-10 Shut off engine.

*Supplies*

Tags, identification, Item 48, Appendix C

LO 9-2320-279-12 Hydraulic reservoir drained.

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic (2)

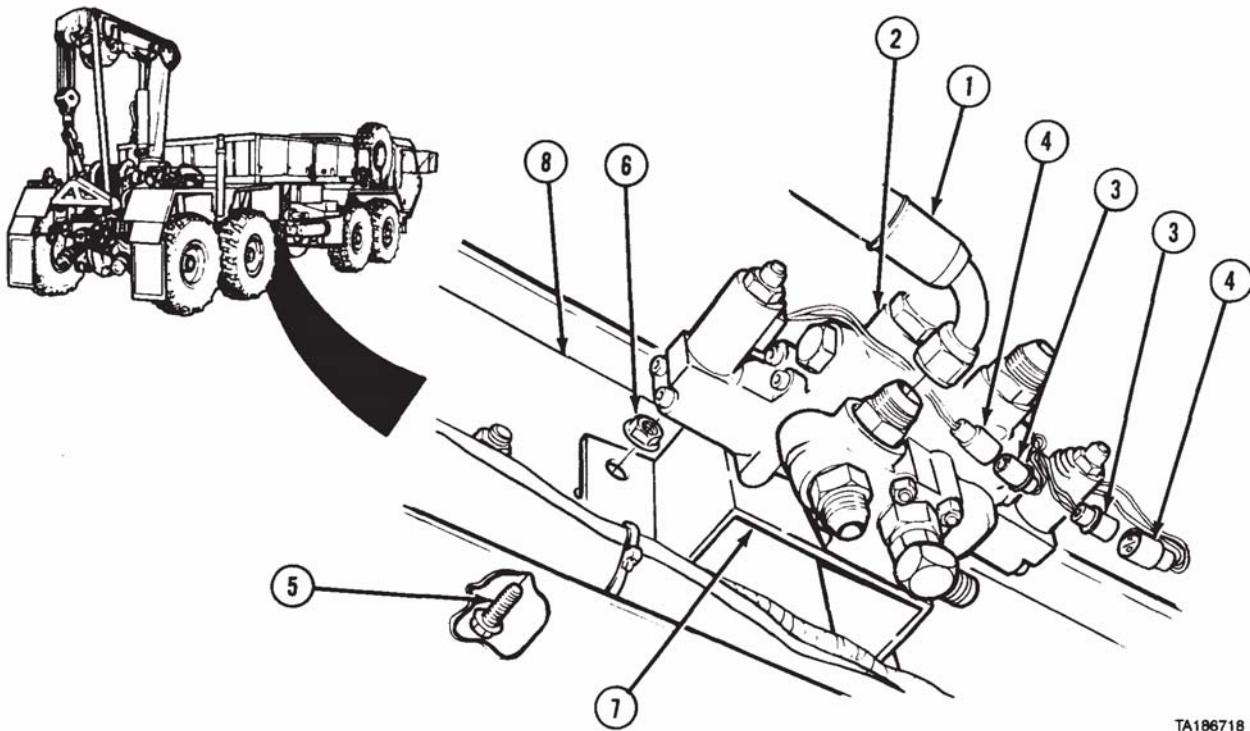
*Special Environmental Conditions*

None

*General Safety Instructions*

None

## Hydraulic System Maintenance Instructions (Cont)

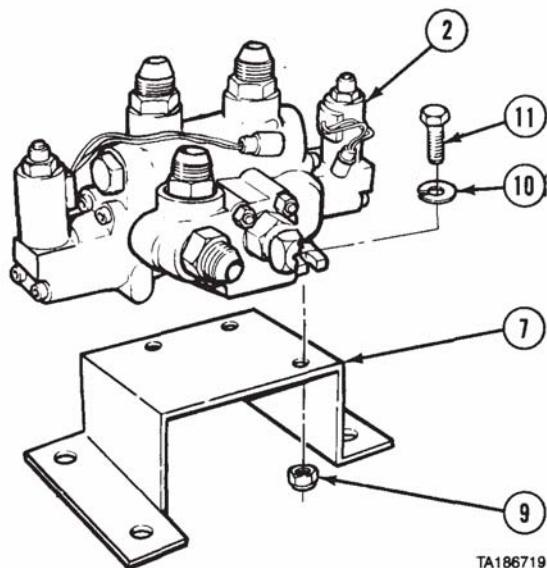
**a. Removal.**

TA186718

**NOTE**

Tag and mark lines, wires, and fittings before removal.

- (1) Disconnect six hydraulic lines (1) from selector valve (2).
- (2) Disconnect two wires (3) from two connectors (4).
- (3) Soldier A holds four screws (5) while Soldier B removes four nuts (6), selector valve (2), and mounting bracket (7) from frame (8).
- (4) Remove three nuts (9), lockwashers (10), screws (11), and mounting bracket (7) from selector valve (2).

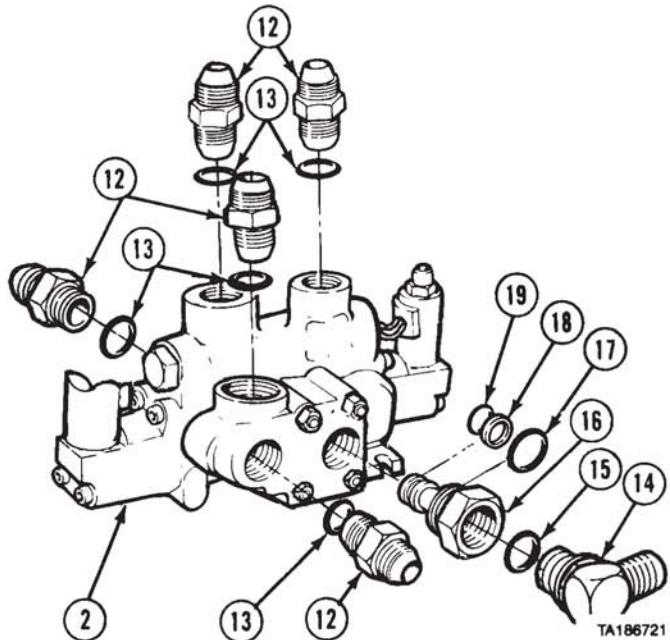


TA186719

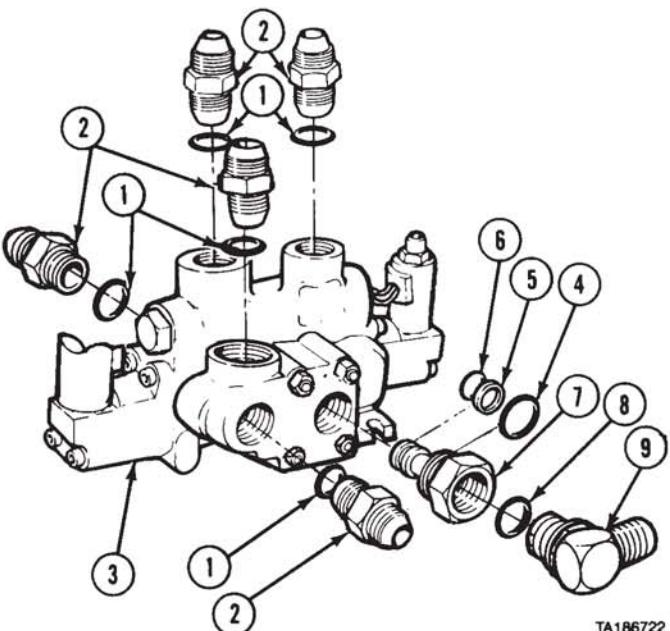
## Hydraulic System Maintenance Instructions (Cont)

**19-11. HEAVY-DUTY SELECTOR VALVE AND MOUNTING BRACKET REMOVAL/INSTALLATION (M984) (CONT).**

- (5) Remove five fittings (12) from selector valve (2).
- (6) Remove five preformed packings (13) from fittings (12).
- (7) Remove elbow (14) and preformed packing (15).
- (8) Remove adapter (16), preformed packing (17), backup ring (18), and preformed packings (19).

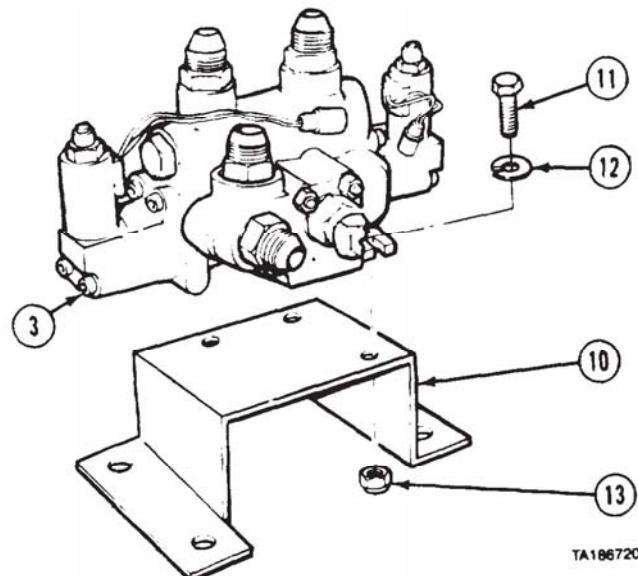
**b. Installation.**

- (1) Install five preformed packings (1) on fittings (2).
- (2) Install five fittings (2) in selector valve (3).
- (3) Install preformed packing (4), backup ring (5), and preformed packing (6) on adapter (7).
- (4) Install adapter (7), preformed packing (8), and elbow (9) in selector valve (3).



## Hydraulic System Maintenance Instructions (Cont)

- (5) Install mounting bracket (10) on valve (3) with three screws (11), lockwashers (12), and nuts (13).

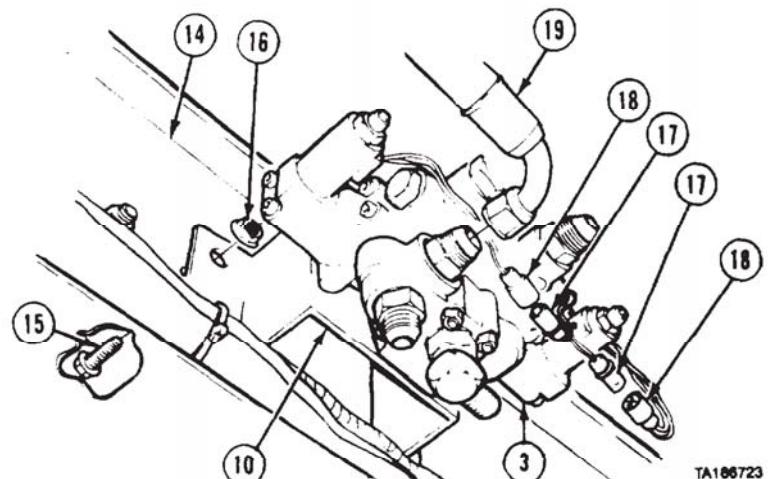


TA186720

- (6) Soldier A installs selector valve (3) and mounting bracket (10) on frame (11) with four screws (15) while Soldier B tightens four nuts (16).  
 (7) Connect two wires (17) to two connectors (18).  
 (8) Connect six hydraulic lines (19) to selector valve (3).

**c. Follow-on Maintenance.** Fill hydraulic reservoir (LO 9-2320-279-12).

END OF TASK



TA186723

## Hydraulic System Maintenance Instructions (Cont)

**19-12. PRIMARY PUMP HYDRAULIC MOTOR CONTROL VALVE, BRACKET, AND CABLE BRACKET REMOVAL/INSTALLATION (M978).**

This task covers:

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

**INITIAL SETUP***Models*

M978

*References*

None

*Test Equipment*

None

*Equipment Condition**TM or Para      Condition Description*

TM 9-2320-279-10 Shut off engine.

TM 9-2320-279-12 Hydraulic reservoir drained.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

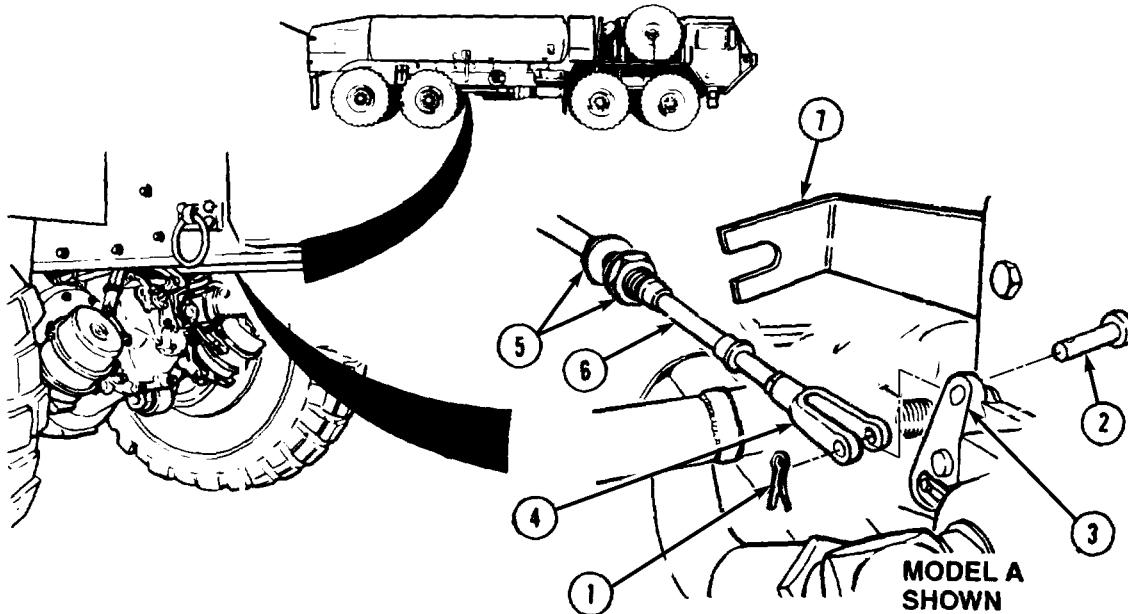
Oil, lubricating, Item 32, Appendix C  
Tags, identification, Item 47, Appendix C

*General Safety Instructions*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

**a. Removal.****NOTE**

There are two kinds of control valves. Model A has the top mounting screw on the left side of the top elbow. Model B has the top mounting screw on the right side of the top elbow. Both valves are removed the same way. However, if one type of valve must be replaced by the other type, the mounting bracket, valve lever, clevis pin, and cotter pin must be changed also. Refer to TM 9-2320-279-24P for proper identification of parts.

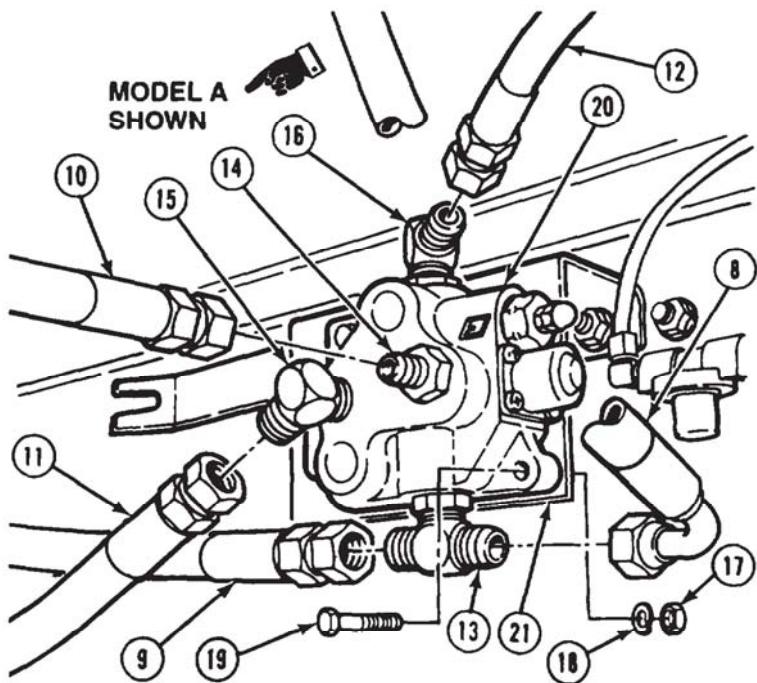
- (1) Remove cotter pin (1) and pin (2) from valve lever (3) and clevis (4).
- (2) Loosen two nuts (5). Remove control cable (6) from cable bracket (7).

## Hydraulic System Maintenance Instructions (Cont)

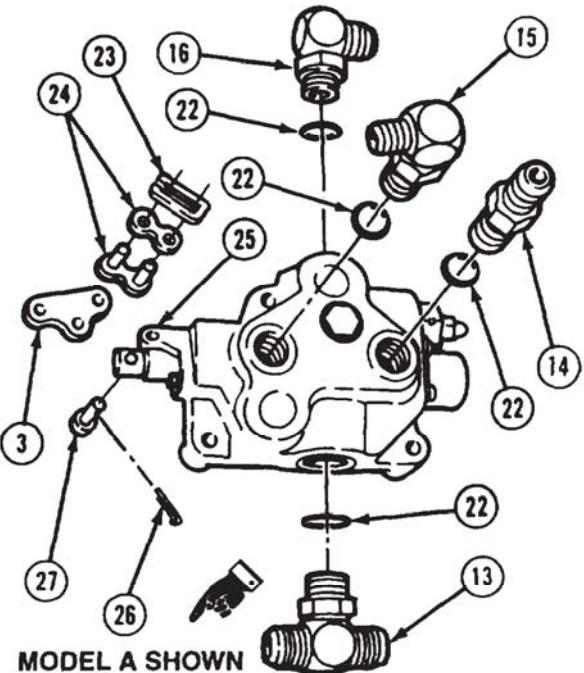
## NOTE

Tag and mark hose and fittings before removal.

- (3) Remove five hose assemblies (8, 9, 10, 11, and 12) from tee (13), adapter (14), elbow (15), and elbow (16).
- (4) Remove three nuts (17), lockwashers (18), screws (19), and control valve (20) from valve bracket (21).



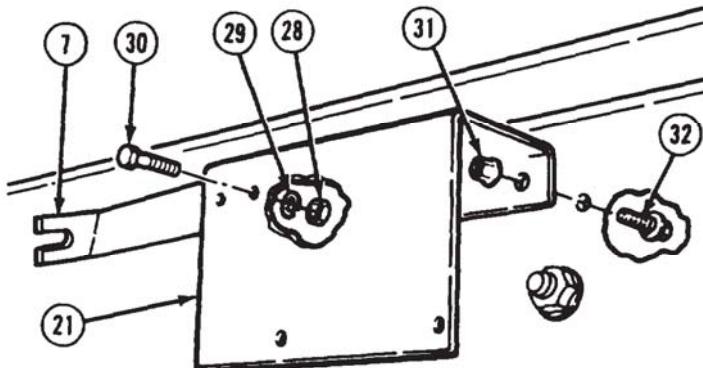
- (5) Remove tee (13), adapter (14), elbow (15), elbow (16), and four preformed packings (22) from control valve (20).
- (6) Remove clip (23) from link assembly (24). Remove link assembly from bracket (25) and valve lever (3).
- (7) Remove cotter pin (26), pin (27), and valve lever (3).



## Hydraulic System Maintenance Instructions (Cont)

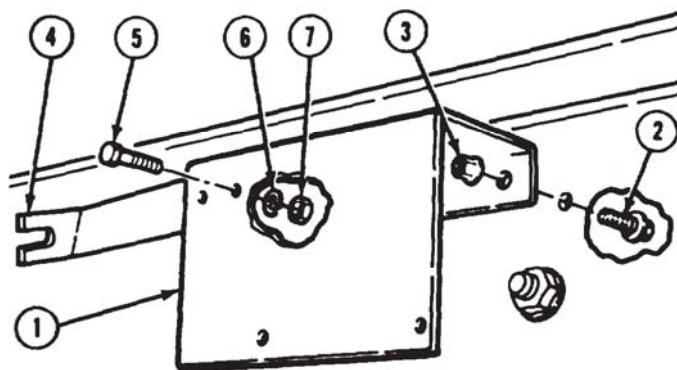
**19-12. PRIMARY PUMP HYDRAULIC MOTOR CONTROL VALVE BRACKET, AND CABLE BRACKET REMOVAL/INSTALLATION (M978) (CONT).**

- (8) Remove two nuts (28), lockwashers (29), screws (30), and cable bracket (7).  
 (9) Remove two nuts (31), screws (32), and valve bracket (21).

***b. Installation*****NOTE**

There are two kinds of control valves. Model A has the top mounting screw on the left side of the top elbow. Model B has the top mounting screw on the right side of the top elbow. Both valves are installed the same way. However, if one type of valve is replaced by the other type, the mounting bracket, valve lever, clevis pin, and cotter pin must be replaced also. Refer to TM 9-2320-279-24P for proper identification of parts.

- (1) Install valve bracket (1), two screws (2), and nuts (3).  
 (2) Install cable bracket (4), two screws (5), lockwashers (6), and nuts (7).

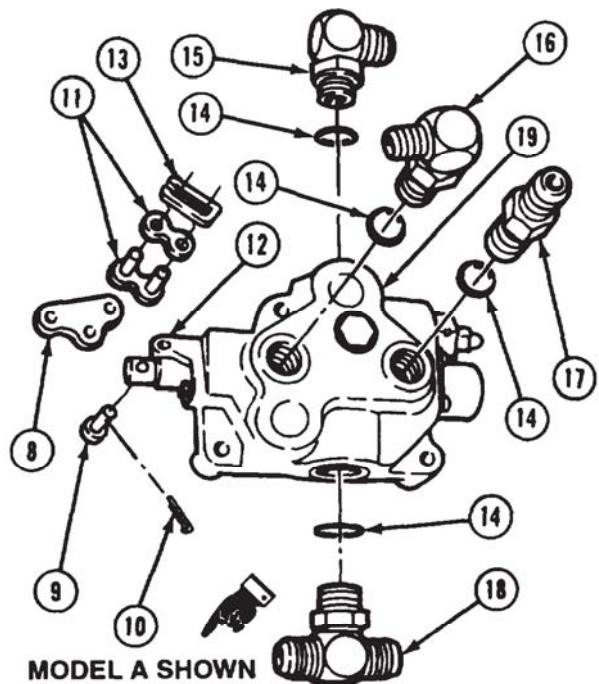


## Hydraulic System Maintenance Instructions (Cont)

**NOTE**

Pin can be installed in bracket and valve lever from either direction.

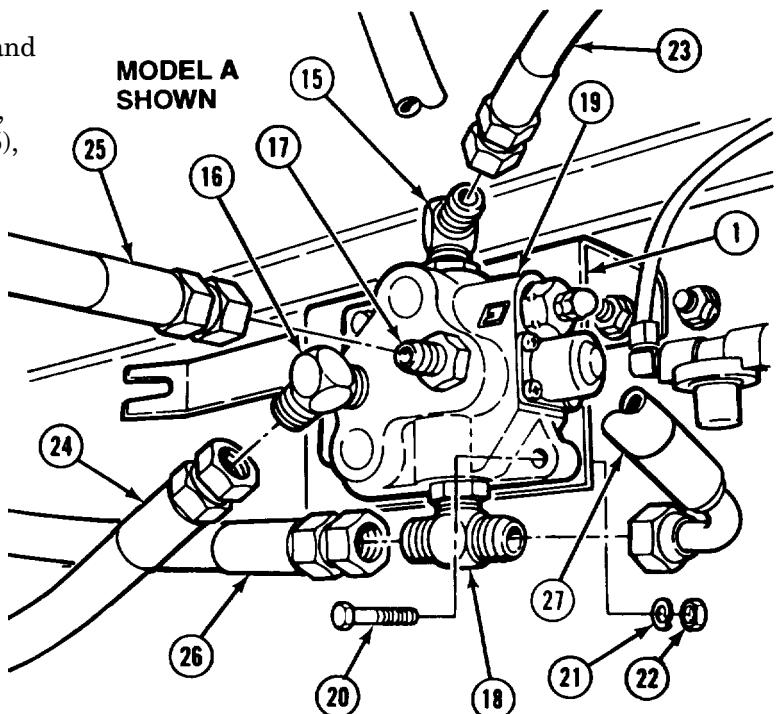
- (3) Install valve lever (8), pin (9), and cotter pin (10).
- (4) Install link assembly (11) on bracket (12) and valve lever (8). Install clip (13) on link assembly (11).
- (5) Lubricate and install four preformed packings (14) on elbow (15), elbow (16), adapter (17), and tee (18).
- (6) Install elbow (15), elbow (16), adapter (17), and tee (18) on control valve (19).





### Hydraulic System Maintenance Instructions (Cont)

- (7) Install control valve (19), three screws (20), lockwashers (21), and nuts (22) on valve bracket (1).
- (8) Install five hose assemblies (23, 24, 25, 26, and 27) on elbow (15), elbow (16), adapter (17), and tee (18).



#### **NOTE**

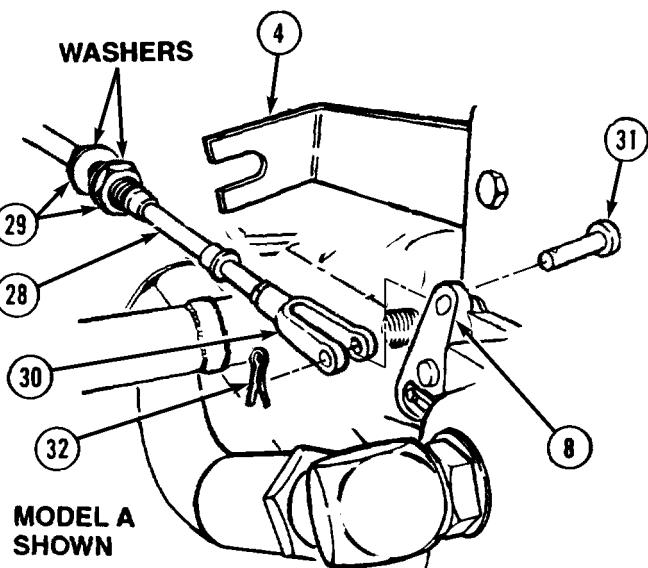
When installing control cable, make sure washers are on each side of bracket before tightening nuts.

- (9) Install control cable (28) on cable bracket (4). Tighten two nuts (29).
- (10) Install clevis (30), pin (31), and cotter pin (32) on valve lever (8).

**c. Follow-on Maintenance.**

- (1) Fill hydraulic reservoir (LO 9-2320-279-12).
- (2) Adjust primary pump hydraulic motor control cable (para 19-14).

**END OF TASK**



## Hydraulic System Maintenance instructions (Cont)

**19-12.1. RETRIEVER CONTROL VALVE LEVERS REMOVAL/INSTALLATION (M984E1).**

This task covers:

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

**INITIAL SETUP***Models*

M984E1

*References*

None

*Test Equipment*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition</i>	<i>Description</i>
TM 9-2320-279-10	Shut off engine.	

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

None

*General Safety Instructions*

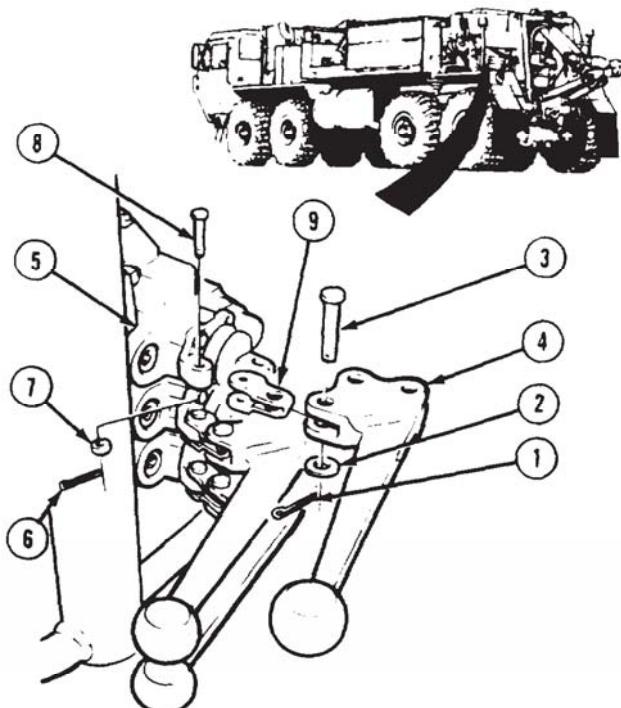
None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

**a. Removal.****NOTE**

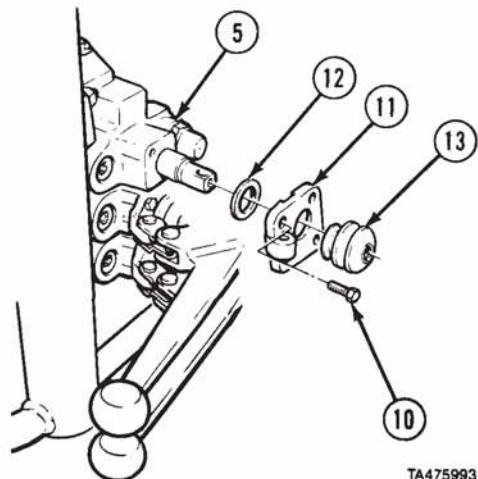
- All levers, linkages, and filters are removed the same way.
  - Start removal with top lever.
- (1) Remove two cotter pins (1), washers (2), pins (3), and lever (4) from valve (5).
  - (2) Remove cotter pin (6), washer (7), pin (8), and linkage (9) from valve (5).



TA475992

## Hydraulic System Maintenance Instructions (Cont)

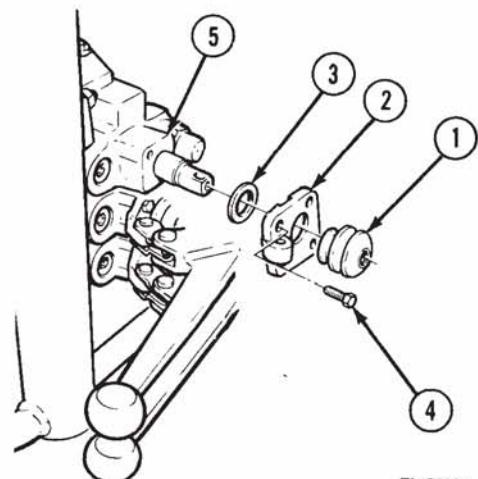
- (3) Remove two screws (10), retainer (11), and filter (12) from valve (5).
- (4) Remove dust cap (13) from retainer (11).



TA475993

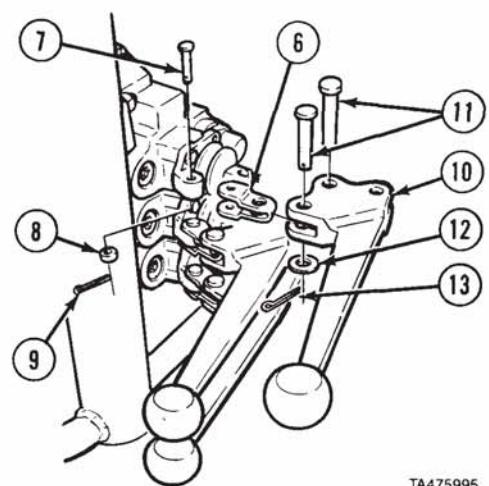
**b. Installation.****NOTE**

- All levers, linkages, and filters are installed the same way.
  - Start installation with bottom lever.
- (1) Install dust cap (1) in retainer (2).
  - (2) Install filter (3) and retainer (2) with two screws (4) on valve (5).



TA475994

- (3) Install linkage (6) on valve (5) with pin (7), washer (8), and cotter pin (9).
- (4) Install lever (10) on valve (5) with two pins (11), washers (12), and cotter pins (13).



TA475995

**c. Follow-on Maintenance.** None.**END OF TASK**

## Hydraulic System Maintenance Instructions (Cont)

**19-12.2. RETRIEVER CONTROL ASSEMBLY REMOVAL/INSTALLATION (M984E1).**

This task covers:

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

**INITIAL SETUP***Models*

M984E1

*References*

None

*Test Equipment*

None

*Equipment Condition**Special Tools*

None

*TM or Para*

TM 9-2320-279-10

*Condition Description*

Work lamp and cord removed from brackets.

*Supplies*

Oil, lubricating, Item 32, Appendix C

*Para*

19-12.1

*Valve levers removed.**Personnel Required*

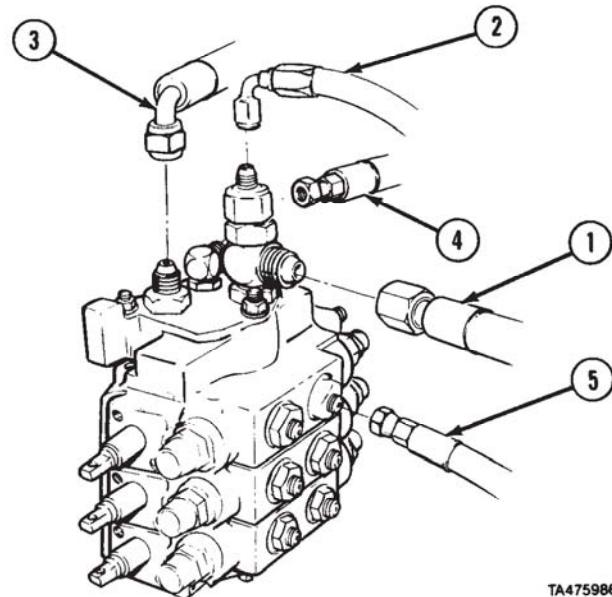
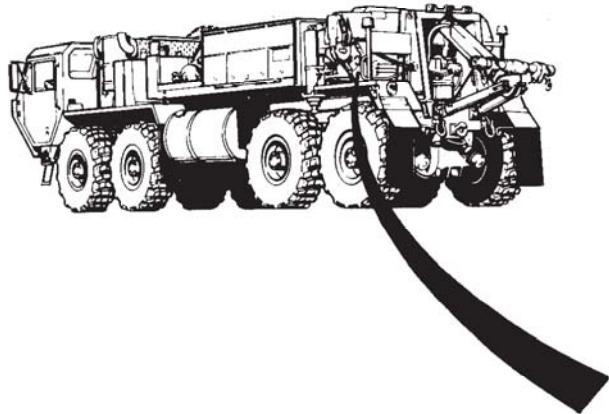
MOS 63S, Heavy wheel vehicle mechanic

*Special Environmental Conditions*

None

*General Safety Instructions*

None

**a. Removal.**

TA475986

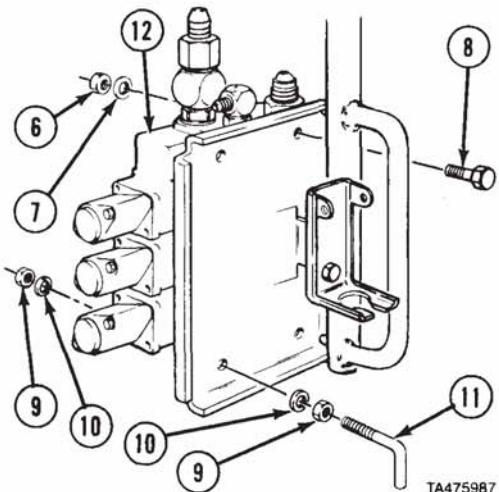
**NOTE**

Tag and mark hoses and fittings before removing.

- (1) Remove four hoses (1, 2, 3 and 4).
- (2) Remove six hoses (5).

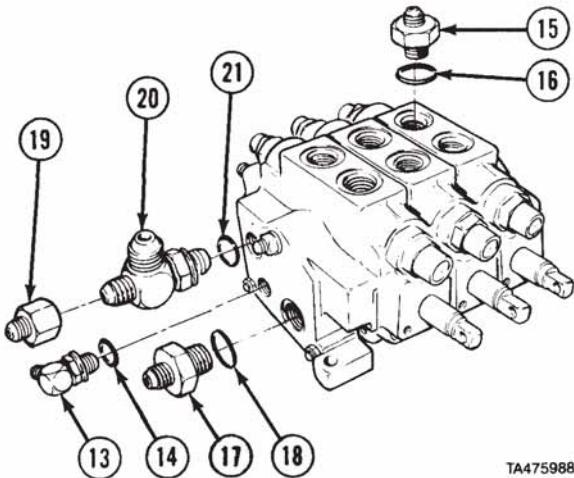
## Hydraulic System Maintenance Instructions (Cont)

- (3) Remove two nuts (6), lockwashers (7), and screws (8).
- (4) Remove two nuts (9), lockwashers (10), hooks (11), and retriever control assembly (12).
- (5) Remove two lockwashers (10) and nuts (9) from hooks (11).

**NOTE**

Nut on stud may have to be loosened in order to provide clearance to remove elbow.

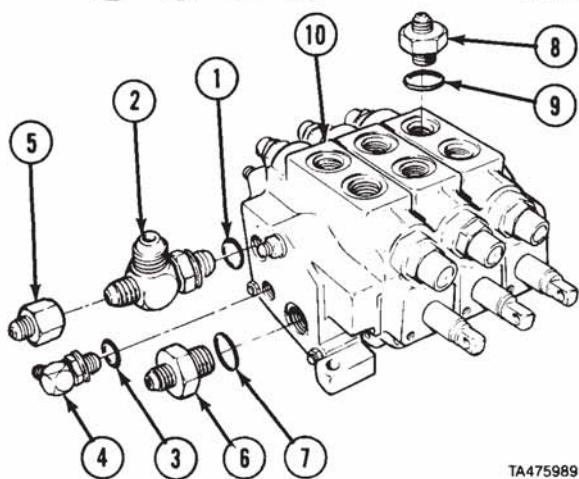
- (6) Remove elbow (13) and preformed packing (14).
- (7) Remove six fittings (15) and preformed packings (16).
- (8) Remove fitting (17) and preformed packing (18).
- (9) Remove adapter (19).
- (10) Remove fitting (20) and preformed packing (21).

**b. Installation.**

- (1) Install preformed packing (1) and fitting (2).
- (2) Install preformed packing (3) and elbow (4).
- (3) Install adapter (5) on fitting (4).
- (4) Install fitting (6) and preformed packing (7).
- (5) Install six fittings (8) and preformed packings (9) on retriever control assembly (10).

**NOTE**

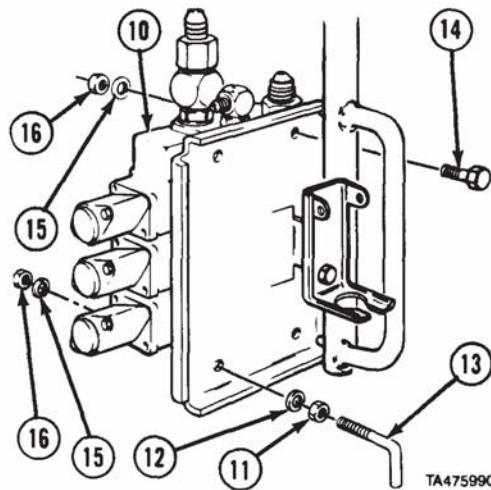
Tighten nut on stud if loose.



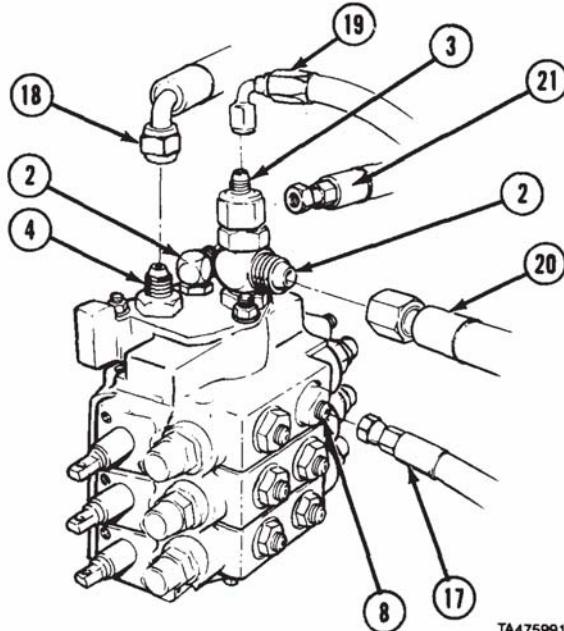
## Hydraulic System Maintenance Instructions (Cont)

**19-12.2. RETRIEVER CONTROL ASSEMBLY REMOVAL/INSTALLATION (M984E1) (CONT.).**

- (6) Install two nuts (11) and lockwashers (12) on two hooks (13).
- (7) Install retriever control assembly (10), two hooks (13), screws (14), four lockwashers (15), and nuts (16).



- (8) Install six hoses (17) on fittings (8).
- (9) Install three hoses (18, 19 and 20) on fittings (2 and 4).
- (10) Install hose (21) on elbow (2).

**c. Follow-on Maintenance.**

- (1) Install valve levers (para 19-12.1)
- (2) Install work lamp and cord on bracket (TM 9-2320-279-10).
- (3) Start engine, engage PTO. Check for leaks and check operation of retrieval system (TM 9-2320-279-10).

**END OF TASK**

## Hydraulic System Maintenance Instructions (Cont)

**19-13. SELECTOR VALVE REMOVAL/INSTALLATION**

This task covers:

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

**INITIAL SETUP***Mode Is*

- M977 with winch
- M978 with winch
- M983 without crane
- M985 with winch

*References*

- None

*Test Equipment*

- None

*Equipment Condition*

- |                  |                              |
|------------------|------------------------------|
| TM or Para       | Condition Description        |
| TM 9-2320-279-10 | Shut off engine.             |
| LO 9-2320-279-12 | Hydraulic reservoir drained. |

*Special Tools*

- None

*Special Environmental Conditions*

- None

*Supplies*

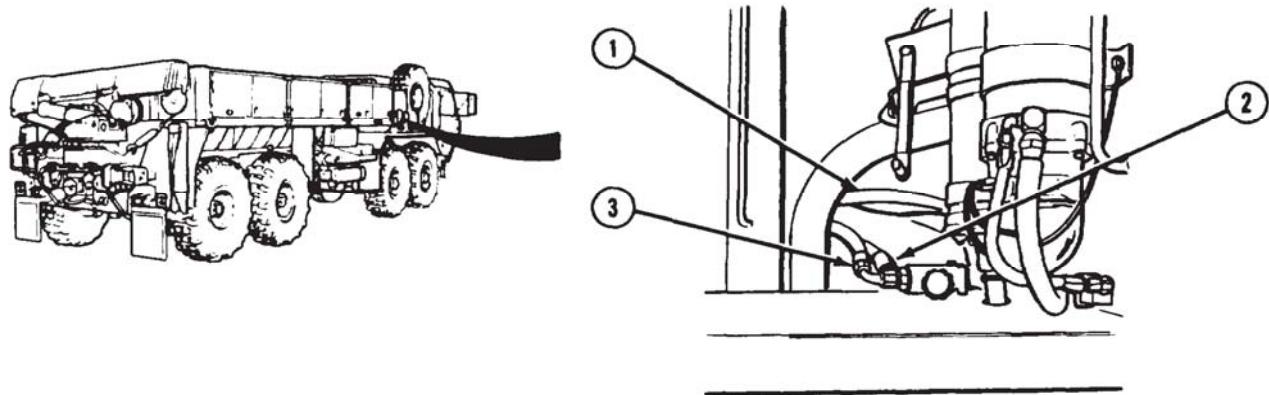
- Oil, lubricating, Item 33, Appendix C
- Tags, identification, Item 48, Appendix C

*General Safety Instructions*

- None

*Personnel Required*

- MOS 63S, Heavy wheel vehicle mechanic

*a. Removal.***NOTE**

- There are two kinds of selector valves. Model A is approximately 2 in. (51 mm) thick at the mounting holes. Model B is approximately 1 in. (25 mm) thick at the mounting holes. Both are removed the same way.
- Tag and mark lines before removal.

- (1) Disconnect hydraulic lines (1, 2, and 3).

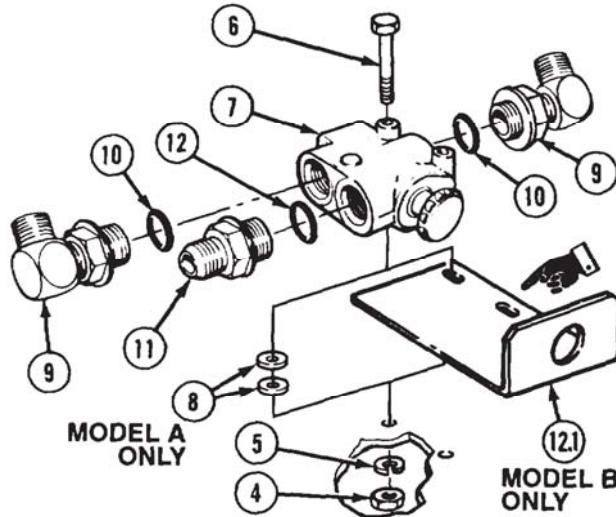
## Hydraulic System Maintenance Instructions (Cont)

**19-13. SELECTOR VALVE REMOVAL/INSTALLATION (CONT).**

- (2) Remove two nuts (4) and lockwashers (5).

**NOTE**

- Trucks with guard perform steps (3.1), (4), and (5). Trucks without guard perform steps (3), (4), and (5).
  - Washers are used on Model A only without guard.
- (3) Remove two screws (6), selector valve (7), and four washers (8).
- (3.1) Remove two screws (6), selector valve (7), and guard (12.1).
- (4) Remove two elbows (9) and preformed packings (10).
- (5) Remove adapter (11) and preformed packings (12).

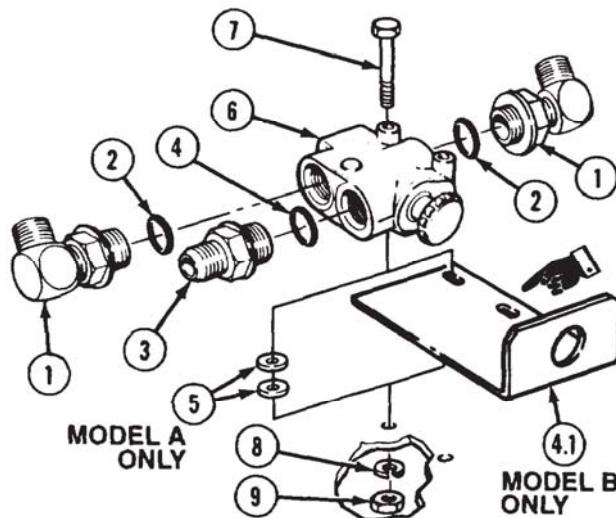
**b. Installation.**

- (1) Install two elbows (1) and preformed packings (2).

**NOTE**

Trucks with guard, perform steps (2), (2.1), (4), and (5). Trucks without guard perform steps (2), (3), (4), and (5).

- (2) Install adapter (3) and preformed packing (4).
- (2.1) Install guard (4.1), selector valve (6), and two screws (7).

**NOTE**

- On trucks without guard mount washers between fender and selector valve.
- Washers are used on Model A only without guard.
- There are two kinds of selector valves. Model A is approximately 2 in. (51 mm) thick at mounting holes, Model B is approximately 1 in. (25 mm) thick at mounting holes. Both are installed the same way.

- (3) Install four washers (5), selector valve (6), and two screws (7).
- (4) Install two lockwashers (8) and nuts (9).

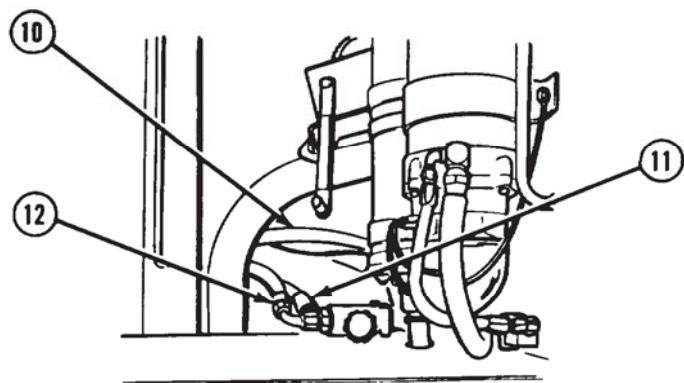
**Hydraulic System Maintenance Instructions (Cont)**

- (5) Install hydraulic lines (10, 11, and 12).

**c. Follow-on Maintenance**

- (1) Fill hydraulic reservoir  
(LO 9-2320-279-12).
- (2) Check hydraulic connections for leaks.
- (3) Check operation of selector valve  
(TM 9-2320-279-10).

**END OF TASK**

**19-14. SELECTOR VALVE REMOVAL/REPAIR/INSTALLATION (M983).**

This task covers:

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

**INITIAL SETUP***Models*

M983 with crane

*References*

None

*Test Equipment*

None

*Equipment Condition*

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

LO 9-2320-279-12 Hydraulic reservoir drained.

*Special Tools*

None

*Supplies*

Oil, lubricating, Item 33, Appendix C

Tags, identification, Item 48, Appendix C

*Special Environmental Conditions*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

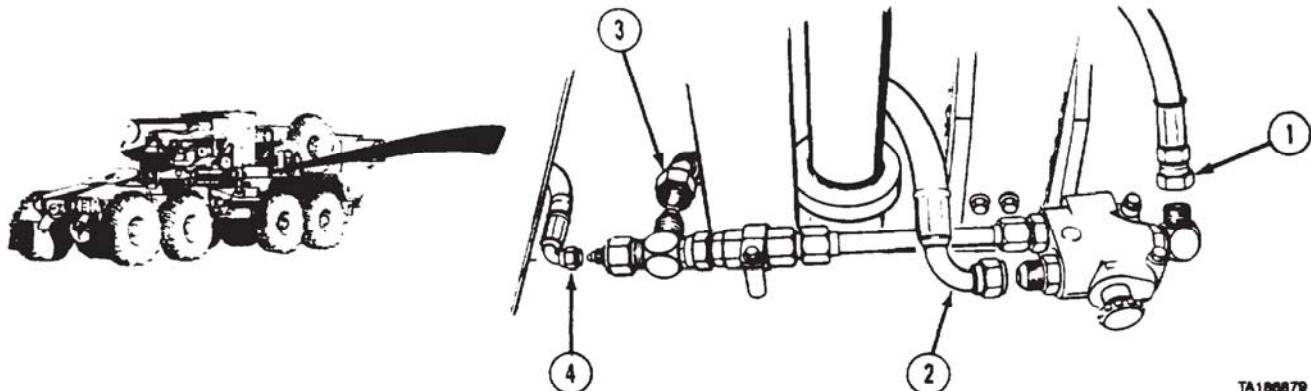
*General Safety Instructions*

None

## Hydraulic System Maintenance Instructions (Cont)

## 19-14. SELECTOR VALVE REMOVAL/REPAIR/INSTALLATION (M983) (CONT.)

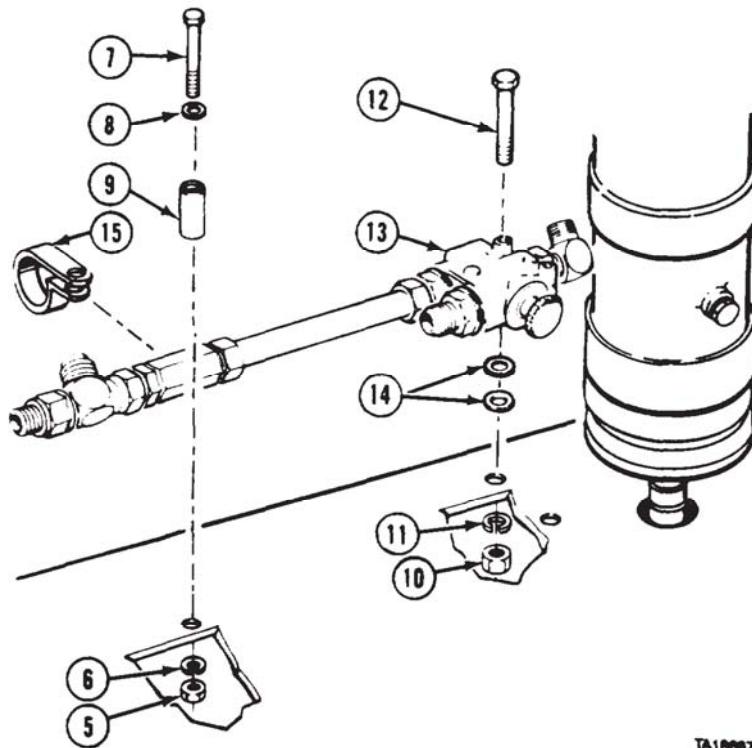
## a. Removal.



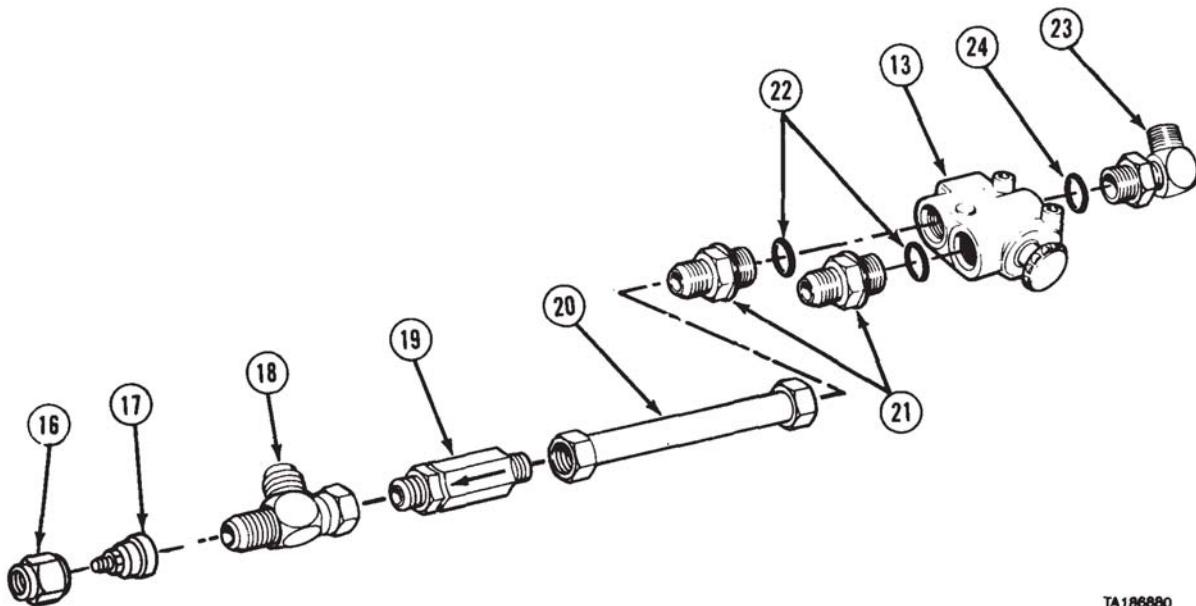
## NOTE

Tag and mark lines before removal

- (1) Disconnect hydraulic lines (1, 2, 3, and 4).
- (2) Remove nut (5), lockwasher (6), screw (7), washer (8), and spacer (9).
- (3) Remove two nuts (10), lockwashers (11), screws (12), selector valve (13), and four washers (14).
- (4) Remove clamp (15).



## Hydraulic System Maintenance Instructions (Cont)



TA186880

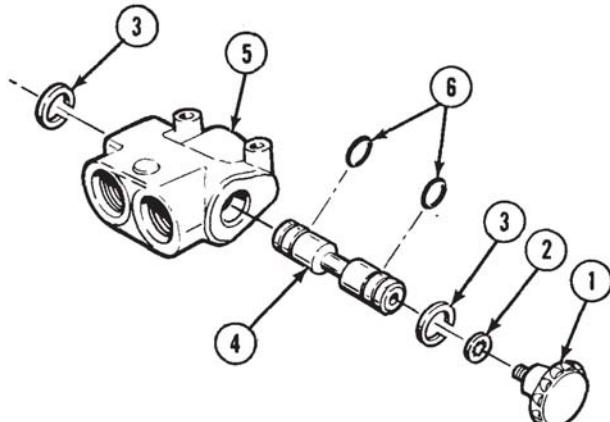
- (5) Remove adapter (16), reducer (17), and tee (18).
- (6) Note direction of arrow and remove check valve (19).
- (7) Remove tube (20), two adapters (21), and preformed packings (22) from selector valve (13).
- (8) Remove elbow (23) and preformed packing (24).

**b. Disassembly.**

- (1) Remove knob (1) and lockwasher (2).
- (2) Remove two retaining rings (3).
- (3) Remove spool (4) from valve body (5).
- (4) Remove two preformed packings (6).

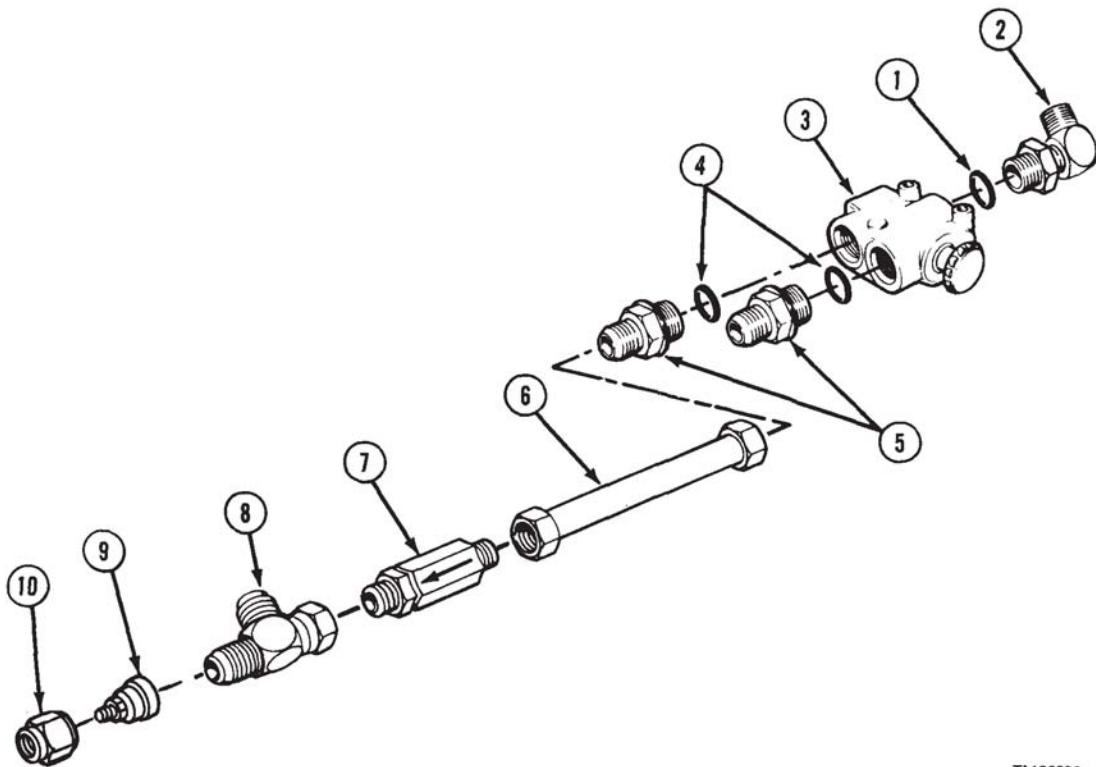
**c. Assembly.**

- (1) Install two preformed packings (6).
- (2) Lubricate spool (4) with oil and install spool in valve body (5).
- (3) Install two retaining rings (3).
- (4) Install knob (1) and lockwasher (2).



TA186881

## Hydraulic System Maintenance Instructions (Cont)

**19-14. SELECTOR VALVE REMOVAL/REPAIR/INSTALLATION (M983) (CONT).****d. Installation.**

TA186883

- (1) Install preformed packing (1) and elbow (2) in selector valve (3).
- (2) Install two preformed packings (4) and adapters (5) in selector valve (3).
- (3) Install tube (6), check valve (7), tee (8), reducer (9), and adapter (10).

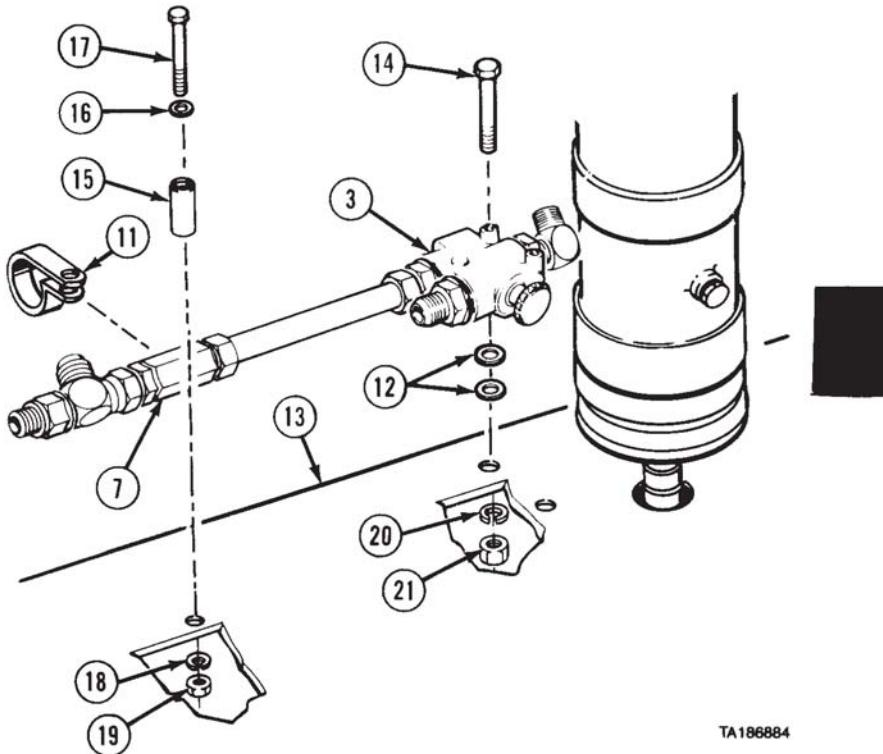
## Hydraulic System Maintenance Instructions (Cont)

- (4) Position clamp (11) on check valve (7).

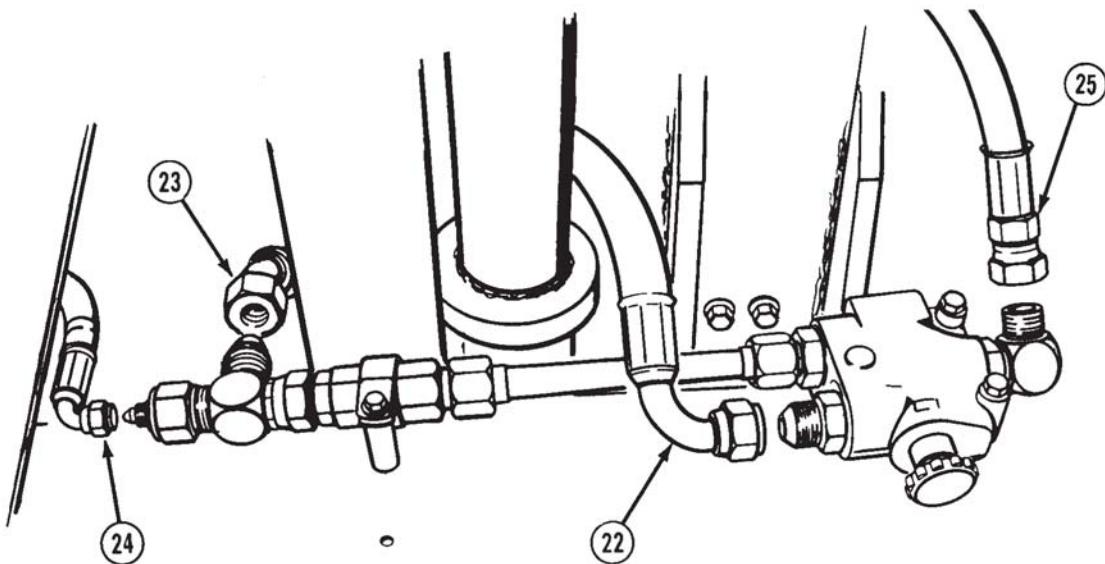
**NOTE**

Washers mount between fender and selector valve.

- (5) Position four washers (12) and selector valve (3) on fender (13). Install two screws (14).
- (6) Install clamp (11) and spacer (15) with washer (16), screw (17), lockwasher (18), and nut (19).
- (7) Install two lockwashers (20) and nuts (21).



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TA186885

- (8) Install hydraulic lines (22, 23, 24, and 25).

**e. Follow-on Maintenance.**

- (1) Fill hydraulic reservoir (LO 9-2320-279-12).
- (2) Check hydraulic connections for leaks.

**END OF TASK**

## Hydraulic System Maintenance Instructions (Cont)

**19-15. PRIMARY PUMP HYDRAULIC MOTOR CONTROL CABLE AND MOUNT REMOVAL/INSTALLATION/ADJUSTMENT (M978).**

This task covers:

- a. Removal
- b. Installation
- c. Adjustment
- d. Follow-on Maintenance

**INITIAL SETUP***Models*

M978

*References*

None

*Test Equipment*

None

*Equipment Condition**Special Tools*

None

*TM or Para* TM 9-2320-279-10 *Condition Description* Pump module rear access doors opened.

*Supplies*

Ties, cable, plastic, Item 52, Appendix C

*Special Environmental Conditions*

None

*Personnel Required*

MOS 63W, Wheel vehicle repairer

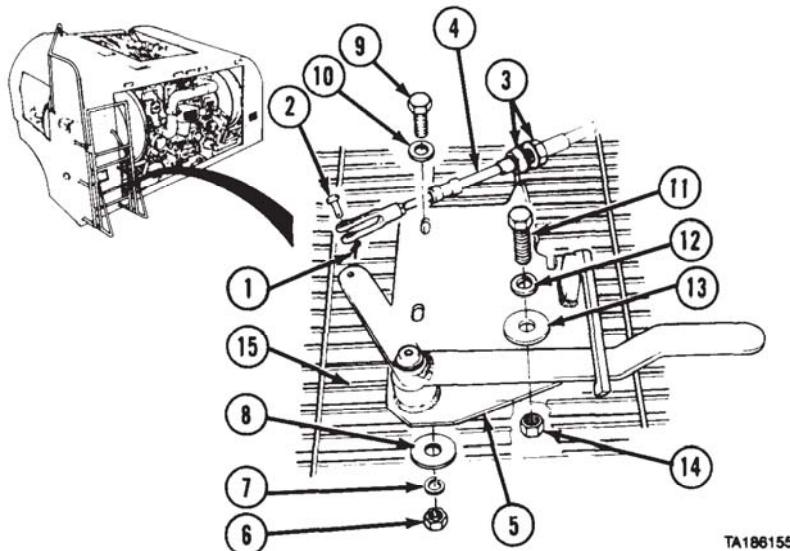
*General Safety Instructions*

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

**a. Removal.****NOTE**

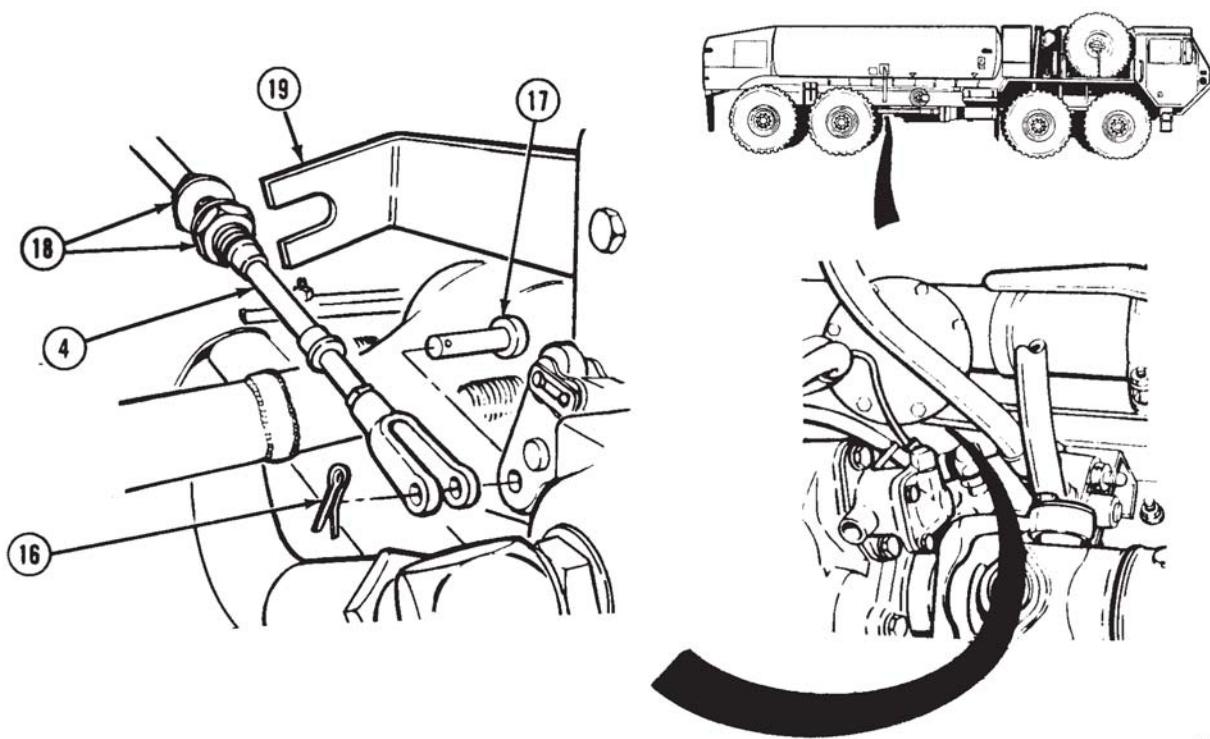
Mark position of shift mount.

- (1) Remove cotter pin (1) and pin (2).
- (2) Loosen two nuts (3) and remove shift cable (4) from shift mount (5).
- (3) Remove two nuts (6), lockwashers (7), washers (8), screws (9), and washers (10).
- (4) Remove screw (11), lockwasher (12), washer (13), and locknut (14).
- (5) Remove shift mount (5) from grating (15).



TA186155

## Hydraulic System Maintenance Instructions (Cont)



TA357016

**NOTE**

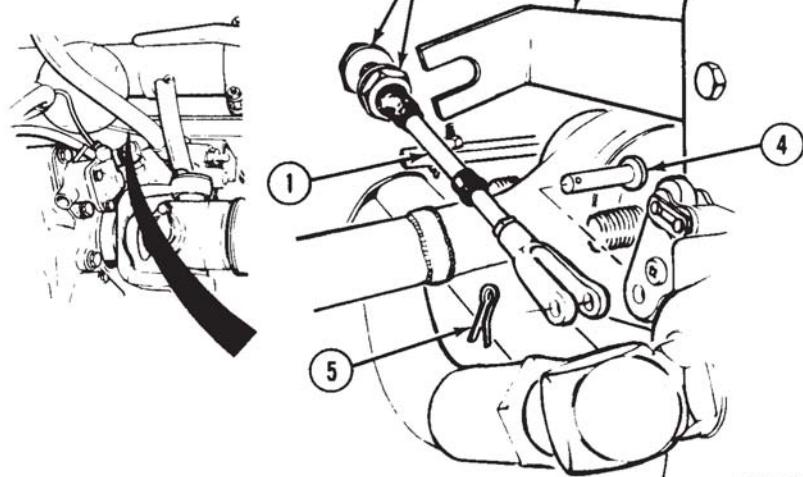
Remove all plastic cable ties as necessary.

- (6) Remove cotter pin (16) and pin (17).
- (7) Loosen two nuts (18).
- (8) Remove shift cable (4) from bracket (19).

**b. Installation.****NOTE**

Install plastic cable ties as needed.

- (1) Install shift cable (1) in bracket (2) and tighten two nuts (3).
- (2) Install pin (4) and cotter pin (5).

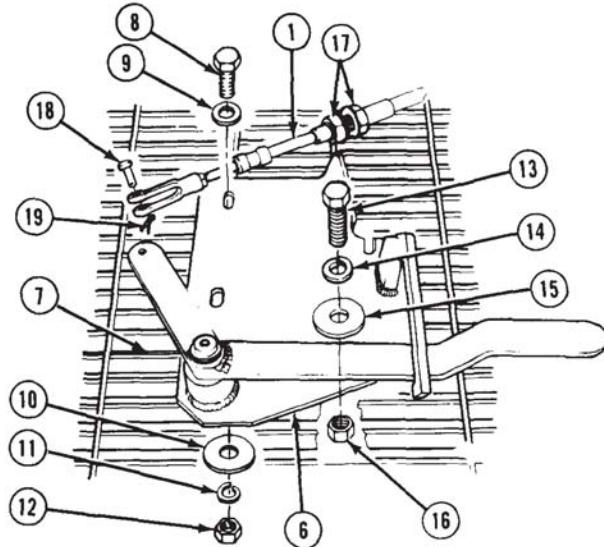


TA186157

## Hydraulic System Maintenance Instructions (Cont)

**19-15. PRIMARY PUMP HYDRAULIC MOTOR CONTROL CABLE AND MOUNT  
REMOVAL/INSTALLATION/ADJUSTMENT (M978) (CONT).**

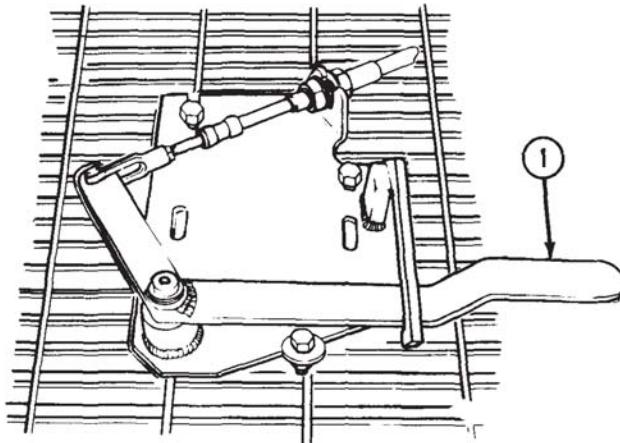
- (3) Install shift mount (6) on grating (7) with two screws (8), washers (9), washers (10), lockwashers (11), and nuts (12).
- (4) Install screw (13), lockwasher (14), washer (15), and locknut (16).
- (5) Install shift cable (1) in shift mount (6) and tighten two nuts (17).
- (6) Install shift cable (1) with pin (18) and cotter pin (19).



TA186158

**c. Adjustment.**

- (1) Make sure shift lever (1) is in disengaged position.



TA186159

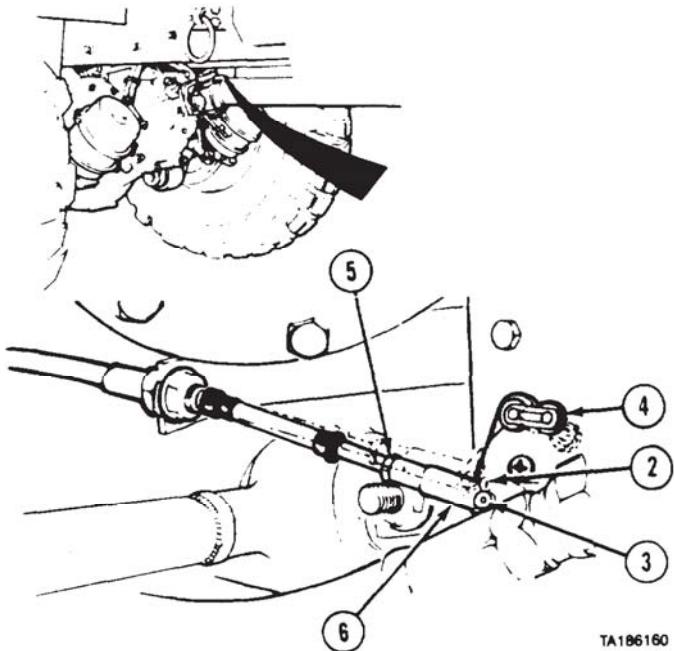
## Hydraulic System Maintenance Instructions (Cont)

- (2) Remove cotter pin (2) and pin (3).
- (3) Check that control lever (3) is full forward to disengaged position. If so, do step (8). If not, do steps (4) through (8).
- (4) Move control lever (4) full forward to disengaged position.
- (5) Loosen locknut (5).
- (6) Adjust clevis (6) so holes in clevis align with hole in control lever (4).
- (7) Tighten locknut (5).
- (8) Install control lever (4) with pin (3) and cotter pin (2).

**d. Follow-on Maintenance.**

- (1) Recirculate fuel (TM 9-2320-279-10).
- (2) Check that pump engages and disengages when shift lever is moved.
- (3) Close rear module doors (TM 9-2320-279-10).

END OF TASK



TA186160

## Section IV. HYDRAULIC LINES AND FLUID FILTER

**19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION.**

This task covers:

- a. Typical Hydraulic Coupling Removal
- b. Typical Hydraulic Coupling Installation
- c. Typical Clip, Clamp, and Bracket Removal

- d. Typical Clip, Clamp, and Bracket Installation
- e. Hydraulic Lines
- f. Follow-on Maintenance

**INITIAL SETUP***Models*

All

*Test Equipment*

None

*Special Tools*

None

*Supplies*Tags, identification, Item 48, Appendix C  
Ties, cable, plastic, Item 52, Appendix C*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*References*

None

*Equipment Condition**TM or Para*      *Condition Description*

TM 9-2320-279-10 Shut off engine.

LO 9-2320-279-12 Hydraulic reservoir drained (only when replacing reservoir lines).

*Special Environmental Conditions*

None

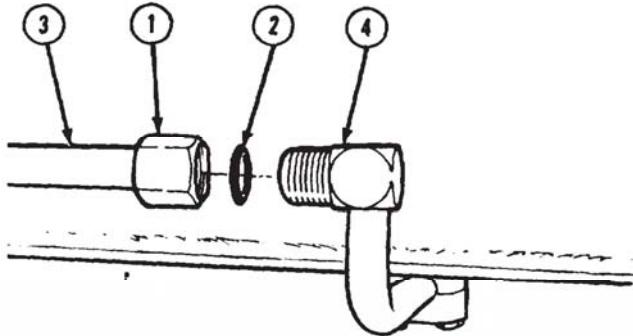
*General Safety Instructions*

None

## Hydraulic System Maintenance Instructions (Cont)

**19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).****NOTE**

- This procedure only shows location of vehicle hydraulic lines. It will never be necessary to remove all hydraulic lines at once.
- Refer to subparagraph e. for locations of specific hydraulic lines. Line numbers shown are from Hydraulic Schematic FO-3, located at the end of this manual.
- All hydraulic lines are connected with compression fittings. Some fittings will not have preformed packings. Fitting from which hydraulic line is being removed or installed can be an elbow, tee, or adapter on a valve or other hydraulic component or hydraulic line. All compression fittings are removed and installed the same way. Elbow is shown.
- Some hoses have coated cloth to prevent chafing damage to hose.
- Tag and mark position of all hydraulic lines.
- Cut plastic cable ties as necessary,

**a. Typical Hydraulic Coupling Removal.**

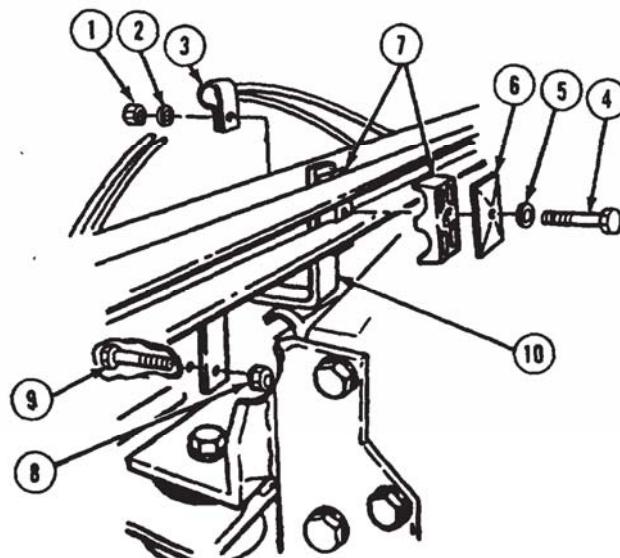
Loosen fitting (1). Remove preformed packing (2) and hose (3) from elbow (4).

**b. Typical Hydraulic Coupling Installation.**

Install preformed packing (2) and connect hose (3) on elbow (4) with fitting (1).

**c. Typical Clip, Clamp, and Bracket Removal.****NOTE**

- All clips, clamps, and brackets are removed and installed the same way.
  - Mark position of brackets.
- (1) Remove locknut (1), washer (2), and cushion clip (3).
  - (2) Remove screw (4), washer (5), plate (6), and two clamps (7).
  - (3) Remove nuts (8), screws (9), and bracket (10).
- d. Typical Clip, Clamp, and Bracket Installation.**
- (1) Install bracket (10), screws (9), and nuts (8).
  - (2) Install two clamps (7), plate (6), washer (5), and screw (4).
  - (3) Install cushion clip (3), washer (2), and locknut (1).



## Hydraulic System Maintenance Instructions (Cont)

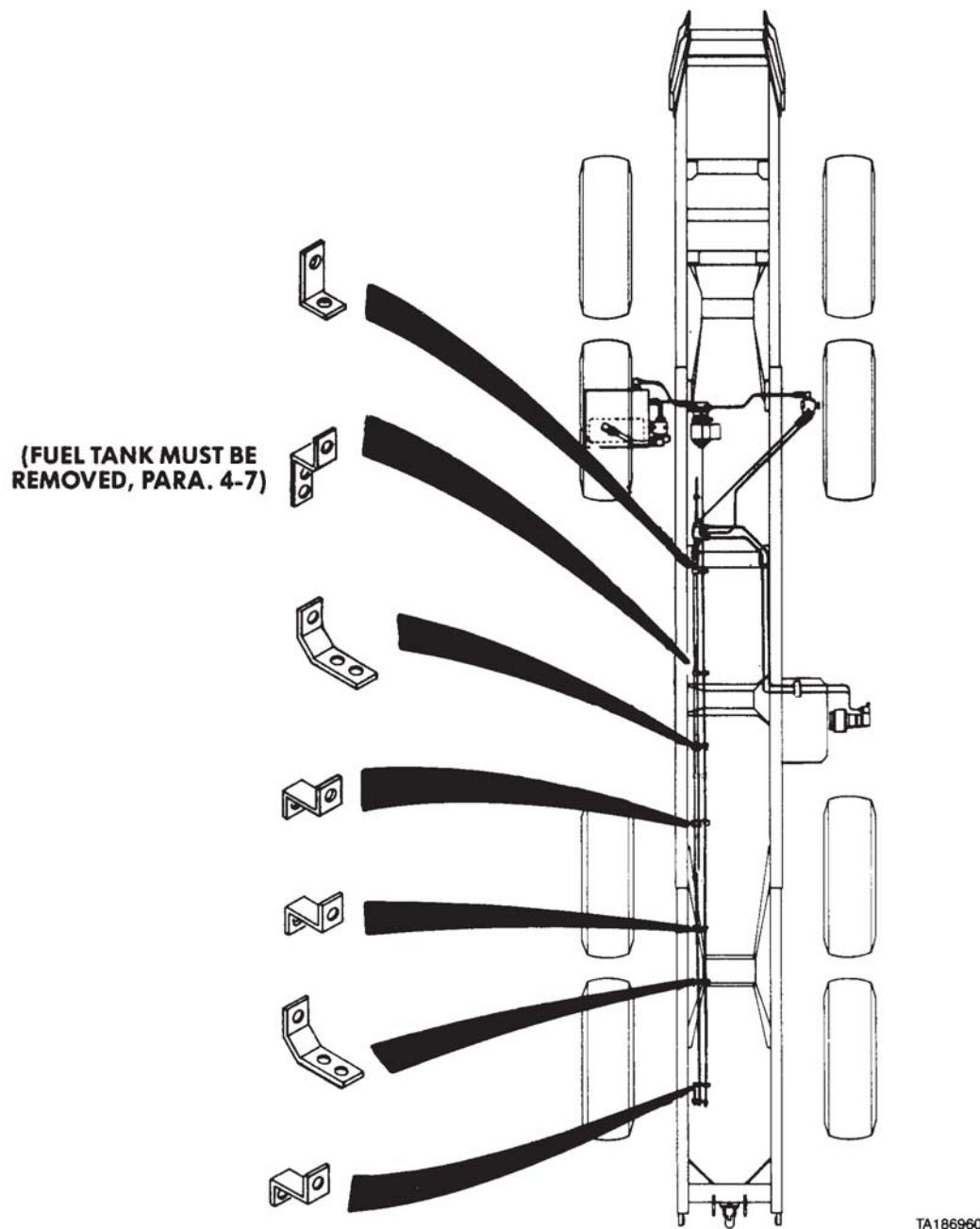


Figure 19-1. Typical Hydraulic Line Brackets.

TA186960

## Hydraulic System Maintenance Instructions (Cont)

**19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).****e. Hydraulic Lines.****NOTE**

Refer to Figure 19-2 for component location.

**Table 19-1. Hydraulic Line Index For M977, M985 Without Winch**

<b>Line No.</b>	<b>From</b>	<b>To</b>
278	Hydraulic Reservoir (1)	PTO Pump (2)
496	PTO Pump Tee (2)	High Pressure Filter (3)
928	PTO Pump Tee (2)	Relief Valve (4)
902	High Pressure Filter (3)	Hydraulic Line Connector (5)
902A	Hydraulic Line Connector (5)	Hydraulic Line Connector (Top) (6)
902B	Hydraulic Line Connector (Top) (6)	Quick Disconnect (Bottom) (7)
883	Quick Disconnect (Top) (7)	Hydraulic Line Connector (Bottom) (6)
883A	Hydraulic Line Connector (Bottom) (6)	Hydraulic Line Connector (5)
883B	Hydraulic Line Connector (5)	Manifold Block (8)
883C	Manifold Block (8)	Return Line Filter (9)
277	Manifold Block (8)	Steering Pump (10)
278	Steering Pump (10)	Hydraulic Reservoir (1)
301	Steering Pump (10)	Main Gear (11)
302	Manifold Block (8)	Secondary Gear (2)

## Hydraulic System Maintenance Instructions (Cont)

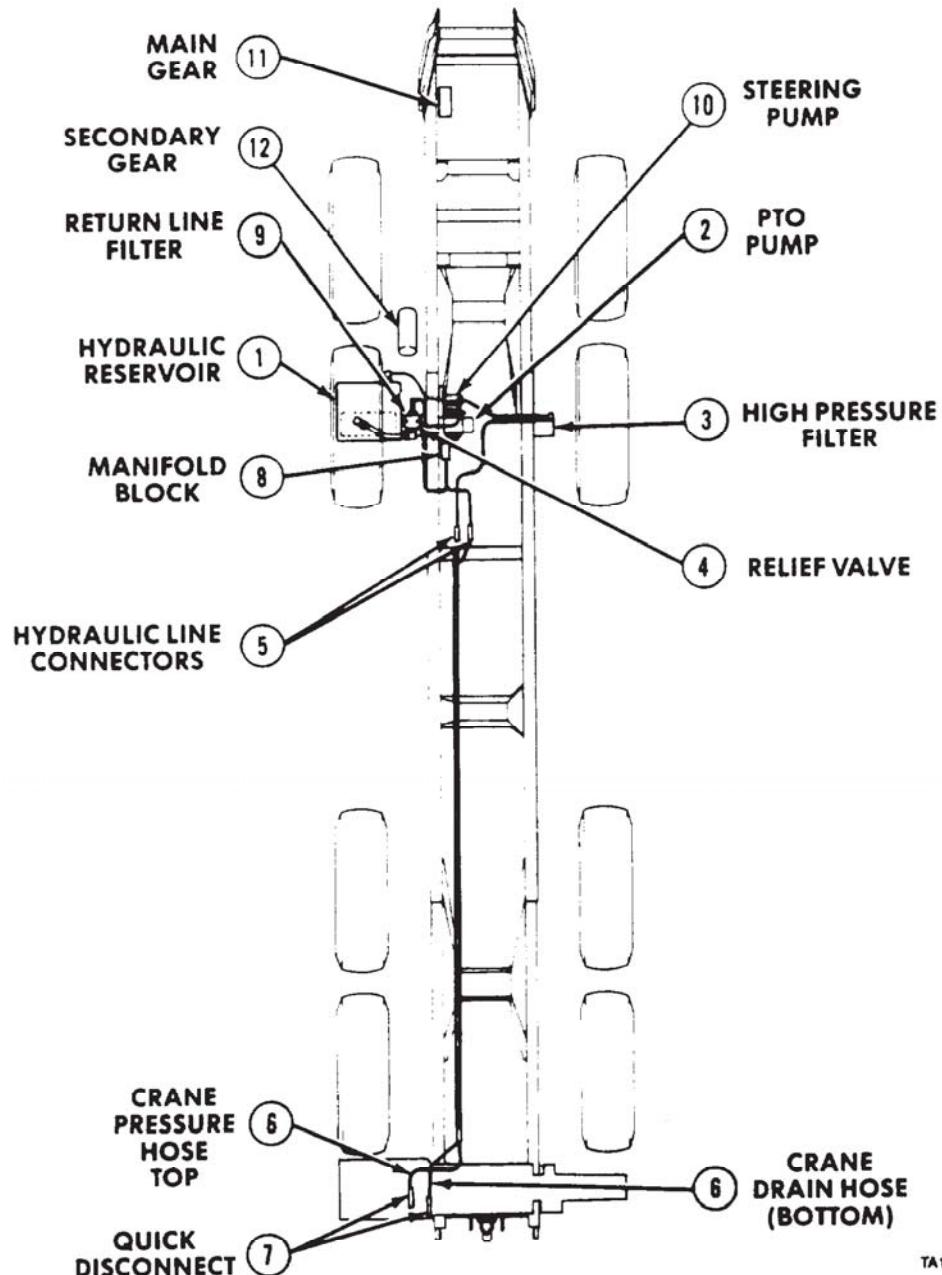


Figure 19-2. Hydraulic Lines - M977, M985 Without Winch.

## Hydraulic System Maintenance Instructions (Cont)

**19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).****NOTE**

Refer to Figure 19-3 for component location.

*Table 19-2. Hydraulic Line Index For M977, M985 With Winch*

Line No.	From	To
278	Hydraulic Reservoir (1)	PTO Pump (2)
496	PTO Pump Tee (2)	High Pressure Filter (3)
928	PTO Pump Tee (2)	Relief Valve (4)
936	High Pressure Filter (3)	Selector Valve (5)
899	Selector Valve (5)	S.R.W. Control Valve (6)
900	S.R.W. Control Valve (B) Port (6)	Winch Motor Bulkhead Connector (7)
900A	Winch Motor Bulkhead Connector (7)	Winch Motor Valve (Bottom) (8)
900	S.R.W. Control Valve (A) Port (6)	Winch Motor Bulkhead Connector (7)
900A	Winch Motor Bulkhead Connector (7)	Winch Motor Valve (Top) (8)
277	Manifold Block (9)	Steering Pump (10)
278	Steering Pump (10)	Hydraulic Reservoir (1)
301	Steering Pump (10)	Main Gear (11)
302	Manifold Block (9)	Secondary Gear (12)
902	Selector Valve (5)	Hydraulic Line Connector (13)
902A	Hydraulic Line Connector (13)	Crane Pressure Hose (14)
902B	Crane Pressure Hose (14)	Quick Disconnect (Top) (15)
883	Quick Disconnect (Bottom) (15)	Crane Return Hose (16)
883A	Crane Drain Hose (16)	S.R.W. Control Valve Tee (6)
883B	S.R.W. Control Valve Tee (6)	Manifold Block (9)
883C	Manifold Block (9)	Return Line Filter (17)

## Hydraulic System Maintenance Instructions (Cont)

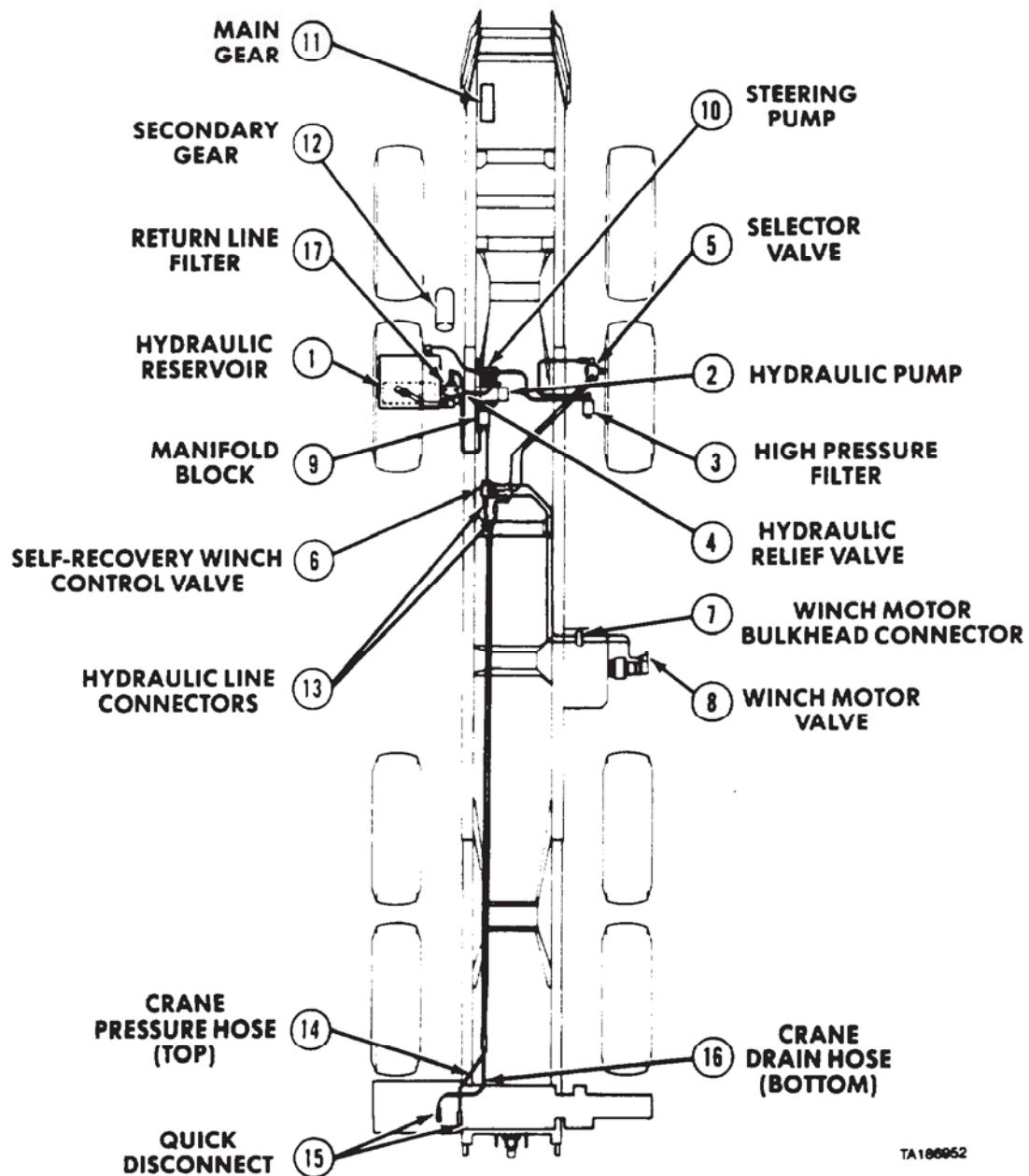


figure 19-3. Hydraulic Lines - M977, M985 With Winch.

## Hydraulic System Maintenance Instructions (Cont)

**19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).****NOTE**

Refer to Figure 19-4 for component location.

*Table 19-3. Hydraulic Line Index For M983 With Crane*

Line No.	From	To
278	Hydraulic Pump Reservoir (1)	PTO Pump (2)
278	Hydraulic Reservoir (1)	Steering Pump (10)
278A	Hydraulic Reservoir (1)	Hand Pump (9)
496	PTO Pump (2)	Selector Valve (3)
928	PTO Pump (2)	Relief Valve (7)
899	Selector Valve (3)	S.R.W. Control Valve (4)
900	S.R.W. Control Valve (B) Port (4)	Winch Motor Bulkhead Connector (5)
900A	Winch Motor Bulkhead Connector (5)	Winch Motor Valve (Bottom) (6)
900	S.R.W. Control Valve (A) Port (4)	Winch Motor Bulkhead Connector (5)
900A	Winch Motor Bulkhead Connector (5)	Winch Motor Valve (Top) (6)
902	Selector Valve (3)	Crane Connection (A) (Supply) (8)
902A	Selector Valve (3)	Hand Pump (9)
301	Steering Pump (10)	Main Gear (11)
277	Steering Pump (10)	Manifold Block (12)
302	Manifold Block (12)	Secondary Gear (13)
883	Relief Valve (7)	Return Line Filter (14)
883A	Return Line Filter (14)	Manifold Block (12)
883B	Manifold Block (12)	S.R.W. Control Valve (4)
883C	S.R.W. Control Valve (4)	Crane Connection (B) (Return) (15)
883D	Crane Connection (Cl (16)	Hydraulic Reservoir (1)

## Hydraulic System Maintenance Instructions (Cont)

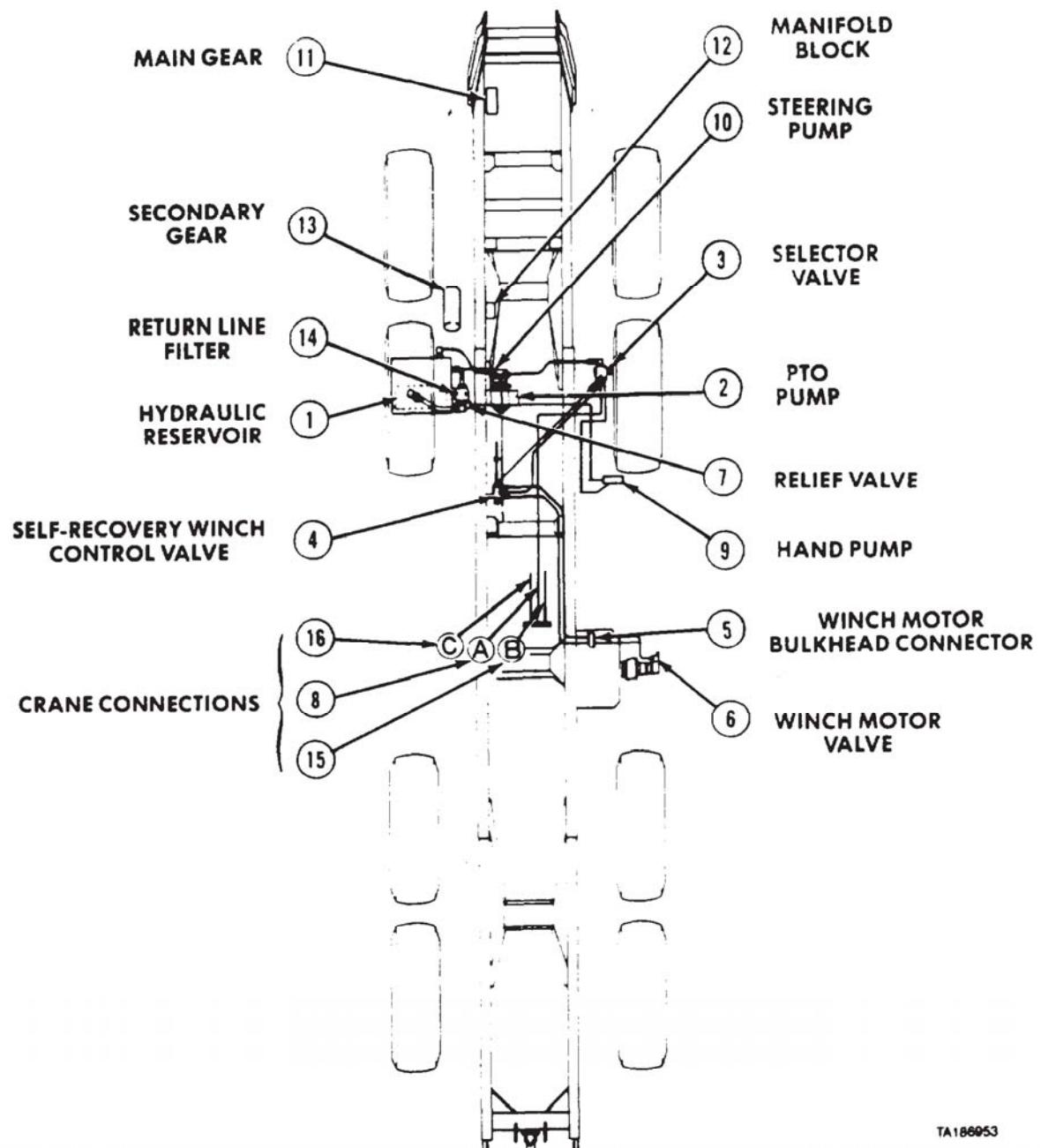


Figure 19-4. Hydraulic Lines - M983 With Crane.

**Hydraulic System Maintenance Instructions (Cont)****19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).****NOTE**

Refer to Figure 19-5 for component location.

***Table 19-4. Hydraulic Line Index For M983 Without Crane***

Line No.	From	To
I	278 Hydraulic Reservoir (1)	PTO Pump (2)
	496 PTO Pump Tee (1)	Selector Valve (3)
	928 PTO Pump Tee (1)	Relief Valve (7)
	899 Selector Valve (3)	S.R.W. Control Valve (4)
	900 S.R.W. Control Valve (B) Port (4)	Winch Motor Bulkhead Connector (Inner) (5)
	900A Winch Motor Bulkhead Connector (5)	Winch Motor Valve (Bottom) (6)
	900 S.R.W. Control Valve (A) Port (4)	Winch Motor Bulkhead Connector (Outer) (5)
	900A Winch Motor Bulkhead Connector (5)	Winch Motor Valve (Top) (6)
	902 Selector Valve (3)	Auxiliary Hydraulics Relief Valve (8)
	906 Auxiliary Hydraulics Relief Valve (8)	Auxiliary Hydraulics Bulkhead Connector (Inner) (9)
	907 S.R.W. Control Valve (OUT) (5)	Auxiliary Hydraulics Bulkhead Connector (Outer) (9)
	278 Hydraulic Reservoir (1)	Steering Pump (10)
	301 Steering Pump (10)	Main Gear (11)
	277 Steering Pump (10)	Manifold Block (12)
	302 Manifold Block (12)	Secondary Gear (13)
	883 Relief Valve (7)	Return Line Filter (14)
	883A Return Line Filter (14)	Manifold Block (12)
	883B Manifold Block (12)	S.R.W. Control Valve (4)
	883C S.R.W. Control Valve (4)	Relief Valve (8)

## Hydraulic System Maintenance Instructions (Cont)

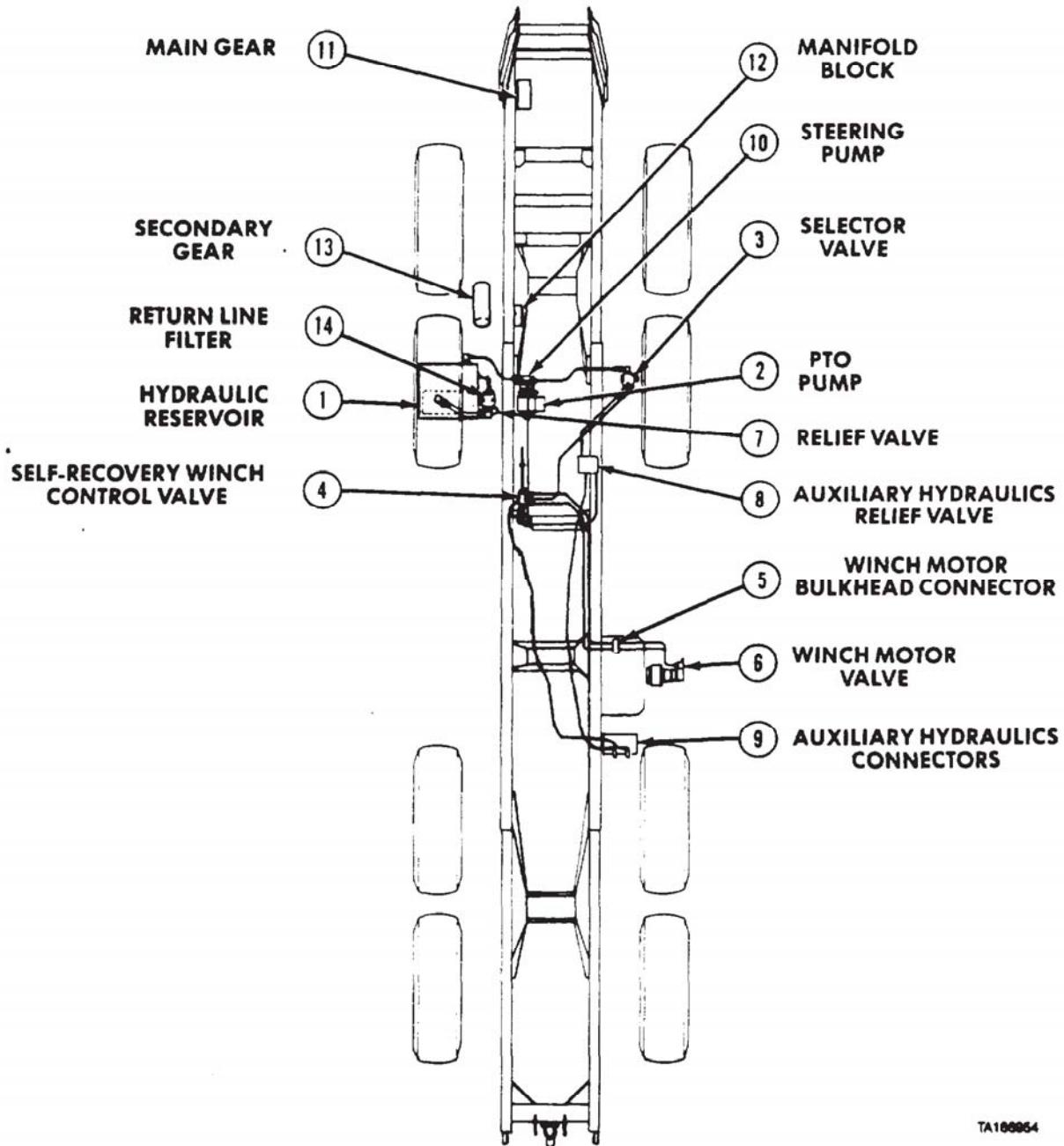


Figure 19-5. Hydraulic lines - M983 Without Crane.

**Hydraulic System Maintenance Instructions (Cont)****19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).****NOTE**

Refer to Figure 19-6 for component location.

***Table 19-5. Hydraulic Line Index For M978 With Winch***

Line No.	From	To
278	Hydraulic Reservoir (1)	PTO Pump (2)
496	PTO Pump Tee (2)	Selector Valve (3)
902	Selector Valve (3)	Tanker Control Valve (4)
905	Selector Valve (3)	Priority Flow Valve (5)
928	PTO Pump Tee (2)	Relief Valve (6)
903	Tanker Control Valve (B) Port (4)	Fuel Pump (7)
904	Tanker Control Valve Tee (4)	Fuel Pump (7)
906	Tanker Control Valve (A) Port (4)	Auxiliary Hydraulic Bulkhead Connector (Supply) (8)
907	Tanker Control Valve Tee (4)	Auxiliary Hydraulic Bulkhead Connector (Return) (8)
899	S.R.W. Control Valve (IN) Port (9)	Priority Flow Valve (5)
900	S.R.W. Control Valve (B) Port (9)	Winch Motor Bulkhead Connector (10)
900A	Winch Motor Bulkhead Connector (10)	Winch Motor Valve (Bottom) (11)
900	S.R.W. Control Valve (A) Port (9)	Winch Motor Bulkhead Connector (10)
900A	Winch Motor Bulkhead Connector (10)	Winch Motor Valve Top (11)
278	Hydraulic Reservoir (1)	Steering Pump (12)
301	Steering Pump (12)	Main Gear (13)
277	Steering Pump (12)	Manifold Block (14)
302	Manifold Block (14)	Secondary Gear (15)
883	Relief Valve (6)	Return Line Filter (16)
883A	Return Line Filter (16)	Manifold Block (14)
883B	S.R.W. Control Valve (OUT) Tee (9)	Fuel Pump Tee (7)
883C	S.R.W. Control Valve (OUT) Tee (9)	Manifold Block (14)
883D	S.R.W. Control Valve (OUT) Tee (9)	Priority Flow Valve (5)
883E	Fuel Pump (7)	Hydraulic Reservoir (1)

## Hydraulic System Maintenance Instructions (Cont)

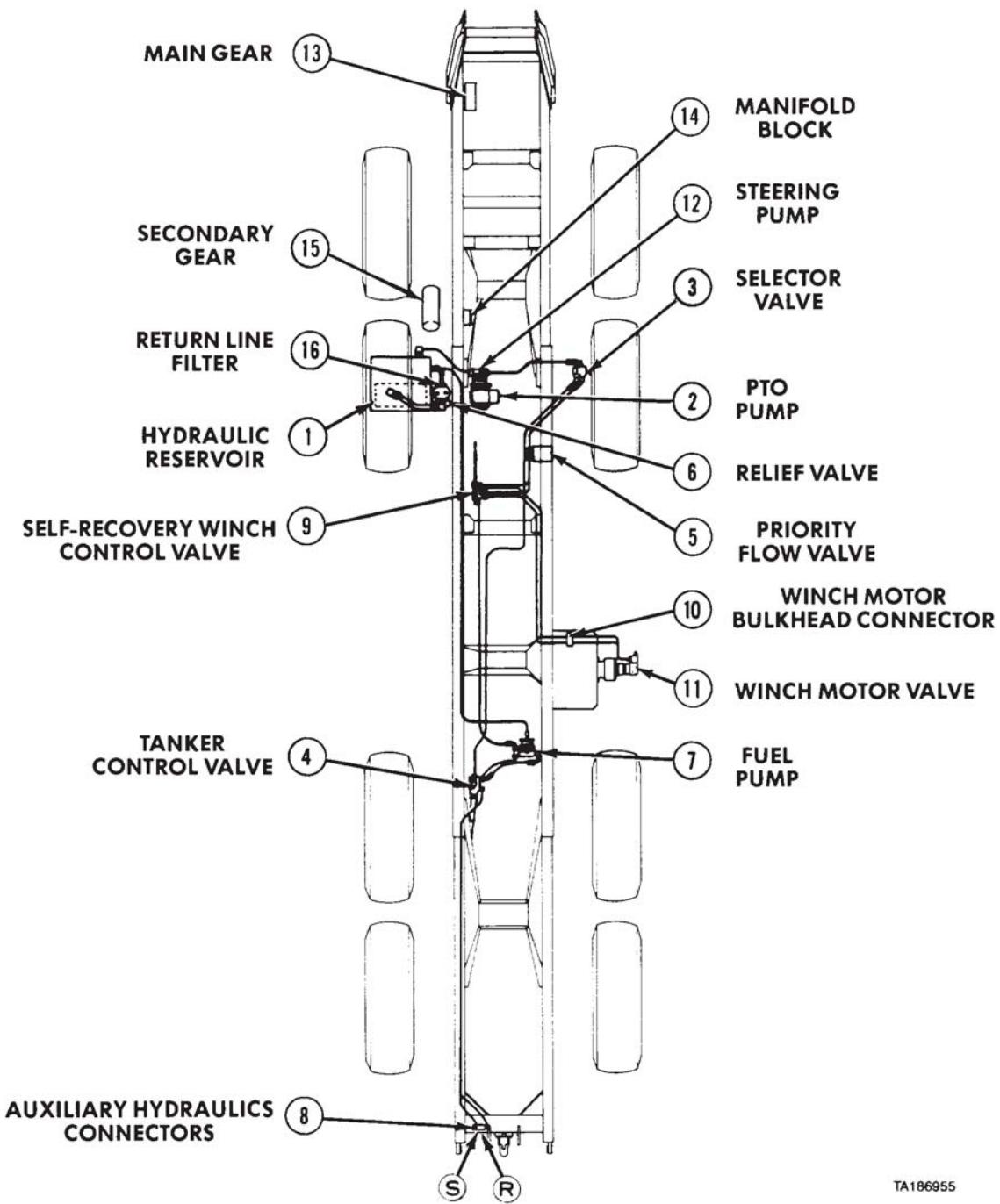


Figure 19-6. Hydraulic Lines - M978 With Winch.

## Hydraulic System Maintenance Instructions (Cont)

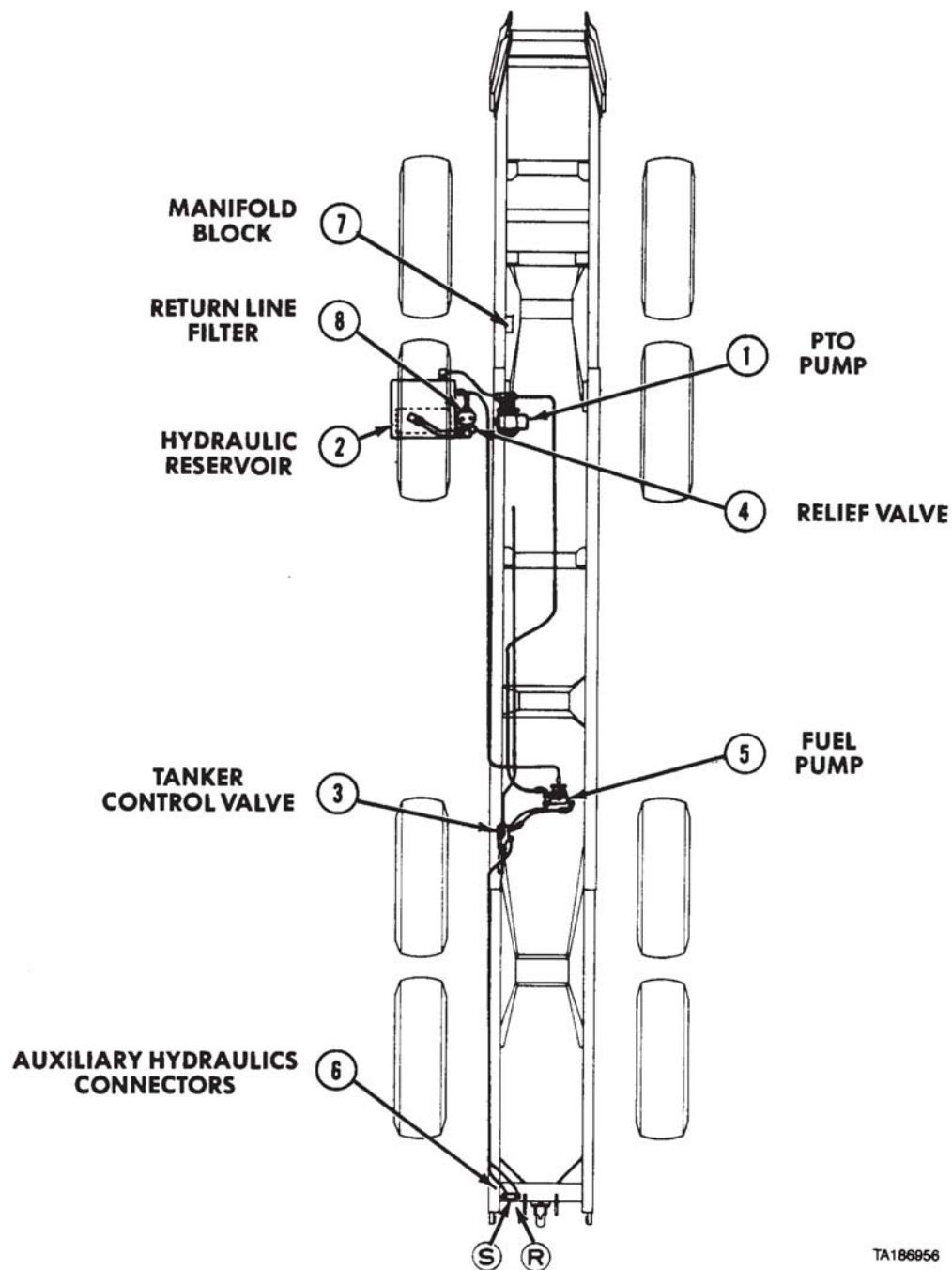
**19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT.).****NOTE**

Refer to Figure 19-7 for component location.

**Table 19-6. Hydraulic Line Index For M978 Without Winch**

Line No.	From	To
278	Hydraulic Reservoir (1)	PTO Pump (2)
902	PTO Pump (1)	Tanker Control Valve (3)
928	PTO Pump Tee (1)	Relief Valve (4)
903	Tanker Control Valve (B) Port (3)	Fuel Pump (5)
904	Tanker Control Valve Tee (3)	Fuel Pump (5)
906	Tanker Control Valve (A) Port (3)	Auxiliary Hydraulic Bulkhead Connector (Supply) (S) (6)
907	Tanker Control Valve Tee (3)	Auxiliary Hydraulic Bulkhead Connector (Return) (R) (6)
883A	Manifold Block (7)	Return Line Filter (8)
883B	Fuel Pump (5)	Hydraulic Reservoir (2)

## Hydraulic System Maintenance Instructions (Cont)



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Figure 19-7. Hydraulic Lines Index - M978 Without Winch.

## Hydraulic System Maintenance Instructions (Cont)

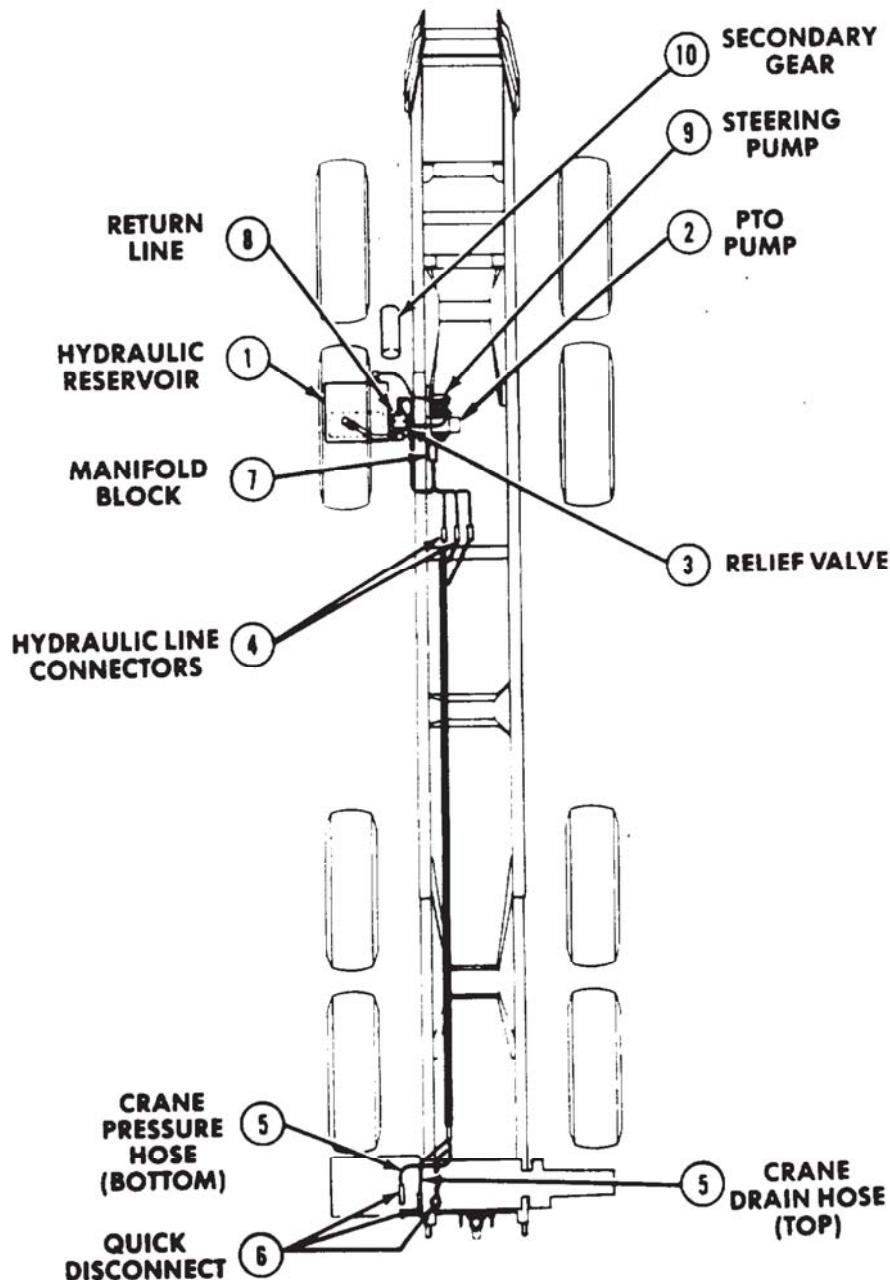
**19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT.).****NOTE**

Refer to Figure 19-8 for component location.

**Table 19-7. Hydraulic Line Index For M985E1 Without Winch**

Line No.	From	To
278	Hydraulic Reservoir (1)	PTO Pump (2)
928	PTO Pump (2)	Relief Valve (3)
902	PTO Pump (2)	Hydraulic Line Connector (4)
902A	Hydraulic Line Connector (4)	Hydraulic Line Connector (Top) (5)
902B	Hydraulic Line Connector (Bottom) (5)	Quick Disconnect (Top) (6)
883	Quick Disconnect (Top) (6)	Hydraulic Line Connector (Bottom) (5)
883A	Hydraulic Line Connector (Bottom) (5)	Hydraulic Line Connector (4)
883B	Hydraulic Line Connector (4)	Manifold Block (7)
883C	Manifold Block (7)	Return Line Filter (8)
883D	Return Line Filter (8)	Relief Valve (3)
277	Manifold Block (7)	Steering Pump (9)
301	Steering Pump (9)	Manifold Block (7)
302	Manifold Block (7)	Secondary Gear (10)
883	PTO Pump (2)	Quick Disconnect (6)

## Hydraulic System Maintenance Instructions (Cont)



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Figure 19-8. Hydraulic lines - M985E1 Without Winch.

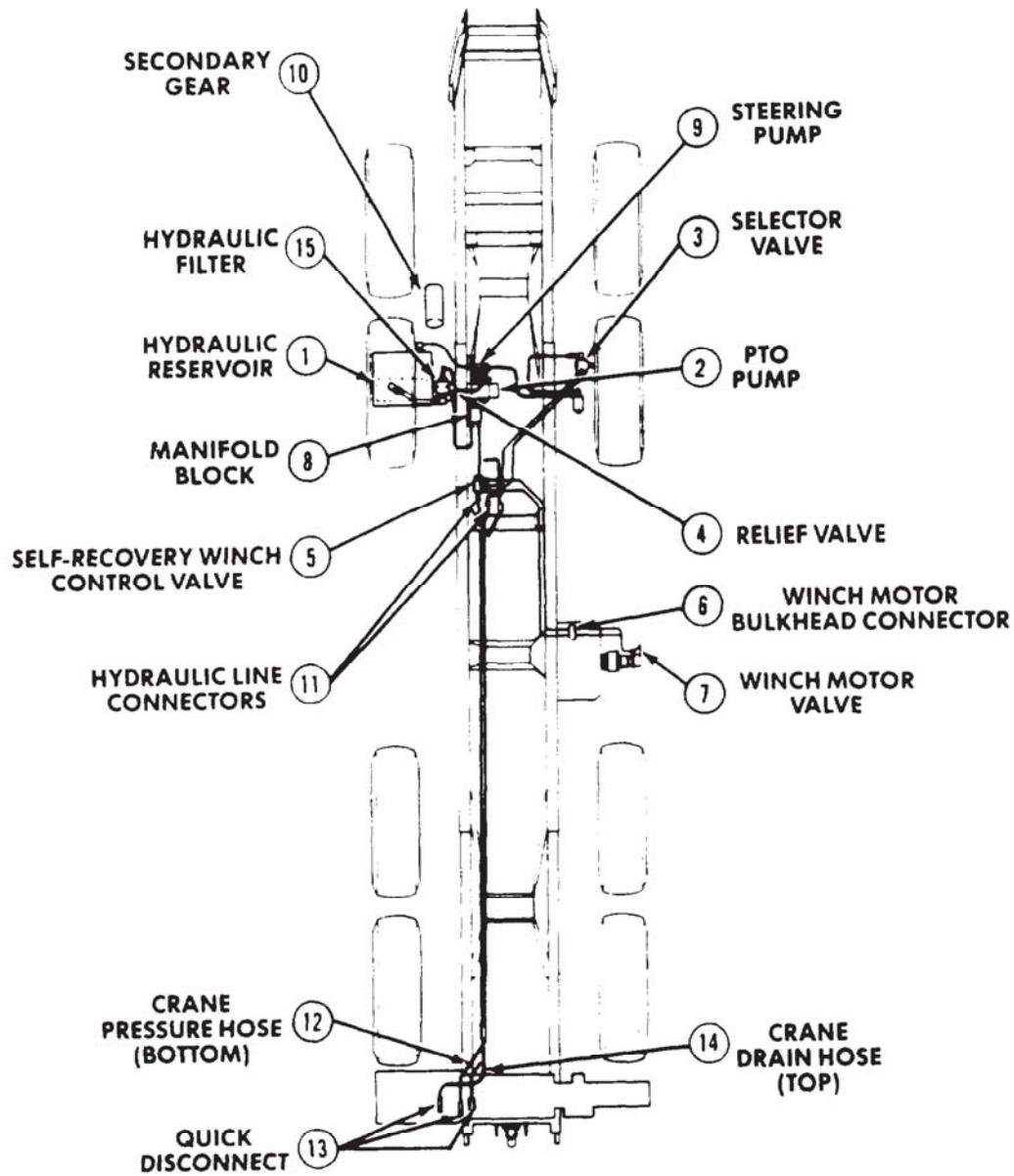
## Hydraulic System Maintenance Instructions (Cont)

**19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).****NOTE**

Refer to Figure 19-9 for component location.

*Table 19-8. Hydraulic Line Index For M985E1 With Winch*

Line No.	From	To
278	Hydraulic Reservoir (1)	PTO Pump (2)
496	PTO Pump Tee (2)	Selector Valve (3)
928	PTO Pump Tee (2)	Relief Valve (4)
899	Selector Valve (3)	S.R.W. Control Valve (5)
900	S.R.W. Control Valve (B) Port (5)	Winch Motor Bulkhead Connector (6)
900A	Winch Motor Bulkhead Connector (6)	Winch Motor Valve (Bottom) (7)
900	S.R.W. Control Valve (A) Port (5)	Winch Motor Bulkhead Connector (6)
900A	Winch Motor Bulkhead Connector (6)	Winch Motor Valve (Top) (7)
277	Manifold Block (8)	Steering Pump (9)
302	Manifold Block (8)	Secondary Gear (10)
902	Selector Valve (3)	Hydraulic Line Connector (11)
902A	Hydraulic Line Connector (11)	Crane Pressure Hose (12)
902B	Crane Pressure Hose (12)	Quick Disconnect (Top) (13)
883	Quick Disconnect (Bottom) (13)	Crane Drain Hose (14)
883A	Crane Drain Hose (14)	S.R.W. Control Valve Tee (5)
883B	S.R.W. Control Valve Tee (5)	Manifold Block (8)
883C	Manifold Block (8)	Return Line Filter (15)
833D	Return Line Filter (15)	Relief Valve (4)

**Hydraulic System Maintenance Instructions (Cont)**

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Figure 19-9. Hydraulic Lines - M985E1 With Winch.

## Hydraulic System Maintenance Instructions (Cont)

**19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).****NOTE**

Refer to Figure 19-10 for component location.

*Table 19-9. Hydraulic Line Index For M984*

Line No.	From	To
278	Hydraulic Reservoir (1)	PTO Pump (2)
496	PTO Pump Tee (2)	Selector Valve (3)
928	PTO Pump Tee (2)	Hydraulic Relief Valve (4)
900	S.R.W. Control Valve (B) Port (2)	Winch Motor Bulkhead Connector (Inner) (13)
900A	S.R.W. Control Valve (A) Port (12)	Winch Motor Valve (Bottom) (14)
900	Winch Motor Bulkhead Connector (13)	Winch Motor Bulkhead Connector (Outer) (13)
900A	Winch Motor Bulkhead Connector (13)	Winch Motor Valve (Top) (14)
883	Manifold Block (7)	Return Line Filter (15)
883A	Return Line Filter (15)	Relief Valve (16)
883B	Manifold Block (7)	S.R.W. Control Valve (12)
883C	S.K.W. Control Valve (12)	Priority Flow Valve (4)
883D	S.R.W. Control Valve (12)	H.D.W./Crane Control Valve (5)
883E	H.D.W./Crane Control Valve (5)	Quick Disconnect (11)
883F	PTO Pump (2)	Quick Disconnect (11)
902	Selector Valve (3)	H.D.W./Crane Control Valve (5)
905	Selector Valve (3)	Priority Flow Valve (4)
903	H.D.W. Crane Control Valve (5)	H.D. Winch Motor Valve (Elbow) (6)
904	H.D.W./Crane Control Valve (5)	H.D. Winch Motor Valve (Side) (6)
277	Manifold Block (7)	Steering Pump (8)
301	Steering Pump (8)	Main Gear (9)
302	Main Gear (9)	Secondary Gear (10)
902	H.D.W./Crane Control Valve (5)	Quick Disconnect (11)

## Hydraulic System Maintenance Instructions (Cont)

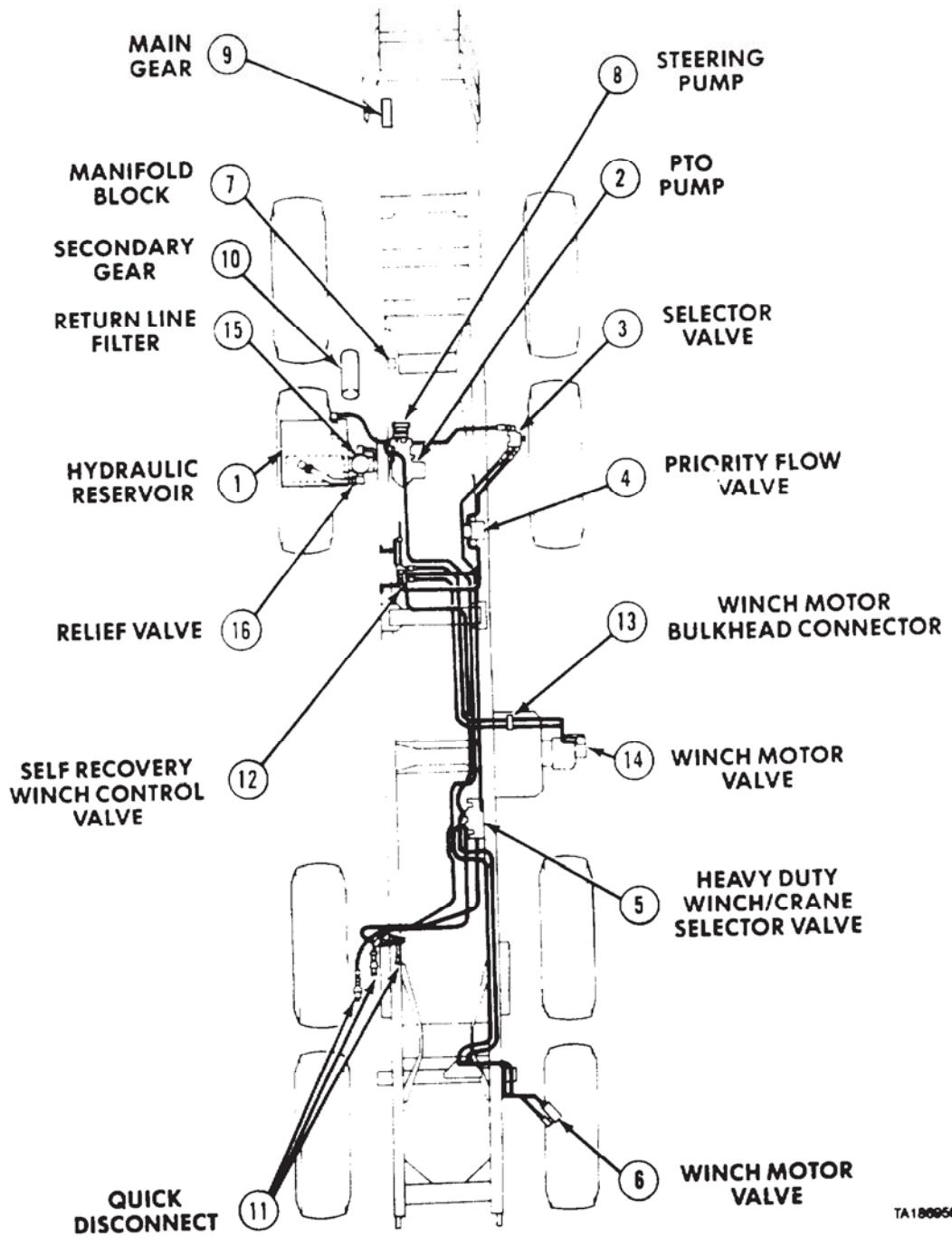


Figure 19-10. Hydraulic Lines M984.

## Hydraulic System Maintenance Instructions (Cont)

**19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).****NOTE**

Refer to Figure 19-11 for component location.

*Table 19-10. Hydraulic Line Index For M984E1*

Line No.	From	To
278	Hydraulic Reservoir (1)	Winch/Crane Pump (2)
918	Hydraulic Reservoir (1)	H.D. Winch Drain (3)
496	Winch/Crane Pump Inlet (4)	H.D. Winch Manifold Valve (5) (P3)
906	Winch/Crane Pump Outlet (6)	H.D. Winch Manifold Valve (5) (P4)
666	Steering Tensioner Manifold Valve (7)	Fairlead Tensioner Motor (8)
773	Hydraulic Reservoir Filter (9)	Steering/Tensioner Manifold Valve (7)
497	Hydraulic Reservoir Filter (9)	H.D. Winch Manifold Valve (5)
883	Hydraulic Reservoir Filter (9)	Crane (10)
302	Hydraulic Reservoir Filter (9)	Secondary Gear (11)
301	Steering/Tensioner Manifold Valve (7)	Main Gear (12)
941	Steering/Tensioner Pump (13)	Steering/Tensioner Manifold Valve (7)
928	Steering/Tensioner Pump (13)	Steering/Tensioner Manifold Valve (7)
278	Hydraulic Reservoir (1)	Steering/Tensioner Pump (13)
900	S.R.W. Control Valve (B) (Port) (14)	Winch Motor Bulkhead Connector (15)
900A	Winch Motor Bulkhead Connector (15)	Winch Motor Valve (Bottom) (16)
900	S.R.W. Control Valve (A) Port (17)	Winch Motor Bulkhead Connector (15)
900A	Winch Motor Bulkhead Connector (15)	Winch Motor Valve (Top) (18)
899	H.D. Winch Manifold Valve (5)	S.R.W. Control Valve (Inlet) (19)
777	H.D. Winch Manifold Valve (5)	S.R.W. Control Valve (Outlet) (20)
049	H.D. Winch Manifold Valve (5)	Steering/Tensioner Manifold Valve (7)
527	H.D. Winch Manifold Valve (5) (Pilot Drain)	H.D. Winch Drain (21)
903	H.D. Winch Outlet (22)	H.D. Winch Manifold Valve (5) (G6)
904	H.D. Winch Control Valve (5) G7	H.D. Winch Inlet (23)
878	Main Gear (12)	Secondary Gear (11)
319	Main Gear (12)	Secondary Gear (11)
877	Main Gear (12)	Secondary Gear (11)

## Hydraulic System Maintenance Instructions (Cont)

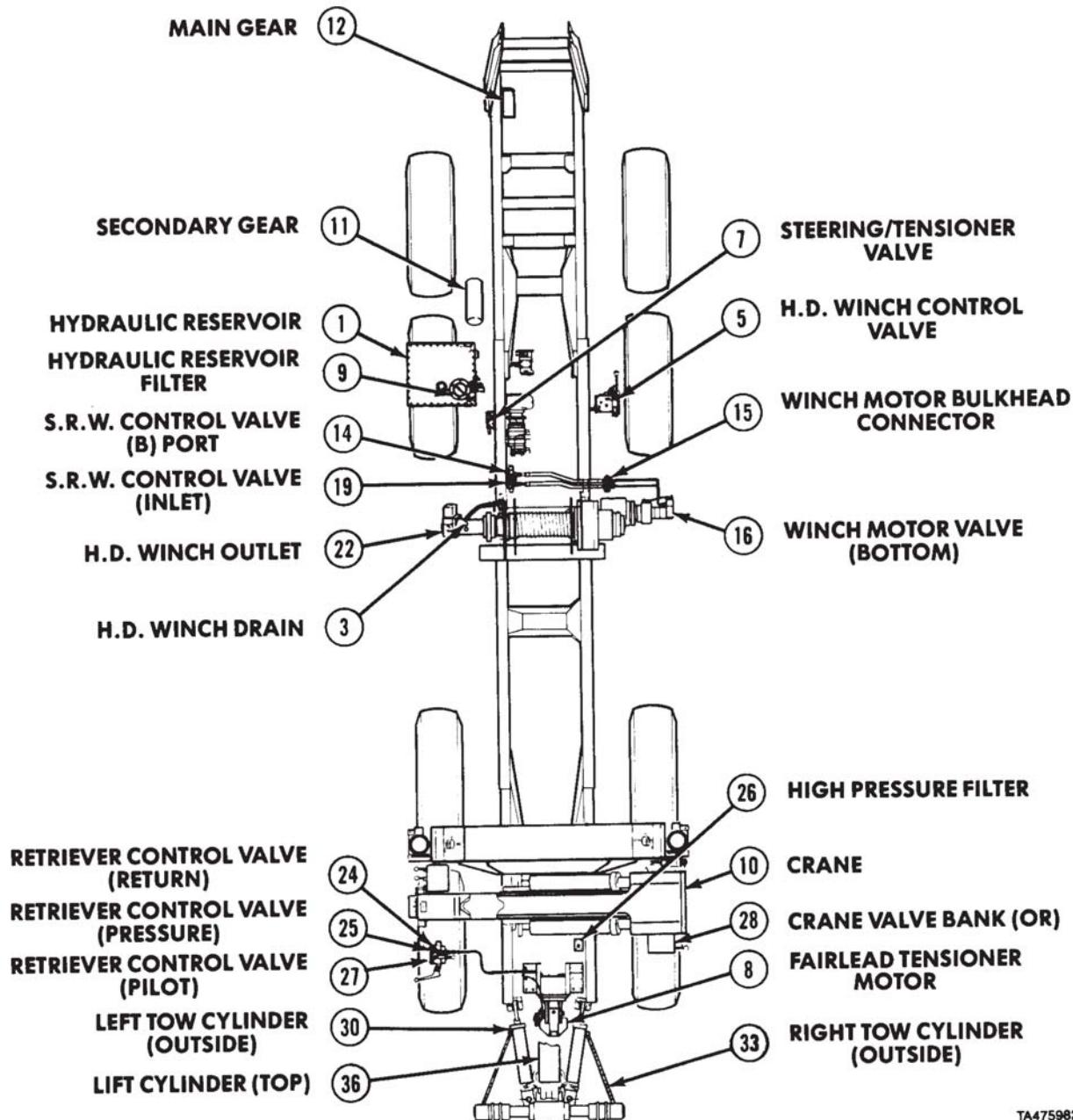


Figure 19-11. Hydraulic Lines - M984E1 Sheet 1 of 2.

## Hydraulic System Maintenance Instructions (Cont)

**19-16. HYDRAULIC LINES AND BRACKETS REMOVAL/INSTALLATION (CONT).****NOTE**

Refer to Figure 19-11 for component location.

**Table 19-10. Hydraulic Line Index For M984E1 (Cont)**

Line No.	From	To
907	Retriever Control Valve (Return) (24)	Tee to Line 883
942	Retriever Control Valve (Return) (24)	Fairlead Tensioner Motor (8)
936	Retriever Control Valve (Pressure) (25)	High Pressure Filter (26)
939	Retriever Control Valve (Pilot) (27)	Crane Valve Bank (OR) (28)
786	Retriever Control Valve (1) (29)	Left Tow Cylinder (Outside) (30)
787	Retriever Control Valve (1) (29)	Left Tow Cylinder (Inside) (31)
784	Retriever Control Valve (2) (32)	Right Tow Cylinder (Outside) (33)
785	Retriever Control Valve (2) (32)	Right Tow Cylinder (Inside) (34)
506	Retriever Control Valve (3) (35)	Lift Cylinder (Top) (36)
507	Retriever Control Valve (3) (35)	Lift Cylinder (Bottom) (37)
902	High Pressure Filter (26)	Crane (10)
935	H.D. Winch Control Valve (5)	High Pressure Filter (26)

## Hydraulic System Maintenance Instructions (Cont)

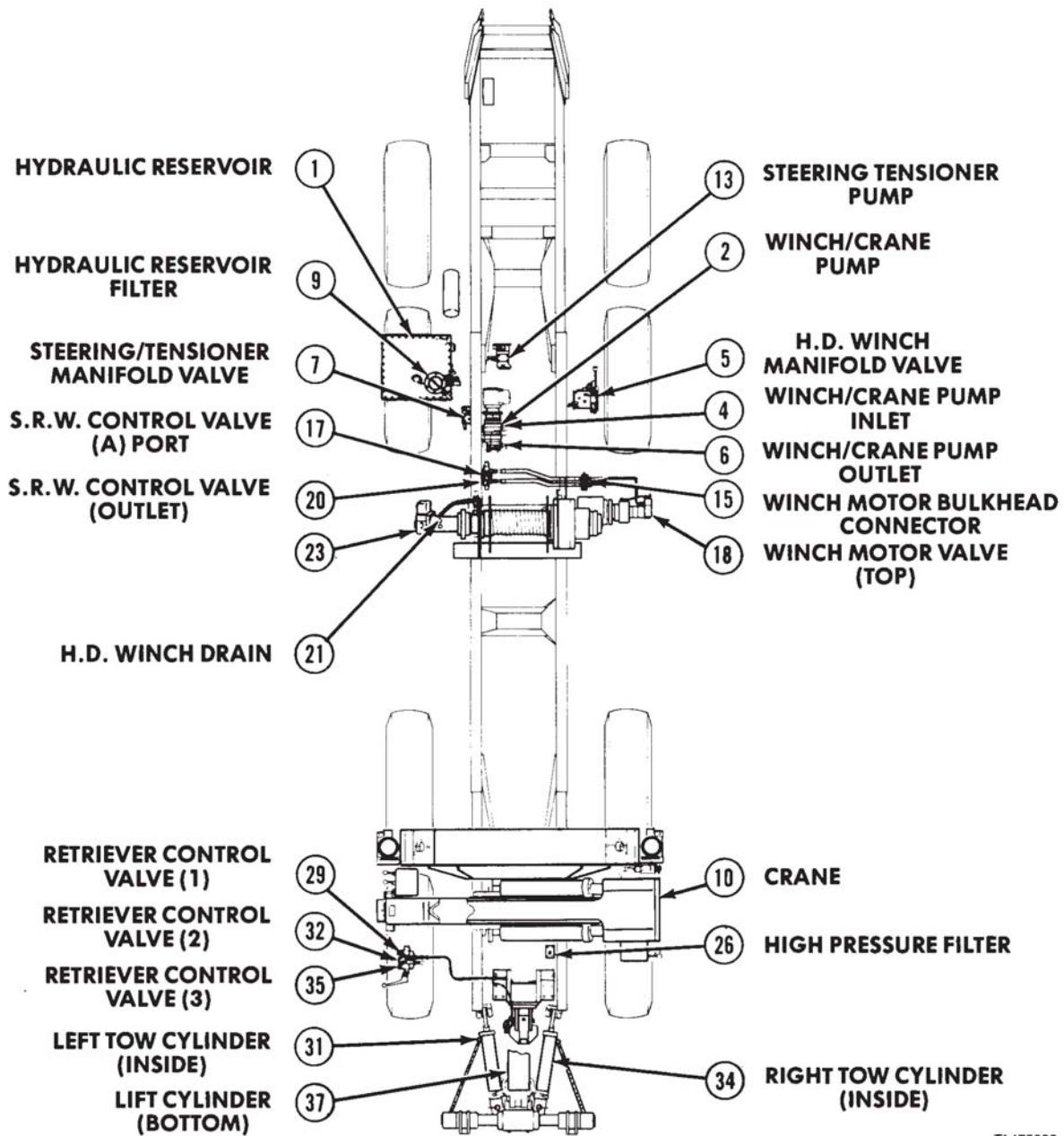


Figure 19-11. Hydraulic Lines - M984E1 Sheet 2 of 2.

**f. Follow-on Maintenance.**

- (1) Fill hydraulic reservoir (LO 9-2320-279-12).
- (2) Check hydraulic lines for leaks.

## Hydraulic System Maintenance Instructions (Cont)

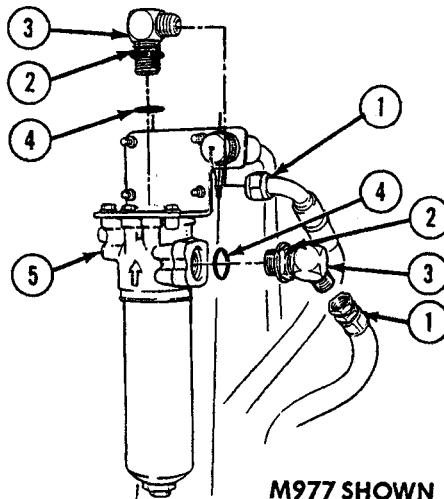
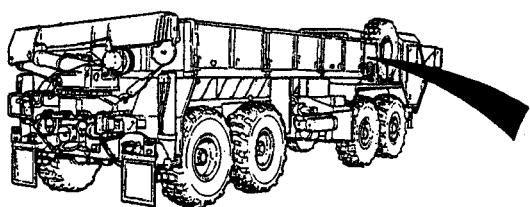
**19-17. CRANE HYDRAULIC FLUID FILTER ASSEMBLY AND MOUNTING BRACKET REMOVAL/REPAIR/INSTALLATION (M977, M984E1, M985).**

This task covers:

- |                            |                          |
|----------------------------|--------------------------|
| a. Removal                 | d. Assembly (Model A)    |
| b. Disassembly (Model A)   | d.1. Assembly (Model B)  |
| b.1. Disassembly (Model B) | e. Installation          |
| c. Cleaning/Inspection     | f. Follow-on Maintenance |

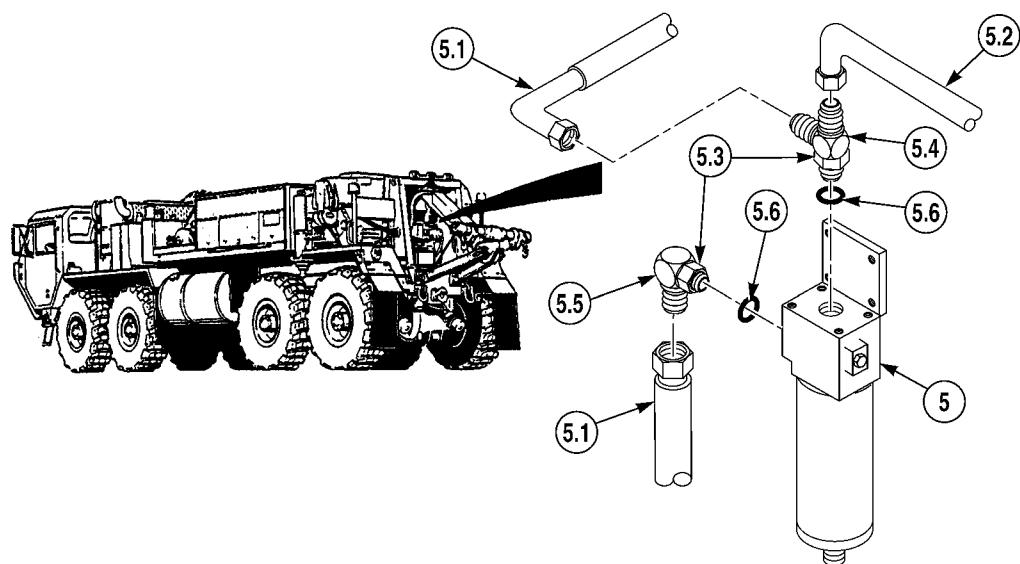
**INITIAL SETUP**

<i>Models</i>	<i>References</i>
M977, M984E1, M985	None
<i>Test Equipment</i>	<i>Equipment Condition</i>
None	TM or Para Condition Description
<i>Special Tools</i>	TM 9-2320-279-10 Shut off engine.
None	
<i>Supplies</i>	<i>Special Environmental Conditions</i>
Solvent, drycleaning, Item 47, Appendix C	None
Tags, identification, Item 48, Appendix C	
<i>Personnel Required</i>	<i>General Safety Instructions</i>
MOS 63S, Wheel vehicle mechanic	None

**a. Removal.****M977 SHOWN****NOTE**

- Some M984E1 have a tee fitting on top. Do Steps (2.1) and (2.2) for M984E1 with tee fitting only.
- Tag and mark hoses and fittings before removal.

- (1) Disconnect two hoses (1).
- (2) Loosen two nuts (2). Remove two fittings (3) and preformed packings (4) from hydraulic fluid filter (5).

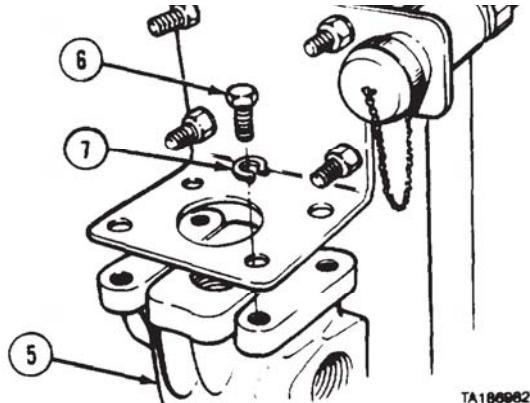
**Hydraulic System Maintenance Instructions (Cont)**

- (2.1) Remove two hoses (5.1) and hydraulic tube assembly (5.2).
- (2.2) Loosen two nuts (5.3). Remove two fittings (5.4) and (5.5) and two preformed packings (5.6) from hydraulic fluid filter (5).



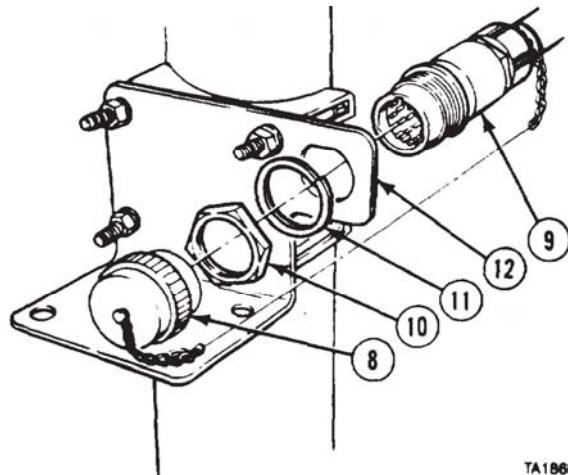
## Hydraulic System Maintenance Instructions (Cont)

- (3) Remove four screws (6), lockwashers (7), and hydraulic fluid filter (5).



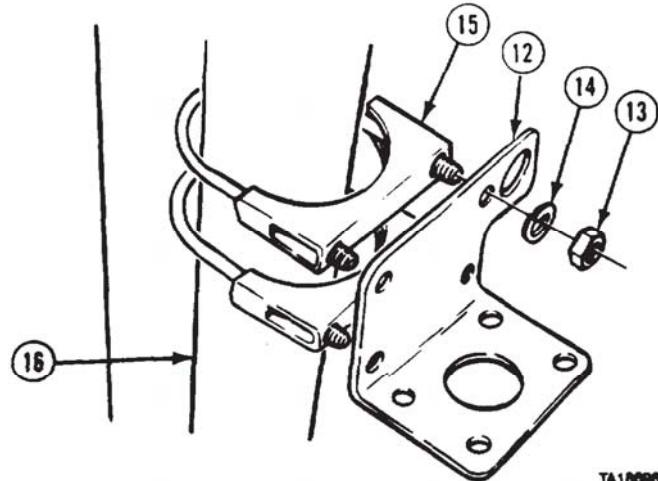
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- (4) Remove protective cap (8) from remote control connector (9).  
 (5) Remove nut (10), lockwasher (11), and remote control cable connector (9) from mounting bracket (12).



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- (6) Remove four nuts (13), lockwashers (14), and mounting bracket (12) from two clamps (15).  
 (7) Remove two clamps (15) from tire davit (16).

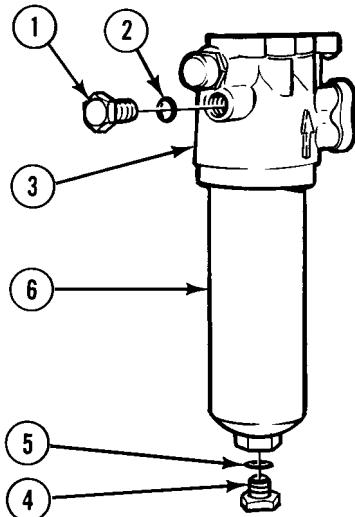


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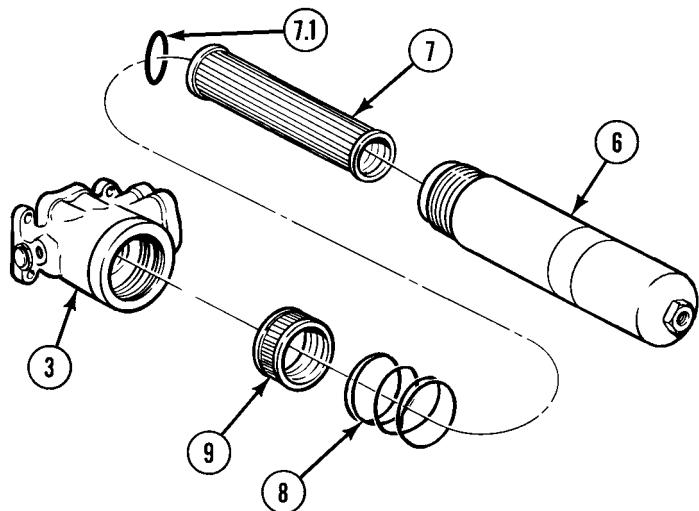
## Hydraulic System Maintenance Instructions (Cont)

**19-17. CRANE HYDRAULIC FLUID FILTER ASSEMBLY AND MOUNTING BRACKET REMOVAL/REPAIR/INSTALLATION (CONT).**
**b. Disassembly (Model A).**

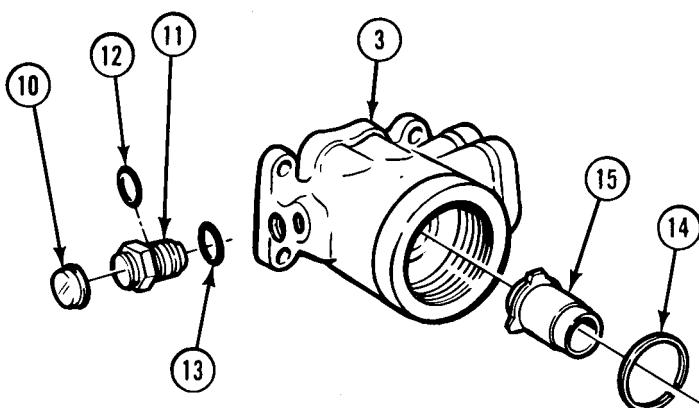
- (1) Remove bleed plug (1) and preformed packing (2) from head (3).
- (2) Remove bleed plug (4) and preformed packing (5) from bowl (6). Drain fluid.
- (3) Remove bowl (6) from head (3).



- (4) Remove filter (7) and preformed packing (7.1) from bowl (6).
- (5) Remove spring (8) and filter (9) from head (3).



- (6) Remove cover (10) and differential pressure device (11) from head (3).
- (7) Remove preformed packings (12 and 13) from differential pressure device (11).
- (8) Remove retaining ring (14) and valve (15) from head (3).



## Hydraulic System Maintenance Instructions (Cont)

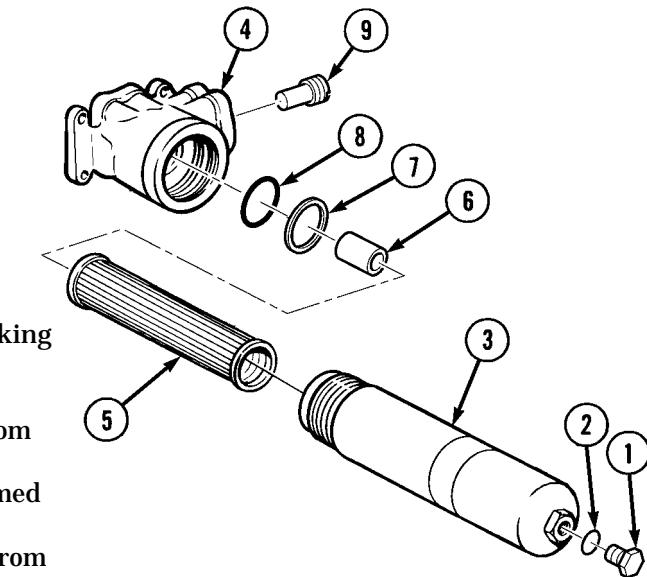
## b.1. Disassembly (Model B).

## NOTE

Some Model B filter assemblies have a machined head. Others have a cast head. Bowls for the cast head and bowls for the machined head are not interchangeable. All other internal parts are the same. Disassembly is the same.

- (1) Remove plug (1) and preformed packing (2) from bowl (3). Drain fluid.
- (2) Remove bowl (3) from head (4).
- (3) Remove filter (5) and bushing (6) from head (4).
- (4) Remove backup ring (7) and preformed packing (8) from head (4).
- (5) Remove bypass valve assembly (9) from head (4).

## c. Cleaning/Inspection.

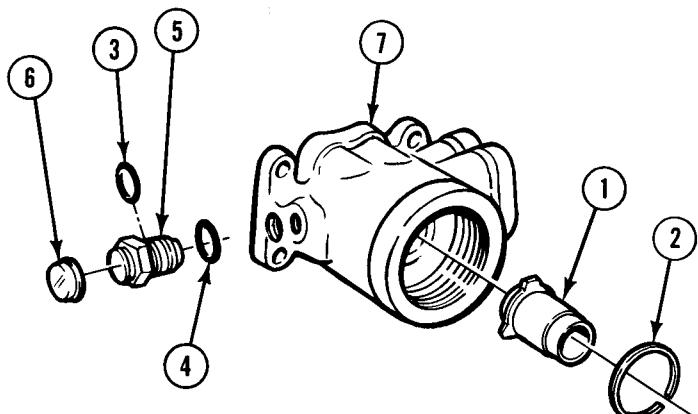
WARNING

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

- (1) Clean all metal parts in dry-cleaning solvent.
- (2) Inspect each part for damage.
- (3) Replace damaged parts.

## d. Assembly (Model A).

- (1) Install valve (1) with retaining ring (2).
- (2) Install preformed packings (3 and 4) on differential pressure device (5).
- (3) Install differential pressure device (5) and cover (6) in head (7).



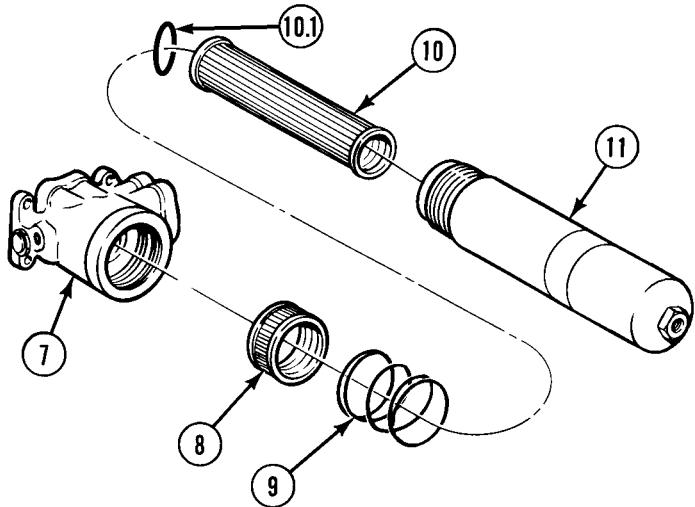
## Hydraulic System Maintenance Instructions (Cont)

## 19-17. CRANE HYDRAULIC FLUID FILTER ASSEMBLY AND MOUNTING BRACKET REMOVAL/REPAIR/INSTALLATION (CONT.)

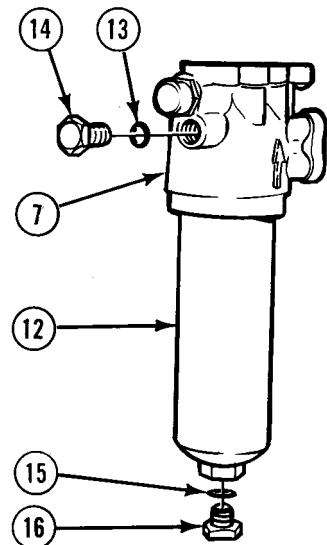
## NOTE

Side with seal faces up.

- (4) Install filter (8) and spring (9) in head (7).
- (5) Install filter (10) and preformed packing (10.1) in bowl (11).
- (6) Install bowl (11) in head (7) and tighten to 15 lb-ft (20 Nsm).



- (7) Install preformed packing (13) and bleed plug (14) in head (7).
- (8) Install preformed packing (15) and bleed plug (16) in bowl (12).



## Hydraulic System Maintenance Instructions (Cont)

### **d.1. Assembly (Model B).**

#### **NOTE**

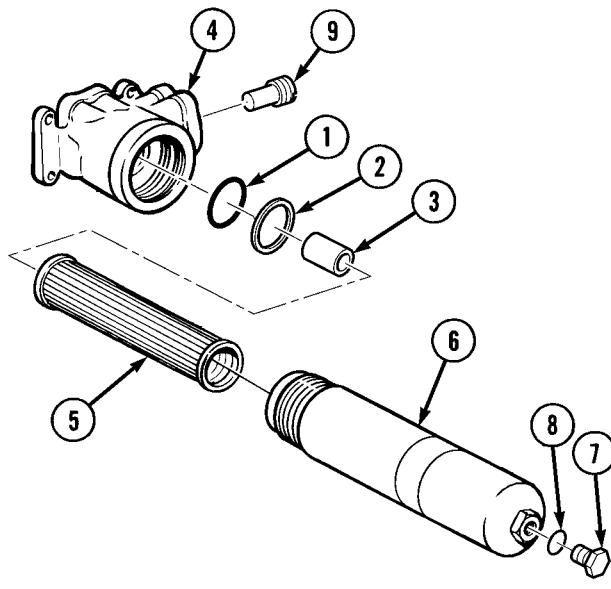
Some Model B filter assemblies have a machined head. Others have a cast head. Bowls for the cast head and bowls for the machined head are not interchangeable. All other internal parts are the same. Assembly is the same.

- (1) Install preformed packing (1), backup ring (2), and bushing (3) in head (4).

#### **NOTE**

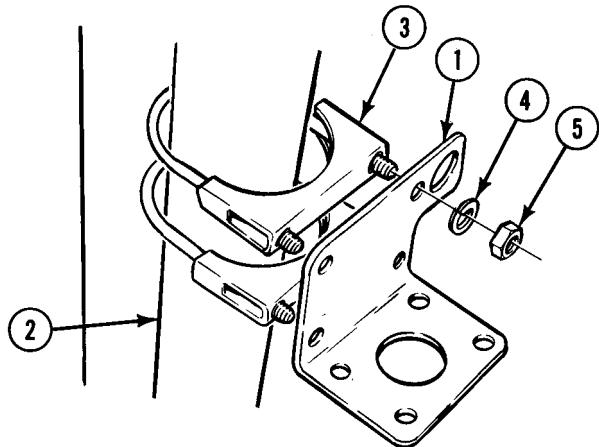
Side with seal faces up.

- (2) Install filter (5) in bowl (6).
- (3) Install bowl (6) in head (4) and tighten to 15 lb-ft (20 N•m).
- (4) Install plug (7) and preformed packing (8) on bowl (4).
- (5) Install bypass valve assembly (9) in head (4).

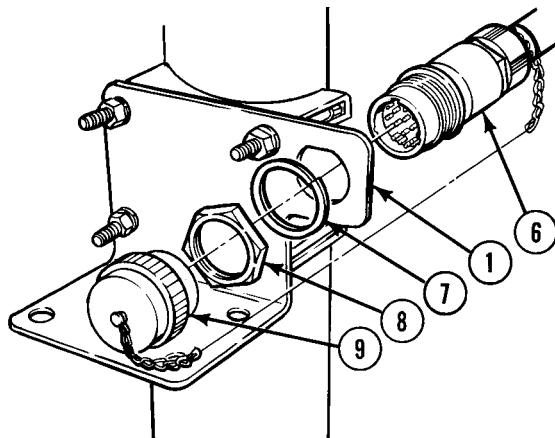


### **e. Installation.**

- (1) Install mounting bracket (1) on tire davit (2) with two clamps (3).
- (2) Install four lockwashers (4) and nuts (5) on two clamps (3). Do not tighten.

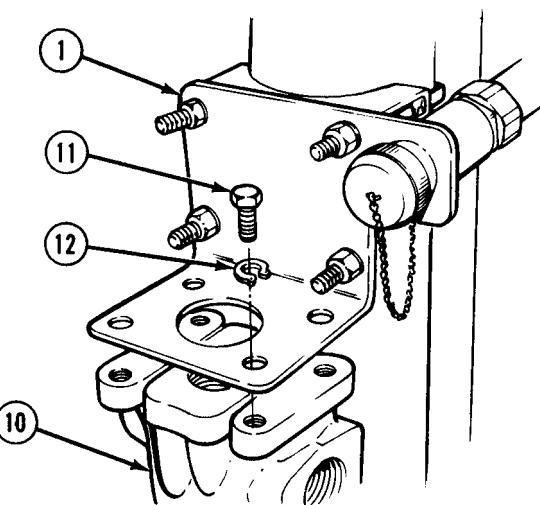


- (3) Install remote control connector (6) on mounting bracket (1) with lockwasher (7) and nut (8).
- (4) Install protective cap (9) on remote control connector (6).



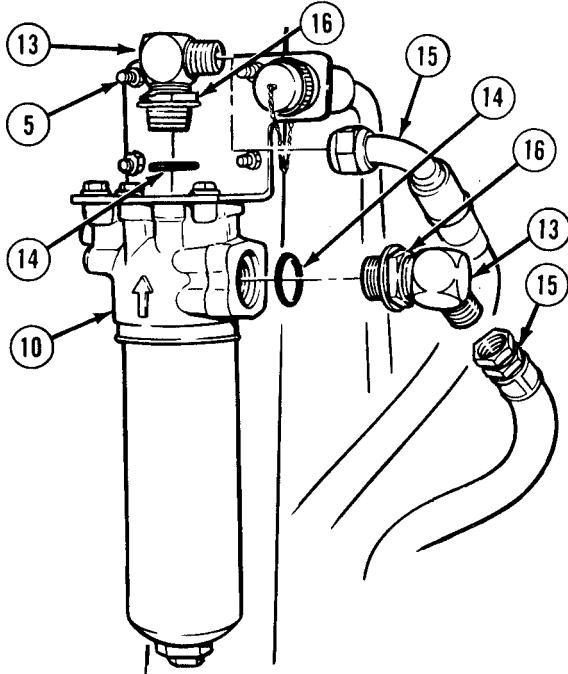
**Hydraulic System Maintenance Instructions (Cont)**

- (5) Install hydraulic fluid filter (10) on mounting bracket (1) with four screws (11) and lockwashers (12).

**NOTE**

Do steps (6) and (7) for M977 and M985.

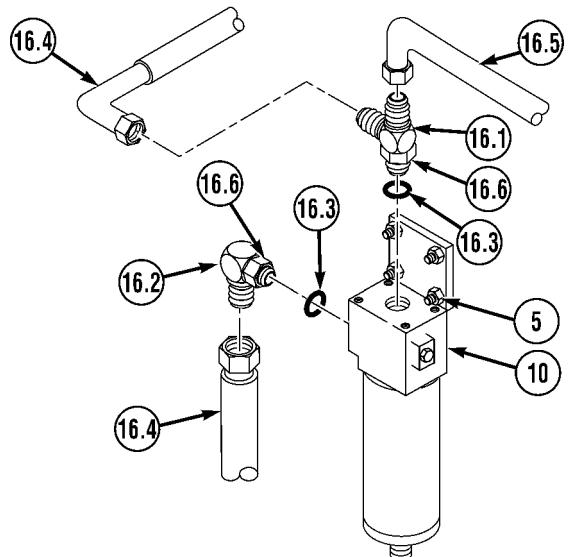
- (6) Install two hydraulic hose fittings (13) and two preformed packings (14) on hydraulic fluid filter (10).  
 (7) Connect two hydraulic hoses (15) to fittings (13). Tighten nuts (16) on fittings (13).



**NOTE**

Perform steps (7.1) and (7.2) for M984E1 with tee fitting only.

- (7.1) Install two fittings (16.1) and (16.2) and two preformed packings (16.3) on hydraulic fluid filter (10).
- (7.2) Connect two hoses (16.4) and hydraulic tube assembly (16.5) to two fittings (16.1 and 16.2). Tighten nuts (16.6) on two fittings (16.1 and 16.2).
- (8) Tighten four nuts (5).



**f. Follow-on Maintenance.** Operate crane and check connections and filter for leaks (TM 9-2320-279-10).

**END OF TASK**



# CHAPTER 20

## ARCTIC KIT MAINTENANCE

### **Contents**

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Arctic Heater Kit Removal/Installation (Model A) .....	20-2	20-1
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Arctic Heater Kit Removal/Installation (Model B) .....	20-4	20-39

### **Section I. INTRODUCTION**

**20-1. GENERAL.** This chapter contains maintenance instructions for removing, replacing, and installing accessory components authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

### **Section II. ARCTIC HEATER KIT**

#### **Arctic Heater Kit Maintenance Instructions**

##### **20-2 ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL A).**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

#### **INITIAL SETUP**

*Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*

*TM or Para*      *Condition Description*

TM 9-2320-279-10 Shut off engine.

*Special Tools*

None

TM 9-2320-279-10 Spare tire removed.

TM 9-2320-279-10 Engine cover open.

TM 9-2320-279-10 Engine side panels removed.

*Supplies*

Tags, identification, Item 48, Appendix C  
Compound, sealing, pipe thread, Item 18,  
Appendix C

Para 6-2      Radiator and engine block drained.

Ties, cable, plastic, Item 52, Appendix C

Para 7-92      Battery box removed.

Adhesive, Item 3.1, Appendix C

*Special Environmental Conditions*

None

Adhesive, Item 3.3, Appendix C

*General Safety Instructions*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

## Arctic Kit Maintenance Instructions (Cont)

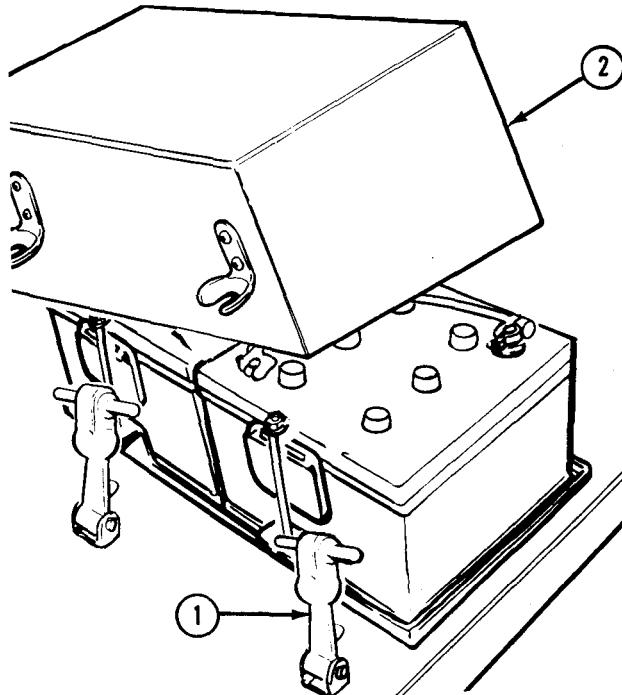
## 20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL A) (CONT).

## a. Removal.

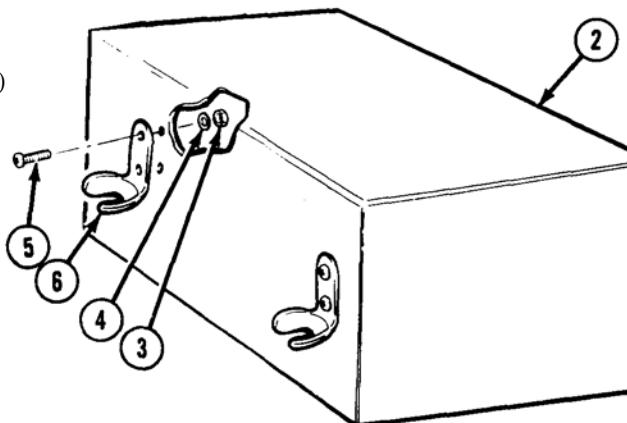
**NOTE**

- This procedure covers removal of complete arctic heater kit. If not necessary to remove complete kit, remove only items necessary to complete task.
- Tag and mark all wires and cables before removal.
- Cut plastic cable ties as required.

- (1) Loosen three rubber hood hooks (1) and remove battery box cover (2).

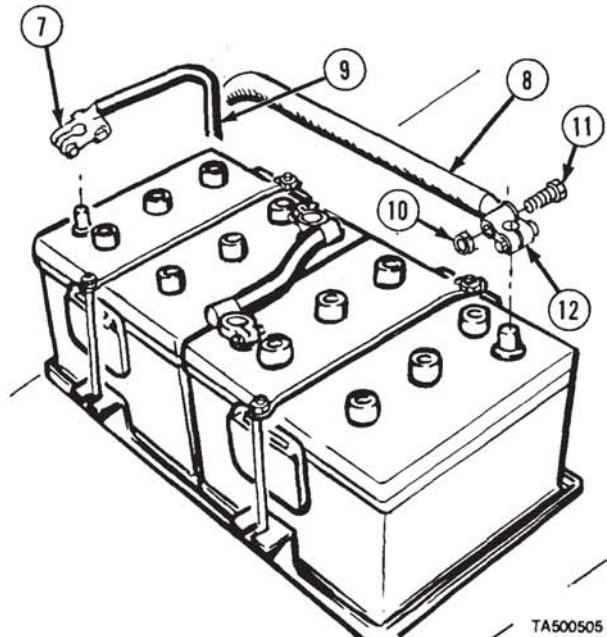


- (2) Remove six locknuts (3), washers (4), screws (5), and three hood brackets (6) from battery box cover (2).

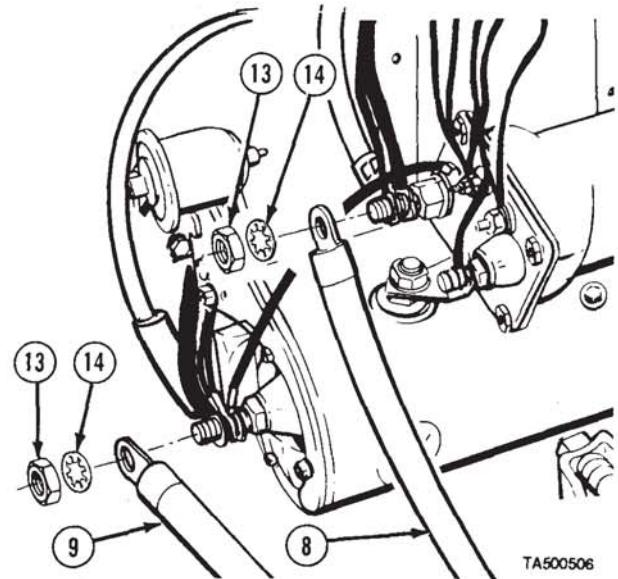


**Arctic Kit Maintenance Instructions (Cont)**

- (3) Loosen two nuts (7).
- (4) Remove two cables (8) and (9).
- (5) Remove two nuts (10), screws (11), and terminals (12) from cables (8) and (9).



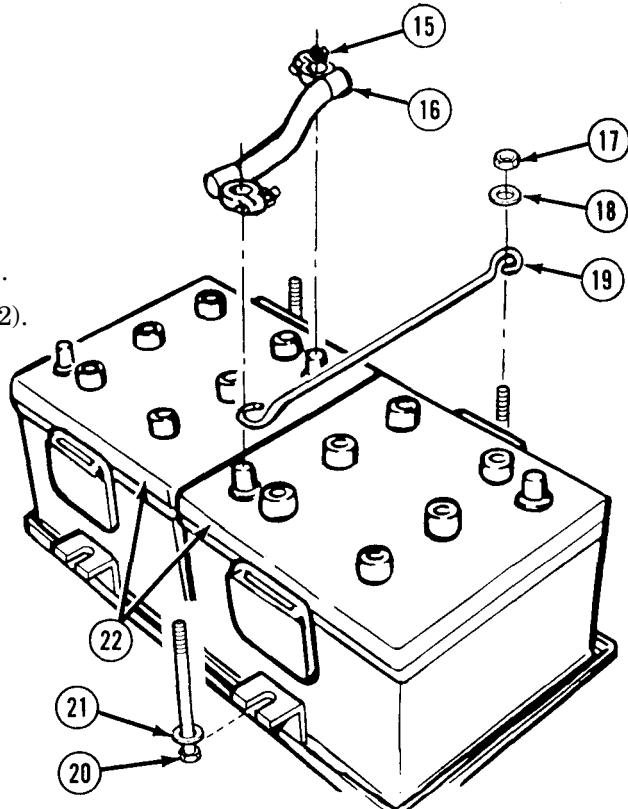
- (6) Remove two nuts (13) and lockwashers (14).
- (7) Remove two cables (8) and (9).



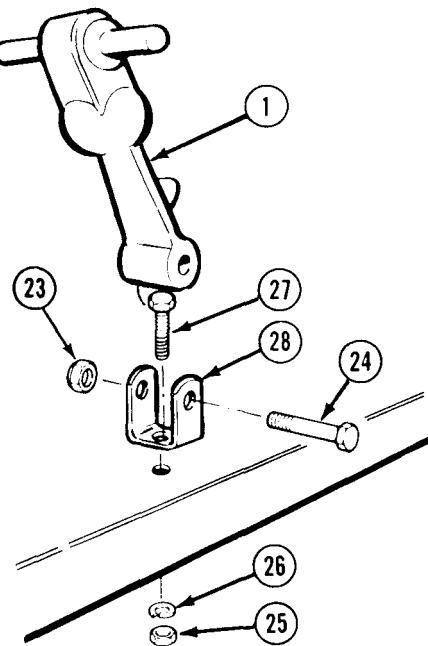
## Arctic Kit Maintenance Instructions (Cont)

## 20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL A) (CONT).

- (8) Loosen two nuts (15) and remove jumper cable (16).
- (9) Remove four locknuts (17), washers (18), and two holddowns (19).
- (10) Remove four screws (20) and washers (21).
- (11) Note position and remove two batteries (22).

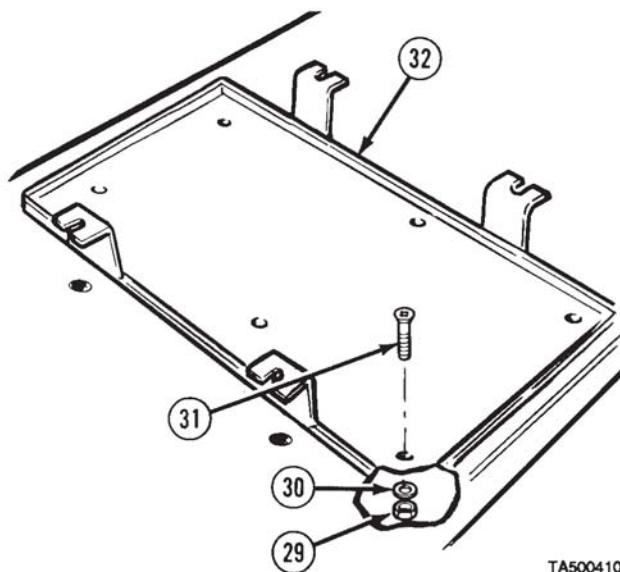


- (12) Remove three locknuts (23), screws (24), and rubber hooks (1).
- (13) Remove three nuts (25), lockwashers (26), screws (27), and hook brackets (28).



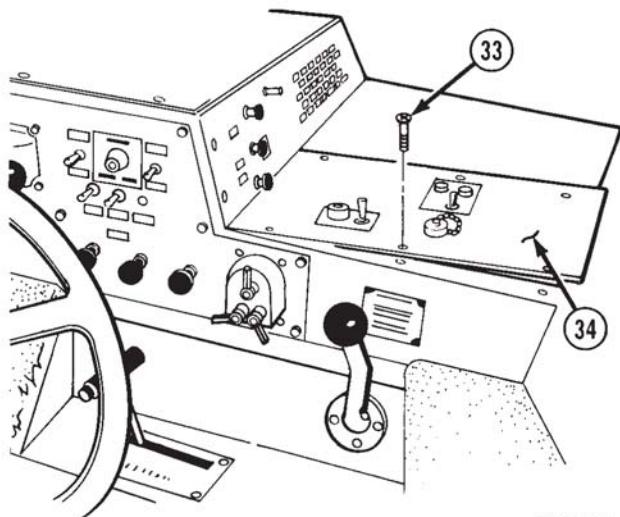
**Arctic Kit Maintenance Instructions (Cont)**

- (14) Remove six locknuts (29), washers (30), screws (31), and battery box (32).



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- (15) Remove six screws (33) and lift heater compartment cover (34).

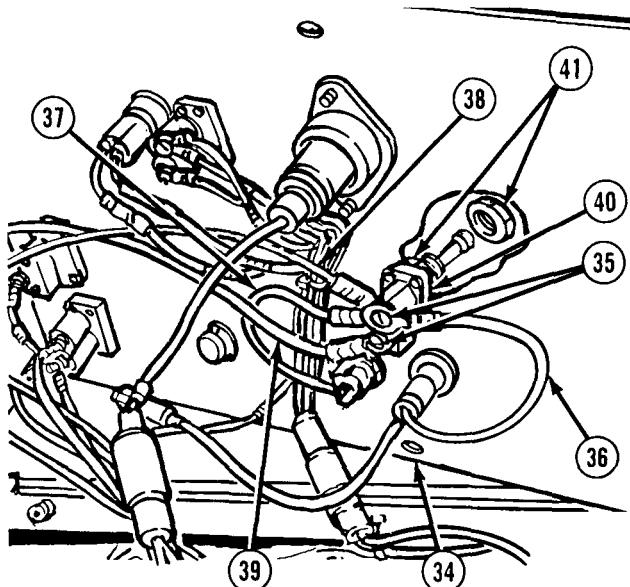


TA500509

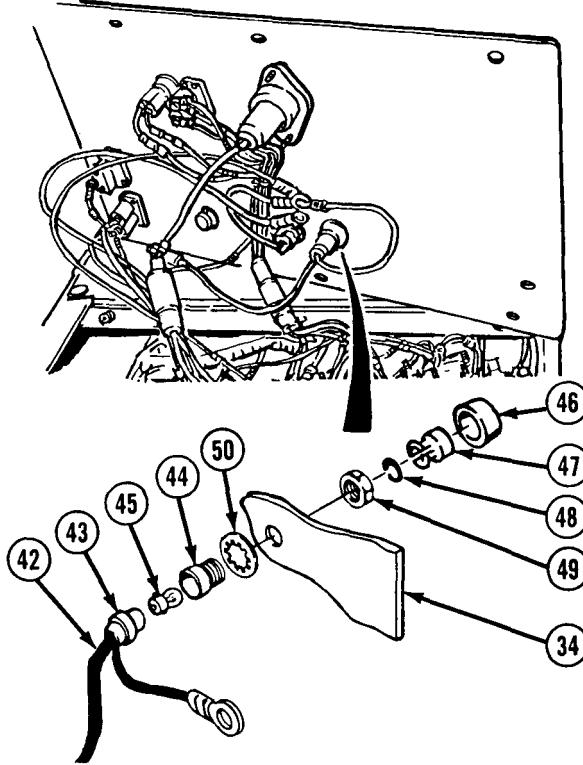
## Arctic Kit Maintenance Instructions (Cont)

## 20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL A) (CONT).

- (16) Remove two screws (35) and disconnect four wires (36 thru 39) from coolant pump switch (40).
- (17) Remove nut (41) and coolant pump switch (40) from heater compartment cover (34).
- (18) Remove remaining nut (41).

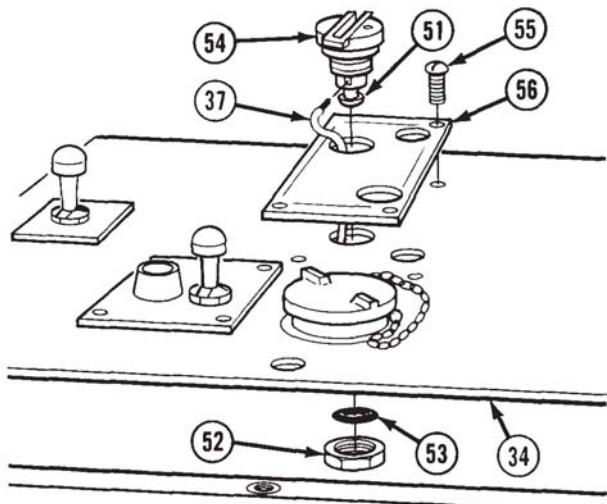


- (19) Cut ground wire (42), allowing enough length to connect ground wire at installation.
- (20) Pull indicator light socket (43) out of housing (44).
- (21) Remove lamp (45) from indicator light socket (43).
- (22) Remove shield (46).
- (23) Remove lens (47) from housing (44). Remove force ring (48) from lens.
- (24) Remove nut (49), housing (44), and lockwasher (50) from heater compartment cover (34).



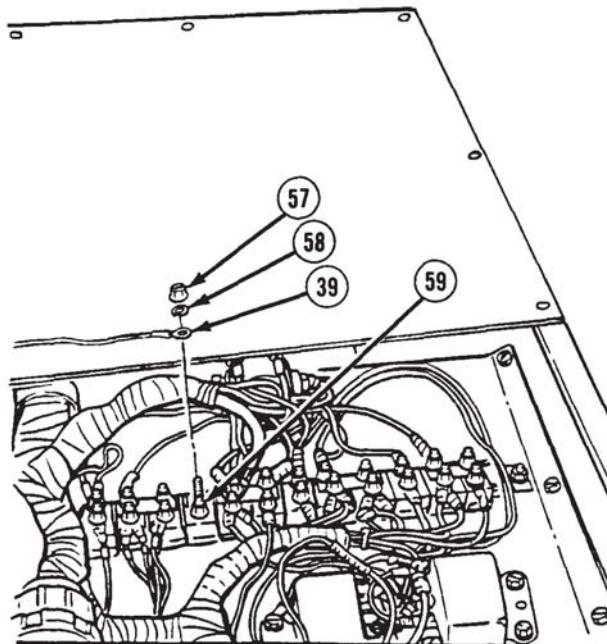
## Arctic Kit Maintenance Instructions (Cont)

- (25) Loosen screw (51) and remove wire (37).
- (26) Remove nut (52), washer (53), and receptacle (54).
- (27) Remove four screws (55) and data plate (56) from heater compartment cover (34).



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- (28) Remove nut (57), lockwasher (58), and wire (39) from circuit breaker (59).

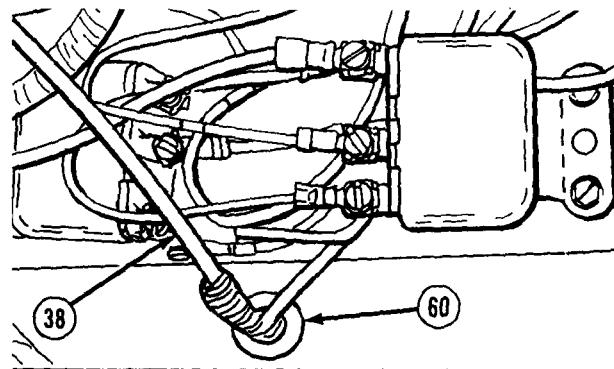


TA500500

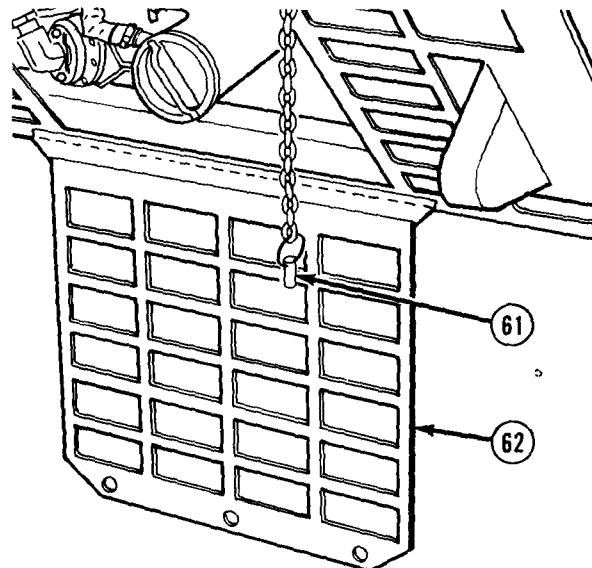
Arctic Kit Maintenance Instructions (Cont)

**20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL A) (CONT).**

- (29) Push wire (38) through hole (60).

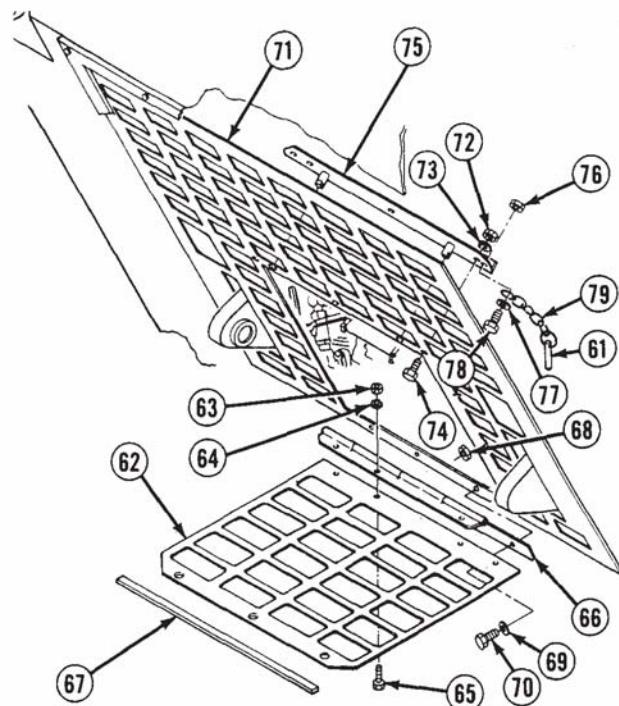


- (30) Remove two pins (61) and open door (62).



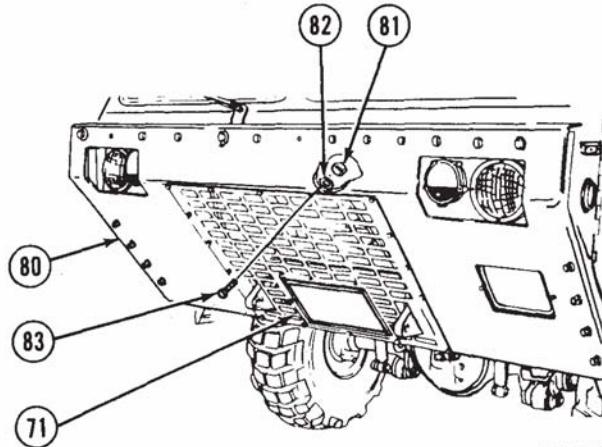
**Arctic Kit Maintenance Instructions (Cont)**

- (31) Remove four nuts (63), lockwashers (64), screws (65) and door (62) from hinge (66).
- (32) If damaged, remove rubber strip (67) from door (62).
- (33) Remove three locknuts (68), washers (69), screws (70), and hinge (66) from skid plate grille (71).
- (34) Remove three nuts (72), lockwashers (73), screws (74), and stiffener (75).
- (35) Remove two locknuts (76), washers (77), screws (78), and chains (79).
- (36) Remove two pins (61) from chains (79).



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- (37) While Soldier A holds skid plate grille (71) to skid plate (80), Soldier A removes 13 locknuts (81), washers (82), and screws (83).
- (38) Soldier A and Soldier B removes skid plate grille (71).



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## Arctic Kit Maintenance Instructions (Cont)

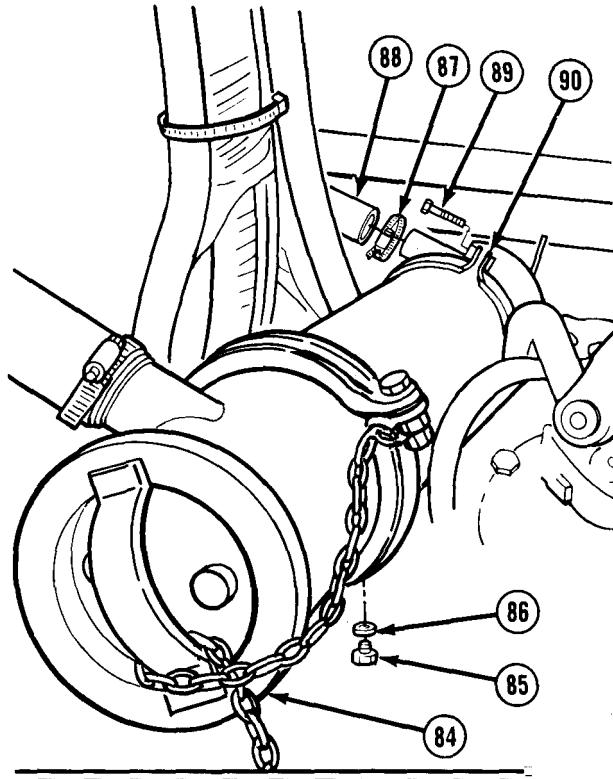
## 20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL A) (CONT).

- (39) Remove water jacket (84) as follows:

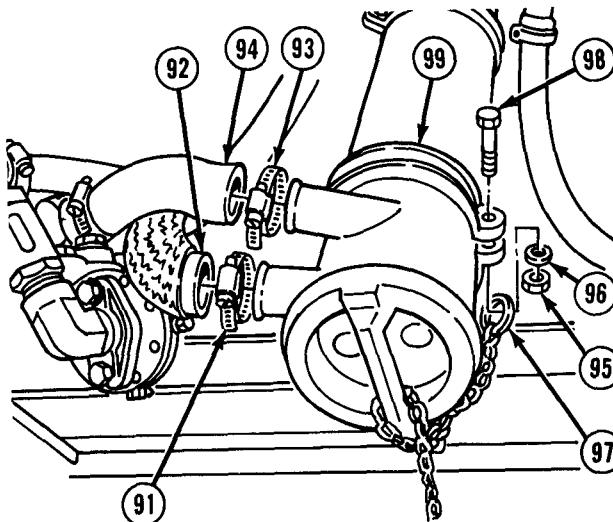
**WARNING**

Water jacket and drain plug may be very hot if arctic heater has been operating. Do not touch hot drain plug or water jacket or personal injury may result.

- (a) Position five gallon (18.93 liter) drain pan under water jacket (84).
- (b) Remove drain plug (85) and washer (86) and allow fluid to drain from water jacket (84).
- (c) Loosen clamp (87) and remove hose (88) from water jacket (84).
- (d) Remove screw (89) and loosen clamp (90).



- (e) Loosen clamp (91) and remove exhaust pipe (92) from water jacket (84).
- (f) Loosen clamp (93) and remove hose (94) from water jacket (84).
- (g) Remove nut (95), washer (96), and safety chain (97).
- (h) Remove screw (98) and loosen clamp (99).
- (i) Remove water jacket (84) from two clamps (90) and (99).



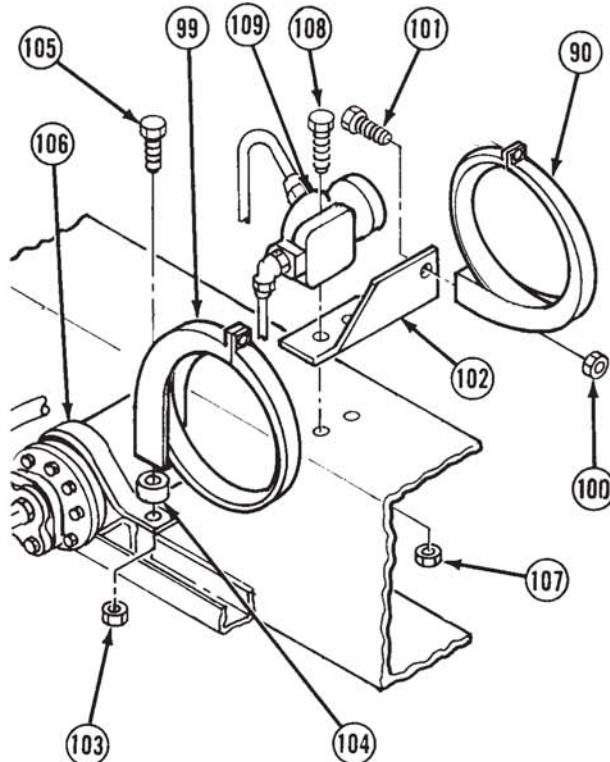
## Arctic Kit Maintenance Instructions (Cont)

- (40) Remove nut (100), screw (101), and clamp (90) from bracket (102).
- (41) Remove nut (103), spacer (104), screw (105), and clamp (99) from bracket (106).

**NOTE**

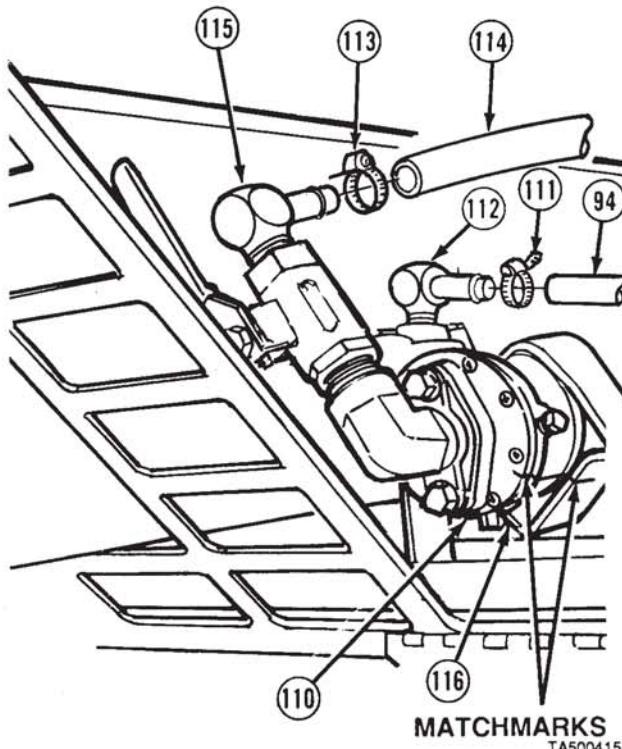
Quick release valve is mounted to bracket only on model M984A1.

- (42) Remove two nuts (107), screws (108), quick release valve (109), and bracket (102).



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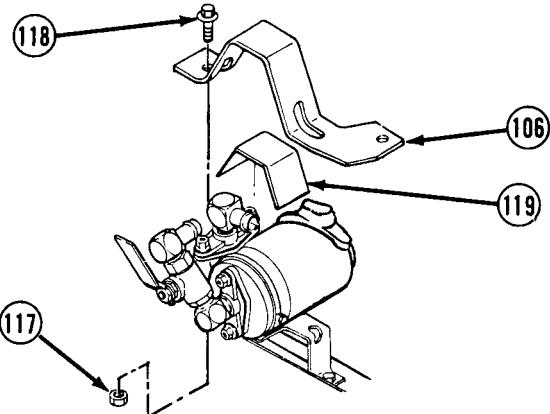
- (43) Remove coolant pump (110) as follows:
  - (a) Loosen clamp (111) and remove hose (94) from elbow (112).
  - (b) Loosen clamp (113) and remove hose (114) from elbow (115).
  - (c) Matchmark coolant pump (110) and bracket (116).

MATCHMARKS  
TA500415

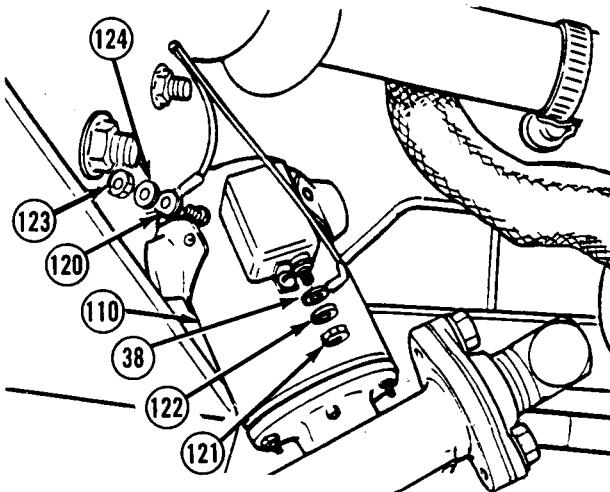
## Arctic Kit Maintenance Instructions (Cont)

## 20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL A) (CONT).

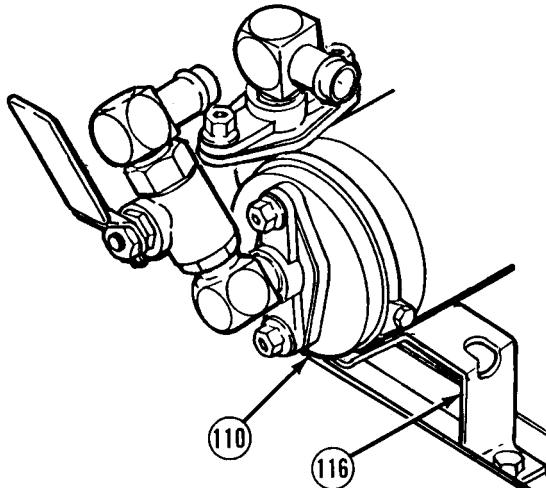
- (d) Remove two nuts (117), screws (118), and bracket (106).
- (e) If damaged remove rubber (119) from bracket (106).



- (f) Pull outward on coolant pump (110) until wires (38) and (120) are accessible.
- (g) Remove nut (121), lockwasher (122), and wire (38) from coolant pump (110).
- (h) Remove nut (123), lockwasher (124) and wire (120) from coolant pump (110).

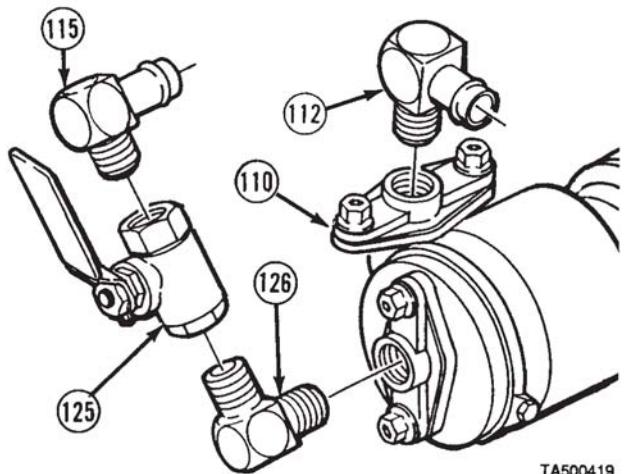


- (i) Remove coolant pump (110) from bracket (116).



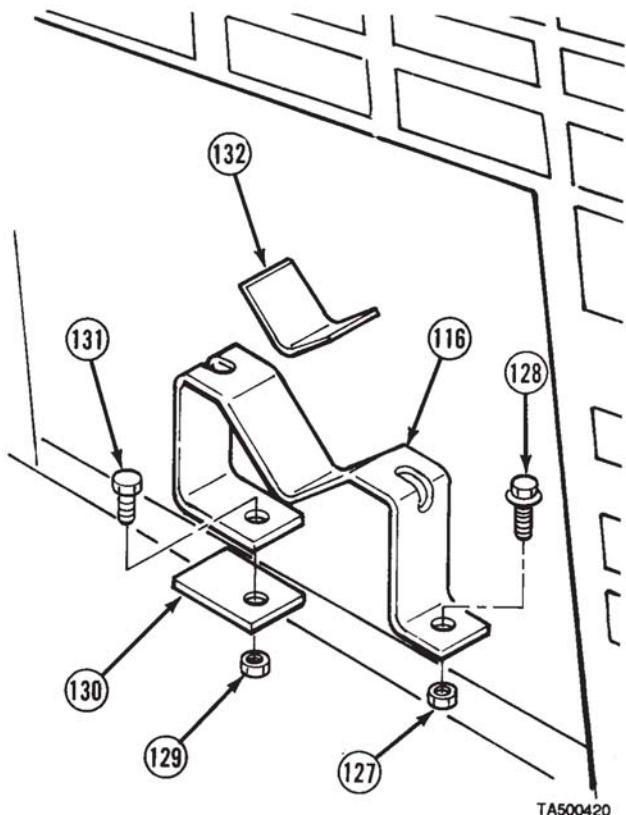
## Arctic Kit Maintenance Instructions (Cont)

- (44) Remove elbow (112) from coolant pump (110).
- (45) Remove elbow (115), valve (125), and elbow (126) from coolant pump (110).



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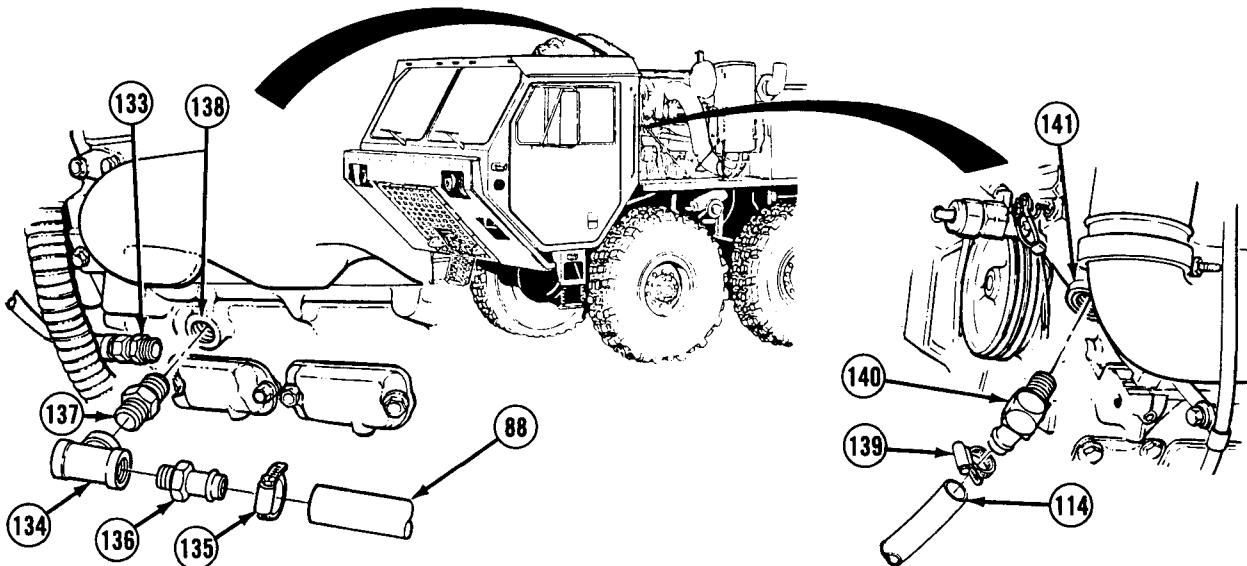
- (46) Remove nut (127) and screw (128) from bracket (116).
- (47) Remove nut (129), plate (130), screw (131), and bracket (116).
- (48) If damaged remove rubber (132) from bracket (116).



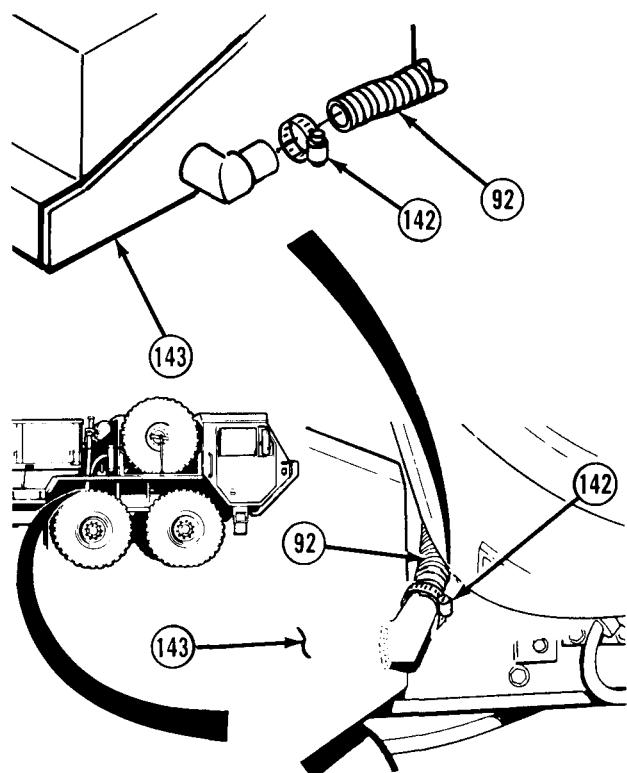
TA500420

## Arctic Kit Maintenance Instructions (Cont)

## 20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL A) (CONT).



- (49) Remove hose (133) from tee (134).
- (50) Loosen clamp (135) and remove hose (88) from adapter (136).
- (51) Remove adapter (136) from tee (134).
- (52) Remove tee (134) and nipple (137) from engine block (138).
- (53) Loosen clamp (139) and remove hose (114) from adapter (140).
- (54) Remove adapter (140) from thermostat housing (141).



- (55) Loosen clamp (142) and remove exhaust pipe (92) from battery box (143) and remove exhaust pipe from vehicle.

## Arctic Kit Maintenance Instructions (Cont)

**NOTE**

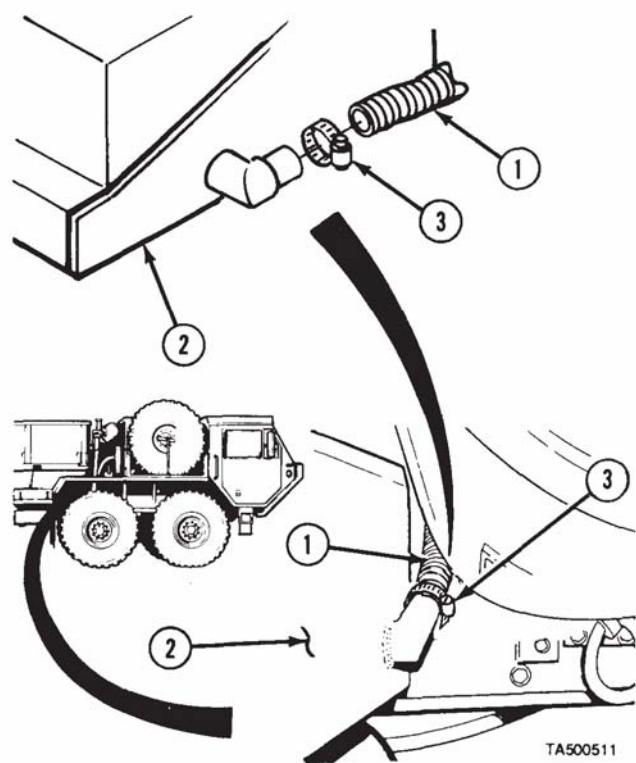
Do steps (56) and (57) only if complete arctic heater kit is to be removed.

- (56) Remove alternator belt set (para 6-15).
- (57) Remove fan belt set (para 6-17).

**b. Installation.****NOTE**

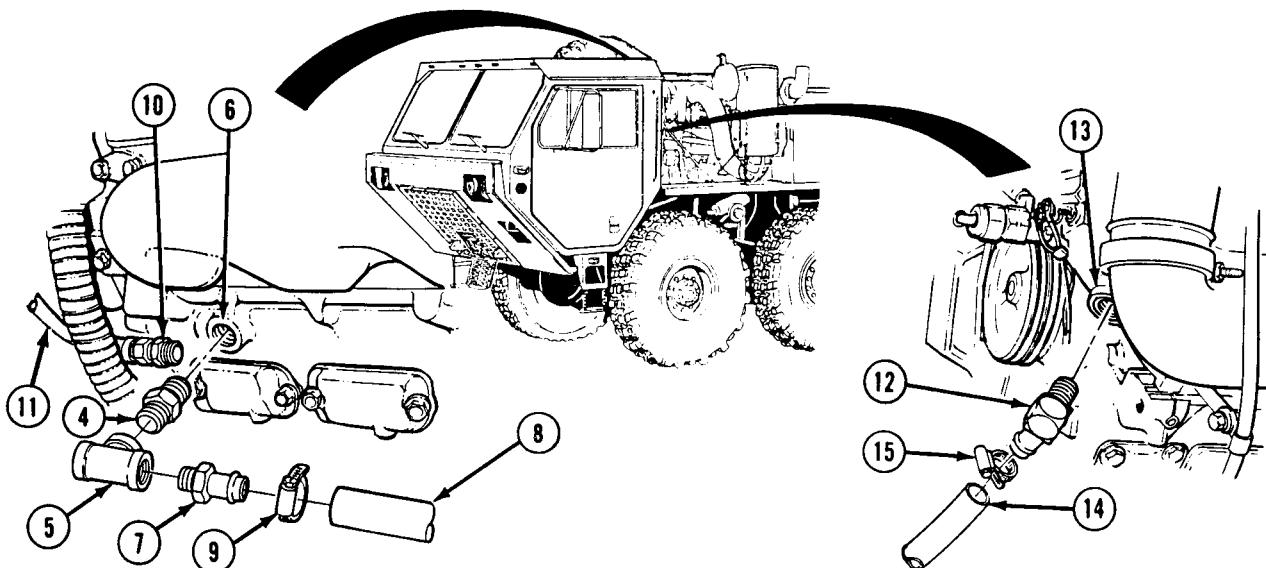
This procedure covers installation of complete arctic heater kit. If complete kit was not removed, do only steps necessary to complete task.

- (1) Install fan belt set (para 6-17).
- (2) Install alternator belt set (para 6-15).
- (3) Install exhaust pipe (1) within frame rail and attach to battery box (2) with clamp (3).



## Arctic Kit Maintenance Instructions (Cont)

## 20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL A) (CONT).

**WARNING**

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

- (4) Apply pipe thread sealing compound to threads of nipple (4) and install nipple and tee (5) in engine block (6).
- (5) Apply pipe thread sealing compound to threads of adapter (7) and install in tee (5).
- (6) Install hose (8) on adapter (7) with clamp (9).
- (7) Apply pipe thread sealing compound to threads of adapter (10), in hose (11), and install adapter in tee (5).
- (8) Apply pipe thread sealing compound to threads of adapter (12) and install in thermostat housing (13).
- (9) Install hose (14) on adapter (12) with clamp (15).

## Arctic Kit Maintenance Instructions (Cont)

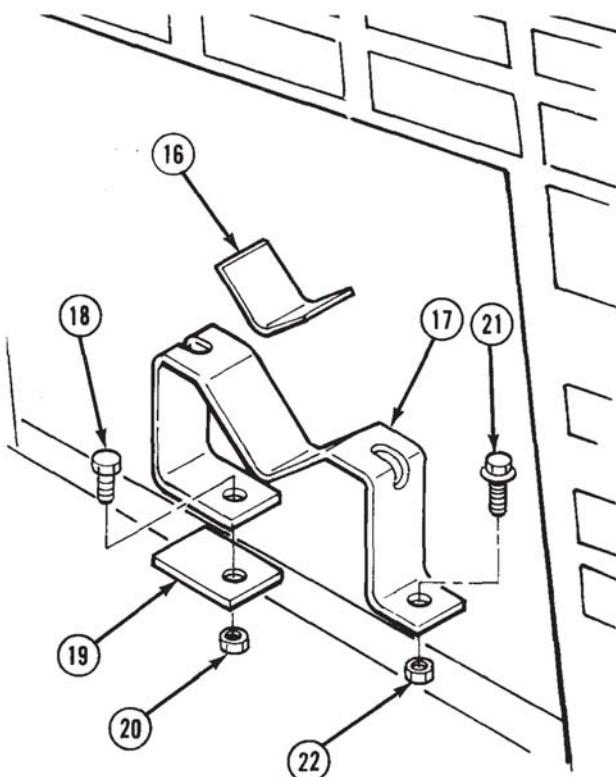
**WARNING**

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

**NOTE**

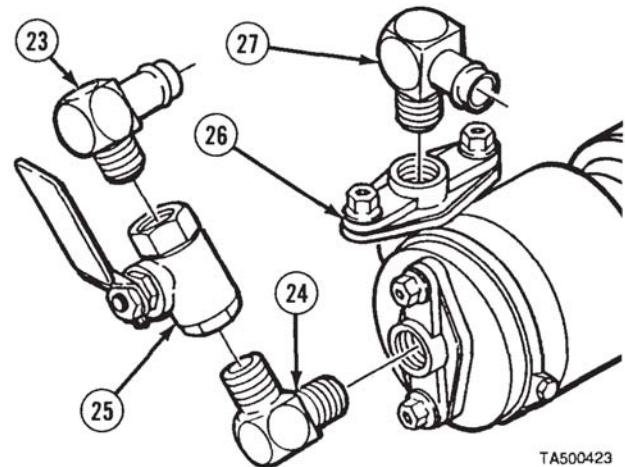
Ensure that surface of bracket is clean.

- (11) If removed, apply adhesive (item 3.1, Appendix C) to rubber (16) and install on bracket (17). Apply hand pressure until adhesive sets.
- (12) Install bracket (17) with screw (18), plate (19), and nut (20).
- (13) Install screw (21) and nut (22).



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- (14) Apply pipe thread sealing compound to threads of elbows (23) and (24).
- (15) Install elbow (23), valve (25) and elbow (24) in coolant pump (26).
- (16) Apply pipe thread sealing compound to threads of elbow (27) and install in coolant pump (26).



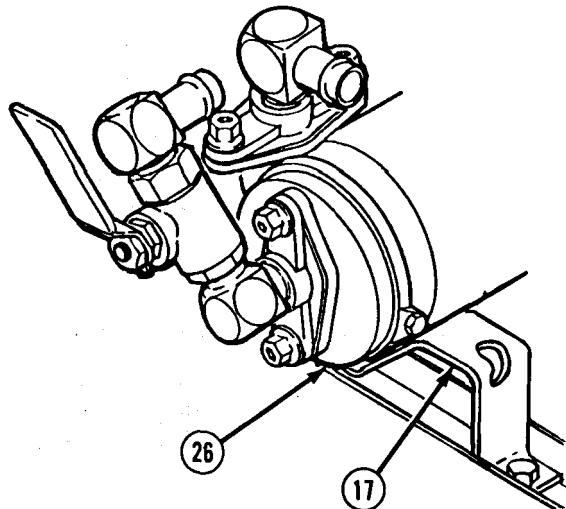
TA500423

## Arctic Kit Maintenance Instructions (Cont)

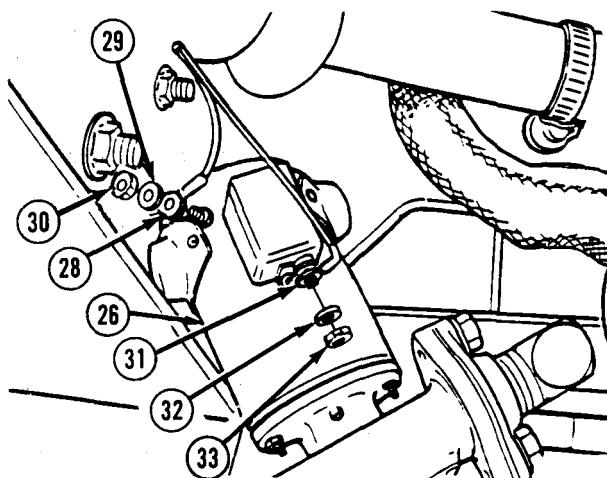
**20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL A) (CONT).**

(17) Install coolant pump (26) as follows:

- (a) Position coolant pump (26) on bracket (17).



- (b) Install wire (28) on coolant pump (26) with lockwasher (29) and nut (30).
- (c) Install wire (31) on coolant pump (26) with lockwasher (32) and nut (33).



## Arctic Kit Maintenance Instructions (Cont)

**WARNING**

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

**NOTE**

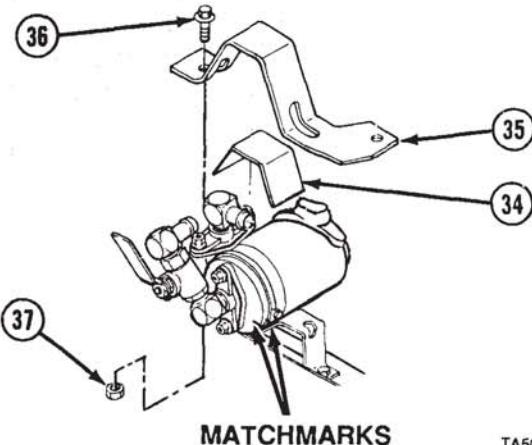
Ensure that surface of bracket is clean.

- (d) If removed, apply adhesive (item 3.1, Appendix C) to rubber (34) and install on bracket (35). Apply hand pressure until adhesive sets.

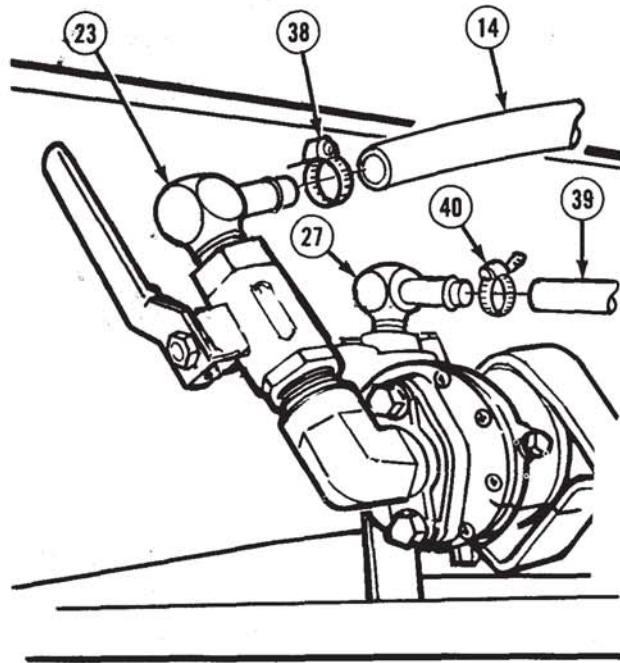
**NOTE**

Ensure matchmarks on coolant pump and bracket are alined.

- (e) Install bracket (35) with two screws (36) and nuts (37).
- (f) Install hose (14) on elbow (23) with clamp (38).
- (g) Install hose (39) on elbow (27) with clamp (40).



TA500426



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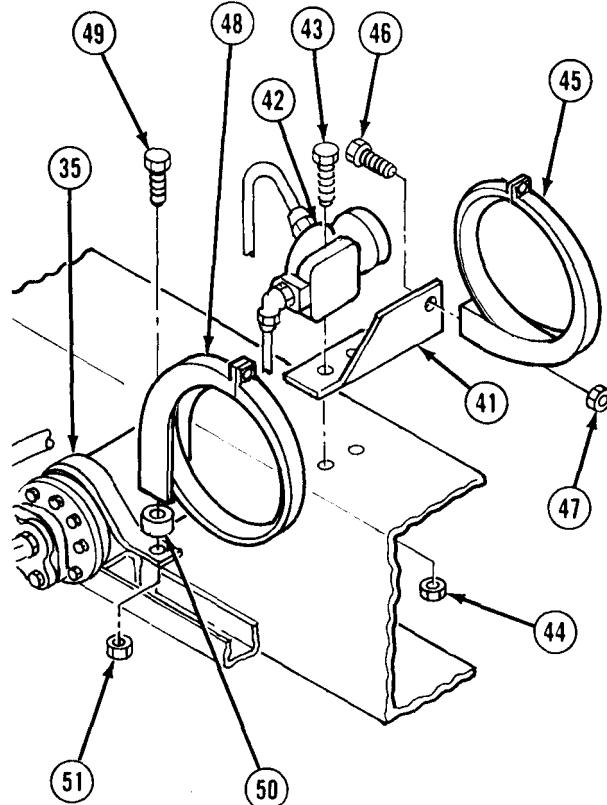
## Arctic Kit Maintenance Instructions (Cont)

## 20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL A) (CONT).

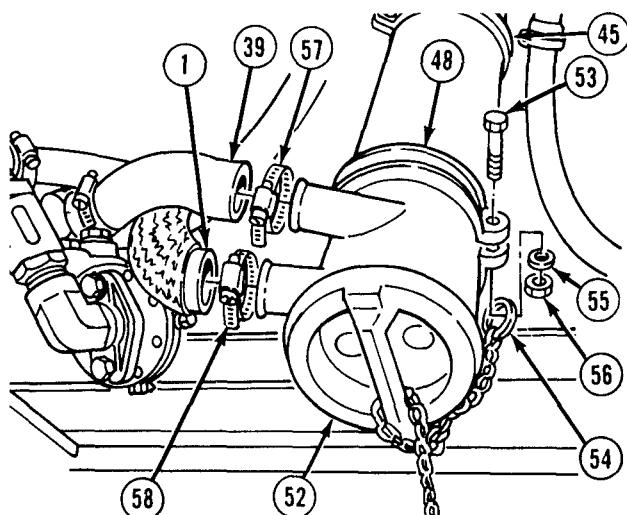
**NOTE**

Quick release valve is mounted to bracket only on model M984A1.

- (18) Install bracket (41) and quick release valve (42) with two screws (43) and nuts (44).
- (19) Install clamp (45) on bracket (41) with screw (46) and nut (47).
- (20) Install clamp (48) on bracket (35) with screw (49), spacer (50), and nut (51).

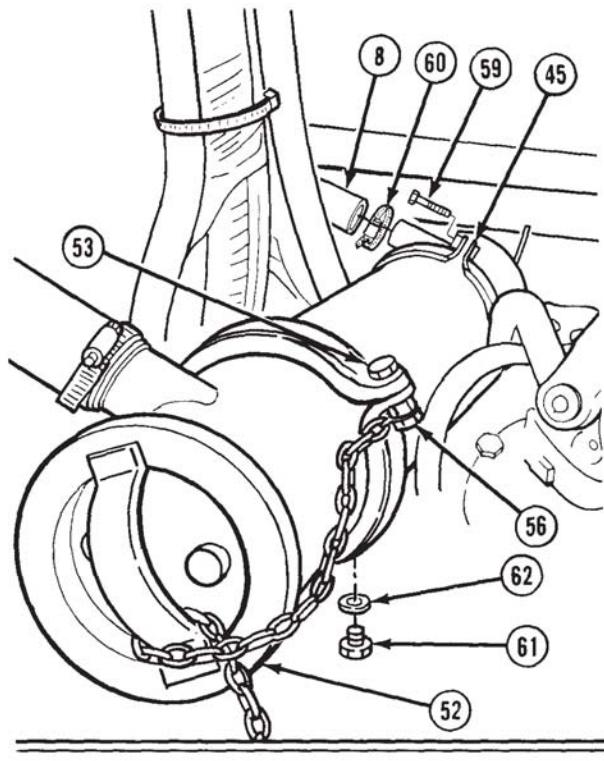


- (21) Install water jacket (52) as follows:
  - (a) Position water jacket (52) in two clamps (45) and (48).
  - (b) Install screw (53) in clamp (48). Do not tighten screw.
  - (c) Install safety chain (54) on screw (53) with washer (55) and nut (56). Do not tighten nut.
  - (d) Install hose (39) on water jacket (52) with clamp (57).
  - (e) Install exhaust pipe (1) on water jacket (52) with clamp (58).



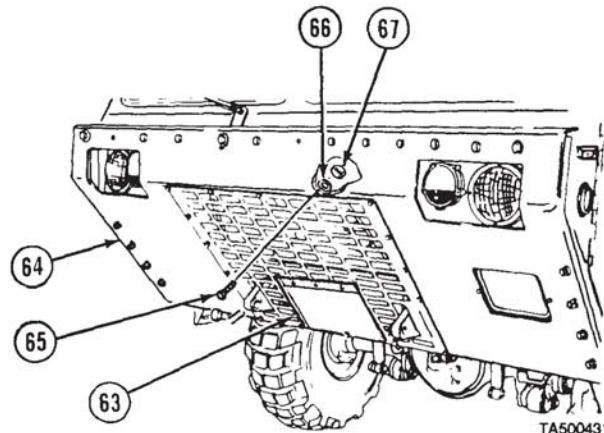
## Arctic Kit Maintenance Instructions (Cont)

- (f) Install screw (59) in clamp (45). Do not tighten screw.
- (g) Install hose (8) on water jacket (52) with clamp (60).
- (h) Tighten screws (53), (59), and nut (56).
- (i) Install drain plug (61) with washer (62) in water jacket (52).



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- (22) Soldier A and Soldier B position skid plate grille (63) on skid plate (64).
- (23) While Soldier A holds skid plate grille (63) in position, Soldier B installs 13 screws (65), washers (66), and locknuts (67).



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## Arctic Kit Maintenance Instructions (Cont)

## 20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL A) (CONT).

- (24) Install two pins (68) on chains (69).
- (25) Install two chains (69) on stiffener (70) with two screws (71), washers (72), and locknuts (73).
- (26) Install stiffener (70) with three screws (74), lockwashers (75), and nuts (76).
- (27) Install hinge (77) on skid plate grille (63) with three screws (78), washers (79), and locknuts (80).

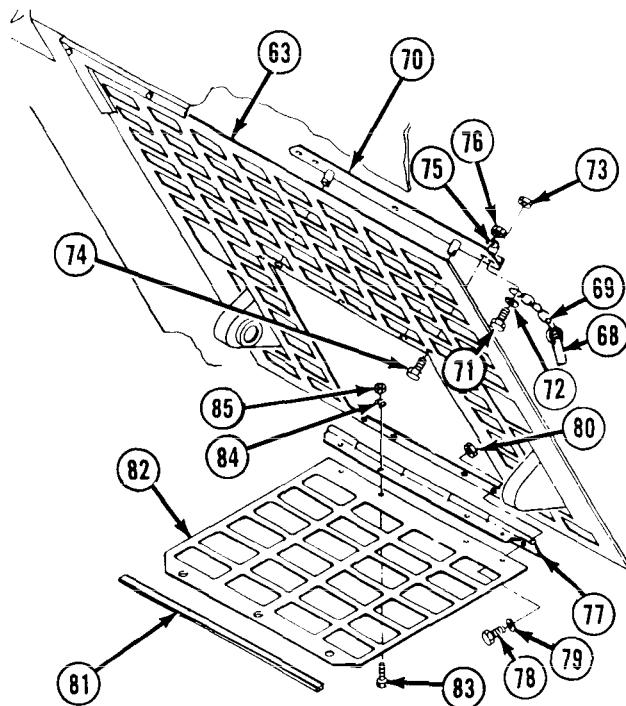
**WARNING**

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

**NOTE**

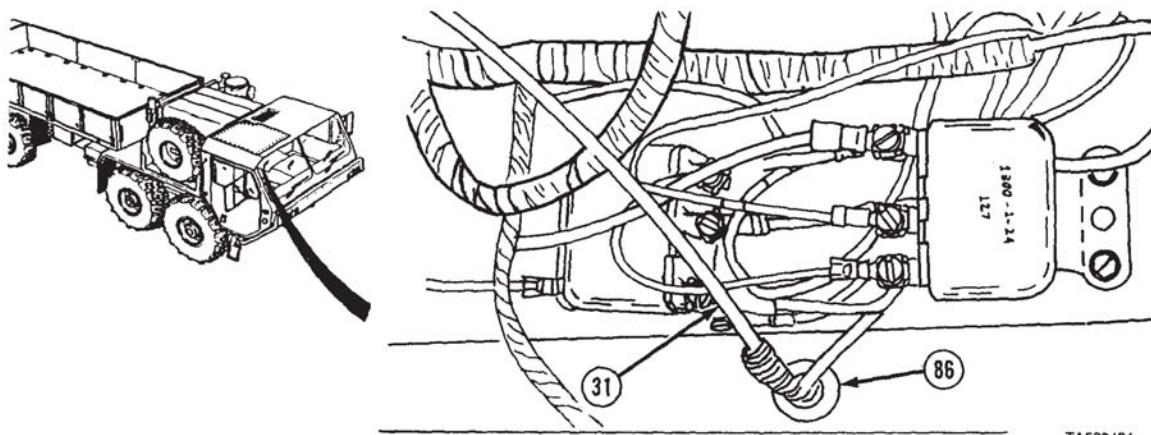
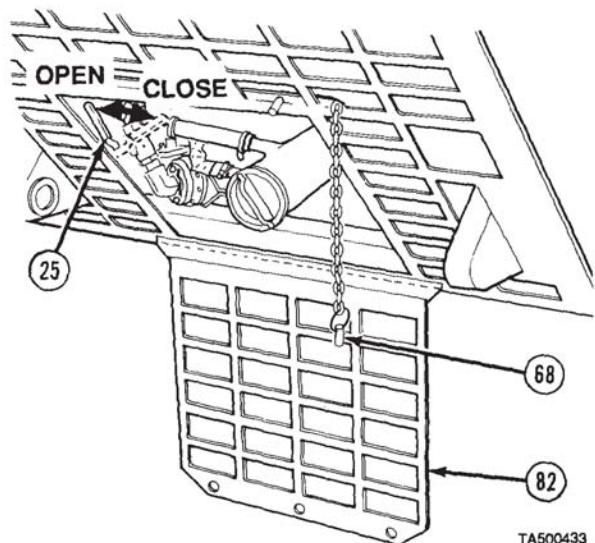
Ensure that rubber mounting surface of door is clean.

- (28) If removed, apply adhesive (item 3.3, Appendix C) to rubber (81) and install on door (82). Apply hand pressure until adhesive sets.
- (29) Install door (82) on hinge (77) with four screws (83), lockwashers (84), and nuts (85).



## Arctic Kit Maintenance Instructions (Cont)

- (30) Close valve (25).
- (31) Close door (82) and secure with two pins (68).

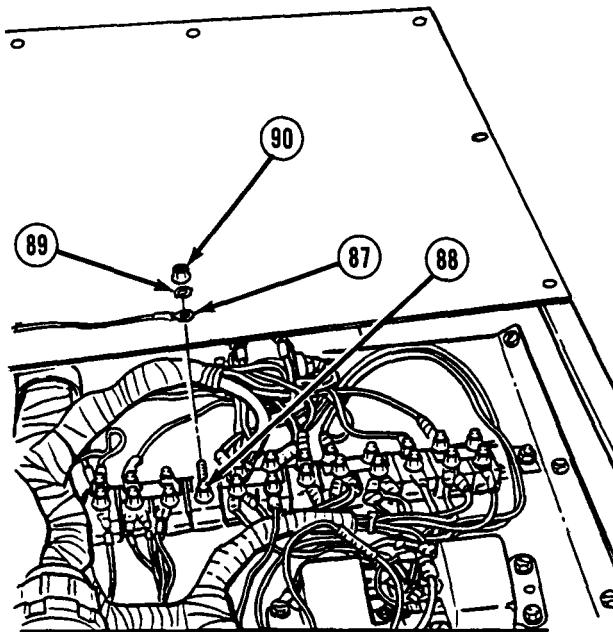


- (32) Push wire (31) up through hole (86).

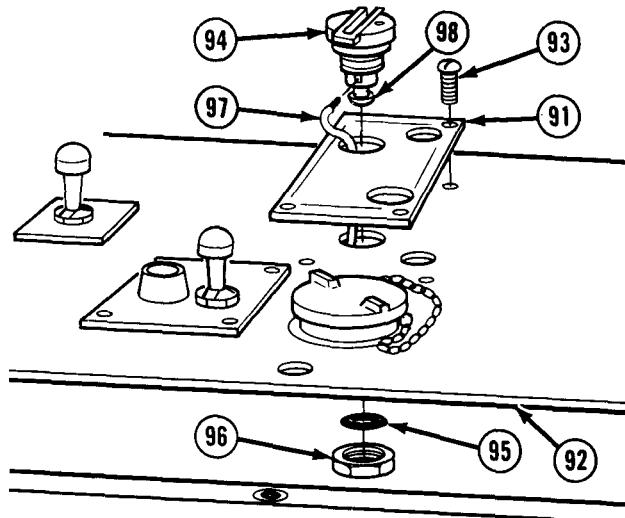
## Arctic Kit Maintenance Instructions (Cont)

## 20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL A) (CONT).

- (33) Install wire (87) on circuit breaker (88) with lockwasher (89) and nut (90).

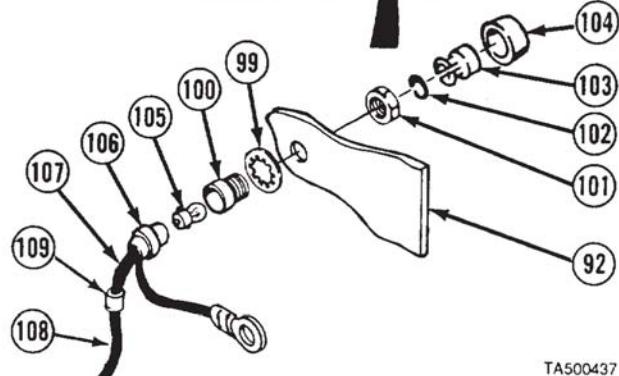
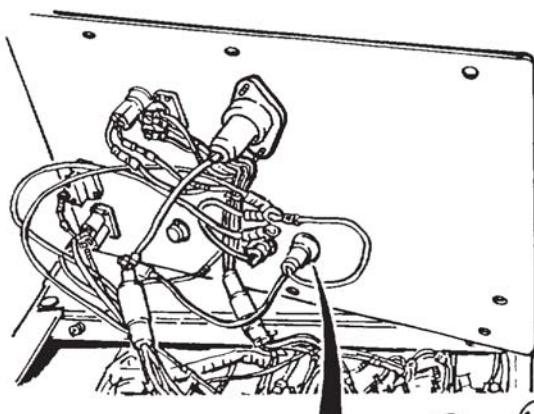


- (34) Install data plate (91) on heater compartment cover (92) with four screws (93).
- (35) Install receptacle (94) with washer (95) and nut (96).
- (36) Install wire (97) in receptacle (94) and tighten screw (98).



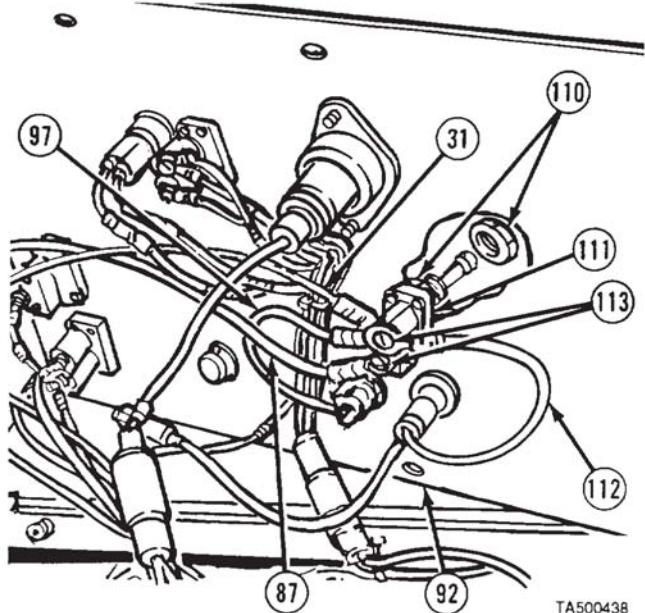
## **Arctic Kit Maintenance Instructions (Cont)**

- (37) Install lockwasher (99) on housing (100) and insert housing in heater compartment cover (92). Secure with nut (101).
  - (38) Install force ring (102) in lens (103) and install lens in housing (100).
  - (39) Install shield (104).
  - (40) Install lamp (105) in indicator light socket (106).
  - (41) Attach ground wire (107) to ground wire (108) with electrical butt connector (109).
  - (42) Install indicator light socket (106) in housing (100).



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- (43) Install nut (110) on coolant pump switch (111).
  - (44) Install coolant pump switch (111) in heater compartment cover (92) with remaining nut (110).
  - (45) Install three wires (31), (97), and (112) on output side of coolant pump switch (111) with screw (113).
  - (46) Install wire (87) on input side of coolant pump switch (111) with remaining screw (113).

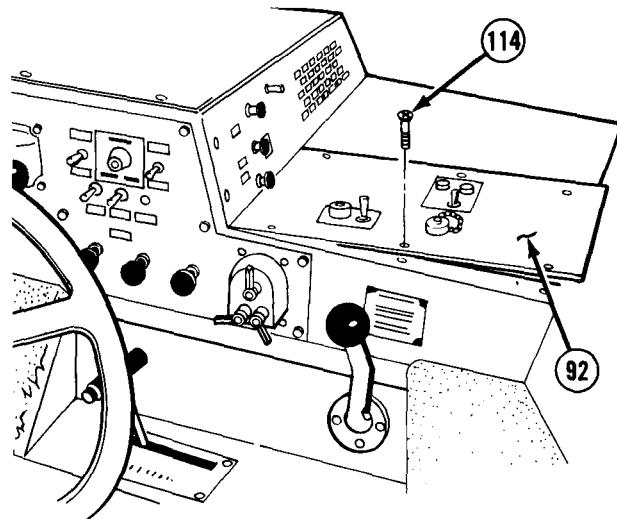


TA500438

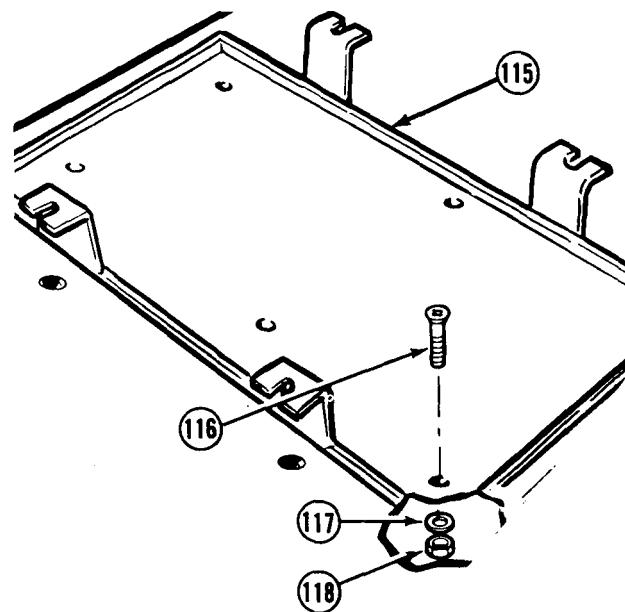
## Arctic Kit Maintenance Instructions (Cont)

## 20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL A) (CONT).

- (47) Install heater compartment cover (92) with six screws (114).

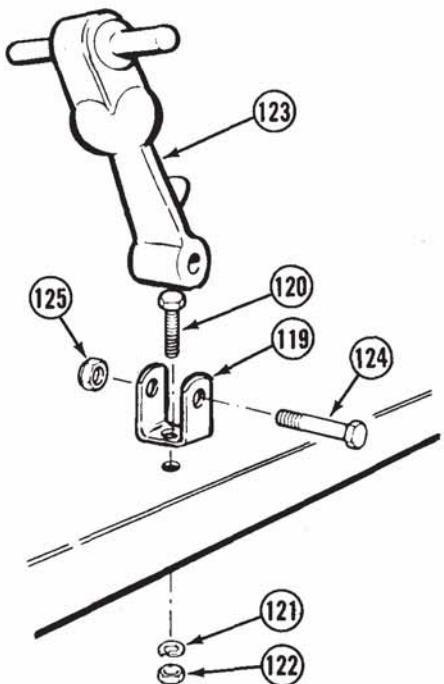


- (48) Install battery box (115) with six screws (116), washers (117), and locknuts (118).



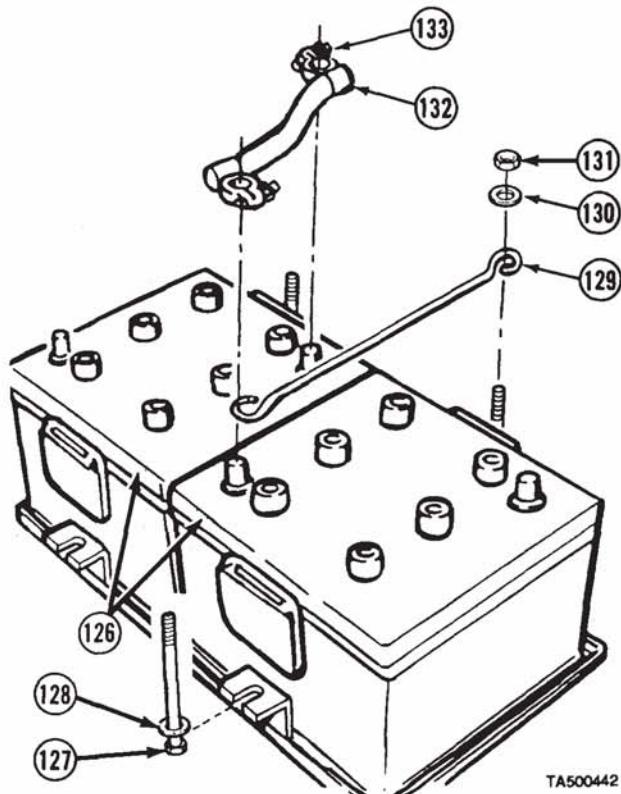
## Arctic Kit Maintenance Instructions (Cont)

- (49) Install three hook brackets (119) with screws (120), lockwashers (121), and nuts (122).
- (50) Install three rubber hooks (123) with screws (124) and locknuts (125).



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- (51) Install two batteries (126).
- (52) Install four screws (127) and washers (128).
- (53) Install two holdowns (129) with four washers (130) and locknuts (131).
- (54) Install jumper cable (132) and tighten two nuts (133).

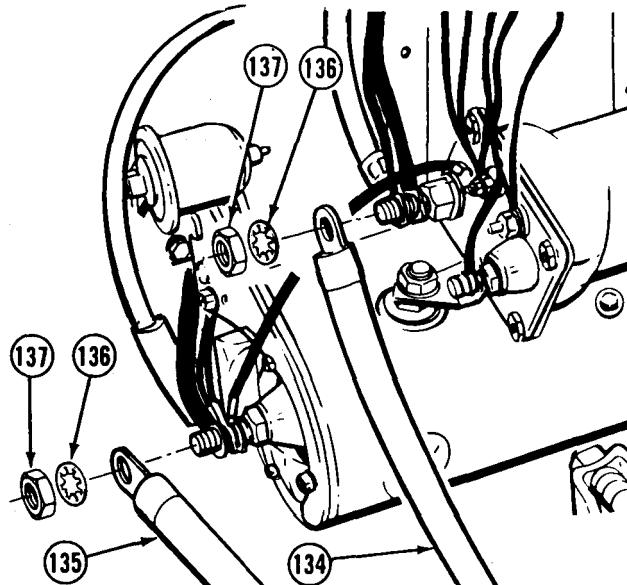


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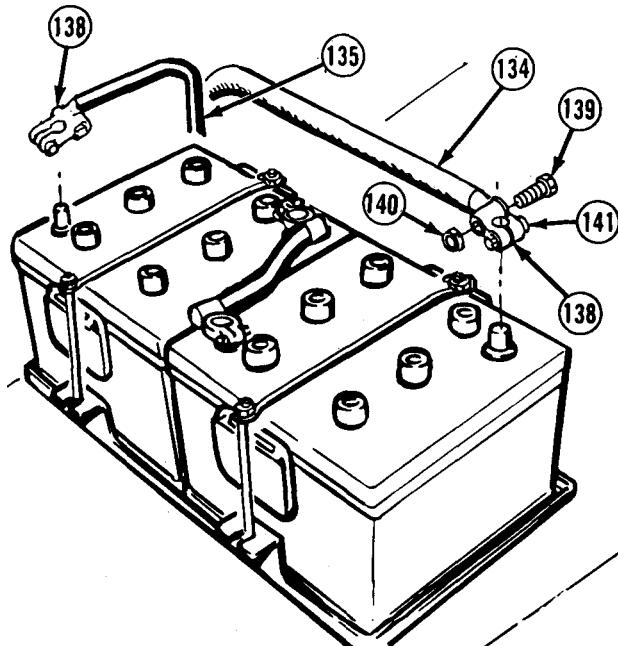
## Arctic Kit Maintenance Instructions (Cont)

## 20-2. ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL A) (CONT).

- (55) Install two cables (134) and (135) with lockwashers (136) and nuts (137).

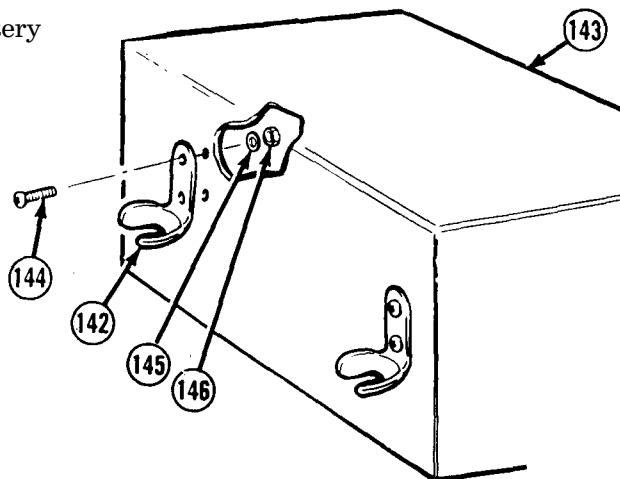


- (56) Install terminals (138) on cables (134) and (135) with screws (139) and nuts (140).
- (57) Install two cables (134) and (135) and tighten nuts (141).

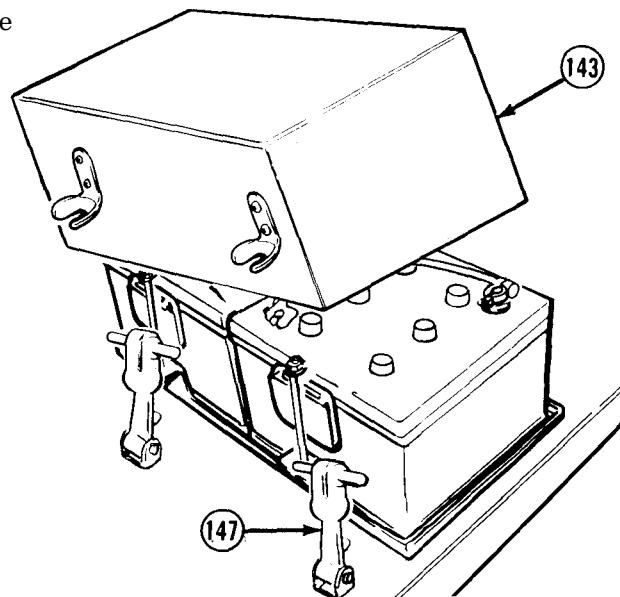


**Arctic Kit Maintenance Instructions (Cont)**

- (58) Install three hood brackets (142) on battery box cover (143) with six screws (144), washers (145), and locknuts (146).



- (59) Install battery box cover (143) with three rubber hood hooks (147).

**c. Follow-on Maintenance.**

- (1) Install battery box (para 7-92).
- (2) Fill cooling system (para 6-2).
- (3) Install engine side panels (TM 9-2320-279-10).
- (4) Close engine cover (TM 9-2320-279-10).
- (5) Stow spare tire (TM 9-2320-279-10).

**END OF TASK**

All data on pages 20-30 thru 20-38, deleted.



## Arctic Heater Kit Maintenance Instructions (Cont)

**20-4 ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL B).**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

**INITIAL SETUP****Models**

All

**Test Equipment**

None

**Special Tools**

None

**Supplies**

Compound, corrosion preventive, Item 12.1,  
Appendix C  
Compound, sealing, pipe thread, Item 18,  
Appendix C  
Ties, cable, plastic, Item 52, Appendix C  
Tags, identification, Item 48, Appendix C  
Sealant, RTV200, electrical, Item 45.05,  
Appendix C  
Connector, electrical, butt, Item 19,  
Appendix C

**Personnel Required**

MOS 63S, Heavy wheel vehicle mechanic (2)

**References**

None

**Equipment Condition**

TM or Para	Condition Description
Para 6-2	Cooling system drained.
Para 14-5	Skid plate grille removed.
Para 16-3	Right front splash guard removed.
Para 17-2	Front cable tensioner removed.
Para 7-91	Batteries disconnected.

**Special Environmental Conditions**

None

**General Safety Instructions**

None

**a. Removal.****WARNING**

To avoid eye injury, eye protection is required when working around batteries. Do not smoke, use open flame, make sparks, or create other ignition sources around batteries. If a battery is giving off gases, it can explode and cause injury to personnel. Remove all jewelry, such as rings, ID tags, watches, and bracelets. If jewelry contacts a battery terminal, a direct short will result in instant heating of tools, damage to equipment, and cause injury to personnel.

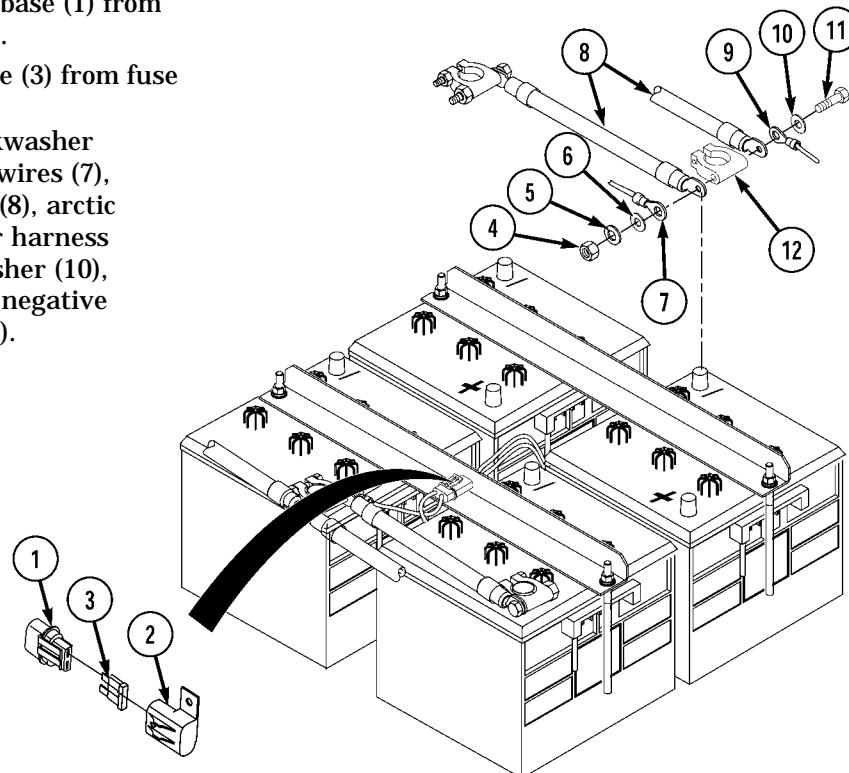
**NOTE**

- Tag and mark all wires and cables prior to removal.
- Remove plastic cable ties as required.

## Arctic Heater Kit Maintenance Instructions (Cont)

## 20-4 ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL B) (CONT).

- (1) Remove fuse holder base (1) from fuse holder cover (2).
- (2) Remove 15 AMP fuse (3) from fuse holder base (1).
- (3) Remove nut (4), lockwasher (5), washer (6), five wires (7), two negative cables (8), arctic engine heater power harness ground wire (9), washer (10), and screw (11) from negative battery terminal (12).

CAUTION

While tightening nut, hold screw with wrench. Failure to comply may cause damage to equipment.

## NOTE

Apply corrosion preventive compound as required.

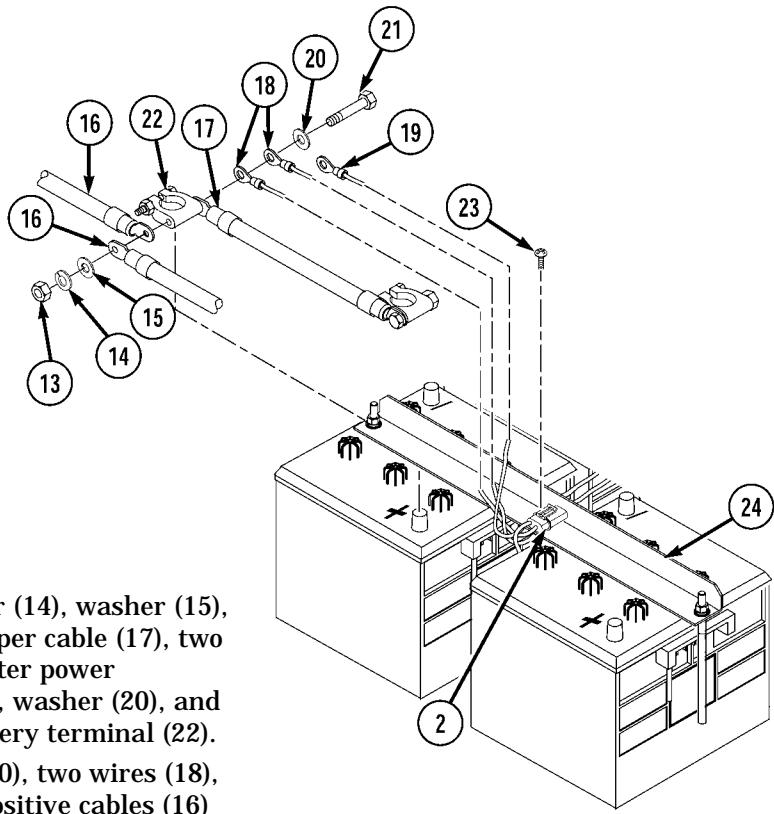
- (4) Install screw (11), washer (10), two negative cables (8) and five wires (7) to negative battery terminal (12) with washer (6), lockwasher (5) and nut (4). Tighten nut (4) to 12 to 16 lb-ft (16 to 22 NSm).

## Body Accessory Maintenance Instructions (Cont)

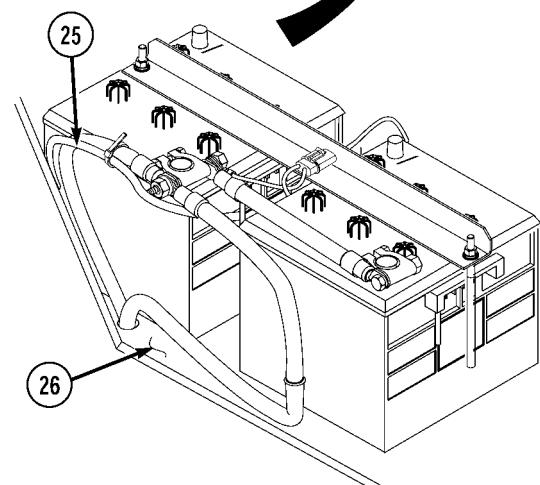
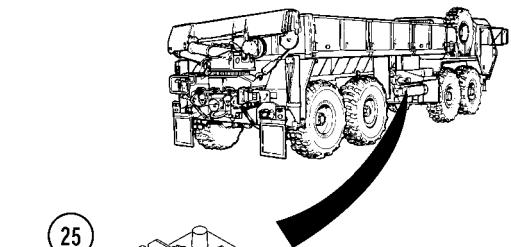
- (5) Remove nut (13), lockwasher (14), washer (15), two positive cables (16), jumper cable (17), two wires (18), arctic engine heater power harness pigtail red wire (19), washer (20), and screw (21) from positive battery terminal (22).

- (6) Install screw (21), washer (20), two wires (18), jumper cable (17) and two positive cables (16) to positive battery terminal (22) with washer (15), lockwasher (14) and nut (13). Tighten nut (13) to 12 to 16 lb-ft (16 to 22 NSm).

- (7) Remove screw (23) and fuse holder cover (2) from battery hold down (24).



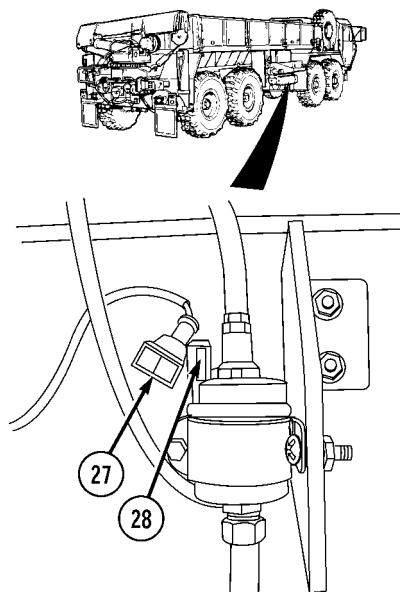
- (8) Remove arctic engine heater power harness (25) from battery box (26).



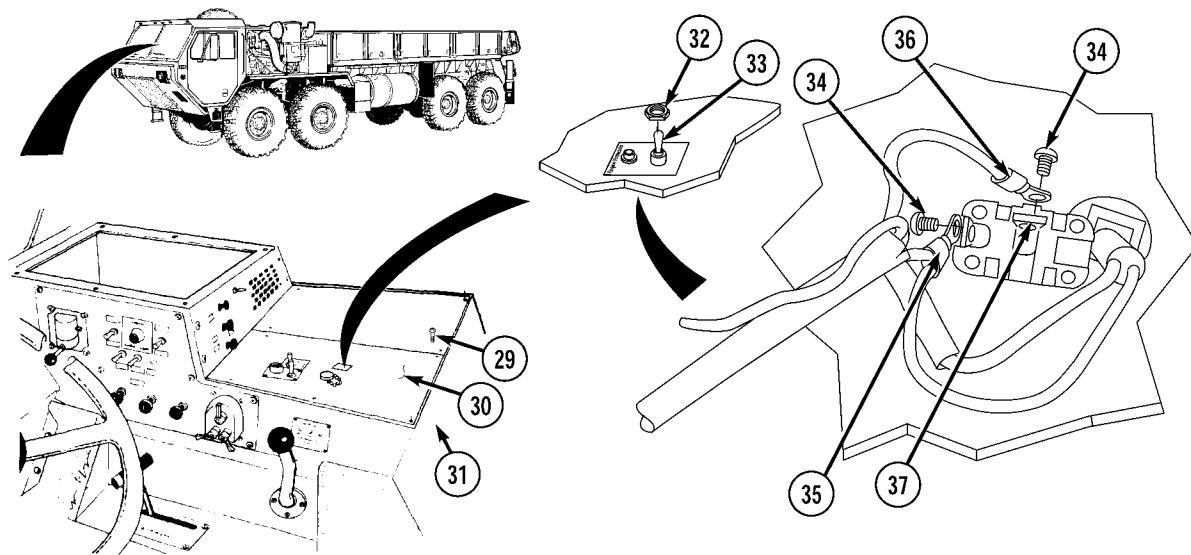
## Arctic Heater Kit Maintenance Instructions (Cont)

## 20-4 ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL B) (CONT).

- (9) Disconnect fuel metering harness connector (27) from fuel metering pump connector (28).

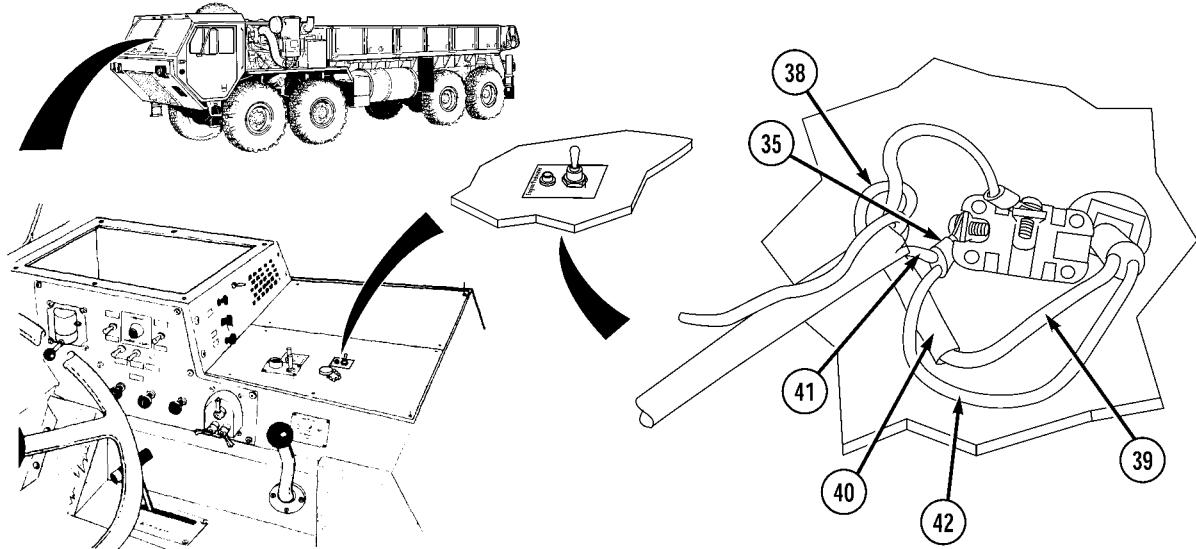


- (10) Remove six screws (29) and left heater compartment cover (30) from console (31).
- (11) Remove locknut (32) and arctic engine heater on/off switch (33) from left heater compartment cover (30).
- (12) Remove two screws (34) and ring terminals (35 and 36) from arctic engine heater on/off switch (37).

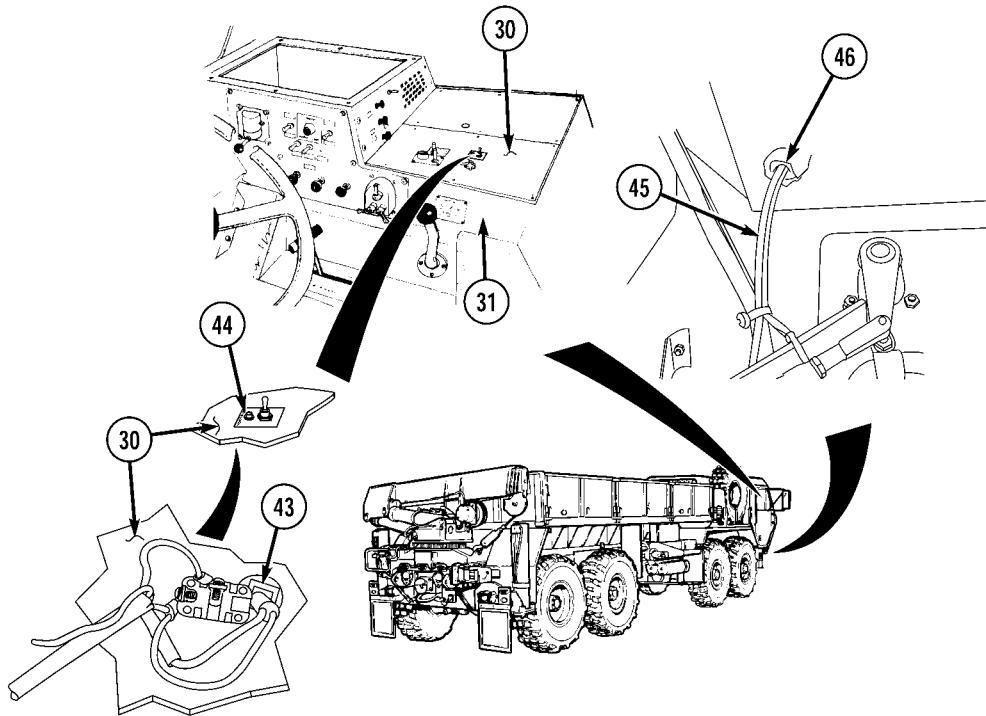


## Arctic Heater Kit Maintenance Instructions (Cont)

- (13) Cut arctic engine heater switch harness blue/white wire (38) and LED harness white wire (39) at butt connector (40).
- (14) Cut arctic engine heater switch harness yellow wire (41) and LED harness red wire (42) at ring terminal (35).



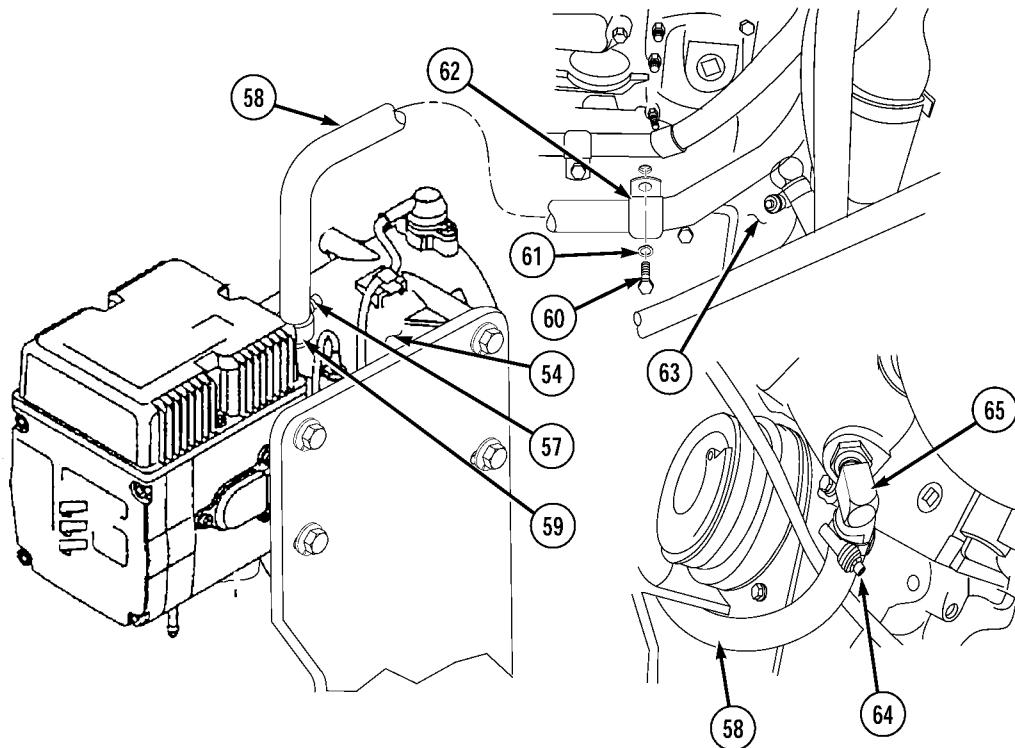
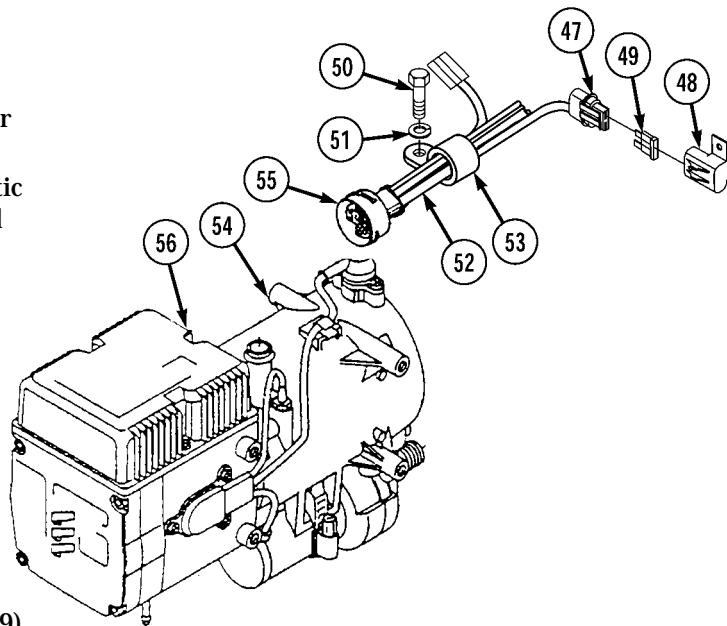
- (15) Remove spring clip (43) and LED harness (44) from left heater compartment cover (30).
- (16) Pull arctic engine heater switch harness (45) out console (31) through hole (46).



## Arctic Heater Kit Maintenance Instructions (Cont)

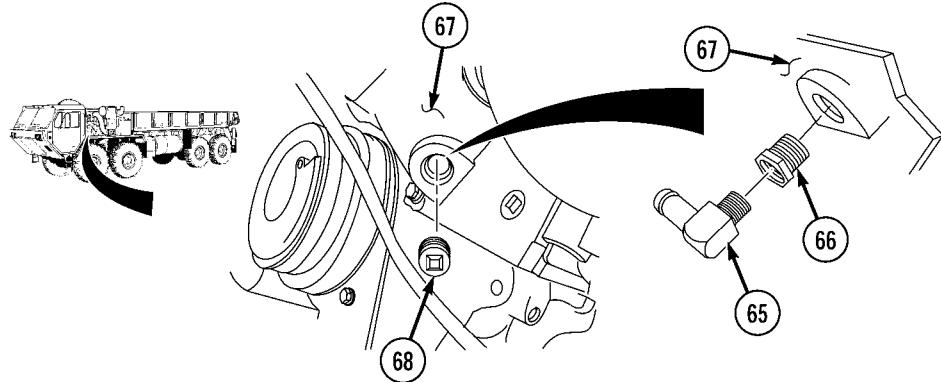
## 20-4 ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL B) (CONT).

- (17) Remove fuse holder base (47) from fuse holder cover (48).
- (18) Remove 5 AMP fuse (49) from fuse holder base (47).
- (19) Remove screw (50), lockwasher (51), arctic engine heater electrical harness (52) and cushion clamp (53) from arctic engine heater (54).
- (20) Disconnect arctic engine heater electrical harness connector (55) from arctic engine heater connector (56).
- (21) Remove arctic engine heater electrical harness (52) from vehicle.
- (22) Place suitable drain pan under arctic engine heater (54).
- (23) Remove clamp (57) and water hose (58) from arctic engine heater output port (59).
- (24) Remove screw (60), lockwasher (61), cushion clamp (62) and water hose (58) from oil cooler (63).
- (25) Install screw (60) and lockwasher (61) to oil cooler (63).
- (26) Remove clamp (64) and water hose (58) from 90° fitting (65).



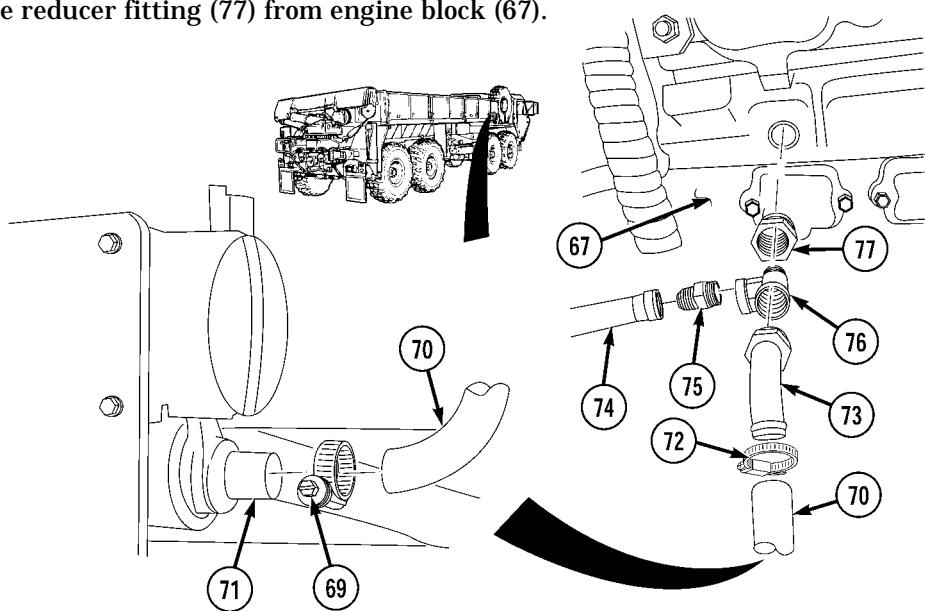
## Arctic Heater Kit Maintenance Instructions (Cont)

- (27) Remove 90\_fitting (65) from reducer fitting (66).
- (28) Remove reducer fitting (66) from engine block (67).

**WARNING**

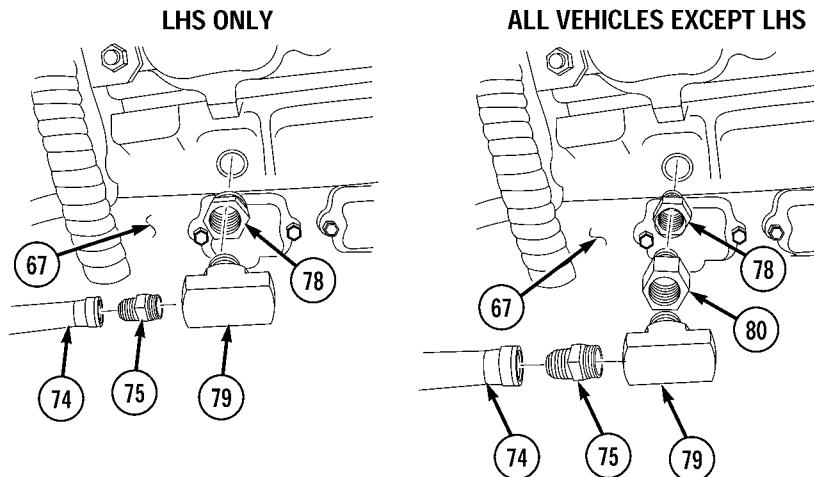
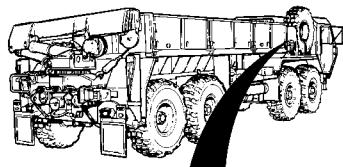
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (29) Apply pipe thread sealing compound on threads of plug fitting (68) and install in engine block (67).
- (30) Remove clamp (69) and water hose (70) from water pump input port (71).
- (31) Remove clamp (72) and water hose (70) from 45\_fitting (73).
- (32) Remove air compressor water line (74) from flared fitting (75).
- (33) Remove flared fitting (75) from tee fitting (76).
- (34) Remove 45\_fitting (73) from tee fitting (76).
- (35) Remove tee fitting (76) from reducer fitting (77).
- (36) Remove reducer fitting (77) from engine block (67).



## Arctic Heater Kit Maintenance Instructions (Cont)

## 20-4 ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL B) (CONT).

**WARNING**

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

- (37) Apply pipe thread sealing compound on threads of reducer fitting (78) and install on engine block (67).

**NOTE**

Perform step (38) on LHS only.

- (38) Apply pipe thread sealing compound on threads of tee fitting (79) and install on reducer fitting (78).

**NOTE**

Perform steps (39) and (40) on all vehicles except LHS.

- (39) Apply pipe thread sealing compound on threads fitting (80) and install on reducer fitting (78).
- (40) Apply pipe thread sealing compound on threads of tee fitting (79) and install on fitting (80).
- (41) Apply pipe thread sealing compound on threads of flared fitting (75) and install on tee fitting (79).
- (42) Install air compressor water line (74) on flared fitting (75).

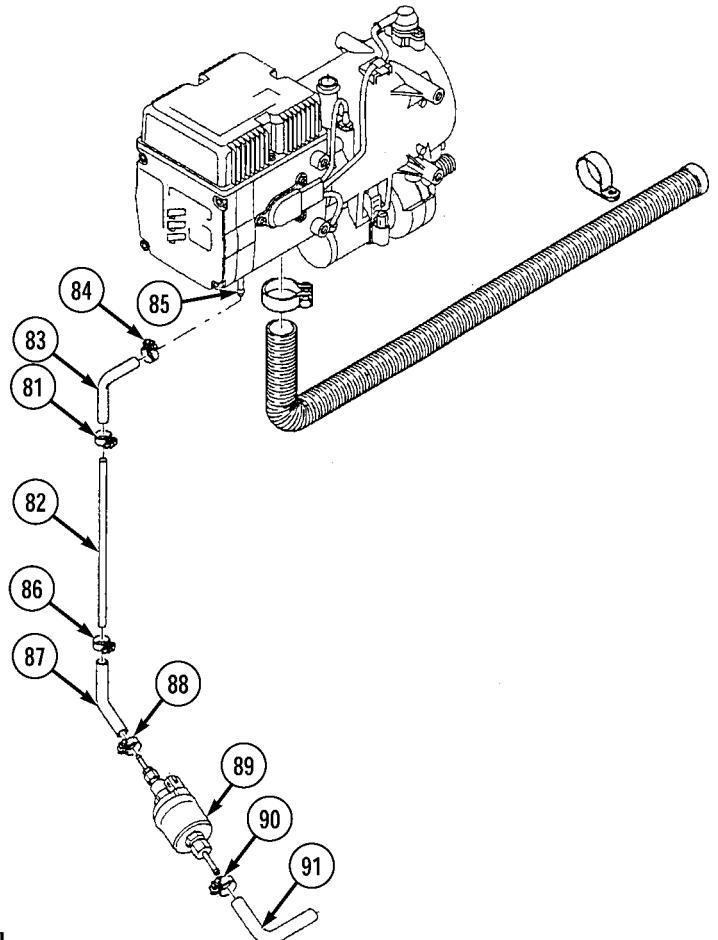
## Arctic Heater Kit Maintenance Instructions (Cont)

**WARNING**

- Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap.
- Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

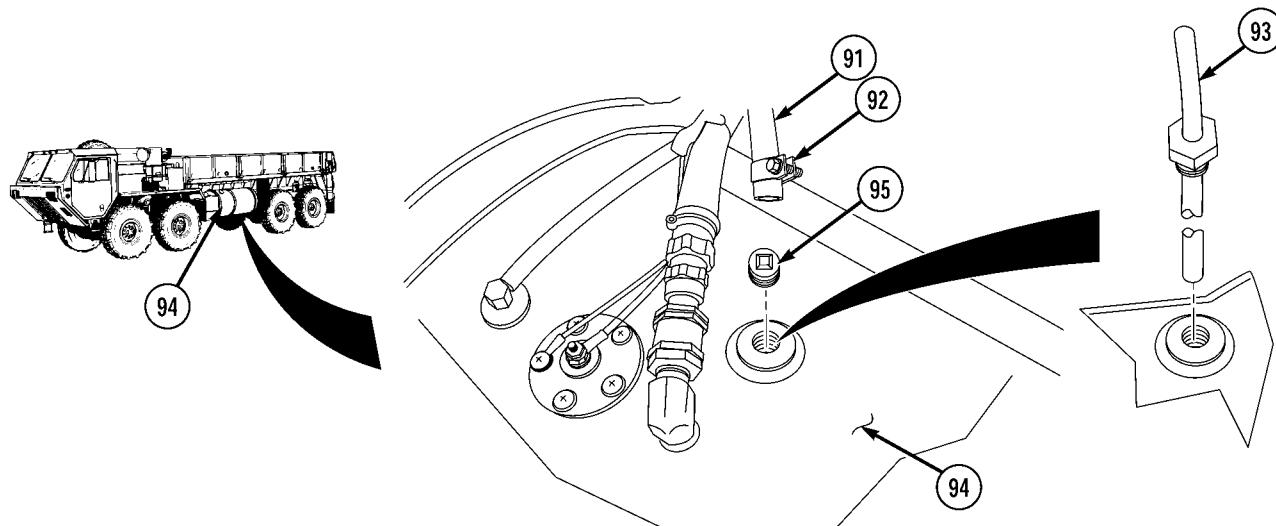
- (43) Remove clamp (81) and fuel line (82) from fuel hose (83).
- (44) Remove clamp (84) and fuel hose (83) from arctic engine heater fuel supply stem (85).
- (45) Remove clamp (86) and fuel line (82) from fuel hose (87).
- (46) Remove clamp (88) and fuel hose (87) from pressure side of fuel metering pump (89).

- (47) Remove clamp (90) and fuel metering pump hose (91) from suction side of fuel metering pump (89).



## Arctic Heater Kit Maintenance Instructions (Cont)

## 20-4 ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL B) (CONT).

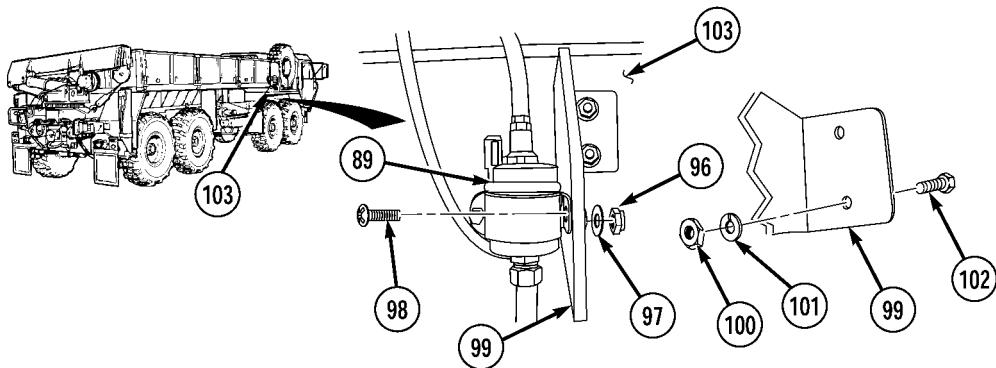


- (48) Remove clamp (92) and fuel metering pump hose (91) from fuel pick-up pipe (93).
- (49) Remove fuel pick-up pipe (93) from fuel tank (94).

**WARNING**

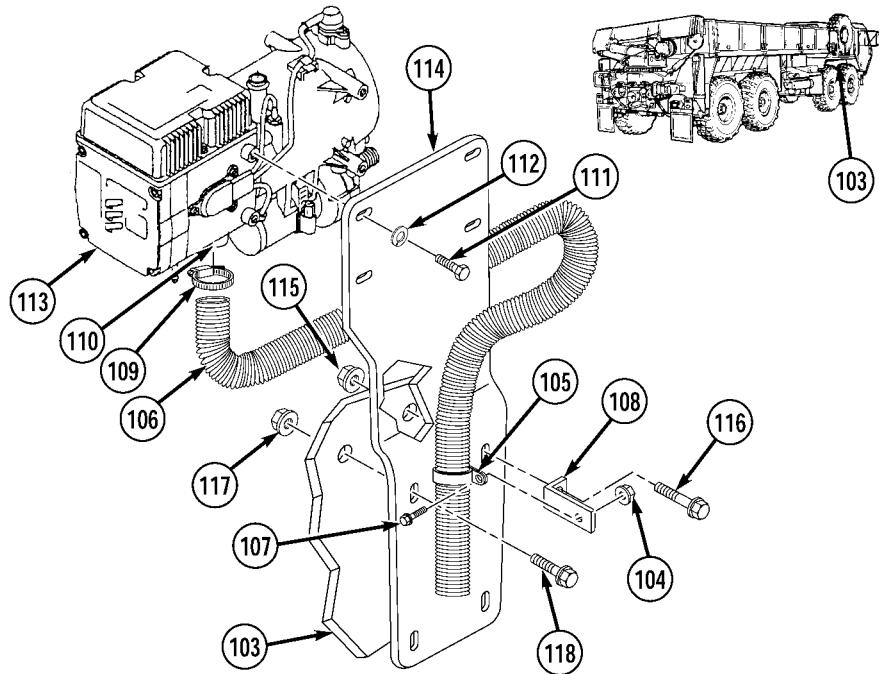
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (50) Apply pipe thread sealing compound on threads of plug fitting (95) and install in fuel tank (94).



- (51) Remove two nuts (96), washers (97), fuel metering pump (89) and screws (98) from fuel metering bracket (99).
- (52) Remove two locknuts (100), lockwashers (101), fuel metering pump mounting bracket (99), and screws (102) from frame rail (103).

## Arctic Heater Kit Maintenance Instructions (Cont)



- (53) Remove locknut (104), clamp (105), exhaust pipe (106) and screw (107) from clip bracket (108).
- (54) Remove clamp (109) and exhaust pipe (106) from arctic engine heater exhaust port (110).
- (55) Remove four screws (111), lockwashers (112) and arctic engine heater (113) from arctic engine heater mounting bracket (114).
- (56) Remove locknut (115), clip bracket (108) and screw (116) from arctic engine heater mounting bracket (114).
- (57) Remove three locknuts (117), screws (118), and arctic engine heater mounting bracket (114) from frame rail (103).

## Arctic Heater Kit Maintenance Instructions (Cont)

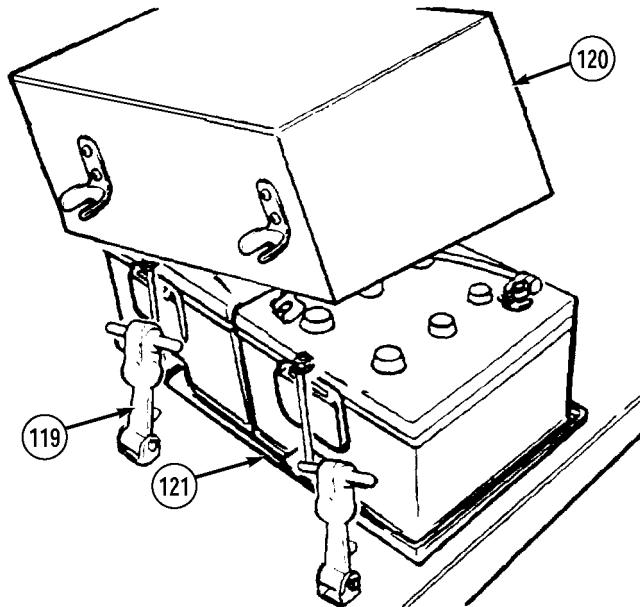
## 20-4 ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL B) (CONT).

**WARNING**

To avoid eye injury, eye protection is required when working around batteries. Do not smoke, use open flame, make sparks, or create other ignition sources around batteries. If a battery is giving off gases, it can explode and cause injury to personnel. Remove all jewelry, such as rings, ID tags, watches, and bracelets. If jewelry contacts a battery terminal, a direct short will result in instant heating of tools, damage to equipment, and cause injury to personnel.

**NOTE**

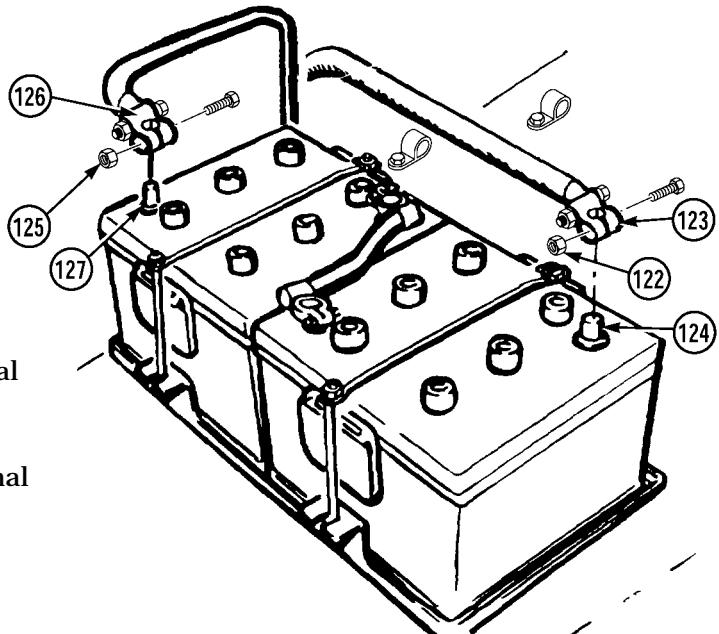
- Apply electrical sealant to exposed wire connectors after installation.
- Remove plastic cable ties as required.



- (58) Loosen three rubber hood hooks (119) and remove battery box cover (120) from battery box (121).

**CAUTION**

Do not pry between terminal and top of battery. Failure to comply may cause damage to equipment.



- (59) Loosen nut (122) and remove positive terminal (123) from battery positive post (124).

- (60) Loosen nut (125) and remove negative terminal (126) from battery negative post (127).

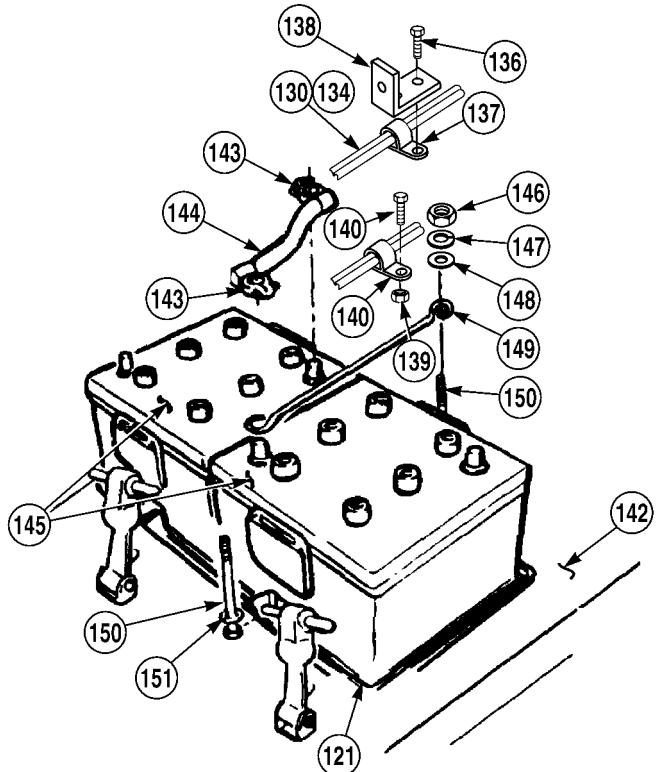
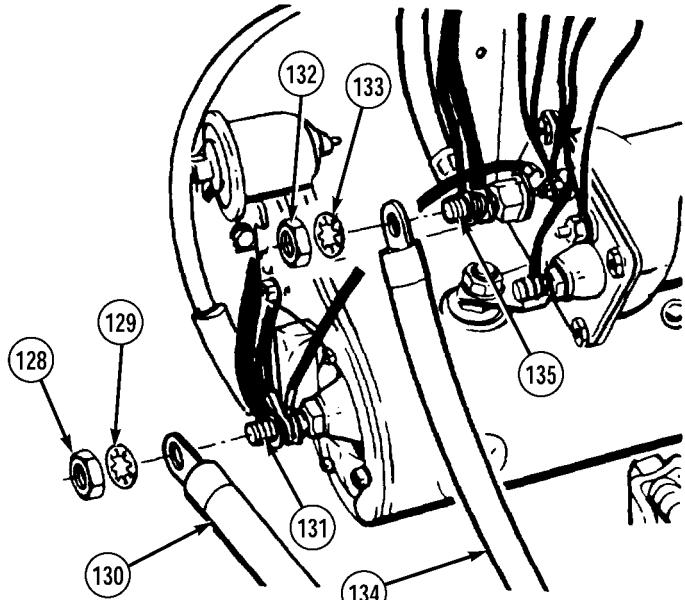
## Arctic Heater Kit Maintenance Instructions (Cont)

- (61) Remove locknut (128), lockwasher (129) and cable 1138 (130) from starter motor ground terminal (131).
- (62) Install lockwasher (129) and locknut (128) on starter motor ground terminal (131).
- (63) Remove locknut (132), lockwasher (133) and cable 1139 (134) from starter solenoid battery terminal (135).
- (64) Install lockwasher (133) and locknut (132) on starter solenoid battery terminal (135).
- (65) Remove screw (136), cushion clamp (137), and cables 1138 (130) and 1139 (134) from engine left side panel hold down bracket (138).
- (66) Install screw (136) to engine left side panel hold down bracket (138).
- (67) Remove locknut (139), cushion clamp (140), cables 1138 (130) and 1139 (134) and screw (141) from left front fender (142).

CAUTION

Do not pry between terminal and top of battery. Failure to comply may cause damage to equipment.

- (68) Loosen two nuts (143) and remove jumper cable (144) from two batteries (145).
- (69) Remove four locknuts (146), lockwashers (147), washers (148) and two hold downs (149) from four screws (150).
- (70) Remove four washers (151) and screws (150) from battery box (121).
- (71) Remove two batteries (145) from battery box (121).



## Arctic Heater Kit Maintenance Instructions (Cont)

## 20-4 ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL B) (CONT).

- (72) Remove two locknuts (152), washers (153), screws (154) and two rubber hood hook assemblies (155) from left front fender (142).
- (73) Remove screw (156) and one rubber hood hook assembly (155) from left front fender (142).
- (74) Install screw (156) to left front fender (142).
- (75) Remove six locknuts (157), washers (158), screws (159) and battery box (121) from left front fender (142).

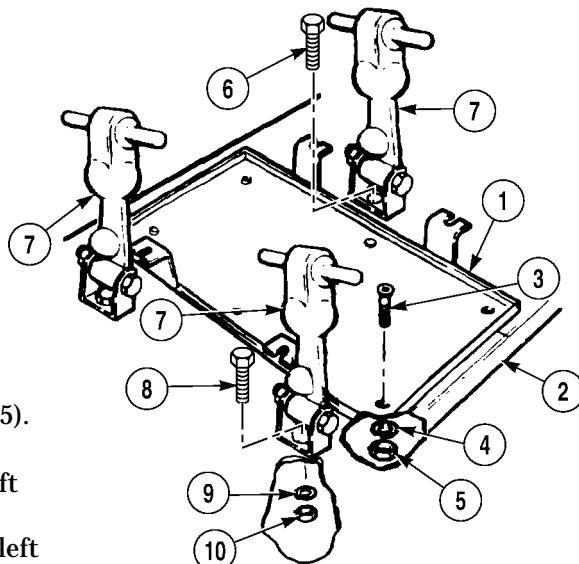
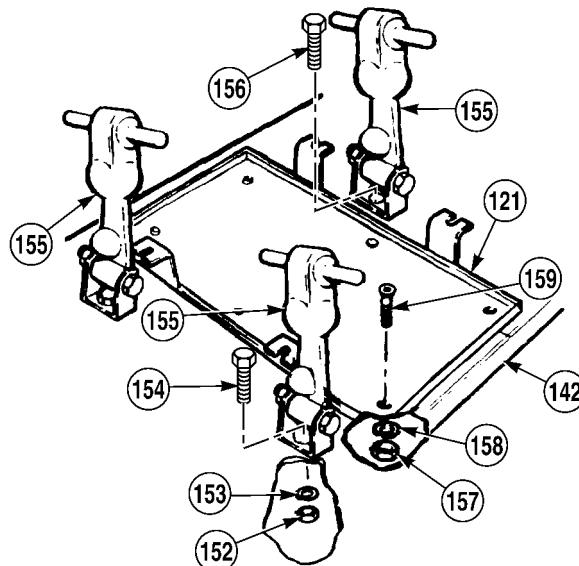
## b. Installation.

**WARNING**

- To avoid eye injury, eye protection is required when working around batteries. Do not smoke, use open flame, make sparks, or create other ignition sources around batteries. If a battery is giving off gases, it can explode and cause injury to personnel. Remove all jewelry, such as rings, ID tags, watches, and bracelets. If jewelry contacts a battery terminal, a direct short will result in instant heating of tools, damage to equipment, and cause injury to personnel.
- Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

**NOTE**

- Apply electrical sealant to exposed wire connectors after installation.
  - Install plastic cable ties as required.
- (1) Install battery box (1) to left front fender (2) with six screws (3), washers (4), and locknuts (5).
  - (2) Remove screw (6) from left front fender (2).
  - (3) Install one rubber hood hook assembly (7) to left front fender (2) with screw (6).
  - (4) Install two rubber hood hook assemblies (7) to left front fender (2) with two screws (8), washers (9), and locknuts (10).



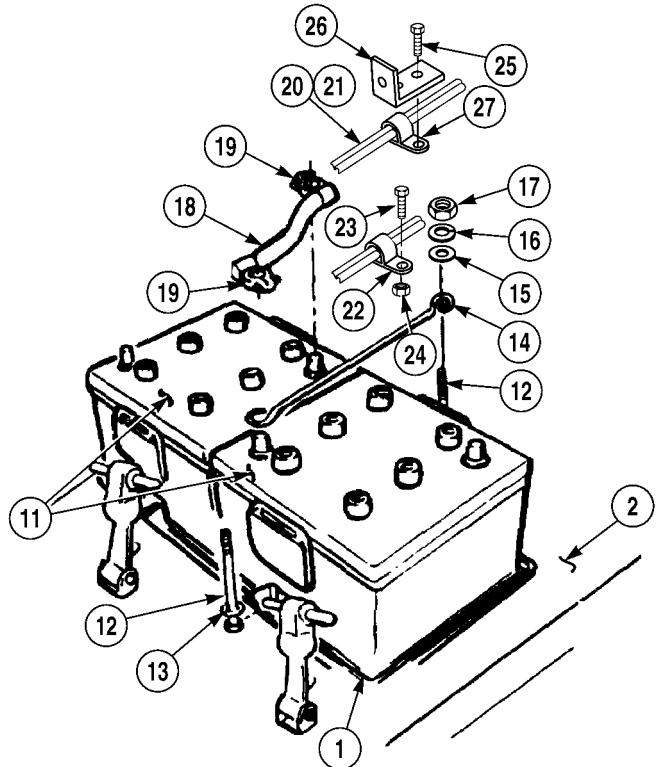
## Arctic Heater Kit Maintenance Instructions (Cont)

- (5) Install two batteries (11) to battery box (1).
- (6) Install four screws (12) and washers (13) to battery box (1).
- (7) Install two hold downs (14) on four screws (12) with washers (15), lockwashers (16) and locknuts (17).

**CAUTION**

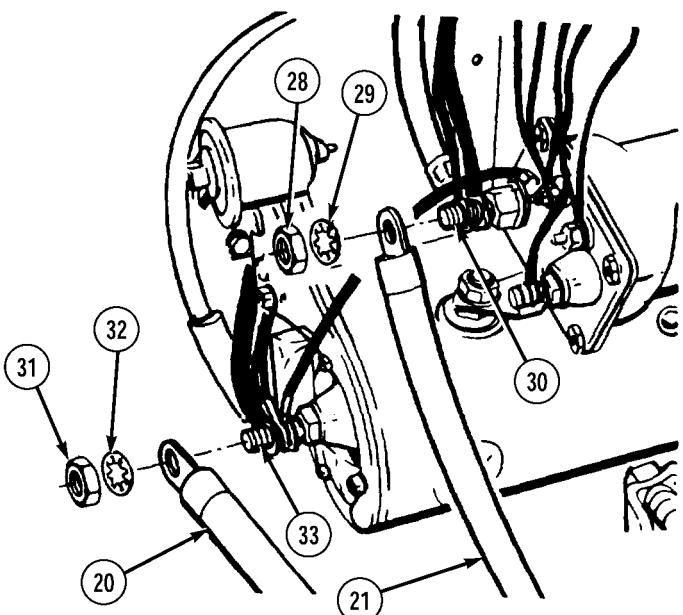
While tightening nut, hold screw with wrench. Failure to comply may damage equipment.

- (8) Install jumper cable (18) to two batteries (11) and tighten two nuts (19). Tighten nuts (19) to 84 to 96 lb-in (9 to 11 NSm).
- (9) Install two cables 1138 (20) and 1139 (21), cushion clamp (22) to left front fender (2) with screw (23) and locknut (24).



- (10) Remove screw (25) from engine left side panel hold down bracket (26).
- (11) Install two cables 1138 (20) and 1139 (21), cushion clamp (27) to engine left side panel hold down bracket (26) with screw (25).

- (12) Remove locknut (28) and lockwasher (29) from starter solenoid battery terminal (30).
- (13) Install cable 1139 (21) on starter solenoid battery terminal (30) with lockwasher (29) and locknut (28).
- (14) Remove locknut (31) and lockwasher (32) from starter motor ground terminal (33).
- (15) Install cable 1138 (20) on starter motor ground terminal (33) with lockwasher (32) and locknut (31).



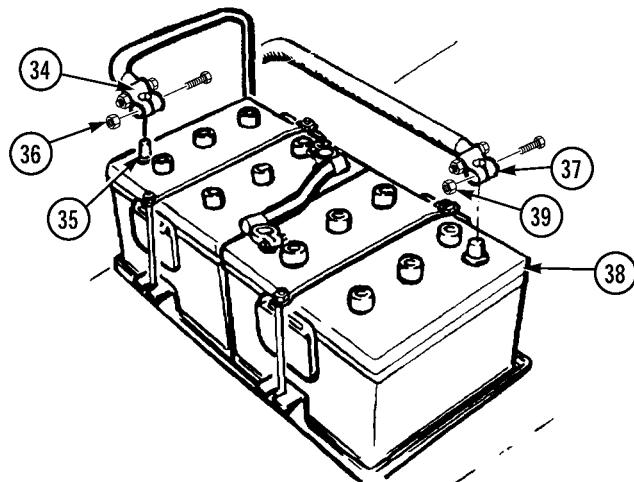
## Arctic Heater Kit Maintenance Instructions (Cont)

## 20-4 ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL B) (CONT).

CAUTION

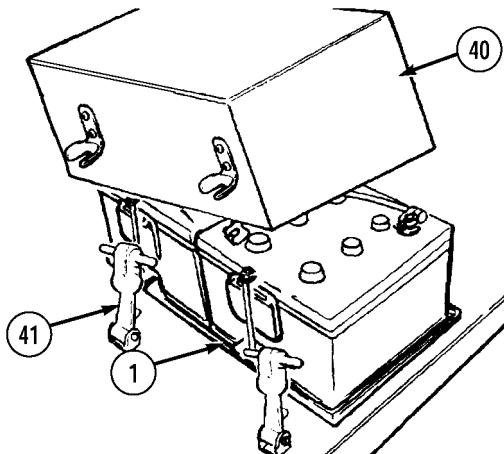
While tightening nut, hold screw with wrench. Failure to comply may damage equipment.

- (16) Install negative terminal (34) to battery negative post (35) and tighten nut (36). Tighten nut (36) to 84 to 96 lb-in (9 to 11 NSm).

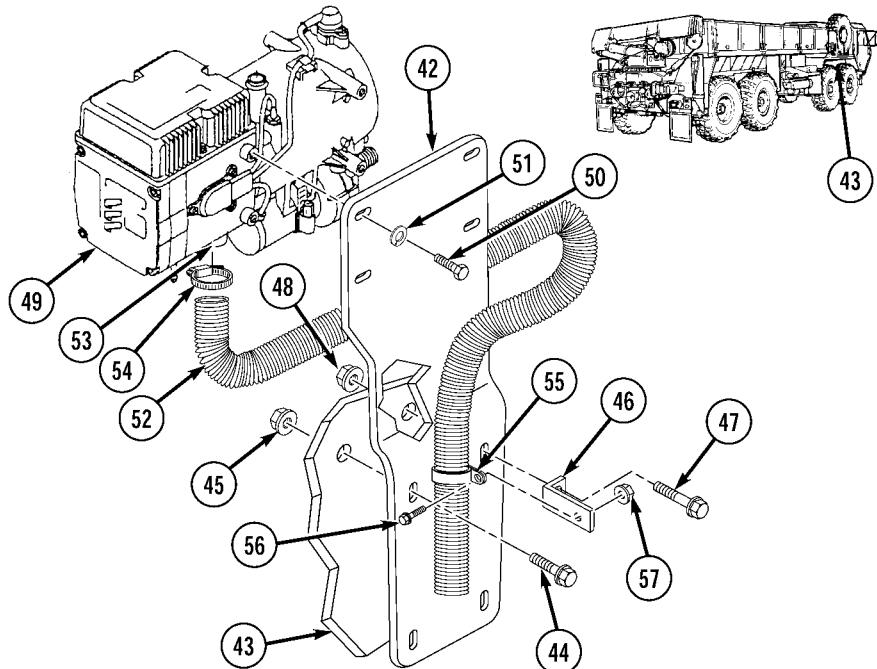


- (17) Install positive terminal (37) to battery positive post (38) and tighten nut (39). Tighten nut (39) to 84 to 96 lb-in (9 to 11 NSm).

- (18) Install battery box cover (40) to battery box (1) with three rubber hood hooks (41).



## Arctic Heater Kit Maintenance Instructions (Cont)



- (19) Install arctic engine heater mounting bracket (42) to frame rail (43) with three screws (44) and locknuts (45).
- (20) Install clip bracket (46) to arctic engine heater mounting bracket (42) and frame rail (43) with screw (47) and locknut (48).
- (21) Install arctic engine heater (49) to arctic engine heater mounting bracket (42) with four screws (50) and lockwashers (51).
- (22) Install exhaust pipe (52) to arctic engine heater exhaust port (53) with clamp (54).
- (23) Install clamp (55) and exhaust pipe (52) to clip bracket (46) with screw (56) and locknut (57).

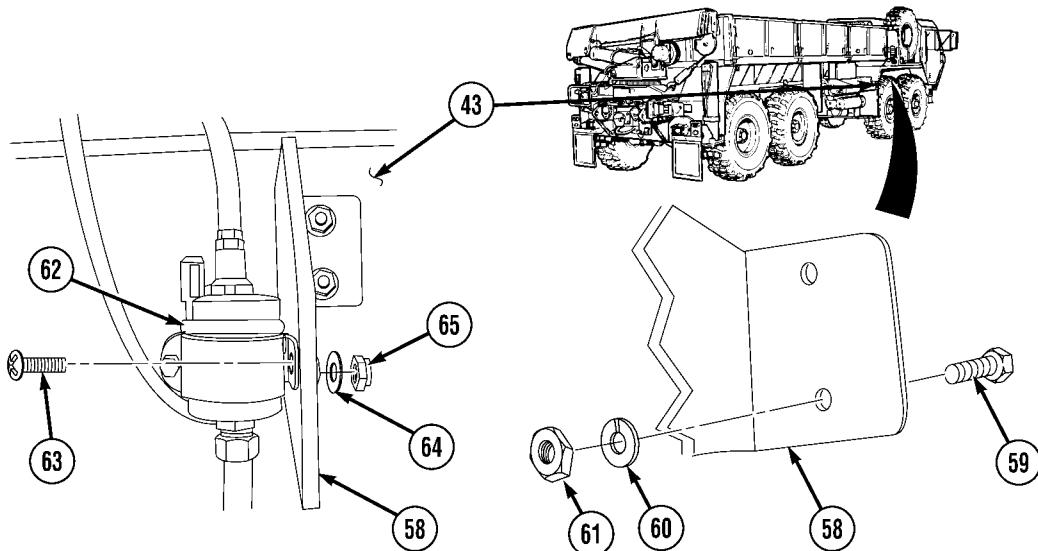
**WARNING**

- Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap.
- Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.

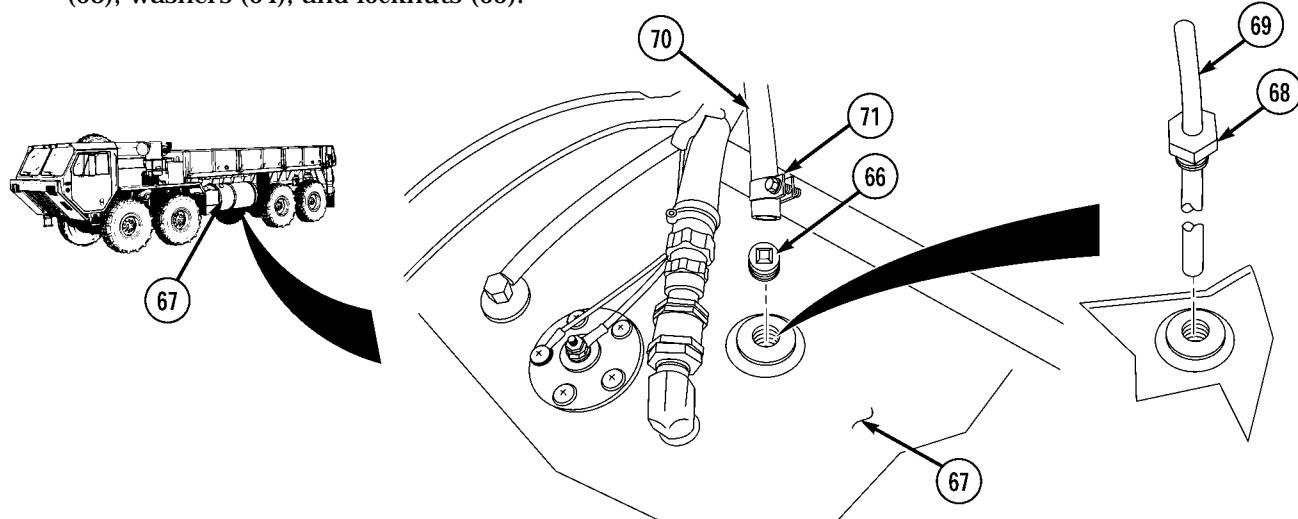
- (24) Install fuel metering pump mounting bracket (58) to frame rail (43) with two screws (59), lockwashers (60) and locknuts (61).

## Arctic Heater Kit Maintenance Instructions (Cont)

## 20-4 ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL B) (CONT).



- (25) Install fuel metering pump (62) to fuel metering pump mounting bracket (58) with two screws (63), washers (64), and locknuts (65).



- (26) Remove plug fitting (66) from fuel tank (67).

**WARNING**

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

- (27) Apply pipe thread sealing compound on threads of compression fitting (68).  
 (28) Install fuel pick-up pipe (69) in fuel tank (67).  
 (29) Install fuel metering pump hose (70) to fuel pick-up pipe (69) with clamp (71).

## Arctic Heater Kit Maintenance Instructions (Cont)

- (30) Route fuel metering pump hose (70) to fuel metering pump (62).

## NOTE

Butt joints and clamps on all connections.

- (31) Install fuel metering pump hose (70) to suction side of fuel metering pump (62) with clamp (71).

- (32) Install fuel hose (72) to pressure side of fuel metering pump (62) with clamp (73).

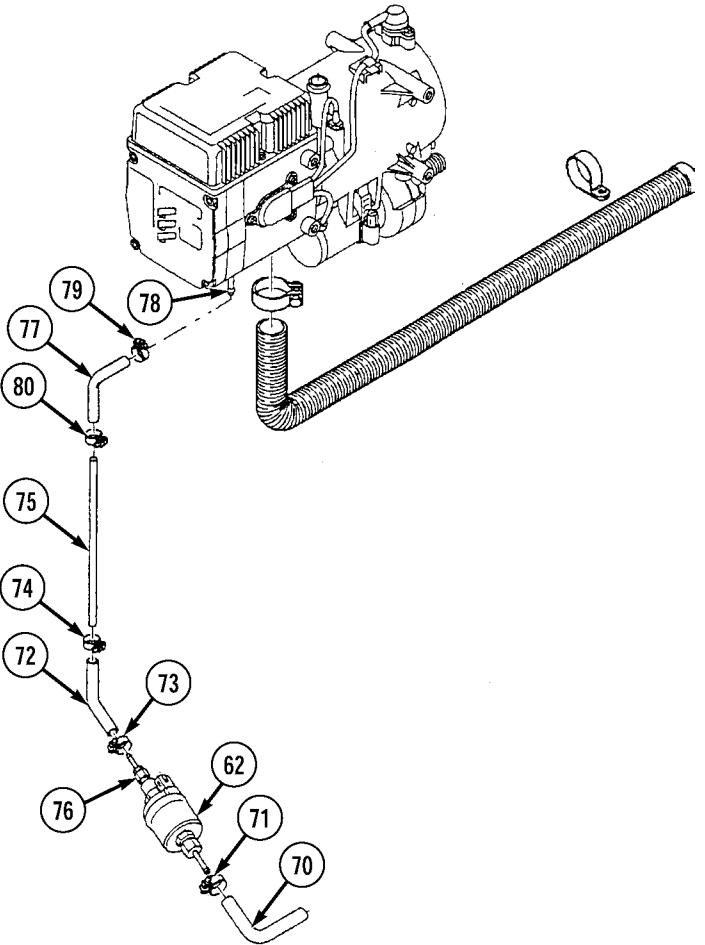
- (33) Place clamp (74) over fuel hose (72).

- (34) Insert fuel line (75) into fuel hose (72) until contact is felt with fuel metering pump stem (76) and tighten clamp (74).

- (35) Install fuel hose (77) on arctic engine heater fuel stem (78) with clamp (79).

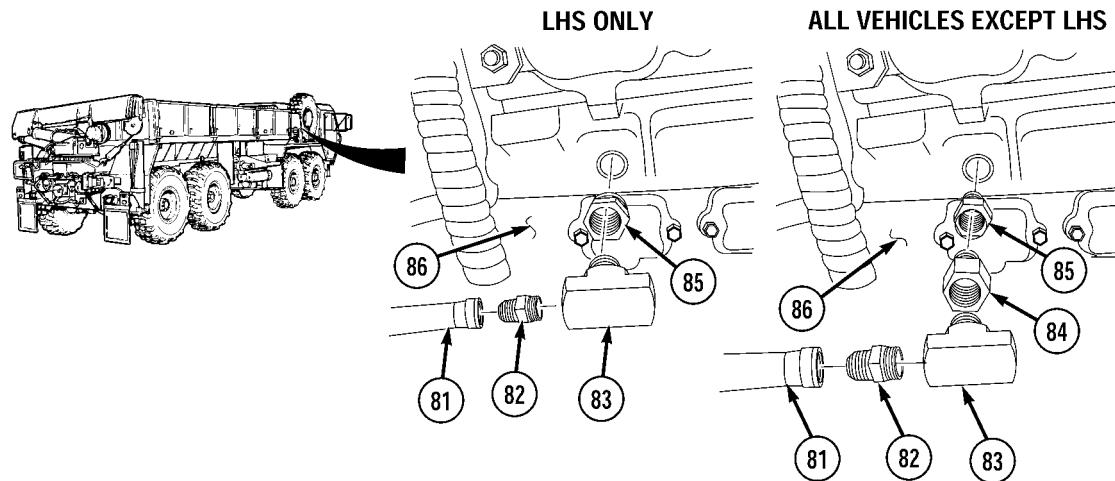
- (36) Place clamp (80) over fuel hose (77).

- (37) Insert fuel line (75) into fuel hose (77) until contact is felt with arctic engine heater fuel stem (78) and tighten clamp (80).



## Arctic Heater Kit Maintenance Instructions (Cont)

## 20-4 ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL B) (CONT).



- (38) Remove air compressor water line (81) from flared fitting (82).  
 (39) Remove flared fitting (82) from tee fitting (83).

## NOTE

- Perform steps (40) and (41) on all vehicles except LHS.
- Perform step (42) on LHS only.

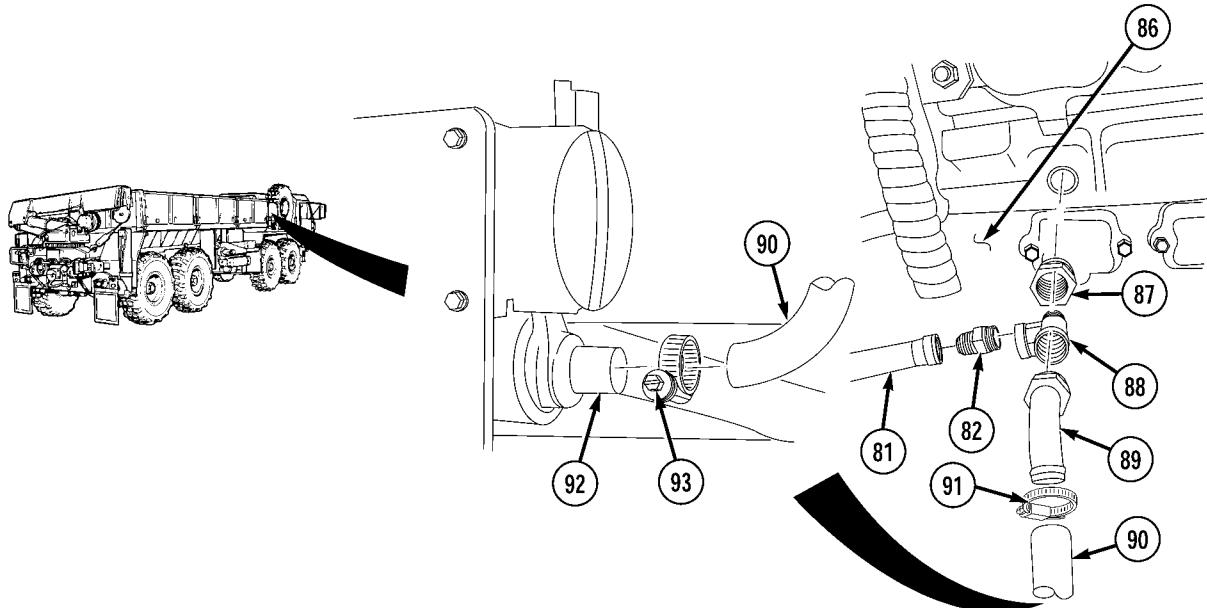
- (40) Remove tee fitting (83) from fitting (84).  
 (41) Remove fitting (84) from reducer fitting (85).  
 (42) Remove tee fitting (83) from reducer fitting (85).  
 (43) Remove reducer fitting (85) from engine block (86).

## Arctic Heater Kit Maintenance Instructions (Cont)

**WARNING**

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

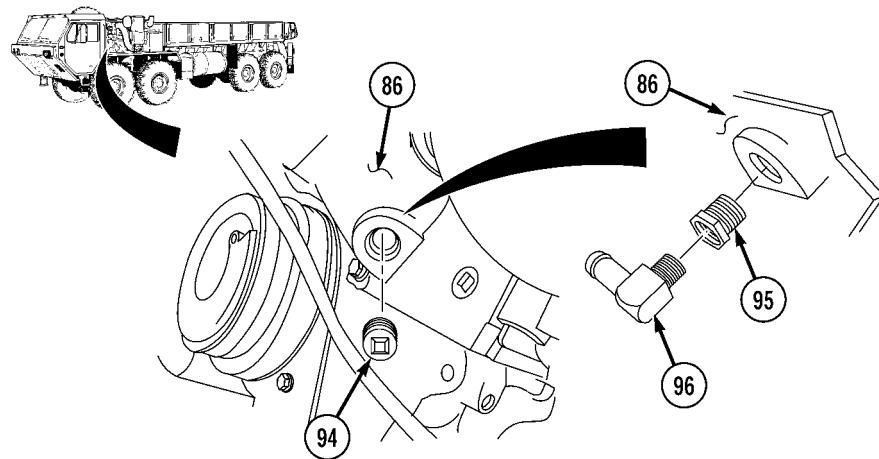
- (44) Apply pipe thread sealing compound on threads of reducer fitting (87) and install on engine block (86).



- (45) Apply pipe thread sealing compound on threads of tee fitting (88) and install on reducer fitting (87).
- (46) Apply pipe thread sealing compound on threads of 45\_ fitting (89) and install on tee fitting (88).
- (47) Apply pipe thread sealing compound on threads of flared fitting (82) and install on tee fitting (88).
- (48) Install air compressor water line (81) on flared fitting (82).
- (49) Install water hose (90) on 45\_ fitting (89) with clamp (91).
- (50) Install water hose (90) on water pump input port (92) with clamp (93).

## Arctic Heater Kit Maintenance Instructions (Cont)

## 20-4 ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL B) (CONT).

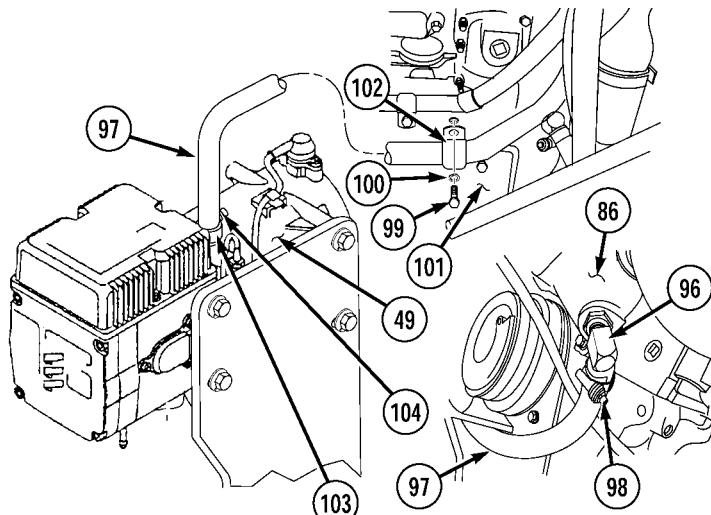


- (51) Remove plug fitting (94) from engine block (86).

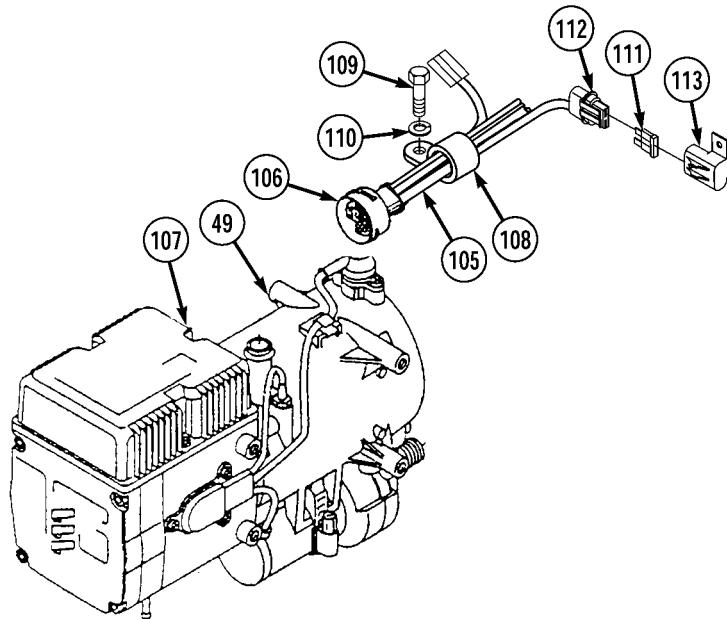
**WARNING**

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

- (52) Apply pipe thread sealing compound on threads of reducer fitting (95) and install on engine block (86).
- (53) Apply pipe thread sealing compound on threads of 90° fitting (96) and install on reducer fitting (95).
- (54) Install water hose (97) on 90° fitting (96) with clamp (98).
- (55) Route water hose (97) along front of engine block (86) to arctic engine heater (49).
- (56) Remove screw (99) and lockwasher (100) from oil cooler (101).
- (57) Install cushion clamp (102) and water hose (97) to oil cooler (101) with lockwasher (100) and screw (99).
- (58) Install water hose (97) to arctic engine heater output port (103) with clamp (104).



## Arctic Heater Kit Maintenance Instructions (Cont)

**WARNING**

To avoid eye injury, eye protection is required when working around batteries. Do not smoke, use open flame, make sparks, or create other ignition sources around batteries. If a battery is giving off gases, it can explode and cause injury to personnel. Remove all jewelry, such as rings, ID tags, watches, and bracelets. If jewelry contacts a battery terminal, a direct short will result in instant heating of tools, damage to equipment, and cause injury to personnel.

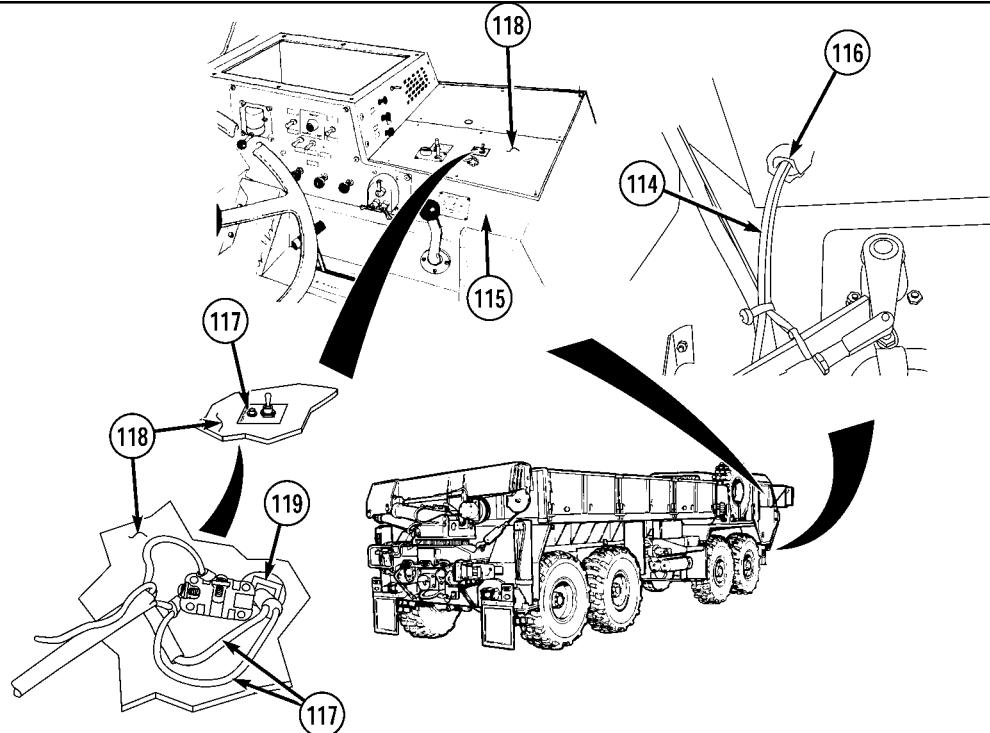
**NOTE**

- Apply corrosion preventive compound as required.
- Install plastic cable ties as required.

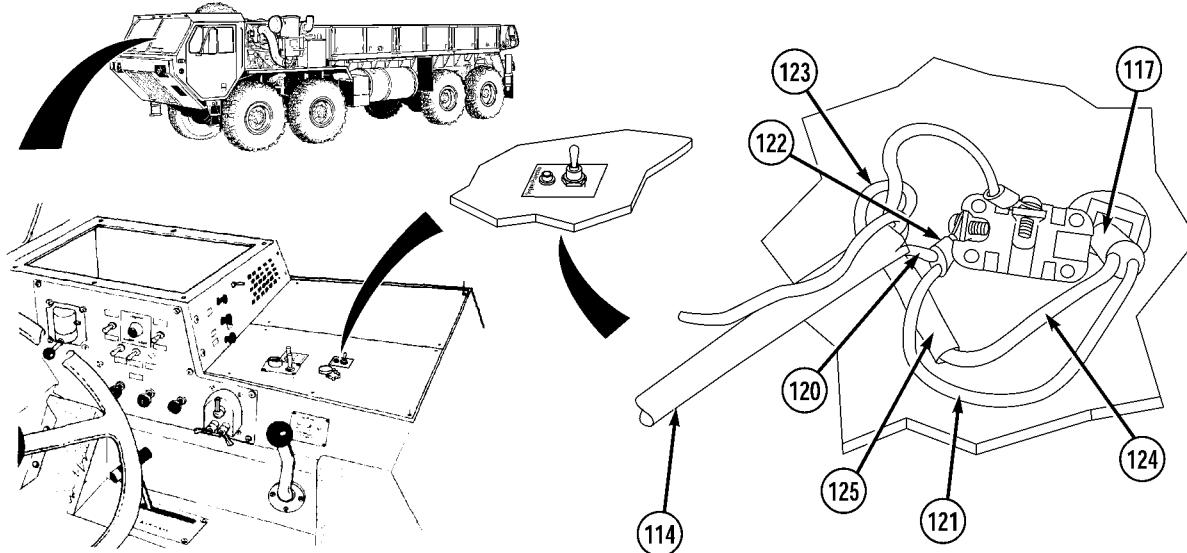
- (59) Install arctic engine heater electrical harness (105) on vehicle.
- (60) Connect arctic engine heater harness connector (106) to arctic engine heater connector (107).
- (61) Install arctic engine heater electrical harness (105) and cushion clamp (108) to arctic engine heater (49) with screw (109) and lockwasher (110).
- (62) Install 5 AMP fuse (111) in fuse holder base (112).
- (63) Install fuse holder base (112) in fuse holder cover (113).

## Arctic Heater Kit Maintenance Instructions (Cont)

## 20-4 ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL B) (CONT).

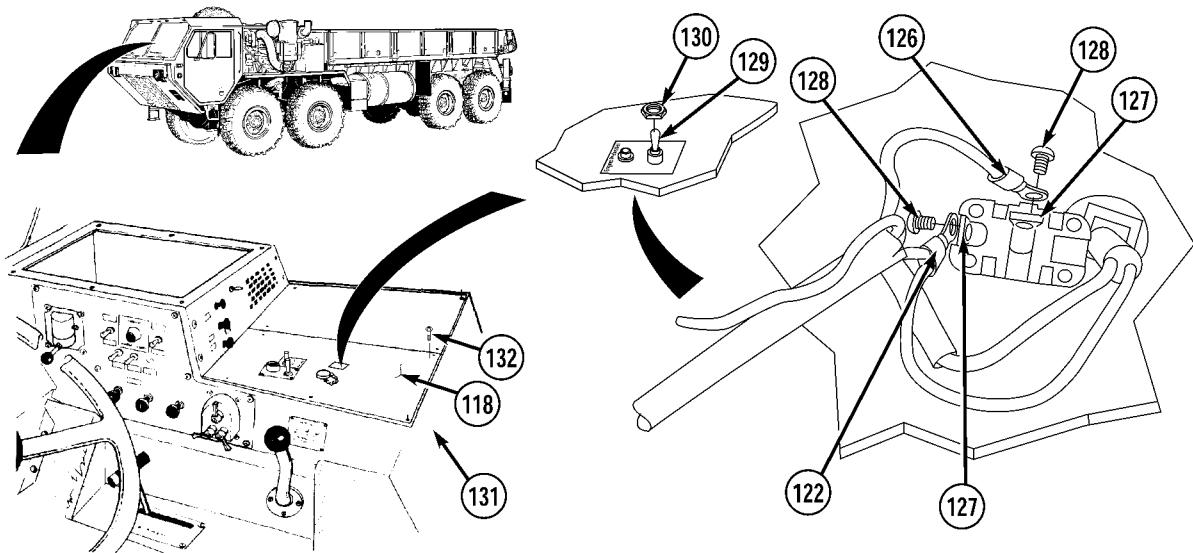


- (64) Route arctic engine heater switch harness (114) to left heater compartment (115) through hole (116).
- (65) Install LED harness (117) to left heater compartment cover (118) with spring clip (119).

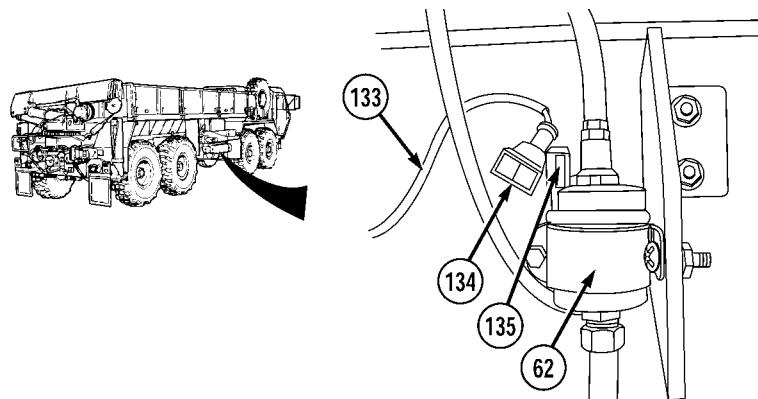


- (66) Prepare arctic engine heater switch harness (114) and LED harness (117) for initial installation.
- (67) Connect arctic engine heater switch harness yellow wire (120) and LED harness red wire (121) with ring terminal (122).
- (68) Connect arctic engine heater switch harness blue/white wire (123) and LED harness white wire (124) with butt connector (125).

## Arctic Heater Kit Maintenance Instructions (Cont)



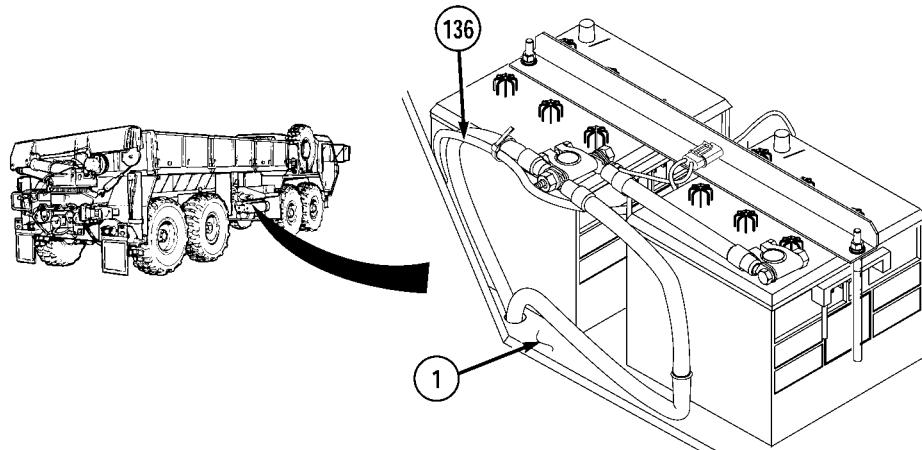
- (69) Install arctic engine heater switch harness red/yellow wire (126) to arctic engine heater on/off switch terminal (127) with screw (128).
- (70) Install ring terminal (122) to arctic engine heater on/off switch terminal (127) with screw (128).
- (71) Install arctic engine heater on/off switch (129) to left heater compartment cover (118) with locknut (130).
- (72) Install left heater compartment cover (118) to console (131) with six screws (132).



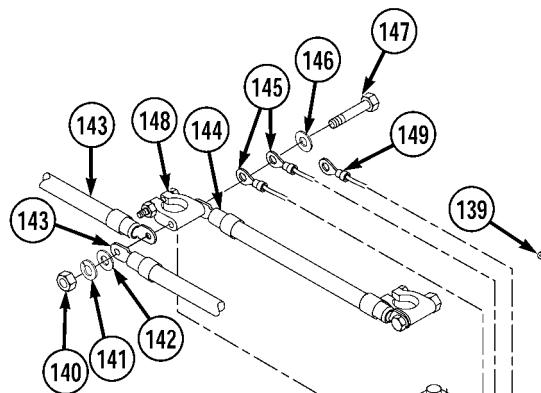
- (73) Route fuel metering harness (133) to fuel metering pump (62).
- (74) Connect fuel metering harness connector (134) to fuel metering pump connector (135).

## Arctic Heater Kit Maintenance Instructions (Cont)

## 20-4 ARCTIC HEATER KIT REMOVAL/INSTALLATION (MODEL B) (CONT).



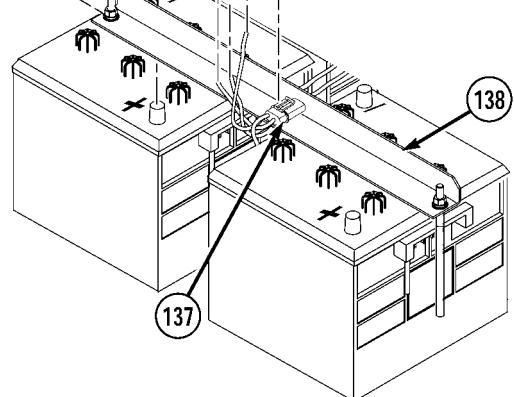
- (75) Route arctic engine heater power harness (136) through battery box (1).



- (76) Install fuse holder cover (137) to hold down (138) with screw (139).  
 (77) Remove nut (140), lockwasher (141), washer (142), two positive cables (143), jumper cable (144), two wires (145), washer (146), and screw (147) from positive battery terminal (148).

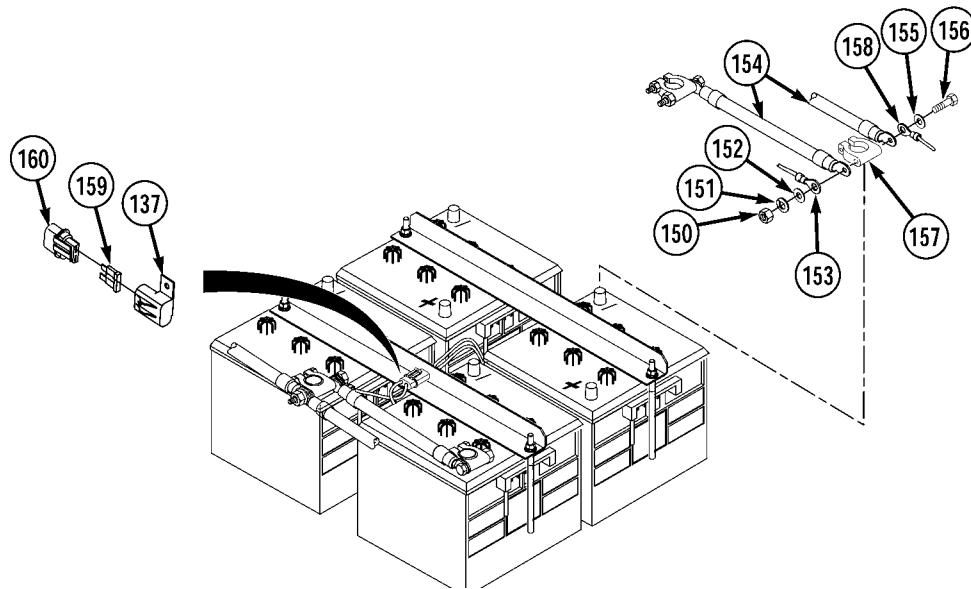
**CAUTION**

While tightening nut, hold screw with wrench.  
 Failure to comply may cause damage to equipment.



- (78) Install screw (147), washer (146), arctic engine heater power harness pigtail red wire (149), two wires (145), jumper cable (144), and two positive cables (143) to positive battery terminal (148) with washer (142), lockwasher (141), and nut (140). Tighten nut (140) to 12 to 16 lb-ft (16 to 22 NSm).

### Arctic Heater Kit Maintenance Instructions (Cont)



- (79) Remove nut (150), lockwasher (151), washer (152), five wires (153), two negative cables (154), washer (155), and screw (156) from negative battery terminal (157).
- (80) Install screw (156), washer (155), five wires (153), two negative cables (154) and arctic engine heater power harness brown wire (158) to negative battery terminal (157) with washer (152), lockwasher (151), and nut (150). Tighten nut (150) to 12 to 16 lb-ft (16 to 22 N·m).
- (81) Install 15 AMP fuse (159) in fuse holder base (160).
- (82) Install fuse holder base (160) in fuse holder cover (187).
- (83) Connect batteries (para 7-9).
- (84) Fill cooling system (para 6-2).
- (85) Start engine and warm up to normal operating temperature.
- (86) Check cooling system for leaks.
- (87) Shut off engine (TM 9-2320-279-10).
- (88) Check and fill coolant system (para 6-2).

**NOTE**

On initial startup arctic engine heater may require several start attempts to self prime fuel system. Arctic engine heater will attempt to start two times per start cycle. After second failed start attempt arctic engine heater will not operate until arctic engine heater on/off switch is turned OFF and back ON.

Audible clicking from arctic engine heater fuel metering pump may indicate that arctic engine heater fuel system is not primed. If audible clicking is heard from arctic engine heater fuel metering pump, repeat steps (50) through (53) four times or until arctic engine heater starts. Do not attempt to start arctic engine heater more than five times. Arctic engine heater should prime itself within nine start attempts.

- (89) Turn arctic engine heater ON (TM 9-2320-279-10).
- (90) Observe arctic engine heater indicator light for steady illumination.
- (91) Observe arctic engine heater for proper operation.
- (92) Turn arctic engine heater on/off switch OFF (TM 9-2320-279-10).

**c. Follow-on Maintenance.**

- (1) Install front cable tensioner (para 17-2).
- (2) Install right front splash guard (para 16-3).
- (3) Install skid plate grille (para 14-5).
- (4) Install engine side panels and close engine covers (TM 9-2320-279-10).

**END OF TASK**



# CHAPTER 21

## ARMAMENT EQUIPMENT MAINTENANCE

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Machine Gun Ring Front Support Removal/Installation . . . . .	2 1 - 3	2 1 - 3
Machine Gun Ring Rear Support Removal/Installation . . . . .	2 1 - 4	2 1 - 4
Operator's Platform Support Removal/Installation . . . . .	2 1 - 5	2 1 - 5
Rifle Mounting Kit Removal/Installation . . . . .	2 1 - 6	2 1 - 7

### Section I. INTRODUCTION

**21-1. GENERAL.** This chapter contains maintenance instructions for removing, replacing, and installing armament equipment components authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

### Section II. ARMAMENT

#### Armament Equipment Maintenance Instructions

##### **21-2. MACHINE GUN RING REMOVAL/INSTALLATION.**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

#### **INITIAL SETUP**

*Models*

All

*References*

TM 9-1005-245-14

*Test Equipment*

None

*Equipment Condition*

*TM or Para*      *Condition Description*  
TM 9-2320-279-10 Shut off engine.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

None

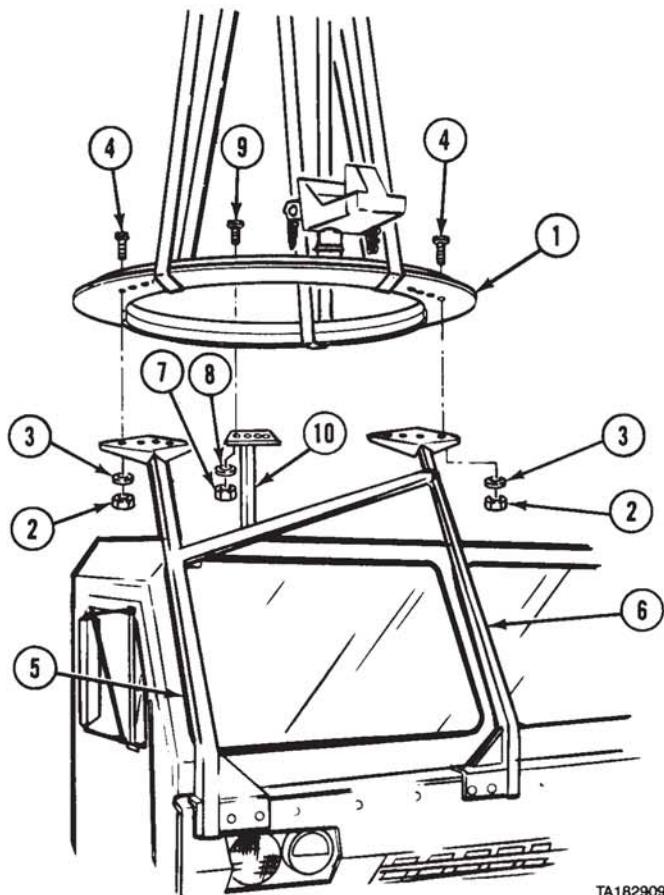
*General Safety Instructions*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

## Armament Equipment Maintenance Instructions (Cont)

**21-2. MACHINE GUN RING REMOVAL/INSTALLATION (CONT).****a. Removal.****NOTE**

Refer to TM 9-1005-245-14 for further information on the machine gun ring.

- (1) Support machine gun ring (1) with suitable lifting device.
- (2) Remove eight nuts (2), washers (3), and screws (4) from machine gun ring (1) and front supports (5 and 6).
- (3) Remove four locknuts (7), washers (8), and screws (9) from machine gun ring (1) and rear support (10).
- (4) Remove machine gun ring (1).

**b. Installation.**

- (1) Using suitable lifting device, position machine gun ring (1) on supports (5, 6, and 10).
- (2) Install eight screws (4), washers (3), and nuts (2) in machine gun ring (1) and front supports (5 and 6). Do not tighten.
- (3) Install four screws (9), washers (8), and locknuts (7) in machine gun ring (1) and rear support (10).
- (4) Tighten screws (4 and 9) and nuts (2 and 7).

**c. Follow-on Maintenance.** None.

**END OF TASK**

## Armament Equipment Maintenance Instructions (Cont)

**21-3. MACHINE GUN RING FRONT SUPPORT REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition**TM or Para*

TM 9-2320-279-10

Para 21-2

*Condition Description*

Shut off engine.

Machine gun ring removed.

*Special Tools*

None

*Supplies*

None

*Special Environmental Conditions*

None

*Personnel Required*

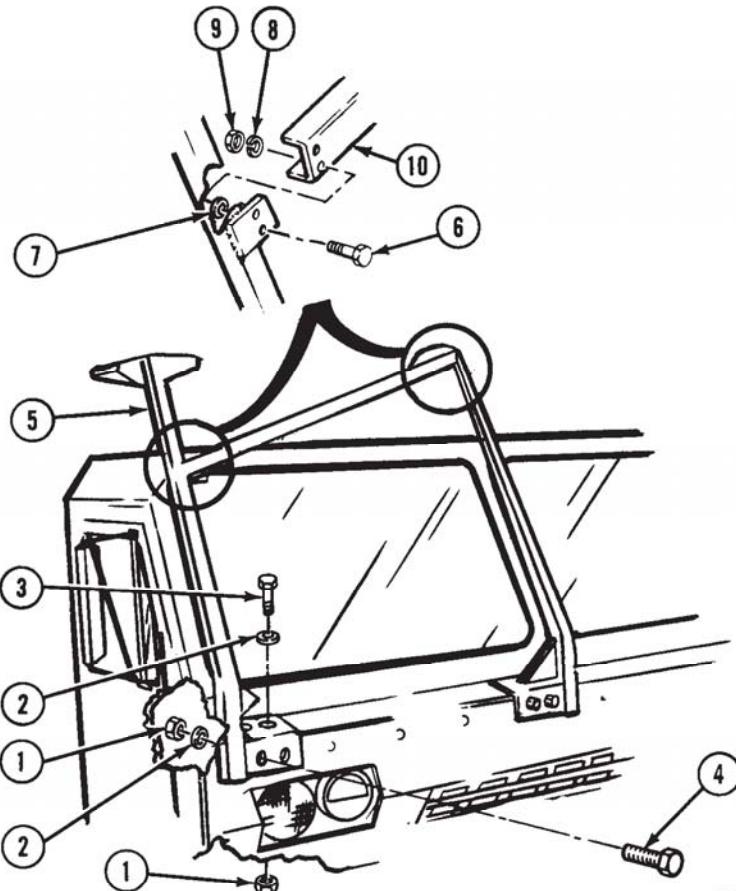
MOS 63S, Heavy wheel vehicle mechanic

*General Safety Instructions*

None

**a. Removal.**

- (1) Remove six nuts (1), washers (2), four screws (3), and four screws (4).
- (2) Remove front support (5).
- (3) Remove four screws (6), washers (7), lockwashers (8), and nuts (9).
- (4) Remove front support channel (10).



TA182904

**b. Installation.**

- (1) Install front support channel (10) with four screws (6), washers (7), lockwashers (8), and nuts (9).
- (2) Using suitable lifting device, position support assembly (5).
- (3) Install support assembly (5) with four screws (3), four screws (4), six washers (2), and six nuts (1).

**c. Follow-on Maintenance.**

Install machine gun ring (para 21-2).

**END OF TASK**

## Armament Equipment Maintenance Instructions (Cont)

**21-4. MACHINE GUN RING REAR SUPPORT REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*

TM or Para      Condition Description

*Special Tools*

None

TM 9-2320-279-10 Shut off engine.

*Supplies*

None

TM 9-2320-279-10 Spare tire removed.

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

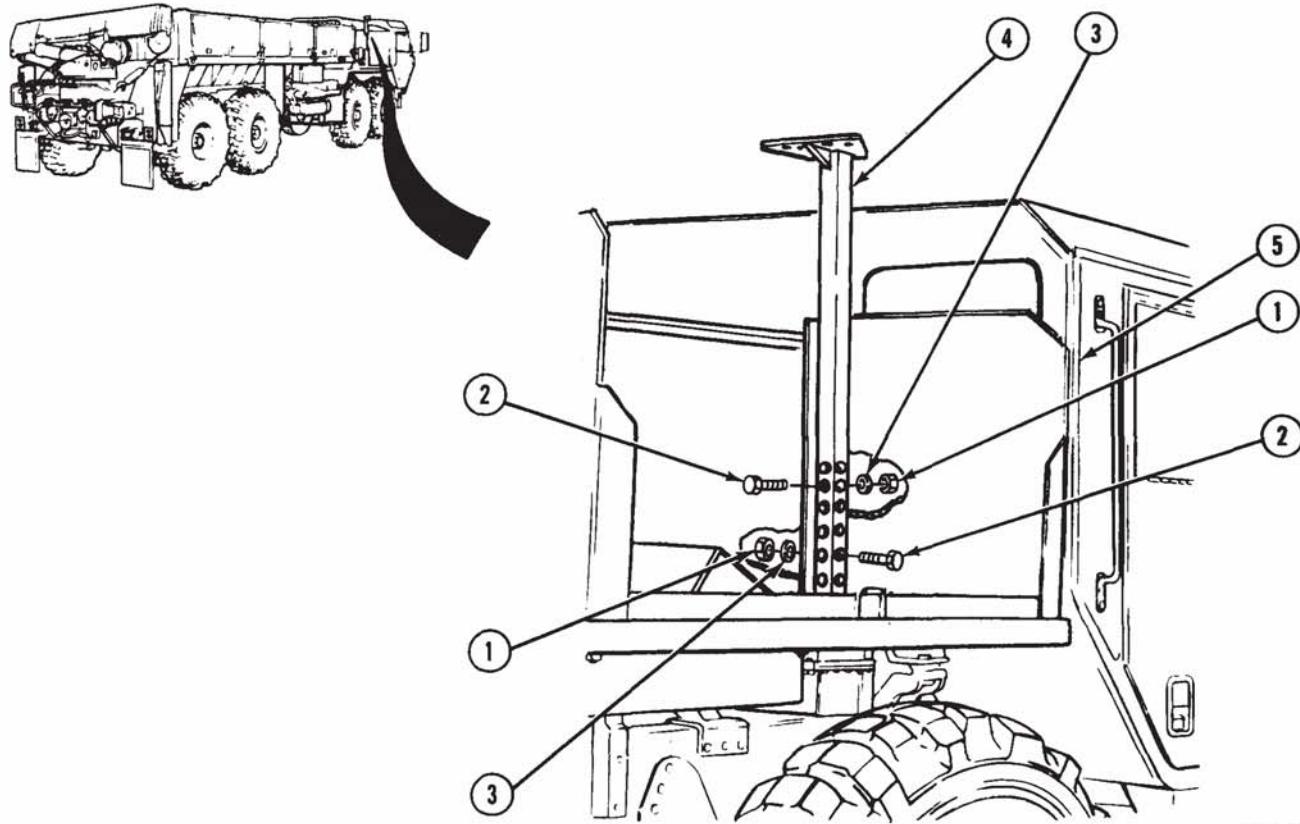
Para 21-2 Machine gun ring removed.

*Special Environmental Conditions*

None

*General Safety Instructions*

None

**a. Removal.**

TA182910

**Armament Equipment Maintenance Instructions (Cont)**

- (1) Remove 12 nuts (1), screws (2), and washers (3).
- (2) Remove machine gun ring rear support (4) from tire carrier (5).

**b. Installation.**

- (1) Position machine gun ring rear support (4) on tire carrier (5).
- (2) Install machine gun ring rear support (4) with 12 screws (2), washers (3), and nuts (1).

**c. Follow-on Maintenance.**

- (1) Install machine gun ring (para 21-2).
- (2) Stow spare tire (TM 9-2320-279-10).

**END OF TASK****21-5. OPERATOR'S PLATFORM SUPPORT REMOVAL/INSTALLATION.**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
TM 9-2320-279-10	Shut off engine.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

None

*General Safety Instructions*

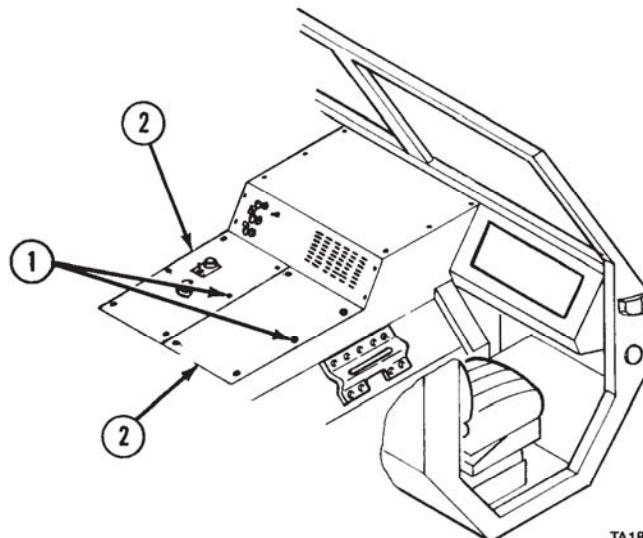
None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

**a. Removal.**

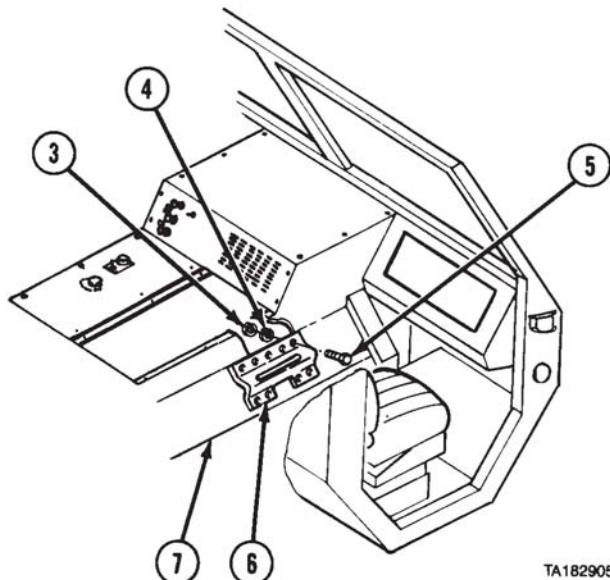
- (1) Remove eight screws (1) and remove right heater compartment cover (2).



## Armament Equipment Maintenance Instructions (Cont)

**21-5. OPERATOR'S PLATFORM SUPPORT REMOVAL/INSTALLATION (CONT.).**

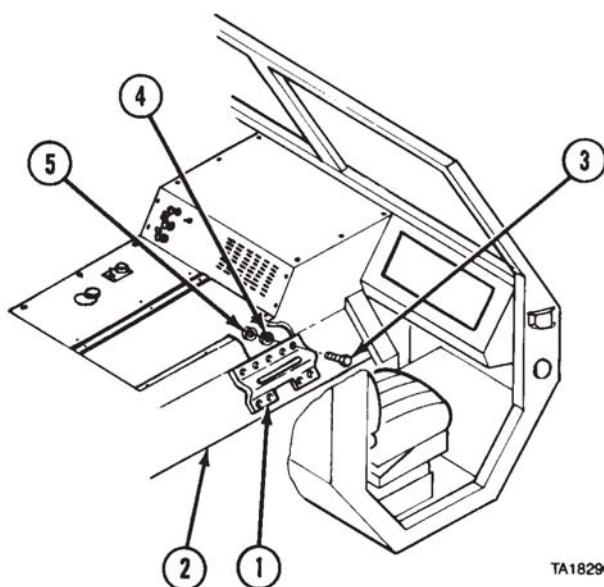
- (2) Remove five nuts (3), washers (4), and screws (5). Remove operator's platform support (6) from cab bulkhead (7).



TA182905

**b. Installation.**

- (1) Install operator's platform support (1) on cab bulkhead (2) with five screws (3), washers (4), and nuts (5).



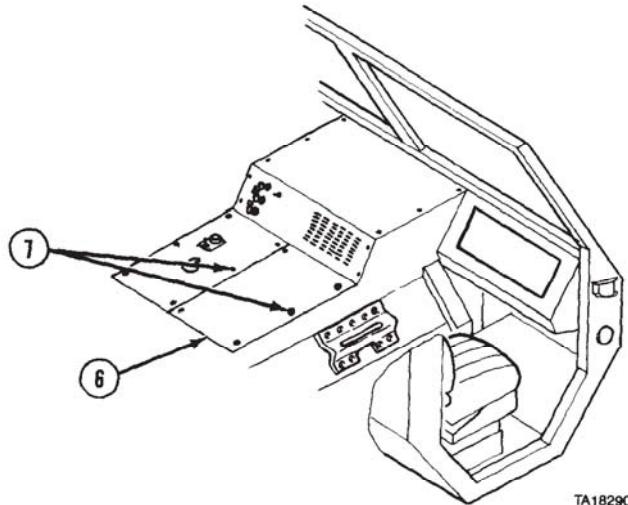
TA182906

**Armament Equipment Maintenance Instructions (Cont)**

- (2) Install right heater compartment cover (6) with eight screws (7).

**c. Follow-on Maintenance.** None.

**END OF TASK**



TA182907

**21-6. RIFLE MOUNTING KIT REMOVAL/INSTALLATION.**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

**INITIAL SETUP***Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*

TM or Para	Condition Description
TM 9-2320-279-10	Shut off engine.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

None

*General Safety Instructions*

None

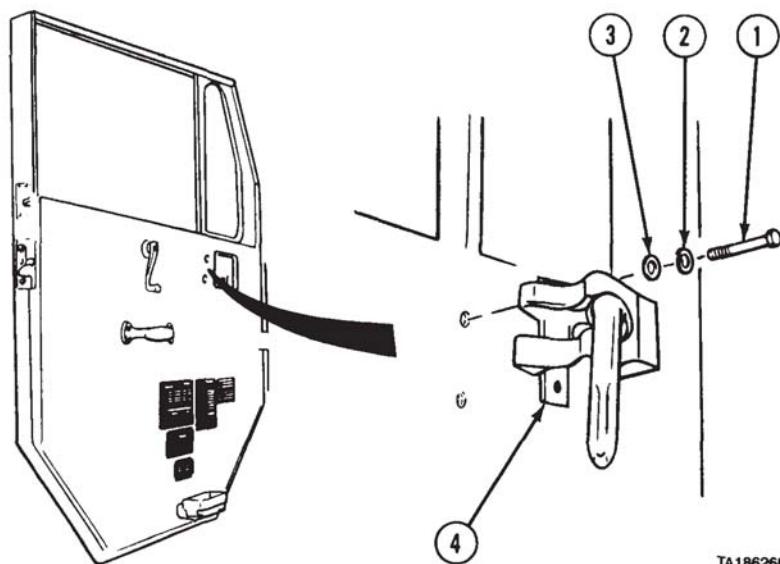
*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

## Armament Equipment Maintenance Instructions (Cont)

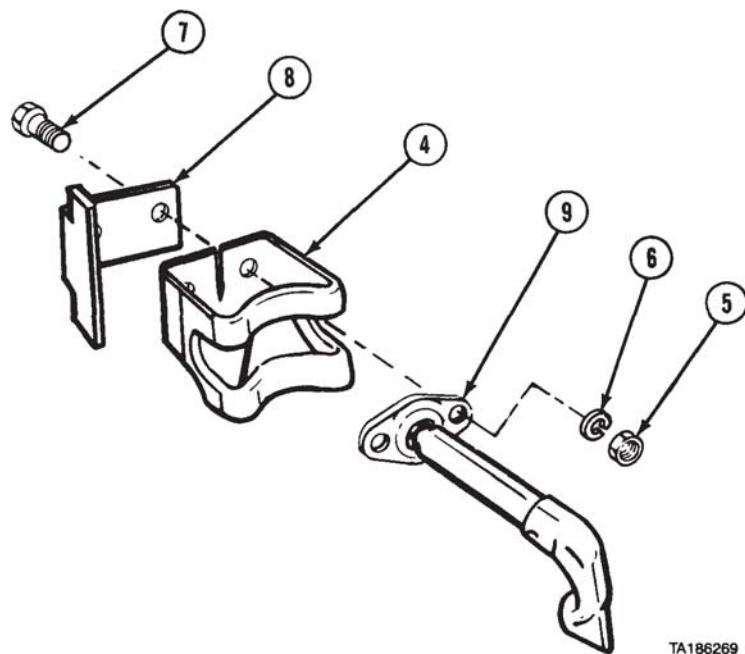
**21-6. RIFLE MOUNTING KIT REMOVAL/INSTALLATION (CONT.).****a. Removal.**

- (1) Remove two screws (1), lockwashers (2), washers (3), and catch mount (4).



TA186268

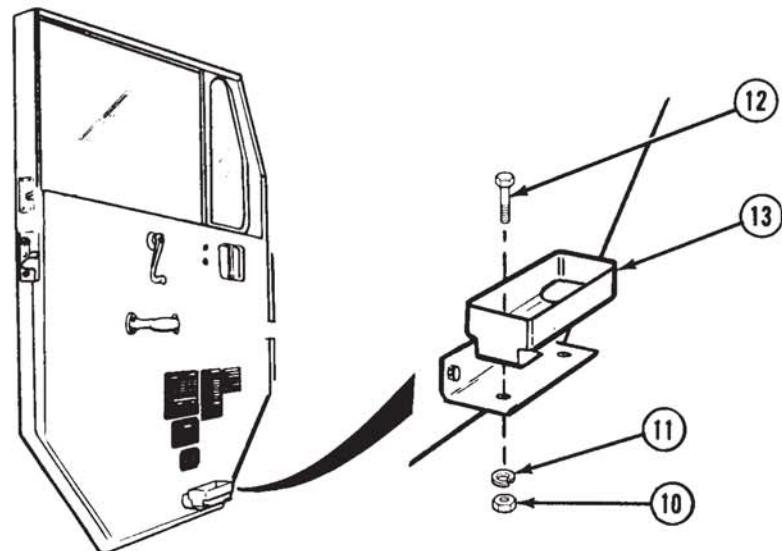
- (2) Remove two nuts (5), lockwashers (6), screws (7), bracket (8), and rifle catch (9) from catch mount (4).



TA186269

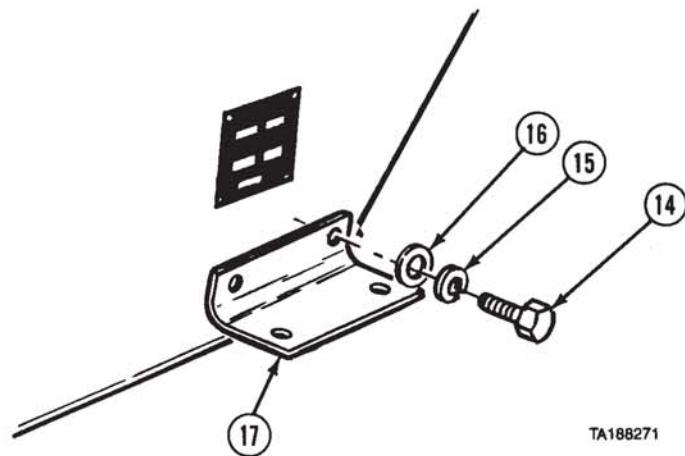
**Armament Equipment Maintenance Instructions (Cont)**

- (3) Remove two nuts (10), lockwashers (11), screws (12), and support (13).



TA186270

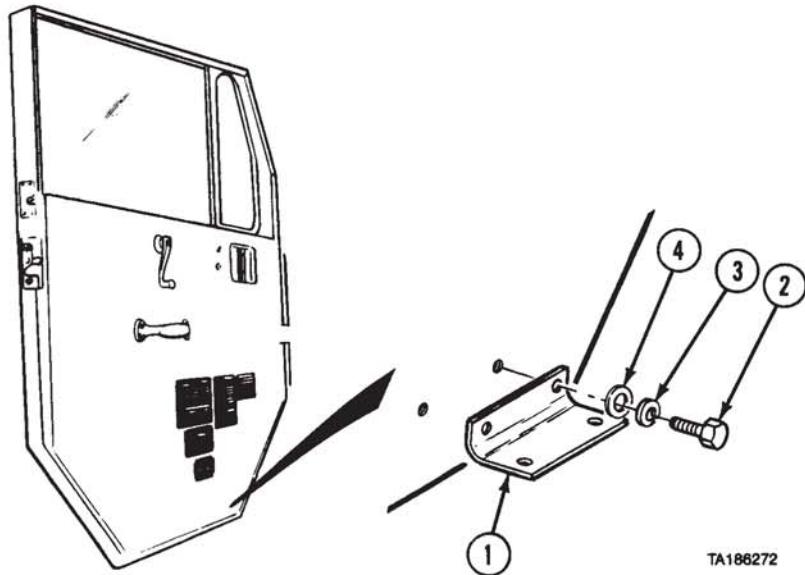
- (4) Remove two screws (14), lockwashers (15), washers (16), and bracket (17).



TA188271

**b. Installation.**

- (1) Install bracket (1) with two screws (2), lockwashers (3), and washers (4).

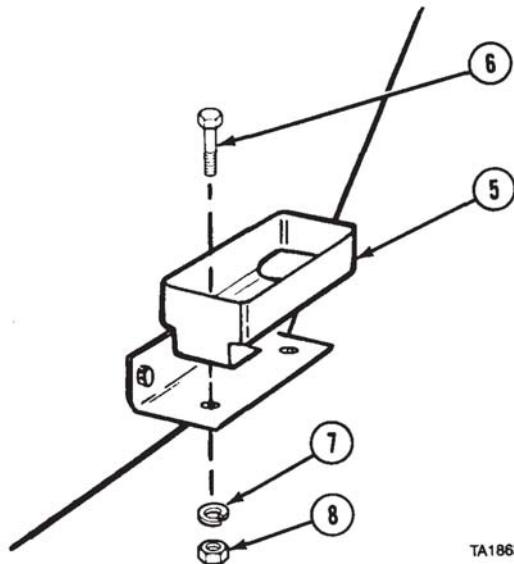


TA186272

## Armament Equipment Maintenance Instructions (Cont)

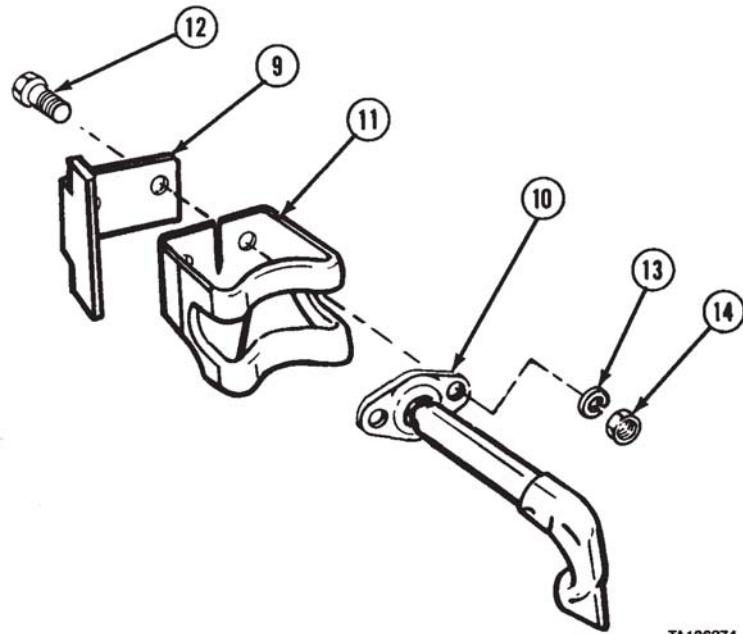
**21-6. RIFLE MOUNTING KIT REMOVAL/INSTALLATION (CONT.).**

- (2) Install support (5) with two screws (6), lockwashers (7), and nuts (8).



TA186273

- (3) Install bracket (9) and rifle catch (10) on catch mount (11) with two screws (12), lockwashers (13), and nuts (14).



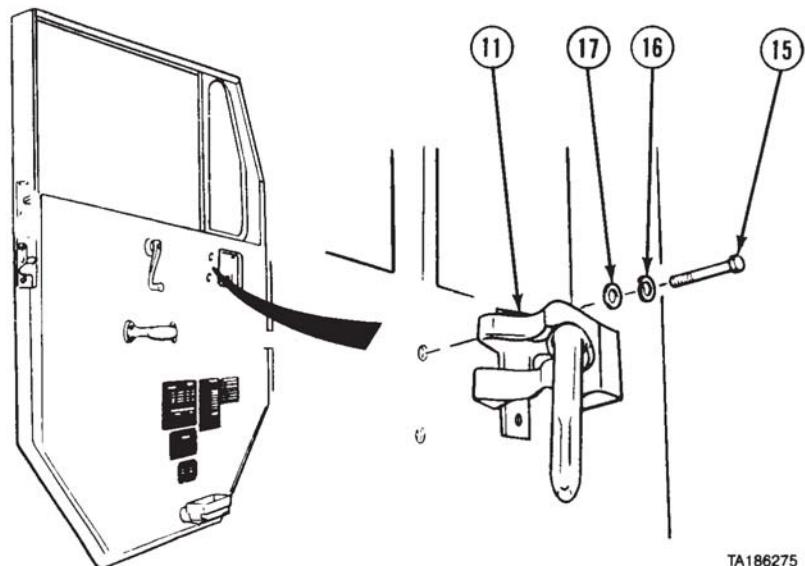
TA186274

**Armament Equipment Maintenance Instructions (Cont)**

- (4) Install catch mount (11) with two screws (15), lockwashers (16), and washers (17).

c. **Follow-on Maintenance.**  
None.

**END OF TASK**



TA186275



## CHAPTER 22

### NON-ELECTRICAL GAGE MAINTENANCE

	<b>Para</b>	<b>Page</b>
General .....	22-1	22-1
Air Pressure Gage Removal/Installation .....	22-2	22-1
DLPG DISCHARGE PRESSURE GAGE Removal/Installation (M978) .....	22-3	22-3
VNPG VENTURI/NOZZLE PRESSURE GAGE Removal/Installation (M978) .....	22-4	22-4
DPG DIFFERENTIAL PRESSURE GAGE Removal/Installation (M979) .....	22-5	22-5
DPG DIFFERENTIAL PRESSURE GAGE Mounting Bracket Removal/Installation (M978) ..	22-6	22-7

#### **Section I. INTRODUCTION**

**22-1. GENERAL.** This chapter contains maintenance instructions for removing and installing non-electrical gage components authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

#### **Section II. GAGES**

##### **Non-Electrical Gage Maintenance Instructions**

#### **22-2. AIR PRESSURE GAGE REMOVAL/INSTALLATION.**

This task covers:

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

#### **INITIAL SETUP**

*Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*

*TM or Para*

TM 9-2320-279-10

*Condition Description*

Shut off engine.

*Special Tools*

None

Para 7-91

Batteries disconnected.

*Supplies*

Compound, sealing, pipe thread, Item 18,  
Appendix C

*Special Environmental Conditions*

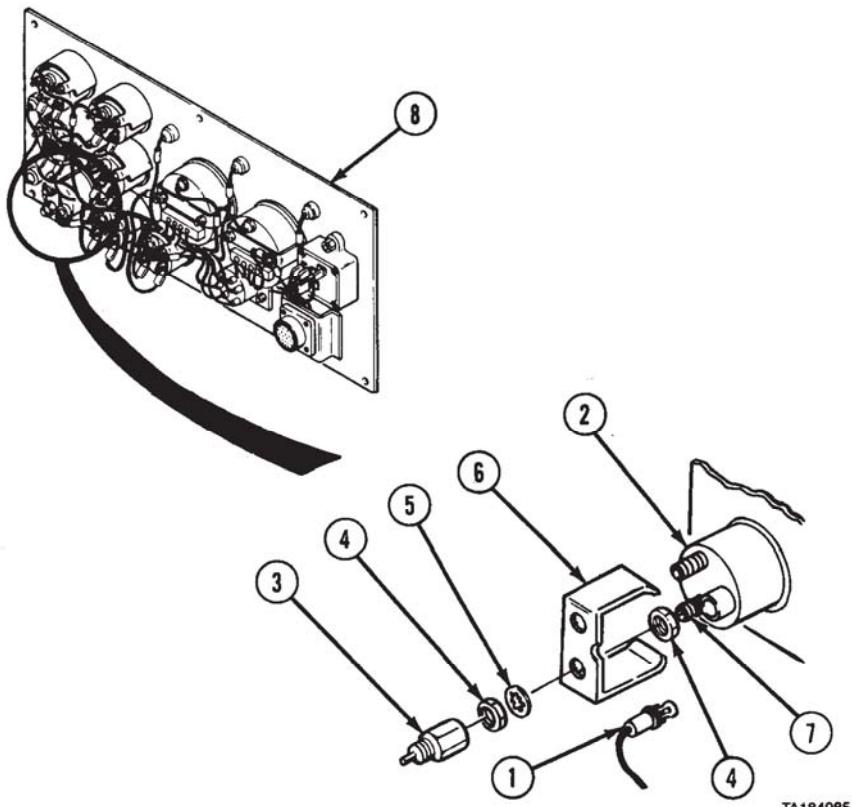
None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*General Safety Instructions*

None

**Non-Electrical Gage Maintenance Instructions (Cont)****22-2. AIR PRESSURE GAGE REMOVAL/INSTALLATION (CONT).****a. Removal.**

- (1) Pull light socket (1) from air pressure gage (2).
- (2) Tag, mark, and remove two connectors (3), nuts (4), lockwashers (5), and bracket (6) from tubes (7).
- (3) Remove air pressure gage (2) from instrument panel (8).

**b. Installation.**

- (1) Install air pressure gage (2) through instrument panel (8).
- (2) Place bracket (6) over air pressure gage (2) and install two nuts (4) and lockwashers (5).

**WARNING**

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

- (3) Apply pipe thread sealing compound to threads of tubes (7).
- (4) Install two connectors (3).
- (5) Install light socket (1) in air pressure gage (2).

**c. Follow-on Maintenance.**

- (1) Install instrument panel (para 7-19).
- (2) Connect batteries (para 7-91).
- (3) Start engine and build up air pressure (TM 9-2320-279-10).
- (4) Check connections for leaks.
- (5) Shut off engine (TM 9-2320-279-10).

**END OF TASK**

## Non-Electrical Gage Maintenance Instructions (Cont)

**22-3. DLPG DISCHARGE LINE PRESSURE GAGE REMOVAL/INSTALLATION (M978).**

This task covers:

- a. Removal
- b. Installation

- c. Follow-on Maintenance

**INITIAL SETUP***Models*

M978

*Test Equipment*

None

*Special Tools*

None

*Supplies*Compound, sealing, pipe thread, Item 18,  
Appendix C*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*References*

None

*Equipment Condition**TM or Para*

TM 9-2320-279-10

*Condition Description*

Pump module rear access doors opened.

*Special Environmental Conditions*

None

*General Safety Instructions*No smoking, flame, sparks, and hot or glowing  
objects within 50 ft (15 m) of vehicle.

- a. Removal.** Remove DLPG DISCHARGE LINE PRESSURE GAGE (1) from tube (2).

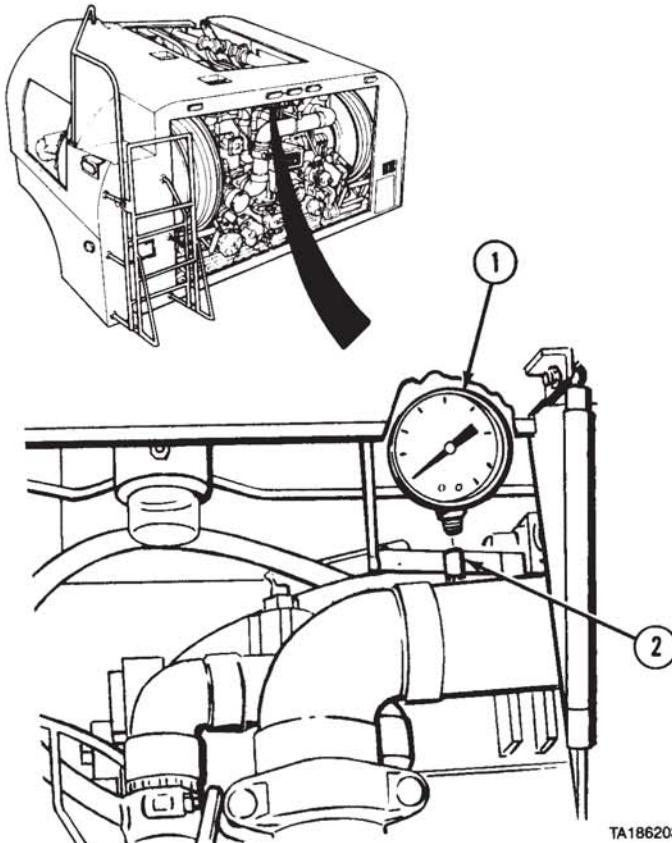
**WARNING**

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

- b. Installation.** Coat threads of DLPG DISCHARGE LINE PRESSURE GAGE (1) with pipe thread sealing compound and install in tube (2).

**c. Follow-on Maintenance.**

- (1) Recirculate fuel (TM 9-2320-279-10).
- (2) Check DLPG DISCHARGE LINE PRESSURE GAGE for leaks and proper operation.
- (3) Close pump module rear access doors (TM 9-2320-279-10).

**END OF TASK**

TA186203

**Non-Electrical Gage Maintenance Instructions (Cont)****22-4. VNPG VENTURI/NOZZLE PRESSURE GAGE REMOVAL/INSTALLATION (M978).**

This task covers:

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

**INITIAL SETUP***Models*

M978

*References*

None

*Test Equipment*

None

*Equipment Condition**Special Tools*

None

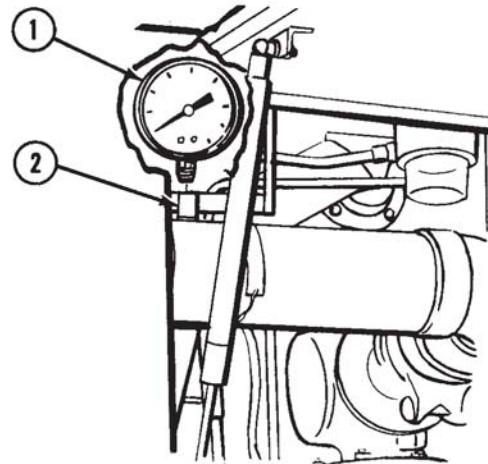
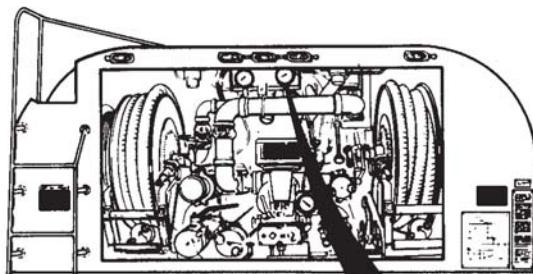
<i>TM or Para</i>	<i>Condition Description</i>
TM 9-2320-279-10	Pump module right rear access door opened.

*Supplies*Compound, sealing, pipe thread, Item 18,  
Appendix C*Special Environmental Conditions*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*General Safety Instructions*No smoking, flame, sparks, and hot or glowing  
objects within 50 ft (15 m) of vehicle.

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## Non-Electrical Gage Maintenance Instructions (Cont)

- a. Removal.** Remove VNPG VENTURI/NOZZLE PRESSURE GAGE (1) from tube (2).

**WARNING**

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

- b. Installation.** Coat threads of VNPG VENTURI/NOZZLE PRESSURE GAGE (1) with pipe thread sealing compound and install in tube (2).

**c. Follow-on Maintenance.**

- (1) Recirculate fuel (TM 9-2320-279-10).
- (2) Check VNPG VENTURI/NOZZLE PRESSURE GAGE for leaks and proper operation.
- (3) Close pump module rear access door (TM 9-2320-279-10).

END OF TASK

<b>22-5. DPG DIFFERENTIAL PRESSURE GAGE REMOVAL/INSTALLATION (M978).</b>
--

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

<b>INITIAL SETUP</b>
----------------------

*Models*

M978

*References*

None

*Test Equipment*

None

*Equipment Condition*

TM or Para      Condition Description  
TM 9-2320-279-10      Pump module rear access doors opened.

*Special Tools*

None

*Supplies*

Compound, sealing, pipe thread, Item 18,  
Appendix C

*Special Environmental Condition*

None

*Personnel Required*

MOS 63S. Heavy wheel vehicle mechanic

*General Safety Conditions*

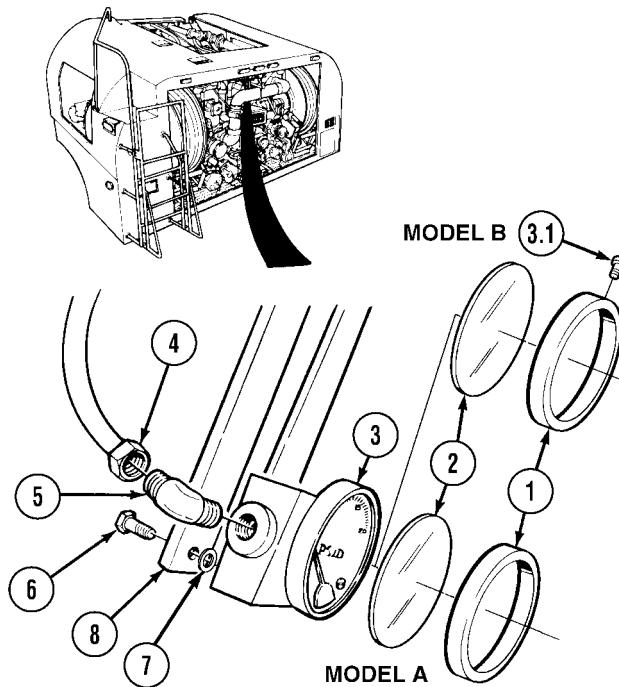
No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

## Non-Electrical Gage Maintenance Instructions (Cont)

**22-5. DPG DIFFERENTIAL PRESSURE GAGE REMOVAL/INSTALLATION (M978) (CONT).****a. Removal.****NOTE**

There are two types of gages. Model A bezel has no securing screws; Model B has two screws to secure bezel to gage. Do step (1) for Model A. Do step (1.1) for Model B.

- (1) Remove bezel (1) and lens (2) from DPG DIFFERENTIAL PRESSURE GAGE (3).
- (1.1) Remove two screws (3.1), bezel (1), and lens (2) from DPG DIFFERENTIAL PRESSURE GAGE (3).
- (2) Disconnect two tubes (4) from elbows (5) on each side of DPG DIFFERENTIAL PRESSURE GAGE (3).
- (3) Remove two elbows (5) from DPG DIFFERENTIAL PRESSURE GAGE (3).
- (4) Remove two screws (6) and fiber washers (7) from bracket (8) and remove DPG DIFFERENTIAL PRESSURE GAGE (3).

**b. Installation.****NOTE**

There are two types of gages. Model A bezel has no securing screws; Model B has two screws to secure bezel to gage. Do step (1) for Model A. Do step (1.1) for Model B.

- (1) Install lens (2) in bezel (1) and install on DPG DIFFERENTIAL PRESSURE GAGE (3).
- (1.1) Install lens (2) in bezel (1) and install on DPG DIFFERENTIAL PRESSURE GAGE (3) with two screws (3.1).
- (2) Install DPG DIFFERENTIAL PRESSURE GAGE (3) on bracket (8) with two fiber washers (7) and screws (6).

**WARNING**

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

- (3) Apply pipe thread sealing compound and install two elbows (5) in DPG DIFFERENTIAL PRESSURE GAGE (3).
- (4) Connect two tubes (4) to elbow (5).

**c. Follow-on Maintenance.**

- (1) Recirculate fuel (TM 9-2320-279-10).
- (2) Check DPG DIFFERENTIAL PRESSURE GAGE for leaks and proper operation.
- (3) Close pump module rear access doors (TM 9-2320-279-10).

**END OF TASK**

## Non-Electrical Gage Maintenance Instructions (Cont)

**22-6. DPG DIFFERENTIAL PRESSURE GAGE MOUNTING BRACKET REMOVAL/INSTALLATION (M978).**

This task covers:

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

**INITIAL SETUP***Models*

M978

*Test Equipment*

None

*Special Tools*

None

*Supplies*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*References*

None

*Equipment Condition**TM or Para*

TM 9-2320-279-10

*Condition Description*

Pump module rear access doors opened.

## Para 22-3

## DLPG DISCHARGE LINE

PRESSURE GAGE removed.

## Para 22-4

## VNPG VENTURI/NOZZLE

PRESSURE GAGE removed.

## Para 22-5

## DPG DIFFERENTIAL

PRESSURE GAGE removed.

## Para 25-4

## DPG differential pressure

gage tubing right side and

left side removed.

*Special Environmental Conditions*

None

*General Safety Instructions*

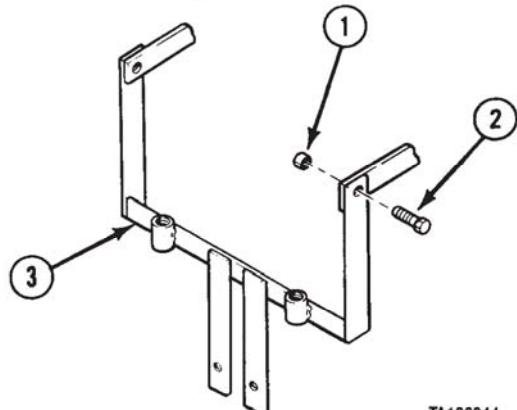
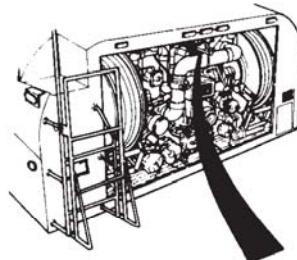
No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

**a. Removal.** Remove two locknuts (1), screws (2), and mounting bracket (3) from pump module.

**b. Installation.** Install mounting bracket (3) in pump module with two screws (2) and locknuts (1).

**c. Follow-on Maintenance.**

- (1) Install DPG DIFFERENTIAL PRESSURE GAGE (para 22-5).
- (2) Install VNPG VENTURI/NOZZLE PRESSURE GAGE (para 22-4).
- (3) Install DLPG DISCHARGE LINE PRESSURE GAGE (para 22-3).
- (4) Install DPG differential pressure gage tubing, right side and left side (para 25-4).
- (5) Close pump module rear access doors (TM 9-2320-279-10).



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**END OF TASK**



# CHAPTER 23

## FILTER-SEPARATOR MAINTENANCE

	Para	Page
General .....	23-1	23-1
V15 DRAIN VALVE Removal/Installation (M978) .....	23-2	23-1
Filter-Separator Elements Removal/Installation (M978) (Model A) .....	23-3	23-4
Filter-Separator Elements Removal/Installation (M978) (Model B) .....	23-3.1	23-6.2
Filter-Separator Removal/Repair/Installation (M978) (Model A) .....	23-4	23-8
Filter-Separator Removal/Repair/Installation (M978) (Model B) .....	23-4.1	23-23

### Section I. INTRODUCTION

**23-1. GENERAL.** This chapter contains maintenance instructions for removing, repairing, and installing filter-separator components authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

### Section II. FILTER-SEPARATOR

#### Filter-Separator Maintenance Instructions

##### **23-2. V15 DRAIN VALVE REMOVAL/INSTALLATION (M978).**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

#### ***INITIAL SETUP***

*Models*  
**M978**

*References*  
**N o n e**

*Test Equipment*  
**None**

*Equipment Condition*  
**TM or Para**      **Condition Description**  
**TM 9-2320-279-10** Pump module rear access doors opened.

*Special Tools*  
**None**

*Special Environmental Conditions*  
**None**

*Supplies*  
Compound, sealing, pipe thread, Item 18,  
Appendix C

*General Safety Instructions*  
No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

*Personnel Required*  
**MOS 63S, Heavy wheel vehicle mechanic**

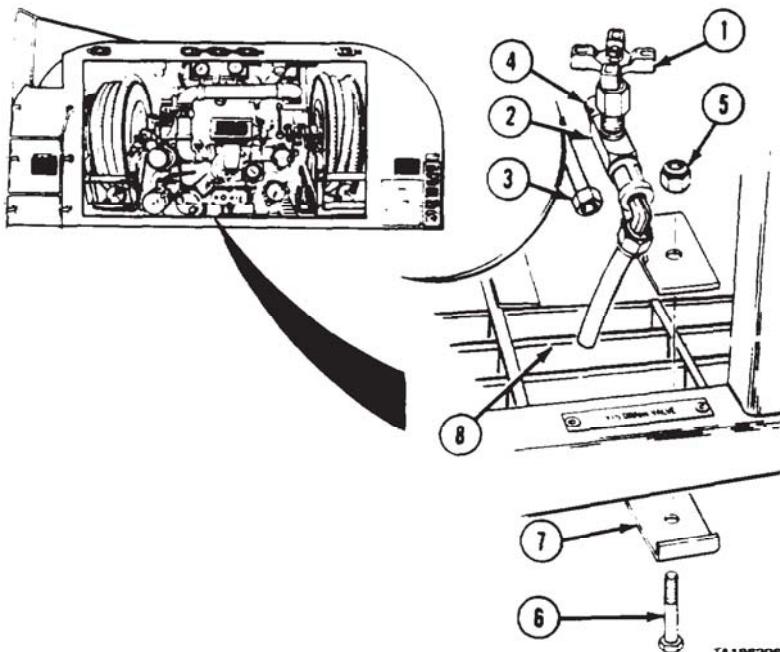
## Filter-Separator Maintenance Instructions (Cont)

23-2. V15 DRAIN VALVE REMOVAL/INSTALLATION (M978) (CONT)*a. Removal.*

## NOTE

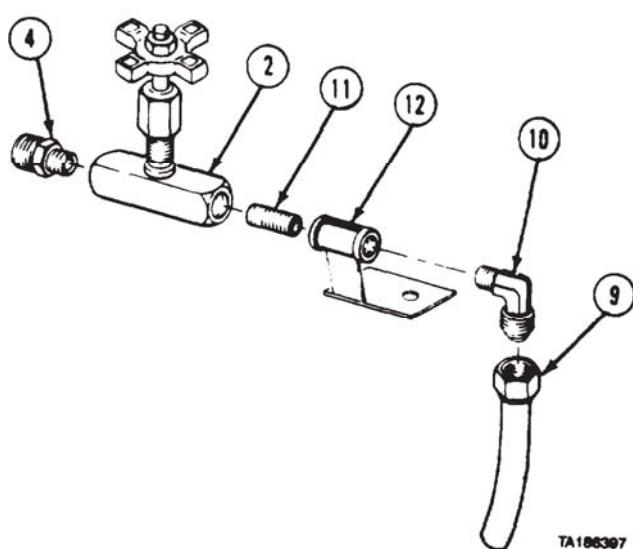
Fuel-separator may contain 20 to 30 gallons (76 to 114 L) of

- (1) Turn knob (1) counterclockwise to open V15 DRAIN VALVE (2). Let fuel drain.
- (2) When fuel stops draining, disconnect tube (3) from adapter (1).
- (3) Remove locknut (5), screw (6), and bracket (7).
- (4) Remove V-15 DRAIN VALVE (2) from grating (8)



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- (5) Remove adapter (4) from V15 DRAIN VALVE (2).
- (6) Remove tube (9) and elbow (10).
- (7) Remove V15 DRAIN VALVE (2) and pipe nipple (11) from bracket (12).



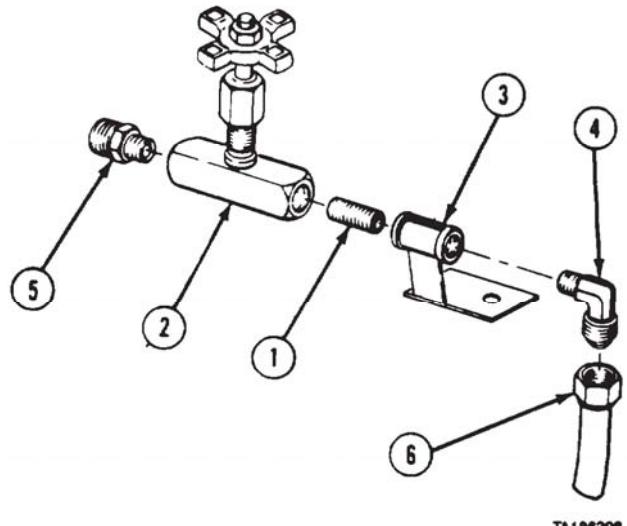
TA186397

## Filter-Separator Maintenance Instructions (Cont)

*b. Installation.***WARNING**

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

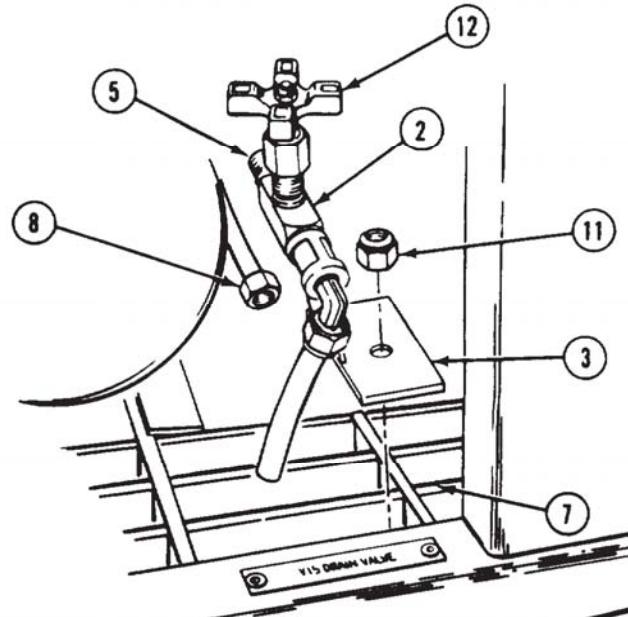
- (1) Apply pipe thread sealing compound to threads of pipe nipple (1) and install V15 DRAIN VALVE (2) and bracket (3).
- (2) Apply pipe thread sealing compound to pipe threads of elbow (4) and install on bracket (3).
- (3) Apply pipe thread sealing compound to pipe threads of adapter (5) and install in V15 DRAIN VALVE (2).
- (4) Install tube (6) on elbow (1).
- (5) Position V15 DRAIN VALVE (2) on grating (7).
- (6) Connect tube (8) to adapter (5).
- (7) Hold bracket (3) in place and install with bracket (9), screw (10), and locknut (11).
- (8) Turn V15 DRAIN VALVE handle (12) clockwise to closed position.



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*c. Follow-on Maintenance.*

- (1) Recirculate fuel (TM 9-2320-279-10).
- (2) Turn V15 DRAIN VALVE handle counterclockwise to open position and check that fuel drains.
- (3) Turn V15 DRAIN VALVE handle clockwise to closed position.
- (4) Check that fuel stops draining and there are no leaks.
- (5) Close pump module rear doors (TM 9-2320-279-10).



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END OF TASK

## Filter-Separator Maintenance Instructions (Cont)

**23-3. FILTER-SEPARATOR ELEMENTS REMOVAL/INSTALLATION (M978)  
(MODEL A).**

This task covers:

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

**INITIAL SETUP***Models*

M978

*TEST Equipment*

None

*Special Tools*

None

*Supplies*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*References*

None

*Equipment Condition**TM or Para      Condition Description*

TM 9-2320-279-10 Shut off engine.

TM 9-2320-279-10 Filter-separator drained.

TM 9-2320-279-10 Pump module top access door opened.

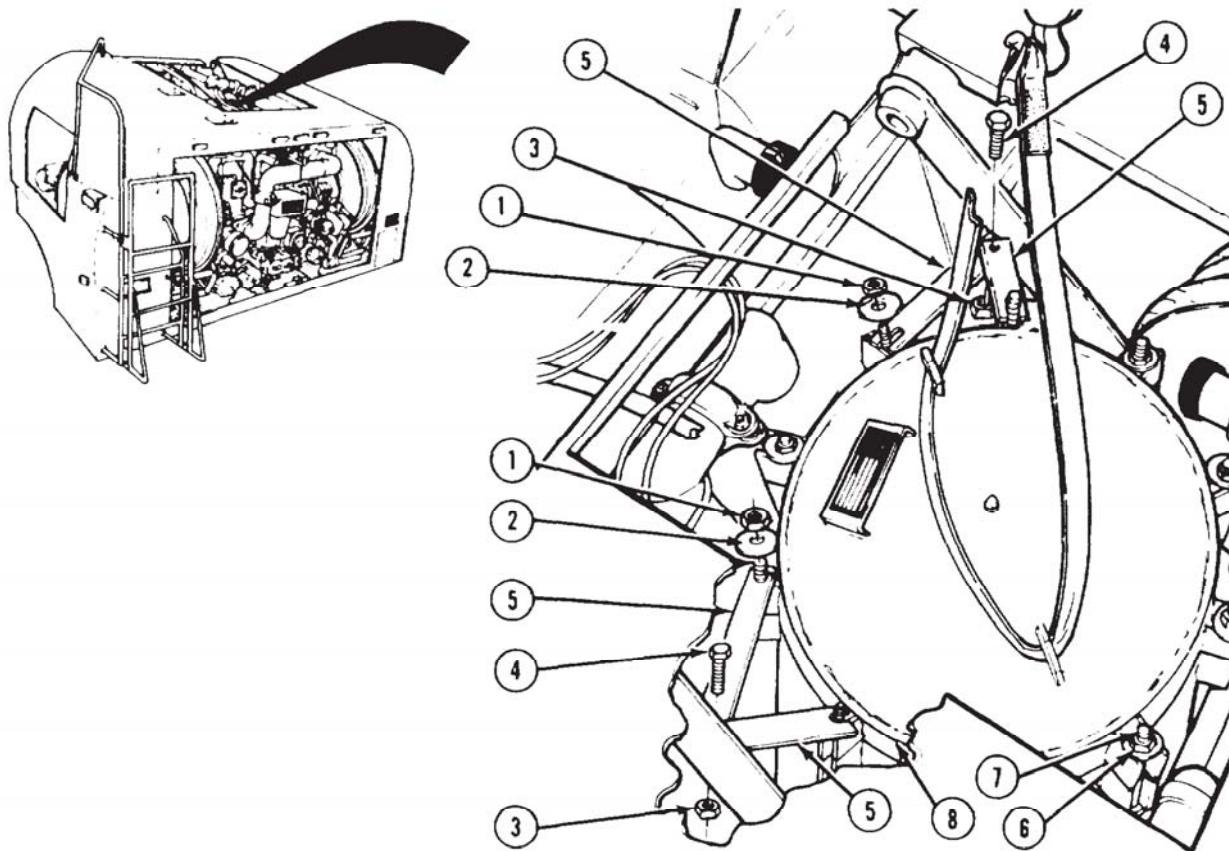
Para 25-36 VT VENTURI assembly removed.

*Special Environmental Conditions*

None

*General Safety Instructions*

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.



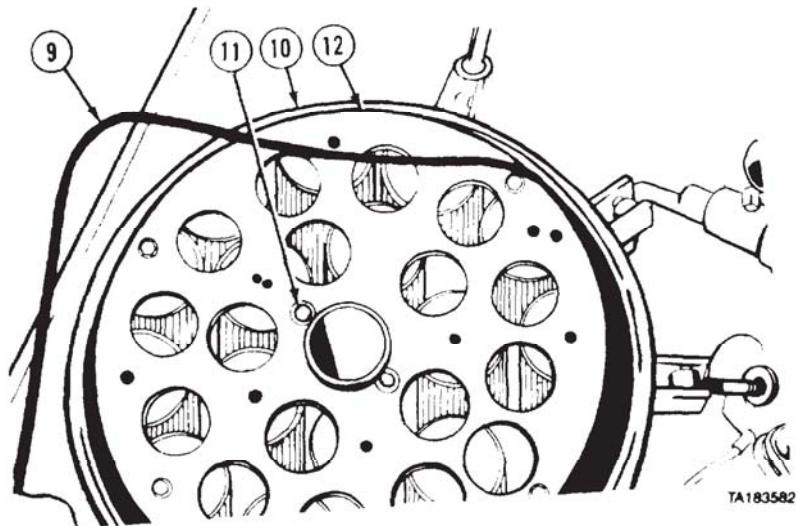
## Filter-Separator Maintenance Instructions (Cont)

*a. Removal.***NOTE**

- The first six nuts are to remove the braces.
- Mark position of cover

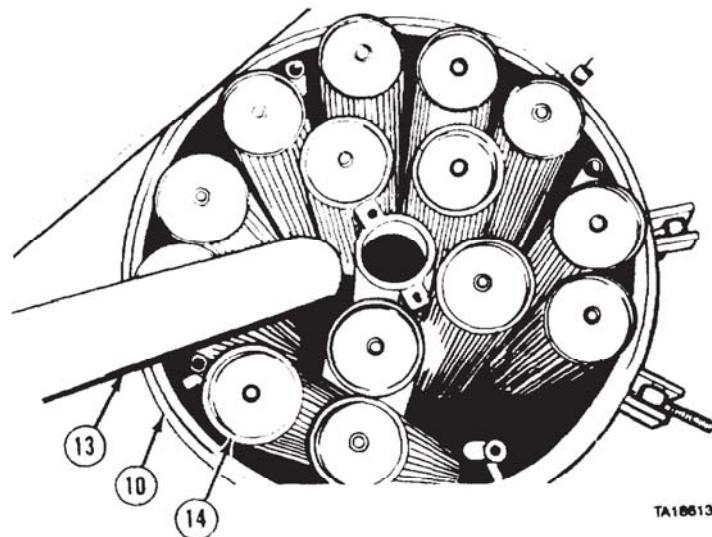
(1) Remove four nuts (1) and washers (2).  
 (2) Loosen two nuts (3) and screws (4) and move four braces (5) out of way.  
 (3) Loosen six nuts (6) and push eyebolts (7) away from cover (8).  
 (4) Using suitable lifting device, remove cover (8).

(5) Remove preformed packing (9) from filter-separator tank (10).  
 (6) Remove six screws (11) from retaining plate (12).  
 (7) Remove retaining plate (12) from filter-separator tank (10).



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(8) Remove 15 canisters (13) from filter-separator tank (10).  
 (9) Remove 15 elements (14) from filter-separator tank (10).

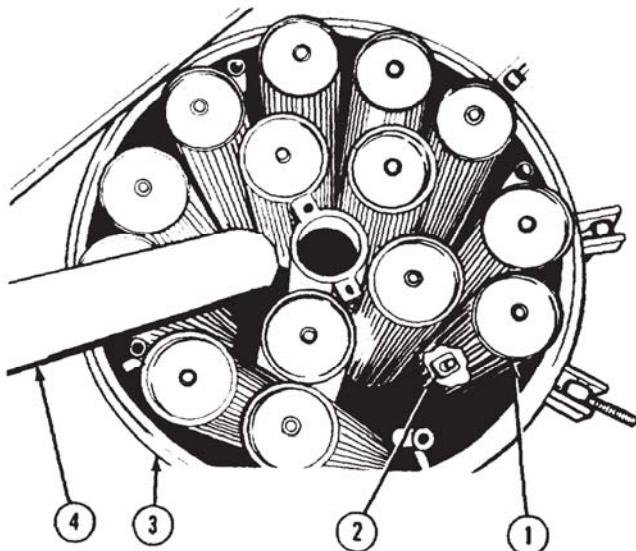


TA186130

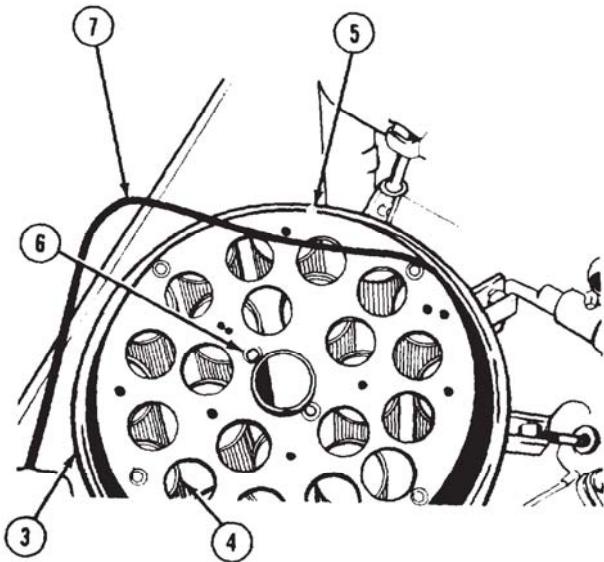
## Filter-Separator Maintenance Instructions (Cont)

**23-3. FILTER-SEPARATOR ELEMENTS REMOVAL/INSTALLATION (M978)  
(MODEL A) (CONT).**
**b. Installation.**

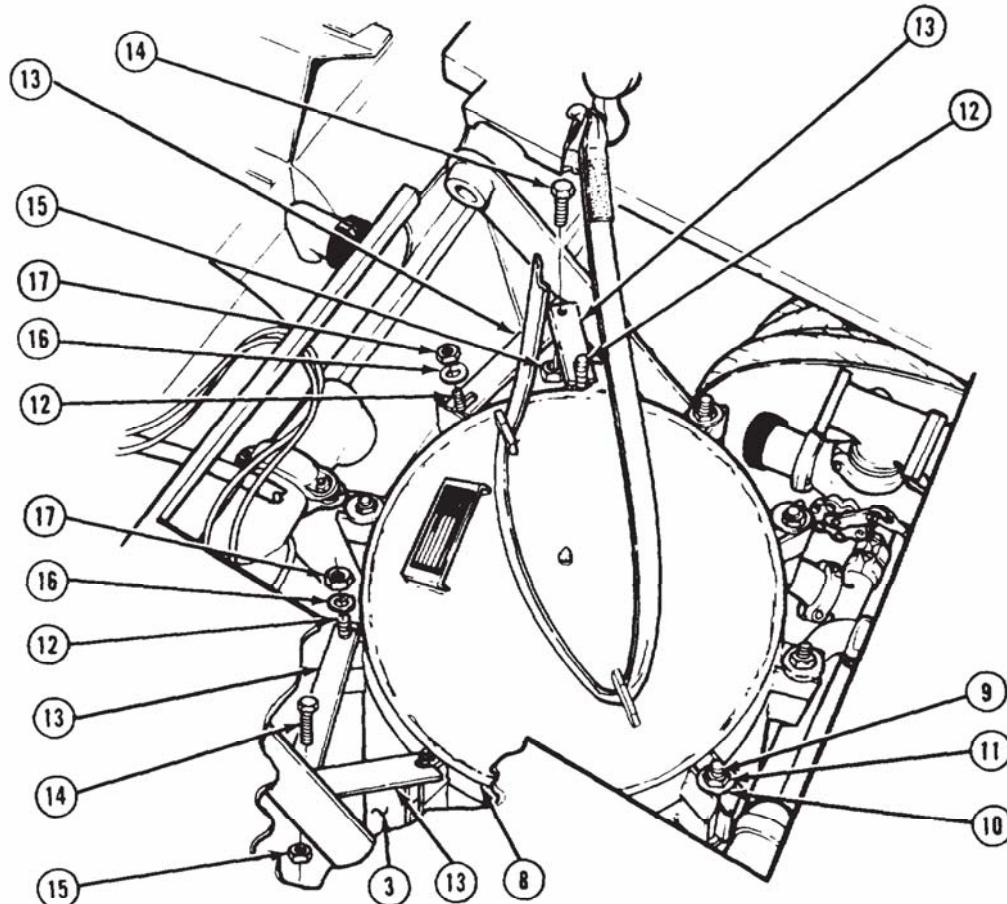
- (1) Install 15 elements (1) over studs (2) in filter-separator tank (3).
- (2) Install 15 canisters (4) over elements (1).



- (3) Position retaining plate (5) over canisters (4).
- (4) Install retaining plate (5) with six screws (6).
- (5) Install preformed packing (7) around top edge of filter-separator tank (3).



## Filter-Separator Maintenance Instructions (Cont)

**CAUTION**

Do not tear or otherwise damage preformed packing during installation of cover. If packing is damaged, cover will leak.

- (6) Using suitable lifting device, position cover (8) on filter-separator tank (3).
- (7) Push six eyebolts (9) in slots on edge of cover (8) so washers (10) and nuts (11) are on top of
- (8) Position four eyebolts (12) in slots on edge of cover (8).
- (9) position four brackets (13) on four eyebolts (12) and tighten two screws (14) and nuts (15)
- (10) Install, but do not tighten, four washers (16) and nuts (17).
- (11) Tighten 10 nuts (11 and 17) to 75 lb-ft (102 N·m).

**c. Follow-on Maintenance.**

- (1) Install VT VENTURI assembly (para 25-36).
- (2) Recirculate fuel (TM 9-2320-279-10).
- (3) Check filter-separator for leaks.
- (4) Close pump module top access door (TM 9-2320-279-10).

**END OF TASK**

## Filter-Separator Maintenance Instructions (Cont)

**23-3.1 FILTER-SEPARATOR ELEMENTS REMOVAL/INSTALLATION (M978)  
(MODEL B).**

This task covers:

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

**INITIAL SETUP***Models*

M978

*Test Equipment*

None

*Special Tools*

None

*Supplies*Oil, fuel, diesel DF-2 regular, Item 27,  
Appendix CPetrolatum, technical, Item 41.1,  
Appendix C*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*References*

None

*Equipment Condition*

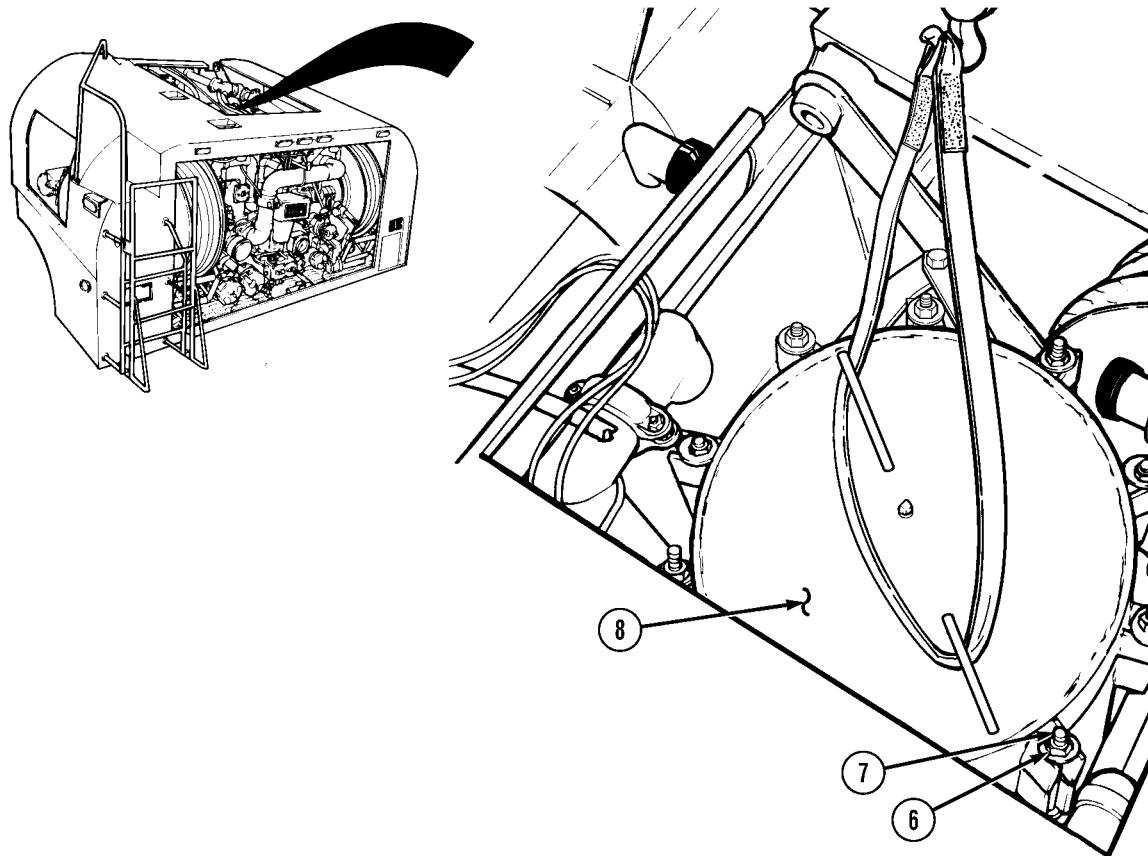
TM or Para      Condition Description

TM 9-2320-279-10 Shut off engine.

TM 9-2320-279-10 Filter-separator drained.

TM 9-2320-279-10 Pump module top access door  
opened.Para 25-36      VT VENTURI assembly  
removed.*Special Environmental Conditions*

None

*General Safety Instructions*No smoking, flame, sparks, and hot or glowing  
objects within 50 ft (15 m) of vehicle.

### Filter-Separator Maintenance Instructions (Cont)

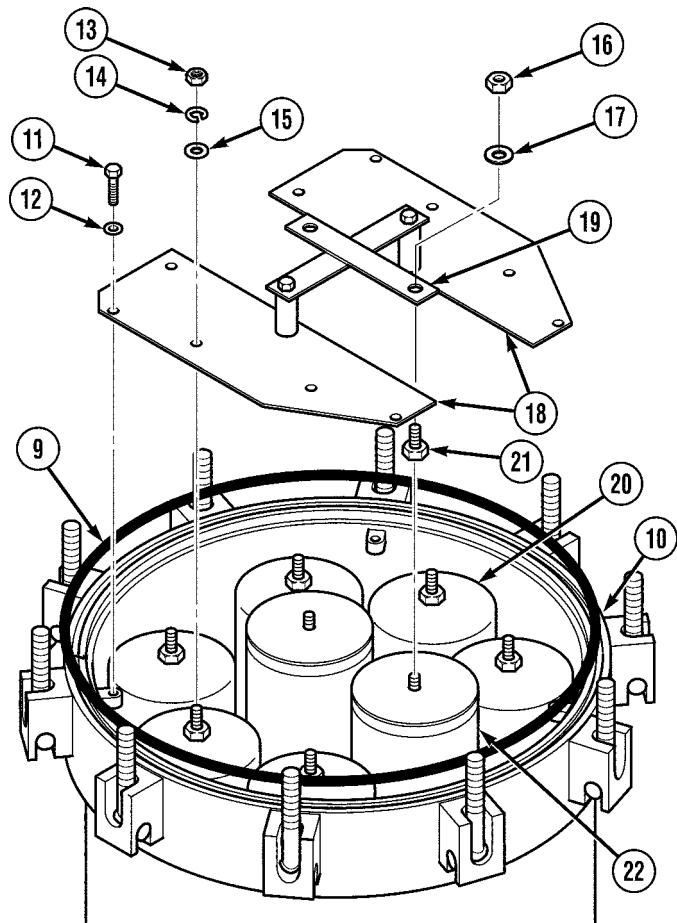
**a. Removal.**

- (1) Deleted.
- (2) Deleted.
- (3) Loosen ten nuts (6) and push tee screws (7) away from cover (8).
- (4) Using suitable lifting device, remove cover (8).
  
- (5) Remove preformed packing (9) from filter-separator tank (10).
- (6) Remove four screws (11) and lockwashers (12).
- (7) Remove six nuts (13), lockwashers (14), and washers (15).
- (8) Remove two nuts (16) and washers (17).
- (9) Remove retainers (18) with locator (19).

**NOTE**

Coalescer elements are threaded onto filter-separator tank.

- (10) Remove six coalescer elements (20) from filter-separator tank (10).
- (11) Remove two seal nuts (21) and separator canisters (22) from filter-separator tank (10).



## Filter-Separator Maintenance Instructions (Cont)

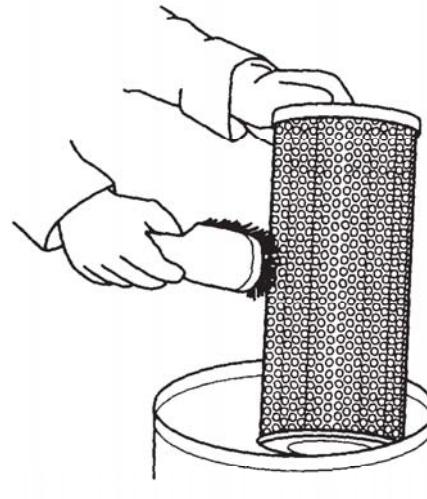
**23-3.1 FILTER-SEPARATOR ELEMENTS REMOVAL/INSTALLATION (M978)  
(MODEL B) (CONT).***b. Cleaning/Inspection.***WARNING**

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open tire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of vehicle.

**CAUTION**

Do not handle separator or coalescer elements with bare hands. Any contaminant, including dirt or oil from hands, will deactivate elements.

- (1) To clean fuel-separator element, submerge element in clean fuel and gently scrub entire screen surface with soft cloth or soft bristle brush.
- (2) Hold separator element by endcaps and visually inspect entire screen surface for any nicks, cuts, or flaws. If element is noticeably flawed, replace element.

**NOTE**

- Cleaned and inspected element should be tested for its ability to repel water before it is reinstalled.
  - If water beads and rolls off screen surface during test, element can be reused.
  - If water adheres to and wets any part of screen surface during test, element should be recleaned (step (1)) and retested (step (3)). If element fails test, replace element.
- (3) To test separator element, hold element at any angle by endcaps, and gradually pour water over entire screen surface.
  - (4) When separator element passes inspection and test, rinse element thoroughly in clean fuel to remove any traces of water. Allow separator element to air dry before reinstalling it.



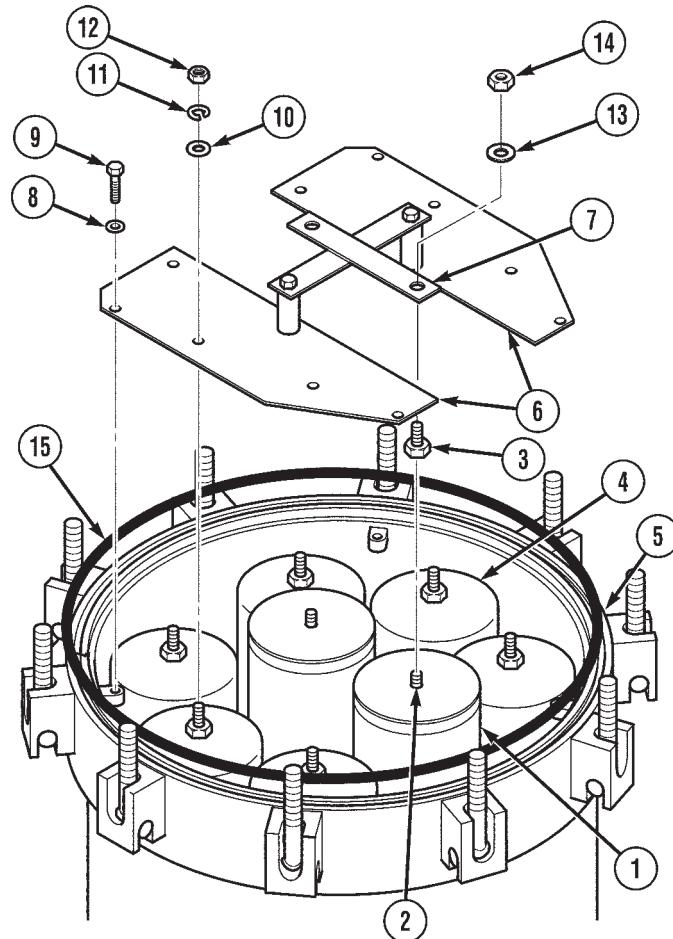
## Filter-Separator Maintenance Instructions (Cont)

## c. Installation.

**CAUTION**

Do not handle separator canister or coalescer element with bare hands. Any contaminants, including dirt or oil from hands, will deactivate elements.

- (1) Install two separator canisters (1) on rods (2) with seal nuts (3). Tighten nuts to 5 lb-ft (6.78 N•m).
- (2) Lightly coat threads of six coalescer elements with petrolatum before installation.
- (3) Install six coalescer elements (4) in filter-separator tank (5). Tighten elements to 30 lb-ft (40.68 N•m) or 1/4 turn past hand tight.
- (4) Install retainers (6) with locator (7) in filter-separator tank (5).
- (5) Install four washers (8) and screws (9).
- (6) Install six washers (10), lockwashers (11), and nuts (12).
- (7) Install two washers (13) and nuts (14).
- (8) Install preformed packing (15) around top edge of filter-separator tank (5).





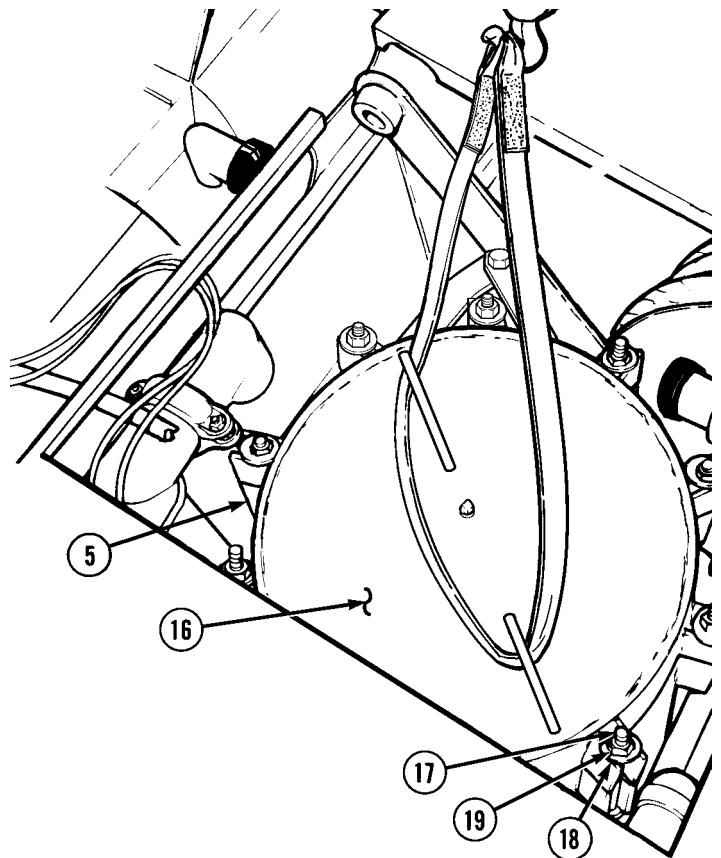
## Filter-Separator Maintenance Instructions (Cont)

**CAUTION**

Do not tear or otherwise damage preformed packing during installation of cover. If packing is damaged, cover will leak.

- (9) Using suitable lifting device, position cover (16) on filter-separator tank (5).
  - (10) Push ten tee screws (17) in slots on edge of cover (16) so washers (18) and nuts (19) are on top of cover.
  - (11) Deleted.
  - (12) Deleted.
  - (13) Deleted.
  - (14) Tighten 10 nuts (19) to 105 lb-ft (142 NSm).
- d. Follow-on Maintenance.
- (1) Install VT VENTURI assembly (para 25-36).
  - (2) Recirculate fuel (TM 9-2320-279-10).
  - (3) Check filter-separator for leaks.
  - (4) Close pump module top access door (TM 9-2320-279-10).

END OF TASK



## Filter-Separator Maintenance Instructions (Cont)

**23-4. FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL A).**

This task covers:

- |  |  |
|--|--|
| a. Removal<br>b. Disassembly<br>c. Cleaning/Inspection | d. Assembly<br>e. Installation<br>f. Follow-on Maintenance |
|--|--|

**INITIAL SETUP***Models*

M978

*Test Equipment*

None

*Special Tools*

None

*Supplies*

Solvent, drycleaning, Item 47, Appendix C  
 Tags, identification, Item 48, Appendix C  
 Compound, sealing, pipe thread, Item 18,  
 Appendix C

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic (2)

*References*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
Para 25-3	Tank drained.
TM 9-2320-279-10	Pull V-6 FUEL/DEFUEL VALVE handle down.
TM 9-2320-279-10	Fuel-separator drained.
TM 9-2320-279-10	Pump module top and rear access doors opened.
Para 16-48	Pump module right side access panel removed.
Para 16-50	Pump module top door piston removed.
Para 25-23	V9 CHECK VALVE removed.
Para 25-33	Eductor assembly removed.

*Special Environmental Conditions*

None

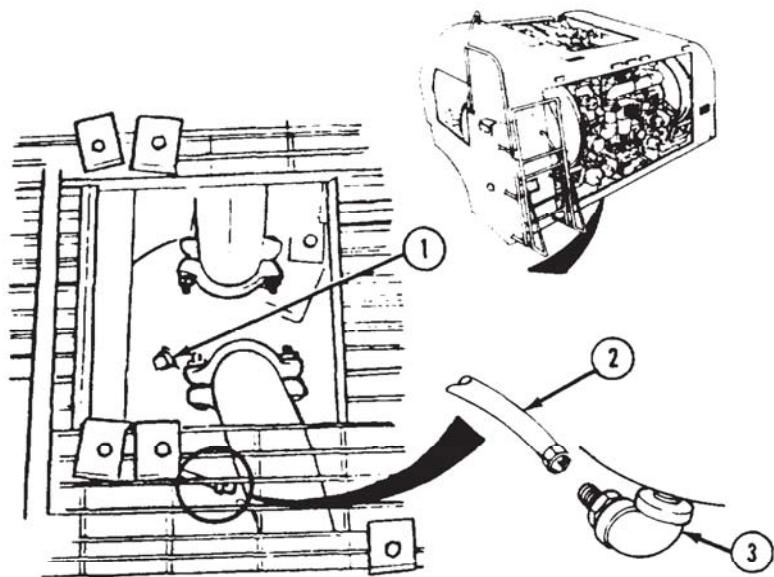
*General Safety Instructions*

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

## Filter-Separator Maintenance Instructions (Cont)

*a. Removal.***WARNING**

- Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.
- Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



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**NOTE**

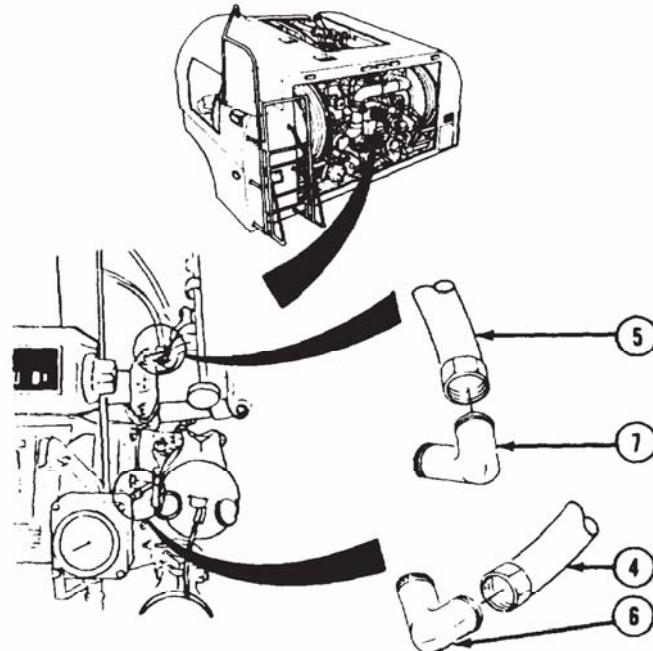
Tag and mark all tubes, hoses, and brackets before removal.

- (1) Remove filter-separator drainplug (1) and drain fuel. When all fuel is drained, coat threads of filter-separator drainplug with pipe thread sealing compound and install.
- (2) Disconnect tube (2) from elbow (3).

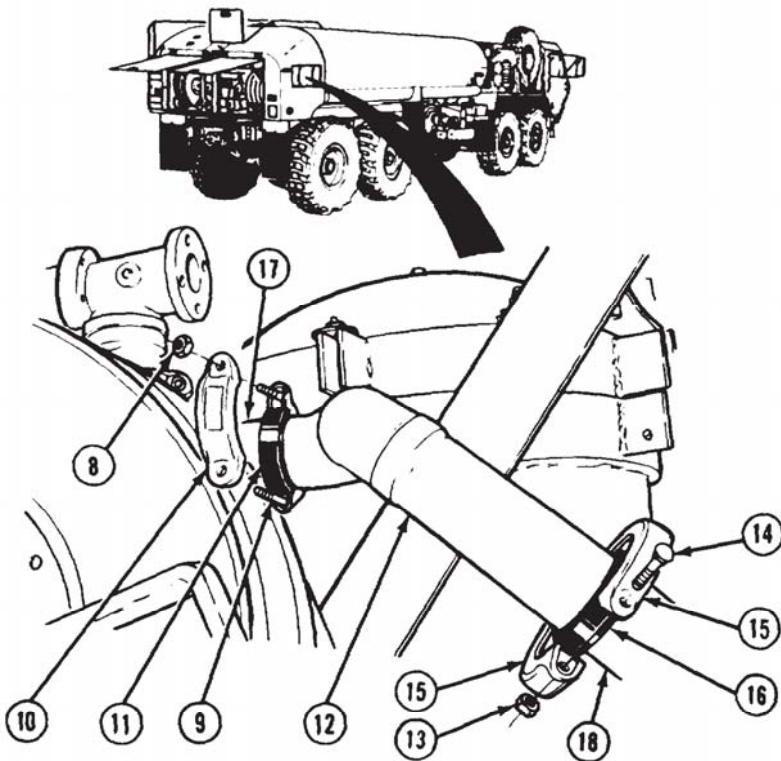
## Filter-Separator Maintenance instructions (Cont)

**23-4. FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL A)  
(CONT).**

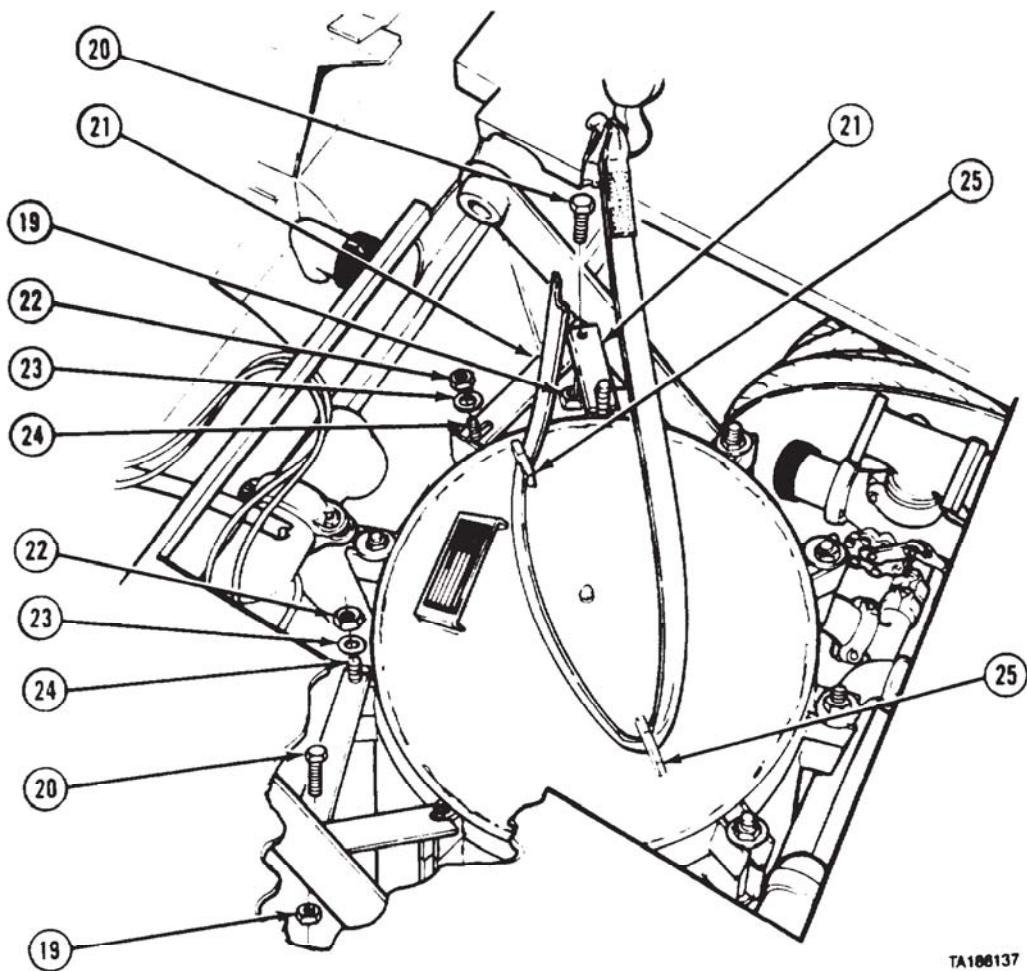
- (3) Disconnect two tubes (4 and 5) from elbows (6 and 7).



- (4) Remove two nuts (8), screws (9), and coupling halves (10) from coupling gasket (11).  
 (5) Slide coupling gasket (11) on pipe (12).  
 (6) Remove two nuts (13), screws (14), and coupling halves (15) from coupling gasket (16).  
 (7) Slide coupling gasket (16) on pipe (12) and remove pipe from two pipes (17 and 18). Remove coupling gaskets.



## Filter-Separator Maintenance Instructions (Cont)

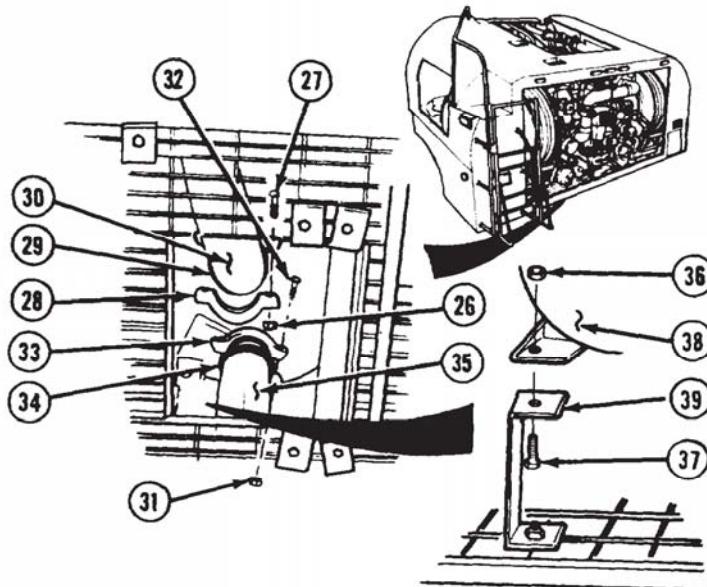


- (8) Remove two locknuts (19) and screws (20) from four brackets (21).
- (9) Remove four locknuts (22), washers (23), and brackets (21) from eyebolts (24).
- (10) Install four washers (23) and locknuts (22) on eyebolts (24).
- (11) Attach suitable lifting device to filter-separator cover lifting eyes (25).

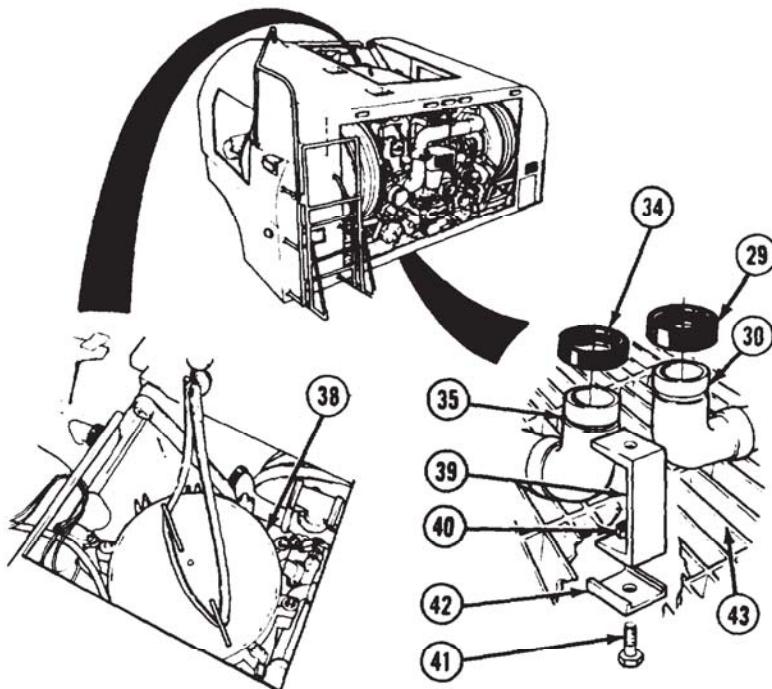
## Filter-Separator Maintenance Instructions (Cont)

**23-4. FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL A)  
(CONT).**

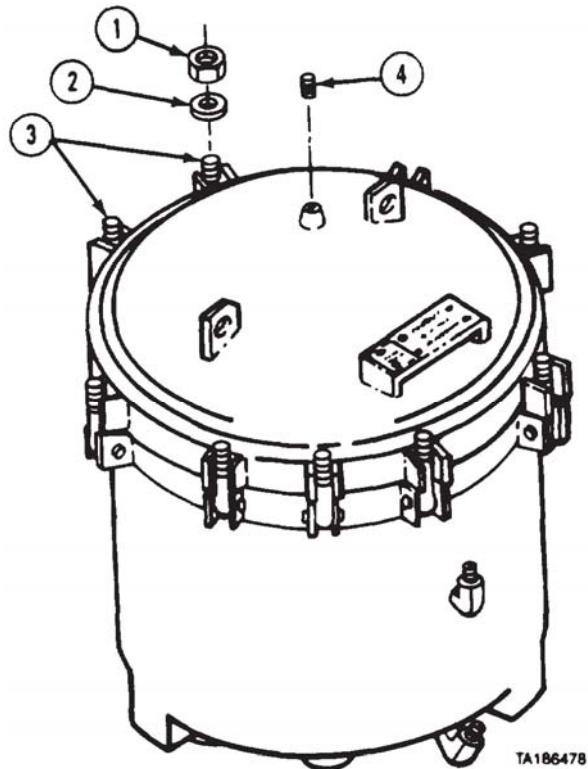
- (12) Remove two nuts (26), screws (27), and coupling halves (28). Slide coupling gasket (29) on pipe (30).
- (13) Remove two nuts (31), screws (32), and coupling halves (33). Slide coupling gasket (34) on pipe (35).
- (14) Soldier A removes three locknuts (36) while Soldier B holds and removes screws (37) from filter-separator (38) and three brackets (39).



- (15) Soldier A guides filter-separator (38) from top access opening of pump module while Soldier B operates suitable lifting device.
- (16) Remove three locknuts (40), screws (41), brackets (42), and brackets (39) from grating (43).
- (17) Remove two coupling gaskets (29 and 34) from pipes (30 and 35).



## Filter-Separator Maintenance Instructions (Cont)

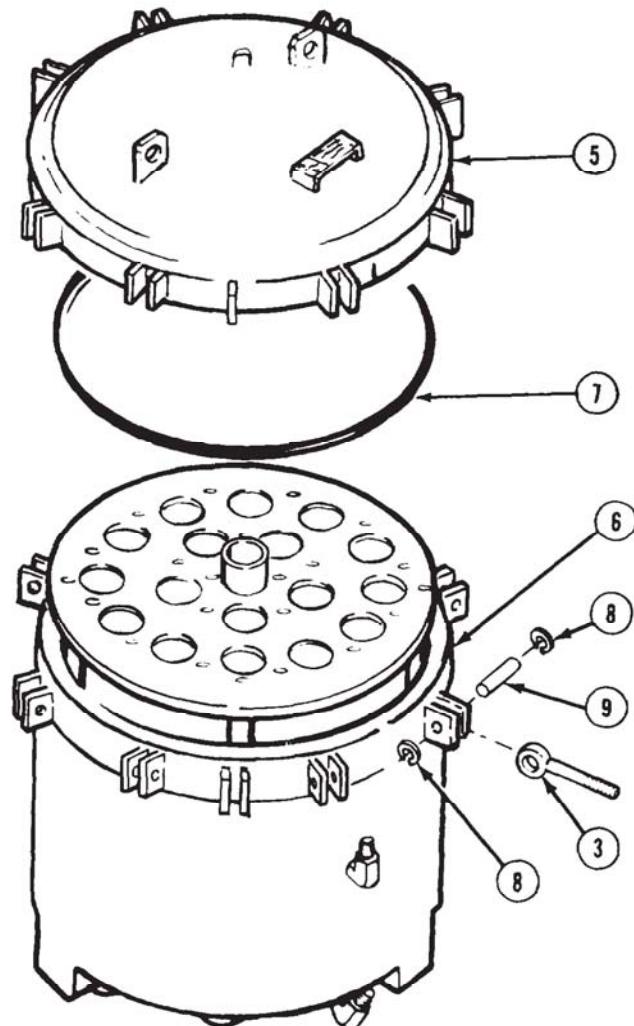


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*b. Disassembly.*

- (1) Remove 10 nuts (1) and washers (2) from eyebolts (3).
- (2) Push down eyebolts (3).
- (3) Remove pipe plug (4).

## Filter-Separator Maintenance Instructions (Cont)

**23-4. FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL A)  
(CONT).**

- (4) Using suitable lifting device, remove cover (5) from filter-separator tank (6).  
(5) Remove preformed packing (7) from filter-separator tank (6).

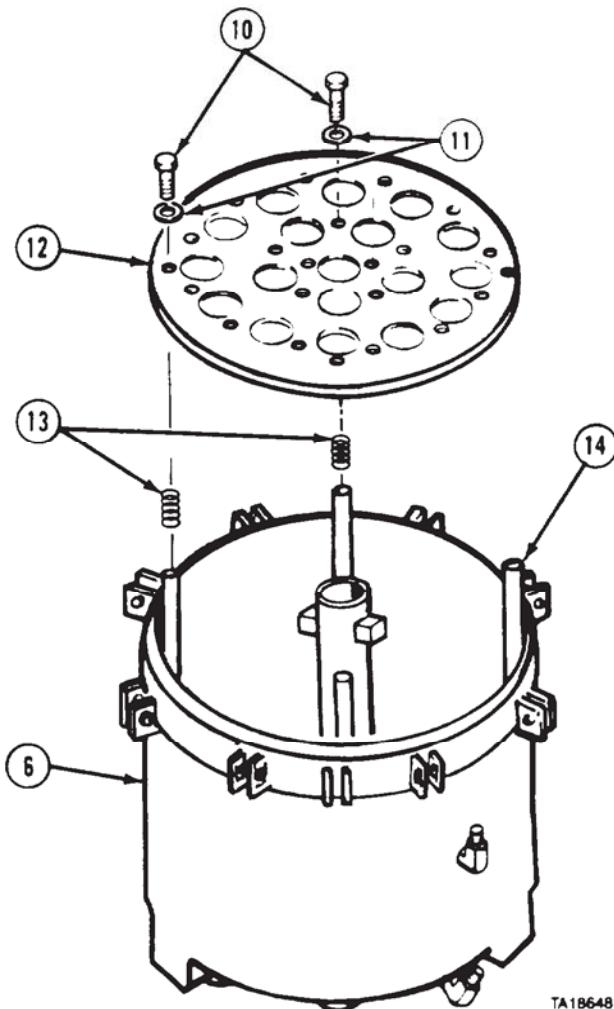
**WARNING**

Wear safety glasses when removing retaining rings to prevent injury or blindness.

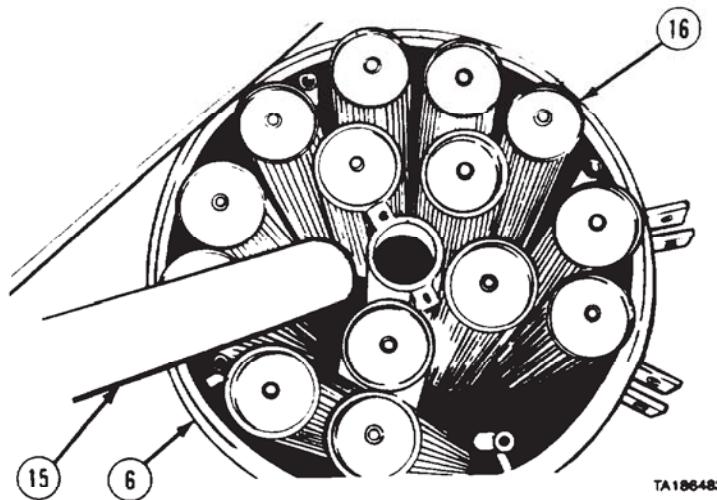
- (6) Remove two retaining rings (8) from each of 10 pins (9).  
(7) Remove 10 pins (9) and eyebolts (3) from filter-separator tank (6).

## Filter-Separator Maintenance Instructions (Cont)

- (8) Remove six screws (10) and washers (11) from retaining plate (12).
- (9) Remove retaining plate (12) from filter-separator tank (6).
- (10) Remove six coil inserts (13) from pipes (14).



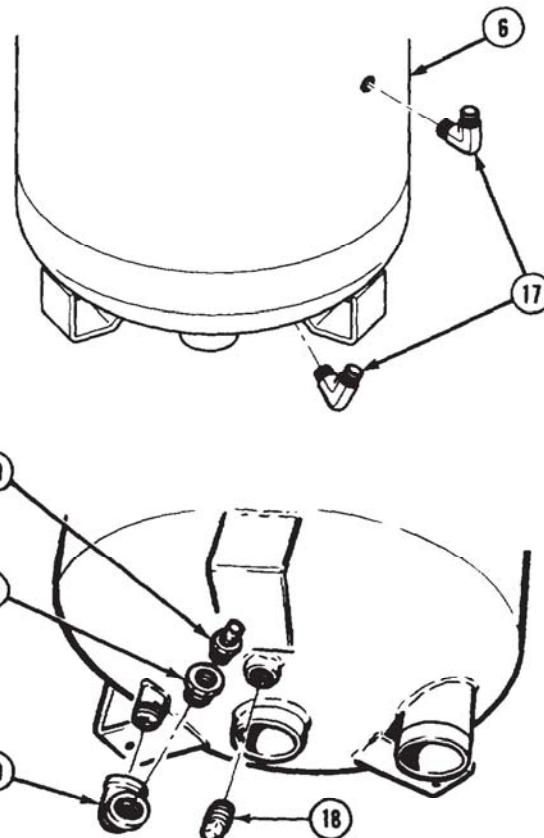
- (11) Remove 15 canisters (15) from filter-separator tank (6).
- (12) Remove 15 elements (16) from filter-separator tank (6).



## Filter-Separator Maintenance Instructions (Cont)

**23-4. FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL A)  
(CONT).**

- (13) Remove two elbows (17) from side of filter-separator tank (6).
- (14) Remove pipe plug (18) and elbow (19) from bottom of filter-separator tank (6).
- (15) Remove fitting (20) and bushing (21) from elbow (19).

*c. Cleaning/Inspection.***WARNING**

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

- (1) Clean all metal parts with drycleaning solvent.

**WARNING**

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment, goggles, shield, and gloves.

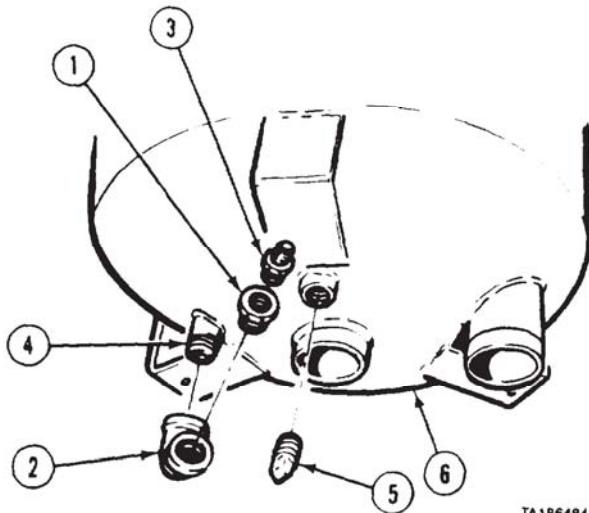
- (2) Dry metal parts with compressed air.
- (3) Inspect each part for damage.
- (4) Replace damaged parts.

## Filter-Separator Maintenance Instructions (Cont)

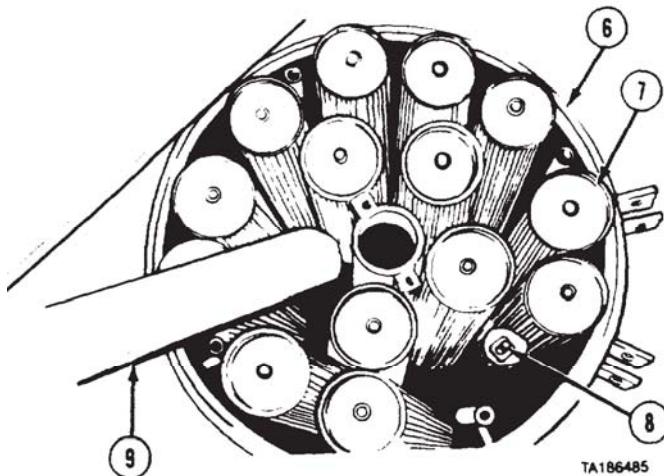
*d. Assembly.***WARNING**

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

- (1) Apply pipe thread sealing compound to bushing (1) and install in elbow (2).
- (2) Apply pipe thread sealing compound to fitting (3) and install in bushing (1).
- (3) Apply pipe thread sealing compound to pipe (4) and install elbow (2).
- (4) Apply pipe thread sealing compound to threads of pipe plug (5) and install in bottom of filter-separator tank (6).
- (5) Install 15 elements (7) over studs (8) in filter-separator tank (6).
- (6) Install 15 canisters (9) over elements (7).



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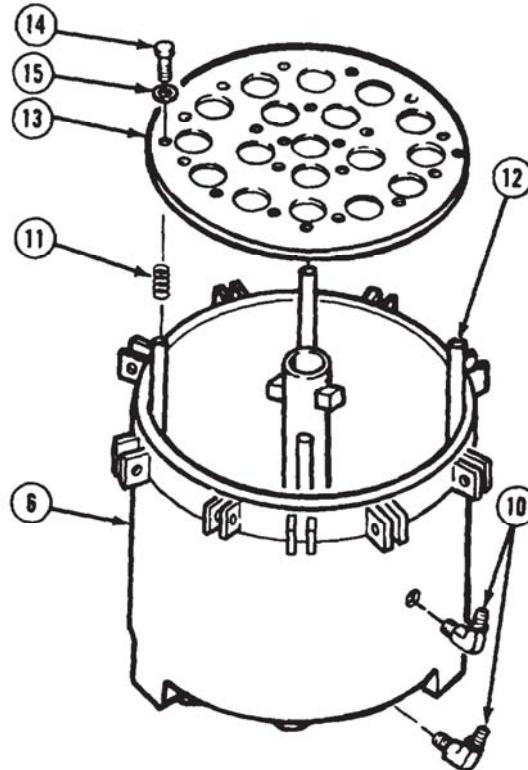
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## Filter-Separator Maintenance Instructions (Cont)

**23-4. FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL A)  
(CONT.)****WARNING**

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

- (7) Apply pipe thread sealing compound to threads of two elbows (10) and install two elbows in side of filter-separator tank (6).
- (8) Apply pipe thread sealing compound to threads of six coil inserts (11) and install in pipes (12).
- (9) Install retaining plate (13) on filter-separator tank (6) with six screws (14) and washers (15).

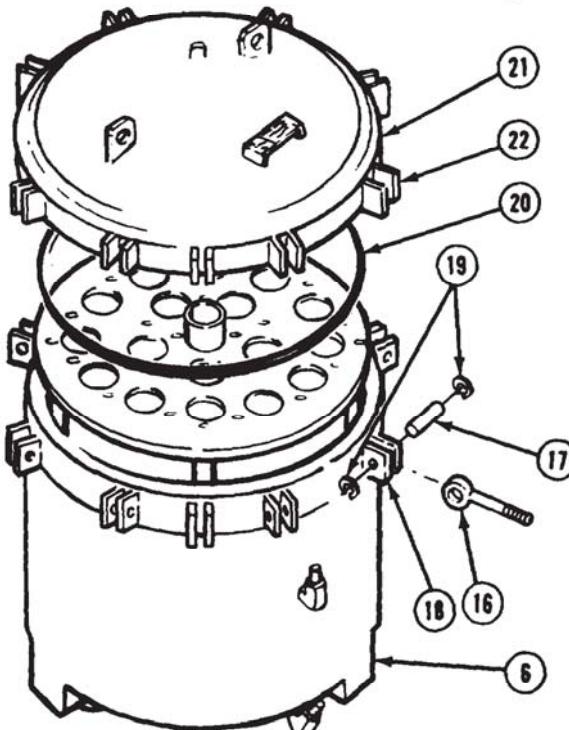


- (10) Position 10 eyebolts (16), and install pins (17) through eyebolts and brackets (18).
- (11) Install two retaining rings (19) in each of 10 pins (17).
- (12) Install preformed packing (20) on top edge of filter-separator tank (6).

**CAUTION**

Do not tear or otherwise damage preformed packing during installation of cover. If packing is damaged, cover will leak.

- (13) Align cover (21) on filter-separator tank (6) so brackets (22) are aligned with brackets (18).



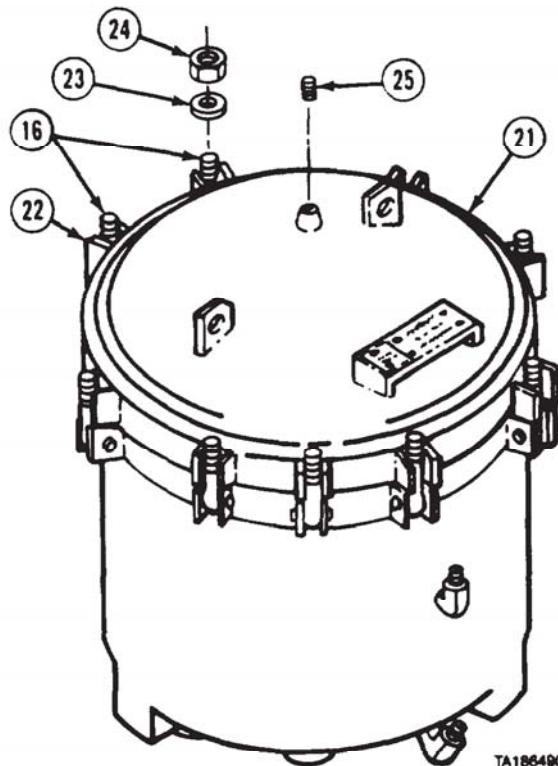
## Filter-Separator Maintenance Instructions (Cont)

- (14) Push 10 eyebolts (16) up in brackets (22).
- (15) Install 10 washers (23) and nuts (24). Tighten to 7.5 lb-ft (102 N·m).

**WARNING**

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

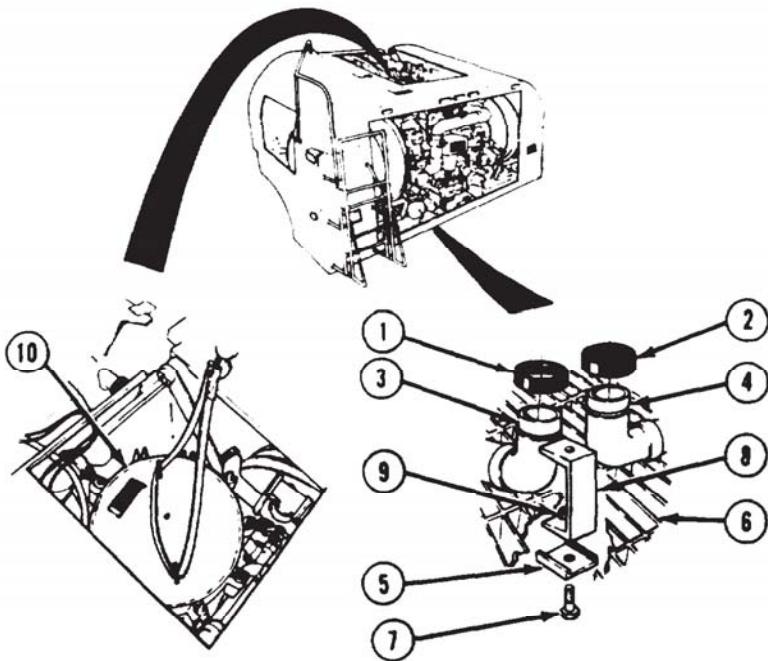
- (16) Apply pipe thread sealing compound to threads of plug (25) and install in cover (21).



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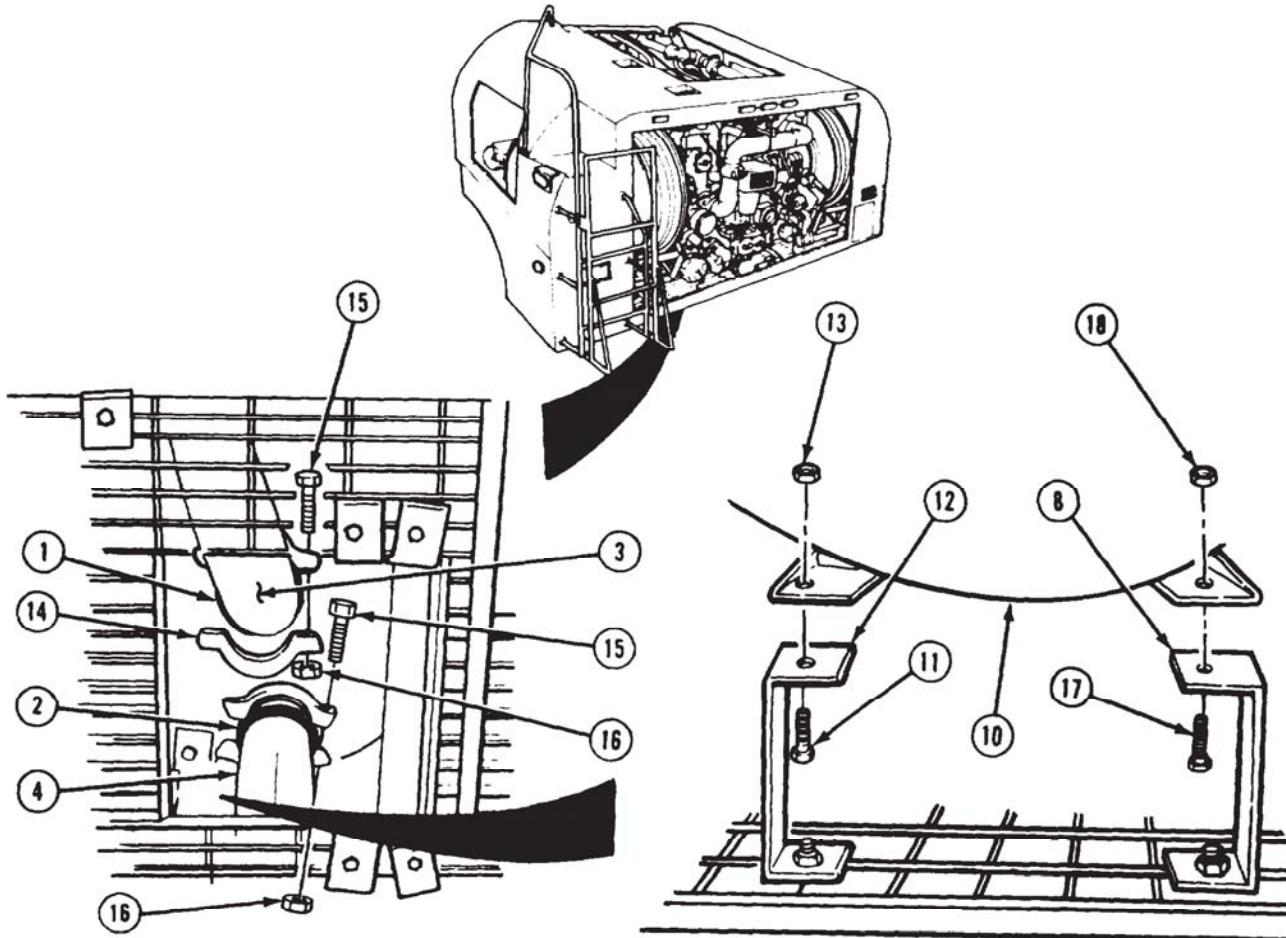
*e. Installation.*

- (1) Install two coupling gaskets (1 and 2) on two pipes (3 and 4).
- (2) Install three brackets (5) on grating (6) with three screws (7), brackets (8), and locknuts (9).
- (3) Soldier A guides filter-separator (10) in through top access opening of pump module while Soldier B operates suitable lifting device.



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## Filter-Separator Maintenance Instructions (Cont)

**23-4. FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL A)  
(CONT).**

- (4) Soldier A installs and holds screw (11) in filter-separator (10) and bracket (12) while Soldier B installs but does not tighten locknut (13).

**NOTE**

- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or out of position, piping connections will leak.

- (5) Align two pipes (3 and 4) with openings in filter-separator (10) and install two coupling gaskets (1 and 2).

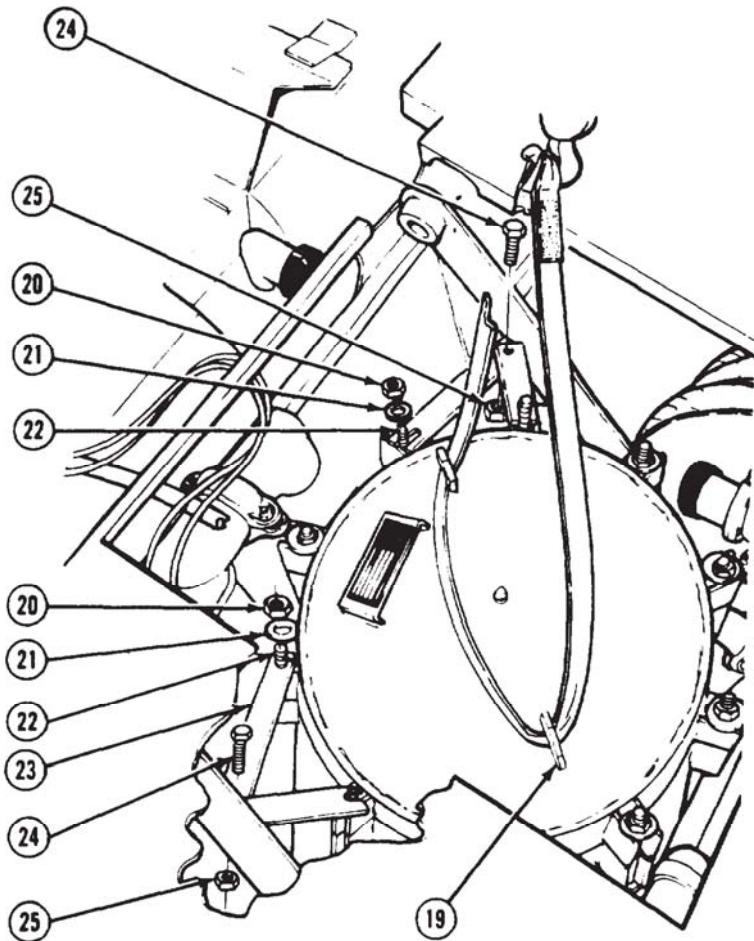
**NOTE**

Next coupling or clamp may have to be loosened before installation.

- (6) Install four coupling halves (14) on two coupling gaskets (1 and 2) with four screws (15) and nuts (16).
- (7) Soldier A installs and holds two screws (17) in filter-separator (10) and brackets (8) while Soldier B installs two locknuts (18).
- (8) Soldier A holds screw (11) while Soldier B tightens locknut (13).

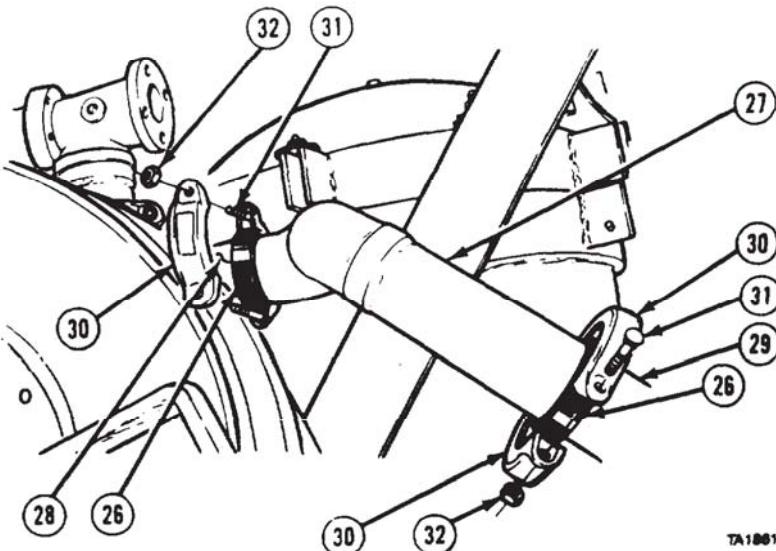
## Filter-Separator Maintenance Instructions (Cont)

- (9) Remove suitable lifting device from filter-separator cover lifting eyes (19).
- (10) Remove four locknuts (20) and washers (21) from eyebolts (22).
- (11) Install four brackets (23), washers (21), and locknuts (20) on eyebolts (22). Do not tighten.
- (12) Install two screws (24) and locknuts (25) in four brackets (23).
- (13) Tighten four locknuts (20) to 75 lb-ft (102 N·m).



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- (14) Slide two coupling gaskets (26) on pipe (27) and position pipe against pipe (28) and pipe (29).
- (15) Position coupling gasket over ends of pipe (28) and pipe (29).
- (16) Install four coupling halves (30) on two coupling gaskets (26) with four screws (31) and nuts (32).

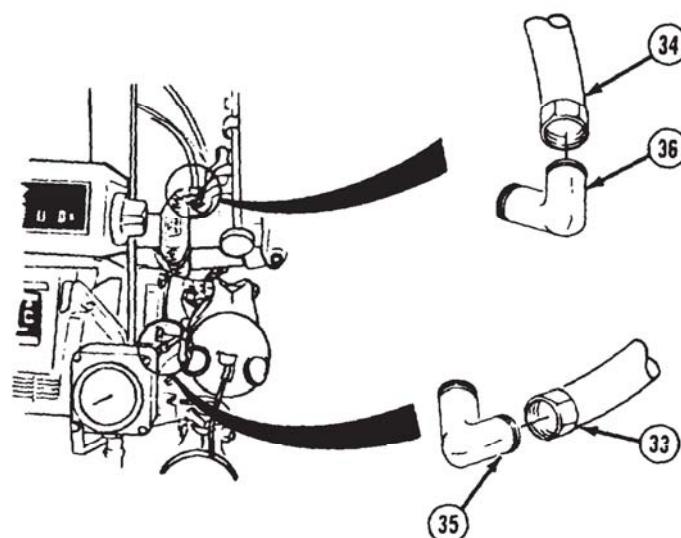


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## Filter-Separator Maintenance Instructions (Cont)

**23-4. FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL A)  
(CONT).**

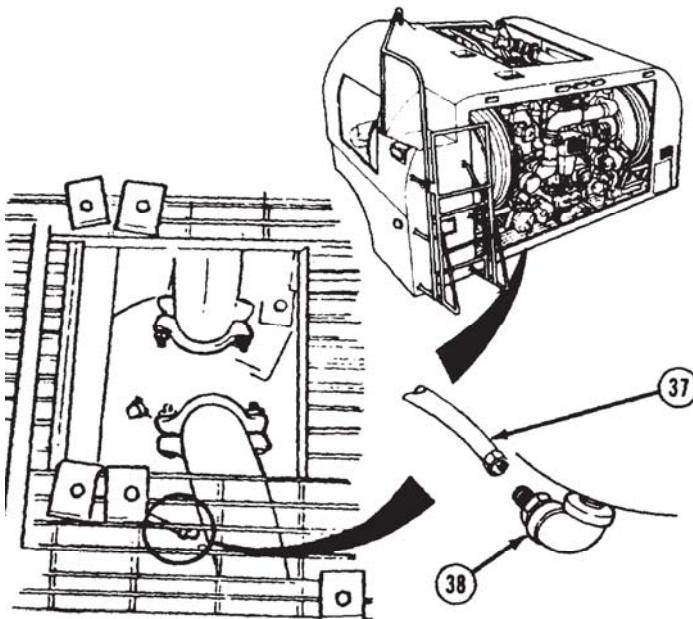
- (17) Connect two tubes (33 and 34) on elbows (35 and 36).



- (18) Connect tube (37) on elbow (38).

*f. Follow-on Maintenance.*

- (1) Install V9 CHECK VALVE (para 25-23).
- (2) Install eductor (para 25-33).
- (3) Load tank (TM 9-2320-279-10).
- (4) Recirculate fuel (TM 9-2320-279-10).
- (5) Check filter-separator and piping for leaks.
- (6) Install pump module top access door piston (para 16-50).
- (7) Install pump module right side access panel (para 16-48).
- (8) Close pump module top and rear access doors (TM 9-2320-279-10).



**END OF TASK**

## Filter-Separator Maintenance Instructions (Cont)

<b>23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B)</b>		
This task covers:		
a. Removal b. Disassembly c. Cleaning/Inspection	d. Assembly e. Installation f. Follow-on Maintenance	
<b>INITIAL SETUP</b>		
<i>Models</i> M978	<i>Equipment Condition</i> <i>TM or Para</i> Para 25-3	<i>Condition Description</i> Tank drained.
<i>Test Equipment</i> None	TM 9-2320-279-10	Pull V-6 FUEL/DEFUEL VALVE handle down.
<i>Special Tools</i> None	TM 9-2320-279-10 TM 9-2320-279-10	Fuel-separator drained. Pump module top and rear access doors opened.
<i>Supplies</i> Oil, fuel, diesel DF-2 regular, Item 27, Appendix C Compound, sealing, pipe thread, Item 18, Appendix C Petrolatum, technical, Item 41.1, Appendix C Solvent, drycleaning, Item 47, Appendix C Tags, identification, Item 48, Appendix C	Para 16-48 Para 16-50 Para 25-23 Para 25-33	Pump module right side access panel removed. Pump module top door piston removed. V9 CHECK VALVE removed. Eductor assembly removed.
<i>Personnel Required</i> MOS 63S, Heavy wheel vehicle mechanic (2)	<i>Special Environmental Conditions</i> None	
<i>References</i> None	<i>General Safety Instructions</i> No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.	

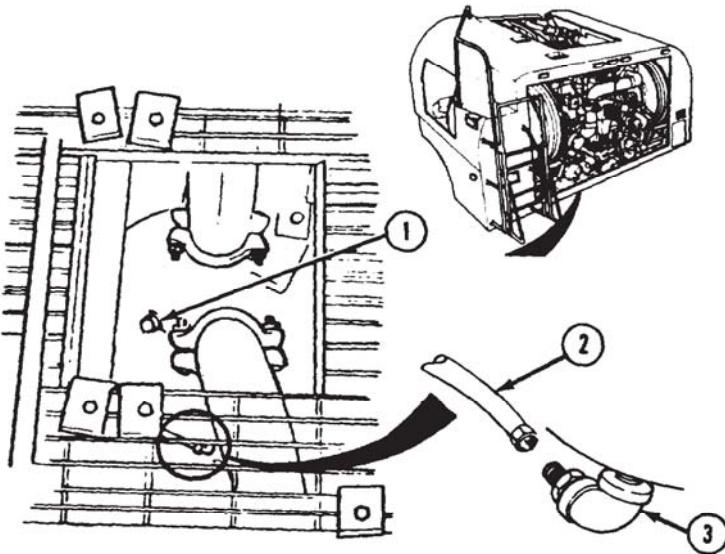
Filter-Separator Maintenance Instructions (Cont)

**23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B)  
(CONT).**

*a. Removal.*

**WARNING**

- Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.
- Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.



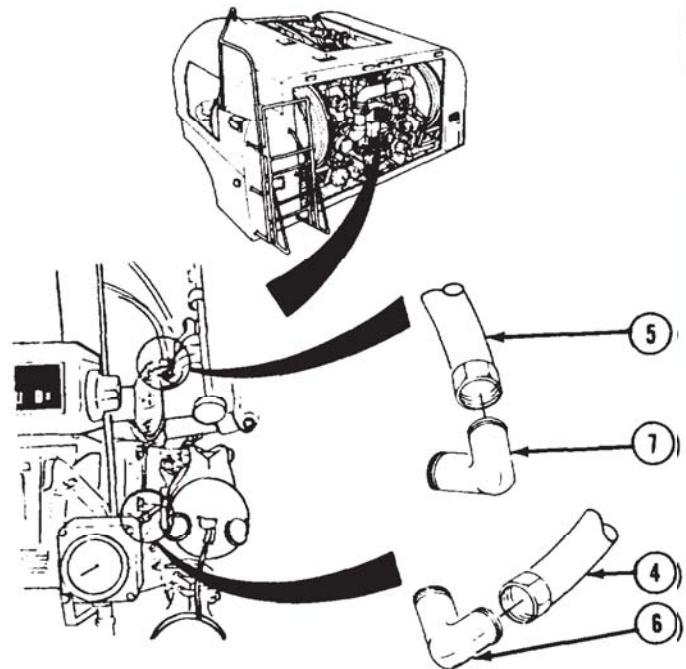
**NOTE**

Tag and mark all tubes, hoses, and brackets before removal.

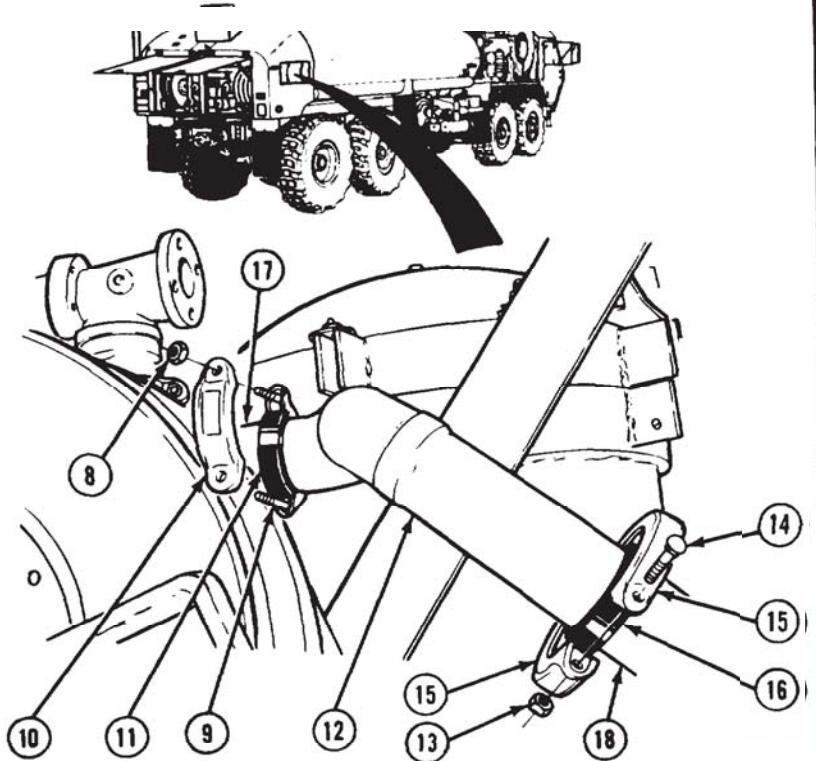
- (1) Remove filter-separator drain plug (1) and drain fuel. When all fuel is drained, coat threads of filter-separator drain plug with pipe thread sealing compound and install.
- (2) Disconnect tube (2) from elbow (3).

## Filter-Separator Maintenance Instructions (Cont)

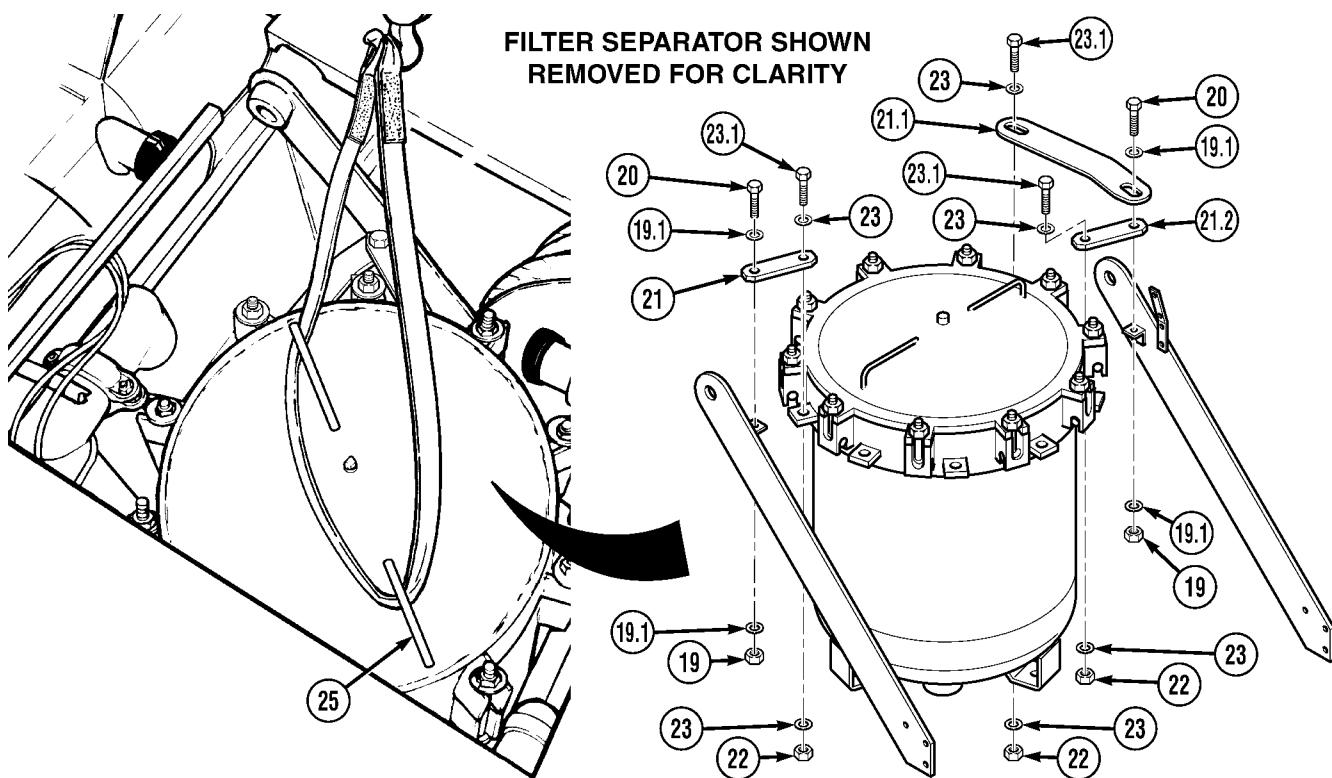
- (3) Disconnect two tubes (4 and 5) from elbows (6 and 7).



- (4) Remove two nuts (8), screws (9), and coupling halves (10) from coupling gasket (11).  
 (5) Slide coupling gasket (11) on pipe (12).  
 (6) Remove two nuts (13), screws (14), and coupling halves (15) from coupling gasket (16).  
 (7) Slide coupling gasket (16) on pipe (12) and remove pipe from two pipes (17 and 18). Remove coupling gaskets.



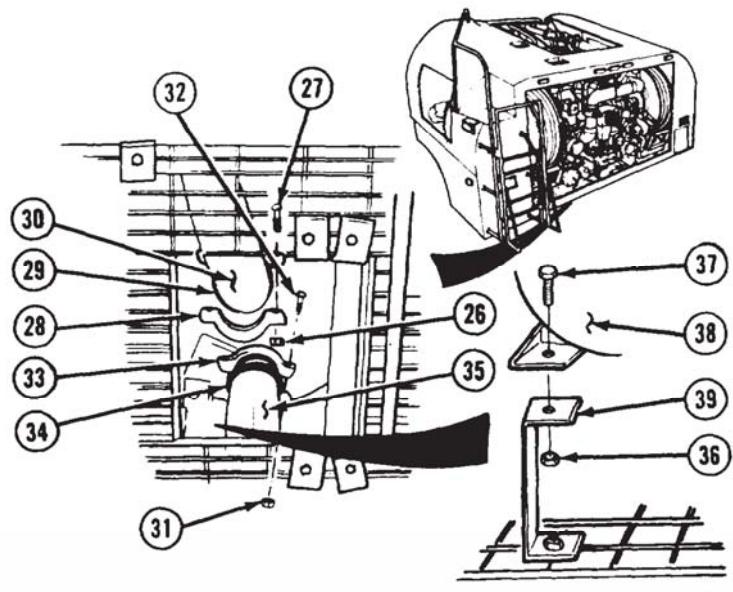
## Filter-Separator Maintenance Instructions (Cont)

23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B)  
(CONT).

- (8) Remove two locknuts (19) four washers (19.1), and two screws (20) from three brackets (21, 21.1, and 21.2).
- (9) Remove three locknuts (22), six washers (23), three screws (23.1) and three brackets (21, 21.1, and 21.2).
- (10) Deleted.
- (11) Attach suitable lifting device to filter-separator cover (25).

## Filter-Separator Maintenance Instructions (Cont)

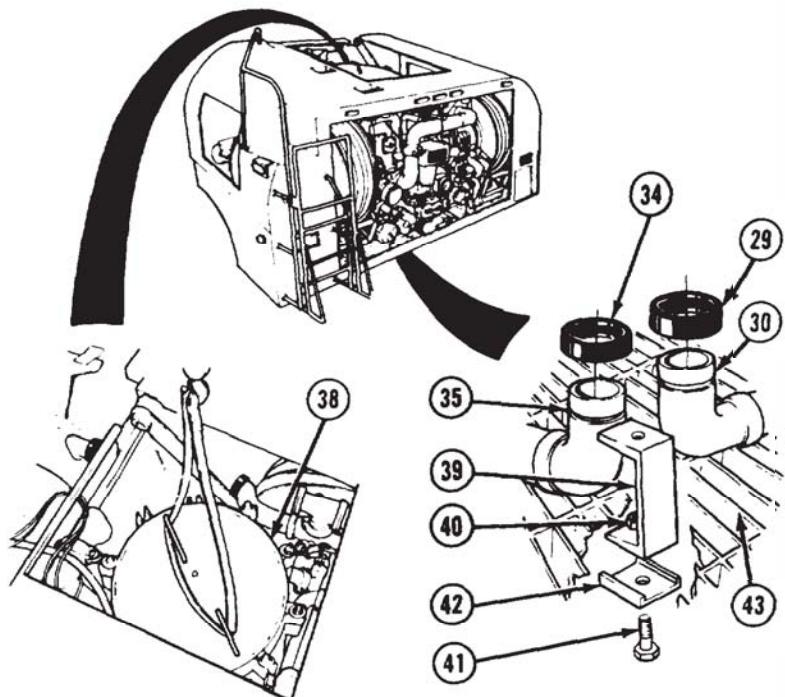
- (12) Remove two nuts (26), screws (27), and coupling halves (28). Slide coupling gasket (29) on pipe (30).
- (13) Remove two nuts (31), screws (32), and coupling halves (33). Slide coupling gasket (34) on pipe (35).
- (14) Soldier A removes three locknuts (36) while Soldier B holds and removes screws (37) from filter-separator (38) and three brackets (39).



- (15) Soldier A guides filter-separator (38) from top access opening of pump module while Soldier B operates suitable lifting device.

**NOTE**  
Mark position of brackets on grating.

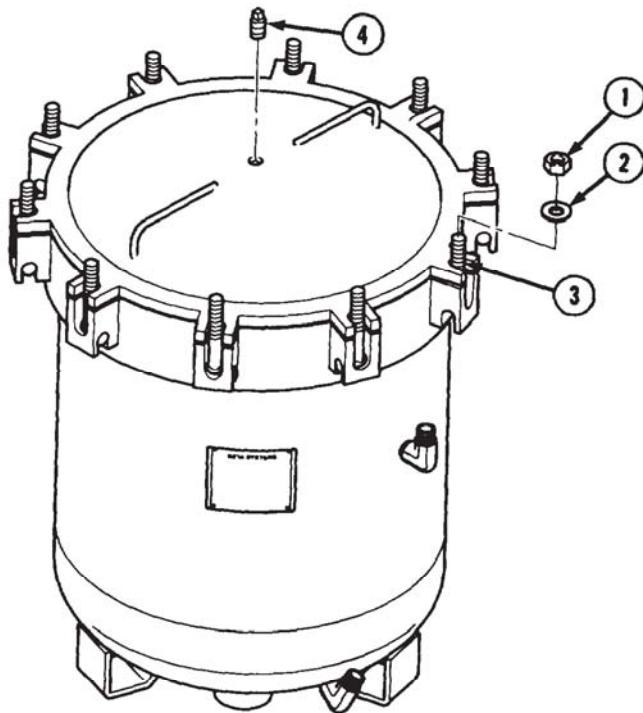
- (16) Remove three locknuts (40), screws (41), brackets (42), and brackets (39) from grating (43).
- (17) Remove two coupling gaskets (29 and 34) from pipes (30 and 35).



Filter-Separator Maintenance Instructions (Cont)

**23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B)  
(CONT).**

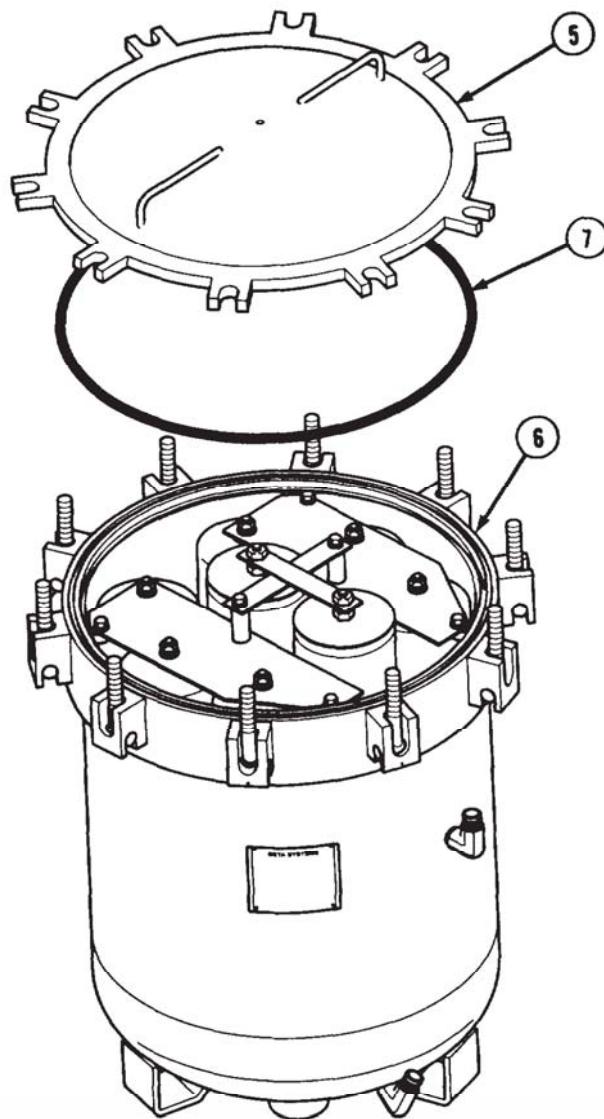
*b. Disassembly.*



**NOTE**  
Mark position of cover.

- (1) Remove 10 nuts (1) and washers (2) from tee screws (3). Push down tee screws.
- (2) Remove pipe plug (4).

## Filter-Separator Maintenance Instructions (Cont)

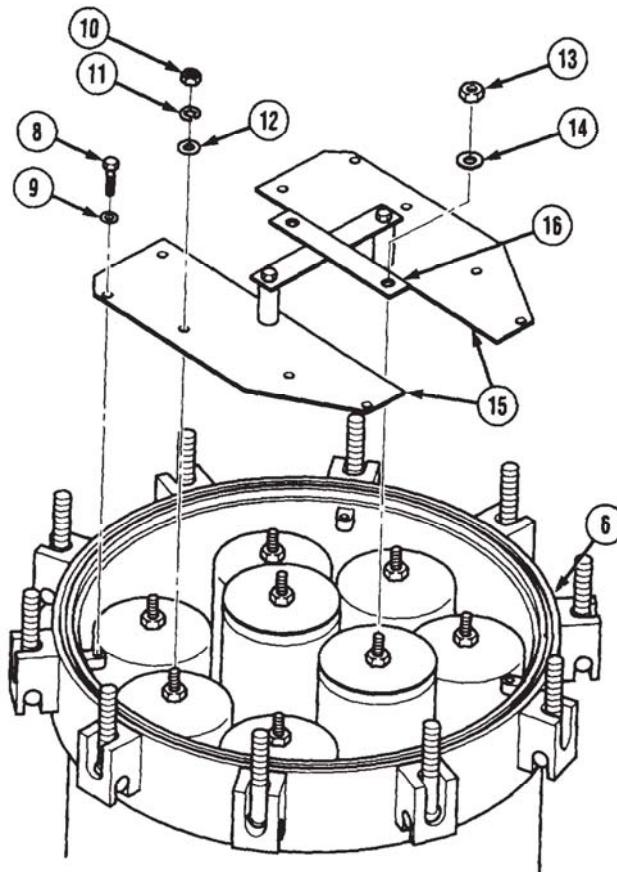


- (3) Using suitable lifting device, remove cover (5) from filter-separator tank (6).
- (4) Remove preformed packing (7) from filter-separator tank (6).

## Filter-Separator Maintenance Instructions (Cont)

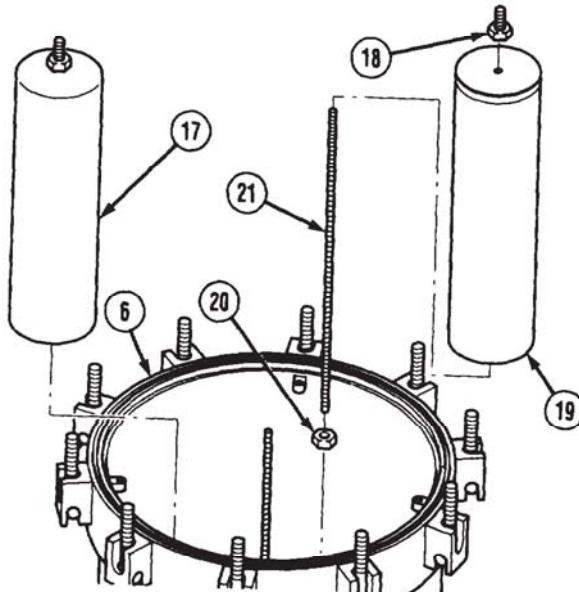
**23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B)  
(CONT).**

- (5) Remove four screws (8) and lockwashers (9).
- (6) Remove six nuts (10), lockwashers (11), and washers (12).
- (7) Remove two nuts (13) and washers (14).
- (8) Remove retainers (15) with locator (16).

**NOTE**

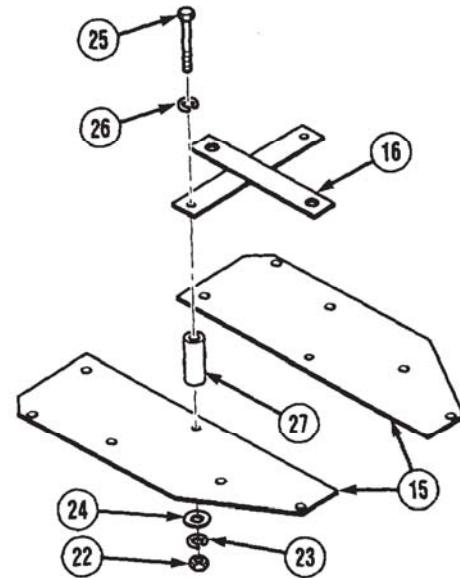
Coalescer elements are threaded onto filter-separator tank.

- (9) Remove six coalescer elements (17) from filter-separator tank (6).
- (10) Remove two seal nuts (18) and separator canisters (19) from filter-separator tank (6).
- (11) Loosen two nuts (20) and remove two rods (21).
- (12) Remove two nuts (20) from rods (21).

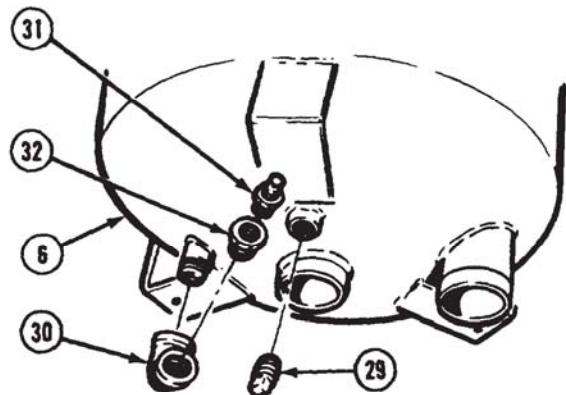
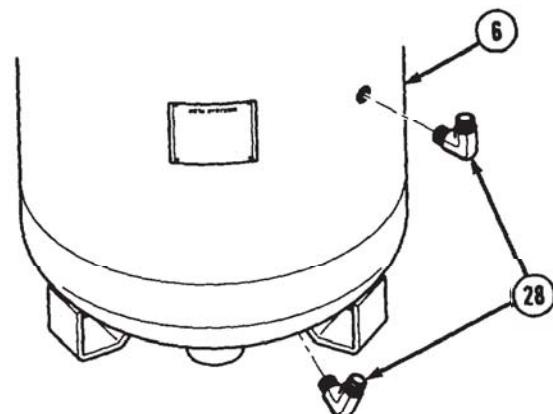


## Filter-Separator Maintenance Instructions (Cont)

- (13) Remove two nuts (22), lockwashers (23), washers (24) screws (25), lockwashers (26), locator (16), and two spacers (27) from retainers (15).



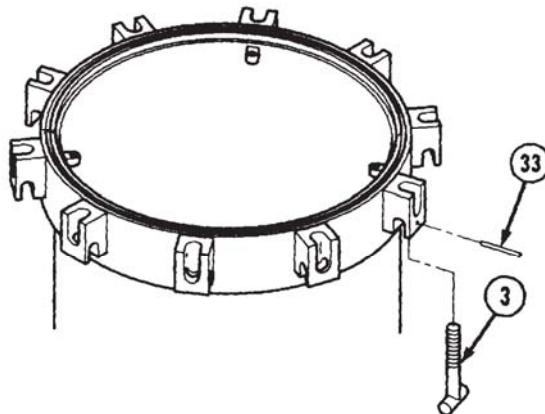
- (14) Remove two elbows (28) from side of filter-separator tank (6).  
 (15) Remove pipe plug (29) and elbow (30) from bottom of filter-separator tank (6).  
 (16) Remove fitting (31) and bushing (32) from elbow (30).



## Filter-Separator Maintenance Instructions (Cont)

**23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B)  
(CONT).**

- (17) Remove ten roll pins (33) and tee screws (3).

*c. Cleaning/Inspection.***WARNING**

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of vehicle.

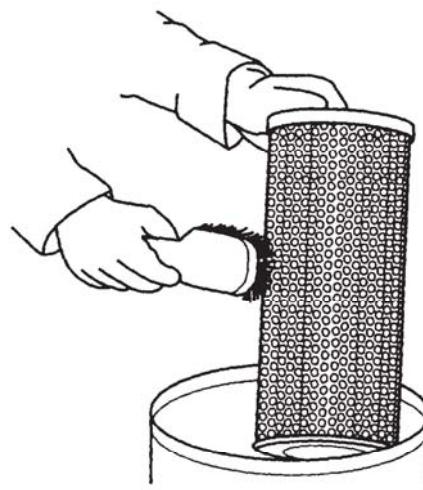
**CAUTION**

Do not handle separator or coalescer elements with bare hands. Any contaminant, including dirt or oil from hands, will deactivate elements.

- (1) To clean fuel-separator element, submerge element in clean fuel and gently scrub entire screen surface with soft cloth or soft bristle brush.
- (2) Hold separator element by endcaps and visually inspect entire screen surface for any nicks, cuts, or flaws. If element is noticeably flawed, replace element.

**NOTE**

- Cleaned and inspected element should be tested for its ability to repel water before it is reinstalled.
  - If water beads and rolls off screen surface during test, element can be reused.
  - If water adheres to and wets any part of screen surface during test, element should be recleaned (step (1)) and retested (step (3)). If element fails test, replace element.
- (3) To test separator element, hold element at any angle by endcaps, and gradually pour water over entire screen surface.



### Filter-Separator Maintenance Instructions (Cont)

- (4) When separator element passes inspection and test, rinse element thoroughly in clean fuel to remove any traces of water. Allow separator element to air dry before reinstalling it.

**WARNING**

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



- (5) Clean all metal parts with drycleaning solvent.

**WARNING**

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment, goggles, shield, and gloves.

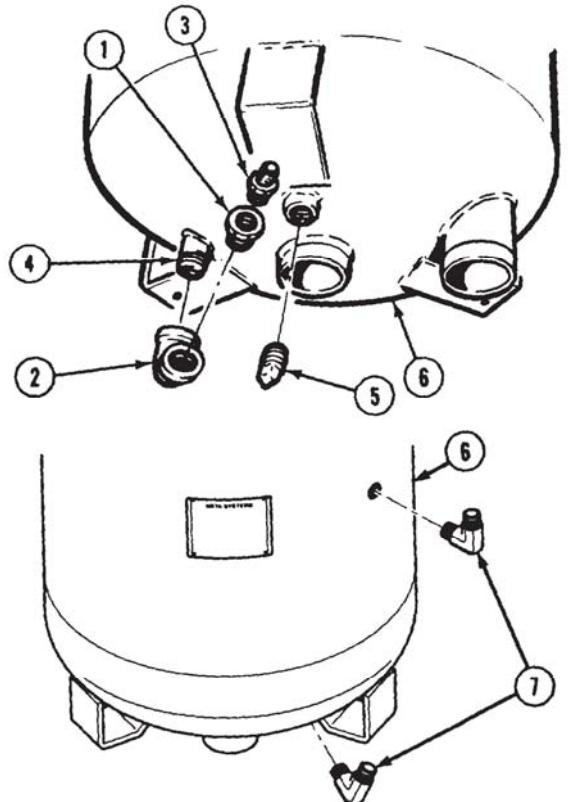
- (6) Dry metal parts with compressed air.  
 (7) Inspect each part for damage.  
 (8) Replace damaged parts.

*d. Assembly.*

**WARNING**

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

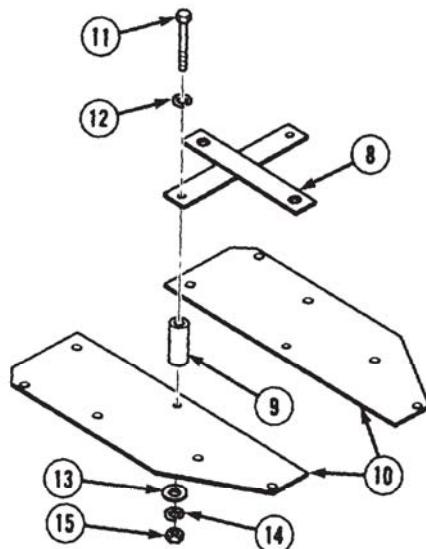
- (1) Apply pipe thread sealing compound to bushing (1) and install in elbow (2).
- (2) Apply pipe thread sealing compound to fitting (3) and install in bushing (1).
- (3) Apply pipe thread sealing compound to pipe (4) and install elbow (2).
- (4) Apply pipe thread sealing compound to threads of pipe plug (5) and install in bottom of filter-separator tank (6).
- (5) Apply pipe thread sealing compound to threads of two elbows (7) and install in filter-separator tank (6).



## Filter-Separator Maintenance Instructions (Cont)

**23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B)  
(CONT).**

- (6) Install locator (8) and two spacers (9) on two retainers (10) with two screws (11), lockwashers (12), washers (13), lockwashers (14), and nuts (15).

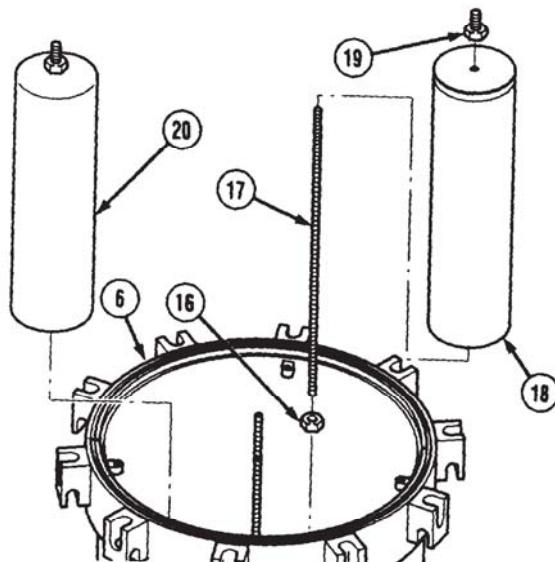


- (7) Install two nuts (16) on two rods (17).  
 (8) Install rods (17) in filter-separator tank (6) and tighten nuts (16).

**CAUTION**

Do not handle separator canister or coalescer element with bare hands. Any contaminants, including dirt or oil from hands, will deactivate elements.

- (9) Install two separator canisters (18) in filter-separator tank (6) with two seal nuts (19). Tighten seal nuts to 5 lb-ft (6.78 N·m).  
 (10) Install six coalescer elements (20) in filter-separator tank (6). Tighten coalescer element to 30 lb-ft (40.68 N·m).



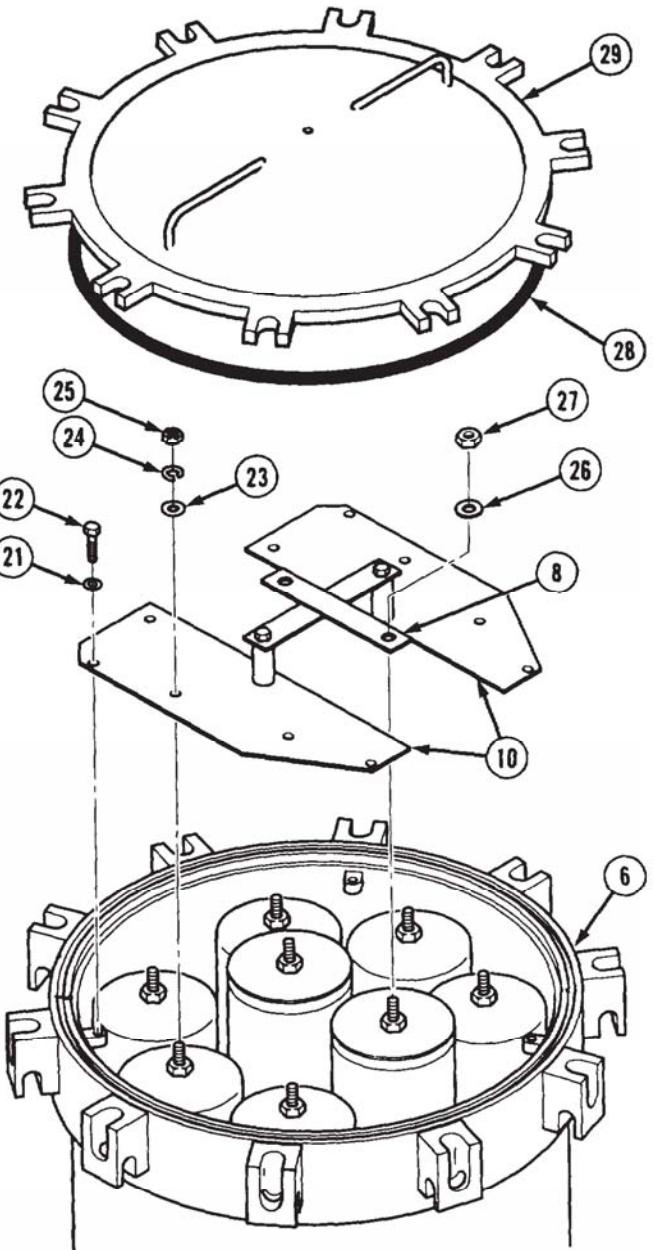
## Filter-Separator Maintenance Instructions (Cont)

- (11) Install retainers (10) with locator (8) in filter-separator tank (6).
- (12) Install four washers (21) and screws (22).
- (13) Install six washers (23), lockwashers (24), and nuts (25).
- (14) Install two washers (26) and nuts (27).
- (15) Install preformed packing (28) around edge of filter-separator tank (6).

**CAUTION**

Do not tear or otherwise damage preformed packing during installation of cover. If packing is damaged, cover will leak.

- (16) Align cover (29) on filter-separator tank (6).



## Filter-Separator Maintenance Instructions (Cont)

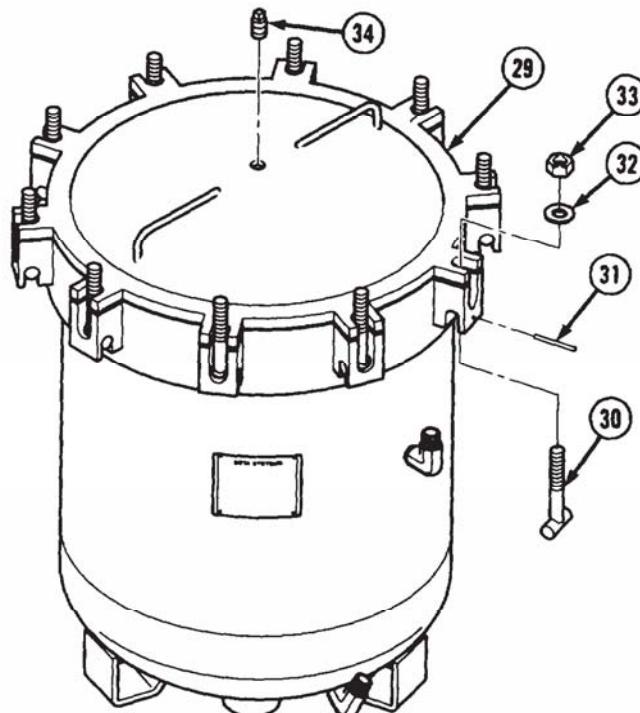
**23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B)  
(CONT).**

- (17) Install ten tee screws (30), roll pins (31), washers (32), and nuts (33). Tighten to 105 lb·ft (142 N·m).

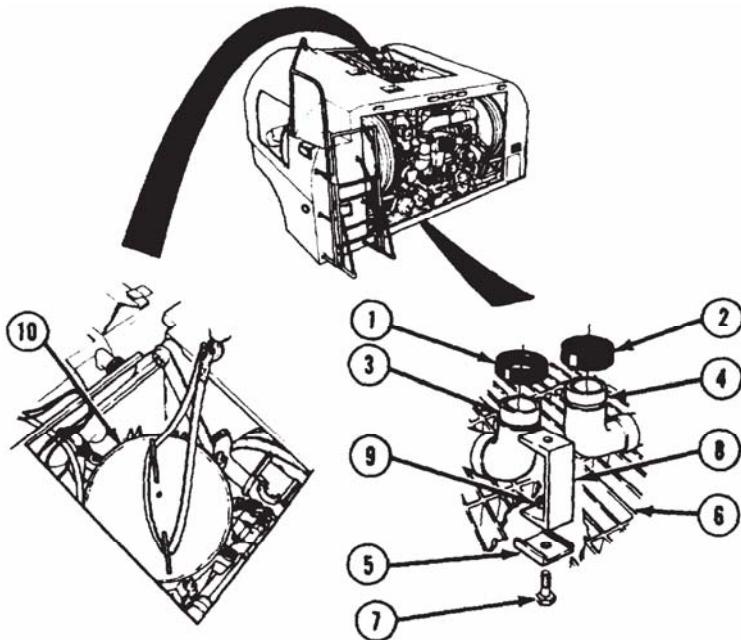
**WARNING**

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

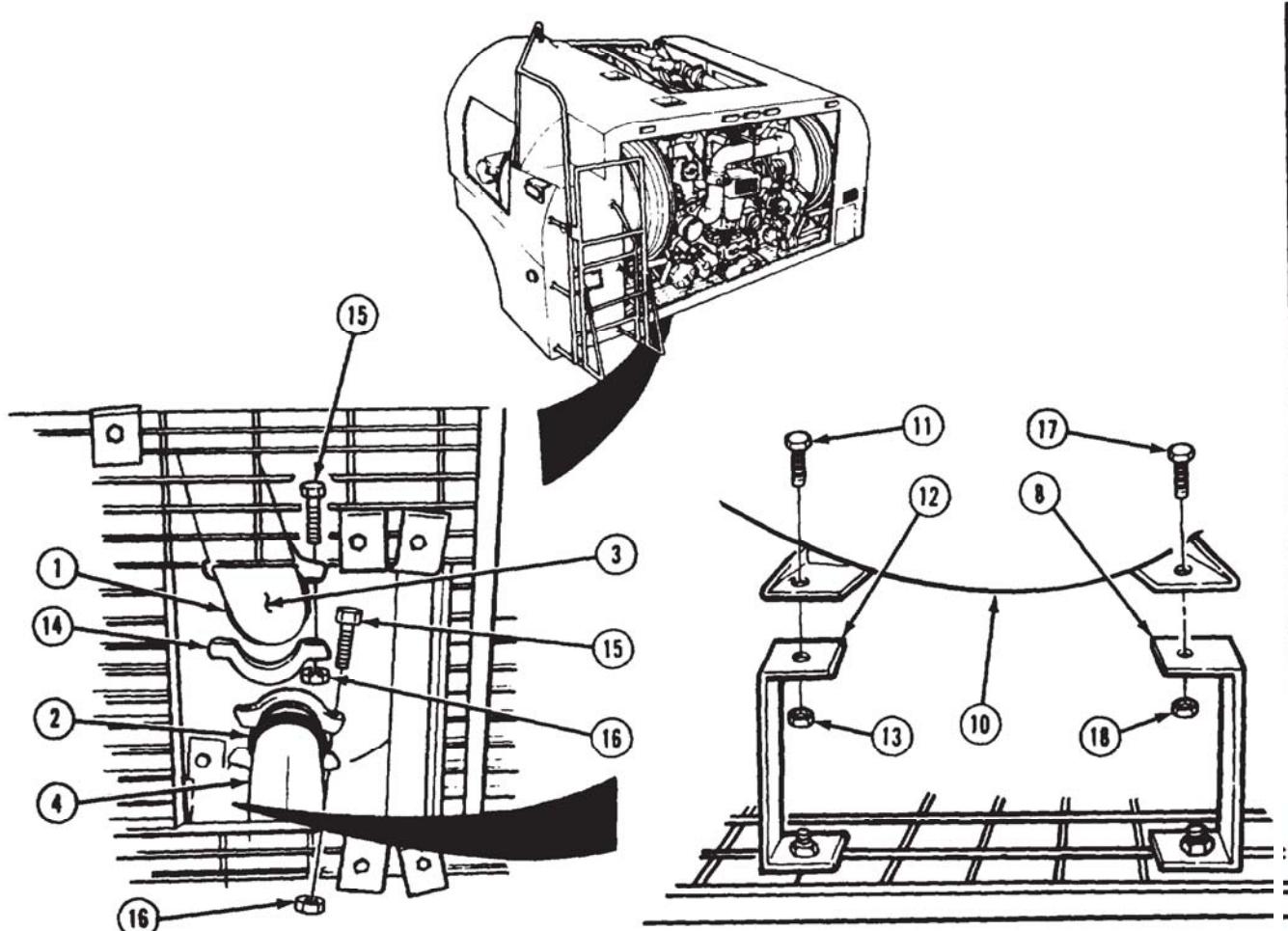
- (18) Apply pipe thread sealing compound to threads of plug (34) and install in cover (29).

*e. Installation.*

- (1) Install two coupling gaskets (1 and 2) on two pipes (3 and 4).
- (2) Install three brackets (5) on grating (6) with three screws (7), brackets (8), and locknuts (9).
- (3) Soldier A guides filter-separator (10) in through top access opening of pump module while Soldier B operates suitable lifting device.



## Filter-Separator Maintenance Instructions (Cont)



- (4) Soldier A installs and holds screw (11) in filter-separator (10) and bracket (12) while Soldier B installs but does not tighten locknut (13).

**NOTE**

- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or out of position, piping connections will leak.

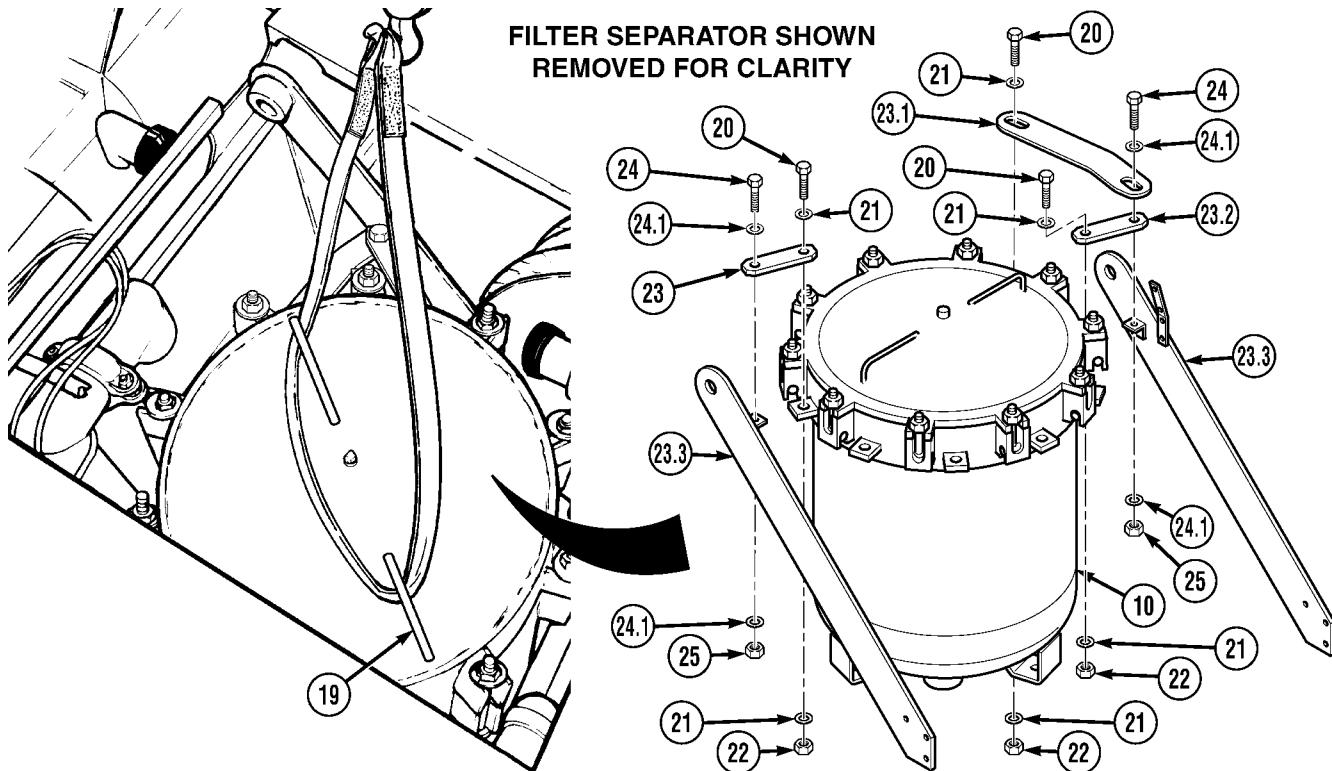
- (5) Align two pipes (3 and 4) with openings in filter-separator (10) and install two coupling gaskets (1 and 2).

**NOTE**

Next coupling or clamp may have to be loosened before installation.

- (6) Install four coupling halves (14) on two coupling gaskets (1 and 2) with four screws (15) and nuts (16).  
 (7) Soldier A installs and holds two screws (17) in filter-separator (10) and brackets (8) while Soldier B installs two locknuts (18).  
 (8) Soldier A holds screw (11) while Soldier B tightens locknut (13).

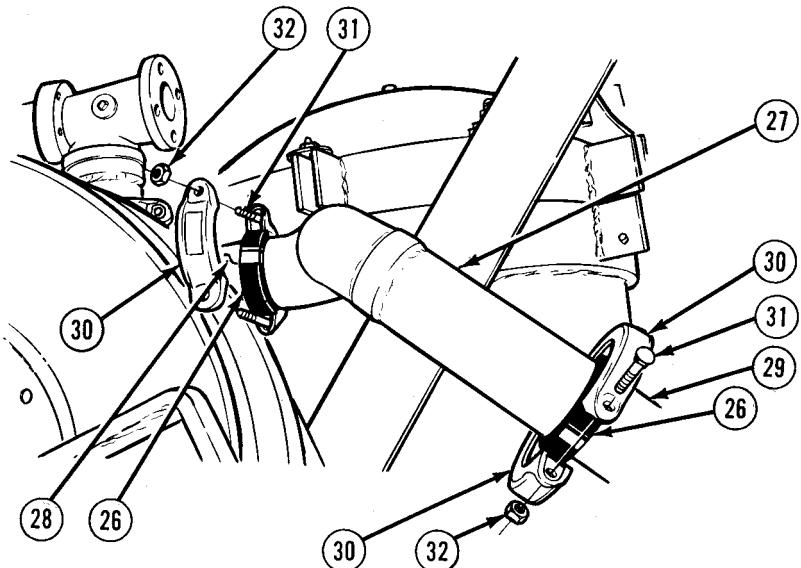
## Filter-Separator Maintenance Instructions (Cont)

23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B)  
(CONT.)

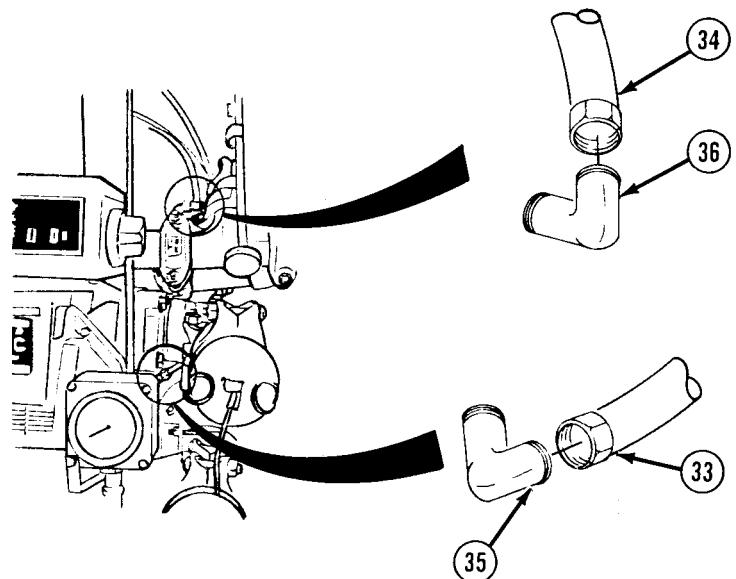
- (9) Remove suitable lifting device from filter-separator cover lifting eyes (19).
- (10) Deleted.
- (11) Install three brackets (23, 23.1 and 23.2) on filter-separator (10) with three screws (20), six washers (21), and three locknuts (22).
- (12) Install three brackets (23, 23.1 and 23.2) to tanker module brackets (23.3) with two screws (24), four washers (24.1), and two locknuts (25).
- (13) Deleted.

## Filter-Separator Maintenance Instructions (Cont)

- (14) Slide two coupling gaskets (26) on pipe (27) and position pipe against pipe (28) and pipe (29).
- (15) Position coupling gaskets over ends of pipe (28) and pipe (29).
- (16) Install four coupling halves (30) on two coupling gaskets (26) with four screws (31) and nuts (32).



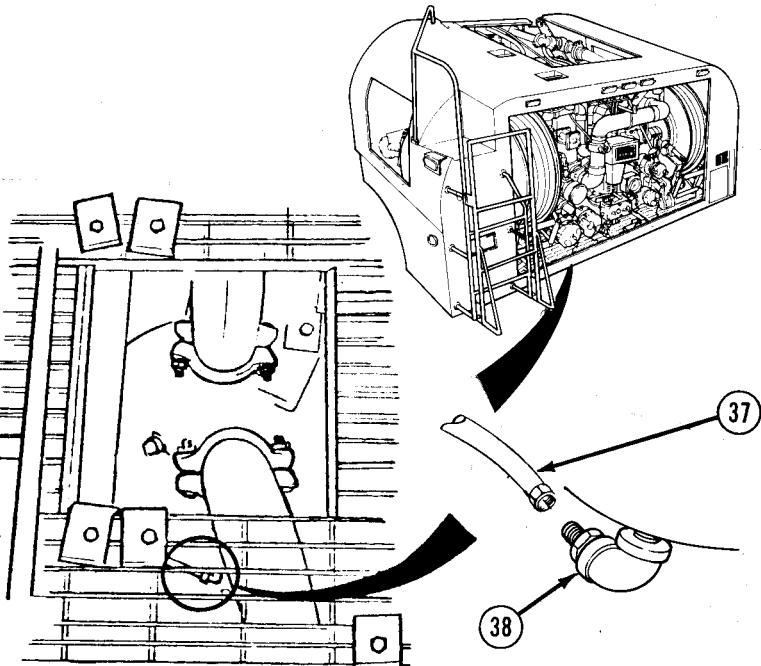
- (17) Connect two tubes (33 and 34) on elbows (35 and 36).



## Filter-Separator Maintenance Instructions (Cont)

23-4.1 FILTER-SEPARATOR REMOVAL/REPAIR/INSTALLATION (M978) (MODEL B)  
(CONT).

- (18) Connect tube (37) on elbow (38).
- f. Follow-on Maintenance.
- (1) Install V9 CHECK VALVE (para 25-23).
  - (2) Install eductor (para 25-33).
  - (3) Load tank (TM 9-2320-279-10).
  - (4) Recirculate fuel (TM 9-2320-279-10).
  - (5) Check filter-separator and piping for leaks.
  - (6) Install pump module top access door piston (para 16-50).
  - (7) Install pump module right side access panel (para 16-48).
  - (8) Close pump module top and rear access doors (TM 9-2320-279-10).



END OF TASK

## CHAPTER 24

### RADIO KIT MAINTENANCE

	Para	Page
General . . . . .	24-1	24-1
Radio Kit Removal/Installation . . . . .	24-2	24-1

#### Section I. INTRODUCTION

**24-1. GENERAL.** This chapter contains maintenance instructions for removing and installing radio kit components authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

#### Section II. RADIO KIT

##### Radio Kit Maintenance Instructions

###### **24-2. RADIO KIT REMOVAL/INSTALLATION.**

This task covers:

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

###### **INITIAL SETUP**

*Models*

All

*References*

None

*Test Equipment*

None

*Equipment Condition*

TM or Para              Condition Description

TM 9-2320-279-10 Shut off engine.

TM 9-2320-279-10 Spare tire removed.

Para 7-91              Batteries disconnected.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

Tags, identification, Item 48, Appendix C  
Ties, cable, plastic, Item 52, Appendix C

*General Safety Instructions*

None

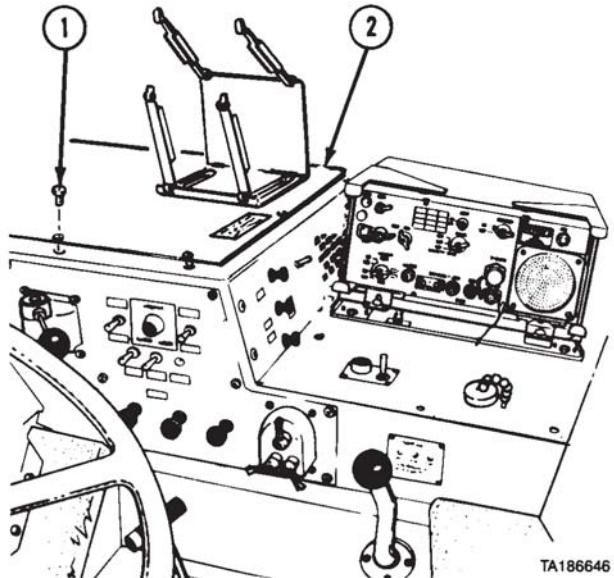
*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

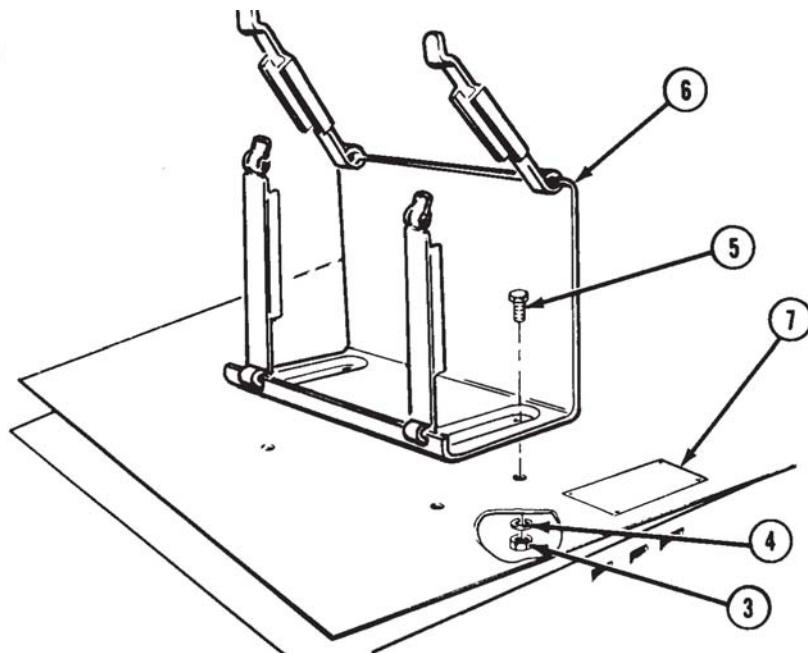
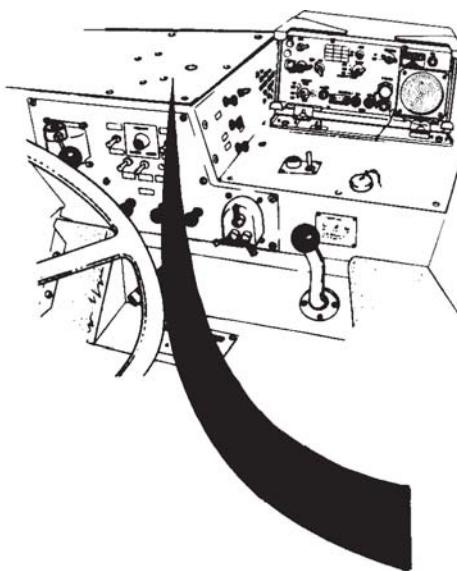
## Radio Kit Maintenance Instructions (Cont)

**24-2. RADIO KIT REMOVAL/INSTALLATION (CONT.).****a. Removal.**

- (1) Remove eight screws (1) and lift heater compartment cover (2).



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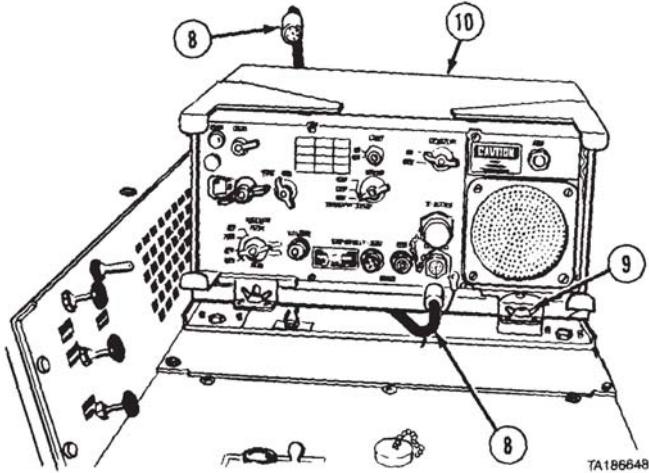


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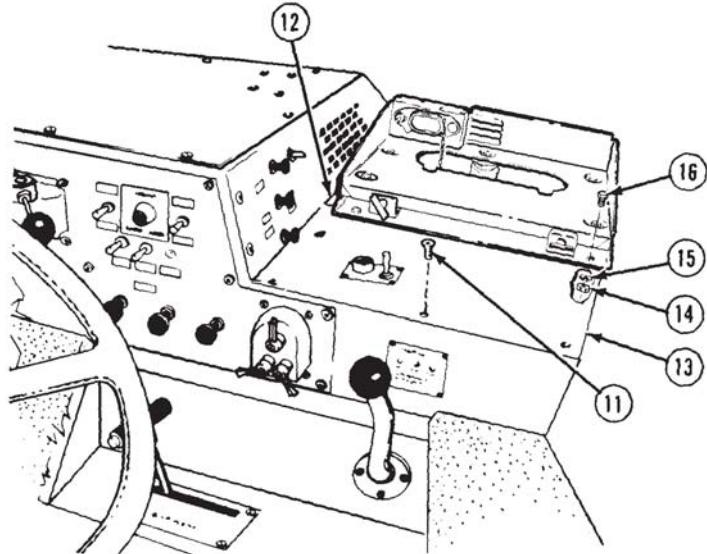
- (2) Remove four nuts (3), lockwashers (4), screws (5), and security unit mount (6).  
 (3) Remove data plate (7).

**Radio Kit Maintenance Instructions (Cont)**

- (4) Tag, mark, and disconnect two antenna leads (8).  
 (5) Loosen two thumbscrews (9) and remove radio (10).



- (6) Remove 11 screws (11) and two heater compartment covers (12 and 13).  
 (7) Remove five nuts (14), lockwashers (15), and screws (16).



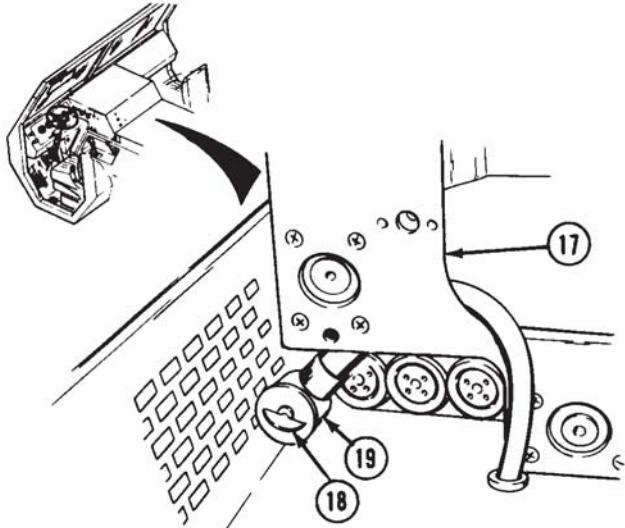
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## Radio Kit Maintenance Instructions (Cont)

**24-2. RADIO KIT REMOVAL/INSTALLATION (CONT).**

- (8) Lift radio mount (17), pull up handle (18), and disconnect connector (19).

- (9) Remove radio mount (17).

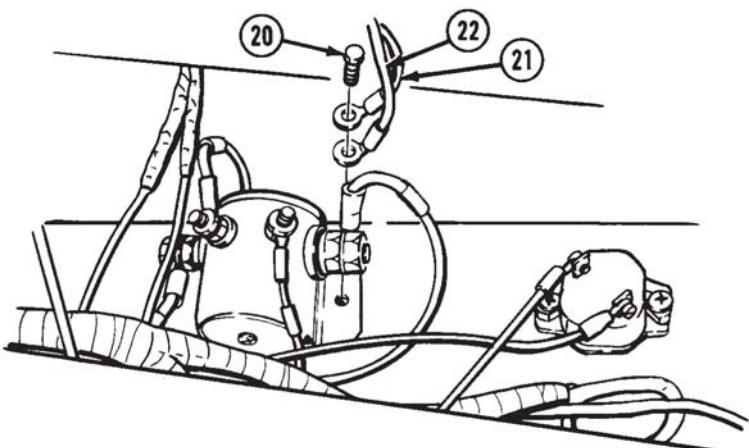


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**NOTE**

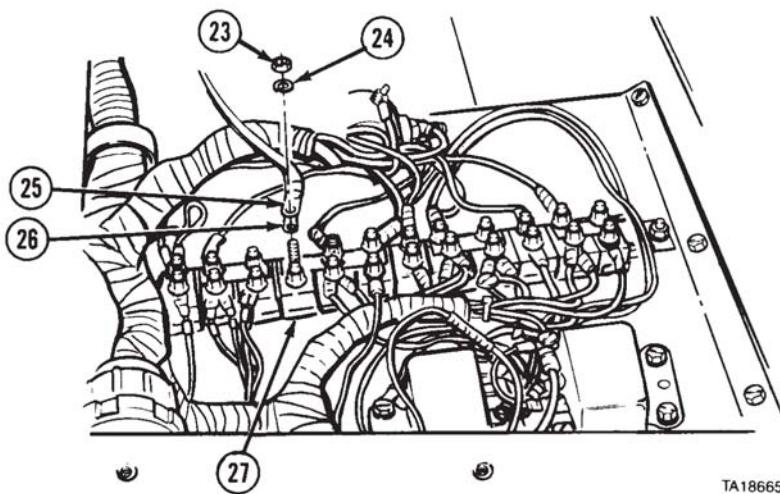
Tag and mark all wires before disconnecting or removing.

- (10) Remove screw (20), black ground wire (21), and green ground wire (22).



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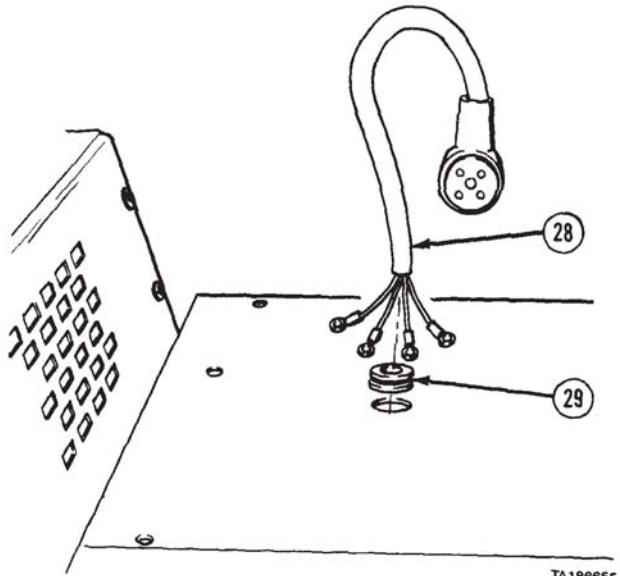
- (11) Remove nut (23), lockwasher (24), red wire (25), and white wire (26) from circuit breaker No. 4 (27).



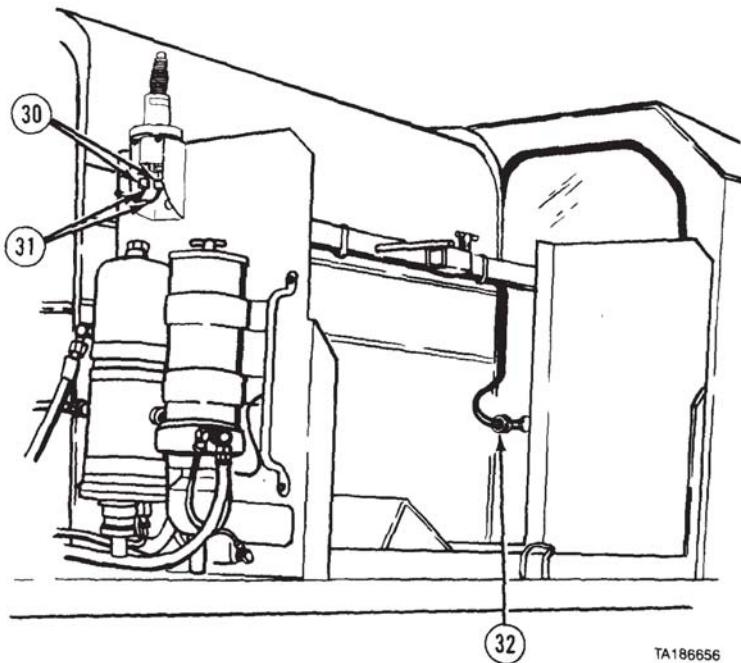
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## Radio Kit Maintenance Instructions (Cont)

- (12) Pull cable (28) up through grommet (29).  
Remove grommet.



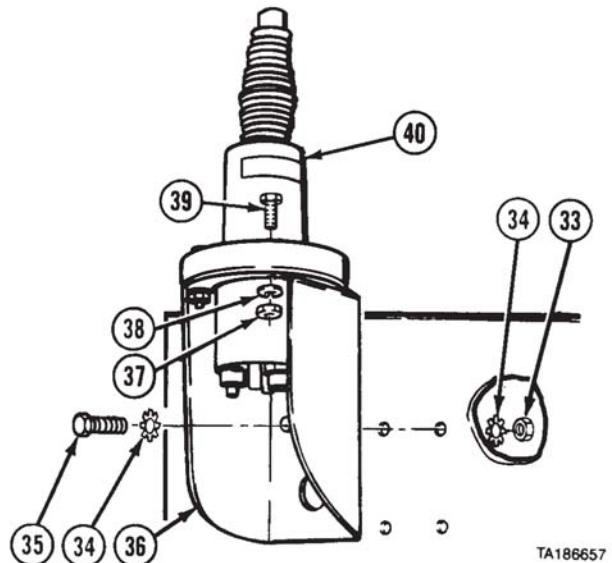
- (13) Disconnect two connectors (30).  
(14) Cut plastic cable ties and pull two cables (31) through grommet (32). Remove grommet.



## Radio Kit Maintenance Instructions (Cont)

24-2. RADIO KIT REMOVAL/INSTALLATION (CONT.)

- (15) Remove four nuts (33), eight lockwashers (34), four screws (35), and antenna mount (36).  
 (16) Remove four nuts (37), lockwashers (38), screws (39), and antenna (40).



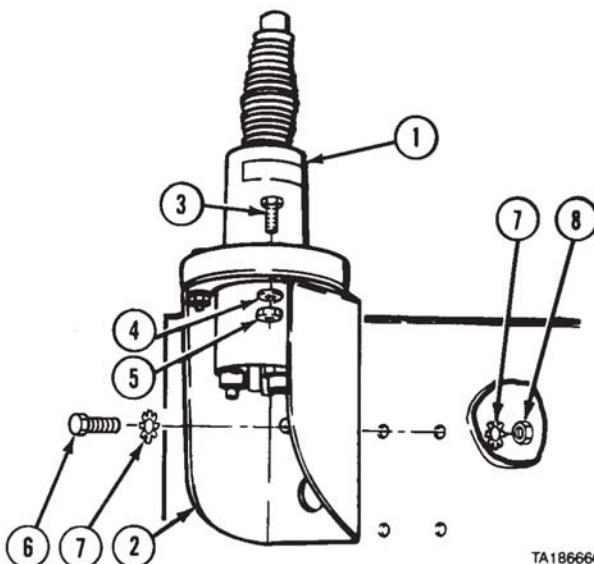
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*b. Installation.*

## NOTE

Use plastic cable ties as needed.

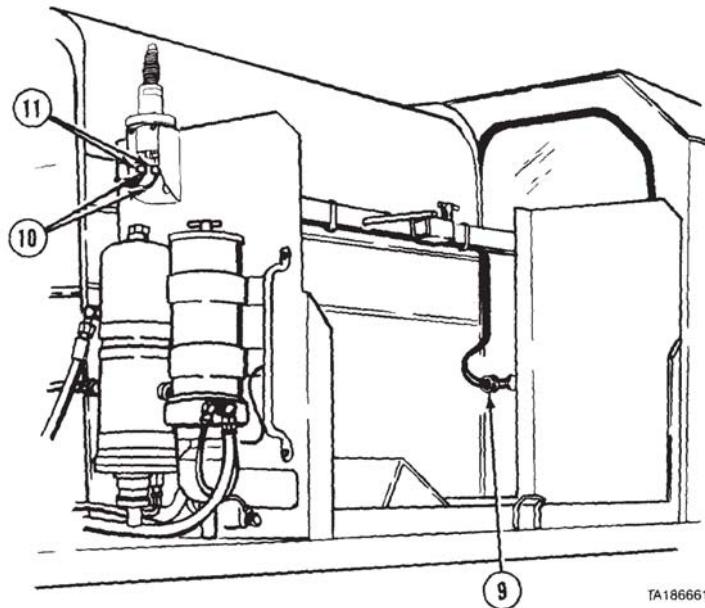
- (1) Install antenna (1) to antenna mount (2) with four screws (3), lockwashers (4), and nuts (5).  
 (2) Install antenna mount (2) with four screws (6), eight lockwashers (7), and four nuts (8).



TA186660

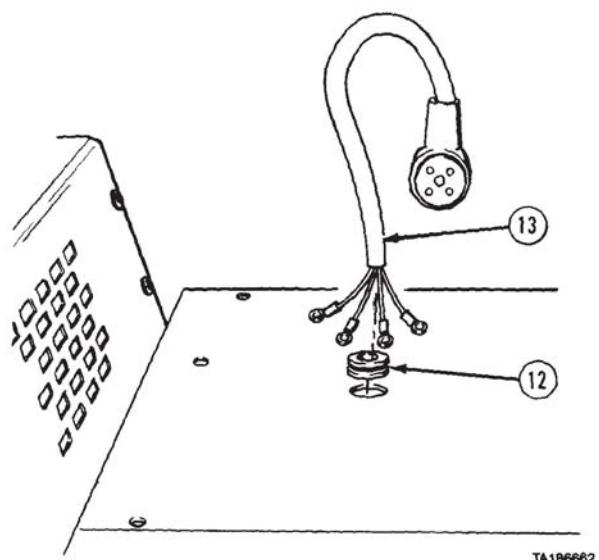
## Radio Kit Maintenance Instructions (Cont)

- (3) Install grommet (9). Pull two cables (10) through grommet.
- (4) Connect two connectors (11) and install cables (10).



TA186661

- (5) Install grommet (12). Push cable (13) down through grommet.

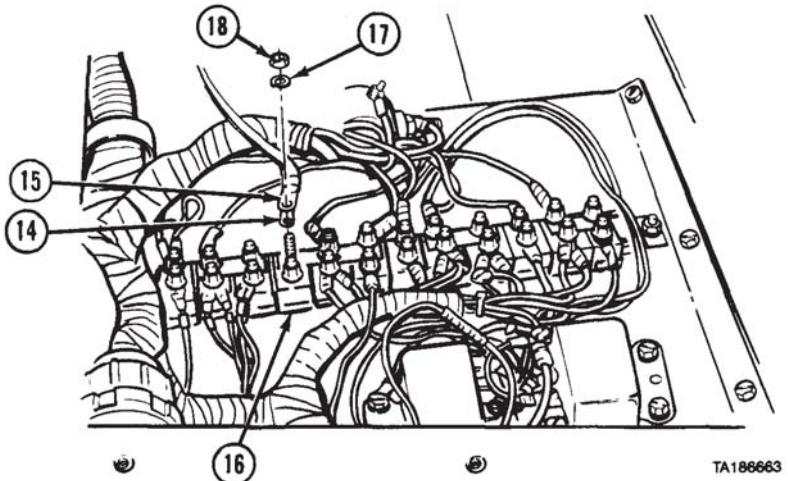


TA186662

## Radio Kit Maintenance Instructions (Cont)

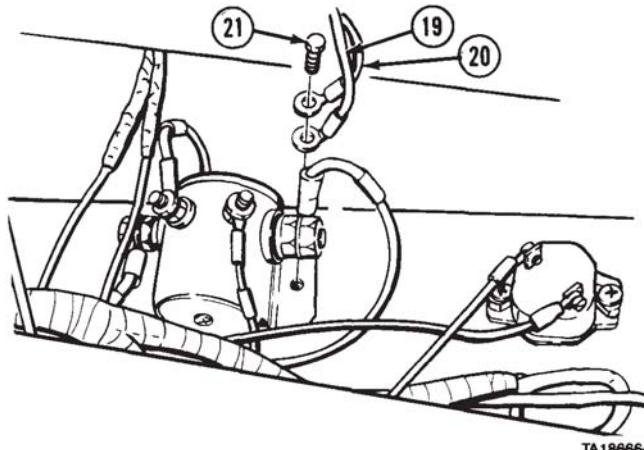
**24-2. RADIO KIT REMOVAL/INSTALLATION (CONT).**

- (6) Install white wire (14) and red wire (15) to circuit breaker No. 4 (16) with lockwasher (17) and nut (18).



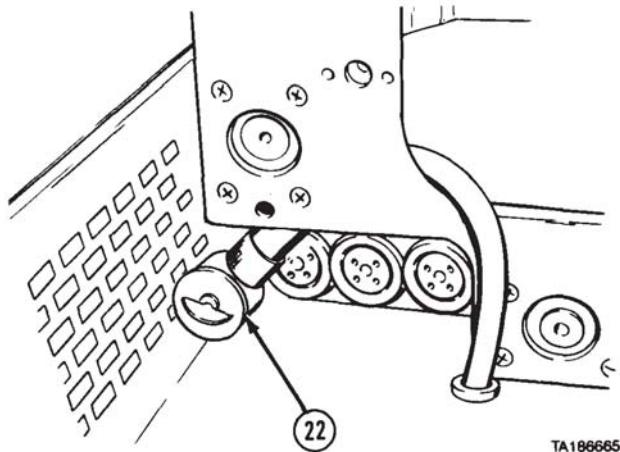
TA186663

- (7) Install green ground wire (19) and black ground wire (20) with screw (21).



TA186664

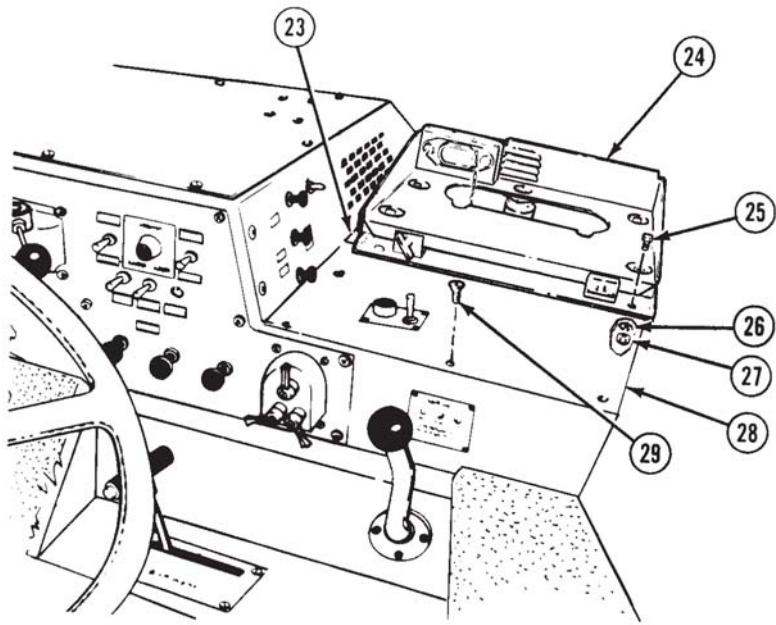
- (8) Connect connector (22).



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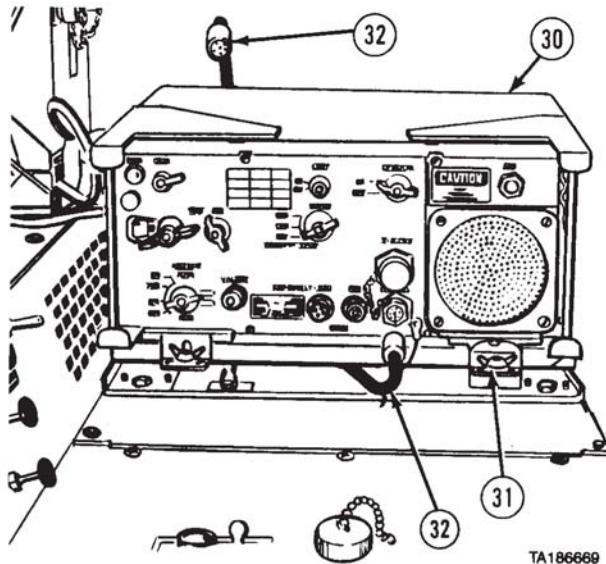
## Radio Kit Maintenance Instructions (Cont)

- (9) Lift heater compartment cover (23) and install mount (24) with five screws (25), lockwashers (26), and nuts (27).  
 (10) Install two heater compartment covers (23 and 28) with 11 screws (29).



TA186667

- (11) Install radio (30) and tighten two thumbscrews (31).  
 (12) Connect two antenna leads (32).



TA186669

## Radio Kit Maintenance Instructions (Cont)

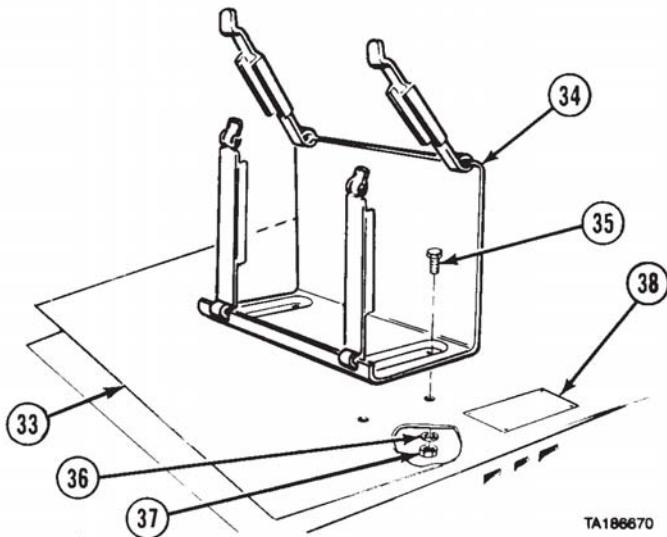
**24-2. RADIO KIT REMOVAL/INSTALLATION (CONT.)**

- (13) Lift heater compartment cover (33) and install security unit mount (34) with four screws (35), lockwashers (36), and nuts (37).
- (14) Install data plate (38).
- (15) Install eight screws (39) in heater compartment cover (33).

**c. Follow-on Maintenance.**

- (1) Complete radio kit installation (TM 11-5820-498-12).
- (2) Connect batteries (para 7-91).
- (3) Stow spare tire (TM 9-2320-279-10).

END OF TASK



## CHAPTER 25

### M978 TANKER MAINTENANCE

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#### Section I. INTRODUCTION

**25-1. GENERAL.** This chapter contains the M978 tanker fuel handling components removal and installation procedures for organizational maintenance. Major components covered in this chapter include:

- piping and tubing
- pumps and pump motors
- valves

The subassemblies and parts which must be removed before the fuel handling components can be removed are referenced to other paragraphs in this manual.

## Section II. SERVICE AND INSPECTION

### M978 Tanker Maintenance Instructions

#### 25-2. GENERAL MAINTENANCE INSTRUCTIONS.

- a. Refer to Figures 25-1 through 25-4 to identify M1978 tanker components before beginning any work.

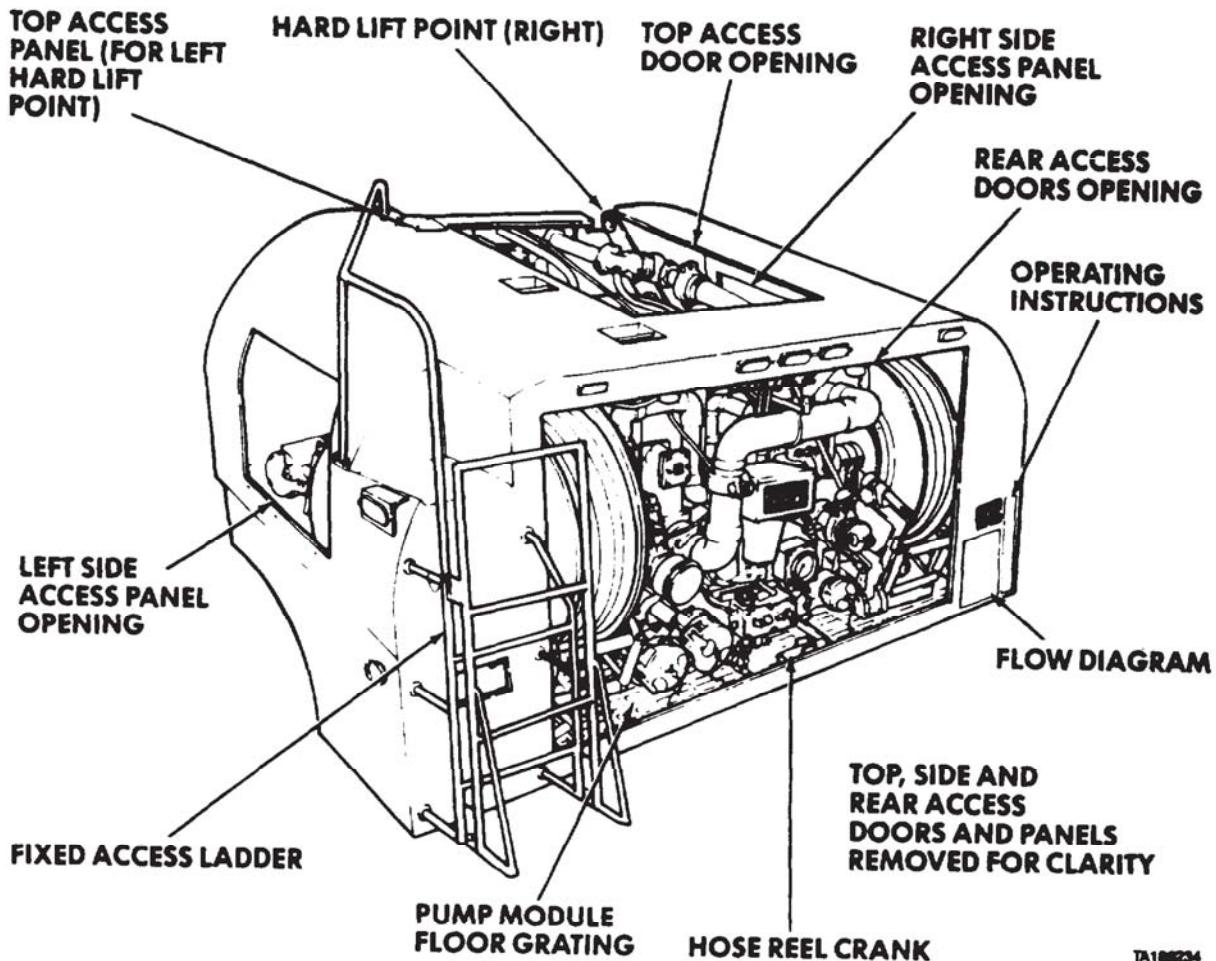


Figure 25-1. Tanker External Components.

## M978 Tanker Maintenance Instructions (Cont)

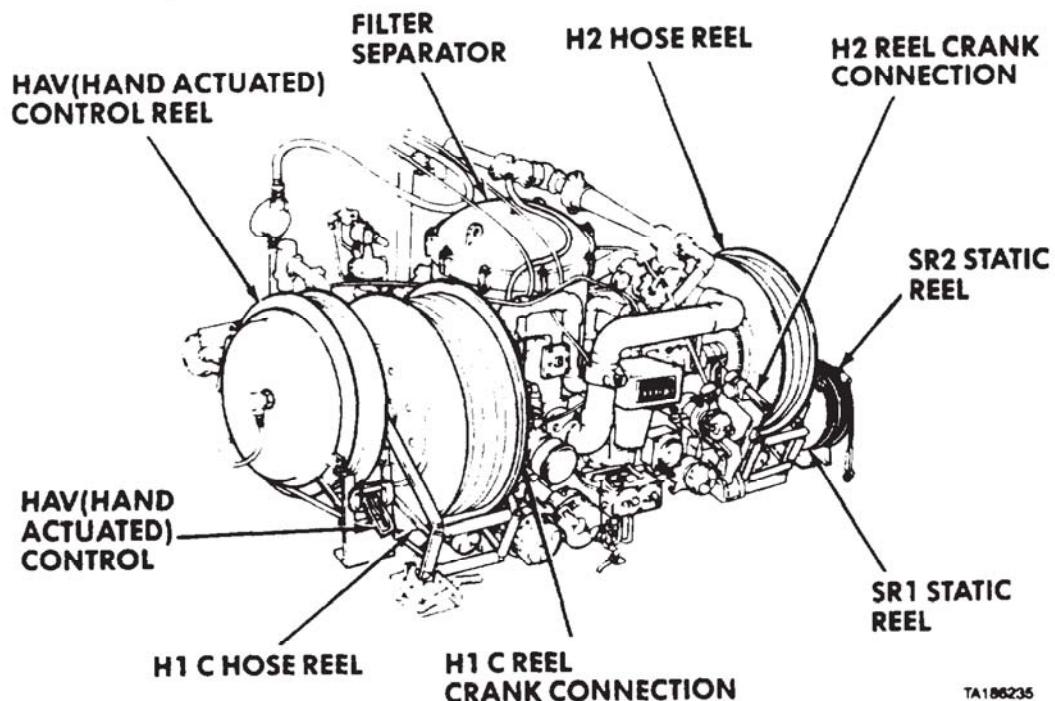


Figure 25-2. Tanker Filter and Manual Dispensing Components.

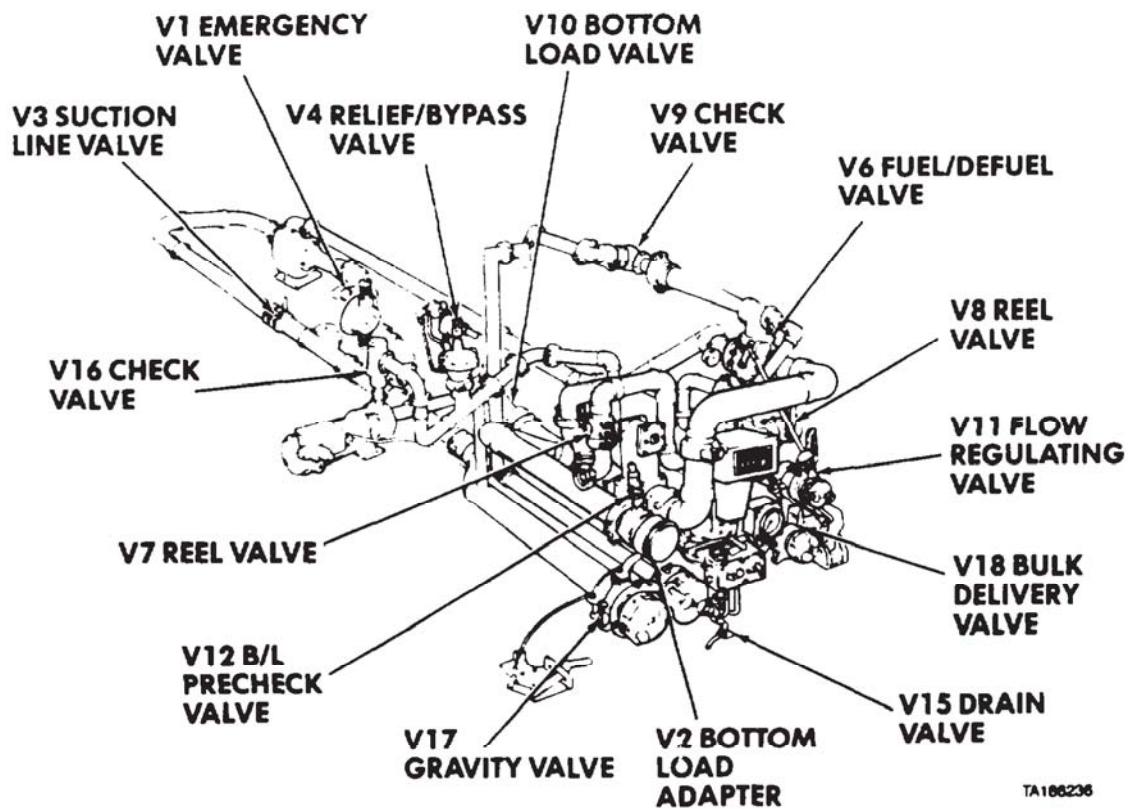
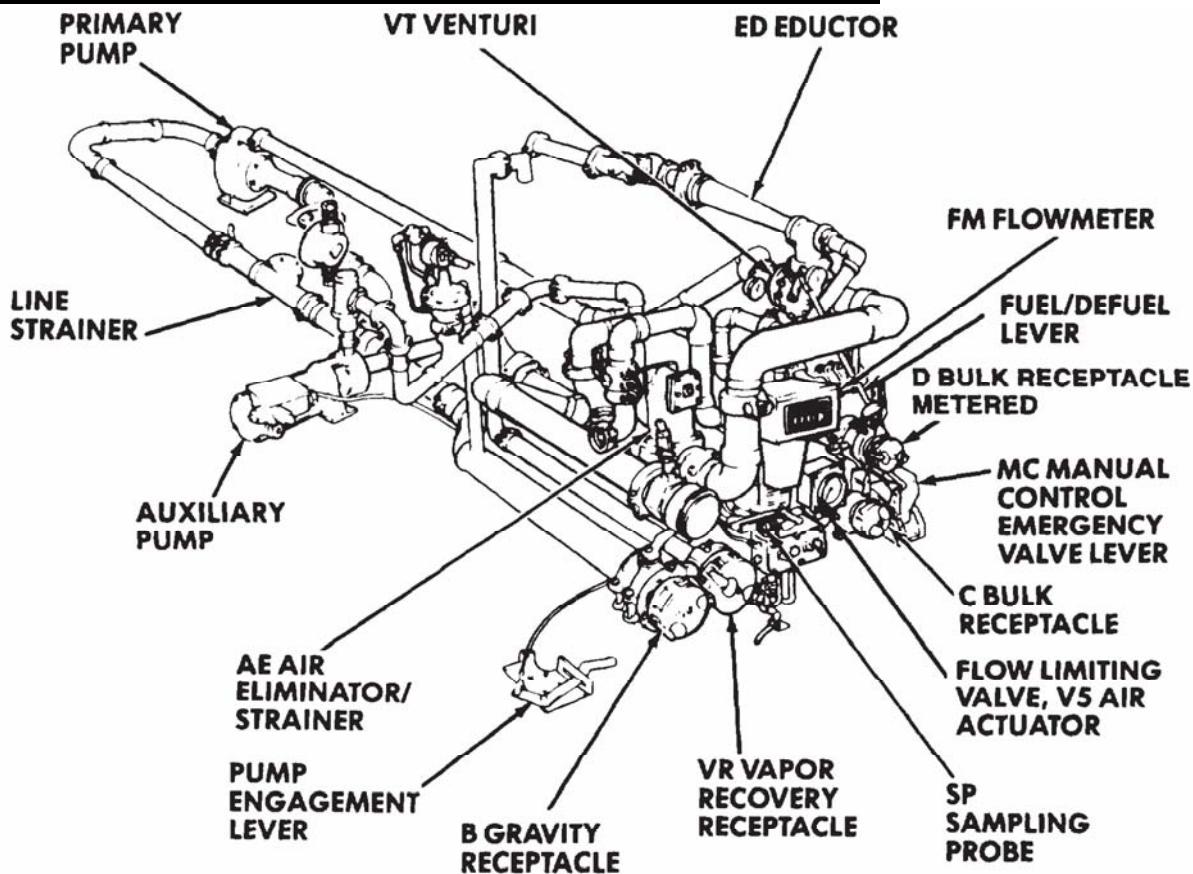


Figure 25-3. Tanker Dispensing Valves.

## M978 Tanker Maintenance Instructions (Cont)

## 25-2. GENERAL MAINTENANCE INSTALLATION (CONT).

*Figure 25-4. Tanker Loading and Servicing Components.*

b. Follow these maintenance practices when working on the M978 tanker and components

**WARNING**

- To prevent explosion and fire, no smoking, flames, sparks, and glowing or hot objects are allowed within 50 ft (15 m) of vehicle.
- Eye protection is required during all grinding operation.

- (1) Tag and mark shims, connectors, wires, tubes, conduit, hoses, and pipes before disconnecting. Matchmark position of clamps, brackets, fittings, components, and subassemblies before removal. Identify similar parts to ensure correct assembly and installation.
- (2) Use suitable container to catch fuel when removing hoses, tubes, fittings, pipes, and components.
- (3) Drain air system before removing air-actuated components and subassemblies.

**CAUTION**

Do not use tape to close off fuel openings. Sticky surface of tape will mix with and contaminate fuel.

- (4) When a component is removed from vehicle, cover open ends of pipes, valves, and other components. Cover open ends with caps or plugs to prevent contaminants from entering fuel circuit.

## M978 Tanker Maintenance Instructions (Cont)

- (5) Handle and store removed components carefully.
- (6) To ease assembly, lay out parts in the order they are removed during disassembly.
- (7) Plumbing tags are attached with wire, screws, or rivets. Do not remove or replace plumbing tags unless missing or damaged.
- (8) Inspect parts as removed, for breaks, dents, cracks, surface defects or other damage. Turn in defective parts. Set aside good parts for later use.
- (9) When unpacking items, remove all packing material (barrier paper, tape, plastic bags, and protective caps).
- (10) Replace all gaskets, packings, and seals removed during repair. Replace all lockwire, lockwashers, and cotter pins at time of assembly.
- (11) Replace broken, worn, or burned electrical wiring.
- (12) Replace broken, frayed, crimped, or soft flexible hoses. Replace stripped or damaged fittings. Replace entire connected flexible hose if fittings are damaged. Hose clamps should not crimp hoses.
- (13) Replace screws, nuts, or fittings with damaged threads. Inspect tapped holes for thread damage. If cross-threaded, retap hole for next oversize screw or stud. If retapping will weaken part, replace part.
- (14) Reshape elongated mounting holes by drilling oversize to receive bushing with required inner diameter. Stake bushing in place with center punch.
- (15) When installing studs, use proper driver. Before driving stud, inspect hole for chips. Blow out foreign matter, coat thread with film of antiseize compound, and start stud by hand.
- (16) Remove protective grease coatings from new parts before installation.
- (17) Lubricate all preformed packings with a thin coat of oil before installation.
- (18) To install preformed packing, stretch packing and place into position. Rotate component on flat surface and uniformly press packing into position.
- (19) Remove all traces of old gasket and sealant before installing new gasket. During installation, coat both sides of gasket with adhesive-sealant.
- (20) When replacing coupling gaskets, lubricate with a thin coat of grease before installation.
- (21) Use suitable lifting device, jack, or other aid when lifting the heavier components.

## c. Follow these cleaning instructions when working on tanker components.

**WARNING**

- Adhesives, solvents, and sealing compounds can burn easily, and give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.
- Compressed air used for cleaning and drying purposes will be reduced to 30 psi and used only with adequate chip guarding and personal protection equipment, goggles, shield, and gloves.

- (1) Soak parts in solvent, and wash away deposits by slushing or spraying. When necessary, brush with oval paint brush moistened in solvent. Use jet of dry compressed air to dry parts, except bearings, after cleaning. Bearings must drip dry.
- (2) Do not use wire brushes, abrasive wheels, or compounds to clean parts, unless specifically approved in the detailed instructions.
- (3) Do not clean rubber parts in dry cleaning solvent. Wipe clean with a clean, dry, lint-free cloth.
- (4) Electrical parts, such as coils, junction blocks, and switches, should not be soaked or sprayed with cleaning solutions. Clean parts with a clean lint-free cloth moistened with dry cleaning solvent.

## d. Follow these inspection instructions when working on the tanker and tanker components.

- (1) Inspect all surfaces in contact with gaskets, coupling gaskets, or seals for nicks, burrs, or scratches which might damage new seal during assembly. Remove any defects before assembly.

## M978 Tanker Maintenance Instructions (Cont)

**25-2. GENERAL MAINTENANCE INSTRUCTIONS (CONT).**

- (2) Inspect all hose surfaces for damaged material. Check for breaks caused by sharp kinks or contact with other parts of vehicle. Inspect fitting threads for damage. Replace defective parts. Check for leaks after assembly and during initial vehicle operation period.
- (3) Inspect wiring harnesses for chafed or burned insulation. Inspect all terminal connectors for loose connections and broken parts.
- (4) Visually inspect all castings and weldments for cracks.

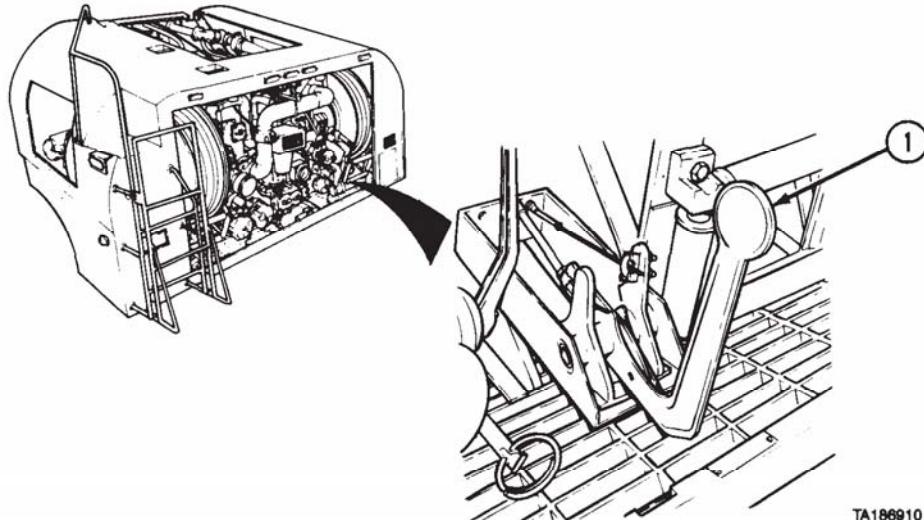
**25-3. 2500 GALLON TANK/DRAIN.**

This task covers:

- a. Drain 2500 gallon tank.
- b. Follow-on Maintenance.

**INITIAL SETUP***Models**M978**Test Equipment**None**Special Tools**None**Supplies**Compound, sealing, pipe thread, Item 18,  
Appendix C**Personnel Required**MOS 63S, Heavy wheel vehicle mechanic**References**None**Equipment Condition*

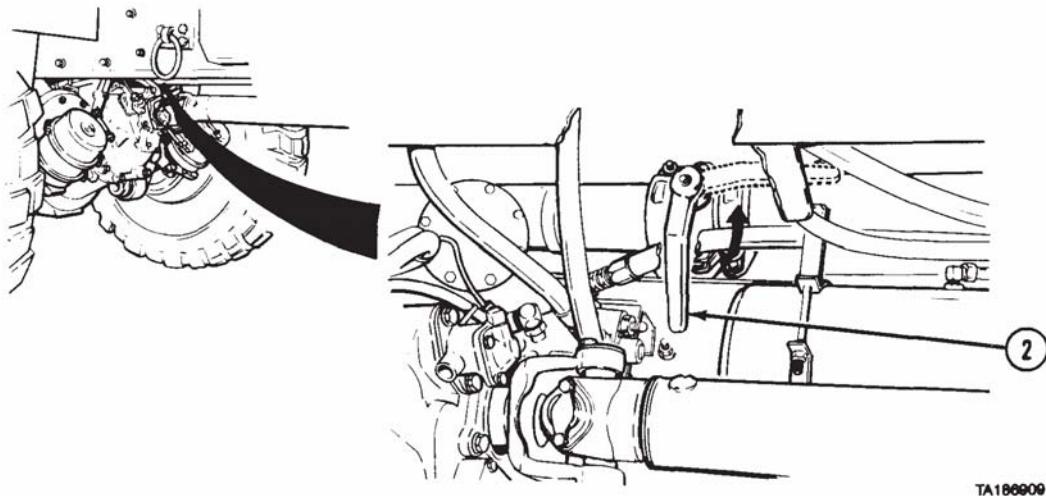
<i>TM or Para</i>	<i>Condition Description</i>
TM 9-2320-279-10	Vehicle system air pressure built up to 100 psi (690 kPa)
TM 9-2320-279-10	Fuel pumped from 2500 gallon tank.
TM 9-2320-279-10	Tanker prepared for operation.

*Special Environmental Conditions**None**General Safety Instructions**No smoking, flame, sparks and hot or glowing objects within 50 ft (15 m) of vehicle.***a. Drain 2500 Gallon Tank.**

(1) Pull MC MANUAL CONTROL EM VALVE lever (1) back to OPEN position.

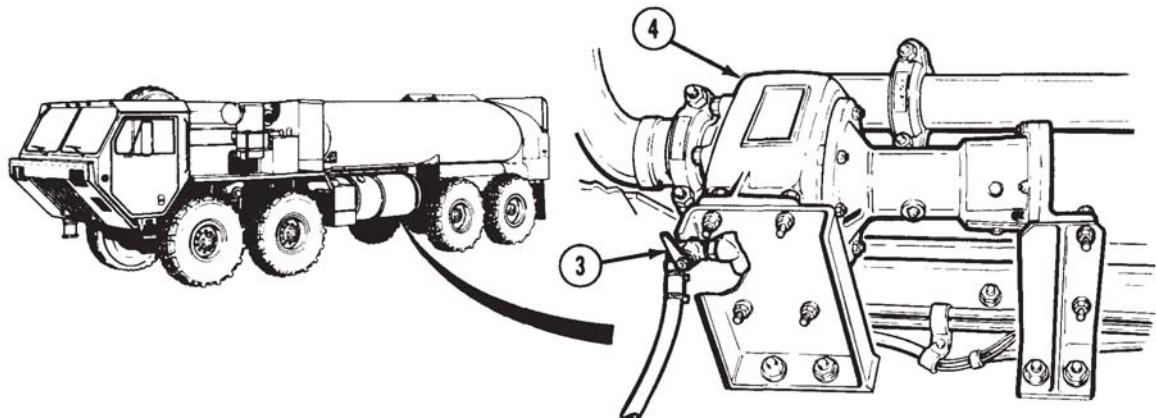
TA186910

## M978 Tanker Maintenance Instructions (Cont)



TA186909

(2) Set V3 suction line valve handle (2) to OPEN position.



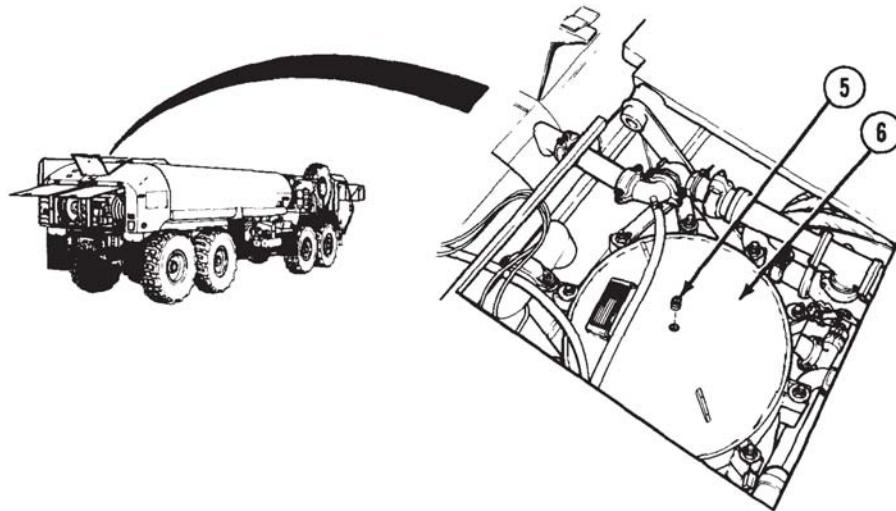
TA186908

## NOTE

Primary pump and piping may contain approximately 50 to 60 gallons (190 to 230 liters) of fuel. Dispose of all drained fuel in accordance with unit standard operating procedures.

(3) Open drain valve (3) in primary pump (4) to drain fuel from piping.

## M978 Tanker Maintenance Instructions (Cont)

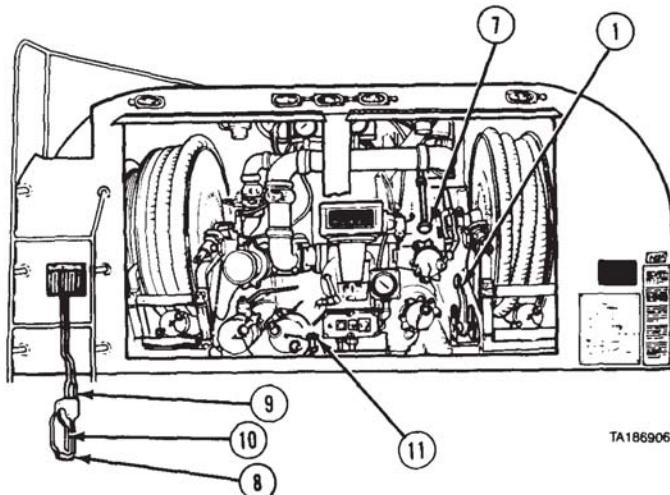
**25-3. 2500 GALLON TANK/DRAIN (CONT.)**

(4) Remove plug (5) from filter-separator cover (6).

- (5) Pull out on V6 FUEL/DEFUEL CONTROL VALVE handle (7).
- (6) Remove HAV HAND ACTUATED CONTROL VALVE (8) and hoses (9) from pump module.

## NOTE

- Filter-separator may contain 20 to 30 gallons (75 to 115 liters) of fuel.
- HAV HAND ACTUATED CONTROL VALVE lever must be squeezed through step (25) for fuel to drain.
- (7) Squeeze and hold lever (10).
- (8) Open V15 DRAIN VALVE (11).
- (9) Remove filter-separator elements (para 23-3).



## NOTE

Continue with step (10) after fuel stops draining from primary pump and filter-separator.

- (10) Close V15 DRAIN VALVE (11).
- (11) Push MC MANUAL CONTROL EM VALVE lever (1) full forward and down to CLOSE position.

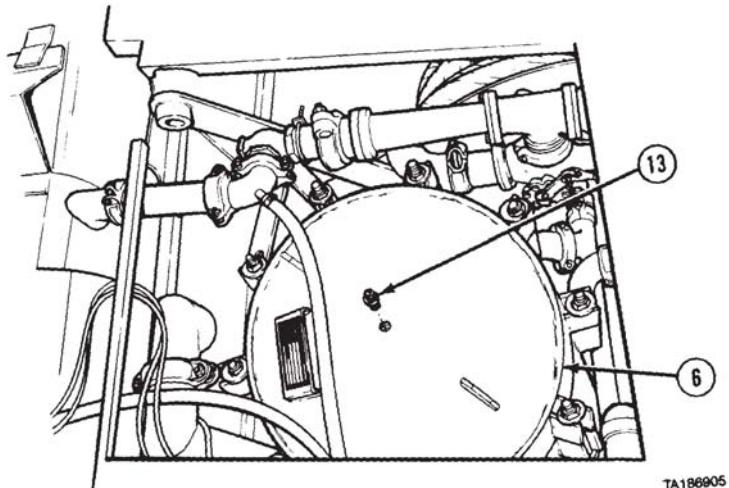
## M978 Tanker Maintenance Instructions (cont)

- (12) Install adapter fitting (13) in filter-separator cover (6).

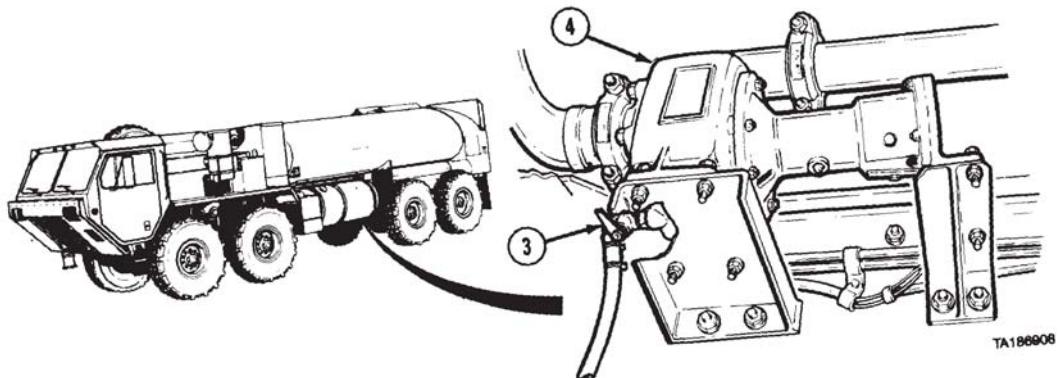
CAUTION

Do not exceed 50 psi (345 kPa) in filter-separator.  
Damage to equipment may result.

- (13) Apply compressed air to adapter fitting (13) and pressurize filter-separator to 10 to 50 psi (69 to 345 kPa).



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**NOTE**

Continue with step (14) after fuel stops draining from primary pump.

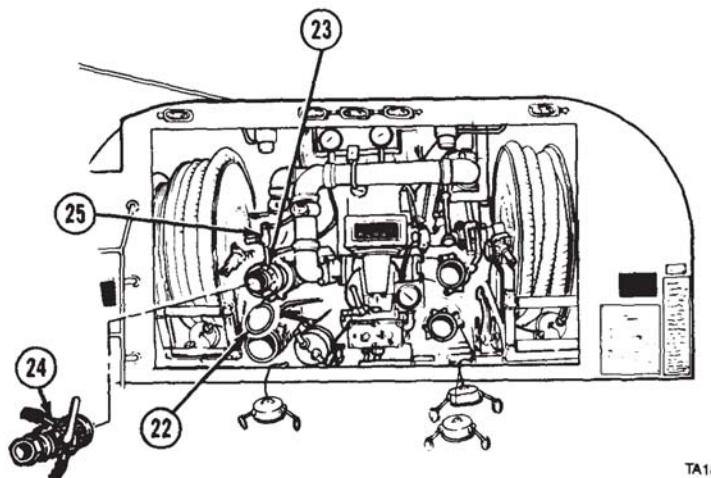
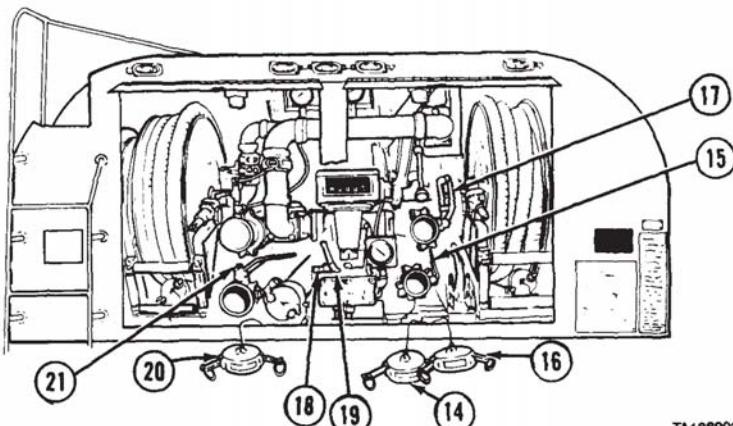
- (14) Close drain valve (3) on primary pump (4).

## M978 Tanker Maintenance Instructions (Cont)

**25-3. 2500 GALLON TANK/DRAIN (CONT).****WARNING**

Fuel in piping is under pressure and may spray when caps are removed or valves are opened, causing personal injury. Remove caps and open valves slowly.

- (15) Remove cap (14), open V18 BULK DELIVERY valve (15), and drain fuel.
- (16) Remove cap (16), open V11 FLOW VALVE (REG) (17), and drain fuel.
- (17) Remove cap (18), open SP SAMPLING PROBE (19), and drain fuel.
- (18) Remove cap (20), open V17 GRAVITY VALVE (21), and drain fuel.



- (19) Remove dust cap (22) from V2 bottom load adapter (23) and install D1 adapter (24).
- (20) Open V12 bottom load CHECK VALVE (25), D1 adapter (24), and drain fuel.

## M978 Tanker Maintenance Instructions (Cont)

- (21) Open V7 REEL VALVE (26) and V8 REEL VALVE (27).

**NOTE**

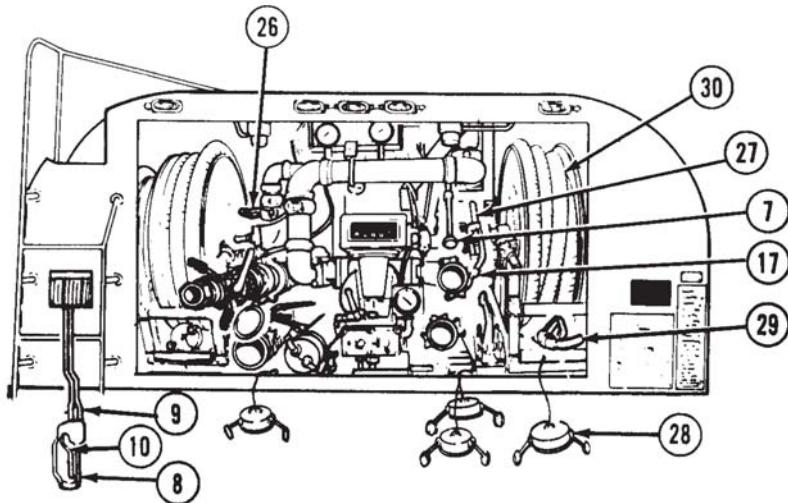
Do steps (22) and (23) for left and right fuel service hoses.

- (22) Remove cap (28) and install fuel service nozzle (29).
- (23) Squeeze lever on fuel service nozzle (29) and drain fuel from hose (30). Release lever.
- (24) Push in on V6 FUEL/DEFUEL CONTROL VALVE handle (7) and drain fuel from V11 FLOW VALVE (REG) (17).
- (25) Pull out on V6 FUEL/DEFUEL CONTROL VALVE handle (7) after fuel stops draining.
- (26) Release lever (10). Rewind hoses (9) and HAV HAND ACTUATED CONTROL VALVE (8) in pump module.
- (27) Discontinue compressed air and remove adapter fitting (13) from filter-separator cover (6).

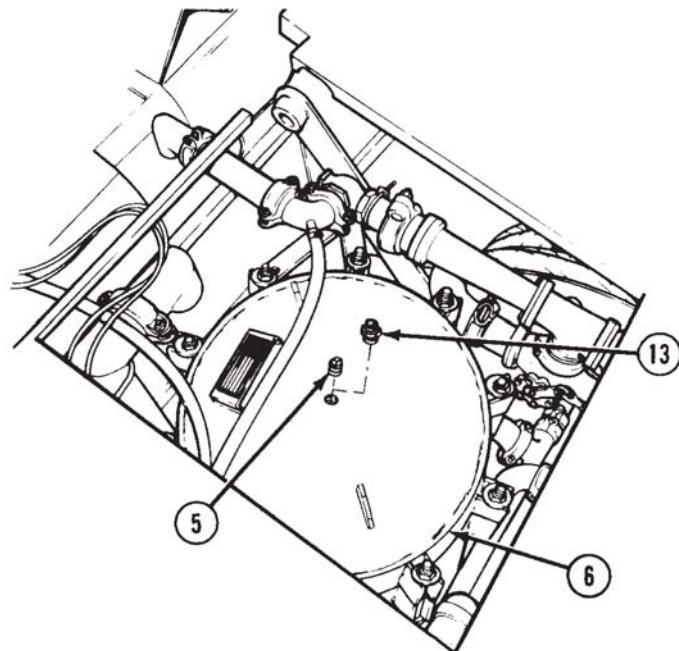
**W A R N I N G**

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

- (28) Apply pipe thread sealing compound to threads of plug (5) and install in filter-separator cover (6).



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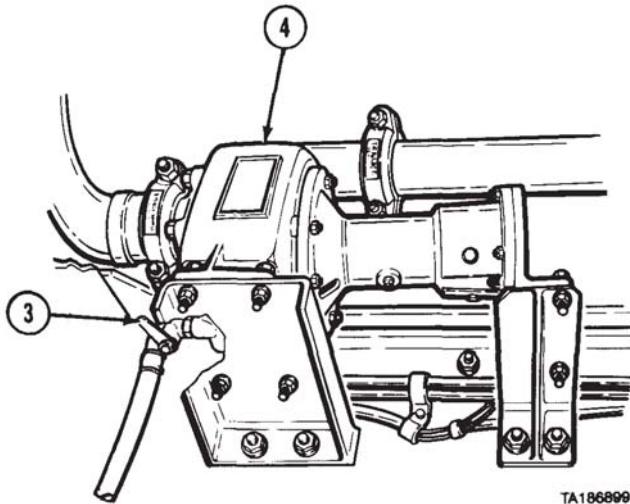


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## M978 Tanker Maintenance Instructions (Cont)

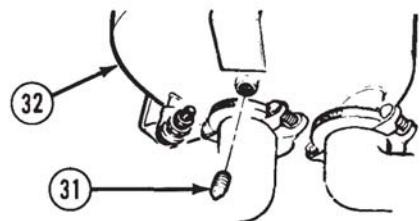
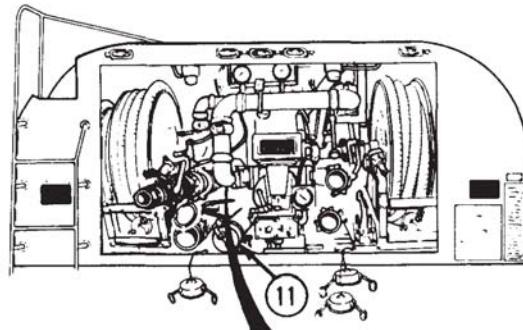
**25-3. 2500 GALLON TANK/DRAIN (CONT).**

- (29) Open drain valve (3) on primary pump (4) and drain remaining fuel.

**WARNING**

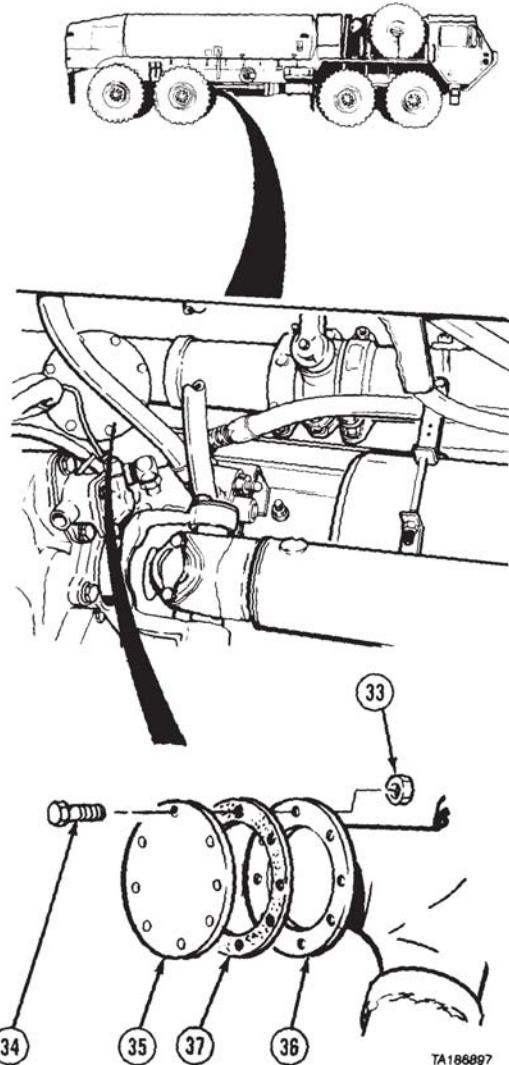
Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (30) Open V15 DRAIN VALVE (11) and drain remaining fuel.  
 (31) Remove plug (31) from bottom of filter-separator (32) and drain remaining fuel.  
 (32) Coat threads with pipe thread sealing compound and install plug (31) in bottom of filter-separator (32) when fuel stops draining.



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## M978 Tanker Maintenance Instructions (Cont)



- (33.) Remove eight nuts (33) and screws (34) from cover (35) and tank fuel strainer (36).
- (34) Remove cover (35) and gasket (37) from tank fuel strainer (36) and let fuel drain.
- (35) Coat both sides of gasket (37) with adhesive-sealant and position gasket and cover (35) on tank fuel strainer (36).
- (36) Install eight screws (34) and nuts (33).

b. *Follow-on Maintenance.* None.

END OF TASK

## M978 Tanker Maintenance Instructions (Cont)

**Section III. TUBING, PUMPS, AND AIR ELIMINATOR****25-4. TANKER TUBING REMOVAL/INSTALLATION.**

This task covers:

- |                                |                                |
|--------------------------------|--------------------------------|
| a. Typical Tubing Removal      | c. Tubing Removal/Installation |
| b. Typical Tubing Installation | d. Follow-on Maintenance.      |

**INITIAL SETUP**

<i>Models</i>	<i>Equipment Condition</i>	
M978		
<i>Test Equipment</i>	<i>TM or Para</i>	<i>Condition Description</i>
None	TM 9-2320-279-10	Pump module top and rear access doors opened (as needed).
<i>Special Tools</i>	<i>Para 16-48</i>	
None	Pump module left and right side access panels removed.	
<i>Supplies</i>	<i>Special Environmental Conditions</i>	
Compound, sealing, pipe thread, Item 18, Appendix C	None	
<i>Personnel Required</i>	<i>General Safety Instructions</i>	
MOS 63S, Heavy wheel vehicle mechanic	No smoking, flame, sparks, hot or glowing objects within 50 ft (15 m) of vehicle.	
<i>References</i>		
None		

## M978 Tanker Maintenance Instructions (Cont)

*a. Typical Tubing Removal.***NOTE**

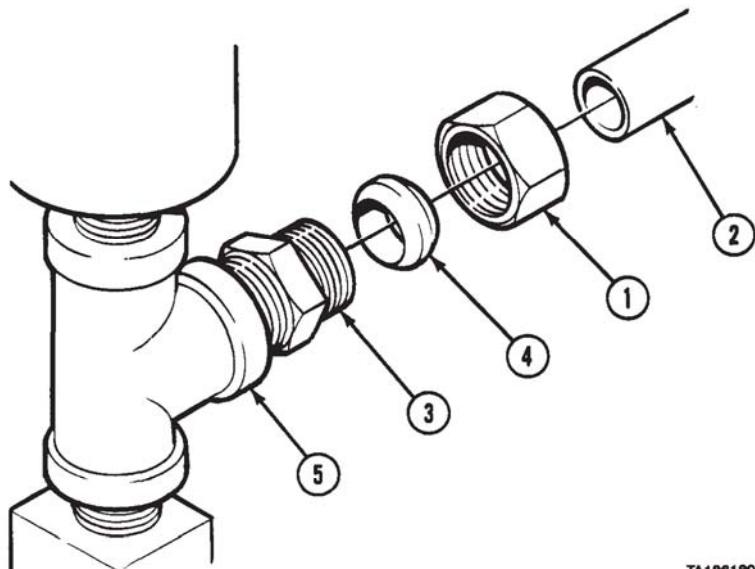
- This procedure is for reference only to show location of M978 tanker tubing. It will never be necessary to remove all the tubing at once. Refer to 25-4.c for location of specific tubing sections,
- All tubing on the M978 Tanker is connected with compression fittings, except tube from V9 CHECK VALVE to AE AIR ELIMINATOR, which uses hose clamps.
- Fitting from which tubing is being removed or installed can be an elbow or adapter on a gage, valve, or other plumbing component. All compression fittings are removed and installed the same way. Adapter is shown.
- Tag and mark tubing before removal.

- (1) Remove nut (1) and tube (2) from adapter (3).
- (2) Remove compression ring (4) from tube (2).
- (3) Remove adapter (3) from component (5).

*b. Typical Tubing Installation.***WARNING**

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

- (1) Coat threads of adapter (3) with pipe thread sealing compound and install in component (5).
- (2) Position nut (1) on tube (2) and install compression ring (4).
- (3) Install nut (1) and tube (2) on adapter (3).



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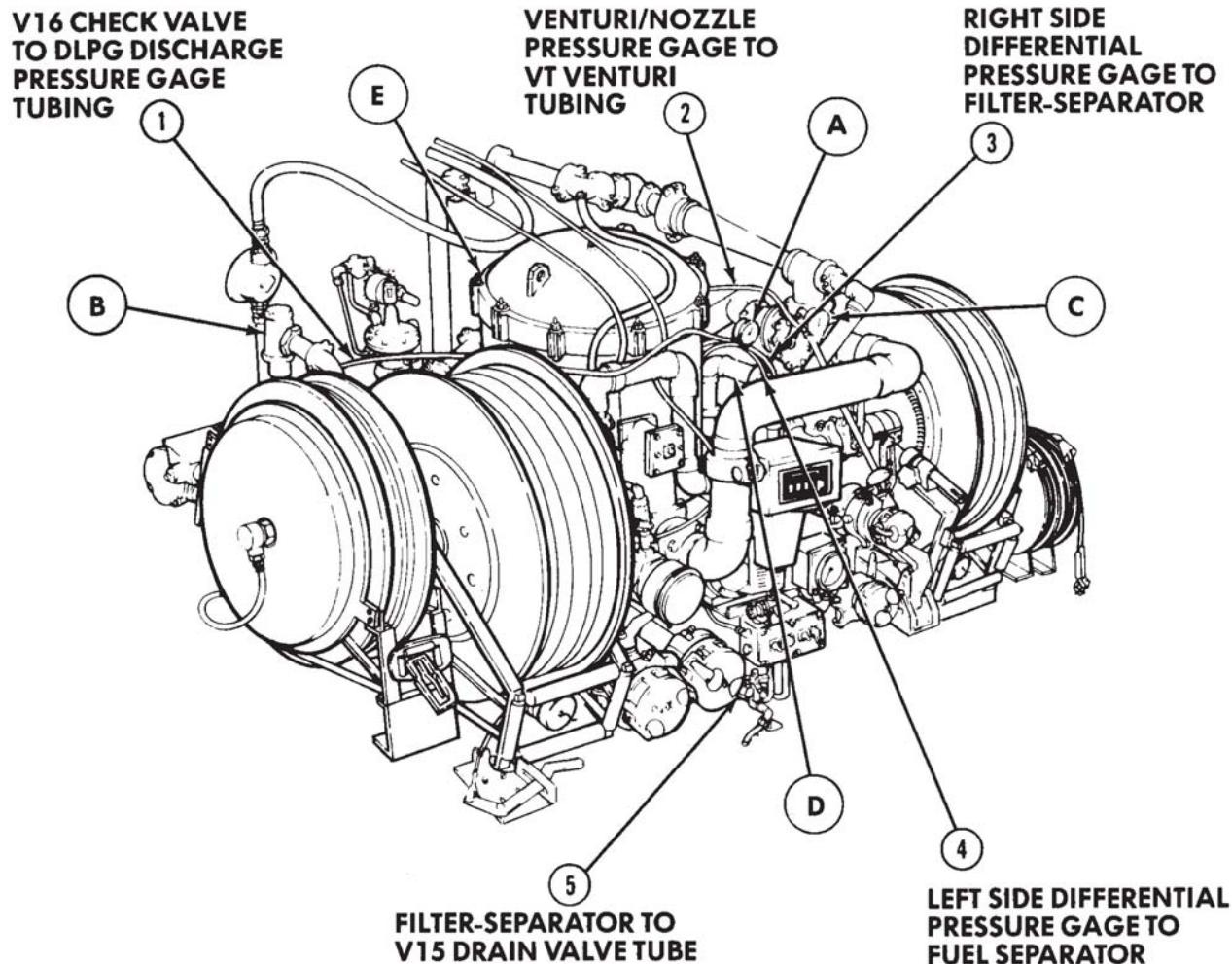
## M978 Tanker Maintenance Instructions (Cont)

*c. Tubing Removal/Installation.* Refer to Table 25-1 and Figure 25-5 for location of specific tubing sections.

*Table 25-1. Tanker Module Tubing.*

Index No.	From	To	Refer To Figure
1	DLPG DISCHARGE LINE PRESSURE GAGE (A)	V16 AUXILIARY PUMP CHECK VALVE (B)	25-5
2	VNPG VENTURI/NOZZLE PRESSURE GAGE (C)	VT VENTURI (not shown)	25-5
3	DPG DIFFERENTIAL PRESSURE GAGE (right side) (D)	Filter-Separator (E)	25-5
4	DPG DIFFERENTIAL PRESSURE GAGE (left side) (D)	Filter-Separator (E)	25-5
5	Filter-Separator (E)	V15 DRAIN VALVE (F)	25-5
6	V15 DRAIN VALVE (F)	(Floor)	25-5
7	V12 Bottom Load PRECHECK VALVE (Top) (G)	Tank (not shown - removed for clarity)	25-5
8	V12 Bottom Load PRECHECK VALVE (Bottom) (G)	Tank (not shown - removed for clarity)	25-5
9	AUXILIARY PUMP (H)	AE AIR ELIMINATOR (I)	25-5
10	V9 CHECK VALVE (J)	AE AIR ELIMINATOR (I)	25-5

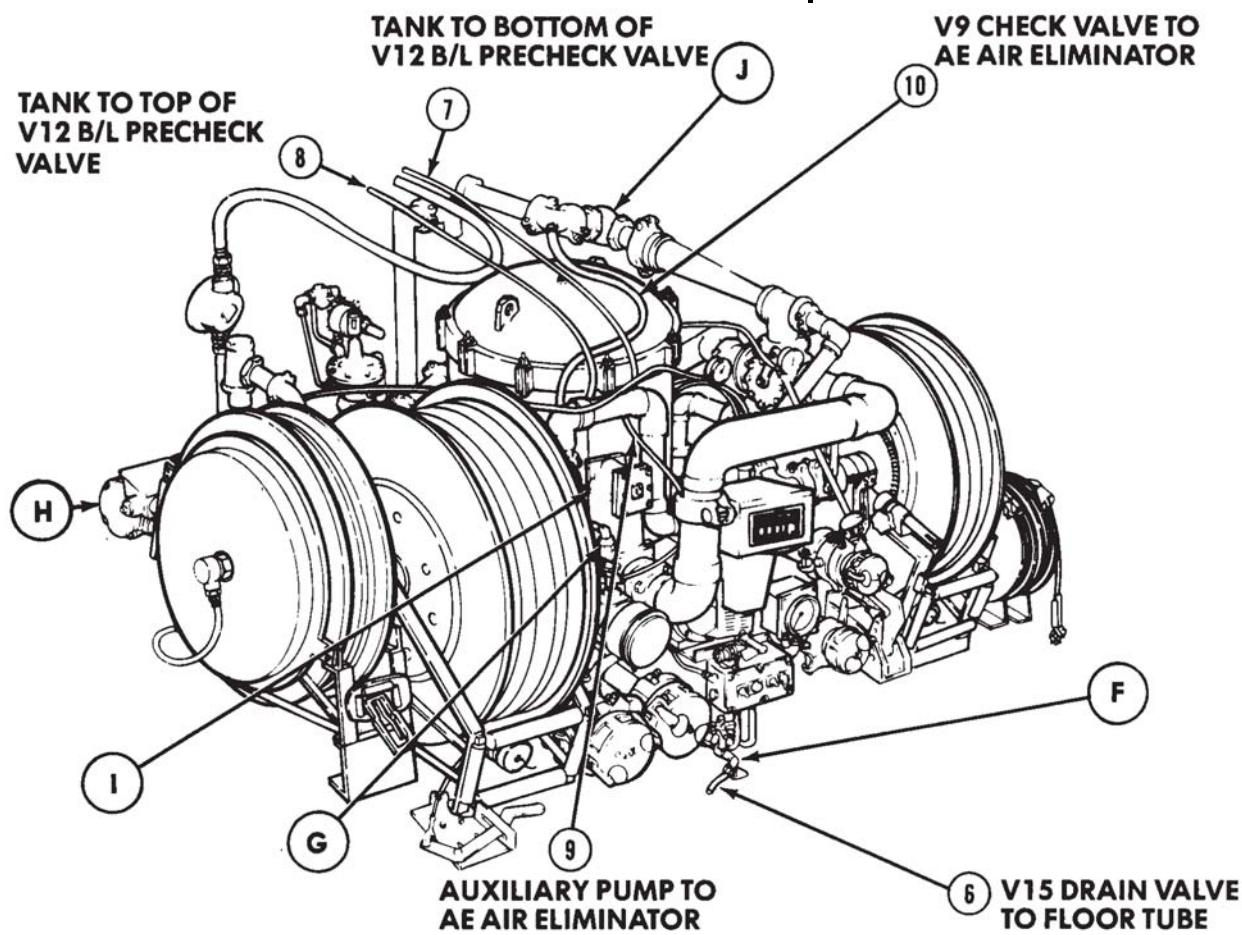
## M978 Tanker Maintenance Instructions (Cont)



TA186182

Figure 25-5. Tanker Module Tubing (Sheet 1 of 2).

## M978 Tanker Maintenance Instructions (Cont)

25-4. TANKER TUBING REMOVAL/INSTALLATION (CONT.).

TA186183

Figure 25-5. Tanker Module Tubing (Sheet 2 of 2).

## d. Follow-on Maintenance.

- (1) Inspect tubing for leaks.
- (2) Install pump module top side access panels (para 16-50).
- (3) Close pump module top and rear access doors (TM 9-2320-279-10).

END OF TASK

## M978 Tanker Maintenance Instructions (Cont)

**25-5. PRIMARY PUMP HYDRAULIC MOTOR REMOVAL/INSTALLATION.**

This task covers:

- a. Removal
- b. Installation

- c. Follow-on Maintenance

**INITIAL SETUP***Models*

M978

*Test Equipment*

None

*Special Tools*

None

*Supplies*Compound, sealing, pipe thread, Item 18,  
Appendix C

Tags, identification, Item 48, Appendix C

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*References*

None

*Equipment Condition*

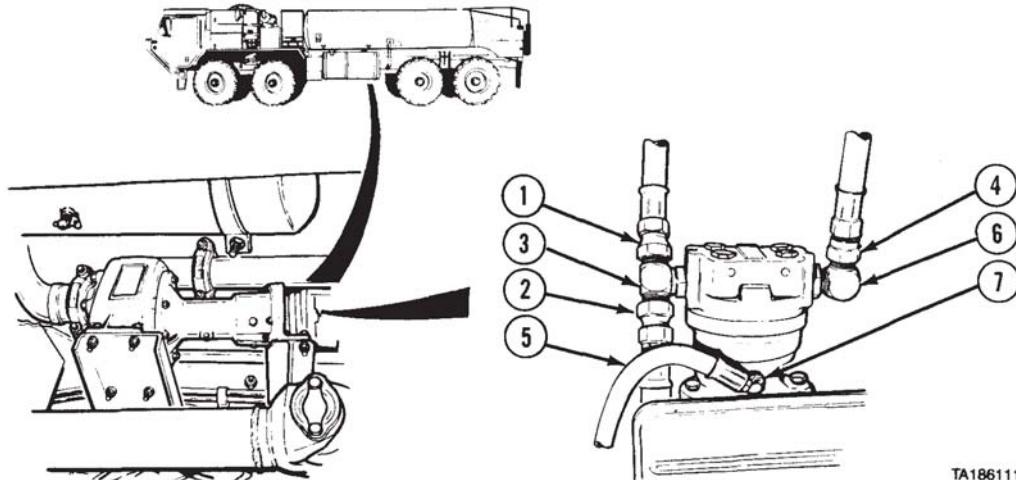
TM or Para

*Condition Description*

None

*Special Environmental Conditions*

None

*General Safety Instructions*No smoking, flame, sparks, and hot or glowing  
objects within 50 ft (15 m) of vehicle.***a. Removal.***

TA186111

**NOTE**

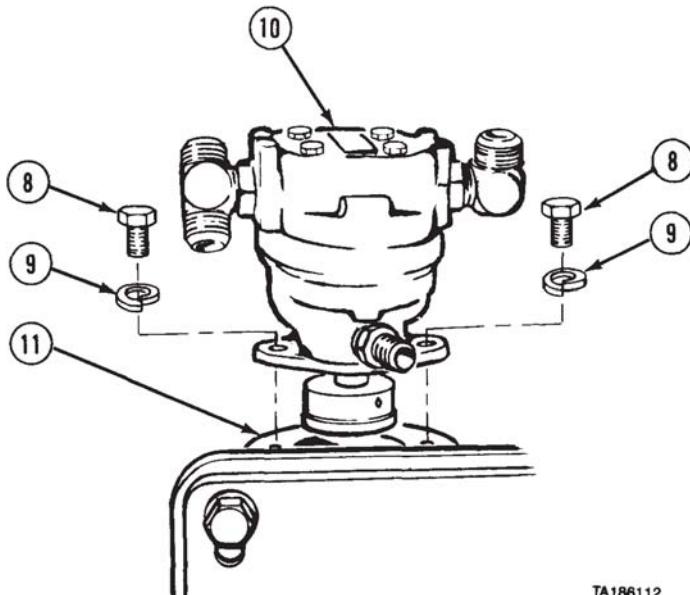
Tag and mark lines and fittings before removal.

- (1) Disconnect two hydraulic lines (1 and 2) from tee (3).
- (2) Disconnect two hydraulic lines (4 and 5) from adapter (6) and elbow (7).

## M978 Tanker Maintenance Instructions (Cont)

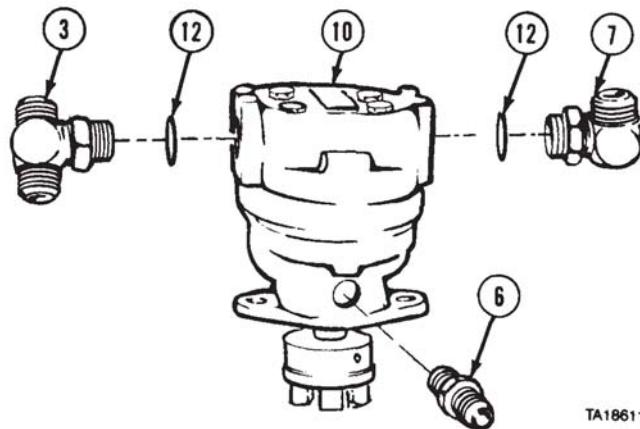
## 25-5. PRIMARY PUMP HYDRAULIC MOTOR REMOVAL/INSTALLATION (CONT).

- (3) Remove two screws (8), lockwashers (9), and motor (10) from pump (11).



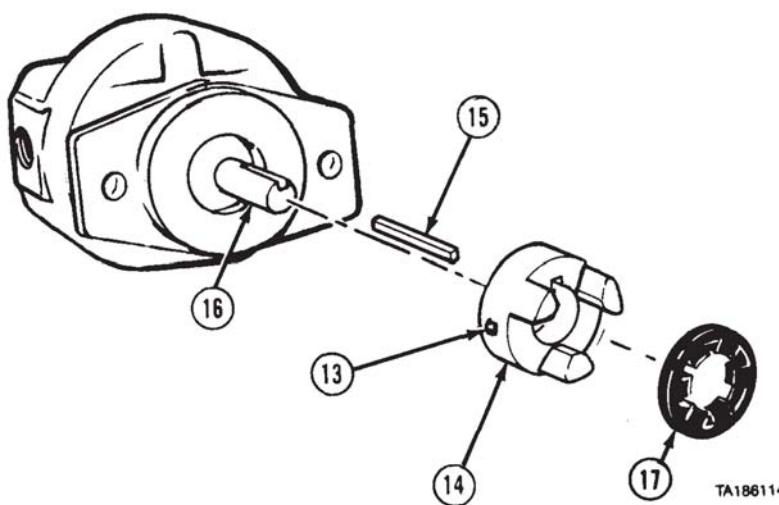
TA186112

- (4) Remove tee (3), adapter (6), and elbow (7) from motor (10).  
 (5) Remove two preformed packings (12).



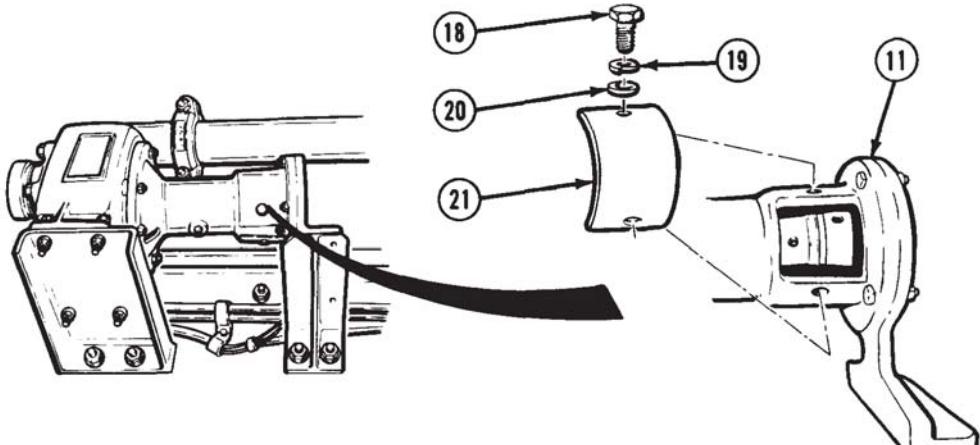
TA186113

- (6) Loosen setscrew (13).  
 (7) Remove rear coupling half (14) and key (15) from shaft (16).  
 (8) Remove rubber coupling (17) from rear coupling half (14),



TA186114

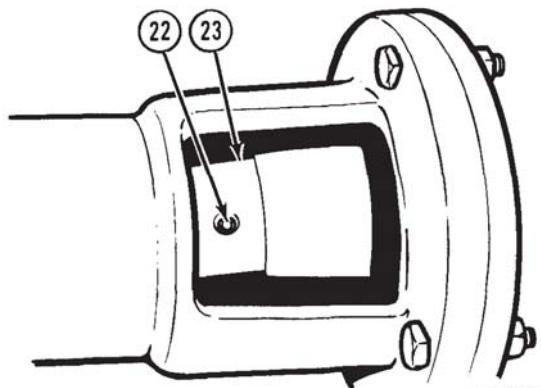
## M978 Tanker Maintenance Instructions (Cont)



TA186115

(9) Remove two screws (18), lockwashers (19), washers (20), and cover (21) from pump (11).

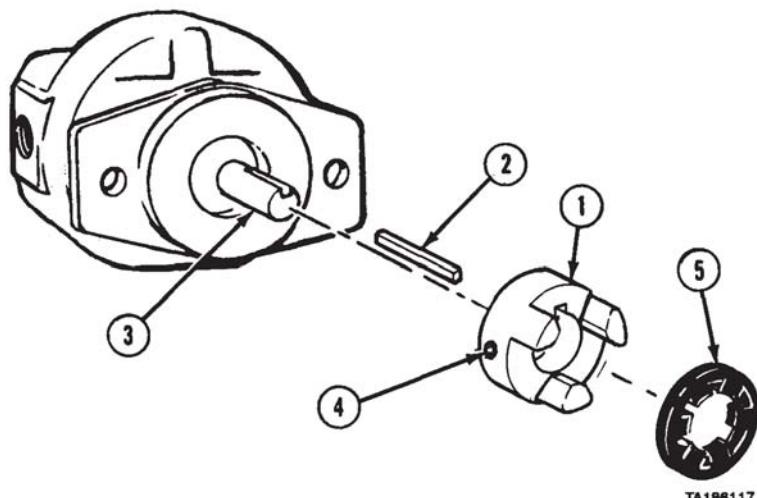
(10) Loosen setscrew (22) and remove front coupling half (23).



TA186116

b. Installation.

- (1) Install rear coupling half (1) and key (2) on motor shaft (3) but do not tighten setscrew (4).
- (2) Install rubber coupling (5) in rear coupling half (1).



TA186117

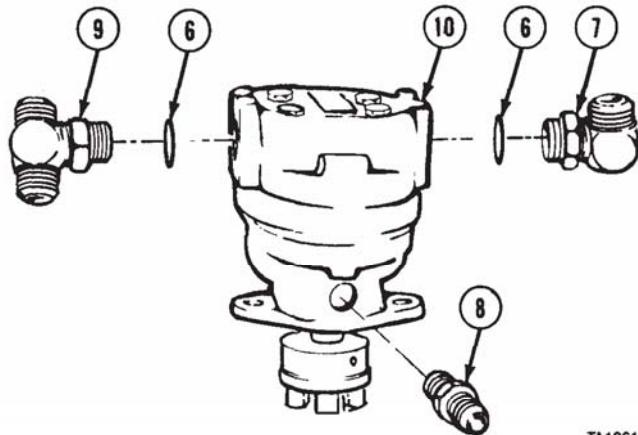
## M978 Tanker Maintenance Instructions (Cont)

**25-5. PRIMARY PUMP HYDRAULIC MOTOR REMOVAL/INSTALLATION (CONT).**

- (3) Install two preformed packings (6).

**WARNING**

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



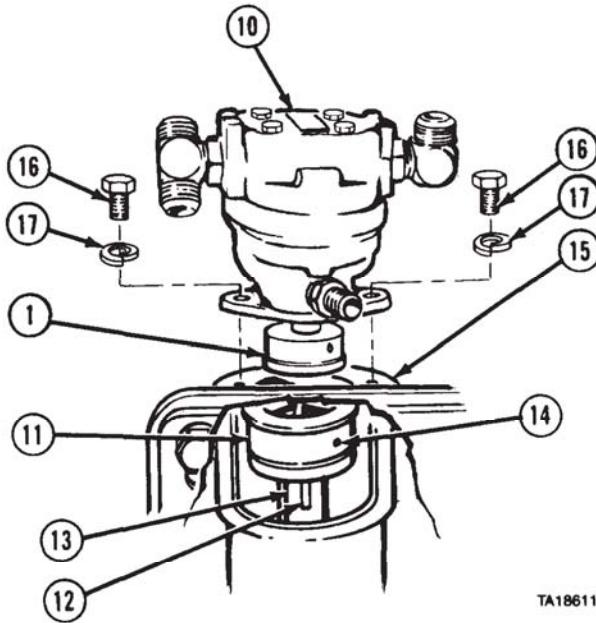
TA186118

- (4) Coat threads of elbow (7) with pipe thread sealing compound.

- (5) Install elbow (7), adapter (8), and tee (9) in motor (10).

- (6) Install front coupling half (11) and key (12) on pump shaft (13) but do not tighten setscrew (14).

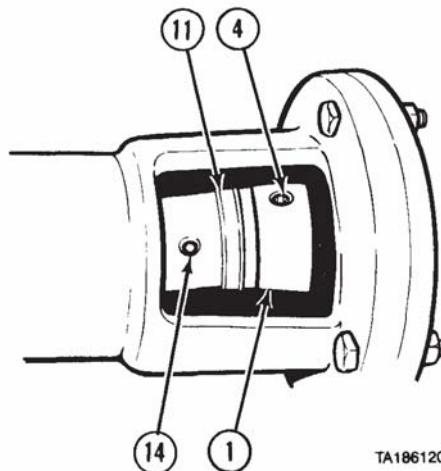
- (7) Align coupling halves (1 and 11) and install motor (10) on pump (15) with two screws (16) and lockwashers (17).



TA186119

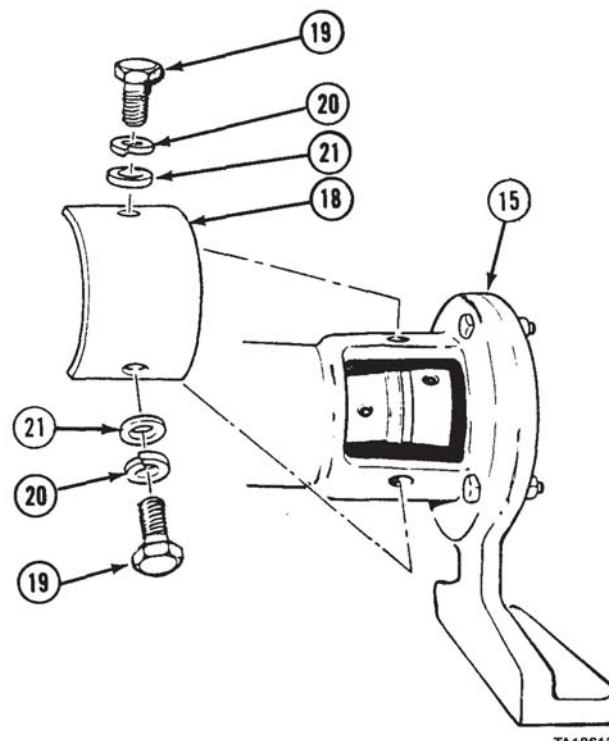
## M978 Tanker Maintenance Instructions (Cont)

- (8) Hold coupling halves (1 and 11) together and tighten setscrews (14 and 4).



TA186120

- (9) Install cover (18) on pump (15) with two screws (19), lockwashers (20), and washers (21).



TA186121

## M978 Tanker Maintenance Instructions (Cont)

**25-5. PRIMARY PUMP HYDRAULIC MOTOR REMOVAL/INSTALLATION (CONT.).**

(10) Install two hydraulic lines (22 and 23) on elbow (7) and adapter (8).

(11) Install two hydraulic lines (24 and 25) on tee (9).

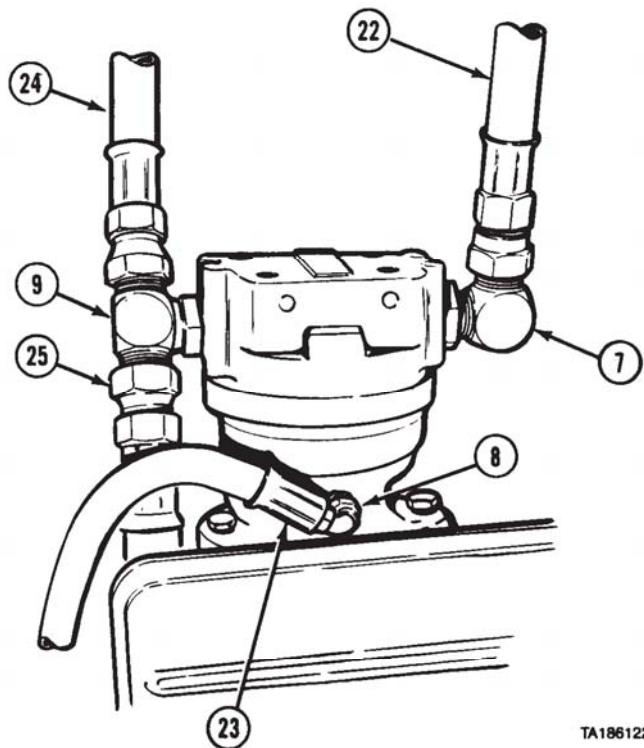
**c. Follow-on Maintenance.**

(1) Prepare tanker for operation (TM 9-2320-279-10).

(2) Recirculate fuel (TM 9-2320-279-10).

(3) Inspect hydraulic motor for leaks.

**END OF TASK**



TA186122

## M978 Tanker Maintenance Instructions (Cont)

**25-6. PRIMARY PUMP REMOVAL/INSTALLATION.**

This task covers:

- a. Removal
- b. Installation

- c. Follow-on Maintenance

**INITIAL SETUP***Models*

M978

*References*

None

*Test Equipment*

None

*Equipment Condition*

TM or Para

Para 25-3

Para 9-9

*Condition Description*

Tank drained.

Propeller shaft between transfer case and third axle removed.

Primary pump hydraulic motor removed.

*Special Tools*

None

*Supplies*Adhesive-sealant, silicone, Item 4, Appendix C  
Compound, sealing, pipe thread, Item 18,

Appendix C

Grease, automotive and artillery, Item 23,  
Appendix C*Special Environmental Conditions*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic (2)

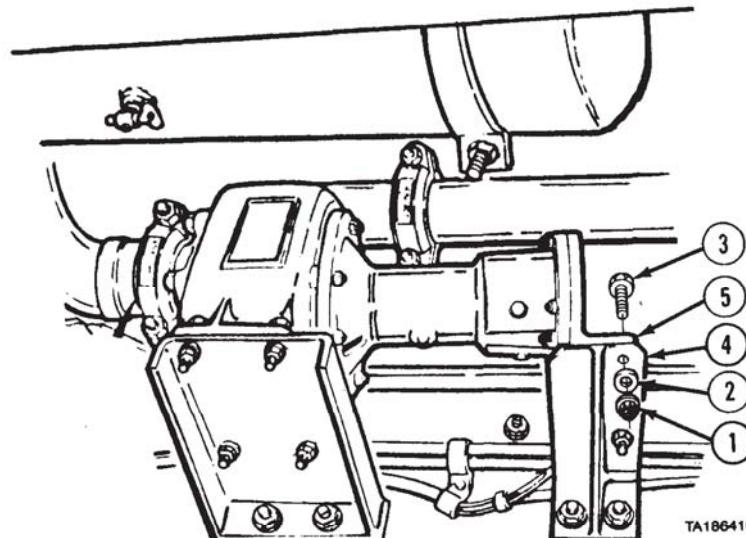
*General Safety Instructions*

No smoking, flame, sparks, and glowing or hot objects within 50 ft (15 m) of vehicle.

**a. Removal.****NOTE**

Pump is located inside right frame rail in front of No. 3 axle. Pump area is shown with crossmember removed for clarity.

- (1) Remove two locknuts (1), washers (2), and screws (3) from rear mount (4) and pump (5).



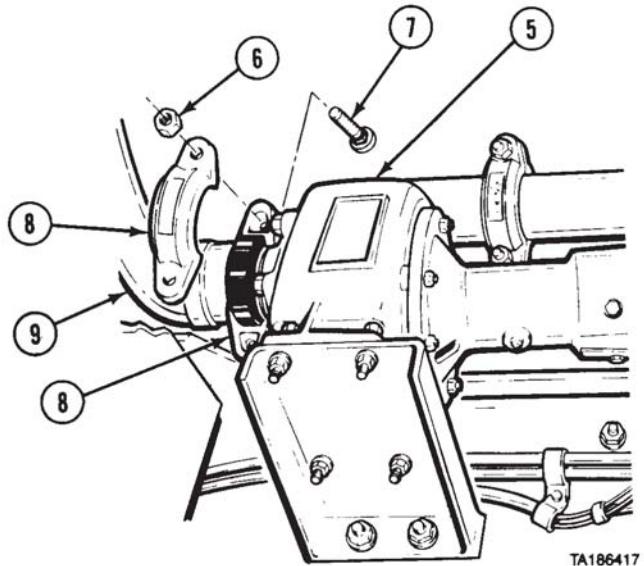
## M978 Tanker Maintenance Instructions (Cont)

## 25-6. PRIMARY PUMP REMOVAL/INSTALLATION (CONT).

**WARNING**

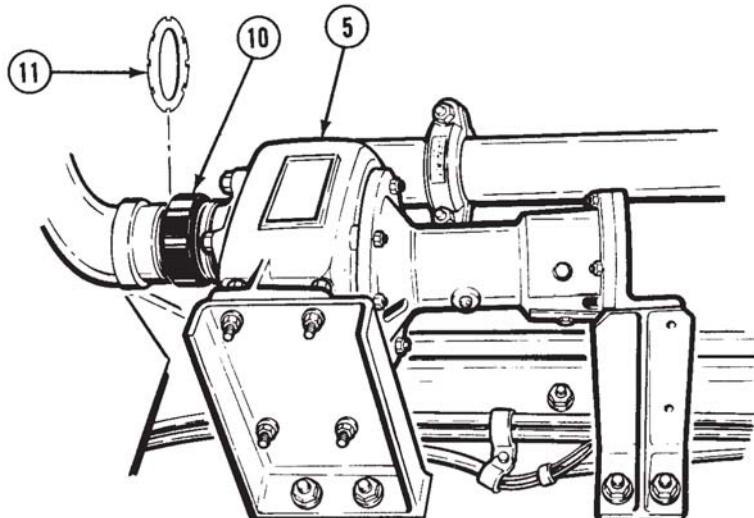
Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (2) Remove two nuts (6), screws (7), and coupling halves (8) from suction pipe (9) and pump (5).



TA186417

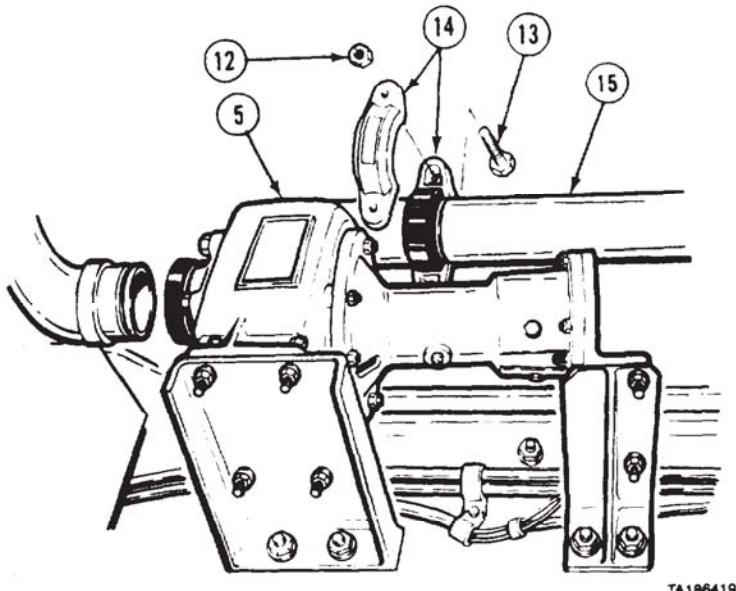
- (3) Push coupling gasket (10) onto pump (5).
- (4) Remove reducer (11) from coupling gasket (10).



TA186418

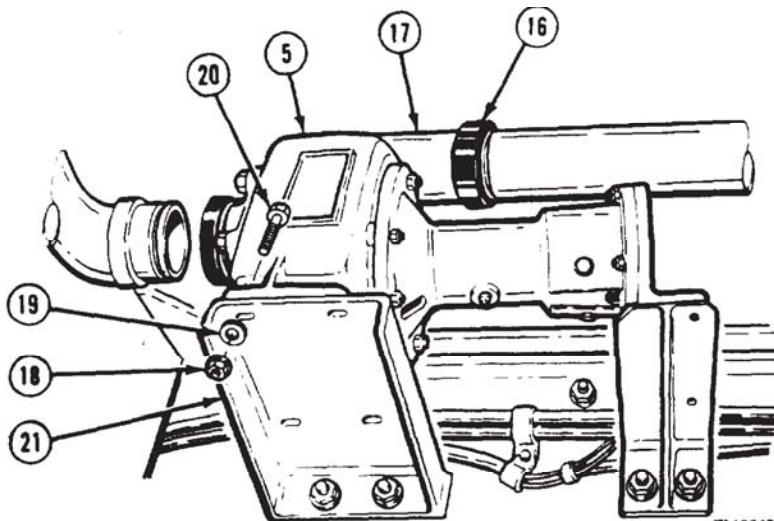
## M978 Tanker Maintenance Instructions (Cont)

- (5) Remove two nuts (12), screws (13), and coupling halves (14) from discharge pipe (15) and pump (5).



TA186419

- (6) Push coupling gasket (16) back onto discharge elbow (17).  
 (7) When fuel has stopped draining, remove four locknuts (18), washers (19), and screws (20) from front pump mount (21) and pump (5).



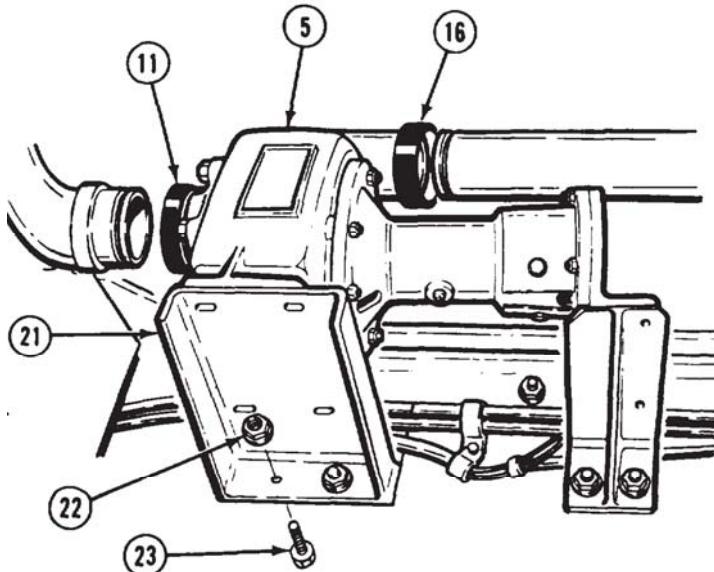
TA186420

## M978 Tanker Maintenance Instructions (Cont)

**25-6. PRIMARY PUMP REMOVAL/INSTALLATION (CONT).****WARNING**

Pump is heavy and may cause severe injury if it slips or is dropped while being moved.

- (8) Support pump (5).
- (9) Remove four locknuts (22) and screws (23) from front pump mount (21).
- (10) Remove mount (21).
- (11) Soldier A and Soldier B remove pump (5) from vehicle.
- (12) Remove coupling gaskets (11 and 16).

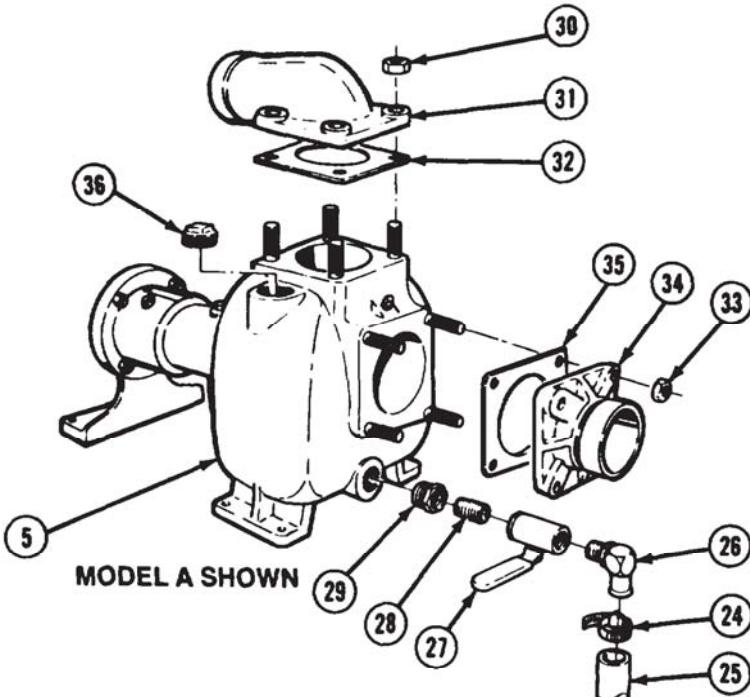


- (13) Remove clamp (24) and hose (25).
- (14) Remove fitting (26), drain valve (27), nipple (28), and bushing (29) from pump (5).

**NOTE**

There are two models of primary pump. Model A pump does not include discharge elbow and suction flange. Model B pump is supplied with discharge elbow and suction flange installed. Do steps (15) and (16) if replacing pump with Model A pump. Skip steps (15) and (16) and go to step (17) if replacing pump with Model B pump.

- (15) Remove four nuts (30), discharge elbow (31), and gasket (32).
- (16) Remove four nuts (33), suction flange (34), and gasket (35).
- (17) Remove fill plug (36).

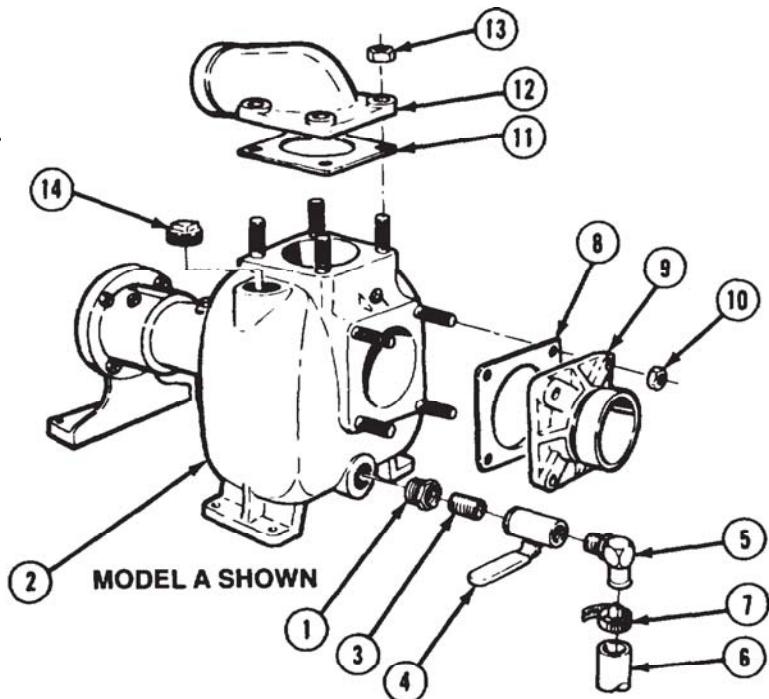


## M978 Tanker Maintenance Instructions (Cont)

*c. Installation.***WARNING**

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

- (1) Apply pipe thread sealing compound and install bushing (1) in pump (2).
- (2) Apply pipe thread sealing compound to both ends of nipple (3) and install in bushing (1).
- (3) Install drain valve (4) on nipple (3).
- (4) Apply pipe thread sealing compound and install fitting (5) on drain valve (4).
- (5) Install hose (6) on fitting (5) with clamp (7). Close drain valve (4).

**NOTE**

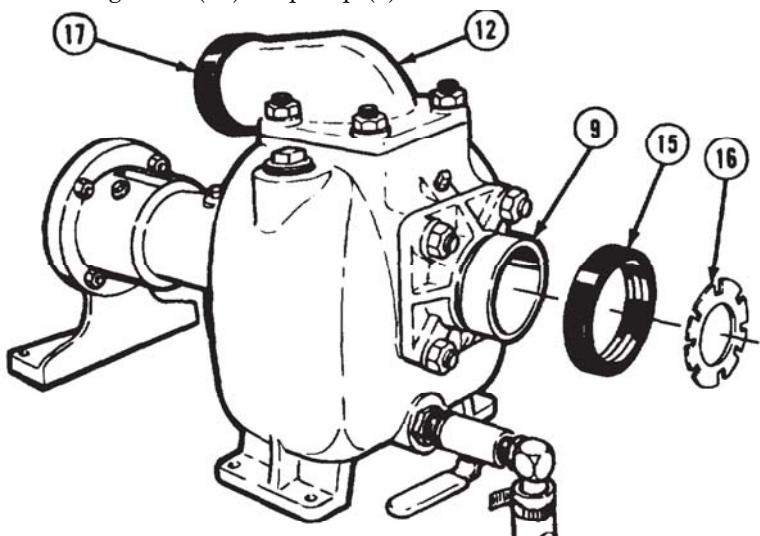
There are two models of primary pump. Model A pump does not include discharge elbow and suction flange. Model B pump is supplied with discharge elbow and suction flange installed. Do steps (6) through (9) if installing Model A pump. Skip steps (6) through (9) and continue with step (10) if installing Model B pump.

- (6) Apply silicone adhesive-sealant and install gasket (8) on pump (2).
- (7) Install suction flange (9) with four nuts (10). Tighten nuts to 34 lb-ft (46 N·m).
- (8) Apply silicone adhesive-sealant and install gasket (11) on pump (2).
- (9) Install discharge elbow (12) with four nuts (13). Tighten nuts to 34 lb-ft (46 N·m).
- (10) Fill pump (2) with one-half gallon clean fuel of same type as in tanker. Install fill plug (14).

**CAUTION**

Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.

- (11) Install coupling gasket (15) and reducer (16) on suction flange (9).
- (12) Install coupling gasket (17) on discharge elbow (12).

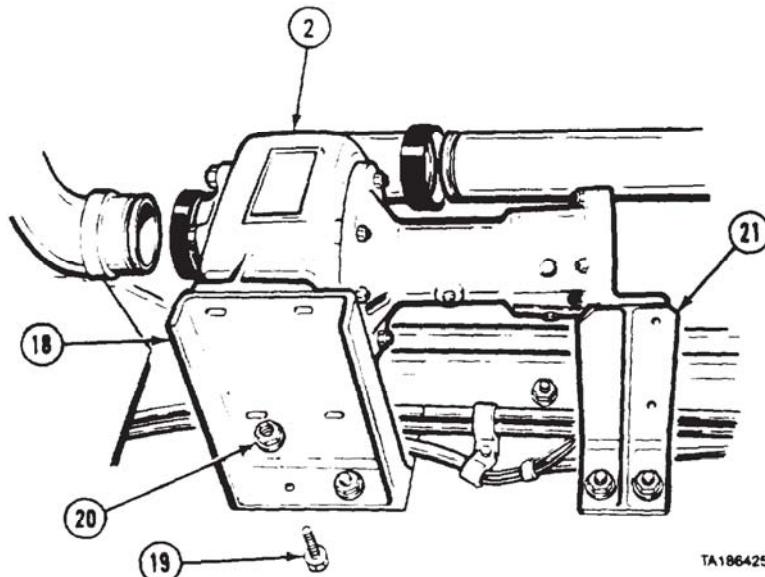


## M978 Tanker Maintenance Instructions (Cont)

**25-6. PRIMARY PUMP REMOVAL/INSTALLATION (CONT).****WARNING**

Pump is heavy and may cause severe injury if it slips or is dropped while being installed.

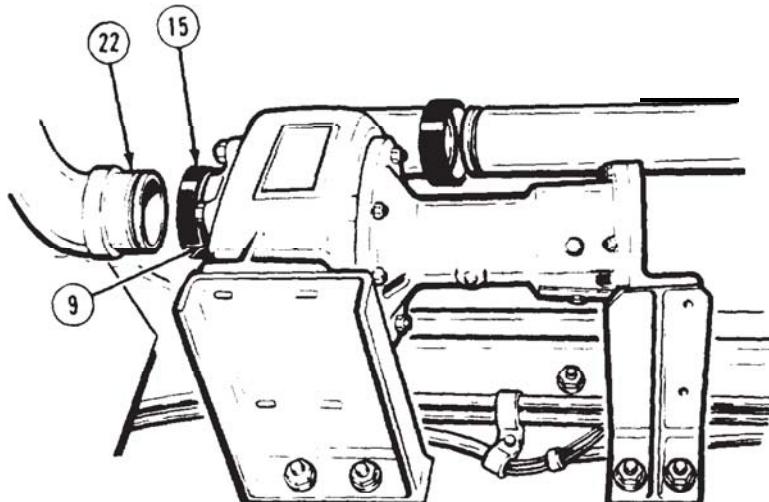
- (13) Support pump (2) in position under tank.
- (14) Install front pump mount (181 with four screws (19) and locknuts (20) level with rear pump mount (21).

**CAUTION**

Do not tear or damage coupling gasket during installation. If coupling gasket is damaged, piping connections will leak.

**NOTE**

- Apply light coat of grease to coupling gasket.
- Loosen pipe connector at next connection
- (15) Position coupling gasket (15) on suction flange (9) and suction pipe (22).

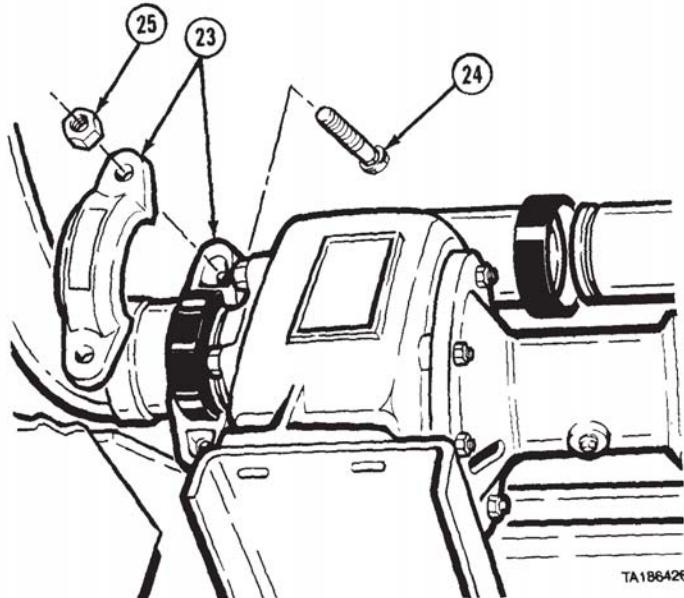


## M978 Tanker Maintenance Instructions (Cont)

**CAUTION**

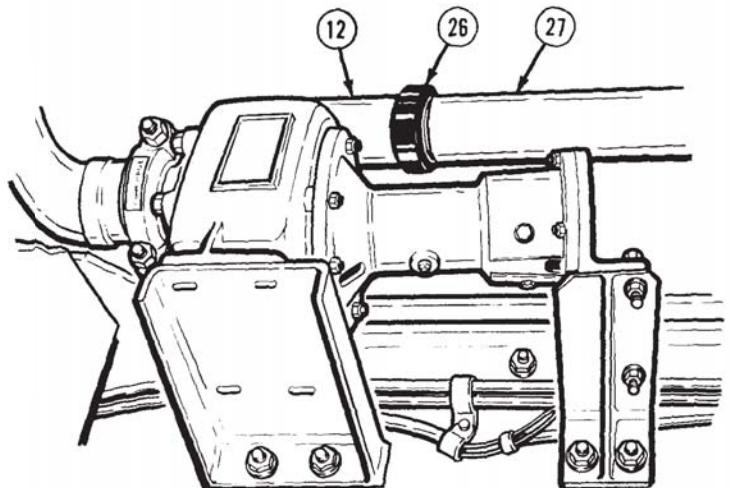
Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

- (16) Install two coupling halves (23) with screws (24) and nuts (25).

**NOTE**

Loosen pipe connector at next connection.

- (17) Position coupling gasket (26) over ends of discharge elbow (12) and discharge pipe (27).

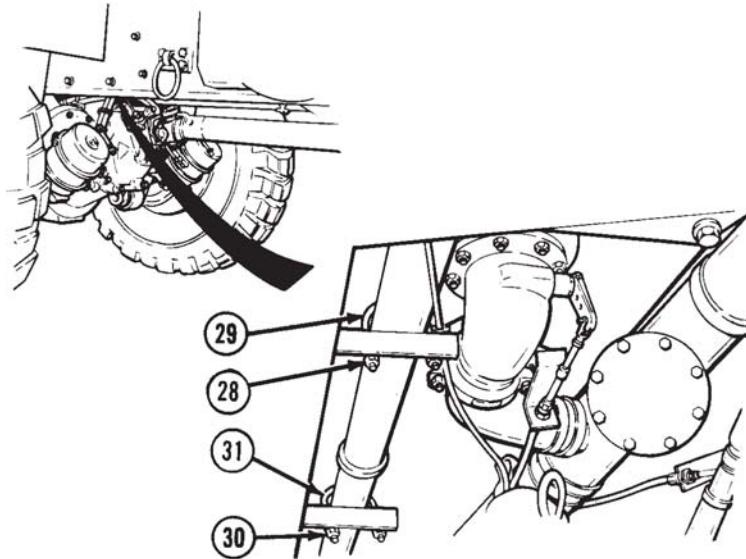


## M978 Tanker Maintenance Instructions (Cont)

**25-6. PRIMARY PUMP REMOVAL/INSTALLATION (CONT.).****NOTE**

If discharge pipe can be aligned with pump discharge elbow, continue with step (22). If not, continue with step (18).

- (18) Loosen two nuts (28) and discharge pipe U-bolt (29).
- (19) Loosen two nuts (30) and discharge pipe U-bolt (31).

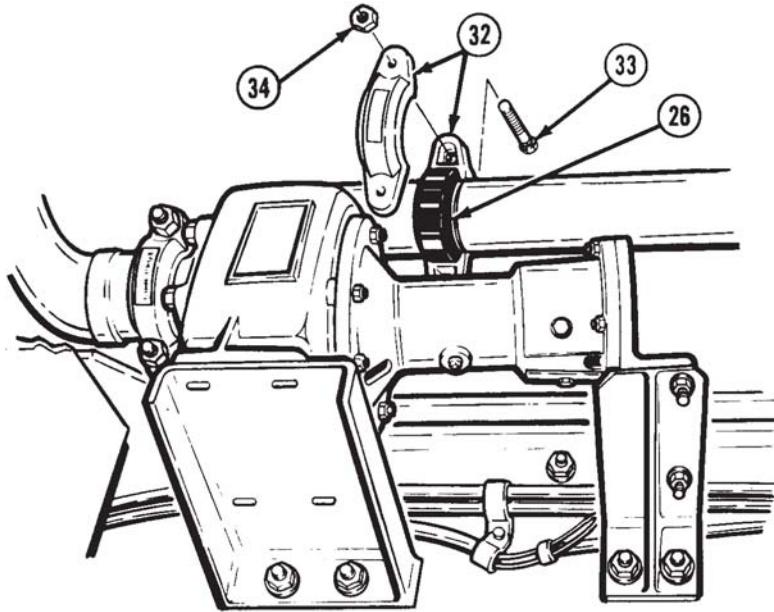


TA186429

**CAUTION**

Do not tear or otherwise damage coupling gasket during installation. If coupling gasket is damaged, piping connections will leak.

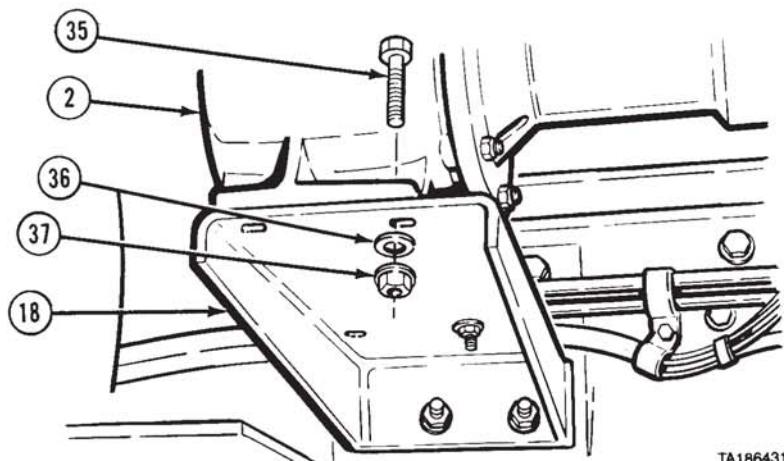
- (20) Install two coupling halves (32) on coupling gasket (26) with two screws (33) and nuts (34).



TA186430

## M978 Tanker Maintenance Instructions (Cont)

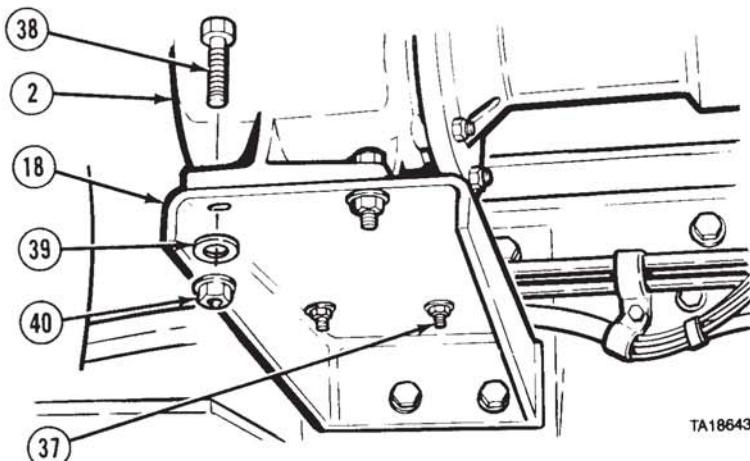
- (21) Install two rear screws (35), washers (36), and locknuts (37) on pump (2) and front pump mount (18). Do not tighten.



TA186431

- (22) Install two front screws (38), washers (39), and locknuts (40) on pump (2) and front pump mount (18). Tighten to 34 lb-ft (46 N·m).

- (23) Tighten two rear locknuts (37) in front pump mount (18) to 34 lb-ft (46 N·m).

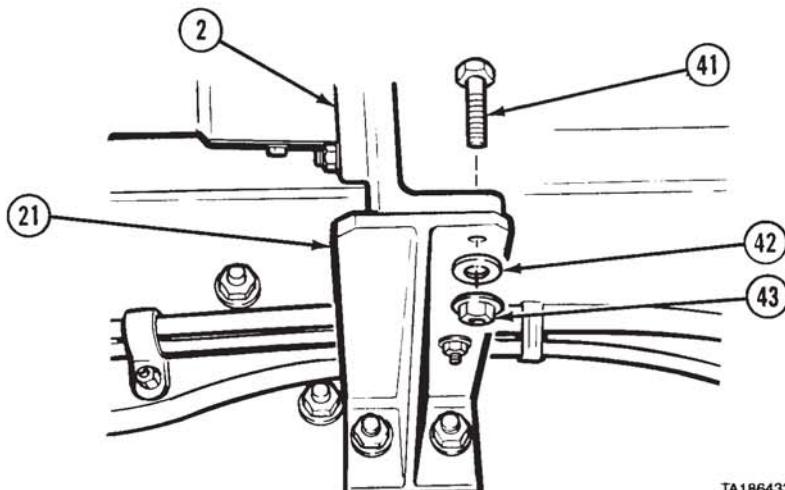


TA186432

**CAUTION**

Pump must be mounted flat or it will twist when tightening new mounting bolts, causing pump damage and leakage.

- (24) Shim pump (2) with shims on rear pump mount (21) so pump is level.
- (25) Install two screws (41), washers (42), and locknuts (43) on pump (2) and rear pump mount (21). Tighten to 34 lb-ft (46 N·m).



TA186433

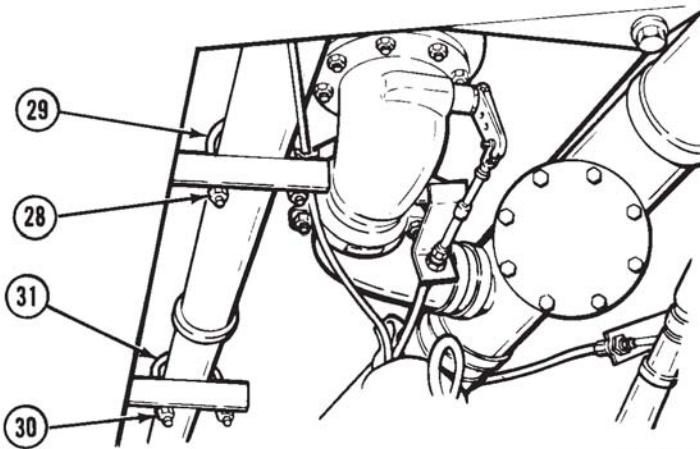
## M978 Tanker Maintenance Instructions (Cont)

25-6. PRIMARY PUMP REMOVAL/INSTALLATION (CONT.)

## NOTE

If discharge pipe U-bolts were not loosened, skip steps (26) and (27).

- (26) Tighten two nuts (28) on discharge pipe U-bolt (29).
- (27) Tighten two nuts (30) on discharge pipe U-bolt (31).
- c. *Follow-on Maintenance.*
  - (1) Install primary pump hydraulic motor (para 25-5).
  - (2) Install propeller shaft between transfer case and third axles (para 9-9).
  - (3) Prepare tanker for operation (TM 9-2320-279-10).
  - (4) Recirculate fuel (TM 9-2320-279-10).
  - (5) Inspect primary pump for leaks.



TA186434

END OF TASK

25-7. AUXILIARY PUMP REMOVAL/INSTALLATION.

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

## INITIAL SETUP

*Models*

M978

*Test Equipment*

None

*Special Tools*

None

*Supplies*Compound, sealing, pipe thread, Item 18,  
Appendix C*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*References*

None

*Equipment Condition**TM or Para*

Para 7-48

*Condition Description*

Auxiliary pump junction box removed.

## Para 25-4

AUXILIARY PUMP to AE  
AIR ELIMINATOR tubing removed.*Special Environmental Conditions*

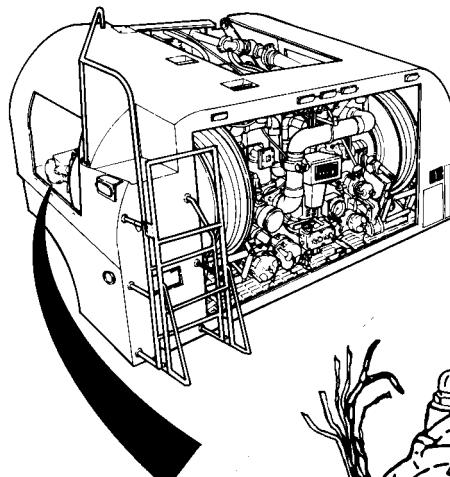
None

*General Safety Instructions*

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

**M978 Tanker Maintenance Instructions (Cont)****a. Removal.**

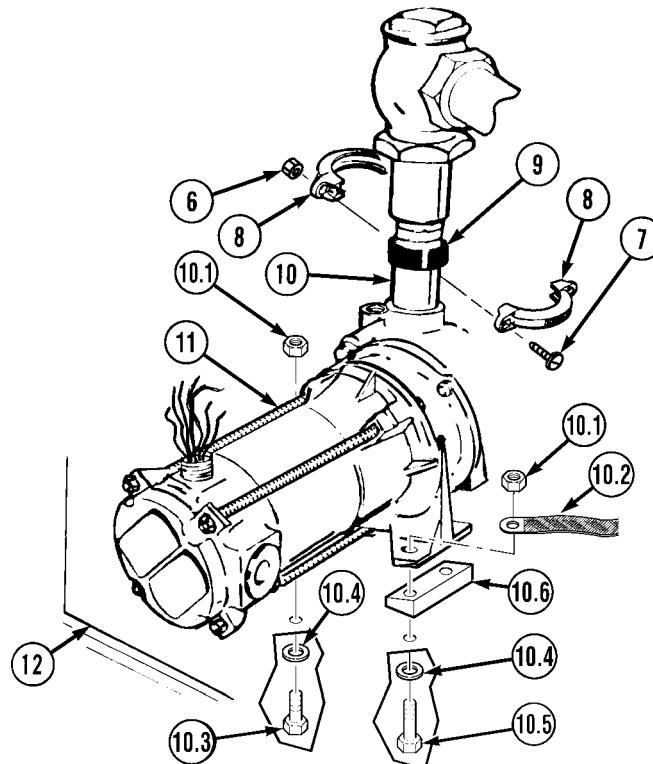
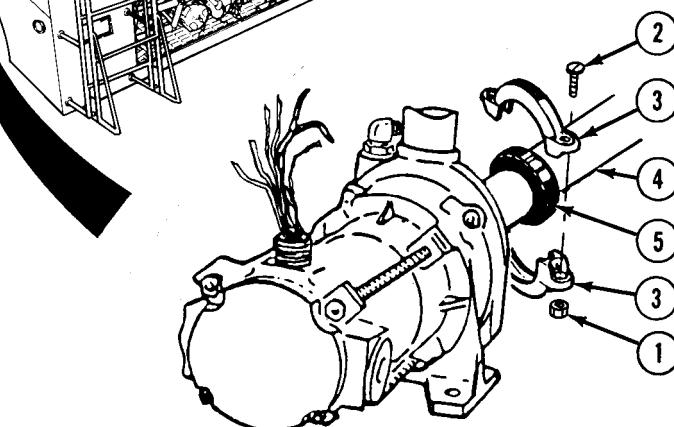
- (1) Remove two nuts (1), screws (2), and coupling halves (3) from pipe (4).
- (2) Push coupling gasket (5) on pipe (4).



- (3) Remove two nuts (6), screws (7), and coupling halves (8).
- (4) Push coupling gasket (9) on pipe (10).

**NOTE**

- For vehicles without spacer perform step (4.1). For vehicles with spacer perform steps (4.2) and (4.3).
  - Ground strap is not present on all vehicles.
- (4.1) Remove four lock nuts (10.1), ground strap (10.2), four screws (10.3), and washers (10.4) from pump (11).
  - (4.2) Remove two lock nuts (10.1), ground strap (10.2), two screws (10.5), washers (10.4), and spacer (10.6) from pump (11).
  - (4.3) Remove two lock nuts (10.1), screws (10.3), and washers (10.4) from pump (11).
  - (5) Remove AUXILIARY PUMP (11) from wheel well (12).



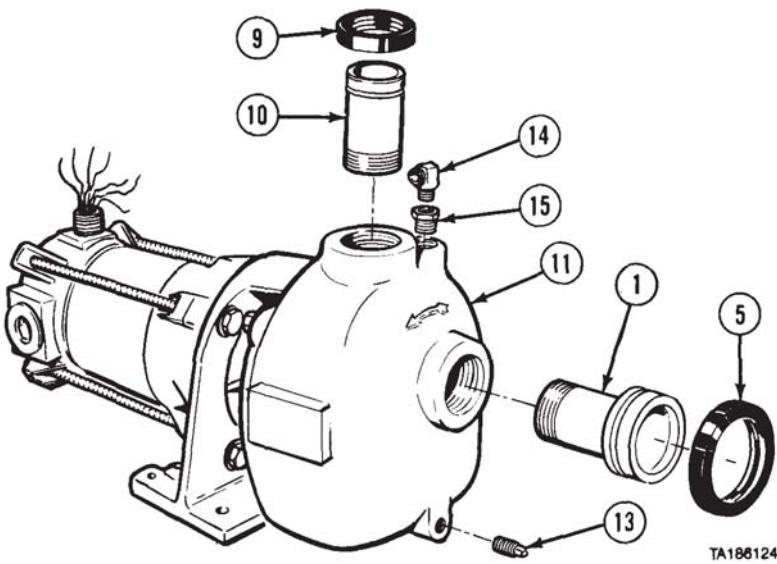
## M978 Tanker Maintenance Instructions (Cont)

**25-7. AUXILIARY PUMP REMOVAL/INSTALLATION (CONT.).**

- (6) Remove two coupling gaskets (5 and 9).
- (7) Remove drain plug (13) and drain all fuel from AUXILIARY PUMP (11).

**WARNING**

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

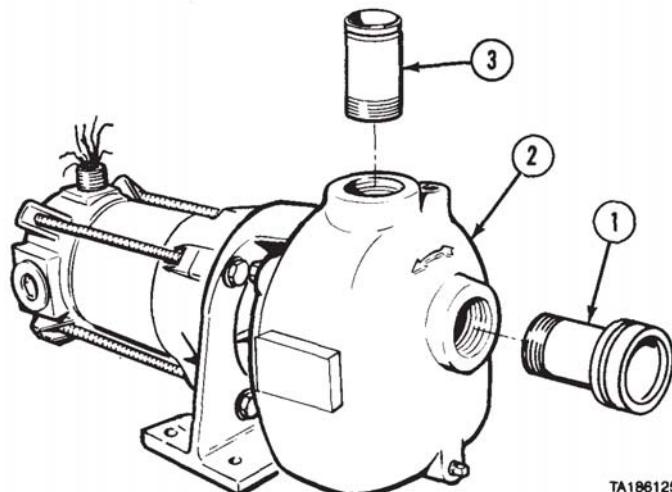


- (8) Coat threads of drain plug (13) with pipe thread sealing compound and install drain plug.
- (9) Remove inlet pipe (1) and outlet pipe (10).
- (10) Remove elbow (14) and adapter (15).

*b. Installation.***WARNING**

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

- (1) Coat threads of inlet pipe (1) with pipe thread sealing compound and install inlet pipe in AUXILIARY PUMP (2).
- (2) Coat threads of outlet pipe (3) with pipe thread sealing compound and install outlet pipe in AUXILIARY PUMP (2).

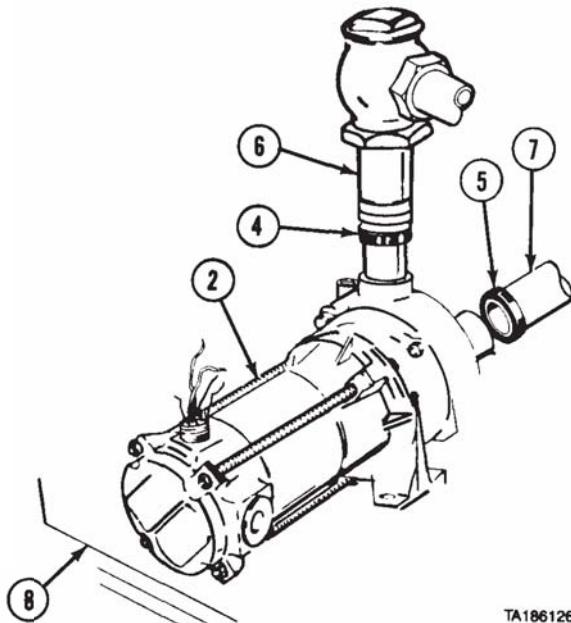


## M978 Tanker Maintenance Instructions (Cont)

## NOTE

Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.

- (3) Install two coupling gaskets (4 and 5) on pipes (6 and 7).
- (4) Position AUXILIARY PUMP (2) on wheel well (8).

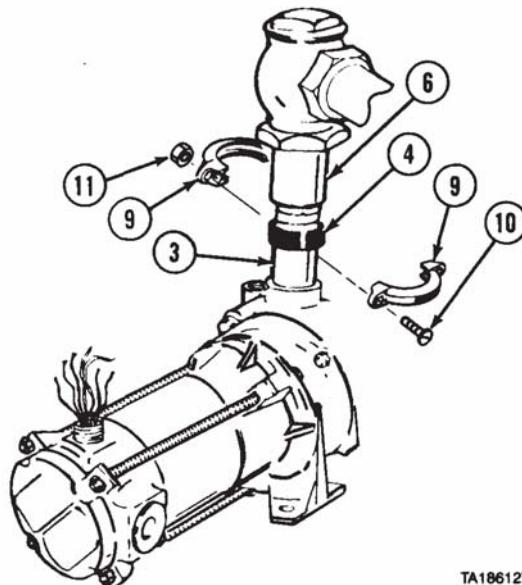


TA186126

## NOTE

Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

- (5) Position coupling gasket (4) over connections of pipes (3 and 6).
- (6) Install two coupling halves (9) with two screws (10) and nuts (11).



TA186127

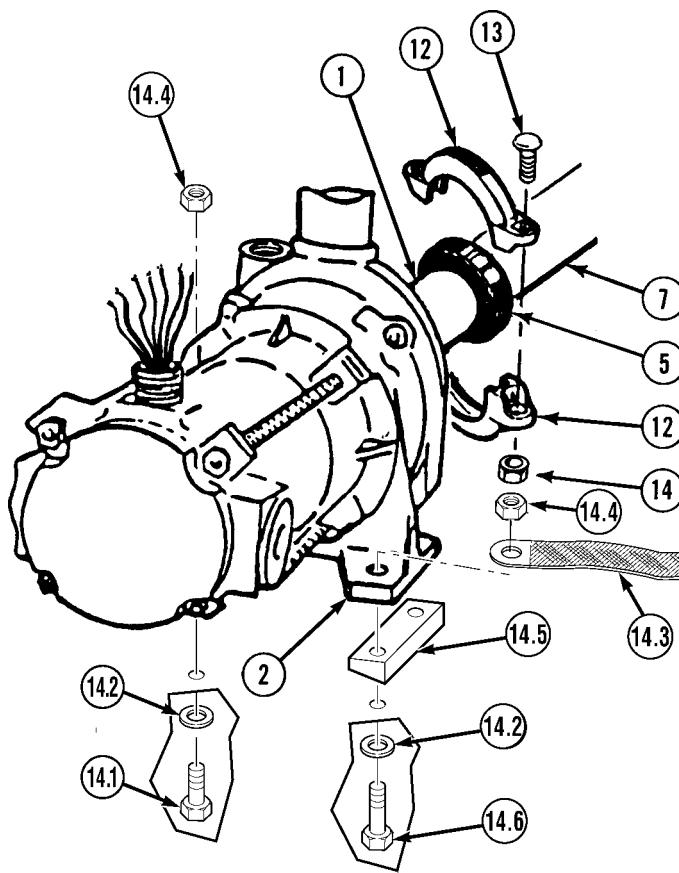
## M978 Tanker Maintenance Instructions (Cont)

**25-7. AUXILIARY PUMP REMOVAL/INSTALLATION (CONT).**

- (7) Position coupling gasket (5) over connections of pipes (1 and 7).
- (8) Install two coupling halves (12) with two screws (13) and nuts (14).

**NOTE**

- For vehicles without spacer, perform step (8.1). For vehicles with spacer, perform steps (8.2) and (8.3).
  - Use longer screws on side of pump with spacer.
  - Ground strap is not present on all vehicles.
- (8.1) Install four screws (14.1), washers (14.2), ground strap (14.3), and four locknuts (14.4) to pump (2).
  - (8.2) Install two screws (14.1), washers (14.2), and locknuts (14.4) on pump (2).
  - (8.3) Install spacer (14.5), two screws (14.6), washers (14.2), ground strap (14.3), and two locknuts (14.4) on pump (2).



- (9) Fill AUXILIARY PUMP (2) with clean fuel of same type as in tanker.

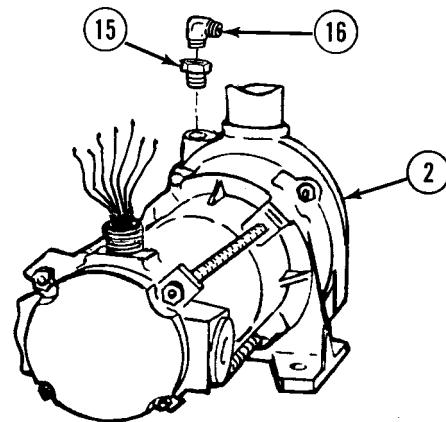
**WARNING**

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

- (10) Coat threads of adapter (15) and elbow (16) with pipe thread sealing compound and install adapter and elbow in AUXILIARY PUMP (2).

**c. Follow-on Maintenance.**

- (1) Install auxiliary pump junction box (para 7-48).
- (2) Install AUXILIARY PUMP to AE AIR ELIMINATOR tubing (para 25-4).
- (3) Perform fuel servicing using AUXILIARY PUMP (TM 9-2320-279-10).
- (4) Inspect AUXILIARY PUMP for leakage and proper operation.

**END OF TASK**

## M978 Tanker Maintenance Instructions (Cont)

**25-8. FLOWMETER STRAINER ASSEMBLY REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

M978

*Test Equipment*

None

*Special Tools*

None

*Supplies*

Adhesive-sealant, silicone, Item 4, Appendix C

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*References*

None

*Equipment Condition**TM or Para*

Para 25-9

*Condition Description*

AE AIR ELIMINATOR removed.

*Special Environmental Conditions*

None

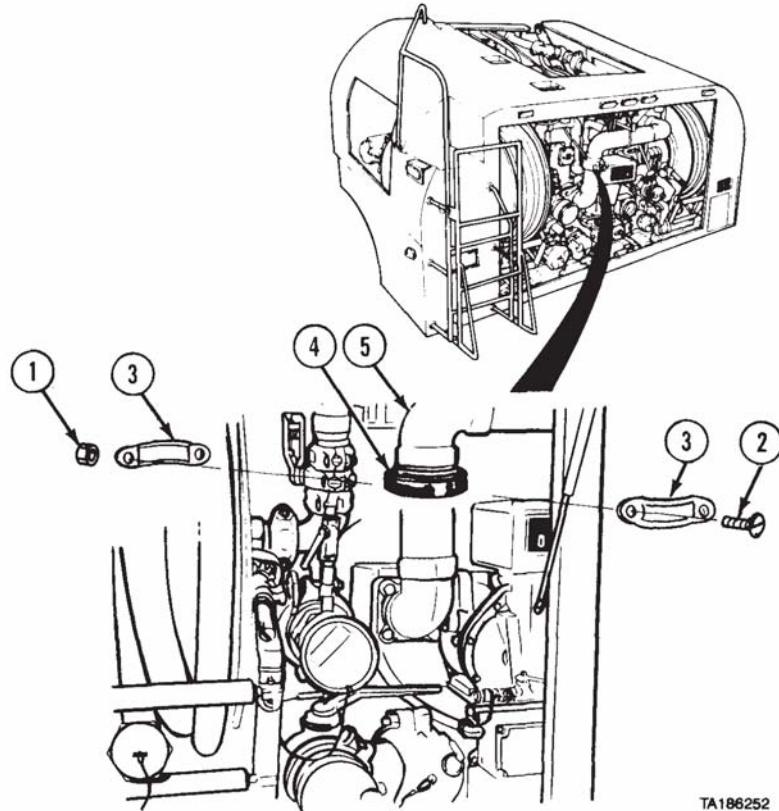
*General Safety Instructions*

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

***a. Removal.*****WARNING**

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (1) Remove two nuts (1), screws (2), and coupling halves (3).
- (2) Push coupling gasket (4) on pipe (5).

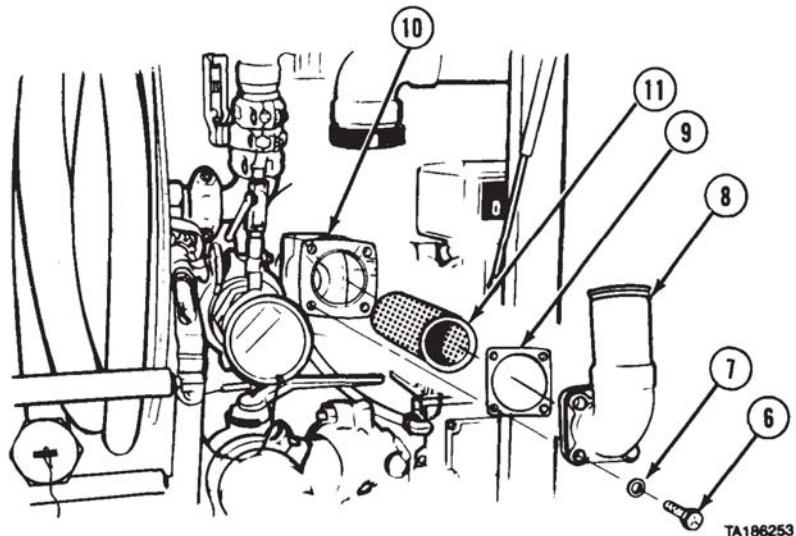


TA186252

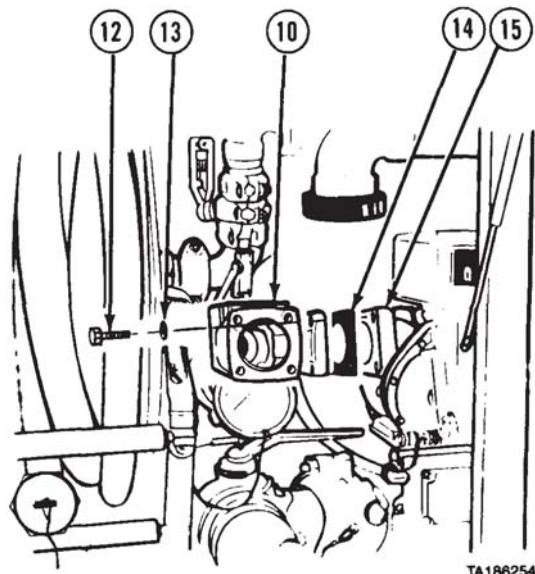
## M978 Tanker Maintenance Instructions (Cont)

**25-8. FLOWMETER STRAINER ASSEMBLY REMOVAL/INSTALLATION (CONT.).**

- (3) Remove four screws (6), washers (7), elbow (8), and gasket (9) from strainer housing (10).
- (4) Remove strainer (11).

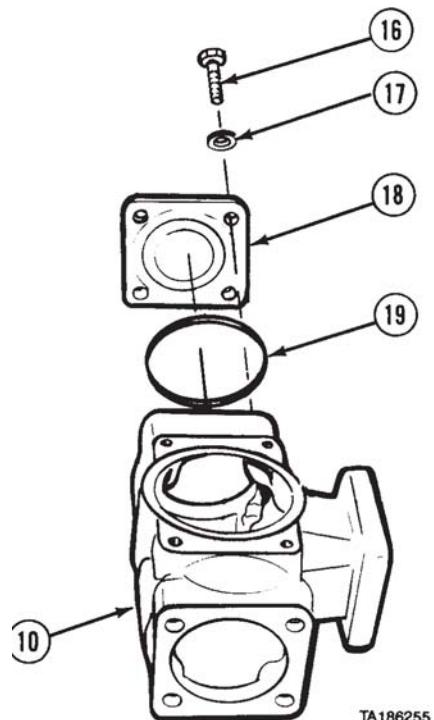


- (5) Remove four screws (12), washers (13), strainer housing (10), and gasket (14) from meter (15).



## M978 Tanker Maintenance Instructions (Cont)

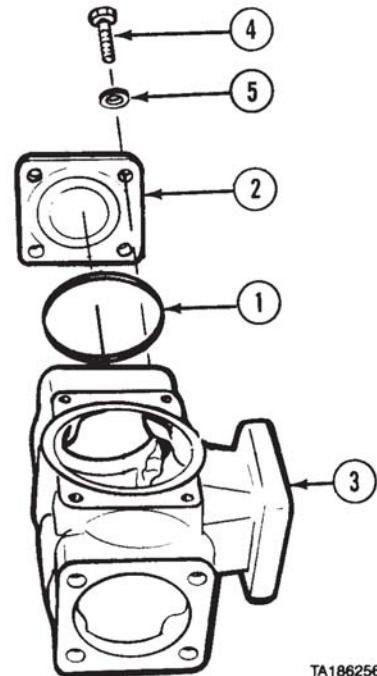
- (6) Remove four screws (16), washers (17), cover (18), and preformed packing (19) from strainer housing (10).



TA186255

b. Installation.

- (1) Install preformed packing (1) on cover (2).  
 (2) Install cover (2) on strainer housing (3) with four screws (4) and washers (5).



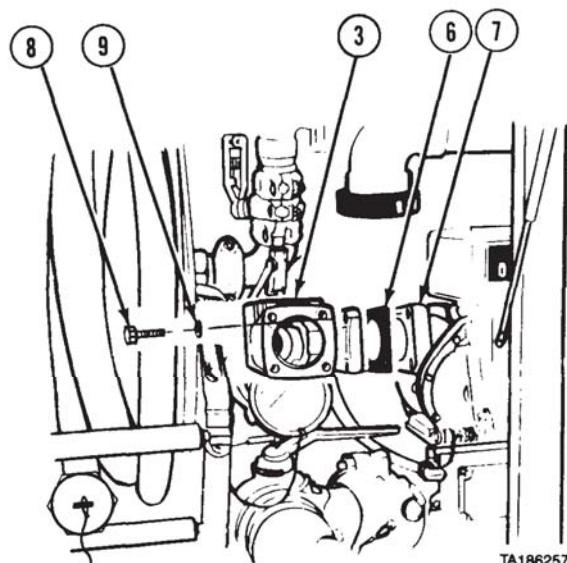
TA186256

## M978 Tanker Maintenance Instructions (Cont)

**25-8. FLOWMETER STRAINER ASSEMBLY REMOVAL/INSTALLATION (CONT.).****WARNING**

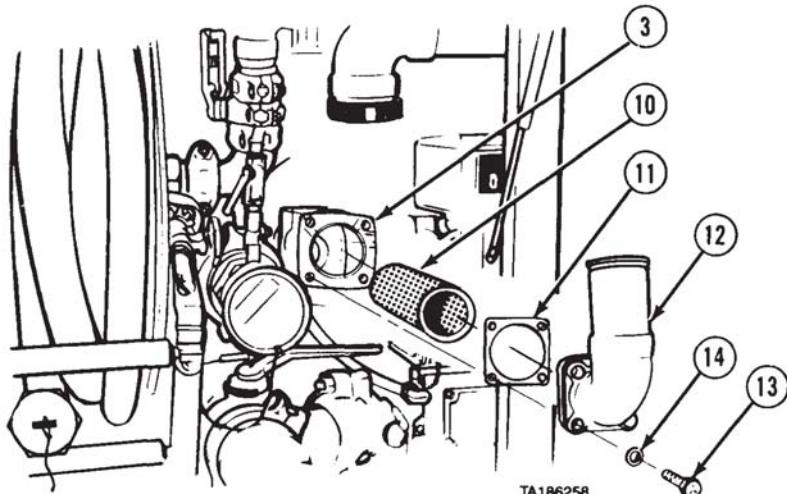
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (3) Apply silicone adhesive-sealant on gasket (6) and install gasket and housing (3) on meter (7) with four screws (8) and washers (9).



TA186257

- (4) Install strainer (10) in strainer housing (3).
- (5) Apply silicone adhesive-sealant on gasket (11) and install gasket and elbow (12) on housing (3) with four screws (13) and washers (14).
- (6) Do not tighten screws (13).



TA186258

## M978 Tanker Maintenance Instructions (Cont)

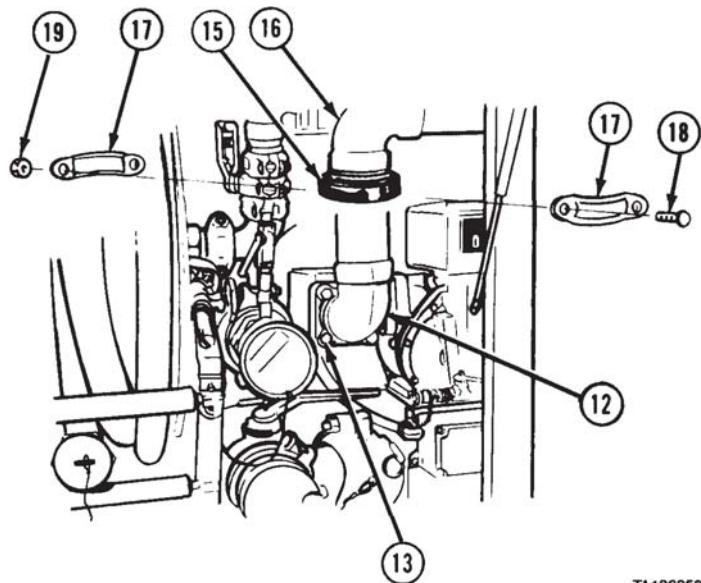
## NOTE

- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.
- Loosen all clamps and next coupling on attaching pipe.
  - (7) Position coupling gasket (15) over connections of pipe (16) and elbow (12).
  - (8) Install two coupling halves (17) with two screws (18) and nuts (19).
  - (9) Tighten screws (13).

c. *Follow-on Maintenance.*

- (1) Install AE AIR ELIMINATOR (para 25-9).
- (2) Recirculate fuel (TM 9-2320-279-10).
- (3) Inspect flowmeter strainer assembly and piping connections for leaks.

END OF TASK



TA186259

## M978 Tanker Maintenance Instructions (Cont)

**25-9. AE AIR ELIMINATOR REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

M978

*References*

None

*Test Equipment*

None

*Equipment Condition**Special Tools*

None

*TM or Para* TM 9-2320-279-10 *Condition Description* Pump module rear access doors opened.

*Supplies*

None

*Special Environmental Conditions*

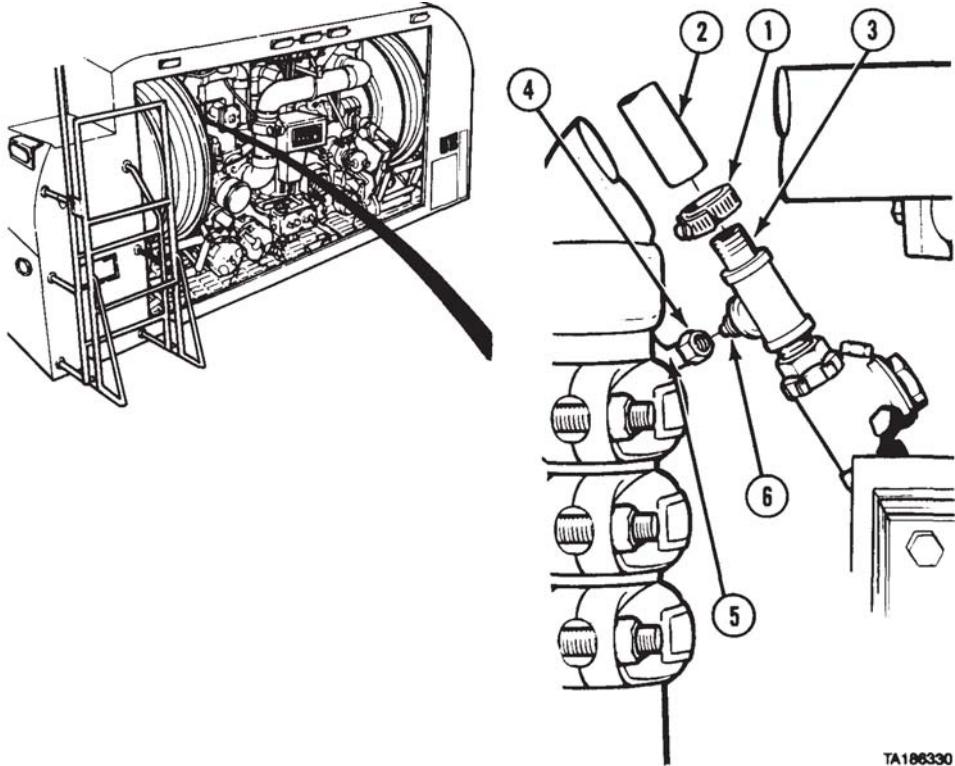
None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*General Safety Instructions*

No smoking, fuel, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

**a. Removal.**

TA186330

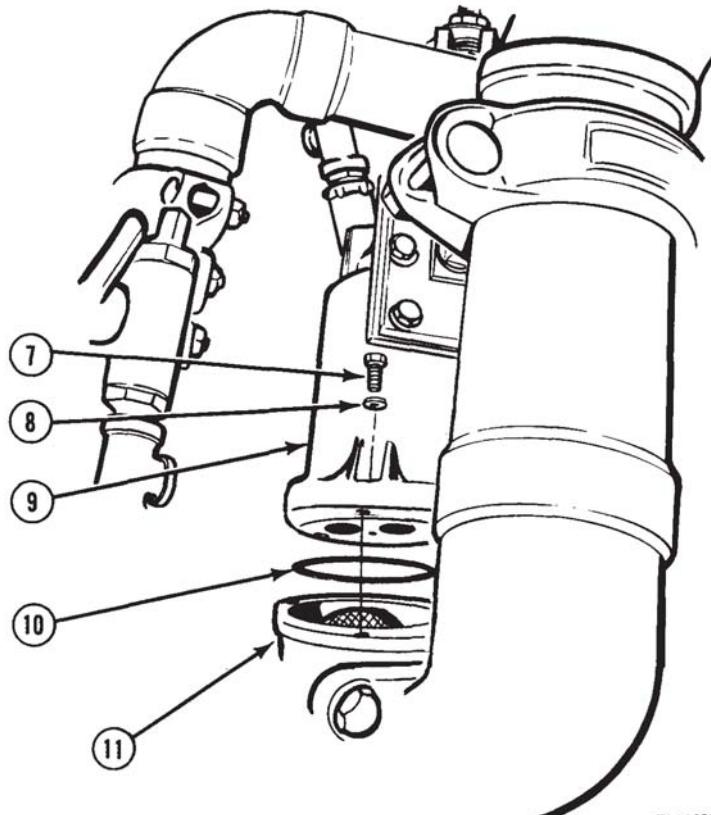
- (1) Loosen clamp (1) and remove tube (2) from pipe nipple (3). Remove clamp.
- (2) Loosen nut (4) and remove tube (5) from adapter (6).

## M978 Tanker Maintenance Instructions (Cont)

**NOTE**

Mark position of AE AIR ELIMINATOR.

- (3) Remove four screws (7) and washers (8).
- (4) Remove AE AIR ELIMINATOR (9) and gasket (10) from strainer (11).



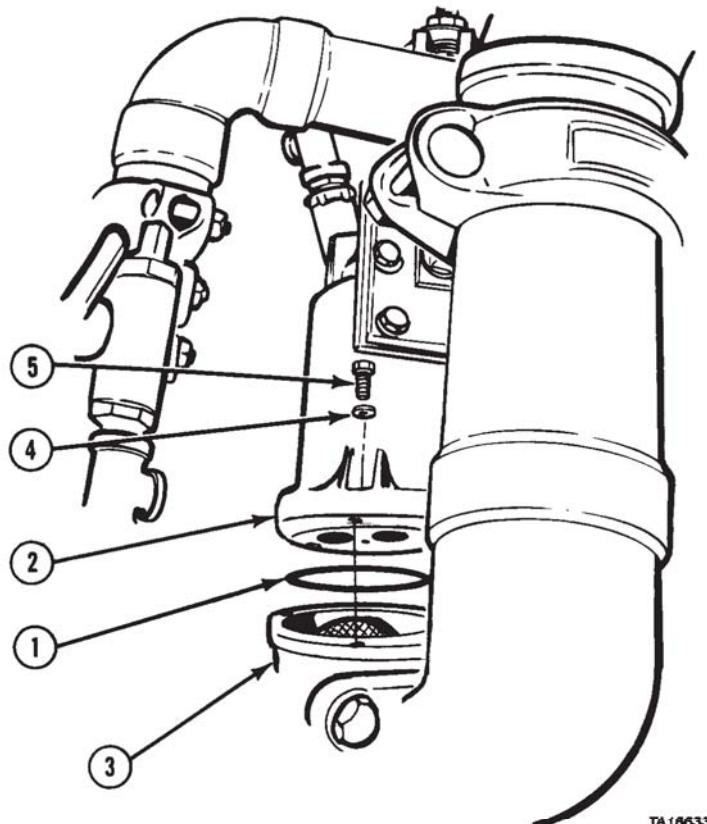
TA186332

## M978 Tanker Maintenance Instructions (Cont)

## 25-9. AE AIR ELIMINATOR REMOVAL/INSTALLATION (CONT).

## b. Installation.

- (1) Position gasket (1) and AE AIR ELIMINATOR (2) on strainer (3).
- (2) Install four washers (4) and screws (5).



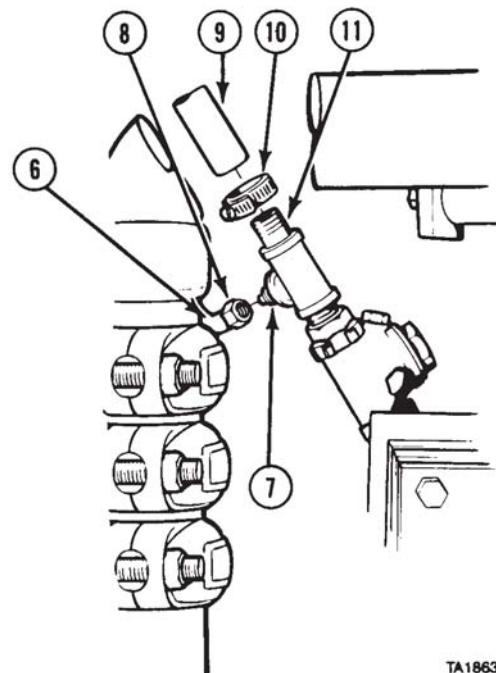
TA186331

- (3) Connect tube (6) on adapter (7) and tighten nut (8).
- (4) Install tube (9) and clamp (10) on pipe nipple (11). Tighten clamp.

## c. Follow-on Maintenance.

- (1) Recirculate fuel (TM 9-2320-279-10).
- (2) Check AE AIR ELIMINATOR for leaks.
- (3) Close pump module rear access doors (TM 9-2320-279-10).

END OF TASK



TA186333

## M978 Tanker Maintenance Instructions (Cont)

**25-10. AE AIR ELIMINATOR CHECK VALVE REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

M978

*Test Equipment*

None

*Special Tools*

None

*Supplies*Compound, sealing, pipe thread, Item 18,  
Appendix C*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*References*

None

*Equipment Condition**TM or Para*

Para 25-9

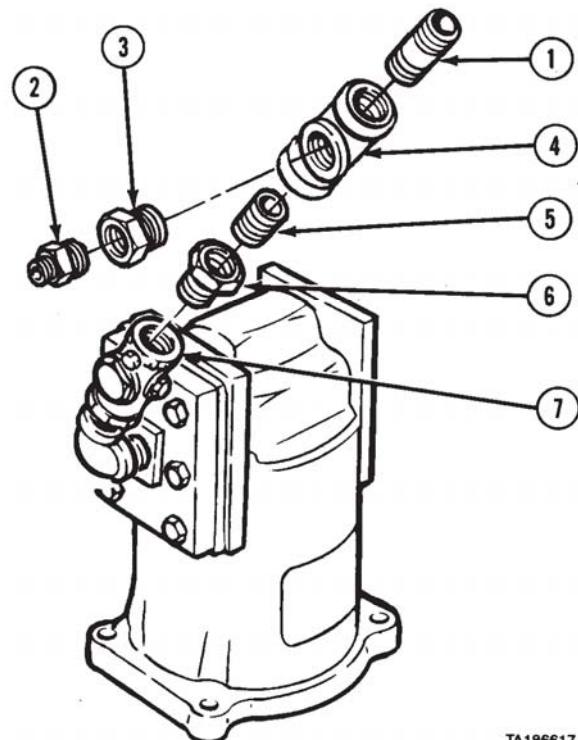
*Condition Description*AE AIR ELIMINATOR  
removed.*Special Environmental Conditions*

None

*General Safety Instructions*No smoking, flame, sparks, and hot or glowing  
objects within 50 ft (15 m) of vehicle.**a. Removal.****NOTE**

Mark position of fittings before removal.

- (1) Remove pipe nipple (1), adapter (2), and reducer bushing (3) from tee fitting (4).
- (2) Remove tee fitting (4), pipe nipple (5), and reducer bushing (6) from check valve (7).

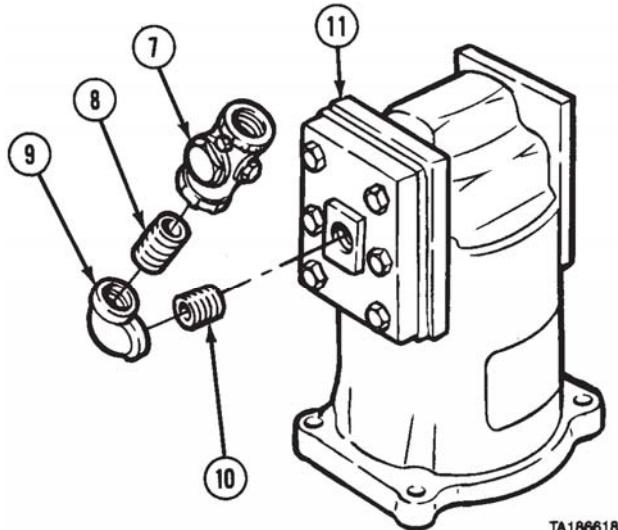


TA186617

## M978 Tanker Maintenance Instructions (Cont)

**25-10. AE AIR ELIMINATOR CHECK VALVE REMOVAL/INSTALLATION (CONT).**

- (3) Remove check valve (7), pipe nipple (8), elbow (9), and pipe nipple (10) from AE AIR ELIMINATOR (11).

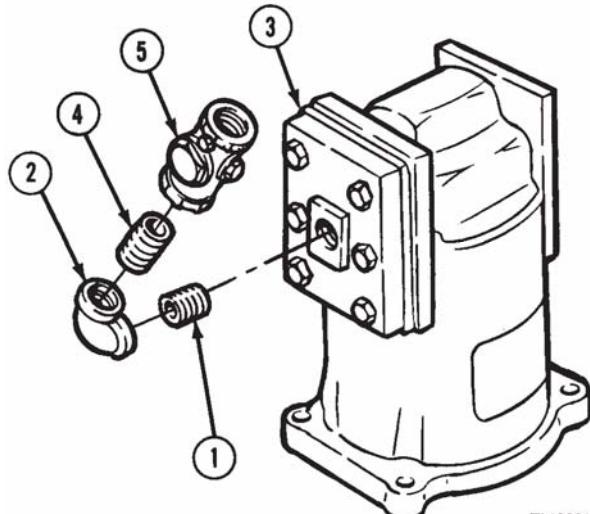


TA186618

*b. Installation.***WARNING**

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

- (1) Apply pipe thread sealing compound to threads of pipe nipple (1) and install pipe nipple and elbow (2) on AE AIR ELIMINATOR (3).
- (2) Apply pipe thread sealing compound to threads of pipe nipple (4) and install pipe nipple and check valve (5) on elbow (2).

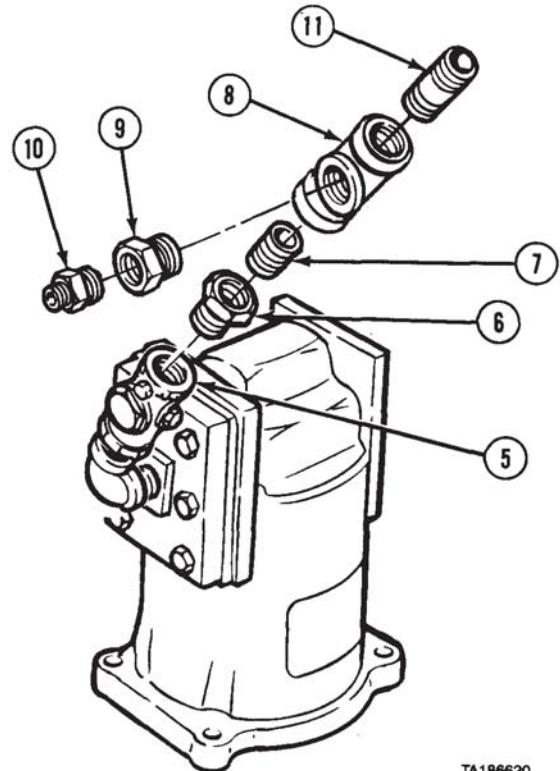


TA186619

## M978 Tanker Maintenance Instructions (Cont)

- (3) Apply pipe thread sealing compound to threads of reducer bushing (6) and install on check valve (5).
  - (4) Apply pipe thread sealing compound to threads of pipe nipple (7) and install on reducer bushing (6).
  - (5) Install tee fitting (8) on pipe nipple (7).
  - (6) Apply pipe thread sealing compound to threads of reducer bushing (9), adapter (10), and pipe nipple (11) and install in tee fitting (8).
- c. *Follow-on Maintenance.*
- (1) Install AE AIR ELIMINATOR (para 25-9).
  - (2) Recirculate fuel (TM 9-2320-279-10).
  - (3) Check AE AIR ELIMINATOR check valve for leaks and proper operation.

END OF TASK



TA186620

## M978 Tanker Maintenance Instructions (Cont)

## Section IV. PIPING AND VALVES

**25-11. TANKER PIPING REMOVAL/INSTALLATION.**

This task covers:

- a. Typical Pipe Coupling and Coupling Gasket Removal
- b. Typical Pipe Coupling and Coupling Gasket Installation
- c. Typical Clamp and Bracket Removal
- d. Typical Clamp and Bracket Installation
- e. Tanker Piping
- f. Tanker Piping Brackets
- g. Follow-on Maintenance

**INITIAL SETUP****Models**

M978

**Test Equipment**

None

**Special Tools**

None

**Supplies**

Grease, automotive and artillery, Item 23,  
Appendix C

**Personnel Required**

MOS 63S, Heavy wheel vehicle mechanic

**References**

None

**Equipment Condition****TM or Para**

Para 25-3

Tank drained.  
TM 9-2320-279-10Pump module top and rear  
access doors opened.

## Para 16-48

Pump module left and right  
side access panels removed.**Special Environmental Conditions**

None

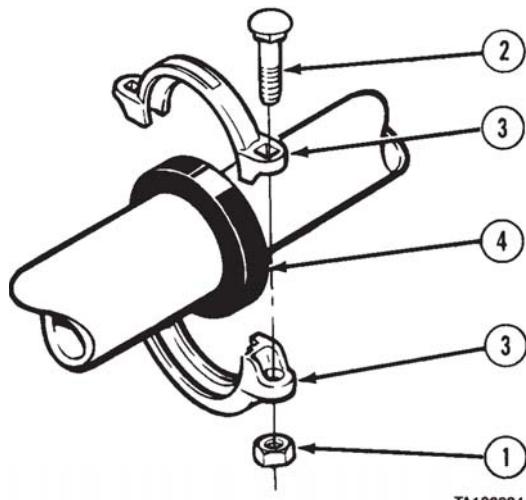
**General Safety Instructions**

No smoking, flame, sparks, hot or glowing  
objects within 50 ft (15 m) of vehicle.

*a. Typical Pipe Coupling and Coupling Gasket Removal.***NOTE**

- This procedure is for reference only to show location of M978 tanker piping. It will never be necessary to remove all the piping at one time. Refer to 25-11.e for locations of specific piping sections.
- All piping sections on the M978 tanker are joined with pipe couplings. Five sizes of standard couplings and two sizes of reducing couplings are used: 1-1/4-inch, 2-inch, 3-inch, 4-inch, and 4-1/2-inch standard couplings, and 4 x 3-inch, 3 x 2-inch reducing couplings.
- All standard and reducing couplings are removed the same way. Reducing coupling is shown.
- Read paragraph 25-2.b before removing piping, valves, adapters, and couplings.

(I) Remove two nuts (1), screws (2), and coupling halves (3) from coupling gasket (4).



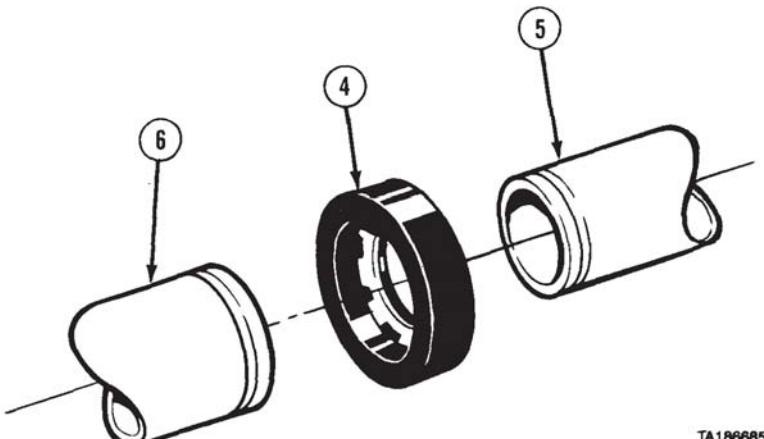
## M978 Tanker Maintenance Instructions (Cont)

CAUTION

One pipe from which coupling gasket is being removed must be removed to prevent damage to coupling gasket. If coupling gasket is damaged, piping connection will leak.

## NOTE

- Component from which coupling gasket is being removed can be a pipe, valve, or adapter. Pipe is shown.
  - Remove component easiest to get to. Refer to paragraph 25-11.e for piping. For valve or adapter refer to specific removal/installation task.
- (2) Push coupling gasket (4) onto pipe (5) and remove pipe (6).  
 (3) Remove coupling gasket (4) from pipe (5).



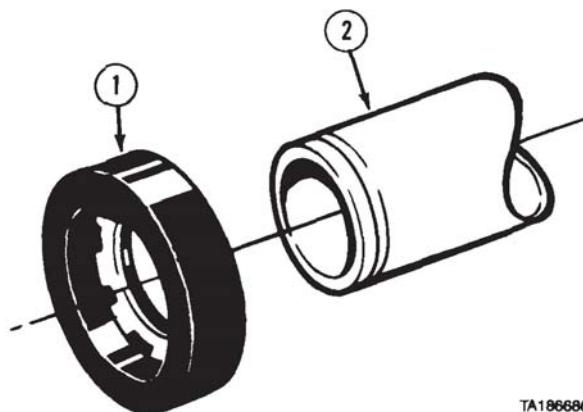
TA186685

*b. Typical Pipe Coupling and Coupling Gasket Installation.*CAUTION

Do not tear or otherwise damage coupling gasket during installation. If coupling gaskets are damaged, piping connections will leak.

## NOTE

- All standard and reducing couplings are installed the same way. Reducing coupling is shown.
- Component on which coupling gasket is being installed can be a pipe, valve, or adapter. Pipe is shown.
- Install component easiest to get to. Refer to paragraph 25-11.e for piping. For valve or adapter, refer to specific removal/installation task.



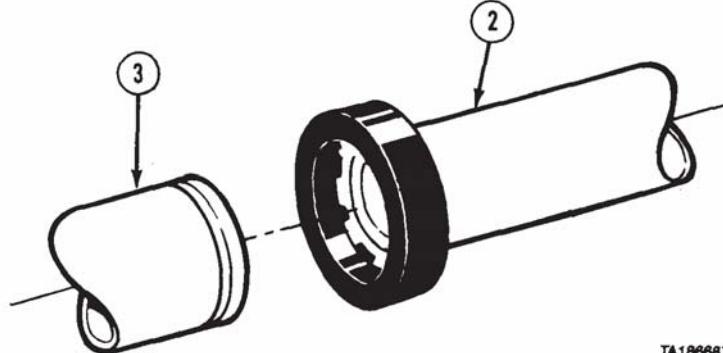
TA186686

(1) Apply light coat of grease to inside of coupling gasket (1) and install on pipe (2).

## M978 Tanker Maintenance Instructions (Cont)

**25-11. TANKER PIPING REMOVAL/INSTALLATION (CONT)**

- (2) Position pipe (3) against pipe (2).



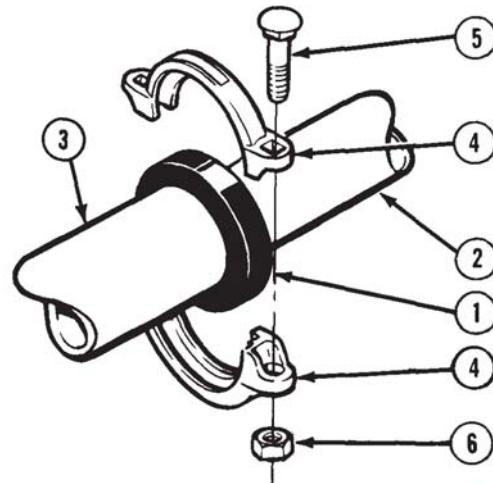
TA186687

- (3) Position coupling gasket (1) over connection of two pipes (2 and 3).

**CAUTION**

Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

- (4) Install two coupling halves (4) on coupling gasket (1) with two screws (5) and nuts (6).



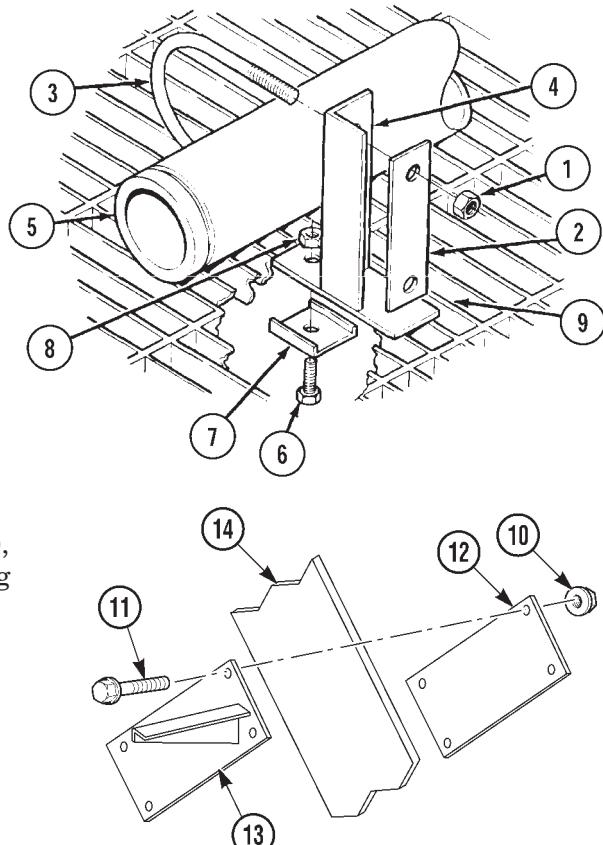
TA186688

## M978 Tanker Maintenance Instructions (Cont)

## c. Typical Clamp and Bracket Removal.

## NOTE

- Some piping sections on the M978 tanker are held in place by brackets and clamps. Brackets on pump module grating are installed with screws, mounting brackets, and locknuts.
  - All clamps and non-weldment brackets are removed the same way and, depending on location, may require two soldiers to remove.
  - Mark position of clamps and brackets before removal.
- (1) Remove two locknuts (1), plate (2), and U-bolt (3) from bracket (4) and pipe (5).
  - (2) Remove screw (6), mounting bracket (7), locknut (8), and bracket (4) from grating (9).
  - (3) Remove four locknuts (10), screws (11), plate (12), and support bracket (13) from right rear hard lift bracket (14).



## d. Typical Clamp and Bracket Installation.

## NOTE

All clamps and non-weldment brackets are installed the same way.

- (1) Install bracket (4) on grating (9) with screw (6), mounting bracket (7), and locknut (8).
- (2) Install pipe (5) on bracket (4) with U-bolt (3), plate (2), and two locknuts (1).
- (3) Position support bracket (13) and plate (12) on right rear hard lift bracket (14).
- (4) Loosely install four screws (11) and locknuts (10) in support bracket (13) and plate (12).

## NOTE

There should be approximately 0.75-in clearance between the pipe elbow and the V5 valve.

- (5) Slide the support bracket (13) up to pipe assembly and tighten four locknuts (10).

## M978 Tanker Maintenance Instructions (Cont)

## 25-11. TANKER PIPING REMOVAL/INSTALLATION (CONT).

## e. Tanker Piping.

## NOTE

Refer to Table 25-2 and Figure 25-6 for location of specific piping sections.

Table 25-2. Tanker Piping

Pipe No.	From	To	Refer To Fig-ure	Equipment Condition TM or Para	Condition Description
1	V17 GRAVITY VALVE (A)	Emergency Valve Outlet Piping (B)	25-6	TM 9-2320-279-10 TM 9-2320-279-10 Para 25-30 Para 23-4	V3 Suction Valve Closed MC MANUAL CONTROL EM VALVE Lever Full Forward V17 GRAVITY VALVE Removed Filter-Separator Removed
2	Gravity Discharge Piping (C)	AUXILIARY PUMP (D)/V4 Bypass/Pressure Relief Valve (E)	25-6		
NOTE					
<p>New style V1 emergency valve is 0.380 in (9.6 mm) shorter than old style V1 emergency valve. When replacing old style valve with new style valve, pipe assembly must also be replaced.</p>					
3	V1 Emergency Valve (F)	Line Strainer (G)/V3 Suction Line Valve (H)	25-6	TM 9-2320-270-10 TM 9-2320-279-10	V3 Suction Valve Closed MC MANUAL CONTROL EM VALVE Lever full Forward, Down, and Closed
4	V3 Suction Line Valve (H)	Primary Pump (I)	25-6	TM 9-2320-279-10 TM 9-2320-279-10	V3 Suction Valve Closed MC MANUAL CONTROL EM VALVE Lever Full Forward, Down, and Closed
5	Primary Pump (I)	Flow Limiting Valve (J)	25-6	Para 23-4	Filter-Separator Removed
6	Flow Limiting Valve Piping (K)	V4 Bypass/Pressure Relief Valve (E)/V16 AUXILIARY PUMP CHECK VALVE (L)	25-6	Para 23-4	Filter-Separator Removed
7	V16 AUXILIARY PUMP CHECK VALVE (L)	AUXILIARY PUMP (D)	25-6	Para 25-29	V16 AUXILIARY PUMP CHECK VALVE Removed

## M978 Tanker Maintenance Instructions (Cont)

Pipe No.	From	To	Refer To Figure	Equipment Condition TM or Para	Condition Description
8	Flow Limiting Valve (J)	Filter-Separator (Not Shown, Removed for Clarity)	25-6	Para 23-4	Filter-Separator Removed
9	Filter-Separator (Not Shown, Removed for Clarity)	V6 FUEL/DEFUEL CONTROL VALVE (M)	25-6	Para 23-4	Filter-Separator Removed

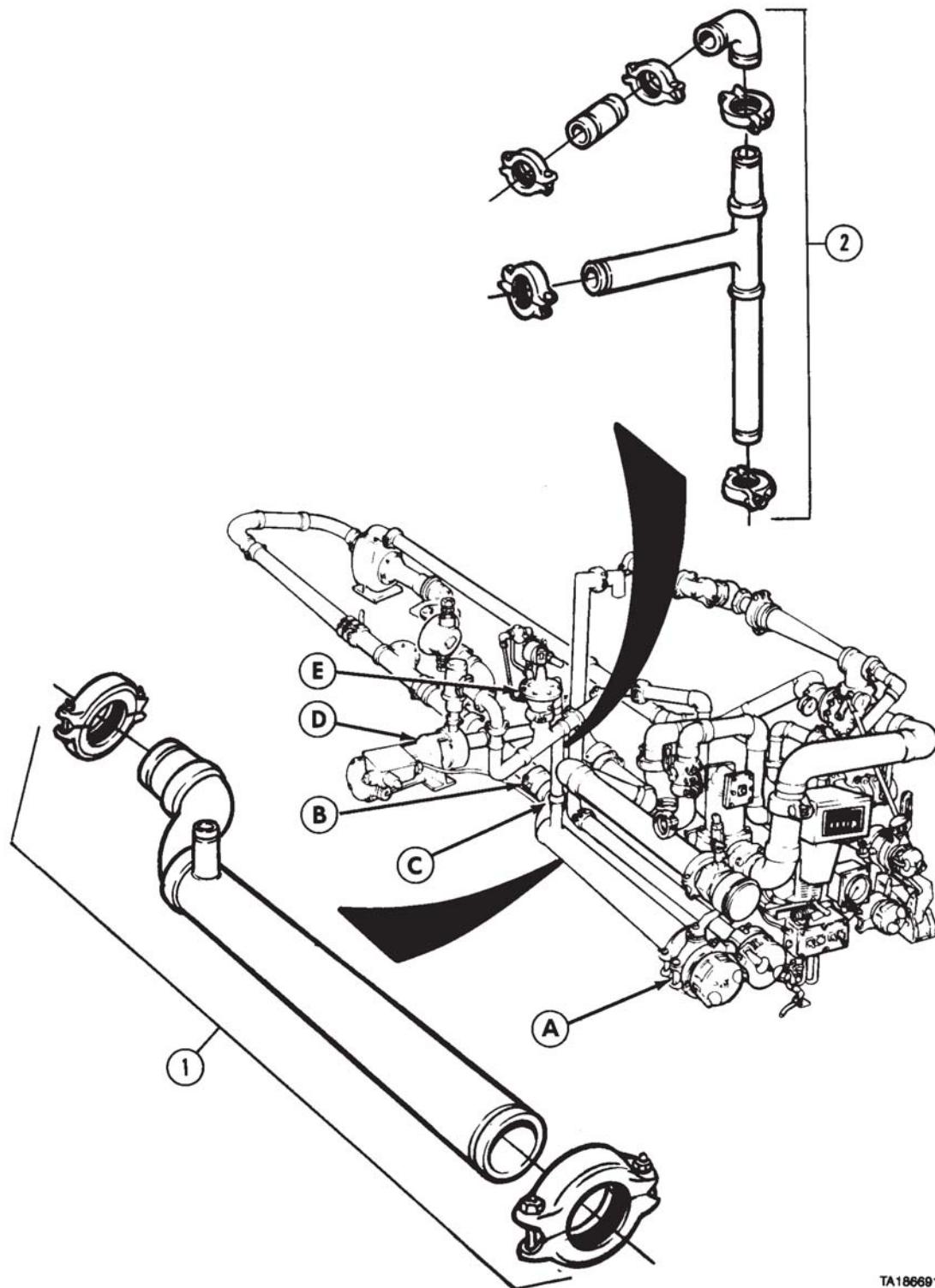


## M978 Tanker Maintenance Instructions (Cont)

Table 25-2. Tanker Piping (Cont)

Pipe No.	From	To	Refer To Figure	Equipment Condition TM Or Para	Condition Description
10	V6 FUEL/DEFUEL CONTROL VALVE (M)	ED EDUCTOR (N)	25-6		
11	ED EDUCTOR (N)	V9 CHECK VALVE (O)	25-6		
12	V9 CHECK VALVE (O)	Tank (Not Shown, Removed for Clarity)	25-6	Para 25-23	V9 CHECK VALVE to Air Eliminator Piping Removed
13	V6 FUEL/DEFUEL CONTROL VALVE (M)	AE AIR ELIMINATOR/Strainer Assembly (P)	25-6		
14	Flow Meter (Q)	VT VENTURI Assembly (R)/V11 FLOW VALVE (REG) (S)	25-6	Para 25-25	V11 FLOW VALVE (REG) Removed
15	VT VENTURI Assembly (R)	V7, V8 REEL VALVES (T)(U)	25-6		
16	V7 REEL VALVE (T)	H1 REEL (Not Shown, Removed for Clarity)	25-6		
17	VR Vapor Recovery Piping (V)			Para 25-30 Para 23-4	V17 GRAVITY VALVE Removed Filter-Separator Removed
18	V2 Bottom Load Adapter (W)/V12 Bottom Load PRECHECK VALVE (X)	V2 Bottom Load Valve (Y)	25-6	Para 23-4  Para 25-16  Para 25-26	Filter-Separator Removed  V2 Bottom Load Adapter Removed V12 Bottom Load PRECHECK VALVE Removed

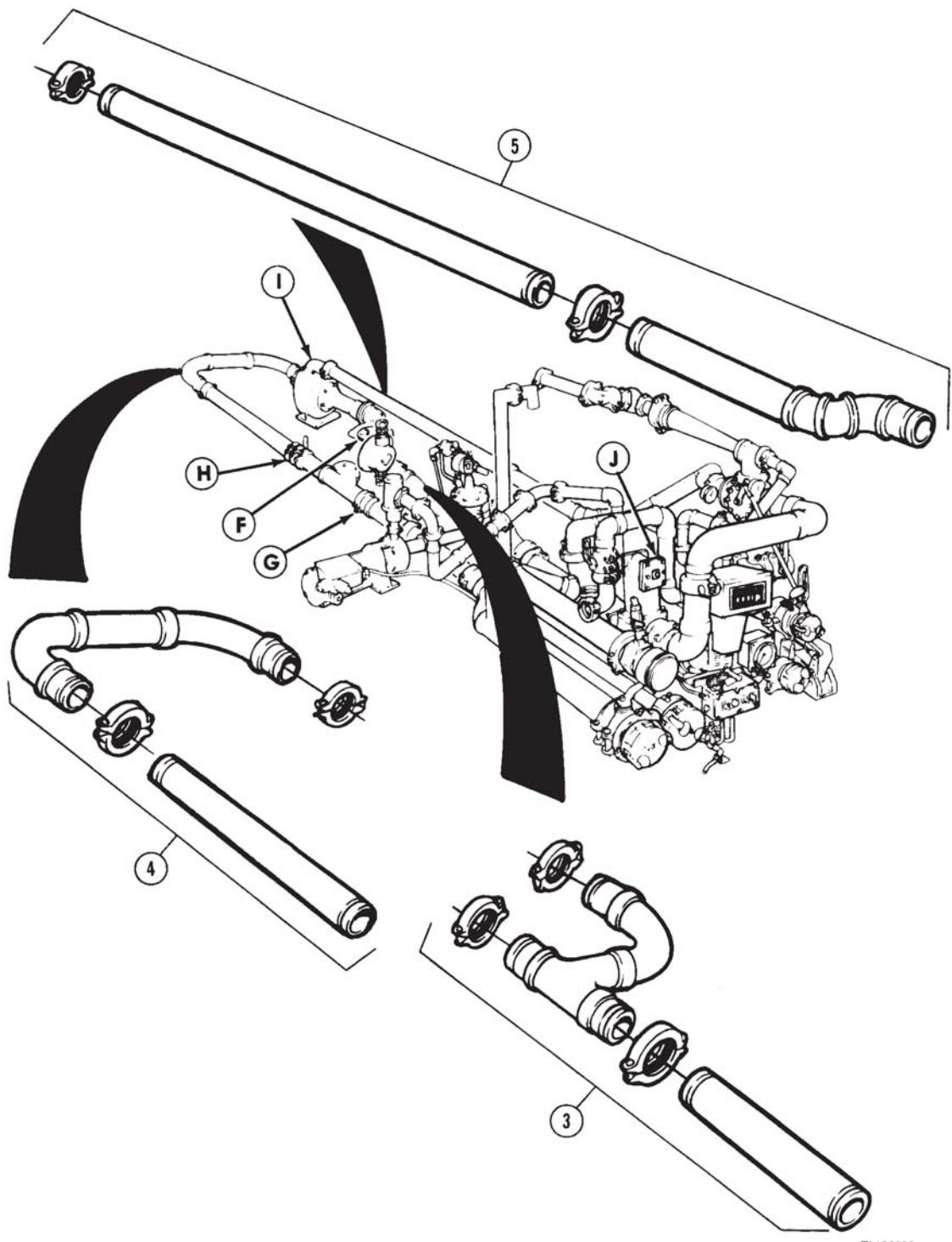
## M978 Tanker Maintenance Instructions (Cont)

**25-11. TANKER PIPING REMOVAL/INSTALLATION (CONT).**

TA186691

Figure 25-6. Tanker Piping (Sheet 1 of 5).

## M978 Tanker Maintenance Instructions (Cont)



TA186692

Figure 25-6. Tanker Piping (Sheet 2 of 5).

## M978 Tanker Maintenance Instructions (Cont)

## 25-11. TANKER PIPING REMOVAL/INSTALLATION (CONT).

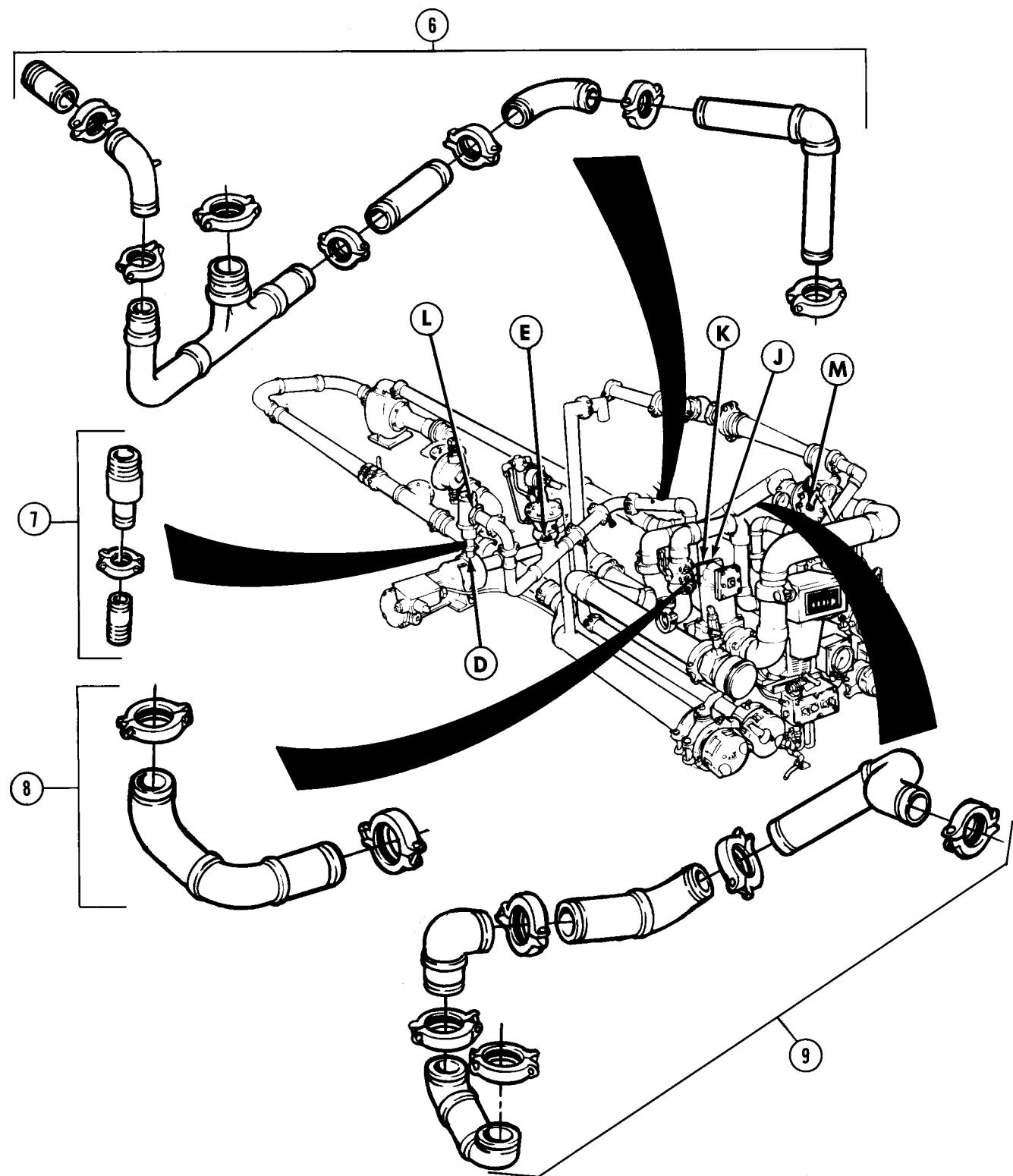


Figure 25-6. Tanker Piping (Sheet 3 of 5).

## M978 Tanker Maintenance Instructions (Cont)

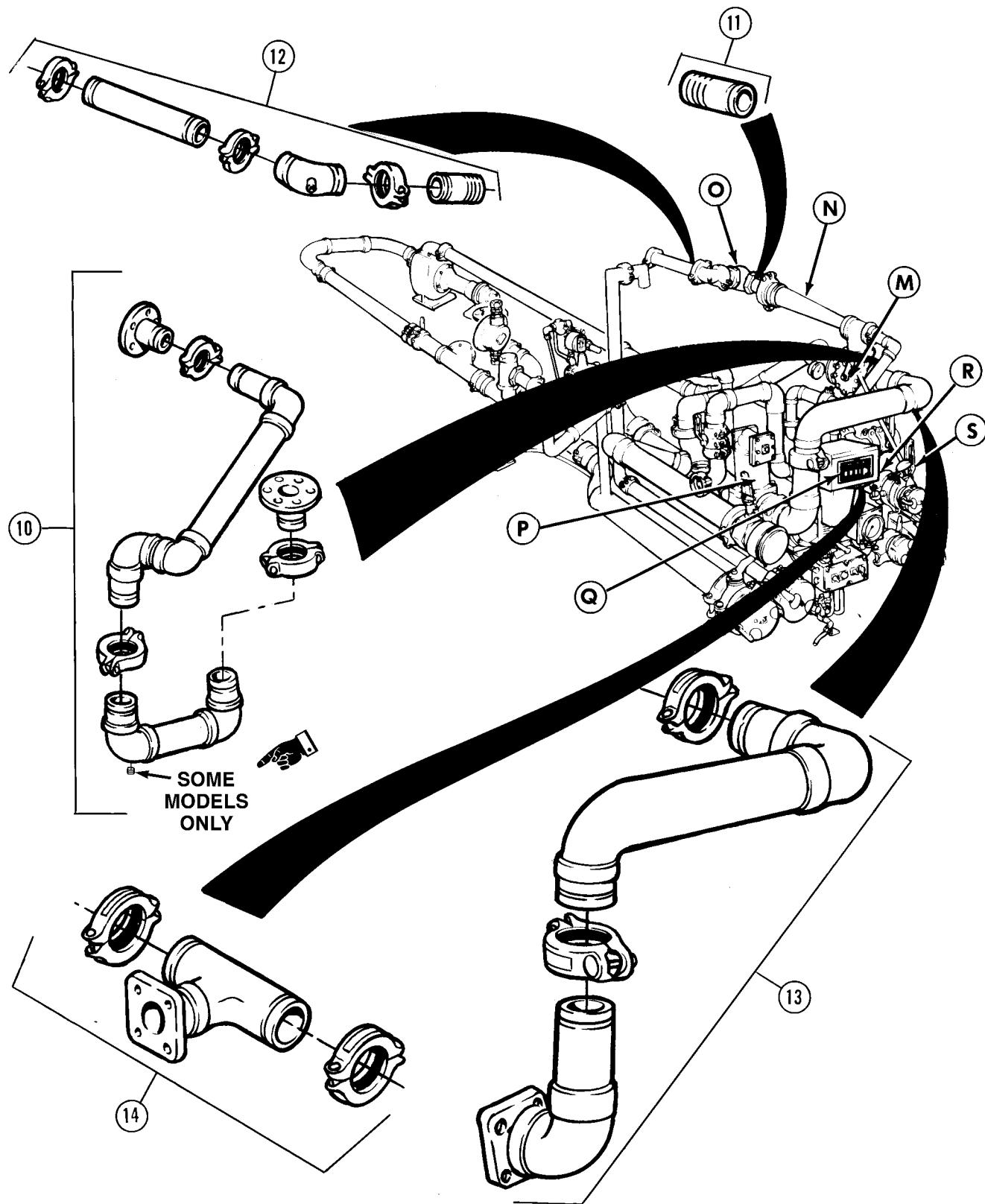


Figure 25-6. Tanker Piping (Sheet 4 of 5).

## M978 Tanker Maintenance Instructions (Cont)

## 25-11. TANKER PIPING REMOVAL/INSTALLATION (CONT).

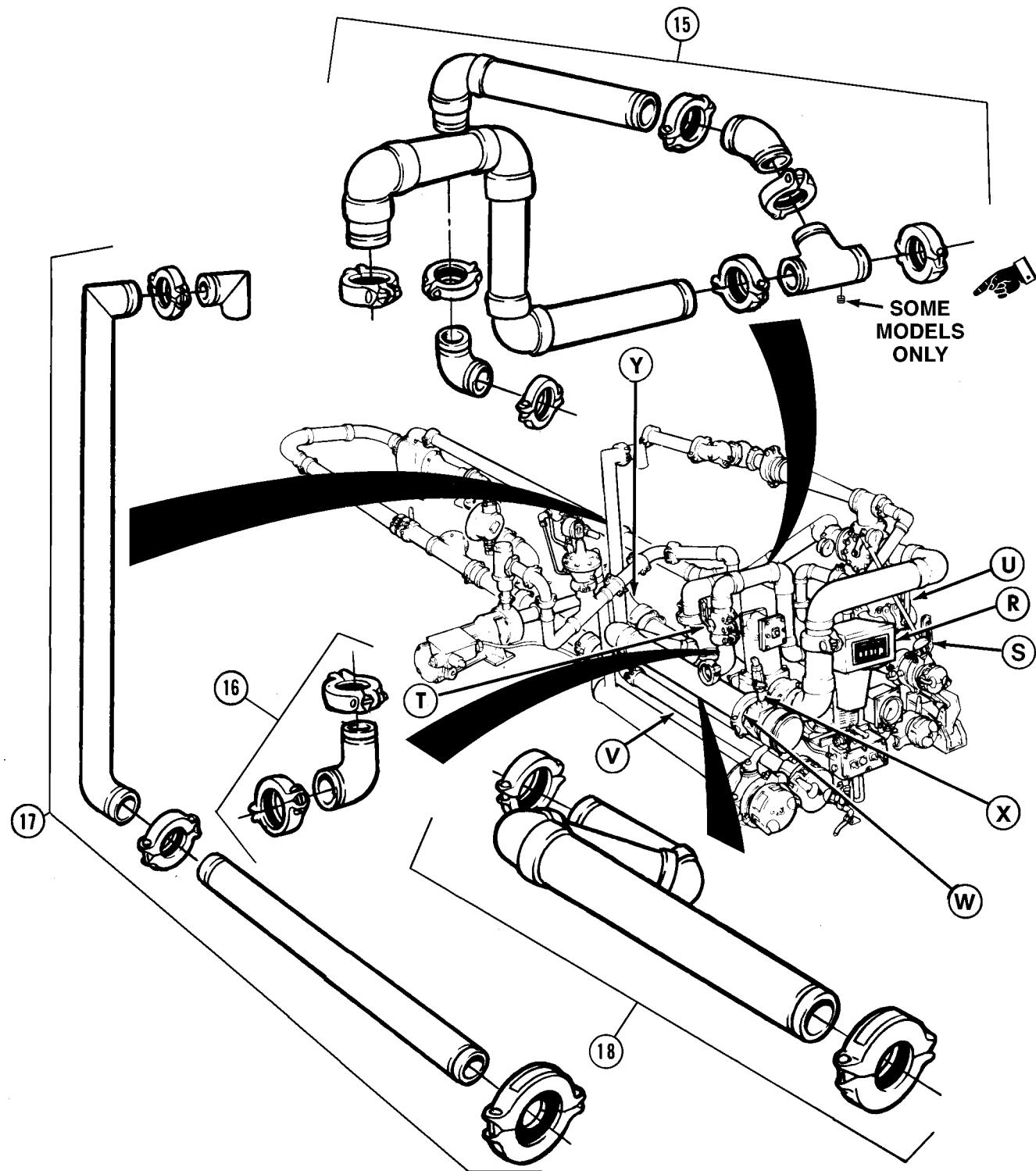


Figure 25-6. Tanker Piping (Sheet 5 of 5).

## M978 Tanker Maintenance Instructions (Cont)

- f. Tanker Piping Brackets. Refer to Figure 25-7 for location of specific tanker piping brackets.

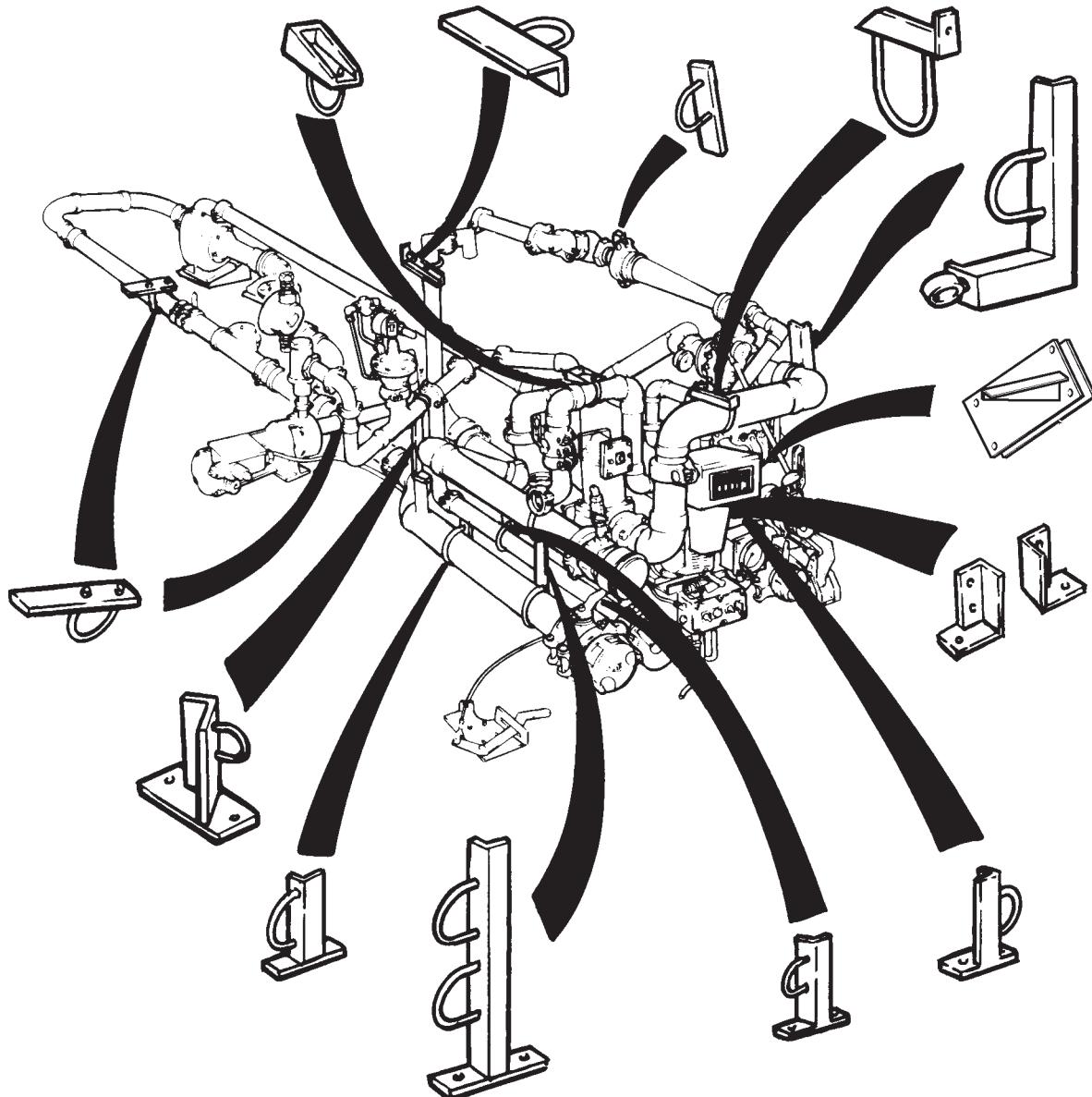


Figure 25-7. Tanker Piping Brackets.

g. Follow-on Maintenance.

- (1) Recirculate fuel (TM 9-2320-279-10).
- (2) Inspect piping connections for leaks.
- (3) Close pump module top and rear access doors (TM 9-2320-279-10).
- (4) Install pump module top and side access panels (para 16-48).

END OF TASK

## M978 Tanker Maintenance Instructions (Cont)

## 25-12. V1 EMERGENCY VALVE REMOVAL/INSTALLATION.

This task covers:

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

## INITIAL SETUP

**Models**  
M978

**References**  
None

**Test Equipment**  
None

**Equipment Condition**  
TM or Para      **Condition Description**  
Para 25-3      Tank drained.

**Special Tools**  
None

**Special Environmental Conditions**  
None

**Supplies**  
Adhesive-sealant, silicone, Item 4, Appendix C

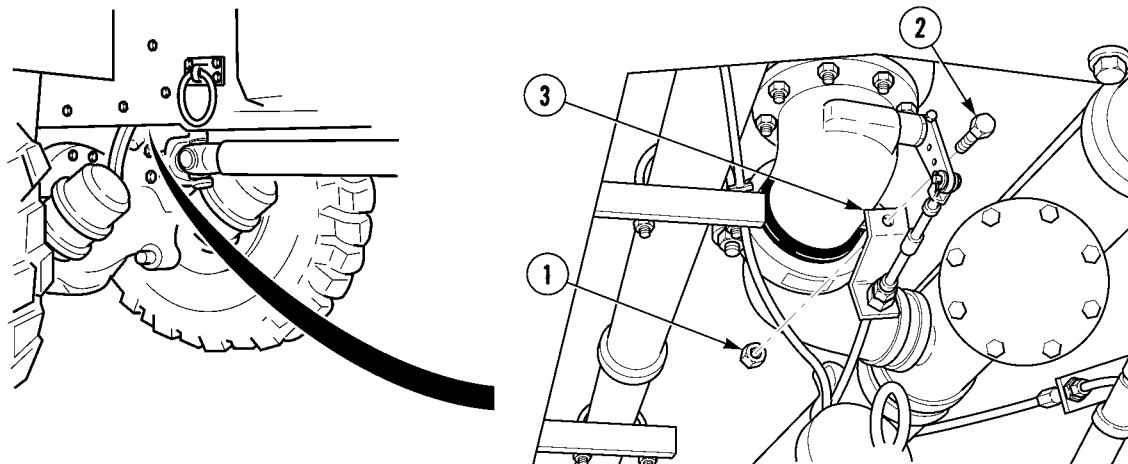
**General Safety Instructions**  
No smoking, flame, sparks, and hot or  
glowing objects within 50 ft (15 m) of  
vehicle.

**Personnel Required**  
MOS 63S, Heavy wheel vehicle mechanic

- a. Removal.

## NOTE

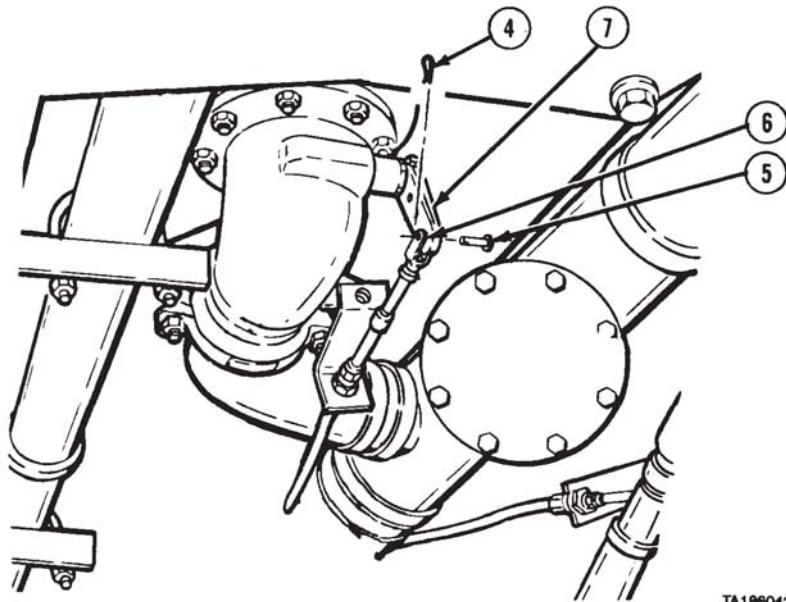
New style V1 emergency valve is .380 in (9.6 mm) shorter than the old style V1 emergency valve. When replacing old style valve with new style valve, pipe assembly must also be replaced. New style valve can be identified by the words "BETTS INDUSTRIES" cast into the valve housing, on the driver's side.



- (1) Remove nut (1) and screw (2) from bracket (3).

## M978 Tanker Maintenance Instructions (Cont)

- (2) Remove cotter pin (4).
- (3) Remove pin (5) and disconnect clevis (6) from lever (7).



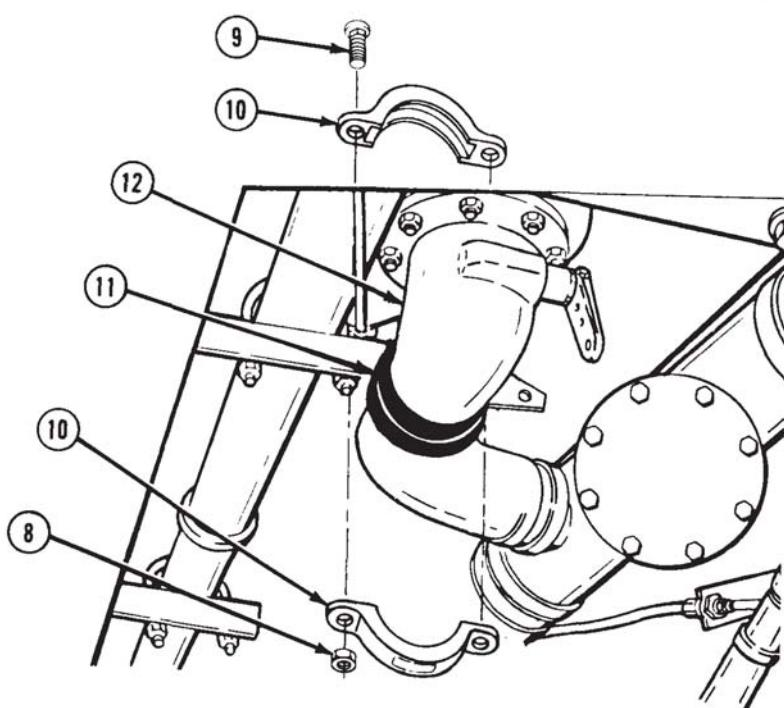
TA186043

- (4) Remove two nuts (8), screws (9), and coupling halves (10).

**WARNING**

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (5) Push coupling gasket (11) on V1 emergency valve (12).

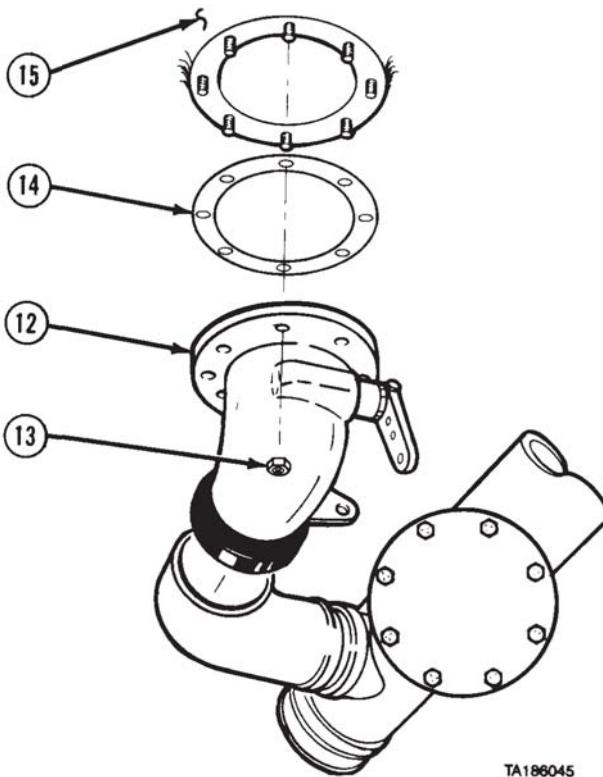


TA186044

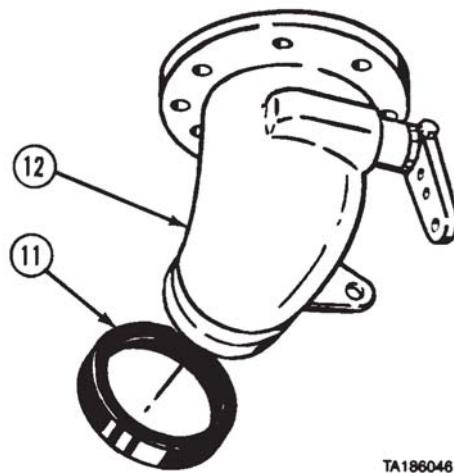
## M978 Tanker Maintenance Instructions (Cont)

**[25-12. V1 EMERGENCY VALVE REMOVAL/INSTALLATION (CONT).]**

- (6) Remove eight nuts (13), V1 emergency valve (12), and gasket (14) from tank (15).



- (7) Remove coupling gasket (11) from V1 emergency valve (12).



## M978 Tanker Maintenance Instructions (Cont)

## b. Installation.

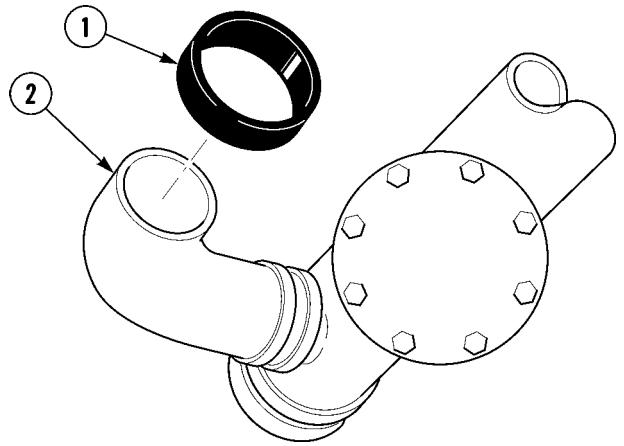
CAUTION

**Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.**

**NOTE**

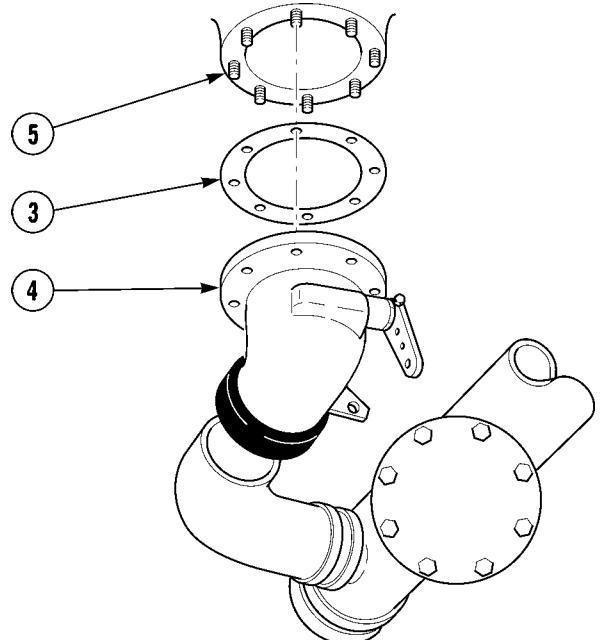
New style V1 emergency valve is .380 in (9.6 mm) shorter than the old style V1 emergency valve. When replacing old style valve with new style valve, pipe assembly must also be replaced.

- (1) Install coupling gasket (1) on pipe (2).

WARNING

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

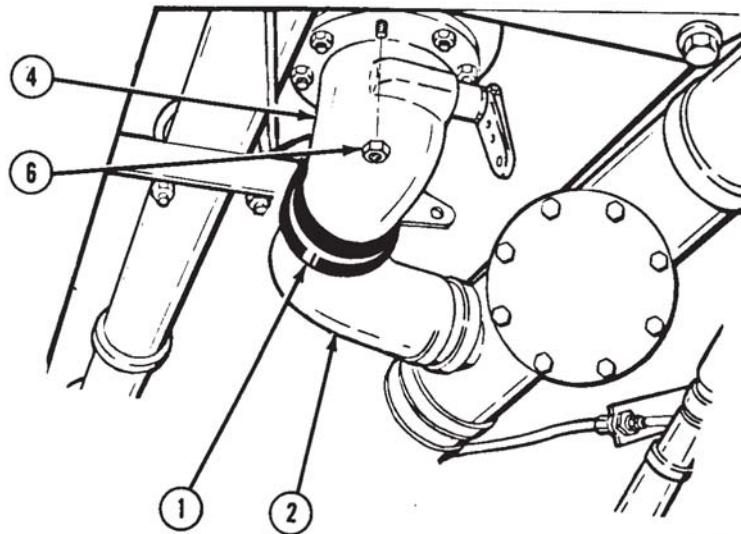
- (2) Apply silicone adhesive-sealant on gasket (3) and install gasket and V1 emergency valve (4) on bottom of tank (5).



## M978 Tanker Maintenance Instructions (Cont)

**25-12. V1 EMERGENCY VALVE REMOVAL/INSTALLATION (CONT).**

- (3) Position coupling gasket (1) over connection of V1 emergency valve (4) and pipe (2).  
 (4) Install eight nuts (6).

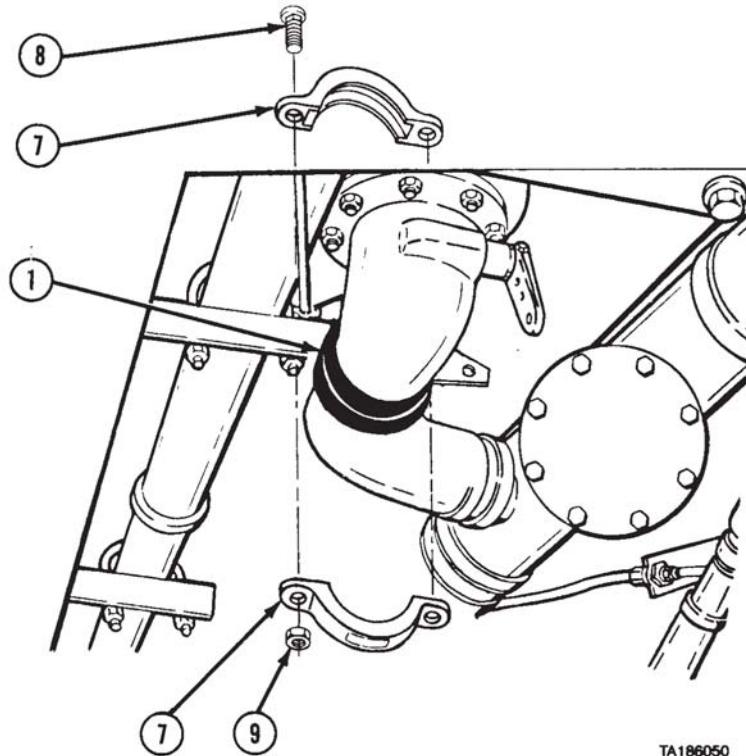


TA186049

**CAUTION**

Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

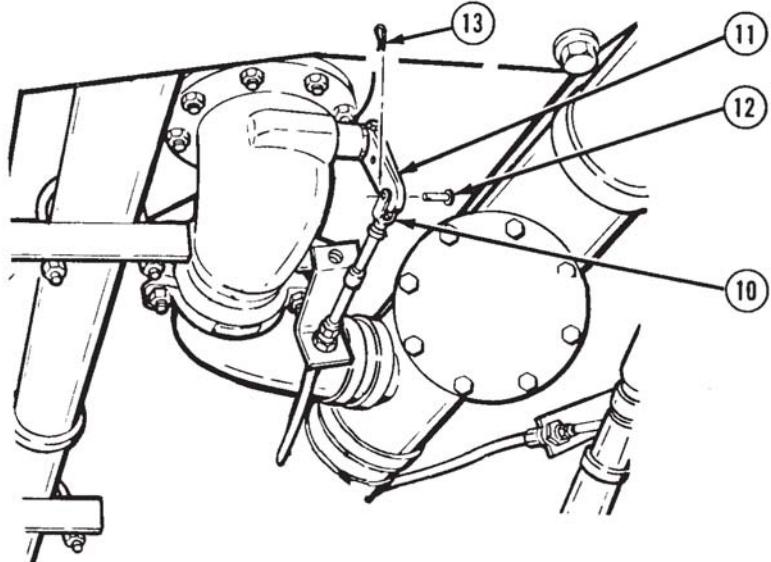
- (5) Install two coupling halves (7) on coupling gasket (1) with two screws (8) and nuts (9).



TA186050

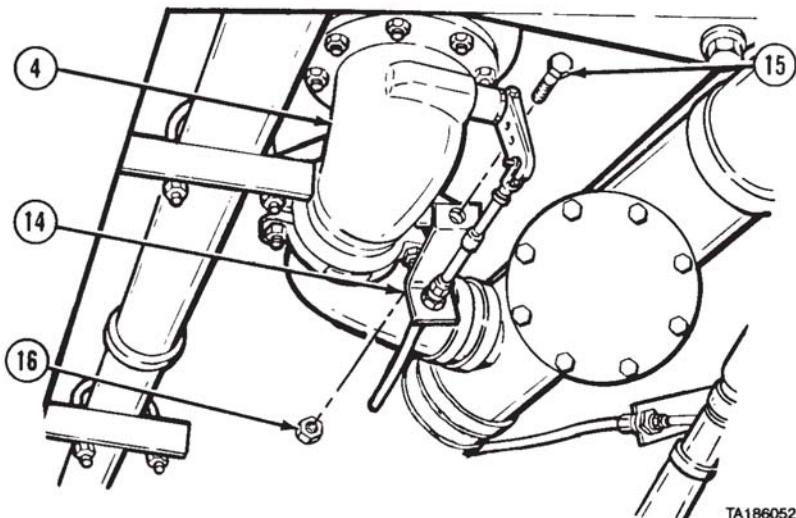
## M978 Tanker Maintenance Instructions (Cont)

- (6) Position clevis (10) on lever (11) so hole through clevis alines with bottom hole in lever.
- (7) Install pin (12) through clevis (10) and lever (11).
- (8) Install cotter pin (13).



TA186051

- (9) Align holes in bracket (14) and V1 emergency valve (4).
  - (10) Install screw (15) and nut (16).
- c. Follow-on Maintenance.**
- (1) Adjust emergency valve actuator assembly (para 25-15).
  - (2) Prepare tanker for operation (TM 9-2320-279-10).
  - (3) Fill tank by bottom loading (TM 9-2320-279-10).
  - (4) Recirculate fuel (TM 9-2320-279-10).
  - (5) Check V1 emergency valve for leaks and proper operation.



TA186052

END OF TASK

## M978 Tanker Maintenance Instructions (Cont)

**25-13. V1 EMERGENCY VALVE CABLE REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

M978

*References*

None

*Test Equipment*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
TM 9-2320-279-10	Pump module rear access doors opened.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

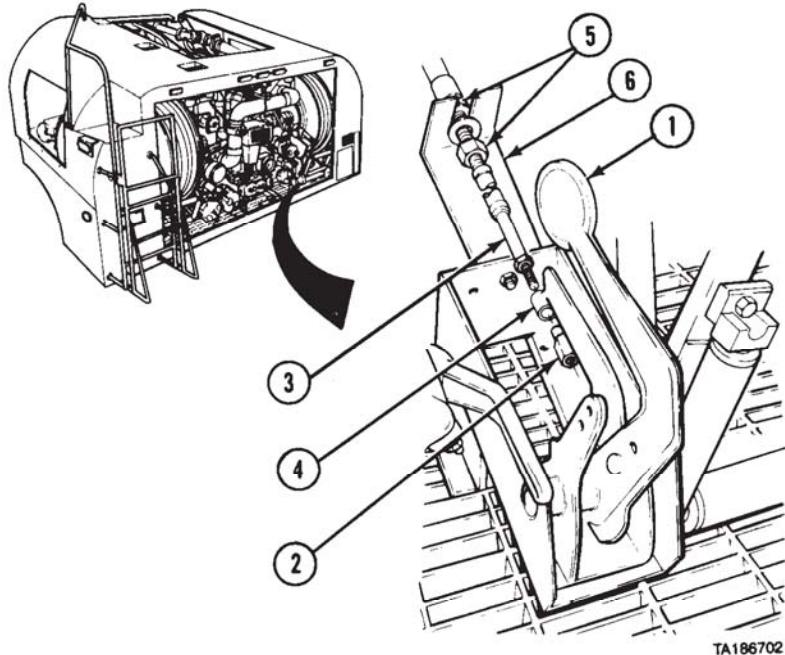
None

*General Safety Instructions*

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

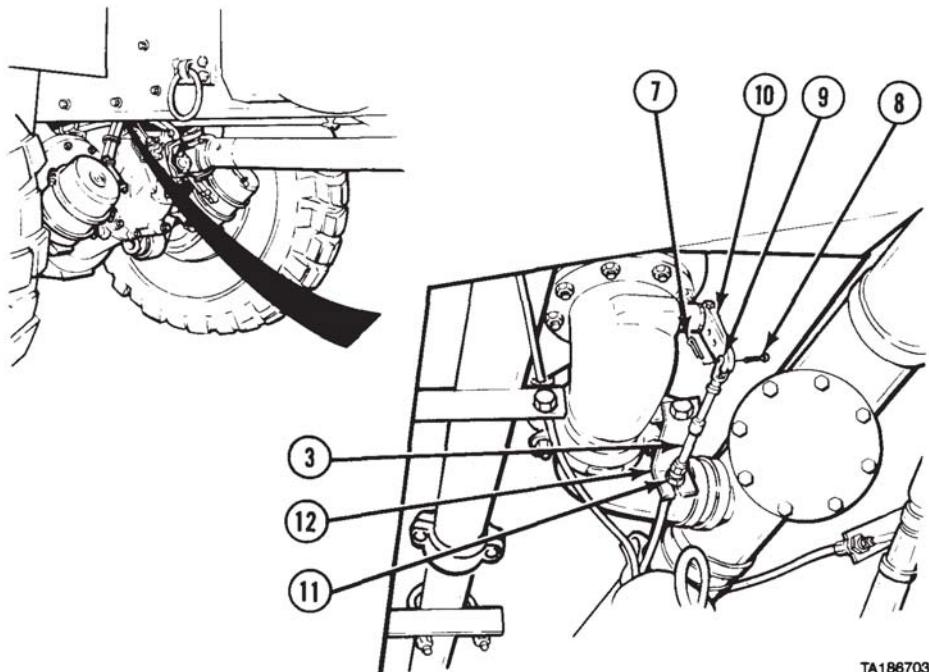
**a. Removal.**

- (1) Push MC MANUAL CONTROL EM VALVE lever (1) full forward and down to closed position.
- (2) Remove nut (2) and cable (3) from offset link (4).
- (3) Loosen two nuts (5) and remove cable (3) from bracket (6).



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## M978 Tanker Maintenance Instructions (Cont)

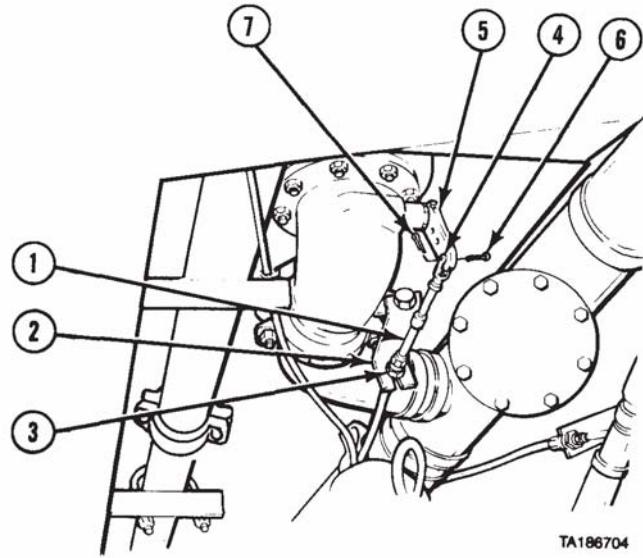


TA186703

- (4) Remove cotter pin (7) and pin (8) from clevis (9) and lever (10).
- (5) Loosen two nuts (11) and remove cable (3) from bracket (12).

**b. Installation.**

- (1) Install cable (1) in bracket (2) and tighten two nuts (3).
- (2) Install clevis (4) in lever (5) with pin (6) and cotter pin (7).



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## M978 Tanker Maintenance Instructions (Cont)

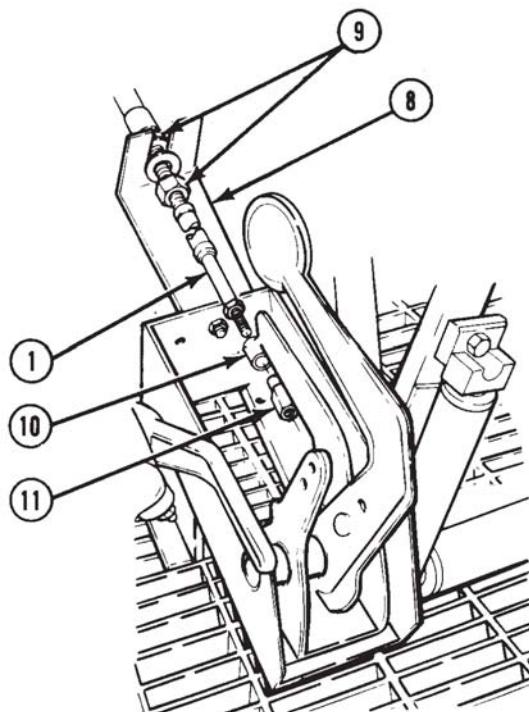
**25-13. V1 EMERGENCY VALVE CABLE REMOVAL/INSTALLATION (CONT).**

- (3) Install cable (1) in bracket (8) and tighten two nuts (9).  
 (4) Install cable (1) in offset link (10) with nut (11).

*c. Follow-on Maintenance.*

- (1) Adjust emergency valve actuator assembly (para 25-15).  
 (2) Close pump module rear access doors (TM 9-2320-279-10).

END OF TASK

**25-14. EMERGENCY SHUT-OFF CABLE REMOVAL/INSTALLATION.**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

## INITIAL SETUP

*Models*  
M978

*References*  
None

*Test Equipment*  
None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
TM 9-2320-279-10	Shut off engine.
TM 9-2320-279-10	Pump module rear doors open.

*Special Tools*  
None

*Supplies*  
None

*Special Environmental Conditions*

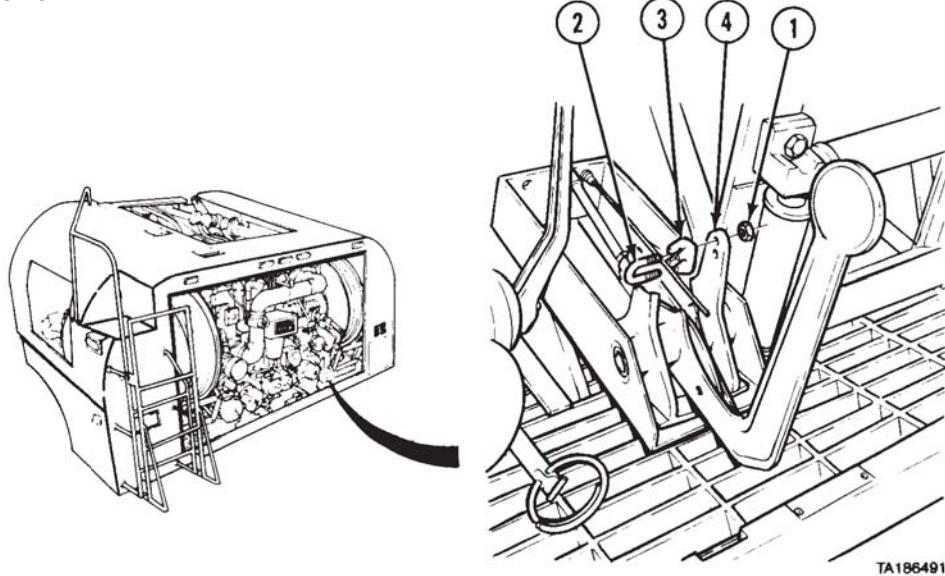
None

*Personnel Required*  
MOS 63S, Heavy wheel vehicle mechanic

*General Safety Instructions*

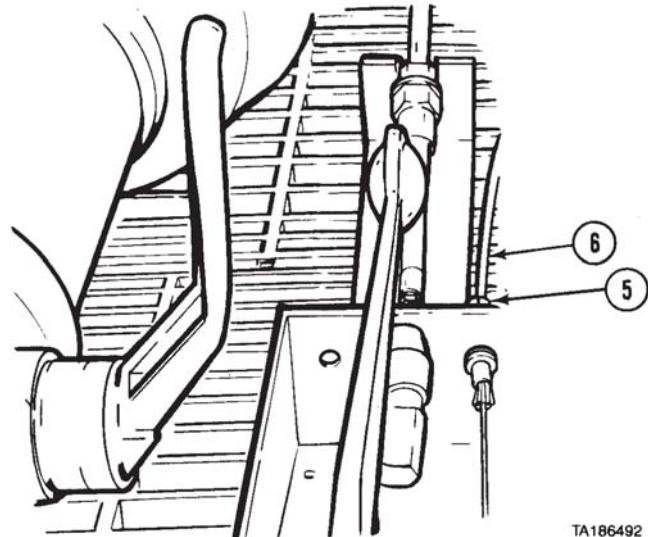
No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

## M978 Tanker Maintenance Instructions (Cont)

*a. Removal.*

(1) Remove two nuts (1), U-bolt (2), and clamp (3) from trip bar (4).

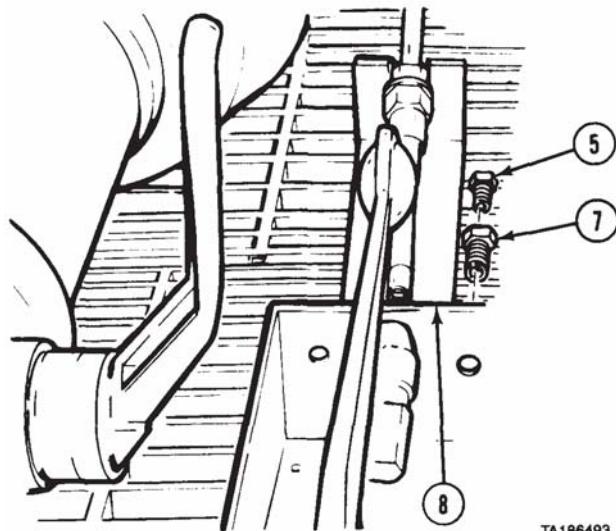
(2) Loosen nut (5) and remove cable (6).



## M978 Tanker Maintenance Instructions (Cont)

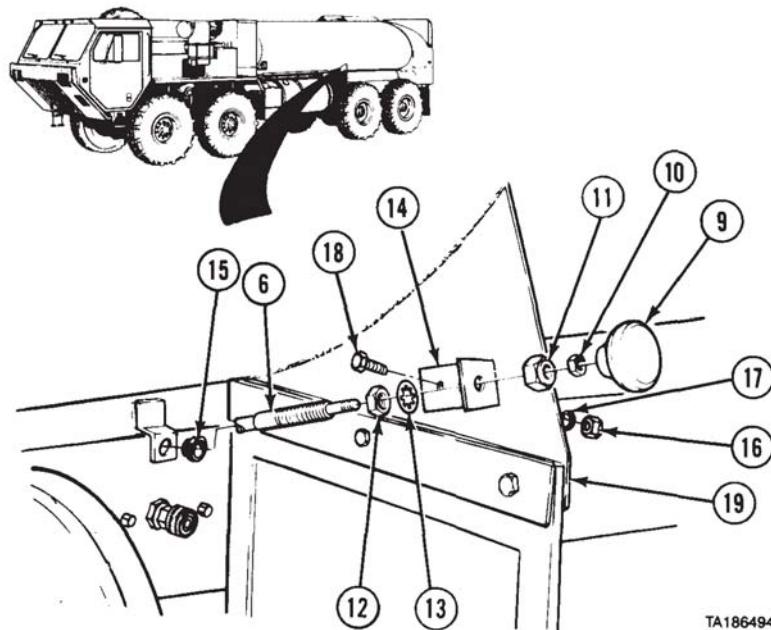
## 25-14. EMERGENCY SHUT-OFF CABLE REMOVAL/INSTALLATION (CONT).

- (3) Remove nut (5) and fitting (7) from frame (8).



TA186493

- (4) Remove knob (9), jamnut (10), and nut (11) from cable (6).  
 (5) Remove cable (6), jamnut (12), and lockwasher (13) from bracket (14).  
 (6) Remove cable (6) and grommet (15) from vehicle.  
 (7) Remove two locknuts (16), washers (17), screws (18), and bracket (14) from mud flap bracket (19).

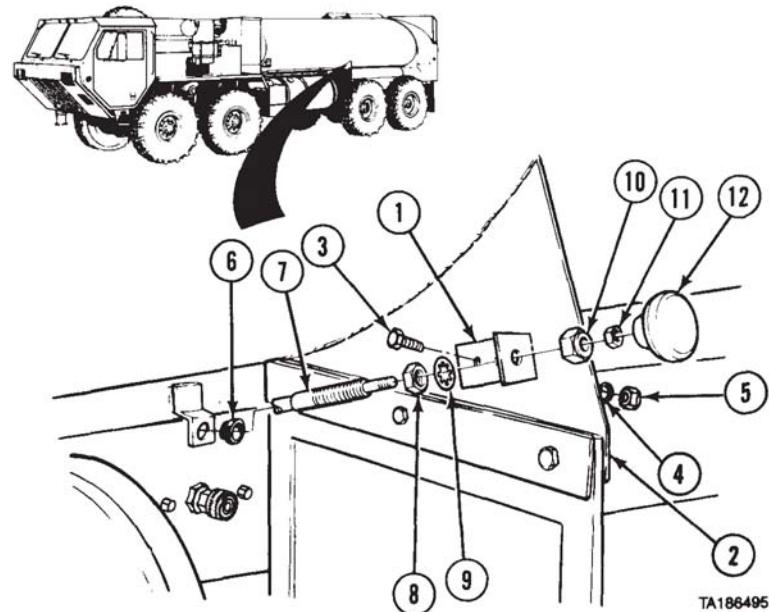


TA186494

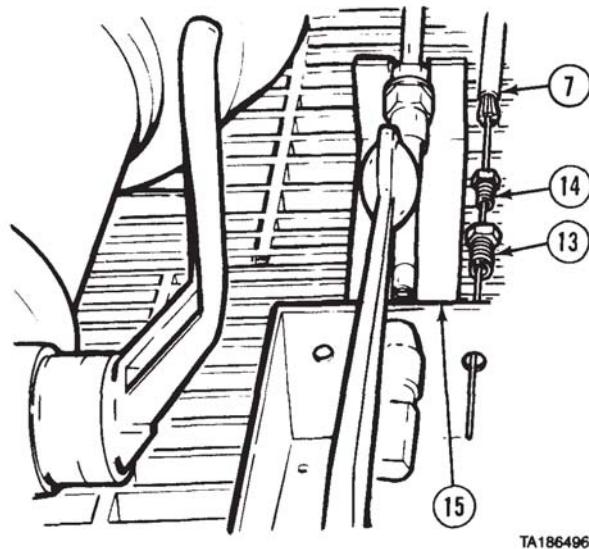
## M978 Tanker Maintenance Instructions (Cont)

**b. Installation.**

- (1) Install bracket (1) on mud flap bracket (2) with two screws (3), washers (4), and locknuts (5).
- (2) Install grommet (6) and position cable (7).
- (3) Install jammnut (8) and lockwasher (9) on cable (7) and position cable in bracket (1).
- (4) Install nut (10) and jammnut (11). Tighten nuts (8 and 10).
- (5) Install knob (12) and tighten jammnut (11) against knob.
- (6) Push in knob (12).



- (7) Install fitting (13) and nut (14) in frame (15). Do not tighten fitting.
- (8) Install cable (7) through nut (14) and fitting (13).

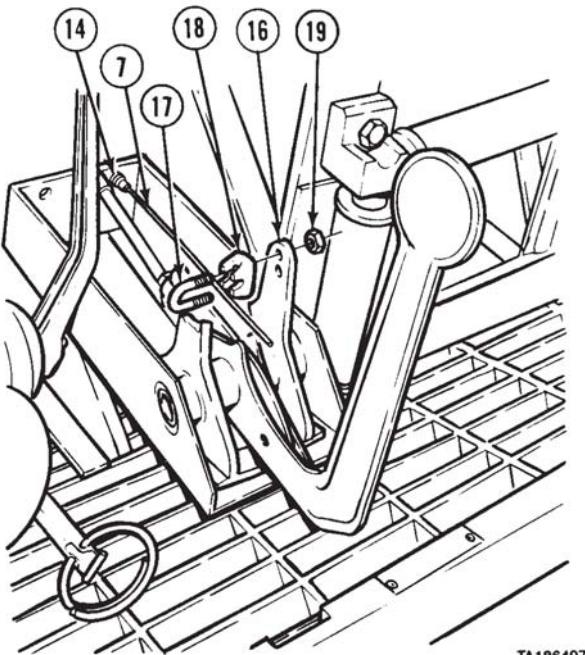


## M978 Tanker Maintenance Instructions (Cont)

## 25-14. EMERGENCY SHUT-OFF CABLE REMOVAL/INSTALLATION (CONT).

- (9) Tighten nut (14).  
 (10) Connect cable (7) to trip bar (16) with U-bolt (17), clamp (18), and two nuts (19).  
 c. Follow-on Maintenance.  
 (1) Adjust cable (para 25-15).  
 (2) Close pump module rear access doors (TM 9-2320-279-10).

END OF TASK



TA186497

25-15. EMERGENCY VALVE ACTUATOR ASSEMBLY  
REMOVAL/REPAIR/INSTALLATION/ADJUSTMENT.

This task covers:

- |                        |                          |
|------------------------|--------------------------|
| a. Removal             | e. Installation          |
| b. Disassembly         | f. Adjustment            |
| c. Cleaning/Inspection | g. Follow-on Maintenance |
| d. Assembly            |                          |

## INITIAL SETUP

## Models

M978

## References

None

## Test Equipment

None

## Equipment Condition

TM or Para	Condition Description
TM 9-2320-279-10	Tanker module rear access doors open.

## Special Tools

None

## Special Environmental Conditions

None

## Supplies

Solvent, dry cleaning, Item 47, Appendix C  
Tags, identification, Item 48, Appendix C

## General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

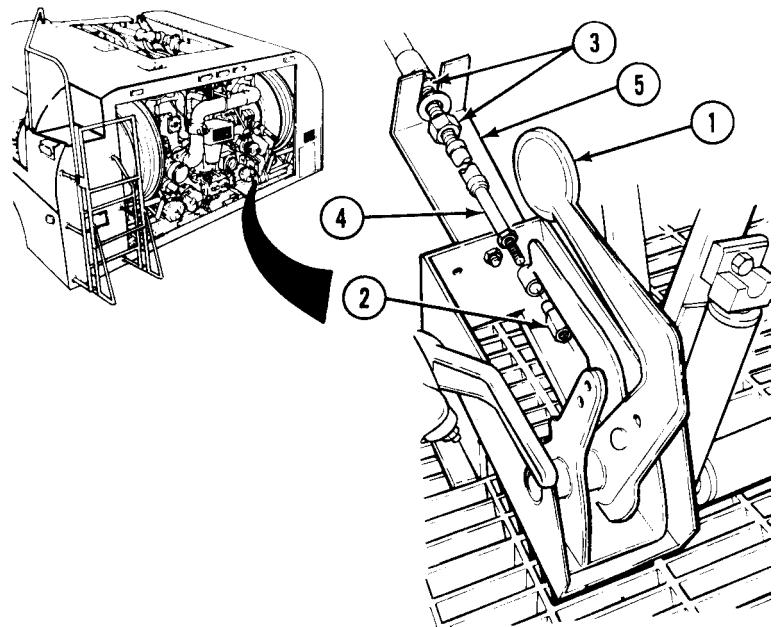
## Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

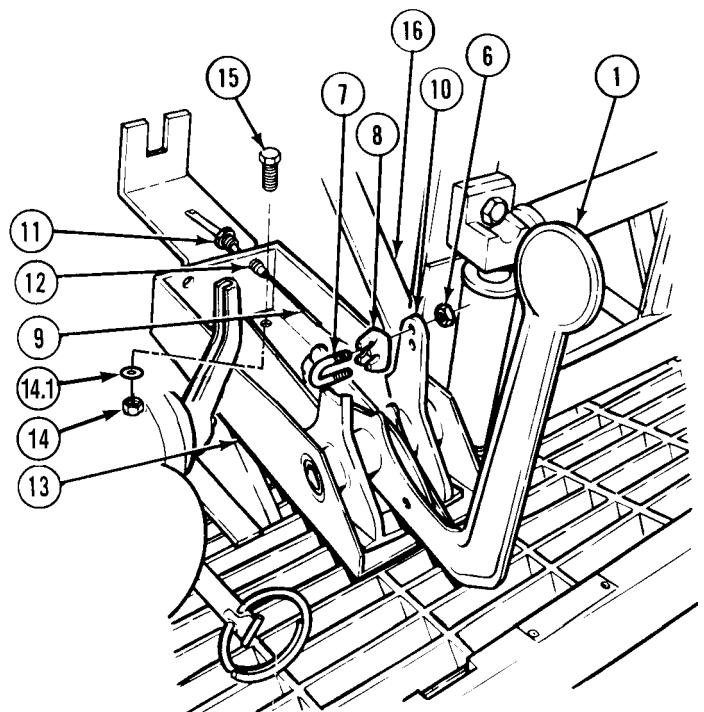
## M978 Tanker Maintenance Instructions (Cont)

**a. Removal.**

- (1) Push MC MANUAL CONTROL EM VALVE lever (1) full forward and down to closed position.
- (2) Remove nut (2).
- (3) Loosen two nuts (3) and remove cable (4) from bracket (5).



- (4) Pull MC MANUAL CONTROL EM VALVE lever (1) back to open position.
- (5) Remove two nuts (6), U-bolt (7), and clamp (8) from cable (9) and trip bar (10).
- (6) Loosen nut (11) and remove fitting (12) and cable (9) from emergency valve actuator (13).
- (7) Remove two locknuts (14), washers (14.1), screws (15), and emergency valve actuator assembly (13) from hose reel frame (16).



## M978 Tanker Maintenance Instructions (Cont)

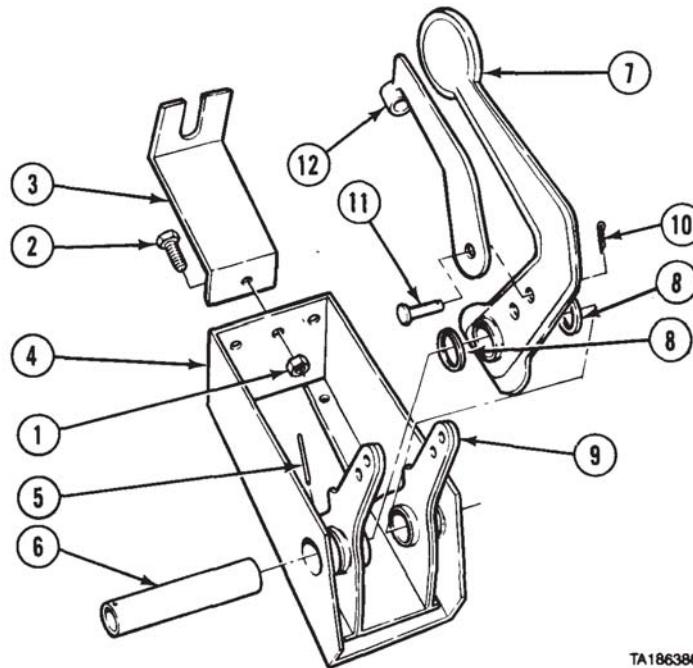
**25-15. EMERGENCY VALVE ACTUATOR ASSEMBLY  
REMOVAL/REPAIR/INSTALLATION/ADJUSTMENT (CONT).**
*b. Disassembly.*

- (1) Remove locknut (1), screw (2), and bracket (3) from frame (4).
- (2) Remove spring pin (5), shaft (6), lever (7), two spacers (8), and trip bar (9) from frame (4).
- (3) Remove cotter pin (10), pin (11), and offset link (12) from lever (7).

*c. Cleaning/Inspection.***WARNING**

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

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



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**WARNING**

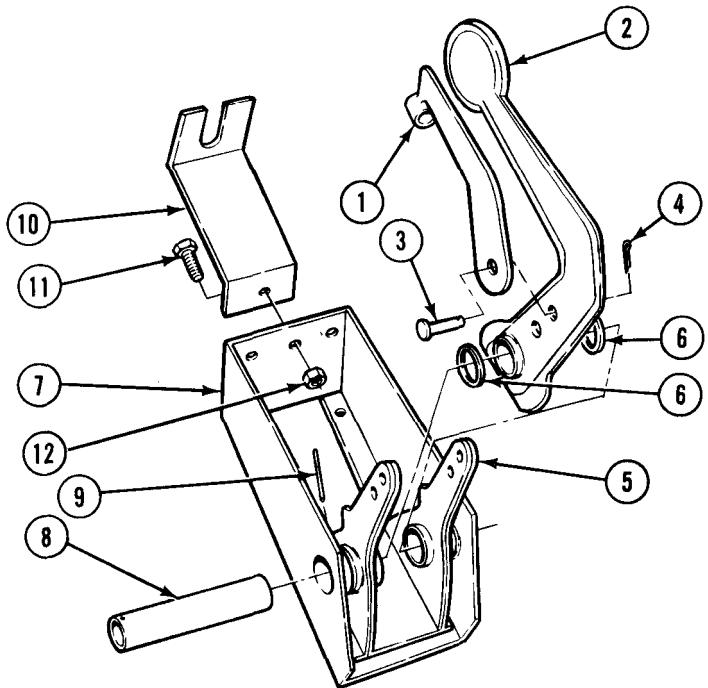
Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment, goggles, shield, and gloves.

- (2) Dry metal parts with compressed air.
- (3) Inspect each part for damage.
- (4) Replace damaged parts.

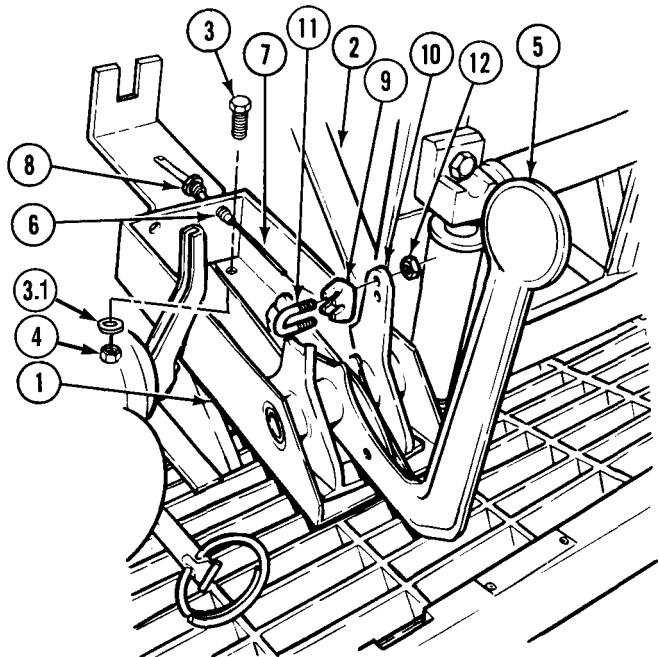
## M978 Tanker Maintenance Instructions (Cont)

**d. Assembly.**

- (1) Install offset link (1) in lever (2) with pin (3) and cotter pin (4).
- (2) Install trip bar (5), two spacers (6), and lever (2) in frame (7) with shaft (8) and spring pin (9).
- (3) Install bracket (10) on frame (7) with screw (11) and locknut (12).

**e. Installation.**

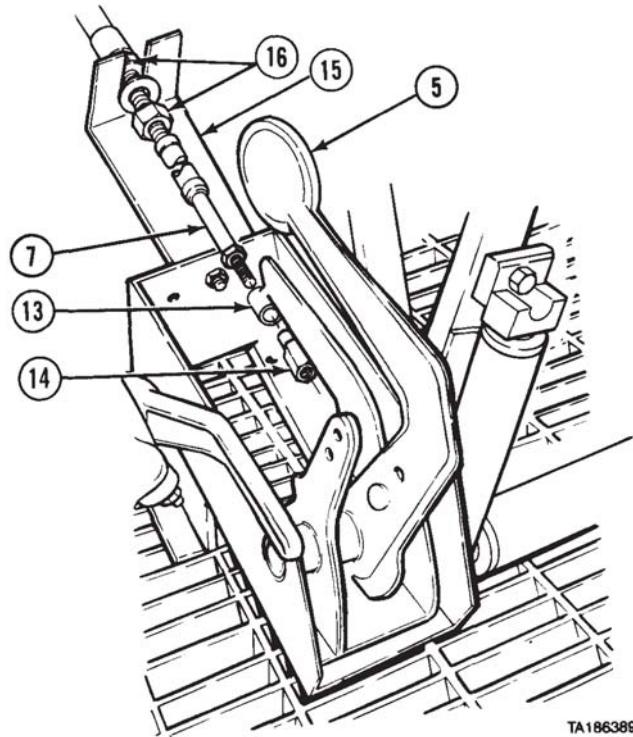
- (1) Install emergency valve actuator assembly (1) on hose reel frame (2) with two screws (3), washers (3.1), and locknuts (4).
- (2) Pull MC MANUAL CONTROL EM VALVE lever (5) back.
- (3) Install fitting (6), cable (7), and emergency valve actuator assembly (1) and tighten nut (8).
- (4) Install clamp (9) and cable (7) on trip bar (10) with U-bolt (11) and two nuts (12).



## M978 Tanker Maintenance Instructions (Cont)

**25-15. EMERGENCY VALVE ACTUATOR ASSEMBLY  
REMOVAL/REPAIR/INSTALLATION/ADJUSTMENT (CONT).**

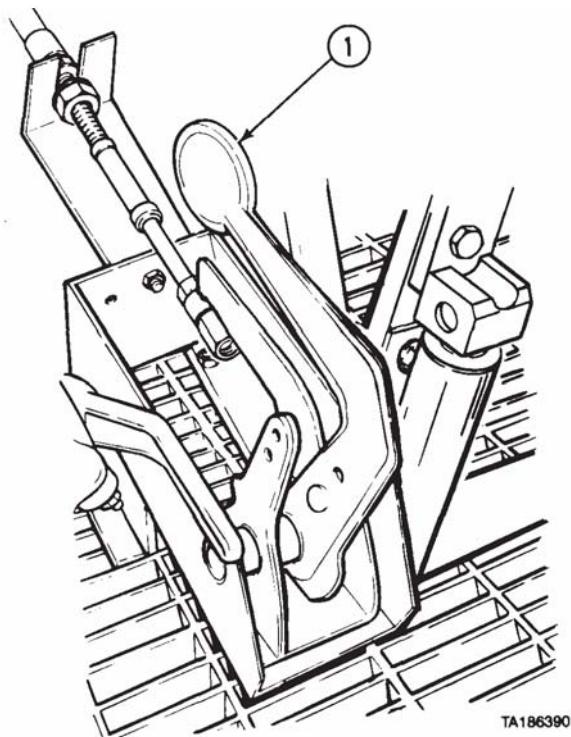
- (5) Push MC MANUAL CONTROL EM VALVE lever (5) forward.
- (6) Install cable (7) in offset link (13) with nut (14).
- (7) Position cable (7) in bracket (15) and tighten two nuts (16).



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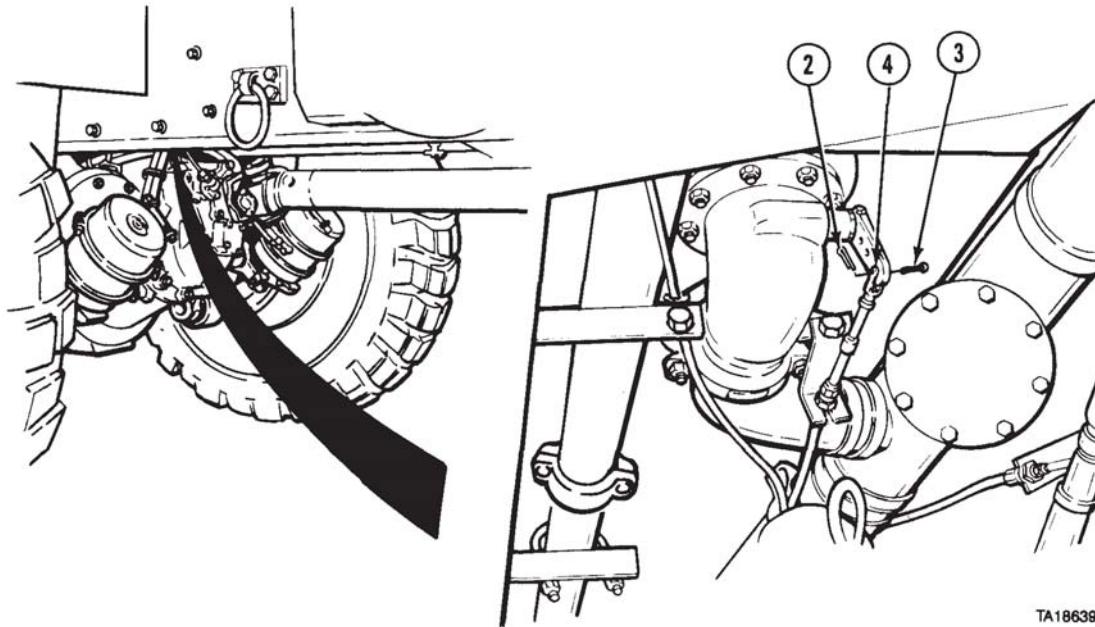
**f. Adjustment.**

- (1) Make sure MC MANUAL CONTROL EM VALVE lever (1) is all the way forward.



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## M978 Tanker Maintenance Instructions (Cont)



TA186391

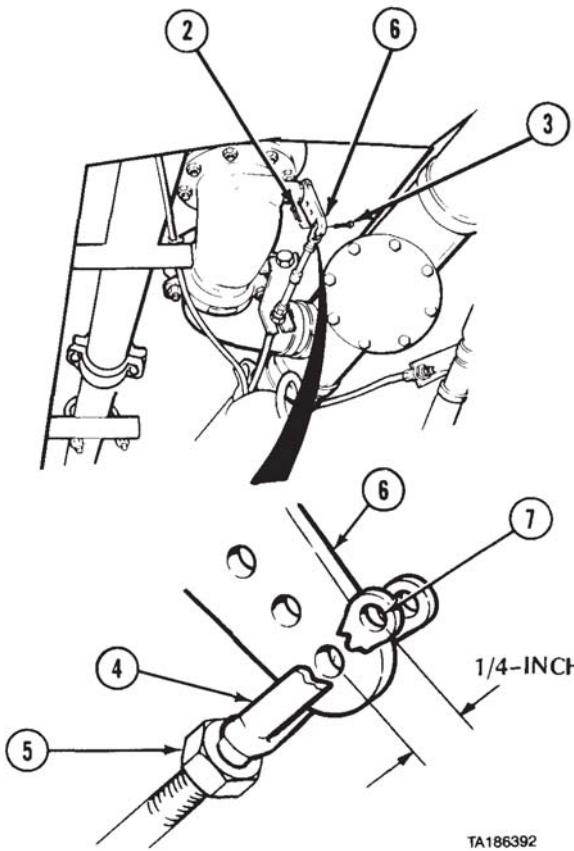
(2) Remove cotter pin (2) and pin (3) from clevis (4).

(3) Loosen locknut (5).

## NOTE

When lever is disconnected from clevis there will be free play in lever. There will be 1/4 in. (6.35 mm) free play in lever after adjustment is made.

- (4) Push lever (6) toward rear of vehicle to remove free play and hold.
- (5) Adjust clevis (4) in or out until center of hole (7) is 1/4 in. (6.35 mm) past center of hole in lever (6).
- (6) Move lever (6) to rear to align with hole in clevis (4).
- (7) Install pin (3) and cotter pin (2).
- (8) Tighten locknut (5).

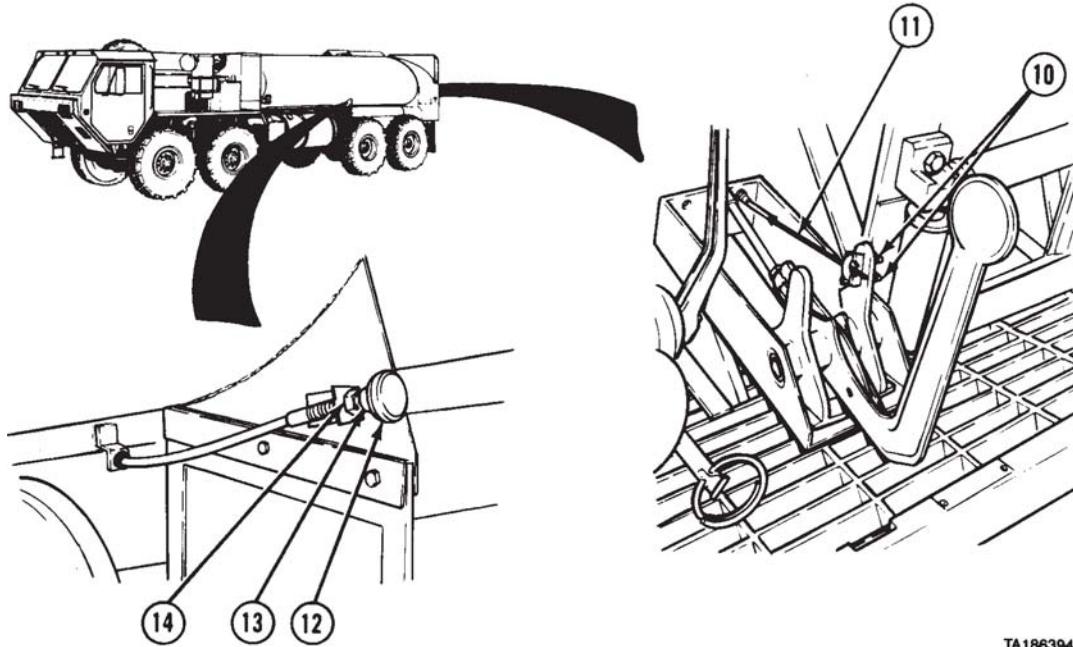
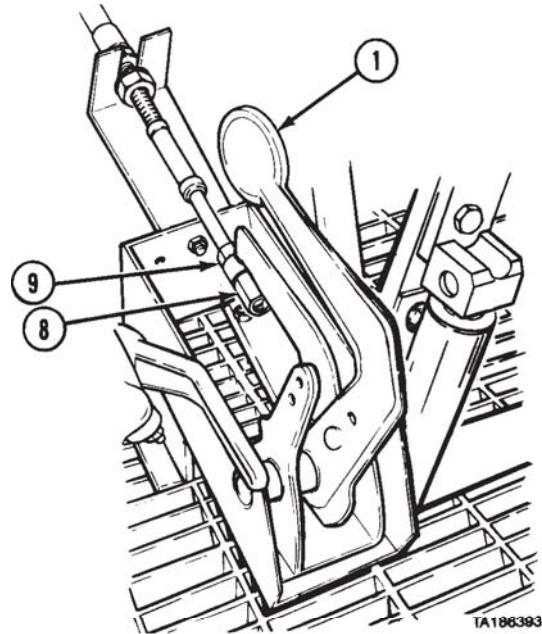


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## M978 Tanker Maintenance Instructions (Cont)

**25-15. EMERGENCY VALVE ACTUATOR ASSEMBLY  
REMOVAL/REPAIR/INSTALLATION/ADJUSTMENT (CONT).**

- (9) Pull MC MANUAL CONTROL EM VALVE lever (1) back.  
 (10) If handle snaps forward, loosen nut (8) until handle does not snap forward then tighten jammnut (9).



- (11) Make sure knob (12) and nut (13) are tight against nut (14).  
 (12) Loosen two nuts (10), pull cable (11) back tight, and tighten two nuts.

*g. Follow-on Maintenance. Close tanker module rear access doors (TM 9-2320-279-10).*

END OF TASK

## M978 Tanker Maintenance Instructions (Cont)

<b>25-16. V2 BOTTOM LOAD ADAPTER REMOVAL/INSTALLATION.</b>		
This task covers:	a. Removal b. Installation	c. Follow-on Maintenance
<b>INITIAL SETUP</b>		
<i>Models</i>		<i>References</i>
M978		None
<i>Test Equipment</i>		<i>Equipment Condition</i>
None	TM or Para Para 25-26	Condition Description V12 bottom load PRECHECK VALVE removed.
<i>Special Tools</i>		
None		
<i>Supplies</i>		<i>Special Environmental Conditions</i>
None		None
<i>Personnel Required</i>		<i>General Safety Instructions</i>
MOS 63S, Heavy wheel vehicle mechanic		No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

**25-16. V2 BOTTOM LOAD ADAPTER REMOVAL/INSTALLATION (CONT.).****a. Removal.**

- (1) Push MC MANUAL CONTROL EM VALVE lever (1) full forward and down in closed position.
- (2) Remove dust cap (2) from V2 bottom load adapter (3).
- (3) Remove two nuts (4), screws (5), and coupling halves (6).
- (4) Remove V2 bottom load adapter (3) and coupling gasket (7) from pipe (8).

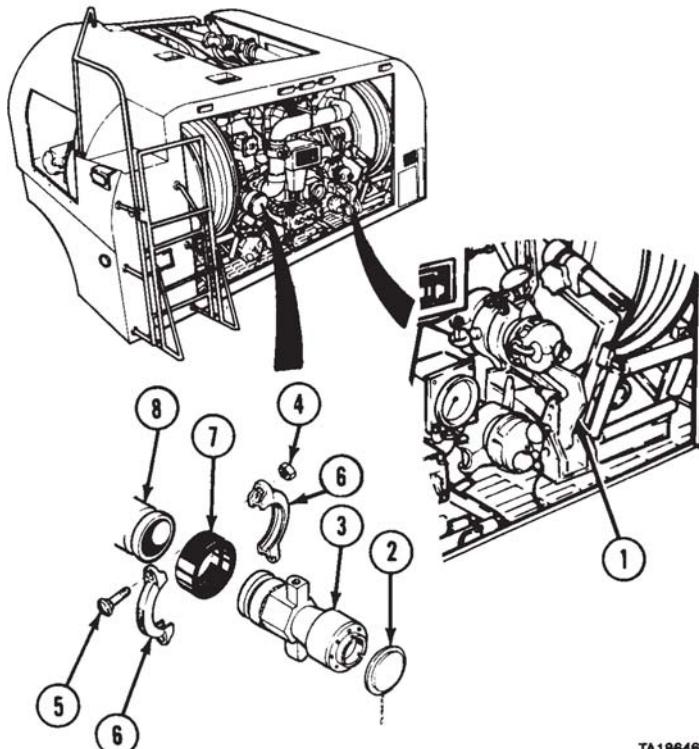
**b. Installation.****CAUTION**

- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
  - Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.
- (1) Install coupling gasket (7) on pipe (8).
  - (2) Position V2 bottom load adapter (3) on pipe (8).
  - (3) Install coupling gasket (7) on V2 bottom load adapter (3).
  - (4) Install two coupling halves (6) on coupling gasket (7) with two screws (5) and nuts (4).
  - (5) Install dust cap (2).

**c. Follow-on Maintenance.**

- (1) Install V12 bottom load PRECHECK VALVE (para 25-26).
- (2) Perform fuel tank bottom loading (TM 9-2320-279-10).
- (3) Check V2 bottom load adapter for leaks.

END OF TASK



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## M978 Tanker Maintenance Instructions (Cont)

**25-17. V3 SUCTION LINE VALVE REMOVAL/INSTALLATION.****This task covers:**

- a. Removal
- b. Installation

- c. Follow-on Maintenance

**INITIAL SETUP****Models**

M978

**References**

None

**Test Equipment**

None

**Equipment Condition**

TM or Para

**Condition Description**

Para 25-3

Tank drained.

**Special Tools**

None

**Special Environmental Conditions**

None

**Supplies**

None

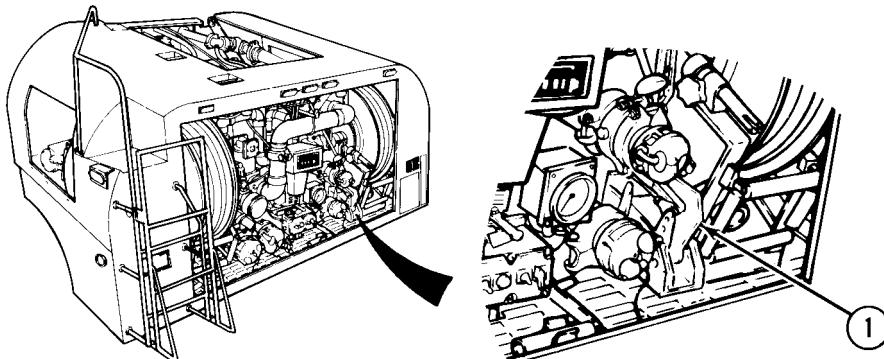
**General Safety Instructions**

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

**Personnel Required**

MOS 63S, Heavy wheel vehicle mechanic

- a. Removal.

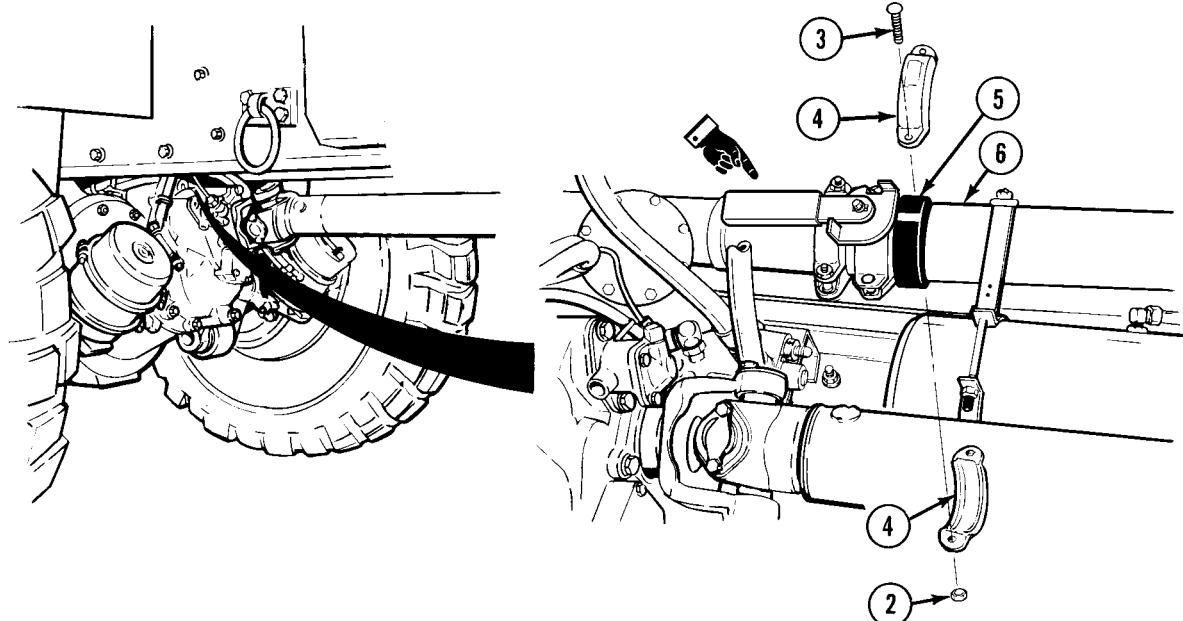
**NOTE**

There are two types of handles. The newest type of handle is shown.

- (1) Push MC MANUAL CONTROL EM VALVE lever (1) full forward and down in closed position.

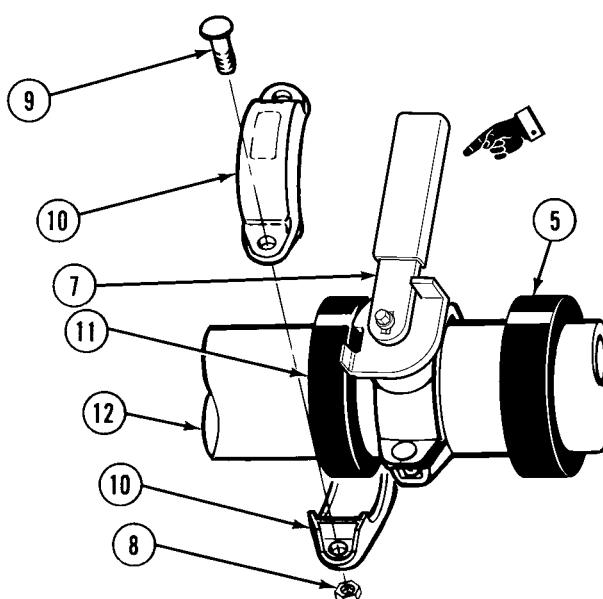
## M978 Tanker Maintenance Instructions (Cont)

## 25-17. V3 SUCTION LINE VALVE REMOVAL/INSTALLATION (CONT).

**WARNING**

Contact with fuel can irritate eyes and skin. Don not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (2) Remove two nuts (2), screws (3), and coupling halves (4).
- (3) Push coupling gasket (5) onto pipe (6).
  
- (4) Hold V3 suction valve (7) in place and remove two nuts (8), screws (9), and coupling halves (10).
- (5) Hold V3 suction valve (7) in place and push coupling gasket (11) onto pipe (12).
- (6) Remove V3 suction valve (7).
- (7) Remove coupling gaskets (5 and 11).



## M978 Tanker Maintenance Instructions (Cont)

## b. Installation.

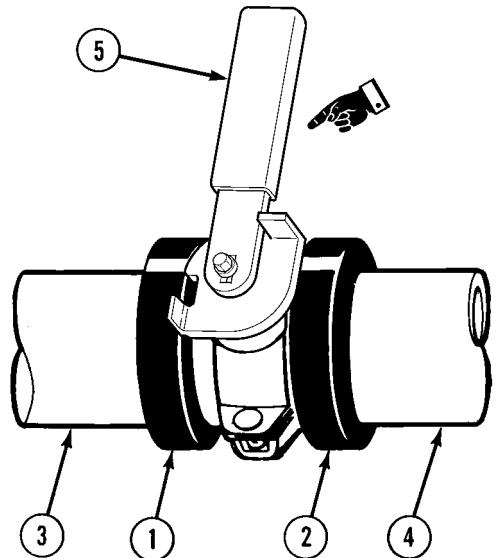
CAUTION

- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connection will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

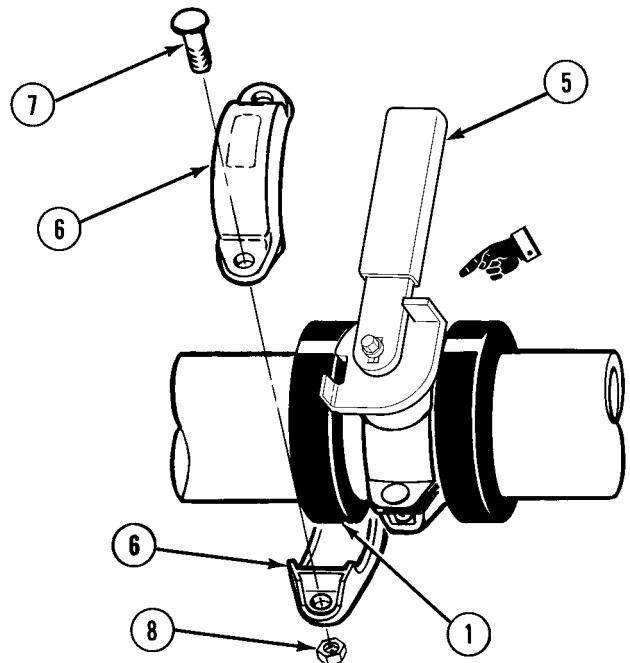
**NOTE**

There are two types of handles. The newest type of handle is shown.

- (1) Install coupling gaskets (1 and 2) on pipes (3 and 4).
- (2) Hold V3 suction line valve (5) in place and position coupling gaskets (1 and 2) over connections of valve and pipes (3 and 4).



- (3) Hold V3 suction line valve (5) in place and install two coupling halves (6) on coupling gasket (1) with two screws (7) and nuts (8).

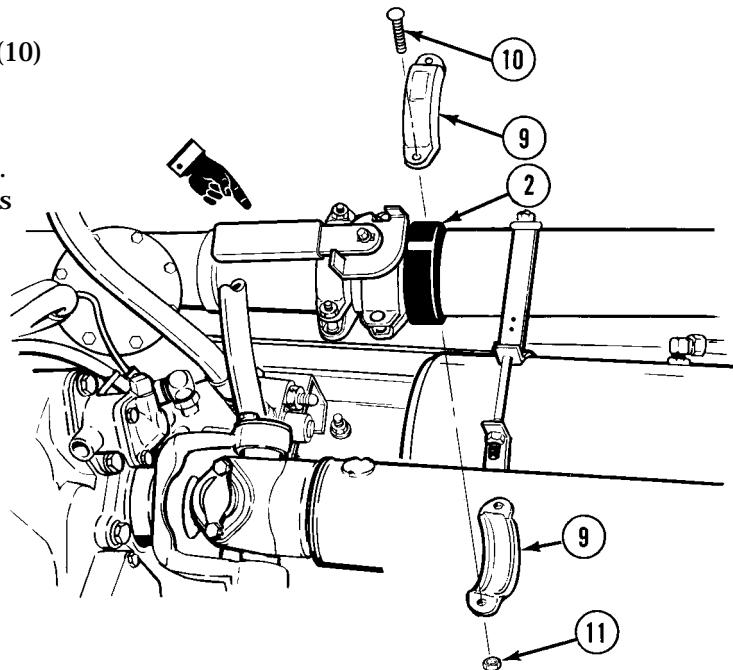


## M978 Tanker Maintenance Instructions (Cont)

## 25-17. V3 SUCTION LINE VALVE REMOVAL/INSTALLATION (CONT).

- (4) Install two coupling halves (9) on coupling gasket (2) with two screws (10) and nuts (11).
- c. Follow-on Maintenance.
- (1) Recirculate fuel (TM 9-2320-279-10).
  - (2) Check V3 suction line valve for leaks and proper operation (TM 9-2320-279-10).

END OF TASK



## 25-18. V4 RELIEF VALVE REMOVAL/INSTALLATION/ADJUSTMENT

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Adjustment            |
| b. Installation | d. Follow-on Maintenance |

## INITIAL SETUP

## Models

M978

## Test Equipment

None

## Special Tools

None

## Supplies

None

## Personnel Required

MOS 63S, Heavy wheel vehicle mechanic (2)

## References

None

## Equipment Condition

TM or Para Condition Description

TM 9-2320-279-10 Pump module rear access doors opened.

Para 16-48 Pump module left side access panel removed.

## Special Environmental Conditions

None

## General Safety Instructions

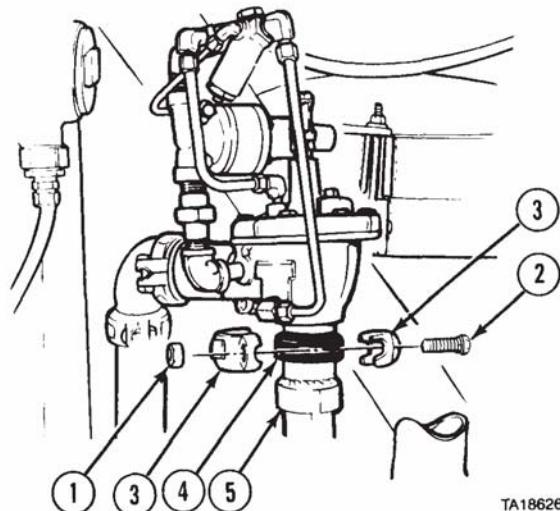
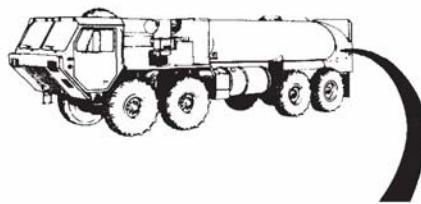
No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

## M978 Tanker Maintenance Instructions (Cont)

*a. Removal.***WARNING**

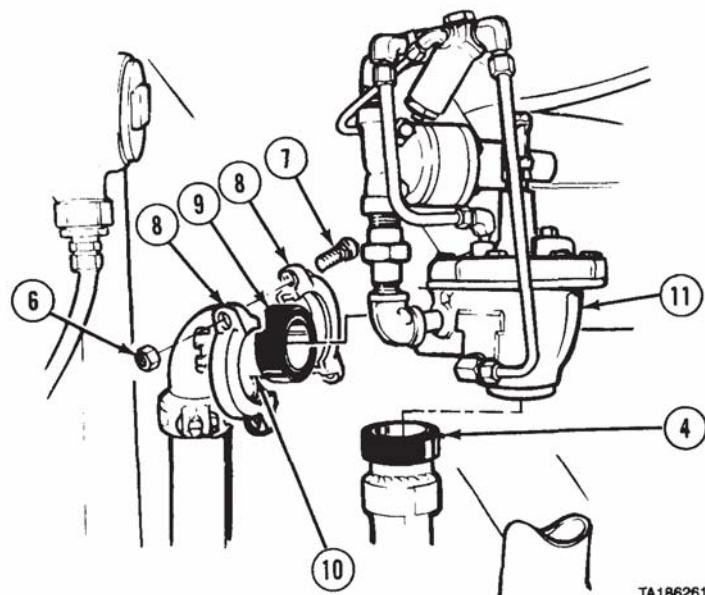
Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (1) Remove two nuts (1), screws (2), and coupling halves (3).
- (2) Slide coupling gasket (4) on pipe (5).



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- (3) Remove two nuts (6), screws (7), and coupling halves (8).
- (4) Slide coupling gasket (9) on pipe (10) and remove V4 relief valve (11).
- (5) Remove two coupling gaskets (4 and 9).



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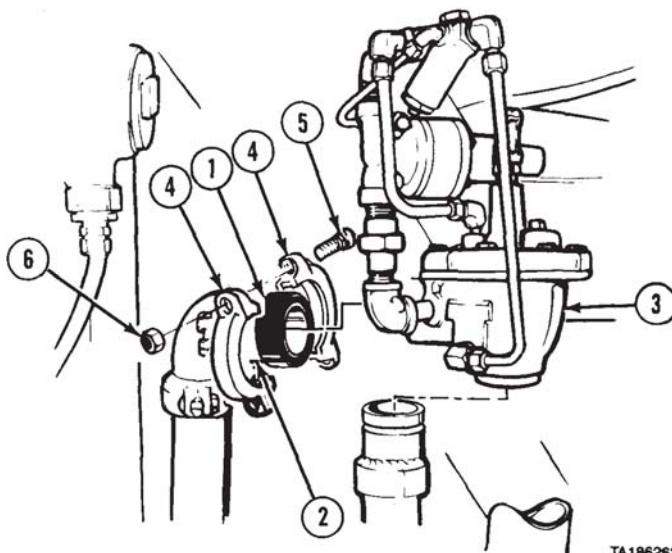
## M978 Tanker Maintenance Instructions (Cont)

## 25-18. V4 RELIEF VALVE REMOVAL/INSTALLATION/ADJUSTMENT (CONT).

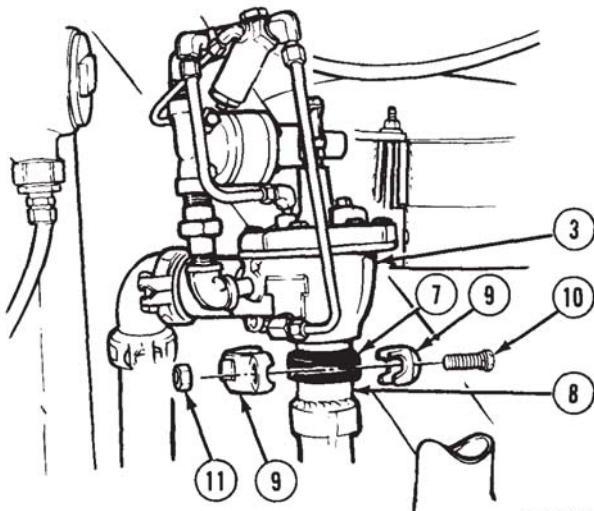
*b. Installation.*CAUTION

- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

- (1) Install coupling gasket (1) on pipe (2).
- (2) Position V4 relief valve (3) on pipe (2) and install coupling gasket (1) over end of valve.
- (3) Install two coupling halves (4) over coupling gasket (1) with two screws (5) and nuts (6).
  
- (4) Install coupling gasket (7) on pipe (8).
- (5) Position V4 relief valve (3) on pipe (8) and install coupling gasket (7) over end of valve.
- (6) Install two coupling halves (9) over coupling gasket (7) with two screws (10) and nuts (11).



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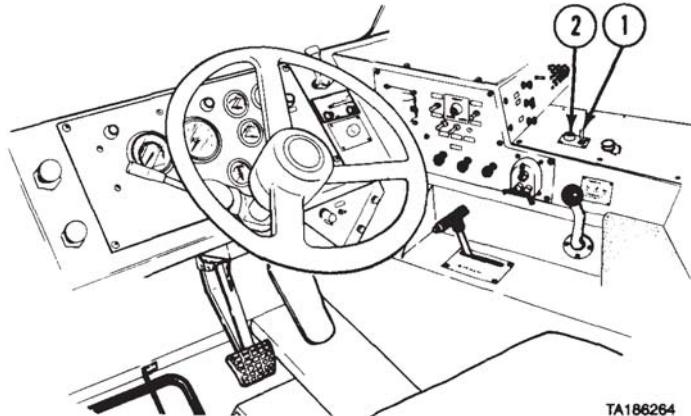
## M978 Tanker Maintenance Instructions (Cont)

*c. Adjustment.*

## NOTE

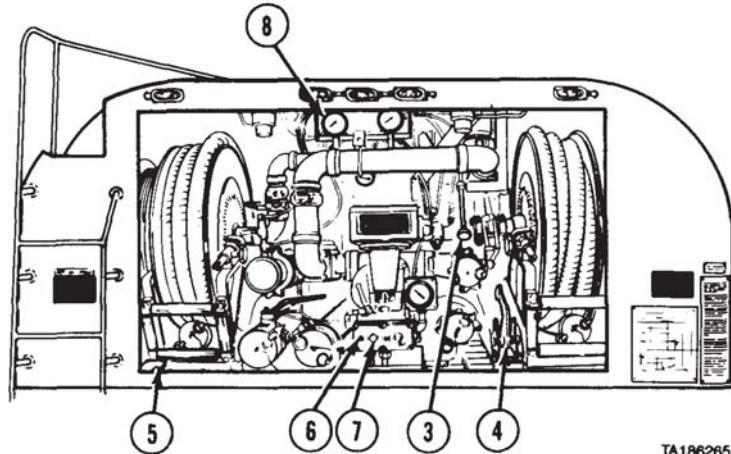
Tank must contain at least 1000 gallons of fuel before doing adjustment procedure.

- (1) Check tanker fuel level (TM 9-2320-279-10).
- (2) Start engine (TM 9-2320-279-10).
- (3) Set PTO ENGAGE switch (1) to ON position. Check that indicator light (2) comes on.



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- (4) Push in V6 FUEL/DEFUEL CONTROL VALVE control rod (3).
- (5) Pull back MC MANUAL CONTROL EM VALVE lever (4).
- (6) Push PUMP ENGAGEMENT LEVER (5) forward.
- (7) Set TC/THROTTLE CONTROL switch (6) up to ON position.
- (8) Press HI/HIGH IDLE switch (7).
- (9) Read discharge line pressure gage (8). Gage should read 55 psi (379 kPa). If gage does not read 55 psi (379 kPa), do steps (10) through (20).

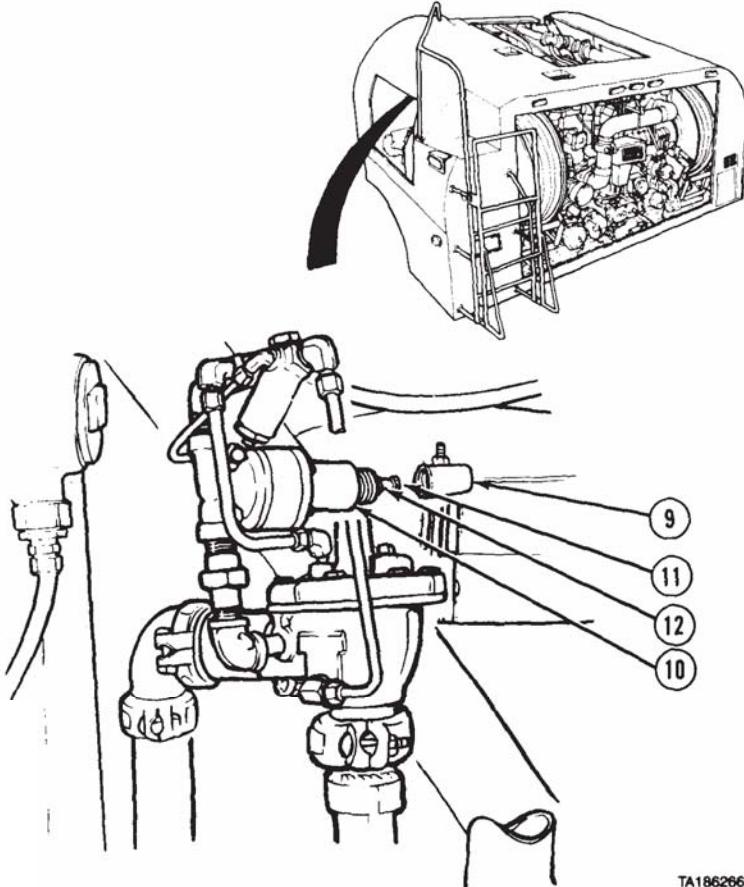


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## M978 Tanker Maintenance Instructions (Cont)

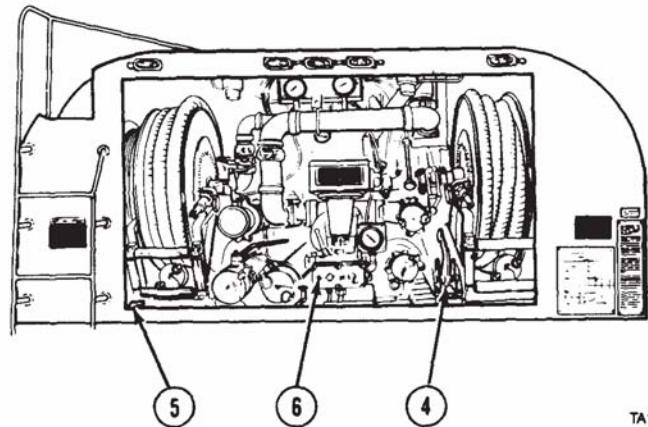
25-18. V4 RELIEF VALVE REMOVAL/INSTALLATION/ADJUSTMENT (CONT).

- (10) Remove cap (9) from control assembly (10).
- (11) Hold screw (11) and loosen nut (12).
- (12) If Soldier A gets reading less than 55 psi (379 kPa), Soldier B turns screw (11) clockwise until reading is 55 psi (379 kPa).
- (13) If Soldier A gets reading of more than 55 psi (379 kPa), Soldier B turns screw (11) counterclockwise until reading is 55 psi (379 kPa).
- (14) Hold screw (11) and tighten nut (12).
- (15) Install cap (9) on control assembly (10).



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- (16) Set TC/THROTTLE CONTROL switch (6) down to OFF position.
- (17) Pull back on PUMP ENGAGEMENT LEVER (5) until locked.
- (18) Push MC MANUAL CONTROL EM VALVE lever (4) forward.



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## M978 Tanker Maintenance Instructions (Cont)

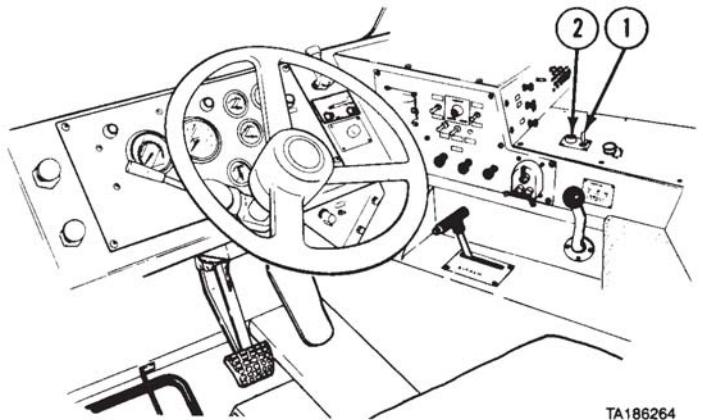
- (19) Set PTO ENGAGE switch (1) to OFF position. Check that indicator light (2) goes out.

(20) Shut off engine (TM 9-2320-279-10).

d. *Follow-on Maintenance.*

- (1) Recirculate fuel (TM 9-2320-279-10).
- (2) Check V4 relief valve for leaks.
- (3) Install pump module left side access panel (para 16-48).
- (4) Close pump module rear access doors (TM 9-2320-279-10).

END OF TASK



TA186264

**25-19. V5 AIR ACTUATED FLOW VALVE AND FLANGE COUPLINGS REMOVAL/INSTALLATION.**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

**INITIAL SETUP**

*Models*

M978

*Test Equipment*

None

*Special Tools*

None

*Supplies*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic (2)

*References*

None

*Equipment Condition*

*TM or Para*      *Condition Description*

TM 9-2320-279-10 Air system drained.

TM 9-2320-279-10 Pump module top access door opened.

Para 16-48      Pump module right side access panel removed.

Para 23-4      Filter-separator removed.

*Special Environmental Conditions*

None

*General Safety Instructions*

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

## M978 Tanker Maintenance Instructions (Cont)

## 25-19. V5 AIR ACTUATED FLOW VALVE AND FLANGE COUPLINGS REMOVAL/INSTALLATION (CONT).

*a. Removal.*

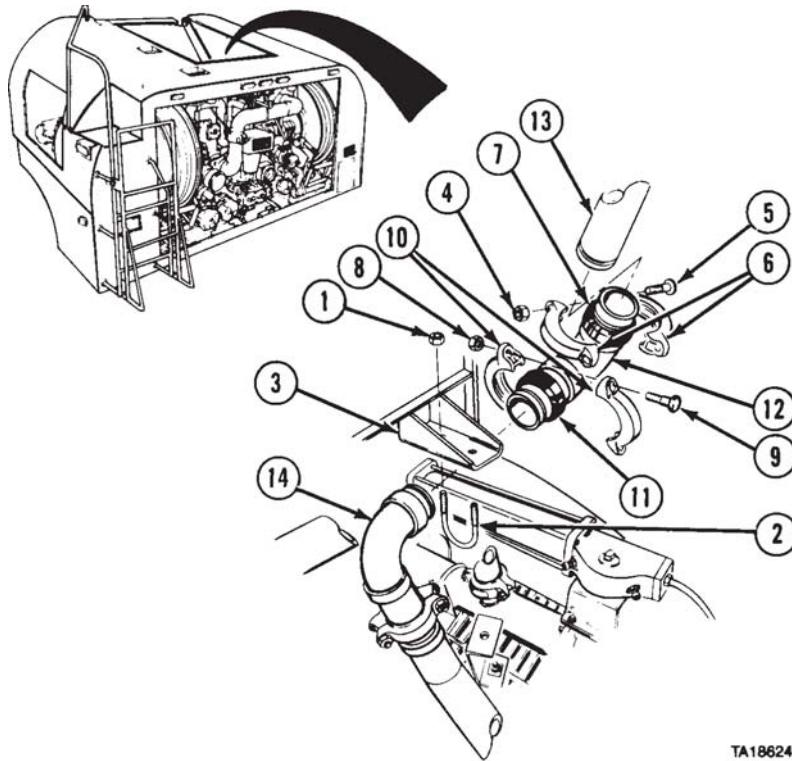
## NOTE

This task is performed from inside module.

- (1) Remove two locknuts (1) and U-bolt (2) from bracket (3).

WARNING

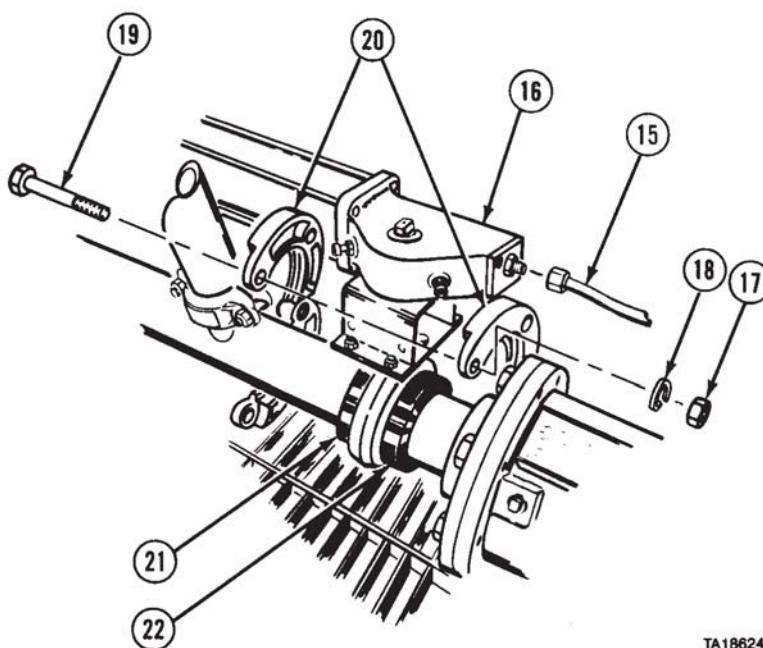
Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.



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- (2) Remove two nuts (4), screws (5), and coupling halves (6) from coupling gasket (7).
- (3) Remove two nuts (8), screws (9), and coupling halves (10) from coupling gasket (11).
- (4) Push coupling gasket (7 and 11) on pipe (12).
- (5) Remove pipe (12) from pipes (13 and 14).
- (6) Remove coupling gaskets (7 and 11) from pipe (12)

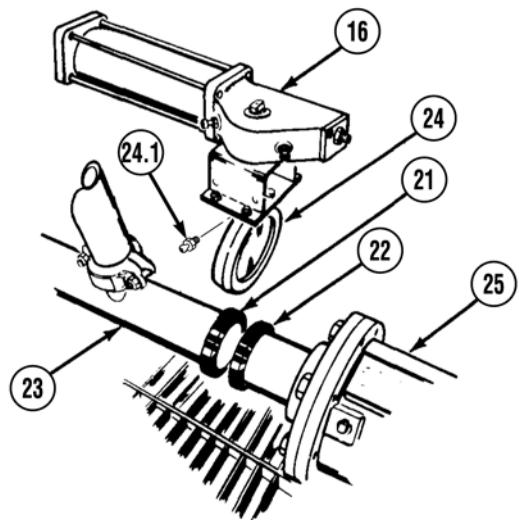
- (7) Disconnect air hose (15) from pneumatic actuator (16).
- (8) Remove four nuts (17), lockwashers (18), screws (19), and two flange coupling halves (20) from two flange coupling gaskets (21 and 22).



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**M978 Tanker Maintenance Instructions (Cont)****NOTE**

- Soldier B works from inside module right side access opening.
  - Matchmark position of pneumatic actuator before removal.
- (9) Soldier A pushes pipe (23) toward front of vehicle while Soldier B removes V5 air actuated flow valve (24) and pneumatic actuator (16).
- (9.1) Remove grease fitting (24.1) from V5 air actuated flow valve (24).
- (10) Remove two flange coupling gaskets (21 and 22) from pipe (23) and valve (25).

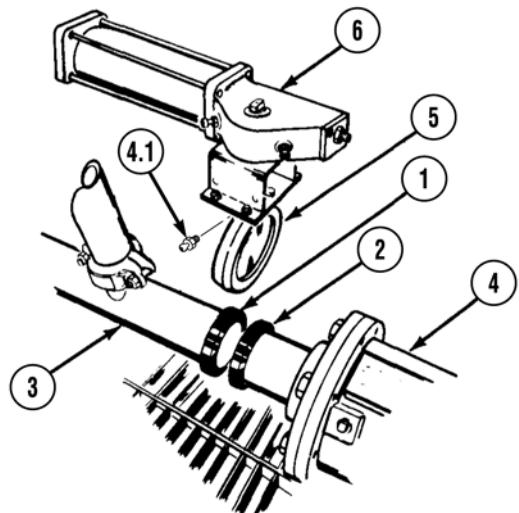
***b. Installation.*****CAUTION**

- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, connections will leak.

**NOTE**

Soldier B works from inside module right side access opening. Be sure pneumatic actuator is aligned to matchmarks.

- (1) Position two flange coupling gaskets (1 and 2) on pipe (3) and valve (4).
- (1.1) Install grease fitting (4.1) on V5 air actuated flow valve (5).
- (2) Soldier A pushes pipe (3) toward front of vehicle while Soldier B positions V5 air actuated flow valve (5) and pneumatic actuator (6) between pipe and valve (4).

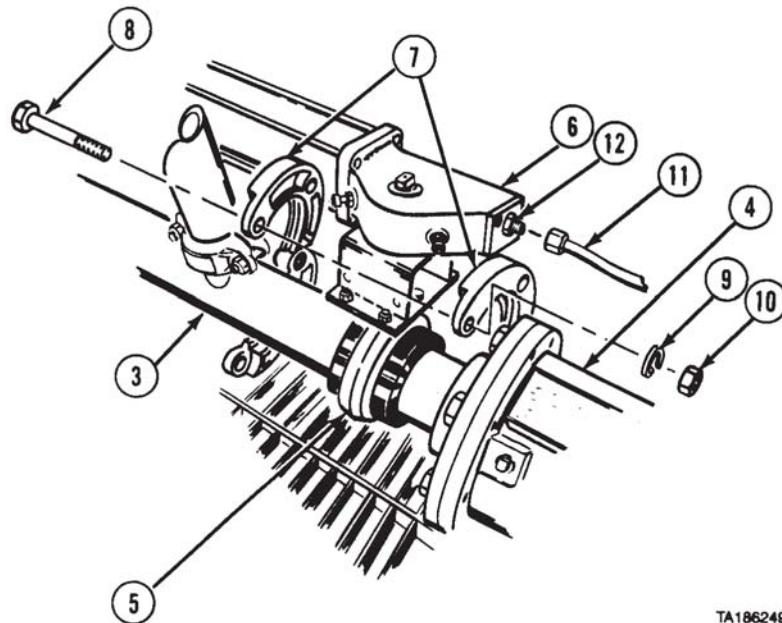


## M978 Tanker Maintenance Instructions (Cont)

**25-19. V5 AIR ACTUATED FLOW VALVE AND FLANGE COUPLINGS  
REMOVAL/INSTALLATION (CONT).**

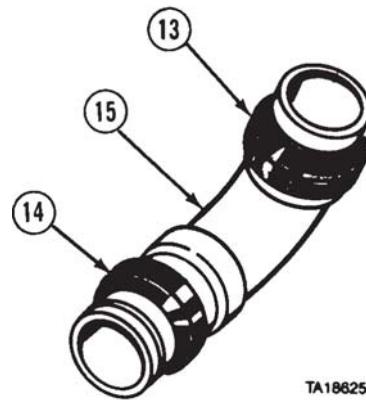
(3) Soldier A installs two flange coupling halves (7) with four screws (8), lockwashers (9), and nuts (10) on pipe (3) and valve (4) while Soldier B supports V5 air actuated flow valve (5).

(4) Install airhose (11) on connector (12).



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(5) Install two coupling gaskets (13 and 14) on pipe (15).



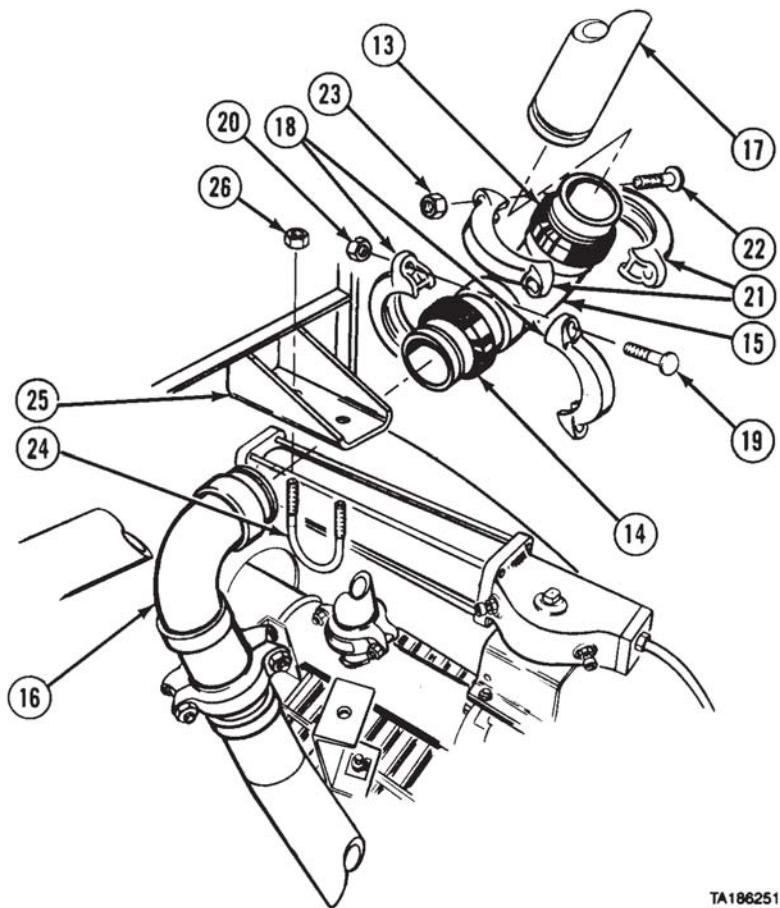
TA186250

## M978 Tanker Maintenance Instructions (Cont)

- (6) Position pipe (15) between pipes (16 and 17).
- (7) Position coupling gasket (14) so that ends of pipes (15 and 16) are covered.
- (8) Position coupling gasket (13) so that ends of pipes (15 and 17) are covered.
- (9) Install two coupling halves (18) with two screws (19) and nuts (20).
- (10) Install two coupling halves (21) with two screws (22) and nuts (23).
- (11) Install U-bolt (24) in bracket (25) with two locknuts (26).

## c. Follow-on Maintenance.

- (1) Install filter-separator (para 23-4).
- (2) Start engine and build up air supply (TM 9-2320-279-10).
- (3) Inspect V5 air actuated flow valve for leaks and proper operation.
- (4) Perform unfiltered bulk unloading (TM 9-2320-279-10).
- (5) Install pump module right side access panel (para 16-48).
- (6) Pump module top access door closed (TM 9-2320-279-10).



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END OF TASK

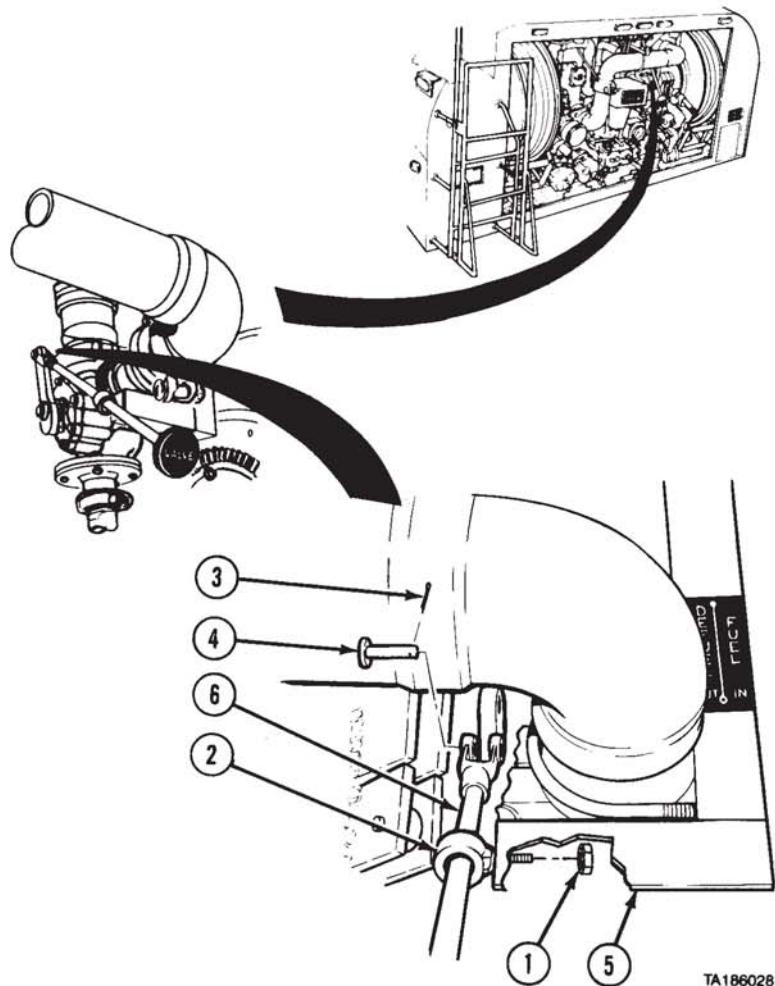
## M978 Tanker Maintenance Instructions (Cont)

<b>25-20. V6 FUEL/DEFUEL CONTROL VALVE CONTROL ROD REMOVAL/INSTALLATION.</b>		
This task covers:		
a. Removal	c. Follow-on Maintenance	b. Installation
INITIAL SETUP		
<i>Models</i>	<i>Equipment Condition</i>	
M978	TM or Para	Condition Description
<i>Test Equipment</i>	TM 9-2320-279-10	Shut off engine.
None	TM 9-2320-279-10	Pump module rear access doors opened.
<i>Special Tools</i>	<i>Special Environmental Conditions</i>	
None	None	
<i>Supplies</i>	<i>General Safety Instructions</i>	
None	No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.	
<i>Personnel Required</i>		
MOS 63S, Heavy wheel vehicle mechanic		
<i>References</i>		
None		

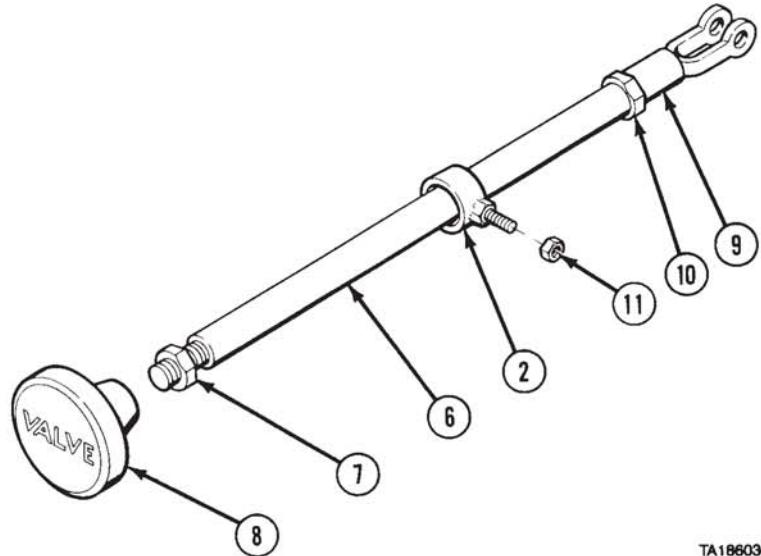
## M978 Tanker Maintenance Instructions (Cont)

**a. Removal.**

- (1) Remove locknut (1) from control rod guide (2).
- (2) Remove cotter pin (3) and pin (4).
- (3) Pull control rod guide (2) from bracket (5) and remove V6 FUEL/DEFUEL CONTROL VALVE control rod (6).



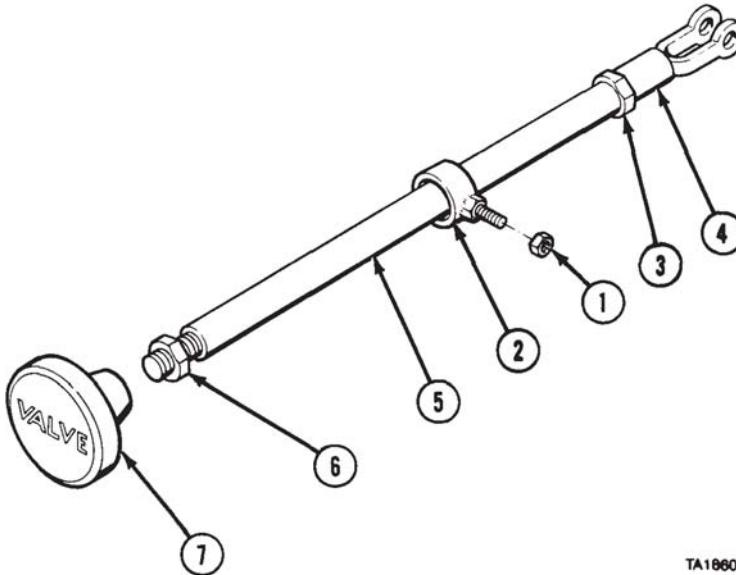
- (4) Loosen jamnut (7) and remove knob (8) and control rod guide (2) from V6 FUEL/DEFUEL CONTROL VALVE control rod (6). Remove jamnut.
- (5) Remove clevis (9) and jamnut (10) from V6 FUEL/DEFUEL CONTROL VALVE control rod (6).
- (6) Remove nut (11) from control rod guide (2).



## M978 Tanker Maintenance Instructions (Cont)

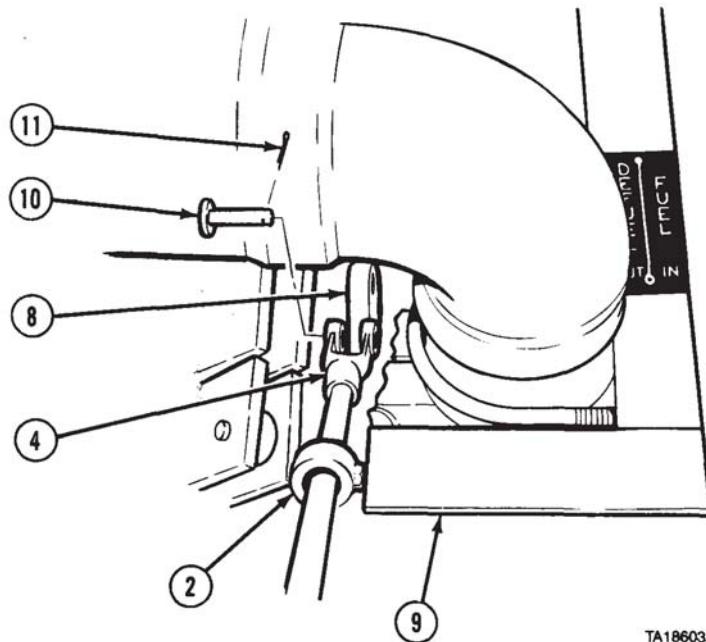
**25-20. V6 FUEL/DEFUEL CONTROL VALVE CONTROL ROD REMOVAL/INSTALLATION (CONT)***b. Installation.*

- (1) Install nut (1) on control rod guide (2).
- (2) Install jammnut (3) and clevis (4) on V6 FUEL/DEFUEL CONTROL VALVE control rod (5).
- (3) Slide control rod guide (2) on V6 FUEL/DEFUEL CONTROL VALVE control rod (5).
- (4) Install jammnut (6) on V6 FUEL/DEFUEL CONTROL VALVE control rod (5).
- (5) Install knob (7) and tighten jammnut (6) against knob.



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- (6) Position clevis (4) on handle (8) and position control rod guide (2) in bracket (9).
- (7) Install pin (10) and cotter pin (11) through clevis (4) and handle (8).

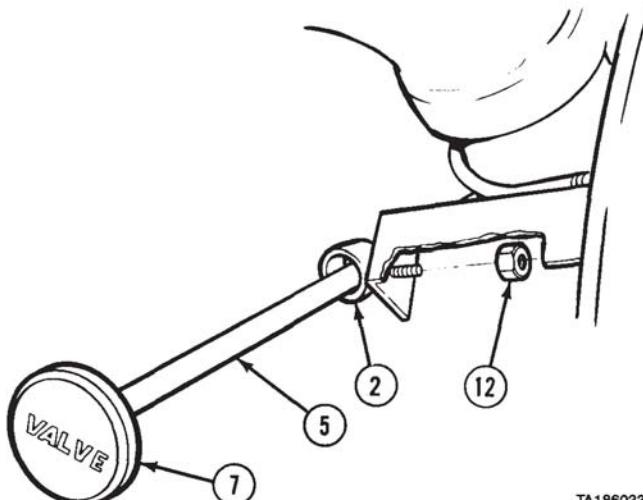


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## M978 Tanker Maintenance Instructions (Cont)

- (8) Install locknut (12) on control rod guide (2).  
 (9) Push in and pull out knob (7) to check operation of V6 FUEL/DEFUEL CONTROL VALVE control rod (5).
- c. Follow-on Maintenance. Close pump module rear doors (TM 9-2320-279-10).

**END OF TASK**



### 25-21. V6 FUEL/DEFUEL CONTROL VALVE REMOVAL/INSTALLATION.

This task covers:

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

#### INITIAL SETUP

*Models*

M978

*Test Equipment*

None

*Special Tools*

None

*Supplies*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic (2)

*References*

None

*Equipment Condition*

*TM or Para*

TM 9-2320-279-10

*Condition Description*

Pump module rear access doors opened.

*Para 25-20*

V6 FUEL/DEFUEL CONTROL VALVE control rod removed.

*TM 9-2320-279-10*

Right side access panel removed.

*Special Environmental Conditions*

None

*General Safety Instructions*

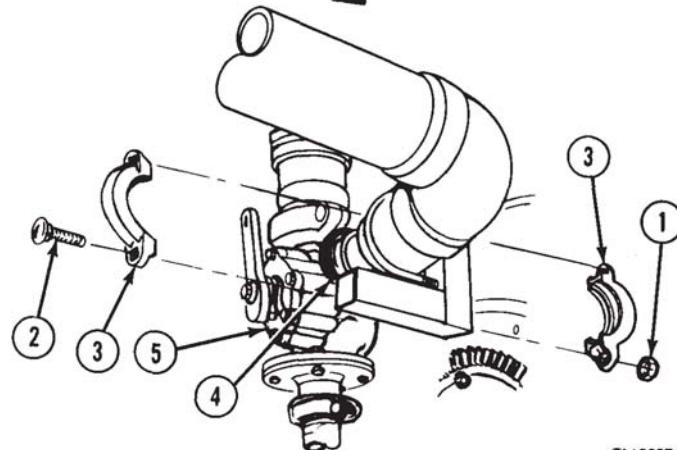
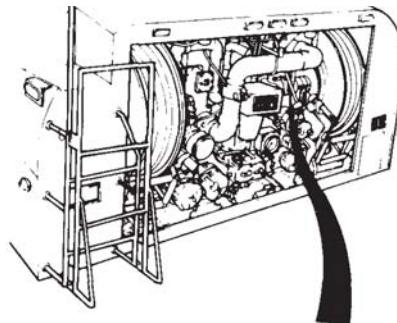
No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

## M978 Tanker Maintenance Instructions (Cont)

**25-21. V6 FUEL/DEFUEL CONTROL VALVE REMOVAL/INSTALLATION (CONT).****a. Removal.****WARNING**

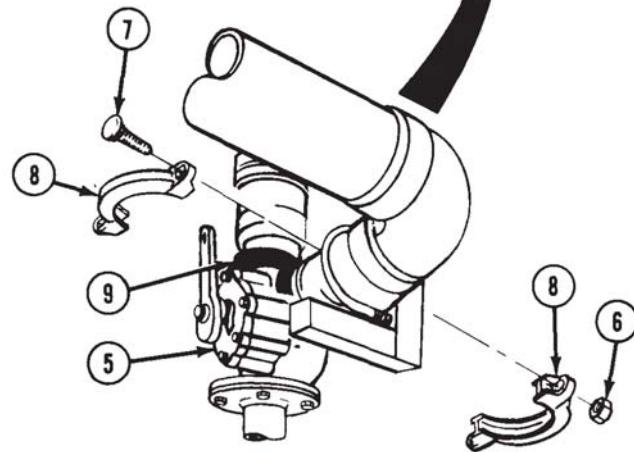
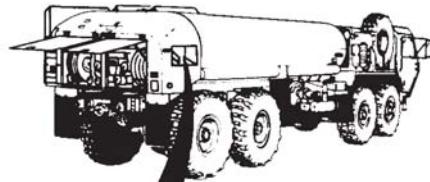
Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (1) Remove two nuts (1), screws (2), and coupling halves (3).
- (2) Push coupling gasket (4) on V6 FUEL/DEFUEL CONTROL VALVE (5).



TA186074

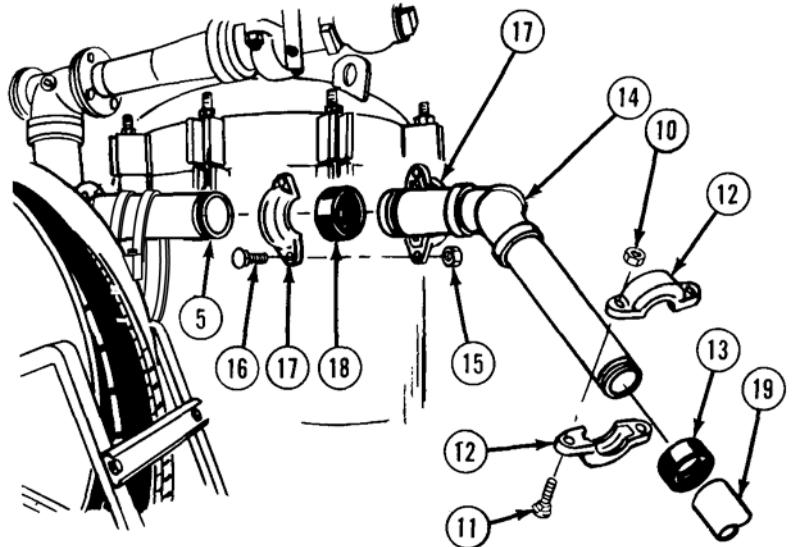
- (3) Remove two nuts (6), screws (7), and coupling halves (8).
- (4) Slide coupling gasket (9) on V6 FUEL/DEFUEL CONTROL VALVE (5).



TA186075

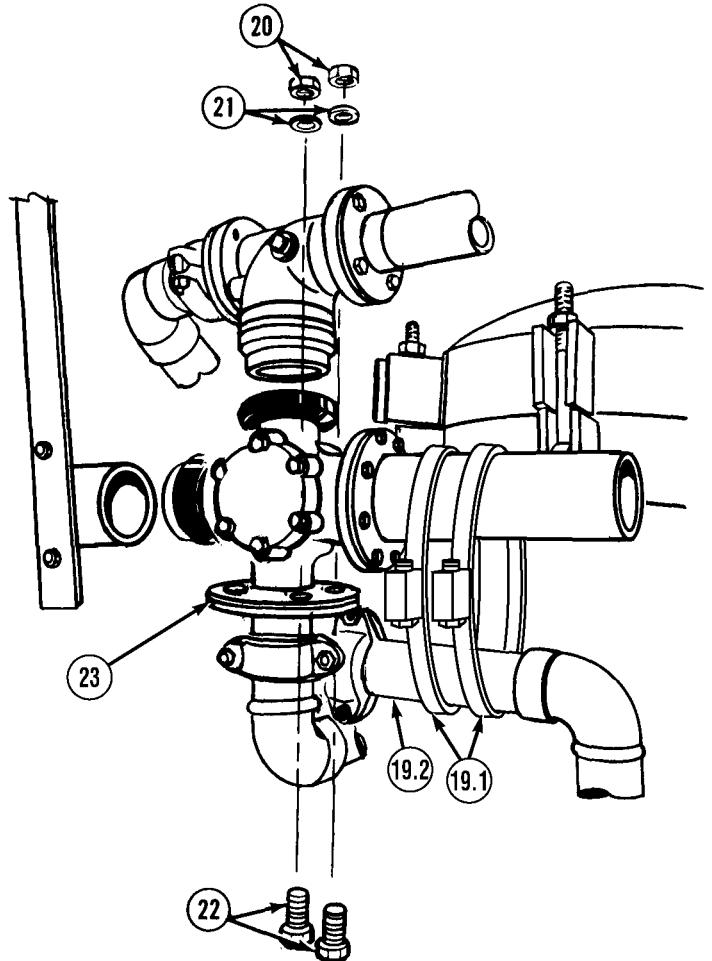
## M978 Tanker Maintenance Instructions (Cont)

- (5) Remove two nuts (10), screws (11), and coupling halves (12).
- (6) Push coupling gasket (13) on pipe (14).
- (7) Remove two nuts (15), screws (16), and coupling halves (17).
- (8) Push coupling gasket (18) on pipe (14).
- (9) Remove pipe (14) and coupling gaskets (13 and 18) from V6 FUEL/DEFUEL CONTROL VALVE (5) and pipe (19).

**NOTE**

Note position of clamps on pipes prior to loosening to ensure proper installation.

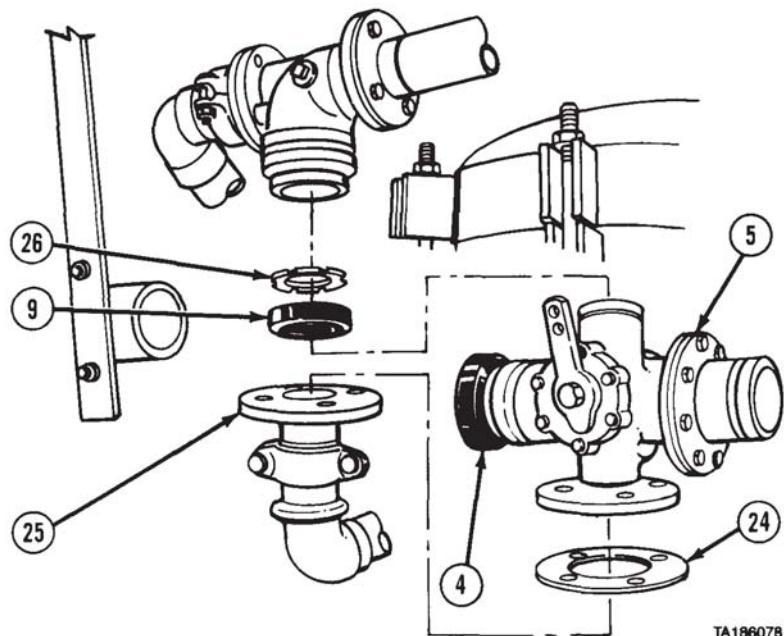
- (9.1) Loosen two clamps (19.1) and slide over pipe (19.2).
- (10) Remove four locknuts (20), washers (21), and screws (22) from flange (23).



## M978 Tanker Maintenance Instructions (Cont)

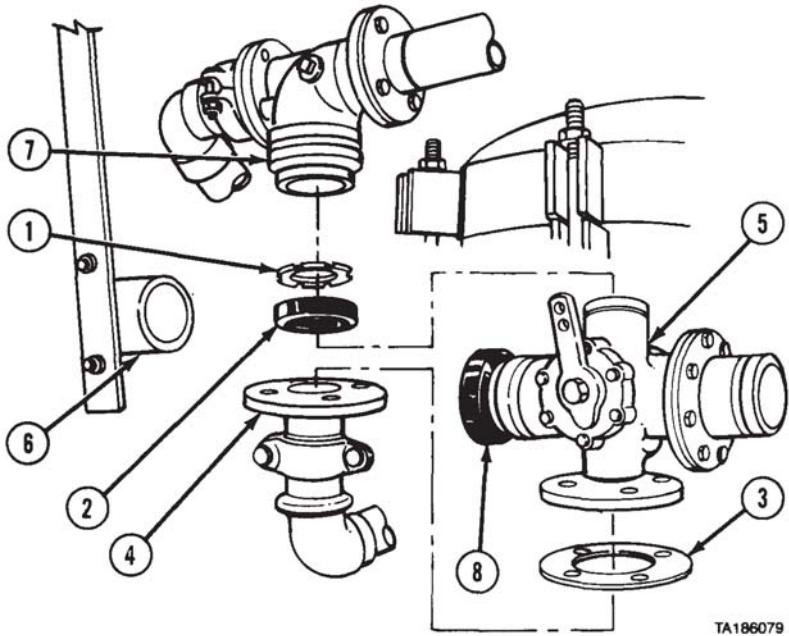
**25-21. V6 FUEL/DEFUEL CONTROL VALVE REMOVAL/INSTALLATION (CONT.)**

- (11) Remove V6 FUEL/DEFUEL CONTROL VALVE (5) and gasket (24) from flange (25).
- (12) Remove two coupling gaskets (4 and 9) from V6 FUEL/DEFUEL CONTROL VALVE (5).
- (13) Remove reducer (26) from coupling gasket (9).

***b. Installation.*****CAUTION**

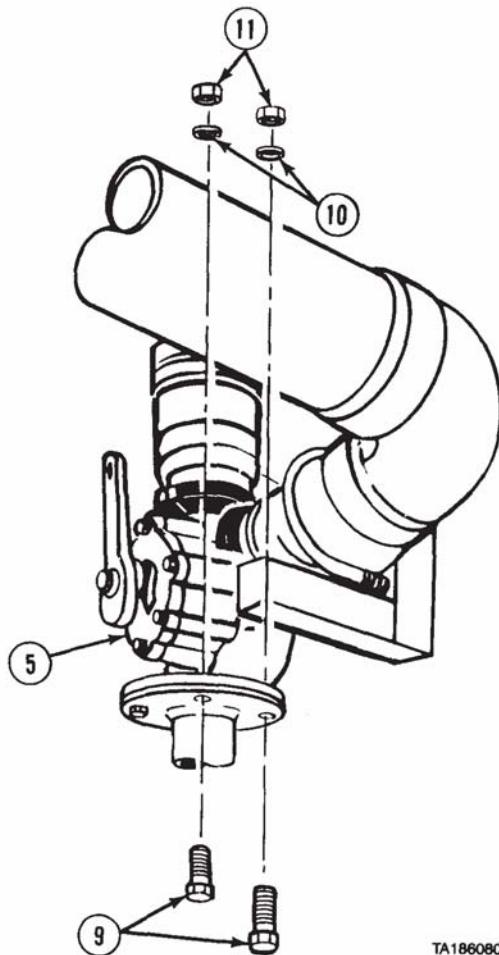
Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.

- (1) Install reducer (1) in coupling gasket (2).
- (2) Install gasket (3) on flange (4).
- (3) Soldier B holds V6 FUEL/DEFUEL CONTROL VALVE (5) in position on pipe (6), flange (4), and eductor assembly (7) while Soldier A installs coupling gaskets (2 and 8) over pipes.



## M978 Tanker Maintenance Instructions (Cont)

- (4) Soldier B holds V6 FUEL/DEFUEL CONTROL VALVE (5) while Soldier A installs four screws (9), washers (10), and locknuts (11). Do not tighten.



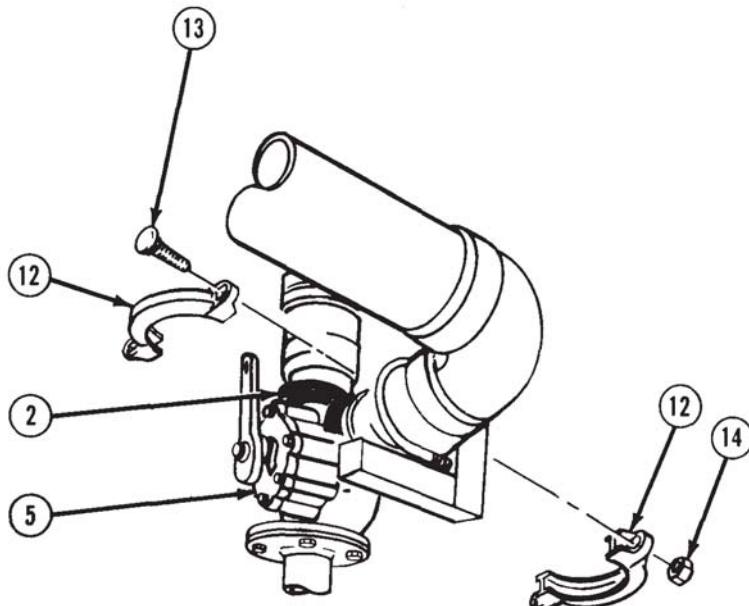
TA186060

## M978 Tanker Maintenance Instructions (Cont)

**25-21. V6 FUEL/DEFUEL CONTROL VALVE REMOVAL/INSTALLATION (CONT).****CAUTION**

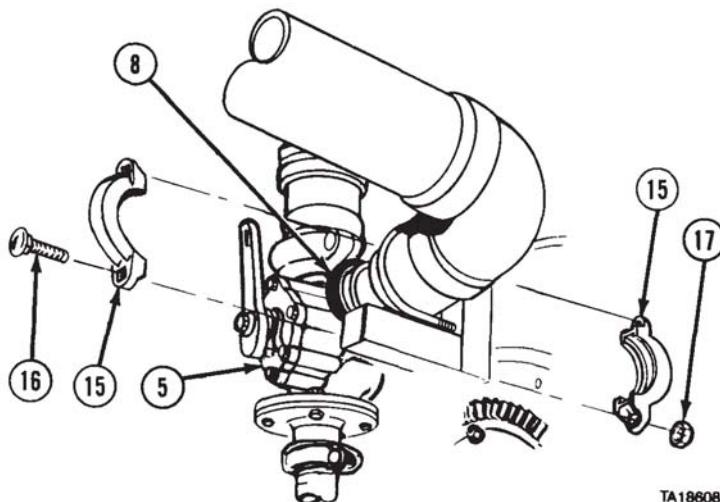
Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

- (5) Soldier B holds V6 FUEL/DEFUEL CONTROL VALVE (5) in position while Soldier A installs two coupling halves (12), screws (13), and nuts (14) over coupling gasket (2).



TA186081

- (6) Soldier A holds V6 FUEL/DEFUEL CONTROL VALVE (5) in position while Soldier B installs two coupling halves (15), screws (16), and nuts (17) on coupling gasket (8).



TA186082

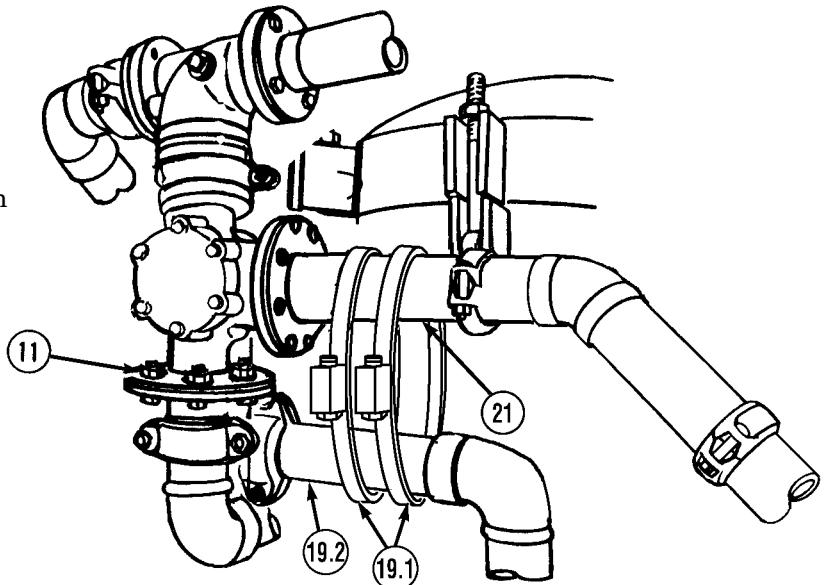
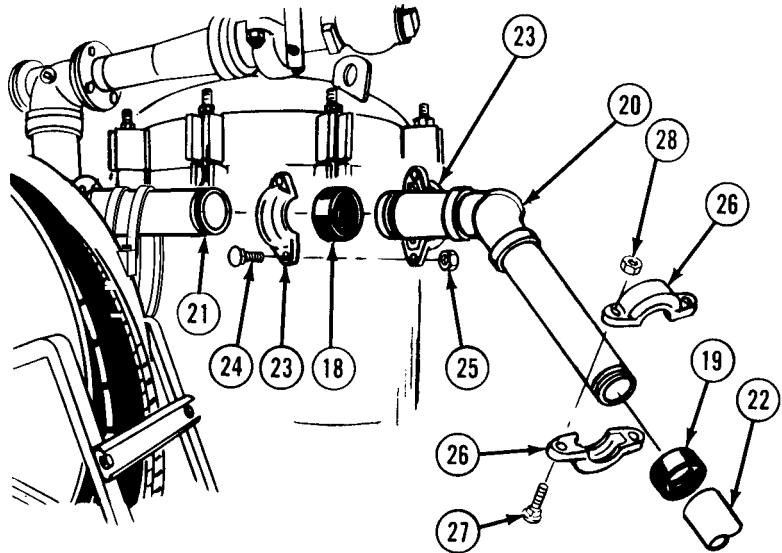
**M978 Tanker Maintenance Instructions (Cont)**

- (7) Slide coupling gaskets (18 and 19) on pipe (20).

**NOTE**

Position clamps on pipes as noted prior to loosening.

- (7.1) Position two clamps (19.1) on pipe (21). Do not tighten.
- (8) Soldier A holds pipe (20) in position while Soldier B installs coupling gaskets (18 and 19) over pipe (21) and pipe (22).
- (9) Soldier A holds pipe (20) in position while Soldier B installs two coupling halves (23), screws (24), and nuts (25) on coupling gasket (18).
- (10) Soldier A holds pipe (20) in position while Soldier B installs two coupling halves (26), screws (27), and nuts (28) on coupling gasket (19).
- (10.1) Tighten two clamps (19.1) on pipes (19.2 and 21).
- (11) Tighten four locknuts (11).

**c. Follow-on Maintenance.**

- (1) Install V6 FUEL/DEFUEL CONTROL VALVE control rod (para 25-20).
- (2) Perform fuel servicing (TM 9-2320-279-10).
- (3) Check V6 FUEL/DEFUEL CONTROL VALVE for leaks.
- (4) Close pump module rear access doors (TM 9-2320-279-10).
- (5) Install right side access panel (TM 9-2320-279-10).

**END OF TASK**

## M978 Tanker Maintenance Instructions (Cont)

## 25-22.V7/V8 REEL VALVES REMOVAL/INSTALLATION.

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

## INITIAL SETUP

## Models

All

## References

None

## Test Equipment

None

## Equipment Condition

TM or Para

## Condition Description

TM 9-2320-279-10 Pump module rear access doors opened.

## Special Tools

None

## Special Environmental Conditions

None

## Supplies

None

## General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

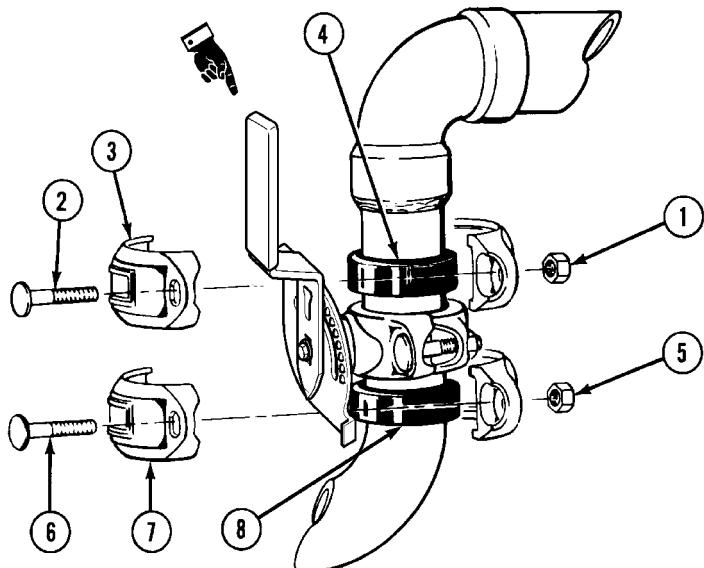
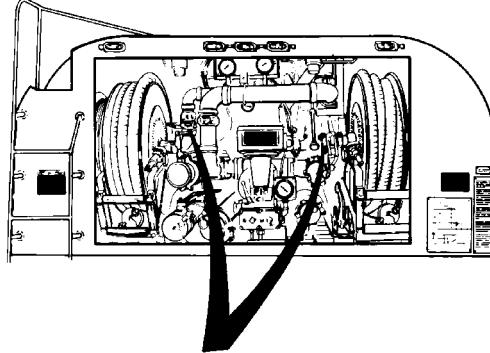
## Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

## a. Removal.

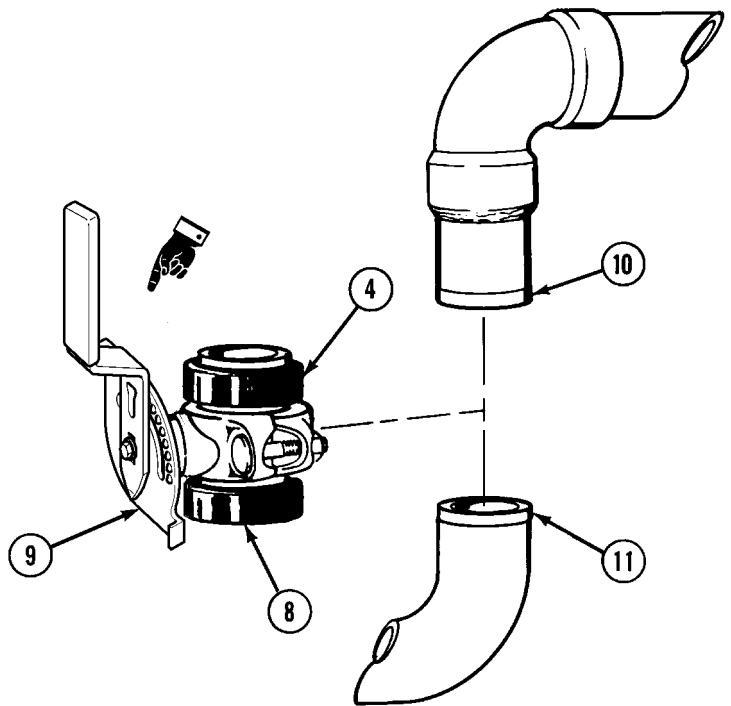
## NOTE

- Steps are the same to remove either V7 or V8 REEL VALVE. V7 REEL VALVE is shown.
  - There are two types of handles. The newest type of handle is shown.
- (1) Remove two nuts (1), screws (2), and coupling halves (3) from coupling gasket (4).
  - (2) Remove two nuts (5), screws (6), and coupling halves (7) from coupling gasket (8).

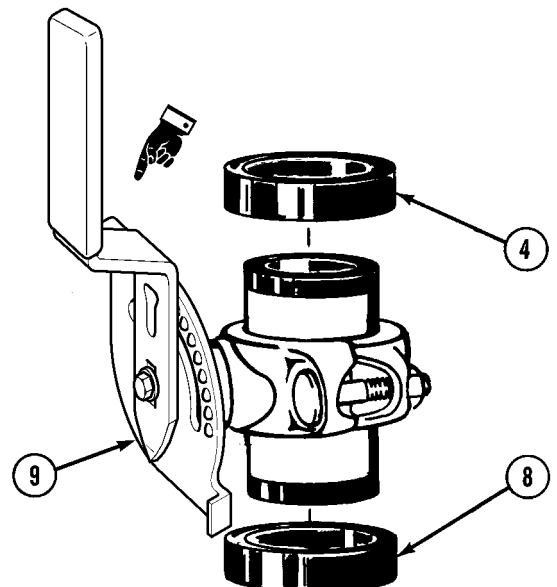


## M978 Tanker Maintenance Instructions (Cont)

- (3) Push coupling gasket (4 and 8) on REEL VALVE (9) and remove REEL VALVE from pipes (10 and 11).



- (4) Remove coupling gaskets (4 and 8) from REEL VALVE (9).



## M978 Tanker Maintenance Instructions (Cont)

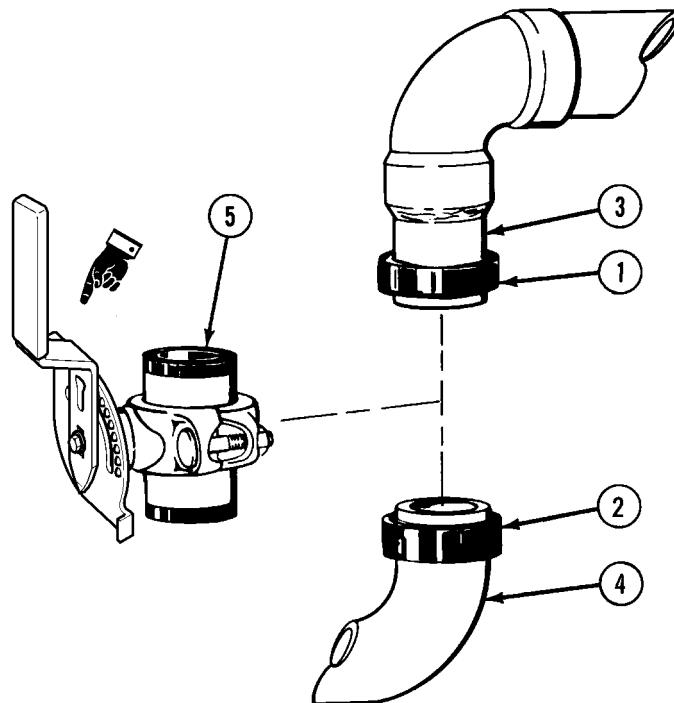
## 25-22. V7/V8 REEL VALVES REMOVAL/INSTALLATION (CONT).

## a. Removal.

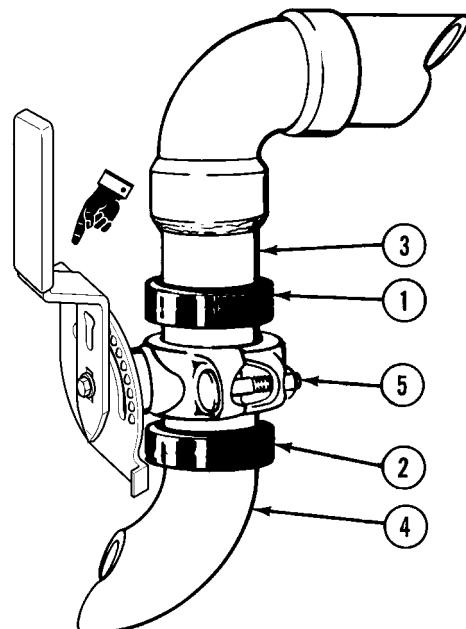
## NOTE

There are two types of handles. The newest type of handle is shown.

- (1) Install two coupling gaskets (1 and 2) on pipes (3 and 4).
- (2) Position REEL VALVE (5) between pipes (3 and 4).



- (3) Hold REEL VALVE (5) in place and position coupling gaskets (1 and 2) over connection of REEL VALVE and pipes (3 and 4).

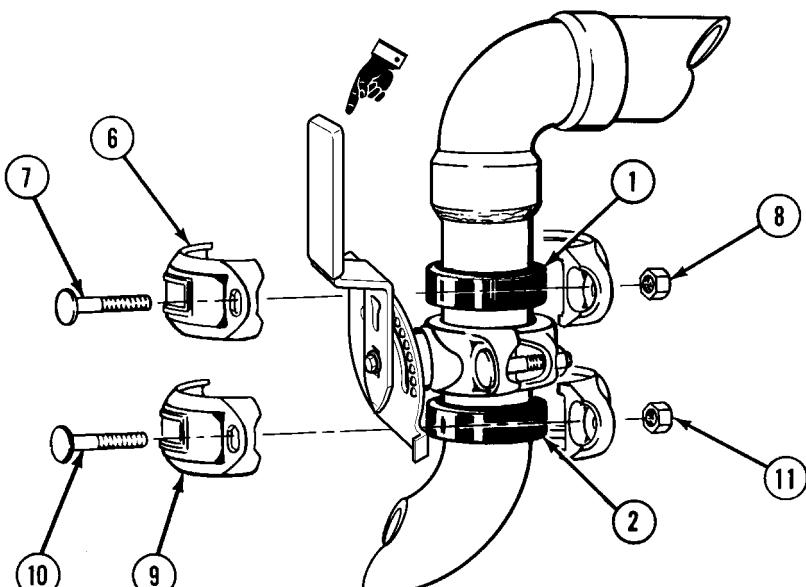


## M978 Tanker Maintenance Instructions (Cont)

CAUTION

Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

- (4) Install two coupling halves (6) on coupling gasket (1) with screws (7) and nuts (8).
- (5) Install two coupling halves (9) on coupling gasket (2) with screws (10) and nuts (11).
- c. Follow-on Maintenance.
  - (1) Perform fuel servicing (TM 9-2320-279-10).
  - (2) Check V7 or V8 REEL VALVE connections for leaks.
  - (3) Close pump module rear access doors (TM 9-2320-279-10).



END OF TASK

## 25-23. V9 CHECK VALVE REMOVAL/REPAIR/INSTALLATION

This task covers:

- |                        |                          |
|------------------------|--------------------------|
| a. Removal             | d. Assembly              |
| b. Disassembly         | e. Installation          |
| c. Cleaning/Inspection | f. Follow-on Maintenance |

## INITIAL SETUP

## Models

M978

## Test Equipment

None

## Special Tools

None

## Supplies

Compound, sealing, pipe thread, Item 18,  
Appendix C  
Oil, lubricating, Item 32, Appendix C  
Solvent, dry cleaning, Item 47, Appendix C

## Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

## References

None

## Equipment Condition

TM or Para	Condition Description
TM 9-2320-279-10	Pump module top access door opened.

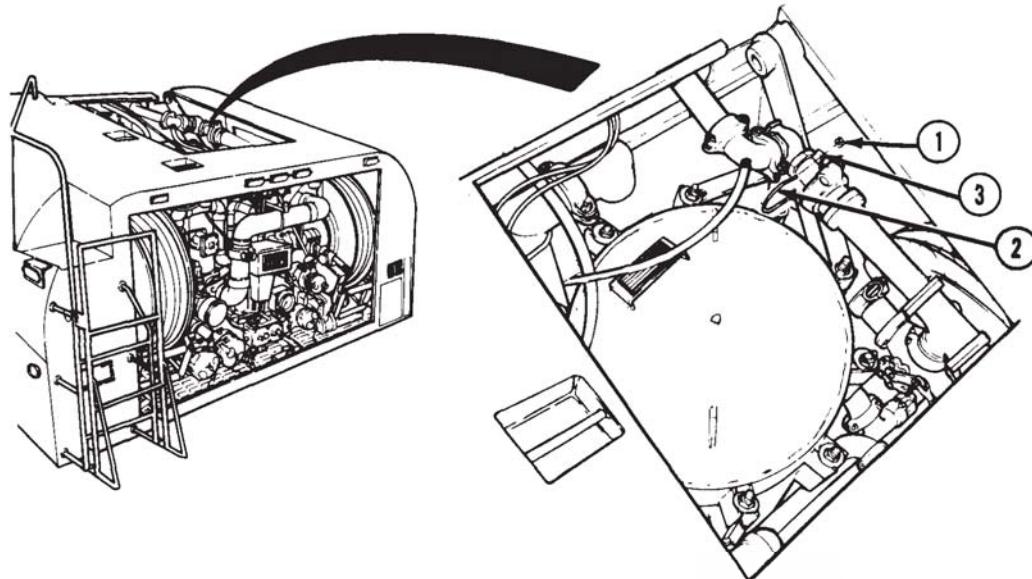
## Special Environmental Conditions

None

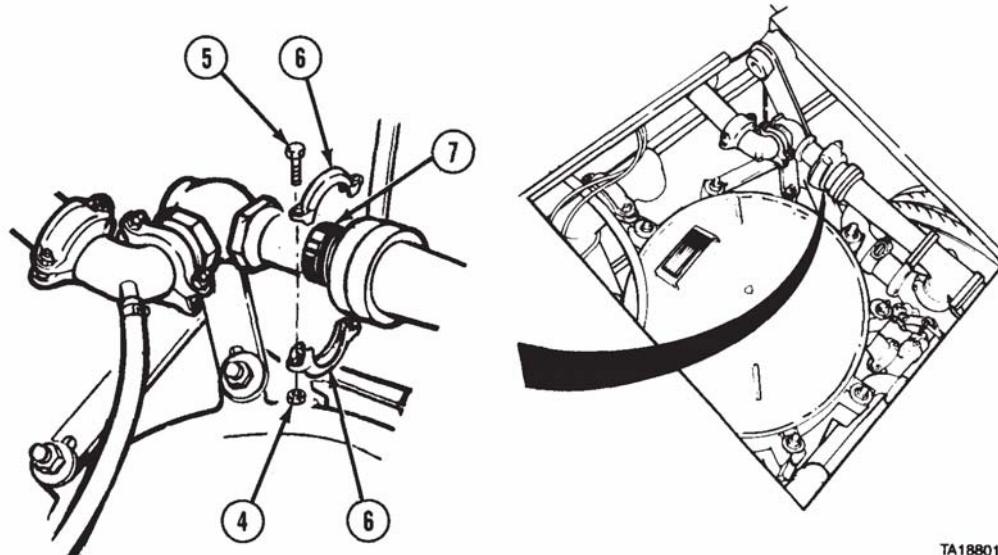
## General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

## M978 Tanker Maintenance Instructions (Cont)

**25-23. V9 CHECK VALVE REMOVAL/REPAIR/INSTALLATION (CONT).***a. Removal.*

(1) Remove two locknuts (1) and U-bolt (2) from bracket (3).

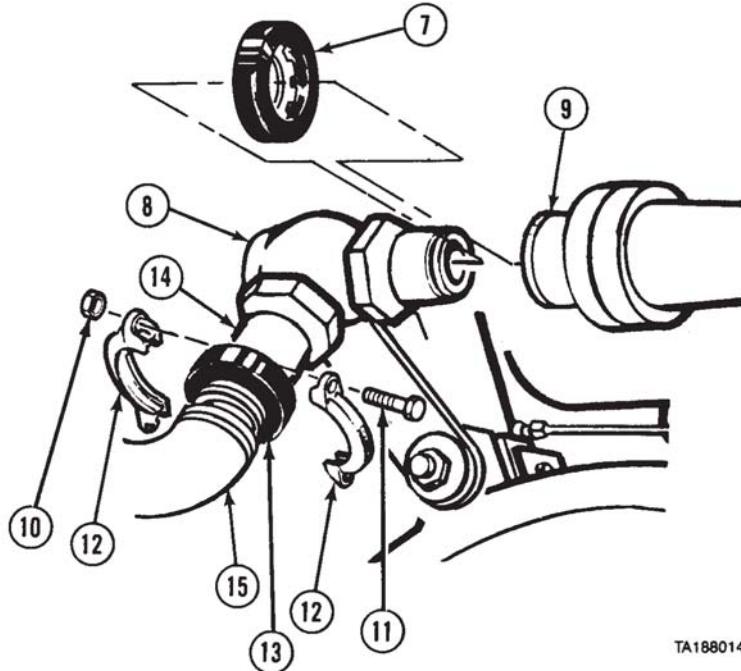


TA188015

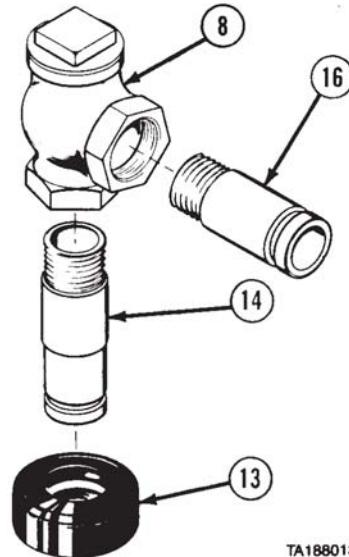
(2) Remove two nuts (4), screws (5), and coupling halves (6) from coupling gasket (7).

## M978 Tanker Maintenance Instructions (Cont)

- (3) Remove coupling gasket (7) from V9 CHECK VALVE (8) and eductor (9).
- (4) Hold V9 CHECK VALVE (8) in place and remove two nuts (10), screws (11), and coupling halves (12).
- (5) Hold V9 CHECK VALVE (8) in place and push coupling gasket (13) on pipe nipple (14).
- (6) Remove V9 CHECK VALVE (8) from pipe (15).



- (7) Remove coupling gasket (13) and two pipe nipples (14 and 16) from V9 CHECK VALVE (8).



## M978 Tanker Maintenance Instructions (Cont)

**25-23. V9 CHECK VALVE REMOVAL/REPAIR/INSTALLATION (CONT.).****b. Disassembly.**

- (1) Remove cap (1) and spring (2) from valve body (3).
- (2) Remove spring (2) from cap (1).
- (3) Remove disk assembly (4) from bearing (5).
- (4) Remove bearing (5) from valve body (3).

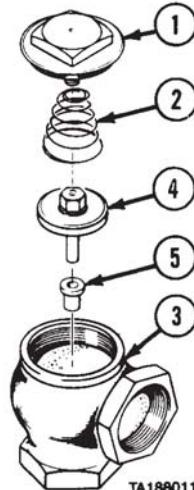
**c. Cleaning/Inspection.****WARNING**

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

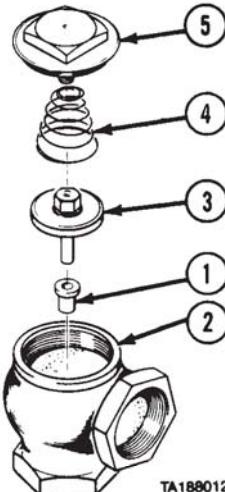
- (1) Clean all metal parts with dry cleaning solvent.

**WARNING**

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment, goggles, shield, and gloves.

**d. Assembly.**

- (1) Lubricate bearing (1) with oil and install in valve body (2).
- (2) Install disk assembly (3) in bearing (1).
- (3) Install spring (4) on cap (5).
- (4) Install cap (5) on valve body (2).

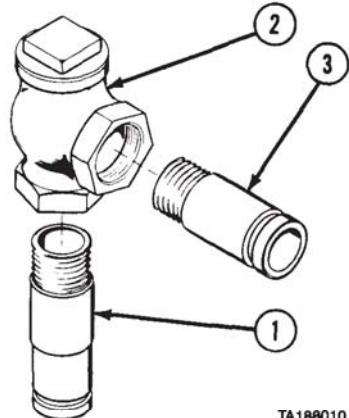


## M978 Tanker Maintenance Instructions (Cont)

*e. Installation***WARNING**

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

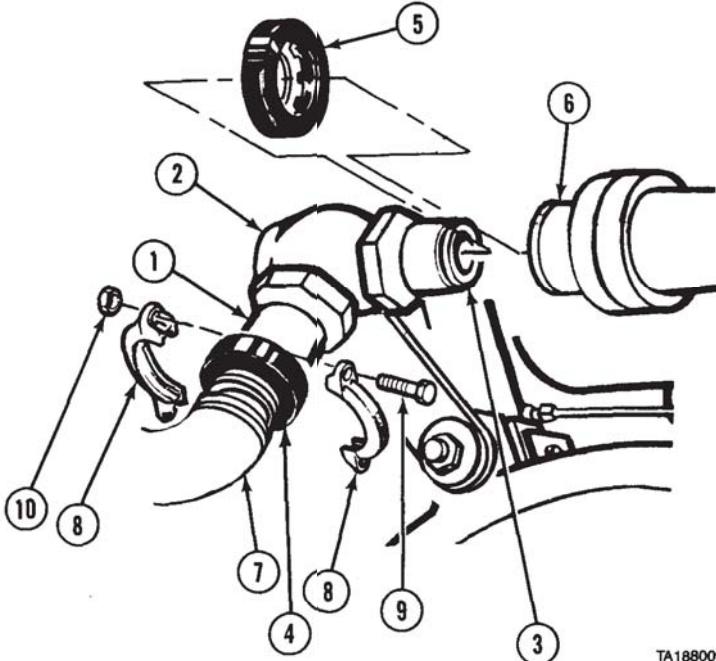
- (1) Apply pipe thread sealing compound to threads of pipe nipple (1) and install on V9 CHECK VALVE (2).
- (2) Apply pipe thread sealing compound to threads of pipe nipple (3) and install on V9 CHECK VALVE (2).



TA188010

**CAUTION**

- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
  - Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.
- (3) Install coupling gasket (4) on pipe nipple (1).
  - (4) Install coupling gasket (5) on end of eductor (6).
  - (5) Hold V9 CHECK VALVE (2) in place and position coupling gasket (5) over pipe nipple (3) and end of eductor (6).
  - (6) Hold V9 CHECK VALVE (2) in place and position coupling gasket (4) over pipe nipple (1) and pipe (7).
  - (7) Hold V9 CHECK VALVE (2) in place and install two coupling halves (8) with screws (9) and nuts (10).

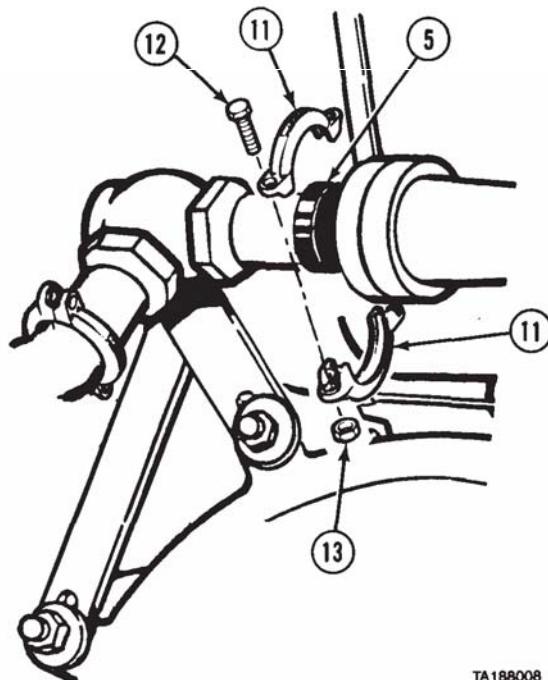


TA188009

## M978 Tanker Maintenance Instructions (Cont)

**25-23. V9 CHECK VALVE REMOVAL/REPAIR/INSTALLATION (CONT).**

- (8) Install two coupling halves (11) on coupling gasket (5) with screws (12) and nuts (13).



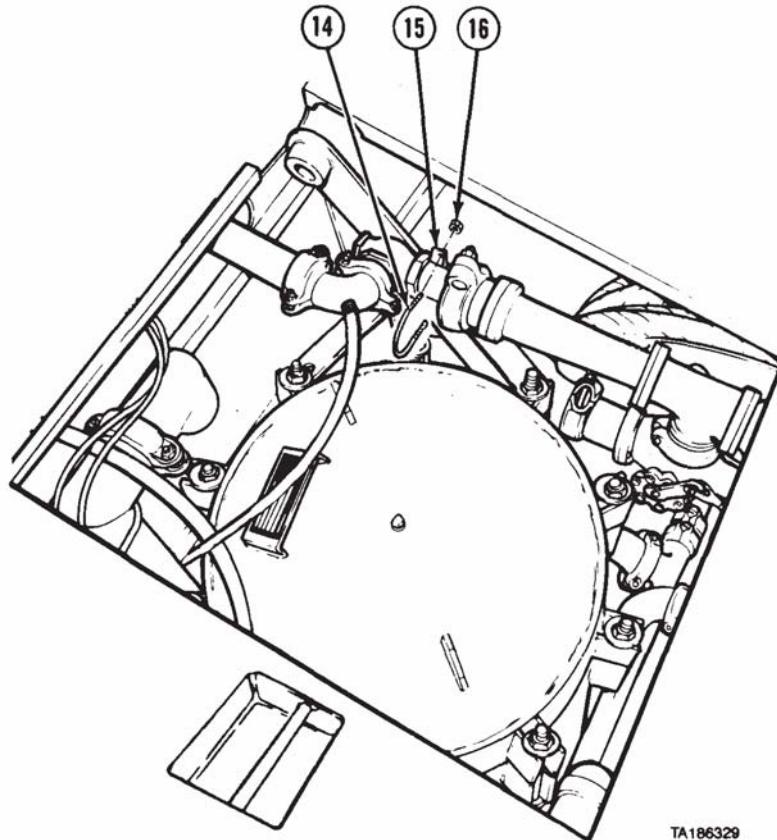
TA188008

- (9) Install U-bolt (14) in bracket (15) with two locknuts (16).

*f. Follow-on Maintenance.*

- (1) Recirculate fuel  
(TM 9-2320-279-10).
- (2) Check V9 CHECK VALVE for leaks.
- (3) Close pump module top access door  
(TM 9-2320-279-10).

END OF TASK



TA186329

## M978 Tanker Maintenance Instructions (Cont)

**25-24. V10 BOTTOM LOAD VALVE REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

M978

*Test Equipment*

None

*Special Tools*

None

*Supplies*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic (2)

*References*

FM 10-71

*Equipment Condition**TM or Para*

Para 25-3

Para 25-28

*Condition Description*

Tank drained.

V14 pilot valve assembly removed.

*Special Environmental Conditions*

None

*General Safety Instructions*

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle. Read and follow all safety precautions in TM 9-2320-279-10 and FM 10-71.

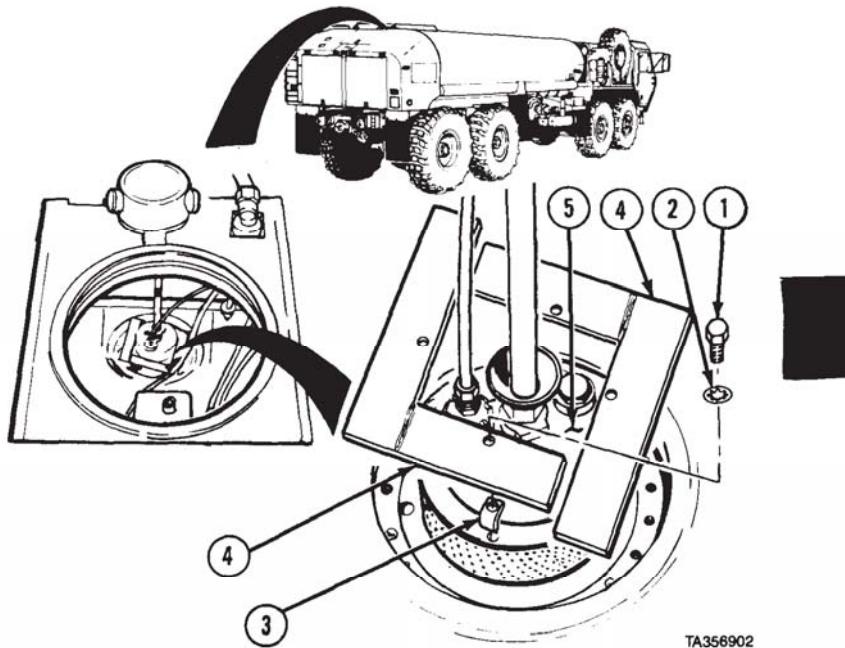
*a. Removal.***WARNING**

Before entering tank, be sure to read and follow all safety precautions in FM 10-71. Liquids and vapors carried in the M978 tanker are flammable and may cause injury or death.

**NOTE**

Soldier A works from inside tank. Soldier B works from under tank.

- (1) Remove four screws (1), lockwashers (2), retainers (3), and two deflection plates (4) from V10 bottom load valve (5).
- (2) Install four retainers (3) with four screws (1) and lockwashers (2).



## M978 Tanker Maintenance Instructions (Cont)

**25-24. V10 BOTTOM LOAD VALVE REMOVAL/INSTALLATION (CONT).****NOTE**

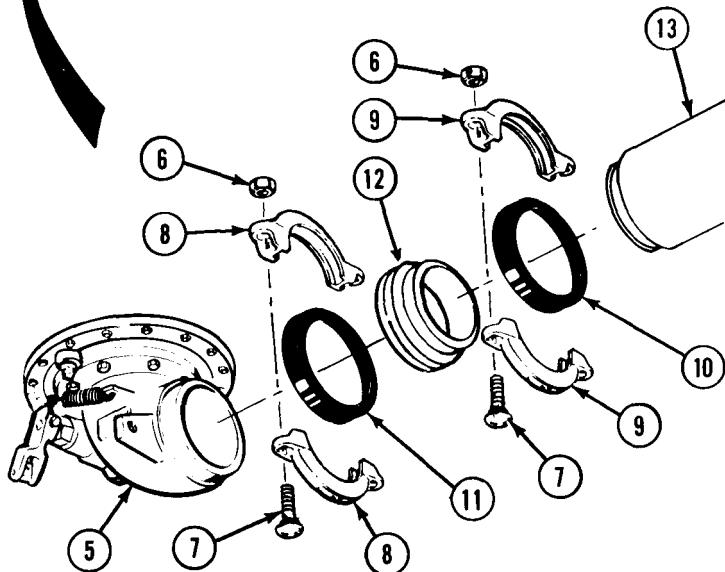
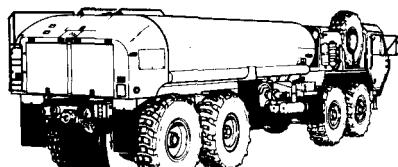
Mark position of V10 bottom load valve before removal.

- (3) Soldier B removes four nuts (6), screws (7), and coupling halves (8 and 9).

**WARNING**

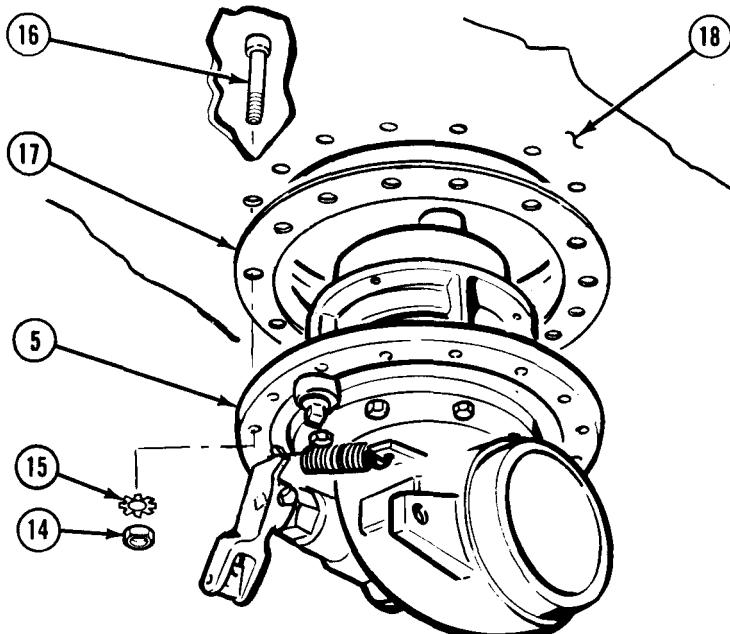
Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (4) Soldier B removes two coupling gaskets (10 and 11) and pipe (12) from V10 bottom load valve (5) and pipe (13).

**NOTE**

Remove screws and gasket only if damaged.

- (5) Soldier B removes 16 nuts (14) and lockwashers (15) while Soldier A removes screws (16).
- (6) Remove V10 bottom load valve (5) and gasket (17) from tank (18).



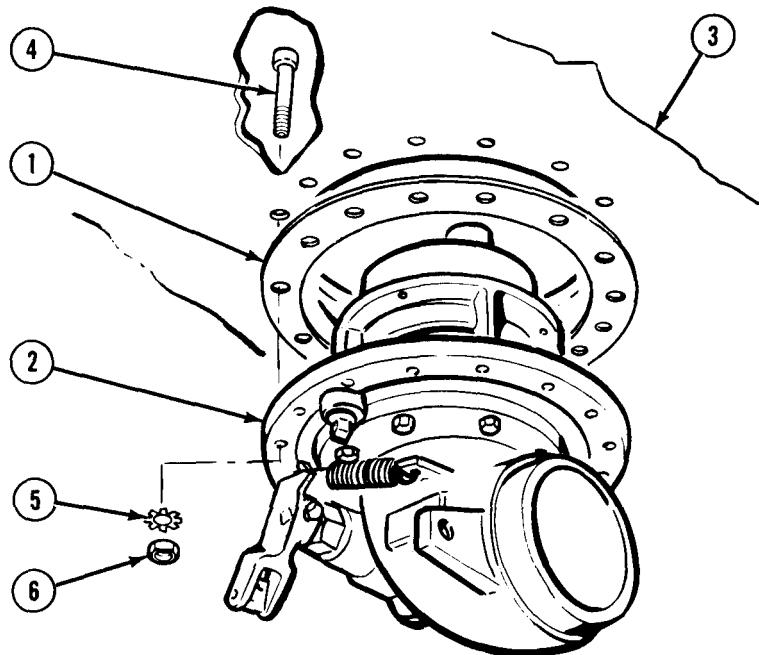
**M978 Tanker Maintenance Instructions (Cont)****b. Installation.****NOTE**

Perform step 1 if gasket was removed.

- (1) Install gasket (1) on V10 bottom load valve (2).

**WARNING**

Before entering tank, be sure to read and follow all safety precautions in FM 10-71. Liquids and vapors carried in the M978 tanker are flammable and may cause injury or death.

**NOTE**

Soldier A works from inside tank.  
Soldier B works from under tank.

- (2) Position V10 bottom load valve (2) on tank (3).

**NOTE**

Install screws only if removed.

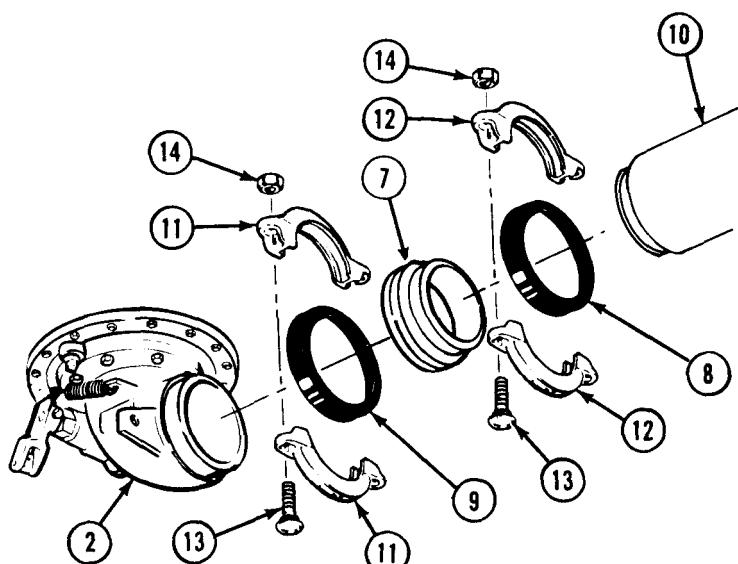
- (3) Soldier A installs 16 screws (4) while Soldier B installs 16 lockwashers (5) and nuts (6).

**CAUTION**

- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

- (4) Install pipe (7) and two coupling gaskets (8 and 9) on V10 bottom load valve (2) and pipe (10).

- (5) Install four coupling halves (11 and 12) with four screws (13) and nuts (14).



## M978 Tanker Maintenance Instructions (Cont)

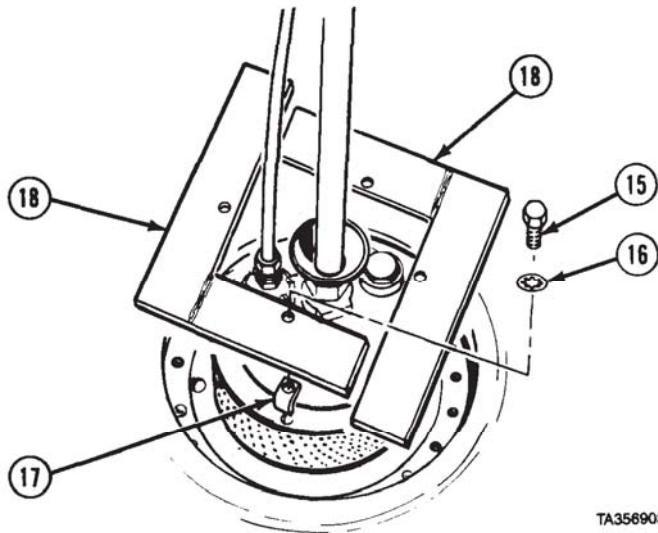
**25-24. V10 BOTTOM LOAD VALVE REMOVAL/INSTALLATION (CONT).**

- (6) Remove four screws (15) and lockwashers (16) from retainers (17).  
 (7) Install two deflection plates (18) with four screws (15) and lockwashers (16).

## c. Follow-on Maintenance.

- (1) Adjust V13 vent valve push rod (para 25-27).  
 (2) Install V14 pilot valve assembly (para 25-28).  
 (3) Perform bottom loading (TM 9-2320-279-10).  
 (4) Check V10 bottom load valve for leaks.

END OF TASK



TA356903

**25-25. V11 FLOW VALVE (REG) REMOVAL/INSTALLATION.**

This task covers:

- |                          |                 |
|--------------------------|-----------------|
| a. Removal               | b. Installation |
| c. Follow-on Maintenance |                 |

## INITIAL SETUP

*Models*

M978

*References*

None

*Test Equipment*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
Para 25-3	Tank drained.
TM 9-2320-279-10	Pump module rear access doors opened.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

None

*General Safety Instructions*

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

## M978 Tanker Maintenance Instructions (Cont)

**a. Removal.****NOTE**

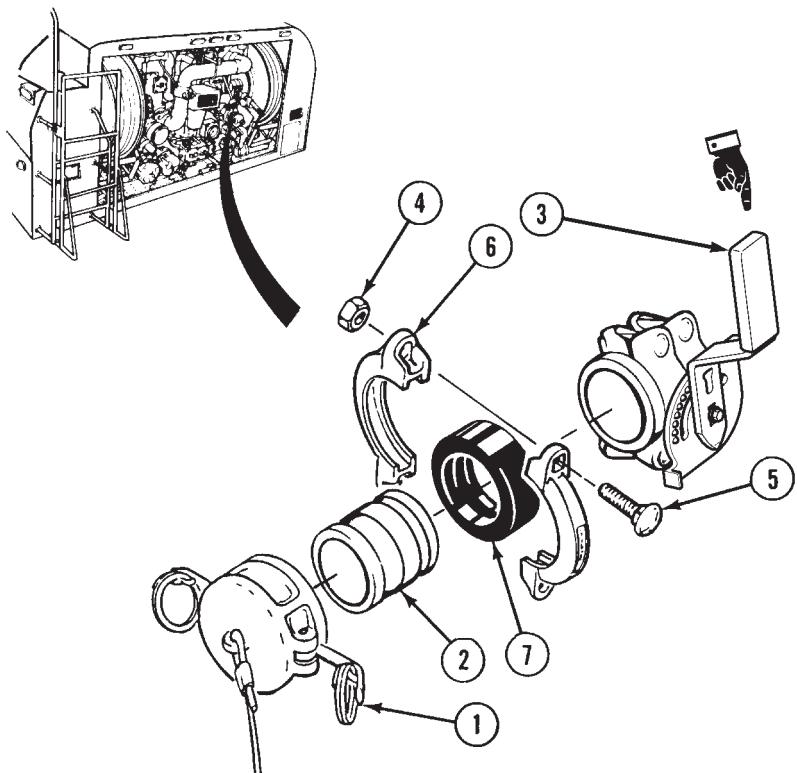
There are two types of handles. The newest type of handle is shown.

- (1) Remove dust cap (1) from adapter (2).

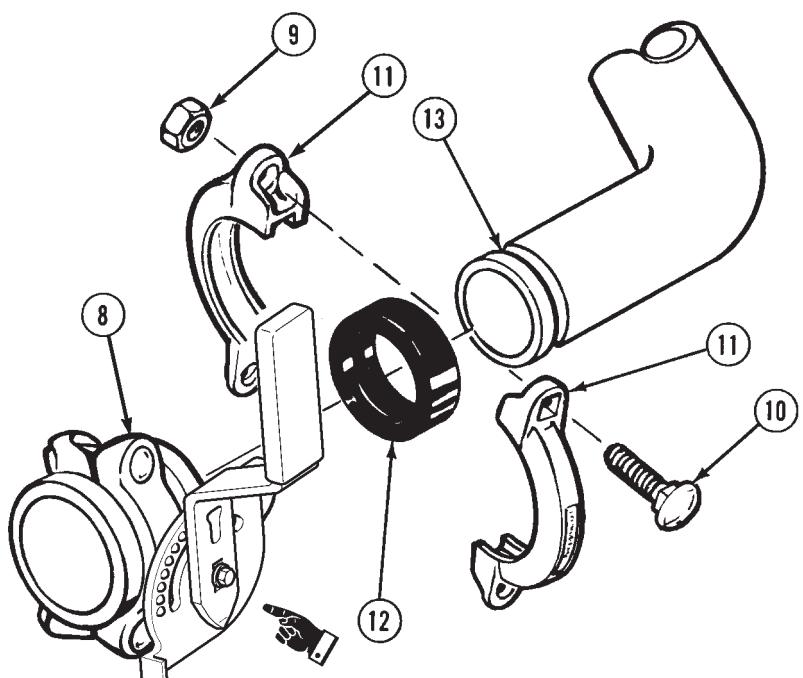
**WARNING**

To prevent fuel from coming in contact with eyes and skin, stand clear when opening valve. Fuel will drain when valve is opened. Contact with fuel can irritate eyes and skin.

- (2) Move valve handle (3) down to open position.
- (3) Move handle (3) up to close position after draining fuel.
- (4) Hold adapter (2) in place and remove two nuts (4), screws (5), and coupling halves (6).
- (5) Remove adapter (2) and coupling gasket (7).



- (6) Hold V11 FLOW VALVE (REG) (8) in place and remove two nuts (9), screws (10), and coupling halves (11) from coupling gasket (12).
- (7) Remove V11 FLOW VALVE (REG) (8) and coupling gasket (12) from pipe (13).



## M978 Tanker Maintenance Instructions (Cont)

## 25-25. V11 FLOW VALVE (REG) REMOVAL/INSTALLATION (CONT).

## b. Installation.

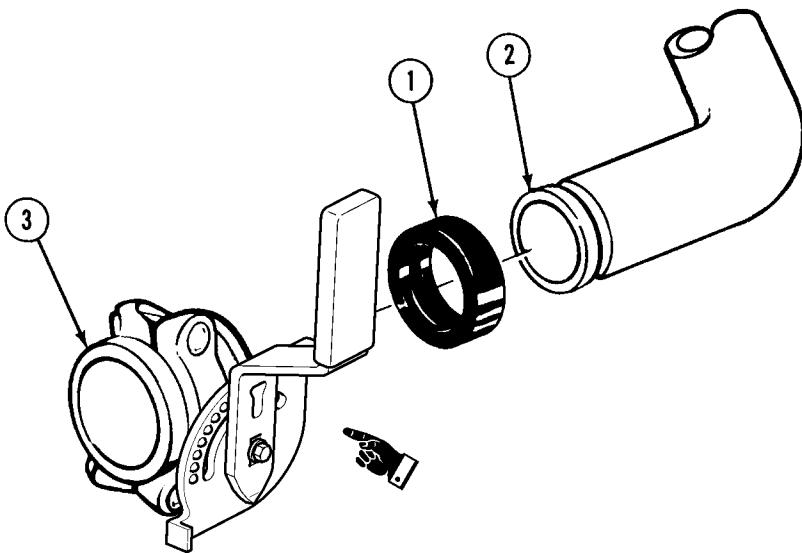
CAUTION

Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.

NOTE

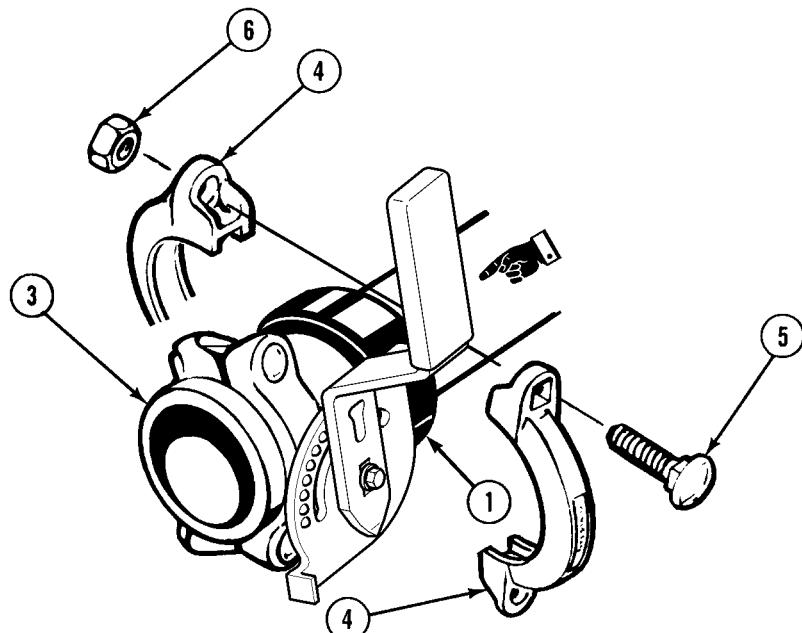
There are two types of handles. The newest type of handle is shown.

- (1) Install coupling gasket (1) on pipe (2).
- (2) Position V11 FLOW VALVE (REG) (3) against pipe (2) and install coupling gasket (1) over ends of valve and pipe.

CAUTION

Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

- (3) Hold V11 FLOW VALVE (REG) (3) in place and install two coupling halves (4) on coupling gasket (1) with two screws (5) and nuts (6).

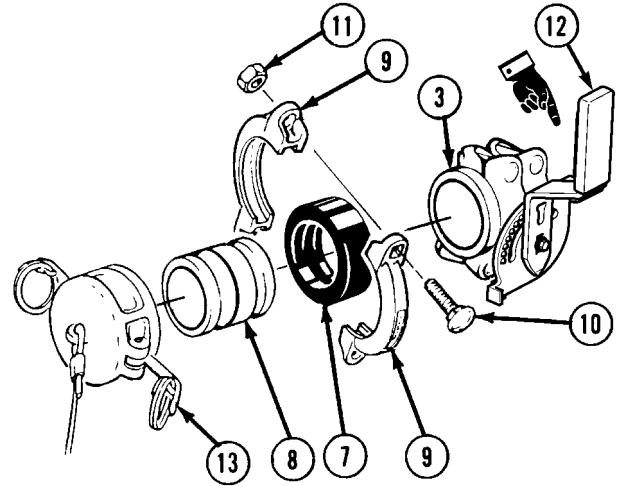


## M978 Tanker Maintenance Instructions (Cont)

CAUTION

Do not tear or otherwise damage coupling gasket during installation. If coupling gaskets are damaged, piping connections will leak.

- (4) Install coupling gasket (7) on V11 FLOW VALVE (REG) (3).
  - (5) Position adapter (8) against V11 FLOW VALVE (REG) (3) and install coupling gasket (7) over ends of valve and adapter
  - (6) Hold adapter (8) in place and install two coupling halves (9) with screws (10) and nuts (11).
  - (7) Make sure valve handle (12) is set to closed position.
  - (8) Install dust cap (13).
- c. Follow-on Maintenance.
- (1) Perform filtered bulk unloading (TM 9-2320-279-10).
  - (2) Check V11 FLOW VALVE (REG) for leaks.
  - (3) Close pump module rear access doors (TM 9-2320-279-10).



END OF TASK

## 25-26. V12 BOTTOM LOAD PRECHECK VALVE REMOVAL/INSTALLATION.

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

## INITIAL SETUP

## Models

M978

## References

None

## Test Equipment

None

## Equipment Condition

TM or Para

## Condition Description

TM 9-2320-279-10 Pump module rear access doors opened.

## Special Tools

None

## Special Environmental Conditions

None

## Supplies

Compound, sealing, pipe thread, Item 18,  
Appendix C

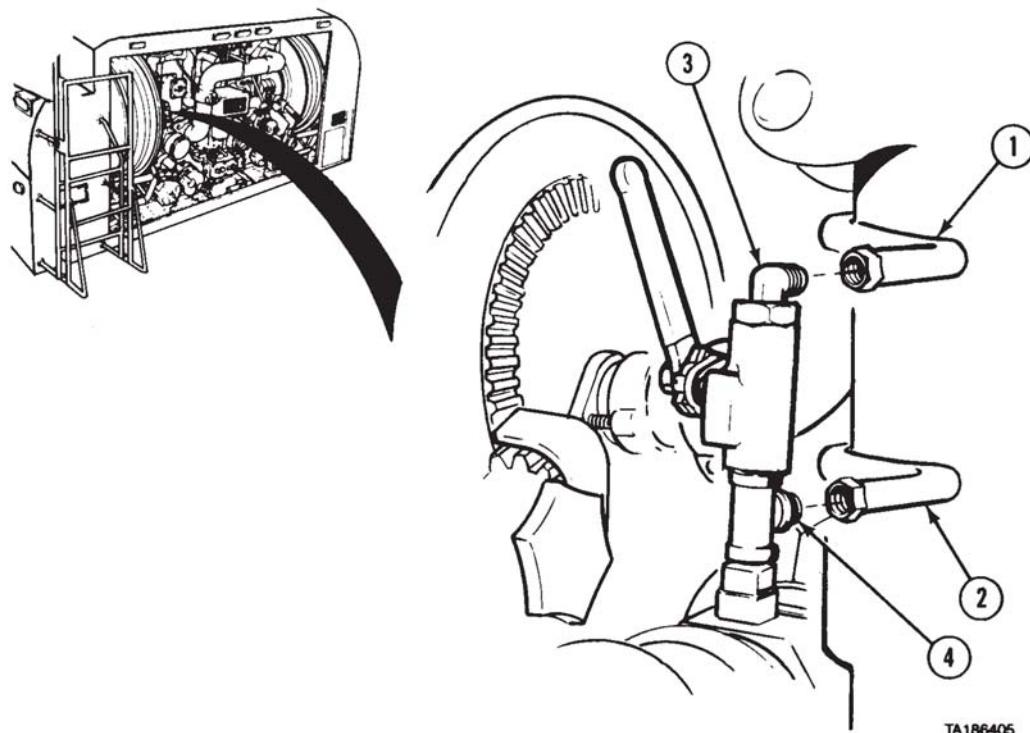
## General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

## Personnel Required

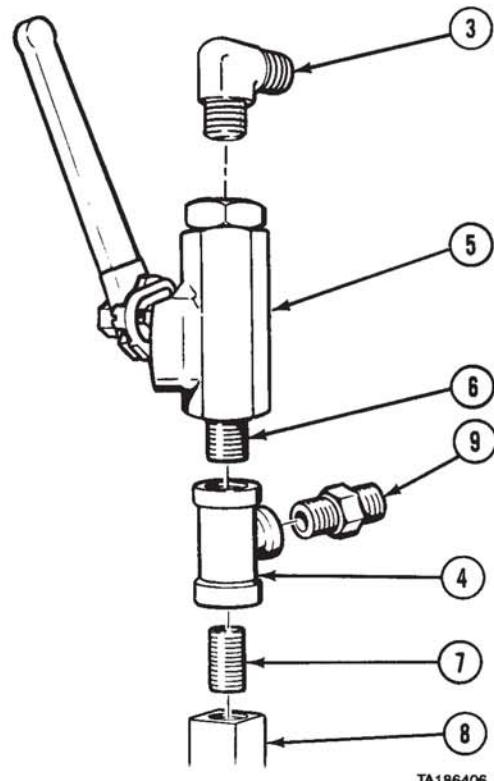
MOS 63S, Heavy wheel vehicle mechanic

## M978 Tanker Maintenance Instructions (Cont)

**25-26. V12 BOTTOM LOAD PRECHECK VALVE REMOVAL/INSTALLATION (CONT).***a. Removal.***NOTE****Tag and mark tubes and fittings before removal.****(1) Remove two tubes (1 and 2) from elbow (3) and tee (4).**

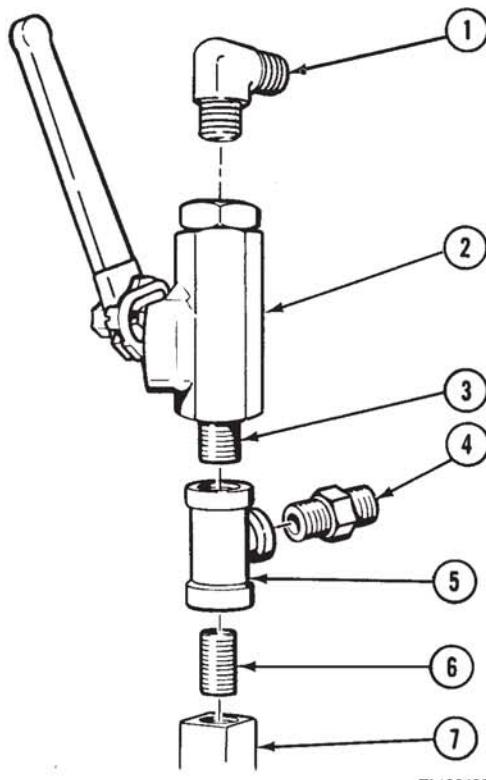
## M978 Tanker Maintenance Instructions (Cont)

- (2) Remove V12 bottom load PRECHECK VALVE (5) and pipe nipple (6).
- (3) Remove tee (4) and pipe nipple (7) from V2 bottom load adapter (8).
- (4) Remove adapter (9) from tee (4).
- (5) Remove elbow (3) and pipe nipple (6) from V12 bottom load PRECHECK VALVE (5).

**b. Installation.****WARNING**

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

- (1) Coat threads of elbow (1) with pipe thread sealing compound and install in V12 bottom load PRECHECK VALVE (2).
- (2) Coat threads of pipe nipple (3) with pipe thread sealing compound and install in V12 bottom load PRECHECK VALVE (2).
- (3) Install adapter (4) in tee (5).
- (4) Coat threads of pipe nipple (6) with pipe thread sealing compound and install pipe nipple and tee (5) in V2 bottom load adapter (7).
- (5) Coat threads of pipe nipple (3) with pipe thread sealing compound and install in tee (5).

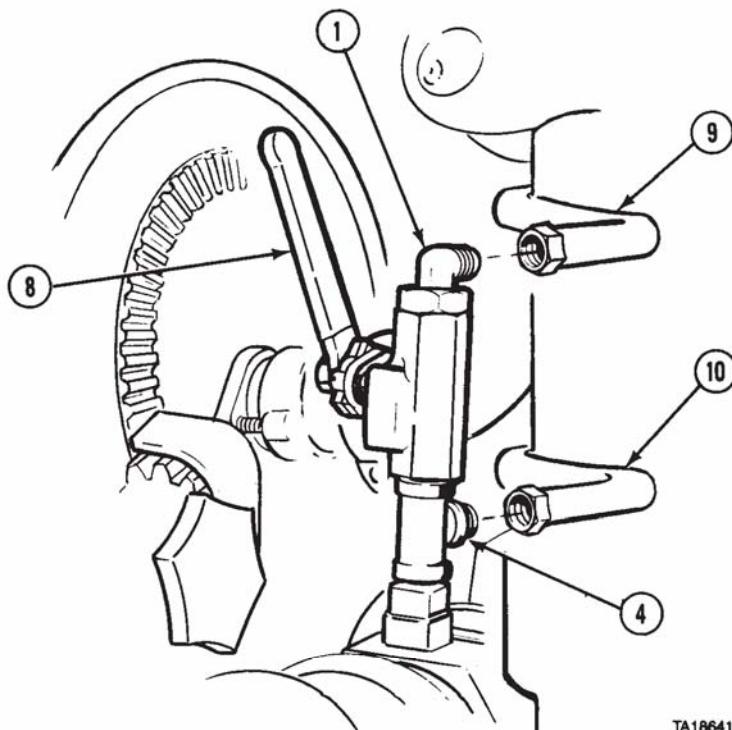


## M978 Tanker Maintenance Instructions (Cont)

**25-26. V12 BOTTOM LOAD PRECHECK VALVE REMOVAL/INSTALLATION (CONT).**

- (6) Move handle (8) to down position.  
 (7) Install two tubes (9 and 10) on elbow (1) and adapter (4).  
 c. Follow-on Maintenance.  
 (1) Perform bottom loading (TM 9-2320-279-10).  
 (2) Check V12 bottom load PRECHECK VALVE for leaks.  
 (3) Close pump module rear access doors (TM 9-2320-279-10).

END OF TASK



TA186410

**25-27. V13 VENT VALVE AND PUSH ROD REMOVAL/INSTALLATION/ADJUSTMENT.**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Push Rod Adjustment   |
| b. Installation | d. Follow-on Maintenance |

## INITIAL SETUP

*Models*

M978

*Test Equipment*

None

*Special Tools*

None

*Supplies*

Adhesive-sealant, silicone, Item 4, Appendix C

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*References*

FM 10-71

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
Para 25-3	Tank drained.
Para 16-49	Tank filler lid removed.

*Special Environmental Conditions*

None

*General Safety Instructions*

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle. Read and follow all safety precautions in TM 9-2320-279-10 and FM 10-71.

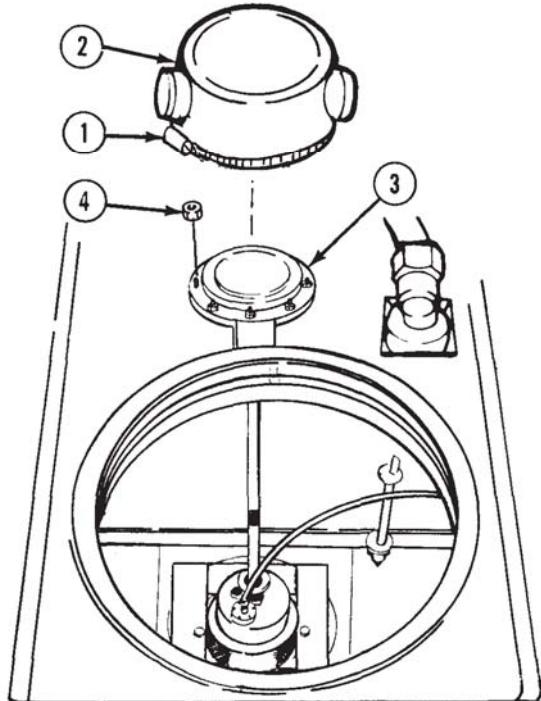
## M978 Tanker Maintenance Instructions (Cont)

*a. Removal.*

## NOTE

Mark position of vent cover.

- (1) Loosen clamp (1) and remove vent cover (2) from V13 vent valve (3).
- (2) Remove eight nuts (4) from V13 vent valve (3).

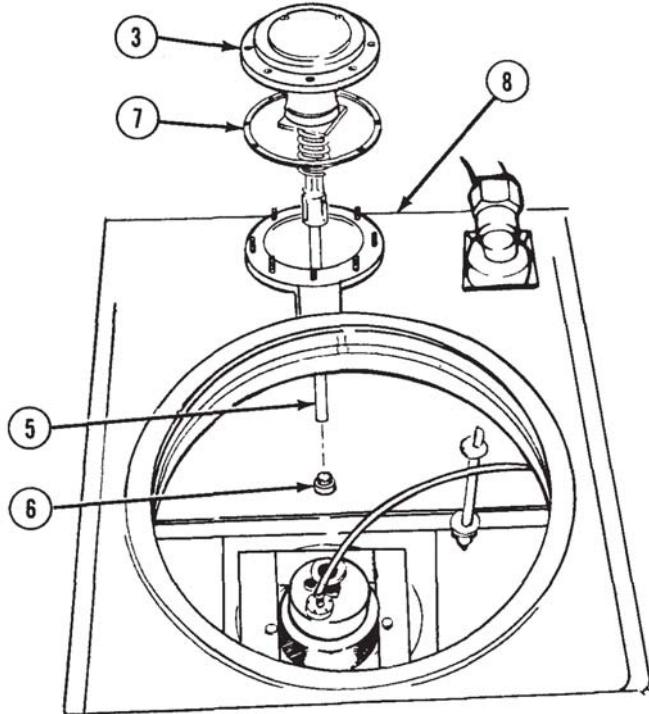


TA186371

## NOTE

Mark position of V13 vent valve.

- (3) Remove push rod (5) and plug (6) from V13 vent valve (3).
- (4) Remove V13 vent valve (3) and gasket (7) from tank (8).

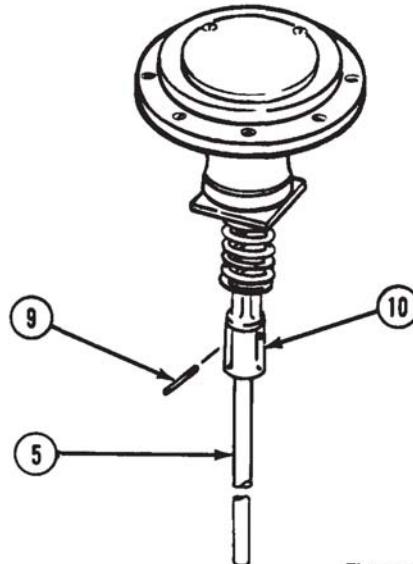


TA186373

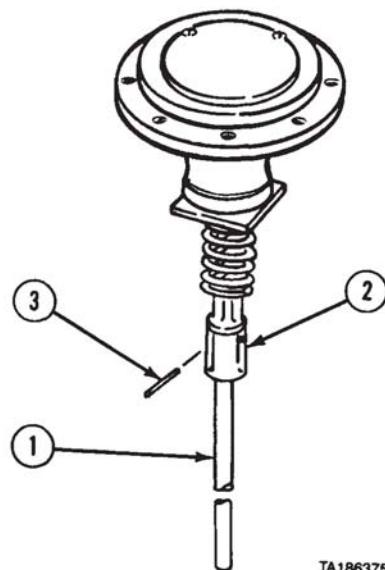
## M978 Tanker Maintenance Instructions (Cont)

**25-27. V13 VENT VALVE AND PUSH ROD REMOVAL/INSTALLATION/ADJUSTMENT (CONT).**

- (5) Remove pin (9) from socket (10).  
(6) Remove push rod (5) from socket (10).

**b. Installation.**

- (1) Install push rod (1) in socket (2).  
(2) Install pin (3) in socket (2).

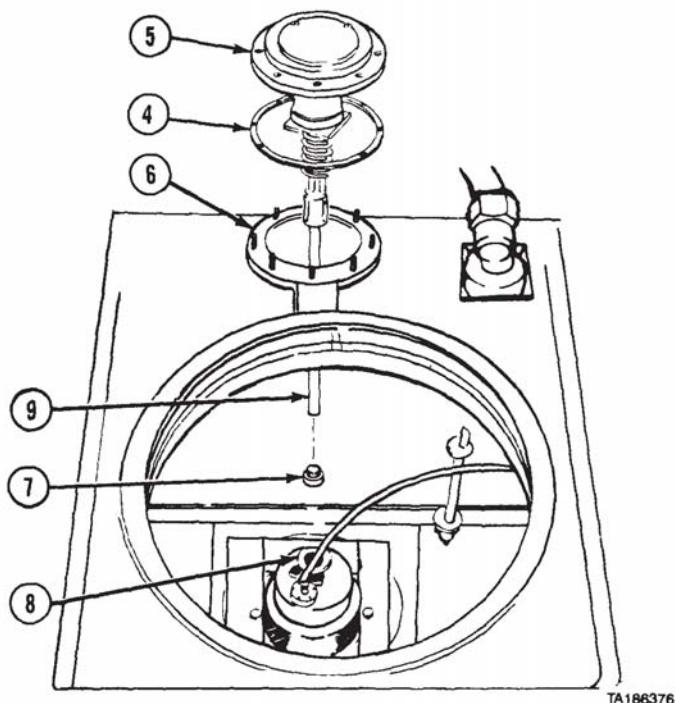


## M978 Tanker Maintenance Instructions (Cont)

**WARNING**

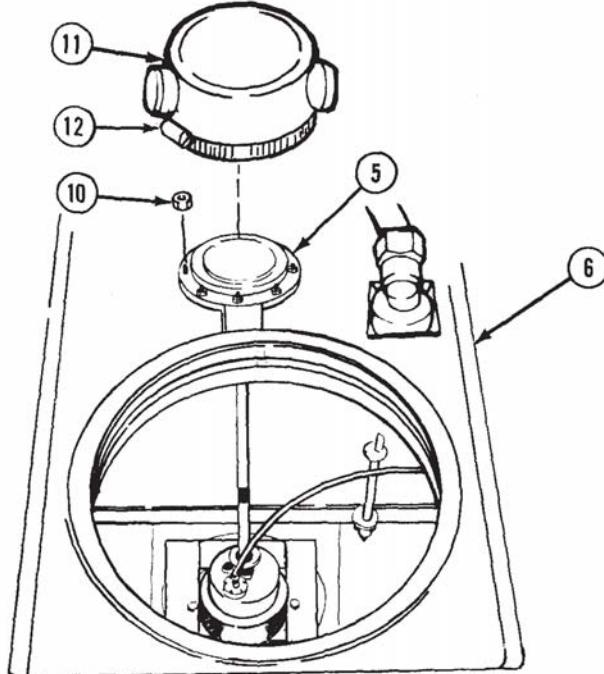
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (9) Coat gasket (4) with silicone adhesive-sealant and position with V13 vent valve (5) on tank (6).
- (4) Install plug (7) in valve (8) with large end down.
- (5) Pull up push rod (9) and position in valve (8).



TA186376

- (6) Install V13 vent valve (5) on tank (6) with eight nuts (10).
- (7) Install vent cover (11) on V13 vent valve (5) and tighten clamp (12).



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## M978 Tanker Maintenance Instructions (Cont)

**25-27. V13 VENT VALVE AND PUSH ROD REMOVAL/INSTALLATION/ADJUSTMENT (CONT).****c. Push Rod Adjustment.**

- (1) Move push rod (1) up and down.  
Measure movement on pin (2).  
Movement must be  $1/16$  to  $1/8$  in. (2 to 3 mm).
- (2) Loosen jamnut (3).

## NOTE

Plug-in valve may come out with push rod.

- (3) Pull up and remove push rod (1) from valve (4).

## NOTE

One turn of push rod is  $1/16$  in. (2 mm).

- (4) Turn push rod (1) clockwise to decrease measurement, or counterclockwise to increase measurement.

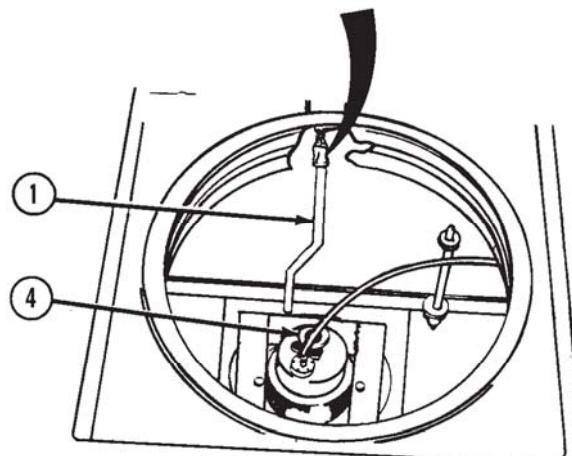
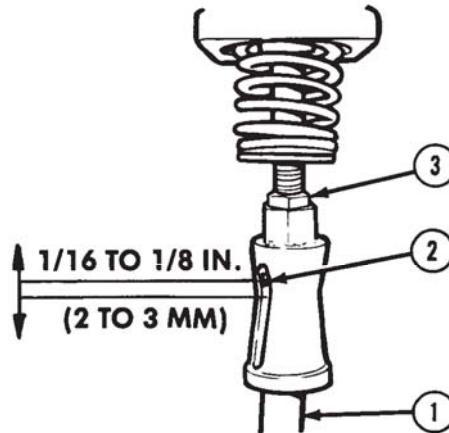
## NOTE

Make sure push rod seats firmly on plug-in valve.

- (5) Install push rod (1) in valve (4). Repeat step (1).
- (6) Tighten jamnut (3) when adjustment is finished.

**d. Follow-on Maintenance.**

- (1) Perform bottom loading (TM 9-2320-279-10).
- (2) Check V13 vent valve for proper operation (air should escape while bottom loading).
- (3) Install tank filler lid (para 16-49).



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END OF TASK

## M978 Tanker Maintenance Instructions (Cont)

**25-28. VI4 PILOT VALVE ASSEMBLY REMOVAL/INSTALLATION.**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

**INITIAL SETUP**

*Models*  
M978

*References*  
FM 10-71

*Test Equipment*  
None

*Equipment Condition*  
*TM or Para*      *Condition Description*  
Para 25-3      Tank drained.  
Para 16-49      Tank filler lid removed.

*Special Tools*  
None

*Special Environmental Conditions*  
None

*Supplies*  
Compound, sealing, pipe thread, Item 18,  
Appendix C

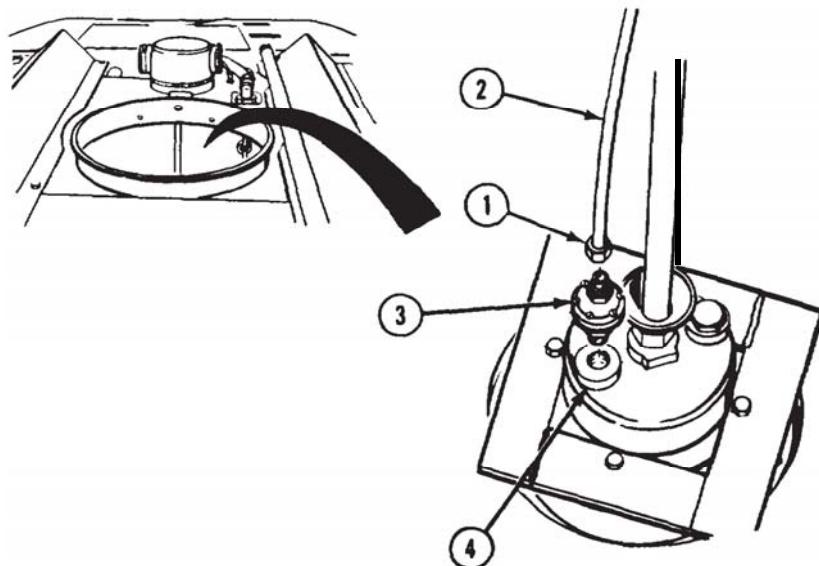
*General Safety Instructions*  
No smoking, flame, sparks, and hot or glowing  
objects within 50 ft (15 m) of vehicle. Read and  
follow all safety precautions in  
TM 9-2320-279-10 and FM 10-71.

*Personnel Required*  
MOS 63S, Heavy wheel vehicle mechanic

**a. Removal.****WARNING**

Before entering tank, be sure to read and follow all safety precautions in FM 10-71. Liquids and vapors carried in the M978 tanker are flammable and may cause injury or death.

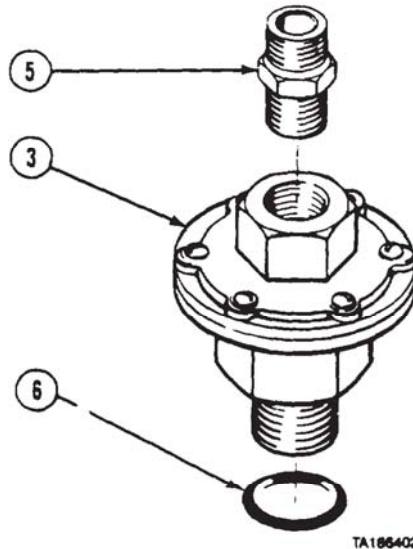
- (1) Loosen nut (1) and disconnect tube (2).
- (2) Remove V14 pilot valve (3) from VI0 bottom load valve (4).



## M978 Tanker Maintenance Instructions (Cont)

**25-28. V14 PILOT VALVE ASSEMBLY REMOVAL/INSTALLATION (CONT).**

- (3) Remove fitting (5) from V14 pilot valve assembly (3)  
 (4) Remove preformed packing (6).

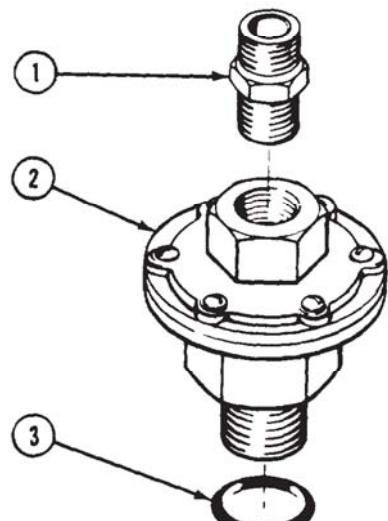


TA186402

*b. Installation.***WARNING**

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

- (1) Apply pipe thread sealing compound to threads of fitting (1) and install in V14 pilot valve assembly (2).  
 (2) Install preformed packing (3).



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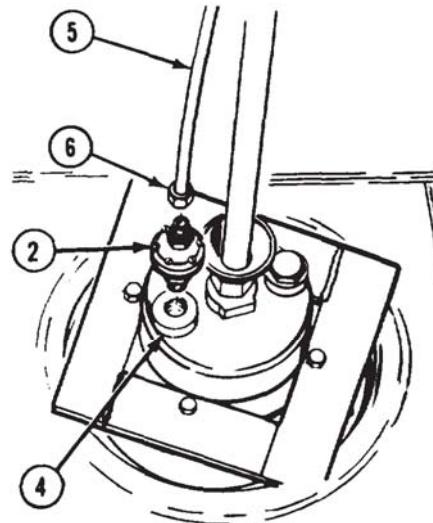
**M978 Tanker Maintenance Instructions (Cont)****WARNING**

Before entering tank, be sure to read and follow all safety precautions in FM 10-71. Liquids and vapors in the M978 tanker are flammable and may cause injury or death.

- (3) Install V14 pilot valve assembly (2) in V10 bottom load valve (4).
- (4) Connect tube (5) and tighten nut (6).

**c. Follow-on Maintenance.**

- (1) Prepare tanker for operation (TM 9-2320-279-10).
- (2) Perform bottom loading (TM 9-2320-279-10).
- (3) Check that fuel flow stops when V12 bottom load PRECHECK VALVE is open and continues when valve is closed (TM 9-2320-279-10).
- (4) Install tank filler lid (para 16-49).

**END OF TASK****25-29. V16 AUXILIARY PUMP CHECK VALVE REMOVAL/REPAIR/INSTALLATION.**

This task covers:

- |                        |                          |
|------------------------|--------------------------|
| a. Removal             | d. Assembly              |
| b. Disassembly         | e. Installation          |
| c. Cleaning/Inspection | f. Follow-on Maintenance |

**INITIAL SETUP**

*Models*  
M978

*References*  
None

*Test Equipment*  
None

*Equipment Condition*  
*TM or Para* Condition Description  
Para 16-48 Pump module left side access panel removed.

*Special Tools*  
None

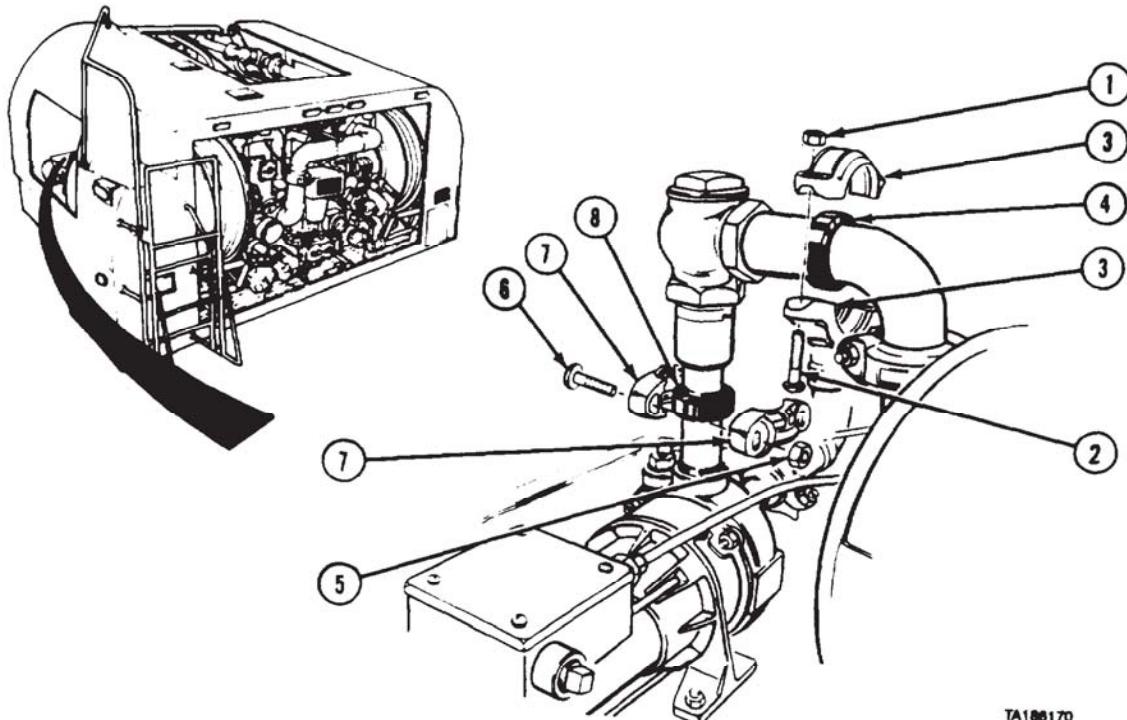
*Special Environmental Conditions*  
None

*Supplies*  
Compound, sealing, pipe thread, Item 18, Appendix C  
Oil, lubricating, Item 32, Appendix C  
Solvent, drycleaning, Item 47, Appendix C

*General Safety Instructions*  
No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

*Personnel Required*  
MOS 63S, Heavy wheel vehicle mechanic

## M978 Tanker Maintenance Instructions (Cont)

**25-29. V16 AUXILIARY PUMP CHECK VALVE REMOVAL/REPAIR/INSTALLATION (CONT.).***a. Removal.*

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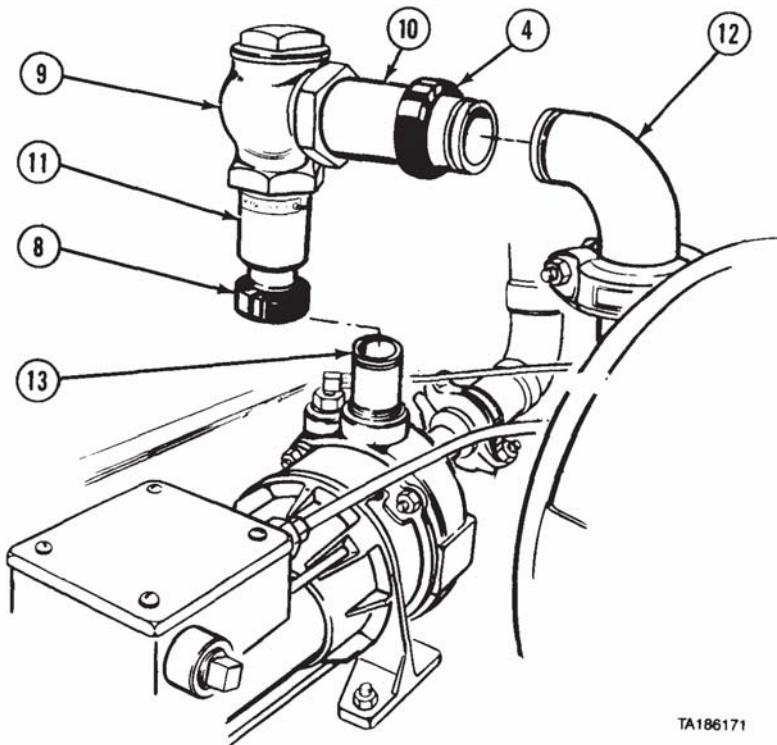
**WARNING**

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (1) Remove two nuts (1), screws (2), and coupling halves (3) from coupling gasket (4).
- (2) Remove two nuts (5), screws (6) and coupling halves (7) from coupling gasket (8).

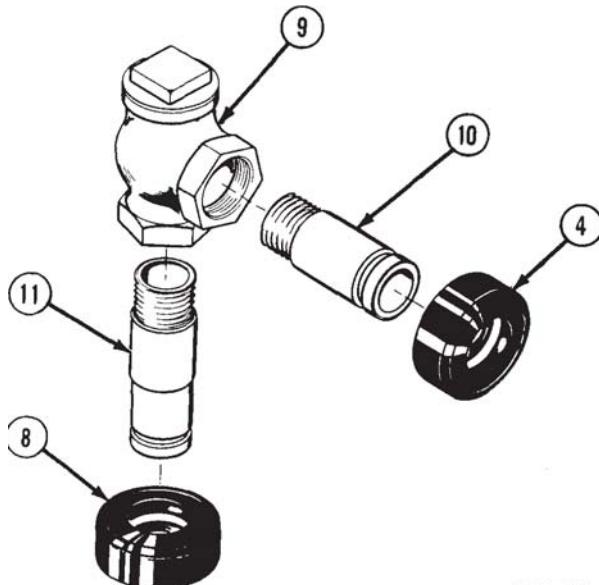
## M978 Tanker Maintenance Instructions (Cont)

- (3) Hold V16 AUXILIARY PUMP CHECK VALVE (9) in place and push coupling gasket (4) onto pipe nipple (10).
- (4) Hold V16 AUXILIARY PUMP CHECK VALVE (9) in place and push coupling gasket (8) onto pipe adapter (11).
- (5) Remove V16 AUXILIARY PUMP CHECK VALVE (9) from elbow (12) and pipe (13).



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- (6) Remove two coupling gaskets (4 and 8).
- (7) Remove pipe nipple (10) and pipe adapter (11) from V16 AUXILIARY PUMP CHECK VALVE (9).



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## M978 Tanker Maintenance Instructions (Cont)

**25-29. V16 AUXILIARY PUMP CHECK VALVE REMOVAL/REPAIR/INSTALLATION (CONT).****b. Disassembly.**

- (1) Remove cap (1) and spring (2) from valve body (3).
- (2) Remove spring (2) from cap (1).
- (3) Remove disk assembly (4) from bearing (5).
- (4) Remove bearing (5) from valve body (3).

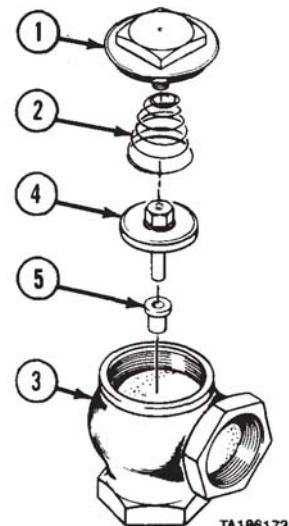
**c. Cleaning/Inspection.****WARNING**

- Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.
- Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment, goggles, shield, and gloves.

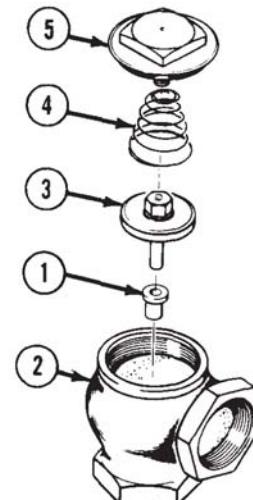
- (1) Clean all metal parts with dry cleaning solvent.
- (2) Dry metal parts with compressed air.
- (3) Inspect all metal parts for bends, breaks, cracks, and sharp edges.
- (4) Inspect spring for cracks and distortion.
- (5) Replace damaged parts.

**d. Assembly.**

- (1) Lubricate bearing (1) with oil and install in valve body (2).
- (2) Install disk assembly (3) in bearing (1).
- (3) Install spring (4) on cap (5).
- (4) Install cap (5) on valve body (2).



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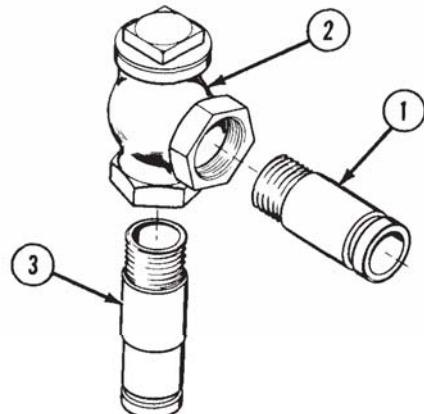
TA186174

## M978 Tanker Maintenance Instructions (Cont)

*e. Installation.***WARNING**

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

- (1) Coat threads of pipe nipple (1) with pipe thread sealing compound and install on V16 AUXILIARY PUMP CHECK VALVE (2).
- (2) Coat threads of pipe adapter (3) with pipe thread sealing compound and install on V16 AUXILIARY PUMP CHECK VALVE (2).

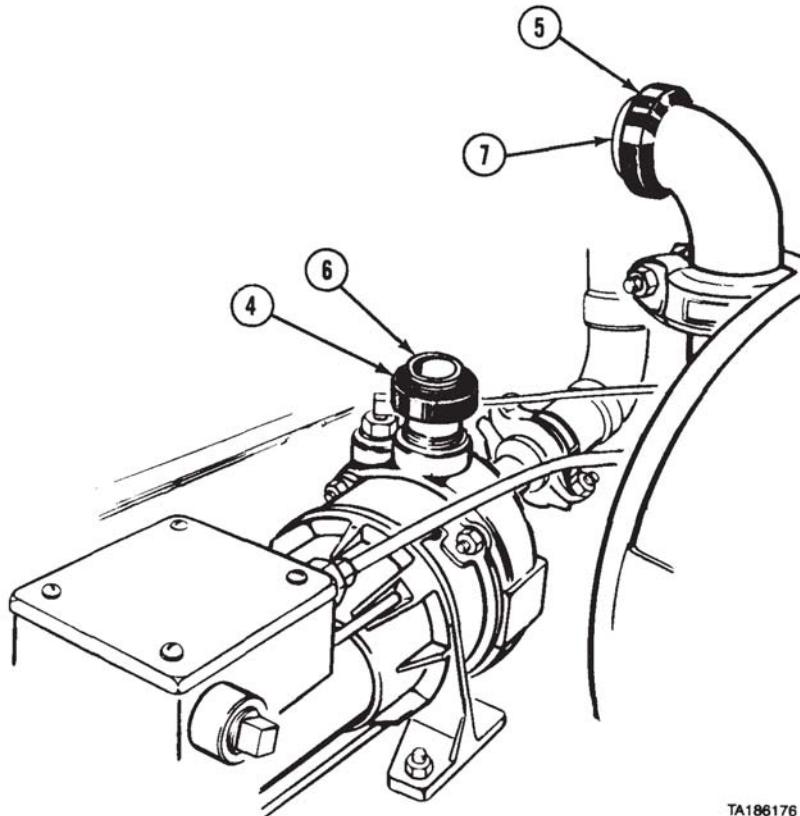


TA186175

**CAUTION**

Do not tear or otherwise damage coupling gasket during installation. If coupling gaskets are damaged, piping connections will leak.

- (3) Install two coupling gaskets (4 and 5) on pipe (6) and elbow (7).

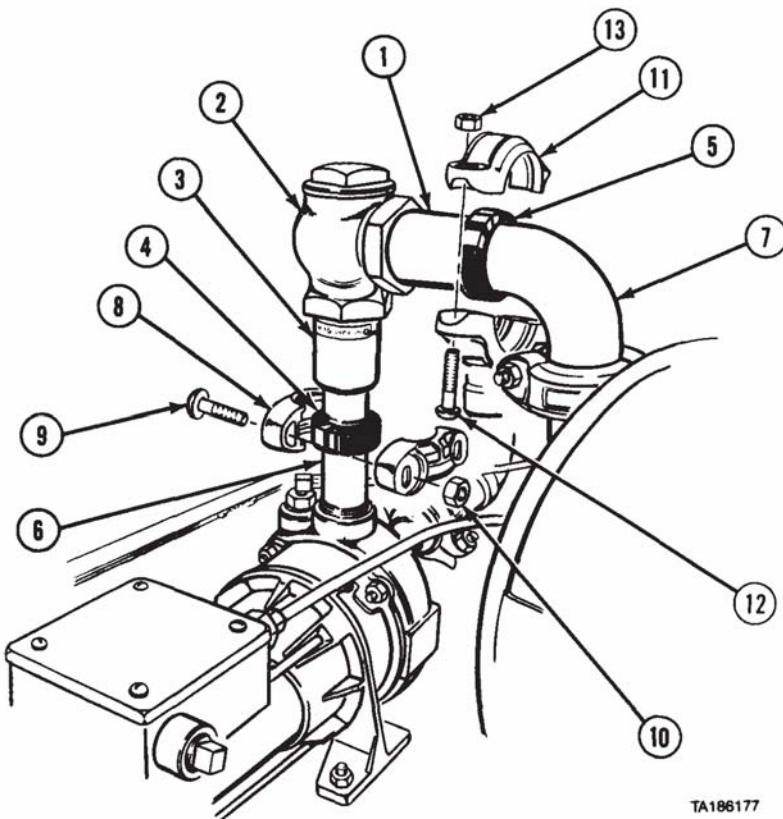


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## M978 Tanker Maintenance Instructions (Cont)

**25-29. V16 AUXILIARY PUMP CHECK VALVE REMOVAL/REPAIR/INSTALLATION (CONT.)**

- (4) Hold V16 AUXILIARY PUMP CHECK VALVE (2) in place and position coupling gasket (4) over connection of pipe adapter (3) and pipe (6).
- (5) Install two coupling halves (8) on coupling gasket (4) with two screws (9) and nuts (10).
- (6) Position coupling gasket (5) over connection of pipe nipple (1) and elbow (7).
- (7) Install two coupling halves (11) on coupling gasket (5) with two screws (12) and nuts (13).
- f. Follow-on Maintenance.
  - (1) Recirculate fuel (TM 9-2320-279-10).
  - (2) Perform fuel servicing using auxiliary pump (TM 9-2320-279-10).
  - (3) Check V16 AUXILIARY PUMP CHECK VALVE for leaks.
  - (4) Install pump module left side access panel (para 16-48).



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END OF TASK

## M978 Tanker Maintenance Instructions (Cont)

**25-30. V17 GRAVITY VALVE REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

M978

*References*

None

*Test Equipment*

None

*Equipment Condition*

TM or Para

Condition Description

Para 25-3

Tank drained.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

None

*General Safety Instructions*

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

## M978 Tanker Maintenance Instructions (Cont)

## 25-30. V17 GRAVITY VALVE REMOVAL/INSTALLATION (CONT).

## a. Removal.

## NOTE

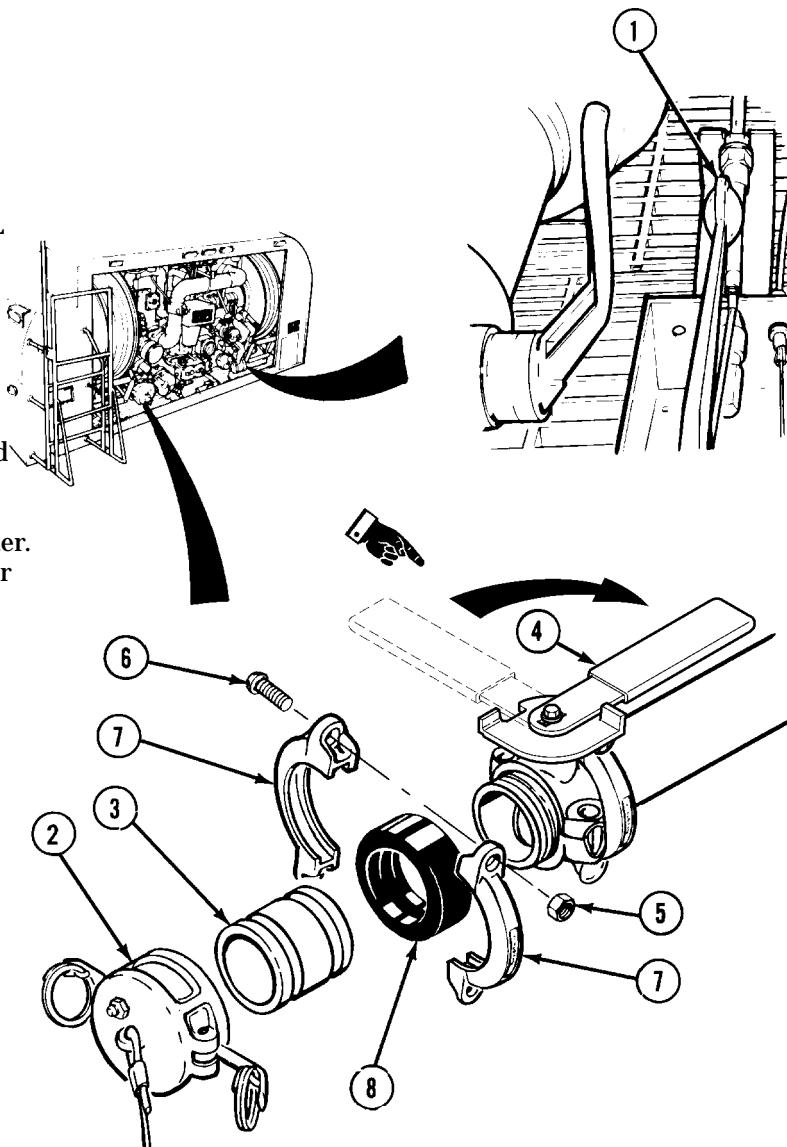
There are two types of handles. The newest type of handle is shown.

- (1) Push MC MANUAL CONTROL EM VALVE lever (1) full forward and down in closed position.

WARNING

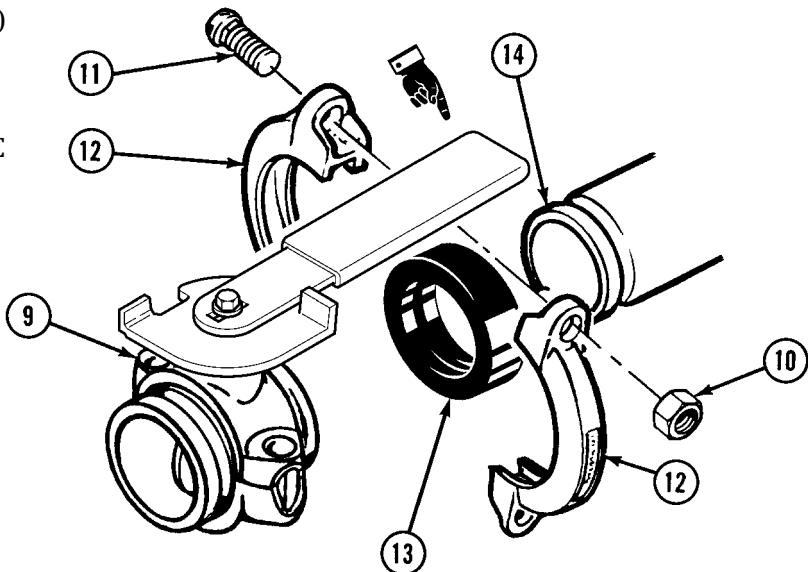
Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (2) Remove dust cap (2) from adapter (3).  
 (3) Move handle (4) to OPEN position.  
 (4) When fuel stops draining, close handle (4), hold adapter (3) in place, and remove two nuts (5), screws (6), and coupling halves (7).  
 (5) Remove adapter (3).  
 (6) Remove coupling gasket (8).



## M978 Tanker Maintenance Instructions (Cont)

- (7) Hold V17 GRAVITY VALVE (9) in place and remove two nuts (10), screws (11), and coupling halves (12).
- (8) Remove V17 GRAVITY VALVE (9) and coupling gasket (13) from pipe (14).



## b. Installation.

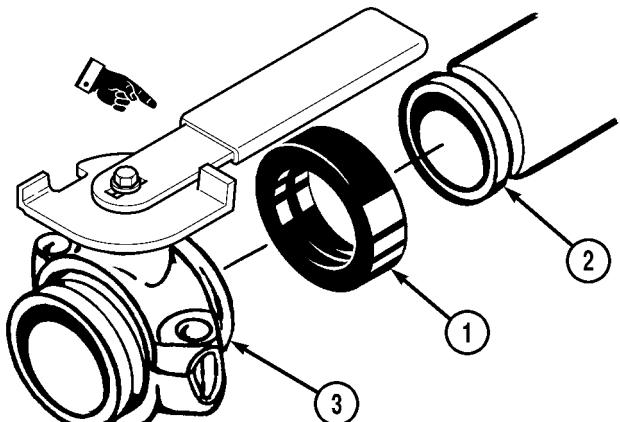
**NOTE**

There are two types of handles. The newest type of handle is shown.

- (1) Install coupling gasket (1) on pipe (2).
- (2) Position V17 GRAVITY VALVE (3) on pipe (2).

**CAUTION**

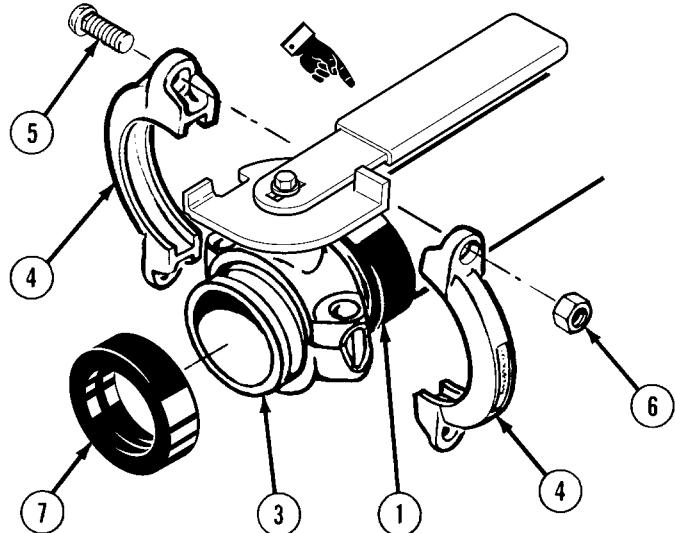
- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
  - Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.
- (3) Hold V17 GRAVITY VALVE (3) in place and position coupling gasket (1) over connection of valve and pipe (2).



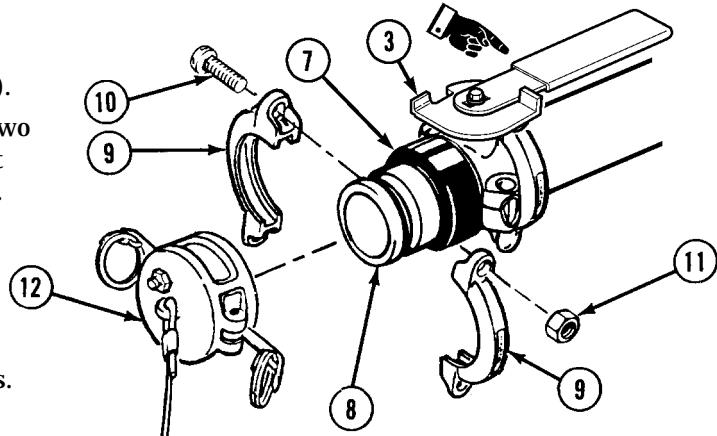
## M978 Tanker Maintenance Instructions (Cont)

## 25-30. V17 GRAVITY VALVE REMOVAL/INSTALLATION (CONT).

- (4) Hold V17 GRAVITY VALVE (3) in place and install two coupling halves (4) on coupling gasket (1) with two screws (5) and nuts (6).
- (5) Install coupling gasket (7) on V17 GRAVITY VALVE (3).



- (6) Hold adapter (8) in place and position coupling gasket (7) on connection of adapter and V17 GRAVITY VALVE (3).
- (7) Hold adapter (8) in place and install two coupling halves (9) on coupling gasket (7) with two screws (10) and nuts (11).
- (8) Install dust cap (12) on adapter (8).
- c. Follow-on Maintenance.
  - (1) Perform unfiltered gravity bulk unloading (TM 9-2320-279-10).
  - (2) Check V17 GRAVITY VALVE for leaks.
  - (3) Close pump module rear access doors (TM 9-2320-279-10).



## M978 Tanker Maintenance Instructions (Cont)

**25-31. V18 BULK DELIVERY VALVE REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

M978

*References*

None

*Test Equipment*

None

*Equipment Condition**Special Tools*

None

Para 25-3

Tank drained.

TM 9-2320-279-10 Pump module rear access doors opened.

*Supplies*

None

*Special Environmental Conditions*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*General Safety Instructions*

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

## M978 Tanker Maintenance Instructions (Cont)

## 25-31. V18 BULK DELIVERY VALVE REMOVAL/INSTALLATION (CONT).

## a. Removal.

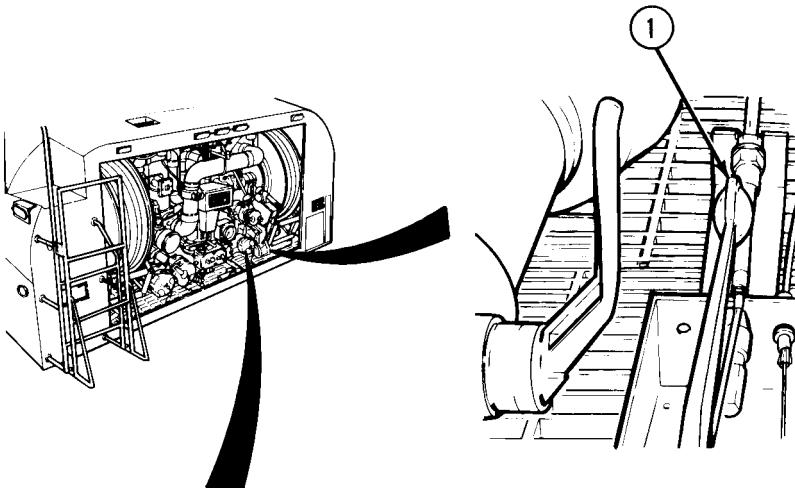
## NOTE

There are two types of handles. The newest type of handle is shown.

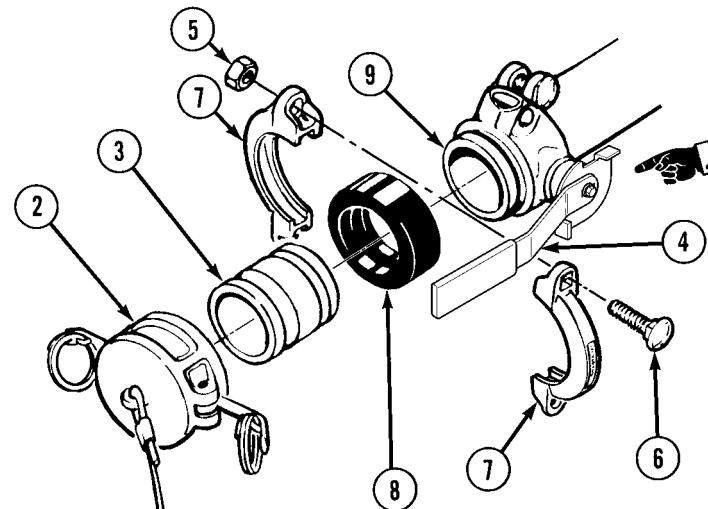
- (1) Push MC MANUAL CONTROL EM VALVE lever (1) full forward and down is closed position.
- (2) Remove dust cap (2) from adapter (3).

## WARNING

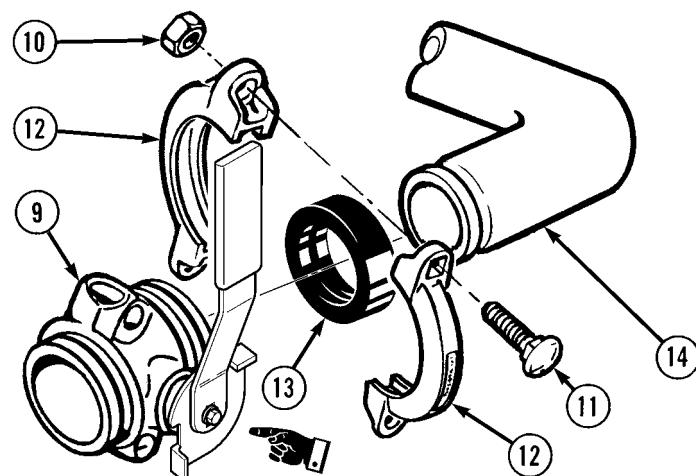
Fuel may drain from piping when valve is opened and coupling removed. Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.



- (3) Set valve handle (4) down to open position.
- (4) When fuel stops draining, close handle (4), hold adapter (3) in place, and remove two nuts (5), screws (6), and coupling halves (7).
- (5) Remove adapter (3).
- (6) Remove coupling gaskets (8) from V18 BULK DELIVERY VALVE (9).



- (7) Hold V18 DELIVERY VALVE (9) in place and remove two nuts (10), screws (11), and coupling halves (12).
- (8) Remove V18 BULK DELIVERY VALVE (9) and coupling gasket (13) from pipe (14).



## M978 Tanker Maintenance Instructions (Cont)

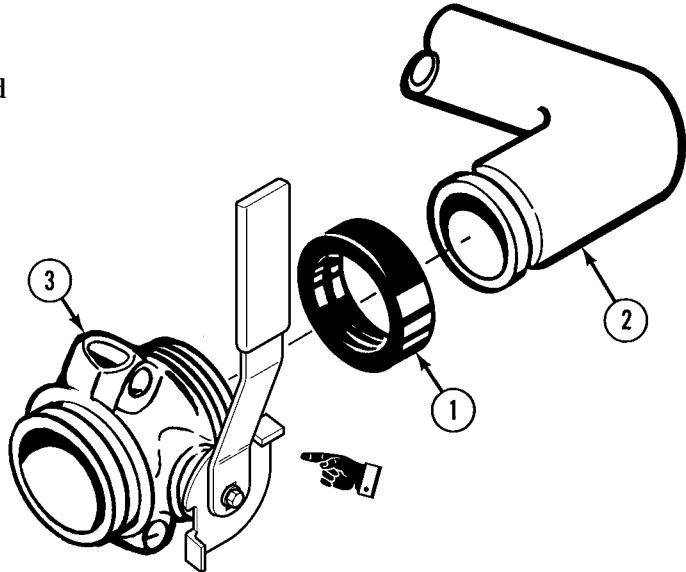
CAUTION

- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

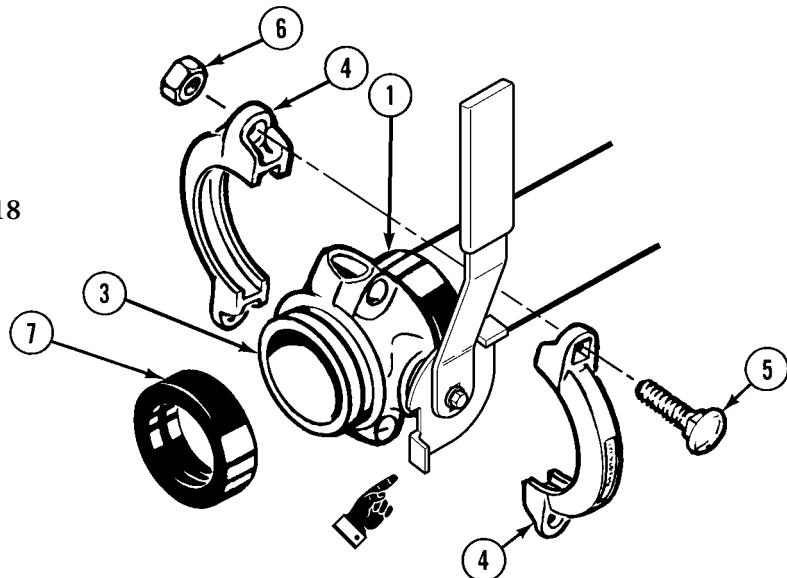
## NOTE

There are two types of handles. The newest type of handle is shown.

- (1) Install coupling gasket (1) on pipe (2).
- (2) Position V18 BULK DELIVERY VALVE (3) on pipe (2).
- (3) Hold V18 BULK DELIVERY VALVE (3) in place and position coupling gasket (1) over connection of valve and pipe (2).



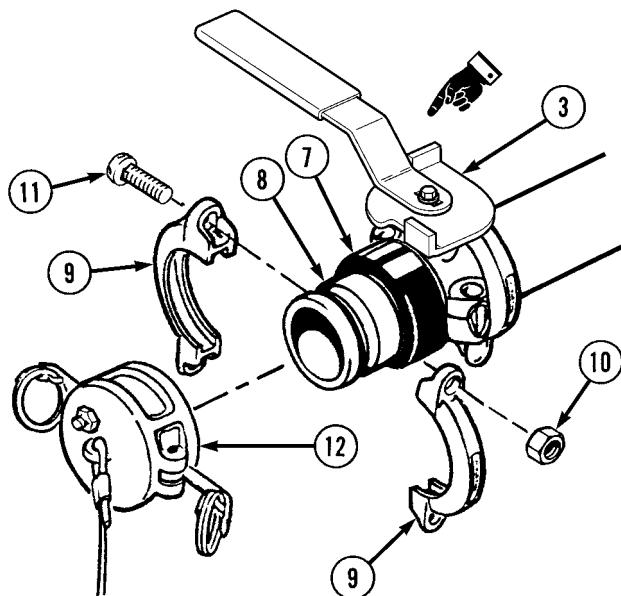
- (4) Hold V18 BULK DELIVERY VALVE (3) in place and install two coupling halves (4) on coupling halves (4) on coupling gasket (1) with screws (5) and nuts (6).
- (5) Install coupling gasket (7) on V18 BULK DELIVERY VALVE (3).



## M978 Tanker Maintenance Instructions (Cont)

## 25-31. V18 BULK DELIVERY VALVE REMOVAL/INSTALLATION (CONT).

- (6) Hold adapter (8) in place and position coupling gasket (7) on connection of adapter and V18 BULK DELIVERY VALVE (3).
- (7) Hold adapter (8) in place and install two coupling halves (9) on coupling gasket (7) with screws (10) and nuts (11).
- (8) Install dust cap (12) on adapter (8).
- c. Follow-on Maintenance.
  - (1) Perform unfiltered bulk unloading (TM 9-2320-279-10).
  - (1) Perform unfiltered bulk unloading (TM 9-2320-279-10).
  - (2) Check V18 BULK DELIVERY VALVE for leaks.
  - (3) Close pump module rear doors (TM 9-2320-279-10).



END OF TASK

## 25-32. V19 JET LEVEL SENSOR REMOVAL/INSTALLATION.

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

## INITIAL SETUP

## Models

M978

## Test Equipment

None

## Special Tools

None

## Supplies

Compound, sealing, pipe thread, Item 18,  
Appendix C  
Tags, identification, Item 48, Appendix C

## Personnel Required

MOS 63S, Heavy wheel vehicle mechanic

## References

None

## Equipment Condition

TM or Para	Condition Description
Para 25-3	Tank drained.
Para 16-49	Tank filler lid removed.

## Special Environmental Conditions

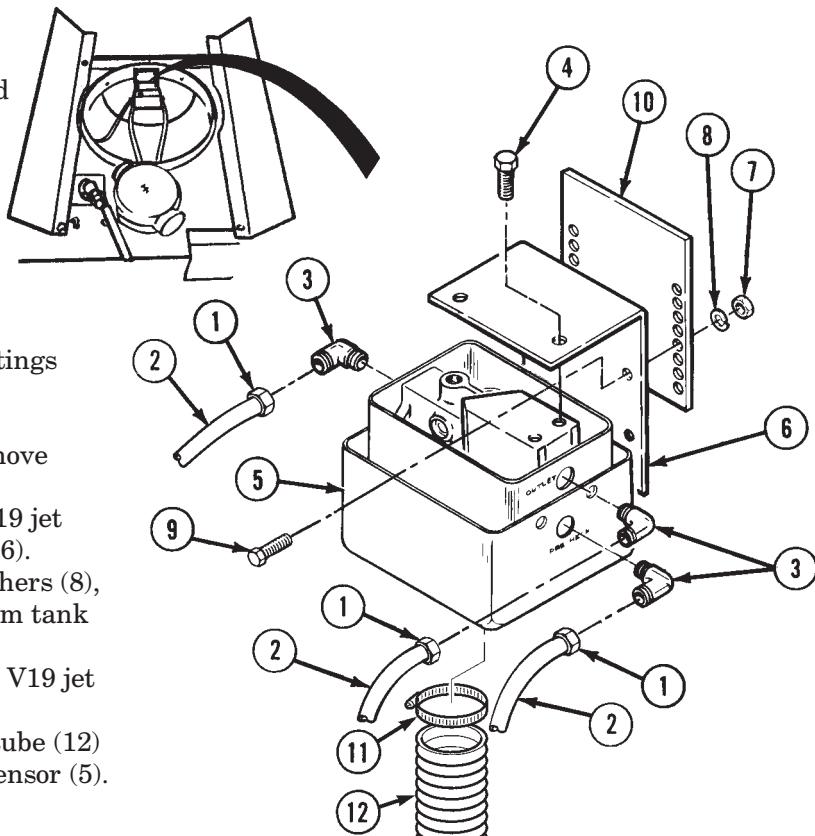
None

## General Safety Instructions

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle. Read and follow all safety precautions in TM 9-2320-279-10 and FM 10-71.

**M978 Tanker Maintenance Instructions (Cont)****a. Removal.****WARNING**

Before entering tank, be sure to read and follow all safety precautions in FM 10-71. Liquids and vapors carried in the M978 tanker are flammable and may cause injury or death.

**NOTE**

Tag and mark hoses, elbows, and fittings before removal.

- (1) Loosen three nuts (1) and remove hoses (2) from elbows (3).
- (2) Remove two screws (4) and V19 jet level sensor (5) from bracket (6).
- (3) Remove two nuts (7), lockwashers (8), screws (9), and bracket (6) from tank bracket (10).
- (4) Remove three elbows (3) from V19 jet level sensor (5).
- (5) Remove clamp (11) and drop tube (12) from bottom of V19 jet level sensor (5).

**b. Installation.**

- (1) Install drop tube (12) end clamp (11) on bottom of V19 jet level sensor (5).

**WARNING**

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

- (1.1) Apply pipe thread sealing compound to threads of three elbows (3) and install in V19 jet level sensor (5).
- (2) Install bracket (6) on tank bracket (10) with two screws (9), lockwashers (8), and nuts (7).
- (3) Install V19 jet level sensor (5) on bracket (6) with two screws (4).
- (4) Install three hoses (2) on elbows (3). Tighten three nuts (1).

**c. Follow-on Maintenance.**

- (1) Install tank filler lid (para 16-49).
- (2) Perform bottom loading (TM 9-2320-279-10).
- (3) Check that fuel flow stops when V12 bottom load PRECHECK VALVE is open and continues when valve is closed (TM 9-2320-279-10).

**END OF TASK**

## M978 Tanker Maintenance Instructions (Cont)

<b>25-32.1 V21 CHECK VALVE AND RECIRCULATION LINE PIPING REMOVAL/REPAIR/INSTALLATION (MODEL B ONLY)</b>	
<b>This task covers:</b>	
a. Removal b. Disassembly c. Cleaning/Inspection	d. Assembly e. Installation f. Follow-on Maintenance
<b>INITIAL SETUP</b>	
<b>Models</b> M978	<b>References</b> None
<b>Test Equipment</b> None	<b>Equipment Condition</b> TM or Para      Condition Description Para 16-49      Tank filler lid removed
<b>Special Tools</b> None	<b>Special Environmental Conditions</b> None
<b>Supplies</b> Solvent, drycleaning, Item 47, Appendix C	<b>General Safety Instructions</b> No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.
<b>Personnel Required</b> MOS 63S, Heavy wheel vehicle mechanic	

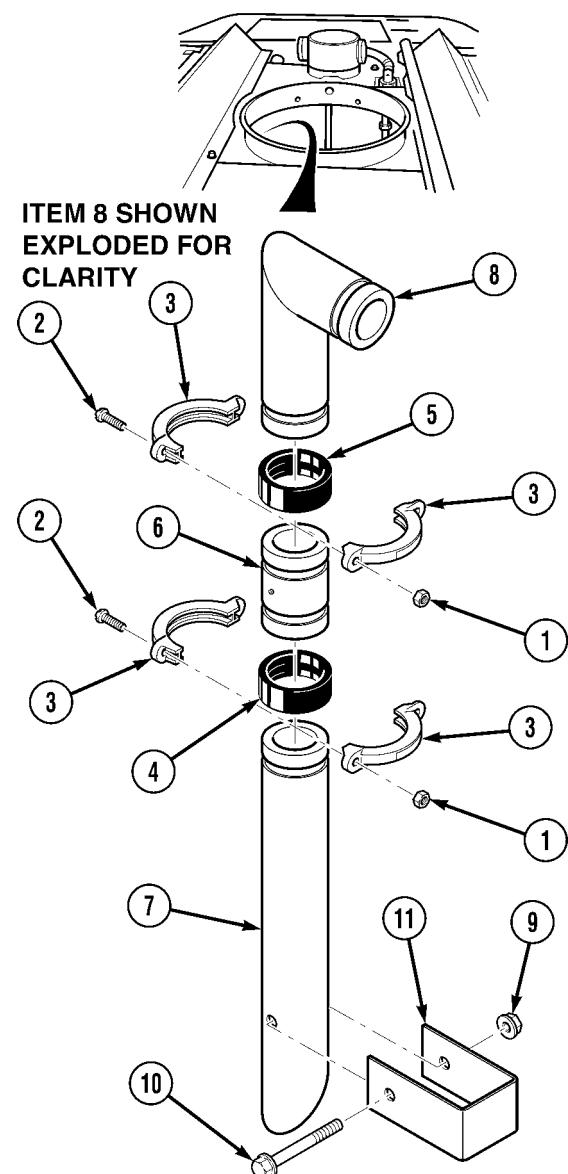
## M978 Tanker Maintenance Instructions (Cont)

**WARNING**

- Before entering tank, be certain to read and follow all safety precautions in FM 10-71. Liquids and vapors carried in the M978 tanker are flammable and may cause injury or death.
- No smoking, flame, sparks, or hot or glowing objects within 50 ft (15 m) of vehicle.

## a. Removal.

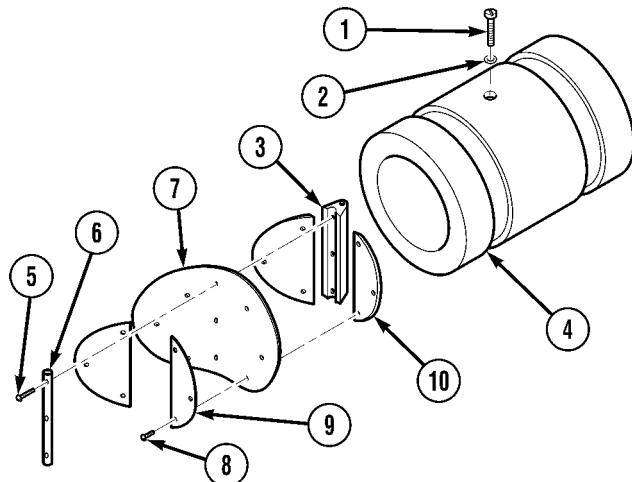
- (1) Remove four nuts (1), screws (2), and coupling halves (3) from two coupling gaskets (4) and (5).
- (2) Hold V21 check valve (6) in place and push coupling gasket (4) onto lower pipe (7).
- (3) Hold V21 check valve (6) in place and push coupling gasket (5) onto upper pipe.
- (4) Remove V21 check valve (6) from two pipes (7) and (8).
- (5) Remove nut (9) and screw (10) from bracket (11) and remove pipe (7).
- (6) Remove two coupling gaskets (4) and (5).



## M978 Tanker Maintenance Instructions (Cont)

**25-32.1 V21 CHECK VALVE AND RECIRCULATION LINE PIPING REMOVAL/REPAIR/INSTALLATION**
**b. Disassembly.**

- (1) Remove two screws (1), washers (2) and hinge post (3).
- (2) Remove three screws (5), hinge clamp (6), and seal (7) from hinge post (3).
- (3) Remove six screws (8), two clamp plates (9), and two valve plates (10) from seal (7).

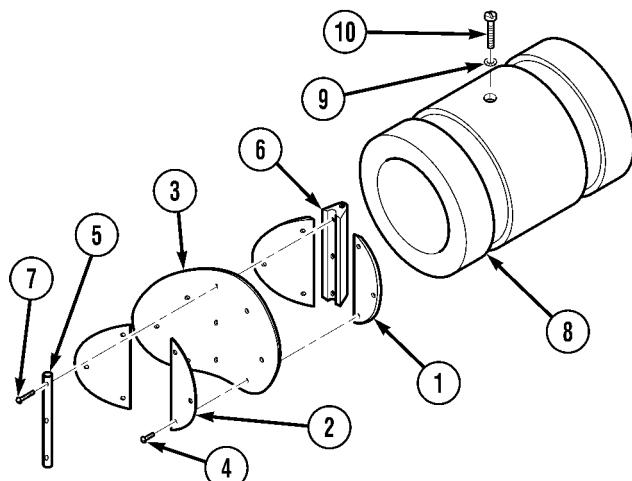
**c. Cleaning/Inspection.****WARNING**

- Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.
- Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment, goggles, shield, and gloves.

- (1) Clean all metal parts with dry cleaning solvent.
- (2) Dry metal parts with compressed air.
- (3) Inspect all metal parts for bends, breaks, cracks, and sharp edges.
- (4) Replace damaged parts.

**d. Assembly.**

- (1) Install two valve plates (1) and clamp plates (2) to seal (3) with six screws (4).
- (2) Install hinge clamp (5) and seal (3) to hinge post (6) using three screws (7).
- (3) Install hinge post (6) in valve body (8) with two washers (9) and screws (10).



## M978 Tanker Maintenance Instructions (Cont)

**CAUTION**

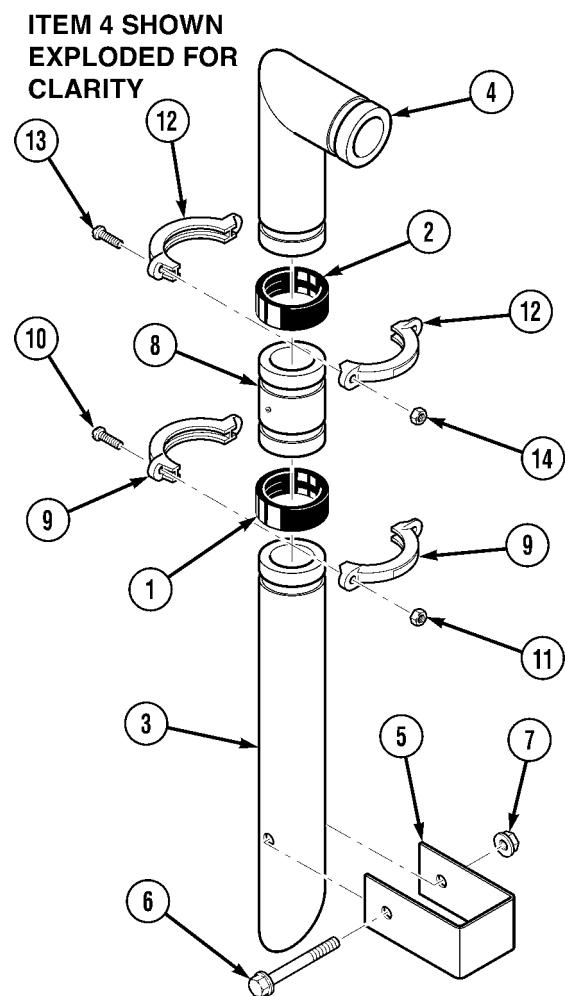
Do not tear or otherwise damage coupling gasket during installation. If coupling gaskets are damaged, piping connections will leak.

**NOTE**

Some tanks have V21 check valve. Others do not.

## e. Installation.

- (1) Install two coupling gaskets (1) and (2) on two pipes (3) and (4).
- (2) Install lower pipe assembly (3) into bracket (5) with screw (6) and nut (7). Do not tighten nut.
- (3) Hold V21 check valve (8) in place on lower pipe (3) and position coupling gasket (1) over connection.
- (4) Install two coupling halves (9) on coupling gasket (1) with two screws (10) and nuts (11).
- (5) Position coupling gasket (2) over connection of upper pipe (4) and V21 check valve (8).
- (6) Install two coupling halves (12) on coupling gasket (2) with two screws (13) and nuts (14).
- (7) Tighten nut (7).



## f. Follow-on Maintenance. Install tank filler lid (para 16-49).

END OF TASK

## M978 Tanker Maintenance Instructions (Cont)

**25-33. ED EDUCTOR ASSEMBLY REMOVAL/REPAIR/INSTALLATION.**

This task covers:

- |                        |                          |
|------------------------|--------------------------|
| a. Removal             | d. Assembly              |
| b. Disassembly         | e. Installation          |
| c. Cleaning Inspection | f. Follow-on Maintenance |

**INITIAL SETUP***Models*

M978

*References*

None

*Test Equipment*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
TM 9-2320-279-10	Pump module top and rear access doors opened.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

Compound, sealing, pipe thread. Item 18, Appendix C  
 Adhesive-sealant, silicone, Item 4, Appendix C  
 Solvent, dry cleaning, Item 47, Appendix C

*General Safety Instructions*

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

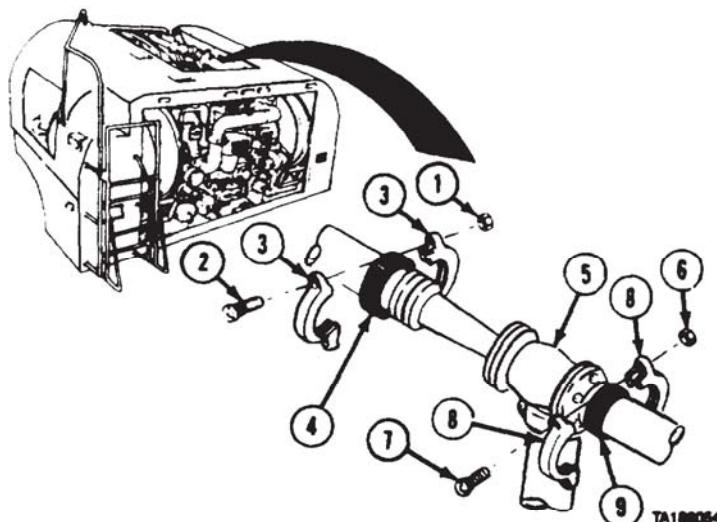
*Personnel Required*

MOS. 63S, Heavy wheel vehicle mechanic (2)

*a. Removal.***WARNING**

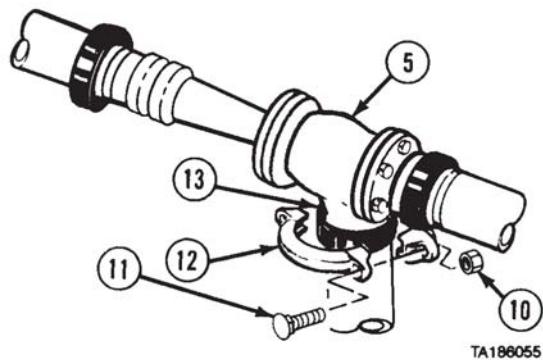
Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (1) Remove two nuts (1), screws (2), and coupling halves (3).
- (2) Push coupling gasket (4) on ED EDUCTOR assembly (5).
- (3) Remove two nuts (6), screws (7), and coupling halves (8).
- (4) Push coupling gasket (9) on ED EDUCTOR assembly (5).

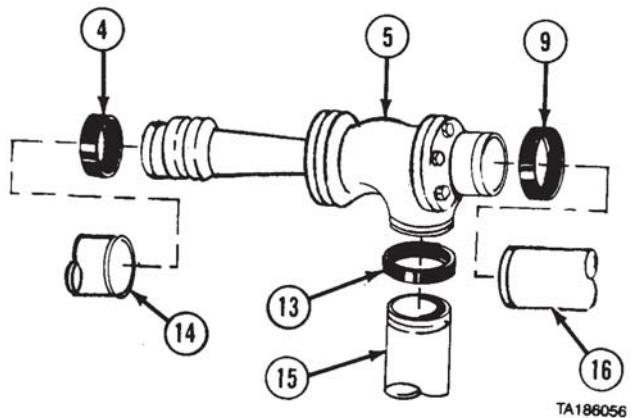


## M978 Tanker Maintenance Instructions (Cont)

- (5) Remove two nuts (10), screws (11), and coupling halves (12).
- (6) Push coupling gasket (13) on ED EDUCTOR assembly (5).



- (7) Remove ED EDUCTOR assembly (5) from three pipes (14, 15, and 16).
- (8) Remove coupling gaskets (4, 9, and 13).



## M978 Tanker Maintenance Instructions (Cont)

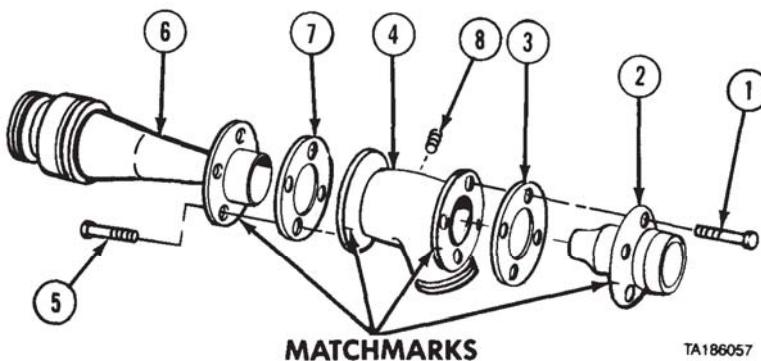
## 25-33. ED EDUCTOR ASSEMBLY REMOVAL/REPAIR/INSTALLATION (CONT.).

*b. Disassembly.*

## NOTE

Matchmark before disassembly.

- (1) Remove four screws (1), nozzle (2), and gasket (3) from ED EDUCTOR (4).
- (2) Remove four screws (5), venturi (6), and gasket (7) from ED EDUCTOR (4).
- (3) Remove pipe plug (8).

*c. Cleaning/Inspection.*

TA186057

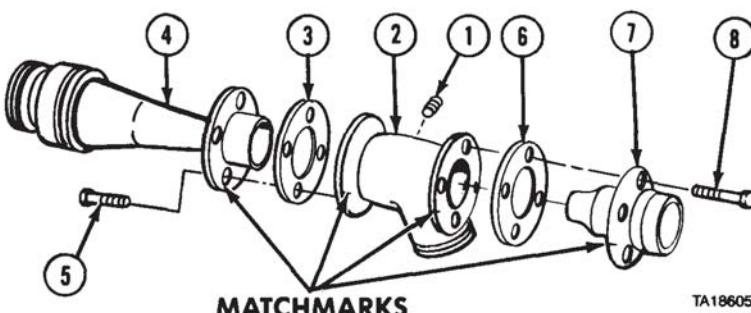
WARNING

- Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with soap and water.
- Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment, goggles, shield, and gloves.

- (1) Dry metal parts with compressed air.
- (2) Inspect each part for damage.
- (3) Replace damaged parts.

*d. Assembly.*WARNING

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



TA186058

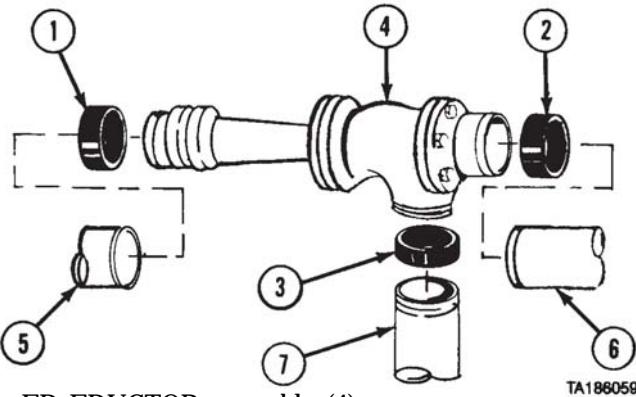
- (1) Apply pipe thread sealing compound to threads of pipe plug (1) and install in ED EDUCTOR (2).
- (2) Apply silicone adhesive-sealant to gasket (3) and install gasket and venturi (4) on ED EDUCTOR (2) with four screws (5).
- (3) Apply silicone adhesive-sealant to gasket (6) and install gasket and nozzle (7) to ED EDUCTOR (2) with four screws (8).

## M978 Tanker Maintenance Instructions (Cont)

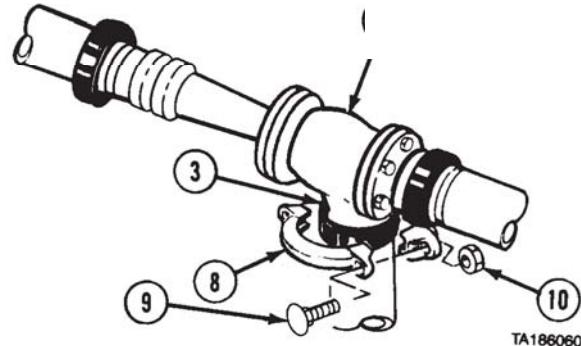
## e. Installation.

**CAUTION**

- Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.
- Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.



- (1) Install three coupling gaskets (1, 2, and 3) on ED EDUCTOR assembly (4).
- (2) Soldier A installs coupling gaskets (1, 2, and 3) over three pipes (5, 6, and 7) while Soldier B holds ED EDUCTOR assembly (4) in position.
- (3) Soldier A installs two coupling halves (8) on coupling gasket (3) with screws (9) and nuts (10) while Soldier B holds ED EDUCTOR assembly (4) in position.

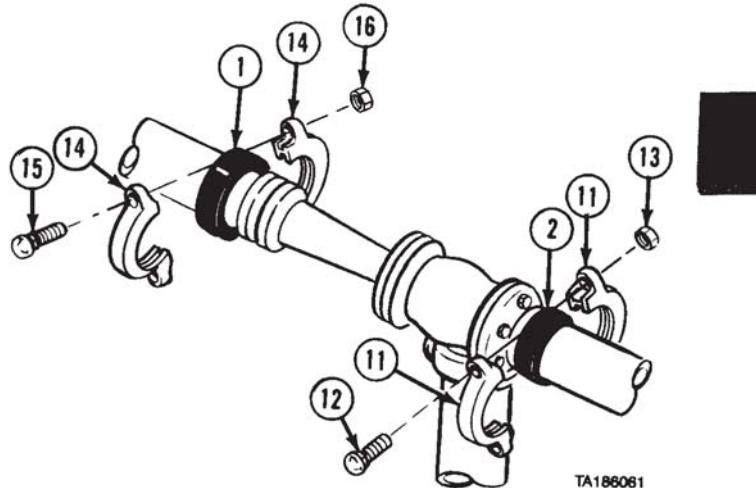


- (4) Install two coupling halves (11) on coupling gasket (2) with two screws (12) and nuts (13).
- (5) Install two coupling halves (14) on coupling gasket (1) with two screws (15) and nuts (16).

## f. Follow-on Maintenance.

- (1) Recirculate fuel (TM 9-2320-279-10).
- (2) Check ED EDUCTOR assembly for leaks.
- (3) Close top and rear pump module access doors (TM 9-2320-279-10).

END OF TASK



**M978 Tanker Maintenance Instructions (Cont)****25-34. FLOW LIMITING VALVE REMOVAL/REPAIR/INSTALLATION.**

This task covers:

- |                        |                          |
|------------------------|--------------------------|
| a. Removal             | d. Assembly              |
| b. Disassembly         | e. Installation          |
| c. Cleaning/Inspection | f. Follow-on Maintenance |

**INITIAL SETUP***Models*

M978

*Test Equipment*

None

*Special Tools*

None

*Supplies*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
Para 25-31	V18 BULK DELIVERY VALVE removed.
Para 23-4	Filter-separator removed.
Para 25-11	Flow limiting valve to filter-separator pipe removed.
Para 25-19	V5 air actuated flow valve removed.

*Special Environmental Conditions*

None

*General Safety Instructions*

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

*References*

None

## M978 Tanker Maintenance Instructions (Cont)

**a. Removal.**

- (1) Remove two locknuts (1) and U-bolt (2) from bracket (3).

**WARNING**

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (2) Remove flow limiting valve (4) from grating (5) and drain fuel.

**b. Disassembly.**

- (1) Remove eight screws (5.1), preformed packing (5.2), and pipe assembly (5.3) from flow limiting valve (4).

**c. Cleaning/Inspection.****WARNING**

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

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

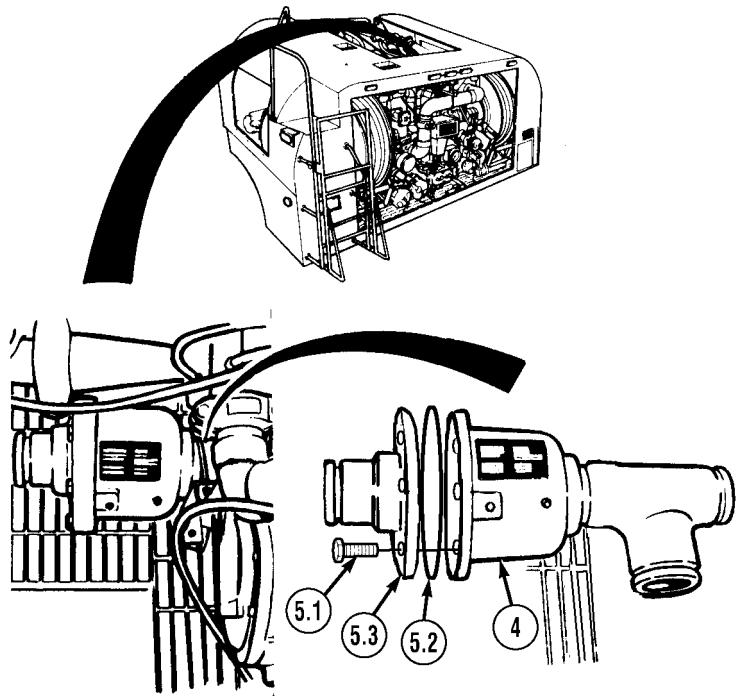
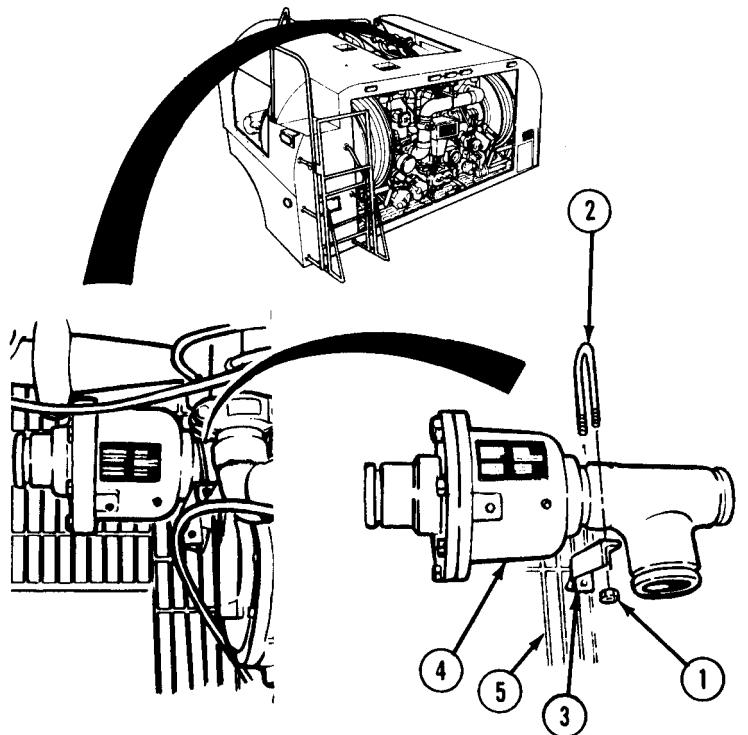
**WARNING**

Compressed air used for cleaning purposes will not exceed 30 psi (207 kPa). Use only with effective chip guarding and personal protective equipment, goggles, shield, and gloves.

- (2) Dry metal parts with compressed air.
- (3) Inspect all metal parts for bends, breaks, cracks, and sharp edges.
- (4) Replace all damaged parts.

**d. Assembly.**

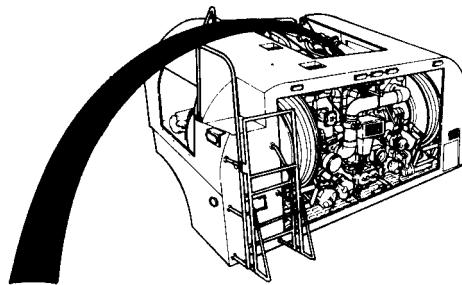
- (1) Install preformed packing (5.2) and pipe assembly (5.3) on flow valve (4) with eight screws (5.1).



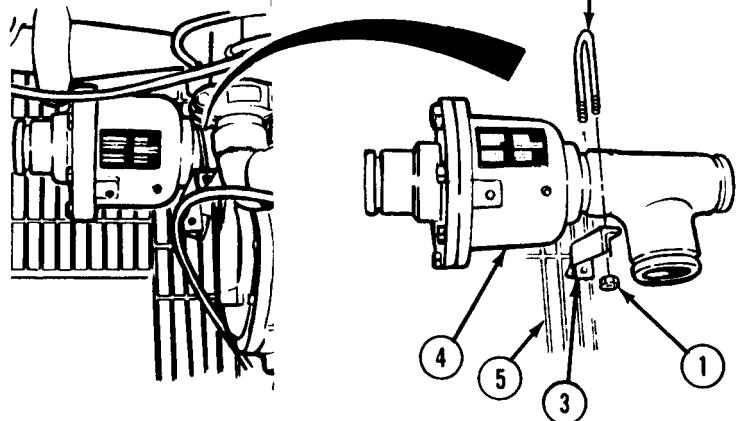


**M978 Tanker Maintenance Instructions (Cont)****e. Installation.**

- (1) Position flow limiting valve (4) against bracket (3) on grating (5).
- (2) Install flow limiting valve (4) with U-bolt (2) and two locknuts (1).

**f. Follow-on Maintenance.**

- (1) Install V5 air actuated flow valve (para 25-19).
- (2) Install flow limiting valve to filter-separator piping (para 25-11).
- (3) Install filter-separator (para 23-4).
- (4) Install V18 BULK DELIVERY VALVE (para 25-31).
- (5) Perform unfiltered bulk unloading (TM 9-2320-279-10).
- (6) Check flow limiting valve for leaks.



**END OF TASK**

## M978 Tanker Maintenance Instructions (Cont)

<b>25-35. SP SAMPLING PROBE VALVE REMOVAL/INSTALLATION.</b>	
This task covers:	
a. Removal	c. Follow-on Maintenance
b. Installation	
<b>INITIAL SETUP</b>	
<i>Models</i>	<i>References</i>
M978	None
<i>Test Equipment</i>	<i>Equipment Condition</i>
None	TM or Para      Condition Description TM 9-2320-279-10 Pump module rear access doors opened.
<i>Special Tools</i>	<i>Special Environmental Conditions</i>
None	None
<i>Supplies</i>	<i>General Safety Instructions</i>
Compound, sealing, pipe thread, Item 18, Appendix C Tags, identification, Item 48, Appendix C	No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.
<i>Personnel Required</i>	
MOS 63S, Heavy wheel vehicle mechanic	

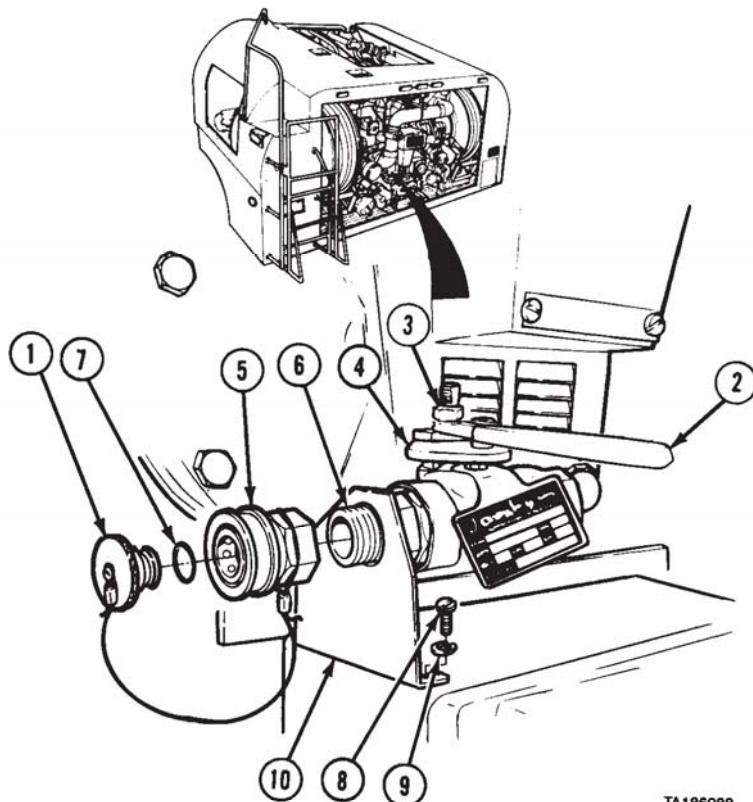
**a. Removal.**

- (1) Remove end cap (1).

**WARNING**

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (2) Set valve handle (2) to open position and drain fuel.
- (3) When fuel stops draining, close valve handle (2).
- (4) Remove nut (3) and handle (2) from SP SAMPLING PROBE (4).
- (5) Remove coupling (5) from pipe nipple (6).
- (6) Remove preformed packing (7) from cap (1).
- (7) Remove two screws (8), lockwashers (9), and bracket (10).

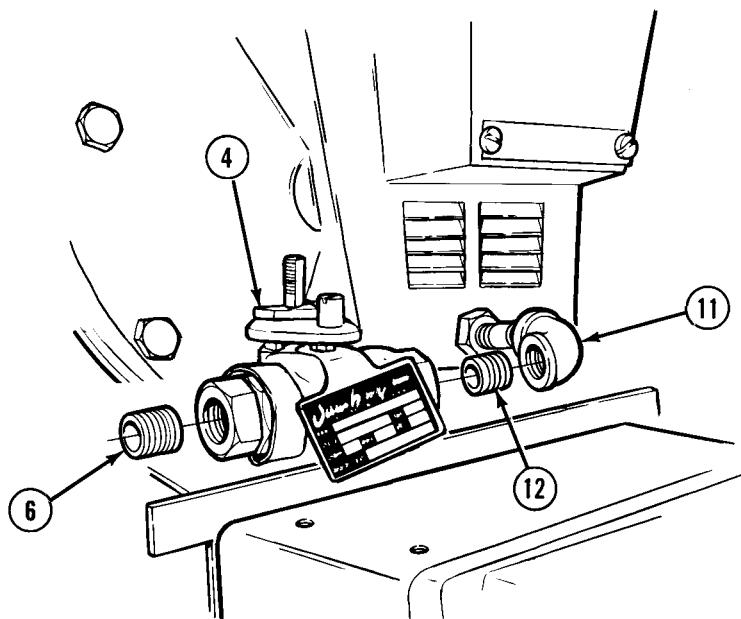


TA186088

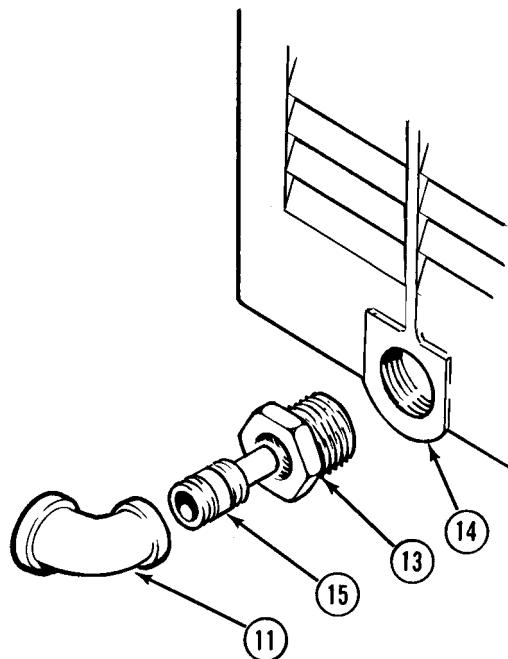
## M978 Tanker Maintenance Instructions (Cont)

## NOTE

- Tag and mark fittings before removal.
  - Some vehicles have a pipe nipple (12) and an elbow. Other vehicles have an elbow which includes the nipple.
- (8) Remove SP SAMPLING PROBE (4) FROM ELBOW (11).
- (9) Remove two pipe nipples (6 and 12) from SP SAMPLING PROBE (4).



- (10) Remove reducer bushing (13) from flowmeter (14).
- (11) Remove elbow (11) and pipe nipple (15) from reducer bushing (13).



## M978 Tanker Maintenance Instructions (Cont)

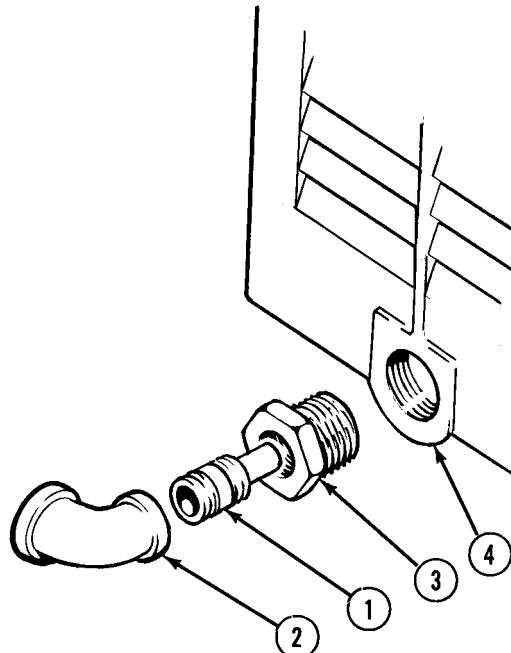
## 25-35. SP SAMPLING PROBE VALVE REMOVAL/INSTALLATION (CONT).

## b. Installation.

WARNING

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

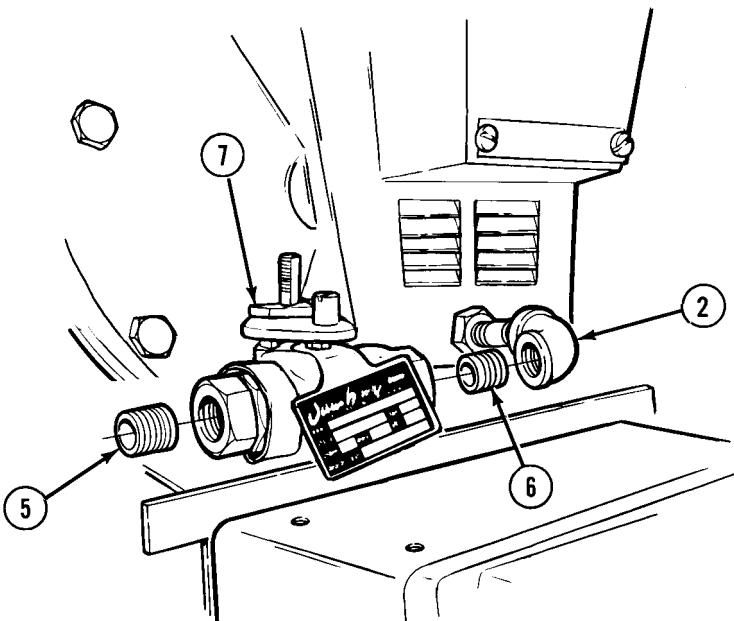
- (1) Apply pipe thread sealing compound on threads of pipe nipple (1) and install in elbow (2).
- (2) Install nipple (1) and elbow (2) in reducer bushing (3).
- (3) Apply pipe thread sealing compound on threads of reducer bushing (3) and install in flowmeter (4).



## NOTE

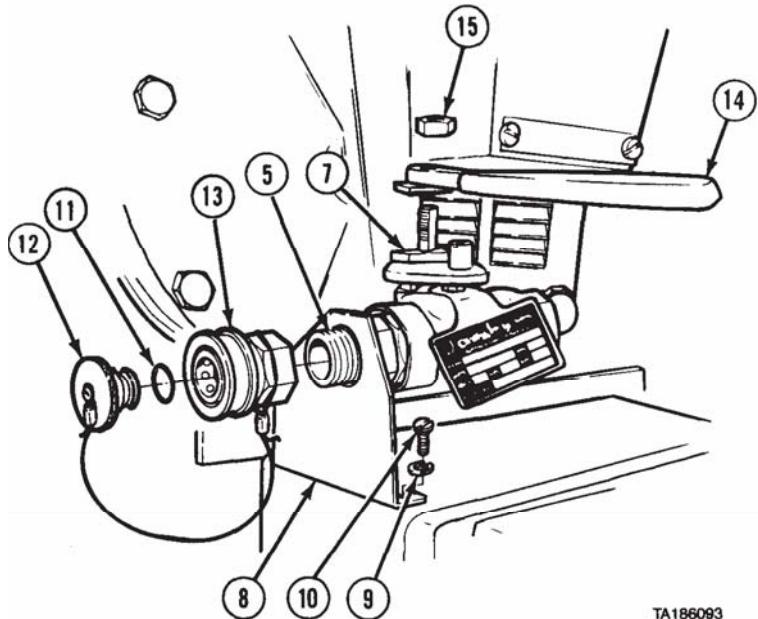
Some vehicles have a pipe nipple (6) and an elbow. Other vehicles have an elbow which includes the nipple.

- (4) Apply pipe thread sealing compound on threads of two pipe nipples (5 and 6) and install in SP SAMPLING PROBE (7).
- (5) Install pipe nipple (6) or SP SAMPLING PROBE (7) on elbow (2).



## M978 Tanker Maintenance Instructions (Cont)

- (6) Position bracket (8) on pipe nipple (5) and install two lockwashers (9) and screws (10).
- (7) Install preformed packing (11) on cap (12) and cap on coupling (13).
- (8) Install coupling (13) on pipe nipple (5).
- (9) Install handle (14) and nut (15) on SP SAMPLING PROBE (7).
- c. Follow-on Maintenance.
  - (1) Check operation of SP SAMPLING PROBE valve (TM 9-2320-279-10).
  - (2) Check SP SAMPLING PROBE valve for leaks.
  - (3) Close pump module rear access doors (TM 9-2320-279-10).



TA186093

END OF TASK

**25-36. VT VENTURI ASSEMBLY REMOVAL/REPAIR/INSTALLATION.**

This task covers:

- a. Removal
- b. Disassembly
- c. Cleaning/Inspection
- d. Assembly
- e. Installation
- f. Follow-on Maintenance

**INITIAL SETUP****Models**

M978

**References**

None

**Test Equipment**

None

**Equipment Condition****TM or Para**

Para 16-48

**Condition Description**

Pump module right side access panel removed.

**Special Tools**

None

**Special Environmental Conditions**

None

**Supplies**

Solvent, dry cleaning, Item 47, Appendix C

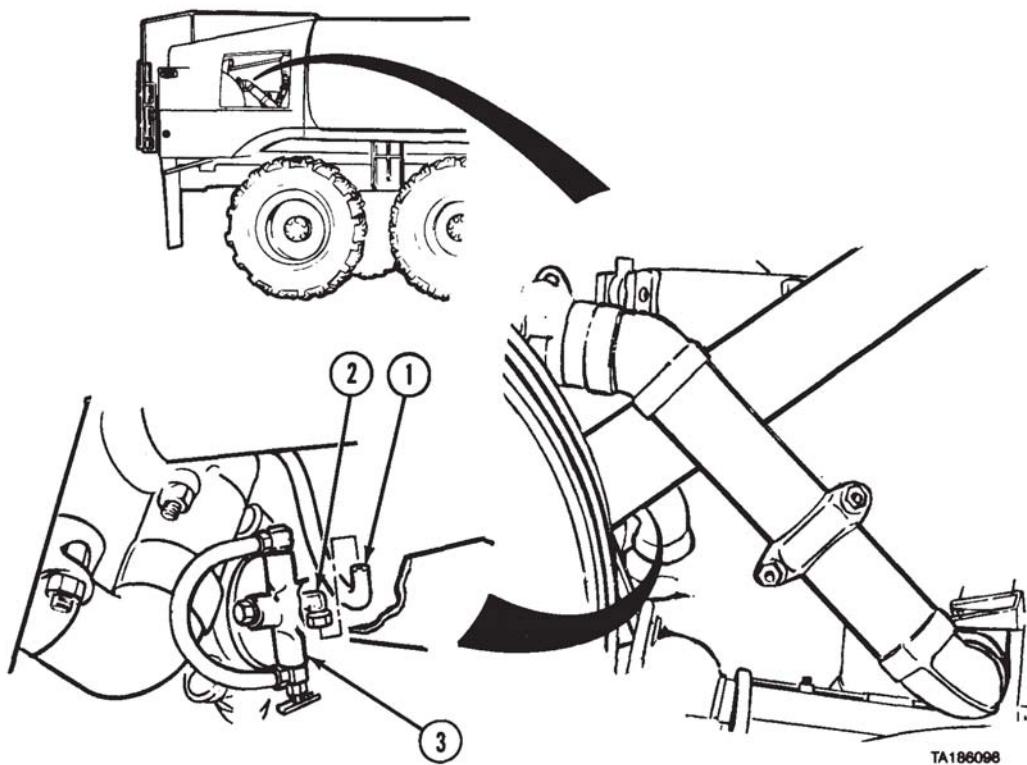
**General Safety Instructions**

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

**Personnel Required**

MOS 63S, Heavy wheel vehicle mechanic

## M978 Tanker Maintenance Instructions (Cont)

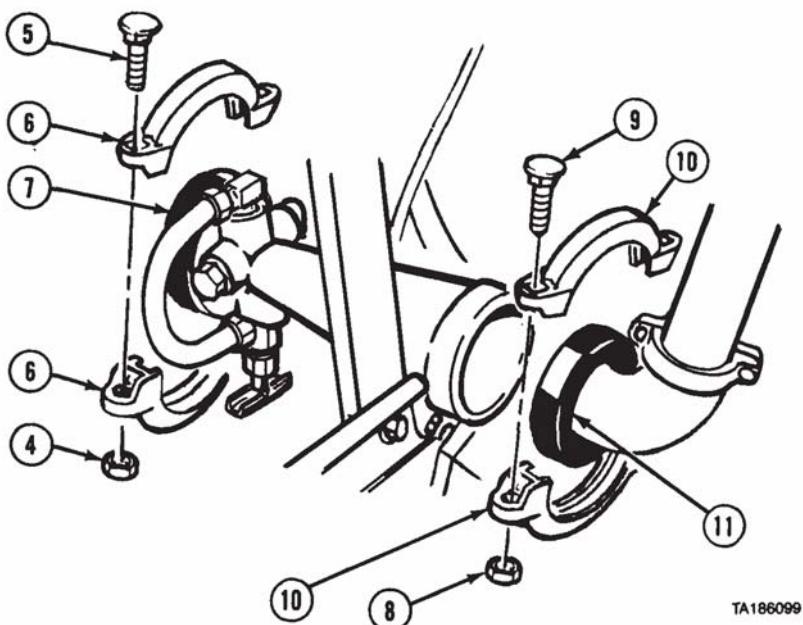
**25-36. VT VENTURI ASSEMBLY REMOVAL/REPAIR/INSTALLATION (CONT.).***a. Removal.*

(1) Disconnect tube (1) from elbow (2) on VT VENTURI assembly (3).

**WARNING**

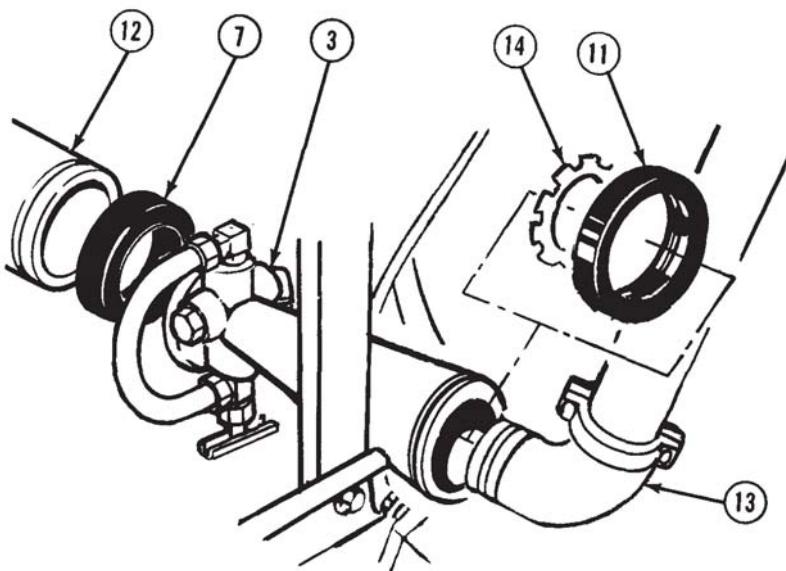
Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (2) Remove two nuts (4), screws (5), and coupling halves (6) from coupling gasket (7).
- (3) Remove two nuts (8), screws (9), and coupling halves (10) from coupling gasket (11).



## M978 Tanker Maintenance Instructions (Cont)

- (4) Push two coupling gaskets (7 and 11) onto end of VT VENTURI assembly (3).
- (5) Remove VT VENTURI assembly (3) from two pipes (12 and 13).
- (6) Remove coupling gaskets (7 and 11) and reducer (14) from VT VENTURI assembly (3).



TA186100

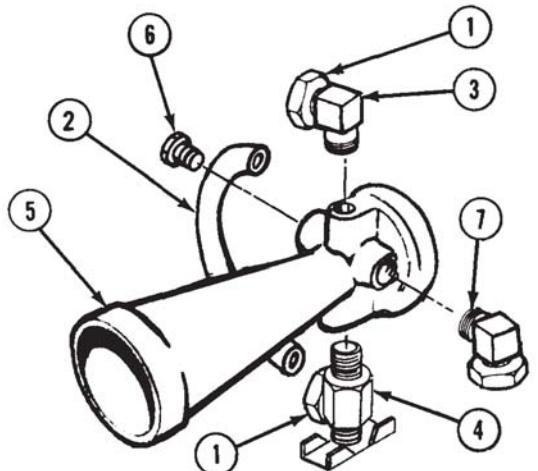
*b. Disassembly.*

- (1) Loosen two nuts (1) and remove tube (2) from elbow (3) and needle valve (4).
- (2) Remove needle valve (4) from VT VENTURI assembly (5).
- (3) Remove plug (6) and two elbows (3 and 7) from VT VENTURI assembly (5).

*c. Cleaning/Inspection.***WARNING**

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

- (1) Clean all metal parts in dry cleaning solvent.
- (2) Inspect all metal parts for damage.
- (3) Replace damaged parts.



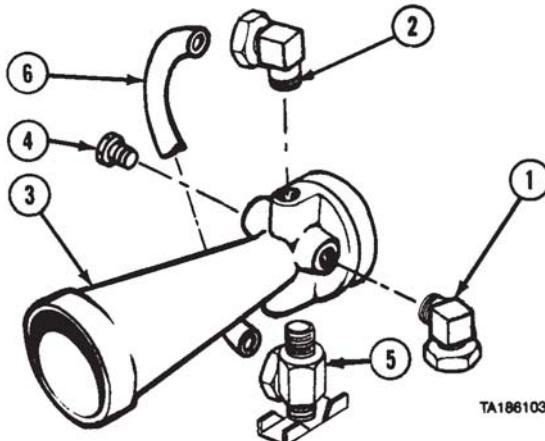
TA186101

## M978 Tanker Maintenance Instructions (Cont)

**25-36. VT VENTURI ASSEMBLY REMOVAL/REPAIR/INSTALLATION (CONT).***d. Assembly.***WARNING**

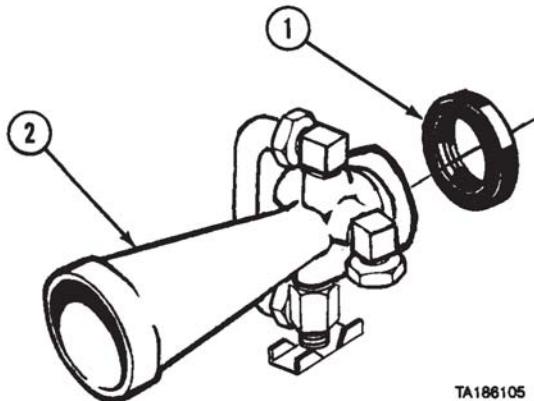
Adhesives, solvents, and sealing compounds can burn easily, can give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent, or sealing compound gets on skin or clothing, wash immediately with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

- (1) Coat threads of two elbows (1 and 2) with pipe thread sealing compound and install on VT VENTURI assembly (3).
- (2) Coat threads of pipe plug (4) with pipe thread sealing compound and install on VT VENTURI assembly (3).
- (3) Coat threads of needle valve (5) with pipe thread sealing compound and install on VT VENTURI assembly (3).
- (4) Install tube (6) on elbow (2) and needle valve (5).

*e. Installation.***CAUTION**

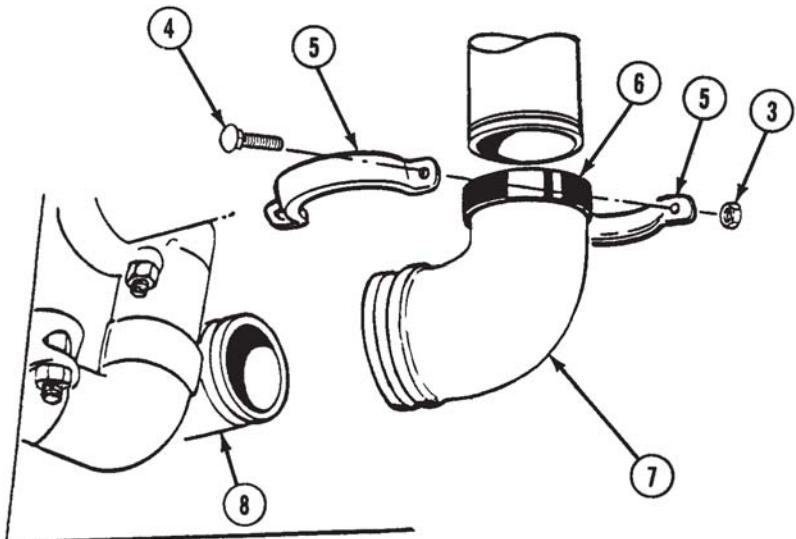
Do not tear or otherwise damage coupling gaskets during installation. If coupling gaskets are damaged, piping connections will leak.

- (1) Install coupling gasket (1) on VT VENTURI assembly (2).



## M978 Tanker Maintenance Instructions (Cont)

- (2) Remove two nuts (3), screws (4), and coupling halves (5) from coupling gasket (6).
- (3) Push coupling gasket (6) on pipe (7).
- (4) Remove pipe (7) from pipe (8).

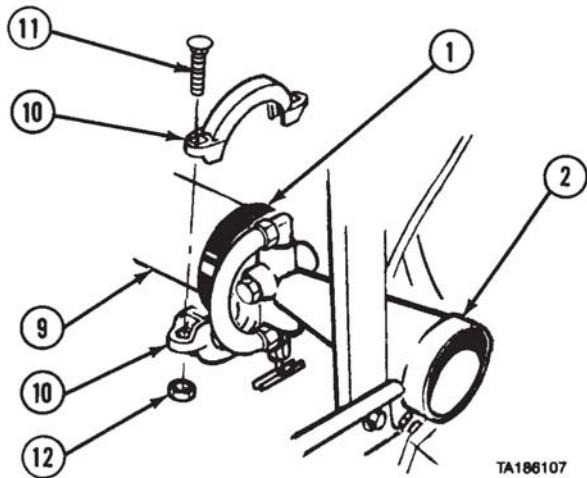


TA186106

**CAUTION**

Do not pinch or pull coupling gaskets off-center while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

- (5) Position coupling gasket (1) over connection of pipe (9) and VT VENTURI assembly (2).
- (6) Install two coupling halves (10), screws (11), and nuts (12) on coupling gasket (1).

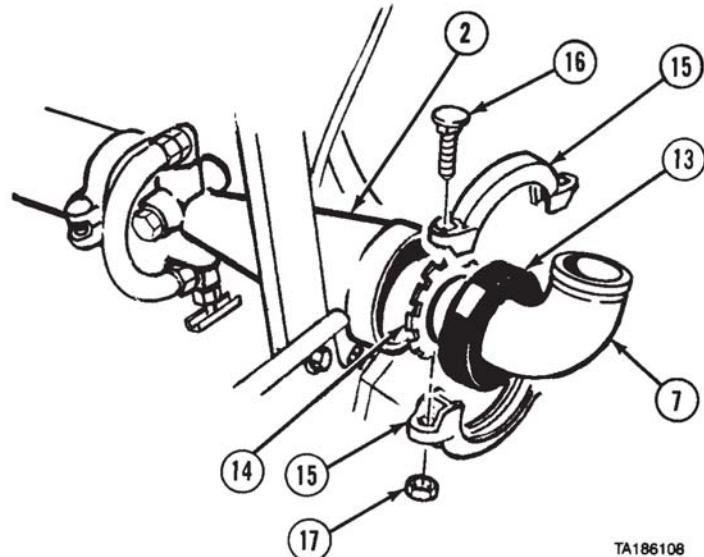


TA186107

## M978 Tanker Maintenance Instructions (Cont)

**25-36. VT VENTURI ASSEMBLY REMOVAL/REPAIR/INSTALLATION (CONT).**

- (7) Position coupling gasket (13) and reducer (14) on pipe (7) and VT VENTURI assembly (2).  
 (8) Install two coupling halves (15) with two screws (16) and nuts (17).



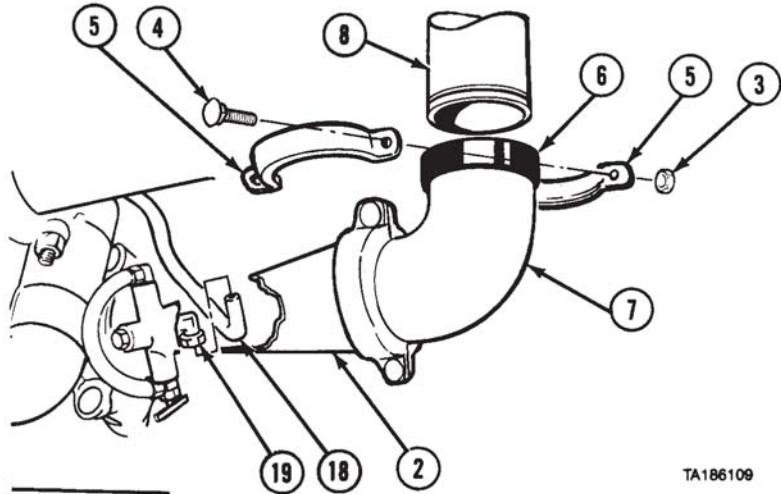
TA186108

- (9) Install tube (18) on elbow (19).

**CAUTION**

Do not pinch or pull coupling gaskets off-center during installation or while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

- (10) Position coupling gasket (6) on pipe (7) and pipe (8).  
 (11) Install two coupling halves (5) on coupling gasket (6) with two screws (4) and nuts (3).



TA186109

**f. Follow-on Maintenance.**

- (1) Perform fuel servicing (TM 9-2320-279-10).  
 (2) Check VT VENTURI assembly for leaks.  
 (3) Install pump module right side access panel (para 16-48).

END OF TASK

## M978 Tanker Maintenance Instructions (Cont)

## 25-37. TANK FUEL STRAINER REMOVAL/REPAIR/INSTALLATION.

This task covers:

- |                        |                          |
|------------------------|--------------------------|
| a. Removal             | d. Assembly              |
| b. Disassembly         | e. Installation          |
| c. Cleaning/Inspection | f. Follow-on Maintenance |

## INITIAL SETUP

*Models*

M978

*References*

None

*Test Equipment*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
Para 25-3	Tank drained.

*Special Tools*

None

*Special Environmental Conditions*

None

*Supplies*

Adhesive-sealant, silicone, Item 4, Appendix C  
Solvent, dry cleaning, Item 47, Appendix C

*General Safety Instructions*

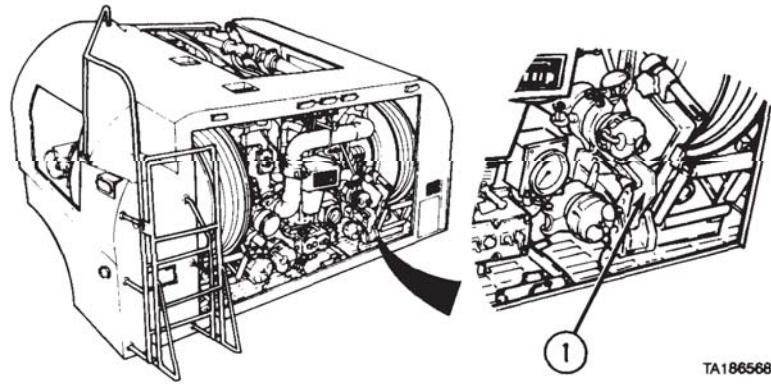
No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

*Personnel Required*

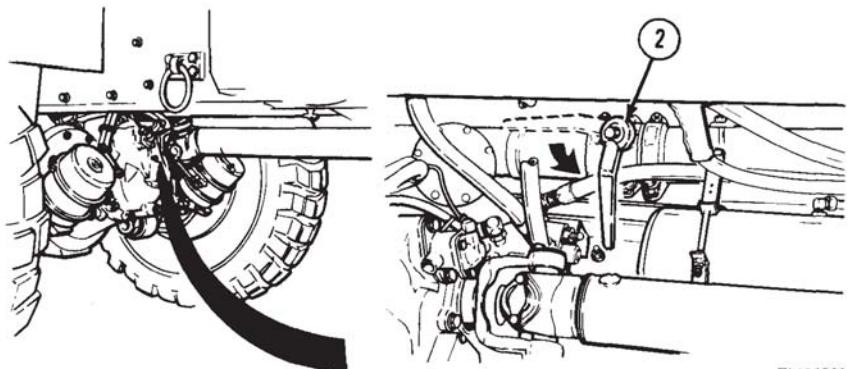
MOS 63S, Heavy wheel vehicle mechanic

## a. Removal.

- (1) Push MC MANUAL CONTROL EM VALVE lever (1) full forward and down to closed position.



TA186568



TA186569

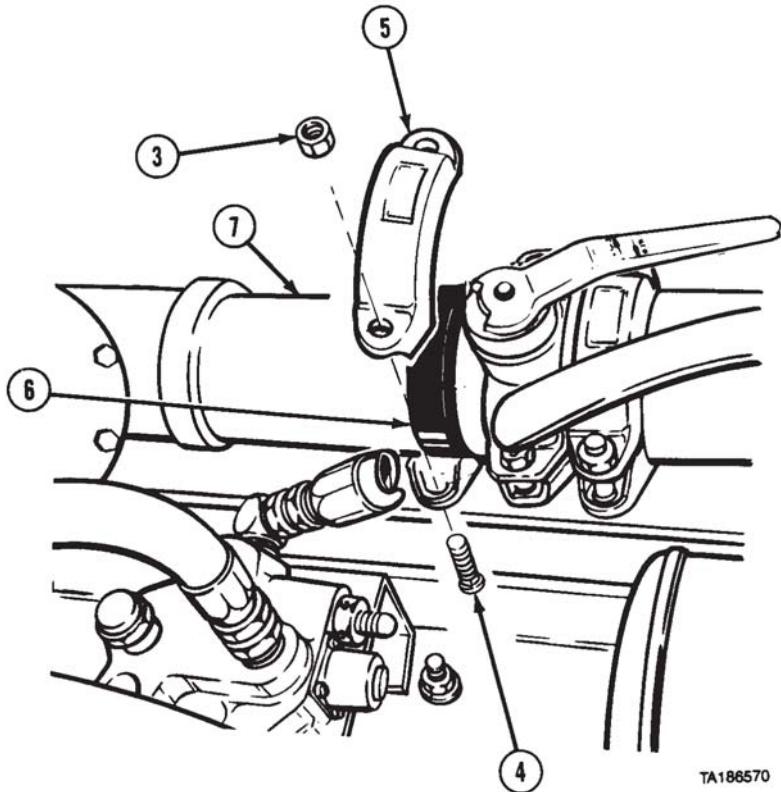
- (2) Move V3 suction line valve handle (2) to CLOSE position.

## M978 Tanker Maintenance Instructions (Cont)

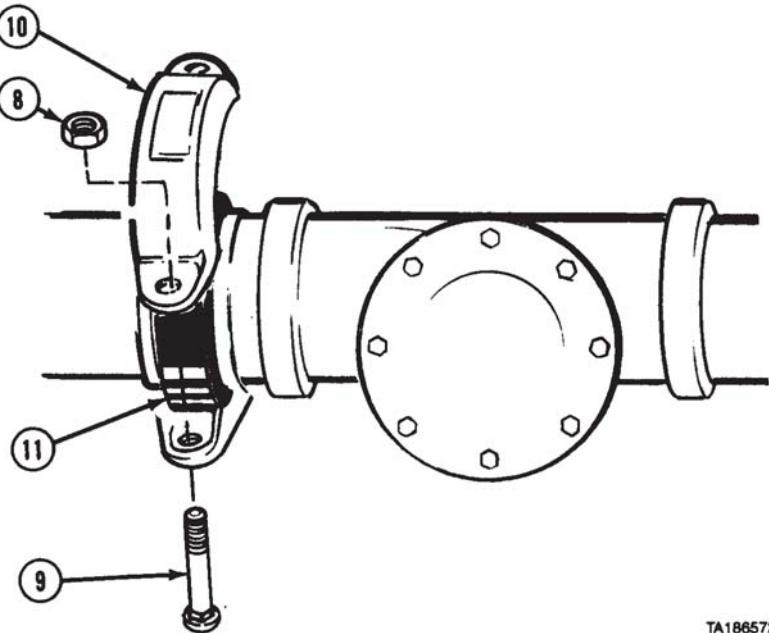
**25-37. TANK FUEL STRAINER REMOVAL/REPAIR/INSTALLATION (CONT.).****WARNING**

Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

- (3) Remove two nuts (3), screws (4), and coupling halves (5) from coupling gasket (6).
- (4) Push coupling gasket (6) on end of strainer pipe (7).

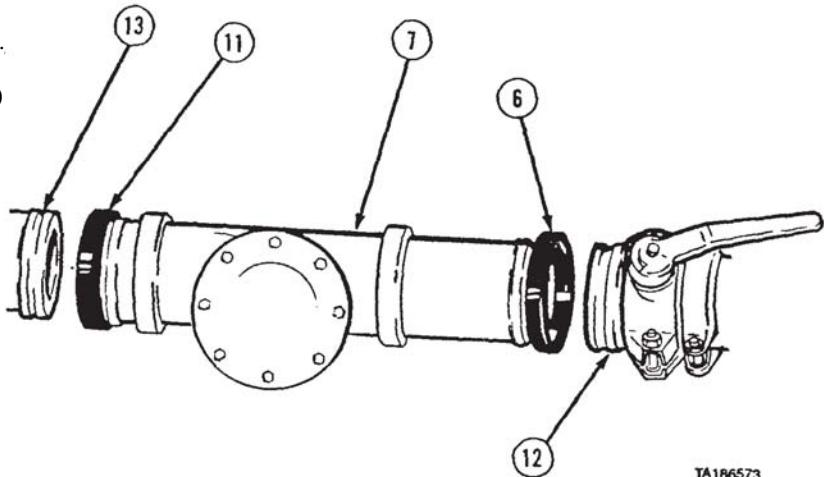


- (5) Remove two nuts (8), screws (9), and coupling halves (10) from coupling gasket (11).



## M978 Tanker Maintenance Instructions (Cont)

- (6) Push coupling gasket (11) on end of strainer pipe (7).
- (7) Remove strainer pipe (7) from V3 suction valve (12) and pipe (13).
- (8) Remove two coupling gaskets (6 and 11) from strainer pipe (7).



TA186573

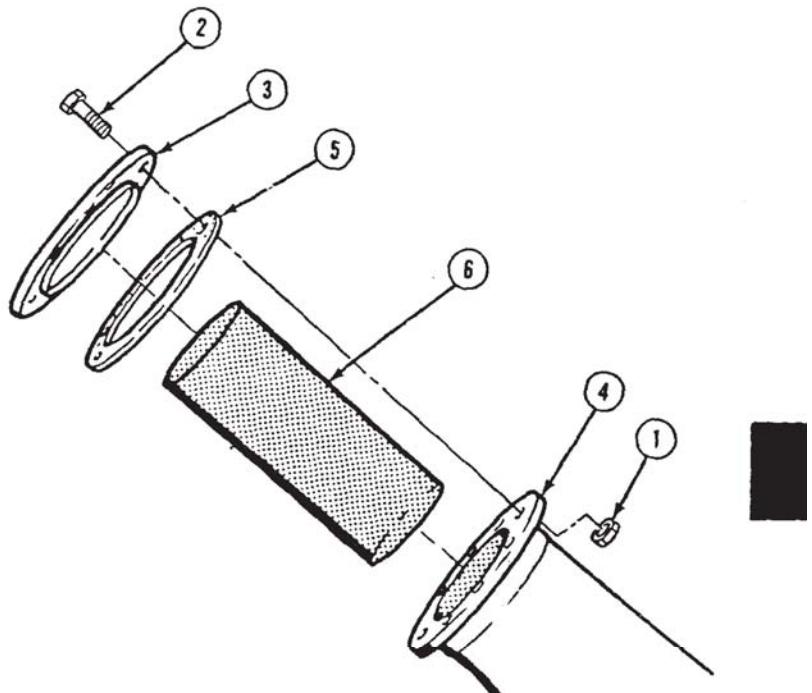
*b. Disassembly.*

- (1) Remove eight nuts (1) and screws (2) from cover (3) and strainer (4).
- (2) Remove cover (3) and gasket (5) from strainer (4).
- (3) Remove basket (6) from strainer (4).

*c. Cleaning/Inspection.***WARNING**

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

- (1) Clean all metal parts in dry cleaning solvent.
- (2) Inspect all metal parts for cracked welds or other damage.
- (3) Inspect threaded parts for damage.
- (4) Replace damaged parts.



TA186577

## M978 Tanker Maintenance Instructions (Cont)

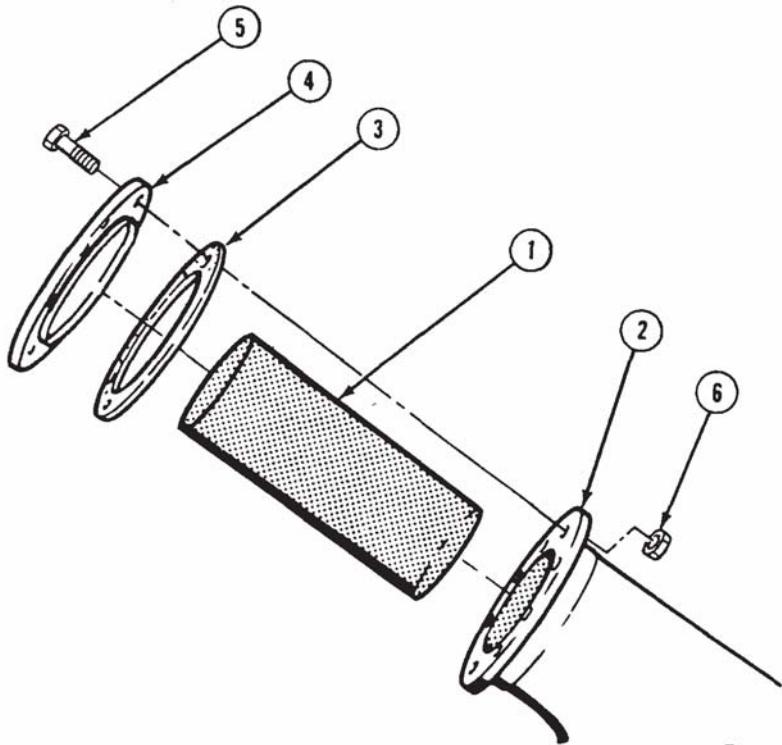
**25-37. TANK FUEL STRAINER REMOVAL/REPAIR/INSTALLATION (CONT.)****d. Assembly.**

- (1) Install basket (1) in strainer (2).

**WARNING**

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

- (2) Apply adhesive-sealant to both sides of gasket (3) and position gasket on strainer (2).
- (3) Position cover (4) on gasket (3) and strainer (2).
- (4) Install eight screws (5) and nuts (6) in cover (4) and strainer (2). Tighten screws to 10 lb-ft (14 N·m).

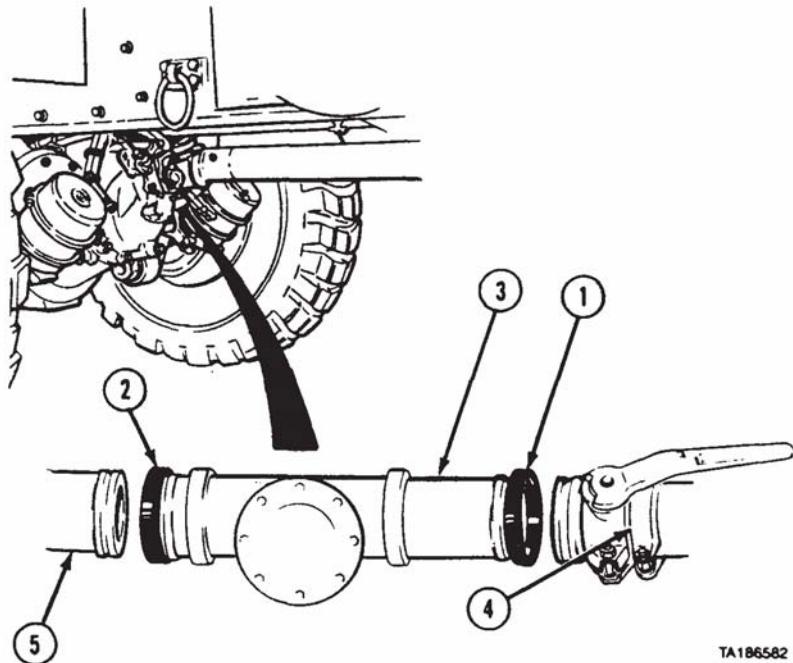


TA186580

**e. Installation.****NOTE**

Do not tear or otherwise damage coupling gaskets during installation or while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

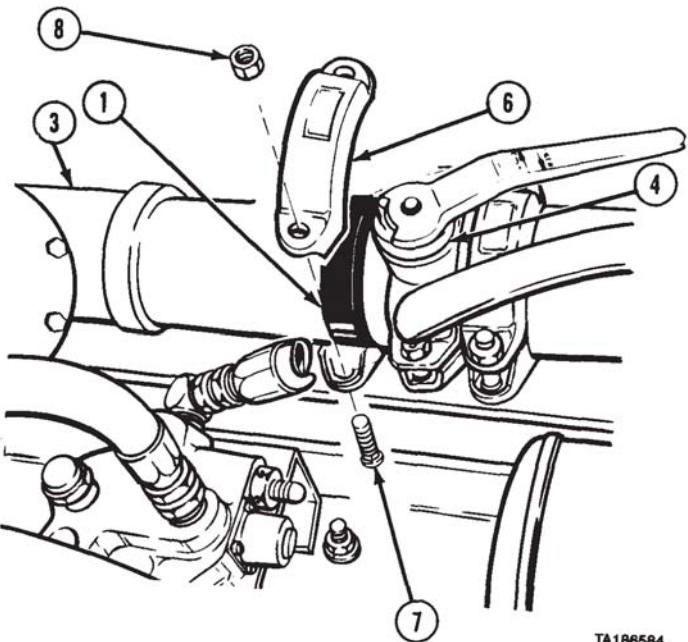
- (1) Position two coupling gaskets (1 and 2) on ends of strainer (3).
- (2) Position strainer (3) between V3 suction line valve (4) and pipe (5).



TA186582

## M978 Tanker Maintenance Instructions (Cont)

- (3) Push coupling gasket (1) on end of V3 suction line valve (4) so that ends of strainer (3) and V3 suction line valve are covered.
- (4) Install two coupling halves (6) on coupling gasket (1) with two screws (7) and nuts (8). Do not tighten.

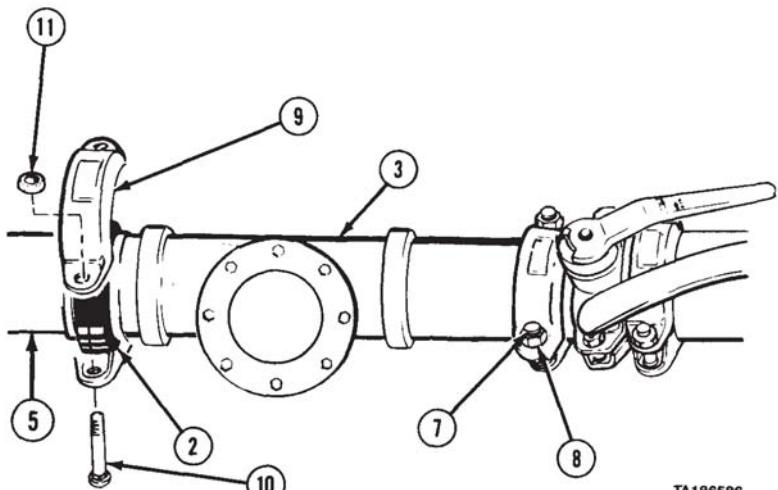


TA186584

**CAUTION**

Do not pinch or pull coupling gaskets off-center during installation or while installing coupling halves. If coupling gaskets are damaged or moved out of position, piping connections will leak.

- (5) Push coupling gasket (2) on end of pipe (5) so that ends of strainer (3) and pipe are covered.
  - (6) Install two coupling halves (9) on coupling gasket (2) with two screws (10) and nuts (11). Do not tighten.
  - (7) Alternately tighten screws (7 and 10) and nuts (8 and 11).
- f. *Follow-on Maintenance.*
- (1) Prepare tanker for operation (TM 9-2320-279-10).
  - (2) Recirculate fuel (TM 9-2320-279-10).
  - (3) Check line strainer assembly for leaks.



TA186586

END OF TASK

## M978 Tanker Maintenance Instructions (Cont)

<b>25-38. CAP AND CABLE REMOVAL/INSTALLATION.</b>	
This task covers:	
a. Removal b. Installation c. Follow-on Maintenance	
INITIAL SETUP	
<i>Models</i>	<i>References</i>
M978	None
<i>Test Equipment</i>	<i>Equipment Condition</i>
None	<i>TM or Para</i> <i>Condition Description</i> TM 9-2320-279-10 Pump module rear doors opened.
<i>Special Tools</i>	<i>Special Environmental Conditions</i>
None	None
<i>Supplies</i>	<i>General Safety Instructions</i>
None	No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.
<i>Personnel Required</i>	
MOS 63S, Heavy wheel vehicle mechanic	

## M978 Tanker Maintenance Instructions (Cont)

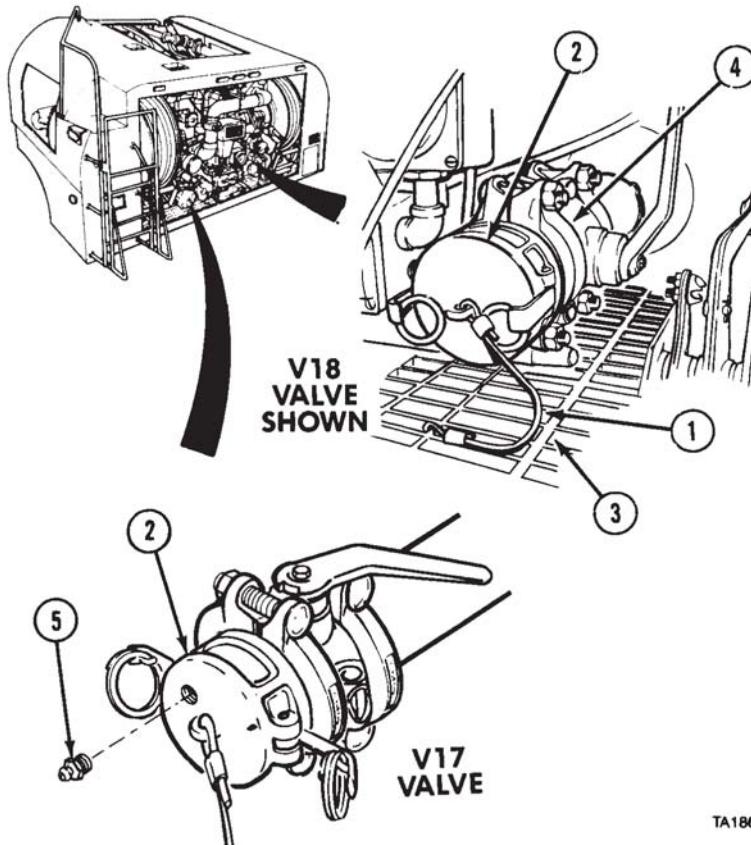
*a. Removal.***WARNING**

- Make sure V17 GRAVITY VALVE, V18 BULK DELIVERY VALVE, and V11 FLOW VALVE are closed before removing caps. Spilled fuel from open valves can cause serious fires and death or injury to personnel.
- Contact with fuel can irritate eyes and skin. Do not let fuel get into eyes. If fuel comes into contact with eyes, immediately rinse eyes with clear water. Wash fuel off skin with soap and water as soon as possible after contact.

**NOTE**

Dust caps and cables on V17 GRAVITY VALVE, V18 BULK DELIVERY VALVE, V11 FLOW VALVE, two servicing hoses, and vapor recovery system are removed the same way.

- (1) Remove cable (1) from cap (2) and grating (3).
- (2) Remove cap (2) from valve (4).



TA186353

**NOTE**

Do step (3) for V17 GRAVITY VALVE dust cap only.

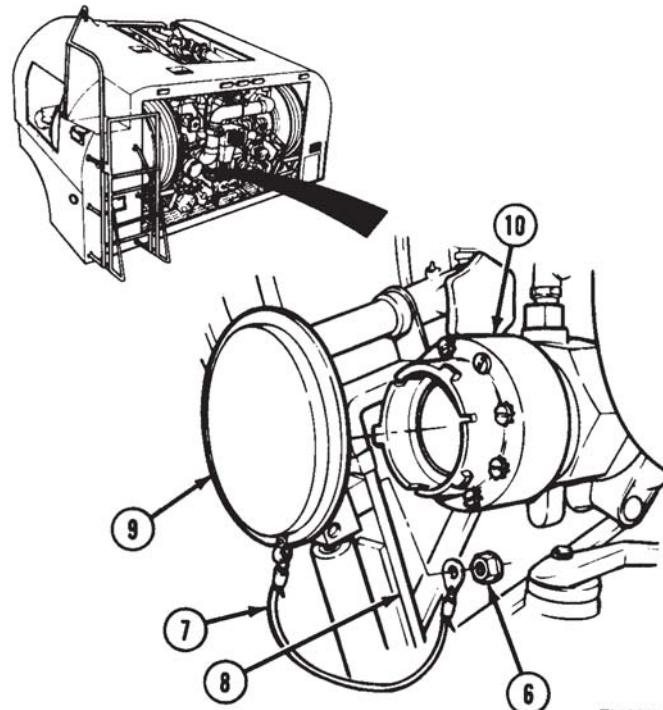
- (3) Remove vacuum release (5) from cap (2).

## M978 Tanker Maintenance Instructions (Cont)

**25-38. CAP AND CABLE REMOVAL/INSTALLATION (CONT.).****NOTE**

Do steps (4) and (5) for V2 bottom load adapter dust cap only.

- (4) Remove locknut (6) and cable (7) from H1 REEL mount (8).
- (5) Remove cap (9) from V2 bottom load adapter (10).

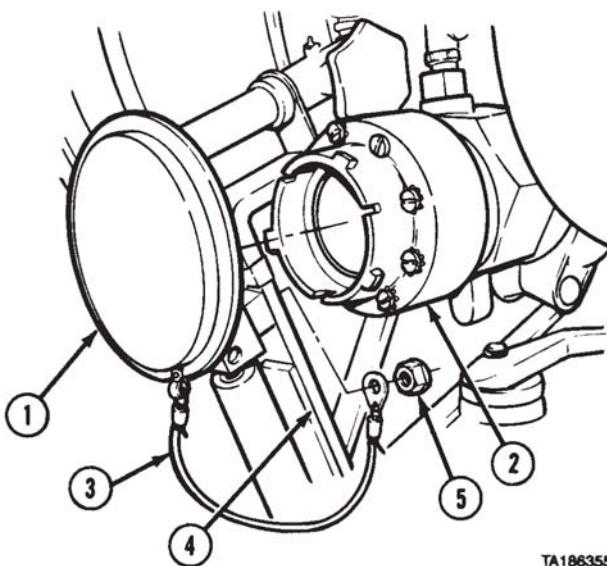


TA186354

**b. Installation.****NOTE**

Do steps (1) and (2) for V2 bottom load adapter dust cap only.

- (1) Install cap (1) on V2 bottom load adapter (2).
- (2) Install cable (3) on H1 REEL mount (4) with locknut (5).



TA186355

## M978 Tanker Maintenance Instructions (Cont)

**NOTE**

Dust caps and cables for V17 GRAVITY VALVE, V18 BULK DELIVERY VALVE, V11 FLOW VALVE, two servicing hoses, and vapor recovery system are install the same way.

- (3) Install cap (6) on valve (7).
- (4) Install cable (8) on cap (6) and grating (9).

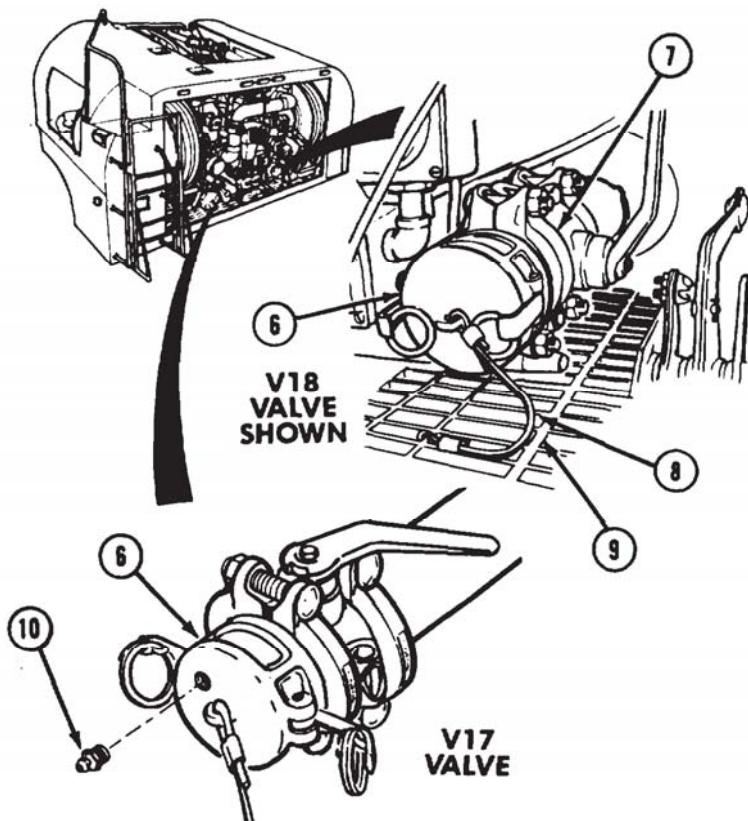
**NOTE**

Do step (5) for V17 GRAVITY VALVE dust cap only.

- (5) Install vacuum release (10) in cap (6).

*c. Follow-on Maintenance.* Close pump module rear doors (TM 9-2320-279-10).

**END OF TASK**



## M978 Tanker Maintenance Instructions (Cont)

**25-39. DROP TUBE REMOVAL/INSTALLATION.**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Inspection            |
| b. Installation | d. Follow-on Maintenance |

**INITIAL SETUP***Models*

M978

*Test Equipment*

None

*Special Tools*

None

*Supplies*

Grease, Item 23.2, Appendix C

Locking compound, Item 16.1, Appendix C

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*References*

None

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
Para 16-49	Tank filler lid removed.

*Special Environmental Conditions*

None

*General Safety Instructions*

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

**WARNING**

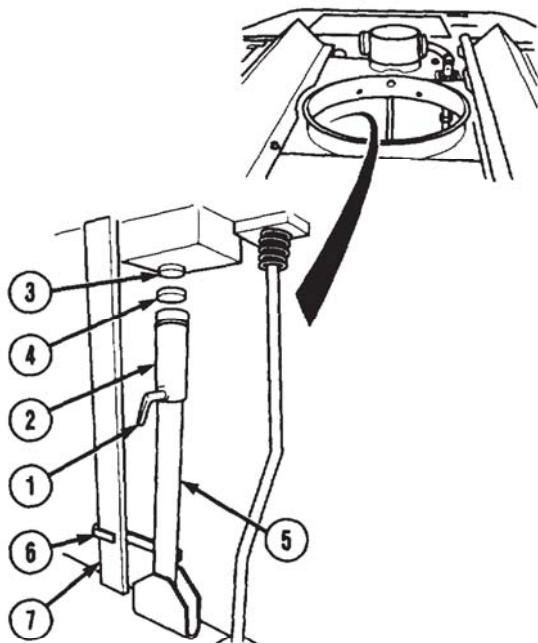
- Before entering tank, be certain to read and follow all safety precautions in FM 10-71. Liquids and vapors carried in the M978 tanker are flammable and may cause injury or death.
- No smoking, flame, sparks, or hot or glowing objects within 50 ft (15 m) of vehicle.

**NOTE**

Some tanks have pipes permanently welded. On some tanks the pipe is removable.

*a. Removal.*

- (1) Loosen setscrew (1).
- (2) Loosen end fitting (2) until it does not contact return port (3).
- (3) Remove and discard seal (4).
- (4) Position tube (5) to unhook bracket (6) from tank brace (7).
- (5) Remove drop tube (5).



## M978 Tanker Maintenance Instructions (Cont)

**b. Installation.****NOTE**

- On some tanks, there is no pipe extending from the return port. On these tanks, install seal into end fitting.
  - Some tanks have pipes permanently welded. On some tanks the pipe is removable.
- (1) Apply grease to seal (1) and install over return port (2).
- (2) Position drop tube (3) inside tank (4) so hook bracket (5) is around brace (6).

**CAUTION**

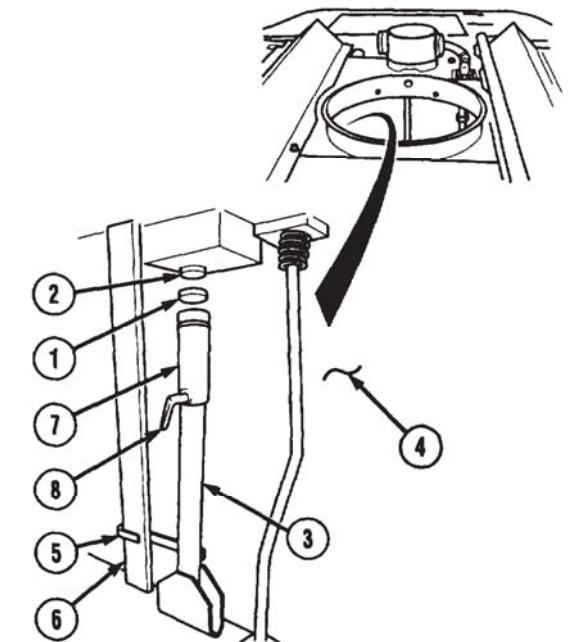
Do not overtighten end fitting or seal damage will result.

- (3) Turn end-fitting (7), first by hand, then using a pipe wrench until seal (1) is squeezed out between return port (2) and end-fitting (7).
- (4) Apply thread locking compound to set screw threads (8) and tighten.

**c. Inspection.** When the drop tube seal is properly installed, fuel should not spray from the seal area when evacuating hoses. This can be observed by opening the manhole and watching for spraying fuel during hose evacuation.

**d. Follow-on Maintenance.** Install tank filler lid (para 16-49).

**END OF TASK**



## M978 Tanker Maintenance Instructions (Cont)

## **25-40. HOSE REEL CRANK STOWAGE HARDWARE REMOVAL/INSTALLATION.**

This task covers:

- a. Removal
  - b. Installation

## INITIAL SETUP

## *Models*

M978

## References

None

## *Test Equipment*

None

### *Equipment Condition*

TM or Pam

### *Condition Description*

### *Special Tools*

None

### *Special Environmental Conditions*

specii  
Nano

## Supplies

None

## *General Safety Instructions*

No. 8

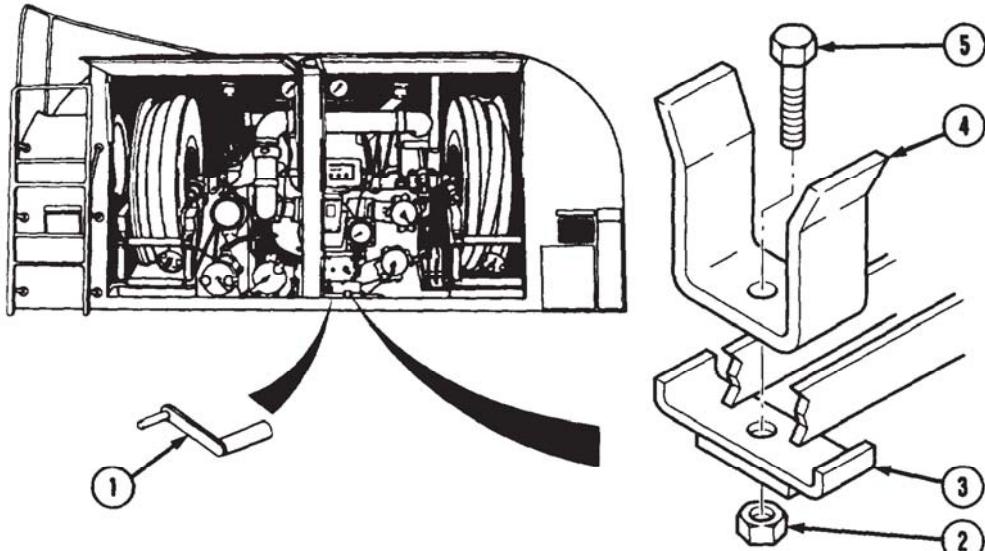
### *Personnel Required*

## MOS 63S, Heavy wheel vehicle mechanic

*General Safety Instructions*

No smoking, flame, sparks, and hot or glowing objects within 50 ft (15 m) of vehicle.

*a. Removal.*



- (1) Remove hose reel crank (1) from stowage.
  - (2) Remove nut (2), mending plate (3), clip (4), and bolt (5).

### ***b. Installation***

- (1) Install clip (4) and mending plate (3) with bolt (5) and nut (2).
  - (2) Install hose reel crank (1) in stowage.

END OF TASK

## M978 Tanker Maintenance Instructions (Cont)

**25-41. VAPOR RECOVERY TEST**

This task covers:

- |                             |                          |
|-----------------------------|--------------------------|
| a. Test Setup               | c. Test Cleanup          |
| b. Test Operating Procedure | d. Follow-on Maintenance |

**INITIAL SETUP***Models*

M978

*Test Equipment*

Manometer

Air Regulator (0-3 psi Maximum Range)

Four' in. Camlock Test Cover  
(Drilled and tapped for 3/4-in. tee fitting)

Vapor Recovery Kit  
(Eastern Technologies, P/N 45D016)

*Supplies*

Ties, cable, plastic, Item 52, Appendix C

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*References*

California Air Resources Board Certification and Test Procedures for Vapor Recovery Systems of Gasoline Delivery Tanks.

*Equipment Condition*

TM or Para

Para 25-3

Para 23-4

*Condition Description*

Tank and piping drained.

Filter separator drained.

*Special Environmental Conditions*

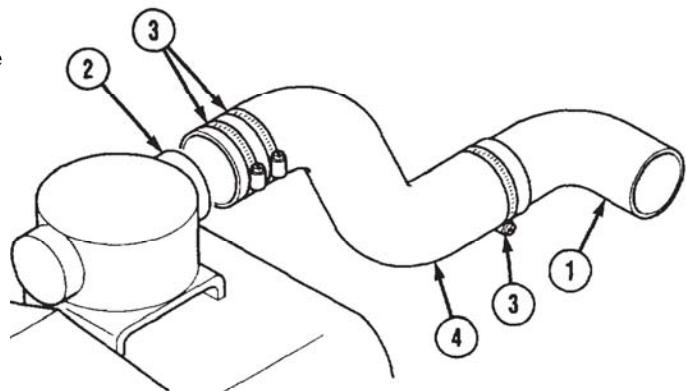
None

*General Safety Instructions*

No smoking, flame, sparks and hot or glowing objects within 50 ft (15 m) of vehicle.

**a. Test Setup.**

- (1) Install vapor recovery kit as follows:
  - (a) Adjust 90-degree elbow (1) on vapor recovery pipe in rear module forward towards top vent valve boot.
  - (b) Install 3.5-in. metal connector (2) into boot opening.
  - (c) Slide three clamps (3) over connector and boot.
  - (d) Install molded rubber vapor tube (4) onto 90-degree elbow and 3.5 in. metal connector.
  - (e) Position and tighten three clamps (3).
- (2) Install 4 in. camlock cover (5), prefitted with manometer and air regulator, to end of vapor recovery pipe (rear module).



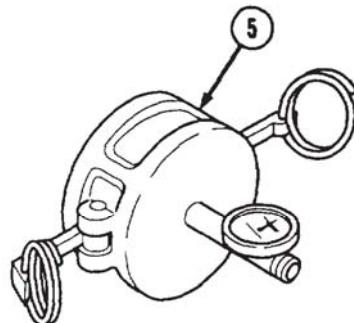
## M978 Tanker Maintenance Instructions (Cont)

**2541. VAPOR RECOVERY TEST (CONT).**

- (3) Place V6 fuel-defuel valve in "fuel" position.
- (4) Locate V10 bottom load valve beneath tank. Turn and hold lever open, thus opening top vent valve. Secure lever in open position using tiewraps or wire.

**CAUTION**

Do not allow more than 3 psi pressure in M978 tank. Damage to tank may result.

**NOTE**

The V10 bottom load valve lever shall be released after completion of first part of test operating procedure.

**b. Test Operating Procedure.** Refer to test operating procedure documented in: CERTIFICATION AND TEST PROCEDURES FOR VAPOR RECOVERY SYSTEMS OF FUEL DELIVERY TANKS.

**c. Test Cleanup.****WARNING**

During pressure tests, ensure air pressure is drained to 0 psi (0 kPa) before taking off any components. If pressure is not released, plates or line could blow off and harm personnel. Do not drain air from tank with any part of body in air spray path. Skin embolisms and/or debris in eyes can occur from released pressure.

- (1) Reduce tank pressure to atmosphere pressure at 4 in. camlock test cover (5).
- (2) Remove 4 in. camlock test cover (5) and reinstall quick disconnect cap.
- (3) Remove vapor recovery test kit and reposition 90-degree elbow to original position.

**d. Follow-on Maintenance. None.**

**END OF TASK**

# CHAPTER 26

## CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL (CBR) EQUIPMENT MAINTENANCE

Contents	Para	Page
General . . . . .	26-1	26-1
M-8 Chemical Alarm Kit Removal/Installation . . . . .	26-2	26-1
M-13 Decontamination Unit Removal/Installation . . . . .	26-3	26-11
Gas Particulate Filter Unit (GPFU) Removal/Installation . . . . .	26-4	26-14

### Section I. INTRODUCTION

**26-1. GENERAL.** This chapter contains maintenance instructions for removing and installing chemical, biological, and radiological (CBR) components authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

### Section II. CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL (CBR) EQUIPMENT

#### Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions

##### **26-2. M-8 CHEMICAL ALARM KIT REMOVAL/INSTALLATION.**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

#### INITIAL SETUP

**Models**

All

**References**

TM 3-6665-225-12

**Test Equipment**

None

**Equipment Condition**

TM or Para      Condition Description  
Para 7-91      Batteries disconnected.

**Special Tools**

None

**Special Environmental Conditions**

None

**Supplies**

Tags, identification, Item 48, Appendix C

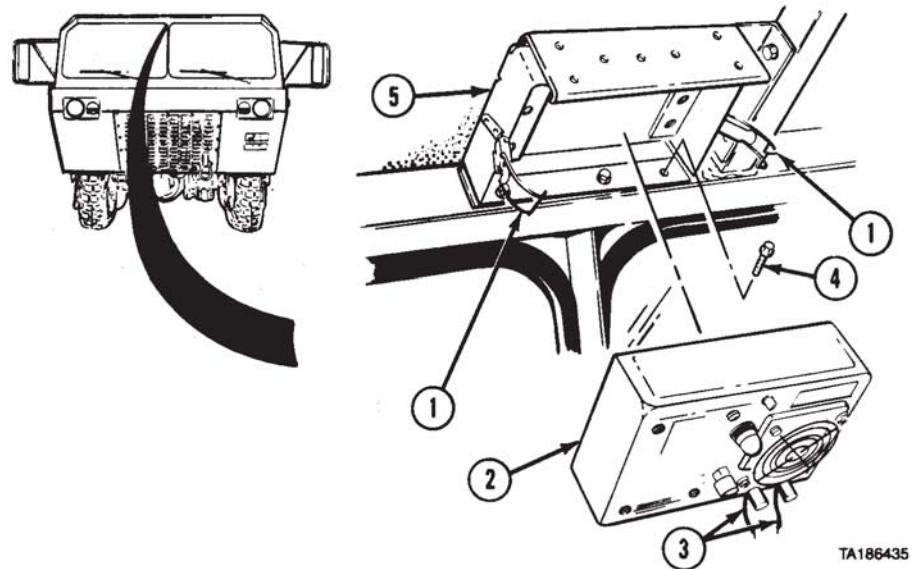
**General Safety Instructions**

None

**Personnel Required**

MOS 63S, Heavy wheel vehicle mechanic

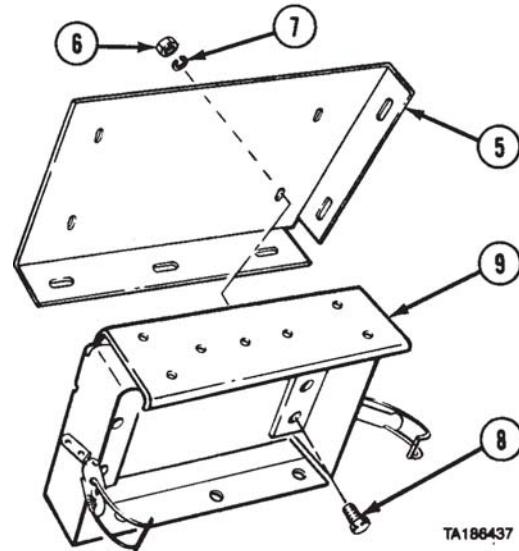
## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

**|26-2. M-8 CHEMICAL ALARM KIT REMOVAL/INSTALLATION (CONT)|***a. Removal.*

## NOTE

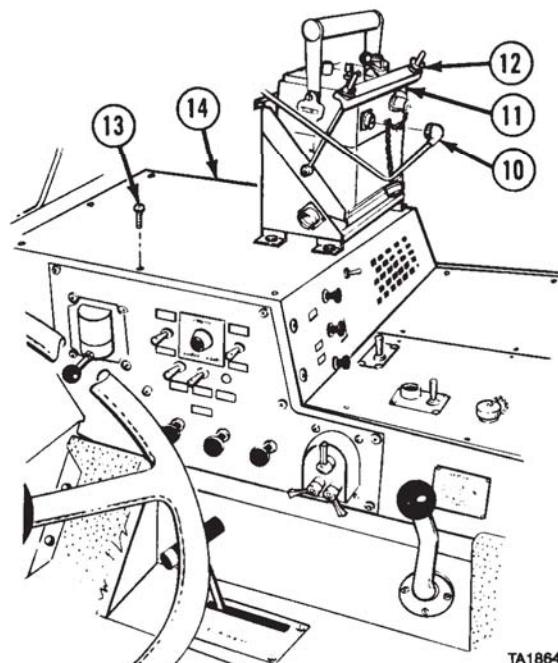
Refer to TM 3-6665-225-12 for further information on the M-8 chemical alarm.

- (1) Loosen two clamps (1) and remove alarm (2).
- (2) Disconnect two wires (3) from alarm (2).
- (3) Remove five screws (4) and bracket (5).
- (4) Remove four nuts (6), lockwashers (7), screws (8), and hanger (9) from bracket (5).



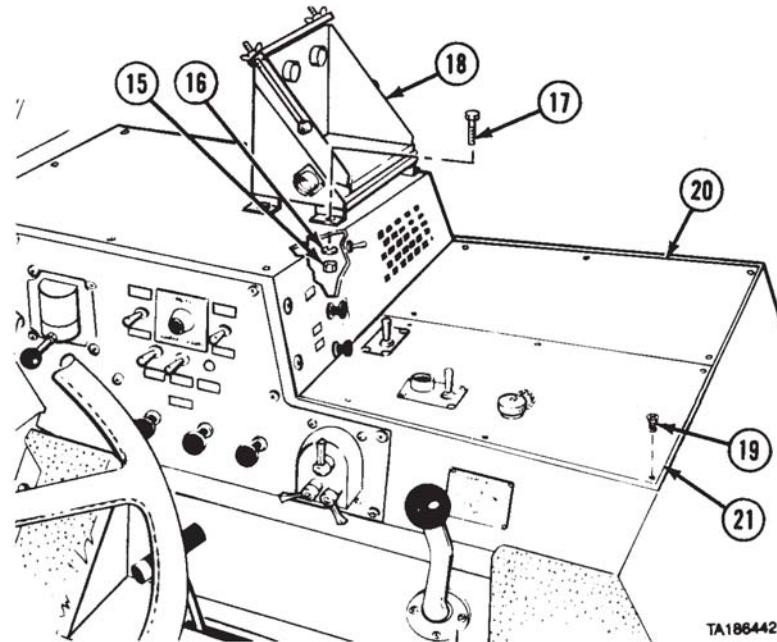
## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

- (5) Disconnect connector (10) from detector (11).
- (6) Loosen two wingnuts (12) and remove detector (11).
- (7) Remove eight screws (13) and lift heater compartment cover (14).



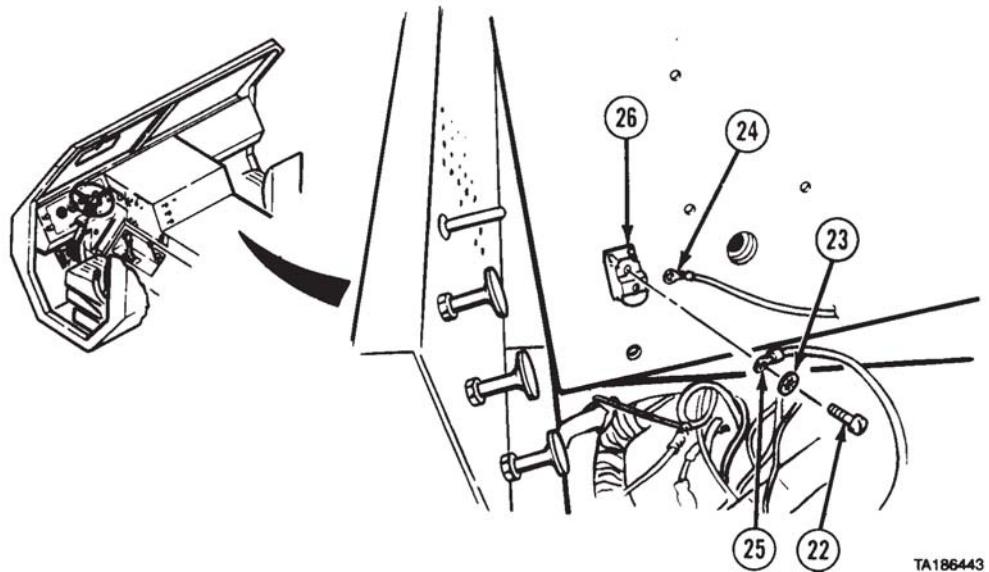
TA186438

- (8) Remove four nuts (15), lockwashers (16), screws (17), and detector mount (18).
- (9) Remove 11 screws (19) and lift heater compartment covers (20 and 21).



TA186442

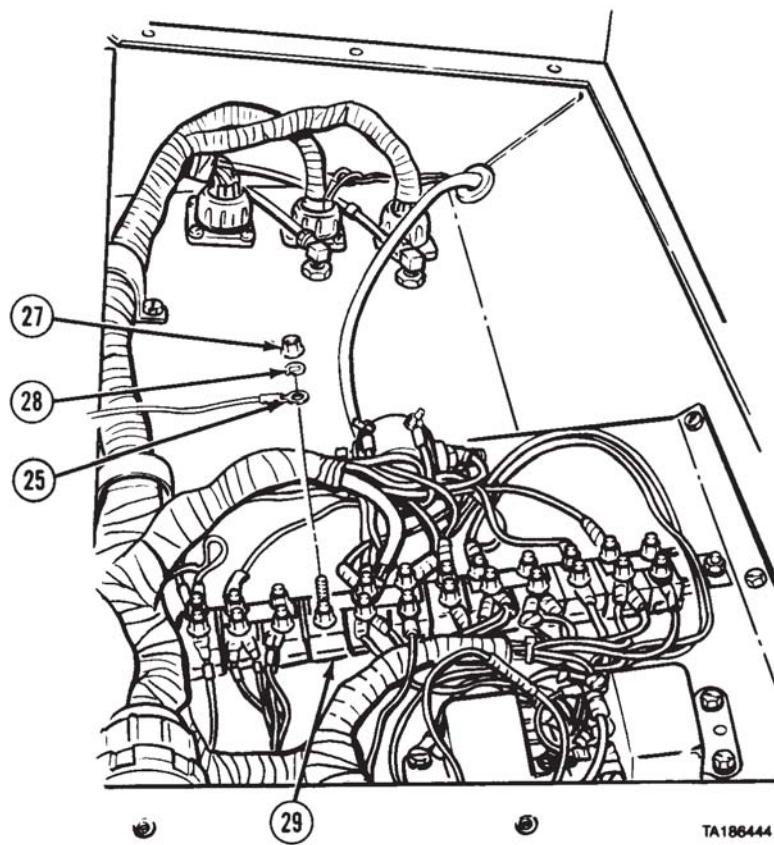
## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

26-2. M-8 CHEMICAL ALARM KIT REMOVAL/INSTALLATION (CONT).

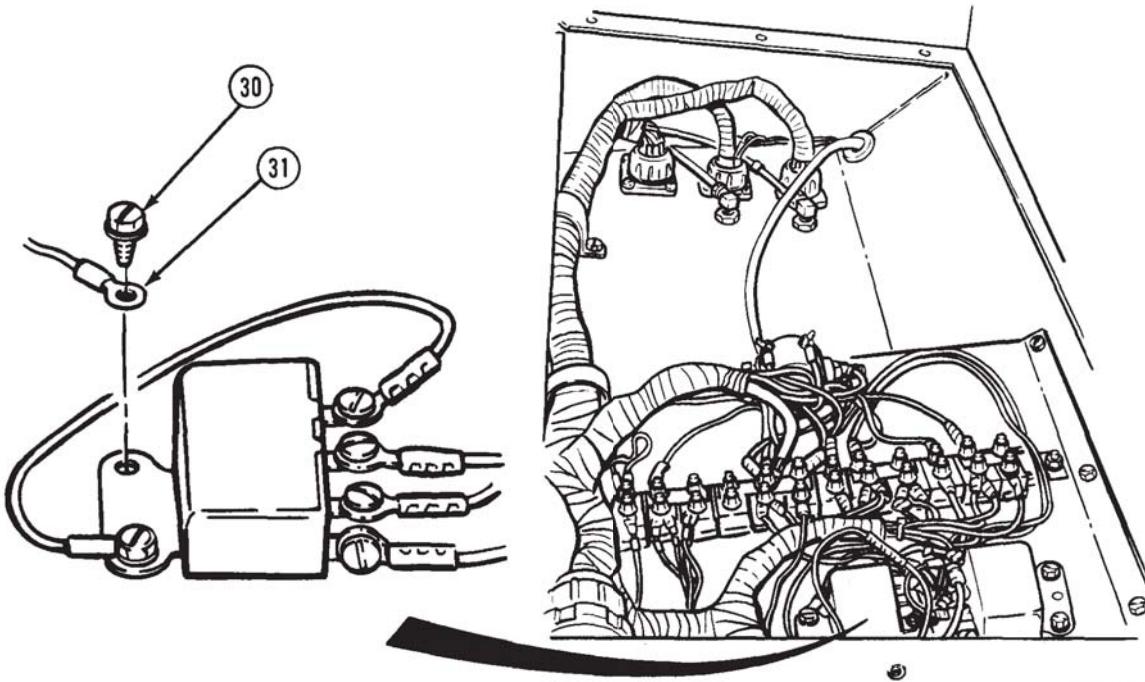
## NOTE

Tag and mark wires before disconnecting.

- (10) Remove two screws (22) and lockwashers (23). Disconnect wire (24) and ground wire (25) from switch (26).
- (11) Remove nut (27) and lockwasher (28). Remove ground wire (25) from circuit breaker No. 4 (29).

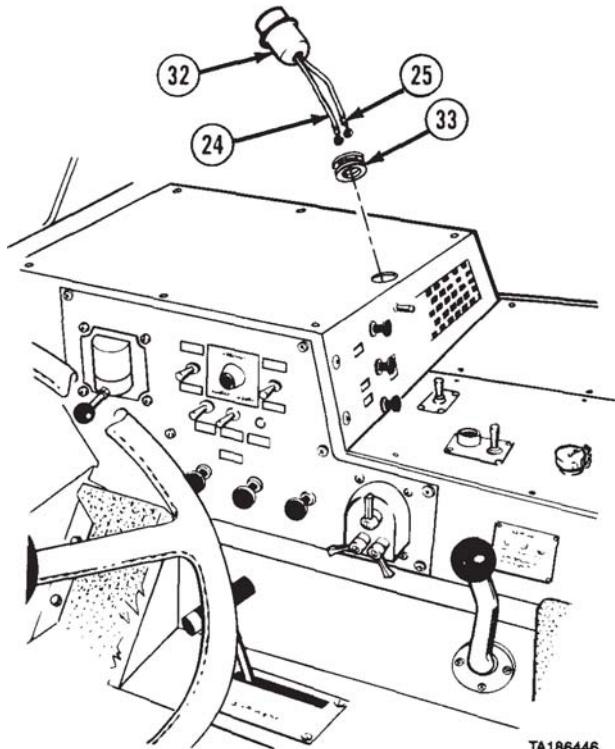


## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)



TA186445

- (12) Remove screw (30) and ground wire (31).
- (13) Pull connector (32), wire (24), and ground wire (25) through grommet (33).
- (14) Remove grommet (33).

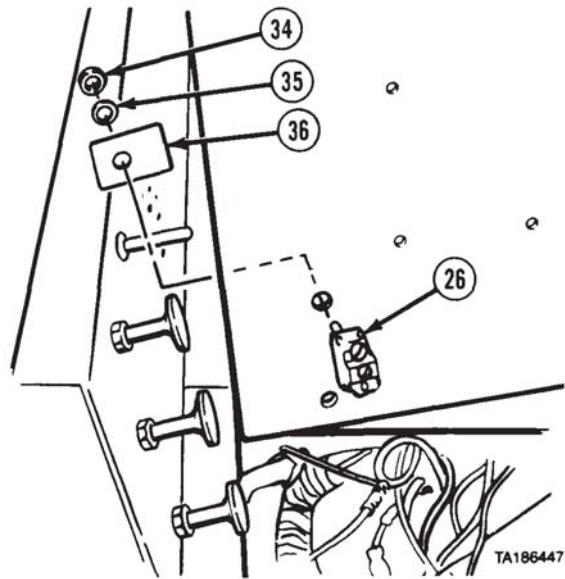


TA186446

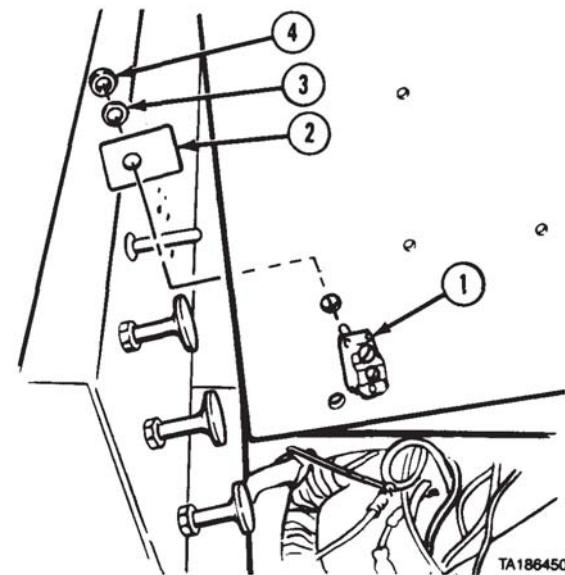
## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

**26-2. M-8 CHEMICAL ALARM KIT REMOVAL/INSTALLATION (CONT).**

- (15) Remove nut (34), washer (35), data plate (36), and switch (26).

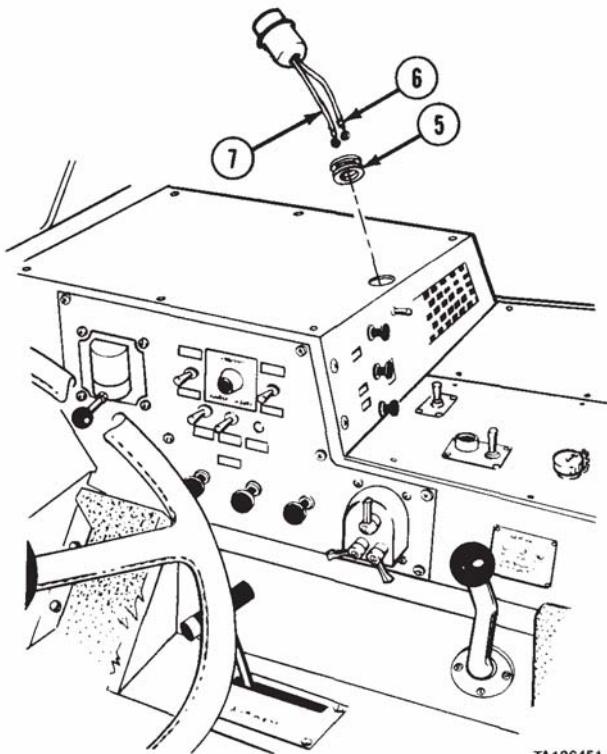
*b. Installation.*

- (1) Install switch (1) and data plate (2) with washer (3) and nut (4).



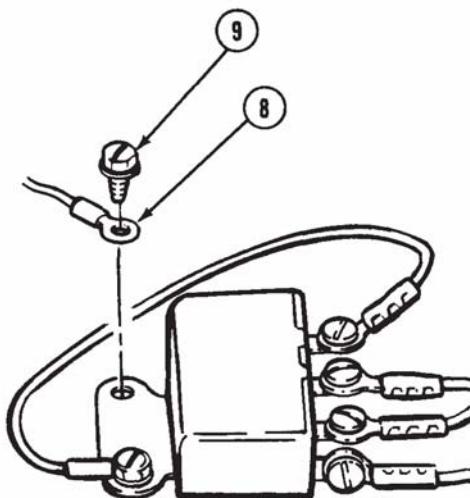
## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

- (2) Install grommet (5).
- (3) Install ground wire (6) and wire (7) through grommet (5).



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- (4) Install ground wire (8) with screw (9).

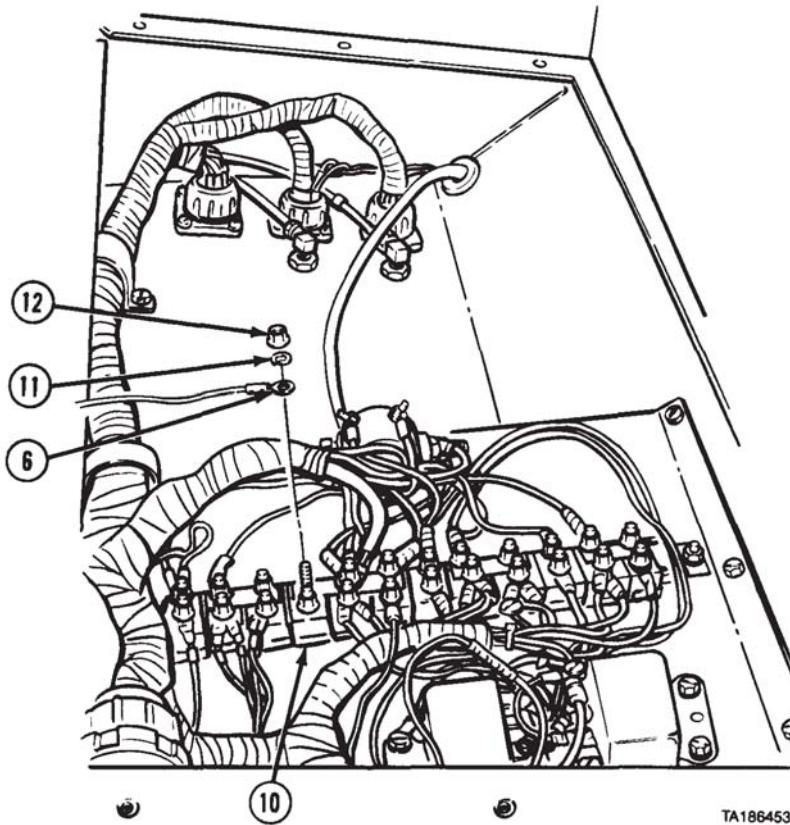


TA186452

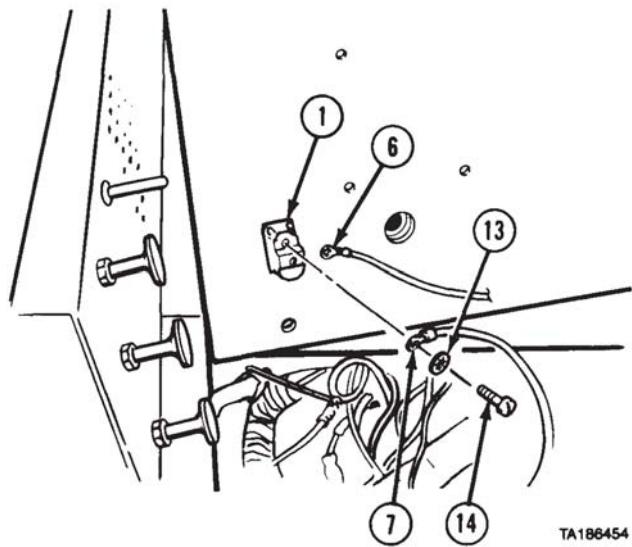
## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

**26-2. M-8 CHEMICAL ALARM KIT REMOVAL/INSTALLATION (CONT.).**

- (5) Install ground wire (6) on circuit breaker No. 4 (10) with lockwasher (11) and nut (12).

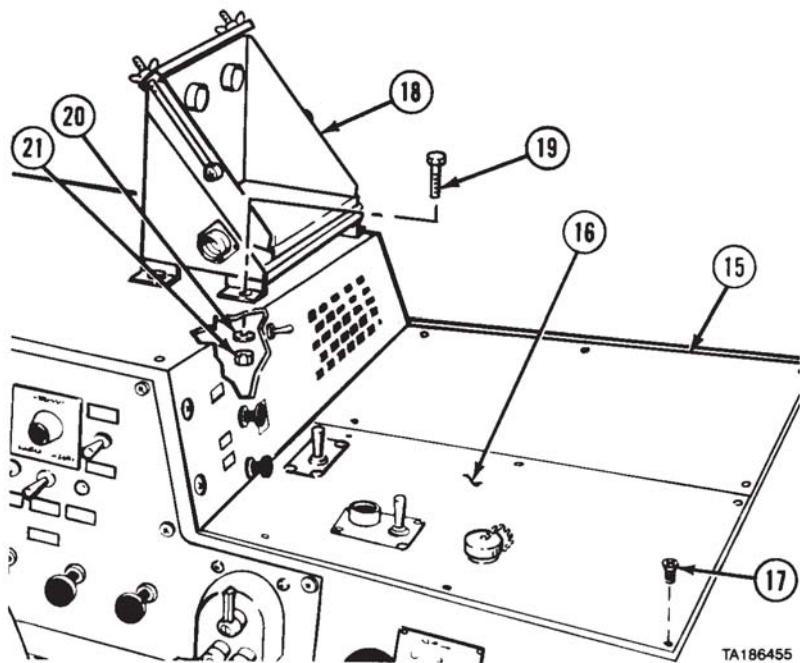


- (6) Install ground wire (6) and wire (7) on switch (1) with two lockwashers (13) and screws (14).



## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

- (7) Install two heater compartment covers (15 and 16) with 11 screws (17).
- (8) Install detector mount (18) with four screws (19), lockwashers (20), and nuts (21).

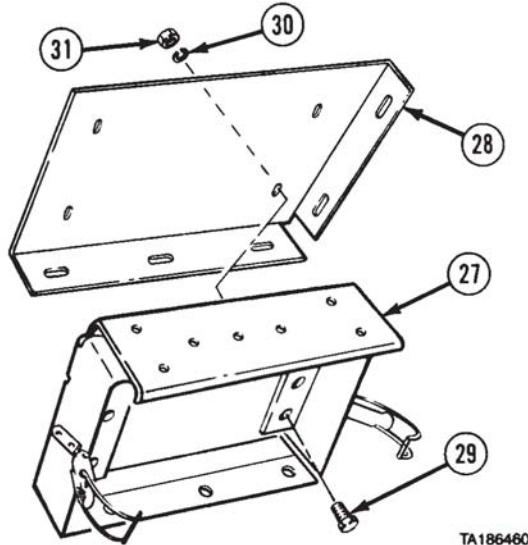


- (9) Install heater compartment cover (22) with eight screws (23).
- (10) Install detector (24) and tighten two wingnuts (25).
- (11) Connect connector (26) to detector (24).

## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

**26-2. M-8 CHEMICAL ALARM KIT REMOVAL/INSTALLATION (CONT).**

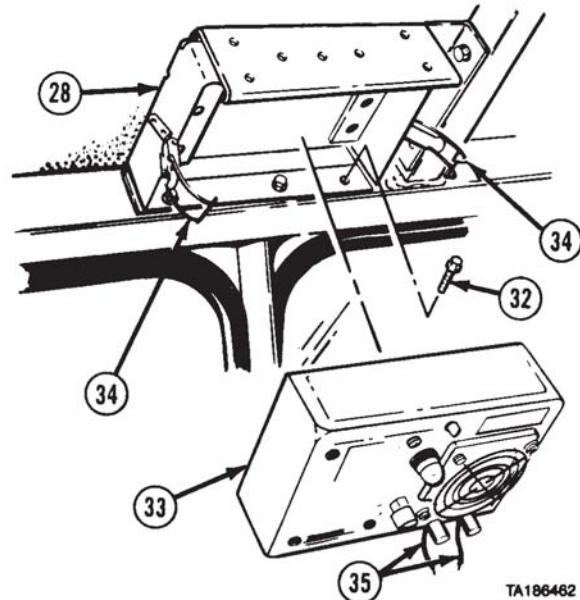
- (12) Install hanger (27) on bracket (28) with four screws (29), lockwashers (30), and nuts (31).



TA186460

- (13) Install bracket (28) with five screws (32).  
 (14) Install alarm (33) and tighten two clamps (34).  
 (15) Connect two wires (35) to alarm (33).  
 c. *Follow-on Maintenance.*  
 (1) Complete chemical alarm installation (TM 3-6665-225-12).  
 (2) Connect batteries (para 7-91).

END OF TASK



TA186462

## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

**26-3. M-13 DECONTAMINATION UNIT REMOVAL/INSTALLATION.**

This task covers:

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

**INITIAL SETUP***Models*

All

*Test Equipment*

None

*Special Tools*

None

*Supplies*

None

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic

*References*

TM 3-4230-214-12&amp;P

*Equipment Condition*

TM or Para Condition Description

TM 9-2320-279-10 Shut off engine.

*Special Environmental Conditions*

None

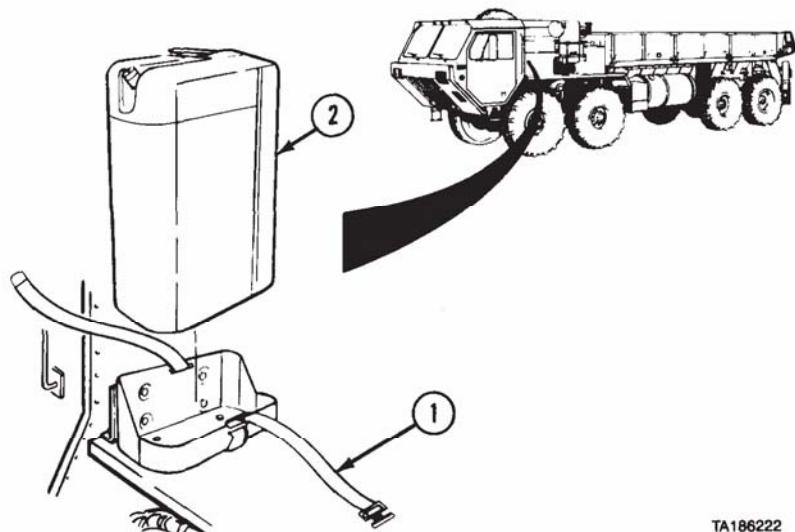
*General Safety Instructions*

None

**a. Removal.****NOTE**

Refer to TM 3-4230-214-12&P  
for further information on the  
M-13 decontamination unit.

- (1) Loosen strap (1) and  
remove decontamination  
unit (2).

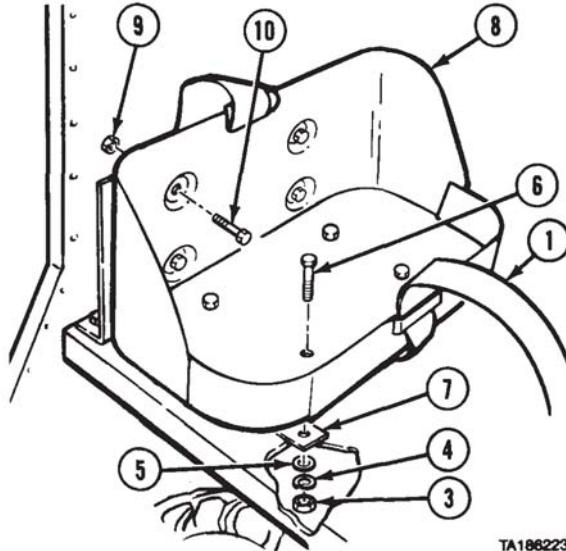


TA186222

## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

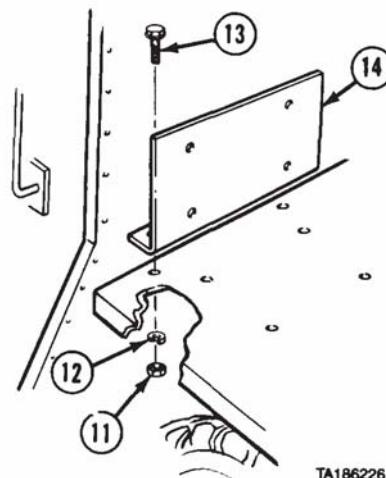
**26-3. M-13 DECONTAMINATION UNIT REMOVAL/INSTALLATION (CONT.).**

- (2) Remove four nuts (3), lockwashers (4), washers (5), screws (6), and two spacers (7) from carrier (8).
- (3) Remove four nuts (9), screws (10), and carrier (8).
- (4) Remove strap (1) from carrier (8).



TA186223

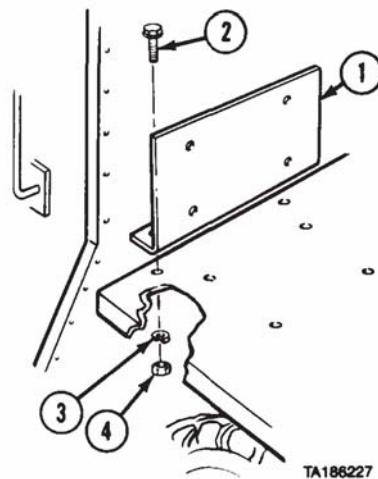
- (5) Remove two nuts (11), lockwashers (12), screws (13), and bracket (14).



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*b. Installation.*

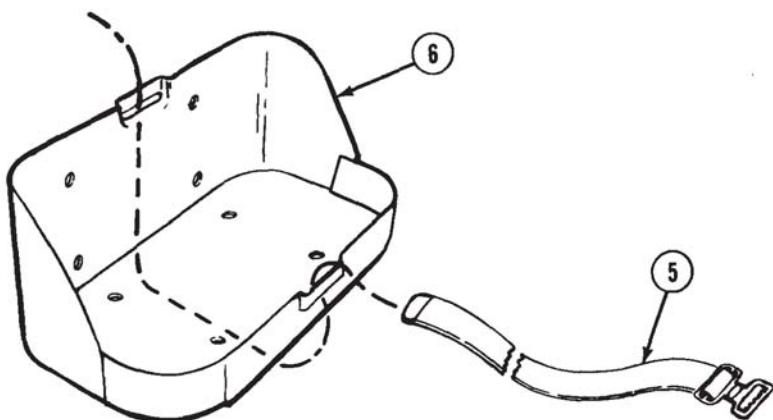
- (1) Install bracket (1) with two screws (2), lockwashers (3), and nuts (4).



TA186227

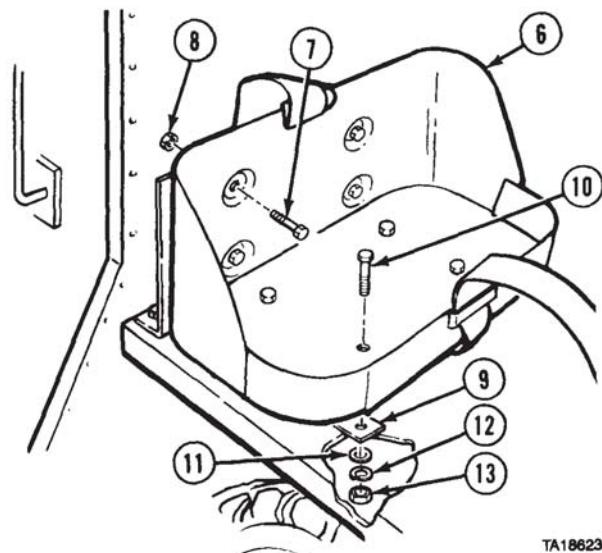
## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

- (2) Install strap (5) through carrier (6).



TA186228

- (3) Install carrier (6) with four screws (7), and nuts (8). Do not tighten.  
(4) Install two spacers (9), four screws (10), washers (11), lockwashers (12), and nuts (13).  
(5) Tighten screws (7 and 10).



TA186230

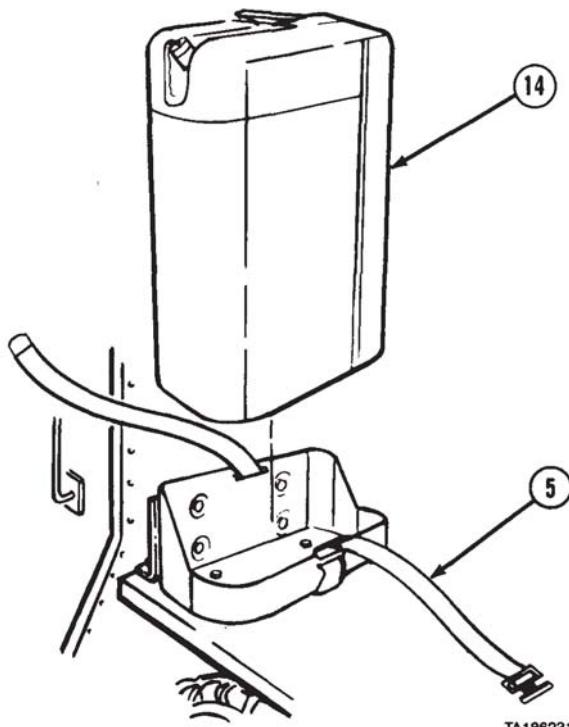
## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

**26-3. M-13 DECONTAMINATION UNIT REMOVAL/INSTALLATION (CONT.).**

(6) Install decontamination unit (14) and tighten strap (5).

c. Follow-on Maintenance. None.

END OF TASK



TA196231

**26-4. GAS PARTICULATE FILTER UNIT (GPFU) REMOVAL/INSTALLATION.**

This task covers:

- |                 |                          |
|-----------------|--------------------------|
| a. Removal      | c. Follow-on Maintenance |
| b. Installation |                          |

**INITIAL SETUP***Models*

All

*Test Equipment*

None

*Special Tools*

None

*Supplies*

Tags, identification, Item 48, Appendix C  
Compound, sealing, pipe thread, Item 18,  
Appendix C

*Personnel Required*

MOS 63S, Heavy wheel vehicle mechanic (2)

*References*

TM 3-220  
TM 10-277

*Equipment Condition*

<i>TM or Para</i>	<i>Condition Description</i>
Para 7-91	Batteries disconnected.

*Special Environmental Conditions*

Contaminated filters shall be placed in double-lined plastic bags, moved swiftly away from worksite, temporarily stored, and disposed of in accordance with local SOP.  
Decontamination operations shall be performed according to TM 3-220.

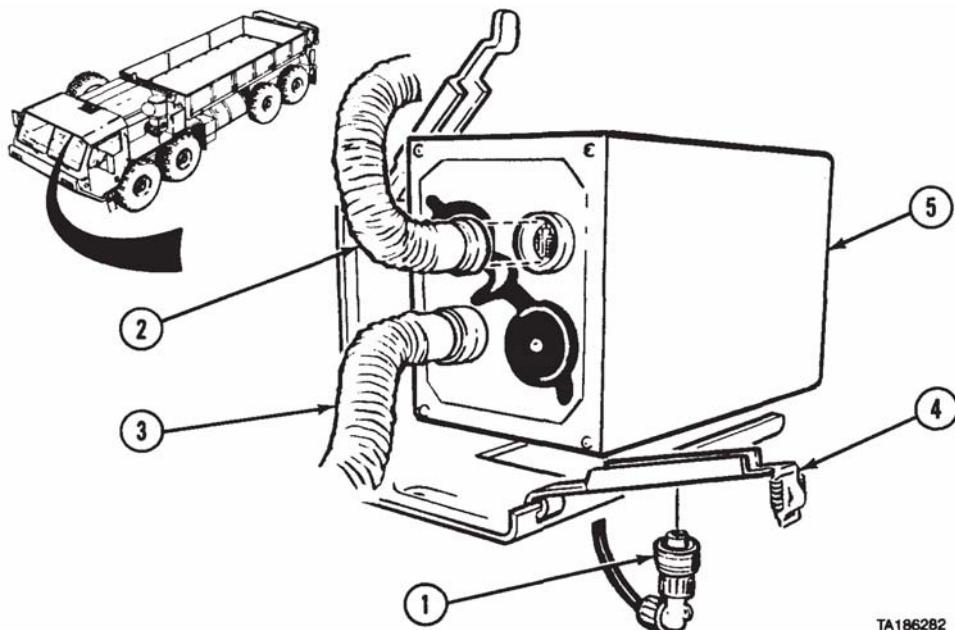
*General Safety Instructions*

After nuclear, biological, or chemical exposure of vehicle, air filter shall be handled with extreme caution. Wear protective clothing during this operation (TM 10-277).

## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

**WARNING**

After Nuclear, Biological, or Chemical (NBC) exposure of vehicle, all air filters shall be handled with extreme caution. Unprotected personnel may experience injury or death if residual toxic agents or radioactive material are present. If vehicle is exposed to chemical or biological agents, servicing personnel shall wear protective mask, hood, protective overgarments, and chemical protective gloves and boots in accordance with TM 10-277. All contaminated air filters shall be placed in double-lined plastic bags and moved swiftly to a segregation area away from the worksite. The same procedure applies for radioactive dust contamination. The Company NBC team should measure radiation prior to filter removal to determine extent of safety procedures required per the NBC Annex to the unit Standard Operating Procedures (SOP). The segregation area in which the contaminated air filters are temporarily stored shall be marked with appropriate NBC placards. Final disposal of contaminated air filters shall be in accordance with local SOP. Decontamination operation shall be in accordance with TM 3-220 and local SOP.

*a. Removal.***NOTE**

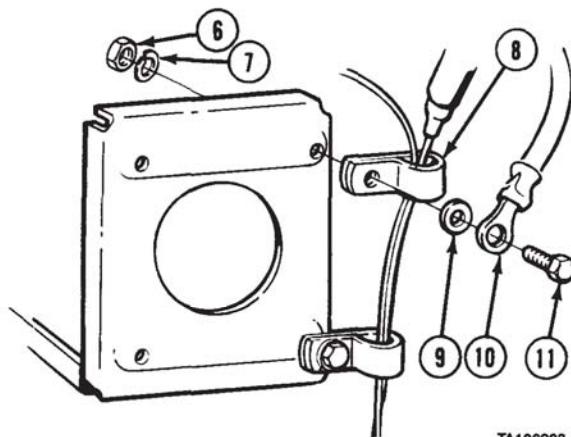
Tag and mark connectors, hoses, and wires before removal.

- (1) Disconnect connector (1).
- (2) Disconnect hoses (2 and 3).
- (3) Loosen clamp (4) and remove filter (5).

## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

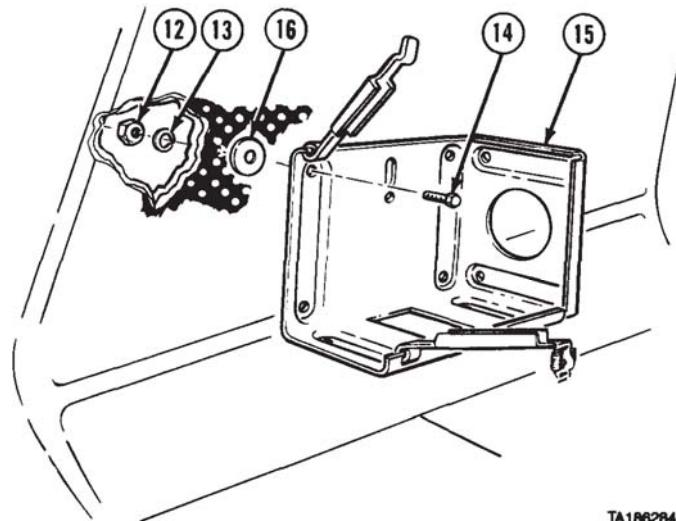
**26-4. GAS PARTICULATE FILTER UNIT (GPFU) REMOVAL/INSTALLATION (CONT).**

- (4) Remove two nuts (6), lockwashers (7), cushion clip (8), washers (9), ground wire (10), and two screws (11).



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- (5) Soldier A removes four nuts (12) and lockwashers (13) while Soldier B holds and removes four screws (14), bracket (15), and four washers (16).



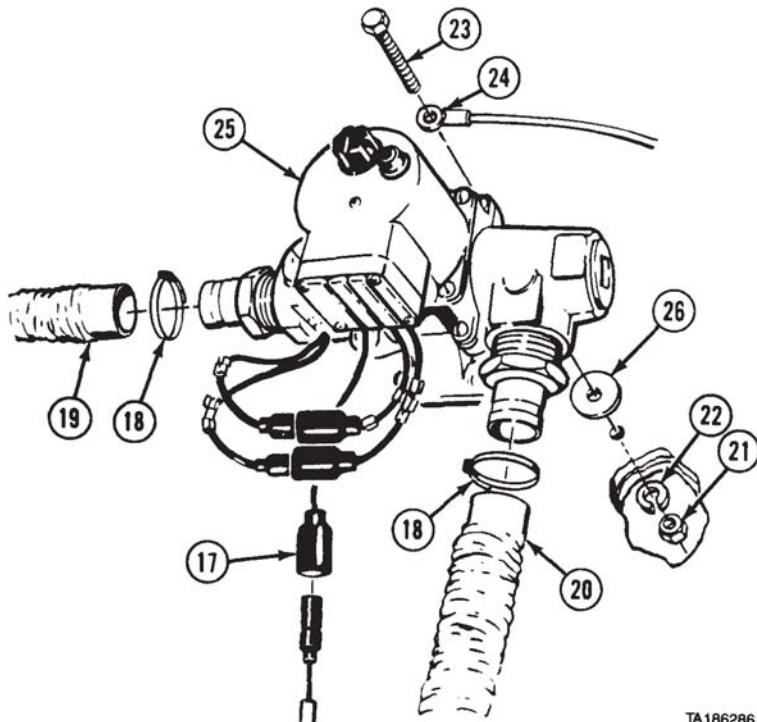
TA186284

## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

## NOTE

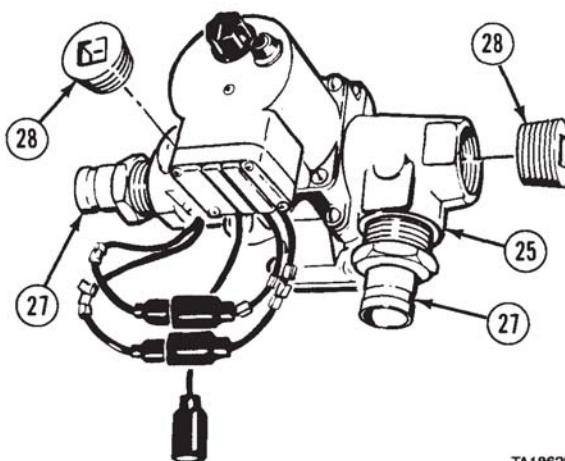
Right and left heaters are removed in a similar manner.

- (6) Disconnect wire (17).
- (7) Loosen two clamps (18).
- Remove hoses (19 and 20).
- Remove clamps.
- (8) Soldier A removes four nuts (21) and lockwashers (22) while Soldier B holds and removes four screws (23), ground wire (24), heater (25), and four washers (26).



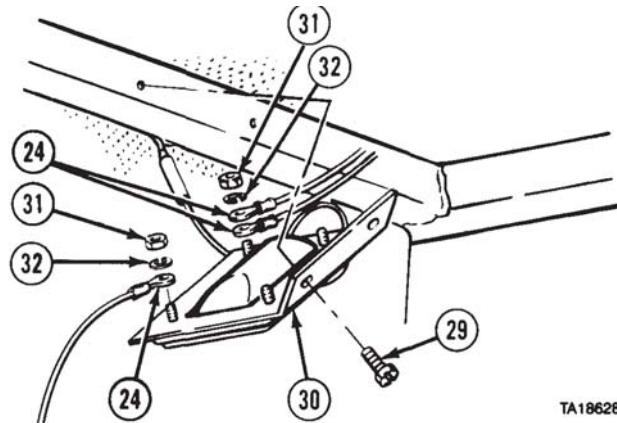
TA186286

- (9) Remove two fittings (27) from heater (25).
- (10) Remove two plugs (28).



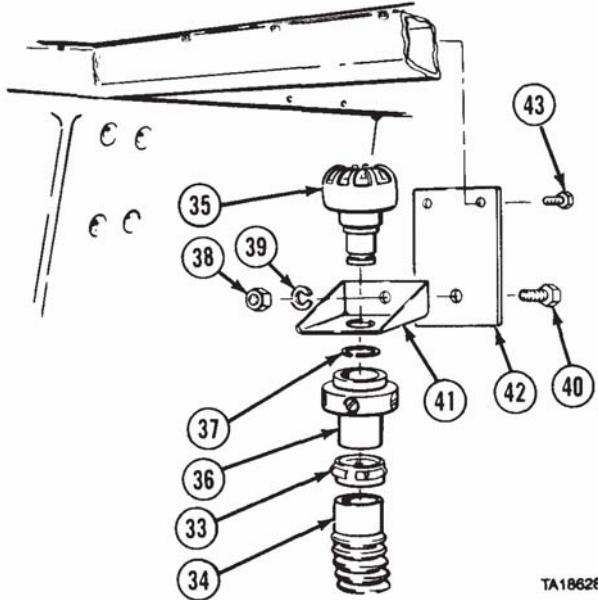
TA186287

## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

**26-4. GAS PARTICULATE FILTER UNIT (GPFU) REMOVAL/INSTALLATION (CONT).**

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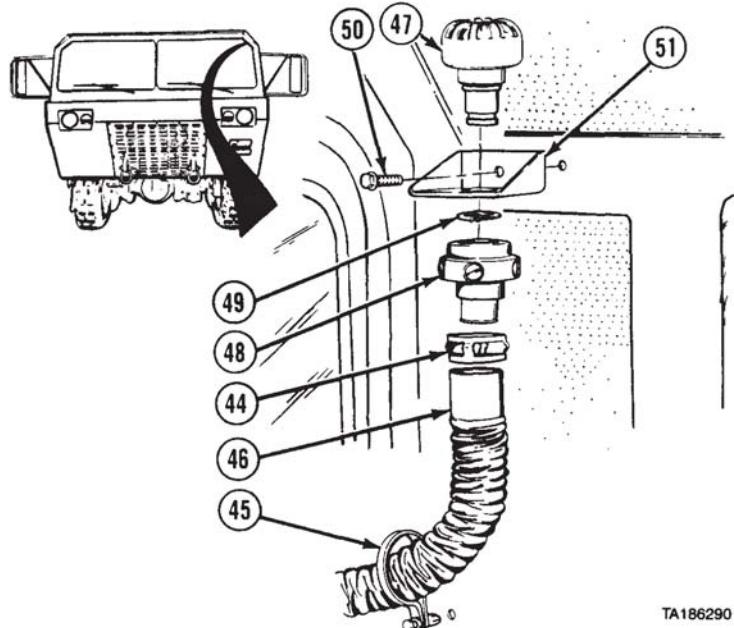
- (11) Remove two screws (29) and domelight bracket (30).
- (12) Remove two nuts (31) and lockwashers (32). Remove three ground wires (24).
- (13) Loosen clamp (33) and remove hose (34). Remove clamp.
- (14) Remove valve (35), connector (36), and retaining ring (37).
- (15) Remove nut (38), lockwasher (39), screw (40), and hanger (41) from bracket (42).
- (16) Remove two screws (43) and bracket (42).



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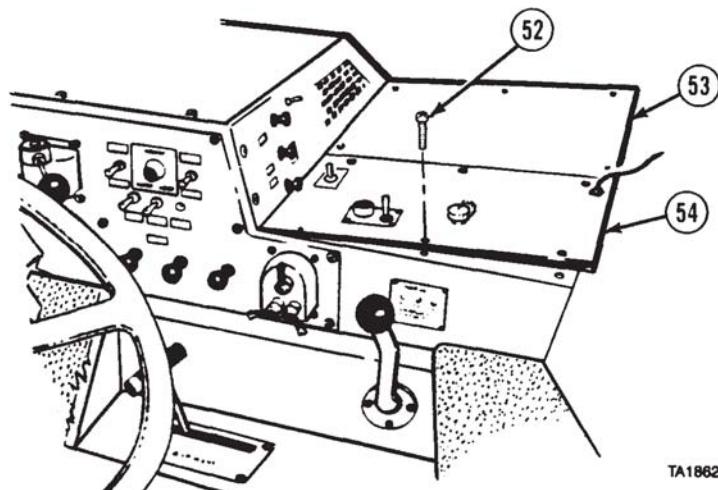
## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

- (17) Loosen clamp (44) and remove clip (45) and hose (46). Remove clamp.
- (18) Remove valve (47), connector (48), and retaining ring (49).
- (19) Remove screw (50) and hanger (51).



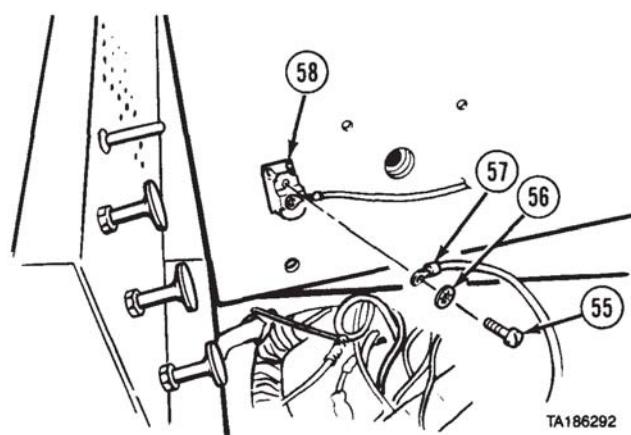
TA186290

- (20) Remove 11 screws (52) and lift heater compartment covers (53 and 54).



TA186291

- (21) Remove screw (55) and lockwasher (56).
- (22) Remove wire (57) from gas particulate switch (58).

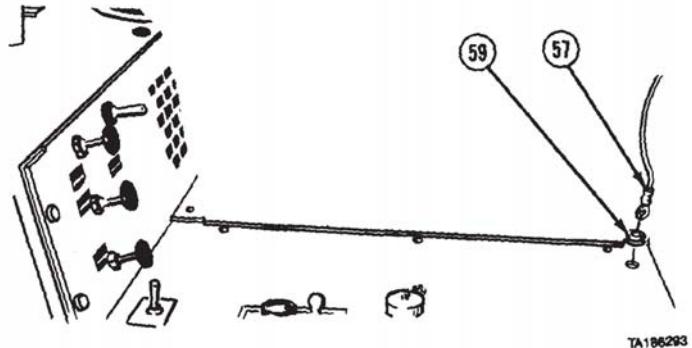


TA186292

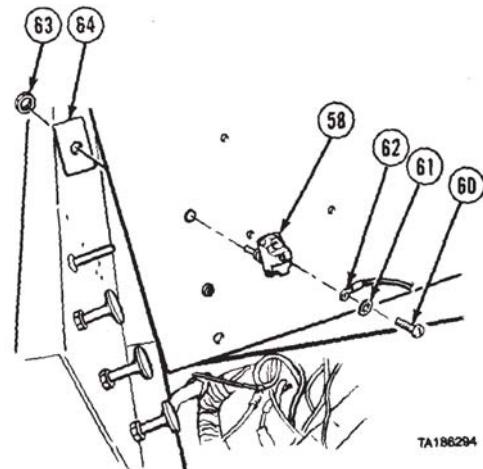
Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

**26-4. GAS PARTICULATE FILTER UNIT (GPFU) REMOVAL/INSTALLATION (CONT.).**

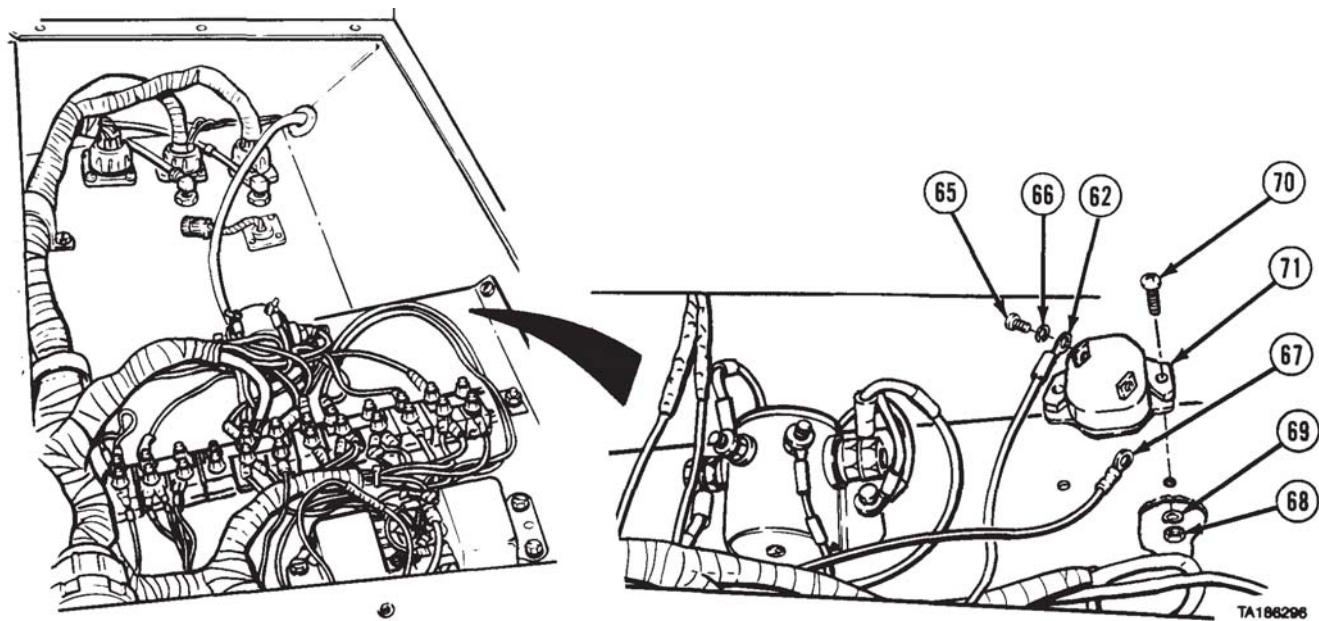
- (23) Pull wire (57) through grommet (59) and remove grommet.



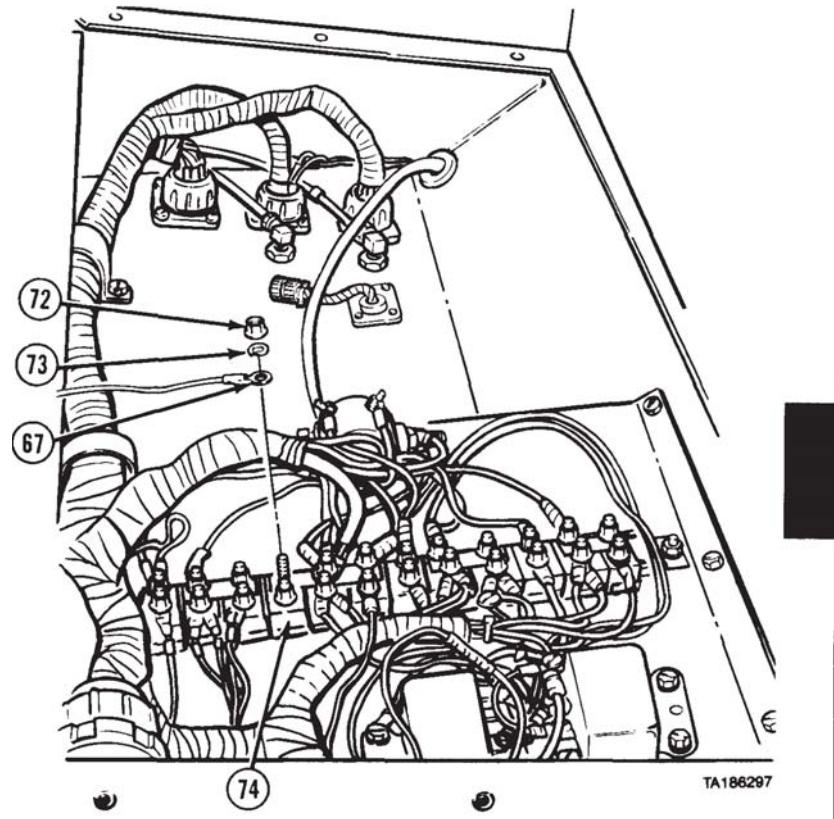
- (24) Remove screw (60), lockwasher (61), and wire (62) from gas particulate switch (58).  
(25) Remove nut (63), data plate (64), and gas particulate switch (58).



## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)



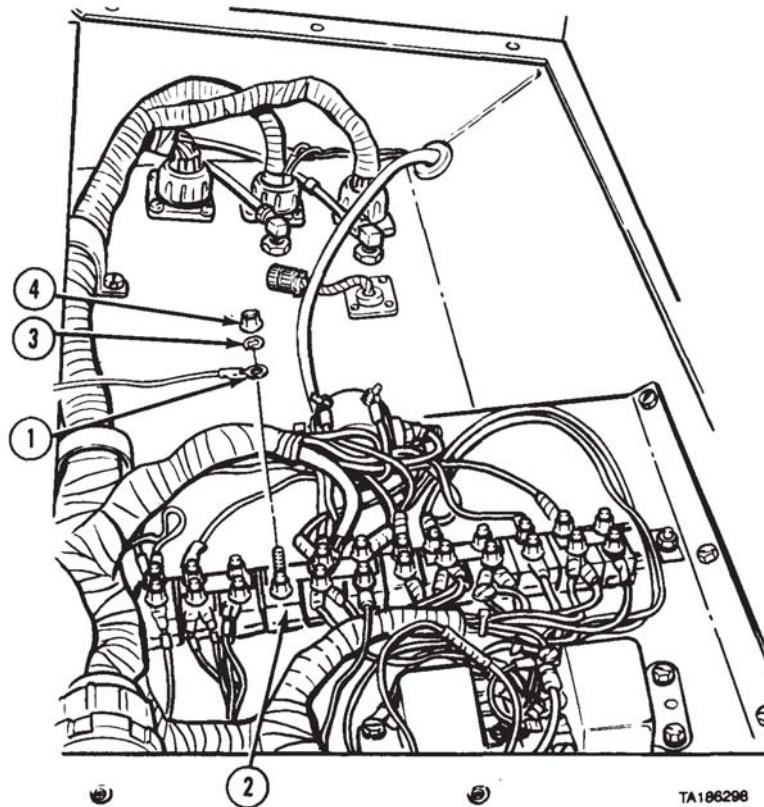
- (26) Remove two screws (65), lockwashers (66), and two wires (62 and 67).
- (27) Remove two nuts (68), lockwashers (69), screws (70), and circuit breaker (71).
- (28) Remove nut (72), lockwasher (73), and wire (67) from circuit breaker No. 4 (74).



## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

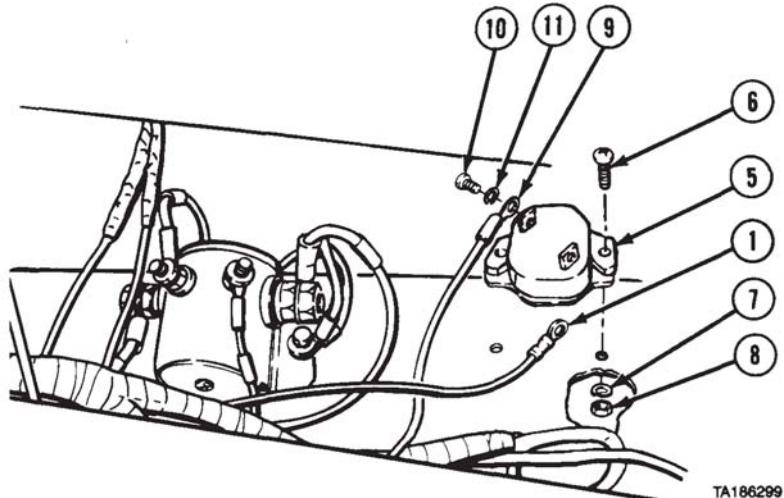
**26-4. GAS PARTICULATE FILTER UNIT (GPFU) REMOVAL/INSTALLATION (CONT.).***b. Installation.*

- (1) Install wire (1) on circuit breaker No. 4 (2) with lockwasher (3) and nut (4).



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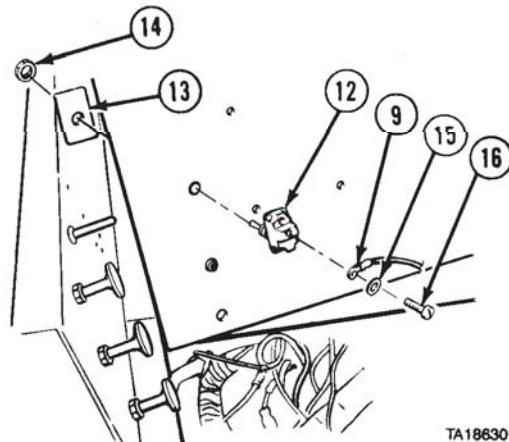
- (2) Install circuit breaker (5) with two screws (6), lockwashers (7), and nuts (8).  
 (3) Install wires (1 and 9) with two screws (10) and lockwashers (11).



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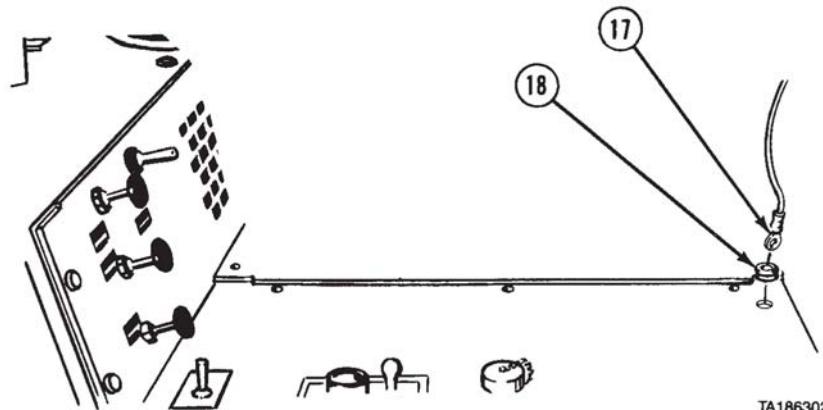
## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

- (4) Install gas particulate switch (12) and data plate (13) with nut (14).
- (5) Install wire (9) on gas particulate switch (12) with lockwasher (15) and screw (16).



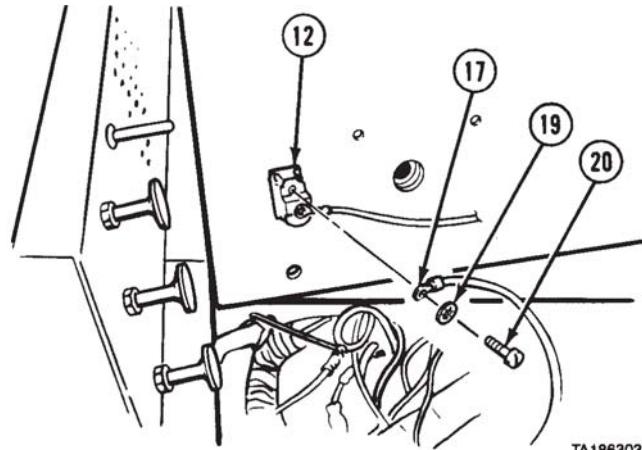
TA186301

- (6) Pull wire (17) through grommet (18). Install grommet.



TA186302

- (7) Install wire (17) on gas particulate switch (12) with lockwasher (19) and screw (20).

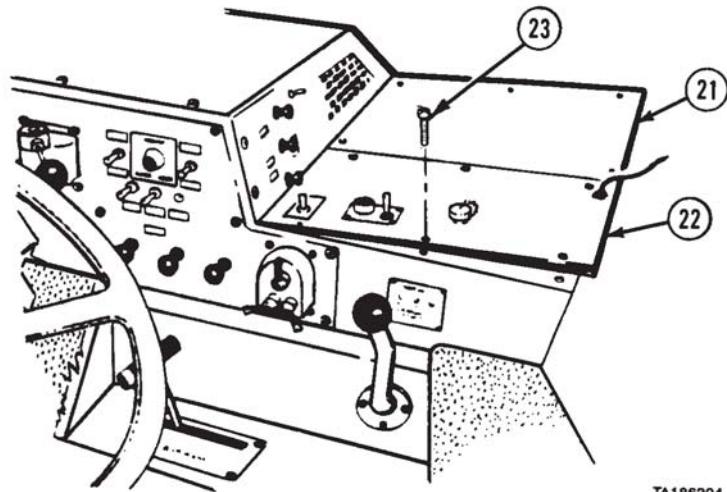


TA186303

## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

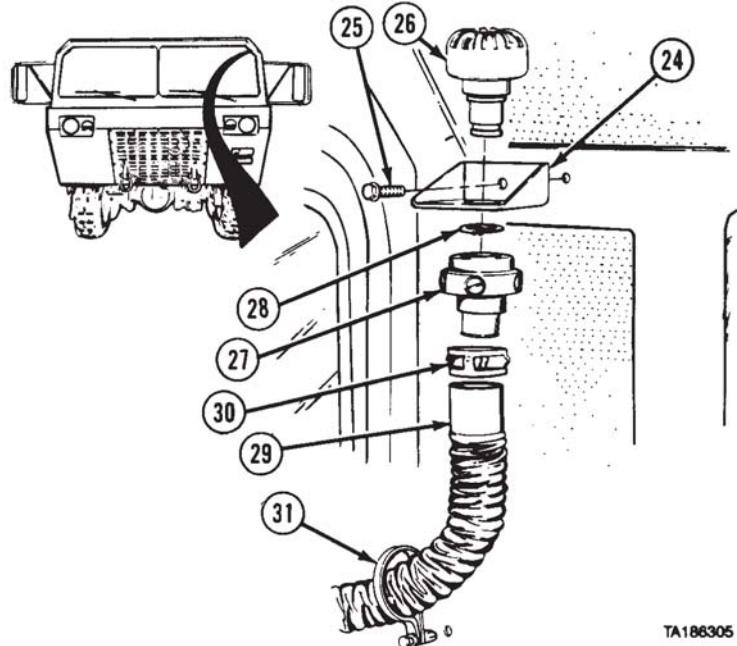
**26-4. GAS PARTICULATE FILTER UNIT (GPFU) REMOVAL/INSTALLATION (CONT.).**

- (8) Install heater compartment covers (21 and 22) with 11 screws (23).



TA186304

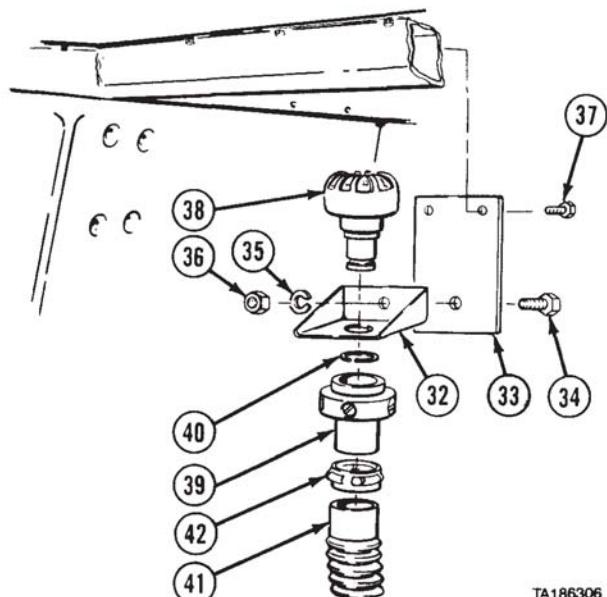
- (9) Install hanger (24) with screw (25).  
 (10) Install valve (26) and connector (27) with retaining ring (28).  
 (11) Install hose (29) with clamp (30) and clip (31).



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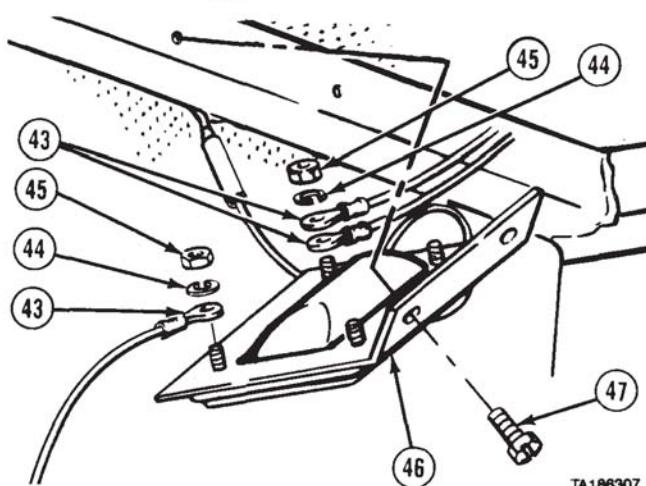
## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

- (12) Install hanger (32) on bracket (33) with screw (34), lockwasher (35), and nut (36).
- (13) Install bracket (33) with two screws (37).
- (14) Install valve (38) and connector (39) with retaining ring (40).
- (15) Install hose (41) with clamp (42).



TA186306

- (16) Install three ground wires (43) with two lockwashers (44) and nuts (45).
- (17) Install domelight bracket (46) with two screws (47).



TA186307

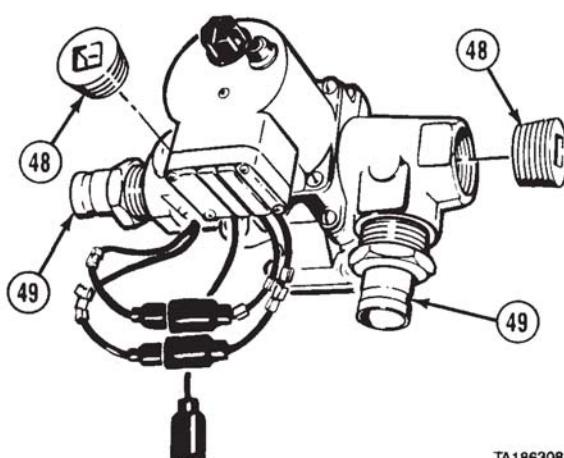
**WARNING**

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

**NOTE**

Right and left heaters are installed in a similar manner.

- (18) Apply pipe thread sealing compound and install two plugs (48).
- (19) Apply pipe thread sealing compound and install two fittings (49).

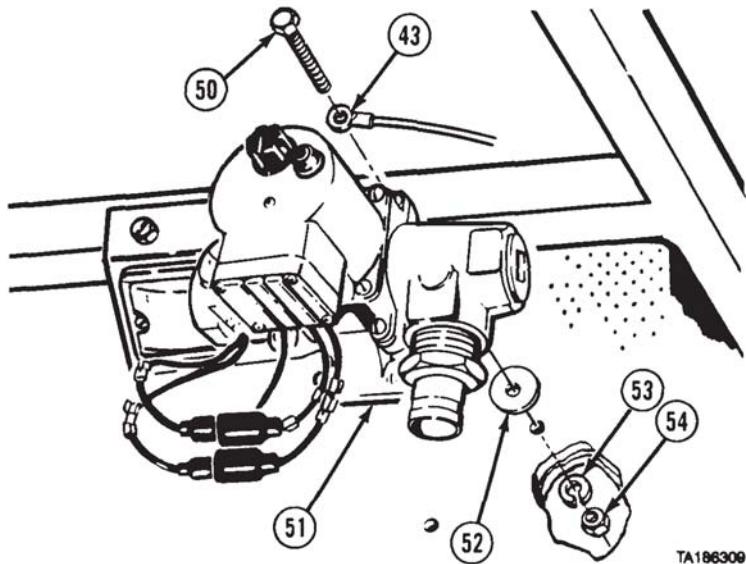


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## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

**26-4. GAS PARTICULATE FILTER UNIT (GPFU) REMOVAL/INSTALLATION (CONT.)**

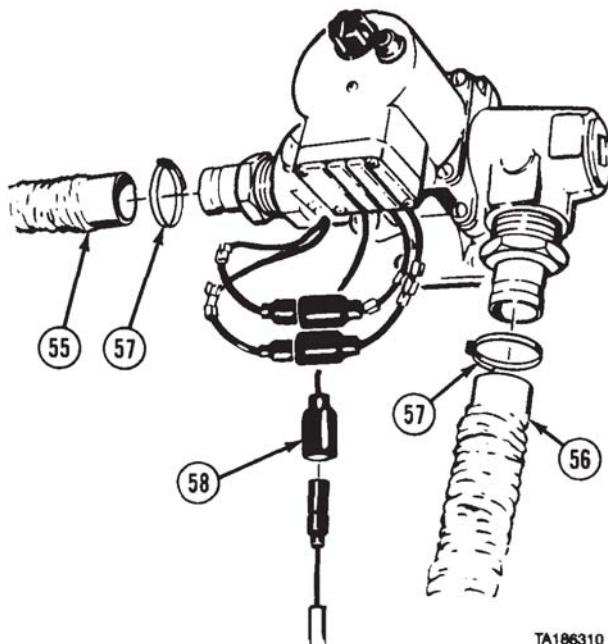
- (20) Soldier A installs and holds four screws (50), ground wire (43), heater (51), and four washers (52) while Soldier B installs four lockwashers (53) and nuts (54).



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- (21) Install hoses (55 and 56) with two clamps (57).

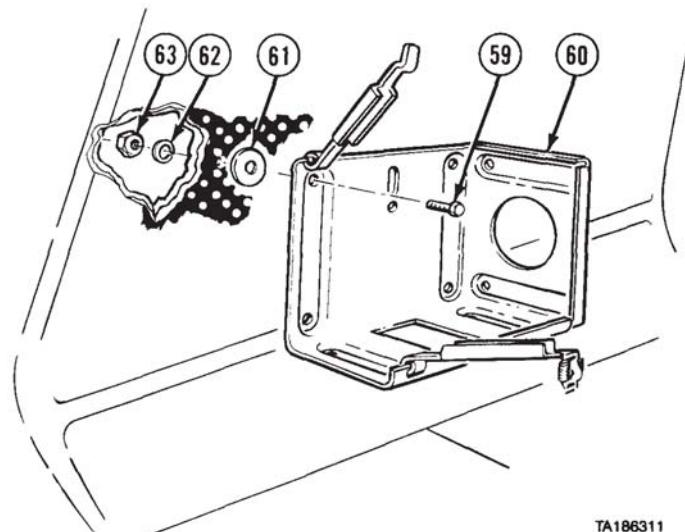
- (22) Connect wire (58).



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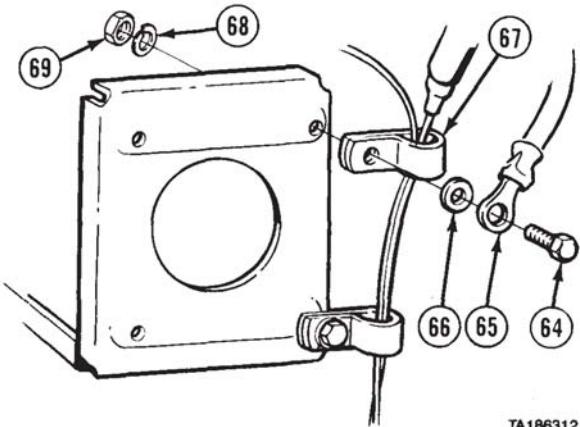
## Chemical, Biological, and Radiological (CBR) Equipment Maintenance Instructions (Cont)

- (23) Soldier A installs and holds four screws (59), bracket (60), and four washers (61) while Soldier B installs four lockwashers (62) and nuts (63).



TA186311

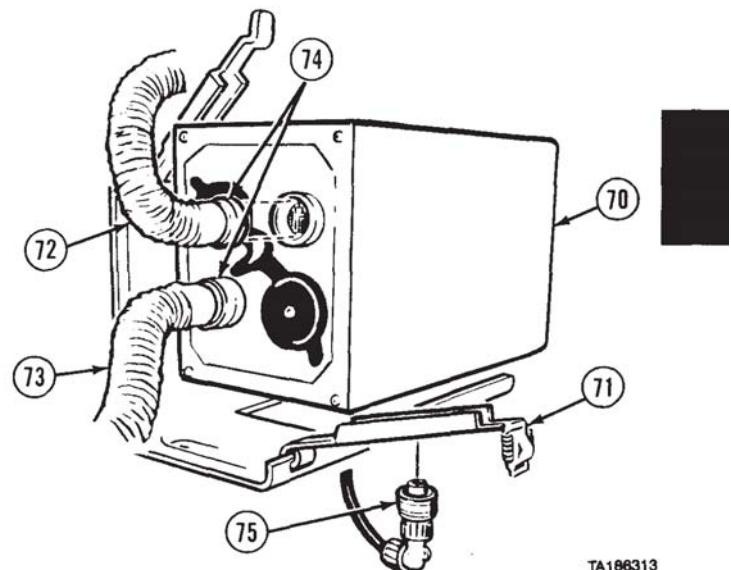
- (24) Install two screws (64), ground wire (65), two washers (66), cushion clip (67), lockwashers (68), and nuts (69).



TA186312

- (25) Install filter (70) and tighten clamp (71).  
 (26) Connect hoses (72 and 73) and tighten two clamps (74).  
 (27) Connect connector (75).  
 c. *Follow-on Maintenance.*  
 (1) Connect batteries (para 7-91).  
 (2) Check operation of gas particulate filter unit (TM 9-2320-279-10).

END OF TASK



TA186313



# CHAPTER 27

## M983 AUXILIARY ELECTRICAL POWER SYSTEM MAINTENANCE

	Para	Page
General . . . . .	27-1	27-1
Generator Set Removal/Installation (M983) . . . . .	27-2	27-1
Power Distribution Box and Bracket Removal/Installation (M983) . . . . .	27-3	27-3

### Section I. INTRODUCTION

**27-1. GENERAL.** This chapter contains maintenance instructions for removing and installing auxiliary electrical power system components authorized by the Maintenance Allocation Chart (MAC) at the organizational maintenance level.

### Section II. AUXILIARY ELECTRICAL POWER SYSTEM

#### M983 Auxiliary Electrical Power System Maintenance Instructions

<b>27-2. GENERATOR SET REMOVAL/INSTALLATION (M983).</b>		
This task covers:		
a. Removal	c. Follow-on Maintenance	b. Installation
INITIAL SETUP		
<i>Models</i>	<i>References</i>	
M983	TM 5-6115-465-12	
<i>Test Equipment</i>	<i>Equipment Condition</i>	
None	<i>TM or Para</i>	<i>Condition Description</i>
<i>Special Tools</i>	TM 9-2320-279-10 Shut off engine.	
None	Para 14-11	Guardrail assembly removed.
<i>Supplies</i>	Para 27-3	Power distribution box removed.
None		
<i>Personnel Required</i>	<i>Special Environmental Conditions</i>	
MOS 63S, Heavy wheel vehicle mechanic (2)	None	
	<i>General Safety Instructions</i>	
	None	

## M983 Auxiliary Electrical Power System Maintenance Instructions (Cont)

**27-2. GENERATOR SET REMOVAL/INSTALLATION (M983) (CONT.).***a. Removal.***NOTE**

Refer to TM 5-6115-465-12 for further information on the generator set.

- (1) Attach sling and suitable lifting device to generator (1).
- (2) Remove eight nuts (2) and screws (3).

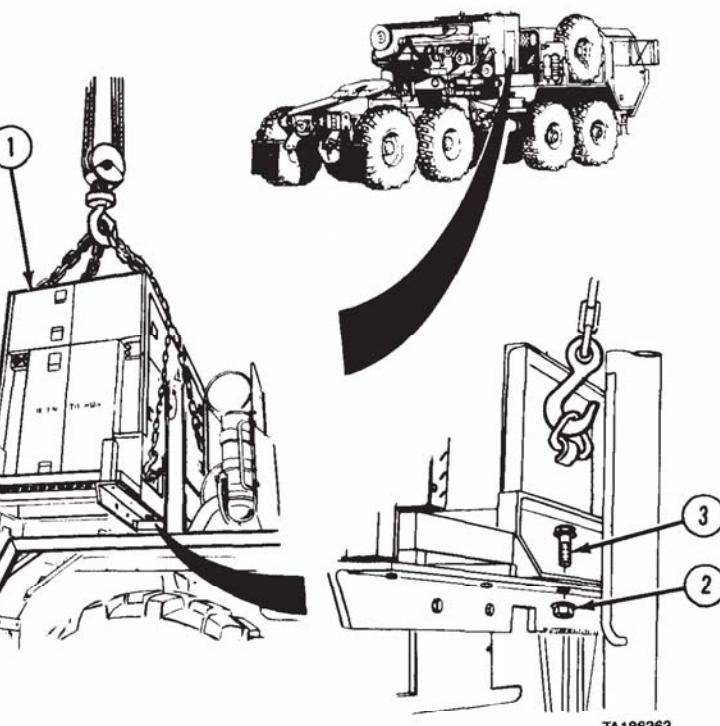
**WARNING**

Keep out from under heavy equipment. Falling equipment can cause serious injury or death.

- (3) Soldier A guides generator (1) from vehicle to work area while Soldier B operates lifting device.
- (4) Disconnect sling and lifting device.

*b. Installation.*

- (1) Attach sling and suitable lifting device to generator (1).

**WARNING**

Keep out from heavy equipment. Falling equipment can cause serious injury or death.

- (2) Soldier A guides generator (1) to vehicle in position shown while Soldier B operates lifting device.
- (3) Install eight screws (3) and nuts (2).
- (4) Disconnect sling and lifting device.

*c. Follow-on Maintenance.*

- (1) Install guardrail assembly (para 14-11).
- (2) Install power distribution box (para 27-3).

END OF TASK

## M983 Auxiliary Electrical Power System Maintenance Instructions (Cont)

**27-3. POWER DISTRIBUTION BOX AND BRACKET REMOVAL/INSTALLATION (M983).**

This task covers:

- a. Removal
- b. Installation

- c. Follow-on Maintenance

**INITIAL SETUP****Models**

M983

**References**

None

**Test Equipment**

None

**Equipment Condition****Special Tools**

None

**TM or Para****Condition Description**

TM 9-2320-279-10 Shut off engine.

TM 5-6115-465-12 Power distribution box disconnected from generator.

**Supplies**

None

**Special Environmental Conditions**

None

**Personnel Required**

MOS 63S, Heavy wheel vehicle mechanic

**General Safety Instructions**

None

**a. Removal.**

- (1) Remove eight nuts (1), lockwashers (2), and screws (3).
- (2) Remove power distribution box (4) from power distribution box brackets (5).

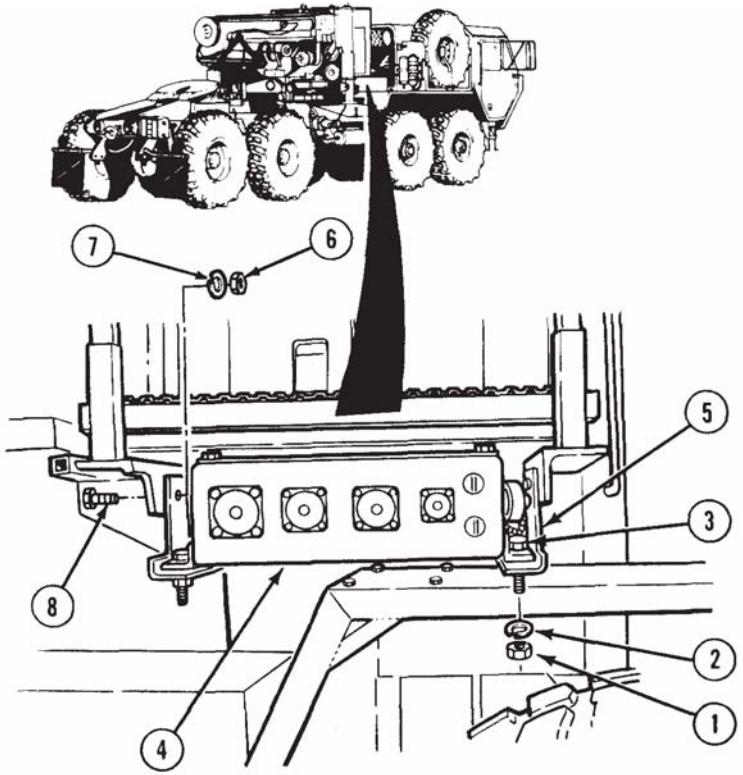
**NOTE**

Both sides of power distribution box brackets are removed and installed the same way.

- (3) Remove two nuts (6), lockwashers (7), and screws (8).
- (4) Remove power distribution box bracket (5).

**b. Installation.**

- (1) Position power distribution box bracket (5).
- (2) Install power distribution box bracket (5) with two screws (8), lockwashers (7), and nuts (6).
- (3) Install power distribution box (4) on power distribution box brackets (5).
- (4) Install eight screws (3), lockwashers (2), and nuts (1).

**c. Follow-on Maintenance.** Connect power distribution box to generator (TM 5-6115-465-12).

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**END OF TASK**



## APPENDIX A

### REFERENCES

**A-1. SCOPE.** This appendix lists all forms, field manuals, technical manuals, and other publications referenced in this manual. Also, those publications that should be consulted for additional information about vehicle operations are listed.

**A-2. PUBLICATION INDEXES.** The following indexes should be consulted frequently for latest changes or revisions and for new publications relating to material covered in this technical manual.

Consolidated Index of Army Publications and Blank Forms ..... DA Pam 310-1

**A-3. FORMS.** The following forms pertain to this manual. Refer to DA Pamphlet 310-1 for index of blank forms.

Equipment Inspection and Maintenance Worksheet (DA Form 2404).

Maintenance Request (DA Form 2407).

Recommended Changes to DA Publication and Blank Forms (DA Form 2028, 2028-2).

Refer to TM 38-750, The Army Maintenance Management Systems (TAMMS), for instructions for the use of maintenance forms pertaining to this material.

**A-4. OTHER PUBLICATIONS.** The following publications contain information pertinent to the M977 series vehicles and associated equipment.

**a. Safety.**

First Aid for Soldiers .....	FM 21-11
Safety Inspection and Testing of Lifting Devices .....	TB 43-0142
Security of Tactical Wheeled Vehicles .....	TB 9-2300-422-20

**b. Vehicle Operation.**

Operator's Manual, M977 Series Vehicles .....	TM 9-2320-279-10
Army Motor Transport Units and Operations .....	FM 55-30
Manual for the Wheeled Vehicle Driver .....	FM 21-305
Vehicle Recovery Operations .....	FM 20-22
Deepwater Fording of Ordnance Material .....	TM 9-238
Petroleum Tank Vehicle Operations .....	FM 10-71
Concepts and Equipment of Petroleum Operations .....	FM 10-67-1

**c. Cold Weather Operation and Maintenance.**

Basic Cold Weather Manual .....	FM 31-70
Northern Operations .....	FM 31-71
Operations and Maintenance of Ordnance Material in Extreme Cold Weather (0 degrees to -65 degrees F) .....	FM 9-207

**d. Maintenance and Repair.**

Lubrication Order for M977 Series Vehicles .....	LO 9-2320-279-12
Organization Repair Parts and Special Tools List for M977 Series Vehicle .....	TM 9-2320-279-24P
Direct Support and General Support Maintenance for M977 Series Vehicles .....	TM 9-2320-279-34
Direct Support and General Support Maintenance Repair Parts and Special Tools List for M977 Series Vehicles .....	TM 9-2320-279-24P
Direct Support and General Support Maintenance with Repair Parts and Special Tools List for Diesel Engine (8V92TA) for M977 Series Vehicles .....	TM 9-2320-279-34&P
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
Cooling Systems: Tactical Vehicles .....	TM 750-254
Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling Systems .....	TB 750-651
Organizational Maintenance of Military Petroleum Pipeline, Tanks, and Related Equipment .....	FM 10-20

**References (Cont)****A-4. OTHER PUBLICATIONS (CONT).**

Maintenance Advisory for Purging All Fuel Tankers Using a Biodegradable Purging Solution .....	GPM 94-02
Repair of Tents, Canvas, and Webbing .....	FM 10-16
Painting Instructions for Field Use .....	TM 43-0139
Camouflage Pattern Painting .....	FM 5-20
Color, Marking, and Camouflage Painting of Military Vehicles .....	TB 43 0209
Description, Use, Bonding Techniques, and Properties of Adhesives .....	TB ORD 1032
Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordnance Materiel and Related Materiels Including Chemicals .....	TM 9-247
Metal Body Repair and Related Operations .....	FM 43-2
Welding Theory and Application .....	TM 9-237
Inspection, Care, and Maintenance of Antifriction Bearings .....	TM 9-214
Ordnance Tracked and Wheeled Vehicle Hull and Chassis Wiring, Repair of .....	TB ORD 650
Care and Use of Handtools and Measuring Tools .....	TM 9-243
Charging System Troubleshooting (The Easy Way) .....	DA Pam 750-33
Purging, Cleaning, and Coating Interior Ferrous and Terne Sheet Vehicle Fuel Tanks .....	TB 43-0212
Operator's Organizational, Direct Support, and General Support Maintenance Manual for Lead-Acid Storage Batteries .....	TM 9-6140-200-14
Rigging .....	FM 5-725

**e. Decontamination.**

Chemical, Biological, and Radiological (CBR) Decontamination .....	TM 3-220
(NBC) Nuclear, Biological and Chemical Defense .....	FM 21-40

**f. Maintenance of Auxiliary Equipment and Special Purpose Kits.**

Operator's and Organizational Maintenance Manual Radio Sets .....	TM 11-5820-498-12
Operator, Organizational, Direct Support, and General Support Maintenance Manual Including Repair Parts and Special Tools List for Machine Gun Mounts .....	TM 9-1005-245-14
Operator and Organizational Maintenance Manual Generator Set .....	TM 5-6115-465-12
	LO 5-6115-465-12
Operator and Organizational Maintenance Manual for Chemical Alarm .....	TM 3-6665-225-12
Operator and Organizational Maintenance Manual Including Repair Parts and Special Tools list for Decontamination Apparatus .....	TM 3-4230-214-12&P

**g. General.**

Hand Receipt Manual for M977 Series Vehicles .....	TM 2320-279-10-HR
Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use .....	TM 750-244-6
Principles of Automotive Vehicles .....	TM 9-8000
Camouflage .....	FM 5-20

**h. Warranty.**

Warranty Technical Bulletin for M977 Series Vehicles .....	TB 9-2300-295-15/19
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**APPENDIX B**  
**MAINTENANCE ALLOCATION CHART**  
**FOR**  
**M977 SERIES VEHICLES**

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**Section I. INTRODUCTION**

**[B- 1. GENERAL]** This Maintenance Allocation Chart designates responsibility for performance of maintenance repair functions at specified maintenance levels.

- a.** Section I is a general explanation and definition of terms.
- b.** Section II shows the maintenance level responsible and estimated work measurement time for specific functions.
- c.** Section III lists common tool sets and the special tools, test and support equipment required for each maintenance function shown in Section II.
- d.** Section IV lists the remarks referenced in Section II.

**B-2. EXPLANATION OF COLUMNS IN SECTION II.**

- a. Column 1, Group number.** Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.
- b. Column 2, Component/Assembly.** Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.
- c. Column 3, Maintenance Functions.** Column 3 lists the functions to be performed on the item listed in Column 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 category of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "work time" figures will be shown for each category. The number of man-hours specified by 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, troubleshooting 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 maintenance chart. This figure does not include any time for performance of preliminary tasks listed elsewhere in the MAC e.g., removal of engine under repair of fuel pump when the engine is listed separately in the MAC. The symbol designations for the various maintenance categories remain as follows:

C - Operator/Crew  
 O - Organizational Maintenance  
 F - Direct Support Maintenance  
 H - General Support Maintenance

- e. Column 5, Tools and Equipment.** Column 5 specifies the code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated functions.

- f. Column 6, Remarks.** Column 6 references any amplifying remarks.

## Maintenance Allocation Chart (Cont)

**B-3. The maintenance functions are defined as follows:**

- a. **Inspect.** To closely and critically examine (e.g., sight, sound, or feel) an item to detect errors, flaws, wear, etc., and to determine its condition and serviceability by comparing its physical/mechanical/electrical characteristics within established standards.
- b. **Test.** To verify serviceability and detect incipient failure by measuring the mechanical 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 (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.
- d. **Adjust.** To maintain, 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 equipment used in precision measurement. Consists of comparison 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.
- g. **Install.** The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) for an unserviceable counterpart.
- h. **Repair.** The application of maintenance services (inspect, test, service, adjust, aline, calibrate, or replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), item, or system.
- i. **Overhaul,** That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like-new condition.
- j. **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 equipment/components.
- k. **Replace.** To remove an unserviceable item and install a serviceable counterpart in its place.

## Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools and Equipment	(6) Re- marks
			Unit		Direct Support	General Support		
			C	O	F	H		
01 0100	ENGINE Engine Assembly	Inspect Service Replace Repair	0.4	1.0	16.0	65.4	3 3, 5 3, 4, 5, 8, 10, 50, 51, 124, 139, 140	
0101	Engine Block	Replace Repair				37.7	3, 5 5, 11, 12, 13, 14, 15	
	Cylinder Head	Replace Repair			6.8	5.0	3, 5, 17, 18, 19 3, 5, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30	
0102	Crankshaft and Main Bearing	Replace Repair				6.8 1.0	3, 5 3, 5, 121	
	Crankshaft Pulley	Replace			0.8		3, 5	
	Crankshaft Cover/Front Seal	Repair			4.5		3, 5	
0103	Flywheel Housing and Rear Oil Seal	Replace			1.8		3, 5, 31, 31.1, 32, 32.1, 32.2, 33, 122	
	Flexplate Assembly	Replace			3.0		3, 5	
0104	Piston and Connecting Rod	Replace				4.4	3, 5, 34, 35, 36, 38, 42	
		Repair				0.4	3, 5, 37, 39, 46	
0105	Rocker Cover and Gasket	Replace Repair	0.3 0.3				6 6	
	Rocker Arm	Replace Repair			1.5 1.0		5, 19 5	
	Cam Follower/Push Rod	Replace				2.4	3, 5	
	Vibration Damper	Replace			2.0		3, 5	
	Camshaft Assembly	Replace Repair				7.8 0.5	3, 5, 40, 41 5	
	Cam Follower	Repair				1.0	5	
	Idler Gear	Replace Repair				3.0 0.5	3, 5 5, 70	
0106	Oil Filter	Replace	0.9				6	
	Oil Cooler Assembly	Replace	3.0				1, 6	
	Oil Pan/Gasket	Replace			4.0		3, 5	
	Oil Pump	Replace Repair			11.4		3, 5 5	
	Oil Pressure	Replace			0.2		3, 5	
	Regulator/Relief Valve	Repair			0.2		3, 5	

Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component Assembly	Maintenance Function	(4) Maintenance Level				Tools & Equipment	(6) Remarks
			C	O	F	H		
0108	Exhaust Manifold	Replace			1.0		3, 5	
0109	Water Pump Drive Gear	Replace				1.6	3,5	
	Blower Accessory Drive	Replace			0.5		3, 5	
	Hub	Repair			1.0		3, 5	
	Blower Drive Support	Replace			0.8		3, 5	
		Repair			1.2		3, 5	
	Oil Pump Drive Gear	Replace				2.0	3, 5	
0112	Engine Brake Retarder	Adjust			0.9		3, 5, 60	
		Replace			1.8		3.5	
		Repair			1.4		5, 60, 61	
	Retarder Buffer	Adjust			0.5		5	
	Switch Assembly	Replace			1.2		5	
03	FUEL SYSTEM	Inspect	0.2					
0301	Fuel Injector	Adjust			0.5		47, 47.1	
		Test				1.5	62, 64	
		Replace			1.8		4.5	
		Repair				1.0	5, 62, 63, 64, 65, 66, 67, 68, 69	
	Injector Rack Control Lever	Adjust			1.0		5	
0302	Fuel Pump	Replace			1.3		5	
		Repair			1.0		3, 5, 55	
0304	Air Cleaner Assembly	Replace			1.0		6	
	Air Restriction Assembly	Inspect	0.1					
		Replace			0.3		6	
	Air Filter Element	Service	0.4				*	
		Replace			0.3		6	
	Intake Ducting	Replace			0.3		6	
0305	Blower Assembly	Replace			2.0		3, 5, 57	
		Repair				8.0	3, 5, 42, 43, 57, 143, 144	
	Turbocharger	Replace			2.0		3, 5	
		Repair				4.0	5, 56, 123, 131	
	Air Inlet Adapter	Replace			1.5		5	
0306	Fuel Tank	Replace		2.0			2, 6	
	Fuel Lines and Fittings	Replace		*			6	
	Fuel Strainer	Service	0.1					A
0308	Governor	Adjust			1.0		5, 59	
		Replace			1.0		3, 5	
		Repair			2.5		3, 5, 59	
	Governor Cover	Replace			1.2		3, 5	
		Repair			1.1		3, 5	

## Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component Assembly	Maintenance Function	(4) Maintenance Level				(5) Tools & Equipment	(6) Remarks
			C	O	F	H		
0308	Variable Low Speed Limiting Governor Engine Stop Solenoid	Replace			1.0		5	
		Adjust		1.0			5	
		Replace			1.0		5	
		Adjust			0.4		3, 48, 49	
		Replace			0.4		5	
	Throttle Delay	Repair			0.5		5	
		Replace			0.5		3, 5	
		Replace			0.3		3, 54	
		Repair						
		Inspect	0.1					
0309	Fuel Water Separator	Service		0.3			6	
		Replace		0.5			6	
		Repair		0.5			6	
		Inspect	0.1					
0311	Ether Starting Aid	Replace		0.3			6	
0312	Throttle Treadle Valve	Test		0.2			1, 6	
		Replace		0.8			6	
		Repair			0.5		3, 5	
04	EXHAUST SYSTEM	Inspect	0.1					
0401	Muffler Assembly	Replace		2.0			6	
05	COOLING SYSTEM	Inspect	0.1					
		Service		0.7			2, 6	
		Test			0.2			
0501	Radiator	Replace		4.0			2, 6	
		Repair			2.6		3, 5	
		Replace		1.0			2	
0502	Radiator Baffles	Replace		2.2			6	
		Fan Shroud						
0503	Thermostats Cooling System Hoses and Tubes Aftercooler	Replace		1.0			2, 52, 53	
		Replace					6	
		Replace						A
		Replace			0.9		5, 12	
0504	Water Pump	Replace			1.3		3, 5	
		Repair			0.5		3, 5, 44, 132	
0505	Fan	Inspect	0.1					
		Replace			1.5		6	
		Replace			1.0		6	
		Repair				2.0	3, 5, 45, 46	
	Fan Clutch	Inspect	0.1					
		Adjust			0.6		6, 16	
	Fan Belts	Replace			1.2		6	
		Replace	0.1		1.0		6	
	Pulleys	Inspect						
		Replace						

## Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools & Equipment	(6) Remarks
			C	O	F	H		
06	ELECTRICAL	Test		0.3			2	
		Replace		1.7			2	
		Repair			1.9		3, 5	
		Alternator Belts	Inspect	0.1				
			Adjust		0.6		6, 16	
			Replace		0.7		6	
		Voltage Regulator	Adjust		0.3		2, 6	
			Replace		0.1		6	
		Starter Motor	Test		0.3		1	
			Replace		1.9		2, 6	
			Repair			4.0	5	
0603	Starter Solenoid	Replace			1.0		5	
		Starter Relay	Replace		0.2		6	
		Ignition Relay	Replace		0.2		6	
		High Idle Assembly (MY77, M985)	Replace		1.2		6	
			Repair		0.4		6	
		High Idle Wire Harness (M977, M985)	Replace		0.8		6	
			Repair		*	*	6, 9	
		High Idle Assembly (M983)	Replace		1.2		6	
		High Idle Wire Harness (M983)	Replace		1.0		6	
			Repair		*	*	6, 9	
0607	Dash Panel	Inspect	0.1					
		Replace		0.5			6	
		Dash Panel Wire Harness	Replace		2.5		6	
		Circuit Breaker	Replace		0.3		6	
		Speedometer/Odometer	Replace		0.4		6	
		Tachometer/Hourmeter	Replace		0.4		6	
		Switches	Replace		0.2		6	
		Gages	Inspect	0.1				
			Replace		0.5		6	
		Neutral Interlock Switch	Replace		0.5		6	
0608	Warning Buzzer	Inspect	0.1					
		Replace		0.5			6	
		Main Junction Box (M978)	Replace		1.5		6	
			Repair		0.4		6	
		Auxiliary Pump Junction Box (M978)	Replace		0.6		6	
			Repair		0.4		6	
	Control Junction Box (M978)	Replace		1.0			6	
			Repair		1.0		6	

## Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools & Equipment	(6) Remarks
			C	O	F	H		
0608	Control Box (M984E1)	Replace		0.8			6	
		Repair		1.1			6	
	Junction Box (M983)	Replace		2.0			6	
		Repair		1.0			6	
	Crane Wiring (M977, M985, M984E1)	Replace	*		*		5	A
0609		Repair	*	*			6, 9	A, C
	Neutral Safety Switch	Adjust		0.3			6	
		Replace		0.6			2, 6	
	Turn Signal Switch	Replace		0.5			6	
	Headlamp Assembly	Inspect	0.1					
0610		Adjust		0.5			6	
		Replace		0.2			6	
	Lights	Inspect	0.1					
		Replace		0.2			6	
	Work Lamps	Replace		0.3			6	
0611		Repair		0.3			6	
	strobe Light (M984E1)	Replace		0.5			6	
		Repair		0.5			6	
	Fuel Level Sensor	Replace		0.5			2, 6	
	Sending Units	Replace		0.5			6	
0612	Fuel Restriction Sensor	Replace		0.3			6	
	Electric Horn	Replace		0.2			6	
	Horn Relay	Replace		0.3			6	
	Batteries	Inspect	0.1					
		Test		0.3			2	
0613		Service		0.3			2, 6	
		Replace		1.0			2, 6	
	Battery Box	Inspect	0.1					
		Replace		1.4			2, 6	
	Engine Wiring Harness	Test			*		3, 5	B
0614		Replace			6.0		3, 5	D
		Repair			*		5, 9	A
	Cab Wiring Harness	Test			*		3, 5	B
		Replace			12.0		3, 5, 102	D
		Repair			*		5, 9	A, C
0615	Chassis Wiring Harness	Test			*		3, 5	B
		Replace			4.0		3, 5, 102	D
		Repair			*		5, 9	A, C
	Chassis/Engine Wiring Harness	Replace			4.0		6	D
		Repair		*	*		6, 9	A, C

Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools & Equipment	(6) Remarks
			C	O	F	H		
0613	Inter-vehicle Harness	Test		*			2, 6	B
		Replace	0.1				3	D
		Repair	*				2, 6	A
	STE/ICE Wiring Harness	Test	*				2, 6	B
		Replace			2.0		6	
		Repair	*				2, 6	A
	Trailer Electrical Connector	Inspect	1.1					
		Replace	0.5				6	
07	TRANSMISSION							
0705	Shift Cable	Adjust	0.4				6	
		Replace	1.1				6	
	Transmission Shift Control	Replace	0.6				2.6	
		Repair			1.5		3, 5	
0708	Torque Converter Stator	Replace					2.0	2, 5
		Repair					0.5	3, 5, 81
	Torque Converter Pump	Replace					2.5	3, 5, 82, 83
		Repair					0.5	3, 5
	Torque Converter Housing	Replace					1.0	3, 5, 122, 133, 134
		Repair					2.0	3, 5
	Flywheel Assembly	Replace			1.0		3, 5, 80 *	
		Repair			0.5		5	
		Inspect	0.1					
0710	Transmission Assembly	Test			0.9		3, 5	
		Service			0.8		6	
		Replace				16.0	3, 5	
		Repair					3, 5, 8, 79, 89, 124	
		Replace					20.4	
	Gear Unit and Main Shaft	Repair					0.5	3, 5, 74
		Replace					4.0	3, 5, 72, 73, 73.1, 75
	Forward Clutch	Replace					0.3	3, 5, 88
		Repair					3.5	3, 5, 84, 85, 86, 87
	Rear cover	Replace					1.3	3, 5
		Repair					1.8	3, 5, 76, 77, 78, 83, 84
0713	Center Support and Second Clutch	Replace					0.5	3, 5
		Repair					1.0	3, 5
	Fourth Clutch	Replace					0.6	3, 5
		Repair					2.5	3, 5, 84
	First Clutch	Replace					1.0	3, 5, 84
		Repair					1.0	3, 5, 71, 91, 92
	Third Clutch and Center Support Housing	Replace					1.0	3, 5, 90

## Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component Assembly	(3) Maintenance Function	(4) Maintenance Level				Tools & Equipment	(6) Remarks
			C	O	F	H		
0714	Control Valve Body	Replace Repair			1.8	3.3	3, 5 3, 5	
	Lockup Cutoff Valve Body	Replace Repair			0.5	1.5 0.5	3, 5 3, 5	
	Governor	Replace		0.2	0.4		3, 5	
0721	Filter Element	Replace					2	
08	TRANSFER CASE							
0801	Transfer Case	Inspect Service	0.1	0.3	3.0		6	
		Replace Repair				3, 5	3, 5	
	Oil Seals	Inspect Replace	0.1	0.2			3	
	Top Input Shaft Assembly	Repair				1.0	3, 5	
	Center Shaft Assembly	Repair				1.0	3, 5	
	Lower Rear Output Shaft Assembly	Repair				1.0	3, 5	
	Lower Front Output Shaft Assembly	Repair				1.0	3, 5	
	Upper Shift Rod Assembly	Repair				0.5	3, 5	
	Lower Shift Rod Assembly	Repair				0.5	3, 5	
	Differential Air Chamber	Replace Repair			0.5 0.3		5 5	
0803	Traction Control Valve	Replace Repair		1.0	0.5		6	
	2-Speed Shift	Adjust		0.8			6	
	Cable	Replace		1.0			6	
	Lube Pump	Replace Repair			0.5	0.5	3 3	
0804	Breather	Inspect Replace	0.1	0.2			6	
	PROPELLER SHAFTS							
0900	Propeller Shafts and Universal Joints	Inspect Service	0.2	0.1			2, 6	
		Replace		0.6			2, 6	
1000	FRONT AXLE							
	Forward and Intermediate Axles	Inspect Service	0.1	0.5	3.9		6 3, 5	

## Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools & Equipment	(6) Remarks
			C	O	F	H		
1000	Axle Shafts	Replace			2.0		5	
	Axe Breather	Repair			0.5		3, 5	
		Inspect	0.1					
		Service		0.2			6	
		Replace		0.1			6	
1002	Differential Carrier	Replace			2.0		5, 104	
	Differential Carrier Cover Axle No. 2	Repair				5.0	3, 4, 5, 8, 56, 104, 125	
		Replace			3.0		3, 5, 105	
		Repair			1.0		3, 5, 56, 105, 125	
		Input, Output, Yoke/Oil Seals	Replace		0.6		2, 5, 104, 105	
1004	Ball Socket	Replace			3.2		3, 5	
	Ball and Bushing	Replace			1.8		3, 5	
	Trunnion Bearings	Inspect		0.4				
		Replace			1.0		3, 5	
11	REAR AXLE							
1100	Intermediate and Rear Axles	Inspect	0.1					
		Aline			2.0		3, 5	
		Service		0.5			6	
		Replace			3.0		3, 5	
		Replace		0.4			6	
1102	Axle Shafts	Inspect	0.1					
		Service			0.2		6	
		Replace			0.1		6	
		Replace				2.0	5	
		Repair				5.0	3, 4, 5, 8, 56, 125	
1102	Differential Carrier	Replace			3.0		5	
	Differential Carrier Cover Axle No. 3	Repair			1.0		5	
		Replace			0.6		3, 5, 10, 105	
		Replace				2.0	5	
		Repair				5.0	3, 4, 5, 8, 56, 125	
12	BRAKE SYSTEMS							
1202	Brakes	Inspect	0.2					
		Adjust		0.3			6	
		Replace		1.4			6	
		Repair			1.0		5	
		Replace		1.0			2, 6	
	Brake Shoes (Front)	Repair				1.0	5	
		Replace					6	
	Brake Shoes (Rear)	Replace			2.4	1.0	5	
		Repair					6	
	Camshaft and Slack Adjuster	Replace					6	

## Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools & Equipment	(6) Remarks
			C	O	F	H		
1208	Brake Chamber (Front)	Replace		0.4			6	
		Repair		0.4			2, 6	
	Brake Chamber (Rear)	Replace		0.5			6	
		Repair			0.5		2, 6	
	Brake Treadle Valve	Replace		1.7			6	
		Repair			0.8		5, 2	
	Brake Relay Valve	Replace		0.6			6	
		Repair			0.7		5	
	Air Dryer	Inspect	0.1					
		Service		0.5			6	
		Replace		0.6			6	
		Repair		1.0			6	
	Spring Brake Control Valve	Replace		0.3			6	
		Repair			0.4		5	
1209	Parking Brake Valve	Replace		0.3			6	
		Repair			0.7		5	
	Front Service Brake Control Valve (M984E1)	Replace		0.8			6	
		*						
	Air Reservoirs/Valves	Replace		*			6	
		Replace		*			6	
	Air Compressor	Inspect	0.1					
		Replace		0.7			2, 6	
	Air Governor	Repair			3.5		5, 128, 129	
		Adjust		0.2			6	
		Replace		0.3			6	
1211	Trailer Connections	Repair			0.3		5	
		Inspect	0.1					
	Tractor Protection Valve	Replace		0.1			6	
		Repair		0.3			6	
	Trailer Hand Brake Control Valve	Replace		0.3			6	
		Repair			0.5		5	
	Trailer Air Supply Valve	Replace		0.6			6	
		Repair			0.6		5	
13	WHEELS							
1311	Wheels with Tires	Inspect	0.1					
		Replace	0.4					
	Hub, Wheel Bearings and Studs	Repair					2, 6, 7, 135, 136	
		Service		1.0			137	
		Replace		2.0			2, 6, 93, 114, 114.1, 115, 116, 117, 118	

## Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools & Equipment	(6) Remarks
			C	O	F	H		
	Brake Drum	Inspect Replace		1.0	0.2			
14	STEERING SYSTEM	Inspect Service Adjust	0.2	0.5	3.0		6 2 3, 5	
1401	Steering Wheel Steering Column Drag Link (Each)	Replace Replace Inspect Replace Repair		0.6 0.9 0.1 1.0 0.5			2, 6 5 2, 6 2, 6	
1401	Tie rod	Inspect Replace Repair		0.1 0.2 0.5				
	Pitman Arm	Inspect Replace		0.1	3.5		5	
	Intergear Link	Inspect Replace		0.1	2.5		5	
	90° Gear Box	Replace Repair			1.5 3.0		5 3, 5	
1407	Steering Gear	Inspect Adjust Replace Repair	0.1		0.5 2.6 2.0		5 3, 5 3, 5	
	Slave Steering gear	Inspect Replace Repair	0.1		1.4 2.0		3, 5 3, 5	
	Steering/Tensioner Pump (M984E1)	Replace Repair			1.6 2.5		3, 5	
1411	Steering System Lines and Fittings	Replace		*			6	A
1413	Hydraulic Reservoir	Inspect Replace	0.1				2, 6	
	Hydraulic Filter	Replace		0.2			6	
15	FRAME							
1501	Frame Assembly	Inspect Repair	0.1			*	3, 4, 5 2	A
	Cab Support, Rear	Replace		1.2				
	Cab Support, Front	Replace			3.0		3, 5	
	Radiator Support	Replace			3.0		3, 5	
	Engine Supports	Replace			3.0		3, 5	
	Transmission Supports	Replace			2.0		3, 5	
	Front Crossmember	Replace			3.0		3, 4, 5	
	Tandem Crossmember	Replace			6.0		3, 4, 5	

## Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools & Equipment	(6) Remarks	
			C	O	F	H			
1501	Intermediate Crossmembers Skid Plate Rear Decking Assembly (M983) Fifth Wheel Ramp Assembly (M983) Transfer Case Support Assembly Generator Mount (M983) Right Side and Rear Catwalk (M983)	Replace			5.0		3, 4, 5		
		Replace		1.0			6		
		Replace		0.4			6		
		Inspect	0.1						
		Service	0.1						
		Replace		0.4			6		
		Replace			3.0		3, 5		
		Replace		2.5			2, 6		
1503	Pintle Hook  Self-Guided Coupler (M1977-CBT)  Retriever Cross-Tube Assembly (M984E1) Retriever Lift Cylinder (M984E1) Retriever Tow Cylinder (M984E1)	Inspect	0.1						
		Service		0.1			2		
		Replace		0.4			2		
		Inspect	0.1						
		Service		0.1			2		
		Replace		1.0			2		
		Repair			1.5		3, 5		
		Replace		0.8			3, 5		
1504	Tire Davit Winch	Replace			1.8		3, 5		
		Repair				2.5	3, 5		
		Replace			1.0		3, 5		
		Repair				1.5	3, 5		
1504		Inspect	0.1						
		Service		0.1			6		
		Replace		0.7			6		
		Repair		0.7			6		
1506	Fifth Wheel (M983)	Inspect	0.1						
		Service	0.3						
		Replace		1.0			2, 6		
		Repair			3.0		3, 5, 112, 113		
16	SPRINGS AND SHOCK ABSORBERS								
1601	Spring and Saddle Assembly	Inspect		0.1			3, 5		
		Replace			4.0		3, 5		
		Repair				2.5			
1604	Shock Absorber and Bushings	Inspect		0.1					
		Replace		0.3			6		
1605	Front Equalizer Beam (All Models)	Replace			4.0		3, 5		
		Repair			1.5		3, 95, 96, 100, 101		

## Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools & Equipment	(6) Remarks
			C	O	F	H		
1605	Rear Equalizer Beam (M977, M978, M983)	Replace			4.0		3, 5 3, 95, 96, 100, 101	
		Repair			1.5			
	Rear Equalizer Beam (M984, M985)	Replace			4.0		3, 5 3, 95, 96, 97, 98	
		Repair			1.5			
	Rear Equalizer Beam (M984E1)	Replace			4.0		3, 5 3, 99	
	Torque Rod	Repair			1.5			
18	CAB AND BODY	Inspect	0.1				2, 6 2	
		Replace	1.0					
		Inspect	0.1			1.3	3, 5	
		Replace						
		Lateral Torque Rod					3, 5	
		Replace						
1801	Cab	Inspect	0.1				3, 5	
		Service	0.1					
		Replace				4.0	6	
		Adjust	0.3					
		Replace	1.0				2, 6	
		Repair	2.5					
1802	Door	Replace	0.2				6	
		Replace						
		Adjust	0.3				2, 6	
		Replace	1.0					
		Repair	2.5				2, 6	
		Replace	0.2					
1806	Engine Cover	Inspect	0.1				6	
		Replace				0.5		
		Replace				0.8	5	
		Replace	0.5					
		Replace	0.2				6	
		Replace	0.5					
1808	Cab Glass	Replace	0.1				6	
		Replace						
		Replace	0.3				5	
		Replace	1.0					
		Replace	0.8				5	
		Replace						
1810	Windshield Glass	Replace	0.5				6	
		Replace	0.2					
		Replace	0.5				2, 6	
		Replace	0.5					
		Replace	0.8				6	
		Replace						
1806	Fenders	Replace	0.3				6	
		Repair	0.5					
		Replace	0.1				6	
		Replace	0.2					
		Replace	0.5				2, 6	
		Replace	0.5					
1808	Splash Guards	Replace	0.4				6	
		Replace	1.0					
		Replace	0.8				6	
		Replace						
		Replace	0.8				6	
		Replace						
1806	Mud Flaps	Replace	0.4				6	
		Replace	1.0					
		Replace	0.8				2, 6	
		Replace						
		Replace	0.5				6	
		Replace						
1808	Seat Assembly	Replace	0.3				6	
		Repair	0.5					
		Replace	0.1				6	
		Replace						
		Replace	0.3				6	
		Replace						
1810	Sun Visor	Replace	0.4				6	
		Replace	1.0					
		Replace	0.8				6	
		Replace						
		Replace	0.8				6	
		Replace						
1808	Stowage Box	Replace	0.4				2, 6	
		Replace	1.0					
		Replace	0.8				6	
		Replace						
		Replace	0.8				6	
		Replace						
1808	Hose Stowage Tube (M978)	Replace	0.4				6	
		Replace	1.0					
		Replace	0.8				2, 6	
		Replace						
		Replace	0.8				6	
		Replace						
1808	Fuel Hose Reel (M978)	Replace	0.4				2, 6	
		Repair	0.5					
		Replace	0.8				3, 5	
		Replace						
		Replace	0.8				2, 6	
		Replace						
1808	Control Reel (Air) (M978)	Replace	0.8				2, 6	
		Repair	0.5					
		Replace	0.8				3, 5	
		Replace						
		Replace	0.8				2, 5	
		Replace						
1808	Static Reel (M978)	Replace	0.3				2, 5	
		Repair	0.5					
		Replace	0.8				3, 5	
		Replace						
		Replace	0.8				3, 5	
		Replace						
1810	Cargo Body (M977, M985)	Replace				4.0	3, 5	
		Replace						
		Replace				3.0	3, 5, 119	
		Replace						
		Replace					3, 5, 119	
		Replace						

## Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools & Equipment	(6) Remarks
			C	O	F	H		
1810	Cargo Tie Downs	Replace		0.2			6	
	Equipment Body (M984E1)	Replace		1.0			6	
1811	M978 Tanker Body	Replace			5.0	*	3, 5	
	Manhole Cover	Repair					5, 7	A
	Tanker Module	Replace		1.0			3, 5	
		Repair			2.0		3, 5	A
		Replace			4.0	*	5, 102	
		Repair					3, 5	A
	Module Access Door	Test			0.8		141, 142	
		Replace		0.5		*	2, 6	
		Repair					5	
	Tank Vent	Replace			0.8		3, 5	A
20	WINCH, CRANE, AND PTO							
2001	Self-Recovery Winch	Inspect	0.1					
		Service		0.3				
		Replace		1.5			5	
		Repair			1.0		3, 5	L
	Self-Recovery Winch	Replace			1.5		5	
	Hydraulic Motor	Repair			1.0		5	
	Self-Recovery Winch	Replace			1.0		5	
	Counterbalance Valve	Repair			1.0		5	
	Self-Recovery Winch	Replace			1.0		5	
	Brake	Repair					5, 8	
	Self-Recovery Winch	Inspect	0.1					
	Cable	Service	0.3					
		Replace		0.8			6	
	Self-Recovery Winch	Replace		1.2			6	
	Cable Tensioner	Repair		0.4			6	
	Self-Recovery Winch	Replace		0.3			6	
	Cable Guide	Repair		0.8			6	
	Heavy-Duty Winch	Inspect	0.1					
		Service	0.3					
		Replace			0.8		5	
		Repair				3.0	3, 5, 126	
	Heavy-Duty Winch	Replace			1.5		5	
	Hydraulic Motor	Repair				2.5	5	
	Heavy-Duty Winch	Replace			1.0		5	
	Counterbalance Valve	Repair			1.0		5	
	Heavy-Duty Winch Brake	Replace			2.5		5	
		Repair			2.0		3, 5, 8	
	Heavy-Duty Winch Cable	Inspect	0.1					
		Service	0.3					
		Replace		0.8			6	

Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools & Equipment	(6) Remarks
			C	O	F	H		
2001	Fairlead, Tensioner Assembly (M984E1)	Adjust	0.2		1.0		5	
		Replace			1.2		3, 5	
		Repair						
		Heavy-Duty Winch Fairlead Motor (M984E1)	Replace		1.1		5	
		Repair			1.5		5, 7	
		Heavy-Duty Winch Cable Sheave (M984E1)	Replace		1.5		3, 5	
		Heavy-Duty Winch Cable Roller (M984E1)	Replace	1.1			2, 6	
		Repair	1.0				2, 6	
		M977, M985, M984E1 Cranes	Inspect	0.1				
		Service		0.5			2, 6	
		Replace			8.0	*	3, 5	
		Repair					3, 4, 5, 8	
		Hoist	Inspect	0.1				A
		Service		0.3			6	
		Replace			3.0		3, 5	
		Repair				16.0	3, 5	
	Hoist Drive Control Valve	Replace			0.5		3, 5	
		Repair			1.0		3, 5	
	Moist Drive Motor	Replace			1.5		3, 5	
		Repair			4.0		3, 5	
	Hoist Brake	Replace			1.0		3, 5	
		Repair			3.5		3, 5	
	Hoist Cable	Inspect	0.1					
		Service		0.3			6	
		Replace		0.5			6	
	Crane Hook Block	Replace		0.3			6	
		Repair		0.5			2, 6	
	Hydraulic Pipes, Tubes, Hoses and Fittings	Replace			*		5	
		Turntable	Replace			6.0	3, 5	
	Swing Drive	Replace			1.2		3, 5	
		Repair			1.0		3, 5	
	Swing Drive Motor	Replace			0.7		3, 5	
		Repair			1.2		3, 5	
	Swing Drive Brake	Replace			1.0		3, 5	
		Repair			1.0		3, 4, 5	
	Boom	Replace		2.0			3, 5	
		Repair		1			3, 5	
	Erection Cylinders	Replace			1.5		3, 5	
		Repair				1.5	3, 5	

## Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools & Equipment	(6) Remarks
			C	O	F	H		
2001	Lift Cylinders	Replace			1.5		3, 5	
		Repair				1.0	3, 5	
	Extension	Replace			2.0		3, 5	
		Repair				1.5	3, 5	
	Crane Control Valve	Replace			2.0		3, 5	
		Repair				*	3, 5	
	Outrigger Control Valve	Replace			1.2		3, 5	
		Repair				1.5	3, 5	
	Crane Accumulator	Replace			0.3		3, 5	
		Repair			0.5		3, 5	
	Crane Solenoid Valve	Replace			0.5		3, 5	
	Mast	Replace			3.5		3, 5	
	Remote Control	Replace	0.1				6	
		Repair	0.6				6	
	Remote Control Cable	Replace	0.1				6	
		Repair	*				6	
	Tension Cylinder Assembly (M84E1)	Replace			1.3		3, 5	
		Repair				1.0	3, 5	
	M983 Crane	Inspect	0.1				2, 6	
		Service	0.9				3, 5, 106, 107	
		Replace			8.0		3, 4, 5, 8, 109,	
		Repair				*	111	
	Hoist	Inspect	0.1				3, 5	
		Replace			3.0		3, 5	
		Repair				16.0	3, 5	
	Hoist Check Valves	Test			0.3		3, 109, 111	
		Replace			0.5		3, 5	
	Hoist Drive Unit	Replace			1.5		3, 5	
		Repair				4.0	3, 5	
	Hoist Cable	Inspect	0.1				6	
		Service	0.3				2, 6	
		Replace	0.5					
	Crane Hook Block	Replace	0.3				6	
		Repair	0.5				6	
	Hydraulic Pipes, Tubes, Hoses and Fittings	Replace			*		5, 108	
	Crane Base	Replace				6.0	3, 5	
	Hose Reel	Replace			1.0		3, 5	
		Repair				1.5	3, 5	
	Unfolding Cylinders	Replace			1.5		3, 5	
		Repair				2.0	3, 5	

## Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools & Equipment	(6) Remarks
			C	O	F	H		
2001	Inner Boom Cylinders	Replace			2.0		3, 5	
		Repair				2.0	3, 5	
	Boom Extensions 1 and 2 Cylinders	Replace			1.0		3, 5	
		Repair				2.5	3, 5	
	Boom Extensions 3 and 4 Cylinders	Replace			6.0		3, 5	
		Repair				6.0	3, 5	
	Extension Back Pressure Valves	Replace			0.5		3, 5	
		Repair			0.6		3, 5	
	Extension No. 1	Replace			2.0		3, 5	
	Extension No. 2 and No. 3	Replace			2.5		3, 5	
	Extension No. 4	Replace			2.0		3, 5	
	Boom Unit	Replace			2.0		3, 5	
	Beam	Replace			2.5		3, 5, 106, 107	
	Slewing Plate and Bearing	Replace			1.5		5, 7	
	Slewing Housing and Pistons	Replace			2.5		3, 5	
	Three Point Bridge and Trunnion	Replace			2.5		3, 5, 106	
	Overload Cell	Replace			2.0		3, 5	
	Crane Power Distribution Box	Test				*	3, 5, 130	B
		Replace			1.0			
		Repair				4.0	3, 5	
2004	Remote Control	Inspect	0.1					
		Adjust			1.0		5	
		Replace	0.1				2, 6	
		Repair			1.0		5	
	Remote Control Cable	Replace	0.1				6	
		Repair	*				2, 6	A
	System Relief Valve	Replace			0.5		3, 5	
	Main Control Valve	Replace			0.7		3, 5, 108, 110	
		Repair			2.0		3, 5	
	Overload Protection Valve	Test			*		3, 5	B
		Adjust			1.5		5	
		Replace			0.5		3, 5	
	Motor Proportional Control	Adjust				0.3	5	
	Power Take-Off	Replace	2.0				2, 6	
		Repair			2.5		3, 5	
	PTO Solenoid	Replace	0.6				6	

**Maintenance Allocation Chart (Cont)**

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools and Equipment	(6) Remarks
			Unit		Direct Support	General Support		
			C	O	F	H		
2004	PTO Hydraulic Pump	Replace Repair		1.0	2.0		2, 6 3, 5	
	PTO Hydraulic Pump (M984A1)	Replace Repair		1.2	2.5		2, 6 3, 5	
	Outrigger Jack (M977, M985)	Replace Repair			1.0	1.0	3, 5 3, 5	
	Outrigger Jack (M983)	Replace Repair		1.0	1.0		2, 6 3, 5	
	Outrigger Jack (M984A1)	Replace Repair			1.2	1.0	3, 5 3, 5	
	Outrigger Extension Cylinder (M977, M985)	Replace Repair			3.0	1.0	3, 5 3, 5	
	Outrigger Beam (M977, M985, M984A1)	Replace			2.0		3, 5	
	Outrigger Hydraulic Lines and Fittings	Replace	*				5	A
	Outrigger Control Valve	Replace Repair			1.0		3, 5 3, 5	
	Outrigger Extension Cylinder (M984A1)	Replace Repair			1.5	1.0	3, 5 3, 5	
22 2202	BODY ACCESSORY ITEMS							
	Windshield Wiper Motor	Replace	0.6				6	
	Windshield Wiper Arm	Replace	0.2				6	
	Windshield Wiper Control Valve	Replace	0.3				6	
	Mirror	Replace	0.3				6	
	Air Horn	Replace	0.3				6	
	Air Horn Control Valve	Replace	0.5				6	
	Heater	Replace Repair	1.5 1.0				6	
	Heater Control Cable	Replace	0.6				6	
	Heater Motor and Core	Replace	0.5				6	
	Heater Hoses and Fittings (Each)	Replace	0.5				6	
	Heater Control Valve	Replace	1.0				6	
	Cab Air Vent Box and Screen	Replace	0.5				6	
	Fuel Transfer Hose (M978)	Replace	0.4				2, 6	
	Vent Hose (M978)	Replace	0.2				6	

## Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools & Equipment	(6) Remarks
			C	O	F	H		
2202	Fuel Nozzle (M978)	Replace		0.3			6	
	Static Discharge Cable (M978)	Repair		0.3	0.8		5	
	Air Actuated Valve and Air Hose (M978)	Replace		0.3	0.4		6	
2210	Data Plates	Replace	0.2				2, 6	
24	HYDRAULIC COMPONENTS							
2401	Hydraulic Hand Pump (M983)	Replace		0.8			6	
		Repair			0.5		5	
	Main Hydraulic Relief Valve	Replace	1.1				2, 6	
		Repair	0.7				6	
	Pressure Relief Valve (M983)	Replace	0.6				2, 6	
		Repair		0.5			5	
	Pressure Relief Valve (M984)	Replace	0.6				2, 6	
		Repair		0.5			5	
	Self-Recovery Winch Control Valve	Replace	0.8				6	
		Repair		0.5			5	
	Self-Recovery Winch	Replace	0.5				6	
		Repair		0.5			6	
	Selector Valve	Replace		0.5			6	
		Repair		0.5			6	
2402	Fuel Pump Control Valve (M978)	Replace	1.0				6	
		Repair		0.8			5	
	Heavy-Duty Winch Manifold (M984E1)	Replace	1.2				2, 6	
		Repair	1.0				2, 6	
	Retriever Control Valve (M984E1)	Replace	1.2				6	
		Repair		1.3			3, 5	
	Steering/Tensioner Manifold	Replace		1.5			3, 5	
		Repair			1.1		3, 5	
2406	Return Line Filter/Mounting	Replace	0.6				6	
	Pressure Line Filter/Mounting (M977, M985, M984E1)	Replace	0.6				6	
		Repair	0.3				2, 6	
	Hydraulic Lines and Fittings	Replace					2, 6	A
29	AUXILIARY GENERATOR							
2901	Generator Set (M983)	Inspect	0.3					
		Replace		0.5			6	
		Repair						F

## Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools and Equipment	(6) Remarks
			Unit		Direct Support	General Support		
			C	O	F	H		
2967	Generator Power Distribution Box (M983)	Inspect Replace Repair	0.1	0.2			6	G
33	SPECIAL PURPOSE KITS							
3301	Reusable Containers	Service Repair			0.2		5	
3303	Arctic Heater Kit (Model A)	Inspect Install Replace	0.2		4.5	4.5	5	
	Coolant Pump (P/O Arctic Heater Kit, Model A)	Replace Repair Test		0.5		0.5	2, 6	
	Arctic Heater Kit (Model B)	Inspect Install Repair Replace	0.2		4.0	4.0	3, 5	B
		Test				*	3, 5	
		Replace		0.3		*	3, 5	
		Repair				*	3, 5	A, C
	Wiring Harness (P/O Arctic Heater Kit, Model A)	Test				*	3, 5	
	Wiring Harness (P/O Arctic Heater Kit, Model B)	Replace				1.5	2, 6	
	Arctic Battery Box	Repair	1.2	*			2, 6	
	Front Arctic Brake Chamber	Replace	0.4				6	
34	Rear Arctic Brake Chamber	Repair	0.4				6	
	ARMAMENT EQUIPMENT							
	3401	Machine Gun Mounting Kit	Inspect Install Replace	0.1		2.0	3, 5	
				1.0			2, 6	
	Machine Gun Ring Rifle Mount	Install Replace			0.3		3, 5	
					0.3		6	
1806	Air-Ride Seat and Seatbelt (Four Point) Kit Installation	Replace Install			.3		6	
					6.0		3, 5	



## Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools and Equipment	(6) Remarks
			Unit		Direct Support	General Support		
			C	O	F	H		
47 4702	NON-ELECTRIC GAGES	Inspect Replace	0.1	0.2			6	
	Air Pressure Gage							
	M978 Fuel Pressure Gage							
	M978 Pressure Differential Gage							
56 5600	M978 Fuel Gage	Inspect Replace	0.1	0.2			6	
	FILTERS, SEPARATORS, AND PURIFIERS							
	Filter Separator (M978)	Service Replace Repair		0.8 7.8 1.3			6 2, 6 2, 6	

## Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools and Equipment	(6) Remarks
			Unit		Direct Support	General Support		
			C	O	F	H		
68	RADIO KIT							
6809	Radio	Inspect Install Replace Repair	0.1	1.5	2.0		3, 5 6	H
72	DISPENSING COMPONENTS (M978)							
7202	Primary Pump	Inspect Service Replace Repair	0.3	1.0 2.0		1.1	6 5 3, 5	
	Primary Pump Hydraulic Motor Control Cable and Mount	Adjust Replace		0.5 0.5			6 6	
	Primary Pump Hydraulic Motor	Replace Repair		2.0	3.0		6 3, 5	
	Auxiliary Pump	Replace Repair		1.0		2.0	2, 6 3, 5	
	Flowmeter	Replace Repair Adjust			0.6 *	4.0	3, 5 3, 5	
	Flowmeter Strainer	Service Replace		0.4 0.5			6 2, 6	
7203	Fuel/Defuel Control Valve Lever	Replace		0.5			6	
	Emergency Valve	Replace Repair		0.6		0.3	3, 5 3, 5	
	Emergency Shutoff Cable	Replace		1.0			2, 6	
	Bottom Load Valve Adapter	Replace Repair		0.8	1.0		2, 6 3, 5	
	Air Eliminator	Replace Repair		0.6	0.2		2, 6 3, 5	
	Eductor & Gaskets	Replace		0.5			2, 6	
	Tanker Valves	Replace Repair		*	*		6 3, 5, 127	A
	Line Strainer Assembly	Service Replace		0.4 0.6			6 6	
	Air Eliminator Check Valve	Replace		1.0			6	
	Venturi Assembly	Replace		2.4			6	
	Pump Module Piping	Replace		*			6	A
	Fuel Level Sensor	Replace		0.5			6	
	Tanker Piping	Replace		*			6	A

Maintenance Allocation Chart (Cont)

(1) Group Number	(2) Component Assembly	(3) Maintenance Function	(4) Maintenance Level				(5) Tools & Equipment	(6) Remarks
			C	O	F	H		
91	CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL (CBR) EQUIPMENT							
9111	Gas Particulate Filter Unit	Inspect Install Replace Repair	0.2	2.2	2.0		3, 5 6	I
9120	M-3 Decontamination Unit	Inspect Install Replace Repair	0.2	0.5	1.0		3, 5 6	J
9131	M-8 Chemical Alarm	Inspect Install Replace Repair	0.2	1.8	2.3		3, 5 6	K

## Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/ Nato Stock Number	Tool Number
1	O	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No. 2, Less Power	4910-00-754-0650	
2	O	Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No. 1, Less Power	4910-00-754-0654	
3	F	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance, Basic Less Power	4910-00-754-0705	
4	F	Shop Equipment, Automotive Maintenance and Repair: Field Maintenance Supplemental Set No. 2, Less Power	4910-00-754-0707	
5	F	Tool Kit, Master Mechanics	5180-00-699-5273	
6	O	Tool Kit, General Mechanics; Automotive	5180-00-177-7033	
7	O	Shop Equipment, Lubrication and Tire Servicing, Mounting	4940-00-209-6231	

## Tools and Test Equipment Requirements (Cont)

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/ Nato Stock Number	Tool Number
8	F	Shop Equipment, Machine Shop: Field Maintenance Basic, Less Power	3470-00-754-0708	
9	F	Tool Kit, Automotive Fuel and Electrical System Repair	4910-00-754-0655	
10	F	Engine Stand Adapter Plate	4910-00-146-9324	J33850/J8601-0
11	H	Core Plug Remover/Installer	5120-01-130-8864	J23019
12	H	Water Inlet, Adapter Remove/Installer	5120-01-048-2180	J25275
13	H	Cylinder Checking Gage	5120-01-070-4543	J5347-B
14	H	Cylinder Liner Depth Gage	5210-01-174-4498	J24898
15	H	Cylinder Block Test Kit		2SK737
16	O	Gage, Belt Tensioner	6635-01-093-3710	J23600
17	F	Cylinder Head Guide Stud Set	4910-01-162-3630	J24748
18	F	Cylinder Head Lifting Fixture	4910-00-456-7620	J22062-01
19	F	Fuel Line Wrench	5120-00-019-5232	J8932-B
20	H	Cylinder Head Test Fixture	4910-01-158-3985	J28454
21	H	Injector Tube Reconditioning Tool Set	2910-01-146-9619	J22525-B
22	H	Cylinder Liner Depth Gage	5210-00-023-4798	J22273-01
23	H	Protrusion Gage	4910-01-167-4281	J25521
24	H	Installer Valve Bridge Guide	5120-00-999-8616	J7482
25	H	Remover, Valve Guide	5120-00-733-8880	J6569
26	H	Installer, Valve Guide	5120-00-999-8617	J21520
27	H	Valve Seat Insert Installer	5120-01-048-3118	J24357
28	H	Valve Seat Collet	5120-01-048-1379	J23479-33
29	H	Puller Assembly	5120-01-048-1382	J23479-35
30	H	Water Nozzle Installer	5120-01-048-3119	J24857-A
31	F	Stud Set Alinement	5120-00-629-9781	J1927-01
31.1	F	Stud Set Alinement	5120-01-048-2155	J25002
32	F	Seal Installer, Flywheel Housing	4910-00-176-4230	J21112-B
32.1	F	Oversize Seal Installer		J35686
32.2	F	Handle		J3154-1
33	F	Crankshaft Rear Oil Seal Expander	5210-00-336-0445	J4239
34	H	Cylinder Liner Remover Assembly	4910-01-158-3982	J24563-A
35	H	Cylinder Liner Holddown Clamps	4910-01-158-3984	J24565-02
36	H	Piston Pin Retaining Tool	5120-00-127-7757	J23762-A
37	H	Piston Crown ID Gage	5120-01-130-8869	J25397

## Tools and Test Equipment Requirements (Cont)

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/Nato Stock Number	Tool Number
38	H	Piston Groove Gage	5220-01-028-1109	J24599
39	H	Leak Detector Set	5210-01-061-4253	J23987-01
40	H	Camshaft Gear Puller	5120-00-219-8397	J1902-01
41	H	Camshaft Gear and Water Pump Pully Remover	5120-00-733-8890	J7932
42	H	Piston Feeler Gage Set Part of Kit J5438-01	5120-00-671-2275	J3174-02
43	H	Blower Service Set	5120-00-936-4376	F6270-F
44	F	Water Pump Drive Gear Installer	5120-01-033-8902	J25257
45	F	Fan Drive Overhaul Tool	4910-01-163-1340	3-462-902-24460
46	F	Feeler Gage 0.001	5210-01-119-7601	FB310B
47	F	Injector Timing Gage	5110-01-160-2614	J34610
47.1	F	Injector Timing Gage	5220-01-348-1638	J25502
48	F	Throttle Delay Cylinder Gage Pin	5210-01-138-7558	J25558
49	F	Throttle Delay Cylinder Gage	5120-01-138-7559	J255560
50	F	Turbocharger Inlet Shield	4910-01-127-7952	J26554-A
51	F	Cylinder Compression Gage Package	4910-01-148-1236	J7334-04
52	O	Thermostat Seal Installer	5120-00-977-5579	J8550
53	O	Handle, Thermos Seal Installer	5120-00-977-5578	J7079-2
54	F	1/4" Drive 12 pt 1/4" Socket	5120-00-189-8609	819158
55	F	Fuel Pump Tool Set	5180-00-219-8407	J1508-E
56	H	Magnetic Base Dial Indicator	5120-00-402-9619	J7872
57	F	Blower Shaft Alinement Tool	5120-01-048-3122	J33001/J24619
58	H	Polishing Stick	5120-00-402-9626	J22964
59	F	Governor Gap Gage 0.200	5210-01-048-6532	J23478
60	F	Feeler Gage		007958
61	F	Solenoid Wrench	5120-01-163-1349	011494
62	H	Injector Rack and Freeness Tester	4910-00-950-3119	J22396
63	H	Needle Valve Lift Gage	5310-00-937-7285	J9462-02
64	H	Injector Test Fixture	4940-01-148-7876	J23010
65	H	Injector Tip Concentricity Gage	5210-00-990-3327	J5119
66	H	Injector Service Set	5180-01-038-0251	J23435-02
67	H	Brass Wire Brush	5130-00-937-7281	J7944
68	H	Injector Body Reamer	5110-00-937-7628	J21089
69	H	Lapping Block Set	3460-00-937-5521	J22090-A



## Tools and Test Equipment Requirements (Cont)

<b>Tool or Test Equipment Ref Code</b>	<b>Maintenance Category</b>	<b>Nomenclature</b>	<b>National/ Nato Stock Number</b>	<b>Tool Number</b>
70	H	Idler Gear Holding Fixture	5180-01-167-4285	15K900
71	H	Gage Retaining Ring Selector	4910-01-158-3999	J24208-15
72	H	Gun Gear Reaming Set	5110-01-150-9755	J28489
73	H	Bushing Installer	4910-01-158-3986	J24201
73.1	H	Bushing Installer		J25458-3
74	H	Main Shaft Lifting Bracket	5120-01-115-1157	J24196
75	H	Bushing Swaging Tool	4910-01-158-3970	J26997-A
76	F	Lock Socket	5120-01-170-6709	L883
77	F	Transmission Oil Seal Installer	5120-01-048-3125	J24202-1A
78	H	Ouput Shaft Bushing Installer	5120-01-115-9174	J24203

## Tools and Test Equipment Requirements (Cont)

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/ Nato Stock Number	Tool Number
79	H	Transmission Holding Fixture	5120-01-115-1165	J24310
80	H	Flywheel Lifting Bracket	5120-01-116-6049	J24365
81	H	Stator Roller Holder	5120-01-115-1158	J24218-2
82	H	Ring Bearing Installer	5120-01-054-4054	J24447
83	F	Drive Handle	5120-01-054-4048	J24202-4
84	H	Clutch Spring Compressor	5120-01-048-3129	J24204
85	H	Collector, Ring Installer and Staking Set	5120-01-048-3124	J24200
86	H	Forward Clutch Piston Inner Seal Protector	5120-01-048-2157	J24216-01
87	H	PTO Gear Removing Fixture	4910-01-158-3969	J26899
88	H	Fourth Clutch Alinement Fixture	5120-01-115-1156	J24221
89	H	Mainshaft Oil Seal Remover and Installer	5120-01-115-1161	J26282
90	H	Swaging Tool	4910-01-168-9543	J28525-1
91	H	Sleeve Compressor	4910-01-158-4000	J24208-2
92	H	Compressor Center Support	4910-01-158-3972	J24208-3
93	O	Wheel Bearing Wrench		3335074
94	F	Torque Adapter	5120-01-173-6252	SRES20
95	F	Adapter	4910-01-186-3125	Y-855A
96	F	Adapter/Clamp	4910-01-186-2132	Y-856/42052
97	F	Adapter	4910-01-158-3941	Y-861
98	F	Adapter	4910-01-162-7012	Y-862
99	F	Center End Bushing Service Set	4910-01-168-1435	Y-840A/1763
100	F	Adapter	4910-01-186-3128	Y-852
101	F	Adapter	4910-01-186-3126	Y-853
102	O	Insert Removal Tool	5120-01-158-4707	114010
103		Deleted		
104	F	Socket, 2-1/4 inch	5120-01-171-7613	2BF878
105	F	Socket, 2-7/8 inch		2BF707
106	F	Socket, 2-3/16 inch	5120-01-213-9278	2BG264
107	F	Socket, 1-13/16 inch	5120-01-214-6616	2BG262
108	F	Formed Socket	4910-01-158-3998	390 1530
109	F	Measure Box	5910-01-157-3570	996 8709
110	F	Wrench, Crowfoot 24 mm	5120-01-108-6646	FCOM24
111	F	Adapter		309-1597
112	H	Tester, Lock, 2 inch	4910-01-157-3571	TFTLN-1000
113	H	Tester, Lock, 3-1/2 inch	4910-01-157-3572	TFTLN-1500

## Tools and Test Equipment Requirements (Cont)

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/ Nato Stock Number	Tool Number
114	O	Handle, Seal Installer		RD296
114.1	O	Adapter, Seal Installer		RD289
114.2	O	Adapter, Seal Installer		RD305
115	O	Adapter, Seal Installer		RD291
116	O	Adapter, Seal Installer		RD414
116.1	O	Adapter, Pilot		RD415
117	O	Installer, Seal		H-A08-LR460-AG336
118	O	Installer, Wear Ring		ADDP336
119	F	Driver, Torx Head	5120-01-214-8705	FTX30A2
120	F	Air Pressure Gage 30 PSI		
121		Remover, Bearing Shell		2BG624
122	H	Eyes, Lifting		2BH944
123	H	Pliers, Retaining Ring		2BH945
124	H	Engine Stand	4910-00-808-3372	J6837-C/J29109
125	H	Spring Scale		J8129
126	H	Detent Ball Compression Tool		IPP161
127	F	Compression Tool	5120-01-167-4319	2SK886
128	F	Unloader Bore Bushing Removal Tool	5120-01-173-7092	2BF829
129	F	Air Compressor Cylinder Head Removal Tool	4910-01-162-3632	2AH762
130	F	Diagnostic Tool	3950-01-164-1880	500-392-01
131	H	Turbocharger Holding Fixture		2SK742
132	F	Remover, Water Pump Seal	4910-01-158-3979	J22150-B
133	H	Pitot Tube Guide Pins	4910-01-162-3637	J6889-1
134	H	Front Support Needle Bearing Installer	5120-01-115-1160	J24197
135	O	Tire Iron		T23B
136	O	Tire Iron		T48A
137	O	Tire Iron		T52
138	F	Puller Tool		24702
139	O	Manometer, 12-0-12	6685-00-150-5172	J7333-6
140	O	Manometer Tubing	4710-00-146-9636	J8639-2
141	O	Vapor Recovery Kit		45D016
142	O	Air Regulator 0-3 PSI		
143	H	Seal Installer	4910-01-299-9289	J35787-2
144	H	Spacer Installer	4910-01-296-9936	J35787-1
145	O	Socket, 3-1/4	5120-01-144-5331	A-A-2635

**Section IV. REMARKS**

REFERENCE CODE	REMARKS
A	No specific times established. Times required for replacement or repair will depend on extent of work required.
B	No specific times established. Time required for test will depend on the extent of testing required.
C	In the "O" category repair is limited to splicing of wires, taping of the harness or wires, and the replacement of wire ends.
D	At the "F" level the entire wire harness is replaced.
E	In the "F" level repair of the cylinder block consists of replacement of block plugs, air box covers, and air box drain tubes.
F	Repair of the generator set is covered in TM 5-6115-465-12.
G	Repair of the power distribution box is covered in TM-(TBD).
H	Repair of the radio is covered in TM 11-5820-498-12.
I	Repair of the gas particulate filter is covered in TM-(TBD).
J	Repair of the M-13 decontamination unit is covered in TM 3-4230-214-12&P.
K	Repair of the M-8 chemical alarm is covered in TM 3-6665-225-12.
L	Replacement of winch components is performed at Direct Support.

## APPENDIX C

### EXPENDABLE SUPPLIES AND MATERIALS LIST

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#### Section I. INTRODUCTION

**C-1. SCOPE.** This appendix lists expendable supplies and materials needed to operate and maintain M977 Series Vehicles. These items are authorized by CTA 50-970. This appendix includes expendable items (except Medical, Class V, Repair Parts, and Heraldic Items) and consumable materials.

**C-2. EXPLANATION OF COLUMNS.**

**a. Column (1) - Item Number.** This number is assigned to the entry in the listing and is referenced in the Initial Setup under "Supplies" to identify the material (e.g., "Oil, lubricating, Item 28, Appendix C").

**b. Column (2) - Level.** This column identifies the lowest level of maintenance that requires the listed item.

- C - Operator/Crew
- O - Organizational 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 the national stock number to request or requisition the item.

**d. Column (4) - Description.** Indicates the federal item name and, if required, a description to identify the item. Where applicable, the last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) 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 (e.g., ea, in., pr). If the unit of measure differs from the unit of issue, requisition the **lowest** unit of issue that will satisfy the requirements.

#### Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
1	C	8040-00-181-7761	Adhesive No. 4500 (FSCM 08853) (OTC P/N 30456 AX)	
1.1	O		Adhesive (OPMNO) Sika 255 FC Blk (45152) (OTC P/N 3145938)	oz
2	O		Adhesive No. 1099-L (FSCM 04963) (OTC P/N EE 39597)	
2.1	O	8040-00-838-4981	Adhesive No. 405 (FSCM 23577) (OTC P/N 1579200) (45152)	
3	O	8040-01-152-8104	Adhesive No. PL 200 (OTC P/N 1322080)	
3.1	O	8040-01-321-1254	Adhesive No. 409 (No. 40945) (FSCM 05972) (OTC P/N 1586850), 20 gm tube	gm
3.2	O		Adhesive P/N 1300 (FSCM 28712) (OTC P/N 32167AX), 5 oz tube	oz
3.3	O	8040-01-235-5435	Adhesive No. 1711 (FSCM 04963) (OTC P/N 1482140), 5 oz tube	oz

**Expendable Supplies and Material List (Cont)**

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
4	O	8040-00-995-0590	Adhesive-Sealant, Silicon RTV, General Purpose (MIL-A-46106A)	
4.1	O	8040-00-118-2695	Adhesive-Sealant, RTV, Non Corrosive (MIL-A-46146) (FSCM 01139) (RTV 162)	
4.1.05	O		Adhesive, Sika #221 Blk (OTC P/N 1945250)	ea
4.2	O	8040-00-938-6860	Adhesive Spray (FSCM 04963) (OTC P/N 1537350)	
4.3	O	8040-01-250-3969	Adhesive, Thread Locking (FSCM 05972) (Loctite 242) (OTC P/N 65270AX)	ea
5	O		Antifreeze, Permanent, Ethylene Glycol, Inhibited (MIL-A-46153)	
		6850-00-181-7929	1-gal can	gl
		6850-00-181-7933	5-gal drum	gl
		6850-00-181-7940	55-gal drum	gl
6			Antifreeze, Arctic Type (MIL-A-11755)	
		6850-00-243-1992	1-gal can	gl
		6850-00-174-1806	55-gal drum	gl
7	O		Cement, General Purpose, Synthetic Base (MIL-C-4003)	
8	O	7510-00-164-8893	Chalk	
8.1	O		Cleaner, Adhesive Prep (OTC P/N 1959900)	ea
9	O		Clips, Wire, Plastic	
9.1	O		Coating, Protective, P/N 1412020	
10	O	8030-00-597-5367	Compound, Antisieze, High Temperature (MIL-A-907)	
11	O	6850-00-598-7328	Compound, Cleaning, Conditioner and Inhibitor for Engine Cooling System (MIL-C-10597)	
		6850-00-598-7328	Package, Consisting of: a. Cleaner, Part 1, Oxalic Acid. b. Cleaner, Part 2, Aluminum Chloride. c. Sodium Silicate Conditioner. d. Alkaline Conditioner. e. Inhibitor. f. Instruction Sheet.	ea
12			Compound, Cleaning P-C-435A	
12.1	O		Compound, Corrosion Preventive (MIL-C-62218A) (05238) (P/N 2085B)	
12.2	O		Compound, Corrosion Preventive (FSCM 45152) (OTC P/N 1388330), 8 oz can	oz
13	F	5970-00-166-5697	Compound, Insulating, Electrical, Embedding (MIL-C-47233)	
14	F	5350-00-193-7227	Compound, Lapping and Grinding A-A-1203	
15	F		Compound, Polishing K-M J23028	

**Expendable Supplies and Material List (Cont)**

(1) <b>Item Number</b>	(2) <b>Level</b>	(3) <b>National Stock Number</b>	(4) <b>Description</b>	(5) <b>U/M</b>
16	F	8030-00-181-7603 8030-00-181-7529	Compound, Retaining (MIL-R-46082) 50-cc 250-cc	cc cc
16.1	O		Compound, Sealing, Lubricating, Wicking, Thread Locking, Anaerobic, Single Component (MIL-S-46163) Type I, Grade K	
17	O		Compound, Sealing, Lubricating, Wicking, Thread Locking, Anaerobic, Single Component (MIL-S-46163) Type I, Grade L	
17.1	O	8030-01-804-5392 8030-01-014-5869 8030-01-025-1696	Compound, Sealing, Lubricating, Wicking, Thread Locking, Anaerobic, Single Component (MIL-S-46163) Type II, Grade N 10 ml bottle 50 ml bottle 250 ml bottle	ml ml ml
17.2	O		Compound, Sealing, Lubricating, Wicking, Thread Locking, Anaerobic, Single Component (MIL-S-46163) Type II, Grade O	
17.3	O		Compound, Sealing, Lubricating, Wicking, Thread Locking, Anaerobic, Single Component (MIL-S-46163) Type II, Grade R	
18	O	8030-01-054-0740	Compound, Sealing, Pipe Thread PS/T92-31 (FSCM 05972) (OTC P/N 702350-X)	
18.1	O	8030-01-166-0675	Compound, Sealing, Pipe Thread (FSCM 05972) (No. 56707) (Loctite 567), 6 ml tube (No. 56747) (Loctite 567), 50 ml tube (No. 56765) (Loctite 567), 250 ml tube	ml ml ml
18.2	O	8030-01-026-1538	Compound, Sealing, Pipe Thread 56941 (FSCM 05972) (OTC P/N 56437AX)	cc
18.3			Deleted	
19	O		Connector, Electrical, Butt 34072 (FSCM 04618)	
20			Detergent, Painted Surface, Powder, PC 731A, Type II	
21	F		Dye, Prussian Blue	
22	O		Enamel, Alkyd, Camouflage, Black (for stenciling) (MIL-E-52192B)	
		8010-00-111-8005 8010-00-111-8356	1-gal can 5-gal can	gl gl
23	C	9150-00-190-0905 9150-00-065-0029 9150-00-935-1017 9150-00-190-0904 9150-00-190-0905 9150-00-190-0907 9150-00-530-7369	Grease, Automotive and Artillery GAA (MIL-G-10924) 2-1/4-oz tube 14-oz cartridge 1-lb can 5-lb can 35-lb can 120-lb can	oz oz lb lb lb lb lb

**Expendable Supplies and Material List (Cont)**

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
23.1	O		Grease, Electrical (45152) 1388330	
23.2	O	6505-00-133-8025	Grease, White (92469) Vaseline	
23.3	O		Hardener, Epoxy, High Solids (MIL-P-53022) Type II (09225) (P/N 4489 CEH)	
23.4	O		Hardener, Epoxy, High Solids (MIL-P-53022) Type II (09225) (P/N 3119CEH)	
23.5	O		Inhibitor, Corrosion, Liquid Cooling System (89524) (P/N NALCOOL 2000)	
		6850-01-085-4717	1-pt can	pt
		6850-01-085-4718	64-oz bottle	oz
		6850-01-085-4719	5-gal can	gl
		6850-01-087-4045	15-gal drum	gl
		6850-01-086-3438	55-gal drum	gl
24	O		Lockwire	
24.1	O		Lubricant, Tire and Rim	
		2640-00-256-5526	1-qt can	qt
		2640-00-256-5527	1-gal can	gl
		2640-00-256-5529	(5) 1-gal containers in a carton	gl
25	F	6810-00-281-6929	Methyl Ethyl Ketone TT-M-261 (MIL-T-27602)	
26	C		Oil, Fuel, Diesel DF-1 Winter (VV-F-800)	
		9140-00-286-5286	Bulk	gl
		9140-00-286-5287	5-gal can	gl
		9140-00-286-5288	55-gal drum, 16 gage	gl
		9140-00-286-5289	55-gal drum, 18 gage	gl
27	C		Oil, Fuel, Diesel DF-2 Regular (VV-F-800)	
		9140-00-286-5294	Bulk	gl
		9140-00-286-5295	5-gal can	gl
		9140-00-286-5296	55-gal drum, 16 gage	gl
		9140-00-286-5297	55-gal drum, 18 gage	gl
28	C		Oil, Lubricating, Gear GO 85/140 (MIL-L-2105)	
		9150-01-035-5395	5-gal can	gl
		9150-01-035-5396	55-gal drum	gl
29	C		Oil, Lubricating, Gear GO 75 (MIL-L-2105)	
		9150-01-035-5390	1-qt can	qt
		9150-01-035-5391	5-gal drum	gl
			55-gal drum	gl
30	C		Oil, Lubricating OE/HDO 10 (MIL-L-2104)	
		9150-00-265-9425	1-qt can	qt
		9150-00-265-9428	5-gal drum	gl
		9150-00-265-9429	55-gal drum, 16 gage	gl
		9150-00-265-9430	55-gal drum, 18 gage	gl
31	C		Oil, Lubricating, OE/HDO 20 (SAE 20)	

## Expendable Supplies and Materials List (Cont)

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
32	C	9150-00-265-9433 9150-00-265-9435	Oil, Lubricating, OE/HDO 30 (SAE 30) (MIL-L-2104) 1-qt can 5-gal drum	qt gl
		9150-00-265-9436 9150-00-265-9437	55-gal drum, 16 gage 55-gal drum, 18 gage	gl gl
32.1	C	9150-00-189-6730 9150-00-188-9862	Oil, Lubricating, OE/HDO 40 (SAE 40) (MIL-L-2104) 1-qt can 55-gal drum	qt gl
33	C	9150-01-152-4117	Oil, Lubricating, Internal Combustion Engine, Tacti- cal Service (MIL-L-2104) (OE/HDO 15W/40) 1-qt can	qt
34	C	9150-00-402-4478 9150-00-402-2372 9150-00-402-7197	Oil, Lubricating, OEA Ice, Subzero (MIL-L-4667) 1-qt can 5-gal drum 55-gal drum, 16 gage	qt gl gl
35	O		Oil, Preservative (MIL-O-6083)	
36	O		Oil, Preservative (MIL-C-8188)	
37	F		Oil, Test, Fuel Injector DDA/Kent-Moore No. J26400	
38	O	8010-01-141-2411 8010-01-128-6958 8010-01-131-6257	Paint, Polyurethane, Chemical Agent Resistant Coating CARC No. 383 Green (MIL-C-46168B) 1-qt can A 1-gal can A 4-gal can A	qt gl gl
39	O	8010-01-141-2411 8010-01-128-6858 8010-01-131-6257	Paint, Polyurethane (Catalyst Component) (MIL-C-46168B) 1/2-pt can B 1-qt can B 1-gal can B	pt qt gl
39.1	O		Paint, Polyurethane, Chemical Agent Resistant Coating (CARC) Black (MIL-C-46168B) 1-qt kit 1-gal kit 5-gal kit	kt kt kt
39.2	O	8010-01-160-6744	Paint, Polyurethane, Chemical Agent Resistant Coating (CARC) Brown 383 (MIL-C-46168B) 511X303 1-qt kit 1-gal kit 5-gal kit	kt kt kt

**Expendable Supplies and Materials List (Cont)**

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
39.3	O		Paint, Polyurethane (Resin Component), Chemical Agent Resistant Coating (CARC) Tan No. 686A (MIL-C-46168) Color No. 33446 (09225) (P/N 8609TUA-GD)  8010-01-260-0910 8010-01-260-0909 8010-01-260-0908	
			1-qt kit 1-gal kit 5-gal kit	kt kt kt
39.4	O		Paint, Single Component, Chemical Agent Resistant Coating (CARC) Brown No. 383 (MIL-C-53039) Color No. 30051 (09225) (P/N 8606TUA-2K)  8010-01-229-7543 8010-01-229-7544 8010-01-229-7545	
			1-qt can 1-gal kit 5-gal kit	qt kt kt
40	O		Paper, Abrasive, Garnet (Emery Cloth) P-P-121 5350-00-221-0884 5350-00-271-7930	
41	O		Paper, Abrasive, Silicon Carbide, Waterproof P-P-101 5350-00-619-9166 5350-00-224-7207 5350-00-578-8378	
41.1	O	9150-00-250-0933	Petrolatum, Technical (Petroleum Jelly) (VV-P-236)	lb
42	O		Primer, Epoxy (Red, Glyptol Enamel) (Resin Component) (MIL-P-52192B)	
43	O		Primer, Epoxy (Catalyst Component) (MIL-P-52192B)	
43.1	O		Primer, Epoxy, High Solids Chemical Agent Resistant Coating (CARC) Off White (MIL-P-53022) Type II (09225) (P/N 4488WEP3)	
43.2	O		Primer, Epoxy, High Solids, White (MIL-P-53022) Type II (09225) (P/N 3118WEJ-RM)	
43.3	O		Primer, (OPMNO) Sika Cleaner 205 (45152) (OTC P/N 3145939)	oz
44	O		Rust Preventive MIL-C-16173 Texaco Type "L", (OTC P/N 19AS436)  8030-00-062-5866 8030-00-231-2345 8030-00-244-1293 8030-00-244-1294	ea
			1-qt can 5-gal drum 55-gal drum, 16 gage 55-gal drum, 18 gage	qt gl gl gl
44.1	O		Shim, Body P/N 60901AX	ea
45	O		Soap Chips, P-5-579	
45.05	O		Sealant, RTV200 Electrical (OTC P/N 3119525) (45152)	
45.1	O		Sealant No. Sikaflex 201 (FSCM 45152) (OTC P/N 1414680)	gl

**Expendable Supplies and Material List (Cont)**

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
45.1.05	O		Sealant No. Sikaflex 221 (FSCM 45152) (OTC P/N 1490170)	
45.2	O		Shrink, Heat 603314-4 (04618)	
46	O		Solder, Resin Flux Core ASTM B 284-79	
47	O	6850-00-664-5685 6850-00-281-1985	Solvent, Drycleaning SD (P-D-680) 1-qt can 1-gal can	qt gl
48	O	8135-00-178-9200	Tags, Identification (MIL-T-12755)	
49	F	8030-00-889-3534 8030-00-889-3535	Tape, Antiseize, Tetrafluoroethylene (MIL-T-27730)	
50	O	5970-00-644-3167	Tape, Insulation, Electrical (MIL-T-50886)	
51	O	8010-00-181-8080 8010-00-181-8079 8010-00-280-1751	Thinner, Aliphatic, Polyurethane Coating (MIL-T-81772) 1-gal 5-gal 55-gal	gl gl gl
52	O	5975-01-034-5871	Ties, Cable, Plastic (MIL-S-29190)	
52.1	O	8030-00-946-6158	Treatment, Corrosion (MIL-C-23411)	
53	F		Tubing, Heat Shrinkable (MIL-T-47051)	
54	O		Walkway Compound Nonslip (MIL-W-5044)	
54.1	O	7930-00-985-6750	Wax, Automobile 14-oz can	oz



## APPENDIX D

### PREPARATION FOR TOWING

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**D- 1. SCOPE.** This appendix covers preparing an M977 series vehicle for towing from the front.

**D-2. PREPARATION FOR TOWING.**

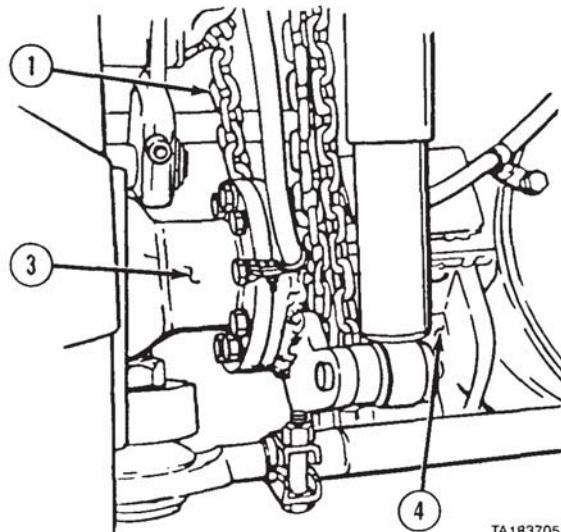
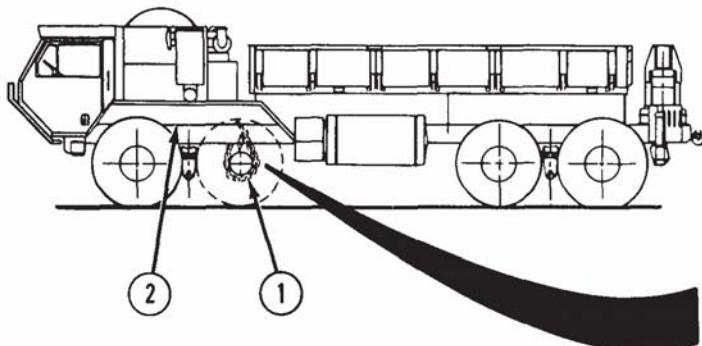
This task covers:

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>a. Preparation for towing.</li> <li>b. Axle restraining chain removal.</li> </ul> | <ul style="list-style-type: none"> <li>c. Follow-on Maintenance</li> </ul> |
|--|--|

**INITIAL SETUP**

<i>Models</i>	<i>Equipment Condition</i>	
All		
<i>Test Equipment</i>	<i>TM or Para</i>	<i>Condition Description</i>
None	TM 9-2320-279-10 Para 9-9	Shut off engine. Propeller shaft between transfer case and No. 3 axle removed.
<i>Special Tools</i>	<i>Special Environmental Conditions</i>	
None	None	
<i>Supplies</i>	<i>General Safety Instructions</i>	
None	None	
<i>Personnel Required</i>		
MOS 63S, Heavy wheel vehicle mechanic		
<i>References</i>		
None		

## Preparation for Towing (Cont)

**D-2. PREPARATION FOR TOWING (CONT)..****CAUTION**

When installing axle restraint chains, route chains so hoses or lines are not between frame and chain or axle and chain. Damage to equipment may result.

**NOTE**

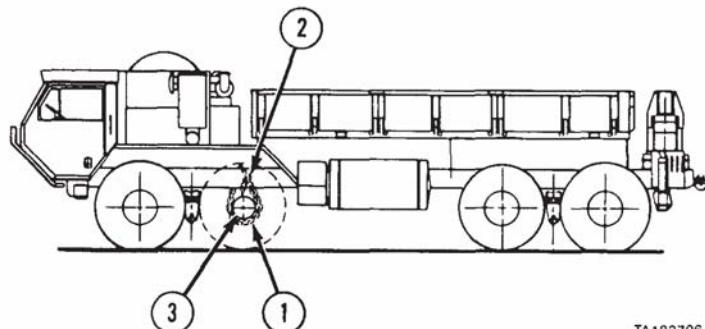
Axles should be restrained with chains on both sides of vehicle.

a. *Preparation for Towing.* Route axle restraint chains (1) over frame rail (2) and around axle (3) beside walking beam (4). Hook chains.

b. *Axle Restraining Chain Removal.* Remove axle restraining chains (1) from around frame rails (2) and axles (3) and stow.

c. *Follow-on Maintenance.* Install propeller shaft between transfer case and axle No. 3 (para 9-9).

END OF TASK



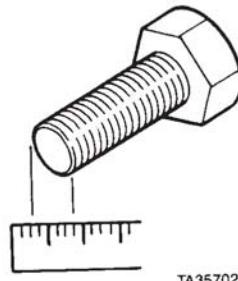
## APPENDIX E

### TORQUE LIMITS

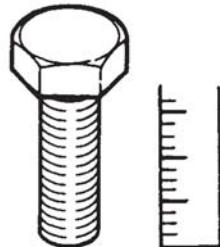
**[E-1. GENERAL]** This section provides general torque limits for screws used on the M977 series vehicles. Special torque limits are indicated in the maintenance procedures for applicable components. The general torque limits given in this appendix shall be used when specific torque limits are not indicated in the maintenance procedure. These general torque limits cannot be applied to screws that retain rubber components. The rubber components will be damaged before the torque limit is reached. If a special torque limit is not given in the maintenance instructions, tighten the screw or nut until it touches the metal bracket then tighten it one more turn.

**[E-2. TORQUE LIMITS]** Table E-1 lists dry torque limits. Dry torque limits are used on screws that do not have lubricants applied to the threads. Table E-2 lists wet torque limits. Wet torque limits are used on screws that have high pressure lubricants applied to the threads. Table E-3 lists torque limits for the M983 (HIAB) crane.

**[E-3. HOW TO USE TORQUE TABLE:]**



- (1) Measure the diameter of the screw you are installing.



- (2) Count the number of threads per inch.

- (3) Under the heading SIZE, look down the left hand column until you find the diameter of the screw you are installing (there will usually be two lines beginning with the same size).
- (4) In the second column under SIZE, find the number of threads per inch that matches the number of threads you counted in step (2). (Not required for metric screws.)

CAPSCREW HEAD MARKINGS	
Manufacturer's marks may vary. These are all SAE Grade 5 (3-line).  <b>STANDARD</b>	Metric screws are of three grades: 8.8, 10.9, and 12.9. Grades & Manufacturer's marks appear on the screw head.  <b>METRIC</b>

TA357028

- (5) To find the grade screw you are installing, match the markings on the head to the correct picture of CAPSCREW HEAD MARKINGS on the torque table.
- (6) Look down the column under the picture you found in step (5) until you find the torque limit (in lb-ft or N·m) for the diameter and threads per inch of the screw you are installing.

## Torque Limits (Cont)

Table E-1. Torque Limits for Dry Fasteners

CAPSCREW HEAD MARKINGS			TORQUE							
SIZE			SAE GRADE NO. 2		SAE GRADE NO. 5		SAE GRADE NO. 6 or 7		SAE GRADE NO. 8	
DIA. INCHES	THREADS PER INCH	MILLIMETERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS
1/4	20	6.35	5	7	8	11	10	14	12	1
1/4	28	6.35	6	9	10	14	12	16	14	19
5/16	18	7.94	11	15	17	23	21	28	25	34
5/16	24	7.94	12	16	19	26	24	33	25	34
3/8	16	9.53	20	27	30	41	40	54	45	61
3/8	24	9.53	23	31	35	47	45	61	50	68
7/16	14	11.11	30	41	50	68	60	81	70	95
7/16	20		35	47	55	75	70	95	80	108
1/2	13	12.70	50	68	75	102	95	129	110	149
1/2	20		55	75	90	122	100	136	120	1
9/16	12	14.29	65	88	110	149	135	183	150	203
9/16	18		75	102	120	163	150	203	170	23
5/8	11	15.88	90	122	150	203	190	258	220	298
5/8	18		100	136	180	244	210	285	240	325
3/4	10	19.05	160	217	260	353	320	434	380	515
3/4	16		180	244	300	407	360	488	420	597
7/8	9	22.23	140	190	400	542	520	705	600	814
7/8	14		155	210	440	597	580	786	660	895
1	8	25.40	220	298	580	786	800	1085	900	1220
1	12		240	325	640	868	860	1166	1000	1356
1-1/8	7	25.58	300	407	800	1085	1120	1519	1280	1736
1-1/8	12		340	461	880	1193	1260	1709	1440	1953
1-1/4	7	31.75	420	570	1120	1519	1580	2142	1820	2468
1-1/4	12		460	624	1240	1681	1760	2387	2000	2712
1	6	34.93	560	759	1460	1980	2080	2820	2380	3227
1-3/8	12		640	868	1680	2278	2380	3227	2720	3688
1-1/2	6	38.10	740	1	1940	2631	2780	3770	3160	4285
1-1/2	12		840	1139	2200	2983	3100	4204	3560	4827

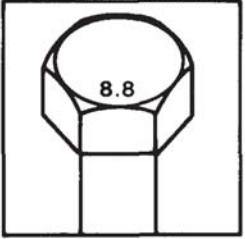
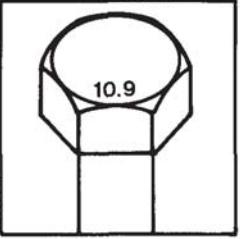
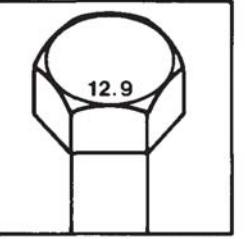
## Torque Limits (Cont)

Table E-2. Torque Limits for Wet Fasteners

CAPSCREW HEAD MARKINGS			TORQUE									
			SAE GRADE NO. 2		SAE GRADE NO. 5		SAE GRADE NO. 6 or 7		SAE GRADE NO. 8			
DIA. INCHES	THREADS PER INCH	MILLIMETERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS
1/4	20	6.35	4	6	6	8	8	11	9	12		
1/4	28	6.35	5	7	7	9	9	12	10	14		
5/16	18	7.94	8	11	13	18	1	22	18	24		
5/16	24	7.94	9	12	14	19	18	24	20	27		
3/8	16	9.53	15	20	23	31	30	41	35	47		
3/8	24	9.53	17	23	25	34	30	41	35	47		
7/16	14	11.11	24	33	35	47	45	61	55	75		
7/16	20		25	34	40	54	50	68	60	81		
1/2	13	12.70	35	47	55	75	70	95	80	108		
1	20		40	54	65	88	80	108	90	122		
9/16	12	14.29	50	68	80	108	100	136	110	149		
9/16	18		55	75	90	122	110	149	130	176		
5/8	11	15.88	70	95	110	149	140	190	170	231		
5/8	18		80	108	130	176	160	217	180	244		
3/4	10	19.05	120	163	200	271	240	325	280	380		
3/4	16		140	190	220	298	280	380	320	434		
7/8	9	22.23	110	149	300	407	400	542	460	624		
7/8	14		120	1	320	434	440	597	500	678		
1	8	25.40	1	217	440	597	600	814	680	922		
1	12		170	231	480	651	660	895	740	1003		
1-1/8	7	25.58	220	298	600	814	840	1139	960	1302		
1-1/8	12		260	353	660	895	940	1275	1080	1464		
1-1/4	7	31.75	320	434	840	1139	1100	1492	1	1		
1-1/4	12		360	488	920	1248	1320	1790	1500	2034		
1	6	34.93	420	570	1100	1492	1	2115	1780	2414		
1	12		460	624	1	1709	1780	2414	2040	2766		
1-1/2	6	38.10	560	760	1460	1980	2080	2820	2360	3200		
1-1	12		620	841	1640	2224	2320	3146	2660	3607		

## Torque Limits (Cont)

Table E-3. Dry Torque Limits for M983 Crane (Metric)

CAPSCREW HEAD MARKINGS							
SIZE		METRIC GRADE 8.8		METRIC GRADE 10.9		METRIC GRADE 12.9	
DIA INCHES	MILLIMETERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS	POUNDS FEET	NEWTON METERS
.157	4	2	3	3	4	4	5
.197	5	4	5	6	8	7	9
.237	6	7	9	10	14	11	15
.276	7	11	15	16	22	20	27
.315	8	18	24	25	34	29	39
.394	10	32	43	47	64	58	79
.473	12	58	79	83	113	100	136
.552	14	94	127	133	180	159	216
.630	16	144	195	196	266	235	319
.709	18	190	258	269	365	323	438
.788	20	260	353	366	496	440	597
.867	22	368	499	520	705	678	919
.946	24	470	637	664	900	794	1077
1.064	27	707	959	996	1351	1235	1
1.182	30	967	1311	1357	1840	1	2210

**APPENDIX F**  
**ILLUSTRATED LIST OF MANUFACTURED ITEMS**

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**Section I. INTRODUCTION**

This appendix includes complete instructions for making items authorized to be manufactured or fabricated at organizational maintenance.

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.

All bulk materials needed for manufacture of an item are listed by part number or specification number in a tabular list on the illustration.

**Section II. MANUFACTURED ITEMS PART NUMBER INDEX**

Part No.	Description	Fig. No.
M13486/12-1/120	Cable	F-1
104190B	Chain	F-2
110966A6W	Wire Assembly	F-3
118160A42	Seal, Nonmetallic	F-5
118160A48	Seal, Nonmetallic	F-5
118160A5	Seal, Nonmetallic	F-5
118160A51	Seal, Nonmetallic	F-5
118160A54	Seal, Nonmetallic	F-5
118971A90U	Hose Assembly	F-4
119348A100	Loom, Protective	F-6
119348A110	Sleeving, Textile	F-6
119348A72	Loom, Protective	F-6
119622A134	Loom, Protective	F-6
119622A16	Loom, Protective	F-6
119622A290	Sleeving, Textile	F-6
119622A4	Loom, Protective	F-6
119622A52	Loom, Protective	F-6
119622A6	Sleeving, Textile	F-6
119784A102U	Hose Assembly	F-4
119784A105U	Hose Assembly	F-4
120025A152	Sleeving, Insulation	F-6
120025A197	Loom, Protective	F-6
120025A59	Conduit, Nonmetallic	F-6
1244FX11	Wire	F-3
1244FX114	Cable, Low Tension	F-1
1244FX12	Wire, Low Tension	F-3
1244EX17	Cable, Low Tension	F-3
1244FX18	Cable, Low Tension	F-1
1244Fx19	Wire	F-3
1244FX20	Wire	F-3

Part No.	Description	Fig. No.
1244FX210	Cable, Low Tension	F-1
1244FX24	Cable, Low Tension	F-1
1244FX28	Wire	F-3
1244FX3	Cable, Low Tension	F-1
1244FX40	Cable, Low Tension	F-1
1244FX5	Wire	F-3
1244FX6	Cable, Low Tension	F-1
1244Fx8	Wire, Low Tension	F-3
1244FX9	Wire	F-3
124623A53	Liner, Strap	F-7
125865A160	Seal, Door	F-8
125865A52	Seal	F-8
125865A53	Seal, Door	F-8
1324230	Cable, Battery	F-1
1324240	Cable, Battery	F-1
1324250	Cable, Battery	F-1
1332080U75	Hose Assembly	F-4
1332080U91	Hose Assembly	F-4
1338990U57	Hose Assembly	F-4
1341010	Hose	F-4
1341020	Hose	F-4
1341030	Hose	F-4
1341070	Hose	F-4
1341080	Hose	F-4
134141A4W	Wire Assembly	F-3
134141A6W	Wire Assembly	F-3
134141A7W	Wire Assembly	F-3
1341850	Chain	F-2
1343280	Hose	F-4
1343990-3	Sleeving, Insulation	F-6
1344500	Block, Battery Spacer	F-19
1350860W	Harness, Wire Assembly	F-15
1353360W	Wire Assembly	F-17
1353720U	Cable, Battery	F-1
1354460U	Harness, Wire Assembly	F-16
1356520	Tubing, Flexible	F-9
1358560W	Wire Assembly	F-18
1370550	Hose	F-4
1370560	Hose	F-4
1378050	Chain	F-2
1383550	Cable Assembly	F-1
1394510-10	Chain	F-2
1394510-12	Chain	F-2
1394510-20	Chain	F-2
1394510-26	Chain	F-2
1394510-36	Chain	F-2
1394510-84	Chain	F-2
1398190	Gasket, Strip	F-10
1408180U	Cord Assembly	F-11
1433240U	Hose Assembly	F-4

**Manufactured Items (Cont)**

<b>Part No.</b>	<b>Description</b>	<b>Fig. No.</b>
1454210	Cable, Battery	F-1
1454220	Cable, Battery	F-1
1458530	Chain	F-2
1465020W14	Wire Assembly	F-3
1465020W20	Wire Assembly	F-3
1467160-5	Molding	F-12
1467160-8	Channel	F-5
1467170-4	Molding	F-12
1467170-8	Quickedge	F-12
1478600-2	Sleeving, Insulation	F-6
1487200-46	Sleeve	F-6
1519710	Fastener	F-13
1519720	Fastener	F-13
1531960	Cable, Battery	F-1
1531970	Cable, Battery	F-1
159	Chain	F-2
1605150-57	Tubing, Nylon	F-9
1605160-14	Tubing, Nylon	F-9
1605160-38	Tubing, Nylon	F-9
1605160-48	Tubing, Nylon	F-9
1605160-50	Tubing, Nylon	F-9
1605160-52	Tubing, Nylon	F-9
1605160-53	Tubing, Nylon	F-9
1605160-60	Tubing, Nylon	F-9
1605170-18	Tubing, Nylon	F-9
1605260-48	Tubing, Nylon	F-9
1605270-101	Tubing, Nylon	F-9
1605270-114	Tubing, Nylon	F-9
1605270-157	Tubing, Nylon	F-9
1605270-56	Tubing, Nylon	F-9
1605270-60	Tubing, Nylon	F-9
1605270-8	Tubing, Nylon	F-9
1605270-88	Tubing, Nylon	F-9
1605290-10	Tubing, Nylon	F-9
1605300-100	Tubing, Nylon	F-9
1605300-101	Tubing, Nylon	F-9
1605300-14	Tubing, Nylon	F-9
1605300-160	Tubing, Nylon	F-9
1605300-192	Tubing, Nylon	F-9
1605300-199	Tubing, Nylon	F-9
1605300-73	Tubing, Nylon	F-9
Deleted		
1656490-100	Tubing, Nylon	F-9
1656490-104	Tubing, Nylon	F-9
1656490-111	Tubing, Nylon	F-9
1656490-12	Tubing, Nylon	F-9
1656490-17	Tubing, Nylon	F-9

**Manufactured Items (Cont)**

<b>Part No.</b>	<b>Description</b>	<b>Fig. No.</b>
1656490-231	Tubing, Nylon	F-9
1656490-50	Tubing, Nylon	F-9
1656490-67	Tubing, Nylon	F-9
1656490-77	Tubing, Nylon	F-9
1656490-78	Tubing, Nylon	F-9
1656500-16	Tubing, Nylon	F-9
1656500-18	Tubing, Nylon	F-9
1656500-192	Tubing, Nylon	F-9
1656500-258	Tubing, Nylon	F-9
1656500-35	Tubing, Nylon	F-9
1656500-42	Tubing, Nylon	F-9
1656500-68	Tubing, Nylon	F-9
1656500-77	Tubing, Nylon	F-9
1771670	Cloth, Coated	F-20
1927FX12	Cable, Low Tension	F-1
1927FX14	Cable, Low Tension	F-1
1927FX140	Wire, Electrical	F-3
1927FX16	Wire	F-3
1927FX18	Wire	F-3
1927FX19	Wire	F-3
1927FX21	Wire	F-3
1927FX22	Wire	F-3
1927FX23	Cable, Low Tension	F-1
1927FX24	Wire	F-3
1927FX4	Cable, Low Tension	F-1
1927FX5	Cable, Low Tension	F-1
1927FX55	Wire	F-3
1927FX6	Cable, Low Tension	F-1
1927FX7	Wire	F-3
1927FX8	Cable, Low Tension	F-1
1927FX9	Wire	F-3
1948970-164	Tubing, Nylon	F-9
19998FX4W	Wire Assembly	F-3
19998FX6W	Wire Assembly	F-3
2AD977	Hose, Overflow	F-4
2AT188	Hose	F-4
2DD51	Hose	F-4
2DD52	Hose	F-4
2DD53	Hose	F-4
2DD54	Hose	F-4
2013270	Hose Assembly	F-4
21021FX4	Hose	F-4
223-8	Hose	F-4
23319FX11	Tubing, Nylon	F-9
23319FX125	Tubing, Nylon	F-9
23319FX172	Tubing, Nylon	F-9
23319FX175	Tubing, Nylon	F-9
23319FX198	Tubing, Nylon	F-9

**Manufactured Items (Cont)**

<b>Part No.</b>	<b>Description</b>	<b>Fig. No.</b>
23319FX199	Tubing, Nylon	F-9
23319FX203	Tubing, Nylon	F-9
23319FX214	Tubing, Nylon	F-9
23319FX215	Tubing, Nylon	F-9
23319FX227	Tubing, Nylon	F-9
23319FX23	Tubing, Nylon	F-9
23319FX230	Tubing, Nylon	F-9
23319FX235	Tubing, Nylon	F-9
23319FX242	Tubing, Nylon	F-9
23319FX252	Tubing, Nylon	F-9
23319FX259	Tubing, Nylon	F-9
23319FX260	Tubing, Nylon	F-9
23319FX35	Tubing, Nylon	F-9
23319FX359	Tubing, Nylon	F-9
23319FX362	Tubing, Nylon	F-9
23319FX37	Tubing, Nylon (for Model B wiper motor P/N GS-2850 use 37 inch hose)	F-9
23319FX375	Tubing, Nylon	F-9
23319FX38	Tubing, Nylon (for Model B wiper motor P/N GS-2850 use 38 inch hose)	F-9
23319FX41	Tubing, Nylon	F-9
23319FX51	Tubing, Nylon	F-9
23319FX70	Hose	F-4
23319FX75	Tubing, Nylon	F-9
23323FX112	Tubing, Nylon	F-9
23323FX116	Tubing, Nylon	F-9
23323FX155	Tubing, Nylon	F-9
23323FX159	Tubing, Nylon	F-9
23323FX175	Tubing, Nylon	F-9
23323FX179	Tubing, Nylon	F-9
23323FX191	Tubing, Nylon	F-9
23323FX194	Tubing, Nylon	F-9
23323FX195	Tubing, Nylon	F-9
23323FX201	Tubing, Nylon	F-9
23323FX203	Tubing, Nylon	F-9
23323FX204	Tubing, Nylon	F-9
23323FX231	Tubing, Nylon	F-9
23323FX242	Tubing, Nylon	F-9
23323FX251	Tubing, Nylon	F-9
23323FX266	Tubing, Nylon	F-9
23323FX271	Tubing, Nylon	F-9
23323FX285	Tubing, Nylon	F-9
23323FX301	Tubing, Nylon	F-9
23323FX320	Tubing, Nylon	F-9
23323FX35	Tubing, Nylon	F-9
23323FX42	Tubing, Nylon	F-9

**Manufactured Items (Cont)**

<b>Part No.</b>	<b>Description</b>	<b>Fig. No</b>
23323FX43	Tubing, Nylon	F-9
23323FX48	Tubing, Nylon	F-9
23323FX51	Tubing, Nylon	F-9
23323FX92	Tubing, Nylon	F-9
23323FX93	Tubing, Nylon	F-9
23854FX96	Cord	F-11
26578AX16	Seal	F-8
26927AX26	Weatherstrip, Belt	F-8
26947BX10	Molding, Quickeedge	F-12
26947BX19	Molding, Quickeedge	F-12
26947BX4	Molding, Quickeedge	F-12
26947BX5	Molding, Quickeedge	F-12
26987AX130	Tape, Roof	F-14
2794HX5	Hose, Push-On	F-4
3013503	Hose Assembly	F-4
3013504	Hose Assembly	F-4
Deleted		
3013512	Hose Assembly	F-4
Deleted		
3013520	Hose Assembly	F-4
Deleted		
3013522	Hose Assembly	F-4
Deleted		
Deleted		
Deleted		
3013526	Hose Assembly	F-4
3013527	Hose Assembly	F-4
3013528	Hose Assembly	F-4
Deleted		
Deleted		
3013532	Hose Assembly	F-4
Deleted		
3013556	Hose Assembly	F-4

**Manufactured Items (Cont)**

<b>Part No.</b>	<b>Description</b>	<b>Fig. No</b>
Deleted		
3013563	Hose Assembly	F-4
3013564	Hose Assembly	F-4
3013565	Hose Assembly	F-4
3013621	Tubing, Nylon	F-9
3013625	Tubing, Nylon	F-9
3013627	Tubing, Nylon	F-9
3013678	Tubing, Nylon	F-9
3013680	Tubing, Nylon	F-9
3013682	Tubing, Nylon	F-9
3013707	Tubing, Nylon	F-9
3013711	Tubing, Nylon	F-9
3013712	Tubing, Nylon	F-9
3013719	Tubing, Nylon	F-9
3013721	Tubing, Nylon	F-9
3013723	Tubing, Nylon	F-9
3013724	Tubing, Nylon	F-9
3013725	Tubing, Nylon	F-9
3013729	Tubing, Nylon	F-9
3013730	Tubing, Nylon	F-9
3013733	Tubing, Nylon	F-9
3013735	Tubing, Nylon	F-9
3014522	Wire Assembly	F-3
3014523	Wire Assembly	F-3
3014524	Wire Assembly	F-3
3014525	Wire Assembly	F-3
3014526	Wire Assembly	F-3
3014527	Wire Assembly	F-3
3014529	Wire Assembly	F-3
3014530	Wire Assembly	F-3
3014531	Wire Assembly	F-3
3014532	Wire Assembly	F-3
3014533	Wire Assembly	F-3
3014534	Wire Assembly	F-3
3014535	Wire Assembly	F-3
3014536	Wire Assembly	F-3
3014549	Wire Assembly	F-3
3014550	Wire Assembly	F-3
3014552	Lead, Electrical	F-3
3014553	Wire Assembly	F-3
3014554	Wire Assembly	F-3
3014560	Wire Assembly	F-3
3014561	Wire Assembly	F-3

**Manufactured Items (Cont)**

Part No.	Description	Fig. No
3014586	Wire Assembly	F-3
3014587	Wire Assembly	F-4
3014607	Wire Assembly	F-3
3014608	Wire Assembly	F-3
3014613	Hose Assembly	F-4
3052066	Wire Assembly	F-3
3052069	Wire Assembly	F-3
3052070	Wire Assembly	F-3
3052072	Tubing, Nylon	F-9
3073603	Wire Assembly	F-3
3073604	Wire Assembly	F-3
3073605	Wire Assembly	F-3
3073606	Wire Assembly	F-3

**Manufactured Items (Cont)**

<b>Part No.</b>	<b>Description</b>	<b>Fig. No.</b>
31270AX41	Tubing, Nylon	F-9
31271AX103	Tubing, Nylon	F-9
31271AX131	Tubing, Nylon	F-9
31271AX134	Tubing, Nylon	F-9
31271AX137	Tubing, Nylon	F-9
31271AX170	Tubing, Nylon	F-9
31271AX200	Tubing, Nylon	F-9
31271AX202	Tubing, Nylon	F-9
31271AX227	Tubing, Nylon	F-9
31271AX40	Tubing, Nylon	F-9
31271AX72	Tubing, Nylon	F-9
31271AX89	Tubing, Nylon	F-9
3152179	Seal, Rubber	F-5
3243781	PVC Matting, Black	F-22
3266394	Tubing, Nonmetallic	F-9
32690AX56U	Hose Assembly	F-4
32850AX14	Hose, Defroster	F-4
32850AX16	Hose, Defroster	F-4
32850AX30	Hose, Heat	F-4
32850AX36	Hose, Defroster	F-4
32850AX51	Hose, Heat	F-4
33296AX-04RL	Hose Assembly	F-4
3487FX12W	Wire Assembly	F-3
3487FX16W	Wire Assembly	F-3
3487FX4W	Wire Assembly	F-3
3506FX4W	Wire Assembly	F-3
3506FX6W	Wire Assembly	F-3
35633AX60U	Cable	F-1
3609FX100W	Wire Assembly	F-3
3609FX3W	Wire Assembly	F-3
3639FX4W	Wire	F-3
3639FX8W	Wire	F-3
3681FX15U	Wire Assembly	F-3
4TC23	Rubber, Flat	F-12
40AW168-048	Hose	F-4
40AW168-070	Hose	F-4
40AW168-23	Hose	F-4
40AW168-25	Hose	F-4
40AW168-34	Hose	F-4
409GX	Wrench, Bearing Nut	F-23
4126FX7W	Wire Assembly	F-3
45A073-P1	Tubing, Nonmetallic	F-9
45A073-P2	Tubing, Nonmetallic	F-9
45A073-P3	Tubing, Nonmetallic	F-9
45A078-P1	Tubing, Nonmetallic	F-9
45A080-P1	Tubing, Nonmetallic	F-9
45A080-P2	Tubing, Nonmetallic	F-9
45A080-P3	Tubing, Nonmetallic	F-9

## Manufactured Items (Cont)

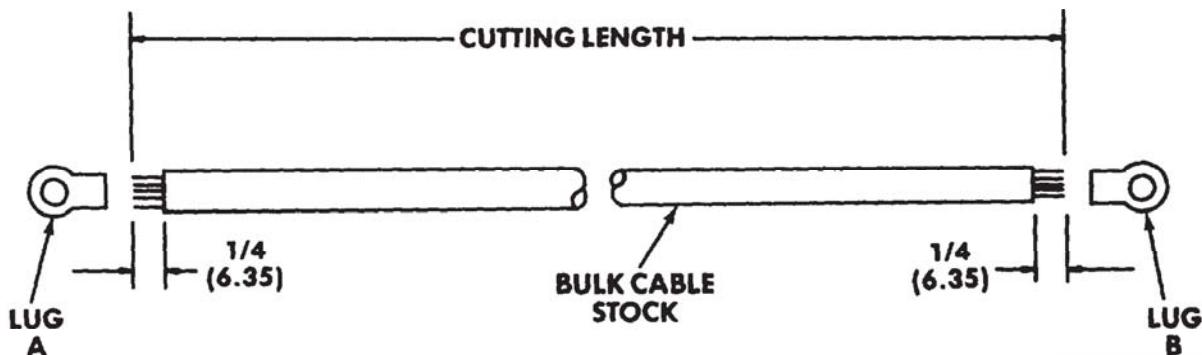
Part No.	Description	Fig. No.
45A083-P1	Tube, Metallic	F-9
45A084-P1	Tube, Metallic	F-9
45A091-P1	Tube, Metallic	F-9
45A092-P1	Tube, Metallic	F-9
45A093-P1	Tube, Metallic	F-9
45A094-P1	Tube, Metallic	F-9
45A095-P1	Tube, Metallic	F-9
45A102-P1	Tube, Metallic	F-9
45A103-P1	Tube, Metallic	F-9
45A104-P1	Tube, Metallic	F-9
45A215-P1	Tubing, Nonmetallic	F-9
45A230-P3	Tubing, Nonmetallic	F-9
45A230-P5	Tube, Metallic	F-9
45A243-P4	Hose	F-4
45A286-P3	Tubing, Nonmetallic	F-9
45A286-P5	Tubing, Nonmetallic	F-9
45A330-P1	Tubing, Nonmetallic	F-9
45A331-P1	Tubing, Nonmetallic	F-9
45A338-P1	Tubing, Nonmetallic	F-9
45A339-P1	Tubing, Nonmetallic	F-9
45D001-P1	Wire	F-3
45D001-P10	Wire	F-3
45D001-P11	Wire	F-3
45D001-P12	Wire	F-3
45D001-P13	Wire	F-3
45D001-P14	Wire	F-3
45D001-P15	Wire	F-3
45D001-P2	Wire	F-3
45D001-P20	Wire	F-3
45D001-P21	Wire	F-3
45D001-P22	Wire	F-3
45D001-P23	Wire	F-3
45D001-P24	Wire	F-3
45D001-P25	Wire	F-3
45D001-P26	Wire	F-3
45D001-P27	Wire	F-3
45D001-P28	Wire	F-3
45D001-P29	Wire	F-3
45D001-P3	Wire	F-3
45D001-P30	Wire	F-3
45D001-P31	Wire	F-3
45D001-P32	Wire	F-3
45D001-P33	Wire	F-3
45D001-P34	Wire	F-3
45D001-P35	Wire	F-3
45D001-P36	Wire	F-3
45D001-P37	Wire	F-3
45D001-P38	Wire	F-3
46D001-P39	Wire	F-3
46D001-P40	Wire	F-3

## Manufactured Items (Cont)

Part No.	Description	Fig. No.
45D001-P41	Wire	F-3
45D001-P42	Wire	F-3
45D001-P43	Wire	F-3
45D001-P44	Wire	F-3
45D001-P45	Wire	F-3
45D001-P46	Wire	F-3
45D001-P47	Wire	F-3
45D001-P48	Wire	F-3
45D001-P49	Wire	F-3
45D001-P5	Wire	F-3
45D001-P59	Wire	F-3
45D001-P6	Wire	F-3
45D001-P61	Wire	F-3
45D001-P62	Wire	F-3
45D001-P63	Wire	F-3
45D001-P64	Wire	F-3
45D001-P7	Wire	F-3
45D001-P70	Wire	F-3
45D001-P8	Wire	F-3
45D001-P9	Wire	F-3
46754AX100U	Hose Assembly	F-4
46754AX87U	Hose Assembly	F-4
47369AX134U	Hose Assembly	F-4
47371AX14U	Hose Assembly	F-4
47371AX58U	Hose Assembly	F-4
47555AX12U	Hose Assembly	F-4
47554AX64U	Hose Assembly	F-4
47554AX67U	Hose Assembly	F-4
47554AX69U	Hose Assembly	F-4
47554AX75U	Hose Assembly	F-4
47554AX81U	Hose Assembly	F-4
47554AX87U	Hose Assembly	F-4
50543AX4W	Wire Assembly	F-3
50543AX6W	Wire Assembly	F-3
50543AX72W	Wire Assembly	F-3
5129157	Hose	F-4
5129157	Hose	F-4
54057-1	Heat Shrink	F-9

## Manufactured Items (Cont)

Part No.	Description	Fig. No.
59745AX55	Strip, Locking	F-5
59747AX55	Channel, Locking	F-5
60264AX12U	Hose Assembly	F-4
60264AX18U	Hose Assembly	F-4
60580AX58	Hose, Vent	F-4
61340AX48U	Cable	F-1
62289AX26U	Hose Assembly	F-4
65058AX12	Hose	F-4
65058AX24	Hose	F-4
66341AX6	Hose	F-4
69390AX65U	Hose Assembly	F-4
69390AX67U	Hose Assembly	F-4
69390AX69U	Hose Assembly	F-4
69390AX79U	Hose Assembly	F-4
69390AX81U	Hose Assembly	F-4
75014-32-7-10	Chain, Pin	F-2
7720853-6-7/8	Wire	F-3
91431	Hose	F-4

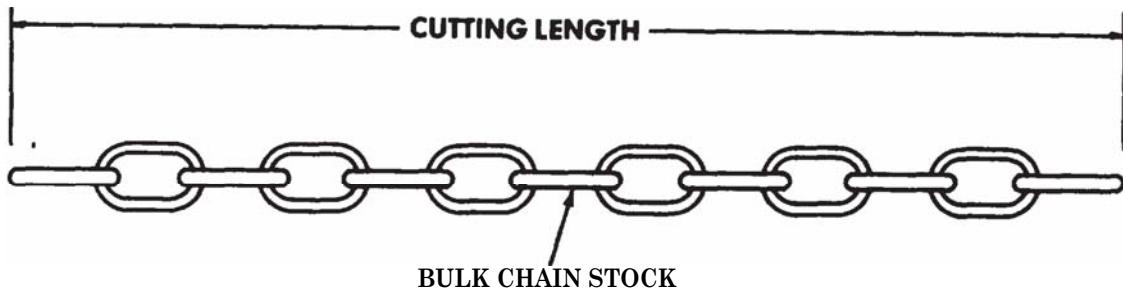
*Figure F-1. Cable Assembly*

1. Fabricate from bulk cable stock listed in table F-1.
2. Using wire cutters cut cable to length required in table F-1.
3. For cable assemblies, strip ends of cable 1/4 inch (6.35 mm).
4. Crimp required lugs listed in table F-1 to ends of cable.
5. Dimensions are in inches (mm).

**Manufactured Items (Cont)*****Table F-1. Cable and Cable Assemblies***

Cable/Assembly Part Number	Bulk Cable Part Number	Cutoff Length Inches (mm)	Lug A	Lug B
M13486/12-1-120	M13486/12-1	120 (3048.0)		
1244FX114	1927FX	114 (2895.6)		
1244FX17	1244FX	17 (431.8)		
1244FX18	1244FX	18 (457.2)		
1244FX210	1927FX	210 (5334.0)		
1244FX24	1244FX	24 (609.6)		
1244FX3	1244FX	3 (76.2)		
1244FX40	1244FX	40 (1016.0)		
1244FX6	1244HX	6 (152.4)		
1324230	1262HX	153 (3886.2)	33043	MS20659-122
1324240	1262HX	153 (3886.2)	33043	MS20659-122
1324250	1262HX	9 (228.6)	29707	MS75004-1
1353720U	1262HX	11 (279.4)	33043	33043
1383550	1262HX	6 (152.4)	601307-1	MS75004-1
1454210	1262HX	198 (5209.2)	33043	MS20659-122
1454220	1262HX	198 (5029.2)	33043	MS20659-122
1531960	1262HX	46 (1168.4)	33043	321877
1531970	1262HX	54 (1371.6)	33043	321877
1927FX12	1927FX	12 (304.8)		
1927FX14	1927FX	14 (355.6)		
1927FX23	1927FX	23 (584.2)		
1927FX4	1927FX	4 (101.6)		
1927FX5	1927FX	5 (127.0)		
1904FX6	1927FX	6 (152.4)		
1927FX8	1927FX	8 (203.2)		
35633AX60U	1262HX	60 (1524.0)	33043	MS20659-122
61340AX48U	1262HX	48 (1219.2)	33043	MS20659-122

## Manufactured Items (Cont)

*Figure F-2. Chains*

1. Fabricate from bulk chain stock listed in table F-2.
2. Using hacksaw or suitable cutting device, cut chain to length required in table F-2.

*Table F-2. Chains*

Chain/Assembly Part Number	Bulk Chain Part Number	Cutoff Length Inches (mm)
104190B	75014-32	17 (431.8)
1341850	70105-32	4 (101.6)
1341850	70105-32	6 (152.4)
1318050	C43974	3 (76.2)
1354510-10	031-0424	10 (254.0)
1394510-12	031-0424	12 (304.8)
1394510-20	031-0424	20 (508.0)
1394510-26	031-0424	26 (660.4)
1394510-36	031-0424	36 (914.4)
1394510-84	031-0424	84 (2133.6)
1458530	75014-32	8 (203.2)
159	42C14856-305	7 (177.8)
75014-32-7-10	75014-32-7	10 (254.0)

## Manufactured Items (Cont)

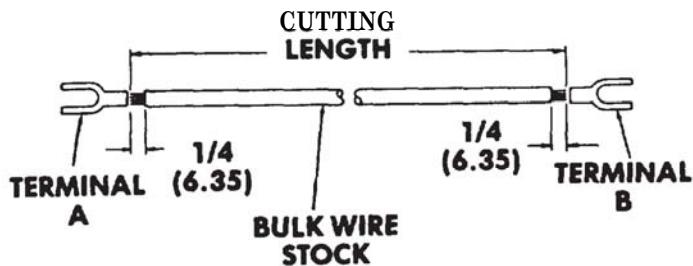


Figure F-3. Wire Assembly

1. Fabricate from bulk wire stock listed in table F-3.
  2. Use wire cutters cut wire to length required in table F-3.
  3. For wire assemblies strip ends of wire 1/4 inch (6.35mm).
  4. Crimp required lugs or terminals onto ends of wire.
- Dimensions are in inches (mm).

Table F-3. Wire and Wire Assemblies

Wire/Assembly Part Number	Bulk Wire Part Number	Cutoff Length Inches (mm)	Terminal A	Terminal B
110966A6W	R-64951	6 (152.4)	Terminal DV14-250F1	Lug 55039-4
1244FX11	1244FX	11 (279.4)		
1244FX12	1927FX	12 (304.8)		
1244FX19	1244FX	19 (482.6)		
1244FX20	1244FX	20 (508.0)		
1244FX5	1927FX	5 (127.0)		
1244FX8	1244FX	8 (203.2)		
1244FX9	1927FX	9 (228.6)		
1313910W6	1927FX	6 (152.4)	Terminal DV14-250F1	Terminal C-50-501
1324080W4	10516FX	4 (101.6)	Lug MS20659-111	Lug MS25036-125
1324080W6	10516FX	6 (152.4)	Lug MS20659-111	Lug MS25036-125
1328110W	R-64951	45 (1143.0)	Terminal 3055	Contact 112532
134141A4W	1927FX	4 (101.6)	Lug MS25036-106	Lug MS25036-106
134141A6W	1927FX	6 (152.4)	Lug MS25036-106	Lug MS25036-106
134141A7W	1927FX	7 (177.8)	Lug MS25036-106	Lug MS25036-106
1465020W14	1927FX	14 (355.6)	Terminal 154818-3	Lug MS25036-106
1465020W20	1927FX	20 (508.0)	Terminal 154718-3	Lug MS25036-106
1927FX140	1927FX	140 (3556.0)		
1927FX16	1927FX	16 (406.4)		
1927FX18	1927FX	18 (457.2)		
1927FX19	1927FX	19 (482.6)		
1927FX20	1927FX	20 (508.0)		
1927FX21	1927FX	21 (533.4)		
1927FX22	1927FX	22 (558.8)		
1927FX24	1927FX	24 (609.6)		
1927FX55	1927FX	55 (1397.0)		
1927FX7	1927FX	7 (177.8)		
1927FX9	1927FX	9 (228.6)		
19998FX4W	1927FX	4 (101.6)	Lug 34158	Terminal 41450
19998FX6W	1927FX	6 (152.4)	Lug 34158	Terminal 41450

## Manufactured Items (Cont)

Table F-3. Wire and Wire Assemblies (Cont)

Wire/Assembly Part Number	Bulk Wire Part Number	Cutoff Length Inches (mm)	Terminal A	Terminal B
3014522	10516FX	20 (508.0)	Lug MS20659-132	Lug MS25036-125
3014523	1245FX	10 (254.0)	Lug MS25036-113	Lug 55013-8
3014524	1245FX	5 (127.0)	Lug MS25036-113	Lug 55013-8
3014525	10516FX	28 (711.2)	Lug MS20659-111	Lug MS20659-145
3014526	10516FX	16 (406.4)	Lug MS20659-111	Lug MS20659-145
3014527	1927FX	14 (355.6)	Terminal C19303-3203	Lug 55006-6
3014528	R-64951	16 (406.4)	Quick Disc DV14-250FI	Lug 34163
3014529	1245FX	20 (508.0)	Lug 55013-8	Lug 55031-8
3014530	1245FX	10 (254.0)	Lug 55013-8	Lug 55031-8
3014531	1245FX	21 (533.4)	Lug 55013-8	Lug 55031-8
3014532	1927FX	9 (228.6)	Contact 165429-1	
3014533	1927FX	6 (152.4)	Lug 320861	Lug 55006-6
3014535	10516FX	20 (508.0)	Lug MS20659-145	Lug MS25036-125
3014536	10516FX	16 (406.4)	Lug MS20659-111	Lug MS20659-132
3014550	1927FX	21 (533.4)	Lug 55006-6	Lug 55039-2
3014551	1927FX	4 (101.6)	Lug MS25036-108	Lug 55039-2
3014552	1927FX	4 (101.6)	Lug 55039-2	Lug 55006-6
3014553	1927FX	27 (685.8)	Lug 31903	Lug 55039-2
3014554	1927FX	24 (609.6)	Terminal 2965142	
3014555	R-64951	7 (177.0)		
3014560	1927FX	6 (152.4)	Lug 55006-6	Lug 55006-6
3014561	1927FX	10 (254.0)	Lug 55006-6	Lug 55006-6
3014562	1927FX	6 (152.4)	Lug MS25036-108	Lug MS25036-108
3014563				
3014584				
3014586	4127FX	39 (990.6)	Lug 55013-8	Lug MS25036-113
3014587	10516FX	35 (889.0)	Lug MS20659-132	Lug MS20659-145
3052066	1927FX	6 (152.4)	Lug MS25036-108	Quick Disc DNF14-250FIB
3052069	1927FX	3 (76.2)	Lug MS25036-108	Lug MS25036-108
3052070	1927FX	100 (2540.0)	Lug MS25036-108	Quick Disc DNF14-250FIB
3073603	1244FX	18 (457.2)	Lug 34161	Lug 34161
3073604	1244FX	52 (1320.8)	Lug 34161	Lug 34161
3073605	1244FX	6 (152.4)	Lug 34161	
3073606	1244FX	18 (457.2)	Lug 34161	Lug 34161
3487FX12W	1244FX	12 (304.8)	Lug 55006-6	Lug 55006-6
3487FX16W	1244FX	16 (406.4)	Lug 55006-6	Lug 55006-6
3487FX18W	1244FX	18 (457.2)	Lug 34161	Lug 34161
3487FX52W	1244FX	52 (1320.8)	Lug 34161	Lug 34161
3487FX4W	1244FX	4 (101.6)	Lug 55006-6	Lug 55006-6
3506FX4W	1927FX	4 (101.6)	Lug 55006-6	
3506FX6W	1927FX	6 (152.4)	Lug 55006-6	Terminal 41450
3514FX6W	1244FX	6 (152.4)	Lug 34161	
3582FX18W	1244FX	18 (457.2)	Lug 34161	Lug 34164

## Manufactured Items (Cont)

Table F-3. Wire and Wire Assemblies (Cont)

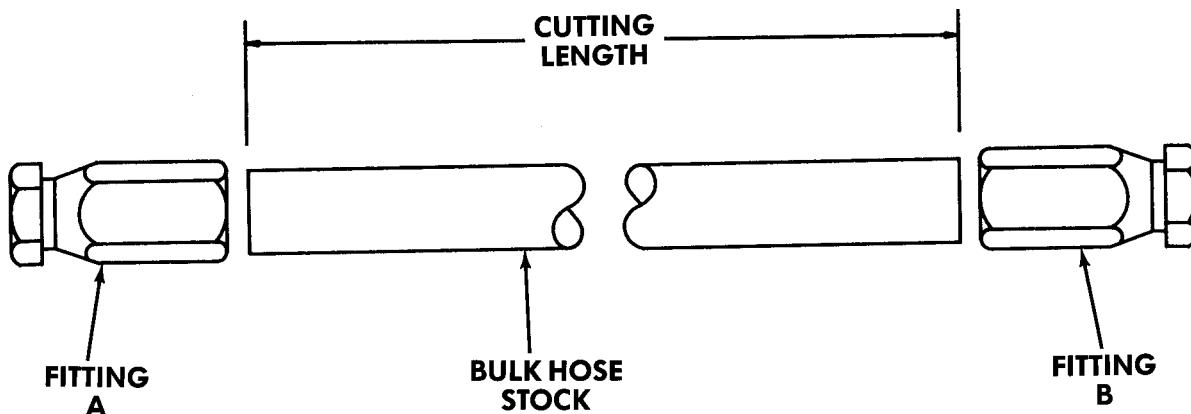
Wire/Assembly Part Number	Bulk Wire Part Number	Cutoff Length Inches (mm)	Terminal A	Terminal B
3609FX72W	1927FX	72 (1828.8)	Lug 55006-6	Lug 55006-6
3639FX4W	1244FX	4 (101.6)	Lug 55006-6	Lug 55039-2
3639FX8W	1244FX	8 (203.2)	Lug 55006-6	Lug 55039-2
3681FX15U	1245FX	15 (381.0)	Lug 55013-8	
4126FX7W	4127FX	7 (177.8)	Lug 55013-8	Lug MS25036-114
45D001-P1	R-59095	24 (609.6)		
45D001-P10	R-59118	65 (1651.0)		
45D001-P11	R-59118	66 (1676.4)		
45D001-P12	R-59118	35 (889.0)		
45D001-P13	R-59118	44 (1117.6)		
45D001-P14	R-59118	27 (685.8)		
45D001-P15	R-59118	48 (1219.2)		
45D001-P2	R-59095	72 (1828.8)		
45D001-P20	R-59118	24 (609.6)		
45D001-P21	R-59118	180 (4572.0)		
45D001-P22	R-59118	66 (1676.4)		
45D001-P23	R-59118	84 (2133.6)		
45D001-P24	R-59120	40 (1016.0)		
45D001-P25	R-59120	65 (1651.0)		
45D001-P26	R-59120	6 (152.4)		
45D001-P27	R-59097	40 (1016.0)		
45D001-P28	R-59097	65 (1651.0)		
45D001-P29	R-59097	6 (152.4)		
45D001-P3	R-59095	90 (2286.0)		
45D001-P30	R-59122	96 (2438.4)		
45D001-P31	R-59122	65 (1651.0)		
45D001-P32	R-59122	6 (152.4)		
45D001-P33	R-59120	24 (609.6)		
45D001-P34	R-59120	65 (1651.0)		
45D001-P35	R-59116	96 (2438.4)		
45D001-P36	R-59116	65 (1651.0)		
45D001-P37	R-59116	6 (152.4)		
45D001-P38	R-59116	96 (2438.4)		
45D001-P39	R-59097	65 (1651.0)		
45D001-P40	R-59122	24 (609.6)		
45D001-P41	R-59096	96 (2438.4)		
45D001-P42	R-59096	65 (1651.0)		
45D001-P43	R-59096	24 (609.6)		
45D001-P44	R-59122	6 (152.4)		
45D001-P45	R-59122	6 (152.4)		



## Manufactured Items (Cont)

Table F-3. Wire and Wire Assemblies (Cont)

Wire/Assembly Part Number	Bulk Wire Part Number	Cutoff Length Inches (mm)	Terminal A	Terminal B
45D001-P46	R-59116	6 (152.4)		
45D001-P48	R-59120	6 (152.4)		
45D001-P49	R-59126	6 (152.4)		
45D001-P5	R-59070	40 (1016.0)		
45D001-P59	R-59118	12 (304.8)		
45D001-P6	R-59070	65 (1651.0)		
45D001-P60	R-59118	35 (889.0)		
45D001-P61	R-59118	25 (635.0)		
45D001-P62	R-59118	12 (304.8)		
45D001-P63	R-59116	6 (152.4)		
45D001-P64	R-59097	6 (152.4)		
45D001-P7	R-59070	66 (1676.4)		
45D001-P70	R-59116	6 (152.4)		
45D001-P8	R-59070	44 (1117.6)		
45D001-P9	R-59118	40 (1016.0)		
4802FX39W	4127FX	39 (990.6)	Lug 55013-8	Lug MS25036-113
50543AX4W	1927FX	4 (101.6)	Lug 55006-6	Terminal DV14-250F1
50543AX72W	1927FX	72 (1828.8)	Lug 55006-6	Lug 55006-6
59032AX35W	10516FX	35 (889.0)	Lug MS20659-132	Lug MS20659-145
7720853-6-7/8	M13486-1-5	6.87 (174.6)		

**Manufactured Items (Cont)****Figure F-4. Hose Assembly**

1. Fabricate from bulk hose stock listed in table F-4.
2. Using fine tooth hacksaw or suitable cutting device cut hose to length required in table F-4.
3. For hose assemblies, place fitting A in vise and screw hose counterclockwise until hose bottoms in fitting. Back off 1/4 turn.
4. Place fitting B in vise and screw hose counterclockwise until hose bottoms. Back off 1/4 turn.
5. Dimensions are in inches (mm).

**Table F-4. Hose and Hose Assemblies**

Hose Assembly Part Number	Bulk Hose Part Number	Cutoff Length Inches (mm)	Fitting A	Fitting B
107732A49U	1525-12RL	49 (1244.6)	Adapter 4741-12B	
109972A10U	FC300-04AQPR	10 (254.0)	Adapter 4411-4S	Adapter 4411-4S
109972A20U	FC300-04AQPR	20 (508.0)	Adapter 4411-4S	Adapter 4411-4S
109972A24U	FC300-04AQPR	24 (609.6)	Adapter 4411-4S	Adapter 4411-4S
109973A18U	FC300-04AQPR	18 (457.2)	Elbow 190296-4S	Adapter 4411-4S
109974A21U	FC300-06RL	21 (533.4)	Adapter 4411-6S	Elbow 190261-6S
109974A70U	FC300-06RL	70 (1778.0)	Adapter 4411-6S	Elbow 190261-6S
109974A72U	FC300-06RL	72 (1828.8)	Adapter 4411-6S	Elbow 190261-6S
109980A35U	2781-12-RL	35 (889.0)	Adapter 4411-16S	Adapter 4411-16S
118971A90U	FC350-08RL	90 (2286.0)	Elbow 190296-8S	Adapter 4411-8S
119784A102U	FC350-08RL	102 (2590.8)	Elbow 190297-8S	Adapter 4411-8S
119784A105U	FC350-08RL	105 (2667.0)	Elbow 190297-8S	Adapter 4411-8S
1332080U75	FC350-08RL	75 (1905.0)	Elbow 190297-8S	Elbow 190297-8S
1332080U91	FC350-08RL	91 (2311.4)	Elbow 190297-8S	Elbow 190297-8S
1338990U57	FC350-04RL	57 (1447.8)	Elbow 190296-4S	Elbow 190296-4S
1340800U29	FC350-24	17 (431.8)	Adapter 4411-24S	Adapter 4411-24S
1341010	M62217/1-48	5 (127.0)		
1341020	70-255	4.5 (114.3)		
1341030	M62217/1-10	101 (2565.4)		
1341070	70-038	16.5 (419.1)		
1341080	70-100	40.5 (1028.7)		
1343280	M62217/1-10	74 (1879.6)		
1370550	70-075 x 36	7.5 (109.5)		
1370560	70-075 x 36	30.5 (774.7)		
1433240U	FC300-16	38 (965.2)	Adapter 448-16S	Elbow 190261-16S

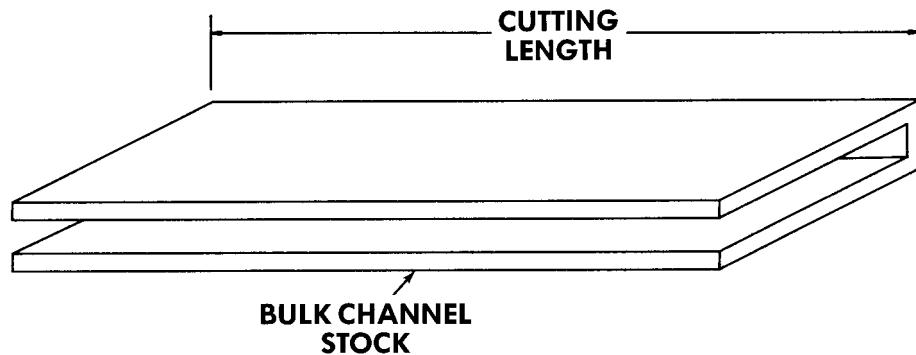
**Manufactured Items (Cont)**  
**Table F-4. Hose and Hose Assemblies (cont)**

Hose Assembly Part Number	Bulk Hose Part Number	Cutoff Length Inches (mm)	Fitting A	Fitting B
2013270	FC350-10RL	19 (482.6)		
21021FX4	2556-6-RL	4 (101.6)		
23319FX70	4246-0410	70 (1778.0)		
2794HX5	L-81	5 (127.0)		
2AD977	200-01	61 (1549.4)		
2AT188	FC184-06	25 (635.0)		
2DD51	FC184-06	13 (330.2)		
2DD52	FC184-06	26 (660.4)		
2DD53	FC184-06	8.5 (215.9)		
2DD54	FC184-06	16 (406.4)		
3013512	FC300-16		Adapter 4411-16S	Elbow 190261-16S
Deleted				
3013520	FC300-10	68 (1727.2)	Elbow 190296-10S	Elbow 190295-10S
Deleted				
3013522	FC350-24	29 (736.6)	Elbow 4779-24S	Adapter 4411-24S
Deleted				
Deleted				
Deleted				
3013526	FC350-24	17 (431.8)	Elbow 4777-24S	Adapter 4411-24S
3013527	2575-4RL	122 (3098.8)	Adapter 4797-4B	Adapter 4797-4B
3013528	1503-16-RL	93 (2362.2)	Adapter 94-4411-16	Adapter 94-4411-16
Deleted				
Deleted				
3013532	FC186-12	40 (1016.0)	Adapter 63-190600-12	Adapter 63-190600-12
Deleted				
Deleted				
Deleted				
3013536	FC350-04RL	5 (127)	Adapter 4401-4S	Adapter 4401-4S
3013537	FC350-04RL	10 (254)	Adapter 401-4S	Adapter 401-4S
Deleted				
3013555	FC350-06 RL	26 (660.4)	Adapter 4411-6S	Elbow 190261-6S
3013556	2556-6-RL	193 (4902.2)	Adapter 4739-6	Adapter 4739-6
Deleted				
3013558	FC350-04L	38 (965.2)	Adapter 4411-4S	Elbow 190296-4S
Deleted				

## Manufactured Items (Cont)

*Table F-4. Hose and Hose Assemblies (cont)*

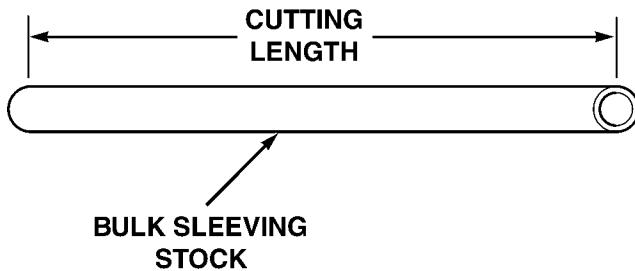
Hose Assembly Part Number	Bulk Hose Part Number	Cutoff Length Inches (mm)	Fitting A	Fitting B
3013563	2556-10-RL	158 (4013.2)	Adapter 4797-10B	Adapter 4797-10B
3013564	2556-10-RL	64 (1625.6)	Adapter 4797-10	Adapter 4797-10
3013565	2556-10-RL	24 (609.6)	Adapter 4797-10	Adapter 4797-10
3013679	4246-0410	70 (1778)		
3014613	FC300-12	43 (1092.2)	Elbow 190261-128	Adapter 4411-128
12690AX56U	1503-16-RL	56 (1422.4)	Adapter 94-4411-16	Adapter 94-4411-16
12850AX14	22020	14 (355.6)		
12850AX16	22020	16 (406.4)		
12850AX30	22020	30 (762.0)		
12850AX36	22020	36 (914.4)		
12850AX51	22020	51 (1295.4)		
13296AX38U	FC350-04RL	38 (965.2)	Adapter 4411-4S	Adapter 4411-4S
40AW168-116	846-50	109 (2768.6)		
40AW168-140	846-50	140 (3556.0)		
40AW168-23	846-50	23 (584.2)		
40AW168-25	846-50	25 (635.0)		
40AW 168-34	846-50	34 (863.6)		
45A243-P4	592	60 ft (18.3m)		
46754AX100U	FC350-06RL	100 (2540.0)	Adapter 4401-6S	Adapter 4401-6S
46754AX87U	FC350-06RL	87 (2209.8)	Adapter 4401-6S	Adapter 4401-6S
17369AX134U	FC350-12	134 (3403.6)	Adapter 4411-12S	Adapter 4411-12S
47371AX14U	FC350-04RL	14 (355.6)	Adapter 4401-4S	Adapter 4401-4S
47371AX58U	FC350-04RL		Adapter 4401-4S	Adapter 4401-4S
47554AX12U	FC350-06RL	12 (304.8)	Adapter 4411-6S	Adapter 4411-6S
47554AX64U	FC350-06RL	64 (1625.6)	Adapter 4411-6S	Adapter 4411-6S
47554AX67U	FC350-06RL	67 (1701.8)	Adapter 4411-6S	Adapter 4411-6S
47554AX69U	FC350-06RL	69 (1752.6)	Adapter 4411-6S	Adapter 4411-6S
47554AX75U	FC350-06RL	75 (1905.0)	Adapter 4411-6S	Adapter 4411-6S
47554AX81U	FC350-06RL	81 (2057.4)	Adapter 4411-6S	Adapter 4411-6S
47554AX87U	FC350-06RL	87 (2209.8)	Adapter 4411-6S	Adapter 4411-6S
5129157	223-8	12.25 (311.2)		
5129157	223-8	27 (685.8)		
30264AX12U	FC350-04RL	12 (304.8)	Adapter 4411-4S	Adapter 4411-4S
30264AX18U	FC350-04RL	18 (457.2)	Adapter 4411-4S	Adapter 4411-4S
30264AX19U	FC350-04RL		Adapter 4411-4S	Elbow 190296-4S
50580AX58	2575-4RL	58 (1473.2)		
55058AX12	2575-4RL	12 (304.8)		
35058AX24	2575-4RL	24 (609.6)		
66341AX6	2556-10-RL	6 (152.4)		
69390AX65U	FC350-08RL	65 (1651.0)	Adapter 4411-8S	Adapter 4411-8S
69390AX67U	FC350-08RL	67 (1701.8)	Adapter 4411-8S	Adapter 4411-8S
69390AX69U	FC350-08RL	69 (1752.6)	Adapter 4411-8S	Adapter 4411-8S
69390AX79U	FC350-08RL	79 (2006.6)	Adapter 4411-8S	Adapter 4411-8S
69390AX81U	FC350-08RL	81 (2057.4)	Adapter 4411-8S	Adapter 4411-8S
91431	846-50	7.25 (184.2)		

**Manufactured Items (Cont)****Figure F-5. Seal, Nonmetallic**

1. Fabricate from bulk seal stock listed in table F-5.
2. Using suitable cutting tool cut seal to length required in table F-5.
3. Dimensions are in inches (mm).

**Table F-5. Seal**

<b>Seal Part Number</b>	<b>Seal Bulk Part Number</b>	<b>Cutoff Length Inches (mm)</b>
118160A42	K2284CF118160A	42 (1066.8)
118160A48	K2284CF118160A	48 (1219.2)
118160A5	118160A	5 (127.0)
118160A51	118160A	51 (1295.4)
118160A54	118160A	54 (1371.6)
1467160-8	75000343	8 (203.2)
3152179	AS1340	101 (2540.0)
4TC23	4TC	23 (584.2)
59745AX55	AS-1597	55 (1397.0)
59747AX55	3509-R	55 (1397.0)

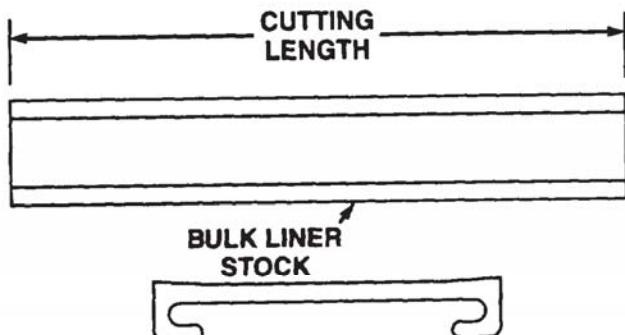
**Manufactured Items (Cont)****Figure F-6. Looms and Sleeving**

1. Fabricate from bulk stock listed in table F-6.
2. Using suitable cutting tool cut to length required in table F-6.
3. Dimensions are in inches (mm).

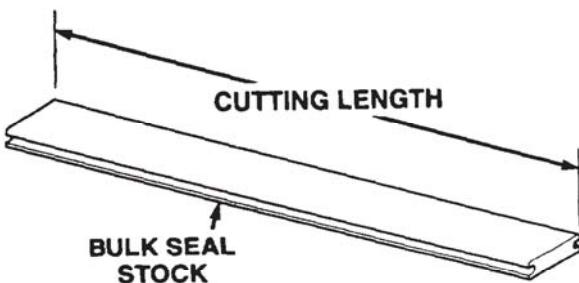
**Table F-6. Looms and Sleeving**

Loom/Sleeving Part Number	Bulk Part Number	Cutoff Length Inches (mm)
119348A100	6749001	100 (2540.0)
119348A110	6749001	110 (2794.0)
119348A72	6749001	72 (1828.8)
119622A134	6753001	134 (3403.6)
119622A16	6753001	16 (406.4)
119622A290	6753001	290 (7366.0)
119622A4	6753001	4 (101.6)
119622A52	6753001	52 (1320.8)
119622A6	6753001	6 (152.4)
120025A	120025A	152 (3860.8)
120025A	120025A	197 (5003.8)
120025A	120025A	59 (1498.6)
1343990-3	6753001	3 (76.2)
1478600-2	M23053/5-106-0	2 (50.8)
1487200-46	FC425-32	46 (1168.4)

## Manufactured Items (Cont)

*Figure F-7. Strap Liner**Table F-7. Strap Liner*

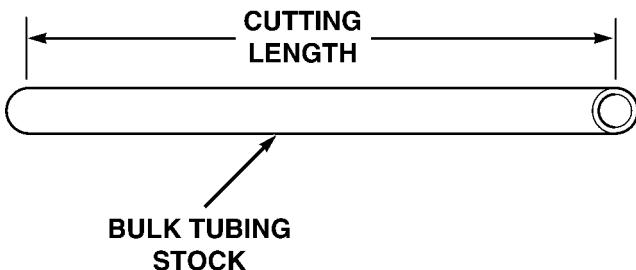
Liner Part Number	Bulk Liner Part Number	Cutoff Length Inches (mm)
124623A53	124623A	53 (1346.2)

*Figure F-8. Seals end Weatherstrip*

1. Fabricate from bulk stock listed in table F-8.
2. Using suitable cutting tool cut to length required in table F-8 .
3. Dimensions are in inches (mm).

*Table F-8. Seals and Weatherstrip*

Seal Part Number	Bulk Seal Part Number	Cutoff Length Inches (mm)
125865A160	75001366	160 (4064.0)
125865A52	75001366	52 (1320.8)
125865A53	75001366	53 (1346.2)
1398190	NE-71A	4.5 (114.3)
26578AX16	X195	16 (406.4)
26927AX26	29627AX	26 (660.4)

**Manufactured Items (Cont)**

1. Fabricate from bulk stock listed in table F-9.
2. Using suitable cutting tool cut to length required in table F-9.
3. Dimensions are in inches (mm).

**Figure F-9. Tubing****Table F-9. Tubing**

<b>Tube Part Number</b>	<b>Bulk Tube Description/Part Number</b>	<b>Cutoff Length Inches (mm)</b>
1356520	Flexible/5241K57	60 (1524.0)
1605150-57	PFT-8B-RED	57 (1447.8)
1605160-14	PFT-6B-RED	14 (355.6)
1605160-38	PFT-6B-RED	38 (965.2)
1605160-48	PFT-6B-RED	48 (1219.2)
1605160-50	PFT-6B-RED	50 (1270.0)
1605160-52	PFT-6B-RED	52 (1320.8)
1605160-53	PFT-6B-RED	53 (1346.2)
1605160-60	PFT-6B-RED	60 (1524.0)
1605170-18	PFT-4A-RED	18 (457.2)
1605260-48	PFT-4A-GRN	48 (1219.2)
1605270-101	PFT-6B-GRN	101 (2565.4)
1605270-114	PFT-6B-GRN	114 (2895.6)
1605270-157	PFT-6B-GRN	157 (3987.8)
1605270-56	PFT-6B-GRN	56 (1422.4)
1605270-60	PFT-6B-GRN	60 (1524.0)
1605270-8	PFT-6B-GRN	8 (203.2)
1605270-88	PFT-6B-GRN	88 (2235.2)
1605290-10	PFT-4A-YEL	10 (254.0)
1605300-100	PFT-6B-YEL	100 (2540.0)
1605300-101	PFT-6B-YEL	101 (2565.4)
1605300-14	PFT-6B-YEL	14 (355.6)
1605300-160	PFT-6B-YEL	160 (4064.0)
1605300-192	PFT-6B-YEL	192 (4876.8)
1605300-199	PFT-6B-YEL	199 (5054.6)
1605300-73	PFT-6B-YEL	73 (1854.2)
Deleted		
1656490-100	PFT-10B-RED	100 (2540.0)
1656490-104	PFT-10B-RED	104 (2641.6)
1656490-111	PFT-10B-RED	111 (2819.4)
1656490-12	PFT-10B-RED	12 (304.8)

## Manufactured Items (Cont)

Table F-9. Tubing

Tube Part Number	Bulk Tube Description/Part Number	Cutoff Length Inches (mm)
1656490-17	PFT-10B-RED	17 (431.8)
1656490-231	PFT-10B-RED	231 (5867.4)
1656490-50	PFT-10B-RED	50 (1270.0)
1656490-67	PFT-10B-RED	67 (1701.8)
1656490-77	PFT-10B-RED	77 (1955.8)
1656490-78	PFT-10B-RED	78 (1981.2)
1656500-16	PFT-10B-GRN	16 (406.4)
1656500-18	PFT-10B-GRN	18 (457.2)
1656500-192	PFT-10B-GRN	192 (4876.8)
1656500-258	PFT-10B-GRN	258 (6553.2)
1656500-35	PFT-10B-GRN	35 (889.0)
1656500-42	PFT-10B-GRN	42 (1066.8)
1656500-68	PFT-10B-GRN	68 (1727.2)
1656500-77	PFT-10B-GRN	77 (1955.8)
1948970-164	PFT-10B-YEL	164 (4165.6)
23319FX125	4246-0410	125 (3175.0)
23319FX172	4246-0410	172 (4368.8)
23319FX175	4246-0410	175 (4445.0)
23319FX198	4246-0410	198 (5029.2)
23319FX203	4246-0410	203 (5156.2)
23319FX214	4246-0410	214 (5435.6)
23319FX216	4246-0410	216 (5486.4)
23319FX227	4246-0410	227 (5765.8)
23319FX23	4246-0410	23 (584.2)
23319FX230	4246-0410	230 (5842.0)
23319FX235	4246-0410	235 (5969.0)
23319FX242	4246-0410	242 (6146.8)
23319FX251	4246-0410	251 (6375.4)
23319FX252	4246-0410	252 (6400.8)
23319FX259	4246-0410	259 (6578.6)
23319FX260	4246-0410	260 (6604.0)
23319FX35	4246-0410	35 (889.0)
23319FX37	4246-0410	37 (939.8)
23319FX38	4246-0410	38 (965.2)
23319FX359	4246-0410	359 (9118.6)
23319FX362	4246-0410	362 (9194.8)
23319FX51	4246-0410	51 (1295.4)
23319FX75	4246-0410	75 (1905.0)

## Manufactured Items (Cont)

Table F-9. Tubing

Tube Part Number	Bulk Tube Description/Part Number	Cutoff Length Inches (mm)
23323FX100	3250-061	101 (2565.4)
23323FX101	3250-061	112 (2844.8)
23323FX112	3250-061	114(2895.6)
23323FX114	3250-061	116 (2946.4)
23323FX116	3250-061	155 (3937.0)
23323FX155	3250-061	159 (4038.6)
23323FX159	3250-061	175 (4445.0)
23323FX175	3250-061	179 (4546.6)
23323FX179	3250-061	191 (4851.4)
23323FX191	3250-061	192 (4876.8)
23323FX192	3250-061	194 (4927.6)
23323FX194	3250-061	195 (4953.0)
23323FX195	3250-061	199 (5054.6)
23323FX199	3250-061	201 (5105.4)
23323FX201	3250-061	203 (5156.2)
23323FX203	3250-061	204 (5181.6)
23323FX204	3250-061	231 (5867.4)
23323FX231	3250-061	242 (6146.8)
23323FX242	3250-061	251 (6375.4)
23323FX251	3250-061	266 (6756.4)
23323FX266	3250-061	271 (6883.4)
23323FX271	3250-061	285 (7239.0)
23323FX285	3250-061	301 (7645.4)
23323FX301	3250-061	320 (8128.0)
23323FX320	3250-061	35 (889.0)
23323FX35	3250-061	42 (1066.8)
23323FX42	3250-061	43 (1092.2)
23323FX43	3250-061	48 (1219.2)
23323FX48	3250-061	51 (1295.4)
23323FX51	3250-061	92 (2336.8)
23323FX92	3250-061	93 (2362.2)
23323FX93	3250-061	68 (1727.2)
3013616	3250-101	18 (457.2)
3013617	3250-101	42 (1066.8)
3013618	3250-101	16 (406.4)
3013619	3250-101	35 (889)
3013620	3250-101	37 (939.8)
3013624	4246-0410	33 (838.2)
3013625	4246-0410	38 (965.2)
3013626	4246-0410	14 (355.6)
3013627	4246-0410	41(1041.4)
3013628	4246-0410	8 (203.2)
3013678	4246-0410	12 (304.8)
3013680	4246-0410	75 (1905)
3013681	4246-0410	

**Manufactured Items (Cont)*****Table F-9. Tubing***

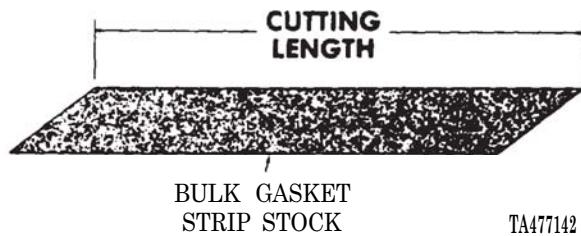
<b>Tube Part Number</b>	<b>Bulk Tube Description/Part Number</b>	<b>Cutoff Length Inches (mm)</b>
3013682	4246-0410	5 (127.0)
3013683	4246-0410	23 (584.2)
3013684	4246-0410	125 (3175)
3013685	3250-081	57 (1447.8)
3013686	3250-061	14 (355.6)
3013687	3250-061	50 (1270)
3013688	3250-061	60 (1524)
3013689	3250-061	53 (1346.2)
3013690	FC350-08	52 (1320.8)
3013691	4246-0410	18 (457.2)
3013705	4246-0410	48 (1219.2)
3013706	3250-061	60 (1524)
3013707	3250-061	8 (203.2)
3013708	3250-061	56 (1422.4)
3013709	4246-0410	10 (254)
3013710	3250-61	14 (355.6)
3013711	3250-61	73 (1854.2)
3013712	3250-61	73 (1854.2)
3013713	3250-101	111 (2819.4)
3013714	3250-101	100 (2540)
3013715	3250-101	12 (304.8)
3013716	3250-101	67 (1701.8)
3013717	3250-101	78 (1981.2)
3013718	3250-101	50 (1270)
3013719	Nylon/3250-101	17 (431.8)
3013721	Nylon/3250-101	104 (2641.6)
3013723	3250-061	74 (1879.6)
3013724	3250-061	21 (533.4)
3013725	3250-061	80 (2032.0)
3013726	3250-061	21 (533.4)
3013729	3250-061	74 (1879.6)
3013730	3250-061	40 (1016.0)
3013731	3250-061	53 (1346.2)
3013733	3250-061	59 (1498.6)
3013734	3250-061	59 (1498.6)
3013735	3250-061	46 (1168.4)
3013736	3250-081	41 (1041.4)
3052072	Nylon/4246-0410	33 (838.2)
31270AX44	Nylon/3250-081	44 (1117.6)
31270AX60	Nylon/3250-081	60 (1524.0)
31271AX103	Nylon/3250-101	103 (2616.2)



**Manufactured Items (Cont)*****Table F-9. Tubing***

<b>Tube Part Number</b>	<b>Bulk Tube Description/Part Number</b>	<b>Cutoff Length Inches (mm)</b>
31271AX131	Nylon/3250-101	131 (3327.4)
31271AX134	Nylon/3250-101	134 (3403.6)
31271AX137	Nylon/3250-101	137 (3479.8)
31271AX170	Nylon/3250-101	170 (4318.0)
31271AX200	Nylon/3250-101	200 (5080.0)
31271AX202	Nylon/3250-101	202 (5130.8)
31271AX227	Nylon/3250-101	227 (5765.8)
31271AX231	Nylon/3250-101	231 (5867.4)
31271AX40	Nylon/3250-101	40 (1016.0)
31271AX72	Nylon/3250-101	72 (1828.8)
31271AX89	Nylon/3250-101	89 (2260.6)
3266394	PV108-1	27 (685.8)
45A073-P1	Non-metallic/66-P	172 (4368.8)
45A073-P2	Non-metallic/66-P	48 (1219.2)
45A073-P3	Non-metallic/66-P	72 (1828.8)
45A078-P1	Non-metallic/88-P	84 (2133.6)
45A080-P1	Non-metallic/88-P	12 (304.8)
45A080-P2	Non-metallic/88-P	40 (1016.0)
45A080-P3	Non-metallic/88-P	16 (406.4)
45A083-P1	Metallic/66-P	45.5 (1155.7)
45A084-P1	Metallic/ALT-6	74 (1879.6)
45A091-P1	Metallic/ALT-6	16 (406.4)
45A092-P1	Metallic/ALT-6	23 (584.2)
45A093-P1	Metallic/ALT-6	10.5 (266.7)
45A094-P1	Metallic/ALT-6	36 (914.4)
45A095-P1	Metallic/ALT-6	44 (1117.6)
45A102-P1	Metallic/ALT-6	24 (609.6)
45A103-P1	Metallic/ALT-6	16 (406.4)
45A104-P1	Metallic/ALT-6	31 (787.4)
45A215-P1	Non-metallic/66-SN	11 (279.4)
45A230-P3	Non-metallic/66-SN	43 (1092.2)
45A230-P5	Metallic/2575-4RL	2 (50.8)
45A286-P3	Non-metallic/66-SN	96 (2438.4)
45A286-P5	Non-metallic/66-SN	38 (965.2)
45A330-P1	Non-metallic/66-SN	21 (533.4)
45A331-P1	Non-metallic/66-SN	34 (863.6)
45A338-P1	Non-metallic/66-SN	36 (914.4)
45A339-P1	Non-metallic/66-SN	46 (1168.4)
54057-1	Heat shrink/54057-3	3 (96.2)

## Manufactured Items (Cont)



1. Fabricate from bulk stock listed in table F-10.
2. Using knife or suitable cutting tool cut to length required in table F-10.
3. Dimensions are in inches (mm).

Figure F-10. Gasket Strip

Table F-10. Gasket Strip

Gasket Strip Part Number	Bulk Gasket Part Number	Cutoff Length Inches (mm)
1398190	NE-71A	4.5 (114.3)
26927AX26	26927AX	26 (660.4)

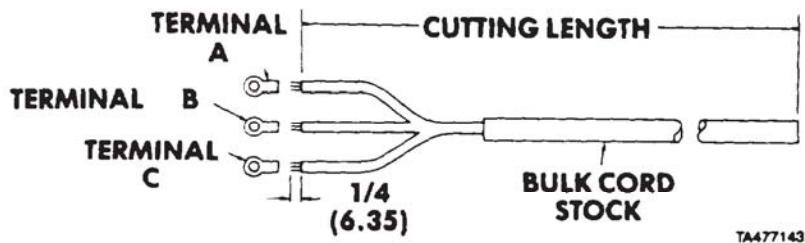


Figure F-11. Cord Assembly

1. Fabricate from bulk cord stock listed in table F-11.
2. Using suitable cutting tool cut to length required in table F-11.
3. For cord assembly, strip one end of cord so that wires are exposed.
4. Strip wire ends 1/4 in. (6.35 mm).
5. Crimp required lugs listed in table F-11 onto **ends of cord**.
6. Dimensions are in inches (mm).

Table F-11. Cord and Cord Assemblies

Cord/Assembly Part Number	Bulk Cord Part Number	Cutoff Length Inches (mm)	Terminal A	Terminal B	Terminal C
23854FX96	23854FX	SS(2438.4)			
1408180U	23854FX	305(7747.0)	M525036-106	M525036-106	M525036-106

## Manufactured Items (Cont)

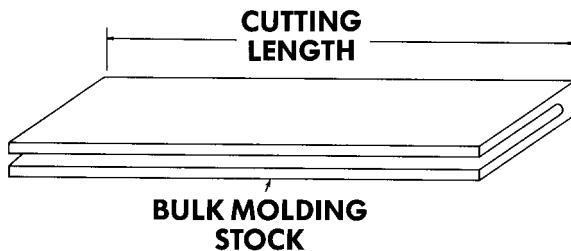


Figure F-12. Quikedge Molding

1. Fabricate from bulk molding stock listed in table F-12.
2. Using knife or suitable cutting tool cut to length required in table F-12.
3. Dimensions are in inches (mm).

Table F-12. Quikedge Molding

Molding Part Number	Bulk Liner Part Number	Cutoff Length Inches (mm)
1467170-4	75000349	4 (101.6)
1467170-8	7000349	8 (203.2)
1467160-5	75000343	5 (127.0)
26947BX10	75000317	10 (254.0)
26947BX19	75000317	19 (482.6)
26947BX4	75000317	4 (101.6)

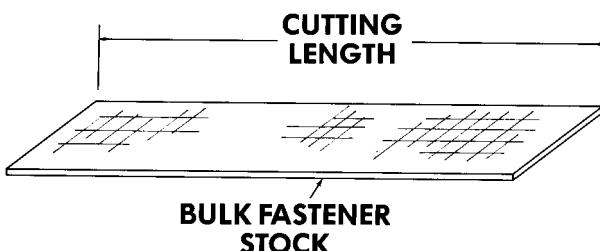


Figure F-13. Fastener

1. Fabricate from bulk stock listed in table F-13.
2. Using suitable cutting tool cut to length required in table F-13.
3. Dimensions are in inches (mm).

Table F-13. Fasteners

Fastener Part Number	Bulk Fastener Part Number	Cutoff Length Inches (mm)
1519710	SJ-3542	5.25 (133.4)
1519720	SJ-3541	11.38 (289.0)

## Manufactured Items (Cont)

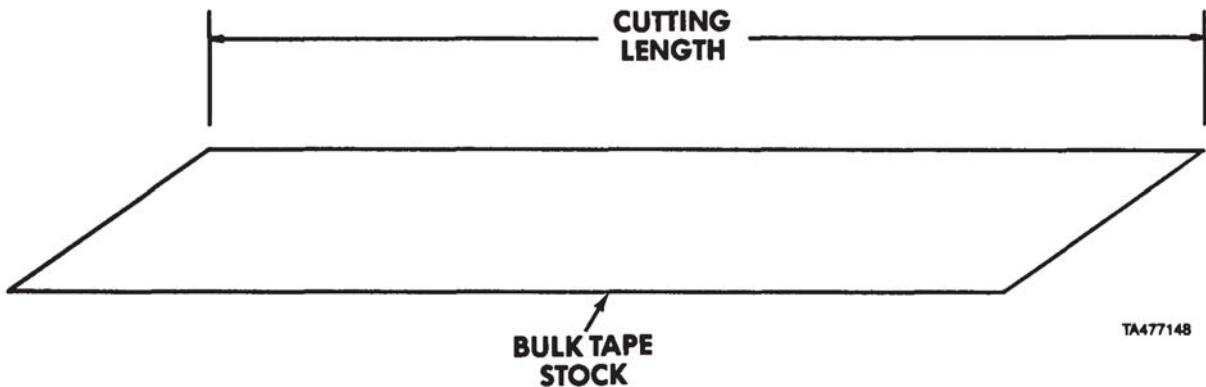


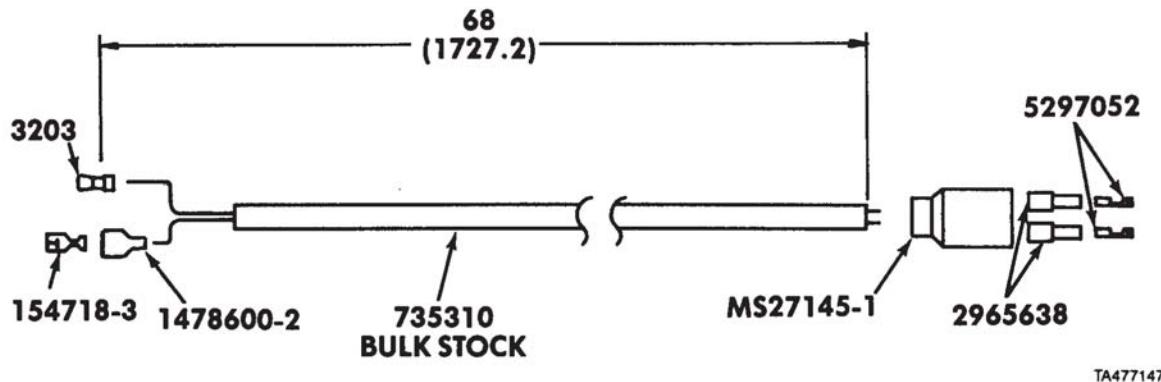
Figure F-14. Roof Tape

1. Fabricate from bulk tape stock listed in table F-14.
2. Using knife or suitable cutting tool cut to length required in table F-14.
3. Dimensions are in inches (mm).

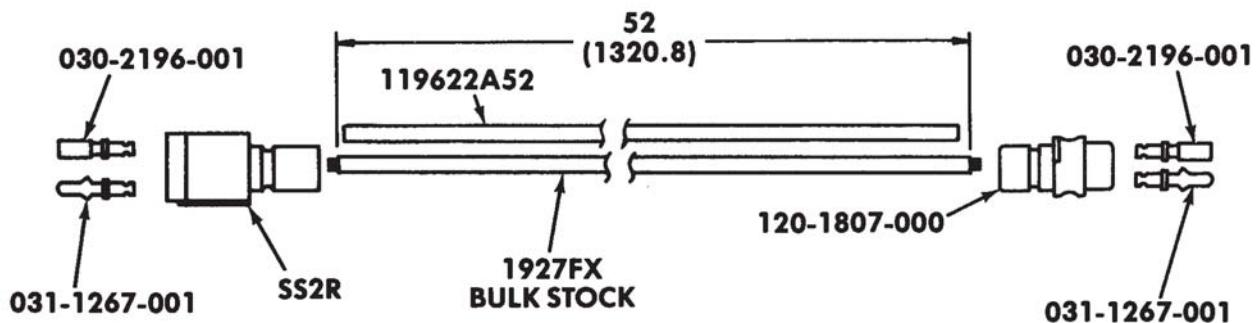
Table F-14. Roof Tape

Roof Tape Part Number	Bulk Tape Part Number	Cutoff Length Inches (mm)
26987AX130	4508 X 3/4	130 (3302.0)

## Manufactured Items (Cont)

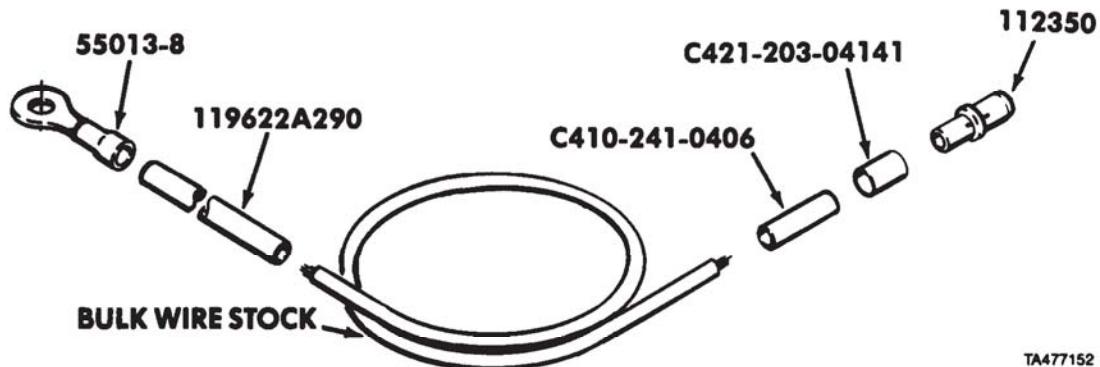
**Figure F-15. 1350860W Wire Harness Assembly**

1. Fabricate from 1927FX bulk stock.
2. Using wire cutters cut to 52 inches (1320.8 mm).
3. Strip ends of wire 1/4 in. (6.35 mm).
4. Crimp connectors SS2R and 120-1807-000 to ends of wire (figure F-15).
5. Attach terminals 031-1267-001 and 030-2196-001 to connectors.
6. Dimensions are in inches (mm).

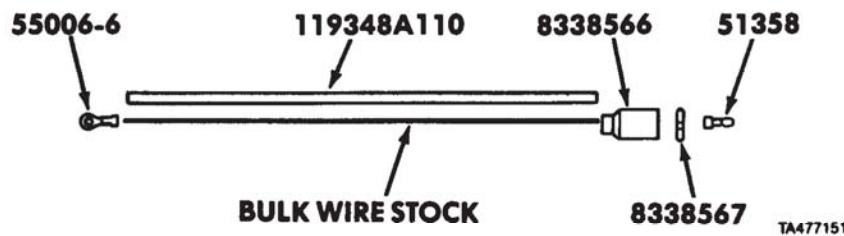
**Figure F-16. 1354460W Wire Harness Assembly**

1. Fabricate from 735310 bulk stock.
2. Using wire cutters cut to 68 inches (1727.2 mm).
3. Strip ends of wire 1/4 inch (6.35 mm).
4. Attach terminals 3203 and 154718-3 and sleeving 1478600-2 to wire strands (figure F-16).
5. Crimp connector MS27145-1 to end of wire.
6. Attach terminals 2965638 and bushings 5297052 to connector.
7. Dimensions are in inches (mm).

## Manufactured Items (Cont)

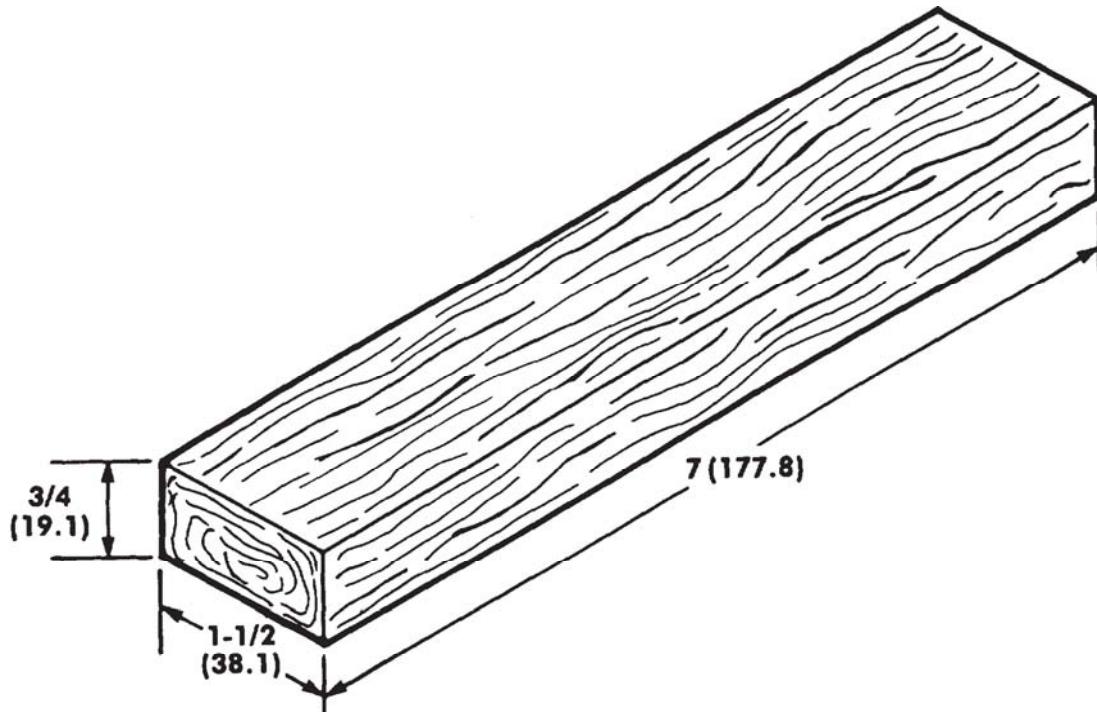
**Figure F-17. 1353360W Wire Assembly**

1. Fabricate from 4127-F bulk wire.
2. Using wire cutters cut wire to 60 inches (1524 mm).
3. Strip both ends of wire 1/4 inch (6.35 mm).
4. Cut 119622A290 sleeving to 59.5 inches (1511 mm) and slide over wire.
5. Crimp 55013-8 lug terminal onto end of wire.
6. Attach C410-241-0406 rubber bushing and C421-203-04141 sleeve bushing to end of wire.
7. Attach 112350 electrical contact of end of wire.
8. Dimensions are in inches (mm).

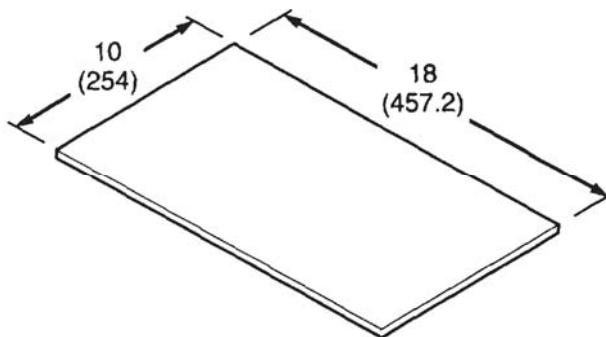
**Figure 18. 1358560W Wire Assembly**

1. Fabricate from 1927FX bulk wire.
2. Using wire cutters cut wire to 60 inches (1524 mm).
3. Strip both ends of wire 1/4 inch (6.35 mm).
4. Cut 119348A110 sleeving to 59.5 inches (1511 mm) and slide over wire.
5. Crimp 55006-6 lug terminal onto end of wire.
6. Attach 8338560 electrical shell to end of wire.
7. Install 8338567 slotted washer and 51358 electrical contact to shell.
8. Dimensions are in inches (mm).

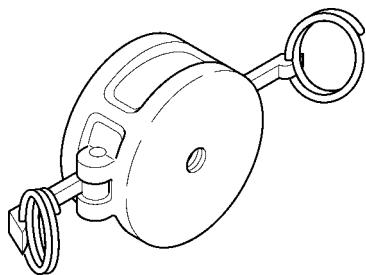
## Manufactured Items (Cont)

*Figure F-19. Block, Battery Spacer*

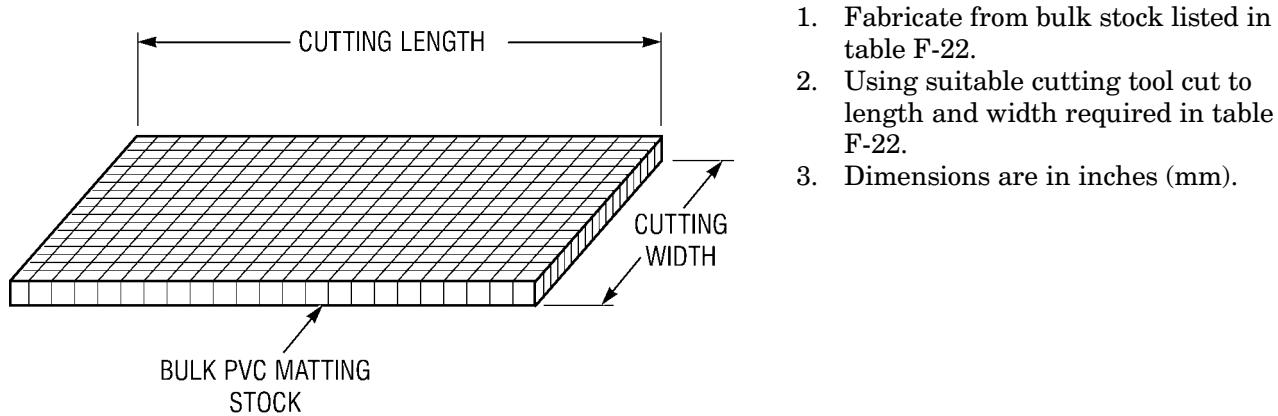
1. Fabricate from MML751 lumber stock.
2. Using saw and standard planing machine, cut stock to 3/4 (19.1) by 1-1/2 (38.1) by 7 (177.8).
3. All dimensions are in inches (mm).

*Figure F-20. Coated Cloth*

1. Fabricate from 0.003 thick Buna-N nylon fabric.
2. Dimensions are in inches (mm).

**Manufactured Items (Cont)****Figure F-21. Four Inch Camlock Test Cover**

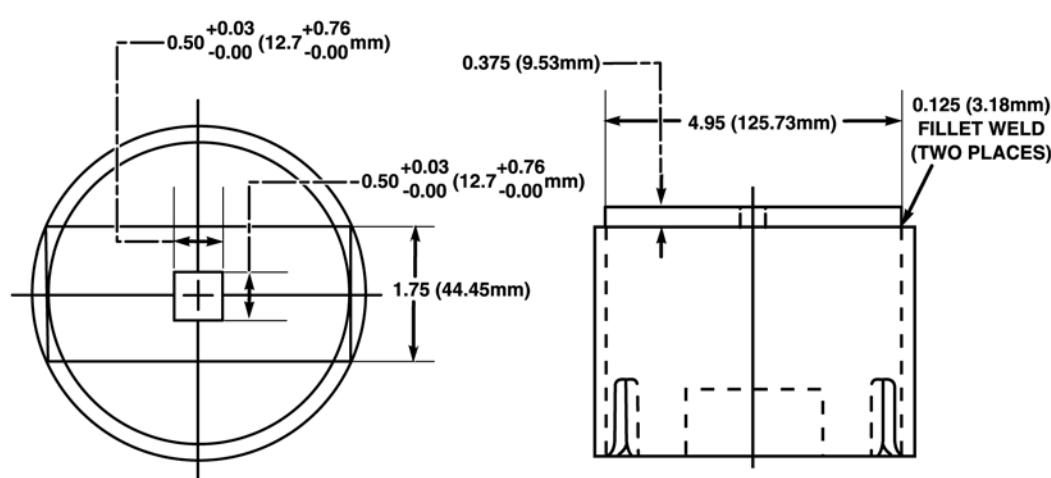
1. Fabricate from quick disconnect cap, P/N MS27028-17.
2. Drill and tap for 3/4 inch tee fitting.



1. Fabricate from bulk stock listed in table F-22.
2. Using suitable cutting tool cut to length and width required in table F-22.
3. Dimensions are in inches (mm).

**Figure F-22. PVC Matting****Table F-14.1. PVC Matting**

PVC Matting Part Number	Bulk PVC Matting Part Number	Cutoff Length Inches (mm)	Cutoff Width Inches (mm)
3243150	3243781	21 (533.4)	11 (279.4)
3243183	3243781	34 (863.6)	11 (279.4)

**Manufactured Items (Cont)****Figure F-23. Bearing Nut Socket**

1. Fabricate from bearing nut wrench (NSN 5120-01-279-4789).
2. Weld a flat bar, 0.375 in. x 1.75 in. x 4.95 in. (9.53 mm x 44.45 mm x 125.73 mm) with 0.50 in. x 0.50 in. (12.7 mm x 12.7 mm) square hole in center, to the back of socket.
3. Dimensions are in inches (mm).

**Table F-14.2. Bar**

<b>Thickness Inches (mm)</b>	<b>Width Inches (mm)</b>	<b>Length Inches (mm)</b>	<b>Material</b>
0.375 (9.53)	1.75 (44.45)	4.95 (125.73)	1020 HR Steel Plate

***Table F-15. M1977-CBT Components***

The maintenance tasks and Maintenance Allocation Chart (MAC) group listed below contain specific information about the M1977-CBT (Common Bridge Transport).

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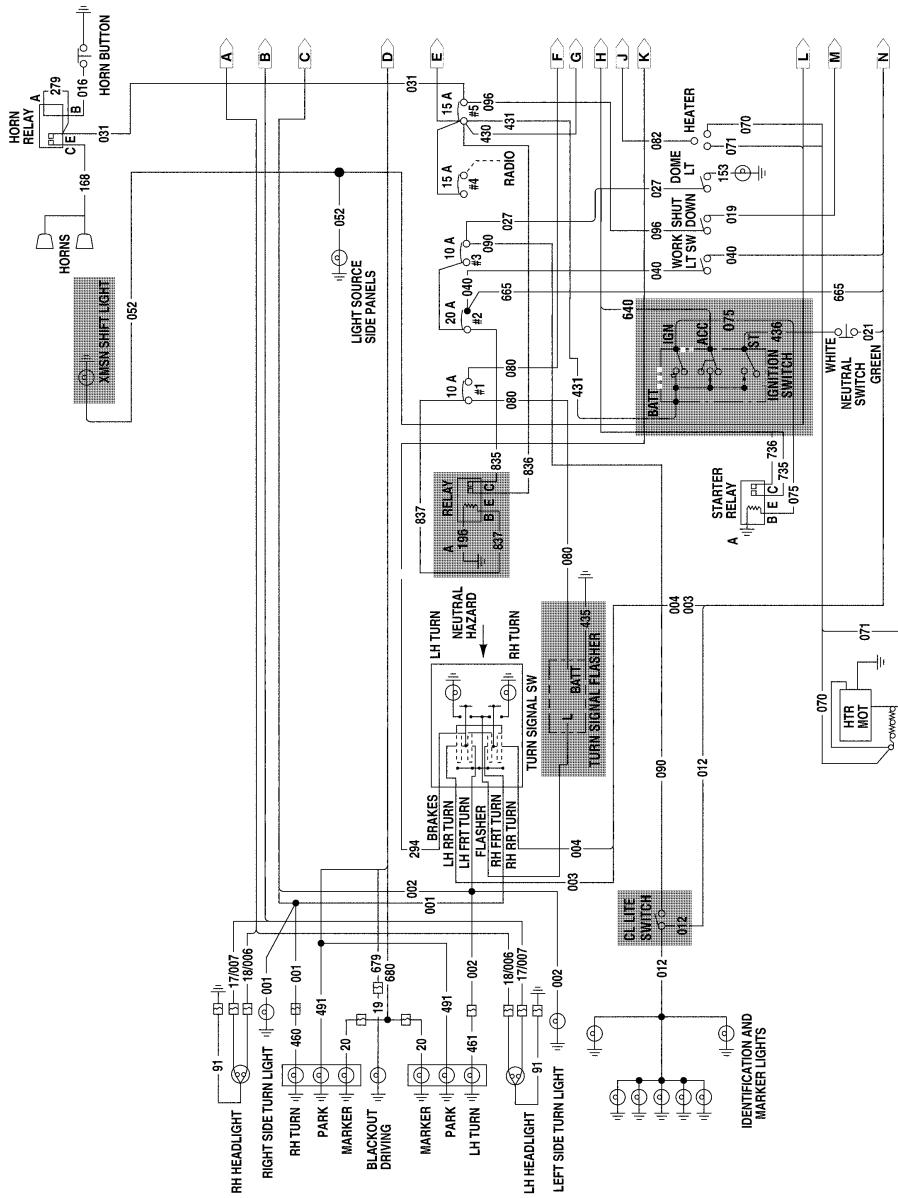
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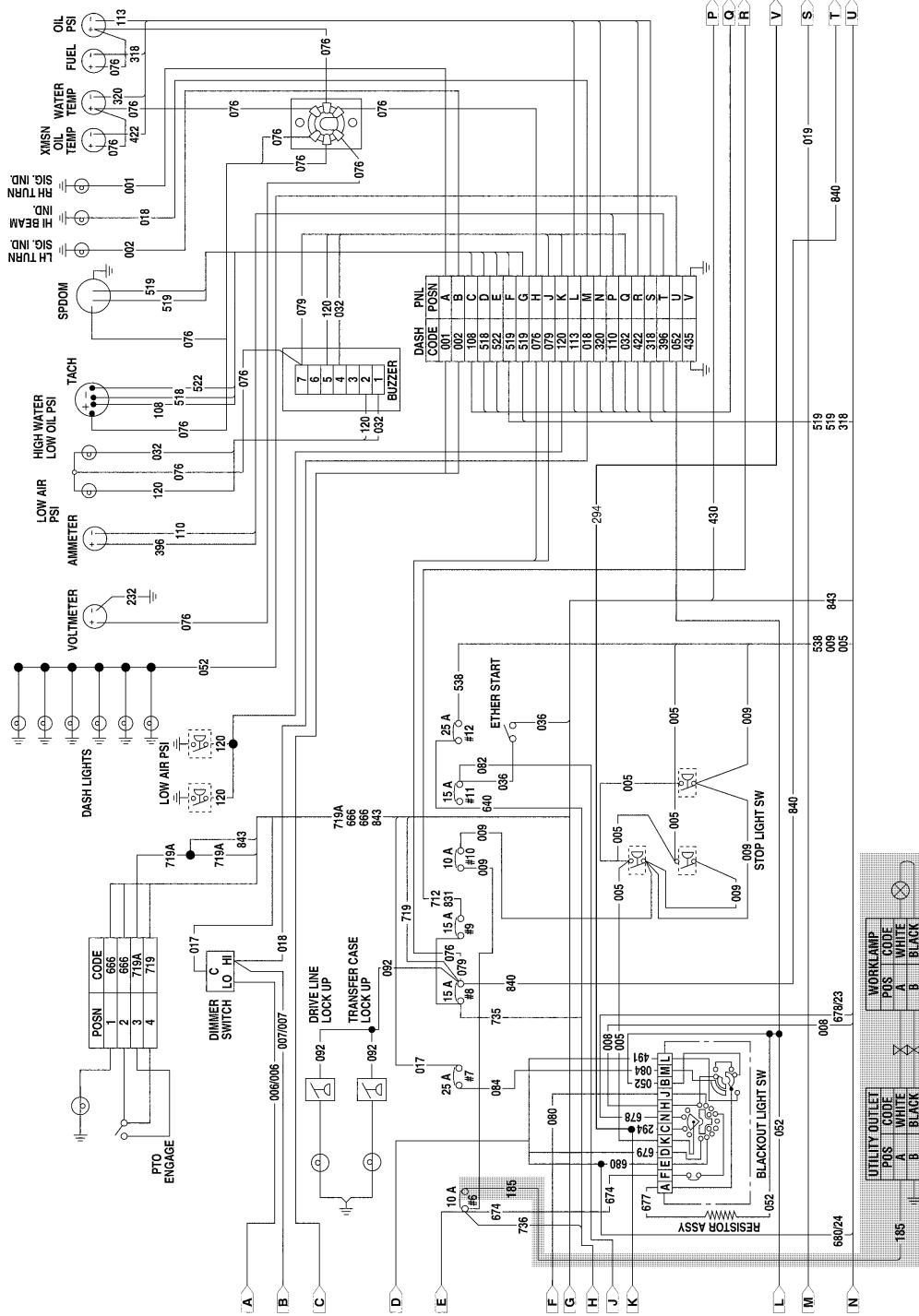
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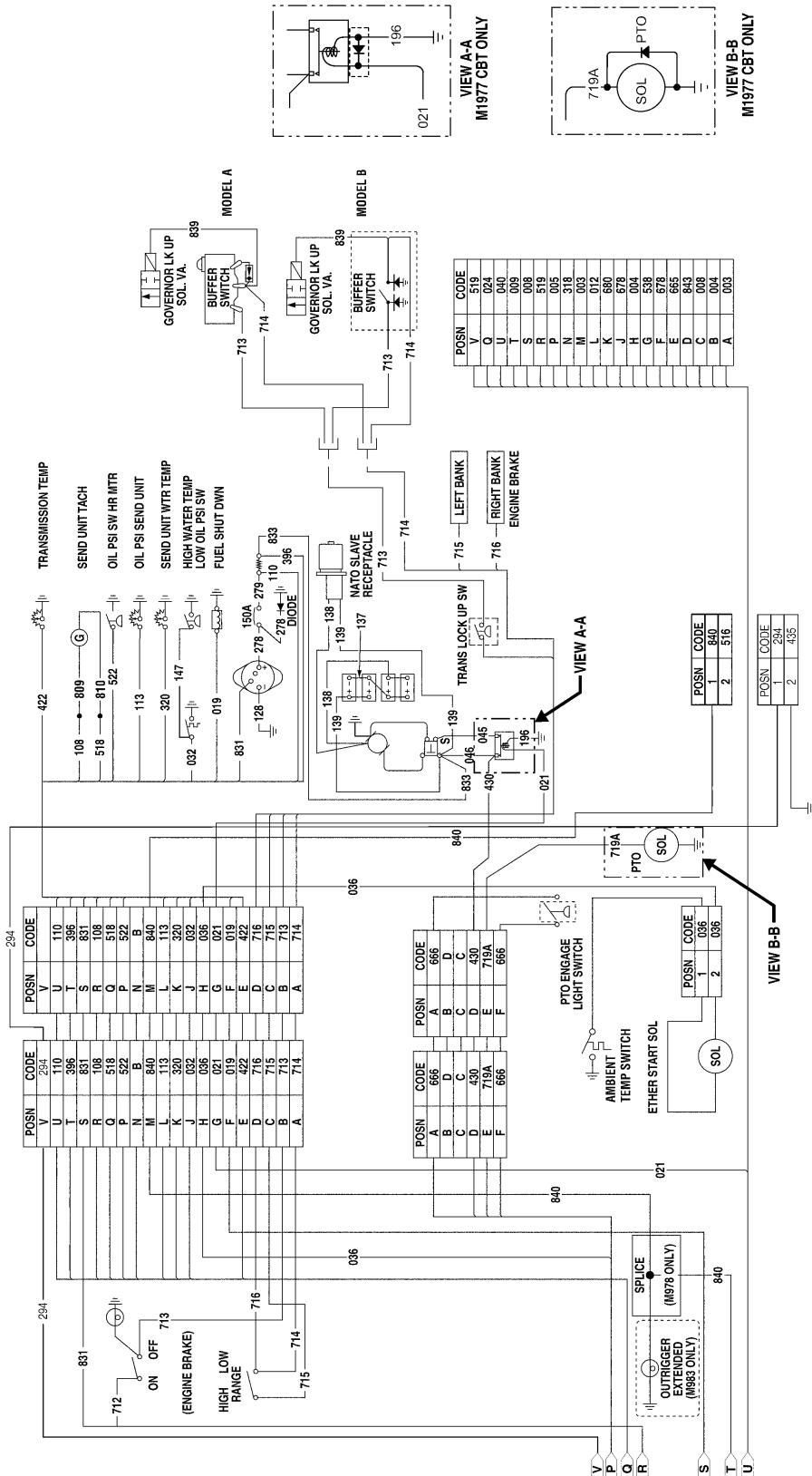


FO-1. Electric Schematic (Sheet 1 of 6).  
FP-1/(FP-2 blank)  
Change 4



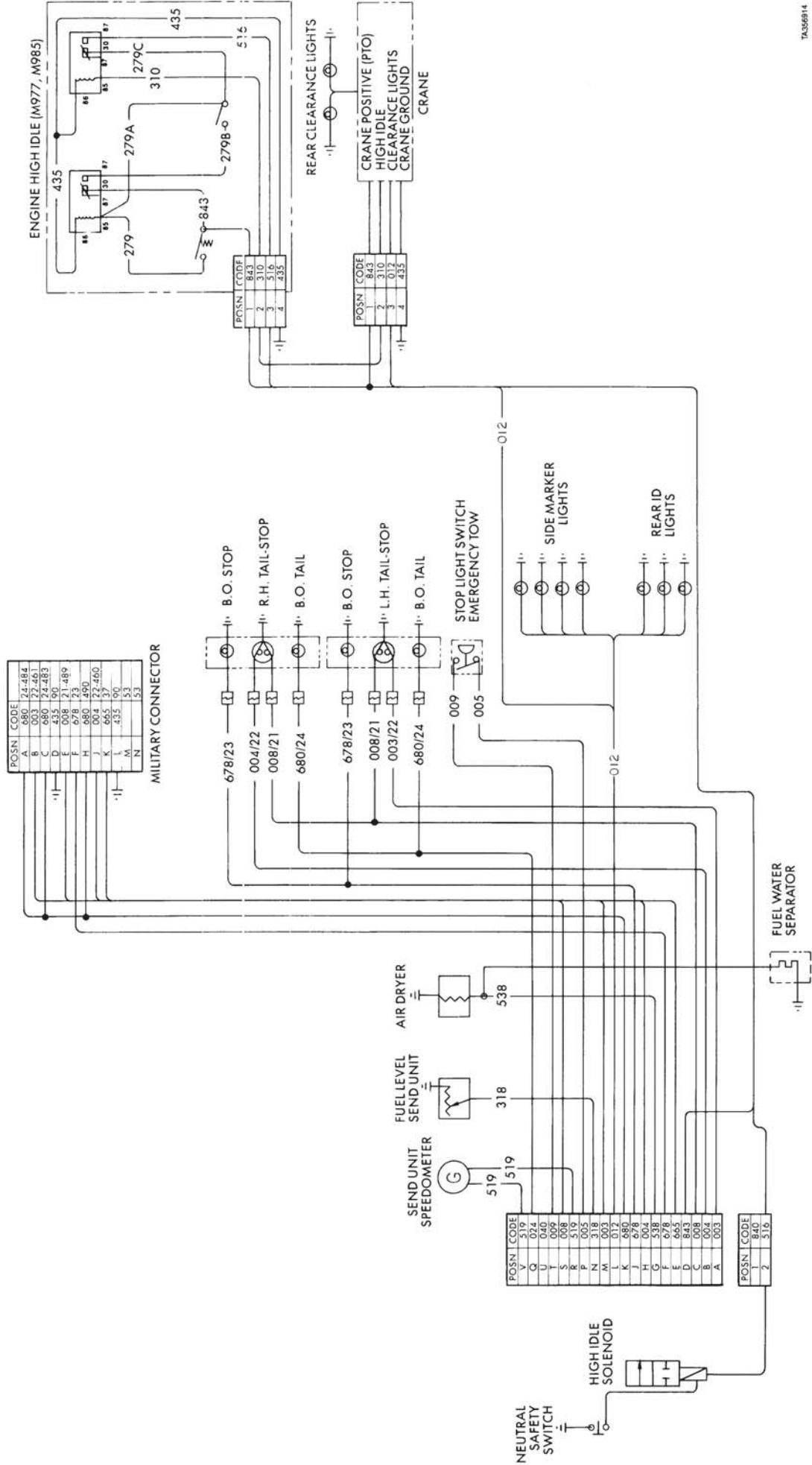




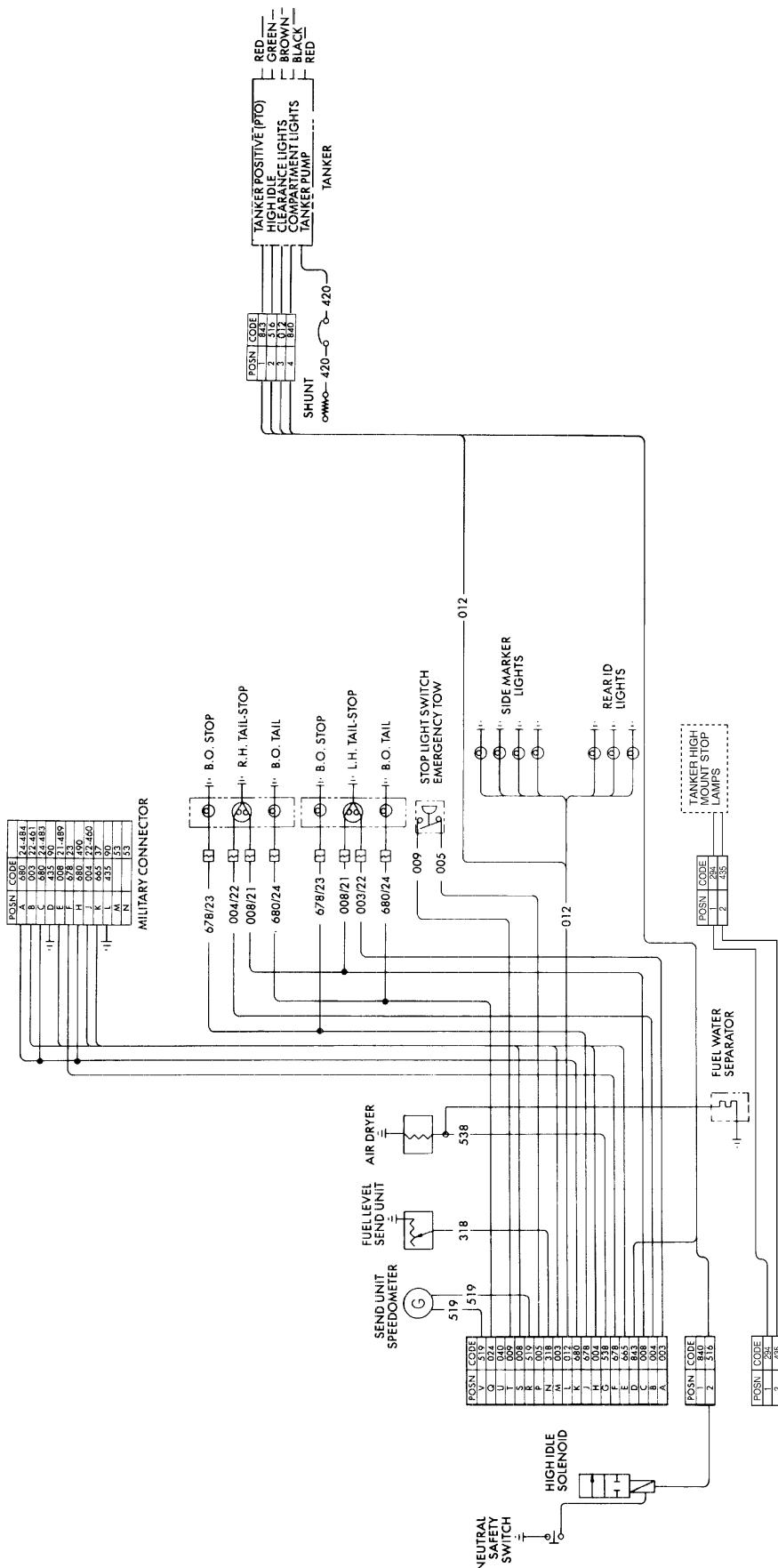


FO-1. Electric Schematic (Sheet 1 of 6).  
Change 8      FP-2.3/(FP-2.4 blank)



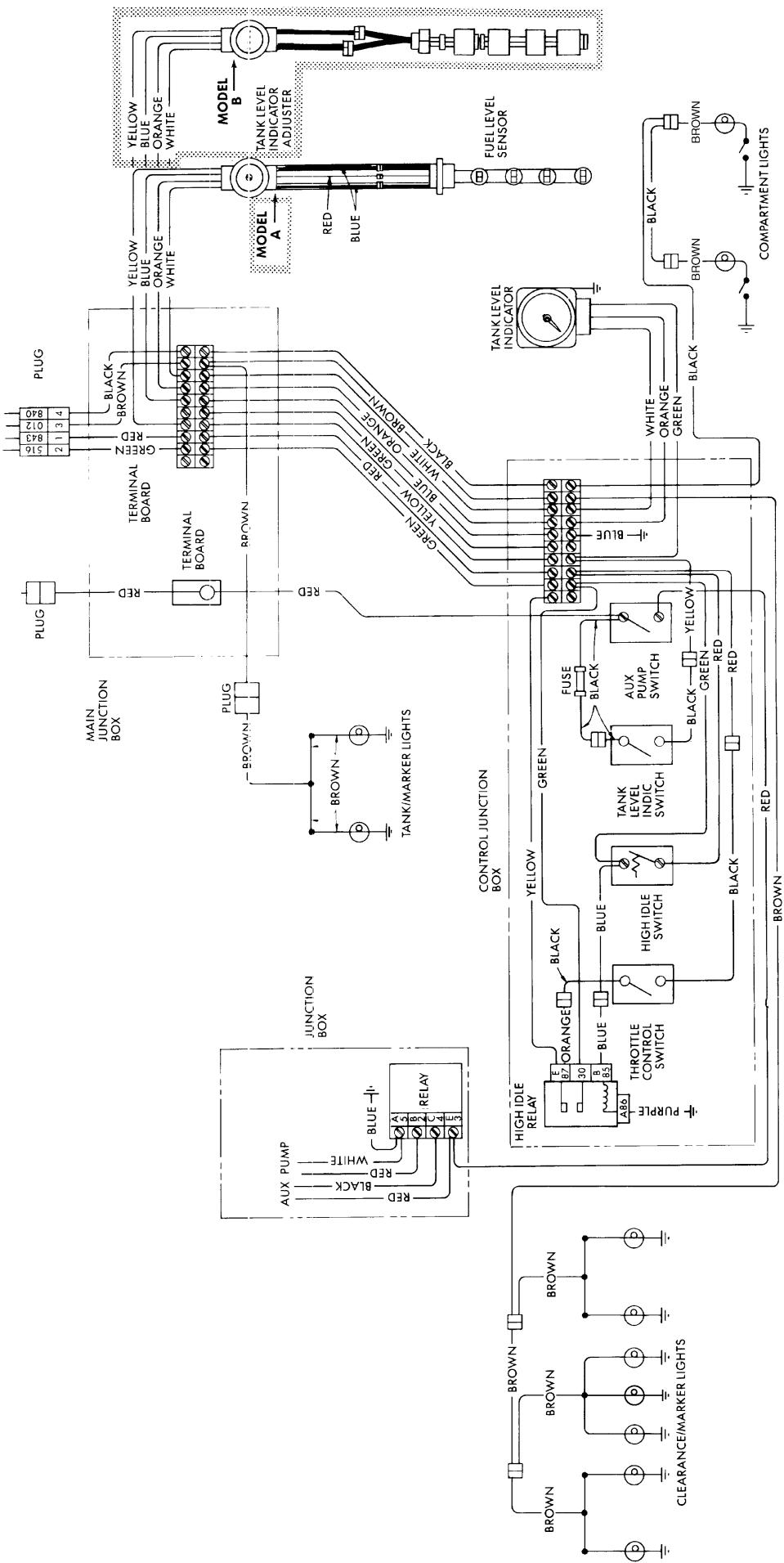






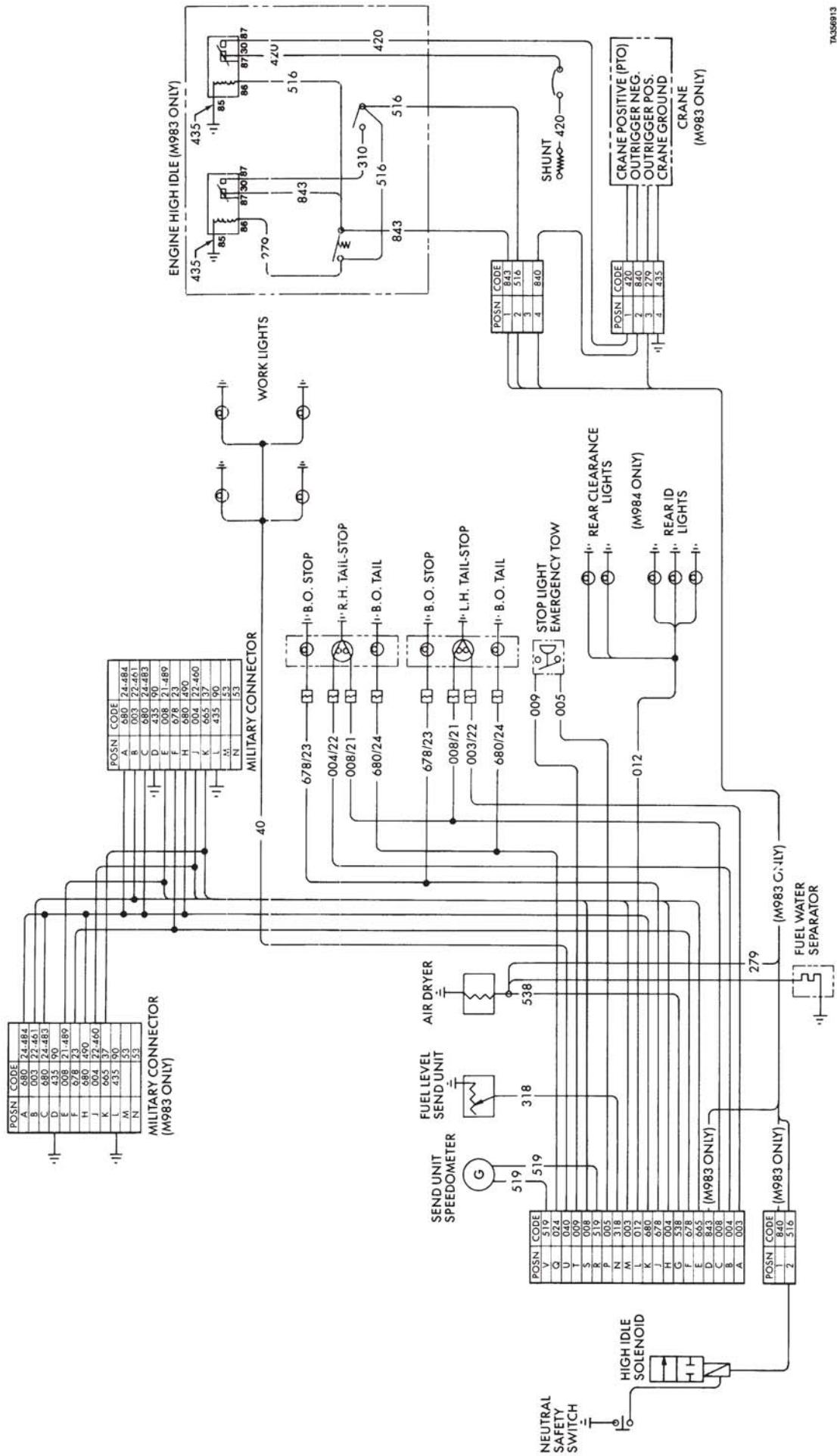
**FO-1. Electric Diagram (M978) (Sheet 3 of 6).**  
**Change 5**      FP-5/(FP-6 blank)





FO-1. Electric Diagram (M978) (Sheet 4 of 6).  
Change 5  
FP-7/(FP-8 blank)





FO-1. Electric Diagram (M983, M984) (Sheet 5 of 6).

FP-9/(FP-10 blank)



TOW LIGHTS

678/23 — B.O. STOP

004/22 — RH TAIL-STOP

008/21 — B.O. TAIL

680/24 — B.O. TAIL

TOW LIGHT CABLE

Position Code

A 435

B 435

C 435

D 435

E 435

F 435

G 435

H 435

I 435

J 435

K 435

L 435

M 435

N 435

O 435

P 435

Q 435

R 435

S 435

T 435

U 435

V 435

W 435

X 435

Y 435

Z 435

AA 435

AB 435

AC 435

AD 435

AE 435

AF 435

AG 435

AH 435

AI 435

AJ 435

AK 435

AL 435

AM 435

AN 435

AO 435

AP 435

AQ 435

AR 435

AS 435

AT 435

AU 435

AV 435

AW 435

AX 435

AY 435

AZ 435

BA 435

BB 435

BC 435

BD 435

BE 435

BF 435

BG 435

BH 435

BI 435

BJ 435

BK 435

BL 435

BM 435

BN 435

BO 435

BP 435

BQ 435

BR 435

BS 435

BT 435

BU 435

BV 435

BW 435

BX 435

BY 435

BZ 435

CA 435

CB 435

CC 435

CD 435

CE 435

CF 435

CG 435

CH 435

CI 435

CJ 435

CK 435

CL 435

CM 435

CN 435

CO 435

CP 435

CQ 435

CR 435

CS 435

CT 435

CU 435

CV 435

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EH 435

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EK 435

EL 435

EM 435

EN 435

EP 435

EQ 435

ER 435

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DX 435

DY 435

DZ 435

EA 435

EB 435

EC 435

ED 435

EE 435

EF 435

EG 435

EH 435

EI 435

EK 435

EL 435

EM 435

EN 435

EP 435

EQ 435

ER 435

ES 435

ET 435

EU 435

EV 435

DW 435

DX 435

DY 435

DZ 435

EA 435

EB 435

EC 435

ED 435

EE 435

EF 435

EG 435

EH 435

EI 435

EK 435

EL 435

EM 435

EN 435

EP 435

EQ 435

ER 435

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EV 435

DW 435

DX 435

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EA 435

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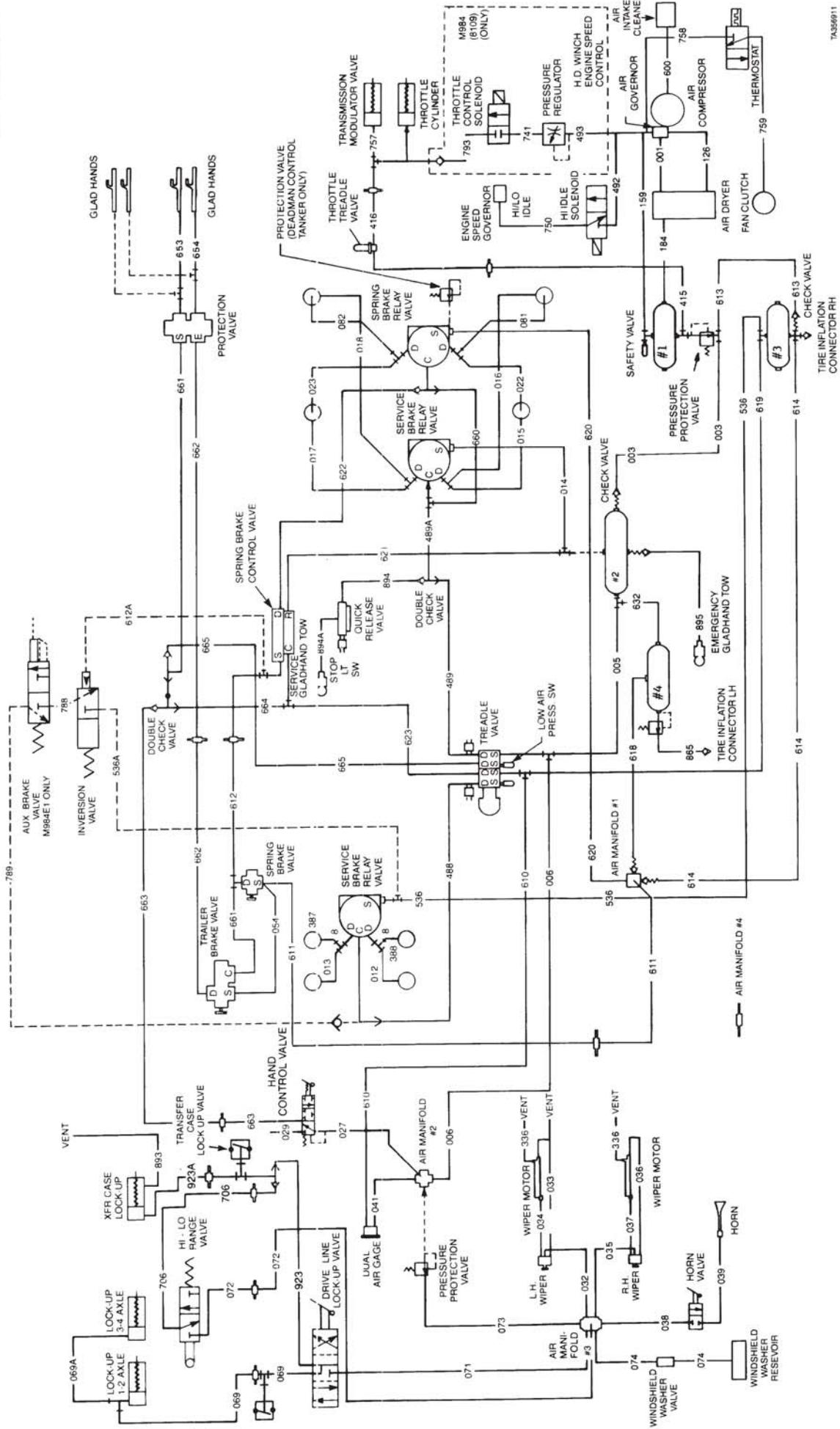
EI 435

EK 435

EL 435

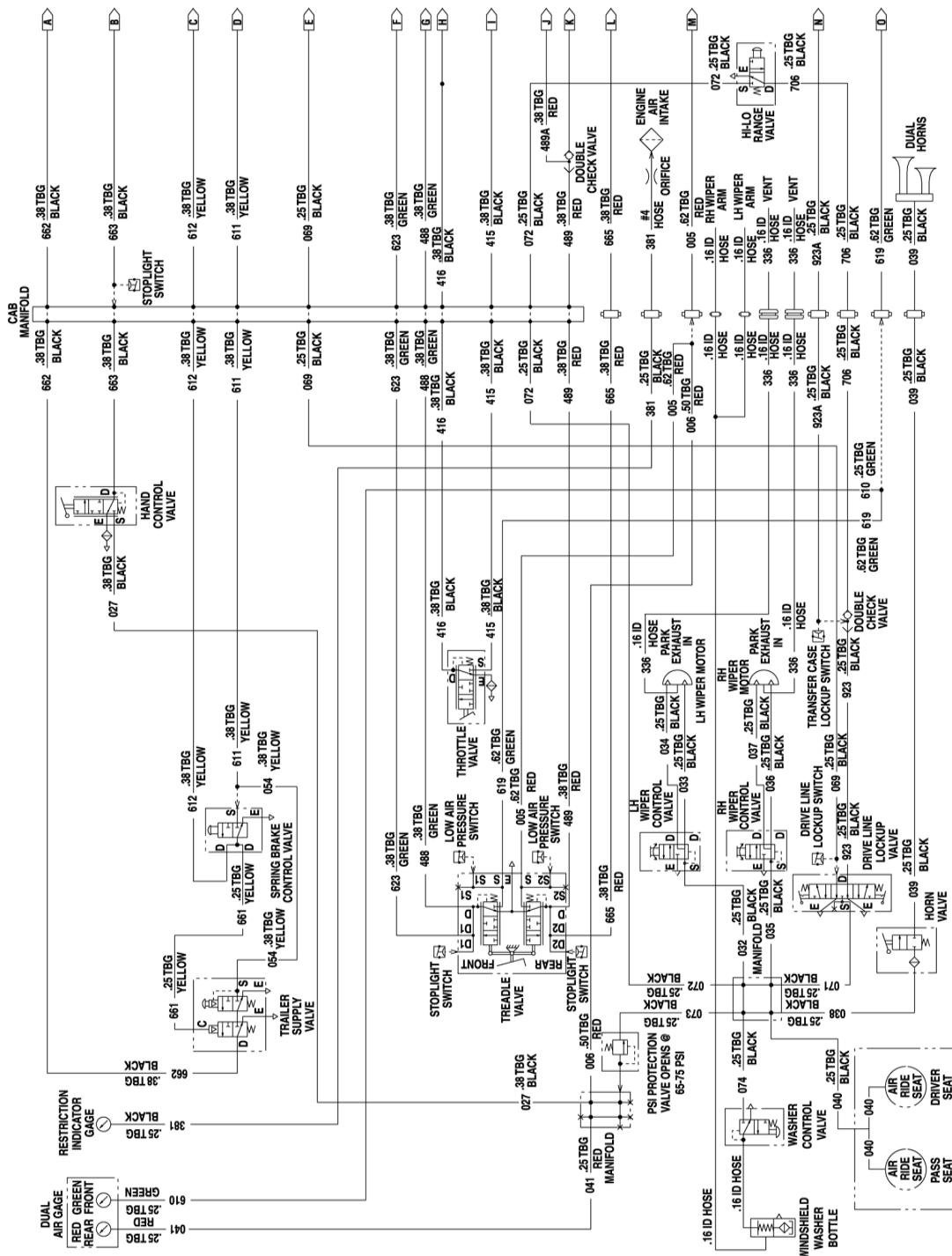
EM 435



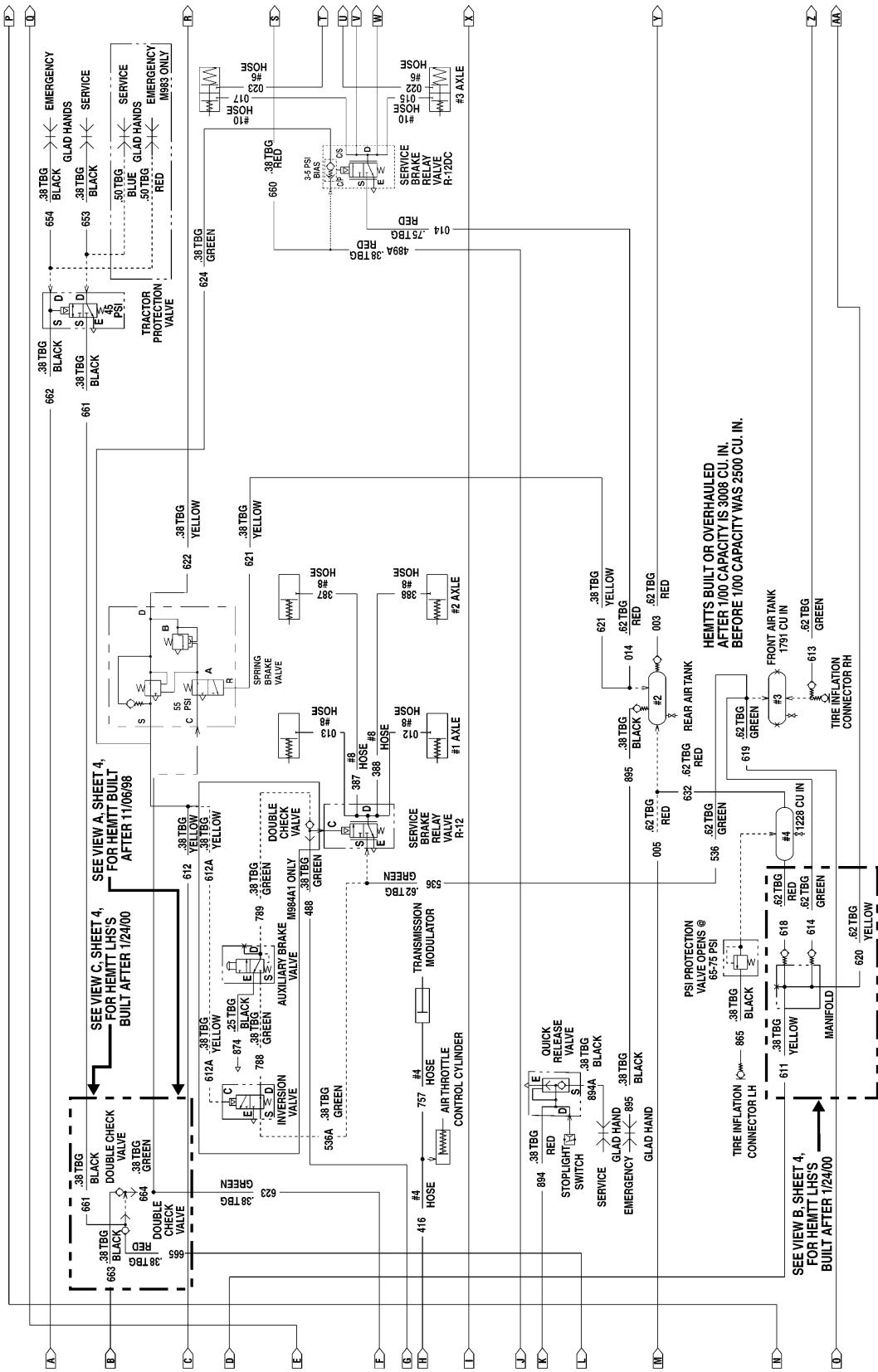


FO-2. Air Schematic.

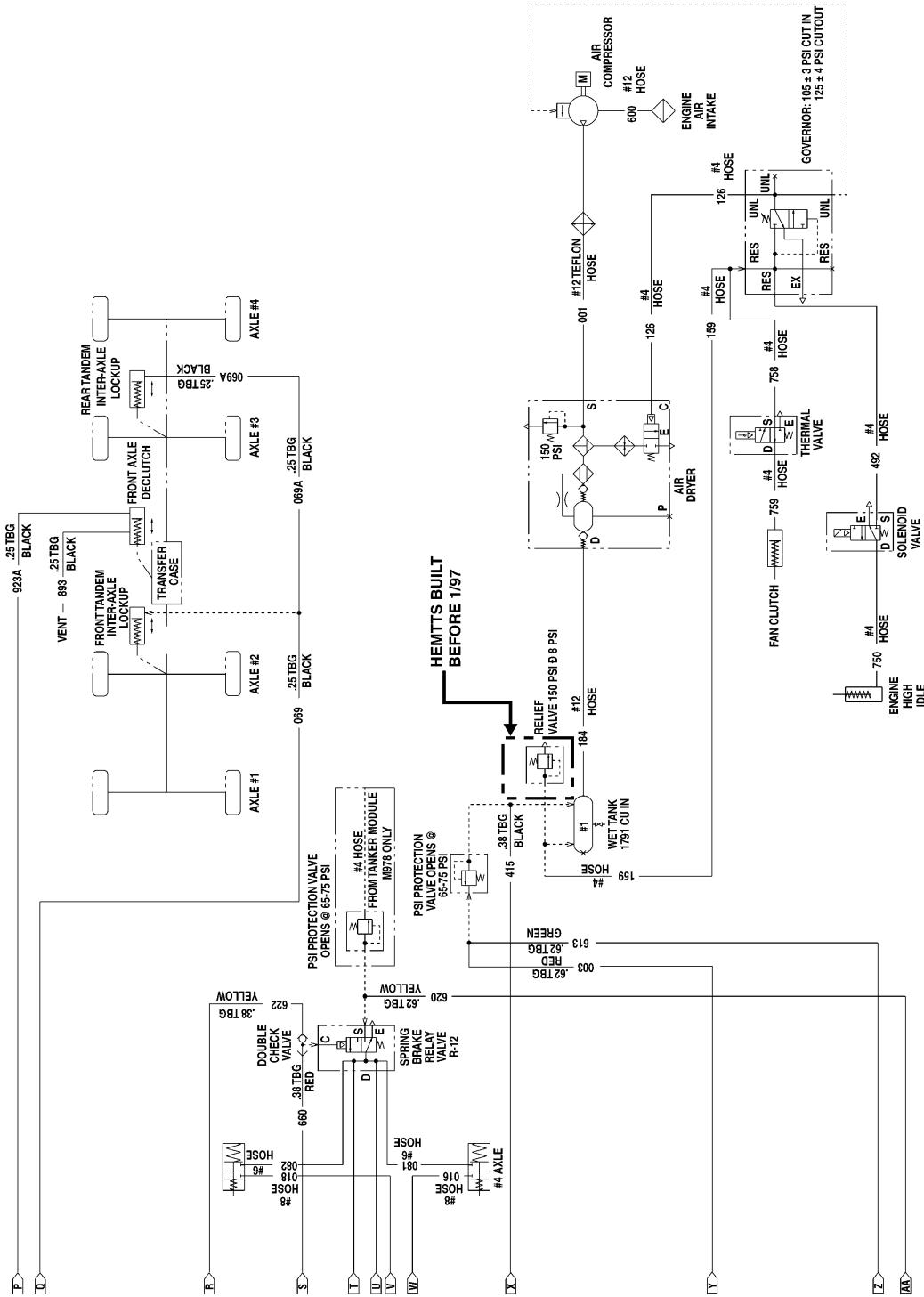






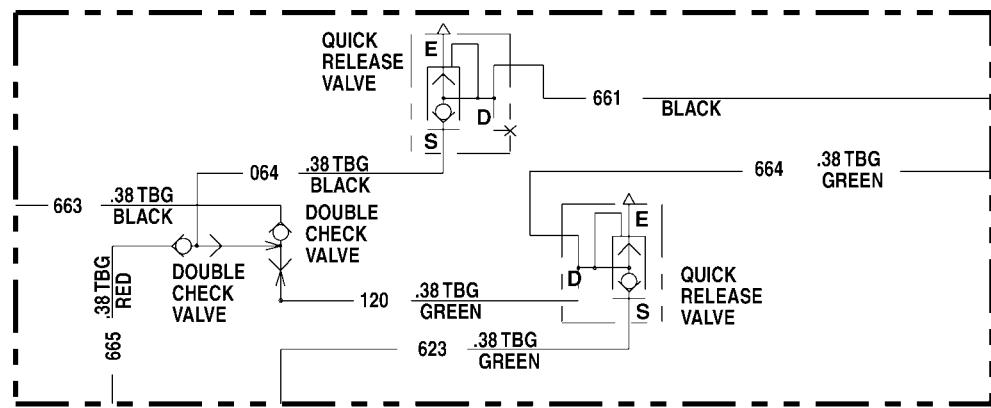




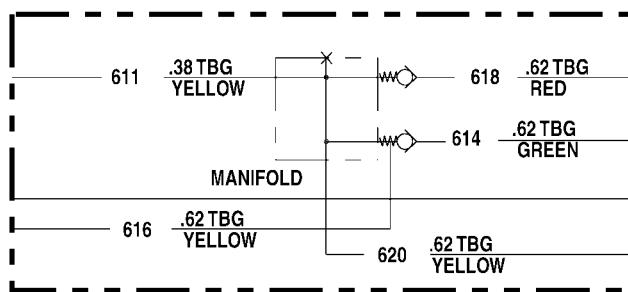


**FO-2.1 Air Schematic (Sheet 3 of 4).**  
**Change 5**      **FP-14.5/(FP-14.6 blank)**

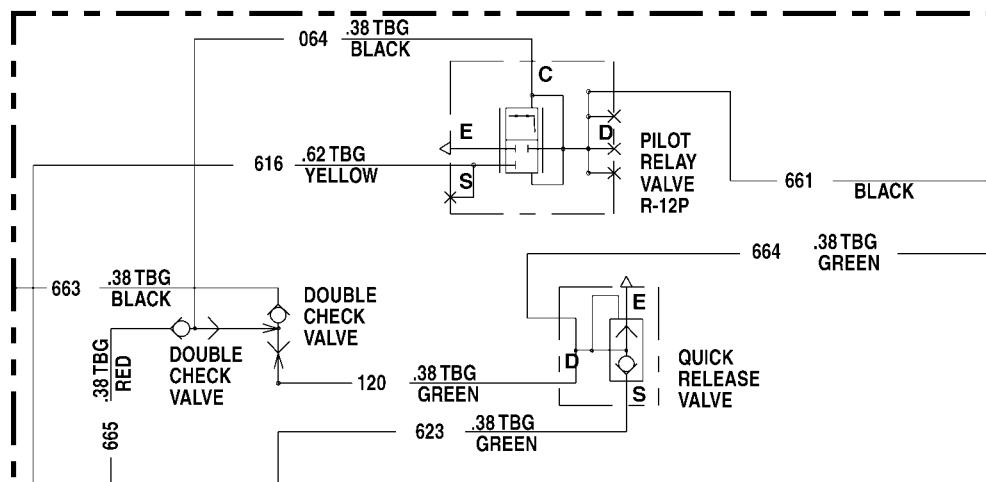




VIEW A

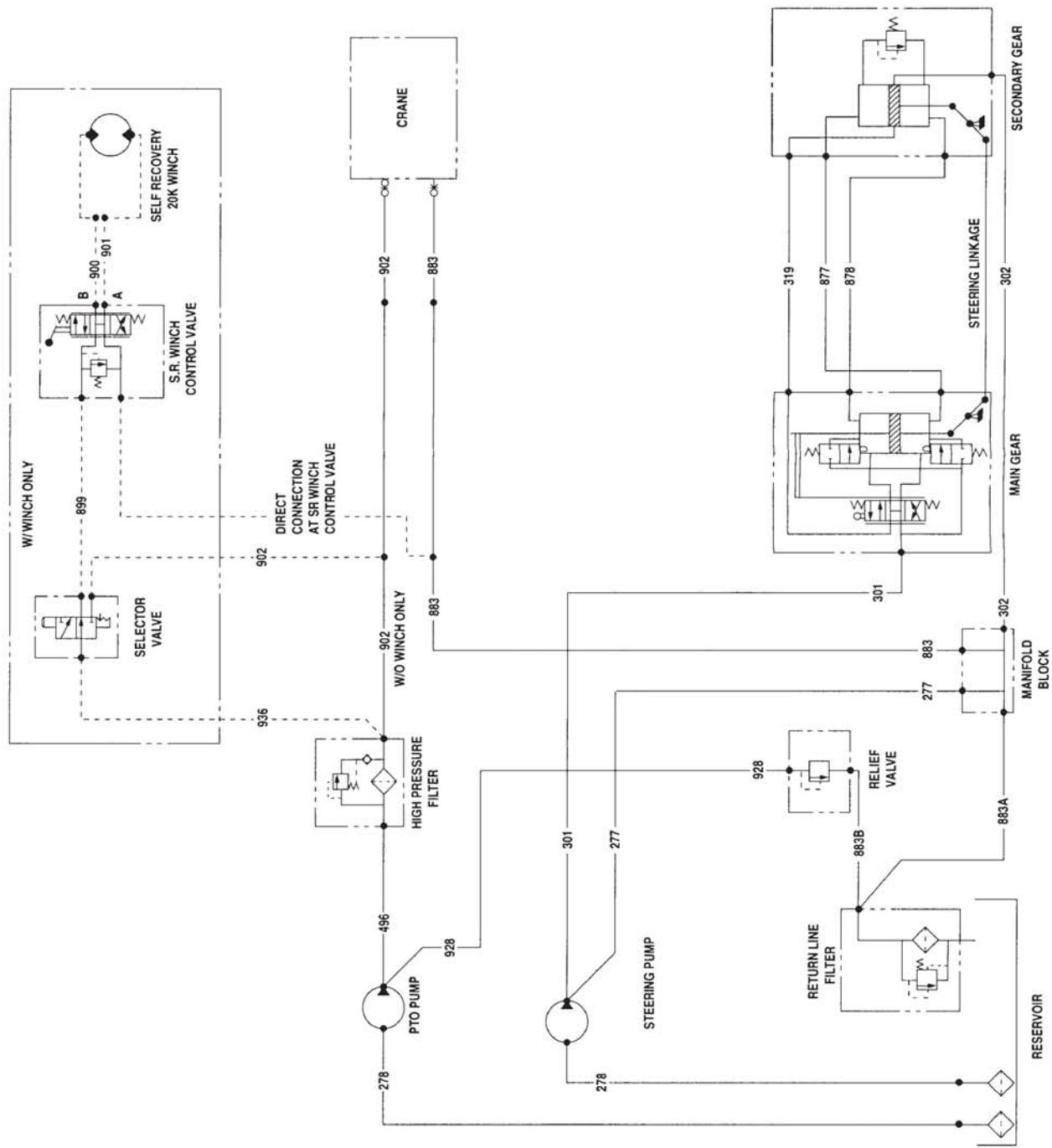


VIEW B



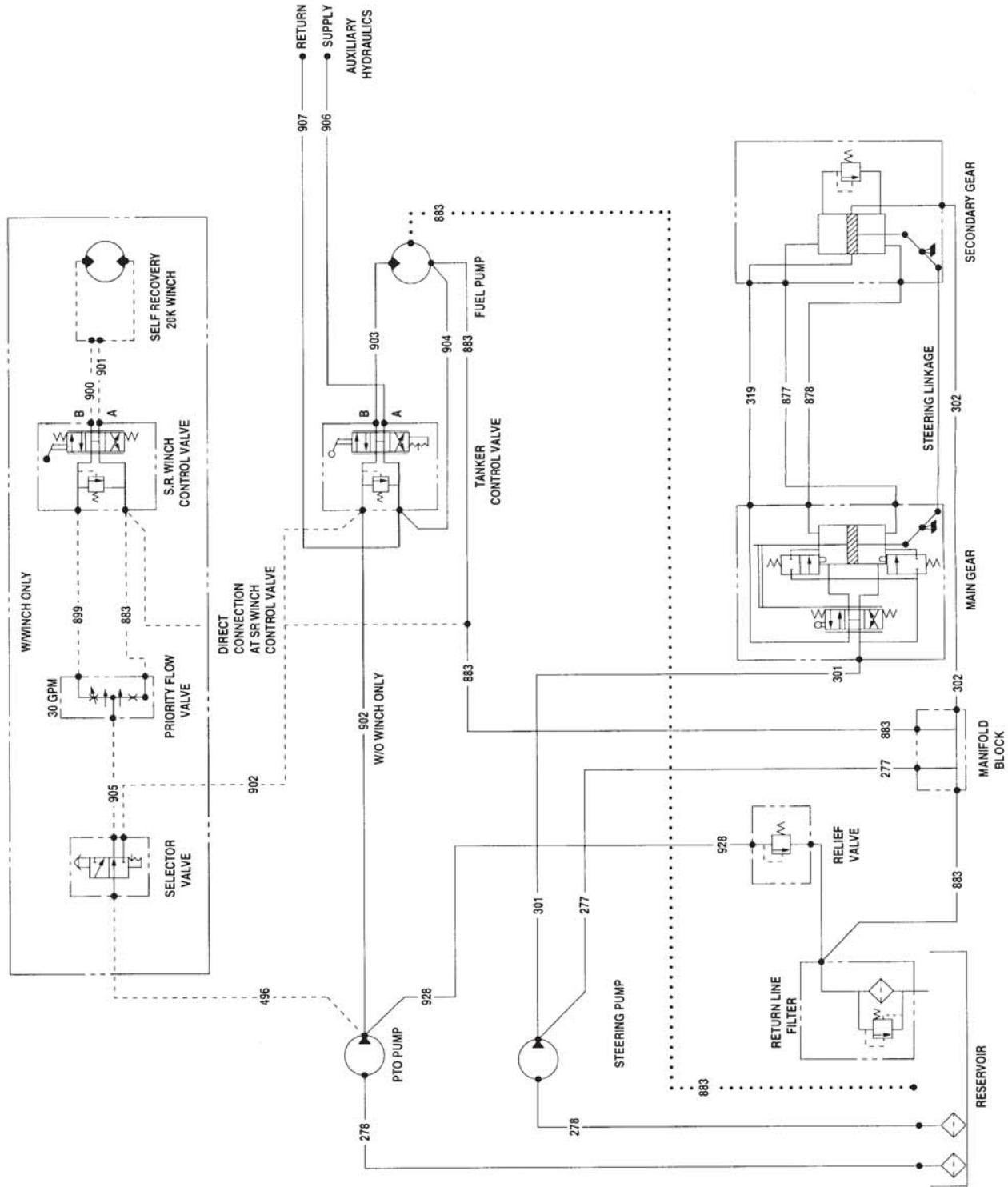
VIEW C





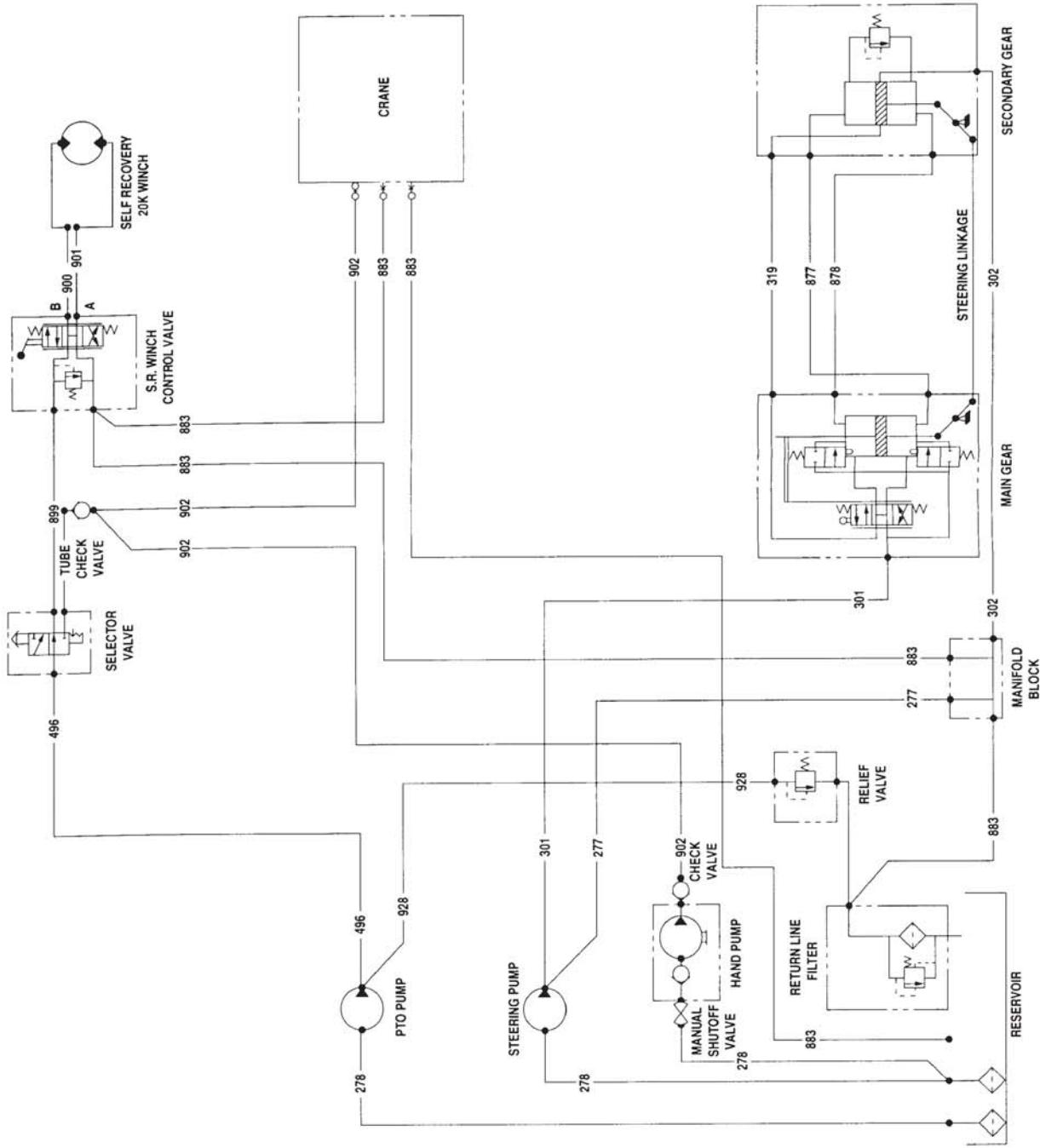
FO-3. Hydraulic Schematic (M977, M985) (Sheet 1 of 7).  
Change 3      FP-15/(FP-16 blank)



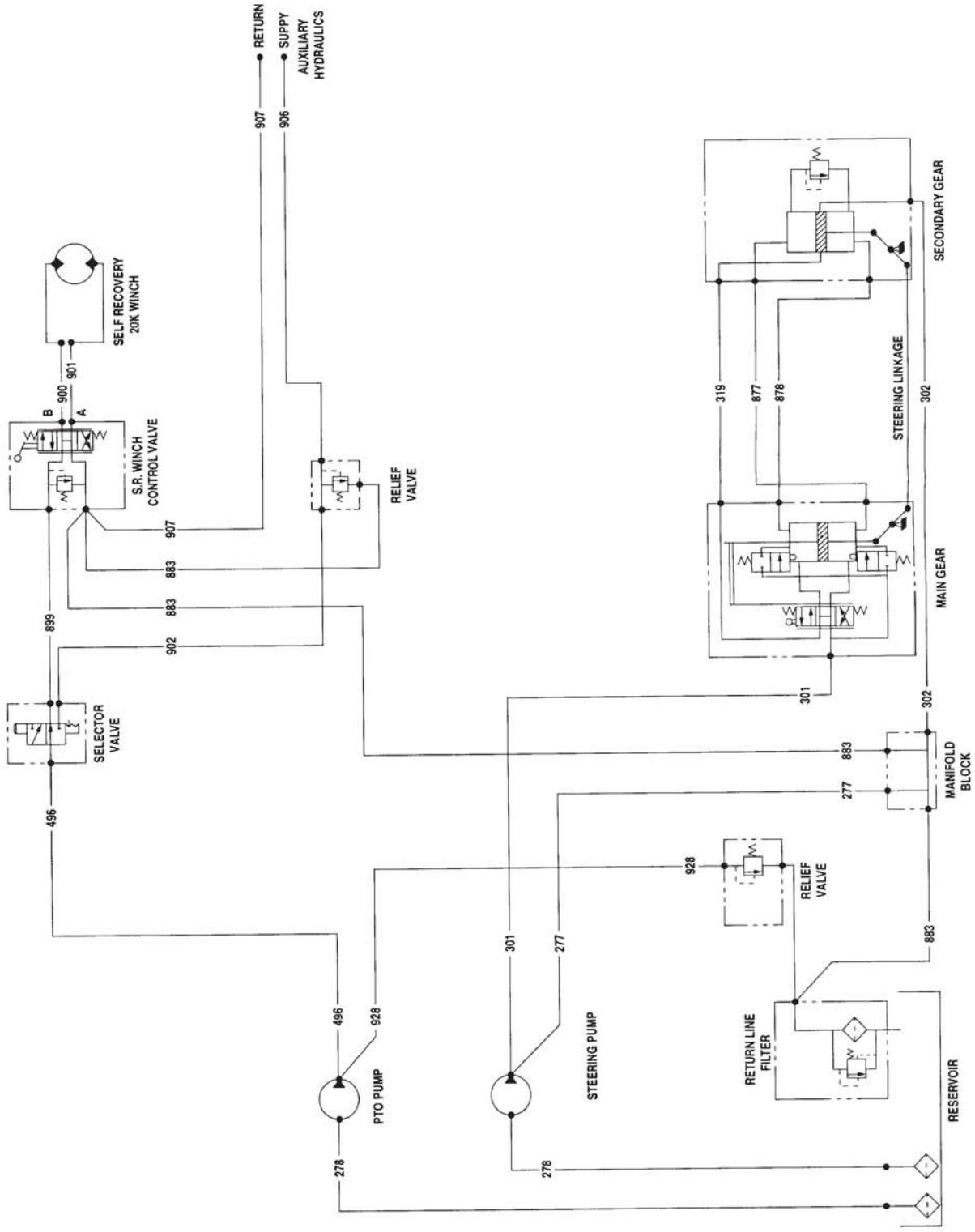


FO-3. Hydraulic Schematic (M978) (Sheet 2 of 7).  
 Change 3      FP-17/(FP-18 blank)



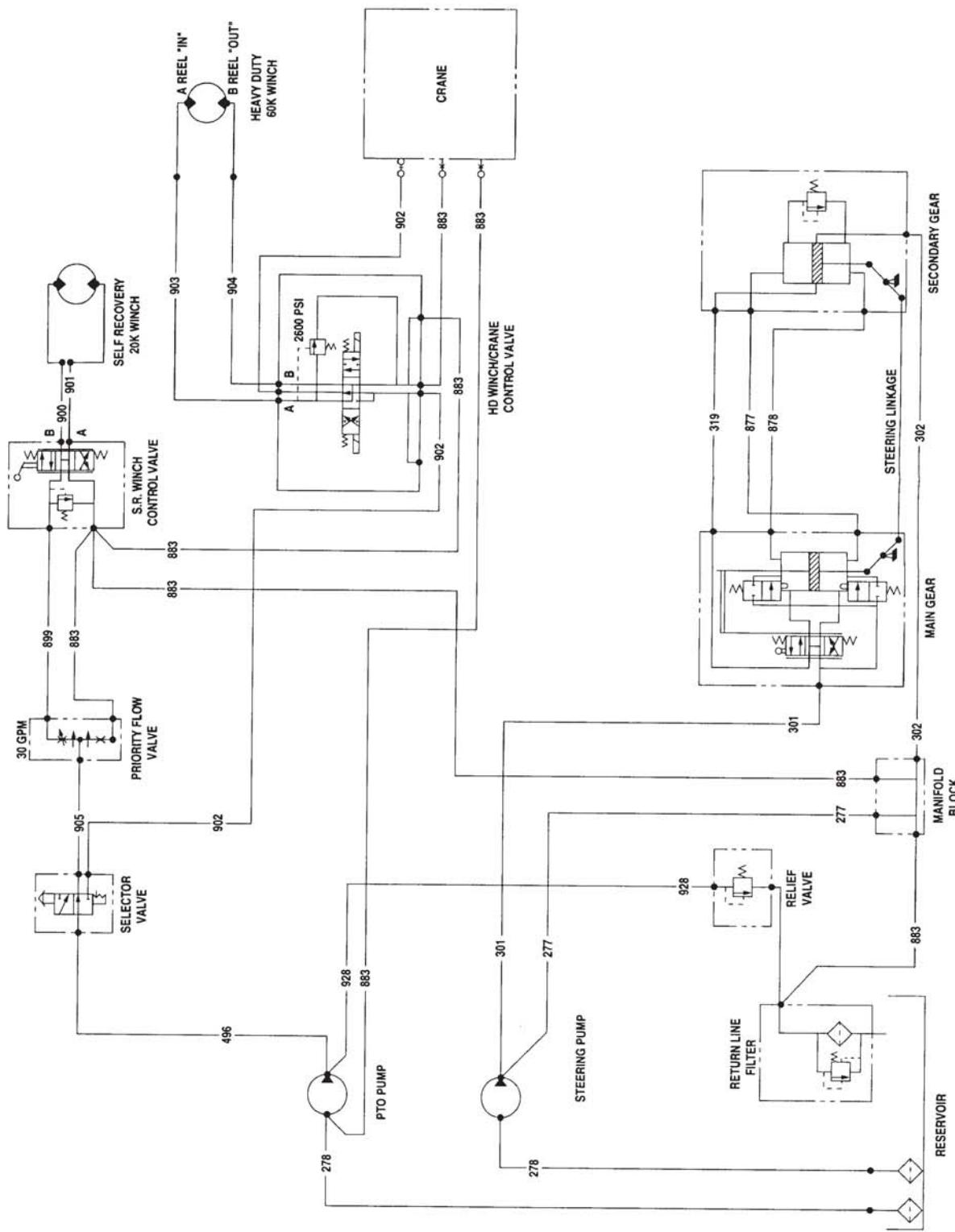




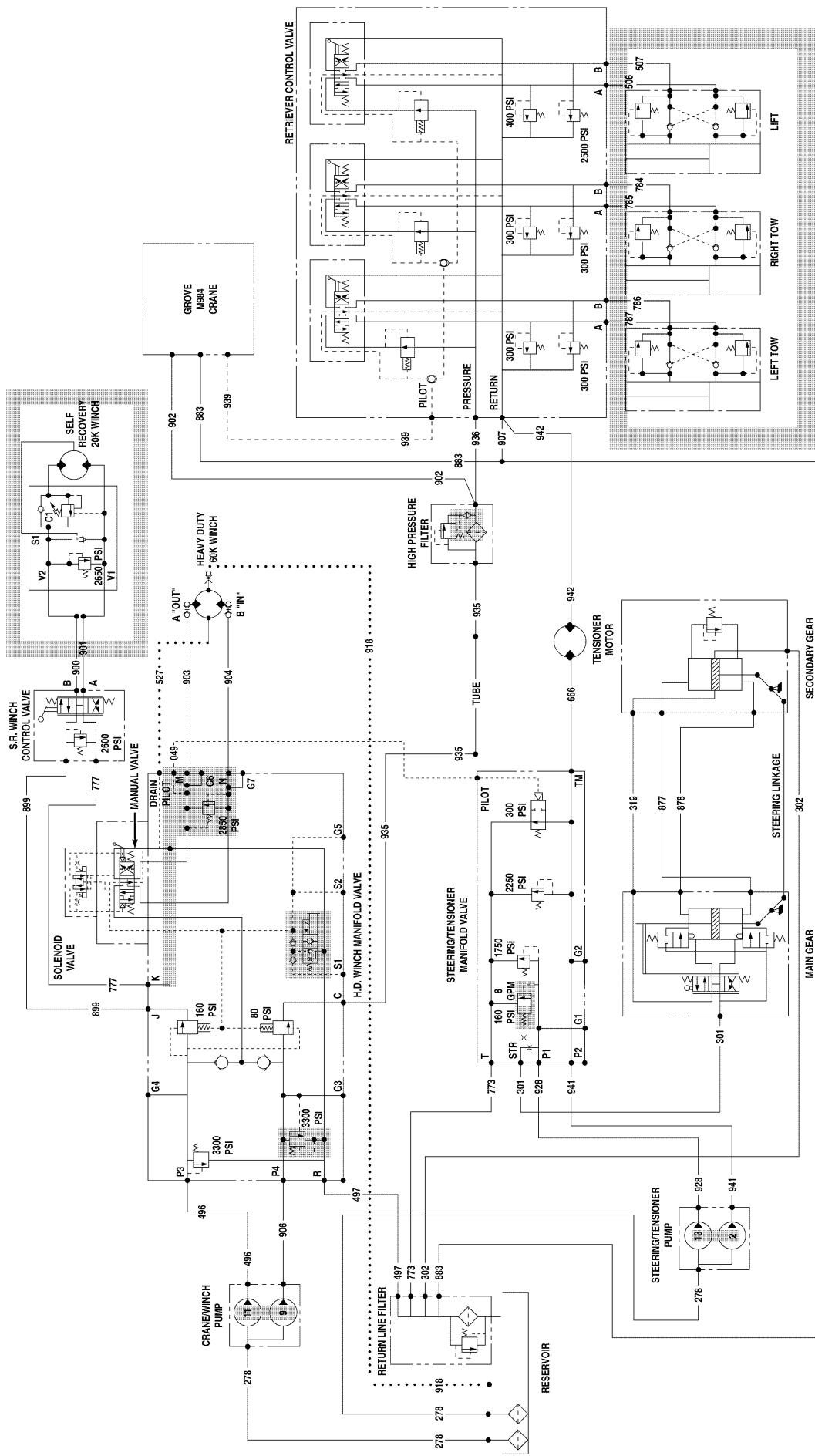


FO-3. Hydraulic Schematic (M983 w/o crane) (Sheet 4 of 7).  
 Change 3  
 FP-21/(FP-22 blank)









FO-3. Hydraulic Schematic (M984E1) (Sheet 6 of 7).  
Change 4 FP-25 (FP-26 blank)







By Order of the Secretary of the Army:

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*General, United States Army*  
*Chief of Staff*

Official:

R.L. DILWORTH  
*Brigadier General, United States Army*  
*The Adjutant General*

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PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.									
2-66	N.A.	N.A.	2-9									
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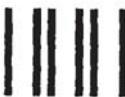
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THE METRIC SYSTEM AND EQUIVALENTSLINEAR MEASURE

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 = 3.86 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

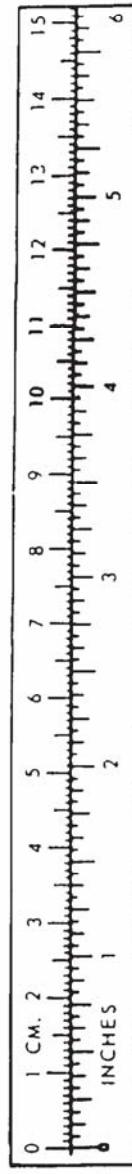
TEMPERATURE

$5^{\circ}\text{C} = 41^{\circ}\text{F}$   
 $212^{\circ}\text{F}$  Fahrenheit is equivalent to  $100^{\circ}\text{C}$  Celsius  
 $90^{\circ}\text{F}$  Fahrenheit is equivalent to  $32.2^{\circ}\text{C}$  Celsius  
 $32^{\circ}\text{F}$  Fahrenheit is equivalent to  $0^{\circ}\text{C}$  Celsius  
 $9.5^{\circ}\text{C} + 32 = \text{F}$

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 . . . . .	2.471
Cubic Meters . . . . .	Cubic Feet . . . . .	35.315
Cubic Meters . . . . .	Cubic Yards . . . . .	1.308
Milliliters . . . . .	Fluid Ounces . . . . .	0.034
Liters . . . . .	Pints . . . . .	2.113
Liters . . . . .	Quarts . . . . .	1.057
Liters . . . . .	Gallons . . . . .	0.264
Grams . . . . .	Ounces . . . . .	0.035
Kilograms . . . . .	Pounds . . . . .	2.205
Metric Tons . . . . .	Short Tons . . . . .	1.102
Newton-Meters . . . . .	Pound-Feet . . . . .	0.738
Kilopascals . . . . .	Pounds per Square Inch . . . . .	0.145
Kilometers per Liter . . . . .	Miles per Gallon . . . . .	2.354
Kilometers per Hour . . . . .	Miles per Hour . . . . .	0.621



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