

### Gas Delivery Systems

When gases are used in significant volumes, a centralized gas delivery system is a practical necessity. A well-conceived delivery system will reduce operating costs, increase productivity and enhance safety.

A centralized system will allow the consolidation of all cylinders into one storage location. With all the cylinders in one place, inventory control will be streamlined and cylinder handling will be simplified and improved. Gases can be separated by type to enhance safety.

With gas delivery systems the frequency of cylinder changeouts are reduced. This reduction is achieved by connecting multiple cylinders to supply panels in banks in such a way that one bank can be safely vented, replenished and purged while a second bank provides continuous gas service. This type of system can supply gas to multiple applications and even entire facilities, eliminating the need for separate cylinders and regulators for each point of use.

Since cylinder switchover can be accomplished automatically by the supply panel, cylinders in a bank will be uniformly exhausted, resulting in improved gas utilization and lower costs. The integrity of the delivery system will be better protected since cylinder changeouts will be done in an isolated, controlled environment.



### Purity

The level of gas purity required at each point of use is extremely important in designing a gas delivery system. Maintaining the gas purity is simplified with a centralized system as described above. Selection of materials for construction should be consistent throughout. For example, if a research grade gas is being utilized, all stainless steel construction and diaphragm packless shut-off valves should be used to eliminate contamination of the gas stream.

In general, three levels of purity are sufficient to describe nearly any application. The first level, usually described as a multi-purpose applications, has the least stringent purity requirement. Typical applications may include welding, cutting, laser assist, atomic absorption or ICP mass spectrometry. Gas supply panels for multipurpose applications are economically designed for safety and convenience. Acceptable materials for construction include brass, copper, Teflon®, Tefzel® and Viton®. Packed valves, such as needle valves and ball valves, are often used for flow shut-off. Gas distribution systems manufactured to this level should not be used with high purity or ultra-high purity gases.

The second level, called high-purity applications, requires a higher level of protection against contamination. Applications include laser resonator gases or chromatography where capillary columns are used and system integrity is important. Materials of construction are similar to multi-purpose manifolds, except flow shut-off valves are diaphragm packless to prevent diffusion of contaminants into the gas stream.

The third level is referred to as ultra-high purity applications. This level requires the highest level of purity for components in a gas delivery system. Trace measurement in gas chromatography is an example of an ultra-high purity application. Wetted materials for manifolds at this level must be selected to minimize trace components adsorption. These materials include 316L stainless steel, Teflon®, Tefzel® and Viton®\*. All tubing should be 316SS cleaned and passivated. Flow shut-off valves must be diaphragm packless. It is particularly important to recognize that components that are suitable for multi-purpose applications may adversely affect results in high or ultra-high purity applications. For example, out-gassing from neoprene diaphragms in regulators can cause excessive baseline drift and unresolved peaks.

\*Teflon®, Viton® and Tefzel® are registered trademarks of The Chemours Company

## Types of Gas Delivery Systems

### SINGLE STATION SYSTEMS

In some applications, a gas is used only to calibrate instrumentation. For example, a continuous emissions monitoring system (CEMS) may only require calibration gases to flow for a few minutes each day. Such an application clearly does not require a large-scale automatic changeover manifold. However, the delivery system should be designed to protect against contamination of the calibration gas and to minimize costs associated with cylinder change-outs.

A single station supply panel with bracket is an ideal solution for this type of application. It provides a safe and cost-effective means of connecting and changing out cylinders by eliminating the need to struggle with the regulator. When the gas includes corrosive components such as HCl or NO, a purge assembly should be incorporated into the manifold to allow the regulator to be purged with an inert gas (usually nitrogen) to protect it from corrosion. The single station panel can also be equipped with a second pigtail. This arrangement allows an additional cylinder to be connected and held in reserve. Switchover is accomplished manually using the cylinder shut-off valves. This configuration is usually desirable with calibration gases since the precise mix of components generally varies somewhat from cylinder to cylinder. A cylinder change may require resetting the instrument.



### SEMI-AUTOMATIC SWITCHOVER SYSTEMS

Many applications require continuous use and/or larger volumes of gases beyond what is practical for a single station manifold. Any pause in the gas supply results in lost or ruined experiments, a loss of productivity and even downtime for an entire facility. Semi-automatic switchover systems provide the capability to switch from a primary to a reserve cylinder or bank without interrupting the gas supply, thus minimizing costly downtime. Once the primary cylinder or bank is depleted, the system automatically switches to the reserve cylinder or bank for continuous gas flow. The user then changes the empty cylinders for new cylinders, while the gas is still flowing from the reserve side. A bi-directional valve is used to indicate the primary or reserve side during cylinder change-out.

### FULLY AUTOMATIC PROGRAMMABLE SWITCHOVER SYSTEMS

In some critical manufacturing and laboratory processes, an uninterrupted gas supply is an absolute necessity. Failure of the gas supply in these facilities can result in loss of an entire laboratory's in-process experiments or even shutdown of manufacturing production line or process. The potential cost of either of these events is so high that the installation of a gas delivery system, designed to provide an uninterrupted gas supply, is clearly justified. A fully automatic programmable switchover system is generally selected for these applications.

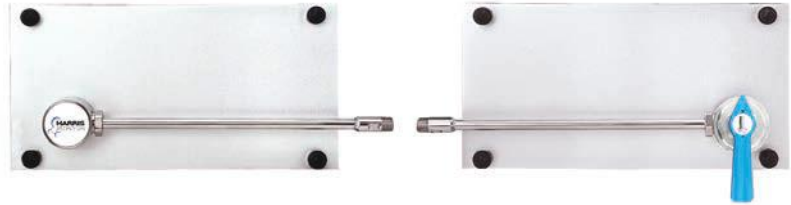
## Extensions

### HPI E

### High purity extensions

#### FEATURES:

- Max. inlet pressure 300 bar
- Pipe material stainless steel 316L (1.4404)
- Modular design
- Diaphragm inlet shut off valve option
- Easy to install
- Made of 316L stainless steel for corrosive gases
- Made of chrome-plated brass for non-corrosive gases and mixture up to 6.0

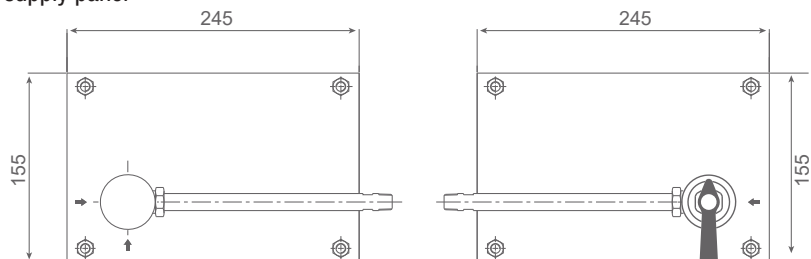


#### APPLICATIONS:

- To increase the number of connected cylinders to supply panel

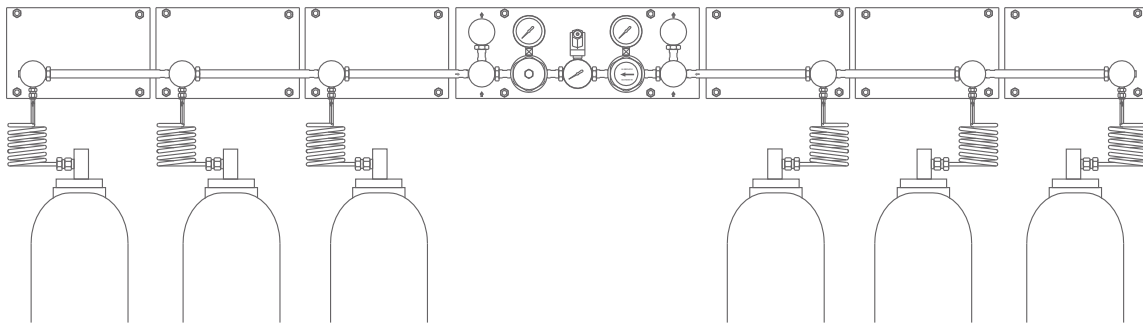
#### TECHNICAL DATA:

Purity	Up to 6.0
Inlet pressure	Max. 300 bar (4350 psig)
O-ring	Viton®* (FKM)
Oxygen use	Suitable



#### MATERIAL SPECIFICATIONS:

Shut-off valve seat	PCTFE
Diaphragm (valve)	Elgiloy®**
Inlet ports	1/4" NPT(F)
Weight	1,2 kg



#### ORDERING INFORMATION:

PART NO.	MATERIAL	EXTENSION SIDE	SHUT OFF VALVE VERSION
9013287	Chrome-plated brass	Right	No
9013288	Chrome-plated brass	Left	No
9013289	Stainless steel	Right	No
9013290	Stainless steel	Left	No
9013291	Chrome-plated brass	Right	Yes
9013292	Chrome-plated brass	Left	Yes
9013293	Stainless steel	Right	Yes
9013294	Stainless steel	Left	Yes

For example: 9013287

\* Viton® is a registered trademark of The Chemours Company  
 \*\* Elgiloy® a registered trademark of Elgiloy Specialty Metals

# Purge assemblies

## HPI PA High purity purge assemblies

### FEATURES:

- Max. inlet pressure 300 bar
- Diaphragm shut-off valve
- Made of 316L stainless steel

### APPLICATIONS:

- Purge assemblies

### TECHNICAL DATA:

Purity	Up to 6.0
Inlet pressure	Max. 300 bar (4350 psig)
Oxygen use	Suitable

### MATERIAL SPECIFICATIONS:

Diaphragm (valve)	Hastelloy®* C276
Ports	1/4" NPT(F)
Leak rate	1x10 <sup>-8</sup> mbar l/s He
Orifice	Ø 3,2 mm

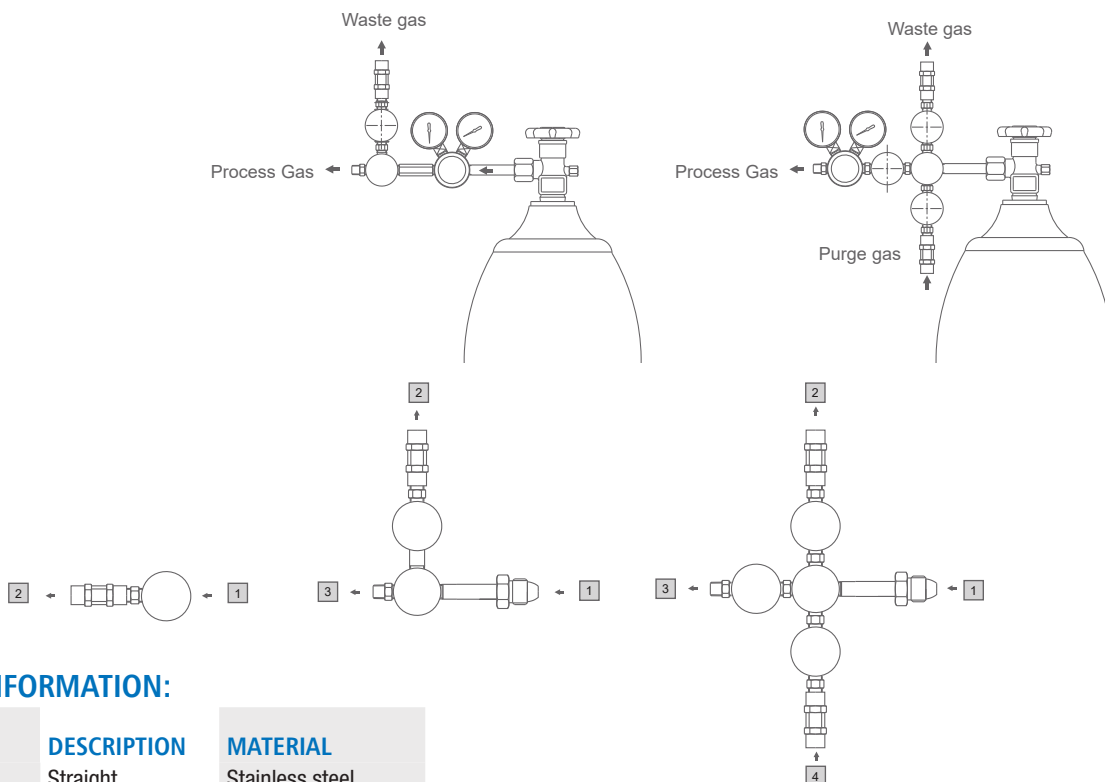


Straight purge assemblies

Tee purge assemblies



Cross purge assemblies



### ORDERING INFORMATION:

PART NO.	DESCRIPTION	MATERIAL
9013277	Straight	Stainless steel
9013278	Tee	
9013279	Cross	

For example: 9013277

\* Hastelloy® is a registered trademark name of Haynes International, Inc

# Valves

## HPI DV300

### High purity, high pressure diaphragm valve

#### FEATURES:

- Max. inlet pressure 300 bar (4350 psig)
- 3/4 turn
- Very high leak tightness
- Metal to metal sealing to atmosphere
- Made of 316L stainless steel for corrosive gases
- Made of chrome-plated brass for non-corrosive gases and mixture up to 6.0

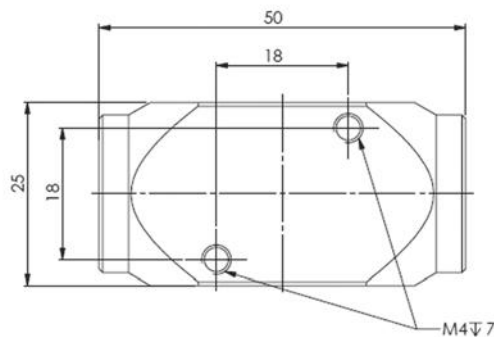
#### TECHNICAL DATA:

Purity	Up to 6.0
Inlet pressure	Max. 300 bar (4350 psig)
Inlet/outlet connection	1/4 FNPT
Oxygen use	Suitable



#### MATERIAL SPECIFICATIONS:

Seal	Kel-F (CTFE)
Seal	Metal to metal
Leak rate	$2,0 \times 10^{-8}$ mbar l/s He
Flow capacity	$C_v = 0,13$



#### RELATED OPTION:

Nipple connector 1/4" NPT

9574RM	1/4" NPT male	1/4" NPT male	Chrome-plated brass
957X4R	1/4" NPT male	1/4" NPT male	Stainless steel 316L

#### ORDERING INFORMATION:

PART NO.	CONNECTION INLET	CONNECTION OUTLET	BODY MATERIAL
9105190	1/4" NPT female	1/4" NPT female	Chrome-plated brass
9105191	1/4" NPT female	1/4" NPT female	Stainless steel 316L



# Valves

## HPI DS300

### High purity, high pressure diaphragm valve

#### FEATURES:

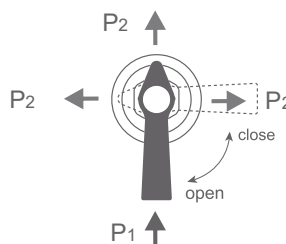
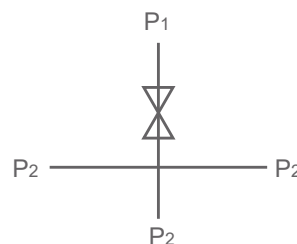
- Max. inlet pressure 300 bar
- Very high leak tightness
- Metal to metal sealing to atmosphere
- Made of 316L stainless steel for corrosive gases
- Made of chrome-plated brass for non-corrosive gases and mixture up to 6.0

#### TECHNICAL DATA:

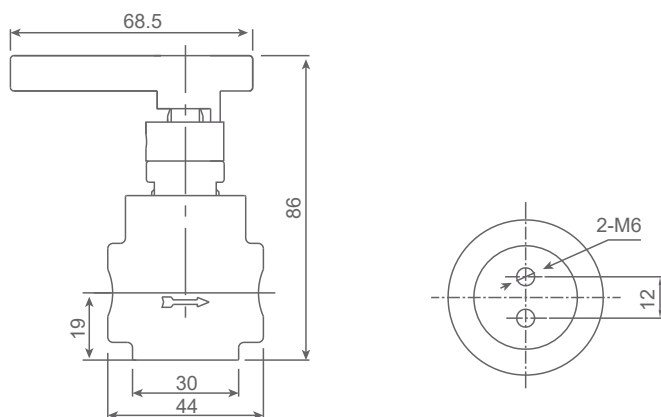
Purity	Up to 6.0
Inlet pressure	Max. 300 bar (4350 psig)
Oxygen use	Suitable

#### MATERIAL SPECIFICATIONS:

Seat	PCTFE
Diaphragm	Elgiloy®*
Filter	SS316
Leak rate	1x10 <sup>-8</sup> mbar l/s He
Orifice	Ø 2,7 mm



Left lever for shutoff



#### ORDERING INFORMATION:

PART NO.	DESCRIPTION	INLET CONFIGURATION	OUTLET CONFIGURATION	BODY MATERIAL	DIAPHRAGM MATERIAL	SEAT MATERIAL
9103265	1/4 turn instrument valve	1/4" NPT female	1/4" NPT female	Chrome-plated brass	Elgiloy® (R)	PCTFE
9103266	1/4 turn instrument valve	1/4" NPT female	1/4" NPT female	Stainless steel	Elgiloy® (R)	PCTFE

\* Elgiloy® a registered trademark of Elgiloy Specialty Metals

## HPI NR300

### High purity, high pressure needle valve

#### FEATURES:

- Max. inlet pressure 206 bar (2987 psig)
- Durable
- Flow regulating
- Metal to metal sealing to atmosphere
- Made of 316L stainless steel

#### TECHNICAL DATA:

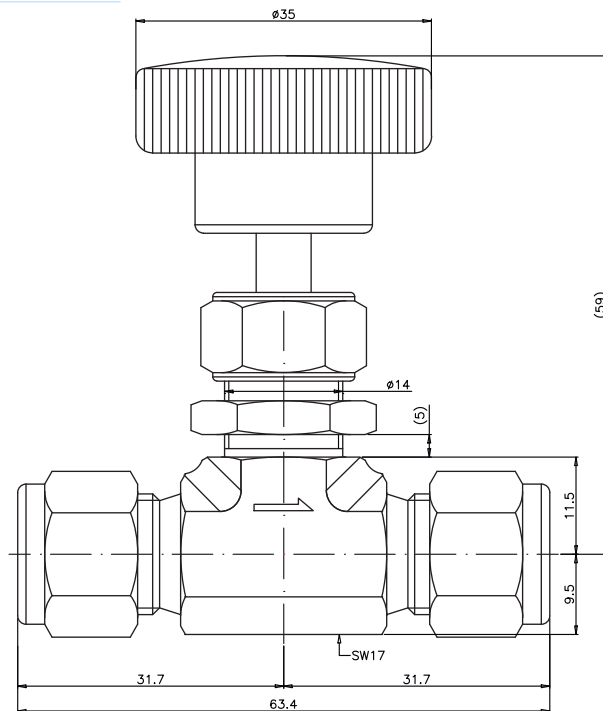
Purity	Up to 6.0
Inlet pressure	Max. 206 bar (2987 psig)
Oxygen use	Suitable

#### MATERIAL SPECIFICATIONS:

Seals	Metal to metal
Leak rate	$1 \times 10^{-8}$ mbar l/s He
Flow capacity	$C_v = 0,17$



Model shown with additional accessories to be ordered separately



#### ORDERING INFORMATION:

##### PART NO.

9103270  
9103271  
9103272  
9103273  
9103274  
9103275  
9103276

##### CONNECTION INLET

1/4" NPT male  
1/4" NPT female  
1/4" NPT male  
1/4" NPT male  
1/4" NPT male  
6 mm tube fitting  
1/4" tube fitting

##### CONNECTION OUTLET

1/4" NPT female  
1/4" NPT female  
1/8" tube fitting  
6 mm tube fitting  
1/4" tube fitting  
6 mm tube fitting  
1/4" tube fitting

##### BODY MATERIAL

Stainless steel 316L

## Flexible hoses

### HPI FH

#### Flexible hoses for connecting gas supply panels and gas cylinder

##### FEATURES:

- HPI FH S hose made of stainless steel 316L / 304
- HPI FH T hose made of PTFE + stainless steel 304
- Special requirements on request
- The hose is made of stainless steel 316L or PTFE inside, a stainless steel 304 double braid and end needed connections
- All hoses are equipped with stainless steel safety cable
- Inner diameter 6 mm
- Elbow connection on cylinder side



Model shown with additional accessories to be ordered separately

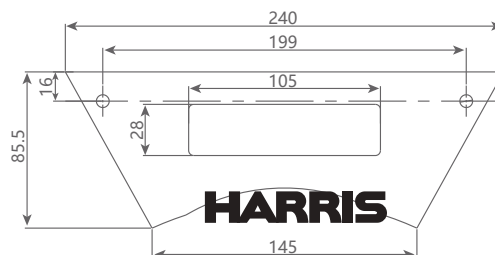
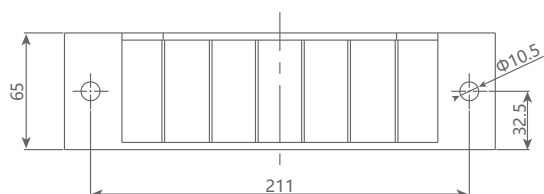
##### ORDERING INFORMATION:

MODEL	LENGTH	INLET CONFIGURATION	CYLINDER CONNECTION	OPTION
HPI FH T PTFE/stainless steel 304	1000 mm    1000	1/4" NPT (Male) Panel connection	Cylinder connection    Please specify	Elbow connection on cylinder connection side    000
HPI FH S 316L/304 stainless steel	2000 mm    2000 3000 mm    3000	1/4" NPT (Female)    002		Elbow connection on both sides    EE Straight cylinder connection    SC
For example: HPI FH T	1000	001		DIN477 no6    000

## Cylinder Wall Bracket

##### DESCRIPTION:

- Special design for one cilinder
- Easy installation to a wall or construction
- Delivered with safety belt
- ABS material



##### ORDERING INFORMATION:

PART NO.  
9009506



## Check valves

### HPI CV L Check valve

#### FEATURES:

- The HPI CV L is a compact design for laboratory pipeline system
- Valve is closed
- When differential pressure between inlet and outlet is higher than the set pressure of the spring, the loaded poppet will move backwards and will enable a free passage of flow through the valve
- Inlet and outlet connection is 1/4" tube fitting

#### MATERIAL SPECIFICATIONS:

O-ring	Viton®* (FKM)
Materials body	SS 316L
Pressure rating	200 bar
Cracking pressure	0,02 bar



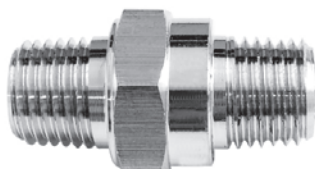
#### ORDERING INFORMATION:

PART NO.	DESCRIPTION	CONNECTION INLET	CONNECTION OUTLET	BODY MATERIAL
9010209	Line check valve	1/4" tube fitting	1/4" tube fitting	Stainless steel 316L

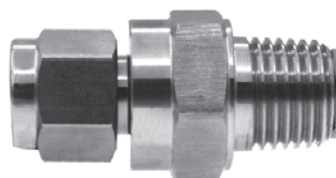
## HPI CVP Check valve

### FEATURES:

- The HPI CVP is a compact design for connecting gas supply panel and hose or pigtail
- Valve is normally closed
- When differential pressure between inlet and outlet is higher than the set pressure of the spring, the loaded poppet will move backwards and will enable a free passage of flow through the valve



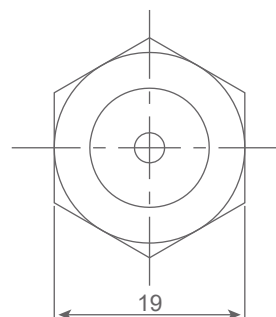
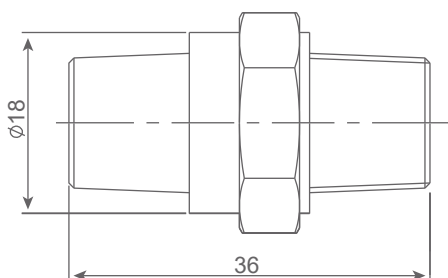
9010210



9010211

### MATERIAL SPECIFICATIONS:

O-ring	Viton®* (FKM)
Materials body	SS 316L
Pressure rating	300 bar
Cracking pressure	0,02 bar



### ORDERING INFORMATION:

PART NO.	DESCRIPTION	CONNECTION INLET	CONNECTION OUTLET	BODY MATERIAL
9010210	Panel check valve	1/4" NPT male	1/4" NPT male	Stainless steel 316L
9010211	Pigtail check valve	1/4" tube fitting	1/4" NPT male	Stainless steel 316L

\*Viton® is a registered trademark of The Chemours Company

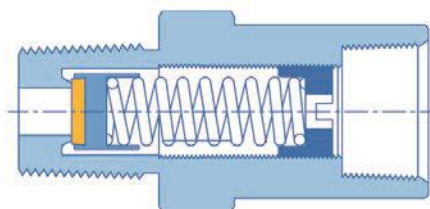
## Relief valves

### HPI RVP Adjustable relief valves

These relief valves may be used as an integral part of a pressure regulator or on equipment downstream of a regulator. The relief valves have a 1/4" NPT inlet and outlet thread to vent gases either externally or remotely.

#### FEATURES:

- The HPI RVP is a relief valve for low pressure service.
- The valve is normally closed. It will open when system pressure reaches the set level. It will re-close when the system pressure falls below the set level.
- Upstream set pressure is the first indicator of flow process.
- Every pressure relief after the first is repeatable within a deviation at room temperature.
- Blocked upstream set pressure is the first indicator of a stopped flow process and is always lower than the set pressure.
- Calculation of set pressure valve design demands back pressure consideration as the system back pressure increases the set pressure. The set pressure are multiplied by 1,3 times of the working pressure.
- Every RVP Relief Valve is factory tested for proper set and resealing performance.



#### MATERIAL SPECIFICATIONS:

O-ring	Viton®* (FKM)
Materials body	SS 316L or chrome-plated brass
Inlet connection	1/4" NPT (M)
Outlet connection	1/4" NPT (F)
Open pressure	Up to 50 bar <sup>1</sup>

#### ORDERING INFORMATION:

##### PART NO.

9103281

9103282

9103283

9103284

9103285

9103286

##### SET PRESSURE RANGE

0 - 6 bar

0 - 6 bar

6 - 16 bar

6 - 16 bar

16 - 26 bar

16 - 26 bar

##### MATERIAL

Chrome-plated brass

Stainless steel

Chrome-plated brass

Stainless steel

Chrome-plated brass

Stainless steel

<sup>1</sup> 26 – 50 bar upon request

\* Viton® is a registered trademark of The Chemours Company

## Stainless Steel Tube Fitting

### Male Connector

**PART NO.**

9007848	6 mm OD x 1/4 in. male NPT
9007849	8 mm OD x 1/4 in. male NPT
9007850	10 mm OD x 1/4 in. male NPT
9007857	1/8 in. tube OD x 1/4 in. male NPT
9007858	1/4 in. tube OD x 1/4 in. male NPT
9007861	1/2 in. tube OD x 1/4 in. male NPT

**BODY MATERIAL**

316 stainless steel
316 stainless steel
316 stainless steel
316 stainless steel
316 stainless steel
316 stainless steel



### Union

**PART NO.**

9007897	6 mm tube OD
9007898	8 mm tube OD
9007900	1/4 in. tube OD

**BODY MATERIAL**

316 stainless steel
316 stainless steel
316 stainless steel



### Union Elbow

**PART NO.**

9007908	6 mm tube OD
9007909	8 mm tube OD
9007911	1/4 in. tube OD

**BODY MATERIAL**

316 stainless steel
316 stainless steel
316 stainless steel



### Union Tee

**PART NO.**

9007913	6 mm tube OD
9007914	8 mm tube OD
9007915	1/4 in. tube OD

**BODY MATERIAL**

316 stainless steel
316 stainless steel
316 stainless steel



### Plug

**PART NO.**

9007935	6 mm tube OD
9007936	8 mm tube OD
9007950	1/4 in. tube OD

**BODY MATERIAL**

316 stainless steel
316 stainless steel
316 stainless steel



Models shown with additional accessories to be ordered separately

## Pressure Gauges

### PG

#### DESCRIPTION:

- Pressure gauges are designed for general and laboratory applications involving the measurement of compressed gases compatible with the materials of construction.
- Gauges are used to monitor pressure of regulators, points of use, supply boards.
- Radial (6 o'clock) mount                      PG R
- Centre back mount                                PG B

#### MATERIAL SPECIFICATIONS:

Type	Bourdon tube pressure gauge
Diameter	49 mm
Pressure	Many pressure ranges available From 2 bar up to 400 bar
Mounting connections	Radial mount Centre back mount
Connection	¼" NPT male
Corpus material	Chrome-plated brass or stainless steel
Accuracy	Class 2,5

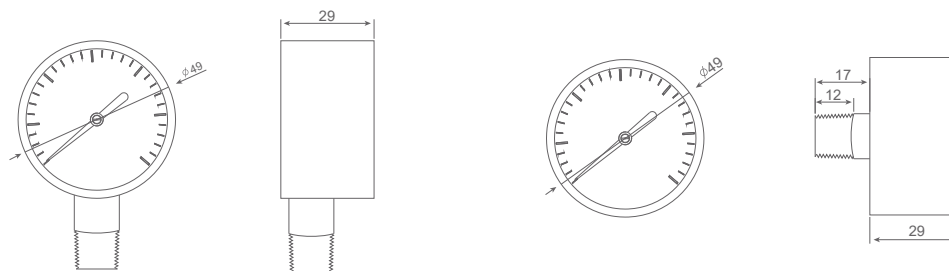


PG R



PG B

Models shown with additional accessories to be ordered separately



#### ORDERING INFORMATION:

PART NUMBER	DESCRIPTION	SCALE (bar)	SCALE (psi)	MATERIAL	CONNECTION	INDUCTIVE
9007664	PG RC-2,5B	0-2,5 bar	0-35 psig	BC	Radial	No
9007665	PG RC-6B	0-6 bar	0-86 psig	BC	Radial	No
9007666	PG RC-10B	0-10 bar	0-145 psig	BC	Radial	No
9007667	PG RC-16B	0-16 bar	0-230 psig	BC	Radial	No
9007668	PG RC-25B	0-25 bar	0-350 psig	BC	Radial	No
9007669	PG RC-60B	0-60 bar	0-860 psig	BC	Radial	No
9007676	PG RC-250B	0-250 bar	0-3500 psig	BC	Radial	No
9007677	PG RC-400B	0-400 bar	0-5800 psig	BC	Radial	No
9007678	PG BC-6B	0-6 bar	0-86 psig	BC	Back	No
9007679	PG BC-16B	0-16 bar	0-230 psig	BC	Back	No
9007680	PG BC-25B	0-25 bar	0-350 psig	BC	Back	No
9007681	PG BC-60B	0-60 bar	0-860 psig	BC	Back	No
9007682	PG RS-2,5B	0-2,5 bar	0-35 psig	SS	Radial	No
9007683	PG RS-6B	0-6 bar	0-86 psig	SS	Radial	No
9007684	PG RS-10B	0-10bar	0-145psig	SS	Radial	No
9007685	PG RS-16B	0-16 bar	0-230 psig	SS	Radial	No
9007686	PG RS-25B	0-25 bar	0-350 psig	SS	Radial	No
9007687	PG RS-60B	0-60 bar	0-860 psig	SS	Radial	No
9007688	PG RS-250B	0-250 bar	0-3500 psig	SS	Radial	No
9007689	PG RS-400B	0-400 bar	0-5800 psig	SS	Radial	No
9007690	PG BS-6B	0-6 bar	0-86 psig	SS	Back	No
9007691	PG BS-16B	0-16 bar	0-230 psig	SS	Back	No
9007692	PG BS-25B	0-25 bar	0-350 psig	SS	Back	No
9007693	PG BS-60B	0-60 bar	0-860 psig	SS	Back	No

Inductive contact version on request.

## Alarm system

### HAS

#### DESCRIPTION:

- Alarm box is used for monitoring low supply pressure gas source and inform user visually by LED light and acoustically by loud buzzer.
- Three version available 2, 6, 10 possible contact connection
- Readable LED light display
- 230V AC, 50 Hz; 110V AC, 60 Hz power supply (on request)



#### ORDERING INFORMATION:

4302085	HAS1, 1 connection
4302086	HAS2, 2 connections
4302087	HAS4 4 connections
4302088	HAS6, 6 connections
4302089	HAS10, 10 connections