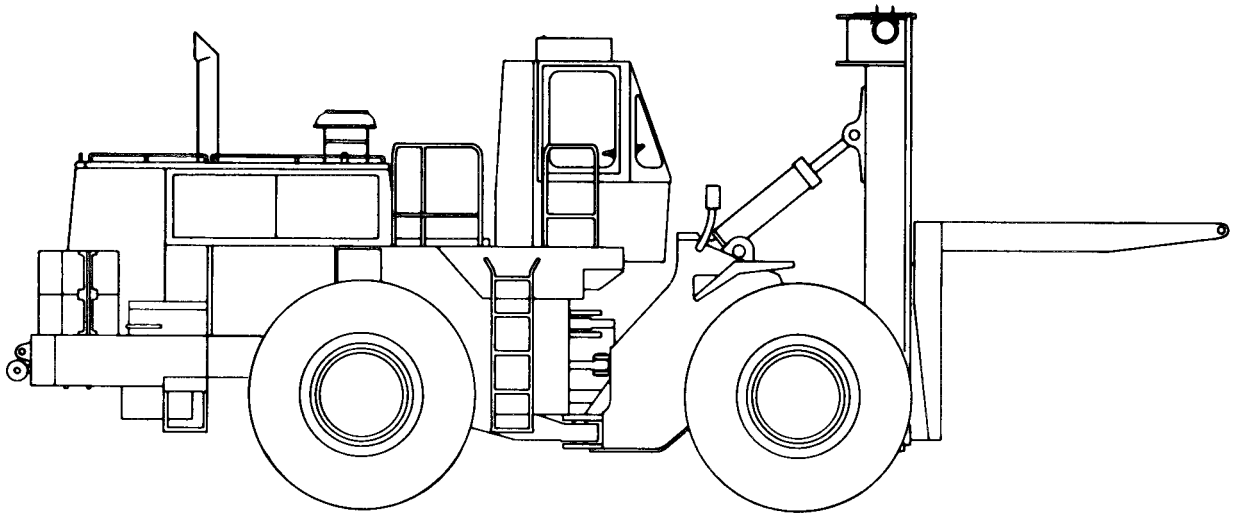
TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE MANUAL



TRUCK, CONTAINER HANDLER
ROUGH TERRAIN, 50,000 LB CAPACITY
DED, PT, NSN 3930-01-082-3758
WITH TOPHANDLER(S)

HEADQUARTERS, DEPARTMENT OF THE ARMY

JUNE 1981

SUMMARY OF WARNINGS (Sheet 1 of 2)

WARNING

If you sustain any injuries, no matter how slight, follow the first aid procedures outlined in FM 21-11.

WARNING

CARBON MONOXIDE (EXHAUST GAS) CAN KILL YOU

Carbon monoxide is without color or smell, but can kill you. 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 air movement. Precautions must be followed to insure crew safety when the personnel heater, main or auxiliary engine of any vehicle is operated for any purpose.

1. DO NOT operate personnel heater or engine of vehicle in a closed place unless the place is well-ventilated.
2. DO NOT idle engine for long periods.
3. DO NOT drive any vehicle with inspection plates, cover plates, or engine compartment doors removed unless necessary for maintenance purpose.
4. BE ALERT at all times during vehicle operation for exhaust odors and exposure symptoms. If either is present, IMMEDIATELY VENTILATE personnel compartment. If symptoms persist, remove affected person to fresh air; keep warm; DO NOT PERMIT PHYSICAL EXERCISE; if necessary, give artificial respiration.

   FOR ARTIFICIAL RESPIRATION, REFER TO FM 21-11.
5. BE AWARE: the field protective mask for nuclear-biological-chemical (NBC) protection will not protect you from carbon monoxide poisoning.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS GOOD VENTILATION.

Go on to Sheet 2

SUMMARY OF WARNINGS (CONT) (Sheet 2 of 2)

WARNING

Use caution when removing radiator filler cap. Steam can cause injury. Do not allow inhibitor to contact skin or eyes. It contains alkali.

Clear area of personnel, obstructions before activating vehicle.

Brake system is under pressure. Relieve pressure before loosening lines. Stop vehicle on level ground. Apply parking brake and shut off engine. Pump brake pedal several times until no pressure remains. This will relieve pressure in brake lines.

Hydraulic system is under pressure. Release pressure by lowering mast and moving hydraulic levers. Remove oil filler cap slowly. Release hydraulic pressure before loosening hydraulic lines.

Use extreme caution when installing jacking device. Do not let jack, beam, or engine slip. Serious injury could result.

Use solvents only in well ventilated areas. Fumes may be dangerous.

WARNING

Do not smoke or have open flames or sparks around fuel lines.

Do not smoke or have open flame or sparks near batteries. Sparks can cause battery gases to explode.

Be careful when working around an engine that is running. Do not touch hot exhaust system components.

Wear face shield and protective clothing to prevent injury when using pressure air or water. Use 30 psi (207 kPa) maximum for cleaning.

Be certain ether starting aid cannister is removed from vehicle before shipment or storage.

Be careful not to drip electrolyte on you or equipment. If electrolyte spills on you, splash affected areas with water to flush electrolyte. Get medical attention at once.

When jacking, be sure the vehicle is on level ground. Put blocks in front of and behind each wheel so vehicle does not move.

Stand behind vehicle when inflating tires. Use self-attaching air chuck.

End

Change No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 31 May 2006

ORGANIZATIONAL MAINTENANCE MANUAL

TRUCK, CONTAINER HANDLER: ROUGH TERRAIN
50,000 LB CAPACITY, DED, PT
NSN 3930-01-082-3758 WITH TOPHANDLER(S)

TM 10-3930-641-20, 26 June 1981, 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 and by a vertical bar adjacent to the TA number.

Remove Pages	Insert Pages
2-5 through 2-24	*2-5 through 2-24*
	2-24.1 through 2-24.11
2-74 through 2-78	*2-74 through 2-78*
B-1 through B-28	*B-1 through B-28*
	B-29 through B-32
C-1 through C-4	*C-1 through C-4*
2028-2	*2028*
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No. 1

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DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 18 July 1989

ORGANIZATIONAL MAINTENANCE MANUAL

TRUCK, CONTAINER HANDLER: ROUGH TERRAIN
50,000 LB CAPACITY, DED, PT
NSN 3930-01-082-3758 WITH TOPHANDLER(S)

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2-23 and 2-24	*2-23 and 2-24*
2-391 and 2-392	*2-391 and 2-392*
None	*2-398.1 through 2-398.11/(2-398.12 Blank)*
2-513 and 2-514	*2-513 and 2-514*
A-1 and A-2	*A-1 and A-2*
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LIST OF EFFECTIVE PAGES

NOTE

A vertical line in the outer margins of the page indicates the portion of text effected by the change. Changes to illustrations are indicated by miniature pointing hands. Change to wiring diagrams is indicated by shaded areas.

Dates of issue for original and change pages are:

Original - 26 June 1981. C1 18 July 1981, C2 31 May 2006

TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 31 AND TOTAL NUMBER OF CHAPTERS IS 10 CONSISTING OF THE FOLLOWING:

Page No.	Change No.	Page No.	Change No.
Cover/Pin	2	DA Form 2028 Sample	2
a and b	0	DA Form 2028 (three)	2
A and B	2	Back Cover/PIN Number	0
i/(ii Blank)	1	Foldouts	0
1-1 and 1-2	1		
1-3 thru 1-28	0		
2-1 thru 2-4	0		
2-5 thru 2-24	2		
2-24.1 thru 2-24.12	2		
2-25 thru 2-4-73	0		
4-27 thru 2-79	2		
2-80 thru 2-398	0		
2-398.1 thru 2-398.11/ (2-398.12 Blank))	1		
2-399 thru 2-515	0		
A-1 and A-2	1		
B-1 thru B-28	2		
C-1 thru C-4	2		
D-1 thru D-9/(D-10 Blank)	0		
E-1 and E-2	0		
Index-1 thru Index-7	0		
Authentication Page	0		

TECHNICAL MANUAL
NO.10-3930-641-20

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 26 June 1981

ORGANIZATIONAL MAINTENANCE MANUAL

TRUCK, CONTAINER HANDLER: ROUGH TERRAIN 50,000 LB CAPACITY, DED PT NSN 3930-01-082-3758 WITH TOPHANDLER(S)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and *Blank Forms),* or DA Form 2028-2, located in the back of this manual, direct to: Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren, MI 48397-5000. A reply will be furnished to you.

CHAPTER 1

Section I. GENERAL INFORMATION

SCOPE

This manual is for your use in performing organizational maintenance of the Rough Terrain Container Handler (RTCH).

MAINTENANCE FORMS, RECORDS AND REPORTS

Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by DA Pam 738-750, The Army Maintenance Management System (TAMMS).

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

Refer to TM 750-244-3, Procedures for Destruction of Equipment to Prevent Enemy Use.

REPORTING OF EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

EIR can and must be submitted by anyone who is aware of an unsatisfactory condition with the equipment design or use. It is not necessary to show a new design or list a better way to perform a procedure, just simply tell why the design is unfavorable or why a procedure is difficult. EIR may be submitted on SF 368 (Quality Deficiency Report). Mail directly to Commander, U.S. Army Tank-Automotive Command, Warren, MI 48397-5000, ATTN: AMSTA-QRD. We'll send you a reply.

WARRANTY INFORMATION

The Rough Terrain Container Handler is warranted by Caterpillar Tractor Co. for 15 months or 1500 hours of operation, whichever comes first. Warranty starts on the date found on DA Form 2408-9 in the log book. Report all defects in material or workmanship to your supervisor, who will take appropriate action.

PREPARATION FOR STORAGE OR SHIPMENT

Refer to Chapter 2, Section VII of this manual for requirements for storage or shipment, including administrative storage.

Section II. EQUIPMENT DESCRIPTION AND DATA

EQUIPMENT PURPOSE, CAPABILITIES AND FEATURES (Sheet 1 of 1)

PURPOSE

1. Handles ISO (International Standards Organization) designation 1A or lC cargo containers or Sealand Containers.
2. Handles and stacks containers.
3. Loads and unloads flatbed trailers and rail cars.
4. Makes over-the-shore landings.

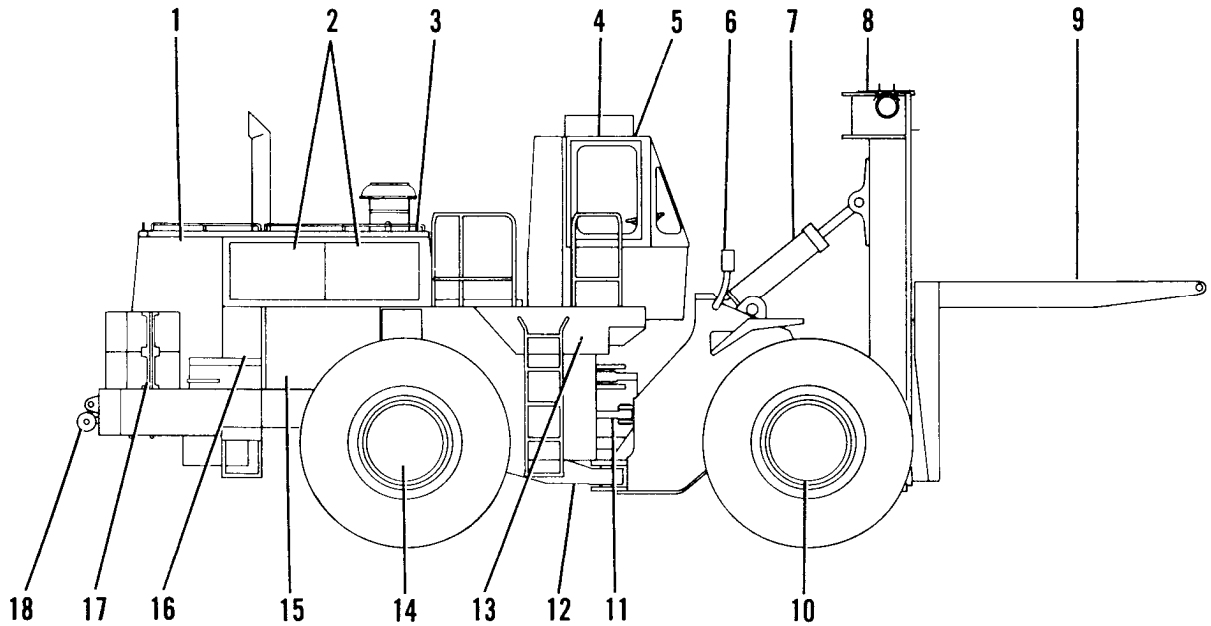
CAPABILITIES AND FEATURES

1. Operates over rough terrain - including beaches, snow, mud and cross country.
2. Fords up to 60 inches (152 cm) of salt water.
3. Comes with a 20 ft (6.1 m) tophandler and may also have a 35 ft (10.6 m) or 40 ft (12.2 m) tophandler.
4. Raises, lowers, tilts forward or backward, sideshifts or sidetilts a container load.
5. Lifts a load from 12 in. (30 cm) below ground level to 118 in. (300 cm) above ground level (measured to bottom of container)
6. Articulated (bends in center) for easy load handling.

End

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Sheet 1 of 3)

1. RADIATOR - For cooling system. Grille faces rear.
2. UPPER ENGINE ACCESS PANELS - Two on each side. Hinged for easy access.
3. HOOD - Two-piece, can be removed.
4. OPERATOR'S CAB - Equipped with rollover protective structure (ROPS).
5. AUXILIARY HEADLIGHT - One on each side of cab.
6. LIGHTS - High beam and low beam on each side of cab.
7. TILT CYLINDER - One on each side. Tilts the mast forward and backward.
8. MAST - Moves to position the contair w,
9. FORKS - Mount and secure the tophandlers.
10. FRONT WHEELS, AXLES AND FINAL DRIVES.
11. STEERING CYLINDER - One on each side.
12. HITCH - Articulated for easy steering maneuverability.



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Go on to Sheet 2

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT) (Sheet 2 of 3)

13. HYDRAULIC TANK (SEE p. 1-4) - On right side of vehicle
or
FUEL TANK - On left side of vehicle.

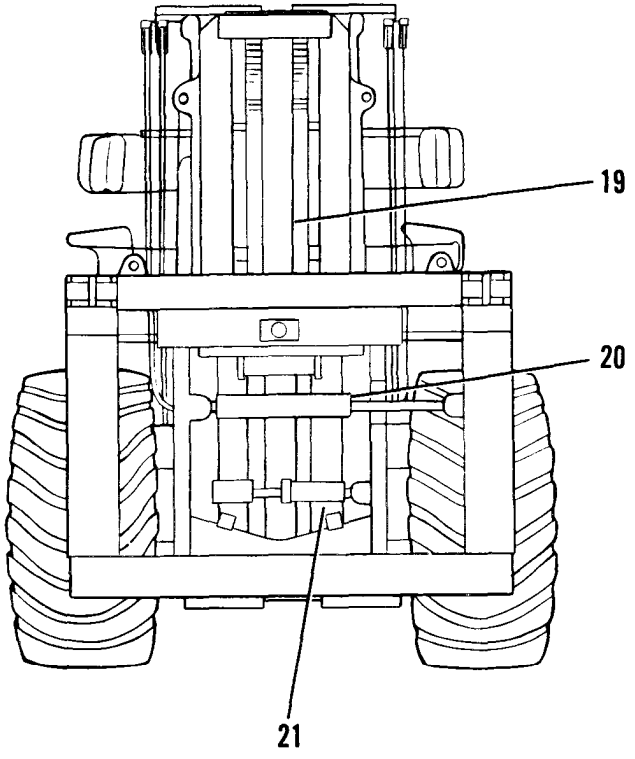
14. REAR WHEELS, FINAL DRIVES AND AXLES.

15. LOWER ENGINE ACCESS PANE LS - one on each side of engine. Remove for access.

16. BATTERY BOX - Two batteries cm each side of vehicle.

17. COUNTERWEIGHT - Provides stability when handling load.

18. TOWING PINTLE - For towing operations.



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19. LIFT CYLINDER - Raises and lowers the mast.

20. SIDE SHIFT CYLINDER - Shifts forks and tophandler to the side.

21. SIDE TILT CYLINDER - Rotates forks and tophandler.

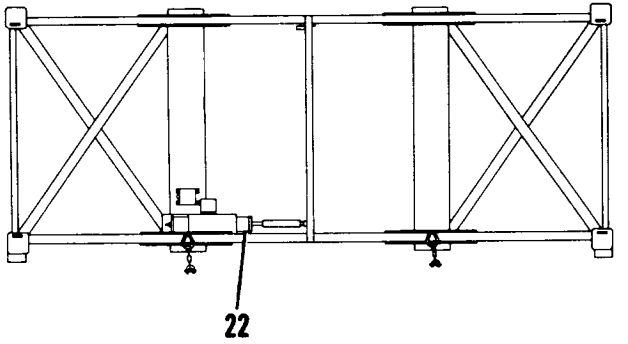
Go on to Sheet 3

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (CONT) (Sheet 3 of 3)

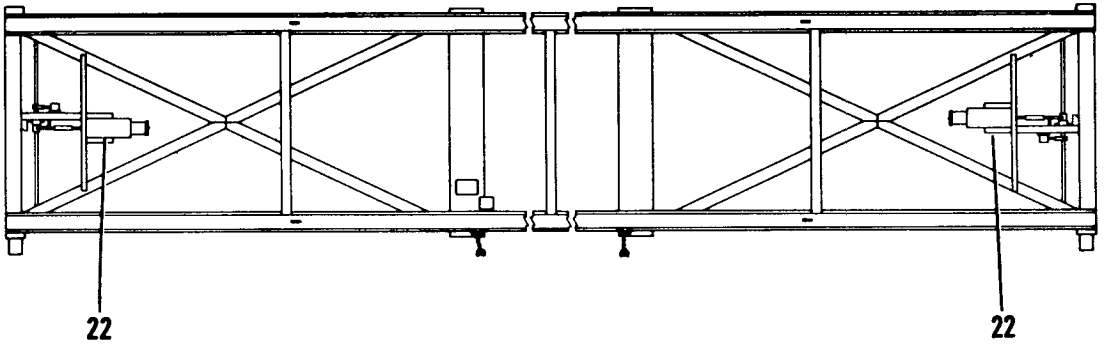
22. CONTAINER LOCK CYLINDER –

1 on 20 ft (6 m) tophandler,
2 on 35 ft (10.7 m) and 40 ft (12 m) tophandler.

Rotates locks to secure container to tophandler.



20 FT TOPHANDLER



35 FT OR 40 FT TOPHANDLER

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End

PERFORMANCE DATA (Sheet 1 of 3)

ENGINE

- Model . . . . . Caterpillar Model 3408T
- Type . . . . . IX.rectinjection 65° V-8 turbo diesel
- Flywheel horsepower @ 2100 rpm 393
- Kilowatts @ l00 rpm 293
- Torque @1300 rpm . . . . . 1210 lb-ft
- Engine low idle speed (foot off accelerator) . . . . . 700 rpm
- Engine high idle speed (accelerator held to floor) . . . . . 2320 rpm
- Engine operating range . . . . . Full
- Ignition Type . . . . . Compression
- Injector timing . . . . . 28°(BTC)
- Bore . . . . . 5.4” (137mm)
- Stroke . . . . . 6“ (152mm)
- Displacement . . . . . 1099 cid (181iters)
- Compression ratio 14-5:1
- Firing order 1-8-4-3-6-5-7-2
- Fuel . . . . . Diesel No.2
- Weight . . . . . 3200 lbs(1450 kg)

HYDRAULIC SYSTEM

- Type . . . . . Closed with vacuum relief
- Pump . . . . . Single stage
  - Type/Output . . . . . Gear/71 gpm
  - Relief valve setting . . . . . 2500 psi
  - Operating pressur e . . . . . 2500 psi
  - Weight . . . . . 107 lbs(49kg)
- Cylinders
  - Lift (bore x stroke) . . . . . .10” x 69"
  - Tilt (bore x stroke) . . . . . 7’’ x 19.25
  - Sideshift (bore x stroke) . . . . . 6’’ x 24"
  - Sidetilt (bore x stroke) . . . . . 6” x 6.5”
- Brakes . . . . . All wheel disc
  - Type . . . . . Full hydraulic oil bath disc
  - Braking surface . . . . . 2300 sq. in. x 4
  - Pump type . . . . . Gear
    - Output . . . . . 28 gpm @1000 psi
    - Relief valve setting . . . . . 2200 psi
    - Weight . . . . . .70 lbs (31.752 kg)

Go onto Sheet 2

PERFORMANCE DATA (CONT) (Sheet 2 of 3)

Steering . . . . . Center point frame articulation
- Type . . . . . Full hydraulic
- Steering angle (each direction) . . . . . 27°
- Pump type . . . . . Gear
  - Output . . . . . l0l gpm @ 1000 psi
  - Relief valve setting . . . . . 2500 psi
  - Operating pressure . . . . . 2500 psi
  - Weight . . . . . 107 lbs (49kg)

Electrical
- Batteries . . . . . Lead-acid
  - Quantity 4
  - Type 8D
  - Voltage (nominal) 24V
- Alternator . . . . . Integral regulator
  - Type . . . . . Solid state
  - Amperage 50A

Transmission and Powertrain
- Type . . . . . Power shift planetary
- Transmission reduction ratio

	Forward	Reverse
First	5.6049	4.9043
Second	3.1429	2.7500
Third	1.7751	1.5532
Fourth	1.0000	0.8750

  - Weight . . . . . 1756 lbs (796 Kg)
- Transfer case reduction ratio
  - Input 1.0256
  - Output 1.1795
  - Weight . . . . . 1080 lbs (490 Kg)
- Final drive reduction ratio 5.0526
- Bevel gear reduction ratio 3.7500
- Axle oscillation
  - Front . . . . . Fixed
  - Rear . . . . . .±13°

Go on to Sheet 3

PERFORMANCE DATA (CONT) (Sheet 3 of 3)

Tires
- Type . . . . . Radial
- Size. 35/65-R33
- Inflation pressure
  - Front . . . . . 70 psi
  - Rear . . . . . 40 psi
- Weight (tire and rim) . . . . . 3000 lbs. (1361 Kg)

General
- Shipping weight
- Operational weight . . . . . 105,1201bs (47,680 Kg)
  - Without container handler . . . . . 103,230 1bs (46,830 Kg)
  - With 20'container handler . . . . . 107,030 1bs(48,550 Kg)
  - With 35' container handler . . . . . 112,3501bs (50,960 Kg)
  - With 40'container handler . . . . . 113,160 lbs (51,330 Kg)

Performance

Maximum speed	Forward	Reverse
With rated load	14.5 mph	14.9 mph
Without rated load	18.5 mph	19.4 mph

- Towing . . . . . 5 mph for l0 miles maximum
- Maximum grade* . . . . . 25%@ 2 mph
- Maximum fording depth* . . . . . 60"
- Maximum side slope* . . . . . 15°
- Maximum breakover angle* . . . . . 148°
- Maximum approach angle* . . . . . 25°
- Maximum departure angle* . . . . . 20°
- Maximum ground clearance* . . . . . 16"
- Curb circle clearance . . . . . .70'
- Tilt cycling time (each direction)* . . . . . 9 seconds
- Lifting capacity . . . . . 50,000 lbs. (22,700 Kg)

*Tophandler raised l foot. . . . . Full back tilt

REFILL CAPACITIES (Approximate)

COMPARTMENT OR SYSTEM		U.S. MEASURE	METRIC MEASURE
Engine Crankcase		11 gal.	42 liters
Hydraulic Tank		78 gal.	295 liters
Transmission		17.5 gal.	66 liters
Differential and Final Drives	Front	27 gal.	102 liters
	Rear	27 ml.	102 liters
Cooling System		28 gal.	106 liters
Fuel Tank		165 gal.	625 liters

End

Section III. TECHNICAL PRINCIPLES OF OPERATION

This section contains a functional description of operation of these vehicle systems:

Engine lubrication systeim

Cooling system

Fuel system

Air inlet and exhaust system

Electrical system

Drive system

Brake system

Steering system

Mast hydraulic system

Transmission hydraulic system

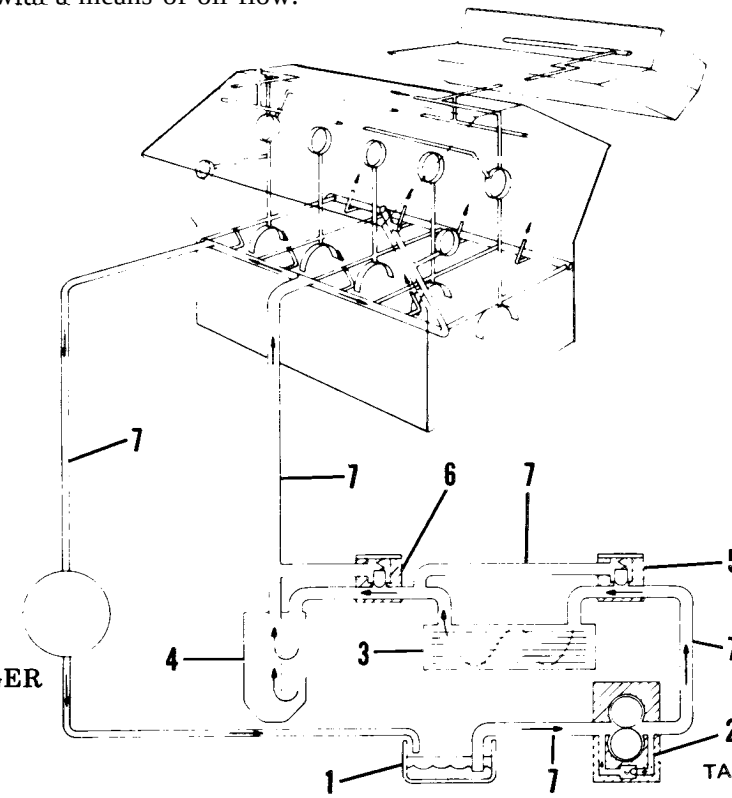
The purpose of this section is to provide enough information to allow a maintenance technician to do the job properly.

ENGINE LUBRICATION SYSTEM DESCRIPTION (Sheet 1 of 1)

Engine lubrication system consists ofl

1. Oil pan
2. Oil pump
3. Oil cooler
4. Oil filters
5. Oil cooler bypass valve
6. Oil filter bypass valve
7. Oil lines and passages

1. OIL PAN. Seals the bottom of the engine and functions as a reservoir for storing engine lubricating oil. A plug is provided in the bottom for draining engine oil.
2. OIL PUMP. A gear-type driven by a gear on the engine crankshaft. The pump's function is to supply the engine lubrication system with oil flow. Oil is pulled from the oil pan and sent to the oil cooler.
3. OIL COOLER. Reduces the temperature of the engine lubricating oil by transferring the heat of the oil to the engine cooling system.
4. OIL FILTERS. Remove foreign particles from the engine lubrieating oil.
5. OIL COOLER BYPASS VALVE. Provides immediate lubrication to the engine when the engine is cold. The valve also provides for continuous lubrication if the oil cooler has a restriction in it.
6. OIL FILTER BYPASS VALVE. Provides immediate lubrication to the engine, for a few seconds, when the engine is started cold. The valve also provides the engine with continuous lubrication when the filters are plugged.
7. OIL LINES AND PASSAGES. Provide the lubrication system with a means of oil flow.



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COOLING SYSTEM DESCRIPTION

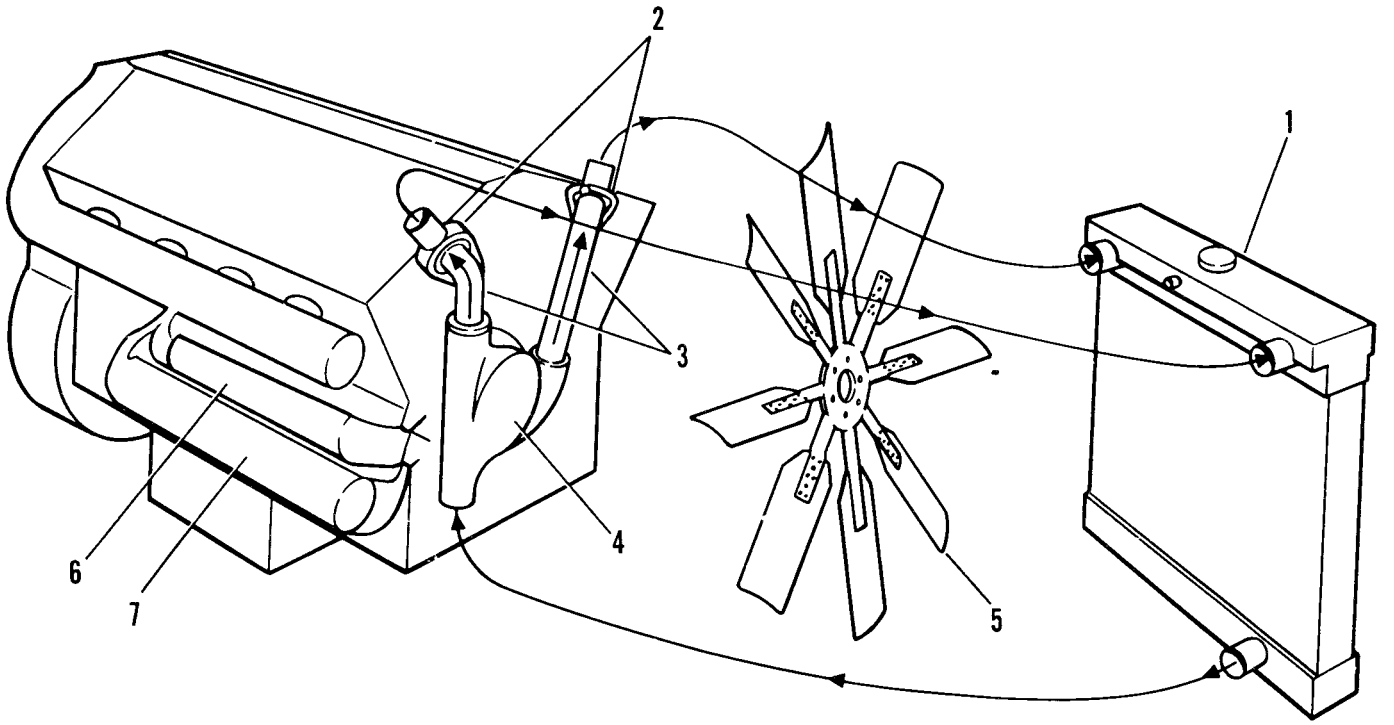
Cooling system components are:

1. Radiator
2. Water temperature regulators
3. Radiator bypass lines
4. Water pump
5. Fan
6. Engine oil cooler
7. Transmission oil cooler

1. RADIATOR. The radiator is a sealed pressure type radiator. Coolant flows through the inside of the core and is cooled by the inside of the core and is cooled by the action of air flowing through the outside of the core and around the fins.
2. WATER TEMPERATURE REGULATORS. Control the temperature of the coolant by restricting the amount of coolant flow to the radiator. When the engine is cold, the regulators will stop the flow of coolant to the radiator and allow the coolant to recirculate in the cylinder block until it is warm. When the coolant is warm enough the regulators will begin to open, allowing it to flow through the radiator. When the engine is completely warmed up the regulators will allow a full flow of coolant through the radiator to maintain the engine operating temperature.
3. RADIATOR BYPASS LINES. Allow the coolant to circulate through the engine block, without going to the radiator.
4. WATER PUMP. Pumps the coolant through the cooling system.
5. FAN. Draws air through the radiator core to remove heat from the coolant.
6. ENGINE OIL COOLER. Cools the engine oil.
7. TRANSMISSION OIL COOLER. Cools the transmission oil.

Go on to Sheet 2

COOLING SYSTEM DESCRIPTION (Sheet 2 of 2)



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End

FUEL SYSTEM DESCRIPTION (Sheet 1 of 2)

The direct injection fuel system consists of:

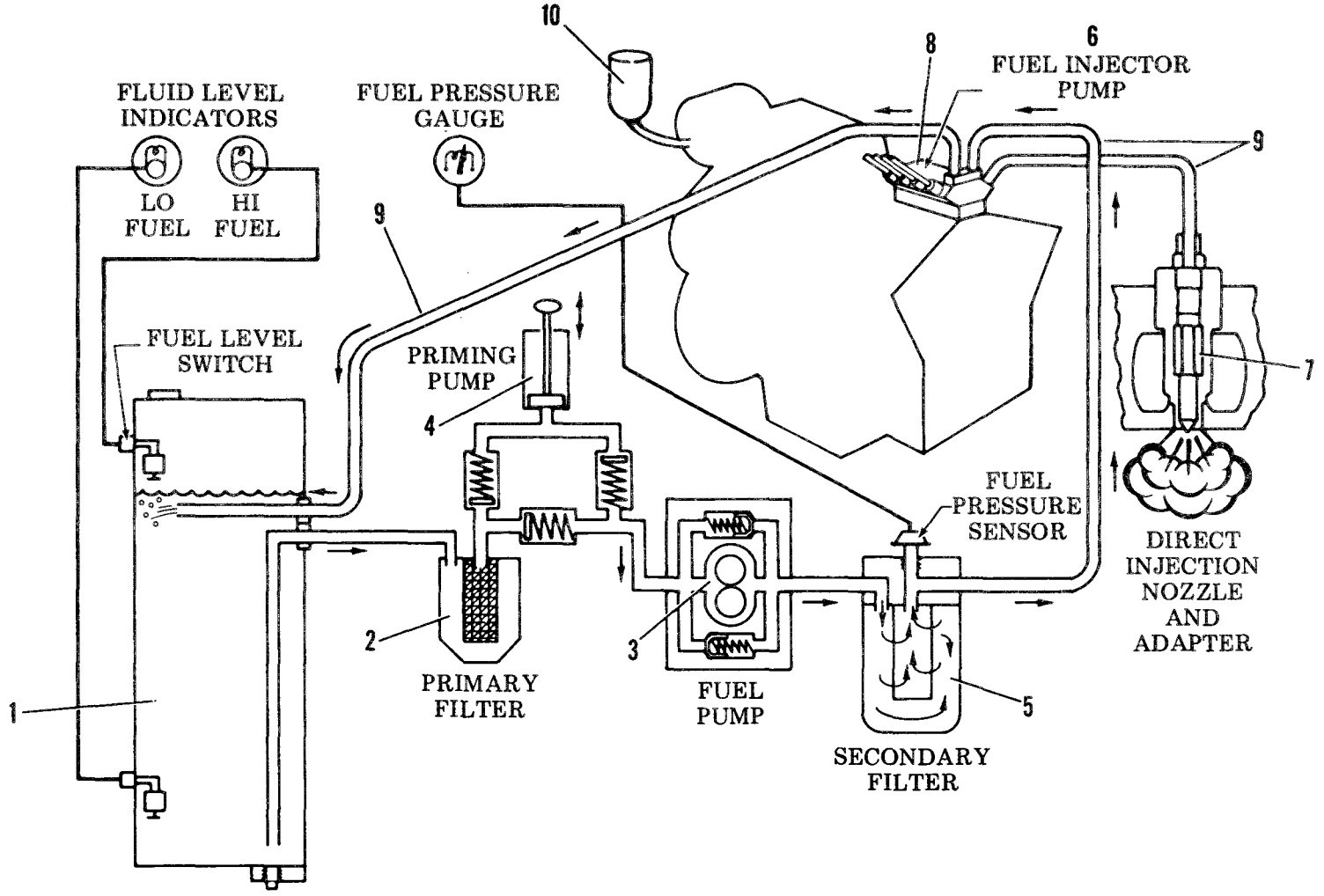
1. Fuel tank
2. Primary fuel filter
3. Transfer pump
4. Priming pump
5. Secondary fuel filter
6. Injection pump
7. Injection nozzles
8. Governor
9. Fuel lines
10. Ether starting aid

1. FUEL TANK. Located next to the cab on the left side of the vehicle. The capacity of the tank is 165 gal. (625 liters). The tank has a drain valve and drain plug at the bottom and a filler screen and cap at the top.
2. PRIMARY FUEL FILTER. Filters all fuel coming from the fuel tank before the fuel enters the transfer pump.
3. TRANSFER PUMP. Sends the fuel to the priming pump, secondary filter and the injection pump.
4. PRIMING PUMP. Used to prime fuel system on initial startup or after changing fuel filters. The priming pump also removes air from the fuel system.
5. SECONDARY FUEL FILTER. A final filter before fuel enters injection pump.
6. INJECTION PUMP. Provides the injection nozzles with a metered, high pressure charge of fuel at a precise time.
7. INJECTION NOZZLES. Spray the metered amount of fuel from the injection pump into the cylinder for combustion.
8. GOVERNOR. Controls the amount of fuel needed to keep the desired engine speed. The governor is controlled by the accelerator pedal.
9. FUEL LINES. Carry fuel from the tank to various components of the fuel system and provide return routes for unused fuel.
10. ETHER STARTING AID. Delivers a measured amount of ether into the turbocharger inlet for ease in cold weather starting. The ether is stored under pressure in a cylinder and the amount to be sprayed into the inlet is controlled by an electrically activated valve.

Go on to Sheet 2

FUEL SYSTEM DESCRIPTION (CONT)

(Sheet 2 of 2)



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End

AIR INLET AND EXHAUST SYSTEM DESCRIPTION

Air inlet and exhaust system components are:

1. Air cleaner
2. Turbocharger
3. Inlet manifold
4. Cylinder heads
5. Exhaust manifolds
6. Exhaust pipe and muffler

1. AIR CLEANER. A dual element, dry type. Outside air is drawn through the filter elements by a vacuum created in the turbocharger. When one, or both, of the elements get clogged, a "high vacuum" switch in the air cleaner housing turns on the PLUGGED AIR FILTER indicator on the instrument panel.

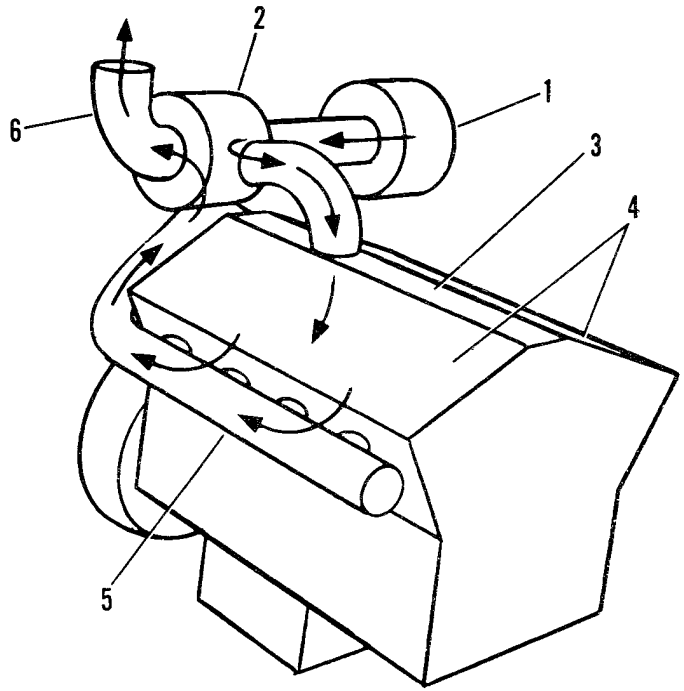
2. TURBOCHARGER. Pulls in the clean air from the air cleaner and compresses it. The turbocharger is driven by the engine exhaust gases; the exhaust gases turn the turbine wheel, which causes the compressor wheel to turn. The compressed air then goes to the inlet manifold of the engine.

3. INLET MANIFOLD. The system of passages inside the engine used to guide the compressed air to the cylinders.

4. CYLINDER HEADS. Contain the valves and valve system components which control the flow of inlet air and exhaust gases into and out of the cylinder during engine operation.

5. EXHAUST MANIFOLDS. Carry the exhaust gases from the cylinders to the turbocharger.

6. MUFFLER AND EXHAUST PIPE. Reduces engine noise and carries exhaust gases away from engine compartment.



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End

ELECTRICAL SYSTEM DESCRIPTION (Sheet 1 of 3)

The major components of the electrical system are:

1. Engine stop solenoid
2. Batteries (4)
3. Left hand instrument panel
4. Right hand instrument panel
5. Container lock indicator panel
6. Ether aid solenoid
7. Starting motor
8. Starter solenoid
9. Engine relay panel
10. Main disconnect switch
11. Alternator
12. Wiring harness.

1. ENGINE STOP SOLENOID. Closes the fuel supply to the fuel injection pump when the POWER switch is turned to OFF which stops the engine.

2. BATTERIES (4). Two sets of 12-volt batteries, one set on each side of the engine near the radiator, are connected in a series-parallel arrangement to provide 24 volts dc to the vehicle electrical system.

3. LEFT HAND INSTRUMENT PANEL. Contains lights which illuminate to provide visual indication of vehicle operating cxmditicm. Also contains light switches, service meter, wiper/washer switch and fuses.

4. RIGHT HAND INSTRUMENT PANEL. Contains gages to indicate vehicle operating conditions. Also contaks POWER switch and fuses.

5. CONTAINER LOCK INDICATOR PANEL. contains lights which indicate top handler locked/unlocked condition.

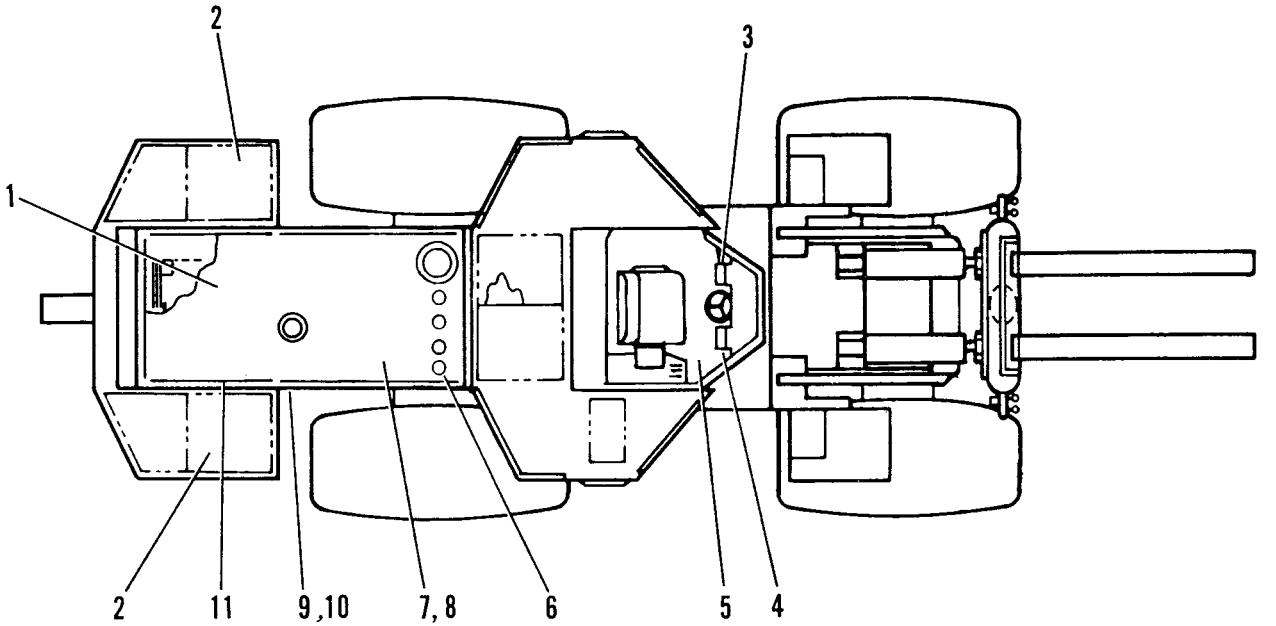
6. ETHER AID SOLENOID. Opens to allow ether to enter the turbocharger outlet when the START AID switch is pushed during cold weather starting. The ether aid solenoid will not adivate if temperature is above 80°F (26.7°C).

7. STARTING MOTOR. Used to turn the engine fast enough to get the engine running. It is activated only when the starter solenoid contacts are closed.

8. STARTER SOLENOID. Engages the starter pinion with the flywheel ring gear and closes the starting motor circuit. This happens only when the POWER, switch is turned to START and the transmission is in NEUTRAL.

9. ENGINE RELAY PANEL. Contains engine harness connectors, engine relays, diodes and circuit breakers in one easily accessed location.

Go on to Sheet 2



12. WIRING HARNESSES (NOT SHOWN)

TA 098802

Go on to Sheet 3

10. MAIN DISCONNECT SWITCH. Disconnects the batteries from the rest of the electrical system.

11. ALTERNATOR. Makes electricity for the chargng circuit. A built-in voltage regulator controls the electrical output to keep the batteries at full charge.

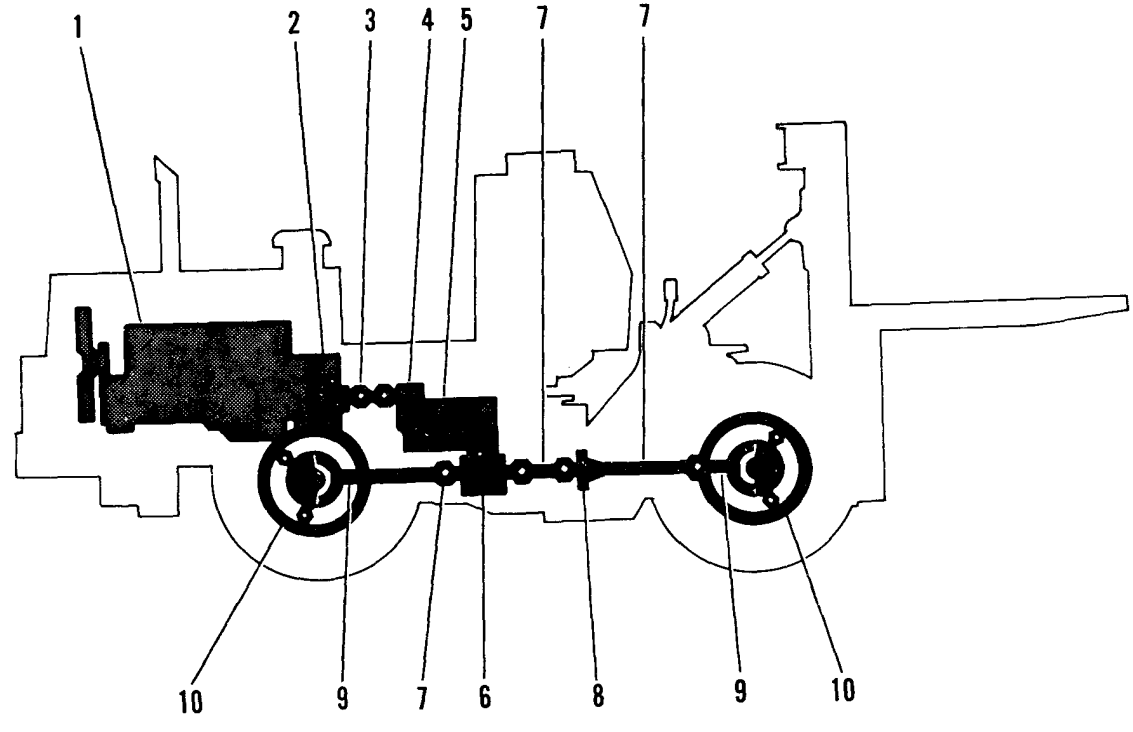
12. WIRING HARNESS. Provide a patch for current flow from the batteries through the various components of the electrical system. (Not called out on illustration.)

End

DRIVE SYSTEM DESCRIPTION

Drive system transfers power from the engine to drive the wheels and consists of:

1. Diesel engine
2. Torque converter
3. Upper drive shaft
4. Input transfer gears
5. Transmission
6. Output transfer gears
7. Drive shafts
8. Bearing cage
9. Differential
10. Final drive



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Go on to Sheet 2

DRIVE SYSTEM DESCRIPTION (CONT)

1. DIESEL ENGINE. Provides mechanical power necessary for drive train. Power is transmitted from engine flywheel to torque, converter.

2. TORQUE CONVERTER. Connects the engine power to the drive train, similar to a mechanical clutch.

3. UPPER DRIVE SHAFT. Transmits power from torque converter to the input transfer gears.

4. INPUT TRANSFER GEARS. A system of gears which provides a speed reduction between torque converter and transmission, The output gear of the transfer gears turns the input shaft of the transmissioil.

5. TRANSMISSION. A hydraulically activated (automatic) type. The transmission has four speed ranges FORWARD and four speed ranges in REVERSE. Both speed and direction are manually selected.

6. OUTPUT TRANSFER GEARS. A system of gears at the output side of the transmission which transmits power from the transmission to the drive shafts.

7. DRIVE SHAFTS (3). A means of transmitting power from:

   (A) Output transfer gears to the rear differential.

   (B) Output transfer gears to the bearing cage.

   (C) Bearing cage to the front differential.

8. BEARING CAGE. Supports the extra universal joint and drive shafts required for articulated steering. Also, it transmits power between drive shafts (2) and (3).

9. DIFFERENTIAL. A gear arrangement that connects and divides the power from the drive shaft to the axle shafts. Dividing the power causes the outside wheel to turn faster than the inside when making a turn. This vehicle is equipped with a front and rear differential; both function in the same manner.

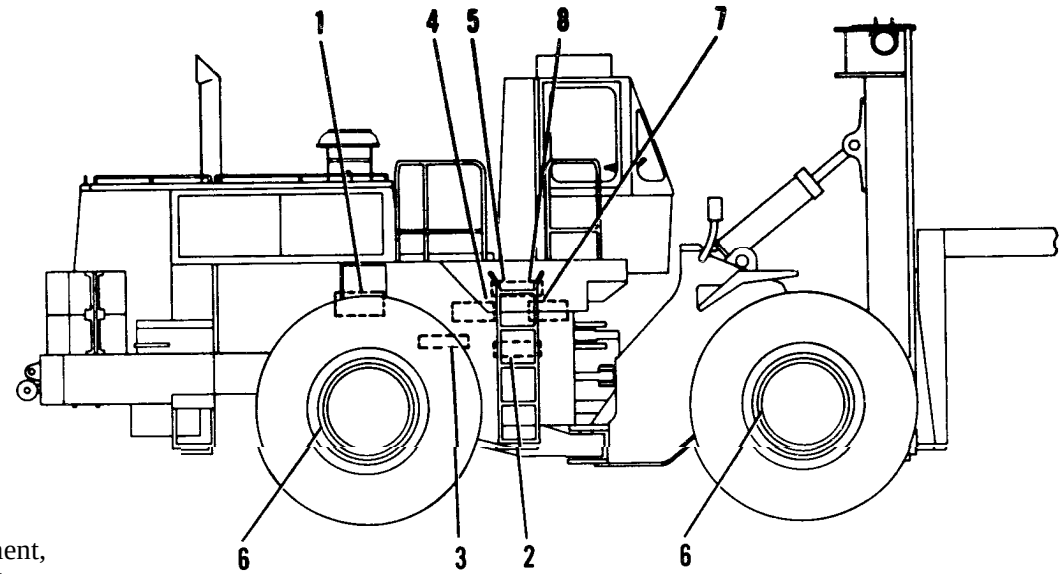
10. FINAL DRIVE. A gear arrangement that causes the last speed reduction and torque increase in the power train. Input power for the final drive is from the axle shaft and the output is the road wheel. There are four final drives on this vehicle, one for each wheel.

End

BRAKE SYSTEM DESCRIPTION (Sheet 1 of 2)

Brake system consists of:

1. Hydraulic pump (small section)
2. Accumulator charging valve
3. Accumulator
4. Brake control valve
5. Transmission neutralizer control valve
6. Service brakes
7. Emergency and parking brake
8. Emergency and parking brake control valve



1. HYDRAULIC PUMP (Smaller Section). Positive displacement, gear-type. Pump driven by the engine, supplies oil to operate brake and implement pilot oil systems. Oil is pumped from hydraulic tank to accumulator charging valve for distribution to the two systems.

2. ACCUMULATOR CHARGING VALVE. Distributes flow of oil, from pump, to brake and implement pilot control systems. Contains a check valve and a pressure relief valve. Check valve keeps pressure in accumulator in a constant range of 1950 PSI (137.1 kg/cm^2) maximum to 1450 PSI (101.9 kg/cm^2) minimum. Pressure relief valve controls maximum oil pressure in accumulater if accumulator charging valve malfunctions.

3. ACCUMULATOR. A cylinder which stores pressurized hydraulic oil for brake system. A part in accumulator allows oil to go to brake control valve when either brake pedal is pushed.

4. BRAKE CONTROL VALVE. Regulates amount of high pressure oil from the accumulator required to obtain a specific pressure at the wheel brakes. Specific-pressure required is determined by position of either brake pedal.

5. TRANSMISSION NEUTRALIZER CONTROL VALVE. Causes transmission to shift into neutral when left brake pedal is pushed. This provides for full engine power to hydraulic system.

6. SERVICE BRAKES (4). Oil activated, disc-type. Pushing either brake pedal sends pressurized oil from brake control valve to push against discs and plates in the brake housing, causing friction. This friction causes wheels to turn slower or stop.

TA 098566

Go on to Sheet 2

BRAKE SYSTEM DESCRIPTION (CONT) (Sheet 2 of 2)

7. EMERGENCY AND PARKING BRAKE. (See page 1-22) A spring activated, disc-type. Brake is mounted on the output transfer case. When activated, it prevents output transfer gears from turning. Brake is released by high pressure accumulator oil.

NOTE

If, due to a malfunction in accumulator charging circuit, pressure drops below 700 PSI (49.2 kg/cm^2), the brake will automaticxdly be activated.

8. EMERGENCY AND PARKING BRAKE CONTROL VALVE. Controls oil flow from accumulator to emergency and parking brake. Valve is manually activated by the operator. Pulling out on parking brake control knob, on right side of steering column, causes brake to be applied. Pushing in cm knob causes brake to release.

End

STEERING SYSTEM DESCRIPTION (Sheet 1 of 2)

Steering system can be divided into three groups: steering group, pilot group, and supplemental steering group.

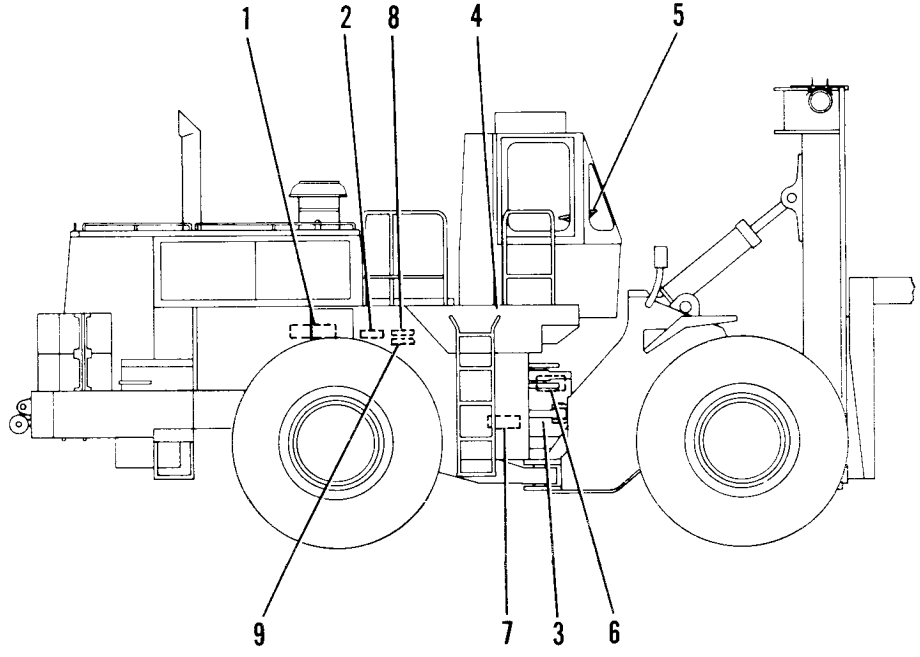
A. STEERING GROUP COMPONENTS

1. HYDRAULIC PUMP (Larger Section). A gear-type, driven by the engine. The pump is used to supply hydraulic oil to the steering system. The oil is pulled from the hydraulic tank and pumped to the diverter valve.

9. STEERING CONTROL VALVE. Directs the high pressure oil to one of the two steering cylinders depending on which direction the steering wheel is turned. The control valve is hydraulically activated by the neutralizer valves.

3. STEERING CYLINDERS (2). Are activated by high pressure hydraulic oil from the control valve. When a left turn is being made, the right steering cylinder is activated; when a right turn is being made, the left cylinder is activated.

4. HYDRAULIC TANK. The storage reservoir for all of the hydraulic oil used in the machine except for the transmission and torque converter. An inlet strainer provides filtering when adding or replacing oil to the tank. Also, a filter is built into the tank for filtering all of the oil returning from the hydraulic system.



5. STEERING WHEEL AND COLUMN. Adjustable to eight different positions. Seven of the positions are for operator comfort, while the eighth and most forward is for storing and locking the wheel when not in use. Pushing the wheel into the store position also moves the transmission control lever to NEUTRAL.

6. NEUTRALIZER VALVES (2) Stop the flow of pilot oil to the steering control valve at the end of a complete turn in either direction. This stops the steering action before the machine turns against the frame stops. The valves are normally open, allowing flow through them.

TA 098585

Go on to Sheet 2

B. SUPPLEMENTAL STEERING COMPONENTS (See page 1-24)

The supplemental steering system has two purposes:

To give an oil supply for the steering system if there is a failure of the primary system or if the engine stops when the machine is moving.

To add oil to the primary oil flow when the engine rpm is less than 1170 to 1300 rpm and the machine is moving.

7. SUPPLEMENTAL STEERING PUMP. A ground driven, gear-type pump. Ground driven means that the pump turns as long as the machine moves. The pump gets its power from the output transfer gears of the transmission. Its function is to supply oil to the steering system when there is a failure of the primary pump or when the engine stops and the machine is still moving. It also adds oil to the primary oil flow when the engine is turning at less than 1170 to 1300 rpm and the machine is moving.

8. DIVERTER VALVE. Senses the pressure and controls the flow direction of the oil from the primary and supplemental pumps.

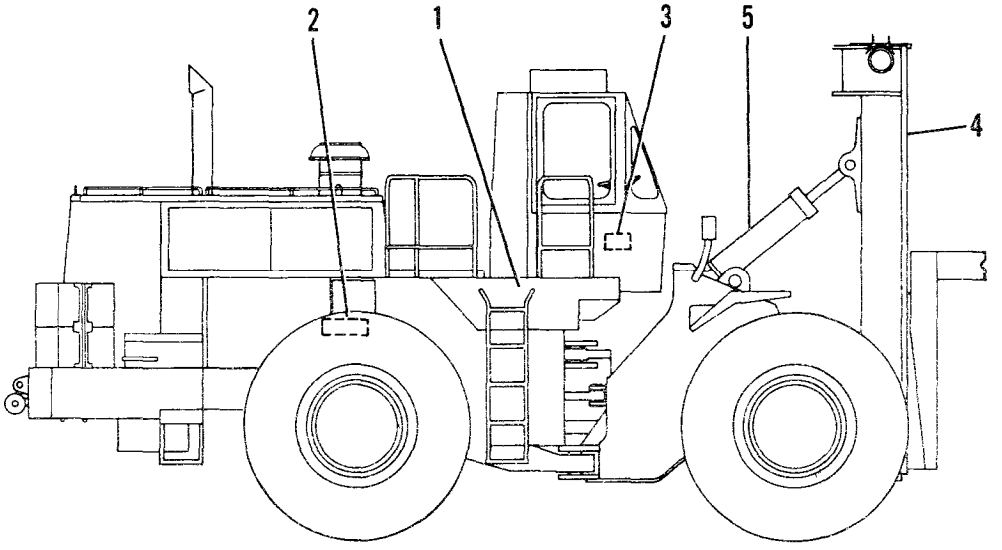
9. FLOW SWITCH. Warns the operator of a failure of the primary pump or lines.

End

HYDRAULIC SYSTEM DESCRIPTION (Sheet 1 of 2)

High pressure mast hydraulic system consists of:

1. Hydraulic tank
2. Hydraulic pump
3. Control valve
4. Lift cylinder
5. Tilt cylinders
6. Side shift cylinder
7. Side tilt cylinder
8. Container lock cylinders



Oil flows from hydraulic tank (1) to hydratdic pump (2) then to control valve (3). The control levers are moved to let oil go through the control valve to lift cylinder (4), tilt cylinders (5), side shift cylinder (6), side tilt cylinder (7) or container lock cylinders (8). Oil returns from the cylinders through the control valve and back to the tank.

1. HYDRAULIC TANK. The storage reservoir for all of the hydraulic oil used in the machine except for the transmission and torque converter. Equipped with an inlet strainer for filtering oil when added. A filter is built into the tank for filtering oil returning from the hydraulic system.

2. HYDRAULIC PUMP. A gear-type, driven by the engine. Supplies oil to the control valve for distribution to the hydraulic system.

3. CONTROL VALVE. Directs high pressure oil to hydraulic cylinders, depending on the position of hydraulic control lever. Contains an oil pressure relief valve to return extra oil pressure back to the hydrau!ic tank when the mast is fully tilted, fully raised, fully shifted or fully rotated.

4. LIFT CYLINDER. A ram-type cylinder which moves up by hydraulic oil pressure and moves down by gravity. The extended part of the cylinder is completely filled with oil.

5. TILT CYLINDERS (2). Double acting cylinders which extend by hydraulic pressure and retract by hydraulic pressure. Control the forward-backward tilt angle of the mast.

TA 098567

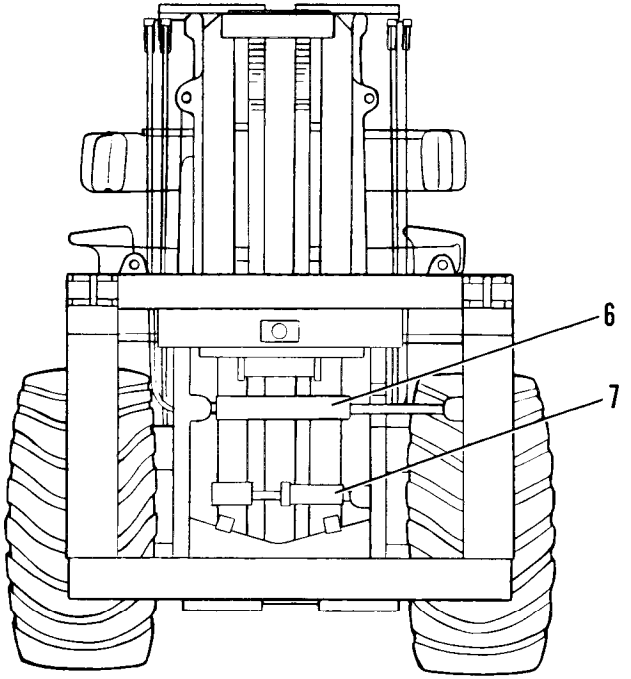
Go on to Sheet 2

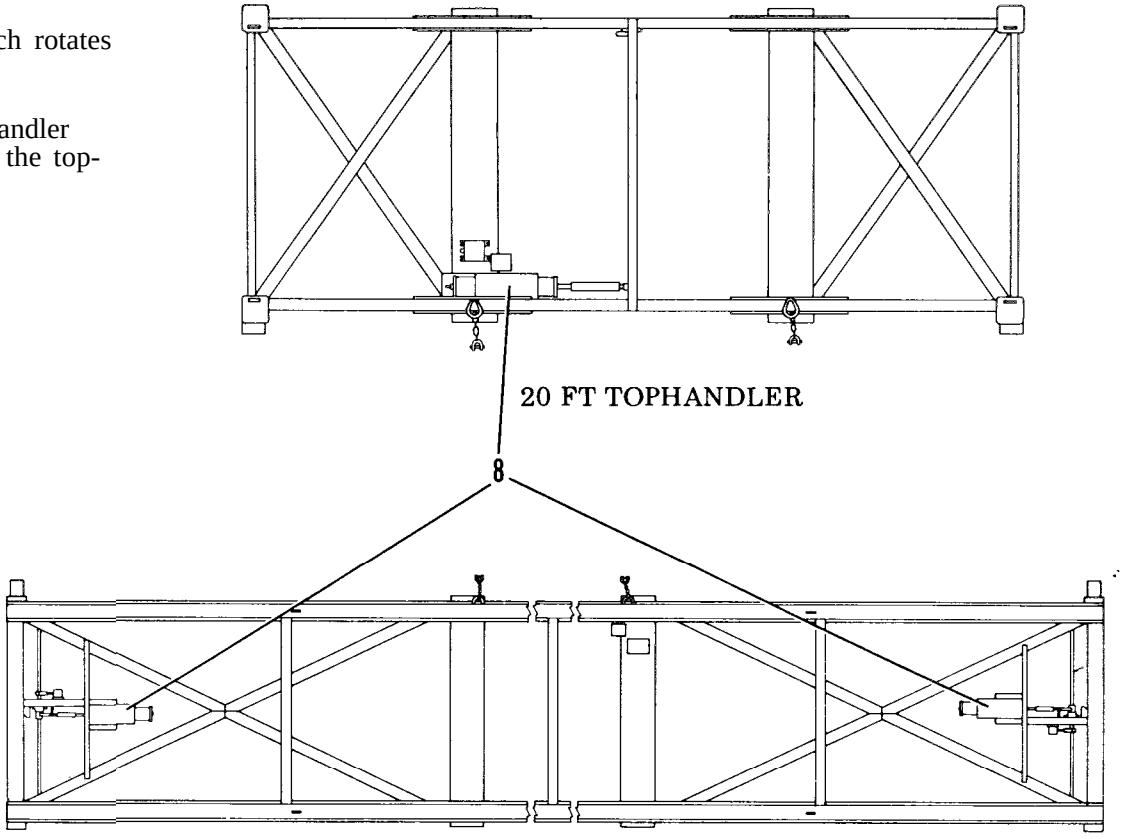
HYDRAULIC SYSTEM DESCRIPTION (CONT) (Sheet 2 of 2)

6. SIDE SHIFT CYLINDER. A double acting cylinder which ccm-trols the side shift of the forks and tophandler with respect to the center line of the vehicle.

7. SIDE TILT CYLINDER. A double acting cylinder which rotates the forks and tophandler.

8. CONTAINER LOCK CYLINDERS. One on 20 ft tophandler and two on 35 ft and 40 ft tophandlers. Extend to lock the top-handler to the container.





20 FT TOPHANDLER

35 & 40 FT TOPHANDLER

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End

TRANSMISSION HYDRAULIC SYSTEM DESCRIPTION

(Sheet 1 of 1)

Transmission hydraulic system consists of:

1. Oil reservok
2. Oil filter
3. Magnetic screen
4. Oil pump
5. Oil cooler
6. Connecting lines

1. OIL RESERVOIR. The lower portion of the output transfer gear case serves as a reservoir for the transfer gear and transmission. A drain plug is located in the bottom of the case for draining transmission system oil.

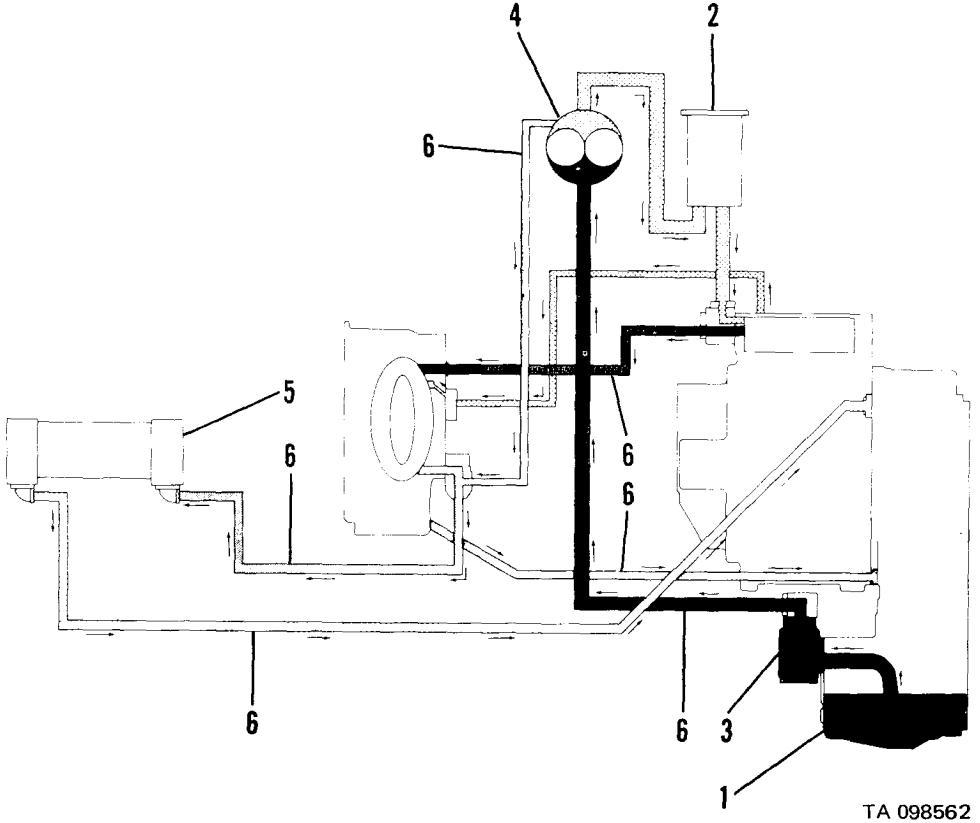
2. OIL FILTER. Removes debris from the hydraulic oil. The filter is located in the compartment behind the cab.

3. MAGNETIC SCREEN. Removes metal particles and other debris before the oil goes to the oil pump. The screen is fastened to the output transfer gear case.

4. OIL PUMP. A gear-type pump, driven by the engine. Oil is pulled from the reservoir, through the magnetic screen and pumped to the oil filter.

5. OIL COOLER. Removes heat from the transmission system hydraulic oil. High temperature oil comes from the torque converter and passes through the oil cooler. The heat of the oil is transferred to the engine cooling system and the cooler oil returns to the transmission.

6. CONNECTING LINES. Carry oil to and from the oil filter and oii cooler.



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End

CHAPTER 2

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

COMMON TOOLS AND EQUIPMENT

For authorized common took and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

Refer to TM 10-3930-641-20P for special tools and TMDE you will need in maintaining the vehicle. No support equipment is required.

REPAIR PARTS

Repair parts are listed and illustrated in the repair parts and special tools list, TM 10-3930-641-20P, covering organizational maintenance for this equipment.

Section II. SERVICE UPON RECEIPT

INSPECTING AND SERVICING PRESERVED VEHICLES

Do the following if the vehicle you receive has been stored:

1. Remove any tape or seals installed to protect openings.
2. Remove the covering from over the windshield, windows, rear view mirrors, and lights.
3. Remove the covering from the operator's seat.
4. Remove the plastic covering from the instrument panel and steering column.
5. Fill the fuel tank. Refer to TM 10-3930-641-10.
6. Check tire pressure and inflate to the right pressure. See page 2-397.
7. Check coolant in the radiator. The radiator is filled with antifreeze and water. Drain coolant and refill. See page 2-214.
8. Wipe preservative from all exposed metal surfaces.
9. Check for damage.
10. Clean all exterior surfaces. Touch up paint scratches.
11. Do the before operation (B) preventive maintenance checks and services. Refer to TM 10-3930-641-10.
12. Do the lubrication specified in LO 10-3930-641-12.
13. Check batteries for charge. See page 2-268.
14. Make sure the vehicle is ready for operation. Then remove all warning tags.

INSPECTING AND SERVICING NON-PRESERVED VEHICLES

1. Do the before operation (B) preventive maintenance checks and services. See TM10-3930-641-10.
2. Do the lubrication specified in LO 10-3930-641-12.
3. Report any deficiencies or damage in accordance with DA Pam 738-750. Report to Commander, U.S. Army Tank-Automotive Command, Warren, MI 48397-5000, ATTN: AMSTA-M.
4. Check tires, fill fuel tanks and check coolant.

INSTALLATION

Depending on the way the vehicle was shipped, components may have been removed. Install as required.

Component	
Mast	Contact Direct Support
Rollover protective structure (ROPS)	Contact Direct Support
Exhaust pipe	Page 2-211
Cab	Contact Direct Support

OVERVIEW

(Sheet 1 of 1)

To make sure that the RTCH is ready for operation at all times, it must be systematically inspected and serviced. The following pages include your Organizational PMCS Introduction and Organizational PMCS.

End

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION (Sheet 1 of 9)

GENERAL

1. To ensure that the RTCH is ready for operation at all times, it must be lubricated and inspected on a regular basis so that defects may be found before they result in serious damage, equipment failure, or injury to personnel.
2. The *KEY* in this PMCS Introduction lists the types, amounts, and temperature ranges of the lubricants required for specified intervals.
3. Lubrication Charts at the end of this PMCS Introduction show all lubrication points for the RTCH.
4. Organizational PMCS contains systematic instructions on lubrications, inspections, adjustments, and corrections to be performed by Organizational Maintenance to keep the RTCH in good operating condition and ready for its primary mission.

EXPLANATION OF TABLE ENTRIES

1. **Item Number (Item No.) Column.** Numbers in this column are for reference. When completing DA Form 2404 or DA Form 5988-E (*Equipment Inspection and Maintenance Worksheet*), include the item number for the check/service indicating a fault. Item numbers also appear in the order you must perform checks and services for the interval listed.

NOTE: If both an hours and calendar interval are provided, perform check or service at whichever interval comes first.

2. **Interval Column.** This column tells you when you must perform the procedure in the procedure column. Intervals are based on hours or calender dates.
   a. *Hours* procedures must be done at the hour interval listed.
   b. *Semiannual* procedures must be done twice each year
   c. *Annual* procedures must be done once each year.
   d. *Biennial* procedures must be done once every two years.
   e. *Triennial* procedures must be done once every three years.
3. **Man-Hours Column.** This column indicates man-hours required to complete prescribed lubrication service.
4. **Item to Check/Service Column.** This column identifies the item to be checked or serviced.

NOTE: The WARNINGs and CAUTIONs appearing in your PMCS table should always be observed. WARNINGs and CAUTIONs appear before applicable procedures. These WARNINGs and CAUTIONs must be observed to prevent serious injury to yourself and others or to prevent your equipment from being damaged.

5. **Procedure Column.** This column gives the procedure you must perform to check or service the item listed in the Item to Check/Service column, to know if the equipment is ready or available for its intended mission or for operation. You must perform the procedure at the time stated in the interval column.
6. **Not Fully Mission Capable If: Column.** Information in this column tells you what fault will keep your equipment from being capable of performing its primary mission. If you perform check/service procedures that show faults listed in this column, the equipment is not mission-capable. Follow standard operating procedures for maintaining the equipment or reporting equipment failure.

Go to Sheet 2

GENERAL LUBRICATION PROCEDURES

NOTE 1: Lubrication instructions in LO 10-3930-641-12 have been superseded: Operator Maintenance level lubrication is contained in PMCS in TM 10-3930-641-10. Organizational Maintenance level lubrication is contained in this PMCS.

NOTE 2: Lubrication instructions contained in this PMCS are mandatory.

NOTE 3: Dashed leader lines used in illustrations of lubrication points indicate that lubrication is required on both sides of the equipment.

1. Recommended intervals are based on normal conditions of operation, temperature, and humidity. When operating under extreme conditions, such as high or low temperatures or exposure to sand or dust, lubricants should always be changed more frequently. Lubricants that have become contaminated must be changed regardless of interval. When in doubt, notify your supervisor.

WARNING: When servicing this machine, performing maintenance, or disposing of materials such as engine coolant, hydraulic oil, lubricants, battery acids or batteries, and CARC paint, consult your unit/local hazardous waste disposal center or safety office for local regulatory guidance. If further information is needed, please contact The Army Environmental Hotline at 1-800-872-3845.

2. Ensure that all fluids drained as a result of lubrication or maintenance are collected in a suitable container and disposed of in accordance with local policy and ordinances. Clean up any spills immediately.

3. Keep all lubricants in a closed container and store in a clean, dry place away from extreme heat. Keep container covers clean and do not allow dust, dirt, or other foreign material to mix with lubricants. Keep all lubrication equipment clean and ready for use.

4. Maintain a good record of all lubrication performed and report any problem noted during lubrication. Refer to DA PAM 750-8 for maintenance forms and procedures to record and report any findings.

WARNING: Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition. Failure to do so may result in injury or death to personnel.

5. Keep all external parts of equipment not requiring lubrication free of lubricants. Before lubrication, wipe lubrication fittings with a clean rag (Item 16, Appendix C) and solvent cleaning compound (Item 17, Appendix C). After lubrication, wipe off excess oil or grease to prevent accumulation of foreign matter.

6. Refer to FM 9-207 for lubrication instructions in cold weather.

7. Engine, transmission, and hydraulic system oil filters shall be changed when:

   a. they are known to be contaminated or clogged;

   b. at prescribed hardtime intervals.

8. For equipment under manufacturer's warranty, hardtime oil service intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions (e.g., longer-than-usual operating hours, extended idling periods, or extreme dust).

Go to Sheet 3

GENERAL PMCS PROCEDURES

1. Always perform PMCS in the same order so it gets to be a habit. Once you've had some practice, you'll spot anything wrong in a hurry. If any deficiency is discovered, perform the appropriate troubleshooting task in Section IV of Chapter 2 of this manual. If any component or system is not serviceable, or if the given service does not correct the deficiency, notify your supervisor.
2. Before performing preventive maintenance, read all the checks required for the applicable interval and prepare all tools needed to make all checks. Have several clean rags (Item 16, Appendix C) handy. Perform ALL inspections at the applicable interval.
   a. **Keep It Clean.** Dirt, grease, oil, and debris get in the way and may cover up a serious problem. Clean as you work and as needed. Use detergent (Item 18, Appendix C) and water when you clean.
   b. **Rust and Corrosion.** Check metal parts for rust and corrosion. If any bare metal or corrosion exists, clean and apply a light coat of lubricating oil (Item 8, Appendix C). Report it to your supervisor.
   c. **Bolts, Nuts, and Screws.** Check bolts, nuts, and screws for obvious looseness, missing, bent or broken condition. Look for chipped paint, bare metal, or rust around bolt heads. If you find one you think is loose, tighten it.
   d. **Welds.** Look for loose or chipped paint, rust, or gaps where parts are welded together. If you find a bad weld, report it to your supervisor.
   e. **Electric Wires and Connectors.** Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors and ensure that the wires are in good condition.
   f. **Fluid Hoses and Lines.** Look for wear, damage, and signs of leaks. Ensure that clamps and fittings are tight. Wet spots indicate leaks, but a stain around a fitting or connector can also mean a leak. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, correct it if authorized by the Maintenance Allocation Chart (Appendix B). If not authorized, notify your supervisor.
   g. **Fluid Leakage.** It is necessary for you to know how fluid leakage affects the status of your machine. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your machine. Learn and be familiar with them, and remember — when in doubt, notify your supervisor.—

Leakage Definitions for Organizational PMCS

Class I	Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
Class II	Leakage of fluid great enough to form drops, but not enough to cause drops to drip from item being checked/inspected.
Class III	Leakage of fluid great enough to form drops that fall from item being checked/inspected.

CAUTION: Operation is allowable with Class I and Class II leakage. WHEN IN DOUBT, NOTIFY YOUR SUPERVISOR. When operating with Class I or Class II leaks, check fluid levels more frequently. Class III leaks must be reported immediately to your supervisor. Failure to do this will result in damage to machine and/or components.

Go to Page 4

PMCS INITIAL SETUP

1. **General.** This paragraph lists tools, materials, and personnel required for PMCS and lubrication.
2. **Tools (Appendix B).**
   a. General mechanic's tool kit
   b. Common no. 1 shop set
   c. Supplemental no. 1 shop set
   d. Drain tool, hydraulic tank (pipe nipple, P/N 6B3156)
3. **Materials (Appendix C).**
   a. Antifreeze
   b. Cleaning compound, solvent, Type III
   c. Coating compound
   d. Detergent, general purpose
   e. Distilled-deionized water
   f. Grease, GAA
   g. Lubricating oil, OE/HDO-10
   h. Lubricating oil, OE/HDO-10/30
   i. Lubricating oil, OE/HDO-15/40
   j. Lubricating oil, OE, HDO-30
   k. Lubricating oil, OEA
   l. Lubricating oil, GO 80/90
   m. Lubricating oil, GO 75
   n. Rag, wiping
   o. Sodium bicarbonate, technical
4. **Personnel.**
   a. Driver/Operator
   b. Organizational Maintenance Mechanic

Go to Sheet 5

- KEY -

LUBRICANT/ COMPONENT	REFILL CAPACITY	EXPECTED TEMPERATURES*			INTERVALS
		+6°F to +122°F (-14°C to +50°C)	-4°F to +50°F (-20°C to +10°C)	-25°F to +32°F (-4°C to 0°C)	
OE/HDO Lubricating Oil, ICE, Tactical					**H - Hours S - Semiannual A - Annual B - Biennial T - Triennial**
OEA Lubricating Oil, ICE, Arctic					
Engine Crankcase	11 Gal. (41.6 L)	See Chart A			
Transmission	24 Gal. (90.8 L)	See Chart B			
Hydraulic System	130 Gal. (492.1 L)	See Chart C			
GO Lubricating Oil, Gear, Multipurpose					
Front and Rear Differentials and Final Drives	27 Gal. (102.2 L) Each	See Chart D			
GAA Grease, Automotive and Artillery	As Required	All Temperatures			
Upper (Transmission) Drive Shaft					
Lower Drive Shaft					
Drive Shaft Support Bearing					
Frame Pivot Bearings					
ANTIFREEZE Ethylene Glycol, Inhibited, Heavy-Duty					
Engine Radiator	28 Gal. (106 L) System Capacity	All Temperatures			
*** For arctic operation, refer to FM 9-207.**					

Go to Sheet 6

Table 1. CHART A—ENGINE CRANKCASE

Lubricant	EXPECTED TEMPERATURES																			
°F	-70	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+120
°C	-57	-51	-46	-40	-34	-29	-23	-18	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+49
OE/HDO	Lubricating Oil, ICE, Tactical																			
OEA	Lubricating Oil, ICE, Arctic																			
OE/HDO 10W/30								—	—	—	—	—								
OE/HDO 15W/40									—	—	—	—	—	—	—	—	—	—	—	—
OEA			—	—	—	—	—	—												

Table 2. CHART B—TRANSMISSION

Lubricant	EXPECTED TEMPERATURES																			
°F	-70	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+120
°C	-57	-51	-46	-40	-34	-29	-23	-18	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+49
OE/HDO	Lubricating Oil, ICE, Tactical																			
OEA	Lubricating Oil, ICE, Arctic																			
OE/HDO 30								—	—	—	—	—								
OE/HDO 10*									—	—	—	—	—	—	—	—	—	—	—	—
OEA *			—	—	—	—	—	—												

*If OEA lubricant is required to meet the low expected-temperature range, OEA lubricant is to be used in lieu of OE/HDO 10 lubricant for all expected temperatures where OE/HDO 10 is specified.

Go to Sheet 7

Table 3. CHART C—HYDRAULIC SYSTEM

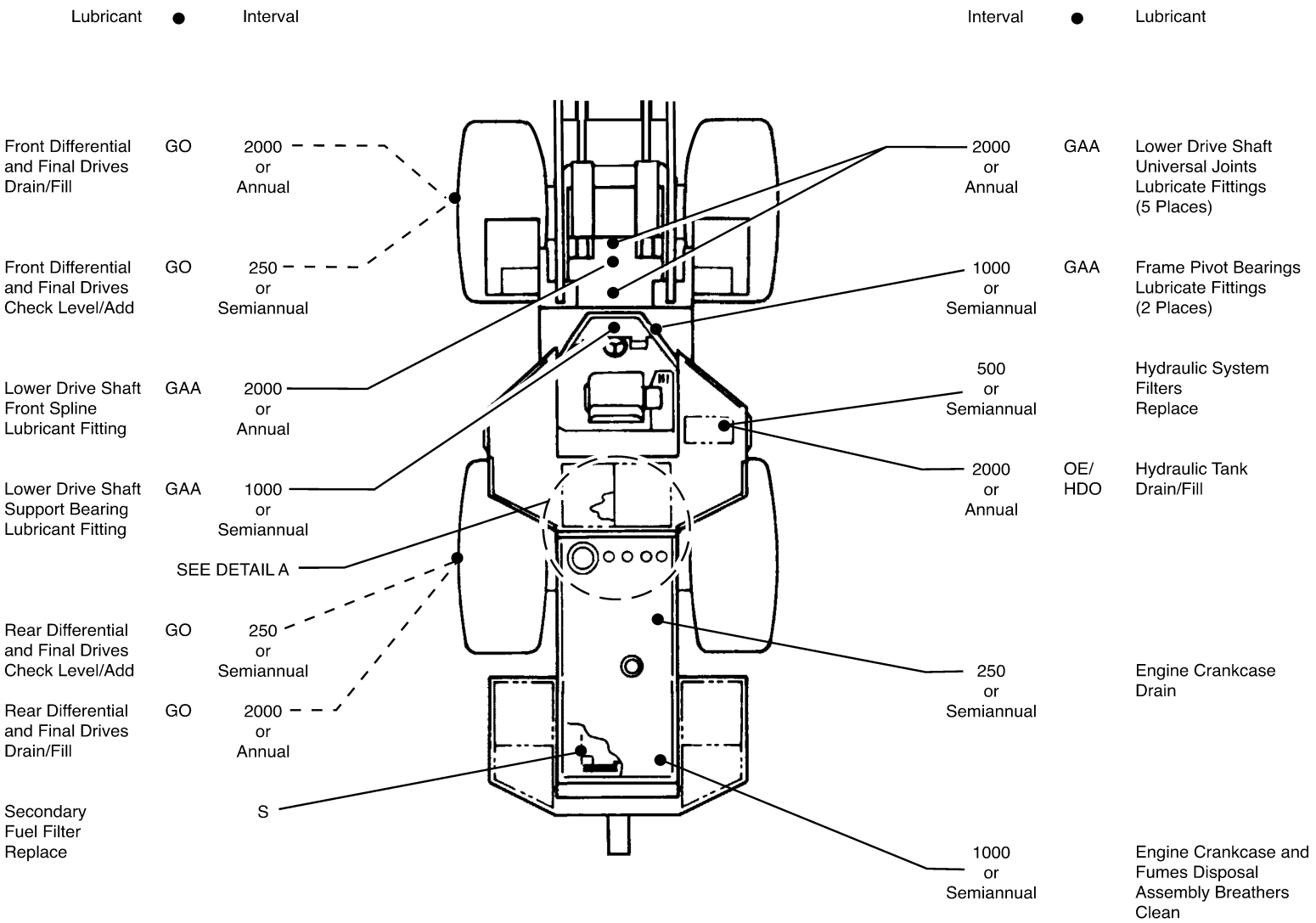
Lubricant	EXPECTED TEMPERATURES																			
	°F	-70	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+120
	°C	-57	-51	-46	-40	-34	-29	-23	-18	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+49
OE/HDO	Lubricating Oil, ICE, Tactical																			
OEA	Lubricating Oil, ICE, Arctic																			
OE/HDO 30																				
OE/HDO 10																				
OEA *																				

*If OEA lubricant is required to meet the low expected-temperature range, OEA lubricant is to be used in lieu of OE/HDO 10 lubricant for all expected temperatures where OE/HDO 10 is specified.

Table 4. CHART D—FRONT AND REAR DIFFERENTIALS AND FINAL DRIVES

Lubricant	EXPECTED TEMPERATURES																			
	°F	-70	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+120
	°C	-57	-51	-46	-40	-34	-29	-23	-18	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+49
GO	Lubricating Oil, Gear																			
GO 80/90																				
GO 75																				

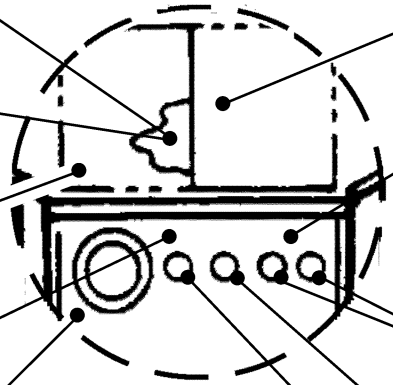
Go to Sheet 8


Lubricant
Interval
Front Differential and Final Drives Drain/Fill
GO
2000 or Annual
Front Differential and Final Drives Check Level/Add
GO
250 or Semiannual
Lower Drive Shaft Front Spline Lubricant Fitting
GAA
2000 or Annual
Lower Drive Shaft Support Bearing Lubricant Fitting
GAA
1000 or Semiannual
SEE DETAIL A
Rear Differential and Final Drives Check Level/Add
GO
250 or Semiannual
Rear Differential and Final Drives Drain/Fill
GO
2000 or Annual
Secondary Fuel Filter Replace
S
Interval
Lubricant
2000 or Annual
GAA
Lower Drive Shaft Universal Joints Lubricate Fittings (5 Places)
1000 or Semiannual
GAA
Frame Pivot Bearings Lubricate Fittings (2 Places)
500 or Semiannual
Hydraulic System Filters Replace
2000 or Annual
OE/ HDO
Hydraulic Tank Drain/Fill
250 or Semiannual
Engine Crankcase Drain
1000 or Semiannual
Engine Crankcase and Fumes Disposal Assembly Breathers Clean

Go to Sheet 9

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION - CONT (Sheet 9 of 9)

Lubricant	●	Interval
Transmission Oil Dipstick and Fill	OE/ HDO	1000 or Semiannual
Transmission Drain		1000 or Semiannual
Transmission Magnetic Screen Clean		1000 or Semiannual
Upper(Transmission) Drive Shaft Universal Joints Lubricate Fittings (2 Places)	GAA	1000 or Semiannual
Primary Fuel Filter Clean		S



DETAIL A

Interval	●	Lubricant
1000 or Semiannual		Transmission Breather Replace
250 or Semiannual	OE/ HDO	Engine OIl Dipstick and Fill
250 or Semiannual		Engine Oil Filters Replace
500 or Semiannual		Transmission Oil Filter Replace
500 or Semiannual		Brake Hydraulic System Oil Filter Replace

End

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ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (Sheet 1 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
				NOTE • Review all WARNINGs, CAUTIONs, and NOTEs before performing Organizational PMCS on the RTCH. • Unless otherwise indicated, perform PMCS with machine parked on level ground, parking brake applied, transmission in N (Neutral), container handler forks lowered to the ground, engine shut down, and wheels blocked. • Perform Operator PMCS prior to or in conjunction with Organizational PMCS if: a. There is a delay between daily operation of the machine and Organizational PMCS. b. The regular operator is not assisting. • If leakage is detected during performance of PMCS, further investigation is required to determine location and cause of leak.	
1	**250 Hours or Semiannual**		**Engine V-Belts**	a. Inspect fan drive belts and alternator belt for worn, frayed, or cracked condition. Replace belts if worn, frayed, or cracked. (See pages 2-229 and 2-252.) b. Check belt tension. Adjust belt tension to 9/16-13/16 in. (1.4-2.0 cm) deflection, with 25 lb (11.5 kg) pressure on belt midway between pulleys. (See pages 2-229 and 2-252.)	

Go on to Sheet 2

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 2 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION / ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
2	250 Hours or Semiannual	1.0 Hours	Engine Oil and Filters	**NOTE** Engine crankcase capacity is 11 gal. (41.6 L).	
				Perform complete engine lubrication: (See page 2-152.) a. Drain engine oil. b. Check for clogged crankcase breathers. c. Test function of LOW ENGINE OIL indicator. d. Replace oil filters. e. Refill crankcase with lubricating oil (Items 7.1, 8.1, or 8.2, Appendix C) until level is between LOW and FULL marks on LOW IDLE side of dipstick. f. Check oil filter lines and oil filter bases for leaks.	Class III oil leaks are evident.

Go on to Sheet 3

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 3 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
3	250 Hours or Semiannual		Fuel System	**WARNING** • DO NOT perform fuel system checks, inspections, or maintenance while smoking or near fire, flames, or sparks. Fuel may ignite, causing injury or death to personnel or damage to machine. • Personnel must wear fuel-resistant gloves when handling fuels. If exposed to fuel, promptly wash exposed skin and change fuel-soaked clothing.	
				With engine at low idle, check for fuel system leaks and damage to the following components: a. Fuel lines. Replace as needed. (See page 2-173.) b. Fuel injection lines. (See page 2-170.) c. Fuel transfer pump. Replace if necessary. (See page 2-177.) d. Fuel priming pump. Replace if necessary. (See page 2-179.)	Any fuel leaks are evident.
4	250 Hours or Semiannual		Turbocharger	a. Inspect turbocharger air lines (seal and gaskets) for leaks. If leaks and damage are evident, notify Direct Support Maintenance.	
				b. Inspect turbocharger oil lines for leaks. If leaks and damage are evident, notify Direct Support Maintenance.	Class III oil leaks are evident.

Go on to Sheet 4

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 4 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION / ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
5	250 Hours or Semiannual		Ether Starting Aid	**WARNING** Ether fuel is extremely flammable and toxic. DO NOT smoke and make sure you are in a well-ventilated area away from heat, open flames, or sparks. Wear eye protection. Avoid contact with skin and eyes and avoid breathing ether fumes. If fluid enters or fumes irritate the eyes, wash immediately with large quantities of clean water for 15 minutes. Seek medical attention immediately if ether is inhaled or causes eye irritation. Failure to follow this warning may cause injury or death to personnel. Replace ether canister as needed. Inspect ether lines and fittings. Replace as necessary. (See page 2-189.)	
6	250 Hours or Semiannual		Engine Air Cleaner	**WARNING** • If NBC exposure is suspected, personnel wearing protective equipment must handle all air cleaner media. Consult your NBC Officer or NBC NCO for appropriate handling or disposal procedures. • NBC contaminated filters must be handled using adequate precautions and must be disposed of by trained personnel. • For more information, refer to: FM 3-3, *Chemical and Biological Contamination Avoidance*; FM 3-5, *NBC Decontamination*; FM 3-7, *NBC Field Handbook*; and FM 3-3-1, *Nuclear Contamination Avoidance*. **NOTE** • Primary air cleaner element must be replaced after six cleanings, or once each year, even if it has not been cleaned six times. • Secondary element must be replaced after cleaning or replacing primary element for the 3rd time, or if PLUGGED FILTER indicator remains on after cleaning primary element. Clean primary air cleaner element. Replace secondary air cleaner element if necessary. (See page 2-198.)	

Go on to Sheet 5

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 5 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION / ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
7	250 Hours or Semiannual		Exhaust System	**WARNING** Exhaust system components may be hot to the touch, unless engine has been allowed to cool down. Use caution to safeguard against burns. Failure to follow this warning may result in injury to personnel.	
				a. With engine cool, inspect muffler for evidence of leaks and damage. Replace if necessary. (See page 2-211.)	
				b. Inspect exhaust pipe for evidence of leaks and damage. Replace if necessary. (See page 2-211.)	
				c. Inspect for loose, missing, or damaged exhaust manifold taperlock studs. Notify Direct Support Maintenance if any of these conditions exist.	
8	250 Hours or Semiannual		Cooling System	**WARNING** Cooling system components may be hot to the touch, unless engine has been allowed to cool down. Use caution to safeguard against burns. Failure to follow this warning may result in injury to personnel.	
				a. Inspect radiator hoses and coolant lines for leaks and damage. Replace as necessary. (See page 2-247.)	Class III coolant leaks are evident.
				b. Inspect water pump for leaks and proper functioning. Replace if necessary. (See page 2-225.)	Class III coolant leaks are evident.

Go on to Sheet 6

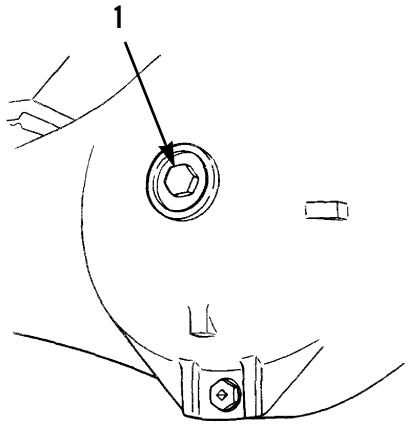
ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 6 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION / ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
9	250 Hours or Semiannual		Batteries	**WARNING** • To avoid injury, eye protection and acid-resistant gloves must be worn 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 or a tool contacts a battery terminal, a direct short will result in instant heating or electric shock, damage to equipment, and injury to personnel. • Sulfuric acid contained in batteries can cause serious burns. If battery corrosion or electrolyte makes contact with skin, eyes or clothing, take immediate action to stop the corrosive burning effects. Failure to follow these procedures may result in injury or death to personnel. • DO NOT use compressed air to clean batteries. Use a clean, dry rag. Perform complete battery service. (See page 2-272.)	
10	250 Hours or Semiannual		Transmission	a. Inspect transmission oil lines for leaks and damage. If leaks or damage are noted, notify Direct Support Maintenance. b. Inspect transmission control linkage for damage. Replace if necessary. (See page 2-407). c. Adjust linkage if necessary. (See page 2-407.)	Class III oil leaks are evident.

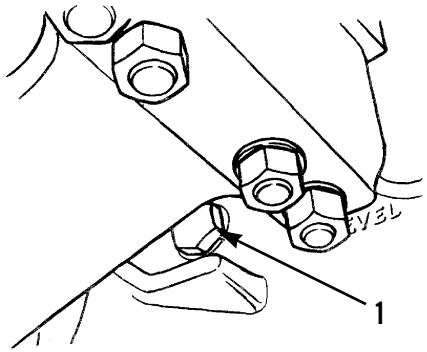
Go on to Sheet 7

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 7 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
11	**250 Hours or Semiannual**	**0.2 Hours**	**Front and Rear Differentials**	Check oil level at level plugs (1) of front and rear differentials. Oil must be level with bottom of plug opening. Add gear lubricating oil (Item 5 or 6, Appendix C) as necessary. (See page 2-392.)	



FRONT

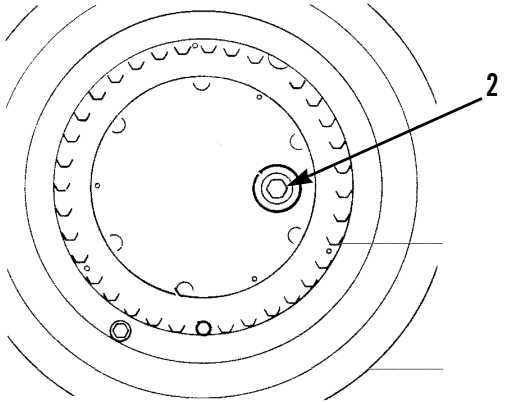


REAR

422-0048

Go on to Sheet 8

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION / ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
12	250 Hours or Semiannual	0.4 Hours	Front and Rear Final Drives	**NOTE** To ensure an accurate reading, fill plug must be horizontal to axle (3 o'clock or 9 o'clock position), as shown. Check oil level at fill plug (2), at each end of front and rear axles. Oil must be level with bottom of fill plug opening. Add gear lubricating oil (Item 5 or 6, Appendix C) as necessary. (See page 2-392.)	



Go on to Sheet 9

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 9 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION / ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
13	250 Hours or Semiannual		Service Brakes	a. Test service brakes for proper functioning. (See Operator PMCS in TM 10-3930-641-10.)	
				WARNING Brake system is under hydraulic pressure. Pressure must be relieved before loosening lines. Stop machine on level ground. Apply parking brake and shut down engine. Pump brake pedal several times until no pressure remains. Failure to relieve pressure as indicated may cause injury or death to personnel.	
				b. Park machine on level ground, with parking brake applied, transmission in N (Neutral), container handler forks lowered to the ground, engine shut down, and wheels blocked. Relieve brake system hydraulic pressure as follows: Pump brake pedal several times until no pressure remains.	
				c. Inspect brake control valve, accumulator, transmission neutralizer valve, brake lines, and hoses for leaks and damage. If leaks or damage are evident, notify Direct Support Maintenance.	Class III oil leaks are evident.
				d. Adjust service brake pedal and control linkage as required. (See pages 2-369 and 2-366.)	

Go on to Sheet 10

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 10 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION / ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
14	**250 Hours or Semiannual**		**Parking Brakes**	a. Test parking brake and indicator light for proper functioning. (See Operator PMCS in TM 10-3930-641-10.)	
				WARNING Brake system is under hydraulic pressure. Pressure must be relieved before loosening lines. Stop machine on level ground. Apply parking brake and shut down engine. Pump brake pedal several times until no pressure remains. Failure to relieve pressure as indicated may cause injury or death to personnel.	
				b. Park machine on level ground, with parking brake applied, transmission in N (Neutral), container handler forks lowered to the ground, engine shut down, and wheels blocked. Relieve brake system hydraulic pressure by pumping brake pedal several times until no pressure remains.	
				c. Inspect parking brake control valve and brake lines for leaks and damage. If leaks or damage are evident, notify Direct Support Maintenance.	Class III oil leaks are evident.
				d. Adjust parking brake linkage as required. (See page 2-358.)	

Go on to Sheet 11

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 11 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
				WARNING Improper or misuse of inflation equipment can result in tire blowout or rim failure. Failure to use inflation equipment properly could cause injury or death to personnel.	
15	**250 Hours or Semiannual**		**Tires**	Gage all tires for correct inflation pressure and add air as required. (See page 2-397.) Front: 70 psi (480 kPa) Rear: 40 psi (275 kPa)	
16	**250 Hours or Semiannual**		**Steering System**	a. Inspect steering control valve and right and left neutralizer valves for leaks and damage. (See page 1-24.) If leaks or damage are evident, notify Direct Support Maintenance. b. Inspect steering system hydraulic lines and cylinders for leaks and damage. If leaks or damage are evident, notify Direct Support Maintenance.	Class III oil leaks are evident.
				WARNING Steering system is under hydraulic pressure. Pressure must be relieved before removing hydraulic tank filler cap. Stop machine on level ground. Apply parking brake and shut down engine. Turn steering wheel in both directions several times. Failure to relieve pressure as indicated may cause injury or death to personnel.	
				c. Perform steering system tests: (1) Check for air and foreign material in hydraulic oil. (See page 2-417.) (2) Test steering time. (See page 2-417.) (3) Test steering slip. (See page 2-417.)	

Go on to Sheet 12

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 12 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION / ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
17	250 Hours or Semiannual		Mast Hydraulic Cylinders, Lines, and Fittings	**WARNING** Hydraulic system is under pressure. Pressure must be relieved before loosening any hydraulic system line. Stop machine on level ground. Apply parking brake and shut down engine. Cycle all hydraulic control levers through all positions. Failure to relieve pressure as indicated may cause injury or death to personnel.	
				a. Inspect lift cylinder and lift cylinder lines and fittings for leaks and damage. Ensure lines are properly supported and there is no evidence of rubbing or chafing. Notify Direct Support Maintenance of any leaks or damage found.	Class III oil leaks are evident.
				b. Inspect tilt cylinders and tilt cylinder lines and fittings for leaks and damage. Ensure lines are properly supported and there is no evidence of rubbing or chafing. Notify Direct Support Maintenance of any leaks or damage found.	Class III oil leaks are evident.
				c. Inspect side tilt cylinder and side tilt cylinder lines and fittings for leaks and damage. Ensure lines are properly supported and there is no evidence of rubbing or chafing. Notify Direct Support Maintenance of any leaks or damage found.	Class III oil leaks are evident.
				d. Inspect side shift cylinder and side shift cylinder lines and fittings for leaks and damage. Ensure lines are properly supported and there is no evidence of rubbing or chafing. Notify Direct Support Maintenance of any leaks or damage found.	Class III oil leaks are evident.

Go on to Sheet 13

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 13 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
18	**250 Hours or Semiannual**		**Hydraulic System Pumps and Valves**	a. Inspect hydraulic pump for leaks and damage. Notify Direct Support Maintenance of any leaks or damage found.	Class III oil leaks are evident.
				b. Inspect supplemental hydraulic pump for leaks and damage. Notify Direct Support Maintenance of any leaks or damage found.	Class III oil leaks are evident.
				c. Inspect hydraulic control valve, accumulator charging valve, and relief valves for leaks and damage. Notify Direct Support Maintenance of any leaks or damage found.	Class III oil leaks are evident.
19	**250 Hours or Semiannual**		**Mast and Rollers**	Inspect mast and rollers for wear and damage.	
20	**250 Hours or Semiannual**		**Lift Chains**	Inspect lift chains for wear and damage. If worn or damaged, or if tension on lift chains is not equal, notify Direct Support Maintenance.	
21	**250 Hours or Semiannual**		**Tophandlers (20 Ft, 35 Ft, and 40 Ft)**	Inspect tophandlers, tophandler cylinders, hoses, lines, and fittings for leaks and damage. Notify Direct Support Maintenance of any leaks or damage found.	Class III oil leaks are evident.
22	**500 Hours or Semiannual**		**Engine Supports**	Inspect front and rear engine supports for cracks and other damage.	

Go on to Sheet 14

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 14 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
23	500 Hours or Semiannual		Fuel Tank	**WARNING** • DO NOT perform fuel system checks, inspections, or maintenance while smoking or near fire, flames, or sparks. Fuel may ignite, causing injury or death to personnel or damage to machine. • Personnel must wear fuel-resistant gloves when handling fuels. If exposed to fuel, promptly wash exposed skin and change fuel-soaked clothing. a. Remove, disassemble, clean, assemble, and install fuel tank filler cap and screen. (See page 2-195.) b. Drain water and sediment from fuel tank. (See page 2-193.)	
24	500 Hours or Semiannual		Coolant Filter	Replace coolant filter. (See page 2-244.)	
25	500 Hours or Semiannual	0.3 Hours	Transmission Oil Filter	Replace transmission oil filter element. (See page 2-402.)	
26	500 Hours or Semiannual	0.5 Hours	Hydraulic System and Brake Hydraulic System Filters	**WARNING** Hydraulic system is under pressure. Pressure must be relieved before loosening any hydraulic system line. Stop machine on level ground. Apply parking brake and shut down engine. Cycle all hydraulic control levers through all positions. Failure to relieve pressure as indicated may cause injury or death to personnel. a. Replace two hydraulic tank filter elements. (See page 2-487.) b. Replace brake hydraulic system filter element. (See page 2-490.)	

Go on to Sheet 15

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 15 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
27	**500 Hours or Semiannual**	**0.3 Hours**	**Steering System Oil Filter Strainer**	Remove, clean, and reinstall strainer. (See page 2-421.)	
28	**500 Hours or Semiannual**		**Mast**	Check tightness of mast mounting bolts. Proper torque is 1,000 lb-ft (1,356 Nm).	
29	**500 Hours or Semiannual**		**Forks**	Check mounting of forks.	
30	**500 Hours or Semiannual**		**Tilt Cylinders**	a. Test tilt cylinders for proper extension: Tilt mast as far as possible and watch that tilt cylinders stop at the same time. If they do not stop at the same time, notify Direct Support Maintenance. b. Perform drift test of tilt cylinders. (See page 2-493.) If results are not within specification, notify Direct Support Maintenance.	
31	**1,000 Hours or Semiannual**		**Engine Crankcase and Fumes Disposal Assembly Breathers**	Clean breathers. (See page 2-158.)	

Go on to Sheet 16

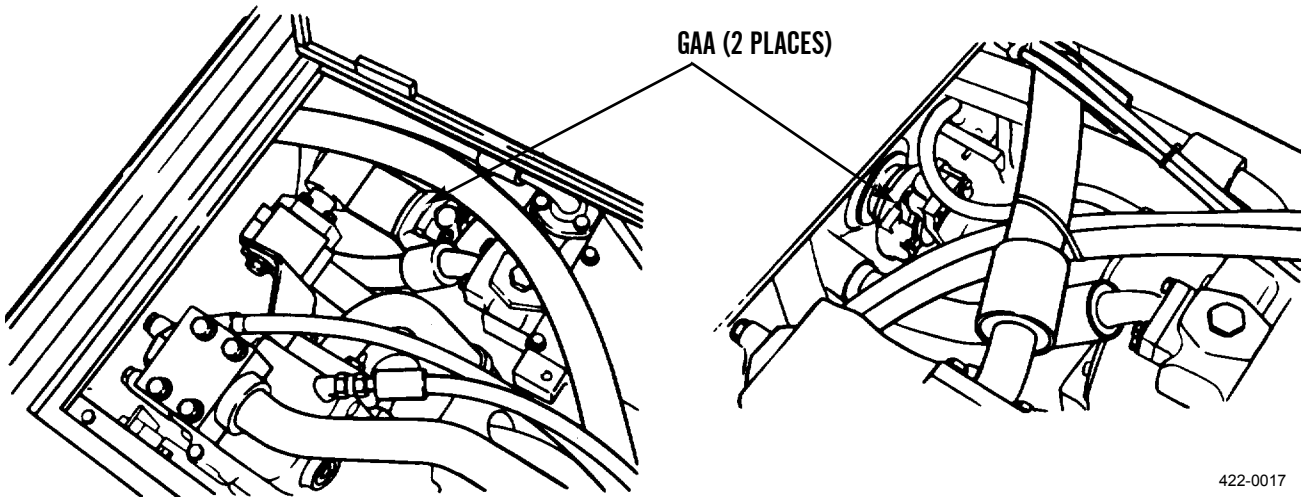
ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 16 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
32	**1,000 Hours or Semiannual**	**0.5 Hours**	**Transmission**	Perform complete transmission service. (See page 2-402.) a. Drain oil from transmission. b. Clean magnetic strainer. c. Replace transmission and torque converter breathers. d. Replace oil filter element. e. Refill transmission with lubricating oil (Item 7, 7.1, or 8, Appendix C) until level is between LOW and FULL marks on dipstick.	

Go on to Sheet 17

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 17 of 30)

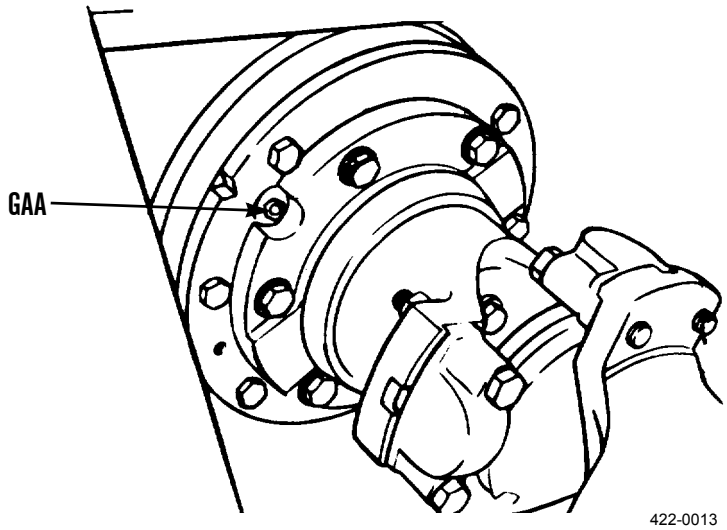
ITEM NO.	INTERVAL	MAN-HOURS	LOCATION / ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
33	1,000 Hours or Semiannual	0.2 Hours	Upper (Transmission) Drive Shaft Universal Joints	a. Lower rear of front crankcase guard. (See page 2-483.) b. Inspect shaft and universal joints for wear and damage. Replace if necessary. (See page 2-377.) c. Lubricate two fittings with GAA grease (Item 3 or 4, Appendix C).	



Go on to Sheet 18

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 18 of 30)

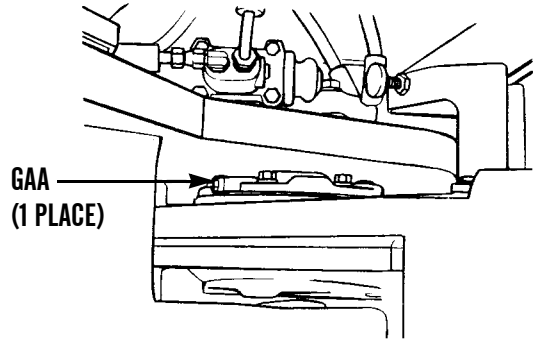
ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
34	**1,000 Hours or Semiannual**	**0.1 Hours**	**Drive Shaft Support Bearing**	a. Inspect bearing cage for leaks. (See page 2-380.) b. Lubricate one fitting on drive shaft support bearing with GAA grease (Item 3 or 4, Appendix C).	



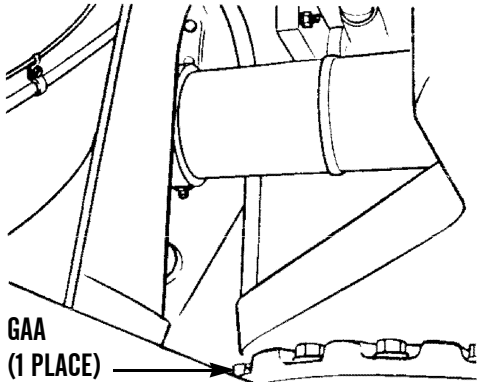
Go on to Sheet 19

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 19 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
35	**1,000 Hours or Semiannual**	**0.2 Hours**	**Frame Upper and Lower Pivot Bearings**	Lubricate one fitting on each pivot with GAA grease (Item 3 or 4, Appendix C).	



UPPER PIVOT

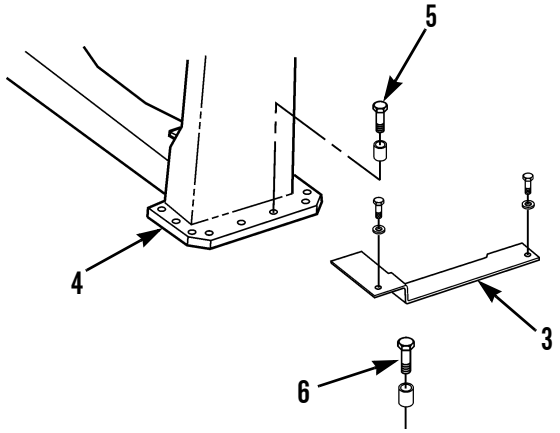


LOWER PIVOT

Go on to Sheet 20

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 20 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION / ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
36	**1,000 Hours or Semiannual**		**Rollover Protective Structure (ROPS)**	a. Remove covers (3) from both sides of ROPS (4). b. Tighten two 1-in. bolts (5) on each side to 640 ± 80 lb-ft (868 ± 108 Nm). c. Tighten eight 1-1/8-in. bolts (6) on each side to 800 ± 100 lb-ft (1085 ± 136 Nm). d. Reinstall covers (3) on both sides of ROPS (4).	



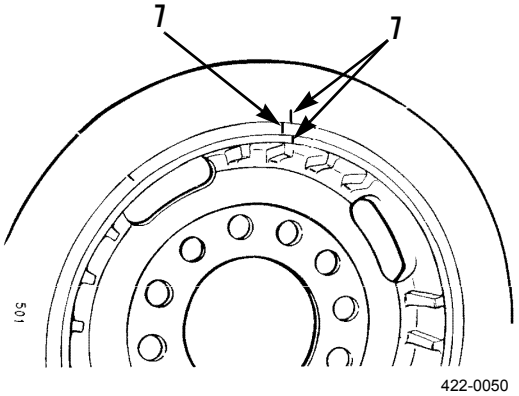
Go on to Sheet 21

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 21 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
37	Semiannual		Fuel System	**WARNING** • DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames, or sparks. Fuel may ignite, causing injury or death to personnel or damage to machine. • Personnel must wear fuel-resistant gloves when handling fuels. If exposed to fuel, promptly wash exposed skin and change fuel-soaked clothing. a. Clean primary fuel filter element. Inspect gasket and replace as necessary. (See page 2-183.) **NOTE** Secondary fuel filter must be replaced semiannually OR when fuel pressure gage is in RED zone with engine running at high idle. b. Replace secondary fuel filter. (See page 2-186.)	
38	1,000 Hours or Annual		Exhaust System Dust Ejector	Remove and clean dust ejector. Inspect and replace any component of dust ejector that is damaged. (See page 2-198.)	

Go on to Sheet 22

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 22 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
39	**2,000 Hours or Annual**		**Vibration Damper Pulley**	Inspect damper. Marks (7) on damper hub and ring should aline. If not, replace damper. (See page 2-155.)	
					
40	**2,000 Hours or Annual**		**Engine Valve Lash**	Notify Direct Support Maintenance to adjust engine valve lash.	

Go on to Sheet 23

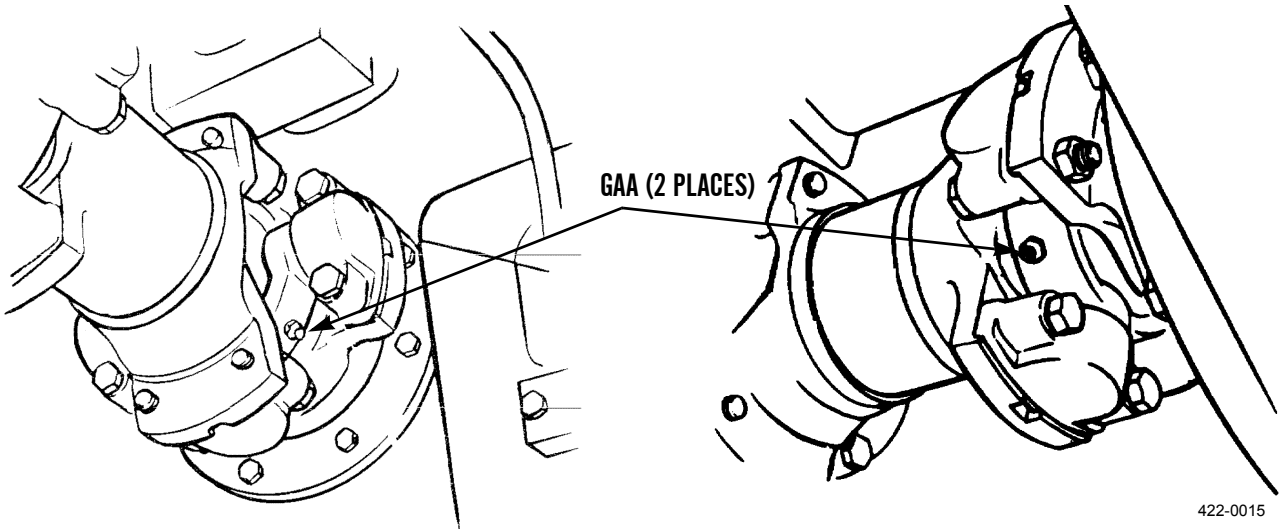
ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 23 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
41	2,000 Hours or Annual	1.0 Hours	Front and Rear Differentials and Final Drives	**NOTE** Capacity for each axle is 27 gal. (102.2 L). a. Drain oil from front and rear differentials and final drives. Refill with gear lubricating oil (Item 5 or 6, Appendix C). (See page 2-392.) b. Remove, clean, and reinstall one front differential breather and two rear differential breathers.	

Go on to Sheet 24

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 24 of 30)

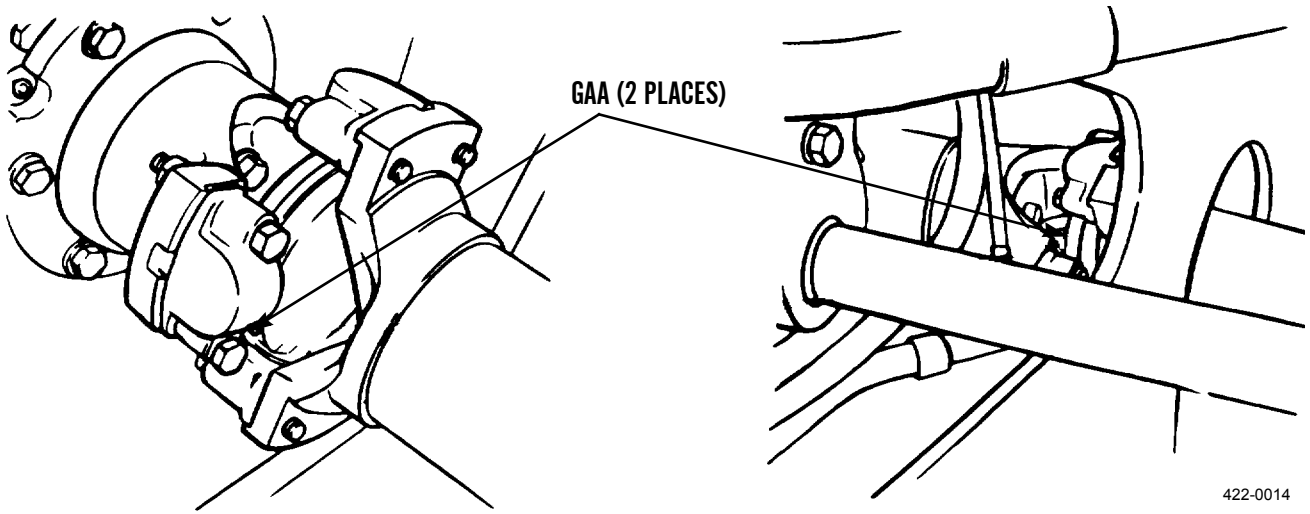
ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
42	**2,000 Hours or Annual**	**0.5 Hours**	**Lower Drive Shaft**	a. With rear of front crankcase guard lowered, inspect rear portion of drive shaft and universal joints for wear and damage. Replace if necessary. (See page 2-380.) b. Lubricate two fittings on rear portion of drive shaft with GAA grease (Item 3 or 4, Appendix C).	



Go on to Sheet 25

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 25 of 30)

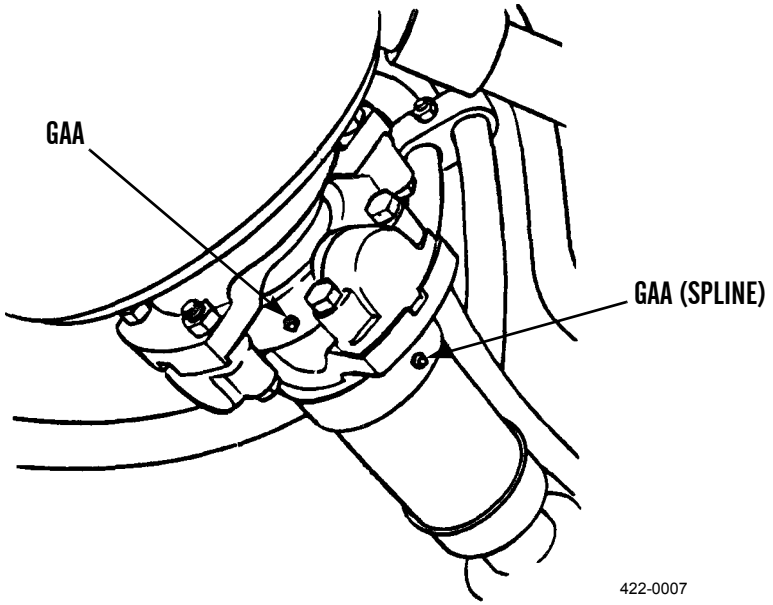
ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
42 (CONT)	**2,000 Hours or Annual**	**0.5 Hours**	**Lower Drive Shaft**	c. Inspect center portion of drive shaft and universal joints for wear and damage. Replace if necessary. (See page 2-380.) d. Lubricate two fittings on center portion of drive shaft with GAA grease (Item 3 or 4, Appendix C).	



Go on to Sheet 26

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 26 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
42 (CONT)	**2,000 Hours or Annual**	**0.5 Hours**	**Lower Drive Shaft**	e. Inspect front portion of drive shaft and universal joints for wear and damage. Replace if necessary. (See page 2-380.) f. Lubricate one fitting on front portion of drive shaft with GAA grease (Item 3 or 4, Appendix C). Lubricate second fitting on front drive shaft spline with GAA grease.	



Go on to Sheet 27

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 27 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION / ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
43	2,000 Hours or Annual	1.0 Hours	Hydraulic System	**WARNING** Hydraulic system is under pressure. Pressure must be relieved before loosening any hydraulic system line. Stop machine on level ground. Apply parking brake and shut down engine. Cycle all hydraulic control levers through all positions. Failure to relieve pressure as indicated may cause injury or death to personnel. a. Park machine on level ground, with parking brake applied, transmission in N (Neutral), container handler forks lowered to the ground, engine shut down, and wheels blocked. Relieve hydraulic system pressure by moving all hydraulic controls through all positions. b. Unlock and raise floor plate. c. Slowly remove filler cap. Inspect cap gasket and replace if damaged. **WARNING** Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition. Failure to follow this warning may cause injury or death to personnel. d. Remove retaining ring and filler screen from hydraulic tank. Wash screen in clean solvent cleaning compound (Item 17, Appendix C).	

Go on to Sheet 28

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 28 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION / ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
43 (CONT)	**2,000 Hours or Annual**	**1.0 Hours**	**Hydraulic System**	e. Install filler screen in hydraulic tank and secure with retaining ring. f. Remove drain plug from underside of hydraulic tank. Clean drain plug in solvent cleaning compound. **NOTE** Hydraulic system capacity is 130 gal. (492.1 L). g. Place a container under hydraulic tank drain opening. h. Install drain tool (pipe nipple) in drain opening to open internal drain valve. Allow all oil to drain from hydraulic tank. i. Remove drain tool and install drain plug. j. Replace two hydraulic tank filter elements. (See page 2-487.) k. Replace brake hydraulic system filter element. (See page 2-490.) l. Perform panel test to ensure LOW HYD OIL indicator is functioning. (See Operator PMCS in TM 10-3930-641-10.)	

Go on to Sheet 29

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 29 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
43 (CONT)	2,000 Hours or Annual	1.0 Hours	Hydraulic System	**NOTE** Do not start engine. m. Turn power switch to ON position. LOW HYD OIL indicator should come on. n. With power switch still on, begin filling hydraulic tank with oil (Item 7, 7.1, or 8, Appendix C). o. LOW HYD OIL indicator should turn off when oil level goes above ADD COLD mark in sight gage. p. Turn power switch to OFF position. q. Continue to add oil until level is at FULL COLD mark or completely fills sight gage. r. Install filler cap. s. Start engine, raise container handler forks, and tilt them back and forth several times. (See TM 10-3930-641-10.) t. Lower container handler forks to the ground and apply parking brake. (See TM 10-3930-641-10.) u. Oil must be free of bubbles. If bubbles are present, inspect suction lines hoses and clamps. v. Shut down engine. (See TM 10-3930-641-10.)	

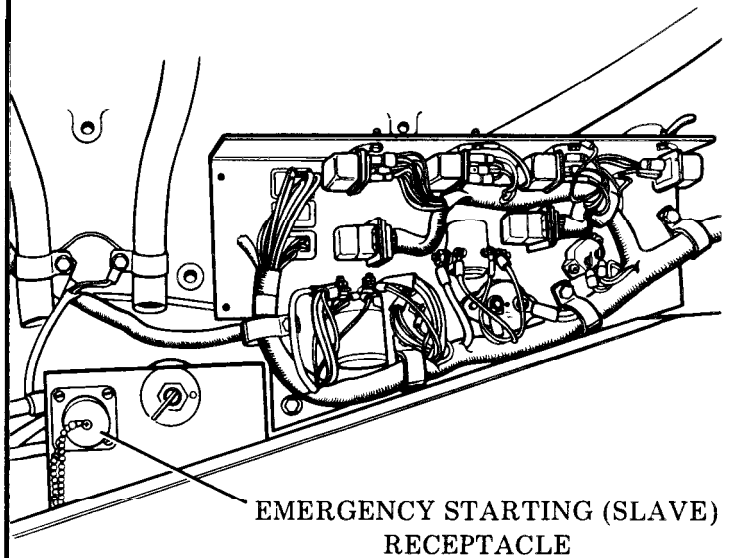
Go on to Sheet 30

ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) (CONT) (Sheet 30 of 30)

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
43 (CONT)	2,000 Hours or Annual	1.0 Hours	Hydraulic System	w. Tighten clamps if loose and replace hoses if damaged.	
44	2,000 Hours or Annual		Front and Rear Frames	Inspect front and rear frames for damage, misalinement, cracks, or broken welds. Notify Direct Support Maintenance of any problem found.	
45	4,000 Hours or Biennial	0.5 Hours	Cooling System	**WARNING** • DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant will cause serious burns. • DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Loosen cap to first stop and let any pressure out of cooling system, then remove cap. Failure to follow this warning may cause serious burns. • Wear effective eye, glove, and skin protection when handling coolants. Failure to follow this warning may cause injury to personnel. Change antifreeze solution in radiator and replace coolant filter. (See page 2-215.)	
46	Triennial		Seat Belt	Replace seat belt that is more than three years old, as indicated on manufacturer's tag on belt.	

End

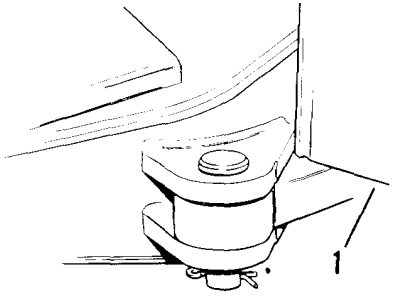
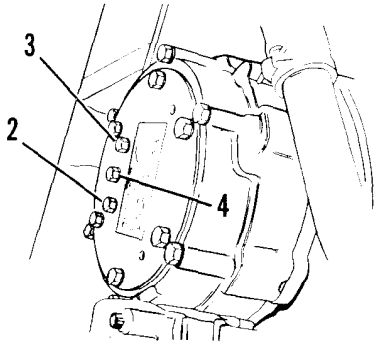
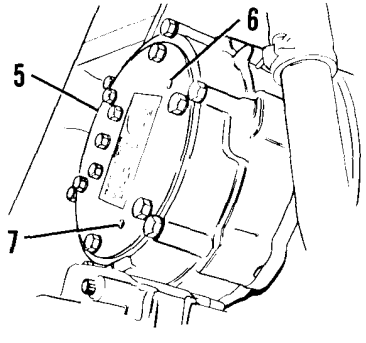
STARTING WITH OUTSIDE ELECTRICAL SOURCE (Sheet 1 of 1)

LOCATION/ITEM	ACTION	REMARKS
	CAUTION Be sure main disconnect switch and POWER switch are off and keys removed before you connect slave cable to your vehicle.	
1. Starting cable	Connect to emergency starting (slave) receptacle.	 EMERGENCY STARTING (SLAVE) RECEPTACLE
2. Engine	Start. NOTE To use the emergency starting receptacle, use jumper cable with a plug to mate with receptacle. Connect external stating source first, then insert plug into receptacle of vehicle to be started. After engine starts, remove plug from receptacle.	See TM 10-3930-641-10.

TA 098889

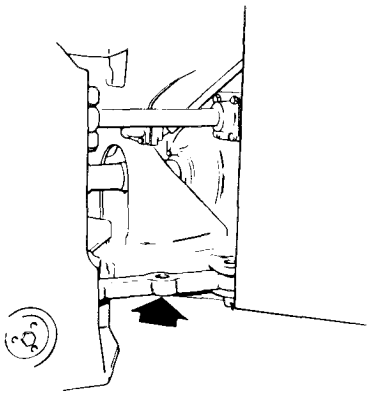
End

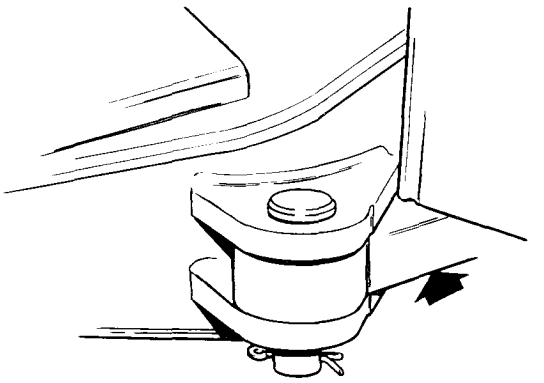
MANUAL RELEASE OF PARKING BRAKE

LOCATION/ITEM	ACTION	REMARKS
	Po manually release parking brake, do the following:	
1. Wheels	Block. This will keep the vehicle from rolling vhen parking brake is released.	
2. Shipping link (1) at bottom of articulated (steering) joint, left side of vehicle.	Connect to front and rear frames. (See page 2-27.)	
3. Capscrews (2, 3, 4) on cover of parking/emergency brake. Parking brake is mounted on front of transmission housing.	Remove from storage holes in cover.	
4. Capscrews	a. Install capscrews in forcing holes (5, 6, 7) in cover of emergency/parking brake. b. Tighten until there is solid resistance. CAUTION After repairs have been made and before operating the vehicle, disconnect shipping link (1), remove capscrews from forcing holes. Install capscrews in storage holes.	   TA 098576 End

SHIPPING LINK INSTALLATION AND STORAGE (Sheet 1 of 1)

LOCATION/ITEM	ACTION	REMARKS
	Install shipping link between front and rear frames to keep vehicle in straight-ahead position when vehicle is being: a. Lifted. b. Transported. c. Serviced near its center.	CAUTION Do not tow with shipping link installed.
INSTALLATION		
Shipping link	a. POSITION between frames. b. SECURE with pins and cotter pins.	
STORAGE		
Shipping link	a. REMOVE from frames. b. SECURE to retaining plates with pins.	





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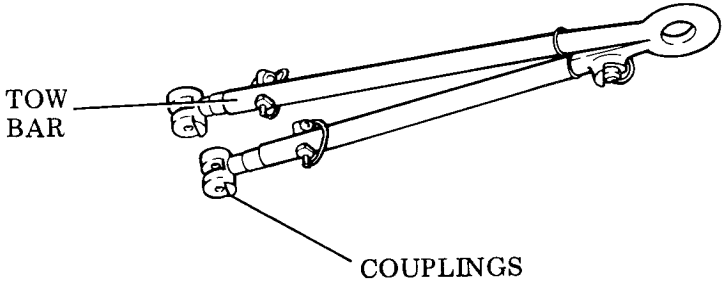
End

TOWING

WARNING

Never use a tow line. Always use a medium duty tow bar. (See MS500048.)



NOTE

Tow with engine running to control operable steering and brakes.

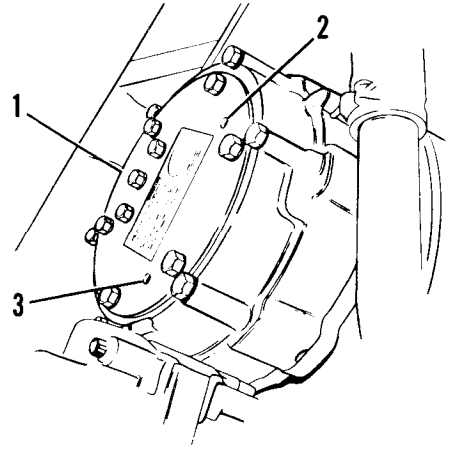
Do not tow vehicle faster than 5 MPH (8 km/hr) or farther than 10 miles (16 km).

1. Put tension on tow bar and check that couplings are attached properly.
2. You must be in the vehicle to steer it while it is being towed.
3. If you think there is an engine or transmission failure, tell direct support. They will have to remove the axle shafts and the transmission input drive shaft before towing.

WARNING

There is no emergency brake if all four axle shafts or front and rear drive shafts are removed.

4. Install capscrews in forcing holes (1, 2, 3). Tighten until there is solid resistance.
5. Reverse steering cylinder hoses on one cylinder only, so steering cylinders can move freely.
6. Inspect the vehicle for powertrain damage. If there is damage, remove all four axle shafts.



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End

Section IV. TROUBLESHOOTING

The symptoms index for organizational maintenance starts on page 2-30. It lists the malfunctions (symptoms), tests or inspections and corrective actions that the organization can ordinarily perform. It also lists the malfunctions which have to be referred to higher maintenance levels.

The troubleshooting table starts on page 2-34. In an emergency where immediate corrective action must be taken to operate the vehicle, you may have to perform actions which are ordinarily beyond your responsibility.

Bear in mind that it is not possible to list all the malfunctions which might develop. If you have a problem that is not included in the table, notify your supervisor.

SYMPTOMS INDEX (Sheet 1 of 4)

NOTE

Before you begin troubleshooting, be sure you have performed all applicable operating checks.

Go on to Sheet 2

SYMPTOMS INDEX (CONT) (Sheet 2 of 4)

Go on to Sheet 3

SYMPTOMS INDEX (CONT) (Sheet 3 of 4)

Go on to Sheet 4

SYMPTOMS INDEX (CONT) (Sheet 4 of 4)

End

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

BRAKE SYSTEM

1. BRAKES ARE SLOW TO STOP VEHICLE

Step 1. Check brake pedal travel.
Adjust pedal travel. (See page 2-369.)

Step 2. Inspect for leaking lines or fittings.
Tighten/replace.

Step 3. Inspect lines for kinks.
Straighten or replace.

BRAKES DO NOT RELEASE

Inspect brake control linkage for binding.
Replace/adjust. (See page 2-353.)

3. BRAKES DO NOT STOP VEHICLE

Step 1. Inspect hydraulic reservoir fluid level.
Add fluid. (See LO 10-3930-641-12.)

Step 2. Inspect brake pedal travel.
Adjust pedal travel. (See page 2-369.)

Step 3. Inspect brake linkage.
Adjust. (See page 2-366.)

Step 4. Inspect brake lines for kinks.
Straighten or replace.

TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

BRAKE SYSTEM (CONT)

4. BRAKES RELEASE SLOWLY

Step 1. Inspect brake control linkage adjustment.
Adjust linkage. (See page 2-366.)

Step 2. Check lines for restrictions,
Clean lines.

5. EMERGENCY PARKING BRAKE DOESN'T DISENGAGE

Step 1. Inspect lines for restrictions.
Clean lines.

Step 2. Inspect for loose fittings.
Tighten fittings.

Step 3. Inspect control valve linkage for proper adjustment.
Adjust linkage. (See page 2-358.)

6. EMERGENCY PARKING BRAKE DOESN'T WORK

Inspect parking brake control valve linkage for adjustment or defective parts.
Adjust/replace. (See page 2-358.)

7. TRANSMISSION DOES NOT DISENGAGE WHEN LEFT BRAKE PEDAL IS PUSHED

Inspect adjustment of brake control linkage.
Adjust. (See page 2-366.)

TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ENGINE

1. ALTERNATOR INDICATOR LIGHT COMES ON - ALTERNATOR IS NOT CHARGING

Step 1. Inspect drive belt.
Adjust/replace. (See page 2-252.)

Step 2. Check battery connections.
Clean/tighten. (See page 2-272.)

2. ALTERNATOR IS NOISY

Step 1. Inspect drive belt for damage or wear.
Replace. (See page 2-252.)

Step 2. Inspect alternator drive pulley keyway.
Replace drive pulley if keyway is worn and pulley is loose. (See page 2-252.)

Step 3. Check alinement of pulley and drive belt.
Aline. (See page 2-252.)

3. BLACK OR GRAY SMOKE FROM EXHAUST

Inspect cleaner for obstructions.
Service. (See page 2-198.)

4. COOLANT IN LUBE OIL
Inspect engine oil cooler.
Notify direct support.

TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ENGINE (CONT)

5. ENGINE CRANKS BUT WILL NOT START OR IS HARD TO START

Step 1. Inspect fuel level.
Add fuel. (See page 2-193.)

Step 2. Inspect fuel filters.
Clean/replace. (See pages 2-183 and 2-186.)

Step 3. Check for bad quality fuel. (Drain small amount and visually check for particles.)
Replace fuel. (See page 2-193.)
Replace fuel filter element. (See pages 2-183 and 2-186.)

Step 4. Check exhaust for white smoke.
Use ether as required.
Check ether system for proper operation.

6. ENGINE DOES NOT DEVELOP FULL POWER

Step 1. See if quality of fuel is bad. (Drain small amount and visually check for particles.)
Replace fuel. (See page 2-193.)
Replace fuel filter element. (See pages 2-183 and 2-186.)

Step 2. Inspect for restriction of air inlet filter.
Replace air filter elements. (See page 2-198.)

Step 3. Inspect for low fuel pressure.
Check fuel filters - clean/replace. (See pages 2-183 and 2-186.)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ENGINE (CONT)

7. ENGINE KNOCKS

See if fuel quality is bad. (Drain small amount and check for particles.)
Replace fuel. (See page 2-193.)
Replace fuel filter elements. (See pages 2-183 and 2-186.)

8. ENGINE OVERHEATS

Step 1. Check coolant level. Coolant level should be within 1/2” of bottom of fill pipe.
Add coolant. (See page 2-215.)

Step 2. Inspect radiator core for debris.
Clean radiator core.

Step 3. Inspect engine oil level.
Add oil to specified level. (See page 2-152.)

Step 4. Inspect radiator pressure cap for defects.
Replace cap.

Step 5. Inspect transmission oil level.
Add oil if necessary. (See page 2-402.)

Step 6. Determine if the vehicle is being continuously overloaded.
Direct operator not to exceed rated load capacity.

NOTE

RTCH is rated to carry 50,000 lb. load. Do not exceed capacity.

TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ENGINE (CONT)

9. ENGINE MISFIRES OR RUNS ROUGH

Step 1. Inspect fuel level.
Add fuel. (See page 2-193.)

Step 2. Check exhaust for white smoke.
Use ether as required.

Step 3. Inspect fuel lines between fuel tank and fuel transfer pump for crimps, leaks, and bends.
Replace fuel lines. (See page 2-173.)

Step 4. Check fuel pressure.
Replace fuel filter (secondary). (See page 2-186.)
Clean primary fuel filter. (See page 2-183.)

10. ENGINE STALLS AT LOW RPM

Inspect fuel lines between fuel tank and fuel transfer pump for crimps, leaks, and bends.
Replace fuel lines. (See page 2-173.)

11. ENGINE WILL NOT CRANK WHEN IGNITION SWITCH IS IN START POSITION

Step 1. Inspect main disconnect switch.
Turn to ON position. (See TM 10-3930-641-10.)

Step 2. Inspect batteries.
Charge/replace. (See page 2-277.)

Step 3. Inspect starting motor for damage.
Replace. (See page 2-258.)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ENGINE (CONT)

12. EXHAUST SMOKE IS HOT AND THICK

Step 1. Check for restrictions in exhaust system.
Remove restrictions.

Step 2. Inspect air filter elements.
Replace. (See page 2-198.)

13. LOW ENGINE OIL PRESSURE

Step 1. Check oil level.
Add oil if necessary. (See page 2-152.)

Step 2. Inspect engine oil filter elements.
Replace. (See page 2-152.)

Step 3. Inspect engine oil cooler.
Notify direct support.

14. OIL IN COOLING SYSTEM

Step 1. Inspect engine oil cooler for defects.
Notify direct support.

Step 2. Inspect transmission oil cooler for defects.
Notify direct support.

TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ENGINE (CONT)

15. STARTING MOTOR DOES NOT TURN OVER

Step 1. Inspect batteries.
Recharge/replace. (See page 2-277.)

Step 2. Inspect battery connections.
Clean and tighten.

Step 3. Check electrical starting circuit. (See page 2-74.)

Step 4. Test solenoid.
Replace. (See page 2-261.)

Step 5. Inspect starting motor.
Replace. (See page 2-258.)

16. SUDDEN LARGE INCREASE IN FUEL USE

Inspect fuel lines and fittings for leaks.
Replace. (See page 2-173.)

17. UNUSUAL ENGINE VIBRATIONS

Step 1. Test fan assembly for fan blade out of balance.
Remove fan belts (see page 2-229) and operate engine at speed that had vibration. If there is no vibration, replace fan assembly. (See page 2-236.)

Step 2. Check fan drive pulley for loose capscrews.
Tighten capscrevw. (See page 2-155.)

TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

ENGINE (CONT)

18. WHITE OR BLUE SMOKE FROM EXHAUST

Step 1. Inspect for engine oil past specified level.
Drain engine oil to specified level.

Step 2. Excessive oil consumption caused by engine running rough or misfiring.
Inspect air cleaner for obstructions.
Service. (See page 2-198.)

HYDRAULIC SYSTEM

1. BOUNCY ACTION OR NO MOVEMENT OF HYDRAULIC SYSTEM WHEN TRYING TO LIFT A LOAD

Test for air in hydraulic system.
Bleed air from system by using bleed screw at top of lift cylinder. (See page 2-496.)

2. CARRIAGE WILL NOT LOWER CORRECTLY

Step 1. Inspect mast sliding blocks, rollers, and chains for correct lubrication.
Lubricate components as necessary. (See LO 10-3930-641-12.)

Step 2. Inspect lift line for restrictions.
Clean/replace.

Step 3. Check control linkage for proper adjustment. (See page 2-497.)

3. HYDRAULIC SYSTEM WILL NOT HOLD A LOAD

Inspect lines and fittings for leaks.
Tighten.

TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HYDRAULIC SYSTEM (CONT)

4. HYDRAULIC SYSTEM WILL NOT LIFT LOAD

Step 1. Inspect lines and fittings for leaks.
Replace/tighten.

Step 2. Inspect mast sliding blocks, rollers, and chains for correct lubrication.
Lubricate components as necessary. (See LO 10-3930-641-12.)

Step 3. Check control linkage for proper adjustment. (See page 2-502.)

5. LIFT OR TILT CYLINDERS DO NOT HOLD POSITION WITH HYDRAULIC CONTROL LEVERS IN NEUTRAL CONDITION

Inspect lines and fittings for leaks.
Tighten.

6. MAST TILTS TOO SLOWLY

Step 1. Inspect tilt cylinder packing nut for tightness.
Loosen nut.

Step 2. Check control linkage for proper adjustment. (See page 2-497.)

7. NOISY HYDRAULIC PUMP

Step 1. Inspect oil level.
Add oil. (See LO 10-3930-641-12.)

Step 2. Inspect filter for dirt.
Replace filter. (See page 2-487.)

TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

HYDRAULIC SYSTEM (CONT)

8. OIL TEMPERATURE TOO HIGH - HYDRAULIC OIL TEMPERATURE NEEDLE IS IN RED AREA

Step 1. Inspect oil level.
Add oil. (See LO 10-3930-641-12.)

Step 2. Inspect hydraulic oil cooler core for debris.
Clean core.

Step 3. Inspect oil lines for restrictions.
Clean oil lines.

Step 4. Decide if system has been continuously overloaded.

NOTE

RTCH is rated to carry 50,000 lb. loads. Do not exceed capacity.

TORQUE CONVERTER

TORQUE CONVERTER OVERHEATS – NEEDLE OF TORQUE CONVERTER OIL TEMPERATURE GAGE IS IN RED AREA

Step 1. Check transmission oil level.
Add oil. (See LO 10-3930-641-12.)

Step 2. Check coolant level in engine radiator.
Fill to 1/2” below bottom of fill pipe. (See page 2-214.)

Step 3. See if vehicle has been operated continuously at overload capacity.

NOTE

RTCH has rated load capacity of 50,000 lb. Tell operator not to exceed rated load capacity.

TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TRANSFER CASES AND DRIVE LINE COMPONENTS

1. FINAL DRIVE IS LOCKED

Inspect oil levels.
Add oil. (See LO 10-3930-641-12.)
Replace breather if plugged. (See page 2-392.)

2. FRONT OR REAR DIFFERENTIALS IN OPERATIVE

Inspect oil levels.
Add oil. (See LO 10-3930-641-12.)
Replace breather if plugged. (See page 2-392.)

3. NOISY TRANSFER GEARS

Step 1. Check transmission oil.
Add oil. (See LO 10-3930-641-12.)

Step 2. Inspect main drive shaft universal points.
Tighten capscrews. (See page 2-377.)

4. SYSTEM LOSES OIL

Step 1. Check drain plug.
Tighten/replace.

Step 2. Inspect all lines and fittings.
Tighten/replace.

TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TRANSMISSION

1. BACKUP WARNING ALARM DOES NOT SOUND WHEN TRANSMISSION SELECTION LEVER IS PUT IN REVERSE.

Step 1. Inspect direction control linkage for defects or incorrect adjustment.
Replace defective parts. (See page 2-412.)
Adjust linkage. (See page 2-407.)

Step 2. Test warning switch. (See page 2-334.)
Replace.

Step 3. Test backup warning alarm. (See page 2-334.)
Replace.

2. TRANSMISSION DOESN'T WORK WHEN SPEED SELECTION LEVER IS PLACED IN ANY SPEED.

Step 1. Inspect transmission oil level.
Add oil. (See LO 10-3930-641-12.)

Step 2. Inspect speed control linkage for incorrect adjustment and broken or defective parts.
Replace broken or defective parts. (See page 2-412.)
Adjust linkage. (See page 2-407.)

3. TRANSMISSION OIL INDICATOR LIGHT COMES ON DURING OPERATION

Step 1. Inspect oil filter.
Replace oil filter element. (See page 2-402.)

Step 2. Check transmission oil. (See page 2-402.)

4. TRANSMISSION OVERHEATS - TORQUE CONVERTER OIL TEMPERATURE GAGE NEEDLE IS IN RED AREA.

Step 1. Inspect transmission oil level.
Add oil. (See LO 10-3930-641-12.)

Step 2. Inspect magnetic strainer in output transfer gear case.
Clean. (See page 2-403.)

TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TRANSMISSION (CONT)

5. TRANSMISSION WILL NOT SHIFT FROM ONE DIRECTION TO ANOTHER

Inspect direction control linkage for incorrect adjustment and broken or defective. parts.
Replace defective parts. (See page 2-412.)
Adjust linkage. (See page 2-407.)

6. TRANSMISSION WILL NOT SHIFT FROM ONE SPEED TO ANOTHER

Inspect speed control linkage for incorrect adjustment and broken or defective parts.
Replace broken or defective parts. (See page 2-412.)
Adjust linkage. (See page 2-407.)

7. TRANSMISSION SHIFTS ROUGHLY – SPEED RANGES ENGAGE VERY SUDDENLY

Inspect adjustment of control linkages.
Adjust. (See page 2-407.)

8. TRANSMISSION SHIFTS SLOWLY

Inspection transmission oil level.
Add oil. (See LO 10-3930-641-12.)

9. WARNING ALARM DOES NOT SOUND WHEN TRANSMISSION DIRECTION SELECTION LEVER IS MOVED FROM NEUTRAL WHILE ENGINE IS RUNNING AND PARKING BRAKE IS ON

Step 1. Inspect direction control linkage for incorrect adjustment or defects.
Adjust linkage. (See page 2-407.)
Replace defective parts. (See page 2-412.)

Step 2. Test warning switch. (See page 2-334.)
Replace warning switch.

Step 3. Test backup warning alarm. (See page 2-334.)
Replace alarm.

TROUBLESHOOTING (CONT)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

TRANSMISSION (CONT)

10. TRANSMISSION DOES NOT WORK IN ANY FORWARD SPEED OR ANY REVERSE SPEED

Step 1. Inspect adjustmerit of direction control linkage.
Adjust. (see page 2-407.)

Step 2. Inspect oil pump.
Replace. Notify Direct Support.

11. VEHICLE MOVES WHEN SELECTION LEVER IS IN NEUTRAL

Inspect direction control linkage for correct adjustment or damaged parts.
Replace damaged parts. (See page 2-412.)
Adjust linkage. (See page 2-407.)

STEERING SYSTEM

1. STEERING WHEEL CAN STILL BE TURNED WHEN VEHICLE IS AT FULL TURN

Inspect adjustment of striker assembly for neutralizer valve.
Notify direct support.

2. STEERING WHEEL IS HARD TO TURN

Step 1. Allow hydraulic oil to warm up to normal operating temperatures.

Step 2. Inspect lines of hand metering unit for restrictions.
Clean/replace lines.

3. VEHICLE DOESN'T TURN WHEN STEERING WHEEL IS TURNED

Step 1. Check shipping link.
Disconnect shipping link. (See page 2-27.)

Step 2. Inspect hydraulic oil reservoir.
Add oil. (See LO 10-3930-641-12.)

Step 3. Check steering lines for restriction.
Clean lines.

Step 4. Inspect steering pump for damage.
Notify Direct Support.

GENERAL

This section contains troubleshooting information for isolating most electrical problems to an individual circuit and in most cases to an individual component. Replacement of the component is, in most cases, referenced to another section unless only basic knowledge is required to perform the task.

This manual cannot cover all possible problems, however, the most likely to occur ue mentioned. In general, a switch or sending unit is more likely to be defective than a gage or indicator. The least likely cause of a problem would be in the wires or harnesses.

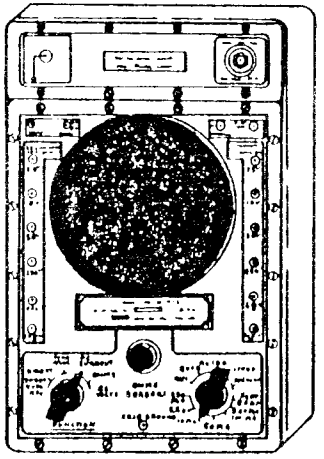
TROUBLESHOOTING

To use the QUICK GUIDE (pages 2-71 through 2-73): determine which system, engine, alternator, etc., the PROBLEM occurs in, then go down list of PROBLEMS until problem is found. Refer to page under REFERENCE column. Read QUESTION for each STEP. If answer to QUESTION is YES, go to STEP number shown under YES; if answer is NO, go to STEP number shown under NO.

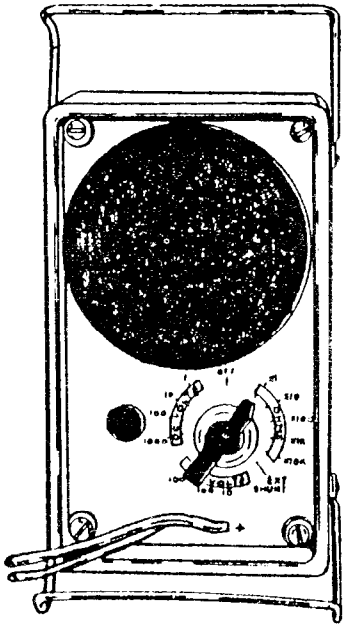
ELECTRICAL TEST EQUIPMENT (Sheet 1 of 8)

GENERAL

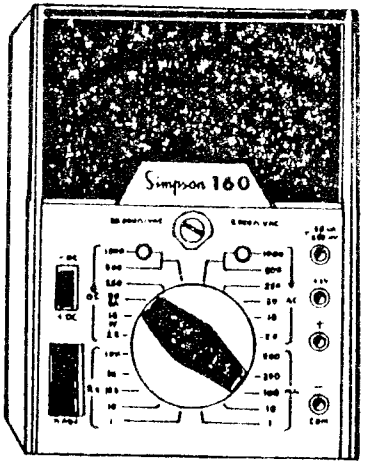
All needed electrical testing can be done using a multimeter. This section shows how to use a multimeter for finding the causes of electrical problems which may develop in the vehicle. The TS-352 B/U, the AN/URM-105, and the Simpson 160 are the models you can get in organizational maintenance automotive shop sets. They all do the same job. This section shows how to set up, zero, and do testing with any of the three muitimeters. The ohms scale is used for continuity, shorts, and resistance testing. AC/DC voltages can also be measured using the multimeter.



TS-352 B/U



AN/URM-105



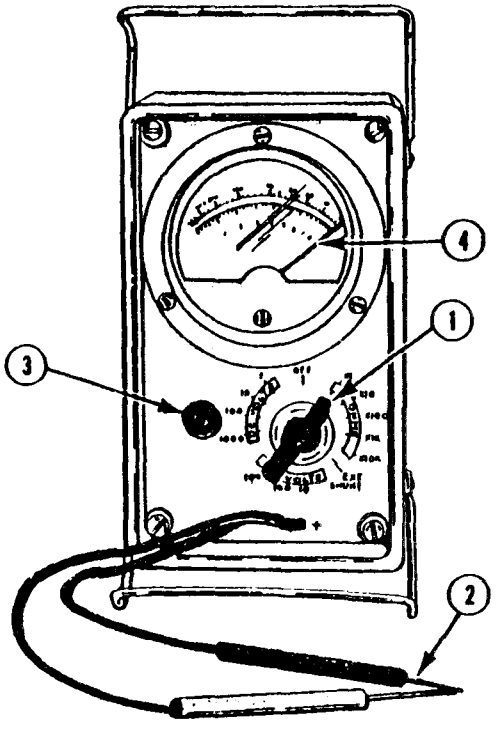
SIMPSON 160

TA 098579

Go on to Sheet 2

OHMS SCALE

USING THE OHMS SCALE



The ohms (Ω) scale is used to make tests for continuity, shorts, and resistance.

NOTE

Proper operation of electrical components depends upon proper grounding. In all troubleshooting procedures of devices which depend on screws or physical contact for their electrical ground (lamp sockets, sending units, batteries, etc), use a jumper wire from the device to the truck frame to check grounding.

The multimeter must be set up and zeroed before making these tests. Perform the following steps for the multimeter you are using.

AN/URM-105

A Set selector switch (1) to X1 ohms position.

B Now zero the meter. Touch the two probes (2) together while turning ohms adj knob (3) until needle (4) is over 0 on the top scale.

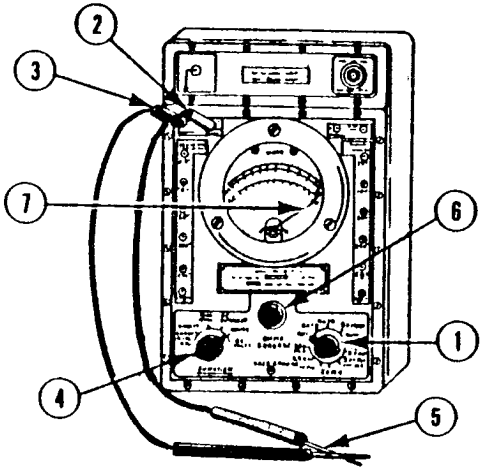
C If needle will not zero, replace the batteries. If needle still will not zero after replacing the batteries, turn in the multimeter for repair.

TA 098580

Go on to Sheet 3

OHMS SCALE (CONT)

USING THE OHMS SCALE (CONT)



SIMPSON 160

A Set selector switch (1) on RX1.

B Put black (-) lead (2) in COM-jack.

C Put red (+) lead (3) in + jack.

D Set polarity reversing switch (4) on +DC.

E Touch the two probes (5) together.

F Zero meter by turning the OHMS ZERO ADJ (6) knob until needle (7) is over 0 on top scale.

G If needle will not zero, replace the batteries. If needle still will not zero after replacing the batteries, turn in the multimeter for repair.

TS-352 B/U

A Set RANGE switch (1) to RX1.

B Put black (-) lead (2) into the OHMS -DC ± AC jack.

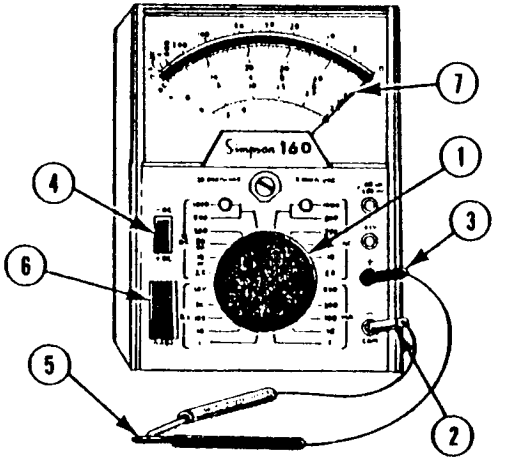
C Put red (+) lead (3) in the upper left OHMS jack.

D Turn FUNCTION switch (4) to OHMS.

E Touch the two probes (5) together.

F Zero meter by turning the OHMS ZERO ADJ (6) knob until needle (7) is over 0 on top scale.

G If needle will not zero, replace the batteries. If needle still will not zero after replacing the batteries, turn in the multimeter for repair.

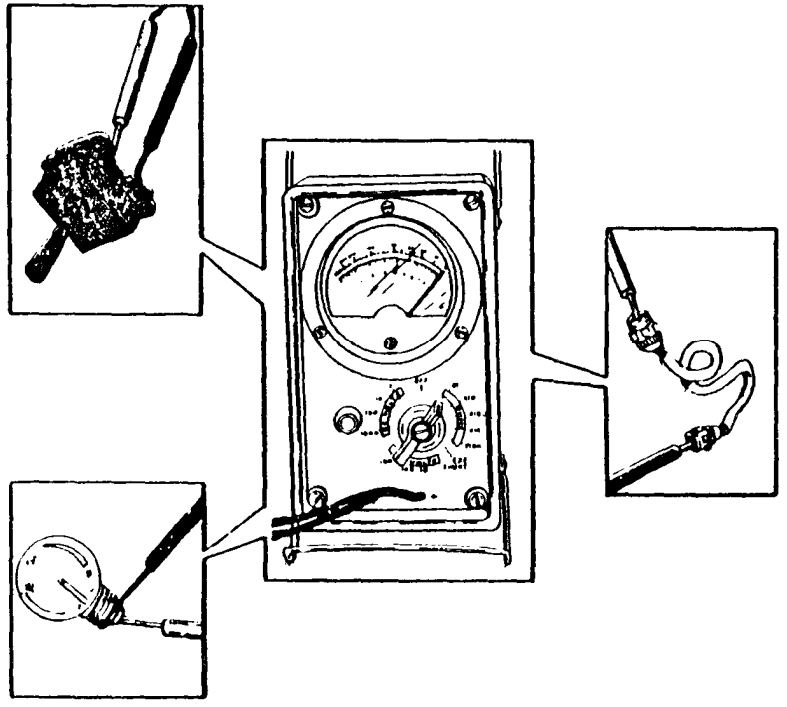


TA 098581

Go on to Sheet 4

OHMS SCALE (CONT)

TESTING FOR CONTINUITY



Continuity tests are made to check for breaks in a circuit, such as the switch, light bulb, or electrical cable as shown. To make a continuity check, do the following steps:

A Set up and zero the multimeter.

CAUTION

Failure to do the following step can damage the multimeter.

B Disconnect the circuit being tested. To be safe, disconnect the battery ground strap.

C Connect the meter probes to both terminals of the circuit being tested. (The AN/ URM-105 is illustrated, but the probes are connected to the circuit the same way with all three multimeters.)

D Observe needle movement.

If the needle swings to the far right over the 0 on the top scale, the circuit has continuity.

If the needle doesn't move, the circuit is open (broken).

If the needle jumps or flickers, there is a loose connection in the circuit being tested.

TA 098582

Go on to Sheet 5

OHMS SCALE (CONT)

TESTING FOR SHORT CIRCUITS

A short or short circuit occurs when two circuits that should not be connected have contact with each other. A short also occurs when a circuit that should not touch ground has contact with ground. To check for shorts, do the following steps:

A Set up and zero the multimeter.

CAUTION

Failure to do the following step can damage the multimeter.

B Disconnect the circuit being tested. To be safe, disconnect the battery ground strap.

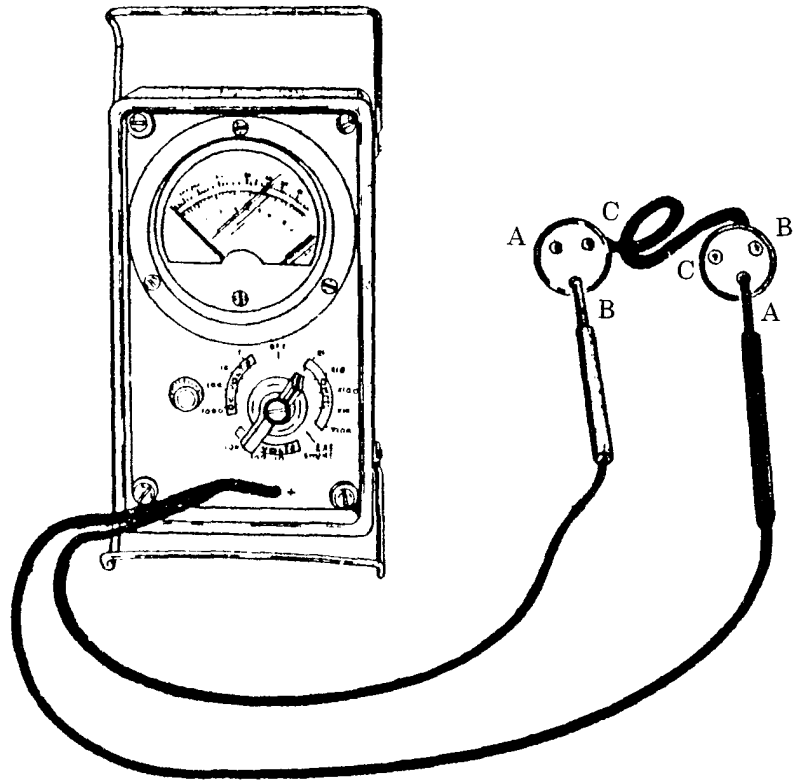
C Connect one probe to one circuit and the other prcbe to the other circuit or ground (if checking for a short to ground). The examp~e shows a check to see if wire A is shorted to wire B in the wiring harness.

D Observe needle movement.

If the needle swings to the far right over the 0 on the top scale, the circuits are short circuited.

If the needle doesn't move, the circuits are not short circuited.

If needle jumps or flickers, the circuits are intermittently short circuited.



TA 098583

Go on to Sheet 6

OHMS SCALE (CONT)

MEASURING RESISTANCE

To measure resistance, do the following steps:

A Setup and zero the multimeter.

CAUTION

Failure to do the following step can damage the rnultimeter.

B Disconnect the circuit being tested. To be safe, disconnect the battery ground strap.

NOTE

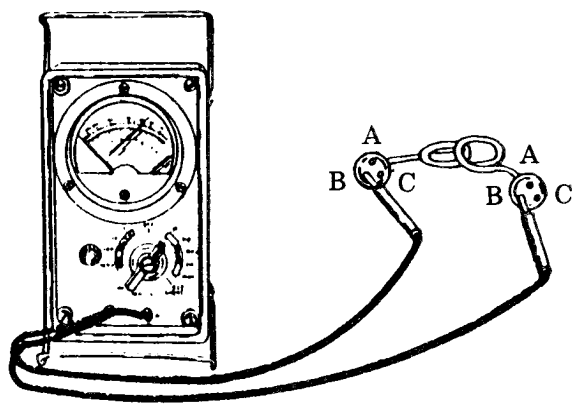
Zero the meter every time you change ranges.

C If the test calls for an ohms range different than RX1 or Xl, set the selector switch to that range (like RX10 or X10).

D Connect the probes across the circuit or item to be measured. The example shows measuring the resistance of one wire in a three-wire cable.

E Read the meter. If the meter switch is on the RXI or Xl range, the reading is taken directly from the top scale. If the meter switch is on a different range, multiply the reading on the scale according to the table below.

OHMS SWITCH SETTING	SCALE
Xl or RX1	Read number on scale
X10 or RX10	Multiply reading by 10
X100 or RX100	Multiply reading by 100
X1K or RX1K	Multiply reading by 1000
X10K or RX10K	Multiply reading by 10,000



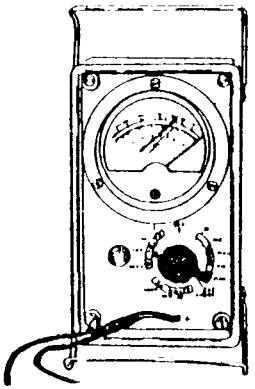
TA 098584

Go on to Sheet 7

ELECTRICAL TEST EQUIPMENT (CONT) (Sheet 7 of 8)

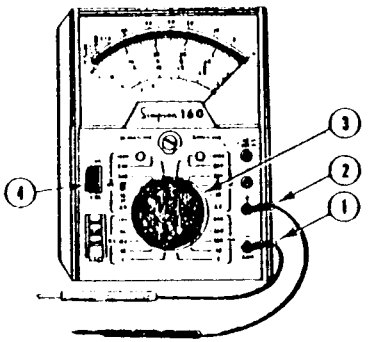
DC VOLTS SCALE

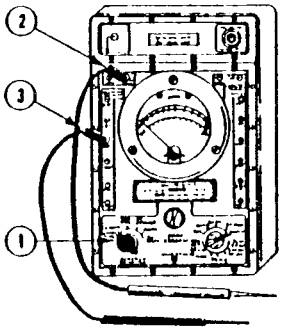
USING THE DC VOLTS SCALE



AN/URM-105

SIMPSON 160





TS-352 B/U

SETTING UP THE METER

Before using the multimeter to measure DC volts, do the following steps pertaining to the multimeter you have.

AN/URM-l05

Set meter switch to DC volts range. (To measure 24 volts DC, set switch on 100 DC VOLTS range.)

TS-352 B/U

A Set FUNCTION switch (1) to DIRECT.

B Put black lead (2) in OHMS-DC/±AC jack.

C To measure 24 volts DC, plug red lead (3) into 50V jack on left side of meter. (If measuring less than 10 volts DC, use 10V jack. If measuring less than 2.5 volts DC, use 2.5V jack.)

SIMPSON 160

A Connect black lead (1) to COM-jack.

B Connect red lead (2) to + jack.

C To measure volts DC, set selector switch (3) to VDC 50 position. (If measuring less than 10 volts DC, set selector switch to VDC 10 position. If measuring less than 2.5 volts DC, set selector switch to VDC 2.5 position.)

D Set polarity reversing switch (4) to +DC.

TA 098585

Go on to Sheet 8

DC VOLTS SCALE (CONT)

MEASURING DC VOLTS

To measure DC voltage, do the following steps:

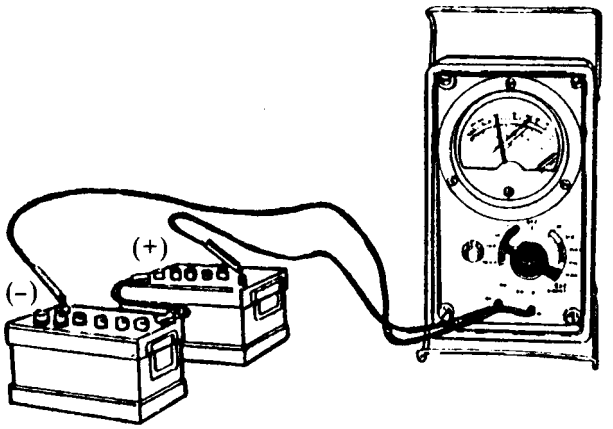
A Set up and zero multimeter.

CAUTION

If you are unsure of the voltage to be measured on the vehicle, always start on the highest range. This will protect the meter.

B Connect the red probe to the positive (+) side of the circuit and the black probe to the negative (-) side. The example shows 24 volts DC being measured across the batteries.

C Read the meter. If the needle moves off scale to the left, reverse the probes on the circuit.



NOTE

The following examples show how to read all three multimeters.

AN/URM-l05

Read the DC volts scale for the range at which the selector switch is set.

SWITCH SETTING	SCALE
1000 DC VOLTS	0-10 (and multiply by 100)
100 DC VOLTS	0-10 (and multiply by 10)
10 DC VOLTS	0-10
1 DC VOLT	0-10 (and divide by 10)

TS-352 B/U

Read the DC volts scale for the range at which the red lead is plugged.

RANGE	SCALE
50V	0-5 (and multiply by 10)
10V	0-10 (and multiply by 4)
2. 5V	0-2.5

SIMPSON 160

Read the DC volts scale for the range at which the selector switch is set.

SWITCH SETTING	SCALE
VDC 50	0-50
VDC 10	0-10
VDC 2.5	0-25 (and divide by 10)

TA 098586

End

CODES, ABBREVIATIONS AND SYMBOLS (Sheet 1 of 3)

COLOR CODE

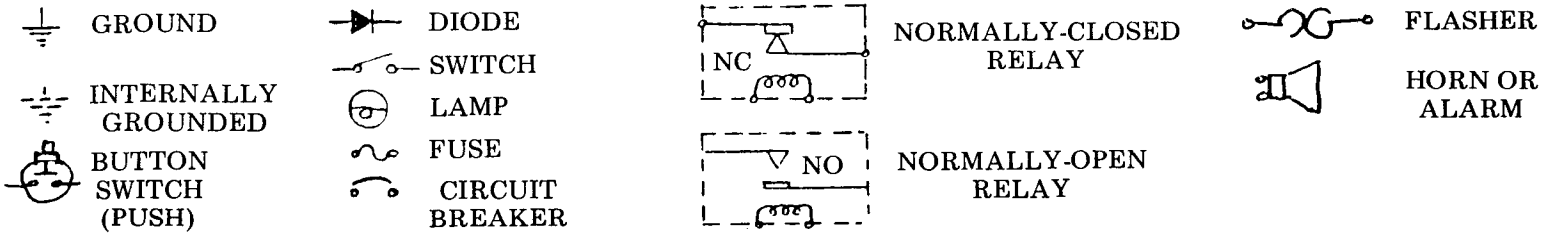
Wire and connector colors are shown according to the following color code:

Abbreviation	Color	Abbreviation	Color
R	Red	GY	Gray
W	White	PR	Purple
O	Orange	BR	Brown
Y	Yellow	DK G	Dark Green
T	Tan	DK BL	Dark Blue
PK	Pink	LT G	Light Green
BK	Black	LT BL	Light Blue
G	Green		

Two colors separated by a slash mark indicate a wire with a stripe - for example, R/LT G is a red wire with a light green stripe. Note the correct codes for colors often confused:

BK is black, BL is blue, PK is pink, PR is purple.

SYMBOLS



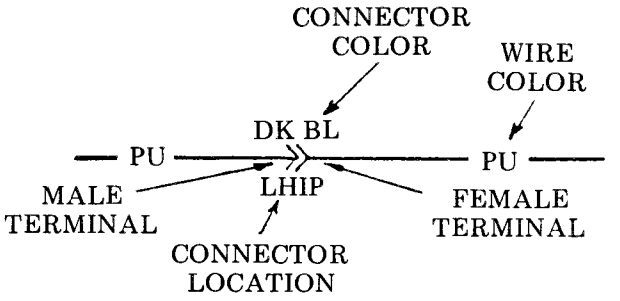
TA 098587

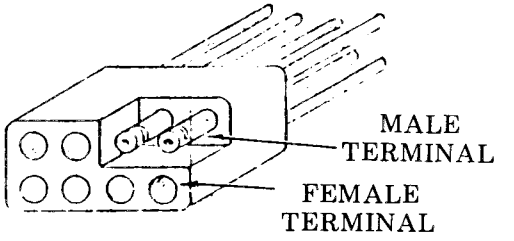
Go on to Sheet 2

CODES AND ABBREVIATIONS (CONT) (Sheet 2 of 3)

WIRE HARNESS CONNECTORS

Harnesses are connected together by molded multiple-bullet connectors, some of which are color-coded for easy identification. On these schematics, connector color and location are shown as follows:





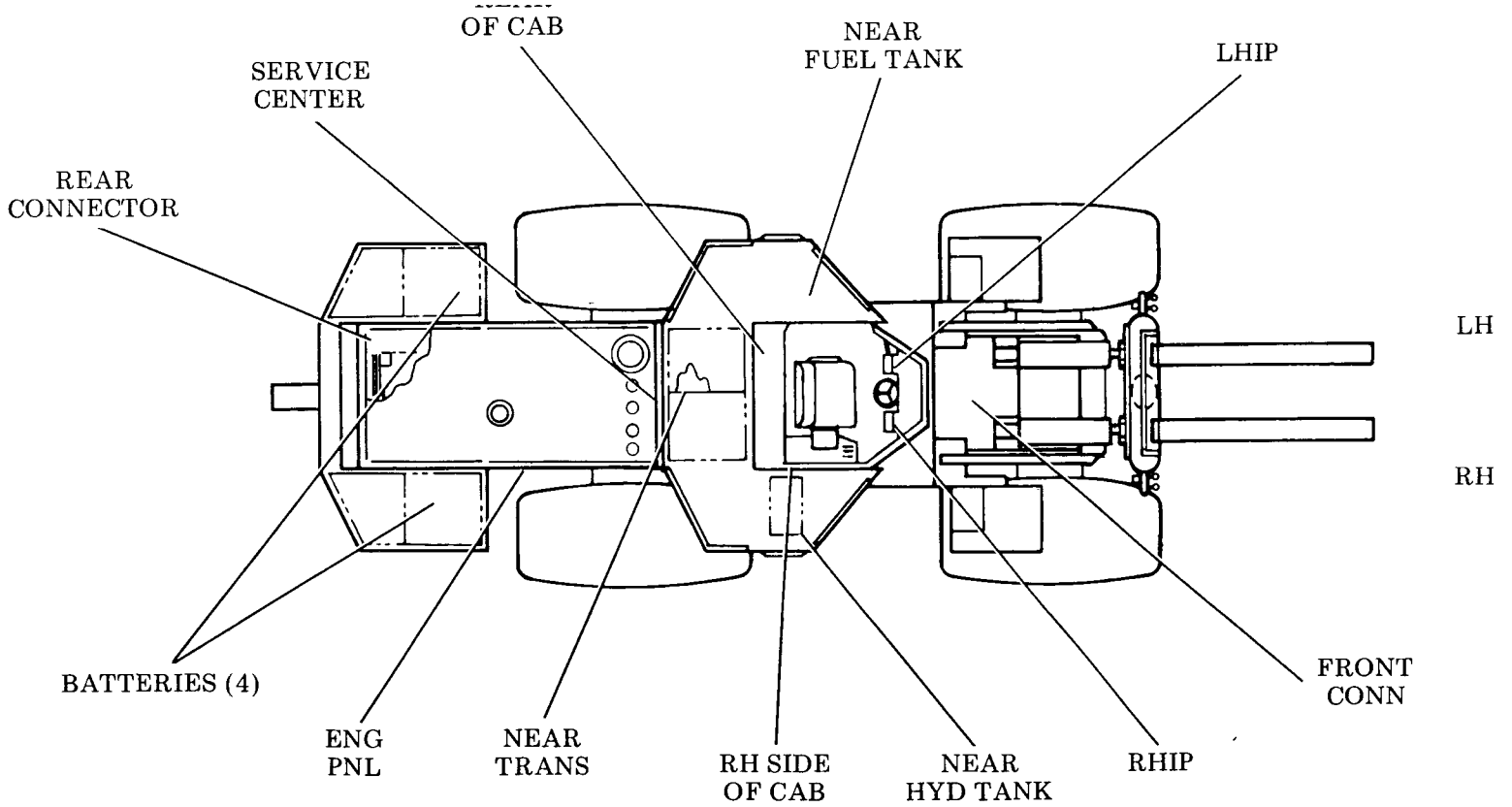
Connector locations: (see page 2-60, sheet 3)

LHIP - Behind LH instrument panel
RHIP - Behind RH instrument panel
Rear of cab - Behind cover below rear window
RH side of cab - Behind cover below RH window
Engine panel - Behind right rear wheel and engine access panel
Near Trans. - Under trap doors behind cab
Front Corm. - On loader frame
Rear Corm. - Behind radiator
Service Center - Behind service center doors

TA 098588

Go on to Sheet 3

CODES AND ABBREVIATIONS (CONT) (Sheet 3 of 3)



HARNESS CONNECTOR LOCATIONS

TA 098589

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

WIRE LIST (Sheet 1 of 5)

All wires are 16 gage (AWG) except those listed below. If uncertain of a wire gage, look down the column designated COLOR until you find the color code for your wire. If under the. FROM / TO columns, your wire is not listed, use 16 gage wire, otherwise use gage size as listed under column AWG.

WIRE COLOR	WIRE AWG	FROM	TO
BK	14	Ceiling heater blower motor	Ground
BK	18	VOLTMETER - term GRD	ALTERNATOR indicator
BK	18	ALTERNATOR indicator	Panel light RHIP
BK	18	POWER switch - term GRD	PANEL TEST switch - term 5
BR/BK	18	LOW HYD OIL LEVEL indicator	LOW ENGINE OIL LEVEL indicator
BR/BK	18	LOW ENGINE OIL LEVEL indicator	HIGH FUEL LEVEL indicator
DK BL	12	DK G connector at LHIP (for FLOOD LIGHTS)	BK connector at rear of cab
DK BL	12	BK connector at rear of cab	DK G connector at rear of cab

Go on to Sheet 2

WIRE LIST (CONT) (Sheet 2 of 5)

WIRE COLOR	WIRE AWG	FROM	TO
G	14	Ceiling heater blower switch (MED SPD)	Ceiling heater blower motor
GY	18	Splice near voltmeter in RHIP harness	Lamp sockets on all gage lights (five wires total)
LT BL	14	Fuse 6 RHIP	DK G connector at RHIP
LT BL	14	DK G connector at RHIP	Cab floor heater blower motor
LT BL	14	Ceiling heater switch (LOW SPD)	Ceiling heater blower motor
LT G	14	Splice in front harness	LH warning horn
LT G	14	Splice in front harness	RH warning horn

Go on to Sheet 3

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

WIRE LIST (CONT) (Sheet 3 of 5)

WIRE COLOR	WIRE AWG	FROM	To
O	10	Alternator-term+	Main power relay (2 separate wires required)
O	10	Main power relay	60-amp circuit breaker (2 separate wires required)
O	10	60-amp circuit breaker	Panel fuse holder no. 5 in LHIP and to splice in cab harness (NOTE: 2 separate wires are required, but they are spliced together in cab harness, see schematic)
O	12	Splice in cab harness	Fuse holder no. 9 in RHIP
O	12	Fuse holder no. 9 in RHIP	Fuse holder no. 8 in RHIP
O	12	Fuse holder no. 8 in RHIP	Fuse holder no. 7 in RHIP
O	12	Fuse holder no. 7 in RHIP	Fuse holder no. 6 in RHIP
O	12	Fuse holder no. 5 in LHIP	Fuse holder no. 4 in LHIP
O	12	Fuse holder no. 4 in LHIP	Fuse holder no. 3 in LHIP
O	12	Fuse holder no. 3 in LHIP	Fuse holder no. 2 in LHIP
O	12	Fuse holder no. 2 in LHIP	Fuse holder no. 1 in LHIP
O	14	Main power relay	15-amp circuit breaker
O	14	Ceiling heater switch (HI SPD)	Ceiling heater blower motor

Go on to Sheet 4

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

WIRE LIST (CONT) (Sheet 4 of 5)

WIRE COLOR	WIRE AWG	FROM	TO
R	8	Main power relay	Starter relay
R	10	Main power relay	Starter solenoid - term BATT (2 sepmate wires required)
R	10	Alternator - term + (Pos)	Radio interference capacitor on alternator
R	10	Operator warning horn - term where PR/Y wire connects	Radio interference capacitor on operator warning horn (behind driver's seat)
R	10	Ceiling heater fan switch - term where R wires connect	Radio interference capacitor on heater housing
R	10	Capacitor on ceiling heater housing	Ground on heater housing
R	10	Windshield wiper switch - term B (inserted between term B and O wire)	Radio interference capacitor mounted on LHIP housing
R	12	Splice into LT BL wire ilear heater switch	Radio interference capacitor on heater housing
W	10	Starter relay	Starter solenoid - term SOL
W	18	Indicator light sockets on LHIP	Diode board assembly on LHIP (NOTE: 13 separator wires required)

Go on to Sheet 5

WIRE LIST (CONT) (Sheet 5 of 5)

WIRE COLOR	WIRE AWG	FROM	TO
Y	12	DK G connector at LHIP	Loose connector coming from B connector at rear of cab (Wire comes from AUX switch on LHIP and can be used to power external source with 24 vdc)
Y/BK	14	15-amp circuit breaker on engine relay panel	Ceiling heater switch
Y/BR	18	Fuse holder no. 1 in LHIP	All indicator lamp sockets in LHIP (NOTE: from NO COOLANT FLOW indicator lamp socket to DK G connector is 16 gage Y/BR wire)
Y/BR	18	Fuse holder no. 9 in RHIP	All gages in RHIP

End

WIRE AND HARNESS TESTING **(Sheet 1 of 1)**

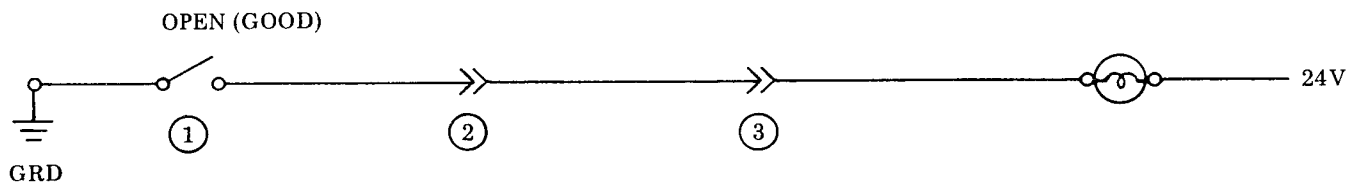
Because of the numerous wires, harnesses and connectors which interconnect components in this system, tracing of individual wires is left up to you. Use the mini-schematic diagram accompanying each PROBLEM to determine the wire color, termination and connector locations. Use the schematic illustrations at the rear of this manual to determine pin and socket locations and overall view. Also, see WIRE LIST, page 2-61.

TIPS

Shorts usually are determined by a light, etc. remaining ON when it should be OFF. After determining that the switch is working properiy, do the follo wing:

a. Reconnect wire at switch (1).

b. Unplug connector at next connection (2). If light goes out, short is between (1) and (2). If light remains ON, reconnect (2) and disconnect (3) etc. until last connector. If light remains ON, short is between last connector (3) and lamp socket.



c. If short cannot be repaired, notify Direct Support to replace harness unless you are authorized to do so.

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End

DIODE TESTING (Sheet 1 of 2)

This task covers: Testing diodes for shorts or opens.

INITIAL SETUP

Test Equipment

Multimeter

Materials/Parts

Diode

Troubleshooting Reference

Page 2-71

Equipment Condition

Item removed from equipment

Special Tools

None

Personnel Required

One mechanic

References

None

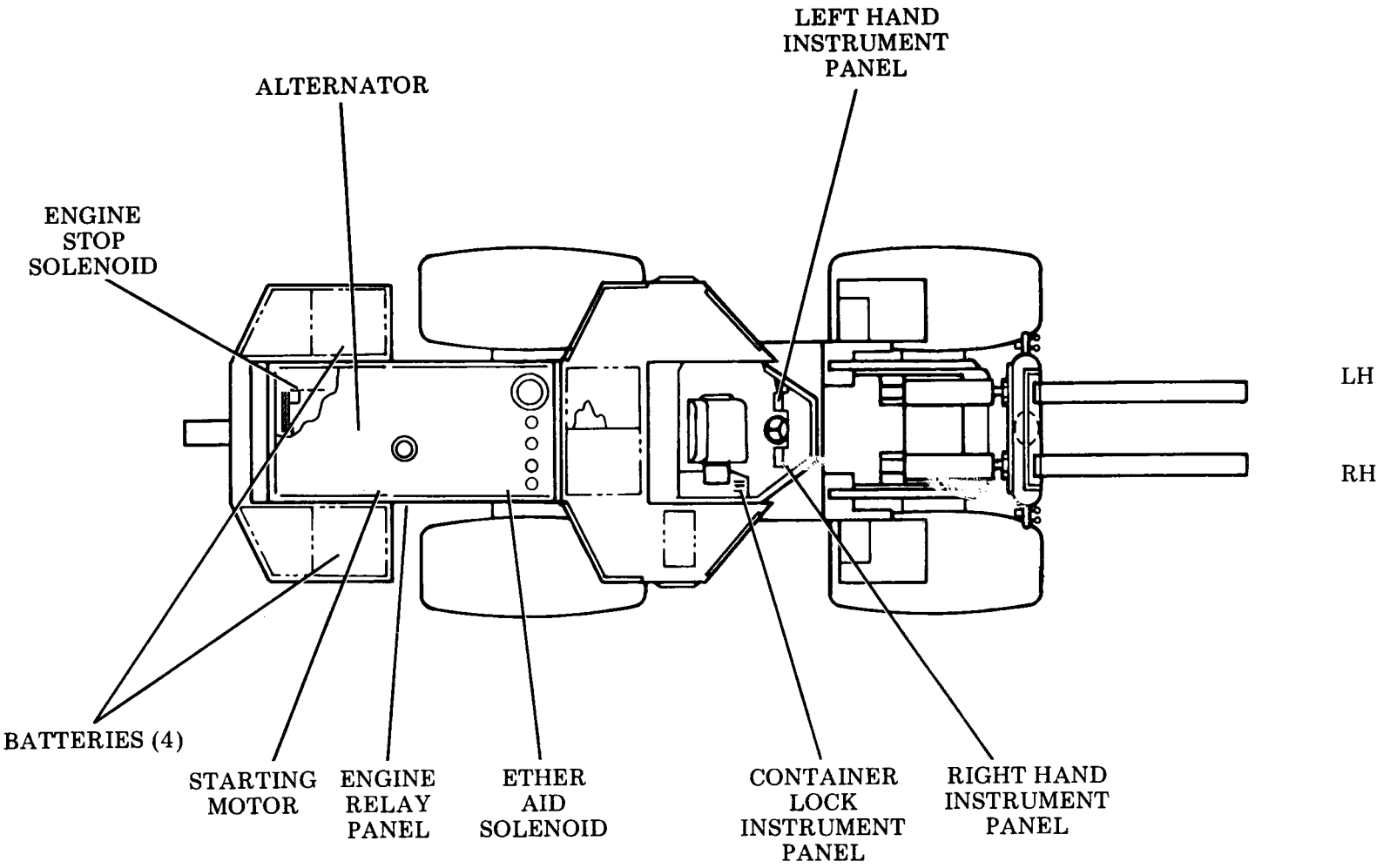
General Safety Instructions

None

Go on to Sheet 2

DIODE TESTING (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
Multimeter	a. Set up, using RX10 scale, and zero.	
	b. Connect meter probes across diode.	Observe reading.
	c. Reverse probes.	Again observe reading.
		Good diode will have lower (near zero) reading in one direction and a higher (near infinity) in the other direction. Replace diode assembly if both readings are low or both are high.
		End



MAJOR ELECTRICAL COMPONENTS LOCATIONS

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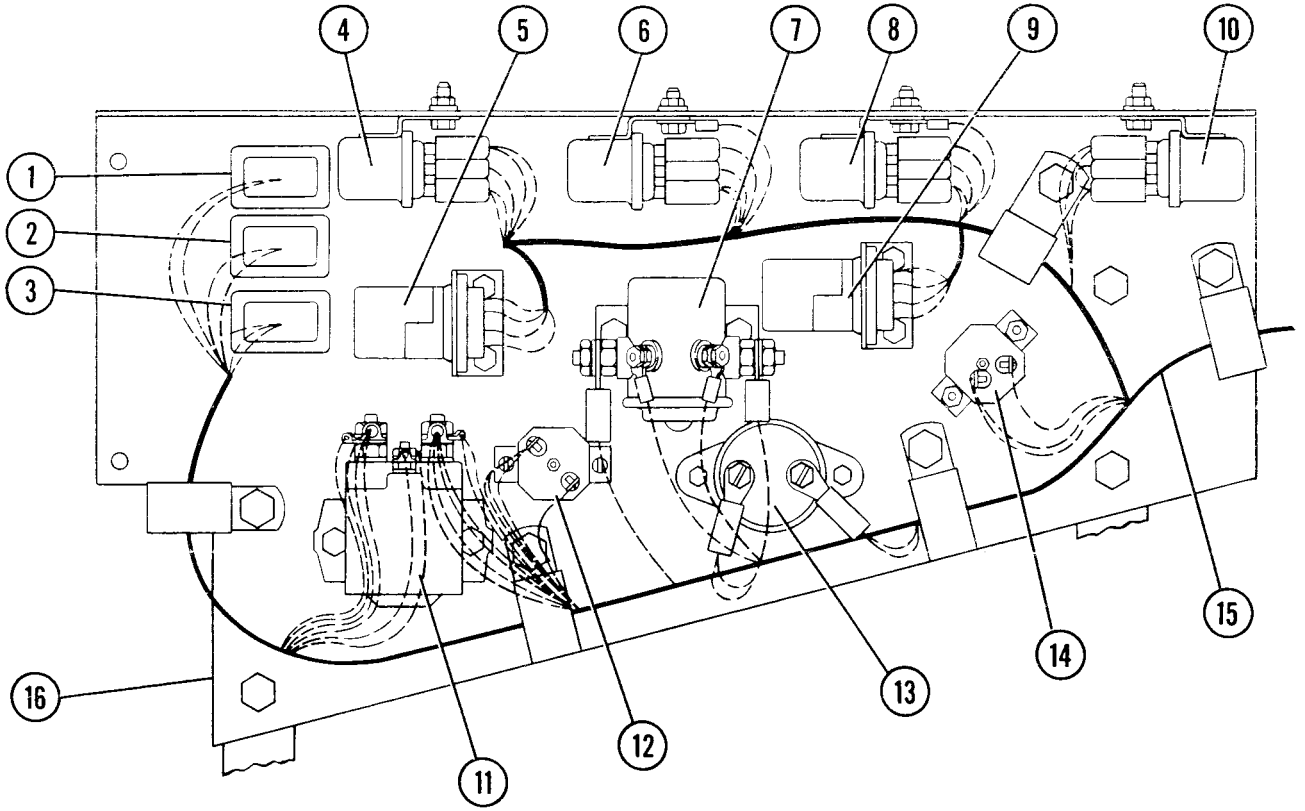

1. Rear harness to engine harness connector (BLACK)
2. Rear harness to engine harness connector (RED)
3. Rear harness to engine harness connector (DARK BLUE)
4. Alternator relay
5. Plug-in diode assembly #3
6. Engine stop relay
7. Starter relay
8. Warning horn relay
9. Plug-in diode assembly #4
10. Start interlock relay
11. Main power relay
12. 15-amp circuit breaker
13. 60-amp circuit breaker
14. 8-amp circuit breaker
15. Rear wiring harness
16. Engine relay panel

ENGINE RELAY PANEL

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ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

ELECTRICAL TROUBLESHOOTING QUICK GUIDE (Sheet 1 of 3)

ITEM	PROBLEM	REFERENCE
ENGINE	1. WILL NOT CRANK	See page 2-74.
	2. CRANKS SLOWLY	See page 2-80.
	3. CRANKS, BUT WILL NOT START	See page 2-81.
ALTERNATOR	4. CHARGES TOO MUCH OR NOT ENOUGH	See ALTERNATOR TESTING/ ADJUSTING, page 2-255.
STARTING AID	5. COLD WEATHER STARTING AID DOES NOT WORK	See page 2-86.
CAB	6. NO POWER TO INDICATOR LIGHTS, SERVICE LIGHTS, ETC.	See page 2-90.
HEATERS	7. FLOOR HEATER BLOWER MOTOR DOES NOT WORK	See page 2-92.
	8. CEILING HEATER/DEFROSTER BLOWER MOTOR DOES NOT WORK	See page 2-94.
HORNS	9. FRONT WARNING HORNS DO NOT WORK	See page 2-95.
	10. OPERATOR AUDIBLE WARNING HORN DOES NOT' WORK	See page 2-96.

Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

ELECTRICAL TROUBLESHOOTING QUICK GUIDE (CONT) (Sheet 2 of 3)

ITEM	PROBLEM	REFERENCE
INDICATOR LIGHTS	11. ONE DOES NOT WORK	See page 2-97.
	12. ALL DO NOT WORK	See page 2-98.
	13. PRESTART AND ALTERNATOR REMAIN ON AFTER ENGINE STARTS	See page 2-101.
	14. HI FUEL LEVER REMAINS ON	See page 2-104.
	15. LOW HYD OIL LEVEL REMAINS ON	See page 2-106.
	16. LOW ENG OIL LEVEL REMAINS ON	See page 2-108.
	17. LOW FUEL LEVEL REMAINS ON	See page 2-110.
	18. IMPLEMENT, TRANS, AIR OR PILOT REMAINS ON	See page 2-112.
	19. NO COOLANT FLOW REMAINS ON	See page 2-114.
	20. SUPP STER REMAINS ON	See page 2-117.
	21. HI TEMP HYD OIL REMAINS ON	See page 2-118.

Go on to Sheet 3

ELECTRICAL TROUBLESHOOTING QUICK GUIDE (CONT) (Sheet 3 of 3)

ITEM	PROBLEM	REFERENCE
INDICATOR LIGHTS (CONT)	22. LOW PRESS BRAKE REMAINS ON	See page 2-120.
	23. PARK BRAKE ON REMAINS ON	See page 2-122.
	24. CONTAINER LOCK LIGHTS DO NOT WORK	See page 2-124.
SERVICE LIGHTS	25. TAIL/PANEL, HEAD, FLOOD OR AUX FLOOD LIGHTS DO NOT WORK	See page 2-126.
	26. STOP LIGHTS DO NOT WORK	See page 2-133.
	27. DOME LIGHT DOES NOT WORK	See page 2-136.
GAGES	28. DO NOT WORK	See page 2-138.
SERVICE METER	29. DOES NOT WORK	See page 2-141.
ALARM	30. BACKUP ALARM DOES NOT WORK WHEN TRANSMISSION SELECTOR IS IN REVERSE	See page 2-143.
	31. BACKUP ALARM WORKS WHEN TRANSMISSION SELECTOR IS IN FORWARD OR NEUTRAL	See BACK UP ALARM SWITCH TESTING/ADJUSTMENT, page 2-334.

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 1 (Sheet 1 of 6)

ENGINE WILL NOT CRANK

Batteries fully charged. See page 2-269.
Cables good and installed correctly. See page 2-279.
Connectors clean and tight on posts.
Gages, lights, etc. work with POWER switch in ON position (see NOTE A).

NOTE A: If gages, lights, etc. do not work, see PROBLEM 6.

TROUBLESHOOT STARTING CIRCUIT

For battery power to turn the starting motor in this system, five switches must be closed.

Three of these are magnetic switches that are electrically activated:

A. Starter solenoid located on the starting motor.
B. Starter relay located on the engine relay panel. See page 2-60.
C. Start interlock relay located on the engine relay panel. See page 2-60.

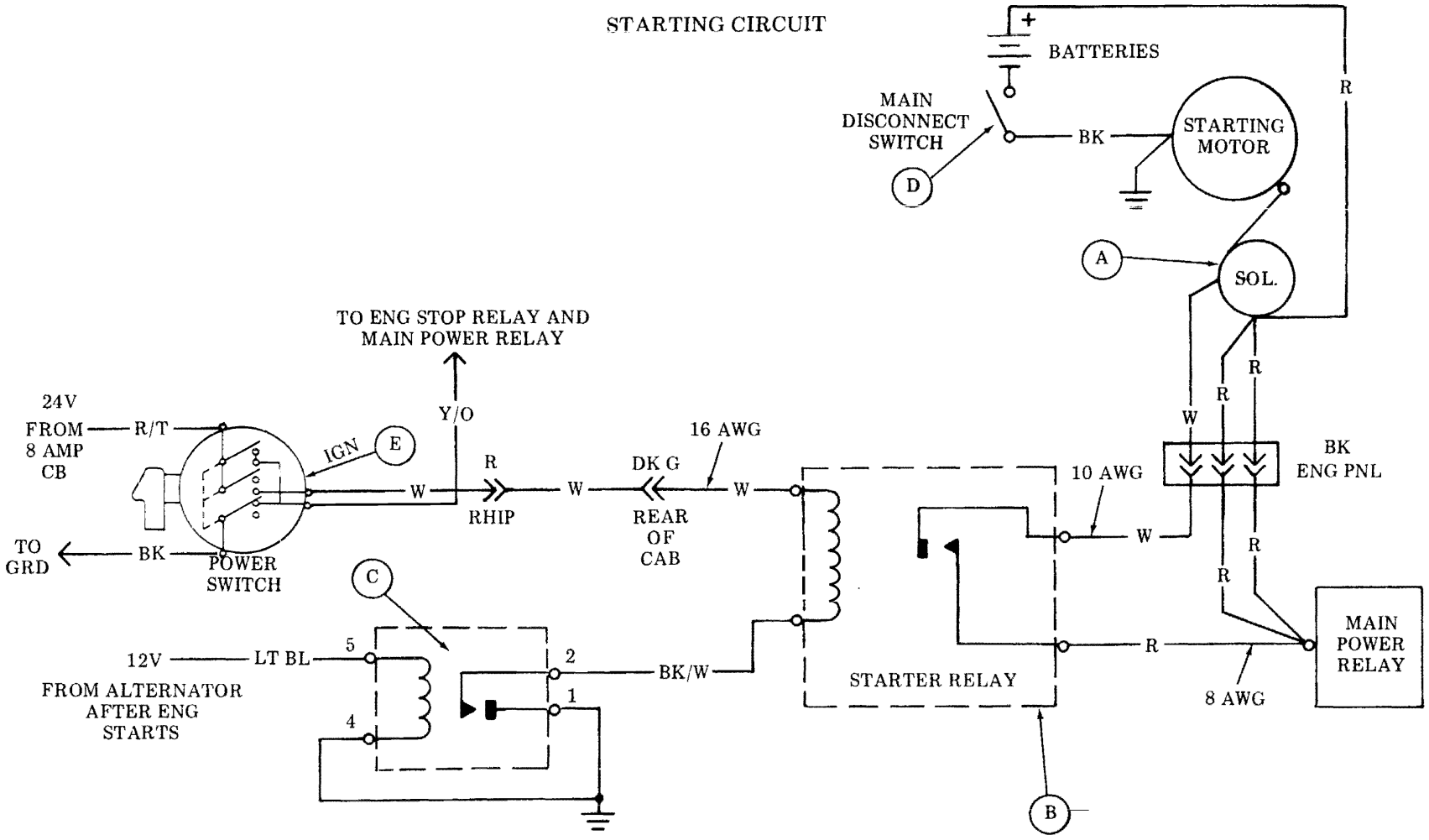
The other two are manually activated switches:

D. Main disconnect located near engine relay panel.
E. POWER key switch at START position located on right-hand instrument panel.

The main disconnect switch (D) should always be closed except when working on the starting system components. The POWER switch (E) connects battery power to the starting circuit to energize the coil on the starter relay (B). However, the coil can only be energized if the current can flow to ground. The start interlock relay (C) provides the ground path as long as it is closed. (NOTE: This relay is normally closed and opens when the alternator starts up. This prevents the starter relay from closing if the power switch is accidentally turned to START while the engine is running.) When the coil on the starter relay (B) is energized, power goes from the battery to the start solenoid (A), which closes the circuit to the starting motor.

Go on to Sheet 2

PROBLEM NO. 1 (CONT) (Sheet 2 of 6)



Go on to Sheet 3

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 1 (CONT) (Sheet 3 of 6)

NOTE 1: When testing for voltage, negative lead from your multimeter should be to ground (machine frame). See page 2-56.

NOTE 2: An assistant is required to turn and hold POWER switch in the START position.

NOTE 3: Start engine to ensure that repair/replacement has solved problem.

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
1	Turn main disconnect switch to ON. Turn POWER switch to START. Test for voltage present (NOTES 1 and 2) at terminal BAT terminal where R/T wire connects to POWER switch. Is battery voltage present?	3	2	See page 2-305.
2	Replace/repair R/T wire from POWER switch to main power relay.			Use same gage and color wire removed.
3	Turn main disconnect switch to ON. Turn POWER switch to START. Test for voltage present (NOTES 1 and 2) at terminal S where W wire connects to POWER switch. Is battery voltage present?	5	4	See page 2-70.
4	Turn main disconnect switch to OFF. Replace POWER switch (NOTE 3).	—	—	See page 2-305.
5	Turn main disconnect switch to ON. Turn POWER switch to START. Test for voltage present at terminal on starter relay (7, page 2-70) where W wire connects. Is battery voltage present?	7	6	See page 2-70.
6	Replace/repair W wire from starter relay to POWER switch.	—	—	Use same gage and color wire removed.

Go on to Sheet 4

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 1 (CONT) (Sheet 4 of 6)

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
7	Turn main disconnect switch to OFF. Turn POWER switch to OFF. Disconnect B/W wire from starter relay and start interlock relay (10, page 2-70). Test B/W wire for continuity. Is there continuity?	9	8	See page 2-70.
8	Replace/repair B/W wire from starter relay to start interlock.	—	—	Use same gage and color wire removed.
9	Turn main disconnect switch to ON. Test start interlock relay (10, page 2-70) terminal (from which B/W wire was removed) for continuity to ground. Reconnect B/W wire. Is there continuity?	11	10	See page 2-70.
10	Replace/repair B wire from start interlock to ground.	—	—	Use same gage and color wire removed.
11	Turn POWER switch to ON. Test for voltage present at terminal on start interlock relay (10, page 2-70) where LT BL wire connects. Is battery voltage present?	12	13	See page 2-70
12	Replace/repair LT BL wire from start interlock to alternator.	—	—	Use same gage and color wire removed.
13	Place a jumper between B/W wire and ground and attempt to crank engine. Does engine crank?	14	15	
14	Replace start interlock relay (10, page 2-70). Turn POWER switch to OFF.	—	—	If problem still exists, replace/repair BK ground wire from start interlock relay terminal 4 to connector at warning horn relay (8, page 2-70) mounting screw.

Go on to Sheet 5

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 1 (CONT) (Sheet 5 of 6)

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
15	Test for voltage present at large terminal on starter relay (7, page 2-70) where R wire connects. Is battery voltage present?	17	16	See page 2-70.
16	Repair/replace R wire from starter relay (7) to main power relay (11, page 2-70).	—	—	R wire must be 8-gage.
17	Turn POWER switch to START. Test for battery voltage at starter solenoid. Is battery voltage present at starter solenoid terminal:	—	—	
	a SOL - where 10 gage W wire connects?	17B	20	
	b Where solenoid connects to starting motor frame?	19	18	
18	Replace starter solenoid.	—	—	See page 2-261.
19	Replace starting motor. Turn main disconnect switch to OFF.			See page 2-261.
20	Test W wire between starter solenoid and starter relay for continuity with W wire isolated. Is there continuity?	22	21	
21	Repair/replace W10-gage wire from starter relay to starter solenoid. Main disconnect switch OFF. Does problem still exist?	22	end	W wire must be 10-gage.
22	Replace starter relay. Turn main disconnect switch to OFF.			See page 2-337.

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 2 (Sheet 1 of 1)

ENGINE CRANKS SLOWLY

1. Test voltage potential onalfour batteries, see page 2-269.
2. If batteries are good, check battery cables for proper size, freedom from corrosion and proper installation, see page 2-279.
3. If batteries are fully charged, battery cables and connectors are good, and all mechanical systems work properly, inform Direct Support to test starting motor current draw.

NOTE

If ambient temperature is below 32°F (0°C) check that engine oil and diesel fuel ratings ue correct. If cold weather starting aid is being used and everything else is proper, see PROBLEM 5.

End

PROBLEM NO. 3 (Sheet 1 of 4)

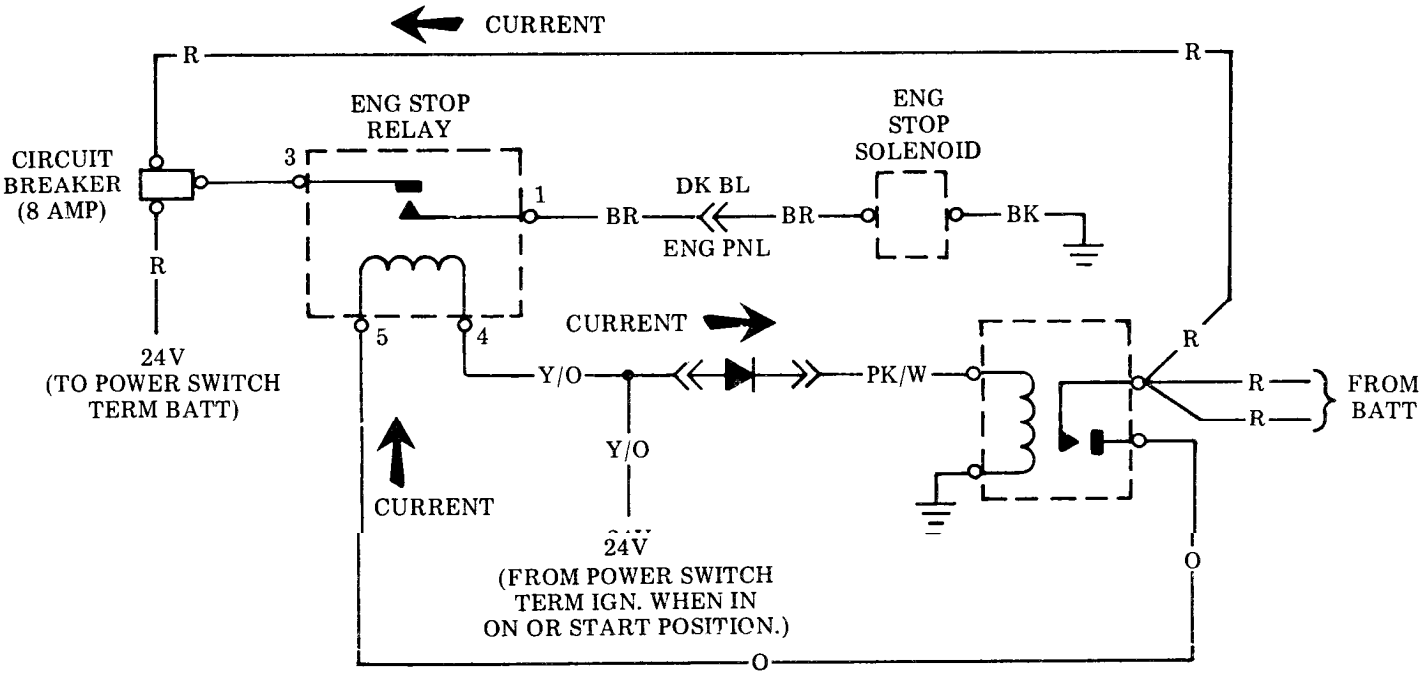
ENGINE CRANKS, BUT WILL NOT START

TROUBLESHOOT ENGINE STOP CIRCUIT

NOTE

This engine must crank fast enough to obtain heat of compression for ignition. If cranking speed is slow, see PROBLEM 2.

ENGINE STOP CIRCUIT

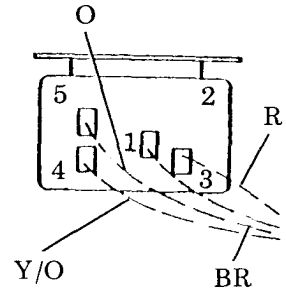


Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 3 (CONT) (Sheet 2 of 4)

NOTE 1: When testing for voltage, negative lead from your multimeter should be to ground (machine frame, etc.). See page 2-56.
NOTE 2: Always replace a wire with the same size (gage).
NOTE 3: Start engine after repair/replacement to ensure problem is solved.

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
	Gain access to right side of engine.			
1	Place transmission gear selector in reverse. With POWER switch in ON position does back-up alarm sound?	3	2	If YES, main power relay circuit is working.
2	See PROBLEM 6, page 2-90.	—	—	
3	Turn POWER switch to ON. Test for voltage present (NOTE 1) at engine stop relay (6, page 2-70) terminals. Is battery voltage present at terminal: a. 1 - Where BR wire connects? b. 3 - Where R wire connects? c. 5 - Where O wire connects? d. 4 - Where Y/O wire connects?	4 3 (c) 3 (d) 12	3 (b) 10 11 13	 ENGINE STOP RELAY
4	Is battery voltage present at engine stop solenoid terminal where BR wire connects?	7	5	Stop solenoid is located at governor on top of engine.

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Go on to Sheet 3

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 3 (CONT) (Sheet 3 of 4)

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
5	Make sure DK BL connector (3, page 2-70) is properly seated and recheck for voltage present at engine stop solenoid. Is battery voltage now present at BR wire terminal?	—	6	If YES, engine should start. Hit does not, go to step 7.
6	16 gage BR wire from stop relay to solenoid is open. NOTES 2 and 3.	—	—	See page 2-53.
7	Is battery voltage present at BK ground wire terminal on engine stop solenoid?	9	8	
8	Turn POWER switch to OFF. Notify direct support to replace engine stop solenoid. NOTE 3.	—	—	
9	Repair/replace 16 gage BK ground wire from solenoid to ground. NOTE 3.	—	—	Wire grounds at fuel filter mounting bracket screw.
10	16 gage R, wire from 8 amp. Circuit breaker (14, page 2-70) to engine stop relay is open. Repair or replace wire. NOTE 3.	—	—	

Go on to Sheet 4

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 3 (CONT) (Sheet 4 of 4)

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
11	16 gage O wire from main power relay (11, page 2-70) to engine stop relay is open. Repair or replace wire. NOTE 3.	—	—	
12	16 gage Y/O wire from engine stop relay to plug-in diode assembly No. 3 (5, page 2-70) is open. Repair or replace wire. NOTE 3.	—	—	
13	Replace engine stop relay. POWER switch OFF. NOTE 3.	—	—	

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 4 (Sheet 1 of 1)

ALTERNATOR	CHARGES TOO MUCH OR NOT ENOUGH

See ALTERNATOR TESTING/ADJUSTING, page 2-255.

End

PROBLEM NO. 5 (Sheet 1 of 4)

COLD WEATHER STARTING AID DOES NOT WORK

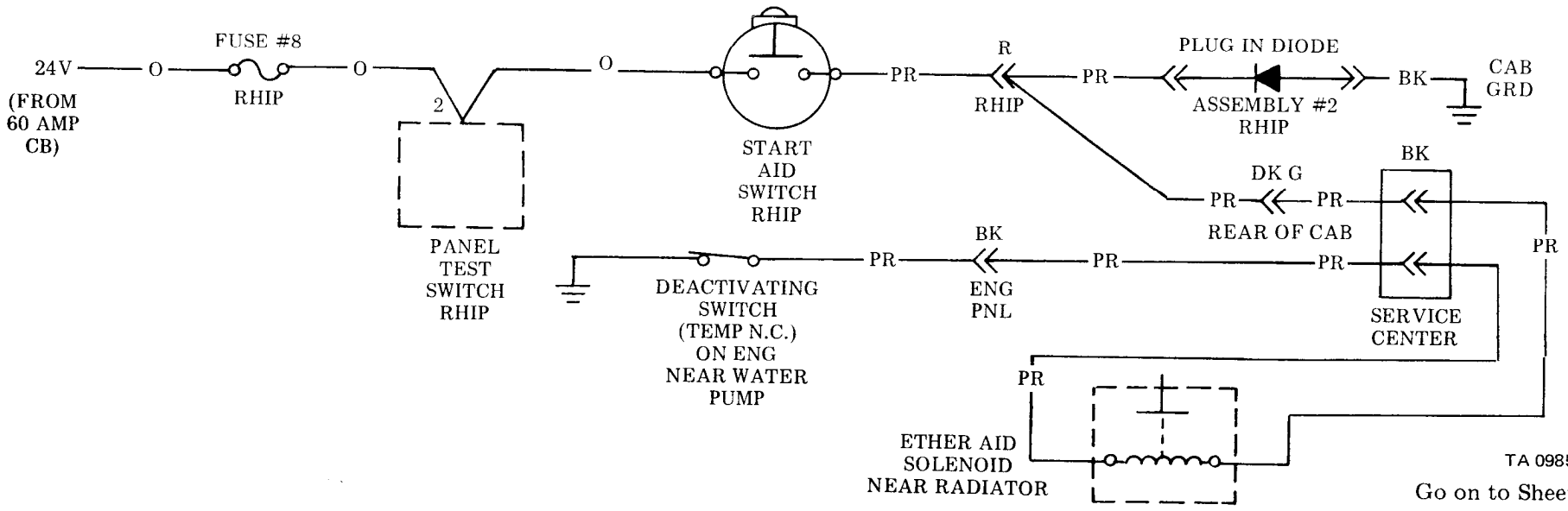
Engine cold (see NOTE). POWER switch ON or START.

NOTE

COOLANT TEMPERATURE MUST BE BELOW 80°F (26.7°C) TO CLOSE SWITCH!

The starting aid circuit receives its power from fuse 8. When the START AID switch is closed current flows from the fuse, through the switch, through the solenoid, through the deactivating switch and to ground. The deactivating switch must be closed. This switch opens (see NOTE above) when coolant temperature is above 100° F (37.8° C), deactivating the starting aid circuit. The diode protects the START AID switch from arcing due to induced solenoid high current.

START AID CIRCUIT



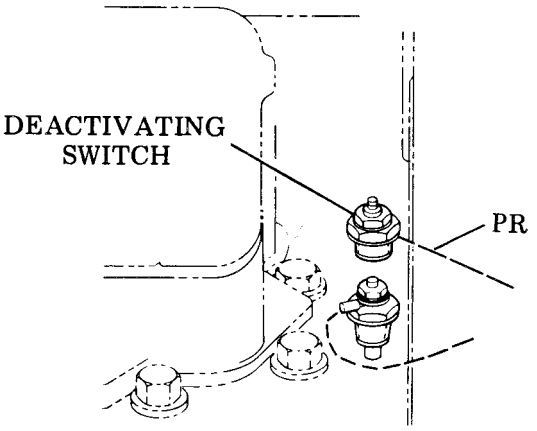
Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 5 (CONT) (Sheet 2 of 4)

NOTE: Voltage is checked to ground, see page 2-56.

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
	Remove engine left rear access doors.			
1	Is fuse 8 good? If indicator lamps come on when PANEL TEST switch is ON, fuse 8 is good.	3	2	Second fuse from right in RHIP.
2	Replace 10 amp fuse no. 8.	—	—	
3	Have an assistant push START AID switch button while you listen for clicking at ether aid solenoid. Is clicking present?	4	7	
4	With START AID switch closed, is battery voltage present at PR wire on deactivating switch?	5	6	
5	Replace deactivating switch.	—	—	See page 2-315.



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Go on to Sheet 3

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 5 (CONT) (Sheet 3 of 4)

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
6	16 gage PR wire from ether aid solenoid to deactivating switch is open.	—	—	See page 2-53.
7	Is battery voltage present at ether aid solenoid terminals? One or both?	8	9	
8	Replace ether aid solenoid.			See page 2-337.
9	Gain access to back of RHIP. Is battery voltage present at START AID switch where O wire connects?	11	10	
10	16 gage O wire from PANEL TEST switch to START AID switch is open, repair/replace.	—	—	
11	Is battery voltage present at START AID switch where PR wire connects?	13	12	

Go on to Sheet 4

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PR0BLEM NO. 5 (CONT) (Sheet 4 of 4)

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
12	Replace START AID switch.	—	—	See page 2-315.
13	16 gage PR wire from START AID switch to ether aid solenoid is open.	—	—	See page 2-53.

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 6 (Sheet 1 of 2)

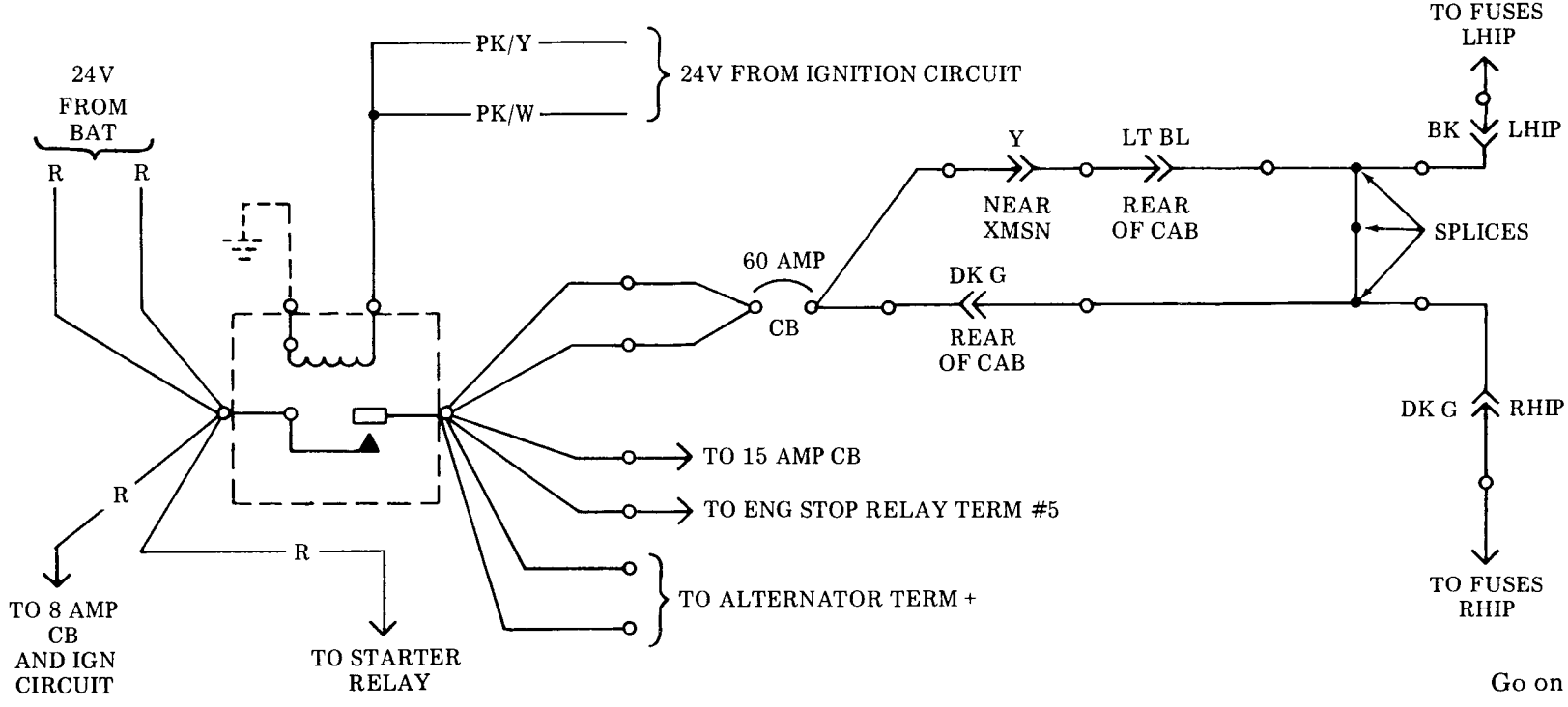
CAB

NO POWER TO INDICATOR LIGHTS, SERVICE LIGHTS, ETC.

Engine starts. Batteries fully charged.
Ceiling heater blower works.

All power to the cab, except for the ignition-start circuits, comes from the main power relay (11, page 2-70). The main power relay coil is energized by the ignition circuit which receives its power from the 8 amp circuit breaker connected directly to positive side of batteries. Go to step 1.

MAIN POWER CIRCUIT



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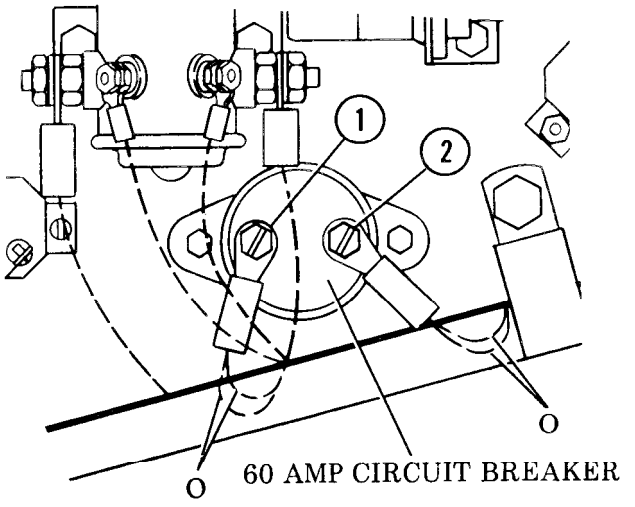
Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 6 (CONT) (Sheet 2 of 2)

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER No	REMARKS
	POWER switch ON Gain access to engine relay panel.			
1	Is battery voltage present at 60 amp. circuit breaker (13, page 2-70) input terminal ① ?	2	5	
2	Is battery voltage present at output terminal ② ?	4	3	
3	Replace 60 amp circuit breaker.	—	—	
4	10 gage O wire(s) from 60 amp. circuit breaker to splices in cab harness is open. See WIRE and HARNESS TESTING, page 2-66.	—	—	
5	10 gage O wire (O) from main power relay to 60-amp circuit breaker is open.			See page 2-53.



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End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 7 (Sheet 1 of 2)

HEATERS

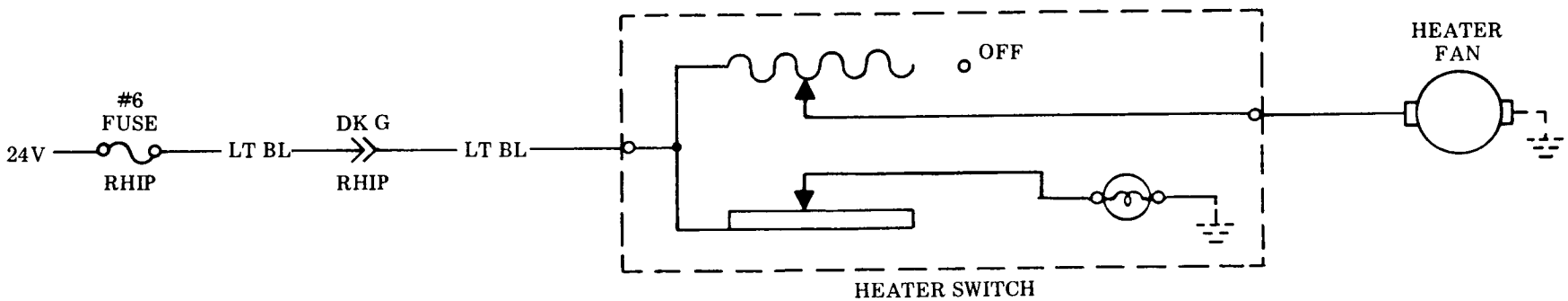
FLOOR HEATER BLOWER MOTOR DOES NOT WORK

POWER switch ON

The floor heater fan is controlled by a switch with a built-in indicator lamp. This lamp should be a 5D19 Bulb. If this bulb is burned out, it is possible that a 12 volt bulb was installed by mistake.

The floor heater receives its power from fuse 6, first fuse from left in Right Hand Instrument Panel.

FLOOR HEATER CIRCUIT



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Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 7 (CONT) (Sheet 2 of 2)

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
1	Is fuse no. 6 good?	3	2	
2	Replace fuse no. 6.	—	—	
3	Is battery voltage present at heater switch termimd where LT BL wire connects?	4	5	See page 2-57.
4	Replace heater switch.	—	—	See page 2-315.
5	LT BL wire from fuse 6 to switch is open.	—	—	See page 2-53.

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 8 (Sheet 1 of 1)

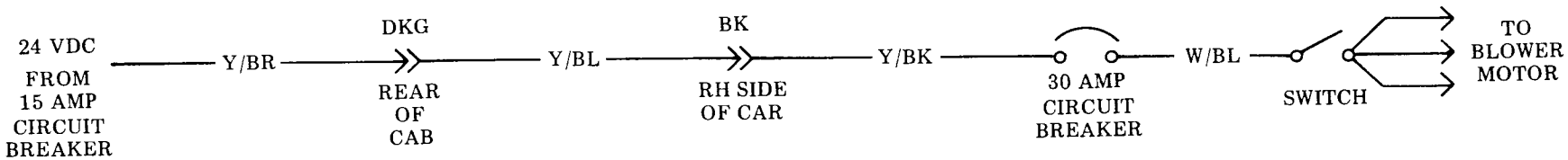
HEATERS

CEILING HEATER/DEFROSTER BLOWER MOTOR DOES NOT WORK

POWER switch ON

Blower motor receives its power from 15 amp circuit breaker on engine relay panel If warning horn does not work, 15 amp circuit breaker is bad. If warning horn works, problem is probably at heater switch. (See page 2-315.)

CIRCUIT



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End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 9 (Sheet 1 of 1)

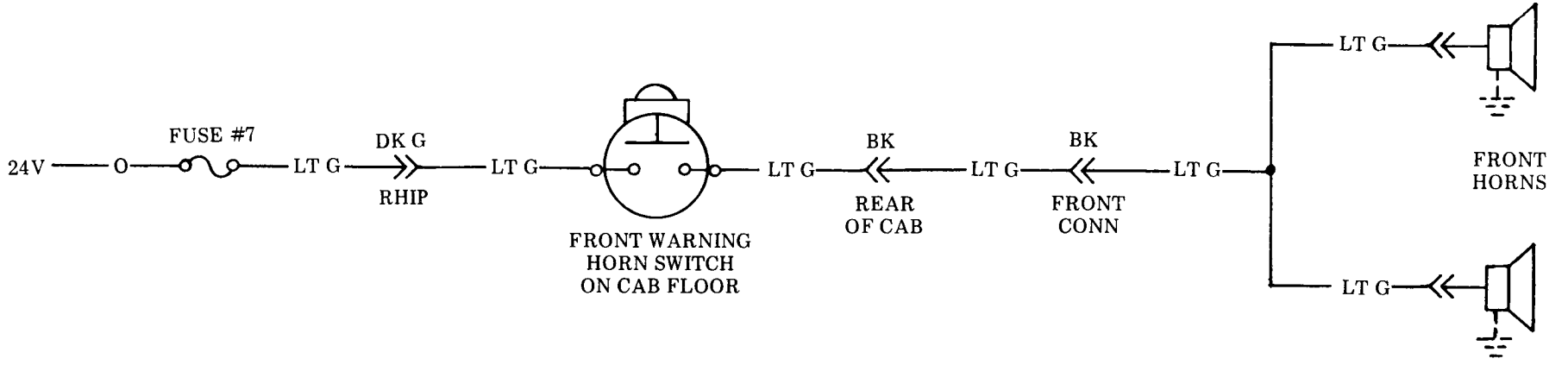
HORNS

FRONT WARNING HORN(S) DO NOT WORK

POWER switch ON. All other systems work.

The front warning horns get their power from fuse no. 7. If back horns do not work, problem is at fuse or within wiring (LT G) from fuse 7 to horns. If one horn does not work, problem is at horn or wiring from splice from front harness to horn. (Refer to page 2-327.)

FRONT WARNING HORN(S) CIRCUIT



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End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 10 (Sheet 1 of 1)

HORNS

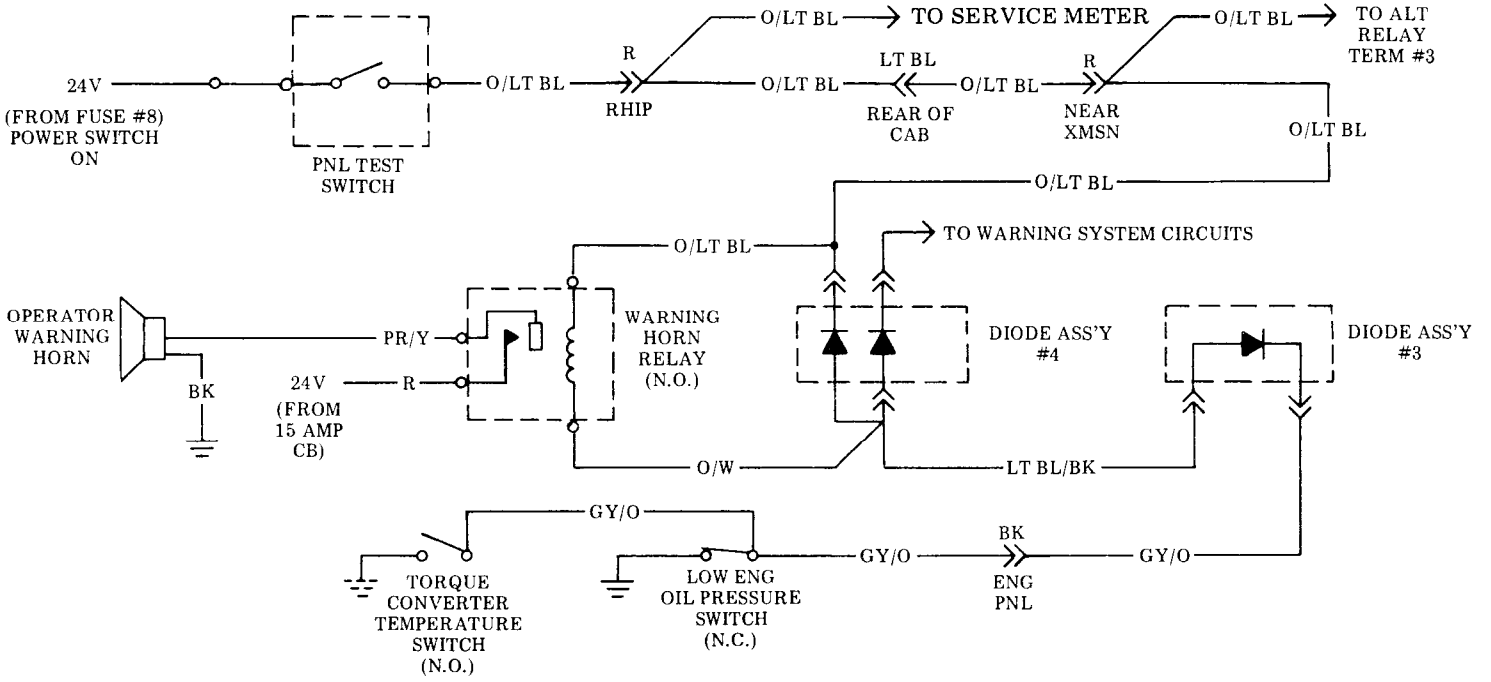
OPERATOR AUDIBLE WARNING HORN DOES NOT WORK

POWER switch ON. PANEL TEST switch ON.

TEST LOW ENGINE OIL PRESSURE SWITCH IF VOLTAGE IS PRESENT AT HORN

When the PANEL TEST switch is closed, circuit flows from PANEL TEST switch, through warning horn relay coil, through low engine oil pressure switch to ground. (See page 2-327.)

OPERATOR WARNING HORN CIRCUIT



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End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 11 (Sheet 1 of 1)

INDICATOR LIGHTS ONE WILL NOT COME ON WHEN PANEL TEST SWITCH IS ON

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
1	Test bulb for continuity, (page 2-53). Is bulb good?	2	*	*Replace bulb (24 volt only).
2	Check condition of socket and if bulb is seating correctly. Is socket good?	3	*	*Repair or replace socket, see page 2-305.
3	Gain access to rear of instrument panel. Are the wire terminals properly connected and tight? (NOTE A).	4	*	*Make proper.
4	Test individual diode for light which will not come on. Is diode good?	6	5	See diode test procedure, page 2-67.
5	Individual diodes are not serviceable, replace diode board assembly.			See page 2-337.
6	18 gage W wire from diode to lamp socket is open, repair or replace wire.	—	—	

*For LOW PRESS BRAKE indicator, test flasher for continuity, see page 2-53. Replace flasher if defective.

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 12 (Sheet 1 of 3)

INDICATOR LIGHTS — ALL DO NOT WORK

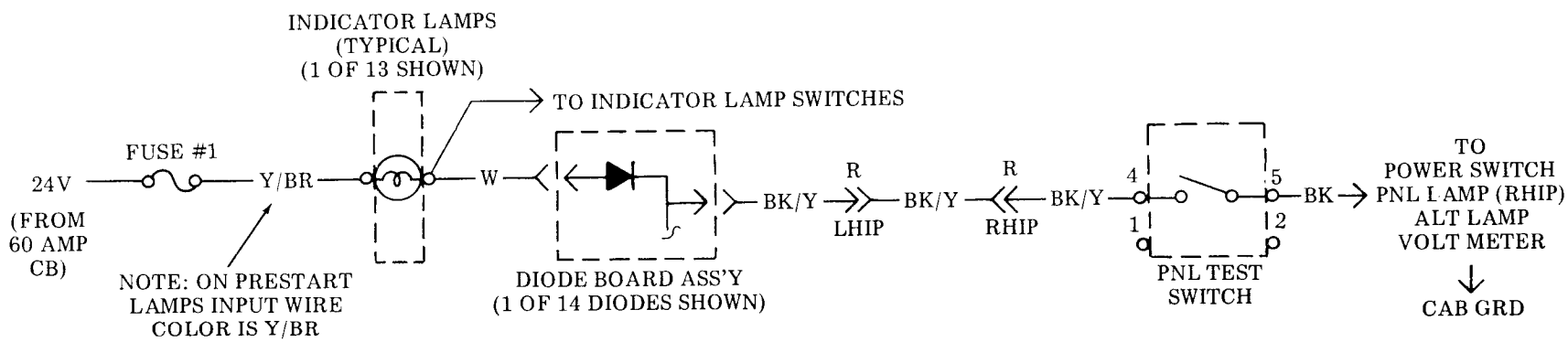
POWER switch ON. PANEL TEST switch ON.
Service lights (HEAD, FLOOD, etc.) work (see NOTE A).

NOTE A: If the service lights do not work, see PROBLEM 6, page 2-90.

TROUBLESHOOT PANEL TEST CIRCUIT

This circuit provides a means of testing the indicator lamps, service meter, and operator audible warning horn before the engine is started. Diodes are used to isolate the individual circuits from each other, yet allow one switch to test all circuits simultaneously.

PANEL TEST CIRCUIT



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Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 12 (CONT) (Sheet 2 of 3)

NOTE 1: When testing for voltage, negative lead from your multimeter should be to ground (machine frame, etc.). See page 2-57.
NOTE 2: Always replace a wire with the same size (gage).
NOTE 3: After repair/replacement, turn POWER and PANEL TEST switches to ON to ensure problem is solved.

STEP	QUESTION OR INSTRUCTION	ANSWER. YES	NO	REMARKS
	Reach under each instrument panel and make sure harness connectors are properly seated.	—	—	Total of eight (8) connectors.
1	Place PANEL TEST switch in down, OFF, position. With POWER switch in ON position, are PRESTART and ALTERNATOR indicators lit?	6	2	
2	Is no. 1 fuse (below TAIL/PANEL switch) good?	4	3	
3	Replace fuse (10 amp). NOTE 3.	—	—	
4	Gain access to rear of Left Hand Instrument PANEL (LHIP). Is voltage present (NOTE 1) at each lamp socket and at fuse-holder where Y/BR wire connects?	6	5	Wire color at PRESTART sockets is BR/B.
5	Correct opening in 18 gage Y/BR wire from lamp sockets to no. 1 fuseholder. NOTES 2 and 3.	—	—	
6	Gain access to rear of Right Hand Instrument Panel. Is voltage present at PANEL TEST switch terminal 4 where BK/Y wire connects?	7	10	

Go on to Sheet 3

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 12 (CONT) (Sheet 3 of 3)

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
7	Place PANEL TEST switch in up, ON, position. Is voltage present at PANEL TEST switch terminal 5 where BK ground wire connects?	9	8	
8	Turn POWER switch to OFF. Replace PANEL TEST switch. NOTE 3.	—	—	See page 2-315.
9	B ground wire from PANEL TEST switch to cab ground is open. Repair/replace. NOTES 2 and 3.	—	—	
10	Is voltage present at diode board assembly (LHIP) terminal where BK/Y wire connects?	11	12	
11	16 gage BK/Y wire from diode board assembly to PANEL TEST switch is open. NOTES 2 and 3.	—	—	See page 2-53.
12	Replace diode board assembly. NOTE 3.	—	—	See page 2-337.

End

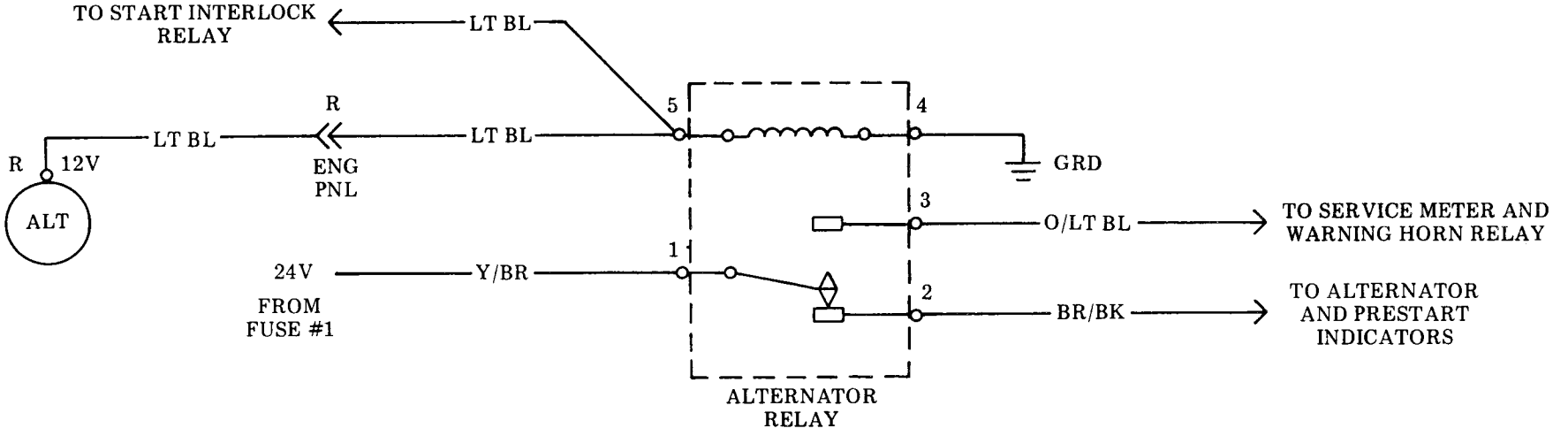
ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 13 (Sheet 1 of 3)

INDICATOR LIGHTS	ALTERNATOR, LOW ENG OIL LEVEL, LOW HYD OIL LEVEL AND HI FUEL LEVEL INIXCATORS REMAIN ON AFTER ENGINE STARTS. (PRESTART INDICATORS)
	VOLTS meter indicates normal charge.

These four circuits operate only before the engine is started. They obtain their power from the alternator relay which is supposed to open the circuits when alternator output starts up.

ALTERNATOR RELAY CIRCUIT

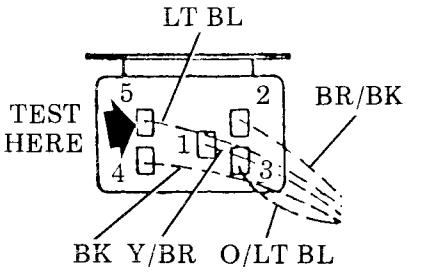


Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 13 (CONT) (Sheet 2 of 3)

NOTE A: Voltage is checked to ground, see page 2-56.
NOTE B: After replacement, START engine to ensure problem is solved.

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER No	REMARKS
	Engine running. Parking Brake ON.			
1	Remove engine lower right access covers. Test for voltage (NOTE A) present at terminal no. 5 where LT BL wire connects on alternator relay (4, page 2-70). Is voltage present? (12 volts DC).	2	3	
2	Replace alternator relay. POWER switch OFF.			See page 2-352. NOTE B.
3	WARNING Do not get any part of your body, clothing or test equipment near the alternator drive belts. Test for voltage present at terminal R where LT BL wire connects on alternator. Is voltage present?	5	4	12 volts DC should be present.
4	Replace alternator. POWER switch OFF.	—	—	See page 2-252. NOTE B.

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Go on to Sheet 3

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 13 (CONT) (Sheet 3 of 3)

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
5	Test for open in LT 13L wire from alternator to alternator relay.	—	—	See page 2-53.

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

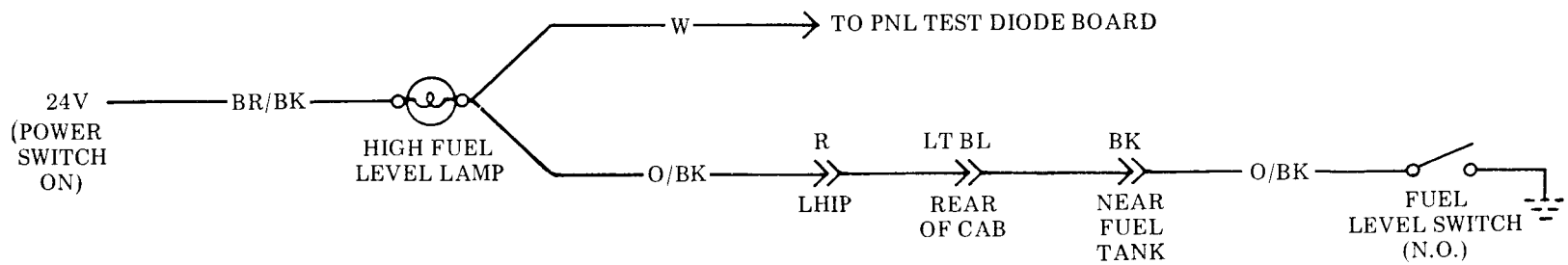
PROBLEM NO. 14 (Sheet 1 of 2)

INDICATOR LIGHTS HI FUEL LEVEL INDICATOR REMAINS ON

Engine not running. Fuel level LOW. POWER switch ON.

This circuit uses a normally-open (N.O.) magnetic float switch which will be closed if the fuel level in the tank is sufficient for a 10-hour wmrk day. Power to the circuit is supplied by the alternator relay terminal 2 when the POWER switch is in the ON position. The circuit is deactivated after the engine starts.

HIGH FUEL LEVEL INDICATOR CIRCUIT



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Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 14 (CONT) (Sheet 2 of 2)

NOTE A: After replacement, turn POWER switch to ON to ensure problem is solved.

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
1	Disconnect O/BK wire at upper fuel level switch on fuel tank. Prevent wire terminal from touching ground. Does indicator light remain ON?	5	2	
2	Turn POWER switch to OFF. Remove fuel level switch, (see page 2-315). Is float defective or incorrectly installed?	3	4	
3	Install correctly or repair/replace float, install switch, connect O/B wire and turn POWER switch to ON. Does indicator light remain ON?	4	–	See page 2-315.
4	Replace fuel level switch. POWER switch OFF. NOTE A.	—	·	See page 2-315.
5	Test for short in O/BK wire from switch to indicator lamp socket. See WIRE and HARNESS TESTING.	—	—	See page 2-66.

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 15 (Sheet 1 of 2)

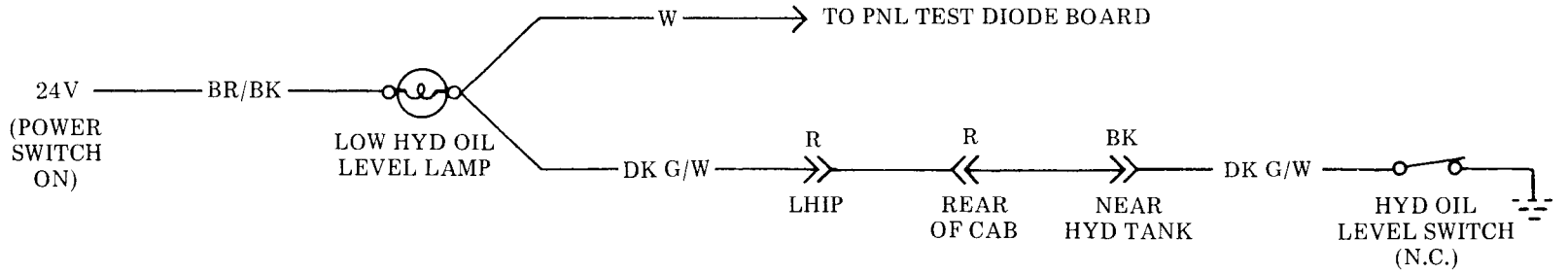
INDICATOR LIGHTS (PRE START)

LOW HYD OIL LEVEL REMAINS ON

Engine not running. Hydraulic tank oil level normal (check sight gage on side of tank). POWER switch ON.

This circuit uses a normally-dosed (N. C.) magnetic float switch which is open when the float is pushed up by sufficient oil in the tank. Power to the circuit is supplied from the alternator relay terminal 2 when the POWER switch is turned to ON. The circuit is deactivated after the engine starts.

LOW HYDRAULIC OIL LEVEL CIRCUIT



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Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 15 (CONT) (Sheet 2 of 2)

NOTE A: After replacement, turn POWER switch to ON to ensure problem is solved.

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
1	Disconnect DK G/W wire at hydraulic level switch on hydraulic tank. Prevent wire terminal from touching ground. Does indicator light remain ON?	5	2	
2	Turn POWER switch to OFF. Remove hydraulic oil level switch, (see page 2-3 15). Is float defective or incorrectly installed?	3	4	
3	Install correctly or repair/replace float, install switch connect DK G/W wire and turn POWER switch to ON Does indicator light remain ON?	4	–	See page 2-315.
4	Replace hydraulic oil level switch. POWER switch OFF. NOTE A.	—	—	See page 2-315.
5	Test for short in DK G/W wire from switch to indicator lamp socket. See WIRE and HARNESS TESTING.	—	—	See page 2-66.

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 16

(Sheet 1 of 2)

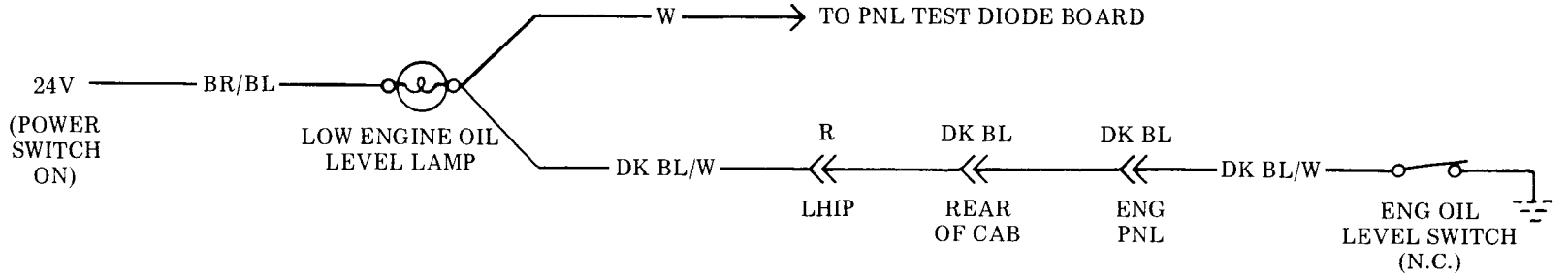
INDICATOR LIGHTS (PRESTART)

LOW ENG OIL LEVEL INDICATOR REMAINS ON

Engine not running. Engine oil level normal. (See page 2-152.) POWER switch ON.

This circuit uses a normally-closed (N. C.) magnetic float switch which will be closed if the oil level in the engine oil pan is too low. Power to the circuit is supplied by the alternator relay terminal 2 when the POWER switch is in the ON position. The circuit is deactivated after the engine starts.

LOW ENGINE OIL LEVEL INDICATOR CIRCUIT



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Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 16 (CONT) (Sheet 2 of 2)

NOTE A: After replacement, turn POWER switch to ON to ensure problem is solved.

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
1	Disconnect DK BL/W wire at engine oil level switch on oil pan. Prevent wire terminal from touching ground. Does indicator light remain ON?	5	2	
2	Turn POWER switch to OFF. Remove engine oil level switch, see page 2-315. Is float defective or incorrectly installed?	3	4	
3	Install correctly or repair/replace float, install switch, connect DK BL/W wire and turn POWER switch to ON. Does indicator light remain ON?	4	–	See page 2-315.
4	Replace engine oil level switch. POWER switch OFF. NOTE A.	—	—	See page 2-315.
5	Test for short in DK BL/W wire from switch to indicator lamp socket. See WIRE and HARNESS TESTING.	—	—	See page 2-66.

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 17 (Sheet 1 of 2)

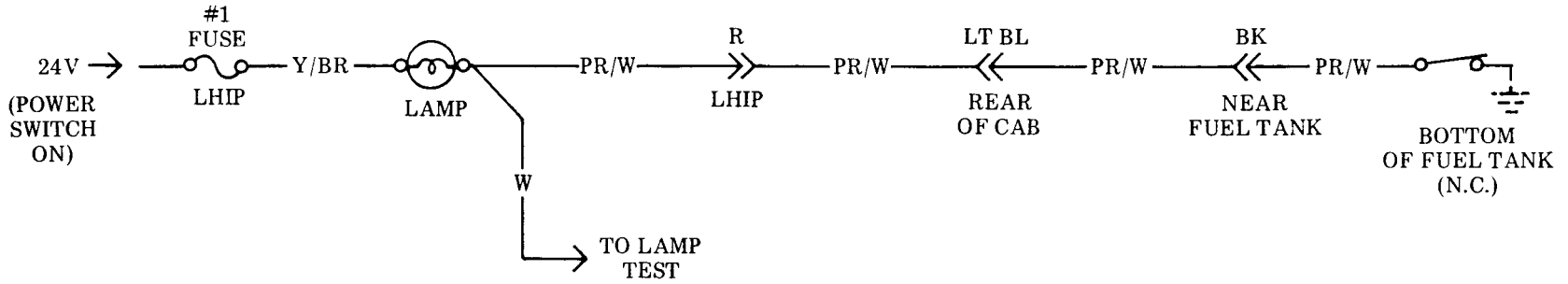
INDICATOR LIGHTS

LOW FUEL LEVEL INDICATOR REMAINS ON

POWER switch ON. Fuel tank has 16.5 gals. or more fuel in it.

This circuit uses a normally-closed (N.C.) magnetic float switch which will be open when fuel level is above 10% (16.5 gals.) of tank capacity. The circuit receives its power from the no. 1 fuse (first fuse from left in Left Hand Instrument Panel (LHIP)). POWER switch ON. Engine running or not.

LOW FUEL LEVEL INDICATOR CIRCUIT



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Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 17 (CONT) (Sheet 2 of 2)

NOTE A: After replacement, turn POWER switch to ON to ensure problem is solved.

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
1	Disconnect PR/W wire at low fuel level switch on fuel tank. Prevent wire terminal from touching ground. Does indicator light remain ON?	5	2	Switch is at lower side of tank.
2	Turn POWER switch to OFF. Remove low fuel level switch, see page 2-315. Is float defective or incorrectly installed?	3	4	
3	Install correctly or repair/replace float, install switch, connect PR/W wire and turn POWER switch to ON. Does indicator light remain ON?	4	–	See page 2-315.
4	Replace fuel level switch, POWER switch OFF. NOTE A.	—	—	See page 2-315.
5	Test for short in PR/W wire from switch to indicator lamp socket. See WIRE and HARNESS TESTING.	—	—	See page 2-66.

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 18 (Sheet 1 of 2)

INDICATOR LIGHTS (PLUGGED FILTER)

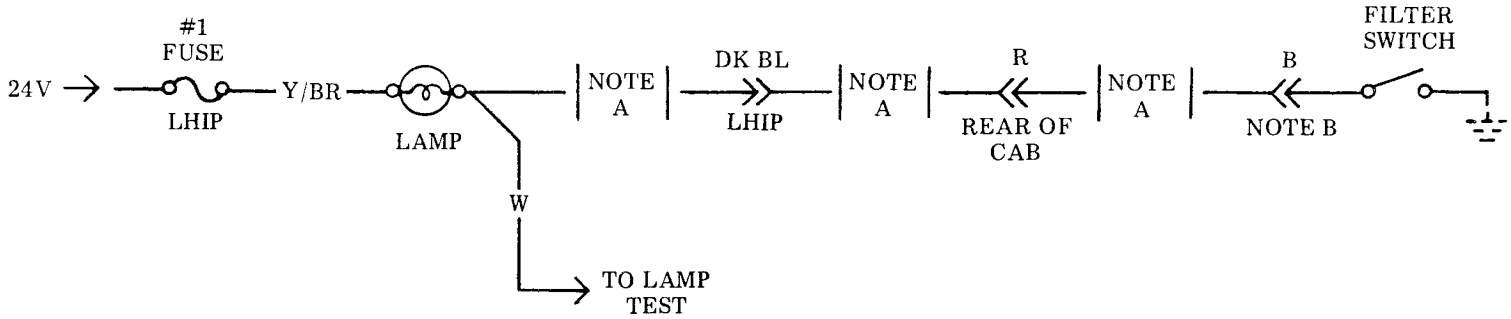
IMPLEMENT, TRANS, AIR OR PILOT INDICATOR REMAINS ON AFTER CHANGING CORRESPONDING FILTER

POWER switch ON. Engine not running.

The individual circuits for these four indicators are identical except for the color of the wire from the lamp socket to the switch. All four circuits receive their power from the no. 1 fuse (first fuse from left in Left Hand Instrument Panel (LHIP)) when the POWER switch is ON.

All switches are normally-open type switches which ciose if filter pressure drop becomes excessive.

TYPICAL FILTER INDICATOR CIRCUIT



	NOTE A WIRE COLOR	NOTE B LOCATION
IMPL.	W/DK G	NEAR HYD TANK
XMSN	R/BK	SERVICE CENTER
AIR	R/W	SERVICE CENTER
PILOT (BRAKE)	T/W	NEAR HYD TANK

TA 098614

Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 18 (CONT) (Sheet 2 of 2)

	Switch	Location
NOTE C:	IMPLEMENT	Top of hydraulic tank.
	TRANS	Filter housing at service center behind cab.
	AIR	Air filter elbow at service center behind cab.
	PILOT (BRAKE)	Filter housing at service center behind cab.

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
	POWER switch ON			
1	Disconnect wire (NOTE A, Sheet 1) at switch for indicator that remains ON. Prevent wire terminal from touching ground.	—	—	For switch locations, see NOTE C above. Go to step 2.
2	Does indicator light remain ON?	4	3	
3	Replace switch. POWER switch OFF. NOTE D.	—	—	See page 2-305.
4	Test for short in wire (NOTE A, Sheet 1) from switch to indicater socket. See WIRE and HARNESS TESTING.	—	—	See page 2-66.

NOTE D: After replacement, turn POWER switch to ON to ensure problem is solved.

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 19 (Sheet 1 of 3)

INDICATOR LIGHTS NO COOLANT FLOW REMAINS ON

Engine running. WATER TEMP gage shows NORMAL temperature. POWER switch is ON.

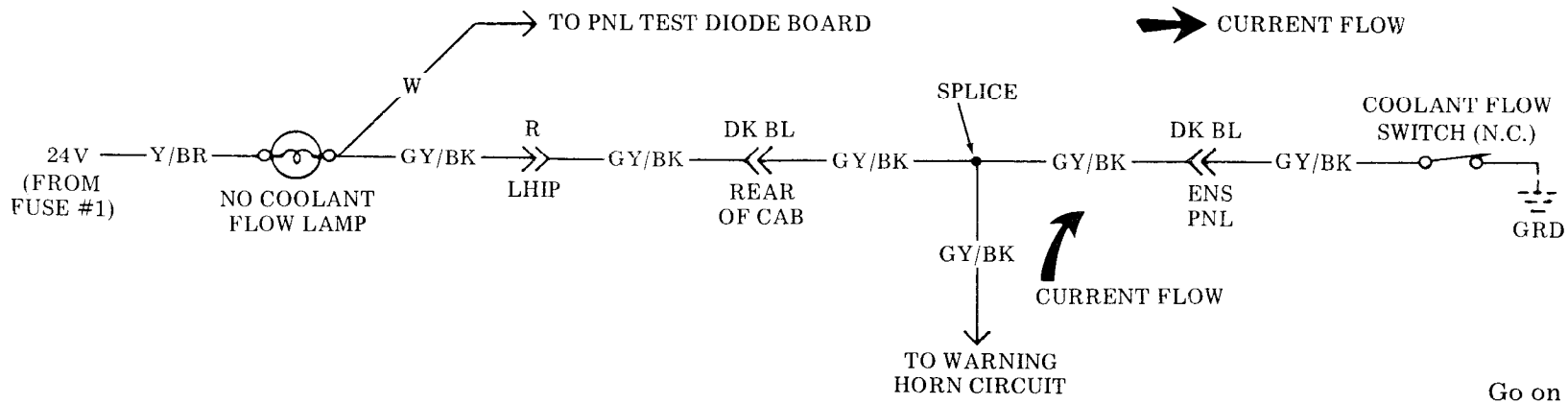
NOTE

The warning horn behind the operator's seat wili be sounding, however, the problem is not in that circuit.

TROUBLESHOOT COOLANT FLOW CIRCUIT

This circuit uses a normally closed paddle switch which opens when coolant flows against the paddle. When the switch closes, the indicator light comes on and the horn blows.

NO COOLANT INDICATOR CIRCUIT



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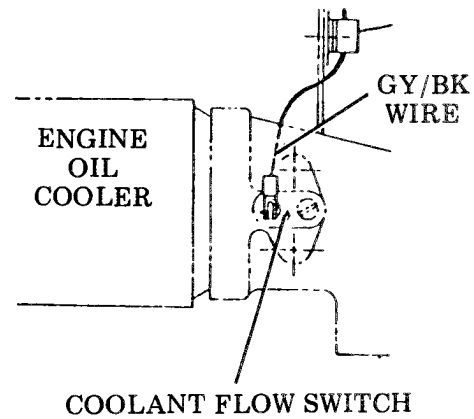
Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 19 (CONT) (Sheet 2 of 3)

NOTE I: DO NOT allow wire temindto touch ground(machine frame, etc.).
NOTE 2: START engine after replacement/repair to ensure problem is solved and reconnect PR/Y wire at warning horn relay if disconnected.

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
	Gain access to left rear and right front of engine. If the horn is blowing go to Step 1; if not, go to Step 2.			
1	Disconnect PR/Y wire from warning horn relay (8, page 2-70)	—	—	This will deactivate horn.
2	CAUTION Make sure PARKING brake is engaged and transmission selector is in NEUTRAL. Disconnect GY/BK wire at coolant flow switch. (NOTE 1) START engine. Did NO COOLANT FLOW indicator light go off?	3	4	
3	Turn POWER switch to OFF. Replace coolant flow switch. NOTE 2.	—	—	See page 2-315.

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Go on to Sheet 3

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 19 (CONT) (Sheet 3 of 3)

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
4	Turn POWER switch to OFF.			
	Reconnect GY/BK wire at coolant flow switch. GY/BK wire from coolant flow switch is shorted, see WIRE and HARNESS TESTING, page 2-66.	—	—	NOTE 2.

End

PROBLEM NO. 20 (Sheeet 1 of 1)

INDICATOR LIGHTS SUPP STER REMAINS ON

POWER switch ON. Engine running.
Normal steering system operating.

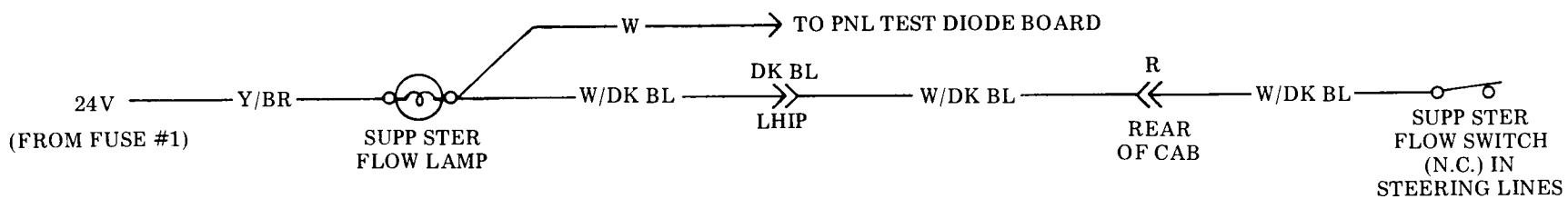
This circuit uses a normally closed paddle-type flow switch which opens when normal steering system flow occurs. When flow stops (supplemental steering takes over) the switch closes, lighting the SUPP STER lamp.

NOTE

Make sure arrow on switch points in direction of flow (away from main steering pump).

To troubleshoot: turn POWER switch to OFF, disconnect W/DK BL wire at flow switch and then START engine. If light goes out, replace flow switch, page 2-315. If light remains on, W/DK BL 16 gage wire is shorted between switch and lamp socket. See WIRE and HARNESS TESTING, page 2-66.

SUPP STER INDICATOR CIRCUIT



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End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

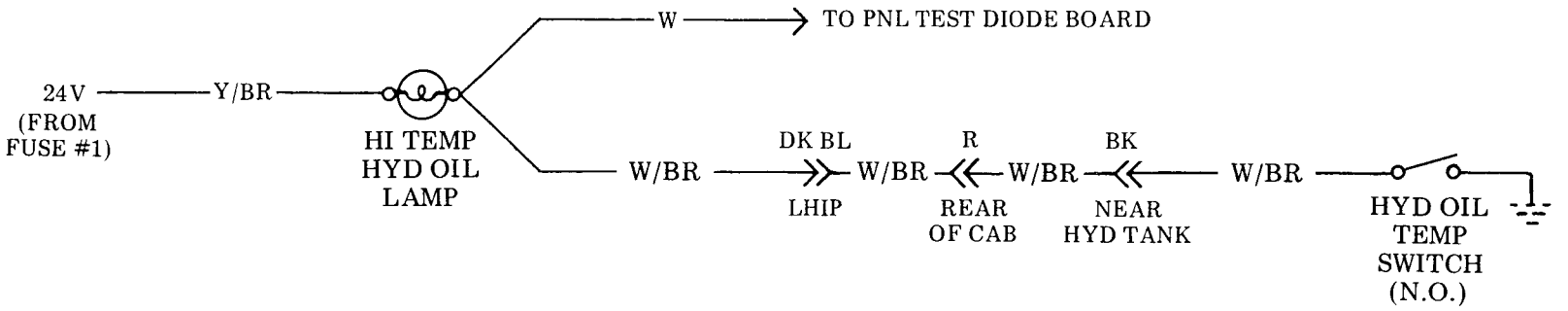
PROBLEM NO. 21 (Sheet 1 of 2)

INDICATOR LIGHTS	HI TEMP HYD OIL REMAINS ON AFTER HYDRAULIC OIL TEMPERATURE IS BELOW 190°F (87.8°C) (NOTE A)
	POWER switch ON.

NOTE A: Lower a thermometer into the hydraulic oil tank. If hydraulic oil temperature is below 190°F (87.8°C), go to Step 1. If temperature is above 190°F (87.8°C) but below 215°F (101.7°C) wait until temperature comes down below 190°F (87.8°C), and then go to Step 1. If temperature is above 215°F (101.7°C), problem is in hydraulic system; notify Direct Support.

This circuit uses a normally open temperature switch which closes when oil temperature in hydraulic tank exceeds 215°F (101.7°C). The switch opens where oil temperature drops below 190°F (87.8°C).

HIGH TEMPERATURE HYDRAULIC OIL CIRCUIT



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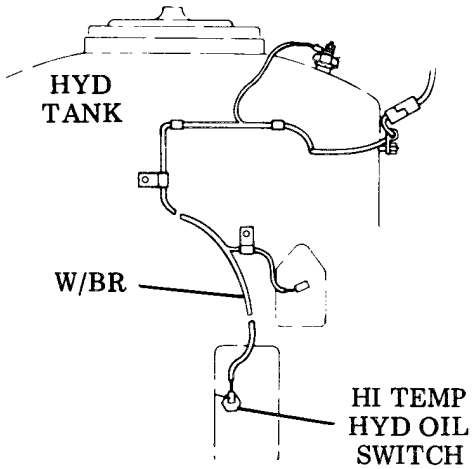
Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 21 (CONT) (Sheet 2 of 2)

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
	POWER switch ON.			
1	Disconnect W/BR wire at high temperature hydraulic oil switch. Do not let it touch ground. Did HI TEMP HYD OIL light go OFF?	2	3	
2	Turn POWER switch to OFF. Replace temperature switch. See page 2-315.	—	—	
3	16 gage W/BR wire from switch is shorted. See WIRE and HARNESS TESTING, page 2-66.	—	—	



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End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 22 **(Sheet 1 of 2)**

INDICATOR LIGHTS LOW PRESS BRAKE REMAINS ON

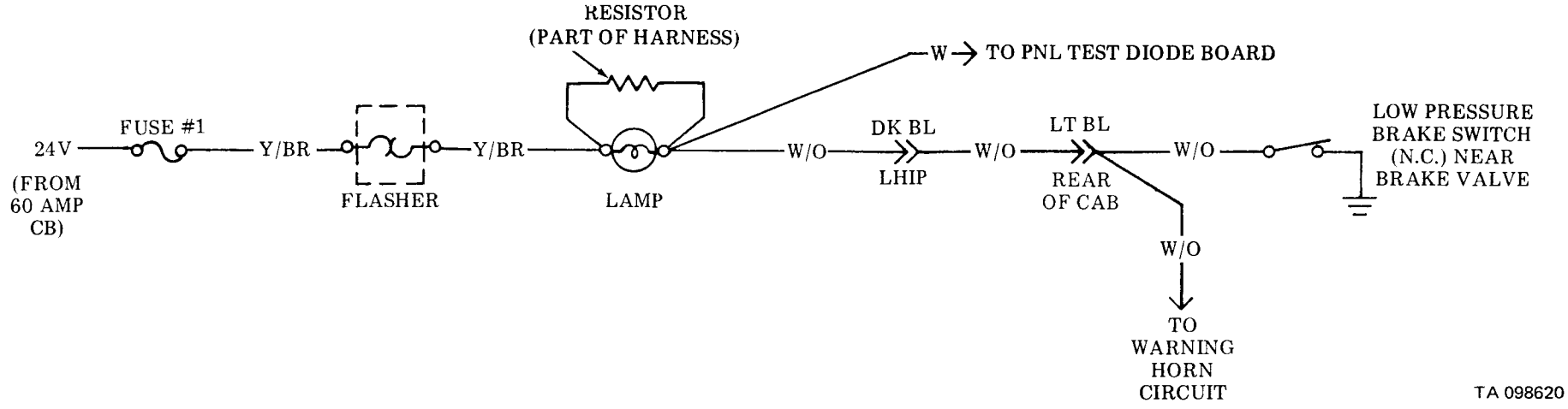
Engine running. Oil level in hydraulic tank is normal. Machine stops normally.

NOTE

The warning horn behind the operator's seat will be sounding, however, the problem is not in that circuit.

For circuit description, see Sheet 2.

LOW PRESS BRAKE INDICATOR CIRCUIT



Go on to Sheet 2

PROBLEM NO. 22 (CONT) (Sheet 2 of 2)

This circuit uses a normally closed pressure switch which opens when accumulator output pressure is about 1,100 psi (7585 kPa). If the pressure drops to 1,000 ± 100 psi (6900 ± 69 kPa) the switch closes and the LOW PRESS BRAKE light comes orI as well as the operator warning horn. The flasher causes the light to flash on and off.

TO TROUBLESHOOT: Disconnect W/O wire from brake pressure switch (do not allow it to touch ground). With engine running; if LOW PRESS BRAKE light is now OFF, replace brake pressure switch, (see page 2-315). If light remains ON, W/0, 16 gage wire between switch and lamp socket is shorted. See WIRE and HARNESS TESTING, page 2-66.

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 22 (Sheet 1 of 2)

INDICATOR LIGHTS PARK BRAKE ON - REMAINS ON

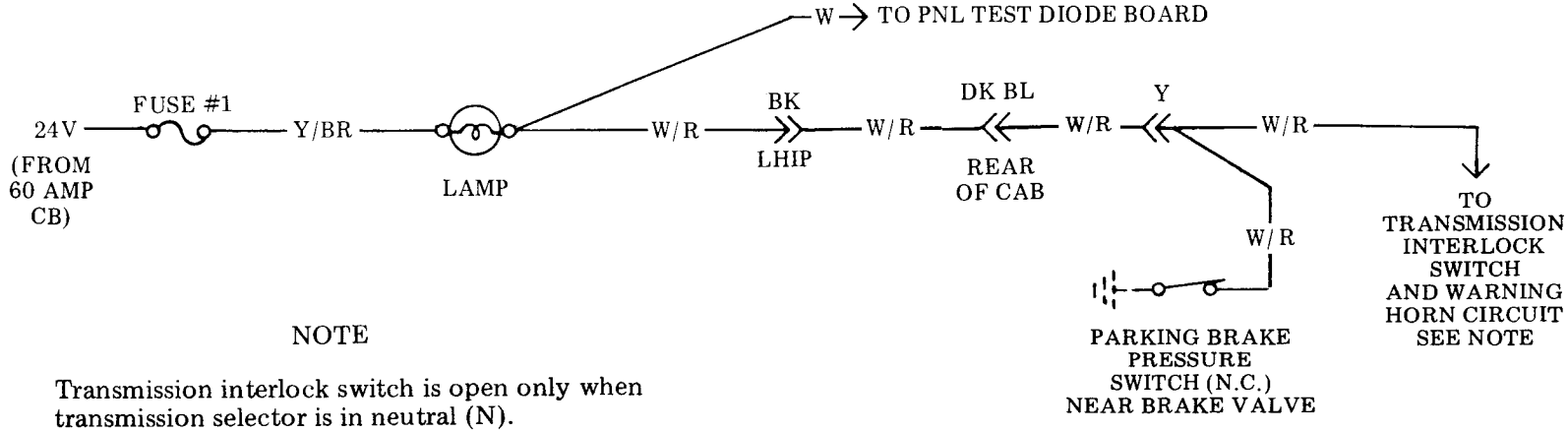
Engine running. Parking brake released. Hydraulic oil level normal. Accumulator pressure normal. Machine moves in forward and in reverse normally.

NOTE

The warning horn behind the operator's seat will be sounding, however, the problem is not in that circuit.

For circuit description, go to Sheet 2.

PARKING BRAKE ON INDICATOR CIRCUIT



NOTE

Transmission interlock switch is open only when transmission selector is in neutral (N).

TA 098621

Go on to Sheet 2

PROBLEM NO. 23 (CONT) (Sheet 2 of 2)

This circuit uses a nomally closed pressure switch which opens when accumulator output pressure is about 1,100 psi (7585 kPa). The switch closes if parking brake release pressure falls below 900-1100 psi (6210-7585 kPa). This causes the PARK BRAKE ON light to come on and provides a path for the warning horn relay circuit, causing the horn to blow if the transmission is in FORWARD or REVERSE.

The transmission setting is sensed by a microswitch cm the transmission interlock mechanism.

TO TROUBLESHOOT: Disconnect W/R wire from brake pressure switch (do not allow it to touch ground). With engine running; if PARK BRAKE ON light is now OFF, replace parking brake pressure switch, (see page 2-315). If light remains ON, W/R 16 gage wire between switch and lamp socket is shorted. See WIRE and HARNESS TESTING, page 2-66.

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 24 (Sheet 1 of 2)

INDICATOR LIGHTS (CONTAINER LOCK INSTRUMENT PANEL, CLIP)

CONTAINER LOCK LIGHTS DO NOT WORK

POWER switch ON.

NOTE A: The container lock light panel lights receive their power from fuse 5 in LHIP. This same fuse powers the dome light circuit, therefore, if the dome light works the fuse and wiring to the BLACK connector at RH side of cab are good. Problem is either in CLIP or wiring from BLACK connector to CLIP.

NOTE B: If only one lamp does not light when lens is pressed, problem is in bulb, socket or related wiring within panel.

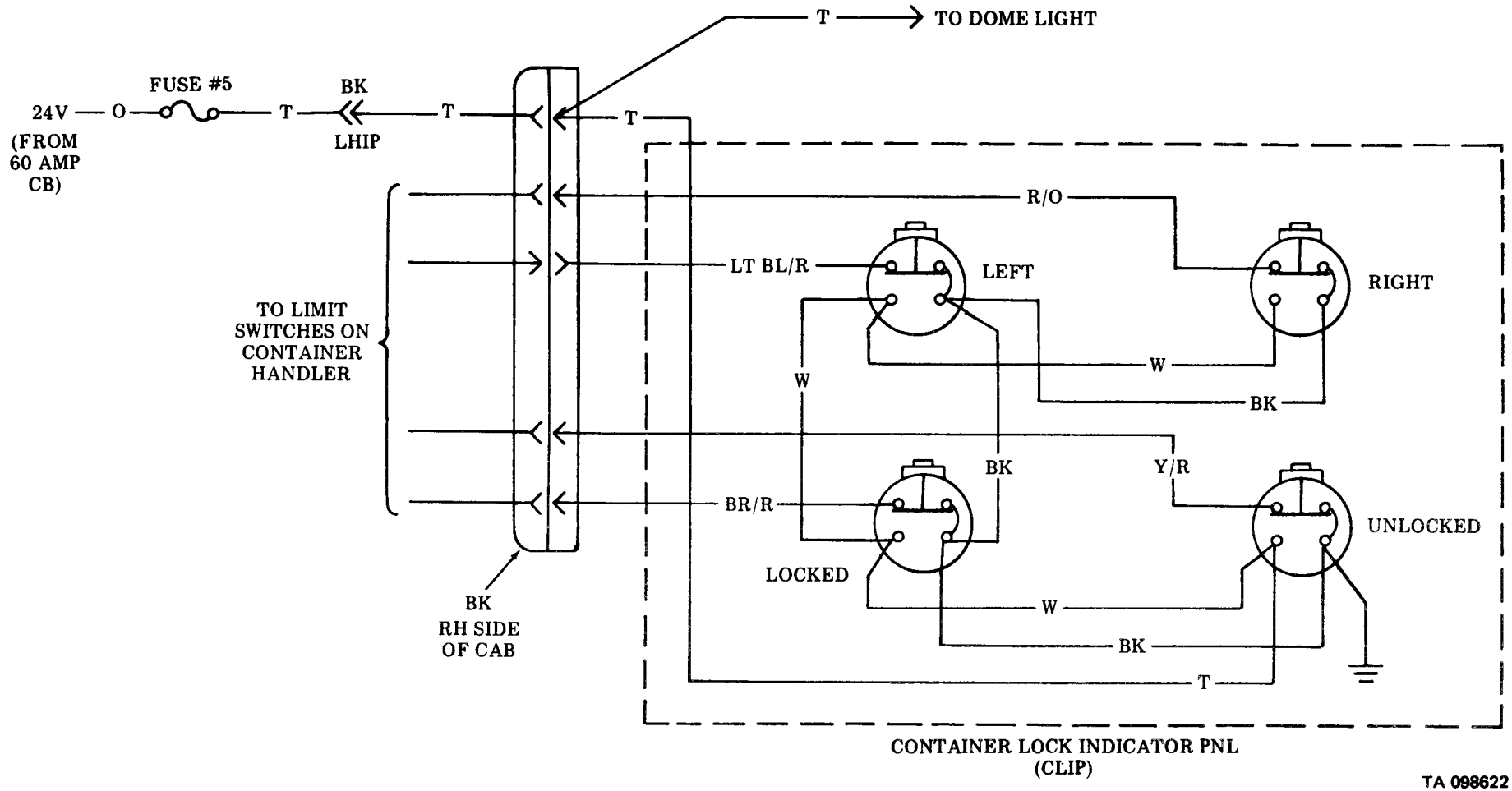
NOTE C: If only one lamp does not light when in normal operation (see OPERATOR'S CONTROLS AND INDICATORS), problem is either in limit switch on container handler or in associated wiring. See TM 10-3930-641-10.

CONTAINER LOCK INDICATOR CIRCUIT (See Sheet 2)

Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 24 (CONT) (Sheet 2 of 2)



TA 098622

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 25 (Sheet 1 of 7)

SERVICE LIGHTS	25 a. TAIL, Sheet 4 25 b. PANEL, Sheet 5 25 c. HEAD, Sheet 6 25 d. FLOOD, Sheet 6 25 e. AUX FLOOD, Sheet 7

A general procedure can be used to troubleshoot most of the service lights. This procedure is as follows:

1. Read the circuit description for the particular faulty light(s) while referring to the mini-circuit diagram below the description. If all of the service lights do not work, see PROBLEM 6.

2. Use the following generalized tabular logic tree to isolate the problem (see Sheet 2).

NOTE A: All lamps are 24 volts.

NOTE B: Voltage checks are negative to ground. See page 2-57.

NOTE C. Continuity checks are made with item removed from system. See page 2-53.

NOTE D: If only one lamp will not come on, go to Step 8.

NOTE E: HEAD LIGHTS get power from a 15 amp circuit breaker rather than a fuse. Go to Step 3.

NOTE F: Fuse numbers are from left to right starting at LHIP.

NOTE G: Always replace or repair a wire with same size (gage). See WIRE LIST, page 2-61.

Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 25 (CONT) (Sheet 2 of 7)

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
	Make sure DK G wire harness connector behind LHIP is completely connected.			
1	Check fuse (NOTES E and F). Is fuse good?	3	2	Use continuity test. NOTE C.
2	Replace fuse (use 10 amp fuse only).	—	—	If new fuse blows, go to Step 3.
3	Gain access to rear of LHIP. Is voltage present (NOTE B) at switch terminal where PR wire connects?	5	4	
4	Repair/replace 16 gage PR wire from fuseholder to switch. NOTE G.	—	—	
5	Is voltage present at other wire on switch when switch is turned ON?	7	6	
6	Turn POWER switch OFF. Replace switch.	—	—	See page 2-305.

Go on to Sheet 3

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 25 (CONT) (Sheet 3 of 7)

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
	POWER switch and faulty LIGHT switch(s) ON.			
7	Is battery voltage present at lamp terminal where wire from switch connects?	8	9	
8	Replace lamp.	—	—	
9	Wire from switch to lamp is open. See WIRE AND HARNESS TESTING.	—	—	See page 2-66.

Go on to Sheet 4

PROBLEM NO. 25 (CONT) (Sheet 4 of 7)

25 a. When the TAIL/PANEL LIGHT switch is closed, current flows from fuse 3, through the switch and through the tail lamps to ground. Current also flows to the panel light circuit, therefore, if panel lights and gages work, the problem is either at the tail lamps or in the GY wire between the DK BL connector at Right Hand Instrument Panel (RHIP) and the tail lamps.

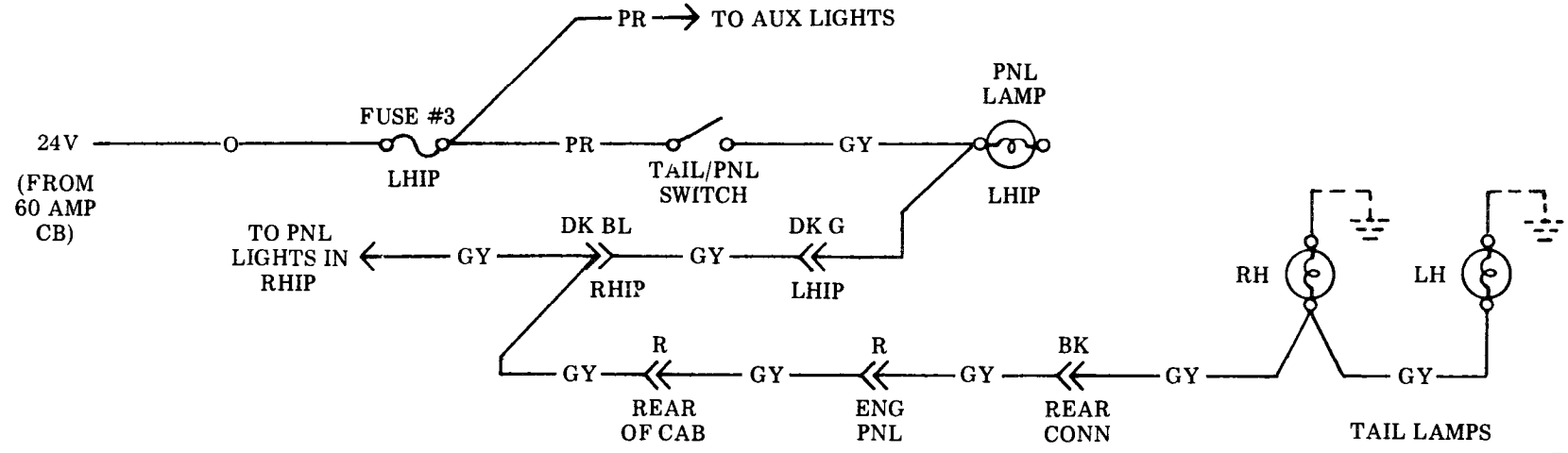
If only Right Hand (RH) tail lamp is out test bulb and check ground. If only Left Hand (LH) tail lamp is out test bulb, check ground and GY wire from RH tail lamp.

If panel lights do not come on, problem is either at fuse (see NOTE) or switch or in wiring from fuse to Left Hand Instrument Panel (LHIP) panel lamp.

NOTE

If auxiliary flood lights work, problem is not at fuse.

TAIL LIGHT CIRCUIT



TA 098623

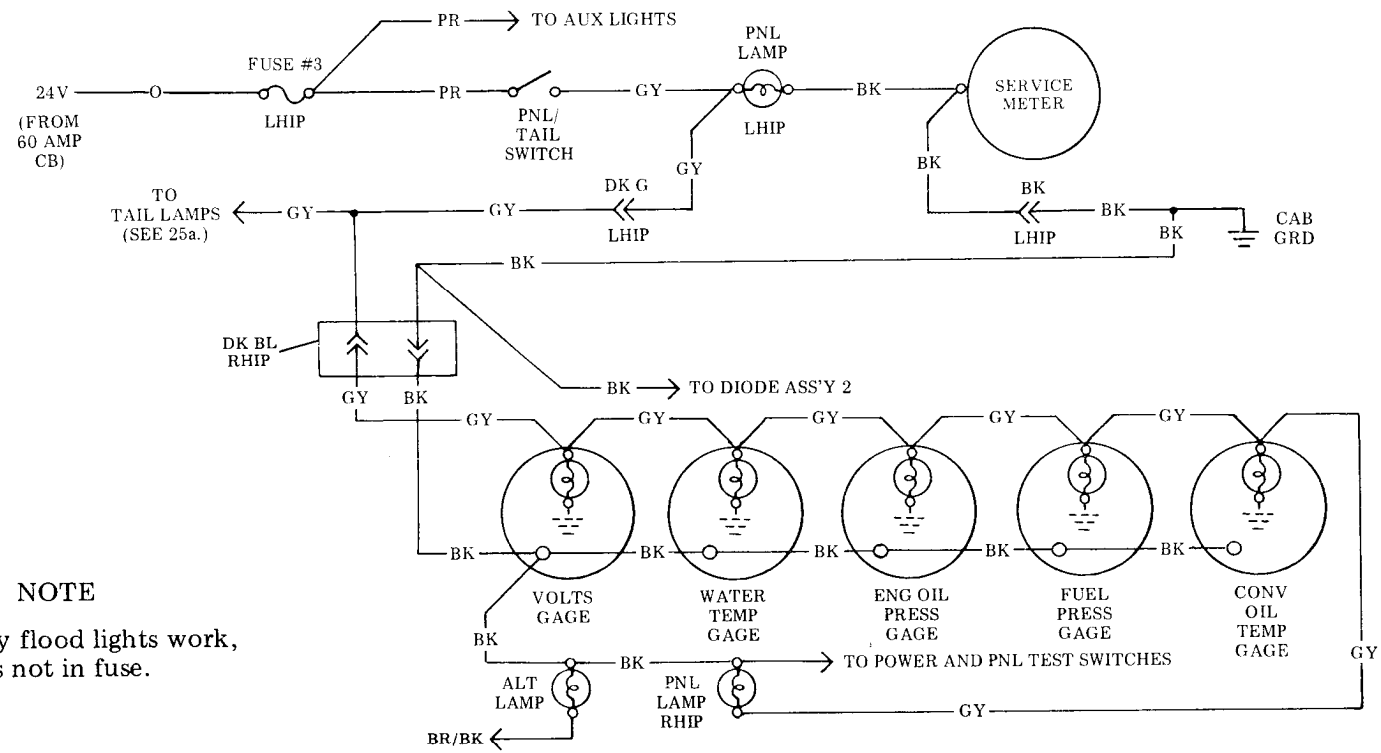
Go on to Sheet 5

PROBLEM NO. 25 (CONT) (Sheet 5 of 7)

25 b. When the TAIL/PANEL LIGHT switch is closed, current flows from fuse 3, through the switch and through a.) LHIP panel lamp to ground, b.) through each gage lamp to ground and c.) through RHIP panel lamp to ground. Current also flows through the tail light circuit, therefore, if only tail lights work, the problem is in the ground circuit - check cab ground first. If the tail lights and LHIP panel light works, the problem is in the GY wire or connections between the RHIP panel light and the DK BL connector at RHIP - check for proper seating of connector first.

If only one lamp is out, check bulb and then wiring to its socket (NOTE: Gage lamps are each grounded to the case of the gage, which in turn is grounded by way of BK wires).

PANEL LIGHT CIRCUIT



NOTE

If auxiliary flood lights work, problem is not in fuse.

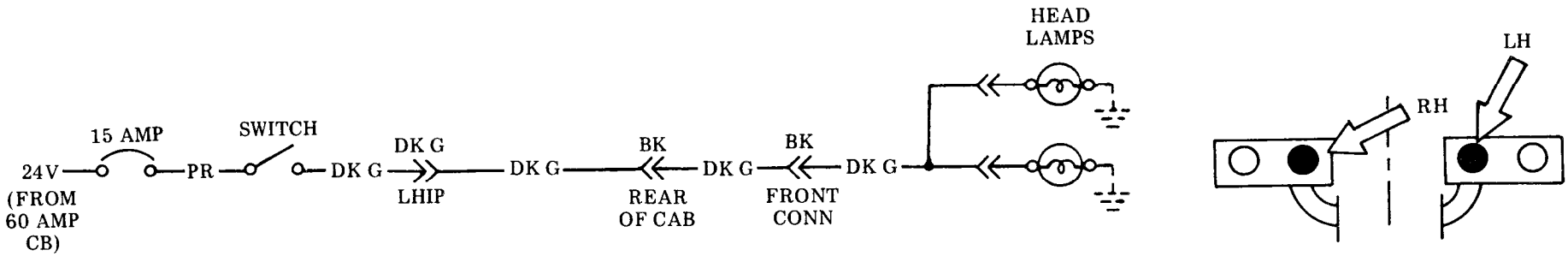
TA 098624

Go on to Sheet 6

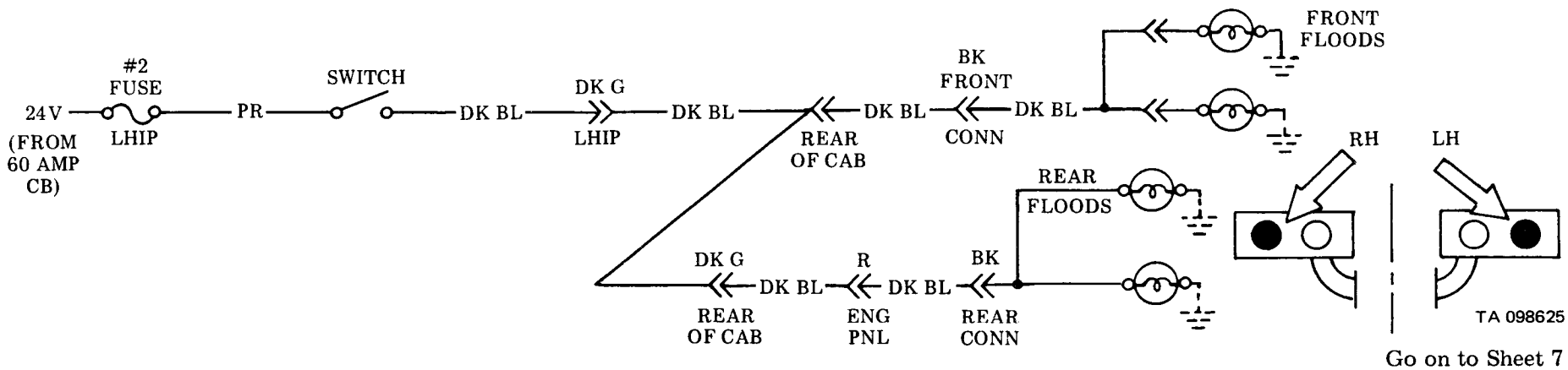
PROBLEM NO. 25 (CONT) (Sheet 6 of 7)

25 c. The HEAD LAMPS obtain their power from a 15 amp automatic-resetting circuit breaker rather than from a fuse. Current flo ws from the circuit breaker, through the switch, and through the lamps to ground. If only one lamp is out, problem is in the lamp or interconnecting wiring.

HEAD LIGHT CIRCUIT



25 d. When the FLOOD LIGHT switch is closed, current flows from fuse 2, through all four (front and rear) flood lamps to ground. If only the front work or only the rear work, switch and fuse are good. See diagram below.



Go on to Sheet 7

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

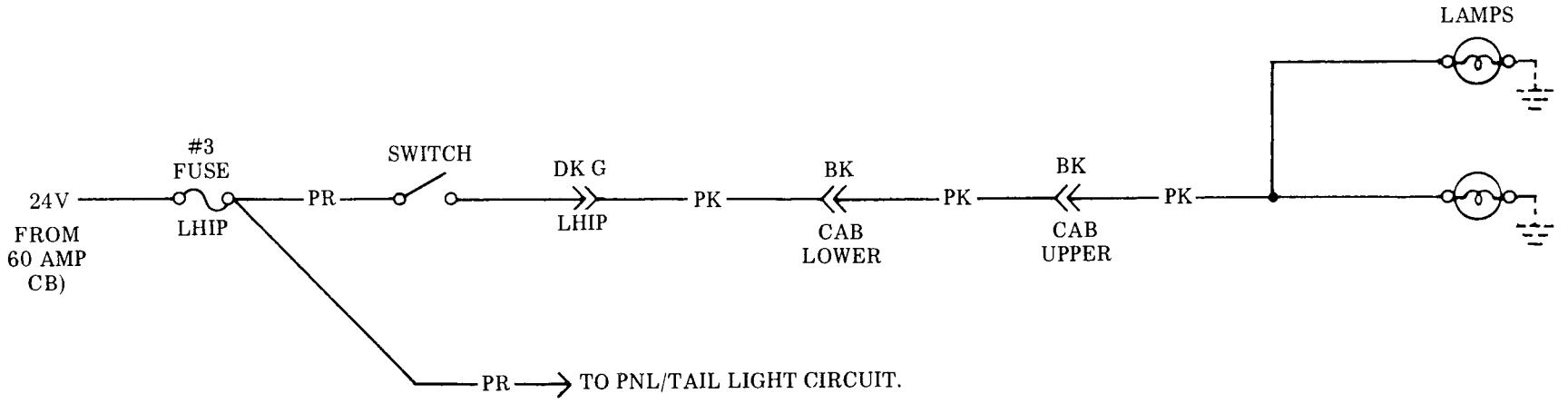
PROBLEM NO. 25 (CONT) (Sheet 7 of 7)

25 e. The auxiliary flood lights are mounted on top of the cab. When the AUX FLOOD switch is closed, current flows from fuse 3 through the switch through the auxiliary flood lamps to ground.

NOTE

If PANEL/TAIL LIGHTS work, fuse 3 is good.

AUX FLOOD LIGHT CIRCUIT



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End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 26 (Sheet 1 of 3)

SERVICE LIGHTS — STOP LIGHT(S) DO NOT WORK

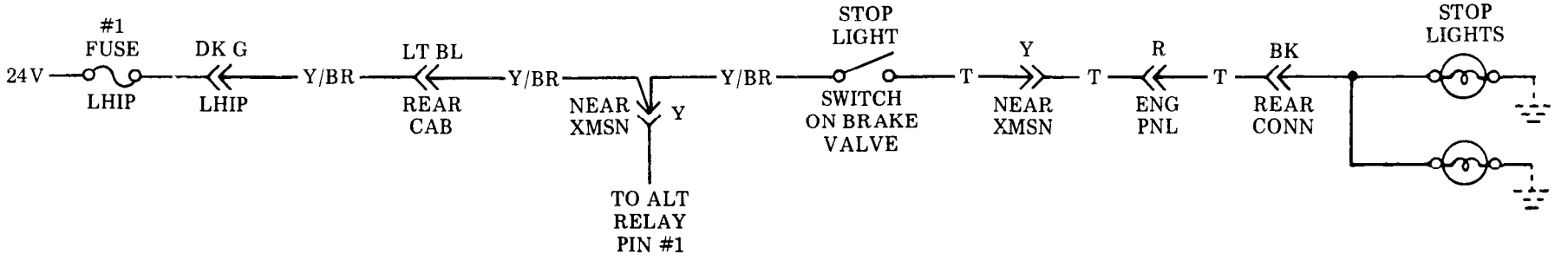
POWER switch ON. Brake pedal pressed. Indicator lights come ON when PANEL TEST switch is ON (see NOTE).

NOTE

Brake light switch receives its power from same circuit that feeds the panel test lights. If all indicator lights do not come on, see PROBLEM 12. If all indicator lights do come on, problem is between yellow connector and lamps or in the lamps.

This circuit uses a normally open pressure switch which closes when brake pedal (left or right) is pressed.

STOP LIGHT CIRCUIT



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Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 26 (CONT) (Sheet 2 of 3)

NOTE: Battery voltage is checked to ground (see page 2-57).

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
	Service brake ACTIVATED.			
1	Is battery voltage present at stop light switch terminal where Y/BR wire connects? See NOTE.	3	2	Stop light switch is on brake valve.
2	16 gage Y/BR wire from switch to yellow connector near transmission is open. Repair/replace wire. See page 2-54.	—	—	
3	Is battery voltage present at stop light switch terminal where T wire connects?	5	4	
4	Replace stop light switch.	—	—	See page 2-315.

Go on to Sheet 3

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 26 (CONT) (Sheet 3 of 3)

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
5	Is battery voltage present at RH stop light where T wire connects?	7	6	
6	16 gage T wire from stop light switch to RH stop lamp is open. Repair or replace wire.	—	—	See page 2-54.
7	Replace both stop lamps.	—	—	See page 2-291.

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 27 (Sheet 1 of 2)

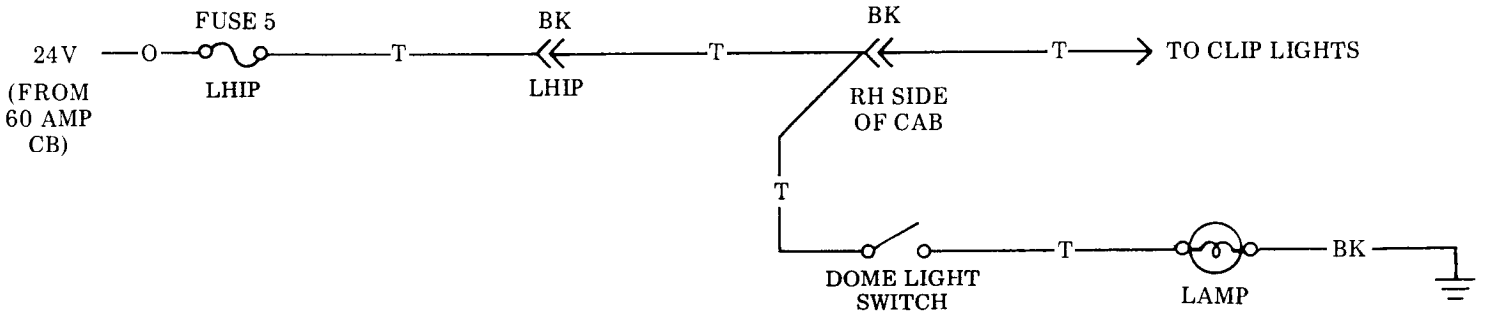
SERVICE LIGHTS DOME LIGHT DOES NOT WORK

POWER switch ON. Remaining lights work.

TROUBLESHOOT DOME LIGHT CIRCUIT

The DOME light receives its power from fuse 5. Fuse 5 also supplies power to the Container Lock Instrument Panel (CLIP) lights. If the CLIP iights work problem is not in fuse or wiring to B connector at RH side of cab, go to Step 1.

DOME LIGHT CIRCUIT



TA 098628

Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 27 (CONT) (Sheet 2 of 2)

NOTE: Voltage is checked to ground, see page 2-57.

STEP	QUESTION OR INSTRUCTION OR BOTH	ANSWER YES	ANSWER NO	REMARKS
1	Is fuse 5 good?	3	2	Right most fuse in LHIP.
2	Replace 10 amp. fuse.	—	—	
3	Is bulb burned out?	4	5	
4	Replace 24 volt bulb.	—	—	
5	Is battery voltage present at T wire where it connects to lamp assembly?	6	7	
6	Replace DOME lamp assembly.	—	—	
7	Test T, 16 gage wire from dome lamp to fuseholder 5. See page 2-53.	—	—	

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 28 (Sheet 1 of 3)

GAGES DO NOT WORK

Engine running and at nomal operating temperature.

The gages receive power from fuse 9 (rightmost fuse in RHIP). If all the gages do not work, check fuse 9 first. If fuse is good, repair/replace Y/BR wire from fuseholder 9 to VOLTS gage.

In case of suspected pressure or temperature gage malfunction, test circuit as follows: Remove wire from corresponding sender, with the POWER switch ON, and note the gage reading. Then momentarily ground the wire to machine frame and note gage reading. If gage and associated wiring are good, results should be:

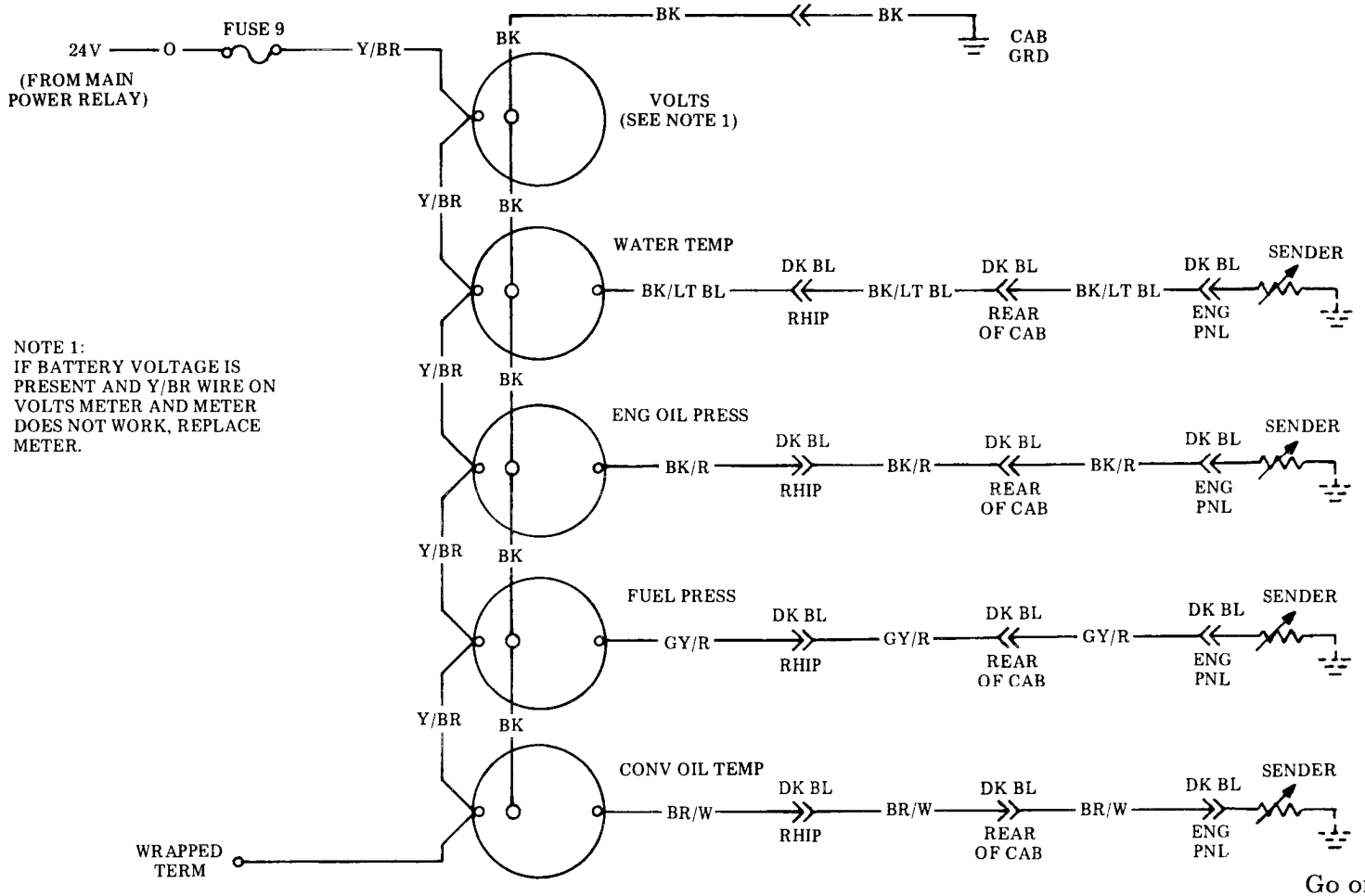
Gage	Gage Indication With Wire Disconnected	Gage Indication With Wire Grounded
Engine Coolant Temp.	Low	High
Converter Temp.	Low	High
Engine Oil Pressure	High	Low
Engine Fuel Pressure	High	Low

Senders are probably more likely to fail than the gages themselves.

Go on to Sheet 2

PROBLEM NO. 28 (CONT) (Sheet 2 of 3)

FUSE 9 POWER SCHEMATIC

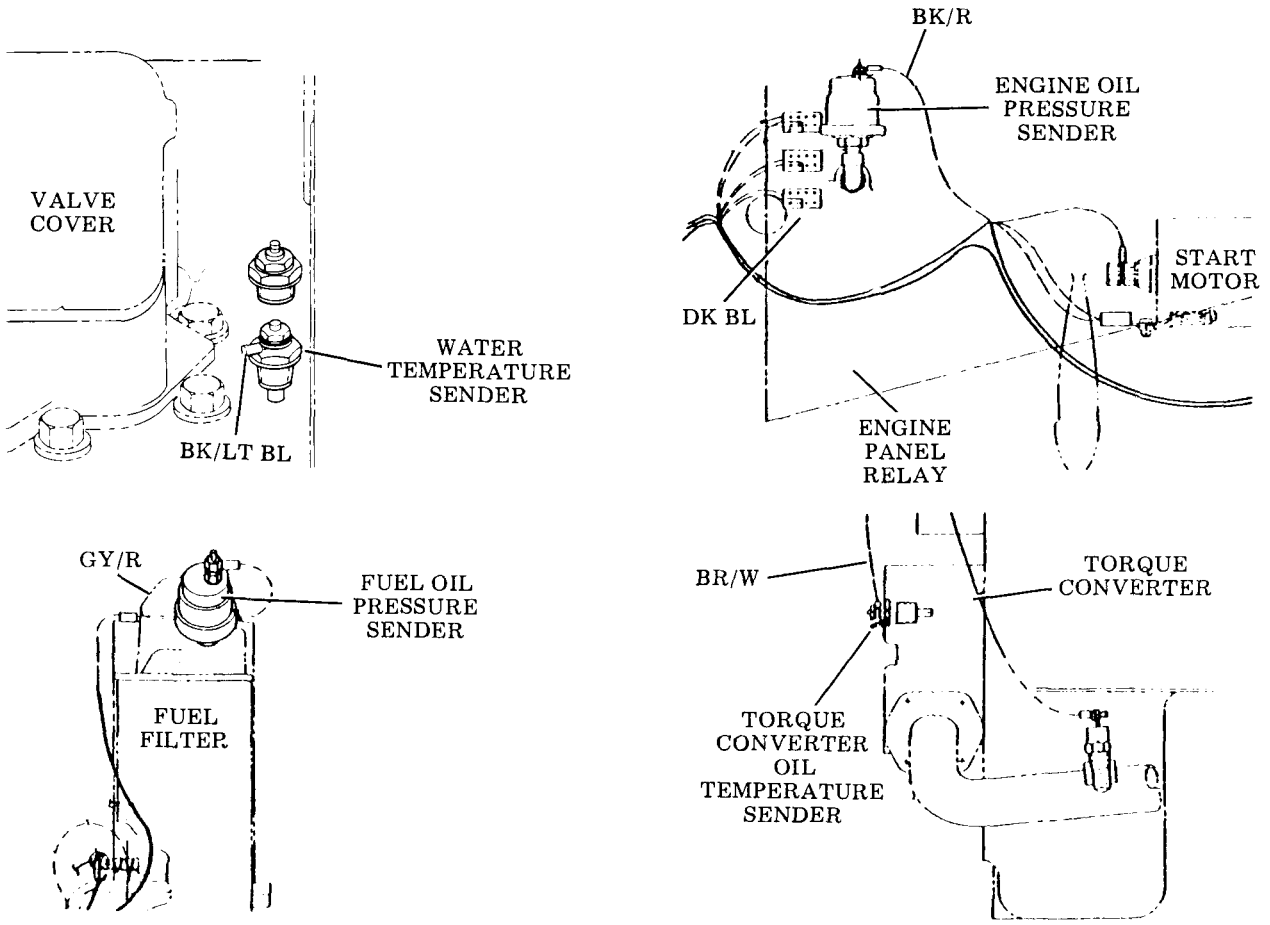


TA 098629

Go on to Sheet 3

PROBLEM NO. 28 (CONT)

SENDING UNITS



TA 098630

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

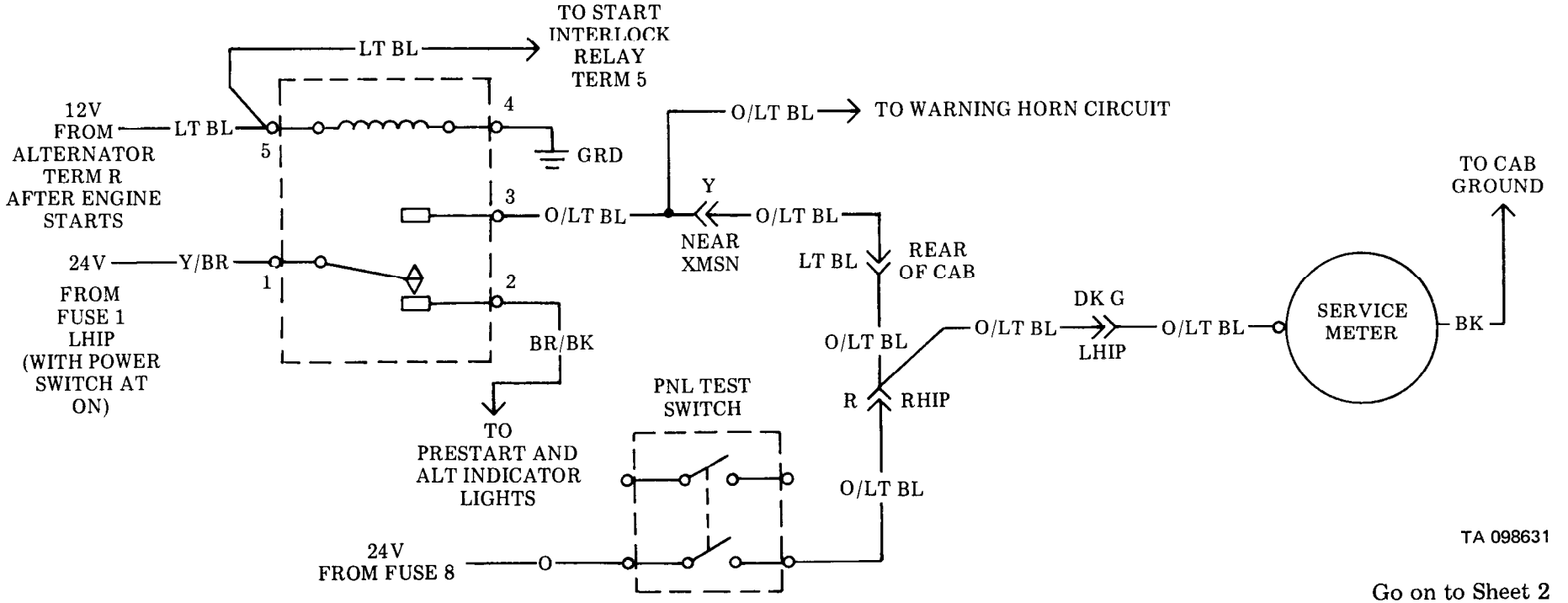
PROBLEM NO. 29 (Sheet 1 of 2)

SERVICE METER DOES NOT WORK

All other gages, lights, etc. work.

The service meter can receive its power from two sources: a. From fuse 1 when the engine is running or b. From fuse 8 when the PANEL TEST switch is closed. If service meter does not work only when PANEL TEST switch is on, replace PANEL TEST switch.

SERVICE METER CIRCUIT



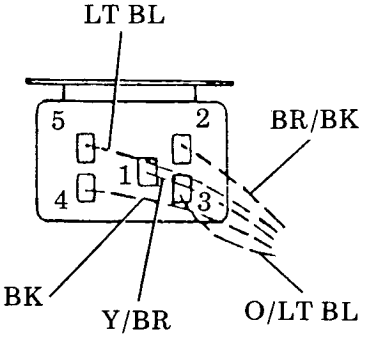
Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 29 (CONT) (Sheet 2 of 2)

NOTE 1: If service meter works (allow 1-2 minutes for warm up) when PANEL TEST switch is ON (POWER switch ON, engine not running) trouble is in alternator relay or associated wiring. Go to Step 5.
NOTE 2: Voltage is checked to ground, see page 2-57.

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
1	Gain access to rear of LHIP. START engine. Is battery voltage present at hourmeter where O/LT BL wire connects.	2		See page 2-305.
2	Is BK wire properly grounded?	4	3	
3	Repair/replace 16 gage BK wire.	—	—	
4	Replace service meter. POWER switch OFF.	—	—	See page 2-305.
5	Turn POWER switch to OFF. Place transmission selector in FORWARD or REVERSE. Does operator warning horn work?	7	6	
6	Gain access to engine relay panel. START engine. Is battery voltage present at alternator relay (4, page 2-70) terminal 3, where O/LT BL wire connects?	7	8	
7	O/LT BL 16 gage wire from Y connector near transmission to service meter is open.	—	—	See page 2-53.
8	Replace alternator relay. POWER switch OFF.	-	—	See page 2-337.



ALT. RELAY

TA 098632

End

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 30 (Sheet 1 of 2)

ALARM

BACKUP ALARM DOES NOT WORK

POWER switch ON. TRANSMISSION GEAR SELECTOR in REVERSE. Ceiling heater blower motor works (see NOTE).

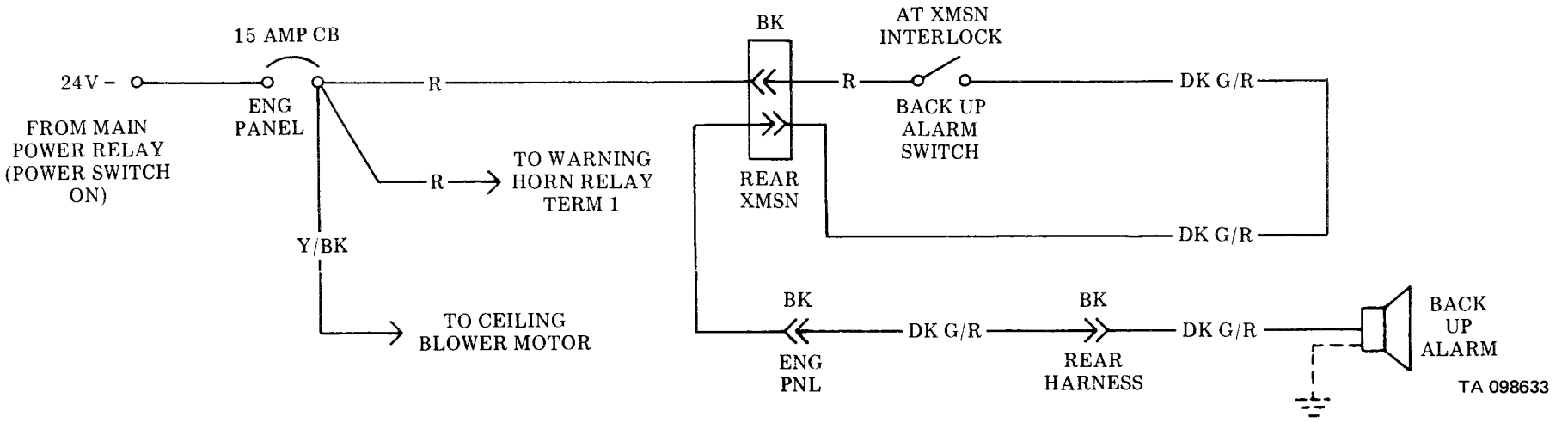
NOTE

If ceiling blower motor does not work, problem is at 15 amp. Circuit Breaker (CB) or associated wiring.

The backup alarm receives its power from 15 amp. CB (12, page 2-70). POWER switch must be ON to energize main power relay connecting battery voltage to the 15 amp. CB.

Placing transmission selector in reverse closes micro-switch on the transmission interlock, which sounds the backup alarm.

BACKUP ALARM CIRCUIT

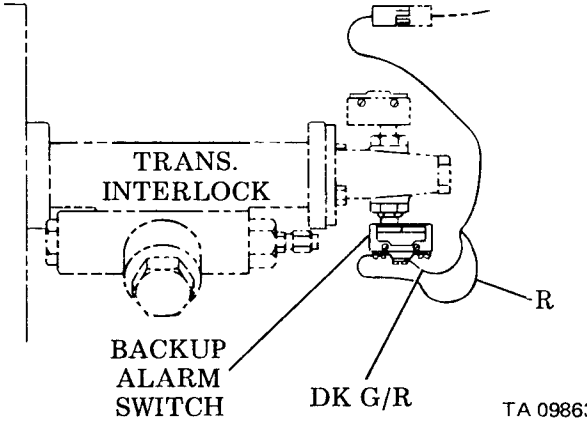


Go on to Sheet 2

ELECTRICAL SYSTEMS TROUBLESHOOTING (CONT)

PROBLEM NO. 30 (CONT) (Sheet 2 of 2)

STEP	QUESTION OR INSTRUCTION	ANSWER YES	ANSWER NO	REMARKS
	POWER switch ON. TRANS. selector in REVERSE.			
1	Is battery voltage present at backup alarm where DK G/R wire connects?	2	3	
2	Replace backup alarm.	—	—	See page 2-329.
3	Is battery voltage present at backup alarm switch where DK GR/R wire connects?	4	5	Switch is on transmission interlock mechanism.
4	16 gage DK G/R wire from backup alarm to switch is open.	—	—	See page 2-53.
5	Is battery voltage present where R wire connects?	7	6	
6	16 gage R wire from switch to 15 amp CB is open. Repair/ replace wire with same gage wire.	—	—	
7	See BACKUP ALARM SWITCH TESTING/ADJUSTMENT, page 2-334.	—	—	



End

Section V. MAINTENANCE

This section contains:

a. Servicing
b. Inspection
c. Removal
d. Disassembly
e. Cleaning
f. Repair or replacement
g. Reassembly
h. Installation
i. Adjustment
j. Test

Instructions for organizational maintenance personnel as allocated by the Maintenance Allocation Chart.

GENERAL MAINTENANCE PRACTICES (Sheet 1 of 1)

General maintenance practices are given in this section. This information will not be repeated in any other part of this manual.

SAFETY

Safety is always the most important consideration when working on this vehicle. Understand completely the job to be done and use common sense. Don't just do the job. Do it safely. Shipping link must be installed before any maintenance.

REMOVING PARTS

Always respect the weight of a part. Use a hoist whenever necessary. Don't lift heavy parts by hand. A hoist and adjustable lifting beam or sling are needed to remove most parts. The length of chain or cable from the hoist to the part being lifted should be parallel and should be positioned directly over the center of the part. Never leave a part hoisted in mid-air.

Always use blocking to support the part that has been hoisted. If you cannot remove a part, check to see that all capscrews and attached hardware have been removed. Check to see if any parts are in the way of the part being hoisted.

CLEANING

Keep all dirt out of parts. The vehicle will perform better. Seals, filters, and covers are used in this vehicle to keep it clean. They must be kept in good shape to help the vehicle run well.

Clean and look at all parts when removing parts. Make sure all holes and passages are clean and open. After cleaning parts, be sure to cover them with a clean cloth, paper, or other clean material. Make sure the part is clean when it is installed.

Always clean around air lines, hydraulic lines, or covers before removing them. Plug, tape, or put caps on holes and openings to keep dirt out.

DISASSEMBLY AND ASSEMBLY

Always put together or take apart one part at a time. Do not work on two parts at the same time. Be sure to make all adjustments. Always check your work when you are finished. Make sure everything is done.

Check the adjustments for the last time by operating the vehicle. If all adjustments are correct, the vehicle is ready to go back to work.

End

REPAIR AND REPLACEMENT PROCEDURES (Sheet 1 of 3)

HARDWARE AND THREADED PARTS

Install helical thread inserts when inside threads in castings are not able to withstand desired torque.

Replace capscrews, nuts, studs, washers, spacers, and small common hardware if missing or damaged in any way. Repair minor thread damage by cleaning out the threads using a tap or die.

Replace all damaged or missing lubrication fittings.

BELTS, WIRING, HOSES AND LINES

Replace belts, hoses, clamps, electrical wiring, electrical switches, circuit breakers, and fuel lines if they are broken, split or inoperative.

INSTRUMENTS AND GAGES

Replace defective or broken instruments and gages.

BALL AND ROLLER BEARINGS

Anti-friction bearings must be handled in a special way. To keep out dirt and abrasives, cover the bearings as soon as they are removed.

Wash bearings in a non-flammable cleaning solution. Knock out packed lubricant inside by tapping the bearing against a wooden block. Wash bearings again. Cover bearings with clean material, and set them down to dry.

Then coat bearings with oil. Wrap them in clean paper.

Go on to Sheet 2

Make sure the chamfered side of the bearing faces the shoulder when installing bearings against shoulders. Before pressing bearings into place, lubricate them and all metal surfaces they contact. Put pressure only on the part of the bearing that directly contacts the mating part.

Always use the proper tools and fixtures for removing and installing bearings. Special tools and fixtures that are needed are listed in the manual.

Bearings do not usually need to be removed. Remove bearings only if it is necessary.

SLEEVE BEARINGS

Do not remove a sleeve bearing unless it is damaged, very worn, or loose in its bore. If you must remove a sleeve bearing, press it out.

When pressing or driving, put pressure right in line with the bore. Use a bearing driver or a bar with a smooth flat end to drive a bearing. Never use a hammer.

If there are oil holes, make sure they are alined.

GASKETS

Always replace used gaskets with new gaskets. Never use the same gasket twice. Make sure the gasket holes match up with holes in the mating part.

If gasket must be made, make sure to cut holes to match up with the mating part. Use material that is the right type and thickness.

Serious damage to the machine can happen if any holes on the part are blocked by the gasket.

LIP TYPE SEALS

Lip seals are usually used to seal oil or grease. To seal in oil, the lip is usually put facing toward oil to be sealed. To seal grease, the lip usually faces away from grease.

Seals should not be removed. Only remove seals to get at other parts or if the seal is damaged or worn.

Leaking oil or grease usually means that a seal is damaged and needs to be replaced. Replace leaking seals so that bearings don't overheat. If seal is removed, replace with new seal.

Soak new rawhide seals in warm oil for one-half hour before using them, if possible. Put in wiper edge seal with wiper edge turned in direction recommended. When putting seals in place, use shims around shafts and shoulders.

Go onto Sheet 3

REPAIR AND REPLACEMENT PROCEDURES (CONT) (Sheet 3 of 3)

PACKINGS

Packing seals and O-rings (preformed packings) should always be replaced if they are removed from the mated part. To prevent leaks, put a coating of the lubricant being sealed on seals before putting them on the part.

GEARS

Always use the tools listed in the manual to work on gears. Always watch for damaged or worn teeth on gears.

Burs and rough spots should be removed with a honing stone or crocus cloth before putting gear in place. Lubricate mating surfaces before pressing gears on shafts.

SHAFTS

If a shaft does not come out easily, check that all nuts and capscrews have been removed. See if other parts are in the way before using force.

Shafts fitted to tapered splines should be very tight. If shafts are not tight, disassemble and check tapered splines. Discard parts that are worn. Make sure tapered splines are clean, dry, and free of burs before putting them in place. Press mating parts together tightly.

Clean off rust compound from all machined surfaces of new parts.

PARTS REPLACEMENT

Replace worn, damaged, or defective parts with new parts.

End

CLEANING (Sheet 1 of 1)

PARTS PROTECTION

Before cleaning, protect rubber items (hoses, boots, electrical insulation) from cleaning solutions. Protect them with a grease-proof barrier material. Remove the rubber part if it cannot be protected.

CLEANING PROCESS

Any cleaning method may be used as long as it does not damage a part. Cleaning is necessary so that parts can be checked. Rusted paint areas must be stripped to bare metal before repainting.

RUST OR CORROSION REMOVAL

Rust and corrosion can be removed with a wire brush, abrasive cloth, sand blasting, vapor blasting, or rust remover. Use buffing or a crocus cloth on highly polished parts that are rusted.

BEARINGS

Remove shields and seals from bearings before cleaning. Bearings with permanent shields and seals must not be cleaned in solution.

Clean open bearings by soaking them in a petroleum cleaning solution item 2 Appendix C. Never use a solution with chlorine in it.

Bearings should stand and dry. Do not use compressed air to dry. Do not spin bearings while they are drying.

End

ENGINE MAINTENANCE INSTRUCTIONS

This section covers removal and installation of the following engine components for Organizational Maintenance personnel:

a. Pulley and vibration damper
b. Engine crankcase breather
c. Oil filter lines
d. Engine oil filters
e. Valve covers
f. Tachometer drive

Also instructions for engine lubrication and oil filter replacement.

LIST OF TASKS (Sheet 1 of 1)

TASK NO.	TASK	REF (PAGE)	TROUBLESHOOTING REF (PAGE)
1	Engine lubrication.	2-152	2-38, 2-40
2	Pulley and vibration damper removal/installation.	2-155	2-41
3	Engine crankcase breather and fumes disposal assembly service.	2-158	None
4	Oil filter lines and oil filler assembly removal/installation.	2-161	None
5	Valve covers removal/installation.	2-165	None
6	Tachometer drive removal/installation.	2-167	None

End

ENGINE LUBRICATION

This task covers: Draining and refilling crankcase with oil. Replacing engine oil filters.

INITIAL SETUP

Test Equipment

None

Special Tools

Strap wrench

Materials/Parts

Oil per LO 10-3930-641-12

Oil filters

Suitable oil container, capable of holding 11 gallons (42 liters) of waste oil.

Personnel Required

Two mechanics

References

LO 10-3930-641-12

Engine crankcase breather service, page 2-158

Engine starting and stopping, TM 10-3930-641-10

PMCS, page 2-5

Shipping link removal/installation, page 2-471.

Troubleshooting Reference

Pages 2-38, 2-40

Equipment Condition

Engine OFF. Parking brake control OUT.

Power switch OFF. Vehicle level.

Shipping link installed

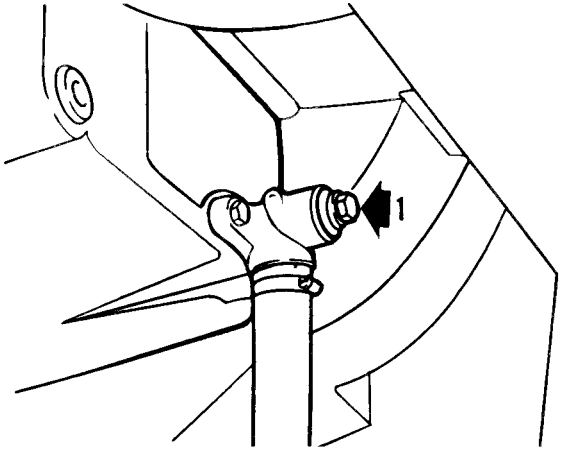
General Safety Instructions

Use caution when draining oil. Hot oil causes burns.

Main disconnect switch OFF.

Go on to Sheet 2

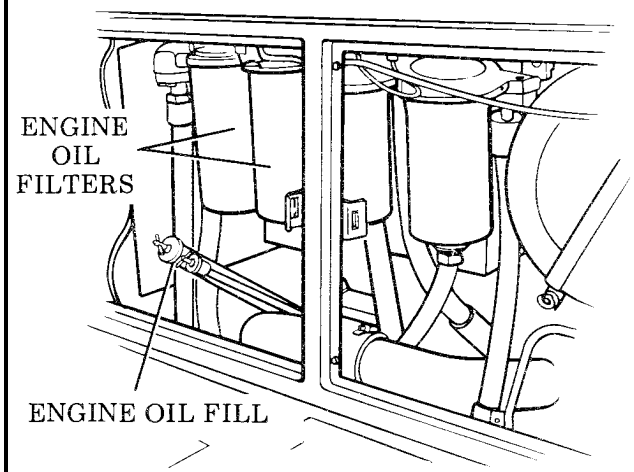
ENGINE LUBRICATION (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
1. Drain hose	Move to position outside crankcase guard.	
2. Drain valve (1)	a. Open. b. Drain oil into suitable container. c. Close.	
3. Drain hose	Place inside crankcase guard.	
4. Crankcase breathers	Check for clogging.	See ENGINE CRANKCASE BREATHER SERVICE, page 2-158.

TA 098635

Go onto Sheet 3

ENGINE LUBRICATION (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
5. Oil filters	a. Using strap wrench, remove two and discard. b. Clean filter mounting bases. Be sure old gaskets are completely removed. c. Apply film of clean engine oil to gaskets on new filters. d. Install filters snugly; hand tighten. NOTE One person should be in cab, while one person checks for leaks.	
6. LOW ENG OIL indicator on operator's indicator panel	Test by turning POWER switch ON. Indicator should come ON.	
7. Engine crankcase	Fill.	See LO 10-3930-641-12.
8. Engine	Start and run at low idle.	
9. Oil filter bases	Check for leaks	
10. Oil level dipstick	Check oil level.	Oil level should be between LOW and FULL marks on LOW IDLE side of dipstick. If not, add oil.
11. LOW ENG OIL indicator on operator's indicator panel	Should be off.	
12. Engine	Shut down.	

TA 098636

End

PULLEY AND VIBRATION DAMPER REMOVAL/INSTALLATION (Sheet 1 of 3)

This task covers: Removal and installation of front engine pulley and vibration damper.

INITIAL SETUP

Test Equipment

None

Special Tools

Guide bolt, 5/8-18 x 7

Materials/Parts

None

Personnel Required

Two mechanics

References

PMCS, page 2-5

Torque limits chart, page E-1

Alternator belt adjustment, page 2-254

Hood removal/installation, page 2-452

Shipping link removal/installation, page 2-471.

Troubleshooting Reference

Page 2-41

Equipment Condition

Engine OFF and cooled.

Parking brake control OUT.

Shipping link installed.

Hood removed.

General Safety Instructions

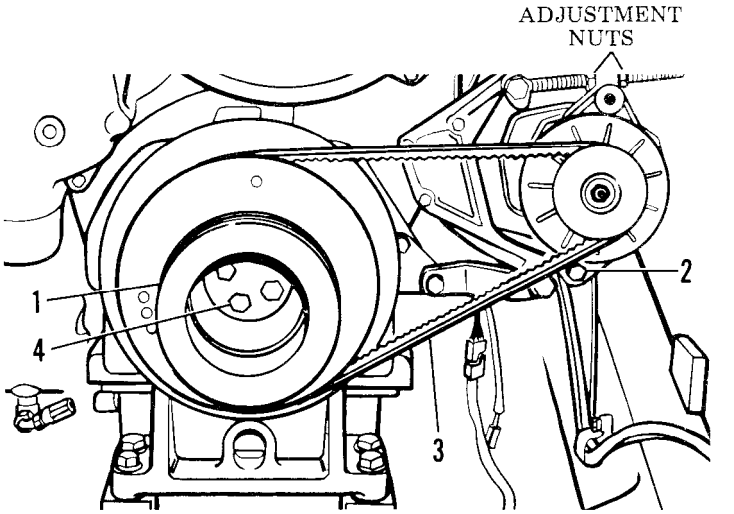
If engine is not completely cooled, parts may be hot. Handle carefully.

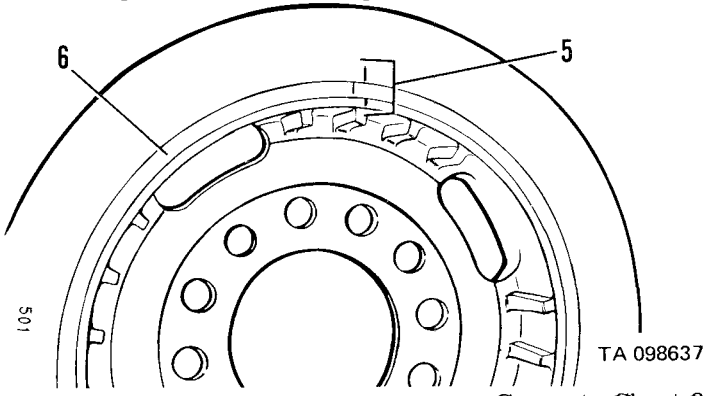
Main disconnect switch OFF.

Go on to Sheet 2

PULLEY AND VIBRATION DAMPER REMOVAL/INSTALLATION (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Fan drive belts	Remove from pulley (1). See page 2-229.	
2. Belt adjustment nut	a. Loosen mounting bolts (2). b. Loosen adjustment nuts enough to remove belt.	
3. Alternator belt (3)	Remove.	
4. Capscrews (4)	Remove four from pulley.	
5. Pulley (1)	Remove.	If marks aline, install pulley and belts. If marks are not alined, replace vibration damper.
6. Vibration damper (6)	a. Check marks (5) for alinement.	

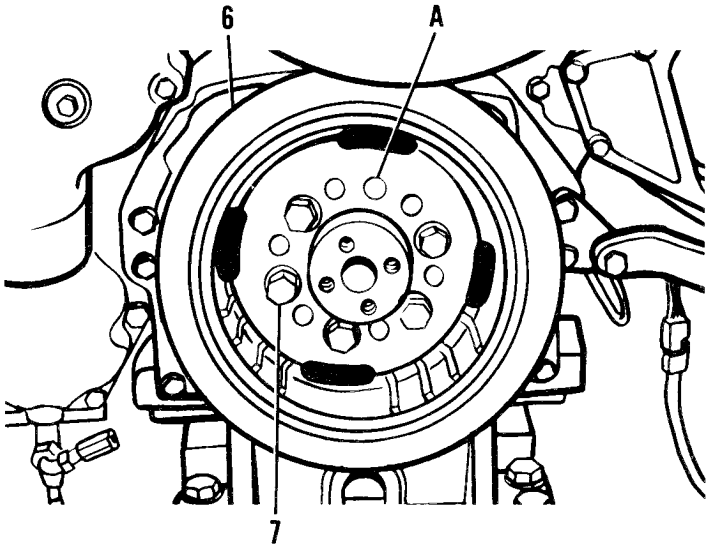




Go on to Sheet 3

PULLEY AND VIBRATION DAMPER REMOVAL/INSTALLATION (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
6. Vibration damper (cont)	b. Remove one capscrew (7). Install guide bolt 5/8-18 x 7, shown at (A).	Impact wrench may be used.
	c. Remove five remaining capscrews (7).	
	d. Remove damper (6).	
	NOTE Adapter may come off with damper.	
	e. Remove adapter from damper.	
INSTALLATION		
1. Vibration damper (6) and adapter	a. Position on crankshaft.	
NOTE Install adapter first.	b. Install five capscrews (7) and tighten.	
	c. Remove guide bolt (A).	
	d. Install sixth capscrew (7)	See TORQUE LIMITS CHART, page E-1.
2. Pulley (1)	Position on front of engine.	
3. CapsCrews (4)	Install four cap screws and tighten.	See TORQUE LIMITS CHART, page E-1.
4. Alternator belt (3)	Install and adjust. Tighten adjustment nuts (2). See page 2-254.	See ALTERNATOR BELT ADJUSTMENT, page 2-254.
5. Fan drive belts	Install. See page 2-229.	



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End

ENGINE CRANKCASE BREATHER AND FUMES DISPOSAL ASSEMBLY SERVICE

This task covers: Removal, cleaning, and installation of crankcase breathers and fumes disposal assembly.

INITIAL SETUP

Test Equipment

None

Special Tools

None

Materials/Parts

Non-flammable cleaning solvent, item 2 Appendix C
Gasket

O-ring

Personnel Required

One mechanic

References

PMCS, page 2-5

Troubleshooting Reference

None

Equipment Condition

Engine OFF and cooled.

Mast lowered. Parking brake control OUT.

Side panel open.

General Safety Instructions

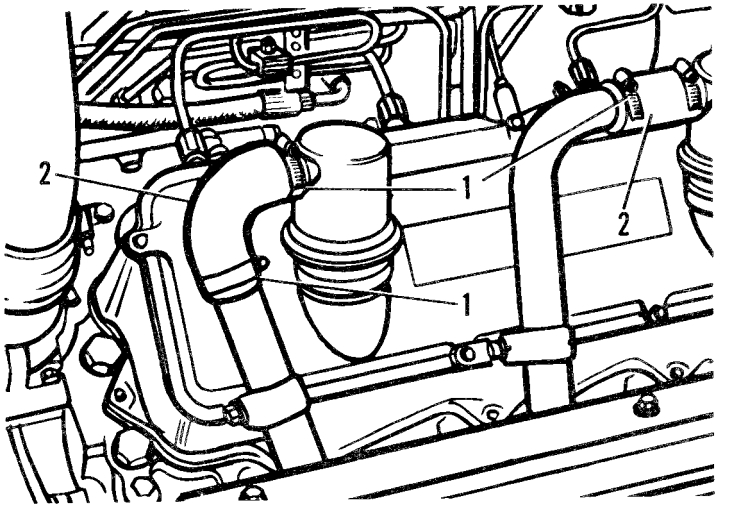
Handle lines and breathers carefully. Parts and oil may be hot. They can cause burns.

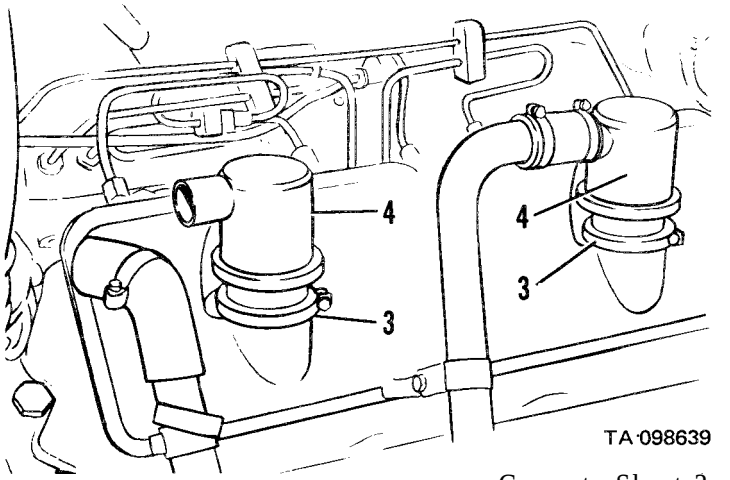
Main disconnect switch OFF.

Go on to Sheet 2

ENGINE CRANKCASE BREATHER AND FUMES DISPOSAL ASSEMBLY SERVICE (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
1. Hose clamps (1)	Loosen.	
2. Hose (2) (fumes disposal group)	Remove.	
3. Breather clamps (3)	Loosen.	
4. Breathers (4)	a. Remove breathers (4).	
	WARNING Use solvents only in well ventilated areas. Fumes may be dangerous.	
	b. Wash breathers (4) in clean, non-flammable solvent.	
	c. Allow breathers to dry.	
	d. Replace O-ring inside breather.	

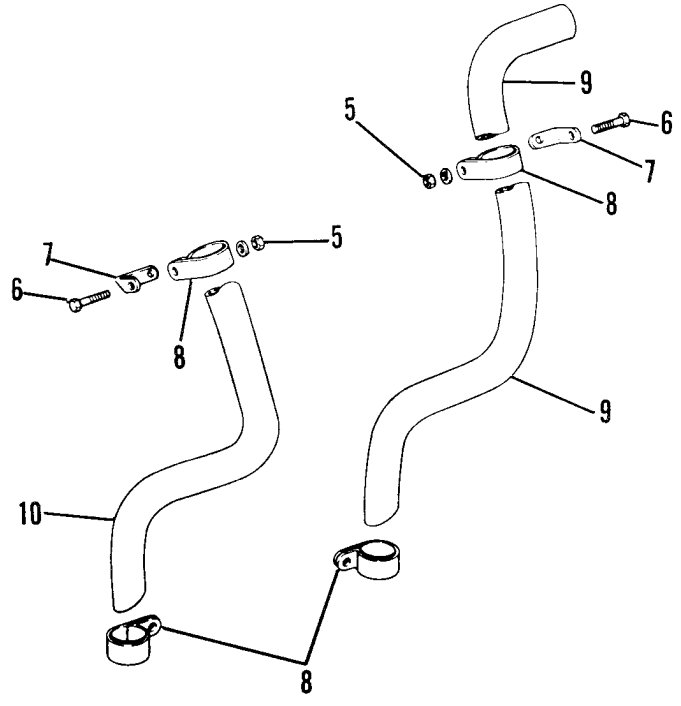




Go on to Sheet 3

ENGINE CRANKCASE BREATHER AND FUMES DISPOSAL ASSEMBLY SERVICE (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
4. Breathers (4) (cont)	**e.** Install.	
5. Breather clamps (3)	Position and tighten.	
6. Hose (2) (fumes disposal group)	Check for damage. Replace if necessary.	
7. Capscrews (6), nuts (5) and washers securing brackets (8)	Remove.	
8. Fumes disposal group (9 and 10)	Remove.	
9. Fumes disposal group (9 and 10) and brackets (8)	Place in position and secure with capscrews (6), nuts (5) and washers.	
10. Hose clamps (1)	Position and tighten.	



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End

OIL FILTER LINE AND OIL FILLER ASSEMBLY REMOVAL/INSTALLATION

This task covers: Removal and installation of engine oil filter lines and oil filler assembly.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine OFF and cooled.

Access panels open.

Special Tools

None

Personnel Required

One mechanic

References

Torque limits chart, page E-1

General Safety Instructions

Use caution in handling lines. Hot oil causes burns.

Protect parts of vehicle from oil spillage. Catch line oil in small pan or bucket.

Main disconnect switch OFF.

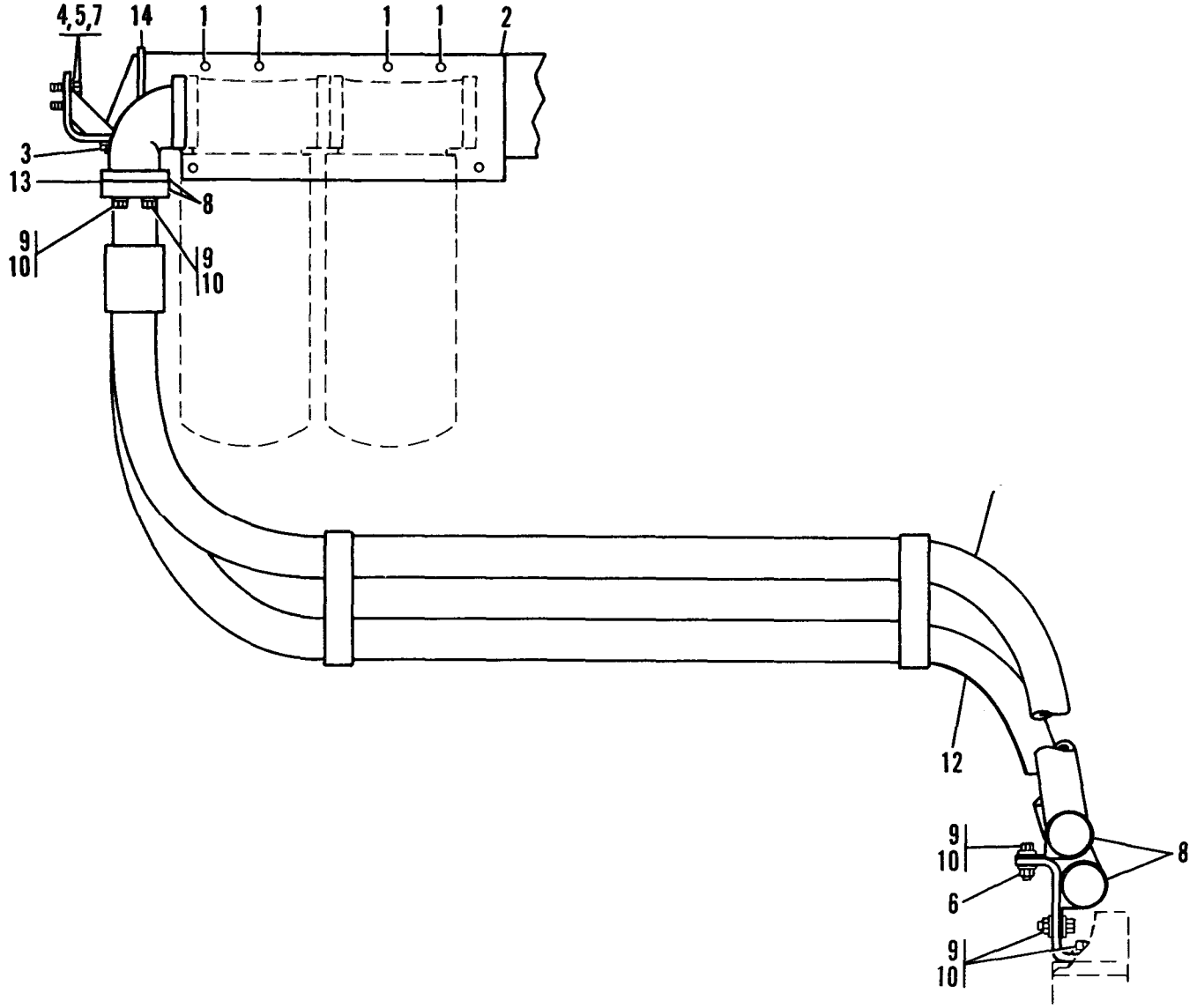
Go onto Sheet 2

OIL FILTER LINE AND OIL FILLER ASSEMBLY REMOVAL/INSTALLATION (CONT) (Sheet 2 of 4)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL OIL FILTER LINE		
1. Hose nut (9)	Loosen four at oil filter end of each line.	
2. Clips and straps	Remove from frame and hoses.	
3. Hose nut (9)	Loosen at oil cooler end.	
4. Hose assembly (11), (12)	Remove.	
INSTALLATION		
1. Hose assembly (11), (12)	Position in vehicle.	
2. Hose nut (9)	Tighten four at oil cooler end.	See TORQUE LIMITS CHART, page E-1.
3. Clips and straps	Install on hoses and frame.	
4. Hose nut (9)	Tighten four at oil filter end.	See TORQUE LIMITS CHART, page E-1.

Go on to Sheet 3

OIL FILTTER LINE AND OIL FILLER ASEMBLY REMOVAL/ INSTALLATION (CONT) (Sheet 3 of 4)



1. Capscrew
2. Support
3. Capscrew
4. Washer
5. Nut
6. Gasket
7. Capscrew
8. Flange
9. Capscrew
10. Washer
11. Hose Assembly
12. Hose Assembly
13. Seal
14. Adapter

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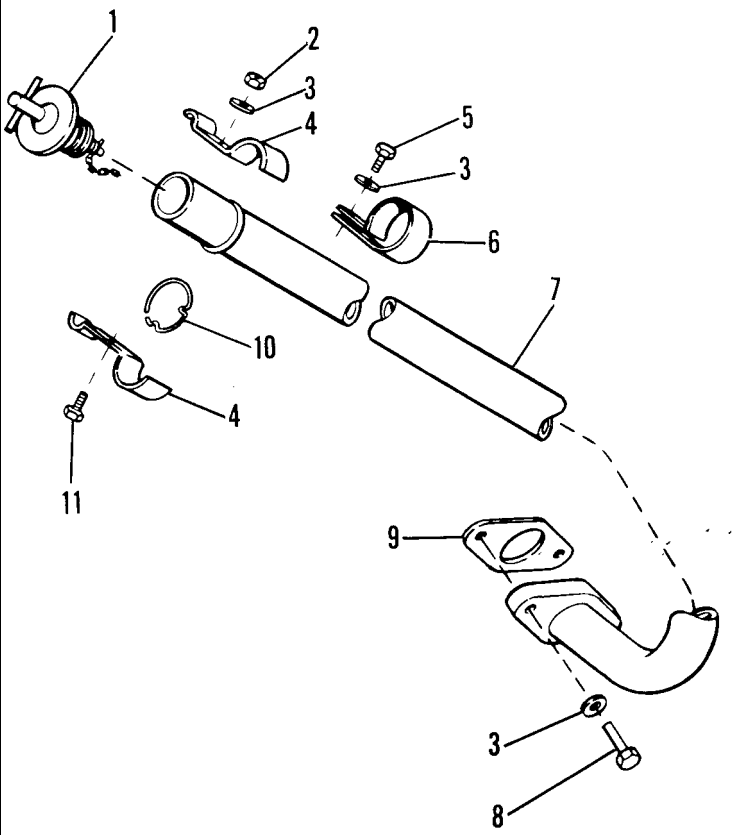
Go on to Sheet 4

OIL FILTER LINE AND OIL FILLER ASSEMBLY REMOVAL/INSTALLATION (CONT) (Sheet 4 of 4)

LOCATION/ITEM	ACTION	REMARKS
OIL FILLER ASSEMBLY REMOVAL		
1. Plug (1)	Remove.	
2. Capscrews (5, 8, 11), washers (3) and nuts (2)	Remove.	
3. Brackets (4) and (6)	Remove.	
4. Filler assembly (7)	Remove.	
5. Preformed packing (9)	Replace.	
INSTALLATION		
1. Filler assembly (7) and brackets (6)	Place in position.	
2. Capscrews (9) and (5) and washers (3)	Install.	
3. Bracket (4)	Position on oil filler assembly (7) and dipstick tube.	
4. Bracket (4)	Secure with capscrew (11), nut (2) and washer (3).	
5. Plug (1)	Install.	



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End

VALVE COVERS REMOVAL/INSTALLATION

This task covers: Replacement of engine valve covers.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Gasket

Non-flammable cleaning solvent, item 2 Appendix C

Troubleshooting Reference

None

Equipment Condition

Access panel open.

Special Tools

None

Personnel Required

One mechanic

References

None

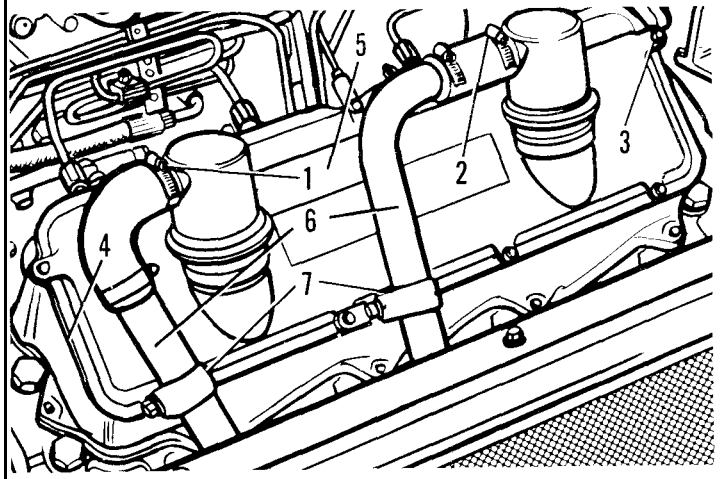
General Safety Instructions

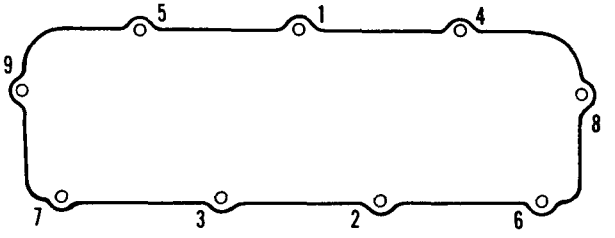
Main disconnect switch OFF.

Go on to Sheet 2

VALVE COVERS REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Clamps (1) and (2) on breather tube connections.	Loosen. See page 2-158, Engine crankcase breather service. NOTE Step No. 1 is not necessary for right side.	
2. Capscrews (3)	Remove.	
3. Valve cover (5)	Remove.	
4. Breather tubes (6)	Remove four clips (7).	
5. Gasket (4)	Remove and discard. Clean gasket mating surface with cleaning solvent.	
INSTALLATION		
1. Gasket (new)	Install.	
2. Valve cover (5)	Place in position.	
3. Breather tubes (6)	a. Position tubes on engine. b. Install clips (7).	
4. Capscrews (3)	Torque in sequence to 13-23 lb. ft. (18-31 N•m).	
5. Clamps (1) and (2)	Install and tighten.	





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End

TACHOMETER DRIVE REMOVAL/INSTALLATION

This task covers: Removal and installation of the tachometer drive.

INITIAL SETUP

Test Equipment

None

Materials/Parts

O-ring

Troubleshooting Reference

None

Equipment Condition

Engine stopped.

Special Tools

None

Personnel Required

One mechanic

References

None

General Safety Instructions

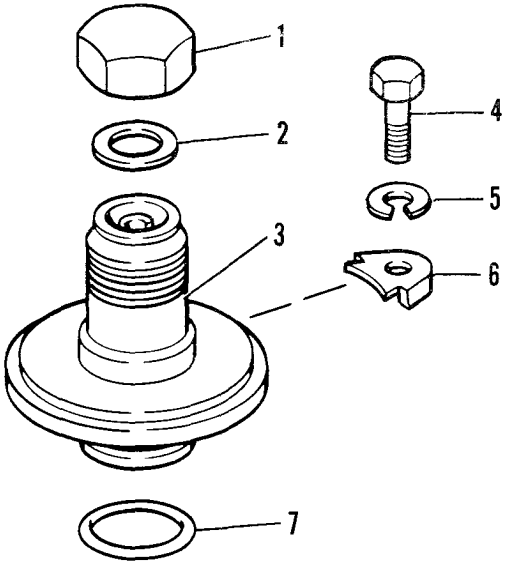
Steering wheel tagged "DO NOT OPERATE."

Main disconnect switch OFF.

Go on to Sheet 2

TACHOMETER DRIVE REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Two capscrews (4), washers (5, and retainers (6)	Remove from fuel transfer pump body.	
2. Tachometer drive (3)	Remove.	
3. O-ring seal (7)	Remove.	
INSTALLATION		
1. O-ring seal (7)	Replace.	
2. Tachometer drive (3)	Place in position on fuel transfer pump body.	
3. Capscrews (4), washers (5) and retainers (6)	Install.	



1. Cap
2. Washer
3. Tachometer drive
4. Capscrew
5. Lockwasher
6. Retainer
7. O-ring seal

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End

FUEL SYSTEM MAINTENANCE INSTRUCTIONS

This section covers removal and installation of these fuel system components for Organizaticmal Maintenance personnel:

a. Fuel injection lines
b. Fuel lines
c. Ether starting aid assembly
d. Fuel transfer pump
e. Fuel priming pump
f. Fuel filters

Fuel priming procedure

Filter servicing instructions

Service fuel tank

Clean fuel tank filler and cap

LIST OF TASKS (Sheet 1 of 1)

TASK NO.	TASK	REF (PAGE)	TROUBLESHOOTING REF (PAGE)
1	Fuel injection lines removal/installation.	2-170	None
2	Fuel lines and fittings removal/installation.	2-173	2-39, 2-41
3	Fuel transfer pump removal/installation.	2-177	None
4	Fuel priming pump removal/installation.	2-179	None
5	Priming the fuel system.	2-181	None
6	Primary fuel filter service.	2-183	2-37, 2-39
7	Secondary fuel air filter service.	2-186	2-37, 2-39
8	Ether starting aid removal/installation.	2-189	None
9	Fuel tank service.	2-193	2-37, 2-39
10	Clean fuel tank filler and cap and screen.	2-195	None

End

FUEL INJECTION LINES REMOVAL AND INSTALLATION

This task covers: Removing and installing fuel injection lines.

INITIAL SETUP

Test Equipment

None

Special Tools

5P144 Socket

Materials/Parts

Tags

Plugs

Personnel Required

One mechanic

References

Hood removal, see page 2-452

Muffler removal, see page 2-211

PMCS, page 2-5

Priming the fuel system, page 2-181
(Remove air from fuel system)

Troubleshooting Reference

None

Equipment Condition

Engine shut down.

Hood removed.

Muffler removed.

General Safety Instructions

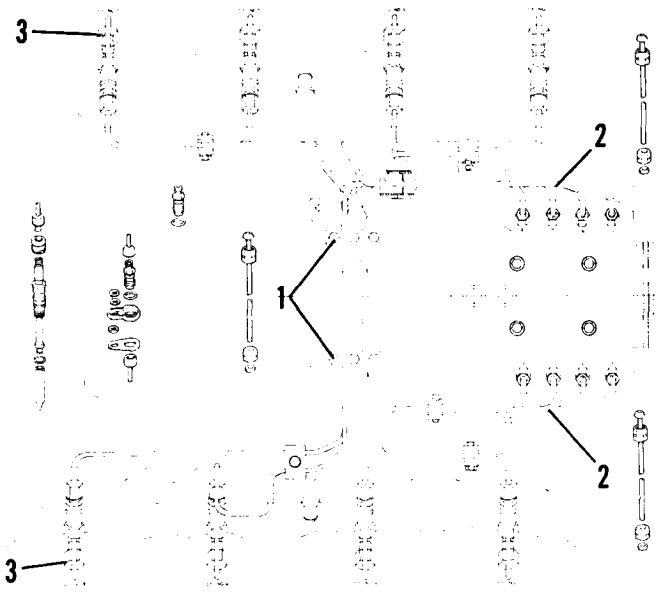
Main disconnect switch OFF.

Do not smoke or have open flames or sparks around fuel or lines. Fuel may catch fire and cause burns.

Go on to Sheet 2

FUEL INJECTION LINES REMOVAL AND INSTALLATION (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. CapsCrews (1) that secure injection lines to support bracket	Remove.	
	NOTE	
2. Fuel injection lines (2)	Remove lines as an assembly, and change bad line(s) at bench. a. Tag to identify location on pumps and lines. b. Disconnect from pumps. c. Plug or cap lines and pumps to keep fuel system clean. d. Disconnect lines from valve cover base adapters (3). e. Plug or cap adapters and lines.	
3. Injection lines (2)	Remove. **CAUTION** Do not use bent or kinked injection lines.	



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Go on to Sheet 3

FUEL INJECTION LINES REMOVAL AND INSTALLATION (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION	CAUTION If new lines are used for replacement, then remove identification tags from lines. Tags can cause wear on injection lines.	
1. Fuel injection lines (2)	a. Must be clean and dry. b. Position on engine and connect to correct injection pumps and valve cover base adapter(s). c. Tighten nuts on lines to torque of 25-35 lb. ft. (34-48 N•m).	
2. Capscrews (1) that secure injection lines to support bracket	Install.	
3. Fuel system	Remove air by operating the priming pump.	See page 2-181.

End

FUEL LINES AND FITTINGS REMOVAL/INSTALLATION

This task covers: Removal and installation of fuel lines and fittings.

INITIAL SETUP

Test Equipment

None

Special Tools

None

Materials/Parts

Preformed packings

Gaskets

Personnel Required

One mechanic

References

TORQUE LIMITS CHART, page E-1

PMCS, page 2-5

Troubleshooting Reference

Pages 2-39, 2-41

Equipment Condition

Engine OFF and cooled

Access doors open

General Safety Instructions

Do not smoke or have open flames or sparks around fuel or lines. Fuel may catch fire and cause burns.

Main disconnect switch OFF.

Go on to Sheet 2

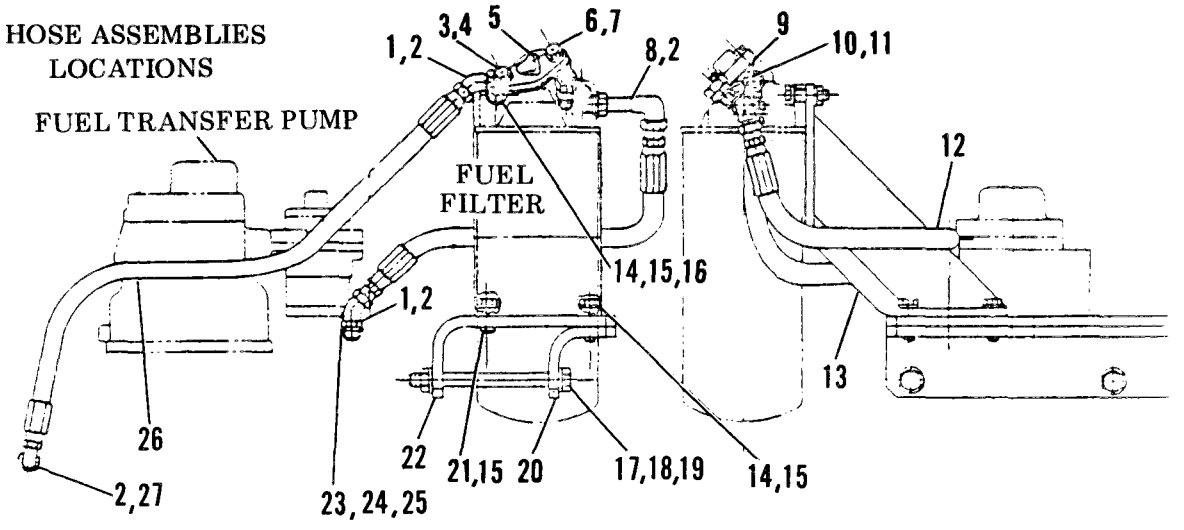
FUEL LINES AND FITTINGS REMOVAL/INSTALLATION (CONT) (Sheet 2 of 4)

LOCATION/ITEM	ACTION	REMARKS
	NOTE	
REMOVAL	The following procedures apply to any of the fuel lines and fittings.	
1. Connector nuts	Loosen at both ends of fuel line.	Connector nuts are at each end of each hose or tube assembly.
2. Lines/hoses	Remove.	
3. Elbow nuts	Loosen.	Elbow nuts hold elbows tight to the base; they are screwed in.
4. Elbows	Remove.	
5. Preformed packings	Remove where installed.	
INSTALLATION		
1. Preformed packings	a. Coat lightly with fuel oil. b. Install.	

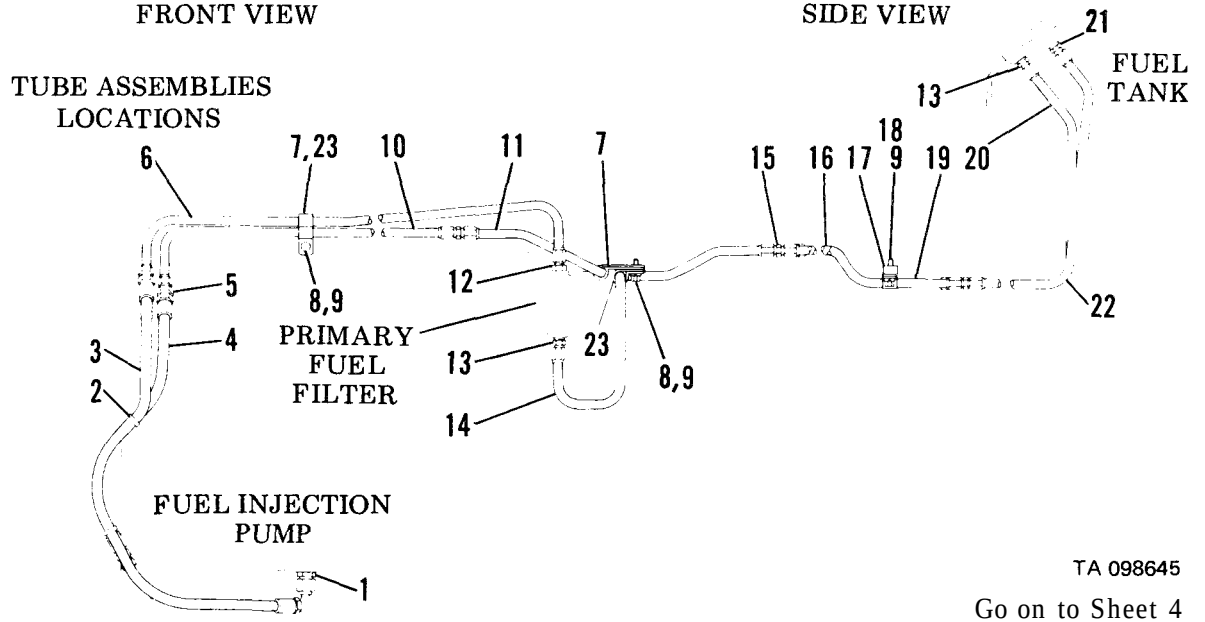
Go on to Sheet 3

FUEL LINES AND FITTINGS REMOVAL/INSTALLATION (CONT) (Sheet 3 of 4)

1. Elbow
2. Preformed packing
3. Washer
4. Capscrew
5. Fuel filter base cover
6. Capscrew
7. Washer
8. Elbow
9. Gasket
10. Adapter
11. Preformed packing
12. Hose assembly
13. Fuel filter bracket assembly
14. Capscrew
15. Washer
16. Nut
17. Capscrew
18. Washer
19. Nut
20. Bracket
21. Capscrew
22. Bracket
23. Adapter
24. Elbow
25. Pipe plug
26. Hose assembly
27. Connector



1. Connector Seal
2. Strap
3. Hose assembly
4. Hose assembly
5. Connector
6. Tube assembly
7. Clip
8. Bolt
9. Lockwasher
10. Tube assembly
11. Tube assembly
12. Connector Seal
13. Connector
14. Tube assembly
15. Union
16. Tube assembly
17. Sleeve
18. Bolt
19. Tube assembly
20. Tube assembly
21. Connector
22. Tube assembly
23. Clip



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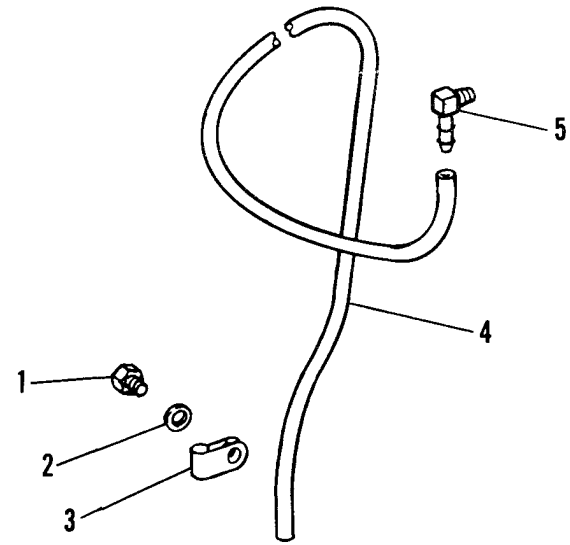
Go on to Sheet 4

FUEL LINES AND FITTINGS REMOVAL/INSTALLATION (CONT) (Sheet 4 of 4)

LOCATION/ITEM	ACTION	REMARKS
2. Elbows	Install.	
3. Elbow nuts	Tighten.	See TORQUE LIMITS CHART, page E-1.
4. Lines/hoses	Install.	
5. Connector nuts	Tighten.	See TORQUE LIMITS CHART, page E-1.
PUMP OVERFLOW LINE		
1. Capscrew (1), washer (2), and clip (3)	Remove.	
2. Overflow line (4)	Slip off nipple (5) and replace.	
3. Capscrew (1), washer (2), and clip (3)	Install.	



TA 098646

End

FUEL TRANSFER PUMP REMOVAL/INSTALLATION

This task covers: Replacement of fuel transfer pump.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Gasket

O-ring seal

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Access door open.

Special Tools

None

Personnel Required

One mechanic

References

PMCS, page 2-5

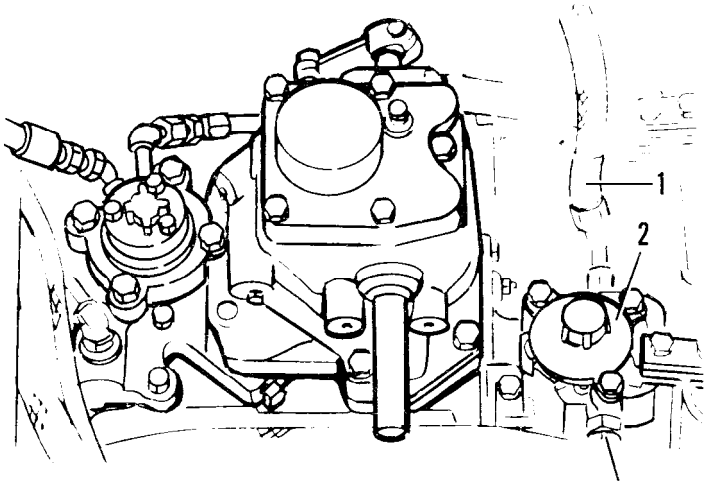
General Safety Instructions

Main disconnect switch OFF

Go on to Sheet 2

FUEL TRANSFER PUMP REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Fuel lines (1) and (3)	Disconnect from fuel transfer pump (2).	
2. Two bolts that hold fuel transfer pump to injection pump rear plate	Remove.	
3. Fuel transfer pump	Remove.	
	NOTE Replace gasket and O-ring seal.	
INSTALLATION		
1. Gasket and fuel transfer pump (2)	a. Install new gasket and O-ring seal. b. Place in position and rotate pump to align **gears.**	
2. Fuel lines (1) and (3)	Install.	
3. Two capscrews	Install.	



NOTE

Lift transfer pump up evenly to ease removal.

TA 098647

End

FUEL PRIMING PUMP REMOVAL/INSTALLATION

This task covers: Replacement of fuel priming pump.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Gasket

Troubleshooting Reference

None

Equipment Condition

Engine shut down

Access door open

Special Tools

None

Personnel Required

One mechanic

References

PMCS, page 2-5

General Safety Instructions

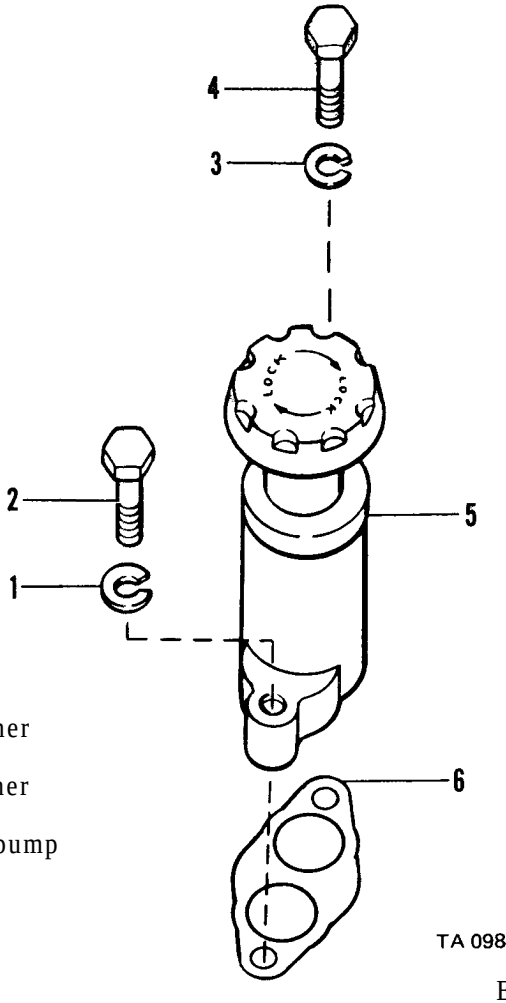
Main disconnect switch OFF

Do not smoke or have open flames or sparks around fuel or lines. Fuel may catch fire and cause burns.

Go onto Sheet 2

FUEL PRIMING PUMP REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Two capscrews (2) and (4) and two washers (1) and (3)	Remove. See page 2-182 for location.	
2. Priming pump (5)	Remove.	
3. Gasket (6)	Discard and replace with new gasket.	
INSTALLATION		
1. Priming pump (5) and gasket (6)	Place in position.	
2. Two capscrews (2) and (4) and two washers (1) and (3)	Install.	



1. Lockwasher
2. Capscrew
3. Lockwasher
4. Capscrew
5. Priming pump
6. Gasket

TA 098648

End

PRIMING THE FUEL SYSTEM

This task covers: Using the fuel priming pump to prime the fuel system.

INITIAL SETUP

Test Equipment

None

Special Tools

None

Materials/Parts

None

Personnel Required

Two mechanics

References

Shipping link removal/installation, page 2-471

Troubleshooting Reference

None

Equipment Condition

Engine shut down

Shipping link installed

Rear access door open

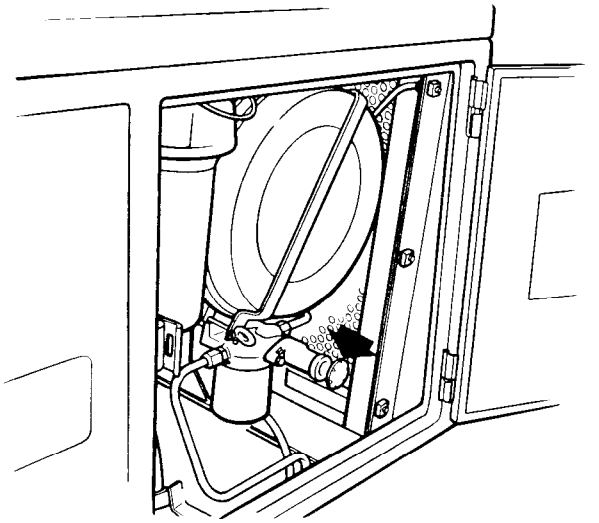
General Safety Instructions

Main disconnect switch OFF

Do not make or have open flames or sparks around fuel or lines. Fuel may catch fire and cause burns.

Go on to Sheet 2

PRIMING THE FUEL SYSTEM (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
1. Priming pump	Unlock (turn handle counterclockwise ½ turn) and pump until you feel resistance.	
2. Priming pump	Lock pump (turn handle clockwise until it locks).	
3. Engine	Start and check system for leaks.	

TA 098649

End

FUEL FILTER SERVICE – PRIMARY

This task covers: Removing and cleaning or replacing the primary fuel filter element.

INITIAL SETUP

Test Equipment

None

Special Tools

None

Materials/Parts

Gasket

Element

Dry cleaning solvent, item 2 Appendix C

Personnel Required

One mechanic

References

Priming the fuel system, page 2-181

PMCS, page 2-5

Troubleshooting Reference

Pages 2-37, 2-39

Equipment Condition

Engine shut down

Access door open

General Safety Instructions

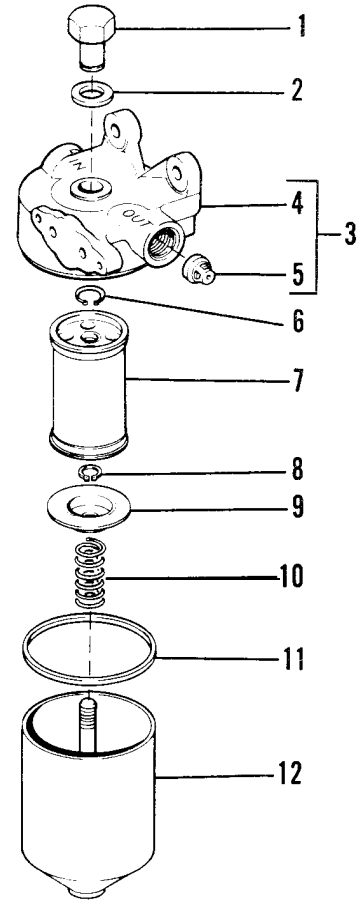
Main disconnect switch OFF

Do not smoke or have open flames around fuel or lines. Fuel may catch fire and cause burns.

Go on to Sheet 2

FUEL FILTER SERVICE – PRIMARY (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
	NOTE When fuel pressure gage is in RED area — engine running at high idle (accelerator held to floor), shut down vehicle and wash fuel filter.	1. Nut 2. Gasket 3. Base assembly 4. Base 5. Valve assembly 6. Lock ring 7. Element assembly 8. Retaining ring 9. Retainer 10. Spring 11. Gasket 12. Case assembly
1. Mounting nut (1) (Left rear of engine below air cleaner) See page 2-182 for location.	Loosen.	
2. Gasket (2)	Visually check and replace if necessary.	
3. Case assembly (12)	Remove.	
4. Element (7)	a. Remove lock ring (6) and element (7). b. Wash in clean, nonflammable solvent, item 2, Appendix C. c. Dry, using low pressure air (30 psi max.).	
5. Gasket (11)	Discard and replace with new gasket.	
6. parts (4, 5, 8, 9, 10)	Remove if required.	
7. Case assembly (12)	Clean in solvent, item 2, Appendix C.	



TA 098650

Go on to Sheet 3

FUEL FILTER SERVICE – PRIMARY (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
8. Parts (4, 5, 8, 9, 10)	Install if removed.	
9. Element (7)	Install in case assembly and secure with lock ring (6).	
10. New gasket (11)	Install.	
11. Case assembly (12)	Install.	
	NOTE When changing the primary fuel filter is the only function being performed, the fuel pump must be primed before engine is started. Prime the pump while tightening the nut (1). See page 2-181.	
12. Nut (1)	Tighten.	
13. Engine	a. Start. b. Check for fuel filter leaks. c. Shut down.	

End

FUEL FILTER SERVICE – SECONDARY

This task covers: Replacing the secondary fuel filter.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Dry cleaning solvent, item 2
Appendix C

Troubleshooting Reference

Pages 2-37, 2-39

Equipment Condition

Engine shut down

Access door open

Special Tools

Strap wrench

Personnel Required

One mechanic

References

Torque limits chart, page E-1

Priming the fuel system, page 2-181

PMCS, page 2-5

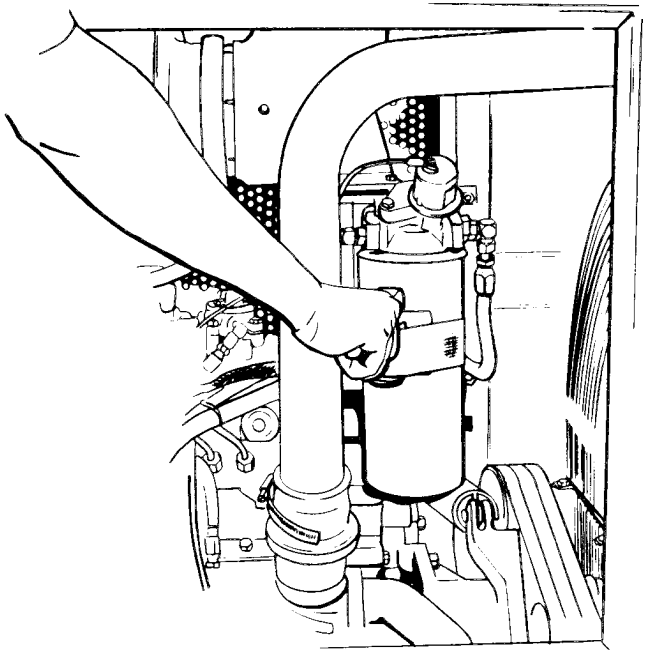
General Safety Instructions

Main disconnect switch OFF

Do not smoke or have open flames around fuel or lines. Fuel may catch fire and cause burns.

Go on to Sheet 2

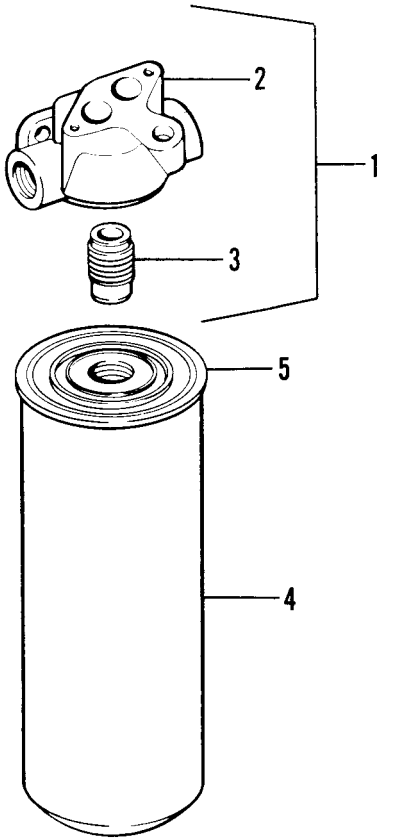
FUEL FILTER SERVICE – SECONDARY (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
1. Filter	NOTE Change filter element when fuel pressure gage reads in RED area — engine running at high idle (accelerator held to floor). a. Remove, using strap wrench. b. Discard filter.	 TA 098651

Go on to Sheet 3

FUEL FILTER SERVICE – SECONDARY (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
2. Base assembly (1)	a. Clean. b. Be sure all of old gasket is removed. NOTE Replace stud (3) if necessary.	
3. Gasket (5)	a. Lubricate with diesel fuel. b. Install. NOTE Fill new filter with clean, fresh fuel. This will save time when priming the fuel system.	
4. Filter (4)	a. Install. b. Tighten until gasket contacts base. c. Tighten ½ to ¾ turn more.	
5. Priming pump	Prime fuel system. See page 2-181.	



1. Base assembly
2. Base
3. Stud
4. Filter
5. Gasket

TA 098652

End

ETHER STARTING AID REMOVAL/INSTALLATION

This task covers: Replacement of ether starting aid components.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine shut down

Right side access panel open

Special Tools

None

Personnel Required

One mechanic

References

PMCS, page 2-5

General Safety Instructions

Main disconnect switch OFF

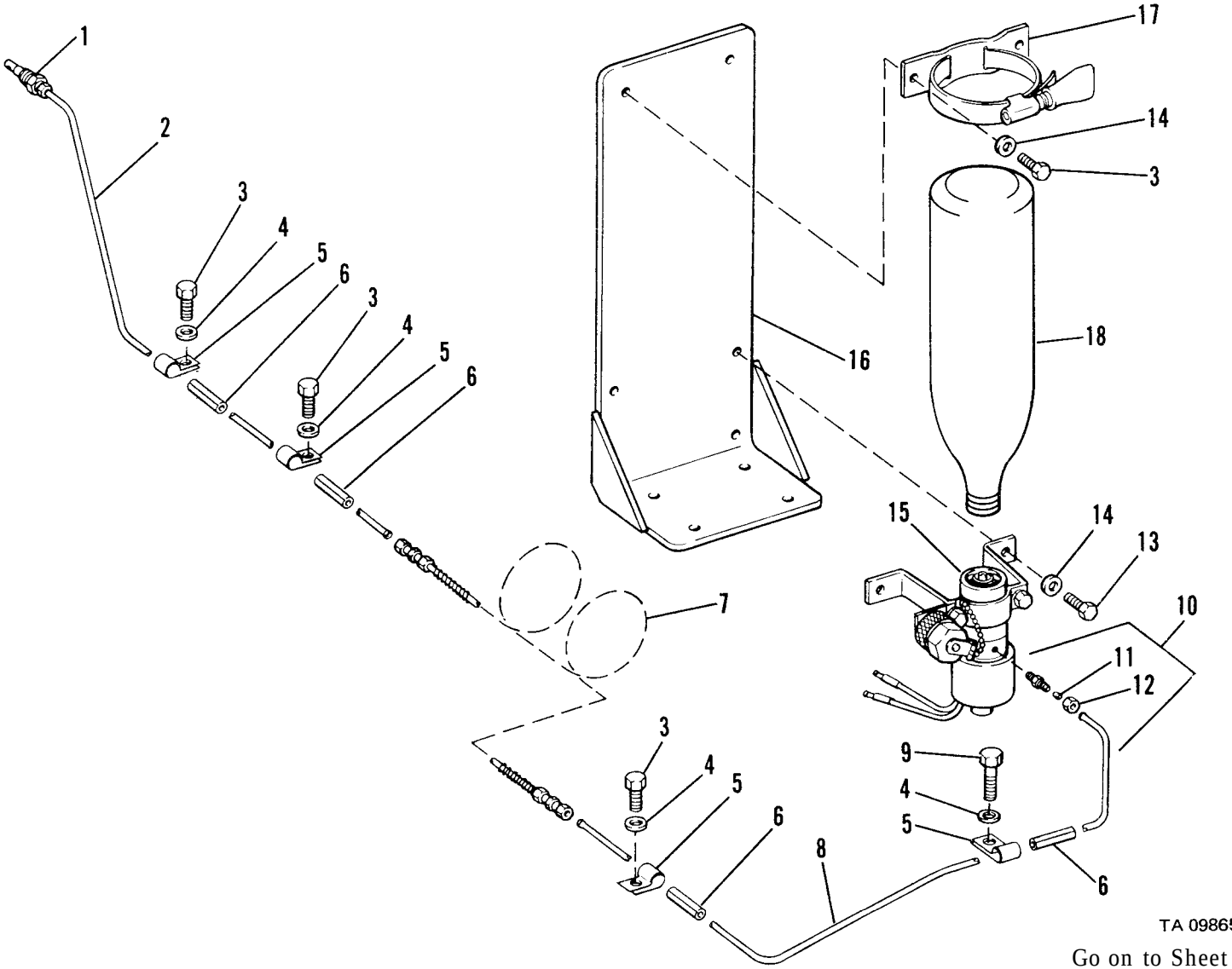
Do not smoke or have open flames or sparks around fuel or lines. Fuel may catch fire and cause burns.

Go on to Sheet 2

ETHER STARTING AID REMOVAL/INSTALLATION (CONT)

(Sheet 2 of 4)

1. Atomizer assembly
2. Tube
3. Capscrew
4. Washer
5. Clip
6. Grommet
7. Tube assembly
8. Tube
9. Capscrew
10. Connector
11. Sleeve
12. Nut
13. Capscrew
14. Washer
15. Valve assembly
16. Bracket
17. Clamp
18. Canister



TA 098653

Go on to Sheet 3

ETHER STARTING AID REMOVAL/INSTALLATION (CONT) (Sheet 3 of 4)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
	NOTE Remove parts only as needed for repair or replacement.	
1. Ether canister (18)	Remove if installed.	
2. Atomizer assembly (1)	Unscrew from intake manifold.	
3. Tubes (2), (7), and (8)	a. Remove by removing mounting hardware and clips. b. Unscrew or disconnect as required	
4. Valve assembly (15)	a. Disconnect and tag wires. b. Disconnect tube at connector (10). c. Remove capscrews (13) and washers 14).	
5. Clamp (17)	Remove capscrews (3) and washers (14).	
6. Bracket (16)	Can be removed by removing remaining capscrews.	

Go on to Sheet 4

ETHER STARTING AID REMOVAL/INSTALLATION (CONT) (Sheet 4 of 4)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION		
1. Bracket (16)	Install if removed.	
2. Clamp (17)	a. Install. b. Install capscrews (3) and washers (14).	
3. Valve assembly (15)	a. Install. b. Secure with capscrews (13) and washers (14). c. Connect tube at connector (10). d. Connect wires.	
4. Tubes (2), (7) and (8)	a. Install — screw in or connect. b. Install mounting hardware and clips.	
5. Atomizer assembly (1)	Screw into intake manifold.	
6. Canister (18)	Install.	

End

FUEL TANK SERVICE (Sheet 1 of 2)

This task covers: Fuel tank service.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Container to catch sediment and moisture

Troubleshooting Reference

Pages 2-37, 2-39

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

PMCS, page 2-5

Fuel system description, page 1-14

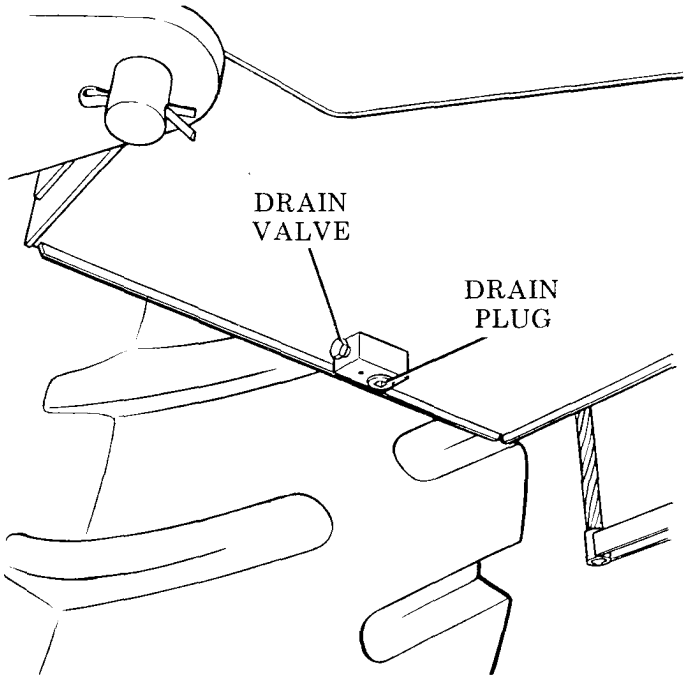
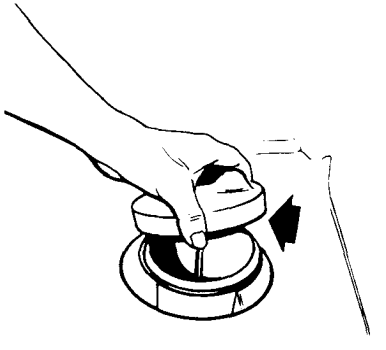
General Safety Instructions

Main disconnect switch OFF

Do not smoke or have open flames or sparks around fuel or lines. Fuel may catch fire and cause burns.

Go on to Sheet 2

FUEL TANK SERVICE (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
1. Drain valve on fuel tank	a. Place suitable container under drain valve. CAUTION Do not remove drain plug instead of opening drain valve. b. Open. c. Allow sediment and moisture to drain. d. Close. WARNING Do not smoke while adding fuel. Fumes from fuel are flammable.	
2. Fuel cap	a. Remove. b. Fill tank with DF-2 fuel oil. c. Install cap.	

End

CLEAN FUEL TANK FILLER CAP AND SCREEN

This task covers: Removing, inspecting, cleaning and installing the fuel tank filler cap and strainer screen.

INITIAL SETUP

Test Equipment

None

Special Tools

None

Materials/Parts

Solvent, item 2, Appendix C

Diesel fuel, item 14, Appendix C

Gasket

Personnel Required

One mechanic

References

PMCS, page 2-8

Fuel system description, page 1-14.

Troubleshooting Reference

None

Equipment Condition

Engine stopped

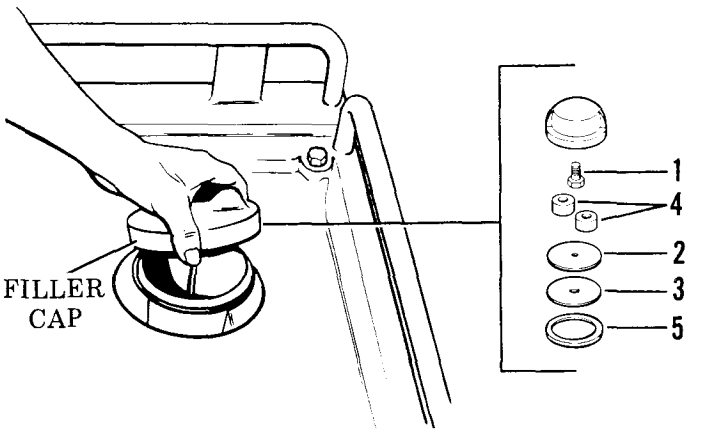
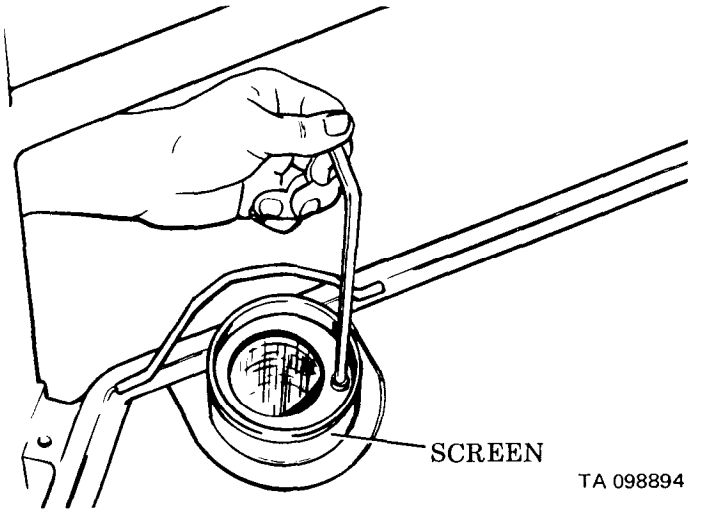
General Safety Instructions

Main disconnect switch OFF

Do not smoke or have open flames or sparks around fuel or lines. Fuel may catch fire and cause burns.

Go onto Sheet 2

CLEAN FUEL TANK FILLER CAP AND SCREEN (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
1. Filler cap	a. Remove. b. Disassemble. (1) Remove capscrew (1). (2) Remove gasket (2), baffle (3), two elements (4) and gasket (5). c. Wash cap and element in solvent. d. Squeeze element dry. e. Lightly oil element with diesel fuel. f. Assemble filler cap. (1) Put elements (4), gasket (2 and baffle (3) in place. (2) Fasten with capscrew (1). g. Replace gasket (5) if worn.	
2. Retaining ring and screen	a. Remove. b. Wash screen in solvent.	
3. Screen, retaining ring, and filler cap	Install.	TA 098894 End

AIR INTAKE SYSTEM MAINTENANCE INSTRUCTIONS

This section includes organizational maintenance procedures for the air intake system as follows:

Air cleaner replacement
Air cleaner and dust ejector service

LIST OF TASKS (Sheet 1 of 1)

TASK NO.	TASK	REF (PAGE)	TROUBLESHOOTING REF (PAGE)
1	Air cleaner and dust ejector service.	2-198	2-36, 2-37, 2-40, 2-42
2	Air cleaner housing and elbow removal/ installation.	2-206	None
3	Service air cleaner/precleaned.	2-208	2-36, 2-37, 2-40, 2-42

End

AIR CLEANER AND DUST EJECTOR SERVICE

This task covers: Cleaning air filter housing, air filter elements, and dust ejector.

Removal
Cleaning

Replacement
Installation

INITIAL SETUP

Test Equipment

None

Special Tools

Air nozzle

Materials/Parts

Non-sudsing detergent, item 18, Appendix C

Tape, item 11, Appendix C

Secondary filter element

Gasket

Lint-free cloth, item 16, Appendix C

Personnel Required

One mechanic

References

TORQUE LIMITS CHART, page E-1

PMCS, page 2-5

Hood removal/installation, page 2-452.

Troubleshooting Reference

Pages 2-36, 2-37, 2-40, 2-42

Equipment Condition

Access door open (behind cab)

Engine OFF and cooled.

Front hood removed

General Safety Instructions

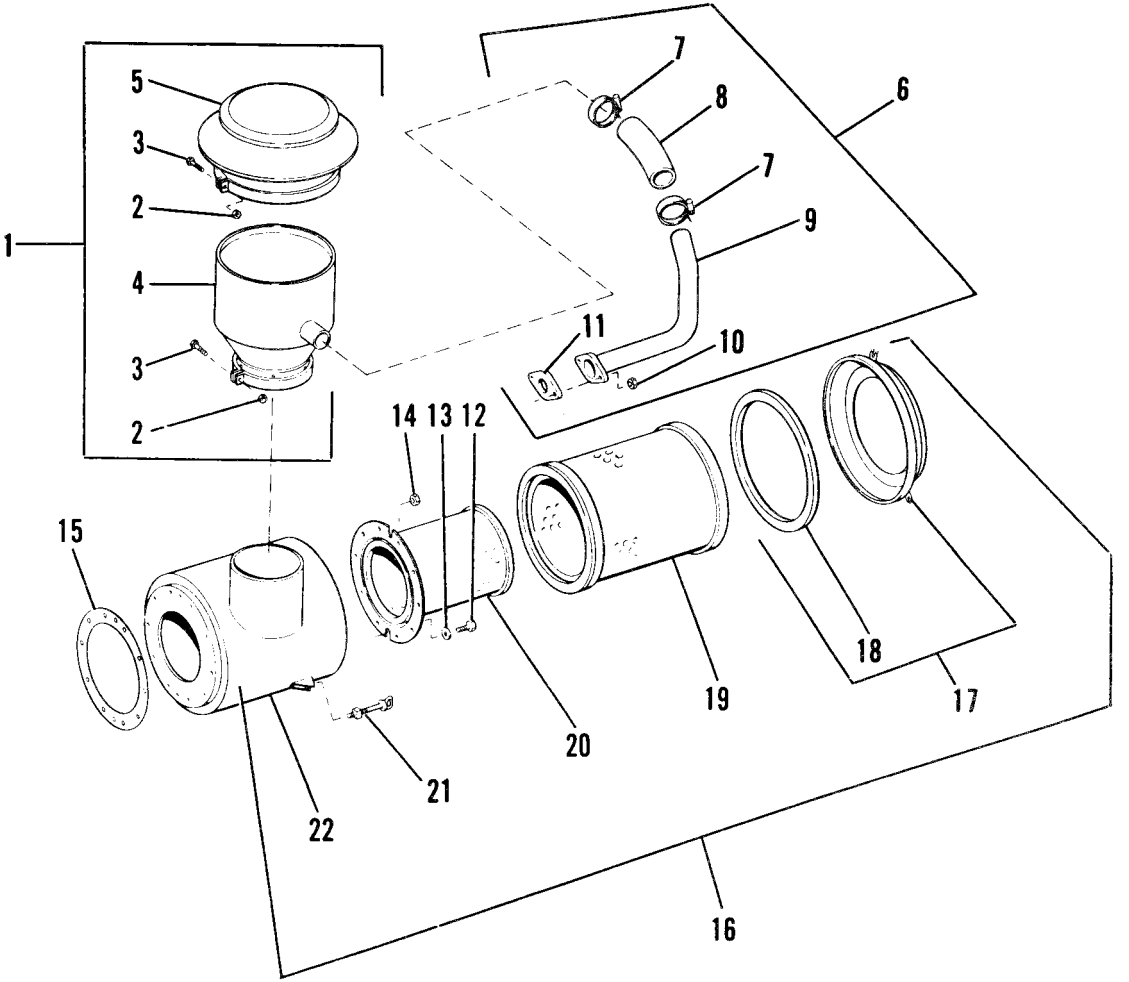
Be careful not to allow dust into engine. Dust will damage fuel injection unit.

Main disconnect switch OFF.

Go on to Sheet 2

AIR CLEANER AND DUST EJECTOR SERVICE (CONT)

1. Pre-cleaner assembly
2. Nut
3. Screw
4. Body assembly
5. Hood assembly
6. Dust ejector assembly
7. Clamp
8. Hose
9. Tube assembly
10. Nut
11. Adapter
12. Capscrew
13. Washer
14. Locknut
15. Gasket
16. Air cleaner assembly
17. Cover assembly
18. Gasket
19. Primary element
20. Secondary element
21. Rod assembly
22. Housing

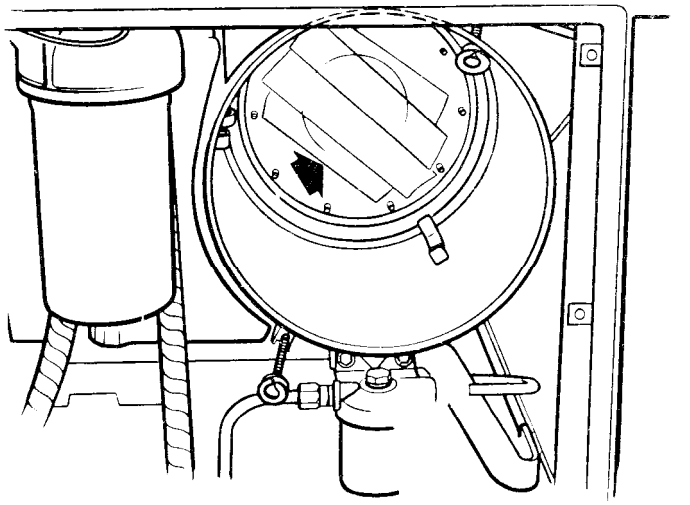


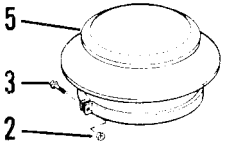
TA 098656

Go on to Sheet 3

AIR CLEANER AND DUST EJECTOR SERVICE (CONT) (Sheet 3 of 8)

LOCATION/ITEM	ACTION	REMARKS
DISASSEMBLY/CLEANING		See PMCS, page 2-5 for service interval.
1. Rod assembly (21)	Loosen.	
2. Cover assembly (17)	Remove. Wipe clean with cloth, or wash in water and non-sudsing detergent.	
3. Primary element (19)	Remove. CAUTION Do not reuse secondary element. Loose particles could damage fuel injection unit.	
4. Secondary element (20)	Remove locknuts (14) and washers (13) from studs. Then remove secondary element.	
5. Air inlet opening (in housing 22)	Cover with tape.	
6. Screw (3)	Loosen at hood assembly (5).	
7. Hood assembly (5)	Remove. Wipe clean with cloth, or wash in water and non-sudsing detergent.	

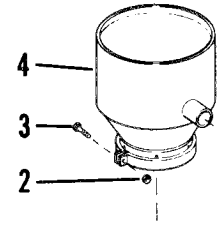
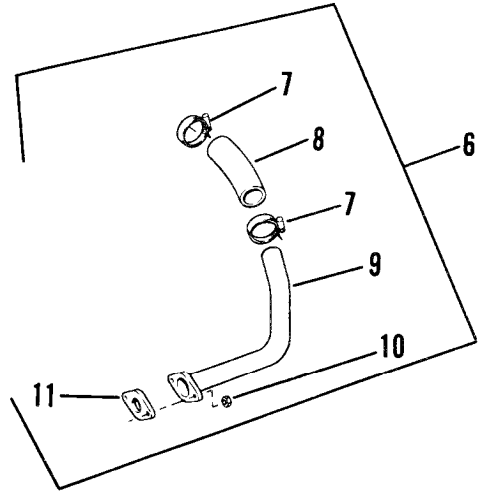




TA 098657

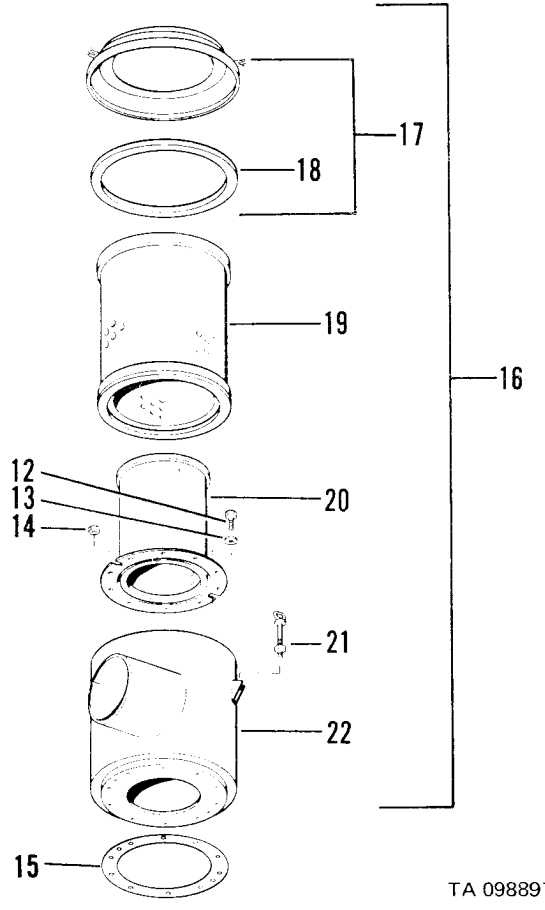
Go on to Sheet 4

AIR CLEANER AND DUST EJECTOR SERVICE (CONT) (Sheet 4 of 8)

LOCATION/ITEM	ACTION	REMARKS
8. Body assembly (4)	Wipe clean with cloth, or wash in water and non-sudsing detergent.	
9. Dust ejector (6)	a. Loosen clamps (7). b. Remove hose (8). c. Remove nuts (10). d. Remove tube (9). e. Clean tube and hose with air (30 psi max.) or water.	Replace if defective. 
10. Gasket (15)	a. Inspect. If damaged: b. Remove capscrews (12) and washers (13). c. Remove housing (22). d. Replace gasket (15). e. Clean housing (22) with cloth or wash in non-sudsing detergent. f. Position housing (22) on manifold. g. Install capscrews (12) and washers (13).	 See TORQUE LIMITS CHART, page E-1.

Go onto Sheet 5

AIR CLEANER AND DUST EJECTOR SERVICE (CONT) (Sheet 5 of 8)

LOCATION/ITEM	ACTION	REMARKS
11. Housing (22) CLEANING ELEMENT	CAUTION Do not wash housing with water or clean with pressure air when it is on manifold. Dirt particles could be forced into engine. Wipe clean with cloth. WARNING Wear face shield and protective clothing to prevent injury when using pressure air or water. Use 30 psi maximum for cleaning. CAUTION Do not bump or tap element to clean. Do not use element with damaged pleats, gaskets, or seals. Discard damaged elements. NOTE Use pressure air, pressure water, or detergent as necessary to clean primary element. Replace primary element after six cleanings or yearly.	 TA 098897

Go on to Sheet 6

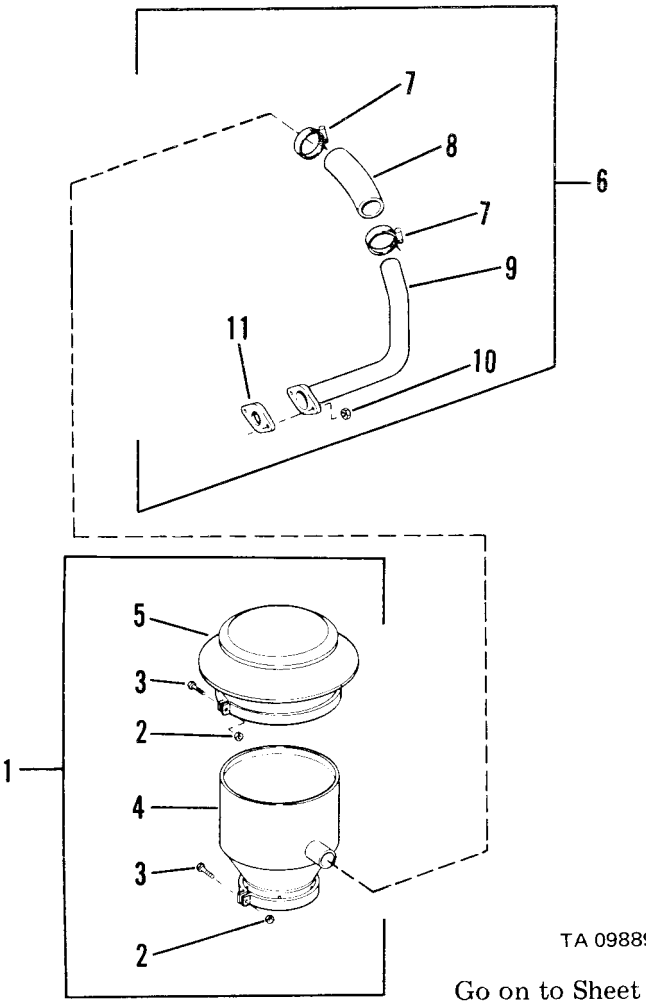
AIR CLEANER AND DUST EJECTOR SERVICE (CONT) (Sheet 6 of 8)

LOCATION/ITEM	ACTION	REMARKS
CLEANING ELEMENT		
1. Pressure air	a. Direct pressure air along length of inside pleats and along length of outside pleats of element (19).	
	b. Again direct air along inside pleats.	
	c. Inspect element for cleanliness, rips, or tears.	
2. Pressure water	a. Direct pressure water [40 psi (280 kPa) maximum] along length of inside pleats and along length of outside pleats of element (19).	
	b. Again direct water along inside pleats.	
	c. Allow to dry.	
	d. Inspect element for cleanliness, rips, or tears.	
3. Detergent	a. Wash element in warm water and non-sudsing household detergent.	
	b. Rinse well with clean water.	
	c. Allow to dry.	
	d. Inspect element for cleanliness, rips, or tears.	

Go onto Sheet 7

AIR CLEANER AND DUST EJECTOR SERVICE (CONT) (Sheet 7 of 8)

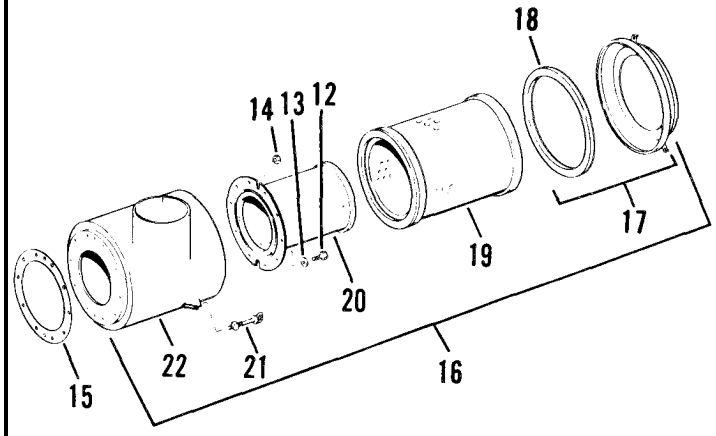
LOCATION/ITEM	ACTION	REMARKS
4. Light bulb	Insert into element when dry. If light shows through rips or tears, discard element. If light does not show through, reuse element.	
ASSEMBLY		
1. Dust ejector (6)	Position between muffler and pre-cleaner.	
2. Nuts (10)	Install.	
3. Hose (8)	Install.	
4. Clamps (7)	Tighten.	
5. Hood assembly (5)	Install.	
6. Screw (3)	Tighten.	
7. Air inlet opening	Remove tape.	



TA 098896

Go on to Sheet 8

AIR CLEANER AND DUST EJECTOR SERVICE (CONT)

LOCATION/ITEM	ACTION	REMARKS
8. Secondary element (20)	Install with washers (13) and locknuts (14).	
9. Primary element (19)	Install.	
10. Cover (17)	Install.	
11. Rod assembly (21)	Tighten.	
12. POWER switch	Turn ON.	
13. Engine	Start	PLUGGED FILTER AIR indicator should remain OFF.
14. Engine	Stop.	
15. POWER switch	Turn OFF.	

TA 098895

End

AIR CLEANER HOUSING AND ELBOW REMOVAL/INSTALLATION (Sheet 1 of 2)

This task covers: Removal and installation of air cleaner housing and elbow.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Precleaner removed.

Hood removed.

Engine OFF.

Special Tools

None

Personnel Required

One mechanic

References

Torque Limits Chart, page E-1

Air Cleaner Service, page 2-198

Hood removal/installation, page 2-454.

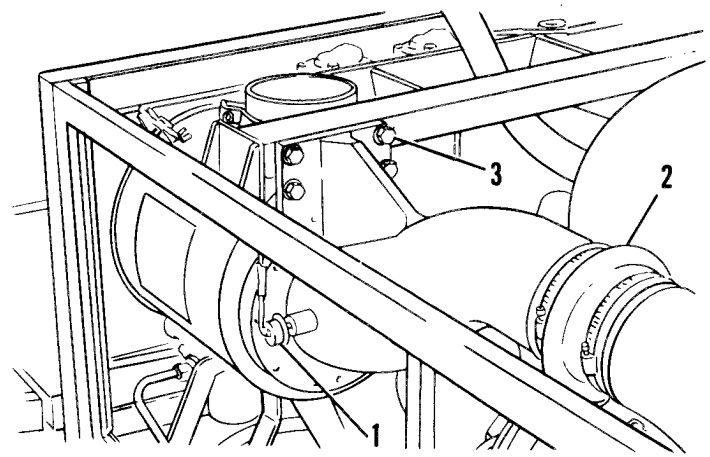
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

AIR CLEANER HOUSING AND ELBOW REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Wire assembly	Disconnect from air cleaner sensing unit (1).	
2. Clamps (2)	Loosen.	
3. Capscrews (3)	Remove.	
	NOTE Weight of air cleaner housing and elbow is 50 lb (23 kg).	
4. Air cleaner housing and elbow	Remove as a unit.	If disassembly is required, see Air Cleaner Service, page 2-198.
INSTALLATION		
1. Air cleaner housing and elbow	Position in engine compartment.	
2. Capscrews (3)	Install.	See TORQUE LIMITS CHART, page E-1.
3. Clamps (2)	Tighten.	
4. Wire assembly	Connect to air cleaner sensing unit (1).	



TA 098658

End

SERVICE AIR CLEANER/PRECLEANER (Sheet 1 of 2)

This task covers:

INITIAL SETUP

Test Equipment

None

Materials/Parts

Lint-free cloth, item 16, Appendix C

Troubleshooting Reference

Pages 2-36, 2-37, 2-40, 2-42

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

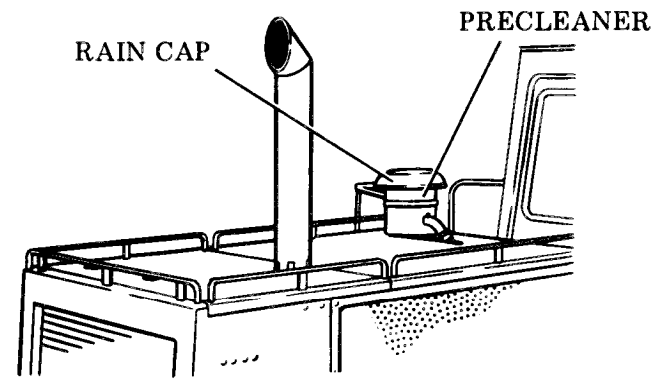
PMCS, page 2-5

General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

SERVICE AIR CLEANER/PRECLEANED (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
Rain cap and screen	a. Remove. b. Clean rain cap, screen and precleaner housing if dirty. Use a clean rag. c. Reinstall.	 TA 098659

End

EXHAUST SYSTEM MAINTENANCE INSTRUCTIONS

This section covers removal and installation of these exhaust system components for Organizational Maintenance personnel:

a. Muffler

b. Exhaust pipe

LIST OF TASKS (Sheet 1 of 1)

TASK NO.	TASK	REF (PAGE)	TROUBLESHOOTING REF (PAGE)
1	Exhaust pipe and muffler removal/installation.	2-211	None

End

EXHAUST PIPE AND MUFFLER REMOVAL/INSTALLATION

This task covers: Removal and installation of exhaust pipe and muffler.

INITIAL SETUP

Test Equipment

None

Special Tools

Hoist

Materials/Parts

None

Personnel Required

One mechanic

References

TORQUE LIMITS CHART, page E-1

PMCS, page 2-5

Hood removal/installation, page 2-454.

Air cleaner and dust ejector service, page 2-198.

Troubleshooting Reference

None

Equipment Condition

Engine OFF and cooled.

Hoods removed.

Left side access cover open.

Air cleaner and dust ejector removed.

General Safety Instructions

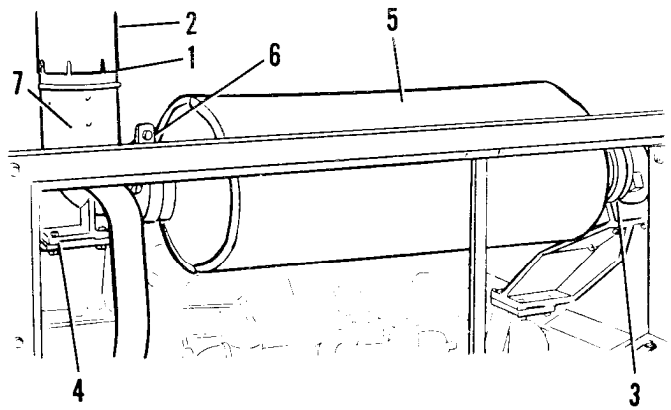
Handle pipe and muffler carefully. Hot parts burn.

Main disconnect switch OFF.

Go on to Sheet 2

EXHAUST PIPE AND MUFFLER REMOVAL/INSTALLATION (CONT)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Hood	Remove.	See page 2-454.
2. Clamp (1)	Remove.	
3. Exhaust pipe (2)	Remove.	
4. Clamp (3)	Loosen.	
5. Hoist	Attach.	
	NOTE Weight of muffler is 165 lb. (75 kg). Be prepared for that weight when capscrews are removed.	
6. Capscrews (4) and nuts	Remove from elbow support.	
7. Muffler (5)	Remove.	



TA 098660

Go on to Sheet 3

EXHAUST PIPE AND MUFFLER REMOVAL/INSTALLATION (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
8. Clamp (6)	Loosen.	
9. Elbow (7)	Remove.	Replace parts as necessary.
INSTALLATION		
1. Elbow (7)	Install.	
2. Clamp (6)	Tighten and torque to 18 ± 5 lb. ft (24 ± 7 N•m).	
3. Muffler (5)	Position in engine compartment.	
4. Capscrews (4)	Install and tighten.	See TORQUE LIMITS CHART, page E-1.
5. Clamp (3)	Tighten and torque to 18 ± 5 lb. ft. (24 ± 7 N•m).	
6. Exhaust pipe (2)	Install.	
7. Clamp (1)	Tighten and torque to 18 ± 5 lb. ft. (24 ± 7 N•m).	
8. Hood	Install.	See page 2-454.
9. Air cleaner and dust ejector.	Install	See page 2-198.

End

COOLING SYSTEM MAINTENANCE INSTRUCTIONS

This section covers removal and installation of these cooling system components for Organizational Maintenance personnel:

a. Water pump
b. Fan
c. Fan drive mechanism
d. Fan belt tightener (tensioner)
e. Hoses, lines and fittings
f. Fan belts
g. Water temperature regulators (thermostats)
h. Coolant filter

Also instructions for draining and refilling the cooling system.

LIST OF TASKS (Sheet 1 of 1)

TASK NO.	TASK	REF (PAGE)	TROUBLESHOOTING REF (PAGE)
1	Coolant replacement.	2-215	2-38
2	Water temperature regulators (thermostats) removal/installation.	2-218	None
3	Water temperature regulators testing.	2-223	None
4	Water pump removal/installation.	2-225	None
5	Fan belt set removal/installation.	2-229	2-41
6	Fan belt tightener (tensioner) removal/installation.	2-231	None
7	Fan assembly removal/installation.	2-233	2-41
8	Fan drive mechanism removal/installation.	2-236	2-41
9	Radiator rear guard removal/repair/installation.	2-242	None
10	Coolant filter base assembly removal/installation	2-244	None
11	Hoses, lines and fittings removal/installation.	2-247	None
12	Fan guards removal/installation.	2-249	None

End

COOLANT REPLACEMENT

This task covers: Draining and refilling cooling system with coolant.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Antifreeze solution per MIL-A-46155 (28 gal.), item 1, Appendix C

Troubleshooting Reference

Page 2-38

Equipment Condition

Engine turned off and cooled.

Left rear access panel open.

Special Tools

None

Personnel Required

One mechanic

References

TM 750-254

General Safety Instructions

Open radiator cap slowly to allow steam to escape.

Be careful. Steam burns.

Avoid contact with coolant.

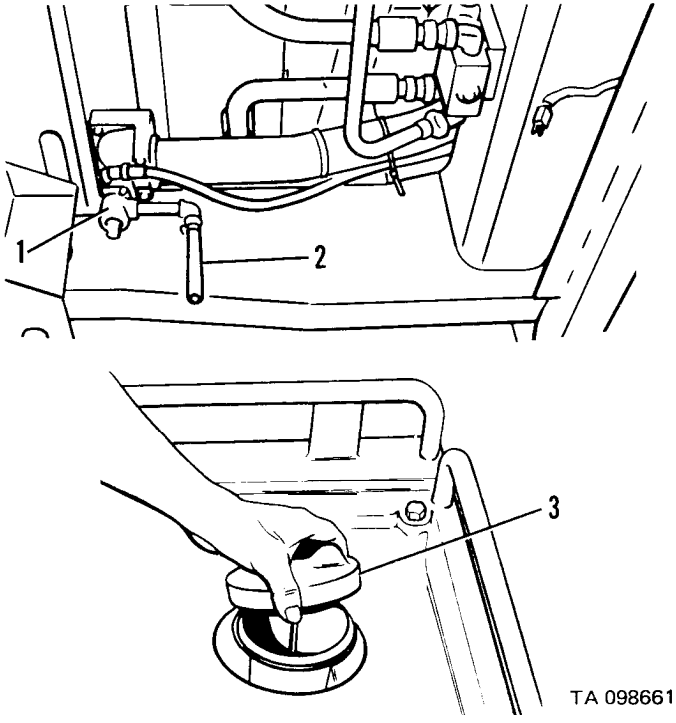
The alkaline solution can harm skin and eyes.

Main disconnect switch OFF.

Go on to Sheet 2

COOLANT REPLACEMENT (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
Antifreeze	Mix antifreeze solution to lowest expected temperature.	MIL-A-46153.
DRAIN SYSTEM		
1. Drain valve (1)	Open and drain coolant into suitable container.	Be sure cooling system drain hose (2) is through hole in crankcase guard.
2. Precharge element (coolant filter canister)	Remove. (See page 2-244.)	
FILL SYSTEM		
1. Antifreeze	Add to fill radiator.	
2. Engine	Start and run with radiator cap (3) off to remove air bubbles from system.	
3. Precharge element (coolant filter canister)	Replace. (See page 2-244.)	



Go on to Sheet 3

COOLANT REPLACEMENT (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
3. Radiator cap (3)	a. Install. b. Operate engine for 5 minutes. c. Let engine cool. d. Recheck level of antifreeze.	

End

WATER TEMPERATURE REGULATORS REMOVAL/INSTALLATION

This task covers: Replacement of water temperature regulators (thermostats).

INITIAL SETUP

Test Equipment

None

Materials/Parts

Lip seals (2)

Troubleshooting Reference

None

Equipment Condition

Coolant drained to below level of water temperature regulators.

Special Tools

Seal driver

Personnel Required

One mechanic

References

Coolant replacement, page 2-215

General Safety Instructions

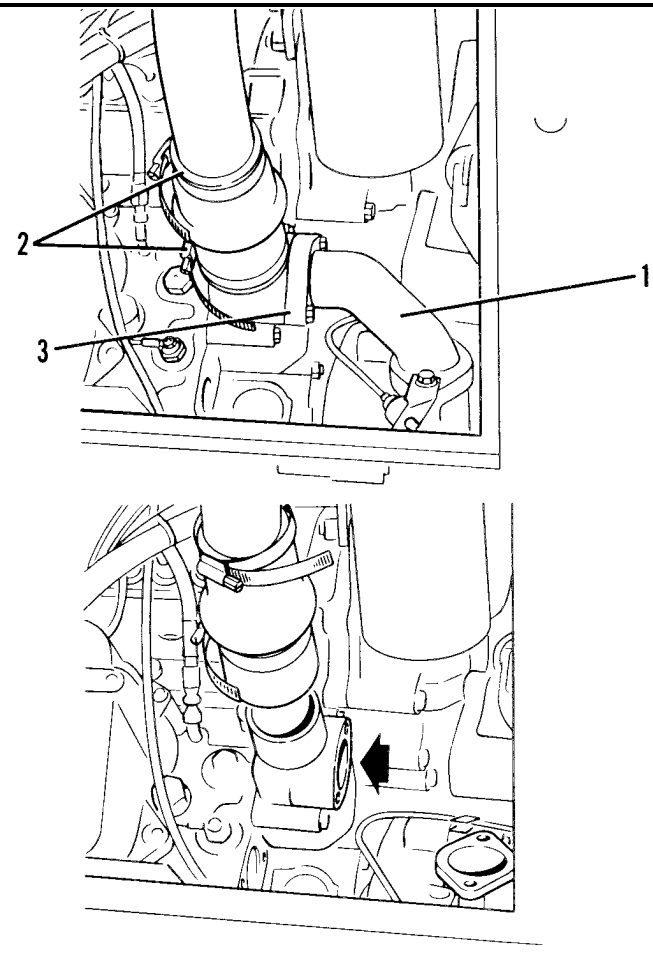
Let engine cool.

Main disconnect switch OFF.

Go on to Sheet 2

WATER TEMPERATURE REGULATORS REMOVAL/INSTALLATION (CONT) (Sheet 2 of 5)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Coolant	Drain to level below water temperature regulators.	
2. Elbow (1)	a. Remove capscrews and elbow. b. Remove dipstick for filter.	
3. Two hose clamps (2)	Loosen.	
4. Hose	Slide up on tube assembly.	
5. Cover assembly (3)	Remove.	
6. Water temperature regulator	Remove from left cylinder head.	
7. Lip seal	Discard.	

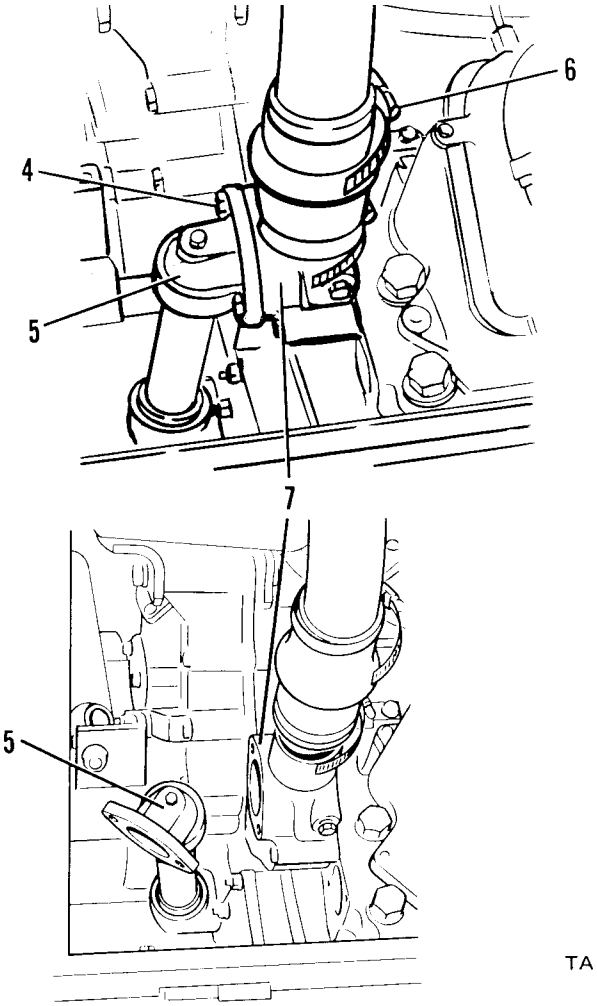


TA 098662

Go on to Sheet 3

WATER TEMPERATURE REGULATORS REMOVAL/INSTALLATION (CONT) (Sheet 3 of 5)

LOCATION/ITEM	ACTION	REMARKS
8. Two bolts (4)	Remove.	
9. Tube assembly (5)	Turn away from cover assembly for water temperature regulator.	
10. Two clamps (6)	Loosen.	
11. Hose	Slide up on tube assembly.	
12. Cover assembly (7)	Remove.	
13. Water temperature regulator	Remove from right cylinder head.	
14. Lip seal	Discard.	

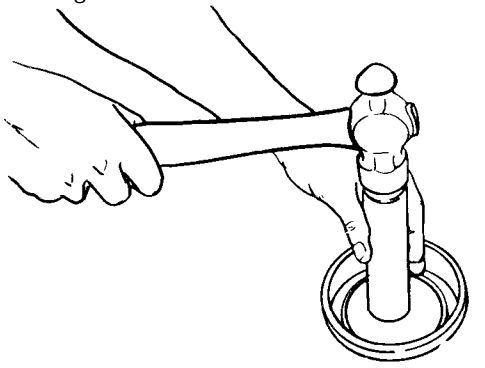


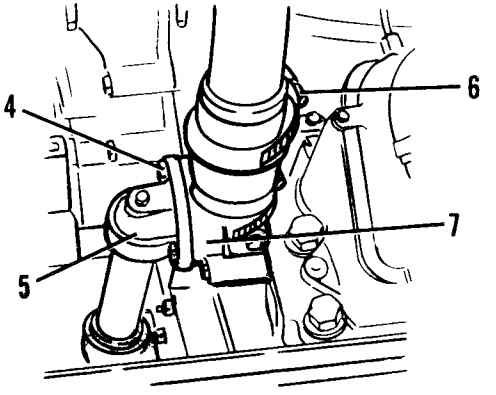
TA 098663

Go on to Sheet 4

WATER TEMPERATURE REGULATORS REMOVAL/INSTALLATION (CONT) (Sheet 4 of 5)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION		
1. New lip seals	Install using a seal driver	Seal should make contact with counterbore. Lip of seal away from regulator.
2. Right water temperature regulator	Install.	
3. Cover assembly (7)	Install.	
4. Hose	Slide into position on cover assembly.	
5. Clamps (6)	Tighten.	
6. Tube assembly (5)	Connect to cover assembly.	

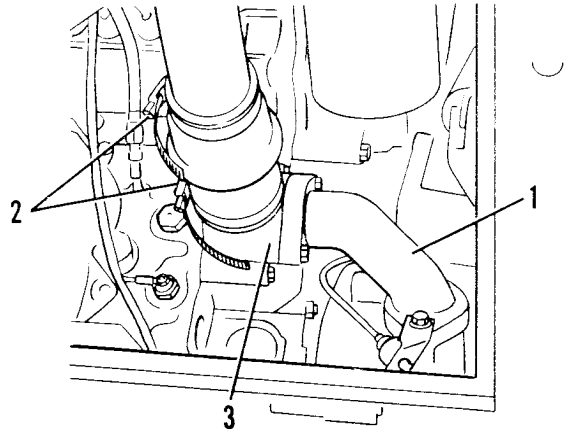




TA 098664

Go on to Sheet 5

WATER TEMPERATURE REGULATORS REMOVAL/INSTALLATION (CONT) (Sheet 5 of 5)

LOCATION/ITEM	ACTION	REMARKS
7. New water temperature regulator	Install.	
8. Cover assembly (3)	Install.	
9. Hose	Slide into position on cover assembly.	
10. Clamps (2)	Tighten.	
11. Elbow (1)	Install.	
12. Cooling system	Fill	See page 2-215.

TA 098665

End

WATER TEMPERATURE REGULATOR TESTING

This task covers: Test of water temperature regulators (thermostats).

INITIAL SETUP

Test Equipment

Thermometer

Materials/Parts

Pan of water

Source of heat

Two bricks

Troubleshooting Reference

None

Equipment Condition

Temperature regulators removed from machine.

Special Tools

None

Personnel Required

One mechanic

References

Water temperature regulators removal/installation, page 2-218.

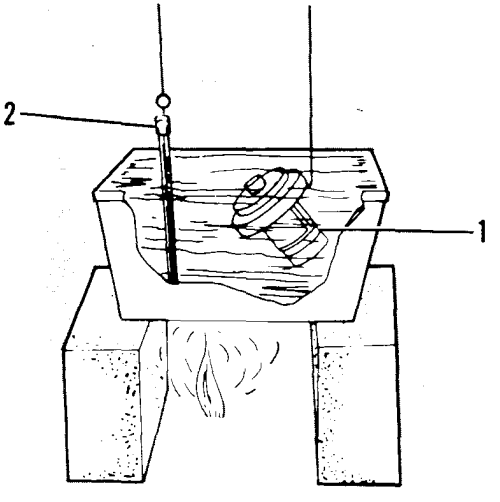
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

WATER TEMPERATURE REGULATOR TESTING (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
TEST		
1. Temperature regulator (1)	Suspend in pan of water.	
2. Thermometer (2)	Suspend in pan of water.	
3. Water	Heat to 197°F (92°C).	
	NOTE Regulator should begin to open at this point.	
4. Water	Heat until boiling.	
	NOTE Regulator should open all the way. If it doesn't, discard the regulator and replace it.	



TA 098666

End

WATER PUMP REMOVAL/INSTALLATION (Sheet 1 of 4)

This task covers: Replacement of water pump.

INITIAL SETUP

Test Equipment

None

Special Tools

None

Materials/Parts

None

Personnel Required

One mechanic

References

PMCS, page 2-5

Coolant replacement, page 2-215

Fan removal/installation, page 2-233

Troubleshooting Reference

None

Equipment Condition

Coolant drained from system.

Panel over water pump removed, left side of vehicle.

Fan assembly and guard may be removed if necessary.

Engine OFF and cooled.

General Safety Instructions

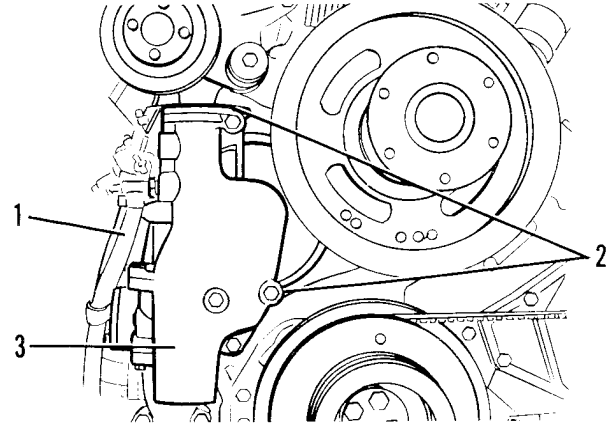
Engine must be cool.

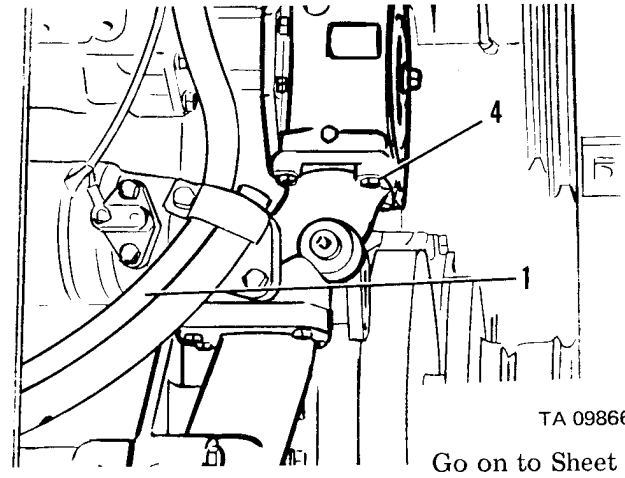
Main disconnect switch OFF.

Go on to Sheet 2

WATER PUMP REMOVAL/INSTALLATION (CONT)

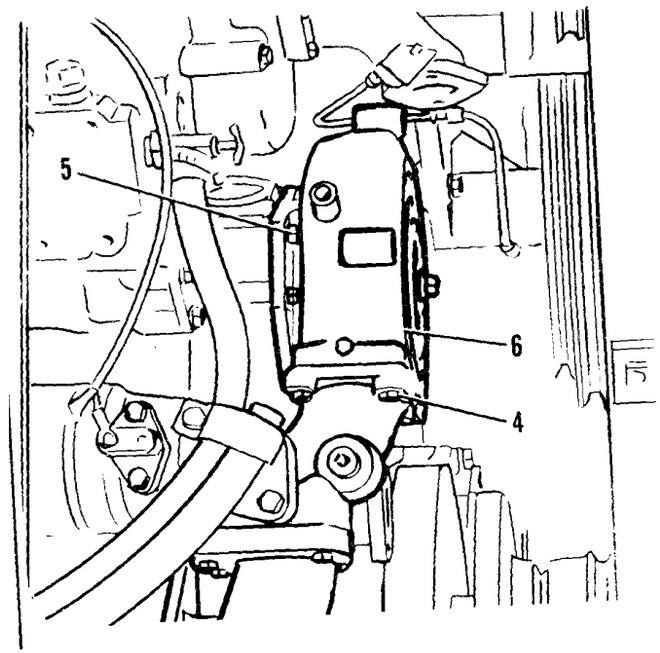
LOCATION/ITEM	ACTION	REMARKS
REMOVAL		This will permit belt tightener to move away from water pump.
1. Vee belt set	Remove (see page 2-229).	
2. Heater hose (2 each) (1)	Tag and disconnect from housing assembly.	
3. Clips holding hoses to water cooler	Disconnect from valve assembly.	
4. Housing assembly	Disconnect hose going from housing assembly to inlet elbow on radiator.	
5. Housing assembly capscrews (2)	Remove.	
	NOTE Be sure all capscrews are removed.	
6. Housing assembly (3)	Remove.	
7. Four capscrews (4) at outlet side	Remove.	





Go on to Sheet 3

WATER PUMP REMOVAL/INSTALLATION (CONT)

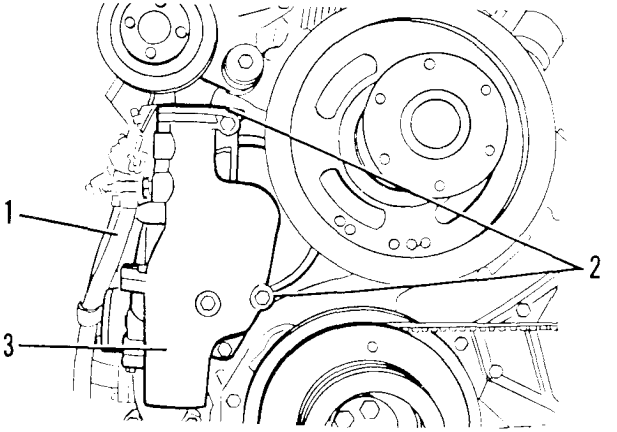
LOCATION/ITEM	ACTION	REMARKS
8. Nuts (5)	Remove from behind water pump. NOTE Be aware of capscrew in seven o'clock position. It is difficult to remove.	
9. Grease line and clip at fan drive	Remove.	
10. Water pump	Remove.	
INSTALLATION		
1. Water pump (6)	Put in position.	
2. Nuts (5)	Install.	
3. Four capscrews (4) at outlet side	Install.	

TA 098668

Go on to Sheet 4

WATER PUMP REMOVAL/INSTALLATION (CONT) (Sheet 4 of 4)

LOCATION/ITEM	ACTION	REMARKS
4. Housing assembly (3)	Install.	
5. Capscrews (2) to hold it	Install.	
6. Hose going from water pump to inlet elbow on radiator	Install.	
7. Grease line and clip	Install.	
8. Heater hose (1)	Connect.	
9. Heater hose clips	Install on cooler.	
10. Vee belt set for fan	Install.	See page 2-229.
11. Panel assembly over water pump	Install. The panel is located on the left side of vehicle.	
12. Cooling system	Fill with coolant.	See page 2-215.



TA 098669

End

FAN BELT SET REMOVAL/INSTALLATION

This task covers: Replacement of fan belt set.

INITIAL SETUP

Test Equipment

None

Materials/Parts

One fan belt set (three belts)

Troubleshooting Reference

Page 2-41

Equipment Condition

Access panel open.

Special Tools

Pry bar

Personnel Required

One mechanic

References

PMCS, page 2-5

General Safety Instructions

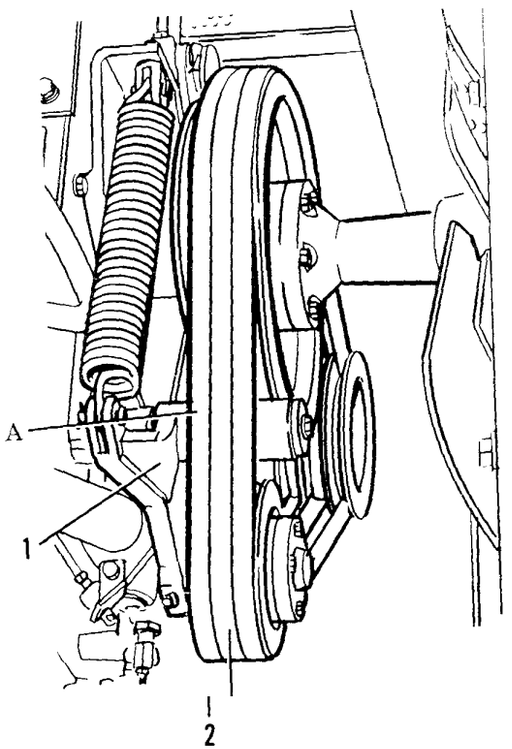
Main disconnect switch OFF.

TA 098670

Go onto Sheet 2

FAN BELT SET REMOVAL/INSTALLATION (CONT)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Fan belt tightener (1)	Use pry bar (insert at point A) to put pressure on top of fan belt tightener, moving tightener down, and remove fan belt set (2).	When replacing worn or damaged fan belts, the entire set of 3 must be replaced at the same time. See TM 750-254.
INSTALLATION		
1. Fan belt tightener (1)	Put pressure on top of fan belt tightener and put on new fan belt set (2).	



TA 098671

End

FAN BELT TIGHTENER REMOVAL/INSTALLATION

This task covers: Fan belt tightener replacement.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine shut down.

Special Tools

Pry bar

Personnel Required

One mechanic

References

LO 10-3930-641-12

Fan belt removal/installation, page 2-229

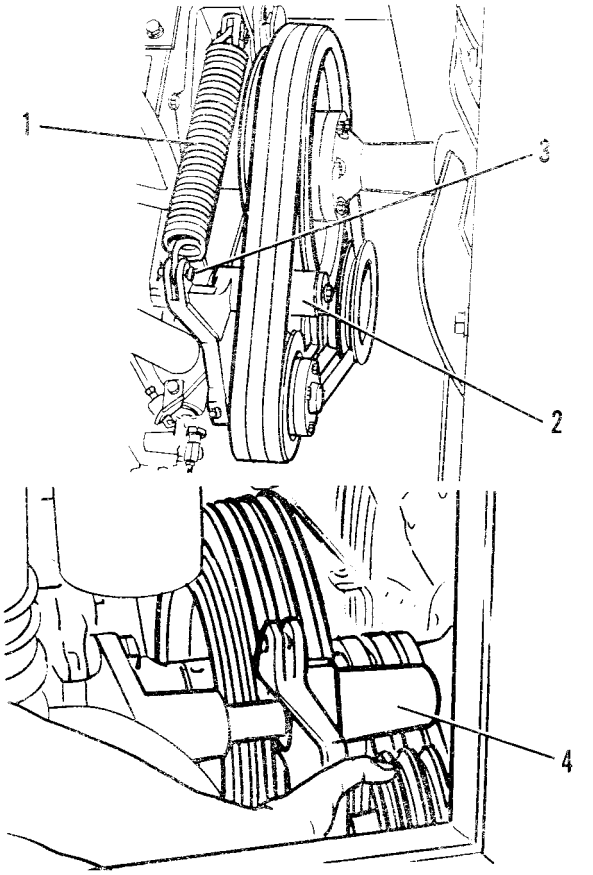
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

FAN BELT TIGHTENER REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Three fan belts	Remove.	
2. Cotter pin and pin (3), spring (1)	Remove.	
	WARNING Spring tension may be present.	
3. Plate, washer and capscrew (2)	Remove.	
4. Fan belt tightener (4)	Remove.	
INSTALLATION		
1. Fan belt tightener (4)	Put in position on fan drive bracket and install plate, washer, and capscrew.	
2. Spring (1), pin and cotter pin (3)	Install.	
3. Three belts	Install.	
4. Fan belt tightener	Grease.	See LO 10-3930-641-12.



See page 2-229.

TA 098672

End

FAN ASSEMBLY REMOVAL/INSTALLATION

This task covers: Replacement of fan assembly.

INITIAL SETUP

Test Equipment

None

Materials/Parts

O-ring seal

Troubleshooting Reference

Page 2-41

Equipment Condition

Engine turned OFF.

Special Tools

Hoist

Suitable container

Personnel Required

One mechanic

References

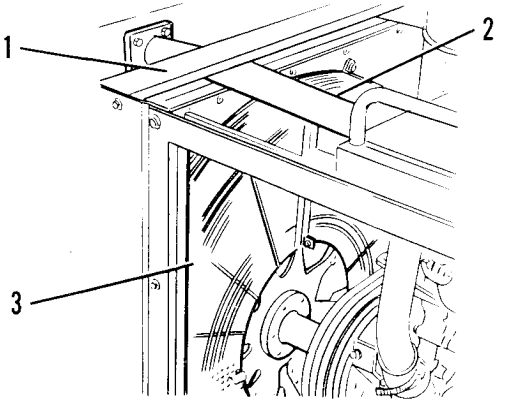
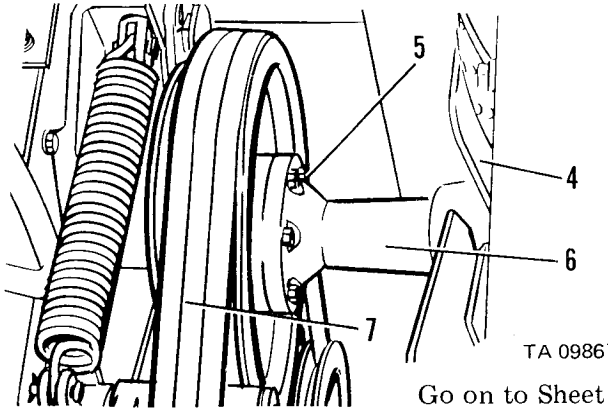
Fan guards removal/installation, page 2-249

General Safety Instructions

Use hoist to lift assembly.
Work only on cool engine.
Main disconnect switch OFF.

Go on to Sheet 2

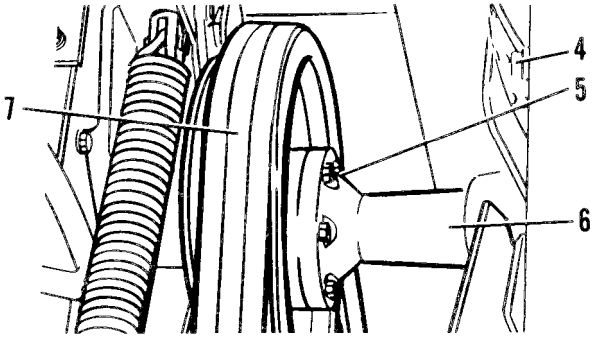
FAN ASSEMBLY REMOVAL/INSTALLATION (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Rear hood	Remove.	See page 2-454.
2. Cooling system	Drain coolant from cooling system to below level of tube assemblies. (See page 2-215.)	
3. Channel assembly (1)	a. Mark channel position. b. Remove.	
4. Tube assemblies (2)	Remove from radiator top tank.	
5. Fan guards (3)	Remove. CAUTION Guard will drop when last bolt is removed. NOTE Mark guards right/left, upper/lower.	Weight of fan assembly is 95 lbs.
6. Fan belts (7)	Remove.	
7. Hoist	Fasten to fan assembly (4).	
8. Nuts and bolts (5)	Remove from adapter (6).	
9. Fan assembly	a. Remove. CAUTION Don't let fan hit radiator. b. Discard O-ring seal on fan drive bearing.	

Go on to Sheet 3

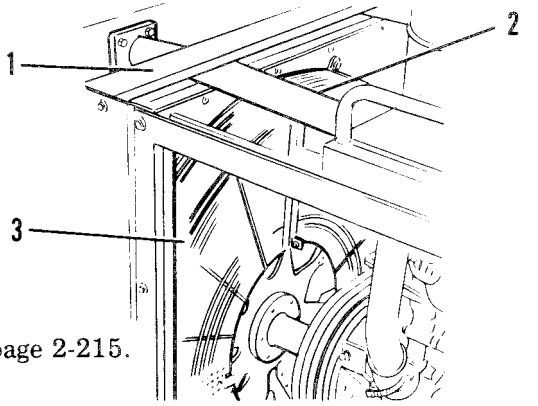
FAN ASSEMBLY REMOVAL/INSTALLATION (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION		
1. New o-ring seal	Install on fan drive bearing.	
2. Hoist	a. Fasten to fan drive assembly. b. Position fan assembly (4).	
3. Nuts and capscrews (5)	a. Install to hold fan assembly (4) and adapter (6) in position. b. Lubricate assembly.	
4. Fan belts (7)	Install.	
5. Fan guards (3)	Install.	
6. Tube assemblies (2)	Install to radiator tank top. Use new gaskets.	
7. Channel assembly (1)	Install.	
8. Cooling system	Fill with coolant to correct level.	
9. Rear hood	Install.	



CAUTION

Do not let fan assembly (4) touch hydraulic oil cook core assembly. Contact can cause damage.



See page 2-215.

See page 2-454.

TA 098674

End

FAN DRIVE MECHANISM REMOVAL/INSTALLATION

This task covers: Replacement of fan drive mechanism.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Preformed packing

Troubleshooting Reference

Page 2-41

Equipment Condition

Rear hood removed.
Fan assembly removed.
Fan guards removed.

Special Tools

Hoist

Personnel Required

One mechanic

References

Hood removal, page 2-454.
Fan guards removal/installation, page 2-249.
Fan assembly removal/installation, page 2-233.
Fan belt tightener removal/installation, page 2-231.

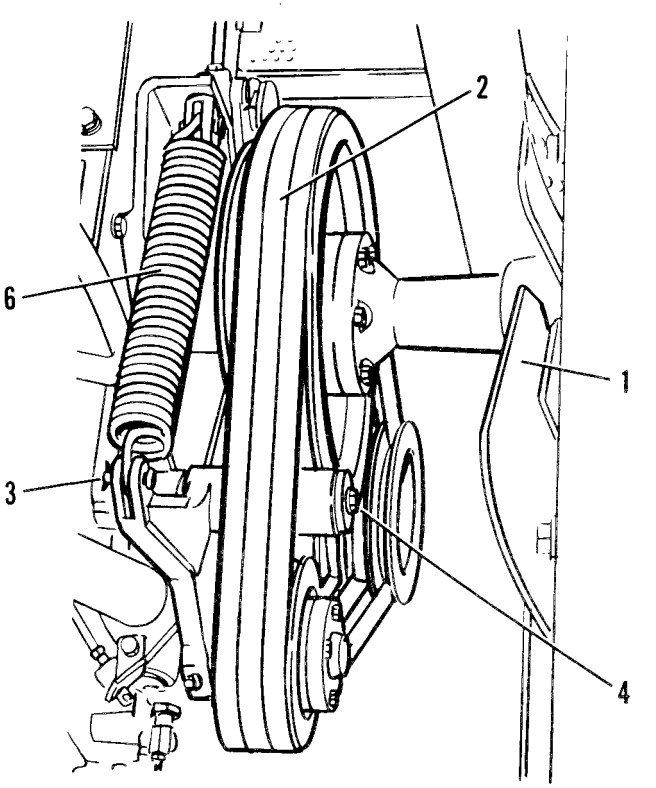
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

FAN DRIVE MECHANISM REMOVAL/INSTALLATION (CONT) (Sheet 2 of 6)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL	CAUTION In course of disassembly fan assembly will be rested against hydraulic oil cooler core. Place carefully so as not to damage core.	Fan assembly weight is 95 lbs. (43 kg)
1. Channel assembly.	a. Mark channel position. b. Remove from above fan assembly.	
2. Fan guards	Remove.	
3. Hoist	Fasten to fan assembly (1).	
4. Fan drive capscrews (4)	Remove.	
5. Fan assembly	Remove.	
6. Three belts (2)	Remove from fan drive.	
7. Spring (6)	Disconnect.	
8. Belt tightener cotter pin (3)	Remove.	



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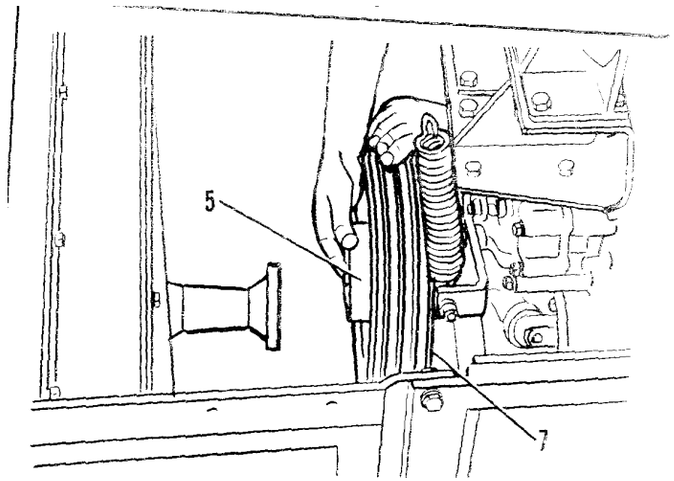
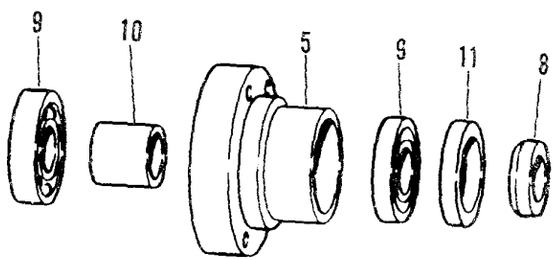
Go on to Sheet 3

FAN DRIVE MECHANISM REMOVAL/INSTALLATION (CONT)

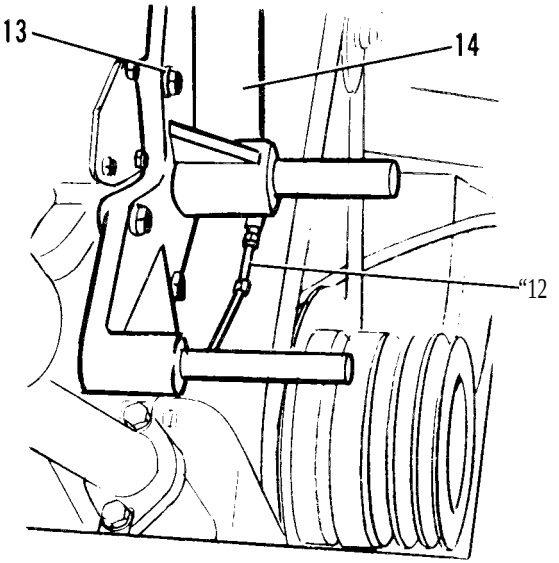
LOCATION/ITEM	ACTION	REMARKS
9. Hub assernbly retainer and two cap-screws (5)	Remove	
10. Hub assembly (5)	Remove, holding pulley (7) in position. NOTE Use gear puller if required (caution must be taken not to damage shaft if puller is used).	
11. Pulley (7)	Remove.	
12. Spacer (8)	Remove from fan drive bracket.	
13. Preformed packings, bearings (9), spacer (10) and seal (11)	Remove from hub (5).	
14. Belt tightener	Remove.	

See page 2-231.

TA 098898

Go on to Sheet 4

FAN DRIVE MECHANISM REMOVAL/INSTALLATION (CONT) (Sheet 4 of 6)

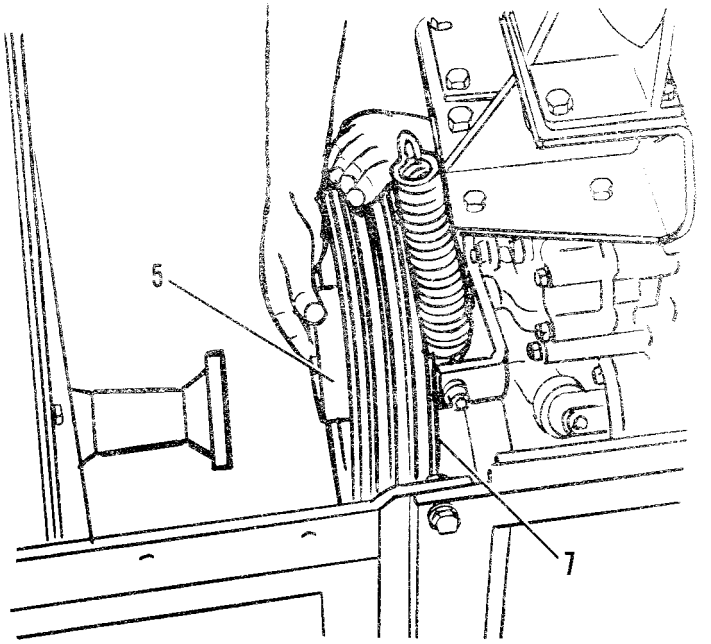
LOCATION/ITEM	ACTION	REMARKS
15. Fan drive bracket grease line (12)	a. Remove clip. b. Disconnect grease line.	
16. Fan drive bracket bolts (13)	Remove.	
17. Fan drive bracket (14)	Remove.	
INSTALLATION		
1. Fan drive bracket (14) and bracket bolts (13)	Install.	
2. Grease line (12)	a. Connect grease line, b. Attach clip.	
3. Fan belt tightener	Install.	See page 2-231.

TA 098677

Go on to Sheet 5

FAN DRIVE MECHANISM REMOVAL/INSTALLATION (CONT) (Sheet 5 of 6)

LOCATION/ITEM	ACTION	REMARKS
4. Seal (11)	Install in hub, lip toward the outside.	
5. Small bearing (9)	Install in hub.	
6. Spacer (10)	Install on fan drive bracket with chamfer toward radiator.	
7. Pulley (7)	Install on fan drive bracket.	
8. Inner bearing (9) and hub (5)	Install, holding pulley in position.	
9. Spacer (10), outer bearing (9) and preformed packings	Install.	
10. Hub assembly retainer and two capscrews (5)	Install using loctite.	
11. Belt tightener spring (6)	Install, using pin and cotter pin.	
12. Three belts (2)	Install on fan drive pulley.	
13. Fan assembly (1)	Hoist into position and install.	
14. Three capscrews	Install.	



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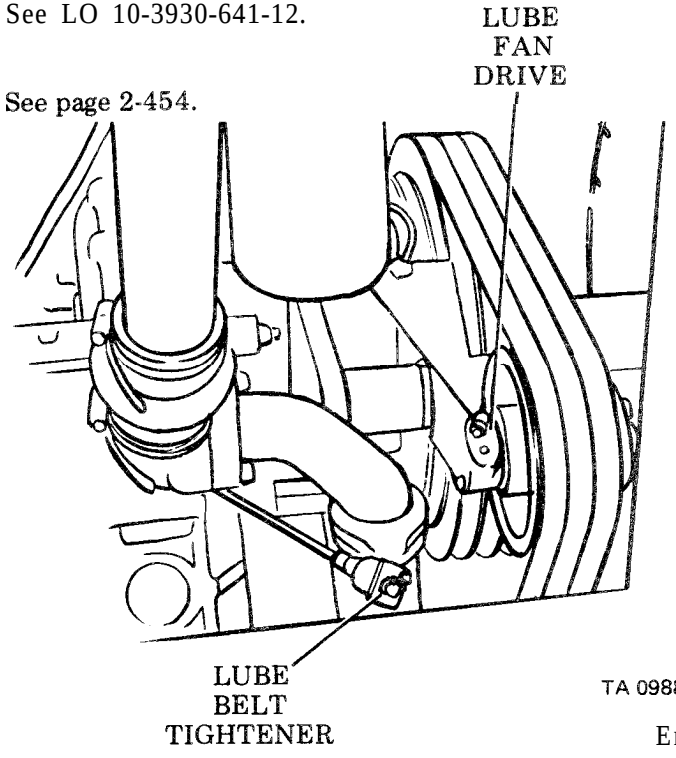
Go on to Sheet 6

FAN DRIVE MECHANISM REMOVAL/INSTALIATION (CONT) (Sheet 6 of 6)

LOCATION/ITEM	ACTION	REMARKS
15. Fan guards	Install.	See page 2-249.
16. Channel assembly	Install and observe marking.	
17. Fan drive mechaism	Grease.	See LO 10-3930-641-12.
18. Fan belt tightener	Grease.	See LO 10-3930-641-12.
19. Rear hood	Install.	See page 2-454.



TA 098899

End

RADIATOR REAR GUARD REMOVAL, REPAIR AND INSTALLATION

This task covers: Removal, repair and installation of the radiator rear guard

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine OFF.

Special Tools

None

Personnel Required

One mechanic

References

TM 9-450

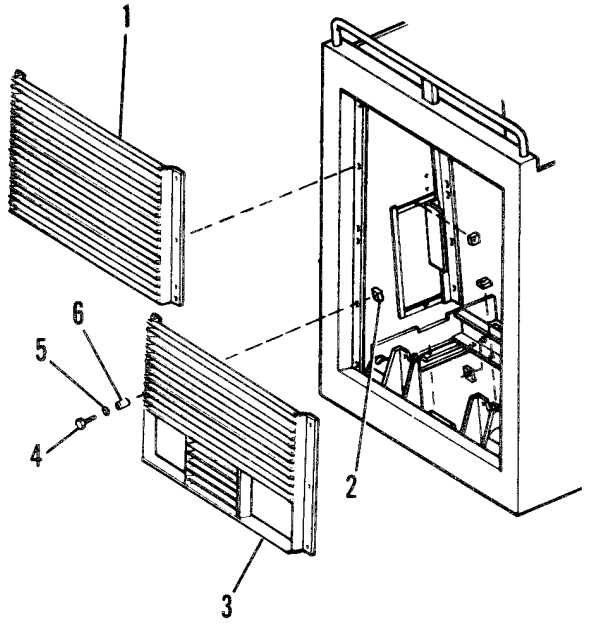
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

RADIATOR REAR GUARD REMOVAL, REPAIR AND INSTALLATION (CONT)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Capscrew (4), washer (5), spacer (6), and nut (2)	Remove.	
2. Rear guard section (3), (1)	Remove.	
REPAIR		
1. Rear guard section (3), (1)	Straighten bent louvers or frame. Reweld any broken welds.	
INSTALLATION		
1. Rear guard section (3), (1)	Position.	
2. Capscrew (4), washer (5), spacer (6), and nut (2)	Install.	



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End

COOLANT FILTER BASE ASSEMBLY REMOVAL/INSTALLATION

This task covers: Replacement of coolant filter base assembly.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Coolant filter

Troubleshooting Reference

None

Equipment Condition

Engine OFF and cooled.
Right access panel open.
Drain coolant below level of lowest hose opening.

Special Tools

None

Personnel Reauired

One mechanic

References

Drain coolant. See page 2-216.

General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

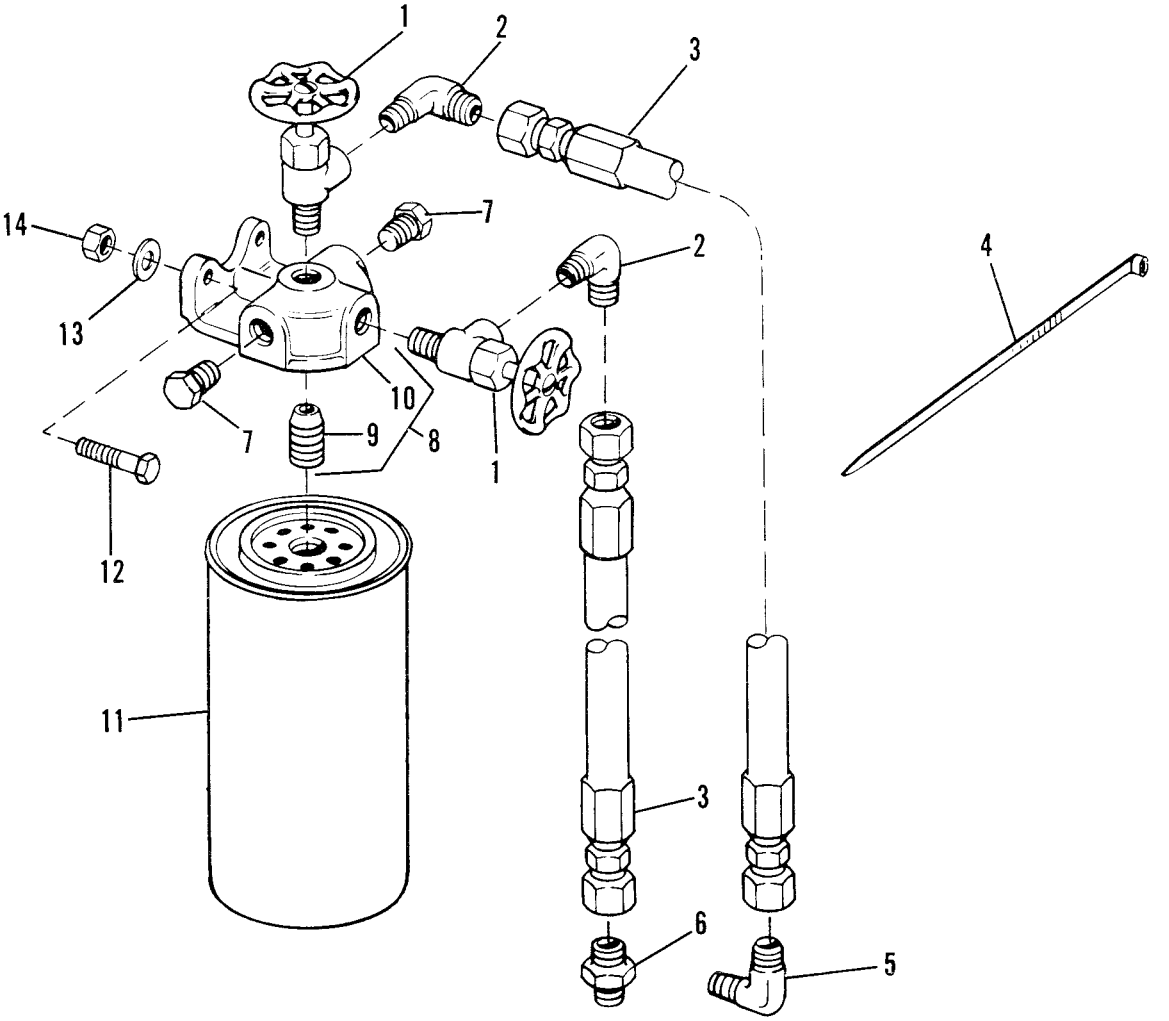
COOLANT FILTER BASE ASSEMBLY REMOVAL/INSTALLATION (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Coolant filter canister (11)	Remove by unscrewing counterclockwise with strap wrench.	
2. Inlet (3), outlet (3)	a. Disconnect lines at fittings (2).	
	b. Tag for identification.	
	c. Cap lines.	
3. Two capscrews (12), washers (13) and nuts (14)	Remove from bracket.	
INSTALLATION		
1. Two capscrews (12), washers and nuts (14)	Install in bracket.	
2. Inlet (3), outlet (3)	Connect lines at fittings (2).	
3. Coolant filter canister (11)	Install.	
	a. Wet gasket with coolant.	
	b. Screw canister clockwise onto base. Tighten with strap wrench.	
4. Coolant level	Check and fill as required.	See page 2-216.

Go on to Sheet 3

COOLANT FILTER BASE ASSEMBLY REMOVAL/INSTALLATION (CONT) (Sheet 3 of 3)

1. Valve assernb!y
2. Elbow
3. Hose assembly
4. Strap
5. Elbow
6. Connector
7. Pipe plug
8. Base assembly
9. Stud
10. Base
11. Precharge element
12. Capscrew
13. Washer
14. Nut



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End

HOSES, LINES AND FITTINGS REMOVAL/INSTALLATION

This task covers: Replacement of hoses, lines and fittings.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Gasket
Hose

Troubleshooting Reference

None

Equipment Condition

Engine OFF and cooled.

Special Tools

None

Personnel Reauired

One mechanic

References

PMCS, page 2-5

General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

HOSES, LINES AND FITTINGS REPLACEMENT (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
1. Cooling system	Drain.	See page 2-216.
2. Hose, line or fitting.	Replace as required.	See page 1-12 and TM 10-3930-641-20P for parts location and identification.
3. Hose, line or fitting gasket	If gasket is on unit, always replace.	Old gasket is deformed and will not form satisfactory seal.
4. Cooling system	Fill cooling system with coolant.	See page 2-216.

End

FAN GUARDS REMOVAL/INSTALLATION (Sheet 1 of 2)

This task covers: Removal/instalation of the fan guards.

INITIAL SETUP

Test, Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine OFF.
Rear hood removed.
Left, and right access panel removed.

Special Tools

None

Personnel Required

One mechanic

References

Hood removal/installation, page 2-454.

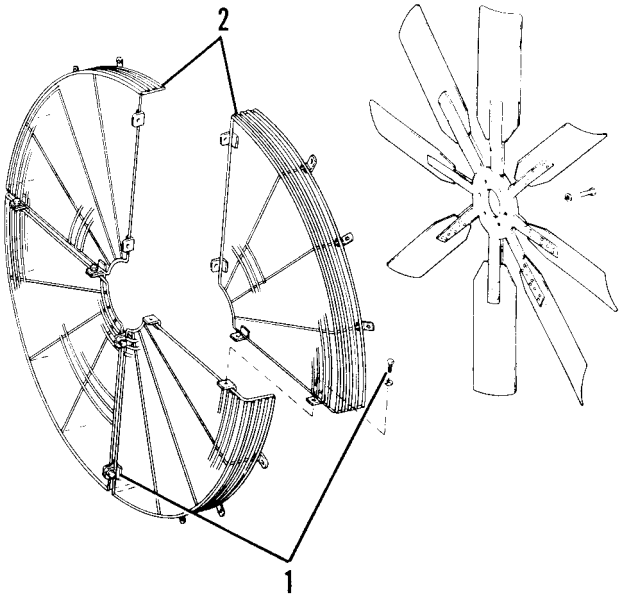
General Safety Instructicms

Main disconnect switch OFF.

Goon to Sheet 2

FAN GUARDS REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Capwscrews (1)	Remove.	
2. Fan guards (2)	Remove.	
INSTALLATION		
1. Fan guards (2)	Place in position.	
2. CapScrews (1)	Install.	



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End

ENGINE ELECTRICAL COMPONENTS MAINTENANCE

This section covers removal and installation of the following engine electrical components:

a. Alternator
b. Starting motor
c. Starting solenoid
d. Engine oil pressure sending unit
e. Engine water temperature sending unit

LIST OF TASKS (Sheet 1 of 1)

TASK NO.	TASK	REF (PAGE)	TROUBLESHOOTING REF (PAGE)
1	Alternator removal/installation.	2-252	2-102
2	Alternator testing/adjusting.	2-255	2-85
3	Stating motor removal/installation.	2-258	2-79
4	stating solenoid removd/installation/ adjustment.	2-261	2-79
5	Engine oil pressure sending unit removal/ installation.	2-264	2-140
6	Engine water temperature sending unit removal/installation.	2-266	2-140

End

ALTERNATOR REMOVAL/INSTALLATION

This task covers: Removal and installation of alternator.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

Page 2-102

Equipment Condition

Right rear lower side access cover removed.

Special Tools

None

Personnel Reauired

One mechanic

References

Torque Limits Chart, Page E-1.

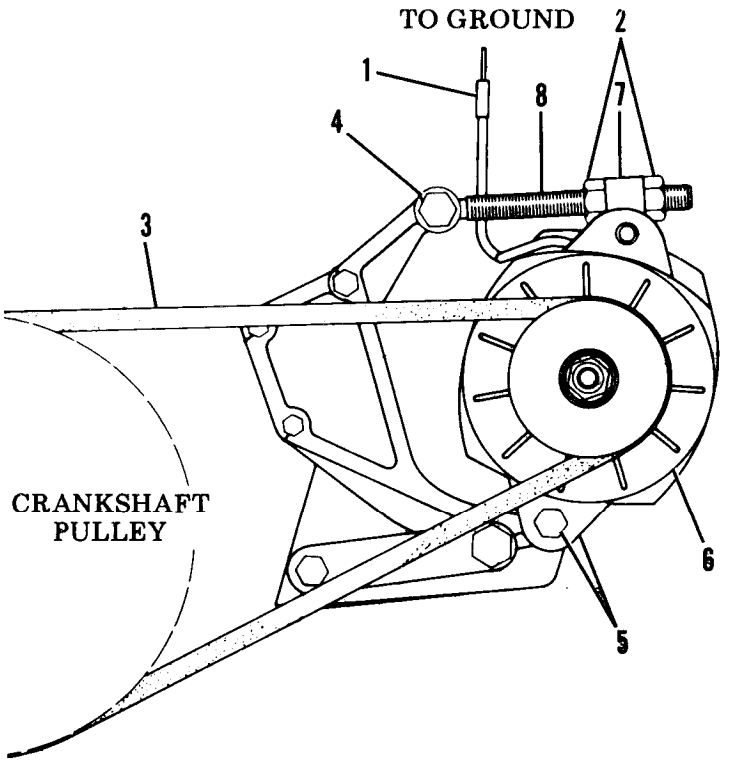
General Safety Instructions

Turn main disconnect switch to OFF to avoid shocks.

Go on to Sheet 2

ALTERNATOR REMOVAL/INSTALLATION (CONT)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Wires (1)	Mark three wires for location and disconnect. (Only ground wire is shown at right.)	
2. Nuts (2)	Loosen.	
3. Belt (3)	Remove.	
4. Capscrew (4)	Loosen.	
	CAUTION Hold alternator to keep it from falling.	
5. CapScrews (5)	Remove.	
6. Alternator (6)	Remove.	
INSTALLATION		
1. Alternator	Position on mounting bracket.	
2. Capscrews (5)	Install. Tighten finger tight.	



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Go on to Sheet 3

ALTERNATOR REMOVAL/INSTALLATION (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
3. Capscrew (4)	Install and tighten to 49-63 lb. ft. (66-85 N•m).	
4. Belt (3)	a. Install.	
	b. Adjust by moving nuts (2) and block (7) along alternator adjustment rod (8).	Belt should deflect no more than 9/16 to 13/16 when 25 lbs. of pressure is appiied midway along top of belt.
5. Capscrews (5)	Tighten to 21-27 lb. ft. (28-37 N•m).	
6. Nuts (2)	Tighten to 105-115 lb. ft. (142-156 N•m).	
7. Wires (1)	Connect. Be sure to attach in locations marked in Item 1.	Tighten output terminal to 9-11 lb. ft. (12-15 N.m).

End

ALTERNATOR TESTING/ADJUSTMENT (Sheet 1 of 3)

This task covers: Alternator voltage adjustment and operation tests.

INITIAL SETUP

Test Equipment

Multimeter

Materials/Parts

None

Troubleshooting Reference

Page 2-85

Equipment Condition

Lower right engine access cover removed.
Upper right rear engine access cover open.

Special Tools

Torque wrench

Personnel Required

One mechanic

References

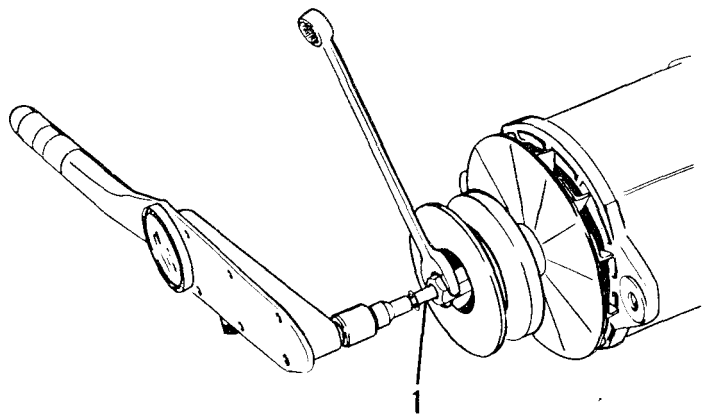
Battery testing, page 2-269.
Battery cable removal, repair and installation, page 2-279.
Operator's cab instrument checks, TM 10-3930-641-10.

General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

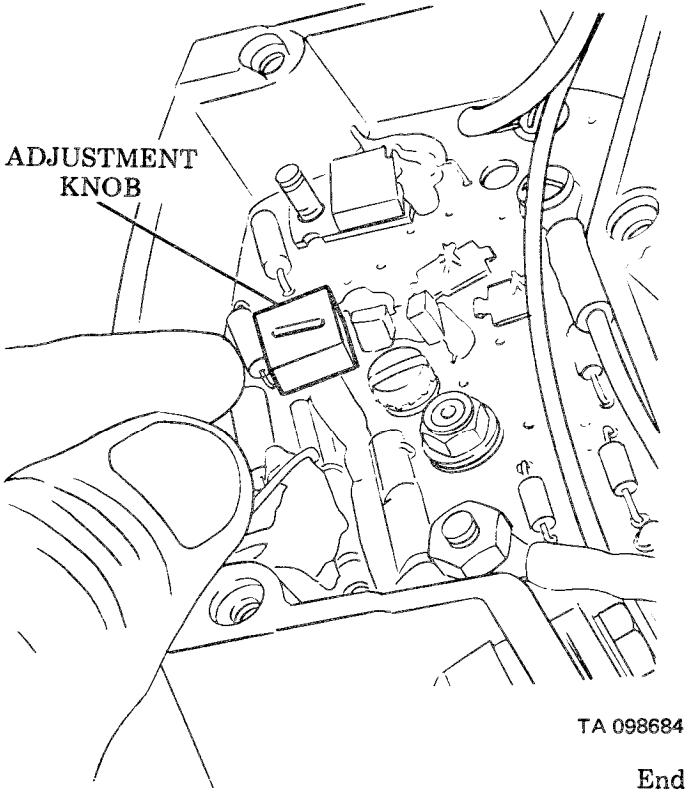
ALTERNATOR TESTING/ADJUSTMENT (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
TESTING	NOTE Before testing alternator for malfunction, be sure the following conditions are met:	
	a. Battery is at 75% charge (1.240 Sp. Ga.).	See Battery Testing, page 2-270.
	b. Proper size battery cables are installed, free from corrosion and properly connected.	See Battery Cable Removal, Repair, and InstaHatim, page 2-282.
	c. Leads, junctions, switches and panel instruments work properly.	See Operator Cab Instrument Checks, TM 10-3930 - 641-10.
	d. Alternator belt is properly adjusted and not overly worn.	
1. Pulley nut (1)	Check torque. Tighten to 70-80 lb. ft. (95-109 N•m).	 TA 098683

Go on to Sheet 3

ALTERNATOR TESTING/ADJUSTMENT (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
2. **Alternator wires**	a. Tum main disconnect to ON.	
	b. Connect multimeter positive lead to terminal marked + where orange wires connect. Check voltage output to ground.	b. Voltage should be 26-30 volts (28 V ideal).
	c. Conned multimekr positive lead to terminal R where light blue wire connects.	c. Voltage should be 12 volts.
ADJUSTMENT		
1. Access plate	Remove.	
2. Adjustment knob	H alternator Chmges too much or too little, turn adjustment knob with screwdriver.	



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End

STARTING MOTOR REMOVAL/INSTALLATION

This task covers: Removal and installation of starting motor.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Starting motor

Troubleshooting Reference

Pages 2-39, 2-79

Equipment Condition

Front hood and right side access cover removed.

Special Tools

Hoist

Personnel Required

One mechanic

References

Torque Limits Chart, page E-1.

Hood removal/installation, page 2-454.

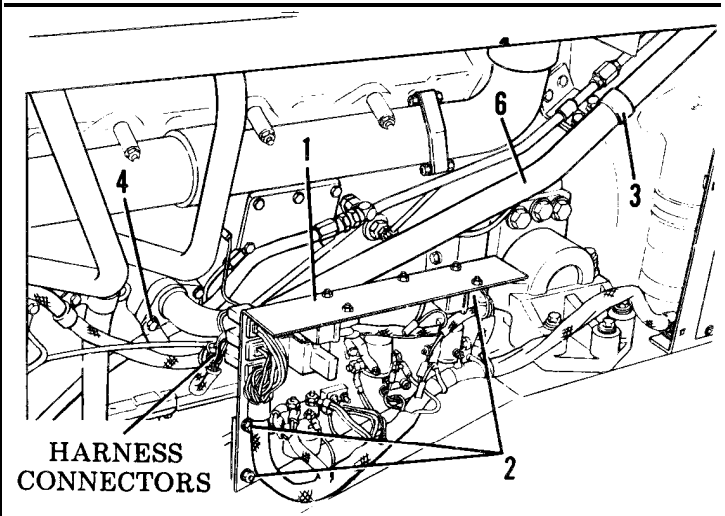
General Safety Instructions

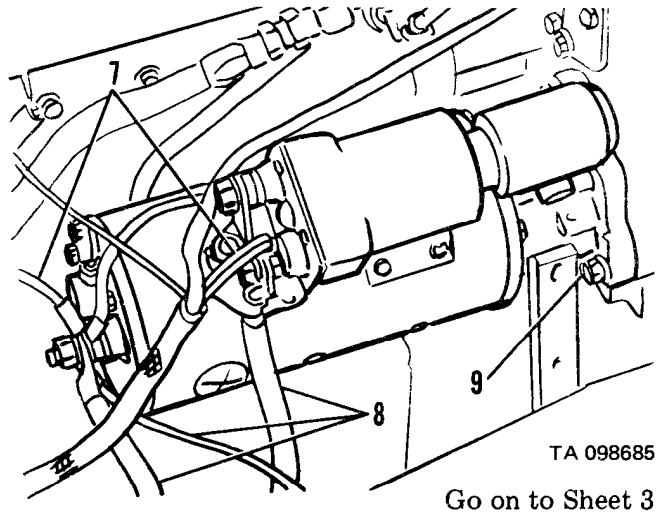
Main disconnect switch OFF.

Go on to Sheet 2

STARTING MOTOR REMOVAL/INSTALLATION (CONT)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Panel (1)	a. Tag and disconnect three wiring harnesses from back side of panel. b. Remove four screws, Iockwashers, and nuts (2) which hold panel (1) to frame. c. Move panel (1) aside.	
2. Capscrew, washer, and nut.	Remove from clip (3)	
3. Capscrew	Remove capscrew and upper clamp from oil filler tube (6).	
4. Capscrews (4)	Remove.	
5. Oil filler tube (6) and gasket	Loosen three capscrews (9).	
6. Motor and solenoid wires (7), (8)	Mark for location and disconnect. **CAUTION** Weight of starting motor is 75 lb. (34 kg). Be yepared to hold motor when capscrews are ?emoved.	
7. Capscrews (9)	Loosen three capscrews (9).	
8. Motor	Attach lifting sling.	





Go on to Sheet 3

STARTING MOTOR REMOVAL/INSTALLATION (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
9. Capscrews (9)	Remove. Remove top capscrew last.	
10. Starting motor	Lift out of vehicle.	
INSTALLATION		
1. Starting motor	Position motor at flywheel housing.	
2. Capscrews (9)	Install and tighten three capscrews. Start top capscrew first.	See Torque Limits Chart, page E-1.
3. Motor and solenoid wires (7), (8)	Connect. Be sure to reconnect them in the positions marked before they were disconnected.	Tighten terminal nuts to 16-30 lb. in. (2-3.5 N•m).
4. Oil filler tube (6) and gasket	Position at side of engine.	
5. Capscrews (4)	Install and tighten two screws.	See Torque Limits Chart, page E-1.
6. Capscrew and upper clamp	Install.	See Torque Limits Chart, page E-1.
7. Capscrew, washer, and nut	Install in clip (3).	
8. Panel (1)	a. Position on frame.	
	b. Install four capscre ws, washers and nuts (2) holding panel to frame.	Black - Top Red - Center Dark Blue - Lower
	c. Connect wiring harnesses to back.	

End

STARTING SOLENOID REMOVAL/INSTALLATION/ADJUSTMENT (Sheet 1 of 3)

This task covers: Removal, installation, and adjustment of starting solenoid.

INITIAL SETUP

Test Equipment

None.

Materials/Parts

None

Troubleshooting Reference

Page 2-79

Equipment condition

Engine shut down.
Right lower access cover removed.

Special Tools

None

Personnel Required

One mechanic

References

Torque Limits Chart, page E-1.

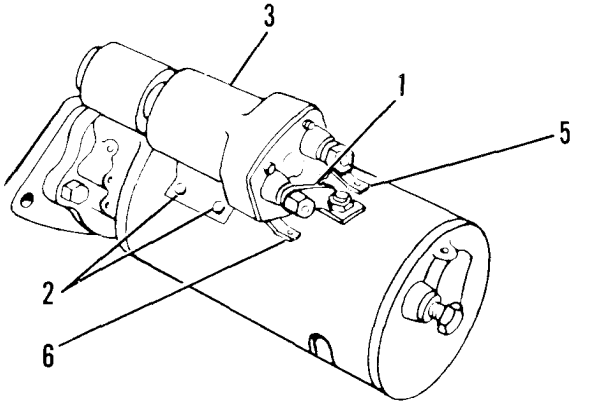
General Safety Instructions

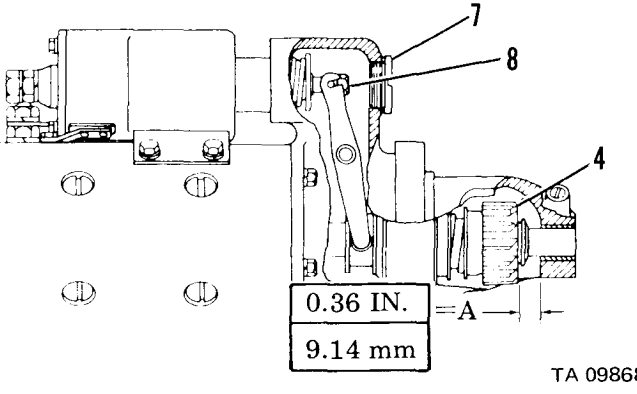
Turn main disconnect switch to OFF to prevent shocks.

Go onto Sheet 2

STARTING SOLENOID REMOVAL/INSTALLATION/ADJUSTMENT (CONT)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Solenoid wires	Mark for location and disconnect.	
2. Connector (1)	Remove two nuts and remove connector.	
3. Capscrews (2)	Remove four capscrews which hold solenoid to starting motor.	
4. Solenoid (3)	Remove.	
INSTALLATION		
1. Solenoid (3)	Position on starting motor.	
2. Capscrews (2)	Install and tighten four capscrews.	See TORQUE LIMITS CHART, page E-1.
3. Pinion (4)	Adjust clearance.	
	NOTE Do not install connector (1).	
	a. Connect a battery positive lead to terminal (5), marked SW.	
	b. Connect a ground to terminal (6).	





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Go on to Sheet 3

STARTING SOLENOID REMOVAL/INSTALLATION/ADJUSTMENT (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
3. Pinion(4)(Cont)	c. Connect a wire from solenoid terminal marked MOTOR to ground terminal (6).	Pinion (4) will move to crank position and stay there until battery is disconnected.
	d. Push pinion toward starting motor to eliminate free movement.	
	e. Remove plug (7) and turn nut (8) to adjust pinion clearance.	Pinion clearance (Dimension A) should be 0.36 in. (9.14 mm).
	f. Install plug.	
	g. Release pinion.	
	h. Disconnect battery and test wires.	
4. Connector(1)	Install with two nuts.	
5. Solenoid wires	Connect. Be sure to reconnect them in the positions marked before they were disconnected.	

End

ENGINE OIL PRESSURE SENDING UNIT REMOVAL/INSTALLATION

This task covers: Replacement of engine oil pressure sending unit.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Engine oil pressure sending limit.
Thread sealant, item 10, Appendix C.

Troubleshooting Reference

Page 2-140

Equipment Condition

Engine OFF.

Special Tools

None

Personnel Required

One mechanic

References

Operator's cab instrument checks, TM 10-3930-641-10.

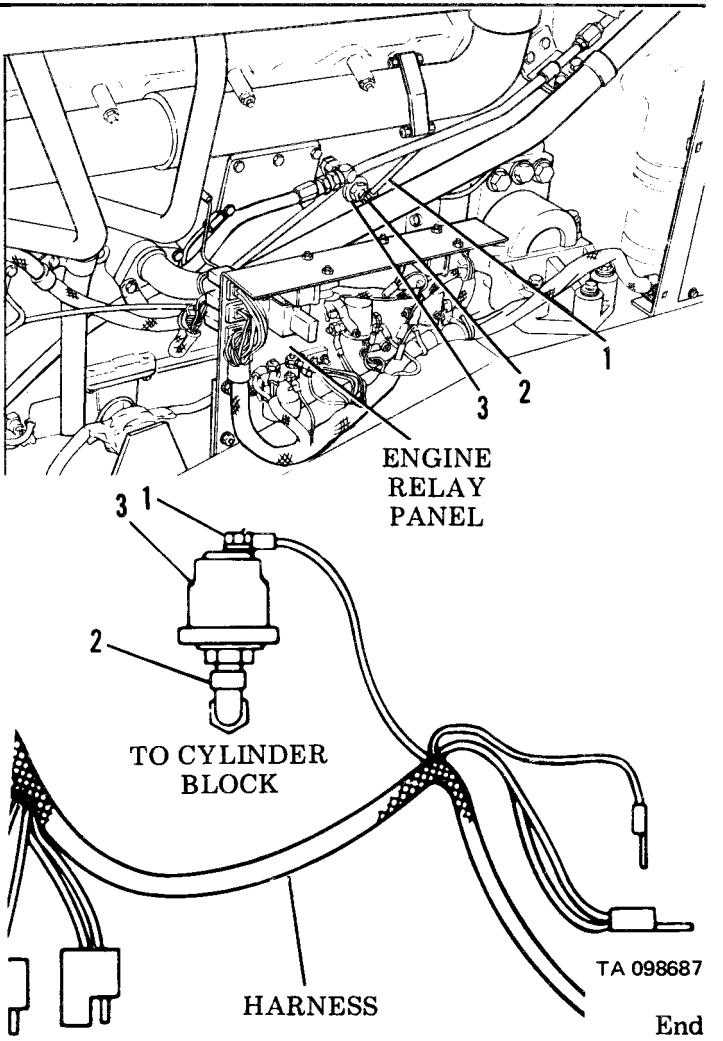
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

ENGINE OIL PRESSURE SENDING UNIT REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Sending unit (3)	Locate. Behind engine relay panel and directly above engine oil filler tube.	
2. Terminal (1)	Disconnect.	
3. Sending unit (3)	Remove and discard.	
4. Elbow fitting (2)	Remove from sending unit.	
INSTALLATION	NOTE Use thread sealant on threads.	
1. Elbow fitting (2)	Install on engine. Open end up.	
2. Sending unit (3)	Install on elbow fitting.	
3. Terminal (1)	Install.	



End

ENGINE WATER TEMPERATURE SENDING UNIT REMOVAL/INSTALLATION

This task covers: Replacement of engine water temperature sending unit.

INITIAL SETUP

Test Equipment

None

Materials/Parts

One engine water temperature sending unit.

Troubleshooting Reference

Page 2-140

Equipment Condition

Radiator drained to below level of sending unit.

Left rear access panel open.

Special Tools

None

Personnel Reauired

One mechanic

References

Coolant replacement, page 2-215.

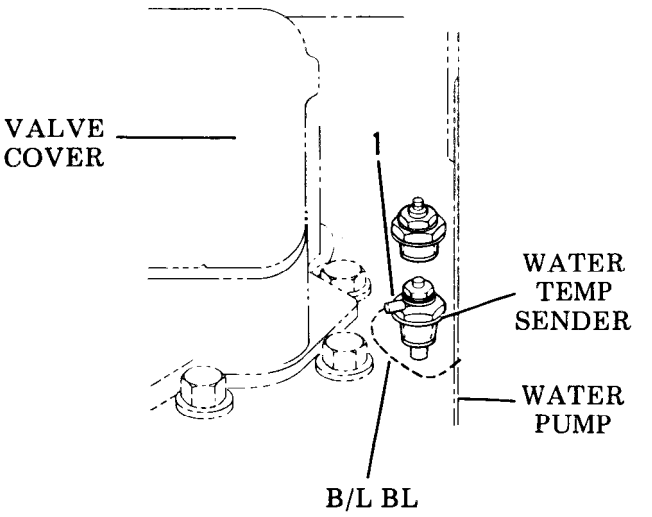
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

ENGINE WATER. TEMPERATURE SENDING UNIT REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Sending unit.	Locate on left cylinder head.	
2. Terminals (1)	Disconnect.	
3. Water temperature sending unit	Remove.	
	NOTE Radiator must be drained below center line of fan.	
INSTALLATION		
1. Water temperature sending unit	Position.	
2. Sending unit	Install in engine block.	
3. Terminals (1)	Connect.	



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End

BATTERY MAINTENANCE INSTRUCTIONS

This section includes procedures for maintaining the battery and battery cables:

a. Testing

b. Service

c. Battery removal and installation

d. Battery cable removal, repair and installation

LIST OF TASKS (Sheet 1 of 1)

TASK NO.	TASK	REF (PAGE)	TROUBLESHOOTING REF (PAGE)
1	Battery testing.	2-269	2-80
2	Battery service.	2-272	2-80
3	Battery removal/installation.	2-277	2-80
4	Battery cable removal, repair and installation.	2-279	2-80

End

BATTERY TESTING

This task covers: a. Testing specific gravity of battery with Battery/Coolant Tester.
b. Testing battery charge with multimeter.

INITIAL SETUP

Test Equipment

Battery/Coolant Tester
Multimeter

Materials/Parts

None

Troubleshooting Reference

Page 2-80

Equipment Condition

Engine OFF.

Special Tools

None

Personnel Required

One mechanic

References

Battery removal/installation, page 2-277.
TM 9-6140-200-14

General Safety Instructions

Be careful not to splash electrolyte on you or equipment. Do not smoke or have open flame or sparks near battery. Wear safety goggles and gloves.

Main disconnect switch OFF.

Go on to Sheet 2

BATTERY TESTING (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
SPECIFIC GRAVITY TEST	NOTE Battery/Coolant Tester automatically adjusts for temperature. Test battery before adding water. Make separate test for each battery cell.	
1. Fill plug	Remove. WARNING Be careful not to drip electrolyte on you or equipment. If electrolyte spills on you, flood affected areas with water to flush electrolyte. Get medical attention at once. Do not smoke or have open flame or sparks near batteries. Sparks can cause battery gases to explode.	
2. Battery	Use tester dipstick to draw a few drops of electrolyte.	
3. Battery/coolant tester	a. Place electrolyte in measm-ing window of tester. b. Point tester at a bright light, ard laok through eyepiece lens.	

Go on to Sheet 3

BATTERY TESTING (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
3. Battery coolant tester (cont)	c. Read scale where light and shadow meet.	Reading must be between 1.280 and 1.225 (1.225 and 1.180 tropical electrolyte). If not, a. In field, charge battery. See TM 9-6140-200-14. b. In garrison, replace battery with fully charged battery. See battery removal and installation, page 2-277.
MULTIMETER TEST		
Multimeter	Follow instructions on multimeter cover for test.	May be used to test battery. See TM 9-6140-200-14.

End

BATTERY SERVICE (Sheet 1 of 5)

This task covers: Cleaning, checking, filling battery.

INITIAL SETUP

Test Equipment

Battery/Coolant tester
6630-00-105-1418

Materials/Parts

Distilled water, item 15, Appendix C
Baking soda, item 19, Appendix C
Coating compound 8030-00-145-0151 or equivalent, item 10, Appendix C
GAA grease, item 4, Appendix C

Troubleshooting Reference

Page 2-80

Equipment Condition

Engine OFF

Special Tools

Terminal clamp puller
Terminal cleaning tool

Personnel Required

One mechanic

References

TM 9-6140-200-14

General Safety Instructions

Be careful not to splash electrolyte on you or equipment.
Do not smoke or have open flame or sparks near battery.
Wear safety goggles and gloves when servicing battery.
Main disconnect switch OFF.

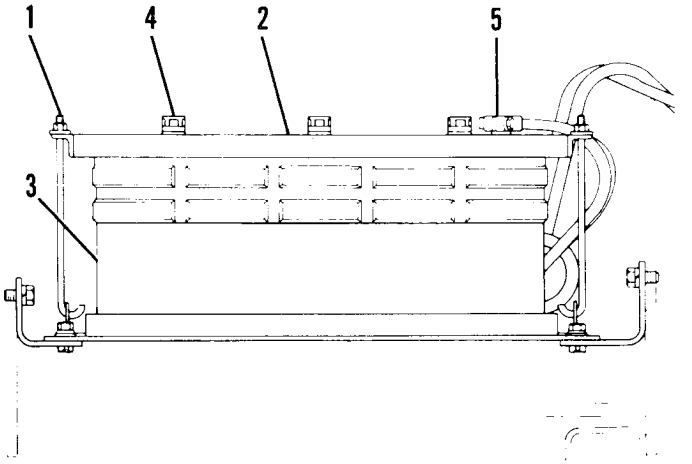
Go on to Sheet 2

BATTERY SERVICE (CONT) (Sheet 2 of 5)

LOCATION/ITEM	ACTION	REMARKS
	WARNING Do not splash electrolyte on you or equipment. Injury or damage will result. If you spill electrolyte, flood affected area with water to flush electrolyte. Get immediate medical attention. Do not smoke or have sp~ks or open flame near batteries. Battery gases could explode, causing severe injury.	
1. Battery box cover	Open.	
	CAUTION Use small, open end wrenches to loosen terminal nuts. Large crescent wrenches may slip and damage battery or nuts. Do not pry off terminals or twist to remove. Terminal or posts may be damaged. Use clamp puller.	
2. Battery terminals	a. Loosen terminal nuts. b. Use clamp puller to remove terminals. c. Use terminal cleaning tool to clean terminals and posts.	NOTE Remove negative terminal first.

Go onto Sheet 3

BATTERY SERVICE (CONT) (Sheet 3 of 5)

LOCATION/ITEM	ACTION	REMARKS
3. Battery holddown (2)	a. Remove nuts (1). b. Remove holddown (2). c. Clean well with wire brush. d. Soak in tub of water mixed with 1/2 pound soda to each gallon of water. e. Rinse with clean water and dry. f. Paint with coating compound.	
4. Battery (3)	a. Check to be sure fill plugs (4) are tight. b. Remove battery from box to clean. See page 2-277. c. Use soda/water solution to clean top of battery and battery box. d. Rinse well and dry. e. Install battery.	
5. Fill plugs (4)	a. Remove and check water level. b. Test battery specific gravity. **WARNING** Add distilled water only. Do not add electrolyte, except in a battery shop. c. Add distilled water to level of ring if necessary. d. Install fill plugs.	See BATTERY TESTS, page 2-269.

TA 098689

Go on to Sheet 4

BATTERY SERVICE (CONT) (Sheet 4 of 5)

LOCATION/ITEM	ACTION	REMARKS
6. Cables	Check for damage. Replace if necessary.	See battery cable removal and installation, page 2-279.
7. Battery holddown (2)	a. Position on battery top. CAUTION Do not overtighten nuts (1). Battery case may crack. b. Install and tighten nuts (1).	
8. Battery terminals (5)	CAUTION Be sure polmity (+ and -) connection is correct. Alternator may be darnaged if terminals are reversed. Do not use hammer to install terminals. a. Install terminals (5). b. Using smali, open end wrenches, tighten terminal nuts. CAUTION Do not pull hard on terminals or twist with pliers.	NOTE Install negative terminal last.

Go on to Sheet 5

BATTERY SERVICE (CONT) (Sheet 5 of 5)

LOCATION/ITEM	ACTION	REMARKS
8. Battery terminals (cont)	c. Check cable connections: Grip cable at terminal. Twist gently. Lift up. Push down. If terminal moves, tighten nut. d. Cover terminals with light coat of GAA grease, 1/32 to 1/8 in. (1 to 3 mm) thick. Wipe off extra grease.	
9. Battery box cover	Close.	

End

BATTERY REMCIVAIWW3TALLATION (Sheet 1 of 2)

This task covers: Removal and installation of battery.

INITIAL SETUP

Test Equipment

None

Materials/Parts

GAA grease
Baking soda, item 19, Appendix C
Coating compound, item 10, Appendix C

Troubleshooting Reference

Page 2-80

Equipment Condition

Engine OFF.

Special Tools

Terminal clamp puller

Personnel Required

One mechanic

References

TM 9-6140-200-14

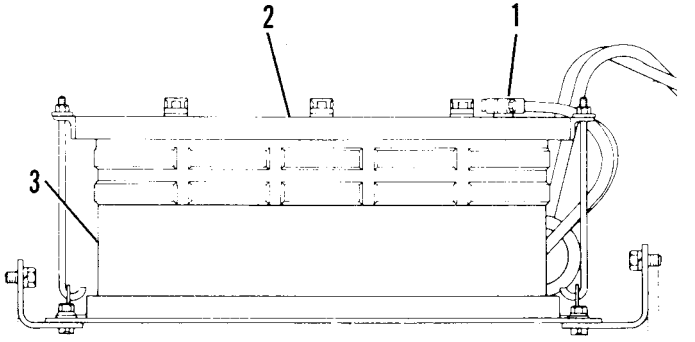
General Safety Instructions

Do not splash electrolyte on you or equipment. If electrolyte spills on you, flood affected area with water to flush electrolyte. Get medical attention at once.
Do not smoke or have open flame or sparks near battery. Sparks can cause battery gases to explode.
Main disconnect switch OFF.

Go onto Sheet 2

BATTERY REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL	NOTE See TM 9-6140-200-14 for instructions on when to replace battery.	
1. Battery box cover	Open.	
2. Battery terminals (1)	Remove.	See battery service, page 2-272.
3. Battery holddown (2)	Remove.	See battery service, page 2-272.
	CAUTION Lift battery carefully. Do not hit side of battery box. Case could crack.	
4. Battery (3)	Remove and send to Direct Support Maintenance for repair.	
INSTALLATION		
1. Battery (3)	Install.	
2. Battery holddown (2)	Install.	See battery service, page 2-272.
3. Battery terminals (1)	Install.	See battery service, page 2-272.
4. Battery box cover.	Close.	



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End

BATTERY CABLE REMOVAL, REPAIR, AND INSTALLATION

This task covers: Removal, repair, and installation of battery cables/terminals.

INITIAL SETUP

Test Equipment

None

Materials/Parts

GAA grease

Troubleshooting Reference

Page 2-80

Equipment Condition

Battery box cover open

Special Tools

Terminal clamp puller
Crimping tool
Terminal cleaning tool

Personnel Required

One mechanic

References

None

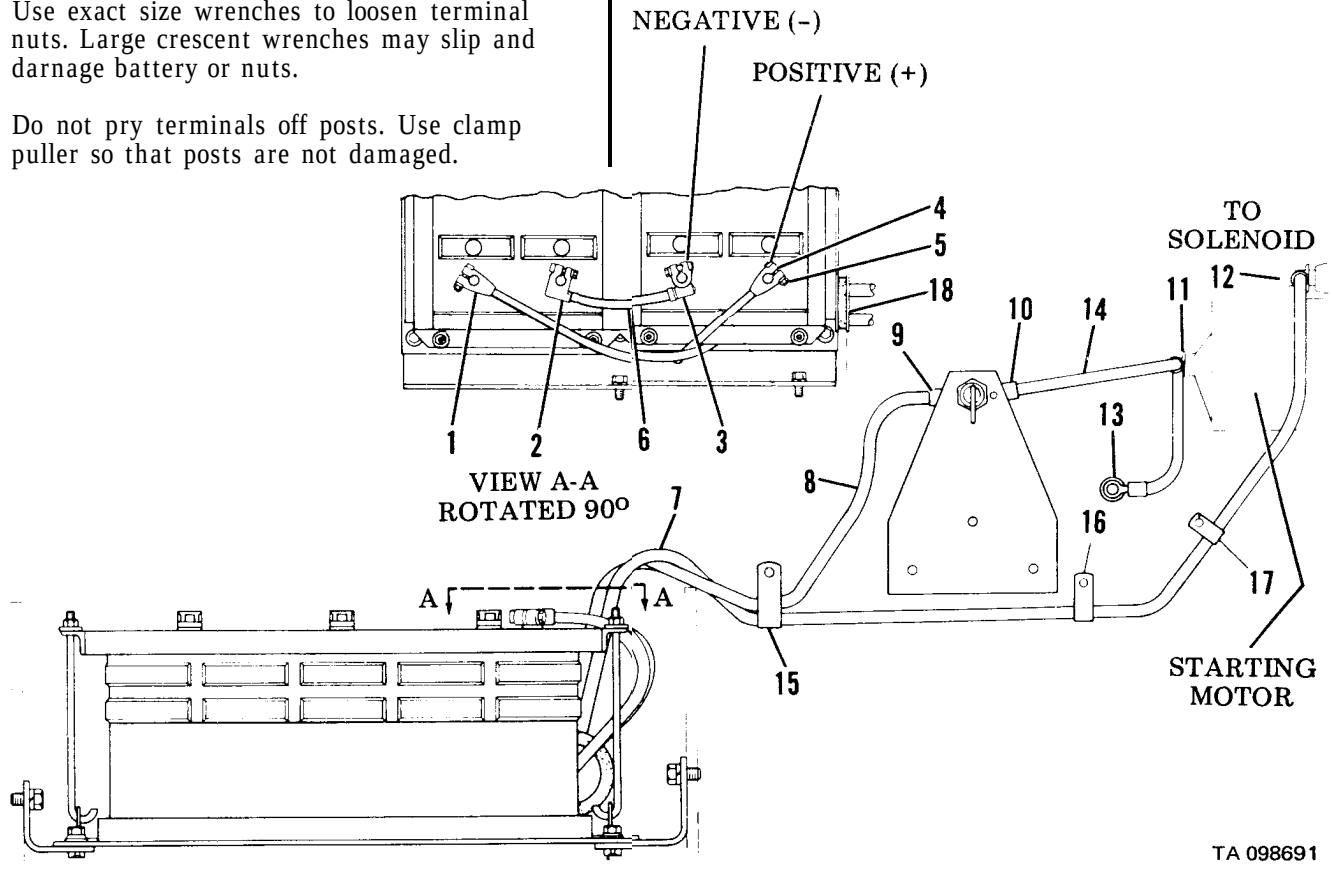
General Safety Instructions

Remove negative battery terminals first, and install them last to prevent completed battery circuits. Do not put tools on battery top. You may damage battery or short across posts and get shocks.
Main disconnect switch OFF.

Go on to Sheet 2

BATTERY CABLE REMOVAL, REPAIR, AND INSTALLATION (CONT) (Sheet 2 of 5)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL	Use exact size wrenches to loosen terminal nuts. Large crescent wrenches may slip and darnage battery or nuts. Do not pry terminals off posts. Use clamp puller so that posts are not damaged.	



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Go on to Sheet 3

BATTERY CABLE REMOVAL, REPAIR, AND INSTALLATION (CONT) (Sheet 3 of 5)

LOCATION/ITEM	ACTION	REMARKS
	CAUTION Remove negative terminals first.	
1. Battery terminals (1, 2,3,4)	a. Loosen battery terminal clamp nuts (5).	
	b. Use terminal clamp puller to remove clamps from posts.	When terminals (2, 3) are removed, cable (6) may be removed from vehicle.
	c. If you are replacing battery terrninaks only, pull or cut them from cables. Clean cable ends, and reinstall.	
	d. If you are replacing terminals and cables, pull or cut battery terminals from cables (7, 8), and goon to step 2.	
2. Terminals (9, 10,11,12, 13)	a. Remove nuts which hold terminals to studs.	
	b. Remove terminals from studs.	Cable (14) may be removed from vehicle when terminals (10, 11, 13) are removed.
	c. If you are replacing only terminals, pull or cut lug terminals from cables, and reinstall.	
	d. If you are replacing cables, pull or cut terminals from cables, and go on to step 3.	

Go on to Sheet 4

BATTERY CABLE REMOVAL, REPAIR, AND INSTALLATION (CONT) (Sheet 4 of 5)

LOCATION/ITEM	ACTION	REMARKS
3. Cables (6, 7,8, 14)	a. Slide cables (7, 8) through grommet (18). b. Remove cables (7, 8) from clips (15, 16, 17). c. Remove from vehicle	
REPAIR/INSTALLATION		
1. Cables (6, 7,8, 14)	a. Cut new cables. b. Slide cables (7, 8) through grommet (18). c. Install cables (7, 8) into clips (15, 16, 17).	Cable Number / Length 6 — 7.25 in. (18.4 cm) 7 — 58 in. (147 cm) 8 — 74 in. (188 cm) 14 — 15 in. (38 cm)
2. Terminals (9, 10, 11, 12, 13)	Install on cables, and crimp tight.	
3. Battery terminals (1, 2,3,4)	a. Install on cables, and crimp tight. **CAUTION** Be sure polarity (+ and -) connection is correct. Alemator may be damaged if terminals axe reversed. Do not hammer terminals onto posts. Posts and terminals will be damaged.	

Go on to Sheet 5

BATTERY CABLE REMOVAL, REPAIR, AND INSTALLATION (CONT) (Sheet 5 of 5)

LOCATION/ITEM	ACTION	REMARKS
3. Battery terminals 1,2,3,4)(cont)	b. Use temimd cleaning tool to clean posts, and install battery terminals to posts. c. Tighten terminal clamps with clamp nuts (5). CAUTION Do not pull hard on terminals or twist with pliers. Posts and terminals will be damaged. d. Check terminal connections by gently lifting and twisting. If terminals move, tighten nuts (5). e. Cover terminals with light coat of GAA grease - 1/32 to 1/8 in. (1-3 mm).	

End

VEHICLE LIGHTING SYSTEMS MAINTENANCE INSTRUCTIONS

This section includes procedures for replacing and repairing vehicle lights:

a. All headlight sealed unit

b. Headlight/front flood

c. Backup light

d. Stop and tail lamp

e. ROPS (auxiliary) flood lights

LIST OF TASKS (Sheet 1 of 1)

TASK NO.	TASK	REF (PAGE)	TROUBLESHOOTING REF (PAGE)
1	Headlight and backup light sealed lamp units removal/installation.	2-285	2-126
2	Headlight body removal/installation.	2-287	2-126
3	Cab dome light bulb removal/installation.	2-289	2-126
4	Combination stop and tail lamp removal/ installation.	2-291	2-126, 2-135
5	Combination stop and tail lamp bulb replacement.	2-293	2-126
6	ROPS (auxiliary) lights removal/installation	2-295	2-126

End

HEAD LIGHT AND BACKUP LIGHT SEALED LAMP UNITS REMOVAL/INSTALLATION (Sheet 1 of 2)

This task covers: Replacing the sealed unit of the head light assembly and backup light.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Head light sealed unit

Troubleshooting Reference

Page 2-126

Equipment Condition

Engine shut down

S~ecial Tools

None

Personnel Required

One mechanic

References

Head light body removal/installation, page 2-287

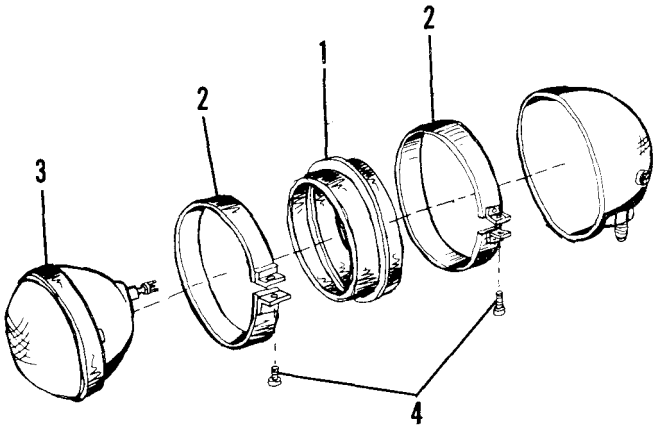
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

HEAD LIGHT AND BACKUP LIGHT SEALED LAMP UNITS REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Screws (4) and moldings (2)	Loosen screws and remove moldings.	
2. Rubber ring (1) under molding	Remove.	
3. Sealed unit (3)	Disconnect, remove, and discard.	
INSTALLATION		
1. Sealed unit (3)	Insert in body assembly and connect.	
2. Ring (1) under molding.	Install.	
3. Molding (2) and screw (4)	Reassemble. Install molding with sharp curved side toward middle o: ring.	



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End

HEADLIGHT BODY REMOVAL/INSTALLATION (Sheet 1 of 2)

This task covers: Replacement of headlight body.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Headlight body

Troubleshooting Reference

Page 2-126

Equipment Condition

Engine shut down

Front warning horn removed, page 2-327

Special Tools

None

Personnel Reauired

One mechanic

References

Sealed lamp unit removal/installation, page 2-285.

Warning horn removal/installation, page 2-327.

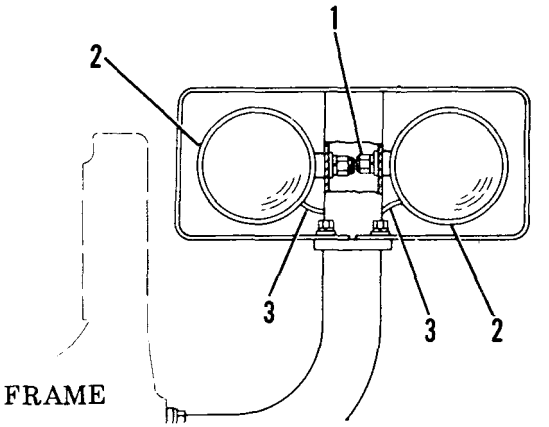
General Safety Instructions

Main disconnect switch OFF

Go on to Sheet 2

HEADLIGHT BODY REMOVAJJINSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Warning horn	Remove.	See page 2-327.
2. Wire (3)	Disconnect.	
3. Nut, inside spacer, lockwasher (1)	Remove.	
4. Headlight body (2) and outside spacer	Remove.	
INSTALLATION		
1. Outside spacer	Install on headlight mounting stud flat side towards light.	
2. Headlight (2)	Place in bracket.	
3. Nut, spacer, lockwasher (1)	Install with flat side of spacer towards lockwasher.	
4. Wire (3)	Connect.	
5. Warning horn	Install.	See page 2-327.



TA 098693

End

CAB DOME LIGHT BULB REMOVAL/INSTALLATION

This task covers: Removal/installation of cab dome light bulb.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Cab dome light

Troubleshooting Reference

Page 2-90

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

None

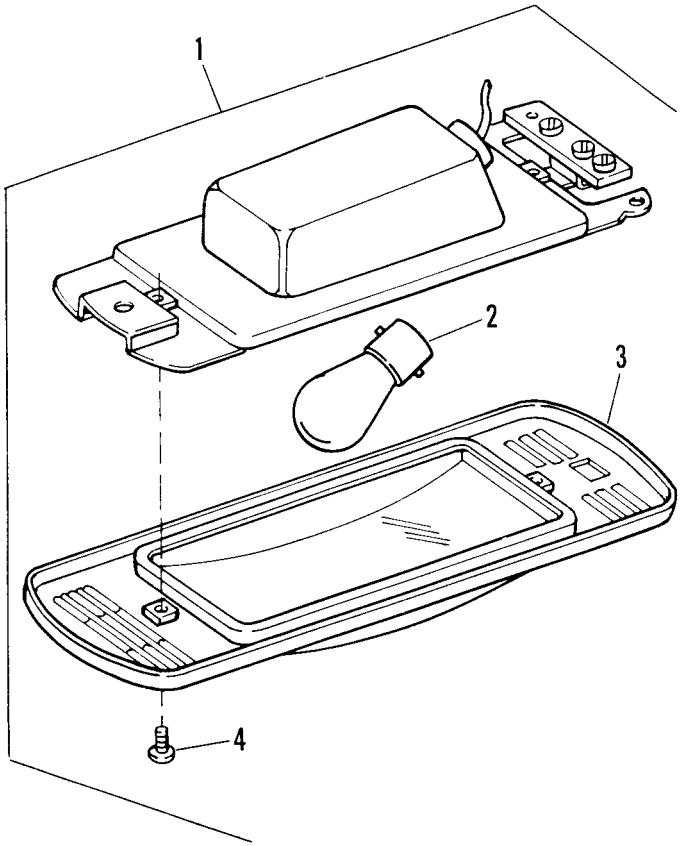
General Safety Instructions

Main disconnect switch OFF

Go on to Sheet 2

CAB DOME LIGHT BULB REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
1. Capscrews (4)	Remove.	
2. Lens (3)	Remove.	
3. Bulb (2)	Remove.	
INSTALLATION		
1. Bulb (2)	Insert.	
2. Lens (3)	Place in position.	
3. Capscrews (4)	Install.	



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End

COMBINATION STOP AND TAIL LAMP REMOVAL/INSTALLATION (Sheet 1 of 2)

This task covers: Replacement of combination stop and tail lamp assembly.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Combination stop and tail lamp assembly

Troubleshooting Reference

Pages 2-126, 2-135

Equipment Condition

Engine shut down

Radiator guard lower section removed

Special Tools

None

Personnel Required

One mechanic

References

Headlight sealed unit removal/installation, page 2-285

Radiator rear guard removal/installation, page 2-242

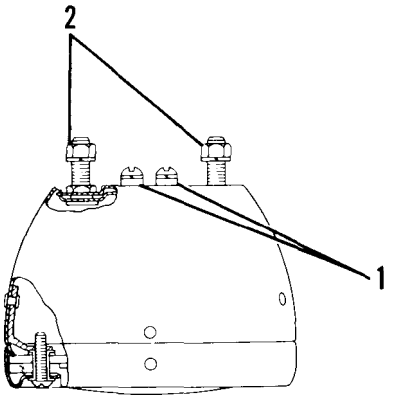
General Safety Instructions

Main disconnect switch OFF

Go on to Sheet 2

COMBINATION STOP AND TAIL LAMP REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Terminils (1) and wires	Loosen terminal screws. Tag and disconnect wires.	
2. Nuts and lockwashers (2)	Remove.	
3. Lamp assembly	Remove.	
INSTALLATION		
1. Lamp assembly	Hold in place.	
2. Nut and lockwasher (2)	Install.	
3. Terminals (1)	Reconnect wires.	



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End

COMBINATION STOP AND TAIL LAMP – BULB REPLACEMENT

This task covers: Replacing a burned out bulb in the stop and tail lmp assembly.

INITIAL SETUP

Test. Equipment

None

Materials/Parts

Bulb

Troubleshooting Reference

Page 2-126

Equipment Condition

Engine shut down

Special Tools

None

Personnel Required

One mechanic

References

None

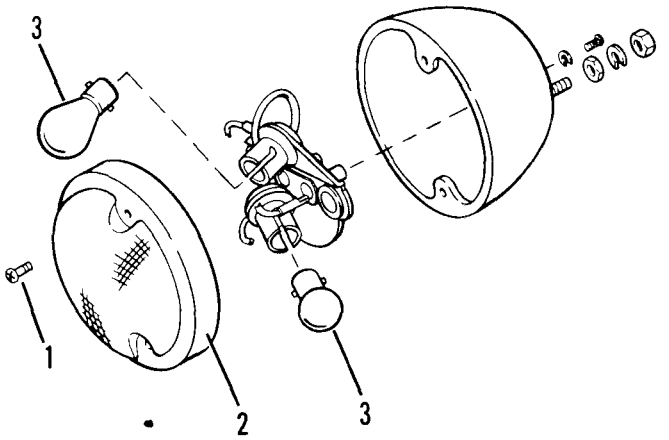
General Safety Instructions

Main disconnect switch in OFF

Go on to Sheet 2

COMBINATION STOP AND TAIL LAMP – BULB REPLACEMENT (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Screws (1)	Loosen.	
2. Door assembly (2)	Remove.	
3. Bulb (3)	Remove by pushing and turning. Discard.	
INSTALLATION		
1. New bulb (3)	Install.	
2. Door assembly (2)	Install.	
	NOTE Door assembly only goes in one way when both screws are installed.	
3. Screws (1)	Tighten.	



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End

ROPS (AUXILIARY) LIGHT REMOVAL/INSTALLATION

This task covers: Removal/installation of the ROPS (auxiliary) lights.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Light assembly

Troubleshooting Reference

Page 2-126

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

Sealed lamp unit removal, see page 2-285

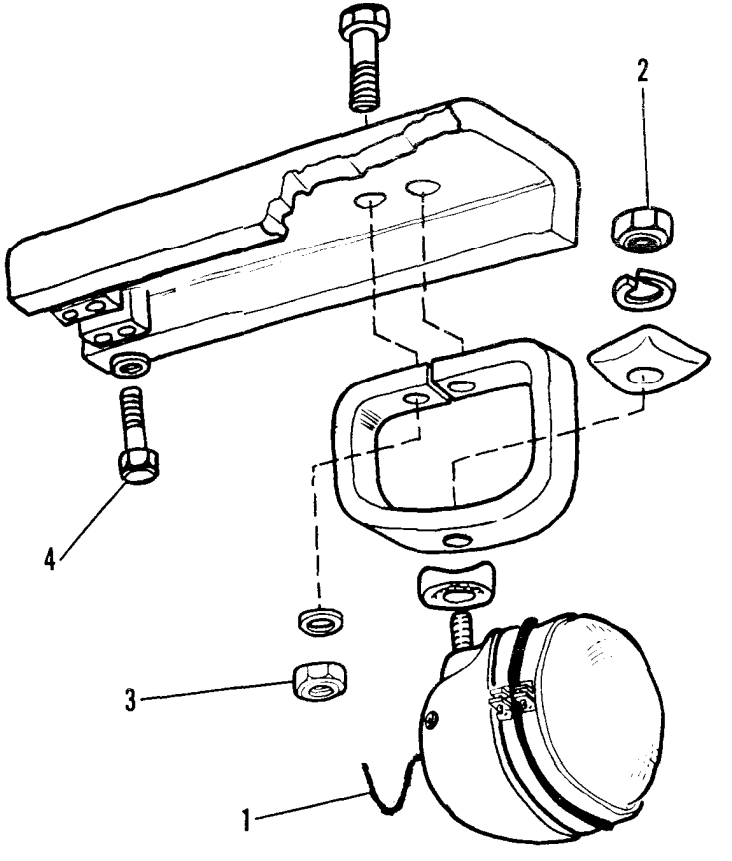
General Safety Instructions

Main disconnect switch is OFF

Go on to Sheet 2

ROPS (AUXILIARY) LIGHT REMOVAL/INSTALLATION (CONT)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Wire assembly (1)	Remove.	
2. Nut (2)	Remove nut (2), washer, spacer and body assembly.	
3. Capscrews, washers and nuts (3	Remove (if necessary).	
4. Capscrews (4)	Remove (if necessary).	
INSTALLATION		
1. Capscrews (4)	Install (if removed).	
2. Capscrews, washers and nuts (3)	Install.	
3. Nut (2)	Install nut, washer, spacer and body assembly.	
4. Wire assembley (1)	Install.	



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End

VEHICLE ELECTRICAL COMPONENTS MAINTENANCE INSTRUCTIONS

This section includes procedures for removing and installing:

a. Main disconnect switch
b. Container lock indicator panel
c. Instrument panels
d. Switches
e. Oil level switch
f. Radio interference suppression components
g. Backup wining alarm and switch
h. Vehicle horns
i. Relays, solenoids, circuit breaker, diodes and switches and repairing wiring harnesses

LIST OF TASKS (Sheet 1 of 1)

TASK NO.	TASK	REF (PAGE)	TROUBLESHOOTING REF (PAGE)
1	Container lock indicator panel removal/ installation	2-298	2-124
2	Main disconnect switch removal/installation	2-300	2-74
3	Container lock indicator disassembly/assembly	2-302	2-125
4	Instrument panels removal, disassembly, assembly, installation	2-305	2-113, 2-127
5	Switch removal/installation	2-315	2-87, 2-89
6	Oil level switch removal/installation	2-317	2-138
7	Radio interference suppression components removal/installation	2-319	None
8	Front warning horn removal/installation	2-327	2-95
9	Backup warning alarm and switch removal/ installation	2-329	2-143
10	Vehicle horns removal/installation	2-332	2-95
11	Backup alarm/start interlock switch testing/ adjustment	2-334	2-73, 2-144
12	Relay, solenoid, circuit breaker, diode and switch removal/installation	2-337	2-88, 2-97
13	Wiring harness repair	2-340	2-66

End

CONTAINER LOCK INDICATOR PANEL REMOVAL/INSTALLATION (Sheet 1 of 2)

This task covers: Removal/installation of container lock indicator panel.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Container lock indicator panel

Troubleshooting Reference

Page 2-124

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

Container lock indicator disassembly/assembly, page 2-302

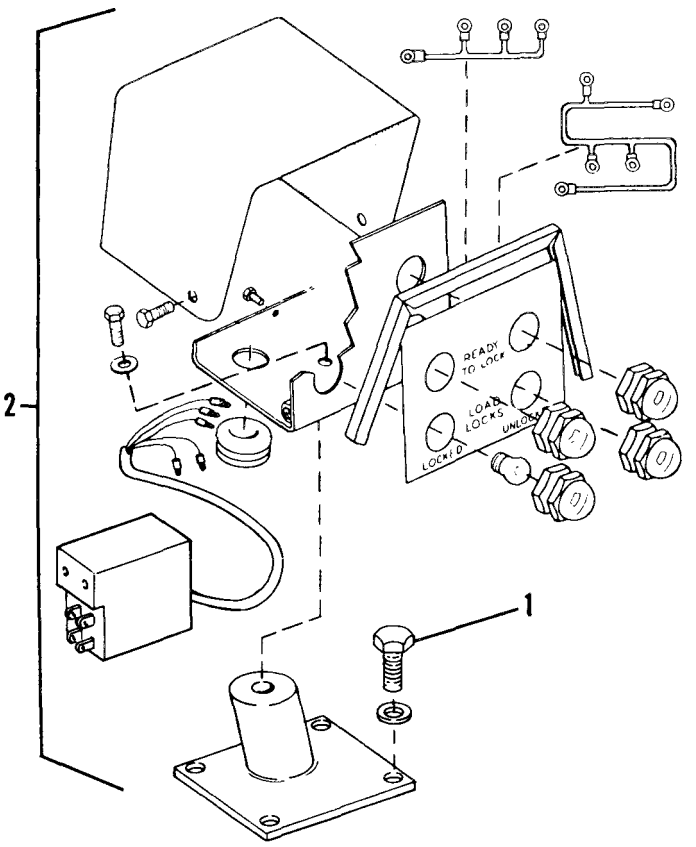
General Safetv Instructions

Main disconnect switch OFF

Go on to Sheet 2

CONTAINER LOCK INDICATOR PANEL REMOVAL/INSTALLATION (CONT)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Capscrews and washers (1)	Remove.	
2. Container lock indicator assembly (2)	Remove.	
INSTALLATION		
Container lock indicator assembly (2)	Locate on floor heater housing.	
2. Capscrews and washers (1)	Install.	



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End

MAIN DISCONNECT SWITCH REMOVAL/INSTALLATION

This task covers: Removal and installation of the main disconnect switch.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Main disconnect switch

Troubleshooting Reference

Page 2-74

Equipment Condition

Engine OFF

Special Tools

Battery terminal puller

Personnel Reauired

One mechanic

References

Battery service, page 2-272

TM 10-3930-641-10

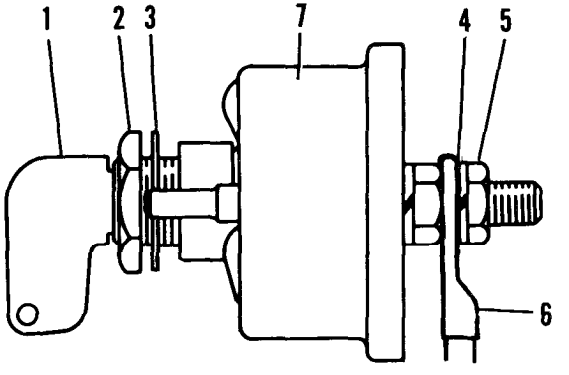
General Safety Instructions

Batteries disconnected, see page 2-272

Go on to Sheet 2

MAIN DISCONNECT SWITCH REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL	**WARNING**	
	Disconnect negative (black) cable from battery at each battery box.	
1. Key (1)	Turn to OFF and remove.	
2. Nuts (5), washers (4) and three cables (6)	Remove after tagging the three cables for location.	
3. Nut (2) and washer (3)	Remove.	
4. Switch (7)	Remove from the mounting plate.	
INSTALLATION		
1. Switch (7)	Position through the mounting plate.	
2. Washer (3) and nut (2)	Install and tighten.	Torque to 20 lb. ft. (27 N•m).
3. Three cables (6), washers (4) and nuts (5)	Install and tighten.	Torque to 40 lb. ft. (54 N•m).
4. Key (1)	Install.	NOTE
5. Battery cables	Connect.	Connect negative terminals last.



TA 098699

End

CONTAINER LOCK INDICATOR DISASSEMBLY/ASSEMBLY

This task covers: Disassembly/assembly of container lock indicator.

INITIAL SETUP

Test Equipment

None

Materials/Parts

As required

Troubleshooting Reference

Page 2-125

Equipment Condition

Engine OFF

Container lock indicator panel removed

Special Tools

None

Personnel Required

One mechanic

References

Container lock indicator panel removal/ installation, page 2-298

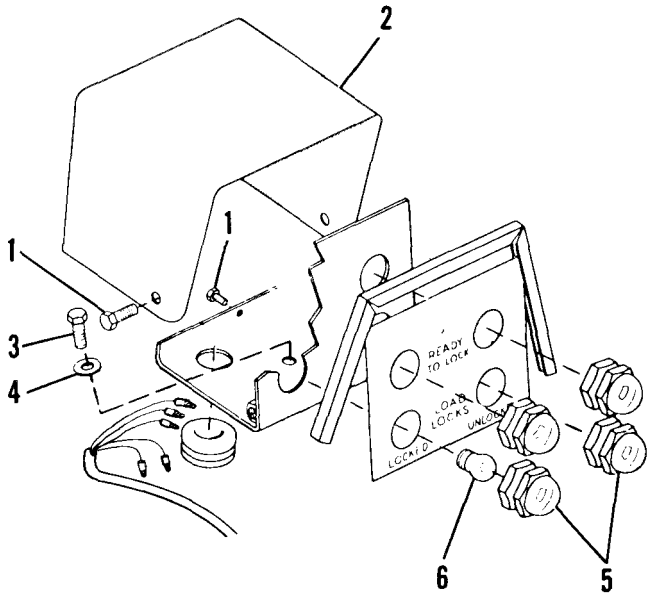
General Safety Instmctions

None

Go on to Sheet 2

CONTAINER LOCK INDICATOR DISASSEMBLY/ASSEMBLY (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
DISASSEMBLY		
1. Capscrews (1) and cover (2)	Remove.	
2. Mounting cap screw (3) and washer (4)	Remove.	
3. Screws and wires	a. Tag wires (for reassembly) and remove. b. Pull wires through grommet in plate.	
4. Bulb covers (5)	Remove.	
5. Bulbs (6)	Remove.	

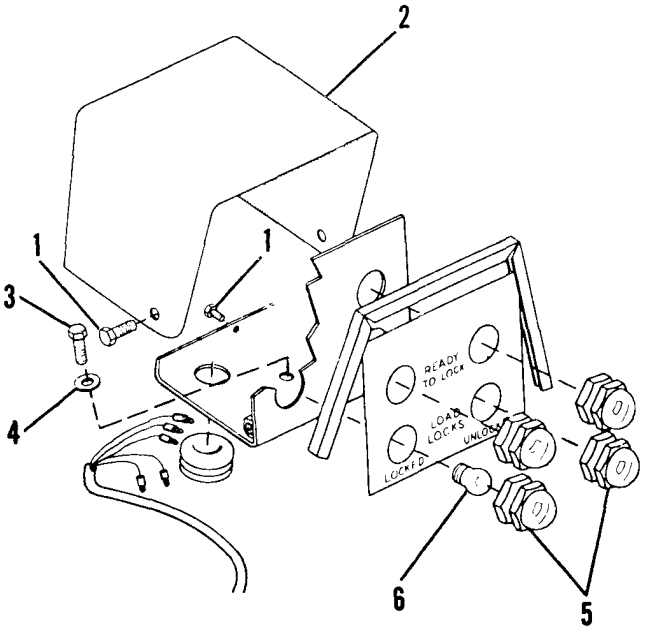


TA 098700

Go on to Sheet 3

CONTAINER LOCK INDICATOR DISASSEMBLY/ASSEMBLY (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
ASSEMBLY		
1. Wires and screws	Pull wires through grommet and install.	
2. Washer (4) and mounting capscrew (3)	Install.	
3. Cover (2) and capscrews (1)	Install.	
4. Bulbs (6)	Install.	
5. Bulb covers (5)	Install.	



TA 098701

End

INSTRUMENT PANELS REMOVAL, DISASSEMBLY, ASSEMBLY, INSTALLATION

This task covers: Replacement of instrument panels and components.

INITIAL SETUP

Test Equipment

None

Materials/Parts

As needed

Troubleshooting Reference

Pages 2-113, 2-127

Equipment Condition

Engine OFF

Special Tools

None

Personnel Reauired

One mechanic

References

None

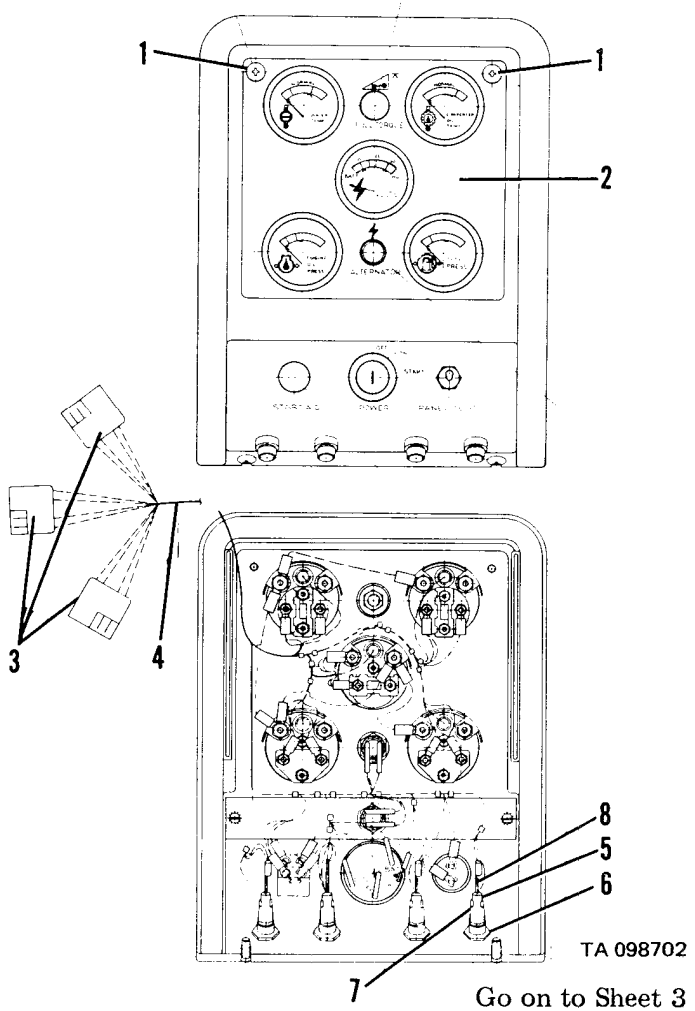
General Safety Instructions

Main disconnect switch OFF

Go on to Sheet 2

INSTRUMENT PANELS REMOVAL, DISASSEMBLY, ASSEMBLY, INSTALLATION (CONT) (Sheet 2 of 10)

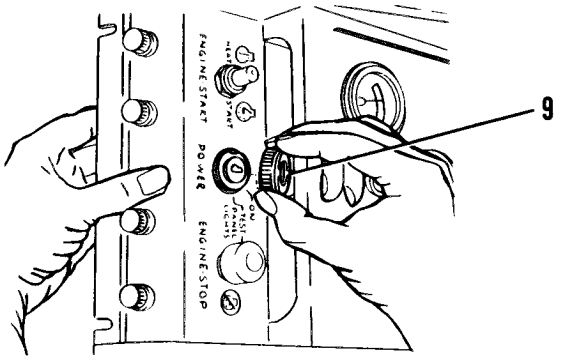
LOCATION/ITEM	ACTION	REMARKS
REMOVAL	NOTE Follow the same procedure for either instrument panel.	
1. Four screws (1)	Remove from panel (2) and pull out panel.	
2. Harness (4)	Disconnect at connectors (3). Remove panel.	
3. Capacitor	Remove from capscrew in lower right hand comer behind left instrument panel.	
DISASSEMBLY		
1. Fuseholder (7)	Remove as follows:	
a. Two wires (8)	a. Disconnect from terminal (5).	
b. Nut (6)	b. Loosen and remove.	
	NOTE The slot in the nut must line up with the side terminal of fuseholder.	
c. Fuseholder (7)	c. Remove through front of panel.	

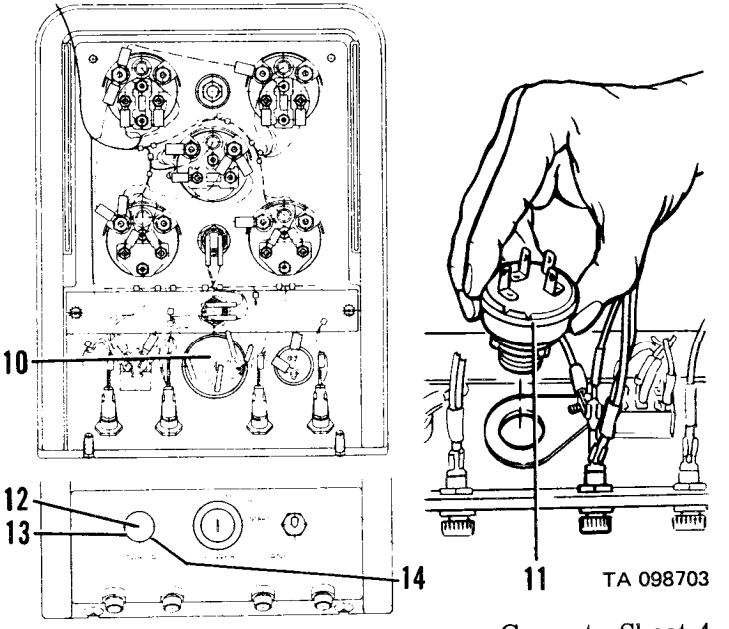


Go on to Sheet 3

INSTRUMENT PANELS R.EMOVAL, DISASSEMBLY, ASSEMBLY, INSTALLATION (CONT) (Sheet 3 of 10)

LOCATION/ITEM	ACTION	REMARKS
2. Power switch (11)	Remove as follows:	
a. Ring (9)	a. Remove.	
b. Wires (10)	b. Identify and disconnect.	
c. Switch (11)	c. Remove from back of panel.	
3. Starting aid switch (14)	Remove as follows:	
a. Rubber cap (12)	a. Turn in a counterclockwise direction to loosen and remove.	
b. Nut (13)	b. Remove.	

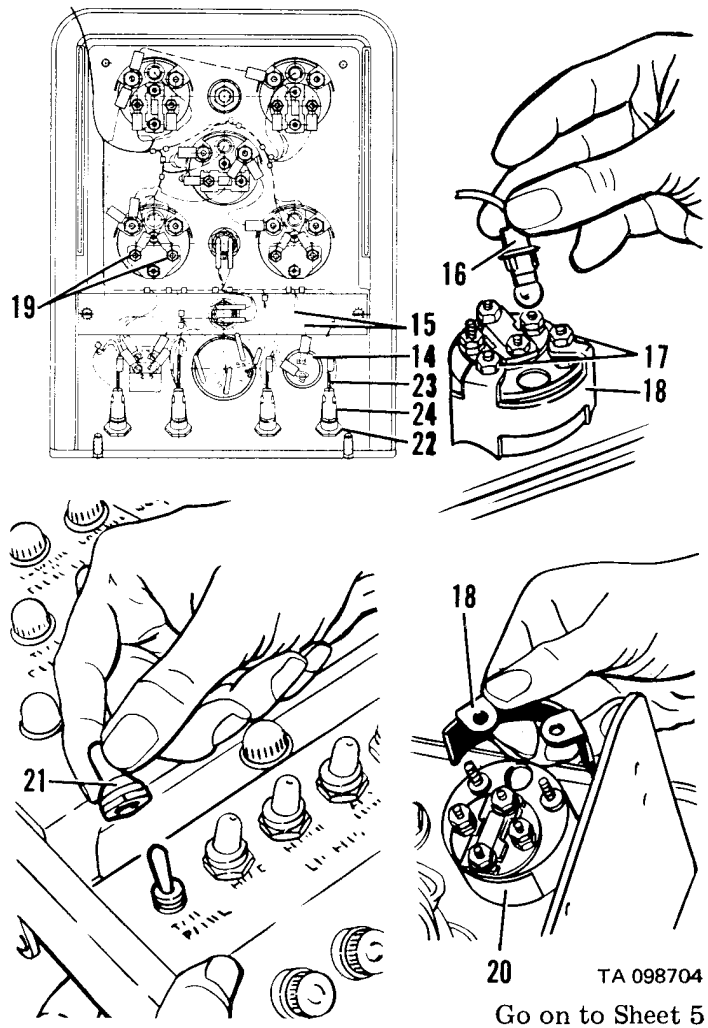




Go on to Sheet 4

INSTRUMENT PANELS REMOVAL, DISASSEMBLY, ASSEMBLY, INST'ALLATION (CONT) (Sheet 4 of 10)

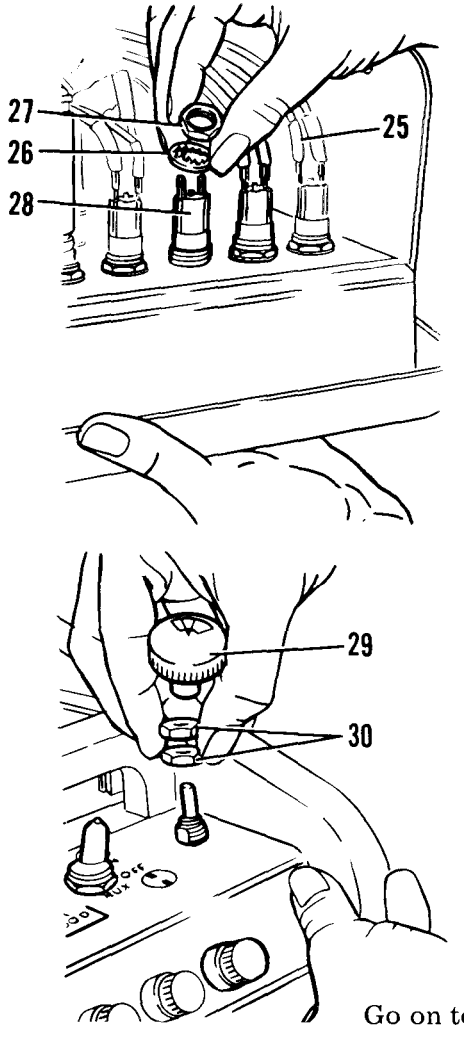
LOCATION/ITEM	ACTION	REMARKS
3. c. Two wires (15)	c. Remove from switch (14) and identify.	
d. Switch (14)	d. Remove from back of panel.	
4. Gages (all) (20)	Remove as follows:	
a. Lamp socket (16)	a. Remove from gage.	
b. Two wires (19)	b. Remove and identify.	
c. Two nuts (17) that fasten gage to retainer (18)	c. Remove. Remove retainer (18).	
d Gage (20)	d. Remove through front of panel.	
5. Toggle switches	Remove as follows:	
a. Nut (22) and rubber boot (21)	a. Use a wrench on nut (22 and remove.	



Go on to Sheet 5

INSTRUMENT PANELS REMOVAL, DISASSEMBLY, ASSEMBLY, INSTALLATION (CONT) (Sheet 5 of 10)

LOCATION/ITEM	ACTION	REMARKS
5. b. Wires (23)	b. Disconnect and identify.	
c. Switch (24)	c. Remove from back of panel.	
6. Indicator lights	Remove as follows:	
a. Wires (25)	a. Disconnect and identify.	
b. Nut (27) and lockwasher (26)	b. Remove.	
c. Indicator light (28)	c. Remove through front of panel.	
7. Washer/wiper switch	Remove as follows:	
a. Knob (29)	a. Pull from switch.	
b. Locknut and nut (30)	b. Remove from switch.	

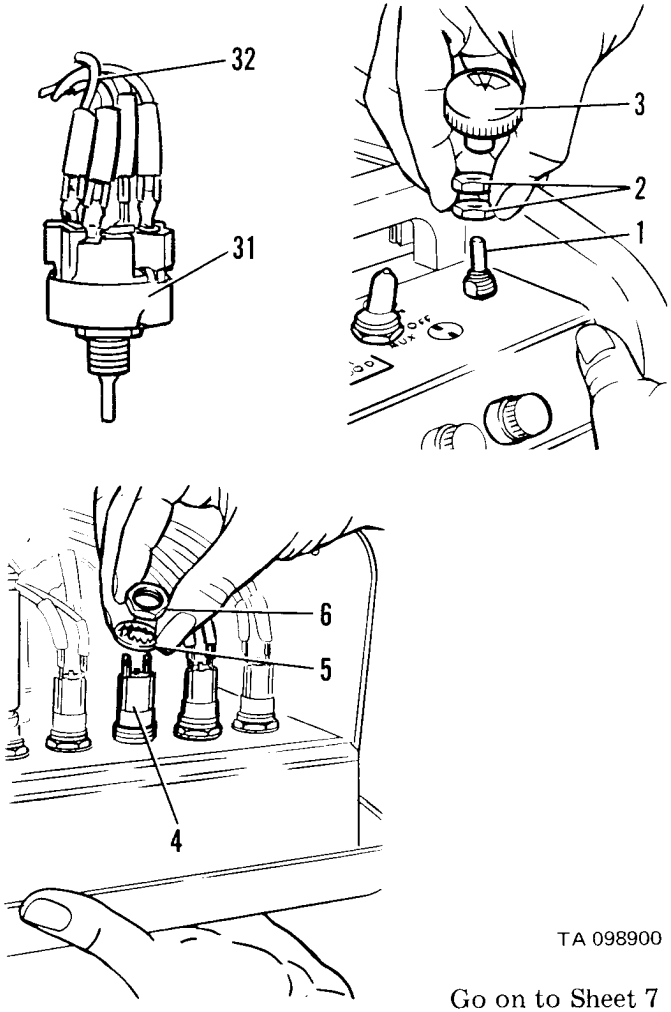


TA 098705

Go on to Sheet 6

INSTRUMENT PANELS REMOVAL, DISASSEMBLY, ASSEMBLY, INSTALLATION (CONT) (Sheet 6 of 10)

LOCATION/ITEM	ACTION	REMARKS
8. c. Wires (32)	c. Remove from switch and identify.	
d. Switch (31)	d. Remove from back of panel.	
ASSEMBLY		
1. Washer/wiper switch (1)	Install as follows:	
a. Switch (1)	a. Put through rear of panel with flat part of shaft toward the TOP of the panel.	
b. Nut and locknut (2)	b. Install.	
c. Knob (3)	c. Install by pushing on to shaft.	
d. Wires (32)	d. Install.	
2. Indicator lights	Install as follows:	
a. Indicator socket (4)	a. Install through front of panel.	
b. Lockwasher (5) and nut (6)	b. Install on indicator.	
c. Two wires	c. Connect.	

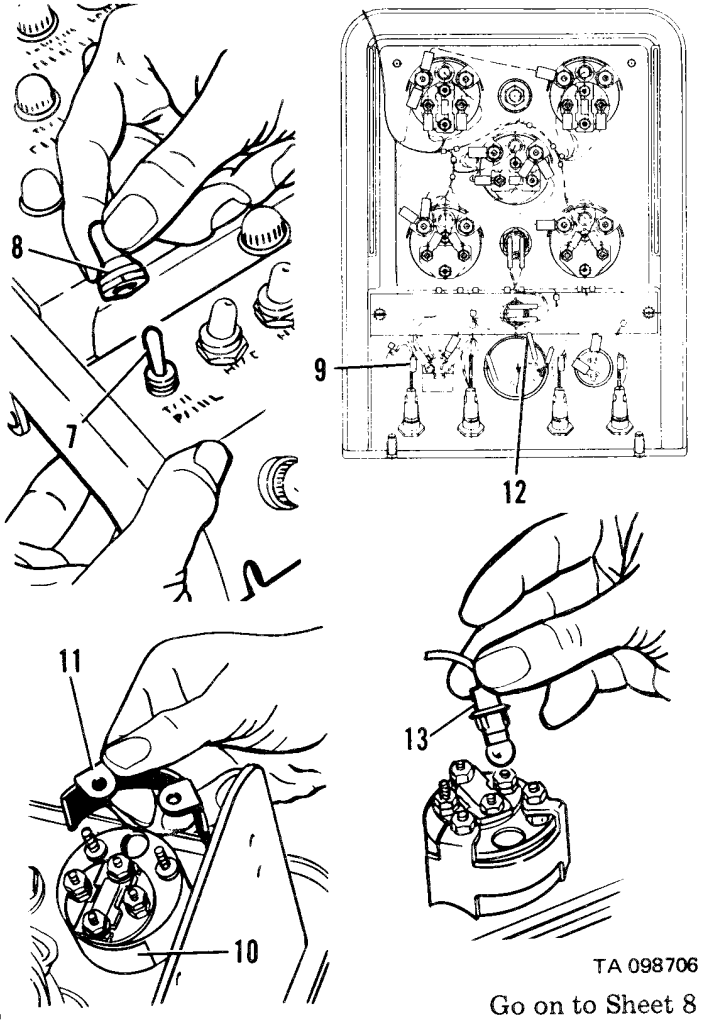


TA 098900

Go on to Sheet 7

INSTRUMENT PANELS REMOVAL, DISASSEMBLY, ASSEMBLY, INSTALLATION (CONT)

LOCATION/ITEM	ACTION	REMARKS
3. Toggle switches (7)	Install as follows:	
a. Switch (7)	a. Install from back of panel.	
b. Boot (8) and nut	b. Install.	
	NOTE The groove in the switch must lineup with the tab in the panel.	
c. Two wires (9)	c. Connect to the terminals.	
4. Gages (all) (10)	Install as follows:	
a. Gage (10)	a. Install through front of panel.	
b. Retainer (11)	b. Install and fasten to gage with two lockwashers and two nuts.	
c. Wires (12)	c. Connect.	
d. Lamp socket (13)	d. Install in gage.	

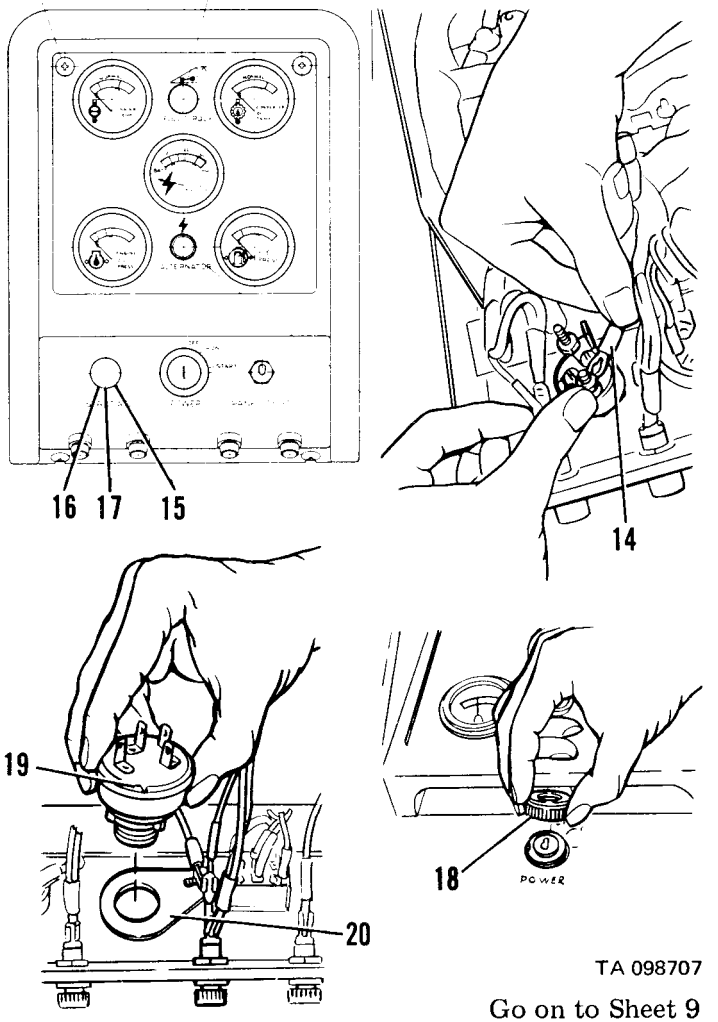


TA 098706

Go on to Sheet 8

INSTRUMENT PANELS REMOVAL, DISASSEMBLY, ASSEMBLY, INSTALLATION (CONT) (Sheet 8 of 10)

LOCATION/ITEM	ACTION	REMARKS
5. Stinting aid switch	Install as follows:	
a. Switch (15)	a. Install through back of panel.	
b. Nut (16) and cap (17)	b. Install on switch (15).	
c. Two wires (14)	c. Connect to back of switch (15).	
6. Ignition switch (19)	Install as follows:	
a. Switch (19)	a. Install through tab (20) and put switch through back of panel.	
b. Ring (18)	b. Install on switch and hand-tighten.	
c. Three wires	c. Connect.	

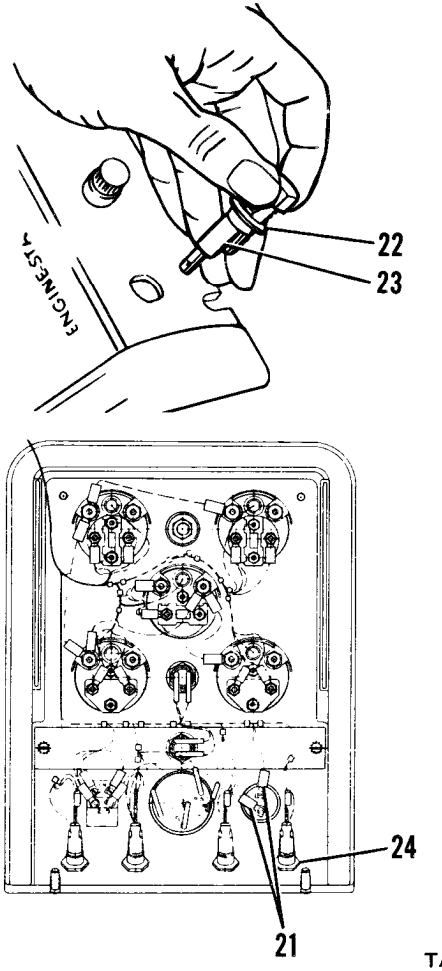


TA 098707

Go on to Sheet 9

INSTRUMENT PANELS REMOVAL, DISASSEMBLY, ASSEMBLY, INSTALLATION (CONT) Sheet 9 of 10)

LOCATION/ITEM	ACTION	REMARKS
7. Fuseholder (23)	Install as follows:	
a. Seal (22)	a. Install on fuseholder (23).	
b. Fuseholder (23	b. Install through front of the panel.	
c. Nut (24)	c. Install on fuseholder.	
	NOTE The slot in the nut (24) must lineup with the side termimd of the fuseholder.	
d. Wires (21)	d. **Connect.**	

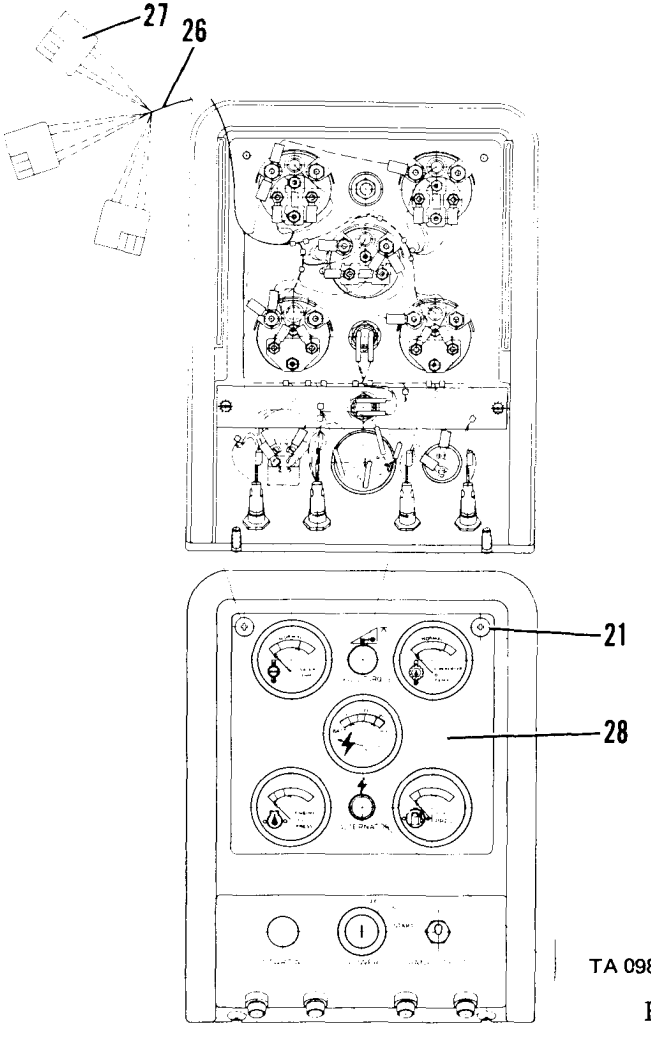


TA 098708

Go on to Sheet 10

INSTRUMENT PANELS REMOVAL, DISASSEMBLY, ASSEMBLY, INSTALLATION (CONT) (Sheet 10 of 10)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION		
1. Harness (26)	Connect to connectors (27).	
2. Capacitor	Connect to lower right hand corner of left panel behind wiper switch using nut and capscrew. See page 2-320.	
3. Panel (28)	Install, using four screws (21).	



TA 098709

End

SWITCH REMOVAL/INSTALLATION (Sheet 1 of 2)

This task covers: Replacement of all switches.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Switch

Troubleshooting Reference

Pages 2-87, 2-89

Equipment Condition

System drained to below level of switch

Special Tools

None

Personnel Required

One mechanic

References

Engine oil pressure sending unit removal/ installation, page 2-264.

Engine water temperature sending unit removal/ installation, page 2-266.

Instrument panels removal, disassembly, assembly, installation, page 2-305.

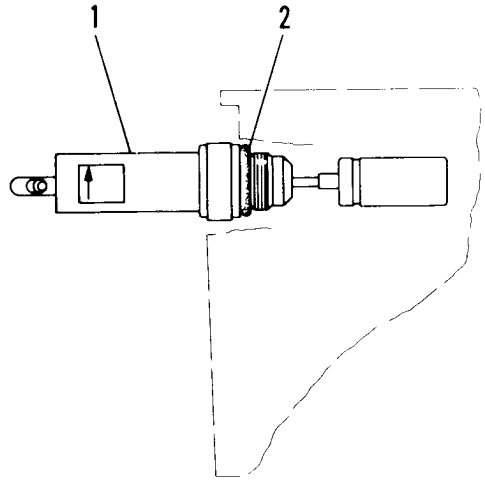
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

SWITCH REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Terminals	Mark for identification.	
2. Nuts and lockwashers holding terminals in place on the switch (1)	Remove.	
3. Fastening capscrews (2) holding switch in place.	Remove (or unscrew switch, depending on type).	
4. Switch (1)	Remove.	
INSTALLATION		
1. Switch (1)	Place in position on machine.	
2. Fastening capscrews (2) to hold switch in place	Install.	
3. Terminals	Place in position.	
4. Nuts and lockwashers	Install.	



TYPICAL SWITCH

TA 098901

End

OIL LEVEL SWITCH REMOVAL/INSTALLATION (Sheet 1 of 2)

This task covers: Removal and installation of oil level switch.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Switch

Gasket

Troubleshooting Reference

Page 2-138

Equipment Condition

Engine oil is to be drained

Special Tools

None

Personnel Required

One mechanic

References

Engine oil pressure sending unit removal/ installation, page 2-264

Switch removal/installation, page 2-315

LO 10-3930-641-12

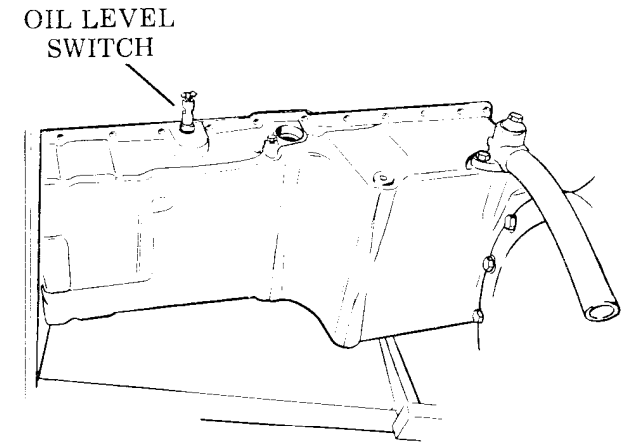
General Safety Instructions

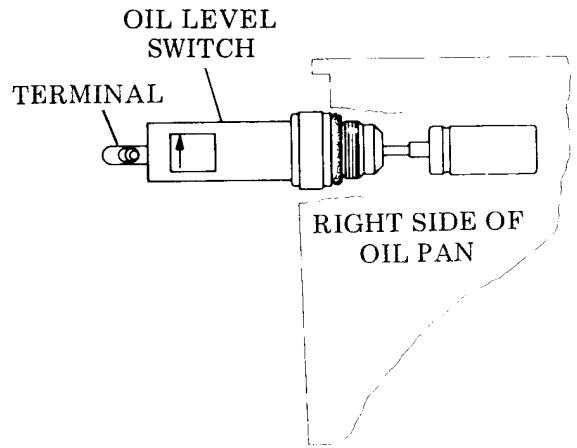
Main disconnect switch OFF

Go on to Sheet 2

OIL LEVEL SWITCH REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Terminal wire	Remove from end of switch.	
2. Oil level switch	Remove. (Unscrew from oil pan.)	
INSTALLATION		
1. Oil level switch	Install with a new gasket.	
2. Terminal wire	Install on end of switch.	





TA 098710

End

RADIO INTERFERENCE SUPPRESSION COMPONENTS REMOVAL/INSTALLATION

This task covers: Removal and installation of radio interference suppression components.

INITIAL SETUP

Test Equipment

None

Materials/Parts

As needed

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

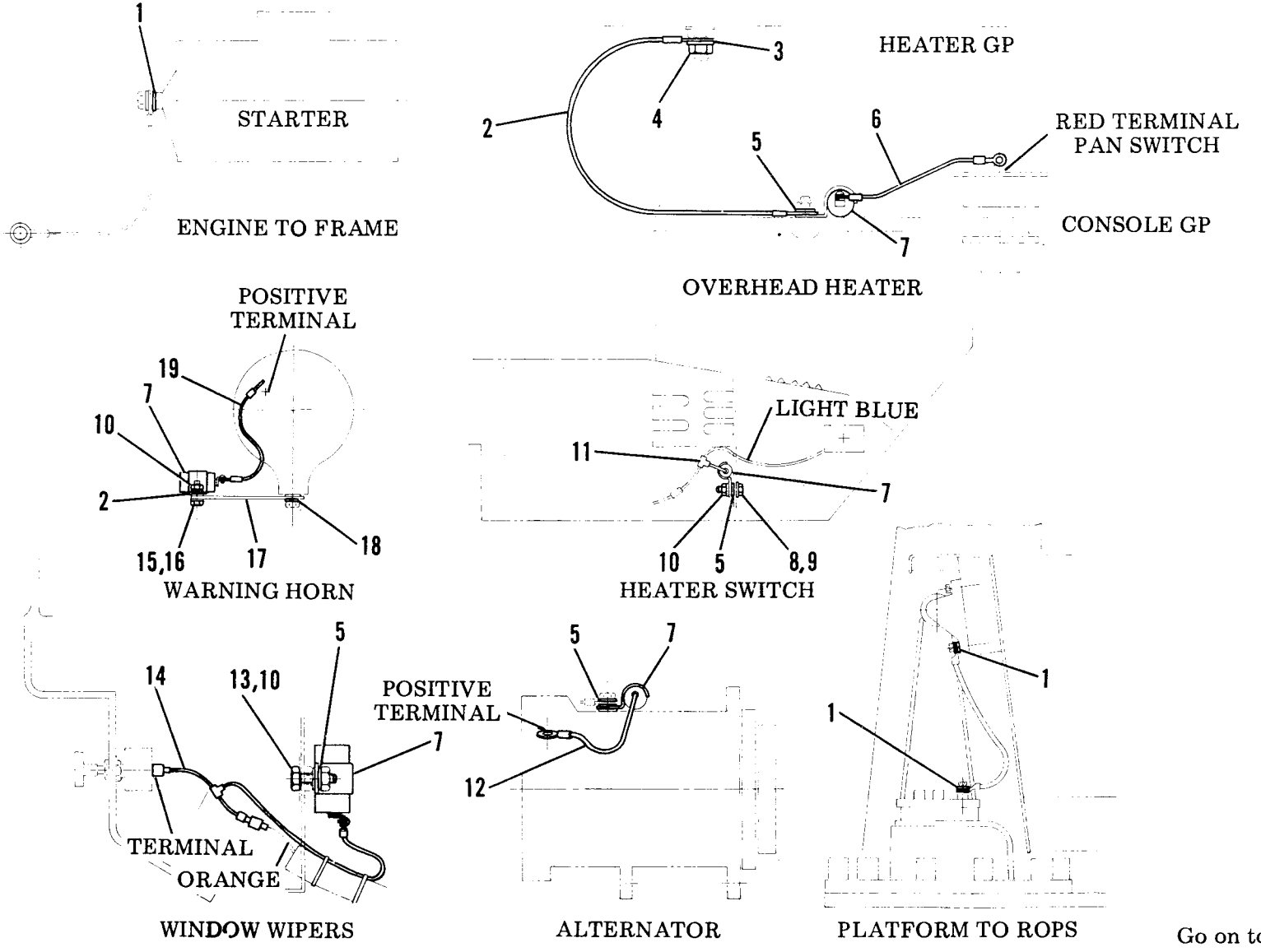
Radio interference suppression, page 2-510.

General Safety Instructions

Main disconnect switch OFF

Go on to Sheet 2

RADIO INTERFERENCE SUPPRESSION COMPONENTS REMOVAL/INSTALLATION (CONT) (Sheet 2 of 8)

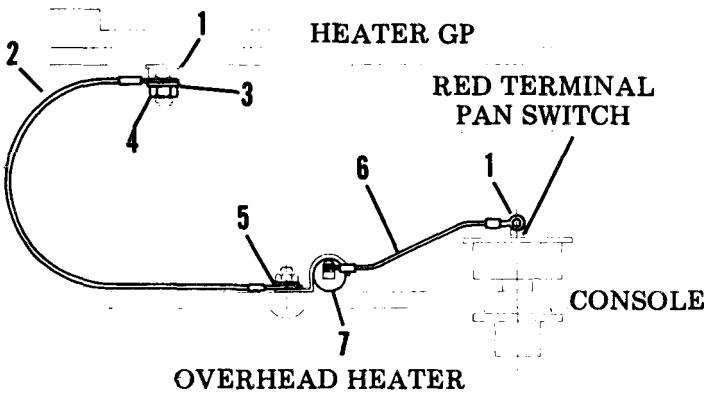
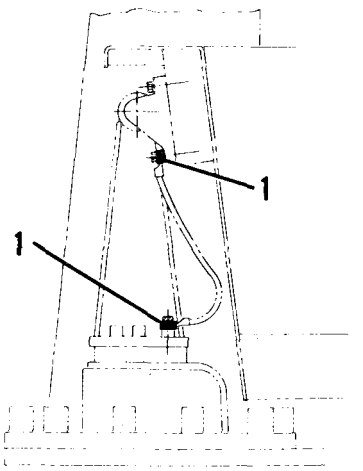


1. Terminal
2. Wire
3. Washer
4. Nut
5. Washer
6. Wire
7. Capacitor
8. Washer
9. Capscrew
10. Capscrew
11. Clip
12. Wire
13. Washer
14. Wire
15. Washer
16. Capscrew
17. Plate
18. Washer

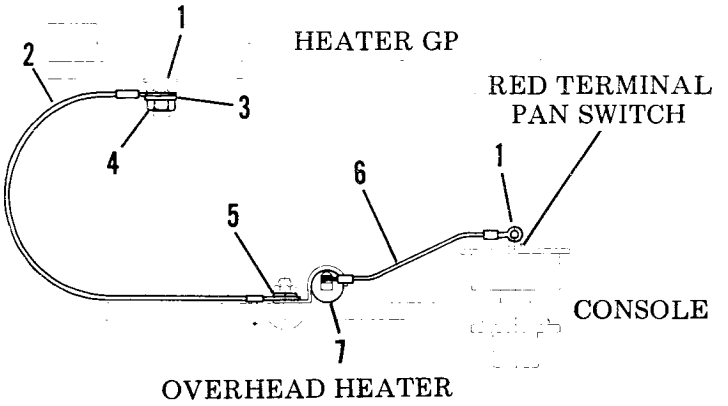
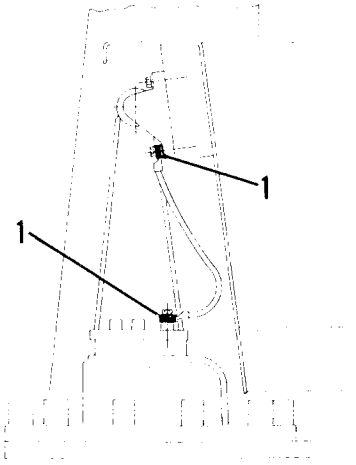
TA 098711

Go on to Sheet 3

RADIO INTERFERENCE SUPPRESSION COMPONETS REMOVAL/INSTALLATION (CONT) (Sheet 3 of 8)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL	NOTE Determine where the wire is routed and make note. The shield wire may be in a harness. If so, it will be necessary to-cut the wrapping to remove it. Make sure it gets rewrapped when it is installed.	 OVERHEAD HEATER
1. Electrical terminals (1)	Remove.	
2. Shield wire (2), (6)	Remove.	 PLATFORM TO ROPS TA 098902

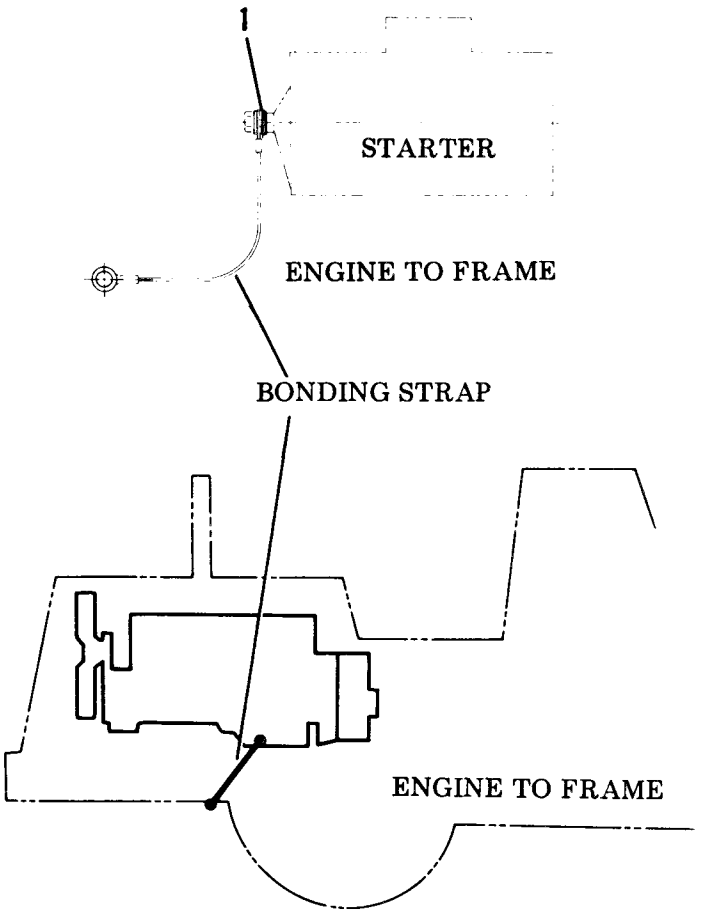
Go onto Sheet 4

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION	NOTE Determine where the wire is routed and make note. The shield wire may be in a harness. If so, it will be necessary to cut the wrapping to remove it. Make sure it gets rewrapped when it is installed.	 OVERHEAD HEATER
1. Shield wire	Route wire in the original way.	
2. Electrical connectors	Install.	 PLATFORM TO ROPS TA 098903

Go on to Sheet 5

RADIO INTERFERENCE SUPPRESSION COMPONENTS REMOVAL/INSTALLATION (CONT) (Sheet 5 of 8)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Bonding strap	Locate.	
2. Terminals (1)	Remove.	
3. Bonding strap	Remove.	

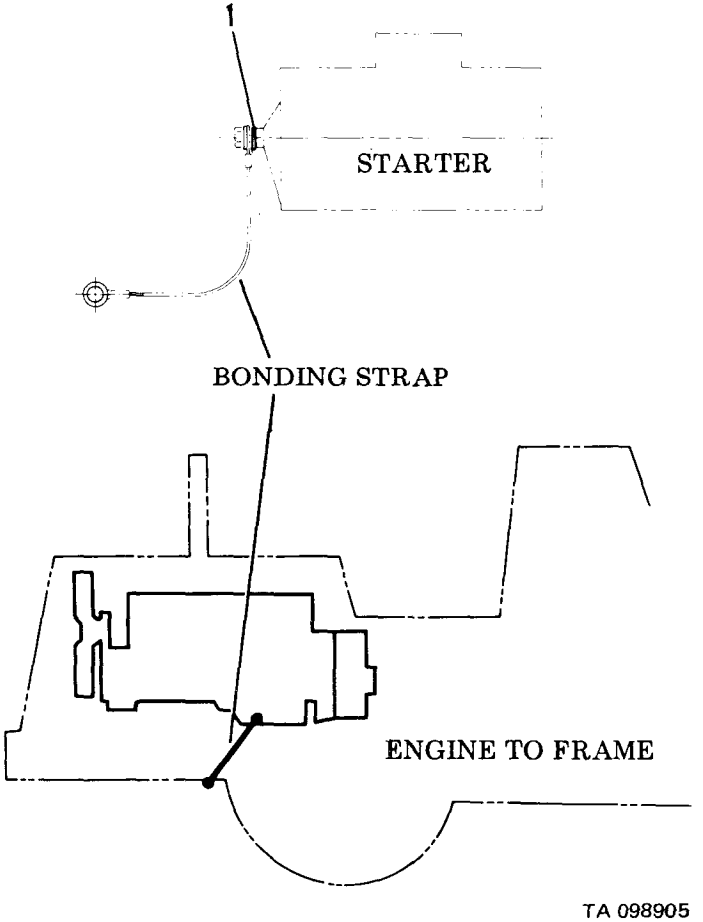


TA 098904

Go on to Sheet 6

RADIO INTERFERENCE SUPPRESSION COMPONENTS REMOVAL/INSTALLATION (CONT) (Sheet 6 of 8)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION		
1. Bonding strap	Locate on mounting holes.	
2. Terminals (1)	Install.	

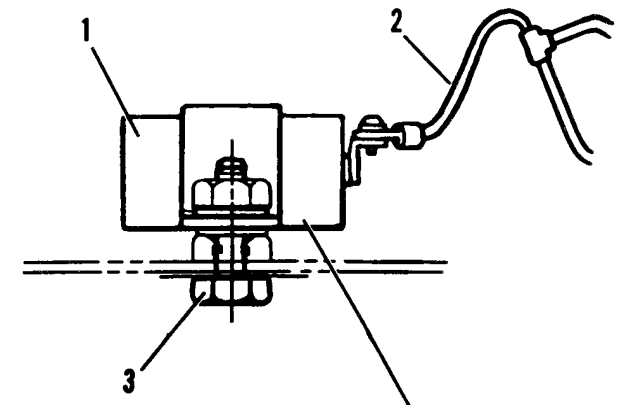


TA 098905

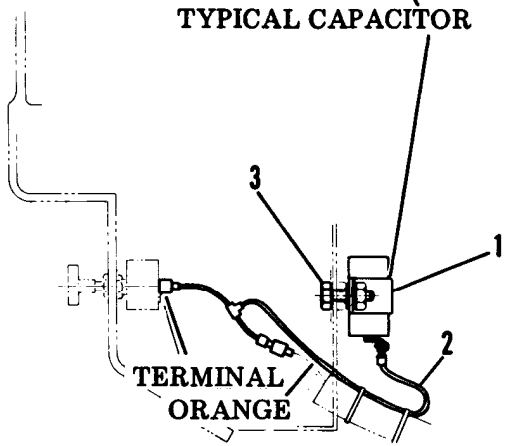
Go on to Sheet 7

RADIO INTERFERENCE SUPRESSION COMPONENTS REMOVAL/INSTALLATION (CONT) (Sheet 7 of 8)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Capacitor (1)	Locate.	
2. Wire (2)	Remove.	
3. Fastener (3)	Remove.	
4. Capacitor	Remove.	



TYPICAL CAPACITOR



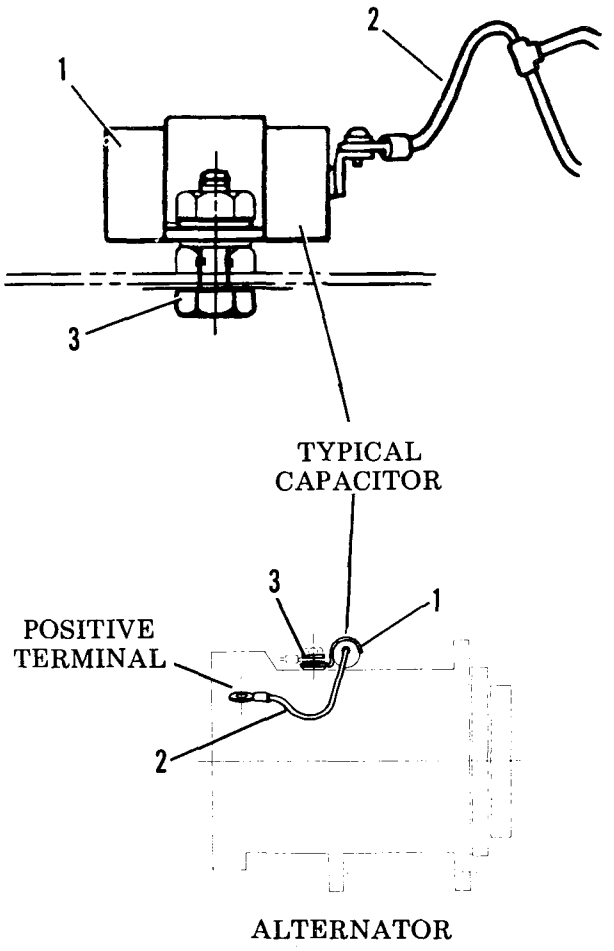
WINDOW WIPERS

TA 098712

Go on to Sheet 8

RADIO INTERFERENCE SUPPRESSION COMPONENTS REMOVAL/INSTALLATION (CONT) (Sheet 8 of 8)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION		
1. Capacitor (1)	Locate on mounting holes.	
2. Fasteners (3)	Install.	
3. Wire (2)	Install.	



End

FRONT WARNING HORN REMOVAL/INSTALLATION

This task covers: Removal and installation of either front warning horn.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

Page 2-95

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

None

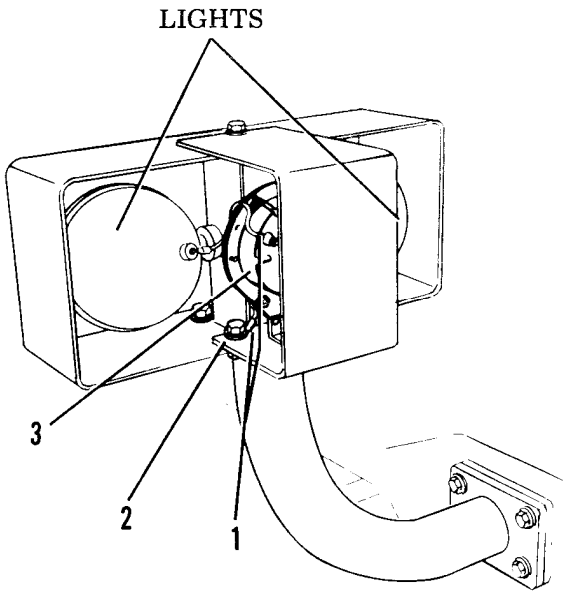
General Safety Instructions

Main disconnect switch OFF

Go on to Sheet 2

FRONT WARNING HORN REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Wires (1)	Tag wires for identification and disconnect.	
2. Capscrews, nuts and washers (2)	Remove.	
3. Horn (3)	Remove.	
INSTALLATION		
1. Horn (3)	Locate on mounting hole.	
2. Capscrews, nuts and washers (2)	Install.	
3. Wires (1)	Connect to horn.	



TA 098713

End

BACKUP WARNING ALARM AND SWITCH REMOVAL/INSTALLATION (Sheet 1 of 3)

This task covers: Removal and installation of backup warning alarm and switch.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

Page 2-143

Equipment Condition

Radiator rear guard lower section removed

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

Radiator rear guard removal/installation, page 2-242

Backup alarm/start interlock switch testing/ adjustment, page 2-334

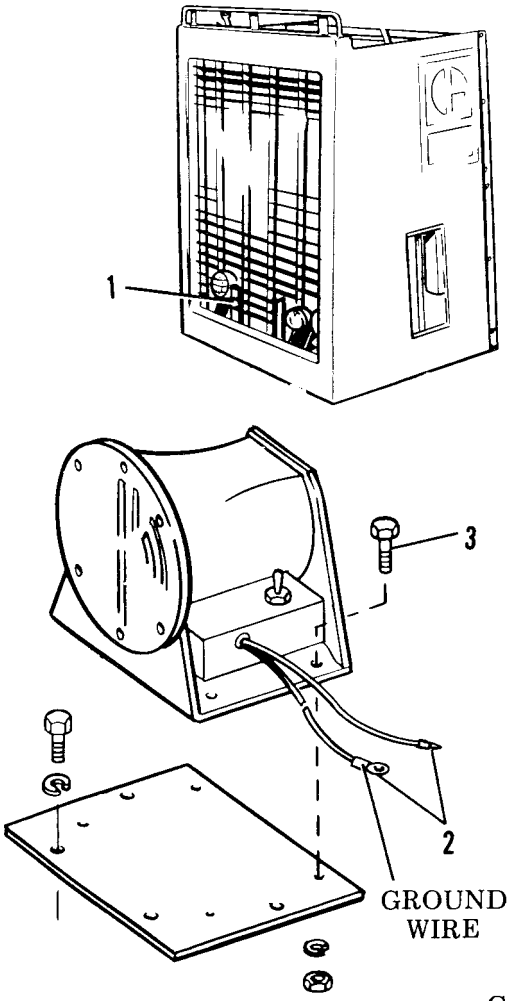
General Safety Instructions

Main disconnect switch OFF

Go on to Sheet 2

BACKUP WARNING ALARM AND SWITCH REMOVAL/INSTALLATION (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
ALARM REMOVAL		
1. Wires (2)	Tag and disconnect.	
2. Nuts, washers and bolts (3	Remove two.	
3. Alarm (1)	Remove.	
ALARM INSTALLATION		
1. Alarm (1)	Locate on mounting holes.	
2. Bolts (3), washers and nuts	Install. Ground wire must be under nut.	
3. Wires (2)	Connect.	

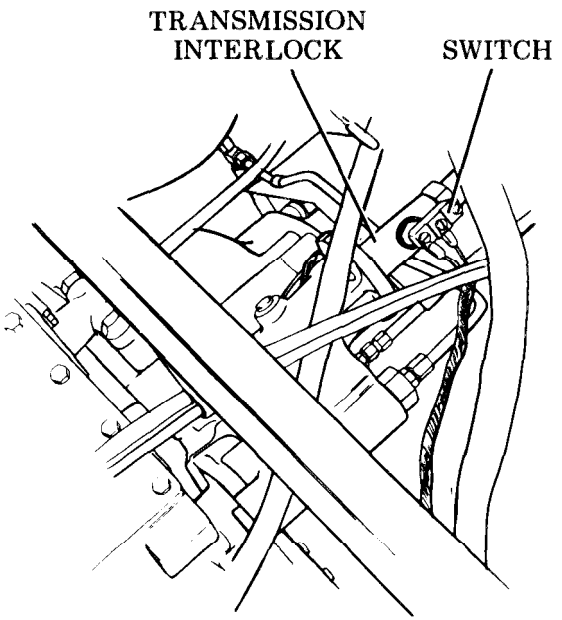


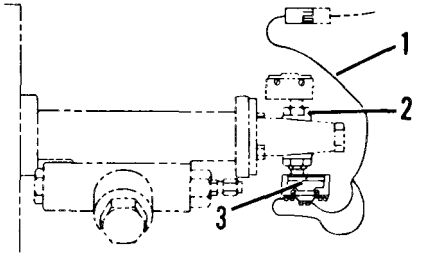
TA 098714

Go on to Sheet 3

BACKUP WARNING ALARM AND SWITCH REMOVAL/INSTALLATION (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
SWITCH REMOVAL		
1. Wire (1)	Unplug.	
2. Nut (2)	Remove.	
3. Switch (3)	Remove.	
SWITCH INSTALLATION		
1. Switch (3)	Place in mounting hole.	
2. Nut (2)	Install.	
3. Wire (1)	Plug in.	Adjust switch travel. See page 2-334.





TA 098715

End

VEHICLE HORNS REMOVAL/INSTALLATION (Sheet 1 of 2)

This task covers: Replacement of vehicle horns.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

Page 2-95

Equipment Condition

Engine OFF-

Special Tools

None

Personnel Required

One mechanic

References

None

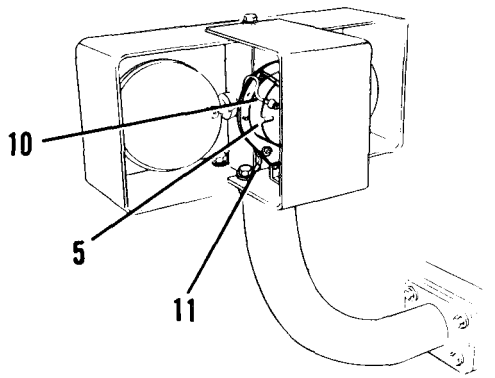
General Safety Instructions

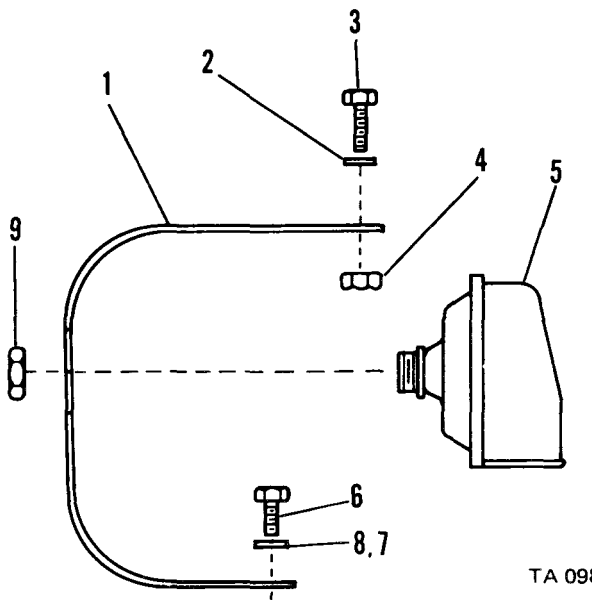
Main disconnect switch OFF

Go on to Sheet 2

VEHICLE HORNS REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Capscrews (3 and 6), nut (4) and washers (2 and 7)	Remove from bracket (1).	
2. Hex nut (9)	Remove from bracket (1).	
3. Horn (5)	Remove.	
4. Electrical connector (10)	Disconnect.	
5. Ground cable (11)	Disconnect.	
INSTALLATION		
1. Electrical connector (10)	Connect.	
2. Horn (5)	Install.	
3. Hex nut (10)	Install.	
4. Ground cable (11)	Connect.	
5. Capscrews (3 and 6), washers (2 and 7) and nuts (4)	Install.	





TA 098716

End

BACKUP ALARM/START INTERLOCK SWITCH TESTING/ADJUSTMENT

This task covers: Testing and adjusting of backup alarm or start interlock micro switches.

INITIAL SETUP

Test Equipment

Multimeter

Materials/Parts

None

Troubleshooting Reference

Pages 2-73, 2-144

Equipment Condition

Engine OFF

Soecial Tools

None

Personnel Required

One mechanic

References

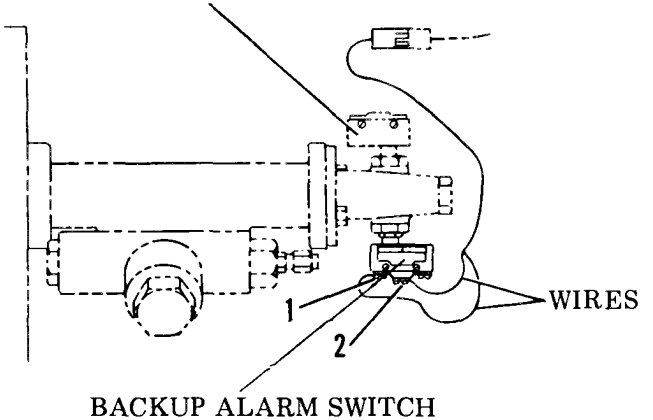
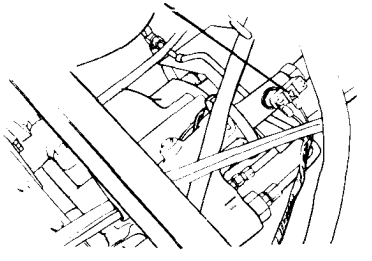
None

General Safety Instructions

Main disconnect switch OFF

Go on to Sheet 2

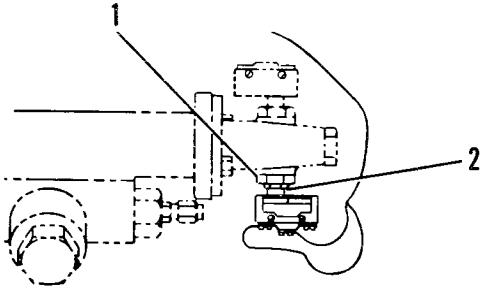
BACKUP ALARM/START INTERLOCK SWITCH TESTING/ADJUSTMENT (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
TESTING		START INTERLOCK SWITCH  BACKUP ALARM SWITCH 
1. Transmission interlock or backup alarm micro switch terminals	a. Tag and disconnect both wires. b. With your multimeter set to read ohms, connect one lead to terminal (1) and connect other lead to terminal (2).	
2. Transmission gear selector	a. Place in REVERSE. b. Place in NEUTRAL. c. Place transmission selector in FORWARD.	Multimeter should read ZERO (switch closed). Multimeter should read ∞ (switch open). For start interlock switch, multimeter should read ZERO; for backup alarm switch, multimeter should read ∞.

TA 098717

Go on to Sheet 3

BACKUP ALARM/START INTERLOCK SWITCH TESTING/ADJUSTMENT (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
ADJUSTMENT	Multimet.er connected as in TESTING.	
1. Actuator jam nut (1)	Loosen.	
2. Transmission gear selector.	Put in REVERSE.	
3. Actuator body (2)	a. Turn in or out just until ohms scale reads ZERO, switch closes.	If ohms scale remains ∞ ohms, replace switch and actuator assembly. Repeat adjustment.
	b. Turn (2) one additional turn in.	
4. Actuator jam nut (1)	Tighten.	Go to TESTING, Step 1.

TA 098718

End

RELAY, SOLENOID, CIRCUIT BREAKER, DIODE AND SWITCH REMOVAL/INSTALLATION

This task covers: Removal and installation of any relay, solenoid, circuit breaker, diode and switch.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

Pages 2-88, 2-97

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

Schematics, page FO-1

General Safety Instructions

Main disconnect switch OFF

Go on to Sheet 2

RELAY, SOLENOID, CIRCUIT BREAKER, DIODE AND SWITCH REMOVAL/INSTALLATION (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Wires	Locate, tag and remove all wires connected to the part being replaced.	See schematics, page FO-1.
2. Nuts, bolts or screws	Remove the fastener holding the part on.	
3. Relay, solenoid, circuit breaker, diode or switch	Remove.	

Go on to Sheet 3

RELAY, SOLENOID, CIRCUIT BREAKER, DIODE AND SWITCH REMOVAL/INSTALLATION (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION		
1. Relay, solenoid, circuit breaker, diode or switch	Position on mounting holes.	
2. Bolts, nuts or screws	Install.	
3. Electrical wires	Install per tagging.	

End

WIRING HARNESS REPAIR

This task covers: Repairing wiring harness.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Wire that is the correct gage

Troubleshooting Reference

Page 2-66

Equipment Condition

Harness removed from vehicle

Engine OFF

Special Tools

Electrical crimper

Soldering gun

Personnel Required

One mechanic

References

Electrical schematics, page FO-1

General Safety Instructions

Main disconnect switch OFF

Go on to Sheet 2

WIRING HARNESS REPAIR (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
1. Wires	If wires of a harness are found defective they may be replaced. Sometimes it may be necessary to cut open the wrapping with a sharp knife. After replacing the wire(s) you should rewrap the group of wires with electrical tape. At this time it will be necessary to replace the connectors. See Step 2.	Do not try to replace a wire with a gage different than that of the original wire. Try to replace the wire with the same color so it will be color coded to the manual.
2. Connector	There is a large variety of connectors available. Determine which type to use from the old connector. The connector may be fastened by soldering or crimping with an electrical crimper.	If you splice wires be sure you insulate the connection with electrical tape.

End

BRAKE SYSTEM MAINTENANCE INSTRUCTIONS

This section covers removal and installation of these brake system components for Organizational Maintenance personnel:

a. Parking brake linkage
b. Brake pedal
c. Service brake linkages

Also instructions for:

a. Adjusting parking brake linkage
b. Bleeding paxking brake
c. Adjusting service brake linkage
d. Adjusting service brake pedal
e. Bleeding service brake

LIST OF TASKS

(Sheet 1 of 1)

TASK NO.	TASK	REF (PAGE)	TROUBLESHOOTING REF (PAGE)
1	Parking brake control linkage removal/installation.	2-343	None
2	Service brake pedals removal/installation.	2-346	None
3	Brake pedal linkages disassembly/assembly.	2-353	2-34
4	Parking brake linkage adjustment.	2-358	2-35
5	Parking brake bleeding.	2-360	None
6	Parking brake lines and fittings inspection/removal/ installation.	2-363	2-34
7	Service brake control linkage adjustment.	2-366	2-34, 2-35
8	Service brake pedals adjustment.	2-369	2-34
9	Service brake system bleeding.	2-371	None

End

PARKING BRAKE CONTROL LINKAGE REMOVAL/INSTALLATION

This task covers: Removal and installation of parking brake linkage.

INITIAL SETUP

Test Equipment

None

Materials/Paxts

As required

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Wheels blocked

Special Tools

None

Personnel Required

One mechanic

References

PMCS, page 2-5

Parking brake linkage adjustment, page 2-358

General Safety Instructions

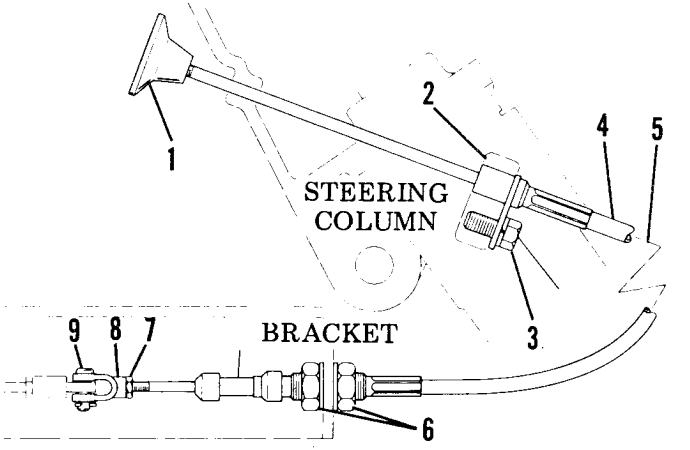
Block front and rear tires

Main disconnect switch OFF

Go on to Sheet 2

PARKING BRAKE CONTROL LINKAGE REMOVAL/INSTALLATION (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL	NOTE Make sure all oil pressure is relieved from brake system before disassembly. Turn off engine and relieve pressure by pressing a brake pedal repeatedly until ail brake oil pressure is relieved.	
1. Nut (7)	Loosen.	
2. Pin (9), cotter pin and clevis (8)	Remove from parking brake valve.	
3. Cable (5)	Disengage from clevis (8).	
4. Nuts (6)	Loosen completely.	
5. Capscrew (3) and clip (2)	Remove.	
6. Knob (1), stem, cable housing (4) and cable (5)	Remove.	
7. Knob, stem and cable (5)	Remove from cable housing (4).	



1. Knob
2. Clip
3. Capscrew
4. Cable housing
5. Cable
6. Nut
7. Nut
8. Clevis
9. Pin

TA 098719

Go on to Sheet 3

PARKING BRAKE CONTROL LINKAGE REMOVAL/INSTALLATION (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION		
8. Knob (1), stern and cable (5)	Insert in cable housing (4).	
9. Capscrew (3) and Clip (2)	Install to secure cable housing.	
10. Nuts (6)	Tighten.	
11. Pin (9), cotter pin and clevis (8)	Install.	
12. Nut (7)	a. Tighten. b. Adjust cable tension.	See page 2-358.

End

SERVICE BRAKE PEDALS REMOVAL/INSTALLATION

This task covers: Removal and installation of service brake pedal components.

INITIAL SETUP

Test Equipment

None

Materials/Pints

Multipurpose grease, item 3, Appendix C

Troubleshooting Reference

None

Equipment Condition

Engine shut down

Vehicle parked on level surface

Special Tools

Seal driver

L.eel rule

Personnel Required

One mechanic

References

Service brake pedal adjustment, page 2-369

PMCS, page 2-5

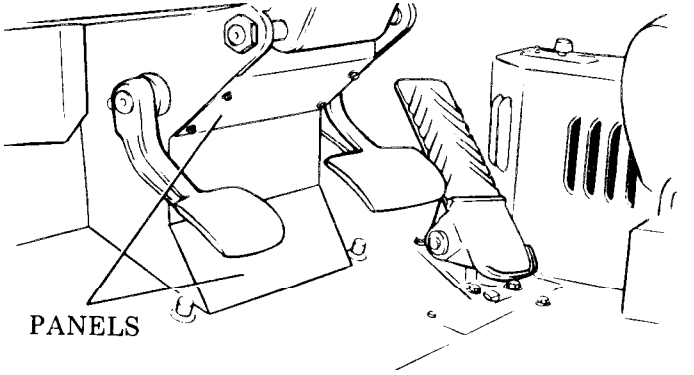
General Safety Instructions

Apply parking brake and block tires before performing the procedure.

Main disconnect switch OFF.

Go on to Sheet 2

SERVICE BRAKE PEDALS REMOVAL/INSTALLATION (CONT) (Sheet 2 of 7)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL	NOTE Procedure given is for right hand brake pedal. Left hand brake pedal is the same.	 PANELS
1. Two panels that cover brake pedal linkage and cables	Remove.	
2. Twelve point capscrew (10)	Remove from back of pedal.	See Sheet 4 for illustration.
3. Pedal (11) and washer (3)	Slide off splined shaft.	
4. Spring (18)	Remove.	

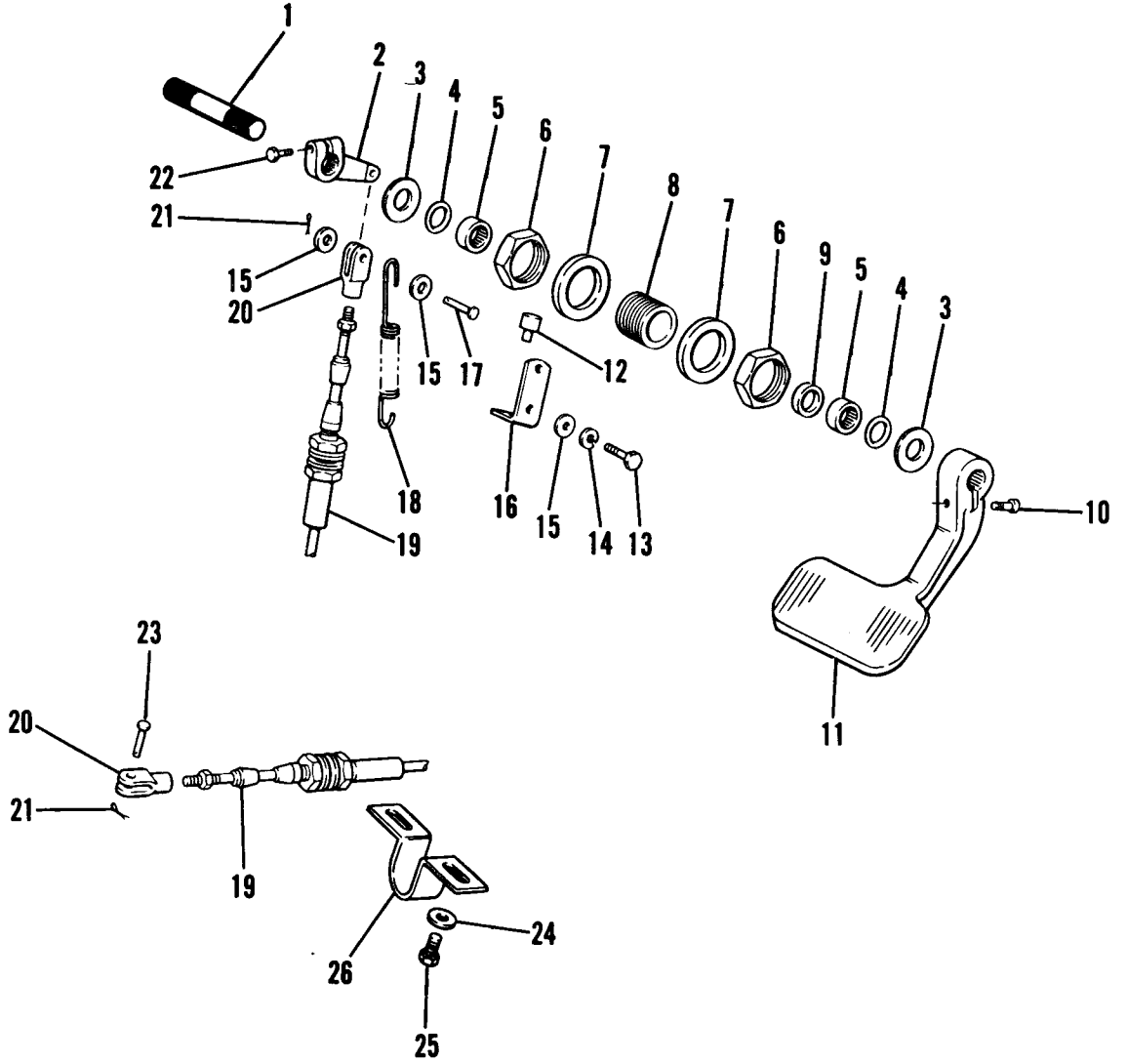
Go on to Sheet 3

SERVICE BRAKE PEDALS REMOVAL/INSTALLATION (CONT) (Sheet 3 of 7)

LOCATION/ITEM	ACTION	REMARKS
5. Capscrews (13). lockwashers (14). wa;her (15), angle assembly (16)'	Remove.	
6. Cotter pin (21), two washers (15), pin (17)	Remove from lever (2) to release cable (19).	
7. Shaft (1)	Slide out of bearing (5	
8. Capscrew (22) and shaft (1)	Remove from lever (2).	
9. Large nut (6) and washer (7) on inside of pedal	Remove from bearing retainer (8).	
10. Large nut (6) and washer (7) on outside of pedal	Remove from other side of bearing retainer (8).	

Go on to Sheet 4

SERVICE BRAKE PEDALS REMOVAL/INSTALLATION (CONT)



1. Shaft
2. Lever
3. Washer
4. Seal
5. Bearing
6. Nut
7. Washer
8. Retainer
9. Spacer
10. Capscrew
11. Pedal
12. Bumper
13. Capscrew
14. Lockwasher
15. Washer
16. Angle assembly
17. Pin
18. Spring
19. Cable assembly
20. Cable end
21. Cotter pin
22. Capscrew
23. Pin
24. Washer
25. Capscrew
26. Clamp

TA 088721

Go on to Sheet 5

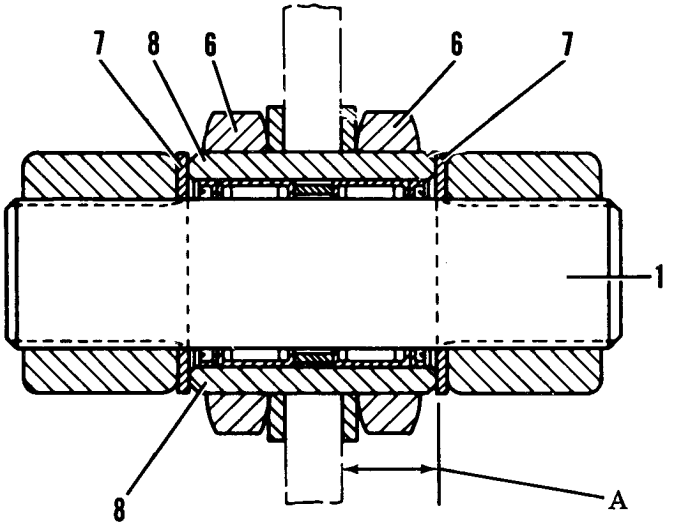
SERVICE BRAKE PEDALS REMOVAL/INSTALLATION (CONT) (Sheet 5 of 7)

LOCATION/ITEM	ACTION	REMARKS
11. Seals (4)	Remove and discard.	
12. Bearings (5) and spacer (9)	Remove.	
INSTALLATION		
1. Bearings (5)	a. Lubricate with multipurpose grease. b. Install with spacer (9) into retainer (8).	
2. Lip type seals (4)	a. Install in retainer. Seals must contact bearings. Lips of seals must be toward outside of retainer. b. Lubricate lips with multipurpose grease.	Use a seal driver to install.
3. One nut (6) and washer (7)	Install on retainer (8).	

Go on to Sheet 6

SERVICE BRAKE PEDALS REMOVAL/INSTALLATION (CONT) (Sheet 6 of 7)

LOCATION/ITEM	ACTION	REMARKS
4. Retainer (8)	Install into hole in frame.	
5. Other nut (6) and washer (7)	Install.	
6. Retainer assembly	Adjust: a. Turn nuts (6) until end of retainer (8) is 0.62 in. (15.7 mm) from side of bracket (Dimension A). b. Tighten nuts (6) to 90-110 lb. ft. (121-149 N•m).	
7. Lever (2)	a. Install on shaft (1). b. Secure with capscrew (22). c. Install assembly with washer (3) between lever and nut (6).	



TA 098722

Go on to Sheet 7

SERVICE BRAKE PEDALS REMOVAL/INSTALLATION (CONT) (Sheet 7 of 7)

LOCATION/ITEM	ACTION	REMARKS
8. Cable end (20)	Connect to lever assembly with washers (15), pin (17) and cotter pin (21).	
9. Spring (18)	Install on pin in lever assembly.	
10. Angle assembly (16)	Install against lever with two cap screws (13) and lockwashers (14) and washer (15).	
11. Pedal (11) and washer (3)	a. Install on splined shaft (1) of lever assembly so it is about 3.75 in. (95.3 mm) from floor. b. Secure with capscrew (10).	
12. Brake pedal	Adjust.	See page 2-369.
13. Floor panels	Install.	

End

BRAKE PEDAL LINKAGES DISASSEMBLY/ASSEMBLY (Sheet 1 of 5)

This task covers: Disassembly and assembly of brake pedal linkages.

INITIAL SETUP

Test Equipment

None

Materials/Parts

As required

Troubleshooting Reference

Page 2-34

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

Service brake pedal adjustment, page 2-369

PMCS, page 2-5

General Safety Instructions

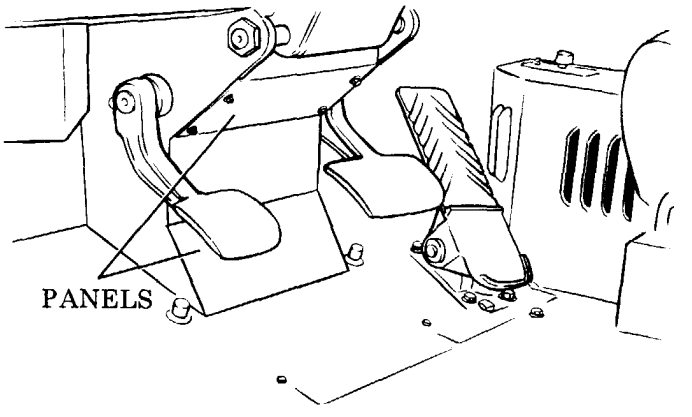
Block front and rear tires.

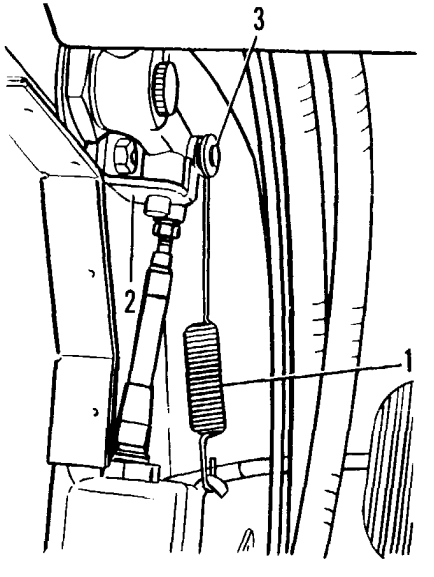
Main disconnect switch OFF.

Go on to Sheet 2

BRAKE PEDAL LINKAGES DISASSEMBLY/ASSEMBLY (CONT) (Sheet 2 of 5)

LOCATION/ITEM	ACTION	REMARKS
DISASSEMBLY	**WARNING** Make sure all pressure in brake system is re-[eased before any lines are disconnected. With engine off, pump a brake pedal repeatedly until all pressure is relieved.	
1. Two panels that cover brake pedal linkage and cables	Remove.	
2. Spring (1)	Remove.	
3. Two capscrews and washers that secure angle stop (2)	Remove.	
4. Angle stop (2)	Remove.	
5. Cotter pin, two washers and pin (3) that secure cable clevis	Remove.	



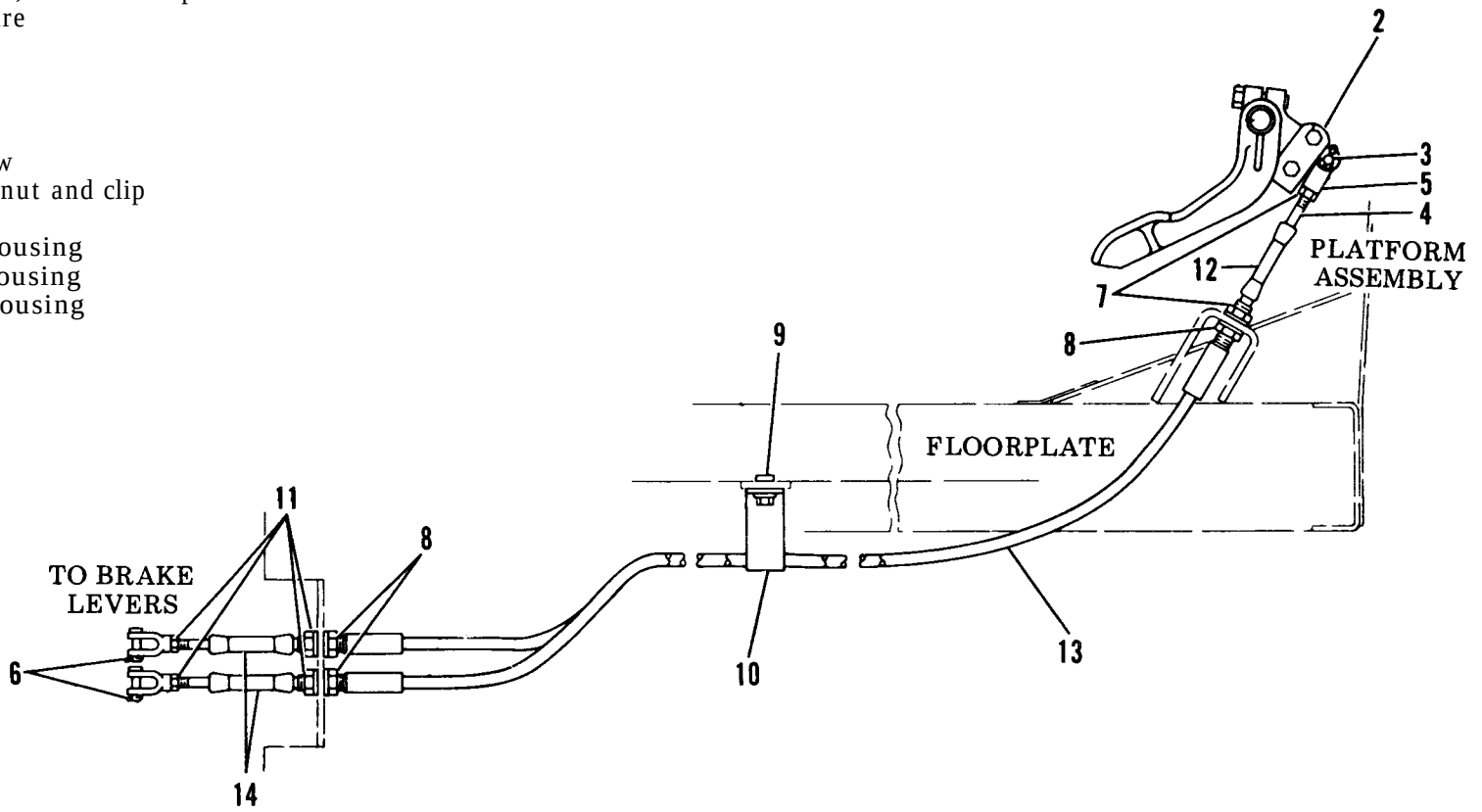


TA 098723

Go onto Sheet 3

BRAKE PEDAL LINKAGES DISASSEMBLY/ASSEMBLY (CONT) (Sheet 3 of 5)

1. Spring (shown on page 2-354)
2. Angle stop
3. Cotter pin, washer and pin
4. Cable wire
5. Clevis
6. Pin
7. Nut
8. Nut
9. Capscrew
10. Washer, nut and clip
11. Nut
12. Cable housing
13. Cable housing
14. Cable housing



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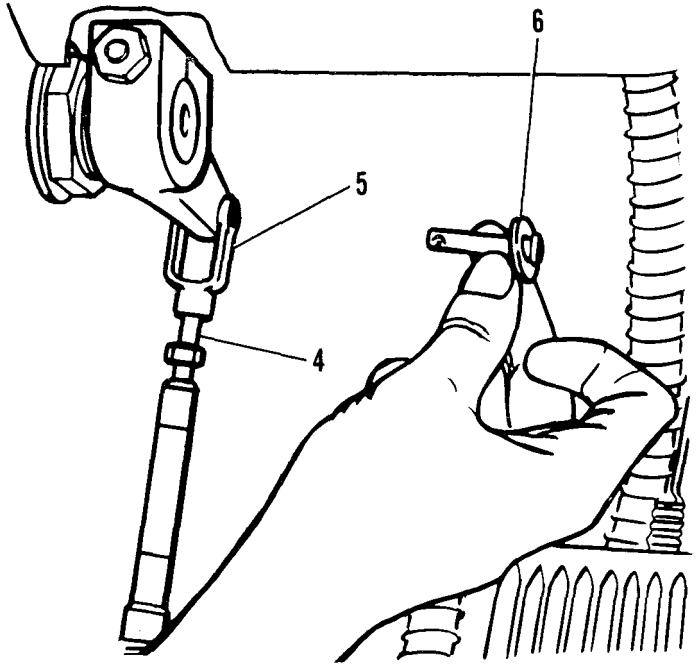
Go on to Sheet 4

BRAKE PEDAL LINKAGES DISASSEMBLY/ASSEMBLY (CONT) (Sheet 4 of 5)

LOCATION/ITEM	ACTION	REMARKS
6. Cable wire (4)	Disconnect from clevis (5).	
7. Access door assembly over brake control valve group	Lift up and lay access door down.	
8. Pins (6) and cotter pins	Remove from clevis that secures cables to brake pedal levers.	
9. Cable wire (4)	Remove from valve group end of cable wire housing.	
10. Nuts (7) on upper cable housing (12)	Remove.	
11. Nuts (8) on middle cable housing (13)	Remove.	
12. Capscrew (9), washer, nut and clip (10)	Remove.	
13. Nuts (11) on lower cable housing (14)	Remove.	
	NOTE If only cable wire needs replacing, then follow Steps 1 thru 8, ASSEMBLY.	



TA 098725

Go on to Sheet 5

BRAKE PEDAL LINKAGES DISASSEMBLY/ASSEMBLY (CONT) (Sheet 5 of 5)

LOCATION/ITEM	ACTION	REMARKS
ASSEMBLY		
1. Lower cable housings (14)	a. Install cm bracket.	See page 2-355.
	b. Secure with nuts (11).	
2. Middle cable housings (13)	a. Install on bracket and to floor plate.	
	b. Secure with nuts (8).	
3. Capscrew (9), nut., washer and clip (10)	Install.	
4. Cable wire (4)	a. Feed through cable housings from brake control valve end.	
	b. Secure to clevis.	
	c. Secure clevis to brake levers with pins (6) and cotter pins.	
5. Upper cable housings (12)	Install and feed cable wire (4) through at same time.	
6. Cable wire (4)	a. Secure to clevis.	
	b. Secure clevis to brake pedal with cotter pin, two washers, pin (3) and spring (1).	
7. Angle stop (2)	a. Install.	
	b. Adjust against brake lever pedal so that pedal is 3.25 in. (82.6 mm) above pedal stop on floor plate.	
8. Two panels that cover brake pedal linkage and cables.	Install and secure with capscrews.	

End

PARKING BRAKE LINKAGE ADJUSTMENT

This task covers: Adjustment of parking brake linkage.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

Page 2-35

Equipment Condition

Engine OFF. Shipping link installed. Wheels blocked. Parking brake control IN.

Special Tools

Steel rule

Personnel Required

One mechanic

References

Parking brake control linkage removal/installation, page 2-343.

PMCS, page 2-5.

Shipping link removal/installation, page 2-471.

General Safety Instructions

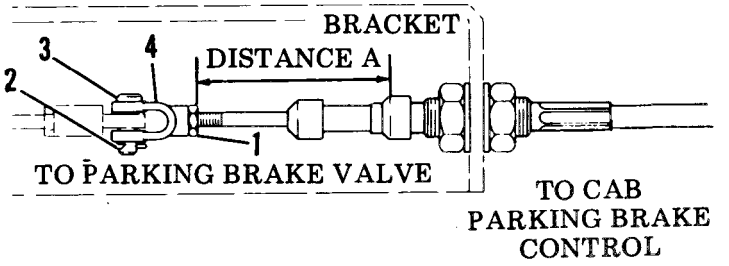
Park vehicle on level ground. Place blocks in front of and behind each wheel to prevent vehicle moving.

Main disconnect switch OFF.

Go on to Sheet 2

PARKING BRAKE LINKAGE ADJUSTMENT (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
1. Parking brake control	Push IN.	
2. Parking brake linkage (located beneath cab)	a. Measure distance A.	Distance should be between 6.8 and 6.9 in. (172.7 to 175.7 mm).
	b. If distance A is different from the specification:	
	Loosen nut (1).	
	Remove cotter pin (2).	
	Remove rod end pin (3).	
	Turn rod end (4) to adjust distance.	
	Install rod end pin (3) and cotter pin (2).	
	Tighten nut (1).	



1. Nut
2. Cotter pin
3. Pin
4. Rod end

TA 098726

End

PARKING BRAKE BLEEDING

This task covers: Bleeding air from parking brake system.

INITIAL SETUP

Test Equipment

None

Special Tools

None

Materials/Parts

Hydraulic oil

Hoses

Buckets

Personnel Required

One mechanic

References

LO 10-3930-641-12

Shipping link removal/installation, page 2-471.

TM 10-3930-641-10

Service brake bleeding, page 2-371

Troubleshooting Reference

None

Equipment Condition

Parking brake control IN.

Transmission selector lever in NEUTRAL.

General Safety Instructions

Be sure vehicle is on level ground.

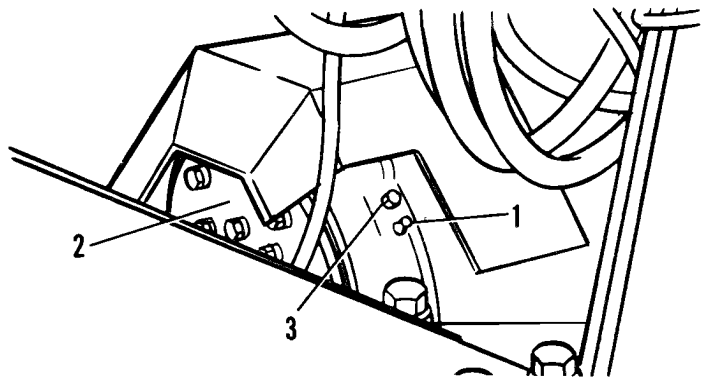
Install shipping link.

Place blocks in front of and behind wheels to prevent vehicle movement.

Go on to Sheet 2

PARKING BRAKE BLEEDING (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
	WARNING Be sure the vehicle is on level ground. Put blocks in front of and behind each wheel so vehicle does not move.	
	NOTE Check hydraulic oil level. Fill if necessary.	
1. Engine	a. Start engine.	See TM 10-3930-641-10.
	b. Wait for LOW BRAKE PRESS indicator to go OFF.	
	c. Turn engine OFF.	See TM 10-3930-641-10.
2. Parking brake control	Push in.	
3. Hose	Connect to fitting (1) on top of parking brake housing (2).	
4. Screw valve (3)	a. Open using an open-end wrench.	



VIEWED FROM UNDER FORWARD END, LEFT SIDE OF CAB

TA 098727

Go on to Sheet 3

PARKING BRAKE BLEEDING (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
4. Screw valve (3) (cont)	b. Allow oil to flow through hose until there are no air bubbles in oil. c. Close valve.	
5. Hydraulic oil reservoir	WARNING Remove reservoir cap slowly. Hydraulic system is under pressure, and cap could fly off if removed quickly. Check oil level. Fill as necessary.	
6. Parking brake		See TM 10-3930-641-10.

End

PARKING BRAKE LINES AND FITTINGS INSPECTION/REMOVAL/INSTALLATION

This task covers: Inspection and replacement of parking brake lines and fittings.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Hydraulic oil

Troubleshooting Reference

Page 2-34

Equipment Condition

Parking brake control IN.

Special Tools

None

Personnel Required

One mechanic

References

Torque Limits Chart, page E-1

PMCS, page 2-5

General Safety Instructions

Park vehicle on level ground. Install safety link.
Place blocks in front of and behind wheels to prevent vehicle movement.
Release brake pressure by pumping brake pedal until resistance is gone.
Main disconnect switch OFF.

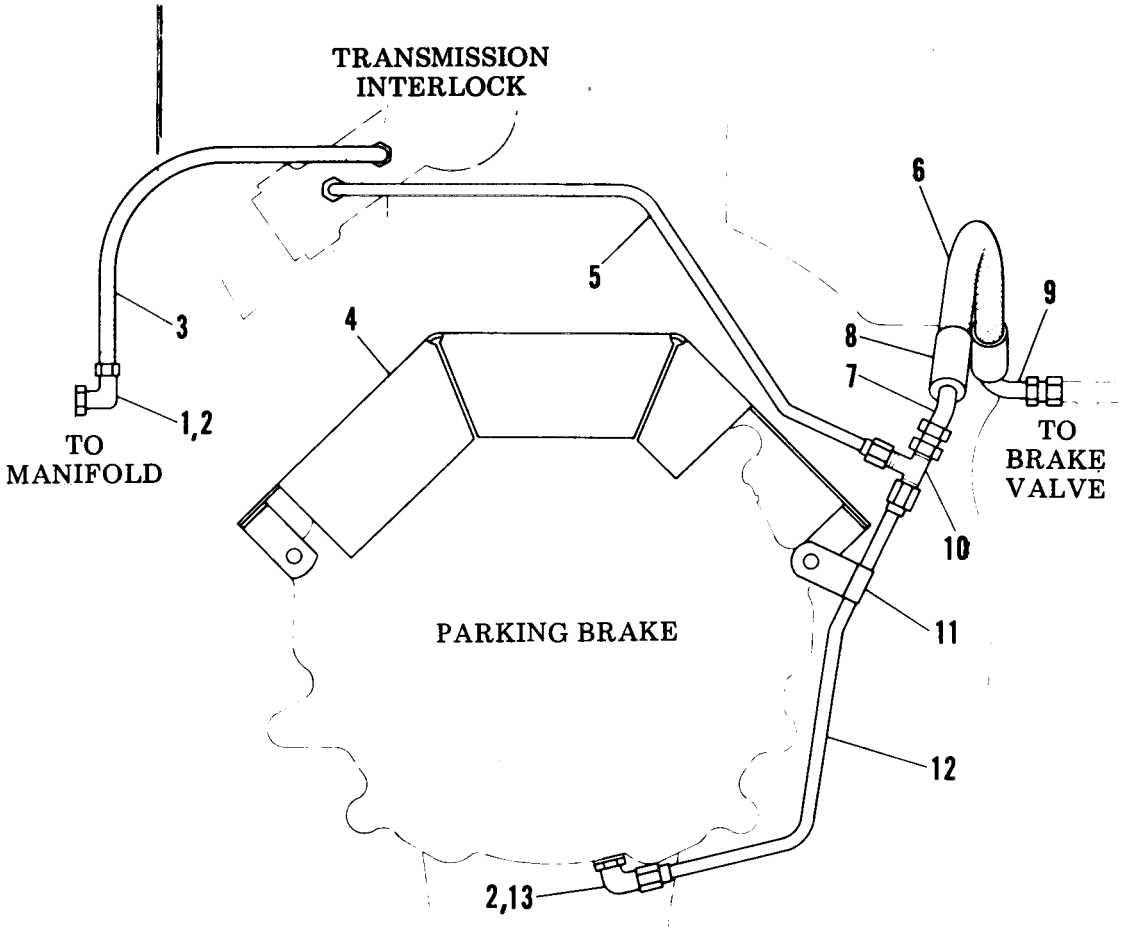
Go on to Sheet 2

PARKING BRAKE LINES AND FITTINGS INSPECTION/REMOVAL/INSTALLATION (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
INSPECTION		
1. Lines (3, 5,6, 12)	Check for damage, leaks and kinks.	
2. Elbows (1, 13)	Check for damage, leaks.	
3. Tee (10)	Check for damage, leaks.	
4. Preformed packing (2)	Check for damage.	
5. Coupling (7, 9)	Check for leaks, damage.	
REMOVAL/INSTALLATION		
1. Lines and fittings	Replace if damaged or leaking: a. Loosen nuts on fittings. b. Remove darnaged part. c. Install new part. d. Tighten fittings.	See Torque Limits Chart, page E-1.

Go on to Sheet 3

PARKING BRAKE LINES AND FITTINGS INSPECTION/REMOVAL/INSTALLATION (CONT) (Sheet 3 of 3)



1. Elbow
2. Preformed packing
3. Hose assembly
4. Guard assembly
5. Tube assembly
6. Hose assembly
7. Coupling assembly
8. Sleeve
9. Coupling assembly
10. Tie
11. Clip
12. Tube assembly
13. Elbow

TA 098729

End

SERVICE BRAKE CONTROL LINKAGE ADJUSTMENT

This task covers: Adjustment of service brake control linkage.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

Pages 2-34, 2-35

Equipment Condition

Engine OFF. Parking brake control OUT.

Shipping link installed.

Platform door open.

Special Tools

Steel rule

Personnel Required

One mechanic

References

PMCS, page 2-5

Parking brake control linkage removal/ installation, page 2-343

Shipping link removal/installation, page 2-471.

General Safety Instructions

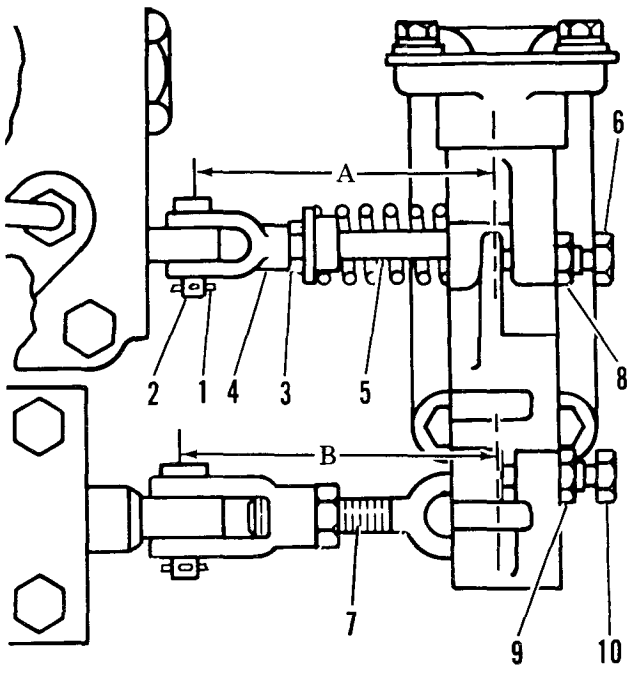
Release brake pressure by pumping brake pedal until there is no resistance.

Main disconnect switch OFF.

Go on to Sheet 2

SERVICE BRAKE CONTROL LINKAGE ADJUSTMENT (CONT) (Sheet 2 of 3)

LOCATION/ITENl	ACTION	REMARKS
1. Rod (5) (Refer to page 2-355 for location)	a. Check distance A.	Distance A should be 4.25 m. (108.0 mm).
	b. If distance A is incorrect, adjust rod length.	
	Remove cotter pin (1) from rod end pin (2).	
	Remove rod end pin (2).	
	Loosen nut (3).	
	Adjust rod length by twisting rod end (4) in or out on rod (5).	
	Replace rod end pin (2) and cotter pin (1).	
	Recheck distance A.	



BRAKE CONTROL LINKAGE

TA 098730

Go on to Sheet 3

SERVICE BRAKE CONTROL LINKAGE ADJUSTMENT (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
2. Rod (7)	a. Check distance B. b. If distance B is incorrect, adjust rod length as described in Item lb on previous page.	Distance B should be 4.40 in. (111.8 mm).
3. Nut (8)	Loosen.	
4. Capscrew (6)	Adjust so that the end just touches lever.	
5. Nut (8)	Tighten.	
6. Nut (9)	Loosen.	
7. CapsCrew (10)	Adjust so that the end just touches lever.	
8. Nut (9)	Tighten.	

End

SERVICE BRAKE PEDALS ADJUSTMENT

This task covers: Adjustment of service brake pedal travel.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

Page 2-34

Equipment Condition

Engine OFF. Parking brake control OUT.

Special Tools

Steel rule

Personnel Required

One mechanic

References

PMCS, page 2-5

Service brake pedals removal/installation, page 2-346

General Safety Instructions

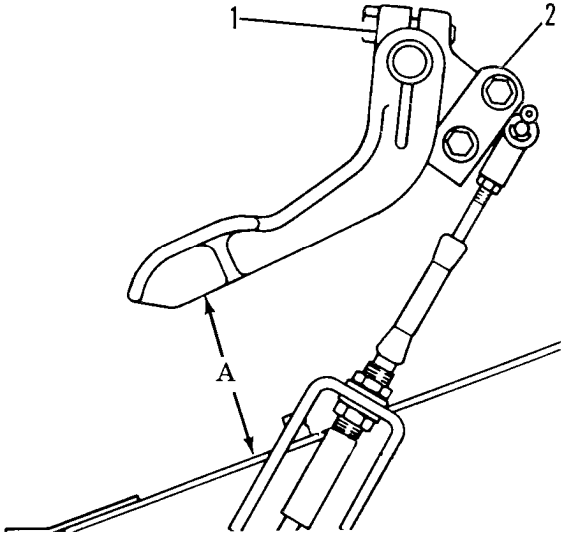
Release brake pressure by pumping brake pedal until resistance is gone.

Main disconnect switch OFF.

Go on to Sheet 2

SERVICE BRAKE PEDALS ADJUSTMENT (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
1. Angle assembly (2)	Loosen two capscrews and nuts on angle assembly.	Dimension A should be 3.25 in. (82.6 mm).
2. Lever (1)	Adjust to dimension A.	
3. Angle assembly (2)	Move to hold lever (1) at dimension A. Tighten capscrews and nuts on angle assembly.	



ADJUSTMENT OF BRAKE PEDAL TRAVEL

TA 098731

End

SERVICE BRAKE SYSTEM BLEEDING

This task covers: Bleeding air from service brake system.

INITIAL SETUP

Test Equipment

None

Special Tools

None

Materials/Parts

Oil; as required

Hoses

Buckets

Personnel Required

One mechanic

References

LO 10-3930-641-12

TM 10-3930-641-10

PMCS, page 2-5

Parking brake beeding, page 2-360

Shipping link removal/installation, page 2-471.

Troubleshooting Reference

None

Equipment Condition

As described in procedure

Transmission selector lever in NEUTRAL

General Safety Instructions

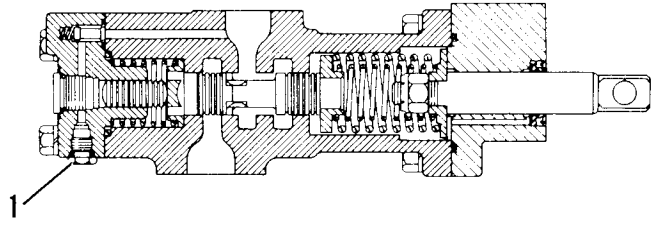
Be sure vehicle is on level ground.

Install shipping link

Place blocks in front of and behind wheels to prevent vehicle movement.

Go on to Sheet 2

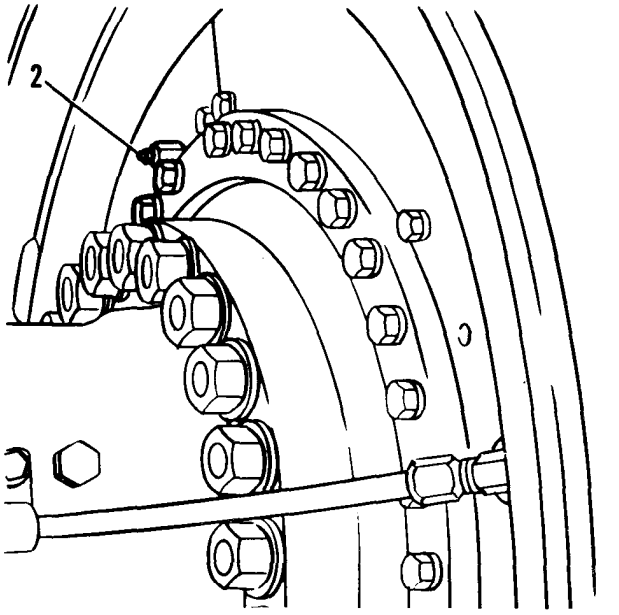
SERVICE BRAKE SYSTEM BLEEDING (CONT)

LOCATION/ITEM	ACTION	REMARKS
	NOTE Be sure to keep hydraulic tank full throughout this bleeding procedure. You'll have to check oil level several times.	
1. Engine	a. Start	See TM 10-3930-641-10.
	b. Run at low idle until LOW PRESS BRAKE light goes off.	
	c. Stop.	See TM 10-3930-641-10. See page 1-22, BRAKE SYSTEM DESCRIPTION, Step 4.
2. Brake control valve plug (1)	Open (turn counterclockwise).	See SYSTEM DESCRIPTIONS, page 1-22 for location.
3. Brake pedal	Push and hold until oil flowing from plug has no air (no bubbles).	 1 BRAKE CONTROL VALVE 1. Plug for removal of air TA 098732
4. Brake control valve plug	Close.	
5. Brake pedal	Release.	

Go on to Sheet 3

SERVICE BRAKE SYSTEM BLEEDING (CONT) (Sheet 3 of 5)

LOCATION/ITEM	ACTION	REMARKS
6. Engine	**a.** Start.	See TM 10-3930-641-10.
	b. Run at low idle until LOW PRESS BRAKE light goes off.	
	c. Stop.	See TM 10-3930-641-10.
7. Brake pedal	Press 5 times to relieve oil pressure.	
8. Steps 6 and 7	Do two more times.	
9. Hose	Connect to air removal screw (2) at one of the wheel brakes.	



AIR REMOVAL SCREW

TA 098733

Go on to Sheet 4

SERVICE BRAKE SYSTEM BLEEDING (CONT) (Sheet 4 of 5)

LOCATION/ITEM	ACTION	REMARKS
10. Engine	a. Start.	See TM 10-3930-641-10.
	b. Run at low idle.	
11. Air removal screw (2)	Turn out 1/2 to 1 turn to let oil flow through hose.	
12. Brake pedal	Push several times until oil flow from the hose las no bubbles.	Flush about a half gallon of oil from the wheel brake.
13. Air removal screw (2)	Tighten.	
14. Steps 9-13	Do for remaining three wheel brakes.	

Go on to Sheet 5

SERVICE BRAKE SYSTEM BLEEDING (CONT) (Sheet 5 of 5)

LOCATION/ITEM	ACTION	REMARKS
15. Engine	a. Start. b. Run at low idle until LOW PRESS BRAKE light goes off. NOTE Keep engine running.	See TM 10-3930-641-10.
16. Brake pedal	a. Hold down for 20 seconds. b. Release for 30 seconds. c. Do steps a. and b. 3 times. d. Release.	
17. Air removal screws (2)	a. Open all four at once. b. Allow oil to drain until there are no more air bubbles. c. Close.	Do steps 15-16-17 until oil has no bubbles.
18. Hydraulic tank	Fill with oil	See LO 10-3930-641-12.

End

DRIVE SHAFTS MAINTENANCE INSTRUCTIONS

This section covers removal and installation of these drive shaft components for Organizational Maintenance personnel:

a. Upper drive shaft

b. Lower drive shaft

LIST OF TASKS (Sheet 1 of 1)

TASK NO.	TASK	REF (PAGE)	TROUBLESHOOTING REF (PAGE)
1	Upper drive shaft removal/installation.	2-377	None
2	Lower drive shaft removal/installation.	2-380	None

End

UPPER DRIVE SHAFT REMOVAL/INSTALLATION (Sheet 1 of 3)

This task covers: Replacing upper drive shaft.

INITIAL SETUP

Test Equipment

None

Special Tools

Floor jack

Materials/Parts

None

Personnel Reauired

Two mechanics

References

Lower drive shaft removal/installation, page 2-380

LO 10-3930-641-12

PMCS, page 2-5

Drive system description, page 1-20

Rear crankcase guard removal/installation, page 2-483.

Troubleshooting Reference

None

Equipment Condition

Install safety link.

Remove front lower drive shaft.

Remove rear crankcase guard.

General Safety Instructions

Block wheels.

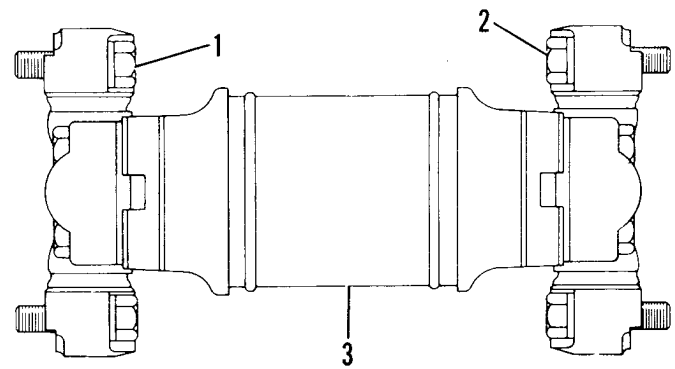
Female portion of drive shaft should be installed toward source of power.

Main disconnect switch OFF.

Go on to Sheet 2

UPPER DRIVE SHAFT REMOVAL/INSTALLATION (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Four capscrews, nuts, and washers (1) on spider that faces input transfer gear	Remove.	
2. Center of shaft (3)	Support with hand or jack while doing next step.	
3. Four capscrews, nuts, and washers (2) on spider that faces torque converter	Remove.	
4. Shaft	Remove.	



TA 098734

Go on to Sheet 3

UPPER DRIVE SHAFT REMOVAL/INSTALLATION (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION	NOTE Use jack to support shaft.	
1. Shaft with spiders	Lift into place between torque converter and input transfer gear case.	
2. Four capscrews, nuts and washers (1) at transfer gearcase end	Install. Tighten to a torque of 90 to 110 lb. ft. (122 to 149 N·m).	
3. Four capscrews, nuts and washers (2) at torque converter end	Install. Tighten to a torque of 90 to 110 lb. ft. (122 to 149 N·m).	
		End

LOWER DRIVE SHAFT REMOVAL/INSTALLATION

This task covers: Removal and installation of lower drive shaft.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Suitable wood blocks to support drive shaft while on floor jack.

Troubleshooting Reference

None

Equipment Condition

Rear crankcase guard removed.

Install shipping link.

Special Tools

Floor jack

Personnel Required

Two mechanics

References

Upper drive shaft removal /installation, page 2-377

LO 10-3930-641-10

PMCS, page 2-5

Drive system description, page 1-20

Rear crankcase guard removal/installation, page 2-483.

General Safety Instructions

Park vehicle on level ground.

Pull parking brake control OUT to prevent vehicle movement.

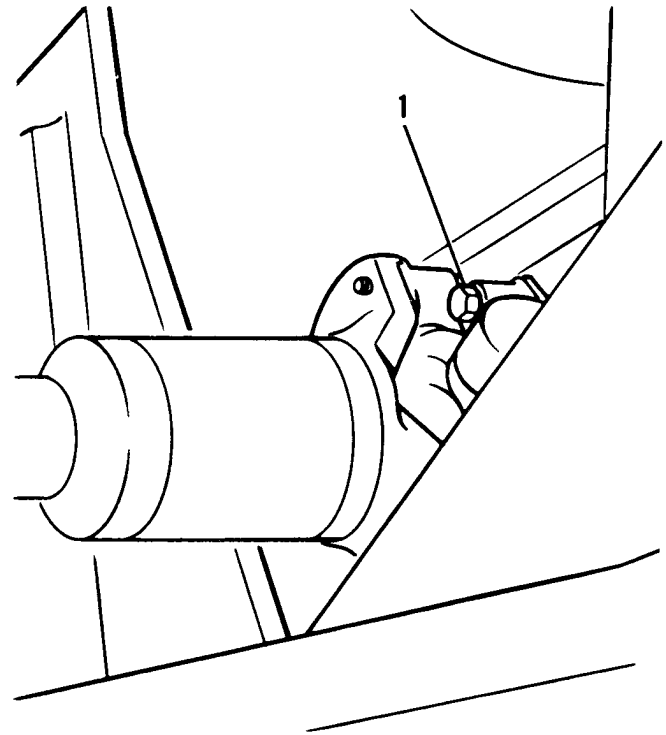
Block wheels.

Main disconnect switch OFF.

Go on to Sheet 2

LOWER DRIVE SHAFT REMOVAL/INSTALLATION (CONT)

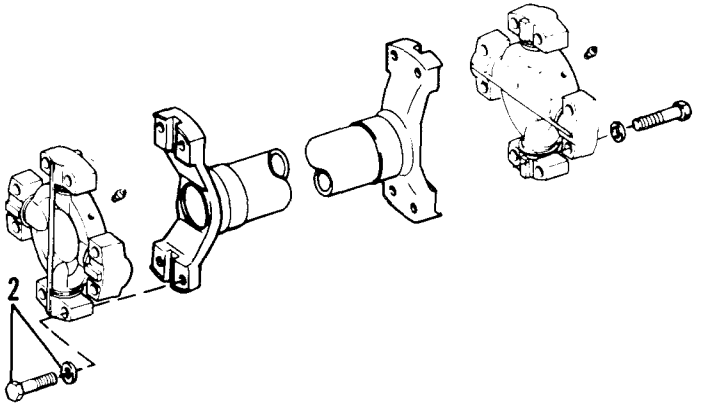
LOCATION/ITEM	ACTION	REMARKS
	WARNING Support middle drive shaft during removal or it may fall and injure you. Two men are required for removal. Shaft weight: 86 lb. (39 kg).	
REMOVAL OF LOWER DRIVE SHAFT, MIDDLE PIECE		
1. Four capscrews, nuts, and washers (1) on front spider facing bearing cage	Remove.	
2. Center of shaft	Support shaft with suitable jack while doing next step.	



TA 098735

Go on to Sheet 3

LOWER DRIVE SHAFT REMOVAL/INSTALLATION (CONT) (Sheet 3 of 11)

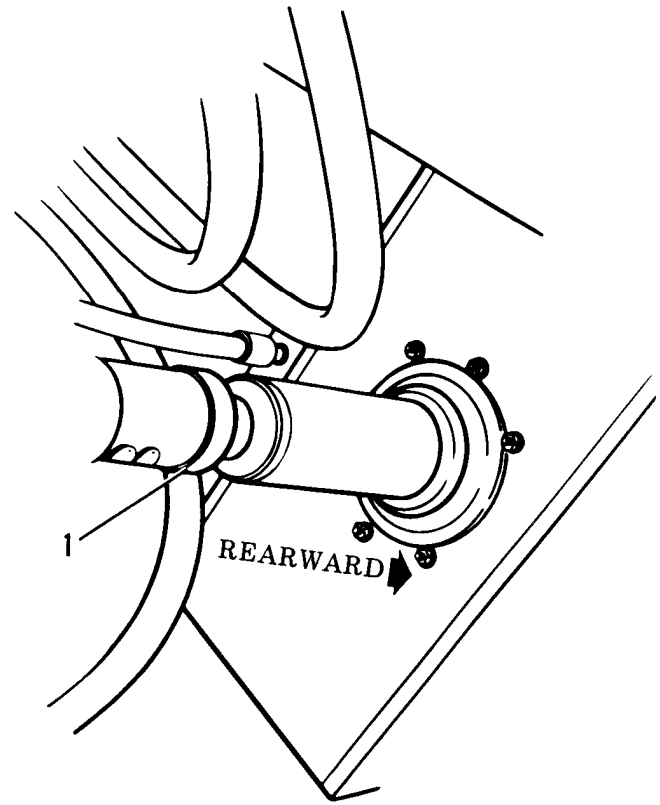
LOCATION/ITEM	ACTION	REMARKS
3. Four capscrews, nuts and washers (2) on rear spider facing transfer gear case	Remove.	REAR FRONT
4. Shaft - with spiders	Carefully remove.	 SHAFT WITH SPIDERS

TA 098736

Go on to Sheet 4

LOWER DRIVE SHAFT REMOVAL/INSTALLATION (CONT) (Sheet 4 of 11)

LOCATION/ITEM	ACTION	REMARKS
	WARNING Support front drive shaft during removal or it may fall and injure you. Two men are required for removal. Shaft weight: 132 lb. (60 kg).	
REMOVAL OF LOWER DRIVE SHAFT, FRONT PIECE		
1. Collar(1)	a. Loosen. Slide to the rear.	

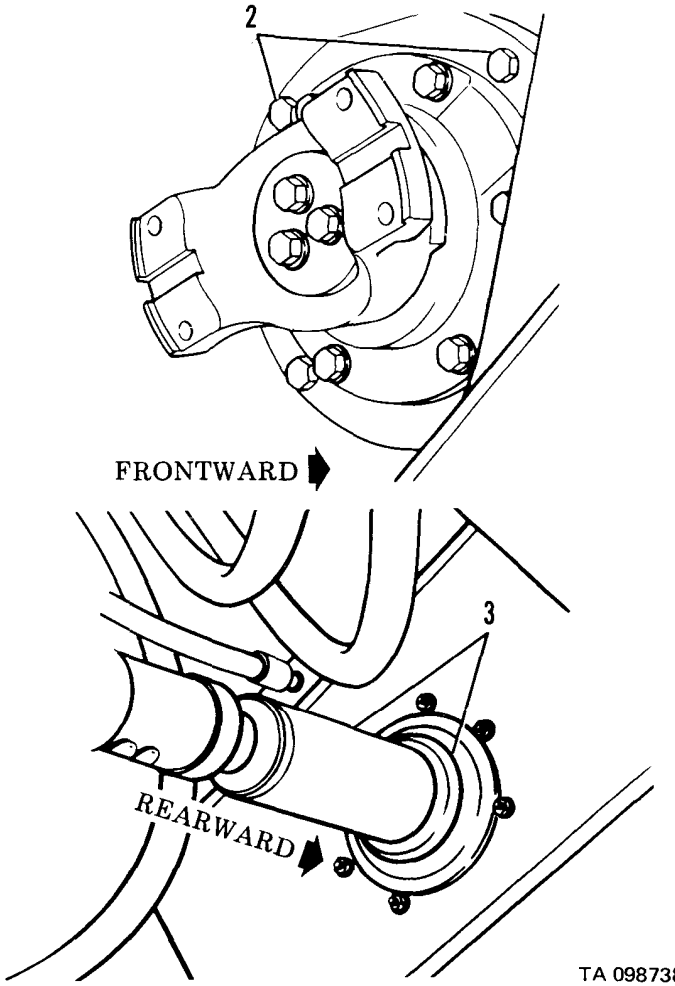


TA 098737

Go on to Sheet 5

LOWER DRIVE SHAFT REMOVAL/INSTALLATION (CONT)

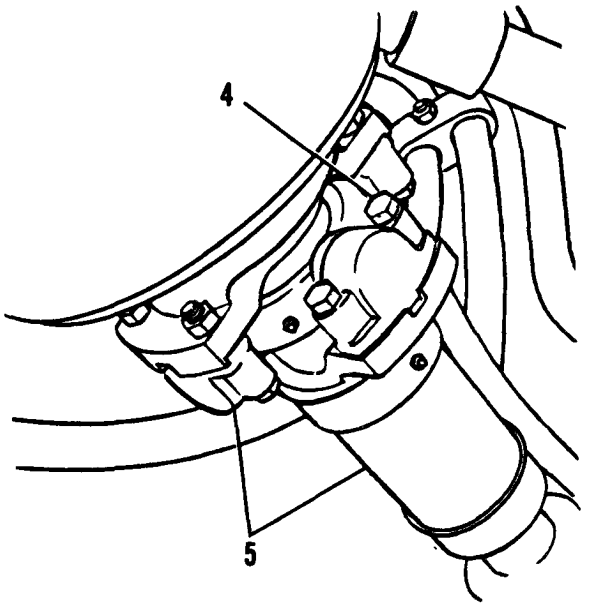
LOCATION/ITEM	ACTION	REMARKS
2. Six capscrews, nuts, and washers (2)	Remove.	
3. Shaft and bearing cage (3)	a. Support shaft with suitable jack while doing next step. b. Pull shaft and bearing cage rewward, out of main frame.	



TA 098738

Go on to Sheet 6

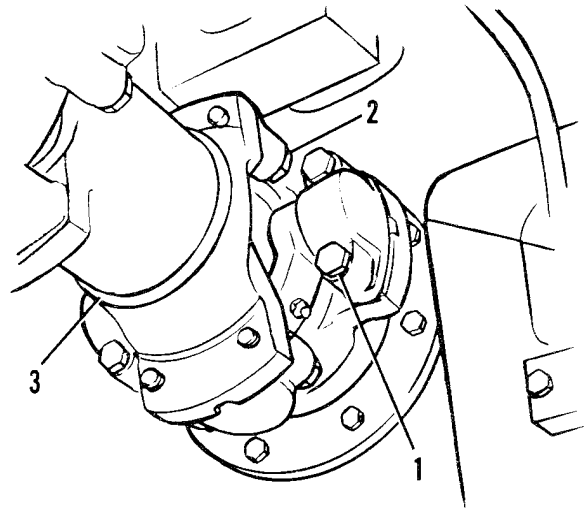
LOWER DRIVE SHAFT REMOVAL/INSTALLATION (CONT) (Sheet 6 of 11)

LOCATION/ITEM	ACTION	REMARKS
4. Four nuts, capscrews, and washers (4)	a. Remove. b. Remove spider and front shaft yoke assembly (5).	 TA 088739

Go on to Sheet 7

LOWER DRIVE SHAFT REMOVAL/INSTALLATION (CONT) (Sheet 7 of 11)

LOCATION/ITEM	ACTION	REMARKS
	WARNING Support rear drive shaft during removal or it will fall and injure you. Two men are required for removal. Shaft weight: 55 lb. (25 kg).	
REMOVAL OF LOWER DRIVE SHAFT, REAR PIECE		
1. Four capscrews, nuts, and washers (1)	Remove.	
2. Center of shaft (3)	Support shaft with hands or suitable jack while doing next step.	
3. Four capscrews, nuts, and washers (2)	Remove.	
4. Shaft with spiders	Remove.	



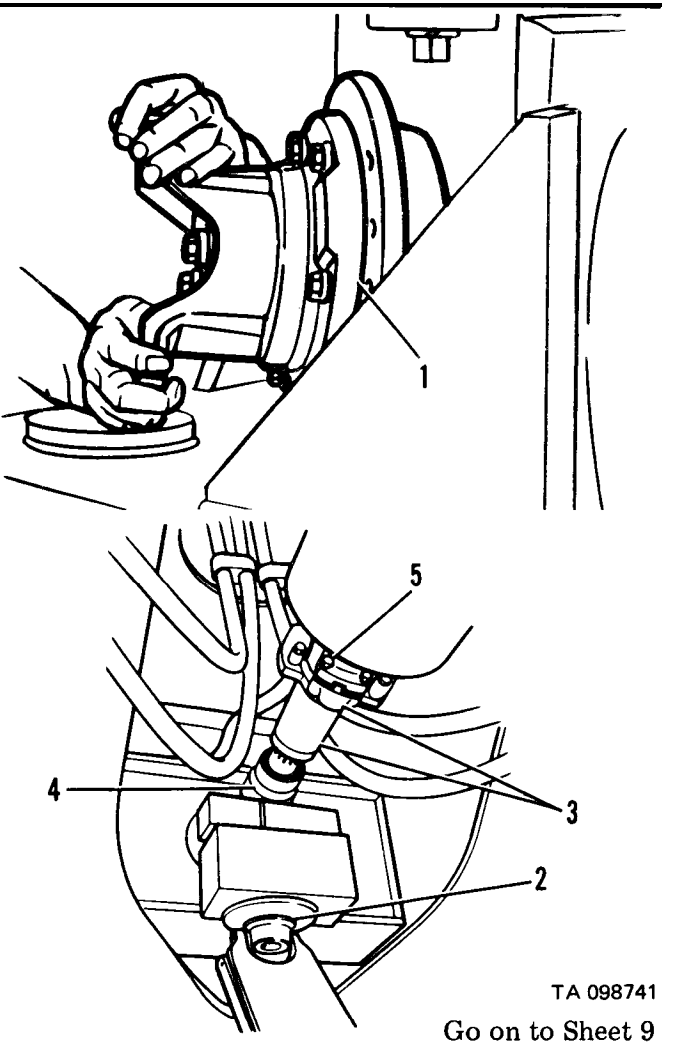
VIEW FROM UNDER MACHINE

TA 098740

Go on to Sheet 8

LOWER. DRIVE SHAFT REMOVAL/INSTALLATION (CONT) (Sheet 8 of 11)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION OF LOWER DRIVE SHAFT, FRONT PIECE		
1. Bearing cage and shaft (1)	a. Support shaft with a floor jack (2). b. Push shaft partly into main frame.	
2. Spider and front shaft yoke (3)	a. Slide onto splined end of front shaft (4). b. Aline spider with yoke of front differential.	
3. Four capscrews, nuts, and washers (5)	Install. Torque from 90 to 110 lb. ft. (122 to 149 N•m).	

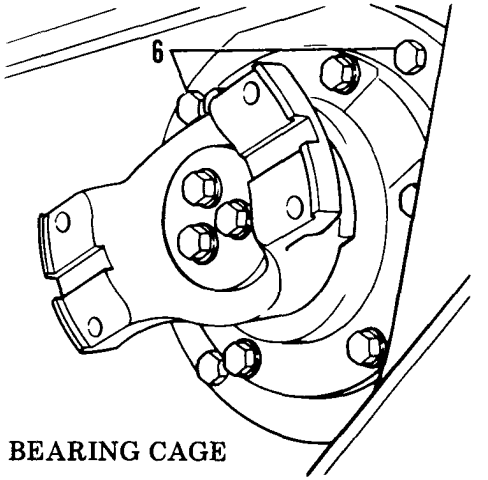


TA 098741

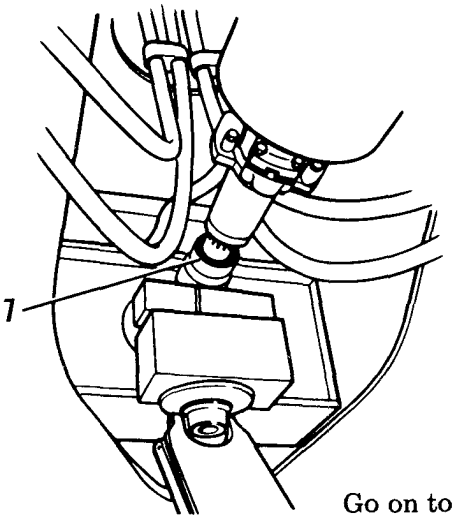
Go on to Sheet 9

LOWER DRIVE SHAFT REMOVAL/INSTALLATION (CONT)

LOCATION/ITEM	ACTION	REMARKS
4. Bearing cage and shaft	Aline holes in main frame with holes in bearing cage.	
5. Six capscrews, nuts, and washers (6)	Install.	
6. Collar (7)	Slide collar and seal forward; tighten.	



BEARING CAGE

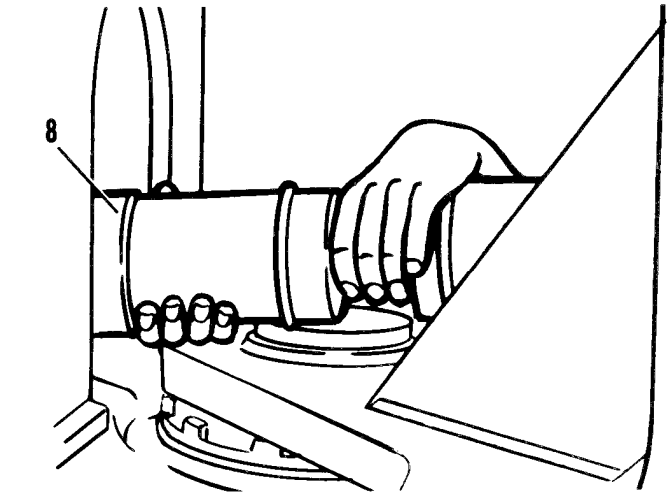


TA 098742

Go on to Sheet 10

LOWER DRIVE SHAFT REMOVAL/INSTALLATION (CONT) (Sheet 10 of 11)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION OF LOWER DRIVE SHAFT, MIDDLE PIECE		
1. Shaft with spiders (8)	a. Lift into place between frames of vehicle. b. Jack or block up shaft to keep it in place.	
2. Four capscrews, nuts, and washers (9)	Install. Torque from 90 to 110 lb. ft. (122 to 149 N•m).	
3. Four capscrews, nuts, and washers (10)	Install. Torque from 90 to 110 lb. ft. (122 to 149 N•m).	

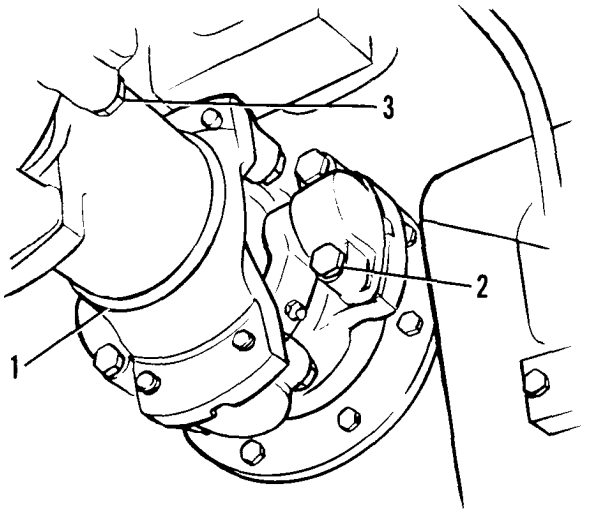


TA 098743

Go on to Sheet 11

LOWER DRIVE SHAFT REMOVAL/INSTALLATION (CONT) (Sheet 11 of 11)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION OF LOWER DRIVE SHAFT, REAR PIECE		
1. Shaft with spiders (1)	Lift into position.	
2. Four capscrews, nuts, and washers (2)	Install. Torque from 90 to 110 lb. ft. (122 to 149 N•m).	
3. Four capscrews, nuts, and washers (3)	Install. Torque from 90 to 110 lb. ft. (122 to 149 N•m).	



VIEW FROM UNDER MACHINE

TA 098745

End

DIFFERENTIALS AND TIRE MAINTENANCE INSTRUCTIONS

T'his section covers service of these differential and tire components for Organizational Maintenance personnel:

a. Change oil in differentials and final drive.

b. Inspect tire pressure and add air.

c. Tires and rims removal/installation.

LIST OF TASKS (Sheet 1 of 1)

TASK NO.	TASK	REF (PAGE)	TROUBLESHOOTING REF (PAGE)
1	Front and rear axle /fintd drive service.	2-392	2-45
2	Tire service.	2-397	Nrone
3	Tires and rims removal.	2-398.1	None
4	Tires and rims installation.	2-398.3	None
5	Tire removal/installation.	2-398.5	None

End

FRONT AND REAR AXLE/FINAL DRIVE SERVICE (Sheet 1 of 5)

This task covers: Changing oil in differentials and final drives.

INITIAL SETUP

Test Equipment

None

Special Tools

None

Materials/Parts

MIL-L-2105 lubricant (27 gal. ea.)

GO 80, 27 gallons (102 liters)
(Item 5, Appendix C)

Containers to catch waste oil

Personnel Reauired

One mechanic

References

LO 10-3930-641-12

PMCS, page 2-5

Shipping link removal/installation, page 2-471

Troubleshooting Reference

Page 2-45

Equipment Condition

Shipping link installed

Vehicle tires blocked

General Safety Instructions

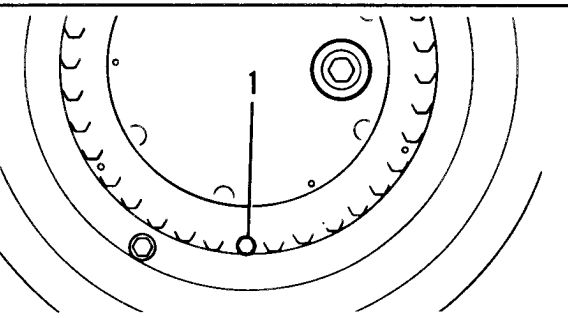
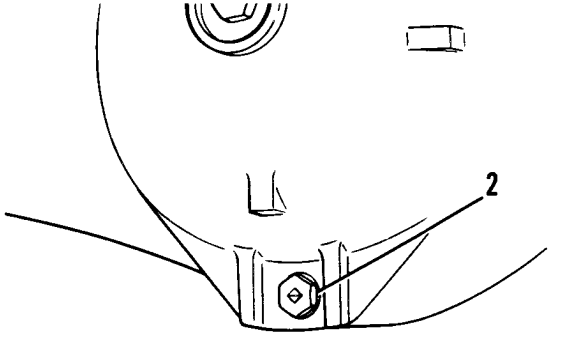
Park vehicle on level ground.

Lower mast.

Main disconnect switch OFF.

Go on to Sheet 2

FRONT AND REAR AXLE/FINAL DRIVE SERVICE (CONT) (Sheet 2 of 5)

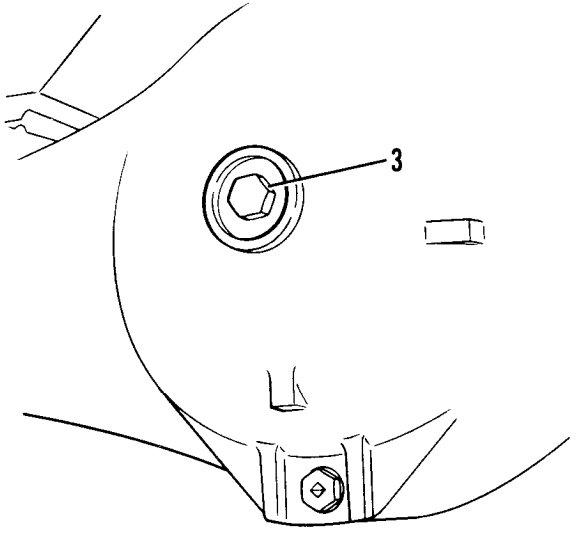
LOCATION/ITEM	ACTION	REMARKS
1. Final drive drain plugs (1)	a. Position each wheel, in turn, with drain plug down. b. Remove plug. c. Drain oil. d. Clean plugs. e. Install.	
2. Differential drain plugs (2), front and rear	a. Remove. b. Drain oil. c. Clean plugs. d. Install.	

TA 098746

Go on to Sheet 3

FRONT AND REAR AXLE/FINAL DRIVE SERVICE (CONT) (Sheet 3 of 5)

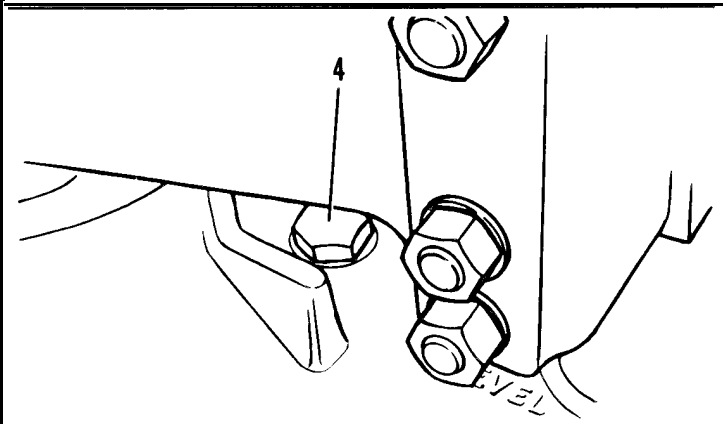
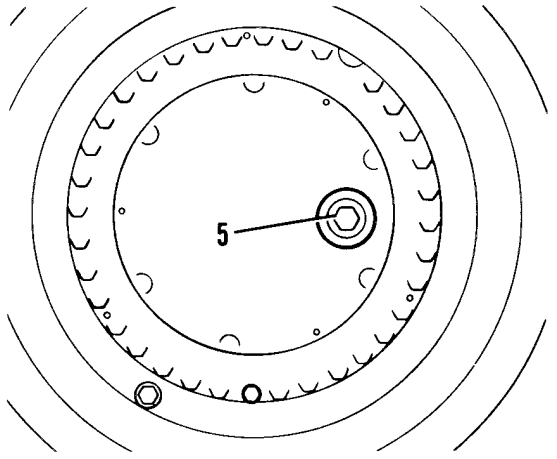
LOCATION/ITEM	ACTION	REMARKS
3. Front differential fill plug (3)	a. Remove.	See LO 10-3930-641-12
	b. Fill differential to bottom of fill plug opening.	
	c. Install plug.	



TA 098747

Go on to Sheet 4

FRONT AND REAR AXLE/FINAL DRIVE SERVICE (CONT)

LOCATION/ITEM	ACTION	REMARKS
4. Rear differential oil level plug (4)	a. Remove.	
	b. Clean.	
5. Final drive fill plugs (5)	a. Rotate each wheel so that final drive fill plug is at the horizontal center line of the wheel.	
	b. Remove fill plugs (5).	
	c. Fill rear differential slowly through fill plug opening for final drive. Fill to bottom of oil level plug opening.	
	d. Install oil level plug (4).	

See LO 10-3930-641-12.

TA 098748

Go on to Sheet 5

FRONT AND REAR AXLE/FINAL DRIVE SERVICE (CONT) (Sheet 5 of 5)

LOCATION/ITEM	ACTION	REMARKS
5. Final drive fill plugs (cont)	e. Fill final drives to bottom of fill plug opening.	See LO 10-3930-641-12.
	f. Clean fill plugs.	
	g. Install.	

End

TIRE SERVICE (Sheet 1 of 2)

This task covers: Servicing tires.

INITIAL SETUP

Test Equipment

Tire pressure gage

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Parking brake control out

Engine OFF

Special Tools

Source of low pressure air, self-attaching air chucks with distant valve control.

Personnel Required

One mechanic

References

None

General Safety Instructions

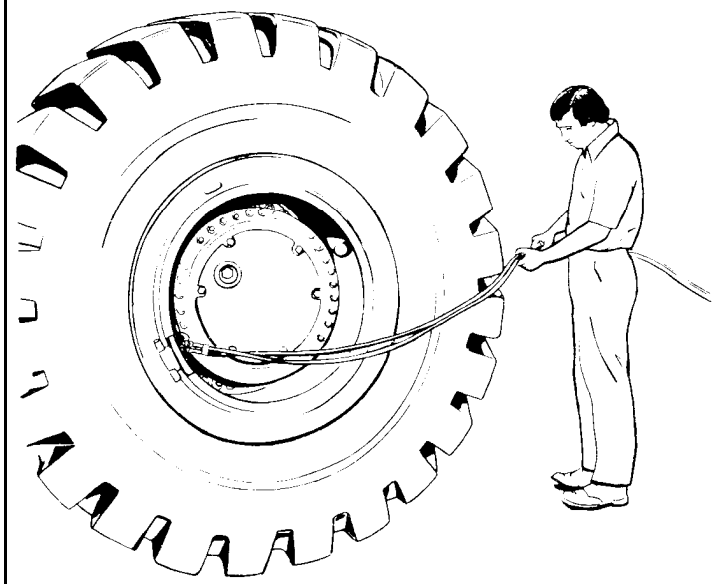
Stand behind tire when inflating.

Main disconnect switch OFF.

Go on to Sheet 2

TIRE SERVICE (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
1. Tire pressure	a. Check with a tire pressure gage. WARNING To prevent injury while inflating tires, stand behind tire and use a self-attaching air chuck. b. Inflate if low. See page 2-400.	Tire pressure to be 70 psi (483 KPa) (front) 40 psi (276 KPa) (rear)
2. Air	Bleed moisture from air source at the accumulator and through the air hose.	
3. Tire valve stem and self-attaching air chucks	Install chuck on valve stem (1). WARNING Stand behind tire when inflating. Use self-attaching air chuck.	
4. Tire	Inflate to: 70 psi (front) 40 psi (rear)	



TA 098749

End

TIRES AND RIMS REMOVAL (Sheet 1 of 2)

This task covers: Removal of tires and rims.

INITIAL SETUP

Test Equipment

None

Special Tools

None

Materials/Parts

Wooden blocks

Personnel Required

Two mechanics

References

None

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Parking brake ON.

Shipping link installed

Vehicle parked on hard level ground (preferably concrete).

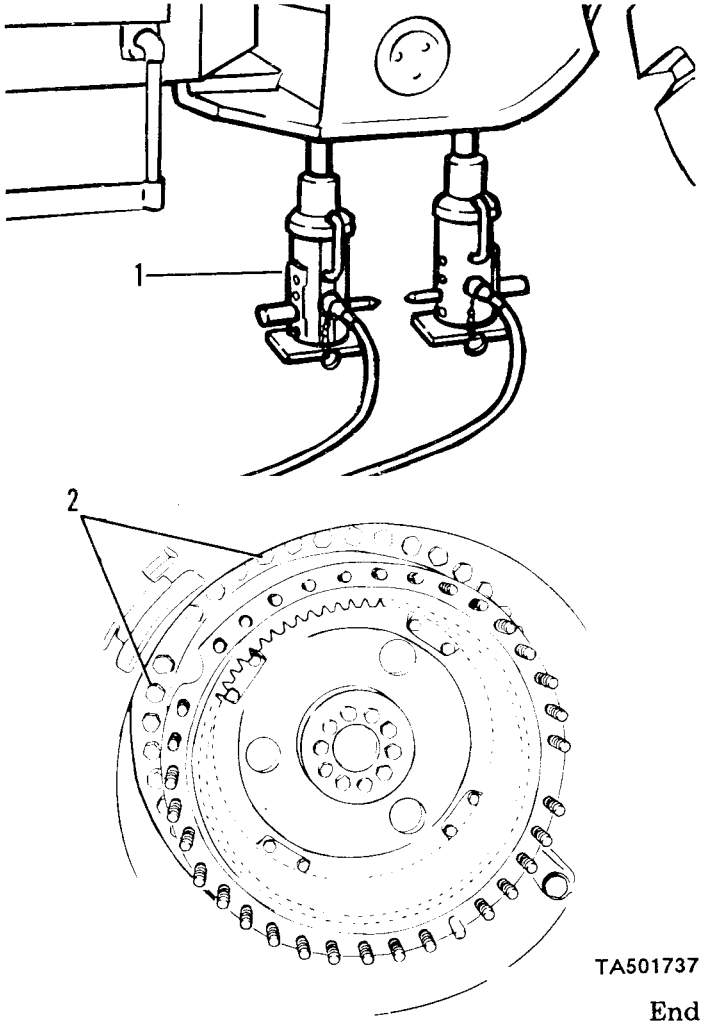
General Safety Instructions

Block wheels except one being removed.

Go on to Sheet 2

TIRES AND RIMS REMOVAL (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
1. Blocks	Block front and back tires that are not being removed.	
2. Hydraulic jacks (1)	a. Position under front main frame. b. Lift. machine until forks of a lift truck can be positioned under tire. c. Place wood block under front axle housing to help hold machine up.	
3. Nuts (2) and washers that hold tire and rim	Remove.	
4. Lift truck	a. Position lift truck under tire. b. Fasten tire and rim to truck.	
5. Tire and rim	Remove. Tire and rim are 3000 lb. (1361 kg).	



TA501737

End

TIRES AND RIMS INSTALLATION (Sheet 1 of 2)

This task covers: Installation of tires and rims.

INITIAL SETUP

Test Equipment

None

Special Tools

None

Materials/Parts

As required

Personnel Required

Two mechanics

References

Tires and rim removal, page 5-80.

Troubleshooting Reference

None

Equipment Condition

Engine OFF.

Parking brake ON.

Shipping link instalied.

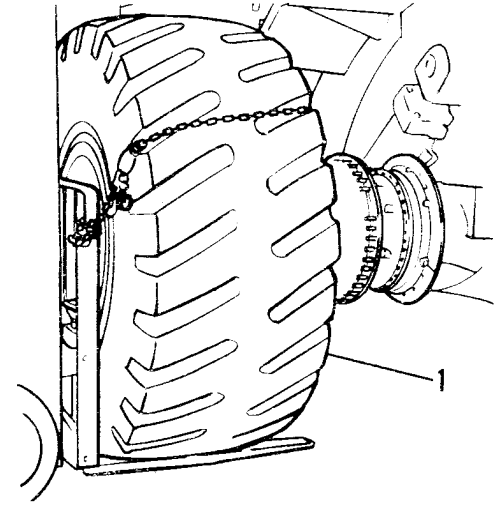
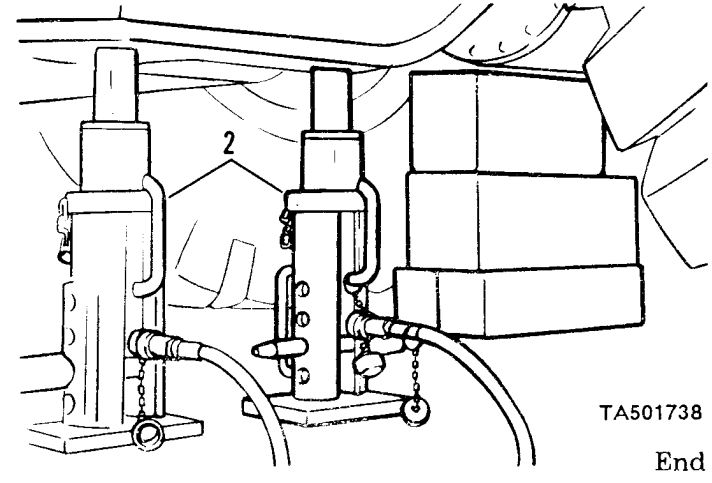
Vehicle parked on hard level ground (preferably concrete)

General Safety Instructions

Block wheels except one being installed.

Go on to Sheet 2

TIRES AND RIMS INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
1. Tire and rim (1)	a. Fasten to forks of lift truck. b. Position tire and rim- on wheel assembly.	
2. Four nuts and washers	a. Instali to hold tire and rim to wheel assembly. b. Remove lift truck.	
3. Nuts and washers that secure tire and rim	Install. Tighten to a torque of 340-440 lb, ft. (460-596 N•m).	
4. Hydraulic jacks (2)	Lift machine and remove wood blocks from under front axle housing. Lower machine to floor.	 TA501738

End

TIRE REMOVAL/INSTALLATION

This task covers: Replacement of tire with wheel assembly on vehicle.

INITIAL SETUP

Test Equipment

None

Special Tools

Sledge hammer

Pry bars

Bead breaking tool kit

Materials/Parts

Tire

Wooden blocks

Personnel Required

One mechanic

References

None

Troubleshooting Reference

None.

Equipment Condition

Machine parked on hard level ground (preferably concrete).

Safety link installed on main frames of machine.

General Safety Instructions

All air must be released from tire. Check valve stem by running a piece of wire through it to make sure it is not plugged. Stand to one side of tire while inflating.

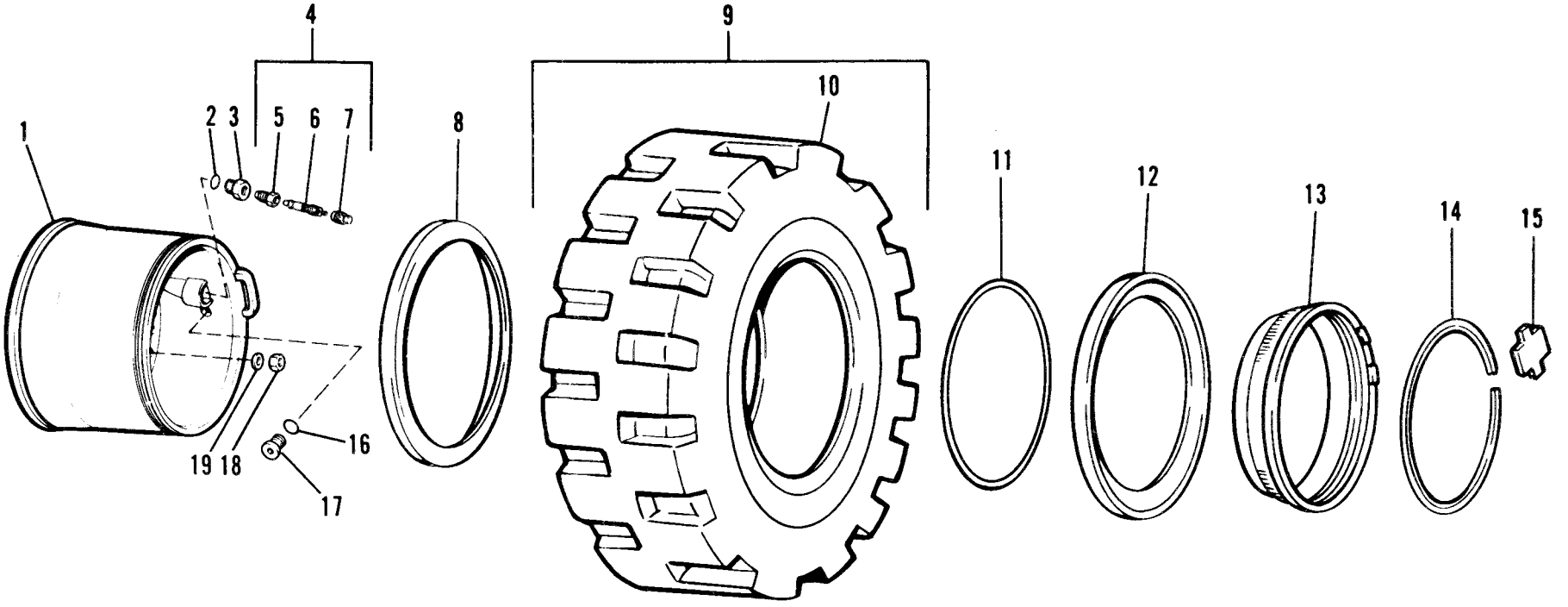
Go on to Sheet 2

TIRE REMOVAL/INSTALLATION (CONT) (Sheet 2 of 7)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Blocks	Block both sides of front and rear tires that are not being serviced.	
2. Tire	Raise off ground using hydraulic jack under axle housing near tire being serviced.	If not parked on concrete, place hardwood blocks under jack.
3. Blocks	Place under axle housing. Lower hydrauiic jack.	
4. Valve stem cap (7)	Remove.	
5. Valve stem core (6)	Remove slowly using valve stem core removal tool. **WARNING** All air must be exhausted from tire. Check the valve stem by running a piece of wire through it to make sure it is not plugged.	

Go on to Sheet 3

TIRE REMOVAL/INSTALLATION (CONT) (Sheet 3 of 7)



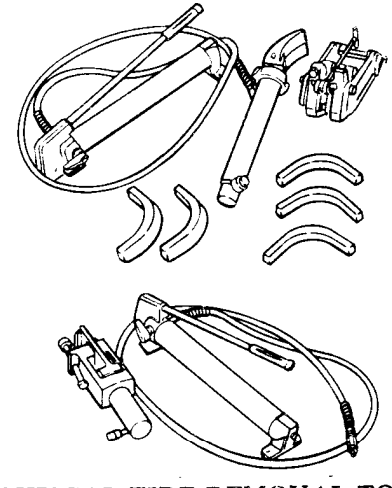
1. Rim
2. Preformed packing
3. Spud
4. Airvalve assembly
5. Nut
6. Valve stem core
7. Valve stem cap
8. Flange
9. Tire assembly
10. Tire
11. Preformed packing
12. Flange
13. Band
14. Lock ring
15. Driver
16. Preformed packing
17. Spud
18. Nut
19. Preformed packing

TA501739

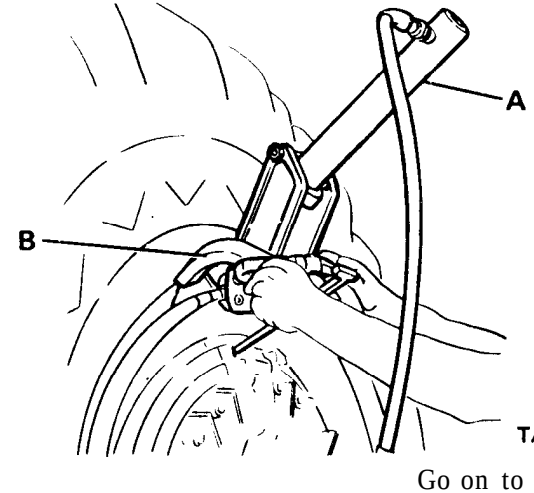
Go on to Sheet 4

TIRE REMOVAL/INSTALLATION (CONT)

LOCATION/ITEM	ACTION	REMARKS
6. Band (13)	Drive back far enough to remove driver (15) using a sledge hammer.	
7. Driver (15)	Remove.	
8. Lock ring (14)	Remove using hammer and pry bars.	
9. Preformed packing (11)	Remove.	
10. Bead breaking tool (A)	a. Attach to rim as shown. b. Break bead and insert metal bead wedge (B). c. Continue to break bead in as many places as necessary around tire.	
11. Band (13)	Remove using pry bars.	
12. Flange (12)	Remove.	



TYPICAL TIRE REMOVAL TOOLS



Go on to Sheet 5

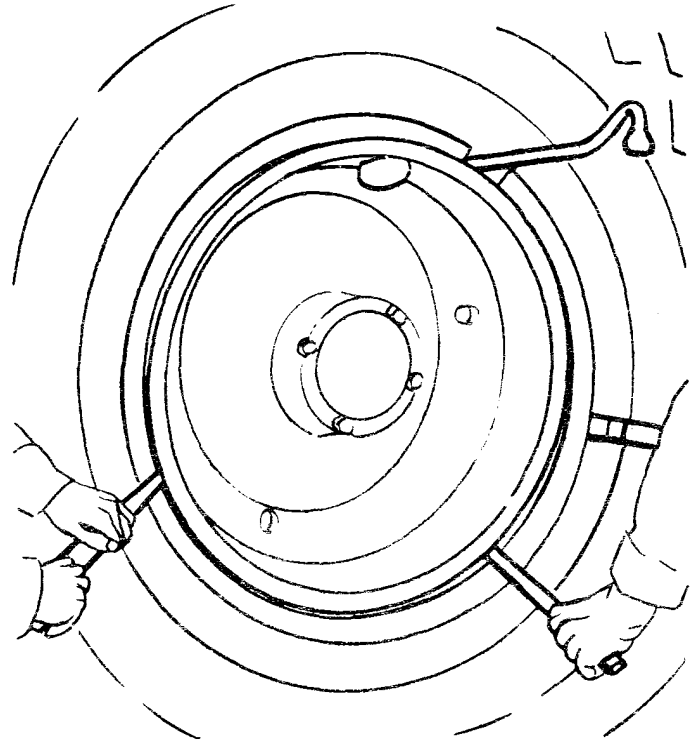
TIRE REMOVAL/INSTALLATION (CONT) (Sheet 5 of 7)

LOCATION/ITEM	ACTION	REMARKS
13. Bead breaking tool (A)	a. Attach to rear of tire. NOTE There are only two places (180° apart) where tool (A) can be attached. b. Break bead and insert metal bead wedge. c. Move 180° and break second bead.	
14. Two lifting cables	Cradle tire and attach to hoist.	
15. Tire (10)	Remove.	
16. Flange (8)	Remove.	
INSTALLATION		
1. Nut (5), spud (3) and preformed packing (2)	Remove and install using new preformed packing.	
2. Flange (8)	Install.	
3. Tire (10)	Install using lifting slings and hoist.	
4. Band (13)	Insert in flange (12) and install both on tire (10).	

Go on to Sheet 6

TIRE REMOVAL/INSTALLATION (CONT) (Sheet 6 of 7)

LOCATION/ITEM	ACTION	REMARKS
5. Band (13)	Pound back far enough to expose second groove in rim.	
6. Preformed packing(11)	a. Lubricate with engine oil. b. Install in second groove making sure it does not get twisted or cut. c. Pull band (13) gently over preformed packing.	
7. Lock ring (14)	Insert end as shown and turn 90°. Ring must be engaged in first groove all around rim.	
8. Drive (15)	Install.	



TA501741

Go on to Sheet 7

TIRE REMOVAL/INSTALLATION (CONT) (Sheet 7 of 7)

LOCATION/ITEM	ACTION	REMARKS
	NOTE Apply a liquid detergent solution to tiont and rear bead areas on tire.	
9. Valve stem	a. Attach air chuck.	Use self-attaching type air chuck with valve core remove. After seal is made, install valve core.
	WARNING Stad to one side of the - not in front d rim area - when inflating tire.	
	b. Inflate tire to 70 psi front, 40 psi rear.	You may have to compress tire, using chains and cable hoist, to get beads to seal.
	c. Install valve cap.	
10. Axle housing	Raise with hydraulic jack, remove wood Mocks and lower titil tire rests on ground.	
11. Shipping link	Disconnect.	

END

TRANSMISSION MAINTENANCE INSTRUCTIONS

This section covers removal and installation of these transmission components for Organizational Maintenance personnel:

a. Filter

b. Linkage

Also instructions for servicing the transmission and adjusting the control linkage.

LISTS OF TASKS (Sheet 1 of 1)

TASK NO.	TASK	REF (PAGE)	TROUBLESHOOTING REF (PAGE)
1	Transmission oil filler assembly removal/ installation.	2-400	None
2	Transmission service.	2-402	2-44, 2-46, 2-47
3	Transmission control linkage adjustment	2-407	2-46, 2-47, 2-48
4	Transmission controls removaI/installation.	2-412	2-47, 2-48

End

TRANSMISSION OIL FILLER ASSEMBLY REMOVAL/INSTALLATION (Sheet 1 of 2)

This task covers: Removal and installation of Transmission oil filler assembly.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

None

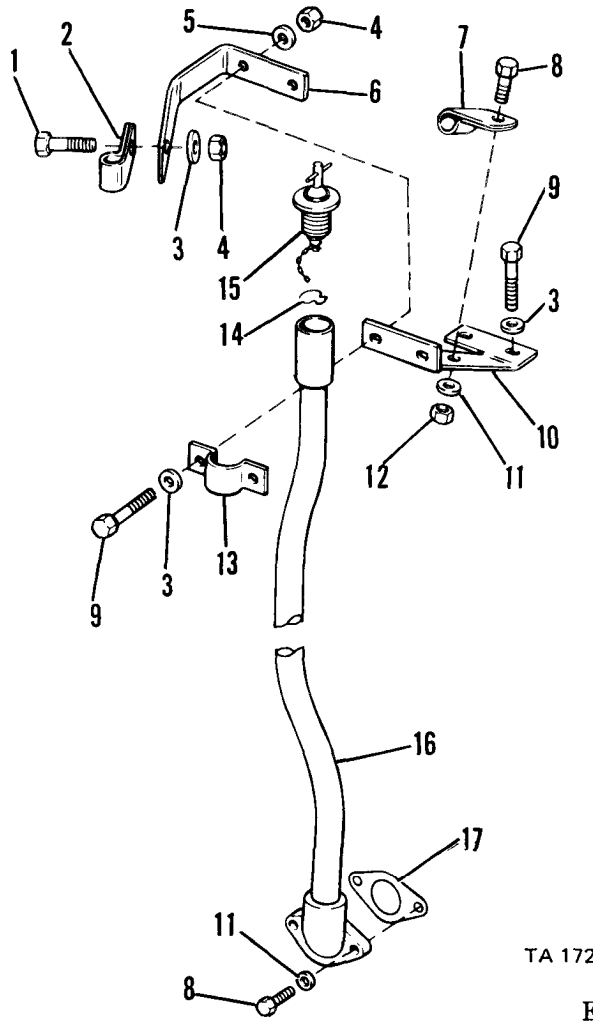
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

TRANSMISSION OIL FILLER ASSEMBLY REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Plug (15)	Remove.	
2. Capscrews (8), (9) and washers (11), (3)	Remove.	
3. Filler tube (16)	Remove with bracket (13).	
4. Preformed packing (17)	Replace.	
INSTALLATION		
1. Filler tube (16) and bracket (13)	Place in position with preformed packing (17).	
2. Capscrews (8) and washers (11)	Install.	
3. Capscrews (9) and washers (3)	Install.	
4. Plug (15)	Install.	



TA 172222

End

TRANSMISSION SERVICE

This task covers: a. Changing transmission oil
b. Replacing filter
c. Cleaning magnetic strainer assembly
d. Replacing torque converter breathers
e. Replacing transmission breathers

INITIAL SETUP

Test Equipment

None

Special Tools

Air nozzle and source of low pressure air

Materials/Parts

Oil per LO 10-3930-641-12
Torque converter breather
Transmission breather
Oil filter elements, two
Cover gasket
Solvent
Cleaning compound, Item 2, Appendix C
Container to catch waste oil
Face shield
Protective clothing
Stiff brush

Personnel Required

Two mechanics

References

PMCS, page 2-5

LO 10-3930-641-12

Troubleshooting Reference

Pages 2-44, 2-46, 2-47

Equipment Condition

Engine OFF and cooled

Access doors open

General Safety Instructions

Park the vehicle on level ground.

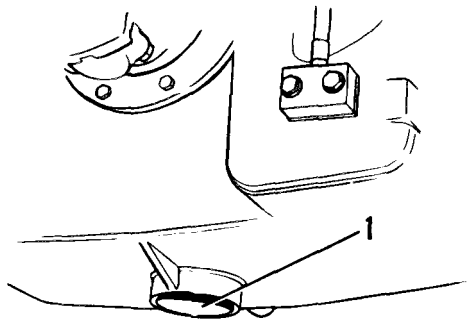
Lower mast.

Turn POWER switch to OFF.

Hot oil and parts can cause bums. Be careful during servicing procedure not to spill hot oil on you.

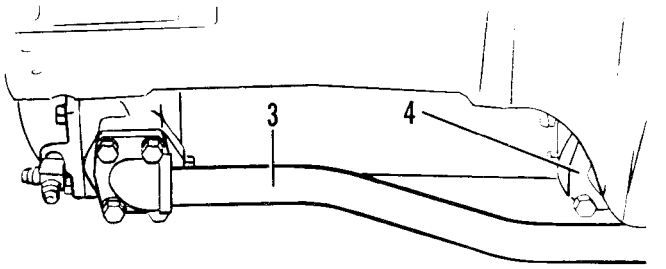
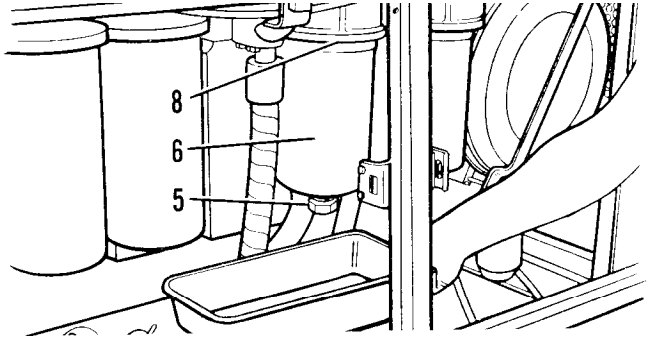
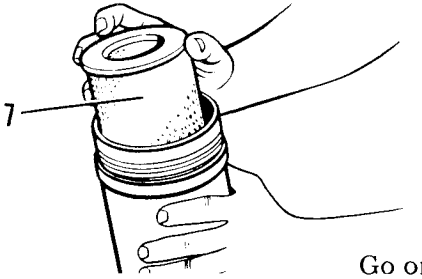
Go on to Sheet 2

TRANSMISSION SERVICE (CONT) (Sheet 2 of 5)

LOCATION/ITEM	ACTION	REMARKS
1. Drain plug (1)	a. Remove. b. Drain oil. c. Clean drain plug and install.	
2. Magnetic strainer (2)	**CAUTION** Do not drop or rap magnet against hard objects. Magnets will be damaged. a. Remove four capscrews and cover. b. Remove magnetic strainer. c. Wash screen and cover in clean, non-flammable solvent. **WARNING** When using pressure air, wear face shield and protective clothing to prevent injury. Use 30 psi maximum pressure for cleaning. d. Clean magnets with pressure air or stiff brush.	See PMCS, page 2-5.  TA 098751

Go on to Sheet 3

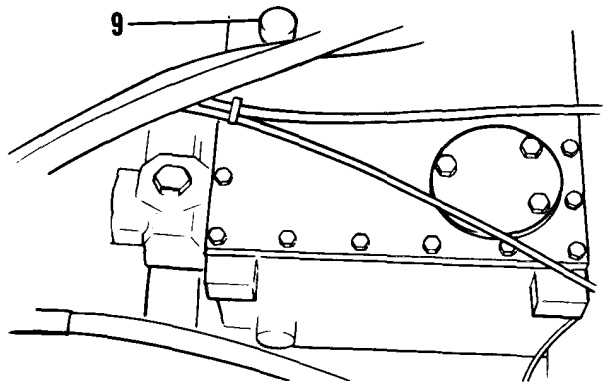
TRANSMISSION SERVICE (CONT) (Sheet 3 of 5)

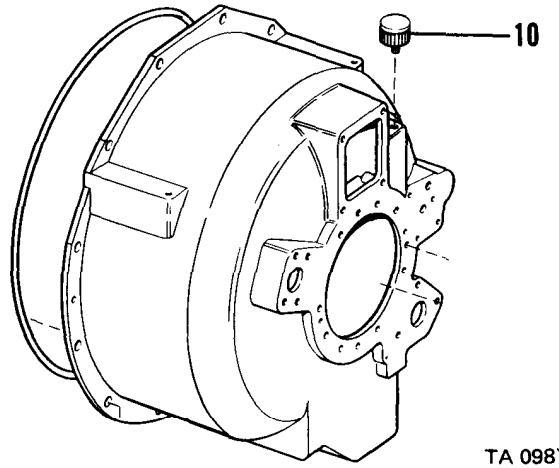
LOCATION/ITEM	ACTION	REMARKS
2. Magnetic strainer (cont)	e. Replace damaged magnets. f. Replace cover seal if damaged. g. Install strainer cover and four capscrews.	
3. Transmission oil cooler lines (3, 4)	Check for damage. Replace if necessary.	
4. Transmission oil filter	NOTE Place pan under filter housing to prevent spillage. a. Remove filter housing drain plug (5). b. Drain oil. c. Remove filter housing (6). d. Remove and discard filter element (7). e. Clean filter housing base (8). f. Wash filter housing in clean, non-flammable solvent. WARNING When using pressure air, wear face shield and protective clothing to prevent injury. Use 30 psi maximum pressure for cleaning.	See PMCS, page 2-5.   TA 098752

Go on to Sheet 4

TRWSMISSION SERVICE (CONT)

LOCATION/ITEM	ACTION	REMARKS
4. Transmission oil filter (cont)	g. Install new filter element in housing.	See PMCS, page 2-5.
	h. Install filter housing.	
	i. Clean and install drain plug.	
5. Transmission breather (9), and torque converter breather (10)	a. Remove and discard.	
	b. Replace.	



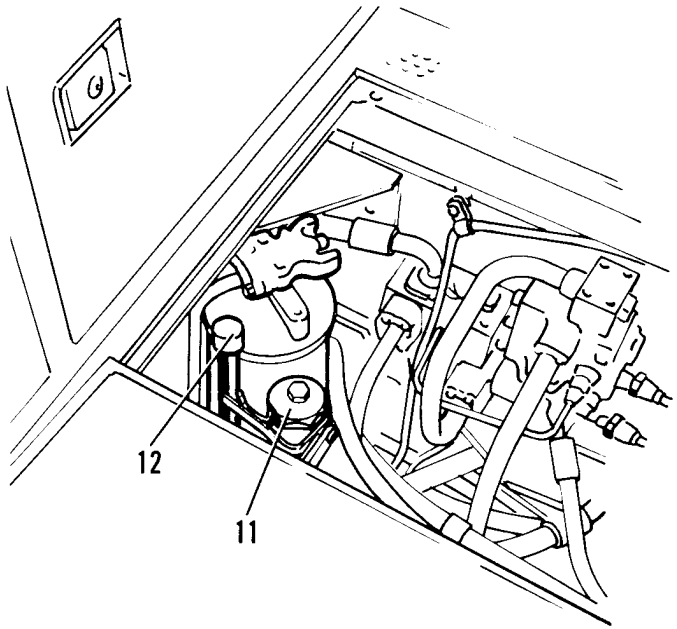


TA 098753

Go on to Sheet 5

TRANSMISSION SERVICE (CONT) (Sheet 5 of 5)

LOCATION/ITEM	ACTION	REMARKS
6. Transmission	Remove cap (11) and fill transmission.	See LO 10-3930-641-12.
7. Engine	Start and run at low idle.	See TM 10-3930-641-10.
8. Dipstick (12)	Use to check oil level.	Oil level should be between LOW and FULL marks on dipstick. Add oil if necessary.
9. Transmission oil filter	Check seat for leaks.	
10. Engine	Stop.	



TA 098754

End

TRANSMISSION CONTROL LINKAGE ADJUSTMENT

This task covers: Adjustment of transmission control linkage.

INITIAL SETUP

Test Equipment

None

Special Tools

None

Materials/Parts

None

Personnel Required

Two mechanics

References

PMCS, page 2-5

Transmission controls removal/installation, page 2-412.

Shipping link removal/installation, page 2-471.

Troubleshooting Reference

Pages 2-46, 2-47, 2-48

Equipment Condition

Turn engine OFF while adjusting linkage so that vehicle does not slip into gear and move. Pull parking brake control OUT. Install shipping link.

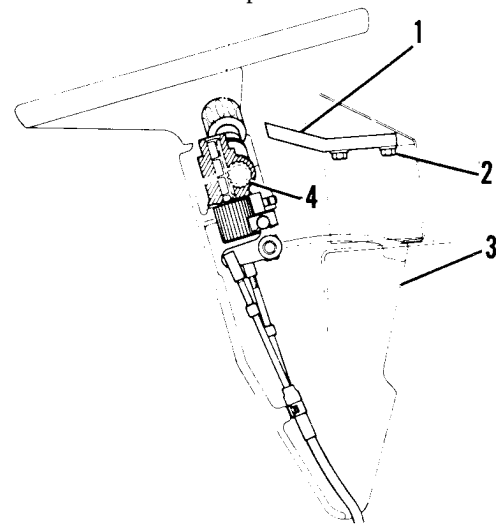
General Safety Instructions

Main disconnect switch OFF.

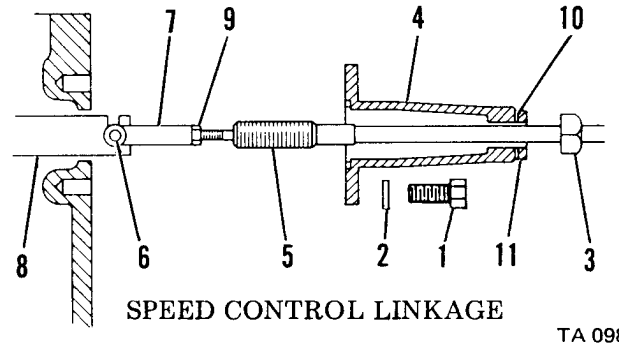
Go on to Sheet 2

TRANSMISSION CONTROL LINKAGE ADJUSTMENT (CONT) (Sheet 2 of 5)

LOCATION/ITEM	ACTION	REMARKS
1. Stop (1)	Check stop for proper adjustment. If stop is out of adjustment: a. Put control lever in NEUTRAL. b. Move steering column (3) forward to stored position. c. Loosen capscrews (2). d. Move stop until end just touches lever assembly (4). e. Tighten capscrews (2).	Stop (1) must move lever (4) to NEUTRAL when steering column is in stored position.
2. Speed control linkage (Located on steering hydraulic controls. See page 2-409.)	Adjust: a. Remove cap screws (1) and lockwashers (2). b. Loosen nut (3) from cable threads (5) and slide washer (11) and seal (10) back. c. Turn bracket (4) off threads (5). d. Lift pins (6) and yoke (7) out of slot in speed selection spool (8).	



STOP ADJUSTMENT

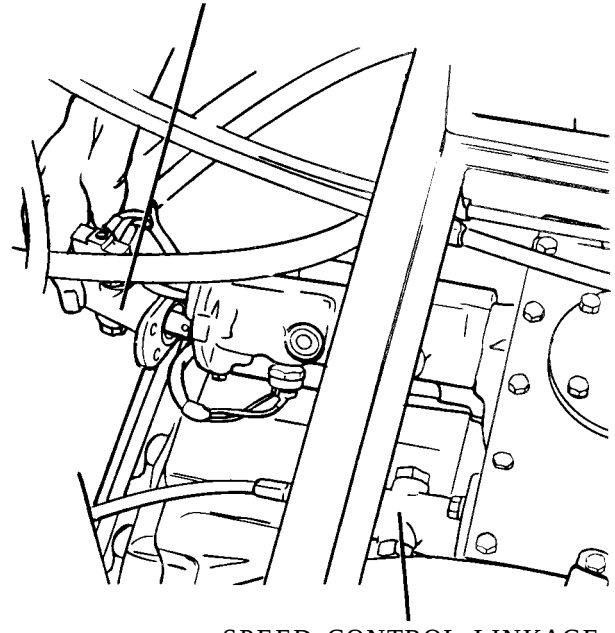


SPEED CONTROL LINKAGE

TA 098755

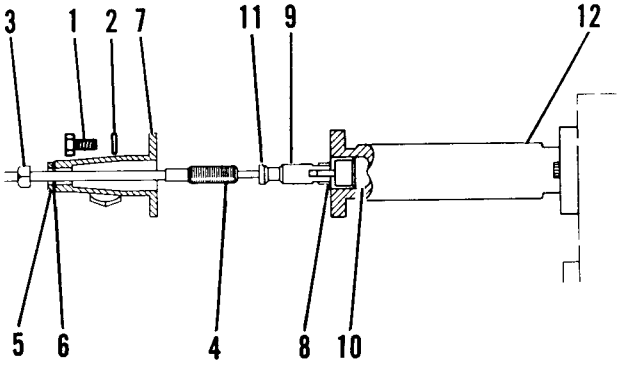
Go on to Sheet 3

TRANSMISSION CONTROL LINKAGE ADJUSTMENT (CONT) (Sheet 3 of 5)

LOCATION/ITEM	ACTION	REMARKS
2. Speed control linkage (cont)	e. Pull speed selection spool (8) out of case until it does not move. f. Hold speed selection spool (8) and install pin (6) in slot of spool. If pin cannot be installed without moving spool, loosen nut (9) to adjust yoke (7). Tighten nut (9). g. Install bracket (4) on threads (5). Turn until it is even with face of transmission case. h. Install capscrews (1) and lockwashers (2) into holes in transmission case. i. Install seal (10), washer (11), and nut (3) against bracket (4).	DIRECTION CONTROL LINKAGE  SPEED CONTROL LINKAGE TA 098888

Go onto Sheet 4

TRANSMISSION CONTROL LINKAGE ADJUSTMENT (CONT) (Sheet 4 of 5)

LOCATION/ITEM	ACTION	REMARKS
3. Direction control linkage.	Adjust: a. Move steering column all the way forward to stored position. Control lever will be in NEUTRAL. b. Remove capscrews (1) and lockwashers (2). c. Loosen nut (3) from cable threads (4). d. Move washer (5) and seal (6) off threads (4). e. Remove bracket (7) from threads (4). f. Lift pins (8) and yoke (9) out of slot in rod (10).	 TA 098756

Go on to Sheet 5

TRANSMISSION CONTROL LINKAGE (CONT) (Sheet 5 of 5)

LOCATION/ITEM	ACTION	REMARKS
3. Direction control linkage (cent)	g. Hold rod (10) and install pin (8) into slot in rod. If pin cannot be installed without moving rod, loosen cam (11) and adjust yoke (9). Tighten cam (11).	
	h. Install bracket (7) on threads (4) until it is even with face of lock group (12).	
	i. Install capscrews (1) and lockwashers (2) into holes in lock group (12).	
	j. Install seal (6), washer (5), and nut (3). Tighten nut against bracket.	

End

TRANSMISSION CONTROLS REMOVAL/INSTALLATION

This task covers: Replacement of transmission controls.

INITIAL SETUP

Test Equipment

None

Materials/Parts

As required

Troubleshooting Reference

Pages 2-47, 2-48

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

Transmission controls linkage adjustment, page 2-407

PMCS, page 2-5

Location, page 2-409

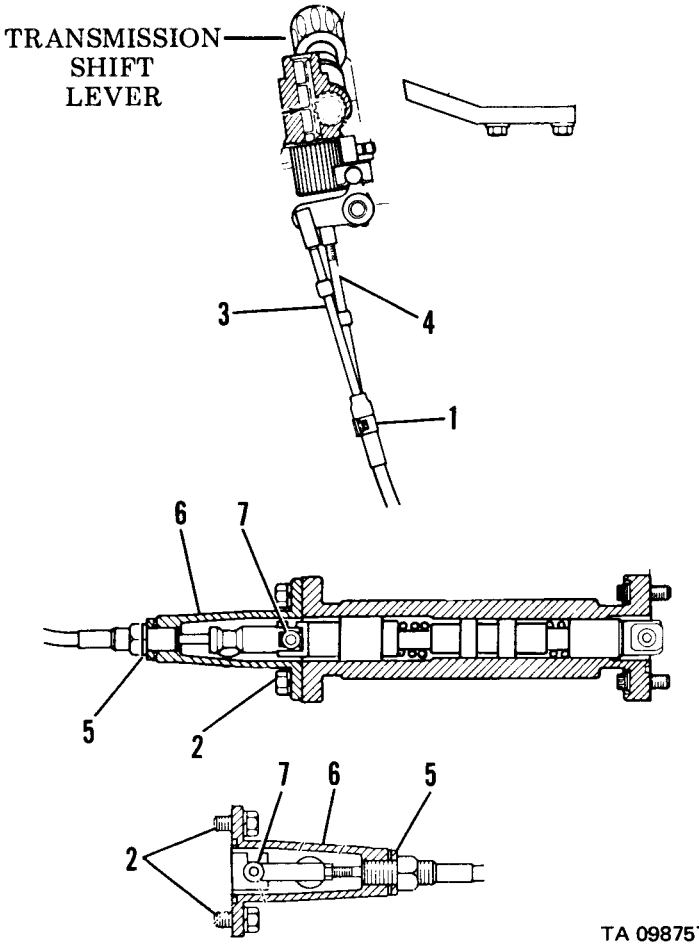
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

TRANSMISSION CONTROLS REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Clamp (1)	Disconnect.	
2. Four capscrews (2)	Remove.	
3. Control cable assemblies (3) and (4)	Detach.	
4. Retaining nuts (5)	Unscrew.	
5. Bracket (6)	Slide up cable.	
6. Pins (7)	Lift out of slots.	
7. Controls	Discard.	
INSTALLATION		
1. Controls	Place in position.	
2. Control cable assemblies (3) and (4)	Attach.	
3. Capscrews (2) and clamp (1)	Install.	
4. Control linkages	Adjust. (See page 2-407.)	



TA 098757

End

STEERING SYSTEM MAINTENANCE INSTRUCTIONS

This section covers removal and installation of these steering system components for Organizational Maintenance personnel:

a. Steering wheel b. Steering filter

Also instructions for steering system tests.

LIST OF TASKS (Sheet 1 of 1)

TASK NO.	TASK	REF (PAGE)	TROUBLESHOOTING REF (PAGE)
1	Steering wheel removal/installation.	2-415	None
2	Steering system tests.	2-417	2-48
3	Steering filter service.	2-421	None

End

STEERING WHEEL REMOVAL/INSTALLATION (Sheet 1 of 2)

This task covers: Removal and installation of steering wheel.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

Steering wheel puller

Personnel Required

One mechanic

References

None

General Safety Instructions

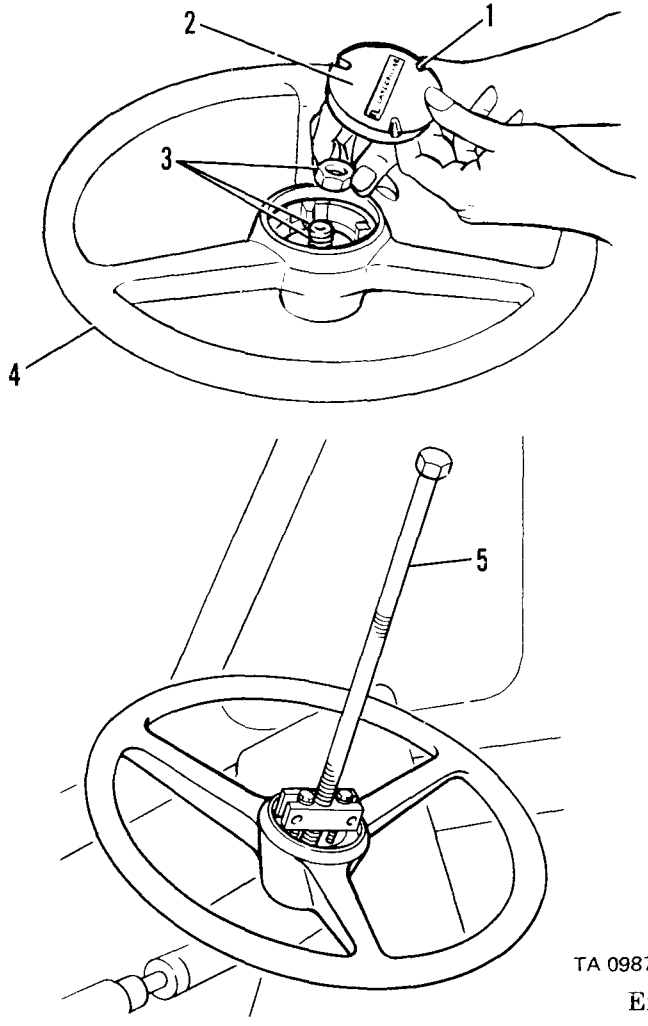
Pull parking brake control OUT.

Main disconnect switch OFF.

Go on to Sheet 2

STEERING WHEEL REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Screws (1)	Remove three from center cover (2) of steering wheel (4).	
2. Cover (2)	Remove.	
3. Nut, lockwasher, washer (3)	Remove from steering shaft.	
4. Steering wheel (4)	Install steering wheel puller (5) and remove steering wheel.	
INSTALLATION		
1. Steering wheel (4)	Install.	
2. Nut, lockwasher, washer (3)	Install. Tighten nut to a torque of 34-40 lb. ft. (46-54 N•m).	
3. Cover (2)	Install.	
4. Screw (1)	Install three in cover.	



TA 098758

End

STEERING SYSTEM TESTS

This task covers: Check of hydraulic oil, steering time test, and steering slip test.

INITIAL SETUP

Test Equipment

Stopwatch

Magnet

Materials/Parts

Container for hydraulic fluid

Troubleshooting Reference

Page 2-48

Equipment Condition

As stated in procedure

Special Tools

None

Personnel Required

Two mechanics

References

Transmission service, page 2-402

LO 10-3930-641-12

General Safety Instructions

Remove hydraulic reservoir cap slowly. Reservoir is under pressure.

Perform operational tests in area clear of personnel and obstructions.

Go on to Sheet 2

STEERING SYSTEM TESTS (CONT) (Sheet 2 of 4)

LOCATION/ITEM	ACTION	REMARKS
HYDRAULIC OIL CHECK	WARNING Remove hydraulic reservoir cap slowly to prevent sudden release of pressure.	
1. Hydraulic oil	Measure.	
2. Hydraulic reservoir	Check hydraulic oil immediately after engine is stopped: a. Take sample of oil in clear container. Check sample for air bubbles. If air bubbles are found, send vehicle to Direct Support Maintenance for further tests and repair. b. Remove filter elements. Check for foreign particles in oil. Use a magnet to separate iron. If foreign particles are found, send vehicle to Direct Support Maintenance for repair.	Particles may be metal from grating parts or non-metal from damaged seals, preformed packings, etc. See transmission service, page 2-402.

Go on to Sheet 3

STEERING SYSTEM TESTS ((X-NT) (Sheet 3 of 4)

LOCATION/ITEM	ACTION	REMARKS
STEERING TIME TEST	NOTE Perform tests with vehicle on dry, hard surface and brake OFF.	
1. Steering wheel	With engine at high idle, turn from stop to stop and from each stop to center.	Turning time from stop to stop must be between 2.6 and 3.0 seconds. The difference between right turn and left turn time must not be more than 0.3 seconds.
2. Brakes	With engine at high idle, push brake pedal and turn steering wheel from stop to stop.	Turning time must not increase more than 0.2 seconds from time with brake OFF. If vehicle steering time does not meet these specifications, send vehicle to Direct Support Maintenance for adjustments and repair.
3. Carriage	Raise.	

Go on to Sheet 4

STEERING SYSTEM TESTS (CONT) (Sheet 4 of 4)

LOCATION/ITEM	ACTION	REMARKS
STEERING SLIP TEST		
1. Brakes	Release.	
2. Steering wheel	With engine running at low idle:	
	a. Turn through one revolution in each direction.	Steering resistance should increase when direction is changed.
	b. Turn slowly from stop to stop.	Steering should be smooth, not jerky, and should be at constant speed without irregular motion.
	c. Begin turning and release wheel.	Steering wheel should stop.
		If vehicle fails these tests, send to Direct Support Maintenance for repairs.

End

STEERING FILTER SERVICE (Sheet 1 of 2)

This task covers: Steering filter service

INITIAL SETUP

Test Equipment

None

Materials/Parts

Cleaning Compound, Item 2, Appendix C

Clean lint-free rag, Item 16, Appendix C

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

LO 10-3930-641-12

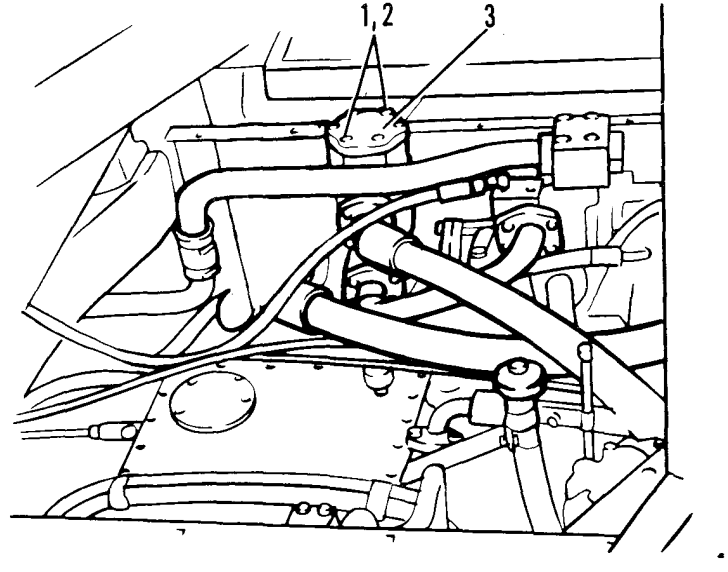
General Safety Instructions

Main disconnect switch OFF

Go on to Sheet 2

STEERING FILTER SERVICE (CONT)

LOCATION/ITEM	ACTION	REMARKS
1. Capscrews (1) and washers (2)	Remove.	
2. Cap (3)	Remove.	
3. Strainer	Remove and clean in cleaning solvent. Dry with clean lint-free rag.	
4. Strainer	Install.	
5. Cap (3)	Place in position.	
6. Capscrews (1) and washers (2)	Install.	



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End

BODY ACCESSORY ITEMS MAINTENANCE INSTRUCTIONS

This section covers removal and installation of these accessory items for Organizational Maintenance personnel:

a. Mirrors
b. Wipers
c. Cab heater and defroster

Also instructions for servicing cab air filters.

LIST OF TASKS (Sheet 1 of 1)

TASK NO.	TASK	REF (PAGE)	TROUBLESHOOTING REF (PAGE)
1	Mirrors removal/installation.	2-424	None
2	Windshield wiper motor and linkage removal/installation.	2-426	None
3	Cab floor heater removal/installation.	2-434	None
4	Cab heater and defroster removal/installation.	2-440	None
5	Filter for cab heater removal/installation.	2-450	None

End

MIRRORS REMOVAL/INSTALLATION

This task covers: Removing and installing the side mount mirrors.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

Torque limits chart, page E-1

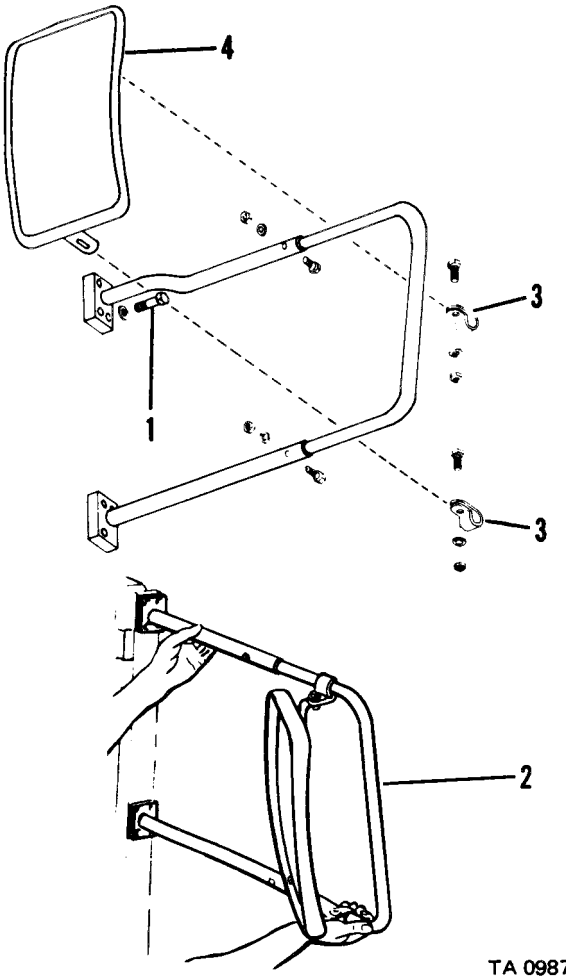
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

MIRRORS REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
COMPLETE ASSEMBLY		
REMOVAL	NOTE	
	Mirror assembly will fall when six capscrews are removed.	
1. Capscrews (1)	Remove six.	
2. Mirror assembly (2:	Remove.	
INSTALLATION		
1. Mirror assembly (2)	Put in position.	
2. Capscrews (1)	Install.	
MIRROR ONLY		
REMOVE		
1. Clip (3), capscrews, nuts, washers	Remove.	
2. Mirror (4)	Remove.	
INSTALLATION		
1. Mirror	Put in position.	
2. Clip (3), capscrews, nuts, washers	Install.	



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End

WINDSHIELD WIPER MOTOR AND LINKAGE REMOVAL/INSTALLATION

This task covers: Replacement of windshield wiper motor and linkage.

NOTE

This procedure covers both the front and rear windshield wiper motor and linkage removal and installation.

INITIAL SETUP

Test Equipment

None

Materials/Parts

As needed

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

Torque limits chart, page E-1

General Safety Instructions

Main disconnect switch OFF.

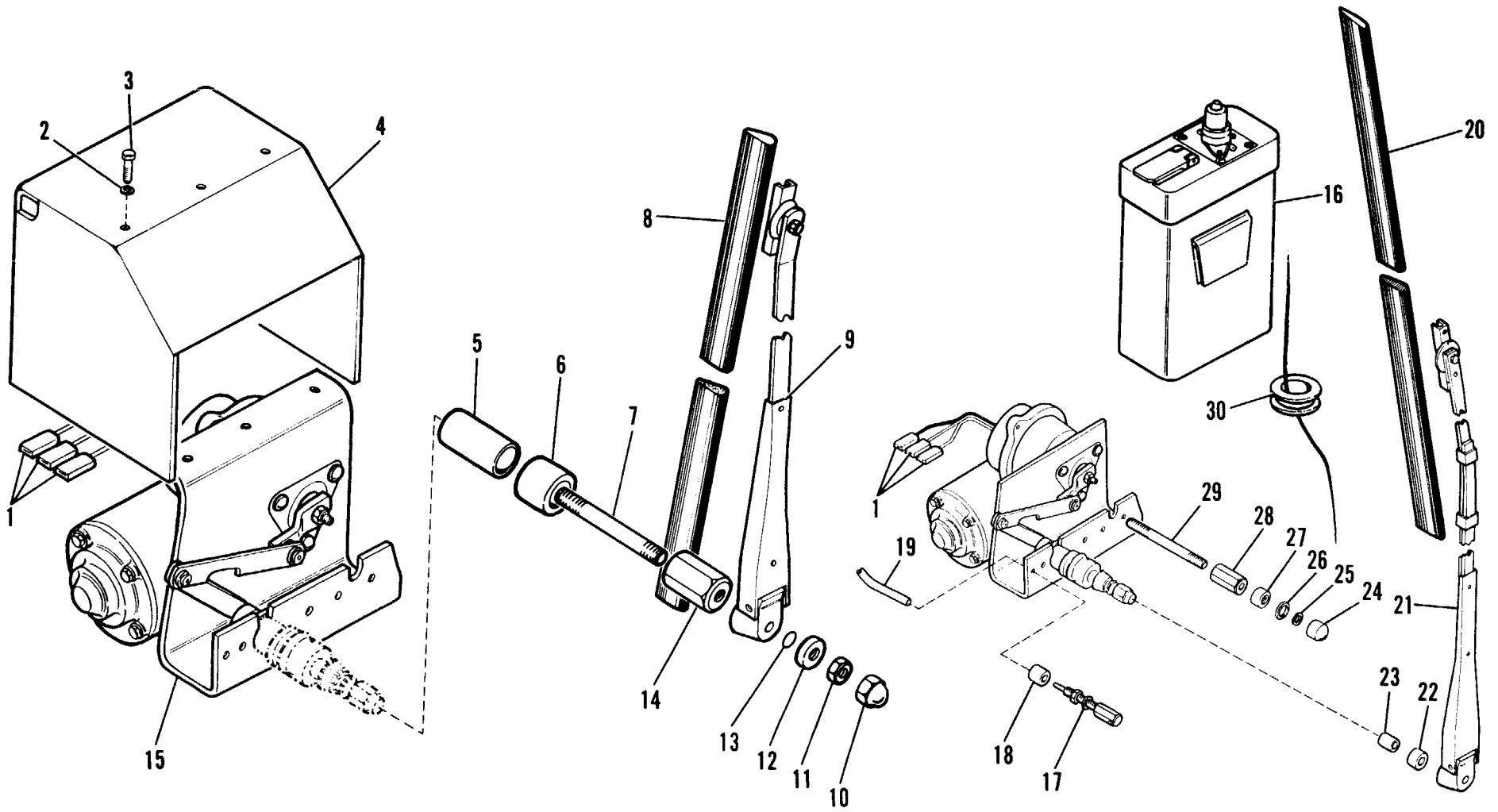
Go on to Sheet 2

WINDSHIELD WIPER MOTOR AND LINKAGE REMOVAL/INSTALLATION (CONT)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		LEGEND FOR PAGE 2-428 1. Terminal 2. Washer 3. Capscrew 4. Motor housing 5. Spacer 6. Cap 7. Shaft 8. Blade 9. Wiper arm assembly 10. Nut 11. Jam nut 12. Lockwasher 13. Preformed packing 14. Driver 15. Cover 16. Tank 17. Nozzle 18. Spacer 19. Hose 20. Blade 21. Wiper arm assembly 22. Spacer 23. Spacer 24. Nut 25. Retainer 26. Seal 27. Seal 28. Nut 29. Stud 30. Grommet
1. Nut (10), lockwasher (12), jam nut (11), preformed packing (13), wiper arm assembly (9) and driver (14)	Remove from wiper arm shaft.	
2. Cap (6) and nut behind it, spacer (5) and shaft (7)	Remove.	
3. Three nuts (24). Three retainers with seals (25), (26), (27)	Remove.	
4. Five screws and lockwashers, panel and seal of cab dashboard	Remove.	
5. Eight capscrews, lockwashers, washers and cover of cab dashboard	Remove.	

Go on to Sheet 3

WINDSHIELD WIPER MOTOR AND LINKAGE REMOVAL/INSTALLATION (CONT)



TA 098761

Go on to Sheet 4

WINDSHIELD WIPER MOTOR AND LINKAGE REMOVAL/INSTALLATION (CONT) (Sheet 4 of 8)

LOCATION/ITEM	ACTION	REMARKS
6. Four capscrews and lockwashers	Remove from steering position bracket and remove bracket.	
7. Three terminals (1)	Discomect and remove wiper motor and linkage.	
8. Washer nozzle (17) and spacer (18)	Remove. Remove hose (19) and nut from inside cab.	

Go on to Sheet 5

WINDSHIELD WIPER MOTOR AND LINKAGE REMOVAL/INSTALLATION (CONT) (Sheet 5 of 8)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION		
1. Washer nozzle (17) and spacer 18)	Install.	
2. Nut and hose (19) from washer pump	Install on nozzle.	
3. Wiper motor and linkage	Place in position.	
4. Three terminals (1)	Connect.	

Go on to Sheet 6

WINDSHIELD WIPER MOTOR AND LINKAGE REMOVAL/INSTALLATION (CONT) (Sheet 6 of 8)

LOCATION/ITEM	ACTION	REMARKS
5. Seal (25) in retainer (26), nut (24), and nut (28)	Install on stud.	
6. Spacer (5)	Install on wiper arm shaft (7).	
7. Cap (6)	Install on wiper arm shaft (7).	

Go on to Sheet 7

WINDSHIELD WIPER MOTOR AND LINKAGE REMOVAL/INSTALLATION (CONT) (Sheet 7 of 8)

LOCATION/ITEM	ACTION	REMARKS
8. Driver (14)	Install on wiper arm shaft. Turn wiper motor ON to find correct position for wiper arm assembly. Stop motor.	
9. Wiper arm assembly (9)	Install on wiper arm shaft. Fine adjustments for the wiper arm at REST position can be made with capscrew on back of motor assembly gear box.	
10. Lockwasher (12) and nut (10)	Install on wiper arm shaft.	
11. Steering positioner bracket and rack	Install with four bolts, lockwashers and washers.	

Go on to Sheet 8

WINDSHIELD WIPER MOTOR AND LINKAGE REMOVAL/INSTALLATION (CONT) (Sheet 8 of 8)

LOCATION/ITEM	ACTION	REMARKS
12. Cab dashboard cover	Put over steering positioner bracket and install eight bolts, lockwashers, and washer to hold it.	
13. Dashboard panel and seal	Install using five screws and lockwashers.	

End

CAB FLOOR HEATER REMOVAL/INSTALLATION

This task covers: Removal and installation of cab floor heater.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

None

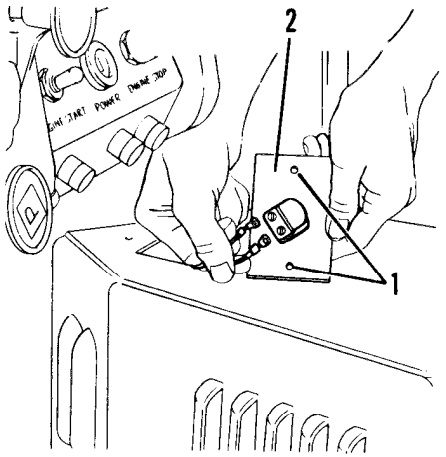
General Safety Instructions

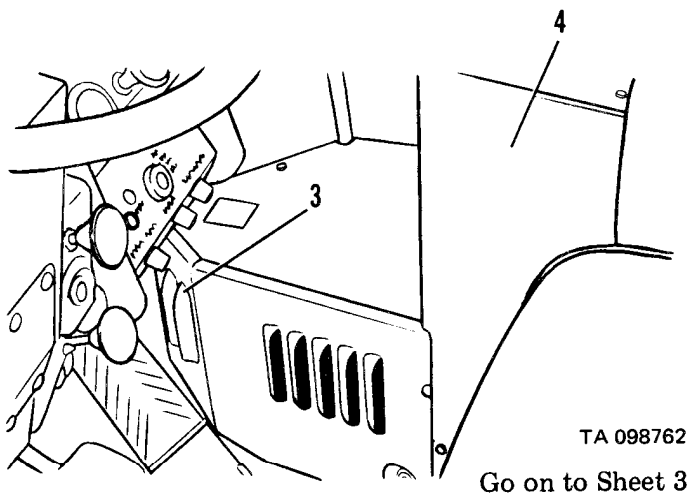
Main disconnect switch OFF.

Go on to Sheet 2

CAB FLOOR HEATER REMOVAL/INSTALLATION (CONT)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Container lock indicator panel	Remove. (See page 2-298.)	
2. Two capscrews and washers (1), "off-on" switch plate (2)	Remove. Lift up switch plate (2).	
3. Two wires that are connected to switch	a. Put identification on them for correct installation. b. Disconnect.	
4. Twelve capscrews and lockwashers that secure panels (3) and (4)	Remove three of each at heater panel (3); nine of each at hydraulic control console front panel.	
5. Panels (3) and (4)	Remove.	

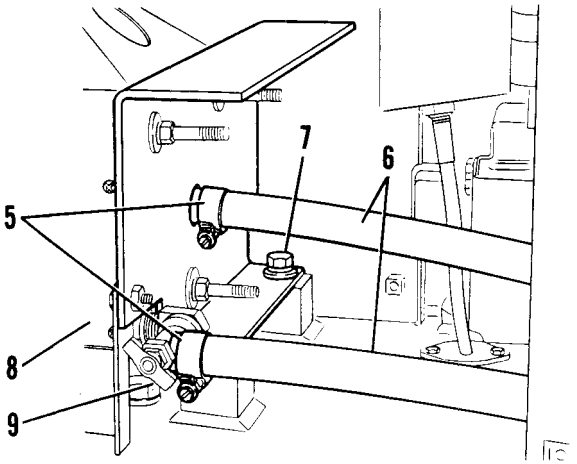


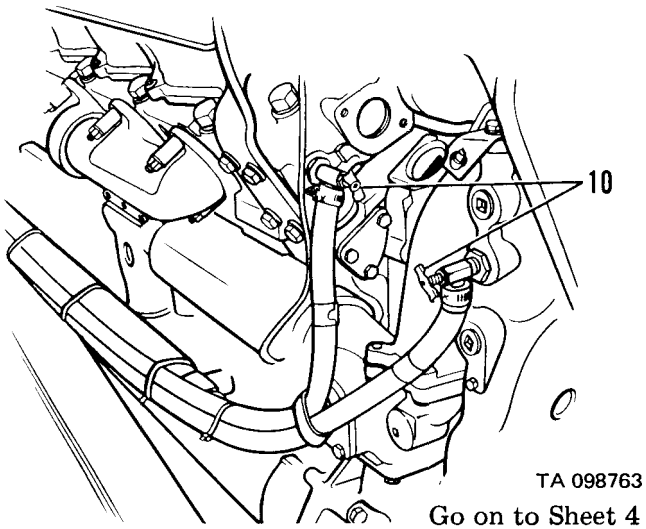


Go on to Sheet 3

CAB FLOOR HEATER REMOVAL/INSTALLATION (CONT) (Sheet 3 of 6)

LOCATION/ITEM	ACTION	REMARKS
6. Two heater hose shut-off valves (10) on engine	Turn clockwise to closed position.	
7. Inlet shut-off valve (9) at cab heater	Turn clockwise to closed position.	
8. Two chunps (5)	Loosen.	
9. Two hoses (6)	Tag for identification anckdisconnect horn heater assembly.	
10. Two capscrews, lockwashers, and washers (7) on heater bracket	Remove.	
11. Heater assembly and bracket (8)	Remove.	





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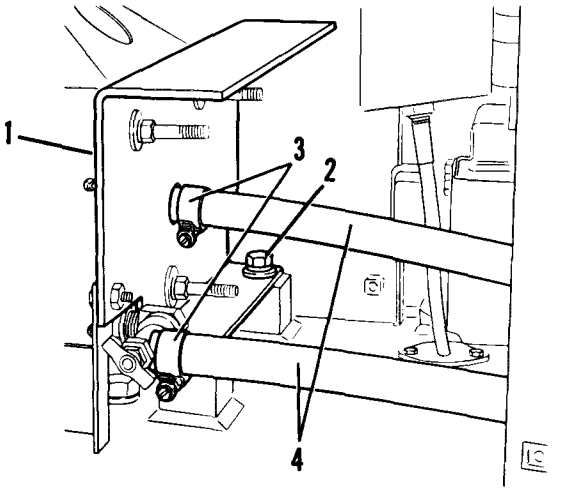
Go on to Sheet 4

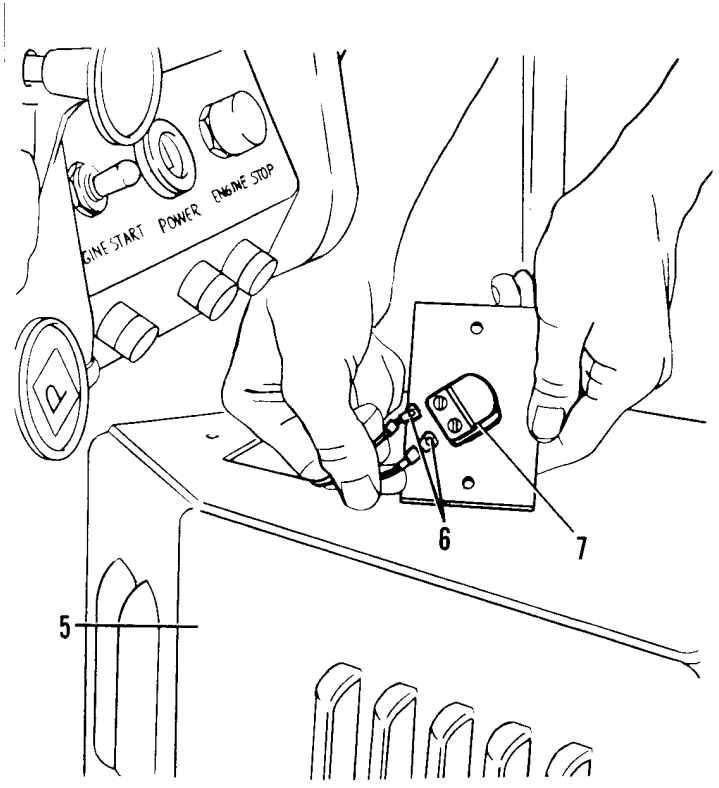
CAB FLOOR HEATER REMOVAL/INSTALLATION (CONT) (Sheet 4 of 6)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION		
1. Heater assembly and bracket (1)	Position in cab.	
2. Two capscrews, lockwashers, and washers (2)	Install in heater bracket.	
3. Two clamps (3) and two hoses (4)	a. Put loosened clamps on ends of hoses. b. Connect hoses to proper fittings on heater. c. Slide clamps up and tighten them.	

TA 098764

Go on to Sheet 5

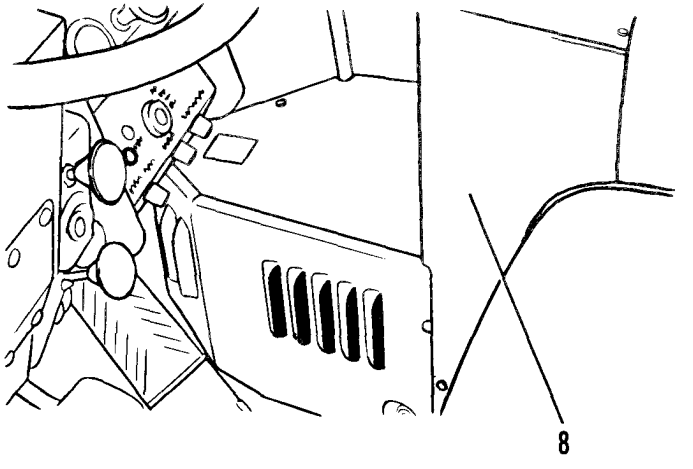
CAB FLOOR HEATER REMOVAL/INSTALLATION (CONT) (Sheet 5 of 6)

LOCATION/ITEM	ACTION	REMARKS
4. Heater panel (5)	a. Position over heater. b. Pull two wires (6) through hole in top of panel.	
5. Three capscrews and lockwashers that secure heater panel	Install in panel.	
6. Two wires (6) and switch plate (7)	Connect wires to correct terminals on switch.	
7. Two capscrews that secure switch plate to heater panel	Install.	

TA 098765

Go on to Sheet 6

CAB FLOOR HEATER REMOVAL/INSTALLATION (CONT) (Sheet 6 of 6)

LOCATION/ITEM	ACTION	REMARKS
8. Hydraulic control console front panel (8)	Position in cab.	
9. Nine capscrews and lockwashers that secure hydraulic control console front panel	Install.	

TA099228

End

CAB HEATER AND DEFROSTER REMOVAL/INSTALLATION

This task covers: Removal and installation of cab heater and filter.

INITIAL SETUP

Test Equipment

None

Materials/Parts

As required

Troubleshooting Reference

None

Equipment Condition

Main disconnect switch OFF

Special Tools

Two 1/2-13 NC forged eyebolts

Four 5/16-18 NC forged eyebolts

Hoist

Personnel Required

One mechanic

References

Torque limits chart, page E-1

General Safety Instructions

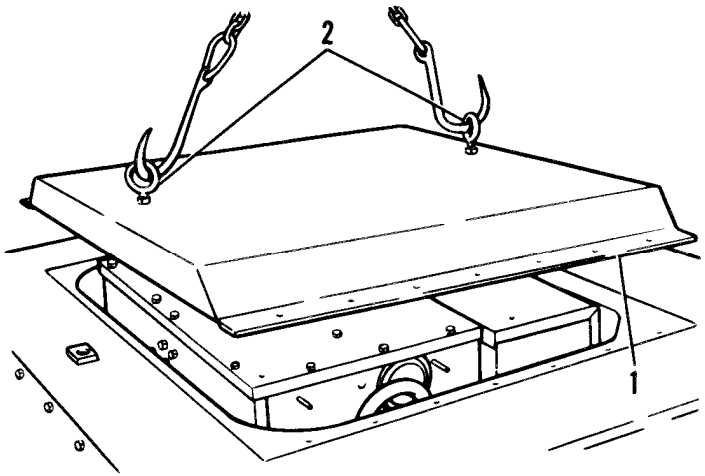
Vehicle engine must be off.

Battery must be disconnected.

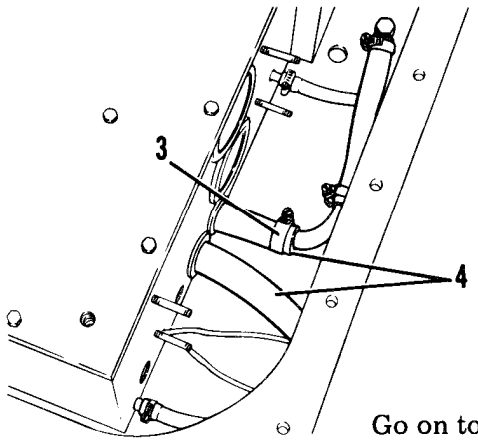
Go on to Sheet 2

CAB HEATER AND DEFROSTER REMOVAL/INSTALLATION (CONT)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Fourteen capscrews and washers around edges of cover (1)	Remove.	
2. Two 1/2-13 NC forged eyebolts with nuts and washers (2)	a. Lift one side of the cover, block it securely and install eyebolt. Repeat for other eyebolt. b. Fasten hoist to eyebolts and remove cover. Cover weighs 92 lb. (42 kg).	
3. Two hose clamps and two heater hoses (3)	a. Loosen clamps. b. Disconnect hoses (4).	



TYPICAL EXAMPLE



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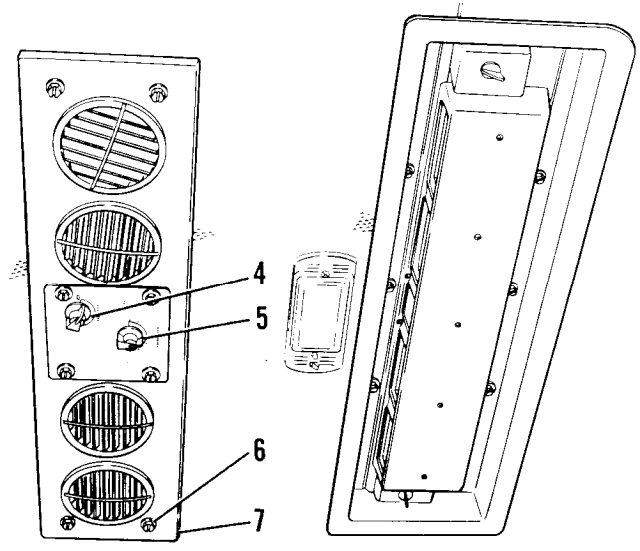
Go on to Sheet 3

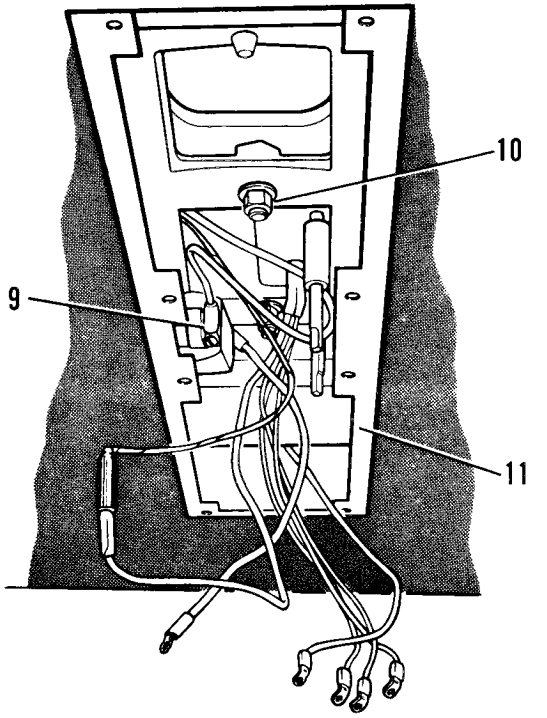
CAB HEATER AND DEFROSTER REMOVAL/INSTALLATION (CONT) (Sheet 3 of 10)

LOCATION/ITEM	ACTION	REMARKS
4. Heater temperature control knob (4)	Loosen setscrew and remove knob from control console (7).	
5. Fan speed knob (5)	Loosen setscrew and remove knob from control console (7).	
6. Eight capscrews (6)	Remove.	
7. Control console (7)	Lower.	
8. Wires at fan switch (5)	Disconnect. Put identification on wires for correct installation.	

TA 098768

Go on to Sheet 4

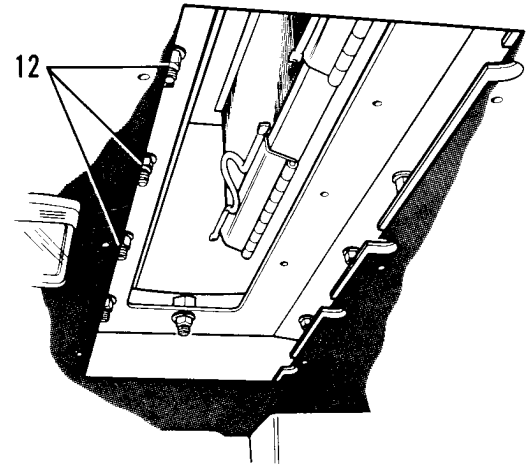
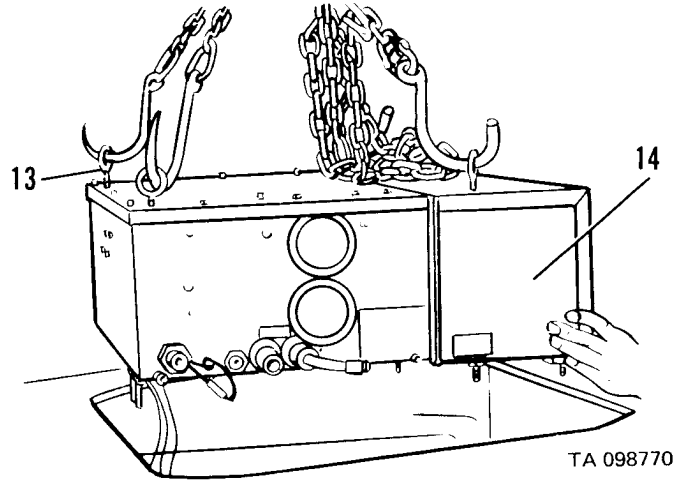
CAB HEATER AND DEFROSTER REMOVAL/INSTALLATION (CONT) (Sheet 4 of 10)

LOCATION/ITEM	ACTION	REMARKS
9. Circuit breaker terminal(9)	Disconnect white/blue wire at terminal. Put identification on wire for correct installation.	
10. Four nuts and washers (10) that hold heater unit to cab	Remove.	
11. Air duct (11)	Remove.	

TA 098769

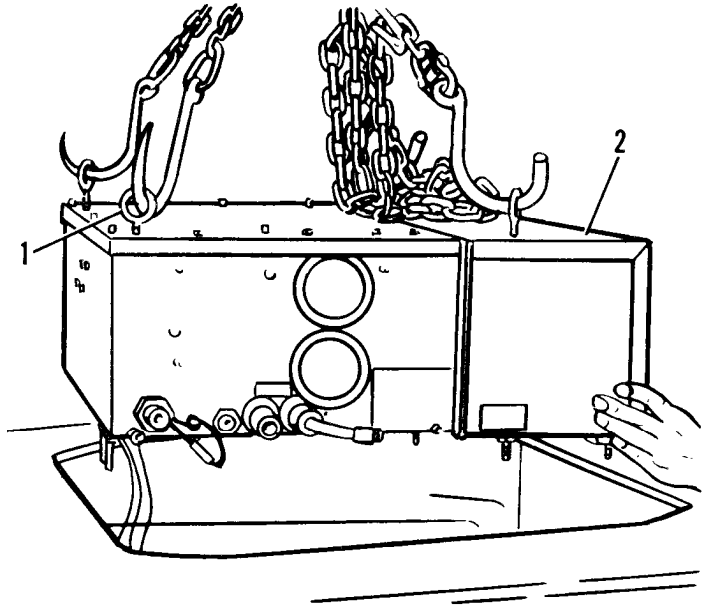
Go on to Sheet 5

CAB HEATER AND DEFROSTER REMOVAL/INSTALLATION (CONT) (Sheet 5 of 10)

LOCATION/ITEM	ACTION	REMARKS
12. Ten nuts and washers (12) that hold heater unit to cab	Remove.	
13. Four 5/16-18NC forged eyebolts (13)	a. Install eyebolts in top of heater unit (14). b. Attach a hoist to eyebolts as shown. c. Lift heater unit from cab. Heater unit weighs 105 lb. (47.6 kg).	

Go on to Sheet 6

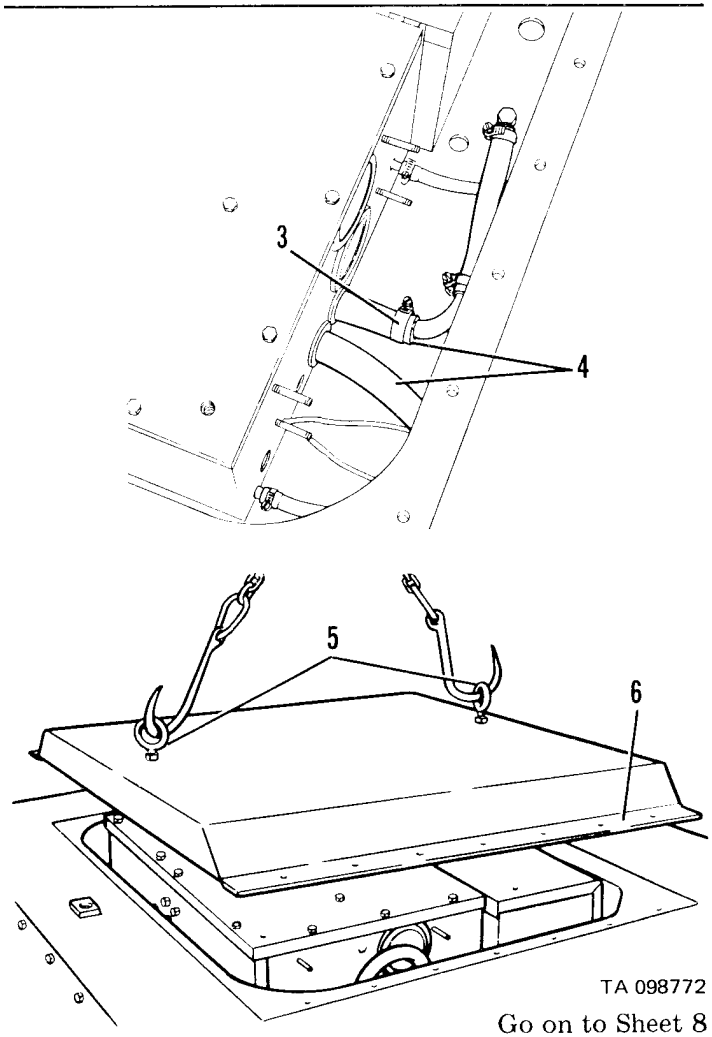
CAB HEATER AND DEFROSTER REMOVAL/INSTALLATION (CONT) (Sheet 6 of 10)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION		
1. Four 5/16-18NC forged eyebolts (1)	a. Install on top of heater unit (2). b. Attach a hoist to eyebolts as shown. c. Lift heater unit above Roll-Over Protective Structure (ROPS). d. Lower heater unit into position.	 TA 098771

Go on to Sheet 7

CAB HEATER AND DEFROSTER REMOVAL/INSTALLATION (CONT) (Sheet 7 of 10)

LOCATION/ITEM	ACTION	REMARKS
2. Two clamps (3)	Slide loosened clamps over ends of heater hoses (4).	
3. Two heater hoses (4)	a. Connect hoses to fittings on heater unit. b. Slide clamps over hose and fittings and tighten clamps.	
4. Two 1/2-13NC forged eyebolts with nuts and washers (5)	a. Install on cover (6). b. Attach hoist to eyebolts as shown. c. Lift cover above Roll-Over Protective Structure (ROPS). d. Position cover on ROPS. e. Lift one side of cover, block it securely and remove eyebolt. f. Remove second eyebolt the same way.	
5. Cover (6)	Position on ROPS.	



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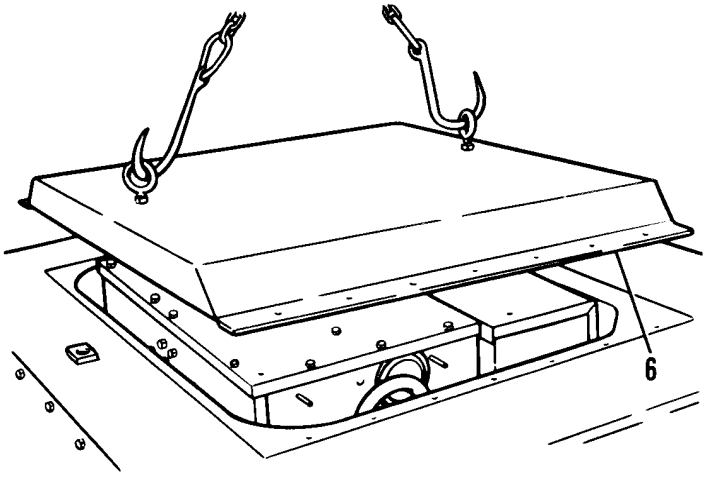
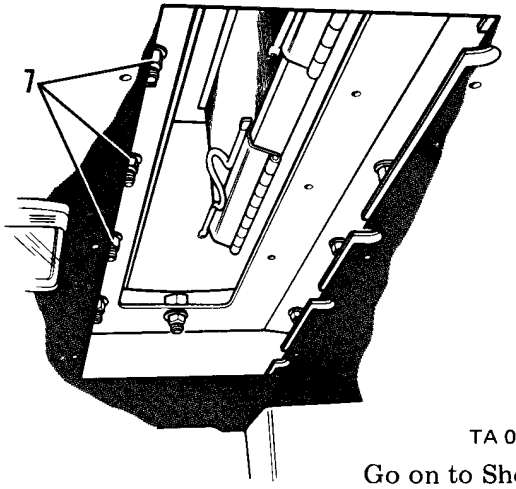
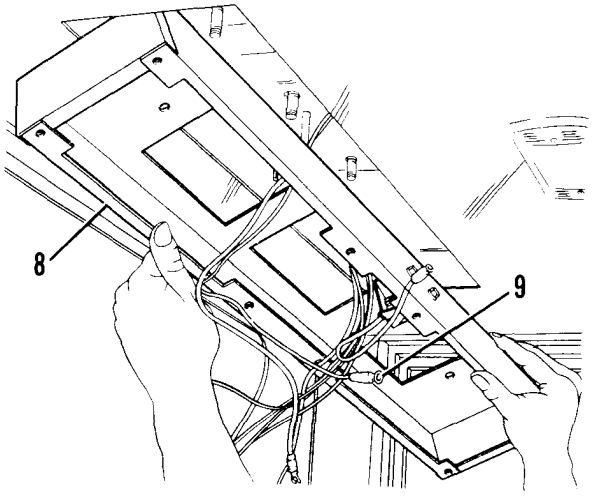
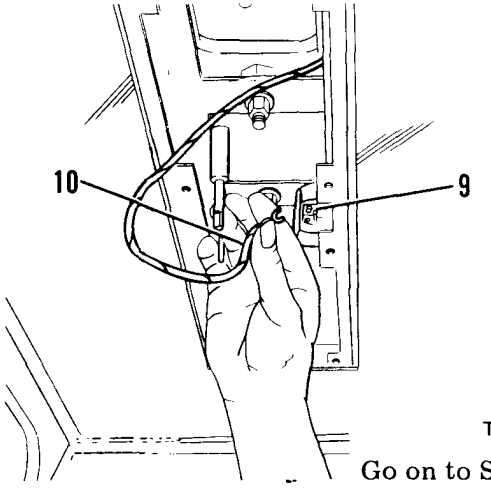
Go on to Sheet 8

CAB HEATER AND DEFROSTER REMOVAL/INSTALLATION (CONT)

LOCATION/ITEM	ACTION	REMARKS
6. Fourteen capscrews and washers that hold cover (6) t.n ROPS.	Install.	
7. Ten nuts and washers (7) that hold heater unit to cab	Install. Tighten nuts to a torque of 100-180 lb. in. (11 to 30 N•m).	 TA 098773

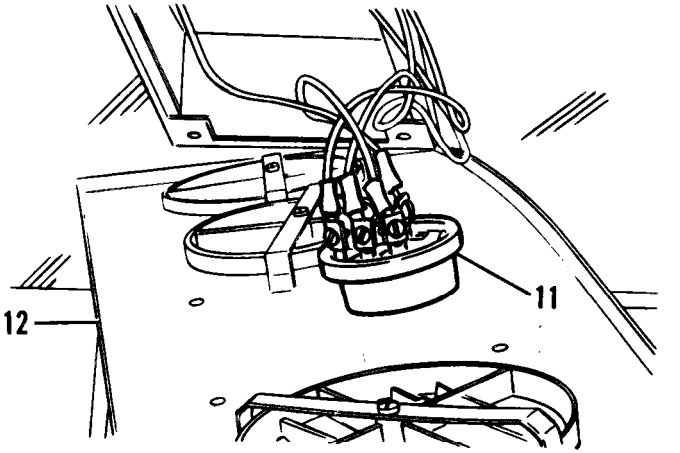
Go on to Sheet 9

CAB HEATER AND DEFROSTER REMOVAL/INSTALLATION (CONT) (Sheet 9 of 10)

LOCATION/ITEM	ACTION	REMARKS
8. Airduct (8)	Position under four heater unit mounting nuts in front of cab. Side with circuit breaker (9) must face the rear of cab.	
9. Four nuts andwashers that hold air duct bracket	Install. Tighten nuts to a torque of 100-180 lb. in. (11 to 30 N•m).	
10. Circuit breaker terminal (9)	Connect white/blue wire (10).	 TA 098774

Go on to Sheet 10

CAB HEATER AND DEFROSTER REMOVAIJINSTALLATION (CONT) (Sheet 10 of 10)

LOCATION/ITEM	ACTION	REMARKS
11. Fan switch (11)	Connect proper wires to proper terminals on switch.	
12. Control console (12)	Position console on roof.	
13. Eight capscrews that hold control console to roof	Install.	
14. Fan speed and heater temperature knobs	a. Install. Tighten setscrew. b. Test for proper operation.	

TA 098775

End

FILTER FOR CAB HEATER REMOVAL/INSTALLATION

This task covers: Remove, cleaning and installation of the filter for the cab heater.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Non-sudsing detergent

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

None

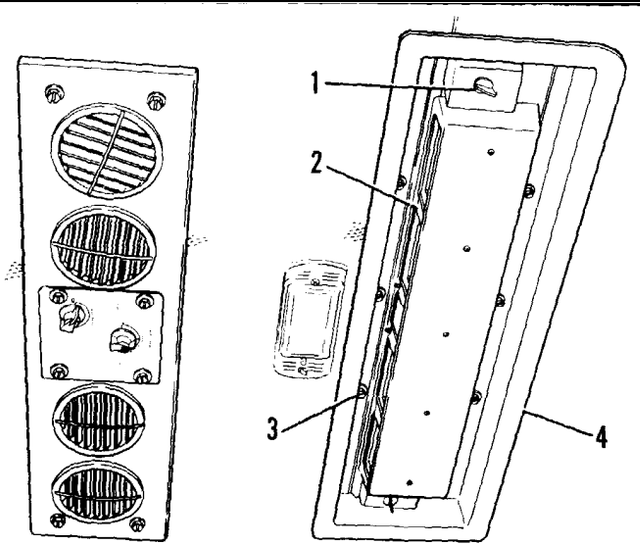
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

FILTER FOR CAB HEATER REMOVAL/INSTALLATION (CONT)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Two thumb screws (1)	Loosen.	
2. Cover (2)	Remove.	
3. Two foam rubber filters	Remove.	
4. Eight screws (3)	Remove.	
5. Filter flange (4)	Remove.	
CLEANING		
Foam rubber filters	a. Wash in non-sudsing detergent. b. Rinse in clean water. c. Squeeze dry.	

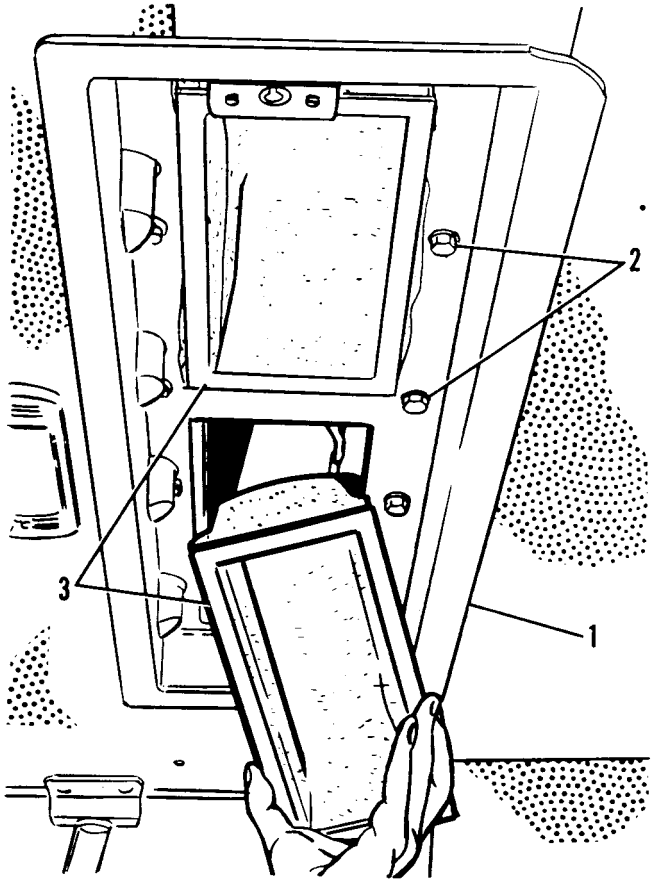


TA 098776

Go on to Sheet 3

FILTER FOR CAB HEATER REMOVAL/INSTALLATION (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION		
1. Filter flange (1)	Position on air duct.	
2. Eight screws (2)	Install.	
3. Two foam rubber filters (3)	Install.	
4. Cover	Install.	
5. Two thumb screws	Tighten.	



TA 098777

End

BODY, CAB, AND HOOD MAINTENANCE INSTRUCTIONS

This section covers removal and installation of these body components for Organizational Maintenance personnel:

a. Hood
b. Fenders
c. seat
d. Arm cushion
e. Cab door and striker
f. Handrails
g. Ladders
h. Shipping link
i. Grease lines
j. Pintle hook
k. Rear bumper

Also instructions for striker adjustment.

LIST OF TASKS (Sheet 1 of 1)

TASK NO.	TASK	REF (PAGE)	TROUBLESHOOTING REF (PAGE)
1	Hood removal/installation.	2-454	None
2	Fenders removal/installation.	2-457	None
3	Seat removal/installation.	2-460	None
4	Seat belts removal/installation.	2-462	None
5	Arm cushion removal/installation.	2-464	None
6	Windshield wipers removal/installation.	2-466	None
7	Cab door and striker removal/installation.	2-468	None
8	Shipping link removal/installation.	2-471	None
9	Striker adjustment.	2-473	None
10	Platform handrails removal/installation.	2-475	None
11	Ladders removal/installation.	2-477	None
12	Grease lines removal/installation.	2-479	None
13	Pintle hook removal/installation.	2-481	None
14	Crankcase guard removal/installation.	2-483	None

End

HOOD REMOVAL/INSTALLATION

This task covers: Replacement of hood.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Shipping link installed.

Special Tools

Hoist - 150 lbs. minimum capacity

Personnel Reauired

One mechanic

References

Shipping link removal/installation, page 2-471.

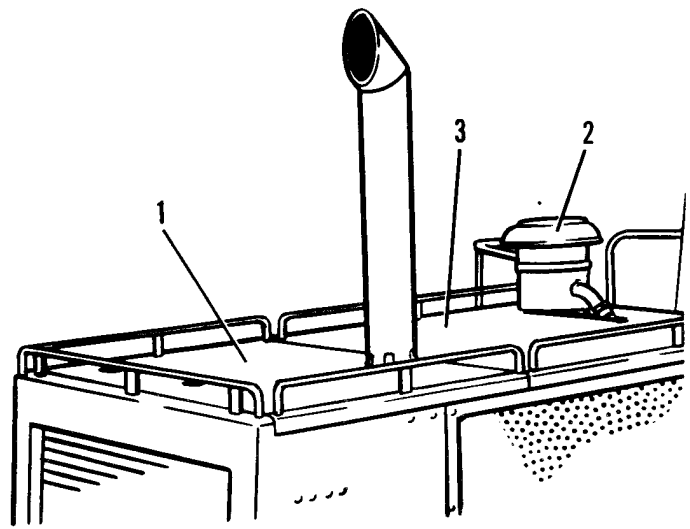
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

HOOD REMOVAL/INSTALLATION (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
1. Four capscrews and washers that hold rear hood (1) in position	Remove.	
2. Rear hood (1)	Fasten hoist and remove. NOTE Weight of hood is 96 lbs. (44 kg).	
3. Precleaned lid (2)	Remove.	
4. Rubber latch assemblies	Disconnect five from frame assembly.	
5. Front hood (3)	Fasten hoist and remove, guiding carefully over precleaner. NOTE Weight of hood is 124 lbs. (56 kg).	

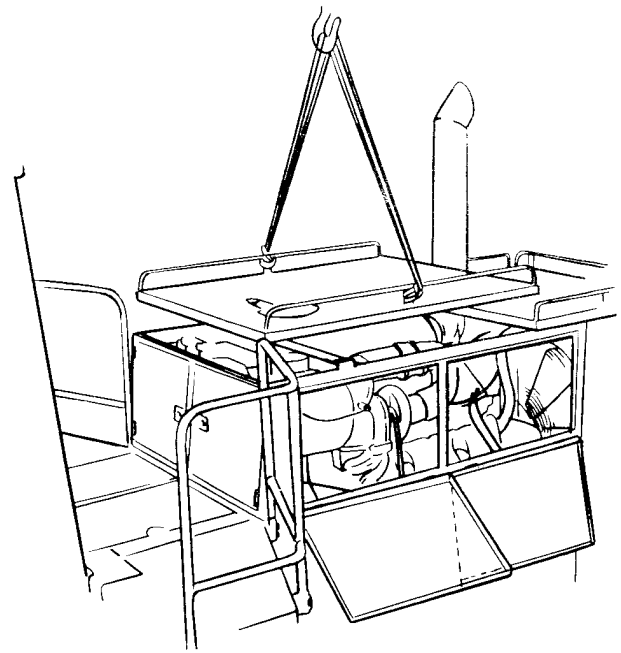


TA 098778

Go on to Sheet 3

HOOD REMOVAL/INSTALLATION (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION		
1. Front hood (3)	Fasten hoist and put in position.	
2. Rubber latch assemblies	Fasten to frame assembly.	
3. Precleaner lid (2)	Place in position and tighten clamp.	
4. Nuts for precleaner lid	Fasten.	
5. Hose clamp	Tighten.	
6. Rear hood (1)	Fasten hoist and put in position.	
7. Four capscrews that hold rear hood in position	Install. The two longer capscrews are installed toward the cab.	



TA 098887

End

FENDERS REMOVAL/INSTALLATION

This task covers: Removing and installing front and rear fenders.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

Hoist

Personnel Required

One mechanic

References

Torque limits chart, page E-1

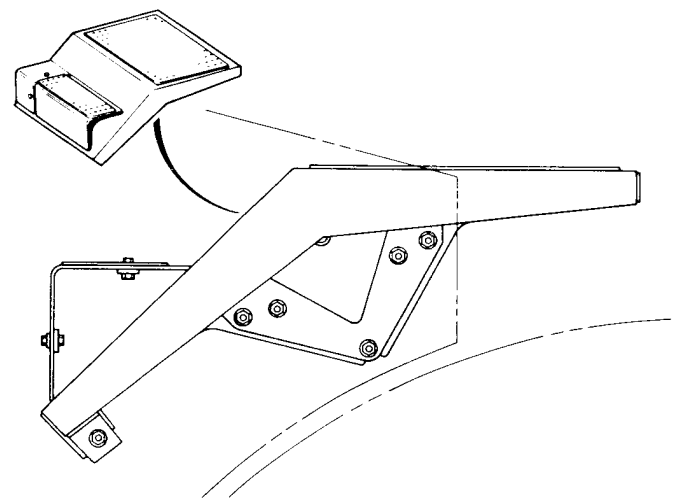
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

FENDERS REMOVAL/INSTALLATION (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
1. Fender, front	Attach hoist.	
2. Nuts, capscrews and washers	Remove six.	
3. Fender	a. Lift and pull away from the vehicle. b. Lower to ground.	
INSTALLATION		
1. Fender, front	a. Hoist into position. b. Install six nuts, capscrews and washers.	
2. Nuts, capscrews and washers	Tighten.	
3. Fender, front	Remove hoist.	



TA 098779

Go on to Sheet 3

FENDERS REMOVAL/INSTALLATION (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Fenders, rear handrail	a. Remove six capscrews and spacers on each side. b. Remove lug. c. Lift fender and handrail off vehicle to ground.	
INSTALLATION		
1. Fenders, rear handrail	a. Lift fender and handrail into place. b. Install lug, six capscrews, and washers. c. Install grab iron.	

End

SEAT REMOVAL/INSTALLATION

This task covers: Removal and installation of operator's seat.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

Hoist

Personnel Required

One mechanic

References

Torque limits chart, page E-1

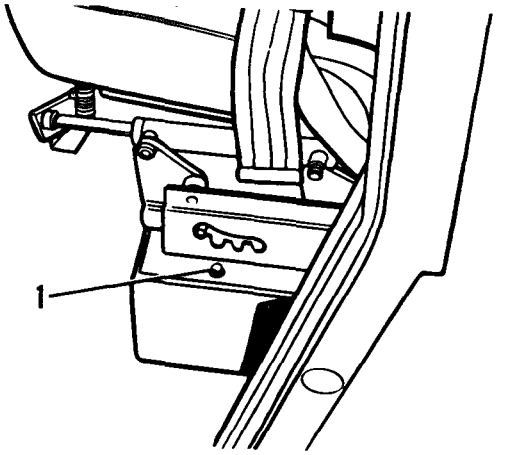
General Safety Instructions

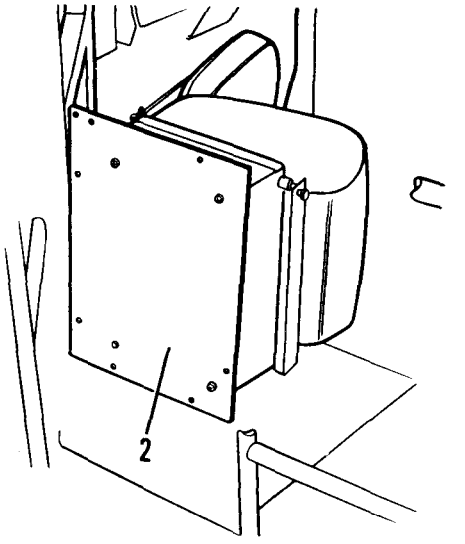
Main disconnect switch OFF.

Go on to Sheet 2

SEAT REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Hex head capscrews (1)	Remove eight capscrews from seat platform.	
2. Seat, plate attached (2)	a. Place on its side. b. Remove from cab to vehicle platform outside. c. Lower seat to the ground using hoist.	
3. Plate (2)	Remove four hex head capscrews and lockwashers.	
INSTALLATION		
1. Plate (3)	Install plate to bottom of seat with four capscrews and lockwashers.	
2. Seat, plate attached	a. Raise up to outside vehicle platform. b. Place seat on its side. Move into cab and arrange seat upright. c. Aline eight holes. d. Install eight hex head capscrews (1).	





TA 098780

End

SEAT BELTS REMOVAL/INSTALLATION (Sheet 1 of 2)

This task covers: Seat belts removal/installation

INITIAL SETUP

Test Equipment

None

Materials/Parts

As required

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

None

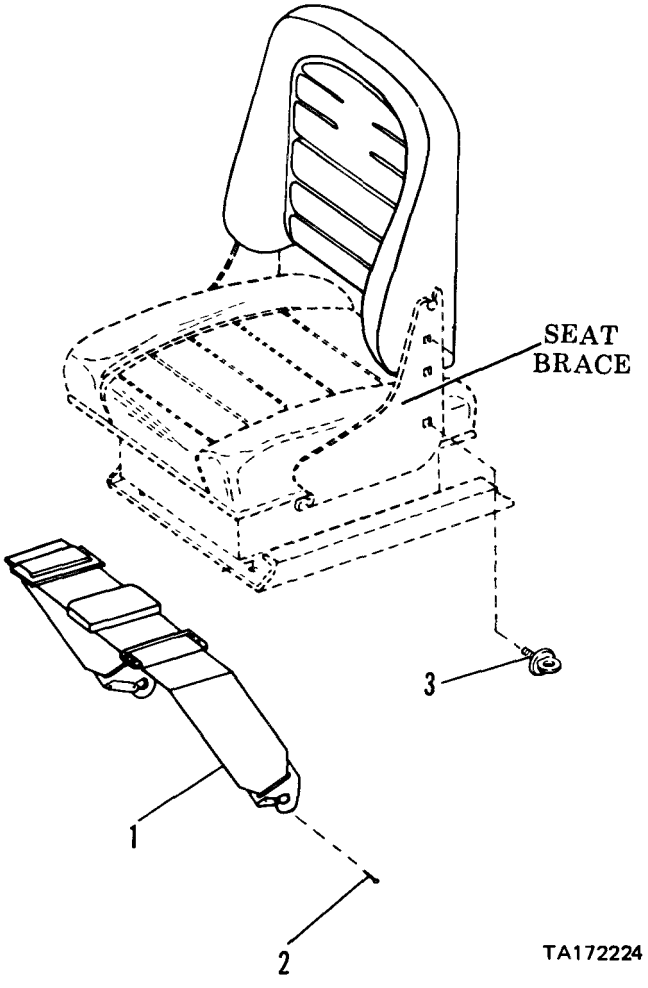
General Safety Instructions

Main disconnect switch OFF

Go on to Sheet 2

SEAT BELTS REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Nut attaching eyebolts (3) to seat brace	Remove.	
2. Eyebolts (3)	Remove.	
3. Cotter pin (2)	Remove.	
4. Seat belt (1)	Remove from eyebolt (3) and discard.	
INSTALLATION		
1. Seat belt (1)	Attach to eyebolt (3).	
2. Cotter pin (2)	Install.	
3. Eyebolt (3)	Install in seat brace using nut.	



TA172224

End

ARM CUSHION REMOVAL/INSTALLATION (Sheet 1 of 2)

This task covers: Removal and installation of arm cushion.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

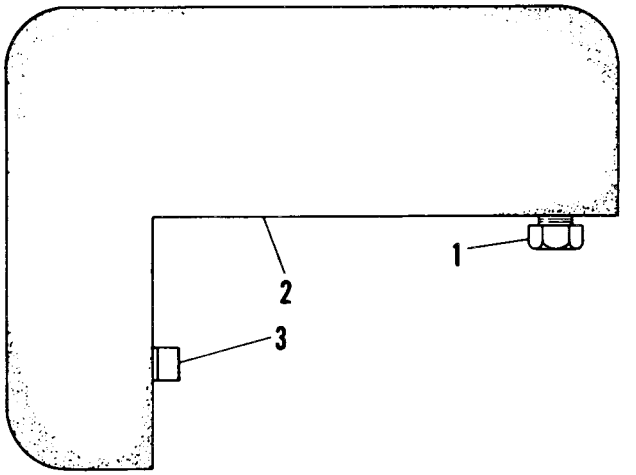
None

General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

ARM CUSHION REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Arm cushion	a. Remove capscrew (1). b. Remove cushion (2) by sliding forward to clear rod (3). Then remove cushion from cab.	
INSTALLATION		
1. Arm cushion	a. Slide cushion (2) into place and rod (3) into proper position. b. Install capscrew (1).	

TA 098781

End

WINDSHIELD WIPERS REMOVAL/INSTALLATION (Sheet 1 of 2)

This task covers: Windshield wipers removal /installation

INITIAL SETUP

Test Equipment

None

Materials/Parts

As required

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

None

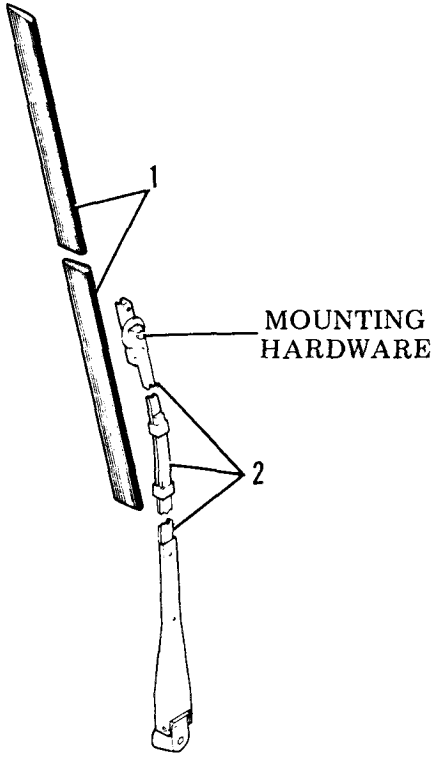
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

WINDSHIELD WIPERS REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Mounting hardware	Detach from arm (2) and wiper blade (1).	
2. Wiper blade (1)	Remove.	
INSTALLATION		
1. Wiper blade (1)	Position on arm (2) and secure with mounting hardware.	



TA172225

End

CAB DOOR AND STRIKER REMOVAL/INSTALLATION

This task covers: Removing and installing cab door and striker.

INITIAL SETUP

Test Equipment

None

Materials/Parts

As required

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

Hoist – 150 lb. minimum lifting capacity

Personnel Required

One mechanic

References

Striker adjustment, page 2-473.

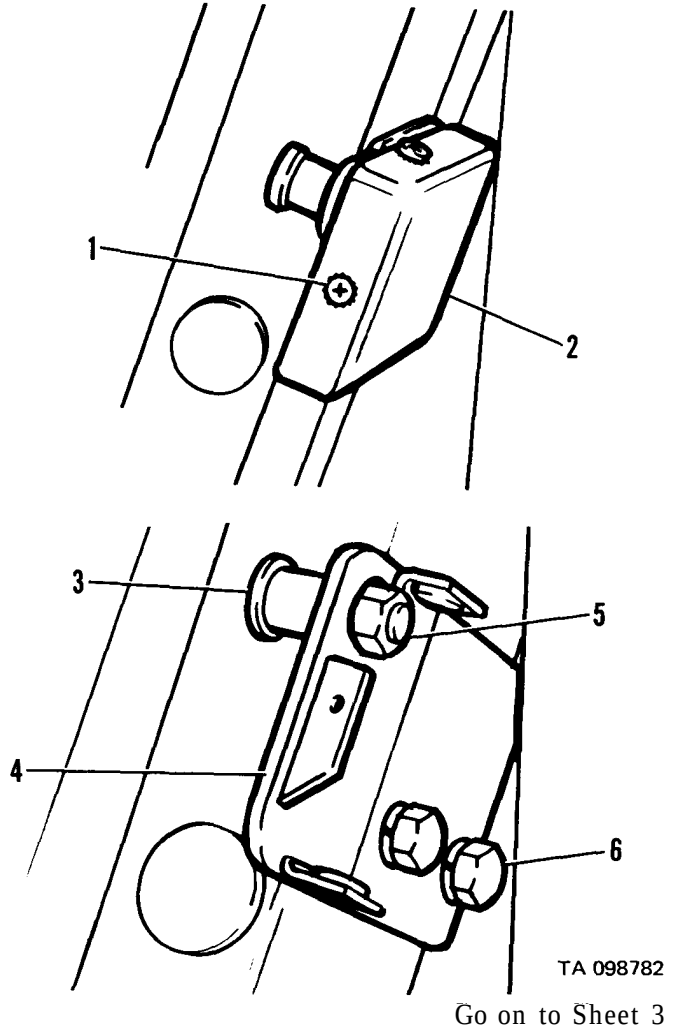
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

CAB DOOR AND STRIKER REMOVAL/INSTALLATION (CONT) (Sheet 2 of 3)

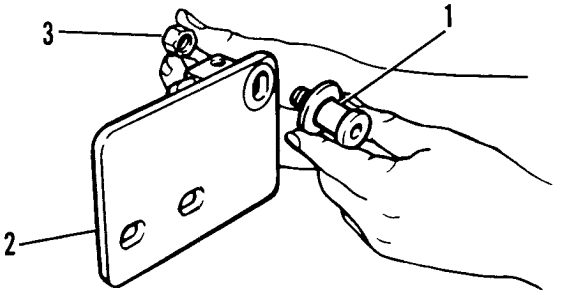
LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Left handrail	Remove four hex head capscrews and washers, and remove rail from platform.	
2. Door	a. Remove nut from center hinge. b. Open door, so it will clear Roll-Over Protective Structure (ROPS). c. Hoist door from hinges, and place it on ground.	
3. Striker	a. Remove three screws and lockwashers (1). b. Remove cover (2). c. Remove hex head capscrews and lockwashers (6). d. Remove plate (4) and shims. e. Remove nut (5) and striker assembly (3).	

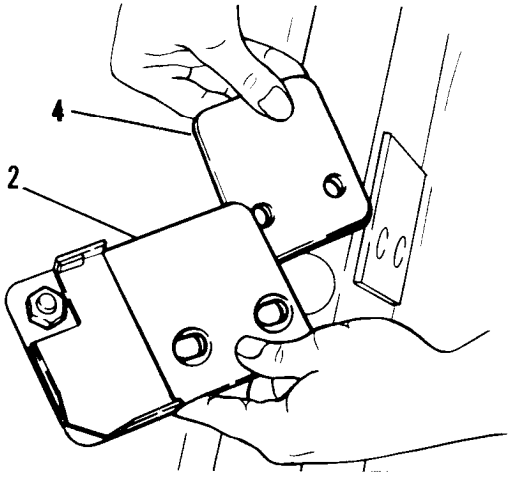


Go on to Sheet 3

CAB DOOR AND STRIKER REMOVAL/INSTALLATION (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION		
1. Door	a. Hoist door up to hinges, and lower into hinges. b. Remove hoist, and install the nut on the center hinge.	
2. Handrail	Install handrail with four hex head capscrews and washers.	
3. Striker	a. Install striker assembly (1) into plate (2), and install nut (3). b. Install shims (4) and plate (2) with two capscrews.	
4. Cover	After adjustments, install cover with three capscrews and lockwashers.	





For adjustments, see page 2-473.

TA 098783

End

SHIPPING LINK REMOVAL/INSTALLATION

This task covers: The removal and installation of the shipping link.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

Shipping link installation and storage, page 2-27

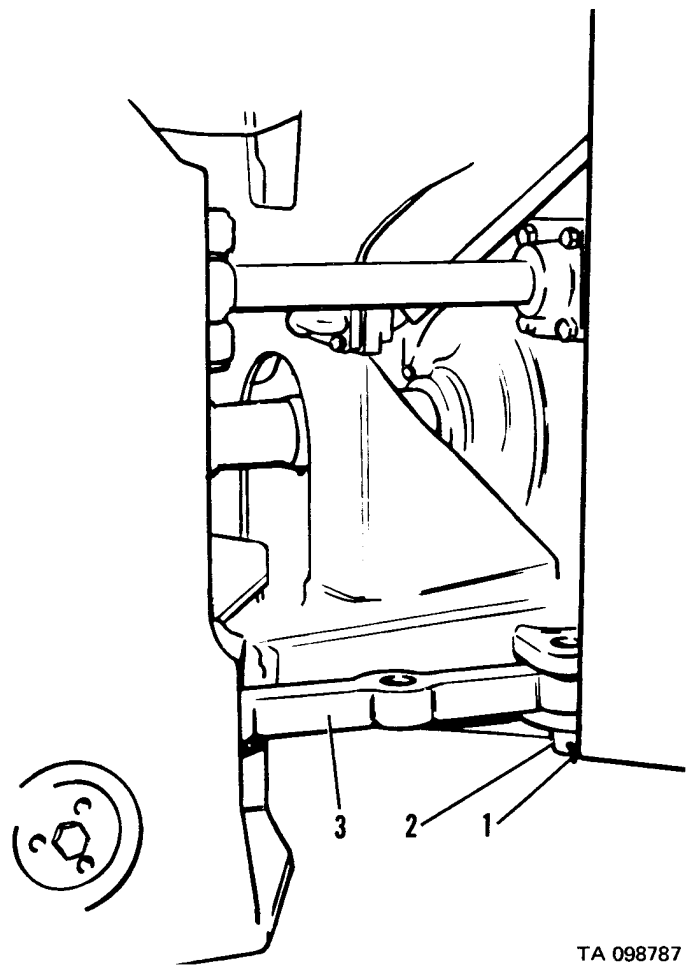
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

SHIPPING LINK REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
1. Cotter pin (1)	Remove.	
2. Retaining pin (2)	Remove.	
3. Shipping link (3)	Place in storage position.	
4. Retaining pin (2) and cotter pin (3)	Install.	
INSTALLATION		
1. Cotter pin (1) and retaining pin (2)	Remove.	
2. Shipping link (3)	Remove from storage position and fasten to retaining plates.	
3. Retaining pin (2)	Place in position.	
4. Cotter pin (1)	Install.	



TA 098787

End

STRIKER ADJUSTMENT (Sheet 1 of 2)

This task covers: Adjusting the striker after installation.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Shims

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

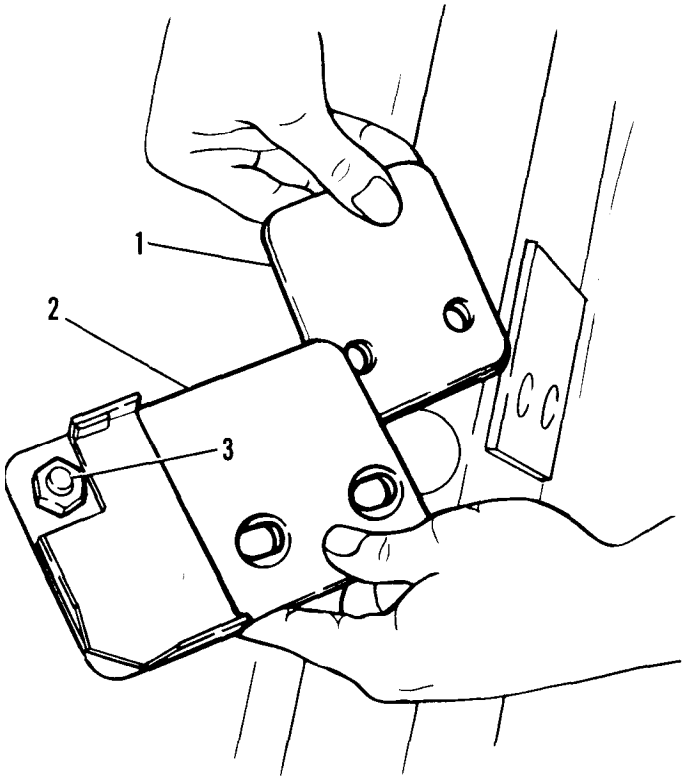
Cab door and striker removal/installation, page 2-468.

General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

STRIKER ADJUSTMENT (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
Striker and plate (2)	a. For forward or backward adjustments, install or remove shims (1). b. For right or left adjustments, or if door is too loose or too tight, move striker plate. c. If door doesn't close or is hard to close, loosen the striker and move up or down (3).	Adjustment is done when door is next to striker so that the point where latch and striker meet can be seen.  TA 098784 End

PLATFORM HANDRAILS REMOVAL/INSTALLATION (Sheet 1 of 2)

This task covers: Removal and installation of platform handrails.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

None

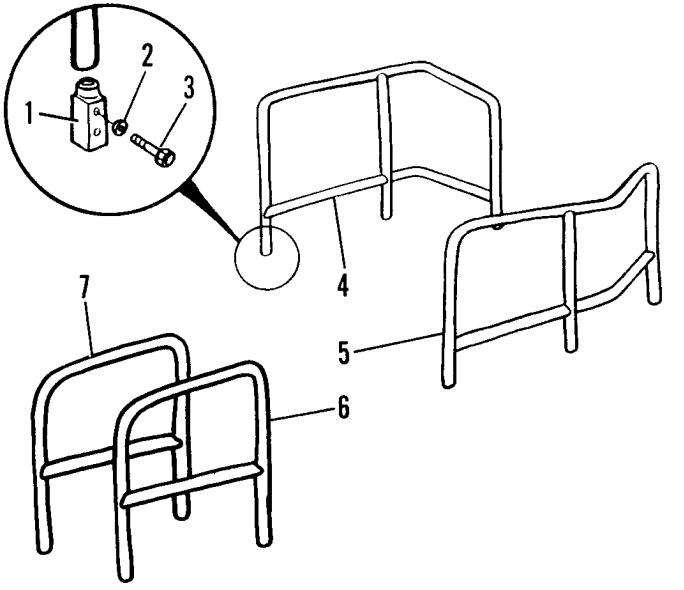
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

PLATFORM HANDRAILS REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Capscrews (3) and washers (2)	Remove.	
2. Handrails (4), (5), (6), (7)	Remove with support block (1).	
INSTALLATION		
1. Handrails	Place in position with support block (1).	
2. Capscrews (3) and washers (2)	Install.	



TA 098785

End

LADDERS REMOVAL/INSTALLATION

This task covers: Removal/installation of ladders.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

None

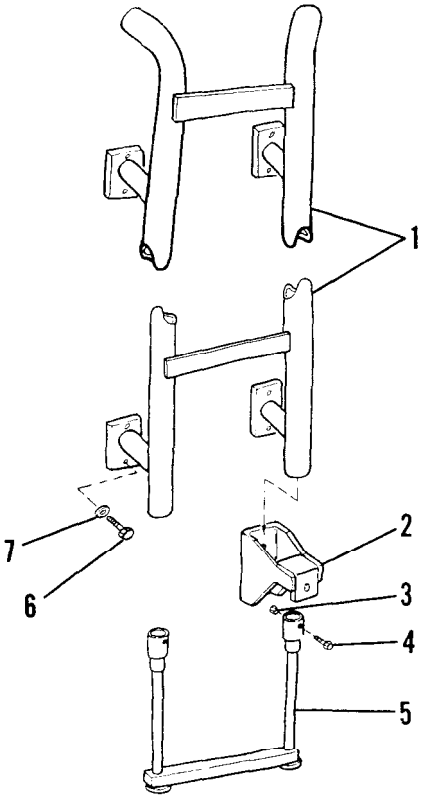
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

LADDERS REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Capscrews (4), (6) and washers (3), (7)	Remove.	
2. Ladders (1) and (5)	Remove from brace (2).	
INSTALLATION		
1. Ladders (1) and (5)	Place in position on brace (2).	
2. Capscrews (4), (6) and washers (3), (7)	Install.	



TA 098786

End

GREASE LINES REMOVAL/INSTALLATION

This task covers: Removal and installation of grease lines.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Grease line assembly

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

LO 10-3930-641-12

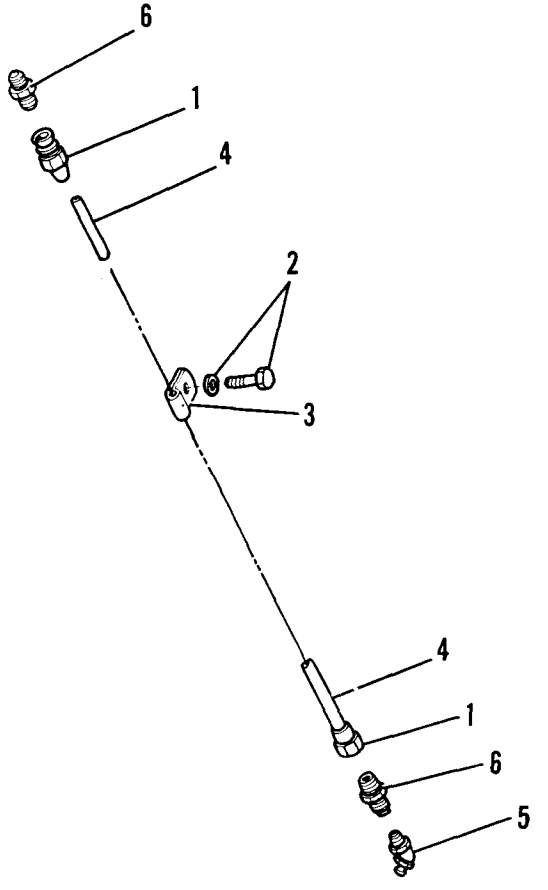
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

GREASE LINES REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
1. Fittings (1)	Disconnect.	
2. Capscrew and washer (2)	Remove.	
3. Clip (3)	Remove.	
4. Line (4)	Remove.	
5. Grease fitting (5)	Remove.	
6. Connectors (6)	Remove.	
	NOTE If a new line is to be used, attach grease fitting and fill line with appropriate grease (see LO 10-3930-641-12) BEFORE installation.	
INSTALLATION		
1. Connector (6)	Install.	
2. Line (4) and fitting (1)	Install on connector (6).	
3. Clip (3) and capscrew and washer (2)	Install on line (4).	
4. Grease fitting (5)	Install on line with fitting (1).	
	NOTE Perform Step 4 if you did not use a new line.	



TA 098788

End

PINTLE HOOK REMOVAL/INSTALLATION

This task covers: Removal/installation of pintle hook.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

None

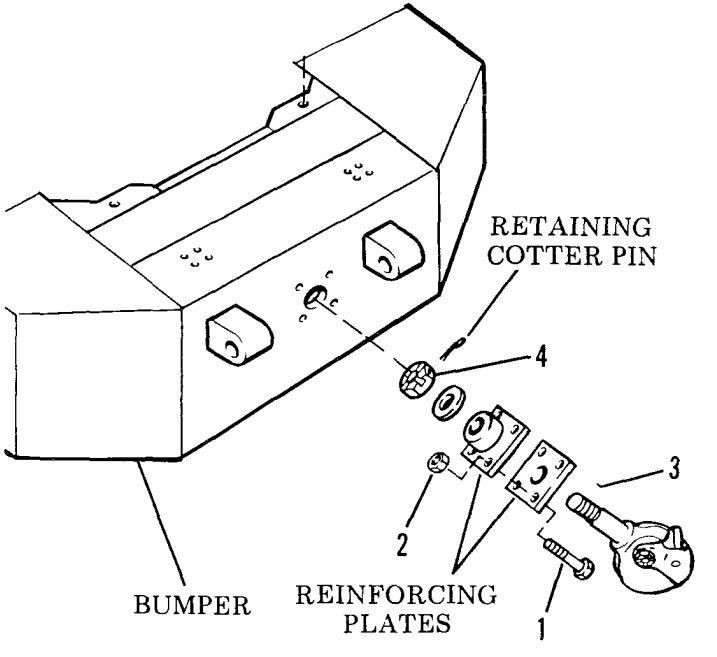
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

PINTLE HOOK REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
1. Capscrews (1), washers and nuts (2) holding pintle hook (3) to bumper	Remove.	
2. Large retaining nut (4) behind bumper	Remove from shaft.	
3. Pintle hook (3)	Remove.	
1. Pintle hook (3)	Place in position.	
2. Large retaining nut (4) behind bumper	Install on shaft.	
3. Capscrews (1), washers and nuts (2)	Install.	



TA 098886

End

CRANKCASE GUARD REMOVAL/INSTALLATION

This task covers: Replacement of crankcase guards.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine off.

Wheels blocked.

Special Tools

None

Personnel Required

Two mechanics

References

None

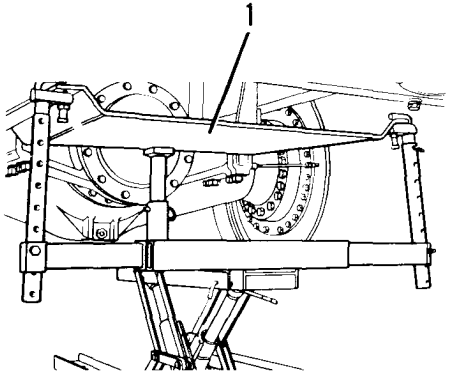
General Safety Instructions

Place jack under guard before loosening capscrews.

Go on to Sheet 2

CRANKCASE GUARD REMOVAL/INSTALLATION (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL FRONT CRANKCASE GUARD	**WARNING**	
	Place jack under guard before loosening capscrews. Front guard weighs 70 pounds.	
1. Capscrews that hold front crankcase guard (1).	Loosen, and install jack.	
2. Capscrews	Remove.	
3. Front crankcase guard (1)	Lower, using the jack.	
INSTALLATION		
1. Front crankcase guard (1)	Place in position, using jack.	
2. Capscrews	Install.	
3. Jack	Remove. Tighten capscrews.	

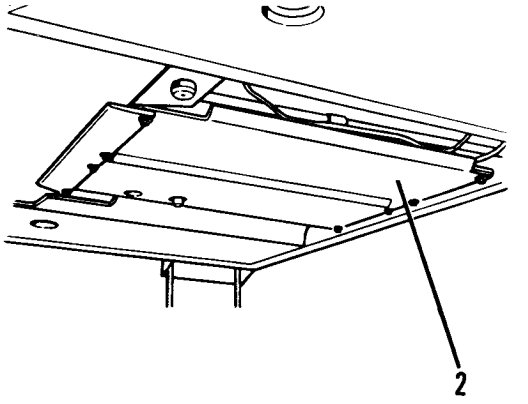


TA 098884

Go on to Sheet 3

CRANKCASE GUARD REMOVAL/INSTALLATION (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL **REAR CRANKCASE GUARD**		
	Place jack under guard before loosening capscrews. Rear guard weighs 130 pounds.	
1. Four capscrews that hold rear crankcase guards (2)	Remove.	
2. Rear crankcase guard	Remove the two rear crankcase guards.	
	NOTE Weight of each guard is 70 lb. (32 kg).	
INSTALLATION		
1. Rear crankcase guard (2)	Position under machine.	
2. Capscrews	Install.	



TA 098885

End

HYDRAULIC LIFT COMPONENTS MAINTENANCE INSTRUCTIONS

This section covers removal and installation of these hydraulic components for Organizational Maintenance personnel:

a. Control linkage b. Mast lines guard

Also instructions for servicing hydraulic filter, servicing brake hydraulic system, lift cylinder test and bleeding, tilt cylinder test, and control linkage adjustment.

LIST OF TASKS (Sheet 1 of 1)

TASK NO.	TASK	REF (PAGE)	TROUBLESHOOTING REF (PAGE)
1	Hydraulic filter - service.	2-487	2-43
2	Brake hydraulic system filter - service.	2-490	None
3	Tilt cylinder test.	2-493	2-43
4	Lift cylinder test and bleeding.	2-495	2-43
5	Controls and linkage adjustment.	2-497	2-43
6	Mast lines guard removal/installation.	2-500	None
7	Hydraulic hand control removal/installation.	2-502	None
8	Tophandler guide plate mounting bolts replacement.	2-505	None
9	Tophandler limit switch adjustment.	2-507	None

End

HYDRAULIC FILTER – SERVICE

This task covers: Servicing hydraulic filter.

INITIAL SETUP

Test Equipment

None

Special Tools

None

Materials/Parts

Filter element for implement filter (two)

Solvent cleaning compound (Item 2, Appendix C)

Hydraulic fluid (Item 9, Appendix C)

Cover gasket

Personnel Required

One mechanic

References

PMCS, page 2-5

Troubleshooting Reference

Page 2-43

Equipment Condition

Fork assembly lowered

Engine OFF

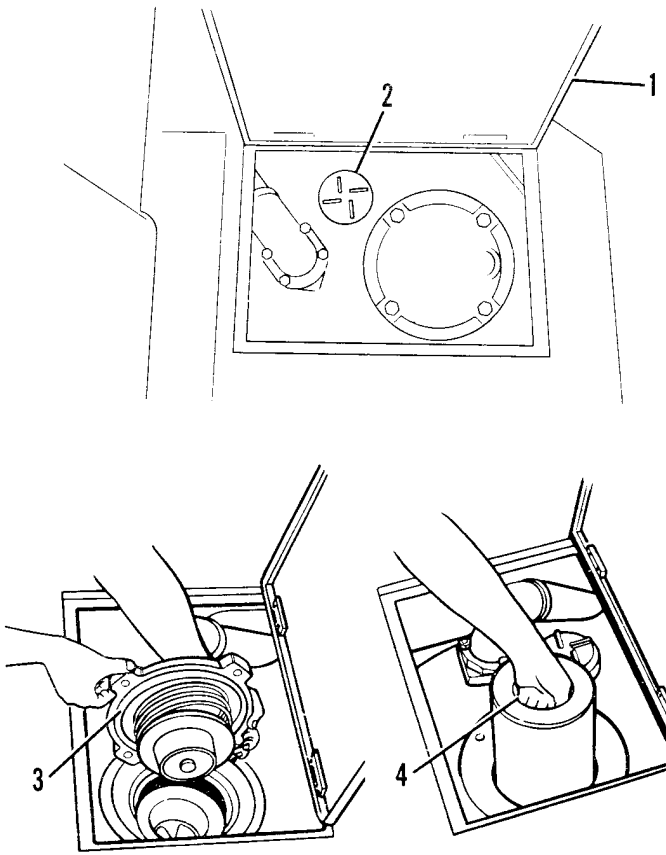
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

HYDRAULIC FILTER – SERVICE (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
1. Floor plate (1) (Right side of vehicle)	Unlock and raise.	
2. Filler cap (2)	Remove slowly to relieve pressure.	
3. Four capscrews	Remove from implement filter cover.	
Implement filter cover (3)	Remove.	
4. Cover gasket	Inspect. Replace if damaged.	
5. Two filter elements (4)	Remove and discard.	

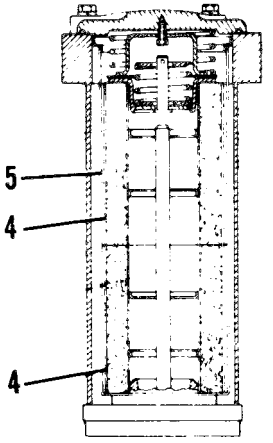


TA 098794

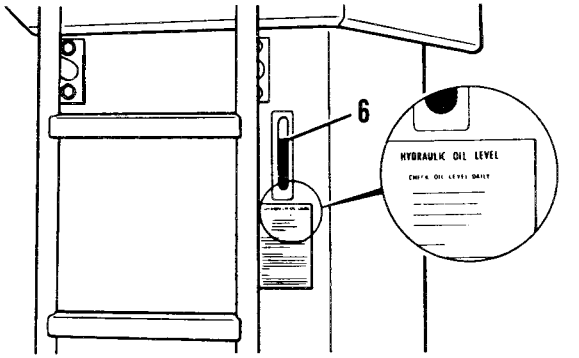
Go on to Sheet 3

HYDRAULIC FILTER – SERVICE (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
6. Filter screen (5)	Remove and clean in nonflammable solvent.	
7. Cover (3)	Clean in nonflammable solvent.	
8. Screen (5)	Install.	
9. Two filter elements (4)	Replace.	
10. Cover and capscrews (3)	Replace.	
11. Engine	Start. Run at low idle. Inspect for leaks.	
12. Oil level indicator (6)	Check.	
13. oil	Add if necessary.	
14. Engine	Stop.	
15. Floor plate (1)	Close and lock.	



FILTER ASSEMBLY



TA 098795

Oil level should be above ADD COLD mark.

End

BRAKE HYDRAULIC SYSTEM FILTER – SERVICE (Sheet 1 of 3)

This task covers: Servicing brake hydraulic system filter.

INITIAL SETUP

Test Equipment

None

Materials/Parts

Filter elements for brake hydraulic system

Solvent cleaning compound (Item 2, Appendix C)

Pan to catch oil

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

PMCS, page 2-5

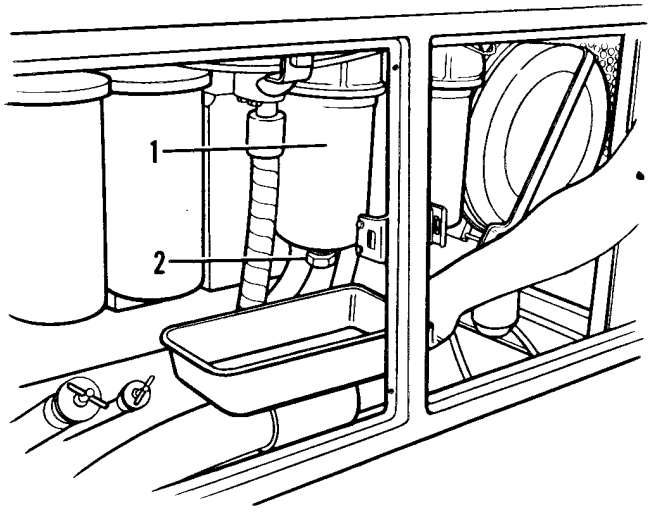
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

BRAKE HYDRAULIC SYSTEM FILTER – SERVICE (CONT)

LOCATION/ITEM	ACTION	REMARKS
1. Access doors	Open.	
2. Filter (1)	Place pan under drain plug to prevent draining oil on machine.	
3. Housing drain plug (2) Oil	Remove. Drain.	

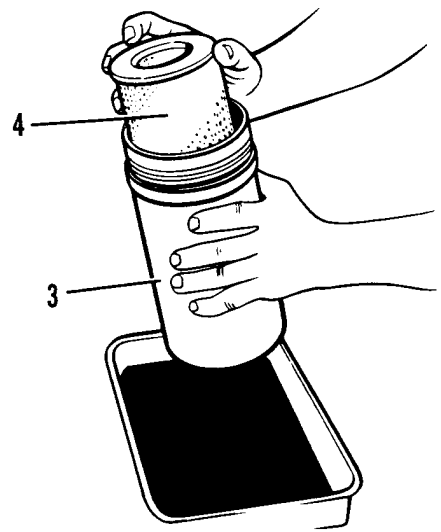


TA 098796

Go on to Sheet 3

BRAKE HYDRAULIC SYSTEM FILTER – SERVICE (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
4. Filter housing (3)	Remove.	
Filter element (4)	Remove and discard.	
5. Filter housing base	Clean in nonflammable solvent.	
6. Filter housing (3)	Clean in nonflammable solvent.	
7. Filter	Install new element (4).	
8. Housing (3)	Install.	
Drain plug (2)	Clean and install.	
9. Housing	To tighten housing, use nut on bottom of filter housing.	
10. Access doors	Close.	
11. Hydraulic tank	Add oil to fill.	See LO 10-3930-641-12.



TA 098797

End

TILT CYLINDER TEST

This task covers: Drift test of tilt cylinders.

INITIAL SETUP

Test Equipment

Tape measure

Watch

Materials/Parts

None

Troubleshooting Reference

Page 2-43

Equipment Condition

Intermittent operation

Special Tools

None

Personnel Required

Two mechanics

References

PMCS, page 2-5

Lift cylinder test, page 2-495

Shipping link installation/storage, page 2-471

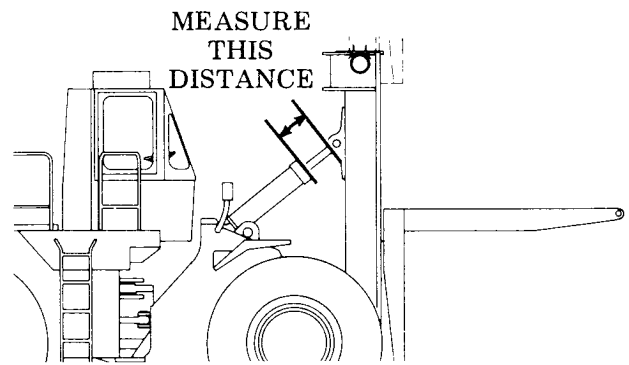
General Safety Instructions

Shipping link installed.

Parking brake ON.

Go onto Sheet 2

TILT CYLINDER TEST (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
1. Vehicle	Lift rated capacity load off ground.	Hydraulic oil must be at normal operating temperature (110°-120°F). Mast will be vertical.
2. Tilt cylinder	Take measurement of tilt cylinder rods from nut to cylinder housing.	
3. Mast	Operate to complete forward and complete reverse position several times.	
4. Mast	Put mast back to vertical position.	
5. Engine	Turn off engine. Wait 20 minutes and take another measurement of tilt cylinder rods.	
6. Tilt cylinder	If measurement changed from measurement taken in Step 2, then tilt system has drifted.	Mast must not drift more than one-half inch in 20 minutes.

TA 098798

End

LIFT CYLINDER TEST AND AIR BLEEDING

This task covers: Drift test of lift cylinder and bleeding of air from lift cylinder.

INITIAL SETUP

Test Equipment

Tape measure

Watch

Materials/Parts

None

Troubleshooting Reference

Page 2-43

Equipment Condition

Engine running, machine operable

Special Tools

None

Personnel Required

Two mechanics

References

Tilt cylinder test, page 2-493

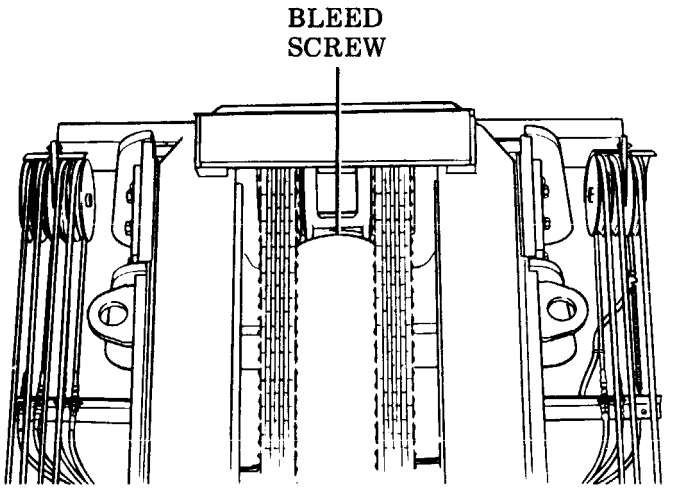
General Safety Instructions

Shipping link installed.

Go on to Sheet 2

LIFT CYLINDER TEST AND AIR BLEEDING (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
1. Vehicle	Put rated capacity load on forks.	
2. Hydraulic controls	Operate vehicle through normal lift and tilt cycle.	Hydraulic oil must be at normal operating temperature, (110 °-1200 F).
3. Forks	With load on forks, lift carriage so lift cylinder has hydraulic load.	Mast at 0° tilt.
4. Carriage	Measure height of carriage from ground.	Carriage must not drift more than one inch in 20 minutes.
BLEEDING AIR FROM LIFT CYLINDER		
1. Bleed screw	Loosen but do not remove.	
	WARNING System is under high pressure. Removing bleed screw completely will cause mast and carriage to drop suddenly.	
2. Carriage	Lift approximately 2 ft. (608 mm).	
3. Air in lift cylinder	Allow to bleed through bleed screw until oil comes out with no air.	
4. Bleed screw	Tighten.	
5. Mast	Lower completely.	
6. Hydraulic tank	Check level and fill if necessary. (See LO 10-3930-641 -12.)	



TA 172226

End

CONTROLS AND LINKAGE ADJUSTMENT (Sheet 1 of 3)

This task covers: Adjustment of hydraulic control linkages.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

Page 2-43

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

Shipping link installation/storage, page 2-471

General Safety Instructions

Parking brake ON.

Shipping link installed.

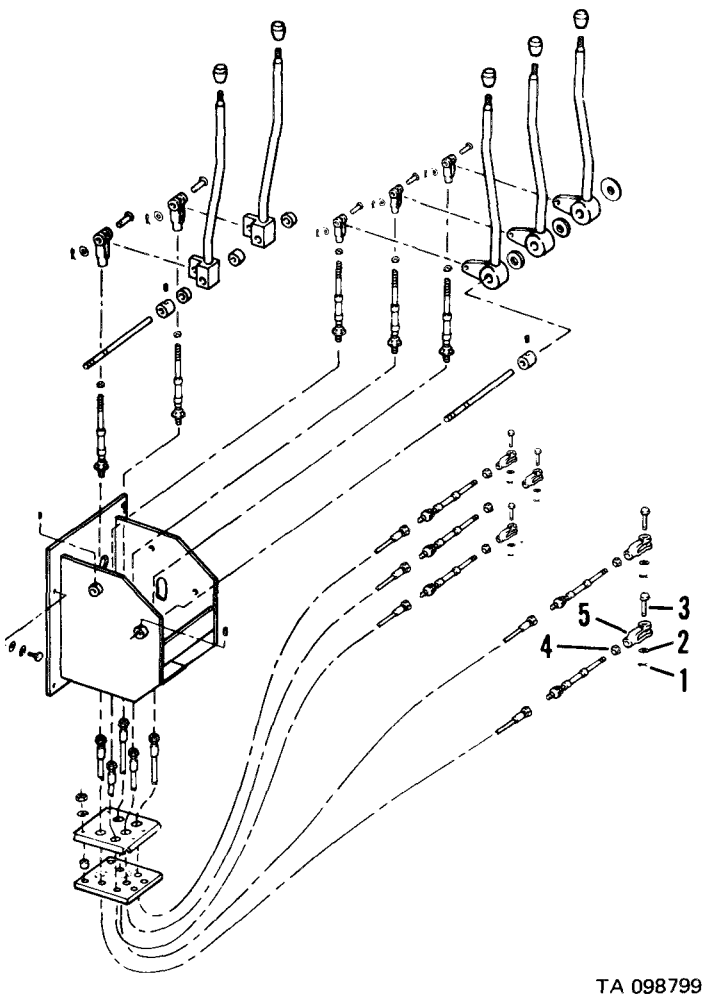
Go onto Sheet 2

CONTROLS AND LINKAGE ADJUSTMENT (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
1. Cotter pin (1) and washer (2)	Remove.	
2. Pin (3)	Remove.	
3. Nut (4)	Loosen.	Slide up on cable.
4. Yoke (5)	Remove.	
5. Spool	Center. (Allow spool to slide to NEUTRAL position.)	Pull spool to end of travel and release. Push spool to end of travel and release.
6. Yoke (5)	Adjust yoke (5) until retaining pin (3) can be installed in holes without removing spool.	
7. Nut (5)	Install on threads and turn until it is flush with face of yoke.	

Go on to Sheet 3

CONTROLS AND LINKAGE ADJUSTMENT (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
8. Washer (2) and cotter pin (1)	Install.	
9. Nut (5)	Tighten against bracket.	TA 098799 End

MAST LINES GUARD REMOVAL/INSTALLATION (Sheet 1 of 2)

This task covers: Removal and installation of the mast lines guard.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

None

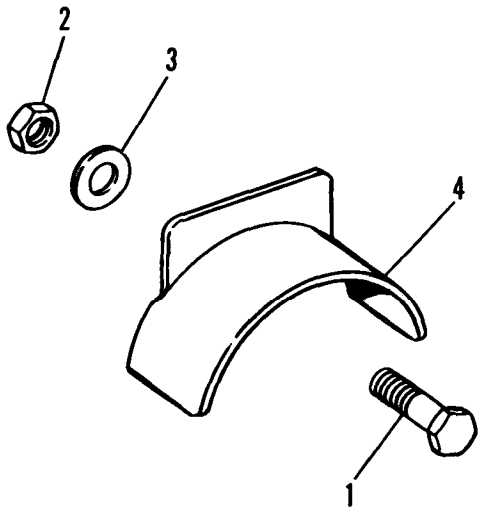
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

MAST LINES GUARD REMOVAL/INSTALLATION (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL	NOTE Use an appropriate platform to work on the mast lines guard. DO NOT climb the mast.	
1. Capscrews (1), nuts (2) and washers (3)	Remove.	
2. Mast lines guards (4)	Remove.	
INSTALLATION		
1. Mast lines guards (4)	Place in position.	
2. Capscrews (1), nuts (2) and washers (3)	Install.	



TA 098800

End

HYDRAULIC HAND CONTROL REMOVAL/INSTALLATION (Sheet 1 of 3)

This task covers: Replacement of hydraulic hand controls.

INITIAL SETUP

Test Equipment

None

Materials/Parts

As required

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

Controls and linkage adjustment, page 2-497

General Safety Instructions

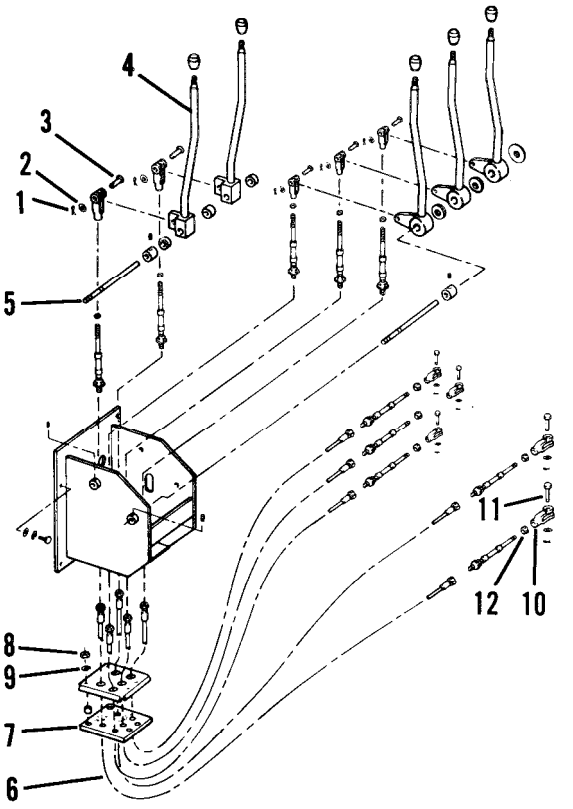
Mast lowered and tilted full forward.

Main disconnect switch OFF.

Go on to Sheet 2

HYDRAULIC HAND CONTROL ASSEMBLY REMOVAL/INSTALLATION (CONT) (Sheet 2 of 3)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Capscrews, washers, three panels	Remove.	
2. Cotter pin (1) and washer (2)	Remove from clevis pin (3).	
3. Handle (4)	Remove by sliding off shaft (5).	
4. Cable assembly	Loosen at bracket assembly (7).	
5. Retainer (8 & 9) and seal	Remove and save.	
6. Rod end (10)	Remove pin (11) and disconnect at valve assembly.	
7. Rod end (10)	Loosen nut (12) and unscrew rod end (10) from cable assembly.	
8. Handle (4) and cable assembly	Adjust. (See page 2-497.)	

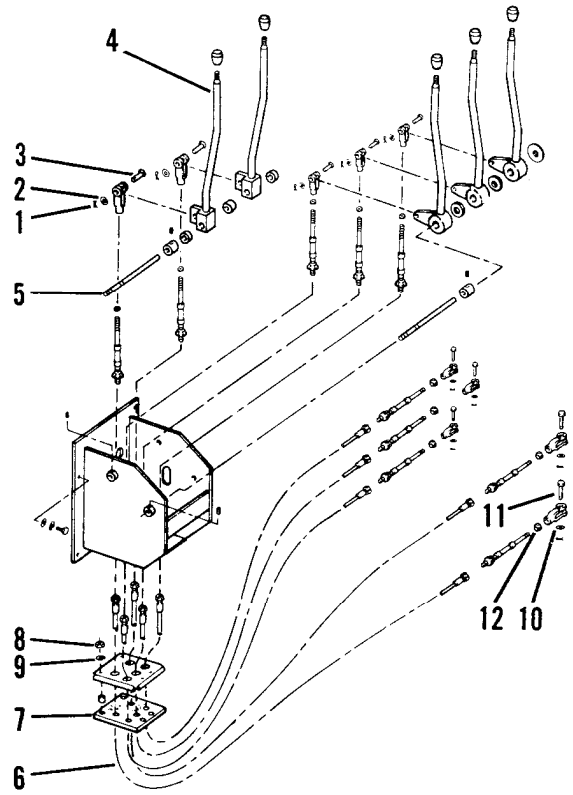


TA 098792

Go on to Sheet 3

HYDRAULIC HAND CONTROL ASSEMBLY REMOVAL/INSTALLATION (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
INSTALLATION		
1. Handle (4) and cable assembly	Install.	
2. Rod end (10)	Screw onto cable assembly. Tighten, using nut (12).	
3. Rod end (10)	Install on valve assembly using pin (11).	
4. Retainer (8 and 9) and seal		
5. Bracket assembly (7)		
6. Handle (4)	Slide onto shaft (5).	
7. Cotter pin (1) and washer (2)	Install on clevis pin (3).	
8. Hydraulic hand control	Adjust. (See page 2-497.)	



TA 098793

End

TOPHANDLER GUIDE PLATE MOUNTING BOLTS REPLACEMENT (Sheet 1 of 2)

This task covers: Removal/installation of the tophandler guide plate mounting bolts.

INITIAL SETUP

Test Equipment

None

Materials/Parts

As required

Troubleshooting Reference

None

Equipment Condition

Engine OFF

Special Tools

None

Personnel Required

One mechanic

References

None

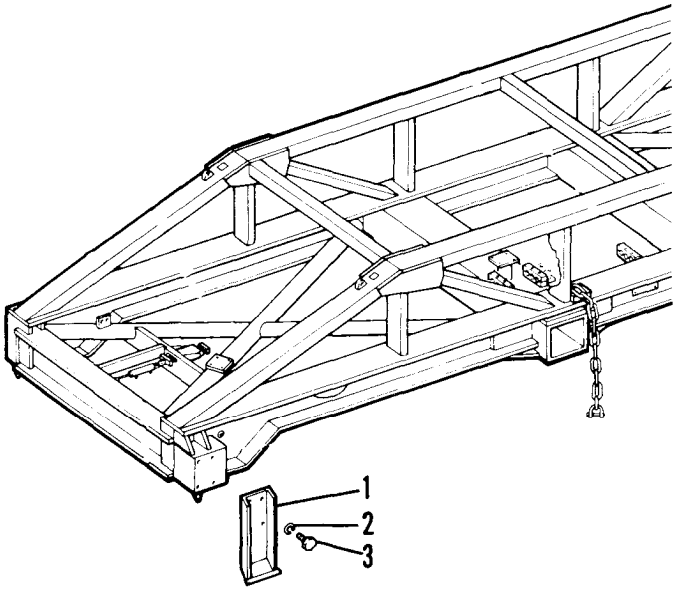
General Safety Instructions

Main disconnect switch OFF.

Go on to Sheet 2

TOPHANDLER GUIDE PLATE MOUNTING BOLTS REPLACEMENT (CONT) (Sheet 2 of 2)

LOCATION/ITEM	ACTION	REMARKS
REMOVAL		
1. Capscrews (3) and washers (2)	Remove.	
	NOTE Excess pressure against the guide plate will break the head off the capscrew. It may be necessary for you to use a vise grips or similar tool to remove the rest of the capscrew.	
2. Guide plate (1)	Remove.	
INSTALLATION		
1. Guide plate (1)	Position on tophandler.	
2. Capscrew (3) and washer (2)	Install.	



TA 172227

End

TOPHANDLER LIMIT SWITCH ADJUSTMENT

This task covers: Tophandler limit switch adjustment.

INITIAL SETUP

Test Equipment

None

Materials/Parts

None

Troubleshooting Reference

None

Equipment Condition

Engine running at low idle
Transmission in NEUTRAL
Emergency brake ON

Special Tools

None

Personnel Required

One operator
One mechanic

References

Container lock indicator panel, TM 10-3930-641-10.

Mast controls, TM 10-3930-641-10.

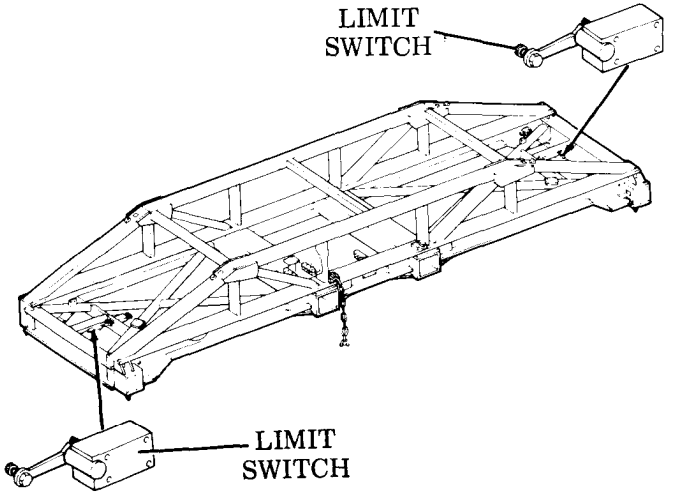
General Safety Instructions

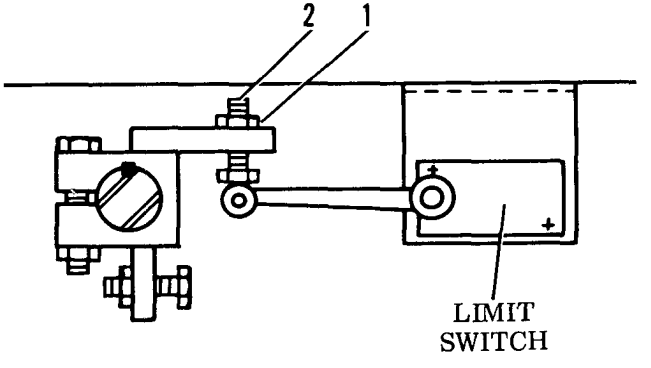
The man resetting the limit switches must be very careful while on the tophandler.

Go on to Sheet 2

TOPHANDLER LIMIT SWITCH ADJUSTMENT (CONT)

LOCATION/ITEM	ACTION	REMARKS
	WARNING It is critical that the operator and mechanic understand what each is to do during this procedure. All actions, steps and hand signals must be worked out and understood beforehand.	
1. Mechanic	Safely position self on container handler.	
2. Mechanic	Signal operator to push full forward on container lock control handle.	
3. Operator	Push container lock control handle full forward. Place hands on steering wheel.	
4. Mechanic	Loosen jam nut (1) on capscrew (2) and back out capscrew.	

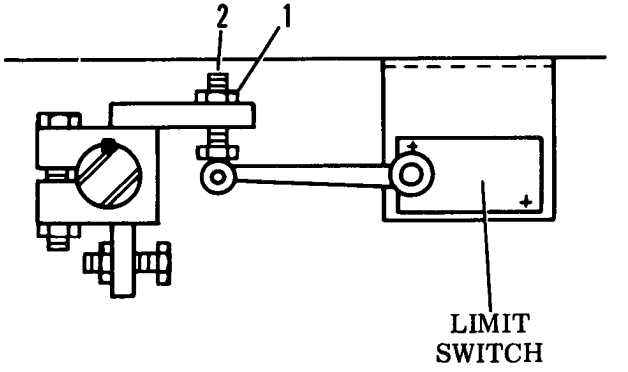




TA 172228

Go on to Sheet 3

TOPHANDLER LIMIT SWITCH ADJUSTMENT (CONT) (Sheet 3 of 3)

LOCATION/ITEM	ACTION	REMARKS
5. Operator	Signal mechanic when green indicator light on container lock control panel goes out.	
6. Mechanic	Signal operator to pull full back on container lock control handle.	
7. Operator	Pull full back on container lock control handle. Place hands on steering wheel.	
8. Mechanic	Turn capscrew (2) in.	
9. Operator	Signal mechanic when red indicator light on container lock control panel comes on and stays on.	
10. Mechanic	Set jam nut (1) firmly in place.	
11. Procedure	Repeat for other limit switch.	

TA 172229

End

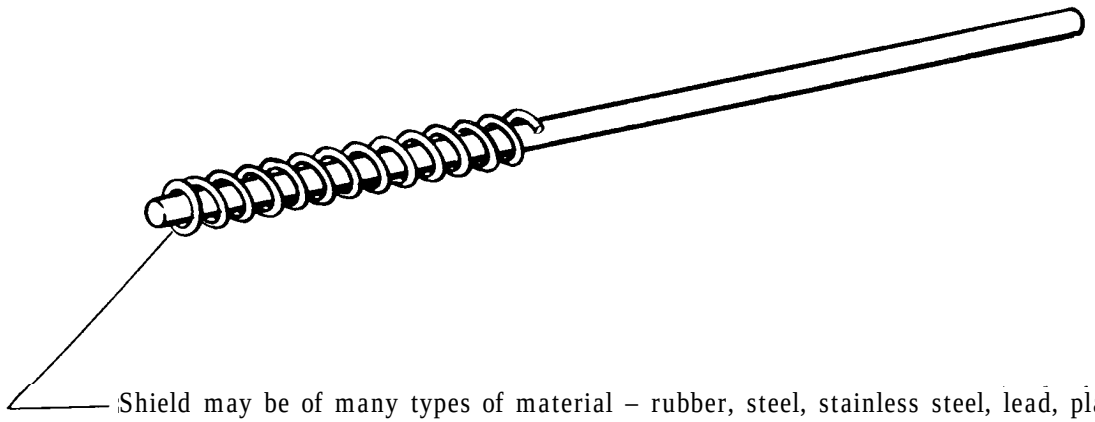
Section VI. RADIO INTERFERENCE SUPPRESSION

RADIO INTERFERENCE SUPPRESSION

Essentially, suppression is attained by providing a low resistance path to ground for stray currents. The methods used include shielding the ignition and high frequency wires, grounding the vehicle with bonding straps, and using capacitors and resistors.

The primary components are:

Wire Shields. Some of the high voltage or frequency wires have the possibility of electrical leakage through the insulating cover. The "wire shield" is a protective covering over the wire to aid in the reduction or elimination of such leakages. These leakages, if not restrained from the radio, would cause undesirable interference.



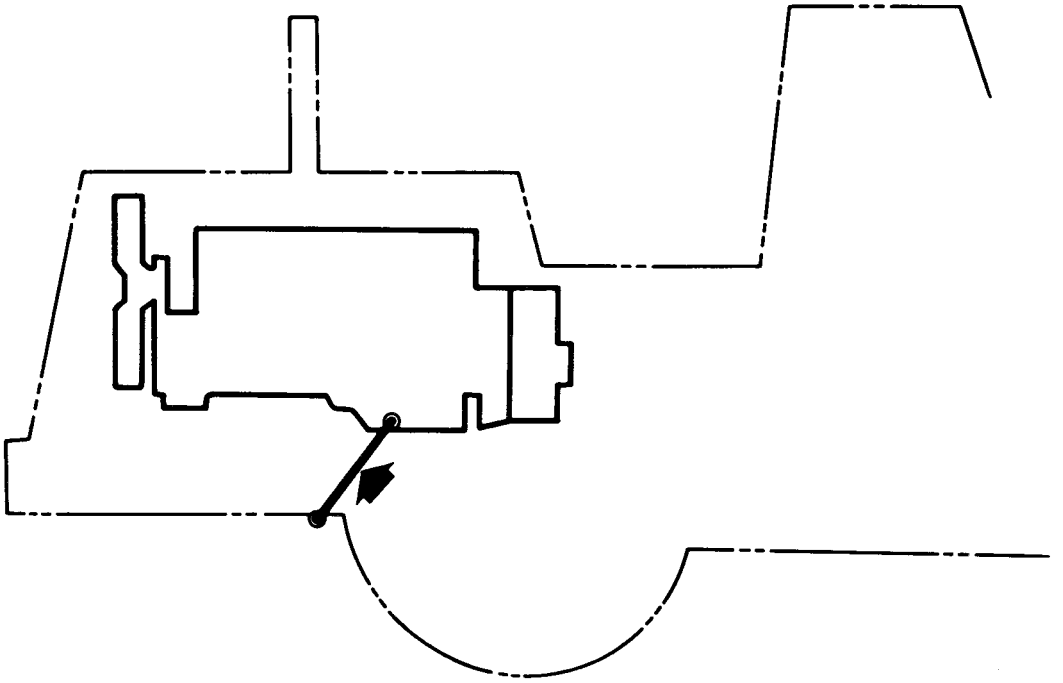
Shield may be of many types of material – rubber, steel, stainless steel, lead, plastic, etc.

TA 098573

Go on to Sheet 2

RADIO INTERFERENCE SUPPRESSION (CONT) (Sheet 2 of 3)

Bonding Straps. Generally, the frame of a vehicle is used as the second wire (ground) of an electrical circuit. This ground is used for all the systems of the vehicle. The "bonding straps" ensure there is a definite ground between the major assemblies or components. This definite ground eliminates the possibilities of an erratic ground which would cause undesirable radio interference.



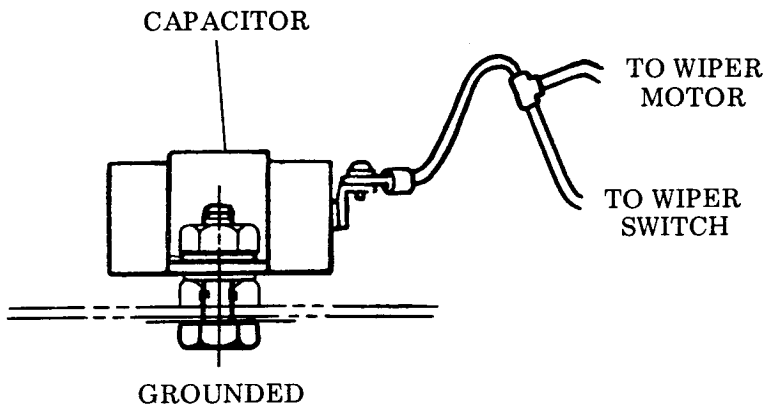
Bonding strap from the engine to the frame is one of a few major straps.

TA 098574

Go on to Sheet 3

RADIO INTERFERENCE SUPPRESSION (CONT) (Sheet 3 of 3)

Capacitors. A capacitor is an electrical absorption chamber. When installed in the proper locations, it actually absorbs stray electrical current and keeps it from entering into the radio circuit.



A capacitor that is hooked into the positive lead to a wiper motor would absorb any undesirable static from the rotating motor.

TA 098575

End

Section VII. PREPARATION FOR STORAGE OR SHIPMENT

SHIPMENT

This vehicle can be shipped by sea transportation, rail, or truck and is designed for minimum disassembly before shipment. Refer to the Military Traffic Management Command's Transportability Review, TR 80-1-19A.

WARNING

Be certain ether starting aid cannister is removed from vehicle before shipment or storage. Page 2-189

Seaboard transportation

Remove exhaust pipe and seal opening . . . . Page 2-211

Shipping link installed . . . . . Page 2-471

Rail transportation

Remove mast . . . . . Notify direct support maintenance

If necessary, remove ROPS . . . . Notify direct support maintenance

Remove exhaust pipe and seal opening . . . . . Page 2-211

Shipping link installed . . . . Page 2-471

Truck transportation

Remove mast . . . . . Notify direct support maintenance

Remove ROPS . . . . . Notify direct support maintenance

Remove cab . . . . . Notify direct support maintenance

Remove exhaust pipe and seal opening . . . . . Page 2-211

Shipping link installed . . . . Page 2-471

PACKING

1. Protect the following items by wrapping or taping:
   - Hydraulic fluid level gage
   - Steering wheel and column
   - Instrument panels and container lock panel
   - Windshield, windows and mirrors
   - Windshield wipers
   - Headlights, taillights and auxiliary lights.
2. Protect steering cylinders, rotation and sideshift cylinders by applying a layer of protective coating.
3. Install steering lock.
4. Drain cooling system (page 2-216) and fill with a fresh, clean solution of 50 percent water and 50 percent antifreeze conforming to MIL-A-46153. Tag the steering wheel to indicate the temperature to which the cooling system can be subjected before damage.
5. Be sure the crankcase is filled with oil.

MARKING

Mark shipping containers and unboxed components in accordance with MIL-STD-129.

ARMY SHIPPING DOCUMENTS

Prepare all Army shipping documents in accordance with AR 725-50.

LOADING (RAIL TRANSPORT)

Load, brace and block the equipment in accordance with requirements of the Association of American Railroads and the following:

1. Inspect all flatcars before loading to see that they are in a suitable condition to safely carry the load to its destination.

2. Prepare flatcars for loading by removing all debris, previous blocking, nails and other obstructions. Inspect flatcars for loose or broken floor planks. Do not use damaged cars.

3. Refer to Association of American Railroads “Rules Governing the Loading of Commodities on Open-Top Cars.”

4. Position the vehicle as far away from the brake wheel end of the flatcar as space permits. Allow minimum clearance of 4 inches below, 6 inches above, behind and to each side of the flatcar brake wheel.

APPENDIX A

REFERENCES

A-1. PUBLICATION INDEXES AND GENERAL REFERENCES

Indexes should be consulted frequently for latest changes or revisions of references given in this appendix and for new publications relating to material covered in this publication.

a. Military Publication Indexes
Consolidated Index of Army Publication and Forms . . . . . DA PAM 25-30
Index of Graphic Training Aids and Devices . . . . . DA PAM 310-5

b. General References
First Aid for Soldiers .... FM 21-11

A-2. FORMS

Refer to DA PAM 738-750, The Army Maintenance Management System (TAMMS), for instructions on the use of maintenance forms pertaining to the material.

A-3. OTHER PUBLICATIONS

The following publications contain information pertinent to the major item material and associated equipment,

a. Vehicle
Lubrication Order, Truck, Container Handler: Rough Terrain, 50,000 lb. Capacity . . . . . LO 10-3930-641-12
Operator's Manual, Truck, Container Handler: Rough Terrain, 50,000 lb. Capacity . . . . . TM 10-3930-641-10
organizational Maintenance Repair Parts and Special Tools List for Truck, Container Handler:
Rough Terrain, 50,000lb. Capacity . . . . . TM 10-3930-641-20P

b. Camouflage
Camouflage . . . . . FM 5-20
Color, Marking and Camouflage Painting of Military Vehicles, Construction Equipment and
Materials Handling Equipment.. . . . . TB 43-0209

APPENDIX A

REFERENCES (CONT)

A-3. OTHER PUBLICATIONS (CONT)

c. Decontamination

Chemical, Biological, and Radiological (CBR) Decontamination . . . .TM 3-220

d. General

Basic Cold Weather Manual FM31-70
Manual for Wheeled Vehicle Driver . . . . . FM 21-305 ■
Northern Operations . . . . FM 31-71
Operation and Maintenance of Ordnance Material in Cold Weather (0° to-65°F) . . . . FM 9-207
Procedures for Destruction of Equipment to Prevent Enemy Use . . . . TM 750-244-3
Military Traffic Management Command's Transportability Review . . . . TR 80-1-19A ■

e. Maintenance and Repair

Organizational Care, Maintenance and Repair of Pneumatic Tires and Inner Tubes . . . . . TM 9-2610-200-20
Operator's, Organizational, Direct Support and General Support Maintenance Manual for Lead-Acid Storage Batteries . . . . TM 9-6140-200-14
Description, Use, Bonding Techniques, and Properties of Adhesives. . . . . .TB ORD 1032
Inspection, Care, Maintenance of Antifriction Bearings . . . . TM 9-214
Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling Systems . . . . . TB 750-651
Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordnance Material and Related Materials Including Chemicals . . . . TM 9-247
Welding Theory and Application . . . . TM 9-237
Non-Aeronautical Equipment Army Oil Analysis Program (AOAP). . . . . TB 43-0210

f. Administrative Storage

Administrative Storage of Equipment . . . . TM 740-90-1

Section I. Maintenance Allocation Chart (MAC) Introduction

THE ARMY MAINTENANCE SYSTEM MAC

1. This introduction provides a general explanation of all maintenance and repair functions authorized at the two maintenance levels under the Two-Level Maintenance System concept.
2. The MAC immediately following this introduction designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component shall be consistent with the capacities and capabilities of the designated maintenance levels, which are shown in the MAC (Appendix B) in column (4) as:

   Field - includes subcolumns:

   C - Operator/Crew
   O - Organizational
   F - Direct Support

   Sustainmant - includes subcolumns:

   H - General Support
   D - Depot
3. The tools and test equipment requirements (immediately following the MAC) list the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from the MAC.
4. The remarks (immediately following the tools and test equipment requirements) contain supplemental instructions and explanatory notes for a particular maintenance function.

MAINTENANCE FUNCTIONS

Maintenance functions are limited to and defined as follows:

1. **Inspect.** To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).
2. **Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards on a scheduled basis, i.e., load testing of lift devices and hydrostatic testing of pressure hoses.
3. **Service.** Operations required periodically to keep an item in proper operating condition; e.g., to clean (includes decontaminate, when required), preserve, drain, paint, or replenish fuel, lubricants, chemical fluids, or gases.
4. **Adjust.** To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.
5. **Align.** To adjust specified variable elements of an item to bring about optimum or desired performance.
6. **Calibrate.** To determine and cause corrections to be made or to be adjusted on instruments of test, measuring, and diagnostic equipment used in precision measurement. Calibration consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

MAINTENANCE FUNCTIONS - CONTINUED

7. **Remove/Install.** To remove and install the same item when required to perform service or other maintenance functions. Installation may be the act of emplacing or seating a spare, repair part, or module (component or assembly) into position in a manner to allow the proper functioning of an equipment or system.
8. **Replace.** To remove an unserviceable item and install a serviceable counterpart in its place. Replacement is authorized by the MAC and the assigned maintenance level is shown as the third position code of the Source, Maintenance, and Recoverability (SMR) code.
9. **Repair.** Repair is the application of maintenance services, including fault location/troubleshooting, removal/installation, disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

NOTE

The following definitions are applicable to the "repair" maintenance function:

- Services - Inspecting, testing, service, adjustment, alignment, calibration, and/or replacement.
- Fault location/troubleshooting - The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or Unit Under Test (UUT).
- Disassembly/assembly - The step-by-step breakdown (taking apart) of a spare/functional group coded item to the level of its least component, assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).
- Actions - Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

10. **Overhaul.** That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.
11. **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.

EXPLANATION OF COLUMNS IN THE MAC, SECTION 1

1. **Column (1) - Group Number.** Column (1) lists Group numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the Next Higher Assembly (NHA).
2. **Column (2) - Component/Assembly.** Column (2) contains the item names of components, assemblies, subassemblies, and modules for which maintenance is authorized.
3. **Column (3) - Maintenance Function.** Column (3) lists the functions to be performed on the item listed in Column (2). (For a detailed explanation of these functions, refer to "Maintenance Functions" outlined above.)

EXPLANATION OF COLUMNS IN THE MAC, TABLE 1 - CONTINUED

4. **Column (4) - Maintenance Level.** Column (4) specifies each level of maintenance authorized to perform each function listed in column (3), by indicating work time required (expressed as manhours in whole hours or decimals) in the appropriate subcolumn. This work time figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance levels, appropriate work time figures are to be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the MAC. The symbol designations for the various maintenance levels are as follows:

   Field:

   C - Operator/Crew Maintenance
   O - Organizational
   F - Direct Support Maintenance

   Sustainment:

   H - General Support Maintenance
   D - Depot Maintenance

NOTE

The "L" maintenance level is not included in column (4) of the MAC. Functions at this level of maintenance are identified by a work time figure in the "H" column of column (4), and an associated reference code is used in the REMARKS CODE column (6). This code is keyed to the remarks, and the SRA complete repair application is explained there.

5. **Column (5) - Tools and Equipment Reference Code.** Column (5) specifies, by code, common tool sets (not individual tools), common Test, Measurement, and Diagnostic Equipment (TMDE), special tools, special TMDE, and special support equipment required to perform the designated function. Codes are keyed to the entries in the tools and test equipment table.

6. **Column (6) - Remarks Code.** When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks table entries (Table 3).

EXPLANATION OF COLUMNS IN THE TOOLS AND TEST EQUIPMENT REQUIREMENTS, SECTION 3

1. **Column (1) - Tool or Test Equipment Reference Code.** The tool and test equipment reference code correlates with a code used in column (5) of the MAC.

2. **Column (2) - Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.

3. **Column (3) - Nomenclature.** Name or identification of the tool or test equipment.

4. **Column (4) - National Stock Number (NSN).** The NSN of the tool or test equipment.

5. **Column (5) - Tool Number (ICAGEC).** The manufacturer's part number, model number, or type number. The manufacturer's Commercial and Government Entity Code (CAGEC) is also included.

EXPLANATION OF COLUMNS IN THE REMARKS, SECTION 4

1. **Column (1) - Remarks Code.** The code recorded in column (6) of the MAC.
2. **Column (2) - Remarks.** This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
01	**ENGINE**								
0100	Engine, Assembly, Diesel	Inspect	0.1						
		Test			1.0			3	E
		Service		1.0				1,2	B
		Adjust			1.0			3	F
		Replace			32.0			3	
		Repair				125.0		4	A,D
	Trunnions	Inspect		0.05				1,2	
		Replace			0.5			3	
		Repair			0.5			3	
	Supports	Inspect		0.05					
		Replace			0.5			3	
0101	Block, Short	Replace				60.0		4	
		Repair				8.0		4	
	Cylinder Head Assembly	Replace			8.0			3	
		Repair			8.0			3	
0102	Damper	Replace		4.0				1,2	
	Crankshaft	Inspect				1.0		4	
		Replace				26.0		4,13	
	Bearings, Main	Replace				8.0		4	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
01	**ENGINE (CONT)**								
	Seals, Oil	Replace				1.0		4,13,14	
0103	Flywheel Assembly	Replace			16.0			3	
		Repair				2.5		4	
	Flywheel Housing	Replace			11.0			3	
		Repair			2.0			3	
0104	Piston	Replace				24.0		4	
		Repair				3.0		4	
	Connecting Rod	Replace				24.0		4	
		Repair				3.0		4	
	Bearings, Connecting Rod	Replace				2.0		4	
0105	Rocker Arm Assembly	Adjust			1.5			3,7,8	
		Replace			8.0			3,7	
	Rotocoil Assembly	Replace			0.5			3	
		Repair			0.2			4	
	Valves	Replace			14.0			3	
	Camshaft	Replace				16.5		4,8	
	Timing Gears	Replace			5.5			3	
	Covers, Valve	Replace		0.5				1,2	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
01	**ENGINE (CONT)**								
0106	Oil Pan	Replace			5.0			3	
		Repair			1.0			3	
	Engine Oil Pump	Replace			8.0			3	
		Repair			2.0			3	
	Oil Filter	Service		0.3				1,2	B
		Replace		1.0				1,2	
	Oil Filer Bypass Valves	Replace			1.0			3	
	Oil Cooler	Replace			4.0			3	
		Repair			1.0			3	
	Breather	Inspect		0.1				1,2	
		Service		0.1				1,2	
		Replace		0.6				1,2	
	Oil Filler Assembly	Replace		2.0				1,2	
	Oil Lines and Fittings	Inspect		0.1					
		Replace		2.0				1,2	
0108	Manifold, Exhaust	Replace			3.0			3	
0109	Accessory Drive Gears and Housing	Replace Repair			10.5 8.0			3 3	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
01	**ENGINE (CONT)**								
	Tachometer Drive	Replace		0.7				1,2	
	Adapters, Gears and Rear Accessory Drive	Replace			8.5			3	
		Repair			6.0			3	
03	**FUEL SYSTEM**								
0301	Fuel Injection Nozzles	Test			1.0			3,11	
		Replace			2.5			3,6	
		Repair				1.0		4	
0302	Fuel Injection Pump	Inspect			0.2				
		Test			2.0			3	G
		Replace			4.0			3	
		Repair				10.0		4,5,7,9,10	
		Adjust				2.0		4,8,12	H
	Fuel Pump Lines	Inspect	0.1						
		Replace		1.0				1,2	
	Transfer Pump	Replace		1.0				1,2	
		Repair			2.5			3	
	Priming Pump	Replace		0.5				1,2	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
03	**FUEL SYSTEM (CONT)**								
0304	Air Cleaner	Service		0.1				1	
		Replace		0.5				1,2	
	Dust Ejector	Service		0.5				1,2	
0305	Turbocharger	Replace			6.0			3	
		Repair				2.0		4	
	Turbocharger Air Lines	Replace			1.0			3	
	Turbocharger Oil Lines	Replace			1.0			3	
0306	Fuel Tank	Inspect	0.2						
		Service		0.5				1,2	
		Replace			2.0			3	
		Repair			2.0			3	
	Fuel Lines and Fittings	Inspect	0.2						
		Replace		2.0				1,2,15	
0308	Governor	Adjust			1.0			3,8	
		Replace			2.0			3	
		Repair				3.0		4	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
03	**FUEL SYSTEM (CONT)**								
	Fuel Ratio Control	Adjust			0.2			3	
		Replace			0.8			3	
		Repair			1.4			3	
	Controls	Inspect	0.2					1,2	
		Adjust			1.0			3	
		Replace			1.5			3	
0309	Fuel Filters, Primary	Service		0.5				1,2	B
		Replace		0.5				1,2	
	Fuel Filter, Secondary	Service		0.5				1,2	B
		Replace		1.0				1,2	
0311	Ether Starting Aid	Service		0.2				1,2	
		Replace		2.0				1,2	
04	**EXHAUST SYSTEM**								
0401	Muffler and Pipes	Inspect	0.2						
		Replace		1.0				1,2	
	Fumes Disposal Assembly	Replace		1.0				1,2	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
05	**COOLING SYSTEM**								
0501	Radiator Assembly	Inspect	0.1						
		Service		0.5				1,2	
		Replace			6.0			3	
		Repair			4.0			3	
0502	Shrouds	Replace			2.0			3	
		Repair			2.0			3	
0503	Water Temperature Regulators	Test		1.0				1,2	
		Replace		2.0				1,2	
	Water Temperature Switch	Test		1.0				1,2	
		Replace		2.0				1,2	
	Hose, Lines and Fittings	Inspect	0.5						
		Replace		1.0				1,2	
0504	Water Pump Assembly	Inspect	0.1						
		Replace		3.5				1,2	
		Repair			2.0			3	
0505	Fan Assembly	Replace		2.0				1,2	
	Fan Guards	Replace		0.5				1,2	
	Belt, Drive	Inspect	0.1						
		Replace		1.0				1,2	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
05	**COOLING SYSTEM (CONT)**								
	Fan Drive Mechanism	Replace		0.7				1,2	
		Repair			1.5			3	
	Crankshaft Pulley	Replace		0.5				3	
	Belt Tightener	Replace		1.0				1,2	
0507	Auxiliary Cooler, Hydraulic Oil	Replace			2.0			3	
		Repair				2.0		3	
	Oil Lines, Hydraulic Oil Cooler	Inspect		0.1					
		Replace			2.0			3	
0508	Coolant Filter (Conditioner)	Replace		0.5				1,2	
06	**ELECTRICAL SYSTEM**								
0601	Alternator	Test		0.5				1,2	I
		Replace		1.5				1,2	
		Repair				1.0		4	
		Overhaul				2.5		4	
0603	Starting Motor	Test		0.5				1,2	I
		Replace		2.5				1,2	
		Repair				5.0		4	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
06	**ELECTRICAL SYSTEM (CONT)**								
	Solenoid, Starting Motor	Test		0.5				1,2	I
		Replace		1.5				1,2	
0606	Warning Controls, Engine	Inspect	0.1						I
		Test		0.5				1,2	
		Replace		0.5				1,2	
	Solenoid, Fuel Shutoff	Test		0.2				1,2	I
		Adjust			0.2			3	
		Replace			1.0			3	
	Engine Wiring	Test		1.5				1,2	
		Replace			3.0			3	
		Repair		2.0				1,2	
0607	Instrument Panel	Inspect	0.5						
		Replace		1.0				1,2	
		Repair		1.0				1,2	
	Service Meter	Replace		0.5				1,2	
	Container Lock Indicator	Inspect	0.1						I
		Test		0.2				1,2	
		Replace		1.5				1,2	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
06	**ELECTRICAL SYSTEM (CONT)**								
	Console Wiring	Replace		1.5				1,2	
		Repair		1.0				1,2	
	Start Switch	Replace		0.5				1,2	
0609	Headlights	Test		0.2				1,2	I
		Replace		0.5				1,2	
	Backup Light	Test		0.2				1,2	I
		Replace		0.5				1,2	
	Taillights	Test		0.2				1,2	I
		Replace		0.5				1,2	
	Stoplights	Test		0.2				1,2	I
		Replace		0.5				1,2	
	ROPS Lights	Test		0.2				1,2	I
		Replace		1.0				1,2	
	Cap Lights	Test		0.2				1,2	I
		Replace		0.5				1,2	
	Lamps, Sealed	Replace		0.5				1,2	I

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
06	**ELECTRICAL SYSTEM (CONT)**								
0610	Sending Unit, Oil Pressure	Test		0.5				1,2	I
		Replace		0.5				1,2	
	Sending Unit, Engine Temperature	Test		0.5				1,2	I
		Replace		0.5				1,2	
	Stoplight Switch	Test		0.2				1,2	I
		Replace		0.5				1,2	
0611	Horn	Test		0.2				1,2	I
		Replace		0.5				1,2	
	Horn Switch	Test		0.2				1,2	I
		Replace		0.5				1,2	
	Alarm, Backup Warning	Test		0.2				1,2	I
		Replace		0.5				1,2	
0612	Batteries, Storage	Inspect	0.2						
		Test		0.5				1,2	I
		Service		0.5				1,2	C
		Replace		0.5				1,2	
	Battery Box	Replace		0.5				1,2	
		Repair			0.5			3	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
06	**ELECTRICAL SYSTEM (CONT)**								
	Battery Cables	Replace		0.3				1,2	
		Repair		0.3				1,2	
0613	Wiring Harnesses	Replace			2.5			3	
		Repair		1.0				1,2	
	Terminals and Connectors	Replace		1.0				1,2	
0615	Radio Interference Suppression	Replace		0.5				1,2	
07	**TRANSMISSION**								
0708	Torque Converter	Test			0.3			3	J
		Replace				6.0		4	
		Repair				12.0		4	
	Torque Converter Cooler Lines	Inspect	0.1						
		Replace			1.5			3	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
07	**TRANSMISSION (CONT)**								
0710	Transmission Assembly	Service		0.5				1,2	B
		Replace			20.0			3	
		Repair				8.0		4	
		Test			0.5			3	J
	Transmission Controls	Inspect		0.2				1,2	
		Replace			1.5			3	
		Adjust		0.5				1,2	
	Planetary Assembly	Replace				10.0		4	
		Repair				15.0		4	
	Carrier Assembly	Replace				12.0		4	
		Repair				15.0		4	
	Input Transfer Gear Assembly	Replace				2.0		4	
		Repair				10.0		4	
	Output Transfer Gear Assembly	Replace				2.0		4	
		Repair				10.0		4	
0721	Pump, Transmission Oil	Replace			4.0			3	
		Repair				4.0		4	
	Control Valve	Test			0.2			3	
		Replace				1.0		4	
		Repair				2.0		4	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
07	**TRANSMISSION (CONT)**								
	Oil Filter	Service		0.3				1,2	
		Replace		0.5				1,2	
	Linkage	Service		1.0				1,2	
		Replace		1.5				1,2	
	Oil Cooler	Replace			2.4			3	
		Repair				1.0		3	
	Oil Filler Assembly	Replace		1.0				1,2	
	Oil Lines, Transmission	Inspect		0.5					
		Replace			3.0			3	
09	**PROPELLER SHAFTS**								
0900	Drive Shafts	Replace		4.0				1,2	
		Repair			2.0			3	
	Universal Joint/Spider and Bearing Assembly	Replace			2.0			3	B
10	**FRONT AXLE**								
1000	Front Axle Assembly	Replace			5.0			3	
		Repair				4.0		4	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
10	**FRONT AXLE (CONT)**								
1002	Differential Assembly, Front	Inspect		1.0					
		Service		0.5				1,2	B
		Replace				8.0		4	
		Repair				4.0		4	
11	**REAR AXLE**								
1100	Rear Axle Assembly	Replace			5.0			3	
		Repair				4.0		4	
	Trunnion Support Assemblies	Replace			5.0			3	
		Repair				3.5		4	
1102	Differential Assembly, Rear	Inspect		1.0					
		Service		0.5				1,2	B
		Replace				8.0		4	
		Repair				4.0		4	
12	**BRAKES**								
1201	Hand Brake Assembly	Inspect		0.1				1,2	
		Replace			3.0			3	
		Repair			2.0			3	
	Brake Lines	Inspect		0.2					
		Replace			3.0			3	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
12	**BRAKES (CONT)**								
	Brake Control	Replace		2.0				1,2	
		Repair		1.0				1,2	
1202	Service Brake Assembly	Replace			3.0			3	
		Repair				2.0		4	K
	Service Brake Linkage	Adjust		1.5				1,2	
1204	Brake Control	Replace			2.0			3	
		Repair			2.0			3	
	Accumulator	Replace			2.0			3	
		Service			1.0			3	
	Lines, Fittings, and Hoses	Inspect		0.1					
		Replace			1.0			3	
	Hydraulic Valves	Replace			2.0			3	
		Repair			2.0			4	
1206	Mechanical Brake Pedal and Linkage	Replace			1.5			3	
		Repair			2.0			3	
13	**WHEELS**								
1311	Wheel Assembly	Replace		0.8				1,2	K
	Rims	Replace			0.8			3,16,17	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
13	**WHEELS (CONT)**								
1313	Tires	Inspect	0.1						
		Service		0.5				1,2	
		Replace			2.0			3,16,17	
		Repair			1.0			3	
14	**STEERING**								
1401	Steering Wheel	Replace		1.0				1,2	
	Steering System	Test		0.5				1,2	L
		Service		0.5				1,2	B
		Adjust			1.0			3	
		Replace			3.0			3	
		Repair			2.0			3	
	Adjustable Steering Column	Replace			3.0			3	
		Repair			2.0			3	
	Steering Valve Assembly	Replace			3.0			3	
		Repair				2.0		4	
1402	Articulated Hitch Assembly	Service		0.2				1,2	B
		Repair			8.0			3	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
14	**STEERING (CONT)**								
1410	Steering Pump	Test			1.0			3	L
		Inspect		1.0				3	
		Replace			5.0			3	
		Repair				3.0		4	
	Steering Pump, Supplemental	Test			1.0			3	L
		Inspect		1.0					
		Replace			5.0			3	
		Repair				3.0		4	
1411	Hoses, Lines and Fittings	Inspect		0.1					
		Replace			3.0			3	
	Steering Filter	Service		0.3				1,2	B
		Replace		0.5				1,2	
1412	Hydraulic Cylinders	Inspect	0.1						
		Replace			8.0			3	
		Repair				2.0		4	
1414	Steering System Diverter Valves	Inspect		0.2					
		Replace			1.0			3	
		Repair				1.0		4	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
14	**STEERING (CONT)**								
	Steering Limit Valve	Inspect		0.2					
		Adjust			0.5			3	
		Replace			1.0			3	
		Repair				1.0		4	
15	**FRAME AND TOWING ATTACHMENTS**								
1501	Frame Assembly, Engine End	Inspect		0.5					
		Repair				2.0		4	
	Frame Assembly, Non-Engine End	Inspect		0.5					
		Repair				2.0		4	
	Bumper, Rear	Replace				2.0		4	
		Repair				2.0		4	
	Platform	Replace			2.0			3	
		Repair			2.0			3	
	Platform Guard	Replace		0.5				1,2	
		Repair			1.0			3	
	Ladder	Replace		0.5				1,2	
		Repair		1.0				1,2	
	Shipping Link	Replace		0.2					

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
15	**FRAME AND TOWING ATTACHMENTS (CONT)**								
	Platform, Right Hand	Replace			2.0			3	
		Repair			2.0			3	
	Pintle Hook Assembly	Replace		0.5				1,2	
1502	Counterweight	Replace			1.0			3	
18	**BODY, CAB, HOOD, AND HULL**								
1801	Body	Repair			5.0			3	
	Cab	Repair			1.0			3	
		Replace			25.0			3	
	ROPS	Replace			1.0			3	
1802	Fender, Front	Replace		3.0				1,2	
		Repair			2.0			3	
	Fender, Rear	Inspect		0.2					
		Replace		1.5				1,2	
		Repair			2.0			3	
	Windshield	Replace			3.0			3	
	Glass	Replace			2.0			3	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
18	**BODY, CAB, HOOD, AND HULL (CONT)**								
1806	Seat	Replace		1.0				1,2	
		Repair			1.5			3	
	Arm Cushion	Replace		0.5				1,2	
	Seat Belts	Replace		0.5				1,2	
22	**BODY, CHASSIS, AND ACCESSORY ITEMS**								
2202	Mirrors	Inspect	0.1						
		Replace		0.2				1,2	
	Wipers	Inspect	0.1						
		Replace		1.0				1,2	
	Windshield Wiper Motor	Replace		2.0				1,2	
	Cab Heater and Defroster	Test	0.2						
		Replace		2.0				1,2	
	Air Filter, Cab Heater	Service		0.2				1,2	
		Replace		1.2				1,2	
	Heater Lines	Replace		1.0				1,2	
		Repair		0.5				1,2	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
22	**BODY, CHASSIS, AND ACCESSORY ITEMS (CONT)**								
	Control Console Assembly, Heater Grease Lines	Replace		1.5				1,2	
		Service		0.2				1,2	B
		Replace		1.0				1,2	
24	**HYDRAULIC SYSTEMS**								
2400	Hydraulic System	Inspect	0.1						
		Service		0.5				1,2	B
		Repair				2.0		4	
2401	Hydraulic Pump	Test			1.0			3	J
		Replace			6.0			3	
		Repair				3.0		4	
2402	Control Valves	Replace			4.0			3	
		Repair				5.0		4	
2403	Controls and Linkage	Adjust		1.0				1,2	
		Replace		2.0				1,2	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
24	**HYDRAULIC SYSTEMS (CONT)**								
2404	Tilt Cylinder	Inspect	0.1						
		Test			0.2			3	J
		Replace			1.0			3	
		Repair				8.0		4	
	Side Tilt Cylinder	Inspect	0.1						
		Test			0.2			3	J
		Replace			1.0			3	
		Repair				8.0		4	
	Side Shift Cylinder	Inspect	0.1						
		Test			0.2			3	J
		Replace			1.0			3	
		Repair				8.0		4	
2405	Mast	Inspect		0.1					
		Replace			3.0			3	
		Repair				2.0		4	
	Carriage	Inspect		0.1					
		Replace			2.0			3	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
24	**HYDRAULIC SYSTEMS (CONT)**								
	Forks	Inspect	0.1						
		Replace			0.5			3	
	Lift Cylinder	Replace			1.0			3	
		Repair				1.0		4	
2406	Hydraulic Lines and Fittings	Inspect		0.1					
		Replace			1.0			3	
	Hydraulic Filter	Service		0.5				1,2	B
		Replace		1.0				1,2	
2407	Hydraulic Reservoir	Inspect	0.1						
		Service		0.5				1,2	B
		Replace			2.0			3	
		Repair				3.0		3	
33	**SPECIAL PURPOSE KITS**								
3307	Tophandler, 20 Ft	Inspect	0.1						
		Install	0.5						
		Repair			1.5			3	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
33	**SPECIAL PURPOSE KITS (CONT)**								
	Tophandler, 35 Ft	Inspect	0.1						
		Install	0.5						
		Repair			1.5	2.0		3,4	
	Tophandler, 40 Ft	Inspect	0.1						
		Install	0.5						
		Repair			1.5	2.0		3,4	
	Force Limiter	Inspect	0.1						
		Adjust			0.5			3	
		Service		0.2				1,2	B
		Replace			1.2			3	
		Repair			1.5			3	
	Twistlock	Inspect	0.1						
		Adjust			0.7			3	
		Service		0.4				1,2	
		Replace			1.0			3	B
	Hydraulic Cylinder, Tophandler	Replace			0.5			3	B
		Repair				1.0		4	

Section II. MAINTENANCE ALLOCATION CHART (MAC) FOR TRUCK, CONTAINER HANDLER (CONT)

(1)	(2)	(3)	(4) MAINTENANCE LEVEL					(5)	(6)
			FIELD			SUSTAINMENT			
			UNIT		DS	GS	DEPOT	TOOLS AND EQUIPMENT	
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	C	O	F	H	D	REF CODE	REMARKS CODE
33	**SPECIAL PURPOSE KITS (CONT)**								
	Tophandler Guide Plate Mounting Bolts	Replace		0.2				1,2	

Section III. TOOLS AND TEST EQUIPMENT FOR TRUCK, CONTAINER HANDLER

(1) ITEM NO.	(2) MAINTENANCE LEVEL	(3) ITEM NAME	(4) NATIONAL STOCK NUMBER	(5) TOOL NUMBER/	(6) CAGEC
1	O	Shop Equipment, Automotive Maintenance and Repair: Common No. 1	4910-00-754-0654	W32593	19204
2	O	Shop Equipment, Automotive Maintenance and Repair: Supplemental No. 1	4910-00-754-0653	W32867	19204
3	F	Shop Equipment, Automotive Maintenance and Repair: Wheeled Vehicles, Set B	4910-00-348-7697	T09906	19204
4	H	Shop Equipment, Automotive Maintenance and Repair: Wheeled Vehicles, Set A	4910-00-348-7696	T09905	19204
5	F	Wrench, Injector Pump Removal	5120-01-375-5889	8S4613	11083
6	F	Extractor, Injector	5120-00-178-1267	8S2244	11083
7	F	Tool Set, Valve Lifter	5120-01-276-0528	5P7433	11083
8	F	Tool, Engine Turning	3020-01-250-1610	9S9082	11083
9	H	Fixture, Fuel Rack Bearing		5P6217	11083
10	H	Driver, Fuel Rack Bearing		5P6218	11083
11	F	Extractor, Fuel Nozzle Adapter	4930-01-268-7417	5P6229	11083
12	F	Pin, Timing		5P9697	11083
13	H	Distorter, Wear Sleeve	5120-01-119-1748	5P7312	11083
14	H	Ring, Distorter	5120-01-288-2453	5P7314	11083
15	O	Socket, Fuel Line	5120-01-124-1773	5P144	11083
16	O,F	Remover, Tire, Bead Breaker, Hydraulic	4910-00-773-9341	814D1100	994
17	O,F	Constrictor, Bead Expander	4910-00-138-1819	TC28	31989

Section IV. REMARKS FOR TRUCK, CONTAINER HANDLER

(1) REFERENCE CODE	(2) REMARKS
A	Complete engine gasket kit is available.
B	**See Preventive Maintenance Checks and Services (PMCS)** for lubrication instructions.
C	Battery maintenance instructions are provided in TM 9-6140-200-14.
D	Repair time is given with engine removed from vehicle.
E	Test includes inlet manifold pressure check, compression check, oil pressure check, and operational check.
F	Adjustment consists of valve adjustment.
G	Fuel injection pump test consists of timing check.
H	Fuel injection pump adjustment consists of timing adjustment and fuel rack adjustment.
I	Operational test or electrical troubleshooting as required.
J	Test consists of pressure check and performance tests.
K	Front and rear wheels, brakes, and final drives are identical.
L	Steering test consists of hydraulic pressure check.

APPENDIX C
EXPENDABLE SUPPLIES AND MATERIALS LIST
Section I. INTRODUCTION

SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the Rough Terrain Container Handler. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

EXPLANATION OF COLUMNS

1. **Column (1) - Item Number.** This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 2, App. C").
2. **Column (2) - Maintenance Level.** This column identifies the lowest level of maintenance that requires the listed item.

   C - Operator/Crew
   O - Organizational Maintenance
3. **Column (3) - National Stock Number.** This is the National Stock Number (NSN) assigned to the item; use it to request or requisition the item.
4. **Description.** Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.
5. **U/M (Unit of Measure).** Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, gal, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NO.	(2) MAINTENANCE LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	C		Antifreeze: Permanent Ehtylene Glycol, Inhibited, Heavy-Duty	
		6850-01-441-3218	(58536) A-A-52624 1 Gallon Can	gal
		6850-00-181-7933	(81349 MILA46153 5 Gallon Container	gal
		6850-01-441-3223	(58536) A-A-52624 55 Gallon Drum	dr
2	O	6850-00-941-5054	Cleaning Compound, Solvent, 5 gal can O-C-1889 (8138)	gal
3	C	9150-00-935-1017	GAA Grease, Auto/Artillery, 14 oz cartridge M-10924-B (81349)	ea
4	C	9150-00-190-0904	GAA Grease, Auto/Artillery, 1-3/4 lb can M-10924-C (81349)	lb
5	O		GO Lubricating Oil, Grade 80/90 MIL-PRF-2105 (81349)	
		9150-01-035-5392	1 Quart Can	qt
		9150-00-001-9395	5 Gallon Can	gal
		9150-01-035-5394	55 Gallon Drum	gal
6	O		GO Lubricating Oil, Grade 75 MIL-PRF-2105	gal
		9150-01-035-5390	1 Quart Can	qt
		9150-01-035-5391	5 Gallon Can	gal

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST (CONT)

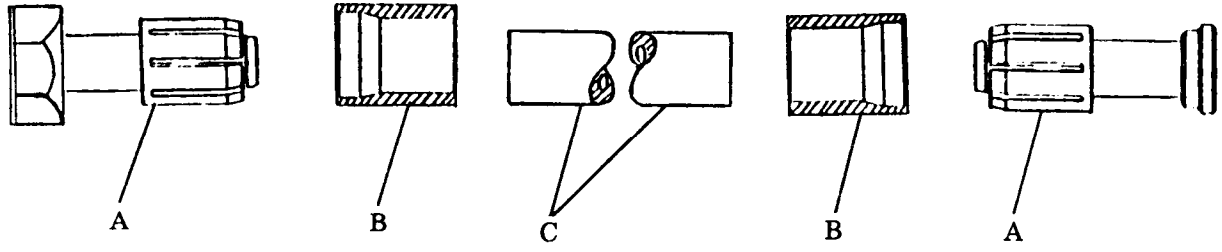
(1) ITEM NO.	(2) MAINTENANCE LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
7	C		Lubricating Oil, OE/HDO-30 MIL-PRF-2104 (81349)	
		9150-00-186-6681	1 Quart Can	qt
		9150-00-188-9858	5 Gallon Can	gal
7.1	C		Lubricating Oil, OEA, Arctic MIL-PRF-46167 (81349)	
		9150-00-402-4478	1 Quart Can	qt
		9150-00-402-2372	5 Gallon Can	gal
		9150-00-491-7197	55 Gallon Drum	dr
8	C		Lubricating Oil, OE/HDO-10 MIL-PRF-2104 (81349)	
		9150-00-189-6727	1 Quart Can	qt
		9150-00-186-6668	5 Gallon Can	gal
		9150-00-191-2772	55 Gallon Drum	dr
8.1	C	9150-00-247-0481	Lubricating Oil, OE/HDO-10/30 BRAYCO413J (2R128)	qt
8.2	C		Lubricating Oil, OE/HDO-15/40 MIL-PRF-2104 (81349)	
		9150-01-152-4117	1 Quart Can	qt
		9150-01-152-4118	5 Gallon Can	gal
		9150-01-152-4119	55 Gallon Drum	dr

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST (CONT)

(1) ITEM NO.	(2) MAINTENANCE LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
9	O	9150-00-935-9807	OH T, Hydraulic Fluid, Petroleum Base MIL-H-6083 (81349)	qt
10	O	8030-00-145-0151	Coating Compound, Plastisol, 1 qt can A-A-59464 (58536)	qt
11	O	8135-00-551-1245	Tape, Pressure Sensitive Adhesive, 60 yd roll, 4 in wide A-A-884 (58536)	yd
12	O	8010-00-297-0560	Enamel, Alkyd, Lusterless OD, 1 gal can MPI 8-FLAT (80244)	gal
13	O	8010-00-598-5936	Enamel, Semigloss OD, 16 oz can (aerosol) MIL-E-11195 (81349)	ea
14	C	9140-00-286-5294	Fuel Oil, Diesel: DF2 ASTM D 975 (81346)	gal
15	O	6810-00-356-4936	Distilled-Deionized 6Z9250 (80063)	gal
16	C	7920-00-205-1711	Rag, Wiping: Cotton, Class 2. Grade B, 50 lb bale 7920-00-205-1711 (80244)	lb
17	C		Cleaning Compound, Solvent, Type III MIL-PRF-680 (81349)	
		6850-01-474-2318	1 Gallon Can	gal
		6850-01-474-2320	5 Gallon Can	gal
		6850-01-474-2321	55 Gallon Drum	dr
18	C	7930-00-249-8036	Detergent, General Purpose: 5 lb box 7930-00-249-8036 (80244)	lb
19	O	6810-00-264-6618	Sodium Bicarbonate, Technical: 1 lb box AA374-2 (58536)	lb

APPENDIX D
ILLUSTRATED LIST OF MANUFACTURED ITEMS

MANUFACTURED HOSES



A. Stem Assy – Assembly may have nuts on the ends or may be attached with flanges. Stem Assy 's will be listed as one per end.

B. Sleeve Assy – Sleeves will be listed as one per end.

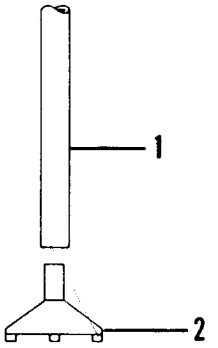
C. Hose – Hoses listed are in bulk length.

Hose Assy No.	Bulk Hose No.	Hose Length	Sleeve No. (Qty)	Stem Assy No. (Qty)
8N1467	5P0182	100.4 in. (2.6m)	3S7116 (2)	1P1219 (1) 3S8573 (1)
8N1468	5P0182	108.3 in. (2.8m)	3S7116 (2)	1P1219 (1) 5S3826 (1)

TA098911

MANUFACTURED HOSES (CONT)

88841-28 PUMP ASSEMBLY



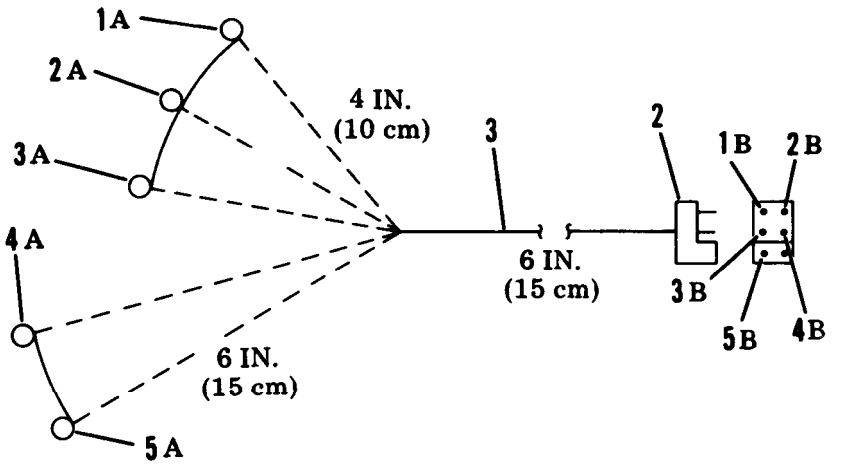
1. 5P5992 Hose, Bulk 8 in. (20 cm) – Qty 1
2. 87883-4 Strainer – Qty 1

TA172270

MANUFACTURED HARNESSES

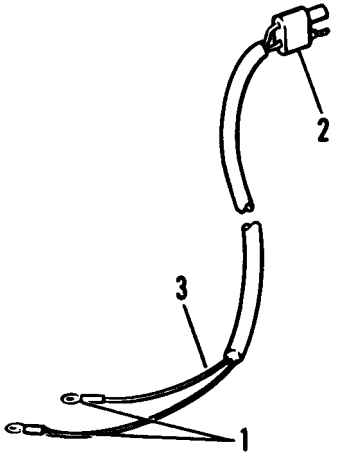
Cut wire to length. Attach terminals and connectors as shown in diagram. Check for continuity (page 2-53) and shorts (page 2-54).

5R4551 HARNESS ASSEMBLY



1. 2L8074 Ring Terminal – Qty 5
2. 19188A Connector – Qty 1
3. 5P5623 Bulk Wire, 16 gage – 5 pieces, length as shown

2V7616 HARNESS ASSEMBLY

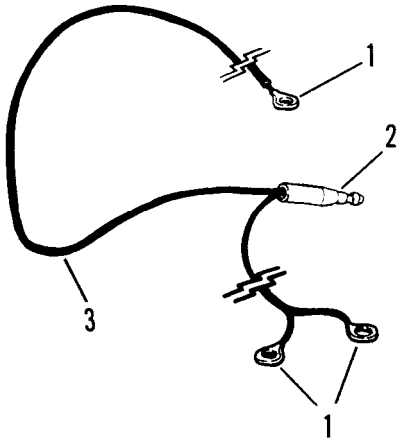


1. MS25036-153 Terminal – Qty 2
2. 19191 Connector – Qty 1
3. 5P5623 Bulk Wire, 16 gage – 2 pieces, 8 in. (20 cm)

TA172230

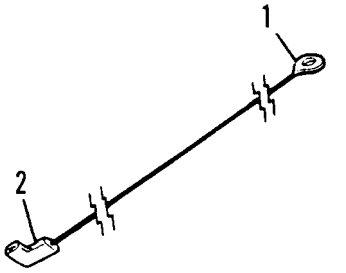
MANUFACTURED HARNESSES (CONT)

5R4490 WIRE ASSEMBLY



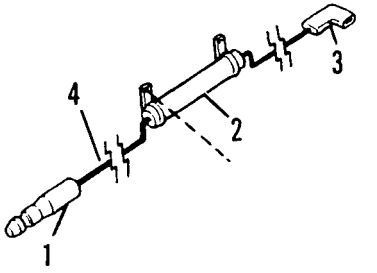
1. MS25036-153 Lug Terminal – Qty 3
2. 2863 Terminal, Quick Disconnect – Qty 1
3. 5P5623 Bulk Wire. 16 gage — 2 pieces, 40 in. (100 cm)

2V4305 WIRE ASSEMBLY



1. 2L8074 Lug Terminal – Qty 1
2. 412026 Terminal, Female – Qty 2
3. 5P5623 Bulk Wire, 16 gage – 18 in. (45 cm)

2V4306 WIRE ASSEMBLY

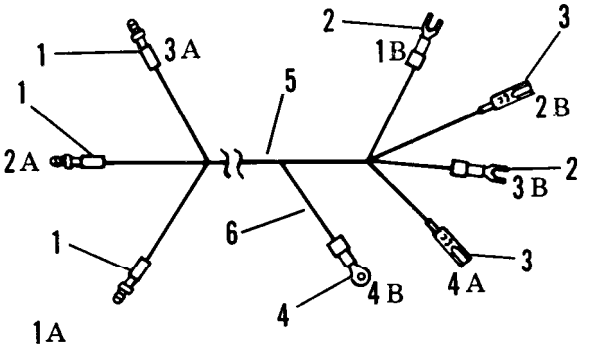


1. 11722 Connector – Qty 1
2. 0200R Resistor – Qty 1
3. 412026 Terminal, Female – Qty 1
4. 5P5623 Bulk Wire, 16 gage – 44 in. (110 cm)

TA172231

MANUFACTURED HARNESSES (CONT)

2V3020 HARNESS ASSEMBLY



1. 11722 Plug, Tip – Qty 3

2. 5P1475 Terminal, Lug – Qty 2

3. 7K4475 Pin, Shoulder – Qty 2

4. MS25036-110 Terminal, Lug – Qty 1

5. 5P5623 Bulk Wire, 16 gage –
   Length as follows:

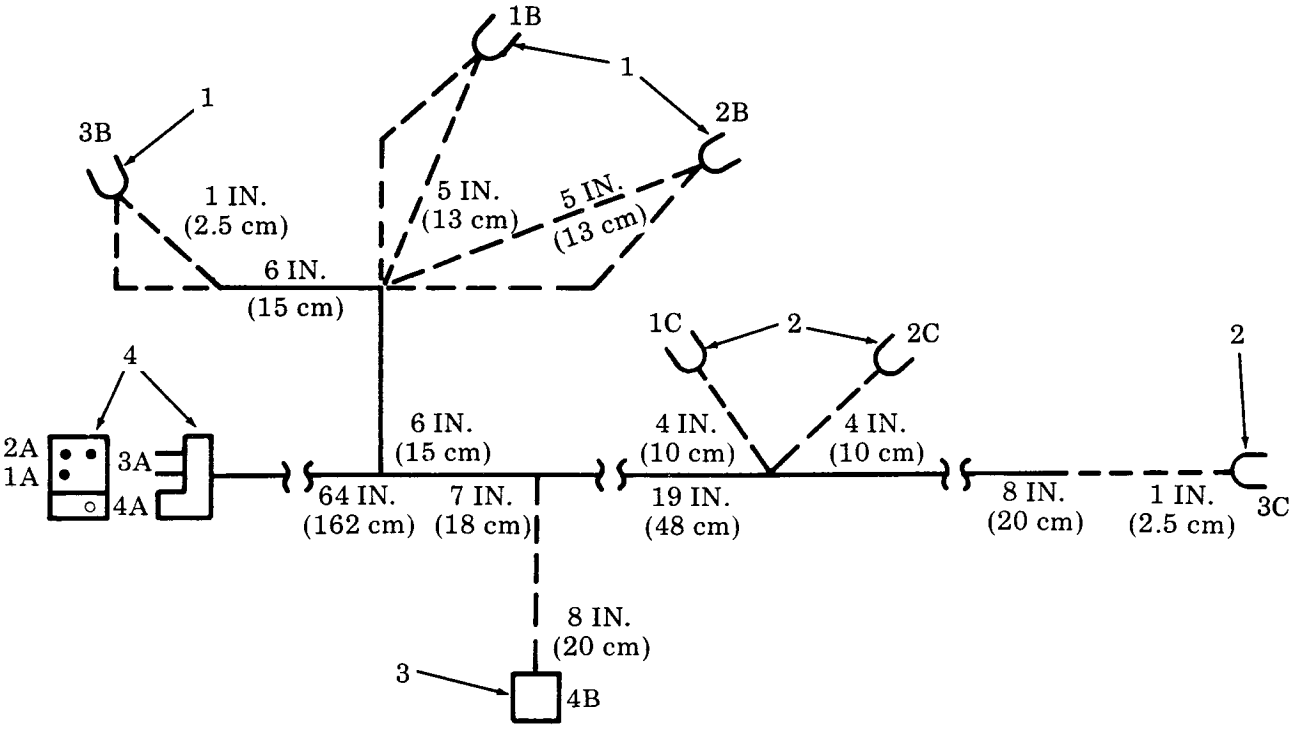
   1A to 1B – 43 in. (110 cm)
   3A to 3B – 43 in. (110 cm)
   4A to 4B – 12 in. (30 cm)

6. 5P5624 Bulk Wire, 14 gage – from 2A to 2B – 47 in. (120 cm)

TA172232

MANUFACTURED HARNESSES (CONT)

2V2989 HARNESS ASSEMBLY



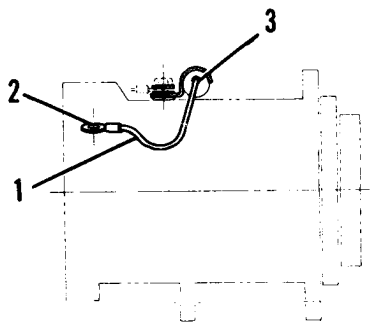
1. 5P1475 Terminal, Lug – Qty 3
2. 5P1477 Terminal, Lug – Qty 3
3. 17510 Jack, Tip – Qty 1
4. 19188A Connector – Qty 1
5. 5P5623 Bulk Wire, 16 gage – Length as follows:

   1A to 1B – 75 in. (190 cm)
   2A to 2B – 75 in. (190 cm)
   3A to 3B – 77 in. (195 cm)
   4A to 4B – 79 in. (200 cm)
   1C to 2B – 41 in. (104 cm)
   2C to 2B – 41 in. (104 cm)
   3C to 3B – 48 in. (122 cm)

TA172233

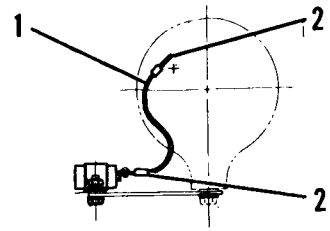
MANUFACTURED HARNESSES (CONT)

5R4686 WIRE ASSEMBLY



1. 5P5632 Bulk Wire, 10 gage – 6 in. (15 cm)
2. 2L8071 Terminal – Qty 1
3. 2L8064 Terminal – Qty 1

5R4687 WIRE ASSEMBLY

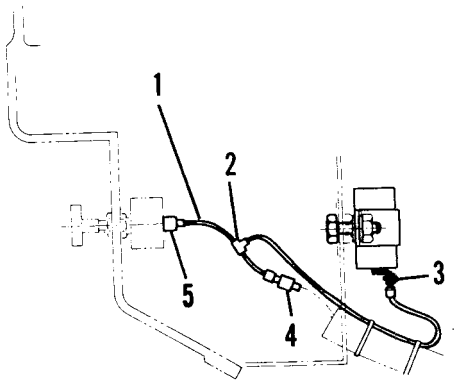


1. 5P5632 Bulk Wire, 10 gage – 6 in. (15 cm)
2. 2L8049 Terminal – Qty 2

TA172271

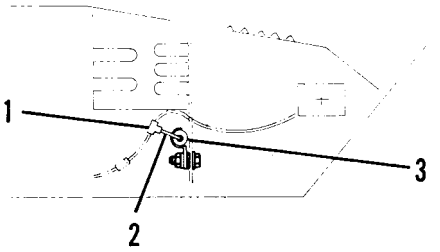
MANUFACTURED HARNESSES (CONT)

5R4689 WIRE ASSEMBLY



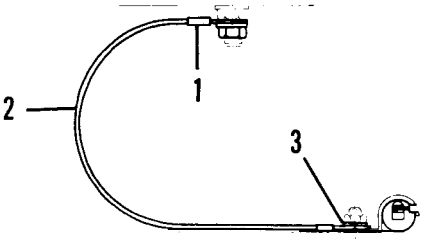
1. 5P5632 Bulk Wire, 10 gage – 2 pieces 8 in. (20 cm) and 14 in. (35 cm)
2. 5R4677 Splice - Qty 1
3. 2L8064 Terminal – Qty 1
4. 6N9018 Connector – Qty 1
5. 5P5618 Terminal – Qty 1

5R4688 WIRE ASSEMBLY



1. 5R4677 Splice – Qty 1
2. 5P5621 Bulk Wire, 12 gage – 6 in. (15 cm)
3. 2L8064 Terminal – Qty 1

5R4690 WIRE ASSEMBLY

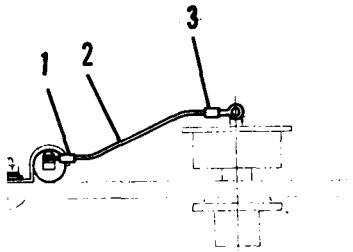


1. 2L8069 Terminal – Qty 1
2. 5P5632 Bulk Wire, 10 gage – 12 in. (30 cm)
3. 2L8067 Terminal – Qty 1

TA172272

MANUFACTURED HARNESSES (CONT)

5R4691 WIRE ASSEMBLY

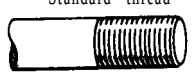


1. 2L8067 Terminal – Qty 1
2. 5P5632 Bulk Wire, 10 gage – 8 in. (20 cm)
3. 228066 Terminal – Qty 1

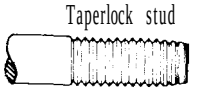
TA172273

APPENDIX E
TORQUE LIMITS

GENERAL TORQUE FOR CAPSCREWS AND NUTS

THREAD DIAMETER		STANDARD TORQUE	
inches	millimeters	lb. ft.	N•m
Standard thread 		Use these torques for bolts and nuts with standard threads (conversions are approximate).	
1/4	6.35	9 ± 3	12 ± 4
5/16	7.94	18 ± 5	25 ± 7
3/8	9.53	32 ± 5	45 ± 7
7/16	11.11	50 ± 10	70 ± 15
1/2	12.70	75 ± 10	100 ± 15
9/16	14.29	110 ± 15	150 ± 20
5/8	15.88	15 ± 20	200 ± 25
3/4	19.05	265 ± 35	360 ± 50
7/8	22.23	420 ± 60	570 ± 80
1	25.40	640 ± 80	875 ± 100
1 1/8	28.58	800 ± 100	1100 ± 150
1 1/4	31.75	1000 ± 120	1350 ± 175
1 3/8	34.93	1200 ± 150	1600 ± 200
1 1/2	38.10	1500 ± 200	2000 ± 275
		Use these torques for bolts and nuts on hydraulic valve bodies.	
5/16	7.94	13 ± 2	20 ± 3
3/8	9.53	24 ± 2	35 ± 3
7/16	11.11	39 ± 2	50 ± 3
1/2	12.70	60 ± 3	80 ± 4
5/8	15.88	118 ± 4	160 ± 6

GENERAL TORQUE FOR TAPERLOCK STUDS



1/4	6.35	5 ± 2	7 ± 3
5/16	7.94	10 ± 3	15 ± 5
3/8	9.53	20 ± 3	30 ± 5
7/16	11.11	30 ± 5	40 ± 10
1/2	12.70	40 ± 5	55 ± 10
9/16	14.29	60 ± 10	80 ± 15
5/8	15.88	75 ± 10	100 ± 15
3/4	19.05	110 ± 15	150 ± 20
7/8	22.23	170 ± 20	230 ± 30
1	25.40	260 ± 30	350 ± 40
1 1/8	28.58	320 ± 30	400 ± 40
1 1/4	31.75	400 ± 40	550 ± 50
1 3/8	34.93	480 ± 40	650 ± 50
1 1/2	38.10	550 ± 50	750 ± 70

INDEX

Page

INDEX (cont)

Page

C (cont)

D

Page

E

F

INDEX (cont)

INDEX (cont)

Page

I (cont)

L

M

Page

N

O

INDEX (cont)

Page

P

R

Page

S

Page

S (cont)

T

Page

V

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INDEX (cont)

Page

W

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

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PUBLICATION/FORM NUMBER:	DATE:	TITLE:
TM X-XXXX-XXX-XXX	Date of the TM.	Title of TM.

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Exact wording of recommended change must be given)
	0019 00 1	3	1	1		Step No. 2 says to secure doors open with locking bar or hooks from where to what? The bars or hooks are not identified.
	0019 00 4	4	1	1		Step No. 19 states to remove locking bars, pins or hooks from where to what? The bars, pins or hooks are not identified. Where are they stored?

* Reference to line numbers within the paragraph or subparagraph.

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Doe, John, CPL	755-1313	*CPL John Doe*

TO: *(Forward to proponent of publication or form) (Include ZIP Code)*	FROM: *(Activity and location) (Include ZIP Code)*	DATE:

PART II- REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION/FORM NUMBER:	DATE:	TITLE:
TM X-XXXX-XXX-XXX	Date of the TM.	Title of TM.

PAGE NO.	COLM NO.	LINE NO.	FEDERAL STOCK NUMBER	REFERENCE NO.		FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III - REMARKS *(Any general remarks or recommendations, or suggestions for improvement of publications and*
blank forms. Additional blank sheets may be used if more space is needed.)

* Reference to line numbers within the paragraph or subparagraph.

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
Doe, John, CPL	755-1313	*CPL John Doe*

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TO: (Forward to proponent of publication or form) (Include ZIP Code) AMSTA-LC-LMIT/TECH PUBS, TACOM-RI 1 Rock Island Arsenal Rock Island, IL 61299-7630	**FROM:** (Activity and location) (Include ZIP Code)	

PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.*	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Exact wording of recommended change must be given)

* Reference to line numbers within the paragraph or subparagraph.

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

DA FORM 1 FEB 74 **2028**

REPLACES DA FORM 2028, 1 DEC 68, WHICH WILL BE USED.

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PART II- REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION/FORM NUMBER	DATE	TITLE

PAGE NO.	COLM NO.	LINE NO.	FEDERAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPROTED	RECOMMENDED ACTION

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ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.*	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Exact wording of recommended change must be given)

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TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

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PAGE NO.	COLM NO.	LINE NO.	FEDERAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPROTED	RECOMMENDED ACTION

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ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.*	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Exact wording of recommended change must be given)

* Reference to line numbers within the paragraph or subparagraph.

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PART II- REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

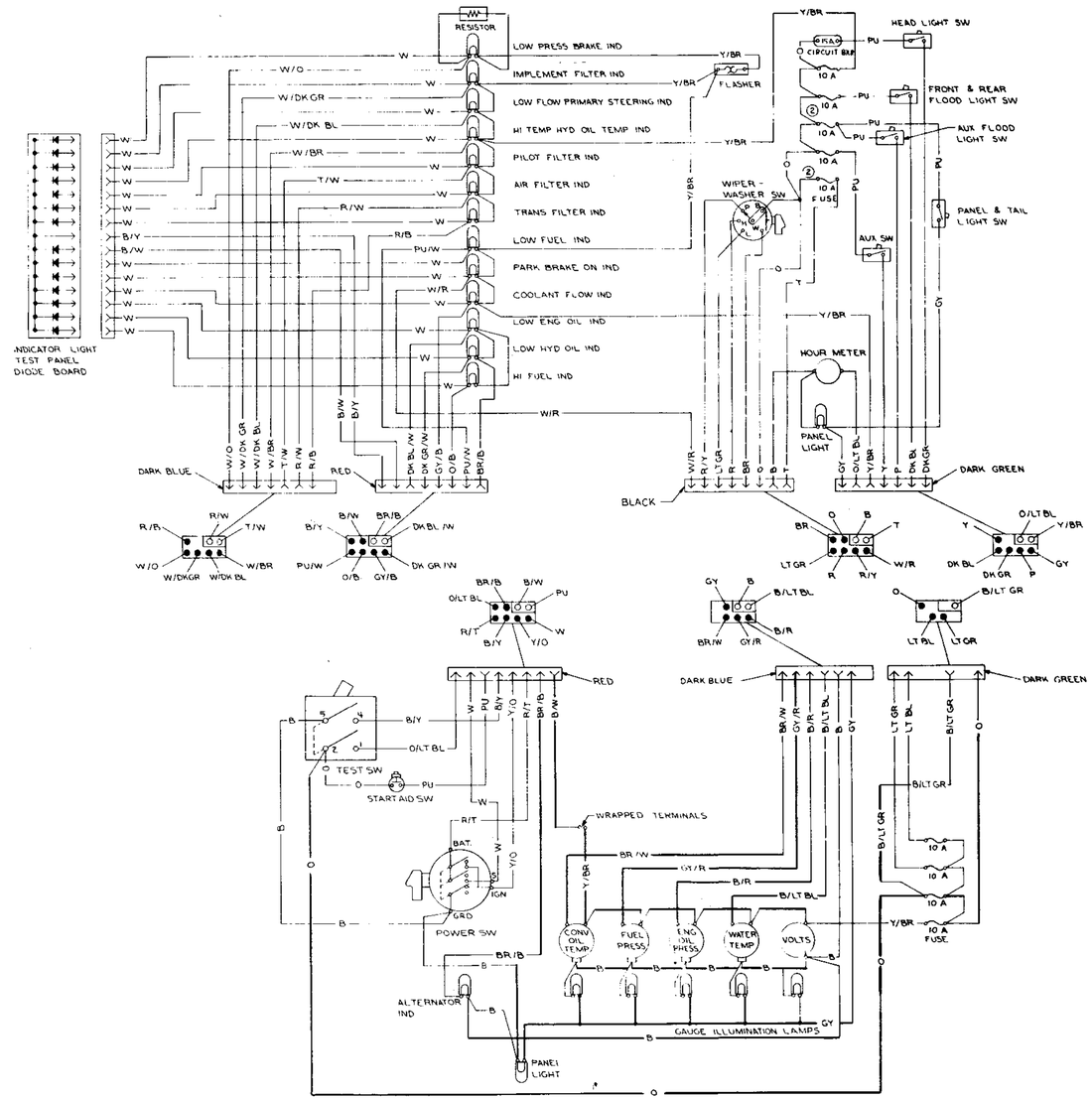
PUBLICATION/FORM NUMBER	DATE	TITLE

PAGE NO.	COLM NO.	LINE NO.	FEDERAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPROTED	RECOMMENDED ACTION

PART III - REMARKS (Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

☆U.S. GOVERNMENT PRINTING OFFICE 1981 341-646/8606



ABBREVIATION	COLOR
R	RED
W	WHITE
O	ORANGE
Y	YELLOW
T	TAN
P	PINK
B	BLACK
GY	GRAY
PU	PURPLE
BR	BROWN
DK GR	DARK GREEN
DK BL	DARK BLUE
LT GR	LIGHT GREEN
LT BL	LIGHT BLUE
XX/XX	BASIC COLOR/STRIPE

SYMBOL	DESCRIPTION
○	WIRE TERMINAL
•	SPLICE OR JUNCTION OF WIRES
—+—	CROSSING OF WIRES NOT CONNECTED
—⏚	WISIBLE GROUNDING OF COMPONENTS
—⏚	INTERNAL GROUNDING OF COMPONENTS
—›‹—	CONNECTOR

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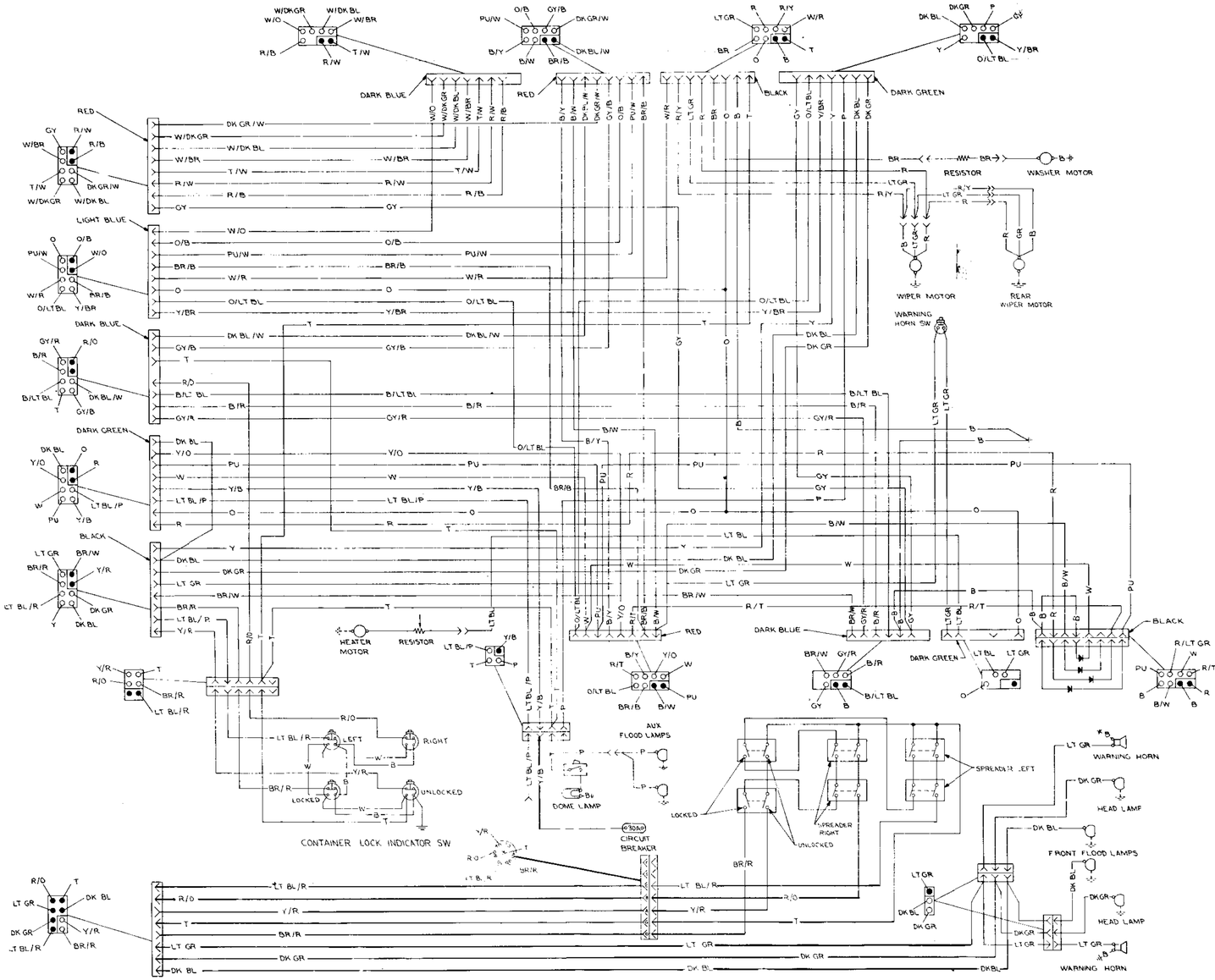
Electrical Schematic Diagram (Sheet 1 of 3)

FO-1



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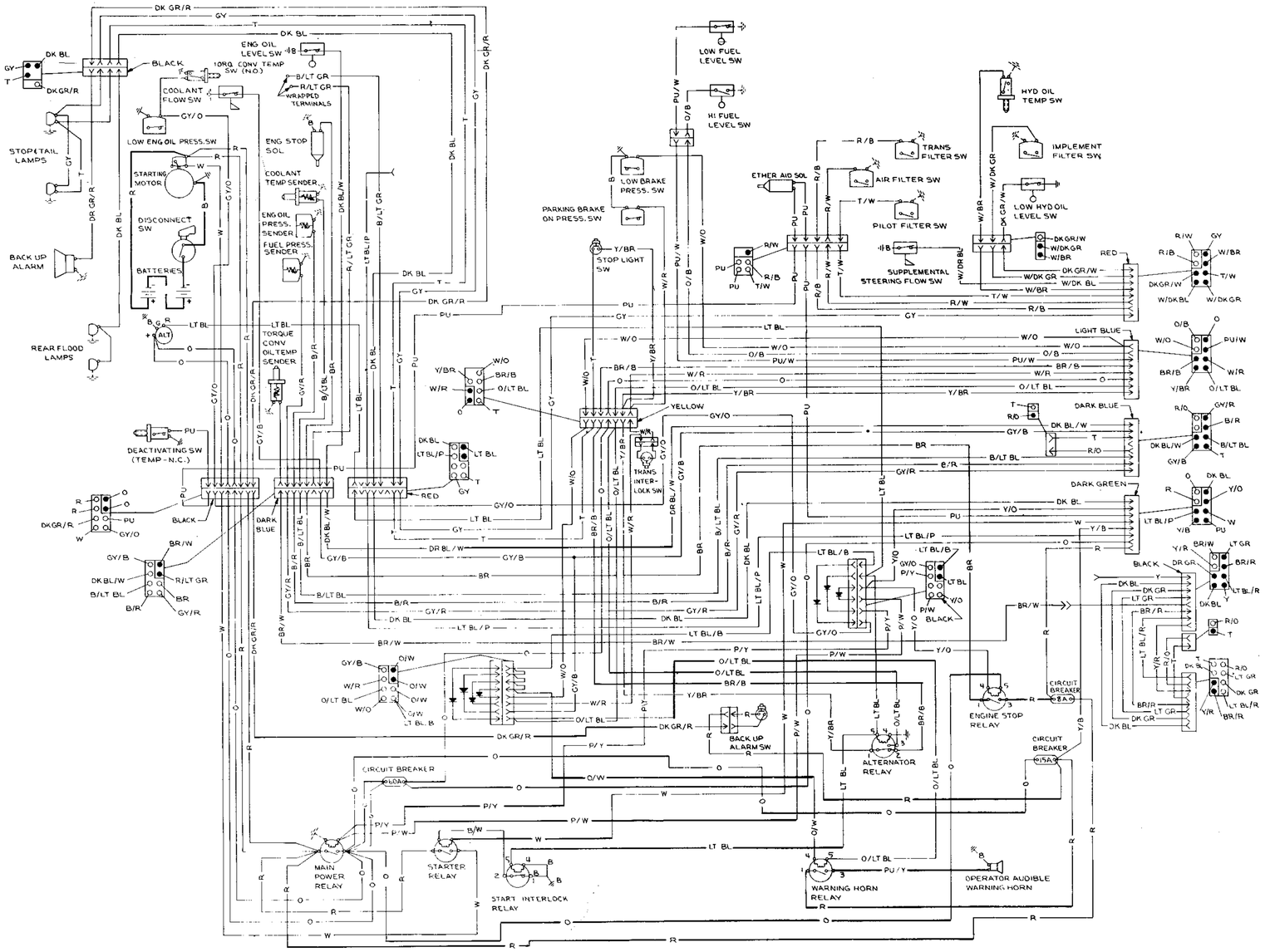
Electrical Schematic Diagram (Sheet 2 of 3)



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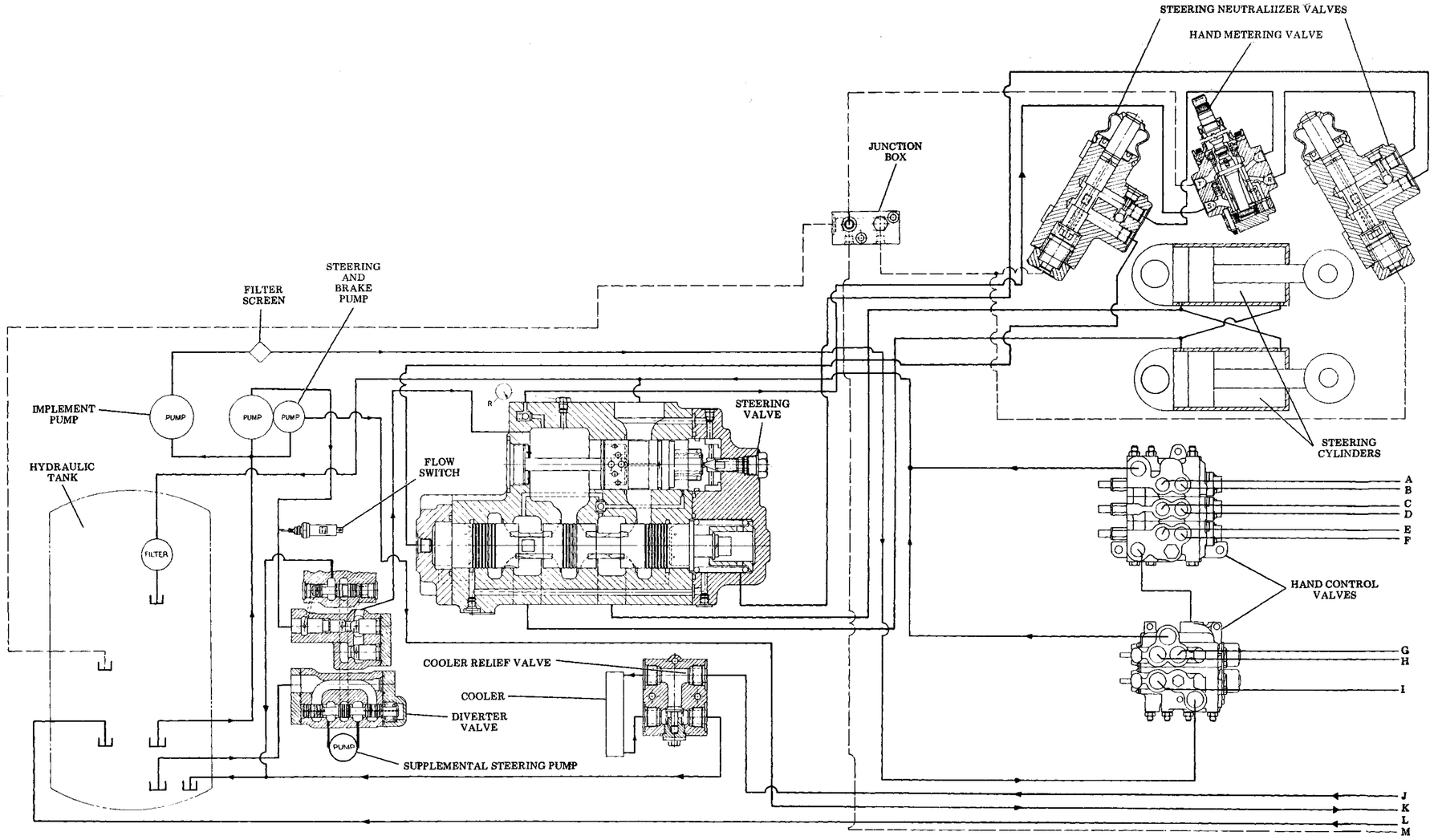
Electrical Schematic Diagram (Sheet 3 of 3)



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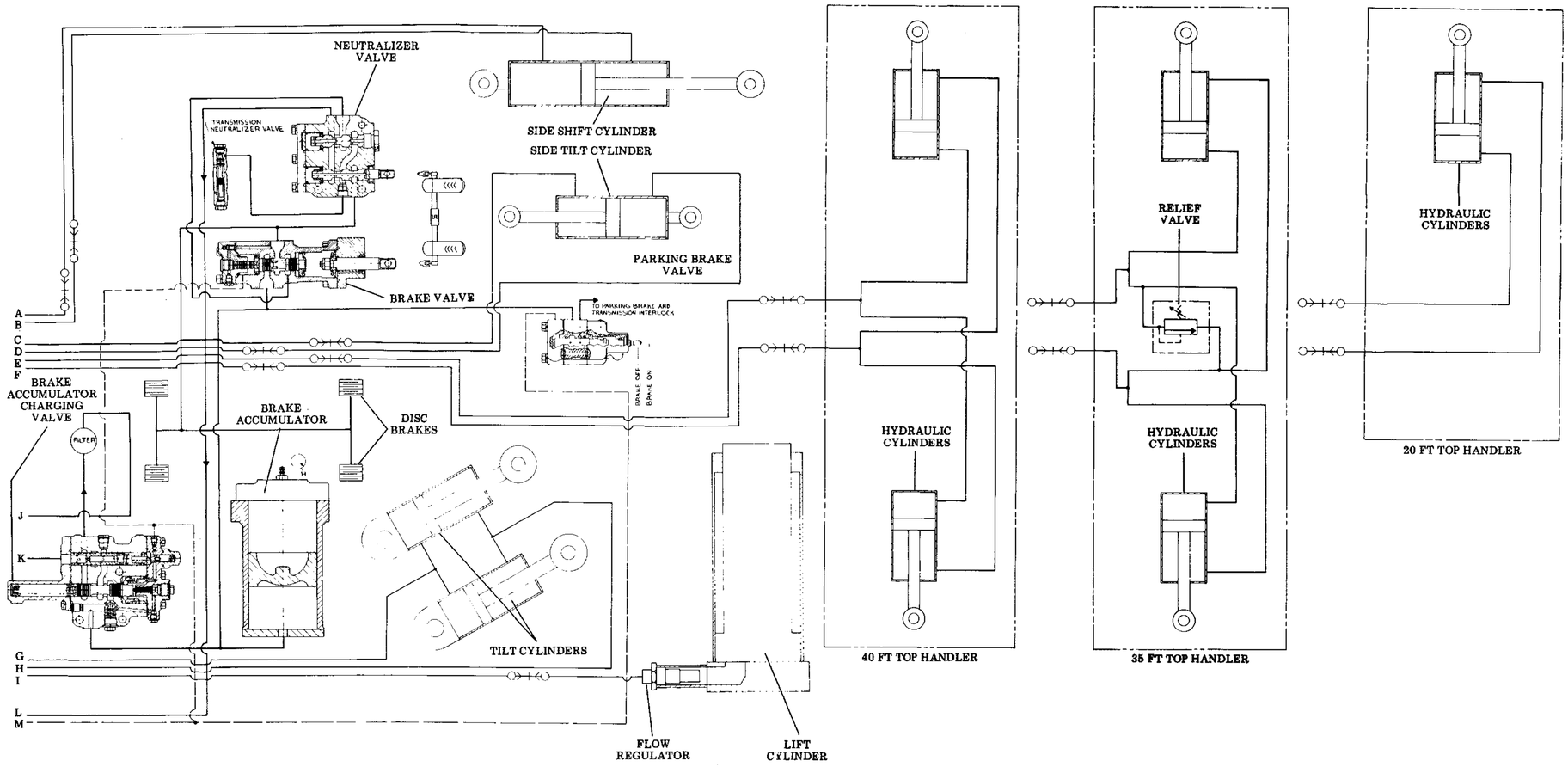
Hydraulic Diagram (Sheet 1 of 2)



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Hydraulic Diagram (Sheet 2 of 2)

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