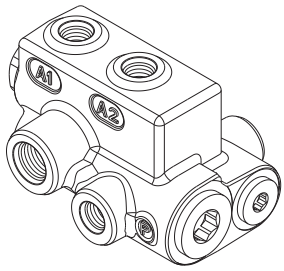

DUAL ACCUMULATOR CHARGING VALVE Load Sensing

Product Explanation, Operating Information, and Service Instructions

ACV-DMN-LS

PRODUCT EXPLANATION

The dual, load sensing accumulator charging valve operates in a flow and pressure on demand system. The charging valve senses the pressure in two separate accumulators. If pressure in one or both accumulators is below a specified pressure range the charging valve sends a pressure signal to a pressure and flow compensated pump. The pump senses the pressure signal from the charging valve and responds by supplying flow to meet the demand from the charging valve. Pressure in the accumulators rise as the volume of oil increases in them. Flow rate to the pressure accumulators is constant. The charging valve stops sending the pressure signal when pressure in the accumulators reaches the high limit of the charging valve.

The accumulator charging valve is connected to the hydraulic system in parallel to other load sensing valves. The highest demand for pressure determines the operating pressure of the system. A load sensing priority valve and fixed displacement pump may be used in place of the pressure and flow compensated pump.

The pressure limiting device of the hydraulic system limits pressure in the accumulators. The system must be designed to ensure 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 the 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.

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.

C **⚠ WARNING**

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

D **⚠ WARNING**

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

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Form No. 81-463-049 2008-10-20

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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.

Disassembly

(Refer to Figure 1)

1. Remove plug (1) from housing (10). Remove o-ring (2) from plug (1).
2. Remove spring (3), poppet (4), sleeve (6), poppet (8), and spring (9) from housing (10). Remove o-rings (5 & 7) from sleeve (6). **NOTE: Be careful not to scratch or mar housing or sleeve bore.**
3. Remove plug (27) from housing (10). Remove o-ring (12) from plug (27).
4. BEFORE moving screw (26), ACCURATELY MEASURE ITS DEPTH from the end of housing (10) and record for reassembly purposes. Remove screw (26) from housing (10).
5. Remove spring (24), retainer (23) and ball (22). Be sure to keep ball (22) separate from ball (15) for reassembly.
6. Remove pin (25) from screw (26) using a drive pin punch. **NOTE: Be careful not to damage threads.**
7. Remove plug (11) from housing (10). Remove o-ring (12) from plug (11).
8. Remove spring (13), stop (14), and ball (15) from housing (10).
9. Place housing (10) on a bench with plug (11) end down. Spool (16) 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 (17) and spool (16) from housing (10). Insert (17) must come out plug (11) end of housing (10). **NOTE: Be careful not to scratch or mar valve seats on insert (17).**
11. Remove spool (16) from insert (17). Remove o-rings (18 & 20) and back-up rings (19 & 21) from insert (17).
12. Remove plug (28) from housing (10). Remove o-ring (29) from plug (28).
13. Remove spacer (30) from housing (10). Using a 1/4-20UNC bolt, remove seat (33) from housing (10). Remove steel ball (34), spring (35), and stop (36) from housing (10). Remove back-up ring (31) and o-ring (32) from seat (33).

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 ENTIRE ASSEMBLY PROCEDURE IS DONE USING CONTAMINATION FREE METHODS.

1. Install new o-rings (5 & 7) on sleeve (6).
2. Install spring (9), poppet (8), sleeve (6), poppet (4), and spring (3) into housing (10).
3. Install new o-ring (2) on plug (1) and install plug (1) in housing (10). Torque 84.1-111.2 N·m (62-82 lb·ft).
4. Install new o-rings (18 & 20) and new back-up rings (19 & 21) on insert (17) as shown. Install insert (17) in housing (10). Note direction of assembly. Seat insert (17) with 12.7 mm (0.50 in) diameter wood or plastic dowel.
5. Install spool (16) into insert (17) in housing (10). Note direction of spool (16), long shoulder end is toward end plug (11). See Figure 1a.
6. Install ball (15) on insert (17) in housing (10). Install stop (14) on ball (15).
7. Install spring (13) over stop (14).
8. Install new o-ring (12) on plug (11) and install plug (11) in housing (10), centering spring (13). Torque plug (11) 47.5-54.2 N·m (35-40 lb·ft).
9. Turn housing (10) so plug (27) end is vertically upward. Install ball (22). Be sure ball (22) is centered in bottom of hole in housing (10). Drop retainer (23) and spring (24) into housing (10).
10. Insert new pin (25) in screw (26). Be sure pin (25) is aligned properly and is evenly driven into screw (26). **NOTE: Do not damage screw threads.**
11. Thread screw (26) into housing (10) to the depth recorded during disassembly.
12. Install new o-ring (12) on plug (27) and install plug (27) in housing (10). Torque plug (27) 47.5-54.2 N·m (35-40 lb·ft).
13. Install new o-ring (32) and new back-up ring (31) on seat (33) as shown.
14. Install stop (36), spring (35), steel ball (34), seat (33), and spacer (30) in housing (10). Note order and direction of parts.
15. Install new o-ring (29) on plug (28). Install plug (28) into housing and torque 73.2-89.5 N·m (54-66 lb·ft).

● Items included in Repair Kit

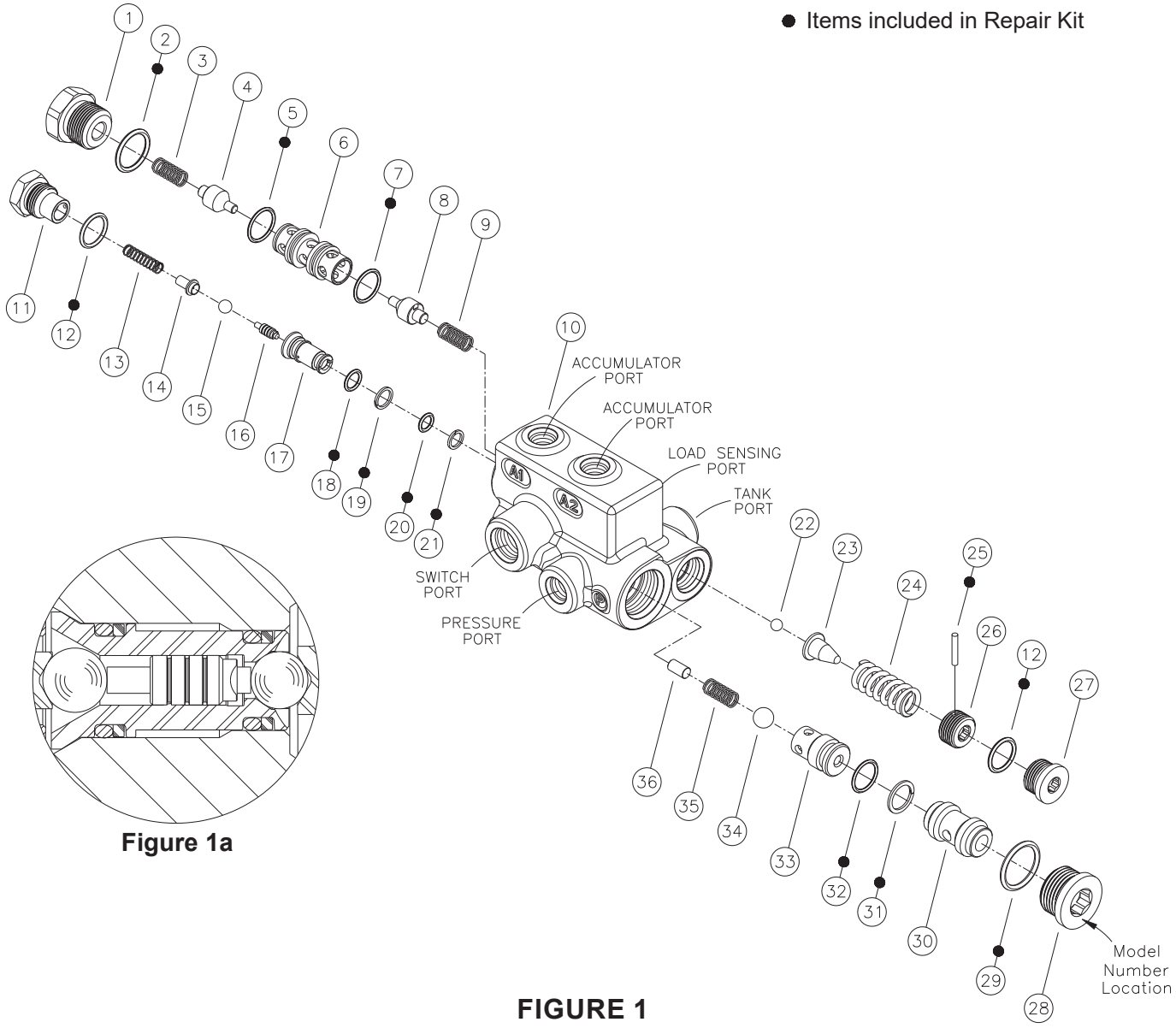

Figure 1a

FIGURE 1

TABLE 1 (Specifications)

Model Number	Repair Kit Number	System Pressure Limit Setting		Nominal High Limit (cut out)		Nominal Low Limit (cut in)	
		bar	(PSI)	bar	(PSI)	bar	(PSI)
06-463-168	06-400-298	213.5 ± 36.4	(3097 ± 528)	160.0 ± 3.5	(2320 ± 50)	120.0 ± 3.5	(1740 ± 50)

NOTE: If your product number is not listed, contact ZF Off-Highway Solutions Minnesota Inc. for information.

VALVE ADJUSTMENT

(Refer to Table 1)

1. See machine servicing instructions to properly reininstall 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 (27) and turn screw (26) in, stopping when gauge shows an increase in pressure. Check the high limit specifications (see TABLE 1) and adjust screw (26) until screw (26) until the high limit setting is met. Reinstall end plug (27). This pressure can be checked correctly only if after each adjustment of screw (26) 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 (27) before starting pump.**
3. Torque end plug (27) 47.5-54.2 N·m (35-40 lb·ft).

SERVICE CHECKS FOR HYDRAULIC SYSTEMS

ACCUMULATOR CHARGING CYCLE REPEATS FREQUENTLY WHEN ACCUMULATORS ARE 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 START TO CHARGE BUT DO 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**

ACCUMULATORS FAIL 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. 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**

SERVICE DIAGNOSIS

(Refer to Figure 1)

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

1. Ball (34) leaking
2. O-ring (32) leaking
3. O-ring (20) leaking
4. Ball (15) leaking
5. Inoperative seat on insert (17)

ACCUMULATORS START TO CHARGE BUT DO NOT REACH HIGH LIMIT

1. O-ring (20) leaking
2. Seat (33) partially plugged

ACCUMULATOR PRESSURES ARE NOT ISOLATED FROM ONE ANOTHER

1. O-rings (5 or 7) leaking
2. Inoperative poppets (4 or 8)

ACCUMULATORS FAIL TO START CHARGING

1. Broken spring (24)
2. O-ring (20) leaking

VERY RAPID CYCLING OF CHARGING VALVE

1. Insert (17) worn
2. Poppets (4 or 8) stuck or partially closed

ACCUMULATOR PRESSURES ARE NOT ISOLATED FROM ONE ANOTHER

1. O-rings (5 or 7) leaking
2. Inoperative poppets (4 or 8)