

**DOLLY CONVERTER, HEAVY, TANK/PLANT TRANSPORTER, MC4
MEDIUM 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 instruction details all the Medium/Heavy Grade Repair procedures for the Dolly Converter, Heavy, Tank/Plant Transporter, MC4.

Associated Publications

2. Reference may be necessary to the latest issue of the following documents:
 - a. [Defence Road Transport Instructions \(DRTI\)](#);
 - b. [Technical Regulation Of ADF Materiel Manual – Land](#) (TRAMM-L);
 - c. TGM 120 – Record Book for Service Equipment – Army;
 - d. [EMEI Vehicle H 980](#) – Dolly Converter, Heavy, Tank/Plant Transporter, MC4. – Data Summary;
 - e. [EMEI Vehicle H 982](#) – Dolly Converter, Heavy, Tank/Plant Transporter, MC4 – Technical Description;
 - f. [EMEI Vehicle H 983](#) – Dolly Converter, Heavy, Tank/Plant Transporter, MC4 – Light Repair
 - g. [EMEI Vehicle H 989](#) – Dolly Converter, Heavy, Tank/Plant Transporter, MC4 – Servicing Instruction;
 - h. [RPS 02217 - Dolly Converter, Heavy, Tank/Plant Transporter, MC4](#)

Authorised Personnel

3. Repairs are to be conducted by technical tradespersons: Army Vehicle Mechanic, RAAF GSE Fitters, or Civil equivalents authorised in accordance with the requirements of the TRAMM-L.

Safety Precautions

WARNING

Personnel working on this equipment are to adhere to all industrial safety standards, work practices and equipment operating and maintenance instructions relating to the equipment.

WARNING

Some assemblies contain powerful springs and injury can result if they are not properly disassembled. Use only proper tools and observe all precautions relevant to the use of the tools.

General Instructions

4. 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.
5. Use only genuine replacement parts and components.
6. Use only those lubricants specified in the Servicing Instruction EMEI VEH H 899 and the User Handbook.
7. Any fastenings of 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.

8. Replace all devices with stripped threads or damaged parts.
9. Table 1 lists the location of the identification markings on the Maintenance Supply Items.

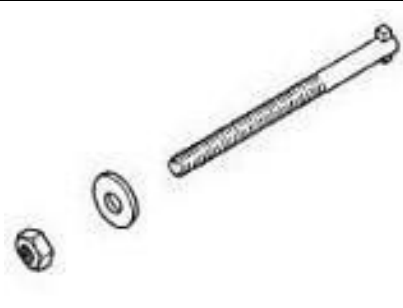
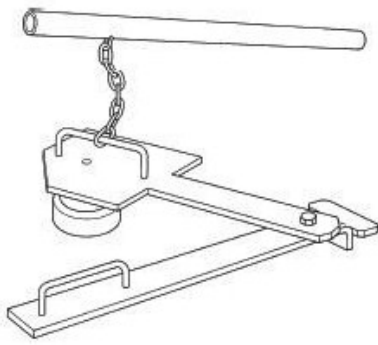
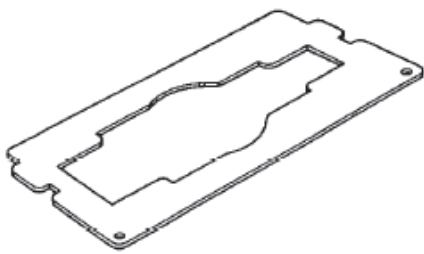
Table 1 Maintenance Supply Item (MSI) Identification Markings

Serial	Item	Location
1	Axle assemblies	Centre of axle beam, opposite brake chamber mountings
2	Fifth wheel	Leading edge of fifth wheel

Special Tools and Gauges

10. The following special tools, as listed and illustrated in Table 2, are required as indicated, to perform the tasks detailed.

Table 2 Special Tools

Serial	Item Name	Part No	Para No.	
1	Spring brake release tool	M9007003	34	
2	Fifth wheel lock tester	TF-TLN-1500	47	
3	King pin gauge	TF-0110		

Repairs

11. Medium Grade Repair includes repair of the following components:
 - a. Axles and Suspension:
 - (1) axles,
 - (2) springs hangers,
 - (3) springs,

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- (4) equaliser assembly, and
- (5) radius rods.
- b. Brakes:
 - (1) brake relay valves,
 - (2) boost relay valve,
 - (3) spring brake control valve,
 - (4) yard release valve,
 - (5) spring brake assembly, and
 - (6) wheel brake assembly.
- c. Frame:
 - (1) fifth wheel, and
 - (2) kompensator.

AXLES AND SUSPENSION

Axle

- 12. Removal.** Remove the axle as follows:

NOTE

Before removing any components of the dolly converter running gear, ensure that the trailer frame is correctly supported, with all weight removed from the suspension components.

- a. Ensure that the weight of each axle is correctly supported.
- b. Remove the wheels from the axle/s to be removed.
- c. Disconnect the two air lines at each spring brake chamber.

NOTE

Label each line to ensure correct connection on replacement.

- d. If the wheel hubs are to be removed, release the spring brakes using the release tools provided (Table 2, Serial 1).

NOTE

The release tools are fitted to the boss on the side of the spring brake chamber adapter housings.

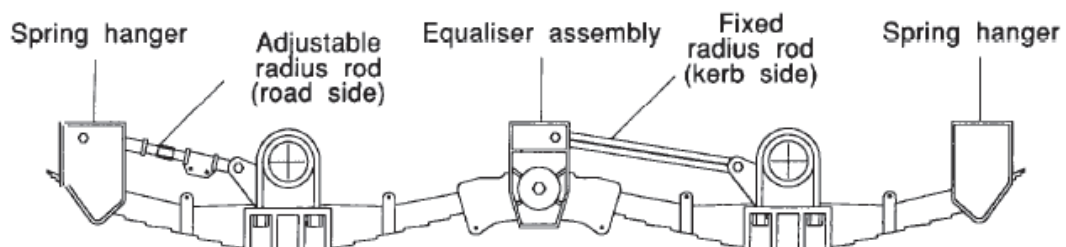


Figure 1 Dolly Converter Suspension Layout

- e. Remove the radius rod bolts, conical bushes and steel sleeve securing the radius rods to the axle; swing the radius rods clear. If insufficient clearance is available, remove the radius rods completely.
- f. Remove the spring retaining bolts from the spring hanger and equaliser.
- g. Remove the U-bolt nuts securing the axle/s to the springs and remove the springs if required.
- h. Using a suitable jack, lower the axle and springs, taking care that the axle does not roll to one side due to weight imbalance.

13. Installation. Install the axle as follows:

- a. Fit the springs to the axle spring seats. Do not tighten the U-bolts at this time.
- b. Raise the axle and springs assembly into position in the spring hanger and equaliser.
- c. Fit the spring retaining bolts into the spring hanger and equaliser.
- d. Fit the radius rods and torque the radius rod bolts to the torque specified in Para 22.
- e. Tighten the U-bolts to the torque specified in Para 22.
- f. Connect the air lines to the spring brake chambers, ensuring that the hoses are connected to the correct ports.
- g. Remove the release tools from the spring brakes and replace them in the stowage bosses located on the side of the spring brake chamber adaptor housings.
- h. Check and adjust the brakes as detailed in EMEI Vehicle H 983, Light Repair.
- i. Check and adjust the axle alignment as detailed in EMEI Vehicle H 983, Light Repair.
- j. Refit the wheels to the hubs.

Springs

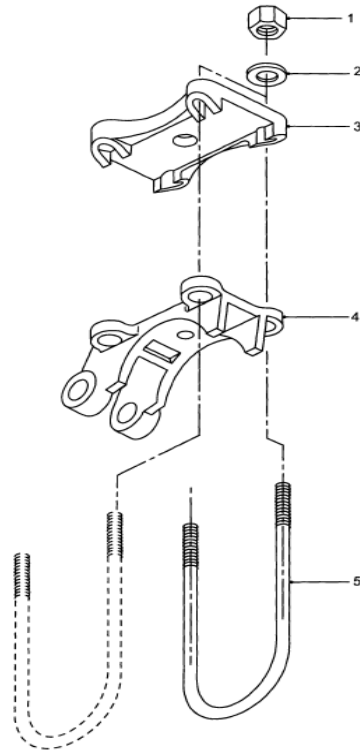
14. Removal. Remove the spring assemblies as follows (Figure 2):

- a. Support the weight of the trailer. Leave the wheels resting on the ground with all weight off the suspension components.

NOTE

There should be approximately 25 mm clearance between the spring and the spring hanger seats.

- b. Remove the hexagon nuts (1) from the U-bolts (5) retaining the spring to the axle.
- c. Remove the U-bolts and spring cap (3).
- d. Remove the hexagon headed spring retaining bolts from the equaliser.
- e. Slide the spring clear of the axle and frame.



- | | | | |
|---|-------------|---|-------------|
| 1 | Hex nut | 4 | Spring seat |
| 2 | Flat washer | 5 | U-bolt |
| 3 | Spring cap | | |

Figure 2 Spring Seats And U-Bolts

- 15. Installation.** Install the spring assemblies as follows (Figure 2).
- Using a suitable jack, lift the spring up to the axle spring seat, ensuring that the spring ends are correctly located in the spring hanger and equaliser.

NOTE

The folded leaf end is to be positioned in the equaliser.

- Fit the hexagon headed retaining bolts to the spring hanger and equaliser.
- Fit the spring U-bolts (5), the spring cap (3), flat washers (2) and hexagon nuts (1). Tighten evenly to the torque specified in Para 22.

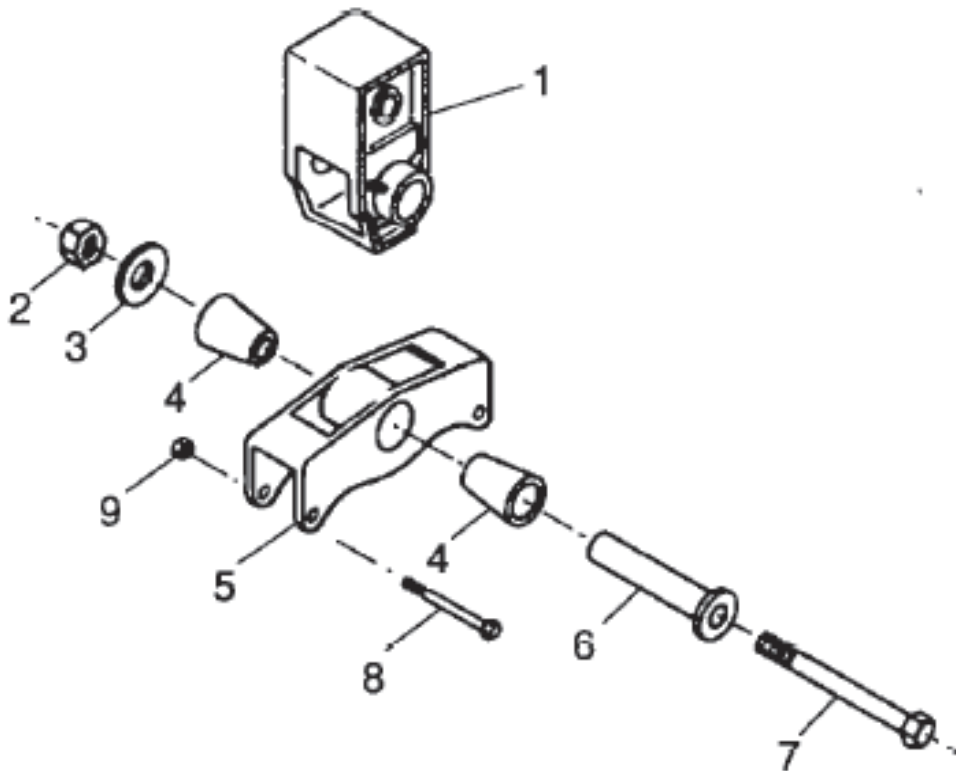
Equaliser Assembly

- 16. Bush Replacement.** Replace the bush as follows (Figure 3):
- Support the weight of the dolly converter frame, leaving the axle assemblies resting on the ground or supported.

NOTE

All weight is to be off the suspension components.

- Remove the Nyloc nut (2), centre bolt (7), flat washer (3) and equaliser shaft (6) from the equaliser beam (5).
- Whilst supporting the equaliser beam, remove the two tapered rubber bushes (4) from the equaliser hanger and beam.



1	Equaliser hanger	4	Tapered bush	7	Bolt
2	Nyloc nut	5	Equaliser beam	8	Retainer bolt
3	Flat washer	6	Steel shaft	9	Hexagon nut

Figure 3 Dolly Converter Suspension Equaliser - Exploded View

- d. Fit replacement bushes to the hanger and equaliser beam.

NOTE

Fit the bolts from inside the trailer frame.

- e. Fit the equaliser shaft, flat washer, centre bolt and Nyloc nut. Tighten to the torque specified in Para 22.

17. Equaliser Removal. Remove the equaliser as follows (Figure 3):

- Support the dolly converter frame on suitable stands.
- Remove the equaliser shaft and bushes as detailed in Para 16.
- Remove the two hexagonal headed retainer bolts (8) from the equaliser beam.

NOTE

To remove the equaliser beam it may be necessary to lower the axles further away from the frame or to remove one spring assembly as detailed in Para 14. This is dependent on the clearance left between the spring and the equaliser seats.

- d. Remove the equaliser beam (5).

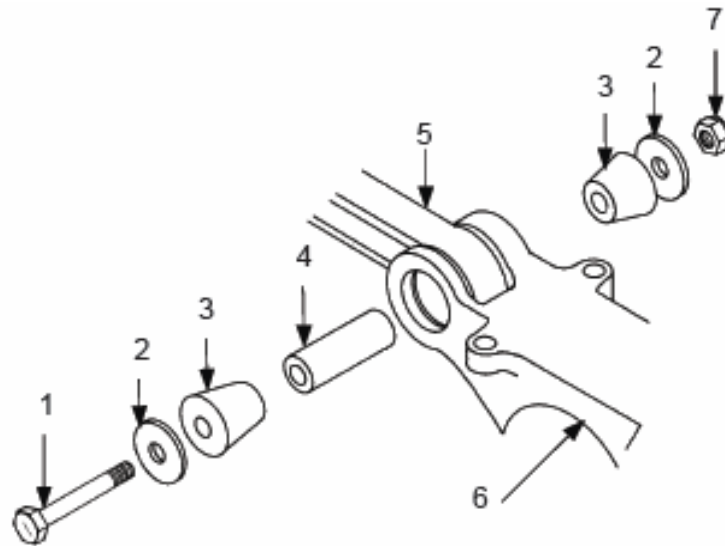
18. Inspection

- Examine the spring equaliser for wear on the spring bearing surfaces and for possible cracks. As this is a suspension item it should not be welded. Replace if found to be faulty.

19. **Equaliser Installation.** Install the equaliser as follows:
- Position the equaliser beam in the hanger ensuring that it is correctly positioned in relation to the spring.
 - Fit the equaliser bushes and shaft assembly as detailed in Para 16.
 - If the springs were removed to allow removal of the equaliser beam, replace the spring as detailed in Para 15.
 - Seat the spring into the equaliser and fit the two retaining bolts.

Radius Rods

20. **Removal.** Remove the radius rods as follows (Figure 4):
- Remove the weight from the suspension by placing safety stands under the dolly converter frame.
 - Remove the two bolts (1) securing the radius rod to the spring seat (6) and the respective spring hanger.



1 Bolt	5 Radius rod
2 Flat washer	6 Spring seat
3 Tapered bush	7 Nyloc nut
4 Steel sleeve	

Figure 4 Radius Rod Mounting Bushes And Pins – Exploded View

- Remove the tapered bushes (3) and the steel sleeve (4) from the radius rod ends.
 - Remove the radius rod (5).
21. **Installation.** Install the radius rods as follows (Figure 4):

NOTE

Fit the bolts from inside the trailer or dolly converter frame.

- Fit the radius rods (5), tapered bushes (3), steel sleeves (4), washers, bolts and nuts. Tighten to the torque specified in Para 22.
- Lower dolly converter frame so that the suspension is taking the weight of the trailer.
- Check and adjust the axle alignment as detailed in EMEI Vehicle H 983, Light Repair.

Specifications

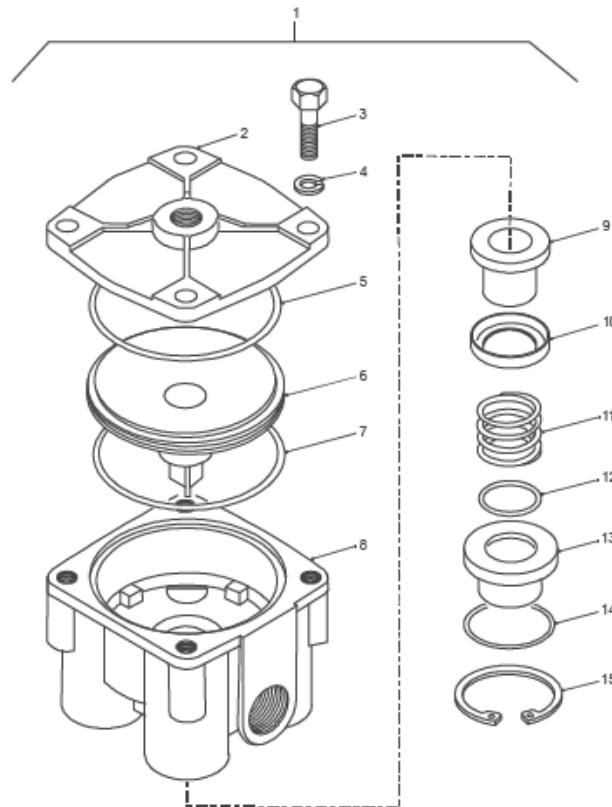
22. The specifications for the suspension system are as follows:

- a. U-bolt torque..... 415 N.m (310 lb. ft)
- b. Radius rod mounting bolt torque 100 N.m (75 lb. ft)
- c. Radius rod clamp bolt torque..... 100 N.m (75 lb. ft)
- d. Equaliser pivot bolt torque..... 100 N.m (75 lb. ft)

BRAKES

Brake Relay Valves

23. **Disassembly.** Disassemble the valve as follows (Figure 5)



1 Brake relay valve	5 O-ring	9 Inlet and exhaust valve poppet	13 Valve poppet guide
2 Top cover	6 Valve piston	10 Valve retainer	14 O-ring
3 Cover bolt	7 O-ring	11 Compression spring	15 Circlip
4 Spring washer	8 Valve body	12 O-ring	

Figure 5 Brake Relay Valve - Exploded View

- a. Remove the brake relay valve or pilot relay valve as detailed in EMEI Vehicle H 983, Light Repair.
- b. Remove the four cover bolts (3) securing the top cover (2) to the body (8).
- c. Mark the cover position in reference to the body.
- d. Remove the top cover and O-ring (5) from the body.
- e. Remove the valve piston (6) and O-ring (7) from the body.

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- f. While depressing the valve poppet guide (13), remove the circlip (15) and slowly relax the compression spring (11) beneath the valve poppet guide.
- g. Remove the valve poppet guide assembly and O-ring (14).
- h. Remove the compression spring from the body.
- i. Remove the inlet/exhaust valve poppet (9) from the body.
- j. Remove the valve retainer (10) from the inlet/exhaust valve poppet.

24. Cleaning and Inspection. Clean and inspect the parts as follows:

- a. Wash all parts in mineral spirits; wipe all rubber parts dry.
- b. Inspect all parts for signs of wear and/or deterioration.
- c. Inspect springs for cracks, distortion or corrosion. Replace defective parts.
- d. Inspect the inlet and exhaust seats for nicks and burrs and replace as necessary.
- e. Replace all rubber parts, and any other parts showing signs of wear or deterioration.

25. Reassembly. Reassemble the valve as follows (Figure 5):

- a. Lightly coat all components with Silicone Pneumatic Grease (XG-315).
- b. Fit the large piston O-ring (7) onto the valve piston (6).
- c. Install the inner and outer O-rings (12 and 14) in the valve poppet guide (13).
- d. Install the O-ring (5) on the cover (2).
- e. Install the valve piston (6) in the body, taking care not to damage the piston O-ring.
- f. Noting the reference marks made during disassembly, install the cover on the valve body.
- g. Secure the cover to the body using the four cover bolts (3) and lock washers (4). Tighten the screws to the torque specified in Para 42.
- h. Install the valve retainer (10) on the inlet/exhaust valve poppet (9) and install the valve poppet in the body.
- i. Install the compression spring (11) in the body.
- j. Install the valve poppet guide in the body; taking care not to damage the O-ring (14).

NOTE

Make certain the circlip is completely seated in its groove in the body before releasing pressure on the spring.

- k. Depress the valve poppet guide (13) and install the circlip (15).
- l. Install and test the brake relay valve or pilot relay valve as detailed in EMEI Vehicle H 983, Light Repair.

Boost Relay Valve

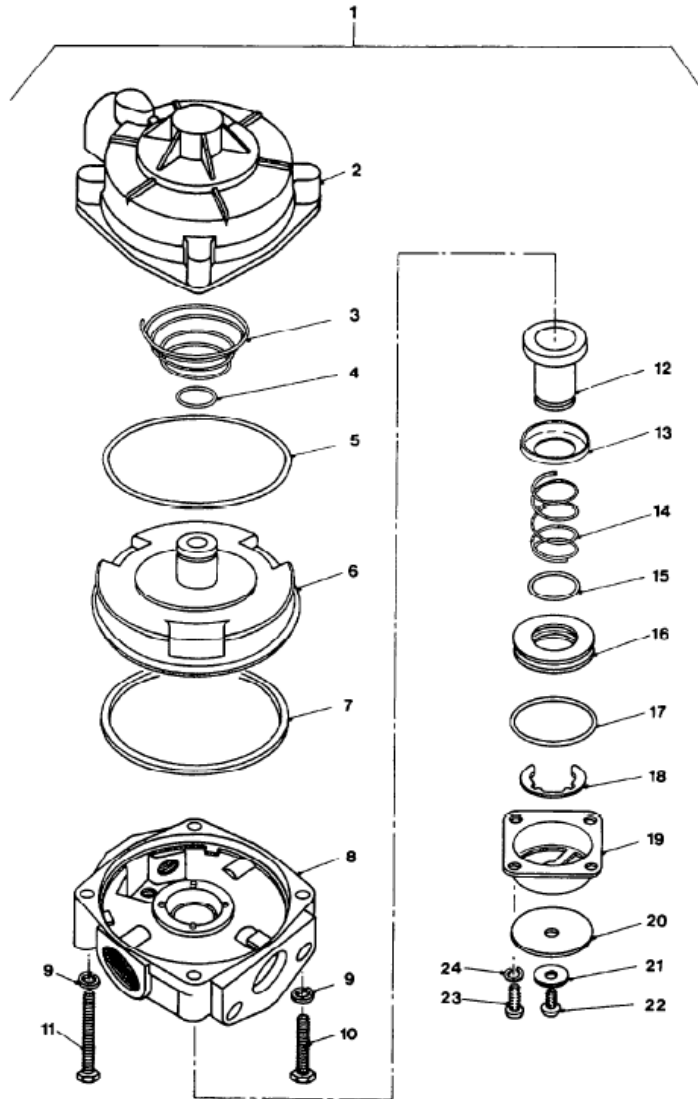
26. Disassembly. Disassemble the valve as follows (Figure 6):

- a. Remove the boost relay valve as detailed in EMEI Vehicle H689, Light Repair.
- b. Mark the relationship of the cover and body to facilitate assembly.
- c. Remove the four hex-head, cap screws (10 and 11) and lock-washers (9) that secure the cover (2) to the body (8) and separate the valve halves.
- d. Remove the sealing ring (7) from the groove in the body.
- e. Remove the relay piston (6) and O-ring (5) from the cover.

- f. Remove the screw (22) that secures the exhaust diaphragm (20) and washer (21) to the exhaust cover (19).
- g. Remove the four screws (23) that secure the exhaust cover to the body.
- h. Remove the inlet/exhaust valve assembly (12 to 18) from the body.

NOTE

If a new inlet/exhaust valve insert is to be installed, omit step i.



1 Boost valve assy.	7 O-ring, square section	13 Retainer	19 Exhaust cover
2 Cover	8 Body	14 Spring	20 Exhaust diaphragm
3 Spring	9 Lock washer	15 O-ring	21 Washer
4 O-ring	10 Hex screw	16 Guide	22 Screw
5 O-ring	11 Hex screw	17 O-ring	23 Screw
6 Piston	12 Inlet/exhaust valve	18 Circlip	24 Lock washer

Figure 6 Boost Relay Valve - Exploded View

- i. Disassemble the insert by removing the circlip and separating the O-rings, the valve guide, valve spring, valve retainer and the inlet/exhaust valve.

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27. Cleaning and Inspection

- a. Wash all metal parts in mineral spirits and dry them thoroughly.

NOTE

When rebuilding the valve, replace all springs and all rubber parts.

- b. Inspect all metal parts for deterioration and wear; as evidenced by scratches, scoring and corrosion.
- c. Inspect the exhaust valve seat on the relay piston for scratches and nicks, which could cause excessive leakage.
- d. Inspect the inlet valve seat in the body for scratches and nicks, which could cause excessive leakage.
- e. Replace all parts considered not fit for use, including all springs and rubber parts.

28. Reassembly. Reassemble the valve as follows (Figure 6):

- a. Lubricate all O-rings, O-ring grooves, piston bores and metal-to-metal moving surfaces with Silicone Pneumatic Grease (XG 315).
- b. Install the O-ring (5) on to the relay piston (6) and install the piston in the cover (2).

NOTE

If a new inlet/exhaust valve insert is used, omit steps c to e.

- c. Place the inlet/exhaust valve (12), rubber side down, on a clean flat surface. Install the valve retainer (13) and the spring (14) on the inlet/exhaust valve.
- d. Install the two O-rings (15 and 17) in their appropriate grooves in the guide (16).
- e. Place the guide over the inlet/exhaust valve; make sure the valve spring is bearing on the retainer (13), compress the assembly and insert the circlip (18) in the groove around the inlet and exhaust valve.
- f. Install the inlet/exhaust valve insert in the body bore.
- g. Place the exhaust cover (19) on the body and secure it using the four Phillips head screws (23). Tighten the screws to the torque specified in Para 42.
- h. Place the exhaust diaphragm (20) on the exhaust cover and secure it using the diaphragm washer (21) and the Phillips head screw (22). Tighten the screw to the torque specified in Para 42.
- i. Install the seal ring (7) in the groove of the valve body (8) and join the two valve halves together.

NOTE

Prior to assembling the cover to the body, note the mark made during disassembly to obtain the proper cover/body relationship.

- j. Secure the body to the cover using the four hex head cap screws (10 and 11). Tighten the screws to the torque specified in Para 42.
- k. Install and test the boost relay valve as detailed in EMEI Vehicle H 983, Light Repair.

Spring Brake Control Valve

29. **Disassembly.** Disassemble the valve as follows (Figure 7):

- a. Remove the spring brake control valve as detailed in EMEI Vehicle H 983, Light Repair.
- b. Remove the four round-headed cover screws (4) which secure the cover (6) to the valve body.

WARNING

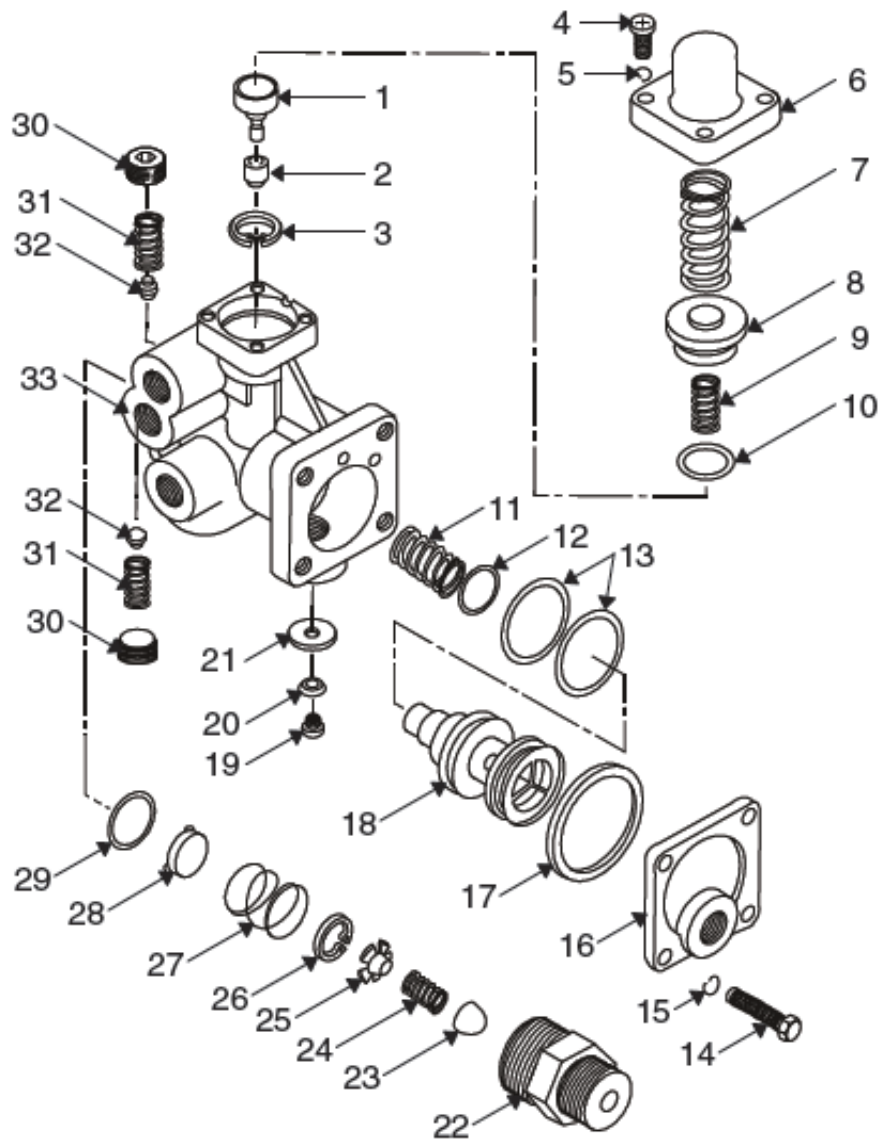
Take care when removing the cover as it is spring loaded.

- c. Remove the spring (7) and pressure protection valve piston assembly (8).
- d. Remove the piston O-ring (10) and the rubber inlet/exhaust valve (2) from the valve stem.

CAUTION

Do not attempt to remove the retaining ring (3) and stem (1) from the piston.

- e. Note and mark the position of the control piston cover on the valve body.
- f. Remove the four hexagon-headed cover screws (14) and spring washers (15), which retain the cover (16) to the body.
- g. Remove the cover, gasket (17), control piston assembly (18) and return spring (11) from the valve body
- h. Remove the three O-rings (12 and 13) from the control piston.
- i. Remove the adapter (22) from the valve body.
- j. Remove the O-ring (29) from the adapter.
- k. Remove the inlet/exhaust valve spring (27) and the valve disc (28).



1	Valve stem	10	O-ring	19	Screw	28	Valve disc
2	Inlet/exhaust valve	11	Spring	20	Washer	29	O-ring
3	Circlip	12	O-ring	21	Exhaust diaphragm	30	Plug
4	Cover screw	13	O-ring	22	Adapter body	31	Spring
5	Spring washer	14	Cover screw	23	Check valve	32	Check valve
6	Cover	15	Spring washer	24	Spring	33	Valve body
7	Spring	16	Control piston cover	25	Retainer		
8	Pressure protection valve piston	17	Gasket	26	Circlip		
9	Spring	18	Control piston	27	Spring		

Figure 7 Spring Brake Control Valve - Exploded View

- l.** Remove the screw (19), washer (20) and diaphragm (21) from the exhaust port.
- m.** Remove the two socket-head pipe plugs (30) which retain the two single check valves (32) in the body.
- n.** Remove the two check valve springs (31), spring guides and rubber check valves (32).

30. Cleaning and Inspection

- a. Wash all metal parts in mineral spirits and dry them. Inspect all parts for excessive wear or deterioration.
- b. Inspect the valve seats for nicks or burrs.
- c. Check the springs for cracks or corrosion.
- d. Replace all rubber parts, and any other parts showing signs of wear or deterioration.

31. Reassembly. Reassemble the valve as follows (Figure 7):

- a. Lubricate all O-rings, O-ring grooves, piston bores and metal-to-metal moving surfaces with Silicone Pneumatic Grease (XG 315).
- b. Assemble the spring (31) to each of the check valves with a twisting motion.
- c. Fit the assemblies into their respective bores in the valve body and install the pipe plugs (30).
- d. Insert the rubber valve disc (28) into the valve body.

NOTE

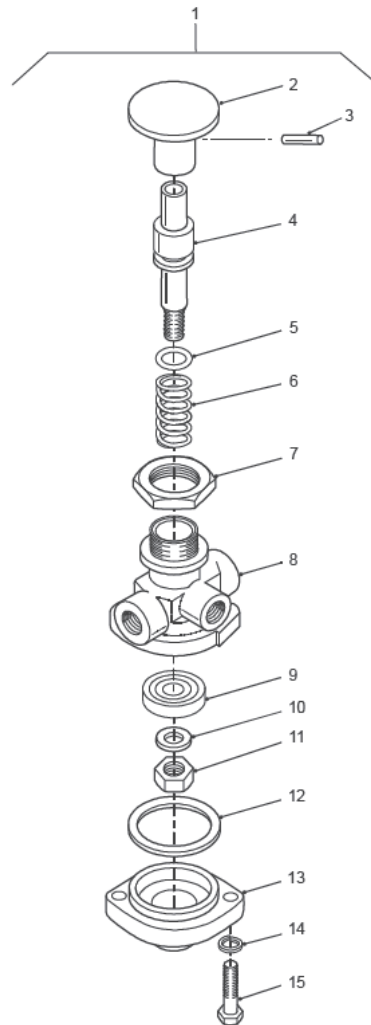
The flat side of the valve, with the four “ears” protruding, rests against the inlet and exhaust valve seat.

- e. Install the inlet/exhaust valve spring (27). Ensure that the spring is aligned and rests evenly on the four “ears” of the valve disc.
- f. Install the O-ring (29) in its proper groove on the reservoir port adapter (22).
- g. Correctly align the inlet/exhaust valve spring in the recess at the end of the reservoir port fitting. Install the fitting and tighten to the torque specified in Para 42.
- h. Install the three O-rings (12, 13) in their respective grooves on the control piston (18).
- i. Position the piston spring (11) into the valve body.
- j. Install the control piston (18) in the valve body.
- k. Refit the control piston cover (16), complete with new gasket (17), in its correct position. Tighten the screws (14) to the torque specified in Para 42.
- l. Install the exhaust diaphragm (21), washer (20) and screw (19) in the control piston exhaust port. Tighten the screw to the torque specified in Para 42.
- m. Install the O-ring (10) in the respective groove of the pressure protection valve piston (8).
- n. Install the piston assembly in the valve body.
- o. Position the spring (7) and cover (6) on top of the pressure protection piston assembly, and secure with the four round-headed cover screws (4). Tighten the screws to the torque specified in Para 42.
- p. Install and test the spring brake control valve as detailed in EMEI Vehicle H 983, Light Repair.

Yard Release Valve

32. Disassembly. Disassemble the valve as follows (Figure 8):

- a. Remove the yard release valve as detailed in EMEI Vehicle H 983, Light Repair.



1 Yard release valve	5 O-ring	9 Inlet/Exhaust valve	13 Lower cover
2 Button	6 Spring	10 Washer	14 Spring washer
3 Roll Pin	7 Panel mounting nut	11 Lock nut	15 Cap screw
4 Plunger	8 Body	12 Sealing ring	

Figure 8 Yard Release Valve - Exploded View

- b. Remove the two cap screws (15) which retain the lower cover (13) and remove the cover.
- c. Remove the sealing ring (12).
- d. Insert a small punch through the roll pin hole in the plunger stem and remove the lock nut (11).
- e. Remove the inlet/exhaust valve (9), plunger (4) and spring (6).
- f. Remove the O-ring (5) from the plunger.

- 33. Reassembly.** Reassemble the valve as follows (Figure 8):
- a. Lubricate all O-rings, O-ring grooves and metal-to-metal moving surfaces with Silicone Pneumatic Grease (XG-315).
 - b. Fit the O-ring (5) to the plunger (4).
 - c. Fit the spring (6), plunger (4) and inlet/exhaust valve (9).
 - d. Insert a small punch through the roll pin hole in the plunger stem; fit the flat washer (10) and lock nut (11).
 - e. Fit the sealing ring (12) and the lower cover (13). Secure with the two cap screws (15) and spring washers (14).
 - f. Install the yard release valve as detailed in EMEI Vehicle H 983, Light Repair.

Spring Brake Chamber

- 34. Caging.** If the spring brake chamber is not caged when received, cage the spring brake chamber as follows:

WARNING

Never attempt to 'cage' any spring brake which shows signs of structural damage or significant corrosion. Handle damaged spring brakes with extreme caution.

- a. Remove the plastic plug from the spring brake chamber housing.

NOTE

Prior to inserting the release tool into the chamber, fit the flat washer and nut to the end of the tool.

- b. Remove the release tool (Table 2, Serial 1) from the chamber body and insert it into the spring brake chamber, passing it through to the centre of the spring brake pressure plate.
- c. Rotate the release tool 90° to engage the lugs into the pressure plate. Pull the tool to ensure that the lugs are properly engaged in the pressure plate.
- d. Tighten the nut onto the release tool and continue turning, withdrawing the release tool from the housing.

NOTE

This compresses the spring brake compression spring and releases the brake.

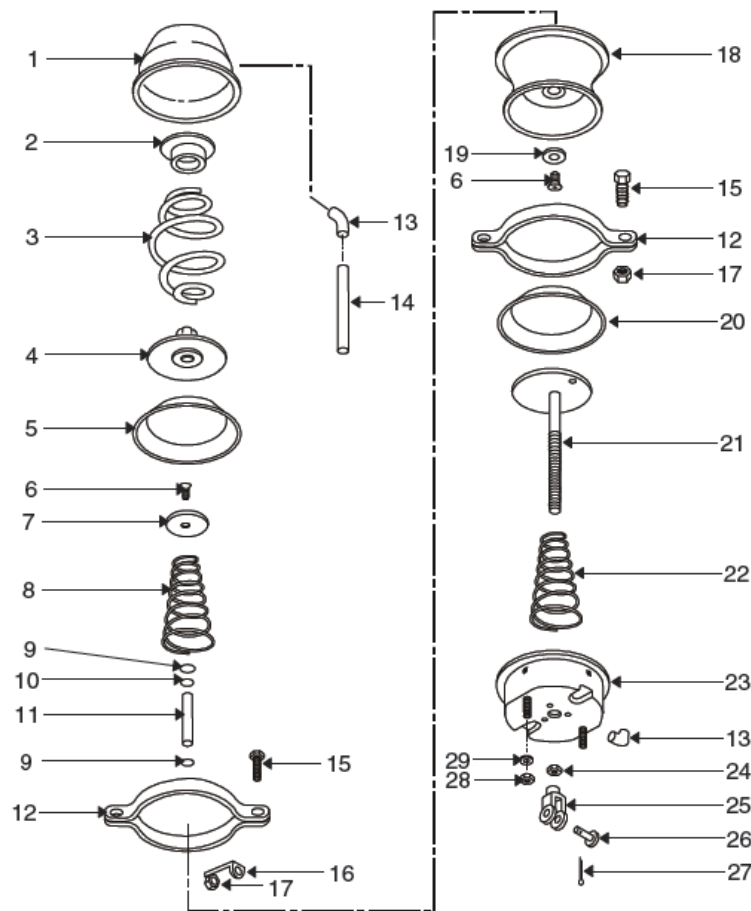
- 35. Disassembly.** Disassemble the valve as follows (Figure 9):

WARNING

Before disassembling the spring brake chamber, ensure that the spring brake compression spring is fully caged.

Extremely high spring pressures exist within the spring brake chamber. Do not attempt complete disassembly unless adequate facilities are available for the removal of the compression spring.

- a. Remove the spring brake chamber as detailed in EMEI Vehicle H 983, Light Repair.
- b. Mark the correct alignment of the housings and clamp assemblies to ensure correct alignment on reassembly.
- c. Remove the clevis (25) and the hexagon nut (24) from the pushrod (21).



1 Spring brake housing	9 Pushrod guide	17 Clamp screw nuts	25 Clevis
2 Spring seat	10 Seal	18 Adaptor housing	26 Clevis pin
3 Compression spring	11 Adaptor pushrod	19 Washer	27 Split pin
4 Pressure plate	12 Clamp	20 Service brake diaphragm	28 Hexagon nut
5 Spring brake diaphragm	13 Vent tube elbow	21 Pushrod	29 Spring washer
6 Screw	14 Vent tube	22 Service brake return spring	
7 Retaining plate	15 Clamp screws	23 Service brake housing	
8 Return spring	16 Red tag	24 Hexagon nut	

Figure 9 Spring Brake Chamber - Exploded View

- d. Remove the vent tube (14) and rubber elbows (13).
- e. Remove the clamp (12) securing the service brake housing (23) to the adaptor housing assembly (18).
- f. Remove the service brake housing, service brake return spring (22), pushrod assembly (21) and the service brake diaphragm (20) from the adaptor housing assembly.
- g. Remove the clamp securing the spring brake housing (1) to the adapter (18).
- h. Lift the adapter housing from the spring brake housing and remove the spring brake diaphragm (5).
- i. Place the spring brake housing and spring assembly into a suitable press.

NOTE

Approximately 380 mm of ram travel is required to fully release the spring pressure.

- j. Ensure that adequate access is available to undo the release tool assembly.
- k. Take the spring pressure with the press and remove the nut from the release tool.
- l. Slowly release the press allowing the spring to extend to full extension.
- m. Remove the compression spring (3) and housing (1) from the press.
- n. Place the adapter housing (18) in the press with the compression spring (8) on the upper side.



Do not apply excessive pressure as damage to the adapter housing may result.

- o. Apply sufficient pressure to clamp the upper plate against the adapter housing.
- p. Remove the lower of the two Nyloc screws (6) and the retaining plate (7) from the adapter pushrod (11).
- q. Slowly release the press and allow the compression spring to extend to its full length.
- r. Remove the adapter pushrod and compression spring.
- s. Remove the two nylon bushes (9) and the neoprene seal (10) from the adapter housing.

36. Cleaning and Inspection

37. Thoroughly wash all metal components in a suitable solvent and blow dry with compressed air.

38. Inspect the clevis assembly for any wear or damage and discard if necessary.

- a. Inspect the push rod assembly for bends or excessive wear; straighten or replace as necessary.
- b. Inspect the pressed metal housing for evidence of cracks or metal fatigue around the mounting studs and the clamping flange. Replace if any cracks or metal fatigue are found.
- c. Inspect the adapter housing for cracks or other signs of wear, particularly around the clamping flanges and the centre pushrod boss. Replace if wear or cracking is evident.
- d. Inspect the spring brake housing for wear or cracks, particularly around the clamping flange and the rear face. Replace if any wear, cracking or other damage is evident.
- e. Inspect all springs for serviceability. Replace if necessary.
- f. Inspect the adapter pushrod for wear or other damage to the sealing surface. Replace if any exists.
- g. Inspect the spring brake pressure plate for wear or damage, particularly around the centre boss area where the release stud assembly engages. Replace if any signs of wear or other damage exists.
- h. Inspect the clamps, screws and nuts for wear or damage; replace if any exists.
- i. Inspect the diaphragms for any signs of perishing or other damage. Inspect the outer edges for build up of rust and scale; remove if the diaphragm is otherwise serviceable, and replace if any flaws are found.

NOTE

It is good practice to replace the diaphragms during overhaul if possible. Refit an old diaphragm only if totally satisfied that it is fit for use.

- 39. Reassembly.** Reassemble the valve as follows (Figure 9):
- a. Apply a light film of Silicone Pneumatic Grease (XG-315) to the adapter pushrod, seal, nylon bushes and the edges of the diaphragms.
 - b. Fit the neoprene seal (10) and the two nylon bushes (9) to the adapter housing (18).
 - c. Mount the adapter housing onto the press bed with the spring brake side up.
 - d. Place the compression spring (8) in position in the adapter housing followed by the adapter pushrod (11).



Do not apply excessive pressure as damage to the adapter housing may result.

- e. Using the press, slowly compress the spring, ensuring that the adapter pushrod is correctly aligned with the centre boss of the adapter housing. Press until the plate is clamped between the press and the adapter housing.
- f. Fit the retaining plate (7) and the Nyloc screw (6) to the adapter pushrod and slowly release the press.

NOTE

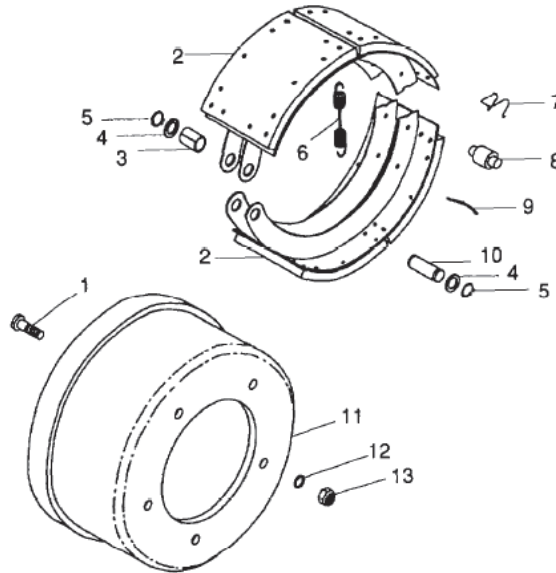
The screws fitted to the adapter pushrod are supplied with a Loctite coating. If refitting used screws, coat them with Loctite 272.

- g. Place the spring brake housing (1), compression spring (3), pressure plate (4) and release tool onto the press bed.
- h. Slowly compress the compression spring, ensuring that the release tool is aligned with the aperture in the adapter housing. When the spring is fully compressed, fit the nut to the release tool.
- i. Remove the spring brake housing assembly from the press and fit the spring brake diaphragm (5) to the housing.
- j. Fit the adapter housing (18) to the spring brake housing.
- k. Fit the clamp assembly (12) to the two housings, ensuring that it is correctly aligned. Tighten the two clamp screws evenly.
- l. Fit the service brake diaphragm (20) to the adapter housing.
- m. Place the pushrod assembly (21) in position on the diaphragm and slide the service brake return spring (22) in position on the pushrod.
- n. Slide the pressed metal housing (23) over the pushrod and align it with the other housings.
- o. Fit the remaining clamp in position, ensuring that it is correctly aligned. Tighten the clamp bolts evenly.
- p. Fit the clevis assembly (25) and locknut (24) to the pushrod.
- q. Fit the vent tube (14) and rubber elbows (13).
- r. Install the spring brake chamber and adjust the brakes as detailed in EMEI Vehicle H 983, Light Repair.

Wheel Brake Assembly

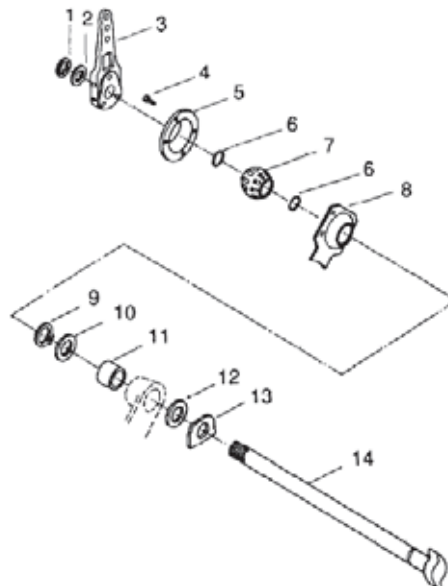
40. Disassembly. Disassemble the wheel brake assembly as follows (Figure 10):

- a. Remove the spring brake chamber, the wheel hub and brake drum assembly, and the brake shoes as detailed in EMEI Vehicle H 893, Light Repair.



- | | | | | |
|-------------------|-----------------|-------------------|------------------|----------------|
| 1 Bolt | 4 Flat washer | 7 Spring clip | 10 Anchor pin | 13 Hexagon nut |
| 2 Brake shoes | 5 Circlip | 8 Roller | 11 Brake drum | |
| 3 Anchor pin bush | 6 Return spring | 9 Spring retainer | 12 Spring washer | |

Figure 10 Wheel Brake Assembly - Exploded View



- | | | | |
|------------------|--------------------|----------------|----------------|
| 1 Circlip | 5 Steel housing | 9 Circlip | 13 Steel plate |
| 2 Flat washer | 6 O-ring | 10 Grease seal | 14 Camshaft |
| 3 Slack adjuster | 7 Nylon bushing | 11 Bushing | |
| 4 Hex head screw | 8 Camshaft bracket | 12 Grease seal | |

Figure 11 Brake Camshaft and Mounting - Exploded View

- b. Remove the cam rollers (8) and retaining clips (9) from the brake shoes.
- c. Remove the slack adjuster retaining circlip (Figure 11, 1) from the inner end of the camshaft (Figure 11, 14). Slide the slack adjuster (Figure 11, 3) from the camshaft splines.
- d. Remove the circlip (Figure 11, 9) securing the camshaft to the brake mounting plate (Figure 11, 13).
- e. Slide the camshaft from its mountings, whilst sliding the circlip and grease seal (Figure 11, 10) from the camshaft.
- f. Remove that four hexagon headed screws (Figure 11, 4) securing the camshaft nylon bushing (Figure 11, 7). Remove the bushing and housing (Figure 11, 5).
- g. Remove the camshaft seal (Figure 11, 12) from the brake mounting plate.

41. Reassembly. Reassemble the wheel brake assembly as follows:

- a. Fit a new camshaft bushing (Figure 11, 11) to the brake mounting plate if required.
- b. Fit the camshaft seal (Figure 11, 12) to the brake mounting plate.

NOTE

Ensure that the seals are correctly fitted and facing in the correct direction. The lip of the outer seal faces into the brake mounting plate to prevent grease entering the brake assembly. The lip of the inner seal faces towards the centre line of the trailer. This allows excess grease to escape and prevents dirt and moisture from entering.

- c. Install the nylon bush (Figure 11, 7) and housing (Figure 11, 5) to the camshaft bracket (Figure 11, 8). Insert, but do not tighten, the four hexagon headed screws (Figure 11, 4).
- d. Fit the circlip (Figure 11, 9) and grease seal (Figure 11, 10) to the camshaft before fitting it through the nylon bushing.
- e. Fit the camshaft (Figure 11, 14) into the two bushings.
- f. Tighten the four nylon bush mounting screws. Check for free rotation of the camshaft.
- g. Fit the slack adjuster (Figure 11, 3) to the camshaft. Ensure that the adjusting screw is facing away from the spring brake mounting plate. Fit the flat washer (Figure 11, 2) and retaining circlip (Figure 11, 1). Rotate the camshaft to the fully released position.
- h. Fit the cam rollers (Figure 10, 8) and retaining clips (Figure 10, 9) to the brake shoes.
- i. Install the brake shoes, the wheel hub and brake drum assembly, and the spring brake chamber, as detailed in EMEI Vehicle H 603, Light Repair.

Specifications

42. The specifications for the brake system are as follows:

- a. Boost relay valve exhaust cover screw torque 20-30 lb. in
- b. Boost relay valve exhaust diaphragm screw torque 5-10 lb. in
- c. Boost relay valve cover screw torque setting 80-120 lb. in
- d. Brake chamber clamp torque 35 N.m (25 lb. ft)
- e. Exhaust diaphragm screw torque 2 N.m (15-20 lb. in)
- f. Maximum brake chamber pushrod travel 51 mm
- g. Pressure protection piston cover screw torque 2-3 N.m (20-30 lb. in)
- h. Relay valve upper cover screws torque 9-14 N.m (80-120 lb. in)
- i. Spring brake control valve to reservoir adapter screw torque 23-34 N.m (200-300 lb. in)

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- j. Spring brake control valve control cover screws 5-7 N.m (40-60 lb.in)
- k. Maximum operating air pressure900 kPa

FRAME

Fifth Wheel

43. **Removal.** Clean and the remove the fifth wheel from the kompensator (Figure 12) as follows:
- a. Remove the two retaining bolts from the fifth wheel frame.
 - b. Slide the two pivot pins from the fifth wheel.
 - c. Lift the fifth wheel clear of the kompensator.

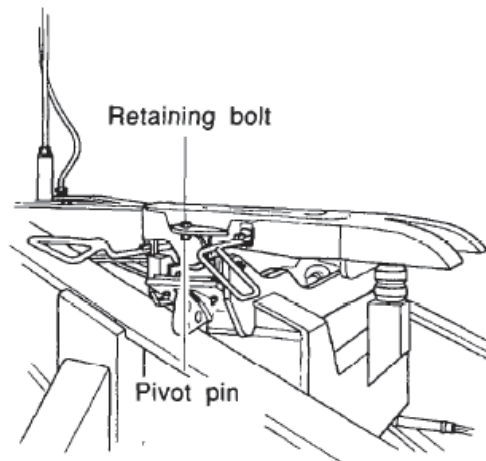
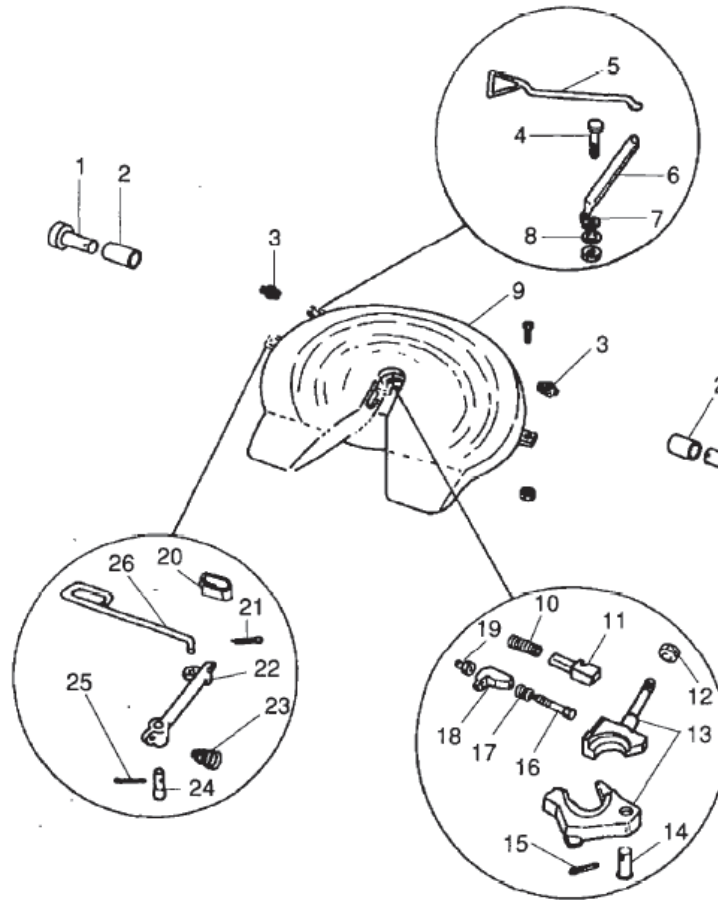


Figure 12 Fifth Wheel and Kompensator

44. **Disassembly.** Disassemble the fifth wheel as follows (Figure 13):
- a. Invert the fifth wheel with the locks in the open position.
 - b. Remove the cotter pin (21) and release handle (26).
 - c. Remove the cotter pin (25), lock pin (24) secondary lock arm (22) and spring (23).
 - d. Remove the cotter pin (15), lock pin (14) and U-spring (20).
 - e. Use a helper wedge to hold back the locking plunger (11).
 - f. Remove the hex lock nut (7) and screw out the bolt (4).
 - g. Remove the two washers (8), the release lever (6) and the release handle (5).
 - h. Remove the helper wedge, locking plunger and spring (10).
 - i. Remove the jam nut (12) and the lock set (13).
 - j. Remove the socket head cap screw (16), locknut (19), adjusting wedge (18) and spring (17).
45. **Cleaning and Inspection.** Thoroughly clean all components using a suitable solvent; dry all components.
46. Inspect the components as follows:
- a. Inspect the top plate for cracks. If any are found, discard the top plate.
 - b. Inspect the lock pivot pin holes for elongation. If any is evident, discard the top plate.
 - c. Inspect the mounting brackets for cracks and wear before mounting the fifth wheel.
 - d. Inspect all rubber bushings for wear and replace if necessary.

- e. Replace all cotter pins, springs, nuts, bolts and washers with new items.

47. **Reassembly.** Reassemble the fifth wheel as follows (Figure 133):



1	Pivot pin	8	Flat washer	15	¼ in x 2½ in cotter pin	22	Secondary lock arm
2	Bushing	9	Fifth wheel plate	16	Socket head capscrew	23	Spring
3	Grease nipple	10	Compression spring (red)	17	Compression spring	24	Lock pin
4	Bolt	11	Plunger	18	Adjusting wedge	25	¼ in x 2 in cotter pin
5	Release handle	12	Jam nut	19	⅝ in – 11 lock nut	26	Release handle
6	Release lever	13	Lock set for 3½ in kingpin	20	U-spring		
7	Hex lock nut	14	Lock pin	21	⅜ in x 1 in cotter pin		

Figure 13 Fifth Wheel Assembly - Exploded View

- a. Lubricate all moving parts.
- b. Install the adjusting wedge (18), spring (17) and the socket head capscrew (16). Tighten the capscrew until one thread shows out of the locknut (19).

NOTE

Final adjustment is made after the fifth wheel has been assembled.

- c. Install the compression spring (red) (10) and the locking plunger (11).
- d. Use the helper wedge to hold the locking plunger back during the installation of the release lever (6).
- e. Install the release lever in the casting and the release handle (5) onto the release lever.

- f. Install a washer (8) between the release lever and the casting. Install the release lever into the slot in the plunger.
- g. Install the other washer (8) on the bolt (4).
- h. Insert the bolt through the release lever and screw it into the casting (9).



Do not over tighten, as the release handle must move freely.

- i. Install the hex lock nut (7) onto the bolt (4) and tighten the nut.
- j. Install the lock set (13) and the jam nut (12). Tighten the jam nut.
- k. Install the U-spring (20).
- l. Lubricate the hole for the lock pin (14) with Never-Seez.
- m. Install the lock pin and the cotter pin (15). Splay the ends of the cotter pin.
- n. Install the release handle (26) into the casting (9) and lubricate the hole in the secondary lock arm (22) for the release handle with Never-Seez.
- o. Fit the secondary lock arm to the release handle; insert the cotter pin (21) and splay the ends.
- p. Install the lock pin (24) and the cotter pin (25); splay the ends of the cotter pin.
- q. Lock the fifth wheel and install the spring (23).
- r. Check the fifth wheel for correct locking operation. Make final adjustments using the lock tester (Table 2, Serial 2) or a new kingpin with the fifth wheel in the locked position.

NOTE

The locking plunger (11) must move freely behind the lock set (13) when in the locked position.

A rectangular warning box with a thick black border and the word "WARNING" in bold, uppercase letters in the center.

WARNING

Over adjustment can cause a potential partial lock.

- s. Tighten or loosen the capscrew (16) for correct lock clearance on the kingpin. Check both the locking and unlocking motions.

48. Installation. Install the fifth wheel as follows (Figure 13):

- a. Apply grease to the pivot pins.
- b. Place the fifth wheel on the Kompensator.
- c. Insert the pivot pins (1) and cotter pins; splay the ends of the cotter pins

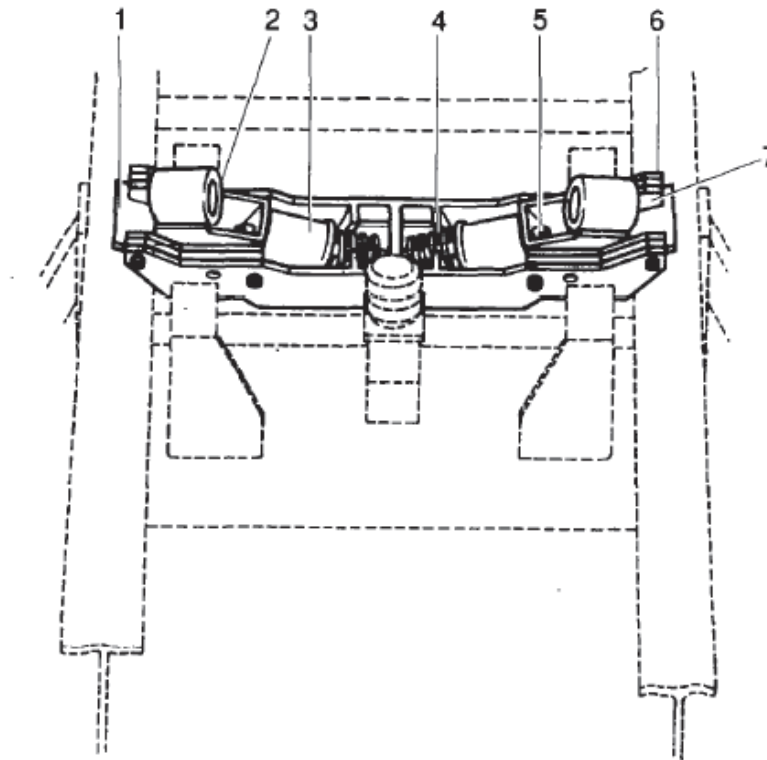
Kompensator

49. The kompensator is permanently fixed to the dolly converter frame and must be disassembled and assembled in place.

50. Disassembly. Disassemble the kompensator as follows (Figure 14):

- a. Thoroughly clean the kompensator to remove grease and dirt.
- b. Remove the fifth wheel assembly as described in Para 43.
- c. Remove the two shoe assemblies (1).
- d. Remove the twelve shim and bearing adjusting plate retaining bolts.

- e. Remove the spring cushion bushes (3), springs (4) and the tie rod (5).



- | | |
|-------------------------|----------------------------|
| 1 Shoe assembly | 5 Tie rod |
| 2 Shoe cushion | 6 Shim |
| 3 Spring cushion bushes | 7 Bearing adjustment plate |
| 4 Spring | |

Figure 14 Fifth Wheel Kompensator

51. **Cleaning and Inspection.** Thoroughly clean all components.

CAUTION

Do not use solvents as this may damage the rubber components.

52. Inspect the components as follows:
- Inspect the shoe cushions for distortion and splitting; replace if faulty.
 - Inspect the shoes for cracks and distortion and measure the thickness of the curved base of the shoe. Replace the shoe if the base thickness measures less than 7.5 mm (0.3 in).
 - Inspect the springs for cracks, distortion and breakage.
 - Inspect the spring cushions bushes for distortion and splitting.
 - Inspect the tie rod for distortion and cracks.
 - Inspect the Kompensator base for cracks or distortion.
 - Inspect the shims, bearing adjusting plates, bolts and grease nipples for serviceability; replace if faulty.

53. Reassembly. Reassemble the kompensator as follows (Figure 14):

- a. Lubricate all moving parts.

NOTE

The grease nipple on each shoe fills a reservoir of approximately 1 kg of grease. Ensure that this reservoir is full when greasing.

- b. Fit the tie rod (5) springs (4) and spring cushion bushes (3) to the kompensator base.
- c. Fit the bearing adjusting plates and original size shims.
- d. Fit the shoe assemblies (1) and check for movement fore and aft. Add shims if the movement exceeds 1.5 mm (0.060 in)

NOTE

Do not over shim. Check for full lateral movement of the shimming.

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END

Distribution List: **VEH H 08.0 – Code 3** (Maint Level)
(Sponsor: LV SPO, Mdm/Hvy B Vehicle Section)