Accumulators
Charging & Gauging Units
FPK / FPS Operating Manual

1.877.GO.HYDAC www.HYDACusa.com
1.888.99.HYDAC www.HYDAC.ca
**Version 4**

- **valve protection cap** *(where applicable)*
- **Valve seal cap**
- **O-ring**

**Version 1**

- **Valve protection cap** *(where applicable)*
- **O-ring** *(where applicable)*
- **Allen Wrench 6 mm** *(to be used to crack open M8 SHCS. T-handle on FPK Charging is not robust enough to overcome recommended torque)*
- **Socket Head Cap Screw (M8)**
- **Seal ring**

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Figure 1

Figure 2
General Warning!
Hydraulic accumulators are pressurized vessels and only qualified technicians should perform maintenance. For additional information refer to HYDAC Operating and Installation Instructions and HYDAC Maintenance Instructions. Read all instructions thoroughly before beginning any type of service or repair.

Tools Required
1. Gas Valve Core Tool.
2. Torque Wrenches.
3. Wrench(es).

Intervals Between Checking Gas Precharge Pressure
The proper gas precharge pressure should be set after each new installation or repair by following the instructions under the Operating and Installation Instructions below. It should be rechecked at least once during the first week of operation. If there is no loss of gas precharge pressure, it should be rechecked again in 3 to 4 months. Thereafter, it should be checked at least once a year. Recharge accumulator when necessary.

Temperature Effect
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. The formula below relates the precharge temperature (T₀) to the operating temperature (T).

Fahrenheit
\[ P_{0,T0} = P_{0,T2} \times \frac{(T_0 + 460)}{(T_2 + 460)} \]

Celsius
\[ P_{0,T0} = P_{0,T2} \times \frac{(T_0 + 273)}{(T_2 + 273)} \]

\( T_0 \) = precharge temperature
\( T_2 \) = maximum operating temperature
\( P_{0,T0} \) = gas precharge pressure at precharge temperature
\( P_{0,T2} \) = gas precharge pressure at maximum operating temperature

Operating and Installation Instruction
Preparation
To check the gas precharge pressure in an accumulator, it must first be isolated from the system shut off, and all hydraulic pressure relieved.

HYDAC gas valve version 4 (see fig. 2)
Unscrew the valve protection cap (where applicable) and the valve seal cap.

HYDAC gas valve version 1 (see fig. 2)
Unscrew the valve protection cap (where applicable), Slightly loosen the socket head cap screw with a 6 mm Allen wrench (approx. 1/6 turn, see fig. 2).

FPS Unit
Prior to connecting the charging and gauging unit to an accumulator, turn T-handle counter-clockwise until resistance is felt. Close manual bleed valve by hand tightening. Connect the unit to the accumulator by screwing cap nut onto HYDAC gas valve version 4; hand tighten (see fig. 1).

FPK Unit
Prior to connecting the charging and gauging unit to an accumulator, close manual bleed valve by hand tightening. Connect the unit to the accumulator by screwing cap nut onto HYDAC gas valve version 1; hand tighten (see fig. 1).

FPK Unit (with adapter FPK/SB)
Prior to connecting the charging and gauging unit to an accumulator, take adapter FPK/SB and unscrew the socket head cap screw 3 full turns counter clockwise using the 6 mm Allen wrench. This is done to prevent gas valve damage and leakage upon installation. Screw the adapter FPK/SB onto HYDAC gas valve version 4, hand tighten. Close manual bleed valve on the FPK unit hand tight. Connect FPK unit to adapter FPK/SB by screwing cap nut onto the adapter; hand tighten.
Checking Gas Precharge Pressure

Connect the appropriate charging and gauging unit to the accumulator following the instructions under “Preparation” (see page 2). Note: Temperature affects the gas precharge pressure, please refer to “Temperature Effect” (see page 2).

FPS Unit

Turn T-handle “A” clockwise a maximum of 3 full turns from the full counterclockwise position. The gauge needle should indicate the existing gas precharge pressure. If there is no gas precharge pressure indicated or if it is too low or too high, please follow instructions under the appropriate section, either “Pressure Release” (see below) or “Charging” (to right). If desired gas precharge pressure registers, please follow the instructions under “Removal of Charging and Gauging Unit” (see page 5).

FPK Unit

Turn T-handle counter clockwise a maximum of 3 full turns. The gauge needle should indicate the existing gas precharge pressure. If there is no gas precharge pressure indicated or if it is too low or too high, please follow instructions under the appropriate section, either “Pressure Release” (see page 3) or “Charging” (see page 3). If desired gas precharge pressure registers, please follow the instructions under “Removal of Charging and Gauging Unit” (see page 4).

Pressure Release

With the appropriate charging and gauging unit attached as previously described, gas precharge pressure can be released by carefully opening manual bleed valve. Release the gas precharge pressure very slowly until the desired gas precharge pressure is reached (this insures that the gas temperature does not fluctuate greatly, providing and accurate gas precharge pressure). Close the manual bleed valve. Allow the gas precharge pressure to stabilize. (5 to 10 minutes) recheck, adjust if required. Once the desired gas precharge pressure is reached, please follow the instructions under “Removal of Charging and Gauging Unit” (see page 5).

Charging

Warning!

Never use oxygen or air - this could cause an explosion! Use dry nitrogen or other recommended gases.

HYDAC recommends the use of a pressure regulator on the commercially available nitrogen bottle to regulate pressure to the charging and gauging unit.

Note: Full nitrogen pressure may damage the gauge. Connect the charging hose to a commercially available nitrogen bottle by means of the G4 adapter (other adapters are available, check with factory for type); the adapter connects to the cap screw “G1”. Connect cap nut of the charging hose to check valve of the charging and gauging unit (see fig. 1). Connect the appropriate charging and gauging unit to the accumulator by following the instructions previously described (see page 2).

Initial Charging

When charging an accumulator that has no initial gas precharge, allow 20 to 30 minutes for the gas temperature and thus pressure to stabilize. Recheck the gas precharge pressure and adjust if necessary.

FPS Unit

Turn T-handle clockwise 3 full turns. Proceed to “Filling”.

FPK Unit

Turn T-handle counter clockwise 3 full turns. Proceed to “Filling”.

FPK Unit (with adapter FPK/SB)

Turn T-handle clockwise 3 full turns. Proceed to “Filling”.
Pressure Increase
When charging an accumulator that has an existing gas precharge, allow 5 to 10 minutes for the gas temperature and thus pressure to stabilize.

FPS Unit
Turn T-handle clockwise until the gauge needle begins to deflect, then turn it another full turn. Proceed to “Filling”.

FPK Unit
Turn T-handle clockwise until the gauge needle begins to deflect, then turn it another full turn. Proceed to “Filling”.

FPK Unit
Turn T-handle clockwise until the gauge needle begins to deflect, then turn it another full turn. Proceed to “Filling”.

Filling
Open the shut-off valve on the commercially available nitrogen bottle and slowly fill the accumulator with dry nitrogen gas.
Precharge very slowly until the pressure in the accumulator reaches 100 psi. Once 100 psi is reached, the charging rate can increase. Charging too quickly may damage the accumulator.

Note: The gauge registers the line pressure, not necessarily the accumulator pressure while charging.

After allowing the appropriate time for the gas temperature and thus pressure to stabilize, adjust the gas precharge pressure as required, refer to “Pressure Increase” (see page 4) or “Pressure Release” (see page 3).

Once the desired gas precharge pressure is reached close the shut-off valve on the commercially available nitrogen bottle.
Remove the charging and gauging unit from the gas valve as described under “Removal of Charging and Gauging Unit” (see page 5).

Removal of Charging and Gauging Unit
Close the shut-off valve on the commercially available nitrogen bottle before removing the charging and gauging unit.

FPS Unit
Turn T-handle counter clockwise until resistance is felt to close the gas valve. Open manual bleed valve to relieve pressure in the charging and gauging unit. Proceed to “Disconnecting”.

FPK Unit
Turn T-handle clockwise until the gas valve is felt to close the socket head cap screw, hand tighten. Open manual bleed valve to relieve pressure in the charging and gauging unit. Proceed to “Disconnecting”.

FPK Unit
Turn T-handle counter clockwise until resistance is felt to close the gas valve. Open manual bleed valve to relieve pressure in the charging and gauging unit. Proceed to “Disconnecting”.

Disconnection
Unscrew the charging and gauging unit from the gas valve. Note: For FPK unit with adapter FPK/SB it may be necessary to loosen the connection between cap nut and the adapter to remove the charging and gauging unit. Check for leaks. None are permissible.

Completion
HYDAC gas valve version 1 (see fig. 1)
Tighten socket head screw cap to 20 Nm (15 lb-ft), and screw on valve protection cap (where applicable); hand tighten.

HYDAC gas valve version 4 (see fig. 1)
Screw on valve seal cap torquing to 30 Nm (22 lb-ft), and valve protection cap (where applicable); hand tighten.
### Spare Parts

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<th>Item</th>
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<td>Seal-Ring</td>
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A Adapters (Gauge to Accumulator)

A1  PN 00361619
M28x1.5  M16x1.5

A2  PN 00361605
M28x1.5  5/8-18UNF

A3  (ADAPTER FPK/SB)  PN 00291533
M28x1.5  7/8-14UNF

A4  PN 00291536
M28x1.5  7/8-14UNF

A5  PN 00291531
M28x1.5  M8x1

A6  PN 02108819
M28x1.5  G3/4A

A7  PN 02110629
M28x1.5  G1/4

A8  PN 02124524
M28x1.5  G3/4

A9  PN 02128638
M28x1.5  Vg8

A10 PN 02128849
M28x1.5  7/8-14UNF

A11 PN 03018210
M28x1.5  M16x2

A12 PN 03930191
M28x1.5  M16x2
(Test Point)
G Adapters (Charging to Accumulator)

**G2**
PN 00236376
Australia
Argentina
Great Britain
Vietnam
Others

**G3**
PN 02103421
Egypt
Lebanon
Israel
Others

**G4**
PN 02068737
USA
Canada
Puerto Rico

**G5**
PN 02236373
Italy

**G6**
PN 02103423
Japan

**G7**
PN 00236377
Korea

**G8**
PN 02103425
Brazil
Chile
Columbia
Others

**G9**
PN 00241168
Taiwan

**G10**
PN 02103427
Russia
Trinidad
Tobago
Venezuela

**G11**
PN 03018678
China

Charging Hoses

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**G1**
SW32

M

M14x1.5