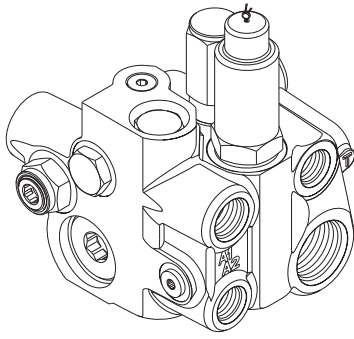




DUAL ACCUMULATOR CHARGING VALVE with RELIEF VALVE

Product Explanation, Operating Information and Service Instructions

PRODUCT EXPLANATION

The accumulator charging valve is designed for installation in an open center hydraulic system between the pump and the downstream secondary hydraulic devices.

The accumulator charging valve supplies oil on demand to the accumulators from the open center circuit. Accumulator charging is accomplished at a preset rate (GPM) and is relatively constant within the preset pressure limits.

The flow to the downstream secondary hydraulic devices will be reduced when the accumulators are charging. Full system pressure is available to the downstream secondary hydraulic devices at all times provided oil delivery and pressure from the pump is not impeded.

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

The accumulator charging valve may incorporate an internal relief valve that limits pressure in the accumulators.

Pressure at accumulator ports A1 and A2 is isolated from accumulator port A3 by internal check valves.

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 6 for 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 RE-ADJUST 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 part number on the accumulator charging valve and compare it to the part number in TABLE 1 on page 6. Be sure you have the proper service instructions.

SERVICE INSTRUCTIONS

Part Number: 422-7680

⚠ 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.

Disassembly

(Refer to Figure 1)

1. Remove plug (1), spring (3), ball (4) and seat (5) from housing (54). **NOTE: Be careful not to damage ball seating surface or internal diameter of seat (5).**
2. Remove o-ring (2) from plug (1). Remove back-up ring (7) and o-ring (6) from seat (5).
3. Remove plug (8), spring (9), ball (10) and seat (11) from housing (54). **NOTE: Be careful not to damage ball seating surface or internal diameter of seat (11).**
4. Remove o-ring (2) from plug (8). Remove back-up ring (7) and o-ring (6) from seat (11).
5. Remove plug (12) from housing (54). Remove o-ring (13) from plug (12). **NOTE: Plug is under spring tension.**
6. Remove plug (18) from housing (54). Remove o-ring (13) from plug (18).
7. Remove spring (16) and rod (17) from housing (54).
8. Remove spool (14) from housing (54) through plug (18) end ONLY. Remove seal (15) from spool (14).
9. **Directional spring (23) is attached to screw assembly (21) by means of the small diameter end of spring (23) being snapped in a groove on the nose end of screw assembly (21). See Figure 1a.** Remove nut (19) and remove screw assembly (21)/spring (23) from housing (54). Remove o-ring (20) from screw assembly (21) from nut (19) side of screw assembly. Remove shim (22), steel ball (24), seat (25), o-ring (2), washer (26), screen (27) and washer (28) from housing (54).
10. Remove plug (42) from housing (54). Remove o-ring (2) from plug (42).
11. BEFORE moving screw (40), ACCURATELY MEASURE ITS DEPTH from the end of housing and record for reassembly purposes. Remove screw (40) from housing (54).
12. Remove spring (39), retainer (38), and ball (37) from housing (54).
13. Remove pin (41) from screw (40) using a drive pin punch. **NOTE: Be careful not to damage threads of screw (40).**
14. Remove plug (29) from housing (54). Remove o-ring (2) from plug (29).
15. Remove spring (30), stop (31) and ball (32) from housing (54).
16. Place housing on a bench with plug (29) end down. Spool (33) may or may not fall out at this point.
17. Using a 6.35-7.87 mm (0.25-0.31 in) diameter wood or plastic dowel, carefully remove insert (34) and spool (33) from housing (54). Insert (34) must come out plug (29) end of housing. Be careful not to scratch or mar valve seats on insert (34).
18. Remove spool (33) from insert (34). Remove o-rings (35 & 36) from insert (34).
19. Remove plug (49) from housing (54). Remove o-ring (50) from plug (49).

20. Remove plug (51) from housing (54). Remove o-ring (52) from plug (51).
21. Remove plug (53) from housing (54). Remove o-ring (52) from plug (53).
22. **NOTE: Service items (55) are included in a separate seal kit 423-0508.** Remove relief valve (44) from housing (54) using hex flats.

⚠ WARNING

Relief valve (43) is preset at the factory. DO NOT READJUST or system damage or failure may occur.

23. Remove o-ring (7), back-up ring (6) and o-ring (20) from relief valve (43).
24. **NOTE: Service items (45) are included in a separate seal kit 365-5724.** Remove relief valve (44) from housing (50) using hex flats.

⚠ WARNING

Relief valve (44) is preset at the factory. DO NOT READJUST or system damage or failure may occur.

25. Remove o-ring (48), back-up ring (47) and o-ring (46) from relief valve (44).

Assembly

(Refer to Figure 1)

NOTE

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

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 (6) and new back-up ring (7) on seat (5). Note order of o-ring and back-up ring. Install new o-ring (2) on plug (1).
2. Position housing (54) with plug (1) end facing up. Install seat (5), ball (4), spring (3) and plug (1) in housing (54). Torque plug (1) 47.5-54.2 N·m (35-40 lb·ft).
3. Install new o-ring (6) and new back-up ring (7) on seat (11). Note order of o-ring and back-up ring. Install new o-ring (2) on plug (8).
4. Position housing (54) with plug (8) end facing up. Install seat (11), ball (10), spring (9) and plug (8) in housing (54). Torque plug (8) 47.5-54.2 N·m (35-40 lb·ft).
5. Install new o-ring (13) on plug (12). Install plug (12) in housing (54) and torque 122.0-135.6 N·m (90-100 lb·ft).
6. Install new seal (15) on spool (14). Be sure seal (15) does not twist in groove.
7. Lubricate spool (14) with clean system fluid and install in housing (54). Note direction of spool (14).
8. Install spring (16) and rod (17) in housing (54).
9. Install new o-ring (13) on plug (18). Install plug (18) into housing (54) and torque 122.0-135.6 N·m (90-100 lb·ft).
10. Install new o-rings (35 & 36) on insert (34) and install insert (34) into housing (54). Note direction of insert (34) assembly. Seat insert (34) using a 12.7 mm (0.50 in) diameter wood or plastic dowel.
11. Install spool (33) into insert (34) in housing. Note direction of spool (33), long shoulder end faces end plug (29).
12. Install ball (32) on insert (34) in housing. Install stop (31) over ball and spring (30) over stop.

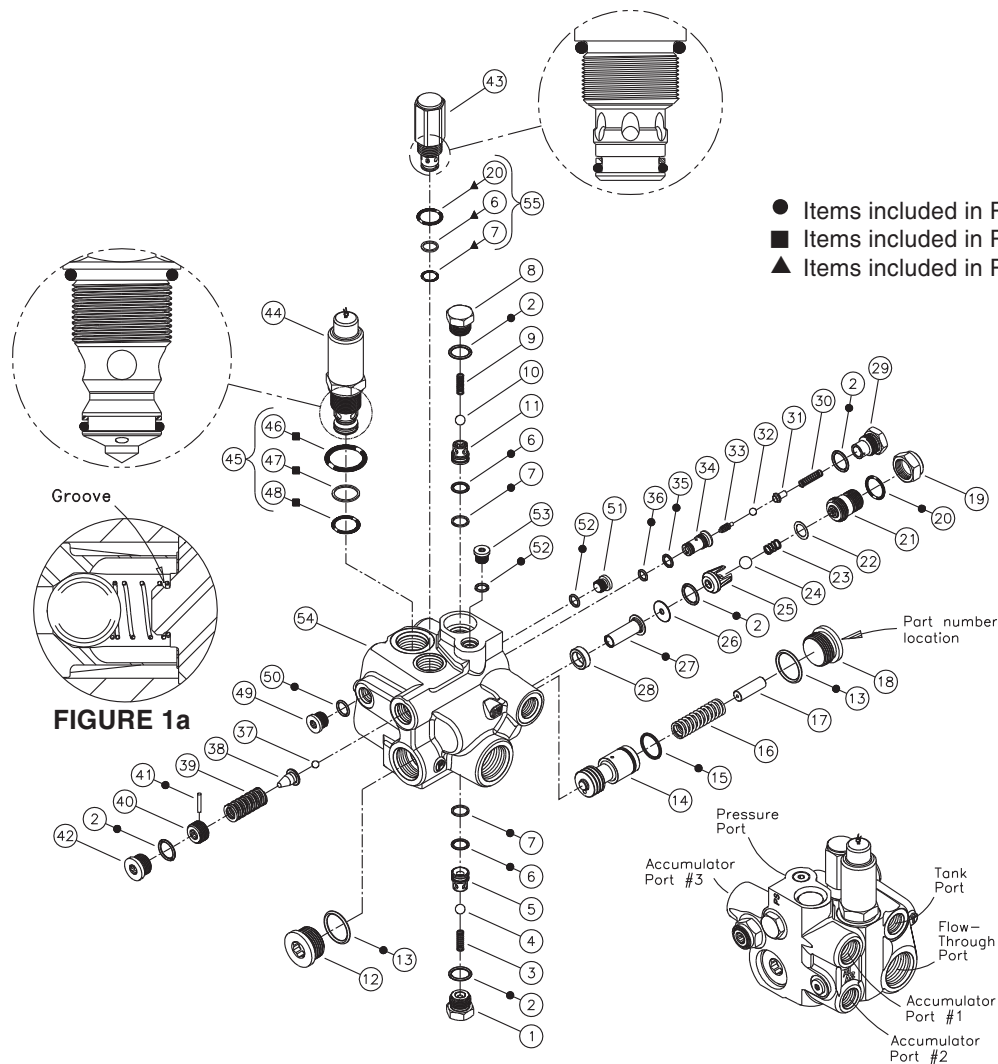


FIGURE 1

13. Install new o-ring (2) on plug (29). Carefully install plug (29) into housing (54), centering spring (30). Torque plug (25) 47.5-54.2 N·m (35-40 lb·ft).
14. Position housing (54) with plug (12) facing up. Install ball (37) in housing. Be sure ball is centered in bottom of hole. Install retainer (38) and spring (39) into housing (54).
15. Install new pin (41) in screw (40). Be sure pin is aligned properly and is evenly driven into screw (40).
NOTE: Do not damage threads of screw (40).
16. Thread screw (40) into housing (54) TO THE DEPTH RECORDED during disassembly.
17. Install new o-ring (2) on plug (42). Install plug (42) in housing (54) and torque 47.5-54.2 N·m (35-40 lb·ft).
18. **Directional spring (23) is attached to screw assembly (21) by means of the small diameter end of spring (23) being snapped into a groove on the nose end of screw assembly (21). If necessary, reattach the small diameter of spring (23) into the groove on the nose end of screw assembly (21) using a slight twisting motion. See Figure 1a.** Install new o-ring (20) on screw assembly (21) from nut (19) side of screw assembly. Install washer (28), new screen (27), washer (26), new o-ring (2), seat (25) and steel ball (24) in housing (54). Fully lubricate shim (22) with clean system fluid and adhere shim (22) to the end of screw assembly (21). Install screw assembly (21)/spring (23) in housing (54). Torque screw assembly (21) 24.4-29.8 N·m (18-22 lb·ft). Then install nut (19) on screw assembly (21) and torque nut 43.4-51.5 N·m (32-38 lb·ft).

19. Install new o-ring (50) on plug (49). Install plug (49) in housing (54) and torque 27.1-33.9 N·m (20-25 lb·ft).
20. Install new o-ring (52) on plug (51). Install plug (51) in housing (54) and torque 13.6-20.0 N·m (10-14 lb·ft).
21. Install new o-ring (52) on plug (53). Install plug (53) in housing (54) and torque 13.6-20.0 N·m (10-14 lb·ft).
22. **NOTE: Service items (45) are included in a separate seal kit 365-5724.** Install new o-ring (46), new back-up ring (47) and new o-ring (48) on relief valve (44). Note order of o-rings and back-up ring. Install relief valve (44) in housing (54) and torque 50.2-59.7 N·m (37-44 lb·ft) using hex flats.

⚠ WARNING

Relief valve (44) is preset at the factory. DO NOT READJUST or system damage or failure may occur.

23. **NOTE: Service items (55) are included in a separate seal kit 423-0508.** Install new o-ring (20), new back-up ring (6) and new o-ring (7) on relief valve (43). Note order of o-rings and back-up ring. Install relief valve (43) in housing (54) and torque 67.8-74.6 N·m (50-55 lb·ft) using hex flats.

⚠ WARNING

Relief valve (43) is preset at the factory. DO NOT READJUST or system damage or failure may occur.

24. To continue, refer to "Accumulator Charging Valve Adjustment" on page 6.

NOTE

Locate the part number on the accumulator charging valve and compare it to the part number in TABLE 1 on page 6. Be sure you have the proper service instructions.

SERVICE INSTRUCTIONS

Part Number: 371-5895

⚠ 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.

Disassembly

(Refer to Figure 1)

1. Remove plug (1), spring (3), ball (4) and seat (5) from housing (52). **NOTE: Be careful not to damage ball seating surface or internal diameter of seat (5).**
2. Remove o-ring (2) from plug (1). Remove back-up ring (7) and o-ring (6) from seat (5).
3. Remove plug (8), spring (9), ball (10) and seat (11) from housing (52). **Note: Be careful not to damage ball seating surface or internal diameter of seat (11).**
4. Remove o-ring (2) from plug (8). Remove back-up ring (7) and o-ring (6) from seat (11).
5. Remove plug (12) from housing (52). Remove o-ring (13) from plug (12). **NOTE: Plug is under spring tension.**
6. Remove plug (18) from housing (52). Remove o-ring (13) from plug (18).
7. Remove spring (16) and rod (17) from housing (52).
8. Remove spool (14) from housing (52) through plug (18) end ONLY. Remove seal (15) from spool (14).
9. **Directional spring (23) is attached to screw assembly (21) by means of the small diameter end of spring (23) being snapped in a groove on the nose end of screw assembly (21). See Figure 2a.** Remove nut (19) and remove screw assembly (21)/spring (23) from housing (52). Remove o-ring (20) from screw assembly (21) from nut (19) side of screw assembly. Remove shim (22), steel ball (24), seat (25), o-ring (2), washer (26), screen (27) and washer (28) from housing (52).
10. Remove plug (42) from housing (52). Remove o-ring (2) from plug (42).
11. BEFORE moving screw (40), ACCURATELY MEASURE ITS DEPTH from the end of housing and record for reassembly purposes. Remove screw (40) from housing (52).
12. Remove spring (39), retainer (38), and ball (37) from housing (52).
13. Remove pin (41) from screw (40) using a drive pin punch. **NOTE: Be careful not to damage threads of screw (40).**
14. Remove plug (29) from housing (52). Remove o-ring (2) from plug (29).
15. Remove spring (30), stop (31) and ball (32) from housing (52).
16. Place housing on a bench with plug (29) end down. Spool (33) may or may not fall out at this point.
17. Using a 6.35-7.87 mm (0.25-0.31 in) diameter wood or plastic dowel, carefully remove insert (34) and spool (33) from housing (52). Insert (34) must come out plug (29) end of housing. Be careful not to scratch or mar valve seats on insert (34).
18. Remove spool (33) from insert (34). Remove o-rings (35 & 36) from insert (34).
19. Remove plug (44) from housing (52). Remove o-rings (45 & 46) from plug (44).

20. Remove plug (47) from housing (52). Remove o-ring (48) from plug (47).
21. Remove plug (49) from housing (52). Remove o-ring (50) from plug (49).
22. Remove plug (51) from housing (52). Remove o-ring (50) from plug (51).
23. **NOTE: Service items (53) are included in a separate seal kit 423-0508.** Remove relief valve (43) from housing (52) using hex flats.

⚠ WARNING

Relief valve (43) is preset at the factory. DO NOT READJUST or system damage or failure may occur.

24. Remove o-ring (7), back-up ring (6) and o-ring (20) from relief valve (43).

Assembly

(Refer to Figure 1)

NOTE

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

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 (6) and new back-up ring (7) on seat (5). Note order of o-ring and back-up ring. Install new o-ring (2) on plug (1).
2. Position housing (52) with plug (1) end facing up. Install seat (5), ball (4), spring (3) and plug (1) in housing (52). Torque plug (1) 47.5-54.2 N·m (35-40 lb·ft).
3. Install new o-ring (6) and new back-up ring (7) on seat (11). Note order of o-ring and back-up ring. Install new o-ring (2) on plug (8).
4. Position housing (52) with plug (8) end facing up. Install seat (11), ball (10), spring (9) and plug (8) in housing (52). Torque plug (8) 47.5-54.2 N·m (35-40 lb·ft).
5. Install new o-ring (13) on plug (12). Install plug (12) in housing (52) and torque 122.0-135.6 N·m (90-100 lb·ft).
6. Install new seal (15) on spool (14). Be sure seal (15) does not twist in groove.
7. Lubricate spool (14) with clean system fluid and install in housing (52). Note direction of spool (14).
8. Install spring (16) and rod (17) in housing (52).
9. Install new o-ring (13) on plug (18). Install plug (18) into housing (52) and torque 122.0-135.6 N·m (90-100 lb·ft).
10. Install new o-rings (35 & 36) on insert (34) and install insert (34) into housing (52). Note direction of insert (34) assembly. Seat insert (34) using a 12.7 mm (0.50 in) diameter wood or plastic dowel.
11. Install spool (33) into insert (34) in housing. Note direction of spool (33), long shoulder end faces end plug (29).
12. Install ball (32) on insert (34) in housing. Install stop (31) over ball and spring (30) over stop.
13. Install new o-ring (2) on plug (29). Carefully install plug (29) into housing (52), centering spring (30). Torque plug (29) 47.5-54.2 N·m (35-40 lb·ft).
14. Position housing (52) with plug (12) facing up. Install ball (37) in housing. Be sure ball is centered in bottom of hole. Install retainer (38) and spring (39) into housing (52).
15. Install new pin (41) in screw (40). Be sure pin is aligned properly and is evenly driven into screw (40). **NOTE: Do not damage threads of screw (40).**

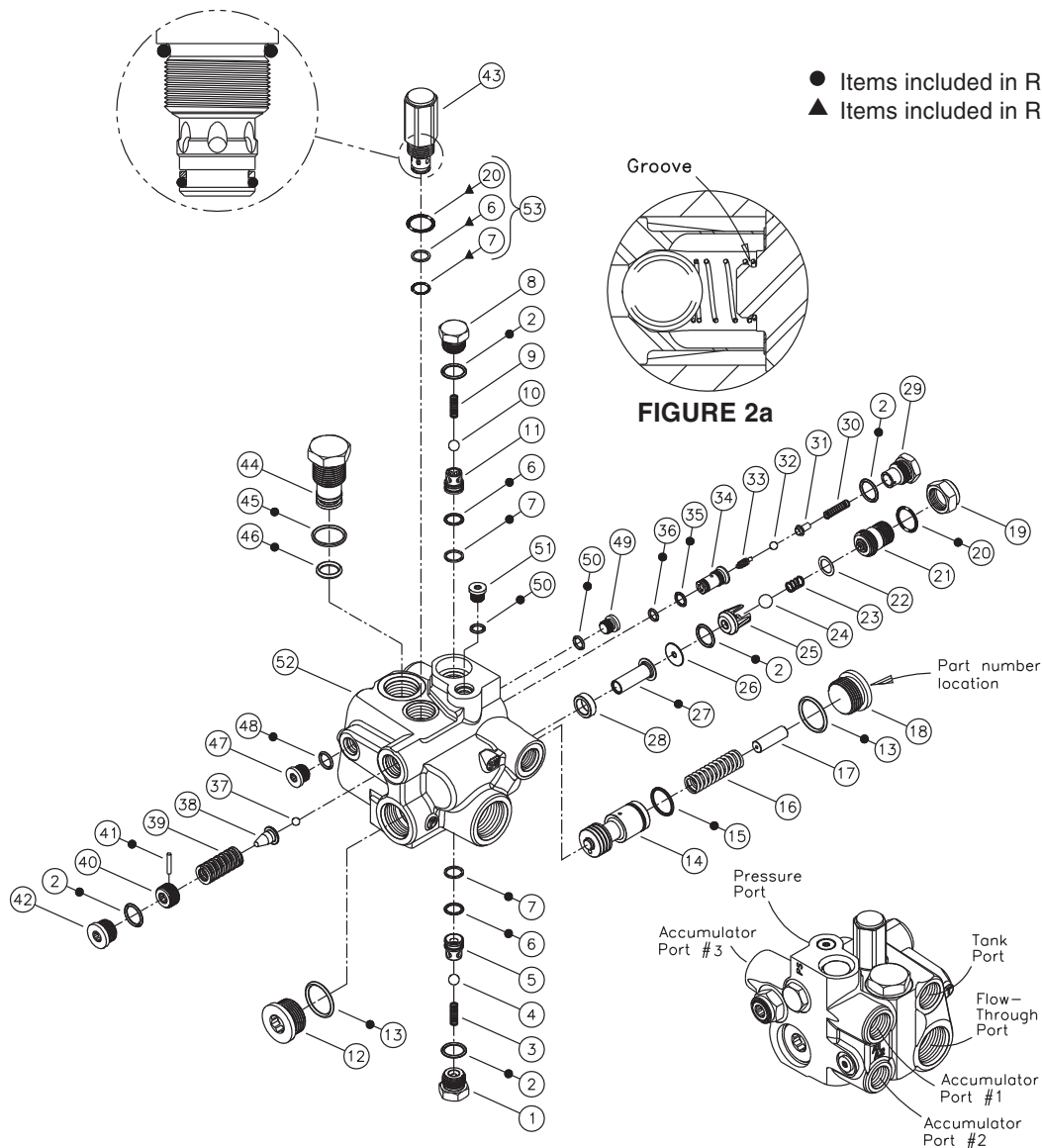


FIGURE 2

16. Thread screw (40) into housing (52) TO THE DEPTH RECORDED during disassembly.
17. Install new o-ring (2) on plug (42). Install plug (42) in housing (52) and torque 47.5-54.2 N·m (35-40 lb-ft).
16. **Directional spring (23) is attached to screw assembly (21) by means of the small diameter end of spring (23) being snapped into a groove on the nose end of screw assembly (21). If necessary, reattach the small diameter of spring (23) into the groove on the nose end of screw assembly (21) using a slight twisting motion. See Figure 2a.** Install new o-ring (20) on screw assembly (21) from nut (19) side of screw assembly. Install washer (28), new screen (27) washer (26), new o-ring (2), seat (25) and steel ball (24) in housing (52). Fully lubricate shim (22) with clean system fluid and adhere shim (22) to the end of screw assembly (21). Install screw assembly (21)/spring (23) in housing (52). Torque screw assembly (21) 24.4-29.8 N·m (18-22 lb-ft). Then install nut (19) on screw assembly (21) and torque nut 43.4-51.5 N·m (32-38 lb-ft).
17. Install new o-rings (45 & 46) on plug (44). Install plug (44) in housing (52) and torque 50.2-59.7 N·m (37-44 lb-ft).

18. Install new o-ring (48) on plug (47). Install plug (47) in housing (52) and torque 27.1-33.9 N·m (20-25 lb-ft).
19. Install new o-ring (50) on plug (49). Install plug (49) in housing (52) and torque 13.6-20.0 N·m (10-14 lb-ft).
20. Install new o-ring (50) on plug (51). Install plug (51) in housing (52) and torque 13.6-20.0 N·m (10-14 lb-ft).
21. **NOTE: Service items (53) are included in a separate seal kit 423-0508.** Install new o-ring (20), new back-up ring (6) and new o-ring (7) on relief valve (43). Note order of o-rings and back-up ring. Install relief valve (43) in housing (52) and torque 67.8-74.6 N·m (50-55 lb-ft) using hex flats.

▲ WARNING

Relief valve (43) is preset at the factory. DO NOT READJUST or system damage or failure may occur.

22. To continue, refer to "Accumulator Charging Valve Adjustment" on page 6.

TABLE 1 (Specifications)

Caterpillar Part Number	Repair Kit Number	Relief Valve (43) Part Number	Relief Valve (43) Seal Kit Number	Relief Valve (44) Part Number	Relief Valve (44) Seal Kit Number	Nominal High Limit (cut out)		Nominal Low Limit (cut in)	
						bar	(PSI)	bar	(PSI)
422-7680	422-7703	423-0507	423-0508	354-3074	365-5724	196.5 ± 3.5	(2850 ± 50)	144.8 ± 3.5	(2100 ± 50)
371-5895	422-7706	423-0507	423-0508	n/a	n/a	196.5 ± 3.5	(2850 ± 50)	144.8 ± 3.5	(2100 ± 50)

Accumulator Charging Valve Adjustment

(Refer to Figure 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 (42) and turn screw (40) in, stopping when gauge shows an increase in pressure. Check the high limit specifications (see TABLE 1) and adjust screw (40) until the high limit setting is met. Reinstall plug (42). This pressure can be checked correctly only if after each adjustment of screw (40) 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 (42) before starting pump.**

⚠ WARNING

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

3. Torque plug (42) 47.5-54.2 N·m (35-40 lb·ft).