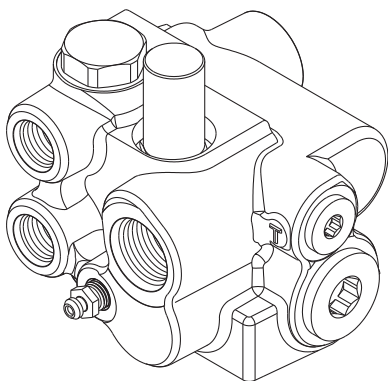




ACCUMULATOR CHARGING VALVE with Relief Valve

Product Explanation, Operating Information, and Service Instructions

PRODUCT EXPLANATION

The accumulator charging valve is designed for installation in an open center hydraulic system. The accumulator charging valve supplies oil on demand to the accumulator from the open center circuit.

Accumulator charging is accomplished at a preset rate (GPM) and is relatively constant within the preset pressure limits. Excess flow is directed back to the hydraulic system reservoir.

The accumulator charging valve incorporates a full flow relief valve to limit the maximum pressure in the hydraulic system.

The accumulator charging flow rate, upper and lower accumulator pressure limits and relief valve setting are set at the time of manufacture.

OPERATING INFORMATION

End user must provide proper maintenance of valve, should it become inoperable, by replacing the valve or servicing it with the proper repair kit. See TABLE 1 on page 3 for the proper repair kit number. Observe Service Instruction procedures on following pages. See Warnings A, B, C, and D below.

IMPORTANT INFORMATION

A **⚠ WARNING**

Due to allowable operating temperature of accumulator charging valve avoid contact or burn injury may occur.

C **⚠ WARNING**

Relief valve is preset at the factory. DO NOT READJUST or system damage or failure may occur.

B **⚠ WARNING**

Be sure system energy is relieved from accumulator charging valve before removing from machine. See machine operating instructions for procedures to relieve system energy.

D **⚠ WARNING**

Do not exceed the high limit pressure setting indicated in TABLE 1 or system damage or failure may occur.

NOTE

Locate the model number on the accumulator charging valve and compare it to the model number in TABLE 1. Be sure you have the proper service instructions.

SERVICE INSTRUCTIONS

⚠ WARNING

Be sure system energy is relieved from accumulator charging valve before removing from machine. See machine operating instructions for procedures to relieve system energy and to remove charge valve from machine.

Disassembly

(Refer to Figure 1)

1. Remove relief valve (42) from housing (15) using a deep, thin wall socket. Do not clamp on the housing round of the newer version relief valve (42). Remove o-rings (45 & 43) and backup ring (44) from relief valve (42). Note order of components. Be careful not to damage grooves on relief valve (42).

⚠ WARNING

Relief valve (42) is preset at the factory. DO NOT READJUST or system damage or failure may occur.

2. Remove plug (7) from housing (15). Remove o-ring (2) from plug (7). **NOTE: Plug (7) is under spring tension.**
3. Remove spring (5) and rod (6) from housing (15).
4. Remove plug (1) from housing (15) and remove o-ring (2) from plug (1).
5. Remove spool (3) from housing (15) through plug (7) end **ONLY**. Remove seal (4) from spool (3).
6. **Earlier Models:** Loosen nut (32) and remove screw assembly (31) from housing (15). Remove o-ring (30) from screw assembly (31). Remove spring (29), steel ball (28), seat (27), o-ring (9) and washer (26) from housing (15).
Later Models: Some later models use a directional spring (29). Directional spring (29) is attached to screw assembly (30) by means of the small diameter end of spring (29) being snapped into a groove on the nose end of screw assembly (30). See Figure 1b. Remove nut (32) and remove screw assembly (30) from housing (15). Remove o-ring (31) from screw assembly (30) from nut (32) side of screw assembly. Remove shim (47), spring (29), steel ball (28), seat (27), o-ring (9) and washer (26) from housing (15).
7. Remove filter (25) and washer (24) from housing (15).
8. Remove plug (8) from housing (15) and remove o-ring (9) from plug (8).
9. **BEFORE** moving screw (10), **ACCURATELY MEASURE ITS DEPTH** from the end of housing (15) and record for reassembly purposes. Remove screw (10) from housing (15).
10. Remove spring (12), retainer (13) and ball (14). Be sure to keep ball (14) separate from ball (20) for reassembling.
11. Remove pin (11) from screw (10) using a drive pin punch.
NOTE: Be careful not to damage threads.
12. Remove plug (23) from housing (15). Remove o-ring (9) from plug (23).
13. Remove spring (22), stop (21) and ball (20) from housing (15).
14. Place housing (15) on a bench with plug (23) end down. Spool (19) may or may not fall out at this point.
15. Using a 6.35-7.87 mm (0.25-0.31 in) diameter wood or plastic dowel, carefully remove insert (18) and spool (19) from housing (15). Insert (18) must come out plug (23) end of housing (15). Be careful not to scratch or mar valve seats on insert (18).
16. Remove spool (19) from insert (18). Remove o-rings (16 & 17) from insert (18).
17. Remove plug (41) from housing (15). Remove o-ring (40) from plug (41).
18. Remove spring (39), poppet (38), sleeve (36), poppet (34), and spring (33) from housing (15). **NOTE: Be careful not to scratch or mar housing or sleeve bore.**
19. Remove o-rings (35 & 37) from sleeve (36).
20. Remove bleeder screw (46) from housing (15).

NOTE

Observe torque specifications as indicated in assembly procedures or system damage or failure may occur.

Assembly

(Refer to Figure 1)

CLEAN ALL PARTS WITH CLEAN SOLVENT AND DRY. LUBRICATE ALL RUBBER PARTS WITH CLEAN SYSTEM FLUID PRIOR TO ASSEMBLY. BE SURE ENTIRE ASSEMBLY PROCEDURE IS DONE WITH CONTAMINATION FREE METHODS.

1. Install new o-ring (2) on plug (1). Install plug (1) in housing (15) and torque 67.8-81.4 N·m (50-60 lb·ft).
2. Install new seal (4) on spool (3). Be sure seal (4) does not twist in groove.
3. Lubricate spool (3) and properly install into housing (15).
4. Install spring (5) and rod (6) into housing (15).
5. Install new o-ring (2) on plug (7). Install plug (7) into housing (15) and torque 67.8-81.4 N·m (50-60 lb·ft).
6. Install new o-rings (16 & 17) on insert (18) and place into housing (15). Note direction of assembly. Seat insert (18) with a 12.7 mm (0.50 in) diameter wood or plastic dowel.
7. Install spool (19) into insert (18) in housing (15). Note direction of spool (19), long shoulder end faces end plug (23). See Figure 1a.
8. Install ball (20) on insert (19) in housing (15). Install stop (21) over ball (20), and spring (22) over stop (21).
9. Install new o-ring (9) on plug (23). Carefully install plug (23) into housing (15), centering spring (22). Torque plug (23) 47.5-54.2 N·m (35-40 lb·ft).
10. Turn housing (15) so plug (1) is vertically upward. Install ball (14) in housing (15). Be sure ball (14) is centered in bottom of hole in housing (15). Place retainer (13) and spring (12) into housing (15).
11. Insert new pin (11) in screw (10). Be sure pin (11) is aligned properly and is evenly driven into screw (10). **NOTE: Be careful not to damage threads.**
12. Thread screw (10) into housing (15) to the depth recorded during disassembly.
13. Install new o-ring (9) on plug (8). Install plug (8) in housing (15) and torque 47.5-54.2 N·m (35-40 lb·ft).
14. Install washer (24) and new filter (25) in housing (15).
15. **Earlier Models:** Install new o-ring (30) on screw assembly (31). Install washer (26), new o-ring (9), seat (27), steel ball (28), spring (29) and screw assembly (31) into housing (15). Torque screw assembly (31) 24.4-29.8 N·m (18-22 lb·ft). Then torque nut (32) 43.4-51.5 N·m (32-38 lb·ft).
Later Models: Some later models use a directional spring (29). Directional spring (29) is attached to screw assembly (30) by means of the small diameter end of spring (29) being snapped into a groove on the nose end of screw assembly (30). If necessary, reattach the small diameter of spring (29) into the groove on the nose end of screw assembly (30) using a slight twisting motion. See Figure 1b. Install new o-ring (31) on screw assembly (30) from nut (32) side of screw assembly. Install washer (26), new o-ring (9), seat (27), steel ball (28) and spring (29) in housing (15). Fully lubricate shim (47) with clean system fluid and install in housing (15) on end of seat (27). Install screw assembly (30) in housing (15). Torque screw assembly (30) 24.4-29.8 N·m (18-22 lb·ft). Then install nut (32) on screw assembly (30) and torque nut 43.4-51.5 N·m (32-38 lb·ft).
16. Install new o-rings (35 & 37) on sleeve (36).
17. Install spring (33), new poppet (34), sleeve (36), new poppet (38) and spring (39) into housing (15).
18. Install new o-ring (40) on plug (41). Install plug (41) in housing (15) and torque 67.8-81.4 N·m (50-60 lb·ft).
19. Install new o-rings (43 & 45) and new back-up ring (44) on relief valve (42). Earlier models will have items 43, 44, & 45 in a bag labeled 04-001-022. Later models will have items 43, 44 & 45 in a bag labeled 04-001-027.
20. Install relief valve (42) in housing (15) and torque 27.1-33.9 N·m (20-25 lb·ft). Do not clamp on the housing round of the newer version relief valve.

⚠ WARNING

Relief valve (42) is preset at the factory. DO NOT READJUST or system damage or failure may occur.

21. Install bleeder screw (46) in housing (15) and torque 13.6-20.3 N·m (10-15 lb·ft).

● Items included in Repair Kit

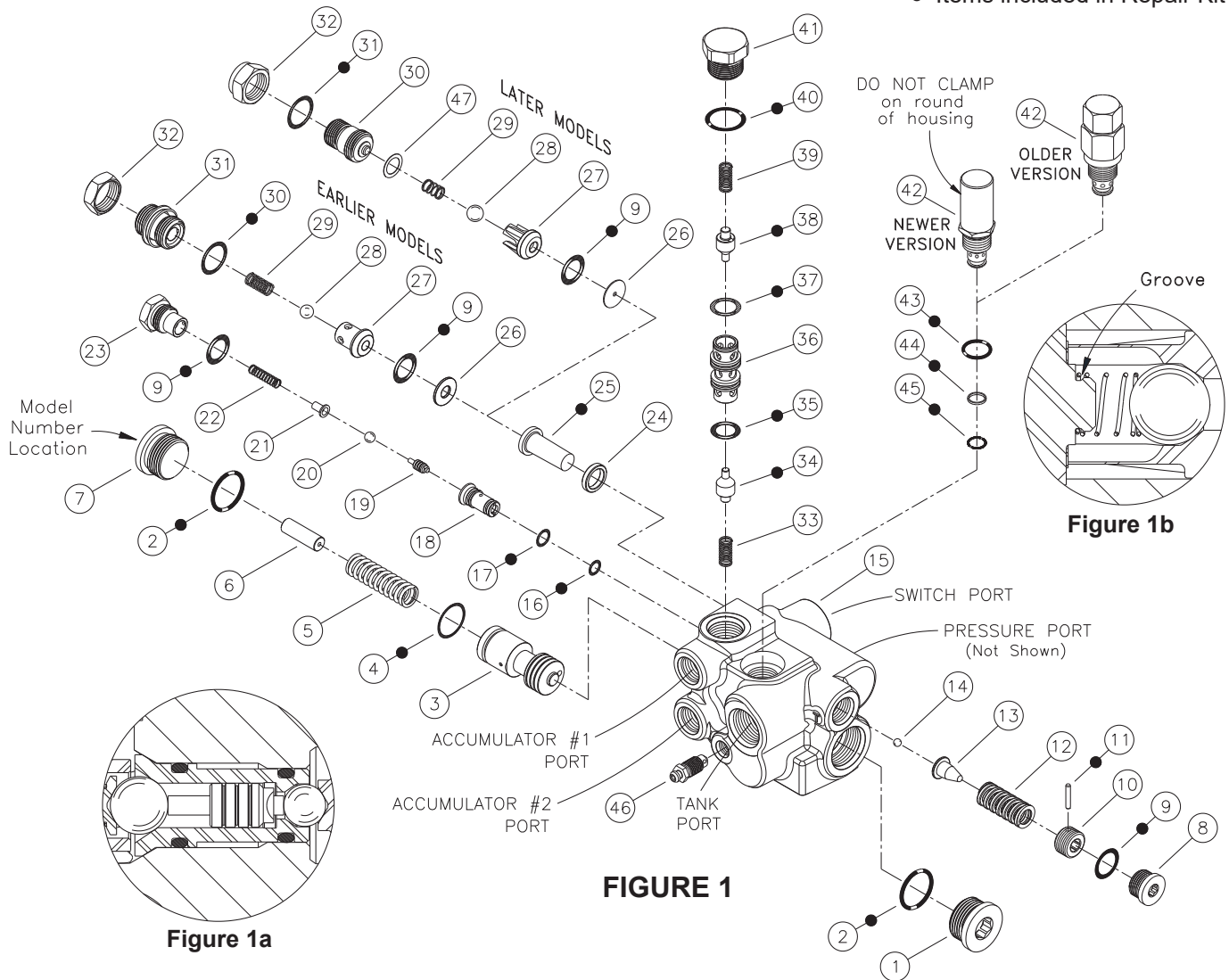


TABLE 1 (Specifications)

Model Number	Repair Kit Number	Relief Valve Pressure Setting		Nominal High Limit (cut out)		Nominal Low Limit (cut in)	
		bar	(PSI)	bar	(PSI)	bar	(PSI)
06-463-414	06-400-216	203.4 ± 3.5	(2950 ± 50)	172.4 ± 3.5	(2500 ± 50)	96.5 ± 3.5	(1400 ± 50)

VALVE ADJUSTMENT

(Refer to Table 1)

1. See machine servicing instructions to properly reinstall accumulator charging valve. Tee an accurate pressure gauge on an accumulator line.
2. Start pump and allow approximately one minute for charging to start (pressure in gauge will read accumulator precharge plus). If valve does not begin to charge remove plug (8) and turn screw (10) in, stopping when gauge shows an increase in pressure. Check the high limit specifications (see TABLE 1) and adjust screw (10) until the high limit setting is met. Reinstall plug (8). This pressure can be checked correctly only if after each adjustment of

screw (10) the accumulator pressure is reduced below the low limit setting and the system recharges the accumulator pressure to its high limit. Repeat process until high pressure setting is accurately adjusted. **NOTE: Be sure to reinstall plug (8) before starting pump.**

3. Torque plug (8) 47.5-54.2 N·m (35-40 lb·ft).

SERVICE CHECKS FOR HYDRAULIC SYSTEMS

ACCUMULATOR CHARGING CYCLE REPEATS FREQUENTLY WHEN ACCUMULATOR IS NOT NORMALLY BEING DISCHARGED IN SERVICE

1. Leaking accumulator lines or fittings
1. **Check lines and fittings for leaks and correct**
2. Incorrect setting of accumulator gas charge
2. **Check accumulator gas charge**
3. Line to accumulator plugged
3. **Replace line**
4. Inoperative charging valve
4. **Replace charging valve**

ACCUMULATORS STARTS TO CHARGE BUT DOES NOT REACH HIGH LIMIT

1. No oil or low oil level in tank
1. **Check oil level**
2. Pump worn or inoperative and not delivering full flow or pressure
2. **Check pump**
3. Inoperative system relief valve (valve leaking or has low setting so full flow and pressure are not available)
3. **Check relief valve**
4. Inoperative charging valve
4. **Replace charging valve**

ACCUMULATOR CHARGING TIME TOO LONG

1. No oil or low oil level in tank
1. **Check oil level**
2. Relief valve setting too low
2. **Check valve setting**
3. Pump worn or inoperative and not delivering full flow or pressure
3. **Check pump**
4. Inoperative charging valve
4. **Replace charging valve**

ACCUMULATOR FAILS TO START CHARGING

1. No oil or low oil level in tank
1. **Check oil level**
2. Worn or inoperative pump
2. **Check pump pressure and flow**
3. Inoperative relief valve
3. **Replace charging valve**
4. Air in accumulator line
4. **Bleed accumulator line**
5. Inoperative charging valve
5. **Replace charging valve**

VERY RAPID CYCLING OF CHARGING VALVE

1. Incorrect setting of accumulator gas charge
1. **Check accumulator gas charge**
2. Inoperative charging valve
2. **Replace charging valve**

LACK OF ADEQUATE FLOW THROUGH VALVE

1. Inoperative pump
1. **Check pump pressure and delivery**
2. Inoperative relief valve
2. **Replace charging valve**
3. Blocked lines
3. **Replace lines**
4. Inoperative charging valve
4. **Replace charging valve**

SERVICE DIAGNOSIS

ACCUMULATOR CHARGING CYCLE REPEATS FREQUENTLY WHEN ACCUMULATOR IS NOT NORMALLY BEING DISCHARGED IN SERVICE

1. Ball (28) leaking.
2. O-ring (9) next to seat (27) leaking.
3. O-ring (17) leaking.
4. Ball (20) leaking.
5. Inoperative seat on insert (18).

ACCUMULATOR STARTS TO CHARGE BUT DOES NOT REACH HIGH LIMIT

1. O-ring (16) leaking.
2. Seal (4) on spool (3) is damaged or worn.

ACCUMULATOR CHARGING TIME TOO LONG

1. Dirt in filter (25).
2. Poppet (34 or 38) stuck, partially closed.
3. Seat (27) partially plugged.
4. Ball (28) stuck.

ACCUMULATOR FAILS TO START CHARGING

1. Broken spring (12).
2. Broken spring (5).
3. Spool (3) stuck.
4. Dirt in filter (25).

VERY RAPID CYCLING OF CHARGING VALVE

1. Insert (18) worn.
2. Poppets (34 or 38) stuck, partially closed.

ACCUMULATOR PRESSURES ARE NOT ISOLATED FROM ONE ANOTHER

1. O-rings (35 or 37) leaking.
2. Inoperative poppets (34 or 38).