



Accumulators

Operating and Installation Instructions

1. General

Prior to installation and during the operation of hydraulic accumulators, the regulations governing accumulators in the place of installation must be observed. In the USA and Canada accumulators are subject to ASME Pressure Vessel Code. In addition, HYDAC suggests a thorough inspection, including a pressure test, every 5 to 10 years depending upon the application.

HYDAC recommends the use of mounting components to minimize the risk of failure due to system vibrations; refer to HYDAC Mounting Components in Accumulator Catalog #02068195.

As part of the commissioning process, vent all air from the system piping once the hydraulics have been connected.

WARNING!



Hydraulic accumulators are pressurized vessels and only qualified technicians should perform repairs. Never weld, braze, or perform any type of mechanical work on the accumulator shell. Never lift the accumulator by the gas valve. Always drain the fluid completely from the accumulator before performing any work, such as recommended repairs (*see Maintenance Instructions in Accumulator Catalog #02068195*) or connecting pressure gauges.

Always observe the maximum working pressure, operating temperature range, pressure ratio, recommended flow rate, and mounting position. For details refer to specific HYDAC product literature. Never use car tire valve cores in accumulators. All defective parts should be replaced with original HYDAC parts.

2. Precharging The Accumulator

Precharge new or repaired accumulators with dry nitrogen gas to the proper gas precharge pressure (P_0) prior to applying hydraulic system pressure.

2.1 Recommended Gas Precharge Pressure (P_0)

FOR ENERGY STORAGE	$P_0 = 0.9 \times P_1$
FOR SHOCK ABSORPTION	$P_0 = (0.6 \text{ to } 0.9) \times P_m$
FOR PULSATION DAMPENING	$P_0 = (0.6 \text{ to } 0.8) \times P_m$
P_1 = minimum working pressure	P_m = median working pressure

2.2 Procedure

Remove valve protection and valve seal caps (*where applicable*). Attach appropriate HYDAC charging and gauging unit (*type FPS for HYDAC gas valve version 4, type FPK for HYDAC gas valve version 1 and type FPK with adapter FPK/SB for top repairable bladder accumulators*) to the accumulator by following the instructions in the HYDAC Charging and Gauging Units manual #02068202. Once attached, slowly open the shut-off valve on the commercially available nitrogen bottle and allow the gas to slowly enter the accumulator. The first 20 to 25 PSI should take 2 to 3 minutes.

If gas precharge pressure is too low, continue charging; refer to HYDAC Charging and Gauging Units manual #02068202.

If gas precharge is too high, it can be reduced by carefully opening the manual bleed valve and relieving some pressure.

Once the proper gas precharge pressure has been reached, disconnect the charging and gauging unit from the accumulator by following the instructions in the HYDAC Charging and Gauging Units brochure. Check for leaks; NONE are permissible. Torque valve seal cap (*see torque requirements below*) and hand tighten valve protection cap (*where applicable*).

Notes:

- 1) When using FPK unit DO NOT use the "T"-handle in the charging and gauging unit to loosen the socket head cap screw; use a 6 mm Allen wrench.
- 2) HYDAC diaphragm accumulators with gas port version E2 are factory precharged and sealed with a welded steel plug. The gas precharge pressure CANNOT be adjusted.

Torque Requirements:

Gas valve Version 1	- socket head cap screw	- 20 Nm (15 lb-ft)
	- valve protection cap	- hand tighten (<i>where applicable</i>)
Gas Valve Version 4	- gas valve core	- 0.5 Nm (0.4 lb-ft)
	- valve seal cap	- 30 Nm (22 lb-ft)
	- valve protection cap	- hand tighten (<i>where applicable</i>)

2.3 Temperature Effects

To ensure that the recommended gas precharge pressure is maintained, even at relatively low or high operating temperatures, the gas precharge pressure should be adjusted for temperature; refer to HYDAC Charging and Gauging Units manual #02068202. When adjusting an existing gas precharge pressure allow 5 to 10 minutes for the gas precharge pressure to reach equilibrium. When precharging for the first time or after performing maintenance work, allow 20 to 30 minutes for the gas precharge pressure to reach equilibrium.

3.0 Checking Gas Precharge Pressure

The gas precharge pressure on gas port version E2 can only be checked using the method described in paragraph 3.2.

3.1 Measuring Gas Precharge Pressure on the Gas Side

To check precharge pressure, attach HYDAC charging and gauging unit by following the instructions in the HYDAC Charging and Gauging Units manual #02068202. Once attached, turn "T" handle until pressure registers on gauge. Adjust gas precharge pressure if necessary (refer to paragraph 2).

3.2 Measuring Gas Precharge Pressure on the Fluid Side

This method requires that a pressure gauge be installed on the safety and shut-off block (fig. 1, item 2) or similar device, which is connected directly to the accumulator. The procedure utilizing the SAF Block is as follows:

- Using hydraulic system pressure fill accumulator with fluid.
- Close shut-off valve (fig. 1, item 3).
- Discharge fluid slowly, by opening the manual bleed valve (fig. 1, item 4).
- While draining the fluid, monitor the pressure gauge closely. The pressure in the gauge will suddenly drop to zero; the pressure indicated immediately prior to this sudden drop is the gas precharge pressure.

3.3 Intervals Between Checking

The gas precharge pressure should be checked at least once during the first week of operation. If there is no loss of gas precharge pressure, it should be rechecked in 3 to 4 months. Thereafter, it should be checked at least once a year.

4. Safety Equipment

HYDAC recommends that the following safety equipment be used in conjunction with accumulators:

4.1 Safety and Shut-off Block

The Hydac safety and shut-off block (see fig. 1) was designed to incorporate the following safety features:

- Pressure measurement device.
- Pressure relief device.
- Shut-off device.
- Bleed down device (*manual or electric operation*).
- Locking device

4.2 Thermal Fuse Cap

In addition to the above, HYDAC also recommends the use of its Thermal Fuse Cap to release gas pressure in the event of a fire.

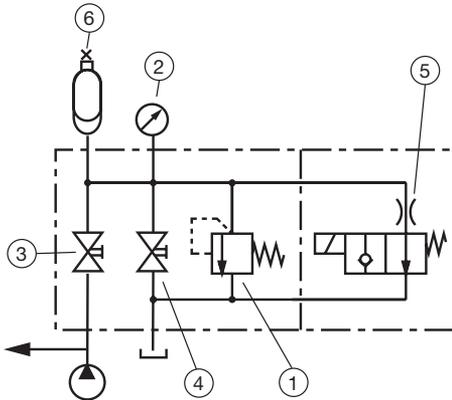


Fig. 1; Schematic of a HYDAC Safety and Shut-off Block

- 1 - pressure relief valve
- 2 - pressure gauge (*optional*)
- 3 - shut-off valve
- 4 - manual bleed valve
- 5 - solenoid operated bleed valve (*optional*)
- 6 - thermal fuse cap (*optional*)