

HYDAC

INTERNATIONAL
INNOVATIVE FLUID POWER



Accumulators

Charging & Gauging Units
FPK / FPS Operating Manual



PN#02068202 • ACU1107-1367 / 09.11

FPS

FPK

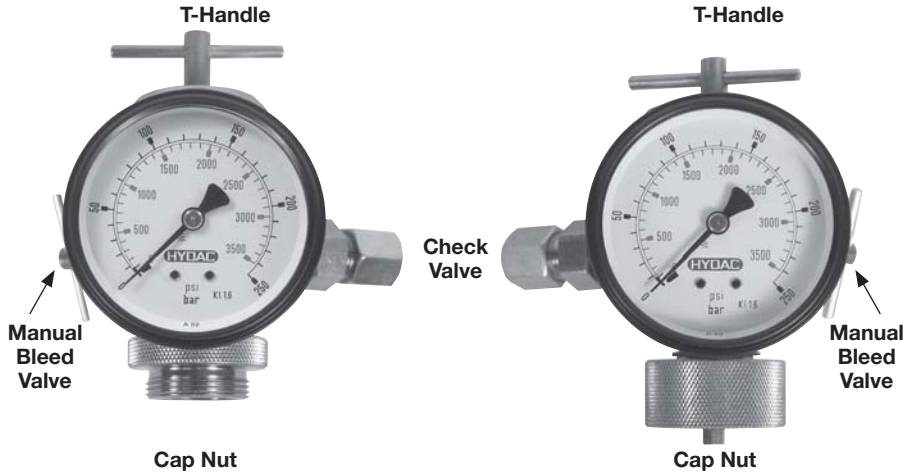


Figure 1

Version 4

Version 1

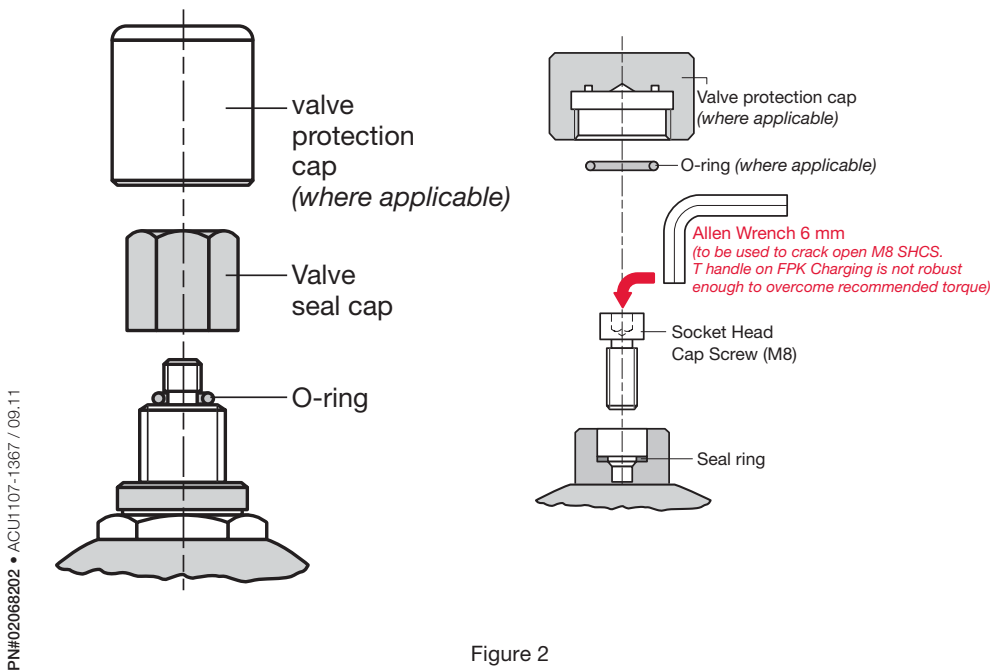


Figure 2

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 (T_0) to the operating temperature (T).

Fahrenheit

$$P_{0,T0} = P_{0,T2} \times (T_0 + 460) / (T_2 + 460)$$

Celsius

$$P_{0,T0} = P_{0,T2} \times (T_0 + 273) / (T_2 + 273)$$

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 an 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 counter clockwise until the gauge needle begins to deflect, then turn it another full turn. Proceed to "Filling".

FPK Unit (with adapter FPK/SB)

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 shutoff 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 resistance 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 (with adapter FPK/SB)

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

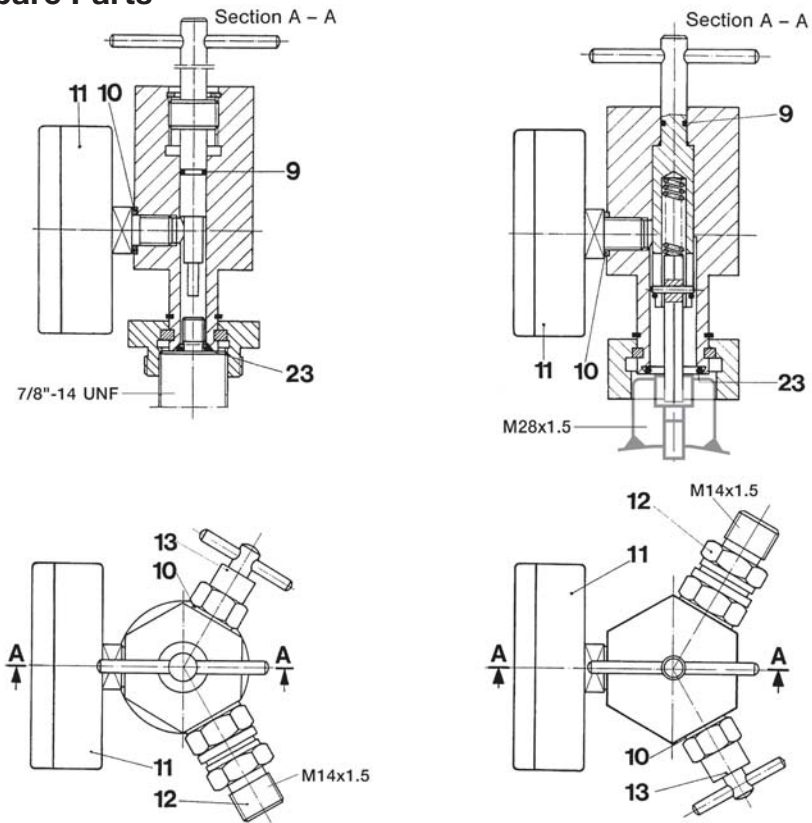
HYDAC gas valve version 1 (see fig. 1)

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

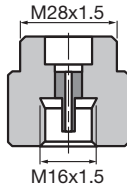


Item	Description	Part No.
9	O-Ring	00601032
10	Seal-Ring	00601228
11	Gauge (select pressure range below)	
	10 (0 to 145 psi)	00606759
	25 (0 to 350 psi)	00606760
	100 (0 to 1400 psi)	00606761
	250 (0 to 3500 psi)	00606762
	400 (0 to 5800 psi)	00606763
12	Check Valve	00610004
13	Manual Bleed Valve	00236445
23	O-Ring - FPS	00626488
	O-Ring - FPK	00601049
-	2.5m Hose	00236514
-	4m Hose	00236515
-	10m Hose	00373405
-	ADAPTER G4	02068737
-	ADAPTER A3 (FPK/SB)	00291533
-	O-Ring - ADAPTER A3 (FPK/SB)	00601964

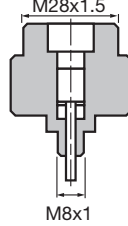
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A Adapters (Gauge to Accumulator)

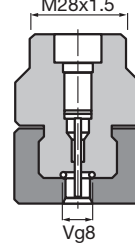
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PN 00361619



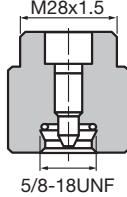
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PN 00291531



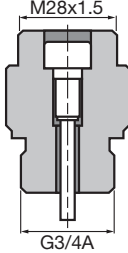
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PN 02128638



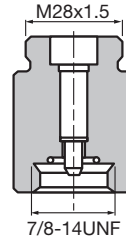
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PN 00361605



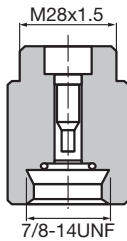
A6
PN 02108819



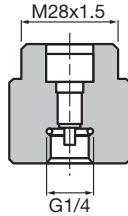
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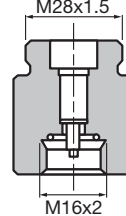
A3 (ADAPTER FPK/SB)
PN 00291533



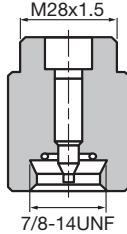
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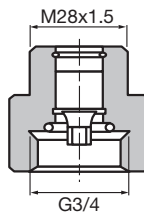
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PN 03018210



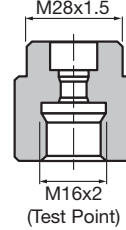
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A8
PN 02124524



A12
PN 03930191



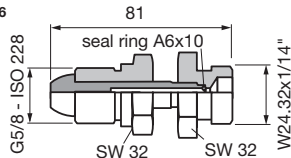
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G Adapters (Charging to Accumulator)

G2

PN 00236376

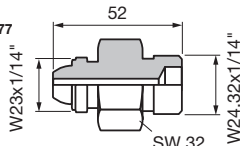
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Great Britain
Vietnam
Others



G7

PN 00236377

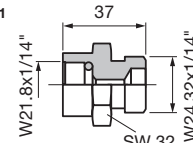
Korea



G3

PN 02103421

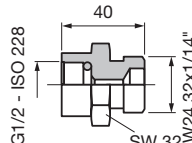
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Lebanon
Israel
Others



G8

PN 02103425

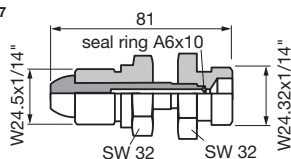
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Chile
Columbia
Others



G4

PN 02068737

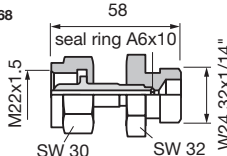
USA
Canada
Puerto Rico



G9

PN 00241168

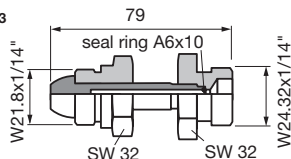
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G5

PN 00236373

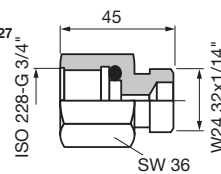
Italy



G10

PN 02103427

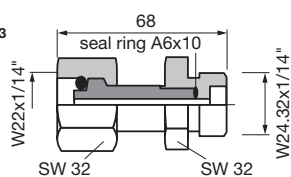
Russia
Trinidad
Tobago
Venezuela



G6

PN 02103423

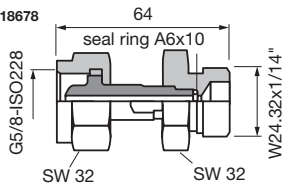
Japan



G11

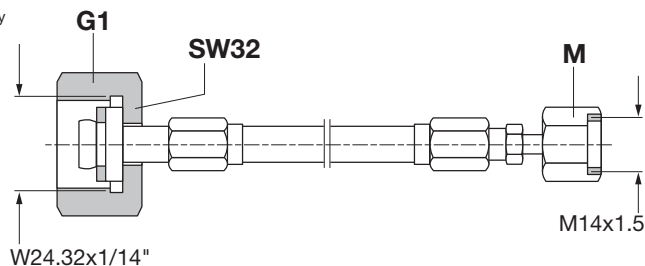
PN 03018678

China



Charging Hoses

Germany
Poland
Others



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