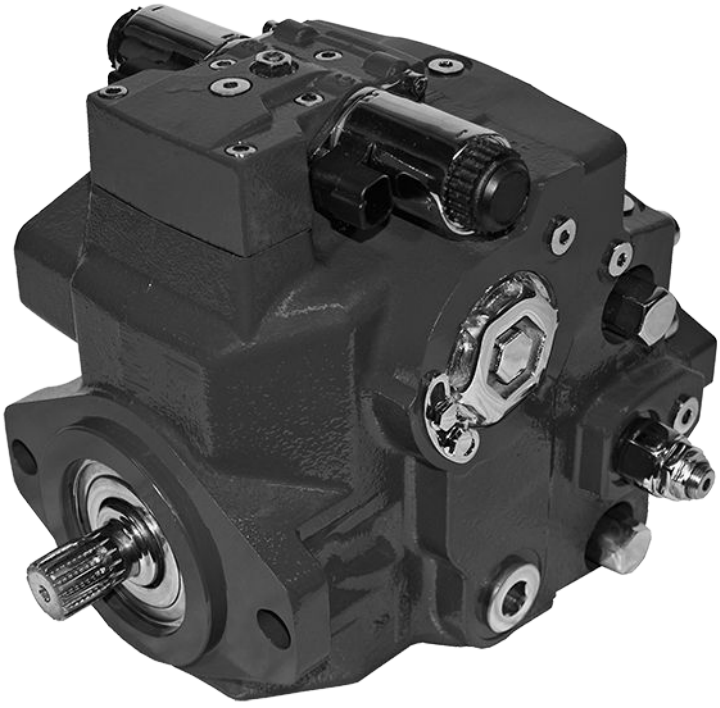
ENGINEERING
TOMORROW

Service Manual

Closed Circuit Axial Piston Pumps
H1 - 045/053/060/068

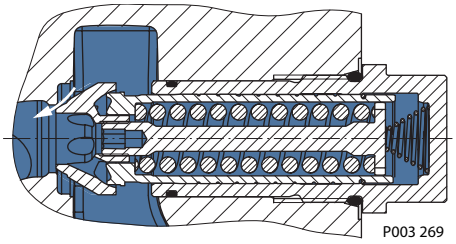


Operation

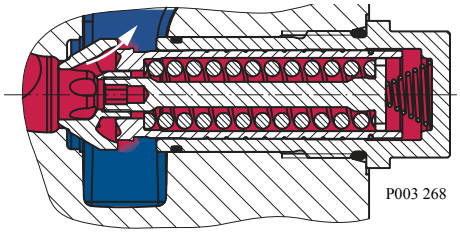
Pressures marked on HPRV valve (continued)

18	180 [2610]
20	200 [2900]
23	230 [3335]
25	250 [3626]
28	280 [4061]
30	300 [4351]
33	330 [4786]
35	350 [5076]
38	380 [5511]
40	400 [5801]
42	420 [6092]

High Pressure Relief and Charge Check Valve with Bypass Valve in charging mode



High Pressure Relief and Charge Check Valve with Bypass Valve in relief mode



Bypass Function

The HPRV valve also provides a loop bypass function when each of the two HPRV hex plugs are mechanically backed out 3 full turns. Engaging the bypass function hydraulically connects both A & B sides of the working loop to the common charge gallery. The bypass function allows you to move a machine or load without rotating the pump shaft or prime mover.

Caution

The HPRV valves are not tow valves. Damage to the pump and motor can occur when operating without charge flow. Limit vehicle/machine movement to no more than 20% of maximum speed and no longer that three minutes. Reseat the HPRV valves after vehicle/machine movement.

Charge Pressure Relief Valve

The charge pressure relief valve maintains charge pressure at a designated level above case pressure. The charge pressure relief valve is a direct acting poppet valve that opens and discharges fluid to the pump case when pressure exceeds a designated level. This level is nominally set with the pump running at 1800

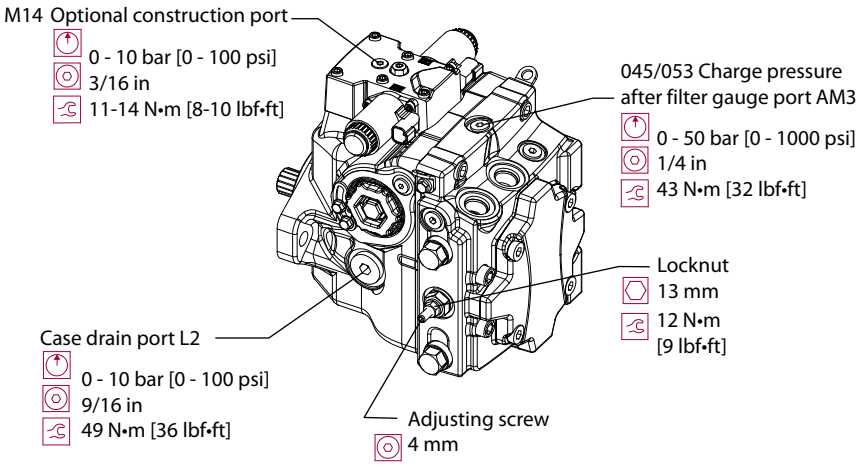
Specifications

Fluid specifications (continued)

Temperature range 2)	Minimum (cold start) 3)	°C	[°F]	-40	[-40]
	Recommended range			60-85	[140-185]
	Rated			104	[220]
	Maximum intermittent 1)			115	[240]
Filtration (recommended minimum)	Cleanliness per ISO 4406			22/18/13	
	Efficiency (charge pressure filtration)	β-ratio		$\beta_{15-20} = 75$ ($\beta_{10} \geq 10$)	
	Efficiency (suction and return line filtration)			$\beta_{35-45} = 75$ ($\beta_{10} \geq 2$)	
	Recommended inlet screen mesh size	µm		100 – 125	
1) Intermittent = Short term t < 1min per incident and not exceeding 2 % of duty cycle based load-life 2) At the hottest point, normally case drain port 3) Cold start = Short term t < 3min, p ≤ 50 bar [725 psi], n ≤ 1000 min^{-1}(rpm)					T000 129E

Adjustments

Charge pressure adjustment



3. Rotate the adjusting screw clockwise to increase the setting; counter clockwise to decrease it. Subtract the case pressure reading to compute the actual charge pressure.

Charge pressure ranges

Model code	Actual charge pressure*
20	20 bar [290 psi] ± 1.5 bar [21.8 psi]
24	24 bar [348 psi] ± 1.5 bar [21.8 psi]
26	26 bar [377 psi] ± 1.5 bar [21.8 psi]
30	30 bar [435 psi] ± 1.5 bar [21.8 psi]

* This is the actual charge pressure port gauge reading minus the case pressure port gauge reading. Factory set at 1800 min-1 (rpm) with a reservoir temperature of 50° C [120° F].

Pressure change per turn is dependent on charge flow entering pump.

4. While holding the adjusting screw, torque locknut to 17 N•m [13 lbf•ft].
5. When you achieve the desired charge pressure setting, remove the gauges and plug the ports.

Pressure Limiter Adjustment

Lock motor output shaft to adjust the pressure limiter setting. Lock the vehicle's brakes or rigidly fix the work function so it cannot rotate.

1. Install 600 bar [10,000 psi] pressure gauges in the high pressure gauge ports (MA and MB). Install a 50 bar [1000 psi] pressure gauge in the charge pressure gauge port (M3).

Ensure charge pressure is properly set before checking pressure limiter.

Minor Repair

1. Disconnect electrical/hydraulic connections and remove the three cap screws (D050) using a 4 mm internal hex wrench.
2. Remove the solenoid/actuator housing (D025/QD77) and O-ring (D025A/QD26). Discard the O-ring.

   Individual coils may be replaced. Use a 12 point 26 mm socket. Torque the coil nut to to 5 N•m [3.7 lbf•ft].
3. Inspect the machined surface on the control. If you find any nicks or scratches, replace the component.
4. Lubricate new O-ring (D025A/QD26) using petroleum jelly and install.
5. Install solenoid/actuator housing with three cap screws (D050) using a 4 mm internal hex wrench. Torque screws to 5 N•m [4 lbf•ft].
6. Reconnect electrical/hydraulic connections and test the pump for proper operation.

For repair part information, see the *Parts Manual* for your model.

MDC Control

Removal

Refer to exploded diagram, below.

1. Using a 5 mm internal hex wrench, remove the six cap screws (D250).
2. Remove the control module and gasket (D150). Discard the gasket.
3. If necessary, remove servo orifices (F00A, F00B), supply orifice (F00P), and tank orifices (F00T) using a 3 mm internal hex wrench. Tag and number them for reistallation.
4. If screen (D084) is clogged, use a hook to remove the retaining ring (D098) and the screen. Discard the screen and replace with a new screen.
5. Before removing the control, note the position of the control lever for reassembly.

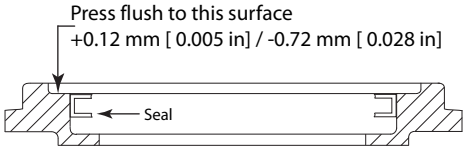
Caution

Do not disassemble the control, otherwise the functionality of the control and the neutral position of the pump can be lost!

Minor Repair

6. Press the bearing (J150) onto the shaft (J100) and replace the retaining ring (J200). Ensure the retaining ring diameter is less than 38.84 mm [1.53 in] when installed on the shaft.
7. Install the shaft/bearing assembly into the pump.
8. Lubricate and install a new O-ring (J260) onto seal carrier (J275). Press a new seal (J250) into the seal carrier. Press the seal until it is flush within +0.12mm [0.005 in] or -0.72 mm [0.0028 in] of the inside lip of the carrier: *see illustration.*

   Positioning seal in seal carrier



9. Cover the shaft with a protective sleeve while installing the seal carrier. Hand press the seal carrier into the housing. Ensure the seal carrier clears the spiral ring groove in the housing. Remove the protective sleeve.
10. Wind the spiral ring into the housing. Ensure the inside diameter of the spiral ring is greater than 68 mm [2.677 in] after installation.

Charge Pump

If the pump has an auxiliary pump attached, remove the auxiliary pump and connecting shaft before removing the auxiliary pad.