

SEMITRAILER, TANK, WATER, HEAVY, MC4, FRUEHAUF 37 000 LITRE

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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INTRODUCTION

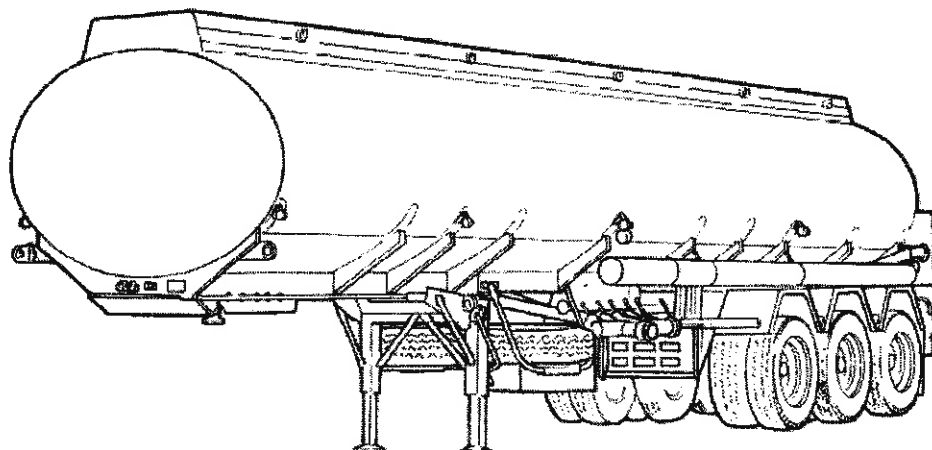


Figure 1 Semitrailer, Tank, Water, Heavy, MC4 – Fruehauf 37 000 Litre

1. This EMEI details all Light Grade Repair procedures for the Semitrailer, Tank, Water, Heavy, MC4 - Fruehauf 37 000 Litre (Figure 1).

Associated Publications

2. Reference may be necessary to the latest issue of the following documents:

- a. Defence Road Transport Instructions (DRTI);
- b. Record Book for Service Equipment TGM 120;
- c. Simplex Complete Equipment Schedules (SCES) 12079;
- d. Repair Parts Scale 02200;
- e. DEF(AUST)206F – Petroleum, Oils and Lubricants Handbook;
- f. Other EMEI:
 - (1) EMEI Vehicle A 119-24 - Repair of Vehicles Under Warranty Agreement - Policy Instruction;
 - (2) Workshop E 410 – Occupational Health and Safety Instruction – Asbestos;
 - (3) EMEI Vehicle H 710 - Semi - Trailer, Tank, Water, Heavy, MC4, Fruehauf 37 000 Litre - Data Summary;
 - (4) EMEI Vehicle H 712 - Semi - Trailer, Tank, Water, Heavy, MC4, Fruehauf 37 000 Litre - Technical Description;
 - (5) EMEI Vehicle H 714-1 - Semi - Trailer, Tank, Water, Heavy, MC4, Fruehauf 37 000 Litre – Medium Grade Repair; and
 - (6) EMEI Vehicle H 719 - Semi - Trailer, Tank, Water, Heavy, MC4, Fruehauf 37 000 Litre - Servicing Instruction.

Rotables Identification

3. The location of the identification numbers of the rotables is in Table 1.

Table 1 Location of Identification Numbers on Rotables

Serial	Rotables	Identification Number Location
1	Axle number	stamped on the axle
2	Engine number	stamped on the identification plate and on the crankcase

Safety Precautions

WARNING

Jacked vehicles **MUST** be positioned on axle stands prior to any work commencing. Failure to comply may result in serious injury or death.

Eye protection **MUST** be worn when using compressed air.

DETAIL

Light Grade Repair

4. This EMEI contains procedures for removing, dismantling, repairing, assembling and installing various components of the semi-trailer, tank, water, heavy, MC4. Where applicable, instructions for the adjustment, lubrication and minor servicing of these items are included.
5. When disconnecting electrical connectors, hoses and fittings, remove clamps as required to gain slack to avoid damage to connectors and fittings.
6. Discard all used O rings, seals, split pins, tab washers and lock washers.
7. Any fastenings or fittings being tightened to prescribed torques are to have dry, clean threads unless otherwise specified. When specified, thread sealants are to be applied to dry, clean, oil free threads.

Special Tools and Gauges

8. The removal of the hub cap, adjustment of the wheel bearings and injection pump timing require the use of special tools. The special tools required are listed in Table 2 and illustrated in Figure 2.

Table 2 Special Tools

Serial	Part Number/Item Name	Paragraph Number	Use
1	JLA13943 Hub Cap Spanner	29.e, 29.g, 29.i, 30.i, 30.n	Hub cap removing/tightening
2	Seal Installer ¹	30.f	Hub oil seal installer
3	7270-2003-008 Injection Timing Nozzle	24.i	Injection pump timing
Note			
1. Item to be fabricated			

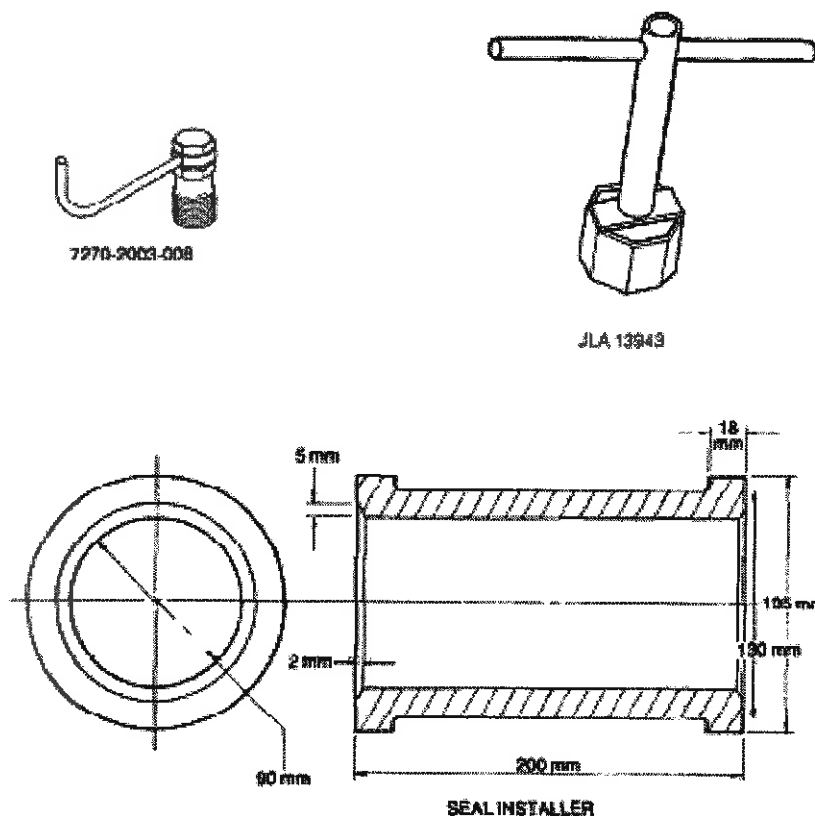


Figure 2 Special Tools

List of Lubricants

9. The list of lubricants for use on the Semi-Trailer, Tank, Water, Heavy, MC4 - Fruehauf 37 000 Litre is in Table 3.

Table 3 List of Lubricants

Serial	Equipment	Lubricant	Capacity
1	King pin	XG-291	as required
2	Apron plate	XG-291	as required
3	Support leg gears	XG-276	as required
4	Support legs (inner)	OMD-115	as required
5	Slack adjuster	XG-291	as required
6	Camshaft bushes	XG-276	as required
7	Wheel bearings	OEP-220	0.65 l
8	Tow couplings	XG-291	as required
9	Toolbox hinges	OMD-115	as required
10	Power unit	OMD-115	1.75 L

ENGINE - GROUP 1

Engine Mounting

10. **Replacement.** Replace the engine mountings as follows:

- Remove the nuts and lock washers securing the engine enclosure to the mountings (rubber insulators).
- Remove the locknuts securing the mountings to the mounting brackets.

- c. Using lifting equipment, raise the engine enclosure sufficient to access the mountings.
- d. Remove the mountings as necessary and install new mountings.
- e. Lower the engine enclosure over the mountings.
- f. Install the nuts and lock washers to secure the enclosure base plate to the mountings.
- g. Tighten the nuts securely.
- h. Install new locknuts to secure the enclosure mountings to the mounting brackets.
- i. Tighten the nuts securely.

Tightening Cylinder Head Bolts and Adjusting Valve Clearances

11. **Tightening Procedure.** Tighten the cylinder head bolts as follows:
- a. Remove the high pressure fuel line (Fuel System - Group 4).
 - b. Torque the four cylinder head retaining nuts to 49 N.m (36 lbf.ft) in the sequence shown (Figure 3).
 - c. Adjust valve clearances (Para 12.).
 - d. Install the high pressure fuel line (Fuel System - Group 4).

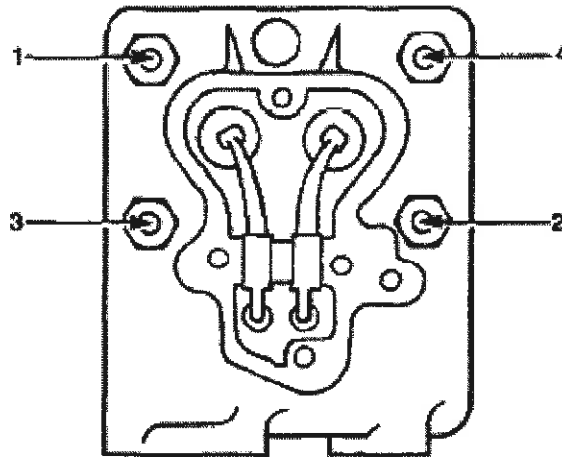


Figure 3 Cylinder Head Tightening Sequence

12. **Valve Clearance Adjustment.** Adjust the valve clearance as follows:

WARNING

Eye protection must be worn when using compressed air.

- a. Wash the area around the valve cover with a cleaning agent.
- b. Blow it dry with compressed air.
- c. Remove the rubber plug from the valve cover.
- d. Remove the two Allen head bolts securing the cover to the cylinder head (Figure 4).
- e. Remove the valve cover and discard the gasket.

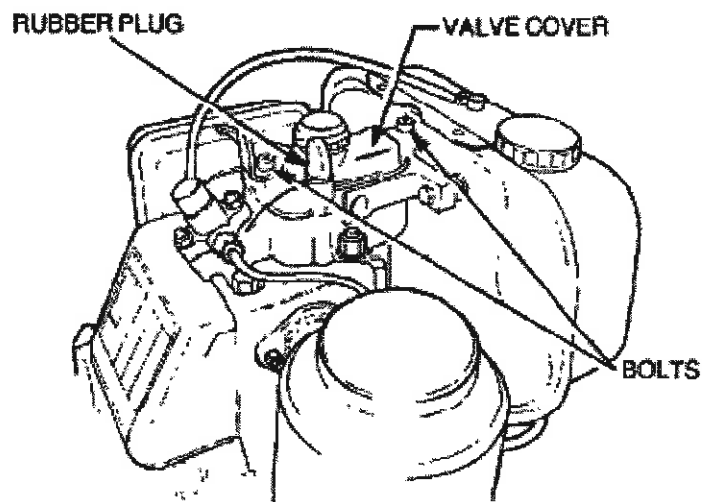


Figure 4 Valve Cover - Removal

WARNING

To avoid personal injury ensure that the hand throttle control is in the stop position and that the excess fuel device is not engaged.

- f. Rotate the crankshaft by hand in a clockwise direction until the piston reaches top dead centre compression.
- g. Adjust both valve clearances to 0.15 to 0.2 mm (0.006-0.008 in.).
- h. Using a new valve gasket, install the valve cover and secure to the cylinder head with the two Allen head bolts.
- i. Torque the bolts to 20 N.m (15 lbf.ft).
- j. Install the rubber plug in the valve cover.

Specifications - Engine

13. **Specifications - Engine.** The specifications for the engine are contained in Table 4.

Table 4 Specifications - Engine

Serial	Item	Specification	Value
1	Cylinder head nuts	torque	49 N.m (36 lbf.ft)
2	Valve clearance - inlet and exhaust	clearance	0.15-0.2 mm (0.006-0.008 in.)
3	Valve cover bolts	torque	20 N.m (15 lbf.ft)

EXHAUST SYSTEM - GROUP 3

Muffler

14. **Replacement.** Replace the muffler as follows:

- a. Remove the two nuts and washers securing the muffler to the cylinder head.
- b. Remove the muffler and the gasket.
- c. Discard the gasket.

- d. Position a new gasket on the mounting studs.
- e. Install the muffler.
- f. Secure it with the two washers and nuts.

FUEL SYSTEM - GROUP 4

Fuel Filter

15. **Replacement.** Replace the fuel filter as follows:

- a. Place a receptacle under the fuel tank.
- b. Remove the bolt securing the fuel filter cover to the fuel tank (Figure 5).
- c. Remove the filter cover

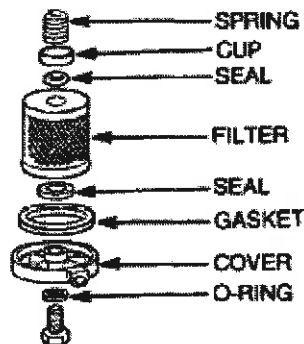


Figure 5 Fuel Filter - Removal

- d. Remove and discard the filter element.
- e. Install the new element (Figure 5).
- f. Install the cover.
- g. Fit a new O ring on the bolt.
- h. Insert the bolt and tighten it securely.
- i. Fill the fuel tank with clean fuel.
- j. Check for leaks around the filter.
- k. Rectify leaks as necessary.

Fuel Tank

16. **Removal.** Remove the fuel tank as follows:

- a. Remove the clamp securing the injector fuel return hose to the fuel tank (Figure 6).
- b. Remove the hose from the tank.

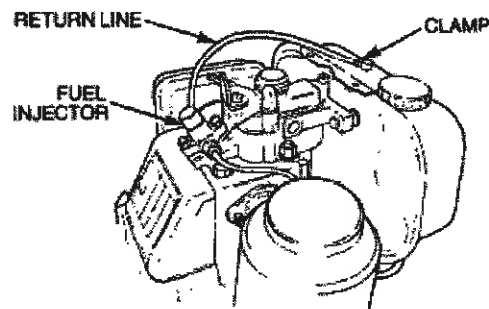


Figure 6 Fuel Return Hose

- c. Place a receptacle under the fuel tank.
 - d. Remove the fuel filter (Para 15.).
 - e. Remove the four bolts, nuts and washers securing the fuel tank to the cylinder head and the crankcase.
 - f. Remove the fuel tank from the engine.
- 17. Installation.** Install the fuel tank as follows:
- a. Position the fuel tank on the engine.
 - b. Secure to the cylinder head and crankcase with the four bolts, washers and nuts.
 - c. Install the fuel filter (Para 15.).
 - d. Install and clamp the injector fuel return line to the top of the tank.
 - e. Fill the tank with clean fuel.
 - f. Check for leaks around the filter.
 - g. Rectify leaks as necessary.

Fuel Line - Low Pressure

- 18. Replacement.** Replace the low pressure fuel line as follows:
- a. Remove the bolt securing the fuel line to the inlet side of the injection pump (Figure 7).
 - b. Allow the fuel to drain into a receptacle.
 - c. Remove and discard the copper gaskets.

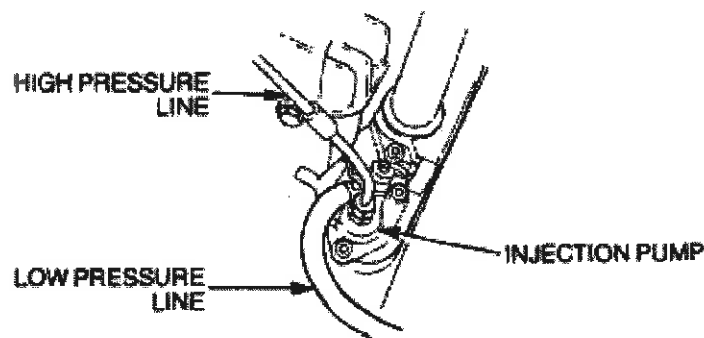


Figure 7 Fuel Injection Pump

- d. Unscrew the fuel line from the fuel filter cover.
- e. Remove and discard the fuel line and gasket.
- f. Install a new copper gasket on the fuel line.

- g. Screw the fuel line into the fuel filter cover.
- h. Place a copper gasket on both sides of the fuel line.
- i. Secure to the inlet side of the injection pump with the bolt.
- j. Fill the fuel tank with clean fuel and check for leaks.
- k. Rectify any leaks as necessary.

Fuel Line - High Pressure

19. Replacement. Replace the high pressure fuel line as follows:

- a. Crack open the nut securing the fuel line to the injector inlet union to release residual pressure.
- b. Loosen the nut completely.
- c. Loosen the nut securing the fuel line to the injection pump outlet union.
- d. Remove the bolt securing the fuel line clamp to the cylinder head.
- e. Remove the line.
- f. Install plugs on the injector pump and the injector to prevent the ingress of dust or dirt (required if a new fuel line is not fitted immediately).
- g. Remove the plugs from the injection pump and the injector (if required).
- h. Install the fuel line and tighten the nuts securely.
- i. Install and tighten the fuel line clamp to the cylinder head securely.

Fuel Return Hose

20. Replacement. Replace the fuel return hose as follows:

- a. Loosen the clamp and remove the hose from the top of the fuel tank.
- b. Remove the bolt securing the hose union to the injector.
- c. Remove the hose.
- d. Discard the two copper gaskets.
- e. Position a new copper gasket on both sides of the hose union.
- f. Secure the hose to the injector with the bolt.
- g. Install the hose on the fuel tank and secure it with a clamp.

Fuel Injector

21. Removal. Remove the fuel injector as follows:

- a. Remove the bolt securing the fuel return hose to the injector.
- b. Discard the copper gaskets.
- c. Crack open the nut securing the high pressure line to the injector, to release residual pressure.
- d. Loosen the nut completely.
- e. Remove the two nuts and washers securing the injector into the cylinder head (Figure 8).
- f. Remove the injector.
- g. Place plugs in the injector orifices and the cylinder head when the injector is removed to prevent the ingress of foreign objects (required if a new injector is not fitted immediately).

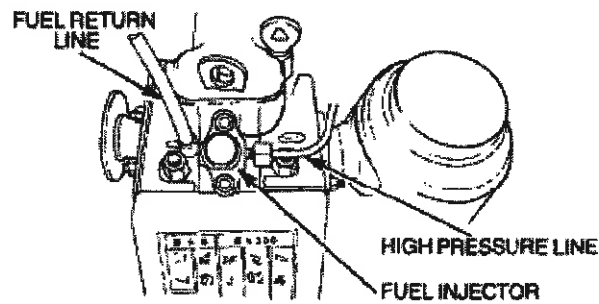


Figure 8 Fuel Injector

- 22. Installation.** Install the fuel injector as follows:
- Remove the plugs from the cylinder head and the injector (if fitted).
 - Install a new copper gasket and the injector in the head.
 - Secure it with the two washers and nuts.
 - Install the high pressure line on the injector.
 - Tighten the nut securely.
 - Position a copper gasket on both sides of the fuel return hose union.
 - Secure it to the injector with the bolt.

Fuel Injection Pump

- 23. Removal.** Remove the fuel injection pump as follows:

WARNING

Eye protection must be worn when using compressed air.

- Clean the area around the injection pump with a cleaning agent.
- Blow it dry with compressed air.
- Remove the bolt securing the low pressure fuel line to the injection pump.
- Place the end of the line in a container to allow the fuel to drain from the fuel tank.
- Discard the copper gaskets.
- Crack open the nut securing the high pressure line to the fuel pump, to release residual pressure.
- Loosen the nut completely.
- Remove the bolt securing the fuel line clamp to the cylinder head.
- Slacken the nut securing the fuel line to the injector and swivel the line away from the fuel pump.
- Install plugs in the fuel pump orifices to prevent the ingress of dust or dirt.
- Remove the three Allen head bolts securing the fuel pump to the engine (Figure 9).
- Remove the pump and the shims.
- Install a cover over the pump opening to prevent the ingress of dust or dirt into the engine.

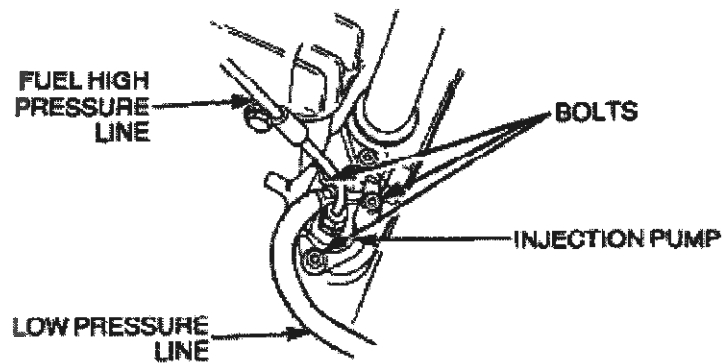


Figure 9 Fuel Injection Pump - Removal

24. **Installation/Timing.** Install/time the fuel injection pump as follows:
- Install the pump into the engine using the same shims that were removed during disassembly or new shims of equivalent thickness.
 - Ensure that the pump control rack aligns with the governor lever.
 - Install the three Allen head bolts to secure the pump to the engine.
 - Torque the bolts to 25 N.m (18 lbf.ft).
 - Position a new copper gasket on both sides of the low pressure fuel line union.
 - Secure the line to the inlet side of the pump.
 - Set the hand throttle control at the maximum setting and lock the control in position.
 - Remove the delivery valve holder, O ring, filler piece, washer, spring, gasket and the delivery valve assembly (Figure 10).

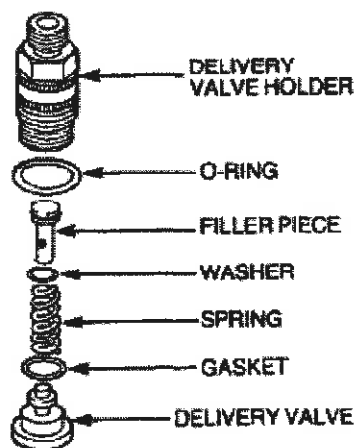


Figure 10 Delivery Valve - Removal

- Install the injection timing nozzle 7270-2003-008 (Figure 11) in the fuel pump.
- Fill the fuel tank with clean fuel.

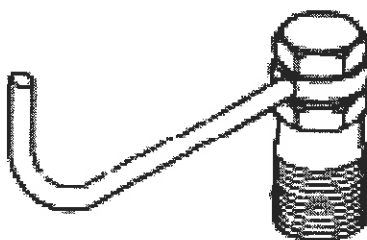


Figure 11 Injection Timing Nozzle

- k. Rotate the engine by hand in a clockwise direction to bring the piston onto the compression stroke. At this stage fuel should be visible at the injection timing nozzle (Figure 12).

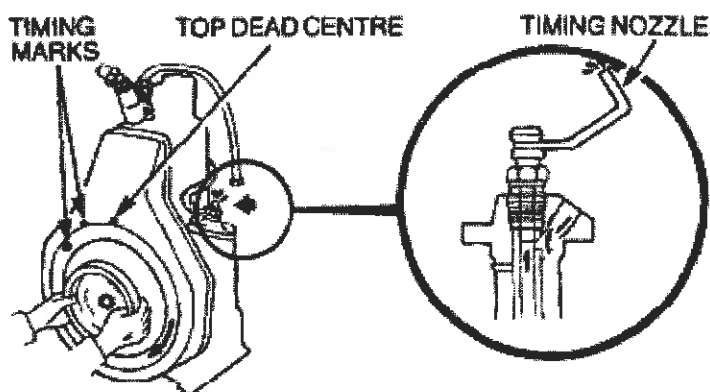


Figure 12 Injection Timing

- l. Continue rotating the crankshaft in the direction of rotation until the timing mark on the flywheel guard panel aligns with the timing mark on the engine shroud at 24-26° (58-62 mm) BTDC (Figure 13). Fuel should not be visible at the timing nozzle.

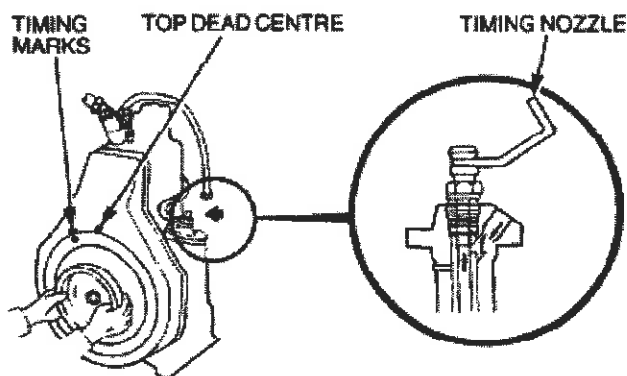


Figure 13 Correct Injection Timing

- m. The injection timing is retarded if the fuel supply does not stop when the timing marks align as shown (Figure 14).
- n. Remove shims as required. The removal of 0.1 mm (0.004 in) corresponds to approximately 2.5 mm (0.0984 in) between the timing marks.

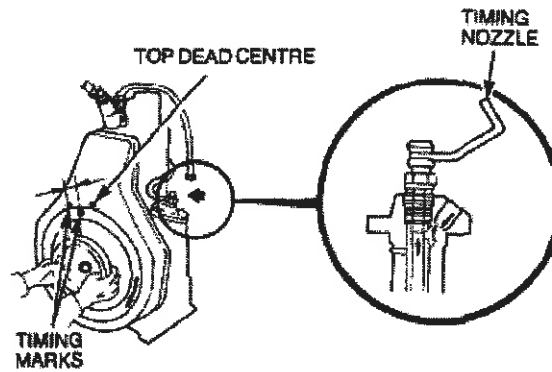


Figure 14 Injection Timing Retarded

- o.** The injection timing is advanced if the fuel supply stops prior to the timing marks aligning as shown (Figure 15).
- p.** Add shims as required. The addition of 0.1 mm (0.004 in) corresponds to approximately 2.5 mm (0.0984 in) between the timing marks.

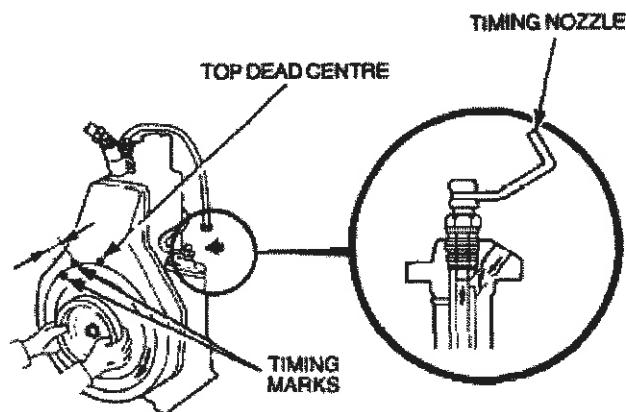


Figure 15 Injection Timing Advanced

- q.** Remove the injection timing nozzle
- r.** Install the delivery valve, gasket, spring washer, filler piece, O ring and delivery valve holder (Figure 10).
- s.** Install the high pressure line on the injector.
- t.** Tighten the fuel line nuts securely.
- u.** Install the fuel line clamp on the cylinder head.

Air Cleaner

25. Removal. Remove the air cleaner as follows:

- a.** Unclip the two fasteners securing the oil reservoir to the air cleaner assembly body (Figure 16).
- b.** Remove the reservoir and the wire mesh filter.
- c.** Remove the foam element from the body.

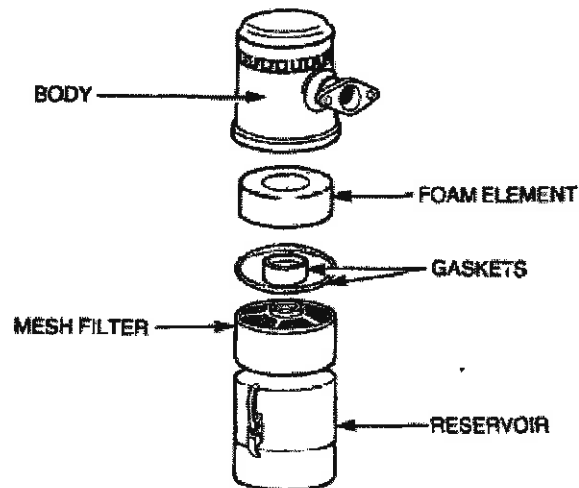


Figure 16 Air Cleaner Assembly - Exploded View

- d. Remove the two nuts and washers securing the air cleaner body to the cylinder head.
 - e. Remove the air cleaner and the gasket.
- 26. Cleaning.** Clean the air cleaner as follows:

WARNING

Eye protection must be worn when using compressed air.

- a. Drain the oil from the reservoir into a container.
 - b. Wash the reservoir, the mesh filter and the foam element in a cleaning agent and blow them dry with compressed air.
- 27. Installation.** Install the air cleaner as follows:
- a. Position the gasket on the cylinder head.
 - b. Install the air cleaner body and secure it with the two washers and nuts.
 - c. Fill the reservoir with oil to the level indicated in the reservoir.
 - d. Install the wire mesh filter.
 - e. Install the foam element in the body.
 - f. Clip the reservoir to the air cleaner body.

Specifications - Fuel System

- 28. Specifications - Fuel System.** The specifications for the fuel system are contained in Table 5.

Table 5 Specifications - Fuel System

Serial	Item	Specification	Value
1	Fuel injection pump bolts	torque	25 N.m (18 lbf.ft)
2	Fuel injection timing	degrees	24-26° (58-62 mm) BTDC
3	Fuel injection pump shims	dimension	0.1 mm (0.004 in) shim corresponds to 2.5 mm (0.0984 in) linear distance between timing marks

AXLES - GROUP 9

Hub Oil Seal and Wheel Bearings

29. **Removal.** Remove the hub oil seal and wheel bearings as follows:

- a. Cage the spring brake (Brake System - Group 12) adjacent to the hub to be removed.
- b. Apply the parking brake.

WARNING

Do not work on the vehicle without the use of an axle stand beneath the axle. Place the axle stand as close to the raised wheel as possible. This procedure is required for all repairs and maintenance activities involving positioning of body parts in potential crush zones of the vehicle. Failure to comply may result in serious injury or death.

- c. Using a jack under the axle, raise the trailer until the wheels are clear of the ground.
- d. Support the axle on safety stands.
- e. Using special tool JLA13943 remove the hub cap and O ring (Figure 17).
- f. Discard the O ring.

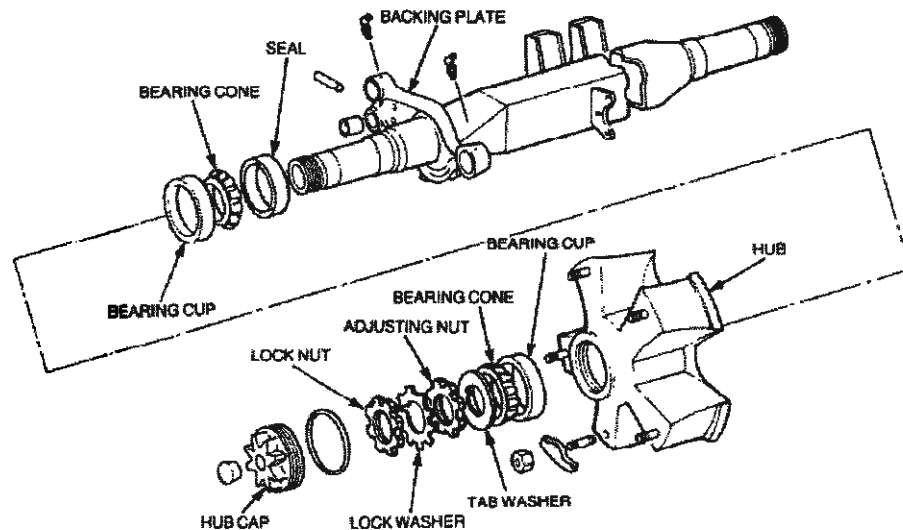


Figure 17 Axle Assembly - Exploded View

- g. Position a wheel trolley jack under the wheels and support the weight.
- h. Straighten the lock tabs on the lock washer and remove the locknut using special tool JLA13943.
- i. Remove the lock washer.
- j. Using tool JLA13943 remove the adjusting nut.
- k. Remove the outer wheel bearing.
- l. Remove the wheel hub and brake drum from the axle shaft.
- m. Remove the inner wheel bearing from the axle shaft.
- n. Using a hammer, tap the oil seal from the axle shaft.
- o. Discard the oil seal.
- p. Using a drift, remove the inner and outer wheel bearing cups (Figure 18).

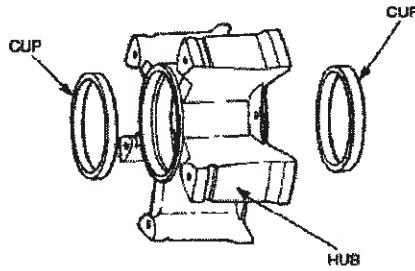


Figure 18 Bearing Cup - Removal

30. **Installation.** Install the hub oil seal and wheel bearings as follows:
- Thoroughly clean the hub assembly and the axle shaft.
 - Using a drift, install the inner and outer bearing cups into the hub.
 - Lubricate the outer surface of the oil seal.
 - Position the seal on the axle shaft.
 - Ensure that the side marked 'oil side' faces away from the trailer.
 - Using the fabricated seal installer, seat the seal against the axle flange (Figure 19).

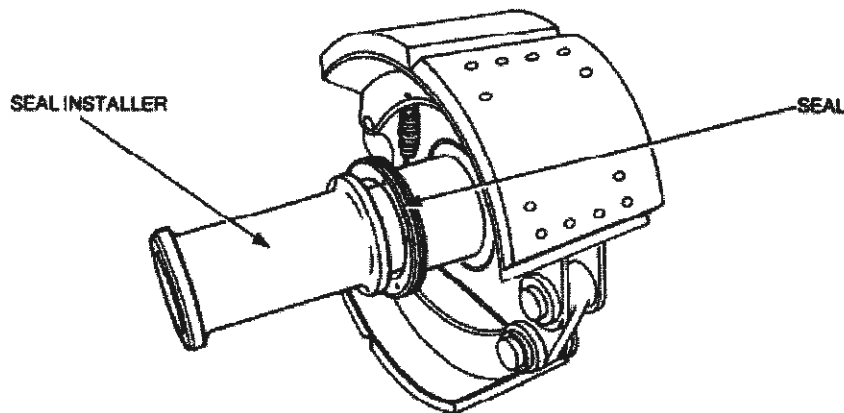


Figure 19 Oil Seal Installation

NOTE

The wheel bearings are fully floating on the axle shaft.

- Install the inner wheel bearing on the axle shaft.
- Using a wheel trolley jack, position the brake drum, hub and wheels on the axle shaft.
- Install the outer wheel bearing and the adjusting nut.
- While rotating the wheels, tighten the nut using special tool JLA13943 to seat the bearings and the oil seal in the hub.
- Back-off the adjusting nut counterclockwise approximately 60° until the wheels rotate freely.
- Install the lock washer and locknut.
- Bend the lock tabs to secure the adjusting nut and the locknut.
- Install a new O ring on the hub cap.
- Lubricate the O ring and the hub cap threads.
- Install the cap.

- q. Tighten securely using special tool JLA13943.
- r. Raise the axle and remove the safety stands.
- s. Fill the hub cap and hub cavity with OEP-220 oil to the level indicated on the cap (Figure 20).

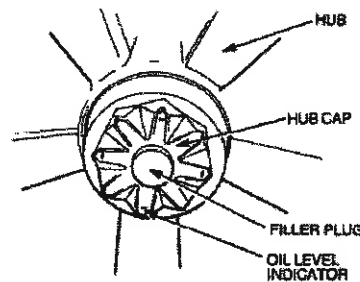


Figure 20 Hub Cap Oil Level Indicator

WHEELS - GROUP 11

Wheels

31. **Removal.** Remove the wheels as follows:

WARNING

Do not work on the vehicle without the use of an axle stand beneath the axle. Place the axle stand as close to the raised wheel as possible. This procedure is required for all repairs and maintenance activities involving positioning of body parts in potential crush zones of the vehicle. Failure to comply may result in serious injury or death

- a. Chock the wheels not being removed.
- b. Apply the parking brake.
- c. Position a jack under the appropriate axle.
- d. Slacken the wheel nuts on the wheels to be removed.
- e. Raise the axle until the wheels are clear of the ground.
- f. Support the axle on a safety stand.
- g. Loosen the wheel nuts and tap the clamps lightly with a hammer.
- h. Remove the wheel nuts and clamps.
- i. Remove the outer wheel using lifting equipment.
- j. Remove the spacer.
- k. Remove the inner wheel using lifting equipment.

32. **Installation.** Install the wheels as follows:

- a. Position the inner wheel on the hub using lifting equipment.
- b. Ensure that the valve stem points away from the trailer.
- c. Ensure that the drive lugs are positioned as shown for a left side wheel (Figure 21) or for a right side wheel (Figure 22).

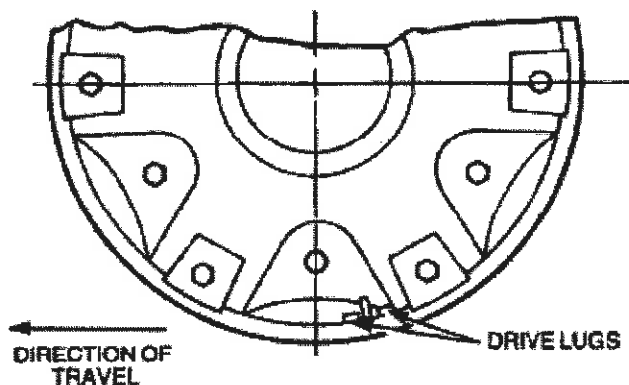


Figure 21 Left Side Wheel - Drive Lug Location

- d. Install the spacer.
- e. Position the outer wheel on the hub using lifting equipment.
- f. Ensure that the valve stem points towards the trailer and diagonally opposite the inner wheel valve stem.
- g. Ensure that the drive lugs are positioned as shown (Figure 21) for a left side wheel or (Figure 22) for a right side wheel.

NOTE

The inner and outer valve stems must be diagonally opposite each other.

- h. Install the wheel clamps and nuts.
- i. Place a block of wood adjacent to the outer tyre.
- j. Rotate the wheels and check for excessive run-out.
- k. Adjust the nuts progressively to eliminate any run-out.
- l. Torque the nuts to 237-305 N.m (175-225 lbf. ft) in the sequence shown (Figure 23).

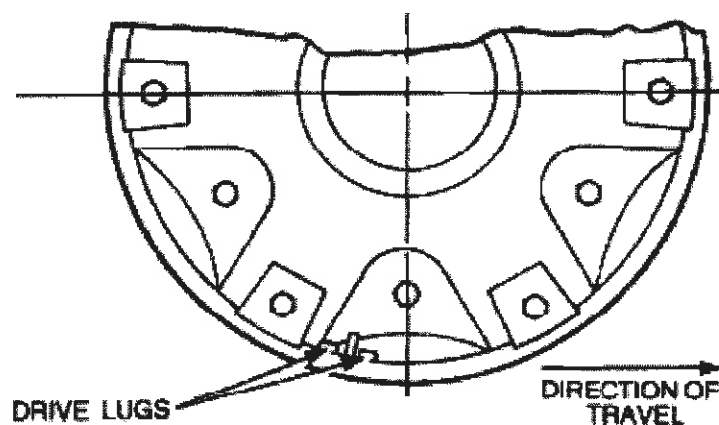


Figure 22 Right Side Wheel - Drive Lug Location

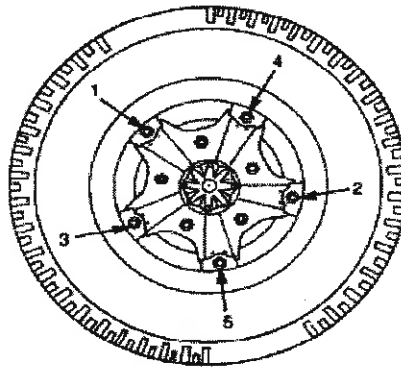


Figure 23 Wheel Nut Tightening Sequence

- m. Raise the axle and remove the safety stand.
- n. Lower the axle and remove the wheel chocks.

Specifications - Wheels

33. **Specifications - Wheels.** The specifications for the wheels are contained in Table 6.

Table 6 Specifications - Wheels

Serial	Item	Specification	Value
1	Wheel nut	torque	237-305 N.m (175-225 lbf.ft)

BRAKE SYSTEM - GROUP 12

WARNING

Brake linings may contain asbestos. If asbestos is present linings are to be handled in accordance with EMEI Workshop E 410.

Any material suspected of containing or being asbestos is to be treated as asbestos until proven otherwise. Small components suspected of being asbestos are to be assumed to be asbestos for maintenance and disposal procedures.

Yard Release Valve

34. **Replacement.** Replace the yard release valve as follows:
- a. Chock the wheels.
 - b. Drain the air from the air reservoirs.
 - c. Tag and remove the air lines from the release valve (Figure 24).
 - d. Remove the knob from the valve stem.
 - e. Remove the two screws securing the valve to the undercarriage and remove the valve.
 - f. Position the new valve on the undercarriage.
 - g. Install the two screws to secure the valve to the undercarriage.
 - h. Install the knob.

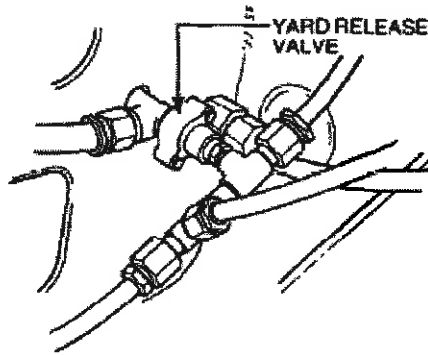


Figure 24 Yard Release Valve

NOTE

Use Teflon tape or approved sealant on all air line connections.

- i. Connect the air lines to the valve and tighten the connections securely.
- j. Charge the air reservoirs to normal operating pressure.
- k. Check for air leaks at the valve.
- l. Rectify any leaks as necessary.

Brake Relay Valve (CA43)

35. Replacement. Replace the brake relay valve (CA43) as follows:

- a. Chock the wheels.
- b. Drain the air from the air reservoirs.
- c. Tag and remove the air lines from the valve.
- d. Remove the valve from the rear air reservoir (Figure 25).

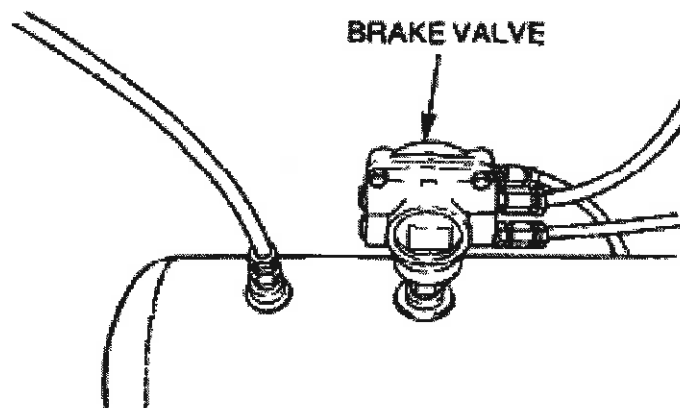


Figure 25 Brake Relay Valve (CA43)

NOTE

Use Teflon tape or approved sealant on all air line connections.

- e. Install the valve on the air reservoir.
- f. Connect the air lines to the valve and tighten the connections securely.
- g. Charge the air reservoirs to normal operating pressure.
- h. Operate the foot brake valve and check for air leaks at the relay valve.

- i. Rectify any leaks as necessary.

Service Brake Relay Valve (CA38)

36. Replacement. Replace the service brake relay valve (CA38) as follows:

- a. Chock the wheels.
- b. Drain the air from the air reservoirs.
- c. Tag and remove the air hoses from the unions on the six service brake chambers.
- d. Tag and remove the six service brake air hoses from the relay valve (Figure 26).

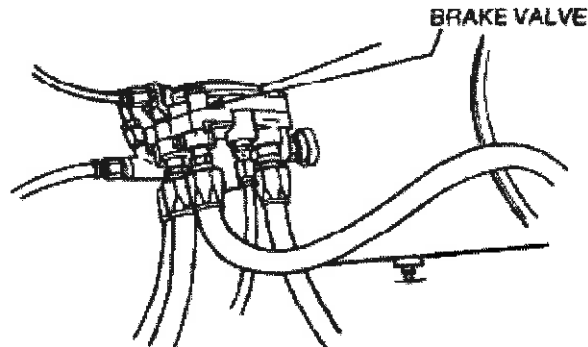


Figure 26 Service Brake Relay Valve (CA38)

- e. Tag and remove the air hose from the yard release valve at the relay valve (CA38).
- f. Tag and remove the air hose from the relay valve (CA43) at the relay valve (CA38).
- g. Tag and remove the air hose from the PARC valve at the relay valve.
- h. Remove the relay valve from the air reservoir.

NOTE

Use Teflon tape or approved sealant on all air line connections.

- i. Install the relay valve on the air reservoir.
- j. Connect the air hoses from the PARC valve, the relay valve (CA43) and the yard release valve to the relay valve (CA38).
- k. Connect the six service brake air hoses on to the relay valve and the service brake chambers.
- l. Charge the air reservoirs to normal operating pressure.
- m. Operate the foot brake valve and check for air leaks at the relay valve (CA43), the service brake relay valve (CA38), the PARC valve and the six service brake chambers.
- n. Rectify any leaks as necessary.

Spring Brake Relay Valve (CA41 PARC Valve)

37. Replacement. Replace the spring brake relay valve (CA41 PARC valve) as follows:

- a. Chock the wheels.
- b. Drain the air from the air reservoirs.
- c. Tag and remove the air hoses from the spring brake chambers on the first axle.
- d. Tag and remove the air hoses from the tee union on the left spring brake chamber of the second axle.
- e. Tag and remove the air hose from the tee union on the right spring brake chamber of the third axle.
- f. Tag and remove the four spring brake hoses from the PARC valve (Figure 27).
- g. Tag and remove the air hose from the service brake relay valve at the PARC valve.

- h. Tag and remove the air hose from the yard release valve at the PARC valve.
- i. Remove the PARC valve from the air reservoir.

NOTE

Use Teflon tape or approved sealant on all air line connections.

- j. Install the PARC valve on the air reservoir.
- k. Connect the air hose from the yard release valve to the PARC valve.

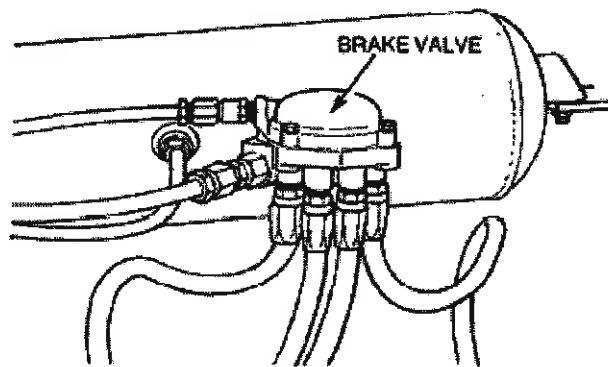


Figure 27 Spring Brake Relay Valve (CA41)

- l. Connect the air hose from the service brake relay valve to the PARC valve.
- m. Connect the four spring brake chamber air hoses to the PARC valve.
- n. Connect the four spring brake chamber air hoses from the PARC valve to their relevant chambers.
- o. Charge the air reservoirs to normal operating pressure.
- p. Check for air leaks, with the parking brake released, at the PARC valve, service brake relay valve and the yard release valve.
- q. Check for air leaks at the spring brake chambers.
- r. Rectify any leaks as necessary.

Air Reservoir

38. Replacement. Replace the air reservoir as follows:

- a. Chock the wheels.
- b. Drain the air from the air reservoirs.
- c. Remove the relay valves from the reservoir (Para 35., 36. and 37.).
- d. Disconnect the air hose interconnecting the reservoir to be removed with the other reservoir.
- e. Remove the four bolts, nuts and washers securing the air reservoir to the mounting brackets.
- f. Remove the air reservoir.
- g. Position the new or replacement air reservoir on the mounting brackets.
- h. Secure with the four bolts, washers and nuts.

NOTE

Use Teflon tape or approved sealant on all air line connections.

- i. Connect the reservoir interconnecting air hose.
- j. Install the relay valves on the reservoir.
- k. Charge the air reservoirs to normal operating pressure and check for air leaks.

- I. Rectify any leaks as necessary.

Slack Adjuster

39. Replacement. Replace the slack adjuster as follows:

- a. Chock the wheels.
- b. Ensure that the parking brakes are released.
- c. Back-off the adjuster to be removed by placing a wrench on the adjusting bolt and depressing the locking sleeve.
- d. Turn the adjusting bolt counterclockwise until no pressure is exerted by the push rod on the adjuster.
- e. Remove the split pin and the clevis pin from the push rod clevis and the slack adjuster (Figure 28).
- f. Remove the circlip and washer retaining the slack adjuster to the S-cam shaft.
- g. Remove the adjuster.
- h. Align the new or replacement adjuster with the splines on the S-cam shaft and install the adjuster.

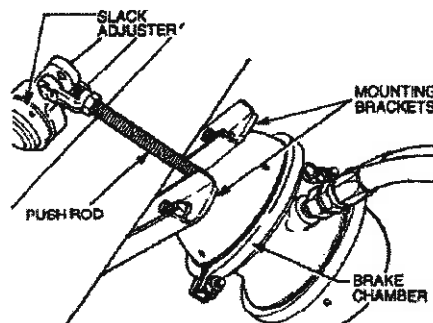


Figure 28 Slack Adjuster and Pushrod

- i. Install the clevis pin through the clevis and the slack adjuster.
- j. Install the split pin.
- k. Adjust the brakes (Para 50.).

Brake Drum

40. Replacement. Replace the brake drum as follows:

- a. Remove the wheels (Wheels - Group 11).
- b. Remove the hub and drum (Axles - Group 9).
- c. Place the hub on a flat surface with the brake drum uppermost.
- d. Remove the five bolts, nuts and washers securing the drum to the hub (Figure 29).
- e. Remove the drum from the hub.

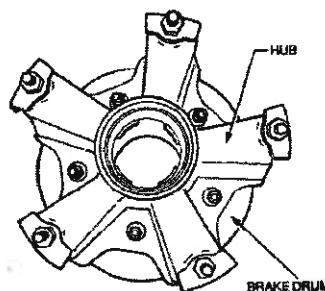


Figure 29 Brake Drum and Hub

- f. Position the new drum on the hub.
- g. Install the five bolts, washers and nuts.
- h. Torque the bolts to 305-373 N.m (225-275 lbf.ft).
- i. Install the hub and drum (Axles - Group 9).
- j. Install the wheels (Wheels - Group 11).
- k. Adjust the brakes (Para 50.).

Brake Shoes

41. Removal. Remove the brake shoes as follows:

- a. Remove the wheels, hub and brake drum (Axles - Group 9).
- b. Support the lower brake shoe.
- c. Using a pair of brake shoe pliers, remove the brake shoe return spring (Figure 30).

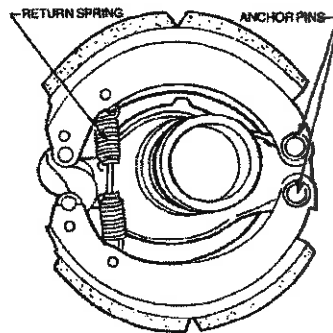


Figure 30 Brake Shoe Removal

- d. Remove the C-clip securing the anchor pins to the brake shoes and the backing plate.
 - e. Support the brake shoe.
 - f. Remove the anchor pin from the shoe and the backing plate.
 - g. Remove the shoe from the backing plate.
- 42. Cleaning and Inspection.** Clean and inspect the brake shoes as follows:
- a. Thoroughly clean the brake dust from the brake components using a cleaning agent.
 - b. Inspect the brake shoes for loose, cracked or excessively worn linings.
 - c. Replace as necessary.
 - d. Inspect the backing plate for cracks or worn anchor pin bushes.
 - e. Replace as necessary.
- 43. Installation.** Install the brake shoes as follows:
- a. Position the brake shoes on the backing plate
 - b. Install the anchor pins and C-clips.
 - c. Using a pair of brake shoe pliers, install the brake shoe return spring.
 - d. Install the brake drum, hub and wheels (Axles - Group 9).

Brake S-Cam

44. Removal. Remove the brake S-cam as follows:

- a. Remove the brake shoes (Para 41.).
- b. Remove the slack adjuster (Para 39.).

- c. Loosen the bolts and nuts securing the S-cam inner bearing and bearing retainers to the axle mounting (Figure 31).

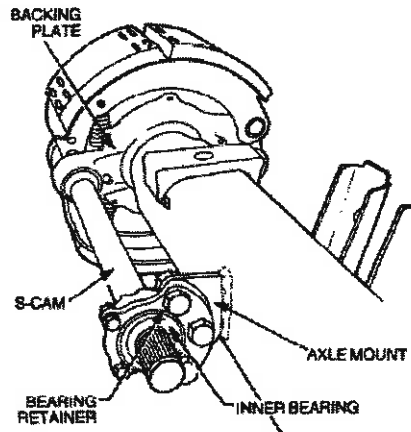


Figure 31 S-Cam Mounting

- d. Remove the S-cam from the inner bearing and the backing plate.
- 45. Installation.** Install the brake S-cam as follows:
- a. Install the S-cam through the backing plate bushing and the inner bearing.
 - b. Tighten the bolts and nuts securing the S-cam inner bearing and bearing retainer to the axle mounting.
 - c. Install the brake shoes (Para 41.).
 - d. Install the slack adjuster (Para 39.).

Service and Spring Brake Chamber

- 46. Removal.** Remove the service and spring brake chamber as follows:
- a. Chock the wheels.
 - b. Remove the dust cap from the spring brake housing.
 - c. Insert the spring brake release stud through the opening in the rear of the chamber into the spring pressure plate.
 - d. Rotate the stud one-quarter of a turn to engage the tangs of the release stud into the slot in the pressure plate (Figure 32).
 - e. Ensure that the release stud remains engaged in the pressure plate.
 - f. Tighten the nut with a wrench to fully compress the spring.
 - g. Drain the air from the air reservoirs.
 - h. Tag and remove the service and brake air hoses from the chamber.
 - i. Remove the split pin and the clevis pin from the push rod clevis and the slack adjuster.
 - j. Remove the two nuts and washers retaining the brake chamber to the axle mounting bracket (Figure 28).
 - k. Remove the chamber.

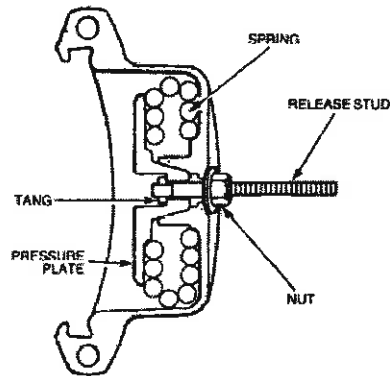


Figure 32 Spring Brake Release Stud

- 47. Installation.** Install the service and spring brake chamber as follows:
- Position the brake chamber on the axle mounting.
 - Install the two washers and nuts.
 - Ensure that the push rod does not bind.
 - Torque the mounting nuts to 122-149 N.m (90-110 lbf.ft).
 - Align the slack adjuster and the push rod clevis.
 - Install the clevis pin and the split pin.
 - Connect the service and spring brake air hoses to the brake chambers.
 - Charge the air reservoirs to normal operating pressure.
 - Remove the release stud and nut to uncage the spring brake pressure plate and spring.
 - Apply the service and spring brakes in turn.
 - Check for correct operation.
 - Check for any air leaks and rectify as necessary.

Air Lines and Fittings

- 48. Replacement (Air Hoses).** Replace the air hoses as follows:
- Determine which air hose requires replacement.
 - Drain the air from the air reservoirs.
 - Gradually release the compression nut from the fittings at each end of the hose.
 - Remove any clamps securing the hose to the trailer.
 - Remove the hose from the trailer.
 - Ensure that the replacement hose is the correct length, diameter and pressure rating.

NOTE

Use Teflon tape or approved sealant on all air line connections.

- Install the hose on the trailer.
 - Tighten the compression nuts securely.
 - Charge the air reservoirs to normal operating pressure.
 - Check for any air leaks.
 - Rectify any leaks as necessary.
- 49. Replacement (Air Lines).** Replace the air lines as follows:

- a. Determine which air line requires replacement.
- b. Drain the air from the air reservoirs.
- c. Gradually release the compression nut from each end of the line.
- d. Remove any clamps securing the line to the trailer.
- e. Remove the line from the trailer.
- f. Obtain a piece of air line the same length, diameter and pressure rating as the line removed.
- g. Install the compression nut and new nipple on the air line.
- h. Install the air line on the trailer.
- i. Tighten the compression nuts securely.
- j. Charge the air reservoirs to normal operating pressure.
- k. Check for any air leaks.
- l. Rectify any leaks as necessary.

Brake Adjustment

50. **Procedure.** Adjust the brakes as follows:

WARNING

Do not work on the vehicle without the use of an axle stand beneath the axle. Place the axle stand as close to the raised wheel as possible. This procedure is required for all repairs and maintenance activities involving positioning of body parts in potential crush zones of the vehicle. Failure to comply may result in serious injury or death.

- a. Chock the wheels not being adjusted.
- b. Raise the wheels to be adjusted clear of the ground by using a jack under the axle.
- c. Support the axle on safety stands.
- d. Release the parking brake.
- e. Ensure that the wheels rotate freely.
- f. Disengage the worm shaft lock on the slack adjuster (Figure 33) by depressing the spring loaded sleeve with a wrench.

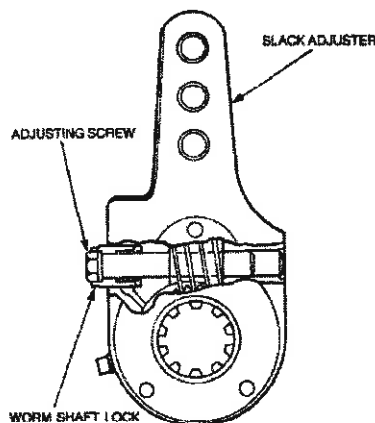


Figure 33 Slack Adjuster Worm Shaft Lock

- g. Turn the adjusting screw in a clockwise direction until the brakes become locked.

- h. Turn the adjusting screw in a counterclockwise direction until the wheels begin to rotate freely.
- i. Release the worm shaft lock.
- j. Ensure that the adjusting screw is secured.
- k. Apply the brakes and check the angle between the slack adjuster and the push rod (Figure 34). The minimum allowable angle is 90°.

NOTE

If the angle is incorrect, maximum brake application will not be achieved.

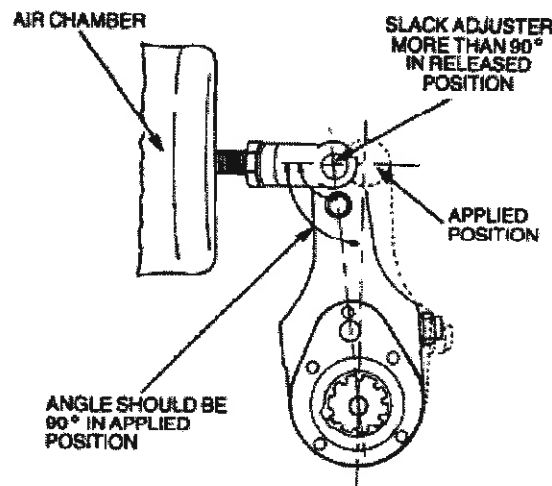


Figure 34 Slack Adjuster and Push Rod Angle

- l. To obtain the correct angle release the brakes.
- m. Remove the split pin and the clevis pin retaining the push rod clevis to the slack adjuster.
- n. Slacken the clevis locknut and turn the clevis several times towards the brake chamber.
- o. Install the clevis pin in the slack adjuster and clevis.
- p. Apply the brakes and check the angle between the push rod and the slack adjuster.
- q. If necessary continue the procedure until the correct angle is obtained.
- r. When the correct angle is obtained, install the split pin in the clevis pin and tighten the clevis locknut.
- s. Remove the safety stands
- t. Lower the wheels.
- u. Remove the wheel chocks.

Specifications - Brake System

51. **Specifications - Brake System.** The specifications for the brake system are contained in Table 7.

Table 7 Specifications - Brake System

Serial	Item	Specification	Value
1	Hub to drum nut	torque	305-373 N.m (225-275 lbf.ft)
2	Brake chamber mounting nut	torque	122-149 N.m (90-110 lbf.ft)
3	Wheel nut	torque	237-305 N.m (175-225 lbf.ft)

Fault Finding - Brakes

52. **Fault Finding - Brakes.** Fault finding for the brake system is contained in Table 8.

Table 8 Fault Finding - Brakes

Serial	Symptom	Probable Cause	Action
1	Insufficient braking	a. mechanical components damaged	check for damaged parts, replace as required
		b. worn brake linings	replace brake linings
		c. low air pressure in the brake system	check supply pressure from the prime mover
		d. reservoir drain cock open	close drain cock
2	Brakes apply too slowly	a. brakes require adjusting or lubrication	adjust brakes. lubricate brake components
		b. relay valve (CA43) faulty	replace valve
		c. blocked or restricted air lines/hoses	clear blockage. replace air line or hose
		d. leaking brake chamber diaphragm	replace brake chamber
3	Brakes release too slowly	a. brakes require adjusting or lubrication	adjust brakes. lubricate brake components
		b. relay valve (CA43) faulty	replace valve
		c. blocked or restricted air lines/hoses	clear blockage. replace air line/hose
4	Brakes do not release	a. brake shoe return spring weak or broken	replace spring
		b. spring brake chamber diaphragm faulty	replace brake chamber
		c. faulty parc valve, service brake relay valve (CA38) or relay valve (CA43)	replace faulty valve
5	Brakes grab or are erratic	a. oil on brake linings	replace linings and oil seal
		b. faulty brake chamber(s)	replace chamber(s)
		c. Eccentric brake drum(s)	replace drum(s)
		d. Loose brake lining	reline brake shoes
		e. brake shoe return spring broken or weak	replace spring
6	Uneven brakes	a. oil on brake linings	replace brake linings and oil seal
		b. eccentric brake drum(s)	replace brake drum(s)
		c. brake chamber diaphragm leaking	replace brake chamber
7	Spring brake does not hold	a. power spring broken	replace brake chamber
		b. brakes require adjusting	adjust brakes
		c. faulty parc valve	replace valve
8	Brakes drag after spring brakes have been used	a. low spring brake hold-off air pressure	check air pressure in system
		b. leaking air lines	repair leaks
9	Spring brakes will not release	a. insufficient air pressure	check air pressure in system
		b. faulty parc valve	replace valve
		c. spring brake chamber diaphragm faulty	replace chamber

SUSPENSION - GROUP 13

Radius Rod/Bushes

53. Replacement. Replace the radius rod/bushes as follows:

- a. Remove the wheels (Wheels - Group 11).
- b. Remove the bolt, nut and washer retaining the radius rod in the front spring hanger and the axle bracket (Figure 35).

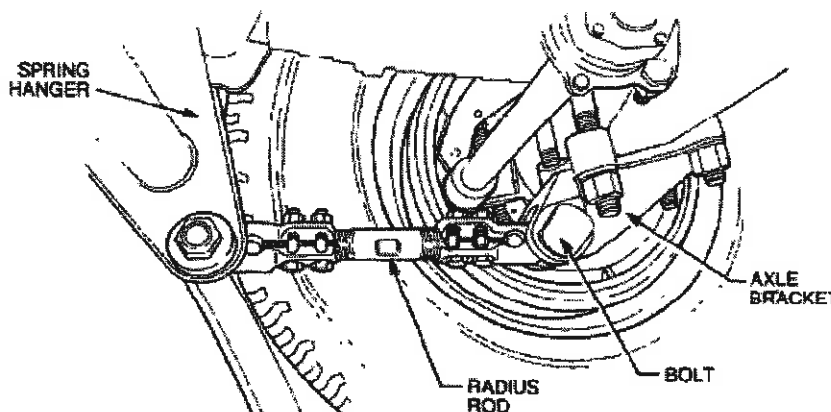


Figure 35 Radius Rod - Mounting

- c. Support the radius rod and using a lever, pry the bushes out of the spring hanger and the axle bracket.
- d. Discard the bushes.
- e. Position the radius rod in the spring hanger.
- f. Install a new bush in both sides of the spring hanger.
- g. Using a bolt, flat washers and nut, seat the bushes into the radius rod and the spring hanger.
- h. Remove the bolt, nut and washers.
- i. Install the retaining bolt, washer and nut.
- j. Align the radius rod in the axle bracket.
- k. Install a new bush in both sides of the bracket.
- l. Using a bolt, flat washers and nut, seat the bushes into the radius rod and the axle bracket.
- m. Remove the bolt, nut and washers.
- n. Install the retaining bolt, washer and nut.
- o. Torque both retaining bolts to 460-490 N.m (340-360 lbf.ft).
- p. Replace the wheels (Wheels - Group 11).

Spring

54. Replacement. Replace the spring as follows:

- a. Remove the wheels (Wheels - Group 11).
- b. Remove the four nuts and washers retaining the U-bolts to the axle bracket.
- c. Remove the U-bolts and the saddle.
- d. Position a jack under the axle adjacent to the spring.
- e. Remove the safety stand.
- f. Lower the axle until the weight of the spring is lightly supported on the axle.

- g. Replace the safety stand.

WARNING

This assembly is heavy. Care must be taken to avoid personal injury.

- h. Remove the spring locating bolt (Figure 36).
- i. Manipulate the spring from the equaliser beam and the spring hanger.

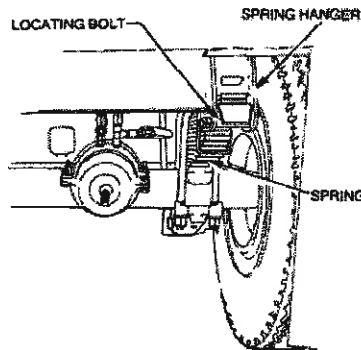


Figure 36 Spring Locating Bolt

- j. Position the new or replacement spring on the axle.
- k. Locate the spring ends in the spring hanger and the equaliser beam.
- l. Install the spring locating bolt.
- m. Raise the axle and spring assembly using a jack.
- n. Support the axle on a safety stand.
- o. Position the U-bolt saddle on top of the spring.
- p. Install the U-bolts.
- q. Install the washers and nuts on the U-bolts.
- r. Torque the nuts to 407 N.m (300 lbf.ft).

NOTE

The U-bolts must be re-torqued after approximately 1000 kms. The trailer must be loaded.

- s. Install the wheels (Wheels - Group 11).

Centre Bolt

- 55. **Replacement.** Replace the centre bolt as follows;
 - a. Remove the spring (Para 54.).
 - b. Remove the broken centre bolt from the spring.
 - c. Align the spring leaves and install the centre bolt.
 - d. Install the spring (Para 54.).

Equaliser Frame

- 56. **Replacement.** Replace the equaliser frame as follows:
 - a. Support the trailer frame on safety stands.

- b. Remove the spring locating bolt and the welded spring locating pin from the equaliser beam (Figure 37).

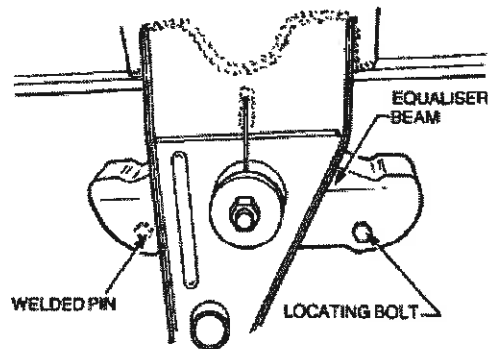


Figure 37 Spring Locating Bolt and Pin

- c. Remove the bolt, nut and washer retaining the equaliser beam in the equaliser hanger.
d. Using a lever, pry the bushes from the equaliser hanger and beam.
e. Manipulate the equaliser beam from the hanger.
f. Position the new or replacement equaliser beam in the hanger.
g. Install a new bush in both sides of the hanger.
h. Using a bolt, flat washer and nut, seat the bushes into the equaliser hanger and the equalizer beam.
i. Remove the bolt, nut and washers.
j. Install the retaining bolt, washer and nut.
k. Torque the retaining bolt to 460-490 N.m (340-360 lbf.ft).
l. Install the spring locating bolt.
m. Weld the locating pin in position.

Axle Alignment

57. **Adjustment.** Adjust the axle alignment as follows:

NOTE

This procedure will only be required in the event of damage being caused to an adjustable radius rod. The axle alignment is preset at the factory.

- a. Remove the damaged radius rod and install a new rod (Para 53.).
b. Slacken the four radius rod end clamp bolts (Figure 38).

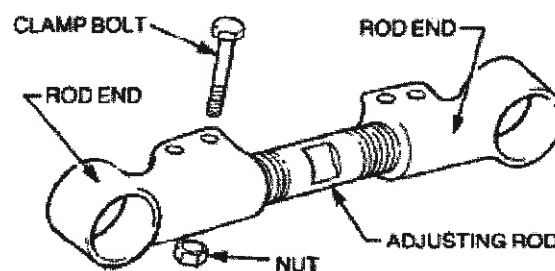


Figure 38 Adjustable Radius Rod

- c. Measure the distance between the centre line of the bolts retaining the nonadjustable radius rod at the spring hanger and the axle bracket.
d. Using a wrench on the adjusting rod, adjust the rod to the same measurement as the non-adjustable rod.

- e. Torque the radius rod clamp to 115-122 N.m (85-90 lbf.ft).

NOTE

The axle alignment should be checked as soon as possible using alignment equipment.

Specifications - Suspension

58. **Specifications - Suspension.** The specifications for the suspension are contained in Table 9.

Table 9 Specifications - Suspension

Serial	Item	Specification	Value
1	Radius rod retaining bolts	torque	460-490 N.m (340-360 lbf.ft)
2	U-bolt nuts	torque	407 N.m (300 lbf.ft)
3	Equaliser beam retaining bolt	torque	460-490 N.m (340-360 lbf.ft)
4	Radius rod clamp bolts	torque	115-122 N.m (85-90 lbf.ft)

ELECTRICAL - GROUP 15

Stop/Tail, Reversing and Indicator Lights

59. **Bulb Replacement.** Replace the bulb as follows:

- Remove the four screws securing the lens cover to the light unit.
- Replace the bulb as required (Figure 39).

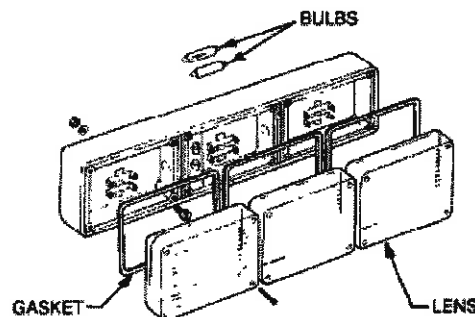


Figure 39 Stop/Tail, Reversing and Indicator Lights - Exploded View

- Install the lens.
 - Secure with the four screws.
60. **Light Unit Replacement.** Replace the light unit as follows:
- Remove the four screws securing each lens cover to the light unit.
 - Tag and disconnect the light unit wiring from the unit.
 - Remove the two screws and nuts securing the light unit to the coaming rail.
 - Remove the unit.
 - Install the light unit.
 - Secure to the coaming rail with the two screws and nuts.
 - Connect the light unit wiring.
 - Install and secure the lens covers with the screws.

Stop/Tail and Number Plate Light

- 61. Bulb Replacement.** Replace the bulb as follows:
- Carefully ease the lens cover out of the rubber light surround.
 - Replace the bulb as required (Figure 40).

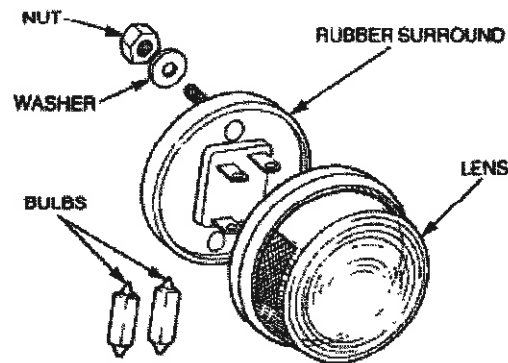


Figure 40 Stop/Tail and Number Plate Light - Exploded View

- With a push/twist action install the lens cover into the rubber light surround.
 - Ensure that the clear section of the lens is facing the number plate.
- 62. Light Unit Replacement.** Replace the light unit as follows:
- Carefully ease the lens cover out of the rubber light surround.
 - Tag and disconnect the wiring from the unit.
 - Remove the two nuts and washers securing the unit to the coaming rail.
 - Remove the unit.
 - Install the light unit.
 - Secure to the coaming rail with the two washers and nuts.
 - Connect the wiring to the unit.
 - Install the lens cover with a push/twist action into the rubber surround.

Blackout Stop/Tail Light

- 63. Light Unit Replacement.** Replace the light unit as follows:
- Tag and disconnect the light unit wiring harness from the main wiring harness.
 - Remove the two nuts and washers securing the light unit to the coaming rail.
 - Insert the unit wiring harness through the coaming rail.
 - Secure the unit to the rail with the two washers and nuts.

Clearance Light

- 64. Bulb Replacement.** Replace the bulb as follows:
- Carefully ease one lens cover out of the rubber light surround.
 - Replace the bulb (Figure 41).

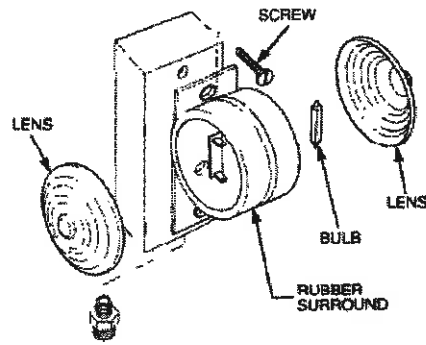


Figure 41 Clearance Light - Exploded View

- c. With a push/twist action install the lens cover into the rubber light surround.
65. **Light Unit Replacement.** Replace the light unit as follows:
- Carefully ease one lens cover out of the rubber light surround.
 - Tag and disconnect the wiring from the light unit.
 - Remove the two screws securing the unit to the mounting bracket.
 - Feed the unit wiring through the rubber surround.
 - Secure the unit to the bracket with the two screws.
 - Connect the wiring to the unit.
 - Install the lens cover with a push/twist action into the rubber surround.

Side Indicator Light

66. **Bulb Replacement.** Replace the bulb as follows:
- Remove the three screws securing the lens cover to the light unit.
 - Remove the lens cover.
 - Replace the bulb (Figure 42).

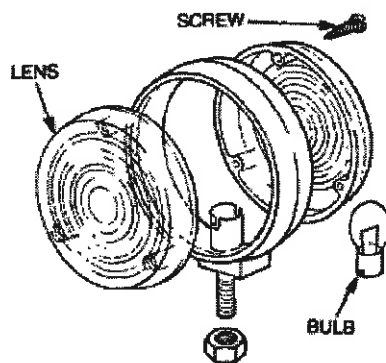


Figure 42 Side Indicator Light - Exploded View

- Install the lens.
 - Secure the lens with the three screws.
67. **Light Unit Replacement.** Replace the light unit as follows:
- Remove the three screws securing the lens cover to the light unit.
 - Remove the cover.
 - Tag and disconnect the wiring from the bulb holder.

- d. Remove the light unit from the mounting pad.
- e. Remove the lens cover from the new unit.
- f. Feed the wiring through the light unit.
- g. Install the unit on the mounting pad.
- h. Connect the wiring to the bulb holder.
- i. Install the lens cover.
- j. Secure with the three screws.

NATO Socket

68. Replacement. Replace the NATO socket as follows:

- a. Disconnect the NATO plug from the towing vehicle.
- b. Slide the rubber cover away from the rear of the socket.
- c. Tag and remove each individual wire from the socket pins using a soldering iron.
- d. Remove the four screws and speed nuts securing the socket to the mounting plate.
- e. Remove the socket.
- f. Position and secure the socket to the mounting plate with the four screws and speed nuts.
- g. Solder each individual wire into its corresponding socket pin.
- h. Slide the rubber boot over the rear of the socket.

69. Test Procedure. Test the NATO socket as follows:

- a. Using a NATO plug lead, connect the trailer's NATO socket to the towing vehicle's NATO socket.
- b. With the vehicle switches off, all lights on the trailer should be extinguished.
- c. Switch on the left side indicator and check that the left side indicators flash.
- d. Switch on the right side indicator and check that the right side indicators flash.
- e. Apply the foot brake and check that the stop lights illuminate.
- f. Switch on the park lights and check that the tail lights and clearance lights illuminate.
- g. Switch to blackout mode and check that all green blackout lights illuminate.
- h. Apply the foot brake and check that the red blackout stop lights illuminate.

Wiring Diagram

70. A vehicle wiring diagram (Figure 51), provides details of the lighting circuits.

FRAME - GROUP 16

King Pin

71. Replacement. Replace the king pin as follows:

- a. Remove the eight nuts and washers securing the king pin to the retention plate (Figure 43).

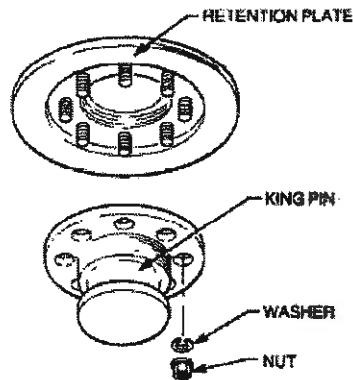


Figure 43 King Pin and Retention Plate

- b. Position the new or replacement king pin on the retention plate bolts.
- c. Install the washers and nuts.
- d. Torque the nuts to 130 N.m (96 lbf.ft).

Apron Plate

- 72. Removal.** Remove the apron plate as follows:

WARNING

This assembly is heavy. Care must be taken to avoid personal injury.

- a. Support the apron plate (Figure 44) on stands.
- b. Remove the fourteen bolts and nuts securing the apron plate to the frame mounting rails.

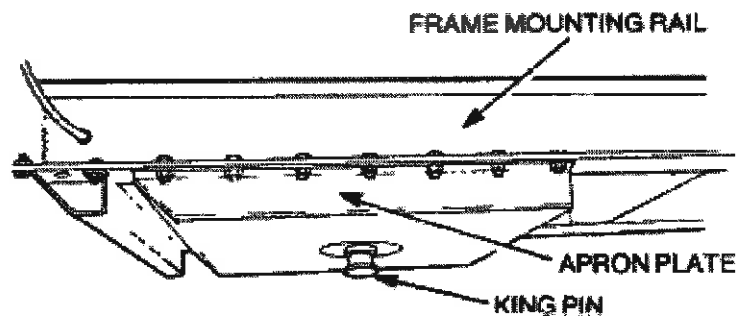


Figure 44 Apron Plate

- c. Using lifting equipment, e.g. a forklift, remove the apron plate from the trailer.
- 73. Installation.** Install the apron plate as follows:
- a. Using lifting equipment, position the apron plate at the frame mounting rails and support it on stands.
 - b. Install the fourteen bolts and nuts.
 - c. Torque them to 243-271 N.m (180-200 lbf.ft).

Support Legs

- 74. Removal.** Remove the support legs as follows:
- a. Support the frame assembly at the front using a stand.
 - b. Raise the support legs until the weight is relieved from the sandshoes.

- c. Remove the bolts, nuts and washers securing the two support leg braces from each brace and the mounting plate on the support leg (Figure 45).

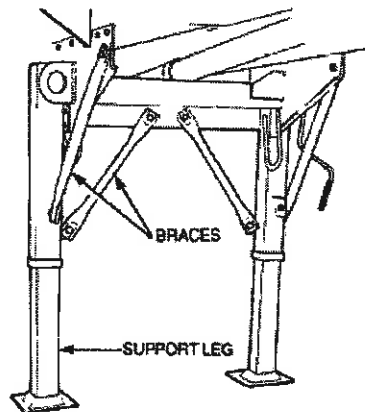


Figure 45 Support Leg and Support Braces

WARNING

This assembly is heavy. Care must be taken to avoid personal injury.

- d. Support the leg, and then remove the ten bolts, nuts and washers securing the leg to the mounting plates (Figure 46).
- e. Remove the support leg from the trailer.

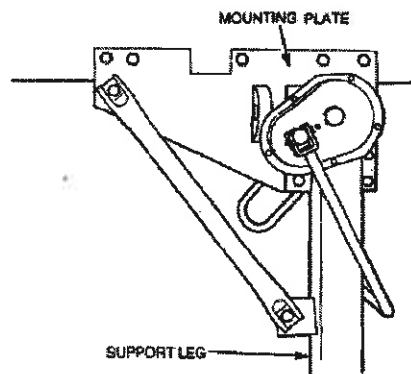


Figure 46 Support Leg Mounting

- 75. Installation.** Install the support legs as follows:

WARNING

This assembly is heavy. Care must be taken to avoid personal injury.

- a. Position the support leg on the trailer mounting plates.
- b. Engage the connecting shaft on the gearbox drive shaft.
- c. Install the ten mounting bolts, washers and nuts.
- d. Position the support braces at the mounting plates on the legs.
- e. Install the bolts, washers and nuts to each brace.
- f. Lower the support legs and raise the trailer.
- g. Remove the stand from under the frame.

Tow Coupling

76. **Removal.** Remove the tow coupling as follows:

WARNING

This assembly is heavy. Care must be taken to avoid personal injury.

- a. Remove the nut cover from the nut and shaft (Figure 47).
- b. Support the tow coupling.
- c. Remove the split pin and the castellated nut.
- d. Remove the washer, inner bearing plate and the rubber block from the rear of the draw beam.

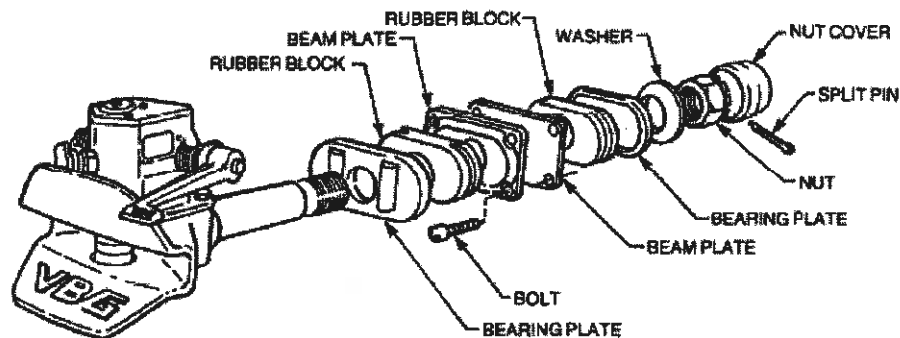


Figure 47 Tow Coupling - Exploded View

- e. Remove the coupling, the outer bearing plate and the rubber block from the draw beam.
- f. Remove the four Allen head bolts securing the outer and inner beam plates to the draw beam.

77. **Installation.** Install the tow coupling as follows:

NOTE

The beam plate with the tapped threads is to be installed inside the draw beam.

- a. Install the inner and outer beam plates (Figure 48) onto the draw beam.
- b. Install the four Allen head bolts.
- c. Torque them to 203-237 N.m (150-175 lbf.ft).

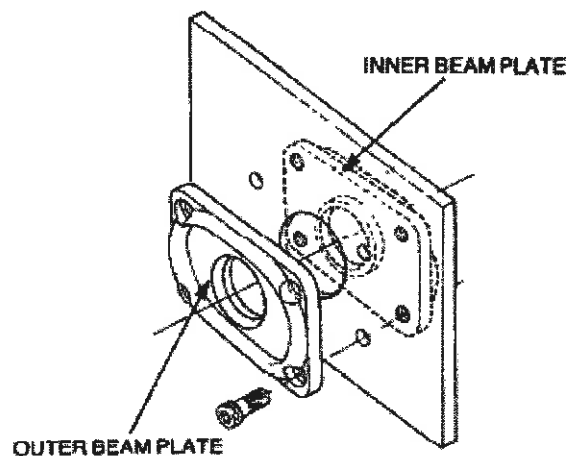


Figure 48 Draw Beam and Beam Plates

WARNING

This assembly is heavy. Care must be taken to avoid personal injury.

- d. Install the outer bearing plate and the rubber block on the coupling shaft.
- e. Install the coupling in the draw beam.
- f. Install the rubber block, the inner bearing plate, the washer and the castellated nut on the shaft.
- g. Tighten the castellated nut until a measurement of 19-21 mm (0.75-0.84 in.) is reached between the edges of the outer bearing plate and the outer beam plate (Figure 49).

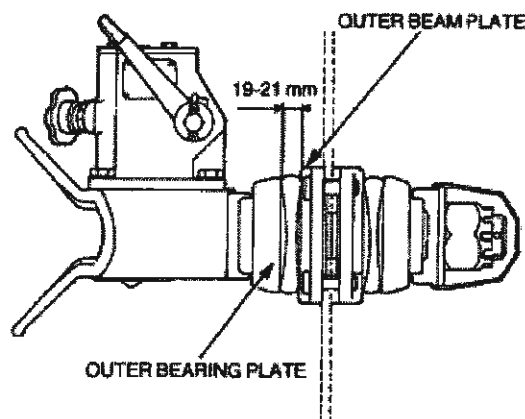


Figure 49 Tow Coupling - Adjustment

- h. Install the split pin through the castellated nut and the coupling shaft.
- i. Partly fill the nut cover with grease and install it over the nut and shaft.

Specifications - Frame

78. Specifications - Frame. The specifications for the frame are contained in Table 10.

Table 10 Specifications - Frame

Serial	Item	Specification	Value
1	King pin mounting nuts	torque	130 N.m (96 lbf.ft)
2	Tow coupling beam plate bolts	torque	203-237 N.m (150-175 lbf.ft)
3	Tow coupling castellated nut	dimension	tightened to attain a measurement of 19-21 mm (0.75-0.84 in) between the outer bearing plate and the outer beam plate
4	King pin apron plate bolts	torque	243-271 N.m (180-200 lbf.ft)

BODY - GROUP 17

Manifold and Flow Control Valves

- 79. Removal.** Remove the manifold and flow control valves as follows:
- a. Completely drain the contents of the water tank.
 - b. Disconnect the hose from the manifold control valve at the end of the manifold.
 - c. Match mark the manifold and the flow control valves to allow for correct alignment during reassembly.
 - d. Support the manifold.
 - e. Slacken all the bolts and nuts securing the manifold and the flow control valves to the compartment inlet/outlet pipes (Figure 50).

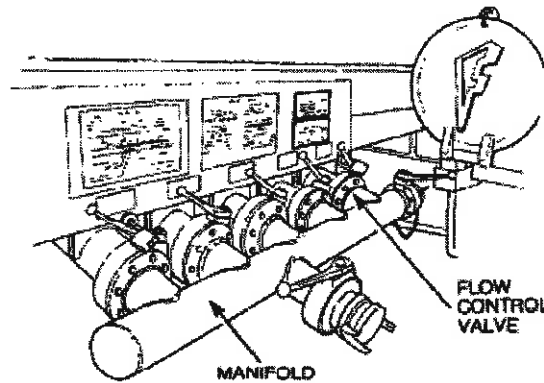


Figure 50 Manifold and Flow Control Valves

- f. Remove each flow control valve in turn, by removing the bolts, nuts and washers securing the valve to both the manifold and the compartment inlet/outlet pipe.
 - g. Remove the manifold from the trailer frame.
- 80. Installation.** Install the manifold and flow control valves as follows:
- a. Remove all trace of gasket residue from the manifold flanges, the flow control valves and the compartment inlet/outlet pipe flanges.
 - b. Install an upper and lower bolt in each end manifold flange.
 - c. Position a flow control valve with a gasket placed on either side onto the bolts.
 - d. Ensure that the match marks are aligned.
 - e. Align the manifold and valve assemblies with the two end compartment pipes.
 - f. Push the bolts through the flange on the pipes.
 - g. Install the washers and nuts.
 - h. Do not tighten the bolts and nuts at this stage.
 - i. Position the remaining valves and gaskets between the manifold and the pipe flanges.
 - j. Secure them with the bolts, washers and nuts.
 - k. Install the remaining bolts, washers and nuts.
 - l. Tighten all the bolts and nuts securely.
 - m. Connect the hose to the manifold control valve at the end of the manifold.
 - n. Partially fill each compartment with water.
 - o. Check for leaks at the control valves and the manifold.
 - p. Rectify any leaks as necessary.

Manifold Control Valve and Cam-lock

- 81. Removal.** Remove the manifold control valve and cam-lock as follows:
- a. Ensure that the compartment flow control valves are closed.
 - b. Disconnect the hose from the manifold control valve at the end of the manifold if this valve is to be removed.
 - c. Remove the eight bolts, nuts and washers securing the cam-lock and the manifold control valve to the manifold flange (Figure 51).

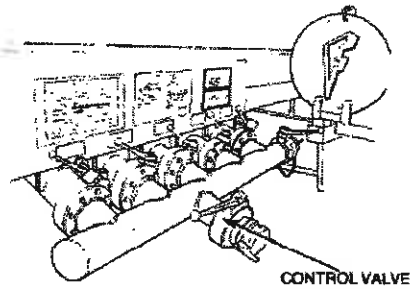


Figure 51 Manifold Control Valve and Cam-lock

- d. Remove the valve and the cam-lock from the manifold.
- 82. **Installation.** Install the manifold control valve and cam-lock as follows:
 - a. Remove all trace of gasket residue from the manifold flange, the valve and the cam-lock flange.
 - b. Position the valve with a gasket on either side at the manifold.
 - c. Align the cam-lock and install the eight bolts, washers and nuts.
 - d. Tighten the bolts and nuts securely.
 - e. Connect the hose to the manifold control valve at the end of the manifold if this valve has been replaced.
 - f. Open the compartment flow control valves and check for any leaks at the manifold valve.
 - g. Rectify any leaks as necessary.

Compartment Inlet/Outlet Pipe

- 83. **Removal.** Remove the compartment inlet/outlet pipe as follows:
 - a. Drain the compartment prior to removal of the inlet/outlet pipe.
 - b. Remove the bolts securing the pipe flange to the relevant compartment inlet/outlet flange (Figure 52).

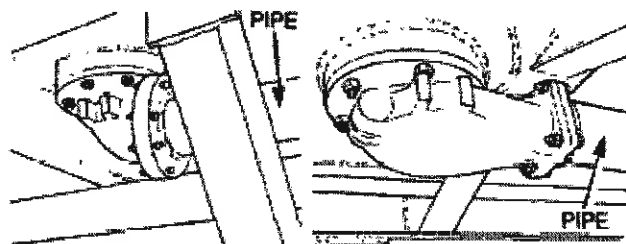


Figure 52 Compartment Pipe and Outlet Flanges

- c. Remove the clamp securing the pipe to the trailer body.
- d. Remove the bolts, nuts and washers securing the pipe flange to the manifold flange (Figure 53).

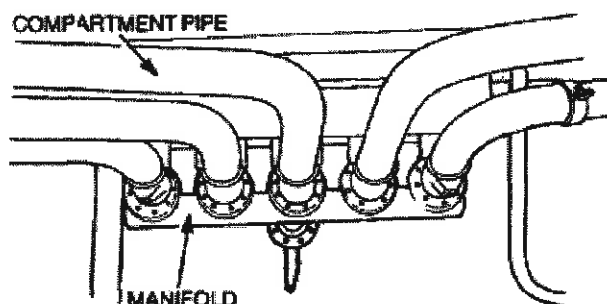


Figure 53 Inlet/Outlet Pipes and Manifold

- e. Support the pipe.
- f. Remove the nuts and washers securing the U-bolt to the manifold mounting bracket.
- g. Remove the pipe and the flow control valve.

84. Installation. Install the compartment inlet/outlet pipe as follows:

- a. Remove all trace of gasket residue from the pipe flanges, the flow control valve, the manifold flange and the compartment inlet/outlet flange.
- b. Install the bolts and nuts.
- c. Do not tighten the bolts and nuts at this stage.
- d. Position the flow control valve, with a gasket on either side, on the manifold.
- e. Install a bolt in the upper bolt hole.
- f. Install the pipe flange on the bolt and secure it with a washer and nut.
- g. Install the remaining bolts, washers and nuts and tighten them securely.
- h. Tighten the bolts and nuts securing the pipe flange to the compartment inlet/ outlet flange.
- i. Position the U-bolt around the pipe.
- j. Secure the U-bolt to the manifold mounting bracket with the washers and nuts.
- k. Install the clamp to secure the pipe to the trailer body.

Priming Pump (Packing Gland)

85. Replacement. Replace the priming pump (packing gland) as follows:

- a. Ensure that the inlet stop cock is in the **off** position.
- b. Remove the nut, washer and handle from the spindle (Figure 54).

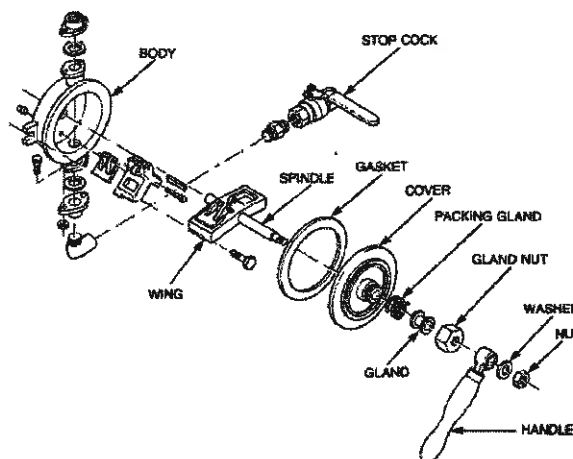


Figure 54 Priming Pump - Exploded View

- c. Remove the gland nut from the cover.
- d. Remove the brass gland and the packing gland.
- e. Discard the packing gland.
- f. Install a new gland, packing gland and a gland nut.
- g. Tighten the gland nut firmly.
- h. Install the handle and secure it in position with the nut and washer.
- i. Open the inlet stop cock and operate the pump.
- j. Check for any water leaks at the gland nut and rectify as necessary.

Manhole Cover

86. Replacement. Replace the manhole cover as follows:

- a. Loosen the four wing nuts securing the manhole cover to the tank (Figure 55).
- b. Remove the bolt, nut and washer securing the manhole cover to the pivot brackets.
- c. Remove the cover.

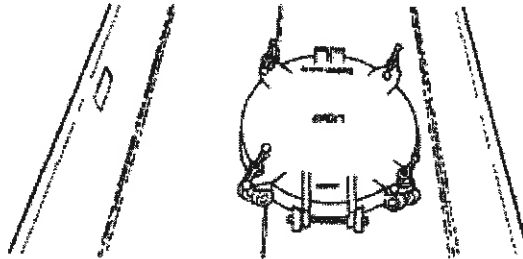


Figure 55 Manhole Cover

- d. Position the new or replacement cover on the pivot brackets.
- e. Secure it with the bolts washer and nut.
- f. Secure the cover to the tank with the four wing nuts.

Ladder and Drain Assembly

87. Removal. Remove the ladder and drain assembly as follows:

- a. Slacken the two hose clamps securing the hoses to the top rail drain tubes (Figure 56).

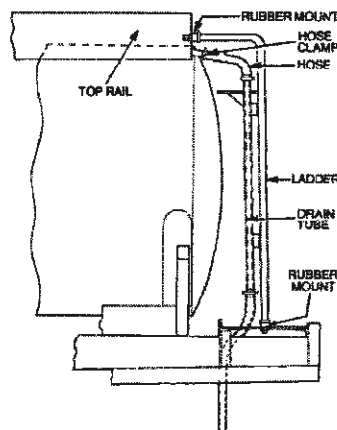


Figure 56 Ladder and Drain Assembly

- b. Remove the two nuts and washers securing the ladder to the top rails.
 - c. Support the ladder and remove the two nuts and washers securing the ladder to the trailer frame.
 - d. Remove the ladder and drain assembly from the trailer mounting studs.
- 88. Installation.** Install the ladder and drain assembly as follows:
- a. Ensure that the rubber mounts are in position on the four mounting studs.
 - b. Position the ladder on the studs.
 - c. Secure the ladder with the four washers and nuts.
 - d. Install the hoses on the top rail drain tubes.
 - e. Tighten the hose clamps securely.

Mudguards

89. **Removal.** Remove the mudguards as follows:
- Support the mudguard.
 - Remove the eight bolts, nuts, washers and the four strengthening plates securing the mudguard to the support brackets.
 - Remove the mudguard from the trailer.
90. **Installation.** Install the mudguards as follows:
- Position the mudguard at the support brackets.
 - Install the eight bolts and washers, the four strengthening plates and the nuts.
 - Tighten the bolts and nuts securely.

Rear Stowage Bin

91. **Removal.** Remove the rear stowage bin as follows:
- Remove the outer nut and washer from the cushion connector at the top of the stowage bin.
 - Remove the three bolts, nuts and washers securing the base of the stowage bin to the angle support brackets mounted on the trailer frame.

WARNING

This assembly is heavy. Care must be taken to avoid personal injury.

- Using lifting equipment remove the stowage bin from the trailer.
92. **Installation.** Install the rear stowage bin as follows:

WARNING

This assembly is heavy. Care must be taken to avoid personal injury.

- Using lifting equipment, position the stowage bin on the angle support bracket and the cushion connector.
- Secure the bin to the angle support brackets with the three bolts, washers and nuts.
- Install the washer and nut to the cushion connector and tighten it securely.

Side Stowage Bin

93. **Removal.** Remove the side stowage bin as follows:
- Support the stowage bin.
 - Remove the two nuts and bolts securing each bin mounting bracket to the tank frame.
 - Remove the two nuts and bolts securing the bin support brace to the tank frame.
 - Remove the bin.
94. **Installation.** Install the side stowage bin as follows:
- Position the bin under the tank.
 - Install the two support brace bolts and nuts finger tight.
 - Install the two bolts and nuts in each bin mounting bracket and tighten them securely.
 - Tighten the support brace bolts and nuts.

ROAD TEST CHECKS

Road Test of Braking System

95. Brakes. Road test the brakes as follows:

- a. Apply the trailer brakes by use of the foot brake or the hand control on the towing vehicle.
- b. Note any erratic action, excessive binding, side pull or noise.
- c. Rectify as necessary.
- d. Disconnect the emergency supply line and check for automatic application of the spring brakes.

96. Parking Brake. Road test the parking brake as follows:

- a. Apply the emergency/parking brake control in the towing vehicle.
- b. Check for the application of the spring brakes.
- c. Apply the parking brake on a gradient of 26% with a 20 tonne payload.
- d. The parking brake must be able to hold the laden vehicle.
- e. Rectify as necessary.

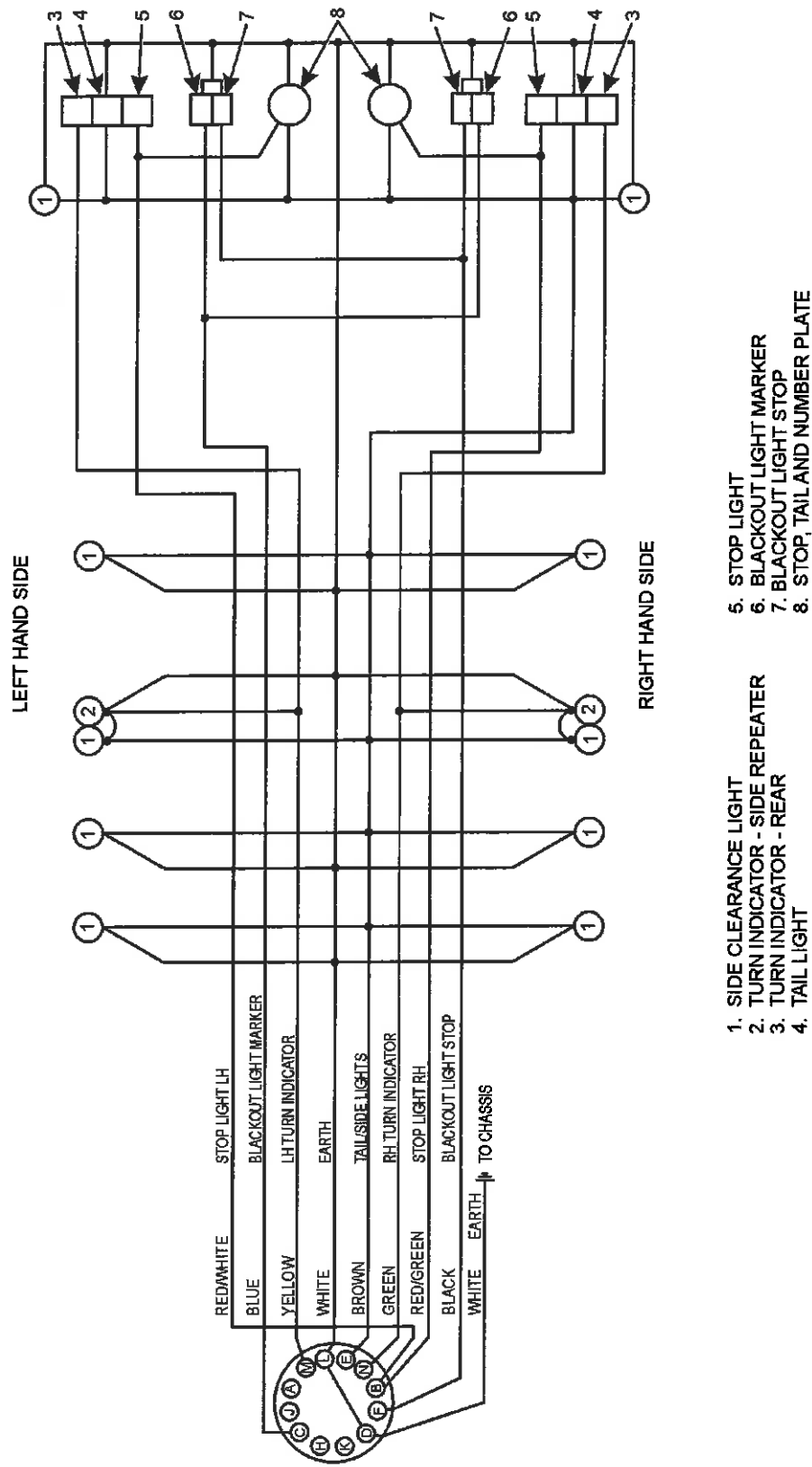


Figure 57 Wiring Diagram

Figure 57

END

Distribution List: VEH H 09.0 - Code 3 (Maint Level)
(Sponsor: LV SPO, Mdm/Hvy B Vehicles)
(Authority: TRAAM)