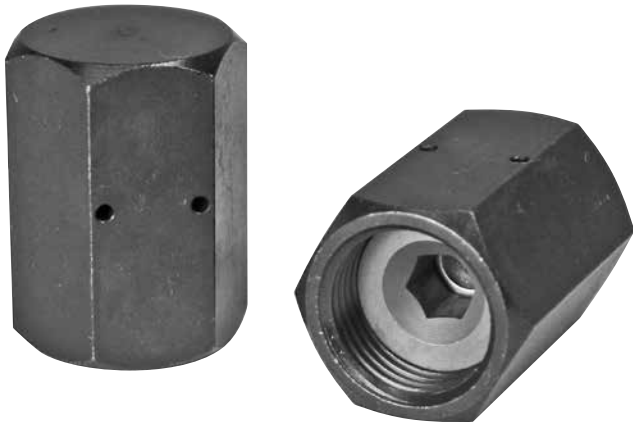


## Thermal Fuse Caps



### Description

HYDAC Thermal Fuse Caps are safety devices that automatically bleed accumulator gas pressure in the event of a fire. These devices are installed on the HYDAC version 4 gas valve. When the critical temperature (320°F to 340°F) is reached, a support ring melts, allowing for the spring to depress the gas valve core.

### Applications

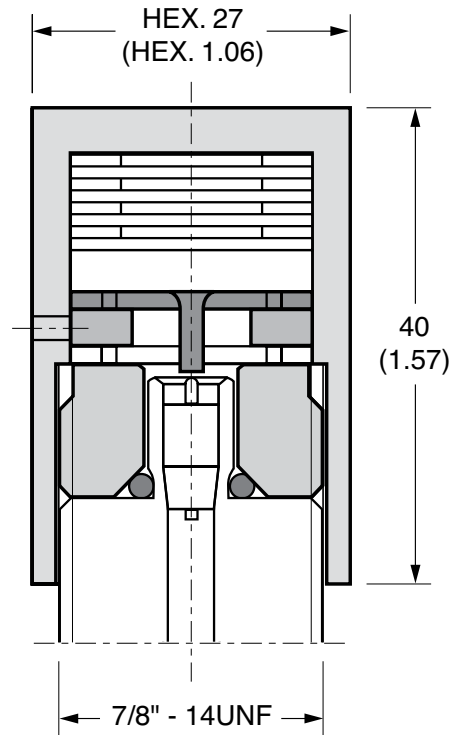
HYDAC Thermal Fuse Caps can be applied as a safety measure on any HYDAC accumulator with a Version 4 Gas Valve. Application of these devices may result in a reduction in insurance premium (*check with provider*).

### Installation

Simply remove and discard the standard Gas Valve Protection Cap and Valve Seal Cap. Screw on the Thermal Fuse Cap and torque to 30 N-m (22 lb-ft.).

### Operation

Once installed, the thermal fuse cap requires no attention. In the event of a fire, the support ring will melt and the spring will expand, causing the pin to depress the gas valve core. The melted support and gas will then exit through the gas bleed ports in the side of the thermal fuse cap.



### Model Code

There are no options for this product, therefore a model code is not given.

**Order Part No. 00363501**

### Technical Data

#### Maximum Working Pressure

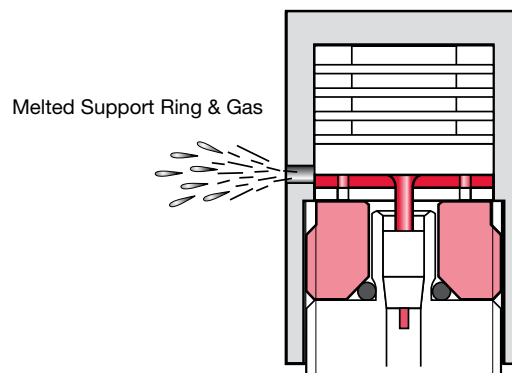
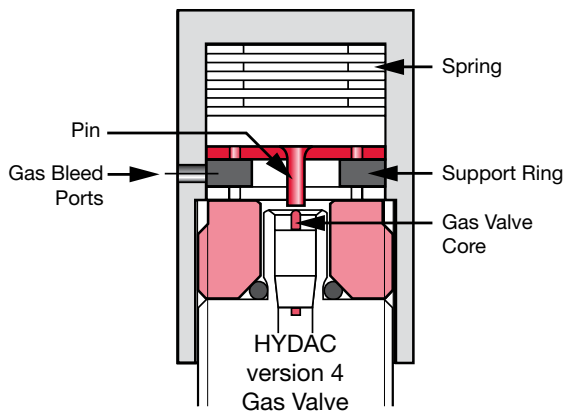
- 5000 psi (345 bar)

#### Maximum Working Temperature

- 200°F (93.5°C)

#### Fusing Temperature

- 320 to 340°F (160 to 171°C)



## Thermal Fuse Plugs, GMP6

CE Certified



### Description

HYDAC GMP6 Thermal Fuse Plugs are safety devices that automatically bleed accumulator gas pressure in the event of a fire. The Thermal Fuse Plug mounts directly to the gas end cap of a piston type accumulator, via a permanent gauging block for bladder and diaphragm type accumulators.

### Advantages

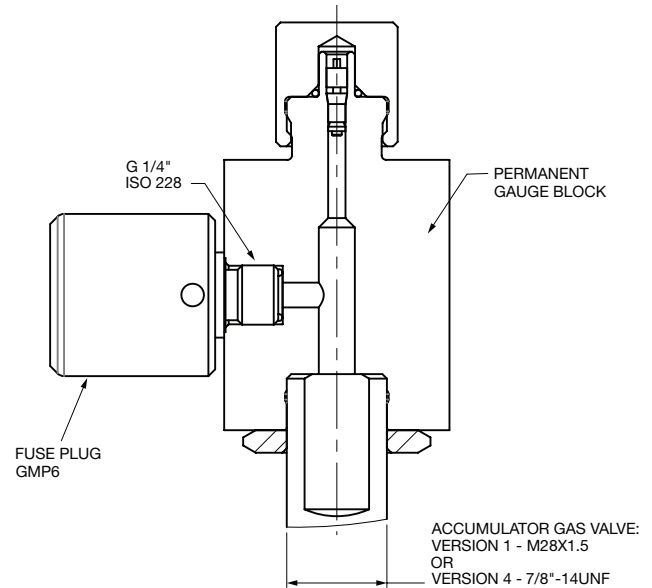
- safety device approved according to PED 97/23/EC with CE-marking and Declaration of Conformity
- variable capability of connecting to bladder, piston and diaphragm accumulators
- suitable for large volume accumulators
- particularly suitable for outdoor applications (e.g. Offshore)

### Installation

The GMP6 Thermal Fuse Plug screws directly onto a piston accumulator. However, the use of a permanent gauging block is required for connection to a bladder or diaphragm accumulator.

### Operation

Once installed, the thermal fuse plug requires no attention. When the critical temperature (320°F to 356°F) is reached, an internal ring melts and a plug releases, allowing the gas to exit through the gas bleed ports in the side of the thermal fuse plug.



GMP6 Thermal Fuse Plug shown with Permanent Gauge Block for use with a bladder or diaphragm accumulator

### Model Code

GMP6-10-CE1637.6.G.120L/S.420bar

Part No.	Connection Type
3517438	ISO 228 - G 1/4

### Technical Data

#### Permitted operating pressure:

- 725 to 6090 psi

#### Temperature range:

- -40° F to 176° F

#### Melting point:

- Between 320° F and 356° F

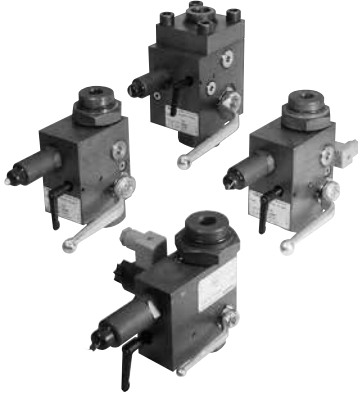
#### Material:

- Stainless Steel

# ACCUMULATOR ACCESSORIES

## SAF Series

### Safety & Shut-off Blocks



#### Description

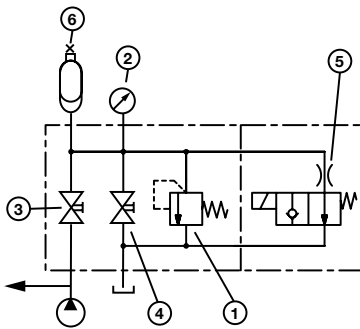
HYDAC safety and shut-off blocks are designed to protect, shut-off, and discharge hydraulic accumulators or user units. The compact design simplifies the hydraulic system connection and offers the following advantages:

- minimum space compared to individual components
- reduced installation time
- various system connections
- system lockout

#### Safety & Shut-off Block Features

- 1 – pressure relief valve (DB12)
- 2 – pressure gauge (optional)
- 3 – main shut-off valve
- 4 – manual bleed valve
- 5 – 2-way solenoid operated bleed valve (optional)
- 6 – accumulator

#### Circuit Diagram



Note: When using hydro-pneumatic accumulators for stored hazardous energy, HYDAC recommends the use of its Safety and Shut-off Block (SAF) with solenoid operated bleed valve.

#### Technical Specifications

##### Fluids

Mineral oil, hydraulic oil, water glycol, non-flammable fluids (other fluids upon request)

##### Temperature (for carbon steel)

5° to 180°F (-15° to 80°C)

##### Maximum Working Pressure

up to 5800 psi (400 bar)

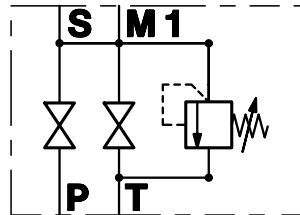
#### Construction

The Safety and Shut-off Block consists of a valve block, a built-in pressure relief valve, a main shut-off valve, and a manually operated bleed valve. In addition, an optional solenoid operated bleed valve allows automatic pressure relief of the accumulator or user unit and therefore relief of the hydraulic system in an emergency or during shut-down. The necessary return line connection is provided in addition to the gauge connection.

#### Standard Models

##### Model with manually operated bleed valve

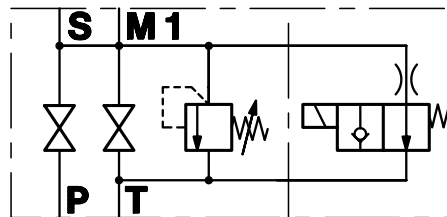
The basic model type "M" contains a manually operated bleed valve for manual pressure release of the accumulator.



Sizes: SAF 10 M  
SAF 20 M  
SAF 32 M

##### Model with solenoid operated bleed valve

In addition to the features of the type "M" block, the type "E" model also contains a solenoid operated bleed valve for automatic pressure release of the accumulator.



Sizes: SAF 10 E  
SAF 20 E  
SAF 32 E

#### Connections

S – Accumulator Connection

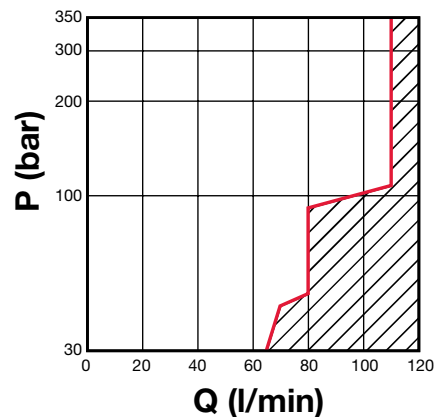
P – System Connection

T – Tank Connection

M1 – Gauge Connection

#### Pressure Relief Valve (DB12)

This valve cannot be set to values in the shaded area



## Model Code

**SAF 20 E 1 6 Y 1 - N 250 C - S 60 L**

**Series**  
SAF = Safety and Shut-off Block (Replaces older model SAB Blocks)

**Size of Main Shut-off Valve**  
10 = DN 10  
20 = DN 20  
32 = DN 32

**Model**  
M = Manual discharge  
E = Solenoid operated and manual discharge

**Block Material**  
1 = Carbon Steel

**Seal Material**  
6 = FPM (Fluoroelastomer)

### 2-Way Solenoid Operated Bleed Valve

**Operating Function**  
(omit) = if manual discharge was selected  
Y = Normally Open (standard) (WSM06020Y)  
Z = Normally Closed (WSM06020Z)

**Solenoid**  
(omit) = if manual discharge was selected  
1 = 0.8 AMP @ 24 VDC  
2 = 0.2 AMP @ 110 VAC – 60 Hz

**Pressure Relief Valve (HYDAC DB12)**  
N 250 = Adjustable up to max pressure of 3625 psi (250 bar)  
N 350 = Adjustable up to max pressure of 5075 psi (350 bar)  
T XXX = Factory set and wire sealed, certified Safety Relief Valve, non-adjustable (xxx is pressure in bar)

**Connection Type (P,T,M1 ports)**  
**Threaded**  
A = BSPP (ISO 228)  
C = SAE (ANSI B 1.1) (standard)

**Flanged (SAF 32 only)**  
E = SAE 2" – 3000 psi (Code 61)  
F = SAE 1-1/2" – 6000 psi (Code 62)

**S Adapter (for S port, accumulator connection)**  
(required only for safety and shut-off blocks with threaded connection)

	SAE (connection type C)	BSPP (connection type A)
<b>For Sizes</b> <b>10 &amp; 20</b>	S 60 = 1 1/16"-12UN (-12)	S 10 = G3/4"
	S 61 = 1 5/16"-12UN (-16)	
	S 62 = 1 5/8"-12UN (-20)	<b>S 11 = G1"</b>
	S 63 = 1 7/8"-12UN (-24)	S 12 = G1 1/4"
	S 64 = 3/4"-16UNF (-8)	S 13 = G2"
<b>For Size</b> <b>32</b>	S 620 = 1 5/8"-12UN	S 309 = G2"
	S 630 = 1 7/8"-12UN	

**Locking Device (if required)**  
L = Locking device

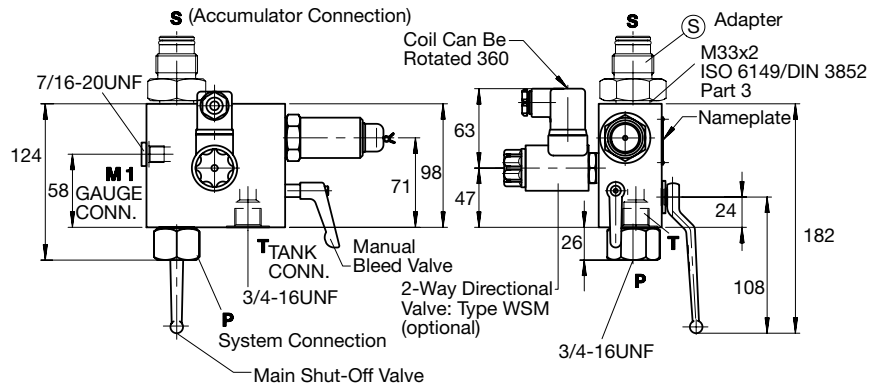
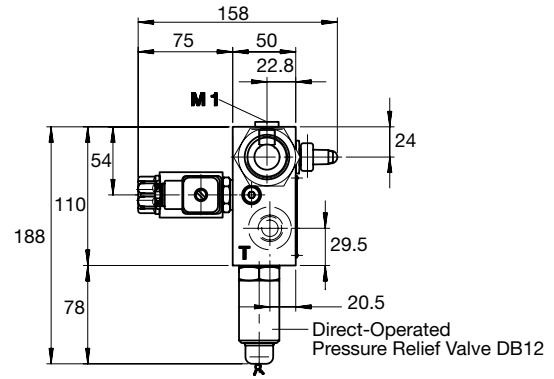
# ACCUMULATOR ACCESSORIES

## Dimensions SAF 10 M/E...C

Type	Approximate Weight	
	kg	(lbs.)
SAF 10 M	4.2	(9.3)
SAF 10 E	4.6	(10.1)

Dimensions in millimeters.

Note: for "M" Type block the 2-way directional valve is replaced with a plug



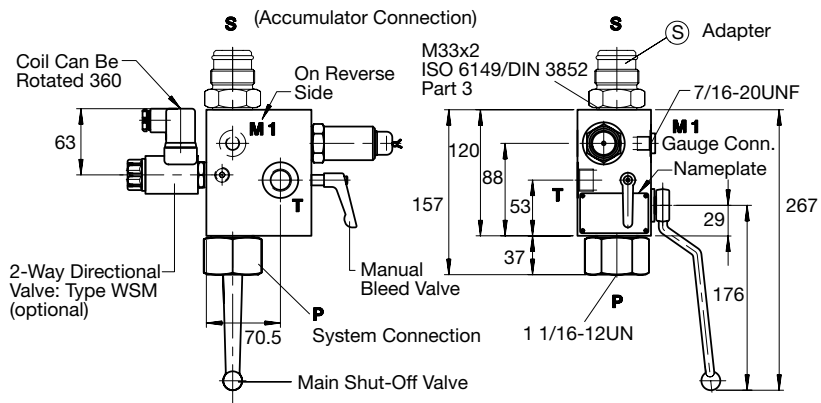
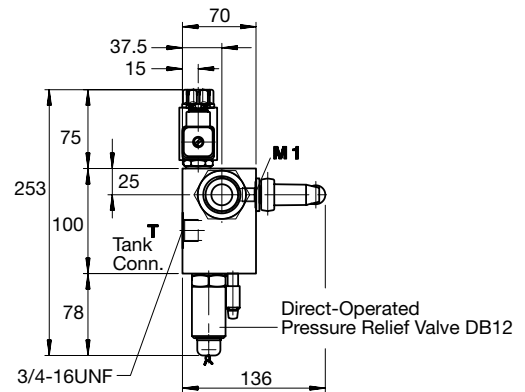
Dimensions are for general information only, all critical dimensions should be verified.

## SAF 20 M/E...C

Type	Approximate Weight	
	kg	(lbs.)
SAF 20 M	6.8	(15.0)
SAF 20 E	7.2	(15.8)

Dimensions in millimeters.

Note: for "M" Type block the 2-way directional valve is replaced with a plug



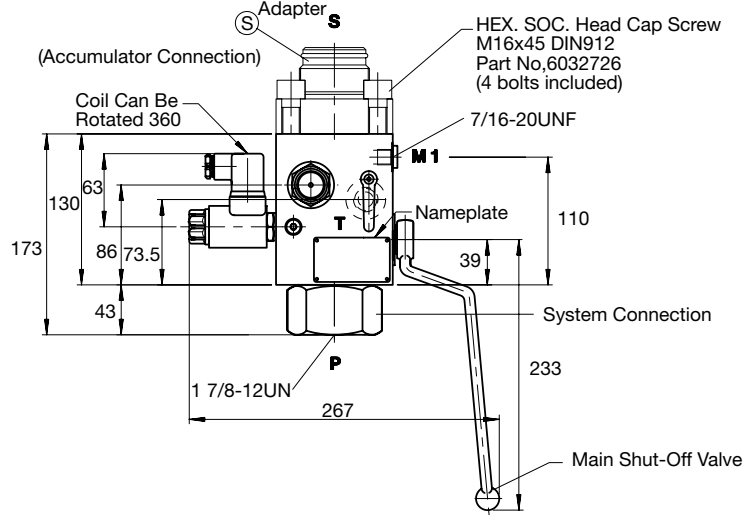
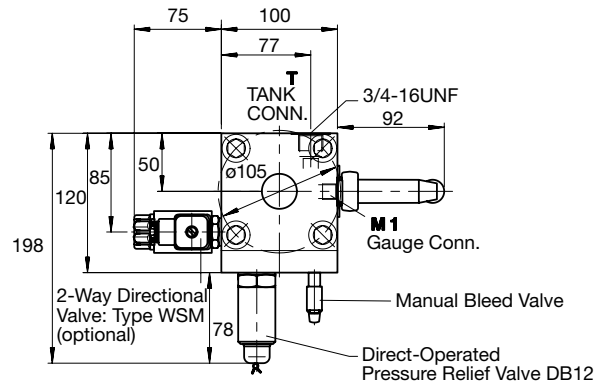
Dimensions are for general information only, all critical dimensions should be verified.

## SAF 32 M/E...C

Type	Approximate Weight	
	kg	(lbs.)
SAF 32 M	12.0	(26.4)
SAF 32 E	12.4	(27.2)

Dimensions in millimeters.

Note: for "M" Type block the 2-way directional valve is replaced with a plug



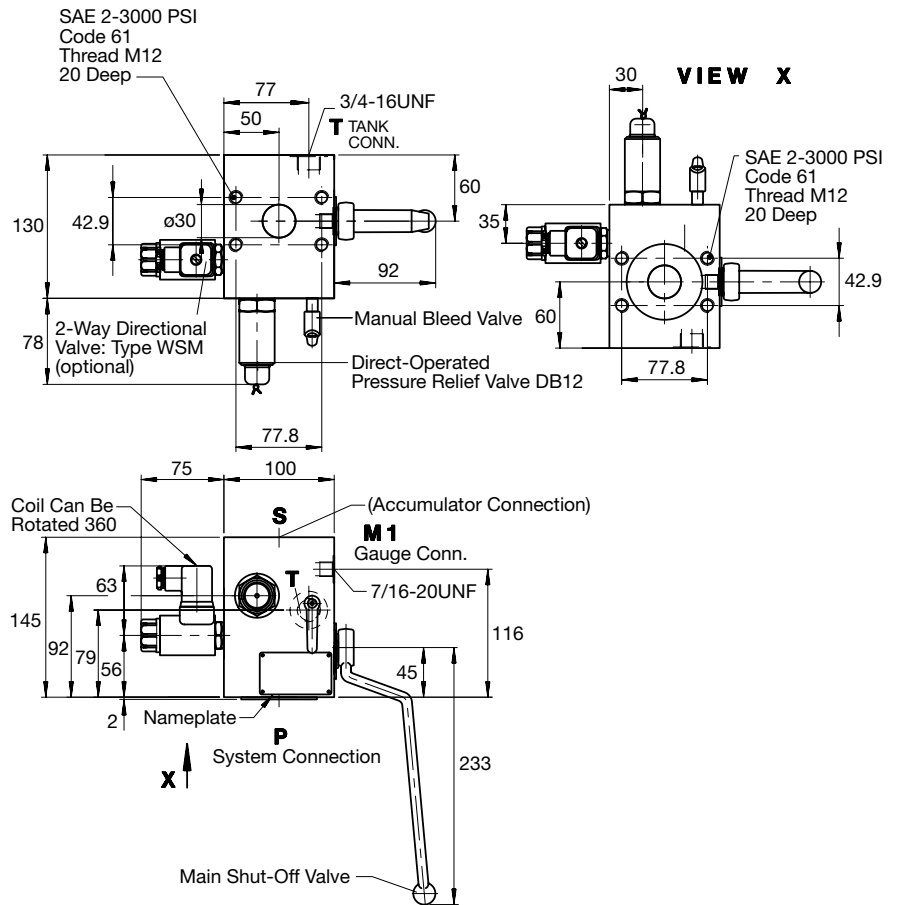
## SAF 32 M/E...E

Type	Approximate Weight	
	kg	(lbs.)
SAF 32 M	15.0	(33.1)
SAF 32 E	15.4	(33.9)

\*Hexagonal socket head cap screws M12x35 - 8.8 SCHS (HYDAC Part No. 602100) have to be ordered separately

Dimensions in millimeters

Note: for "M" Type block the 2-way directional valve is replaced with a plug



Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

# ACCUMULATOR ACCESSORIES

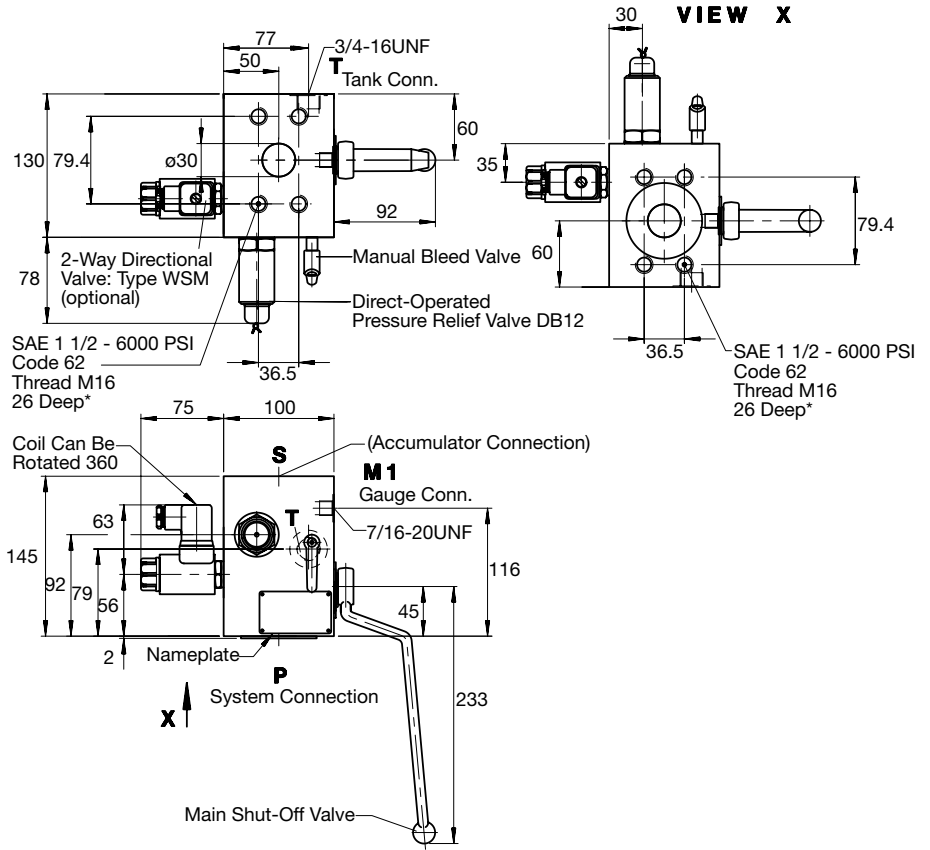
## Dimensions SAF 32 M/E...F

Type	Approximate Weight	
	kg	(lbs.)
SAF 32 M	15.0	(33.1)
SAF 32 E	15.4	(33.9)

\*Hexagonal socket head cap screws  
M16x55 - 8.8 SCHS (HYDAC Part No. 00601496)  
have to be ordered separately

Dimensions in millimeters

Note: for "M" Type block the 2-way directional valve is replaced with a plug



## S Adapters

Fig. 1

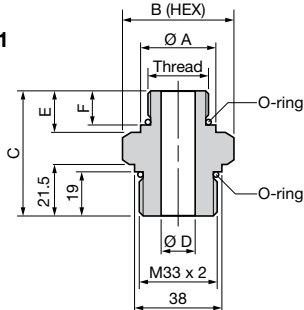
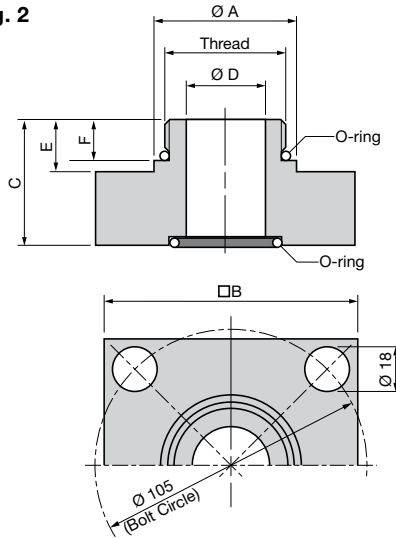


Fig. 2



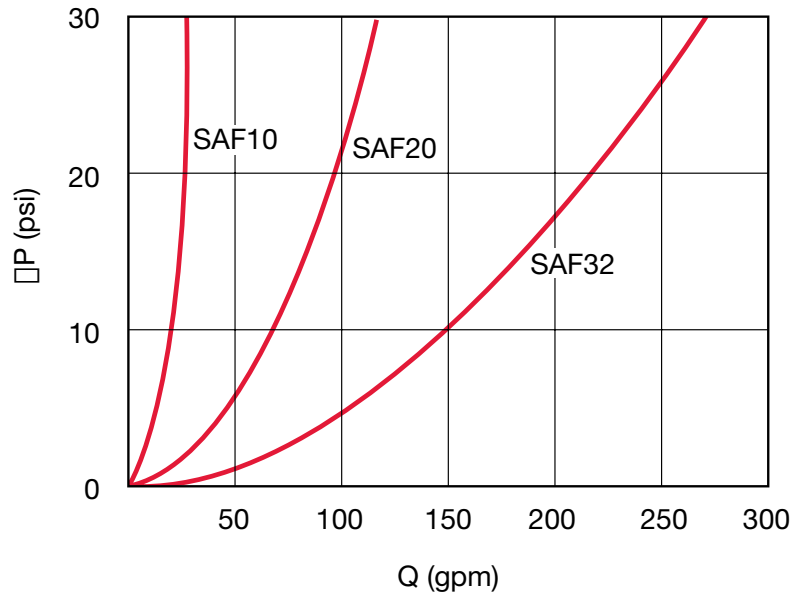
Type SAF	Accumulator Type	Adapter	Fig.	Thread	A	B	C	D	E	F
SAF 10/20	SB330-Size 1 / SBO-Size 2 to 3.5	S 60	1	1 1/16-12 UN	32	41	55	14	19	15
	SBO-Size 1.4, 29 3.5 SK280-100mm bore	S 61	1	1 5/16-12 UN	38	41	55	20	19	15
	SB330-Size 4 to 6 / SB600-Size 1 to 4	S 62	1	1 5/8-12 UN	48	66	57	23	19	15
	SB330/600-Size 10 to 54	S 63	1	1 7/8-12 UN	54	66	57	23	19	15
	SBO-Size 0.32 to 1.4	S 64	1	3/4-16 UNF	23	41	51	10	15	11
SAF 32	SB330-Size 4 to 6 / SB600-Size 1 to 4	S 620	2	1 5/8-12 UN	48	100	49	22	19	15
	SB330/600-Size 10 to 54	S 630	2	1 7/8-12 UN	54	100	49	30	19	15

Dimensions In millimeters

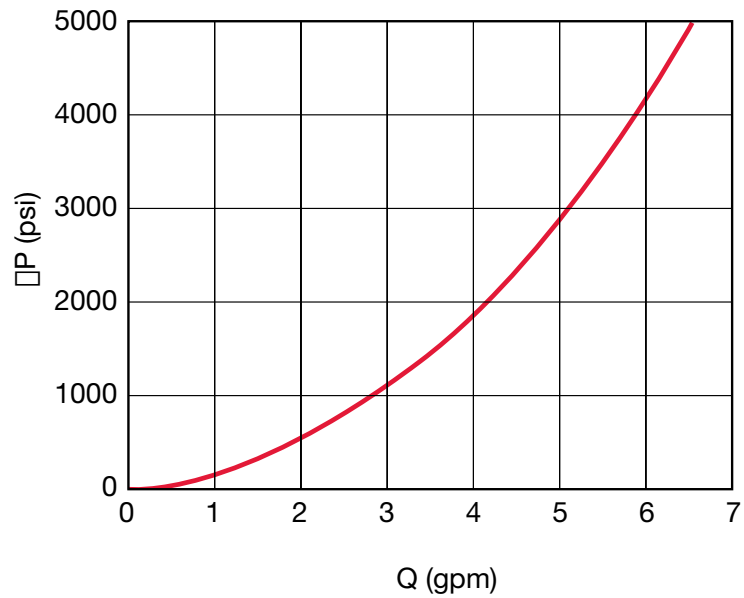
Dimensions are for general information only, all critical dimensions should be verified by requesting a certified print.

## Pressure Drop Charts

### Through Main Shut-off Valve



### Through Solenoid Valve





# ACCUMULATOR ACCESSORIES

## SAF - Spare Parts

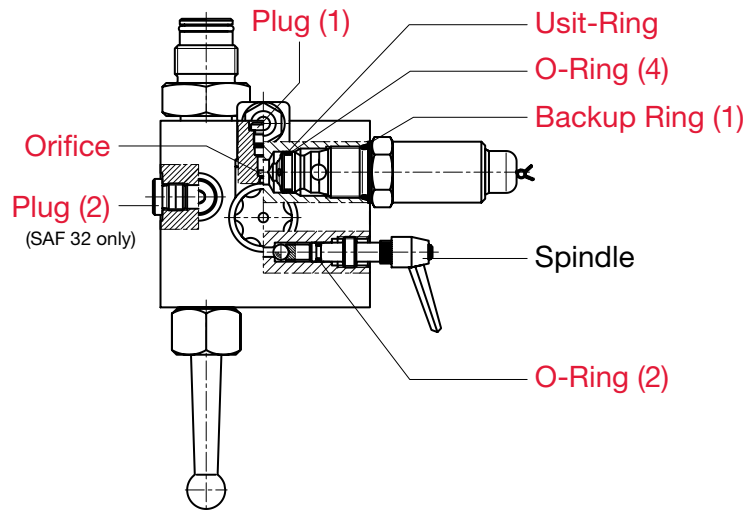
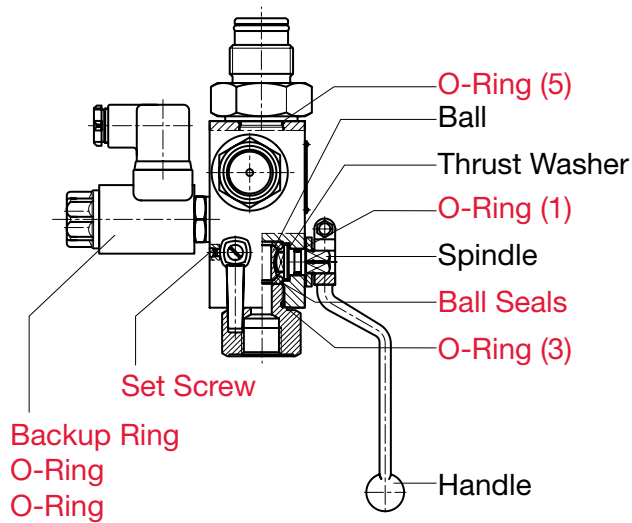
### Seal Kits & Repair Kits

#### Repair Kits

Series	Part Number
SAF 10...	3154715 (FPM)
SAF 20...	3154716 (FPM)
SAF 32...	3154717 (FPM)

#### Seal Kit *(includes parts marked in red)*

Series	Part Number
SAF 10...	3154712 (FPM)
SAF 20...	3154713 (FPM)
SAF 32...	3154714 (FPM)



#### Dimensions for Spare Parts

Item	SAF 10...	SAF 20...	SAF 32...
O-Ring (1)	10 x 2	15 x 2.5	20 x 3
O-Ring (2)	6 x 2	6 x 2	6 x 2
O-Ring (3)	21 x 2	34 x 2.5	53 x 2.5
O-Ring (4)	18 x 2	18 x 2	18 x 2
O-Ring (5)	29.7 x 2.8	29.7 x 2.8	37.2 x 3
Usit-ring	18.3 x 21.5 x 1	18.3 x 21.5 x 1	18.3 x 21.5 x 1
Backup Ring (1)	23.47 x 2.62	23.47 x 2.62	23.47 x 2.62
Plug (1)	7/16-20UNF	3/4-16UNF	3/4-16UNF
Plug (2)	N/A	N/A	G1/8

O-ring dimensions are in mm

#### Solenoid

2-way solenoid operated bleed valve <i>(without coil)</i>	Old 2SV5	New WSM
Normally Open <i>(for SAF...E16Y)</i>	N/A	3055295
Normally Closed <i>(for SAF...E16Z)</i>	N/A	3055276

Coil Kit for 2-way solenoid operated bleed valve	Old 2SV5	New WSM
24 V DC	715003	2083644
110 V AC	715033	2083645

Note: For complete solenoid replacement, both the 2-way solenoid valve and the coil kit are required. 2SV5 coils and WSM coils are not interchangeable. When replacing a 2SV5 with a WSM you must also replace the coil with the WSM design.

#### Spindle Manual Bleed Valve, Repair Kit

Consists of Spindle, Handle, Ball, O-Ring, and Set Screw

Part No.	2115649 (FPM)

## FPK & FPS Series

### Charging & Gauging Units



### 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 H19) 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 H13*

	FPK	FPS	250	F	2.5	G4	K
<b>Series</b>							
FPK =	for use with Gas Valve Version 1 (M28 x 1.5) for SBO and SK						
FPS =	for use with Gas Valve Version 4 (8VI-ISO 4570) for SB, SBO and SK						
NOTE: SB Top repairable bladder accumulators must use FPK with Adapter A3 (FPK/SB), PN 291533							
<b>Gauge Pressure Range</b>							
10 =	0 to 145 psi		(0 to 10 bar)				
25 =	0 to 350 psi		(0 to 25 bar)				
100 =	0 to 1400 psi		(0 to 100 bar)				
250 =	0 to 3500 psi		(0 to 250 bar)				
400 =	0 to 5800 psi		(0 to 400 bar)				
<b>Charging Hose</b>							
F =	with cap screw G1 (thread W24, 32x1/14 - DIN477)						
<b>Charging Hose Length</b>							
2.5 =	8 ft. (2.5 m)						
4.0 =	13 ft. (4 m)						
<b>Adapter</b>							
G4 =	USA (only for CGA 580 gas bottle connections)						
G4.1 =	USA (only for CGA 680 gas bottle connections)						
only available with 400 bar Gauge and adapter integrated onto 4m high pressure hose							
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						
<b>Case</b>							
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.

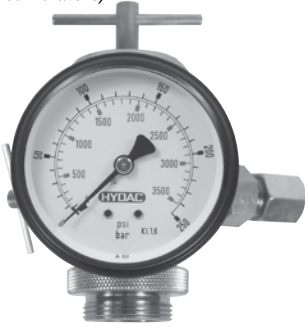
This is also available for download in PDF format on our web site: [www.hydacusa.com](http://www.hydacusa.com)

For spare parts see page H17.

# ACCUMULATOR ACCESSORIES

## Model FPS

For use with gas valve version 4.  
(Except for top repairable bladder accumulators)



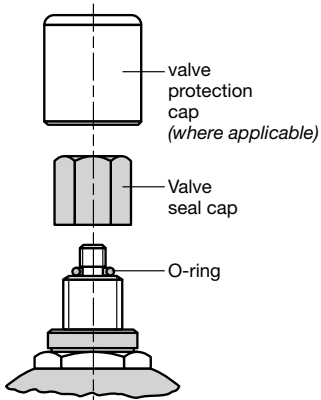
## Model FPK

For use with gas valve version 1.



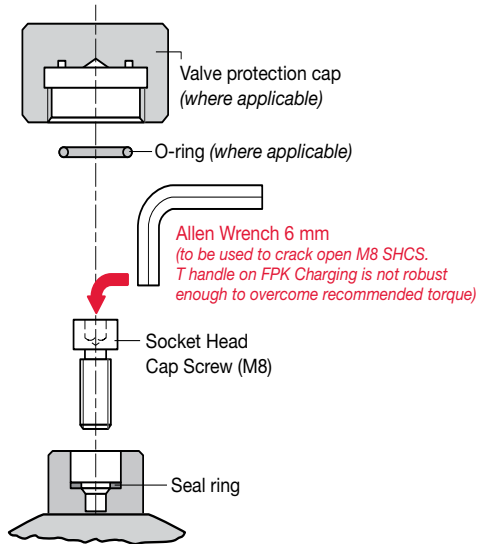
## Gas Valve Version 4

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

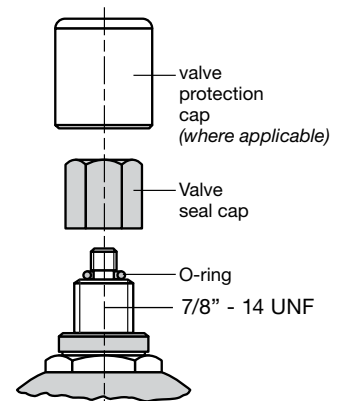
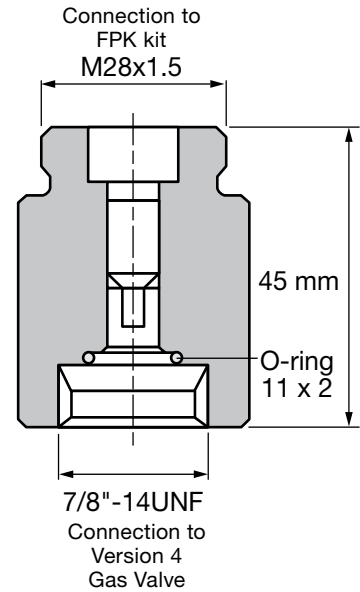
Metric, M28 x 1.5  
Used on Diaphragm Accumulators w/ E1 gas valves and Piston Accumulators w/ VA or VB gas valves



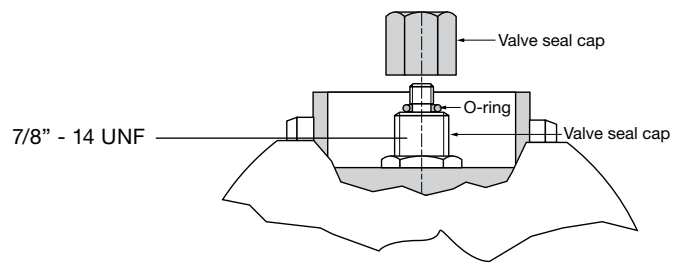
## Adapter A3 (FPK/SB)

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.



## Bottom Repairable



## Top Repairable

## FPO Series

### Charging and Gauging Units



### 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 H19) 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

**FPO 210 F 3 - K**

#### 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)

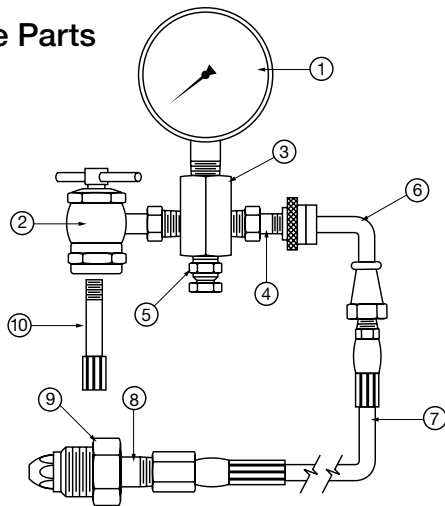
#### Additional Accessories:

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](http://www.hydacusa.com)

### Spare Parts

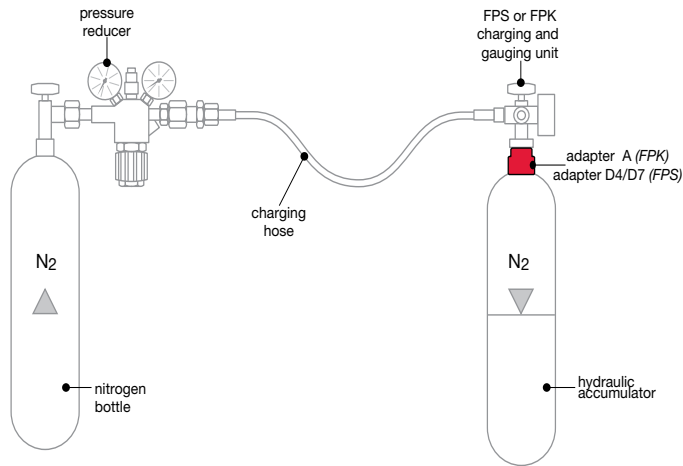


Part Description	Item	Quantity	Part No.
<b>FPO 210 Replacement Kit consists of:</b>			
Pressure Gauge, 3000 PSI	1	1	2701622
T-Handle Lock Chuck	2	1	2701615
Charging Manifold, FPO	3	1	consult factory
Tank Valve	4	1	2701617
Bleeder Valve	5	1	consult factory
Charging Manifold / Bleeder Valve Assembly	3 / 5		2089952
<b>Hose Assembly FPO 210 (CGA 580) consists of:</b>			
High Pressure Coupling (swivel) 1/8" NPT	6	1	2701590
Hose, FPO 3000 PSI, 3m	7	1	2701621
Nipple Gland, CGA-580	8	1	2701620
Nut, CGA-580	9	1	2701619
Top Repairable Gas Valve Extension	10	1	2701741

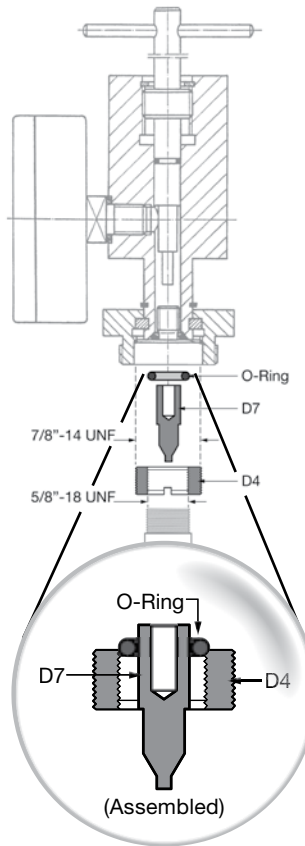
# ACCUMULATOR ACCESSORIES

## Adapters

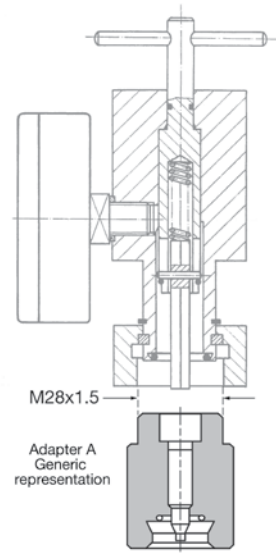
Connecting Charging & Gauging Units to 3000 psi Accumulators



### FPS Unit with Adapter D4/D7



### FPK Unit with Adapter A\*



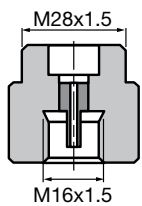
### Adapter D4/D7 Part Number 02067646

Used with FPS Charging & Gauging Unit

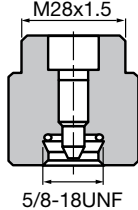
### \*A Adapters

Used with FPK Charging & Gauging Unit

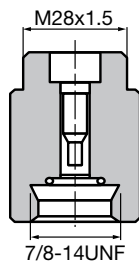
**A1**  
PN 00361619



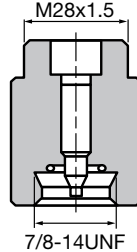
**A2**  
PN 0361605



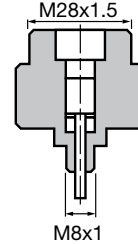
**A3 (ADAPTER FPK/SB)**  
PN 00291533



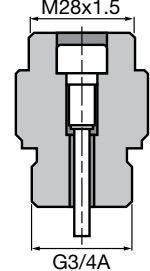
**A4**  
PN 00291536



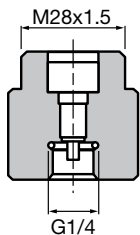
**A5**  
PN 00291531



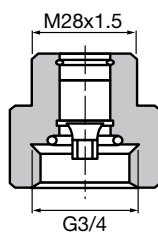
**A6**  
PN 02108819



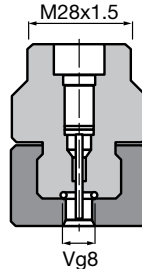
**A7**  
PN 02110629



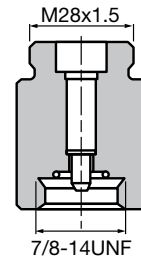
**A8**  
PN 02124524



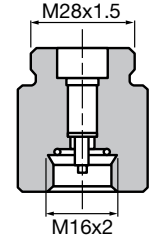
**A9**  
PN 02128638



**A10**  
PN 02128849

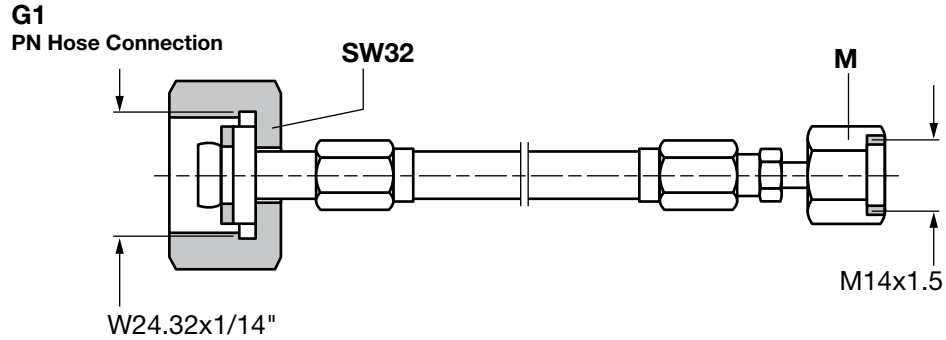


**A11**  
PN 03018210



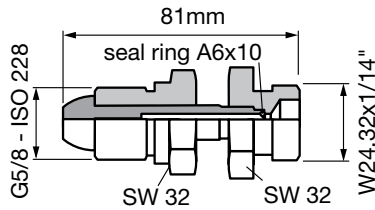
## G Adapters - Connects Charging Hose to Gas Bottle

G2 through G11 to be used to adapt from G1 connection on 3000psi hose to N<sub>2</sub> Bottle or regulator

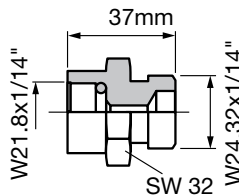


\*\*Included in all charging kits

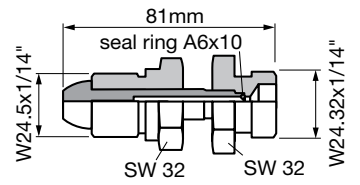
**G2**  
PN 00236376



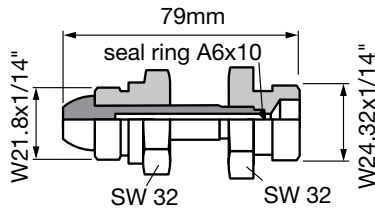
**G3**  
PN 02103421



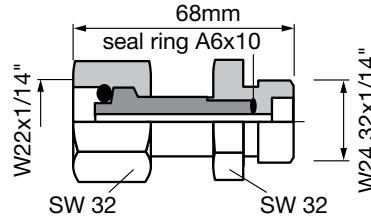
**G4**  
PN 02068737



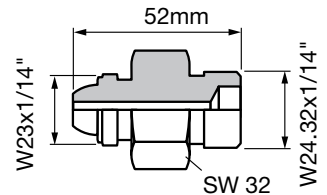
**G5**  
PN 00236373



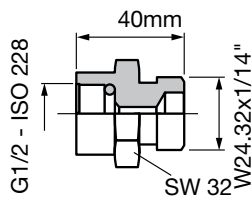
**G6**  
PN 02103423



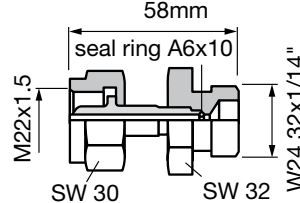
**G7**  
PN 00236377



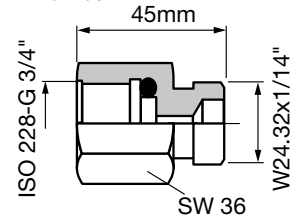
**G8**  
PN 02103425



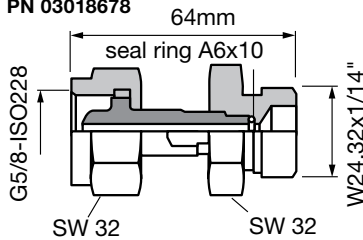
**G9**  
PN 00241168



**G10**  
PN 02103427



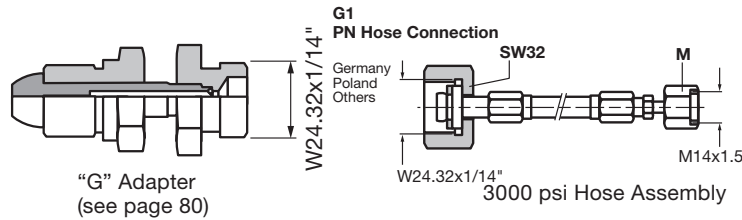
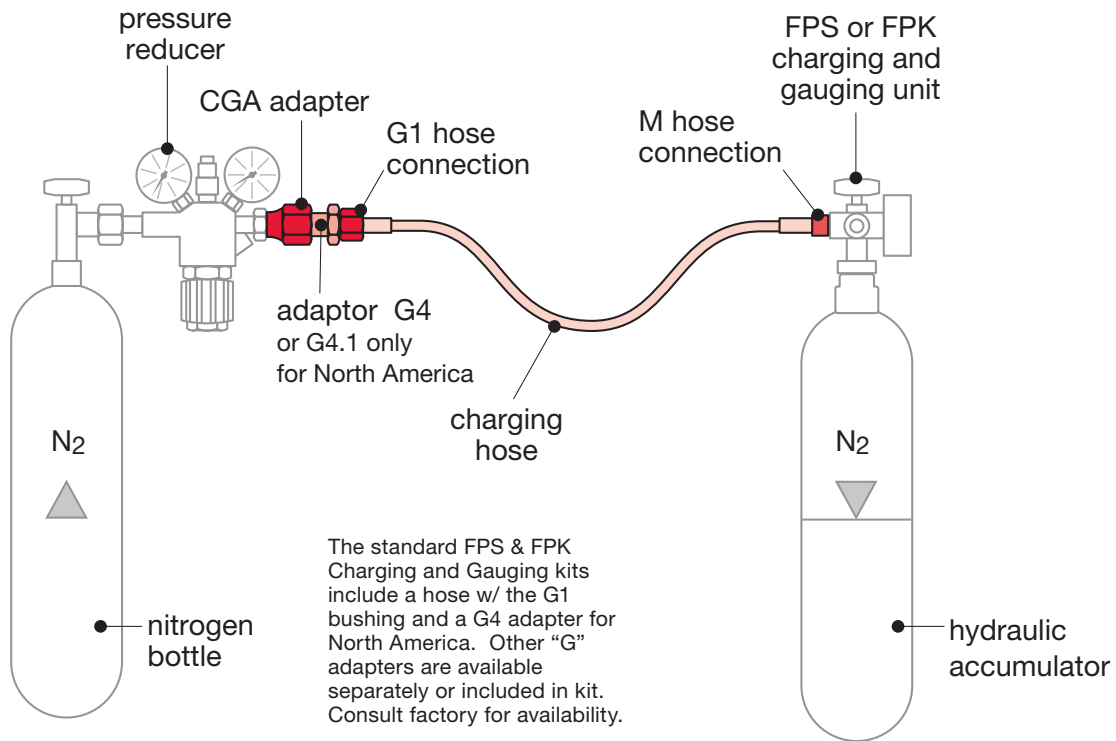
**G11**  
PN 03018678



G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11
Germany Poland Others	India Argentina Great Britain Vietnam Indonesia Others	France Egypt Mexico Israel Others	Canada USA Brazil	Italy	Japan	Korea	Peru Columbia Others	Taiwan	Russia Trinidad & Tobago Venezuela	China

# ACCUMULATOR ACCESSORIES

## Connecting Charging Hose to Gas Bottle



### Charging Hoses

WP	Length	Part No.
3000 psi	2.5 m	236514
	4.0 m	236515
	10.0 m	373405
	15.0 m	2115552
	20.0 m	2109765
	28.0 m	2109574

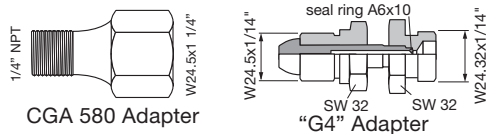
WP	Length	Part No.
5000 psi	2.5 m	3053703
	4.0 m	3053704
	10.0 m	3117720

### CGA 580 Adapter (for USA only)

PN 02701355

ADAPTER B-70 (CGA580 F - 1/4" NPT M)

From G4 Adapter to Regulator

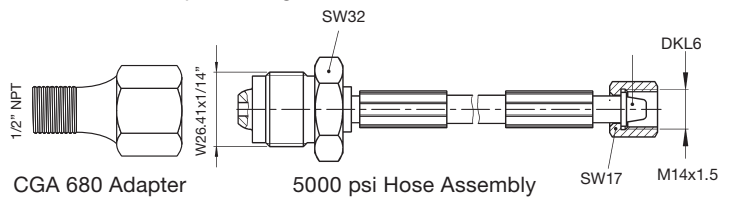


### CGA 680 Adapter (for USA only)

PN 02701356

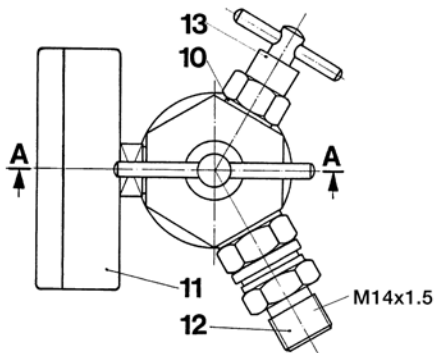
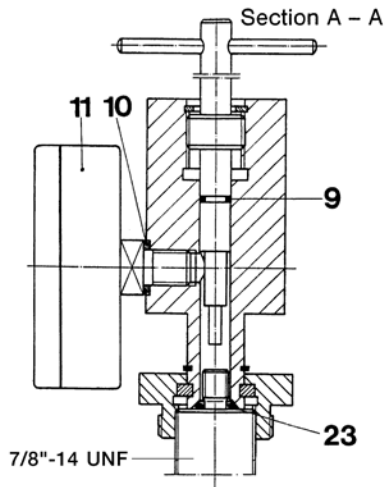
ADAPTER B-682 (CGA580 F - 1/2" NPT M)

From G4.1 Adapter to Regulator

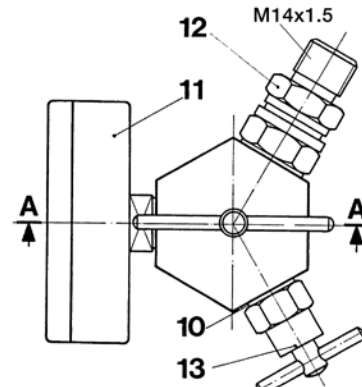
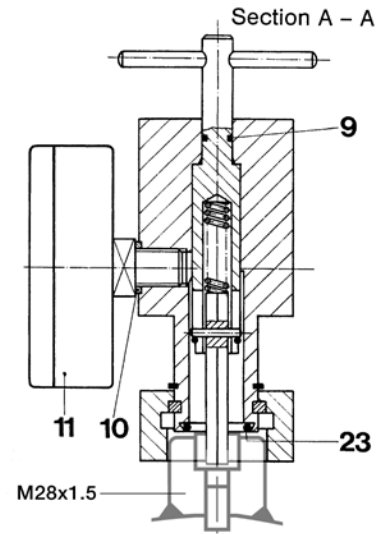


# Charging & Gauging Units

## Spare Parts FPS Unit



## FPK Unit



Item	Description	Part No.
9	O-Ring	601032
10	Seal-Ring	601228
11	Gauge (select pressure range below)	
	10 (0 to 145 psi)	606759
	25 (0 to 350 psi)	606760
	100 (0 to 1400 psi)	606761
	250 (0 to 3600 psi)	606762
	400 (0 to 5800 psi)	606763
12	Check Valve	610004
13	Manual Bleed Valve	236445
23	O-Ring - FPS	626488
	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

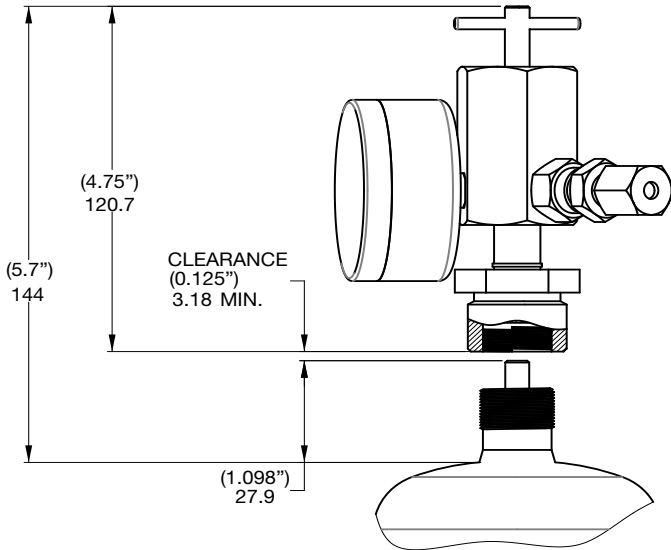
**WARNING:** Only qualified persons should perform maintenance on any type of accumulator. Complete maintenance instructions are available - Contact HYDAC.



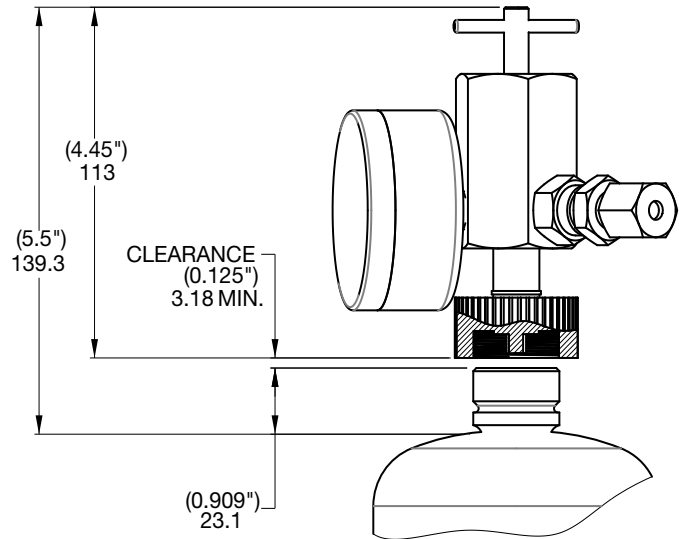
# ACCUMULATOR ACCESSORIES

## Minimum Clearances for Charging & Gauging Kits

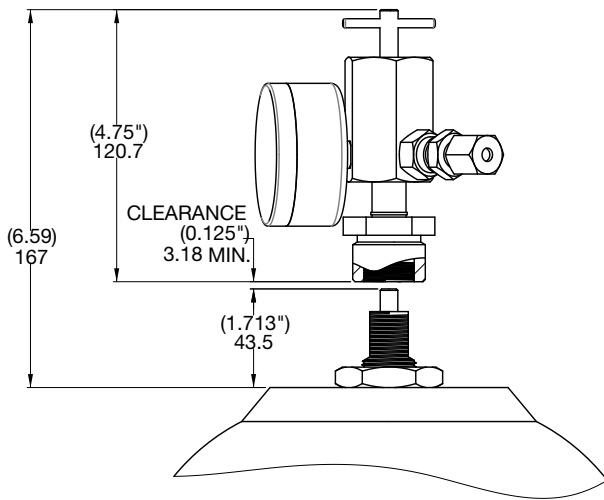
Diaphragm (SBO) and Bladder (SB) Accumulators



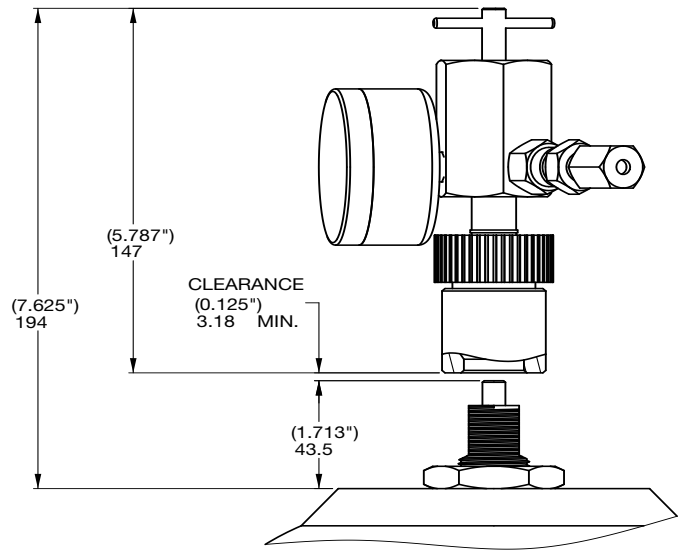
Diaphragm (SBO), Version 4 Gas Valve  
(8VI-ISO 4570) FPS Charging & Gauging Kit



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



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



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

# Permanent Gauging Block



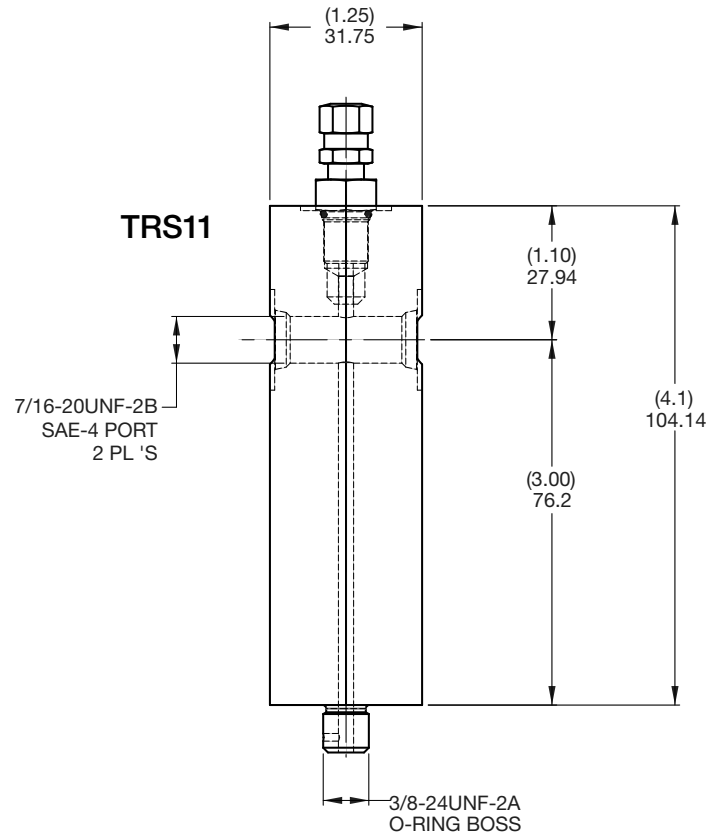
## Description

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

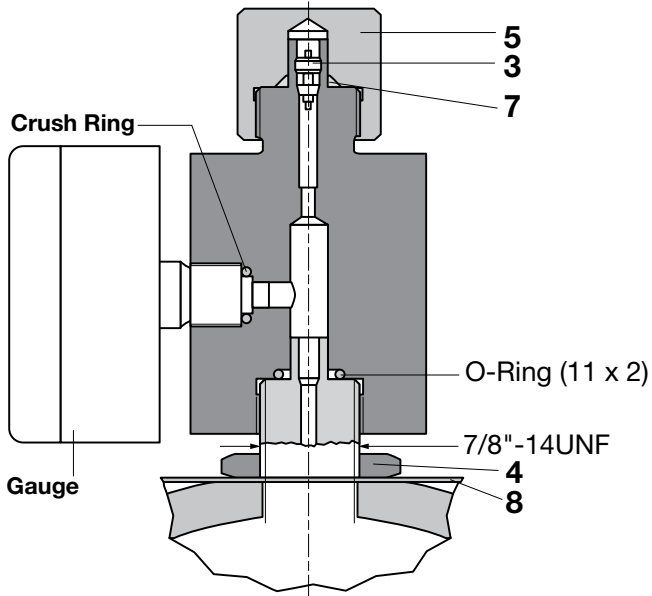
	<b>PERM GAUGING BLOCK</b>	<b>VER4</b>	<b>850</b>
<b>Series</b>	Perm Gauging Block		
<b>Gas Valve Type</b>	VER1 = HYDAC gas valve version 1 (M28x1.5) VER4 = HYDAC gas valve version 4 (7/8"-14UNF)		
<b>Accumulator Type</b>	(omit) = Bottom Repairable (standard) TR = Top Repairable TR S11 = Top Repairable (Oil & Gas / Offshore)		
<b>Gauge Pressure Range</b>	850 = 0 to 850 psi 1450 = 0 to 1450 psi 2300 = 0 to 2300 psi 3600 = 0 to 3600 psi 5800 = 0 to 5800 psi		

# ACCUMULATOR ACCESSORIES

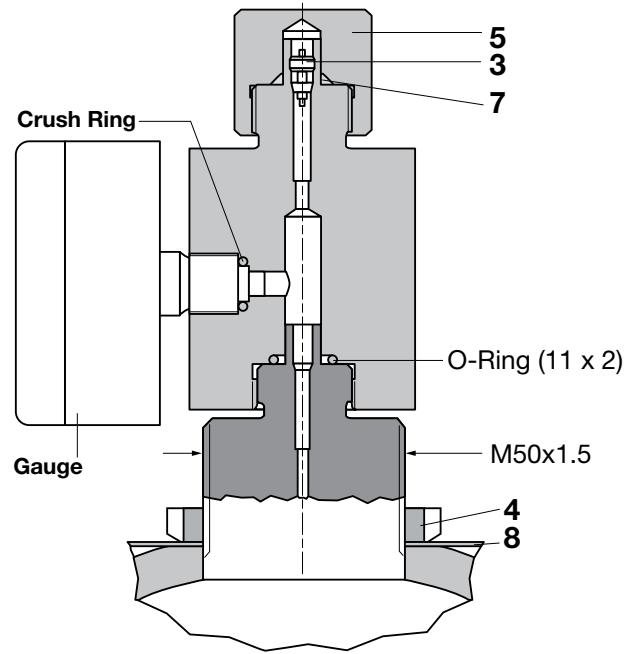
## Installation Drawings

Permanent Gauging Blocks for HYDAC Gas Valve Version 4

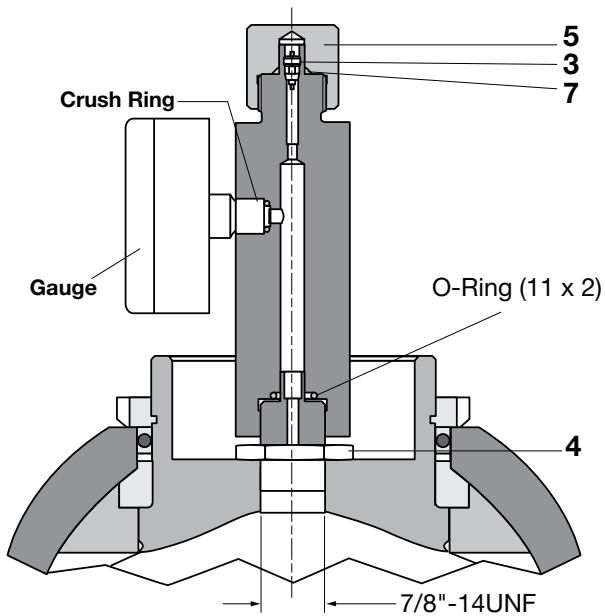
Bottom Repairable Bladder



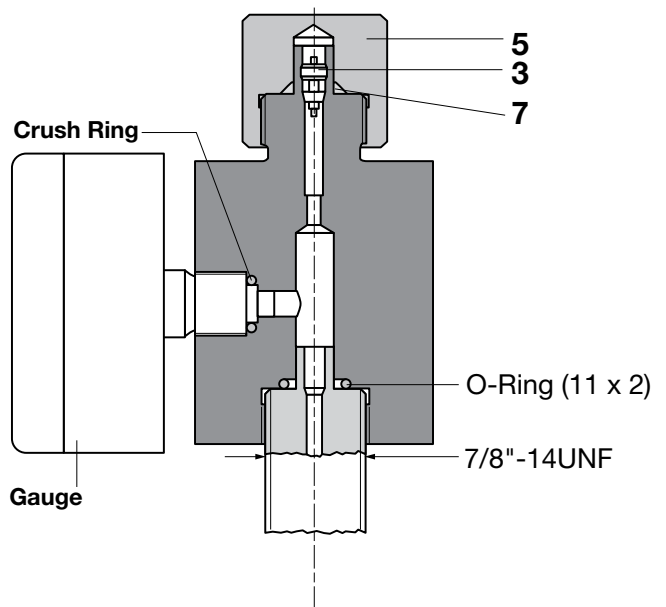
Bottom Repairable Bladder with M50 Gas Valve



Top Repairable Bladder



Piston & Diaphragm



### Parts Legend

3	Gas Valve Core
4	Lock Nut
5	Valve Seal Cap
7	O-ring (7.5 x 2)
8	Name Plate

## Mounting Components

HYDAC mounting components are used to mount all types of hydro-pneumatic accumulators safely and simply, regardless of the mounting position. Our wide range includes suitable mounting components for every type of static hydro-pneumatic accumulator.

### Function

Mounting components are used primarily for the following:

- to fix the accumulator into its position
- to carry the weight of the accumulator
- to counteract the forces exerted by the hydraulic lines

### Types

HYDAC offers three styles of clamps:

- HyRac
- Regular Duty (HS)
- Heavy Duty (HSS)

Additionally, for larger accumulators, HYDAC offers:

- Base Brackets (KBK & KMS)
- Mounting Sets (SEB)

Refer to the illustrations and photos to the right.

### Construction

They are constructed out of zinc-plated steel with a stainless steel strap (depending on style), utilizing a rubber insert to absorb vibration.

The HyRac and regular duty have a one piece construction with center adjustment.

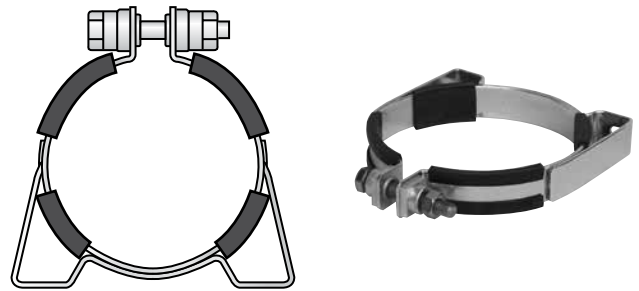
Conversely, the heavy duty clamps have a two piece construction. This allows for easy installation and removal while improving the strength to weight ratio.

HYDAC also offers base brackets for larger accumulators for proper support and isolation from system vibrations. The brackets incorporate a rubber support ring for this reason.

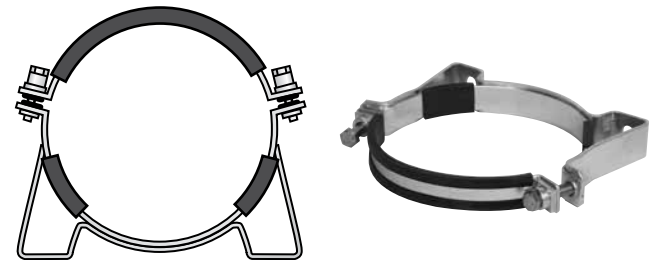
All mounting components can be easily bolted to your system.

Application guides are provided on the following pages to easily match the appropriate mounting components with HYDAC accumulators.

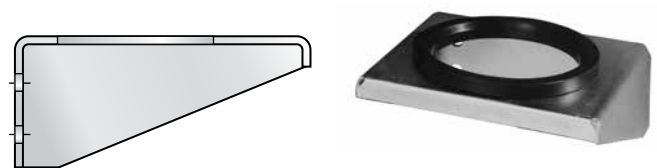
### HS - Regular Duty Clamp



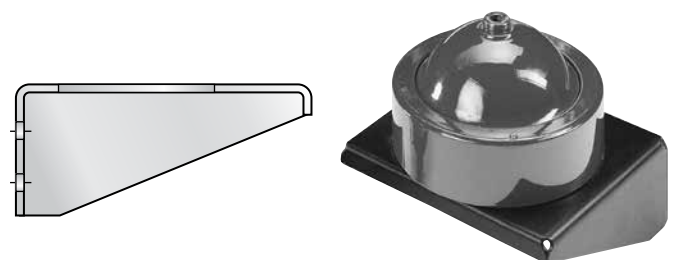
### HSS - Heavy Duty Clamp



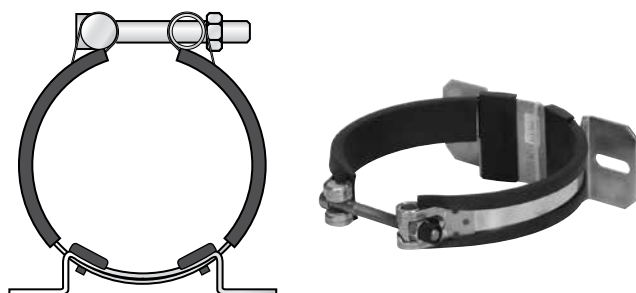
### KBK - Base Bracket



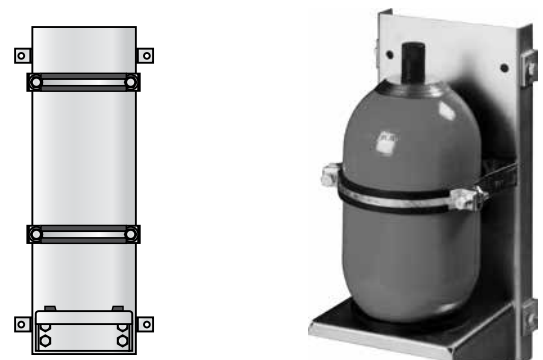
### KMS - Base Bracket for Threaded Diaphragm



### HyRac Clamp



### SEB - Complete Mounting Sets



# ACCUMULATOR ACCESSORIES

## Mounting Component Selection Guide

These are the mounting solutions that HYDAC recommends for each accumulator

### Bladder Accumulators and Nitrogen Bottles

#### SB 330... & SN 330...

Accumulator Size (capacity)	Clamp Type (quantity)	Part Number	Base Bracket Type	Part Number
1 (0.25 gal)	HyRac 110-118 ST (1)	3627484	None	
4 to 6 (1 to 1.5 gal)	HS 167 (1)	2110642	KBK 167/G	4589940
10 to 20 (2.5 to 5 gal)	HSS 222/229 (1)	235224	KBK 222/G	4580439
32 to 54 (10 to 15 gal)	HSS 222/229 (2)	235224	KBK 222/G	4580439

#### SB 600...

Accumulator Size (capacity)	Clamp Type (quantity)	Part Number	Base Bracket Type	Part Number
1 (0.25 gal)	HyRac 110-118 ST (1)	3627484	None	
4 to 6 (1 to 1.5 gal)	HyRac 167-175 ST (1)	3627520	KBK 167/G	4589940
10 to 20 (2.5 to 5 gal)	HSS 242 B (1)	2213456	KBK 222/G	4580439
32 to 54 (10 to 15 gal)	HSS 242 B (2)	2213456	KBK 222/G	4580439

### Piston Accumulators

#### SK 350...

Accumulator Piston Size <sup>1)</sup>	Clamp Type (quantity)	Part Number	Base Bracket Type	Part Number
15 (150 mm)	HyRac 176-185 ST	3627522	KBK 167	238526
18 (180 mm)	HSS 219 (2)	237401	KBK 219	238042
25 (250 mm)	HSS 310 (2)	237389	KBK 310	238043
35 (355 mm)	HSS 434 (2)	297564	consult factory	

1) Example: SK350-20/2112S-210FCF-VE-18 (see page D9 for details)

#### SK 280...

Piston Size <sup>1)</sup>	Clamp Type (quantity)	Part Number
05 (50 mm)	HRGKSM 0 R 58-61/62 ST (2)	3018442
06 (60 mm)	HRGKSM 0 R 73-76/763 ST (2)	444912
08 (80 mm)	HRGKSM 0 R 92-95/96 ST (2)	444995
10 (100 mm)	HRGKSM 1 R 119-127/124 ST (2)	444505
12 (125 mm)	HRGKSM 1 R 146-154/151 ST (2)	444321
15 (150 mm)	HRGKSM 2 R 172-180/178 ST (2)	444402

1) Example: SK280-1/3218U-280 AAD VB 05 (see page D8 for details)

#### SK 210...15H

Piston Size <sup>1)</sup>	Clamp Type (quantity)	Clamp Part Number	Qty Per Accumulator
10 (100 mm)	HyRac 121-129/133 H8 ST	3627515	2
15 (150 mm)	HyRac 167-175 ST	3627520	2

1) Example: SK210-20/3218S-210ACM-KCH-15H (see page D6 for details)

### Diaphragm Accumulators

#### SBO...E... (Welded type)

Accumulator Type	Clamp Type <sup>2)</sup>	Part Number
SBO 250-0.075 E	HyRac 62-65 ST	3627423
SBO 210-0.16 E	HyRac 73-76 ST	3627424
SBO 210-0.32 E	HyRac 92-95/96 ST	3627477
SBO 210-0.5 E	HyRac 100-105 ST	3627480
SBO 330-0.6 E	HyRac 110-118 ST	3627484
SBO 210-0.75 E	HyRac 121-129 ST	3627515
SBO 200-1 E	HyRac 133-142 ST	3627516
SBO 140-1.4 E	HyRac 143-151 ST	3627517
SBO 210-1.4 E	HyRac 143-151 ST	3627517
SBO 100-2 E	HyRac 160-167 ST	3627519
SBO 210-2 E	HyRac 167-175 ST	3627520
SBO 210-2.8 E	HyRac 167-175 ST	3627520
SBO 250-3.5 E	HyRac 167-175 ST	3627520
SBO 330-0.75 E	HyRac 121-129 ST	3627515
SBO 330-1.4 E	HyRac 152-159 ST	3627518
SBO 330-2.0 E	HyRac 167-175 ST	3627520
SBO 330-3.5 E	HyRac 167-175 ST	3627520

2) Only one clamp needed for all accumulators listed.

#### SBO...A6... (Threaded type)

Accumulator Type	Clamp Type	Part Number
SBO 350-0.25 A6	HyRac 110-118 ST	3627484
SBO 500-0.25 A6	HyRac 110-118 ST	3627484
SBO 250-0.6 A6	HyRac 133-142 ST	3627516
SBO 330-0.6 A6	HyRac 133-142 ST	3627516
SBO 600-0.25 A6	HyRac 143-151 ST	3627517
SBO 750-0.25 A6	HyRac 143-151 ST	3627517

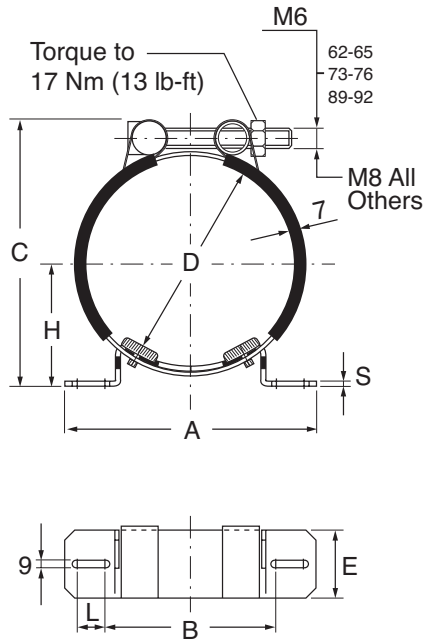
Accumulator Type	Base Bracket Type	Part Number
SBO 210-1.3 A6	KMS 200	359931
SBO 400-1.3 A6	KMS 210	358989
SBO 180-2 A6	KMS 220	359922
SBO 250-2 A6	KMS 220	359922

Note: Either one clamp or one Base Bracket is needed for each accumulator listed.

## Dimensions

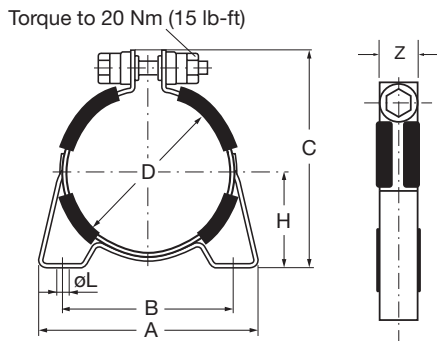
Use the Selection Guide on page H22 to select the appropriate components.

### HyRac - Stainless Steel Strap with swivel-bolt adjustment



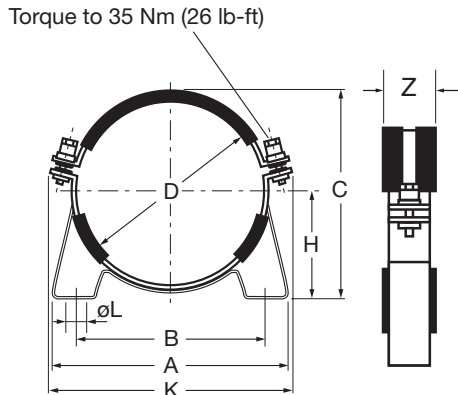
Clamp Model	A	B	C (max)	D (range)	E	H (range)	L	S	Weight kg (lbs)
HyRac 62-65 ST	120 4.72	85 3.34	85 3.54	62-65 2.4-2.6	40 1.6	38-39.5 1.5-1.6	8 0.24	3 0.12	0.16 (0.35)
HyRac 73-76 ST	120 4.72	85 3.34	96 3.98	73-76 2.9-3.0	40 1.6	43.5-45 1.7-1.8	8 0.24	3 0.12	0.16 (0.35)
HyRac 92-95 ST	120 4.72	85 3.34	115 4.53	92-95 3.6-3.7	40 1.6	52.5-54 2.0-2.1	8 0.24	3 0.12	0.17 (0.37)
HyRac 100-105 ST	156 6.14	100 3.94	135 5.31	100-105 3.9-4.1	60 2.4	59-62 2.3-2.4	18 0.71	3 0.12	0.40 (0.88)
HyRac 106-114 ST	156 6.14	100 3.94	143 5.63	106-114 4.2-4.5	60 2.4	62.5-66 2.5-2.6	18 0.71	3 0.12	0.41 (0.9)
HyRac 110-118 ST	156 6.14	100 3.94	156 6.14	110-118 4.3-4.6	60 2.4	72.5-77 2.8-3.0	18 0.71	3 0.12	0.42 (0.93)
HyRac 121-129 ST	156 6.14	100 3.91	165 6.50	121-129 4.8-5.1	60 2.4	75.5-80 3.0-3.1	18 0.71	3 0.12	0.43 (0.95)
HyRac 133-142 ST	156 6.14	100 3.91	174 6.85	133-142 5.2-5.6	60 2.4	76.5-82 3.0-3.2	18 0.71	3 0.12	0.44 (0.97)
HyRac 143-151 ST	156 6.14	100 3.91	182 7.17	143-151 5.6-5.9	60 2.4	83-86.5 3.3-3.4	18 0.71	3 0.12	0.45 (0.99)
HyRac 152-159 ST	156 6.14	100 3.91	191 7.52	152-159 6.0-6.3	60 2.4	87-91 3.4-3.6	18 0.71	3 0.12	0.46 (1.01)
HyRac 160-167 ST	236 9.29	152 5.98	197 7.76	160-167 6.3-6.6	60 2.4	89-93 3.5-3.7	32 1.3	4 0.16	0.7 (1.54)
HyRac 167-175 ST	236 9.29	152 5.98	207 8.15	167-175 6.6-6.9	60 2.4	92.5-96.5 3.6-3.8	32 1.3	4 0.16	0.72 (1.59)
HyRac 176-185 ST	236 9.29	152 5.98	241 9.49	176-185 6.9-7.3	60 2.4	97-102.5 3.8-4.0	32 1.3	4 0.16	0.75 (1.65)
HyRac 202-210 ST	236 9.29	152 5.98	245 9.65	202-210 7.9-8.3	60 2.4	116-120 4.6-4.7	32 1.3	4 0.16	0.76 (1.68)
HyRac 209-217 ST	236 9.29	152 5.98	255 10.04	209-217 8.2-8.5	60 2.4	122.5-126.5 4.8-5.0	32 1.3	4 0.16	0.77 (1.70)

### HS - Regular Duty Clamp, with single center adjustment



Clamp Model	D	D (range)	A	B	C (max)	H	ØL	Z	Weight kg.(lbs)
HS 167	167 6.57	164-170 6.46-6.69	185 7.28	153 6.02	211 8.31	92.5 3.64	9 0.35	30 1.18	0.9 2.0

### HSS - Heavy Duty Clamp with two-piece construction



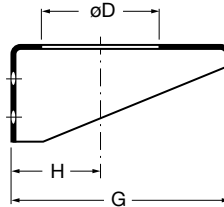
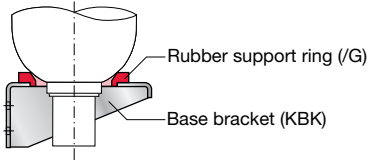
Clamp Model	D	D (range)	A	B	C (max)	H	K	ØL	Z	Weight kg.(lbs)
HSS 219	219 8.62	216-222 8.50-8.74	268 10.55	216 8.50	240 9.45	123 4.84	285 11.22	15 0.59	40 1.57	1.7 3.8
HSS 222/229	226 8.90	220-231 8.66-9.10	270 10.63	216 8.50	244 9.61	123 4.84	295 11.61	15 0.59	40 1.57	1.7 3.8
HSS 242	242 9.53	231-242 9.10-9.53	268 10.55	216 8.50	265 10.43	136 5.35	305 12.01	15 0.59	40 1.57	1.7 3.8
HSS 242 B	242 9.53	231-247 9.10-9.72	268 10.55	216 8.50	265 10.43	136 5.35	305 12.01	15 0.59	40 1.57	1.7 3.8
HSS 286	286 11.26	283-289 11.14-11.38	332 13.07	280 11.02	314 12.36	163 6.42	355 13.98	15 0.59	40 1.57	2.1 4.6
HSS 310	310 12.20	307-313 12.09-12.32	332 13.07	280 11.02	333 13.11	170 6.69	380 14.96	15 0.59	40 1.57	2.1 4.6

Dimensions are in mm with inches shown below.

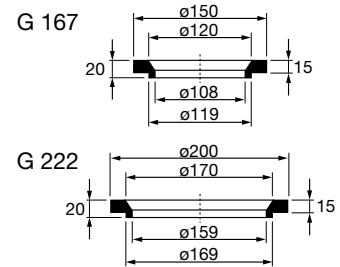
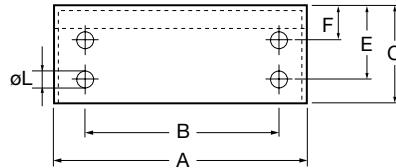
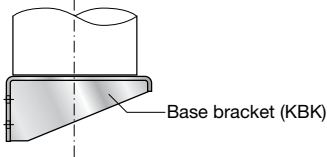
# ACCUMULATOR ACCESSORIES

## KBK - Base Bracket for Bladder and Piston Accumulators

### Bladder Accumulator



### Piston Accumulator



### G-Rubber Support Ring

Model	Material	Part Number
G 167	NBR	236997
G 222	NBR	236996

### Base Bracket with Rubber Support Ring

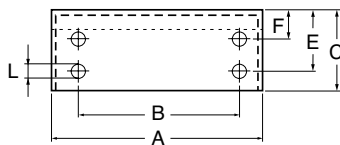
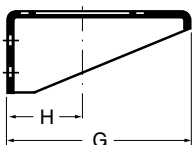
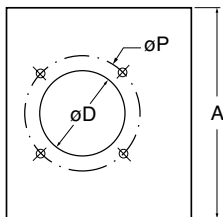
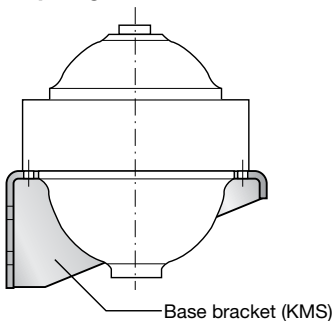
Model	A	B	C	$\phi D$	E	F	G	H	$\phi L$	Weight kg.(lbs)	Rubber Support Ring
KBK 167/G	260 10.24	200 7.87	100 3.94	120 4.72	75 2.95	35 1.38	225 8.86	92 3.62	14 0.55	2.6 (5.7)	G 167
KBK 222/G	260 10.24	200 7.87	100 3.94	170 6.69	75 2.95	35 1.38	225 8.86	123 4.84	14 0.55	2.4 (5.3)	G 222

### Base Brackets without Rubber Support Ring

KBK 126	175 6.89	100 3.94	60 2.36	65 2.56	36 1.42	N/A	150 5.91	77 3.03	14 0.55	1.1 (2.43)	None
KBK 167	260 10.24	200 7.87	100 3.94	120 4.72	65 2.56	25 0.98	225 8.86	92 3.62	14 0.55	2.4 (5.3)	None
KBK 219	270 10.63	180 7.09	100 3.94	135 5.31	80 3.15	40 1.57	250 9.84	123 4.84	14 0.55	6.5 (14.4)	None
KBK 310	330 12.99	220 8.66	200 7.87	190 7.48	140 5.51	60 2.36	340 13.39	170 6.69	22 0.87	18.3 (40.4)	None

## KMS - Base Bracket for Threaded Diaphragm Accumulators

### Diaphragm Accumulator



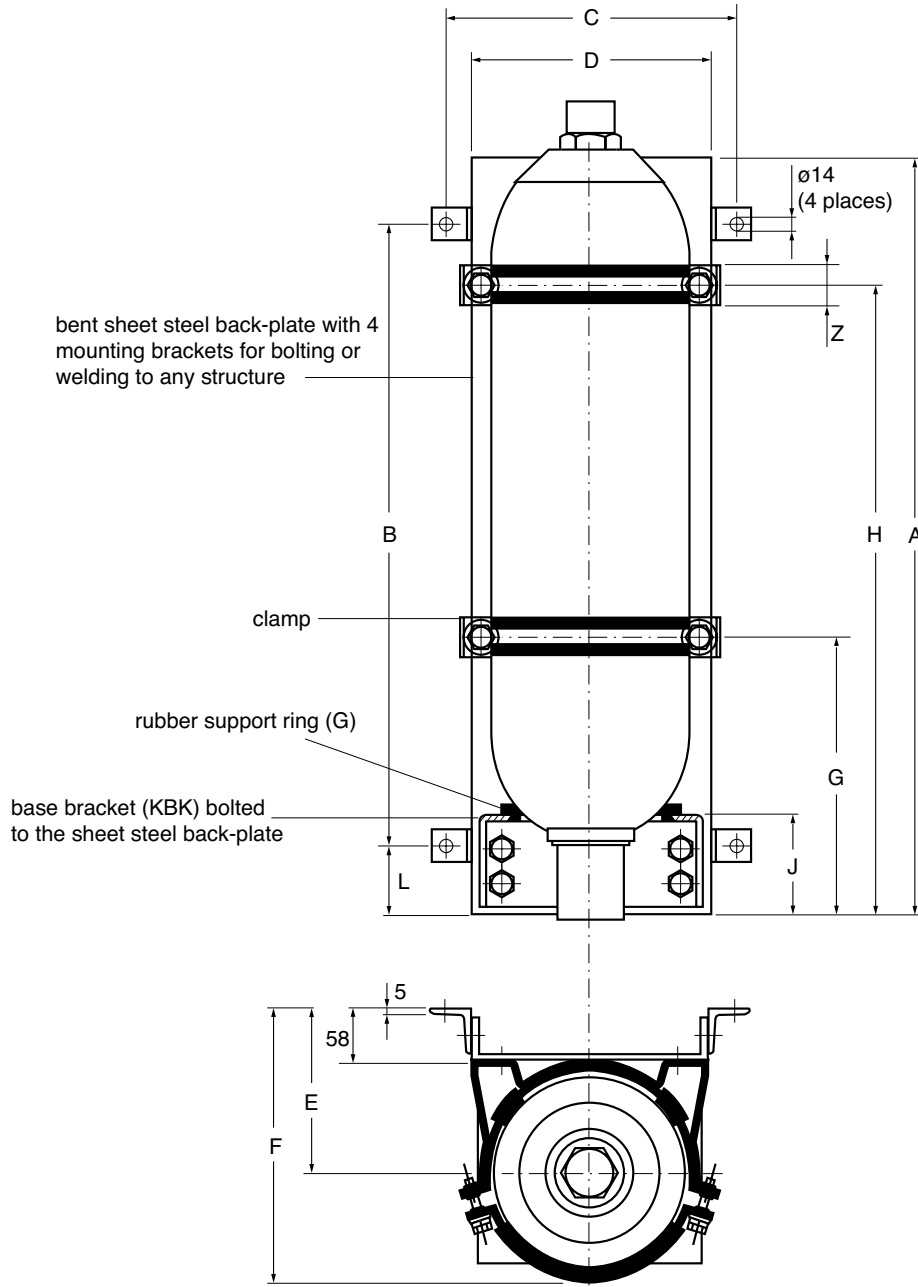
Base Bracket Model	A	B	C	$\phi D$	$\phi P$	E	F	G	H	$\phi L$	Weight kg.(lbs)
KMS 200	270 10.63	180 7.09	100 3.94	148 5.83	160 6.30	80 3.15	40 1.57	250 9.84	123 4.84	14 0.55	6.5 (14.4)
KMS 210	260 10.24	200 7.87	100 3.94	170 6.69	180 7.09	75 2.95	35 1.38	225 8.86	123 4.84	14 0.55	2.4 (5.3)
KMS 220	260 10.24	200 7.87	100 3.94	170 6.69	188 7.40	75 2.95	35 1.38	225 8.86	123 4.84	14 0.55	2.4 (5.3)
KMS 250	260 10.24	200 7.87	100 3.94	192 7.56	204 8.03	75 2.95	35 1.38	225 8.86	123 4.84	14 0.55	2.4 (5.3)
KMS 280	330 12.99	220 8.66	200 7.87	215 8.46	230 9.06	140 5.51	60 2.36	340 13.39	170 6.69	22 0.87	18.3 (40.4)
KMS 300	330 12.99	220 8.66	200 7.87	220 8.66	235 9.25	140 5.51	60 2.36	340 13.39	170 6.69	22 0.87	18.3 (40.4)
KMS 310	330 12.99	220 8.66	200 7.87	245 9.65	265 10.43	140 5.51	60 2.36	340 13.39	170 6.69	22 0.87	18.3 (40.4)
KMS 320	330 12.99	220 8.66	200 7.87	290 11.42	305 12.01	140 5.51	60 2.36	340 13.39	170 6.69	22 0.87	18.3 (40.4)

Dimensions are in mm with inches shown below.

Dimensions are for general information only, All critical dimensions should be verified.

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## SEB - Mounting Sets for SB 330 Bladder Accumulators



Set Type	Accum. size in gallons	Base Bracket		Clamp		Dimensions in mm (inches shown below)									
		Type	Qty.	Type	Qty.	A	B	C	D	E	F (Ref)	G	H	L	J
SEB 4	1	KBK 167/G	1	HS 167	1	410 16.14	320 12.60	330 12.99	270 10.63	152 5.98	265 10.43	-	270 10.63	45 1.77	95 3.74
SEB 10	2.5	KBK 222/G	1	HSS 222/229	1	570 22.44	420 16.54	330 12.99	270 10.63	180 7.09	317 12.48	-	330 12.99	75 2.95	111 4.37
SEB 20	5	KBK 222/G	1	HSS 222/229	1	570 22.44	420 16.54	330 12.99	270 10.63	180 7.09	317 12.48	-	500 19.69	75 2.95	111 4.37
SEB 32	10	KBK 222/G	1	HSS 222/229	2	1340 52.76	1190 46.85	330 12.99	270 10.63	180 7.09	317 12.48	500 19.69	1160 45.67	75 2.95	111 4.37
SEB 54	15	KBK 222/G	1	HSS 222/229	2	1340 52.76	1190 46.85	330 12.99	270 10.63	180 7.09	317 12.48	500 19.69	1160 45.67	75 2.95	111 4.37