To maintain system performance HYDAC recommends that the gas precharge pressure is checked regularly. The inevitable loss of gas precharge pressure due to permeability will change the system effectiveness (performance) and could cause damage to the bladder, diaphragm, or piston accumulator.

HYDAC charging and gauging units allow hydro-pneumatic accumulators to be precharged with dry nitrogen. For these purposes, a charging and gauging unit is connected to a commercially available nitrogen bottle via a flexible charging hose.

These units also allow maintenance personnel to check the current gas precharge pressure of an accumulator. For critical systems, consider the use of a permanent gauging block (see page 82) which will provide for continuous monitoring.

All HYDAC charging and gauging units incorporate a gauge and check valve in the charging connection, and a manual bleed valve with a T-handle.

HYDAC offers two types of charging and gauging units:
- FPK for use with HYDAC version 1 gas valve
- FPS for use with HYDAC version 4 gas valve

### Model Code

**Note:** For Oil, Gas & Marine specific charging & gauging units please refer to page 67

<table>
<thead>
<tr>
<th>Series</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPK</td>
<td></td>
<td>for use with Gas Valve Version 1 (M28 x 1.5) for SBO and SK</td>
</tr>
<tr>
<td>FPS</td>
<td></td>
<td>for use with Gas Valve Version 4 (8VI-ISO 4570) for SB, SBO and SK</td>
</tr>
</tbody>
</table>

### Gauge Pressure Range

<table>
<thead>
<tr>
<th>Gauge Pressure Range</th>
<th>PSI</th>
<th>Bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0 to 145</td>
<td>0 to 10</td>
</tr>
<tr>
<td>25</td>
<td>0 to 350</td>
<td>0 to 25</td>
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<tr>
<td>100</td>
<td>0 to 1400</td>
<td>0 to 100</td>
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<tr>
<td>250</td>
<td>0 to 3500</td>
<td>0 to 250</td>
</tr>
<tr>
<td>400</td>
<td>0 to 5800</td>
<td>0 to 400</td>
</tr>
</tbody>
</table>

### Charging Hose

- **F** with cap screw G1 (thread W24, 32x1/14 - DIN477)

### Charging Hose Length

- **2.5** 8 ft. (2.5 m)
- **4.0** 13 ft. (4 m)

### Adapter

- **G4** USA (only for CGA 580 gas bottle connections)
- **G4.1** USA (only for CGA 680 gas bottle connections)
- **G1** Germany (integral part of charging hose)
- **G2** Great Britain, India
- **G3** France, Mexico
- **G5** Italy
- **G6** Japan
- **G7** South Korea
- **G8** Brazil, Columbia, Peru
- **G9** Taiwan
- **G10** Russia, Venezuela
- **G11** China
- **G12** Australia

### Case

- **K** plastic carrying case (standard)

### Additional Accessories:

- **ADAPTER A3 (FPK/SB)** = adapter for using FPK Charging Unit to fit HYDAC gas valve version 4, including top repairable bladder accumulators

**Note:** For other adapters please consult factory.

- **6mm Allen Wrench** (for HYDAC Gas Valve Version 1, included with FPK Kits)
- **14mm Open End Wrench** (for HYDAC gauge, optional)

Operating and Installation Instructions are included with each charging kit. This is also available for download in PDF format on our web site: [www.hydacusa.com](http://www.hydacusa.com)

For spare parts see page 77.
**Model FPS**
For use with gas valve version 4.
(Except for top repairable bladder accumulators)

**Model FPK**
For use with gas valve version 1.

**Gas Valve Version 4**
On a Bottom Repairable Bladder Accumulator as well as Diaphragm Accumulators with E4 gas valve and piston accumulators with VE Gas Valve.

**Gas Valve Version 1**
Metric, M28 x 1.5
Used on Diaphragm Accumulators w/ E1 gas valves and Piston Accumulators w/ VA or VB gas valves

**Adapter A3 (FPK/SB)**
Part No. 291533
The A3 (FPK/SB) adapter can be used with the FPK to connect to any HYDAC version 4 gas valve for both bottom and top repairable bladder accumulators. The A3 adapter also serves as the required spacer for top repairable bladder accumulators.

Connection to Version 4 Gas Valve
Description

To maintain system performance HYDAC recommends that the gas precharge pressure is checked regularly. The inevitable loss of gas precharge pressure due to permeability will change the system effectiveness (performance) and could cause damage to the bladder, diaphragm, or piston accumulator.

HYDAC charging and gauging units allow hydro-pneumatic accumulators to be precharged with dry nitrogen. For these purposes, a charging and gauging unit is connected to a commercially available nitrogen bottle via a flexible charging hose. These units also allow maintenance personnel to check the current gas precharge pressure of an accumulator. For critical systems, consider the use of a permanent gauging block (see page 82) which will provide for continuous monitoring.

All HYDAC charging and gauging units incorporate a gauge and check valve in the charging connection, and a manual bleed valve with a T-handle.

This charging kit is used for oil & gas / offshore type accumulators having the repairable 2 piece gas valve (denoted by “11” in the gas port segment in the accumulator model code.)

Model Code

Charging and Gauging Unit
FPO = for use with Gas Valve Version 4 (8VI-ISO 4570) for SB, SBO and SK
Gauge Pressure Range
210 = 0 to 3000 psi (0 to 210 bar)
Charging Hose
F = with nitrogen bottle connection CGA-580
Charging Hose Length
3.0 = 10 ft. (3 m)
Case
K = plastic carrying case (standard)

Additional Accessories:
Gas Valve Extension Rod - to be used with top repairable accumulators
Operating and Installation Instructions are included with each charging kit.
This is also available for download in PDF format on our web site: www.hydacusa.com

Spare Parts

<table>
<thead>
<tr>
<th>Part Description</th>
<th>Item</th>
<th>Quantity</th>
<th>Part No.</th>
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</thead>
<tbody>
<tr>
<td>FPO 210 Replacement Kit consists of:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure Gauge, 3000 PSI</td>
<td>1</td>
<td>1</td>
<td>2701622</td>
</tr>
<tr>
<td>T-Handle Lock Chuck</td>
<td>2</td>
<td>1</td>
<td>2701615</td>
</tr>
<tr>
<td>Charging Manifold, FPO</td>
<td>3</td>
<td>1</td>
<td>consult factory</td>
</tr>
<tr>
<td>Tank Valve</td>
<td>4</td>
<td>1</td>
<td>2701617</td>
</tr>
<tr>
<td>Bleeder Valve</td>
<td>5</td>
<td>1</td>
<td>consult factory</td>
</tr>
<tr>
<td>Charging Manifold / Bleeder Valve Assembly</td>
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<td></td>
<td>2089952</td>
</tr>
<tr>
<td>Hose Assembly FPO 210 (CGA 580) consists of:</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>High Pressure Coupling (swivel) 1/8” NPT</td>
<td>6</td>
<td>1</td>
<td>2701590</td>
</tr>
<tr>
<td>Hose, FPO 3000 PSI, 3m</td>
<td>7</td>
<td>1</td>
<td>2701621</td>
</tr>
<tr>
<td>Nipple Gland, CGA-580</td>
<td>8</td>
<td>1</td>
<td>2701620</td>
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<tr>
<td>Nut, CGA-580</td>
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<td>1</td>
<td>2701619</td>
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<tr>
<td>Top Repairable Gas Valve Extension</td>
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<td>1</td>
<td>2701741</td>
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Adapters

Connecting Charging & Gauging Units to 3000 psi Accumulators

FPS Unit with Adapter D4/D7

FPK Unit with Adapter A*

Adapter D4/D7
Part Number 02067646
Used with FPS Charging & Gauging Unit

*A Adapters
Used with FPK Charging & Gauging Unit

A1
PN 00361619
M28x1.5
M16x1.5
5/8-18UNF
7/8-14UNF
G1/4

A2
PN 0361605
M28x1.5
5/8-18UNF
7/8-14UNF
G3/4

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
G Adapters - Connects Charging Hose to Gas Bottle

G2 through G11 to be used to adapt from G1 connection on 3000psi hose to N₂ Bottle or regulator.

**Included in all charging kits**
Connecting Charging Hose to Gas Bottle

The standard FPS & FPK Charging and Gauging kits include a hose w/ the G1 bushing and a G4 adapter for North America. Other “G” adapters are available separately or included in kit. Consult factory for availability.

Charging Hoses

<table>
<thead>
<tr>
<th>WP</th>
<th>Length</th>
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<tbody>
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<td>3000 psi</td>
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<td></td>
</tr>
<tr>
<td>2.5 m</td>
<td>236514</td>
<td></td>
</tr>
<tr>
<td>4.0 m</td>
<td>236515</td>
<td></td>
</tr>
<tr>
<td>10.0 m</td>
<td>373405</td>
<td></td>
</tr>
<tr>
<td>15.0 m</td>
<td>211552</td>
<td></td>
</tr>
<tr>
<td>20.0 m</td>
<td>2109765</td>
<td></td>
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<tr>
<td>28.0 m</td>
<td>2109574</td>
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</table>

CGA 580 Adapter (for USA only)
PN 02701355
From G4 Adapter to Regulator

CGA 680 Adapter (for USA only)
PN 02701356
From G4.1 Adapter to Regulator

5000 psi Hose Assembly

<table>
<thead>
<tr>
<th>WP</th>
<th>Length</th>
<th>Part No.</th>
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</thead>
<tbody>
<tr>
<td>2.5 m</td>
<td>3053703</td>
<td></td>
</tr>
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<td>4.0 m</td>
<td>3053704</td>
<td></td>
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<tr>
<td>10.0 m</td>
<td>3117720</td>
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### Charging & Gauging Units

#### Spare Parts

**FPS Unit**

- **Section A – A**

- **11** O-Ring - FPS 626488
- **12** O-Ring - FPK 601049
- **-** 2.5m Hose 236514
- **-** 4m Hose 236515
- **-** 10m Hose 373405
- **-** ADAPTER G4 2068737
- **-** ADAPTER A3 (FPK/SB) 291533
- **-** O-Ring - ADAPTER A3 (FPK/SB) 601964

**FPK Unit**

- **Section A – A**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Part No.</th>
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<tbody>
<tr>
<td>9</td>
<td>O-Ring</td>
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<tr>
<td>10</td>
<td>Seal-Ring</td>
<td>601228</td>
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<tr>
<td>11</td>
<td>Gauge (select pressure range below)</td>
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</tr>
<tr>
<td></td>
<td>10 (0 to 145 psi)</td>
<td>606759</td>
</tr>
<tr>
<td></td>
<td>25 (0 to 350 psi)</td>
<td>606760</td>
</tr>
<tr>
<td></td>
<td>100 (0 to 1400 psi)</td>
<td>606761</td>
</tr>
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<td></td>
<td>250 (0 to 3600 psi)</td>
<td>606762</td>
</tr>
<tr>
<td></td>
<td>400 (0 to 5800 psi)</td>
<td>606763</td>
</tr>
<tr>
<td>12</td>
<td>Check Valve</td>
<td>610004</td>
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<tr>
<td>13</td>
<td>Manual Bleed Valve</td>
<td>236445</td>
</tr>
<tr>
<td>23</td>
<td>O-Ring - FPS</td>
<td>626488</td>
</tr>
<tr>
<td></td>
<td>O-Ring - FPK</td>
<td>601049</td>
</tr>
<tr>
<td></td>
<td>2.5m Hose</td>
<td>236514</td>
</tr>
<tr>
<td></td>
<td>4m Hose</td>
<td>236515</td>
</tr>
<tr>
<td></td>
<td>10m Hose</td>
<td>373405</td>
</tr>
<tr>
<td></td>
<td>ADAPTER G4</td>
<td>2068737</td>
</tr>
<tr>
<td></td>
<td>ADAPTER A3 (FPK/SB)</td>
<td>291533</td>
</tr>
<tr>
<td></td>
<td>O-Ring - ADAPTER A3 (FPK/SB)</td>
<td>601964</td>
</tr>
</tbody>
</table>

**WARNING:** Only qualified persons should perform maintenance on any type of accumulator. Complete maintenance instructions are available - Contact HYDAC.
Minimum Clearances for Charging & Gauging Kits
Diaphragm (SBO) and Bladder (SB) Accumulators

---

Diaphragm (SBO), Version 4 Gas Valve
(8VI-ISO 4570) FPS Charging & Gauging Kit

- Clearance: 0.125"
- Minimum: 3.18

Bladder (SB), Version 4 Gas Valve
(8VI-ISO 4570) FPS Charging & Gauging Kit

- Clearance: 0.125"
- Minimum: 3.18

Diaphragm (SBO), Version 1 Gas Valve
(M28 x 1.5) FPS Charging & Gauging Kit

- Clearance: 0.125"
- Minimum: 3.18

Bladder (SB), Version 4 Gas Valve
(8VI-ISO 4570) FPK Charging & Gauging Kit

- Clearance: 0.125"
- Minimum: 3.18

Bladder (SB), Version 4 Gas Valve
(8VI-ISO 4570) FPK Charging & Gauging Kit with A3 Adapter

- Clearance: 0.125"
- Minimum: 3.18

---

Courtesy of CMA/Flodyne/Hydradyne / Motion Control / Hydraulic / Pneumatic / Electrical / Mechanical / (800) 426-5480 / www.cmafh.com
Permanent Gauging Block

**Description**

The HYDAC Permanent Gauging Block allows constant monitoring of gas pressure while a system is in operation. This helps users monitor pressure loss, and determine when charging is needed. They are designed to fit bladder, diaphragm, and piston style accumulators with HYDAC Gas Valve Version 4. Use of these blocks facilitates trouble shooting and simplifies maintenance by eliminating the need to attach a charging and gauging unit to monitor pressure. Charging of the accumulator is accomplished by simply attaching a HYDAC charging kit to the gas valve on top of the Permanent Gauging Block in exactly the same manner as attaching to an accumulator without the Permanent Gauging Block.

**Special Tools Required**

- Charging and Gauging Unit
- Gas Valve Core Tool
- 50 mm Open End Wrench (for bottom repairable accumulator)
- 32 mm Open End Wrench (for top repairable accumulator)
- Torque Wrench(es)

Note: The gas valve core (for Version 4) or the M8 SHCS (for Version 1) gas valves must be removed to allow unrestricted gas flow from the accumulator into the Permanent Gauge Block. Read all instructions thoroughly before beginning any type of service or repair work. Refer to additional information contained in the “Operating and Installation Instructions for HYDAC Accumulators.”

**Model Code**

<table>
<thead>
<tr>
<th>Series</th>
<th>Perm Gauging Block</th>
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</thead>
<tbody>
<tr>
<td>PERM GAUGING BLOCK VER4</td>
<td>850</td>
</tr>
</tbody>
</table>

**Gas Valve Type**

- VER1 = HYDAC gas valve version 1 (M28x1.5)
- VER4 = HYDAC gas valve version 4 (7/8"-14UNF)

**Accumulator Type**

- Bottom Repairable (standard)
- Top Repairable

- TR = Top Repairable (Oil & Gas / Offshore)

**Gauge Pressure Range**

<table>
<thead>
<tr>
<th>Pressure</th>
<th>Range</th>
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</thead>
<tbody>
<tr>
<td>850</td>
<td>0 to 850 psi</td>
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<tr>
<td>1450</td>
<td>0 to 1450 psi</td>
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<tr>
<td>2300</td>
<td>0 to 2300 psi</td>
</tr>
<tr>
<td>3600</td>
<td>0 to 3600 psi</td>
</tr>
<tr>
<td>5800</td>
<td>0 to 5800 psi</td>
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</table>
Permanent Gauging Blocks

Installation Drawings
Permanent Gauging Blocks for HYDAC Gas Valve Version 4

Bottom Repairable Bladder

Bottom Repairable Bladder with M50 Gas Valve

Top Repairable Bladder

Piston & Diaphragm

Parts Legend

<p>| | |</p>
<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Gas Valve Core</td>
</tr>
<tr>
<td>4</td>
<td>Lock Nut</td>
</tr>
<tr>
<td>5</td>
<td>Valve Seal Cap</td>
</tr>
<tr>
<td>7</td>
<td>O-ring (7.5 x 2)</td>
</tr>
<tr>
<td>8</td>
<td>Name Plate</td>
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</table>