

**TRUCK, TANK, WATER, HEAVY, MC3 – MACK
LIGHT GRADE REPAIR**

This instruction is authorised for use by command of the Chief of Army. It provides direction, mandatory controls and procedures for the operation, maintenance and support of equipment. Personnel are to carry out any action required by this instruction in accordance with EMEI General A 001.

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GENERAL

Introduction

1. This EMEI contains the Light Grade Repair instructions for the water tank fitted to the Truck, Tank, Water, Heavy, MC3 – Mack. For further information on the cab/chassis or repair and servicing information of the cab/chassis, refer to EMEI Vehicle G 70 decade.

Associated Publications

2. Reference may be necessary to the latest issue of the following documents:
- a. Complete Equipment Schedules (CES):
 - (1) SCES 11657 Truck, Tank Water, Heavy, MC3, 12500L Capacity, Pump Feed;
 - (2) SCES 11658 Equipment Kit, Vehicular Distributor, Water, Tank Type, Truck Mtd;
 - b. AS/NZS 2865 – Safe working in a confined space;
 - c. EMEI Engr Equip W 009-3 – Water transport equipment, cleaning and sanitising;
 - d. EMEI Vehicle G 70 Decade – Truck, Cargo, Heavy, MC3 – Mack;
 - e. EMEI Vehicle G 752 – Truck, Tank, Water, Heavy, MC3 - Mack – Technical Description;
 - f. EMEI Vehicle G 754 – Truck, Tank, Water, Heavy, MC3 - Mack – Medium and Heavy Grade Repair;
 - g. EMEI Vehicle G 757-4 – Fitting of Spraybar Supports;
 - h. EMEI Vehicle G 757-5 – Fitting of Heavy Duty Discharge Manifold;
 - i. EMEI Vehicle G 757-6 – Tank Compartment Delivery Pipes;
 - j. EMEI Vehicle G 757-10 – Fitting of a Walkway Fall Restraint System;
 - k. EMEI Vehicle G 759 – Truck, Tank, Water, Heavy, MC3 - Mack – Servicing Instruction; and
 - l. EMEI Vehicle K 016-1 – Total Restraint Access Module (TRAM) Safety System Technical Manual.

Safety Precautions

3. The following warnings shall be adhered to when carrying out repairs to the water tank.

WARNING

Before working on the hydraulic system, check the temperature of the hydraulic fluid on the gauge fitted to the oil reservoir. Ensure that hydraulic fluid is sufficiently cool to avoid burns.

The TRAM safety system (if fitted) is to be used at all times when working at heights on the water tank body.

CAUTION

Guidance on inspection, cleaning and sanitising of portable water tanks is detailed in EMEI Engr Equip W 009-1.

Item Identification Locations

4. The item identification locations are described in Table 1.

Table 1 Item Identification Locations

Serial	Item	Location
1	Chassis number	Right-hand rear frame, above intermediate axle
2	Chassis nameplate	Left-hand door inside cab
3	Engine number	Right-hand top of timing gear housing
4	Front axle number	Left rear of axle housing
5	Transmission number	Left-hand side
6	Transfer case	Right-hand rear
7	Intermediate axle number	Right-hand front of carrier housing
8	Rear axle number	Right-hand front of carrier housing
9	Injection pump identification	Side of the pump
10	Power take-off (PTO)	Right-hand side
11	Hydraulic pump	Lower side of the pump
12	Water tank	Left-hand forward area

List of Lubricants

5. The list of lubricants is detailed in Table 2.

Table 2 List of Lubricants

Serial	Equipment	Lubricant	Capacity (Litres)
1	Oil reservoir	OM-65	135
2	Transmission	OEP-220	10.4

DETAIL

WARNING

Before working on the hydraulic system, check the temperature of the hydraulic fluid on the gauge fitted to the oil reservoir. Ensure that hydraulic fluid is sufficiently cool to avoid burns.

It is vitally important that dirt and other foreign matter are not allowed to enter the hydraulic system during repairs. Dirt or fluid other than clean hydraulic fluid in the system will cause almost immediate failure. Plug or protect openings to prevent dirt entering the system. Use plastic plugs or covers only for this purpose. Do not use cloth or paper as plugs or covers.

Hydraulic Oil Filter

6. **Removal.** To remove the hydraulic oil filter:

WARNING

Before removing the oil filter, ensure that the hydraulic fluid is sufficiently cool to avoid burns.

- a. Place a receptacle beneath the filter to catch any spillage during removal.
- b. Wash the area around the filter and blow it dry with compressed air.
- c. Remove the filter with the aid of a filter removing tool.

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7. **Replacement.** To replace the hydraulic oil filter:
- a. Clean the filter mounting surface on the adapter.
 - b. Prime the new filter with clean hydraulic fluid (OM-65).
 - c. Apply a film of hydraulic fluid (OM-65) to the sealing gasket on the new filter.
 - d. Carefully install the filter to avoid cross-threading and to ensure good gasket contact.
 - e. Tighten the filter two-thirds of a turn by hand after the sealing gasket contacts the adapter.
 - f. Check the level of fluid in the oil reservoir and if necessary, top up with OM-65.
 - g. Remove the receptacle.

Hydraulic Hoses

8. **Removal.** To remove the hydraulic hoses:

WARNING

Before removing any hydraulic hose, ensure that the hydraulic fluid is sufficiently cool to avoid burns.

- a. Disengage the PTO and shut down the engine.
 - b. Place a suitable receptacle under the hose to be replaced to catch any spillage.
 - c. Crack loose the hose connections to allow any residual fluid (which may be under pressure) to drain off.
 - d. Disconnect the hose connections, remove any zip clamps or other clamping devices and remove the hose.
 - e. Plug the openings to prevent dirt or other foreign material from entering the hydraulic system.
9. **Replacement.** To replace the hydraulic hoses:
- a. Clamp the ferrule in a vice and screw the insert from the hose in a counterclockwise direction (Figure 1).

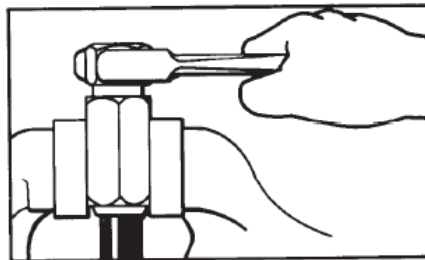


Figure 1 Removing Coupling Insert

- b. With the ferrule clamped in the vice, remove the hose by turning it in a clockwise direction (Figure 2).

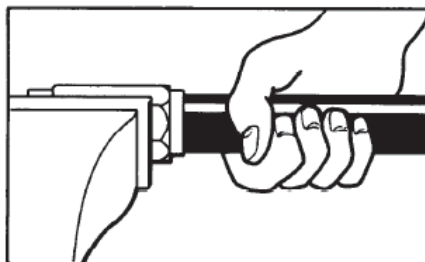


Figure 2 Removing Ferrule

- c. Repeat Para 9. a. and 9. b. for the other end of the hose.
- d. Measure the length of the hose for replacement purposes then discard it.
- e. Cut a new length of hose to the measurement determined at Para 9. d.

NOTE

A cutting disc will be required to obtain a clean cut through the hose without damaging the wire braid reinforcing.

- f. Make a knife cut around the circumference of the hose to the depth of the braid, at a distance from the end of the hose equal to the inside length of the ferrule (Figure 3).
- g. Make one lengthwise cut to the depth of the braid, from the circular cut to the end of the hose.

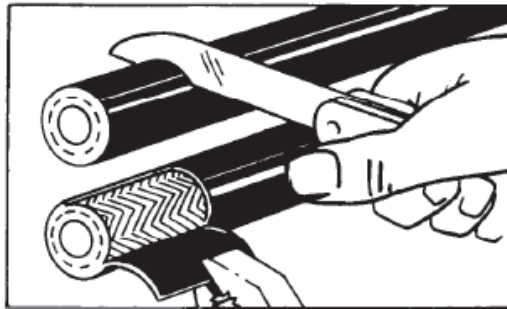


Figure 3 Cutting Hose Outer Cover

- h. Cleanly strip the cover down to the braid.
- i. Push the hose into the ferrule using semi-rotational movements in both clockwise and counterclockwise directions.
- j. The hose is fully home when the end of the hose is 0.8–1.2 mm (1/32– 1/16 in.) from the inside shoulder.
- k. Liberally oil the insert and the inside of the hose with hydraulic fluid (OM–65).
- l. Screw the insert all the way into the ferrule.

NOTE

Do not allow the hose to turn during this operation.

- m. Repeat Para 9. g. to 9. k. for the other end of the hose.
- n. Remove the plugs and install the hose.

NOTE

Ensure that the hose is not twisted and any bends are smooth and gradual.

- o. Fit zip clamps or any other clamping device which may have been removed, then operate the hydraulics to ensure that the hose is correctly fitted and free of leaks.
- p. Rectify as necessary.
- q. Check the level of fluid in the oil reservoir and if necessary, top up with OM–65.

Hydraulic Pump

10. **Removal.** To remove the hydraulic pump:

WARNING

Before removing the hydraulic pump, ensure that the hydraulic fluid is sufficiently cool to avoid burns.

- a. Clean the pump and the hose connections, then blow them dry with compressed air.
 - b. Slacken the screw clamp on the supply hose.
 - c. Remove and plug the supply hose and pump housing with suitable plastic plugs.
 - d. Remove the pressure hose and plug both the hose and the pump housing with suitable plastic plugs.
 - e. Remove the four nuts and washers from the pump adapter flange and remove the pump.
11. **Replacement.** To replace the hydraulic pump:
- a. Clean the mounting faces on the pump and PTO.
 - b. Position a new gasket on the PTO and install the pump.
 - c. Install the retaining nuts and washers and torque the nuts to 34–38 N.m (25–28 lbf.ft).
 - d. Remove the plastic plugs and install the hoses.
 - e. Securely tighten the pressure hose connection and the supply hose screw clamp.
 - f. Start the truck engine, engage the PTO and ensure that the pump functions correctly.
 - g. Check the pump and hoses for leaks.
 - h. Disengage the PTO and shut down the engine and rectify any faults as necessary.
 - i. Check the level of the fluid in the oil reservoir and if necessary, top up with OM-65.

PTO

12. **Removal.** To remove the PTO:

WARNING

Before removing the PTO, ensure that the hydraulic fluid is sufficiently cool to avoid burns.

CAUTION

Both the PTO and adapter housings are quite brittle and easily damaged unless handled carefully.

- a. Wash the area around the PTO and hydraulic pump and blow dry with compressed air.
- b. Remove the hydraulic hoses.
- c. Seal the hoses and the ports in the hydraulic pump with plastic plugs.
- d. Remove the air line from the PTO selector housing.
- e. Remove the six nuts and washers securing the PTO and adapter to the transmission (Figure 4).
- f. Remove the PTO and pump assembly and the adapter housing from the transmission.
- g. Remove all traces of gasket residue from the mounting surfaces.

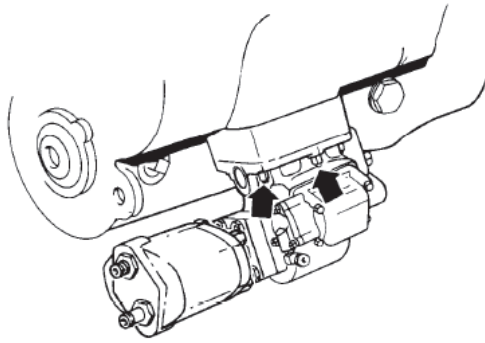


Figure 4 Location of Retaining Nuts

13. **Determining Backlash.** To determine the backlash in the PTO:

- a. Insert a wooden wedge between the transmission PTO drive gear and the transmission housing (Figure 5).

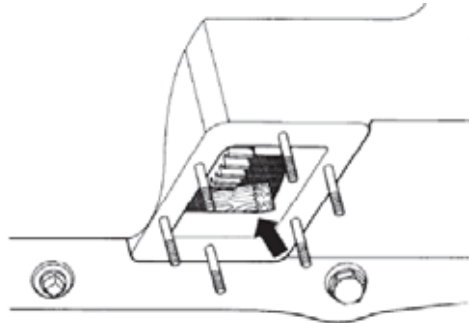


Figure 5 Wedge Location

- b. Install the new gaskets and the adapter housing onto the transmission housing and secure it in place with the top and bottom nuts only.
- c. Install a dial indicator onto the adapter housing with the dial indicator plunger resting squarely on the adapter gear (Figure 6).

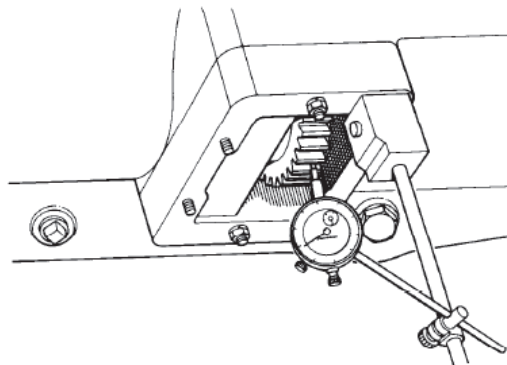


Figure 6 Checking PTO Adapter to Transmission Backlash

- d. Rock the adapter gear back and forth by hand to check the backlash reading.
- e. Add or subtract gaskets between the adapter and transmission to obtain a backlash figure of 0.250-0.375 mm (0.010–0.015 in.).
- f. Remove the nuts from the adapter and remove the adapter from the transmission.
- g. Retain the gaskets.
- h. Remove the wooden wedge from the transmission.

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- i. Position the new gaskets and the adapter on the PTO and secure the adapter to the PTO with two bolts and nuts.
- j. Install a dial indicator on the adapter housing with the dial indicator plunger resting squarely on the adapter gear (Figure 7).
- k. Slide the idler gear against the spring pressure to mesh the idler gear with the adapter gear.
- l. Hold the gear in this position and lock it to prevent it from turning, then rock the adapter gear back and forth by hand and check the backlash reading.

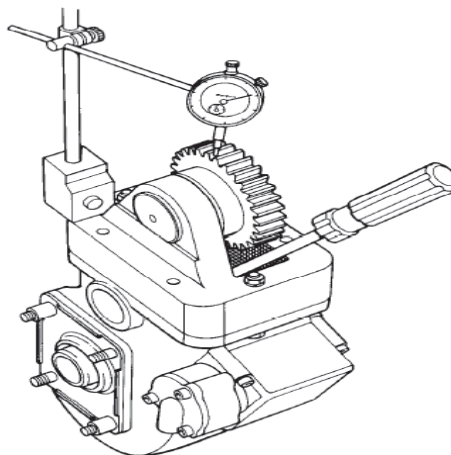


Figure 7 Checking Adapter to PTO Backlash

- m. Add or subtract gaskets between the adapter and PTO to obtain a backlash figure of 0.250–0.375 mm (0.010–0.015 in.).
 - n. Remove the nuts and bolts and separate the adapter housing and PTO.
 - o. Retain the gaskets.
14. **Installation.** To install the PTO:



Both the PTO and adapter housings are quite brittle and easily damaged unless handled carefully.

- a. Position the gaskets (previously determined when setting the adapter-to-transmission backlash) and the adapter onto the transmission.
- b. Position the gaskets (previously determined when setting the adapter-to-PTO backlash) onto the adapter.
- c. Install the PTO.
- d. Apply Loctite 271 to the studs then install the spring washers and nuts.
- e. Torque the nuts to 34–38 N.m (25–28 lbf.ft).
- f. Fit the hydraulic pump and gasket to the PTO.
- g. Apply Loctite 271 to the studs then install the lock washers and nuts.
- h. Torque the nuts to 34–38 N.m (25–28 lbf.ft).
- i. Remove the plastic plugs from the pump and hoses, fit the hoses and tighten the screw clamp and the connector securely.
- j. Reconnect the air line to the selector housing and tighten it securely.
- k. Start the truck engine and engage the PTO.
- l. Check for leaks at the gaskets, the hydraulic hoses and the air hose and rectify if necessary.

- m. Check that the PTO is operating correctly and not making any whining or rattling noise.
- n. If the PTO whines or rattles, repeat the backlash adjustment (Para 13).
- o. Disengage the PTO and shut down the engine.
- p. Check the oil level in the transmission and if necessary, top up with OEP-220.
- q. Check the fluid level in the oil reservoir and if necessary, top up with OM-65.

PTO Control Valve

15. **Removal.** To remove the PTO control valve:
- a. Drain the air from the air brake reservoirs.
 - b. From under the centre console, disconnect the air lines from the control valve.
 - c. Remove the two retaining screws and the instruction plate from the fascia side of the console and remove the valve.
16. **Installation.** To install the PTO control valve:
- a. Position the valve in the console then install the instruction plate and retaining screws and tighten the screws securely.
 - b. Reconnect the air lines and tighten the connections securely.
 - c. Start the engine and allow the air pressure in the brake system to build up then check for air leaks at the valve and rectify as necessary.
 - d. Shut down the engine.

PTO Engagement Selector

17. **Removal.** To remove the PTO engagement selector:
- a. Clean the selector housing and the area around the housing.
 - b. Disconnect the air line from the elbow on the selector housing.
 - c. Remove the four socket head bolts retaining the selector housing to the PTO and remove the selector housing and gasket from the PTO.
 - d. Clean any gasket residue from the mounting surfaces of the PTO and the selector housing.
18. **Installation.** To install the PTO engagement selector:
- a. Position a new gasket and the selector housing on the PTO ensuring that the selector fork is aligned with the gear.
 - b. Install the retaining bolts and torque them to 34–38 N.m (25–28 lbf.ft).
 - c. Reconnect the air line and tighten the connection securely.
 - d. Start the engine and engage the PTO.
 - e. Check for air leaks at the air line connection and rectify as necessary.
 - f. Disengage the PTO and shut down the engine.

Heavy Duty Discharge Manifold and On/Off Road Control Valves

19. **Removal.** To remove the heavy duty discharge manifold and on/off road control valves:
- a. Completely drain all three compartments in the water tank.
 - b. Disconnect the flexible hose from the discharge manifold.
 - c. Suitably support the discharge manifold.
 - d. Remove the bolts, nuts and washers securing the discharge manifold and the on/off-road valves to the outlet pipes.

- e. Carefully remove the manifold and valves.
- f. Separate the control valves from the manifold.
- g. Clean the gasket residue from the mating surfaces of the pipes, valves and manifold.
- h. Replace any faulty or damaged valve.

20. **Disassembly – Heavy Duty Discharge Manifold.** To disassemble the heavy duty discharge manifold:
- a. Remove the eight bolts, nuts and associated washers which secure the cam-lock adaptor to the discharge manifold.
 - b. Discard the spring washers.
 - c. Remove and discard the gasket (Figure 8).
 - d. If necessary, the discharge manifold taps can be removed using a spanner.

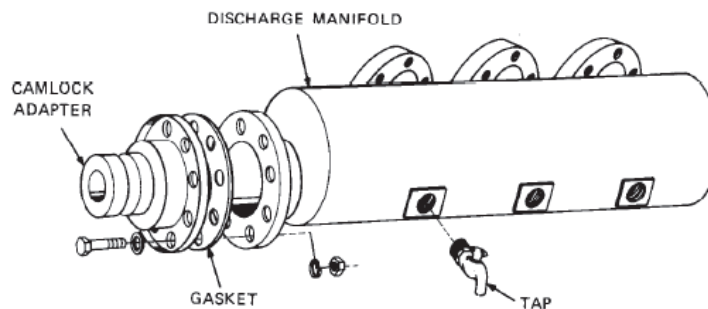


Figure 8 Heavy Duty Discharge Manifold

21. **Cleaning and Inspection.** To clean and inspect the heavy duty discharge manifold:
- a. Clean all parts using a recommended cleaning agent. Ensure that no gasket residue is left on the discharge manifold or the cam-lock adapter.
 - b. Inspect the discharge manifold for signs of damage or metal fatigue, particularly around the water inlet pipes.
22. **Reassembly – Heavy Duty Discharge Manifold.** To reassemble the heavy duty discharge manifold:
- a. Position a new gasket on the discharge manifold water outlet (Figure 8).
 - b. Secure the cam-lock adapter to the discharge manifold using the bolts, flat washers, new spring washers and nuts.
 - c. Torque the bolts to 38–42 N.m (28–31 lbf.ft).
 - d. If the discharge manifold taps were removed at disassembly, apply thread sealing tape to the tap thread, then install the taps and tighten them securely.
23. **Installation.** To install the heavy duty discharge manifold:
- a. Install the bolts in the discharge manifold, then position the valves with a gasket placed on either side, onto the bolts.
 - b. Lift the manifold and valve assembly into position on the outlet pipes, then push the bolts through the flanges on the outlet pipes and install the nuts and washers onto the bolts.
 - c. Torque the bolts and nuts to 38–42 N.m (28–31 lbf.ft).
 - d. Partially fill each compartment of the water tank with water and check for leaks at the on/off road valves and the manifold and rectify any leaks as necessary.

Pump Discharge Control Valve Assembly

24. **Removal.** To remove the pump discharge control valve assembly:
- a. Drain the air from the brake system primary air reservoirs.
 - b. Slacken the nut securing the discharge control valve assembly to the instrument panel.

- c. Remove the screws securing the instrument panel to the console and draw the panel out.
- d. Crack loose the three air line connecting nuts, allowing any compressed air which may be in the air lines to escape.
- e. Disconnect and tag the air lines.
- f. Remove the nut securing the valve to the instrument panel and remove the valve assembly.
- g. Check the condition of the connectors and sleeves and replace parts as necessary.

25. Installation. To install the pump discharge control valve assembly:

- a. Position the control valve assembly in the instrument panel, then install the retaining nut and tighten it securely.
- b. Install the air lines into their correct locations and tighten the connections securely.
- c. Position the instrument panel in the console.
- d. Install and tighten the retaining screws.
- e. Start the truck engine and allow air pressure in the brake system to build-up.
- f. Operate the PUMP DISCHARGE switch and check that the indicator on the Keystone valve actuator is rotating in both directions, as the switch is turned on and off.
- g. Check for air leaks and rectify any faults as necessary.
- h. Shut down the engine.

Hose Reel Assembly

26. Removal. To remove the hose reel assembly:

- a. Ensure that the on/off road control valves are in the closed position.
- b. Loosen the hose clamp securing the hose reel delivery hose to the inlet valve (Figure 9).
- c. Remove the delivery hose then plug it with a suitable plastic plug.
- d. Release the reel lock and unwind the hose.
- e. Open the spray nozzle and the hose reel inlet valve and allow the water to drain from the hose.
- f. Disconnect the hose fittings from the hose reel gooseneck.

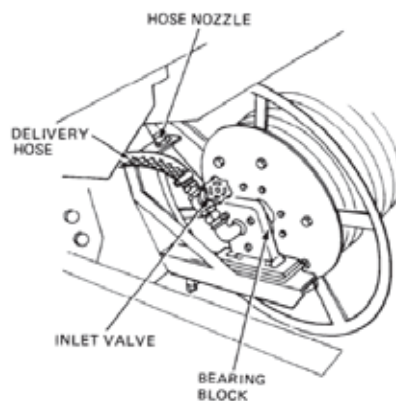


Figure 9 Rear Hose Reel

- g. Support the hose reel then remove the four bolts that secure the hose reel to the mounting brackets.
- h. Remove the bearing cap and support then remove the hose reel.

27. Disassembly. To disassemble the hose reel assembly:

- a. Match mark the position of the bearing to the shaft.
- b. Loosen the bearing grub screw (Figure 10) then slide the bearing off the shaft.

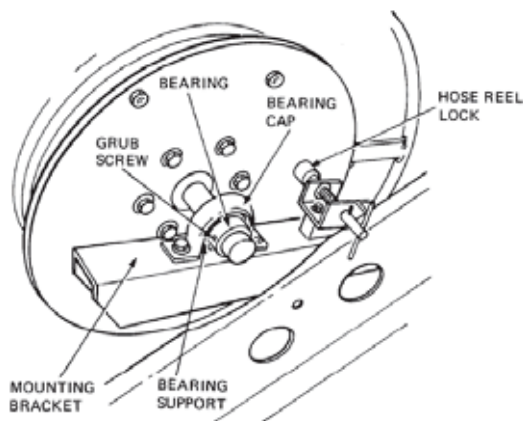


Figure 10 Hose Reel Mounting Arrangement

- c. Remove the three bolts securing the bearing block to the hose reel flange.
 - d. Secure the bearing block in a vice.
 - e. Remove the inlet valve and elbow from the bearing block.
 - f. Secure the elbow in a vice.
 - g. Remove the connector and inlet valve from the elbow.
 - h. Remove the two bolts securing the gooseneck to the hose reel and remove the gooseneck.
- 28. Cleaning and Inspection.** To clean and inspect the hose reel assembly:
- a. Clean all components with a recommended cleaning agent, ensuring that all jointing compound has been removed from all surfaces.
 - b. Inspect the hose for cracks and chafing and replace as necessary.
 - c. Inspect all other components for wear or damage and replace as necessary.
- 29. Reassembly.** To reassemble the hose reel assembly:
- a. Using jointing compound, fit the gooseneck to the hose reel and torque the two retaining bolts to 34-38 N.m (25-28 lbf.ft).
 - b. Using new lock washers, secure the bearing block to the hose reel flange with the three retaining bolts.
 - c. Torque the bolts to 38-42 N.m (28-31 lbf.ft).
 - d. Assemble the inlet valve, the connector and the elbow using thread sealing tape on the threads.
 - e. Fit the complete assembly to the bearing block.
 - f. Push the bearing onto the shaft.
 - g. Align the match marks and tighten the grub screw securely.
 - h. Place the hose reel against the mounting brackets and support it in this position.
 - i. Fit the bearing cap and support to the bearing then, using new lock washers, secure the bearing cap and bearing block to the mounting brackets with the retaining bolts.
 - j. Torque the bolts to 38-42 N.m (28-31 lbf.ft).
 - k. Connect the hose to the hose reel gooseneck.
 - l. Remove the plastic plug from the delivery hose then connect the hose to the inlet valve.
 - m. Tighten the hose clamp securely.
 - n. Open the appropriate on/off road control valve, the hose reel inlet valve and the hose nozzle.
 - o. Operate the water pump and check all connections for leaks.

- p. Shut down the water pump, close the nozzle and valves and rectify any faults as necessary.
- q. Wind the hose onto the reel so that the nozzle can be inserted into the nozzle retainer (Figure 9).
- r. Apply the reel lock.

Hose Reel Inlet Valve

30. Removal. To remove the hose reel inlet valve:

- a. Ensure that the on/off road control valves are in the closed position.
- b. Loosen the hose clamp securing the hose reel delivery hose to the inlet valve.
- c. Remove the delivery hose then plug it with a suitable plastic plug.
- d. If necessary, turn the inlet valve and elbow to facilitate the valve removal then remove the valve using a spanner.

31. Installation. To install the hose reel inlet valve:

- a. Apply thread sealing tape to the valve thread then install the valve onto the connector and tighten it securely.
- b. Remove the plastic plug from the delivery hose then connect the hose to the inlet valve.
- c. Tighten the hose clamp securely.
- d. Open the appropriate on/off road control valve, the hose reel inlet valve and the hose nozzle.
- e. Operate the water pump and check all connections for leaks.
- f. Shut down the water pump.
- g. Close the nozzle and valves and rectify any faults as necessary.

Spraybar or Spray Head (if fitted) Assembly

32. Spraybar Removal. To remove the spraybar assembly:

- a. Ensure that the spraybar control valve is in the closed position, and then remove the flexible coupling from the rear of the spraybar.
- b. Remove the two bolts securing the spraybar to the mounting bracket and remove the spraybar.
- c. Discard the two lock nuts and the four fibre washers.

33. Spraybar Cleaning and Inspection. To clean and inspect the spraybar assembly:

- a. Clean all the components with a recommended cleaning agent, paying particular attention to the spraybar nozzles.
- b. Install the spraybar extension pieces and check for looseness in the cam-lock couplings and replace parts as necessary.
- c. Inspect the nozzles for blockage or damage and replace as necessary.

NOTE

Ensure that all nozzles are correctly aligned to provide the required spray pattern

- d. Inspect the spraybar for cracks or other damage and repair or replace as necessary.
- e. Check the condition of the two bushes at the top of the spraybar mounting brackets and replace as necessary.

34. Spraybar Installation. To install the spraybar assembly:

- a. Remove the spraybar extension pieces and stow them in the spraybar trough on the right-hand side of the truck.
- b. Secure the spraybar to the mounting brackets with the spacers, nuts, bolts and new locknuts (Figure 11).

- c. The spraybar hanger-to-vehicle lifting point bolts are to be tightened until the nut bottoms on the flat washer against the spraybar hanger and the spacer pin is firmly in place. This allows the spraybar to pivot if it strikes an object (Ref EMEI Vehicle G 757-4).

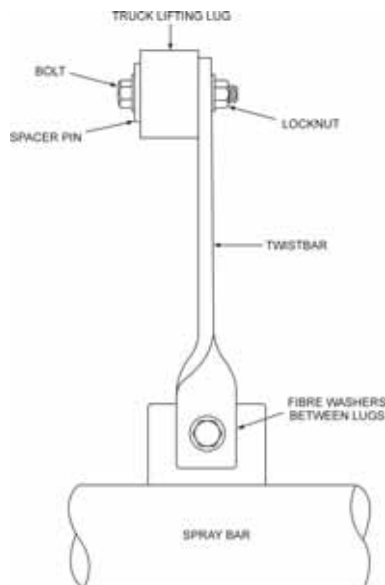
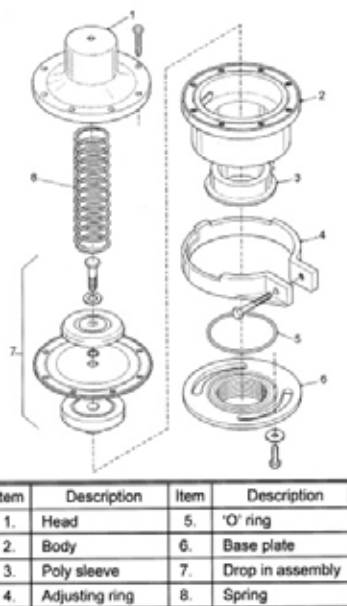


Figure 11 Spraybar Installation

- d. Reconnect the flexible hose to the rear of the spraybar.
- e. Open the spraybar control valve.
- f. Operate the water pump and check for correct spraybar operation.
- g. Shut down the water pump, close the spraybar control valve and rectify any faults as necessary.

35. **Spray Head (If Fitted) Removal.** To remove the spray head (Figure 12):

- a. Close the butterfly located at the RH front corner of the tank, to isolate the rear pipe work from the pump to the tank.
- b. Remove the airline and the fitting from the spray head.
- c. Unscrew the spray head from the pipe work.



Item	Description	Item	Description
1.	Head	5.	'O' ring
2.	Body	6.	Base plate
3.	Poly sleeve	7.	Drop in assembly
4.	Adjusting ring	8.	Spring

Figure 12 Spray Head

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36. **Spray Head (if Fitted) Disassembly.** To disassemble the spray head:

WARNING

The valve is spring loaded. Ensure that the head and the body are securely clamped together, using an appropriate clamping device, prior to removing the bolts. Release the clamps with caution.

- a. With the head and body securely clamped, remove the bolts securing the head to the body.
 - b. Carefully release the clamp and remove the head and spring from the body and withdraw the drop-in assembly.
 - c. Remove the two bolts securing the body to the base plate, lift the body off.
 - d. Remove the O ring and the poly sleeve.
 - e. Remove the adjusting ring from the body.
 - f. Disassemble the drop-in assembly, taking care not to damage the poly bushes.
37. **Spray Head (if Fitted) Cleaning and Inspection.** To clean and inspect the spray head:
- a. Clean and dry all components with a clean cloth.
 - b. Inspect all components for damage and wear and replace as required.
38. **Spray Head (if Fitted) Reassembly.** To reassemble the spray head:
- a. Reassemble the drop-in assembly.
 - b. Fit the adjusting ring to the body.
 - c. Insert the poly sleeve into the body.
 - d. Fit the O ring into the groove in the base plate and resecure the body to the base plate.
 - e. Insert the drop-in assembly and align the holes in the diaphragm with the bolt holes in the body.
 - f. Place the spring onto the upper poly bush then refit the head, tightening the bolts evenly.
39. **Spray Head (if Fitted) Installation.** To install the spray head:
- a. Screw the spray head onto the pipe work, using Loctite 567 or equivalent (low strength pipe sealant).
 - b. Refit the air fitting and the air line to the head.
 - c. Open the butterfly valve and allow the water to flow to the spray head via gravity feed, check for leaks and rectify as necessary.
 - d. Start the pump and test the operation of the valve.
 - e. Check for leaks with the valve closed whilst receiving pump pressure and rectify as necessary.

Spraybar or Spray Head (if Fitted) Control Valve

40. **Removal.** To remove the spraybar control valve:
- a. Ensure that the on/off road control valves are in the closed position.
 - b. Open the spraybar control valve (Figure 13) and drain any water which may be present in the pipe.
 - c. Unlock the cam-lock and disconnect the flexible hose from the spraybar control valve, then remove the cam-lock fitting from the valve using open-ended spanners.

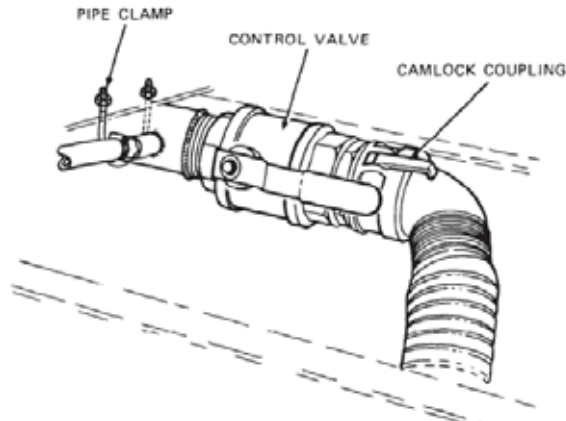


Figure 13 Spraybar Control Valve

- d. Remove the bolt and lock-washer from the valve and remove the control handle.
- e. Use a large pipe wrench to secure the spraybar supply pipe to prevent it from turning while slackening the control valve with an open-ended spanner.
- f. Remove the pipe clamp from the rear end of the spraybar supply pipe and slacken the pipe clamp at the other end of the supply pipe. This will allow the supply pipe to be drawn away from the chassis rail to enable the control valve to be unscrewed from the supply pipe.

NOTE

The spraybar control valve is serviced by replacement only.

41. Installation. To install the spraybar control valve:

- a. Clean the threads on the end of the spraybar supply pipe and apply thread sealing tape to the threads.
- b. Position the valve onto the spraybar supply pipe, ensuring that it is correctly orientated.
- c. Screw the valve onto the pipe.
- d. Secure the pipe with a large pipe wrench to prevent it from turning.
- e. Tighten the valve with an open-ended spanner.

NOTE

Ensure that the control handle is positioned away from the chassis rail.

- f. Clean the threads on the cam-lock fitting, apply thread tape to the threads.
- g. Install the fitting into the valve using open-ended spanners.
- h. Install and tighten the rear pipe clamp, then tighten the front clamp.
- i. Reconnect the flexible hose to the valve and secure the cam-lock connector.
- j. Position the control-handle on the valve, then install and tighten the retaining bolt.
- k. Position the pump outlet hose onto the discharge manifold outlet.
- l. Open the on/off road control valve and check for leaks at the spraybar control valve and rectify any leaks as necessary.
- m. Close the on/off road valves.
- n. Reconnect the hoses to their original positions.

Pump Start Switch

42. Cab Mounted Switch Removal. To remove the pump start switch:

- a. Slacken the nut securing the pump start switch to the instrument panel.
- b. Remove the screws securing the instrument panel to the console and draw the panel out.
- c. Tag the wires connected to the switch to ensure correct reconnection at installation.

- d. Remove the wires.
- e. Remove the nut securing the switch to the instrument panel.
- f. Remove the switch.

43. Cab Mounted Switch Installation. To install the pump start switch:

- a. Install the switch in the instrument panel and secure it with the retaining nut.
- b. Connect the wires to the switch terminals as indicated by the tags.
- c. Position the instrument panel in the console then check the switch for correct operation and rectify faults as necessary.
- d. Secure the instrument panel to the console with the screws.

44. Externally Mounted Switch Removal. To remove the pump start switch:

- a. Remove the nut securing the pump start switch to the instruction plate panel.
- b. Push the switch through the panel.
- c. Tag the wires connected to the switch to ensure correct reconnection at installation.
- d. Remove the wires.

45. Externally Mounted Switch Installation. To install the pump start switch:

- a. Connect the wires to the switch terminals as indicated by the tags.
- b. Install the switch in the instruction plate panel from the rear of the panel and secure the switch with the retaining nut.
- c. Check the switch for correct operation and rectify faults as necessary.

Flexible Hoses

46. Replacement. To replace the flexible hoses:

- a. Ensure that the on/off road valves are in the closed position.
- b. Remove the hose to be replaced.
- c. Cut the wire binding that secures the hose to the cam-lock fittings.
- d. Measure the length of hose for replacement purposes.
- e. Discard the hose.
- f. Cut a new length of hose to the measurement determined in Para 41. d.
- g. Peel back the wire reinforcing from the hose for approximately 70–80 mm from the end of the hose. Cut and discard the reinforcing.
- h. Position the hose on the cam-lock fittings and secure the hose to each fitting with a metal band type clamp.
- i. Install the hose and operate the water pump.
- j. Check the hose connections for leaks.
- k. Shut down the water pump and rectify leaks as necessary.

Layflat Hose

47. Replacement. To replace the layflat hose:

- a. Cut the metal band clamps, or unscrew the hose clamps if fitted, from each end of the hose and remove the rubber protection strips.
- b. Discard the clamps and the protection strips.
- c. Remove the cam-lock fittings from the hose.

- d. Refer to RPS 02168 for the correct replacement hose.
- e. Position the hose on the cam-lock fittings and wrap a rubber protection strip over the hose.
- f. Secure the hose and protection strip to the fittings with metal band or hose clamps.
- g. Remove the flexible hose from the discharge manifold and connect the layflat hose to the manifold.
- h. Open the appropriate on/off road control valve and check the hose connections for leaks.
- i. Close the on/off road control valve and rectify any leaks.
- j. Remove the layflat hose from the discharge manifold and reconnect the flexible hose to the manifold.

Water Tank



Guidance on inspection, cleaning and sanitising of potable water tanks are detailed in EMEI Engr Equip W 009-1.

- 48. **Ladder Removal.** To remove the ladder:
 - a. Remove the four bolts, nuts and washers securing the ladder to the brackets on top of the tank.
 - b. Remove the four bolts, nuts and washers securing the ladder to the brackets at the base of the tank.
 - c. Remove the ladder from the truck.
 - d. Repair or replace the ladder as necessary.
- 49. **Ladder Installation.** To install the ladder:
 - a. Position the ladder on the water tank.
 - b. Install the four bolts, nuts and washers in the top mounting brackets and torque them to 38–42 N.m (28–31 lbf.ft).
 - c. Install the four bolts, nuts and washers in the bottom brackets and torque them to 38–42 N.m (28-31 lbf.ft).
- 50. **TRAM Safety System.** The TRAM safety system (including safety harness) must be inspected for functionality prior to each use. Refer to EMEI Vehicle K 016-1 for the following procedures:
 - a. Inspection and Maintenance;
 - b. Cleaning Procedures;
 - c. Servicing Instructions;
 - d. Repairs; and
 - e. Replacement & Spare Parts.
- 51. **Anode Block Removal.** To remove the anode block:

WARNING

Personnel involved in tank entry are to be trained in Confined Space Entry Procedures. A Confined Space Entry Permit must be issued prior to entering the water tank in order to carry out inspections, cleaning or maintenance work.

- a. Drain the water from the appropriate tank compartment.
- b. Enter the tank compartment and remove the two bolts securing the anode block to the support bracket.
- c. Retain the stainless steel bolts, washers and nuts.

52. **Anode Block Cleaning and Inspection.** To clean and inspect the anode block:
- Clean any residue from the anode support bracket with a wire brush then wash it down with clean water.

NOTE

Ensure that all residues are flushed from the tank.

- Inspect the anode block for signs of excessive corrosion and replace if necessary.
53. **Anode Block Installation.** To install the anode block:
- If a new anode block is to be installed, drill two 9.5 mm (3/8 in.) diameter holes in the anode block as show in Figure 14.

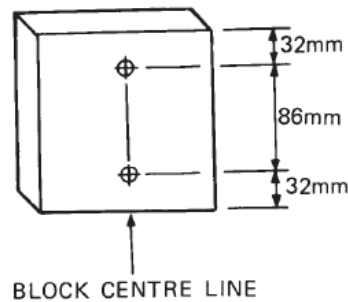


Figure 14 Anode Block Drilling Locations

- Position the anode block on the support bracket and secure it with the two stainless steel bolts, washers and nuts.
 - Torque the nuts to 20–23 N.m (15–17 lbf.ft).
54. **Hatch Assembly Removal.** To remove the hatch assembly:

WARNING

The TRAM safety system (if fitted) is to be used at all times when working at heights on the water tank body.

- Remove the split pin and washer from the pivot pin securing the arm to the hatch cover.
- Slacken the hand wheel to relieve pressure on the pivot pin.
- Drive out the pivot pin and lift the arm from the hatch.
- Lift the hatch cover from the tank.
- Remove and discard the gasket from the hatch cover.
- Remove the split pin and washer from the arm pivot pin.
- Remove the pivot pin and the arm.
- Remove the split pin and washer from the eye-bolt pivot pin.
- Remove the pivot pin and the eye-bolt.
- Check all components for wear or damage and replace parts as necessary.

55. Hatch Assembly Installation. To install the hatch assembly:

WARNING

The TRAM safety system (if fitted) is to be used at all times when working at heights on the water tank body.

- a. Install a new gasket into the hatch cover.
- b. Position the arm on the cover and secure it with the pivot pin.
- c. Install the washer and a new split pin.
- d. Position the arm in the mounting bracket, align the holes and install the pivot pin.
- e. Secure the pivot pin with a washer and a new split pin.
- f. Install the eye-bolt and pivot pin.
- g. Secure the pivot pin with a washer and a new split pin.
- h. Close the hatch cover and secure it with the hand wheel.

FAULT FINDING

56. Table 3 contains fault finding symptoms, probable causes and corrective actions for the hydraulic and water systems:

Table 3 Fault Finding

Serial	Symptom	Probable Cause	Corrective Action
Hydraulic System			
1	No fluid flow – No pressure	Fluid level in the reservoir is too low	Top-up with OM-65
		Pump is not receiving fluid	Check that the oil reservoir gate valve is open. Replace the filter. Check for a blocked pump supply hose and clean or replace it as necessary. Clean the reservoir breather vent then check the fluid level in the reservoir. Top-up if necessary with OM-65
		Power take-off to the pump splined connection is damaged	If the pump only is damaged, replace it. If the PTO is damaged, raise a work order to have it repaired
		Air leaks in the pump supply line	Check the hose connections and tighten it as necessary. Replace the hose if necessary
		Cavitation or aeration in the pump	Check for air leaks in the pump supply line and rectify it. Clean or replace the blocked pump supply line. Clean the reservoir breather vent and if necessary change the system fluid and filter

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Table 3 Fault Finding (Continued)

Serial	Symptom	Probable Cause	Corrective Action
2	Low fluid flow rate	Fluid level in the reservoir is incorrect	Top-up with OM-65
		Leaking pipe or hose connections	Tighten the connections
		Damaged or leaking pipes or hoses	Replace
		Fluid viscosity is too high	Warm fluid up to operating temperature. If the viscosity is still too high, change the filter and fluid. Use only OM-65
		Pump is not operating at optimum capacity	Replace
		Air leaks in the pump supply line	Check the hose connections and tighten them as necessary. Replace the hose if necessary
		Cavitation or aeration in the pump	Check for air leaks in the pump supply line and rectify it. If the supply line is blocked, clean or replace it as necessary. Ensure that the reservoir breather vent is clear and if necessary change the system fluid and filter
		Filter restricted	Replace
3	Low fluid pressure	Inadequate flow rate	Refer to 'No fluid flow – No pressure', or 'Low fluid flow rate'
		Excessive external leakage	Rectify the leaks and fill the reservoir to the correct level with OM-65
4	Erratic fluid pressure	Air in the fluid	Repair or replace the damaged hoses or pipes. Tighten leaking connections then fill the reservoir to the correct level with OM-65
		Hydraulic fluid contaminated	Check for a blocked pump supply hose, clean or replace it as necessary. Ensure that the breather vent is clear and if necessary change the filter and system fluid. Use only OM-65
5	Excessive fluid pressure	Incorrect oil viscosity	Change the filter and fluid. Use only OM-65
		Interface or relief valve is damaged or operating incorrectly	Raise a work order to have it repaired
6	Noisy pump	Air in the fluid	Replace the damaged hoses or pipes and tighten the leaking connections. Fill the reservoir to the correct level with OM-65
		Fluid viscosity is too high	Warm the fluid up to operating temperature. If the viscosity is still too high, change the filter and fluid. Use only OM-65
		Pump is operating too fast	Set the truck engine speed to 1100 rpm.
		Cavitation in the pump	Check the oil reservoir gate valve is open. Replace filter. Check for a blocked pump supply hose, clean or replace as necessary. Ensure that the breather vent is clear and if necessary change the system fluid. Use only OM-65
		Worn or damaged pump	Replace.
7	Fluid overheated	Fluid dirty or reservoir level low or incorrect fluid viscosity	Replace fluid filter, if necessary change system fluid. Ensure reservoir is filled to correct level with OM-65
		System pressure is too high	Raise a work order to have it repaired

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Table 3 Fault Finding (Continued)

Serial	Symptom	Probable Cause	Corrective Action
8	Pump overheated	Refer to 'Fluid overheated'	As above
		Air in the fluid	Replace the damaged hoses or pipes and tighten the leaking connections. Fill the reservoir to correct level with OM-65
		Cavitation in the pump	Check the oil reservoir gate valve is open. Replace the filter. Check for a blocked pump supply hose, clean or replace as necessary. Ensure that the breather vent is clear and if necessary change the system fluid. Use only OM-65
		Worn or damaged pump	Replace
Water System			
9	No water output	Empty water tank	Refill.
		Control valve(s) shut	Open the appropriate on/off road valve, the keystone valve and the hose reel or the spraybar control valve
		Pump is not primed	Prime the pump
		Defective water pump	Raise a work order to have it repaired
		Defective hydraulic system	Raise a work order to have it repaired
		Hose blockage	Repair or replace
10	Noisy water pump	Worn outrigger bearings	Raise a work order to have it repaired

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END

Distribution List: **VEH G 55.0 – Code 3** (Maint Level)
(Sponsor: LV SPO, Med/Hvy B Vehicles)
(Authority: TRAMM)