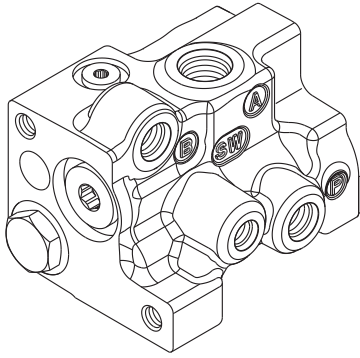




ACV-SMN-LS Single Load Sensing, ACCUMULATOR CHARGING VALVE

Product Explanation, Operating Information, and Service Instructions

PRODUCT EXPLANATION

The load sensing accumulator charging valve operates in parallel to a steering modulating valve that has a dynamic load sense bleed orifice. The load sense line from the system priority valve to the steering modulating valve is routed through the accumulator charging valve. The charging valve senses the pressure in the accumulator. If pressure in the accumulator is below a specified pressure range the charging valve modulates the dynamic load sense signal. Pressure in the accumulator rises as the volume of oil in it increases. Flow rate to the pressure accumulator is constant. The charging valve stops modulation of the dynamic load sense signal when pressure in the accumulator reaches the high limit of the charging valve. In a load sensing system the highest demand for pressure determines the operating pressure of the system.

The pressure limiting device of the hydraulic system limits pressure in the accumulator. The system must be designed to ensure that there is sufficient available flow for all foreseeable operating conditions or has proper priority function to ensure safe operation.

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**

Pressure in the accumulator is limited by the system pressure limiting device. Adjustment outside of the allowable range may result in system damage or failure.

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. 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.

Disassembly

(Refer to Figure 1)

1. Remove plug (1) from housing (35). Remove o-ring (2) from plug (1).
2. Remove spacer (3) from housing (35). Using a 1/4-20UNC bolt, remove seat (6) from housing (35). Remove ball (7), spring (8), and stop (9) from housing (35). Remove back-up ring (4) and o-ring (5) from seat (6).
3. Remove plug (10) from housing (35). Remove o-ring (11) from plug (10).
4. BEFORE moving screw (12), ACCURATELY MEASURE ITS DEPTH from the end of housing (35) and record for reassembly purposes. Remove screw (12) from housing (35).
5. Remove spring (14), retainer (15), and ball (16) from housing (35).
6. Remove pin (13) from screw (12) using a drive pin punch.
NOTE: Be careful not to damage threads.
7. Remove plug (26) from housing (35). Remove o-ring (11) from plug (26).
8. Remove spring (25), stop (24), and ball (23) from housing (35).
9. Place housing (35) on a bench with plug (26) end down. Spool (22) may or may not fall out at this point.
10. Using a 6.4-7.9 mm (0.25-0.31 in) diameter wood or plastic dowel, carefully remove insert (21) and spool (22) from housing (35). Insert (21) must come out plug (26) end of housing (35). **NOTE: Be careful not to scratch or mar valve seats on insert (21).**
11. Remove spool (22) from insert (21). Remove back-up rings (17 & 19) and o-rings (18 & 20) from insert (21).
12. Remove plug (27) from housing (35). Remove o-ring (28) from plug (27).
13. Remove plug (29) from housing (35). Remove o-ring (30) from plug (29).
14. Remove spring (31) and spool (32) from housing (35).
15. Remove plug (33) from housing (35). Remove o-ring (30) from plug (33).
16. Remove plug (34) from housing (35). Remove o-ring (30) from plug (34).

NOTE

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

Assembly

(Refer to Figure 1)

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

1. Install new o-ring (30) on plug (34). Install plug (34) in housing (35). Torque plug (34) 13.6-19.0 N·m (10-14 lb·ft).
2. Install new o-ring (30) on plug (33). Install plug (33) in housing (35). Torque plug (33) 13.6-19.0 N·m (10-14 lb·ft).
3. Install spool (32) and spring (31) in housing (35). Note direction of spool (32).
4. Install new o-ring (30) on plug (29). Install plug (29) in housing (35). Torque plug (29) 13.6-19.0 N·m (10-14 lb·ft).
5. Install new o-ring (28) on plug (27). Install plug (27) in housing (35). Torque plug (27) 67.8-81.4 N·m (50-60 lb·ft).
6. Install new o-rings (20 & 18) and new back-up rings (19 & 17) on insert (21) as shown. Install insert (21) in housing (35). Note direction of assembly. Seat insert (21) with a 12.7 mm (0.50 in) diameter wood or plastic dowel.
7. Install spool (22) into insert (21) in housing (35). Note direction of spool (22), long shoulder end is toward end plug (26). See Figure 1a.
8. Install ball (23) in insert (21) in housing (35). Install stop (24) on ball (23).
9. Install spring (25) over stop (24).
10. Install new o-ring (11) on plug (26) and install plug (26) in housing (35), centering spring (25). Torque plug (26) 47.5-61.0 N·m (35-45 lb·ft).
11. Turn housing so plug (10) is vertically upward. Install ball (16) in housing (35). Be sure ball (16) is centered in bottom of hole in housing (35). Install retainer (15) and spring (14) into housing (35).
12. Insert new pin (13) in screw (12). Be sure pin (13) is aligned properly and is evenly driven into screw (12).
NOTE: Do not damage threads.
13. Thread screw (12) into housing (35) to the depth recorded during disassembly.
14. Install new o-ring (11) on plug (10). Install plug (10) in housing (35). Torque plug (10) 47.5-54.2 N·m (35-40 lb·ft).
15. Install new o-ring (5) and new back-up ring (4) on seat (6) as shown.
16. Install stop (9), spring (8), ball (7), seat (6), and spacer (3) in housing (35). Note order and direction of parts.
17. Install new o-ring (2) on plug (1). Install plug (1) in housing (35) and torque 94.9-108.5 N·m (70-80 lb·ft).

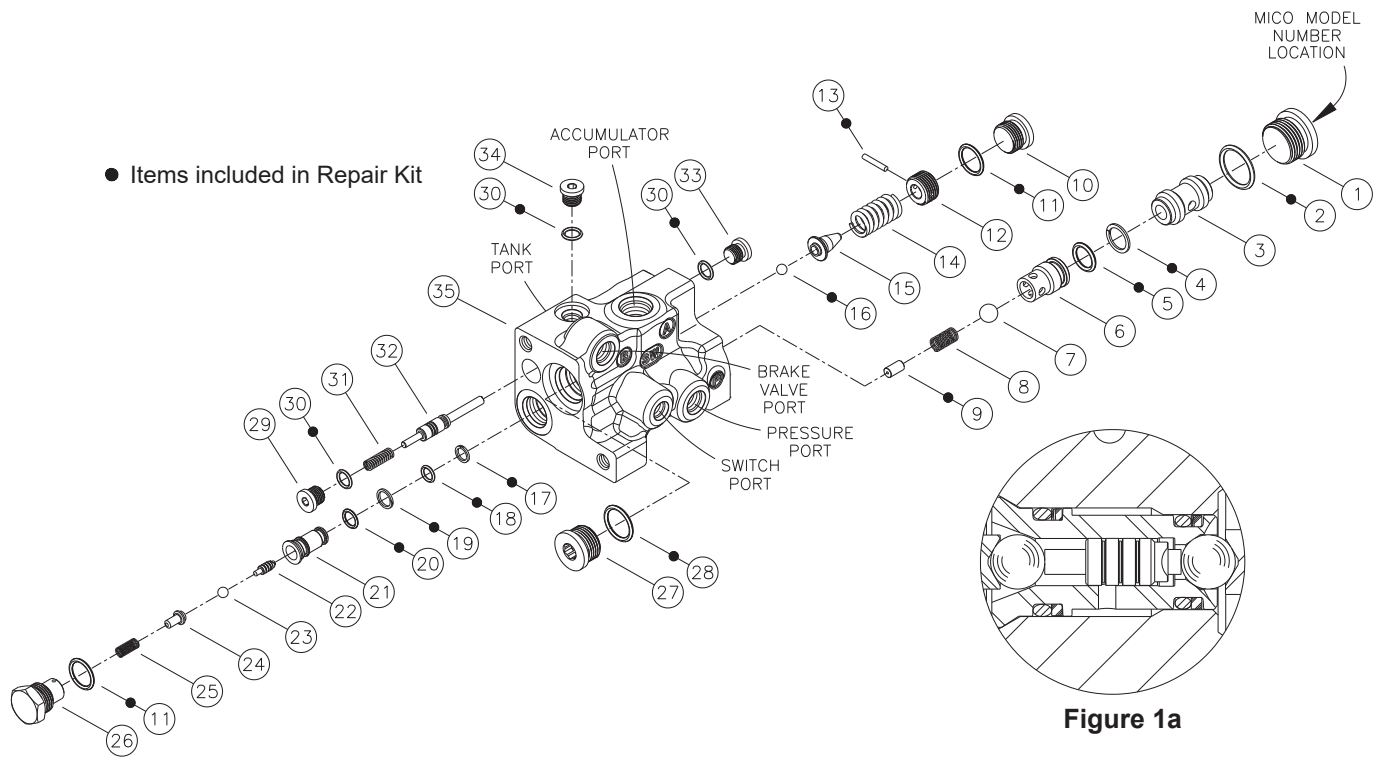


FIGURE 1

TABLE 1 (Specifications)

Model Number	NACCO Model Number	NACCO Repair Kit Number	Nominal High Limit (cut out)		Nominal Low Limit (cut in)	
			bar	(PSI)	bar	(PSI)
06-463-170	8543022	1707730	106.9 ± 3.5	(1550 ± 50)	89.6 ± 3.5	(1300 ± 50)
06-463-174	8543023	1707730	86.2 ± 3.5	(1250 ± 50)	69.0 ± 3.5	(1000 ± 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 end plug (10) and turn screw (12) in, stopping when gauge shows an increase in pressure. Check the high limit specifications (see TABLE 1) and adjust screw (12) until the high limit setting is met. Reinstall end plug (10). This pressure can be checked correctly only if after each adjustment of screw (12) 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 (10) before starting pump.**
3. Torque end plug (10) 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. Inoperative charging valve.
- 3. Replace charging valve.**

ACCUMULATOR 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 defective pump.
- 2. Check pump pressure and flow.**
3. Inoperative relief valve.
- 3. Check relief valve setting.**
4. Inoperative charging valve.
- 4. 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.**

SERVICE DIAGNOSIS

(Refer to Figure 1)

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

1. Ball (7) leaking.
2. O-ring (5) leaking.
3. O-ring (18) leaking.
4. Ball (23) leaking.
5. Inoperative seat on insert (21).

ACCUMULATOR STARTS TO CHARGE BUT DOES NOT REACH HIGH LIMIT

1. O-ring (18) leaking.
2. Seat (6) partially plugged.

ACCUMULATOR FAILS TO START CHARGING

1. Broken spring (14).
2. O-ring (18) leaking.

VERY RAPID CYCLING OF CHARGING VALVE

1. Insert (21) worn.