

Limora Zentrallager

Industriepark Nord 21
 D - 53567 Buchholz
 Tel: +49 (0) 26 83 - 97 99 0
 E-Mail: Limora@Limora.com
 Internet: www.Limora.com

Filialen:

- Aachen • Berlin • Bielefeld
- Düsseldorf • Hamburg
- Köln • Stuttgart

General overhaul instructions for Remote Vacuum Servo Units Types 6 & 7 (for single line braking systems)

Important: In the interest of safety of the vehicle and satisfactory performance of the replacement parts, carefully read and follow all instructions given in conjunction with the appropriate vehicle manufacturer's workshop manual.

Before the servo is removed from the vehicle, clean the unit thoroughly particularly at pipe connections, using ethyl alcohol (commercial methylated spirit) as a solvent. Note: Do not use petroleum based products for cleaning brake and clutch system components. To prevent loss of brake fluid and entry of dirt, plug the hydraulic pipes after disconnecting them from the servo slave cylinder.

Dismantling

1. Working in a clean environment, grip the servo unit firmly in a soft jawed or well padded bench vice by the slave cylinder body (1), with the air control valve uppermost. Remove rubber pipe (2) from the elbow on the end cover. Extract the five self-tapping screws (3) to separate the plastic air valve cover assembly (4) from the valve housing. Remove the rubber diaphragm (5) and plastic support (6) to expose the three countersunk screws securing the valve housing to the mounting flange on the slave cylinder. Except to gain access to the filter element by removal of the snap fitting domed cap, the air control valve should not be further dismantled (Fig.1).

Note: Suspect functioning of the air control valve must be remedied by fitting a complete new sub-assembly comprising of cover, filter and air valve. These parts are contained in a separate air control valve repair kit (part number 5591). Also included in this repair kit is a new rubber air valve diaphragm.

2. Extract countersunk screws (7) and lift off the housing (8) followed by the gasket (9). With a finger, seal off one of the slave cylinder fluid ports and using a foot pump apply low air pressure to the remaining port to expel the air control valve reaction piston (10a /10b) from its cylinder bore. Note: Depending upon the piston bore size, on visual inspection the reaction piston may be fitted with a single rubber cup seal (12), alternatively two ,O' ring seals (11), or on later assemblies only one ,O' ring seal (Fig.2).

IMPORTANT: The relevant major servo repair kit contains the necessary parts to service the reaction piston. Repair kits for servo slave cylinders having a 5/16" piston bore include a new reaction piston and two ,O' ring seals. If repairing a servo slave cylinder using the original rubber cup seal design, discard the old reaction piston and cup seal and fit the new reaction piston and ,O' ring seals. Where the slave cylinder has a reaction piston fitted with one ,O' ring seal, then replace accordingly, fitting the ,O' ring seal into the first groove at the spigot end of the reaction piston (10a). For slave cylinders with a 3/8" piston bore size, retain the existing reaction piston (10b) and replace the rubber cup seal with a new cup seal supplied in the repair kit.

3. Using thumb pressure prise out the vacuum non-return valve (13) from the servo shell (15). Extract the rubber valve mounting (14). Having noted the relative position of the clamping ring bolt (17), it must be refitted in the same position, remove the hex nut (17a), washers (17b) and bolt. Ease the clamping ring (16) off the servo shell, but guard against the sudden release of the end cover (18) caused by the action of the main return spring (Fig.3).
4. As the end cover (18) separates from the servo shell, gradually relax pressure to allow the main return spring to fully extend taking with it the rubber diaphragm assembly and attached servo push rod. Free the edge of the rubber diaphragm (19) from the servo shell rim. Using fingers only, ease the centre of the diaphragm out of the groove in the plastic diaphragm support (20), (Fig.4).
5. Turn diaphragm support so that the slot for the servo push rod retaining key (21) faces downwards. Light fluctuating pressure on the support into the servo shell will release the key and permit the support to lift clear of the push rod under the influence of the main return spring (22). Extract the spring from the servo shell (Fig.5).
6. Bend back the tabs of the exposed locking plate from the bolt heads. Remove the three bolts (23), locking plate (24) and abutment plate (25). Lift off the servo shell and retrieve gasket (26) from the mounting face of the slave cylinder (Fig.6).

Limora Zentrallager

Industriepark Nord 21
 D - 53567 Buchholz
 Tel: +49 (0) 26 83 - 97 99 0
 E-Mail: Limora@Limora.com
 Internet: www.Limora.com

Filialen:

- Aachen • Berlin • Bielefeld
- Düsseldorf • Hamburg
- Köln • Stuttgart

7. Gently withdraw servo push rod (27) and attached slave piston sub-assembly from the slave cylinder bore. Taking careful note of their relative positions for subsequent refitting, slide the plastic bearing (28), gland seal (29) and on earlier assemblies a plastic spacer (30) off the push rod. Later assemblies incorporate a distance piece (31), cup spreader (32), spring (33) and washer (34) in place of the plastic spacer. With the fingers, prise off the cup seal (37) from the head of the slave piston (35), (Fig.7). Note: The slave piston sub-assembly can be detached from the servo push rod by opening up the plastic retaining clip (36) with a small screwdriver and twisting it in the clip joint to expose the retaining pin (38), which can then be pushed out. This operation should not normally be necessary, but if carried out a new retaining clip and pin must be fitted on reassembly. These parts are supplied in the repair kit. Finally, remove slave cylinder body from the bench vice for examination purposes.

Cleaning and inspection

Having completely dismantled the servo assembly, comparison of new parts contained in the major servo repair kit with the original used parts will determine which components to discard. Thoroughly clean all retained parts with new brake fluid, wipe dry with a lint free cloth and lay out on a clean sheet of paper spread over the work bench. Carefully examine the metal components for faults and wear. Particularly inspect the surface finish of the slave cylinder bores and servo push rod for visible score marks, ridges and corrosion. If evidence is apparent a new replacement servo assembly must be fitted. Light dust deposits on the air filter can be removed by blowing through with a low pressure air line (foot pump). Do not use any cleaning fluids or lubricants on the filter. Scrupulous cleanliness of all parts of the servo units is now essential. Ensure hands are kept free of grease and dirt. Use clean brake fluid as a lubricant for assembling the hydraulic parts of the servo.

Reassembly

1. If the slave piston sub-assembly has been separated from the servo push rod. It is most important that these parts are reassembled correctly. Insert the drilled end of the push rod (27) into the skirt in the rear of the new slave piston (35). Depress the spring inside the piston to uncover the retaining pin hole. Fit new retaining pin (38) and release the spring to bear against the protruding pin ends, ensuring that the spring is retained on both sides. Slide on the new plastic pin retaining clip (36), (Fig.8).

Important: Ensure that the clip fits comfortably in the slave piston groove, any protrusions will score the slave cylinder bore.

2. Before assembly, using the grease sachet supplied in the repair kit, lightly apply silicone grease to the outer diameter of the slave piston (35), the slave piston cup seal (37) and push rod gland seal (29). With the fingers only, fit the new piston cup seal evenly into the groove on the head of the slave piston. Ensure the seal lip faces away from the servo push rod. Lubricate the slave cylinder bore with clean brake fluid then carefully insert the slave piston sub-assembly into the main bore taking care that the seal lip does not bend back on entry. Proceed to fit in their correct order the following new parts; washer (34), spring (33), cup spreader (32), distance piece (31) and gland seal (29), by sliding them independently over the protruding push rod and into the slave cylinder bore mouth. Bed each part evenly and separately ensuring that the gland seal lip points into the bore and does not bend or turn back. Before fitting the original retained plastic bearing (28) lightly apply silicone grease from the sachet to the servo push rod in the area marked „xxxxxx“ (ref. Fig.9).
3. Grip slave cylinder body in the bench vice at an angle of 45° with the cylinder bore mouth uppermost. Place a new gasket (26) onto the mounting face of the slave cylinder prior to locating the servo shell in position. Position abutment plate (25) and new locking plate (24) inside the shell and insert the three 5/16" U.N.F. fixing bolts. Tighten bolts evenly to a torque figure of 17Nm (13.3 lbf.ft). Bend over the locking plate tabs to secure the bolts (Fig.6).
4. Insert the main return spring (22) with the first coil spaced around the abutment plate. Pull the push rod out to its limit before fitting the diaphragm support (20). Check main return spring locates correctly against the diaphragm support with the support boss seated inside the end coil and that the retaining key slot in the support faces upwards. Gently press support into the servo shell against the resistance of the return spring until the push rod groove is visible through the slot. Insert the retaining key (21), (Fig.10).
5. Ensure that the servo diaphragm (19) and the diaphragm support (20) are clean and perfectly dry, especially in the vicinity of the centre hole where there must be no trace of lubricant. Fit rubber diaphragm to the support, carefully bedding the inner edge evenly in the support groove. Gentle stretching of the diaphragm away from the centre

Limora Zentrallager

Industriepark Nord 21
D - 53567 Buchholz
Tel: +49 (0) 26 83 - 97 99 0
E-Mail: Limora@Limora.com
Internet: www.Limora.com

Filialen:

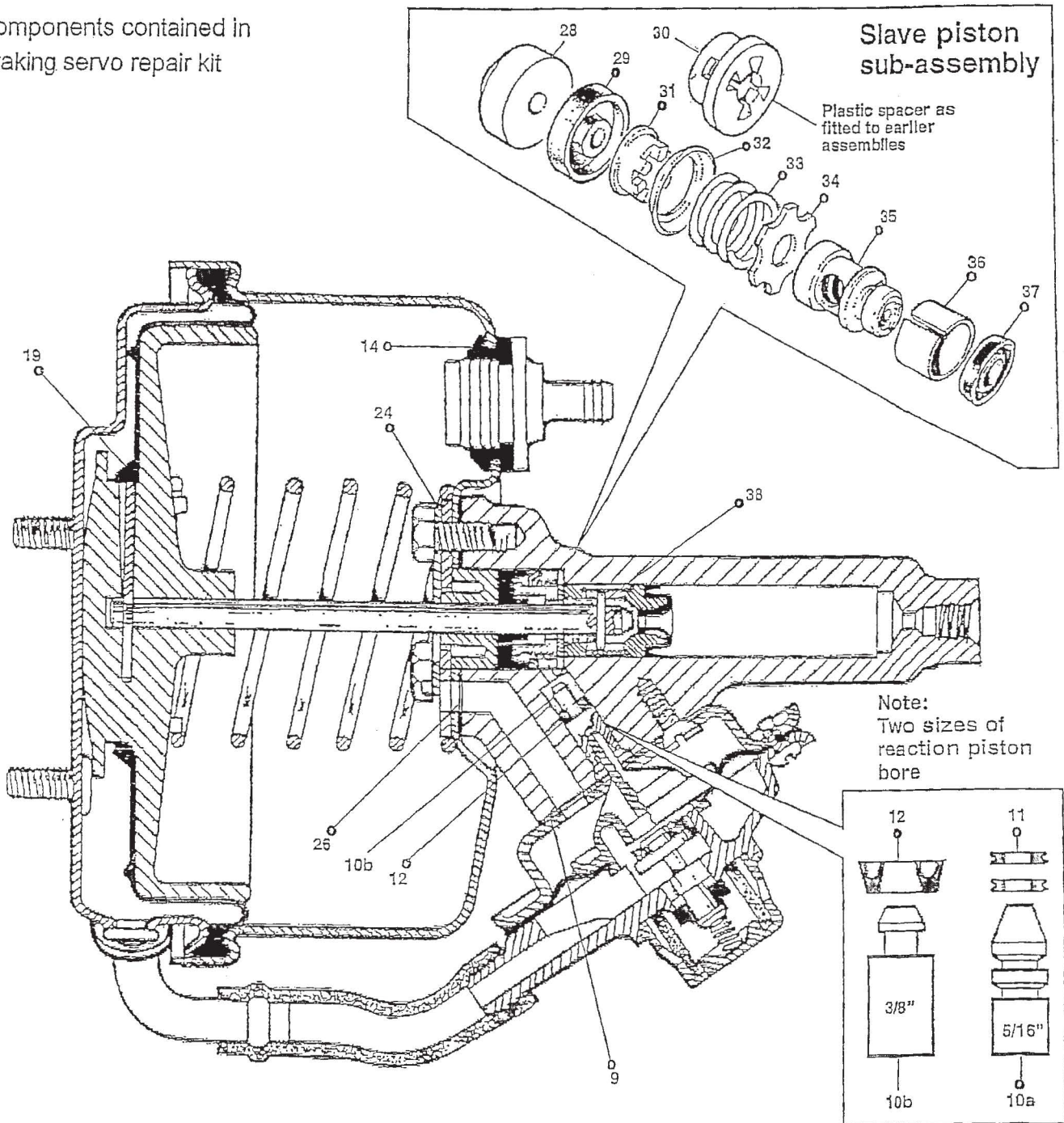
• Aachen • Berlin • Bielefeld
• Düsseldorf • Hamburg
• Köln • Stuttgart

is beneficial in seating the lip properly. Lightly smear the outer edge of the diaphragm with silicone grease supplied, where it contacts the rim of the end cover (18) and servo shell (15). Bed the edge of the diaphragm evenly around the rim of the shell (Fig.4).

6. Using hand pressure, restrain diaphragm assembly within the servo shell, line up the end cover (18) with the shell so that the elbow pipe is in the correct position relative to the mounting for the air valve cover assembly (4). Examine the whole of the clamping edge for correct seating of the diaphragm then secure end cover with the clamping ring (16) in the position noted prior to dismantling. Insert the clamping bolt (17), fit the washers (17b) and nut (17a). Tighten nut to a torque figure of 1.4Nm (12lbf.ins) (Fig.11).
7. Reposition slave cylinder body in the bench vice with the mounting flange for the valve housing facing upwards and horizontal. Using clean brake fluid, lubricate the reaction piston bare then, before assembly, lightly apply silicone grease to the outer diameter of the new reaction piston (10a) and ,O' ring seal(s) (11), this being for slave cylinders having a 5/16" dia. piston bore. Alternatively, the outer diameter of the original retained reaction piston (10b) and the new rubber cup seal (12) for cylinders with a 3/8" dia. piston bore. Note: With the rubber cup seal design when fitting the cup seal onto the piston spigot, ensure that the seal lip is pointing away from the drilled head of the reaction piston. Insert piston fully into its bore, spigot first, taking care not to bend back the seal lip. Locate the new gasket (9) and valve housing (8) onto the mounting face. Secure firmly in position with the three countersunk head screws (7), tightening them to a torque figure of 60-80 lbs.ins. (Fig.2).
Note:- If a new air valve diaphragm is required, this part is obtainable in a separate air control valve repair kit. (Refer to dismantling section No. 1).
8. Carefully position the inner edge of the air valve diaphragm (5) in the groove of the plastic diaphragm support (6). Insert the diaphragm support, spigot first, into the drilled head of the reaction piston. Important: Do not use any lubricants when fitting the air valve diaphragm. Line up the slots in the outer edge of the diaphragm with the screw holes in the valve housing. If the air filter element has been removed for inspection, replace and snap fit the domed cap onto the air valve cover. Place the air valve cover assembly (4) over the diaphragm so that the projections on the under surface of the cover engage in the diaphragm slots. Secure in position with the five self tapping screws (3). Tighten screws down firmly, but do not overtighten, in a progressive and diagonal manner. This tightening sequence is very important as the air valve must seat evenly. Any air leakage into the air valve assembly will impair the action of the whole servo unit.
9. Refit rubber pipe (2) to join the end cover elbow with the air valve cover port. Remove servo assembly from the vice. With the unit back on the bench refit the vacuum non-return valve (13) and its new rubber mounting (14). Finally, thoroughly inspect the servo unit to verify correct reassembly before fitting to vehicle and carrying out the bleeding procedure as per the vehicle manufacturer's instructions.

General overhaul instructions for Remote Vacuum Servo Units Types 6 & 7 (for single line braking systems)

⊕ Components contained in
Braking servo repair kit



Remote Vacuum Servo Unit Component Parts

- | | | |
|----------------------------------|----------------------|---|
| 1 Slave cylinder body | ⊙ 11 'O' ring seal | 20 Diaphragm support |
| 2 Rubber pipe | ⊙ 12 Cup seal | 21 Retaining key |
| 3 Self tapping screw | 13 Non-return valve | 22 Return spring |
| 4 Cover assembly | ⊙ 14 Valve mount | 23 Bolt 5/16" UNF |
| 5 Air valve diaphragm | 15 Servo shell | ⊙ 24 Locking plate |
| 6 Diaphragm support | 16 Clamping ring | 25 Abutment plate |
| 7 Countersunk screw | 17 Bolt | ⊙ 26 Gasket |
| 8 Valve housing | 17a Hex nut | 27 Servo push rod |
| ⊙ 9 Housing gasket | 17b Washer | 28 Plastic bearing |
| ⊙ 10a Reaction piston 5/16" dia. | 18 End cover | ⊙ 29 Gland seal |
| 10b Reaction piston 3/8" dia. | ⊙ 19 Servo diaphragm | 30 Plastic spacer
(earlier assemblies) |
| | | ⊙ 31 Distance piece |
| | | ⊙ 32 Cup spreader |
| | | ⊙ 33 Spring |
| | | ⊙ 34 Washer |
| | | ⊙ 35 Slave piston |
| | | ⊙ 36 Retaining clip |
| | | ⊙ 37 Piston cup seal |
| | | ⊙ 38 Retaining pin |

