

- Widest range of valve and pump solutions from one source.
- In house technical resource and worldwide field support free to clients.
- Total Support and Peace Of Mind with Instant Response Worldwide.
- Worldwide approvals Ex d, Ex ia, Ex emb, Explosion Proof.  
ATEX          ISO 9001
- Certified as SIL 3 Capable.
- Automated diagnostic testing giving zero non conformances against published client criteria.



From design through to manufacture and installation, Bifold has the most in depth range of **Hydraulic, Pneumatic, Instrument, Process, Directional Control Valves and Pumps**



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● 02	Wellhead Control Preferred Range	November 2006
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## Solenoid Valves

● 04	up to 35 bar	Direct and Indirect Acting Solenoid Valves Models FP06P, FP10P, FP12P, BXS & SPR	Ex d, Ex emb, Ex ia	BFD370 November 2014
● 05	250 bar	8 lpm	SVP8x08 Series	Ex d
● 06	690 bar	1 lpm	Direct Acting Solenoid Valves Model FP01	Ex d, Ex emb, Ex ia
● 06	690 bar	15 lpm	Indirect Acting Solenoid Valves Model FP15	Ex d, Ex emb, Ex ia
● 07	610 bar	200 lpm	FP50, FP100, FP200 Series	Ex d, Ex emb, Ex ia
● 07	1380 bar	40 lpm	Slide Valve SV and SV1 Series	Ex d, Ex emb, Ex ia
● 08	690 bar	1 lpm	FPS01 Subsea Series	Issue 4 February 2005
● 08	690 bar		FPS10 Subsea Series	Issue 4 February 2005
				Contact Bifold Fluidpower

## Pilot and Mechanical Valves

● 09	10 bar	Cv 0.9	Domino Junior Logic / Pilot Models SJE, SJJ, HSJ, HSJJ, ASJ, ASHJ, ASJJ & ASHJJ	August 2014
● 09	10 bar	Cv 0.7	Indicating Relays First Out / Visual Indicator Models SJJ, Type T, RA & RB	BFD369 October 2014
● 09	10 bar		Lockout Relay Valve / I200 / I201 / I205 / I206 / I250	M01 - M04
● 10	12 bar	Cv 2.0	Domino Pilot Valve Models S06, S09 & S12	March 2007
● 11	690 bar	3 lpm	High Pressure Logic Valve Models MVP, FP01, HPM, FP15, MHP, MPB, MVR, KOV, COV, HPV, LPV, DHP, MLP & MDV	February 2007
● 11	690 bar	15 lpm	4Way Rotary Valve, I4550	J01 - J04
● 12	1035 bar	15 lpm	FP15, FP15E Interface / Pilot	January 2013
● 12	610 bar	200 lpm	FP50, FP100, FP200 Series Interface / Pilot	Issue 3 February 2005
● 12	1380 bar	40 lpm	Slide Valve SV Interface / Pilot	Issue 3 February 2005
● 12			Shutdown & Slide Valve / 1073, 1074, 1174, 1175, 3100, 3101, 3104, 3105, 3106, 3109, 3111, 3115, 3160, 3163, 3165, 3167, 4100, 4105, 4101, 4102, 4106, 4107, 4111, 4115, 4160, 4165.	L01 - L06 & K01 - K018

## Filters, Regulators, Flow Control, Volume Boosters, HIPEX

● 13	10 bar	Cv 0.8	Models SH and SC Series Air Preparation Units	March 2011
● 13	20 bar	Cv 11.2	Volume Booster Range Model VBP Series	BFD03/8 November 2011
● 13	20 bar	Cv 11.2	High Speed Exhaust Valve Range Model HIPEX Series	BFD20/5 November 2011
● 14	690 bar	Cv 30.0	Flow Controller Valve & Cylinder Plug Valve Models FCV, SE & ASE	February 2011
● 14	520 bar	200 lpm	Inline and Bowl Filters, F & BF	Issue 3 February 2005
● 14	345 bar	150 lpm	Automatic Shut-off Bypass Valve, Type ASBV	Issue 3 February 2005

## Relief, Pressure Sensing, Stick Pilot Valves

● 15	10 bar	Cv 2.3	Pressure Sensing Valve PSV	March 2007
● 16	up to 1300 bar		Relief Valves Gaseous and Liquid Service	BFD81 December 2012
● 17	690 bar		Flowline Pilot PSV5A / PSV5E Stick Pilot	June 2012
● 17	690 bar		Flowline Pilot, 2010 - 2175 Stick Pilot	N01 - N04

## Fire Safety Valves

● 18	10 bar - 690 bar	200 lpm	Frangible Bulb and Eutectic Material Models ETSV, ETSP & FBVP	March 2007
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## Check and Quick Exhaust Valves

● 19	690 bar		Shuttle Valve Models FP15/SV, FP50/SV & S06-SV	October 2012
● 19	690 bar		Quick Exhaust Valves	March 2013
● 20	828 bar	190 lpm	Check Valve Models HCV, PCV, SCV, DCV & EFCV2	March 2011
● 21	690 bar	200 lpm	Excess Flow Check Valve, 381001 & 381171	M05 - M06

## Pumps and Intensifiers

● 22	636 bar		Chemical Injection Motor Pump Unit (CIMPU)	BFD52/2 November 2011
● 22	690 bar		Chemical Metering Hydrodrive Motor Pump Unit CMMPU(H)	BFD53/1 October 2011
● 22	636 bar		Water and Oil Based Fluids Pump/Motor Pump Unit Type XWH	BFD54 August 2011
● 22	1000 bar		Water Pump, Type TW 11470, 11480 & SW 11440	E01 - E08
● 23	870 bar		Water Glycol Pump, XW 11196/11197/11202	D01 - D08
● 24	850 bar		Oil Pump, Type X & Type M pumps	F01 - F06
● 25	1000 bar		Topside Pressure Intensifier, HI 11380	G01 - G06
● 25	1000 bar		Subsea Pressure Intensifier, HI 11400	G07 - G016

## Block Before Bleed / Ball and Needle Valves, Piping Valves and Monoflanges

● 26	690 bar		Fire Safe Instrumentation Products Ball and Needle Valves	BFD80/1 November 2012
● 26	690 bar		Instrumentation Products Ball and Needle Valves	BFD01/9 August 2013
● 27	1379 bar		Medium Pressure Instrumentation Valves & Fittings	BFD89 August 2013
● 28	1035 bar		Instrumentation and Piping Products Models BV & NV	BFD07 September 2009





**MARSHALSEA**  
HYDRAULICS LIMITED

**Bifold FluidPower**<sup>®</sup>  
Limited

# Corporate Brochure

Reliability & Innovation in Directional  
Control Valves, Pumps and Intensifiers

## Features:

- World-wide solenoid approvals - ATEX, CSA, SAA, INMETRO & GOST
- Providing one of the widest range of valves, manifolds pumps and intensifiers
- 316L stainless steel
- World-wide product and system support
- Extensive applications reference list
- State of the art testing facilities for qualification and performance optimisation of control valves and systems





## Introduction

Bifold Fluidpower was established over a century ago as a manufacturer of valves for hazardous environments and is currently a leading manufacturer of electro-hydraulic and pneumatic directional control valves for the oil and gas industry. With the takeover of Marshalsea Hydraulics, Bifold Fluidpower can now offer a large selection of pumps / pump sets and intensifiers along with other high pressure, stainless steel fluidpower equipment. The state of the art manufacturing facility is based in the UK with sales offices in Houston, Singapore and Taunton and representatives in every continent. Through a commitment to innovation and value engineering, Bifold Fluidpower and Marshalsea Hydraulics offers leading technical solutions for control system designs whilst providing excellent service and technical support to customers around the world.

## Leading Performance

Major producers world-wide depend upon Bifold Fluidpower products to perform in the most extreme conditions, offshore and onshore. Depth of knowledge built up over a century enables us to identify the optimum solution for each application. Over 3000 designs include valves for pressures from 10 to 20,000 psi, ambient temperatures from -50°C to +180°C and contamination levels beyond NAS 1638 Class 12. Solenoids certified for flammable gas & dust atmospheres are available with power ratings from 0.9 to 20 watts.

## Actuators & Chokes

You can rely on Bifold Fluidpower for the widest range of directional control valves for actuators and chokes. Our compact manifold systems provide high integrity coupled with low maintenance. They comply with major world-wide solenoid approvals including ATEX, SAA, INMETRO, CSA and GOST. You also have the reassurance and convenience of global technical and circuit design support.



## Wellhead

The Bifold Fluidpower range for wellhead control, incorporating electro-hydraulic low pressure logic, is the widest there is. With a choice of 8000 types across 15 categories, and high and low power options, you are sure to find a valve to fit your application and with the addition of Marshalsea's range it gives you an even greater choice including pumps, relief valves and intensifiers.



## Subsea

Experience gained since 1987 of successfully applying valves directly immersed in sea water has been applied to develop the technically superior, market leading performance, FPS10 range of shearseal type directional valve. Fully seawater compatible, the standard products operate on fluids with contamination levels greater than NAS 1638 Class 12. True failsafe valves, they bring you the benefits of reduced manifold weight, size and costs, and put world beating performance at your command.

- Worlds first 180°C, 20,000 psi valve for HPHT well SSSV control
- Worlds first 130°C, 10,000 psi, 3000 metre subsea valve



## Arctic Service

Since the middle 1990's, Bifold Fluidpower's directional control valves have demonstrated their ability to withstand the severity of environments in Northern Alaska, Canada, Siberia and the Caspian Region. We supply the largest range of pneumatic and hydraulic products for pressures from 2 to 690 bar, backed by the quality assurance of valve type approval testing in our in-house, state of the art climatic test chamber for temperatures down to -70°C. Rigorous test programmes simulate both prolonged low temperature exposure and rapid temperature changes, including complete actuator control system testing.



## Marshalsea Hydraulics



Marshalsea has an established reputation as a manufacturer and supplier to the international offshore oil and gas industry - which demands the very highest standards of engineering excellence and product. The companies success continues to be attributable to its firm commitment to product quality.

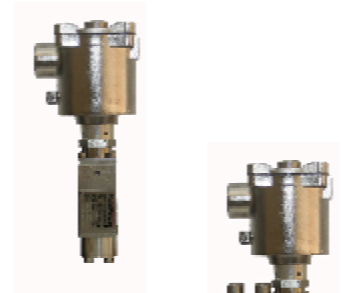
In recent years, Marshalsea has built on the experience and skills of its workforce to extend its product range. In addition to its high quality pumps and valves, Marshalsea now provides a range of stainless steel intensifiers for subsea and topside applications - plus a new range of water pumps specifically designed for water jet cutting applications.





**Product Series:-**  
**Pressure:-**  
**Size Range:-**  
**Solenoid Power / type:-**  
**Explosion Protection:-**  
**Primary Applications:-**

FP01  
0 - 690 bar  
1 litre per minute nominal  
0.9 to 3.7W / direct acting  
EExd, EExemb, EExia  
SSSV, Process, ESD, Choke Valve and Ballast System actuator controls

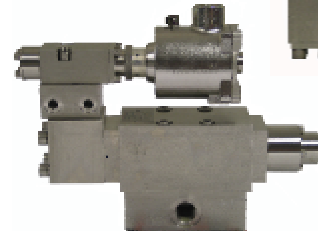


**Product Series:-**  
**Pressure:-**  
**Size Range:-**  
**Solenoid Power / type:-**  
**Explosion Protection:-**  
**Primary Applications:-**

FP05  
0 - 345 bar  
5 litres per minute nominal  
5.7W / direct acting  
EExd,  
Process, ESD and choke valve actuator control, Ballast

**Product Series:-**  
**Pressure:-**  
**Size Range:-**  
**Solenoid Power / type:-**  
**Explosion Protection:-**  
**Primary Applications:-**

FP15  
0 - 690 bar  
15 litres per minute nominal  
0.9 to 3.7W / indirect acting  
EExd, EExemb, EExia  
Wellhead, Process, ESD, Choke, Ballast, Turret and Mooring System actuator control



**Product Series:-**  
**Pressure:-**

FP50, FP100 & FP200  
0 - 345 bar (FP50)  
0 - 250 bar (FP100 & FP200)  
50, 100 & 200 litres per minute nominal  
0.9 to 3.7W / indirect acting  
EExd, EExemb, EExia  
Process, ESD and HIPPS valve actuator control



**Size Range:-**  
**Solenoid Power / type:-**  
**Explosion Protection:-**  
**Primary Applications:-**

**Product Series:-**  
**Pressure:-**  
**Size Range:-**  
**Solenoid Power / type:-**  
**Explosion Protection:-**  
**Primary Applications:-**

SV/SVI Series  
0 - 1380 bar  
up to 40 litres per minute nominal  
0.9 to 3.7W / indirect acting  
EExd, EExemb, EExia  
Special applications for high pressure, high temperature and contaminated control fluids



## Solenoid Valves:-

### Flameproof (EExd)

**Product Series:-**  
**Pressure:-**  
**Size Range:-**  
**Solenoid Power / type:-**  
**Explosion Protection:-**  
**Primary Applications:-**

FP03P, FP06P, FP10P & FP12P  
0 - 10 bar  
1/4" to 1/2"  
1.5 to 6.5 W / direct acting  
EExd, EExia+ EExemb(FP03P only)  
Wellhead, Process and ESD valve actuator control



**Product Series:-**  
**Pressure:-**  
**Size Range:-**  
**Solenoid Power / type:-**  
**Explosion Protection:-**  
**Primary Applications:-**

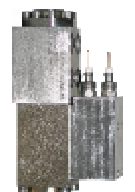
SVP8x08  
0 - 250 bar  
8 litres per minute nominal  
5.7W / direct acting  
EExd  
Process, ESD and choke valve actuator control

## Solenoid Valves:-

### Subsea

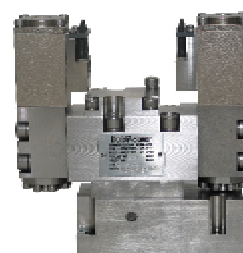
**Product Series:-**  
**Pressure:-**  
**Size Range:-**  
**Solenoid Power / type:-**  
**Primary Applications:-**  
**Depth of operation:-**

FPS01 Subsea  
0 - 690 bar  
1 litre per minute nominal  
15W / direct acting  
Subsea  
3000m



**Product Series:-**  
**Pressure:-**  
**Size Range:-**  
**Solenoid Power / type:-**  
**Primary Applications:-**  
**Depth of operation:-**

FPS10 Subsea  
0 - 690 bar  
10 litre per minute nominal  
15W / indirect acting  
Subsea  
3000m



\* pending spring 2005; consult Bifold Fluidpower





## Stainless Steel Actuator and Choke Control / Wellhead Control

**Product Series:-**  
**Pressure:-**  
**Size Range:-**

**AXIS Manifold system**  
0 - 12 bar  
1/4" to 1"  
**Contact Bifold Fluidpower for full range**

**Product Series:-**  
**Pressure:-**  
**Size Range:-**  
**Primary Applications:-**

**Junior - SJE06 Series**  
0 - 10 bar  
1/4"  
Wellhead and process valve control system logic valves

**Product Series:-**  
**Pressure:-**  
**Size Range:-**  
**Primary Applications:-**

**Junior - SJJE06 Series**  
0 - 10 bar  
1/4"  
Wellhead and process valve control system logic valves

**Product Series:-**  
**Pressure:-**  
**Size Range:-**  
**Primary Applications:-**

**Domino - S Series**  
0 - 10 bar  
1/4" to 1/2"  
Wellhead and process valve control system logic valves

**Product Series:-**  
**Pressure:-**  
**Size Range:-**  
**Primary Applications:-**

**Diaphragm SD Series & Poppet SPR Series**  
0 - 10 bar  
1/4" to 1"  
High flow actuator control valves

**Product Series:-**  
**Pressure:-**  
**Size Range:-**

**SH Series Air Preparation**  
0 - 40 bar  
1/4" to 1"

**Product Series:-**  
**Pressure:-**  
**Size Range:-**

**Flow Control; Needle & Cylinder Plug**  
0 - 690 bar  
1/4" to 1"

**Product Series:-**  
**Pressure:-**  
**Size Range:-**  
**Primary Applications:-**

**FP15**  
0 - 1035 bar  
15 litres per minute nominal  
Wellhead, Process, ESD, Choke, Ballast, Turret and Mooring System actuator control

**Product Series:-**  
**Pressure:-**

**FP50, FP100 & FP200**  
0 - 345 bar (FP50)  
0 - 250 bar (FP100 & FP200)  
50, 100 & 200 litres per minute nominal  
Process, ESD and HIPPS valve actuator control

**Size Range:-**  
**Primary Applications:-**

**Product Series:-**  
**Pressure:-**  
**Size Range:-**  
**Primary Applications:-**

**Slide Valve Series**  
0 - 1380 bar  
up to 40 litres per minute nominal  
Special applications for high pressure, high temperature and contaminated control fluids

**Product Series:-**  
**Pressure:-**  
**Size Range:-**  
**Primary Applications:-**

**PSV5E - flowline pilot range**  
0 - 690 bar sensing; 0 - 16 bar control  
5 litres per minute nominal  
Process valve actuator control systems, Wellhead control system logic valves

**Product Series:-**  
**Pressure:-**  
**Size Range:-**

**Check Valves (Hydraulic & Pneumatic)**  
0 - 690 bar / 0 - 12 bar  
up to 190 litres per minute nominal / 1/4" to 1"

**Product Series:-**  
**Pressure:-**  
**Size Range:-**

**Frangible Bulb, Eutectic plug/Fusible link (Hydraulic & Pneumatic)**  
0 - 690 bar / 0 - 12 bar  
up to 200 litres per minute nominal / 1/4" to 1"

**Product Series:-**  
**Pressure:-**  
**Size Range:-**

**Quick Exhaust Valves (Hydraulic / Pneumatic)**  
0 - 345 bar / 0 - 12 bar  
up to 200 litres per minute nominal / 1/4" to 1"

**Product Series:-**  
**Pressure:-**  
**Size Range:-**

**Hydraulic In Line and Bowl Filters**  
0 - 520 bar  
3, 10 & 25 micron filter rating, 1/4" to 1/2"

**Other Units**

Other units included in the Bifold Fluidpower Range include; **Auto shut off regulator by-pass valves, bug vents, relief valves, port flow regulators, hydraulic valve manifold assemblies -**  
Contact Bifold Fluidpower for details or reference our web site





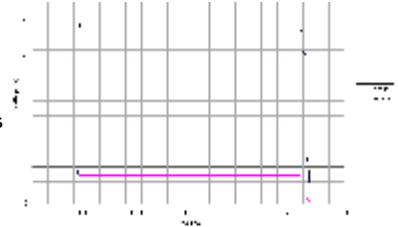
### Approval Testing

In obtaining a wide range of approvals Bifold Fluidpower has subjected valves to onerous tests accredited by external bodies.

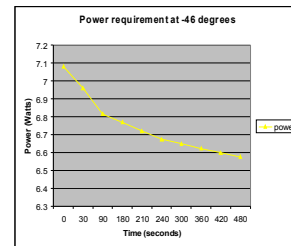
- Endurance testing to 600,000 cycles at the extremes of the operating temperature envelope.
- Environmental testing from -50°C to +180°C
- Full function testing, leak rate monitoring, proof testing 1.5 to 5 times operating pressure (dependent on approval body)
- Maximum and minimum pull-in voltage testing
- Response time testing
- Dielectric strength and insulation strength testing

### State of the art testing and qualification facilities

- State of the art climatic test facilities (-70°C to +180°C).
- Single valve or complete control system testing capability including the process valve actuator - avoid discovering a problem in the field
- Full data logging and analysis of temperature, pressure, and response time.



Temp. (°C)	Time (min)	Current (mA)	Power (W)	Pressure (bar)	Leak Rate (ml/min)	Response Time (ms)
-50	10	100	10	10	0.1	100
0	10	100	10	10	0.1	100
50	10	100	10	10	0.1	100
100	10	100	10	10	0.1	100
150	10	100	10	10	0.1	100
180	10	100	10	10	0.1	100



### Solenoid Approvals

Bifold Fluidpower present valves certified by a wide range of international approved bodies

- ATEX (European hazardous area approval)
- CSA, (Canadian and United States of America hazardous area approval).
- INMETRO (Brazilian hazardous area approval).
- SAA (Australian hazardous area approval).
- GOST (Russian hazardous area approval), GGTN (export licence to Russia), Expert Analysis report supporting the GGTN permit.



### Valve Performance Testing

Bifold Fluidpower offer full qualification testing facilities; independent inspectorate and/or customer witness testing is free of charge when significant valve package orders are placed. Bifold Fluidpower has invested in state of the art climatic testing facilities. Valves are tested to the extremes of the environment required. Testing from simple valve operation to the assessment of:- i) variations in actuator opening times, and ii) pressure surges due to fluid thermal expansion as a result of a rapid temperature rise.

### Leading Innovation

We combine the creative application of valve technology, innovative use of raw materials and the first hand knowledge of offshore and onshore hydraulic and pneumatic control systems to keep our customers ahead of the field. A significant part of our workforce is dedicated to developing valves that are smaller, more robust, for lower power solenoids, working at more extreme temperatures, enhancing both output and safety.

### World-wide Support and Service

With over 95% of production for export, Bifold Fluidpower provides product and technical support for over 5000 valve products world-wide from the offices in the UK, Houston and Singapore. Bifold Fluidpower has invested in state of the art machining centres ensuring accuracy of close tolerances, all thread milled ports and a rapid turnaround capability.

The end user can be sure that Bifold Fluidpower has the product portfolio and the technical and production capability to provide the right solution for your pneumatic and hydraulic system requirements.

### Project Reference List

Bifold Fluidpower has supplied pneumatic and hydraulic control valves to the vast majority of worldwide projects on all continents. Some recent major projects include; Dalia, Sakhalin, Bayu Undan, P50 Albacora Leste, South Pars and North East Al Dhabiya/Rumaitha (NEB). A full Installation Reference list is available via the web or by contacting Bifold Fluidpower



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### Quality Assurance

*All Bifold Fluidpower products are manufactured to a most stringent QA programme. Every care is taken at all stages of manufacture to ensure that every product will give optimum performance and reliability. We are recognised to EN ISO 9001:2000. Functional test certificate, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BSEN 10204 3.1.B where available. The manufacturer reserves the right to make changes to the specifications and design etc., without prior notice*

### Accuracy of information

*We take care to ensure that product information in this catalogue is reasonably accurate and up-to-date. However, our products and services are continually updated so to ensure accurate and up-to-date information please refer to the issue list on the web site or contact a member of our sales team.*



# Electro Hydraulic/ Low Pressure Logic Arctic Service Range -50°C

World leading supplier of control valves  
for low temperature



Superior performance  
throughout the full  
operational range

## Features:

- Worldwide solenoid approvals ATEX, CSA, SAA, INMETRO & GOST
- Providing one of the widest range of low temperature valves and manifolds
- 316L Stainless steel
- World-wide product and system support
- Extensive applications reference list of proven products for arctic service
- State of the art testing facilities to -70°C for qualification and performance optimisation of control valves and systems







## Introduction

Bifold Fluidpower was established over a century ago as a manufacturer of valves for hazardous environments and is currently a leading manufacturer of electro-hydraulic and pneumatic directional control valves for the oil and gas industry. Through a commitment to innovation and value engineering, Bifold Fluidpower offers leading technical solutions whilst providing excellent service and technical support to customers around the world.

Bifold Fluidpower design, develop and manufacture arctic service products for the former Soviet Union, the Caspian region, Canada and Alaska.



## Wide Range of Low Temperature Valves and Manifolds

See individual product brochures for details. A summary is shown below:-

<b>Product Series:-</b>	AXIS Manifold
<b>Pressure :-</b>	0 - 10 bar
<b>Size Range:-</b>	1/4" to 1"
<b>Solenoid Power/Type:-</b>	1.5 to 6.5W
<b>Explosion Protection:-</b>	EExd, EExemb, EExia
<b>Primary Applications:-</b>	Wellhead, Process and ESD valve actuator control

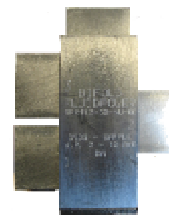
<b>Product Series:-</b>	Junior ASJJ06 Series
<b>Pressure :-</b>	0 - 8 bar
<b>Size Range:-</b>	1/4"
<b>Primary Applications:-</b>	Wellhead and process valve control system logic valves

<b>Product Series:-</b>	ASPR Series sealed spool
<b>Pressure :-</b>	0 - 10 bar
<b>Size Range:-</b>	1/4" to 1"
<b>Solenoid Power/Type:-</b>	3.5 to 6.5W / indirect acting
<b>Explosion Protection:-</b>	EExd, EExemb, EExia
<b>Primary Applications:-</b>	High flow actuator control valves

<b>Product Series:-</b>	FP06PA, FP10PA, FP12PA *
<b>Pressure :-</b>	0 - 16 bar
<b>Size Range:-</b>	1/4" to 1/2"
<b>Solenoid Power/Type:-</b>	1.5 to 6.5W / direct acting
<b>Explosion Protection:-</b>	EExd
<b>Primary Applications:-</b>	Wellhead, Process and ESD valve actuator control

<b>Product Series:-</b>	SVP8x08
<b>Pressure :-</b>	0 - 250 bar
<b>Size Range:-</b>	8 litres per minute nominal
<b>Solenoid Power/Type:-</b>	5.7W / direct acting
<b>Explosion Protection:-</b>	EExd
<b>Primary Applications:-</b>	Process, ESD and choke valve actuator control

\* pending summer 2007





**Product Series:-**  
**Pressure :-**  
**Size Range:-**  
**Solenoid Power/Type:-**  
**Explosion Protection:-**  
**Primary Applications:-**

FP01 (-36°C minimum)  
0 - 690 bar  
1 litre per minute nominal  
0.9 to 3.7W / direct acting  
EExd, EExemb, EExia  
SSSV, Process, ESD, Choke Valve and Ballast System actuator controls



**Product Series:-**  
**Pressure :-**  
**Size Range:-**  
**Solenoid Power/Type:-**  
**Explosion Protection:-**  
**Primary Applications:-**

FP15  
0 - 690 bar (pilot stage); 0 - 1035 bar (main stage)  
15 litres per minute nominal  
0.9 to 5.7W / indirect acting  
EExd (-50°C), EExemb (-36°C), EExia (-36°C)  
Wellhead, Process, ESD, Choke, Ballast, Turret and Mooring System actuator controls.



**Product Series:-**  
**Pressure :-**  
**Size Range:-**  
**Solenoid Power/Type:-**  
**Explosion Protection:-**  
**Primary Applications:-**

FP50, FP100 & FP200  
0 - 345 bar (FP50)  
0 - 250 bar (FP100, FP200)  
50, 100, 200 litres per minute nominal  
0.9 to 5.7W / indirect acting  
EExd (-50°C), EExemb (-36°C), EExia (-36°C)  
Process, ESD and HIPPS valve actuator control



**Product Series:-**  
**Pressure :-**  
**Size Range:-**  
**Solenoid Power/Type:-**  
**Explosion Protection:-**  
**Primary Applications:-**

SV/SVI Series  
0 - 690 bar (pilot stage); 0 - 1380 bar (main stage)  
40 litres per minute nominal  
0.9 to 5.7W / indirect acting  
EExd (-50°C), EExemb (-36°C), EExia (-36°C)  
Special applications for high pressure, high temperature and contaminated control fluids

**Product Series:-**  
**Pressure :-**  
**Size Range:-**

Quick Exhaust Valves - Hydraulic / Pneumatic  
0 - 345 bar Hydraulic ; 0 - 12 bar Pneumatic  
1/4" - 1/2" Hydraulic ; 1/4" - 1" Pneumatic



**Product Series:-**  
**Pressure :-**  
**Size Range:-**

Thermal Relief Valves  
0 - 1380 bar  
1/4" to 1/2"



**Product Series:-**  
**Pressure :-**  
**Size Range:-**

Pressure Relief Valves  
0 - 12 bar  
1/4" to 1/2"



**Product Series:-**  
**Pressure :-**  
**Size Range:-**

ASH Series Air Preparation  
0 - 40 bar  
1/4" to 1"

**Product Series:-**  
**Pressure :-**  
**Size Range:-**

Ancillary Valves (Flow Control, Check Valves, Port Flow Regulators)  
0 - 1035 bar (subject to product type)  
1/4" to 1"



**Product Series:-**  
**Pressure :-**  
**Size Range:-**  
**Primary Applications:-**

PSV5A - Flowline Pilot Range  
0 - 690 bar sensing; 0-16 bar control  
5 litres per minute nominal  
Process valve actuator control systems, Wellhead control logic valves







## Solenoid Approvals

Bifold Fluidpower present valves certified by a wide range of international approved bodies

## International Approvals

- GOST (Russian hazardous area approval), GGTN (export licence to Russia), Expert Analysis report supporting the GGTN permit.
- CSA (Canadian and United States of America hazardous area approval).
- ATEX (European hazardous area approval)
- INMETRO (Brazilian hazardous area approval).
- SAA (Australian hazardous area approval).



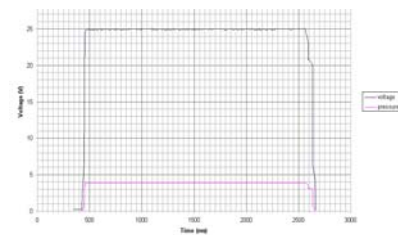
## Approval Testing

In obtaining the range of approvals Bifold Fluidpower has subjected valves to an onerous range of tests accredited by external bodies.

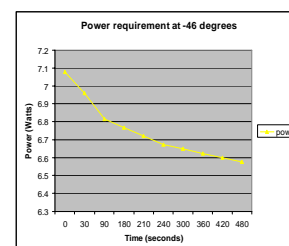
- Endurance testing to 600,000 cycles at the extremes of the operating temperature envelope.
- Environmental testing from -55°C to +90°C
- Full function testing, leak rate monitoring, proof testing 1.5 to 5 times operating pressure (dependent on approval body)
- Maximum and minimum pull-in voltage testing
- Response time testing
- Dielectric strength and insulation strength testing

## State of the Art Testing and Qualification Facilities

- State of the art climatic test facilities (-70°C to +180°C).
- Single valve or complete control system testing capability including the process valve actuator – avoid discovering a problem in the field.
- Full data logging and analysis of temperature, pressure, and response time.



Temp	Stroke	min. sec					
		Tested Time	Corrected Time	Tested Time	Corrected Time		
-20	FB	6.4	9.2	6.24	8.88	6.29	9.05
	Anul	6.23	9.54	6.14	9.4	6.11	9.34
-40	FB	13.31	18.55	10.54	15.16	13	18.12
	Anul	12.21	19.09	14.45	22.52	10.18	15.98
20	FB	4.36	6.26	4.35	6.25	4.30	6.29
	Anul	4.02	6.15	4.05	6.2	4.07	6.23





## Valve Performance Testing

Bifold Fluidpower offer full qualification testing facilities open for external and customer witness testing free of charge when significant valve package orders are placed. Bifold Fluidpower has invested in state of the art climatic testing facilities. Valves are tested to the extremes of the environment required. Testing from simple valve operation to variations in actuator opening times, and pressure surges due to fluid thermal expansion as a result of a rapid temperature rise.

### Sakhalin Island and the Caspian region (40° latitude)

- -35°C to -55°C for 1-2 days in winter to +40°C in summer.
- Rapid temperature rises from -40°C to -20°C.
- Products and systems must be tested at both temperature extremes and tested to simulate rapid night to day temperature changes.

### Prudoe Bay (70° latitude)

- Long periods below -40°C.
- Exposed parts freeze up.
- Products must be held at -40°C for at least 10 days (dependent on the thermal hysteresis of the valve mass and materials).

## World-wide Support and Service

With over 95% of production for export, Bifold Fluidpower provides product and technical support for over 4000 valve products world-wide from the offices in the UK, Houston and Singapore. Bifold Fluidpower has invested in state of the art machining centres ensuring close tolerances, all thread milled ports and a rapid turnaround capability.

The end user can be sure that Bifold Fluidpower has the product portfolio and the technical and production capability to provide the right solution for your pneumatic and hydraulic system requirements.

## Project References

- Sakhalin Island –Shell/Sakhalin Energy. Over 1500 electro-pneumatic and hydraulic control valves, air-preparation and accessory valves and manifold systems supplied on most of the packages.
- Baku to Ceyhan Pipeline –BP. All electro-hydraulic directional control valve packages.
- Tengiz – Tengizchevroil. Electro-hydraulic and pneumatic directional control valves, air preparation and accessory valves. Used on well control, HIPPS valves, and actuated valve packages.
- Shnoevhit –Statoil. Electro-hydraulic directional control valves for well control.
- Shah Deniz –BP. Electro-hydraulic solenoid and accessory valves for HIPPS, wellhead controls and actuated valve packages.
- Karachaganak –Karachaganak Int.Org. Solenoid, pilot, accessory and interface valves for well control packages.
- Terra Nova –Petro Canada. Pneumatic and hydraulic control valves.
- Hibernia – Petro Canada. Pneumatic and hydraulic control valves
- Many other minor projects.



### **UK Office**

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Fax:- +44 (0)161 345 4780  
EMail:- sales@bifold-fluidpower.co.uk  
Web:- www.bifold-fluidpower.co.uk

### **USA Office**

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Tel:- +1 713 783 4253  
Fax:- +1 713 783 0067  
Email:- sales@bifold-fluidpower.com  
Web:- www.bifold-fluidpower.com

### **Asia Pacific Office**

424 Balestier Road #02-08, Giffard Mansion, Singapore 329810

Tel:- +65 6735 1323  
Fax:- +65 6735 1367  
EMail:- bifold@singnet.com.sg  
Web:- www.bifold-fluidpower.co.uk

#### **Quality Assurance**

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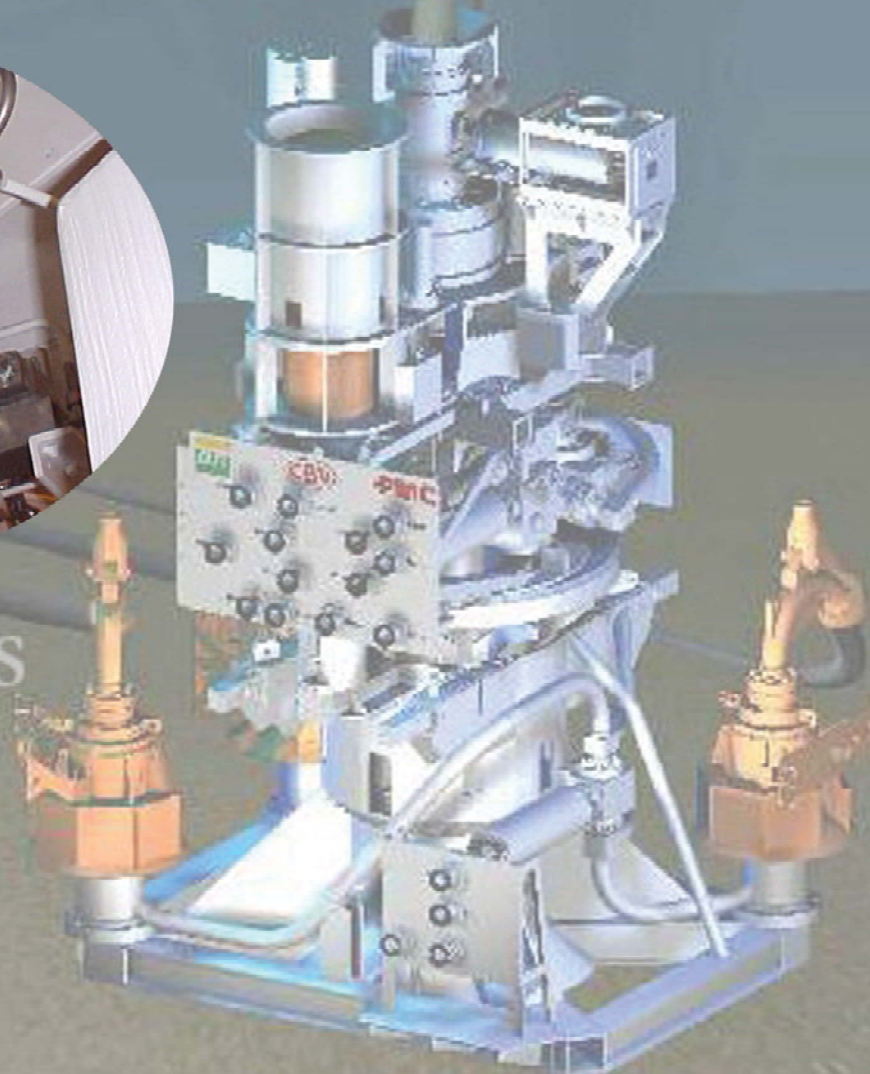
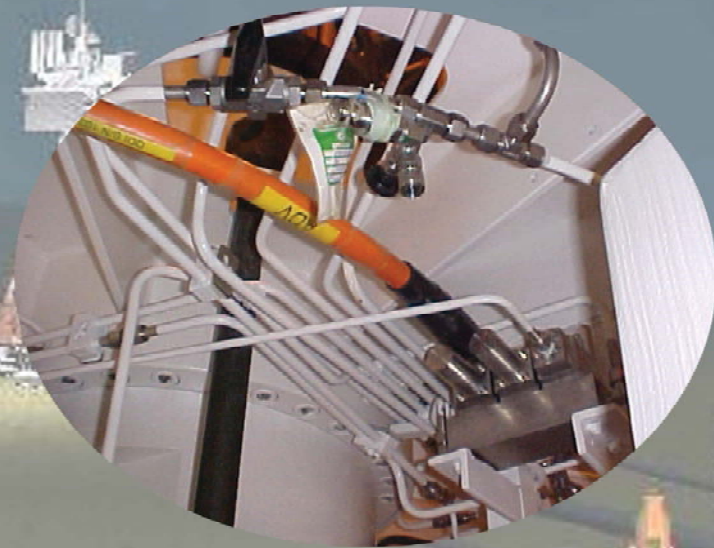
# Bifold FluidPower<sup>®</sup>

Limited

Reliability and Innovation in directional control valves

## Subsea Valve Range

World leading supplier of directional control valves and modular valve assemblies for subsea applications



**FMC** Technologies

### INTRODUCTION

Experience gained since 1987, successfully designing and manufacturing valves for operation directly immersed in sea water, has been applied to develop Bifold Fluidpower's extensive range of technically superior sub-sea valves. Designed to operate reliably on fluids with contamination levels greater than NAS 1638 Class 12, these true failsafe valves bring you the options for reducing sub-sea control module size, weight and costs, and put world beating performance at your command.

Below are typical specification requirements for sub-sea valves and comparable Bifold Fluidpower valve performance:

#### Subsea valve specification

- 1million cycles
- Control fluid compatibility:-  
New generation water glycols, oil (non-charmable);  
up to 20% sea water contamination
- Immersable in di-electric fluids with up to  
20% sea water contamination
- Fluid cleanliness NAS 1638 Class 6 - NAS 1638 Class 10
- 3000m water depth
- up to 760 bar max wp.
- -10°C to +50°C
- Leakage <0.02 to 1 cc/min
- 18 to 28 VDC, 12 Watt

#### Bifold Fluidpower performance

- 1million cycles
- Seawater as operating medium
- Direct sea water immersion
- up to NAS 1638 Class 12
- 3000m water depth
- up to 1035 bar max wp.
- -40°C to +121°C
- Leakage 0 to 0.2 cc/min
- 18 to 28 VDC, 15 Watt

#### Qualification Tests

Bifold Fluidpower valves are subjected to extensive qualification test programmes and these include the following:-

- 3 axis vibration test
- 3 axis, bi-directional shock test
- Thermal cycling from -18°C to +50°C; 0°C to +121°C
- Function tests monitoring internal leakage:
  - Response time at low and high ambient temperature & pressure
  - Operating voltage range
  - Pilot operating pressures (open/closed) at 1 atmosphere and 3000 metre water depth simulation
- Endurance test 100,000 cycles (NAS 1638 Class 12) and 1million cycles (NAS 1638 Class 6)
- Corrosion test - sea water and sea water / control fluid mixtures
- Hyperbaric pressure tests to 310 bar and 414 bar
- Solenoid insulation resistance testing

### SHUTTLE VALVES

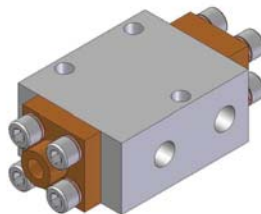
up to 690 bar



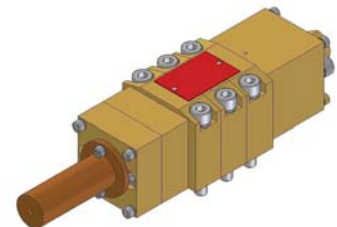
High pressure shuttle valve, subbase mounting

### PILOT OPERATED VALVES

Ball seated and Slide - up to 1035 bar



2/2, 3/2 normally open, spring return, high pressure, pilot operated directional control valve for 121°C ambient. Body ported. 690 bar max. differential working pressure



2/2, 3/2 normally closed or normally open, spring return, high pressure, pilot operated directional control valve for 121°C ambient. Extreme tolerance to poor fluid cleanliness. 1035 bar max differential working pressure. Up to 414 bar max ambient pressure. Subbase mounting. Dual pilot operator options (override and inhibit)



## PILOT OPERATED VALVES (Shear plane sealing) - up to 690 bar

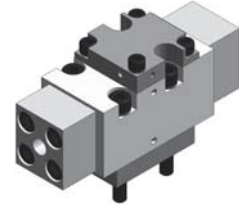
2/2, 3/2, 4/2



Single high pressure pilot 2/2, 3/2, (normally open or normally closed) 4/2, spring return. Cv = 0.24.



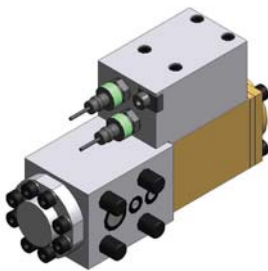
Single high pressure pilot. Adjustable pilot pressure. Cv = 0.24.



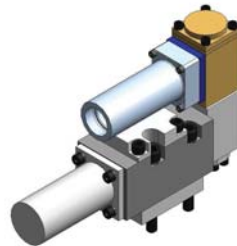
Bi-stable, high pressure pilot Cv = 0.24

## SOLENOID VALVES - up to 690 bar

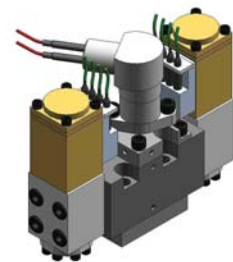
Dual or single coils ; direct acting and 2-stage configurations



3/2, normally closed or normally open, spring return, ball seated directional control valve. Cv = 0.01



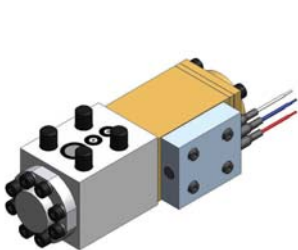
2/2 & 3/2, (normally open or normally closed) and 4/2 spring return, pilot stage solenoid valve operated shear plane sealing type directional control valve. Cv = 0.24.



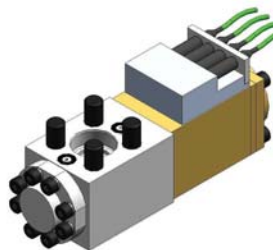
3/2, bi-stable, fail close on loss of pressure pilot stage solenoid valve operated shear plane sealing type directional control valve. Cv = 0.24.

### Solenoid Connector Options

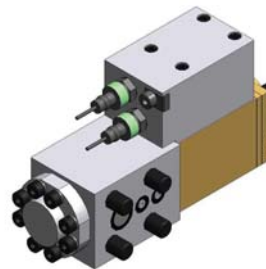
Connectors can be fitted to customer specification.



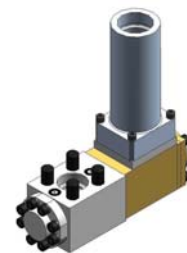
Flying leads



Diamond & Hydrobond. 4 pin, 2 pin & individual push on connectors



Kemlon & DG O'Brien. Individual screw on connectors, internally grounded



Bannex. To suit oil filled cables

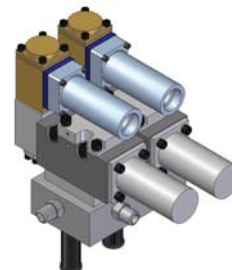
Reliability and innovation in directional control valves

## SPECIAL VALVE PRODUCTS

Direct seawater immersed modular valve assemblies for drill pipe riser and subsea pipeline valves.

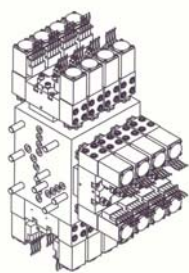


Series configured bi-stable pilot operated 3/2 valve, pilot operated 3/2 spring return valve and solenoid operated 3/2 spring return valve

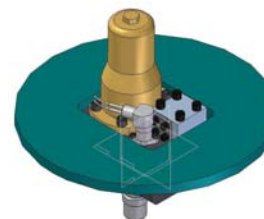
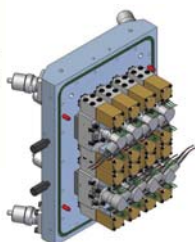


Dual, 3/2, spring return, 2-stage solenoid valves. Integral return line ingress filter protection.

## CONTROL POD PRODUCTS:-



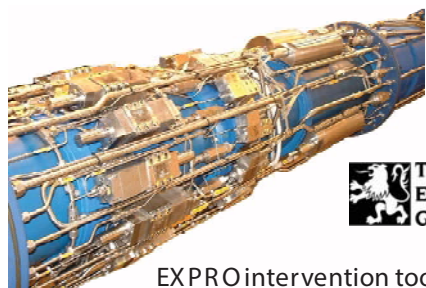
- SCM 8 function flange and 12 function cube manifolds



- SCM pressure supply manifold with filter, pressure transmitter and shuttle valve

## Examples of Installation:-

Pilot operated slide valves and direct acting solenoid valves



EXPRO intervention tool

Bi-stable, 2-stage solenoid valves  
8 function flange manifold



RR C Controls Ltd Well head control module - Talisman Energy

### Quality Assurance

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*Global Presence for  
Peace of Mind*

# Bifold® Group

## Pneumatic and Hydraulic Installation Reference List September 2012



-  SIL 3 Third Party Certified.
- Widest Range of Valve and Pump Solutions.
- Lowest Cost Business Model from Design to Customer.
- Worldwide Certification.  

- Permanent Support Onshore and Offshore.
- A Modern Business with a Vision for the Future.

*Innovative and Reliable  
Valve and Pump Solutions*



[www.bifold.co.uk](http://www.bifold.co.uk)



### A Leading Group



## Introduction

The Bifold Group of companies have provided peace of mind to contractors, installers and end users for over a century. Our innovative range of products, specifically designed with the customer in mind, have gained worldwide approval and credibility for the onerous conditions as found in hazardous (classified) locations, hostile and subsea environments.

The customer requirements for sustained safety and reliability under extreme operating conditions are Bifold's primary objectives. Our state of the art production facilities based in the UK, allows our superior and innovative designs to be manufactured to rigorous quality standards. All this provides the customer with superior products for their application.

Bifold Fluidpower is a leading manufacturer of electro-hydraulic and pneumatic directional control valves and accessories for the upstream and downstream oil and gas industry. With the acquisition of Marshalsea Hydraulics, the Bifold Group can offer an additional wide range of pump sets and pressure intensifiers along with other hydraulic products.

## Worldwide Service and Support

Located in Manchester, UK, Bifold has subsidiary locations in Houston, USA, Singapore and Taunton, UK. The Bifold Group of Companies are supported worldwide with a global network of agents and distributors.

With over 95% of sales for export, Bifold provides product and technical support for over 5,000 valve product types worldwide. The group have invested in state of the art machining centres ensuring accuracy of close tolerances, such as all thread milled ports, and a rapid turnaround capability.

The customer can be confident that Bifold has the product portfolio and the technical and production capability to provide the correct solution for pneumatic and hydraulic system requirements.

## Product Development

Bifold recognise that the demands of the customer base never stand still and we are therefore committed to the ongoing development of our products and features to provide improved safety, versatility, reliability and ease of use.

## Leading Performance

Predominantly used on offshore and onshore oil and gas exploration, production and processing facilities, Bifold's products are chosen by the world's major oil, gas and petrochemical companies. Depth of knowledge enables the identification of the best solution for each application. Over 3,000 designs include valves for pressures from 10 to 20,000 psi, ambient temperatures from -60°C to +180°C and fluid contamination levels beyond ISO 4406 Class 21/18 (NAS 1638 Class 12). Solenoid valves with worldwide certification and Safety Integrity Level (SIL 3) for hazardous (classified) locations are available with power ratings from 0.9 to 20 watts, depending on the application.



**Pneumatic and  
Instrumentation Valves**

**Hydraulic Valves**

**Subsea Valves**

**Hydraulic Pumps,  
Intensifiers and Valves**

Bifold, Bifold Fluidpower, Bifold Subsea and Marshalsea Hydraulics Ltd are all members of the Bifold Group. Registered No. 1787729 in England. Registered Office: Greenside Way, Middleton, Manchester M24 1SW.

## Project History



### Global Presence for Peace of Mind

For quality, reliability and above all, safety, Bifold provide the obvious choice of products. From design through to manufacture and installation of Hydraulic and Pneumatic, Instrument, Process, Directional Control Valves and Pumps.

Our on site capabilities means that whatever you need and wherever you are, we are conveniently placed to provide you with total support and peace of mind.



MAJOR PROJECT SUCCESS		
Operator	Project Name	Location
Abu Dhabi Polymer	Barouge	Abu Dhabi
ADNOC / ADCO	BAB	Abu Dhabi
ADNOC / ADCO	Bu Hasa	Abu Dhabi
ADNOC / ADCO	North East BAB (NEB)	Abu Dhabi
ADNOC / ADCO	OGD - II of OGD III	Abu Dhabi
ADNOC / ADCO	Thamama	Abu Dhabi
ADNOC / ADMA OPCO	Das Island	Abu Dhabi
ADNOC / ADMA OPCO	Umm Shaif	Abu Dhabi
ADNOC / ADMA OPCO	Zakum	Abu Dhabi
ADNOC / GASCO	Shah	Abu Dhabi
Apache	Devil Creek / Reindeer - Caribou	Australia Offshore
Apache	Forties Platforms	North Sea
Apache	John Brooks	Australia Offshore
Arvandan Oil & Gas	Darquain (Arvandan)	Darquain South Iran
BHP	Angostura	Trinidad Offshore
BHP	Neptune	USA GOM
BHP	Pyrenese FPSO	Australia Offshore
Bluewater	Bleo Holm FPSO	North Sea
Bluewater	Hoewene Brim FPSO	North Sea
BP	ACG, Azeri Chirag Guneshi	Caspian Sea
BP	Amethyst	North Sea
BP	Andrew	North Sea
BP	Arbroath	North Sea
BP	Arkwright	North Sea
BP	Atlantis	USA GOM

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When selecting a product, the applicable operating system design must be considered to ensure safe use. The product function, material compatibility, adequate ratings, correct installation, operation and maintenance are the responsibilities of the system designer and user.

#### Quality Assurance

All Bifold products are manufactured to a most stringent QA programme to ensure that every product will give optimum performance and reliability. We are third party certified to EN ISO 9001:2008. Functional test certificates, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BS EN 10204.3.1.8 where available. We reserve the right to make changes to the specifications and design etc., without prior notice.

MAJOR PROJECT SUCCESS		
Operator	Project Name	Location
BP	Avonmouth Terminal	UK
BP	Bacton Renewal	UK
BP	Beatrice	North Sea
BP	Boqueron	Venezuela
BP	Bruce	North Sea
BP	BTC Pipeline	Caspian
BP	Buchan	North Sea
BP	Cats	North Sea
BP	Clair	North Sea
BP	Cleaton	North Sea
BP	Clyde	North Sea
BP	Cupiaga	Columbia
BP	Cusciana	Columbia
BP	Delmeny Terminal	UK
BP	ETAP	North Sea
BP	Everest	North Sea
BP	Foinaven	North Atlantic
BP	Forties	North Sea
BP	Forth	North Sea
BP	Grangemouth Refinery	UK
BP	Greater Plutonio (Block 18)	Angola Offshore
BP	Gyda	North Sea
BP	Hamble Refinery	UK
BP	Inde	North Sea
BP	Lan Tay	Thailand
BP	Leman	North Sea
BP	Lomond	North Sea
BP	Magnus	North Sea
BP	Miller	North Sea
BP	Montrose	North Sea
BP	Nam Con Son	Vietnam Offshore
BP	Newsham	North Sea
BP	N.W. Hutton	North Sea
BP	Pickerill	North Sea
BP	Plutonio	Angola Offshore
BP	Rhum	North Sea

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## Project History



MAJOR PROJECT SUCCESS		
Operator	Project Name	Location
BP	Rijn	Holland Offshore
BP	Rumuila	Iraq
BP	Shah Deniz	Azerbaijan Caspian Sea
BP	Shearwater	North Sea
BP	Shiehallion	North Sea
BP	Skarv	North Sea
BP	Sullom Voe Terminal	UK
BP	SWOPS	North Sea
BP	Tangguh	Indonesia
BP	Thistle	North Sea
BP	Thunderhorse	Gulf of Mexico
BP	Trent / Tyne	North Sea
BP	Valhall	North Sea
BP	Villiages	North Sea
BP	West Sole	North Sea
BP	Wytch Farm	UK
British Gas	Amada	North Sea
British Gas	Blake	North Sea
British Gas	Hasdrubel	Tunisia
British Gas	Karachaganak	Kazakhstan
British Gas	North Morcambe	Irish Sea
British Gas	Rough	North Sea
British Gas	South Morecambe	Irish Sea
BW / Prosafe (Devon Energy)	FPSO Polvo	Brasil Offshore
BW / Prosafe (Petrobras)	FPSO Cidade de Sao Mateus	Brasil Offshore
Chevron	Agbami FPSO	Nigeria Offshore
Chevron	Alba	North Sea
Chevron	Banff	North Sea
Chevron	Blind Faith	USA GOM
Chevron	Bohai Bay	China Offshore
Chevron	Captain	North Sea
Chevron	Erskine	North Sea
Chevron	Frade FPSO	Brasil Offshore
Chevron	Galley	North Atlantic
Chevron	Heather	North Sea
Chevron	Helder	Holland Offshore

## Project History



MAJOR PROJECT SUCCESS		
Operator	Project Name	Location
Chevron	Helm	Holland Offshore
Chevron	Highlander	North Sea
Chevron	Hoorn	Holland Offshore
Chevron	Jack & St. Malo	USA GOM
Chevron	Mariner	North Sea
Chevron	Ninian	North Sea
Chevron	Tahiti	USA GOM
Chevron	Tartan	North Sea
Chevron	Tengiz	Kazakhstan
China Gas	Chongqing	China
CNOOC	Qinhuangdao QHD 32-6	China Offshore
CNOOC	Xihu Trough	China Offshore
CNR	Olowi	Gabon Offshore
Coogee Resources	Montara FPSO	Australia Offshore
Conoco Phillips	Bayu Undan FPSO	Australia Offshore
Conoco Phillips	Belanak FPSO	Indonesia Offshore
Conoco Phillips	Bohai Bay, Peng Lai PLI 9-3 FPSO	China Offshore
Conoco Phillips	Britannia	North Sea
Conoco Phillips	Caister Murdoch	North Sea
Conoco Phillips	Delia	North Sea
Conoco Phillips	Ekofisk	North Sea
Conoco Phillips	Humberside Refinery	UK
Conoco Phillips	Hutton	North Sea
Conoco Phillips	Jade	North Sea
Conoco Phillips	Judy / Joanne	North Sea
Conoco Phillips	Kerisi / Hiu	Indonesia Offshore
Conoco Phillips	MacCulloch	North Sea
Conoco Phillips	Maureen	North Sea
Conoco Phillips	Murchison	North Sea
Conoco Phillips	Pickerill Gas Terminal	UK
Conoco Phillips	Viking	North Sea
Devon Energy (Prosafte)	Polvo FPSO	Brasil Offshore
Dolphin Energy	Dolphin	Qatar
DONG	Cecille & Nini	North Sea
DONG	Nini	North Sea
Encana	Buzzard	North Sea

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## Project History



MAJOR PROJECT SUCCESS		
Operator	Project Name	Location
Encana	Deep Panuke	Canada Offshore
Encana	Ross FPSO	North Sea (UK)
ENI	ABO FPSO	Nigeria Offshore
ENI	Aquila FPSO	Adriatic Sea
ENI	Black Tip	Australia Offshore
ENI	El - Bouri	Mediterranean
ENI	Goliat	Barents Sea
ENI	Kashagan	Caspian Sea
ENI	West Libya Gas (WAFA)	Libya
ExxonMobil	Balder	North Sea
ExxonMobil	Jotun	North Sea
ExxonMobil	Lawit	Malaysia
ExxonMobil	Ringhorne	North Sea
ExxonMobil	Bacton Terminal	UK
ExxonMobil	Beryl	North Sea
ExxonMobil	Coryton Terminal	UK
ExxonMobil	Erha FPSO	Nigeria Offshore
ExxonMobil	Kizomba FPSO	Angola Offshore
ExxonMobil	Sable	Canada Offshore
ExxonMobil	Sage Terminal	UK
ExxonMobil	Sakhalin I	Sakhalin, Russia
ExxonMobil	Statfjord	North Sea
ExxonMobil (SBM)	FPSO Xikomba	Angola Offshore
Gazprom	Sakhalin II	Sakhalin, Russia
Gazprom (Sevmorneftegaz)	Prirazlomnoye	Russia
HESS	South Arne	Denmark Offshore
HESS	Triton	North Sea
Hibernia	Hibernia	Canada Offshore
Hoan Long JOC	Te Giac Trang	Vietnam
Husky	White Rose FPSO	Canada Offshore
ICOFC	Cheshme Khosh Phase II	Iran
ICOFC	Maleh - Koh	Iran
ICOFC	Naft Shahr	Iran
ICOFC	Tehran Shine	Iran
IOEC	Nar	Iran
Iranian Offshore Oil Co.	Reshadat Field I.O.O.C.	Iran



## Project History



MAJOR PROJECT SUCCESS		
Operator	Project Name	Location
Karachaganak Int.Org	Karachaganak	Kazakhstan
Maersk	Gryphon	North Sea
Maersk	Al Shaheen	Qatar
Maersk	Brae	Denmark Offshore
Maersk	Dagmar	Denmark Offshore
Maersk	Dan	Denmark Offshore
Maersk	Halfdan	Denmark Offshore
Maersk	Harald	Denmark Offshore
Maersk	Gorm	Denmark Offshore
Maersk	Kraka	Denmark Offshore
Maersk	Roar	Denmark Offshore
Maersk	Skjold	Denmark Offshore
Maersk	Svend	Denmark Offshore
Maersk	Tyra	Denmark Offshore
Maersk	Valdemar	Denmark Offshore
Maersk	FPSO TI ASIA (Al Shaheen Field)	Qatar
Marathon	Alba	Equatorial Guinea
Marathon	Brae	North Sea
Modec (Petrobras)	FPSO Cidade de Angra dos Reis MV22	Brasil Offshore
Modec (Petrobras)	FPSO Cidade de Mangaratiba MV24	Brasil Offshore
Modec (Petrobras)	FPSO Cidade de Niteroi	Brasil Offshore
Modec (Petrobras)	FPSO Cidade de Rio de Janeiro	Brasil Offshore
Modec (Petrobras)	FPSO Cidade de Sao Paulo MV23	Brasil Offshore
Modec (Shell)	Fluminense FPSO, Bijuipira Salema	Brasil Offshore
Moss Gas	Mossel Bay	South Africa
Murphy	FPSO Kikeh	Malaysia Offshore
NAM	K11-FA-1	Holland Offshore
NAM	K14-FA-1C	Holland Offshore
NAM	K15-B	Holland Offshore
NAM	K15-FA-1	Holland Offshore
NAM	K18-FA-2	Holland Offshore
NEXAN	Golden Eagle	North Sea
NIOC	Aghar / Dalan	Iran
NIOC	AOD	Iran
NIOC	Azadagan	Iran
NIOC	Darqan	Iran

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## Project History



MAJOR PROJECT SUCCESS		
Operator	Project Name	Location
NIOC	Kangan	Iran
NIOC	Salman	Iran
NIOC	Sarkan	Iran
NIOC	South Pars All Phases	Iran
NIOC	West Paydar	Iran
NIOC	Yadavaran	Iran
ONGC	Bombay High	India Offshore
ONGC	Heera	India Offshore
ONGC	Mazagon	India
PEMEX	Cantarell	Mexico Offshore
PDVSA	Hamaca	Venezuela
Petro-Canada	Terra Nova FPSO	Canada Offshore
Petrobras	P-43 FPSO	Brasil Offshore
Petrobras	P-45 FPSO	Brasil Offshore
Petrobras	P-50 FPSO	Brasil Offshore
Petrobras	P-51 Platform	Brasil Offshore
Petrobras	P-52 Platform	Brasil Offshore
Petrobras	P-53 FPSO	Brasil Offshore
Petrobras	P-54 FPSO	Brasil Offshore
Petrobras	P-55 Platform	Brasil Offshore
Petrobras	P-57 FPSO	Brasil Offshore
Petrobras	P-58 FPSO	Brasil Offshore
Petrobras	P-62 FPSO	Brasil Offshore
Petrobras	P-63 FPSO	Brasil Offshore
Petrobras	FPSO Vitoria, Gulfinho Module 2	Brasil Offshore
Petrobras	Manati, Camamu	Brasil Offshore
Petrobras	Merluza	Brasil Offshore
Petrobras	Mexilhao, PMXL-I	Brasil Offshore
Petrobras	Peroa-Cangoa, Camamu-Almada	Brasil Offshore
Petrobras	PRA-I	Brasil Offshore
Petrobras (MODEC)	FPSO Cidade de Angra dos Reis MV22	Brasil Offshore
Petrobras (MODEC)	FPSO Cidade de Ilhabela	Brasil Offshore
Petrobras (MODEC)	FPSO Cidade de Mangaratiba MV24	Brasil Offshore
Petrobras (MODEC)	FPSO Cidade de Niteroi	Brasil Offshore
Petrobras (MODEC)	FPSO Cidade de Pirati	Brasil Offshore
Petrobras (MODEC)	FPSO Cidade de Rio de Janeiro	Brasil Offshore

MAJOR PROJECT SUCCESS		
Operator	Project Name	Location
Petrobras (MODEC)	FPSO Cidade de Sao Paulo MV23	Brasil Offshore
Petrobras (Prosafe)	FPSO Cidade de Sao Mateus	Brasil Offshore
Petrobras (SBM)	FPSO Brasil	Brasil Offshore
Petrobras (SBM)	FPSO Capixaba	Brasil Offshore
Petrobras (SBM)	FPSO Espadarte	Brasil Offshore
Petrobras (SBM)	FPSO Marlim Sul	Brasil Offshore
Petrobras (Seven Marine)	FPSO Piranema	Brasil Offshore
Petrobras (Teekay Petrojarl)	FPSO Tiro Sidon	Brasil Offshore
Petronas	Angsi	Malaysia
Petronas	Cendar	Malaysia Offshore
Petronas	Malong	Malaysia Offshore
Petronas	Sumandak	Malaysia
Petronas	Tiga	Malaysia Offshore
Petronas	Kumang & Tangga Barat Cluster	Indonesia
Petro-Vietnam	Hai Thach Moc Tinh	Vietnam
Premier Oil	AGX Gas Export	Indonesia
PTTEP	Arthit	Thailand Offshore
PTTEP	Bongkot	Thailand Offshore
QGPC	Arab	Qatar
QGPC	Diyab	Qatar
QGPC	Dukham	Qatar
QGPC	Khatiyah	Qatar
Ras Laffan LNG Co.	Ras Laffan LNG	Qatar
ROC Oil	Cliff Head	Australia Offshore
Saga	Snorre	North Sea
Sakhalin Energy	Sakhalin	Sakhalin, Russia
Saudi Aramco	Khuff	Saudi Arabia
Saudi Aramco	Safaniya GOSP	Arabian Gulf
SBM (Chevron)	FPSO Frade	Brasil Offshore
SBM (ExxonMobil)	FPSO Xikomba	Angola Offshore
SBM (Murphy)	FPSO Kikeh	Malaysia Offshore
SBM (Petrobras)	FPSO Espadarte	Brasil Offshore
SBM (Petrobras)	FPSO Brasil	Brasil Offshore
SBM (Petrobras)	FPSO Capixaba	Brasil Offshore
SBM (Petrobras)	FPSO Marlim Sul	Brasil Offshore
SBM (Shell)	FPSO Espirito Santo	Brasil Offshore

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## Project History



MAJOR PROJECT SUCCESS		
Operator	Project Name	Location
Seven Marine	FPSO Piranema	Brasil Offshore
Shell	Auk	North Sea
Shell	Bacton Terminal	UK
Shell	Belema	Nigeria Offshore
Shell	Bonga FPSO	Nigeria Offshore
Shell	Brent	North Sea
Shell	Brigatine	North Sea
Shell	Cleaver	North Sea
Shell	Cormorant	North Sea
Shell	Curlew	North Sea
Shell	Draugan	North Sea
Shell	Dunlin	North Sea
Shell	EA FPSO	Nigeria Offshore
Shell	Eider	North Sea
Shell	Fulmar	North Sea
Shell	Gabon	Nigeria Offshore
Shell	Gannet	North Sea
Shell	Goldeneye	North Sea
Shell	Haven	UK
Shell	Kingfisher	North Sea
Shell	Kittiwake	North Sea
Shell	Leman	North Sea
Shell	Nelson	North Sea
Shell	Pearl GTL	Qatar
Shell	Pelican	North Sea
Shell	Penguins	North Sea
Shell	Sakhalin II	Sakhalin, Russia
Shell	Shearwater	North Sea
Shell	Sole Pit	North Sea
Shell	Tern	North Sea
Shell Brunei	CWWJ2	Brunei
Shell Brunei	CWWJ3	Brunei
Shell (MODEC)	Fluminense FPSO, Bijupira Salema	Brasil Offshore
Shell PDO	Birba	Oman
Shell PDO	Harweel Cluster	Oman
Shell PDO	Quarm Alam MPS	Oman



MAJOR PROJECT SUCCESS		
Operator	Project Name	Location
Shell PDO	Saih Nihayda	Oman
Shell PDO	Yibal	Oman
Shell Sarawak	BYG-A	Malaysia
Shell Sarawak	D35-DPA	Malaysia
Shell Sarawak	D35-DPB	Malaysia
Shell Sarawak	M1	Malaysia
Shell (SBM)	Espirito Santo FPSO	Brasil Offshore
Shell Todd	Pohokura	New Zealand Offshore
Shiraz Petrochemical	Shiraz Petrochemical	Iran
Sonatrach	Arzew	Algeria
Sonatrach	Gassi Touil	Algeria
Sonatrach	In Salah	Algeria
Sonatrach	Rhourde Ouled Dejmaa (ROD)	Algeria
Statoil	Asgard	North Sea
Statoil	Fram	North Sea
Statoil	Garn West	North Sea
Statoil	Gjoa	North Sea
Statoil	Kristin	North Sea
Statoil	Langusund Chemical	Norway
Statoil	Methanol Plant	Norway
Statoil	Morvin	Norway
Statoil	Njord	Norway
Statoil	Norne	Norway
Statoil	Ormen Lange	Norway
Statoil	Oseberg	North Sea
Statoil	Snoehvit	Norway
Statoil	Statfjord	North Sea
Statoil	Troll Olje	North Sea
Statoil	Vega	Norway
Statoil	Veslefrikk	North Sea
Statoil	Vigdis	North Sea
Statoil	Visund	North Sea
Statoil	Volve	Norway
Sun Oil	Balmoral	North Sea
Talisman	Bleo Holm FPSO	North Sea
Talisman	Bunga Orchid	Malaysia Offshore

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Total	AKPO FPSO	Nigeria Offshore
Total	Al Kalij	Qatar
Total	Amenam / Kpono FPSO	Nigeria Offshore
Total	Balal	Iran
Total	Broom	North Sea
Total	Bongkot	Thailand Offshore
Total	Claymore	North Sea
Total	Dalia FPSO	Angola Offshore
Total	Dunbar	North Sea
Total	Elgin Franklin	North Sea
Total	Flotta Terminal	UK
Total	Frigg	North Sea
Total	Girassol FPSO	Angola Offshore
Total	Kharyaga	Russia
Total	Lille Frigg	North Sea
Total	Moho Bilondo FPSO	Congo Offshore
Total	North Alwyn	North Sea
Total	Ofon	Nigeria Offshore
Total	Pazflor FPSO	Angola Offshore
Total	Peciko	Indonesia Offshore
Total	Piper B	North Sea
Total	Rospo Mare	Mediterranean
Total	St Furgus Terminal	UK
Total	Saltire	North Sea
Total	Scapa	North Sea
Total	Sincor	Venezuela
Total	Sisi Nubi	Indonesia Offshore
Total	South Pars	Iran
Total	Tunu	Indonesia Offshore
Total	Usan FPSO	Nigeria Offshore
Total	Nuggets	North Sea
Woodside	Enfield / Laverda FPSO	Australia Offshore
Woodside	Otway	Australia Offshore
Woodside	Pluto LNG	Australia
Varyeganneftegas	Bakhilov	Russia
Vietsovetropetrol	White Tiger	Vietnam Offshore

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**Global Presence for  
Peace of Mind**

**Bifold® Group**

**Pneumatic and  
Instrumentation Valves**

**Hydraulic Valves**

**Subsea Valves**

**Hydraulic Pumps,  
Intensifiers and Valves**

**Bifold®**

**Bifold FluidPower®**

**Bifold® Subsea**

**Bifold®  Marshalsea**

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Bifold, Bifold Fluidpower, Bifold Subsea and Marshalsea Hydraulics Ltd are all members of the Bifold Group. Registered No. 1787729 in England. Registered Office: Greenside Way, Middleton, Manchester, M24 1SW.

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Web: [www.bifold.co.uk](http://www.bifold.co.uk)

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Web: [www.bifold.co.uk](http://www.bifold.co.uk)

**Innovative and Reliable  
Valve Solutions**

**[www.bifold.co.uk](http://www.bifold.co.uk)**



**Bifold FluidPower**<sup>®</sup>  
Limited

Reliability and innovation in directional control valves

# Wellhead Control Preferred Range

Incorporating:-

Low Pressure Logic

Electro-Hydraulic

HPU

Field Items



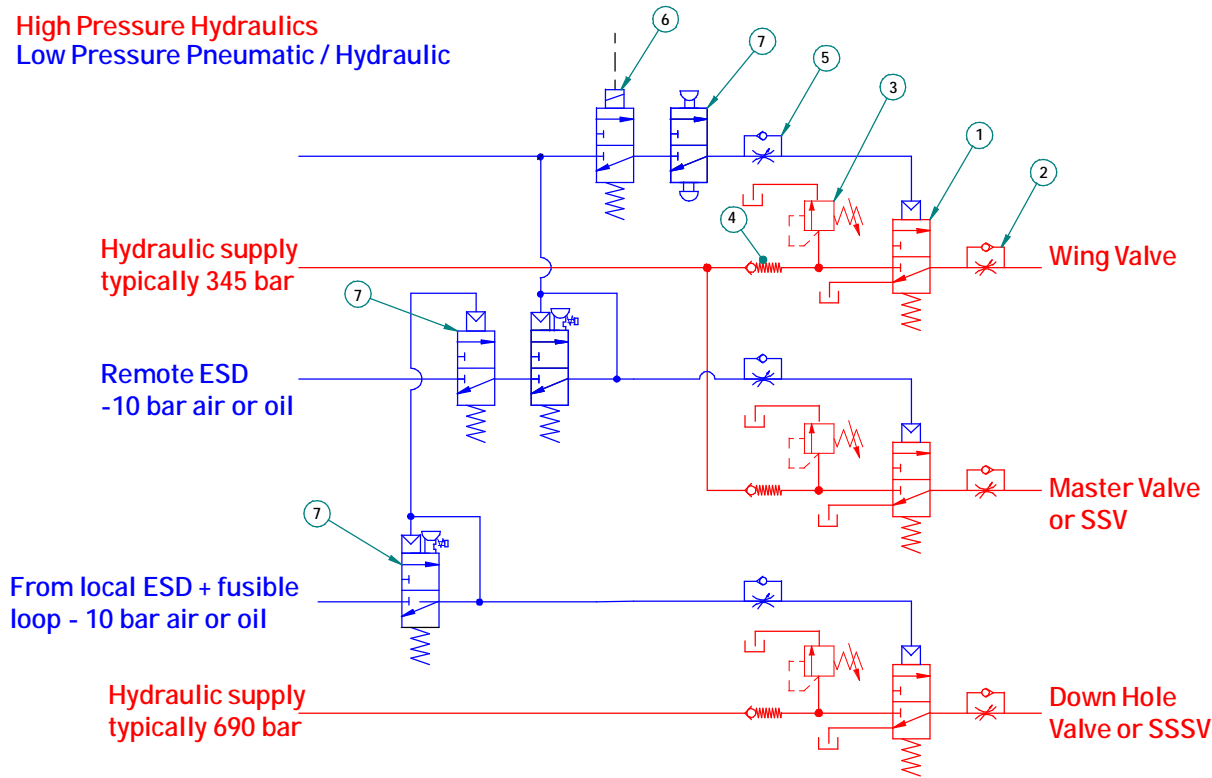


# Low Pressure Logic Wellhead Control

Opening sequence to protect down hole valves

Reliability and Innovation in directional control valves

High Pressure Hydraulics  
Low Pressure Pneumatic / Hydraulic



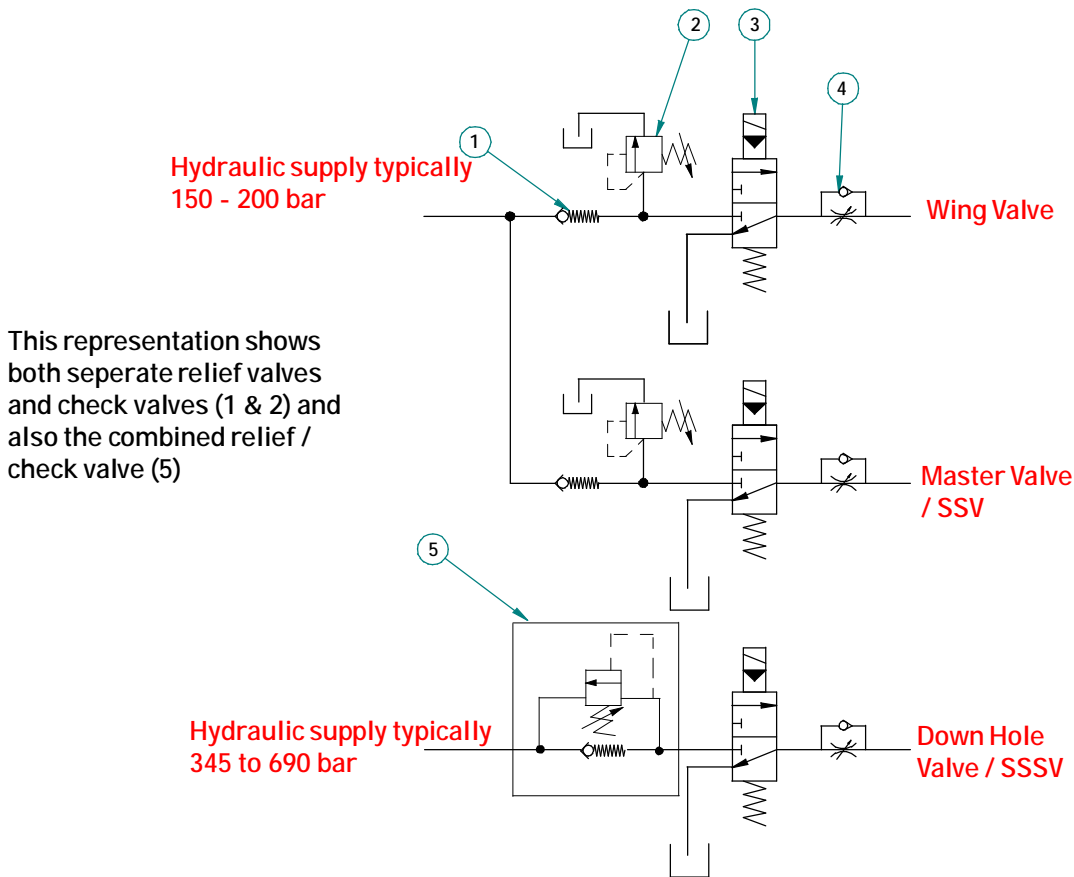
## Check List

1	2	3	4	5	6	7		
Interface Valves	Flow Controls	Thermal Relief	Check Valves	Flow Control	Solenoid	Junior Range		
FP15/L1/04/32/S	FCV3014/05/S	TRV2005/S	ICV4118/05/S	S06-FC1	FP06P-S1-04-32-NU-V-24VDC-87DA9	SJJ06-M14-32-NU-04 SJJ06-P9-32-NC-M16-K54 SJ06-P1-32-NU-00		

NOTE: Valve model numbers shown above are for illustration purposes.  
For complete list of preferred range products please refer to Preferred Product booklet.

# Electro Hydraulic Wellhead Control

Reliability and Innovation in directional control valves



## Check List

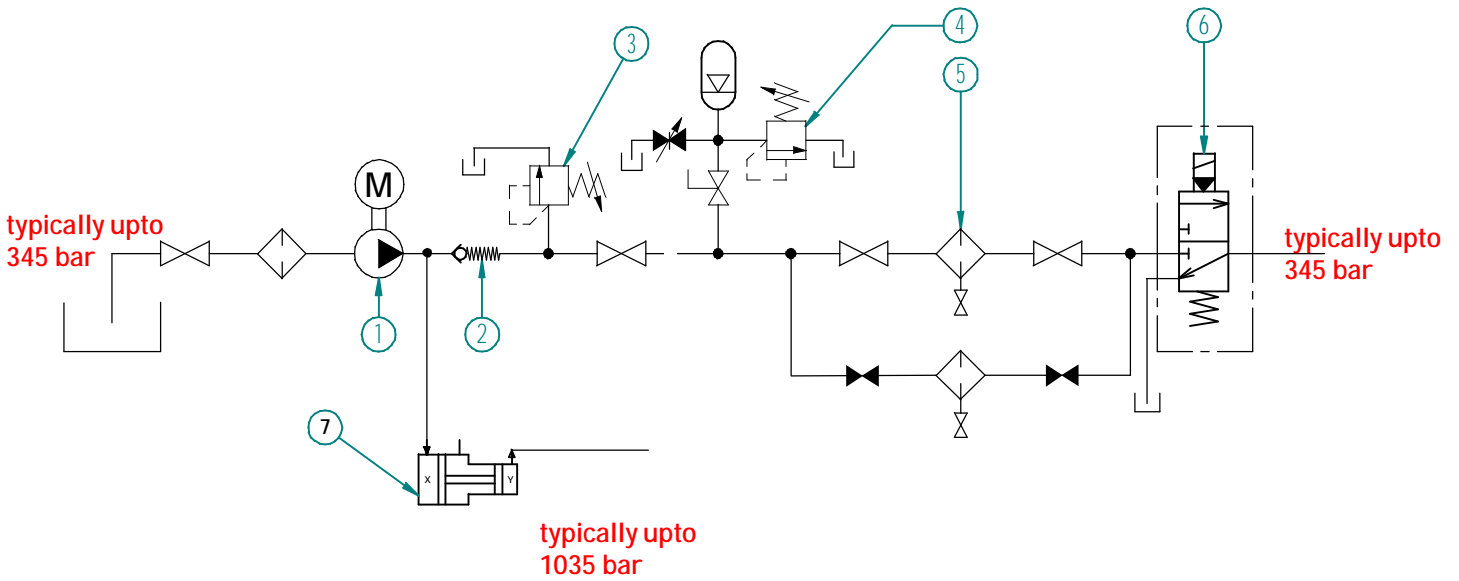
1	2	3	4	5
Check Valves	Thermal Relief	Solenoid Valves	Flow Controls	Combined Check / Relief
ICV4118/05/S	TRV2005/S	FP15/S1/04/32/S-24VDC/97CA9	FCV3014/05/S	14470-04

Valve model numbers shown above are for illustration purposes.

For complete list of preferred range products please refer to Preferred Product booklet.

# HPU section for Wellhead Control

Reliability and Innovation in directional control valves



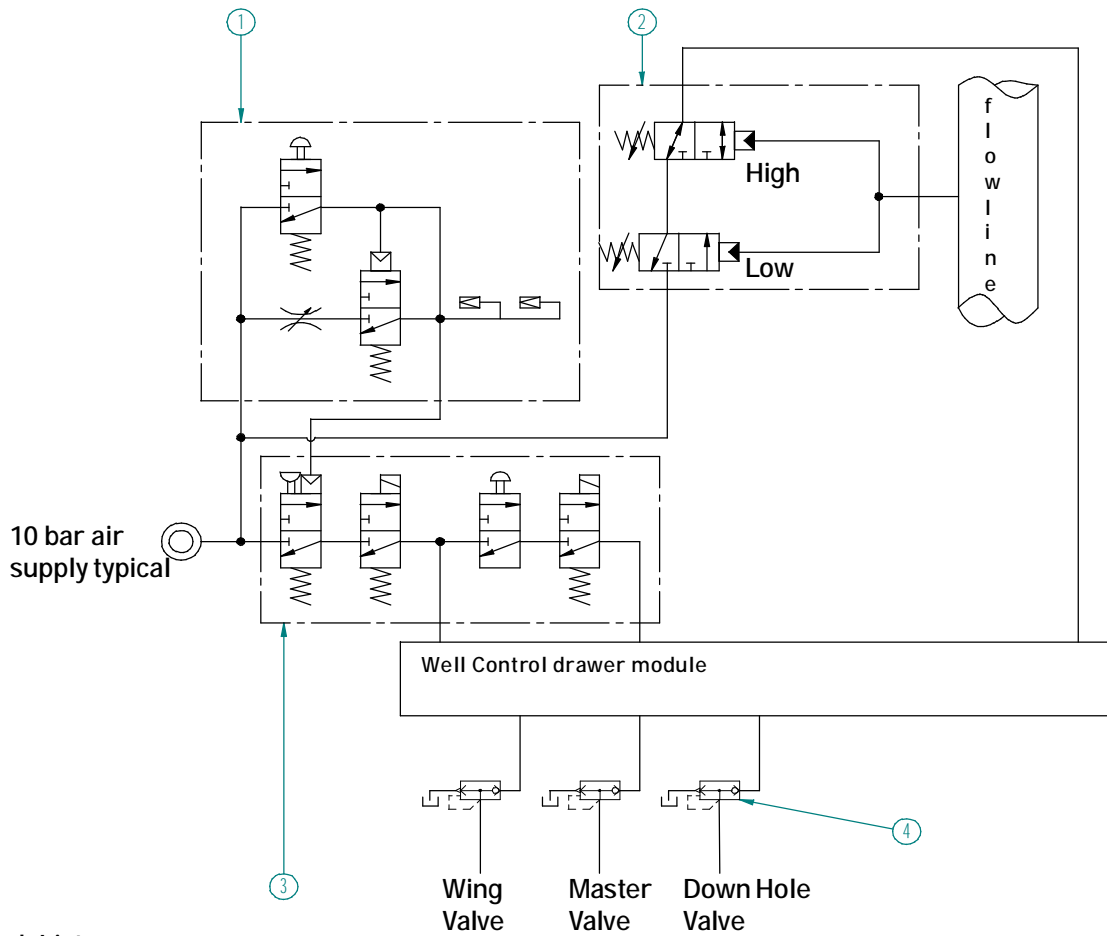
## Check List

1	2	3	4	5	6	7
Pumps (water glycol or oil) & Pumps / motor units	Check Valves	Full Flow Precision Pump Relief	Accumulator Thermal Relief	Hydraulic Filters	Solenoid Valves	Intensifiers
11350-01	ICV4118/05/S	14530-01	TRV2005/S	BF(A)8/03/S	FP15/S1/04/32/S-24VDC/97CA9	11380-02

Valve model numbers shown above are for illustration purposes.  
For complete list of preferred range products please refer to Preferred Product booklet.



Reliability and Innovation in directional control valves



Check List

1			2	3		4
Fusible Loop			Flowline Pilots	Remote ESD Logic Valves		Hydraulic QEV
Junior Range	Needle Valve/ Cylinder Plug	Eutectic / Frangible bulb		Solenoids	Junior Range	
SJJ06-M2-32-NU-00 S06-P1-32-NU-00	S06-NV / S06-CPV	S06-FVMB- 79C	PSV5A/0010/H1/ 04/32/NU/V	FP06P-S1-04-32- NU-V-24VDC-87DA9	SJJ06-P9-32-NC-M15-K54 SJJ06-M14-32-NU-04	QEV15/38MP/15/S

\* Valve model numbers shown above are for illustration purposes. For complete list of preferred range products please refer to Preferred Product booklet.



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EEmail:- bifold@singnet.com.sg

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### *Quality Assurance*

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# Pneumatic Manifold System Model AXIS

Stacker, Compact & Booster Systems

Complex actuator  
controls made simple

## Features:

- Worldwide solenoid approvals ATEX, CSA, SAA, INMETRO NEPSI & GOST
- Booster Manifolds Available
- Patented Stacker System
- Compact low cost version
- High system flow
- Low cost solution
- Extensive weight reduction
- 316L stainless steel
- 3D modelling system design
- 360° fully rotational solenoid housing



## Materials and Construction

- General construction - stainless steel 316L
- Fastenings - stainless steel 316L
- Ports - 1/4", 3/8", 1/2" & 1" thread milled NPT

## Pressure Ratings

- Operating pressure range 0 - 10 bar as standard

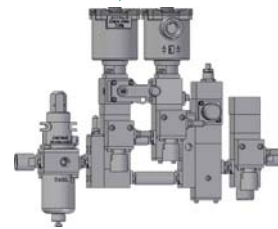
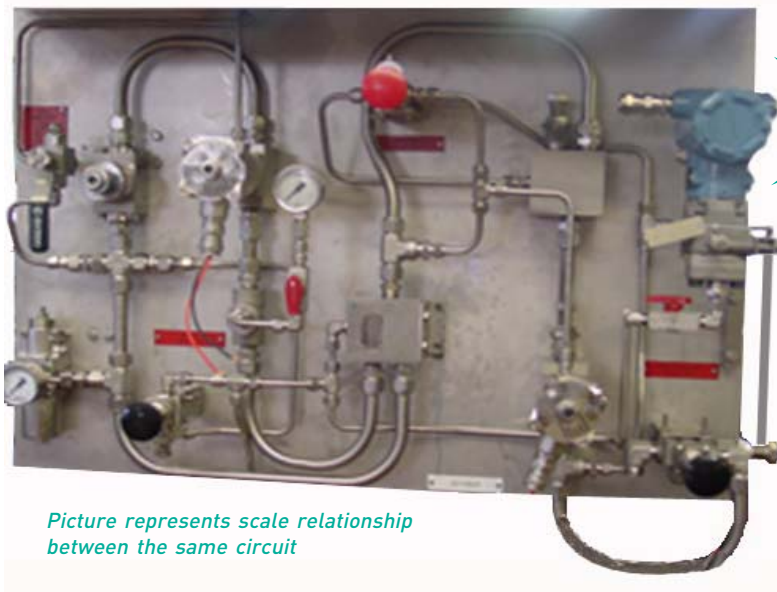
## Solenoid Information

• For AXIS stacker type manifold systems, Bifold Fluidpower use direct acting solenoid valves instead of small orifice pilot stage solenoid valve. This ensures optimum system operation.

## Solenoid Approvals

Solenoid valves satisfy all relevant EC directives

- ATEX Ex II 2GD
- ATEX Ex II 1GD T65°C
- ATEX Ex II 2G
- CSA AExd IIC (USA)
- CSA Exd IIC (Canada)
- INMETRO BR-Exd IIC T6, Exi IIC T6
- GOST 1Exd IIC T6 (T5,T4)
- GOST 0Exia IIC T6
- SAA Exd IIC T6 (T5,T4)
- SAA EEExia IIC T6
- NEPSI Exd IIC T6, Exi IIC T6
- Ingress protection IP66/IP67 to IEC 60529 / NEMA 4



## Circuit Flow Performance

- Calculate circuit Cv and flow rate (using BFP Cv calculator-contact Bifold's office for details)
- Calculate accurate actuator opening and closing time
- Select lowest cost components (save money while meeting system target performance)
- Cv 0.4 to 3.5 dependent on valve selection (50 to 300 SCFM at 6 bar with 1 bar dp)
- Flow improvements up to 400% (over systems conventionally piped with valves of similar port sizes)

## Reduction in:

- Cost
  - Components (below cost of separate valves and fittings)
  - Panel (smaller panel/back plate required and fixings)
  - Labour (reduce labour cost of fabricating system)
- Weight
  - Eliminate fittings, tubing
  - Smaller mounting plate
  - Minimal mounting requirements

## Installation

- Supplied with brackets to suit a range of mounting criteria
- Back plates and simple enclosures can be quoted on request

## Volume Booster Systems

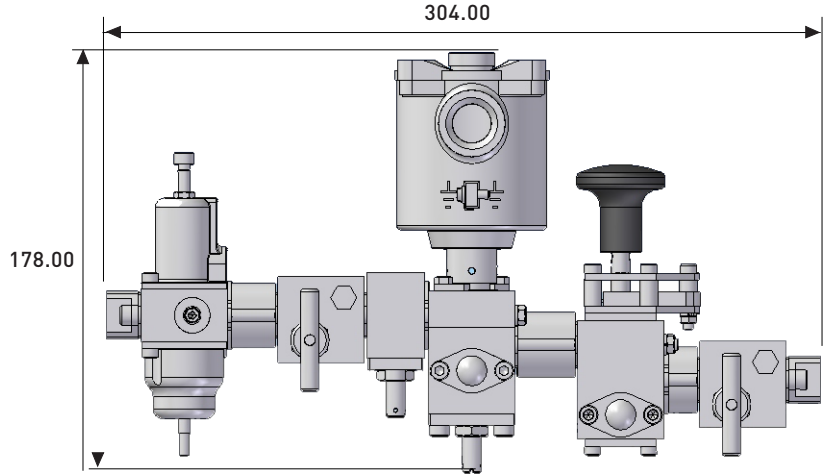
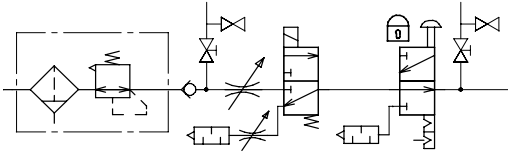
- Wide range of Manifolds available for positioner / DVC systems with Boosters incorporated into manifold

## Increase in:

- Performance
  - Higher system flow (large bore valves and connections)
  - Better reliability (reduced number of leak paths)
  - Improved sealing integrity
  - Less maintenance
- Availability
  - 3 D modelling system design (reduced contractor engineering time incorporating controls onto actuator)

## Compact Example

### XSC1-06-GILMOR



## Solenoid Options - For FP06P Operator on Linear Manifolds

Order Code	Apparatus Code	Power Consmpt	Standard Voltage	Voltage Tolerance	Temp Range		Protection	Cable Connection	Materials of Construction
					Media °C	Ambient °C			
58	EExia IIC T6 or T4	Consult Bifold Fluidpower		85% / 110%	-60°C to +60°C (T6) -60°C to +95°C (T4)		IP66	M20 gland	316L stainless steel
74	EExemb II T3 T120°C	6.8	24VDC		-20°C to +40°C	-20°C to +40°C			
77	EExd IIC T 85°C or T100°C or T135°C	3.5	12, 24, 48, 110 VDC		-60°C to +40°C (T6) -60°C to +55°C (T5) -60°C to +90°C (T4)				
		5.7							
		3.0							
		6.5	12, 24, 48, 110 VDC, 110-120, 220-240 VAC 50 or 60 Hz						
		12.0	12, 24, 48, 110 VDC						

\* For alternative voltages consult Bifold Fluidpower

## Solenoid Options - For FP03P Operator on Stacker Units

Order Code	Apparatus Code	Power Consumption	Standard Voltage	Voltage Tolerance	Temperature Range*		Protection	Cable Connection	Materials of Construction
					Media	Ambient			
78	EExia IIC T6 or T4	refer to solenoid drivers table below				-60°C to +60°C (T6) -60°C to +95°C (T4)	IP66	M20 x 1.5	316 stainless steel
74	EExemb II T3 T120°C	1.8 Watts (low power) 3.6 Watts	24 VDC	+10% / -15%	-20°C to +40°C				
77 std	EExd IIC T85 or T100 or T135	3.0 Watts 1.5 Watts (low power)	12, 24, 48 & 110 VDC 110, 240 VAC 50 or 60 Hz	+10% / -15%	-60°C to +40°C (T85) -60°C to +55°C (100) -60°C to +90°C (T135)				

## Intrinsically Safe Solenoid Drivers (solenoid type 78)

Interface Unit Typical Input Characteristics	Typical Output Characteristics Measured at Solenoid		
	Voltage (V)	Voltage (V)	Current (mA)
28.0	13.56	35.5	0.481
24.0	13.40	35.3	0.473
20.0	13.30	34.7	0.461

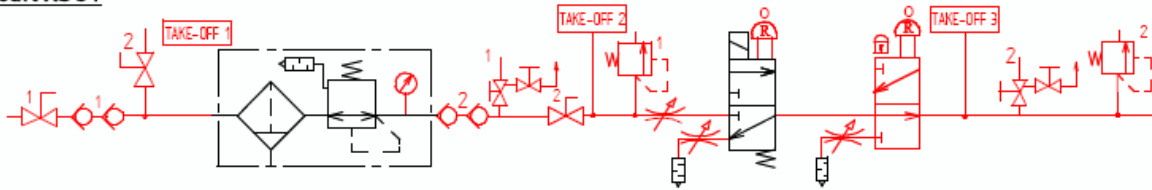
Interface Unit Manufacturer & Model Number	Apparatus Code	Solenoid Base model no.
PEPERL & FUCHS KFD2-SD-Ex1.48	EExia IIC	78



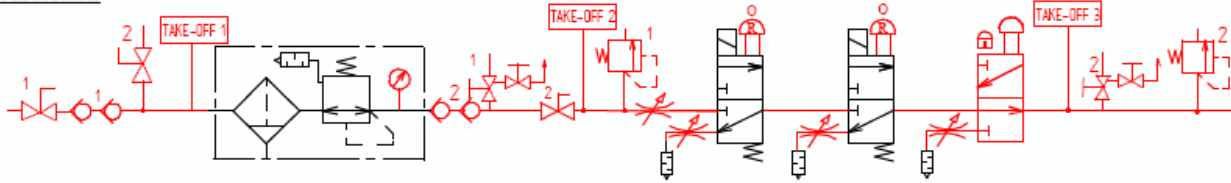
## Selection table for Compact Manifold

Reliability and Innovation in directional control valves

### Circuit XSC1



### Circuit XSC2



### Base System

Filter Reg and Solenoid Valve	1/4"	XSC1-06	3/8"	XSC1-09	1/2"	XSC1-12
Filter reg and 2 Solenoid Valves	1/4"	XSC2-06	3/8"	XSC2-09	1/2"	XSC2-12

### Additional Items

1/4 turn ball valve		A	Take Off		J
Single Check Valve		B	Pressure Relief		K / K2 - Exh to atmosphere K1 / K3 - Captive / adj K2 & K3 located on outlet
Double Check Valve		C	Inlet Flow Control		L
1/4 turn ball valve		D	Block and Bleed		M
Gauge		E	No Breather		N
Take Off		F	Exhaust Flow Control		O
Single Check Valve		G	1 Manual Reset on Sol 1 2 Manual Reset on Sol 2 1 Manual Override on Sol 1 2 Manual Override on Sol 2		P1 P2 P3 P4
Double Check Valve		H	Push / pull valve for ESD function - padlock not supplied		R - Padlockable R1 - Non padlockable R6 - Padlockable - button forward R7 - Non - padlockable - forward R6 & R7 located on outlet
Block and Bleed		I	Take Off		Z

### Supplementary Information

Solenoid	EExia IIC T6 (316)	58
	EExd IIC T6 (316)	77
	EExme II T3 T120	74
Approval	ATEX Ex II 2 GD	A
	INMETRO BR-Exd IIC T6 (T5,T4)	I
	GOST 1 Exd IIC T6 (T5,T4)	G
	SAA Exd IIC T6 (T5,T4)	S
	CSA (C,US) Class 1, Zone 1, AExd IIC T6	U
	CSA (C,US) Class 1, Div 1, Group B,C,D NEPSI Exd, Exi	N
T Rating / Gas Group	T4 IIC	3
	T5 IIC	6
	T6 IIC	9
Voltage	24 VDC	24D
	48 VDC (others available)	48D
Power	See Table on Page 3 (Watts)	XX
Resistance	See Table on Page 3 (Ohms)	135
Seals	Viton	V
Filter Regulator	0 to 10 bar - 25 micron element	10X3
	0 to 10 bar - 50 micron element	10X4
Gauges	40mm dry gauge - bar	X10
	40mm glycerine filled - bar	X11
Options	1/2" NPT conduit entry	K85
Pressure Relief	x.x = pressure setting, i.e. 6.2]	PRx.x

### Examples

#### Requirements -

1/4" system with 10 bar, 25 micron filter regulator and 1 \* autoreset 5.7 watt, 24VDC EExd solenoid:-

Code:- XSC1-06-E-77A9-24D-57-V-10X3-X10

#### Requirements -

1/4" system with ball valve (A), single check valve (B), 10 bar, 25 micron filter regulator, 40mm dry gauge (E), inlet flow control (L), 1 \* manual reset (P1) 3.0 watt, 24VDC EExd solenoid:-

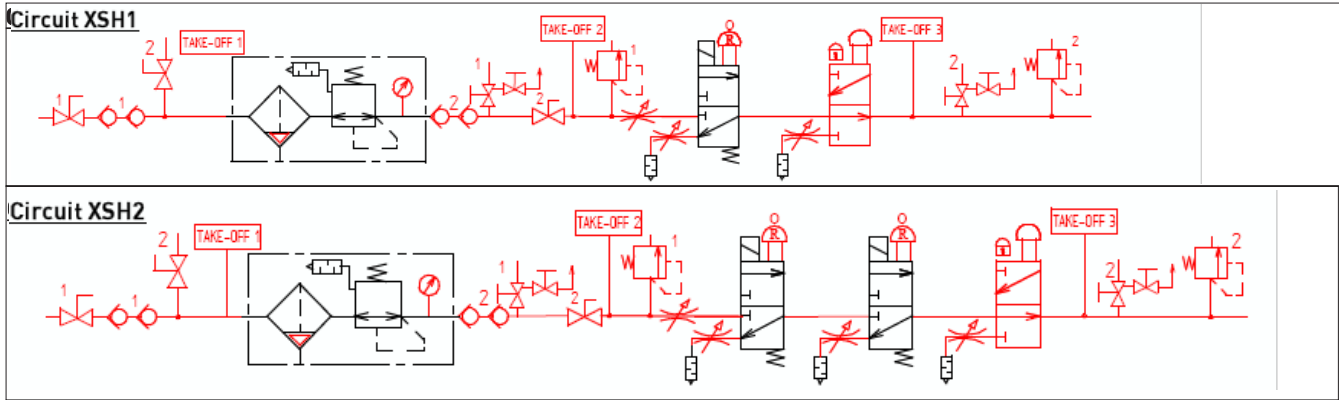
Code:- XSC1-06-ABELP1-77A9-24D-30-V-10X3-X10

#### Requirements -

1/2" system with ball valve (A), double check valve (C), 10 bar, 25 micron filter regulator, 40mm dry gauge (E), inlet flow control (L), 2 \* manual reset (P1,P2) 3.0 watt, 24VDC EExd solenoid, 2 \* exhaust flow control (O):-

Code:- XSC2-12-ACELOP1P2-77A9-24D-30-V-10X3-X10

**Selection table for Linear Manifold - to be used for autodrain systems**



**Base System**

Filter Reg and Solenoid Valve	1/4"	XSH1-06	3/8"	XSH1-09	1/2"	XSH1-12
Filter reg and 2 Solenoid Valves	1/4"	XSH2-06	3/8"	XSH2-09	1/2"	XSH2-12

**Additional Items**

1/4 turn ball valve		A	Take Off		J
Single Check Valve		B	Pressure Relief		K / K2 - Exh to atmosphere K1 / K3 - Captive / adj K2 & K3 located on outlet
Double Check Valve		C	Inlet Flow Control		L
1/4 turn ball valve		D	Block and Bleed		M
Gauge		E	No Breather		N
Take Off		F	Exhaust Flow Control		O
Single Check Valve		G	1 Manual Reset on Sol 1 2 Manual Reset on Sol 2 1 Manual Override on Sol 1 2 Manual Override on Sol 2		P1 P2 P3 P4
Double Check Valve		H	Padlock mountable push / pull valve for ESD function - padlock not supplied		R - Padlockable R1 - Non padlockable R6 - Padlockable - button forward R7 - Non - padlockable - forward R6 & R7 located on outlet
Block and Bleed		I	Auto Drain		Y
			Take Off		Z

**Supplementary Information**

Solenoid	EExia IIC T6 (316) EExd IIC T6 (316) EExme II T3 T120	58 77 74
Approval	ATEX Ex II 2 GD INMETRO BR-Exd IIC T6 (T5,T4) GOST 1 Exd IIC T6 (T5,T4) SAA Exd IIC T6 (T5,T4) CSA (C,US) Class 1, Zone 1, AExd IIC T6 CSA (C,US) Class 1, Div 1, Group B,C,D NEPSI Exd, Exi	A I G S U N
T Rating / Gas Group	T4 IIC T5 IIC T6 IIC	3 6 9
Voltage	24 VDC 48 VDC (others available)	24D 48D
Power	See Table on Page 3 (Watts)	XX
Resistance	See Table on Page 3 (Ohms)	135
Seals	Viton	V
Filter Regulator	0 to 10 bar - 25 micron element 0 to 10 bar - 50 micron element	10X3 10X4
Gauges	40mm dry gauge - bar 40mm glycerine filled - bar	X10 X11
Options	1/2" NPT conduit entry	K85
Pressure Relief	x.x = pressure setting, i.e. 6.2)	PRx.x

**Examples**

**Requirements -**  
1/4" system with 10 bar, 25 micron autodrain filter regulator with gauge and 1 \* autoreset 5.7 watt, 24VDC EExd solenoid:-

Code:- XSH1-06-EY-77A9-24D-57-V-10X3-X5

**Requirements -**  
1/4" system with ball valve [A], single check valve [B], 10 bar, 25 micron filter regulator, 40mm dry gauge [E], inlet flow control [L], 1 \* manual reset [P1] 3.0 watt, 24VDC EExd solenoid:-

Code:- XSH1-06-ABELP1-77A9-24D-30-V-10X3-X10

**Requirements -**  
1/2" system with ball valve [A], double check valve [C], 10 bar, 25 micron filter regulator, 40mm dry gauge [E], inlet flow control [L], 2 \* manual reset [P1,P2] 3.0 watt, 24VDC EExd solenoid, 2 \* exhaust flow control [O):-

Code:- XSH2-12-ACELOOP1P2-77A9-24D-30-V-10X3-X10

Selection table for Stacker Manifold

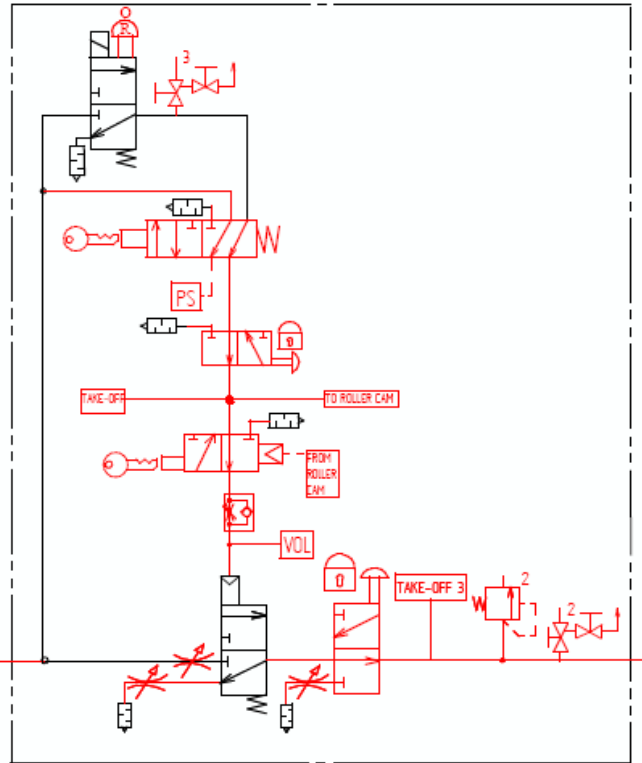
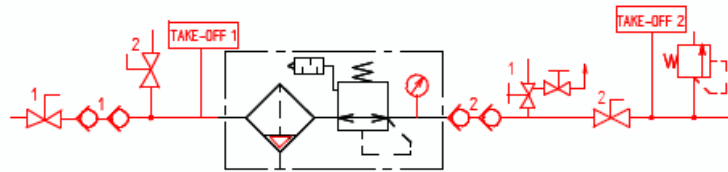
**Single Acting Actuators**

**Circuit XS1 - as shown**

Filter Regulator, 3/2 SPR poppet with 1 Solenoid Valve

**Circuit XS2**

Filter Regulator, 3/2 SPR poppet with 2 Solenoid Valves



**Circuit XS1 shown**

**Double Acting Actuators**

**Circuit XS3**

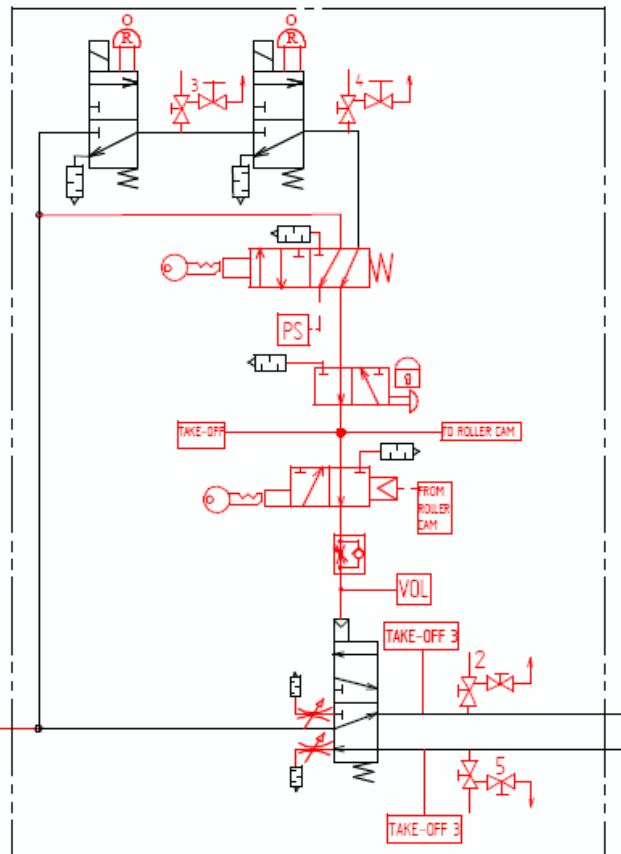
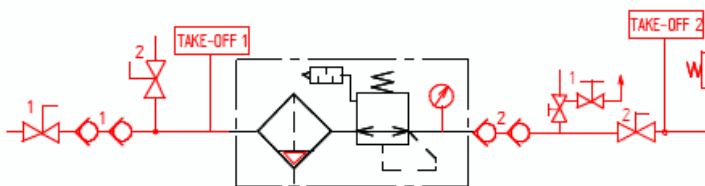
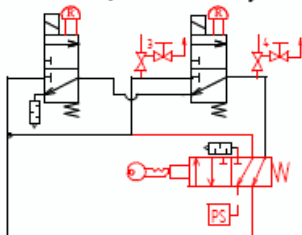
Filter Regulator, 5/2 SPR spool with 1 Solenoid Valve

**Circuit XS4 - as shown**

Filter Regulator, 5/2 SPR spool with 2 Solenoid Valve

**Redundancy Functionality Circuit XSR2 or XSR4**

Secondary Primary



**Circuit XS4 shown**

Base System			Redundancy Function (R)		Redundancy Function (R)		Redundancy Function (R)			
<b>Single Acting Actuators</b>										
Filter Reg and 3/2 pilot with 1 Solenoid Valve	1/4"	XS1-06			3/8"	XS1-09	1/2"	XS1-12		
Filter Reg and 3/2 pilot with 2 Solenoid Valves	1/4"	XS2-06	XSR2-06		3/8"	XS2-09	XSR2-09	1/2"	XS2-12	XSR2-12
<b>Double Acting Actuators</b>										
Filter reg and 5/2 pilot with 1 Solenoid Valves	1/4"	XS3-06			3/8"	XS3-09		1/2"	XS3-12	
Filter reg and 5/2 pilot with 2 Solenoid Valves	1/4"	XS4-06	XSR4-06		3/8"	XS4-09	XSR4-09	1/2"	XS4-12	XSR4-12
<b>Main Flow line Items</b>										
1/4 turn ball valve		A			Pressure Relief			K / K2 - Exh to atmosphere K1 / K3 - Captive / adj K2 & K3 located on outlet		
Single Check Valve		B			Inlet Flow Control			L		
Double Check Valve		C			Block and Bleed			M		
1/4 turn ball valve		D			No Breather			N		
Gauge		E			Exhaust Flow Control			O		
Take Off		F			Block and Bleed - 5/2 ONLY			P		
Single Check Valve		G			Push / pull valve for ESD function - padlock not supplied			R2 - Padlockable R3 - Non Padlockable R6 - Padlockable - button forward R7 - Non - padlockable - button forward		
Double Check Valve		H			3/2 only - located on main flow line					
Block and Bleed		I			Auto Drain			Y		
Take Off		J			Take Off			Z		
					Take Off (5/2 only)			Z1		
<b>Pilot Line Items - all 1/4"</b>					<b>Supplementary Information</b>					
5/2 Key Operated detented key return Solenoid By Pass Valve		Q - Detented Q1 - Spring Return			Solenoid	EExd IIC T6 T85/T100/T135 - 3 watts EExme II T3 T120 - 3.7 watts EExia IIC T6 or T4		77 74 78		
Push / pull valve for ESD function - padlock not supplied		R - Padlockable R1 - Non Padlockable R4 - Padlockable - button forward R5 - Non - padlockable - button forward			Approval	ATEX Ex II 2 GD INMETRO BR - Exd IIC T6 (T5,T4) GOST 1 Exd IIC T6 (T5,T4) SAA Exd IIC T6 (T5,T4) CSA (C,US) Class 1, Zone 1, AExd IIC T6 CSA (C,US) Class 1, Div 1, Group B,C,D NEPSI Exd, Exi		A I G S U N		
Key operated, pilot or key return for partial close system - includes take off to roller cam		S			T Rating / Gas Group	T4 IIC T5 IIC T6 IIC		3 6 9		
Block and Bleed		T			Voltage	24VDC 48VDC	Other voltages available	24D 48D		
Block and Bleed		U			Power (Watts)	See Table on Page 3		XX		
Manual Reset on sol 1 Manual Reset on sol 2		V1 V2			Resistance (Ohms)	370 Ohms Exia		370		
Manual Override on sol 1 Manual Override on sol 2		V3 V4			Seals	Viton Silicone (gas service) Arctic		V AG		
					Filter Regulator	0 to 10 bar - 25 micron element 0 to 10 bar - 50 micron element		10X3 10X4		
					Gauges	50mm dry gauge - bar 50mm dry gauge - bar/psi 50mm glycerine filled - bar 50mm glycerine filled - bar/psi		X5 X5pb X8 X8pb		
					Options	1/2" NPT conduit entry		K85		
					Pressure Relief	x.x = pressure setting, i.e. 6.2		PRx.x		

### Examples

#### Requirements -

1/2" system with ball valve (A), single check valve (B), 10 bar, 25 micron filter regulator, 50mm dry gauge (E), inlet flow control (L), 1 \* manual reset (V1) 3.0 watt, 24VDC EExd solenoid, partial stroking requirement (S):-

Code:- XS1-12-ABEL-SV1-77A9-24D-30-V-10X3-X5

**1" systems available also - contact Bifold Fluidpower**

#### Requirements -

1/2" system for double acting actuator with ball valve(A), double check valve (C), 10 bar, 25 micron filter regulator, 50mm dry gauge (E), 6.2 bar pressure relief (K), 1 \* manual reset (V1) 3.0 watt, 24VDC EExd solenoid, exhaust flow control (O), by pass requirement for solenoid testing (Q):-

Code:- XS4-12-ACEK0-QV1-77A9-24D-30-V-10X3-X5-PR6.2



**Selection Table**  
**3/4" & 1" Stacker Manifold**

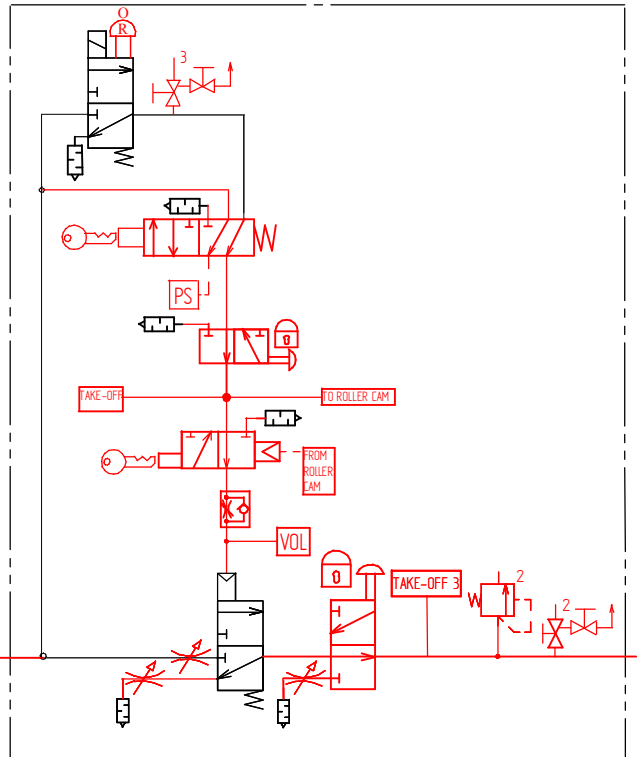
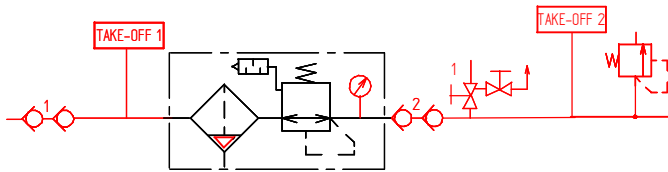
**Single Acting Actuators**

**Circuit XS1 - as shown**

Filter Regulator, 3/2 SPR poppet with 1 Solenoid Valve

**Circuit XS2**

Filter Regulator, 3/2 SPR poppet with 2 Solenoid Valves



**Circuit XS1 shown**

**Double Acting Actuators**

**Circuit XS3**

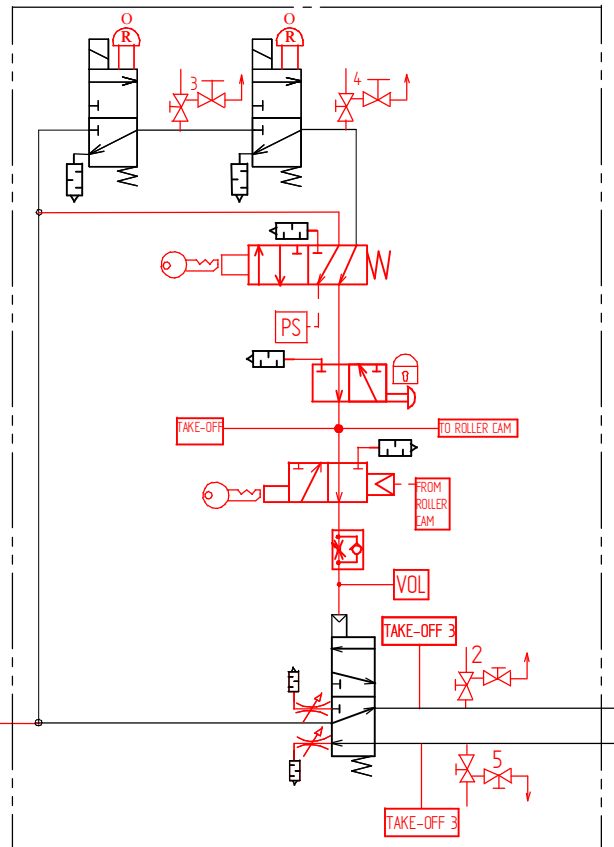
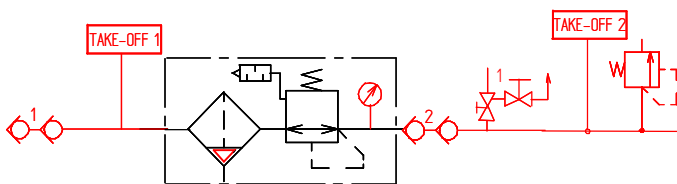
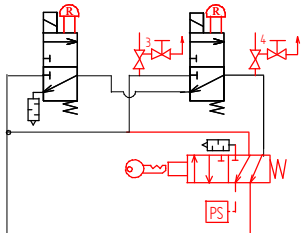
Filter Regulator, 5/2 SPR spool with 1 Solenoid Valve

**Circuit XS4 - as shown**

Filter Regulator, 5/2 SPR spool with 2 Solenoid Valves


















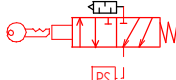

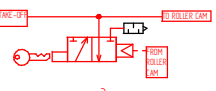







**Redundancy Functionality Circuit XSR2 or XSR4**

Secondary Primary



**Circuit XS4 shown**

## Reliability and Innovation in directional control valves

<u>Base System</u>			Redundancy Function (R)	Redundancy Function (R)
<b>Single Acting Actuators</b>				
Filter Reg and 3/2 pilot with 1 Solenoid Valve	3/4"	XS1-19	1"	XS1-25
Filter Reg and 3/2 pilot with 2 Solenoid Valves	3/4"	XS2-19	XSR2-19	XS2-25 XSR2-25
<b>Double Acting Actuators</b>				
Filter reg and 5/2 pilot with 1 Solenoid Valves	3/4"	XS3-19	1"	XS3-25
Filter reg and 5/2 pilot with 2 Solenoid Valves	3/4"	XS4-19	XSR4-19	XS4-25 XSR4-25
<u>Main Flow line Items</u>				
Single Check Valve		B	Inlet Flow Control (integral on SPR)	 L1 - 3/2 only
Double Check Valve		C	Block and Bleed	 M
Gauge		E	No Breather	N
Take Off		F	Exhaust Flow Control	 O
Single Check Valve		G	Block and Bleed - 5/2 ONLY	 P
Double Check Valve		H	Push / pull valve for ESD function - padlock not supplied (3/2 only)	 R3 - Non Padlockable R7 - Non Padlockable - button front
Block and Bleed		I	Auto Drain	 Y
Take Off		J	Take Off (5/2 only)	 Z1
Pressure Relief		K1 - Captive / adjustable K3 - Captive / adjustable		
				
<u>Pilot Line Items - all 1/4"</u>			<u>Supplementary Information</u>	
5/2 Key Operated detented key return Solenoid By Pass Valve		Q - Detented Q1 - Spring Return	Solenoid	EEExd IIC T6 T85/T100/T135 77 Exemb II T3 T120 74 EEExia IIC T6 or T4 78
Push / pull valve for ESD function - padlock not supplied		R - Padlockable R1 - Non Padlockable R4 - Padlockable - button front R5 - Non Padlockable - button front	Approval	ATEX Ex II 2 GD A Other approvals available - contact Bifold Fluidpower Ltd
Key operated, pilot or key return for partial close system - includes take off to roller cam		S	T Rating / Gas Group	T4 IIC 3 T5 IIC 6 T6 IIC 9
Block and Bleed		T	Voltage	24VDC 24D 48VDC 48D Other voltages available
Block and Bleed		U	Power	3 Watt - EEExd 77 solenoid 30 3.6 Watt - Exemb 74 solenoid 36
Manual Reset on sol 1 Manual Reset on sol 2	 	V1 V2	Resistance	370 ohms - EEExia solenoid only 370 typical for a nominal 32mA barrier
Manual Override on sol 1 Manual Override on sol 2	 	V3 V4	Seals	Viton V Silicone (gas service) Arctic AG
Time Delay		X	Filter Regulator	0 to 10 bar - 50 micron element 10X4
			Gauges	50mm dry gauge - bar X5 50mm dry gauge - bar/psi X5pb 50mm glycerine filled - bar X8 50mm glycerine filled - bar/psi X8pb
			Options	1/2" NPT conduit entry K85
			Pressure Relief	x.x = pressure setting, i.e. 6.2 PRx.x

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#### **Quality Assurance**

*All Bifold Fluidpower products are manufactured to a most stringent QA programme. Every care is taken at all stages of manufacture to ensure that every product will give optimum performance and reliability. We are recognised to EN ISO 9001:2000. Functional test certificate, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BSEN 10204 3.1.B where available. The manufacturer reserves the right to make changes to the specifications and design etc., without prior notice*

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## **Direct & Indirect Acting Solenoid Valves Models FP06P, FP10P, FP12P, BXS & SPR NAMUR Mount Available on FP06P & BXS**

### **Solenoid Valve Range**

**(Up to and including 508 psi / 35 bar working pressure)**



### **Superior Performance Throughout the Full Operational Range**

- Solenoid Valve  
● SIL 3 Third Party Certified
- Solenoid Free to Rotate Through 360°
- 316L Stainless Steel Solenoid Enclosure and Valve. Aluminium Options Available
- Arctic Service Options to -60°C
- Worldwide Solenoid Approvals  
Ex emb, Ex d, Ex ia & Explosion Proof
- Low Power - 1.8W
- High Flow - Up to 11.1 Cv
- Up to and including 508 psi / 35 bar Working Pressure





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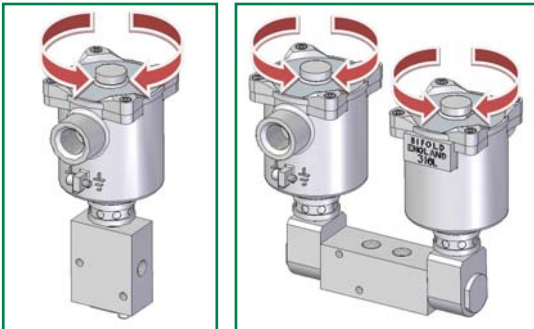
**Quality Assurance**  
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## Features & Benefits

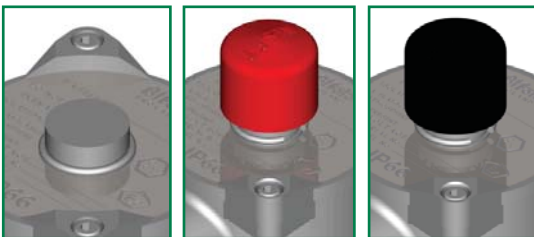
### Worldwide Approvals



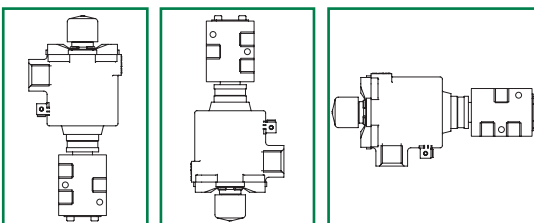
### Solenoid Operator is Free to Rotate 360°



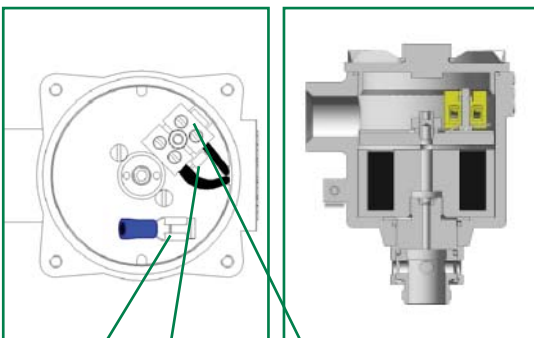
### Widest Range of Override Options



### Valve can be Mounted in any Orientation



### Spacious Enclosure for Ease of Wiring



Internal Earth Connection    Surge Suppression Diode Ex d (dc)    Terminal Block Type MK3

### Standard Solenoid Operator Equipment Design & Build

- Worldwide Approvals
- Solenoid operator is free to rotate 360° allowing for an easy cable layout and ease of connection wiring. Solenoid operator internals rotate with the enclosure and prevent cables being pulled out of terminal block.
- Widest range of override options (Auto Reset, Spring Return Manual Override, Stayput Manual Override, Manual Reset, Tamperproof Manual Latch, Latch Energised).
- Worldwide technical and field support.
- Standard solenoid valve can be mounted in any orientation to simplify installation due to all the components having enhanced rotational capabilities.

### Commissioning and Maintenance Benefits for the Standard Solenoid Valve

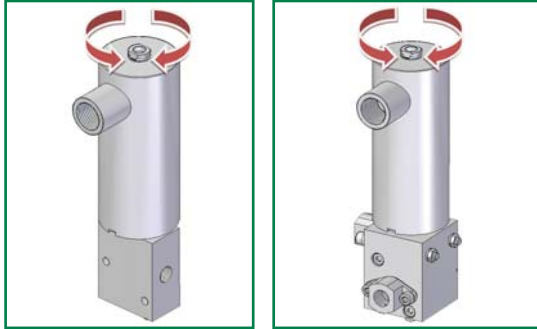
- Tropicalised solenoid operator design - 316L stainless steel enclosure with aluminium options also available; stainless steel or Remko B magnetic parts (dependent upon solenoid Ex type) Fully encapsulated coil.
- Spacious solenoid enclosure for ease of wiring.
- No time penalty for heat dissipation before removing solenoid enclosure cover.
- No special high temperature cable requirements.

## Features & Benefits

### Worldwide Approvals



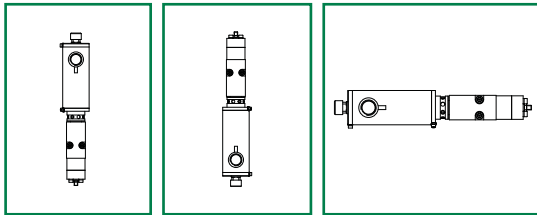
### Solenoid Operator is Free to Rotate 360°



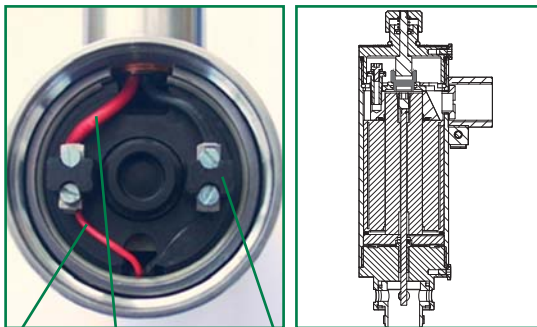
### Override Options



### Valve Assembly can be Mounted in any Orientation



### Compact Enclosure Design



Coil Leads Incoming Supply Leads Connect +Ve To Red Coil Lead Connect -Ve To Black Coil

Terminal Block Surge Suppression Diode Ex d (dc)

### Slimline Solenoid Operator Equipment Design & Build

- Worldwide Approvals.
- Solenoid operator is free to rotate 360° allowing for an easy cable layout and ease of connection wiring. Solenoid operator internals rotate with the enclosure and prevent cables being pulled out of terminal block.
- 316L Stainless Steel Enclosure.
- Override Options - Auto Reset, Manual Override and Manual Reset.
- Worldwide technical and field support.
- Slimline solenoid valve can be mounted in any orientation to simplify installation.

### Commissioning and Maintenance Benefits for the Slimline Solenoid Valve

- Tropicalised solenoid operator design - Fully encapsulated coil.
- No time penalty for heat dissipation before removing solenoid enclosure cover.
- No special high temperature cable requirements.
- Compact design and space envelope.

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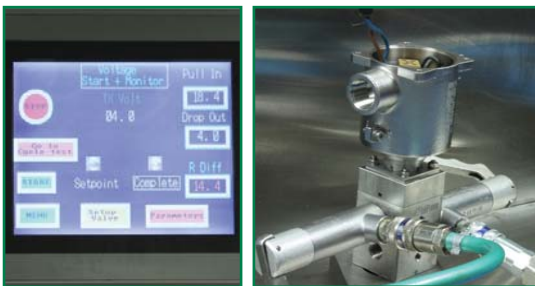
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## Features & Benefits

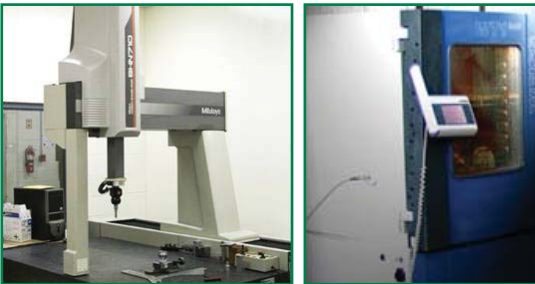
**SIL 3 Capability, FMEA, Extensive Qualification Testing Coupled with 100% Computerised Diagnostic Test Procedures.**



Please refer to the Bifold website to see full range of SIL 3 capability certificates for the FP06P, FP10P, BXS & SPR.



## State of the Art Testing



## Simple Maintenance




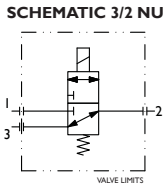

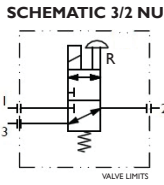
## Safety and Environmental Benefits

- SIL 3 capability: The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3. (For the FP06P, FP10P, BXS & SPR only).
- Force balanced valve design with high safety factors to de-energise at all pressures in Normally Open and Normally Closed configurations.
- 100% computerised diagnostic testing to ensure each solenoid valve is proven along with confirmed safety factors.
- Bifold has state of the art product qualification and production equipment including flow (Cv), environment (-70°C to +180°C), function and leakage testing, and data logging.
- The standard solenoid operator is a holding magnet type which ensures the valve will operate in damp conditions. The risk of corrosion to internal components is reduced, unlike other valve types that incorporate a solenoid core tube design with a 'wetted' armature that will only operate in dry air conditions!
- Tolerant to moist air in control lines.
- The standard solenoid valve has proven arctic service and low temperature performance.
- Products are manufactured, inspected, assembled and tested in our state of the art production facilities.
- Large clearances, metal back up to seals and no knife edge sealing to prevent long term valve sticking.
- Dry solenoid armature to prevent corrosion and affecting safe shut down.
- Simple maintenance - Removable transient suppression diode on Ex d DC solenoid valve assemblies and removable solenoid coil without removing valve from the tubing.



Preferred Range

DIRECT ACTING STANDARD SOLENOID VALVES - PREFERRED RANGE


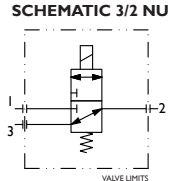




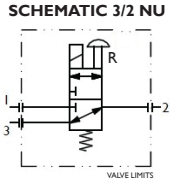




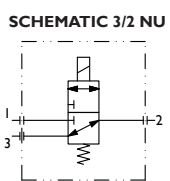




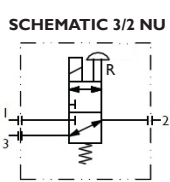



Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>FP06P</b> Auto Reset</p>	<p>SCHEMATIC 3/2 NU</p> 	24	<p><b>FP06P-SI-04-32-NU-V-74AT4-24D-36</b></p> <p><b>FP06P-SI-04-32-NU-V-74AT4-24D-44</b></p> <p><b>FP06P-SI-04-32-NU-V-74AT4-24D-68</b></p>	<p>1/4" NPT Ports, 3 Way 2 Position, Direct Acting, Normally Universal, 24Vdc, Auto Reset.</p> <p> ATEX II 2 GDc, Ex emb IIC T4... T3 Gb</p> <p> IECEx Ex emb IIC T4... T3 Gb</p> <p>3.6 Watt, Cv 0.35, 145 psi / 10 bar.</p> <p>4.4 Watt, Cv 0.6, 145 psi / 10 bar.</p> <p>6.8 Watt, Cv 1.0, 145 psi / 10 bar.</p>
			<p><b>FP06P-SI-04-32-NU-V-77A-24D-35</b></p> <p><b>FP06P-SI-04-32-NU-V-77A-24D-57</b></p>	<p> ATEX II 2 GD, Ex d IIC T4 / T5 / T6</p> <p> IECEx Ex d IIC T4 / T5 / T6</p> <p>3.5 Watt, Cv 0.6, 145 psi / 10 bar.</p> <p>5.7 Watt, Cv 1.0, 145 psi / 10 bar.</p>
 <p><b>FP06P</b> Manual Reset</p>	<p>SCHEMATIC 3/2 NU</p> 	24	<p><b>FP06P-SI-04-32-NU-V-74AT4-24D-ML-36</b></p>	<p>1/4" NPT Ports, 3 Way 2 Position, Direct Acting, Normally Universal, 24Vdc, Manual Reset.</p> <p> ATEX II 2 GDc, Ex emb IIC T4... T3 Gb</p> <p> IECEx Ex emb IIC T4... T3 Gb</p> <p>3.6 Watt, Cv 1.0, 145 psi / 10 bar.</p>
			<p><b>FP06P-SI-04-32-NU-V-77A-24D-ML-30</b></p>	<p> ATEX II 2 GD, Ex d IIC T4 / T5 / T6</p> <p> IECEx Ex d IIC T4 / T5 / T6</p> <p>3.0 Watt, Cv 1.0, 145 psi / 10 bar.</p>

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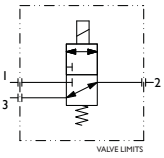



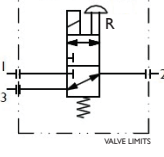


Preferred Range

DIRECT ACTING STANDARD SOLENOID VALVES - PREFERRED RANGE				
Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>FP06P</b> Aluminium Enclosure &amp; Body Auto Reset</p>	 <p>SCHEMATIC 3/2 NU</p>	24	<p><b>FP06P-SI-A04-32-NU-V-27A-24D-35</b></p> <p><b>FP06P-SI-A04-32-NU-V-27A-24D-57</b></p>	<p>1/4" NPT Ports, 3 Way 2 Position, Direct Acting, Normally Universal, 24Vdc, Auto Reset.</p> <p>  ATEX  II 2 GD, Ex d IIC T4 / T5 / T6   IECEX Ex d IIC T4 / T5 / T6                      3.5 Watt, Cv 0.6, 145 psi / 10 bar.                      5.7 Watt, Cv 1.0, 145 psi / 10 bar.                 </p>
 <p><b>FP06P</b> Aluminium Enclosure &amp; Body Manual Reset</p>	 <p>SCHEMATIC 3/2 NU</p>	24	<p><b>FP06P-SI-A04-32-NU-V-27A-24D-ML-30</b></p>	<p>1/4" NPT Ports, 3 Way 2 Position, Direct Acting, Normally Universal, 24Vdc, Manual Reset.</p> <p>  ATEX  II 2 GD, Ex d IIC T4 / T5 / T6   IECEX Ex d IIC T4 / T5 / T6                      3.0 Watt, Cv 1.0, 145 psi / 10 bar.                 </p>
 <p><b>FP06P</b> Aluminium Enclosure 316L Stainless Steel Body Auto Reset</p>	 <p>SCHEMATIC 3/2 NU</p>	24	<p><b>FP06P-SI-04-32-NU-V-27A-24D-35</b></p> <p><b>FP06P-SI-04-32-NU-V-27A-24D-57</b></p>	<p>1/4" NPT Ports, 3 Way 2 Position, Direct Acting, Normally Universal, 24Vdc, Auto Reset.</p> <p>  ATEX  II 2 GD, Ex d IIC T4 / T5 / T6   IECEX Ex d IIC T4 / T5 / T6                      3.5 Watt, Cv 0.6, 145 psi / 10 bar.                      5.7 Watt, Cv 1.0, 145 psi / 10 bar.                 </p>
 <p><b>FP06P</b> Aluminium Enclosure 316L Stainless Steel Body Manual Reset</p>	 <p>SCHEMATIC 3/2 NU</p>	24	<p><b>FP06P-SI-04-32-NU-V-27A-24D-ML-30</b></p>	<p>1/4" NPT Ports, 3 Way 2 Position, Direct Acting, Normally Universal, 24Vdc, Manual Reset.</p> <p>  ATEX  II 2 GD, Ex d IIC T4 / T5 / T6   IECEX Ex d IIC T4 / T5 / T6                      3.0 Watt, Cv 1.0, 145 psi / 10 bar.                 </p>



Preferred Range


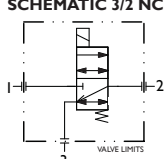





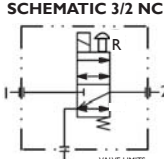




DIRECT ACTING SLIMLINE SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>FP06P</b> Auto Reset</p>	<p>SCHEMATIC 3/2 NU</p> 	25	<b>FP06P-SI-04-32-NU-V-58A-135</b>	<p>1/4" NPT Ports, 3 Way 2 Position, Direct Acting, Normally Universal, Auto Reset.</p> <p>ATEX  II 1G Ex ia, IIC T4 / T6 Ga                      IECEx  Ex ia IIC T4 / T6 Ga                      135 Ohms, Cv 0.35, 145 psi / 10 bar. †</p>
 <p><b>FP06P</b> Manual Reset</p>	<p>SCHEMATIC 3/2 NU</p> 	25	<b>FP06P-SI-04-32-NU-V-58A-ML-135</b>	<p>1/4" NPT Ports, 3 Way 2 Position, Direct Acting, Normally Universal, Manual Reset.</p> <p>ATEX  II 1G Ex ia, IIC T4 / T6 Ga                      IECEx  Ex ia IIC T4 / T6 Ga                      135 Ohms, Cv 0.35, 145 psi / 10 bar. †</p>

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.

Preferred Range

DIRECT ACTING STANDARD SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>FP06P</b> Namur Mount Auto Reset Left Hand Feed</p>	<p>SCHEMATIC 3/2 NC</p> 	26	<p><b>FP06P-SI-NI4-32-NC-V-74AT4-24D-36</b></p> <p><b>FP06P-SI-NI4-32-NC-V-74AT4-24D-44</b></p> <p><b>FP06P-SI-NI4-32-NC-V-74AT4-24D-68</b></p>	<p>1/4" NPT Ports, 3 Way 2 Position, Direct Acting, Normally Closed, 24Vdc, Auto Reset Left Hand Feed.</p> <p>ATEX  II 2 GDc, Ex emb IIC T4...T3 Gb                      IECEx  Ex emb IIC T4...T3 Gb                      3.6 Watt, Cv 0.35, 145 psi / 10 bar.                      4.4 Watt, Cv 0.6, 145 psi / 10 bar.                      6.8 Watt, Cv 1.0, 145 psi / 10 bar.</p>
			<p><b>FP06P-SI-NI4-32-NC-V-77A-24D-35</b></p> <p><b>FP06P-SI-NI4-32-NC-V-77A-24D-57</b></p>	<p>ATEX  II 2 GD, Ex d IIC T4 / T5 / T6                      IECEx  Ex d IIC T4 / T5 / T6                      3.5 Watt, Cv 0.6, 145 psi / 10 bar.                      5.7 Watt, Cv 1.0, 145 psi / 10 bar.</p>
 <p><b>FP06P</b> Namur Mount Manual Reset Left Hand Feed</p>	<p>SCHEMATIC 3/2 NC</p> 	26	<p><b>FP06P-SI-NI4-32-NC-V-74AT4-24D-ML-36</b></p>	<p>1/4" NPT Ports, 3 Way 2 Position, Direct Acting, Normally Closed, 24Vdc, Manual Reset Left Hand Feed.</p> <p>ATEX  II 2 GDc, Ex emb IIC T4...T3 Gb                      IECEx  Ex emb IIC T4...T3 Gb                      3.6 Watt, Cv 1.0, 145 psi / 10 bar.</p>
			<p><b>FP06P-SI-NI4-32-NC-V-77A-24D-ML-30</b></p>	<p>ATEX  II 2 GD, Ex d IIC T4 / T5 / T6                      IECEx  Ex d IIC T4 / T5 / T6                      3.0 Watt, Cv 1.0, 145 psi / 10 bar.</p>


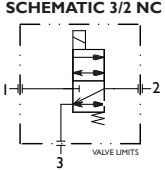

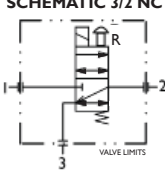

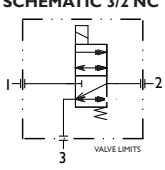

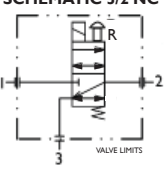
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Preferred Range

DIRECT ACTING SLIMLINE SOLENOID VALVES - PREFERRED RANGE


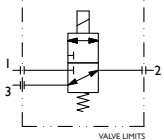




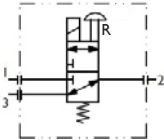



Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>FP06P</b> NAMUR Mount Auto Reset Right Hand Feed</p>	<p>SCHEMATIC 3/2 NC</p> 	27	<b>FP06P-SI-N4-32-NC-V-58A-135</b>	<p>1/4" NPT Ports, 3Way 2 Position, Direct Acting, Normally Closed, Auto Reset, Right Hand Feed.</p> <p>ATEX II I G, Ex ia IIC T4 / T6 Ga IECEX Ex ia IIC T4 / T6 Ga 135 Ohms, Cv 0.35, 145 psi / 10 bar. †</p>
 <p><b>FP06P</b> NAMUR Mount Manual Reset Right Hand Feed</p>	<p>SCHEMATIC 3/2 NC</p> 	27	<b>FP06P-SI-N4-32-NC-V-58A-ML-135</b>	<p>1/4" NPT Ports, 3Way 2 Position, Direct Acting, Normally Closed, 24Vdc, Manual Reset, Right Hand Feed.</p> <p>ATEX II I G, Ex ia IIC T6 Ga IECEX Ex ia IIC T4 / T6 Ga 135 Ohms, Cv 0.35, 145 psi / 10 bar. †</p>
 <p><b>FP06P</b> NAMUR Mount Auto Reset Left Hand Feed</p>	<p>SCHEMATIC 3/2 NC</p> 	27	<b>FP06P-SI-NI4-32-NC-V-58A-135</b>	<p>1/4" NPT Ports, 3Way 2 Position, Direct Acting, Normally Closed, Auto Reset, Left Hand Feed.</p> <p>ATEX II I G, Ex ia IIC T4 / T6 Ga IECEX Ex ia IIC T4 / T6 Ga 135 Ohms, Cv 0.35, 145 psi / 10 bar. †</p>
 <p><b>FP06P</b> NAMUR Mount Manual Reset Left Hand Feed</p>	<p>SCHEMATIC 3/2 NC</p> 	27	<b>FP06P-SI-NI4-32-NC-V-58A-ML-135</b>	<p>1/4" NPT Ports, 3Way 2 Position, Direct Acting, Normally Closed, Manual Reset, Left Hand Feed.</p> <p>ATEX II I G, Ex ia IIC T4 / T6 Ga IECEX Ex ia IIC T4 / T6 Ga 135 Ohms, Cv 0.35, 145 psi / 10 bar. †</p>

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.



Preferred Range

DIRECT ACTING STANDARD SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>FPI2P</b> Auto Reset</p>	<p>SCHEMATIC 3/2 NU</p> 	29	<b>FPI2P-SI-08-32-NU-V-77A-24D-120</b>	<p>1/2" NPT Ports, 3 Way 2 Position, Direct Acting, Normally Universal, 24Vdc, Auto Reset.</p> <p>  ATEX  II 2 GD, Ex d IIC T4 / T5 / T6   IECEX Ex d IIC T4 / T5 / T6                      12.0 Watt, Cv 2.5, 145 psi / 10 bar.                 </p>
 <p><b>FPI2P</b> Manual Reset</p>	<p>SCHEMATIC 3/2 NU</p> 	29	<b>FPI2P-SI-08-32-NU-V-77A-24D-ML-65</b>	<p>1/2" NPT Ports, 3 Way 2 Position, Direct Acting, Normally Universal, 24Vdc, Manual Reset.</p> <p>  ATEX  II 2 GD, Ex d IIC T4 / T5 / T6   IECEX Ex d IIC T4 / T5 / T6                      6.5 Watt, Cv 2.5, 145 psi / 10 bar.                 </p>


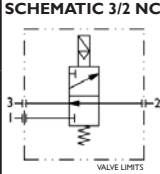

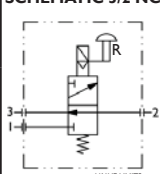

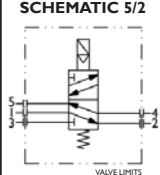

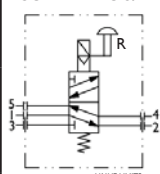
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Preferred Range

DIRECT ACTING STANDARD SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>BXS</b> Auto Reset Internal Pilot</p>	 <p>SCHEMATIC 3/2 NC</p>	30	<b>BXS-04-04-EI-32-NC-00-V-74AT4-24D-36</b>	1/4" NPT Ports, 3 Way 2 Position, Pilot Operated, Direct Acting, Normally Closed, Spring Return, 24Vdc, Auto Reset Internal Pilot. ATEX $\text{Ex}$ II 2 GDc, Ex emb IIC T4...T3 Gb IECEx Ex emb IIC T4...T3 Gb 3.6 Watt, Cv 0.73, 145 psi / 10 bar.
			<b>BXS-04-04-EI-32-NC-00-V-77A-24D-18</b>	ATEX $\text{Ex}$ II 2 GD, Ex d IIC T4 / T5 / T6 IECEx Ex d IIC T4 / T5 / T6 1.8 Watt, Cv 0.73, 145 psi / 10 bar.
			<b>BXS-04-04-EI-32-NC-00-V-78A-260</b>	ATEX $\text{Ex}$ II 1 GD, Ex ia IIC T4 / T6 Ga IECEx Ex ia IIC T4 / T6 Ga 260 Ohms, Cv 0.73, 145 psi / 10 bar. †
 <p><b>BXS</b> Manual Reset Internal Pilot</p>	 <p>SCHEMATIC 3/2 NC</p>	30	<b>BXS-04-04-E5-32-NC-00-V-74AT4-24D-36</b>	1/4" NPT Ports, 3 Way 2 Position, Pilot Operated, Direct Acting, Normally Closed, Spring Return, 24Vdc, Manual Reset Internal Pilot. ATEX $\text{Ex}$ II 2 GDc, Ex emb IIC T4...T3 Gb IECEx Ex emb IIC T4...T3 Gb 3.6 Watt, Cv 0.73, 145 psi / 10 bar.
			<b>BXS-04-04-E5-32-NC-00-V-77A-24D-18</b>	ATEX $\text{Ex}$ II 2 GD, Ex d IIC T4 / T5 / T6 IECEx Ex d IIC T4 / T5 / T6 1.8 Watt, Cv 0.73, 145 psi / 10 bar.
			<b>BXS-04-04-E5-32-NC-00-V-78A-260</b>	ATEX $\text{Ex}$ II 1 GD, Ex ia IIC T4 / T6 Ga IECEx Ex ia IIC T4 / T6 Ga 260 Ohms, Cv 0.73, 145 psi / 10 bar. †
 <p><b>BXS</b> Auto Reset Internal Pilot</p>	 <p>SCHEMATIC 5/2</p>	31	<b>BXS-04-04-EI-52-XX-00-V-74AT4-24D-36</b>	1/4" NPT Ports, 5 Way 2 Position, Pilot Operated, Direct Acting, Spring Return, 24Vdc, Auto Reset Internal Pilot. ATEX $\text{Ex}$ II 2 GDc, Ex emb IIC T4...T3 Gb IECEx Ex emb IIC T4...T3 Gb 3.6 Watt, Cv 0.73, 145 psi / 10 bar.
			<b>BXS-04-04-EI-52-XX-00-V-77A-24D-18</b>	ATEX $\text{Ex}$ II 2 GD, Ex d IIC T4 / T5 / T6 IECEx Ex d IIC T4 / T5 / T6 1.8 Watt, Cv 0.73, 145 psi / 10 bar.
			<b>BXS-04-04-EI-52-XX-00-V-78A-260</b>	ATEX $\text{Ex}$ II 1 GD, Ex ia IIC T4 / T6 Ga IECEx Ex ia IIC T4 / T6 Ga 260 Ohms, Cv 0.73, 145 psi / 10 bar. †
 <p><b>BXS</b> Manual Reset Internal Pilot</p>	 <p>SCHEMATIC 5/2</p>	31	<b>BXS-04-04-E5-52-XX-00-V-74AT4-24D-36</b>	1/4" NPT Ports, 5 Way 2 Position, Pilot Operated, Direct Acting, Spring Return, 24Vdc, Manual Reset Internal Pilot. ATEX $\text{Ex}$ II 2 GDc, Ex emb IIC T4...T3 Gb IECEx Ex emb IIC T4...T3 Gb 3.6 Watt, Cv 0.73, 145 psi / 10 bar.
			<b>BXS-04-04-E5-52-XX-00-V-77A-24D-18</b>	ATEX $\text{Ex}$ II 2 GD, Ex d IIC T4 / T5 / T6 IECEx Ex d IIC T4 / T5 / T6 1.8 Watt, Cv 0.73, 145 psi / 10 bar.
			<b>BXS-04-04-E5-52-XX-00-V-78A-260</b>	ATEX $\text{Ex}$ II 1 GD, Ex ia IIC T4 / T6 Ga IECEx Ex ia IIC T4 / T6 Ga 260 Ohms, Cv 0.73, 145 psi / 10 bar. †

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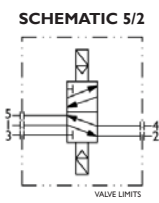

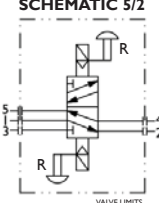
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Preferred Range

INDIRECT ACTING STANDARD SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>BXS</b> Banjo Joint Auto Reset Internal Pilot</p>	 <p>SCHEMATIC 5/2 VALVE LIMITS</p>	31	<b>BXS-04-04-EI-52-XX-EI-V-74AT4-24D-36-L142</b>	1/4" NPT Ports, Dual Solenoid, 5Way 2 Position, Pilot Operated, Indirect Acting, Pilot Return, 24Vdc, Auto Reset Internal Pilot. ATEX $\text{Ex}$ II 2 GDc, Ex emb IIC T4...T3 Gb IECEx Ex emb IIC T4...T3 Gb 3.6 Watt, Cv 0.73, 145 psi / 10 bar.
			<b>BXS-04-04-EI-52-XX-EI-V-77A-24D-30-L142</b>	ATEX $\text{Ex}$ II 2 GD, Ex d IIC T4 / T5 / T6 IECEx Ex d IIC T4 / T5 / T6 3.0 Watt, Cv 0.73, 145 psi / 10 bar.
			<b>BXS-04-04-EI-52-XX-EI-V-78A-260-L142</b>	ATEX $\text{Ex}$ II 1 GD, Ex ia IIC T4 / T6 Ga IECEx Ex ia IIC T4 / T6 Ga †
 <p><b>BXS</b> Banjo Joint Manual Reset Internal Pilot</p>	 <p>SCHEMATIC 5/2 VALVE LIMITS</p>	31	<b>BXS-04-04-E5-52-XX-E5-V-74AT4-24D-36-L142</b>	1/4" NPT Ports, Dual Solenoid, 5Way 2 Position, Pilot Operated, Indirect Acting, Pilot Return, 24Vdc, Manual Reset Internal Pilot. ATEX $\text{Ex}$ II 2 GDc, Ex emb IIC T4...T3 Gb IECEx Ex emb IIC T4...T3 Gb 3.6 Watt, Cv 0.73, 145 psi / 10 bar.
			<b>BXS-04-04-E5-52-XX-E5-V-77A-24D-30-L142</b>	ATEX $\text{Ex}$ II 2 GD, Ex d IIC T4 / T5 / T6 IECEx Ex d IIC T4 / T5 / T6 3.0 Watt, Cv 0.73, 145 psi / 10 bar.
			<b>BXS-04-04-E5-52-XX-E5-V-78A-260-L142</b>	ATEX $\text{Ex}$ II 1 GD, Ex ia IIC T4 / T6 Ga IECEx Ex ia IIC T4 / T6 Ga †

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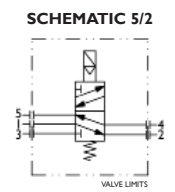

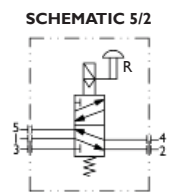

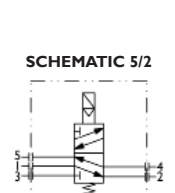

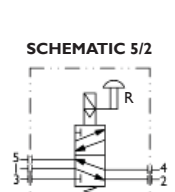
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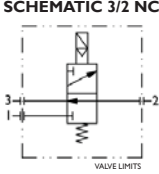

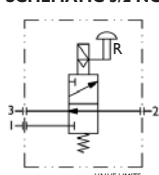

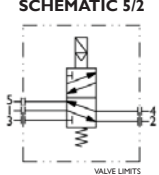

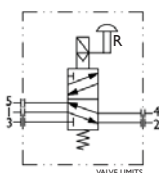
INDIRECT ACTING STANDARD SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>BXS</b> NAMUR Mount Banjo Joint Auto Reset Internal Pilot</p>		32	<b>BXS-04-N4-EI-52-XX-00-V74AT4-24D-36-LI42</b>	1/4" NPT Ports, 5 Way 2 Position, Pilot Operated, Indirect Acting, Pilot Return, 24Vdc, Auto Reset Internal Pilot. ATEX II 2 GDc, Ex emb IIC T4...T3 Gb IECEx Ex emb IIC T4...T3 Gb 3.6 Watt, Cv 0.73, 145 psi / 10 bar.
			<b>BXS-04-N4-EI-52-XX-00-V77A-24D-30-LI42</b>	ATEX II 2 GD, Ex d IIC T4 / T5 / T6 IECEx Ex d IIC T4 / T5 / T6 3.0 Watt, Cv 0.73, 145 psi / 10 bar.
			<b>BXS-04-N4-EI-52-XX-00-V78A-260-LI42</b>	ATEX II 1 GD, Ex ia IIC T4 / T6 Ga IECEx Ex ia IIC T4 / T6 Ga 260 Ohms, Cv 0.73, 145 psi / 10 bar. †
 <p><b>BXS</b> NAMUR Mount Banjo Joint Manual Reset Internal Pilot</p>		32	<b>BXS-04-N4-E5-52-XX-00-V74AT4-24D-36-LI42</b>	1/4" NPT Ports, 5 Way 2 Position, Pilot Operated, Indirect Acting, Pilot Return, 24Vdc, Manual Reset Internal Pilot. ATEX II 2 GDc, Ex emb IIC T4...T3 Gb IECEx Ex emb IIC T4...T3 Gb 3.6 Watt, Cv 0.73, 10 bar.
			<b>BXS-04-N4-E5-52-XX-00-V77A-24D-30-LI42</b>	ATEX II 2 GD, Ex d IIC T4 / T5 / T6 IECEx Ex d IIC T4 / T5 / T6 3.0 Watt, Cv 0.73, 145 psi / 10 bar.
			<b>BXS-04-N4-E5-52-XX-00-V78A-260-LI42</b>	ATEX II 1 GD, Ex ia IIC T4 / T6 Ga IECEx Ex ia IIC T4 / T6 Ga 260 Ohms, Cv 0.73, 145 psi / 10 bar. †
 <p><b>BXS</b> Aluminium Enclosure &amp; Body NAMUR Mount Banjo Joint Auto Reset Internal Pilot</p>		32	<b>BXS-04-AN4-EI-52-XX-00-V27A-24D-30-LI42</b>	1/4" NPT Ports, 5 Way 2 Position, Pilot Operated, Indirect Acting, Pilot Return, 24Vdc, Auto Reset Internal Pilot. ATEX II 2 GD, Ex d IIC T4 / T5 / T6 IECEx Ex d IIC T4 / T5 / T6 3.0 Watt, Cv 0.73, 145 psi / 10 bar.
 <p><b>BXS</b> Aluminium Enclosure &amp; Body NAMUR Mount Banjo Joint Manual Reset Internal Pilot</p>		32	<b>BXS-04-AN4-E5-52-XX-00-V27A-24D-30-LI42</b>	1/4" NPT Ports, 5 way 2 position, Pilot Operated, Indirect Acting, Pilot Return, 24Vdc, Manual Reset Internal Pilot. ATEX II 2 GD, Ex d IIC T4 / T5 / T6 IECEx Ex d IIC T4 / T5 / T6 3.0 Watt, Cv 0.73, 145 psi / 10 bar.

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Preferred Range

DIRECT ACTING STANDARD SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>SPR</b> Auto Reset Internal Pilot</p>	<p>SCHEMATIC 3/2 NC</p> 	33	<b>SPR-08-08-EI-32-NC-00-V-74AT4-24D-36</b>	1/2" NPT Ports, 3Way 2 Position, Pilot Operated, Direct Acting, Normally Closed, Spring Return, 24Vdc, Auto Reset Internal Pilot. ATEX II 2 GDc, Ex emb IIC T4...T3 Gb IECEx Ex emb IIC T4...T3 Gb 3.6 Watt, Cv 3.0, 145 psi / 10 bar.
			<b>SPR-08-08-EI-32-NC-00-V-77A-24D-30</b>	ATEX II 2 GD, Ex d IIC T4 / T5 / T6 IECEx Ex d IIC T4 / T5 / T6 3.0 Watt, Cv 3.0, 145 psi / 10 bar.
			<b>SPR-08-08-EI-32-NC-00-V-78A-260</b>	ATEX II 1 GD, Ex ia IIC T4 / T6 Ga IECEx Ex ia IIC T4 / T6 Ga †
 <p><b>SPR</b> Manual Reset Internal Pilot</p>	<p>SCHEMATIC 3/2 NC</p> 	33	<b>SPR-08-08-E5-32-NC-00-V-74AT4-24D-36</b>	1/2" NPT Ports, 3Way 2 Position, Pilot Operated, Direct Acting, Normally Closed, Spring Return, 24Vdc, Manual Reset Internal Pilot. ATEX II 2 GDc, Ex emb IIC T4...T3 Gb IECEx Ex emb IIC T4...T3 Gb 3.6 Watt, Cv 3.0, 145 psi / 10 bar.
			<b>SPR-08-08-E5-32-NC-00-V-77A-24D-30</b>	ATEX II 2 GD, Ex d IIC T4 / T5 / T6 IECEx Ex d IIC T4 / T5 / T6 3.0 Watt, Cv 3.0, 145 psi / 10 bar.
			<b>SPR-08-08-E5-32-NC-00-V-78A-260</b>	ATEX II 1 GD, Ex ia IIC T4 / T6 Ga IECEx Ex ia IIC T4 / T6 Ga †
 <p><b>SPR</b> Auto Reset Internal Pilot</p>	<p>SCHEMATIC 5/2</p> 	34	<b>SPR-08-08-EI-52-XX-00-V-74AT4-24D-36</b>	1/2" NPT Ports, 5Way 2 Position, Pilot Operated, Direct Acting, Spring Return, 24Vdc, Auto Reset Internal Pilot. ATEX II 2 GDc, Ex emb IIC T4...T3 Gb IECEx Ex emb IIC T4...T3 Gb 3.6 Watt, Cv 3.0, 145 psi / 10 bar.
			<b>SPR-08-08-EI-52-XX-00-V-77A-24D-30</b>	ATEX II 2 GD, Ex d IIC T4 / T5 / T6 IECEx Ex d IIC T4 / T5 / T6 3.0 Watt, Cv 3.0, 145 psi / 10 bar.
			<b>SPR-08-08-EI-52-XX-00-V-78A-260</b>	ATEX II 1 GD, Ex ia IIC T4 / T6 Ga IECEx Ex ia IIC T4 / T6 Ga †
 <p><b>SPR</b> Manual Reset Internal Pilot</p>	<p>SCHEMATIC 5/2</p> 	34	<b>SPR-08-08-E5-52-XX-00-V-74AT4-24D-36</b>	1/2" NPT Ports, 5Way 2 Position, Pilot Operated, Direct Acting Spring Return, 24Vdc, Manual Reset Internal Pilot. ATEX II 2 GDc, Ex emb IIC T4...T3 Gb IECEx Ex emb IIC T4...T3 Gb 3.6 Watt, Cv 3.0, 145 psi / 10 bar.
			<b>SPR-08-08-E5-52-XX-00-V-77A-24D-30</b>	ATEX II 2 GD, Ex d IIC T4 / T5 / T6 IECEx Ex d IIC T4 / T5 / T6 3.0 Watt, Cv 3.0, 145 psi / 10 bar.
			<b>SPR-08-08-E5-52-XX-00-V-78A-260</b>	ATEX II 1 GD, Ex ia IIC T4 / T6 Ga IECEx Ex ia IIC T4 / T6 Ga †

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# Overview

## Materials of Construction

Standard and Slimline Solenoid enclosures and valves are manufactured from 316L stainless steel as standard with aluminium options also available. Valve seals are supplied in Viton as standard. Alternative elastomers available for extreme conditions and to suit media. Springs are manufactured from 302S26 & 316S42 stainless steel as standard. Fasteners are metric A4 18/10 grade stainless steel; equivalent to 316L grade stainless steel.

## Technical Data

### Operating Performance for FP06P, FP10P, FP12P, BXS & SPR

Duty cycle 100% continuously rated/energised.  
 Surge suppression diode is fitted on all Ex d DC solenoid coils as standard.  
 Response times - pull in <100ms, drop out <70ms.  
 Solenoid Insulation - Class H.  
 Pull-in volts to 85% of nominal. (Checked at FAT to be within specified limits to guarantee safety factors).  
 Maximum volts at 110% of nominal.  
 Drop-out volts typically 10 - 20% of nominal (higher Volt options for line monitoring). (Checked at FAT to be within specified limits to guarantee safety factors).  
 Temperature rating -20°C to upper limit of solenoid classification (standard). Arctic service option to -60°C.  
 IP66 & IP67 Ingress Protection to IEC 60529 and NEMA 4X for standard 7 series solenoid enclosures.  
 Bifold solenoid valves must be installed, operated and maintained in accordance with the relevant Bifold installation, operating and maintenance instructions, relevant installation rules, regulations and codes of practice.

## Product Options

Certification & Approval options available for standard 2 & 7 series solenoid enclosure



Certification & Approval options available for slimline 5 series solenoid enclosure



SIL 3 capability: The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3 in accordance with IEC 61508. (For the FP06P, FP10P, BXS & SPR only).

The type 77 Ex d solenoid enclosure has been designed with 'spigot' and 'threaded' type flamepath joints, therefore the minimum spacing requirements for obstruction effects of 'flange' joints in accordance with IEC/BS EN 60079-14 Explosive atmospheres: Electrical installations design, selection and erection regarding the installation of the solenoid enclosure and its proximity with other objects is not applicable.

Solenoid valve assemblies can be mounted in any orientation. Solenoid enclosure can be rotated relative to the pilot stage valve body to suit cable entry.

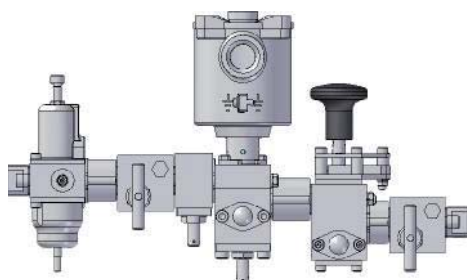
Working pressure up to 508 psi / 35 bar. Maximum working pressure according to valve model.

Operating media - Filtered lubricated or unlubricated air, inert gas, sweet (natural) and sour gas options, water, water glycol mixtures and mineral oil. Maximum viscosity 65 cSt (mm<sup>2</sup>/s).

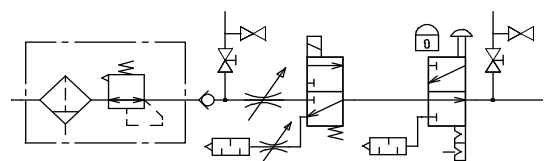
For operating temperature range, please see solenoid valve type and seal options.

Higher voltage options available for line monitoring.

Manual Reset, Manual Override and Manual Latch operator options.



Typical 'AXIS' valve actuator control modular system



These products can be incorporated within our 'AXIS' valve actuator control modular systems.

## Certification Details

### Certification & Approval Details

#### Type 74AT4 Standard Solenoid Enclosure

ATEX, Certificate Number Baseefa 09ATEX0040X.  
 II 2 GD c Ex emb IIC T3 Gb Tamb -25°C to +40°C. \*  
 II 2 GD c Ex emb IIC T4 Gb Tamb -25°C to +50°C. \*\*  
 II 2 GD c Ex emb IIC T3 Gb Tamb -25°C to +55°C. \*\*\*

Dual Labelled/Marked

IECEx, Certificate Number IECEx Bas 09.0012X.  
 Ex emb IIC T3 Gb Tamb -25°C to +40°C. \*  
 Ex emb IIC T4 Gb Tamb -25°C to +50°C. \*\*  
 Ex emb IIC T3 Gb Tamb -25°C to +55°C. \*\*\*

#### Type 27 Standard Solenoid - Aluminium Enclosure

ATEX, Certificate Number Baseefa 10ATEX0026.  
 II 2 GD Ex d IIC T6 (Tamb -40°C to +40°C).  
 II 2 GD Ex d IIC T5 (Tamb -40°C to +55°C).  
 II 2 GD Ex d IIC T4 (Tamb -40°C to +90°C).

Dual Labelled/Marked

IECEx, Certificate Number IECEx Bas 09.0012X.  
 Ex d IIC T6 (Tamb -40°C to +40°C).  
 Ex d IIC T5 (Tamb -40°C to +55°C).  
 Ex d IIC T4 (Tamb -40°C to +90°C).

#### Type 77 Standard Solenoid Enclosure

ATEX, Certificate Number Baseefa 10ATEX0026.  
 II 2 GD Ex d IIC T6 (Tamb -60°C to +40°C).  
 II 2 GD Ex d IIC T5 (Tamb -60°C to +55°C).  
 II 2 GD Ex d IIC T4 (Tamb -60°C to +90°C).

Dual Labelled/Marked

IECEx, Certificate Number IECEx Bas 10.0008.  
 Ex d IIC T6 (Tamb -60°C to +40°C).  
 Ex d IIC T5 (Tamb -60°C to +55°C).  
 Ex d IIC T4 (Tamb -60°C to +90°C).

#### Type 77 Standard Solenoid Enclosure

CSA (US), Certificate Number 1398692  
 Class I, Division I, Groups B, C & D for both  
 Canada & USA.  
 Ex d IIC for Canada, AEx d IIC for USA.  
 T85°C -60°C to +40°C ambient.  
 T100°C -60°C to +55°C ambient.  
 T135°C -60°C to +90°C ambient.

Dual Labelled/Marked

#### Type 77 Standard Solenoid Enclosure

ATEX, Certificate Number Baseefa 10ATEX0026.  
 II 2 GD Ex d IIC T6 (Tamb -60°C to +40°C).  
 II 2 GD Ex d IIC T5 (Tamb -60°C to +55°C).  
 II 2 GD Ex d IIC T4 (Tamb -60°C to +90°C).

#### Type 27 Standard Solenoid - Aluminium Enclosure

NEPSI, Certificate Number GYJ14.1042X  
 Ex d IIC T6 up to 40°C ambient.  
 Ex d IIC T5 up to 55°C ambient.  
 Ex d IIC T4 up to 95°C ambient.

Dual Labelled/Marked

IECEx, Certificate Number IECEx Bas 09.0012X.  
 Ex d IIC T6 (Tamb -40°C to +40°C).  
 Ex d IIC T5 (Tamb -40°C to +55°C).  
 Ex d IIC T4 (Tamb -40°C to +90°C).

#### Type 77 Standard Solenoid Enclosure

NEPSI, Certificate Number GYJ14.1042X  
 Ex d IIC T6 up to 40°C ambient.  
 Ex d IIC T5 up to 55°C ambient.  
 Ex d IIC T4 up to 95°C ambient.

Dual Labelled/Marked

IECEx, Certificate Number IECEx Bas 10.0008.  
 Ex d IIC T6 (Tamb -60°C to +40°C).  
 Ex d IIC T5 (Tamb -60°C to +55°C).  
 Ex d IIC T4 (Tamb -60°C to +90°C).

#### Type 77 Standard Solenoid Enclosure

INMETRO, Certificate Number CEPEL-EX-097/2003X.  
 BR-Ex d IIC T6 -60°C to +40°C ambient.  
 BR-Ex d IIC T5 -60°C to +55°C ambient.  
 BR-Ex d IIC T4 -60°C to +90°C ambient.

Dual Labelled/Marked

IECEx, Certificate Number IECEx Bas 10.0008.  
 Ex d IIC T6 (Tamb -60°C to +40°C).  
 Ex d IIC T5 (Tamb -60°C to +55°C).  
 Ex d IIC T4 (Tamb -60°C to +90°C).

#### Type 77 Standard Solenoid Enclosure

GOST, Certificate Number B00763, RTN.  
 IEx d IIC T6 -60°C to +40°C ambient.  
 IEx d IIC T5 -60°C to +55°C ambient.  
 IEx d IIC T4 -60°C to +90°C ambient.

Dual Labelled/Marked

IECEx, Certificate Number IECEx Bas 10.0008.  
 Ex d IIC T6 (Tamb -60°C to +40°C).  
 Ex d IIC T5 (Tamb -60°C to +55°C).  
 Ex d IIC T4 (Tamb -60°C to +90°C).

#### Type 77 Standard Solenoid Enclosure

KTL, Certificate Number 12-KB4BO-0213  
 Ex d IIC T6 -60°C to +40°C ambient.  
 Ex d IIC T5 -60°C to +55°C ambient.  
 Ex d IIC T4 -60°C to +90°C ambient.

Dual Labelled/Marked

IECEx, Certificate Number IECEx Bas 10.0008.  
 Ex d IIC T6 (Tamb -60°C to +40°C).  
 Ex d IIC T5 (Tamb -60°C to +55°C).  
 Ex d IIC T4 (Tamb -60°C to +90°C).

Please note that operation ambients are dependent upon seal types.  
 For solenoid type 74AT4, the maximum permissible ambient temperature is subject to the coil wattage. Please see page 19.

\* Powers up to 6.8W  
 \*\* Powers up to 4.0W  
 \*\*\* Powers up to 1.8W

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Certification Details

Certification & Approval Details

**Type 28 Standard Solenoid - Aluminium Enclosure**

ATEX, Certificate Number Baseefa 02ATEX0124X.  
 Ⓢ II I GD Ex ia IIC T6 Ga (Tamb = -60°C to +60°C).  
 Ⓢ II I GD Ex ia IIC T4 Ga (Tamb = -60°C to +95°C).

IECEx, Certificate Number IECEx Bas 09.0092X.  
 Ex ia IIC T6 Ga (Tamb = -60°C to +60°C).  
 Ex ia IIC T4 Ga (Tamb = -60°C to +95°C).

Dual Labelled/Marked

**Type 58 Slimline Solenoid Enclosure**

ATEX, Certificate Number Baseefa 08ATEX0292X.  
 Ⓢ II IG Ex ia IIC T6 Ga (-40°C ≤ Ta ≤ +60°C).

IECEx, Certificate Number IECEx Bas 08.0095X.  
 Ex ia IIC T6 Ga (-40°C ≤ Ta ≤ +60°C).

Dual Labelled/Marked

**Type 78 Standard Solenoid Enclosure**

ATEX, Certificate Number Baseefa 02ATEX0124X.  
 Ⓢ II I GD Ex ia IIC T6 Ga (Tamb = -60°C to +60°C).  
 Ⓢ II I GD Ex ia IIC T4 Ga (Tamb = -60°C to +95°C).

IECEx, Certificate Number IECEx Bas 09.0092X.  
 Ex ia IIC T6 Ga (Tamb = -60°C to +60°C).  
 Ex ia IIC T4 Ga (Tamb = -60°C to +95°C).

Dual Labelled/Marked

**Type 28 Standard Solenoid Enclosure - Aluminium Enclosure**

EAC, Certificate Number B00293, RTN.  
 0Ex ia IIC T6 -60°C to +60°C ambient.  
 0Ex ia IIC T4 -60°C to +95°C ambient.

IECEx, Certificate Number IECEx Bas 09.0092X.  
 Ex ia IIC T6 Ga (Tamb = -60°C to +60°C).  
 Ex ia IIC T4 Ga (Tamb = -60°C to +95°C).

Dual Labelled/Marked

**Type 58 Slimline Solenoid Enclosure**

EAC, Certificate Number B00315, RTN Permit Number PPC 00-0481 I2  
 0Ex ia IIC T6 -40°C to +40°C ambient.  
 0Ex ia IIC T5 -40°C to +55°C ambient.  
 0Ex ia IIC T4 -40°C to +60°C ambient.

IECEx, Certificate Number IECEx Bas 08.0095X.  
 Ex ia IIC T6 Ga (-40°C ≤ Ta ≤ +60°C).

Dual Labelled/Marked

**Type 78 Standard Solenoid Enclosure**

EAC, Certificate Number B00293, RTN.  
 0Ex ia IIC T6 -60°C to +60°C ambient.  
 0Ex ia IIC T4 -60°C to +95°C ambient.

IECEx, Certificate Number IECEx Bas 09.0092X.  
 Ex ia IIC T6 Ga (Tamb = -60°C to +60°C).  
 Ex ia IIC T4 Ga (Tamb = -60°C to +95°C).

Dual Labelled/Marked

**Type 58 Slimline Solenoid Enclosure**

INMETRO, Certificate Number CEPEL 12.2125X.  
 BR-Ex ia IIB T6 -40°C to +60°C ambient.

IECEx, Certificate Number IECEx Bas 08.0095X.  
 Ex ia IIC T6 Ga (-40°C ≤ Ta ≤ +60°C).

Dual Labelled/Marked

**Type 78 Standard Solenoid Enclosure**

INMETRO, Certificate Number CEPEL-EX-532/05.  
 BR-Ex ia IIC T6 -60°C to + 40°C ambient.  
 BR-Ex ia IIC T4 -60°C to + 95°C ambient.

IECEx, Certificate Number IECEx Bas 09.0092X.  
 Ex ia IIC T6 Ga (Tamb = -60°C to +60°C).  
 Ex ia IIC T4 Ga (Tamb = -60°C to +95°C).

Dual Labelled/Marked

**Type 28 Standard Solenoid - Aluminium Enclosure**

NEPSI, Certificate Number GYJ14.1042X  
 0Ex ia IIC T6 -60°C to +60°C ambient.  
 0Ex ia IIC T4 -60°C to +95°C ambient.

IECEx, Certificate Number IECEx Bas 09.0092X.  
 Ex ia IIC T6 Ga (Tamb = -60°C to +60°C).  
 Ex ia IIC T4 Ga (Tamb = -60°C to +95°C).

Dual Labelled/Marked

**Type 58 Slimline Solenoid Enclosure**

NEPSI, Certificate Number GYJ14.1314X.  
 BR-Ex ia IIB T6 -40°C to +60°C ambient.

IECEx, Certificate Number IECEx Bas 08.0095X.  
 Ex ia IIC T6 Ga (-40°C ≤ Ta ≤ +60°C).

Dual Labelled/Marked

Please note that operation ambients are dependent upon seal types.

## Certification Details

### Certification & Approval Details

#### Type 78 Standard Solenoid Enclosure



NEPSI, Certificate Number GYJ14.1043.  
Ex ia IIC T6 -60°C to + 40°C ambient.  
Ex ia IIC T4 -60°C to + 95°C ambient.



IECEX, Certificate Number IECEX Bas 09.0092X.  
Ex ia IIC T6 Ga (Tamb = -60°C to +60°C).  
Ex ia IIC T4 Ga (Tamb = -60°C to +95°C).

Dual Labelled/Marked

#### Label Rationalisation

The temperature details on our solenoid valve labels have, to date, been laid out with a single ambient range and 'T' rating, as follows :-

77A3 - T4 (-60°C ≤ Tamb ≤ +90°C)  
or 77A6 - T5 (-60°C ≤ Tamb ≤ +55°C)  
or 77A9 - T6 (-60°C ≤ Tamb ≤ +40°C)

The labels are in the process of being replaced with a single label which covers all potential temperature parameters. Therefore, the label will for example, read as follows :-

77A { T4 (-60°C ≤ Tamb ≤ +90°C)  
T5 (-60°C ≤ Tamb ≤ +55°C)  
T6 (-60°C ≤ Tamb ≤ +40°C) }

Please note that operation ambients are dependent upon seal types.

## Port Connections

### Port Connections for 3/2 (FP06P, FP10P, FP12P, BXS & SPR)

PORT CONNECTIONS TABLE			
Configuration	Pressure	Service	Vent
Normally Closed	1	2	3
Normally Open	3	2	1

For port connections, please refer to selection chart ordering example on pages 24, 25, 26, 27, 28, 29, 30, 33 & 35.

## Solenoid Coil Spare

### Solenoid Coil Spare Selection Chart Ordering Example Type 74AT4, 27 & 77

109		Coil Type
XXX Voltage	74AT4 (Ex emb)	24 & 48 Vdc
	27 (Ex d)	12, 24, 48 & 110 Vdc
	27 (Ex d)	110 & 240Vac
	27 (Ex d)	50 & 60 Hz
	77 (Ex d)	12, 24, 48 & 110 Vdc
XX Power (W)	74AT4 (Ex emb)	1.8, 3.6, 4.4 & 6.8Watts
	27 (Ex d)	1.8, 3.0, 3.5, 5.7 & 6.5Watts
	77 (Ex d)	1.8, 3.0, 3.5, 5.7, 6.5 & 12Watts
109-XXX-XX		Ordering Example

For solenoid operator Type 27 & 77 (Ex d) Vdc & Vac, the coil spare ordering examples are shown below:-

109-110DC-57  
109-110AC-57

## Type MK3

### Type MK3 Terminal Block

The type MK3 terminal block can accommodate solid conductors between the range of 0.5mm<sup>2</sup> to 2.5mm<sup>2</sup> and flexible conductors between the range of 0.5mm<sup>2</sup> to 1.5mm<sup>2</sup>.

## Port Connections



### Port Connections for 5/2 & 5/3 (BXS), & 5/2 (SPR)

PORT CONNECTIONS TABLE			
Configuration	Pressure	Service	Vent
XX	1	2 & 4	3 & 5
YY	1	2 & 4	3 & 5
ZZ	1	2 & 4	3 & 5

For port connections, please refer to selection chart ordering example on pages 31, 32, 34 & 36.

## Solenoid Coil Spare

### Solenoid Coil Spare Selection Chart Ordering Example Type 58

58		Coil Type
135 Resistance (Ω)	58 (Ex ia)	135 Ohms
		Resistance †
58 - 135		Ordering Example

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.

## Solenoid Coil Spare

### Solenoid Coil Spare Selection Chart Ordering Example Type 28 & 78











109		Coil Type
12 Nominal Voltage	28 & 78 (Ex ia)	12 V
		Nominal Voltage
260 Resistance (Ω)	28 & 78 (Ex ia)	260 Ohms
		Resistance †
109-12-260		Ordering Example

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.



Ex emb Options

Options Table I 74AT4 (Ex emb)

SOLENOID OPTIONS TABLE I 74AT4 (Ex emb)									
Product Type	Solenoid Order Code	Typical Apparatus Code	Standard Voltage	Power Consumption (W)	CV Rate	Temperature Range (°C)	Ingress Protection	Cable Entry Connection	Certification Options
 FP06P	74AT4	Ex emb II T3 / T4	24 Vdc 48 Vdc	3.6 4.4 6.8 1.8 (Manual Latch) 3.6 (Manual Latch)	0.35 0.6 1.0 1.0 1.0	<b>Media #</b> -20°C to +90°C -55°C to +90°C <b>Ambient</b> -25°C to +55°C (T3) (3.0W & Below) -25°C to +50°C (T3 & T4) (4.0W & Below) -25°C to +40°C (T3) (6.8W & Below)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	
 FP10P	74AT4	Ex emb II T3 / T4	24 Vdc 48 Vdc	3.6 4.4 6.8	0.35 0.6 1.0	<b>Media #</b> -20°C to +90°C -55°C to +90°C <b>Ambient</b> -25°C to +55°C (T3) (3.0W & Below) -25°C to +50°C (T3 & T4) (4.0W & Below) -25°C to +40°C (T3) (6.8W & Below)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	
 BXS	74AT4	Ex emb II T3 / T4	24 Vdc 48 Vdc	3.6	0.73	<b>Media #</b> -15°C to +130°C -55°C to +130°C <b>Ambient</b> -25°C to +55°C (T3) (3.0W & Below) -25°C to +50°C (T3 & T4) (4.0W & Below) -25°C to +40°C (T3) (6.8W & Below)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	
 SPR-08	74AT4	Ex emb II T3 / T4	24 Vdc 48 Vdc	3.6	3.0	<b>Media #</b> -20°C to +100°C -60°C to +100°C <b>Ambient</b> -25°C to +55°C (T3) (3.0W & Below) -25°C to +50°C (T3 & T4) (4.0W & Below) -25°C to +40°C (T3) (6.8W & Below)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	
 SPR-16	74AT4	Ex emb II T3 / T4	24 Vdc 48 Vdc	3.6	11.1	<b>Media #</b> -20°C to +120°C -60°C to +90°C <b>Ambient</b> -25°C to +55°C (T3) (3.0W & Below) -25°C to +50°C (T3 & T4) (4.0W & Below) -25°C to +40°C (T3) (6.8W & Below)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	

For detailed information on certification, please see page 16.

Other Wattages available upon request.

# Permissible media operating temperatures are dependent upon the selected O-Ring material. Please refer to the product selection charts on pages 24, 26, 28 & 30 to 36.




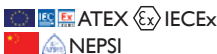
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Ex d Options

Options Table 2 27 (Ex d)

STANDARD SOLENOID OPTIONS TABLE 2 27 (Ex d)									
Product Type	Solenoid Order Code	Typical Apparatus Code	Standard Voltage	Power Consumption (W)	CV Rate	Temperature Range (°C)	Ingress Protection	Cable Entry Connection	Certification Options
 <p>FP06P Aluminium Enclosure 316L Stainless Steel Body</p>	27	Ex d IIC T6, T5 or T4	12 Vdc 24 Vdc 48 Vdc 110 Vdc  110 Vac 240 Vac 50 or 60 Hz	3.5 (Manual Stayput) 5.7  6.5  3.0 (Manual Latch)	0.6  1.0  1.0  1.0	<b>Media #</b> -20°C to +90°C -55°C to +90°C  <b>Ambient</b> -60°C to +40°C (T6) -60°C to +55°C (T5) -60°C to +90°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (½" NPT Option)	
 <p>BXS Aluminium Enclosure 316L Stainless Steel Body</p>	27	Ex d IIC T6, T5 or T4	12 Vdc 24 Vdc 48 Vdc 110 Vdc  110 Vac 240 Vac 50 or 60 Hz	1.8  3.0	0.73	<b>Media #</b> -15°C to +130°C -55°C to +130°C  <b>Ambient</b> -60°C to +40°C (T6) -60°C to +55°C (T5) -60°C to +90°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (½" NPT Option)	

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Other wattages available upon request.

# Permissible media operating temperatures are dependent upon the selected O-Ring material. Please refer to the product selection charts on pages 24, 26 & 30 to 32.

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Ex d Options

Options Table 3 77 (Ex d)

STANDARD SOLENOID OPTIONS TABLE 3 77 (Ex d)

Product Type	Solenoid Order Code	Typical Apparatus Code	Standard Voltage	Power Consumption (W)	CV Rate	Temperature Range (°C)	Ingress Protection	Cable Entry Connection	Certification Options
 FP06P	77	Ex d IIC T6, T5 or T4	12 Vdc 24 Vdc 48 Vdc 110 Vdc  110 Vac 240 Vac 50 or 60 Hz	3.5 (Manual Stayput) 5.7  6.5  3.0 (Manual Latch)	0.6  1.0  1.0  1.0	<b>Media #</b> -20°C to +90°C -55°C to +90°C  <b>Ambient</b> -60°C to +40°C (T6) -60°C to +55°C (T5) -60°C to +90°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	
 FP10P	77	Ex d IIC T6, T5 or T4	12 Vdc 24 Vdc 48 Vdc 110 Vdc  110 Vac 240 Vac 50 or 60 Hz	3.5 (Manual Stayput) 5.7  6.5  3.0 (Manual Latch)	0.6  1.0  1.0  1.0	<b>Media #</b> -20°C to +90°C -55°C to +90°C  <b>Ambient</b> -60°C to +40°C (T6) -60°C to +55°C (T5) -60°C to +90°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	
 FP12P	77	Ex d IIC T6, T5 or T4	12 Vdc 24 Vdc 48 Vdc 110 Vdc  110 Vac 240 Vac 50 or 60 Hz	6.5 (Manual Latch)  12.0	2.5	<b>Media #</b> -15°C to +90°C -30°C to +90°C  <b>Ambient</b> -60°C to +40°C (T6) -60°C to +55°C (T5) -60°C to +90°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	
 BXS	77	Ex d IIC T6, T5 or T4	12 Vdc 24 Vdc 48 Vdc 110 Vdc  110 Vac 240 Vac 50 or 60 Hz	1.8  3.0	0.73	<b>Media #</b> -15°C to +130°C -55°C to +130°C  <b>Ambient</b> -60°C to +40°C (T6) -60°C to +55°C (T5) -60°C to +90°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	
 SPR-08	77	Ex d IIC T6, T5 or T4	12 Vdc 24 Vdc 48 Vdc 110 Vdc  110 Vac 240 Vac 50 or 60 Hz	1.8  3.0	3.0	<b>Media #</b> -20°C to +100°C -60°C to +100°C  <b>Ambient</b> -60°C to +40°C (T6) -60°C to +55°C (T5) -60°C to +90°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	
 SPR-16	77	Ex d IIC T6, T5 or T4	12 Vdc 24 Vdc 48 Vdc 110 Vdc  110 Vac 240 Vac 50 or 60 Hz	1.8  3.0	11.1	<b>Media #</b> -20°C to +120°C -60°C to +90°C  <b>Ambient</b> -60°C to +40°C (T6) -60°C to +55°C (T5) -60°C to +90°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	

For detailed information on certification please see page 16.

Other wattages available upon request.

# Permissible media operating temperatures are dependent upon the selected O-Ring material. Please refer to the product selection charts on pages 24, 26 & 28 to 36.



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Ex ia Options

Options Table 4 58 (Ex ia)

SLIMLINE SOLENOID OPTIONS TABLE 4 58 (Ex ia)								
Product Type	Solenoid Order Code	Typical Apparatus Code	Resistance (Ohms)	CV Rate	Temperature Range (°C)	Ingress Protection	Cable Entry Connection	Certification Options
 FP06P	58 †	Ex ia IIC T6	135	0.35	<b>Media #</b> -20°C to +90°C -55°C to +90°C <b>Ambient</b> -40°C to +60°C (T6)	IP66	M20 x 1.5	









For detailed information on certification, please see page 17.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.

# Permissible media operating temperatures are dependent upon the selected O-Ring material. Please refer to the product selection chart on pages 25 & 27.

Ex ia Options

Options Table 5 28 & 78 (Ex ia)

STANDARD SOLENOID OPTIONS TABLE 5 28 & 78 (Ex ia)								
Product Type	Solenoid Order Code	Typical Apparatus Code	Resistance (Ohms)	CV Rate	Temperature Range (°C)	Ingress Protection	Cable Entry Connection	Certification Options
 BXS Aluminium Enclosure 316L Stainless Steel Body	28 †	Ex ia IIC T6 or T4	260	0.73	<b>Media #</b> -15°C to +130°C -55°C to +130°C <b>Ambient</b> -60°C to +60°C (T6) -60°C to +95°C (T4)	IP66	M20 x 1.5	
 BXS	78 †	Ex ia IIC T6 or T4	260	0.73	<b>Media #</b> -15°C to +130°C -55°C to +130°C <b>Ambient</b> -60°C to +60°C (T6) -60°C to +95°C (T4)	IP66	M20 x 1.5	
 SPR-08	78 †	Ex ia IIC T6 or T4	260	3.0	<b>Media #</b> -20°C to +95°C -60°C to +95°C <b>Ambient</b> -60°C to +60°C (T6) -60°C to +95°C (T4)	IP66	M20 x 1.5	
 SPR-16	78 †	Ex ia IIC T6 or T4	260	11.1	<b>Media #</b> -20°C to +120°C -60°C to +90°C <b>Ambient</b> -60°C to +60°C (T6) -60°C to +95°C (T4)	IP66	M20 x 1.5	

For detailed information on certification, please see pages 17 & 18.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.

# Permissible media operating temperatures are dependent upon the selected O-Ring material. Please refer to the product selection charts on pages 30 to 36.

Safety Parameters: Type 58

U<sub>i</sub> = 35V dc, I<sub>i</sub> = 600 mA, P<sub>i</sub> = 3W, C<sub>i</sub> = 0 µF, L<sub>i</sub> = 0 mH  
Coil Resistance : 135 Ohm ± 5%  
Minimum Current @ solenoid coil = 80 mA

Safety parameters applicable to table 4.

Safety Parameters: Type 28 & 78

U<sub>i</sub> = 31V, I<sub>i</sub> = 210 mA, P<sub>i</sub> = 1.5W, C<sub>i</sub> = 0 µF, L<sub>i</sub> = 0 mH  
Coil Resistance : 260 Ohm ± 5%  
Minimum Current @ solenoid coil = 45 mA

Safety parameters applicable to table 5.

# FP06P 3/2 Standard Solenoid Valve Range Selection Chart

**FP06P 3/2**

For a dimensional drawing of this product please see page 38.



## FP06P Selection Chart - Ordering Example

FP06P			Model Code
<b>S1</b>	145 psi / 10 bar Maximum Valve Pressure		Operator
<b>S2</b>	232 psi / 16 bar Maximum Valve Pressure (For AC Coils = 6.5 Watts)		
<b>04</b>	1/4" Body Ported (Stainless Steel)		Connections
<b>A04</b>	1/4" Body Ported (Aluminium) (Option only available with the type 27 Ex d solenoid)		
<b>32</b>	3 Way 2 Position		Valve Configuration
<b>NU</b>	Normally Universal (for the port connections table, please refer to page 19)		Valve Configuration
<b>S</b>	Nitrile (-20°C to +130°C)	For maximum operating temperatures see 'T' Rating	O-ring Material
<b>SA</b>	Nitrile (Low Temperature) (-25°C to +130°C)	Limitations for Ex emb &	
<b>V</b>	Viton (standard) (-20°C to +90°C)	Ex d on pages 20, 21 & 22	
<b>AL</b>	Flourosilicone (-55°C to +90°C)		
<b>XX</b>	Refer to Solenoid options tables	74AT4 (Ex emb) Page 20 - Table 1 (For the 74AT4 option only please go straight to voltage) 27 & 77 (Ex d) Pages 21 & 22 - Tables 2 & 3	Solenoid**
<b>A</b>	ATEX/IECEX Dual Certified/Labelled	74AT4 (Ex emb) ✓	Solenoid Approval
<b>G</b>	GOST/IECEX Dual Certified/Labelled	27 & 77(Ex d) ✓ (77 Only)	
<b>I</b>	INMETRO/IECEX Dual Certified/Labelled	74AT4 (Ex emb) X	
<b>N</b>	NEPSI/IECEX Dual Certified/Labelled	27 & 77(Ex d) ✓ (77 Only)	
<b>U</b>	CSA (US)/ATEX Dual Certified/Labelled	74AT4 (Ex emb) X	
<b>K</b>	KTL/IECEX Dual Certified/Labelled	27 & 77(Ex d) ✓ (77 Only)	
<b>XXX</b>	Voltage, refer to Solenoid option tables	74AT4 (Ex emb) Page 20 - Table 1 27 & 77 (Ex d) Pages 21 & 22 - Tables 2 & 3	Voltage
<b>M</b>	Electrical to switch or temporary manual override		Options
<b>ML</b>	Electrical and manual required to switch or temporary manual override (3.0 Watts Ex d only)		
<b>MLT</b>	Electrical and manual required to latch - tamperproof		
<b>MOR</b>	Electrical to switch or stayput manual override		
<b>LE</b>	Latched Energised (Only available as NU on S1 option, LE only available as NO, 6.5 Watts, Ex d (77) on S2 option)		
<b>XX</b>	Power (W)	74AT4 (Ex emb) 1.8, 3.6, 4.4 & 6.8 Watts Page 20 - Table 1 27 & 77 (Ex d) 3.0, 3.5, 5.7 & 6.5 Watts Pages 21 & 22 - Tables 2 & 3	Power
<b>NO LETTER</b>	M20 x 1.5 Cable Entry		Cable Entry
<b>K85</b>	1/2" NPT Cable Entry		
<b>NO LETTER</b>	NPT Ports		Option
<b>K6</b>	BSPP Ports		
<b>FP06P-S1-04-32-NU - V - 77 A-24D-ML - 30-K85 - K6</b>			Ordering Example

Bespoke configured datasheets are available for specific model numbers, please contact Bifold for more information.

For the shaded block sections, please refer to the same shaded sections on pages 20, 21 & 22.

\*\* Special conditions for safe use Type 74AT4 - The supply circuit shall be fitted with a fuse capable of meeting a 1500 Amp short circuit current. Must be compliant with Special Conditions for Safe Use as defined in EC Type Examination Certificate Sira01ATEX3248U.

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FP06P 3/2

For a dimensional drawing of this product please see page 38.



FP06P Selection Chart - Ordering Example

<b>FP06P</b>			Model Code
<b>SI</b>	145 psi / 10 bar Maximum Valve Pressure		Operator
<b>04</b>	1/4" Body Ported (Stainless Steel)		Connections
<b>32</b>	3 Way 2 Position		Valve Configuration
<b>NU</b>	Normally Universal (for the port connections table, please refer to page 19)		Valve Configuration
<b>S</b>	Nitrile	(-20°C to +130°C)	O-ring Material
<b>SA</b>	Nitrile (Low Temperature)	(-25°C to +130°C)	
<b>V</b>	Viton (standard)	(-20°C to +90°C)	
<b>AL</b>	Flourosilicone	(-55°C to +90°C)	
<b>XX</b>	Refer to Solenoid options tables 58 (Ex ia) Page 23 - Table 4		Solenoid
<b>A</b>	ATEX/IECEX Dual Certified/Labelled		Solenoid Approval
<b>G</b>	EAC/IECEX Dual Certified/Labelled		
<b>I</b>	INMETRO/IECEX Dual Certified/Labelled		
<b>N</b>	NEPSI/IECEX Dual Certified/Labelled		
<b>U</b>	CSA (US)/ATEX Dual Certified/Labelled		
<b>K</b>	KTL/IECEX Dual Certified/Labelled		
<b>M</b>	Electrical to switch or temporary manual override		Options
<b>ML</b>	Electrical and manual required to switch or temporary manual override		
<b>XX</b>	Resistance (Ω)	58 (Ex ia) - 135 Ohms Page 23 - Table 4	Resistance †
<b>NO LETTER</b>	M20 x 1.5 Cable Entry		Cable Entry
<b>K85</b>	1/2" NPT Cable Entry		
<b>NO LETTER</b>	NPT Ports		Option
<b>K6</b>	BSPP Ports		

**FP06P-SI-04-32-NU - V - 58 A - M - I35-K85 - K6** Ordering Example

Bespoke configured datasheets are available for specific model numbers, please contact Bifold for more information.

For the shaded block section, please refer to the same shaded section on page 23.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.

**FP06P 3/2 NAMUR**

For a dimensional drawing of this product please see page 38.



**FP06P NAMUR Selection Chart - Ordering Example**

<b>FP06P</b>			Model Code
<b>SI</b>	145 psi / 10 bar Maximum Valve Pressure		Operator
<b>N4</b>	1/4" Body Ported Right Hand Feed (Stainless Steel)		Connections
<b>AN4</b>	1/4" Body Ported Right Hand Feed (Aluminium) (Option only available with the type 27 Ex d solenoid)		
<b>NI4</b>	1/4" Body Ported Left Hand Feed (Stainless Steel)		
<b>ANI4</b>	1/4" Body Ported Left Hand Feed (Aluminium) (Option only available with the type 27 Ex d solenoid)		
<b>32</b>	3 Way 2 Position		Valve Configuration
<b>NC</b>	Normally Closed (for the port connections table, please refer to page 19)		Valve Configuration
<b>S</b>	Nitrile	(-20°C to +130°C)	O-ring Material
<b>SA</b>	Nitrile (Low Temperature)	(-25°C to +130°C)	
<b>V</b>	Viton (standard)	(-20°C to +90°C)	
<b>AL</b>	Flourosilicone	(-55°C to +90°C)	
<b>XX</b>	Refer to Solenoid options tables	74AT4 (Ex emb) Page 20 - Table 1 (For the 74AT4 option only please go straight to voltage) 27 & 77 (Ex d) Pages 21 & 22 - Tables 2 & 3	Solenoid **
<b>A</b>	ATEX/IECEX Dual Certified/Labelled	74AT4 (Ex emb) ✓	Solenoid Approval
<b>G</b>	GOST/IECEX Dual Certified/Labelled	27 & 77 (Ex d) ✓ (77 Only)	
<b>I</b>	INMETRO/IECEX Dual Certified/Labelled	74AT4 (Ex emb) X	
<b>N</b>	NEPSI/IECEX Dual Certified/Labelled	27 & 77 (Ex d) ✓ (77 Only)	
<b>U</b>	CSA (US)/ATEX Dual Certified/Labelled	74AT4 (Ex emb) X	
<b>K</b>	KTL/IECEX Dual Certified/Labelled	27 & 77 (Ex d) ✓ (77 Only)	
<b>XXX</b>	Voltage, refer to Solenoid option tables	74AT4 (Ex emb) Page 20 - Table 1 27 & 77 (Ex d) Pages 21 & 22 - Tables 2 & 3	Voltage
<b>M</b>	Electrical to switch or temporary manual override		Options
<b>ML</b>	Electrical and manual required to switch or temporary manual override (3.0 Watts Ex d only)		
<b>MLT</b>	Electrical and manual required to latch - tamperproof		
<b>MOR</b>	Electrical to switch or stayput manual override		
<b>XX</b>	Power (W)	74AT4 (Ex emb) 1.8, 3.6, 4.4 & 6.8 Watts Page 20 - Table 1 27 & 77 (Ex d) 3.0, 3.5, 5.7 & 6.5 Watts Pages 21 & 22 - Tables 2 & 3	Power
<b>NO LETTER</b>	M20 x 1.5 Cable Entry		Cable Entry
<b>K85</b>	1/2" NPT Cable Entry		
<b>NO LETTER</b>	NPT Ports		Option
<b>K6</b>	BSPP Ports		

**FP06P-SI-NI4-32-NC - V - 77 A-24D-ML - 30-K85 - K6** Ordering Example

Bespoke configured datasheets are available for specific model numbers, please contact Bifold for more information.

For the shaded block sections, please refer to the same shaded sections on pages 20, 21 & 22.

\*\* Special conditions for safe use Type 74AT4 - The supply circuit shall be fitted with a fuse capable of meeting a 1500 Amp short circuit current. Must be compliant with Special Conditions for Safe Use as defined in EC Type Examination Certificate Sira01ATEX3248U.

**Note:**

All valves are supplied with a full set of mounting option and 3/2 configuration option interface blocks as standard, please see page 45.

**Accuracy of information**  
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FP06P 3/2 NAMUR

For a dimensional drawing of this product please see page 39.



FP06P NAMUR Selection Chart - Ordering Example

<b>FP06P</b>		Model Code
<b>SI</b>	145 psi / 10 bar Maximum Valve Pressure	Operator
<b>N4</b>	1/4" Body Ported Right Hand Feed (Stainless Steel)	Connections
<b>NI4</b>	1/4" Body Ported Left Hand Feed (Stainless Steel)	
<b>32</b>	3 Way 2 Position	Valve Configuration
<b>NC</b>	Normally Closed (for the port connections table, please refer to page 19)	Valve Configuration
<b>S</b>	Nitrile (-20°C to +130°C)	O-ring Material
<b>SA</b>	Nitrile (Low Temperature) (-25°C to +130°C)	
<b>V</b>	Viton (standard) (-20°C to +90°C)	
<b>AL</b>	Flourosilicone (-55°C to +90°C)	
<b>XX</b> Refer to Solenoid options tables 58 (Ex ia) Page 23 - Table 4		Solenoid
<b>A</b>	ATEX/IECEX Dual Certified/Labelled	58 (Ex ia) ✓
<b>G</b>	EAC/IECEX Dual Certified/Labelled	✓
<b>I</b>	INMETRO/IECEX Dual Certified/Labelled	✓
<b>N</b>	NEPSI/IECEX Dual Certified/Labelled	✓
<b>U</b>	CSA (US)/ATEX Dual Certified/Labelled	X
<b>K</b>	KTL/IECEX Dual Certified/Labelled	X
<b>M</b>	Electrical to switch or temporary manual override	Options
<b>ML</b>	Electrical and manual required to switch or temporary manual override	
<b>XX</b>	Resistance (Ω) 58 (Ex ia) - 135 Ohms Page 23 - Table 4	Resistance †
<b>NO LETTER</b>	M20 x 1.5 Cable Entry	Cable Entry
<b>K85</b>	1/2" NPT Cable Entry	
<b>NO LETTER</b>	NPT Ports	Option
<b>K6</b>	BSPF Ports	

**FP06P-SI-NI4-32-NC - V - 58 A - ML-135-K85 - K6** Ordering Example

Bespoke configured datasheets are available for specific model numbers, please contact Bifold for more information.

For the shaded block section, please refer to the same shaded section on page 23.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.

**Note:**

All valves are supplied with a full set of mounting option and 3/2 configuration option interface blocks as standard, please see page 45.

# FPI0P 3/2 Standard Solenoid Valve Range Selection Chart

**FPI0P 3/2**

For a dimensional drawing of this product please see page 39.



**Bifold**®

## FPI0P Selection Chart - Ordering Example

FPI0P			Model Code
<b>S1</b>	145 psi / 10 bar Maximum Valve Pressure		Operator
<b>S2</b>	232 psi / 16 bar Maximum Valve Pressure (For AC Coils = 6.5 Watts)		
<b>S3</b>	508 psi / 35 bar Maximum Valve Pressure - 1/4" Body Ported option only, 'V' Viton seal option only, typically 0.4 CV		
<b>04</b>	1/4" Body Ported (Stainless Steel)		Connections
<b>06</b>	3/8" Body Ported (Stainless Steel)		
<b>08</b>	1/2" Body Ported (Stainless Steel)		
<b>32</b>	3 Way 2 Position		Valve Configuration
<b>NU</b>	Normally Universal	(for the port connections table, please refer to page 19)	Valve Configuration
<b>S</b>	Nitrile	(-20°C to +90°C) For maximum operating	O-ring Material
<b>SA</b>	Nitrile (Low Temperature)	(-25°C to +130°C) temperatures see 'T' Rating	
<b>V</b>	Viton (Standard)	(-20°C to +90°C) Limitations for Ex emb	
<b>AL</b>	Fluorosilicone	(-55°C to +90°C) & Ex d on pages 20 & 22	
<b>XX</b>	Refer to Solenoid options tables	74AT4 (Ex emb) Page 20 - Table 1 77 (Ex d) Page 22 - Table 3	Solenoid **
<b>A</b>	ATEX/IECEX Dual Certified/Labelled	74AT4 (Ex emb) ✓	Solenoid Approval
<b>G</b>	GOST/IECEX Dual Certified/Labelled	77 (Ex d) ✓	
<b>I</b>	INMETRO/IECEX Dual Certified/Labelled	X	
<b>N</b>	NEPSI/IECEX Dual Certified/Labelled	X	
<b>U</b>	CSA (US)/ATEX Dual Certified/Labelled	X	
<b>K</b>	KTL/IECEX Dual Certified/Labelled	X	
<b>XXX</b>	Voltage, refer to Solenoid option tables	74AT4 (Ex emb) Page 20 - Table 1 77 (Ex d) Page 22 - Table 3	Voltage
<b>M</b>	Electrical to switch or temporary manual override		Options
<b>ML</b>	Electrical and manual required to switch or temporary manual override (3.0 Watts Ex d only)		
<b>MLT</b>	Electrical and manual required to latch - tamperproof		
<b>MOR</b>	Electrical to switch or stayput manual override		
<b>LE</b>	Latched Energised (Only available as NU on S1 option, LE only available as NO, 6.5 Watts, Ex d (77) on S2 option)		
<b>XX</b>	Power (W)	74AT4(Ex emb) 3.6, 4.4 & 6.8 Watts Page 20 - Table 1 77 (Ex d) 3.0, 3.5, 5.7 & 6.5 Watts Page 22 - Table 3	Power
<b>NO LETTER</b>	M20 x 1.5 Cable Entry		Cable Entry
<b>K85</b>	1/2" NPT Cable Entry		
<b>NO LETTER</b>	NPT Ports		Option
<b>K6</b>	BSPG Ports		

**FPI0P-S1-04-32-NU - V - 77 A - 24D-ML - 30-K85 - K6**

Ordering Example

Bespoke configured datasheets are available for specific model numbers, please contact Bifold for more information. For the shaded block sections, please refer to the same shaded sections on pages 20 & 22.

\*\* Special conditions for safe use Type 74AT4 - The supply circuit shall be fitted with a fuse capable of meeting a 1500 Amp short circuit current. Must be compliant with special conditions for safe use as defined in EC Type Examination Certificate Sira01ATEX3248U.

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## FPI2P 3/2

For a dimensional drawing of this product please see page 39.



### FPI2P Selection Chart - Ordering Example

<b>FPI2P</b>		Model Code
<b>SI</b>	145 psi / 10 bar Maximum Valve Pressure	Operator
<b>08</b>	1/2" Body Ported (Stainless Steel)	Connections
<b>32</b>	3 Way 2 Position	Valve Configuration
<b>NU</b>	Normally Universal (for the port connections table, please refer to page 19)	Valve Configuration
<b>S</b>	Nitrile (-15°C to +90°C)	O-ring Material
<b>SA</b>	Nitrile (Low Temperature) (-25°C to +130°C)	
<b>V</b>	Viton (Standard) (-15°C to +90°C)	
<b>AL</b>	Fluorosilicone (-30°C to +90°C)	
<b>XX</b>	Refer to Solenoid options tables 77 (Ex d) Page 22 - Table 3	Solenoid
<b>A</b>	ATEX/IECEX Dual Certified/Labelled	Solenoid Approval
<b>G</b>	GOST/IECEX Dual Certified/Labelled	
<b>I</b>	INMETRO/IECEX Dual Certified/Labelled	
<b>N</b>	NEPSI/IECEX Dual Certified/Labelled	
<b>U</b>	CSA (US)/ATEX Dual Certified/Labelled	
<b>K</b>	KTL/IECEX Dual Certified/Labelled	
<b>XXX</b>	Voltage, refer to Solenoid option tables 77 (Ex d) Page 22 - Table 3	Voltage
<b>M</b>	Electrical to switch or temporary manual override	Options
<b>ML</b>	Electrical and manual required to switch or temporary manual override (6.5 Watts Ex d only)	
<b>MLT</b>	Electrical and manual required to latch - tamperproof	
<b>MOR</b>	Electrical to switch or stayput manual override	
<b>XX</b>	Power (W) 77 (Ex d) 6.5 & 12.0 Watts Page 22 - Table 3	Power
<b>NO LETTER</b>	M20 x 1.5 Cable Entry	Cable Entry
<b>K85</b>	1/2" NPT Cable Entry	
<b>NO LETTER</b>	NPT Ports	Option
<b>K6</b>	BSPP Ports	

**FPI2P-SI-08-32-NU - V - 77 A - 24D-ML - 120-K85 - K6** Ordering Example

Bespoke configured datasheets are available for specific model numbers, please contact Bifold for more information. For the shaded block sections, please refer to the same shaded sections on page 22.



# BXS 3/2 Standard Solenoid Valve Range Selection Chart

**BXS-04 3/2**

For a dimensional drawing of this product please see page 40.



**Bifold**®

## BXS-04 Selection Chart - Ordering Example

<b>BXS-04</b>	1/4"		Model Code		
<b>04</b>	1/4" Body Ported (Stainless Steel)		Connections		
<b>A04</b>	1/4" Body Ported (Aluminium) (Option only available with the type 27 Ex d and type 28 Ex ia solenoids)				
<b>E1</b>	Auto Reset Internal Pilot		Primary Operator		
<b>E3</b>	Manual Override Internal Pilot (M)				
<b>E5</b>	Manual Reset Internal Pilot (ML)				
<b>E13</b>	Manual Reset Tamperproof Internal Pilot (MLT)				
<b>E15</b>	Manual Override Rotary Internal Pilot (MOR)				
<b>22</b>	2 Way 2 Position		Configuration		
<b>32</b>	3 Way 2 Position				
<b>NC</b>	Normally Closed	(for the port connections table, please refer to page 19)	Configuration		
<b>NO</b>	Normally Open				
<b>00</b>	Spring Return		Secondary Operator		
<b>02</b>	Spring Return + Plunger				
<b>E1</b>	Auto Reset Internal Pilot				
<b>E3</b>	Manual Override Internal Pilot (M)				
<b>E5</b>	Manual Reset Internal Pilot (ML)				
<b>E13</b>	Manual Reset Tamperproof Internal Pilot (MLT)				
<b>E15</b>	Manual Override Rotary Internal Pilot (MOR)				
<b>SA</b>	Nitrile (Low Temperature)	(-25°C to +130°C)	O-ring Material		
<b>V</b>	Viton (Standard)	(-15°C to +130°C)			
<b>AL</b>	Fluorosilicone	(-55°C to +130°C)			
<b>XX</b>	Refer to Solenoid options tables	74AT4 (Ex emb) 27 & 77 (Ex d) 28 & 78 (Ex ia)	Page 20 - Table 1 Pages 21 & 22 - Tables 2 & 3 Page 23 - Table 5		
			Solenoid **		
<b>A</b>	ATEX/IECEX Dual Certified/Labelled	74AT4 (Ex emb)	27 & 77 (Ex d)	28 & 78 (Ex ia)	Solenoid Approval *
<b>G</b>	*GOST/EAC/IECEX Dual Certified/Labelled	x	✓ (77 Only)	✓	
<b>I</b>	INMETRO/IECEX Dual Certified/Labelled	x	✓ (77 Only)	✓ (78 Only)	
<b>N</b>	NEPSI/IECEX Dual Certified/Labelled	x	✓	✓	
<b>U</b>	CSA (US)/ATEX Dual Certified/Labelled	x	✓ (77 Only)	x	
<b>K</b>	KTL IECEX Dual Certified/Labelled	x	✓ (77 Only)	x	
<b>XXX</b>	Voltage, refer to Solenoid option tables	74AT4 (Ex emb) 27 & 77 (Ex d)	Page 20 - Table 1 Pages 21 & 22 - Tables 2 & 3	Voltage	
<b>XX</b>	Resistance (Ω)	28 & 78 (Ex ia) - 260 Ohms	Page 23 - Table 5	Resistance †	
<b>XX</b>	Power (W)	74AT4 (Ex emb) 27 & 77 (Ex d)	3.6 Watts Page 20 - Table 1 1.8 & 3.0 Watts Pages 21 & 22 - Tables 2 & 3	Power	
<b>NO LETTER</b>	M20 x 1.5 Cable Entry			Cable Entry	
<b>K85</b>	1/2" NPT Cable Entry				
<b>LI42</b>	Banjo Assembly			Option	
<b>NO LETTER</b>	NPT Ports - Block Before Bleed (BBB)			Options	
<b>K6</b>	BSPP Ports				
<b>K54</b>	Block After Bleed (BAB)				
<b>BXS-04-04-E1-32-NC-00 - V - 77 A-24D - 18-K85-LI42-K54</b>				Ordering Example	

Bespoke configured datasheets are available for specific model numbers, please contact Bifold for more information.

For the shaded block sections, please refer to the same shaded sections on pages 20, 21, 22 & 23.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system. For further product options, please contact Bifold.

\* For details on specific approvals for Russian territories, please contact Bifold for more information.

\*\* Special conditions for safe use Type 74AT4 - The supply circuit shall be fitted with a fuse capable of meeting a 1500 Amp short circuit current. Must be compliant with special conditions for safe use as defined in EC Type Examination Certificate Sira01ATEX3248U.

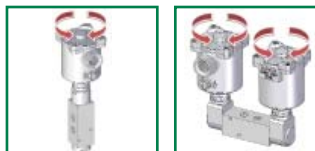
**Accuracy of information**  
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## BXS-04 5/2

For dimensional drawings of these products please see page 40.



### BXS-04 Selection Chart - Ordering Example

<b>BXS-04</b>	1/4"				Model Code
<b>04</b>	1/4" Body Ported (Stainless Steel)				Connections
<b>A04</b>	1/4" Body Ported (Aluminium) (Option only available with the type 27 Ex d and type 28 Ex ia solenoids)				Connections
<b>E1</b>	Auto Reset Internal Pilot				Primary Operator
<b>E3</b>	Manual Override Internal Pilot (M)				
<b>E5</b>	Manual Reset Internal Pilot (ML)				
<b>E13</b>	Manual Reset Tamperproof Internal Pilot (MLT)				
<b>E15</b>	Manual Override Rotary Internal Pilot (MOR)				
<b>52</b>	5 Way 2 Position				Configuration
<b>53</b>	5 Way 3 Position				Configuration
<b>XX</b>	5/2 Valve				Configuration
<b>YY</b>	5/3 Valve All Ports Blocked			(for the port connections table, please refer to page 19)	
<b>ZZ</b>	5/3 Valve Cylinder Ports Vented				
<b>00</b>	Spring Return				Secondary Operator
<b>02</b>	Spring Return + Plunger				
<b>E1</b>	Auto Reset Internal Pilot				Secondary Operator
<b>E3</b>	Manual Override Internal Pilot (M)				
<b>E5</b>	Manual Reset Internal Pilot (ML)				
<b>E13</b>	Manual Reset Tamperproof Internal Pilot (MLT)				
<b>E15</b>	Manual Override Rotary Internal Pilot (MOR)				
<b>SA</b>	Nitrile (Low Temperature)	(-25°C to +130°C)		For maximum operating temperatures see 'T' Rating	O-ring Material
<b>V</b>	Viton (Standard)	(-15°C to +130°C)		Limitations for Ex emb, Ex d & Ex ia on pages 20, 21, 22 & 23	
<b>AL</b>	Fluorosilicone	(-55°C to +130°C)			
<b>XX</b>	Refer to Solenoid options table	74AT4 (Ex emb) 27 & 77 (Ex d) 28 & 78 (Ex ia)	Page 20 - Table 1 Pages 21 & 22 - Tables 2 & 3 Page 23 - Table 5		Solenoid **
<b>A</b>	ATEX/IECEx Dual Certified/Labelled			74AT4 (Ex emb) ✓ 27 & 77 (Ex d) ✓ 28 & 78 (Ex ia) ✓	Solenoid Approval *
<b>G</b>	*GOST/EAC/IECEx Dual Certified/Labelled			74AT4 (Ex emb) x 27 & 77 (Ex d) ✓ (77 Only) 28 & 78 (Ex ia) ✓	
<b>I</b>	INMETRO/IECEx Dual Certified/Labelled			74AT4 (Ex emb) x 27 & 77 (Ex d) ✓ (77 Only) 28 & 78 (Ex ia) ✓ (78 Only)	
<b>N</b>	NEPSI/IECEx Dual Certified/Labelled			74AT4 (Ex emb) x 27 & 77 (Ex d) ✓ 28 & 78 (Ex ia) ✓	
<b>U</b>	CSA (US)/ATEX Dual Certified/Labelled			74AT4 (Ex emb) x 27 & 77 (Ex d) ✓ (77 Only) 28 & 78 (Ex ia) x	
<b>K</b>	KTL IECEx Dual Certified/Labelled			74AT4 (Ex emb) x 27 & 77 (Ex d) ✓ (77 Only) 28 & 78 (Ex ia) x	
<b>XXX</b>	Voltage, refer to Solenoid option tables	74AT4 (Ex emb) 27 & 77 (Ex d)	Page 20 - Table 1 Pages 21 & 22 - Tables 2 & 3		Voltage
<b>XX</b>	Resistance (Ω)	28 & 78 (Ex ia) - 260 Ohms	Page 23 - Table 5		Resistance †
<b>XX</b>	Power (W)	74AT4 (Ex emb) 27 & 77 (Ex d)	3.6 Watts Page 20 - Table 1 1.8 & 3.0 Watts Pages 21 & 22 - Tables 2 & 3		Power
<b>NO LETTER</b>	M20 x 1.5 Cable Entry				Cable Entry
<b>K85</b>	1/2" NPT Cable Entry				
<b>L142</b>	Banjo Assembly				Option
<b>NO LETTER</b>	NPT Ports - Block Before Bleed (BBB)				Options
<b>K6</b>	BSPP Ports				
<b>K54</b>	Block After Bleed (BAB)				

**BXS-04-04-E1-52-XX-00-V - 77 A-24D-18 - K85-L142-K54** Ordering Example

Bespoke configured datasheets are available for specific model numbers, please contact Bifold for more information.  
 For the shaded block sections, please refer to the same shaded sections on pages 20, 21, 22 & 23.  
 † Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.  
 For further product options, please contact Bifold.  
 \* For details on specific approvals for Russian territories, please contact Bifold for more information.  
 \*\* Special conditions for safe use Type 74AT4 - The supply circuit shall be fitted with a fuse capable of meeting a 1500 Amp short circuit current. Must be compliant with special conditions for safe use as defined in EC Type Examination Certificate Sira01ATEX3248U.

## BXS-04 5/2 NAMUR

For a dimensional drawing of this product please see page 41.



### BXS-04 Selection Chart - Ordering Example

<b>BXS-04</b>	1/4"		Model Code		
<b>N4</b>	1/4" Body Ported NAMUR Mount (Stainless Steel)		Connections		
<b>AN4</b>	1/4" Body Ported NAMUR Mount (Aluminium)(Option only available with the type 27 Ex d and type 28 Ex ia solenoids)				
<b>E1</b>	Auto Reset Internal Pilot		Primary Operator		
<b>E3</b>	Manual Override Internal Pilot (M)				
<b>E5</b>	Manual Reset Internal Pilot (ML)				
<b>E13</b>	Manual Reset Tamperproof Internal Pilot (MLT)				
<b>E15</b>	Manual Override Rotary Internal Pilot (MOR)				
<b>52</b>	5 Way 2 Position		Configuration		
<b>53</b>	5 Way 3 Position				
<b>XX</b>	5/2 Valve	(for the port connections table, please refer to page 19)	Configuration		
<b>YY</b>	5/3 Valve All Ports Blocked				
<b>ZZ</b>	5/3 Valve Cylinder Ports Vented				
<b>00</b>	Spring Return		Secondary Operator		
<b>02</b>	Spring Return + Plunger				
<b>E1</b>	Auto Reset Internal Pilot				
<b>E3</b>	Manual Override Internal Pilot (M)				
<b>E5</b>	Manual Reset Internal Pilot (ML)				
<b>E13</b>	Manual Reset Tamperproof Internal Pilot (MLT)				
<b>E15</b>	Manual Override Rotary Internal Pilot (MOR)				
<b>SA</b>	Nitrile (Low Temperature)	(-25°C to +130°C)	O-ring Material		
<b>V</b>	Viton (Standard)	(-15°C to +130°C)			
<b>AL</b>	Fluorosilicone	(-55°C to +130°C)			
		For maximum operating temperatures see 'T' Rating Limitations for Ex emb, Ex d & Ex ia on pages 20, 21, 22 & 23			
<b>XX</b>	Refer to Solenoid options tables	74AT4 (Ex emb) 27 & 77 (Ex d) 28 & 78 (Ex ia)	Page 20 - Table 1 (For the 74AT4 option only please go straight to voltage) Pages 21 & 22 - Tables 2 & 3 Page 23 - Table 5	Solenoid **	
<b>A</b>	ATEX/IECEX Dual Certified/Labelled	74AT4 (Ex emb)	27 & 77 (Ex d)	28 & 78 (Ex ia)	Solenoid Approval *
<b>G</b>	*GOST/EAC/IECEX Dual Certified/Labelled	X	✓ (77 Only)	✓	
<b>I</b>	INMETRO/IECEX Dual Certified/Labelled	X	✓ (77 Only)	✓ (78 Only)	
<b>N</b>	NEPS/IECEX Dual Certified/Labelled	X	✓	✓	
<b>U</b>	CSA (US)/ATEX Dual Certified/Labelled	X	✓ (77 Only)	X	
<b>K</b>	KTL IECEX Dual Certified/Labelled	X	✓ (77 Only)	X	
<b>XXX</b>	Voltage, refer to Solenoid option tables	74AT4 (Ex emb) 27 & 77 (Ex d)	Page 20 - Table 1 Pages 21 & 22 - Tables 2 & 3		Voltage
<b>XX</b>	Resistance (Ω)	28 & 78 (Ex ia) - 260 Ohms	Page 23- Table 5		Resistance †
<b>XX</b>	Power (W)	74AT4 (Ex emb)	3.6 Watts Page 20 - Table 1		Power
		27 & 77 (Ex d)	1.8 & 3.0 Watts Pages 21 & 22 - Tables 2 & 3		
<b>NO LETTER</b>	M20 x 1.5 Cable Entry				Cable Entry
<b>K85</b>	1/2" NPT Cable Entry				
<b>L142</b>	Banjo Assembly				Option
<b>NO LETTER</b>	NPT Ports - Block Before Bleed (BBB)				Options
<b>K6</b>	BSPF Ports				
<b>K54</b>	Block After Bleed (BAB)				

**BXS-04- N4-E1-52-XX-00-V - 77 A - 24D-18-K85-L142-K54** Ordering Example

Bespoke configured datasheets are available for specific model numbers, please contact Bifold for more information.

For the shaded block sections, please refer to the same shaded sections on pages 20, 21, 22 & 23.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.

For further product options, please contact Bifold.

\* For details on specific approvals for Russian territories, please contact Bifold for more information.

\*\* Special conditions for safe use Type 74AT4 - The supply circuit shall be fitted with a fuse capable of meeting a 1500 Amp short circuit current. Must be compliant with special conditions for safe use as defined in EC Type Examination Certificate Sira01ATEX3248U.

#### Note:

All valves are supplied with a full set of mounting option and 3/2 configuration option interface blocks as standard, please see page 45.

**Accuracy of information**  
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## SPR-08 3/2

For dimensional drawing of this product please see page 41.



### SPR-08 Selection Chart - Ordering Example

<b>SPR-08</b>	1/2"		Model Code		
<b>04</b>	1/4" Body Ported (Stainless Steel)		Ports		
<b>06</b>	3/8" Body Ported (Stainless Steel)				
<b>08</b>	1/2" Body Ported (Stainless Steel)				
<b>E1</b>	Auto Reset Internal Pilot		Primary Operator		
<b>E3</b>	Manual Override Internal Pilot (M)				
<b>E5</b>	Manual Reset Internal Pilot (ML)				
<b>E13</b>	Manual Reset Tamperproof Internal Pilot (MLT)				
<b>E15</b>	Manual Override Rotary Internal Pilot (MOR)				
<b>32</b>	3 Way 2 Position		Configuration		
<b>NC</b>	Normally Closed	(for the port connections table, please refer to page 19)	Configuration		
<b>NO</b>	Normally Open				
<b>00</b>	Spring Return		Secondary Operator		
<b>02</b>	Spring Return + Plunger				
<b>E1</b>	Auto Reset Internal Pilot				
<b>E3</b>	Manual Override Internal Pilot (M)				
<b>E5</b>	Manual Reset Internal Pilot (ML)				
<b>E13</b>	Manual Reset Tamperproof Internal Pilot (MLT)		O-ring Material		
<b>E15</b>	Manual Override Rotary Internal Pilot (MOR)				
<b>SA</b>	Nitrile (Low Temperature)	(-25°C to +130°C)		For maximum operating temperatures see 'T' Rating Limitations for Ex emb, Ex d & Ex ia on pages 20, 22 & 23	
<b>V</b>	Viton (Standard)	(-20°C to +100°C)			
<b>AL</b>	Fluorosilicone	(-60°C to +100°C)			
<b>XX</b>	Refer to Solenoid options tables	74AT4 (Ex emb) Page 20 - Table 1 77 (Ex d) Page 22 - Table 3 78 (Ex ia) Page 23 - Table 5	Solenoid **		
<b>A</b>	ATEX/IECEX Dual Certified/Labelled	✓	✓	✓	Solenoid Approval *
<b>G</b>	*GOST/EAC/IECEX Dual Certified/Labelled	X	✓	✓	
<b>I</b>	INMETRO/IECEX Dual Certified/Labelled	X	✓	✓	
<b>N</b>	NEPSI/IECEX Dual Certified/Labelled	X	✓	✓	
<b>U</b>	CSA (US)/ATEX Dual Certified/Labelled	X	✓	X	
<b>K</b>	KTL IECEX Dual Certified/Labelled	X	✓	X	
<b>XXX</b>	Voltage, refer to Solenoid option tables	74AT4 (Ex emb) Page 20 - Table 1 77 (Ex d) Page 22 - Table 3	Voltage		
<b>XX</b>	Resistance (Ω)	78 (Ex ia) - 260 Ohms Page 23 - Table 5	Resistance †		
<b>XX</b>	Power (W)	74AT4 (Ex emb) 3.6 Watts Page 20 - Table 1 77 (Ex d) 1.8 & 3.0 Watts Page 22 - Table 3	Power		
<b>NO LETTER</b>	M20 x 1.5 Cable Entry	Cable Entry			
<b>K85</b>	1/2" NPT Cable Entry	Cable Entry			
<b>NO LETTER</b>	NPT Ports - Block Before Bleed (BBB)	Option			
<b>K6</b>	BSPF Ports	Option			
<b>SPR-08-08-E1-32-NC-00 -V - 77 A - 24D-18-K85 - K6</b>			Ordering Example		

Bespoke configured datasheets are available for specific model numbers, please contact Bifold for more information.

For the shaded block sections, please refer to the same shaded sections on pages 20, 22 & 23.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system. For further product options, please contact Bifold.

\* For details on specific approvals for Russian territories, please contact Bifold for more information.

\*\* Special conditions for safe use Type 74AT4 - The supply circuit shall be fitted with a fuse capable of meeting a 1500 Amp short circuit current. Must be compliant with special conditions for safe use as defined in EC Type Examination Certificate Sira01ATEX3248U.

## SPR-08 5/2

For a dimensional drawing of this product please see page 41.



### SPR-08 Selection Chart - Ordering Example

<b>SPR-08</b>	1/2"		Model Code
<b>04</b>	1/4" Body Ported (Stainless Steel)		Ports
<b>06</b>	3/8" Body Ported (Stainless Steel)		
<b>08</b>	1/2" Body Ported (Stainless Steel)		
<b>E1</b>	Auto Reset Internal Pilot		Primary Operator
<b>E3</b>	Manual Override Internal Pilot (M)		
<b>E5</b>	Manual Reset Internal Pilot (ML)		
<b>E13</b>	Manual Reset Tamperproof Internal Pilot (MLT)		
<b>E15</b>	Manual Override Rotary Internal Pilot (MOR)		
<b>52</b>	5 Way 2 Position		Configuration
<b>XX</b>	5/2 Valve	(for the port connections table, please refer to page 19)	Configuration
<b>00</b>	Spring Return		Secondary Operator
<b>02</b>	Spring Return + Plunger		
<b>E1</b>	Auto Reset Internal Pilot		Secondary Operator
<b>E3</b>	Manual Override Internal Pilot (M)		
<b>E5</b>	Manual Reset Internal Pilot (ML)		
<b>E13</b>	Manual Reset Tamperproof Internal Pilot (MLT)		
<b>E15</b>	Manual Override Rotary Internal Pilot (MOR)		
<b>SA</b>	Nitrile (Low Temperature)	(-25°C to +130°C)	O-ring Material
<b>V</b>	Viton (Standard)	(-20°C to +100°C)	
<b>AL</b>	Fluorosilicone	(-60°C to +100°C)	
<b>XX</b>	Refer to	74AT4 (Ex emb) Page 20 - Table 1	Solenoid **
	Solenoid options tables	(For the 74AT4 option only please go straight to voltage) Page 22 - Table 3	
		77 (Ex d) Page 22 - Table 3	
		78 (Ex ia) Page 23 - Table 5	
<b>A</b>	ATEX/IECEX Dual Certified/Labelled	74AT4 (Ex emb) ✓	Solenoid Approval *
<b>G</b>	*GOST/EAC/IECEX Dual Certified/Labelled	77 (Ex d) ✓	
<b>I</b>	INMETRO/IECEX Dual Certified/Labelled	78 (Ex ia) ✓	
<b>N</b>	NEPSI/IECEX Dual Certified/Labelled	74AT4 (Ex emb) X	
<b>U</b>	CSA (US)/ATEX Dual Certified/Labelled	77 (Ex d) X	
<b>K</b>	KTL IECEX Dual Certified/Labelled	78 (Ex ia) X	
<b>XXX</b>	Voltage, refer to Solenoid option tables	74AT4 (Ex emb) Page 20 - Table 1	Voltage
		77 (Ex d) Page 22 - Table 3	
<b>XX</b>	Resistance (Ω)	78 (Ex ia) - 260 Ohms Page 23 - Table 5	Resistance †
<b>XX</b>	Power (W)	74AT4 (Ex emb) 3.6 Watts Page 20 - Table 1	Power
		77 (Ex d) 1.8 & 3.0 Watts Page 22 - Table 3	
<b>NO LETTER</b>	M20 x 1.5 Cable Entry		Cable Entry
<b>K85</b>	1/2" NPT Cable Entry		
<b>NO LETTER</b>	NPT Ports - Block Before Bleed (BBB)		Option
<b>K6</b>	BSPF Ports		

**SPR-08-08-E1-52-XX-00 - V - 77 A-24D - 18-K85 - K6**

Ordering Example

Bespoke configured datasheets are available for specific model numbers, please contact Bifold for more information.

For the shaded block sections, please refer to the same shaded sections on pages 20, 22 & 23.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.

For further product options, please contact Bifold.

\* For details on specific approvals for Russian territories, please contact Bifold for more information.

\*\* Special conditions for safe use Type 74AT4 - The supply circuit shall be fitted with a fuse capable of meeting a 1500 Amp short circuit current. Must be compliant with special conditions for safe use as defined in EC Type Examination Certificate Sira01ATEX3248U.

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## SPR-16 3/2

For a dimensional drawing of this product please see page 42.



### SPR-16 Selection Chart - Ordering Example

<b>SPR-16</b>		1"	Model Code
<b>12</b>	<b>16</b>	3/4" Body Ported (Stainless Steel) 1" Body Ported (Stainless Steel)	Ports
<b>E2</b>	Auto Reset External Pilot		Primary Operator
<b>E4</b>	Manual Override External Pilot (M)		
<b>E6</b>	Manual Reset External Pilot (ML)		
<b>E14</b>	Manual Reset Tamperproof External Pilot (MLT)		
<b>E16</b>	Manual Override Rotary External Pilot (MOR)		
<b>32</b>	3 Way 2 Position		Configuration
<b>NU</b>	Normally Universal (for the port connections table, please refer to page 19)		Configuration
<b>00</b>	Spring Return		Secondary Operator
<b>E2</b>	Auto Reset External Pilot		
<b>E4</b>	Manual Override External Pilot (M)		
<b>E6</b>	Manual Reset External Pilot (ML)		
<b>E14</b>	Manual Reset Tamperproof External Pilot (MLT)		
<b>E16</b>	Manual Override Rotary External Pilot (MOR)		
<b>SA</b>	Nitrile (Low Temperature)	(-25°C to +130°C)	O-ring Material
<b>V</b>	Viton (Standard)	(-20°C to +120°C)	
<b>AL</b>	Fluorosilicone	(-60°C to +90°C)	
<b>XX</b>	Refer to Solenoid options tables	74AT4 (Ex emb) Page 20 - Table 1 77 (Ex d) Page 22 - Table 3 78 (Ex ia) Page 23 - Table 5	Solenoid **
<b>A</b>	ATEX/IECEX Dual Certified/Labelled	74AT4 (Ex emb) ✓ 77 (Ex d) ✓ 78 (Ex ia) ✓	Solenoid Approval *
<b>G</b>	*GOST/EAC/IECEX Dual Certified/Labelled	74AT4 (Ex emb) X 77 (Ex d) ✓ 78 (Ex ia) ✓	
<b>I</b>	INMETRO/IECEX Dual Certified/Labelled	74AT4 (Ex emb) X 77 (Ex d) ✓ 78 (Ex ia) ✓	
<b>N</b>	NEPSI/IECEX Dual Certified/Labelled	74AT4 (Ex emb) X 77 (Ex d) ✓ 78 (Ex ia) ✓	
<b>U</b>	CSA (US)/ATEX Dual Certified/Labelled	74AT4 (Ex emb) X 77 (Ex d) ✓ 78 (Ex ia) X	
<b>K</b>	KTL IECEX Dual Certified/Labelled	74AT4 (Ex emb) X 77 (Ex d) ✓ 78 (Ex ia) X	
<b>XXX</b>	Voltage, refer to Solenoid option tables	74AT4 (Ex emb) Page 20 - Table 1 77 (Ex d) Page 22 - Table 3	Voltage
<b>XX</b>	Resistance (Ω)	78 (Ex ia) - 260 Ohms Page 23 - Table 5	Resistance †
<b>XX</b>	Power (W)	74AT4 (Ex emb) 3.6 Watts Page 20 - Table 1 77 (Ex d) 1.8 & 3.0 Watts Page 22 - Table 3	Power
<b>NO LETTER</b>	M20 x 1.5 Cable Entry		Cable Entry
<b>K85</b>	1/2" NPT Cable Entry		
<b>NO LETTER</b>	NPT Ports - Block Before Bleed (BBB)		Option
<b>K6</b>	BSPP Ports		
<b>SPR-16-16-E2-32-NU-00 - V - 77 A - 24D-18-K85 - K6</b>			Ordering Example

Bespoke configured datasheets are available for specific model numbers, please contact Bifold for more information.

For the shaded block sections, please refer to the same shaded sections on pages 20, 22 & 23.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system. For further product options, please contact Bifold.

\* For details on specific approvals for Russian territories, please contact Bifold for more information.

\*\* Special conditions for safe use Type 74AT4 - The supply circuit shall be fitted with a fuse capable of meeting a 1500 Amp short circuit current. Must be compliant with special conditions for safe use as defined in EC Type Examination Certificate Sira01ATEX3248U.

# SPR 5/2 Standard Solenoid Valve Range Selection Chart

**SPR-16 5/2**

For a dimensional drawing of this product please see page 42.



**Bifold**®

## SPR-16 Selection Chart - Ordering Example

<b>SPR-16</b>	1"		Model Code		
<b>12</b>	3/4" Body Ported (Stainless Steel)		Ports		
<b>16</b>	1" Body Ported (Stainless Steel)				
<b>E2</b>	Auto Reset External Pilot		Primary Operator		
<b>E4</b>	Manual Override External Pilot (M)				
<b>E6</b>	Manual Reset External Pilot (ML)				
<b>E14</b>	Manual Reset Tamperproof External Pilot (MLT)				
<b>E16</b>	Manual Override Rotary External Pilot (MOR)				
<b>P1</b>	Air Pilot (Standard)		Primary Operator		
<b>P6</b>	Low Pressure Pilot				
<b>P16</b>	Pilot (No Equaliser)				
<b>52</b>	5 Way 2 Position		Configuration		
<b>XX</b>	5/2 Valve	(for the port connections table, please refer to page 19)	Configuration		
<b>00</b>	Spring Return		Secondary Operator		
<b>E2</b>	Auto Reset External Pilot				
<b>E4</b>	Manual Override External Pilot (M)				
<b>E6</b>	Manual Reset External Pilot (ML)				
<b>E14</b>	Manual Reset Tamperproof External Pilot (MLT)				
<b>E16</b>	Manual Override Rotary External Pilot (MOR)				
<b>P1</b>	Air Pilot (Standard)		Secondary Operator		
<b>P6</b>	Low Pressure Pilot				
<b>P16</b>	Pilot (No Equaliser)				
<b>SA</b>	Nitrile (Low Temperature)	(-25°C to +130°C)	O-ring Material		
<b>V</b>	Viton (Standard)	(-20°C to +120°C)			
<b>AL</b>	Fluorosilicone	(-60°C to +90°C)			
<b>XX</b>	Refer to Solenoid options tables	74AT4 (Ex emb) Page 20 - Table 1 77 (Ex d) Page 22 - Table 3 78 (Ex ia) Page 23 - Table 5	Solenoid **		
<b>A</b>	ATEX/IECEX Dual Certified/Labelled	✓	✓	✓	Solenoid Approval *
<b>G</b>	*GOST/EAC/IECEX Dual Certified/Labelled	X	✓	✓	
<b>I</b>	INMETRO/IECEX Dual Certified/Labelled	X	✓	✓	
<b>N</b>	NEPSI/IECEX Dual Certified/Labelled	X	✓	✓	
<b>U</b>	CSA (US)/ATEX Dual Certified/Labelled	X	✓	X	
<b>K</b>	KTL IECEX Dual Certified/Labelled	X	✓	X	
<b>XXX</b>	Voltage, refer to Solenoid option tables	74AT4 (Ex emb) Page 20 - Table 1 77 (Ex d) Page 22 - Table 3	Voltage		
<b>XX</b>	Resistance (Ω)	78 (Ex ia) - 260 Ohms Page 23 - Table 5	Resistance †		
<b>XX</b>	Power (W)	74AT4 (Ex emb) 3.6 Watts Page 20 - Table 1 77 (Ex d) 1.8 & 3.0 Watts Page 22 - Table 3	Power		
<b>NO LETTER</b>	M20 x 1.5 Cable Entry	Cable Entry			
<b>K85</b>	1/2" NPT Cable Entry	Cable Entry			
<b>NO LETTER</b>	NPT Ports - Block Before Bleed (BBB)	Option			
<b>K6</b>	BSPF Ports	Option			
<b>SPR-16-16-E2-52-XX-00 - V - 77 A - 24D-18-K85-K6</b>				Ordering Example	

Bespoke configured datasheets are available for specific model numbers, please contact Bifold for more information.

For the shaded block sections, please refer to the same shaded sections on pages 20, 22 & 23.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.

For further product options, please contact Bifold.

\* For details on specific approvals for Russian territories, please contact Bifold for more information.

\*\* Special conditions for safe use Type 74AT4 - The supply circuit shall be fitted with a fuse capable of meeting a 1500 Amp short circuit current. Must be compliant with special conditions for safe use as defined in EC Type Examination Certificate Sira01ATEX3248U.

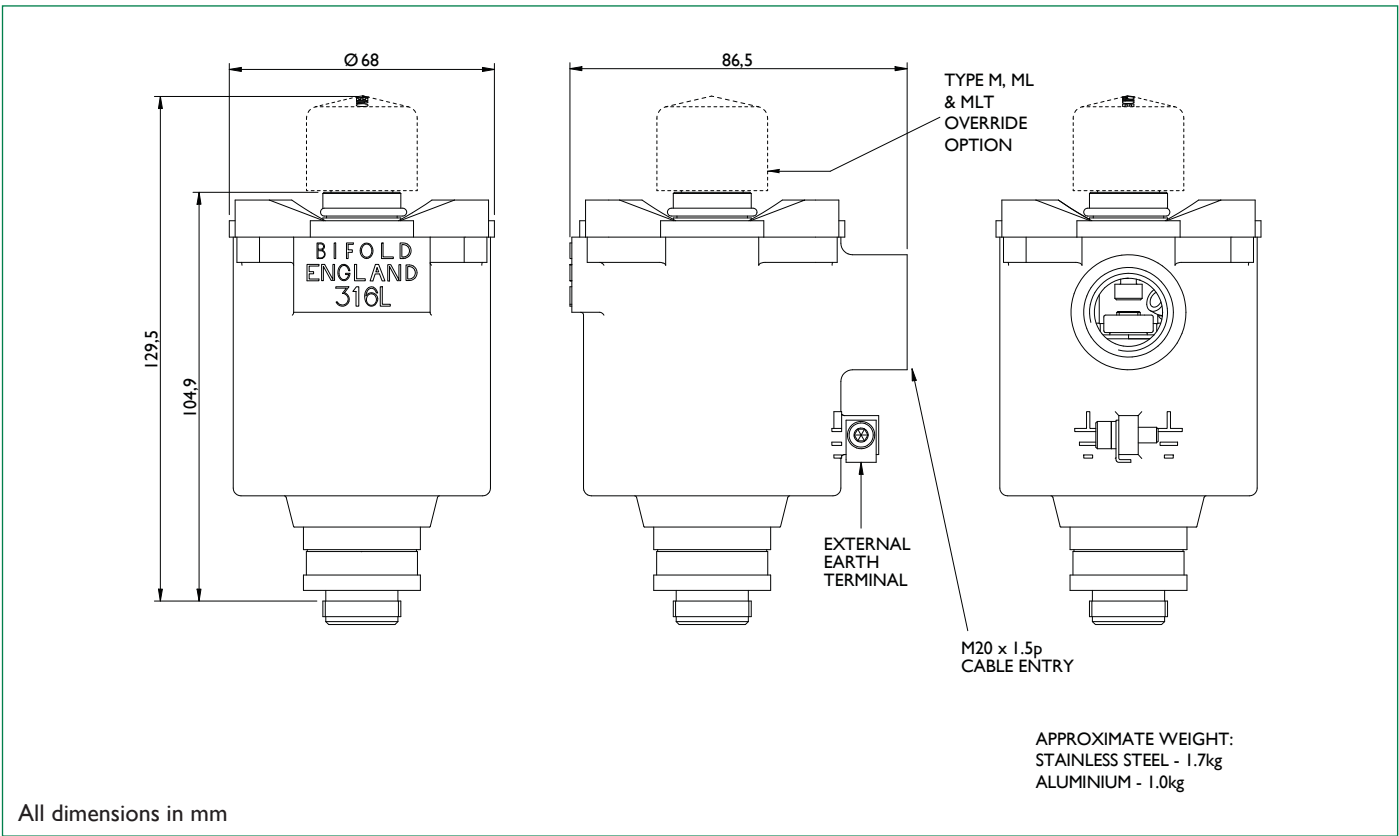
**Accuracy of information**  
We take care to ensure that product information in this catalogue is reasonably accurate and up-to-date. However, our products are continually developed and updated so to ensure accurate and up-to-date information please refer to the product catalogue issue list on our web site or contact a member of our sales team.

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**Quality Assurance**  
All Bifold products are manufactured to a most stringent QA programme to ensure that every product will give optimum performance and reliability. We are third party certified to BS EN ISO 9001:2008. Functional test certificate, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BS EN 10204 3.1 where available. We reserve the right to make changes to the specifications and design etc, without prior notice.

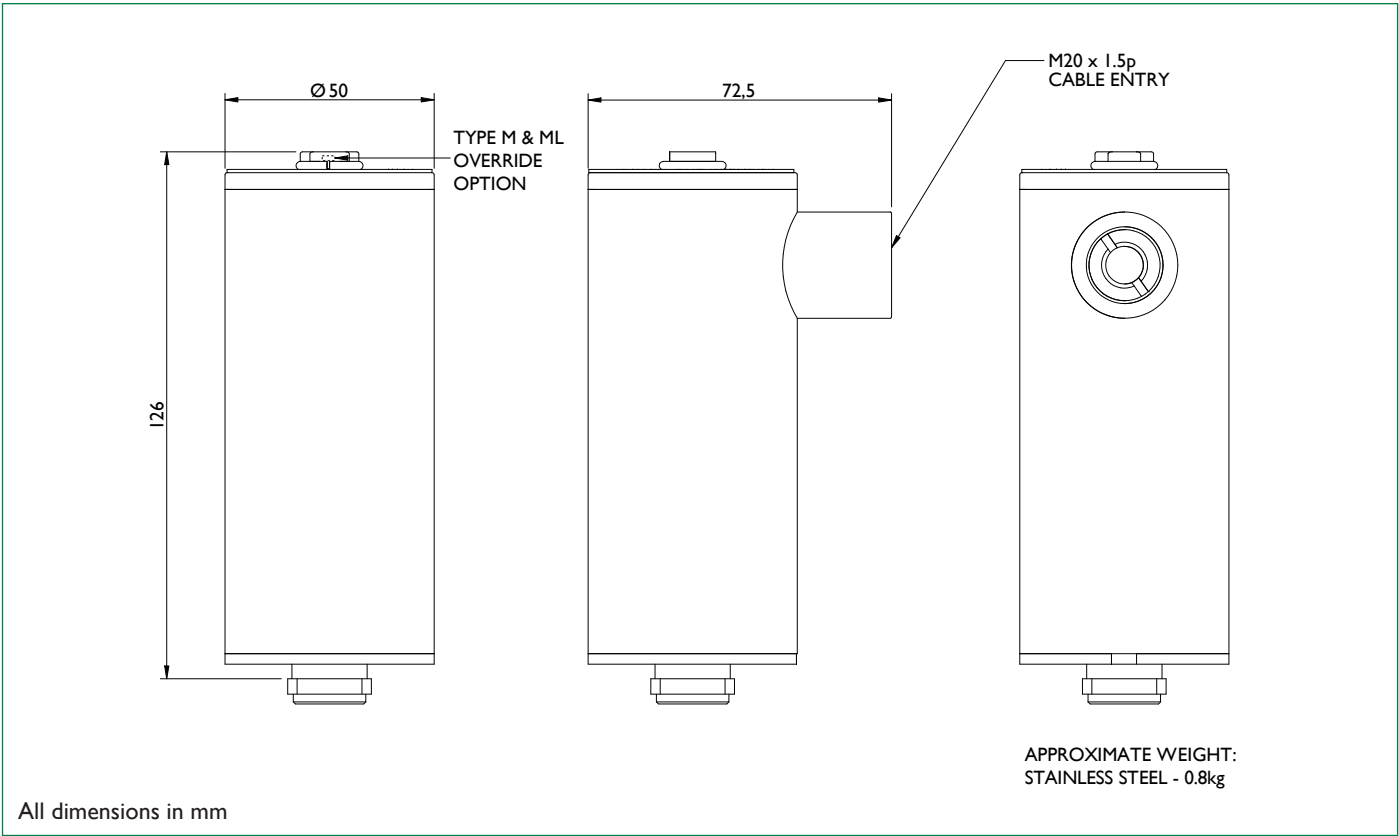
**Dimensional Drawings**

**2 & 7 Series Standard Solenoid Enclosure (Ex emb & Ex d)**



All dimensions in mm

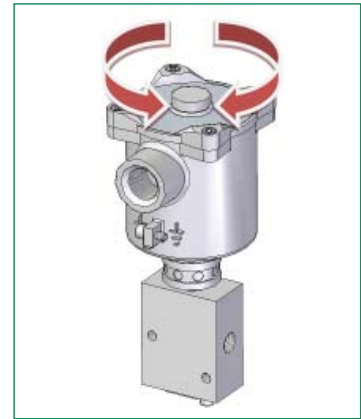
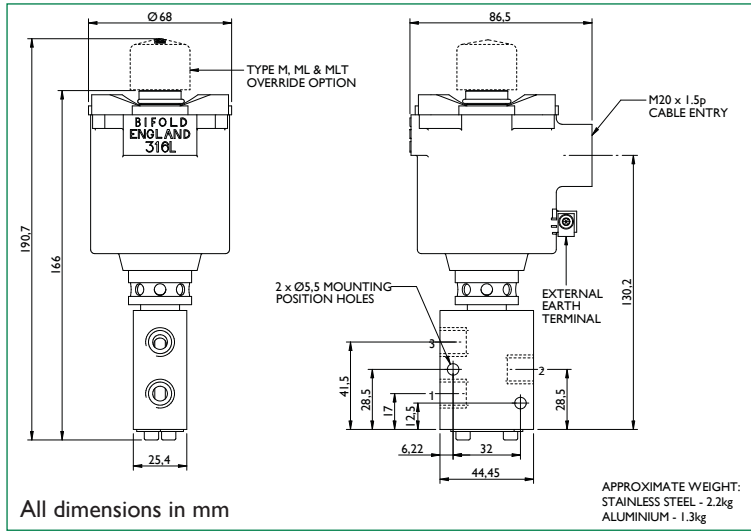
**5 Series Slimline solenoid Enclosure (Ex ia)**



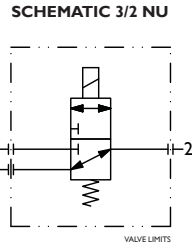
All dimensions in mm

Dimensional Drawings

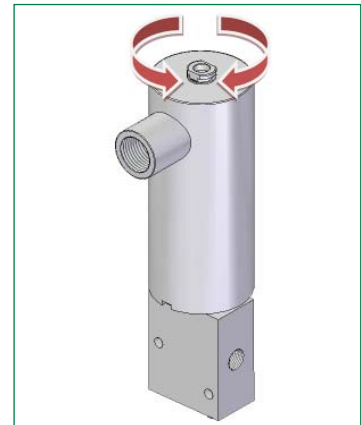
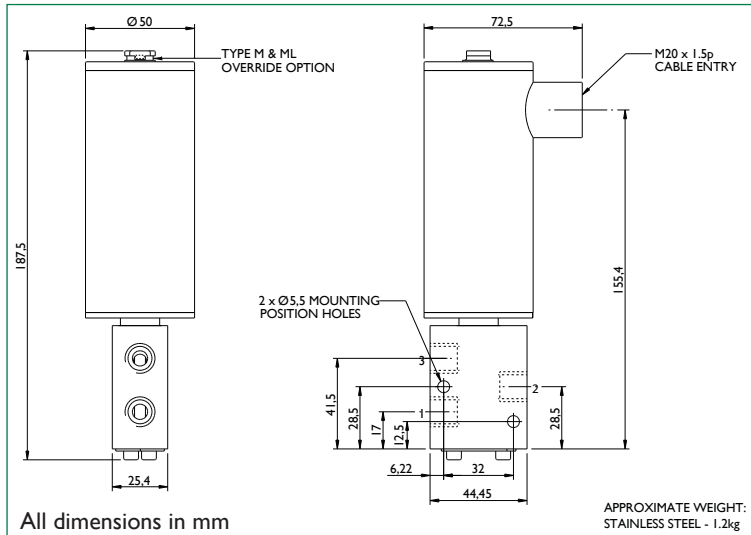
Example Code - FP06P-SI-04-32-NU-V-74AT4-24D-36



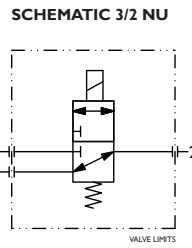
**FP06P**  
Auto Reset



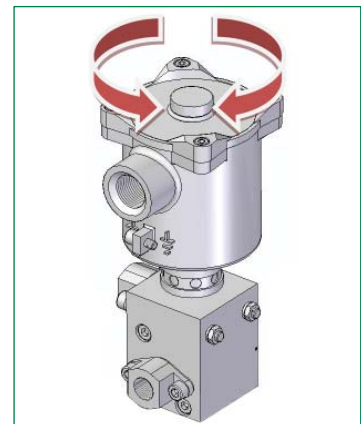
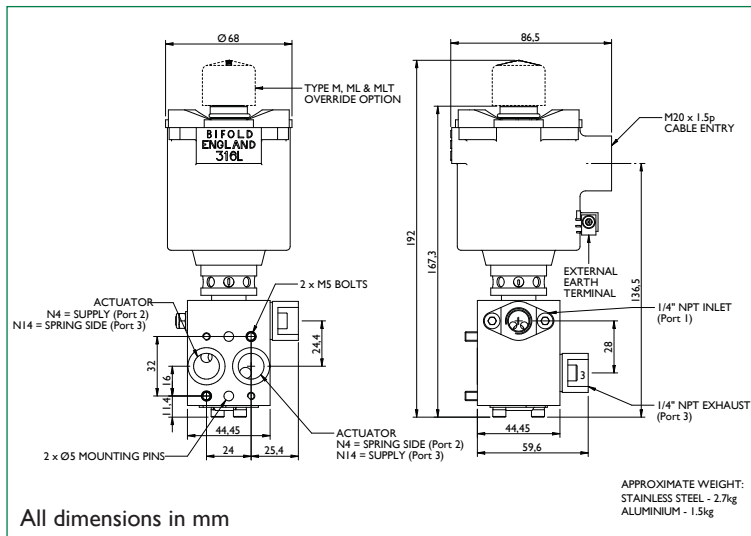
Example Code - FP06P-SI-04-32-NU-V-58A-135



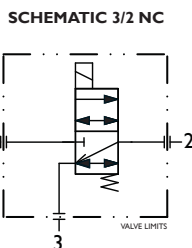
**FP06P**  
Auto Reset



Example Code - FP06P-SI-NI4-32-NC-V-74AT4-24D-36



**FP06P**  
Namur Mount Auto Reset  
Left Hand Feed



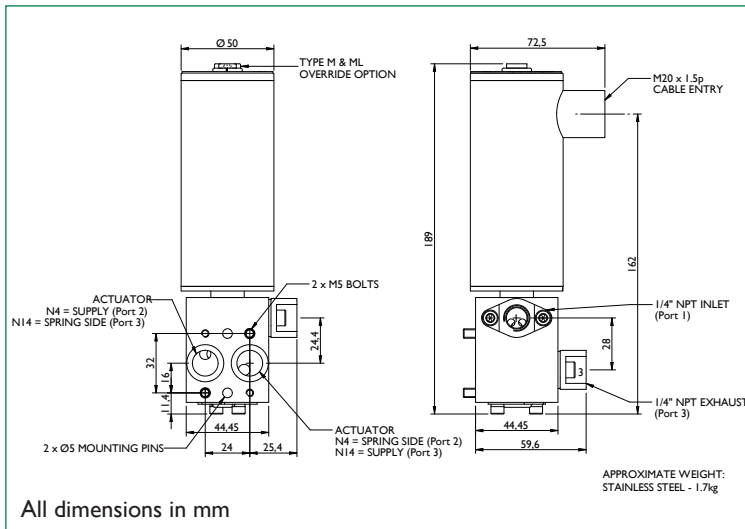
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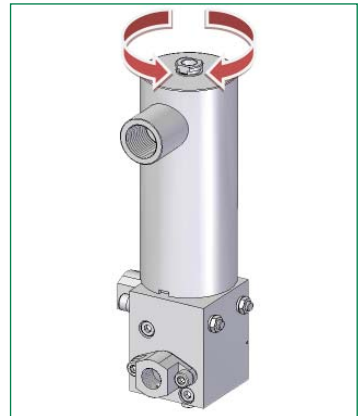
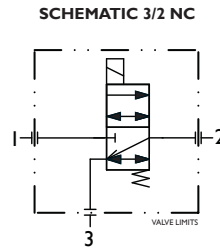
**Quality Assurance**  
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Dimensional Drawings

Example Code - FP06P-SI-N4-32-NC-V-58A-I35

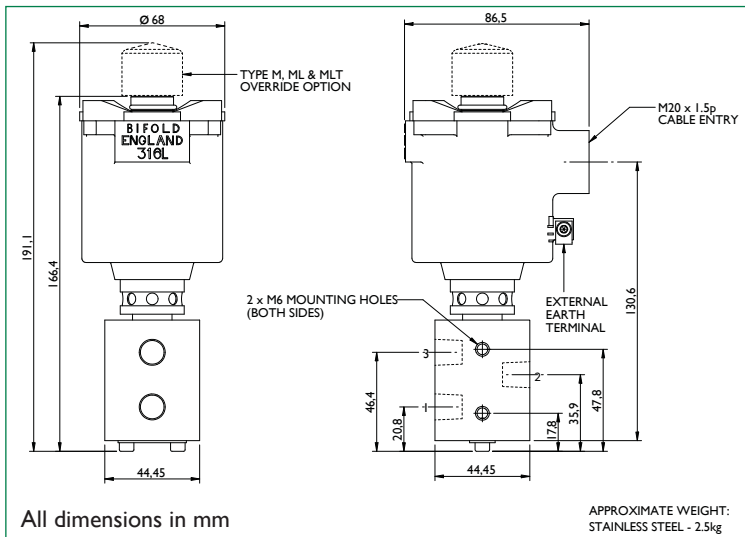


All dimensions in mm

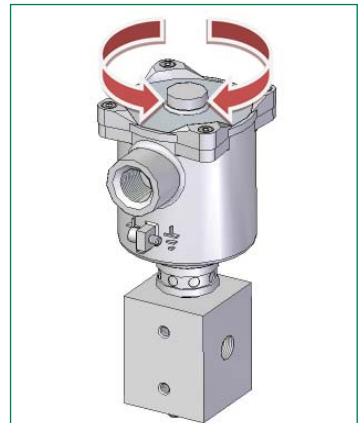
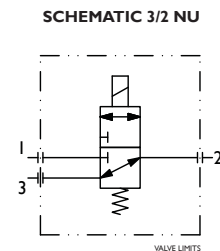


**FP06P**  
NAMUR Mount Auto Reset  
Right Hand Feed

Example Code - FPI0P-SI-04-32-NU-V-74AT4-24D-36

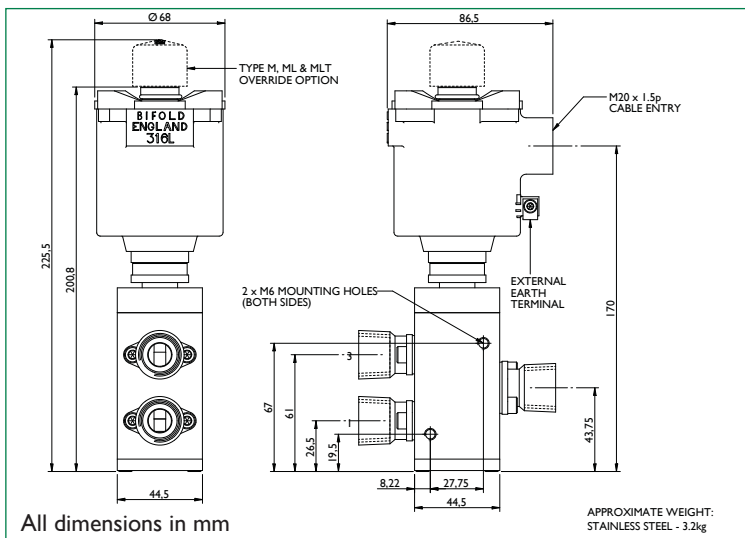


All dimensions in mm

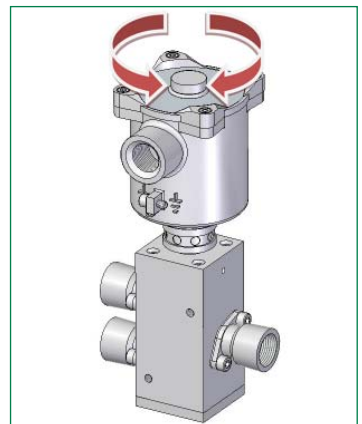
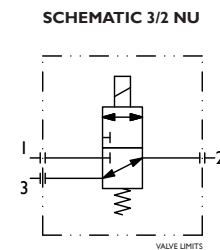


**FPI0P**  
Auto Reset

Example Code - FPI2P-SI-08-32-NU-V-77A-24D-120



All dimensions in mm



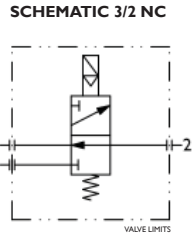
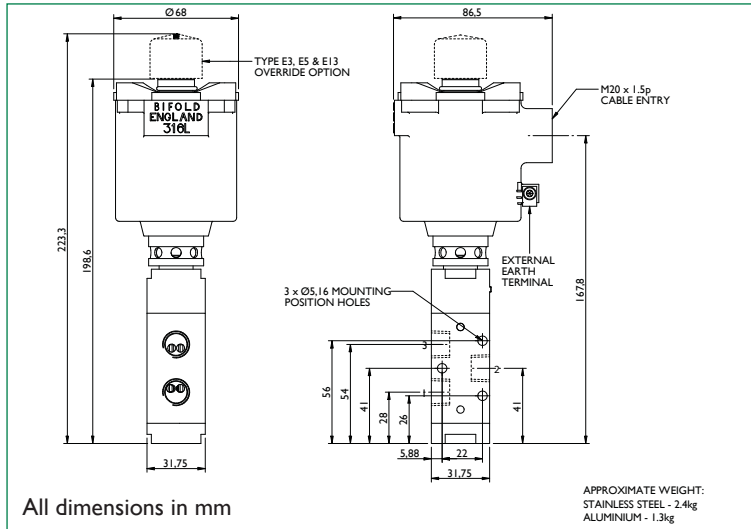
**FPI2P**  
Auto Reset



Dimensional Drawings

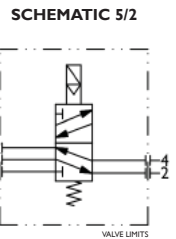
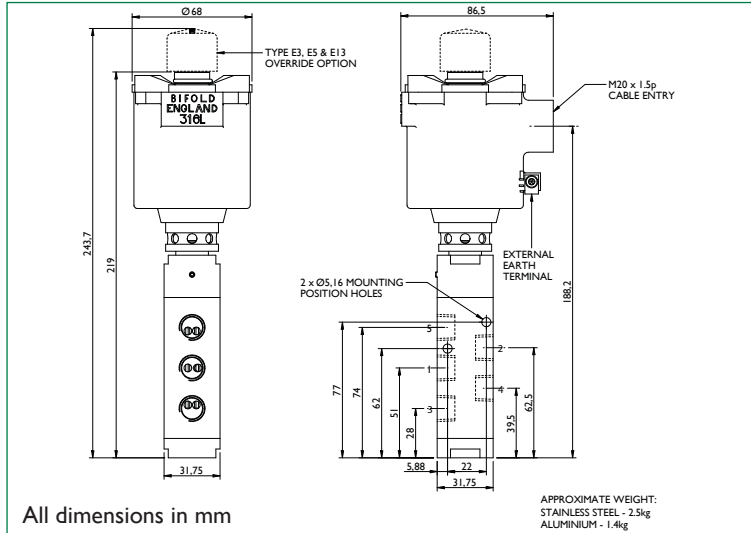


Example Code - BXS-04-04-EI-32-NC-00-V-74AT4-24D-36



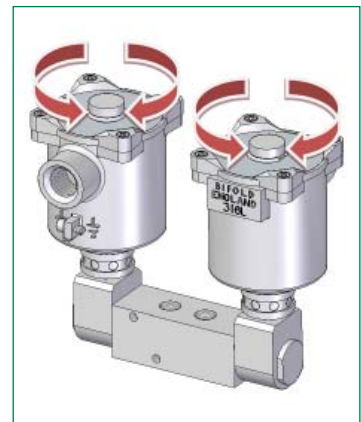
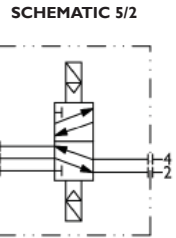
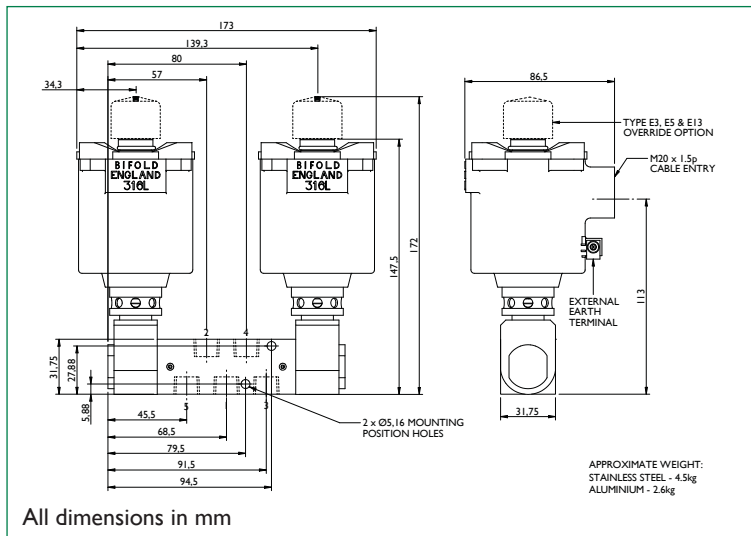
**BXS**  
Auto Reset Internal Pilot

Example Code - BXS-04-04-EI-52-XX-00-V-74AT4-24D-36



**BXS**  
Auto Reset Internal Pilot

Example Code - BXS-04-04-EI-52-XX-EI-V-74AT4-24D-36-LI42



**BXS**  
Banjo Joint Auto Reset Internal Pilot

**Accuracy of information**  
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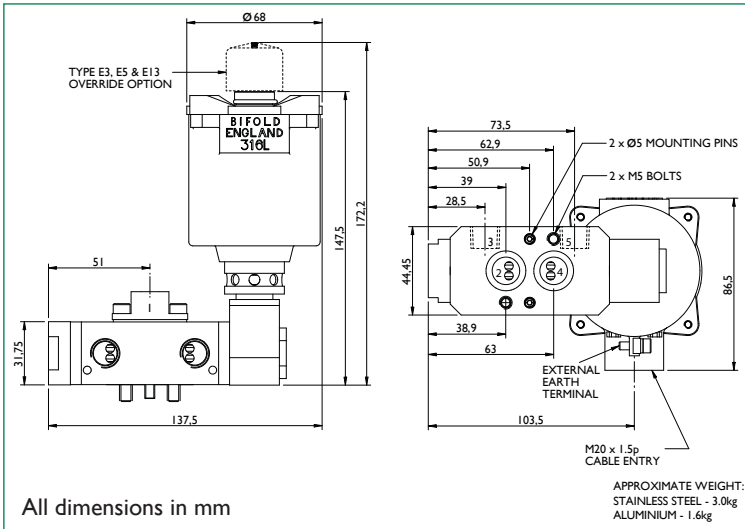
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**Quality Assurance**  
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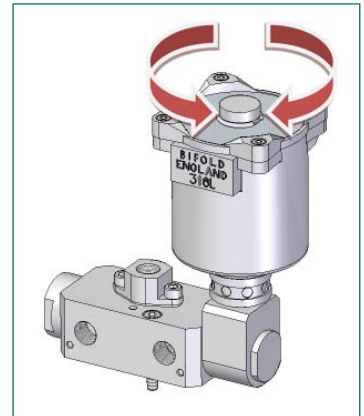
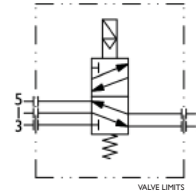
Dimensional Drawings

Example Code - BXS-04-N4-EI-52-XX-00-V-74AT4-24D-36-LI42



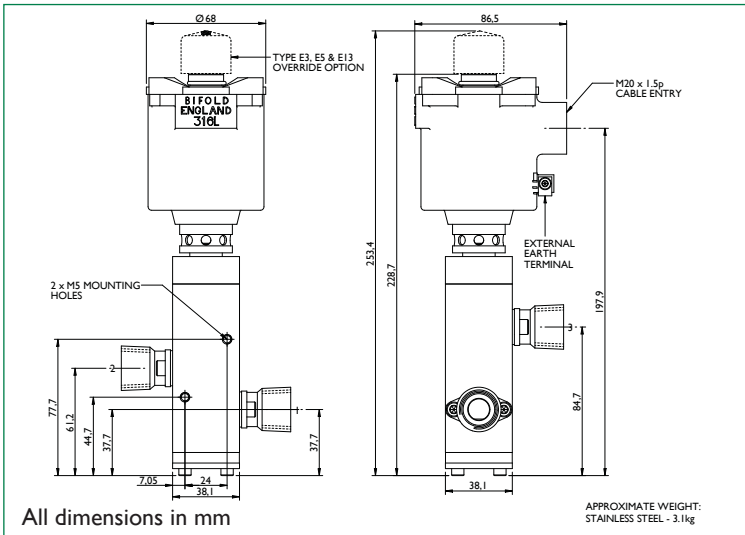
All dimensions in mm

SCHEMATIC 5/2



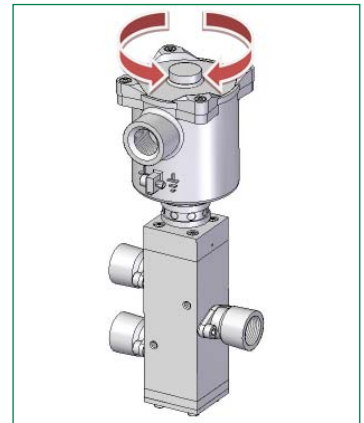
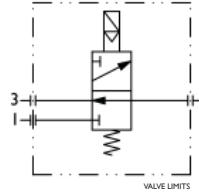
**BXS**  
NAMUR Mount Banjo Joint  
Auto Reset Internal Pilot

Example Code - SPR-08-08-EI-32-NC-00-V-74AT4-24D-36



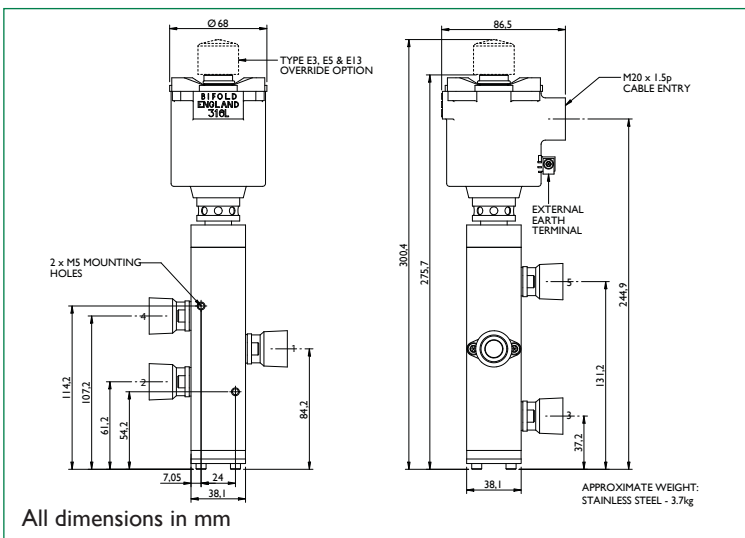
All dimensions in mm

SCHEMATIC 3/2 NC



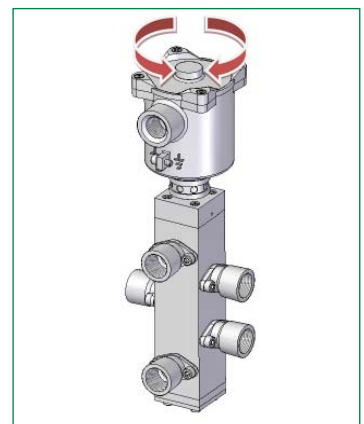
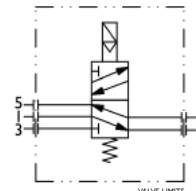
**SPR**  
Auto Reset Internal Pilot

Example Code - SPR-08-08-EI-52-XX-00-V-74AT4-24D-36



All dimensions in mm

SCHEMATIC 5/2



**SPR**  
Auto Reset Internal Pilot

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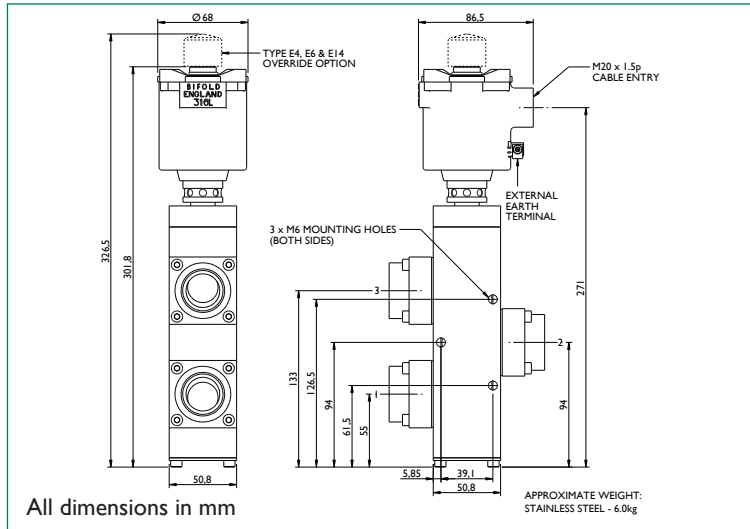
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Quality Assurance

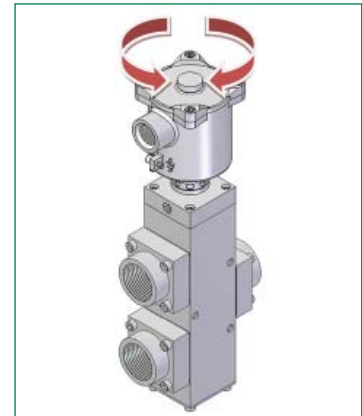
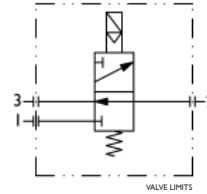
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Dimensional Drawings

Example Code - SPR-16-16-E2-32-NU-00-V-77A-24D-18

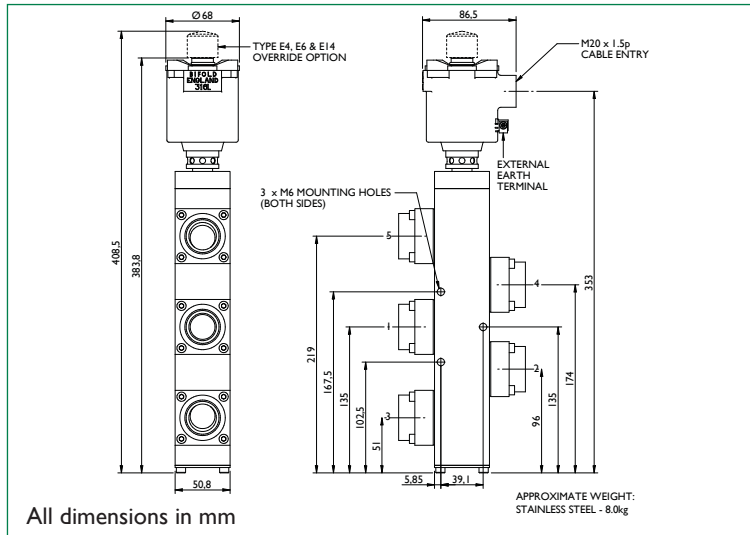


SCHEMATIC 3/2 NU

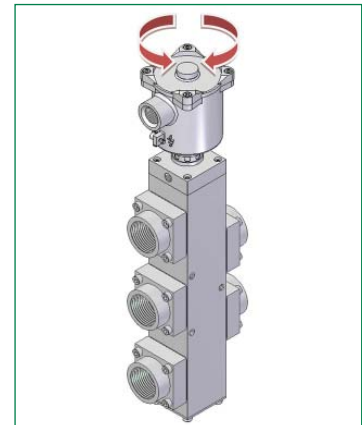
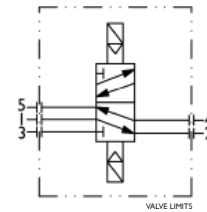


**SPR**  
Auto Reset External Pilot

Example Code - SPR-16-16-E2-52-XX-00-V-77A-24D-18



SCHEMATIC 5/2



**SPR**  
Auto Reset External Pilot

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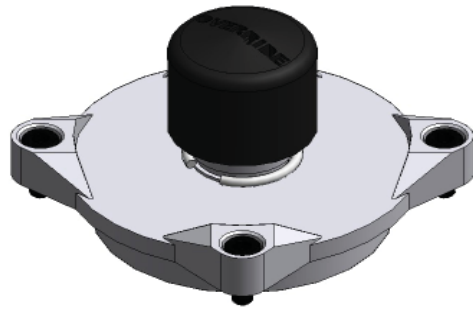
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## Options

### Product Options for Type 74, 27, 77, 28 & 78

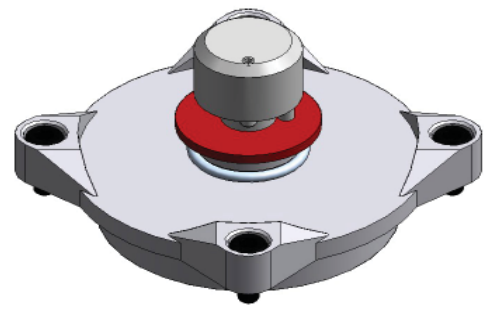
The range of products displayed in this brochure, are designed to accommodate all the options shown below. If the style or arrangement required for your application is not shown, please contact our office with full description and specification details.



**Type M - Electrical to Switch or Temporary Manual Override**

#### Manual Override Type M (E3 & E4)

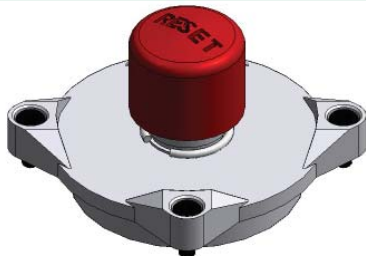
The solenoid valve switches on and off with the electrical supply. The manual override button can be pressed to operate the valve when the solenoid is in the electrically de-energised position. The manual override is non-detented, i.e. does not latch in position. When the button is released, the valve spring returns.



**Type MOR - Electrical to Switch or Stayput Manual Override**

#### Manual Rotary Override Type MOR (E15 & E16)

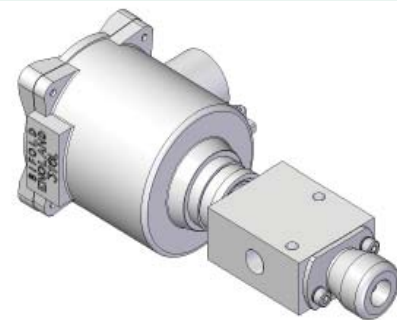
The solenoid valve switches on and off with the electrical supply. The manual override button is rotated through  $\frac{3}{4}$  turn to operate the valve when the solenoid is in the electrically de-energised position. The manual override is detented, i.e. remains in position until rotated back to its original position when the valve spring returns.



**Type ML - Electrical and Manual Required to Switch or Temporary Manual Override**  
**Type MLT - Electrical and Manual Required to Latch - Tamperproof**

#### Manual Reset Type ML (E5 & E6) & MLT (E13 & E14)

For Types ML and MLT, apply the electrical signal and press the reset button. With type ML, the valve moves to the energised position and will not de-energise until the electrical supply is removed. The manual reset button also acts as a manual override, when the valve is in the de-energised position and the electrical supply is off. The manual reset is non-detented, spring return, i.e. does not latch in position. With type MLT, the valve cannot be moved to the energised position by pressing the button if there is no electrical supply to the solenoid.



**Type LE - Latched Energised**

#### Latch Energised Type LE

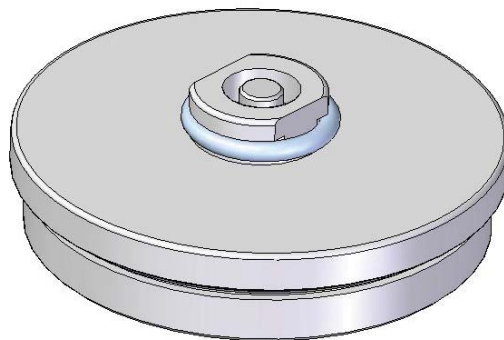
Designed specifically for Deluge systems. The solenoid valve can be used in the electrically de-energised condition. When an electrical signal is applied to the valve, the valve shifts to the energised position and stays in this position, even if the electrical signal is removed, and until the valve is manually moved back to the de-energised position by pressing the reset button. The valve can only be manually reset after the electrical signal is removed. The reset button is fitted at the base of the valve.

### Options



#### Product Options for Type 58

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**Type M - Electrical to Switch or Temporary Manual Override**  
**Type ML - Electrical and Manual Required to Switch or Temporary Manual Override**  
**(Slimline 58 - Series)**

#### Manual Override Type M & Manual Reset Type ML

The solenoid valve switches on and off with the electrical supply. The manual override button can be pressed to operate the valve when the solenoid is in the electrically de-energised position. The manual override is non-detented, i.e. does not latch in position. When the button is released, the valve spring returns.

For Type ML, apply the electrical signal and press the reset button. The valve moves to the energised position and will not de-energise until the electrical supply is removed. The manual reset button also acts as a manual override, when the valve is in the de-energised position and the electrical supply is off. The manual reset is non-detented, spring return, i.e. does not latch in position.

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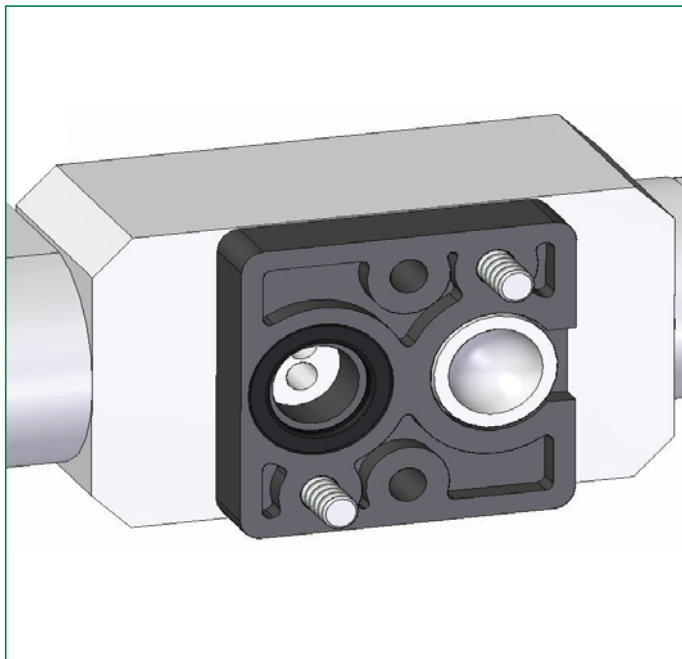
**Quality Assurance**  
All Bifold products are manufactured to a most stringent QA programme to ensure that every product will give optimum performance and reliability. We are third party certified to BS EN ISO 9001:2008. Functional test certificate, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BS EN 10204 3.1 where available. We reserve the right to make changes to the specifications and design etc., without prior notice.



Options

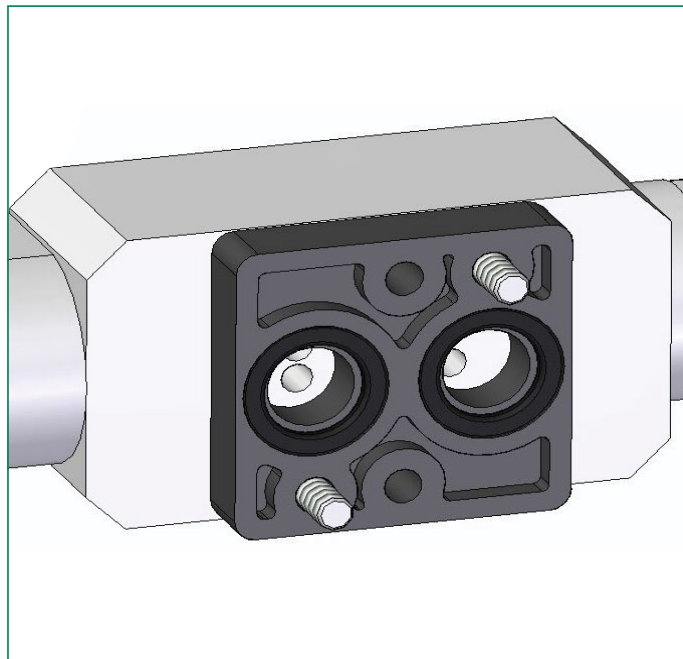


Supplied as Standard for use with: **BXS-04-N4..**, & **BXS-04-AN4..** Solenoid Valves



Mounting Configuration:

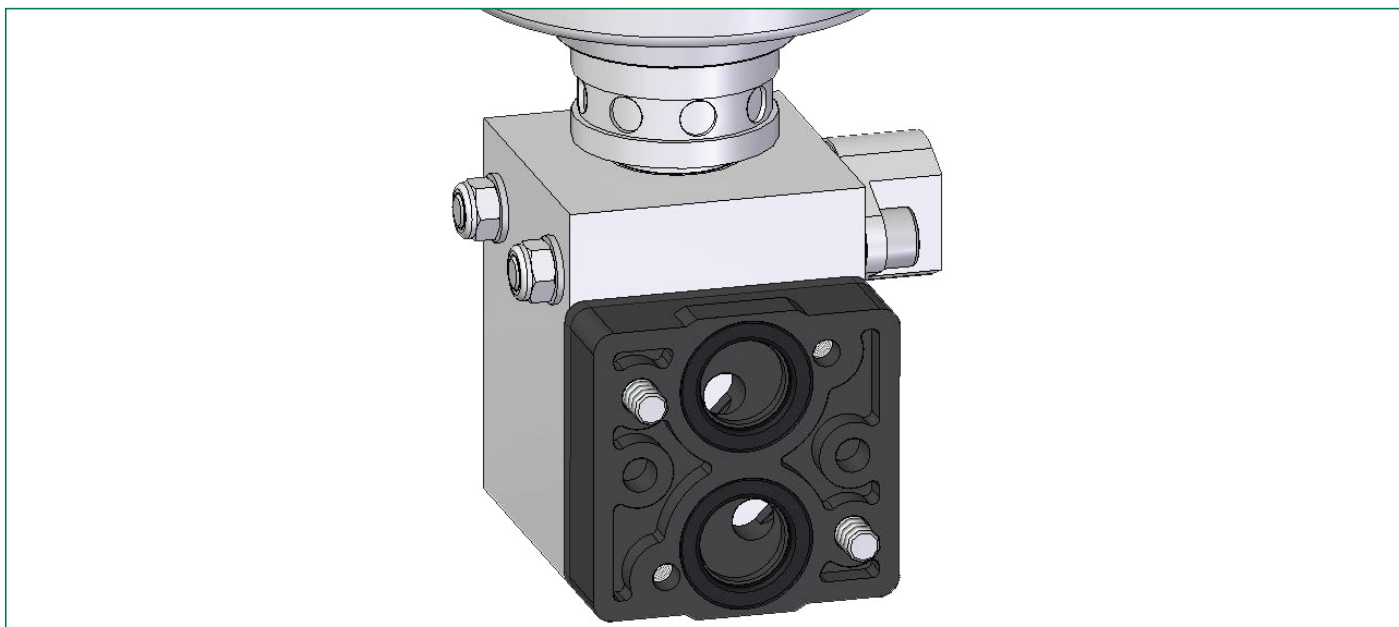
3 Way 2 Position



Mounting Configuration:

5 Way 2 Position & 5 Way 3 Position

Standard for use with: **FP06P-SI-N4..**, & **FP06P-SI-NI4..**, & **FP06P-SI-AN4..**, & **FP06P-SI-ANI4..** Solenoid Valves



Mounting Configuration:

FP06P 3 Way 2 Position with 90° Rotation

**Pneumatic and  
Instrumentation Valves**

**Hydraulic Valves**

**Subsea Valves**

**Hydraulic Pumps,  
Intensifiers and Valves**

**Actuator Electronic Control  
and Positioning**

**Bifold®**

**Bifold FluidPower®**

**Bifold® Subsea**

**Bifold® Marshalsea**

**Bifold® Orange™**

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Bifold, Bifold Fluidpower, Bifold Subsea, Marshalsea Hydraulics and Bifold Orange are all members of the Bifold Group.

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**Innovative and Reliable  
Valve Solutions**



**[bifold.co.uk](http://bifold.co.uk)**

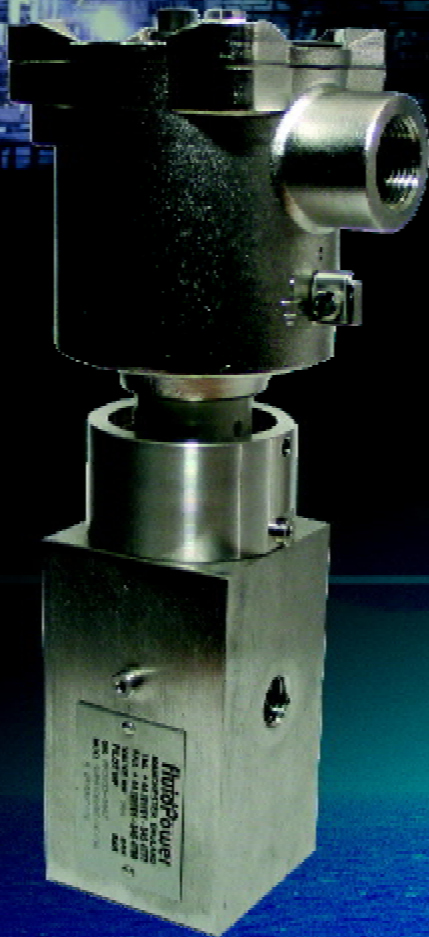
# Direct Acting Solenoid Valve Model SVP8x08

Up to 250 bar, 8 litres per minute

Superior performance  
throughout the  
full operational range

## Features:

- Worldwide solenoid approvals ATEX, SAA, INMETRO & GOST
- 316L stainless steel
- Solenoid rotates through 360°
- Arctic service options to -50°C
- NACE MR-01-75 option



Reliability and Innovation in directional control valves

**Features**

- Wide range of solenoid approvals
- All 316 stainless steel valve body and solenoid
- High flow
- High force solenoid and return spring
- Solenoid rotates through 360°
- Thread milled ports
- Other functions

- ATEX, SAA, INMETRO, GOST
- rugged and corrosion resistant
- 8 lpm, Cv 0.16
- increased reliability
- simplifies cable connection
- leak tight joints
- manual override, spring return or latch; manual reset

**Operating Media**

- Mineral Oils, water glycol mixtures, some chemical (contact Bifold Fluidpower)

**Working Pressure**

- Operating pressure- 0 - 250 bar
- Valve type - Unidirectional as standard
- Reverse flow 'S' to 'P' option (SVP8x08/RF)

**Materials of Construction**

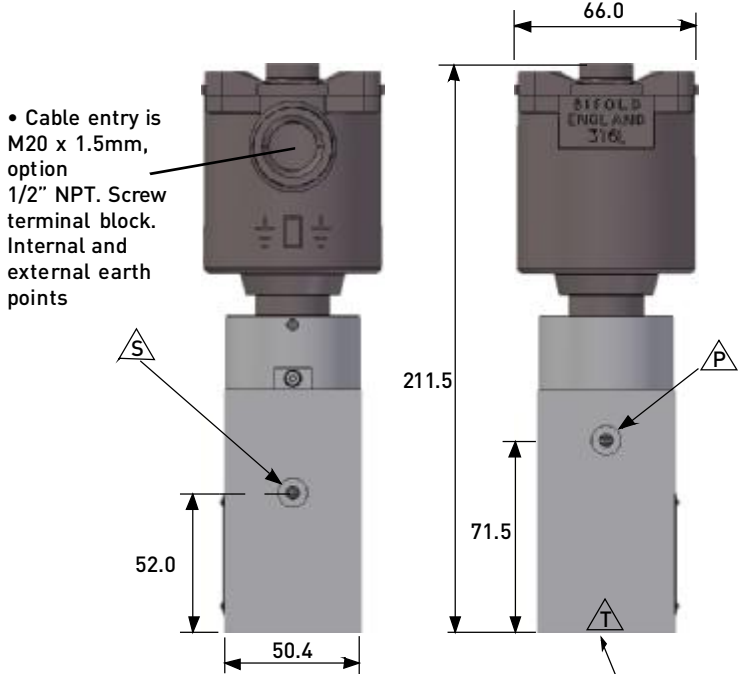
- Body:- stainless steel 316L
- Solenoid housing:- stainless steel 316L
- Internals:- stainless steel 316L, CA104 aluminium bronze to BS2874 and Victrex PEEK grade 450g.
- Fasteners:- Metric A4 18/10 316 grade stainless steel
- Seat Material:- Nitrile as standard. Alternative elastomers available for extreme conditions
- Springs:- stainless steel 302S26

**Solenoid Operating Parameters**

- Duty Cycle 100% continuously rated
- Surge suppression fitted as standard
- Pull in volts +10% / -10% of nominal
- Insulation Class H

**Temperature Range**

See solenoid and elastomer options  
 Example:- SVP8108/NC/04/V-24VDC/97HA6 -20°C to +55°C  
 SVP8108/NC/04/A-24VDC/97HG9 -50°C to +40°C



• Cable entry is M20 x 1.5mm, option 1/2" NPT. Screw terminal block. Internal and external earth points

Tank Port in bottom face

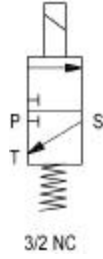
Model shown SVP8108/NC/04/S-24VDC/97HA6

- Weight:- 4.0 Kg

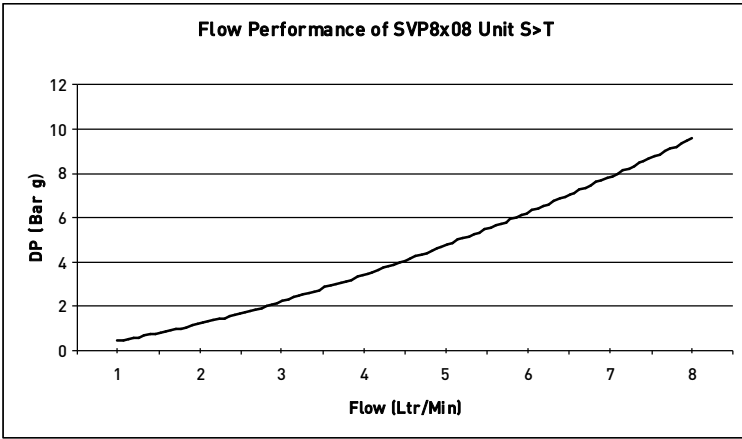
P = Pressure Port - 1/4 NPT or G1/4 BSPP  
 S = Service Port - 1/4 NPT or G1/4 BSPP  
 T = Tank Port - 1/2 NPT or G1/2 BSPP

**PREFERRED RANGE:**

**SVP8008/NC/04/S-24VDC/97HA9**  
 250 bar, 8 l/min, direct acting solenoid valve, 24VDC EExd, T6, 3 port 2 position, 1/4" NPT ports, auto reset



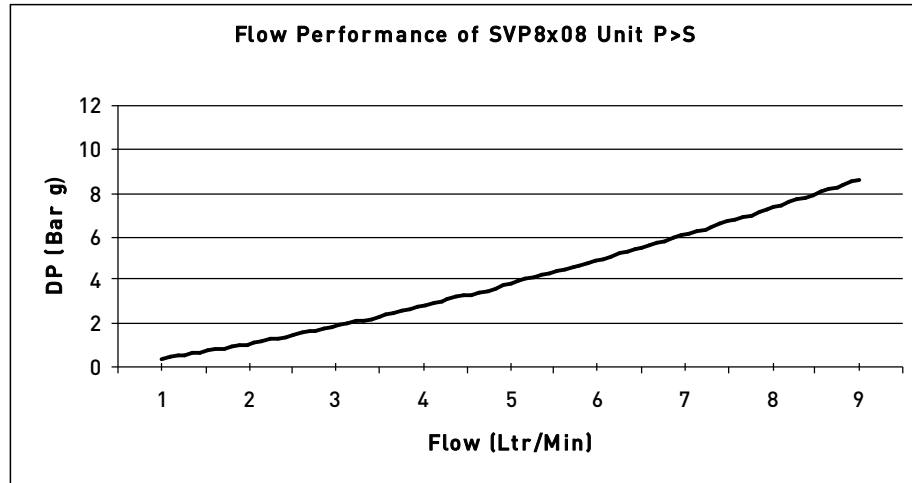
**SVP8008/NC/04/S-24VDC/97HA9/ML**  
 250 bar, 8 l/min, direct acting solenoid valve, 24VDC EExd, T6, 3 port 2 position, 1/4" NPT ports, manual latch



**INSTALLATION:**

Valves can be mounted in any attitude. Solenoids can be rotated relative to the pilot stage valve body to suit cable entry. Systems should be flushed clean to ISO 4406 Class 18/15 or better. Bifold Fluidpower SVP valves afford excellent sealing characteristics provided high standards of cleanliness are maintained. Where this cannot be assured we recommend the use of valves from the extensive range of Bifold Fluidpower Slide Valves which are more tolerant to fluid borne contaminants. Weights detailed in this catalogue are approximate only

Reliability and Innovation in directional control valves



### Summary Table

Order Code	Apparatus Code	Power Consumption	Standard Voltage	Voltage Tolerance	Temperature Range *		Protection	Cable Connection	Materials of Construction
					Media	Ambient			
97H	EExd IIC T85 or T100 or T135	6.5 Watts	24, 110 VDC 110, 240 VAC 50 or 60 Hz	+ / - 10 %	-20°C to +40°C (T6) (std) -60°C to +40°C (T6) -20°C to +55°C (T5) -60°C to +55°C (T5) -20°C to +90°C (T4) -60°C to +90°C (T4)		IP66	M20 Gland	316 stainless steel

\* Refer to operating temperature range, page 2

### Selection Chart

SVP		Model Code
80	Subbase mounting	
81	Body ported 1/4" NPT	Valve types 81X8, 81X8/RF
0	3-way, 2-position	
1	2-way, 2-position	
8	8 lpm @ 10 bar dp	Flow Rating
8/RF	8 lpm @ 10 bar dp, reverse flow 'S' to 'P'	
NC	Normally Closed	Configuration
04	250 bar	Working Pressure
S	Nitrile	O-ring material
V	Viton	
A	Silicone / Fluorosilicone	
xxx		Voltage
97H		6.5 Watt Solenoid
A	ATEX Ex II 2 GD	Solenoid Approval
I	INMETRO BR-Exd IIC T6 (T5, T4)	
G	GOST 1 Exd IIC T6 (T5, T4)	
S	SAA Exd IIC T6 (T5, T4)	
3	T4 IIC	T-Rating & Gas Group
6	T5 IIC	
9	T6 IIC	
H2S	NACE MR-01-75 (Consult BFP)	Options
K6	BSPP ported	
K85	1/2 NPT conduit entry	
L93	Fast response diode	
M	Manual override spring return	
MOR	Manual override rotary stayput	
SVP 80 0 8 / NC / 04 / S - 24VDC / 97H A 9 / ML		Ordering Example

Standard test fluid : Marston Bentley HW540



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#### **Quality Assurance**

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## **Direct Acting Solenoid Valves Model FP01 (Up to 690 bar, 1 litre per minute)**



### **Superior Performance Throughout the Full Operational Range**

- Compact Design
- Solenoid Valve
  -  Certified as SIL 3 Capable
- Solenoid Free to Rotate Through 360°
- 316L Stainless Steel Solenoid Enclosure and Valve
- NACE MR-01-75 Internal Wetted and Body Materials (Option)
- Arctic Service Options to -36°C
- Seated Ball Design Offers Extremely Low Leakage (Less Accumulation Required, Smaller Pump Size & Duty)
- Worldwide Solenoid Approvals Ex d, Ex ia, Ex emb and Explosion Proof
  -       
- Low Power
- Up to 690 bar Working Pressure



Features & Benefits

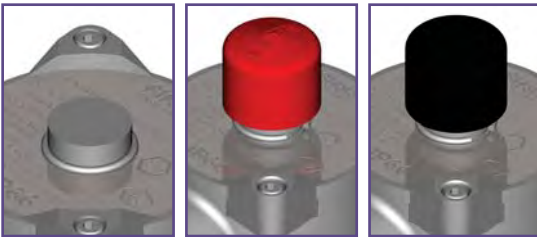
Worldwide Approvals



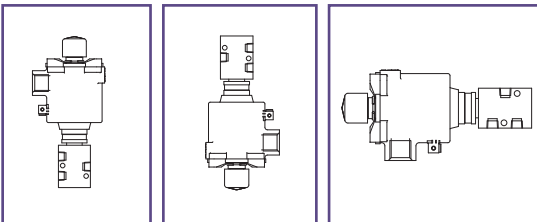
Solenoid Operator is Free to Rotate 360°



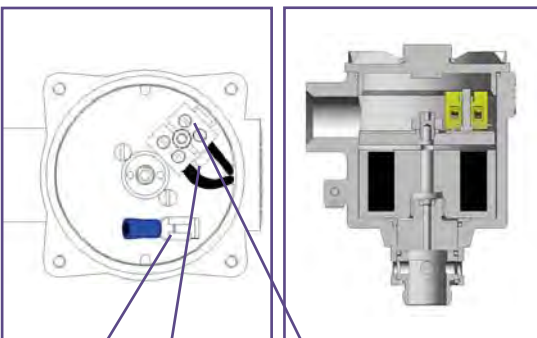
Widest Range of Override Options



Valve can be Mounted in any Orientation



Spacious Enclosure for Ease of Wiring



Internal Earth Connection    Surge Suppression Diode Ex d (dc)    Terminal Block

Standard Solenoid Operator Equipment Design & Build

- Worldwide Approval
- Solenoid operator is free to rotate 360° allowing for an easy cable layout and ease of connection wiring. Solenoid operator internals rotate with the enclosure and prevent cables being pulled out of terminal block.
- Widest range of override options (Auto Reset, Spring Return Manual Override, Stayput Manual Override and Manual Reset).
- Worldwide technical and field support.
- Standard solenoid valve can be mounted in any orientation to simplify installation due to all the components having enhanced rotational capabilities.

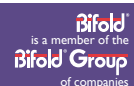
Commissioning and Maintenance Benefits for the Standard Solenoid Valve

- Tropicalised solenoid operator design - 316L stainless steel enclosure; stainless steel or Remko B magnetic parts (dependant upon solenoid Ex type) Fully encapsulated coil.
- Spacious solenoid enclosure for ease of wiring.
- No time penalty for heat dissipation before removing solenoid enclosure cover.
- No special high temperature cable requirements.

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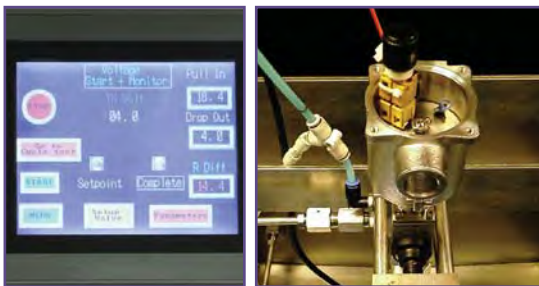
## Features & Benefits

**SIL 3 Capability, FMEA, Extensive Qualification Testing Coupled with 100% Computerised Diagnostic Test Procedures.**



### Safety and Environmental Benefits

- **SIL 3 capability:** The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3.
- Force balanced valve design with high safety factors to de-energise at all pressures in Normally Open and Normally Closed configurations.



- 100% computerised diagnostic testing to ensure each solenoid valve is proven along with confirmed safety factors.

### State of the Art Testing



- Bifold has state of the art testing and qualification equipment including endurance, environment, climatic, performance, function and leakage testing.



- The standard solenoid operator is a holding magnet type which ensures the valve will operate in damp conditions. The risk of corrosion to internal components is reduced, unlike other valve types that incorporate a solenoid core tube design with a 'wetted' armature that will only operate in dry air conditions!

### Simple Maintenance


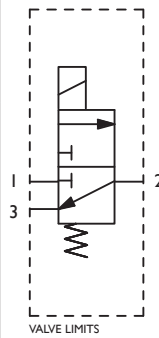

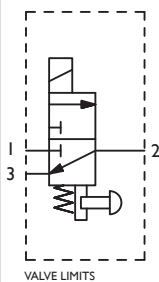

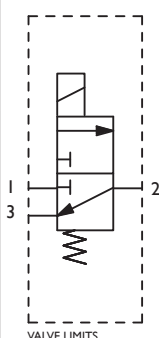

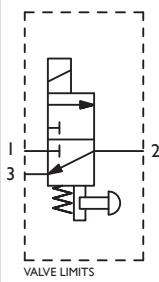


- The standard solenoid valve has proven arctic service and low temperature performance.
- Products are manufactured, inspected, assembled and tested in our state of the art production facilities.

- Dry solenoid armature to prevent corrosion and affecting safe shut down.
- Simple maintenance - Removable transient suppression diode on Ex d DC solenoid valve assemblies and removable solenoid coil without removing valve from the tubing.

Preferred Range

DIRECT ACTING SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>FP01</b> SI</p>	 <p>VALVE LIMITS</p>	13	<b>FP01/S1/M/32/NC/S/74AT4-24D/36</b>	3 way 2 position, direct acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6 Watt, Cv 0.01, 345 bar.
			<b>FP01/S1/M/32/NC/S/77A-24D/30</b>	3 way 2 position, direct acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.01, 345 bar.
			<b>FP01/S1/M/32/NC/S/78A-155</b>	3 way 2 position, direct acting, Normally Closed, Auto Reset. ATEX II I GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.01, 345 bar.
 <p><b>FP01</b> SI Manual Reset</p>	 <p>VALVE LIMITS</p>	13	<b>FP01/S1/M/32/NC/S/74AT4-24D/ML/36</b>	3 way 2 position, direct acting, Normally Closed, 24Vdc, Manual Reset. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6 Watt, Cv 0.01, 345 bar.
			<b>FP01/S1/M/32/NC/S/77A-24D/ML/30</b>	3 way 2 position, direct acting, Normally Closed, 24Vdc, Manual Reset. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.01, 345 bar.
			<b>FP01/S1/M/32/NC/S/78A-155/ML</b>	3 way 2 position, direct acting, Normally Closed, Manual Reset. ATEX II I GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.01, 345 bar.
 <p><b>FP01</b> S2</p>	 <p>VALVE LIMITS</p>	13	<b>FP01/S2/M/32/NC/S/74AT4-24D/36</b>	3 way 2 position, direct acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6 Watt, Cv 0.01, 517 bar.
			<b>FP01/S2/M/32/NC/S/77A-24D/30</b>	3 way 2 position, direct acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.01, 517 bar.
			<b>FP01/S2/M/32/NC/S/78A-155</b>	3 way 2 position, direct acting, Normally Closed, Auto Reset. ATEX II I GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.01, 517 bar.
 <p><b>FP01</b> S2 Manual Reset</p>	 <p>VALVE LIMITS</p>	13	<b>FP01/S2/M/32/NC/S/74AT4-24D/ML/36</b>	3 way 2 position, direct acting, Normally Closed, 24Vdc, Manual Reset. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6 Watt, Cv 0.01, 517 bar.
			<b>FP01/S2/M/32/NC/S/77A-24D/ML/30</b>	3 way 2 position, direct acting, Normally Closed, 24Vdc, Manual Reset. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.01, 517 bar.
			<b>FP01/S2/M/32/NC/S/78A-155/ML</b>	3 way 2 position, direct acting, Normally Closed, Manual Reset. ATEX II I GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.01, 517 bar.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.

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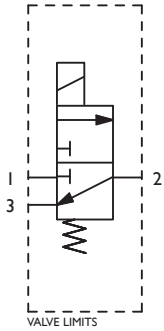

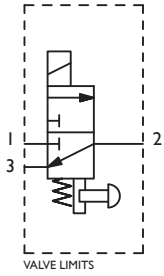
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Preferred Range


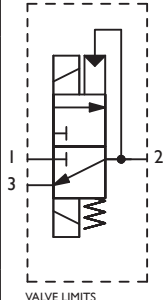







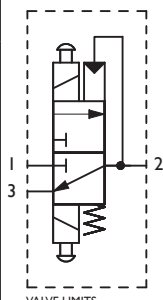






DIRECT ACTING SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>FP01 S3</b></p>		13	<b>FP01/S3/M/32/NC/S/74AT4-24D/36</b>	3 way 2 position, direct acting, Normally Closed, 24Vdc, Auto Reset. ATEX  II 2 GD c, Ex emb IIC T4 Gb IECEx  Ex emb IIC T4 Gb 3.6 Watt, Cv 0.01, 690 bar.
			<b>FP01/S3/M/32/NC/S/77A-24D/30</b>	3 way 2 position, direct acting, Normally Closed, 24Vdc, Auto Reset. ATEX  II 2 GD, Ex d IIC T6 IECEx  Ex d IIC T6 3.0 Watt, Cv 0.01, 690 bar.
			<b>FP01/S3/M/32/NC/S/78A-155</b>	3 way 2 position, direct acting, Normally Closed, Auto Reset. ATEX  II I GD, Ex ia IIC T6 Ga † IECEx  Ex ia IIC T6 Ga 155 Ohms, Cv 0.01, 690 bar.
 <p><b>FP01 S3 Manual Reset</b></p>		13	<b>FP01/S3/M/32/NC/S/74AT4-24D/ML/36</b>	3 way 2 position, direct acting, Normally Closed, 24Vdc, Manual Reset. ATEX  II 2 GD c, Ex emb IIC T4 Gb IECEx  Ex emb IIC T4 Gb 3.6 Watt, Cv 0.01, 690 bar.
			<b>FP01/S3/M/32/NC/S/77A-24D/ML/30</b>	3 way 2 position, direct acting, Normally Closed, 24Vdc, Manual Reset. ATEX  II 2 GD, Ex d IIC T6 IECEx  Ex d IIC T6 3.0 Watt, Cv 0.01, 690 bar.
			<b>FP01/S3/M/32/NC/S/78A-155/ML</b>	3 way 2 position, direct acting, Normally Closed, Manual Reset. ATEX  II I GD, Ex ia IIC T6 Ga † IECEx  Ex ia IIC T6 Ga 155 Ohms, Cv 0.01, 690 bar.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.

Solenoid Valves



DIRECT ACTING SOLENOID VALVES				
Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>FP01</b> S1 / S1, S2 / S2 &amp; S3 / S3</p>		14	<b>FP01/S1/S1/M/32/NC/S/74AT4-24D/SB/36</b>	3 way 2 position, direct acting, Normally Closed, 24Vdc, pulse operated, bi-stable, hydraulically latched, fail to close on loss of pressure, Auto Reset. ATEX  II 2 GD c, Ex emb IIC T4 Gb IECEx  Ex emb IIC T4 Gb 3.6 Watt, Cv 0.01, 345 bar.
			<b>FP01/S2/S2/M/32/NC/S/77A-24D/SB/30</b>	3 way 2 position, direct acting, Normally Closed, 24Vdc, pulse operated, bi-stable, hydraulically latched, fail to close on loss of pressure, Auto Reset. ATEX  II 2 GD, Ex d IIC T6 IECEx  Ex d IIC T6 3.0 Watt, Cv 0.01, 517 bar.
			<b>FP01/S3/S3/M/32/NC/S/78A-155/SB</b>	3 way 2 position, direct acting, Normally Closed, pulse operated, bi-stable, hydraulically latched, fail to close on loss of pressure, Auto Reset. ATEX  II 1 GD, Ex ia IIC T6 Ga † IECEx  Ex ia IIC T6 Ga † 155 Ohms, Cv 0.01, 690 bar.
 <p><b>FP01</b> S1 / S1, S2 / S2 &amp; S3 / S3 Manual Override Spring Return</p>		14	<b>FP01/S1/S1/M/32/NC/S/74AT4-24D/SB/M/36</b>	3 way 2 position, direct acting, Normally Closed, 24Vdc, pulse operated, bi-stable, hydraulically latched, fail to close on loss of pressure. *Manual Override. ATEX  II 2 GD c, Ex emb IIC T4 Gb IECEx  Ex emb IIC T4 Gb 3.6 Watt, Cv 0.01, 345 bar.
			<b>FP01/S2/S2/M/32/NC/S/77A-24D/SB/M/30</b>	3 way 2 position, direct acting, Normally Closed, 24Vdc, pulse operated, bi-stable, hydraulically latched, fail to close on loss of pressure. *Manual Override. ATEX  II 2 GD, Ex d IIC T6 IECEx  Ex d IIC T6 3.0 Watt, Cv 0.01, 517 bar.
			<b>FP01/S3/S3/M/32/NC/S/78A-155/SB/M</b>	3 way 2 position, direct acting, Normally Closed, pulse operated, bi-stable, hydraulically latched, fail to close on loss of pressure. *Manual Override. ATEX  II 1 GD, Ex ia IIC T6 Ga † IECEx  Ex ia IIC T6 Ga † 155 Ohms, Cv 0.01, 690 bar.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.

\* Manual Override Spring Return.

**FP01 - S1 / S1, S2 / S2 & S3 / S3**

For the complete S1 / S1, S2 / S2 & S3 / S3 range, please see the selection chart on Page 14.

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## Overview

### Materials of Construction

Solenoid enclosure and valve manufactured from 316L stainless steel as standard.  
 Internal components are constructed from 316L stainless steel, AISI 440C, CA104 aluminium bronze and ceramic as standard.  
 Alternative materials are available for NACE MR-01-75 compliance.  
 Valve seals are supplied in Nitrile as standard. Alternative elastomers available for extreme conditions and to suite media.  
 Springs are manufactured from 316S42 stainless steel as standard.  
 Fasteners are metric A4 18 / 10 grade stainless steel; equivalent to 316L grade stainless steel.

### Technical Data

#### Operating Performance for FP01

Duty cycle 100% continuously rated / energised.

Surge suppression diode is fitted on all Ex d dc solenoid coils as standard.

Response times - pull in < 100ms, drop out < 70ms.

Solenoid Insulation - Class H.

Pull in volts to 90% of nominal. (checked at FAT to be within specified limits to guarantee safety factors).

Maximum volts at 110% of nominal.

IP66 & IP67 Ingress Protection to IEC 60529 and NEMA 4X for standard 7 series solenoid enclosures.

Bifold solenoid valves must be installed, operated and maintained in accordance with the relevant Bifold installation, operating and maintenance instructions, relevant installation rules and codes of practice.

### Product Options

Certification & Approval available



SIL 3 capability: The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3 in accordance with IEC 61508.

Solenoid valve assemblies can be mounted in any orientation. Solenoid enclosure can be rotated relative to the pilot stage valve body to suit cable entry.

Working pressure up to 690 bar. Maximum working pressure according to valve model.

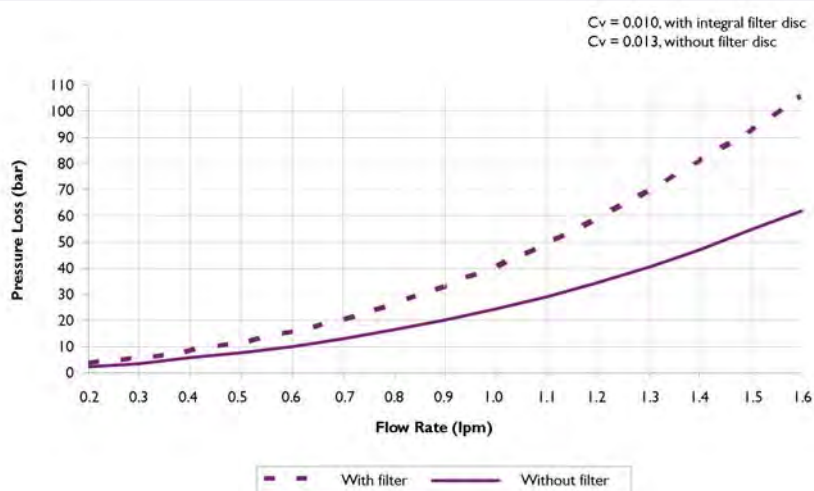
Operating media - Mineral oils, water glycol mixtures, sea water (filtered) and some chemicals.

For operating temperature range, please see solenoid valve type and seal options.

Manual Reset & Manual Override operator options.

Arctic Service options to -36°C.

### Flow Performance



Certification Details

Certification & Approval Details

**Type 74 Solenoid**

ATEX, Certificate Number Baseefa 09ATEX0040X.  
 II 2GD c Ex emb IIC T4 Gb Tamb -25°C to +50°C.  
 II 2GD c Ex emb IIC T3 Gb Tamb -25°C to +55°C.

IECEx, Certificate Number IECEx Bas 09.0012X.  
 Ex emb IIC T4 Gb Tamb -25°C to +50°C.  
 Ex emb IIC T3 Gb Tamb -25°C to +55°C.

Dual Labelled/Marked

**Type 77 Solenoid**

ATEX, Certificate Number Baseefa 10ATEX0026.  
 II 2 GD Ex d IIC T6 (Tamb -60°C to +40°C).  
 II 2 GD Ex d IIC T5 (Tamb -60°C to +55°C).  
 II 2 GD Ex d IIC T4 (Tamb -60°C to +90°C).

IECEx, Certificate Number IECEx Bas 10.0008.  
 Ex d IIC T6 (Tamb -60°C to +40°C).  
 Ex d IIC T5 (Tamb -60°C to +55°C).  
 Ex d IIC T4 (Tamb -60°C to +90°C).

Dual Labelled/Marked

**Type 78 Solenoid**

ATEX, Certificate Number Baseefa 02ATEX0124X.  
 II I GD Ex ia IIC T6 Ga (Tamb = -60°C to +60°C).  
 II I GD Ex ia IIC T4 Ga (Tamb = -60°C to +95°C).

IECEx, Certificate Number IECEx Bas 09.0092X.  
 Ex ia IIC T6 Ga (Tamb = -60°C to +60°C).  
 Ex ia IIC T4 Ga (Tamb = -60°C to +95°C).

Dual Labelled/Marked

**Type 77 Solenoid**

CSA (US), Certificate Number I398692.  
 Class I, Division I, Groups B, C & D for both Canada & USA.  
 Ex d IIC for Canada, AEx d IIC for USA.  
 T85°C -60°C to +40°C ambient.  
 T100°C -60°C to +55°C ambient.  
 T135°C -60°C to +90°C ambient.

**Type 77 Solenoid**

ATEX, Certificate Number Baseefa 10ATEX0026.  
 II 2GD Ex d IIC T6 (Tamb -60°C to +40°C).  
 II 2GD Ex d IIC T5 (Tamb -60°C to +55°C).  
 II 2GD Ex d IIC T4 (Tamb -60°C to +90°C).

Dual Labelled/Marked

**Type 77 Solenoid**

INMETRO, Certificate Number CEPEL-EX-097/2003X.  
 BR-Ex d IIC T6 -60°C to +40°C ambient.  
 BR-Ex d IIC T5 -60°C to +55°C ambient.  
 BR-Ex d IIC T4 -60°C to +90°C ambient.

**Type 78 Solenoid**

INMETRO, Certificate Number CEPEL-EX-532/05.  
 BR-Ex ia IIC T6 -60°C to +40°C ambient.  
 BR-Ex ia IIC T4 -60°C to +95°C ambient.

**Type 77 Solenoid**

GOST, Certificate Number B00763, RTN.  
 Ex d IIC T6 -60°C to +40°C ambient.  
 Ex d IIC T5 -60°C to +55°C ambient.  
 Ex d IIC T4 -60°C to +90°C ambient.

**Type 78 Solenoid**

GOST, Certificate Number B00015, RTN.  
 Permit Number PPC 00-28504.  
 Ex ia IIC T6 -60°C to +40°C ambient.  
 Ex ia IIC T5 -60°C to +55°C ambient.  
 Ex ia IIC T4 -60°C to +90°C ambient.

**Type 77 & 78 Solenoid**

GOST K, GGTN K Permit, Kazakhstan, BIF 7727 2.

**Label Rationalisation**

The temperature details on our solenoid valve labels have, to date, been laid out with a single ambient range and 'T' rating, as follows :-

- 77A3 - T4 (-60°C ≤ Tamb ≤ +90°C)
- or 77A6 - T5 (-60°C ≤ Tamb ≤ +55°C)
- or 77A9 - T6 (-60°C ≤ Tamb ≤ +40°C)

These are in the process of being replaced with a single label which covers all potential temperature parameters. Therefore the label will for example, read as follows :-

$$77A \left\{ \begin{array}{l} T4 (-60^\circ\text{C} \leq T_{amb} \leq +90^\circ\text{C}) \\ T5 (-60^\circ\text{C} \leq T_{amb} \leq +55^\circ\text{C}) \\ T6 (-60^\circ\text{C} \leq T_{amb} \leq +40^\circ\text{C}) \end{array} \right\}$$

For solenoid type 74, the maximum permissible ambient temperature is subject to the coil Wattage. Please see page 9. Please note that operation ambients are dependent upon seal types.

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## Port Connections

### Port Connections (FP01)

PORT CONNECTIONS TABLE			
Configuration	Pressure	Service	Vent
Normally Closed	1	2	3
Normally Open	3	2	1
Selector	1 & 3	2	N/A
Diverter	2	1 & 3	N/A

For port connections, please refer to selection chart ordering example on pages 13 & 14.

## Product Weights

### Approximate Standard Product Weights

PRODUCT WEIGHTS	
Product	Approximate Weight (Excluding Sub-base) (Kg)
S1, S2 & S3	2.5
S1 / S1, S2 / S2 & S3 / S3	5

## Solenoid Coil Spare

### Solenoid Coil Spare Selection Chart - Ordering Example Type 74 & 77

109		Coil Type
<b>XXX</b> Voltage (V)	74 (Ex emb) 24 & 48 Vdc 77 (Ex d) 12, 24, 48 & 110 Vdc 77 (Ex d) 110 & 240 Vac	Voltage
<b>XX</b> Power (W)	74 (Ex emb) 1.8 & 3.6 Watts 77 (Ex d) 1.5 & 3.0 Watts	Power
<b>EXM</b>		74 Only
<b>109-24DC-30 - EXM</b>		Ordering Example

For detailed information, please contact Bifold sales department.

## Solenoid Coil Spare

### Solenoid Coil Spare Selection Chart Ordering Example Type 78

109		Coil Type
<b>XXX</b> Nominal Voltage	78 (Ex ia) 12V	Nominal Voltage
<b>XX</b> Resistance (Ω)	78 (Ex ia) 155 Ohms	Resistance †
<b>109-12 - 155</b>		Ordering Example

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.

## Seal Repair Kit

### Seal Repair Kit Selection Chart - Ordering Example (FP01)

FP01		Model Code
<b>S1</b> 345 bar <b>S2</b> 517 bar <b>S3</b> 690 bar	<b>S1 / S1</b> 345 bar <b>S2 / S2</b> 517 bar <b>S3 / S3</b> 690 bar	Maximum Valve Pressure
<b>M</b>	Sub-base Mounting	Connections
<b>22</b> <b>32</b>	2-way, 2-position 3-way, 2-position	Valve Configuration
<b>NC</b> <b>NO</b> <b>SV</b> <b>DV</b>	Normally Closed Normally Open Selector Valve Diverter Valve	
	3 / 2 Only	
<b>S</b> <b>V</b> <b>SA</b>	Nitrile (standard) Viton Nitrile (Low Temperature)	
	<b>RK</b> Repair Kit	Repair Kit
<b>FP01-SX-M32-NC-S-RK</b>		Ordering Example









When ordering the seal repair kits, please ensure that the serial number of the valve to be overhauled is submitted with the enquiry / order.



Ex emb Options

Options Table I 74 (Ex emb)

SOLENOID OPTIONS TABLE I 74 (Ex emb)

Product Type	Solenoid Order Code	Typical Apparatus Code	Standard Voltage	Power Consumption (W)	CV Rate	Temperature Range (°C)	Ingress Protection	Cable Entry Connection	Certification Options
 FP01 (S1)	74	Ex emb IIC T3 / T4	24Vdc 48Vdc	1.8 3.6	0.01	<b>Media #</b> -20°C to +40°C -25°C to +40°C -20°C to +55°C -25°C to +55°C  <b>Ambient</b> -25°C to +55°C (T3) (Up to 3.0W) -25°C to +50°C (T4) (Up to 4.0W) -25°C to +40°C (T3) (3.0W - 6.8W)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	
 FP01 (S2)									
 FP01 (S3)									
 FP01 (S1 / S1)	74	Ex emb IIC T3 / T4	24Vdc 48Vdc	1.8 3.6	0.01	<b>Media #</b> -20°C to +40°C -25°C to +40°C -20°C to +55°C -25°C to +55°C  <b>Ambient</b> -25°C to +55°C (T3) (Up to 3.0W) -25°C to +50°C (T4) (Up to 4.0W) -25°C to +40°C (T3) (3.0W - 6.8W)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	
 FP01 (S2 / S2)									
 FP01 (S3 / S3)									

For detailed information on certification, please see page 8.

Other Wattages available upon request.

# Permissible media operating temperatures are dependent upon the selected O-Ring material. Please refer to the product selection charts on pages 13 to 14.









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Ex d Options

Options Table 2 77 (Ex d)

SOLENOID OPTIONS TABLE 2 77 (Ex d)									
Product Type	Solenoid Order Code	Typical Apparatus Code	Standard Voltage	Power Consumption (W)	CV Rate	Temperature Range (°C)	Ingress Protection	Cable Entry Connection	Certification Options
 FP01 (S1)	77	Ex d IIC T6, T5 or T4	12 Vdc 24 Vdc 48 Vdc 110 Vdc  110 Vac 240 Vac 50 or 60 Hz	1.5  3.0	0.01	<b>Media #</b> -20°C to +90°C (T4) -60°C to +90°C (T4)  <b>Ambient</b> -60°C to +40°C (T6) -60°C to +55°C (T5) -60°C to +90°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (½" NPT Option)	
 FP01 (S2)									
 FP01 (S3)									
 FP01 (S1 / S1)	77	Ex d IIC T6, T5 or T4	12 Vdc 24 Vdc 48 Vdc 110 Vdc  110 Vac 240 Vac 50 or 60 Hz	1.5  3.0	0.01	<b>Media #</b> -20°C to +90°C (T4) -60°C to +90°C (T4)  <b>Ambient</b> -60°C to +40°C (T6) -60°C to +55°C (T5) -60°C to +90°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (½" NPT Option)	
 FP01 (S2 / S2)									
 FP01 (S3 / S3)									















For detailed information on certification, please see page 8.

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# Permissible media operating temperatures are dependent upon the selected O-Ring material. Please refer to the product selection charts on pages 13 to 14.

Ex ia Options

Options Table 3 78 (Ex ia)

SOLENOID OPTIONS TABLE 3 78 (Ex ia)							
Product Type	Solenoid Order Code	Typical Apparatus Code	CV Rate	Temperature Range	Ingress Protection	Cable Entry Connection	Certification Options
 FP01 (S1)	78 †	Ex ia IIC T6 or T4	0.01	<b>Media #</b> -20°C to +95°C -60°C to +95°C  <b>Ambient</b> -60°C to +60°C (T6) -60°C to +95°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	 ATEX IECEx  INMETRO  GOST  GOST K GGTN
 FP01 (S2)							
 FP01 (S3)							
 FP01 (S1 / S1)	78 †	Ex ia IIC T6 or T4	0.01	<b>Media #</b> -20°C to +95°C -60°C to +95°C  <b>Ambient</b> -60°C to +60°C (T6) -60°C to +95°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	 ATEX IECEx  INMETRO  GOST  GOST K GGTN
 FP01 (S2 / S2)							
 FP01 (S3 / S3)							

For detailed information on certification, please see page 8.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.

# Permissible media operating temperatures are dependent upon the selected O-Ring material. Please refer to the product selection charts on pages 13 to 14.

**Safety Parameters: Type 78**

U<sub>i</sub> = 31 V, I<sub>i</sub> = 210 mA, P<sub>i</sub> = 1.5 W, C<sub>i</sub> = 0 µF, L<sub>i</sub> = 0 mH

Coil Resistance : 155 Ohm ± 5%

Minimum Current @ solenoid coil = 80 mA

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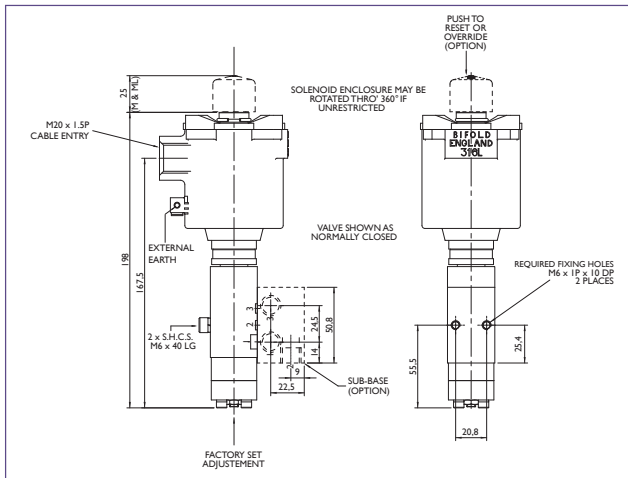
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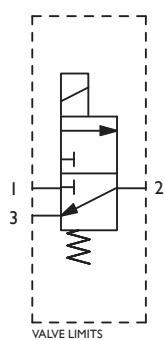


FP01 (S1, S2 & S3)

Dimensional Drawing

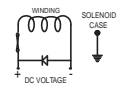


SCHEMATIC 3/2 NC

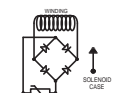
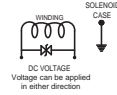


Wiring Diagrams

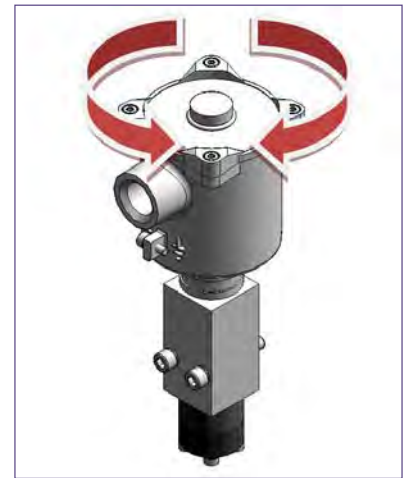
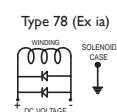
Type 74 (Ex emb)



Type 77 (Ex d)



Type 78 (Ex ia)



FP01 Selection Chart - Ordering Example

<b>FP01</b>		Model Code	
<b>S1</b> 345 bar <b>S2</b> 517 bar <b>S3</b> 690 bar	Direct acting, spring return		Maximum Valve Pressure
<b>M</b>	Sub-base Mounting		Connections
<b>22</b> <b>32</b>	2-way, 2-position (effected by omitting / plugging one port in the sub-base) 3-way, 2-position		Valve Configuration
<b>NC</b> <b>NO</b> <b>SV</b> <b>DV</b>	Normally Closed Normally Open Selector Valve } 3 / 2 Only Diverter Valve }		
<b>S</b> <b>V</b> <b>SA</b>	Nitrile (standard) (-30°C to +130°C) Viton (-20°C to +180°C) Nitrile (Low Temperature) (-36°C to +180°C)		
<b>XX</b>	Refer to solenoid options tables.	74 (Ex emb) Page 10 - Table 1 77 (Ex d) Page 11 - Table 2 78 (Ex ia) Page 12 - Table 3	Solenoid
<b>A</b> <b>G</b> <b>I</b> <b>U</b>	ATEX/IECEx Dual Certified/Labelled GOST INMETRO CSA (US) ATEX Dual Certified/Labelled	<b>74(Ex emb)</b>	Solenoid Approval
		<b>77(Ex d)</b>	
		<b>78(Ex ia)</b>	
		<b>T4</b> Class ≤ 4.0 W (50°C maximum ambient temperature)	
<b>XXX</b>	Voltage, refer to Solenoid option tables.	74 (Ex emb) Page 10 - Table 1 77 (Ex d) Page 11 - Table 2	Voltage
<b>XX</b>	Resistance (Ω)	78 (Ex ia) - 155 Ohms Page 12 - Table 3	Resistance †
<b>M</b> <b>ML</b> <b>MOR</b>	Electrical to switch or temporary manual override Electrical and manual required Electrical to switch or stayput manual override		Options
<b>XX</b>	Power (W)	74 (Ex emb) - 1.8 & 3.6 Watts Page 10 - Table 1 77 (Ex d) - 1.5 & 3.0 Watts Page 11 - Table 2	Power
<b>K85</b>	1/2" NPT cable entry		Option
<b>H2S</b>	NACE MR-01-75 compliant internal wetted and body materials		Option
<b>M221</b> <b>M437</b>	1/4" NPT 1/4" BSPP		Sub-Base Options

FP01 / S1 / M/32 / NC / S / 74 A T4-24D / ML/36 / K85 / H2S / [M221]

Ordering Example

For the shaded block sections, please refer to the same shaded sections on pages 10, 11 & 12.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system. The solenoid valve installation operating and maintenance instruction reference is OP0165.

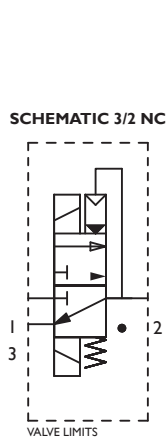
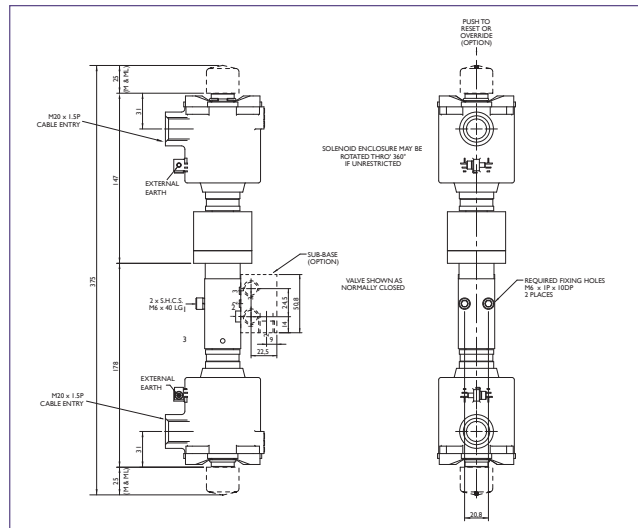
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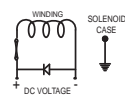
FP01 (S1/S1,S2/S2&S3/S3)

Dimensional Drawing

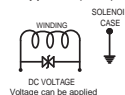


Wiring Diagrams

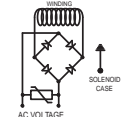
Type 74 (Ex emb)



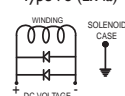
Type 77 (Ex d)



Type 78 (Ex ia)



Type 78 (Ex ia)



FP01 Selection Chart - Ordering Example

<b>FP01</b>			Model Code
<b>S1 / S1</b> <b>S2 / S2</b> <b>S3 / S3</b>	345 bar 517 bar 690 bar	Pulse operated, hydraulically latched, spring bias to close on loss of pressure	Maximum Valve Pressure
<b>M</b>	Sub-base Mounting		Connections
<b>32</b>	3-way, 2-position		Valve Configuration
<b>NC</b>	Normally Closed		Valve Configuration
<b>S</b> <b>V</b> <b>SA</b>	Nitrile (standard) Viton Nitrile (Low Temperature)	(-30°C to +130°C) (-20°C to +180°C) (-36°C to +180°C)	O-ring Material
<b>XX</b>	Refer to solenoid options tables.	74 (Ex emb) 77 (Ex d) 78 (Ex ia)	Solenoid
<b>A</b> <b>G</b> <b>I</b> <b>U</b>	ATEX/IECEx Dual Certified/Labelled GOST INMETRO CSA (US) ATEX Dual Certified/Labelled	74(Ex emb) ✓ 77(Ex d) ✓ 78(Ex ia) ✓	Solenoid Approval
<b>T4</b>	Class ≤ 4.0 W (50°C maximum ambient temperature)		Ex emb 'T' Option
<b>XXX</b>	Voltage, refer to Solenoid option tables.	74 (Ex emb) 77 (Ex d)	Voltage
<b>XX</b>	Resistance (Ω)	78 (Ex ia) - 155 Ohms	Resistance †
<b>SB</b>	Spring bias to close on loss of hydraulic supply pressure		Default Position
<b>M</b> <b>ML</b> <b>MOR</b>	Electrical to switch or temporary manual override Electrical and manual required Electrical to switch or stayput manual override		Options
<b>XX</b>	Power (W)	74 (Ex emb) - 1.8 & 3.6 Watts 77 (Ex d) - 1.5 & 3.0 Watts	Power
<b>K85</b>	1/2" NPT cable entry		Option
<b>H2S</b>	NACE MR-01-75 compliant internal wetted and body materials		Option
<b>M221</b> <b>M437</b>	1/4" NPT 1/4" BSP		Sub-Base Options
<b>FP01/S1/S1/M/32/NC/S / 74 A T4-24D/SB / M / 36 / K85 / HS2 / [M221]</b>			Ordering Example

For the shaded block sections, please refer to the same shaded sections on pages 10, 11 & 12.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system. The solenoid valve installation operating and maintenance instruction reference is OP0165.

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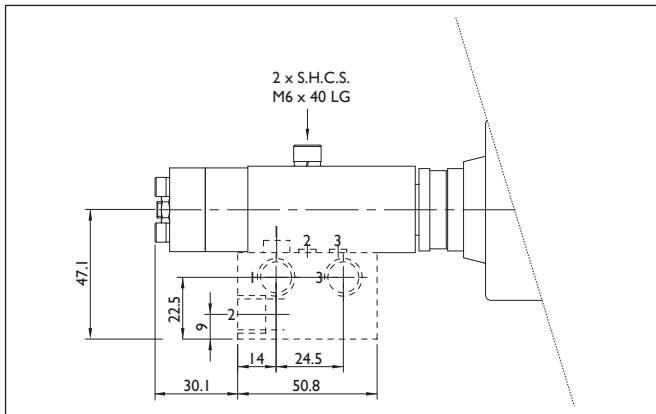
Bifold  
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Bifold Group  
of companies



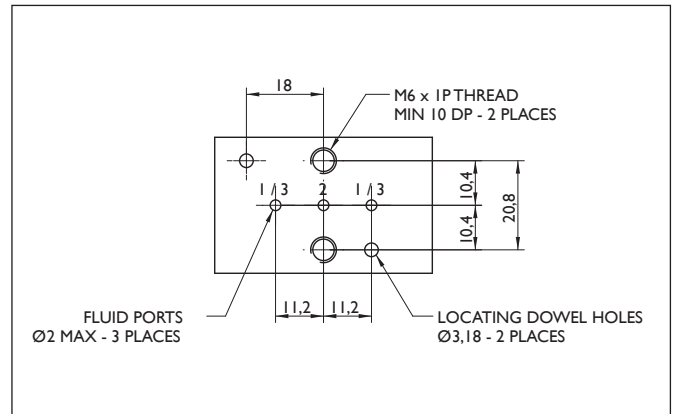


## Interface Details

### Bifold Supplied Sub-Base Detail

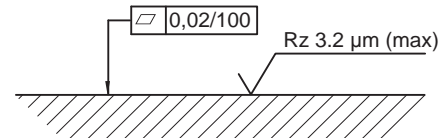


### Interface Detail ( For Customer Designed Sub-Base)



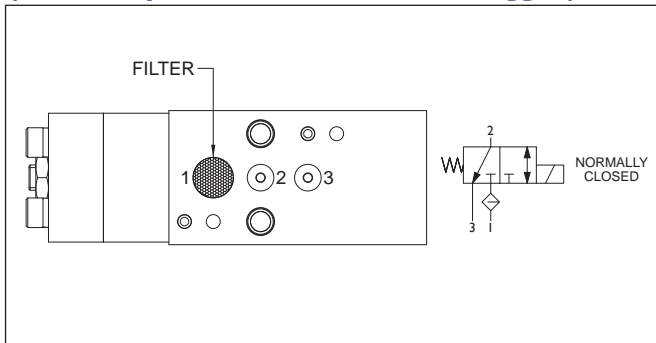
### Surface Finish Requirements

Valve Manifold Mounting - Surface Finish Requirements:-  
(applicable to full extent of valve/manifold interface)

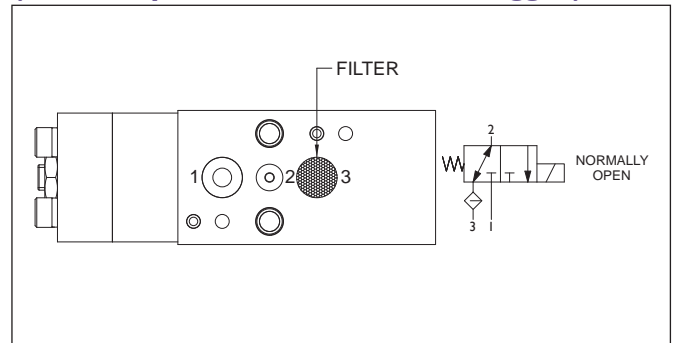


## Configurations

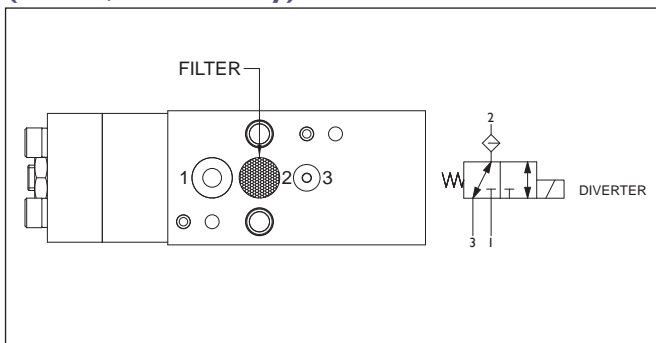
### 3-Way, 2-Position Normally Closed (For 2-Way Valve Port 3 Must Be Plugged)



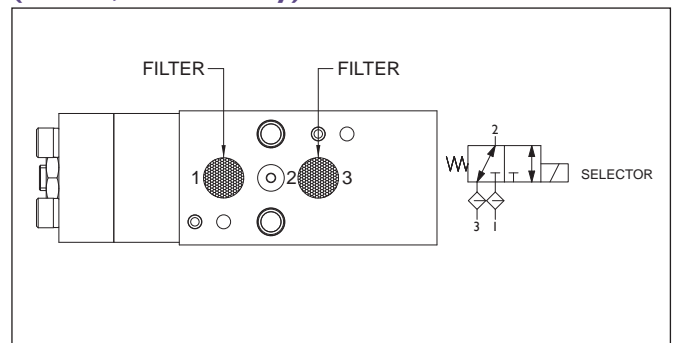
### 3-Way, 2-Position Normally Open (For 2-Way Valve Port 1 Must Be Plugged)



### 3-Way Diverter (For S1,S2 & S3 only)



### 3-Way Selector (For S1,S2 & S3 only)



Options

Product Options

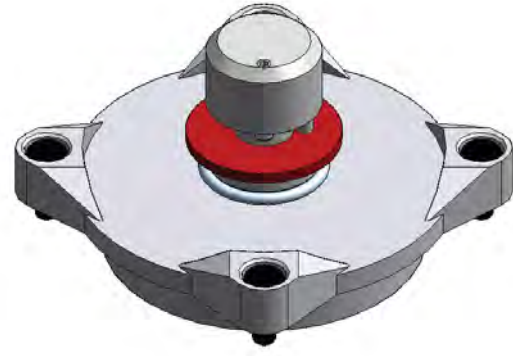
The range of products displayed in this brochure, are designed to accommodate all the options shown below. If the style or arrangement required for your application is not shown, please contact our office with full description and specification details.



**Type M - Electrical to Switch or Temporary Manual Override (Spring Return)**

Manual Override Type M

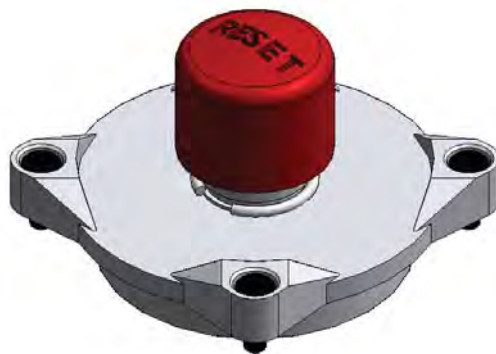
The solenoid valve switches on and off with the electrical supply. The manual override button can be pressed to operate the valve when the solenoid is in the electrically de-energised position. The manual override is non-detented, i.e. does not latch in position. When the button is released, the valve spring returns.



**Type MOR - Electrical to Switch or Temporary Manual Rotary Override (Stayput)**

Manual Rotary Override Type MOR

The solenoid valve switches on and off with the electrical supply. The manual override button is rotated through  $\frac{3}{4}$  turn to operate the valve when the solenoid is in the electrically de-energised position. The manual override is detented, i.e. remains in position until rotated back to its original position when the valve spring returns.



**Type ML - Electrical and Manual Required to Latch**

Manual Reset Type ML

Apply the electrical signal and press the reset button. The valve moves to the energised position and will not de-energise until the electrical supply is removed. The manual reset is non-detented, spring return, i.e. does not latch in position. The valve cannot be moved to the energised position by pressing the button if there is no electrical supply to the solenoid.

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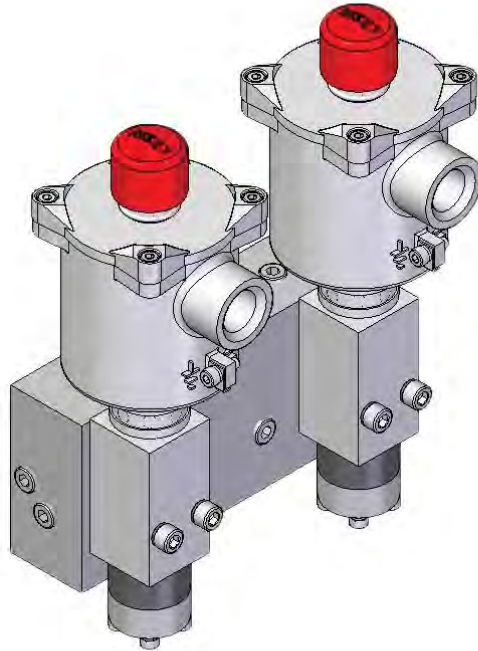
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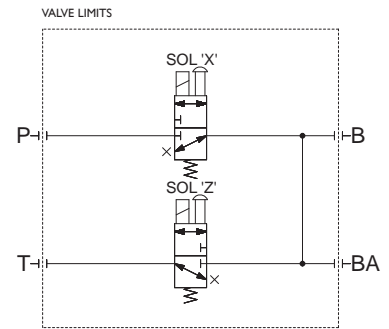
Typical Assemblies



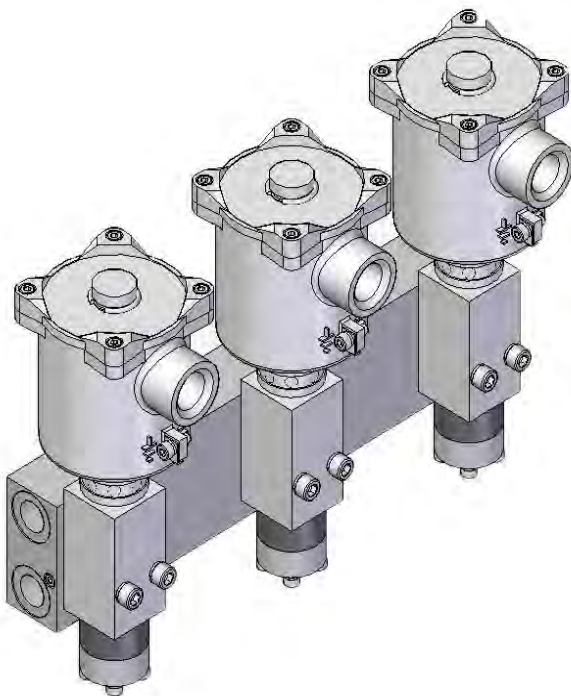
Typical Valve Assembly Showing FP01 Solenoid Valves - Manual Reset



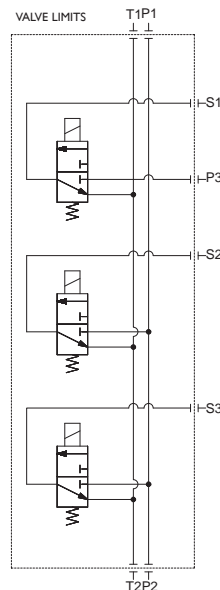
Schematic



Typical Valve Assembly Showing FP01 Solenoid Valves



Schematic



**Instrument, Process,  
Directional Control Valves,  
and Pumps**

**Bifold® Group**

**Pneumatic and  
Instrumentation Valves**

**Hydraulic Valves**

**Subsea Valves**

**Hydraulic Pumps,  
Intensifiers and Valves**

**Bifold®**

**Bifold FluidPower®**

**Bifold® Subsea**

**Bifold®  Marshalsea**

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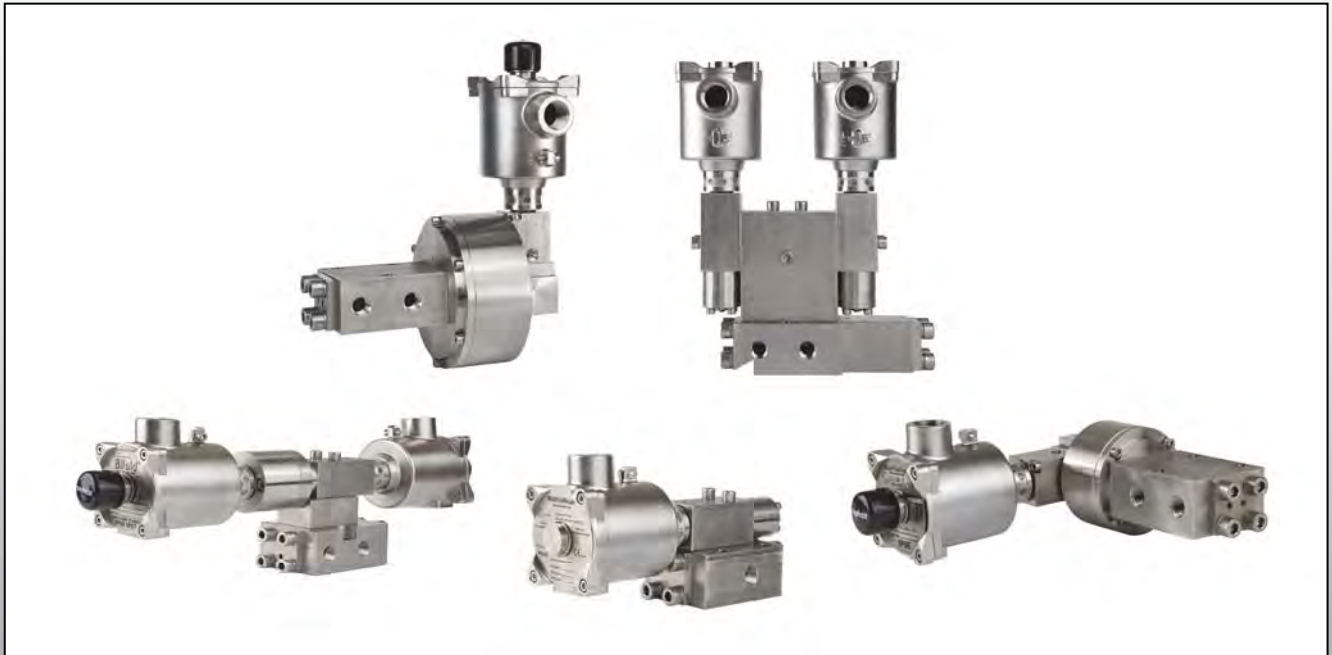
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## **Indirect Acting Solenoid Valves Model FPI5 (Up to 690 bar, 15 litres per minute)**



### **Superior Performance Throughout the Full Operational Range**

- Compact Design
- Solenoid Valve
  - Certified as SIL 3 Capable
- Solenoid Free to Rotate Through 360°
- 316L Stainless Steel Solenoid Enclosure and Valve
- NACE MR-01-75 Internal Wetted and Body Materials (Option)
- Arctic Service Options to -36°C
- Seated Ball design offers extremely low leakage (Less Accumulation Required, Smaller Pump Size & Duty)
- Worldwide Solenoid Approvals
  - Ex d, Ex ia, Ex emb and Explosion Proof
- ATEX  IEC  CE  US  INMETRO  PG   
- Low Power
- Up to 690 bar Working Pressure

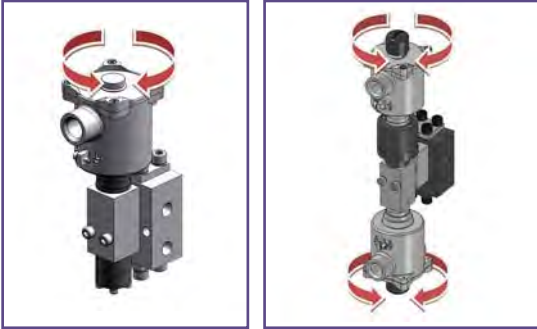


## Features & Benefits

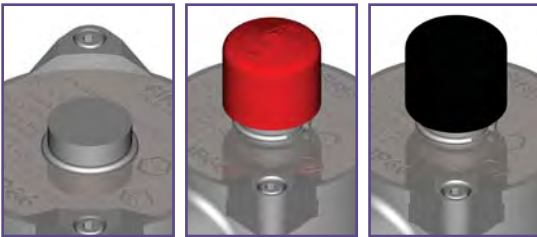
### Worldwide Approvals



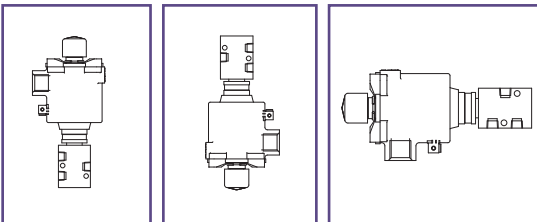
### Solenoid Operator is Free to Rotate 360°



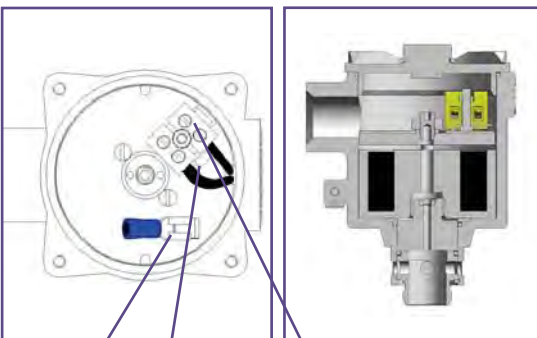
### Widest Range of Override Options



### Valve can be Mounted in any Orientation



### Spacious Enclosure for Ease of Wiring



Internal Earth Connection    Surge Suppression Diode Ex d (dc)    Terminal Block

### Standard Solenoid Operator Equipment Design & Build

- Worldwide Approval
- Solenoid operator is free to rotate 360° allowing for an easy cable layout and ease of connection wiring. Solenoid operator internals rotate with the enclosure and prevent cables being pulled out of terminal block.
- Widest range of override options (Auto Reset, Spring Return Manual Override, Stayput Manual Override and Manual Reset).
- Worldwide technical and field support.
- Standard solenoid valve can be mounted in any orientation to simplify installation due to all the components having enhanced rotational capabilities.

### Commissioning and Maintenance Benefits for the Standard Solenoid Valve

- Tropicalised solenoid operator design - 316L stainless steel enclosure; stainless steel or Remko B magnetic parts (dependant upon solenoid Ex type) Fully encapsulated coil.
- Spacious solenoid enclosure for ease of wiring.
- No time penalty for heat dissipation before removing solenoid enclosure cover.
- No special high temperature cable requirements.

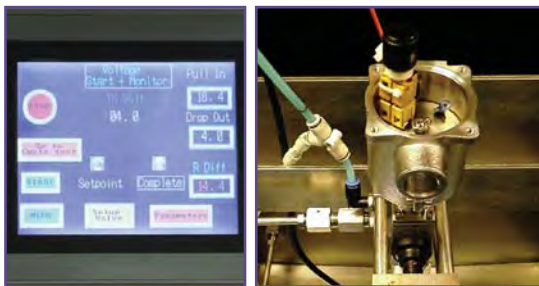
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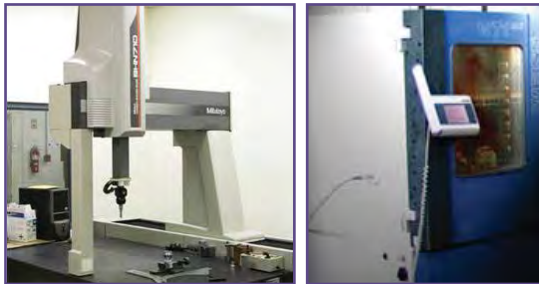
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## Features & Benefits

**SIL 3 Capability, FMEA, Extensive Qualification Testing Coupled with 100% Computerised Diagnostic Test Procedures.**



### State of the Art Testing



### Simple Maintenance



### Safety and Environmental Benefits

- **SIL 3 capability:** The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3.
- Force balanced valve design with high safety factors to de-energise at all pressures in Normally Open and Normally Closed configurations.
- 100% computerised diagnostic testing to ensure each solenoid valve is proven along with confirmed safety factors.
- Bifold has state of the art testing and qualification equipment including endurance, environment, climatic, performance, function and leakage testing.
- The standard solenoid operator is a holding magnet type which ensures the valve will operate in damp conditions. The risk of corrosion to internal components is reduced, unlike other valve types that incorporate a solenoid core tube design with a 'wetted' armature that will only operate in dry air conditions!
- The standard solenoid valve has proven arctic service and low temperature performance.
- Products are manufactured, inspected, assembled and tested in our state of the art production facilities.
- Dry solenoid armature to prevent corrosion and affecting safe shut down.
- Simple maintenance - Removable transient suppression diode on Ex d DC solenoid valve assemblies and removable solenoid coil without removing valve from the tubing.


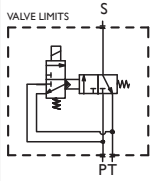

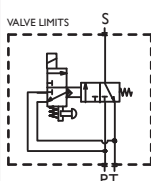

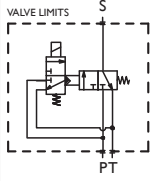

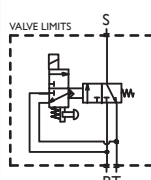
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**Quality Assurance**  
All Bifold products are manufactured to a most stringent QA programme to ensure that every product will give optimum performance and reliability. We are third party certified to BS EN ISO 9001:2008. Functional test certificates, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BS EN 10204 3.1 where available. We reserve the right to make changes to the specifications and design etc., without prior notice.

Preferred Range

INDIRECT ACTING SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>FP15</b> S1</p>		17	<b>FP15/S1/04/32/S/74AT4-24D/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6Watt, Cv 0.32, 345 bar.
			<b>FP15/S1/04/32/S/77A-24D/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0Watt, Cv 0.32, 345 bar.
			<b>FP15/S1/04/32/S/78A-155</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, Auto Reset. ATEX II 1 GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.32, 345 bar.
 <p><b>FP15</b> S1 Manual Reset</p>		17	<b>FP15/S1/04/32/S/74AT4-24D/ML/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Manual Reset. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6Watt, Cv 0.32, 345 bar.
			<b>FP15/S1/04/32/S/77A-24D/ML/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Manual Reset. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.32, 345 bar.
			<b>FP15/S1/04/32/S/78A-155/ML</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, Manual Reset. ATEX II 1 GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.32, 345 bar.
 <p><b>FP15</b> S2</p>		17	<b>FP15/S2/04/32/S/74AT4-24D/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6Watt, Cv 0.32, 517 bar.
			<b>FP15/S2/04/32/S/77A-24D/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.32, 517 bar.
			<b>FP15/S2/04/32/S/78A-155</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, Auto Reset. ATEX II 1 GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.32, 517 bar.
 <p><b>FP15</b> S2 Manual Reset</p>		17	<b>FP15/S2/04/32/S/74AT4-24D/ML/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Manual Reset. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6Watt, Cv 0.32, 517 bar.
			<b>FP15/S2/04/32/S/77A-24D/ML/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Manual Reset. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.32, 517 bar.
			<b>FP15/S2/04/32/S/78A-155/ML</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, Manual Reset. ATEX II 1 GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.32, 517 bar.

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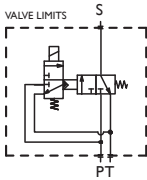

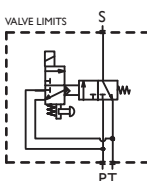
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Preferred Range

INDIRECT ACTING SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>FP15</b> S3</p>		17	<b>FP15/S3/04/32/S/74AT4-24D/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6 Watt, Cv 0.32, 690 bar.
			<b>FP15/S3/04/32/S/77A-24D/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.32, 690 bar.
			<b>FP15/S3/04/32/S/78A-155</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, Auto Reset. ATEX II 1 GD, Ex ia IIC T6 Ga IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.32, 690 bar.
 <p><b>FP15</b> S3 Manual Reset</p>		17	<b>FP15/S3/04/32/S/74AT4-24D/ML/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Manual Reset. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6 Watt, Cv 0.32, 690 bar.
			<b>FP15/S3/04/32/S/77A-24D/ML/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Manual Reset. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.32, 690 bar.
			<b>FP15/S3/04/32/S/78A-155/ML</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, Manual Reset. ATEX II 1 GD, Ex ia IIC T6 Ga IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.32, 690 bar.


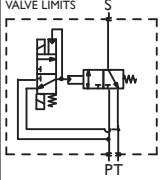

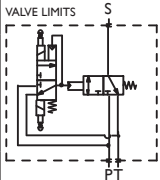

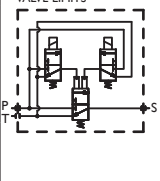

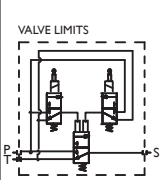
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Solenoid Valves



INDIRECT ACTING SOLENOID VALVES

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>FP15</b> S1 / S1, S2 / S2 &amp; S3 / S3</p>		18	<b>FP15/S1/S1/04/32/SI/74AT4-24D/SB/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, dual pulse operated, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6Watt, Cv 0.32, 345 bar.
			<b>FP15/S2/S2/04/32/SI/77A-24D/SB/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, dual pulse operated, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.32, 517 bar.
			<b>FP15/S3/S3/04/32/SI/78A-155/SB</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting dual pulse operated, Normally Closed, Auto Reset. ATEX II I GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.32, 690 bar.
 <p><b>FP15</b> S1 / S1, S2 / S2 &amp; S3 / S3 Manual Override Spring Return</p>		18	<b>FP15/S1/S1/04/32/SI/74AT4-24D/SB/M/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, dual pulse operated, Normally Closed, 24Vdc, *Manual override. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6Watt, Cv 0.32, 345 bar.
			<b>FP15/S2/S2/04/32/SI/77A-24D/SB/M/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, dual pulse operated, Normally Closed, 24Vdc, *Manual override. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.32, 517 bar.
			<b>FP15/S3/S3/04/32/SI/78A-155/SB/M</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting dual pulse operated, Normally Closed, *Manual override. ATEX II I GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.32, 690 bar.
 <p><b>FP15</b> DPSSI, DPSS2 &amp; DPSS3</p>		19	<b>FP15/DPSSI/04/32/SI/74AT4-24D/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6Watt, Cv 0.32, 345 bar.
			<b>FP15/DPSS2/04/32/SI/77A-24D/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.32, 517 bar.
			<b>FP15/DPSS3/04/32/SI/78A-155</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, Auto Reset. ATEX II I GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.32, 690 bar.
 <p><b>FP15</b> DPSSI, DPSS2 &amp; DPSS3 Manual Override Spring Return</p>		19	<b>FP15/DPSSI/04/32/SI/74AT4-24D/M/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, *Manual override. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6Watt, Cv 0.32, 345 bar.
			<b>FP15/DPSS2/04/32/SI/77A-24D/M/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, *Manual override. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.32, 517 bar.
			<b>FP15/DPSS3/04/32/SI/78A-155/M</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, *Manual override. ATEX II I GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.32, 690 bar.

FP15 - S1 / S1, S2 / S2 & S3 / S3

For the complete S1 / S1, S2 / S2 & S3 / S3 range, please see the selection chart on Page 18.

FP15 - DPSSI, DPSS2 & DPSS3

For the complete DPSSI, DPSS2 & DPSS3 range, please see the selection chart on Page 19.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.  
 \* Manual Override Spring Return.


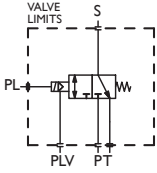

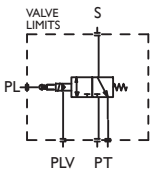

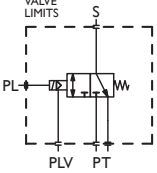

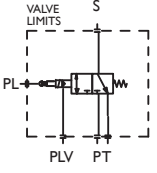
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Solenoid Valves

INDIRECT ACTING SOLENOID VALVES				
Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>FP15</b> S4 &amp; S5</p>		20	<b>FP15/S4/04/32/S/74AT4-24D/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6Watt, Cv 0.32, 414 bar.
			<b>FP15/S5/04/32/S/77A-24D/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.1, 690 bar.
			<b>FP15/S5/06/32/S/78A-370</b>	3/8" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, Auto Reset. ATEX II I GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 370 Ohms, Cv 0.1, 690 bar.
 <p><b>FP15</b> S4 &amp; S5 Manual Override Spring Return</p>		20	<b>FP15/S4/04/32/S/74AT4-24D/M/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc. *Manual override. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6Watt, Cv 0.32, 414 bar.
			<b>FP15/S5/04/32/S/77A-24D/M/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc. *Manual override. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.1 690 bar.
			<b>FP15/S5/06/32/S/78A-370/M</b>	3/8" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed. *Manual override. ATEX II I GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 370 Ohms, Cv 0.1, 690 bar.
 <p><b>FP15</b> S6</p>		21	<b>FP15/S6/04/32/S/74AT4-24D/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6Watt, Cv 0.32, 690 bar.
			<b>FP15/S6/04/32/S/77A-24D/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.32, 690 bar.
			<b>FP15/S6/04/32/S/78A-370</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, Auto Reset. ATEX II I GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 370 Ohms, Cv 0.32, 690 bar.
 <p><b>FP15</b> S6 Manual Override Spring Return</p>		21	<b>FP15/S6/04/32/S/74AT4-24D/M/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc. *Manual override. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6Watt, Cv 0.32, 690 bar.
			<b>FP15/S6/04/32/S/77A-24D/M/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc. *Manual override. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.32, 690 bar.
			<b>FP15/S6/04/32/S/78A-370/M</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed. *Manual override. ATEX II I GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 370 Ohms, Cv 0.32, 690 bar.

**FP15 - S4 & S5**

For the complete S4 & S5 range, please see the selection chart on Page 20.

**FP15 - S6**

For the complete S6 range, please see the selection chart on Page 21.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.  
 \* Manual Override Spring Return.

## Overview

### Materials of Construction

Solenoid enclosure and valve manufactured from 316L stainless steel as standard. Internal components are constructed from 316L stainless steel, AISI 440C, CA104 aluminium bronze and ceramic as standard. Alternative materials are available for NACE MR-01-75 compliance. Valve seals are supplied in Nitrile as standard. Alternative elastomers available for extreme conditions and to suite media. Springs are manufactured from 316S42 stainless steel as standard. Fasteners are metric A4 18 / 10 grade stainless steel; equivalent to 316L grade stainless steel.

### Technical Data

#### Operating Performance for FP15

Duty cycle 100% continuously rated / energised.  
Surge suppression diode is fitted on all Ex d dc solenoid coils as standard.  
Response times - pull in < 100ms, drop out < 70ms.  
Solenoid Insulation - Class H.  
Pull in volts to 90% of nominal. (checked at FAT to be within specified limits to guarantee safety factors).  
Maximum volts at 110% of nominal.  
IP66 & IP67 Ingress Protection to IEC 60529 and NEMA 4X for standard 7 series solenoid enclosures.  
Bifold solenoid valves must be installed, operated and maintained in accordance with the relevant Bifold installation, operating and maintenance instructions, relevant installation rules and codes of practice.

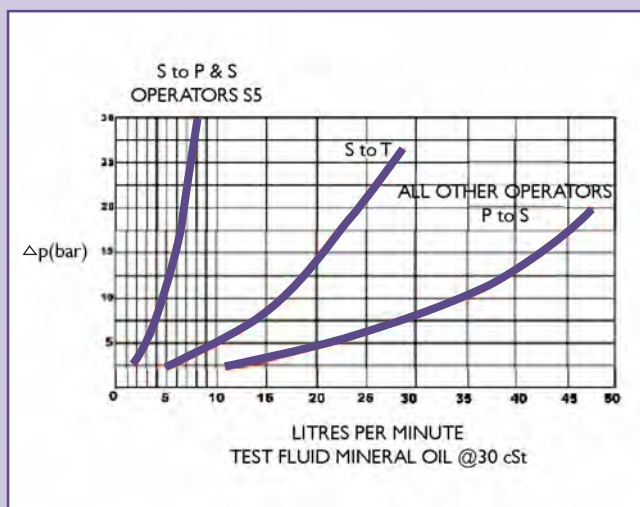
### Product Options

Certification & Approval options available

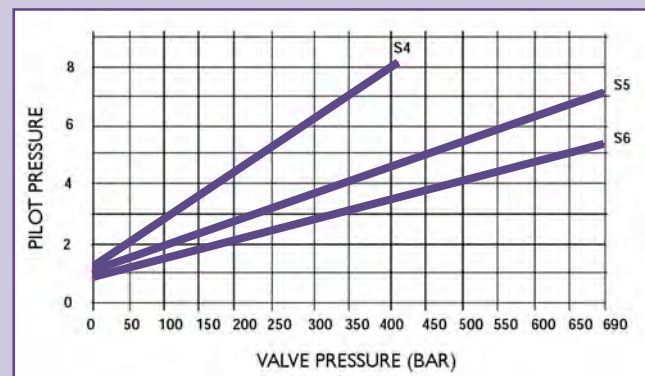


SIL 3 capability: The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3 in accordance with IEC 61508.  
Solenoid valve assemblies can be mounted in any orientation. Solenoid enclosure can be rotated relative to the pilot stage valve body to suit cable entry.  
Working pressure up to 690 bar. Maximum working pressure according to valve model.  
Operating media - Mineral oils, water glycol mixtures, sea water (filtered) and some chemicals (mainstage & high pressure pilot stages). Air, natural gas, bottled gases (low pressure pilot stages only).  
For operating temperature range, please see solenoid valve type and seal options.  
Higher voltage options available for line monitoring.  
Manual Reset, Manual Override and Manual Latch operator options.  
Arctic Service options to -36°C.

### Flow Performance



### Pilot Pressures



Minimum operating pressure 50 bar for types S1, S2, S3, S1 / S1, S2 / S2 & S3 / S3.  
For types S4, S5 & S6, see the graph above.

## Certification Details

### Certification & Approval Details

#### Type 74 Solenoid

ATEX, Certificate Number Baseefa 09ATEX0040X.  
 Ⓢ II 2GD c Ex emb IIC T4 Gb Tamb -25°C to +50°C.  
 Ⓢ II 2GD c Ex emb IIC T3 Gb Tamb -25°C to +55°C.

IECEx, Certificate Number IECEx Bas 09.0012X.  
 Ex emb IIC T4 Gb Tamb -25°C to +50°C.  
 Ex emb IIC T3 Gb Tamb -25°C to +55°C.

Dual Labelled/Marked

#### Type 77 Solenoid

ATEX, Certificate Number Baseefa 10ATEX0026.  
 Ⓢ II 2 GD Ex d IIC T6 (Tamb -60°C to +40°C).  
 Ⓢ II 2 GD Ex d IIC T5 (Tamb -60°C to +55°C).  
 Ⓢ II 2 GD Ex d IIC T4 (Tamb -60°C to +90°C).

IECEx, Certificate Number IECEx Bas 10.0008.  
 Ex d IIC T6 (Tamb -60°C to +40°C).  
 Ex d IIC T5 (Tamb -60°C to +55°C).  
 Ex d IIC T4 (Tamb -60°C to +90°C).

Dual Labelled/Marked

#### Type 78 Solenoid

ATEX, Certificate Number Baseefa 02ATEX0124X.  
 Ⓢ III 1 GD Ex ia IIC T6 Ga (Tamb = -60°C to +60°C).  
 Ⓢ III 1 GD Ex ia IIC T4 Ga (Tamb = -60°C to +95°C).

IECEx, Certificate Number IECEx Bas 09.0092X.  
 Ex ia IIC T6 Ga (Tamb = -60°C to +60°C).  
 Ex ia IIC T4 Ga (Tamb = -60°C to +95°C).

Dual Labelled/Marked

#### Type 77 Solenoid

CSA (US), Certificate Number 1398692.  
 Class I, Division I, Groups B, C & D for both  
 Canada & USA.  
 Ex d IIC for Canada, AEx d IIC for USA.  
 T85°C -60°C to +40°C ambient.  
 T100°C -60°C to +55°C ambient.  
 T135°C -60°C to +90°C ambient.

#### Type 77 Solenoid

ATEX, Certificate Number Baseefa 10ATEX0026.  
 Ⓢ II 2GD Ex d IIC T6 (Tamb -60°C to +40°C).  
 Ⓢ II 2GD Ex d IIC T5 (Tamb -60°C to +55°C).  
 Ⓢ II 2GD Ex d IIC T4 (Tamb -60°C to +90°C).

Dual Labelled/Marked

#### Type 77 Solenoid

INMETRO, Certificate Number CEPEL-EX-097/2003X.  
 BR-Ex d IIC T6 -60°C to +40°C ambient.  
 BR-Ex d IIC T5 -60°C to +55°C ambient.  
 BR-Ex d IIC T4 -60°C to +90°C ambient.

#### Type 78 Solenoid

INMETRO, Certificate Number CEPEL-EX-532/05.  
 BR-Ex ia IIC T6 -60°C to +40°C ambient.  
 BR-Ex ia IIC T4 -60°C to +95°C ambient.

#### Type 77 Solenoid

PG GOST, Certificate Number B00763, RTN.  
 Ex d IIC T6 -60°C to +40°C ambient.  
 Ex d IIC T5 -60°C to +55°C ambient.  
 Ex d IIC T4 -60°C to +90°C ambient.

#### Type 78 Solenoid

PG GOST, Certificate Number B00015, RTN.  
 Permit Number PPC 00-28504.  
 Ex ia IIC T6 -60°C to +40°C ambient.  
 Ex ia IIC T5 -60°C to +55°C ambient.  
 Ex ia IIC T4 -60°C to +90°C ambient.

#### Type 77 & 78 Solenoid

PG GOST K, GGTN K Permit, Kazakhstan,  
 BIF 7727 2.

### Label Rationalisation

The temperature details on our solenoid valve labels have, to date, been laid out with a single ambient range and 'T' rating as follows :-

77A3 - T4 (-60°C ≤ Tamb ≤ +90°C)  
 or 77A6 - T5 (-60°C ≤ Tamb ≤ +55°C)  
 or 77A9 - T6 (-60°C ≤ Tamb ≤ +40°C)

These are in the process of being replaced with a single label which covers all potential temperature parameters. Therefore the label will for example, read as follows :-

77A { T4 (-60°C ≤ Tamb ≤ +90°C)  
 T5 (-60°C ≤ Tamb ≤ +55°C)  
 T6 (-60°C ≤ Tamb ≤ +40°C) }

For solenoid type 74, the maximum permissible ambient temperature is subject to the coil Wattage. Please see page 10. Please note that operation ambients are dependent upon seal types.

## Port Connections

### Port Connections (FP15)

**PORT CONNECTIONS TABLE**

Configuration	Pressure	Service	Vent	Pilot Supply	Pilot Vent
Normally Closed	P	S	T	PL	TL

For port connections, please refer to selection chart ordering example on pages 17, 18, 19, 20 & 21.

## Product Weights

### Approximate Standard Product Weights

**PRODUCT WEIGHTS**

Product	Approximate Weight (Excluding Sub-base) (Kg)
S1, S2 & S3	4
S1 / S1, S2 / S2 & S3 / S3	8.5
DPSS1, DPSS2 & DPSS3	9
S4 & S5	5.2
S6	7

## Seal Repair Kit

### Seal Repair Kit Selection Chart - Ordering Example (FP15)

FP15	Model Code																								
<table border="0"> <tr> <td>S1</td> <td>345 bar</td> <td>DPSS1</td> <td>345 bar</td> </tr> <tr> <td>S2</td> <td>517 bar</td> <td>DPSS2</td> <td>517 bar</td> </tr> <tr> <td>S3</td> <td>690 bar</td> <td>DPSS3</td> <td>690 bar</td> </tr> <tr> <td>S1 / S1</td> <td>345 bar</td> <td>S4</td> <td>414 bar</td> </tr> <tr> <td>S2 / S2</td> <td>517 bar</td> <td>S5</td> <td>690 bar</td> </tr> <tr> <td>S3 / S3</td> <td>690 bar</td> <td>S6</td> <td>690 bar</td> </tr> </table>	S1	345 bar	DPSS1	345 bar	S2	517 bar	DPSS2	517 bar	S3	690 bar	DPSS3	690 bar	S1 / S1	345 bar	S4	414 bar	S2 / S2	517 bar	S5	690 bar	S3 / S3	690 bar	S6	690 bar	Maximum Valve Pressure
S1	345 bar	DPSS1	345 bar																						
S2	517 bar	DPSS2	517 bar																						
S3	690 bar	DPSS3	690 bar																						
S1 / S1	345 bar	S4	414 bar																						
S2 / S2	517 bar	S5	690 bar																						
S3 / S3	690 bar	S6	690 bar																						
<table border="0"> <tr> <td>22</td> <td>2 way, 2 - position</td> </tr> <tr> <td>32</td> <td>3 way, 2 - position</td> </tr> </table>	22	2 way, 2 - position	32	3 way, 2 - position	Valve Configuration																				
22	2 way, 2 - position																								
32	3 way, 2 - position																								
<table border="0"> <tr> <td>S</td> <td>Nitrile (standard)</td> </tr> <tr> <td>V</td> <td>Viton</td> </tr> <tr> <td>SA</td> <td>Nitrile (Low Temperature)</td> </tr> </table>	S	Nitrile (standard)	V	Viton	SA	Nitrile (Low Temperature)	O-ring Material																		
S	Nitrile (standard)																								
V	Viton																								
SA	Nitrile (Low Temperature)																								
RK	Repair Kit																								
FP15-SX-32-SRK	Ordering Example																								

When ordering the seal repair kits, please ensure that the serial number of the valve to be overhauled is submitted with the enquiry / order.

## Solenoid Coil Spare

### Solenoid Coil Spare Selection Chart - Ordering Example Type 74 & 77

109	Coil Type													
<table border="0"> <tr> <td>XXX Voltage (V)</td> <td>74 (Ex emb) 24 &amp; 48 Vdc</td> <td rowspan="3">Voltage</td> </tr> <tr> <td></td> <td>77 (Ex d) 12, 24, 48 &amp; 110 Vdc</td> </tr> <tr> <td></td> <td>77 (Ex d) 110 &amp; 240 Vac</td> </tr> <tr> <td>XX Power (W)</td> <td>74 (Ex emb) 1.8 &amp; 3.6Watts</td> <td rowspan="2">Power</td> </tr> <tr> <td></td> <td>77 (Ex d) 1.5 &amp; 3.0Watts</td> </tr> <tr> <td>109-24DC-30</td> <td>Ordering Example</td> </tr> </table>	XXX Voltage (V)	74 (Ex emb) 24 & 48 Vdc	Voltage		77 (Ex d) 12, 24, 48 & 110 Vdc		77 (Ex d) 110 & 240 Vac	XX Power (W)	74 (Ex emb) 1.8 & 3.6Watts	Power		77 (Ex d) 1.5 & 3.0Watts	109-24DC-30	Ordering Example
XXX Voltage (V)	74 (Ex emb) 24 & 48 Vdc	Voltage												
	77 (Ex d) 12, 24, 48 & 110 Vdc													
	77 (Ex d) 110 & 240 Vac													
XX Power (W)	74 (Ex emb) 1.8 & 3.6Watts	Power												
	77 (Ex d) 1.5 & 3.0Watts													
109-24DC-30	Ordering Example													

For detailed information, please contact Bifold sales department.

## Solenoid Coil Spare

### Solenoid Coil Spare Selection Chart Ordering Example Type 78





109	Coil Type	
XXX Nominal Voltage	78 (Ex ia) 12V	Nominal Voltage
XX Resistance (Ω)	78 (Ex ia) 155 Ohms	Resistance †
	78 (Ex ia) 370 Ohms - (S4, S5 & S6 only)	
109-12 - 155	Ordering Example	





† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.



Ex emb Options

Options Table I 74 (Ex emb)

HIGH PRESSURE SOLENOID OPTIONS TABLE I 74 (Ex emb)									
Product Type	Solenoid Order Code	Typical Apparatus Code	Standard Voltage	Power Consumption (W)	CV Rate	Temperature Range (°C)	Ingress Protection	Cable Entry Connection	Certification Options
 FP15 (S1)	74	Ex emb II C T3 / T4	24 Vdc 48 Vdc	1.8 3.6	0.32	<b>Media #</b> -20°C to +40°C -25°C to +40°C -20°C to +55°C -25°C to +55°C  <b>Ambient</b> -25°C to +55°C (T3) (Up to 3.0W) -25°C to +50°C (T4) (Up to 4.0W) -25°C to +40°C (T3) (3.0W - 6.8W)	IP66 IP67 NEMA 4X	M20 x 1.5 (½" NPT Option)	
 FP15 (S2)									
 FP15 (S3)									

HIGH PRESSURE TWO STAGE DUAL PULSE SOLENOID OPTIONS TABLE I 74 (Ex emb)									
Product Type	Solenoid Order Code	Typical Apparatus Code	Standard Voltage	Power Consumption (W)	CV Rate	Temperature Range (°C)	Ingress Protection	Cable Entry Connection	Certification Options
 FP15 (S1 / S1)	74	Ex emb II C T3 / T4	24 Vdc 48 Vdc	1.8 3.6	0.32	<b>Media #</b> -20°C to +40°C -25°C to +40°C -20°C to +55°C -25°C to +55°C  <b>Ambient</b> -25°C to +55°C (T3) (Up to 3.0W) -25°C to +50°C (T4) (Up to 4.0W) -25°C to +40°C (T3) (3.0W - 6.8W)	IP66 IP67 NEMA 4X	M20 x 1.5 (½" NPT Option)	
 FP15 (S2 / S2)									
 FP15 (S3 / S3)									

For detailed information on certification, please see page 9.

Other Wattages available upon request.





# Permissible media operating temperatures are dependent upon the selected O-Ring material. Please refer to the product selection charts on pages 17 to 18.







Ex emb Options

Options Table I 74 (Ex emb)

**HIGH PRESSURE, DUAL REDUNDANT SOLENOID OPTIONS TABLE I 74 (Ex emb)**

Product Type	Solenoid Order Code	Typical Apparatus Code	Standard Voltage	Power Consumption (W)	CV Rate	Temperature Range (°C)	Ingress Protection	Cable Entry Connection	Certification Options
 FP15 (DPSS1)	74	Ex emb II C T3 / T4	24 Vdc 48 Vdc	1.8 3.6	0.32	<b>Media #</b> -20°C to +40°C -25°C to +40°C -20°C to +55°C -25°C to +55°C  <b>Ambient</b> -25°C to +55°C (T3) (Up to 3.0W) -25°C to +50°C (T4) (Up to 4.0W) -25°C to +40°C (T3) (3.0W - 6.8W)	IP66 IP67 NEMA 4X	M20 x 1.5 (½" NPT Option)	
 FP15 (DPSS2)									
 FP15 (DPSS3)									

**LOW PRESSURE SOLENOID OPTIONS TABLE I 74 (Ex emb)**

 FP15 (S4)	74	Ex emb II C T3 / T4	24 Vdc 48 Vdc	1.8 3.6	0.32 (S4&S6)  0.1 (S5)	<b>Media #</b> -20°C to +40°C -25°C to +40°C -20°C to +55°C -25°C to +55°C  <b>Ambient</b> -25°C to +55°C (T3) (Up to 3.0W) -25°C to +50°C (T4) (Up to 4.0W) -25°C to +40°C (T3) (3.0W - 6.8W)	IP66 IP67 NEMA 4X	M20 x 1.5 (½" NPT Option)	
 FP15 (S5)									
 FP15 (S6)									

For detailed information on certification, please see page 9.

Other Wattages available upon request.

# Permissible media operating temperatures are dependent upon the selected O-Ring material. Please refer to the product selection charts on pages 19 to 21.

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Ex d Options

Options Table 2 77 (Ex d)

HIGH PRESSURE SOLENOID OPTIONS TABLE 2 77 (Ex d)									
Product Type	Solenoid Order Code	Typical Apparatus Code	Standard Voltage	Power Consumption (W)	CV Rate	Temperature Range (°C)	Ingress Protection	Cable Entry Connection	Certification Options
 FP15 (S1)	77	Ex d IIC T6, T5 or T4	12 Vdc 24 Vdc 48 Vdc 110 Vdc  110 Vac 240 Vac 50 or 60 Hz	1.5	0.32	<b>Media #</b> -20°C to +90°C (T4) -60°C to +90°C (T4)  <b>Ambient</b> -60°C to +40°C (T6) -60°C to +55°C (T5) -60°C to +90°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	
 FP15 (S2)				3.0					
 FP15 (S3)									

HIGH PRESSURE TWO STAGE DUAL PULSE SOLENOID OPTIONS TABLE 2 77 (Ex d)									
Product Type	Solenoid Order Code	Typical Apparatus Code	Standard Voltage	Power Consumption (W)	CV Rate	Temperature Range (°C)	Ingress Protection	Cable Entry Connection	Certification Options
 FP15 (S1 / S1)	77	Ex d IIC T6, T5 or T4	12 Vdc 24 Vdc 48 Vdc 110 Vdc  110 Vac 240 Vac 50 or 60 Hz	1.5	0.32	<b>Media #</b> -20°C to +90°C (T4) -60°C to +90°C (T4)  <b>Ambient</b> -60°C to +40°C (T6) -60°C to +55°C (T5) -60°C to +90°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	
 FP15 (S2 / S2)				3.0					
 FP15 (S3 / S3)									

For detailed information on certification, please see page 9.


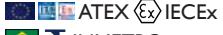

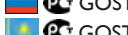

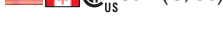


Other Wattages available upon request.

# Permissible media operating temperatures are dependent upon the selected O-Ring material. Please refer to the product selection charts on pages 17 to 18.









Ex d Options

Options Table 2 77 (Ex d)

**HIGH PRESSURE, DUAL REDUNDANT SOLENOID OPTIONS TABLE 2 77 (Ex d)**

Product Type	Solenoid Order Code	Typical Apparatus Code	Standard Voltage	Power Consumption (W)	CV Rate	Temperature Range (°C)	Ingress Protection	Cable Entry Connection	Certification Options
 FP15 (DPSS1)	77	Ex d IIC T6, T5 or T4	12 Vdc 24 Vdc 48 Vdc 110 Vdc  110 Vac 240 Vac 50 or 60 Hz	1.5     3.0	0.32	<b>Media #</b> -20°C to +90°C (T4) -60°C to +90°C (T4)  <b>Ambient</b> -60°C to +40°C (T6) -60°C to +55°C (T5) -60°C to +90°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	 ATEX IECEx  INMETRO  GOST  GOST K GGTN  CSA (C, US)
 FP15 (DPSS2)									
 FP15 (DPSS3)									

**LOW PRESSURE OPTIONS TABLE 2 77 (Ex d)**

 FP15 (S4)	77	Ex d IIC T6, T5 or T4	12 Vdc 24 Vdc 48 Vdc 110 Vdc  110 Vac 240 Vac 50 or 60 Hz	1.5     3.0	0.32 (S4&S6)  0.1 (S5)	<b>Media #</b> -20°C to +90°C (T4) -60°C to +90°C (T4)  <b>Ambient</b> -60°C to +40°C (T6) -60°C to +55°C (T5) -60°C to +90°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	 ATEX IECEx  INMETRO  GOST  GOST K GGTN  CSA (C, US)
 FP15 (S5)									
 FP15 (S6)									

For detailed information on certification, please see page 9.

Other Wattages available upon request.

# Permissible media operating temperatures are dependent upon the selected O-Ring material. Please refer to the product selection charts on pages 19 to 21.









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Ex ia Options

Options Table 3 78 (Ex ia)

HIGH PRESSURE SOLENOID OPTIONS TABLE 3 78 (Ex ia)							
Product Type	Solenoid Order Code	Typical Apparatus Code	CV Rate	Temperature Range (°C)	Ingress Protection	Cable Entry Connection	Certification Options
 FPI5 (S1)	78 †	Ex ia IIC T6 or T4	0.32	<b>Media #</b> -20°C to +95°C -60°C to +95°C  <b>Ambient</b> -60°C to +60°C (T6) -60°C to +95°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	
 FPI5 (S2)							
 FPI5 (S3)							
HIGH PRESSURE SOLENOID OPTIONS TABLE 3 78 (Ex ia)							
 FPI5 (S1 / S1)	78 †	Ex ia IIC T6 or T4	0.32	<b>Media #</b> -20°C to +95°C -60°C to +95°C  <b>Ambient</b> -60°C to +60°C (T6) -60°C to +95°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	
 FPI5 (S2 / S2)							
 FPI5 (S3 / S3)							

For detailed information on certification, please see page 9.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.

# Permissible media operating temperatures are dependent upon the selected O-Ring material. Please refer to the product selection charts on pages 17 to 18.

**Safety Parameters: Type 78 (S1, S2, S3, S1 / S1, S2 / S2 & S3 / S3)**

U<sub>i</sub> = 31 V, I<sub>i</sub> = 210 mA, P<sub>i</sub> = 1.5 W, C<sub>i</sub> = 0 µF, L<sub>i</sub> = 0 mH

Coil Resistance : 155 Ohm ± 5%

Minimum Current @ solenoid coil = 80 mA

**Safety Parameters: Type 78 (S4, S5 & S6)**









U<sub>i</sub> = 31 V, I<sub>i</sub> = 210 mA, P<sub>i</sub> = 1.5 W, C<sub>i</sub> = 0 µF, L<sub>i</sub> = 0 mH

Coil Resistance : 370 Ohm ± 5%

Minimum Current @ solenoid coil = 32 mA

Ex ia Options

Options Table 3 78 (Ex ia)

HIGH PRESSURE, DUAL REDUNDANT SOLENOID OPTIONS TABLE 3 78 (Ex ia)							
Product Type	Solenoid Order Code	Typical Apparatus Code	CV Rate	Temperature Range (°C)	Ingress Protection	Cable Entry Connection	Certification Options
 FP15 (DPSS1)	78 †	Ex ia IIC T6 or T4	0.32	<b>Media #</b> -20°C to +95°C -60°C to +95°C  <b>Ambient</b> -60°C to +60°C (T6) -60°C to +95°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	
 FP15 (DPSS2)							
 FP15 (DPSS3)							
LOW PRESSURE SOLENOID OPTIONS TABLE 3 78 (Ex ia)							
 FP15 (S4)	78 †	Ex ia IIC T6 or T4	0.32 (S4 & S6)	<b>Media #</b> -20°C to +95°C -60°C to +95°C  <b>Ambient</b> -60°C to +60°C (T6) -60°C to +95°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	
 FP15 (S5)			0.1 (S5)				
 FP15 (S6)							

For detailed information on certification, please see page 9.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.

# Permissible media operating temperatures are dependent upon the selected O-Ring material. Please refer to the product selection charts on pages 19 to 21.

**Safety Parameters: Type 78 (S1, S2, S3, S1 / S1, S2 / S2 & S3 / S3)**

U<sub>i</sub> = 31 V, I<sub>i</sub> = 210 mA, P<sub>i</sub> = 1.5 W, C<sub>i</sub> = 0 µF, L<sub>i</sub> = 0 mH

Coil Resistance : 155 Ohm ± 5%

Minimum Current @ solenoid coil = 80 mA

**Safety Parameters: Type 78 (S4, S5 & S6)**

U<sub>i</sub> = 31 V, I<sub>i</sub> = 210 mA, P<sub>i</sub> = 1.5 W, C<sub>i</sub> = 0 µF, L<sub>i</sub> = 0 mH

Coil Resistance : 370 Ohm ± 5%

Minimum Current @ solenoid coil = 32 mA

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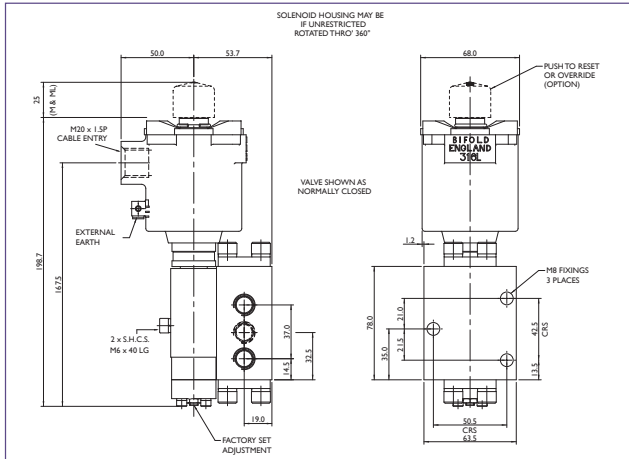
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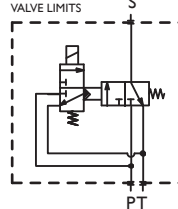


FPI5 (S1, S2 & S3)

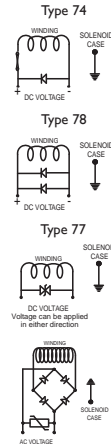
Dimensional Drawing



SCHEMATIC 3/2 NC



Wiring Diagrams



FPI5 Selection Chart - Ordering Example

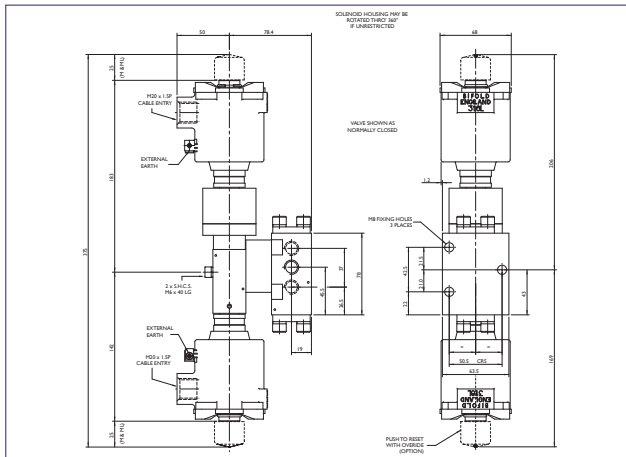
<b>FPI5</b>		High Pressure, Pilot Stage Solenoid Valves			Model Code
<b>S1</b>	345 bar				Maximum Valve Pressure
<b>S2</b>	517 bar				
<b>S3</b>	690 bar				
<b>M</b>		Sub-base Mounting			Connections
<b>04</b>	1/4" NPT Body Ported	<b>38MP</b>	3/8" MP Body Ported (Non Standard)		
<b>06</b>	3/8" NPT Body Ported				
<b>22</b>	2 way, 2 - position	<b>43</b>	4 way, 3 - Position, Open Centre		Valve Configuration
<b>32</b>	3 way, 2 - position	<b>43 / BC</b>	4 Way, 3 - Position, Blocked Centre		
<b>42</b>	4 way, 2 - position				
<b>S</b>	Nitrile (standard)	(-30°C to +130°C)	For maximum operating temperatures see 'T' Rating Limitations for Ex emb, Ex d & Ex ia on pages 11, 13 & 15.		
<b>V</b>	Viton	(-20°C to +180°C)			
<b>SA</b>	Nitrile (Low Temperature)	(-36°C to +180°C)			
<b>NO</b>		Normally Open (NC Normally Closed as Standard)			Option
<b>XX</b>		Refer to Solenoid options tables. 74 (Ex emb) Page 11 - Table 1 77 (Ex d) Page 13 - Table 2 78 (Ex ia) Page 15 - Table 3			Solenoid
<b>A</b>		ATEX/IECEX Dual Certified/Labelled			Solenoid Approval
<b>G</b>		GOST			
<b>I</b>		INMETRO			
<b>U</b>		CSA (US) ATEX Dual Certified/Labelled			
<b>T4</b>		Class ≤ 4.0 W (50°C maximum ambient temperature)			Ex emb 'T' Option
<b>XXX</b>		Voltage, refer to Solenoid option tables. 74 (Ex emb) Page 11 - Table 1 77 (Ex d) Page 13 - Table 2			Voltage
<b>XX</b>		Resistance (Ω) 78 (Ex ia) - 155 Ohms Page 15 - Table 3			Resistance †
<b>M</b>		Electrical to switch or temporary manual override			Options
<b>ML</b>		Electrical and manual required			
<b>MOR</b>		Electrical to switch or stayput manual override			
<b>XX</b>		Power (W) 74 (Ex emb) - 1.8 & 3.6Watts Page 11 - Table 1 77 (Ex d) - 1.5 & 3.0Watts Page 13 - Table 2			Power
<b>K85</b>		1/2" NPT cable entry			Option
<b>H2S</b>		NACE MR-01-75 compliant internal wetted and body materials			Option
<b>K6</b>		BSPP Ports			Option
<b>EP</b>		External Pilot Supply			Options
<b>EPT</b>		External Pilot Supply & Vent			
<b>M306</b>		1/4" NPT	<b>M1236</b>	1/4" BSP	Sub-Base Options
<b>M229</b>		1/2" NPT	<b>M1211</b>	1/2" BSP	

FPI5/S1 / 04 / 32 / S / NO / 74 A T4-24D/ML/36/K85/H2S/K6 / EP/[M306] Ordering Example

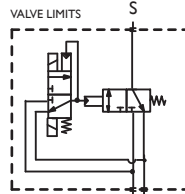
For the shaded block sections, please refer to the same shaded sections on pages 11, 13 & 15.  
 † Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system. The solenoid valve installation operating and maintenance instruction references are OP0001 & OP0165.

FP15 (S1/S1,S2/S2&S3/S3)

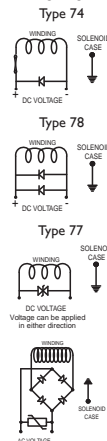
Dimensional Drawing



SCHEMATIC 3/2 NC



Wiring Diagrams



FP15 Selection Chart - Ordering Example

<b>FP15</b>		Pulse operated, hydraulically latched, spring bias to close on loss of pressure		Model Code
<b>S1 / S1</b>	345 bar			Maximum Valve Pressure
<b>S2 / S2</b>	517 bar			
<b>S3 / S3</b>	690 bar			
<b>M</b>	Sub-base Mounting			Connections
<b>04</b>	1/4" NPT Body Ported	<b>38MP</b>	3/8" MP Body Ported (Non Standard)	
<b>06</b>	3/8" NPT Body Ported			Valve Configuration
<b>22</b>	2 way, 2 - position			
<b>32</b>	3 way, 2 - position			
<b>S</b>	Nitrile (standard)	(-30°C to +130°C)	For maximum operating temperatures see 'T' Rating Limitations for Ex emb, Ex d & Ex ia on pages 11, 13 & 15.	O-ring Material
<b>V</b>	Viton	(-20°C to +180°C)		
<b>SA</b>	Nitrile (Low Temperature)	(-36°C to +180°C)		
<b>XX</b>	Refer to Solenoid options tables.	74 (Ex emb) Page 11 - Table 1	77 (Ex d) Page 13 - Table 2	Solenoid
		78 (Ex ia) Page 15 - Table 3		
<b>A</b>	ATEX/IECEx Dual Certified/Labelled	74(Ex emb)	77(Ex d)	Solenoid Approval
<b>G</b>	GOST	X	✓	
<b>I</b>	INMETRO	X	✓	
<b>U</b>	CSA (US) ATEX Dual Certified/Labelled	X	✓	
<b>T4</b>	Class ≤ 4.0 W	(50°C maximum ambient temperature)		Ex emb 'T' Option
<b>XXX</b>	Voltage, refer to Solenoid option tables.	74 (Ex emb)	77 (Ex d)	Voltage
		Page 11 - Table 1	Page 13 - Table 2	
<b>XX</b>	Resistance (Ω)	78 (Ex ia) - 155 Ohms	Page 15 - Table 3	Resistance †
<b>SB</b>	Spring Bias to close on loss of hydraulic supply pressure.			Default Position
<b>M</b>	Electrical to switch or temporary manual override			Options
<b>ML</b>	Electrical and manual required			
<b>MOR</b>	Electrical to switch or stayput manual override			
<b>XX</b>	Power (W)	74 (Ex emb) - 1.8 & 3.6 Watts	77 (Ex d) - 1.5 & 3.0 Watts	Power
		Page 11 - Table 1	Page 13 - Table 2	
<b>K85</b>	1/2" NPT cable entry			Option
<b>H2S</b>	NACE MR-01-75 compliant internal wetted and body materials			Option
<b>K6</b>	BSPP Ports			Option
<b>EP</b>	External Pilot Supply			Options
<b>EPT</b>	External Pilot Supply & Vent			
<b>M306</b>	1/4" NPT	<b>M1236</b>	1/4" BSP	Sub-Base Options
<b>M229</b>	1/2" NPT	<b>M1211</b>	1/2" BSP	
<b>FP15/S1/S1/04/32 / S / 74 A T4-24D/SB/ML/36/K85/H2S/K6 / EP / [M306]</b>				Ordering Example

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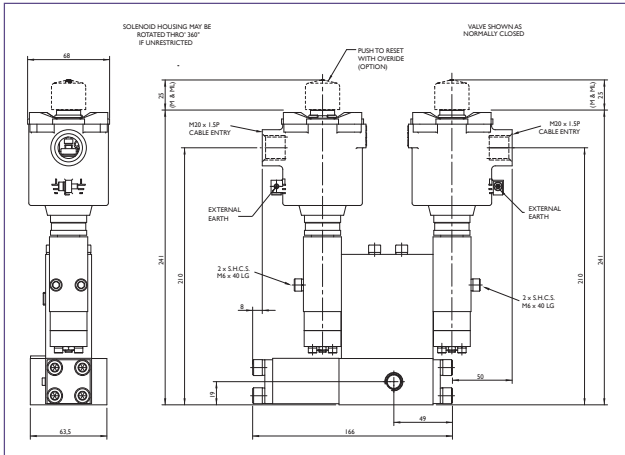
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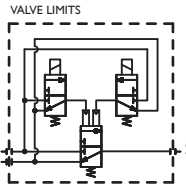


FP15 (DPSSI, 2 & 3)

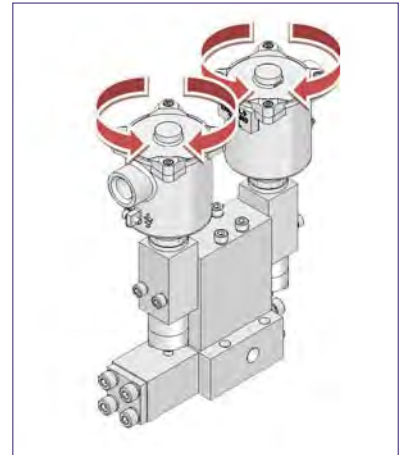
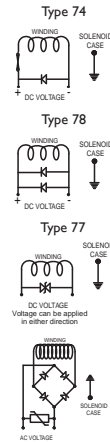
Dimensional Drawing



SCHEMATIC 3/2 NC



Wiring Diagrams



FP15 Selection Chart - Ordering Example

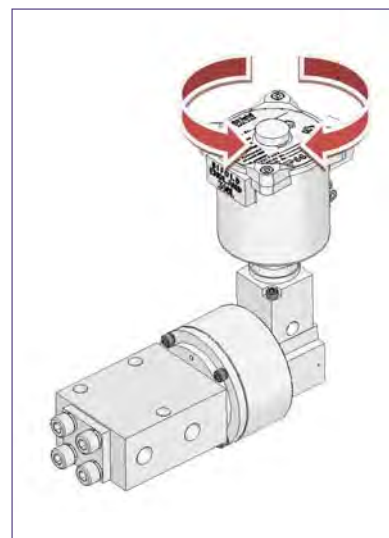
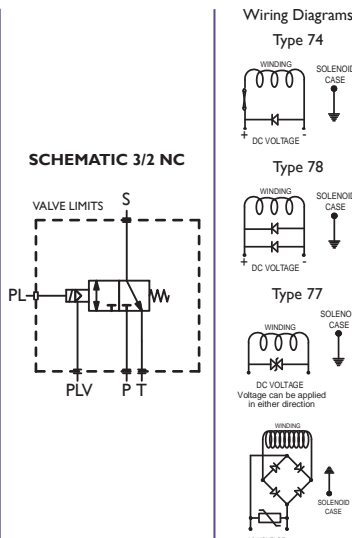
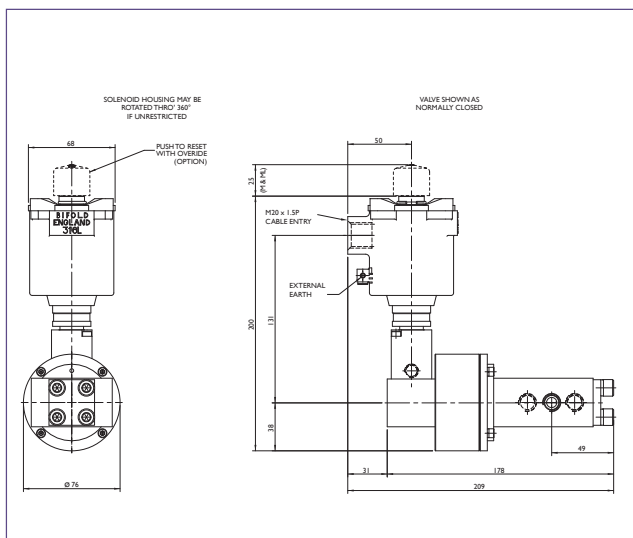
<b>FP15</b>		High Pressure, Pilot Stage, Dual Redundant Solenoid Valves		Model Code
<b>DPSSI</b>	345 bar			Maximum Valve Pressure
<b>DPSS2</b>	517 bar			
<b>DPSS3</b>	690 bar			
<b>M</b>	Sub-base Mounting			Connections
<b>04</b>	1/4" NPT Body Ported	<b>38MP</b>	3/8" MP Body Ported (Non Standard)	
<b>06</b>	3/8" NPT Body Ported			Valve Configuration
<b>22</b>	2 way, 2 - position			
<b>32</b>	3 way, 2 - position			O-ring Material
<b>S</b>	Nitrile (standard)	(-30°C to +130°C)	For maximum operating temperatures see 'T' Rating Limitations for Ex emb, Ex d & Ex ia on pages 12, 14 & 16.	Solenoid
<b>V</b>	Viton	(-20°C to +180°C)		
<b>SA</b>	Nitrile (Low Temperature)	(-36°C to +180°C)		
<b>XX</b>	Refer to Solenoid options tables.		74 (Ex emb) Page 12 - Table 1 77 (Ex d) Page 14 - Table 2 78 (Ex ia) Page 16 - Table 3	
<b>A</b>	ATEX/IECEX Dual Certified/Labelled		74(Ex emb) ✓	Solenoid Approval
<b>G</b>	GOST		77(Ex d) ✓	
<b>I</b>	INMETRO		78(Ex ia) ✓	
<b>U</b>	CSA (US) ATEX Dual Certified/Labelled		74(Ex emb) X	
<b>T4</b>	Class ≤ 4.0 W (50°C maximum ambient temperature)			Ex emb 'T' Option
<b>XXX</b>	Voltage, refer to Solenoid option tables.		74 (Ex emb) Page 12 - Table 1 77 (Ex d) Page 14 - Table 2	Voltage
<b>XX</b>	Resistance (Ω)		78 (Ex ia) - 155 Ohms Page 16 - Table 3	Resistance †
<b>M</b>	Electrical to switch or temporary manual override			Options
<b>ML</b>	Electrical and manual required			
<b>MOR</b>	Electrical to switch or stayput manual override			
<b>XX</b>	Power (W)		74 (Ex emb) - 1.8 & 3.6 Watts Page 12 - Table 1 77 (Ex d) - 1.5 & 3.0 Watts Page 14 - Table 2	Power
<b>K85</b>	1/2" NPT cable entry			Option
<b>H2S</b>	NACE MR-01-75 compliant internal wetted and body materials			Option
<b>K6</b>	BSPP Ports			Option
<b>EP</b>	External Pilot Supply			Options
<b>EPT</b>	External Pilot Supply & Vent			
<b>M306</b>	1/4" NPT	<b>M1236</b>	1/4" BSP	Sub-Base Options
<b>M229</b>	1/2" NPT	<b>M1211</b>	1/2" BSP	
<b>FP15/DPSSI/04 / 32 / S / 74 A T4-24D / ML / 36 / K85 / H2S/K6 / EP / [M306]</b>				Ordering Example

For the shaded block sections, please refer to the same shaded sections on pages 12, 14 & 16.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system. The solenoid valve installation operating and maintenance instruction references are OP0001 & OP0165.

FP15 (S4 & S5)

Dimensional Drawing



FP15 Selection Chart - Ordering Example

<b>FP15</b>				Model Code
<b>S4</b>	414 bar	10 bar (Max Pilot)	Low Pressure, Pilot Stage Solenoid Valves	Maximum Valve Pressure
<b>S5</b>	690 bar			
<b>M</b>	Sub-base Mounting			Connections
<b>04</b>	1/4" NPT Body Ported	<b>38MP</b>	3/8" MP Body Ported (Non Standard)	
<b>06</b>	3/8" NPT Body Ported			
<b>22</b>	2 way, 2 - position			Valve Configuration
<b>32</b>	3 way, 2 - position			
<b>S</b>	Nitrile (standard)	(-30°C to +130°C)	For maximum operating temperatures see 'T' Rating Limitations for Ex emb, Ex d & Ex ia on pages 12, 14 & 16.	O-ring Material
<b>V</b>	Viton	(-20°C to +180°C)		
<b>SA</b>	Nitrile (Low Temperature)	(-40°C to +180°C)		
<b>NO</b>	Normally Open (NC Normally Closed as Standard)			Option
<b>XX</b>	Refer to Solenoid options tables. 74 (Ex emb) Page 12 - Table 1 77 (Ex d) Page 14 - Table 2 78 (Ex ia) Page 16 - Table 3			Solenoid
<b>A</b>	ATEX/IECEX	Dual Certified/Labelled	74(Ex emb) ✓ 77(Ex d) ✓ 78(Ex ia) ✓	Solenoid Approval
<b>G</b>	GOST		74(Ex emb) X 77(Ex d) ✓ 78(Ex ia) ✓	
<b>I</b>	INMETRO		74(Ex emb) X 77(Ex d) ✓ 78(Ex ia) ✓	
<b>U</b>	CSA (US)	ATEX Dual Certified/Labelled	74(Ex emb) X 77(Ex d) ✓ 78(Ex ia) X	
<b>T4</b>	Class ≤ 4.0 W (50°C maximum ambient temperature)			Ex emb 'T' Option
<b>XXX</b>	Voltage, refer to Solenoid option tables. 74 (Ex emb) Page 12 - Table 1 77 (Ex d) Page 14 - Table 2			Voltage
<b>XX</b>	Resistance (Ω) 78 (Ex ia) - 370 Ohms Page 16 - Table 3			Resistance †
<b>M</b>	Electrical to switch or temporary manual override			Options
<b>ML</b>	Electrical and manual required			
<b>MOR</b>	Electrical to switch or stayput manual override			
<b>XX</b>	Power (W) 74 (Ex emb) - 1.8 & 3.6 Watts Page 12 - Table 1 77 (Ex d) - 1.5 & 3.0 Watts Page 14 - Table 2			Power
<b>K85</b>	1/2" NPT cable entry			Option
<b>H2S</b>	NACE MR-01-75 compliant internal wetted and body materials			Option
<b>K6</b>	BSPP Ports			Option
<b>M306</b>	1/4" NPT	<b>M1236</b>	1/4" BSP	Sub-Base Options
<b>M229</b>	1/2" NPT	<b>M1211</b>	1/2" BSP	
<b>FP15/S4 / 04 / 32 / S / NO/74 A T4-24D/ML/36/K85 / H2S / K6 / [M306]</b>				Ordering Example

For the shaded block sections, please refer to the same shaded sections on pages 12, 14 & 16.

† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system. The solenoid valve installation operating and maintenance instruction references are OP0001 & OP0165.

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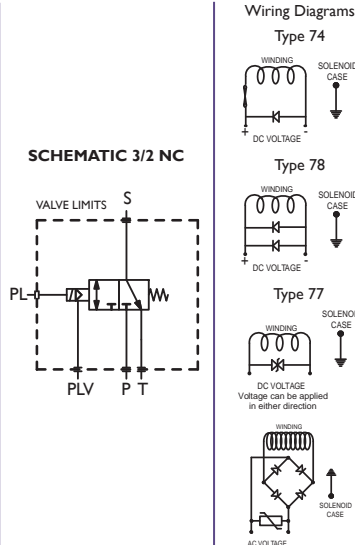
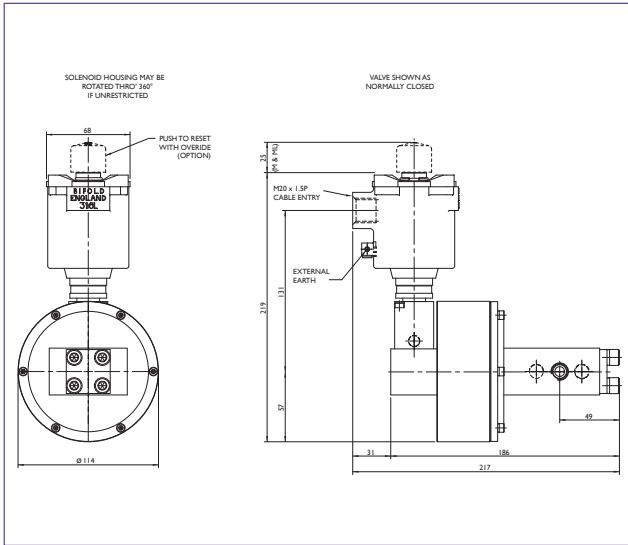
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FPI5 (S6)

Dimensional Drawing



FPI5 Selection Chart - Ordering Example

<b>FPI5</b>			<b>Model Code</b>		
<b>S6</b>	690 bar	7 bar (Max Pilot)	Low Pressure, Pilot Stage Solenoid Valves		
<b>M</b>	Sub-base Mounting				
<b>04</b>	1/4" NPT Body Ported	<b>38MP</b>	3/8" MP Body Ported (Non Standard)		
<b>06</b>	3/8" NPT Body Ported				
<b>22</b>	2 way, 2 - position		Valve Configuration		
<b>32</b>	3 way, 2 - position				
<b>S</b>	Nitrile (standard)	(-30°C to +130°C)	For maximum operating temperatures see 'T' Rating Limitations for Ex emb, Ex d & Ex ia on pages 12, 14 & 16.		
<b>V</b>	Viton	(-20°C to +180°C)			
<b>SA</b>	Nitrile (Low Temperature)	(-40°C to +180°C)			
<b>NO</b>	Normally Open (NC Normally Closed as Standard)			Option	
<b>XX</b>	Refer to Solenoid options tables.			74 (Ex emb) Page 12 - Table 1	Solenoid
				77 (Ex d) Page 14 - Table 2	
				78 (Ex ia) Page 16 - Table 3	
<b>A</b>	ATEX/IECEx Dual Certified/Labelled			74(Ex emb)	Solenoid Approval
<b>G</b>	GOST			77(Ex d)	
<b>I</b>	INMETRO			78(Ex ia)	
<b>U</b>	CSA (US) ATEX Dual Certified/Labelled				
<b>T4</b>	Class ≤ 4.0 W (50°C maximum ambient temperature)			Ex emb 'T' Option	
<b>XXX</b>	Voltage, refer to Solenoid option tables.			74 (Ex emb) Page 12 - Table 1	Voltage
				77 (Ex d) Page 14 - Table 2	
<b>XX</b>	Resistance (Ω) 78 (Ex ia) - 370 Ohms			Page 16 - Table 3	Resistance †
<b>M</b>	Electrical to switch or temporary manual override			Options	
<b>ML</b>	Electrical and manual required				
<b>MOR</b>	Electrical to switch or stayput manual override				
<b>XX</b>	Power (W) 74 (Ex emb) - 1.8 & 3.6 Watts			Page 12 - Table 1	Power
				77 (Ex d) - 1.5 & 3.0 Watts	
<b>K85</b>	1/2" NPT cable entry			Option	
<b>H2S</b>	NACE MR-01-75 compliant internal wetted and body materials			Option	
<b>K6</b>	BSP Ports			Option	
<b>M306</b>	1/4" NPT	<b>M1236</b>	1/4" BSP	Sub-Base Options	
<b>M229</b>	1/2" NPT	<b>M1211</b>	1/2" BSP		
<b>FPI5/S6 / 04 / 32 / S / NO / 74 A T4 - 24D / ML/36/K85 / H2S/K6 / [M306]</b>					Ordering Example

For the shaded block sections, please refer to the same shaded sections on pages 12, 14 & 16.

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Options

Product Options

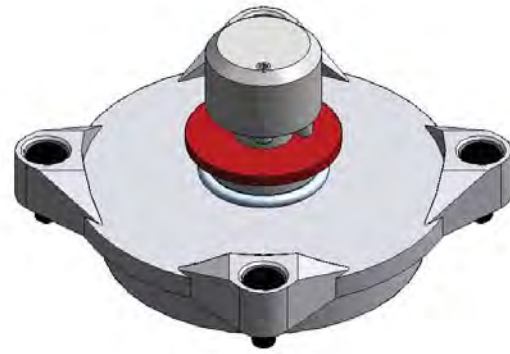
The range of products displayed in this brochure, are designed to accommodate all the options shown below. If the style or arrangement required for your application is not shown, please contact our office with full description and specification details.



**Type M - Electrical to Switch or Temporary Manual Override (Spring Return)**

Manual Override Type M

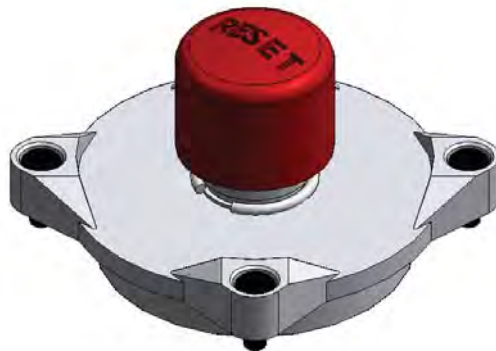
The solenoid valve switches on and off with the electrical supply. The manual override button can be pressed to operate the valve when the solenoid is in the electrically de-energised position. The manual override is non-detented, i.e. does not latch in position. When the button is released, the valve spring returns.



**Type MOR - Electrical to Switch or Temporary Manual Rotary Override (Stayput)**

Manual Rotary Override Type MOR

The solenoid valve switches on and off with the electrical supply. The manual override button is rotated through  $\frac{3}{4}$  turn to operate the valve when the solenoid is in the electrically de-energised position. The manual override is detented, i.e. remains in position until rotated back to its original position when the valve spring returns.



**Type ML - Electrical and Manual Required to Latch**

Manual Reset Type ML

Apply the electrical signal and press the reset button. The valve moves to the energised position and will not de-energise until the electrical supply is removed. The manual reset is non-detented, spring return, i.e. does not latch in position. The valve cannot be moved to the energised position by pressing the button if there is no electrical supply to the solenoid.

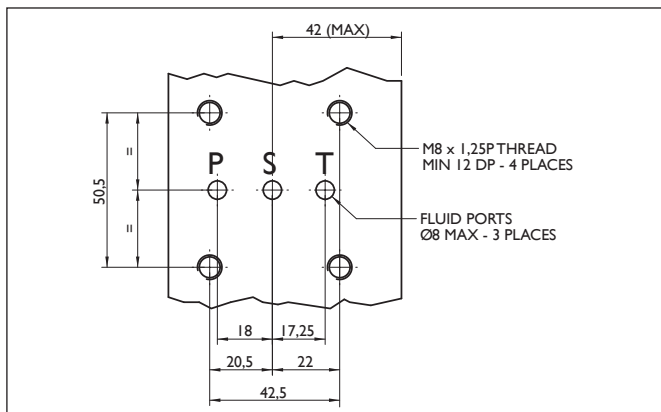
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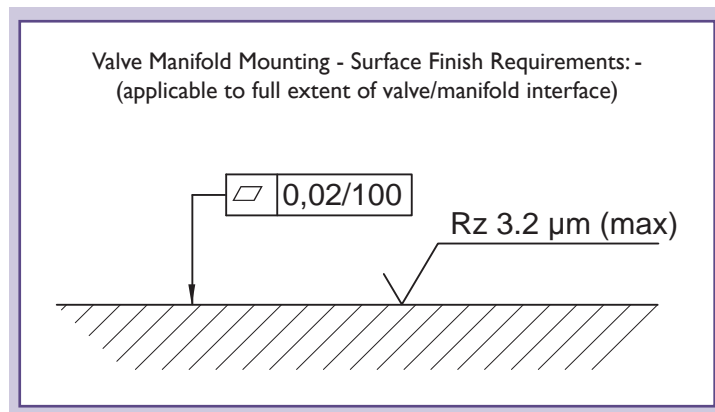
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## Interface Detail

### Interface Detail (For Customer Designed Sub-Base)

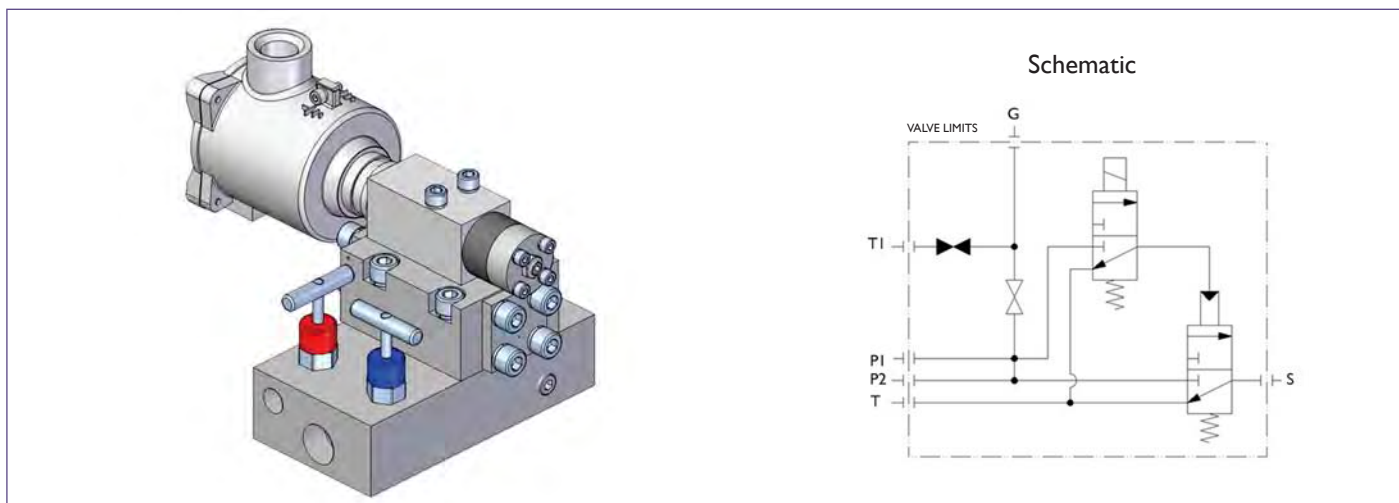


### Surface Finish Requirements

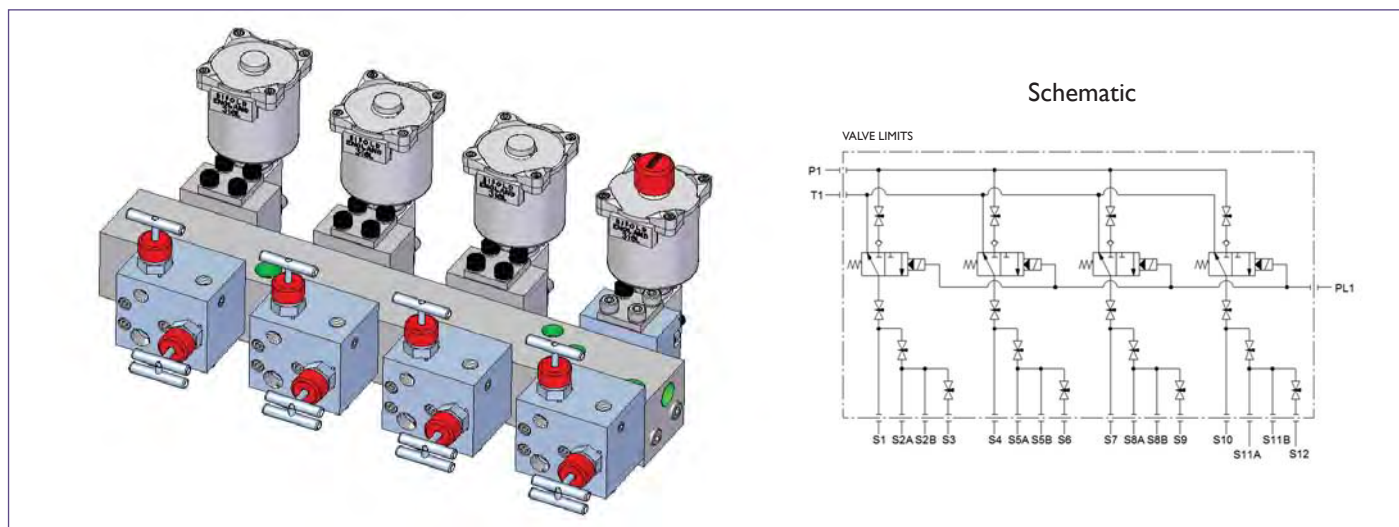


## Typical Assemblies

### Typical Valve Assembly Showing an FPI5 Solenoid Valve



### Typical Valve assembly showing FPI5 Solenoid Valves



**Instrument, Process,  
Directional Control Valves,  
and Pumps**

**Bifold® Group**

**Pneumatic and  
Instrumentation Valves**

**Hydraulic Valves**

**Subsea Valves**

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**Bifold® Subsea**

**Bifold®  Marshalsea**

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**Innovative and Reliable  
Valve Solutions**

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## Solenoid Valve

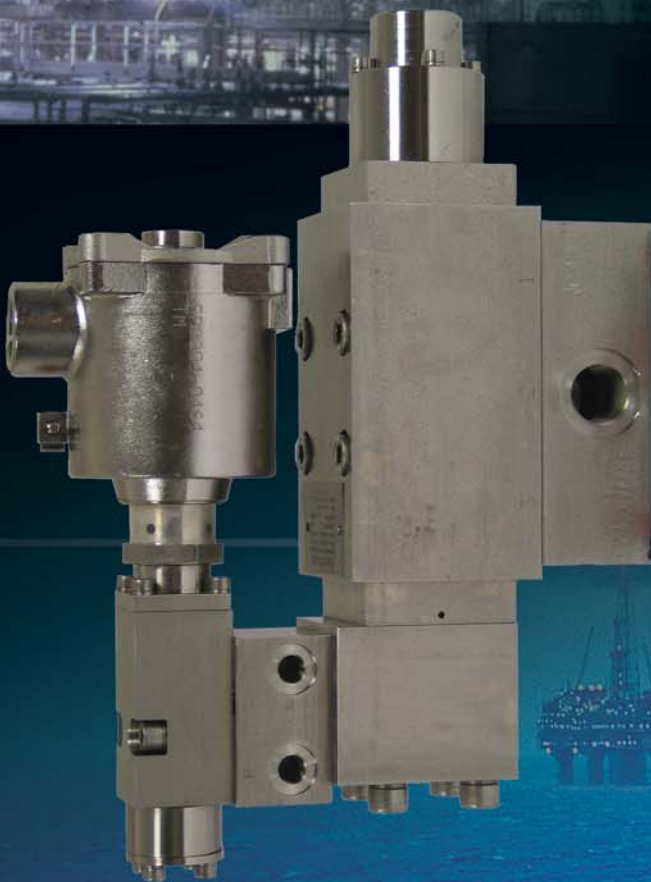
# Model FP50, 100 & 200

up to 345 bar, 200 litres per minute

Superior performance  
throughout the full  
operational range

### Features:

- Worldwide solenoid approvals ATEX, CSA, SAA, INMETRO & GOST
- EExd, EExia and EExemb
- 316L Stainless steel
- Arctic Service options to -50°C
- Solenoid rotates through 360°
- NACE MR-01-75 option





## CONTENTS

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## TECHNICAL SPECIFICATIONS

### MATERIALS OF CONSTRUCTION

All valve bodies:-	stainless steel 316L
Internal components:-	stainless steel 316L/316, CA104 Aluminium Bronze, Ceramic, stainless steel AISI 440C (according to valve type), PEEK (according to valve type)
Fasteners:-	A4 18/10 316 grade stainless steel
Springs:-	Chrome Vanadium Steel SAE 6150, painted and wax coated
Seals:-	Nitrile (standard). Alternative elastomers available for extreme conditions

### MEDIA:

Mineral oils, water glycol mixtures, sea water (filtered), some chemicals (mainstage & high pressure pilot stages).  
Air, natural gas, bottled gases (low pressure pilot stages only).  
Mineral Oils, water glycol mixtures (low pressure pilot stages, solenoid types 87C, 87D, 92 92A only).

### WORKING PRESSURE:

Up to 345 Bar. Maximum working pressure varies according to valve model. Refer to ordering code.

### TEMPERATURE RANGE:

See solenoid and elastomer options. All high pressure, pilot stage solenoid valves, with the exception of type 97D, are limited to -36°C minimum operating temperature on account of restricted flow path and fluid viscosity considerations:-

Examples	FP50/SH1/M/32/SA-24VDC/97CA9	Operating temperature	-36°C to + 40°C
	FP15/SH1/M/32/SA-24VDC/97CA2	Operating temperature	-36°C to + 90°C
	FP15/SH1/M/32/A-24VDC/97DA4	Operating temperature	-50°C to + 55°C

### SOUR GAS SERVICE (REFER TO ORDERING CODE):

All internal wetted and body metal materials conforming to NACE MR-01-75. Solenoid options 97D, 87C & 87D only.

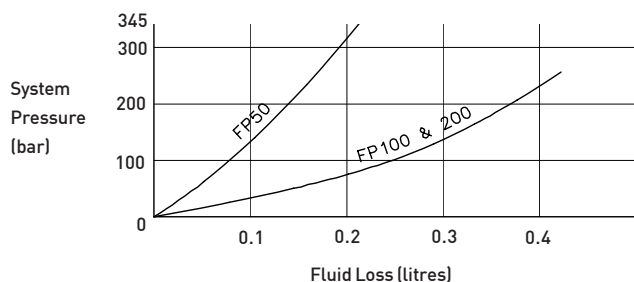
### LAST CHANCE FILTRATION:

A 40 micron, sintered stainless steel, filter disc is fitted as standard on all high pressure, pilot stage solenoid valve operators

### INSTALLATION:

Valves can be mounted in any attitude. Solenoids can be rotated relative to the pilot stage valve body to suit cable entry. Systems should be flushed clean to ISO 4406 Class 18/15 or better. Bifold Fluidpower FP50/100/200 valves afford excellent sealing characteristics provided high standards of cleanliness are maintained. Where this cannot be assured we recommend the use of valves from the extensive range of Bifold Fluidpower Slide Valves which are more tolerant to fluid borne contaminants. Weights detailed in this catalogue are approximate only

### INSTALLATION REQUIREMENTS



Graph illustrating typical fluid loss on SL'x' operators

**IMPORTANT NOTE:** Fluidpower FP50, 100 & 200 Series valves have an open centre change over. This means that whilst the valve is changing position, fluid will flow from the pressure supply to the return/tank port. The volume of fluid lost will depend on the system pressure and valve response time. See curves for typical valve response.



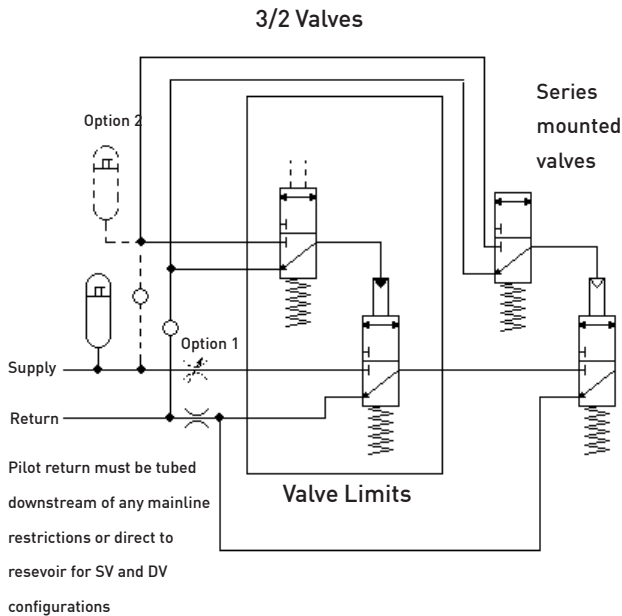
## SELECTION CHART

Reliability and Innovation in directional control valves

<b>FP50</b>	50 lpm	Model Code & nominal flow rating			
<b>FP100</b>	100 lpm				
<b>FP200</b>	200 lpm				
<b>SH 'X'</b>	Solenoid valve operator (two stage) Refer to pilot pressure ranges	Pilot Pressure Range - bar		Standard operators (Other pressure ranges on request)	
		'X'	FP50		FP100/200
0		30-60	32-70		
0A		45-85	43-115		
1		60-120	60-138		
1A		75-150	80-170		
2		120-250	110-235		
2A		145-290	130-280		
3		170-345	150-345		
3A		240-490	190-415		
4	300-610	235-520			
<b>SL 'X'</b>		1	4.5 - 8.5	4.5 - 8.5	
<b>M</b>	Subbase mounting - 32, DV & SV valves. Subbases ordered separately. See page 5.		Connections		
<b>08</b>	1/2 NPT ported subbase assembly		Configuration		
<b>12</b>	3/4 NPT ported subbase assembly (FP 100/200 only)				
<b>32</b>	3 - way, 2 - position				
<b>42</b>	4 - way, 2 - position		Max working pressure - bar		
<b>43</b>	4 - way, 3 - position		FP50	FP100/200	
			345	250	
<b>DV</b>	Diverter Valve		207		
<b>SV</b>	Selector Valve				
<b>S</b>	Nitrile (standard)	(-30°C to +130°C)	Refer to valve operating temperature range on page 2		
<b>V</b>	Viton	(-20°C to +180°C)			
<b>A</b>	Silicone/Fluorosilicone	(-50°C to +40°C)			
<b>SA</b>	Low temperature Nitrile	(-46°C to +130°C)			
<b>XXX</b>	(refer to solenoid options on page 7)				Voltage
<b>XXX</b>	(refer to solenoid options on page 7)				Solenoid
<b>A</b>	ATEX Ex II 2 GD (standard)		87C, 87D, 97C, 97D, 97F, 97G,		
<b>G</b>	GOST 1 Exd IIC T6 (T5,T4)				
<b>I</b>	INMETRO Br-Exd IIC T6 (T5)				
<b>S</b>	SAA Exd IIC T6 (T5,T4)				
<b>U</b>	CSA Exd IIC (Canada) CSA AExd IIC (USA)		87C, 87D		
<b>A</b>	ATEX Ex II 1 GD T75°C (T110°C)		98C		
<b>A</b>	ATEX Ex II 1 GD T65°C (standard)		981		
<b>G</b>	GOST 0 Exia IIC T6				
<b>A</b>	ATEX Ex II 2 GDc T120°C		94C		
<b>A</b>	ATEX Ex II 2 G		991		
<b>1</b>	T4 IIA		87C, 87D, 97C, 97D, 97F, 97G,		
<b>2</b>	T4 IIB				
<b>3</b>	T4 IIC				
<b>4</b>	T5 IIA		87C, 87D, 97C, 97D, 97F, 97G,		
<b>5</b>	T5 IIB				
<b>6</b>	T5 IIC				
<b>7</b>	T6 IIA				
<b>8</b>	T6 IIB		As above +98C		
<b>9</b>	T6 IIC (standard)				
<b>H2S</b>	NACE MR-01-75 - (solenoid options 97D, 87C & 87D only)				
<b>K6</b>	BSPP Ported				
<b>K85</b>	1/2" NPT cable entry				
<b>ML</b>	Manual reset				
<b>M</b>	Manual override spring return		Solenoid operators SH'X' only		
<b>MOR</b>	Manual override rotary stayput				
<b>WS</b>	Weather seal solenoid core tube (90J only)				
<b>FP50/ SH1/ M / 32 / S -24VDC/97C A 9 / ML</b>				Ordering Example	

Standard Test Fluid: Marston Bentley HW540.

## TWO STAGE VALVE INSTALLATION



In some situations due to cross flow leakage the system pressure local to the valve may fall below the required minimum operating pressure. This will result in the mainstage valve stalling in the mid position. To eliminate the possibility of this problem occurring we offer three alternative solutions.

**OPTION 1.** Install a variable orifice in the supply line downstream of the pilot take-off. **Note:** This should be sized and set to maintain sufficient pilot pressure when the valve changes position.

**OPTION 2.** Install an accumulator and non-return valve. This option must be applied when an accumulated supply is not used. (Preferred option)

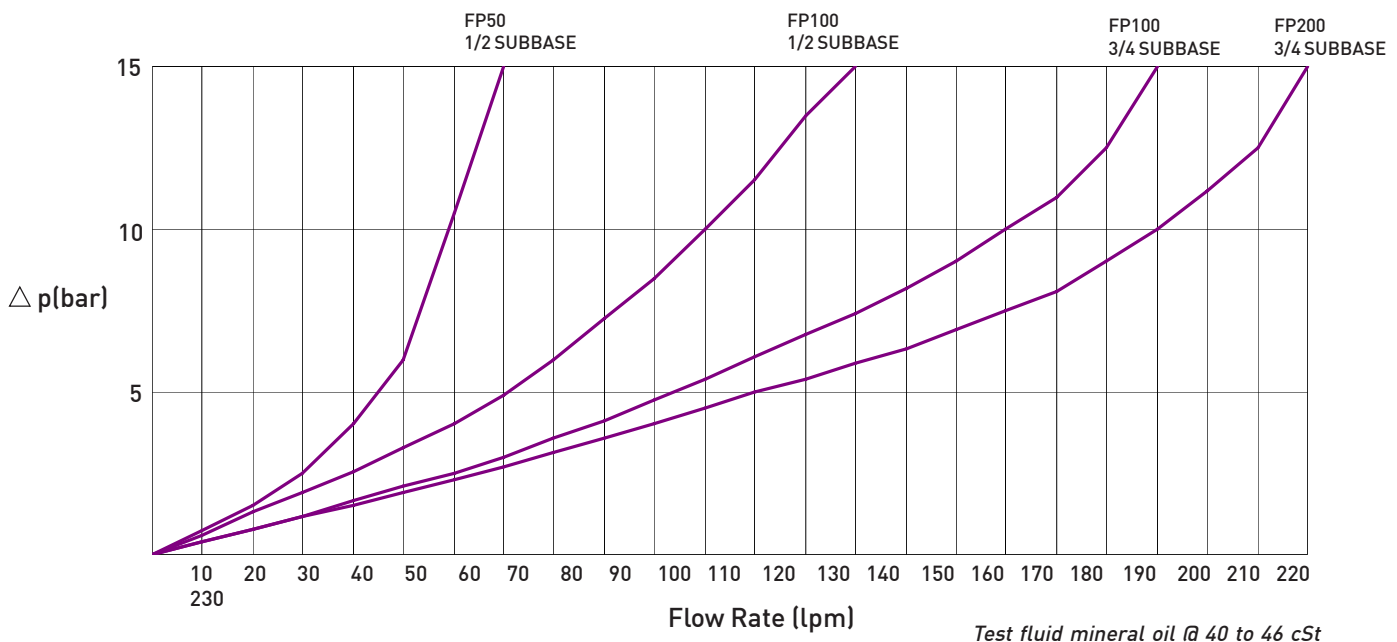
**OPTION 3.** Connect the pilot supply to a point in the system which is not influenced by the operation of the control valve.

### NOTES:-

For 4 way, 2 position two stage valves, the above 3/2 installation requirements apply. For 4 way, 3 position two stage valves, refer to series mounted valve installation details.

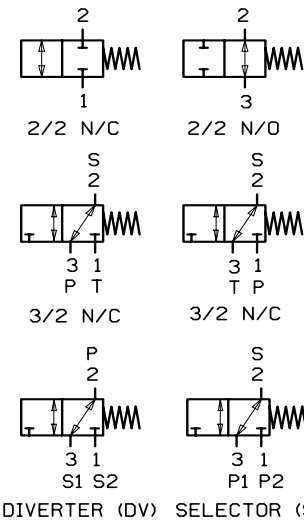
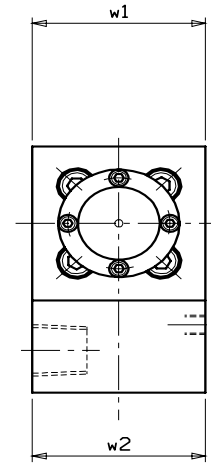
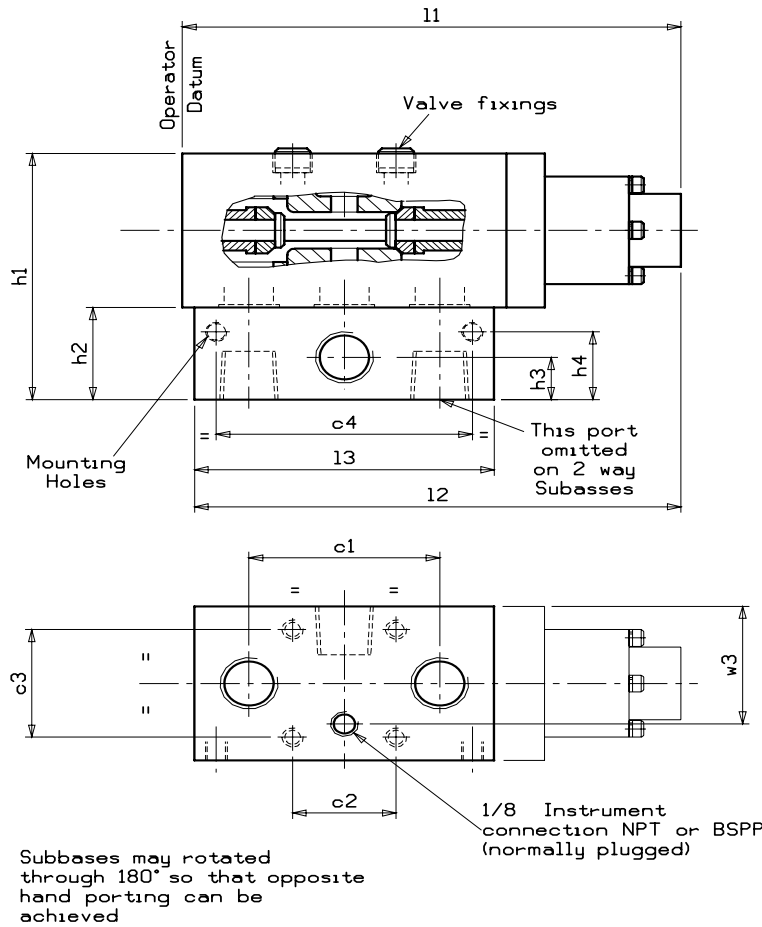
At no time during operation of the valve to the piloted position should the supply pressure be allowed to fall below the minimum pilot pressure quoted for the operator fitted. Refer to ordering code, operator SH'X'.

## FLOW PERFORMANCE



## 2/2, 3/2, DV & SV Body & Subbase

Reliability and Innovation in directional control valves



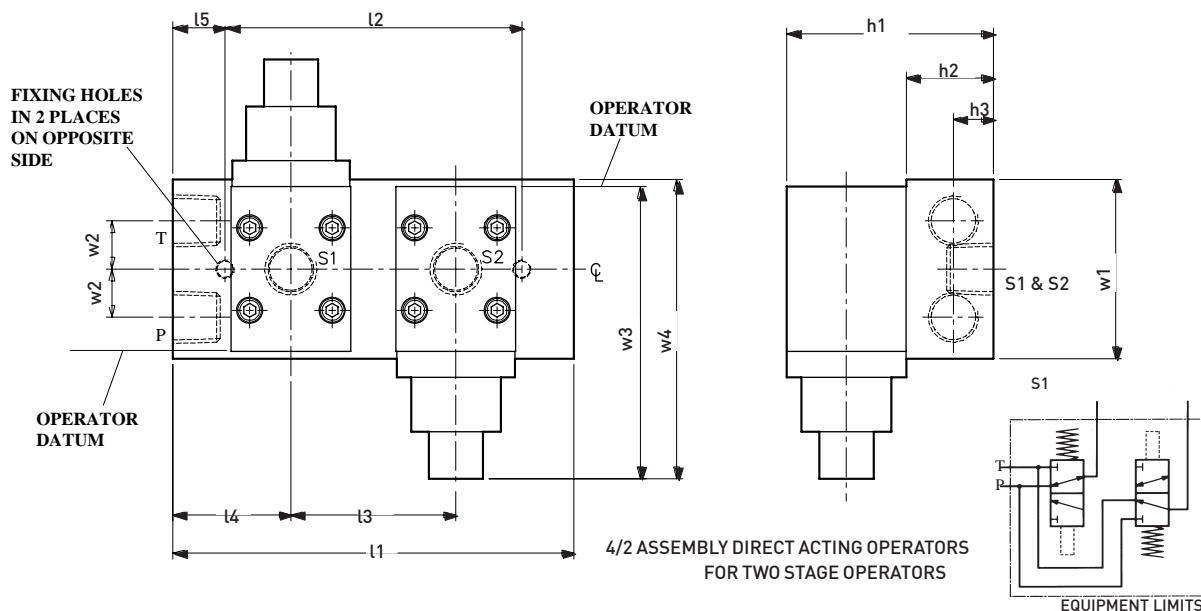
MODEL	c1	c2	c3	c4	h1	h2	h3	h4	l1	l2	l3	w1	w2	w3
FP50	41	35	35	60	82.6	31.8	16.5	22	124	127.1	76.2	50.8	60	45
FP100/200	70	38	45	94	101.6	38.1	17.5	28	183	178.5	110	63.5	63.5	48.5
MODEL	Valve Fixings			Engagement	O-ring	Mounting holes		Weight (kg)						
	Size	Torque (Nm)												
FP50	M6 X 50	7.3	10	BS0101-16	M6 x 1.0p x 10DP	2.0								
FP100/200	M8 x 70	17.7	13	BS0191-16	M8 x 1.25p x 10DP	4.65								

ALL DIMENSIONS IN MILLIMETRES

FP50 (Single Station Manifold)				FP100 & 200 (Single Station Manifold)			
Code		Porting	Weight kg	Code		Porting	Weight kg
2 Way	3 Way			2 Way	3 Way		
M164/02	M162/02	3/8 NPT	1.0	M143/02	M141/02	1/2 NPT	2.0
M159/02	M147/02	1/2 NPT	1.0	M157/02	M140/02	3/4 NPT	2.0
M165/02	M163/02	3/8 BSPP	1.0	M156/02	M152/02	1/2 BSPP	2.0
M160/02	M158/02	1/2 BSPP	1.0	M155/02	M154/02	3/4 BSPP	2.0

For special multipurpose subbases consult Fluidpower

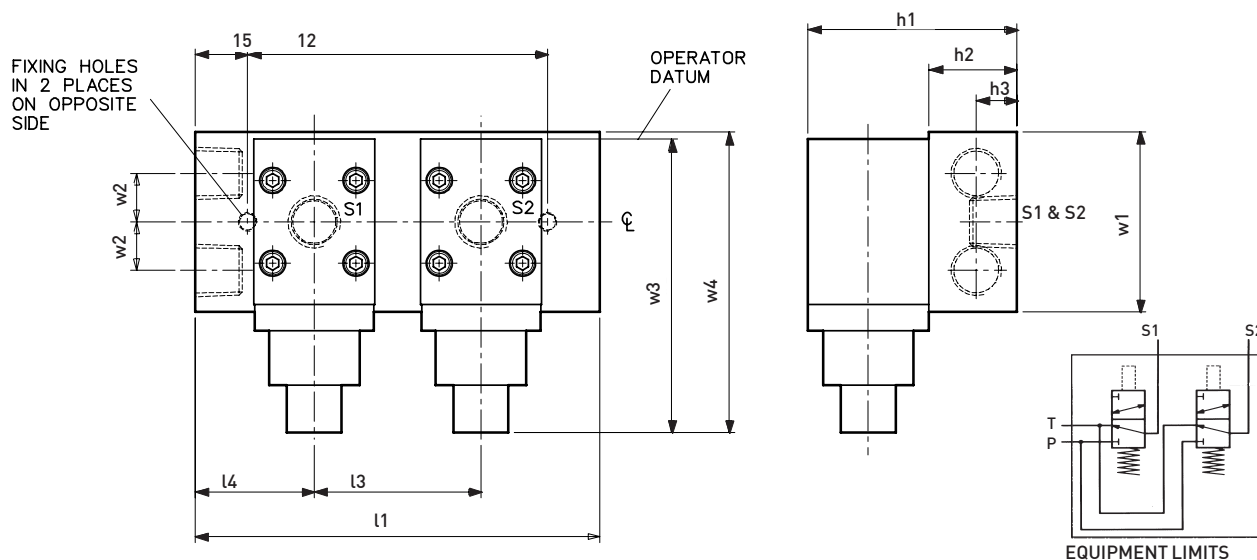
## 4/2 Body Assembly (Code 42) direct acting operators



MODEL	OPERATOR	h1	h2	h3	l1	l2	l3	l4	l5	w1	w2	w3	w4	CONNECTIONS	WEIGHT kg	FIXINGS
FP50	H'X'	89	38	17	155	105	55	50	25	76.2	20.5	124	127	1/2	7.5	M8 x 15 DP
FP50	L1 & SL1	89	38	17	180	130	80	50	25	76.2	20.5	124	127	1/2	8.1	M8 x 15 DP
FP100/200	H'X'	100	36	18	175	135	66	54.5	20	110	35	183	178.5	1/2 OR 3/4	14.7	M10 x 15 DP
FP100/200	L1 & SL1	100	36	18	199	159	90	54.5	20	110	35	183	178.5	1/2 OR 3/4	15.4	M10 x 15 DP

OPERATOR WEIGHT NOT INCLUDED

## 4/3 Body Assembly (Code 43) direct acting operators



MODEL	OPERATOR	h1	h2	h3	l1	l2	l3	l4	l5	w1	w2	w3	w4	CONNECTIONS	WEIGHT kg	FIXINGS
FP50	H'X'	89	38	17	155	105	55	50	25	76.2	20.5	124	127	1/2	7.5	M8 x 15 DP
FP50	L1 & SL1	89	38	17	180	130	80	50	25	76.2	20.5	124	127	1/2	8.1	M8 x 15 DP
FP50	SH'X'	89	38	17	210	160	110	50	25	76.2	20.5	124	127	1/2	9.0	M8 x 15 DP
FP100/200	H'X'	100	36	18	175	135	66	54.5	20	110	35	183	178.5	1/2 OR 3/4	14.7	M10 x 15 DP
FP100/200	L1 & SL1	100	36	18	229	189	120	54.5	20	110	35	183	178.5	1/2 OR 3/4	16.3	M10 x 15 DP
FP100/200	SH'X'	100	36	18	219	179	110	54.5	20	110	35	183	178.5	1/2 OR 3/4	16.0	M10 x 15 DP

OPERATOR WEIGHT NOT INCLUDED

## SOLENOID OPTIONS

### HIGH PRESSURE PILOT STAGE SOLENOID VALVES

Reliability and Innovation in directional control valves

Order Code	Apparatus Code	Power Consumption	Standard Voltage	Voltage Tolerance	Temperature Range*		Protection	Cable Connection	Materials of Construction
					Media	Ambient			
90J	General Purpose	3 Watts	12, 24, 48 & 110 VDC 110, 240 VAC 50 or 60 Hz	+ / - 10 %	-20°C to +60°C		IP65 applies to connector	Hirschmann Connector	Glass filled nylon moulded coil
94C	EExemb II T3 T120°C	3.7 Watts			-20°C to +40°C				
97C (std)	EExd IIC T85	3 Watts			-20°C to +40°C (T6) (std)				
97F	or T100	1.5 Watts			-60°C to +40°C (T6) -20°C to +55°C (T5)				
97G	or T135	1.0 Watt			-60°C to +55°C (T5)				
97D		5.7 Watts			-20°C to +90°C (T4) -60°C to +90°C (T4)				
98C	EExia IIC T6 or T4	refer to solenoid drivers table on the next page			-20°C to +60°C (T6) (std) -60°C to +60°C (T6) -20°C to +95°C (T4) -60°C to +95°C (T4)				316 stainless steel

UL / CSA approved solenoids available upon request. Consult Bifold Fluidpower for details

\*Refer to operating temperature range on page 2

### LOW PRESSURE PILOT STAGE SOLENOID VALVES

Order Code	Apparatus Code	Power Consumption	Standard Voltage	Voltage Tolerance	Temperature Range		Protection	Cable Connection	Materials of Construction				
					Media	Ambient							
981	EExia IIC T6	24VDC System, 12VDC @ solenoid 370 OHMS (Typical barrier MTL728)			-20°C to +40°C		IP66	M20 x 1.5	316 stainless steel				
991	EExme II T3	5.7 Watts	12, 24, 110 VDC 110, 240 VAC 50 or 60 Hz	+10% / -15%	-20°C to +40°C								
87C	EExd IIC T85 or T100 or T135	3.5 Watts	24, 110 VDC 110, 240 VAC 50 or 60 Hz	+/- 10%	-20°C to +40°C (T6) (std) -60°C to +40°C (T6) -20°C to +55°C (T5)								
87D		5.7 Watts			-60°C to +55°C (T5) -20°C to +90°C (T4) -60°C to +90°C (T4)								
92	Class I Div1 Gp C&D Class I Div2 Gp A&B	5.6 - 7.2 Watts			+/- 10%	-20°C to +60°C				NEMA 4, 4X	1/2" NPT	316 stainless steel Nickel plated steel enc.	
92A	Class II Div1 Gp E,F,G												

### INTRINSICALLY SAFE SOLENOID DRIVERS \* (solenoid type 98C)

Interface Unit Manufacturer & Model Number	Apparatus Code	Solenoid Base model no.	Interface Unit Typical Input Characteristics			Typical Output Characteristics Measured At Solenoid		
			Voltage (V)	Current (mA)	Power (W)	Voltage (V)	Current (mA)	Power (W)
MTL 779+	EExia IIB	24VDC/98C	28	85.9	2.41	13.48	85.9	1.16
		&	24	73.7	1.77			
		24VDC/A98C	20	61.4	1.23			
TURCK MK72-S13-Ex0	EExia IIC	24VDC/98C	30	88	2.63	11.81	74.3	0.86
		&	24	107	2.56			
		24VDC/A98C	20	125	2.50			
PEPERL & FUCHS KFD2-SD-ExL.36	EExia IIB	24VDC/98C	30.0	85.5	2.57	11.81	76.0	0.90
		&	24.0	105.1	2.52			
		24VDC/A98C	20.0	125.4	2.51			
ELCON HiD 2881-YA1	EExia IIB	24VDC/98C	28.0	98.6	2.76	11.71	77.5	0.91
		&	24.0	96	2.30			
		24VDC/A98C	21.0	83.4	1.75			
STAHL 9351/10/14/10	EExia EExib IIB & IIC CONSULT MANUFACTURER	24VDC/98C	30.0	89.8	2.69	12.26	80.6	0.99
		&	24.0	115.6	2.77			
		24VDC/A98C	20.0	149.6	2.99			

FP50/100/200 Solenoids - Issue 4 - 23/02/05

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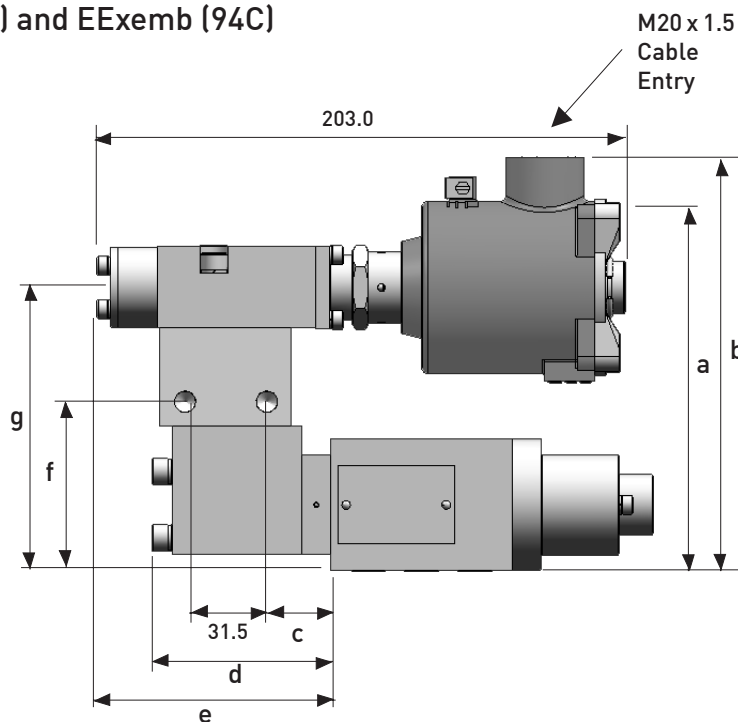
\* The solenoid drivers detailed are suggested models only and do not constitute an approved I.S. system. Consult Bifold Fluidpower prior to using alternative drivers.



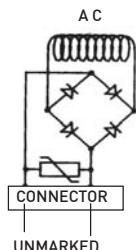
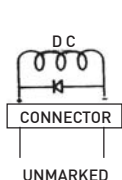
## High Pressure Pilot Stage Solenoid Valves

Solenoid EExd (97C,97F,97G), EExia (98C) and EExemb (94C)

	FP50			FP100/200		
	Gas Group					
	IIA	IIB	IIC	IIA	IIB	IIC
a	138	144.4	157	148	167	176.3
b	154	160.4	173	164	183	192.3
c	24.5	24.5	24.5	27.5	27.5	27.5
d	68.6	68.6	68.6	74.1	74.1	74.1
e	89.8	89.8	89.8	92.8	92.8	92.8
f	65.1	65.1	65.1	78.8	78.8	78.8
g	104	110.4	123	114	133	142.3

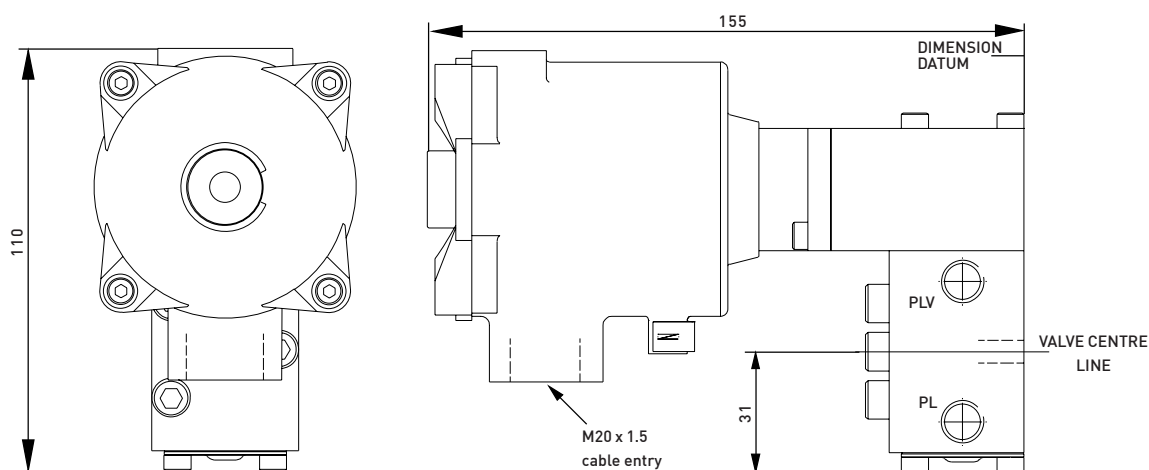


Example code :- FP50/SH1/M/32/S-24VDC/97CA9



## Low Pressure Pilot Stage Solenoid Valve Operators

Codes EExia (981) & EExme (991) - Pneumatic Pilot Only



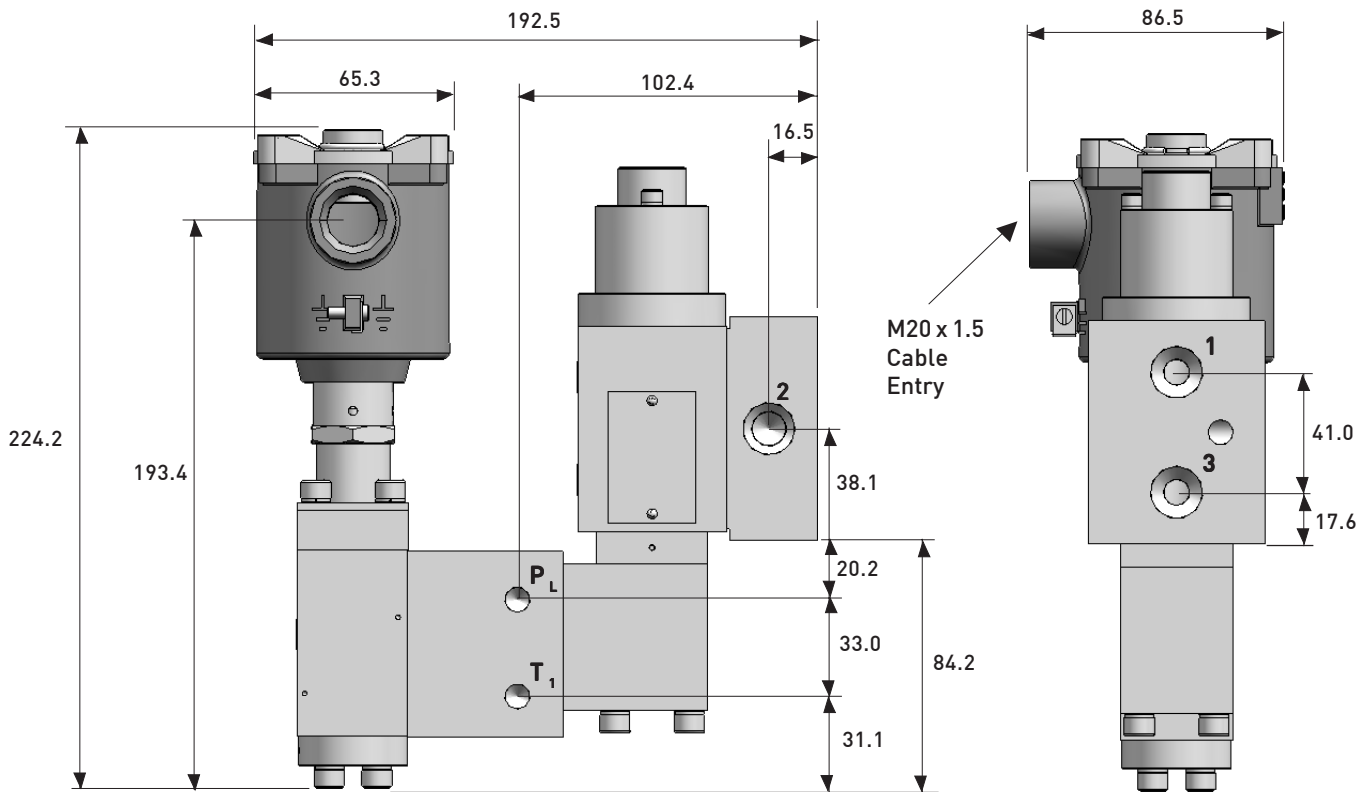
### CONNECTIONS:

PL - PILOT SUPPLY CONNECTION 1/8" NPT  
 PLV - PILOT VENT CONNECTION 1/8" NPT

WEIGHT 2.2 Kg

For operating parameters and associated pilot operator dimensions, refer to option L1 (See page 7)

Codes 97D, (EExd)

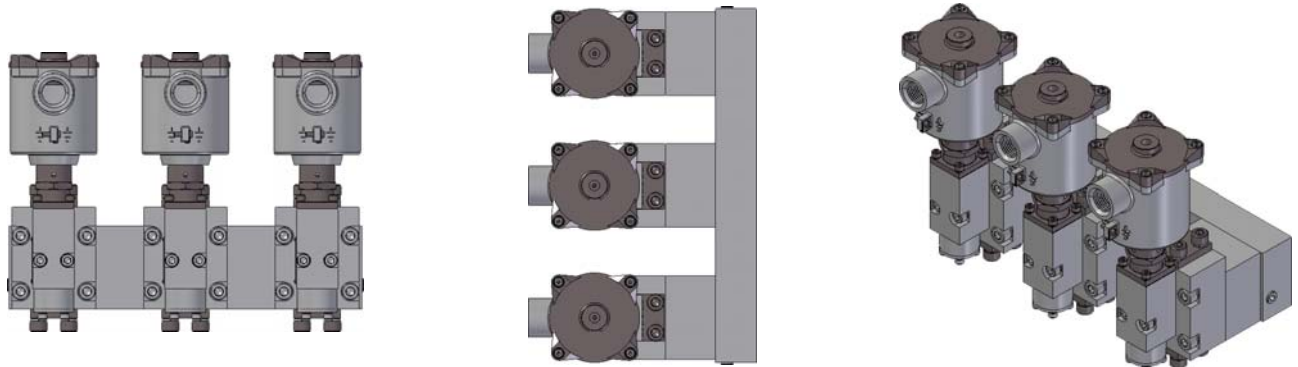


Example code :- FP50/SH1/M/32/S-24VDC/97DA9

## Manifold Options

Bifold Fluidpower has the technical capability to manifold many circuit requirements.

- Reduced leak paths - eliminate fittings
- Simple maintenance
- Integral check valves, gauge port, needle valves - reduce system cost
- Manifold assembly fully tested
- 3D model drawings available to incorporate into customer circuits



Contact Bifold Fluidpower with circuit requirements.

Model Shown is a 3 station FP15 with 97C solenoid

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#### **Quality Assurance**

*All Bifold Fluidpower products are manufactured to a most stringent QA programme. Every care is taken at all stages of manufacture to ensure that every product will give optimum performance and reliability. We are recognised to EN ISO 9001:2000. Functional test certificate, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BSEN 10204 3.1.B where available. The manufacturer reserves the right to make changes to the specifications and design etc., without prior notice*

#### **Accuracy of information**

*We take care to ensure that product information in this catalogue is reasonably accurate and up-to-date. However, our products and services are continually updated so to ensure accurate and up-to-date information please refer to the issue list on the web site or contact a member of our sales team.*



## Slide Valve Solenoids Model SV & SVI

Up to 1380 bar, 40 litres per minute

Superior performance  
throughout the full  
operational range

### Features:

- Worldwide solenoid approvals  
ATEX, SAA, INMETRO, CSA & GOST
- 316L Stainless steel
- Contamination tolerant:-  
fluids > NAS 1638 Class 12
- Solenoid positionable through 360°
- NACE MR-01-75 options
- Arctic Service options to -50°C



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## TECHNICAL SPECIFICATIONS

### MATERIALS OF CONSTRUCTION

All valve bodies:-	stainless steel 316L.
Internal components:-	stainless steel 316L/316, CA104 Aluminium Bronze, Ceramic, stainless steel AISI 440C (according to valve type), PEEK (according to valve type).
Fasteners:-	A4 18/10 316 grade stainless steel.
Springs:-	stainless steel 302S26.
O-Rings:-	Nitrile (standard). Alternative elastomers available for extreme conditions.
Lip Seals:-	PTFE compounds.

### MEDIA:

Mineral oils, water glycol mixtures, sea water (filtered), some chemicals, gases (subject to pressure limitations)(main stage)  
 Air, natural gas, bottled gases (low pressure pilot stages only)  
 Mineral Oils, water glycol mixtures (low pressure pilot stages, solenoid types 87C, 87D, 92 92A only).

### WORKING PRESSURE:

Up to 1380 Bar (20,000PSI). Maximum working pressure varies according to valve model.  
 Refer to ordering code.

### TEMPERATURE RANGE:

See solenoid and elastomer options. All high pressure, pilot stage solenoid valves, with the exception of type 97D, are limited to -36°C minimum operating temperature on account of restricted flow path and fluid viscosity considerations:-

Examples	SV8001/NC/05/SA-24VDC/97CA9	Operating temperature	-36°C to + 40°C
	SV8001/NC/05/SA-24VDC/97CA2	Operating temperature	-36°C to + 90°C
	SV8001/NC/05/A-24VDC/97DA4	Operating temperature	-50°C to + 55°C

### SOUR GAS SERVICE (REFER TO ORDERING CODE).

All internal wetted and body metal materials conforming to NACE MR-01-75. Solenoid options 97D, 87C & 87D only.

### LAST CHANCE FILTRATION:

A 40 micron, sintered stainless steel, filter disc is fitted as standard on all high pressure, pilot stage solenoid valve operators.

### INSTALLATION:

Valves can be mounted in any attitude. Solenoids can be rotated relative to the pilot stage valve body to suit cable entry. Systems should be flushed clean to ISO 4406 Class 18/15 or better. Bifold Fluidpower slide valves afford excellent sealing characteristics and are capable of handling fluids with cleanliness levels > Class 21/18.

Weights detailed in this catalogue are approximate only.



## SELECTION CHART

Reliability and Innovation in directional control valves

<b>SV</b>	upto 690 bar pilot stage solenoid valve	<b>SV/SV</b>	Bi-stable, high pressure pilot stage solenoid valve	Primary Operator
<b>SVI</b>	upto 10 bar pilot stage solenoid valve	<b>SVI/SVI</b>	Bi-stable, low pressure pilot stage solenoid valve	
<b>80</b>	Body ported	1/4 NPT (3/8 MP autoclave, pressure code 15)		Application & Configuration
<b>81</b>	Subbase mounting	(10A, 12A & 18A configurations)	liquid service	
<b>51</b>	Subbase mounting			
<b>82</b>	Body ported	1/4 NPT (3/8 MP autoclave, pressure code 15)		Application & Configuration
<b>53</b>	Subbase mounting		liquid service - subsea	
<b>84</b>	Body ported	1/4 NPT		
<b>55</b>	Subbase mounting		gaseous service	
<b>00</b>	3-way, 2-position	<b>01</b>	3-way, 2-position (reverse flow S to P)	Configuration
<b>02</b>	2-way, 2-position			
<b>10A</b>	3-way, 2-position (81 body only, rated @ 40 lpm, 414 bar max)			
<b>12A</b>	2-way, 2-position (81 body only, rated @ 40 lpm, 414 bar max)			
<b>18A</b>	5-way, 2-position (81 body only, rated @ 40 lpm, 414 bar max)			
<b>08</b>	5-way, 2-position (80 & 84 body only, 345 bar max. working pressure, 3/8 NPT ports)			
<b>NC</b>	normally closed		2/2 & 3/2	Working Pressure
<b>NO</b>	normally open		spring return valves	
<b>02</b>	138 bar		gaseous service	Working Pressure
<b>03</b>	207 bar			
<b>05</b>	345 bar	<b>06</b>	414 bar (10A, 12A & 18A only)	
<b>07</b>	520 bar	<b>10</b>	690 bar	
<b>15</b>	1035 bar		liquid service	
<b>20</b>	1380 bar (Type 5100 only)		180°C max fluid temp. ; 6 lpm nominal	
N.B. Codes 15 & 20:- maximum pilot stage pressure 690 bar				
<b>S</b>	Nitrile (standard)		(-30°C to +130°C)	O-ring material
<b>V</b>	Viton		(-20°C to +180°C)	
<b>A</b>	Silicone/Fluorosilicone		(-50°C to +40°C)	
<b>SA</b>	Low temperature Nitrile		(-46°C to +130°C)	
<b>XXX</b> (refer to solenoid options on page 4)				Voltage
<b>XXX</b> (refer to solenoid options on page 4)				Solenoid
<b>A</b>	ATEX Ex II 2 GD (standard)		87C, 87D,	Solenoid Approvals
<b>G</b>	GOST 1 Exd IIC T6 (T5,T4)		97C, 97D,	
<b>I</b>	INMETRO Br-Exd IIC T6 (T5)		97F, 97G,	
<b>S</b>	SAA Exd IIC T6 (T5,T4)			
<b>U</b>	CSA Exd IIC (Canada) CSA AExd IIC (USA)		87C, 87D	
<b>A</b>	ATEX Ex II 1 GD T75°C (T110°C)		98C	
<b>A</b>	ATEX Ex II 1 GD T65°C (standard)		981	
<b>G</b>	GOST 0 Exia IIC T6			
<b>A</b>	ATEX Ex II 2 Gdc T120°C		94C	
<b>A</b>	ATEX Ex II 2 G		991	
<b>1</b>	T4 IIA		87C, 87D,	T-Rating & Gas Group
<b>2</b>	T4 IIB		97C, 97D,	
			97F, 97G,	
<b>3</b>	T4 IIC		As above +98C	
<b>4</b>	T5 IIA			
<b>5</b>	T5 IIB			
<b>6</b>	T5 IIC		87C, 87D,	
<b>7</b>	T6 IIA		97C, 97D,	
<b>8</b>	T6 IIB		97F, 97G,	
<b>9</b>	T6 IIC (standard)		As above +98C	
<b>H2S</b>	NACE MR-01-75			Options
<b>K6</b>	BSPF ported			
<b>K85</b>	1/2" NPT cable entry			
<b>ML</b>	Manual reset			SV solenoid operators options
<b>M</b>	Manual override-spring return			
<b>MOR</b>	Manual override-rotary stayput			
<b>WS</b>	Weather seal solenoid core tube (90J only)			
<b>SV 80 01 / NC / 05 / S-24VDC / 97C A 9 / ML</b>				Example

Standard Test Fluid: Marston Bentley HW540.

# SOLENOID OPTIONS

## HIGH PRESSURE PILOT STAGE SOLENOID VALVES



Reliability and Innovation in directional control valves

Order Code	Apparatus Code	Power Consumption	Standard Voltage	Voltage Tolerance	Temperature Range*		Protection	Cable Connection	Materials of Construction
					Media	Ambient			
90J	General Purpose	3 Watts	12, 24, 48 & 110 VDC 110, 240 VAC 50 or 60 Hz	+ / - 10 %	-20°C to +60°C		IP65 applies to connector	Hirschmann Connector	Glass filled nylon moulded coil
94C	EExemb II T3 T120°C	3.7 Watts			-20°C to +40°C				
97C (std)	EExd IIC T85	3 Watts			-20°C to +40°C (T6) (std)				
97F	or T100	1.5 Watts			-60°C to +40°C (T6)		IP66	M20 x 1.5	316 stainless steel
97G	or T135	1.0 Watt			-20°C to +55°C (T5)				
97D		5.7 Watts			-60°C to +55°C (T5)				
98C	EExia IIC T6 or T4	refer to solenoid drivers table on the next page	-20°C to +90°C (T4)						
			-60°C to +90°C (T4)						

UL / CSA approved solenoids available upon request. Consult Bifold Fluidpower for details

\*Refer to operating temperature range on page 2

## LOW PRESSURE PILOT STAGE SOLENOID VALVES

Order Code	Apparatus Code	Power Consumption	Standard Voltage	Voltage Tolerance	Temperature Range *		Protection	Cable Connection	Materials of Construction
					Media	Ambient			
981	EExia IIC T6	24VDC System, 12VDC @ solenoid 370 OHMS (Typical barrier MTL728)			-20°C to +40°C		IP66	M20 x 1.5	316 stainless steel
991	EExme II T3	5.7 Watts	12, 24, 110 VDC 110, 240 VAC 50 or 60 Hz	+10% / -15%	-20°C to +40°C				
87C	EExd IIC T85 or T100 or T135	3.5 Watts	24, 110 VDC 110, 240 VAC 50 or 60 Hz	+/- 10%	-20°C to +40°C (T6) (std)				
87D		5.7 Watts			-60°C to +40°C (T6)				
					-20°C to +55°C (T5)				
					-60°C to +55°C (T5)				
92	Class I Div1 Gp C&D Class I Div2 Gp A&B	5.6 - 7.2 Watts		+/- 10%	-20°C to +90°C (T4)		NEMA 4, 4X	1/2" NPT	316 stainless steel
92A	Class II Div1 Gp E,F,G				Nickel plated steel enc.				

## INTRINSICALLY SAFE SOLENOID DRIVERS \* (solenoid type 98C)

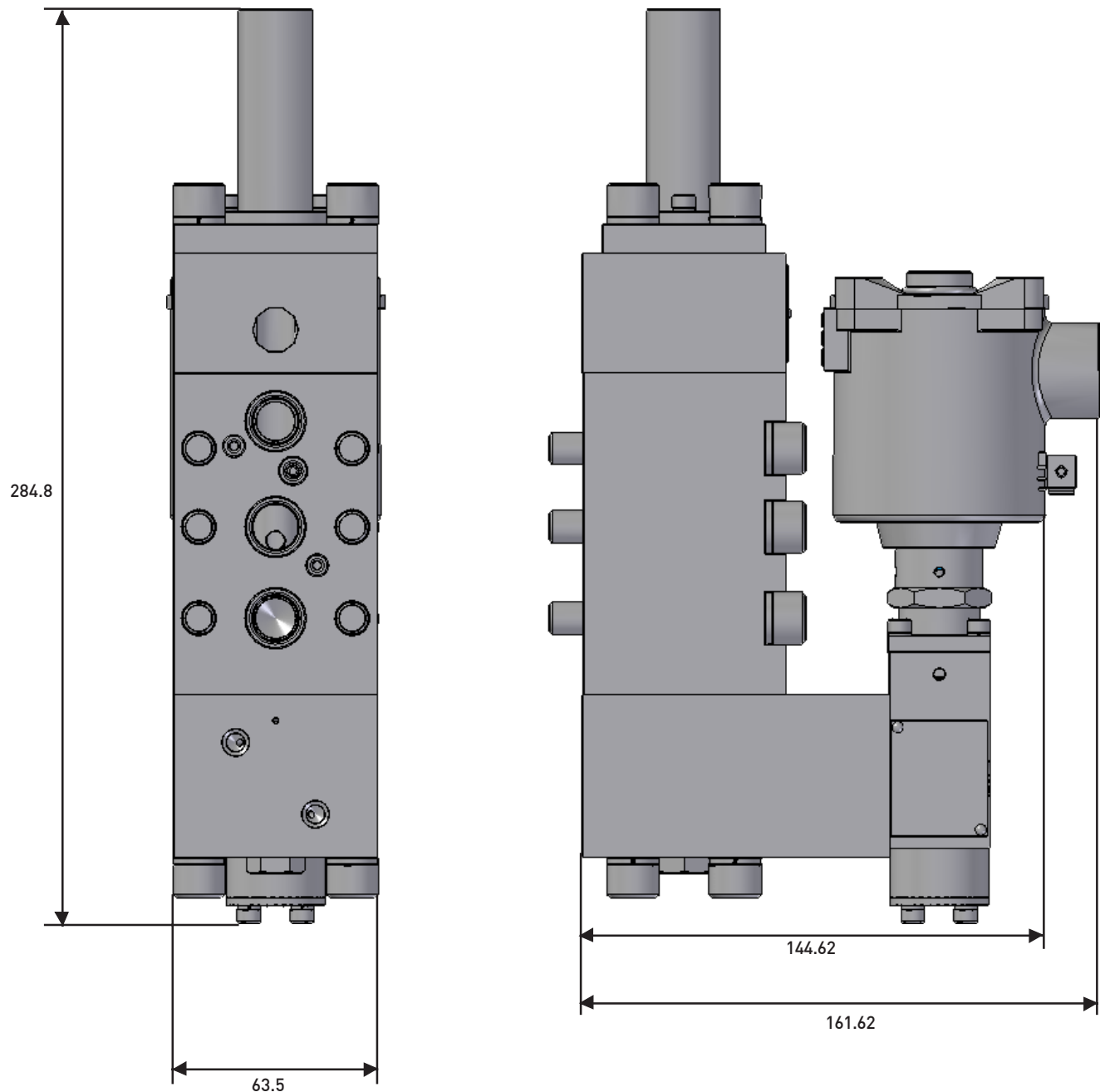
Interface Unit Manufacturer & Model Number	Apparatus Code	Solenoid Base model no.	Interface Unit Typical Input Characteristics			Typical Output Characteristics Measured At Solenoid		
			Voltage (V)	Current (mA)	Power (W)	Voltage (V)	Current (mA)	Power (W)
MTL 779+	EExia IIB	24VDC/98C	28	85.9	2.41	13.48	85.9	1.16
		&	24	73.7	1.77			
		24VDC/A98C	20	61.4	1.23			
TURCK MK72-S13-Ex0	EExia IIC	24VDC/98C	30	88	2.63	11.81	74.3	0.86
		&	24	107	2.56			
		24VDC/A98C	20	125	2.50			
PEPERL & FUCHS KFD2-SD-Ext.36	EExia IIB	24VDC/98C	30.0	85.5	2.57	11.81	76.0	0.90
		&	24.0	105.1	2.52			
		24VDC/A98C	20.0	125.4	2.51			
ELCON HiD 2881-YA1	EExia IIB	24VDC/98C	28.0	98.6	2.76	11.71	77.5	0.91
		&	24.0	96	2.30			
		24VDC/A98C	21.0	83.4	1.75			
STAHL 9351/10/14/10	EExia EExib IIB & IIC <small>CONSULT MANUFACTURER</small>	24VDC/98C	30.0	89.8	2.69	12.26	80.6	0.99
		&	24.0	115.6	2.77			
		24VDC/A98C	20.0	149.6	2.99			

\* The solenoid drivers detailed are suggested models only and do not constitute an approved I.S. system. Consult Bifold Fluidpower prior to using alternative drivers.

Slide Valve Solenoids - Issue 4 - 23/02/05

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sales@bifold-fluidpower.co.uk www.bifold-fluidpower.co.uk

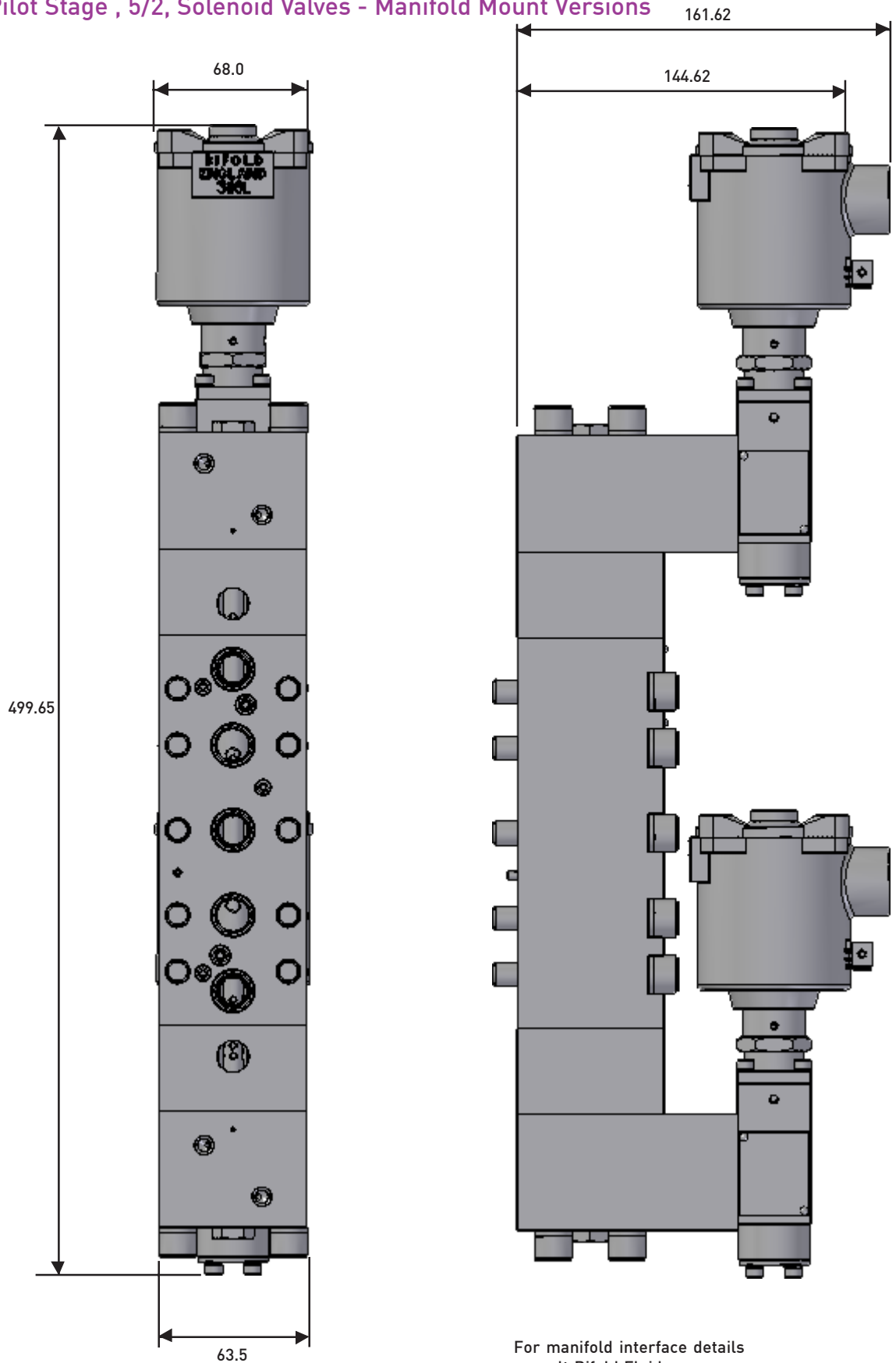
## High Pressure Pilot Stage , 3/2, Solenoid Valves - Manifold Mount Versions



For manifold interface details  
consult Bifold Fluidpower

Example Code:- SV8110A/NC/06/S-24VDC/97CA4

## High Pressure Pilot Stage , 5/2, Solenoid Valves - Manifold Mount Versions

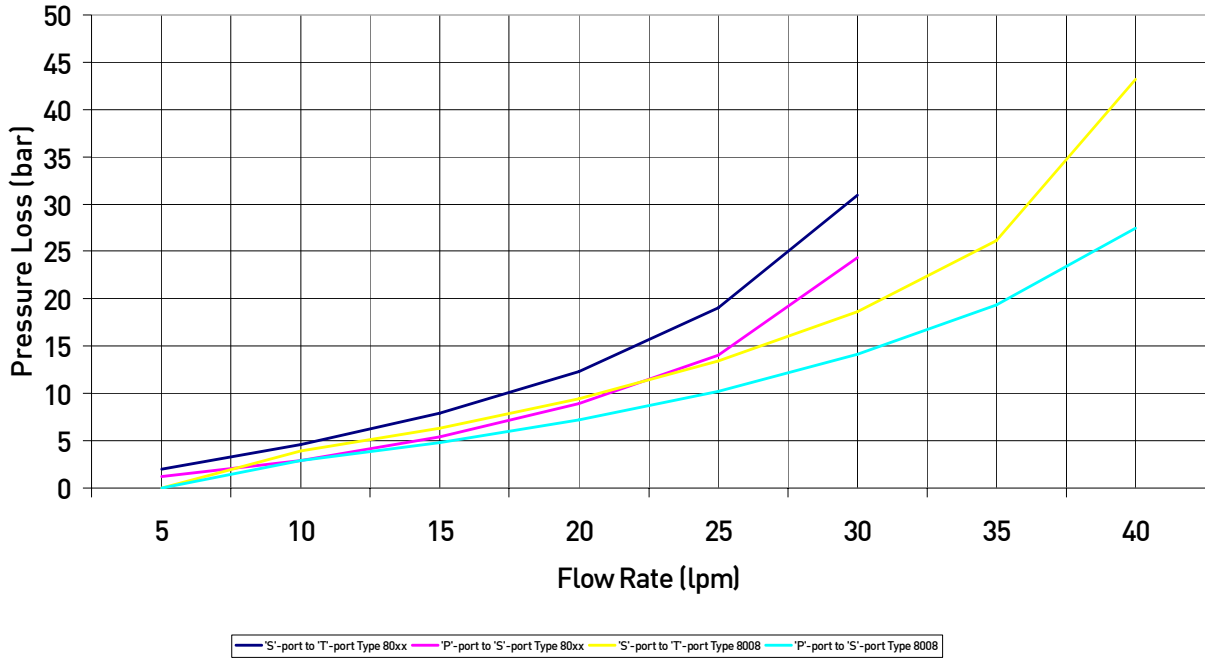


For manifold interface details  
consult Bifold Fluidpower

Example Code:- SV/SV8118A/NC/06/S-24VDC/97CA4

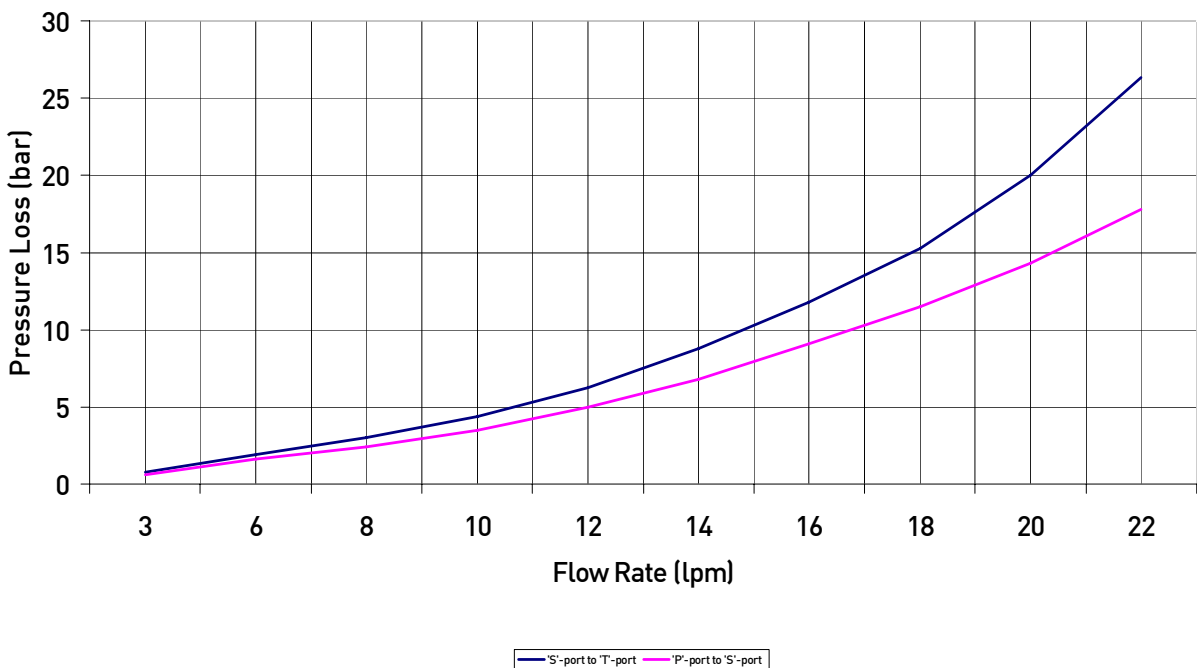
TEST FLUID  
MINERAL OIL @ 30 cST

### Flow Performance 80xx,8008 Slide Valves

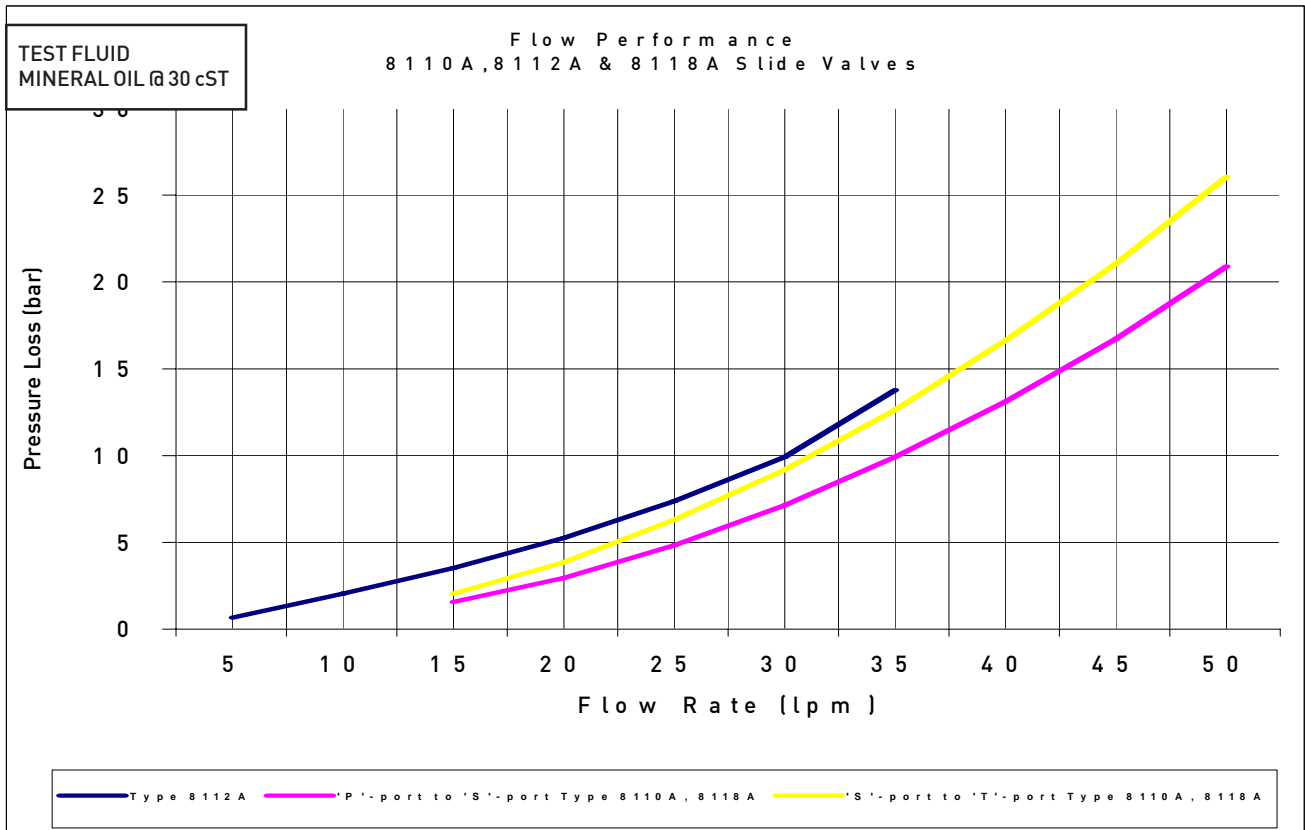


TEST FLUID  
MINERAL OIL @ 30 cST

### Flow Performance 51xx Slide Valves







## OPERATING LIMITATIONS

### APPLICABLE TO ALL 5000 AND 8000 SERIES 2-WAY, 3-WAY AND 5-WAY SLIDE VALVES

#### WARNING

Slide type valves incorporating single acting seals will if subjected to reverse pressurisation/flow partially or fully collapse these seals.

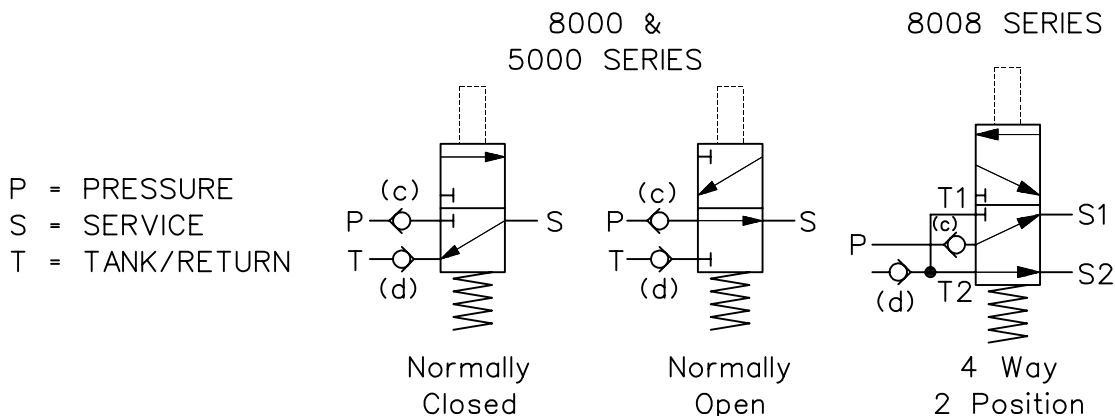
Seal failure will occur if the following operating conditions are introduced into the hydraulic system.

- A higher pressure is applied to the tank/return port than at the service port
- A higher pressure is applied to service port than at the pressure port.
- Depressurisation of the hydraulic supply pressure with the valve in a pressure to service flow mode. (If this is a system design requirement we recommend the 5101 or 8001 valve types are used).
- Back pressure at the tank port exceeding the maximum recommended 200 psi (14 bar) above the service line pressure.

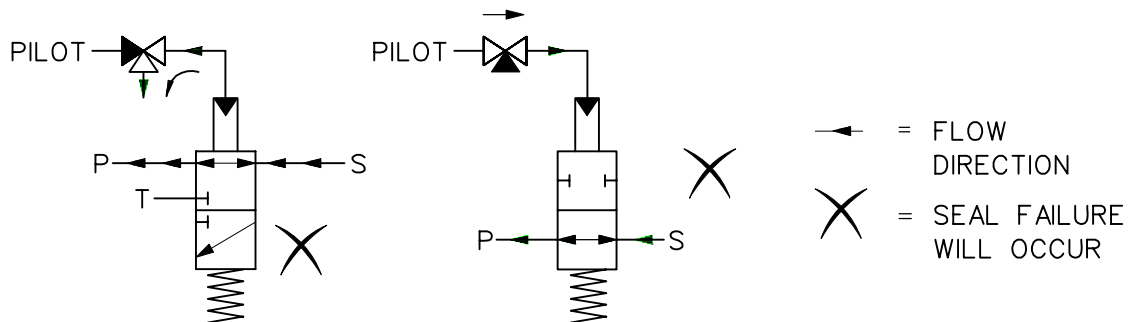
If conditions (c) and (d) can arise during normal operation we recommend the following action is taken.

To eliminate condition (c) install a check valve directly at pressure 'P' inlet port.

To eliminate condition (d) install a check valve directly at the tank 'T' port.



- e) Valve types 5101, 5102, 8001 and 8002 are fitted with a bi-directional seal which is capable of tolerating flow from the pressure (P) port to the service (S) port and vice versa. The reverse flow capability of these valves is only permitted while the valve is in a static mode i.e. the valve must not change position whilst in a reverse flow mode as the seal will be damaged. **Note:** Condition (d) will remain applicable to these valve types.

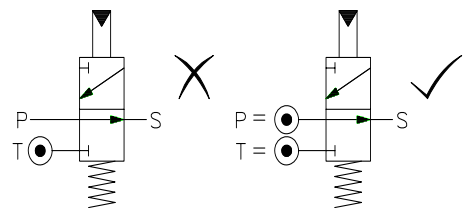


### TESTING

For the purpose of proof testing an entire hydraulic system, including return/tank lines at the maximum test pressure, the tank port lines can be pressurised providing an equivalent pressure is always maintained at the valve pressure port with the valve in a pressure to service mode.

Always dissipate a test pressure down stream of the tank port.

Under no circumstances should the tank port be plugged.



To depressurise a control circuit with the direction for flow maintained P to S (Normally Open Valve or Normally Closed Valve pilot operated to open), pressure must always be dissipated down stream of the service port. (Excluding valves with reverse flow capability, refer to warning paragraph (e)).

### Other Slide Valve Types Effected

- (i) 3-way and 4-way for gas service  
Types: 5500, 8400 and 8408
- (ii) 2-way, 2 position valves for gas service  
Types: 5502 and 8402
- (iii) 2-way, 2 position valves for hydraulic service  
Types 8102 and 8112

The above valve types are fitted with a bi-directional seal which is capable of tolerating flow from the pressure (P) port to the service port (S) and vice versa. The reverse flow capability of these valves is only permitted while the valve is in a static mode i.e. the valve must not change position whilst in a reverse flow mode as the seal will be damaged. (Refer to warning paragraph (e))

### NOTE

To eliminate the modes of failure as described (excludes reverse flow type, refer to warning), we offer a stackable valve system, incorporating 5100 series, subbase manifolds, thermal relief and check valves.

We also manufacture a range of block before bleed and balanced poppet valves which are not susceptible to the seal damage through reverse flow mode applications. For further details on these and our stackable valve system please contact Fluidpower.

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#### **Quality Assurance**

*All Bifold Fluidpower products are manufactured to a most stringent QA programme. Every care is taken at all stages of manufacture to ensure that every product will give optimum performance and reliability. We are recognised to EN ISO 9001:2000. Functional test certificate, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BSEN 10204 3.1.B where available. The manufacturer reserves the right to make changes to the specifications and design etc., without prior notice*

#### **Accuracy of information**

*We take care to ensure that product information in this catalogue is reasonably accurate and up-to-date. However, our products and services are continually updated so to ensure accurate and up-to-date information please refer to the issue list on the web site or contact a member of our sales team.*

## Subsea Solenoid Valve Model FPS01

up to 690 bar, 1 litre per minute



Superior performance  
throughout the full  
operational range

### Features:

- Fully seawater compatible
- Contamination tolerant :  
fluids > NAS1638 Class 12
- Operating temperatures upto 125°C
- 3000 metre water depth
- Cable connector options

## TECHNICAL SPECIFICATIONS

### MATERIALS OF CONSTRUCTION

All valve bodies:-	Stainless steel 316L
Internal components:-	Stainless steel 316L, Monel K500, Inconel 718, MP35N
Fasteners:-	A4 18/10 316 grade stainless steel
Springs:-	Elgiloy
Seating:-	Ceramic ball to MP35N
Solenoid:-	Apticote 460G plated ENIA steel, 316 stainless steel cable connector block
Seals:-	Nitrile (standard). Alternative elastomers available for extreme conditions:-

### MEDIA:

Mineral oils, water glycol mixtures, sea water (filtered), some chemicals

### TEMPERATURE RANGE:

20°C to 125°C (see solenoid options)

### WORKING PRESSURE:

Up to 690 Bar (10,000PSI). Maximum working pressure varies according to valve model.  
Refer to ordering code.

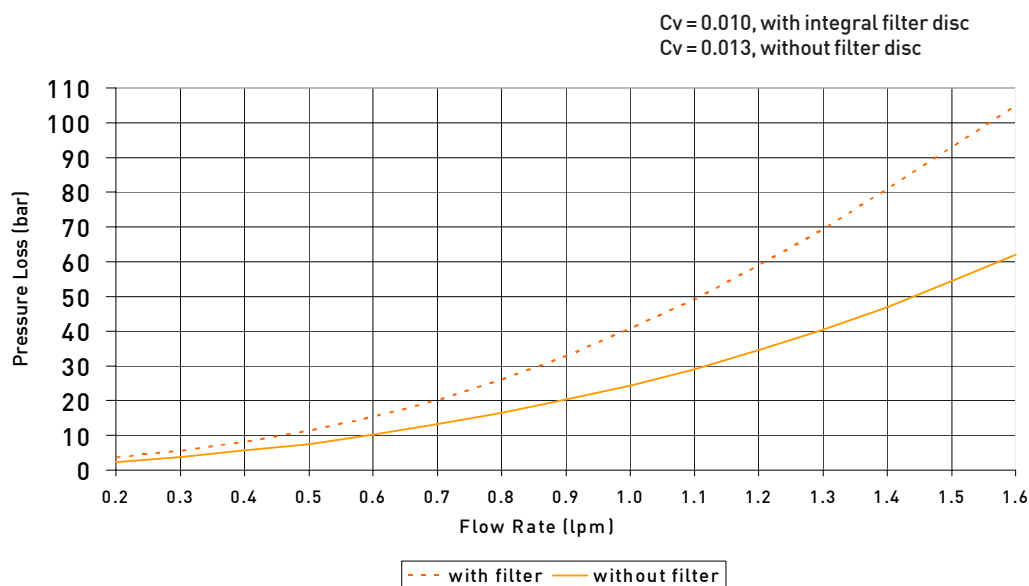
### WORKING DEPTH:

3000 metres.

### LAST CHANCE FILTRATION:

A 40 micron, sintered stainless steel, filter disc is fitted as standard. This may be omitted for an improved flow when alternative last chance filtration is installed in the system upstream of the valve.

## FLOW PERFORMANCE





## SELECTION CHART

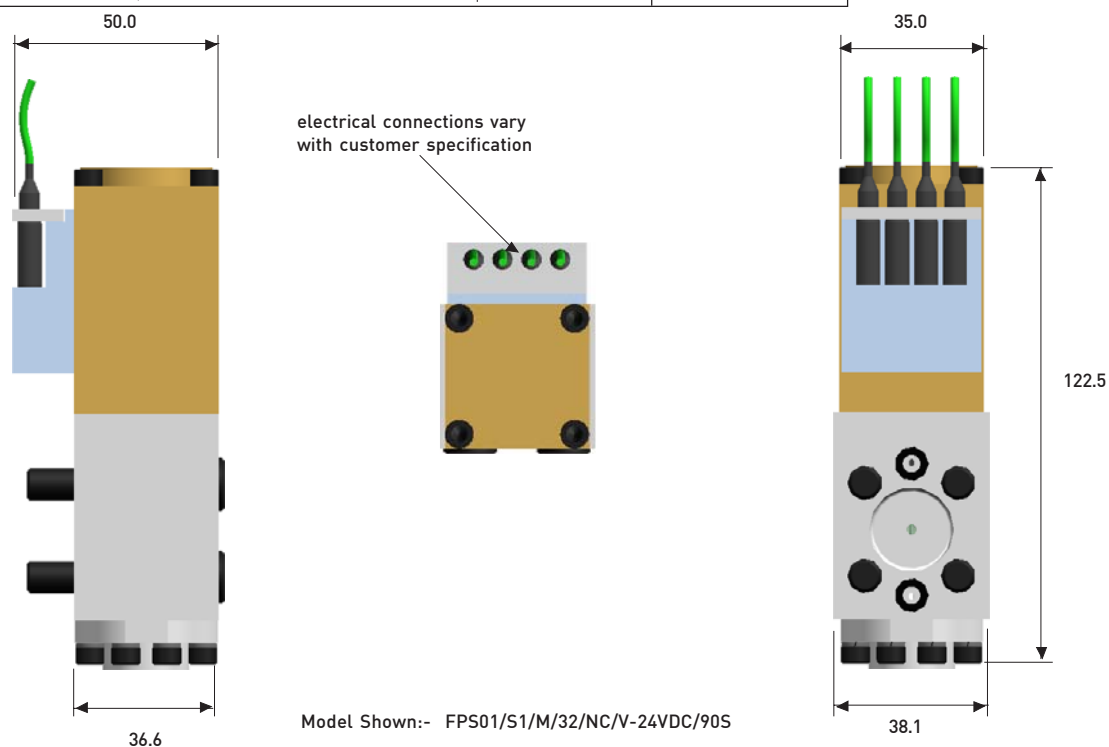
<b>FPS01</b>			Model Code
<b>S1</b> <b>S2</b> <b>S3</b>		345bar 518bar 690bar	Maximum Valve Pressure
<b>M</b> <b>M2</b>	Interface for mainstage valves type FPS10 To suit subbase M411/02 (1/4" NPT)	Subbase Mounting	Connections
<b>32</b>	3 - way, 2 - position		Configuration
<b>NC</b> <b>NO</b>	Normally Closed Normally Open		
<b>S</b> <b>V</b>	Nitrile (standard) [-30°C to +130°C] Viton [-20°C to +180°C]		O-ring material
<b>XXX</b>	(Refer to solenoid options)		Voltage
<b>XXX</b>	(Refer to solenoid options)		Solenoid
<b>FPS01 / S1 / M / 32 / NC / V -24VDC / 90S</b>			Code example

Standard Test Fluid: Marston Bentley HW540

## SOLENOID OPTIONS

ORDER CODE	SINGLE/ DUAL COIL	POWER CONSUMPTION	VOLTAGE 75% - 120%	TEMPERATURE RATING	CABLE CONNECTION
90S	D	15	24VDC	-20°C to +50°C	Hydrobond (x4)
90SKE	D	15	24VDC	-20°C to +125°C	Kemlon (x2)
90/M25	D	15	24VDC	-20°C to +50°C	M25 Bennex
90S/FL	D	15	24VDC	-20°C to + 50°C	18" flying leads

see front page photograph



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# Pilot & Mechanical Valve Model Domino Junior

Up to 10 bar operating pressure

Superior performance  
throughout the  
full operational range

## Features:

- 316L stainless steel
- Arctic Service options to -60°C
- Air, sweet & sour gases, hydraulic oil



## TECHNICAL INFORMATION

Reliability and Innovation in directional control valves

### OPERATING MEDIA

- Air, sweet and sour gas, hydraulic oil

### FLOW PERFORMANCE

• 1-2	25 SCFM	12 NI/sec	708 NI/min	0.7 Cv
• 2-3	32 SCFM	15 NI/sec	906 NI/min	0.9 Cv

### MECHANICAL CONSTRUCTION

- Body:- Stainless steel 316L
- Fasteners:- Metric A4 18/10 316 grade stainless steel
- Seat Material:- Viton (standard). Alternative elastomers available for extreme conditions
- Springs:- Stainless steel 316L
- Ports:- 1/4" thread milled NPT (BSPP options available)

### TEMPERATURE RANGE:

SJE/HSJE/SJJE/HSJJE	-20°C to +180°C
ASJE/AHSJE/ASJJE/AHSJJE	-60°C to +40°C

### OPERATING PRESSURE

- 0 - 10 bar standard service
- 0 - 8 bar ASJE/AHSJE/ASJJE/AHSJJE

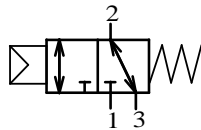
### SEAL REPAIR KITS

example codes:-

- SRKSJE06-P1/00-VITON
- SRKSJE06-P9-VITON
- SRKSJE06-M1-VITON

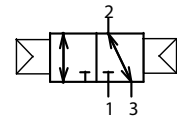
## LOGIC VALVES - PREFERRED MODEL LIST

### PILOT VALVES:



SJE06-P1-32-NU-00

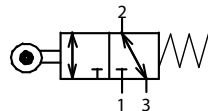
1/4" NPT, Pilot operated, 3 way 2 position, normally universal, (2/2 and 3/2 normally closed operation) spring return, C.v. 0.7, 10 bar (BBB)



SJE06-P1-32-NU-P1

1/4" NPT, Pilot operated, 3 way 2 position, normally universal, pilot return, C.v. 0.7, 10 bar (BBB)

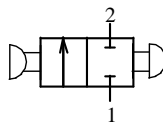
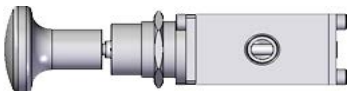
### MECHANICAL VALVES:



SJE06-M12-32-NU-00

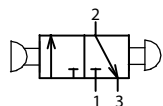
1/4" NPT, Cam operated, 3 way 2 position, normally universal, spring return, C.v. 0.7, 10 bar (BBB)

### PANIC VALVES:



SJJE06-2-PV

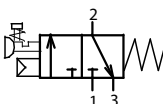
1/4" NPT, 2 way 2 position, push button to block, pull button to bleed, C.v. 0.7 10 bar (BBB)



SJJE06-3-PV

1/4" NPT, 3 way 2 position, push button to block, pull button to bleed, C.v. 0.7 10 bar (BBB)

### RESET VALVES:



SJJE06-P1-32-NC-M15-K54

1/4" NPT, Pull button or energise pilot to operate, normally closed, spring return, C.v. 0.7, 10 bar (BAB)



SJJE06-P1-32-NC-M16-K54

1/4" NPT, Pull button or energise pilot to operate, mechanical latch, normally closed, spring return, C.v. 0.7, 10 bar (BAB)



SJJE06-P9-32-NC-M15-K54

1/4" NPT, Pull button to energise air latch pilot, normally closed, spring return, C.v. 0.7, 10 bar (BAB)



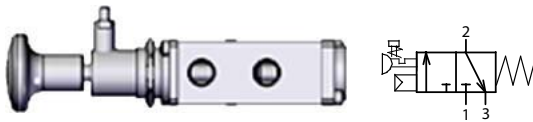
SJJ06-P9-32-NC-M15-K54-K27C

1/4" NPT, Pull button or energise air latch pilot, normally closed, spring return with eyeball indicator from port 2 (green on, red off), C.v. 0.7, 10 bar (BAB)



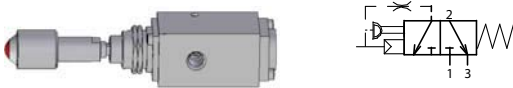
SJJ06-P9-32-NC-M16-K54-K27C

1/4" NPT, Pull button or energise pilot and pull button to operate, mechanical latch, normally closed, spring return with eyeball indicator from port 2 (green on, red off), C.v. 0.7, 10 bar (BAB)



SJJ06-P9-32-NC-M16-K54

1/4" NPT, Pull button or energise pilot and pull button to operate, mechanical latch, normally closed, spring return, preliminary latch pin, C.v. 0.7, 10 bar (BAB)



SJJE06-P9X-32-NC-M15-K54-K27P

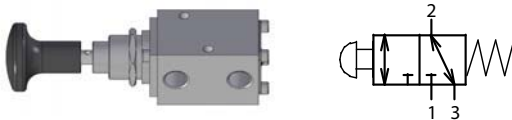
1/4" NPT, Pull button to energise air latch pilot, normally closed, spring return, with eyeball indicator from pilot with restricted feed to port 2 in energised state (green on, red off) C.v. 0.7, 10 bar (BAB)

### RESET VALVES:



SJJ06-M2-32-NU-00

1/4" NPT, shrouded push button, normally universal, spring return, C.v. 0.7, 10 bar



SJJ06-M2-32-NU-00-K10

1/4" NPT, push button, normally universal, spring return, C.v. 0.78, 10 bar



SJJ06-M14-32-NU-04

1/4" NPT, push/pull button, normally universal, detented, C.v. 0.7, 10 bar

ALL VALVES ABOVE AVAILABLE FOR HYDRAULIC SERVICE WITH THE ADDITION OF **H** AT THE START OF THE START NUMBER



## SELECTION CHART : J06

SJE06 HSJE06 ASJE06 / AHSJE06	gaseous service hydraulic service arctic service (-50°C) gaseous / hydraulic	See Note below	Model Code
P1 M11 M12 M52	pilot operator plunger actuator roller cam operated key operator		Primary Actuator
22 32 52	2-way, 2-position 3-way, 2-position 5-port, 2-position		Configuration
NC NO NU XX	Normally Closed Normally Open Normally Universal 52 valves only		Configuration
00	spring return end cap		Return Devices - Secondary Actuator
P1	pilot operator		Air Pilot - Secondary Actuator
M11 M12	plunger actuator roller cam operated		Hand / Mechanical - Secondary Actuator
K4 K6 K54 L26	valve exhaust bug vent BSPP port option block after bleed (std for HSJ/AHSJ) proximity switch (consult BFP)		Options
SJE06 - P1 - 32 - NC - 00 - K4			Ordering Example

**NOTE:-** The bodies of the 3 way 2 position junior range have been reduced from 1 1/2" bar stock to 1 1/4" bar stock. This has been reflected by the addition of the letter 'e' in the part code e.g. SJE06, HSJE06 etc. This is applicable to all options except for when using K27 and 5 way 2 position which will remain as SJJ06 etc.

## SELECTION CHART : JJ06

SJJE06 / HSJJE06 ASJJE06 / AHSJJE06	gaseous / hydraulic service arctic service (-50°C) gaseous / hydraulic service	See Note below	Model Code
P1 P9 P92	pilot operator air latch pilot operator air latch pilot operator - <b>HSJJ or AHSJJ only</b>		Air Pilot Primary Actuator
M2 M9 M14	shrouded push button panel mounting push / pull (padlockable) panel mounting push / pull panel mounting		Hand / Mechanical Primary Actuator
22 32 52	2-way, 2-position 3-way, 2-position 5-port, 2-position		Configuration
NC NO NU XX	Normally Closed Normally Open Normally Universal 52 valves only		Configuration
00 04 05	spring return end cap blanking cap - <b>M9 &amp; M14 only</b> detented action end cap - <b>M9 &amp; M14 only</b>		Return Devices - Secondary Actuator
M15 M16	pull button spring return with panel mount pull button spring return with preliminary latch & panel mount		Hand / Mechanical - Secondary Actuator
K4 K6 K10 K22 K27 K28 K54 L26	valve exhaust bug vent BSPP port option black plastic button extra panel mount ring eye ball indicator - <b>M15 / M16 only</b> red plastic button block after bleed (std for M15/M16 and HSJJ/AHSJJ series) proximity switch (consult Bifold Fluidpower Ltd)		Options
SJJE06 - P9 - 32 - NC - M16 - K54			Ordering Example

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### Quality Assurance

*All Bifold Fluidpower products are manufactured to a most stringent QA programme. Every care is taken at all stages of manufacture to ensure that every product will give optimum performance and reliability. We are recognised to EN ISO 9001:2008. Functional test certificate, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BSEN 10204 3.1 where available. The manufacturer reserves the right to make changes to the specifications and design etc., without prior notice*

### Accuracy of information

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## Indicating Relays

### First Out / Visual Indicator

(Up to and including 145 psi / 10 bar working pressure)



### Superior Performance Throughout the Full Operational Range

- Compact Design
- Up to 145 psi / 10 bar Operating Pressure & Pilot Pressure
- Valve Body 316L Stainless Steel, NACE-MR-01-75 Compliant
- Up to 0.7 Cv

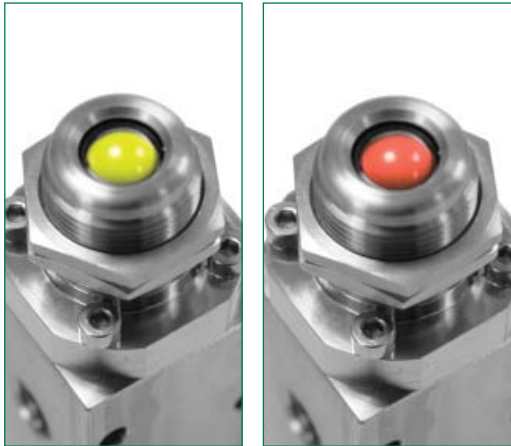


## Features & Benefits

### Introduction

Bifold's Indicating Relays, First Out / Visual Indicator type ranges have two functions. First, to indicate visually on a panel that a circuit malfunction has occurred and secondly, to quickly exhaust operating pressure from the system through the Main Supply Reset valve. The Indicating Relay valve with the Bypass function additionally provides the means to bypass the specific malfunctioning circuit without shutting down associated circuits.

### First Out / Visual Indicator Valve



#### Standard Valve Equipment Design & Build

- Manufactured from 316L grade stainless steel as standard. The valves are suited for offshore and other corrosive atmospheres. Materials can be certified compliant to NACE MR-01-75 rendering the valves suitable for sour gas media.



#### Safety and Environmental Benefits

- Bifold has state of the art product qualification and production equipment including flow (Cv), environment (-70°C to +180°C), function and leakage testing, and data logging.



- Tolerant to moist air in control lines.
- Products are manufactured, inspected, assembled and tested in our state of the art production facilities.

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Overview

"T" Transmitting Type

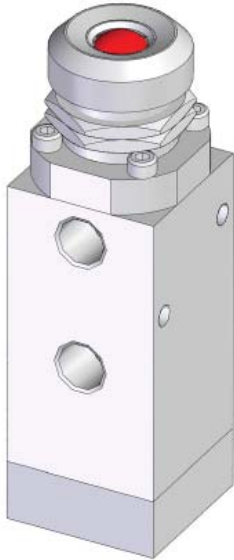
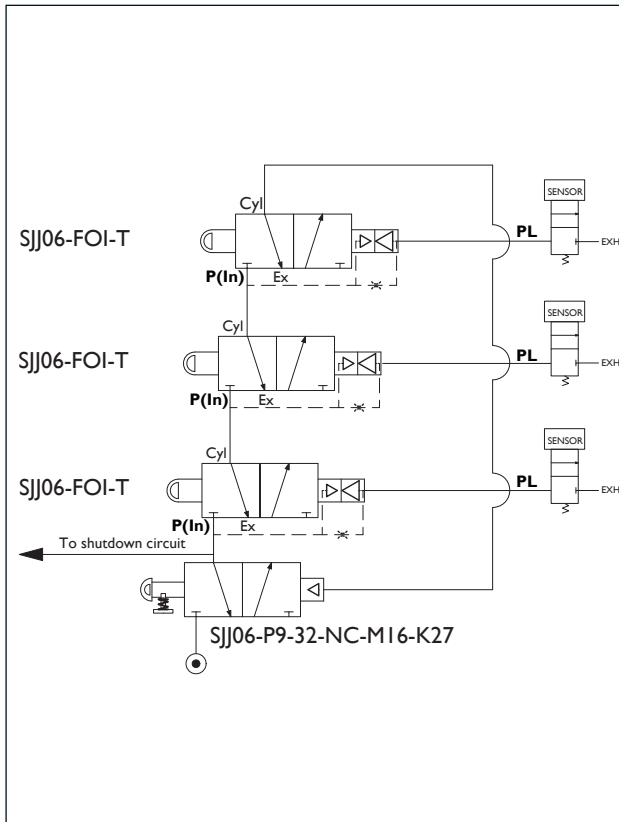


Image shown with the L123 (shroud) option.



SJJ06-FOI-T ("T" Transmitting Type)

The "T" type FOI's transmit a restricted pilot signal through to the sensor which blocks this signal allowing the pressure to build up and cause the FOI to move to the GREEN position, if the sensor is activated the PL is exhausted and causes the first out indicator to move to the RED position, all other first out indicators in the system remain green if their sensor remains intact.

"R" Receiving Type

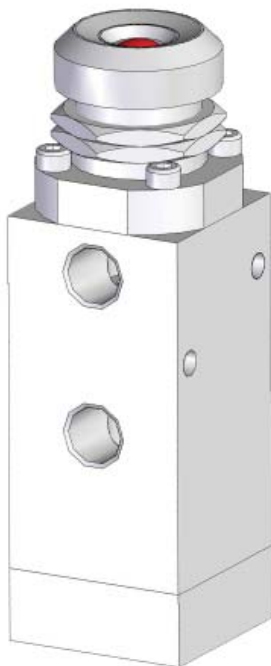
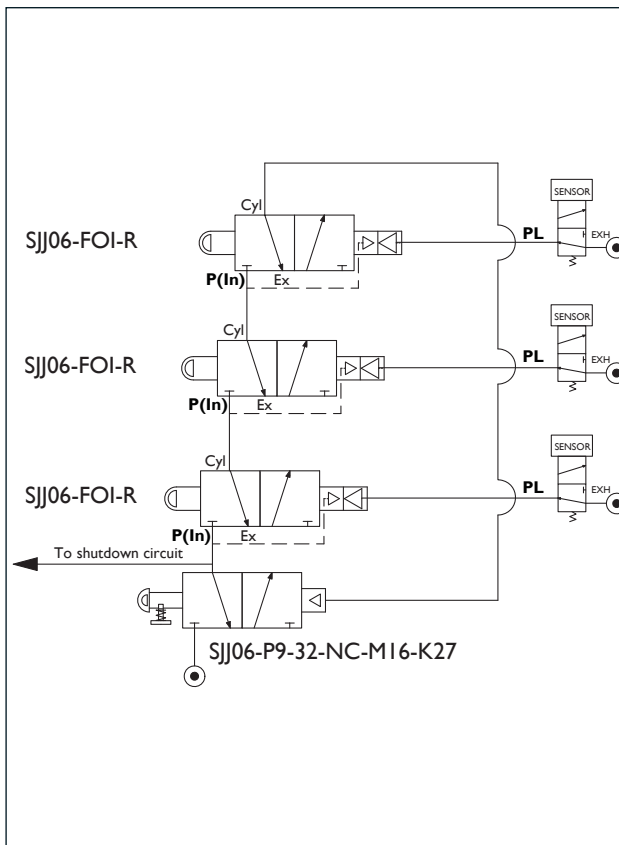


Image shown with the L123 (shroud) option.



SJJ06-FOI-R ("R" Receiving Type)

When PL is applied the valve moves to the open position and the indicator shows green even if there is no air on P(in).

When a sensor drops out, air is removed from PL, the valve closes and the indicator turns to red. The remaining circuit shuts down and the other indicators stay green provided their pilot signal remains on.

Overview

"RA" Receiving Type

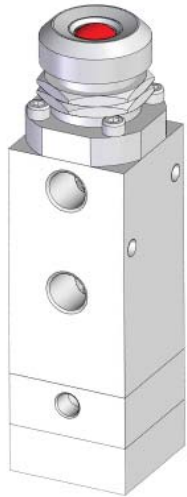
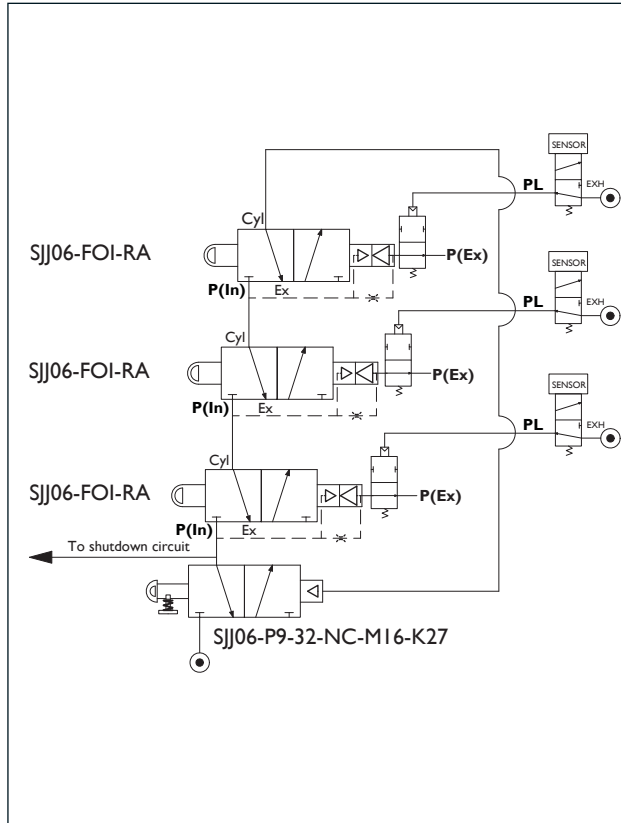


Image shown with the L123 (shroud) option.



SJJ06-FOI-RA ("RA" Receiving Type)

When **PL** and **P(in)** are applied the valve moves to the open position and the indicator shows green.

When a sensor drops out, air is removed from **PL**, the valve closes and the indicator turns to red. The remaining circuit shuts down and the other indicators stay green provided their pilot signal remains on.

Note: If **P(in)** is maintained by a special manual circuit, there will be a small venting discharge from pilot stage **P(Ex)**.

"RB" Receiving Type

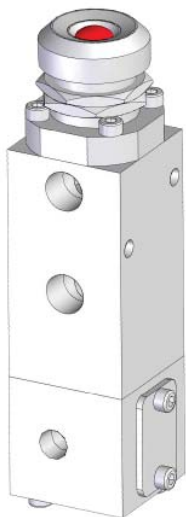
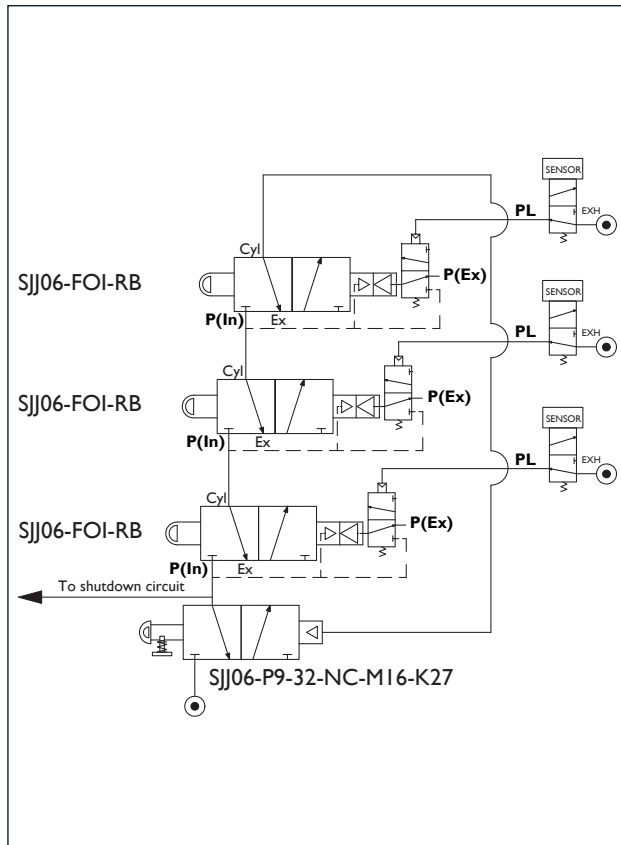


Image shown with the L123 (shroud) option.



SJJ06-FOI-RB ("RB" Receiving Type)

When **PL** and **P(in)** are applied the valve moves to the open position and the indicator shows green.

When a sensor drops out, air is removed from **PL**, the valve closes and the indicator turns to red. The remaining circuit shuts down and the other indicators stay green. The others will remain green even if their sensors subsequently shut down. Therefore only the first indicator to shut down goes red.


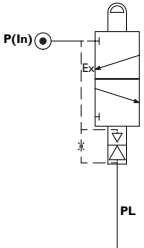

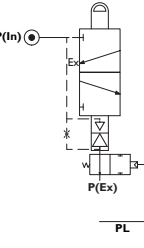

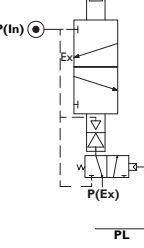
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Preferred Range

FIRST OUT INDICATOR PILOT VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>SJJ06</b> Pilot Valve First Out Indicator "T" Transmitting Type</p>		6	<b>SJJ06-FOI-T-L97</b>	<p>1/4" NPT Ports, 3 Way 2 Position, Pilot Operated, First Out Indicator, Transmitting.</p> <p>Cv 0.7, 145 psi / 10 bar.</p>
 <p><b>SJJ06</b> Pilot Valve First Out Indicator "RA" Receiving Type</p>		6	<b>SJJ06-FOI-RA-L97</b>	<p>1/4" NPT Ports, 3 Way 2 Position, Pilot Operated, First Out Indicator, Receiving.</p> <p>Cv 0.7, 145 psi / 10 bar.</p>
 <p><b>SJJ06</b> Pilot Valve First Out Indicator "RB" Receiving Type</p>		6	<b>SJJ06-FOI-RB-L97</b>	<p>1/4" NPT Ports, 3 Way 2 Position, Pilot Operated, First Out Indicator, Receiving.</p> <p>Cv 0.7, 145 psi / 10 bar.</p>



## Overview

### Materials of Construction

- Valve: 316L Stainless Steel as standard.
- Fasteners: Metric A4 18/10 316L grade Stainless Steel.
- Seat Materials: Viton as standard.
- Springs: UNS R30003 and 316L stainless steel.
- Valve Ports: 1/4" thread milled NPT (BSPP options available).
- Pilot Ports: 1/8" thread milled NPT (BSPP options available).

IP66 & IP67 Ingress Protection to IEC 60529 and NEMA 4X.

### Operating Pressure

22 psi / 1.5 bar - 145 psi / 10 bar mainstage working pressure.  
22 psi / 1.5 bar minimum pilot pressure.

### Flow Performance

0.7 Cv      25 SCFM      708 NL/min  
[Conditions: PI = 6 bar      dP = 1 bar]

### Operating Media

- Filtered air
- Inert gas
- Sweet or sour gas

### Temperature Rating

-15°C to +90°C (Standard).

### Indicating Colours

- Red - Trip mode (Depressurised)
- Green - Working mode (Pressurised)

### Mounting & Installation

- Panel mount - Ø26mm

For more information, please contact Bifold Sales Department.

## SJJ06

### SJJ06 Selection Chart - Ordering Example

<b>SJJ</b>	Standard	Model Code
<b>06</b>	1/4" NPT	Port Size
<b>FOI</b>	Pneumatic Pilot Valve	First Out / Visual Indicator
<b>T</b>	Transmitting Type	Transmitting & Receiving Types
<b>R</b>	Receiving Type	
<b>RA</b>	Receiving Type	
<b>RB</b>	Receiving Type	
<b>L97</b>	M25 x 1.5p Panel Mount Cap	Panel Mount Cap
<b>K6</b>	BSPP	Option
<b>L123</b>	Shroud	Option

**SJJ 06 - FOI - R - L97 - K6 - L123**      Ordering Example

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# Instrument, Process, Directional Control Valves, Pumps and Actuator Electronic Control and Positioning

# Bifold® Group

**Pneumatic and Instrumentation Valves**

**Hydraulic Valves**

**Subsea Valves**

**Hydraulic Pumps, Intensifiers and Valves**

**Actuator Electronic Control and Positioning**

**Bifold®**

**Bifold FluidPower®**

**Bifold® Subsea**

**Bifold® Marshalsea**

**Bifold® Orange™**

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Bifold, Bifold Fluidpower, Bifold Subsea, Marshalsea Hydraulics and Bifold Orange are all members of the Bifold Group.

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## Innovative and Reliable Valve Solutions



[bifold.co.uk](http://bifold.co.uk)



## Lockout relay valves

### Types 1200/1201/ 1205/1206

These lockout relays are pilot-operated, three port, two position valves with a manual reset knob, designed for panel mounting. In the 'locked out' position, service line pressure (Port 2) is vented to tank (Port 4) while supply pressure (Port 3) is blocked. The relay will not operate if a pressure is applied to the pilot connection (Port 1).

The hand knob is pulled to reset the relay, blocking the tank (Port 4) and connecting supply pressure (Port 3) to the service line (Port 2). If a pilot supply is present the relay will immediately be held in this position. Where a pilot supply is not initially present, the relay can be fitted with a latch pin to maintain it mechanically in the actuated position. When a pilot supply is applied, this pin will automatically disengage.

Either loss of pilot pressure or pushing the hand knob returns the relay to the closed 'locked out' position. The relay can be closed manually at all pilot pressures for gaseous media but only up to 70 psi pilot pressure for liquid media.

Specifically designed for use in wellhead safety shutdown systems, the relay is manufactured from 316 stainless steel and CA104 aluminium-bronze materials which meet the requirements of NACE Standard MR-01-75 (latest revision as applicable).

### Operating parameters

<b>Working pressure</b>	10.3 bar (150 psi).
<b>Pilot pressure – minimum</b>	2.1 bar (30 psi).
<b>Pilot pressure – maximum</b>	10.3 bar (150 psi).
<b>Operating media – Types 1200/1205</b>	Air, natural and sour gases
<b>Operating media – Types 1201/1206</b>	Mineral oil, water, water-glycol mixtures
<b>Connections</b>	1/8" NPT all ports.
<b>Working temperature – standard</b>	-20°C to + 160°C.
<b>Working temperature – arctic</b>	Available on request
<b>Manual close, maximum pilot pressures – gaseous media</b>	10.3 bar (150 psi)
<b>Manual close, maximum pilot pressures – liquid media</b>	4.8 bar (70 psi)

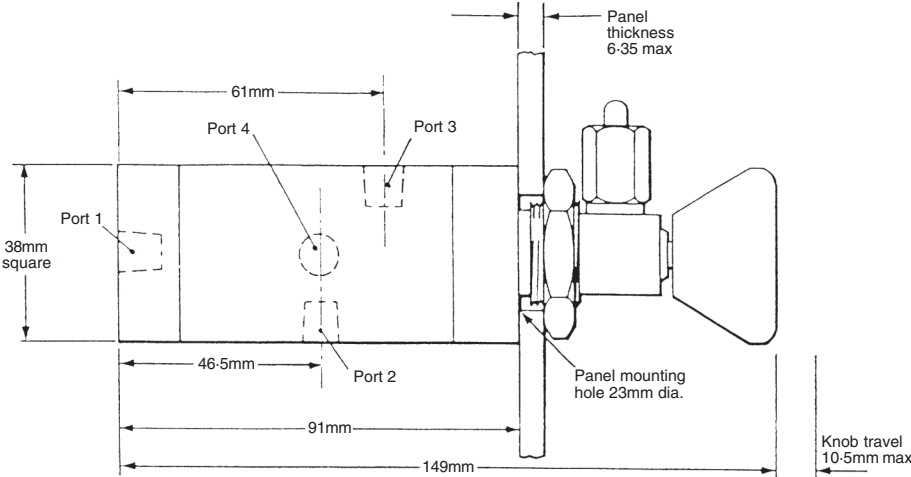


These valves conform to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



Marshalsea Hydraulics has been assessed by SGS Société Générale de Surveillance SA and certified as meeting the requirements of ISO 9001:2000 for the design, development, manufacture and servicing of hydraulic pumps, relief valves and intensifiers.

**Drawing giving dimensions**



**Weight:** 1.1kg

Port	Connection
Port 1	Pilot
Port 2	Service
Port 3	Supply
Port 4	Tank

**Port assignments**



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 United Kingdom

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**We reserve the right to alter specifications or withdraw products without notice**

## Lockout relay valves

### Type 1250

The manual lockout relay Type 1250 (normally closed) is a pilot-operated, three port, two position valve with manual-open actuator. It may be side mounted or panel mounted with a maximum panel thickness of 4 mm. In the 'locked out' position, service line pressure (Port 3) is vented to tank (Port 5) while the supply pressure (Port 4) is blocked. In this position the relay will function if a pressure supply is established at the pilot (Port 1). Thus a closing device must be connected downstream of the relay output with the relay pilot then connected downstream of the closing device, as illustrated in the schematic diagram.

With the remote closing device energised (activated), the relay can be opened; *i.e.*, supply pressure (Port 4) connected to service (Port 3) with tank (Port 5) blocked by depressing the operating knob – the supply pressure will assist the manual operator after approximately three-quarters of its travel to ensure positive operation of the valve changeover. The valve can only be closed by removal of the pilot supply pressure by a separate closing device, *e.g.*, either a solenoid or a three-way manual valve – not by the manual action of pulling out the valve knob.

The valve slide (supplied in a normally closed configuration) has a 'block before bleed' action – for example, the tank port is isolated before the pressure and service ports are interconnected.

Construction materials, predominantly 316 stainless steel and CA104 aluminium-bronze with seals of fluorelastomers and PTFE materials, ensure high corrosion resistance and comply with NACE Standard MR-01-75 (latest revision as applicable).

### Operating parameters

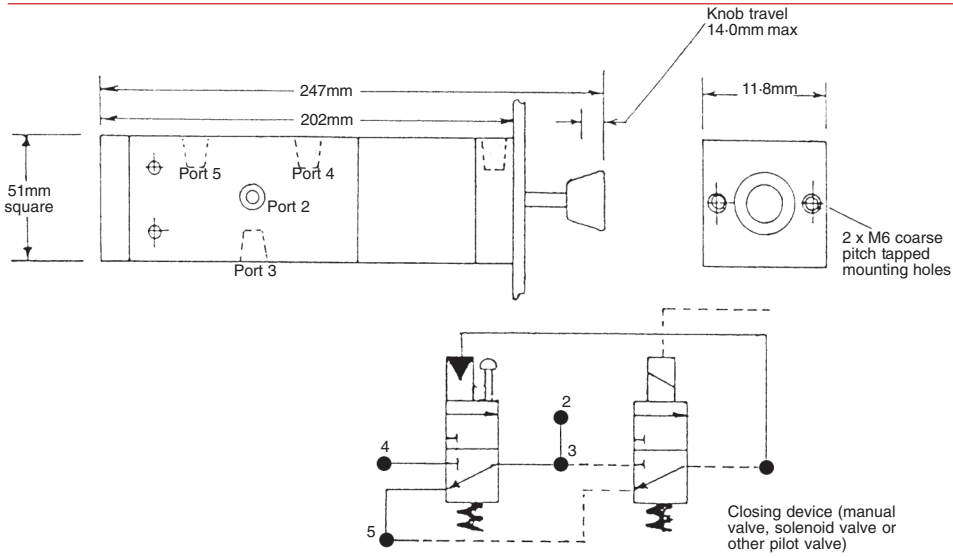
<b>Working/pilot pressure</b>	250 bar (3,625 psi) max. 69 bar min pilot operating pressure.
<b>Operating media</b>	Mineral oils or water-glycol mixtures with corrosion inhibitors.
<b>Connections</b>	1/4" NPT tapped all ports.
<b>Flow rate, nominal</b>	27 litres/min (6 imp galls/min).
<b>Working temperature</b>	-20°C to + 160°C.
<b>Recommended filtration</b>	3 micron



This valve conforms to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



Marshalsea Hydraulics has been assessed by SGS Société Générale de Surveillance SA and certified as meeting the requirements of ISO 9001:2000 for the design, development, manufacture and servicing of hydraulic pumps, relief valves and intensifiers.



**Drawing giving dimensions**

**Port assignments**

Port	Connection
Port 1	Pilot
Port 2	Gauge
Port 3	Service
Port 4	Supply
Port 5	Tank



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## Pilot Valves

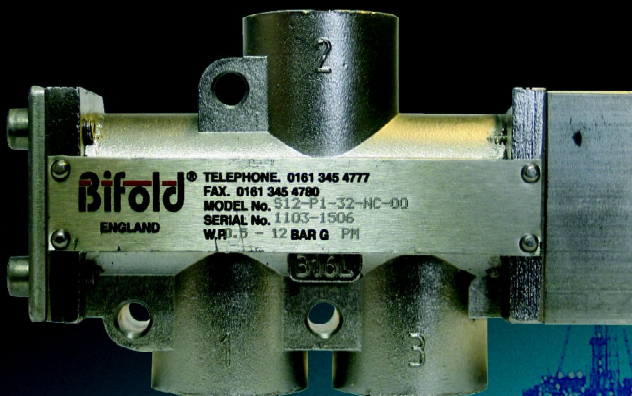
# Model Domino

Up to 12 bar operating pressure

Superior performance  
throughout the  
full operational range

### Features:

- CV up to 2.0
- 316L stainless steel
- 1/4" NPT, 3/8" NPT or 1/2" NPT  
(BSPP option available)





## TECHNICAL INFORMATION

### OPERATING MEDIA

- Air, sweet and sour gas

### OPERATING PRESSURE

- 2-12 bar standard

### FLOW PERFORMANCE

- 1/4" CV = 1.2
- 3/8" CV = 1.9
- 1/2" CV = 2.0

### TEMPERATURE RANGE:

- -20°C to +180°C ambient.

### MECHANICAL CONSTRUCTION

- Body:- stainless steel 316L
- Fasteners:- Metric A4 18/10 316 grade stainless steel
- Seat Material:- Viton (standard). Alternative elastomers available for extreme conditions
- Springs:- stainless steel 316
- Ports:- 1/4" NPT, 3/8" NPT & 1/2" NPT (BSPP options available)

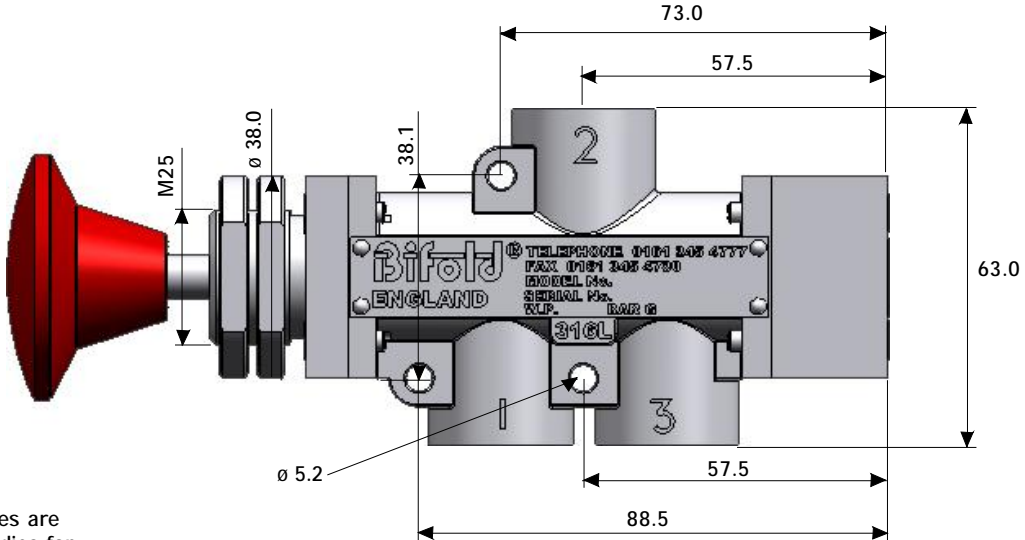
### SEAL REPAIR KITS

example codes:-

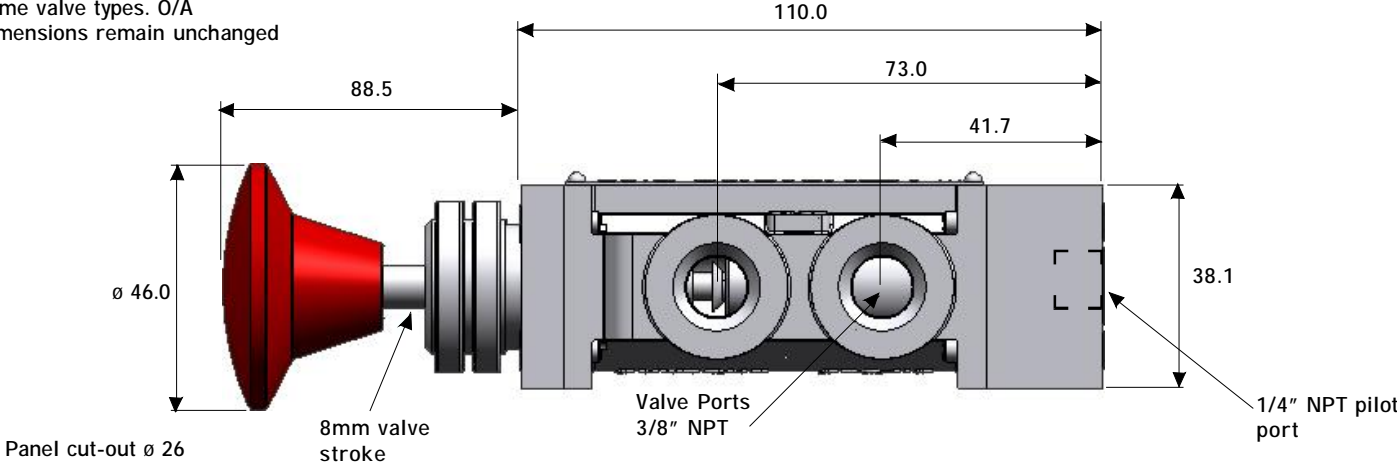
- SRKDOMINO-P1/00-VITON
- SRKDOMINO-P9-VITON
- SRKDOMINO-M1-VITON

### EXAMPLE CODE:

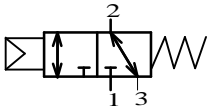
S09-P9-32-NC-M15



NOTE:- Barstock bodies are used in lieu of cast bodies for some valve types. O/A dimensions remain unchanged

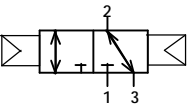


## PREFERRED RANGE



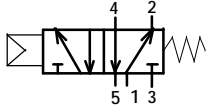
S06-P1-32-NC-00

1/4" NPT, pilot operated, 3 way 2 position, normally closed, spring return, C.v. 1.2, 12 bar max



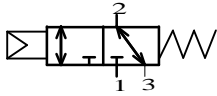
S06-P1-32-NC-P1

1/4" NPT, pilot operated, 3 way 2 position, normally closed, pilot return, C.v. 1.2, 12 bar max



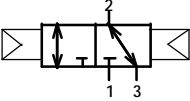
S06-P1-52-XX-00

1/4" NPT, pilot operated, 5 way 2 position, spring return, C.v. 1.2, 12 bar max



S12-P1-32-NC-00

1/2" NPT, pilot operated, 3 way 2 position, normally closed, spring return, C.v. 2.0, 12 bar max



S06-P1-32-NC-P1

1/2" NPT, pilot operated, 3 way 2 position, normally closed, pilot return, C.v. 2.0, 12 bar max

## SELECTION CHART

S06	1/4" NPT									Model Code
S09	3/8" NPT									
S12	1/2" NPT									
		P1	pilot operator							Air Pilot Primary Actuator
		P4	pilot operator with manual reset							
		P5	pressure sensing pilot							
		P6	low pressure pilot (1bar)							
		P8/1	time delay (latch on de-energize)							
		P9	air latch pilot operator							
		M1	push button							Hand / Mechanical Primary Actuator
		M2	push button panel mounted							
		M3	push/pull panel mounted							
		M5	key operator							
		M51	manual key operator							
		M6	lever operator							
		M9	push button with padlock mount							
				22	2-way, 2-position					Configuration
				32	3-way, 2-position					
				52	5-port, 2-position					
						NC	Normally Closed - 2/2 & 3/2 only			Configuration
						NO	Normally Open - 2/2 & 3/2 only			
						XX	52 valves only			
						CO	changeover - 3/2 only			
						DV	divertor - 3/2 only			
								00	spring return end cap	Return devices - Secondary Actuator
								03/1	spring cap with mechanical latch - latch on de-energize	
								03/2	spring cap with mechanical latch - latch on energize	
								04	blanking cap - detented valves	
								P1	pilot operator	Air Pilot - Secondary Actuator
								M1	push button	Hand / Mechanical - Secondary Actuator
								M15	pull button spring return with panel mount	
								M16	pull button spring return with preliminary latch & panel mount	
								K4	Valve exhaust bug vent	Options
								K6	BSP port option	
S09 - P9 - 32 - NC - M15										Ordering Example

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### Quality Assurance

*All Bifold Fluidpower products are manufactured to a most stringent QA programme. Every care is taken at all stages of manufacture to ensure that every product will give optimum performance and reliability. We are recognised to EN ISO 9001:2000. Functional test certificate, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BSEN 10204 3.1.B where available. The manufacturer reserves the right to*

### Accuracy of information

*We take care to ensure that product information in this catalogue is reasonably accurate and up-to-date. However, our products and services are continually updated so to ensure accurate and up-to-date information please refer to*

# High Pressure Logic Valves

## Mechanical and Pilot

Superior performance  
throughout the full  
operational range

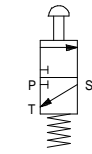
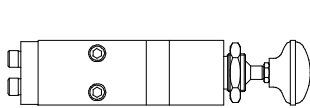
### Features:

- Push Button
- Key Operated
- Lever Operated
- Rotary
- Cam Roller and Plunger
- High Pressure Pilot



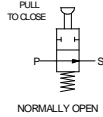
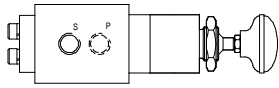


## HP LOGIC VALVES - Mechanical, Button Operated



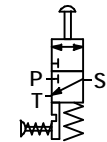
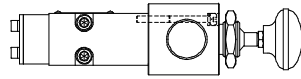
MVP8013/NC/03/S

2 way 2 position push button operated (push to open) panel mountable spring return normally closed poppet type hydraulic control valve, manifold mount. Rated upto 207 bar, upto 5 lpm @ 10 bar DP.



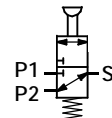
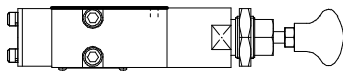
MVP8115/NO/03/S

2 way 2 position pull button operated (pull to close) panel mountable spring return normally open poppet type hydraulic control valve. 1/4" NPT in-line connections. Rated 207 bar, 5 lpm @ 10 bar DP.



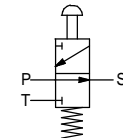
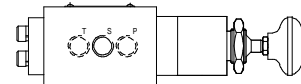
FP01/LPB1/M/32/NC/S

3 way 2 position manual push button (latching detent) operated, normally closed, ball seated poppet type hydraulic control valve. Manifold mount, rated 345 bar, 0.5 lpm nominal.



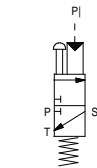
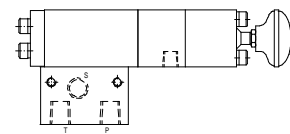
FP01/MV1/M/32/SV/S

3 way 2 position selector manual pull button operated spring return, ball seated poppet type hydraulic control valve. Manifold mount, rated 345 bar, 0.5 lpm nominal.



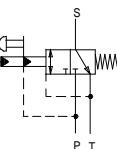
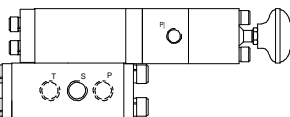
MVP8103/NO/05/S

3 way 2 position, pull button operated (pull to close), panel mountable. Spring return, normally open, poppet type hydraulic control valve, 1/4" NPT connections rated 207 bar WP. Flow rate 5 lpm @ 10 bar DP. Maximum return line pressure allowable when switching to the open position = 125 bar.



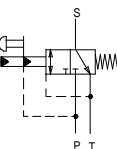
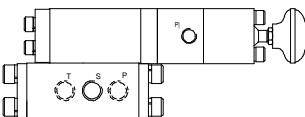
HPMVP8003/NC/05/S

3 way 2 position HP pilot or push button operated (push to open) spring return normally closed poppet type hydraulic control valve, manifold mount. Rated 345 bar, 5 lpm @ 10 bar DP.



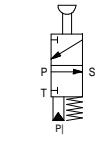
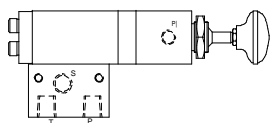
HPMVP8005/104/NC/07/S

3 way 2 position HP pilot (adj) or push button operated (push to open) panel mountable, spring return normally closed poppet type hydraulic control valve, manifold mount. Rated 518 bar, 1 lpm nominal.



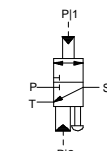
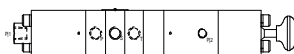
FP15/HPMVH1/04/32/S

3 way 2 position HP pilot or push button operated (push to open), spring return normally closed poppet type hydraulic control valve, 1/4" connections. Min valve operating pressure 50 bar, WP 345 bar, 15 lpm @ 10 bar DP.



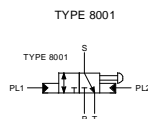
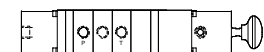
MHPVP8003/NO/05/S

3 way 2 position manually (pull to close) operated, panel mountable, normally open, poppet type hydraulic control valve with high pressure override to open position. Manifold. Rated 345 bar, 5 lpm @ 10 bar DP. pilot operating pressure range 10 - 345 bar, 1/8 NPT connection.



MPBHPV/HPV8001/05/S

3 way 2 position push/pull double high pressure pilot operated, detent block before bleed hydraulic control valve for bi-directional flow. Rated 345 bar, 20 lpm @ 10 bar DP. pilot operating pressure range 40 - 207 bar, 1/4 NPT connections.



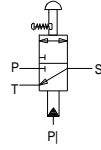
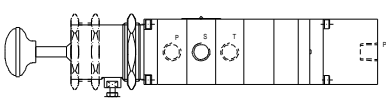
MPBLPV/LPV8001/05/S

3 way 2 position pull/push double low pressure pilot operated, detent block before bleed hydraulic control valve for bi-directional flow. Rated 345 bar, upto 20 lpm @ 10 bar DP. pilot operating pressure range 2.5 - 10 bar, 1/4 NPT connections.

Marshalsea 3111/3115 series M055 option

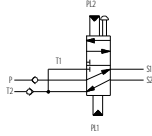
3 way 2 position push/pull (push to close) operated, block before bleed slide type hydraulic control valve for bi-directional flow, P to S, S to T. Mechanical latch in close position. 1/4 connections. Rated 345 bar, upto 20 lpm nominal @ 10 bar DP. Panel mounting.





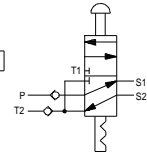
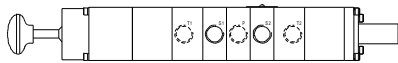
**MPB/LPV8401/NC/05/S-PM-ML**

3 way 2 position manual push/pull operating latch, detented to close position, pilot operation to closed position. 1/4 connections. Rated 345 bar. Pilot operating pressure range 2 to 10 bar, pilot connections (1/4")



**MPBHPV/HPV8008/05/S**

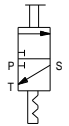
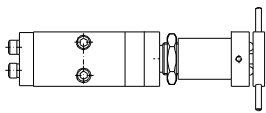
5 way 2 position manual pull/push button double high pressure pilot operated detented, block before bleed hydraulic control valve for uni-directional flow only. 3/8 NPT connections. Rated 345 bar, 23 lpm @ 10 bar DP. Pilot operating pressure range 40 to 345 bar, pilot connections PL1 (1/4") and PL2 (1/8 NPT)



**MPBV8008/05/S**

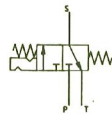
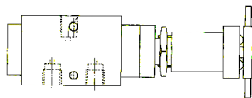
5 way 2 position push/pull detented operated, block before bleed slide type hydraulic control valve. 3/4 connections. Rated 345 bar, upto 23 lpm @ 10 bar DP. Panel mounting available.

**HP LOGIC VALVES, Mechanical, Rotary**



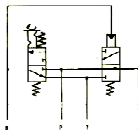
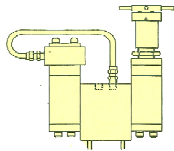
**MVRP8005/NC/05/S**

3 way or 2 way, 2 position manual 90 degree rotary turn operated, detented, panel mountable, spring return, poppet type hydraulic control valve. Manifold mount. Rated upto 690 bar WP. Flow rate 1 lpm nominal.



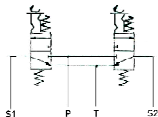
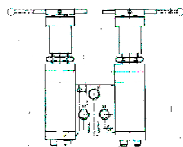
**MVRP8103/NC/05/S**

3 way 2 position manual 90 degree rotary turn operated, detented, panel mountable, spring return, poppet type hydraulic control valve suitable for uni-directional flow only. 1/4" connections, rated upto 345 bar WP. Flow rate 5 lpm @ 10 bar DP.



**MVRP8023/05/S**

4 way 2 position manual rotary 90 degree rotary turn poppet type hydraulic control valve. Cetop 3 connection. Flow rate 5 lpm @ 10 bar DP.



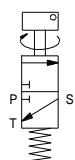
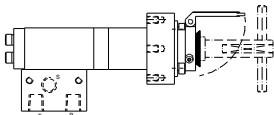
**MVRP8033/05/S**

4 way 3 position manual rotary 90 degree turn poppet type hydraulic control valve. 1/4" NPT connections. Panel mountable. Flow rate upto 5 lpm @ 10 bar DP.

**Marshalsea**

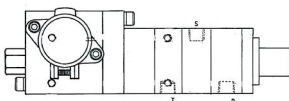
See drawing 14670-02/03

**HP LOGIC VALVES, Mechanical, Key Operated**



**KOVP8005/NC/10/S**

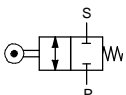
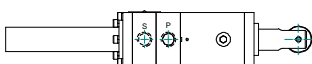
3 way 2 position 90 degree rotary turn, removable key operated, detented, normally closed poppet type hydraulic control valve. Manifold mount, rated 690 bar WP. Flow rate 1 lpm nominal.



**KOV8001/NO/05/S**

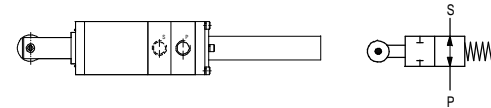
3 way 2 position 90 degree rotary turn, removable key operated, detented, normally closed slide type hydraulic control valve. 1/4" connections, rated 345 bar WP. Flow rate upto 20 lpm @ 10 bar DP.

**HP LOGIC VALVES, Mechanical, CAM Roller and Plunger**

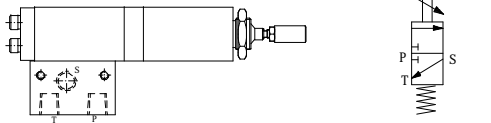


**COV(A)8002/NC/05/S-R**

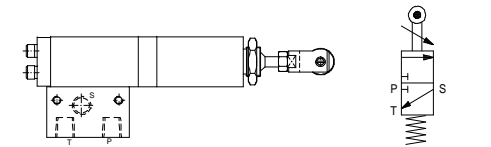
2 way 2 position roller cam operated, spring return, normally closed, slide type hydraulic control valve. 1/4" connections, rated upto 345 bar WP. Flow rate upto 20 lpm @ 10 bar DP



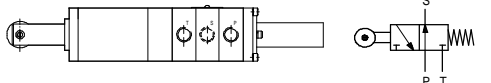
**COV8002/NO/05/S-R** 2 way 2 position roller cam operated, spring return, normally open, slide type hydraulic control valve. 1/4" connections, rated upto 345 bar WP. Flow rate upto 20 lpm @ 10 bar DP



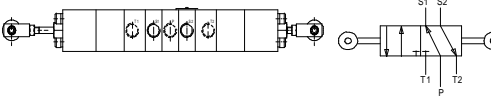
**COVP8005/NC/05/S-P M034** 3 way 2 position plunger cam operated, spring return, normally closed, poppet type hydraulic control valve. Manifold mount, rated 345 bar WP. Flow rate 1 lpm nominal.



**COVP8003/NC/05/S-R M034** 3 way 2 position roller cam operated, spring return, normally closed, poppet type hydraulic control valve. Manifold mount rated 345 bar WP. Flow rate 5 lpm @ 10 bar DP.

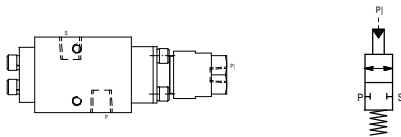


**COV(A)8001/NO/05/S-R** 3 way 2 position roller cam operated, spring return, normally open, slide type hydraulic control valve. 1/4" connections, rated upto 345 bar WP. Flow rate 20 lpm @ 10 bar DP

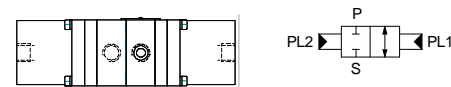


**COV(A)/COV(A)8008/05/S/R** 5 way 2 position dual roller cam operated slide type hydraulic control valve. 3/8" connections, rated 345 bar WP. Flow rate 23 lpm @ 10 bar DP

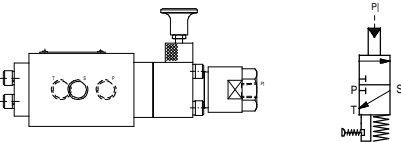
## HP LOGIC VALVES, HP Pilot



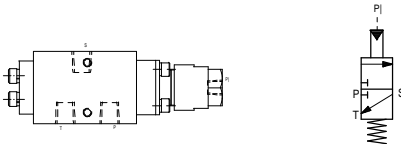
**HPVP8113/NC/03/S(X)** 2 way 2 position high pressure pilot operated, spring return, normally closed poppet type hydraulic control valve suitable for uni-directional flow. 1/4" in-line connections, rated 207 bar WP. Flow rate 5 lpm @ 10 bar DP. Pilot section 1/8 NPT connection. Various pilot operating pressure ranges



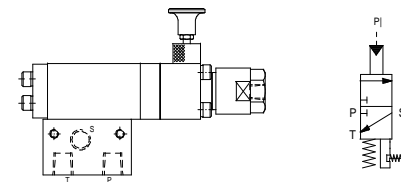
**LPV/LPV8002/05/S** 2 way 2 position low pressure pilot operated, detented, bi-stable, slide type, hydraulic control valve for bi-directional flow 'P' to 'S', 'S' to 'P'. 1/4" connections, rated 345 bar WP. Flow rate 20 lpm @ 10 bar DP. Pilot section 1/4 NPT connection. Pilot operating pressure range 4 to 10 bar.



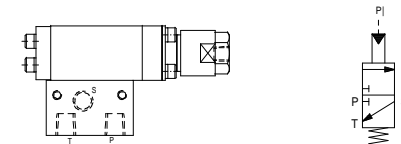
**HPVP8103/NC/05/S-ML(X)** 3 way 2 position high pressure pilot operated, spring return, normally closed poppet type hydraulic control valve suitable for uni-directional flow. 1/4" in-line connections, rated 345 bar WP. Flow rate 5 lpm @ 10 bar DP. Manual reset. Pilot section 1/8 NPT connection. Various pilot operating pressure ranges.



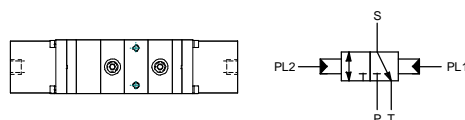
**HPVP8103/NC/05/S(X)** 3 way 2 position high pressure pilot operated, spring return, normally closed poppet type hydraulic control valve suitable for uni-directional flow. 1/4" in-line connections, rated 345 bar WP. Flow rate 5 lpm @ 10 bar DP. Pilot section 1/8 NPT connection. Various pilot operating pressure ranges.



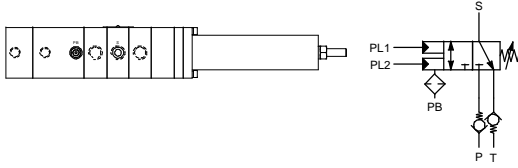
**HPVP8005/NC/05/S-ML** 3 way 2 position high pressure pilot operated, spring return, normally closed poppet type hydraulic control valve manifold mount. Rated 345 bar WP. Flow rate 1 lpm nominal. Manual reset, Pilot section 1/8 NPT connection. Various pilot operating pressure ranges.



**HPVP8003/NC/05/S** 3 way 2 position high pressure pilot operated, spring return, normally closed poppet type hydraulic control valve manifold mount. Rated 345 bar WP. Flow rate 5 lpm @ 10 bar DP. Pilot section 1/8 NPT connection. Various pilot operating pressure ranges

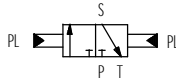
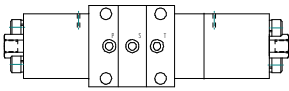


**LPV/LPV8001/05/S** 3 way 2 position low pressure pilot operated, bi-stable, block before bleed slide type, hydraulic control valve for bi-directional flow 'P' to 'S', 'S' to 'P'. 1/4" connections, rated upto 345 bar WP. Flow rate upto 20 lpm @ 10 bar DP. Pilot section 1/4 NPT connection. Pilot operating pressure range 4 to 10 bar.



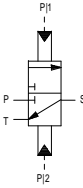
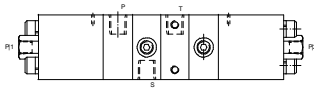
**DHPV8100/05/NC/05/X**

3 way 2 position dual high pressure pilot operated adjustable spring return, normally closed, block before bleed slide type, hydraulic control valve for uni-directional flow only. 1/4" NPT connections, rated 345 bar WP. Flow rate 20 lpm @ 10 bar DP. Pilot section 1/8 NPT connection.



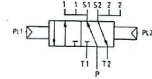
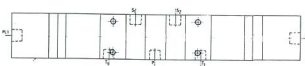
**HPV/HPV5101/05/S**

3 way 2 position high pressure pilot operated, bi-stable, block before bleed slide type, hydraulic control valve for bi-directional flow. Manifold mount. Rated 345 bar WP. Flow rate upto 23 lpm @ 10 bar DP. Pilot section 1/8 NPT connection. Pilot operating pressure range 25 to 345 bar.



**HPV/HPV8001/05/S**

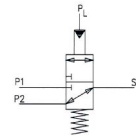
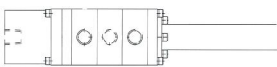
3 way 2 position high pressure pilot operated, bi-stable, block before bleed slide type, hydraulic control valve for bi-directional flow 'P' to 'S', 'S' to 'P'. 1/4" NPT connections, rated 345 bar WP. Flow rate 20 lpm @ 10 bar DP. Pilot section 1/8 NPT connection. Pilot operating pressure range 25 to 345 bar.



**LPV/LPV8008/05/S**

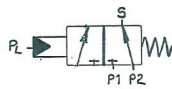
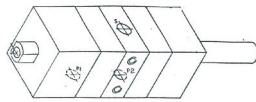
5 way 2 position low pressure pilot operated, detented, bi-stable, block before bleed slide type, hydraulic control valve for uni-directional flow. 3/8" connections, rated 345 bar WP. Flow rate 23 lpm @ 10 bar DP. Pilot section 1/4 NPT connection. Pilot operating pressure range 3 to 10 bar.

**SELECTOR VALVE**



**LPV6000/10/S**

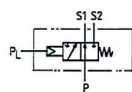
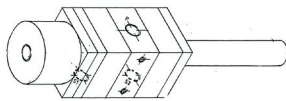
3 way 2 position low pressure pilot operated, spring return, pressure selector, block before bleed type hydraulic control valve. Rated 690 bar WP, 20 lpm @ 10 bar DP. Pilot section 1/8 connection. Operating pressure range 52 - 690 bar.



**HPV6000/10/S**

3 way 2 position high pressure pilot operated, spring return, pressure selector, block before bleed type hydraulic control valve. Rated 690 bar WP, 20 lpm @ 10 bar DP. Pilot section 1/8 connection. Operating pressure range 52 - 690 bar.

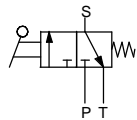
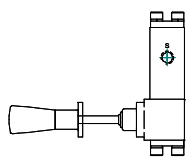
**DIVERTER VALVE**



**LPV7000/10/S**

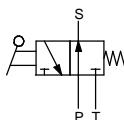
3 way 2 position low pressure pilot operated, spring return, pressure diverter, block before bleed type hydraulic control valve. Rated 690 bar WP, 20 lpm @ 10 bar DP.

**HP LOGIC VALVES, Mechanical, Lever**



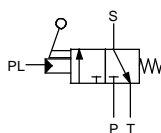
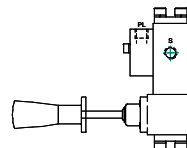
**FP15/M/04/32/S**

3 way 2 position lever operated, spring return, normally closed, block before bleed poppet type hydraulic control valve. 1/4NPT connections. Rated 207 bar WP, 15 lpm @ 10 bar DP.



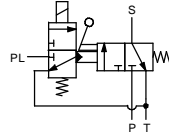
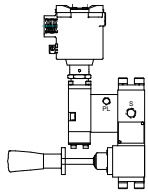
**FP15/M/M/32/S-NO**

3 way 2 position lever operated, spring return, normally open, ball seated type hydraulic control valve, manifold mount connections. Rated 207 bar WP, 15 lpm @ 10 bar DP.



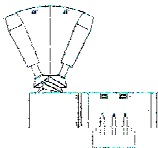
**FP15/167/H2/04/32/S-M**

3 way 2 position lever operated manual override, high pressure pilot operated, spring return, normally closed, block before bleed type hydraulic control valve. 1/4NPT connections. Rated 207 bar WP, 15 lpm @ 10 bar DP. Pilot operating range - refer to literature



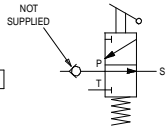
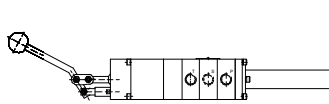
FP15/159/S1/32/S-xxVxC/9xxxx/EP-M

3 way 2 position 2 stage solenoid operated spring return normally closed, block before bleed seated type hydraulic control valve. 1/4 NPT connections. Externally connected pilot stage supply 1/8 NPT connection. Internally connected pilot stage return. Rated 207 bar WP, 15 lpm @ 10 bar DP. Fitted with lever operated spring return manual override to mainstage. Various solenoid operator.



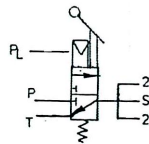
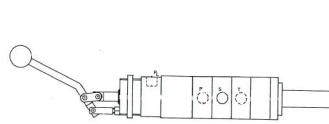
40-091-01-31XX-X

Brisco slide valve, normally closed / open, manifold mounting, lever-operated, 3 port, 3 position valves with detent action. Rated 690 bar WP, 27 lpm @ 10 bar DP. Spring return option.



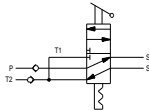
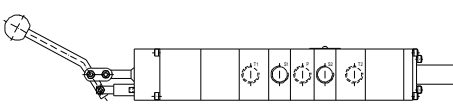
MV8000/N0/05/S

3 way 2 position lever operated, spring return, block before bleed type hydraulic control valve, suitable for bi-directional flow 'P' to 'S', 'S' to 'P'. 1/4NPT connections. Rated 345 bar WP, 20 lpm @ 10 bar DP.



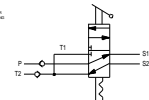
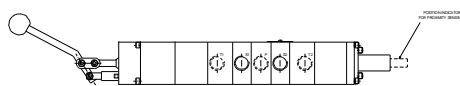
MLPV8000/NC/05/S

3 way 2 position lever operated, spring return, block before bleed slide type hydraulic control valve. 1/4NPT connections. Rated 345 bar WP, Pilot port 1/4 NPT



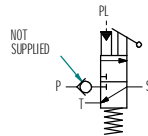
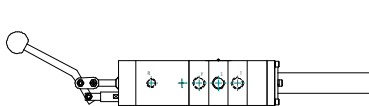
MDV8008/05/S

5 way 2 position, manual lever operated detented (bistable) block before bleed slide type hydraulic control valve for uni-directional flow only. 3/8 connections. Rated 345 bar WP. Flow rate 23 lpm @10 bar DP



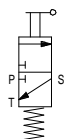
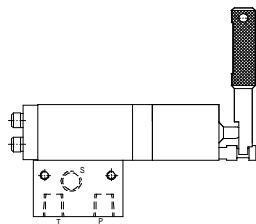
MDV8008/74/05/S

5 way 2 position, manual lever operated detented (bistable) block before bleed slide type hydraulic control valve for uni-directional flow only. Proximity extending rod to detent stop. 3/8 connections. Rated 345 bar WP. Flow rate 23 lpm @10 bar DP



MHPV8001/NC/05/S

3 way 2 position, manual high pressure pilot operated with manual lever override. Spring return before bleed hydraulic control valve for uni-directional flow only. 1/4" connections. Rated 345 bar WP. Flow rate 20 lpm @10 bar DP. Pilot connection 1/8NPT. Operating pressure range 20 to 165 bar.



M(LR)VP8005/NC/10/S

3 way 2 position, manual removable lever operator. Spring return before bleed hydraulic control valve Manifold mount. Rated 690 bar WP. Flow rate 1 lpm nominal @10 bar DP.



## Type 14550

### 4-way directional control valve

Comprising four cam-operated modules, each containing a partially balanced plunger which is unseated when the handle is operated. In the closed position, the plunger makes a leak-free seal with the seat. Being dynamically biased towards closing, the seal becomes tighter as pressure rises.

A module can be readily withdrawn from the base of the valve body for servicing or renewing the seat or seals. Total handle movement of 90° gives positive detented selections at 45° intervals.

The valve is suitable for use with a wide range of fluids and is designed for working pressures of up to 10,000 psi. Torque required to operate the handle remains light throughout the pressure range.



**Materials** 316 stainless steel

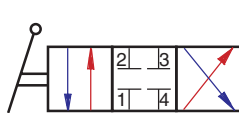
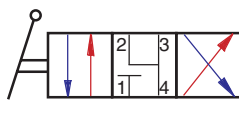
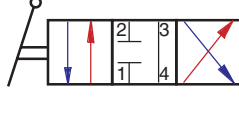
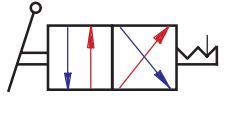
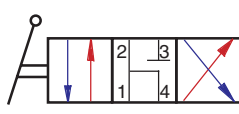


This control valve conforms to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



Marshalsea Hydraulics has been assessed by SGS Société Générale de Surveillance SA and certified as meeting the requirements of ISO 9001:2000 for the design, development, manufacture and servicing of hydraulic pumps, relief valves and intensifiers.



ID	Symbol	Cam no.	Handle position 1	Handle centre	Handle position 2
A		01	Spindle A closed	Spindle A closed	Spindle A open
			Spindle B open	Spindle B closed	Spindle B closed
			Spindle C open	Spindle C closed	Spindle C closed
			Spindle D closed	Spindle D closed	Spindle D open
			Port 3 to pressure		Port 3 to tank
			Port 2 to tank	All ports blocked	Port 2 to pressure
B		02	Spindle A open	Spindle A closed	Spindle A closed
			Spindle B closed	Spindle B closed	Spindle B open
			Spindle C closed	Spindle C open	Spindle C open
			Spindle D open	Spindle D open	Spindle D closed
			Port 3 to tank	Port 1 blocked	Port 3 to pressure
			Port 2 to pressure	Ports 2 & 3 to tank	Port 2 to tank
C		03	Spindle A open	Spindle A closed	Spindle A closed
			Spindle B closed	Spindle B closed	Spindle B open
			Spindle C closed	Spindle C closed	Spindle C open
			Spindle D open	Spindle D open	Spindle D closed
			Port 3 to tank	Ports 1 & 2 blocked	Port 3 to pressure
			Port 2 to pressure	Port 3 to tank	Port 2 to tank
D		02	Spindle A open		Spindle A closed
			Spindle B closed		Spindle B open
			Spindle C closed	Not used	Spindle C open
			Spindle D open		Spindle D closed
			Port 3 to tank		Port 3 to pressure
			Port 2 to pressure		Port 2 to tank
E		04	Spindle A closed	Spindle A open	Spindle A open
			Spindle B open	Spindle B closed	Spindle B closed
			Spindle C open	Spindle C open	Spindle C closed
			Spindle D closed	Spindle D closed	Spindle D open
			Port 3 to pressure	Ports 1 & 2 to tank	Port 3 to tank
			Port 2 to tank	Port 3 blocked	Port 2 to pressure



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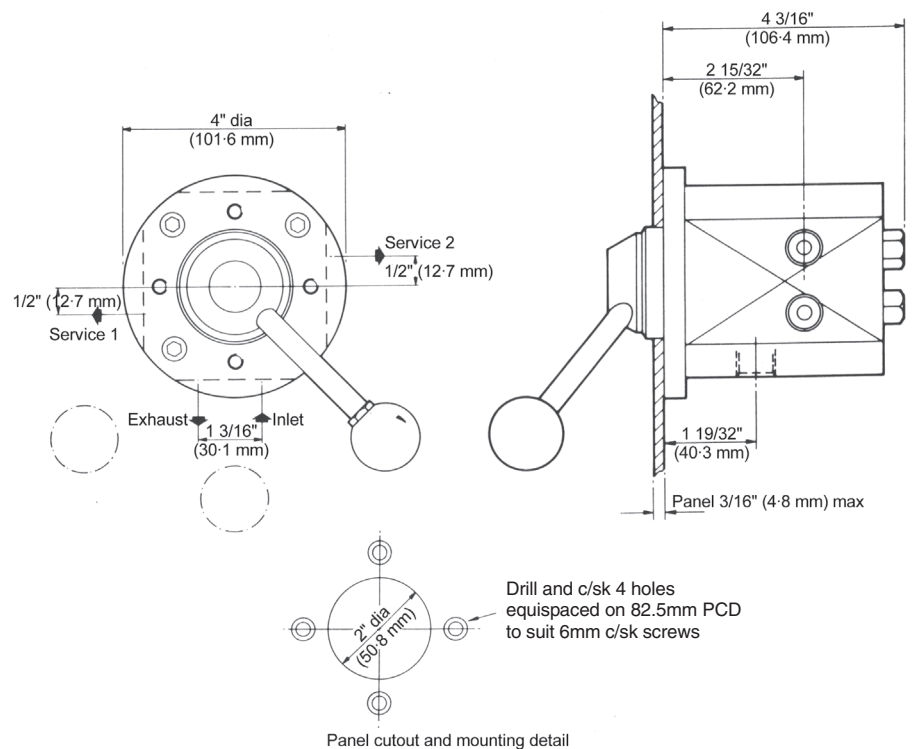
## Type 14550 (continued)

### Product specification

Product numbers for various options of spigot or handle for each of the IDs defined on the previous page can be found from the following table.

ID	Product number			
	Spigot 3/8 NPT	Handle 3/8 NPT	Spigot 3/8 BSP	Handle 3/8 BSP
A	14550-01	14550-08	14550-15	14550-19
B	14550-02	14550-09	14550-16	14550-20
C	14550-03	14550-13	14550-17	14550-21
D	14550-05	14550-10	14550-24	14550-23
E	14550-06	14550-11	14550-25	14550-27

### Drawing giving dimensions



### Spares

Repair kit for all models has order code: RS 565



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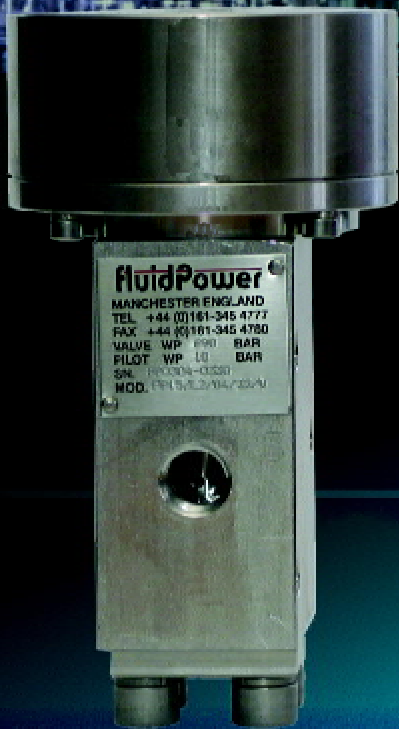
E-mail [info@marshalsea.co.uk](mailto:info@marshalsea.co.uk)

[www.marshalsea.co.uk](http://www.marshalsea.co.uk)

## Interface Valve

# Model FP15 & FP15E

Up to 1035 bar, 15 litres per minute



Superior performance  
throughout the full  
operational range

### Features:

- 316L stainless steel
- Economy version available
- Block before bleed
- Compact design
- From 4 bar pilot pressure
- Arctic service options to -50°C
- NACE MR-01-75 option

## CONTENTS

• TECHNICAL SPECIFICATIONS	2
• ORDERING CODE AND FLOW PERFORMANCE GRAPH	3
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• MANIFOLD OPTIONS	9

## TECHNICAL SPECIFICATIONS

### MATERIALS OF CONSTRUCTION

All valve bodies:-	stainless steel 316L
Internal components:-	stainless steel 316L/316, CA104 Aluminium Bronze, PEEK (according to valve type)
Fasteners:-	metric A4 18/10 316 grade stainless steel.
Springs:-	stainless steel 302S26
Seals:-	nitrile (standard). Alternative elastomers available for extreme conditions.

### MEDIA:

Mineral oils, water glycol mixtures, sea water (filtered), some chemicals,  
Air, natural gas, bottled gases (low pressure pilot operators and option G only)

### TEMPERATURE RANGE:

See elastomer options

### WORKING PRESSURE:

Up to 1035 Bar (15,000PSI). Refer to ordering code.

### SOUR GAS SERVICE (refer to ordering code).

All internal wetted and body metal materials conforming to NACE MR-01-75 / ISO 15156

### INSTALLATION:

Valves can be mounted in any attitude. Systems should be flushed clean to ISO 4406 Class 18/15 or better. Bifold Fluidpower FP15 valves afford excellent sealing characteristics provided high standards of cleanliness are maintained. Where this cannot be assured we recommend the use of valves from the extensive range of Bifold Fluidpower Slide Valves which are more tolerant to fluid borne contaminants. Weights detailed in this catalogue are approximate only

## 1/4" BODY PORTED RANGE:

FP15E				Model Code
Operator	Max Pilot Pressure	Refer to Operating Pressure Graphs on page 4	Max. Valve Pressure	Flow Rate (All valves have a nominal flow of 15 lpm, except operators L2 which are 5 lpm)
L1	10bar		414bar	
L1A Low Pressure Pilot (Piston)	19bar		690bar	
L2	10bar		690bar	
L3	10bar		690bar	
L11	10bar		690bar	
H1 High Pressure Pilot	240bar		690bar	
H2 (Direct Acting)	690bar		690bar	
04	1/4 NPT body ported			Connections
22	2 - way, 2 - position (refer to 'P' to 'S' flow curve)		Normally closed (NC)	Configuration
32	3 - way, 2 - position			
S	Nitrile (standard)		(-30°C to +130°C)	O-ring material
V	Viton		(-20°C to +180°C)	
SA	Low temperature nitrile		(-50°C to +130°C)	
G	150 bar gas, max valve pressure			Options
H2S	NACE MR-01-75 Consult Bifold Fluidpower			
MSO	Manual screw down override			
NO	Normally Open			
FP15E / L1 / 04 / 32 / S				Example

Standard Test Fluid: Marston Bentley HW540



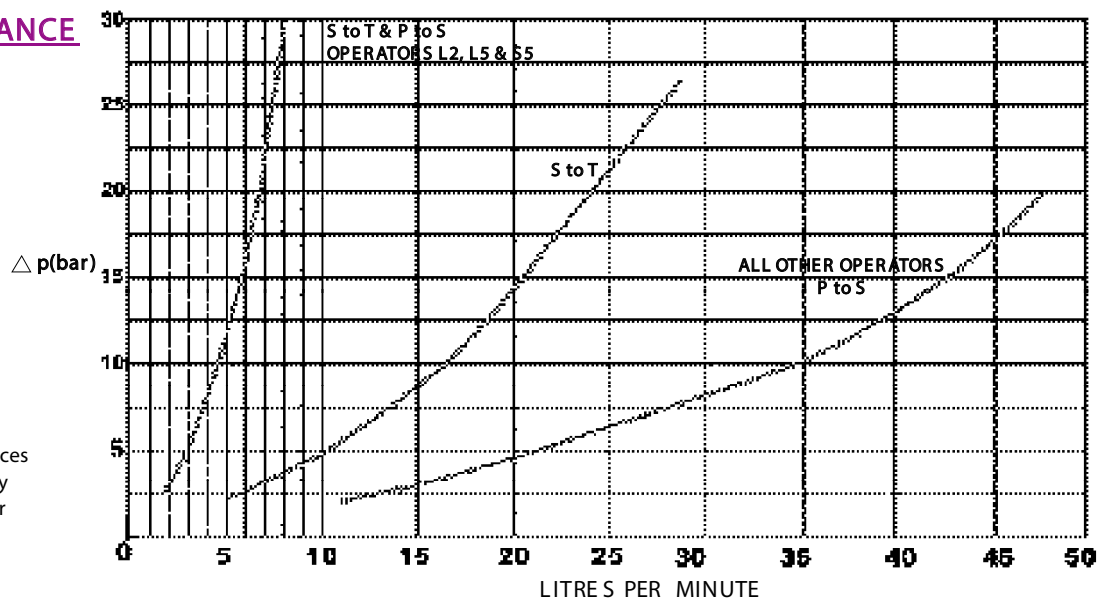
## SELECTION CHART

Reliability and Innovation in directional control valves

FP15					Model Code
Operator	Max Pilot Pressure	Refer to Operating Pressure Graphs on page 4	Max. Valve Pressure	Flow Rate (All valves have a nominal flow of 15 lpm, except operators L2, L11 which are 5 lpm)	
L1 L1A L2 L3 L9 L10 L11	Low Pressure Pilot (Piston)		10 bar 19 bar 10 bar 7 bar 10 bar 10 bar 10 bar		414 bar 690 bar 690 bar 690 bar 900 bar 1035 bar 690 bar
H1 H2 DH2	High Pressure Pilot (Direct Acting)		240 bar 690 bar 690 bar		690 bar 690 bar 690 bar
FBVH1 FBVH2 FBVH3	H.P. Pilot Stage Frangible Bulb valves	H1 H2 H3	ML(X) and MLP(X) options only	345 bar 518 bar 690 bar	H2 operating pressure applies to all models (pg4)
M	Subbase mounting			Connections	
04	1/4 NPT body ported - FBVHx & Hx only				
06	3/8 NPT body ported				
38MP	3/8 MP body ported (non standard) - L9 & L10 ONLY			Configuration	
22	2 - way, 2 - position (refer to 'P' to 'S' flow curve)		Normally closed (NC) unless specified NO see options		
32	3 - way, 2 - position				
S	Nitrile (standard)		(-30°C to +130°C)	O-ring material	
V	Viton		(-20°C to +180°C)		
SA	Low temperature nitrile		(-50°C to +130°C)		
XXX	Temperature rating - refer to frangible bulb options			FBVH'X unit only	
G	150 bar gas, max valve pressure (L & H operators)			Options	
H2S	NACE MR-01-75 Consult Bifold Fluidpower				
K6	BSPP Ported				
MSO	Manual screw down override (L & H operators)				
SI	Status Indicator				
NO	Normally Open				
EP	External pilot supply	FBVH 'x', H'x'... ML(x)			
EPT	External pilot supply and tank	H'x'... MLP(x) only			
ML(X)	Manual Reset	High Pressure Pilot Stage operator			
MLP(X)	Panel Mount Manual Reset	H1, H2 & H3 only			
FP15 / L1 / 04 / 32 / S - NO					Example

Standard Test Fluid: Mars ton Bentley HW540

## FLOW PERFORMANCE

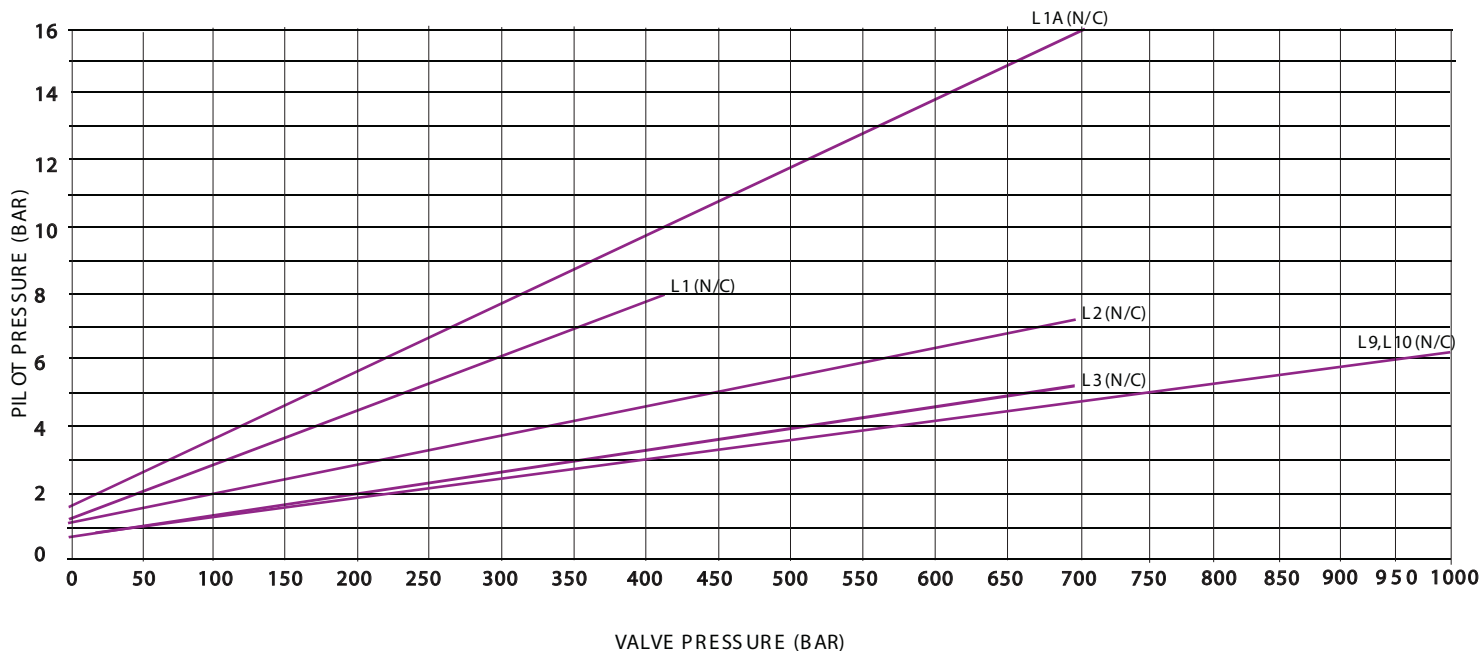


Valve Porting References  
P - Pressure/Supply  
S - Service/Cylinder  
T - Tank/Return

TEST FLUID MINERAL OIL @30 cSt

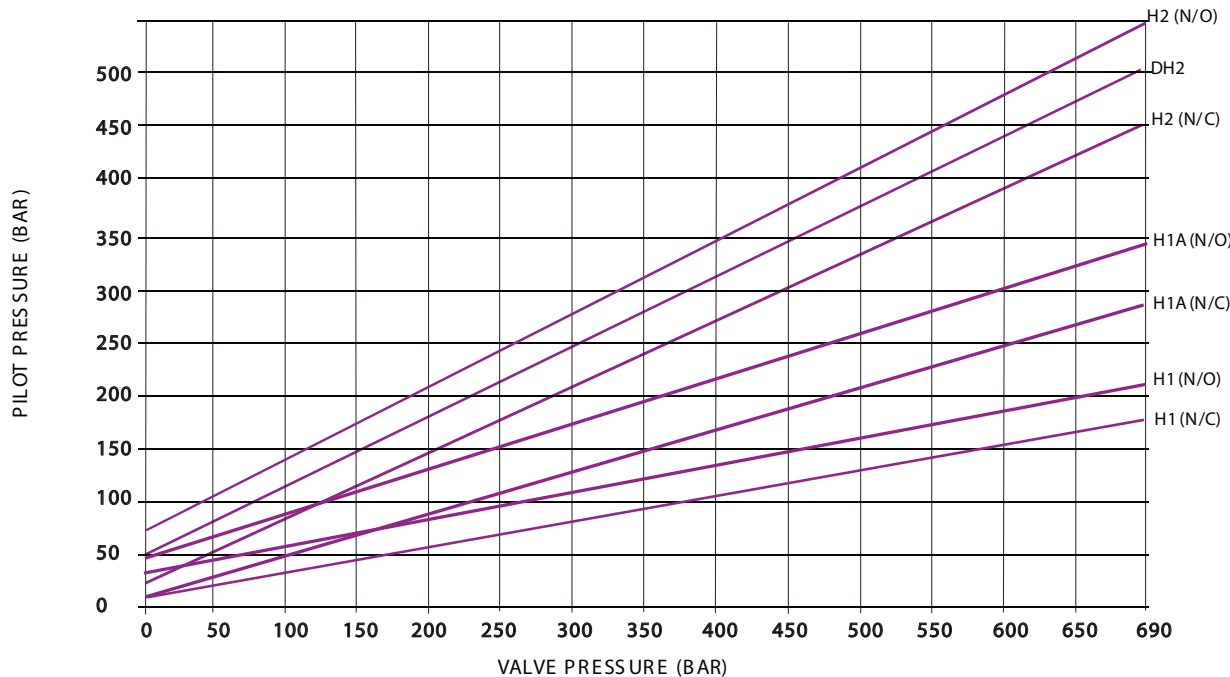
**LOW PRESSURE PILOT OPERATOR INTERFACE VALVES**

*Pilot operating pressures*



**HIGH PRESSURE PILOT OPERATOR INTERFACE VALVES**

*Pilot operating pressures*



**Frangible Bulb Options**

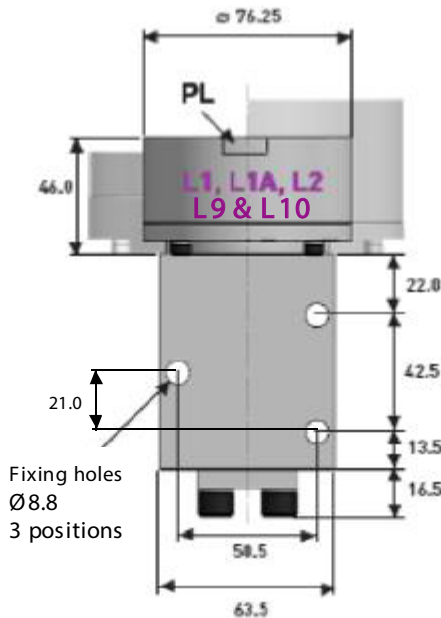
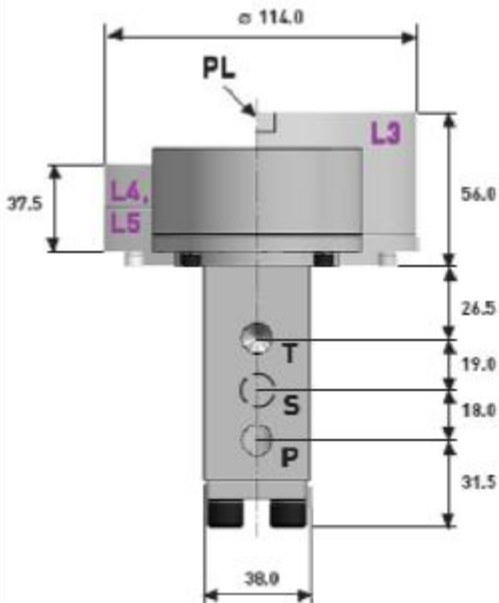
BULB COLOUR	TEMPERATURE RANGE Deg.C	ORDER CODE
Orange	57 (Tol +/- 3.5%)	57C
Red	68 (Tol +/- 3.5%)	68C
Yellow	79 (Tol +/- 3.5%)	79C
Green	93 (Tol +/- 3.5%)	93C
Blue	141 (Tol +/- 3.5%)	141C
Mauve	182 (Tol +/- 3.5%)	182C

**(PL) Pilot Pressure Range**

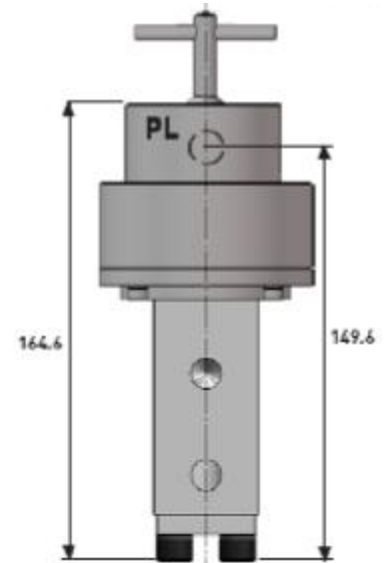
ML & MLP(A)	2,900 to 5,002 PSI	200 to 345 BAR
ML & MLP(B)	2,030 to 3,407 PSI	140 to 235 BAR
ML & MLP(C)	1,392 to 2,494 PSI	96 to 172 BAR
ML & MLP(D)	725 to 1,305 PSI	50 to 90 BAR
ML & MLP(E)	1,131 to 2,102 PSI	78 to 145 BAR
ML & MLP(F)	4,495 to 7,685 PSI	310 to 530 BAR
ML & MLP(G)	7,061 to 10,005 PSI	487 to 690 BAR
ML & MLP(H)	508 to 870 PSI	35 to 60 BAR
ML & MLP(J)	421 to 740 PSI	29 to 51

## Low Pressure Pilot Operator Interface Valves Reliability and Innovation in directional control valves

**Body Ported** FP15, 3/2 (L1, L1A, L2, L3, L4, L5, L9 & L10 models)



Example Code:- FP15/L1/04/32/S



Example Code:- FP15/L1/04/32/S

**Weights:-** (not including MSO option)

L1, L1A, L2	2.6 Kg
L3	4.8 Kg
L4, L5	3.8 Kg

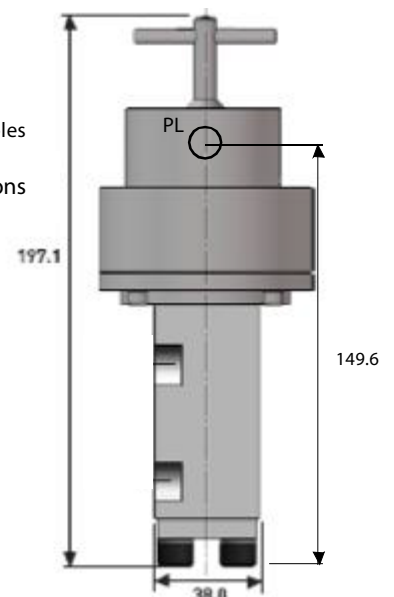
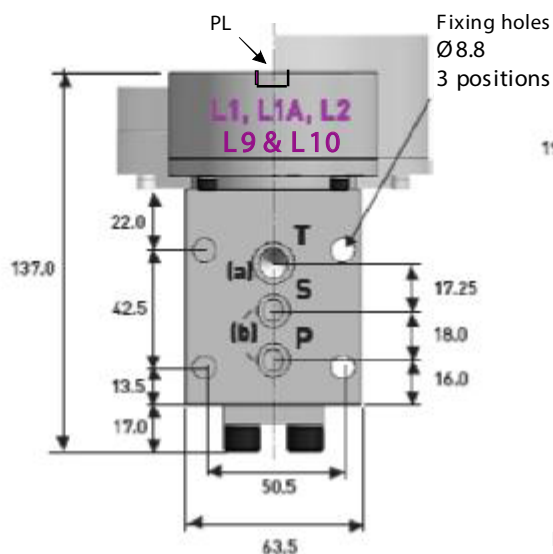
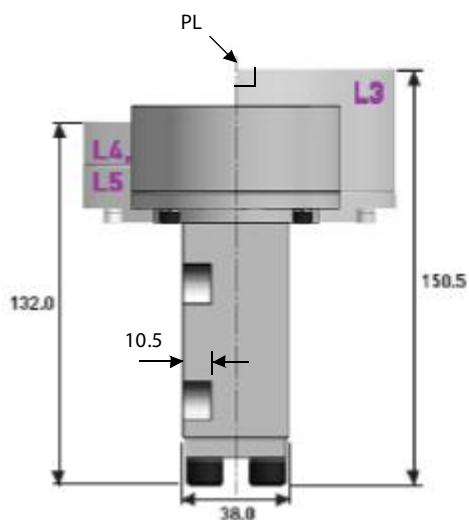
PL	- pilot connection
P	- pressure port
S	- service port
T	- tank port

1/4 NPT or G1/4 BSPP
1/4, 3/8 NPT or G1/4, G3/8 BSPP
1/4, 3/8 NPT or G1/4, G3/8 BSPP
1/4, 3/8 NPT or G1/4, G3/8 BSPP

**Manifold Mount** FP15, 3/2 (L1, L1A, L2, L3, L4, L5, L9 & L10 models)

Manual Screwdown Override (MSO)

- (a) - O-Ring BS0121 - 16 Ø11 max in subbase
- (b) - O-Ring BS0091 - 16 Ø8 max in subbase



Example Code:- FP15/L1/M/32/S

**Weights:-** (not including MSO option)

L1, L1A, L2	2.8 Kg
L3	5.0 Kg
L4, L5	4.0 Kg

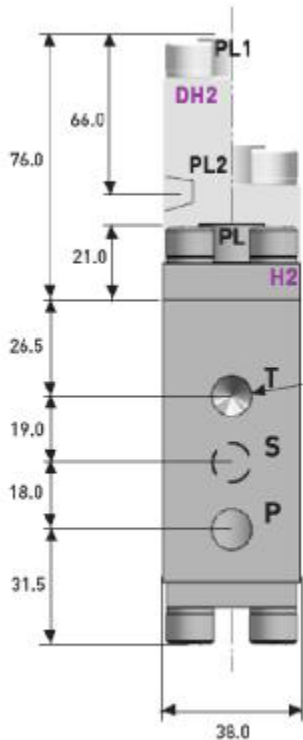
PL	- pilot connection	1/4 NPT or G1/4 BSPP
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## High Pressure Pilot operator Interface Valves

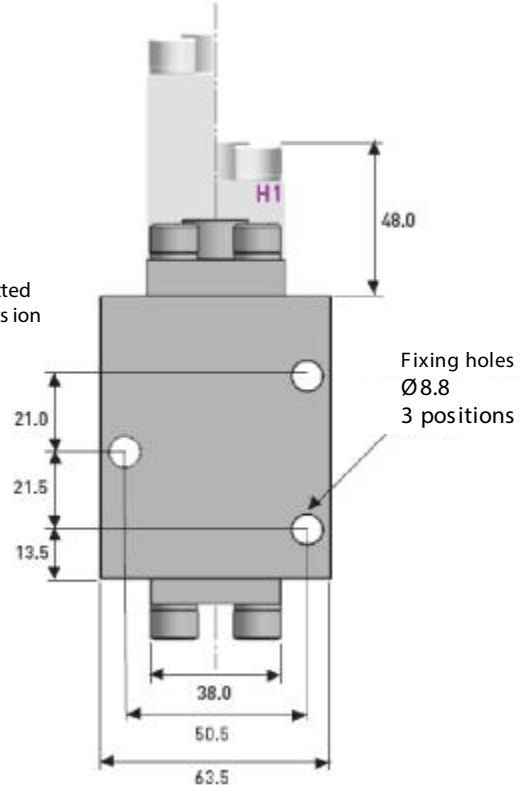
Reliability and Innovation in directional control valves

**Body Ported** FP15, 3/2 (H1, H2 & DH2 models)

Example Code:- FP15/H1/04/32/S



Tank port omitted on two way version



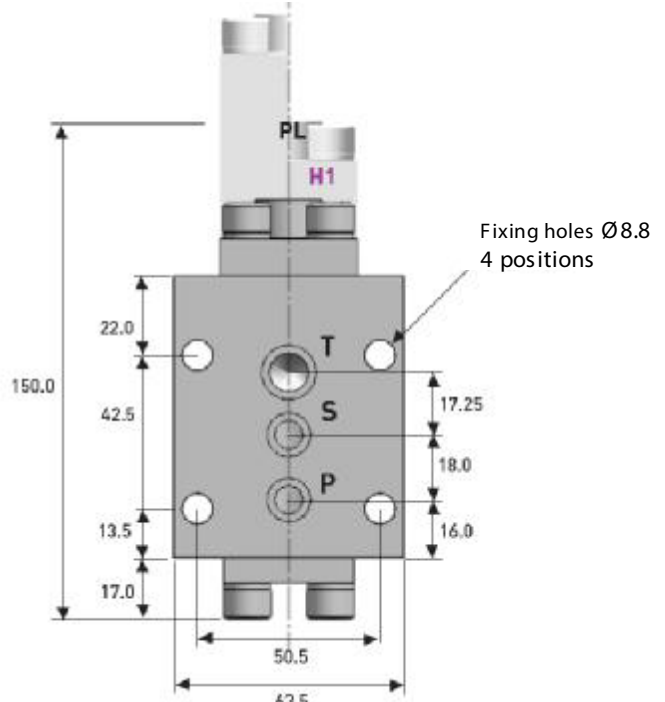
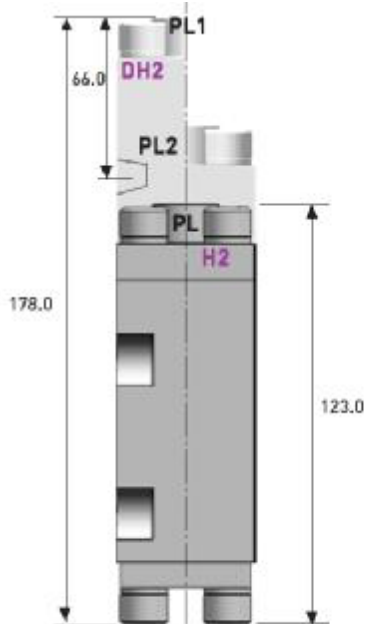
**Weights:-**

H1	2.0 Kg
H2	1.8 Kg
DH2	2.3 Kg

PL, PL1	- pilot connection	1/4 NPT or G1/4 BSPP
PL2	- pilot connection	1/8 NPT or G1/8 BSPP
P	- pressure port	1/4, 3/8 NPT or G1/4, G3/8 BSPP
S	- service port	1/4, 3/8 NPT or G1/4, G3/8 BSPP
T	- tank port	1/4, 3/8 NPT or G1/4, G3/8 BSPP

**Manifold Mount** FP15, 3/2 (H1, H2 & DH2 models)

Example Code:- FP15/H1/M/32/S



**Weights:-**

H1	2.2 Kg
H2	2.0 Kg
DH2	2.5 Kg

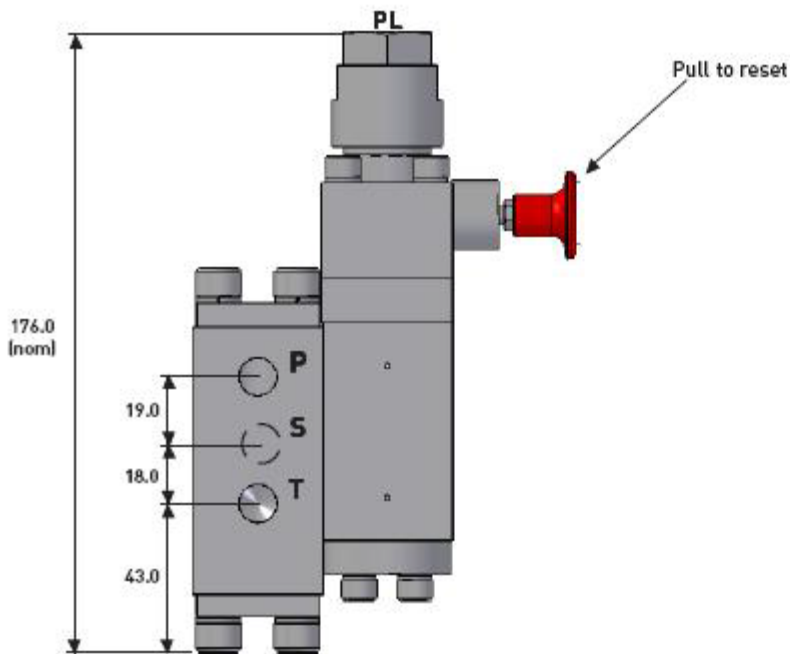
PL, PL1	- pilot connection	1/4 NPT or G1/4 BSPP
PL2	- pilot connection	1/8 NPT or G1/8 BSPP

## High Pressure Pilot Stage Interface Valves

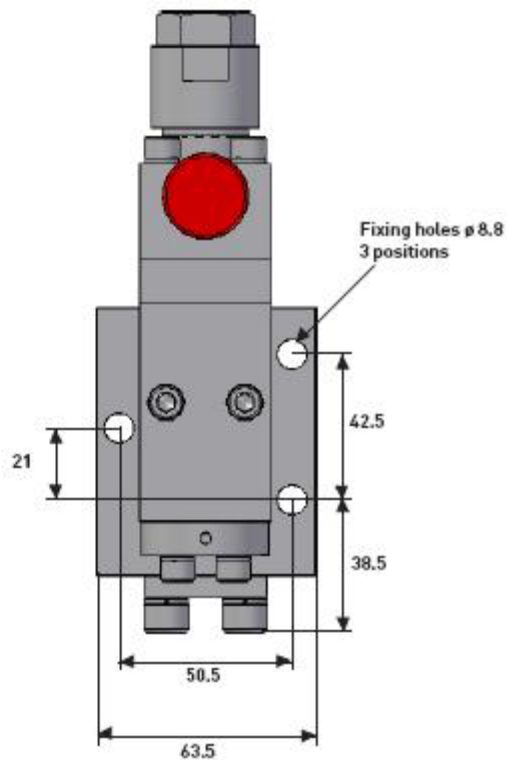
Reliability and Innovation in directional control valves

Refer to pilot range table, page 4

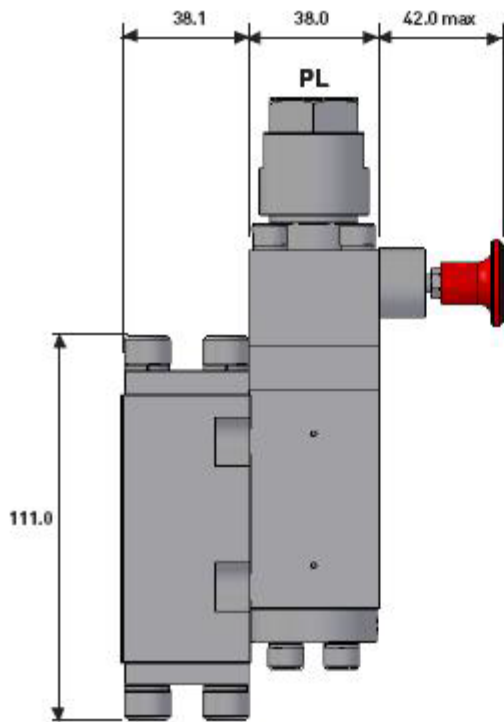
**Body Ported** FP15, 3/2 (H'x'...ML(x)&MLP(x) models)



Example Code:- FP15 /H1/04/32/S-ML(A)

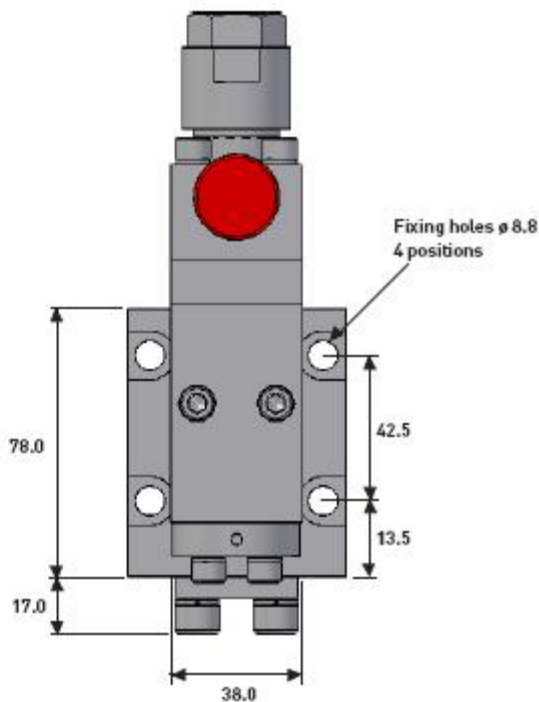


**Manifold Mount** FP15, 3/2 (H'x'...ML(x)&MLP(x) models)



Example Code:- FP15/H1/M/32/S-ML(C)

- |    |                    |                                 |
|----|--------------------|---------------------------------|
| PL | - pilot connection | 1/8 NPT or G1/8 BSPP            |
| P  | - press ure port   | 1/4, 3/8 NPT or G1/4, G3/8 BSPP |
| S  | - service port     | 1/4, 3/8 NPT or G1/4, G3/8 BSPP |
| T  | - tank port        | 1/4, 3/8 NPT or G1/4, G3/8 BSPP |



- |    |                    |                      |
|----|--------------------|----------------------|
| PL | - pilot connection | 1/8 NPT or G1/8 BSPP |
|----|--------------------|----------------------|

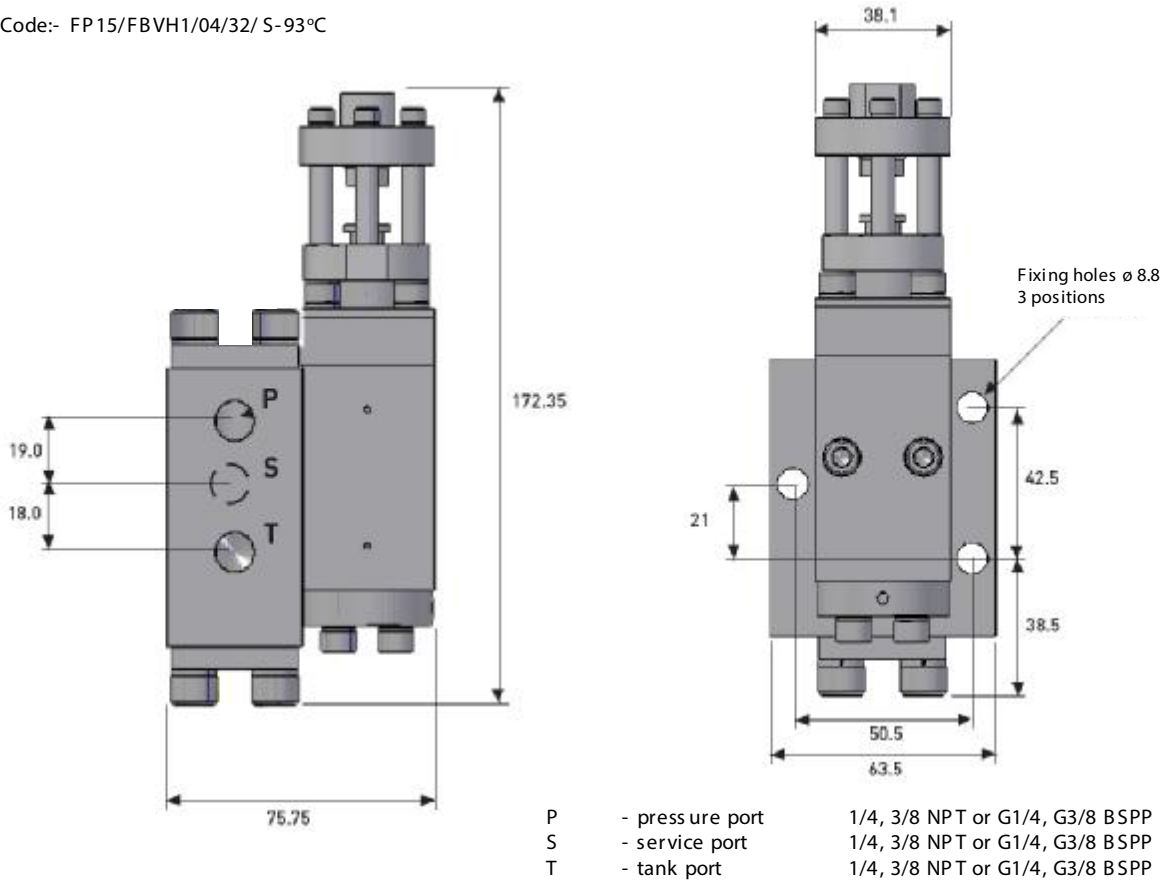


## Frangible Bulb Valves

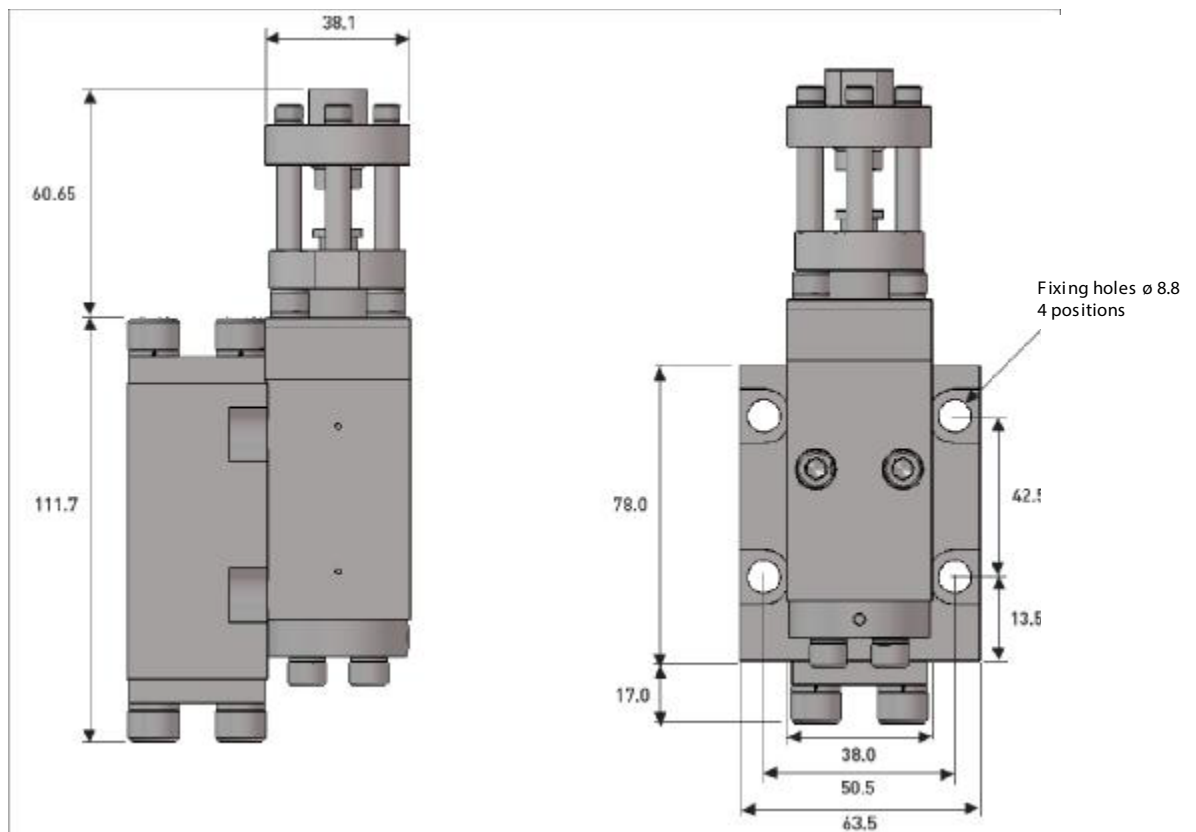
Reliability and Innovation in directional control valves

**Body Ported**, FP15, 3/2 (FBVHx models)

Example Code:- FP15/FBVH1/04/32/ S-93°C



**Manifold Mount**, FP15, 3/2 (FBVHx models)



Example Code:- FP15/FBVH1/M/32/S-93°C

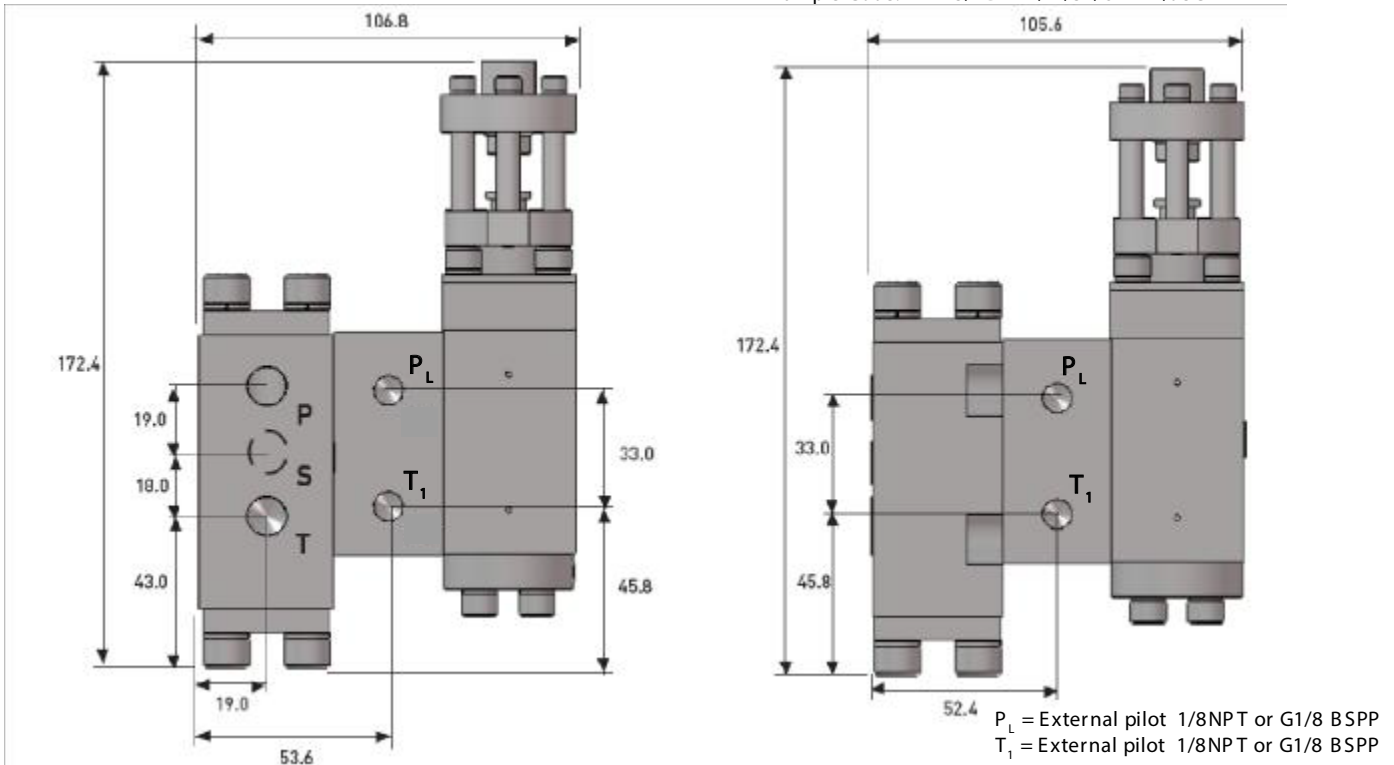
## Body Ported EP/EPT option

Example Code:- FP15/FBVH1/04/32/S-EPT/93C

Reliability and Innovation in directional control valves

## Manifold Mount EP/EPT option

Example Code:- FP15/FBVH1/M/32/S-EPT/93C



P<sub>L</sub> = External pilot 1/8NPT or G1/8 BSPP  
T<sub>1</sub> = External pilot 1/8NPT or G1/8 BSPP

### Preferred Range:

		FP15E/L1/04/32/S	414 bar, 10 bar max pilot pressure, 3 port 2 position, normally closed, 1/4" NPT ports
		FP15E/L2/04/32/S	690 bar, 10 bar max pilot pressure, 3 port 2 position, normally closed, 1/4" NPT ports, 5lpm
		FP15/L1/06/32/S	414 bar, 10 bar max pilot pressure, 3 port 2 position, normally closed, 3/8" NPT ports, 15 lpm
		FP15/L2/06/32/S	690 bar, 10 bar max pilot pressure, 3 port 2 position, normally closed, 3/8" NPT ports, 5 lpm
		FP15/L3/04/32/S	690 bar, 7 bar max pilot pressure, 3 port 2 position, normally closed, 1/4" NPT ports, 15 lpm
		FP15/L2/04/22/S	690 bar, 10 bar max pilot pressure, 2 port 2 position, normally closed, 1/4" NPT ports, 5 lpm
		FP15/L2/04/22/S-NO	690 bar, 10 bar max pilot pressure, 2 port 2 position, normally closed, 1/4" NPT ports, 5lpm
		FP15/L9/38MP/32/S	900 bar, 10 bar max pilot pressure, 3 port 2 position, normally closed, 3/8MP 9/16" - 18UNF ports, 15 lpm
		FP15/L10/38MP/32/S	1035 bar, 10 bar max pilot pressure, 3 port 2 position, normally closed, 3/8MP 9/16" - 18UNF ports, 15 lpm
		FP15/L1/04/32/S-MSO	414 bar, 10 bar max pilot pressure, 3 port 2 position, normally closed, with manual override, 1/4" ports, 15 lpm
		FP15/L2/04/32/S-MSO	690 bar, 10 bar max pilot pressure, 3 port 2 position, normally closed, with manual override, 1/4" ports, 5 lpm
		FP15/L2/04/22/S-MSO	690 bar, 10 bar max pilot pressure, 3 port 2 position, normally closed, with manual override, 1/4" ports, 5 lpm

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#### **Quality Assurance**

*All Bifold Fluidpower products are manufactured to a most stringent QA programme. Every care is taken at all stages of manufacture to ensure that every product will give optimum performance and reliability. We are recognised to EN ISO 9001:2000. Functional test certificate, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BSEN 10204 3.1.B where available. The manufacturer reserves the right to make changes to the specifications and design etc., without prior notice*

#### **Accuracy of information**

*We take care to ensure that product information in this catalogue is reasonably accurate and up-to-date. However, our products and services are continually updated so to ensure accurate and up-to-date information please refer to the issue list on the web site or contact a member of our sales team.*



## Interface Valve

# Model FP50, 100, 200

up to 345 bar, 200 litres per minute



Superior performance  
throughout the full  
operational range

### Features:

- 316L stainless steel
- Arctic service options to -50°C
- NACE MR-01-75 option

## CONTENTS

• TECHNICAL SPECIFICATIONS	2
• ORDERING CODE	3
• INSTALLATION REQUIREMENTS	4
• BODY AND SUBBASE DIMENSIONS	5 - 6
• PILOT AND MANUAL OPERATORS	7
• FRANGIBLE BULB VALVES	8
• FLOW PERFORMANCE GRAPH AND MANIFOLD OPTIONS	9

## TECHNICAL SPECIFICATIONS

### MATERIALS OF CONSTRUCTION

All valve bodies:-	stainless steel 316L
Internal components:-	stainless steel 316L, CA104 Aluminium Bronze, Victrex PEEK
Fasteners:-	Metric A4 18/10 316 grade stainless steel.
Springs:-	Chrome Vanadium Steel SAE 6150, painted and wax coated.
Seals:-	Nitrile (standard). Alternative elastomers available for extreme conditions.

### MEDIA:

Mineral oils, water glycol mixtures, sea water (filtered), some chemicals,  
Air, natural gas, bottled gases (low pressure pilot stages only)

### WORKING PRESSURE:

Up to 345 Bar (5,000PSI). Maximum working pressure varies according to valve model.  
Refer to ordering code.

### TEMPERATURE RANGE:

See elastomer options

### SOUR GAS SERVICE (refer to ordering code).

All internal wetted and body metal materials conforming to NACE MR-01-75.

### INSTALLATION:

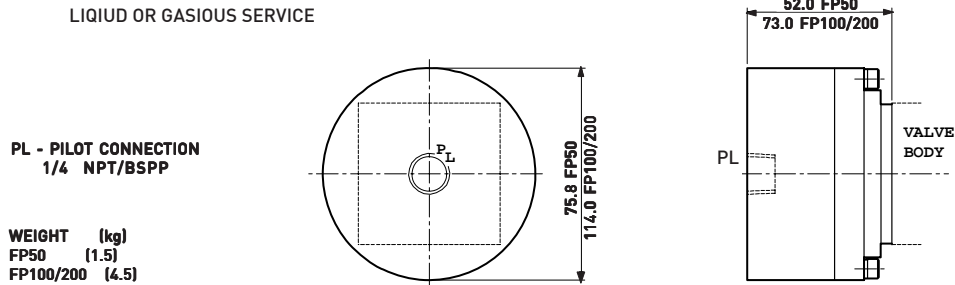
Valves can be mounted in any attitude. Systems should be flushed clean to ISO 4406 Class 18/15 or better. Bifold Fluidpower FP50, FP100 & FP200 valves afford excellent sealing characteristics provided high standards of cleanliness are maintained. Where this cannot be assured we recommend the use of valves from the extensive range of Bifold Fluidpower Slide Valves which are more tolerant to fluid borne contaminants.

Weights detailed in this catalogue are approximate only

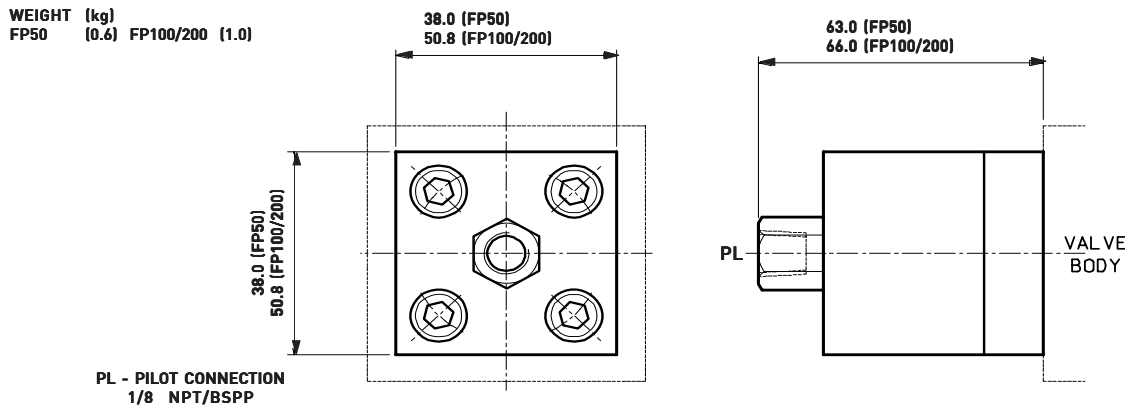


## PILOT OPERATORS

### Low Pressure Pilot Operators (Code L1)

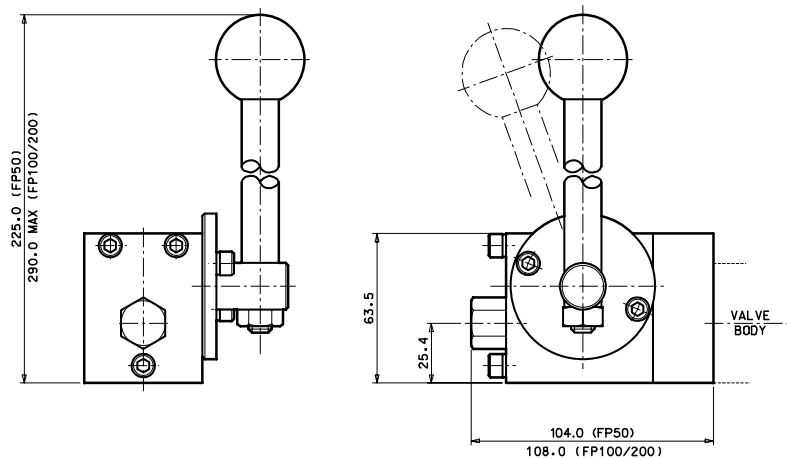


### High Pressure Pilot Operators (Code Hx)



## MANUAL OPERATORS

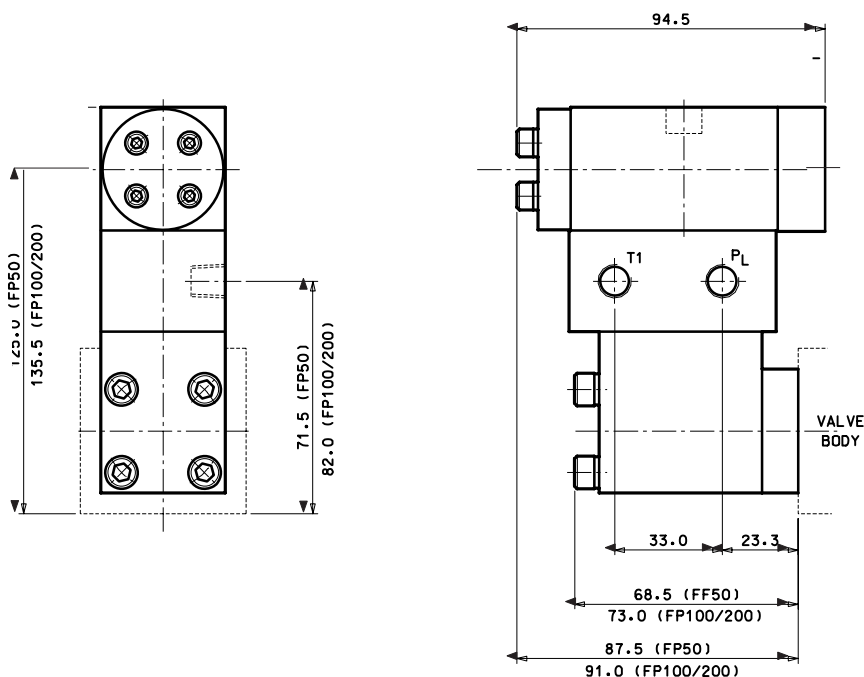
### Manual Lever Operation (Code M)



WEIGHT:FP50/100/200 - 2.6Kg

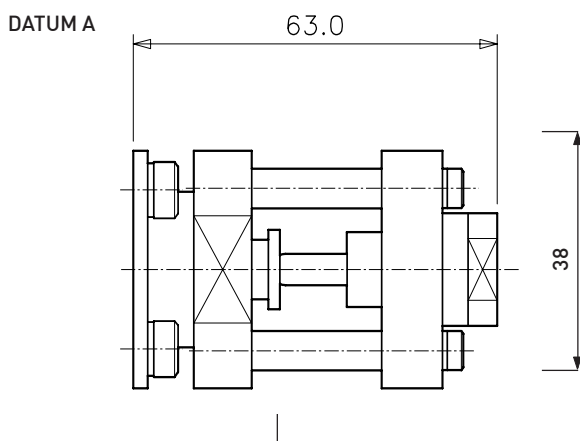
## Pilot Stage Valve for Frangible Bulb Operators (Code FBVH'X')

CONNECTIONS  
 SUPPLY P<sub>L</sub> - 1/8 NPT/BSPP  
 DRAIN T1 - 1/8 NPT/BSPP



WEIGHT:      FP50            2.3 kg  
                  FP100/200      3kg

## Franbible Bulb Operator (Code FBVH'X')

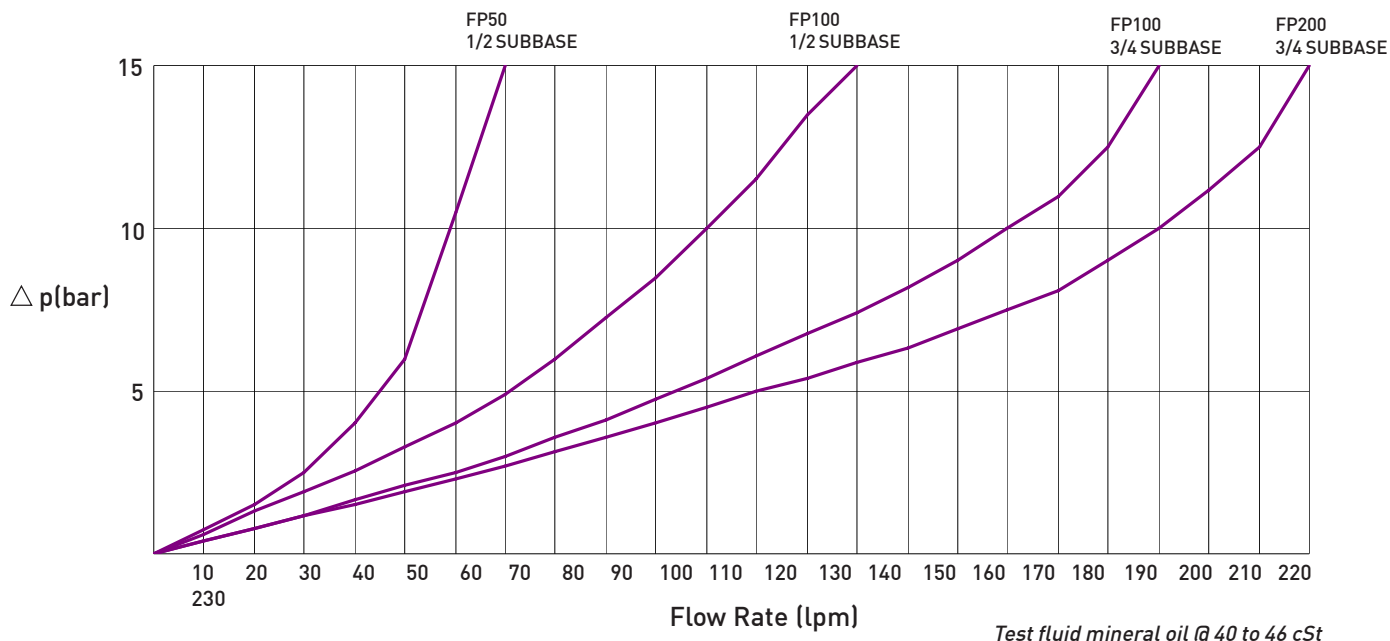


**FRANGIBLE BULB**

BULB COLOUR	TEMPERATURE RANGE Deg.C
Orange	57 (Tol +/- 3.5%)
Red	68 (Tol +/- 3.5%)
Yellow	79 (Tol +/- 3.5%)
Green	93 (Tol +/- 3.5%)
Blue	141 (Tol +/- 3.5%)
Mauve	182 (Tol +/- 3.5%)

**WEIGHT 0.35kg**

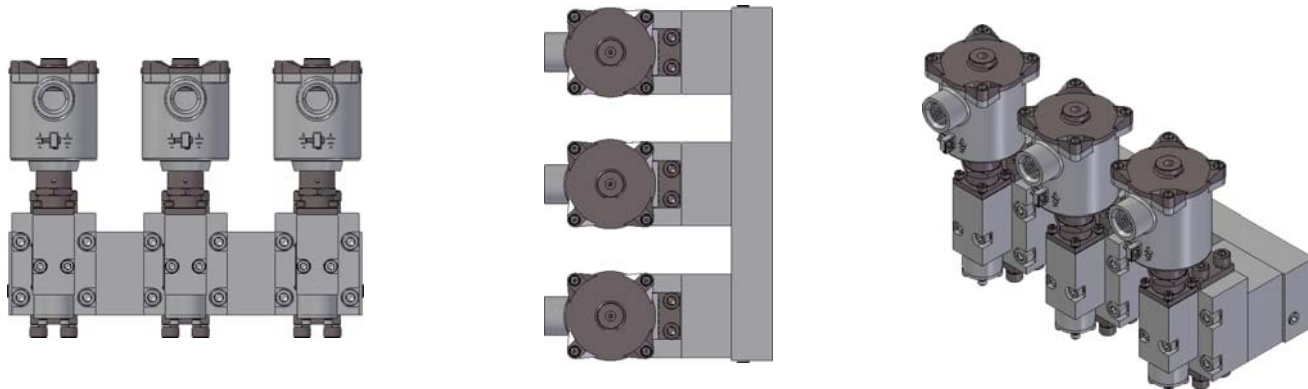
## FLOW PERFORMANCE



## Manifold Options

Bifold Fluidpower has the technical capability to manifold many circuit requirements.

- Reduced leak paths - eliminate fittings
- Simple maintenance
- Integral check valves, gauge port, needle valves - reduce system cost
- Manifold assembly fully tested
- 3D model drawings available to incorporate into customer circuits



Contact Bifold Fluidpower with circuit requirements.  
solenoid

Model Shown is a 3 station FP15 with 97C

## **UK Office**

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### **Quality Assurance**

*All Bifold Fluidpower products are manufactured to a most stringent QA programme. Every care is taken at all stages of manufacture to ensure that every product will give optimum performance and reliability. We are recognised to EN ISO 9001:2000. Functional test certificate, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BSEN 10204 3.1.B where available. The manufacturer reserves the right to make changes to the specifications and design etc., without prior notice*

### **Accuracy of information**

*We take care to ensure that product information in this catalogue is reasonably accurate and up-to-date. However, our products and services are continually updated so to ensure accurate and up-to-date information please refer to the issue list on the web site or contact a member of our sales team.*



# Interface Valve Slide Valve Series

up to 1380 bar, 40 litres per minute



Superior performance  
throughout the full  
operational range

## Features:

- Temperatures upto 180°C
- 316L Stainless steel
- Arctic service option down to -46°C
- NACE MR-01-75 option
- Block before bleed
- Contamination tolerant fluids > NAS1638 Class 12



## CONTENTS

* Technical Specifications	2
• Frangible bulb options	2
• Selection Chart	3
• Example dimension	4
• Flow performance graphs	5 - 6
• Operating limitations	6 - 7

## TECHNICAL SPECIFICATIONS

### MATERIALS OF CONSTRUCTION

All valve bodies:-	stainless steel 316L
Internal components:-	stainless steel 316 & 316L, CA104 Aluminium Bronze
Fasteners:-	A4 18/10 316 grade stainless steel
Springs:-	302S26 stainless steel
Seals:-	O-Rings :- Nitrile (standard). Alternative elastomers available for extreme conditions.
	Lip Seals:- PTFE compounds

### TEMPERATURE RANGE:

See elastomer options

### MEDIA:

Mineral oils, water glycol mixtures, sea water (filtered), some chemicals  
Air, natural gas, bottled gases (low pressure pilot operators and 84,55 series valves only)

### WORKING PRESSURE:

Up to 1380 Bar (20,000PSI). Maximum working pressure varies according to valve model. Refer to ordering code.

### SOUR GAS SERVICE (REFER TO ORDERING CODE):

All internal wetted and body metal materials conforming to NACE MR-01-75.

### INSTALLATION:

Valves can be mounted in any attitude. Systems should be flushed clean to ISO 4406 Class 18/15 or better. Bifold Fluidpower slide valves afford excellent sealing characteristics provided high standards of cleanliness are maintained.

Weights detailed in this catalogue are approximate only

## \* FRANGIBLE BULB OPTIONS

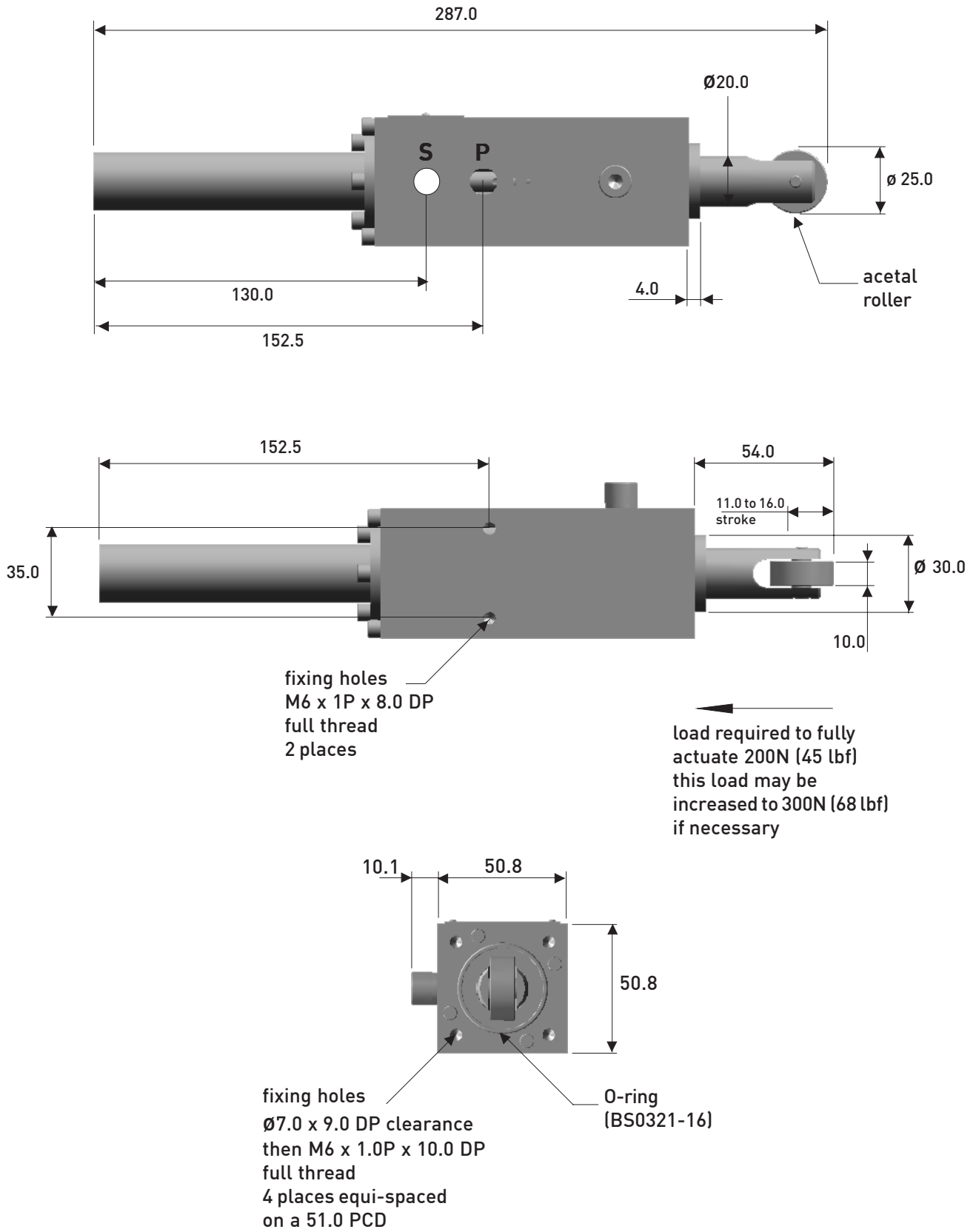
ORDER CODE	BULB COLOUR	TEMPERATURE RANGE °C
57C	Orange	57 +/- 3.5%
68C	Red	68 +/- 3.5%
79C	Yellow	79 +/- 3.5%
93C	Green	93 +/- 3.5%
141C	Blue	141 +/- 3.5%
182C	Mauve	182 +/- 3.5%

## SELECTION CHART

COV(A)	Cam						
DHPV	Dual high pressure pilot (690 bar max)						
FBV	Pilot stage frangible bulb						
HPV	High pressure pilot (690bar max)						
KOV	Security key						
LPV	Low pressure pilot						
MPBHPV	Combination manual palm button and high pressure pilot						
MPBLPV	Combination manual palm button low pressure pilot						
MPBV	Manual palm button						
MHPV	Combination manual lever and high pressure pilot						
MV	Manual lever						
MDV	Manual detented lever						
MLPBV	Manual latch palm button						
						The maximum valve working pressure is dependant upon the operator type. Please consult Bifold Fluidpower prior to ordering	Primary & Secondary Operator
80	Body ported 1/4 NPT (3/8 MP autoclave, pressure code 15)						
81	Subbase mounting (10A, 12A & 18A configurations)					liquid service	Application
51	Subbase mounting						&
82	Body ported (1/4 NPT (3/8 MP autoclave, pressure code 15)						Configuration
53	Subbase mounting					liquid service - subsea	
84	Body ported 1/4 NPT						
55	Subbase mounting					gaseous service	
00	3-way, 2-position						
01	3-way, 2-position (reverse flow S to P)						
02	2-way, 2-position						
10A	3-way, 2-position (81 body only, rated @ 40 lpm, 414 bar max)						Configuration
12A	2-way, 2-position (81 body only, rated @ 40 lpm, 414 bar max)						
18A	5-way, 2-position (81 body only, rated @ 40 lpm, 414 bar max)						
08	5-way, 2-position (80 & 84 body only, 345 bar max. working pressure, 3/8 NPT ports)						
	NC normally closed					2/2 & 3/2	Configuration
	NO normally open					spring return valves	
	02	138 bar				gaseous service	
	03	207 bar					
	05	345 bar	06	414 bar (10A, 12A & 18A only)			Working Pressure
	07	520 bar				liquid service	
	10	690 bar	15	1035 bar			
	20	1380 bar (Type 5100 only)		180°C max fluid temp.; 6 lpm nominal			
	S	Nitrile (standard)				(-30°C to +130°C)	O-Ring Material
	V	Viton				(-20°C to +180°C)	
	SA	Low temperature nitrile				(-46°C to +130°C)	
	XXX						Temp Rating * (Pg 2)
	H2S	NACE MR-01-75					Options
	K6	BSPP ported					
	P	Plunger					
	R	Roller				COV(A) operators	
LPV /80	02 / NC /10 / S						Ordering Examples
MPBLPV/LPV/8001/ NC /10 / S							

Standard Test Fluid: Marston Bentley HW540.

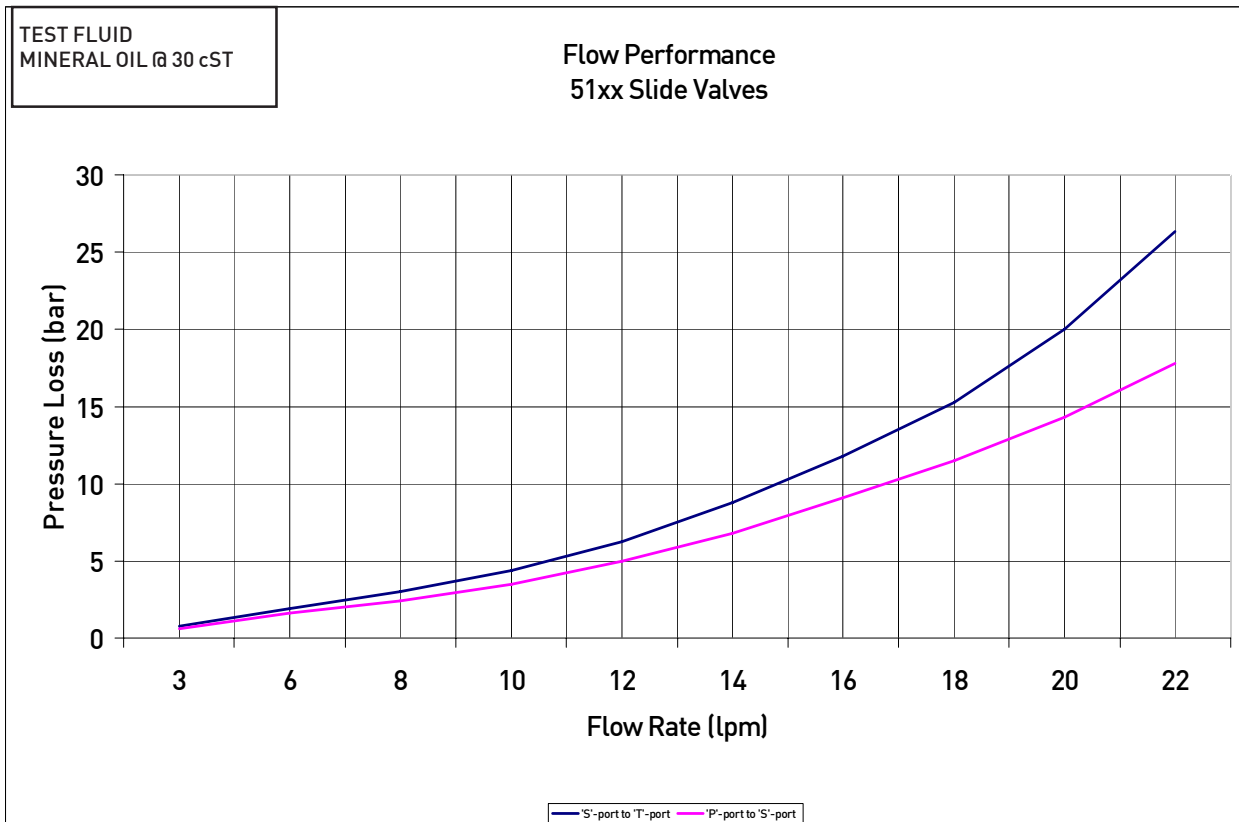
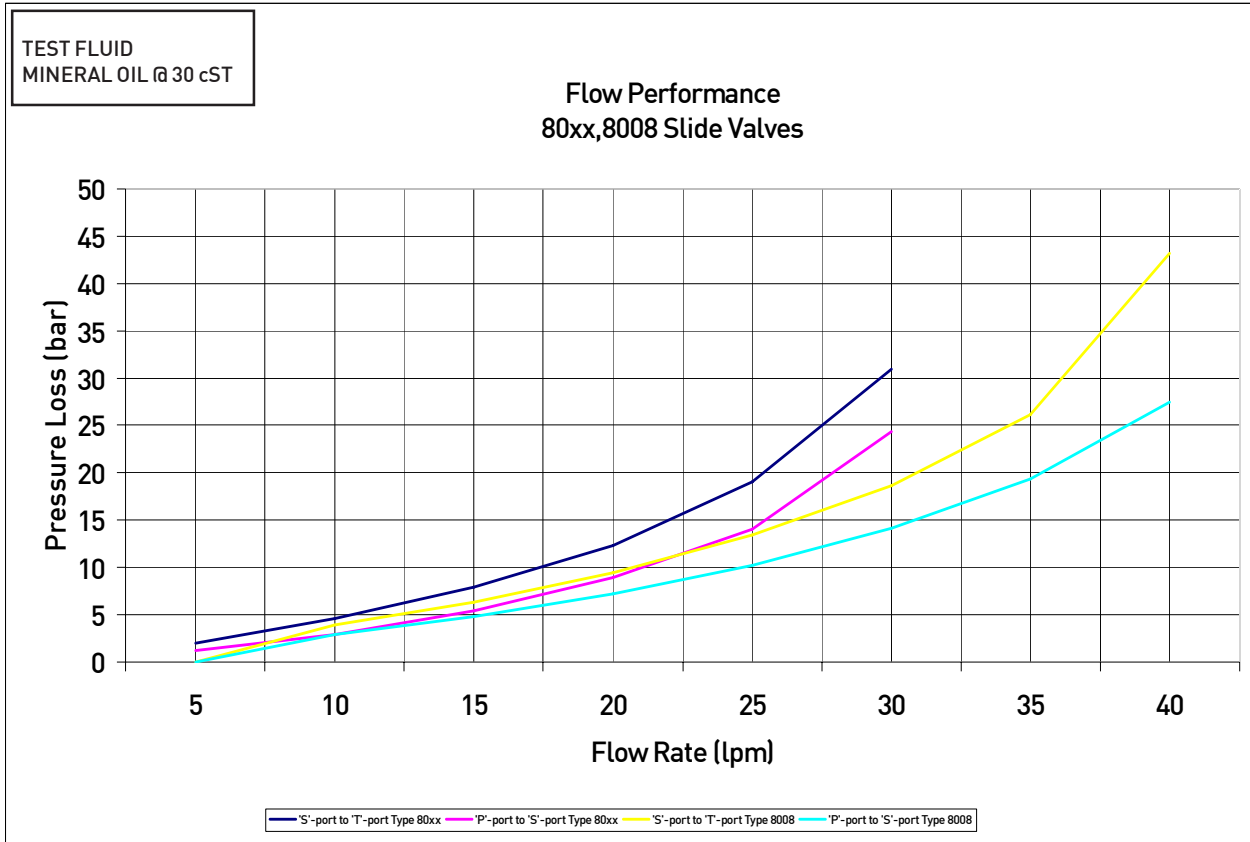
## EXAMPLE MODEL 80 Series

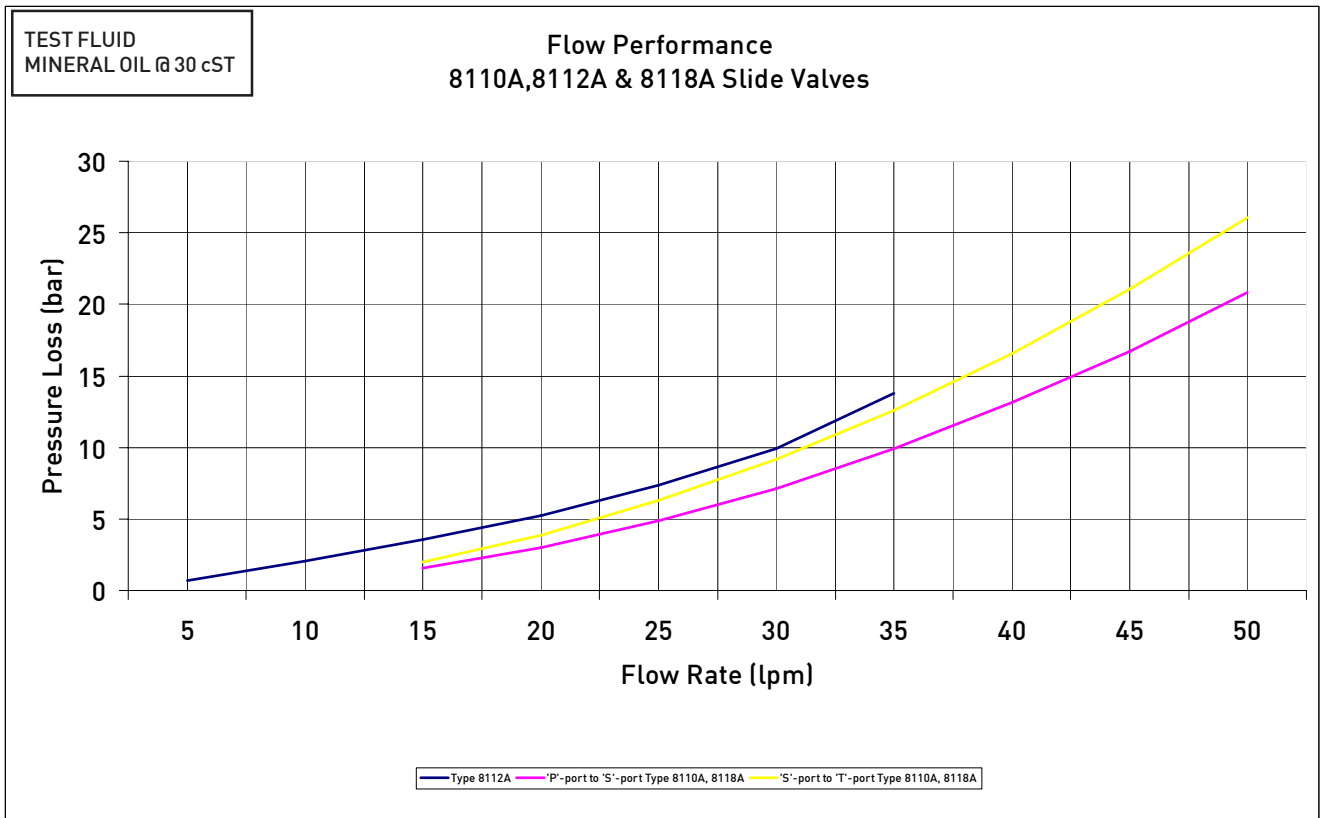


Example shown:- COV(A)8002/NC/05/S-R

**FLOW PERFORMANCE**

Reliability and Innovation in directional control valves





## OPERATING LIMITATIONS

### APPLICABLE TO ALL 5000 AND 8000 SERIES 2-WAY, 3-WAY AND 5-WAY SLIDE VALVES

#### WARNING

Slide type valves incorporating single acting seals will if subjected to reverse pressurisation/flow partially or fully collapse these seals.

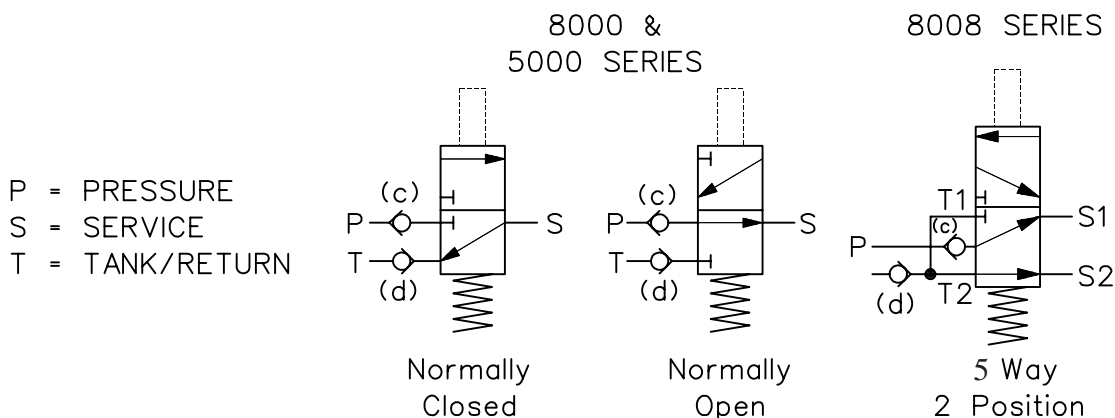
Seal failure will occur if the following operating conditions are introduced into the hydraulic system.

- A higher pressure is applied to the tank/return port than at the service port
- A higher pressure is applied to service port than at the pressure port.
- Depressurisation of the hydraulic supply pressure with the valve in a pressure to service flow mode. (If this is a system design requirement we recommend the 5101 or 8001 valve types are used).
- Back pressure at the tank port exceeding the maximum recommended 200 psi (14 bar) above the service line pressure.

If conditions (c) and (d) can arise during normal operation we recommend the following action is taken.

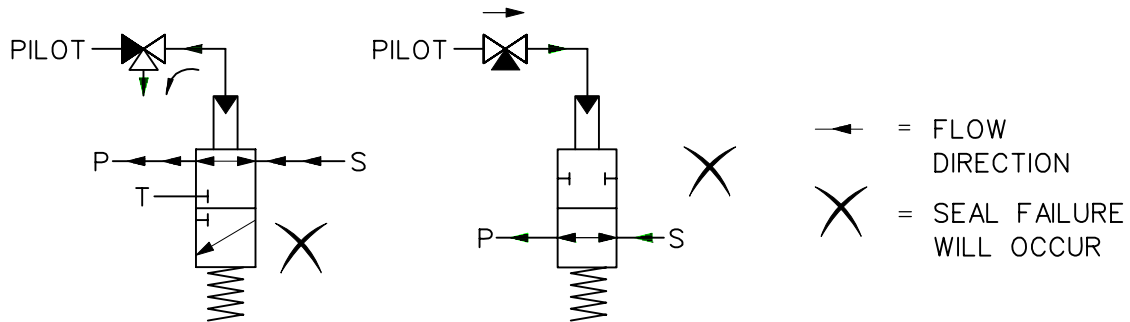
To eliminate condition (c) install a check valve directly at pressure 'P' inlet port.

To eliminate condition (d) install a check valve directly at the tank 'T' port.





- e) Valve types 5101, 5102, 8001 and 8002 are fitted with a bi-directional seal which is capable of tolerating flow from the pressure (P) port to the service (S) port and vice versa. The reverse flow capability of these valves is only permitted while the valve is in a static mode i.e. the valve must not change position whilst in a reverse flow mode as the seal will be damaged. **Note:** Condition (d) will remain applicable to these valve types.

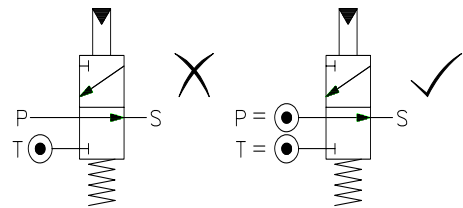


## TESTING

For the purpose of proof testing an entire hydraulic system, including return/tank lines at the maximum test pressure, the tank port lines can be pressurised providing an equivalent pressure is always maintained at the valve pressure port with the valve in a pressure to service mode.

Always dissipate a test pressure down stream of the tank port.

Under no circumstances should the tank port be plugged.



To depressurise a control circuit with the direction for flow maintained P to S (Normally Open Valve or Normally Closed Valve pilot operated to open), pressure must always be dissipated down stream of the service port. (Excluding valves with reverse flow capability, refer to warning paragraph (e)).

## Other Slide Valve Types Affected

- (i) 3-way and 5-way for gas service  
Types: 5500, 8400 and 8408
- (ii) 2-way, 2 position valves for gas service  
Types: 5502 and 8402
- (iii) 2-way, 2 position valves for hydraulic service  
Types 8102 and 8112

The above valve types are fitted with a bi-directional seal which is capable of tolerating flow from the pressure (P) port to the service port (S) and vice versa. The reverse flow capability of these valves is only permitted while the valve is in a static mode i.e. the valve must not change position whilst in a reverse flow mode as the seal will be damaged. (Refer to warning paragraph (e))

## NOTE

To eliminate the modes of failure as described (excludes reverse flow type, refer to warning), we offer a stackable valve system, incorporating 5100 series, subbase manifolds, thermal relief and check valves.

We also manufacture a range of block before bleed and balanced poppet valves which are not susceptible to the seal damage through reverse flow mode applications. For further details on these and our stackable valve system please contact Bifold Fluidpower.

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## Shutdown valves

**Type 1073** Master shutdown valve Type 1073 is a pilot-operated, three port, two position poppet valve with a spring-return action.

Manufactured from materials complying with NACE Standard MR-01-75 (latest revision as applicable). The valve can be used in many oil field and gas field applications. The piston-type pilot section of the valve is equally versatile, responding to a wide range of pilot supply pressures and any one of a variety of pneumatic or hydraulic operating media.

With the valve unoperated, Port 3 is connected to Port 5, while Port 4 is isolated. Pilot pressure, applied above the piston, displaces the valve stem, interconnecting Ports 3 and 4 and isolating Port 5. Low friction fluid seals are used for all dynamic sealing and the valve stem is of balanced design so that the valve can be connected for either normally-open or normally-closed operation.

The valve body has a fourth connection (port 2) for a pressure gauge. If this port is not used, it must be sealed with a 1/4" NPT plug (not supplied with the valve).

### Operating parameters

<b>Working pressure</b>	690 bar (10,000 psi) max.
<b>Pilot pressure</b>	2.1 to 10.3 bar (30 to 150 psi).
<b>Connections</b>	1/4" NPT all ports.
<b>Leakage rate</b>	4 ml/hour max.
<b>Flow rate, nominal</b>	27 litres/min (6 imp galls/min).
<b>Operating media – poppet section</b>	Mineral oils, water, water-glycol mixtures.
<b>Operating media – pilot section</b>	Air, sour gas or one of the poppet media (above).
<b>Pressure drop</b>	See performance curve.
<b>Working temperature</b>	-20°C to + 130°C.
<b>Recommended filtration</b>	10 micron

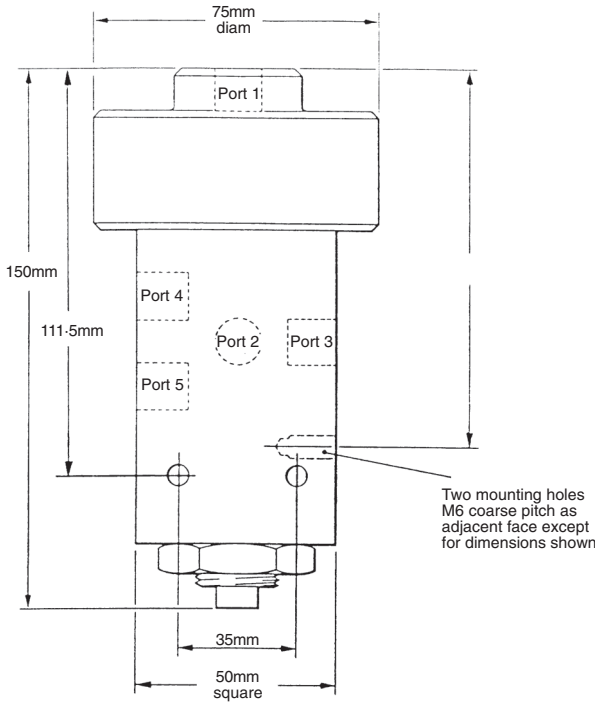


This valve conforms to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



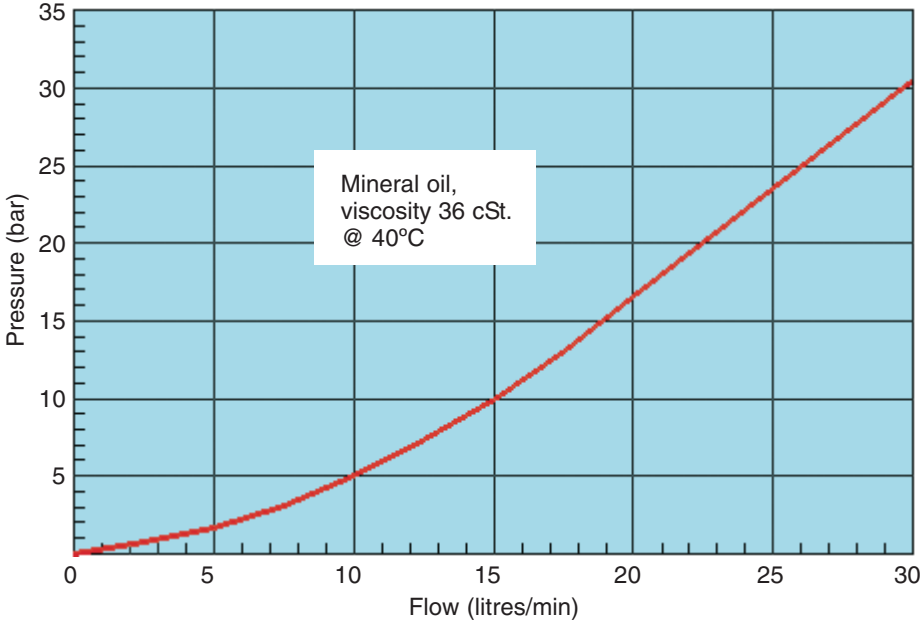
Marshalsea Hydraulics has been assessed by SGS Société Générale de Surveillance SA and certified as meeting the requirements of ISO 9001:2000 for the design, development, manufacture and servicing of hydraulic pumps, relief valves and intensifiers.

**Drawing giving dimensions**



**Weight:** 2.5kg

**Performance curve**



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**We reserve the right to alter specifications or withdraw products without notice**

## Shutdown valves

### Types 1074/1174

Master shutdown valve Types 1074/1174 are pilot-operated, three port, two position poppet valves with a spring-return action. Type 1074 has screwed connections, whereas Type 1174 is manifold mounted.

Manufactured from materials complying with NACE Standard MR-01-75 (latest revision as applicable), the valve can be used in many oil field and gas field applications. The piston-type pilot section of the valve is equally versatile, responding to a wide range of pilot supply pressures and any one of a variety of pneumatic or hydraulic operating media.

With the valve unoperated, Port 3 is connected to Port 5, while Port 4 is isolated. Pilot pressure, applied above the piston, displaces the valve stem, interconnecting Ports 3 and 4 and isolating Port 5. Low friction fluid seals are used for all dynamic sealing so that the valve can be connected for either normally-open or normally-closed operation.

### Operating parameters

<b>Working pressure</b>	690 bar (10,000 psi) max.
<b>Pilot pressure</b>	103 to 345 bar (1,500 to 5,000 psi).
<b>Flow rate, nominal</b>	27 litres/min (6 imp galls/min).
<b>Operating media – valve</b>	Mineral oils, water, water-glycol mixtures.
<b>Operating media – pilot</b>	Air, sour gas or one of the poppet media (above).
<b>Working temperature</b>	-20°C to + 130°C.
<b>Recommended filtration</b>	10 micron



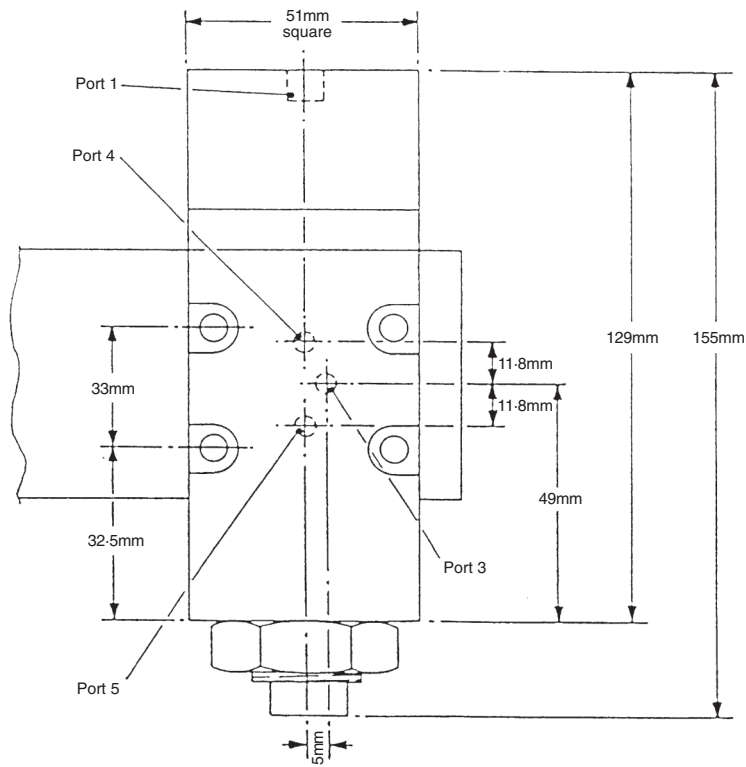
These valves conform to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



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**Drawing giving  
dimensions**



**Weight:** 3kg



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**We reserve the right to alter specifications or withdraw products without notice**

## Shutdown valves

### Type 1175

Master shutdown valve Type 1175 is a pilot-operated, three port, two position poppet valves with a spring-return action.

Manufactured from materials complying with NACE Standard MR-01-75 (latest revision as applicable), the valve can be used in many oil field and gas field applications. The piston-type pilot section of the valve is equally versatile, responding to a wide range of pilot supply pressures and any one of a variety of pneumatic or hydraulic operating media.

With the valve unoperated, Port 3 is connected to Port 5, while Port 4 is isolated. Pilot pressure, applied above the piston, displaces the valve stem, interconnecting Ports 3 and 4 and isolating Port 5. Low friction fluid seals are used for all dynamic sealing so that the valve can be connected for either normally-open or normally-closed operation.

### Operating parameters

<b>Working pressure</b>	690 bar (10,000 psi) max.
<b>Pilot pressure</b>	200 to 690 bar (2,900 to 10,000 psi).
<b>Flow rate, nominal</b>	27 litres/min (6 imp galls/min).
<b>Operating media – valve</b>	Mineral oils, water, water-glycol mixtures.
<b>Operating media – pilot</b>	Mineral oils, water, water-glycol mixtures.
<b>Working temperature</b>	-20°C to + 130°C.
<b>Recommended filtration</b>	10 micron

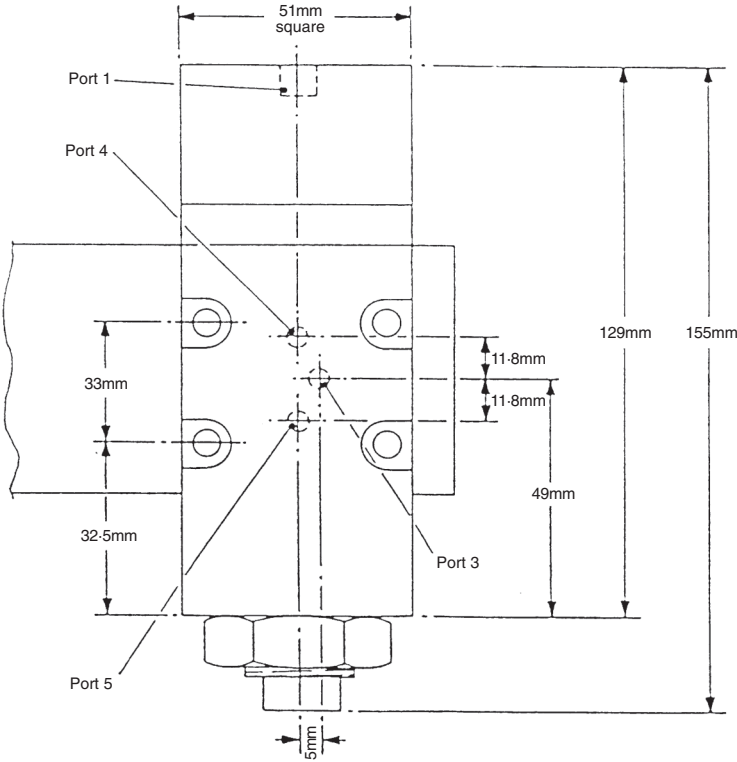


This valve conforms to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



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Drawing giving dimensions



Weight: 3kg



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## Slide valves

### Summary

This section contains details on some 26 different slide valve Types. They are paired, with 13 Types being normally closed, each with a corresponding normally open Type. All these slide valves are pilot-operated, three port, two position valves with a spring return action. A major feature in the design of these slide valves is the elimination of the continuous leakage characteristic of conventional lapped-face spool valves. The valves all incorporate special high pressure seals which prevent leakage and all valve slides have a 'block before bleed' action. Construction materials comply with NACE Standard MR-01-75.

The following table shows some of the key differences in specification for the range of slide valves. This is provided as an aid in selecting the appropriate Type; it does not replace the self-contained individual sheets which provide more complete information and specification data.



These slide valves conform to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



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**Type number specifications**

Type number		Working pressure (bar)	Pilot pressure (bar)	Nominal flow rate (litres/min)	A	B	C
N/C	N/O						
3100	3105	690	103-690	27			
3101	3106	690	103-690	27	x		
3102	3107	690	69-207	27	x		
3103	3108	690	103-690	27		x	
3104	3109	690	69-207	27		x	
3111	3115	690	4.5-17.2	27			
3160	3165	690	3.4-17.2	27	x		
3163	3167	413	3.4-17.2	27	x		x
4100	4105	517	76-517	54			
4101	4106	517	76-517	54	x		
4102	4107	517	76-517	54		x	
4111	4115	690	4.5-17.2	54			
4160	4165	690	3.4-17.2	54	x		

**Key**

- N/C** Normally closed  
**N/O** Normally open  
**A** Manifold mounted with integral pilot connection  
**B** Manifold mounted with remote pilot connection  
**C** Special seals to enable the valve to be used as a selector



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## Slide valves

### Types 3100/3105

Slide valves Type 3100 (normally closed) and 3105 (normally open) are pilot-operated, three port, two position valves with a spring-return action. The pilot operator of each valve is capable of withstanding high pressures equal to the main line pressure. This enables the valves to be used locally as actuators, as quick dump valves. The valves are sealed to withstand external body pressure making them suitable for subsea applications. Manifold mounted versions are also available.

A major feature of the valve design is elimination of the continuous leakage which is characteristic of conventional lapped-face spool valves. The valve incorporates special high pressure seals which prevent leakage.

The valve slide (which can be supplied either normally closed or normally open) has a 'block before bleed' action. In a normally closed valve, for example, this means that the tank port is isolated before pressure and service ports are interconnected.

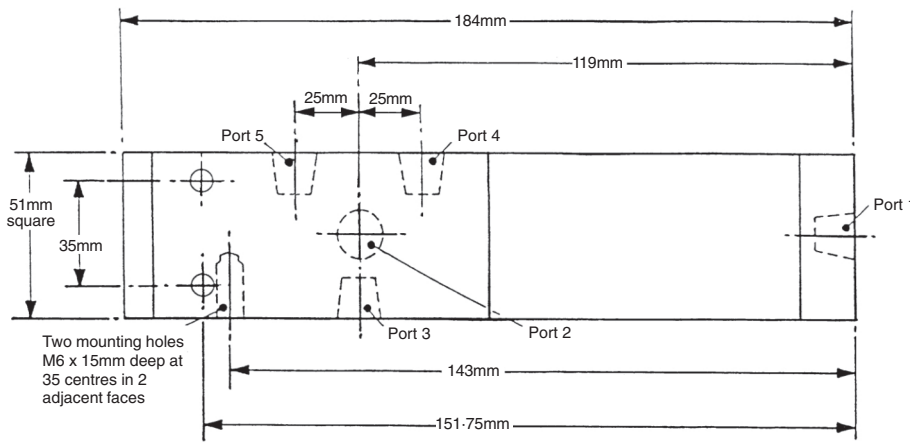
The valve body has a fourth connection (port 2) for a pressure gauge. If this port is not used, it must be sealed with a 1/4" NPT plug (not supplied with the valve).

Construction materials, predominantly 316 stainless steel and CA104 aluminium bronze with seals of fluoroelastomers and PTFE materials, ensure high corrosion resistance and comply with NACE Standard MR-01-75 (latest revision as applicable).

### Operating parameters

<b>Working pressure</b>	690 bar (10,000 psi) max.
<b>Pilot pressure – minimum</b>	103 bar (1,500 psi).
<b>Pilot pressure – maximum</b>	690 bar (10,000 psi).
<b>Operating media</b>	Mineral oils, water, water-glycol mixtures.
<b>Recommended filtration</b>	25 micron.
<b>Connections</b>	1/4" NPTF all ports.
<b>Flow rate, nominal</b>	27 litres/min (6 imp galls/min).
<b>Pressure drop</b>	See performance curve.
<b>Working temperature – standard</b>	-20°C to + 130°C.
<b>Working temperature – arctic</b>	Available on request.

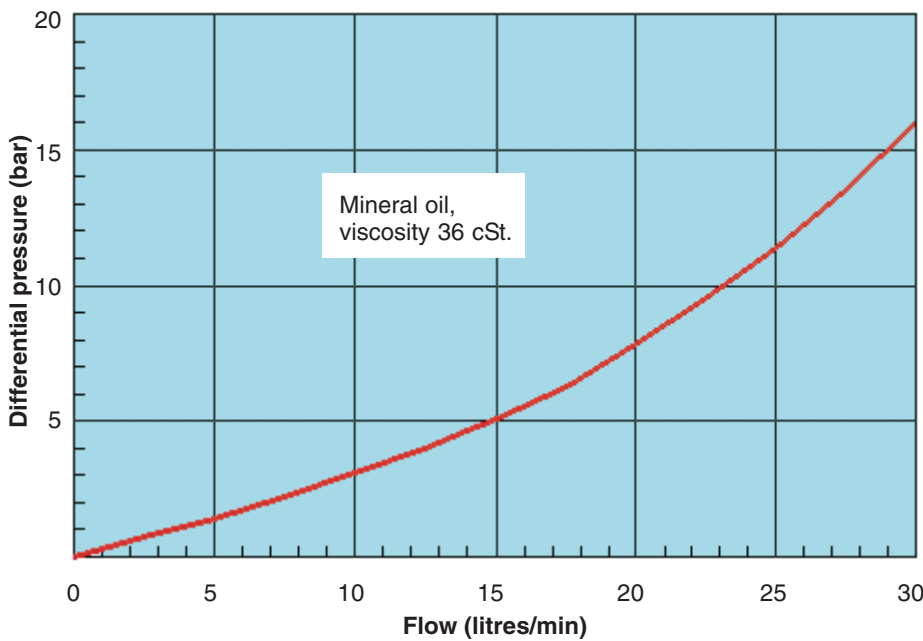
**Drawing giving dimensions**



**Weight:** 3kg

Port	Valve 3100	Valve 3105
Port 1	Pilot	Pilot
Port 2	Gauge	Gauge
Port 3	Service	Service
Port 4	Supply	Tank
Port 5	Tank	Supply

**Port assignments**



**Performance curve**



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## Slide valves

### Types 3101-3104/ 3106-3109

Slide valves Type 3101/2 (normally closed) and 3106/7 (normally open) are manifold mounted with integral pilot connection; the 3103/4 (normally closed) and 3108/9 (normally open) are manifold mounted with remote pilot connection. All types are pilot-operated, three port, two position valves with a spring-return action. The pilot operator of each valve is capable of withstanding high pressures equal to the main line pressure. This enables the valves to be used locally to actuators, as quick dump valves. The valves are sealed to withstand external body pressure making them suitable for subsea applications.

A major feature of the valve design is elimination of the continuous internal leakage which is characteristic of conventional lapped-face spool valves. The valves each incorporate special high pressure seals which prevent leakage and so render the valves suitable for use with many fluid media.

The valve slide (which can be supplied either normally closed or normally open) has a 'block before bleed' action. In a normally closed valve, for example, this means that the tank port is isolated before pressure and service ports are interconnected.

Construction materials, predominantly 316 stainless steel and CA104 aluminium bronze with seals of fluoroelastomers and PTFE materials, ensure high corrosion resistance and comply with NACE Standard MR-01-75 (latest revision as applicable).

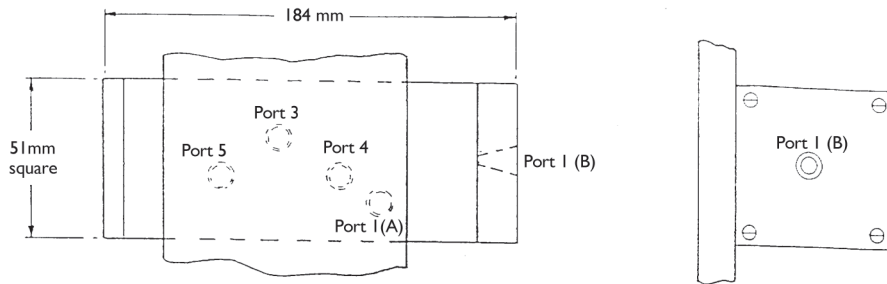
### Operating parameters

<b>Working pressure</b>	690 bar (10,000 psi) max.
<b>Pilot pressure – Type 3101/3/6/8</b>	103 to 690 bar (1,500 to 10,000 psi).
<b>Pilot pressure – Type 3102/4/7/8</b>	69 to 207 bar (1,000 to 3,000 psi).
<b>Operating media</b>	Mineral oils, water, water-glycol based hydraulic fluid. Other media available on request.
<b>Recommended filtration</b>	25 micron.
<b>Connections</b>	1/4" NPTF all ports.
<b>Flow rate, nominal</b>	27 litres/min (6 imp galls/min).
<b>Working temperature</b>	–20°C to + 130°C.

These slide valves conform to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



Marshalsea Hydraulics has been assessed by SGS Société Générale de Surveillance SA and certified as meeting the requirements of ISO 9001:2000 for the design, development, manufacture and servicing of hydraulic pumps, relief valves and intensifiers.



**Drawing giving dimensions**

Port	Valve 3101/2/3/4	Valve 3106/7/8/9
Port 1(A)	3101/2 – integral pilot	3106/7 – integral pilot
Port 1(B)	3103/4 – remote pilot	3108/9 – remote pilot
Port 3	Service	Service
Port 4	Supply	Tank
Port 5	Tank	Supply

**Port assignments**



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## Slide valves

### Types 3111/3115

Slide valves Type 3111 (normally closed) and 3115 (normally open) are pilot-operated, three port, two position valves with a spring-return action. Manifold mounted versions are also available.

A major feature of the valve design is elimination of the continuous leakage which is characteristic of conventional lapped-face spool valves. The valve incorporates special high pressure seals which prevent leakage.

The valve slide (which can be supplied either normally closed or normally open) has a 'block before bleed' action. In a normally closed valve, for example, this means that the tank port is isolated before pressure and service ports are interconnected.

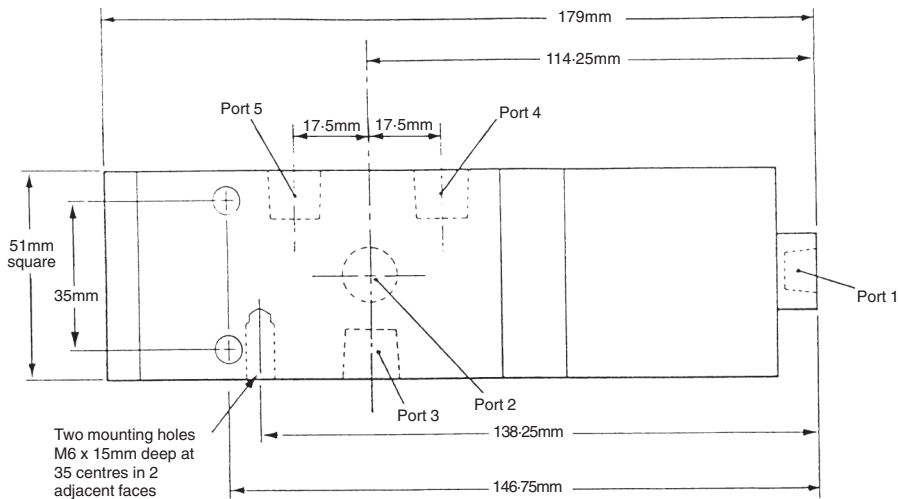
The valve body has a fourth connection (port 2) for a pressure gauge. If this port is not used, it must be sealed with a 1/4" NPT plug (not supplied with the valve).

Construction materials, predominantly 316 stainless steel and CA104 aluminium bronze with seals of fluoroelastomers and PTFE materials, ensure high corrosion resistance and comply with NACE Standard MR-01-75 (latest revision as applicable).

### Operating parameters

<b>Working pressure</b>	690 bar (10,000 psi) max.
<b>Pilot pressure – minimum</b>	4.5 bar (65 psi).
<b>Pilot pressure – maximum</b>	17.2 bar (250 psi).
<b>Operating media – main slide</b>	Mineral oils, water, water-glycol mixtures
<b>Operating media – pilot section</b>	Air, natural and sour gases or any of the main slide media above.
<b>Recommended filtration</b>	25 micron.
<b>Connections</b>	1/4" NPTF all ports.
<b>Flow rate, nominal</b>	27 litres/min (6 imp galls/min).
<b>Pressure drop</b>	See performance curve.
<b>Working temperature – standard</b>	-20°C to + 130°C.
<b>Working temperature – arctic</b>	Available on request.



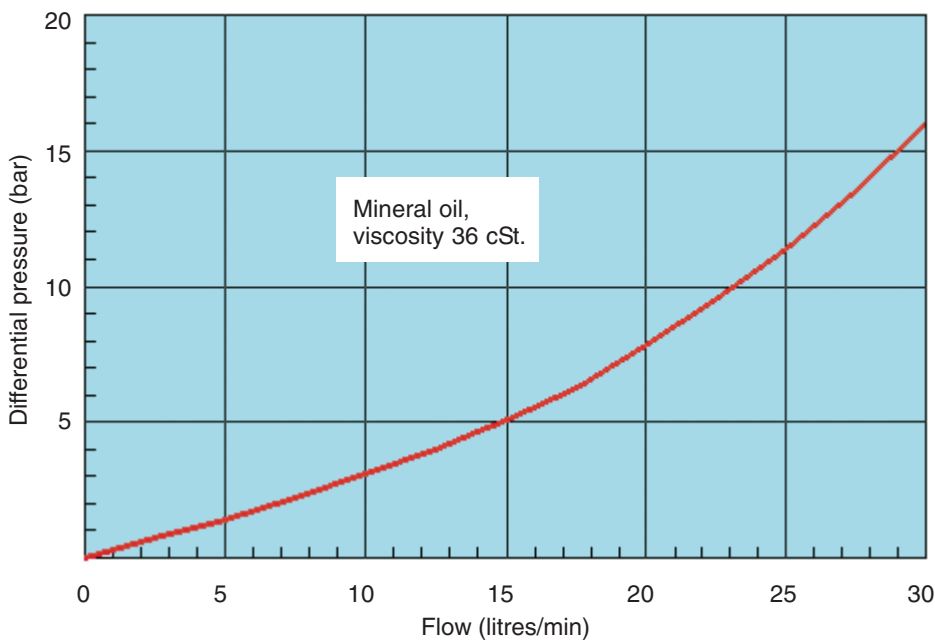


**Drawing giving dimensions**

**Weight:** 3kg

Port	Valve 3111	Valve 3115
Port 1	Pilot	Pilot
Port 2	Gauge	Gauge
Port 3	Service	Service
Port 4	Supply	Tank
Port 5	Tank	Supply

**Port assignments**



**Performance curve**



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## Slide valves

### Types 3160/3163/ 3165/3167

Slide valves Type 3160 (normally closed) and 3165 (normally open) are manifold mounted, pilot-operated, three port, two position valves with a spring-return action. A major feature of the valve design is elimination of the continuous internal leakage which is characteristic of conventional lapped-face spool valves. The valves each incorporate special high pressure seals which prevent leakage and so render the valves suitable for use with many fluid media.

The valve slide (which can be supplied either normally closed or normally open) has a 'block before bleed' action. In a normally closed valve, for example, this means that the tank port is isolated before pressure and service ports are interconnected.

Construction materials, predominantly 316 stainless steel and CA104 aluminium bronze with seals of fluoroelastomers and PTFE materials, ensure high corrosion resistance and comply with NACE Standard MR-01-75 (latest revision as applicable).

Slide valves Type 3163/3167 are as described for Types 3160/3165, but with special seals fitted to enable the valve to be used as a selector. For Type 3163 the pressure at Port 4 must always be greater than the pressure at Port 5. These port numbers are reversed for Type 3167 for which the pressure at Port 5 must always be greater than the pressure at Port 4.

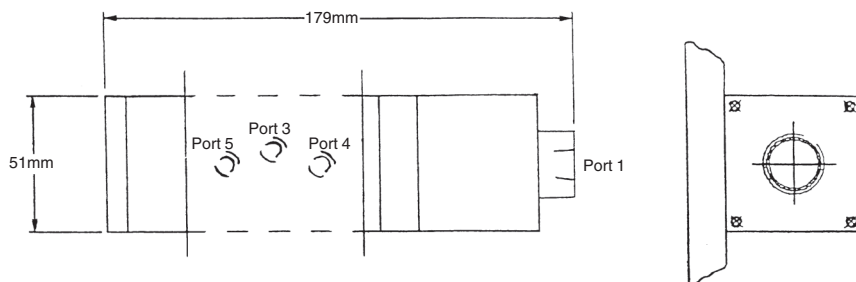
### Operating parameters

<b>Working pressure – Type 3160/5</b>	690 bar (10,000 psi) max.
<b>Working pressure – Type 3163/7</b>	413 bar (6,000 psi) max.
<b>Pilot pressure</b>	3.4 to 17.2 bar (50 to 250 psi).
<b>Operating media – main slide</b>	Mineral oils, water, water-glycol mixtures.
<b>Operating media – pilot section</b>	Air, or any of the main slide media (above).
<b>Recommended filtration</b>	25 micron.
<b>Connections</b>	Manifold mounted.
<b>Pilot connection</b>	1/4" NPTF direct ported.
<b>Flow rate, nominal</b>	27 litres/min (6 imp galls/min).
<b>Working temperature</b>	–20°C to + 130°C.

These slide valves conform to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



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**Drawing giving dimensions**

Port	Valve 3160/63	Valve 3165/67
Port 1	Pilot	Pilot
Port 3	Service	Service
Port 4	Supply	Tank
Port 5	Tank	Supply

**Port assignments**



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## Slide valves

### Types 4100/4105

Slide valves Type 4100 (normally closed) and 4105 (normally open) are pilot-operated, three port, two position valves with a spring-return action. The pilot operator of each valve is capable of withstanding high pressures equal to the main line pressure. This enables the valves to be used locally as actuators, as quick dump valves. The valves are sealed to withstand external body pressure making them suitable for subsea applications. Manifold mounted versions are also available.

A major feature of the valve design is elimination of the continuous leakage which is characteristic of conventional lapped-face spool valves. The valve incorporates special high pressure seals which prevent leakage.

The valve slide (which can be supplied either normally closed or normally open) has a 'block before bleed' action. In a normally closed valve, for example, this means that the tank port is isolated before pressure and service ports are interconnected.

The valve body has a fourth connection (port 2) for a pressure gauge. If this port is not used, it must be sealed with a 3/8" NPT plug (not supplied with the valve).

Construction materials, predominantly 316 stainless steel and CA104 aluminium bronze with seals of fluoroelastomers and PTFE materials, ensure high corrosion resistance and comply with NACE Standard MR-01-75 (latest revision as applicable).

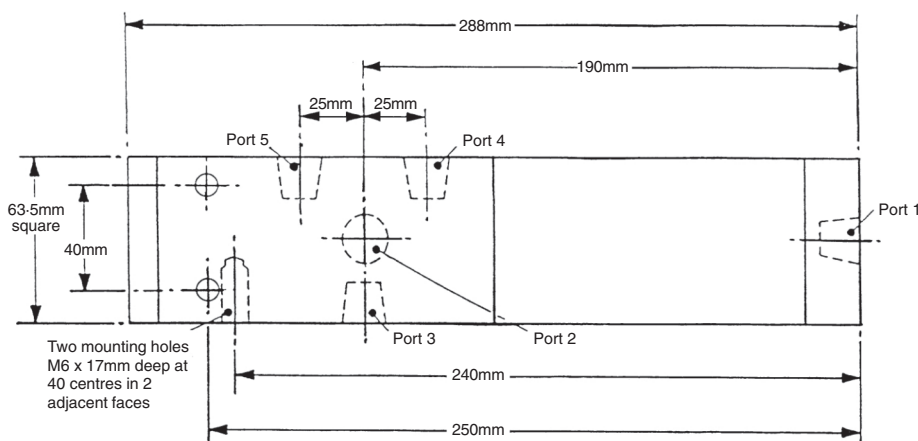
### Operating parameters

<b>Working pressure</b>	517 bar (7,500 psi) max.
<b>Pilot pressure</b>	76.0 to 517 bar (1,100 to 7,500 psi).
<b>Operating media – main slide</b>	Mineral oils, water, water-glycol mixtures.
<b>Operating media – pilot section</b>	Mineral oils, water, water-glycol mixtures.
<b>Recommended filtration</b>	25 micron.
<b>Connections</b>	3/8" NPTF.
<b>Connections – pilot</b>	1/4" NPTF.
<b>Flow rate, nominal</b>	54 litres/min (12 imp galls/min).
<b>Working temperature</b>	-20°C to + 130°C.

These slide valves conform to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



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**Drawing giving dimensions**

**Weight:** 7.0kg

Port	Valve 4100	Valve 4105
Port 1	Pilot	Pilot
Port 2	Gauge	Gauge
Port 3	Service	Service
Port 4	Supply	Tank
Port 5	Tank	Supply

**Port assignments**



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## Slide valves

### Types 4101-4102/ 4106-4107

Slide valves Type 4101 (normally closed) and 4106 (normally open) are manifold mounted with integral pilot connection, pilot-operated, three port, two position valves with a spring return action. The pilot operator of each valve is capable of withstanding high pressures equal to the main line pressure. This enables the valves to be used locally to actuators, as quick dump valves.

A major feature of the valve design is elimination of the continuous internal leakage which is characteristic of conventional lapped-face spool valves. The valves each incorporate special high pressure seals which prevent leakage and so render the valves suitable for use with many fluid media.

The valve slide (which can be supplied either normally closed or normally open) has a 'block before bleed' action. In a normally closed valve, for example, this means that the tank port is isolated before pressure and service ports are interconnected.

Construction materials, predominantly 316 stainless steel and CA104 aluminium bronze with seals of fluoroelastomers and PTFE materials, ensure high corrosion resistance and comply with NACE Standard MR-01-75 (latest revision as applicable).

Slide valves Types 4102 (normally closed) and 4107 (normally open) are as described for Types 4101 and 4106, but with a remote (top) pilot connection and without an integral manifold pilot connection.

### Operating parameters

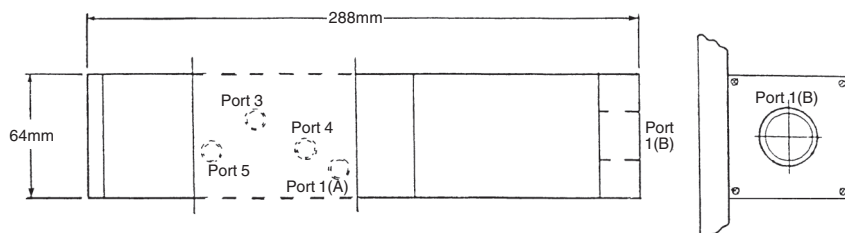
<b>Working pressure</b>	517 bar (7,500 psi) max.
<b>Pilot pressure</b>	76 to 517 bar (1,100 to 7,500 psi).
<b>Operating media – main slide</b>	Mineral oils, water, water-glycol.
<b>Operating media – pilot section</b>	Mineral oils, water, water-glycol.
<b>Recommended filtration</b>	25 micron.
<b>Connections</b>	1/4" NPTF all ports.
<b>Flow rate, nominal</b>	54 litres/min (12 imp galls/min).
<b>Working temperature</b>	-20°C to + 130°C.



These slide valves conform to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



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**Drawing giving dimensions**

Port	Valve 4101/2	Valve 4106/7
Port 1(A)	4101 – integral pilot	4106 – integral pilot
Port 1(B)	4102 – remote pilot	4107 – remote pilot
Port 3	Service	Service
Port 4	Supply	Tank
Port 5	Tank	Supply

**Port assignments**



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## Slide valves

### Types 4111/4115

Slide valves Type 4111 (normally closed) and 4115 (normally open) are pilot-operated, three port, two position valves with a spring-return action. A major feature of the valve design is elimination of the continuous leakage which is characteristic of conventional lapped-face spool valves. The valve incorporates special high pressure seals which prevent leakage and so render the valves suitable for use with many fluid media.

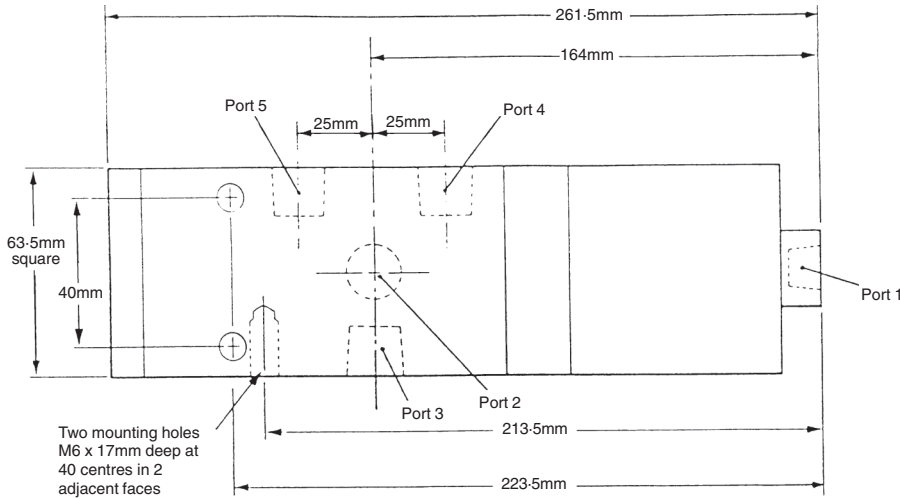
The valve slide (which can be supplied either normally closed or normally open) has a 'block before bleed' action. In a normally closed valve, for example, this means that the tank port is isolated before pressure and service ports are interconnected.

Construction materials, predominantly 316 stainless steel and CA104 aluminium bronze with seals of fluoroelastomers and PTFE materials, ensure high corrosion resistance and comply with NACE Standard MR-01-75 (latest revision as applicable).

The valve body has a fourth connection (port 2) for a pressure gauge. If this port is not used, it must be sealed with a 3/8" NPT plug (not supplied with the valve).

### Operating parameters

<b>Working pressure</b>	690 bar (10,000 psi) max.
<b>Pilot pressure</b>	4.5 to 17.2 bar (65 to 250 psi).
<b>Operating media – main slide</b>	Mineral oils, water, water-glycol mixtures, crude oil and a variety of chemicals.
<b>Operating media – pilot section</b>	Air, H <sub>2</sub> S, bottled gases or any of the main slide media above.
<b>Leakage</b>	None.
<b>Recommended filtration</b>	25 micron.
<b>Connections</b>	3/8" NPTF
<b>Connections – pilot</b>	1/4" NPTF
<b>Flow rate, nominal</b>	54 litres/min (12 imp galls/min).
<b>Pressure drop</b>	See performance curve.
<b>Working temperature – standard</b>	-20°C to + 130°C.

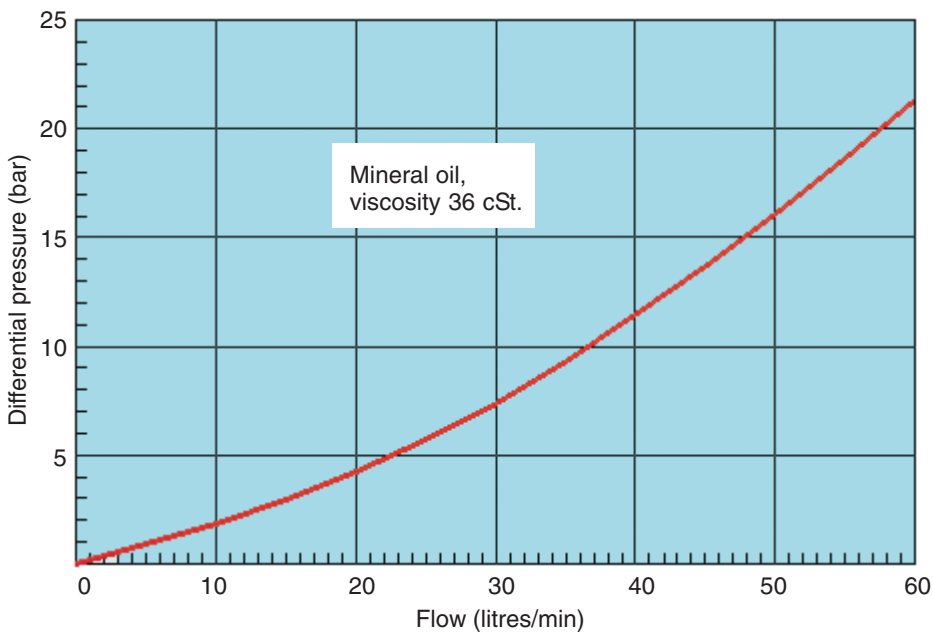


**Drawing giving  
dimensions**

**Weight:** 6.5kg

Port	Valve 4111	Valve 4115
Port 1	Pilot	Pilot
Port 2	Gauge	Gauge
Port 3	Service	Service
Port 4	Supply	Tank
Port 5	Tank	Supply

**Port assignments**



**Performance curve**



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## Slide valves

### Types 4160/4165

Slide valves Type 4160 (normally closed) and 4165 (normally open) are manifold mounted, pilot-operated, three port, two position valves with a spring-return action. A major feature of the valve design is elimination of the continuous internal leakage which is characteristic of conventional lapped-face spool valves. The valves each incorporate special high pressure seals which prevent leakage and so render the valves suitable for use with many fluid media.

The valve slide (which can be supplied either normally closed or normally open) has a 'block before bleed' action. In a normally closed valve, for example, this means that the tank port is isolated before pressure and service ports are interconnected.

Construction materials, predominantly 316 stainless steel and CA104 aluminium bronze with seals of fluoroelastomers and PTFE materials, ensure high corrosion resistance and comply with NACE Standard MR-01-75 (latest revision as applicable).

### Operating parameters

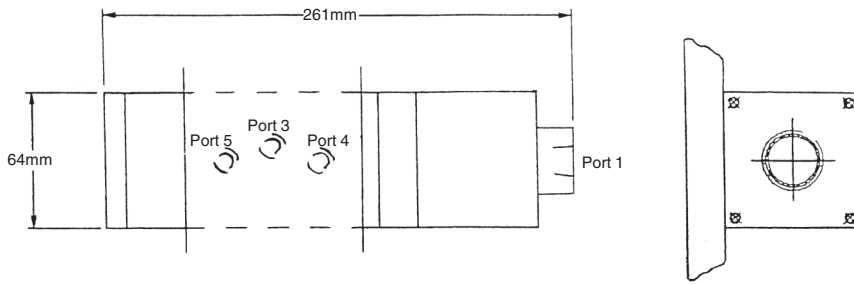
<b>Working pressure</b>	690 bar (10,000 psi) max.
<b>Pilot pressure</b>	3.4 to 17.2 bar (50 to 250 psi).
<b>Operating media – main slide</b>	Mineral oils, water, water-glycol mixtures.
<b>Operating media – pilot section</b>	Air, or any of the main slide media (above).
<b>Recommended filtration</b>	25 micron.
<b>Connections – pilot</b>	1/4" NPTF
<b>Flow rate, nominal</b>	54 litres/min (12 imp galls/min).
<b>Working temperature</b>	-20°C to + 130°C.



These slide valves conform to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



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**Drawing giving dimensions**

Port	Valve 4160	Valve 4165
Port 1	Pilot	Pilot
Port 3	Service	Service
Port 4	Supply	Tank
Port 5	Tank	Supply

**Port assignments**



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# Air Preparation Units Model SH & SC Series

## Filters, Regulators and Filter Regulators



Superior performance  
throughout the  
full operational range

### Features:

- High flow
- High stability
- 316L stainless steel
- Full range of accessories
- Arctic service options to -60°C



## SC Series Filter Regulator

Reliability and Innovation in directional control valves

### Features

- Heavy duty all 316 stainless steel
- High stability
- Thread milled ports
- Elastomer seals
- Modular design
- rugged and corrosion resistant
- precision adjustment
- leak tight joints
- tight shut off
- in line maintenance

### Mechanical Construction

- Body - stainless steel AISI 316L
- Bonnet & bowl - stainless steel AISI 316L
- Element - sintered 316 stainless steel
- Springs - 302S26 stainless steel to BS 2056 (or Inconel)
- Regulating spring - 316 stainless steel
- Ports - 1/4" thread milled NPT
- Seals - viton as standard
- Diaphragm - silicone
- Fasteners - 18/10 stainless steel
- Adjustment mechanism - M8 socket set screw

**Bowl retention capacity**  
25cc (manual drain)

**Maximum inlet pressure**  
20bar

**Filter unit**  
5-10, 20-30 & 40-50 Micron

**Certification**  
Ingress protection designed to meet heavy seas and deck rating

**Regulated pressures**

- 0.20 to 6 bar      2.9 - 87 psi
- 0.40 to 10 bar    5.8 - 145 psi

### Working temperatures

-20°C to +180°C  
-60°C to + 80°C

### Operating fluids

air, natural gas, inert gases.  
Sweet & sour gases -  
consult Bifold Fluidpower

### Flow capacity

10 bar inlet pressure, 6 bar secondary pressure with 1 bar pressure drop using X4 (40 - 50 micron element)

1/4"	-	25.9 SCFM	C.v. 0.7
3/8" & 1/2"	-	27.8 SCFM	C.v. 0.75

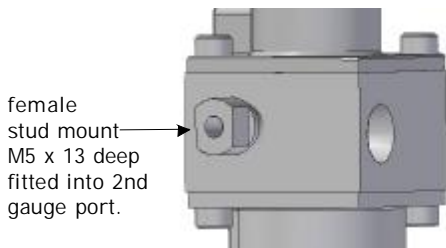
### Relief Port

- Threaded 1/8" NPT vent with removable plastic ingress protection
- For gas service, plastic ingress protection can be removed to enable vented gas to be piped away
- Typical bleed flow at 2 bar secondary pressure 1.5cm<sup>3</sup>/sec
- Relief differential 0.15 bar at 2 bar secondary pressure (relieving type only)

### Seal repair kits

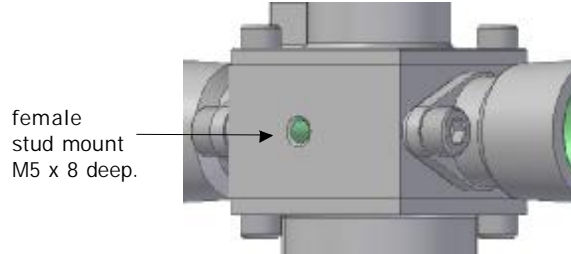
- Please add the prefix SRK on the models required leaving off port sizes (only require model number up to element reference)
- e.g. SRKSC-FR-SR-MD-10-X4-xx

1/4" Unit

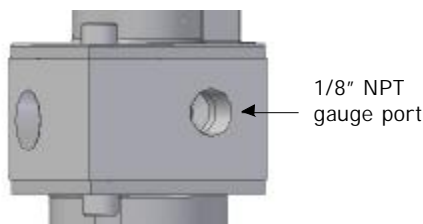


Mounting Details

3/8" & 1/2" Unit

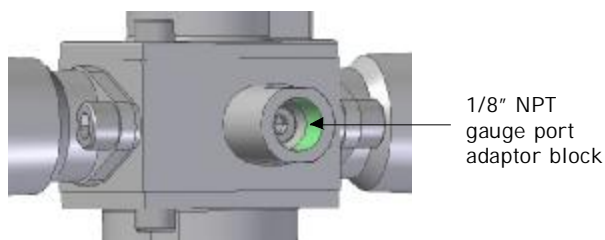


1/4" Unit

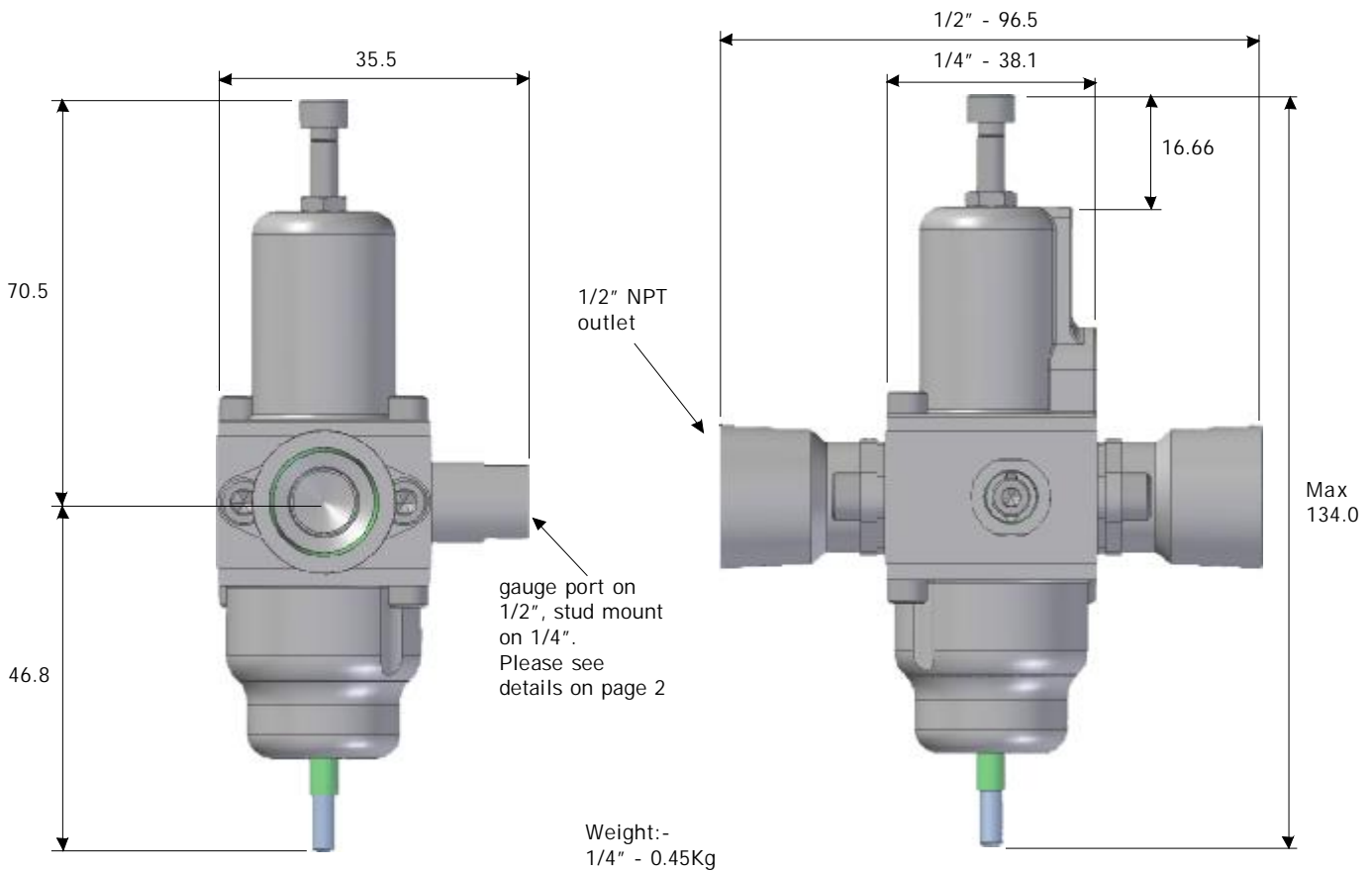


Gauge Details

3/8" & 1/2" Unit



Reliability and Innovation in directional control valves



SC	Compact	Model Code	
06	1/4" NPT	Port Sizes	
09	3/8" NPT		
12	1/2" NPT		
20	20 bar	Inlet Pressure	
FR	Filter Regulator	Model Type	
R1	Regulator		
SR	Self Relieving		
NR	Non Relieving		
MD	Manual Drain <i>(n/a to regulators)</i>		
	Nominal	Actual	Output Pressure Ranges
	06 bar	0.2 - 6 bar	
	10 bar	0.4 - 10 bar	
V	Viton (standard)	O-Ring Material	
AG	Fluorosilicone		
X1	5 - 10 micron element	Filter Element	
X3	20 - 30 micron element		
X4	40 - 50 micron element		
SC 06 - 20 - FR - SR - MD - 10 - V - X4 - xx	(rev no. advised by BF)	Ordering Example	

### Gauge Options

- X10 - 10bar 40mm gauge with 316 SS case
- X11 - 10bar 40mm glycerine filled gauge with 316 SS case
- X10 - 10bar / psi 40mm dual gauge with 316 SS case
- X11 - 10bar / psi 40mm dual glycerine filled gauge with 316 SS case

### Additional Options

- L15 Viton / stainless steel bug vent
- K10 Plastic hand wheel adjuster

## Reliability and Innovation in directional control valves

### Features

- Heavy duty all 316 stainless steel - rugged and corrosion resistant
- Large flow paths - high flow from 0.5 bar dp
- High stability - precision adjustment
- Mounting options - panel, pillar, bracket
- Thread milled ports - leak tight joints
- Elastomer seals - tight shut off
- Modular design - in line maintenance

### Working temperatures

ASH : -60°C to +60°C SH : -20°C to +180°C

### Operating fluids

air, natural gas, inert gases and sweet & sour gases

### Flow capacity

10 bar inlet pressure, 6 bar secondary pressure with 1 bar pressure drop using X4 (40 - 50 micron element)

1/4" - 36 SCFM	C.v. 1.0
1/2" - 94 SCFM	C.v. 2.6
1/2" - 168 SCFM	C.v. 4.2 - high flow version
1" - 429 SCFM	C.v. 11.2

### Ports

service ports - 1/4", 3/8", 1/2", 3/4" & 1" NPT (BSPP options)  
gauge ports - 1/8" NPT standard (1/4" NPT and BSPP options)



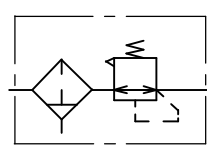


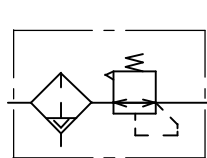


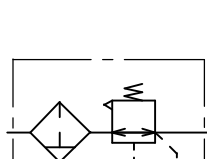


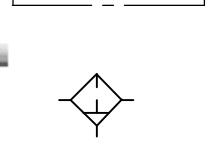


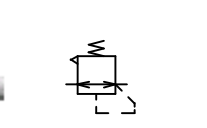


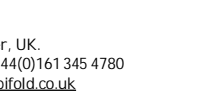



### Relief Port

- Threaded 1/8" NPT vent with removable plastic ingress protection
- For gas service, plastic ingress protection can be removed to enable vented gas to be piped away
- Typical bleed flow at 2 bar secondary pressure 1.5cm<sup>3</sup>/sec
- Relief differential 0.15 bar at 2 bar secondary pressure (relieving type only)

### Seal repair kits

- Please add the prefix SRK on the models required leaving off port sizes (only require model number up to element reference) e.g. SRKSH-FR-SR-MD-10-X3

### Preferred Range:-

			SH06-FR-SR-MD-10-X3-01	1/4" NPT, self relieving, manual drain, 10 bar, 20-30 micron filter element, C.v. 1.7
			SH12-FR-SR-MD-10-X3-01	1/2" NPT, self relieving, manual drain, 10 bar, 20-30 micron filter element, C.v. 2.6
			SH06-FR-SR-AD-10-X3-01	1/4" NPT, self relieving, auto drain, 10 bar, 20-30 micron filter element, C.v. 1.7
			SH12-FR-SR-AD-10-X3-01	1/2" NPT, self relieving, auto drain, 10 bar, 20-30 micron filter element, C.v. 2.6
			SH25-FR-SR-MD-10-X4-01	1" NPT, self relieving, manual drain, 10 bar, 40-50 micron filter element, C.v. 14.2
			SH06-F1-MD-X3-01	1/4" NPT, filter, manual drain, 20-30 micron filter element, C.v. 1.7
			SH12-F1-MD-X3-01	1/2" NPT, filter, manual drain, 20-30 micron filter element, C.v. 2.6
			SH06-R1-SR-10-01	1/4" NPT, regulator, self relieving, 10 bar, C.v. 1.7
			SH12-R1-SR-10-01	1/2" NPT, regulator, self relieving, 10 bar, C.v. 2.6

### Filter unit

10 micron, 20 - 30 micron (standard)  
40 - 50 micron

### Bowl retention capacity

25cc (manual drain), 50cc (auto drain)

### Maximum inlet pressure

16 bar - auto drain only  
20, 40 bar - manual drain only

### Regulated pressures

- 0.03 to 2 bar 0.4 - 29 psi
- 0.03 to 4 bar 0.4 - 58 psi
- 0.20 to 6 bar 2.9 - 87 psi
- 0.25 to 8 bar 3.6 - 116 psi
- 0.40 to 10 bar 5.8 - 145 psi

### Certification

Ingress protection designed to meet heavy seas and deck rating

### Gauges

dry - 50mm, 63mm with psi, bar or dual psi/bar dial  
glycerine filled - 50mm, 63mm with psi, bar or dual psi/bar dial polycarbonate window and blow-out device

## Mechanical Construction

Reliability and Innovation in directional control valves

- Body - stainless steel AISI 316L
- Bonnet & bowl - stainless steel AISI 316L
- Element - sintered 316 stainless steel
- Springs - 302S26 stainless steel to BS 2056 (or Inconel)
- Regulating spring - inconel X750 AMS5699
- Ports - 1/4", 3/8", 1/2", 3/4" or 1" thread milled NPT (BSPP and other options available)
- Seals - viton as standard
- Fasteners - 18/10 stainless steel
- Adjustment mechanism - M8 socket set screw
- Mounting mechanism - Panel, pillar or bracket
- Diaphragm - Silicon

## SH Series Selection Chart

SH	Standard service	Model Code														
S40H	40 bar inlet (only available 1/4")															
ASH	Arctic service															
06	1/4" NPT	Port Sizes														
09	3/8" NPT															
12	1/2" NPT															
19L	3/4" NPT (low flow - see SH 25 selection chart for high flow version)															
19	3/4" NPT (X4 micron element only)															
25	1" NPT (X4 micron element only)															
R1	Regulator	Model Type														
F1	Filter															
FR	Filter Regulator															
SR	Self Relieving	(N/A to Filter Units)														
NR	Non Relieving															
MD	Manual Drain	(N/A to Regulators)														
AD	Auto Drain															
Nominal		Output Pressure Ranges														
Actual																
02 bar	0.03 - 2 bar															
04 bar	0.03 - 4 bar															
06 bar	0.2 - 6 bar															
08 bar	0.25 - 8 bar															
10 bar	0.4 - 10 bar															
X1	5 - 10 micron element	Filter Element														
X3	20 - 30 micron element (standard)															
X4	40 - 50 micron element															
K6	BSPP	Options														
K39	1/4" Gauge Port															
K94	Plug for 1/4" Gauge Port															
K84	Plug for 1/8" Gauge Port															
K10	Black Plastic Button															
xx		Revision														
SH	06	-	FR	-	SR	-	MD	-	10	-	X3	-	K10	-	01	Ordering Example

## Additional Line Items

### Gauges (316 SS case)

- X5 - 10bar 50mm diameter
  - X5 - 16bar 50mm diameter
  - X5 - 160psi 50mm diameter
  - X8 - 10 bar 50mm glycerine filled
- Other scale plates available*

### Mounting Options

- (not available with -F1)
- L8 Panel Mount Kit
- L9 Pillar Mount Kit
- L46 Panel Mount and bracket

### Bug Vent

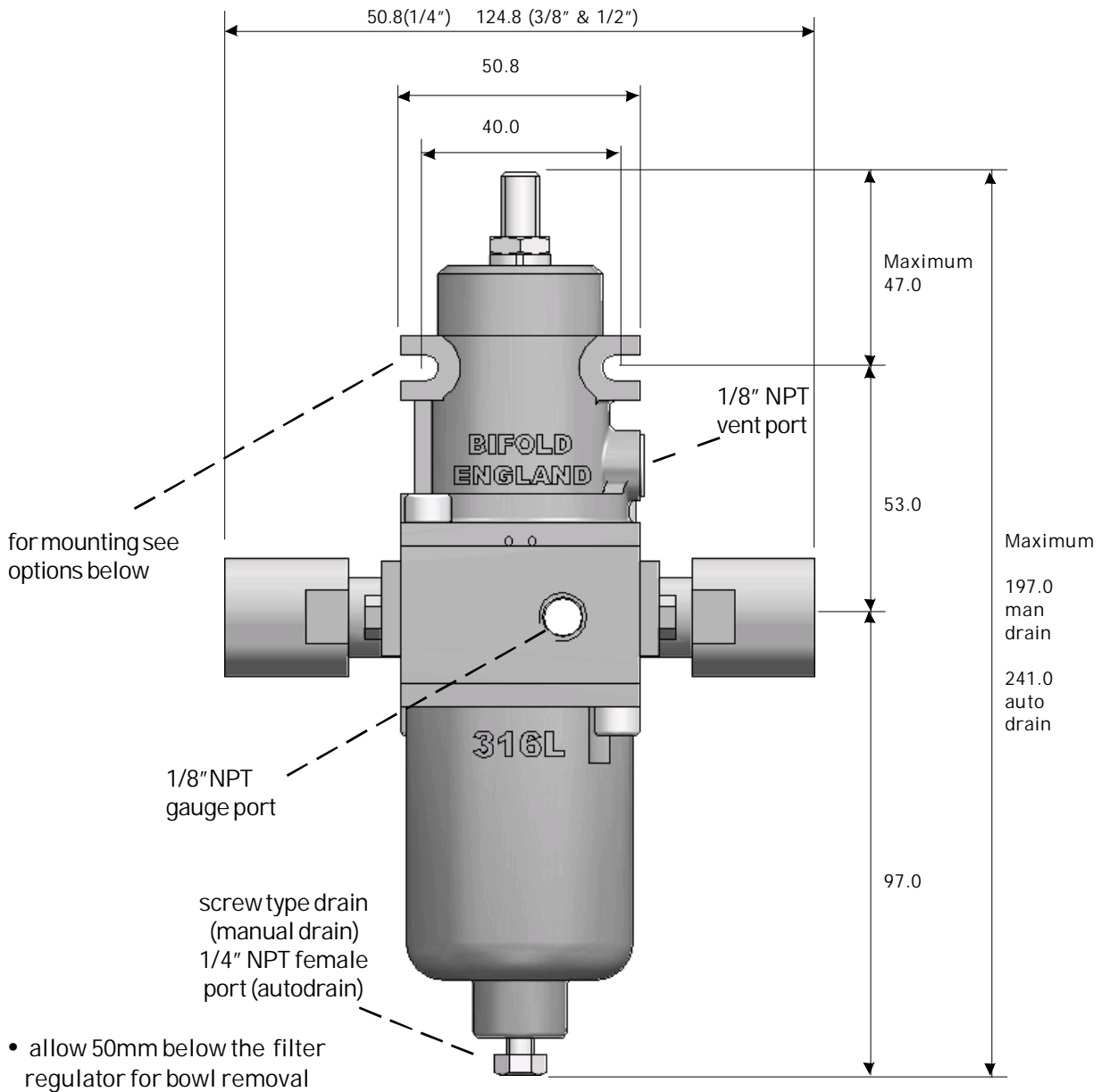
- (not available with -F1)
- L15 13-1 bug vent

### Tamperproof

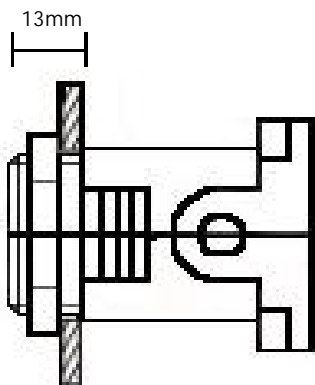
- (not available with -F1 or K10)
- L11 Tamperproof Cap

## Filter Regulator

Reliability and Innovation in directional control valves

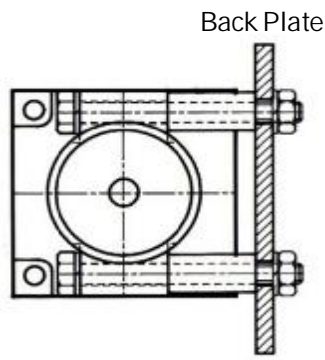


### Panel Mount Kit (L8)

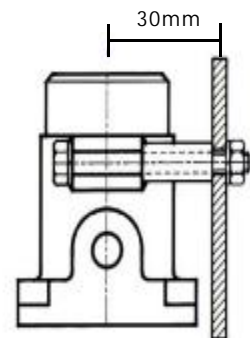


Top cap is threaded and supplied with a panel mount ring

### Pillar Kit (L9)



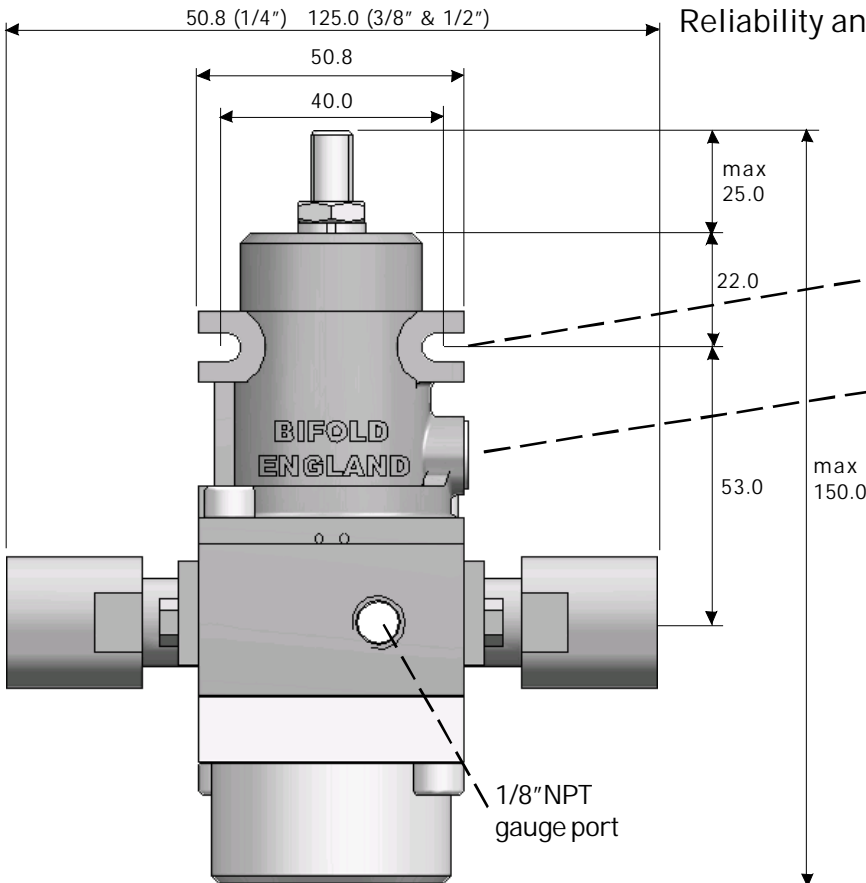
PLAN VIEW



SIDE VIEW

minimum spacer size 20mm

Reliability and Innovation in directional control valves

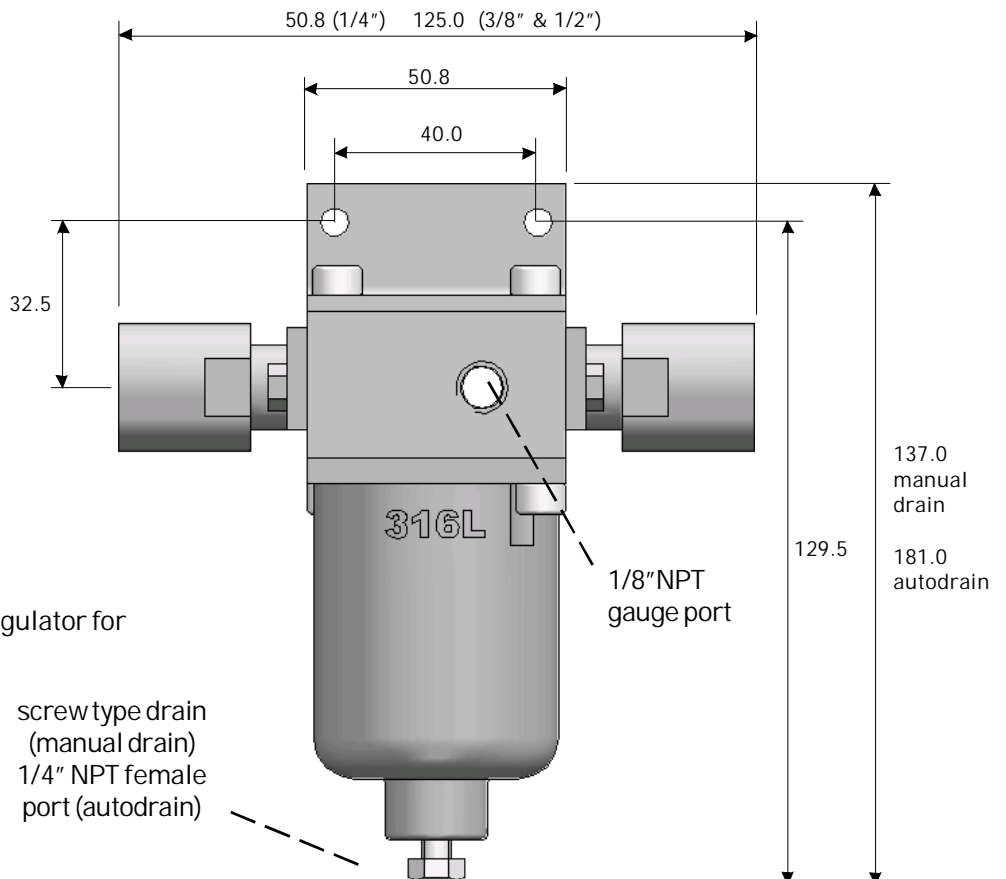


for mounting see options on previous page

1/8" NPT vent port

## Regulators

- designed specifically for use in severe and corrosive environments
- various mounting options
- 'lug' mounting as standard
- suitable for mounting in any position



## Filters

- reduced size and weight
- cost effective
- manual drain or auto drain
- high flow rates
- range of filter elements
- bracket mounting as standard
- allow 50mm below the filter regulator for bowl removal

screw type drain (manual drain)  
1/4" NPT female port (autodrain)



## UK Office

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Web:- [www.bifold-fluidpower.co.uk](http://www.bifold-fluidpower.co.uk)

### *Quality Assurance*

*All Bifold Fluidpower products are manufactured to a most stringent QA programme. Every care is taken at all stages of manufacture to ensure that every product will give optimum performance and reliability. We are recognised to EN ISO 9001:2000. Functional test certificate, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BSEN 10204 3.1.B where available. The manufacturer reserves the right to make changes to the specifications and design etc., without prior notice*

### *Accuracy of information*


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## **Volume Booster Range Model VBP Series**



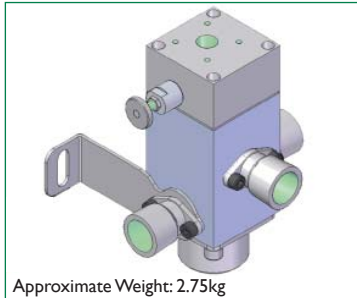
### **Superior Performance Throughout the Full Operational Range**

-  SIL 3 Third Party Certified
- High Flow
- Full Flow 'Captive' Exhaust
- Additionally Functions as a Pressure Relief Valve
- Arctic Service Options
- Sensing Pilot / Valve Seat Assembly: Patent Pending
- Compact Modular Design
- 316L Stainless Steel
- Auto-Drain & Manual-Drain Filter Bowl Assembly Option

Product Features

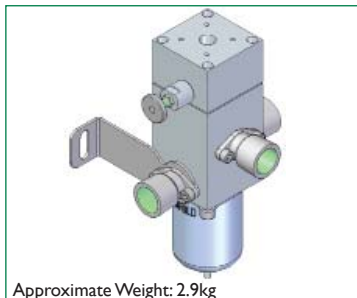
Product

1/2" Volume Booster



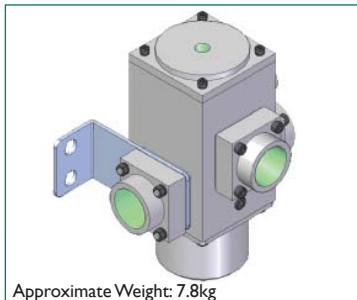
Approximate Weight: 2.75kg

1/2" Volume Booster with Filter



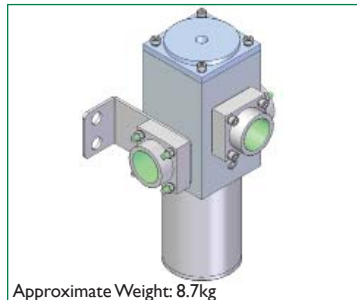
Approximate Weight: 2.9kg

1" Volume Booster



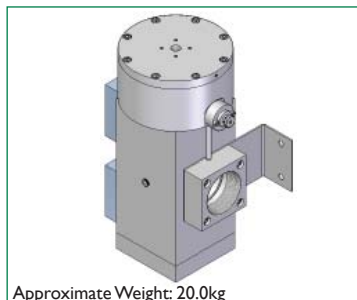
Approximate Weight: 7.8kg

1" Volume Booster with filter



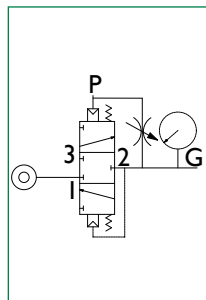
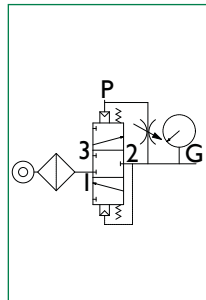
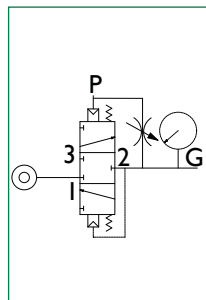
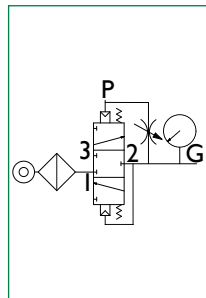
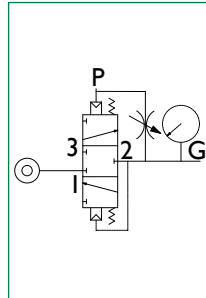
Approximate Weight: 8.7kg

2" Volume Booster



Approximate Weight: 20.0kg

Schematic



- This patented unique product offers equal internal operating forces to function the valve element to the open and vent positions.
- The EQUAL force allows identical inlet and vent orifice diameters: controlled actuators exhaust the air quickly resulting in reduced closing times.
- The performance of the Volume Booster eliminates the need for additional quick exhaust valves enabling reduced costs and installation time.
- Extremely compact modular design.
- Sensing pilot / valve seat assembly : Patent Pending.
- SIL 3 third party certified to IEC 61508 Parts 1 & 2. Consult Bifold.
- Additionally functions as a pressure relief valve.
- Soft seat design.
- Finely balanced design to minimise the impact of both downstream and upstream pressure variations.
- Block before bleed function.
- Captive Venting.
- This product can be incorporated within our 'AXIS'® valve actuator manifold systems.
- Bypass needle adjustment is fitted as standard across the range to eliminate system hunting.
- Service (without pressure applied) can be carried out without removal from the large diameter piping.
- Available with a filter booster combination.

**Accuracy of information**  
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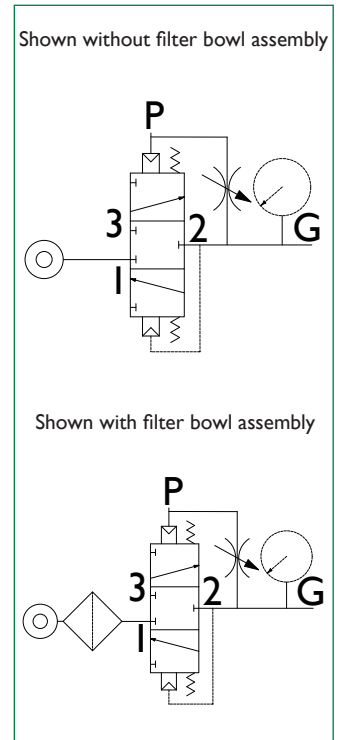
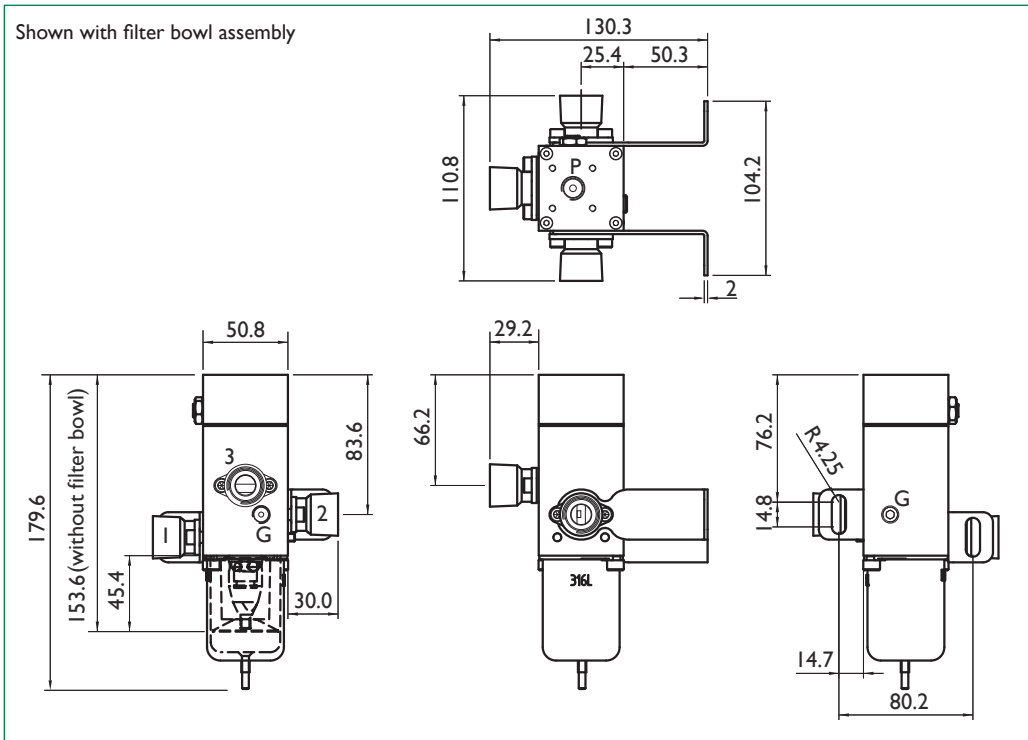
When selecting a product, the applicable operating system design must be considered to ensure safe use. The products function, material compatibility, adequate ratings, correct installation, operation and maintenance are the responsibilities of the system designer and user.

**Quality Assurance**  
All Bifold products are manufactured to a most stringent QA programme to ensure that every product will give optimum performance and reliability. We are third party certified to EN ISO 9001:2000. Functional test certificates, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BSEN 10204.3.1.B where available. We reserve the right to make changes to the specifications and design etc., without prior notice.

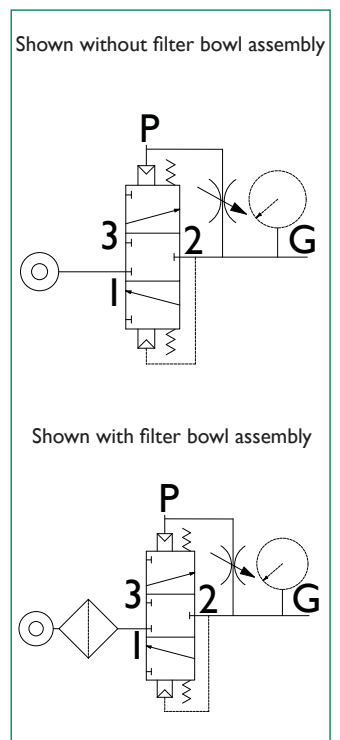
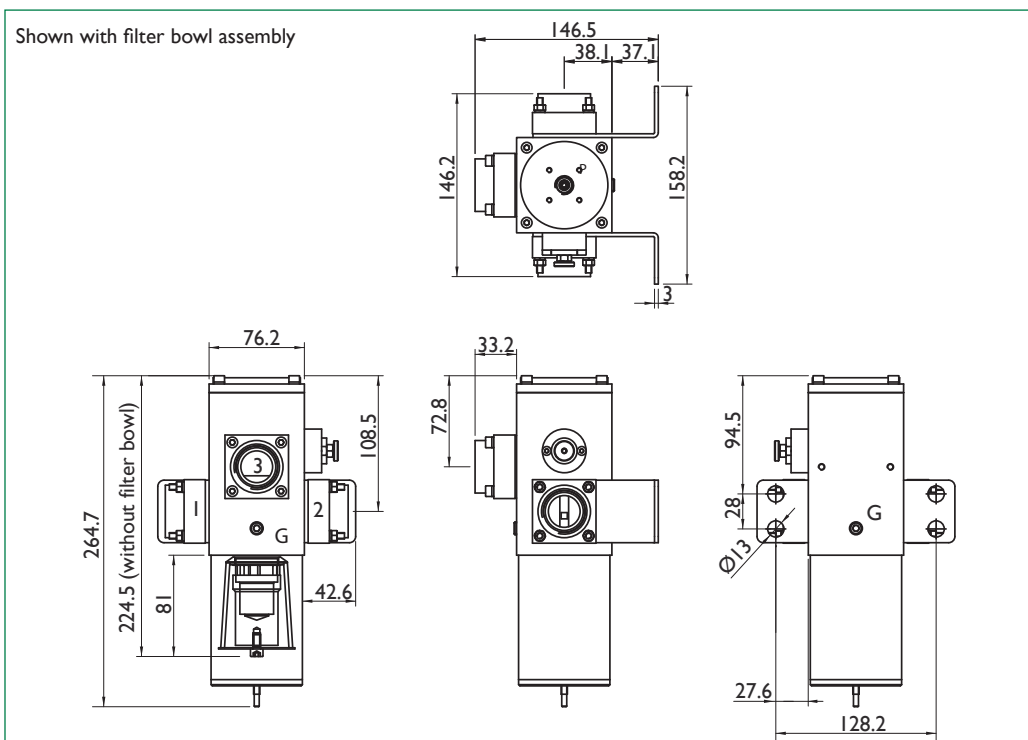
Dimension Drawings



1/2" Volume Booster & Filter Booster



1" Volume Booster & Filter Booster



[www.bifold.co.uk](http://www.bifold.co.uk)

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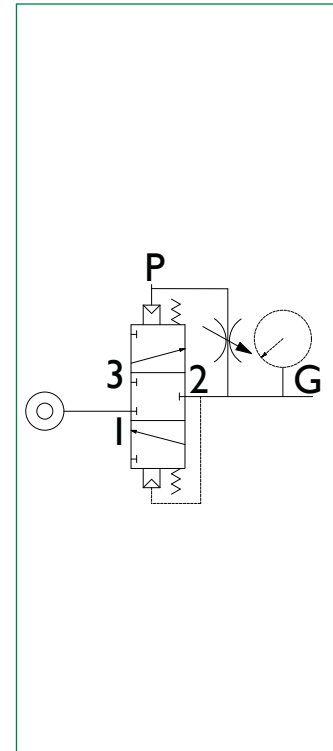
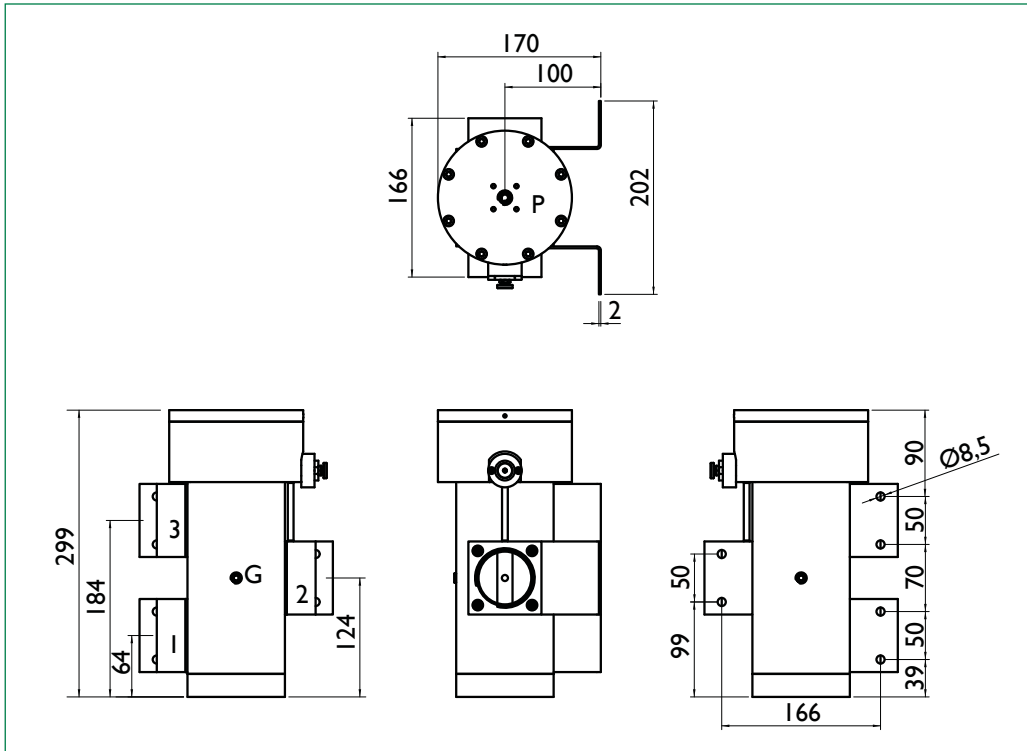
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Bifold  
is a member of the  
Bifold Group  
of companies

Dimension Drawings



2" Volume Booster



CAD Files Available

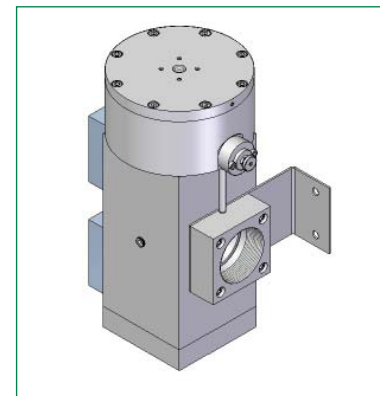
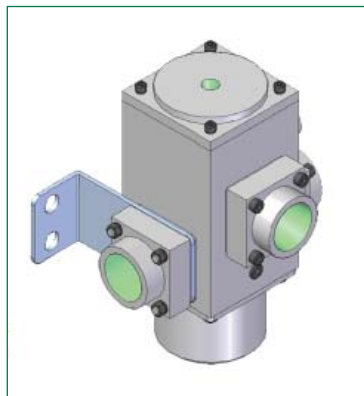
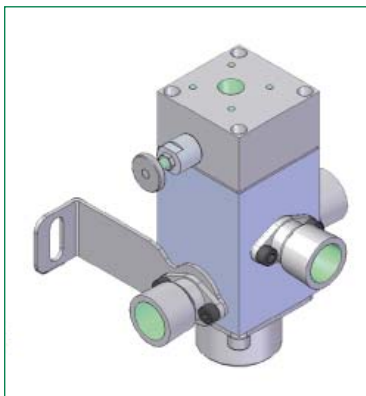
The Bifold technical team can supply CAD Files compatible with the customers CAD System in 2D and 3D formats. This enables Design Engineers to insert one of our images or drgs into their file, turning design into a less time consuming exercise.

Drgs available are:-

2D CAD Drawing in DWG format. Examples of 2D images shown on page 3 and above.

3D CAD Drawing in STEP format. Examples shown below.

Other formats are available, please contact our Technical Office for more information.



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Overview

Product Description

The Bifold Volume Booster converts a low volume pressure signal into a 1:1 ratio high volume output. It is specifically designed for both modulating and "on - off" pilot pressure signals.

Operating Principles

When a low volume pilot pressure signal of 2 to 10 bar g is applied to the sensing port (P), the main valve assembly opens to allow high volume flow from the main inlet port (1) to the outlet port (2). When the sensing assembly detects that the outlet pressure is equal to the pilot pressure, the main valve moves to the 'all ports blocked' rest position and will remain in this position until there is a change in the pilot pressure or outlet pressure.  
 If the sensing head detects that the outlet is higher than the pilot pressure, the high flow exhaust opens to vent the excess pressure.  
 If the sensing head detects that the outlet pressure is too low, the main valve opens to recharge the system to the correct 1:1 ratio pressure.

Technical Data

Material grades - stainless steel 316L body as standard.  
 The springs are manufactured to BS2056, from 302S26 stainless steel as standard or Inconel X-750 (sour gas service).  
 The pilot port is 1/4" NPT.  
 Main ports are available as 1/4", 3/8" & 1/2" NPT sizes (1/2" Volume Booster) and 3/4" & 1" NPT sizes (1" Volume Booster) and 1 1/2" & 2" NPT sizes (2" Volume Booster).  
 Main valve seals are supplied in Viton as standard. Low temperature nitrile and silicone/fluorosilicone seals are available for arctic service.  
 Sensing head seals are supplied in PTFE encapsulated silicone as standard.  
 Fasteners are 18/10 grade stainless steel; equivalent to 316 grade steels.  
 Mounting brackets are supplied as standard.  
 Two gauge ports are 1/8" NPT. One port is plugged as standard.  
 Accuracy is within 5% (valve to pilot pressure).  
 Operating medias are air, natural gas, inert gases and sweet and sour gases.  
 Maximum valve inlet pressure is 15 bar g.  
 Operating temperature range -20°C to +180°C with viton seals as standard.  
 Operating temperature range -50°C to +40°C with low temperature nitrile/silicone seals.  
 Pilot pressure and outlet pressure range from 2 to 10 bar g.

Flow Capacity Cv Table

VOLUME BOOSTER FLOW CAPACITY Cv					
Volume Booster Conventional Schematic			Filter Booster		
Booster Size	Output	Exhaust	Booster Size	Output (5 bar, effective Cv)	Exhaust
1/2"	3.2	3.2	1/2"	9.3	3.2
1"	11.0	11.0	1"	29.0	11.0
2"	50.0	50.0			

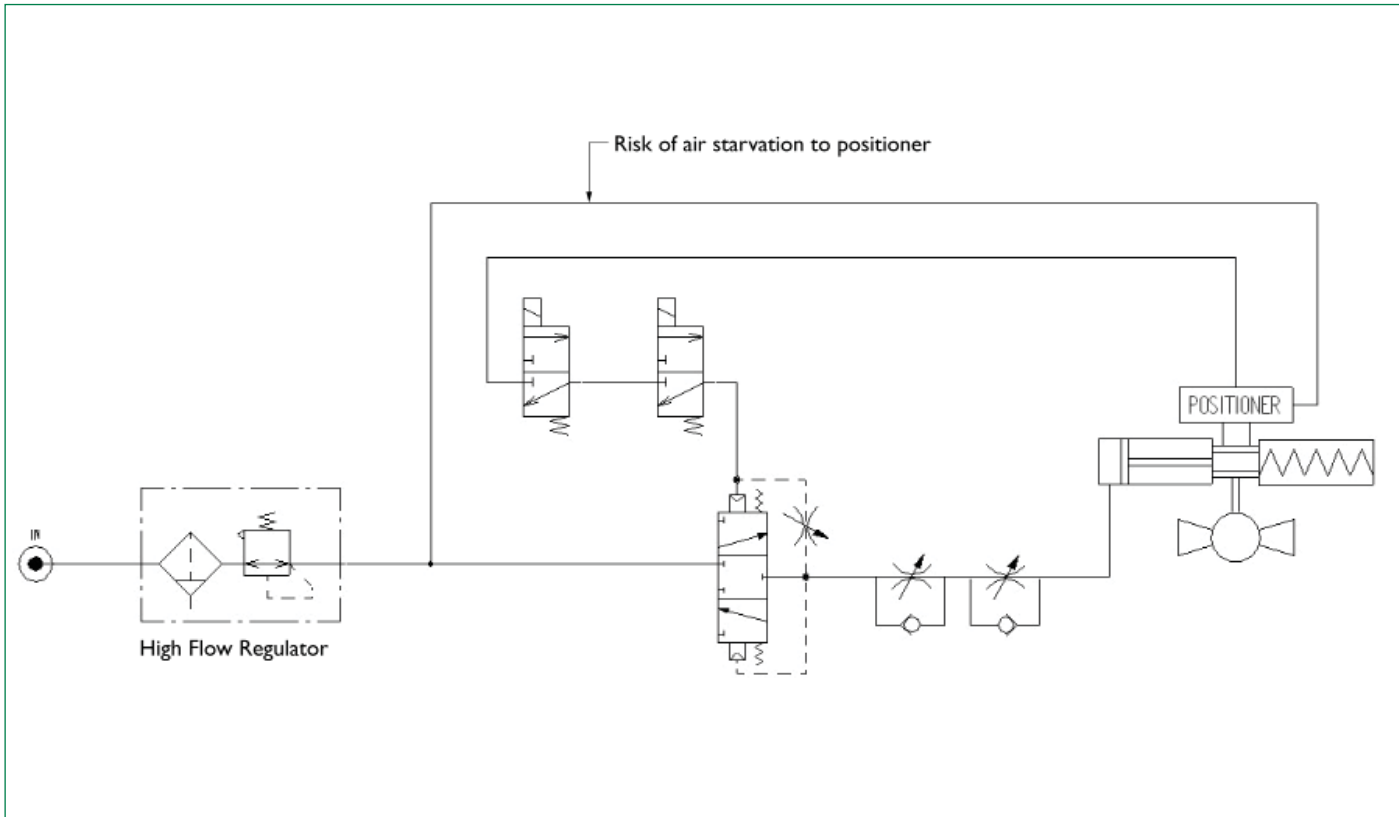
Please see opening and closing time tables on page 10.

Product Options Available

Available with both manual and auto-drain filter bowl assemblies to combine a Filter Regulator and Volume Booster as one unit. A wide range of accessories are available, these include Check Valves and Flow Control Valves etc.  
 Pilot solenoid valve operated options available.  
 Pilot port available as BSPP and BSPT options.  
 Main ports available as BSPP & BSPT options.  
 Two gauge ports available as 1/4" NPT option or BSPP & BSPT.



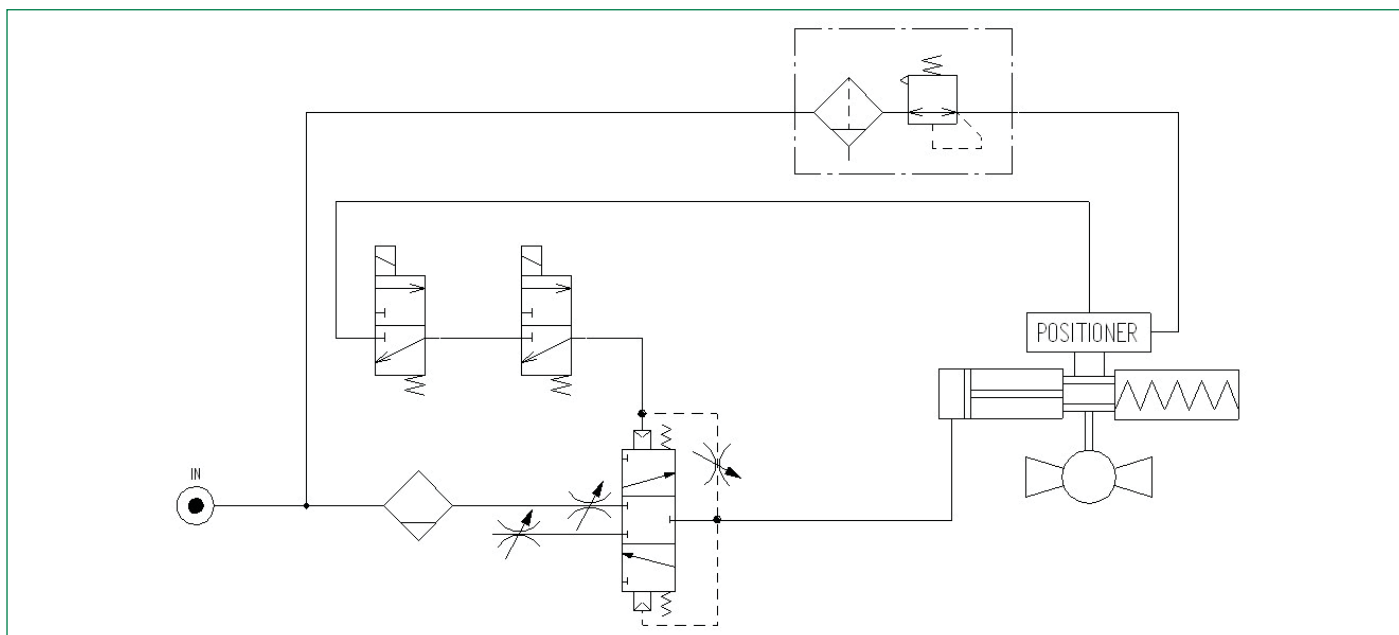
Conventional Setup



Bifold Simplified System Offers:-

- Up to 8 x faster opening.
- Up to 16 x faster closing.
- No risk of Positioner trip.
- Simple set up.
- Logic of circuit is identical for all actuator sizes. Only change required is to the size of the Filter Booster!

See Catalogue 03:- AXIS® Manifold System.  
See Catalogue 13:- Model HIPEX Series.



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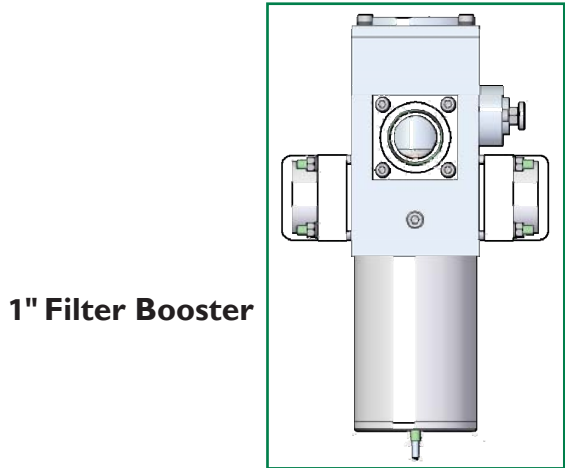
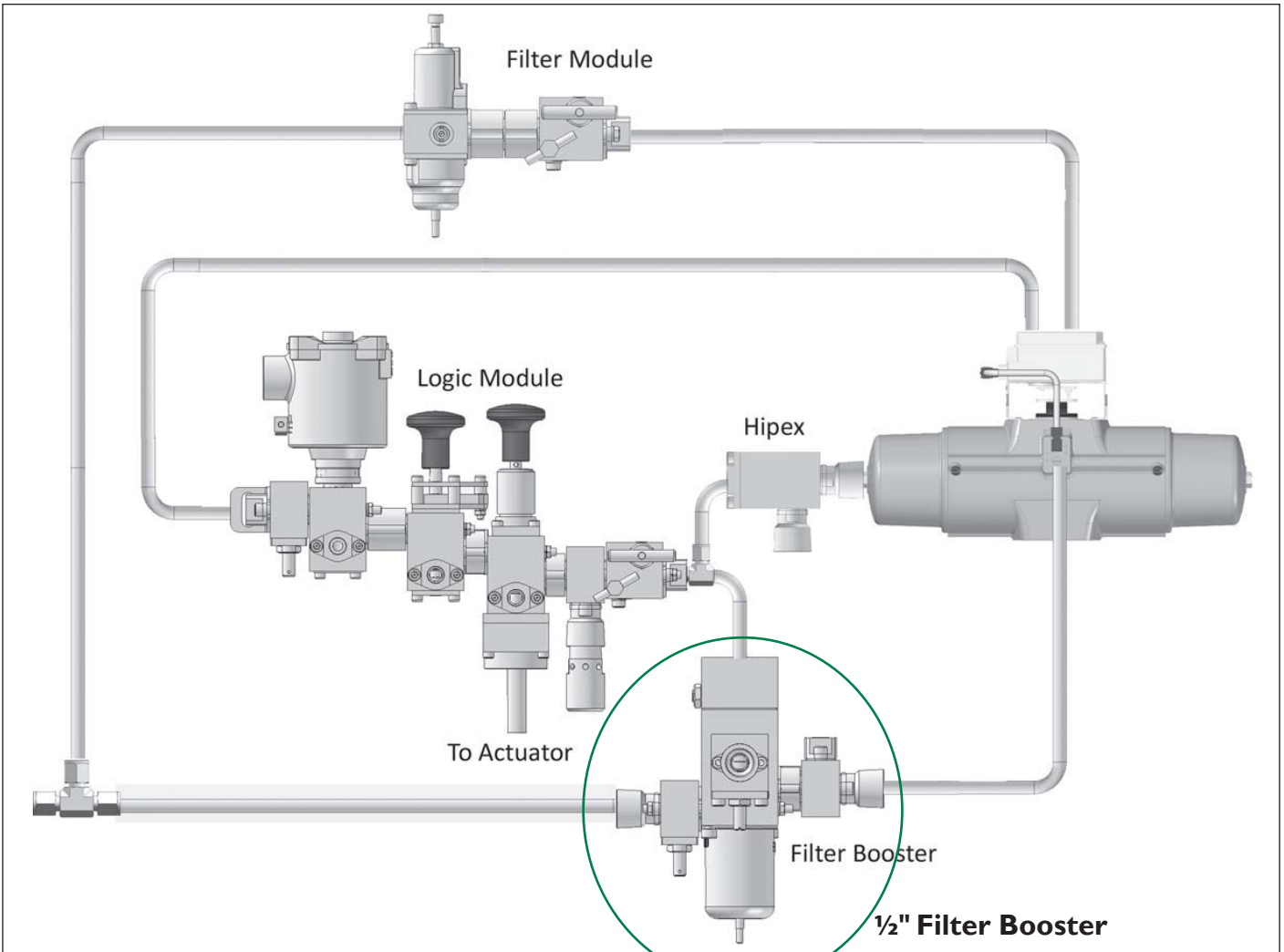
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Simplified Circuits



Positioner Circuits Simplified

The circuit below shows a 1/4" Filter Module and a 1/4" Logic Module, within a standard circuit, along with a 1/2" HIPEX valve and 1/2" Filter Booster. For larger circuits, simply select a larger Filter Booster. If required, change the HIPEX valve where applicable.



**Positioner Circuits - Simplified**  
For larger circuits, simply select a larger Filter Booster.

Traditional System

Conventional Tubed System

Conventional Volume Boosters have a much reduced venting Cv compared to inlet Cv; consequently multiple units are often required to achieve fast actuator closing times.

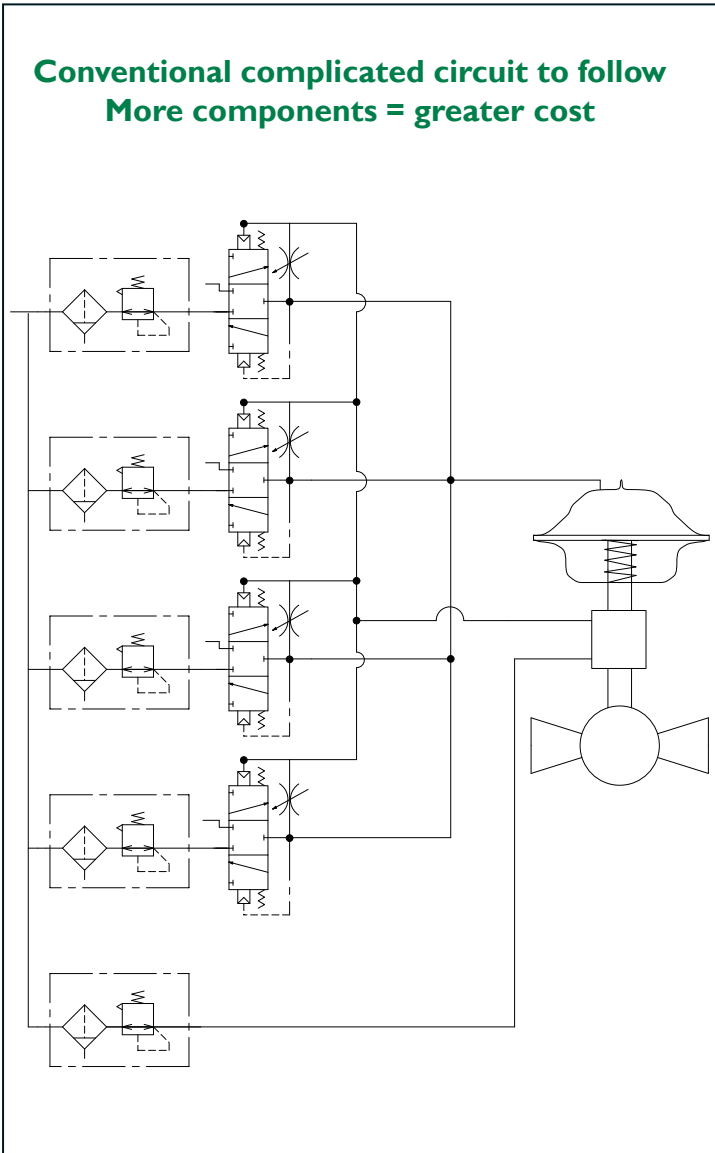
The picture below shows a traditionally tubed system with multiple Filter Regulators and Multiple Volume Boosters.

**Disadvantages with this system are:-**

**This system = Slower Response Times  
Requires Balancing of Filter Regulators**

- No speed control.
- Untidy and complex tubing/extra fittings.
- Complicated installation.
- More leakage points.
- Requirement to balance Filter Regulators.
- Increase in overall system cost.

**Improve System Design - Use Bifold Volume Boosters with a high venting Cv**



**Accuracy of information**  
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Booster System



Bifold Filter Booster System

The picture below shows a simple tubed system with ONE Bifold Filter Regulator and ONE Bifold Volume Booster.

**Advantages with this system are:-**

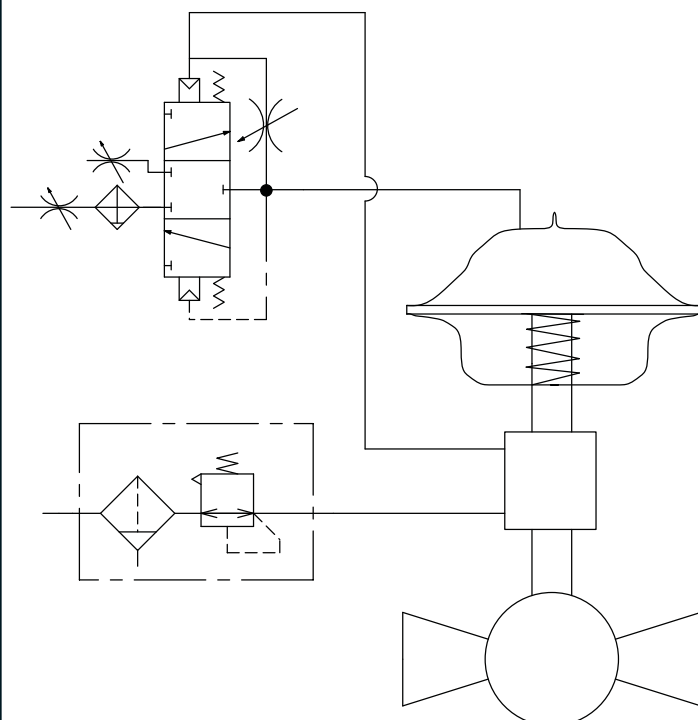
**This system = Faster Response Times  
Simple to Install**

- Optional inlet and venting speed control.
- Faster acting than 4 Filter regulators & 4 Boosters.
- Tidy and simple tubing/reduced fittings.
- Sizes available up to 2".
- Simple to install.
- Lowest overall system cost.

**LOWEST COST SOLUTION**



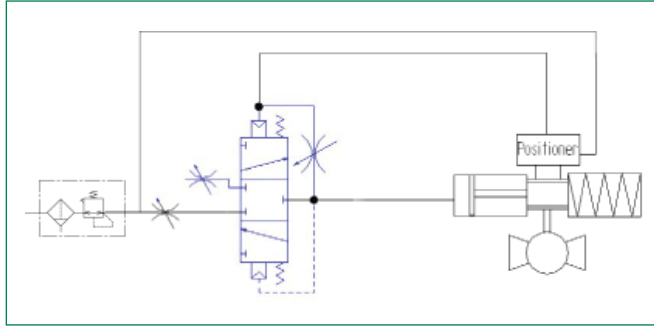
**Simple circuit to follow  
Fewer components = Lowest cost solution**



## Selection Chart

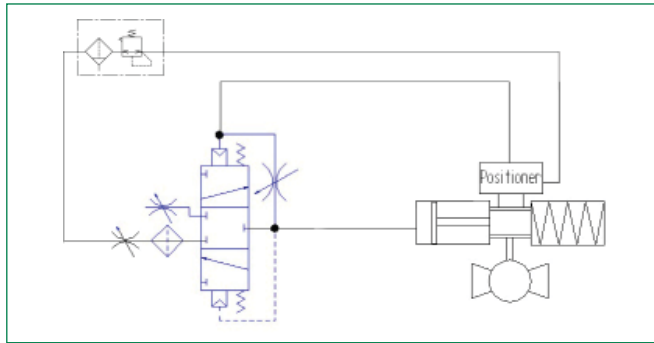
### 1/2" & 1" Volume Booster Opening and Closing Times

**50 litre actuator** - where stroke completes at between 1.9 bar and 2.3 bar. Set pressure 5 bar. Upstream pressure greater than 10 bar.



**CONVENTIONAL SCHEMATIC** (Filter Regulator and Booster on the flow line)

Booster Size	Pressure (Bar)	ESD Open Time (secs)	ESD Closing Time (secs)
1/2"	5	8.9	8.8
1"	5	2.8	2.5



**FILTER BOOSTER** (Filter Regulator off the flowline)

Booster Size	Pressure (Bar)	ESD Open Time (secs)	ESD Closing Time (secs)
1/2"	4	4.0	7.9
1/2"	5	3.1	8.8
1/2"	6	2.3	9.3
1"	4	1.1	1.9
1"	5	1.2	2.5
1"	6	0.8	3.1

### VBP Selection Chart - Ordering Example

VBP	Volume Booster piston type	Standard service stainless steel	Model Code
04	1/4" NPT	16 1" NPT	Port Sizes
06	3/8" NPT	24 1 1/2" NPT	
08	1/2" NPT	32 2" NPT	
12	3/4" NPT		
II	Ratio pilot pressure to valve pressure (I:I)		Ratio
V	Viton (standard)		Seal Materials
AL	Fluorosilicone (arctic service)		
AD	Auto-drain*		Options
MD	Manual-drain*		
X4	40-50 Micron element*		Option
L115	No brackets		Option
L116	Knurled drain screw		Option
XX	Revision number (current revision to be advised on receipt of order).		Revision Number
<b>VBP-08 - II - AL - MD - X4 - L115 - L116 - 02</b>			<b>Ordering Example</b>

\*Filter booster only. For alternative filter micron ratings please contact our office for details.

1 1/2" & 2" Volume Booster presently not available as a Filter Booster.

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## HIPEX Series

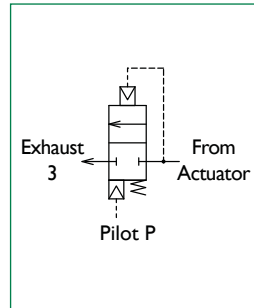


The Volume Booster range can be used in conjunction with the NEW Model HIPEX Series high flow, 2/2 exhaust valve range. See Catalogue 13:- Model HIPEX Series.

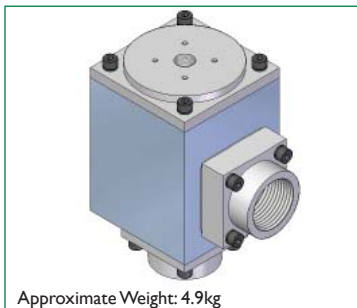
## 1/2" HIPEX Valve



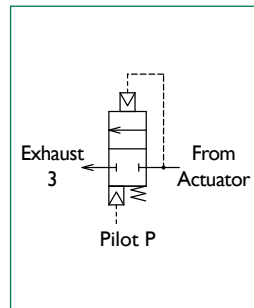
Approximate Weight: 0.8kg



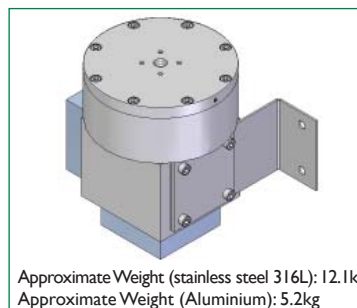
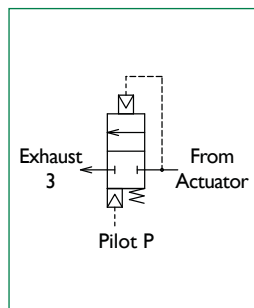
## 1" HIPEX Valve



Approximate Weight: 4.9kg



## 2" HIPEX Valve

Approximate Weight (stainless steel 316L): 12.1kg  
Approximate Weight (Aluminium): 5.2kg

- Very high controlled exhaust flow, up to twice the equivalent Quick Exhaust Valve.
- Exhaust flow is proportional to the differential between inlet and pilot pressures.
- The valve is automatic in operation and requires no adjustment.
- The valve operates on a 1:1 pilot pressure to valve pressure ratio at pressures between 2 and 10 bar g.
- Specifically designed for high flow valve actuator exhausting when accurate partial close testing is required.
- For very fast valve actuator closing, multiple HIPEX units can be fitted to the system.
- Extremely compact modular design.
- Sensing pilot / valve seat assembly : Patent Pending.
- Soft seat design.
- Finely balanced design to minimise the impact of both downstream and upstream pressure variations.

## Benefits of using the HIPEX Series

The Bifold HIPEX Valve is a 2-way, normally closed directional control valve with a venting flow rate proportional to the differential pressure between the inlet and the pilot signal pressures. It is specifically designed for both modulating and "on-off" pilot pressure signals.

When the pilot pressure signal is equal to or above the main valve inlet pressure, the valve exhaust port remains closed.

**Partial close testing function**

When the pilot pressure falls below the main valve inlet pressure, the valve quickly exhausts the excess pressure until both the valve and pilot pressures are again equal, then the exhaust port closes.

**Pressure Relief Function**

If the main valve inlet pressure increases above the pilot pressure, the valve automatically exhausts the excess valve actuator pressure.

**Optional**

The HIPEX valve can be supplied with two exhaust ports. This provides an additional advantage that one exhaust port can be connected to the valve actuator for "closed loop" systems that reduce the need for additional valves, fittings and labour time. The HIPEX can also be supplied with exhaust speed controls fitted as a complete solution.

Ideal for operation in conjunction with the " Bifold Volume Booster" and 'AXIS'<sup>®</sup> valve actuator manifold ranges.



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## High Speed Exhaust Valve Range Model HIPEX Series



### Superior Performance Throughout the Full Operational Range

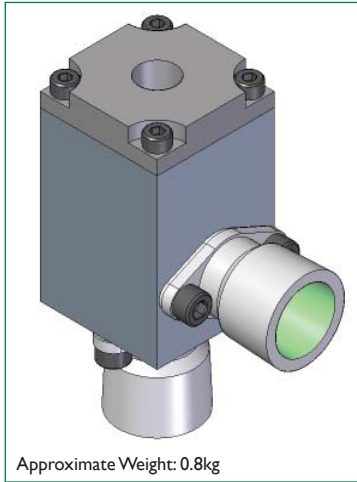
-  SIL 3 Third Party Certified
- High Flow
- Additionally, Functions as a Pressure Relief Valve
- Arctic Service Options
- Sensing Pilot / Valve Seat Assembly: Patent Pending
- Compact Modular Design
- 316L Stainless Steel or Aluminium

Product Features

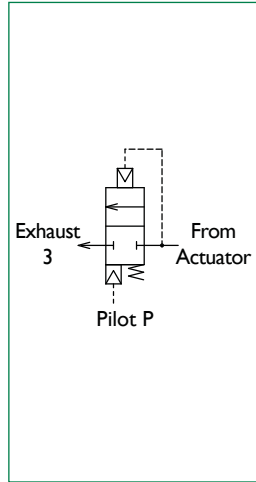


Product

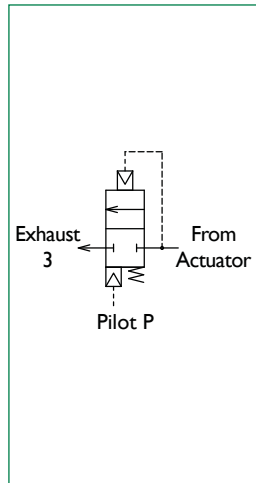
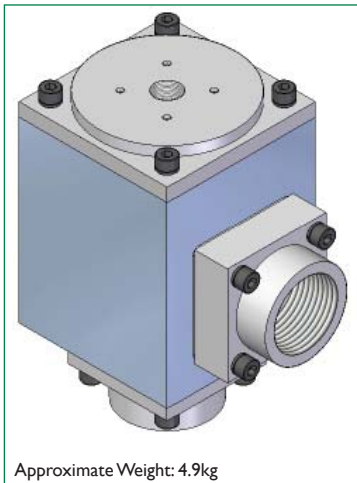
½" HIPEX Valve



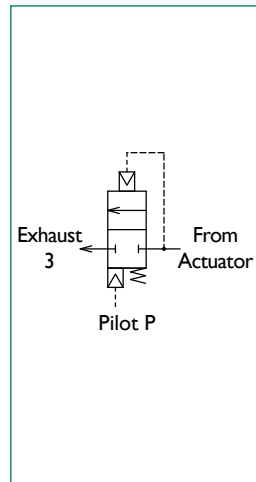
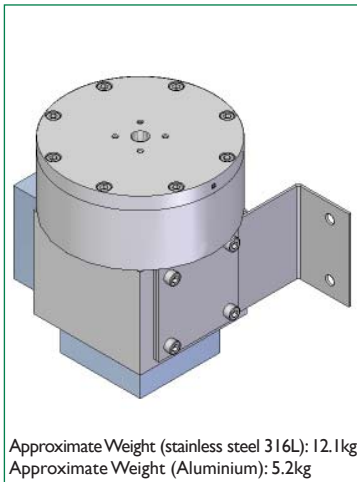
Schematic



1" HIPEX Valve



2" HIPEX Valve



- Very high controlled exhaust flow, up to twice the equivalent Quick Exhaust Valve.
- High flow pilot operated Quick Exhaust Valve with automatic pressure sensing and pressure relief capability.
- Exhaust flow is proportional to the differential between inlet and pilot pressures.
- The valve is automatic in operation and requires no adjustment.
- The valve operates on a 1:1 pilot pressure to valve pressure ratio at pressures between 2 and 10 bar g.
- Specifically designed for high flow valve actuator exhausting when accurate partial close testing is required.
- For very fast valve actuator closing, multiple HIPEX units can be fitted to the system.
- Extremely compact modular design.
- Sensing pilot /valve seat assembly : Patent Pending.
- SIL 3 third party certified to IEC 61508 Parts 1 & 2. Consult Bifold.
- Additionally functions as a pressure relief valve.
- Soft seat design.
- Finely balanced design to minimise the impact of both downstream and upstream pressure variations.
- Service (without pressure applied) can be carried out without removal from the large diameter piping.

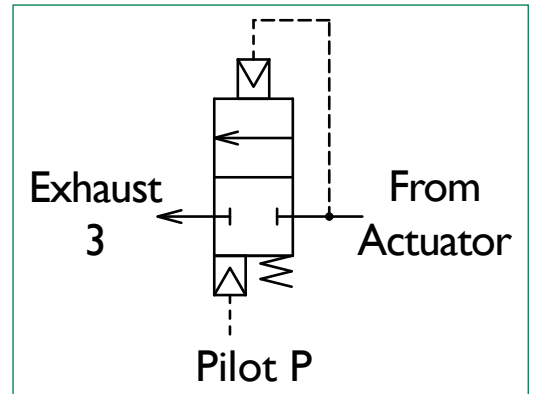
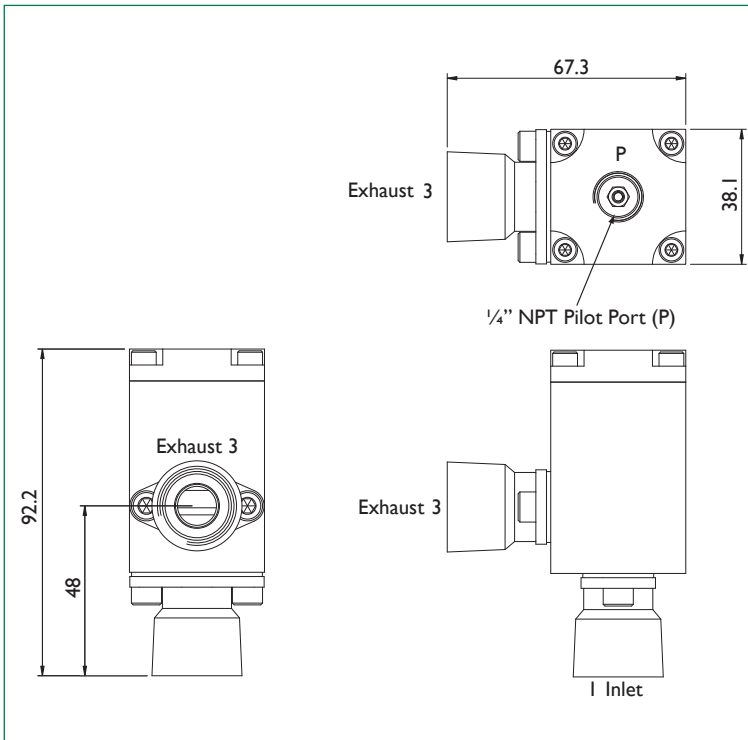
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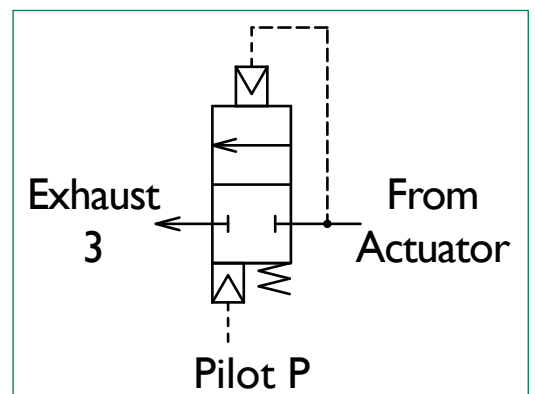
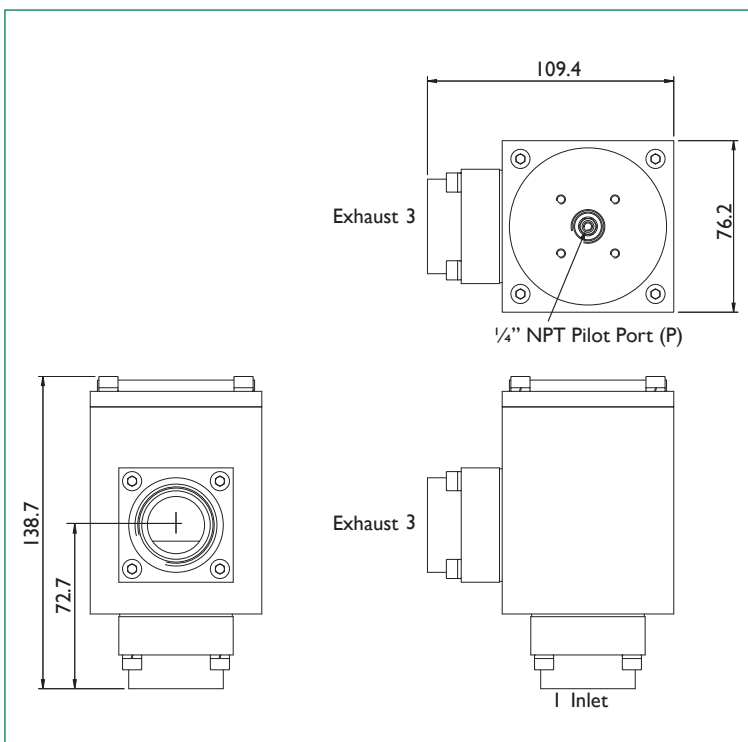
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Dimension Drawings

1/2" HIPEX Valve



1" HIPEX Valve



### Product Description

The Bifold HIPEX Valve is a 2-way, normally closed directional control valve with a venting flow rate proportional to the differential pressure between the inlet and the pilot signal pressures. It is specifically designed for both modulating and "on-off" pilot pressure signals.

### Operating Principles

When the pilot pressure signal is equal to or above the main valve inlet pressure, the valve exhaust port remains closed.

#### Partial close testing function

When the pilot pressure falls below the main valve inlet pressure, the valve quickly exhausts the excess pressure until both the valve and pilot pressures are again equal, then the exhaust port closes.

#### Pressure Relief Function

If the main valve inlet pressure increases above the pilot pressure, the valve automatically exhausts the excess valve actuator pressure.

#### Optional

The HIPEX valve can be supplied with two exhaust ports. This provides an additional advantage that one exhaust port can be connected to the valve actuator for "closed loop" systems that reduce the need for additional valves, fittings and labour time. The HIPEX can also be supplied with exhaust speed controls fitted as a complete solution. Ideal for operation in conjunction with the " Bifold Volume Booster" and 'AXIS'® valve actuator manifold ranges.

### Technical Data

Material grades - stainless steel 316L body as standard.  
 Standard springs are manufactured from 302S26 stainless steel to BS2056 (alternatively from Elgiloy for sour gas service).  
 The pilot port Ⓟ is 1/4" NPT.  
 Main ports are available as 1/4", 3/8" & 1/2" NPT sizes (1/2" HIPEX Valve) and 3/4" & 1" NPT sizes (1" HIPEX Valve).  
 2" HIPEX Valve is supplied with 2" or 1 1/2" NPT port sizes.  
 Main valve seals are supplied in Viton as standard. Fluorosilicone seals are available for arctic service.  
 Sensing head seals are supplied in PTFE encapsulated silicone as standard.  
 Fasteners are 18/10 grade stainless steel; equivalent to 316 grade steels.  
 Accuracy is within 5% (valve to pilot pressure).  
 Operating medias are air, natural gas, inert gases and sweet and sour gases.  
 Maximum valve inlet pressure is 20 bar g.  
 Operating temperature range -20°C to +180°C with viton seals as standard.  
 Operating temperature range -60°C to +180°C with fluorosilicone seals.  
 Pilot pressure and outlet pressure range from 2 to 10 bar g.

### Flow Capacity Cv Table

HIPEX FLOW CAPACITY Cv	
HIPEX Valve	
HIPEX Size	Exhaust
1/2"	3.2
1"	11.0
2"	50.0

**With 2 exhaust ports, flow is increased by approximately 30%.**

Please see closing time table on page 5.

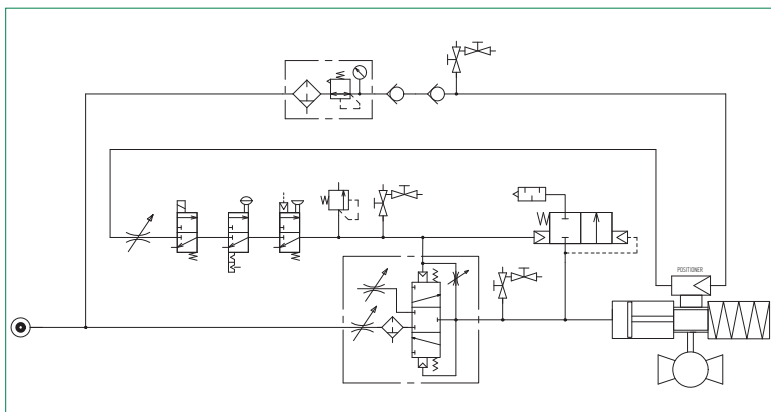
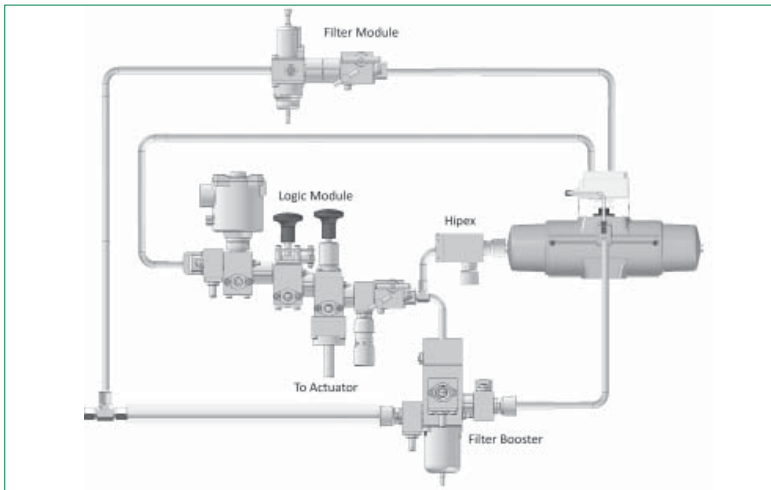
### Product Options Available

Pilot port available as BSPP and BSPT options.  
 Main ports available as BSPP & BSPT options.

**Selection Chart**

**1/2", 3/4", 1" & 2" HIPEX Valve Closing Times**

**50 litre actuator** - where stroke completes at between 1.9 bar and 2.3 bar. Set pressure 5 bar. Upstream pressure greater than 10 bar.



HIPEX SCHEMATIC (HiPEX Valve fitted directly onto the actuator)		
HIPEX Valve Size	Pressure (Bar)	ESD Closing Time (secs)
1/2"	5	4.2
3/4"	5	2.0
1"	5	1.3
2"	5	0.7*

Table shows results for the HIPEX Valve fitted onto a 50 litre actuator.  
 \* Full 2" exhaust path (time limited by actuator damping).

Alternatively, 3 x 1" HIPEX Valves fitted onto a 178 litre actuator resulted in a closing time of 1.7 secs.

See Catalogue 03:- AXIS® Manifold System.  
 See Catalogue 13:- Volume Booster Model VBP Series.

**HIPEX Selection Chart - Ordering Example**

HIPEX Valve	Standard service stainless steel	Model Code
04	1/4" NPT	Port Sizes
06	3/8" NPT	
08	1/2" NPT	
12	3/4" NPT	
16	1" NPT	
24	1 1/2" NPT	
32	2" NPT	
II	Ratio pilot pressure to valve pressure (1:1)	Ratio
V	Viton (standard)	Seal Materials
AL	Fluorosilicone (arctic service)	
E	Single Exhaust	Exhaust Configuration
EE	Double Exhaust	
EN	Double Exhaust with one needle flow control for closed loop application	
XX	Revision number (current revision to be advised on receipt of order).	Revision Number
<b>HIPEX - 08 - II - V - E - XX</b>		<b>Ordering Example</b>



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Pneumatic + Hydraulic Accessory Valves

# Flow Control Valves / Cylinder Plug Valves

upto 690 bar

Superior performance  
throughout the full  
operational range

## Features:

- 316L Stainless steel
- Arctic Service option to -60°C
- NACE MR-01-75 option
- Flow control through 6 full turns



## HYDRAULIC FLOW CONTROL

Reliability and innovation in directional control valves

### MATERIALS OF CONSTRUCTION

All valve bodies:-	stainless steel 316L
Internal components:-	stainless steel 316L, CA104 Aluminium Bronze
Springs:-	stainless steel 302S26 or Inconel for H2S service
Seals:-	nitrile (standard). Alternative elastomers available for extreme conditions.

### STANDARD NON SHUT-OFF ORIFICE SIZES:

1/4" (fine)	-	$\varnothing 0.3$ to $0.5$ mm = $0.071$ mm <sup>2</sup> to $0.192$ mm <sup>2</sup> / $0.0001$ in <sup>2</sup> to $0.0003$ in <sup>2</sup>
1/4" (std)	-	$\varnothing 0.4$ = $0.126$ mm <sup>2</sup> / $0.0002$ in <sup>2</sup>
3/8"	-	$\varnothing 0.5$ = $0.196$ mm <sup>2</sup> / $0.0003$ in <sup>2</sup>
1/2"	-	$\varnothing 0.9$ = $0.64$ mm <sup>2</sup> / $0.0010$ in <sup>2</sup>
3/4"	-	$\varnothing 1.1$ = $0.95$ mm <sup>2</sup> / $0.0015$ in <sup>2</sup>
1"	-	$\varnothing 1.25$ = $1.23$ mm <sup>2</sup> / $0.0019$ in <sup>2</sup>

### TEMPERATURE RANGE:

See elastomer options

### MEDIA:

Mineral oils, water based fluids, methanol, gases (others on request)

## NEEDLE TYPE

### SELECTION CHART

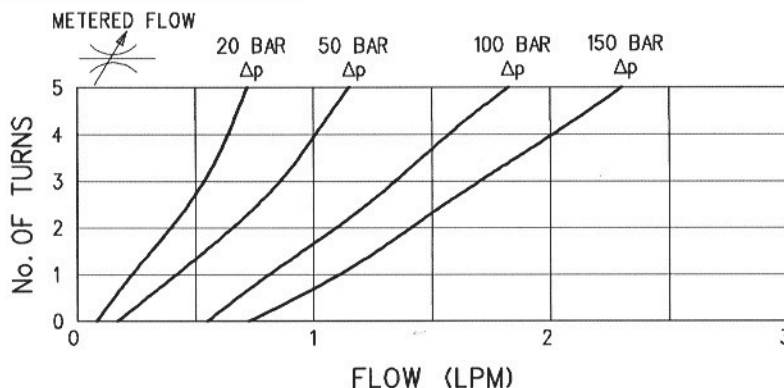
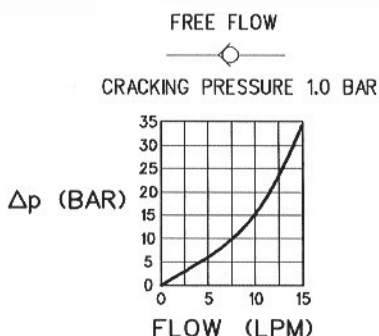
FCV		Model Code
<b>3</b>	Uni-directional	Configuration
<b>4</b>	Bi-directional	
<b>0</b>	non shut off	Metering
<b>1</b>	shut off	
<b>0</b>	fine metering (1/4 only)	Connections
<b>1</b>	standard metering	
<b>2</b>	coarse metering (1/2, 3/4 & 1 only)	
<b>3</b>	extra coarse metering (3/4 & 1 only)	
<b>2</b>	1/4" NPT	Maximum Working Pressure
<b>3</b>	3/8" NPT	
<b>4</b>	1/2" NPT	
<b>6</b>	3/4" NPT	
<b>8</b>	1" NPT	
<b>04</b>	270 bar (3/4, 1)	
<b>05</b>	345 bar (1/4, 3/8 1/2)	
<b>10</b>	690 bar (1/4 only)	Gas Service (14 bar minimum)
<b>02</b>	172 bar (3/4, 1)	
<b>03</b>	207 bar (1/4, 3/8, 1/2)	
<b>06</b>	414 bar (1/4 only)	
<b>S</b>	nitrile (standard) -30°C to +130°C	O-Ring Material
<b>V</b>	viton -20°C to +180°C	
<b>A</b>	flourosilicone -50°C to +40°C	
<b>K6</b>	BSPP connections	Options
<b>PM</b>	panel mount	
<b>SM</b>	side mount	
<b>GS</b>	gas service (high pressure)	
<b>H2S</b>	NACE MR-01-75	
<b>TP</b>	tamperproof domed locknut	
<b>FCV 3 0 1 4 / 05 / S - K6</b>		Example Code

Standard hydraulic test fluid:- Marston Bentley HW540.

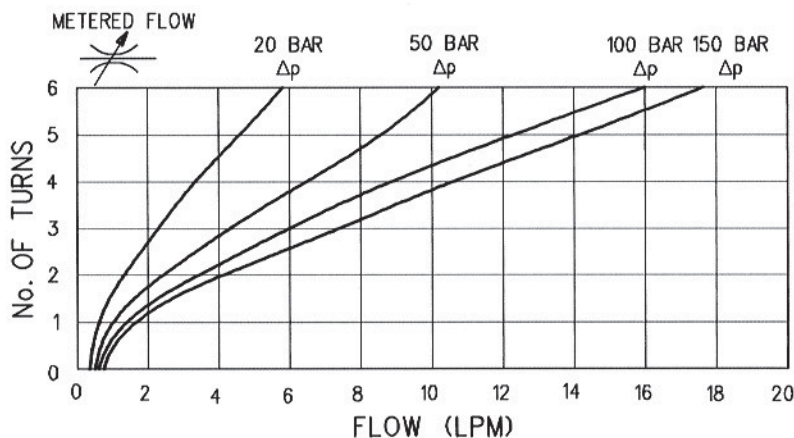
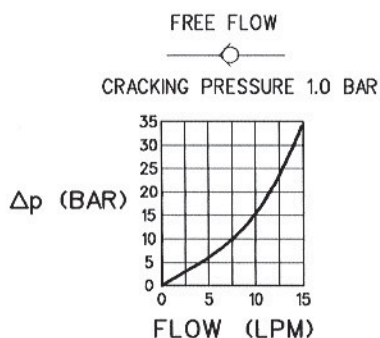
Valves for gas service tested with nitrogen and proof tested with Marston Bentley HW540

## FLOW PERFORMANCE

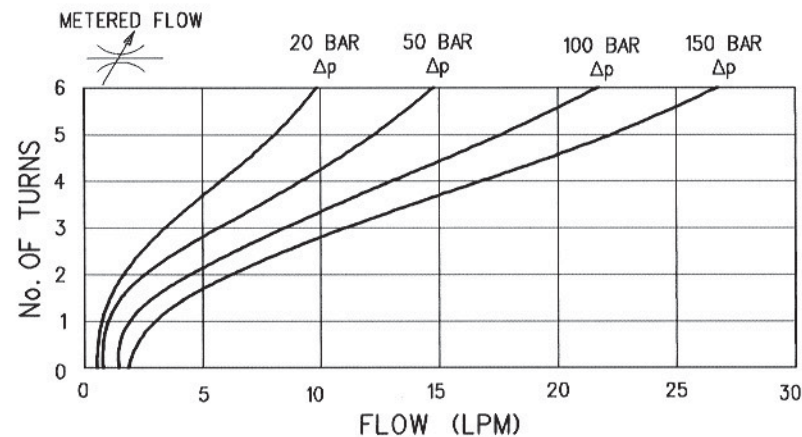
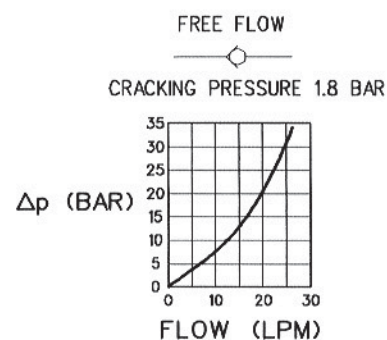
### 1/4" control valves (fine)



### 1/4" control valves (standard)



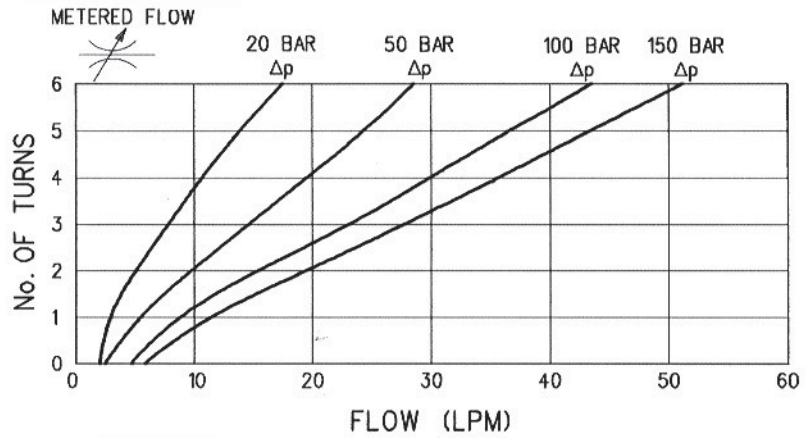
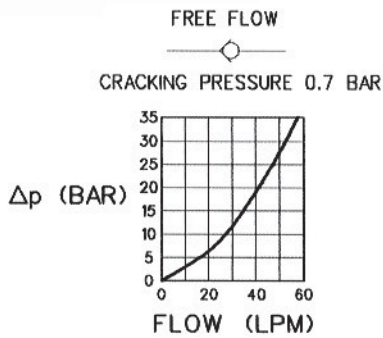
### 3/8" control valves (standard)



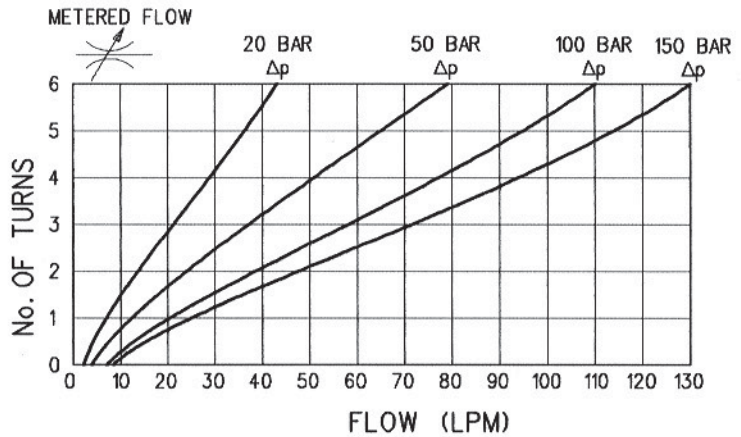
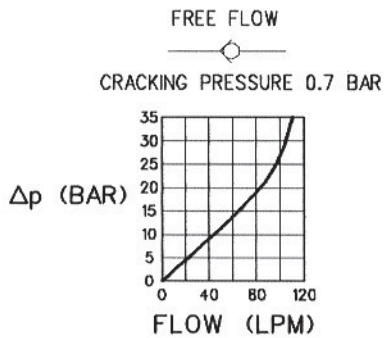
**NOTES:** Flow performance curves are provided as an aid to the correct selection of valve size and are only typical of a valve's performance. (Non- shut-off valves illustrated test fluid mineral oil @ 30cst).



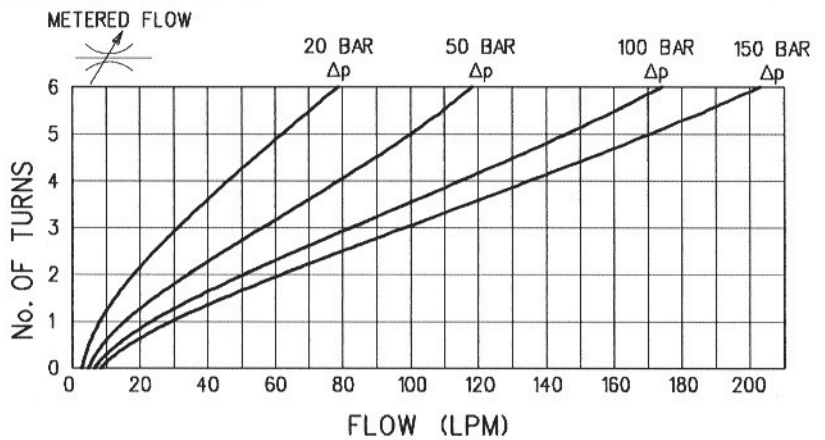
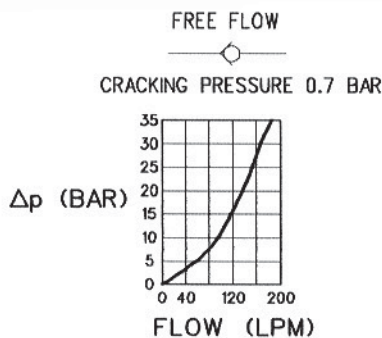
## 1/2" control valves (standard)



## 3/4" control valves (standard)



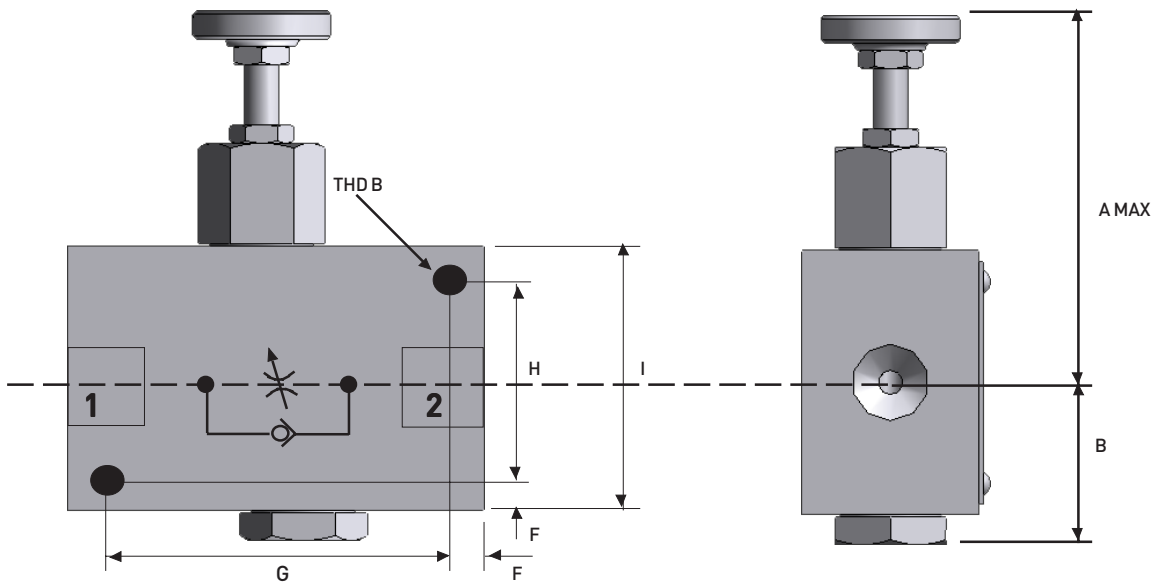
## 1" control valves (standard)



## 3000 SERIES

### Fixing details

#### Side mount option



#### Panel mount option

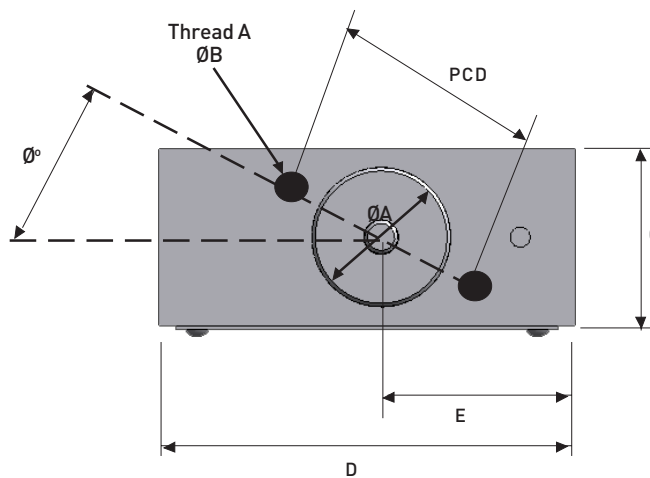


Table of dimensions

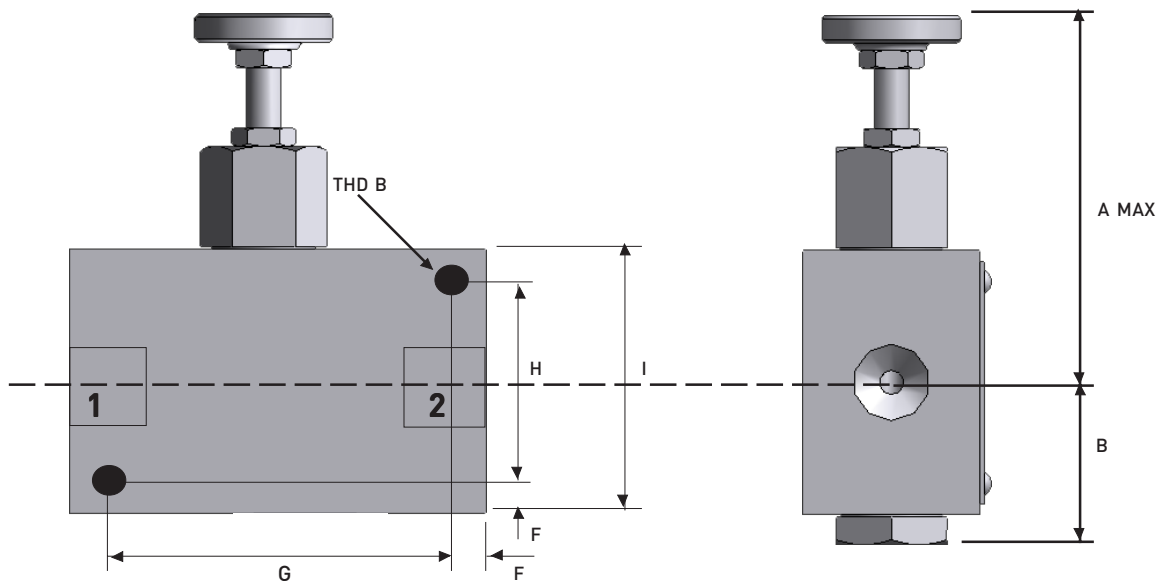
Valve Type	A	B	C	D	E	F	G	H	I	THD A	THD B	Panel Cut-Out				PORTS	WEIGHT
												ØA	ØB	Ø°	PCD		
3x2	52.5	24	25.4	60	32	6	48	26	38.0	M5x7 DP	M5x7 DP	20.5	5.5	30°	30.0	1/4	0.5 KG
3x3	64.5	27	25.4	70	40	6	58	32.5	44.8	M5x7 DP	M5x7 DP	24.5	5.5	25°	35.0	3/8	0.7 KG
3x4	67	34.5	31.75	88	49	7	74	36.8	50.8	M5x7 DP	M5x7 DP	31.0	5.5	30°	42.0	1/2	1.2 KG
3x6	91	50	38.0	97	56	TBA	TBA	TBA	70.0	M5x7 DP	TBA	32.0	5.5	30°	42.0	3/4	2.1 KG
3x8	100	62	44.5	120	69	TBA	TBA	TBA	76.0	TBA	TBA	TBA	TBA	TBA	TBA	1	3.4 KG



## 4000 SERIES Fixing details

Side mount option

Reliability and innovation in directional control valves



Panel mount option

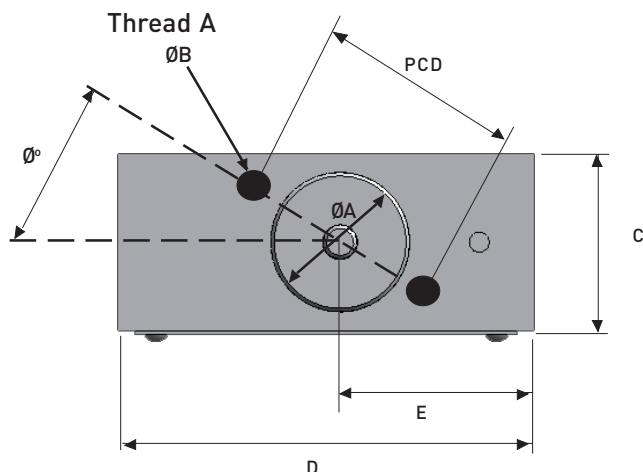


Table of dimensions

Valve Type	Table of dimensions										Panel Cut-Out				PORTS	WEIGHT	
	A	B	C	D	E	F	G	H	I	THD A	THD B	ØA	ØB	Ø°			PCD
4xx2	52.5	19	25.4	60	30	6	48	26	38	M5x7 DP	M5x7 DP	20.5	5.5	30°	30.0	1/4	0.45 KG
4xx3	61.5	19	25.4	63.5	31.8	5	53.5	28.1	38	M5x7 DP	M5x7 DP	24.5	5.5	25°	35.0	3/8	0.55 KG
4xx4	64	22.25	31.75	78	39	6	66.0	32.5	44.5	M5x7 DP	M5x7 DP	31.0	5.5	30°	42.0	1/2	0.95 KG
4xx6	81.5	25.4	38.0	90	45	TBA	TBA	TBA	50.8	TBA	TBA	TBA	TBA	TBA	TBA	3/4	1.45 KG
4xx8	94.0	31.75	44.5	110	55	6	98.0	51.5	63.5	TBA	M6x10 DP	TBA	TBA	TBA	TBA	1	2.65 KG

## CYLINDER PLUG TYPE

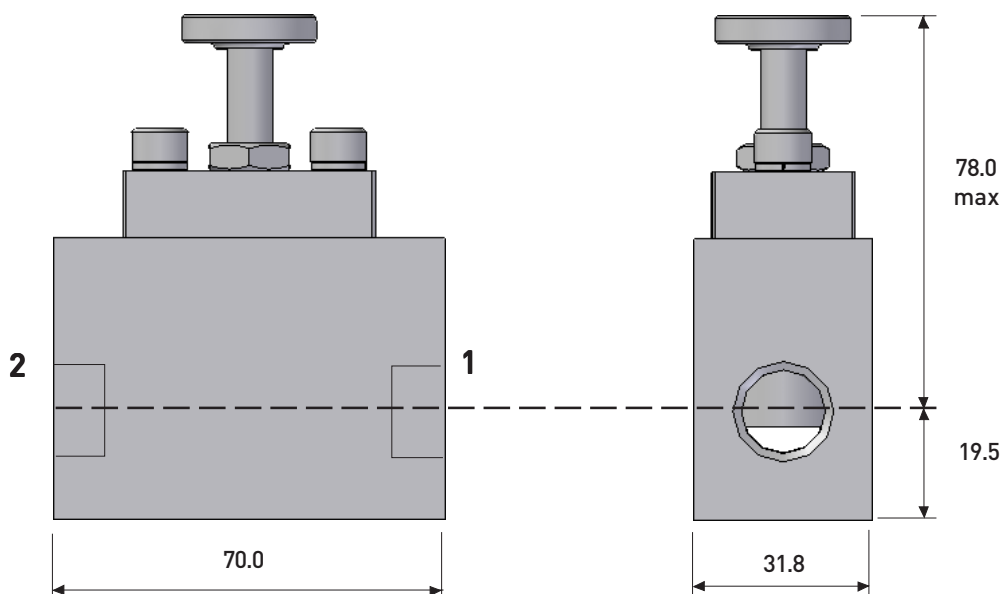
Reliability and innovation in directional control valves

### SELECTION CHART

FCV		Model Code
5	Bi-directional	Configuration
0	non shut off	
1	standard metering	Metering
2	1/4" NPT	Connections
3	3/8" NPT	
4	1/2" NPT	
6	3/4" NPT	
8	1" NPT	
04	270 bar (3/4, 1)	Maximum Working Pressure
05	345 bar (1/4, 3/8, 1/2)	
10	690 bar (1/4 only)	
S	nitrile (standard) -30°C to +130°C	O-Ring Material
V	viton -20°C to +180°C	
A	flourosilicone -50°C to +40°C	
K6	BSP connections	Options
GS	gas service (high pressure)	
H2S	NACE MR-01-75	
TP	tamperproof domed locknut	
FCV 5 0 1 4 / 05 / S - K6		Example Code

Standard test fluid:- Marston Bentley HW540

### FIXING DETAILS



Example Model:- FCV5014/05/S

# PNEUMATIC FLOW CONTROLS NEEDLE VALVES, CYLINDER PLUG VALVES



Reliability and innovation in directional control valves

## TECHNICAL DATA

### OPERATING MEDIA

- Air, sweet and sour gas, hydraulic oil

### MECHANICAL CONSTRUCTION

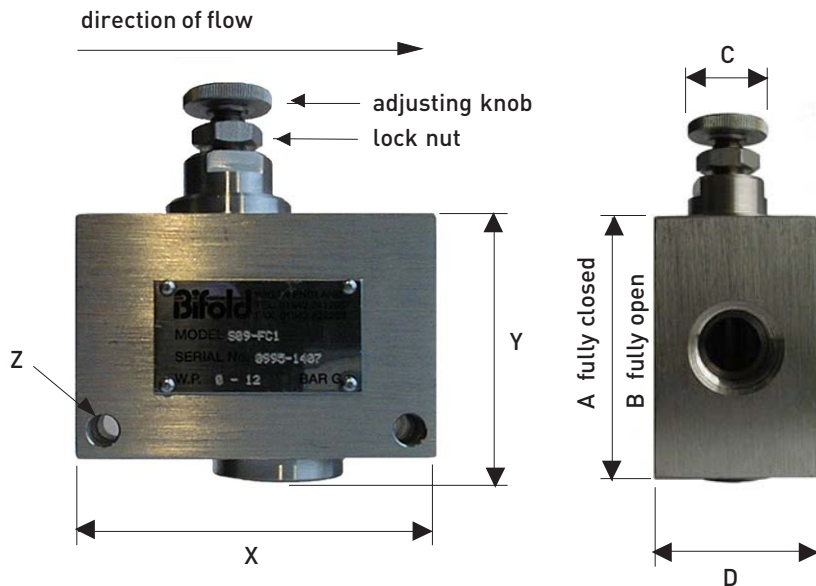
- Body:- stainless steel 316L
- Fasteners:- Metric A4 18/10 316 grade stainless steel
- Seals:- Viton (standard). Alternative elastomers available for extreme conditions
- Springs:- stainless steel 316 S42
- Hand buttons stainless steel 316L

### OPERATING PRESSURE

- 0-12 bar standard

### TEMPERATURE RANGE:

See selection chart model code



Details	1/4"	3/8" & 1/2"	3/4"
• Weight	0.207Kg	0.49Kg	
• X	51	74	85
• Y	42	56	
• Z		6.3 dia	
• A	78	85	113
• B	71	90	118
• C	20 dia	20 dia	20 dia
• D	25.4	32	41.3

## NEEDLE TYPE SELECTION CHART:

<b>S</b>	standard service	(-20°C to +180°C)	Model Code
<b>SE</b>	standard service (engineered)	(-20°C to +180°C) - 1/4" NPT ONLY	
<b>AS</b>	arctic service	(-60°C to +40°C)	
<b>06</b>	1/4" NPT	Configuration	
<b>09</b>	3/8" NPT		
<b>12</b>	1/2" NPT		
<b>19</b>	3/4" NPT (FC1 only)		
<b>25</b>	1" NPT (FC1 only)		
<b>FC1</b>	Flow Control	- uni-directional	Options
<b>NV</b>	Needle Valve	- bi-directional	
<b>K6</b>	BSPB ported	Ordering Example	
<b>FM</b>	fine metering (FC1 only)		
<b>K32</b>	tamper proof		
<b>L117</b>	constant bleed		
<b>S 12 - FC1 - K6 - L117</b>			

## CYLINDER TYPE SELECTION CHART:

<b>S</b>	standard service	(-20°C to +180°C)	Model Code		
<b>AS</b>	arctic service	(-60°C to +40°C)			
	<b>06</b>	1/4" NPT	Port Sizes		
	<b>09</b>	3/8" NPT			
	<b>12</b>	1/2" NPT			
	<b>19</b>	3/4" NPT			
	<b>25</b>	1" NPT			
	<b>CPV</b>	Cylinder plug valve - bi-directional	Configuration		
	<b>K6</b>	BSP ported	Options		
	<b>K32</b>	Anti tamper cap			
	<b>xx</b>	Revision Number	Revision		
<b>S</b>	<b>06</b>	<b>- CPV</b>	<b>- K6</b>	<b>- 01</b>	Ordering Example

### Working Pressures

### CV - fully open

#### Flow Control Valves

1/4" NPT	1 - 12 bar g	0.5
3/8" NPT	0 - 12 bar g	0.9
1/2" NPT	0 - 12 bar g	1.1
3/4" NPT	0 - 12 bar g	2.0
1" NPT	0 - 12 bar g	2.2

#### Needle Valves

1/4" NPT	1 - 12 bar g	0.6
3/8" NPT	0 - 12 bar g	0.9
1/2" NPT	0 - 12 bar g	1.2

#### Cylinder Plug Valves

1/4" NPT	1 - 12 bar g	2.1
3/8" NPT	0 - 12 bar g	3.6
1/2" NPT	0 - 12 bar g	5.1
3/4" NPT	0 - 12 bar g	9.8
1" NPT	0 - 12 bar g	11.2

### PREFERRED RANGE:

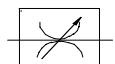


SE06-FC1

1/4" NPT, Flow Control Valve, 1 - 12 bar, C.v. 0.5

S12-FC1

1/2" NPT, Flow Control Valve, 0 - 12 bar, C.v. 1.1

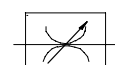


SE06-NV

1/4" NPT, Needle Valve, 1 - 12 bar, C.v. 0.6

S12-NV

1/2" NPT, Needle Valve, 0 - 12 bar, C.v. 1.1

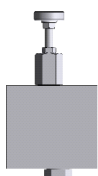


S06-CPV-01

1/4" NPT, Cylinder Plug Valve, 1 - 12 bar, C.v. 2.1

S12-CPV-01

1/2" NPT, Cylinder Plug Valve, 0 - 12 bar, C.v. 5.1



FCV3012/05/S

1/4" NPT, 345 bar, standard metering

FCV3014/05/S

1/2" NPT, 345 bar, standard metering

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### **Quality Assurance**

*All Bifold Fluidpower products are manufactured to a most stringent QA programme. Every care is taken at all stages of manufacture to ensure that every product will give optimum performance and reliability. We are recognised to EN ISO 9001:2000 and First Point assessed (cert no. 10040969). Functional test certificate, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BSEN 10204 3.1.B where available.*

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### **Accuracy of information**

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## Inline & Bowl Filters

# Types F & BF

up to 345 bar, down to 3 micron filter rating

Superior performance  
throughout the full  
operational range

### Features:

- 316L stainless steel
- 3, 10 & 25 micron absolute filter rating





## Types F4/X, F6X & F8/X Introduction:-

Designed to supplement hydraulic system main filters, this range of "last chance" filters affords protection to vulnerable hydraulic components. The filters have considerably greater dirt holding capacity and flow capability than most "last chance" filters and are therefore also suitable as primary filters for low flow hydraulic systems, particularly hand pump units.

Element particle removal ratings are 3, 10 or 25 micron absolute, and the stainless steel mesh elements have a collapse pressure of 200 bar.

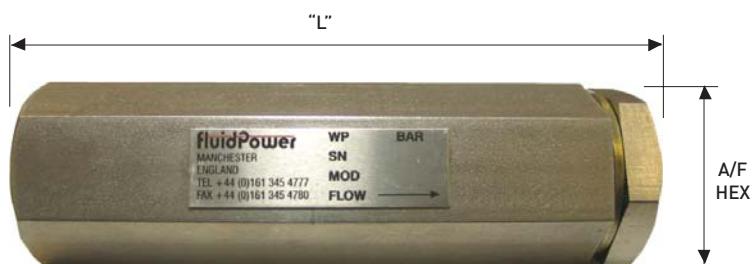
The filters are an all stainless steel construction; the body is 316L grade stainless steel and the pleated elements are also 316 stainless steel.

Suitable for liquids up to 520 bar, the filters are particularly suited for application in offshore/onshore oil and gas production control systems.

## OPERATING PARAMETERS:-

	Thread Size	Length "L"	A/F Hex		Work Press
			mm	inch	
F4/...	1/4 NPT	113mm	33	1.30	520 bar
F6/...	3/8 NPT	153mm	42.5	1.67	520 bar
F8/...	1/2 NPT	200mm	42.5	1.67	345 bar

Filter Ratings (available all sizes)	
3 Micron absolute	1 Nominal
10 Micron absolute	3 Nominal
25 Micron absolute	15 Nominal



## SELECTION CHART:

<b>F</b>		Model Code
	<b>4</b> 1/4" NPT <b>6</b> 3/8" NPT <b>8</b> 1/2" NPT	Connections
	<b>03</b> 3 micron absolute <b>10</b> 10 micron absolute <b>25</b> 25 micron absolute	Filter Rating
	<b>S</b> Nitrile (-30°C to +130°C) <b>V</b> Viton (-20°C to +180°C)	O-ring Material
<b>F</b>	<b>8 / 10 / S</b>	Example Code

## Types BF(A)8 & BFM8 Introduction:-

Designed to supplement hydraulic system main filters, this range of "last chance" bowl filters affords protection to vulnerable hydraulic components.

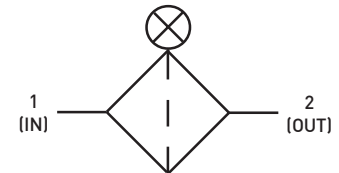
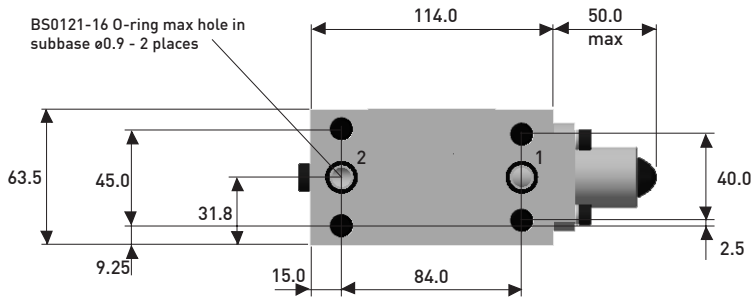
The filters have considerably greater dirt holding capacity and flow capability than most "last chance" filters and are therefore also suitable as primary filters for low flow hydraulic systems, particularly hand pump units.

Type BF(A)8 is body ported and Type BFM8 is manifold mounting.

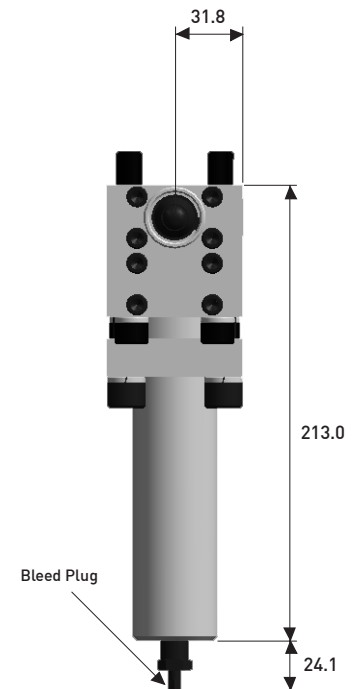
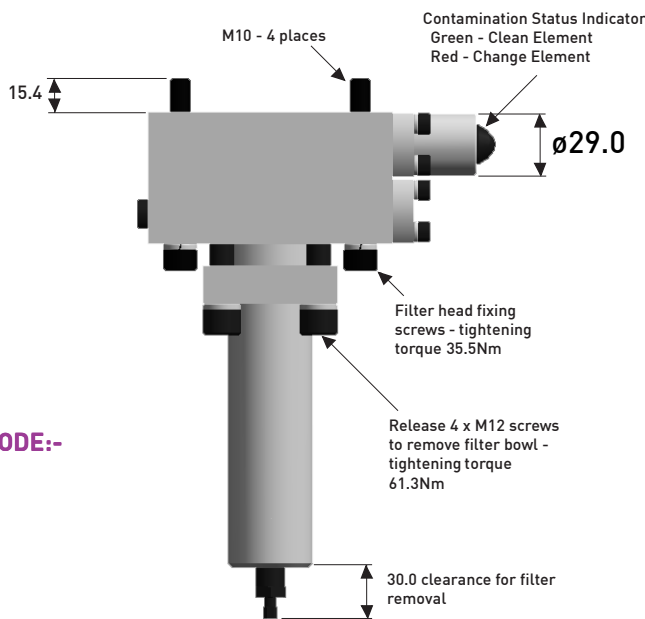
Element particle removal ratings are 3, 10 or 25 micron absolute, and the stainless steel mesh elements have a collapse pressure of 200 bar.

The filters are an all stainless steel construction; the body is 316L grade stainless steel and the pleated elements are also 316 stainless steel.

Filter Ratings (available all sizes)	
3 Micron absolute	1 Nominal
10 Micron absolute	3 Nominal
25 Micron absolute	15 Nominal



Weight:- Approx 5.0 Kg



**EXAMPLE CODE:-**  
BFM8/10/S/SI

## SELECTION CHART:

<b>BF(A)8</b>	1/2 NPT ported	Model Code
<b>BFM8</b>	manifold mounting	
<b>03</b>	3 micron absolute	Filter Rating
<b>10</b>	10 micron absolute	
<b>25</b>	25 micron absolute	
<b>S</b>	Nitrile (-30°C to +130°C)	O-ring Material
<b>V</b>	Viton (-20°C to +180°C)	
<b>SI</b>	Visual clogging indicator (BFM model only)	Options
<b>BFM8 / 25 / S / SI</b>		Example Code

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# Automatic Shut-off Bypass Valve Type ASBV

up to 345 bar, 150 litres per minute

Superior performance  
throughout the full  
operational range

## Features:

- 316L stainless steel
- NACE MR-01-75 option



## INTRODUCTION:-

Control valve type ASBV4018 is a 2- way, 2-position, normally open, spring return, ball seated, pressure sensing valve. The valve is used in parallel with low CV, hand loaded pressure regulators to permit a high bypass flow until a pre-determined, set point pressure is attained. At the set point pressure the valve blocks, and the system fluid is then directed to pass exclusively through the pressure regulator. The valve incorporates a piston sensing the downstream pressure; this reacts against an adjustable return spring. When downstream pressure falls below the set point the valve will re-open to permit a bypass flow. There is a small deadband between shut-off and re-open pressure.

Materials of construction are predominantly 316L stainless steel, with some wetted parts CA104 Aluminium Bronze, Victrex PEEK and PTFE. Standard O-ring seal material is Nitrile.

The valve is specifically designed for application in offshore/onshore oil and gas production control systems, suitable for a variety of control fluids at working pressures up to 345 bar. Optional springs can be fitted to give different set pressure ranges; consult Bifold Fluidpower.

## OPERATING PARAMETERS:-

### Working Pressure :-

345 bar (5000 psi) max. liquid service

### Set Point Pressure Range :-

138 bar to 248 bar (2000 psi to 3600 psi)

### Operating Media:-

Mineral oil, water, water glycol mixtures, injection sea water, various chemicals.

### Connections:-

P & S : 1/2 NPT female

P<sub>L</sub> : 1/8 NPT female (EP model only)

### Working Temperature:-

See elastomer options

### Flow rate, nominal:-

50 litres/min @ 10 bar Dp

150 litres/min @ 10 bar Dp \*

\* available 2005; consult Bifold Fluidpower

### Recommended Filtration:-

10 micron

## FLUID CLEANLINESS

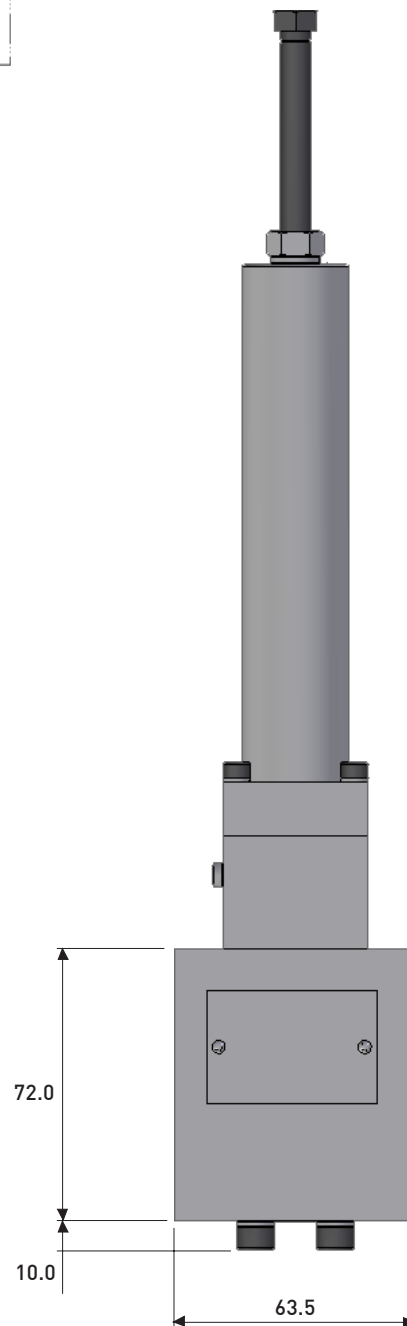
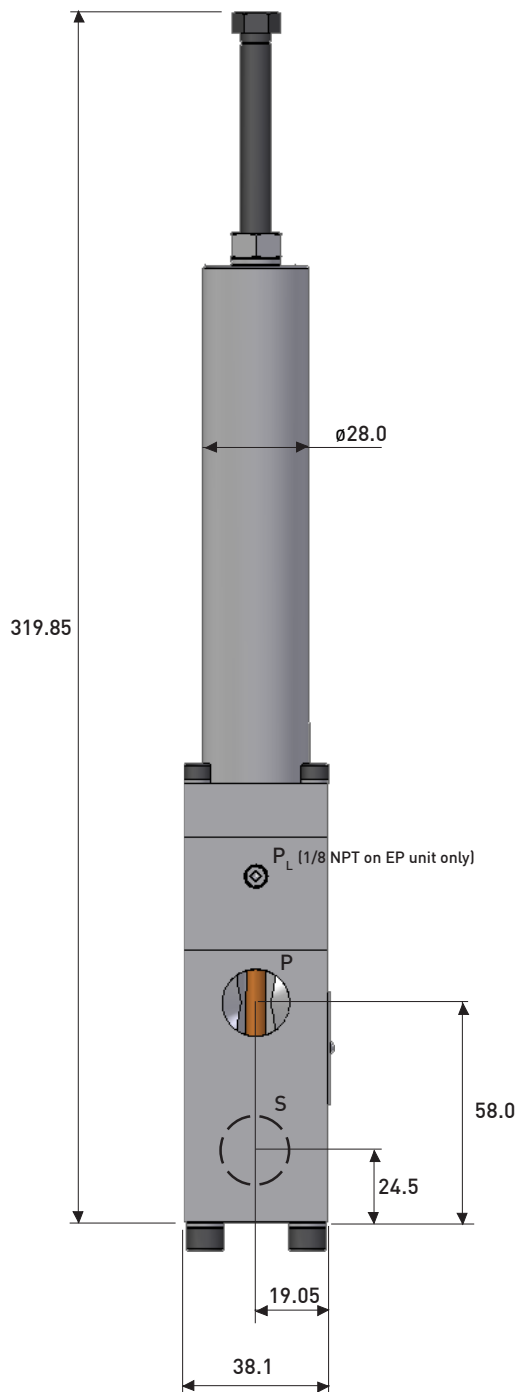
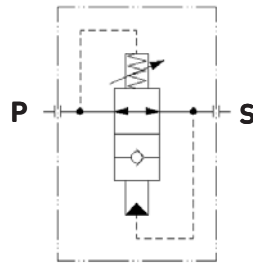
Prior to installation of the control valves it is recommended that the hydraulic system is thoroughly cleaned and flushed to NAS 1638 Class 9 (ISO 4406 Class 18/15) or better. Where this level of cleanliness cannot be guaranteed it is recommended that suitable filtration local to the valve or control system as appropriate is installed.

## SELECTION CHART:

<b>ASBV40</b>			Model Code
<b>18</b>	50 lpm nominal		Flow Rating
<b>35</b>	150 lpm nominal (available 2005. Consult Bifold Fluidpower)		
<b>05</b>	345 bar		Working Pressure
<b>S</b>	Nitrile	(-30°C to +130°C)	O-ring material
<b>V</b>	Viton	(-20°C to +180°C)	
<b>EP</b>	Externally Piloted		
<b>ASBV40 18 / 05 / S / EP</b>			Example Code

**EXAMPLE MODEL:-**

**ASBV4018/05/S**





### **UK Office**

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E-Mail:- bifold@singnet.com.sg

Web:- www.bifold-fluidpower.co.uk

### **Quality Assurance**

*All Bifold Fluidpower products are manufactured to a most stringent QA programme. Every care is taken at all stages of manufacture to ensure that every product will give optimum performance and reliability. We are recognised to EN ISO 9001:2000. Functional test certificate, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BSEN 10204 3.1.B where available. The manufacturer reserves the right to make changes to the specifications and design etc., without prior notice*

### **Accuracy of information**

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## Accessory Valves - Pressure Sensing Valve Model PSV

Up to 12 bar operating pressure

Superior performance  
throughout the  
full operational range

### Features:

- 316L stainless steel
- Arctic Service available
- Adjustable range 2 to 8 bar



The pressure sensing valve is designed for fitting to the pilot port of a valve to create an adjustable pressure sensing function. It is available 1/4" NPT male or can be purchased as part of our junior range as an option on the basic pilot unit which is detailed below. The pressure sensing valve is available for arctic service operation. As a complete unit we also have a pressure sensing Domino range (P5). Please see Domino Catalogue for details.

**TECHNICAL INFORMATION**

**OPERATING MEDIA**

- Air, sweet and sour gas

**MAXIMUM WORKING PRESSURE**

- 12 bar g

**DIFFERENTIAL PRESSURE:**

- 0.4 bar g.

**TEMPERATURE RANGE:**

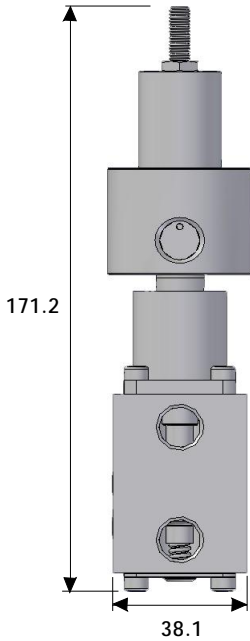
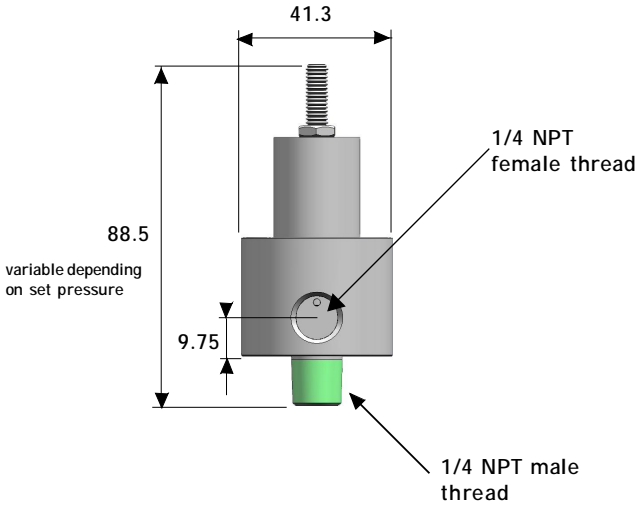
- -20°C to +180°C ambient.
- -50°C to +40°C ambient.

**MECHANICAL CONSTRUCTION**

- Body:- stainless steel 316L
- Seals:- Viton (standard). Alternative elastomers available for extreme environments.
- Diaphragm support:- stainless steel 316L
- Springs:- stainless steel 316 S42
- Outlet port:- 1/4" NPT male thread (BSPP option)
- Pilot port:- 1/4" NPT female (exhaust to atmosphere)

**ADJUSTABLE RANGE:**

- 2 to 8 bar g.



PSV shown on pilot of domino junior - SJ06-P1-32-NU-00-PSV

**SELECTION CHART**

S06 AS06	1/4" NPT standard service 1/4" NPT arctic service	Model Code
	PSV Pressure Sensing Valve	
	K6 BSPP ports	Options
S06 - PSV - K6		Ordering Example

## Relief Valves Gaseous and Liquid Service Ranges



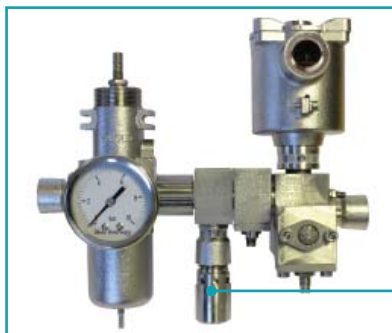
- 316L Stainless Steel
- Arctic Service Options Down to -60°C
- Up to 1300 bar Working Pressure Hydraulic Range
- Pneumatic Relief Valves That Maintain Safety Function in High Flow Applications
- Captive Exhaust Pneumatic Valves
- Hydraulic Relief Valves with Low Dead Bands
- Integrated Check Valve / Thermal Relief Valve for Hydraulic Applications





Features & Benefits

Relief Valves



**Pneumatic Relief Valves (Vent to Atmosphere)**

- Very high flow and low dead band. The Bifold pneumatic relief valves are a safety device designed to match Bifold's high flow filter regulators. The device will limit the over pressure to less than 110% of the set point in the event of a filter regulator mis-operation. Some competitor relief valves have insufficient flow to be used as a safety device in this application.



**Pneumatic Relief Valve (Tubed Exhaust)**

- Pneumatically balanced pressure relief valve maintains safety function with the same exhaust pressure.



**Hydraulic Thermal Relief Valve**

- The special, removable lock down screw facility can be applied to override the relief valve during system pressure test without affecting the pre-set, set point.



**Thermal Check Relief Valve**

- Sometimes referred to as a "yield valve", its principal feature is the ability to return over pressurised fluid caused by thermal expansion downstream, internally through the valve itself and back to the supply point, negating the need for separate exhaust piping to the tank.



**Hydraulic Precision Relief Valve**

- Precision relief valves have very high sealing forces along with accurate and narrow dead bands. Precision relief valves should be used in preference to sprung relief valves where there is risk of vibration induced leakage or where low dead bands are important to system safety performance. Sprung relief valves typically will have a narrow dead band when tested on a static dead weight tester but will have a much wider dead band under flowing conditions that will require a significant drop in system pressure to enable the valve to reseal.

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**Quality Assurance**  
All Bifold products are manufactured to a most stringent QA programme to ensure that every product will give optimum performance and reliability. We are third party certified to BS EN ISO 9001:2008. Functional test certificates, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BS EN 10204 3.1 where available. We reserve the right to make changes to the specifications and design etc., without prior notice.

## Leading Technology



### Product Innovation

The Bifold Group of companies have provided peace of mind to contractors, installers and end users for over a century. Our innovative range of products, specifically designed with the customer in mind, have gained worldwide approval and credibility for the onerous conditions as found in hazardous (classified) locations, hostile and subsea environments. The customer requirements for sustained safety and reliability under extreme operating conditions are Bifold Marshalsea's primary objectives.

Our state of the art production facilities based in the UK, allows our superior and innovative designs to be manufactured to rigorous manufacturing and quality standards.

The policy and overall business objective of Bifold Marshalsea, is to provide system packages of the highest quality and in compliance with customer requirements. We guarantee ease of installation and low lifetime cost of ownership - due to superior design, long-life materials, precision manufacturing and testing facilities.



### Worldwide Service and Support

Located in Taunton, UK, Bifold Marshalsea has subsidiary locations in Houston, USA, Singapore and Manchester, UK. The Bifold Group of Companies are supported worldwide with our engineers and a global network of agents and distributors.

The Group have invested in state of the art machining centres ensuring accuracy of close tolerances, and a rapid turn around capability together with state of the art assembly and testing facilities.

The customer can be confident that Bifold Marshalsea has the product portfolio and the technical and production capability to provide the correct solution for their system requirements, and provide support during and after installation.

### Bifold Marshalsea Product Range

Bifold Marshalsea provides pumps for use with fluids which include a variety of water-based, fire resistant and other media types. The properties of these fluids include a combination of high or low viscosity with either high or low lubricity.

Various pump models are available for use with water glycol and other calibration fluids.

Bifold Marshalsea provide Relief Valves for both gaseous and liquid service.

Bifold Marshalsea also provide surface and subsea Pressure Intensifiers for pressure boosting of water based or synthetic oil-based fluids.



## Overview



### Advantages of Precision Relief Valves over Sprung Relief Valves

Relief valve selection can be complex and the impact of selecting the wrong product are, for example, as follows, If a relief valve is required to reseal while upstream is still pumping, a simple “sprung relief” may cause significant system overpressure, leakage and premature failure. System designers may overcome this fault by designing their system at higher pressures, but this may incur unnecessary extra costs.

If you are not sure what to select, it may be prudent to select a “precision relief” valve instead of a “sprung relief”.

### Dead Weight Test – Results may be Misleading

Relief valve manufacturers usually quote the pressure to relieve and the pressure to reseal based on a test rig that has no flow. This test may indicate a very low dead band. This type of performance is not always as it appears. It may be satisfactory if the system is designed to shut down fully after a valve has relieved and where vibration cannot induce a leak to start.

### Flowing Test Results

#### Sprung relief:

- The pressure immediately after the relief valve increases with the flow rate through the valve.
- The valve might not reseal until the flow has stopped and pressure has reduced to 35% below the relief set pressure.

#### Precision Relief:

- The pressure after the relief is stable at any flow rate up the maximum specified.
- The valve reseats within 10% of the relief set pressure.

### Summary

Precision relief valves are safe and leak free under almost all applications. Knowledge of relief valve performance is required when using simple sprung reliefs.



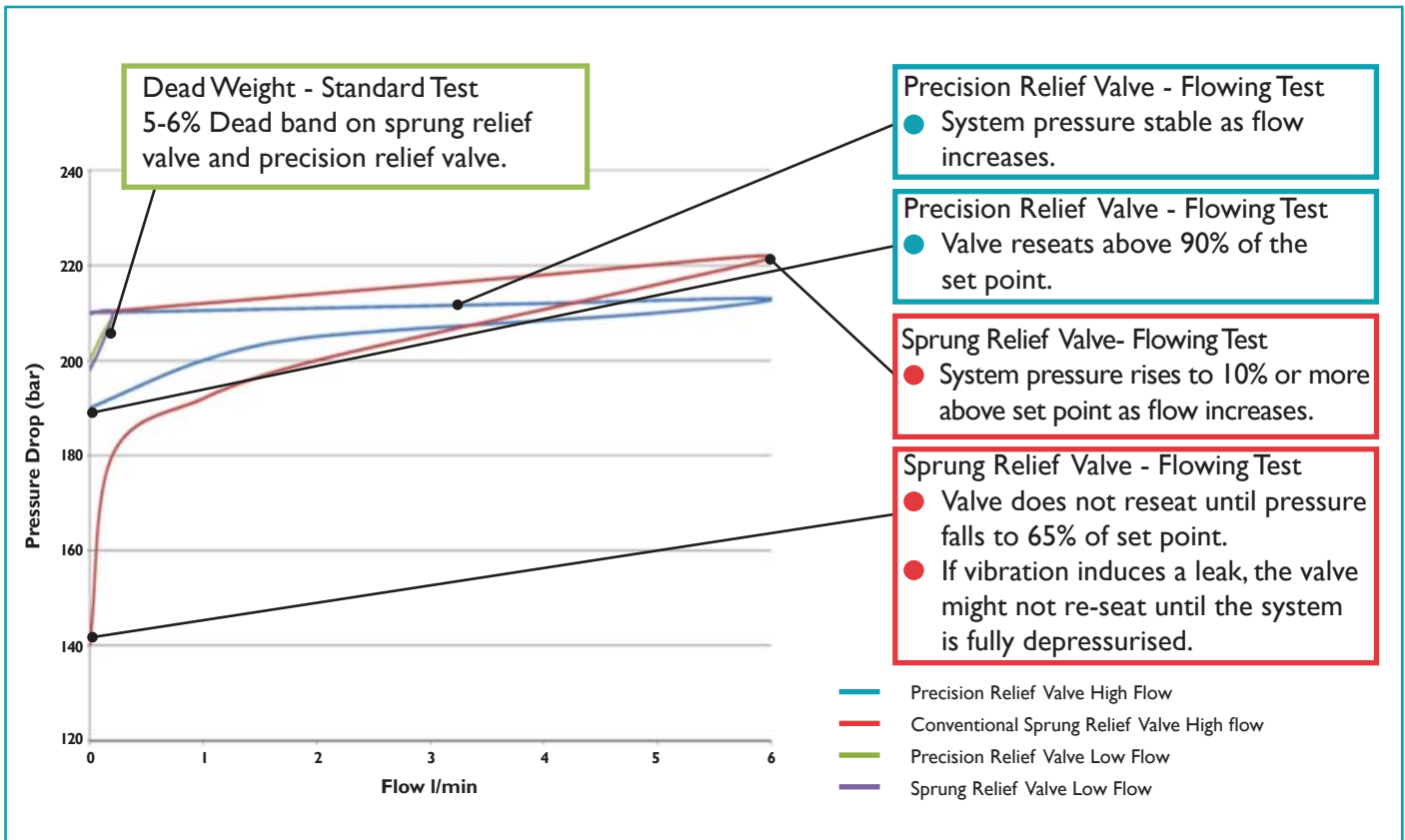
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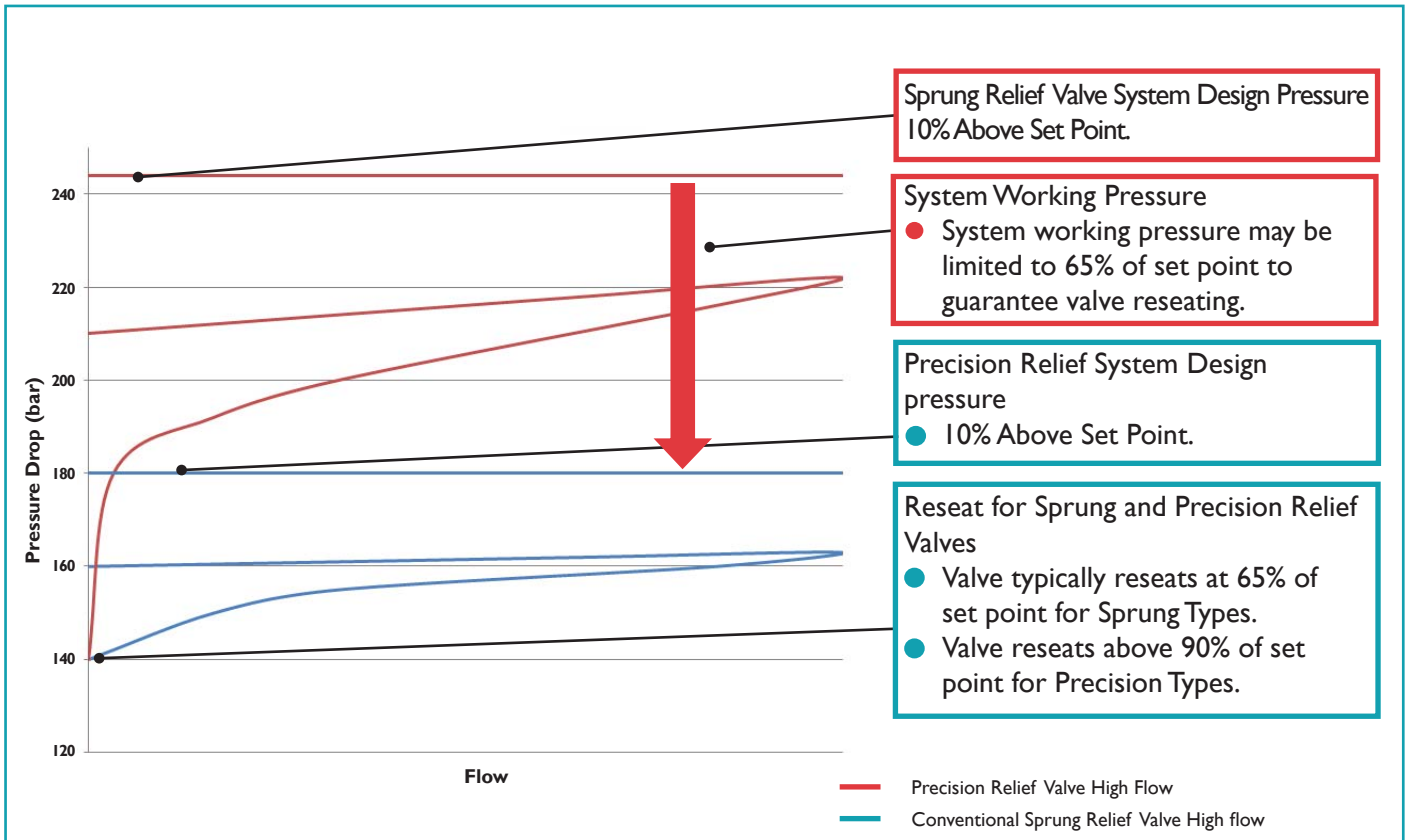
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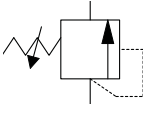

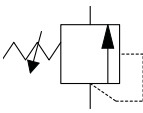

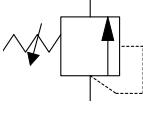


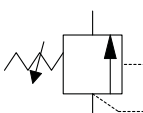


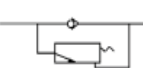

**Performance**

**Dead Weight Test and Flowing test**



**System Design Pressure Benefits**



PNEUMATIC RELIEF VALVES				
Product	Schematic Representation	Page Number	Flow Rates and Pressures	Certification
 <p><b>Pressure Relief Valve</b></p>		<b>8 / 9</b>	0.8 - 12 bar Ø 9 mm Orifice Ø 10.5 mm Orifice Ø 11.4 mm Orifice	This valve conforms to the Pressure Equipment Directive 97/23/EC. All valves are supplied with a test certificate plus a declaration of conformity.
 <p><b>Pressure Relief Valve Type CPR</b></p>		<b>10 / 11</b>	0.8 - 8 bar Ø 12.8 mm Orifice Ø 27.0 mm Orifice	This valve has been designed to conform to ISO 4126-1:2004 part 1 and Pressure Equipment Directive 97/23/EC. All valves are supplied with a test certificate.
HYDRAULIC RELIEF VALVES				
Product	Schematic Representation	Page Number	Flow Rates and Pressures	Certification
 <p><b>Thermal Relief Valve Type 14480</b></p>		<b>12 / 13</b>	7 - 50 bar 35 - 345 bar 50 - 200 bar 200 - 600 bar 345 - 690 bar 600 - 800 bar 600 - 1300 bar Ø 4 mm Orifice	 II 2 G T4 This relief valve conforms to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and are ATEX compliant. This valve also conforms to the Pressure Equipment Directive 97/23/EC. All valves are CE marked and supplied with a test certificate plus a declaration of conformity.
 <p><b>Semi-Capsule Relief Valves Types 14540 &amp; 14640</b></p>		<b>14 / 15</b>	35 - 345 bar 100 - 400 bar 345 - 800 bar 400 - 700 bar Ø 4 mm Orifice	 II 2 G T4 This relief valve conforms to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and are ATEX compliant. This valve also conforms to the Pressure Equipment Directive 97/23/EC. All valves are CE marked and supplied with a test certificate plus a declaration of conformity.
 <p><b>Integrated Check / Thermal Relief Valve Types 14460 &amp; 14470</b></p>		<b>16 / 17</b>	35 - 345 bar 345 - 700 bar	 II 2 G T4 This relief valve conforms to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and are ATEX compliant. This valve also conforms to the Pressure Equipment Directive 97/23/EC. All valves are CE marked and supplied with a test certificate plus a declaration of conformity.

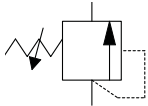
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Selection Table

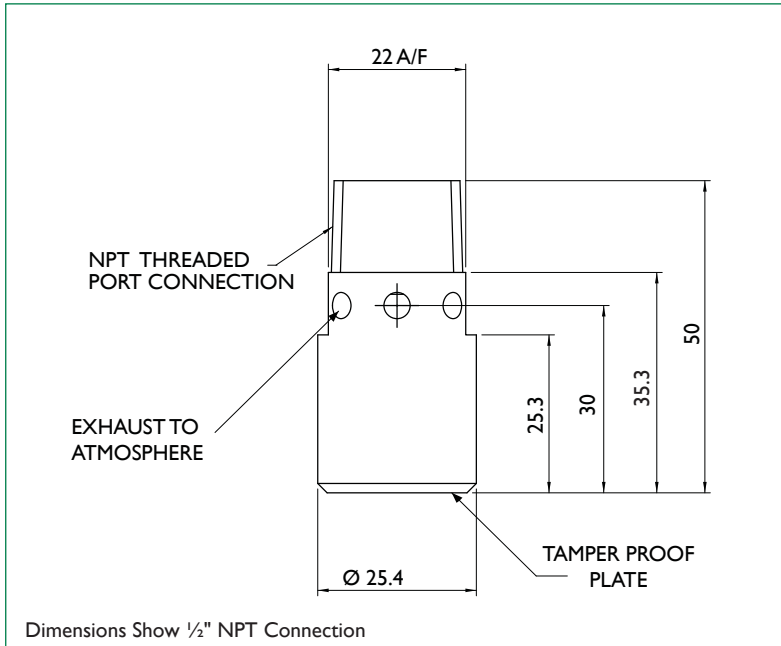


HYDRAULIC RELIEF VALVES				
Product	Schematic Representation	Page Number	Flow Rates and Pressure	Certification
 <p><b>Low Pressure Relief Valve Type I4340</b></p>		18 / 19	5 - 50 bar 50 - 100 bar Up to 112 l / m	 <p>This relief valve conforms to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and are ATEX compliant. This valve also conforms to the Pressure Equipment Directive 97/23/EC. All valves are marked and supplied with a test certificate plus a declaration of conformity.</p>
 <p><b>Relief Valve Types 7608, 7668, 7708, 7768, 24100 &amp; 24400</b></p>		20 / 21	Ø 3/16" Orifice 69 - 414 bar Ø 5/32" Orifice 90 - 620 bar Ø 1/8" Orifice 90 - 932 bar	 <p>This relief valve conforms to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and are ATEX compliant. This valve also conforms to the Pressure Equipment Directive 97/23/EC. All valves are marked and supplied with a test certificate plus a declaration of conformity.</p>
 <p><b>Precision Relief Valve Type I4450</b></p>		22 / 23	103 - 240 bar 207 - 414 bar 345 - 700 bar Up to 45 l / m	 <p>This relief valve conforms to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and are ATEX compliant. This valve also conforms to the Pressure Equipment Directive 97/23/EC. All valves are marked and supplied with a test certificate plus a declaration of conformity.</p>
 <p><b>Precision Relief Valve Types I4520, I4530, I4580 &amp; I4570</b></p>		24 / 25	100 - 240 bar 207 - 414 bar 345 - 700 bar 600 - 1200 bar Up to 25 l / m	 <p>This relief valve conforms to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and are ATEX compliant. This valve also conforms to the Pressure Equipment Directive 97/23/EC. All valves are marked and supplied with a test certificate plus a declaration of conformity.</p>

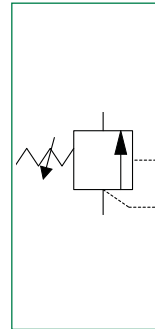
Pneumatic Service



Pressure Relief Valves up to 12.0 bar Set Point



SCHEMATIC



Features and Benefits

- Set Point Repeatability  $\pm 0.15$  bar (up to 5.0 bar) or  $\pm 3\%$  (above 5.0 bar).
- Set Point Range - user specified up to 12.0 bar.
- Sealing Re-Seat Pressure - re-sealing characteristics  $> 90\%$  of set point.
- Orifice Size:  $\varnothing 9$  mm ( $1/4$ " NPT),  $\varnothing 10.5$  mm ( $3/8$ " NPT) &  $\varnothing 11.5$  mm ( $1/2$ " NPT).
- Operating Media - filtered lubricated or unlubricated air, inert gas, sweet (natural), and sour gas options.

Materials

Body	- 316L stainless steel
Spring	- 302S26 stainless steel
Seal Material	- Viton (standard), Fluorosilicone (option) - Silicone

Working Temperature

Temperature Range:	
Viton - (S)	-20°C to +180°C
Fluorosilicone - (AS)	-60°C to +60°C
Silicone -	-60°C to +60°C

Approvals Details

This valve conforms to the Pressure Equipment Directive 97/23/EC. All valves are supplied with a test certificate plus a declaration of conformity.

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**Pneumatic Service**

**Product Description**

The pressure relief valves vent to atmosphere, are direct acting and suitable for low pressure applications.

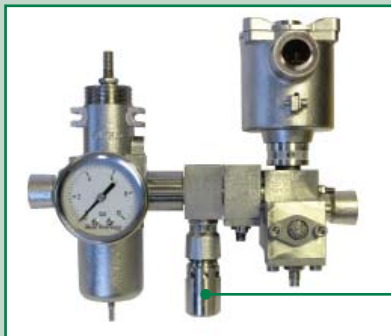
Rated up to 12 bar, the set point pressure is factory set according to user specification. It is not intended to be field adjustable. The valve seat incorporates a silicone face seal affording excellent resealing characteristics.

The relief valve weight is:- 0.13 Kg.

**Selection Chart - Ordering Example**

<b>S</b>	Pressure Relief Valve	Model Code
<b>AS</b>	Pressure Relief Valve low temperature service	
<b>06</b>	1/4" NPT	Port Size
<b>09</b>	3/8" NPT	
<b>12</b>	1/2" NPT	
<b>PRX.X</b>	Pressure relief setting (user specified 0.8 - 12 bar; 0.1 bar increments)	Configuration
<b>K10</b>	Override button	Option
<b>K6</b>	BSP option	Option
<b>S - 06 - PR4.5 - K10 - K6</b>		Ordering Example

It is the responsibility of the system designer and user to select products that are suitable for their intended application of use.



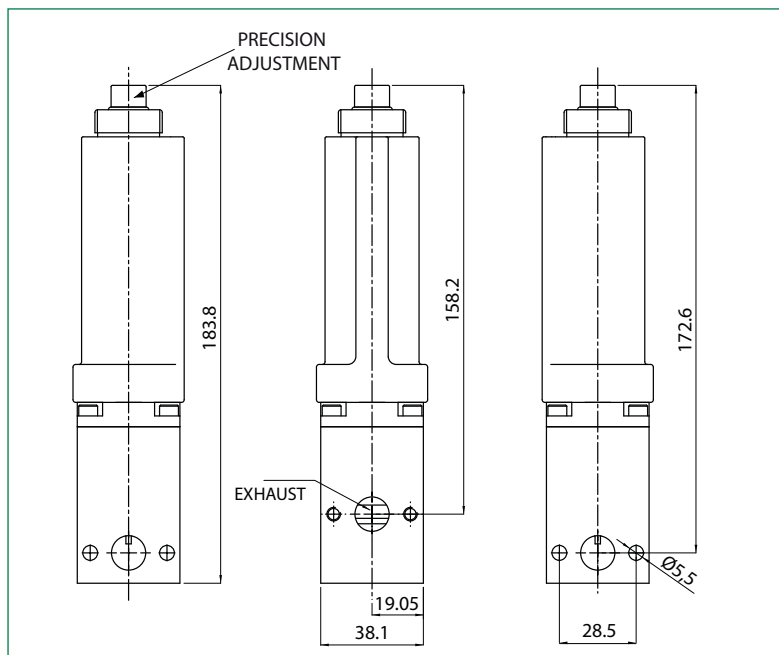
Very high flow and low dead band. The Bifold pneumatic relief valves are a safety device designed to match Bifold's high flow filter regulators. The device will limit the over pressure to less than 110% of the set point in the event of a filter regulator mis-operation. Some competitor relief valves have insufficient flow to be used as a safety device in this application.

Image showing a Bifold pneumatic valve actuator control manifold. (See separate catalogue).

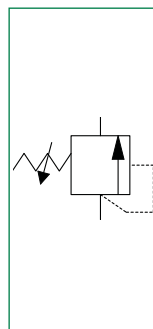


## Pneumatic Service

### Captive Pressure Relief Valves up to 8.0 bar Set Point



#### SCHEMATIC



### Features and Benefits

- Set Point Repeatability  $\pm 3\%$  ( $> 5.0$  bar) or  $\pm 0.15$  bar ( $< 5.0$  bar).
- Set Point Range - user specified up to 8.0 bar.
- Sealing Re-Seat Pressure - re-sealing characteristics  $> 90\%$  of set point.
- Orifice Size:  $\text{Ø}12.8$  mm ( $1/4$ " &  $1/2$ " NPT) &  $\text{Ø} 27$  mm (1" NPT).
- Back Pressure - set point is affected by vent port back pressure and will DECREASE accordingly.
- Operating Media - filtered lubricated or unlubricated air, inert gas, sweet (natural), and sour gas options.
- Precision adjustment with low friction to improve setting reliability.

### Materials

- Body - 316L stainless steel
- Spring - 316S42 and 302S26 stainless steel
- Seal Material - Viton (standard), Fluorosilicone
- MFQ & MVQ Silicone (option  $-60^{\circ}\text{C}$ )

### Working Temperature

- Temperature Range:
- Viton - (V)  $-20^{\circ}\text{C}$  to  $+180^{\circ}\text{C}$
  - Silicone - (AG)  $-60^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$

### Approvals Details

This valve has been designed to conform to ISO 4126-1:2004 part 1 and Pressure Equipment Directive 97/23/EC. All valves are supplied with a test certificate.



**Pneumatic Service**

**Product Description**

The CPR captive vent pressure relief valves are direct acting, externally adjustable, for low pressure applications.

Rated up to 8 bar, the set point pressure is factory set according to user specification. The set point is field adjustable. The valve seat incorporates a silicone face seal affording excellent resealing characteristics.

The captive pressure relief valve weight is:- 1.20 Kg.

**Selection Chart - Ordering Example**

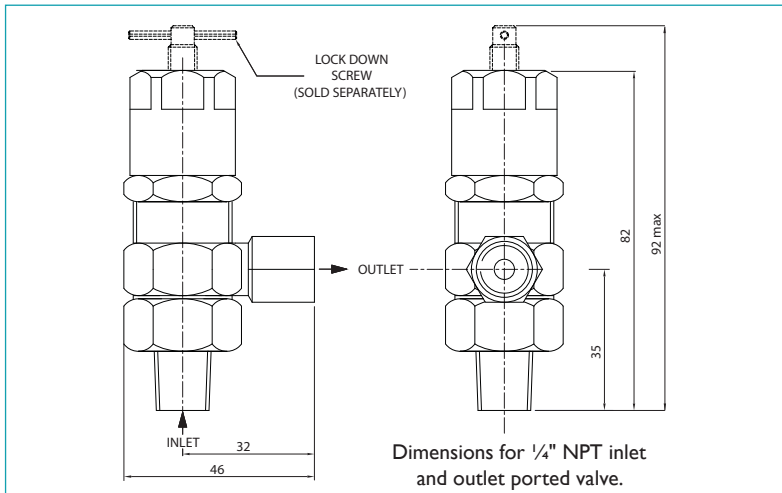
<b>CPR</b>	Captive Pressure Relief Valve		Model Code
<b>04</b>	1/4" NPT		Port Size
<b>08</b>	1/2" NPT		
<b>12</b>	3/4" NPT		
<b>16</b>	1" NPT		
	<b>V</b>	Viton	Seat Material
	<b>AG</b>	Flourosilicone - Low temperature service	
		<b>PRX.X</b> Pressure relief setting (user specified 0.8 - 8 bar; 0.1 bar increments)	Configuration
		<b>K6</b> BSPP option	Option
<b>CPR - 08 - V - PR5.0 - K6</b>			Ordering Example

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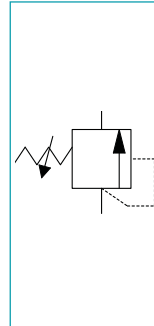
Hydraulic Service



Thermal Relief Valves



SCHEMATIC



Features and Benefits

- No need to remove from the system for proof testing.
- Unique lock down screw facility.
- Set Point Repeatability  $\pm 2\%$ .
- Set Point Range - user specified up to 1300 bar.
- Sealing Re-Seat Pressure - Virtually zero leakage re-seat pressure  $\geq 90\%$  of cracking pressure.
- Proof Test - proof test pressure: 1000 bar. proof test pressure: 1700 bar.
- Orifice Size:  $\varnothing 4\text{mm}$ .
- Back Pressure - set point is not affected by vent back pressure. Maximum permissible back pressure 100 bar.
- Operating Media - mineral oils, water glycol fluids and some chemicals. Consult Bifold Marshalsea for specific chemicals and synthetic oils compatibility.
- Long Life and Repeatable Performance - are ensured through the use of hardened elements.

Materials

Body	- 316L stainless steel
Spring	- 316S42 and 302S26 stainless steel
Seal Material	- Nitrile
	- Viton
	- Silicone
	- Low Temp Nitrile
	- standard
	- add suffix M089 eg. I4480 - 08 - M089
	- add suffix M065 eg. I4480 - 08 - M065
	- add suffix M106 eg. I4480 - 08 - M106
Seat Material	- PEEK, Stainless Steel, Polyurethane

Approvals Details



These relief valves conform to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and are ATEX compliant. These valves also conform to the Pressure Equipment Directive 97/23/EC. All valves are CE marked and supplied with a test certificate plus a declaration of conformity.

Product Description

The Type I4480 thermal relief valve has been designed primarily to provide over pressure protection in systems subject to fluid thermal expansion, but it can also be reliably used as the primary relief valve in systems with low volume pump flow rates.

A unique feature of this valve is the lock down facility that eliminates the need to remove or disconnect the valve during proof testing of the system. Provision is made in the cap for a special lock down screw to be inserted to disable the valve and hold it closed against the increasing pressures applied during testing of the system pipe work and components. This eliminates the

need to remove or disconnect the valve during test procedures. When the lock down screw is removed, the valve reverts to its as set condition without further adjustment or re-calibration.

The thread in the cap is a non-preferred size, thereby preventing unauthorised insertion of other types of screw. Lock down screws are not provided with each valve to prevent unauthorised use; they are available on request.

The relief valve weight is :- 0.24 Kg.

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Hydraulic Service



Selection Chart - Ordering Example

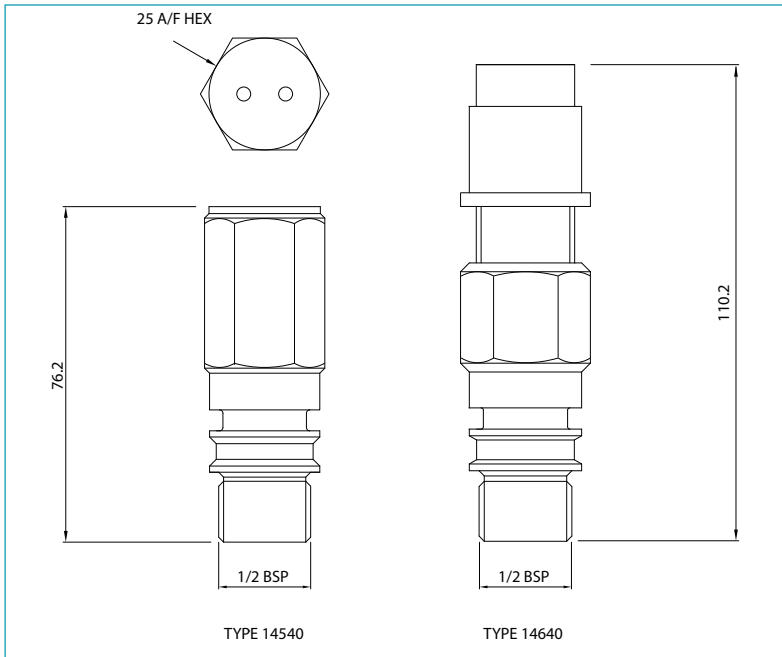
THERMAL RELIEF VALVE I4480 SPECIFICATIONS				
Part Number	Pressure Range (bar)	Inlet Connection	Outlet Connection	Repair Kit
I4480 - 24	7 - 50	1/4" NPT Female	1/4" NPT Female	RS I4480 - 24
I4480 - 25	50 - 200	1/4" NPT Female	1/4" NPT Female	RS I4480 - 25
I4480 - 26	200 - 600	1/4" NPT Female	1/4" NPT Female	RS I4480 - 26
I4480 - 27	600 - 800	1/4" NPT Female	1/4" NPT Female	RS I4480 - 27
I4480 - 20	7 - 50	1/4" NPT Female	1/4" NPT Female	RS I4480 - 20
I4480 - 03	35 - 345	1/4" NPT Female	1/4" NPT Female	RS I4480 - 03
I4480 - 21	50 - 200	1/4" NPT Female	1/4" NPT Female	RS I4480 - 21
I4480 - 22	200 - 600	1/4" NPT Female	1/4" NPT Female	RS I4480 - 22
I4480 - 04	345 - 690	1/4" NPT Female	1/4" NPT Female	RS I4480 - 04
I4480 - 23	600 - 800	1/4" NPT Female	1/4" NPT Female	RS I4480 - 23
I4480 - 30	7 - 50	1/4" BSP Female	1/4" BSP Female	RS I4480 - 30
I4480 - 31	50 - 200	1/4" BSP Female	1/4" BSP Female	RS I4480 - 31
I4480 - 32	200 - 600	1/4" BSP Female	1/4" BSP Female	RS I4480 - 32
I4480 - 33	600 - 800	1/4" BSP Female	1/4" BSP Female	RS I4480 - 33
I4480 - 49	7 - 50	1/4" MP	1/4" NPT	RS I4480 - 49
I4480 - 50	35 - 345	1/4" MP	1/4" NPT	RS I4480 - 50
I4480 - 51	50 - 200	1/4" MP	1/4" NPT	RS I4480 - 51
I4480 - 52	200 - 600	1/4" MP	1/4" NPT	RS I4480 - 52
I4480 - 53	345 - 690	1/4" MP	1/4" NPT	RS I4480 - 53
I4480 - 54	600 - 800	1/4" MP	1/4" NPT	RS I4480 - 54
I4480 - 55	600 - 1300	1/4" MP	1/4" NPT	RS I4480 - 55
I4480 - 44	7 - 50	3/8" MP Female	1/4" MP Female	RS I4480 - 44
I4480 - 46	200 - 600	3/8" MP Female	1/4" MP Female	RS I4480 - 46
I4480 - 47	600 - 1300	3/8" MP Female	1/4" MP Female	RS I4480 - 47
I4480 - 56	7 - 50	3/8" NPT Female	1/4" NPT Female	RS I4480 - 56
I4480 - 57	35 - 345	3/8" NPT Female	1/4" NPT Female	RS I4480 - 57
I4480 - 58	50 - 200	3/8" NPT Female	1/4" NPT Female	RS I4480 - 58
I4480 - 59	200 - 600	3/8" NPT Female	1/4" NPT Female	RS I4480 - 59
I4480 - 60	345 - 690	3/8" NPT Female	1/4" NPT Female	RS I4480 - 60
I4480 - 61	600 - 800	3/8" NPT Female	1/4" NPT Female	RS I4480 - 61
I4480 - 62	600 - 1300	3/8" NPT Female	1/4" NPT Female	RS I4480 - 62
I4480 - 63	7 - 50	3/8" NPT	3/8" NPT	RS I4480 - 63
I4480 - 64	35 - 345	3/8" NPT	3/8" NPT	RS I4480 - 64
I4480 - 65	50 - 200	3/8" NPT	3/8" NPT	RS I4480 - 65
I4480 - 66	200 - 600	3/8" NPT	3/8" NPT	RS I4480 - 66
I4480 - 67	345 - 690	3/8" NPT	3/8" NPT	RS I4480 - 67
I4480 - 68	600 - 800	3/8" NPT	3/8" NPT	RS I4480 - 68
I4480 - 69	600 - 1300	3/8" NPT	3/8" NPT	RS I4480 - 69
I4480 - 70	7 - 50	3/8" BSP	3/8" BSP	RS I4480 - 70
I4480 - 71	35 - 345	3/8" BSP	3/8" BSP	RS I4480 - 71
I4480 - 72	50 - 200	3/8" BSP	3/8" BSP	RS I4480 - 72
I4480 - 73	200 - 600	3/8" BSP	3/8" BSP	RS I4480 - 73
I4480 - 74	345 - 690	3/8" BSP	3/8" BSP	RS I4480 - 74
I4480 - 75	600 - 800	3/8" BSP	3/8" BSP	RS I4480 - 75
I4480 - 76	600 - 1300	3/8" BSP	3/8" BSP	RS I4480 - 76
I4480 - 77	7 - 50	3/8" MP Female	3/8" NPT Female	RS I4480 - 77
I4480 - 78	35 - 345	3/8" MP Female	3/8" NPT Female	RS I4480 - 78
I4480 - 79	50 - 200	3/8" MP Female	3/8" NPT Female	RS I4480 - 79
I4480 - 80	200 - 600	3/8" MP Female	3/8" NPT Female	RS I4480 - 80
I4480 - 81	345 - 690	3/8" MP Female	3/8" NPT Female	RS I4480 - 81
I4480 - 82	600 - 800	3/8" MP Female	3/8" NPT Female	RS I4480 - 82
I4480 - 83	600 - 1300	3/8" MP Female	3/8" NPT Female	RS I4480 - 83
I4480 - 84	7 - 50	1/6" MP	1/4" NPT	RS I4480 - 84
I4480 - 85	35 - 345	1/6" MP	1/4" NPT	RS I4480 - 85
I4480 - 86	50 - 200	1/6" MP	1/4" NPT	RS I4480 - 86
I4480 - 87	200 - 600	1/6" MP	1/4" NPT	RS I4480 - 87
I4480 - 88	345 - 690	1/6" MP	1/4" NPT	RS I4480 - 88
I4480 - 89	600 - 800	1/6" MP	1/4" NPT	RS I4480 - 89
I4480 - 90	600 - 1300	1/6" MP	1/4" NPT	RS I4480 - 90
I4480 - 91	7 - 50	1/6" MP	3/8" NPT	RS I4480 - 91
I4480 - 92	35 - 345	1/6" MP	3/8" NPT	RS I4480 - 92
I4480 - 93	50 - 200	1/6" MP	3/8" NPT	RS I4480 - 93
I4480 - 94	200 - 600	1/6" MP	3/8" NPT	RS I4480 - 94
I4480 - 95	345 - 690	1/6" MP	3/8" NPT	RS I4480 - 95
I4480 - 96	600 - 800	1/6" MP	3/8" NPT	RS I4480 - 96
I4480 - 97	600 - 1300	1/6" MP	3/8" NPT	RS I4480 - 97

Lock Down Screw Part Number: I4489 - 01  
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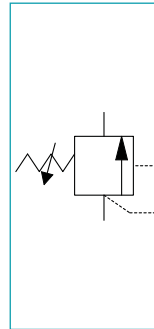
Hydraulic Service



Semi-Capsule Relief Valves



SCHEMATIC



Features and Benefits

- Set Point Repeatability  $\pm 2\%$ .
- Set Point Range - user specified up to 800 bar.
- Sealing Re-Seat Pressure - Virtually zero leakage re-seat pressure  $\geq 90\%$  of cracking pressure.
- Orifice Size:  $\varnothing 4\text{mm}$ .
- Back Pressure - set point is not affected by vent back pressure. Maximum permissible back pressure 100 bar.
- Operating Media - mineral oils, water glycol fluids and some chemicals. Consult Bifold Marshalsea for specific chemicals and synthetic oils compatibility.
- Long Life and Repeatable Performance - are ensured through the use of hardened elements.

Materials

External & Wetted Parts	- 316L stainless steel		
Seal Material	- Nitrile	- standard	
	- Viton	- add suffix M089	eg. I4540 - 08 - M089
	- Silicone	- add suffix M065	eg. I4540 - 08 - M065
	- Low Temp Nitrile	- add suffix M106	eg. I4540 - 08 - M106

Approvals Details



These relief valves conform to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and are ATEX compliant. These valves also conform to the Pressure Equipment Directive 97/23/EC. All valves are CE marked and supplied with a test certificate plus a declaration of conformity.

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## Hydraulic Service



### Product Description

The Type I4540 and I4640 relief valves have been designed primarily to provide pressure control in systems with low flow requirements such as those subject to thermal expansion.

The valve is designed for cartridge fitment into a suitable manifold block or the valve can be face mounted to relieve to atmosphere such as in a tank or sump application.

The relief valve I4540 weight is 0.23 Kg.

The relief valve I4640 weight is 0.31 Kg.

### Selection Chart - Ordering Example

SEMI-CAPSULE RELIEF VALVE I4540 AND I4640 SPECIFICATIONS				
Part Number	Pressure Range (bar)	Outlet Connection	Seat Material	Repair Kit
I4540 - 02	35 - 345	Cartridge	Nitrile	RS I4540 - 02
I4540 - 04	35 - 345	Cartridge	Viton	RS I4540 - 04
I4540 - 03	345 - 800	Cartridge	Viton	RS I4540 - 03
I4540 - 06	345 - 800	Cartridge	Nitrile	RS I4540 - 06
I4640 - 01	100 - 400	Cartridge	Viton	RS I4640 - 01
I4640 - 02	400 - 700	Cartridge	Viton	RS I4640 - 02

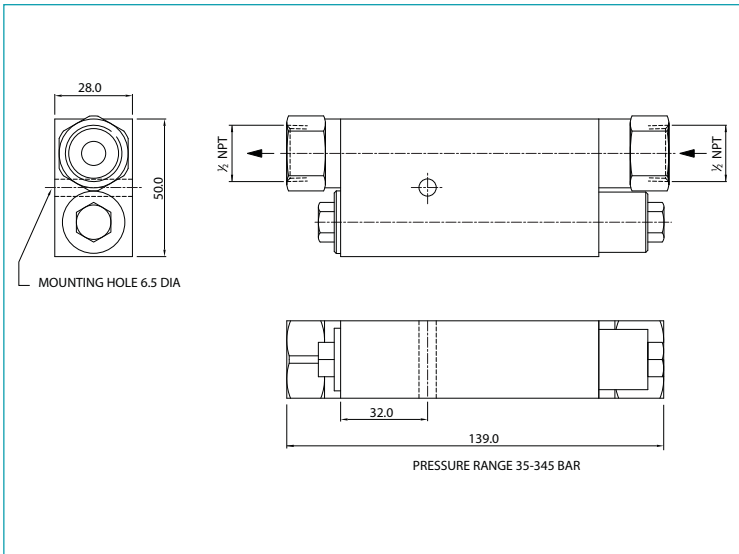
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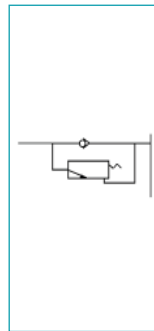
Hydraulic Service



Integrated Check / Thermal Relief Valves



SCHEMATIC



Features and Benefits

- No Exhaust Line Connection required - exhaust line piping is eliminated.
- Set Point Repeatability  $\pm 2\%$ .
- Set Point Range - user specified up to 700 bar.
- Sealing Re-Seat Pressure - Virtually zero leakage re-seat pressure  $\geq 90\%$  of cracking pressure.
- Orifice Size:  $\varnothing 4\text{mm}$ .
- Back Pressure - set point is not affected by vent back pressure. Maximum permissible back pressure 100 bar.
- Operating Media - mineral oils, water glycol fluids and some chemicals. Consult Bifold Marshalsea for specific chemicals and synthetic oils compatibility.
- Single Integrated Unit - single integrated unit eliminates inter-valve piping.
- Valve Proof Testing - removal or disconnection of the valve during proof testing is not required.

Materials

- External & Wetted Parts - 316L stainless steel
- Seat Material: Check Valve - Acetal
- Relief Valve - Polyurethane

Approvals Details



These relief valves conform to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and are ATEX compliant. These valves also conform to the Pressure Equipment Directive 97/23/EC. All valves are CE marked and supplied with a test certificate plus a declaration of conformity.

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Hydraulic Service

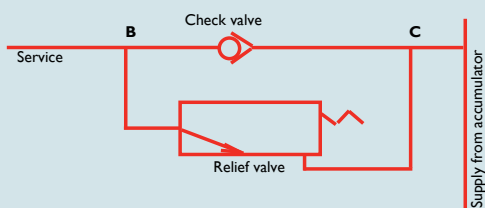


Product Description

The Type I4460 and I4470 check / thermal relief valves have been developed to directly replace a single unit separate check and thermal relief valves used, for example, in wellhead control systems.

The principal feature of this valve is its ability to return over pressurised fluid caused by thermal expansion downstream internally back to the supply point - thereby eliminating separate exhaust piping.

The check / thermal relief valve weight is 1.04 Kg.



The pressure differential between **B** and **C** caused by thermal expansion downstream of **B** is exhausted through the relief valve back into the supply at point **C**. The design of the relief valve is such that variations in pressure at point **C** caused by the operation of adjacent valves or by leakage have no effect on the setting of the relief valve. Even in the event of the supply pressure falling to zero, the set point and sealing integrity of the relief valve will be retained.

Selection Chart - Ordering Example

CHECK / THERMAL RELIEF VALVE I4460 AND I4470 SPECIFICATIONS								
Part Number	Pressure Range (bar)	Port Size	Dimension A	Check Valve Flow Rate Cv	Proof Test Pressure (bar)	Cracking Pressure (bar)	Thermal Expansion Max Flow (litres / min)	Repair Kit
*I4460 - 01	35 - 345	Manifold	132	0.56	1000	0.3	2	RS I4460 - 01
*I4460 - 02	345 - 700	Manifold	132	0.56	1000	0.3	2	RS I4460 - 02
I4470 - 01	35 - 345	1/4" NPT	132	0.56	1000	0.3	2	RS I4470 - 01
I4470 - 02	345 - 700	1/4" NPT	132	0.56	1000	0.3	2	RS I4470 - 02
I4470 - 03	35 - 345	3/8" NPT	132	0.56	1000	0.3	2	RS I4470 - 03
I4470 - 04	345 - 700	3/8" NPT	132	0.56	1000	0.3	2	RS I4470 - 04
I4470 - 07	35 - 345	1/2" NPT	139	1.60	400	0.4	6	RS I4470 - 07
I4470 - 08	345 - 700	1/2" NPT	132	0.56	1000	0.3	2	RS I4470 - 08
I4470 - 10	345 - 700	3/8" MP Butech	139	1.60	400	0.4	6	RS I4470 - 10

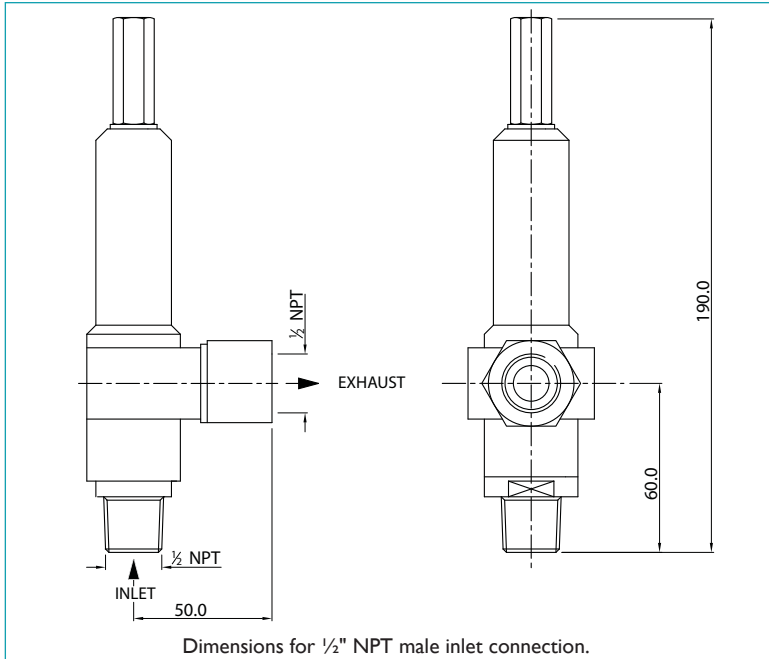
\* Models I4460 are manifold mounted.

It is the responsibility of the system designer and user to select products that are suitable for their intended application of use.

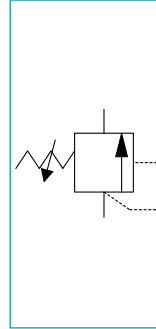
Hydraulic Service



Low Pressure Relief Valves for Accurate System Over Pressure Protection



SCHEMATIC



Features and Benefits

- Suitable for chemical applications
- Valve Construction - the valve uses chemical resistant polymer materials in the seat to provide good low pressure seating with zero leakage.
- Sealing Re-Seat Pressure - Virtually zero leakage re-seat pressure  $\geq 90\%$  of cracking pressure.
- Flow Capacity - Flow rates up to 112l / min. at 10% over pressure.
- Long Life and Repeatable Performance - are ensured through a large area seat.

Materials

Body	- 316L stainless steel	
Spring	- 316S42 and 302S26 stainless steel	
Seal Material	- Nitrile	- standard
	- Viton	- add suffix M089 eg. I4340 - 08 - M089
	- Silicone	- add suffix M065 eg. I4340 - 08 - M065
	- Low Temp Nitrile	- add suffix M106 eg. I4340 - 08 - M106
Seat Material	- Acetal	- standard
	- PEEK	- add suffix M100 eg. I4340 - 08 - M100

Approvals Details



These relief valves conform to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and are ATEX compliant. These valves also conform to the Pressure Equipment Directive 97/23/EC. All valves are CE marked and supplied with a test certificate plus a declaration of conformity.

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Hydraulic Service



Product Description

The Type I4340 low pressure relief valve has been designed to provide accurate pressure control in systems operating at pressures up to 100 bar, such as chemical injection applications.

Flow Capacity - Flow rates up to 112 l / min at 10% over pressure.

The low pressure relief valve weight is 0.89 Kg.

Selection Chart - Ordering Example

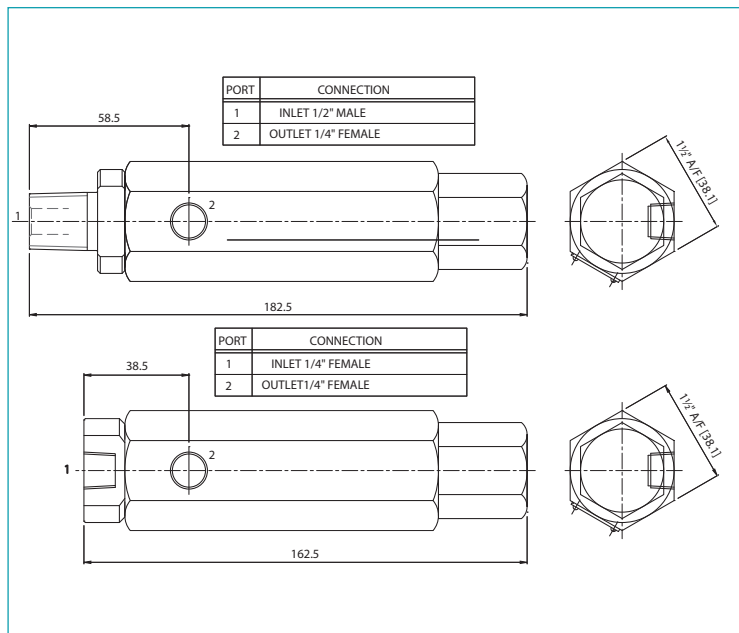
LOW PRESSURE RELIEF VALVE I4340 SPECIFICATIONS				
Part Number	Pressure Range (bar)	Inlet Connection	Outlet Connection	Repair Kit
I4340 - 08	5 - 50	1/4" NPT Female	1/4" NPT Female	RS I4340 - 08
I4340 - 12	5 - 100	1/4" NPT Female	1/4" NPT Female	RS I4340 - 12
I4340 - 13	5 - 50	1/4" BSP	1/4" BSP	RS I4340 - 13
I4340 - 14	5 - 100	1/4" BSP	1/4" BSP	RS I4340 - 14
I4340 - 11	5 - 50	3/8" NPT	3/8" NPT	RS I4340 - 11
I4340 - 15	5 - 100	3/8" NPT	3/8" NPT	RS I4340 - 15
I4340 - 03	5 - 50	1/2" NPT Male	1/2" NPT Female	RS I4340 - 03
I4340 - 04	5 - 100	1/2" NPT Male	1/2" NPT Female	RS I4340 - 04
I4340 - 06	5 - 50	1/2" BSP Male	1/2" BSP Female	RS I4340 - 06
I4340 - 02	5 - 50	3/4" NPT Female	1/2" NPT Female	RS I4340 - 02
I4340 - 07	5 - 50	3/4" NPT Female	3/4" NPT Female	RS I4340 - 07
I4340 - 16	5 - 50	3/4" BSP	3/4" BSP	RS I4340 - 16
I4340 - 17	5 - 100	3/4" BSP	3/4" BSP	RS I4340 - 17
I4340 - 09	5 - 50	1" BSP Female	1" BSP Female	RS I4340 - 09
I4340 - 05	5 - 50	1" NPT Male	1" NPT Female	RS I4340 - 05

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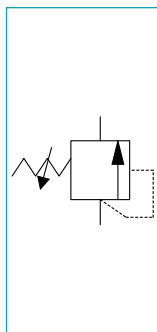
Hydraulic Service



Relief Valves Direct Acting



SCHEMATIC



Features and Benefits

- Set Point Repeatability ±3%.
- Set Point Range - user specified up to 932 bar.
- Sealing Re-Seat Pressure - Virtually zero leakage re-seat pressure ≥ 90% of cracking pressure.
- Proof Test - proof test pressure: 1000 bar.
- Orifice Sizes: Ø 1/8", Ø 5/32" and Ø 3/16".
- Back Pressure - set point is affected by vent back pressure. Maximum permissible back pressure 100 bar.
- Operating Media - Mineral oils, water-glycol mixtures with corrosion inhibitor.
- Prevention of Fluid Leakage - the possibility of fluid leakage via the threads of the spring adjusting screw is prevented by a sealing / locking cap fitted over the protruding end of the screw.

Materials

- External & Wetted Parts - 316L stainless steel
- Seat Material - 316L stainless steel

Approvals Details



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## Hydraulic Service



## Product Description

The type 7608, 7668, 7708 and 7768 relief valves offer a choice of three orifice sizes, each with either 1/4" NPT female, or 1/2" NPT male, inlet connections. The valve is of the direct acting type, comprising a hexagonal section body in which a piston is spring loaded against a seat formed on the inner end of an inlet orifice.

The loading spring is immersed in the valve operating fluid, the spring chamber being connected to the valve outlet port through a fluid way in the piston.

Special manufacturing materials ensure that the valve complies with NACE Standard MR-01-75 when requested and is thus suitable for use in most fluid systems. It should be noted, however, that the valve is designed to function as a safety device and should not be used as an overspill valve to off load excess pump flow and control fluid pressure within a system.

Recommended filtration is 10 micron.  
The relief valve weight is 1.27 Kg.

## Selection Chart - Ordering Example

RELIEF VALVE 7608, 7668, 7708 and 7768 SPECIFICATIONS

Part Number	Pressure Range (bar)	Inlet Connection	Outlet Connection	Repair Kit
7648	69 - 414	1/4" NPT Female	1/4" NPT Female	RS 7648
7608	90 - 620	1/4" NPT Female	1/4" NPT Female	RS 7608
7618	90 - 932	1/4" NPT Female	1/4" NPT Female	RS 7618
7748	69 - 414	1/4" BSP Female	1/4" BSP Female	RS 7748
7708	90 - 620	1/4" BSP Female	1/4" BSP Female	RS 7708
7718	90 - 932	1/4" BSP Female	1/4" BSP Female	RS 7718
24100-01	69 - 414	3/8" MP	1/4" NPT	RS 24100-01
24100-02	90 - 620	3/8" MP	1/4" NPT	RS 24100-02
24100-03	90 - 932	3/8" MP	1/4" NPT	RS 24100-03
24200-01	69 - 414	3/8" NPT	3/8" NPT	RS 24200-01
24200-02	90 - 620	3/8" NPT	3/8" NPT	RS 24200-02
24200-03	90 - 932	3/8" NPT	3/8" NPT	RS 24200-03
24100-04	69 - 414	3/8" MP	3/8" NPT	RS 24100-04
24100-05	90 - 620	3/8" MP	3/8" NPT	RS 24100-05
24100-06	90 - 932	3/8" MP	3/8" NPT	RS 24100-06
24100-07	69 - 414	3/8" MP	3/8" BSP	RS 24100-07
24100-08	90 - 620	3/8" MP	3/8" BSP	RS 24100-08
24100-09	90 - 932	3/8" MP	3/8" BSP	RS 24100-09
24300-01	69 - 414	3/8" BSP	3/8" BSP	RS 24300-01
24300-02	90 - 620	3/8" BSP	3/8" BSP	RS 24300-02
24300-03	90 - 932	3/8" BSP	3/8" BSP	RS 24300-03
7668	69 - 414	1/2" NPT Male	1/4" MP Female	RS 7668
7638	90 - 620	1/2" NPT Male	1/4" MP Female	RS 7638
7768	69 - 414	1/2" BSP Male	1/4" BSP Female	RS 7768
7728	90 - 620	1/2" BSP Male	1/4" BSP Female	RS 7728
7738	90 - 932	1/2" BSP Male	1/4" BSP Female	RS 7738
7628	90 - 620	1/2" NPT Male	1/2" NPT Male	RS 7628
24400-01	69 - 414	9/16" MP	9/16" NPT	RS 24400-01
24400-02	90 - 620	9/16" MP	9/16" NPT	RS 24400-02
24400-03	90 - 932	9/16" MP	9/16" NPT	RS 24400-03
24400-04	69 - 414	9/16" MP	3/8" NPT	RS 24400-04
24400-05	90 - 620	9/16" MP	3/8" NPT	RS 24400-05
24400-06	90 - 932	9/16" MP	3/8" NPT	RS 24400-06
24400-07	69 - 414	9/16" MP	3/8" BSP	RS 24400-07
24400-08	90 - 620	9/16" MP	3/8" BSP	RS 24400-08
24400-09	90 - 932	9/16" MP	3/8" BSP	RS 24400-09

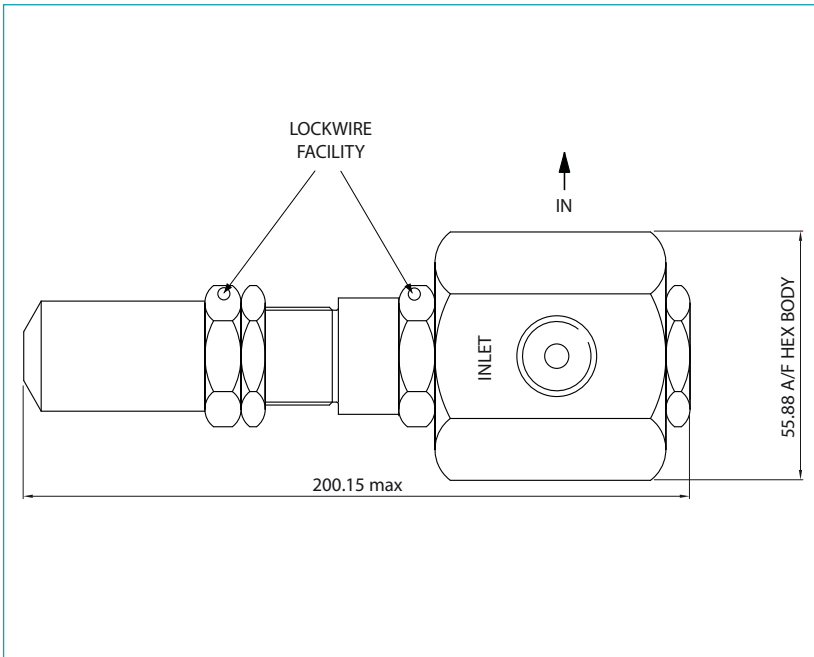
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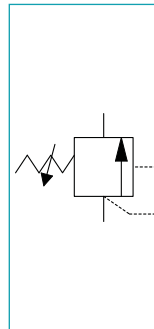
Hydraulic Service



Relief Valves for Accurate Pressure Control



SCHEMATIC



Features and Benefits

- Up to 700 bar, 45 l / m
- Set Point Repeatability ±2%.
- Sealing Re-Seat Pressure - Virtually zero leakage re-seat pressure ≥ 90% of cracking pressure.
- Proof Test - proof test pressure: 1000 bar.
- Flow Capacity - at 10% overpressure: 45 l / m.
- Orifice Size: Ø 3/16".
- Important - Set point is affected by vent port back pressure and will DECREASE accordingly.
- The Main Spring Load - is not transmitted to the seat, thus reducing distortion and wear.

Materials

External & Wetted Parts	- 316L stainless steel		
	- M390		
Seal Material	- Nitrile	- standard	
	- Viton	- add suffix M089	eg. I 4450 - 08 - M089
	- Silicone	- add suffix M065	eg. I 4450 - 08 - M065
	- Low Temp Nitrile	- add suffix M106	eg. I 4450 - 08 - M106
Seat Material	- M340		

Approvals Details

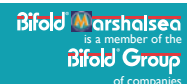


These relief valves conform to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and are ATEX compliant. These valves also conform to the Pressure Equipment Directive 97/23/EC. All valves are CE marked and supplied with a test certificate plus a declaration of conformity.

**Accuracy of information**  
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**Quality Assurance**  
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## Hydraulic Service



## Product Description

The Type I 4450 precision relief valve has been designed to provide accurate over pressure protection in systems operating at pressures of up to 700 bar and flows of up to 45 l / m.

Precision relief valves have very high sealing forces along with accurate and narrow dead bands. Precision relief valves should be used in preference to sprung relief valves where there is risk of vibration induced leakage or where dead bands are important to system safety performance. Sprung relief valves typically will have a narrow dead band when tested on a static dead weight tester but will have a much wider dead band under flowing conditions that will require a significant drop in system pressure to enable the valve to reset.

The floating poppet design enhanced by the use of linear bearings produces characteristics which are non flow dependent and ensures long life with repeatable performance.

Installation and removal of system pipe work is simplified by the right angled porting configuration.

The relief valve weight is 1.38 Kg.

## Selection Chart - Ordering Example

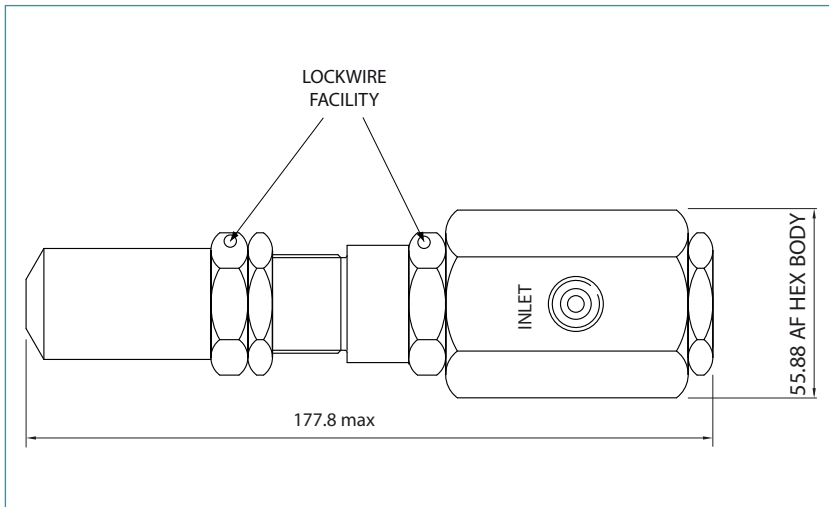
RELIEF VALVE I 4450 SPECIFICATIONS				
Part Number	Pressure Range (bar)	Outlet Connection	Inlet Connection	Repair Kit
I 4450 - 01	103 - 240	½" NPT Female	½" NPT Female	RS I 4450 - 01
I 4450 - 02	207 - 414	½" NPT Female	½" NPT Female	RS I 4450 - 02
I 4450 - 03	345 - 700	½" NPT Female	½" NPT Female	RS I 4450 - 03
I 4450 - 04	103 - 240	½" BSP Female	½" BSP Female	RS I 4450 - 04
I 4450 - 05	207 - 414	½" BSP Female	½" BSP Female	RS I 4450 - 05
I 4450 - 06	345 - 700	½" BSP Female	½" BSP Female	RS I 4450 - 06
I 4450 - 07	103 - 240	¾" NPT Female	¾" NPT Female	RS I 4450 - 07
I 4450 - 08	207 - 414	¾" NPT Female	¾" NPT Female	RS I 4450 - 08
I 4450 - 09	345 - 700	¾" NPT Female	¾" NPT Female	RS I 4450 - 09
I 4450 - 10	103 - 240	¾" MP Female	¾" MP Female	RS I 4450 - 10
I 4450 - 11	207 - 414	¾" MP Female	¾" MP Female	RS I 4450 - 11
I 4450 - 12	345 - 700	¾" MP Female	¾" MP Female	RS I 4450 - 12

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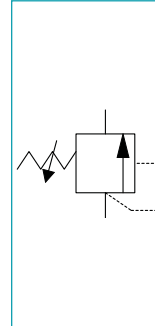
Hydraulic Service



Relief Valves for Accurate Pressure Control



SCHEMATIC



Features and Benefits

- Up to 1200 bar, 25 l / m
- Set Point Repeatability ±2%.
- Sealing Re-Seat Pressure - Virtually zero leakage re-seat pressure ≥ 90% of cracking pressure.
- Proof Test - proof test pressure: 1000 bar.  
\* proof test pressure: 1350 bar.
- Flow Capacity - at up to 10% overpressure: 25 l / m.
- Orifice Size: Ø 1/8".
- Important - Set point is affected by vent port back pressure and will DECREASE accordingly.
- The Main Spring Load - is not transmitted to the seat, thus reducing distortion and wear.

Materials

External & Wetted Parts	- 316L stainless steel	
	- M390	
Seal Material	- Nitrile	- standard
	- Viton	- add suffix M089 eg. I4520 - 08 - M089
	- Silicone	- add suffix M065 eg. I4520 - 08 - M065
	- Low Temp Nitrile	- add suffix M106 eg. I4520 - 08 - M106
Seat Material	- M340	

Working Temperature

Temperature Range:	
Viton	-20°C to +180°C
Nitrile	-20°C to +80°C
Fluorosilicone	-60°C to +60°C
Acetal	-60°C to +60°C

Approvals Details



These relief valves conform to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and are ATEX compliant. These valves also conform to the Pressure Equipment Directive 97/23/EC. All valves are marked and supplied with a test certificate plus a declaration of conformity.

Product Description

The Type I4520, I4530, I4580 and I4570 precision relief valve has been designed to provide accurate over pressure protection in systems operating at pressures of up to 1200 bar and flows of up to 25 l / m.

Precision relief valves have very high sealing forces along with accurate and narrow dead bands. Precision relief valves should be used in preference to sprung relief valves where there is risk of vibration induced leakage or where dead bands are important to system safety performance. Sprung relief valves typically will have a narrow dead band when tested on a static dead weight tester

but will have a much wider dead band under flowing conditions and will require a significant drop in system pressure to enable the valve to reseat. The floating poppet design enhanced by the use of linear bearings produces characteristics which are non flow dependent and ensures long life with repeatable performance.

Installation and removal of system pipe work is simplified by the right angled porting configuration.

The relief valve weight is 0.97 Kg.

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Selection Chart - Ordering Example

RELIEF VALVE I 4520, I 4530 AND I 4580 SPECIFICATIONS

Part Number	Pressure Range (bar)	Inlet Connection	Outlet Connection	Repair Kit
I 4530 - 01	100 - 240	1/4" NPT	1/4" NPT	RS I 4530 - 01
I 4530 - 02	207 - 414	1/4" NPT	1/4" NPT	RS I 4530 - 02
I 4530 - 03	345 - 700	1/4" NPT	1/4" NPT	RS I 4530 - 03
I 4530 - 04	100 - 240	1/4" BSP	1/4" BSP	RS I 4530 - 04
I 4530 - 05	207 - 414	1/4" BSP	1/4" BSP	RS I 4530 - 05
I 4530 - 06	345 - 700	1/4" BSP	1/4" BSP	RS I 4530 - 06
I 4580 - 13	100 - 240	3/8" MP	1/4" NPT	RS I 4580 - 13
I 4580 - 14	207 - 414	3/8" MP	1/4" NPT	RS I 4580 - 14
I 4580 - 15	345 - 700	3/8" MP	1/4" NPT	RS I 4580 - 15
I 4580 - 16	600 - 1200	3/8" MP	1/4" NPT	RS I 4580 - 16
I 4520 - 01	100 - 240	3/8" NPT	3/8" NPT	RS I 4520 - 01
I 4520 - 02	207 - 414	3/8" NPT	3/8" NPT	RS I 4520 - 02
I 4520 - 03	345 - 700	3/8" NPT	3/8" NPT	RS I 4520 - 03
I 4520 - 04	100 - 240	3/8" BSP	3/8" BSP	RS I 4520 - 04
I 4520 - 05	207 - 414	3/8" BSP	3/8" BSP	RS I 4520 - 05
I 4520 - 06	345 - 700	3/8" BSP	3/8" BSP	RS I 4520 - 06
I 4580 - 01	100 - 240	3/8" MP	3/8" NPT	RS I 4580 - 01
I 4580 - 02	207 - 414	3/8" MP	3/8" NPT	RS I 4580 - 02
I 4580 - 03	345 - 700	3/8" MP	3/8" NPT	RS I 4580 - 03
I 4580 - 04	600 - 1200	3/8" MP	3/8" NPT	RS I 4580 - 04
I 4580 - 07	100 - 240	3/8" MP	3/8" BSP	RS I 4580 - 07
I 4580 - 08	207 - 414	3/8" MP	3/8" BSP	RS I 4580 - 08
I 4580 - 09	345 - 700	3/8" MP	3/8" BSP	RS I 4580 - 09
I 4580 - 04	600 - 1200	3/8" MP	3/8" BSP	RS I 4580 - 04
I 4580 - 11	600 - 1200	3/8" MP	3/8" MP	RS I 4580 - 11
I 4580 - 17	100 - 240	3/8" MP	1/2" NPT	RS I 4580 - 17
I 4580 - 18	207 - 414	3/8" MP	1/2" NPT	RS I 4580 - 18
I 4580 - 19	345 - 700	3/8" MP	1/2" NPT	RS I 4580 - 19
I 4580 - 20	600 - 1200	3/8" MP	1/2" NPT	RS I 4580 - 20
23600 - 01	100 - 240	1/2" NPT	1/2" NPT	RS 23600 - 01
23600 - 02	207 - 414	1/2" NPT	1/2" NPT	RS 23600 - 02
23600 - 03	345 - 700	1/2" NPT	1/2" NPT	RS 23600 - 03
23600 - 04	600 - 1200	1/2" NPT	1/2" NPT	RS 23600 - 04
I 4570 - 01	100 - 240	9/16" MP	3/8" NPT	RS I 4570 - 01
I 4570 - 02	207 - 414	9/16" MP	3/8" NPT	RS I 4570 - 02
I 4570 - 03	345 - 700	9/16" MP	3/8" NPT	RS I 4570 - 03
I 4570 - 10	600 - 1200	9/16" MP	3/8" NPT	RS I 4570 - 10
I 4570 - 07	100 - 240	9/16" MP	3/8" BSP	RS I 4570 - 07
I 4570 - 08	207 - 414	9/16" MP	3/8" BSP	RS I 4570 - 08
I 4570 - 09	345 - 700	9/16" MP	3/8" BSP	RS I 4570 - 09
I 4570 - 04	600 - 1200	9/16" MP	3/8" BSP	RS I 4570 - 04
I 4570 - 11	600 - 1200	9/16" MP	9/16" MP	RS I 4570 - 11
I 4570 - 12	100 - 240	9/16" MP	1/2" NPT	RS I 4570 - 12
I 4570 - 13	207 - 414	9/16" MP	1/2" NPT	RS I 4570 - 13
I 4570 - 14	345 - 700	9/16" MP	1/2" NPT	RS I 4570 - 14
I 4570 - 15	600 - 1200	9/16" MP	1/2" NPT	RS I 4573 - 15
23700 - 01	100 - 240	3/4" NPT	3/4" NPT	RS 23700 - 01
23700 - 02	207 - 414	3/4" NPT	3/4" NPT	RS 23700 - 02
23700 - 03	345 - 700	3/4" NPT	3/4" NPT	RS 23700 - 03
23700 - 04	600 - 1200	3/4" NPT	3/4" NPT	RS 23700 - 04
23800 - 01	100 - 240	3/4" MP	3/4" MP	RS 23800 - 01
23800 - 02	207 - 414	3/4" MP	3/4" MP	RS 23800 - 02
23800 - 03	345 - 700	3/4" MP	3/4" MP	RS 23800 - 03
23800 - 04	600 - 1200	3/4" MP	3/4" MP	RS 28700 - 04

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**Instrument, Process,  
Directional Control Valves,  
and Pumps**

**Bifold® Group**

**Pneumatic and  
Instrumentation Valves**

**Hydraulic Valves**

**Subsea Valves**

**Hydraulic Pumps,  
Intensifiers and Valves**

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**Bifold®  Marshalsea**

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**Innovative and Reliable  
Valve Solutions**



**[www.bifold.co.uk](http://www.bifold.co.uk)**

## Flowline Pilot Valve

# Models PSV5A / PSV5E

Low / High or Combination Pressure Sensor



The pilot for rapid response and consistent set point

### Features:

- High flow
- Narrow deadband < 10% of max. set point
- Block before bleed
- Compact design
- Economy version available
- Arctic service option to -50°C



## Reliability and Innovation in directional control valves

### FEATURES :-

- High flow Cv 0.1
- Narrow deadband < 10% of max. set point
- High stability
- PTFE compound high pressure seals
- Arctic Service type available
- NACE MR-01-75

- ensures low pressure oil systems achieve shutdown time
- critical for high-low combinations
- precision adjustment
- low friction for improved set point reliability and low deadband
- option with operation down to -50°C
- all wetted materials compliant to NACE specification

### MECHANICAL :-

- Body :- stainless steel 316L
- Internal components:- stainless steel 316L  
- CA104 aluminium bronze
- Adjustable Knob:- - plastic
- Springs:- stainless steel 302S26
- Seals:- Nitrile and PTFE compound as standard.  
Alternative elastomers available for extreme conditions.
- Fasteners:- A4 18/10 316 stainless steel

### WEIGHT :-

approx 1.5 kg (single)

### VALVE TYPE :-

3 port, 2 position, Normally universal, Block Before Bleed

### MEDIA - CONTROLLED :-

Air, sweet and sour natural gases, bottled gases, mineral oils, water glycol mixtures

### MEDIA - SENSED:-

Air, sweet and sour gases, bottled gases, mineral oils, water glycol mixtures, crude oil

### WORKING PRESSURE :-

0 - 10 bar (0 - 145 psi) control pressure  
700 bar (10, 150 psi) max, flowline pressure

### SET POINT RELIABILITY:-

+ / -1%

### REPAIR KITS:-

### CONNECTIONS :-

1/2" NPT male / 1/4" NPT female flowline as standard  
1/4" NPT female control lines

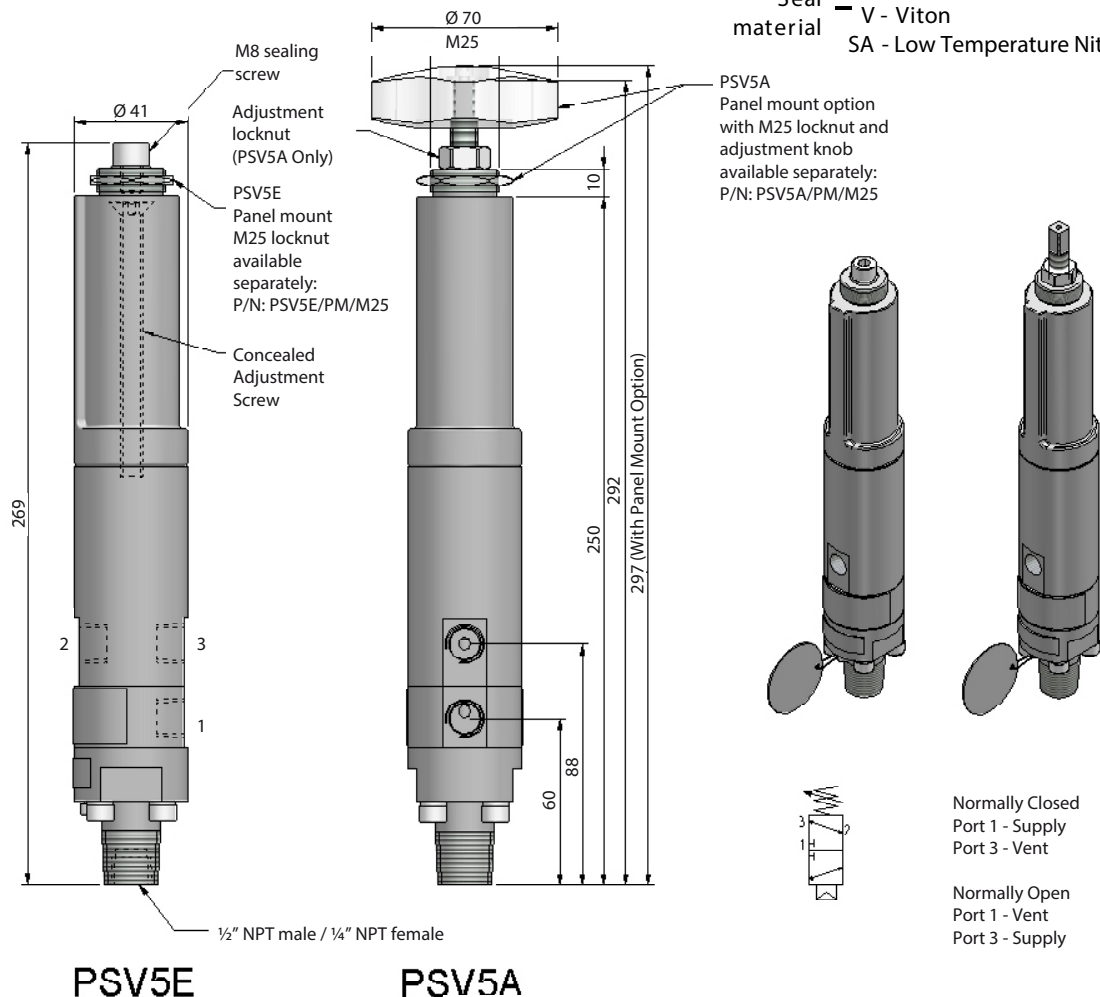
### TEMPERATURE RANGE :-

See seal options

PSV5X/0010/H'X'/X/RK

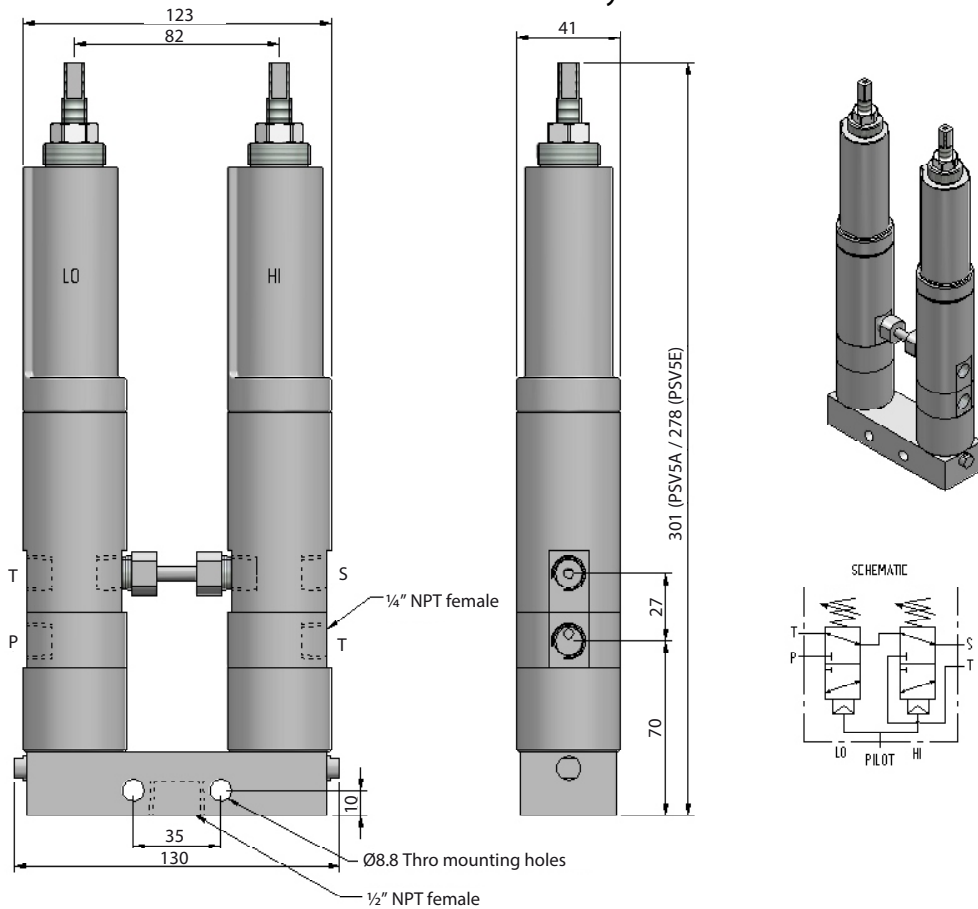
Set point range code: 1 to 9  
See selection chart

Seal material  
S - Nitrile  
V - Viton  
SA - Low Temperature Nitrile



## DUAL FLOWLINE PILOT :-

Reliability and Innovation in directional control valves



## SELECTION CHART :-

PSV5A PSV5E							Model Code		
0010      10 bar							Control Pressure		
Combination	Std	Set Point Range (bar)				Max Working Flowline Pressure		Model Type	
		L Falling / Falling		H Rising / Rising		Gaseous	Hydraulic		
		Min	Max	Min	Max				
L1	H1	H1	172	640	205	680	750		750
L2	H2	H2	70	360	100	380	750		750
L3	H3	H3	70	270	80	300	750		750
L4	H4	H4	30	170	40	180	750		750
L5	H5	H5	25	95	30	115	750		750
L6	H6	H6	20	70	20	80	750		750
L7	H7	H7	8.6	28	10	30	365		582
L8	H8	H8	3	16.5	4.5	18	265	410	
L9	H9	H9	2.5	10.5	3	11	165	263	
		04	1/4" NPT					Port Size	
		32	3 way, 2 position					Configuration	
		NU	Normally Universal					Configuration	
		S	Nitrile (standard)		(-30°C to +130°C)		O-Ring Material		
		V	Viton		(-20°C to +180°C)				
		SA	Low Temperature Nitrile		(-50°C to +40°C)				
PSV5E / 0010      /      H1 / 04 / 32 / NU / V - x (x - revision to be advised on order)							Ordering Example		
PSV5A / 0010      / L1 / H4 / 04 / 32 / NU / V - x									

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## Flowline pilot valves

### Types 2010–2175

These flowline pilot valves are pilot-operated, three port, two position valves with a spring return action. The pressure at which the valve functions is variable by adjusting the spring force – a wide range of pressure settings is covered by using seven interchangeable sensing head assemblies.

The pilots can be supplied with either normally open or normally closed slide configurations, and function with a ‘block before bleed’ action.

The pilots are used to switch a pneumatic or hydraulic control pressure on rising or falling flowline pressures in pipeline valve and wellhead safety control systems.

Construction materials, predominantly 316 stainless steel and CA104 aluminium-bronze, and seals of fluor elastomers and PTFE materials ensure high corrosion resistance and comply with NACE Standard MR-01-75 (latest revision as applicable).

### Operating parameters

Control pressure – standard	Gas 17.3 bar (250 psi).
Control pressure – high	Hydraulic fluid up to 400 bar (6,000 psi) max
Process pressure	690 bar (10,000 psi).max 380 bar (5,510 psi) max – 2X1X only.
Operating media	Mineral oil, water, water-glycol mixtures, air, natural and sour gases.
Connections – controls	1/4” NPT.
Connection – process	1/2” or 3/4” NPT.
Flow rate, nominal	4.5 litres/min (1.0 imp gall/min).
Pressure drop	See performance curve.
Working temperature – standard	–20°C to + 130°C.
Working temperature – arctic	Available on request
Recommended filtration	25 micron



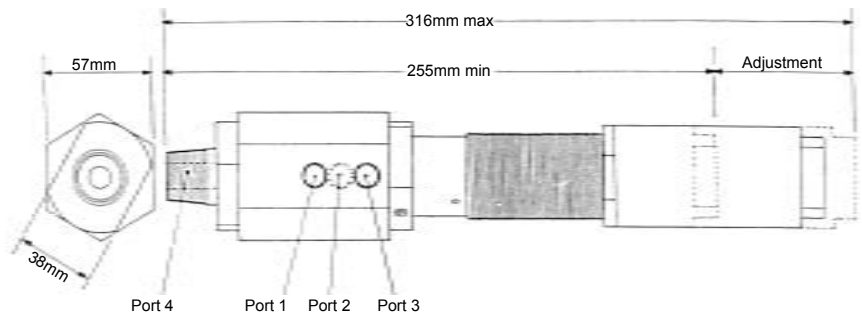
These valves conform to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



Marshalsea Hydraulics has been assessed by SGS Société Générale de Surveillance SA and certified as meeting the requirements of ISO 9001:2000 for the design, development, manufacture and servicing of hydraulic pumps, relief valves and intensifiers.

Type Number N/O	N/C	Pressure (bar)	Pressure (psi)	Process Connection
2010	2110	3.5–17.3	50–250	1/2" NPT
2015	2115	3.5–17.3	50–250	3/4" NPT
2020	2120	13.7–31	200–450	1/2" NPT
2025	2125	13.7–31	200–450	3/4" NPT
2030	2130	31–59	450–850	1/2" NPT
2035	2135	31–59	450–850	3/4" NPT
2040	2140	59–152	850–2,200	1/2" NPT
2045	2145	59–152	850–2,200	3/4" NPT
2050	2150	152–372	2,200–5,400	1/2" NPT
2055	2155	152–372	2,200–5,400	3/4" NPT
2060	2160	372–690	5,400–10,000	1/2" NPT
2065	2165	372–690	5,400–10,000	3/4" NPT
2070	2170	15.9–89	230–1,300	1/2" NPT
2075	2175	15.9–89	230–1,300	3/4" NPT

Type number specifications



Drawing giving dimensions

Weight: 2.7kg



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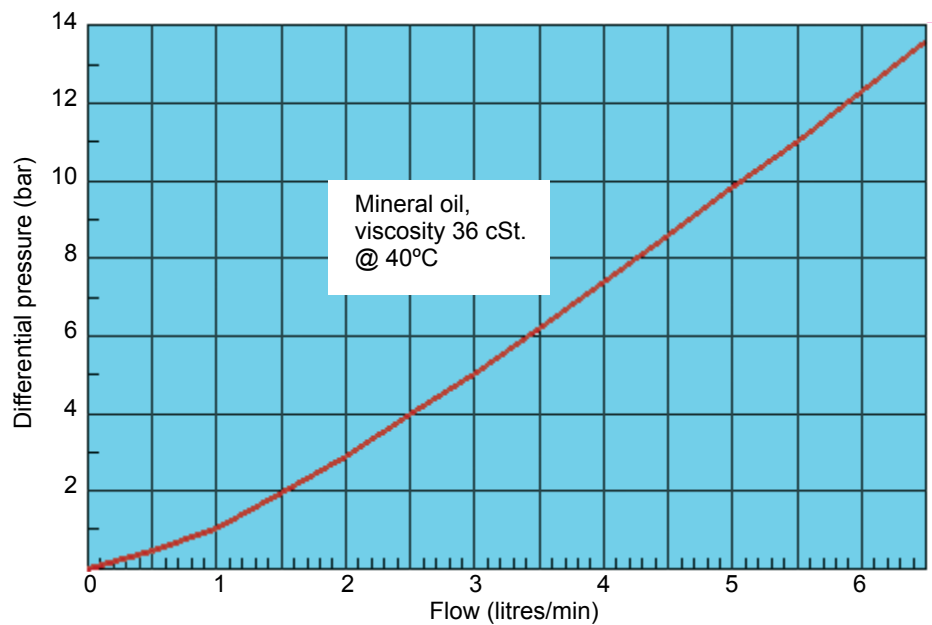
We reserve the right to alter specifications or withdraw products without notice

## Flowline pilot valves Types 2010–2175 (continued)

### Port assignments

Port	Type 20XX	Type 21XX
Port 1	Tank	Supply
Port 2	Service	Service
Port 3	Supply	Tank
Port 4	Process	Process

### Performance curve







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Fusible Valves

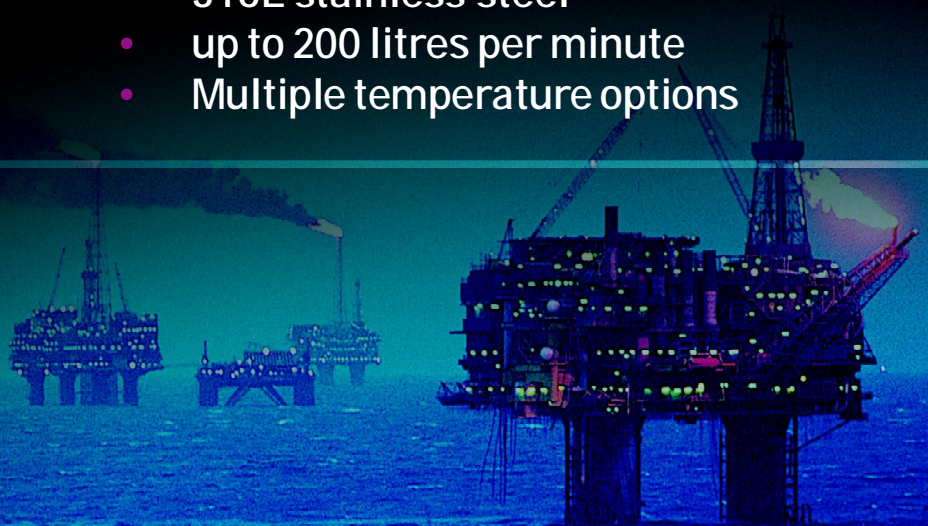
# Frangible Bulb and Eutectic Material

upto 690 bar, 200 litres per minute (nominal)

Superior performance  
throughout the full  
operational range

Features:

- 316L stainless steel
- up to 200 litres per minute
- Multiple temperature options



## INTRODUCTION

Bifold Fluidpower fusible valves have been applied in onshore / offshore oil and gas production safety shutdown systems since 1989. The extensive range includes valves and basic screw-in plugs for pneumatic / low pressure liquid applications, and single and two-stage valves for high pressure liquid service at pressures upto 690 bar (10000psi). Both pneumatic and high pressure liquid service valves are available in 2-way, 2-position and 3-way, 2-position configurations.

Materials of construction are predominantly 316L stainless steel. Elastomer sealing material is Viton as standard (other materials are available for extreme temperature conditions).

## OPERATING PARAMETERS

### WORKING PRESSURE:

12 bar max, - pneumatic / low pressure liquid service  
690 bar max, - liquid service (wp limited according to valve type)

### OPERATING TEMPERATURES:

Frangible bulb : 57°C, 68°C, 79°C, 93°C, 141°C, 182°C  
Eutectic plug : 72°C, 92°C, 125°C, 135°C,

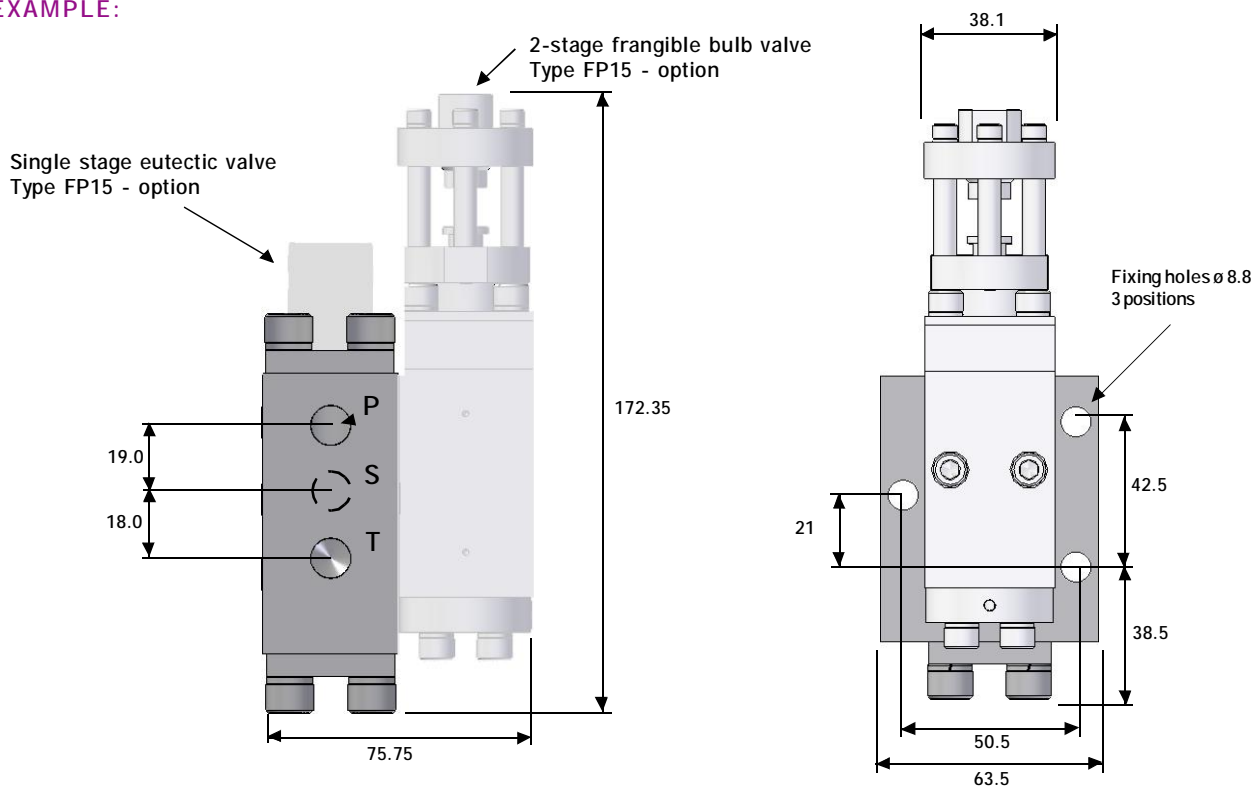
### CONNECTIONS:

1/4" NPT, 3/8" NPT, 1/2" NPT according to valve type

### FLOW CAPACITY:

Up to 50lpm nominal, direct acting  
Up to 200lpm nominal, indirect acting

## EXAMPLE:



## SELECTION CHARTS:

Direct Acting, Eutectic Plug - up to 690 bar liquid service:

ETSV			Eutectic Plug valve	Model Code
15	15 lpm nominal	690 bar max		Flow Rating
50	50 lpm nominal	414 bar max		Flow Rating
04	1/4" NPT	15 lpm		Connections
06	3/8" NPT			Connections
08	1/2" NPT	50 lpm		Connections
22	2-way, 2-position			Configuration
32	3-way, 2-position			Configuration
NC	Normally Closed	(fail closed when plug melts)		Configuration
NO	Normally Open	(fail open when plug melts)		Configuration
S	Nitrile	(-30°C to +130°C)		O-ring Material
V	Viton	(-20°C to +180°C)		O-ring Material
		72C ; 92C ; 125C ; 135C		Melt temperature (°C)
ETSV 50 / 08 / 22 / NO / V / 92C				Example Code

**Direct Venting Plug - 12 bar pneumatic / liquid service:**

<b>ETSP</b>	Eutectic Plug	<b>Model Code</b>
04	1/4" NPT	<b>Connections</b>
06	3/8" NPT	
08	1/2" NPT	
	72C ; 92C ; 125C ; 135C	<b>Melt temperature (°C)</b>
ETSP / 08 / 72C		<b>Example Code</b>

**Direct Acting, Frangible Bulb - up to 690 bar liquid service 2/2 & 3/2**

<b>FBVP</b>		<b>Model Code</b>
80	Subbase mounting	<b>Connections</b>
81	1/4NPT body ported Type 81x3 & 81x8 only	
0	3-way, 2-position	<b>Configuration</b>
1	2-way, 2-position	
3	5 lpm @10 bar Dp	<b>Flow rating</b>
3RF	5 lpm @ 10 bar Dp reverse flow 'S' to 'P'	
5	1 lpm nominal	
8	8 lpm @ 10 bar Dp	
NC	Normally Closed (fail close on bulb fracture)	<b>Configuration</b>
03	207 bar Type 8xx8, 8x13, 8x15	<b>Working Pressure</b>
05	345 bar Type 8x03, 8x05	
07	518 bar Types 8x05	
10	690 bar	
S	Nitrile (-30°C to +130°C)	<b>O-ring Material</b>
V	Viton (-20°C to +180°C)	
	57C ; 68C ; 79C ; 93C ; 141C ; 182C	<b>Bulb Rating (°C) (+/- 3.5%)</b>
FBVP 80 0 3RF / NC / 05 / V / 93C		<b>Example Code</b>

**Indirect Acting, Frangible Bulb - up to 690 bar liquid service 2/2 & 3/2**

<b>FP15</b> 15 lpm nominal <b>FP50</b> 50 lpm nominal <b>FP100</b> 100 lpm nominal <b>FP200</b> 200 lpm nominal <b>FPV8xxx</b> up to 40 lpm nominal (contaminated fluids)	2-stage frangible bulb valve	<b>Model Code</b>
REFER TO PRODUCT CATALOGUES FOR FULL ORDERING CODES		

**Direct Acting, Frangible Bulb - 12 bar pneumatic / liquid service - Vent to atmosphere on bulb fracture.**

<b>S06</b> 1/4 NPT <b>S09</b> 3/8 NPT <b>S12</b> 1/2 NPT	<b>Connections</b>	
<b>FVMB</b>	<b>Model Code</b>	
57C ; 68C ; 79C ; 93C ; 141C ; 182C ; 260C	<b>Bulb Rating (°C) +/- 3.5%</b>	
S06 / FVMB / 79C		<b>Example Code</b>

**Preferred Range**



S06-FVMB-68C

1/4" NPT Frangible bulb valve rates 68oC, 1 - 12 bar

S12-FVMB-68C

1/2" NPT Frangible bulb valve rates 68oC, 0 - 12 bar

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Web:- [www.bifold-fluidpower.co.uk](http://www.bifold-fluidpower.co.uk)

### *Quality Assurance*

*All Bifold Fluidpower products are manufactured to a most stringent QA programme. Every care is taken at all stages of manufacture to ensure that every product will give optimum performance and reliability. We are recognised to EN ISO 9001:2000. Functional test certificate, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BSEN 10204 3.1.B where available. The manufacturer reserves the right to make changes to the specifications and design etc., without prior notice*

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# Pneumatic & Hydraulic Accessory Valves Shuttle Valves

up to 690 bar

Superior performance  
throughout the full  
operational range

## Features:

- 316L stainless steel
- Arctic Service options to -50°C
- Subsea availability





Reliability and innovation in directional control valves

## Hydraulic Shuttle Valve

### MATERIALS OF CONSTRUCTION

All valve bodies:- 316L stainless steel  
 Internal components:- 316L stainless steel  
 Seat:- 316L stainless steel / PEEK  
 Seals:- Nitrile (standard) / PTFE.  
 Alternative elastomers available for extreme conditions.

### TEMPERATURE RANGE:

See elastomer options

### SOUR GAS SERVICE (REFER TO ORDERING CODE):

All internal wetted and body metal materials conforming to NACE MR-01-75.

### SELECTION CHART:

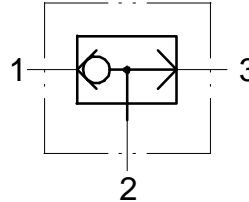
FP15/SV	15 lpm @ 10 bar DP. Max Valve Pressure 690bar	Model Code
04	1/4" NPT	Connections
S	Nitrile (-30°C to +130°C)	O-ring Material
V	Viton (-20°C to +180°C)	
SA	Low temperature Nitrile (-46°C to +130°C)	
H2S	NACE MR-01-75 Consult Bifold Fluidpower	Option
FP15/SV / 05 / S		Example Code

### MEDIA:

Mineral oils, water glycol mixtures, sea water (filtered), some chemicals.

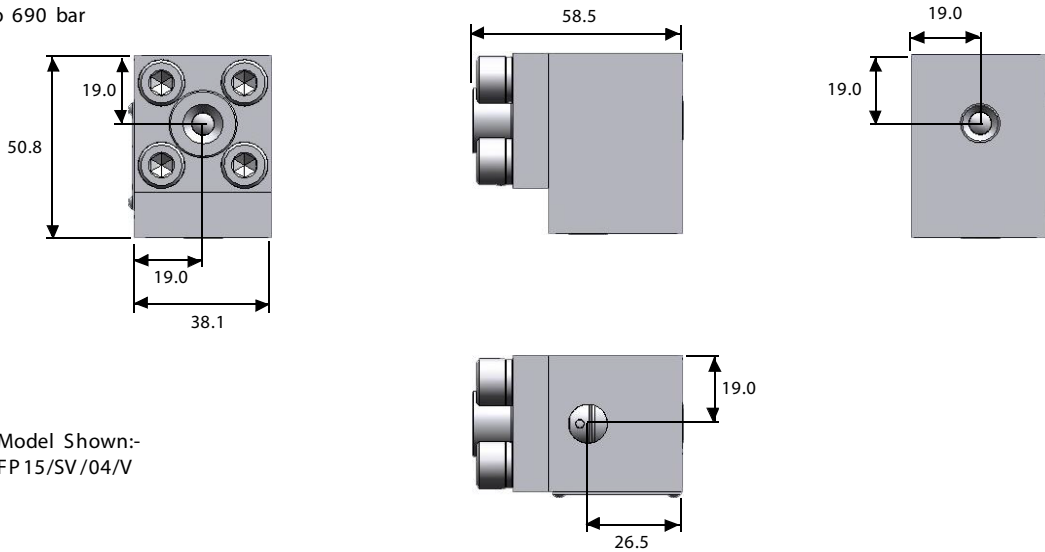
### WORKING PRESSURE:

Up to 690 Bar (10,000PSI).



### FP15 SHUTTLE VALVES

Upto 690 bar

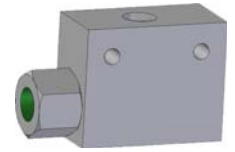
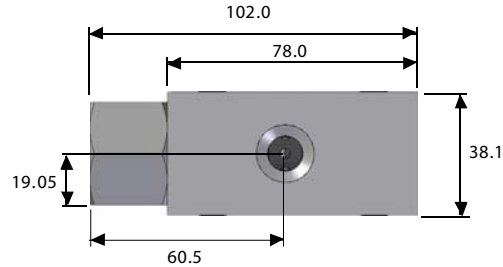
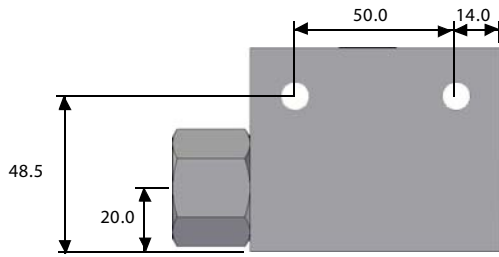


### TOPSIDE / SUBSEA SELECTION CHART:

FPS50/SV	Subsea	50 lpm @10 bar DP	Model Code
FP50/SV	Topside	Max Valve Pressure 345bar	
08	1/2" NPT	Connections	
S	Nitrile (-30°C to +130°C)	O-ring Material	
V	Viton (-20°C to +180°C)		
SA	Low temperature Nitrile (-46°C to +130°C)		
H2S	NACE MR-01-75 Consult Bifold Fluidpower	Option	
FP50/SV / 05 / S		Example Code	

## FPS50 + FP50 SHUTTLE VALVES

Upto 345 bar



- All ports 1/2"  
- Max working pressure 345 bar

## Pneumatic Shuttle Valves

### OPERATING MEDIA

- Air, sweet and sour gas

### OPERATING PRESSURE

- 0-12 bar standard

### TEMPERATURE RANGE:

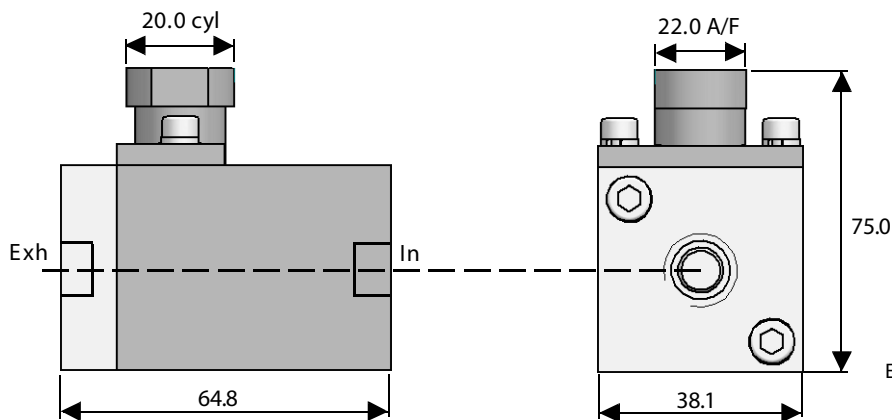
See selection chart model code.

### MECHANICAL CONSTRUCTION

- Body:- stainless steel 316L
- Fasteners:- Metric A4 18/10 316 grade stainless steel
- Seat Material:- Viton (standard). Alternative elastomers available for extreme conditions

## SELECTION CHART

S	standard service	(-20°C to 180°C)	Model Code	
AS	arctic service	(-50°C to 40°C)		
06 - 1/4" NPT; 09 - 3/8" NPT; 12 - 1/2" NPT; 19 - 3/4" NPT; 25 - 1" NPT			Port Sizes	
SV Shuttle Valve			Configuration	
K6 BSPP ported			Options	
S	06	- SV	- K6	Ordering Example



### Working Pressures

1/4"	1 - 12 bar g
3/8"	0 - 12 bar g
1/2"	0 - 12 bar g
3/4"	1 - 12 bar g
1"	1 - 12 bar g

### Cv

0.9 (in to cyl)
1.7
1.9
6.5
8.2

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# Pneumatic & Hydraulic Accessory Valves Quick Exhaust Valves

up to 690 bar

Superior performance  
throughout the full  
operational range

## Features:

- 316L stainless steel
- Available 1/4", 1/2", 3/4" and 1"
- Arctic Service options to -60°C
- NACE MR-01-75 option



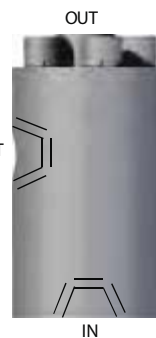
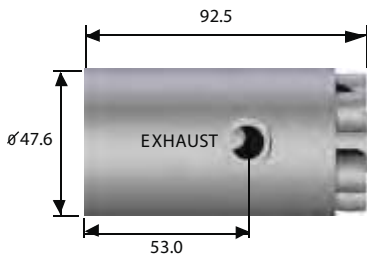
## MATERIALS OF CONSTRUCTION

All valve bodies:- 316L stainless steel  
 Internal components:- 316L stainless steel  
 Seat:- 316L stainless steel / PEEK  
 Seals:- Nitrile (standard) / PTFE.  
 Alternative elastomers available for extreme conditions.

## TEMPERATURE RANGE:

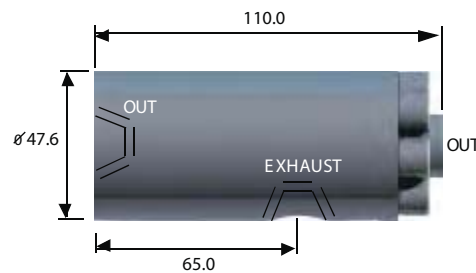
See elastomer options

## QEV15 RANGE



### QEV15/04/10/V

**Weight:**  
Approx 1.1 Kg.  
**Connections:**  
1/4" NPT



### QEV15/38MP/15/V

**Weight:**  
Approx 1.2 Kg.  
**In + Out** - 3/8 medium pressure  
**Exhaust** - 1/4 NPT

	Forward Flow Rate l/m	Trigger Flow Rate to QEV l/m	Exhaust Flow Rate l/m
QEV15 Standard	5	1.8	80
QEV15 Increased Forward Flow	20	3.6	80

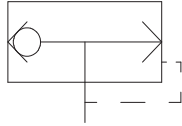
**Trigger Flow Rate:** Minimum flow rate required to switch valve to establish a flow from supply to cylinder.  
**Forward Flow Rate:** Flow rate between supply and cylinder.  
**Exhaust Flow Rate:** Flow rate between cylinder and exhaust.

For lower QEV trigger flow rates, contact Bifold Sales Office.

## SELECTION CHART:

QEV15		Model Code	
04	1/4" NPT	Connections	
06	3/8" NPT, 1/2" NPT exhaust		
08	1/2" NPT		
38MP	3/8" MP connections - 1/4" NPT exhaust	Working Pressure	
06	414 bar		
10	690 bar		
	15	1035 bar (only 38MP)	O-ring Material
S	Nitrile	(-30°C to +130°C)	
V	Viton	(-20°C to +180°C)	
SA	Low Temp Nitrile	(-46°C to +130°C)	Options
H2S	NACE MR-01-75		
38	3/8" NPT exhaust (only 38MP valve)		
HF	Increased Forward Flow		
QEV15 / 04 / 10 / S / H2S		Example Code	

## QEV15 PREFERRED RANGE:



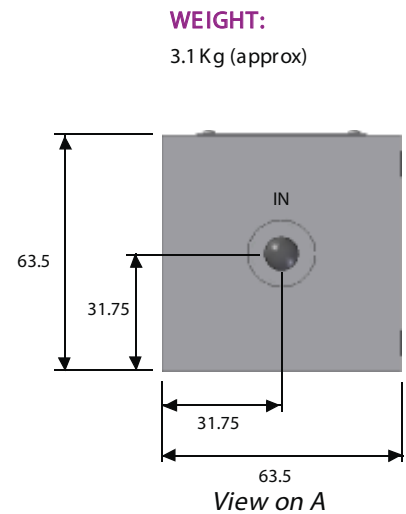
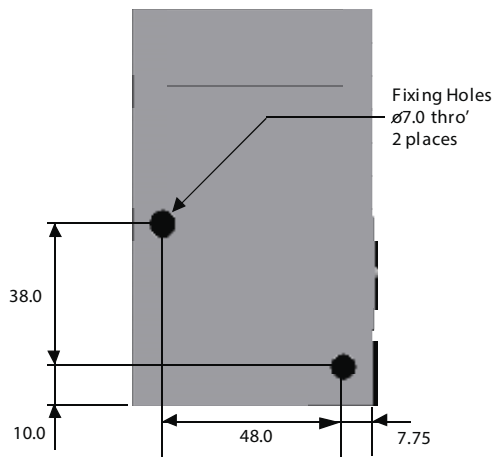
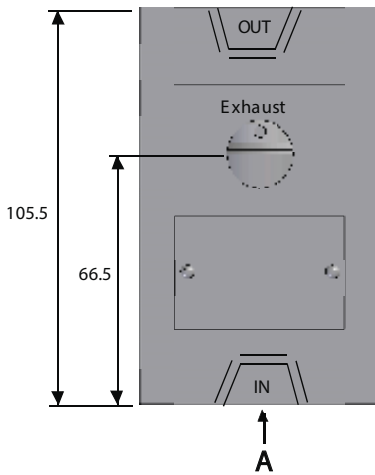
QEV15/06/06/S/H2S 414 bar, 3/8" NPT ports H2S compatible

QEV15/04/10/S 690 bar, 1/4" NPT ports

QEV15/08/10/S 690 bar, 1/2" NPT ports

QEV15/38MP/15/S 1035 bar, medium pressure ports (inlet / outlet), 1/4" NPT exhaust

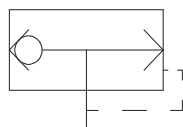
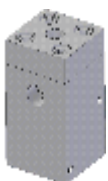
## QEV50 RANGE



## SELECTION CHART:

QEV50	Model Code
08 1/2" NPT	Connections
05 345 bar	Working Pressure
S Nitrile (-30°C to +130°C) V Viton (-20°C to +180°C) SA Low Temp Nitrile (-46°C to +130°C)	O-ring Material
H2S NACE MR-01-75 (consult Bifold Fluidpower)	Options
QEV50 / 08 / 05 / S / H2S	Example Code

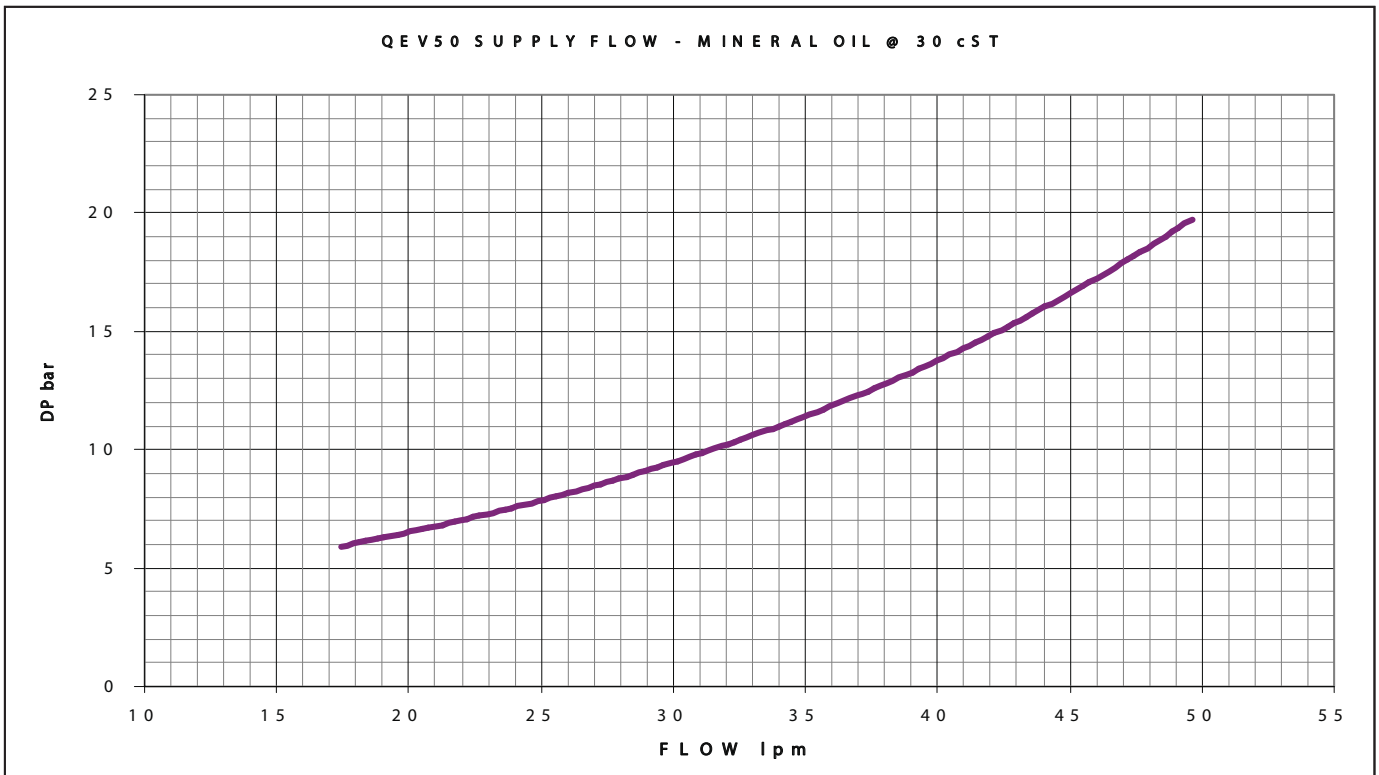
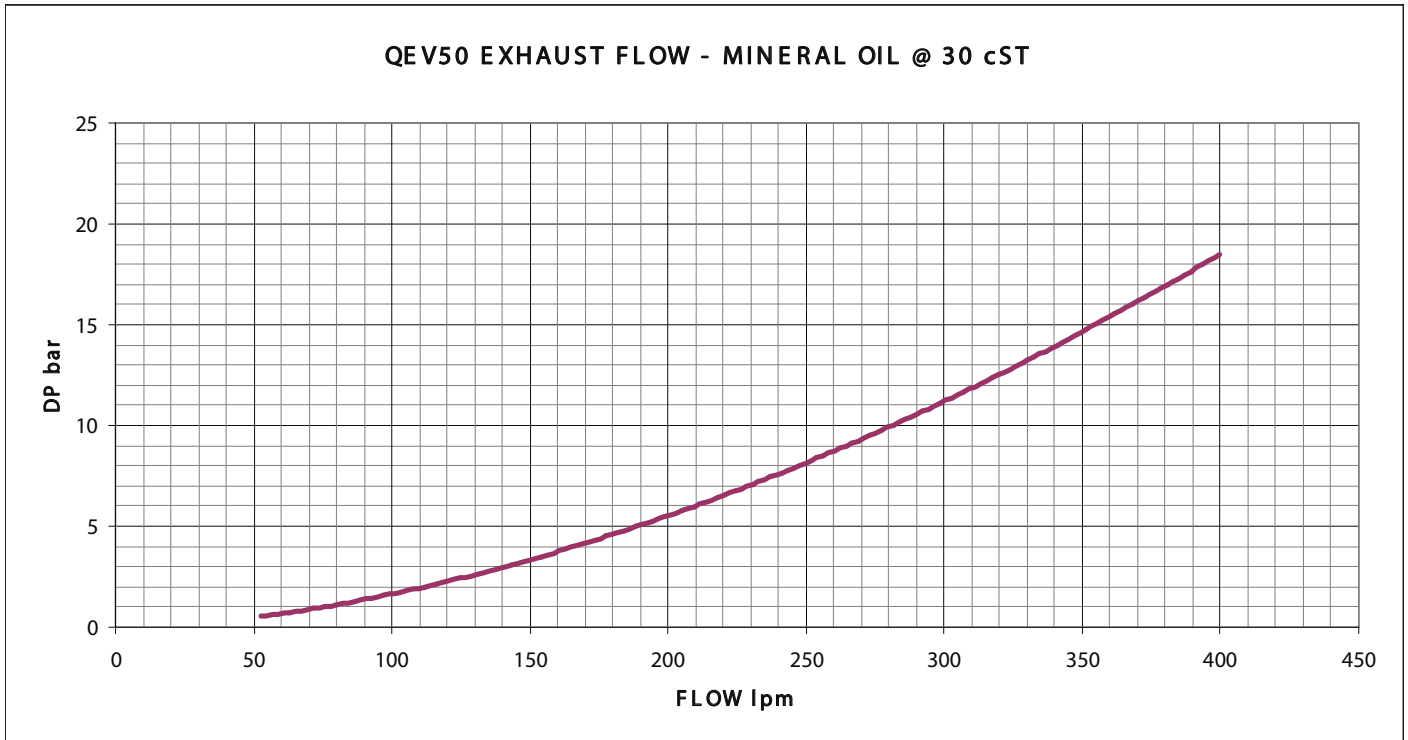
## QEV50 PREFERRED RANGE:



QEV50/08/05/S

345 bar, 1/2" NPT ports, 350 lpm @ 15 bar DP





## Pneumatic Quick Exhaust Valves

### OPERATING MEDIA

• Air, sweet and sour gas

### OPERATING PRESSURE

• 0-12 bar standard

### TEMPERATURE RANGE:

See selection chart model code.

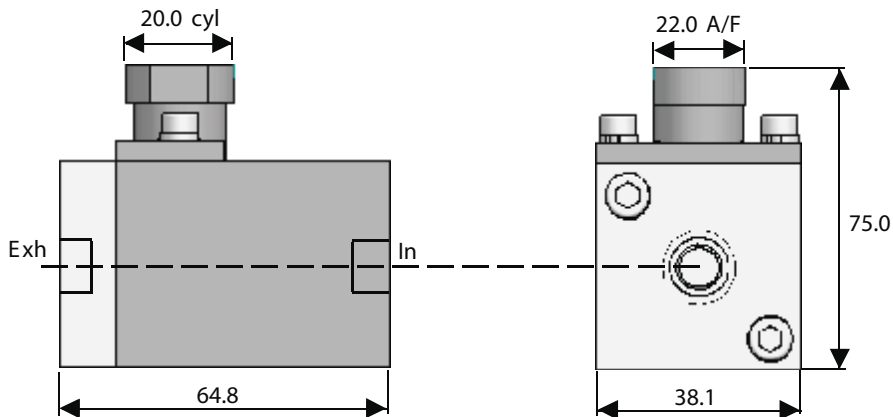
### MECHANICAL CONSTRUCTION

- Body:- stainless steel 316L
- Fasteners:- Metric A4 18/10 316 grade stainless steel
- Seat Material:- Viton (standard). Alternative elastomers available for extreme conditions

### SELECTION CHART

S	standard service	(-20°C to 180°C)	Model Code					
AS	arctic service	(-60°C to 60°C)						
06	1/4" NPT	Quick Exhaust Valve	Port Sizes					
09	3/8" NPT							
12	1/2" NPT							
19	3/4" NPT							
25	1" NPT							
QEV			Configuration					
K4 Bug Vent			Options					
K6 BSPP straight port option								
K34 BSPT taper thread option								
XX			Revision Number					
S	06	-	QEV	-	K6	-	01	Ordering Example

Example:- S09-QEV



#### Quick Exhaust Valves

1/4"  
3/8"  
1/2"  
3/4"  
1"

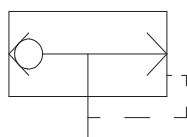
#### Working Press ures

1 - 12 bar g  
0 - 12 bar g  
0 - 12 bar g  
1 - 12 bar g  
1 - 12 bar g

#### Cv

1.1 (cyl to exh) / 0.9 (in to cyl)  
3.0 (cyl to exh) / 1.7 (in to cyl)  
3.5 (cyl to exh) / 1.9 (in to cyl)  
8.3 (cyl to exh) / 6.5 (in to cyl)  
10.0 (cyl to exh) / 8.2 (in to cyl)

### Preferred Range:-



S06-QEV-01

1/4" Quick Exhaust Valve, flow as table above, 0 - 12 bar

S12-QEV-01

1/2" Quick Exhaust Valve, flow as table above, 0 - 12 bar

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### **Quality Assurance**

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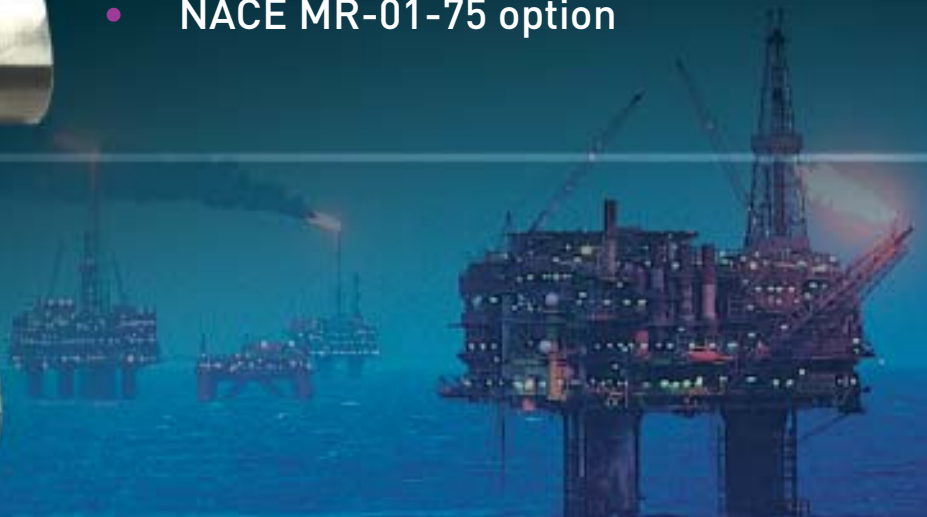
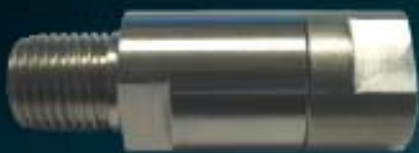
# Hydraulic and Pneumatic Check Valves

up to 828 bar, 190 litres per minute

Superior performance  
throughout the full  
operational range

## Features:

- 316L stainless steel
- Arctic Service options to -60°C
- Low cost solution
- NACE MR-01-75 option



# Hydraulic Check Valves - Type HCV

Reliability and Innovation in directional control valves

## INTRODUCTION:-

Bifold Fluidpower in-line check valves feature compact ball check valve cartridges. Valve seats are PEEK; the ball and spring are stainless steel. Valve body material is 316 S11 stainless steel conforming to NACE Std MR-01-75. The rugged, two piece body construction permits the cartridge to be easily replaced. The standard cracking pressure is 3 psi nominal.

## OPERATING PARAMETERS:-

Working Pressure / Flow Rates :-

Size	Working Pressure (bar)				Flow Rating (lpm) (nominal)	Pressure drop (bar) @ flow rating
	207	414	690	828		
04	✓	✓	✓		10	5
3/8MP				✓	tba	tba
06	✓	✓	✓		10	5
08	✓	✓			70	4.5
12	✓	✓			190	tba
16	✓				190	tba

## Operating Media:-

Mineral oil, water glycol mixtures, some chemicals (Consult Bifold Fluidpower).

## Working Temperature:-

Refer to elastomer options, valve selection chart.

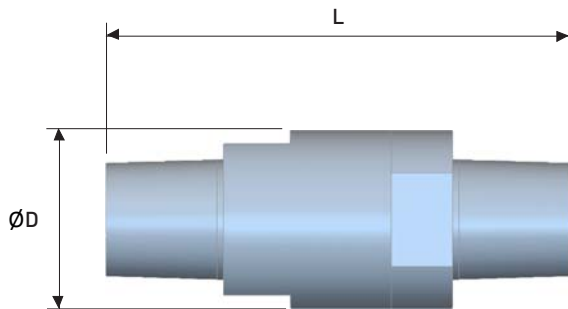
## SELECTION CHART:-

NOTE:- Inlet & outlet connections must be specified as equal sizes

HCV hydraulic service check valve				Model Code	
04F	1/4" NPT	female		Inlet Connection	
04M	1/4" NPT	male			
38MPF		9/16" autoclave type MP female			
38MPM		9/16" autoclave type MP male			
06F	3/8" NPT	female			
06M	3/8" NPT	male			
08F	1/2" NPT	female			
08M	1/2" NPT	male			
12F	3/4" NPT	female			
12M	3/4" NPT	male			
16F	1" NPT	female			
16M	1" NPT	male			
04F	1/4" NPT	female			Outlet Connection
04M	1/4" NPT	male			
38MPF		9/16" autoclave type MP female			
38MPM		9/16" autoclave type MP male			
06F	3/8" NPT	female			
06M	3/8" NPT	male			
08F	1/2" NPT	female			
08M	1/2" NPT	male			
12F	3/4" NPT	female			
12M	3/4" NPT	male			
16F	1" NPT	female			
16M	1" NPT	male			
03	207 bar	(3000 psi)	all sizes	Working Pressure	
06	414 bar	(6000 psi)	1/4", 3/8", 1/2" & 3/4" NPT		
10	690 bar	(10000 psi)	1/4" & 3/8" NPT		
12	828 bar	(12000 psi)	3/8MP only		
3	3 psi nominal			Cracking Pressure	
S	Nitrile (std)	(-30°C to +130°C)		O-ring Material	
V	Viton	(-20°C to +180°C)			
SA	Low Temp Nitrile	(-40°C to +130°C)			
HCV - 04F - 04M - 12 - 3 - S				Ordering Example	

## INSTALLATION:-

Overall dimension



**NOTE:-** these dimensions apply to both pneumatic and hydraulic 3000 psi units

Model	L (mm)	D (mm)	Weight (Kg)
04F/04F	43.5	19.05	0.07
04F/04M	51.5	19.05	0.07
04M/04F	52.0	19.05	0.07
04M/04M	60.0	19.05	0.07
08F/08F	65	31.75	0.27
08F/08M	72	31.75	0.28
08M/08F	76	31.75	0.28
08M/08M	83	31.75	0.26
12F/12F	89	50.8	tba
12F/12M	96	50.8	
12M/12F	96	50.8	
12M/12M	103	50.8	
16F/16F	89	50.8	tba
16F/16M	96	50.8	
16M/16F	96	50.8	
16M/16M	103	50.8	

## Pneumatic Check Valves - Type PCV

### OPERATING MEDIA:

- Air, sweet and sour gas

### MATERIALS OF CONSTRUCTION:

- Body:- stainless steel 316L
- Fasteners:- Metric A4 18/10 316 grade stainless steel
- Seals:- Viton (standard). Alternative elastomers available for extreme conditions

### OPERATING PRESSURE:

- 0-13 bar standard

### TEMPERATURE RANGE:

Refer to elastomer options, valve selection chart.

### SELECTION CHART:

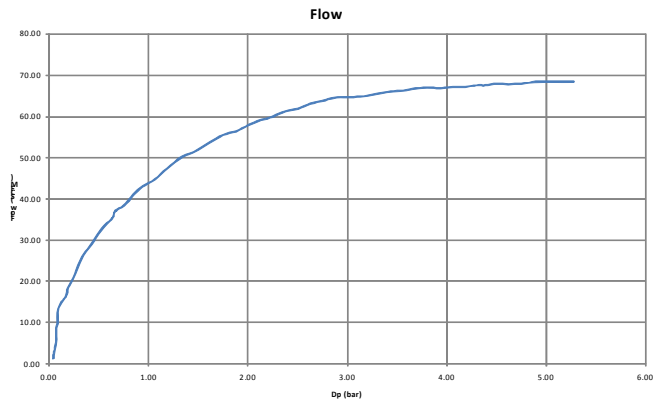
**NOTE:-** Inlet & outlet connections must be specified as equal sizes

PCV Pneumatic service check valve				Model Code		
04F	1/4" NPT	female		Inlet Connection		
04M	1/4" NPT	male				
06F	3/8" NPT	female				
06M	3/8" NPT	male				
08F	1/2" NPT	female				
08M	1/2" NPT	male				
12F	3/4" NPT	female				
12M	3/4" NPT	male				
16F	1" NPT	female				
16M	1" NPT	male				
04F	1/4" NPT	female				Outlet Connection
04M	1/4" NPT	male				
06F	3/8" NPT	female				
06M	3/8" NPT	male				
08F	1/2" NPT	female				
08M	1/2" NPT	male				
12F	3/4" NPT	female				
12M	3/4" NPT	male				
16F	1" NPT	female				
16M	1" NPT	male				
13	13 bar (190 psi)			Working Pressure		
023	0.023 bar (1/3 psi) nominal			Cracking Pressure		
S	Nitrile	(-30°C to +130°C)		O-ring Material		
V	Viton (std)	(-20°C to +180°C)				
SA	Low Temp Nitrile	(-40°C to +130°C)				
PCV - 04F - 04M - 13 - 023 - V				Ordering Example		

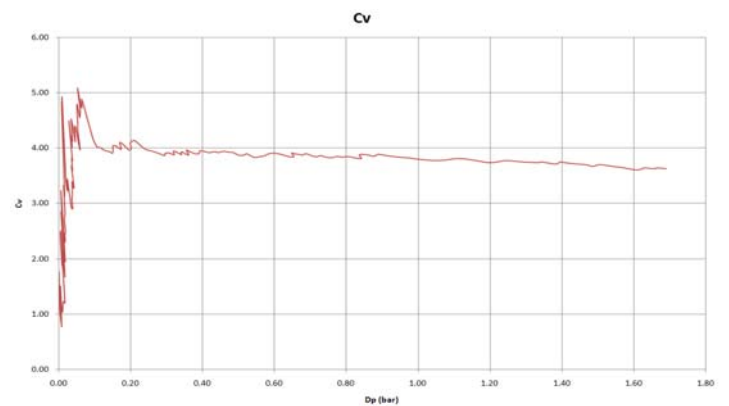
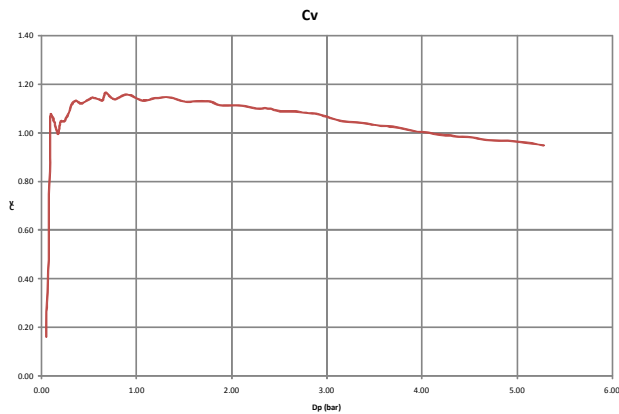
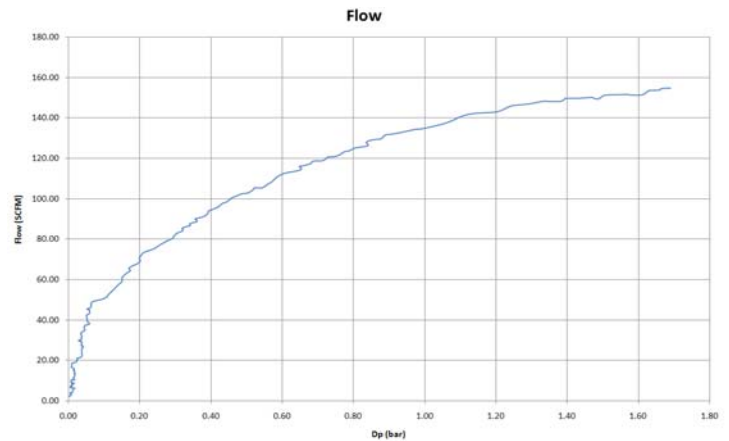


## FLOW PERFORMANCE:-

### 1/4" Pneumatic Check Valve



### 1/2" Pneumatic Check Valve



For 3/4" & 1" data contact Bifold Fluidpower Ltd

## Pilot Operated Check Valves (hydraulic) - Type SCV & DCV

### INTRODUCTION:-

Bifold Fluidpower pilot operated check valves feature compact cartridge ball check valves in a 316S11 stainless steel body. The valves are used to hydraulically lock actuators until pressure is applied, and are available as single or dual pilot operated types.

Check valve cartridge seats are PEEK with the ball and spring stainless steel. The valve is ruggedly constructed, and affords a very low pressure drop. The standard cracking pressure is 5 psi. Flow ratings are either 68 or 190 litres per minute. Valve cartridges are easily replaced without disturbing hydraulic tubing.

Dual pilot operated valves have an internally piloted piston eliminating external pilot tubing.

### OPERATING PARAMETERS:-

#### Working Pressure :-

345 bar (5000 psi)  
207 bar (3000 psi)

#### Operating Media:-

Mineral oil, water glycol mixtures, some chemicals.

	Connections	Flow Rating	Pressure Drop
<b>Type 4018:-</b>	1/2 NPT	68 litres/min (15 igpm)	4.5 bar (65 psi) @ flow rating
<b>Type 4035:-</b>	3/4 NPT	190 litres/min (29 igpm)	1.2 bar (17.5 psi) @ flow rating

**Recommended Filtration:-**  
10 micron

**Working Temperature:-**  
Refer to elastomer options, valve selection chart below

## INSTALLATION:-

### Overall Dimensions(mm):

Type SCV4018	: 122 L x 63.5 W x 38.1 H
Type DCV4018	: 172 L x 63.5 W x 38.1 H
Type SCV4035	: 166.5 L x 63.5 W x 63.5 H
Type DCV4035	: 236 L x 63.5 W x 63.5 H

### Weight:

Type SCV4018	: 1.9 kg
Type DCV4018	: 3.1 kg
Type SCV4035	: 4.6 kg
Type DCV4035	: 7.5 kg

### Fixings:

Type 4018	: Three M6 clearance holes
Type 4035	: Three M8 clearance holes

Valves can be mounted in any attitude. Systems should be flushed clean to ISO 4406 Class 18/15 or better. Weights detailed in this catalogue are approximate only

## SELECTION CHART:

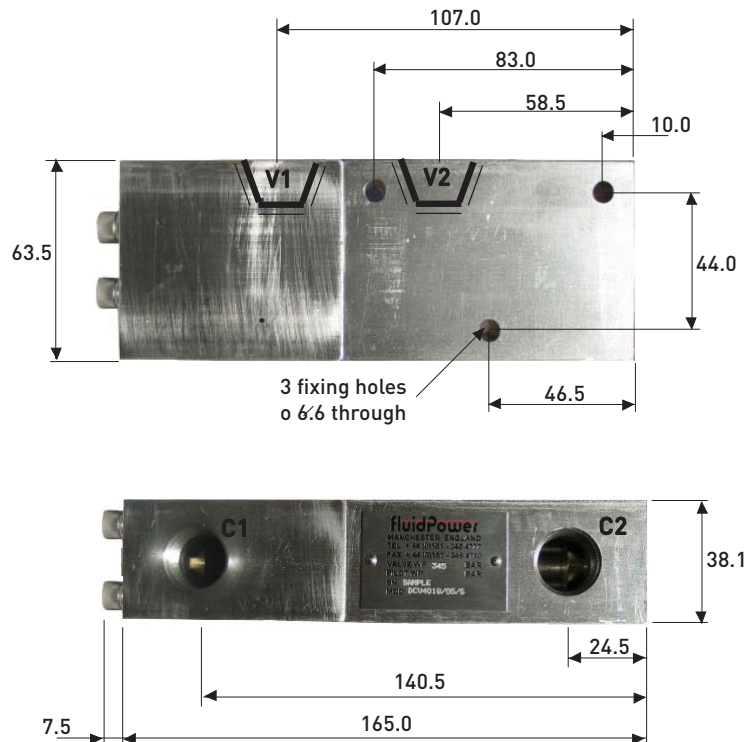
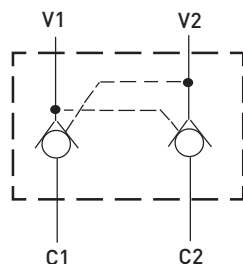
SCV SCV (C) DCV	Single Check Valve Single Check Valve Dual Check Valve	pilot to open pilot to close internal pilot to open	Model Code
	<b>4018</b> <b>4035</b>	68 lpm 190 lpm	Flow Rating
	<b>03</b> <b>05</b>	207bar (4035 only) 345 bar (4018 only)	Working Pressure
	<b>S</b> <b>V</b> <b>A</b>	Nitrile (-30°C to +130°C) Viton (-20°C to +180°C) Fluorosilicone (-50°C to +40°C)	Seal Material
<b>SCV</b>	<b>4018 / 05 / S</b>		Example Code

Standard Test Fluid: Marston Bentley HW540.

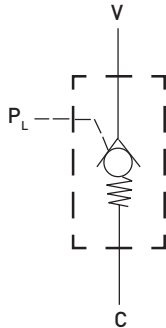
### Example Valve:-

DCV4018/05/S

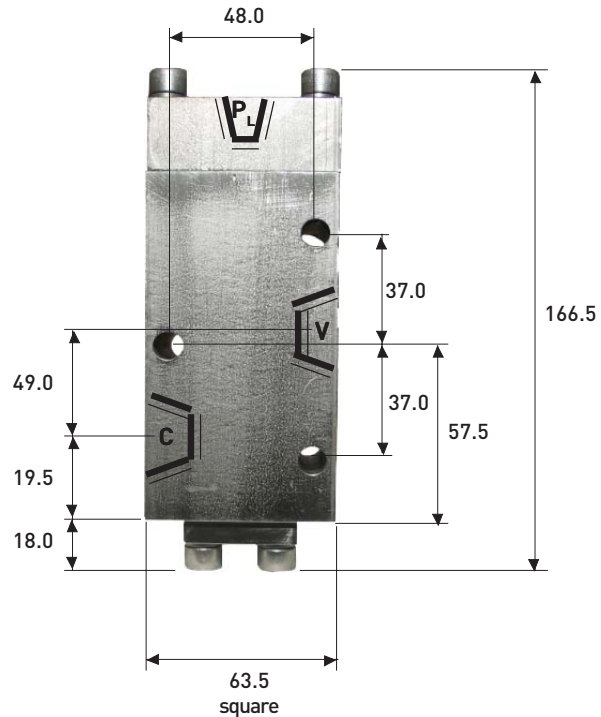
Schematic



## Example Valve:- SCV4035/03/S



Connections:-  
 C = Cylinder            3/4" NPT  
 V = Valve                3/4" NPT  
 P<sub>L</sub> = Pilot                1/4" NPT



## Excess Flow Check Valves (hydraulic) - Type EFCV

### INTRODUCTION:-

Bifold Fluidpower's Excess Flow Check Valves provide an effective shut-off in a system pressure supply line when the flow rate exceeds a pre-determined flow setting. Typically the valves are installed where actuator control lines and associated valves are vulnerable to damage to prevent the total loss of the hydraulic system control fluid in the event of a line fracture or high component leakage. These particular valves are designed to shut-off at very low flow rates, and are very restrictive in a reverse flow condition. The valves should be installed either upstream of the system directional control valve or with a free flow return check valve in parallel if they are installed in the actuator control line, to ensure adequate actuator operating times. Therefore the direction of flow should always be P1 to P2.

The shut-off flow rate is internally adjustable, and can be accurately set.

Valve types 2002 and 2005 are in-line mounting; types 2012 and 2015 are panel mounting and incorporate an integral by-pass valve operable at the panel front. Valves can also be supplied with internal orifices allowing a continuous by-pass bleed for automatic resetting after shut-off during system start-up conditions.

### OPERATING PARAMETERS:-

#### Working Pressure :-

690 bar            (10000psi) max hydraulic service  
 414 bar            (6000psi) max gas service

#### Operating Media:-

Mineral oil, water glycol mixtures, some chemicals.

#### Working Temperature:-

Refer to elastomer options

#### Connections:-

1/4 NPT

#### Recommended Filtration:-

10 microns (NAS 1638 Class 9 system cleanliness)

#### Shut-off Flow Ranges:-

0.4 to 2.0 litres per minute  
 2.0 to 5.0 litres per minute

### INSTALLATION:-

#### Overall Dimension:-

without by-pass valve            77.5 x 38 x 38 mm  
 with by-pass valve                77.5 x 38 x 91 mm

#### Panel Mounting Hole:-

by pass valve type only  
 21.0 mm diameter

#### Weight:-

1.0 Kg

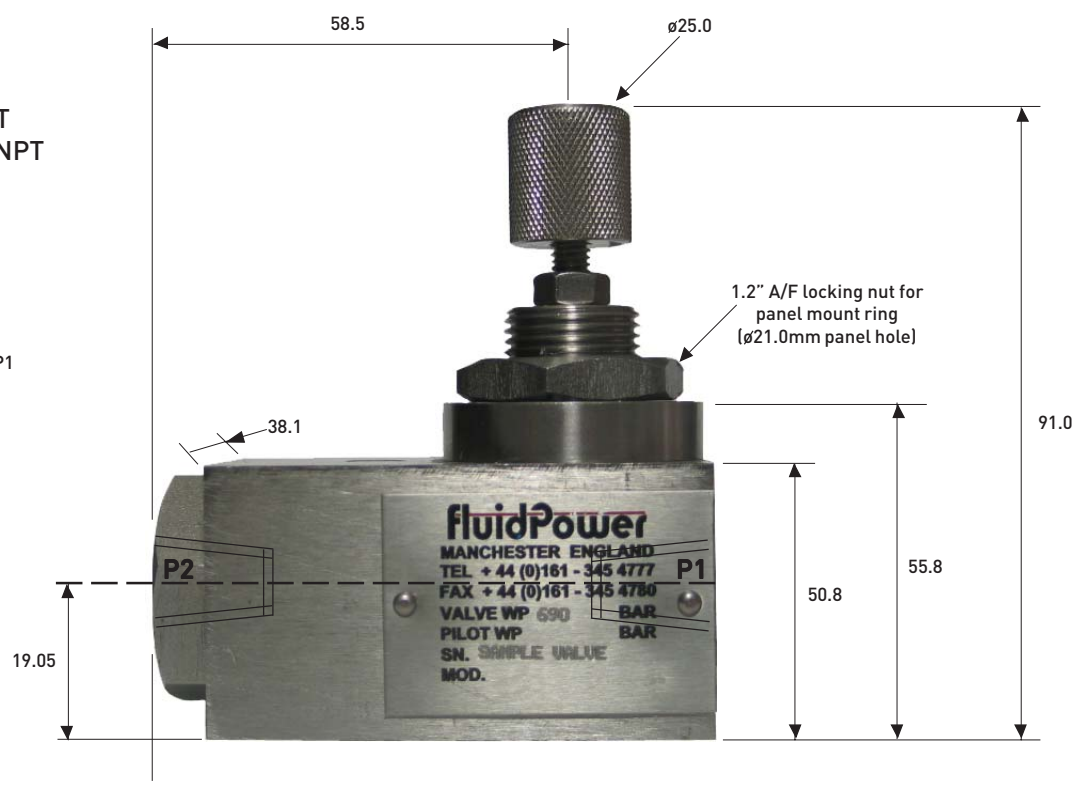
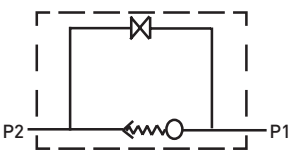
**SELECTION CHART:**

<b>EFCV2</b> Excess Flow Check Valve		Model Code
<b>0</b> Hydraulic Service <b>4</b> Gas Service		Media
<b>0</b> without by-pass valve <b>1</b> with by-pass valve		
<b>2</b> 0.4 - 2 lpm <b>5</b> 2.0 - 5.0 lpm		Shut Off Flow Ranges
<b>00</b> no reset orifice <b>10</b> 0.010" orifice <b>15</b> 0.015" orifice <b>20</b> 0.020" orifice <b>25</b> 0.025" orifice <b>30</b> 0.030" orifice		Orifice
<b>06</b> 414 bar gas service <b>10</b> 690 bar hydraulic service		Working Pressure
<b>S</b> Nitrile (-30°C to +130°C) <b>V</b> Viton (-20°C to +180°C)		O-ring Material
<b>EFCV2 0 1 2 / 00 / 10 / S</b>		Example Code

Standard Test Fluid: Marston Bentley HW540.

**Excess Flow Check Valve**  
**EFCV2015/00/10/S**

**Connections**  
P1 = Inlet Port 1/4" NPT  
P2 = Service Port 1/4" NPT



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## Excess flow check valves

### Types 381001 to 381171

The excess flow check valve is an inline mounting valve which prevents the loss of control fluid in the event of a line break or high leakage downstream. Typically installed in service lines to actuators vulnerable to damage, and located within a system control panel close to the main directional control valve.

The shutoff flow rate is internally adjustable, so a given valve will cover a range of shutoff flow conditions. The valve is designed to pass fluid normally until the flow rate reaches the predetermined setting – at which point a ball check valve seals off the flow.

In many system applications it will be necessary to bypass the excess flow check during startup operations. For this reason the valve can be supplied with either a tapping for external bypass or with an integral valve for internal bypass. The check valve can also be supplied with automatic reset, where an internal orifice allows a continuous bypass bleed.

The check valve is manufactured from 316 stainless steel and CA104 aluminium bronze materials and complies with the requirements of NACE Standard MR-01-75 (latest revision as applicable).

<b>Working pressure</b>	690 bar (10,000 psi) max.
<b>Operating media</b>	Mineral oils, water, water-glycol mixtures.
<b>Connection</b>	1/4" NPT
<b>Shutoff flow ranges</b>	0.4 to 2.0 litres/minute 2.0 to 5.0 litres/minute
<b>Working temperature</b>	Standard    -20°C to +200°C. Arctic        Available on application.
<b>Recommended filtration</b>	25 micron.
<b>Weight</b>	0.8 Kg

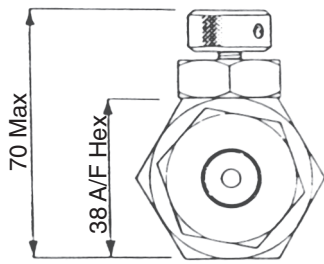


These valves conform to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.

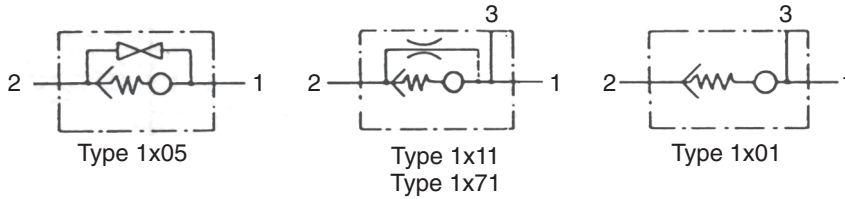
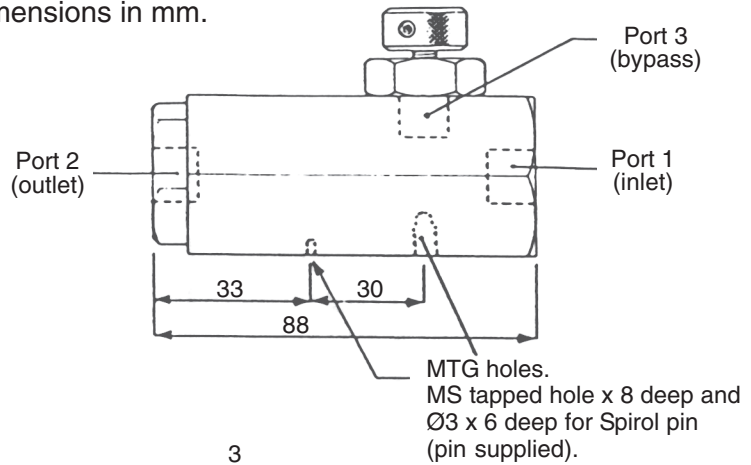


Marshalsea Hydraulics has been assessed by SGS Société Générale de Surveillance SA and certified as meeting the requirements of ISO 9001:2000 for the design, development, manufacture and servicing of hydraulic pumps, relief valves and intensifiers.





All dimensions in mm.



**Standard specifications and model numbers**

Part No.	Shutoff range (litres/min.)	Auto reset orifice	Bypass
381001	0.4–2.0	none	external
381005	0.4–2.0	none	internal without orifice
381011	0.4–2.0	0.010"	external
381021	0.4–2.0	0.015"	external
381031	0.4–2.0	0.020"	external
381041	0.4–2.0	0.025"	external
381051	0.4–2.0	0.030"	external
381061	0.4–2.0	0.0137"	external
381071	0.4–2.0	0.035"	external
381101	2.0–5.0	none	external
381105	2.0–5.0	none	internal without orifice
381111	2.0–5.0	0.010"	external
381121	2.0–5.0	0.015"	external
381131	2.0–5.0	0.020"	external
381141	2.0–5.0	0.025"	external
381151	2.0–5.0	0.030"	external
381161	2.0–5.0	0.0137"	external
381171	2.0–5.0	0.035"	external



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 Venture Way  
 Priorswood Industrial Estate  
 Taunton  
 Somerset TA2 8DE  
 United Kingdom

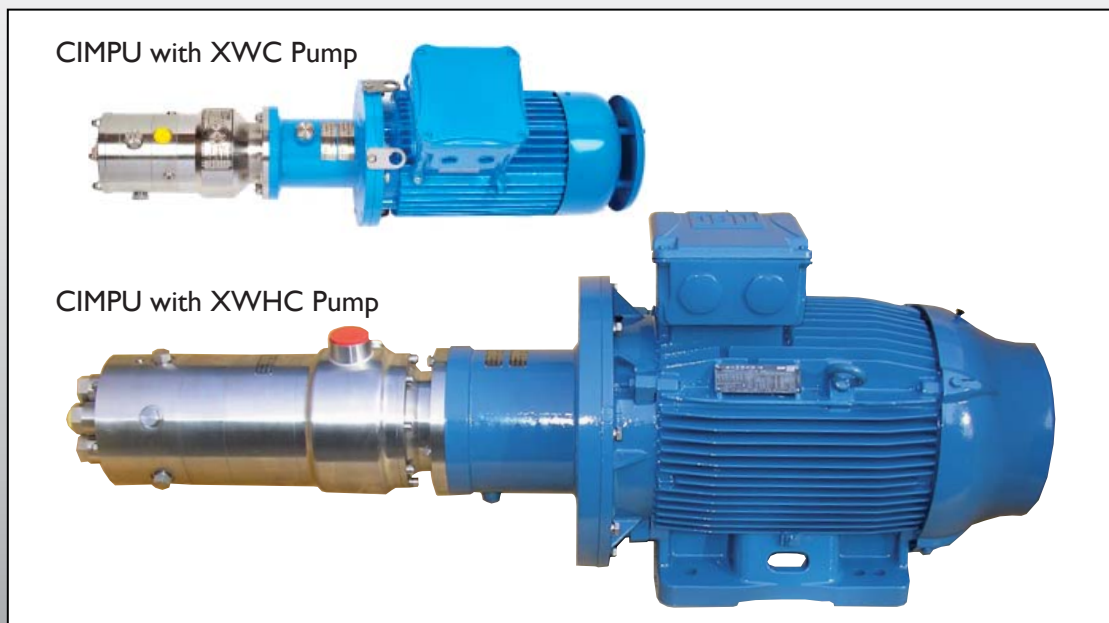
Tel: 01823 331081  
 (+44 1823 331081)  
 Fax: 01823 323382  
 (+44 1823 323382)

E-mail [info@marshalsea.co.uk](mailto:info@marshalsea.co.uk)

[www.marshalsea.co.uk](http://www.marshalsea.co.uk)

**We reserve the right to alter specifications or withdraw products without notice**

## Chemical Injection Motor Pump Unit (CIMPU)



- Flow Rates of up to 168 l/m at 155 bar and 46 l/m at 636 bar
- Established XW and XWH Pumps Developed for use with Potentially Hazardous Chemicals
- Chemically Inert, Low Friction Ceramic Pistons
- Worldwide Approvals  
ATEX  CE   
- In Accordance with API 674
- Compact Multi-Piston Pumps Provide Minimal Pressure Pulsation
- Hermetically Tight, Environmentally Friendly Product

Leading Technology



Product Innovation

The Bifold Group of companies have provided peace of mind to contractors, installers and end users for over a century. Our innovative range of products, specifically designed with the customer in mind, have gained worldwide approval and credibility for the onerous conditions as found in hazardous (classified) locations, hostile and subsea environments.

The customer requirements for sustained safety and reliability under extreme operating conditions are Bifold Marshalsea's primary objectives.

Our state of the art production facilities based in the UK, allows our superior and innovative designs to be manufactured to rigorous manufacturing and quality standards.

The policy and overall business objective of Bifold Marshalsea, is to provide system packages of the highest quality and in compliance with customer requirements. We guarantee ease of installation and low lifetime cost of ownership - due to superior design, long-life materials, precision manufacturing and testing facilities.



Worldwide Service and Support

Located in Taunton, UK, Bifold Marshalsea has subsidiary locations in Houston, USA, Singapore and Manchester, UK. The Bifold Group of Companies are supported worldwide with our engineers and a global network of agents and distributors.

The Group have invested in state of the art machining centres ensuring accuracy of close tolerances, and a rapid turnaround capability together with state of the art assembly and testing facilities.

The customer can be confident that Bifold Marshalsea has the product portfolio and the technical and production capability to provide the correct solution for their system requirements, and provide support during and after installation.

Pumps for Special Fluids

Bifold Marshalsea provide pumps for use with fluids which include a variety of water-based, fire resistant and other media types. The properties of these fluids include a combination of high or low viscosity with either high or low lubricity.

Various pump models are available for use with water glycol and other calibration fluids.

Accuracy of information
We take care to ensure that product information in this catalogue is reasonably accurate and up-to-date. However, our products are continually developed and updated so to ensure accurate and up-to-date information please refer to the product catalogue issue list on our web site or contact a member of our sales team.

When selecting a product, the applicable operating system design must be considered to ensure safe use. The products function, material compatibility, adequate ratings, correct installation, operation and maintenance are the responsibilities of the system designer and user.

Quality Assurance
All Bifold products are manufactured to a most stringent QA programme to ensure that every product will give optimum performance and reliability. We are third party certified to EN ISO 9001:2008. Functional test certificates, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BSEN 10204.3.1.B where available. We reserve the right to make changes to the specifications and design, etc., without prior notice.

Overview



The CIMPU is designed for chemical injection and transfer applications using chemical fluids such as methanol or other toxic or inflammable substances. The unit incorporates the XWC or the XWHC pump, developed from the well established Bifold Marshalsea XW and XWH pumps. The positive displacement axial piston XW and XWH pumps feature a double sealing system to prevent the ingress of oil into the process fluid. Bypass from the pistons is collected in an isolated cavity and returned to the inlet side of the pump. The XWC and XWHC versions can have additional galleries and seals designed to prevent high pressure fugitive emissions and provide a hermetically tight product in the event of primary seal failures (Shown in figures 8 & 9). Chemically inert ceramic pistons with an extremely low coefficient of friction are fitted. Ceramic pistons extend the life of the seals and offer pump benefits with long service intervals. The compact three or six piston pumps operate with minimal pressure pulsation and are in accordance with the API 674 standard.

Flow rates of up to 40 l/m with the 15 kW XWC pump and up to 168 l/m with the 50 kW XWHC pump can be provided.

The CIMPU should be mounted horizontally.

The pump models XWC and XWHC are compliant to API 674.

Certification Details



This pump conforms to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX compliant.



Bifold Marshalsea has been third party assessed and certified as meeting the requirements of ISO 9001: 2000 for the design, development, manufacture and servicing of Hydraulic Pumps, Relief Valves and Pressure Intensifiers.



Figure 1



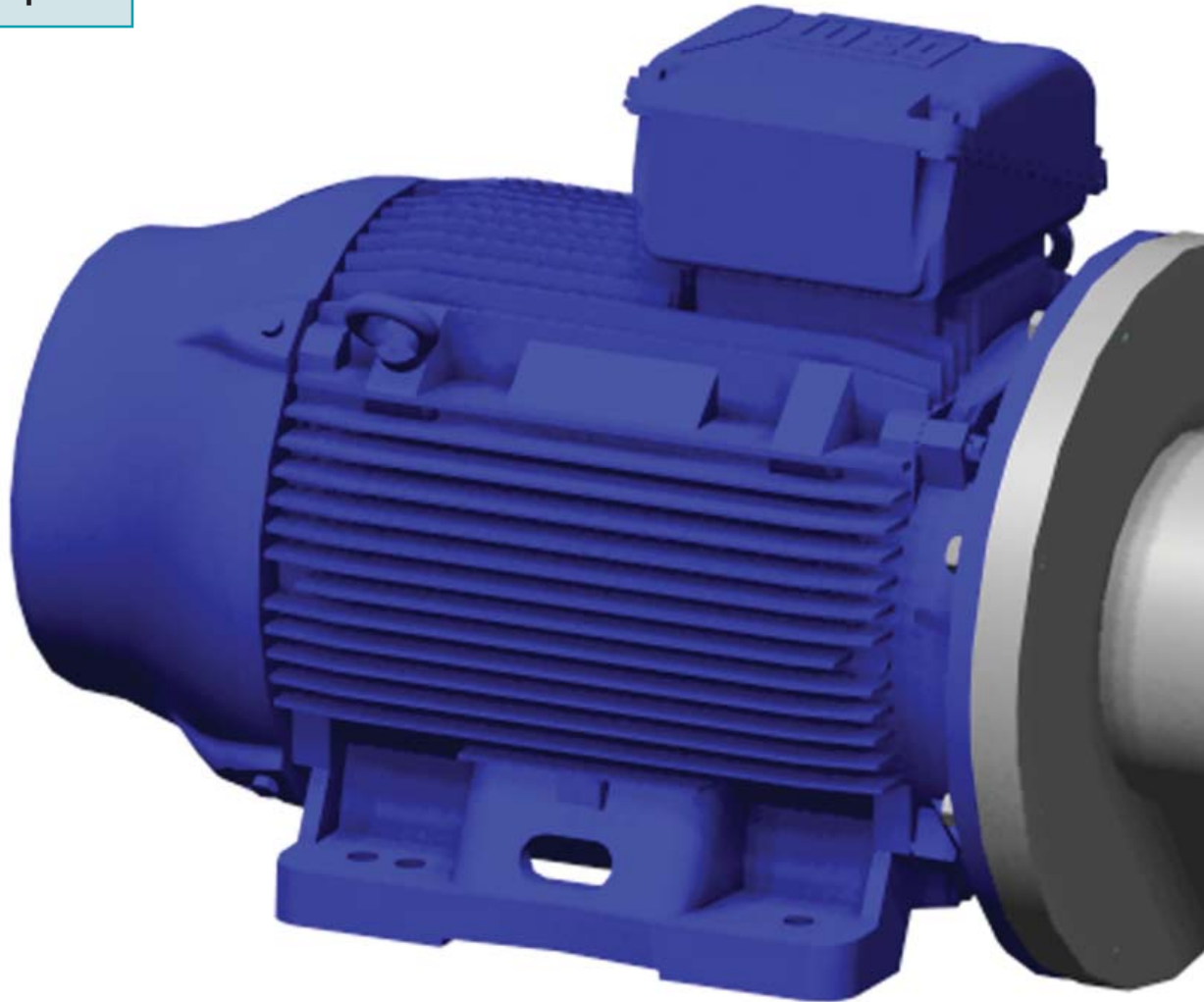
Figure 2

## Features



In Accordance with API 674

Smallest Overall Footprint



Hermetically Tight, Environmentally Friendly Product Option

Established XWC and XWHC Pumps Developed for use with Potentially Hazardous Chemicals



Features



**Compact Multi-Piston Pumps  
Provide Minimal Pressure Pulsation**

**Chemically Inert, Low Friction  
Ceramic Pistons**



Figure 3

**Flow Rates of up to 168 l/m at 155  
bar and 46 l/m at 636 bar**

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Compact Solution



The pictures below show the difference in size between a Bifold Marshalsea pump and motor arrangement and a competitors equivalent product.

Advantages with the Bifold Marshalsea arrangement are:-

- Smallest Overall Footprint.
- Chemically Inert, Low Friction Ceramic Pistons.
- In Accordance with API 674.
- Compact Multi-Piston Pumps Provide Minimal Pressure Pulsation.
- Hermetically Tight, Environmentally Friendly Product.

LOWEST COST SOLUTION

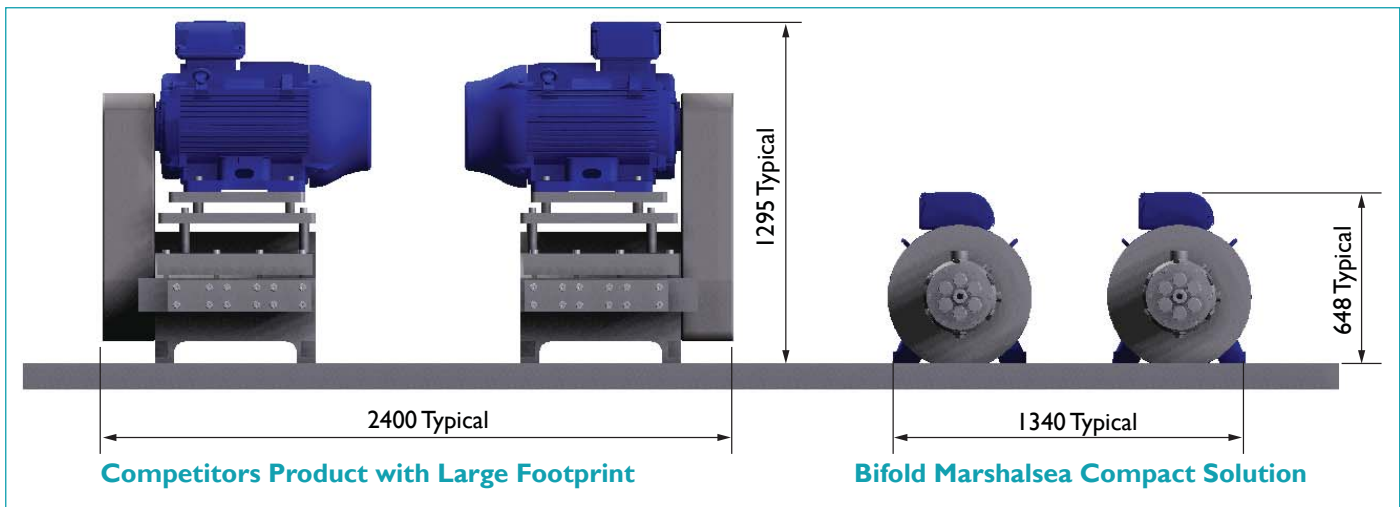


Figure 4

The pump arrangements illustrated in figure 5 show the difference in size between a competitors arrangement with a large footprint compared to the Bifold Marshalsea compact pump and motor arrangement. All our pump packages provide high performance, and reduction in maintenance and service requirements.

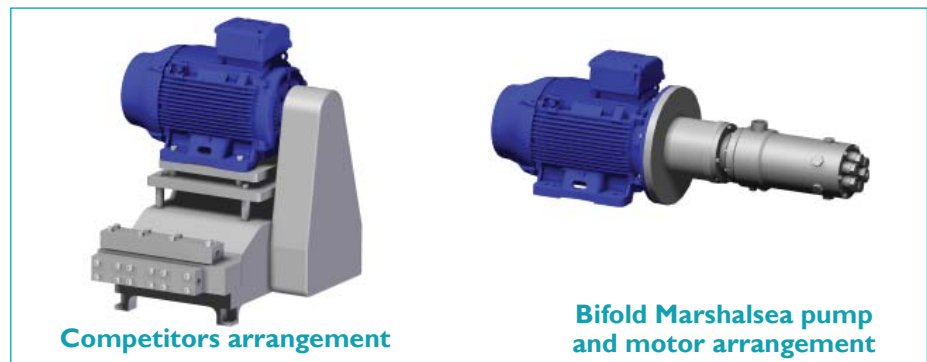


Figure 5

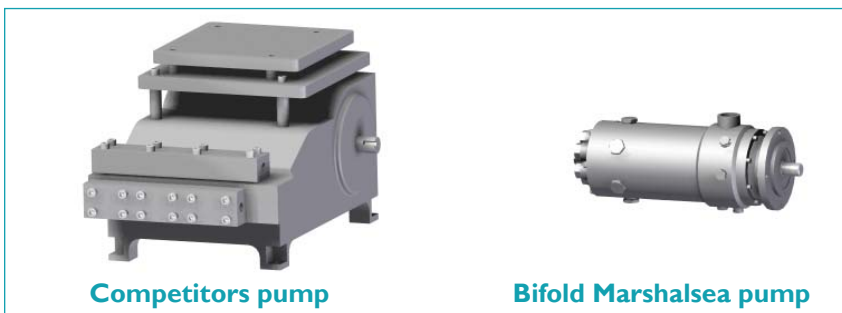


Figure 6

The pumps illustrated in figure 6 show the difference in size between a competitors pump with a large footprint compared to the Bifold Marshalsea compact pump.

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Overview



Figure 7 Shows Relative Sizes of the Two CIMPU's

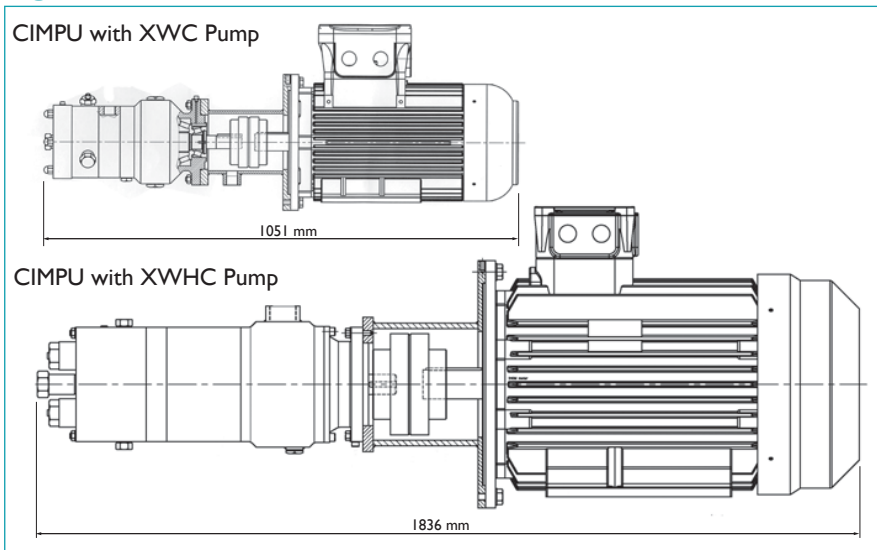


Figure 7 shows that two pumps are offered; either the 15 kW (45 kg) XWC pump or the larger 50 kW (350 kg) XWHC alternative. Both pumps can run continuously at 1,750 rpm with flow rate and pressure options as shown in tables 1 & 2 on pages 8 & 10. In the context of these performance figures, both pumps are ultra compact.

Figure 7

Pump Development for use with Chemical Fluids

The well established XW and XWH pumps with pistons actuated by a single swash plate were originally designed for pumping water-based fluids. They have been developed for use with chemical fluids such as methanol or other toxic or inflammable substances to create the XWC and the XWHC pumps. These pumps use ceramic pistons, as shown below, and incorporate additional galleries and seals to produce a hermetically tight product. The XWC and XWHC pumps feature a double sealing system to prevent the ingress of oil into the process fluid (see figure 16) with any bypass from the pistons collected in an isolated cavity and returned to the inlet of the pump.

Figures 8 & 9 Show Optional Additional Galleries and Seals Designed to Provide a Hermetically Tight Product for use with Toxic Chemical Fluids

XWHC Pump HP Outlet

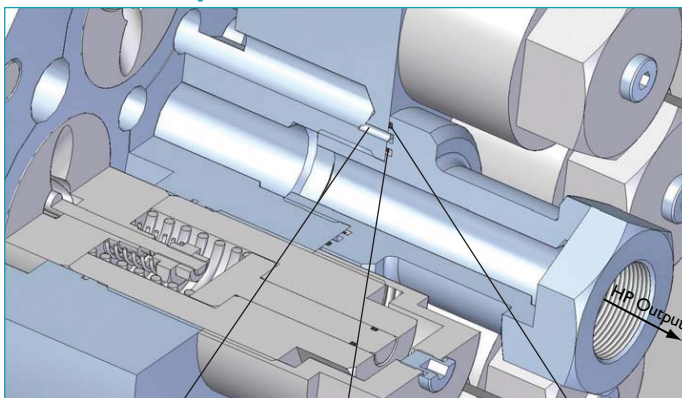


Figure 8

Return Gallery to Pump Inlet    Primary High Pressure Seal    Secondary Low Pressure Seal

XWHC Pump Delivery Valves

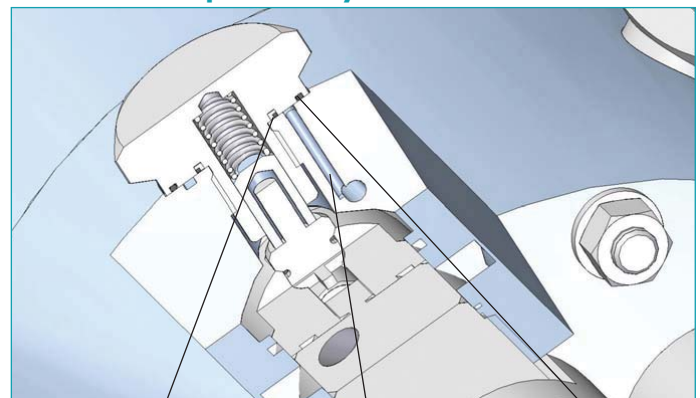


Figure 9

Primary High Pressure Seal    Return Gallery to Pump Inlet    Secondary Low Pressure Seal

## Overview



### High Density, Close Grained Ceramic Piston

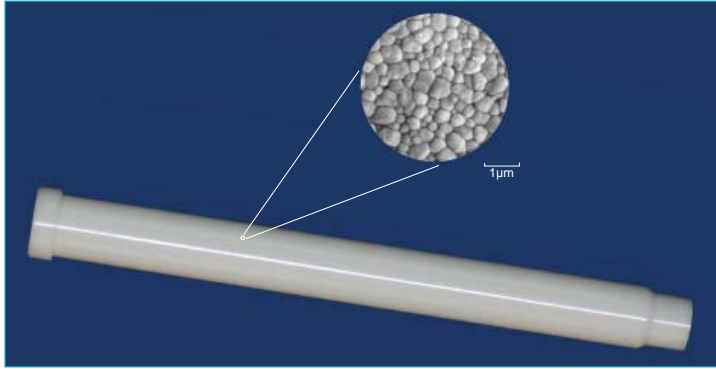


Figure 10

The pump pistons are made from close-grained, high density ceramic material. Figure 10 shows the spherical nature of the grain structure which results in a very low friction running surface. This, in turn, results in a product with a particularly long service life. The chemically inert nature of ceramic also makes it an excellent material for pistons designed to pump chemical fluids.

### Suction Valve Lifters

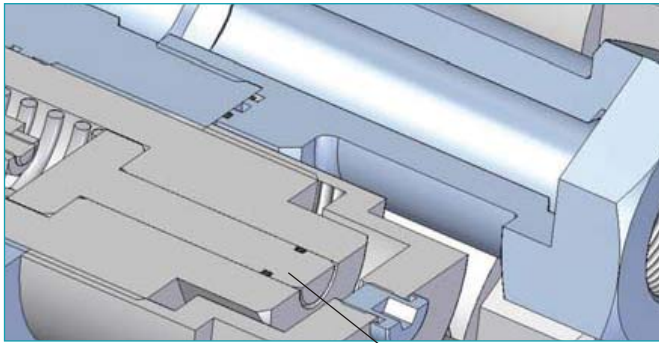


Figure 11

Suction Valve Lifter

The pumps are fitted with suction valve lifters to assist with priming.

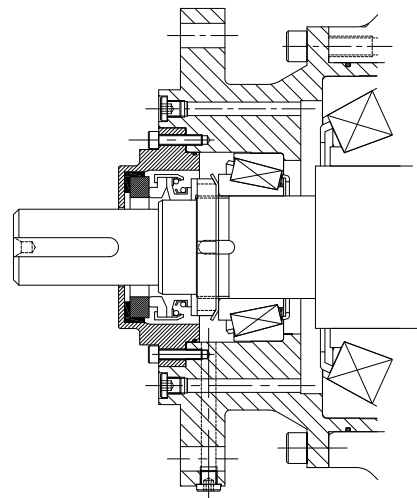


Figure 12

Figure 12 shows the high integrity mechanical shaft seal fitted to this range of pumps. The provision of this seal prevents fluid escaping from the pump in the event that the pump casing becomes contaminated with the process fluid.

### Pump Specifications

XWC PUMP SPECIFICATIONS								
Pump No	No. of pistons	Theoretical Flow					Maximum Pressure	
	Size (inches) x Stroke	cc/rev	l/m at 1450 RPM	l/m at 1750 RPM	USg/m at 1450 RPM	USg/m at 1750 RPM	bar	psi
22500 - 52	3 x 0.562 x 1/3	2.63	3.8	4.6	1.0	1.2	150	2175
22500 - 54	3 x 0.687 x 1/3	3.93	5.7	6.8	1.5	1.8	150	2175
22500 - 62	3 x 0.562 x 2/3	5.26	7.6	9.2	2.0	2.4	150	2175
22500 - 64	3 x 0.687 x 2/3	7.86	11.4	13.7	3.0	3.6	150	2175
22500 - 42	3 x 0.562 x 3/3	7.90	11.5	13.8	3.0	3.6	150	2175
22500 - 44	3 x 0.687 x 3/3	11.79	17.0	20.6	4.5	5.4	150	2175
22600 - 42	6 x 0.562 x 3/3	15.80	22.9	26.6	6.1	7.2	150	2175
22600 - 44	6 x 0.687 x 3/3	23.58	34.2	41.2	9.0	10.8	150	2175

Table 1

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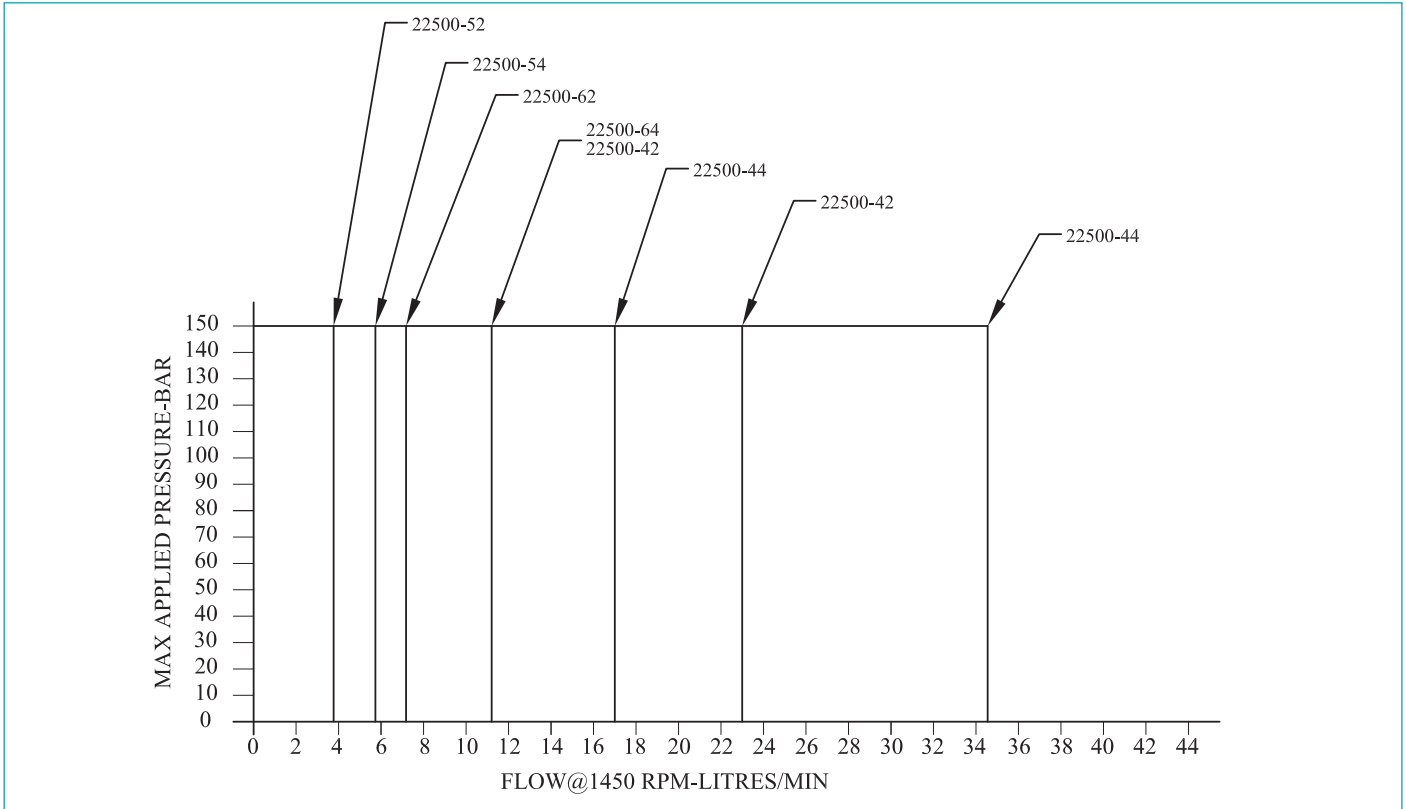
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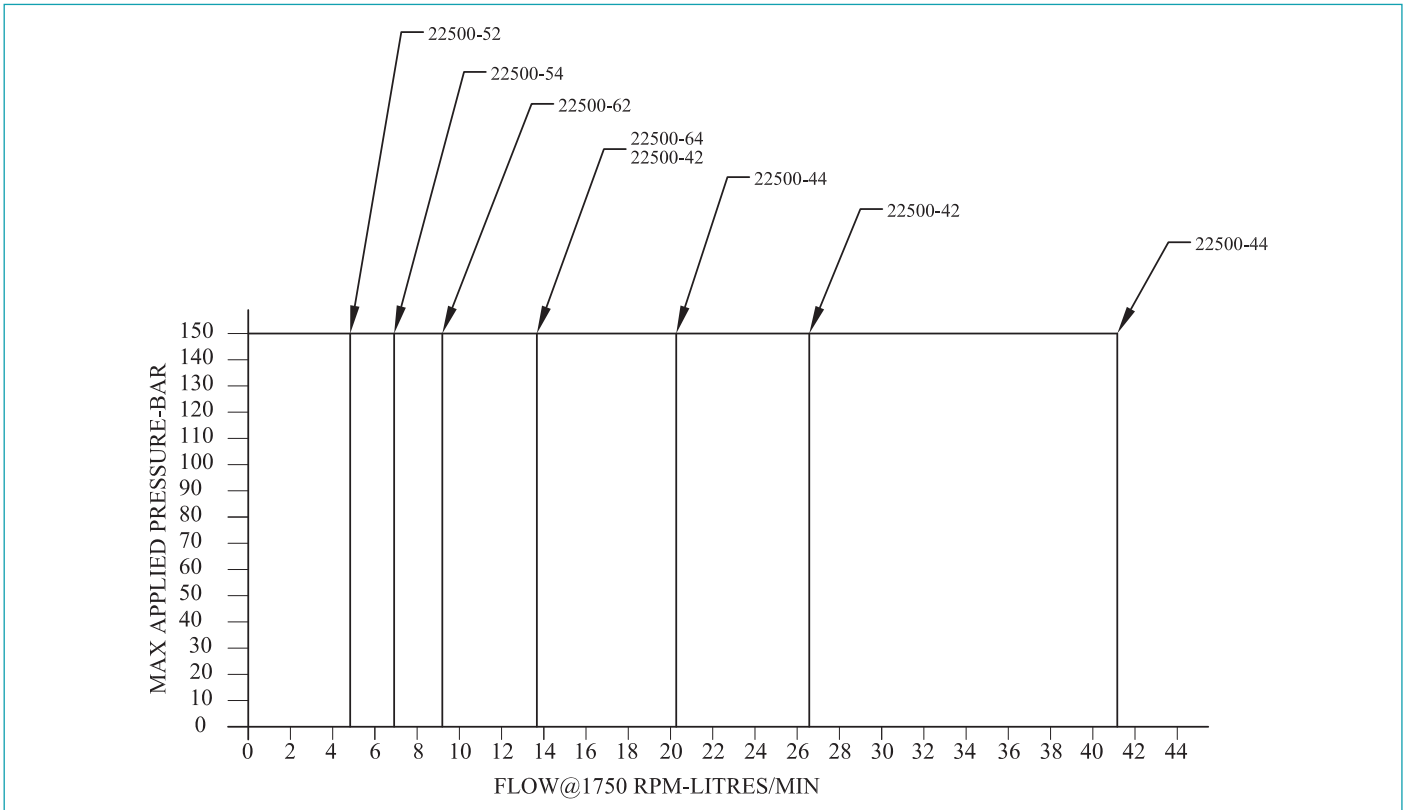
Pump Performance



XWC Pump Performance



Graph 1

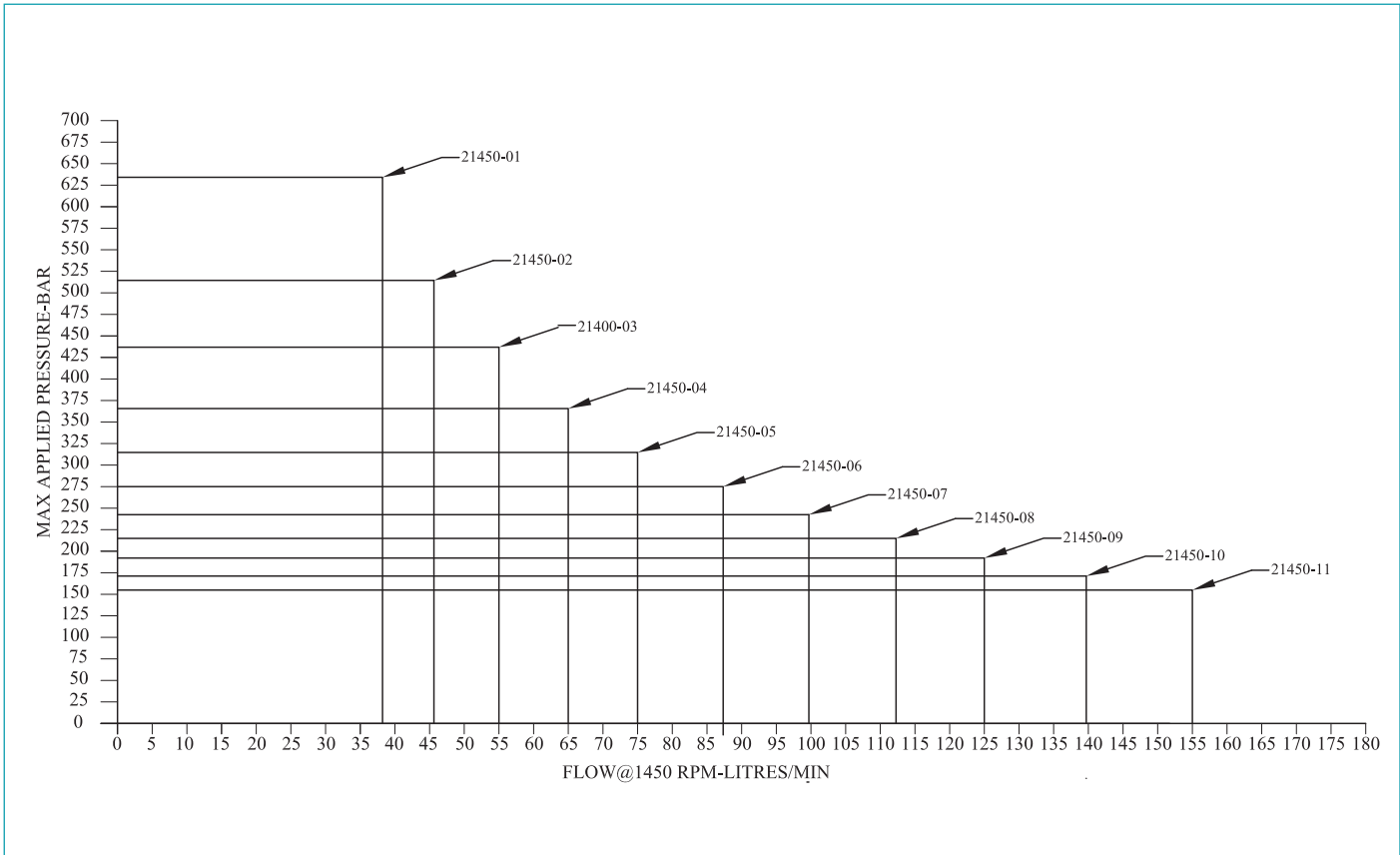


Graph 2

XWHC PUMP SPECIFICATIONS								
Pump No	No. of pistons	Theoretical Flow					Maximum Pressure	
	Size (inches)	cc/rev	l/m at 1450 RPM	l/m at 1750 RPM	USg/m at 1450 RPM	USg/m at 1750 RPM	bar	psi
21450 - 01	3 x 0.562	26	38	46	10	12.0	636	9225
21450 - 02	6 x 0.688	32	46	56	12	14.8	517	7499
21450 - 03	6 x 0.750	38	55	67	14	17.6	435	6309
21450 - 04	3 x 0.813	45	65	79	17	20.8	368	5337
21450 - 05	3 x 0.875	52	75	91	20	24.0	318	4612
21450 - 06	3 x 0.938	60	87	105	23	27.7	275	3989
21450 - 07	6 x 1.000	68	99	119	26	31.4	243	3524
21450 - 08	6 x 1.063	77	112	135	29	35.6	215	3118
21450 - 09	6 x 1.125	86	125	151	33	39.8	192	2785
21450 - 10	6 x 1.188	96	139	168	37	44.4	172	2495
21450 - 11	6 x 1.250	107	155	168	41	49.5	155	2248

Table 2

XWHC Pump Performance



Graph 3

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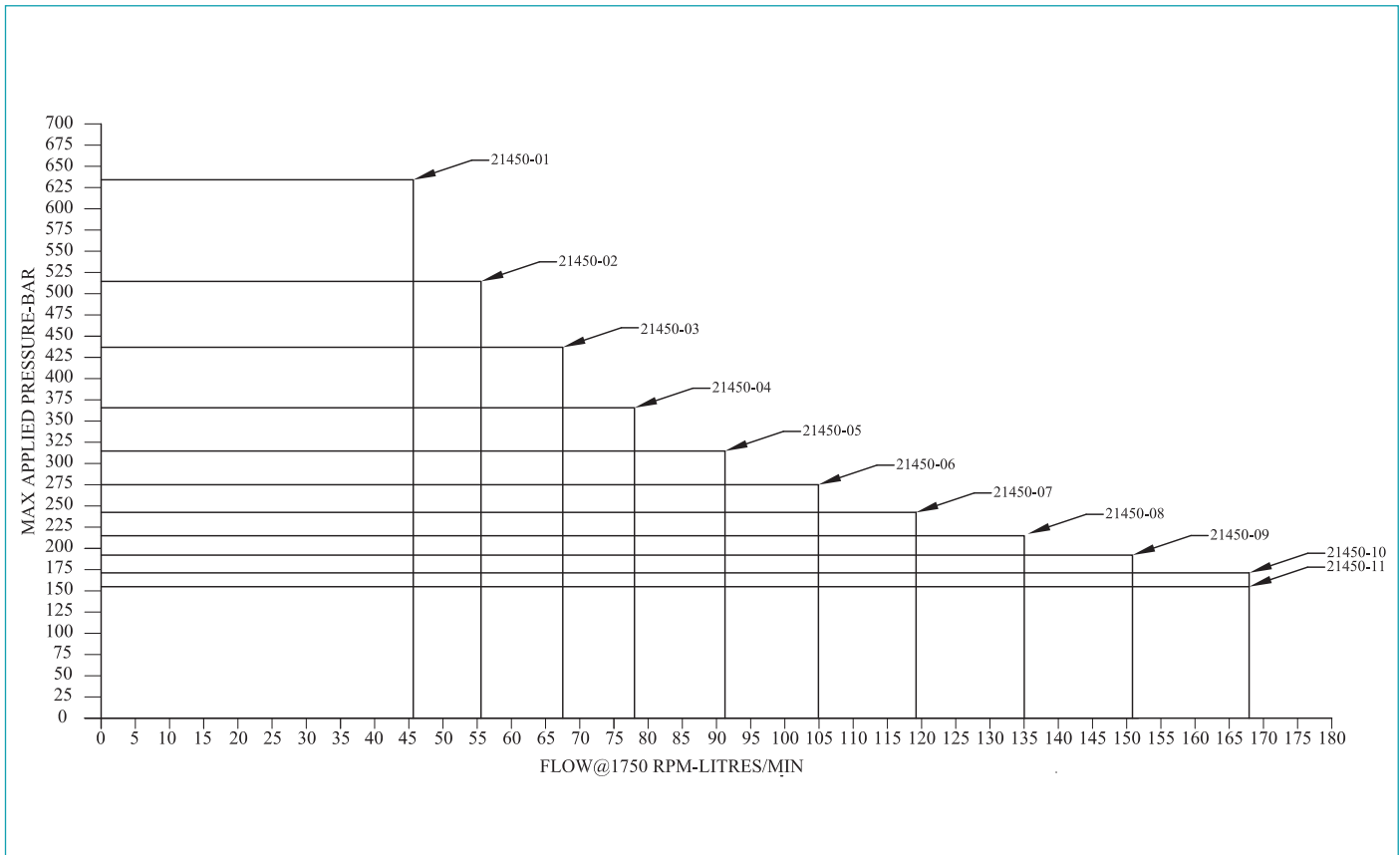
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Pump Performance



XWHC Pump Performance



Graph 4

Different Pump Styles



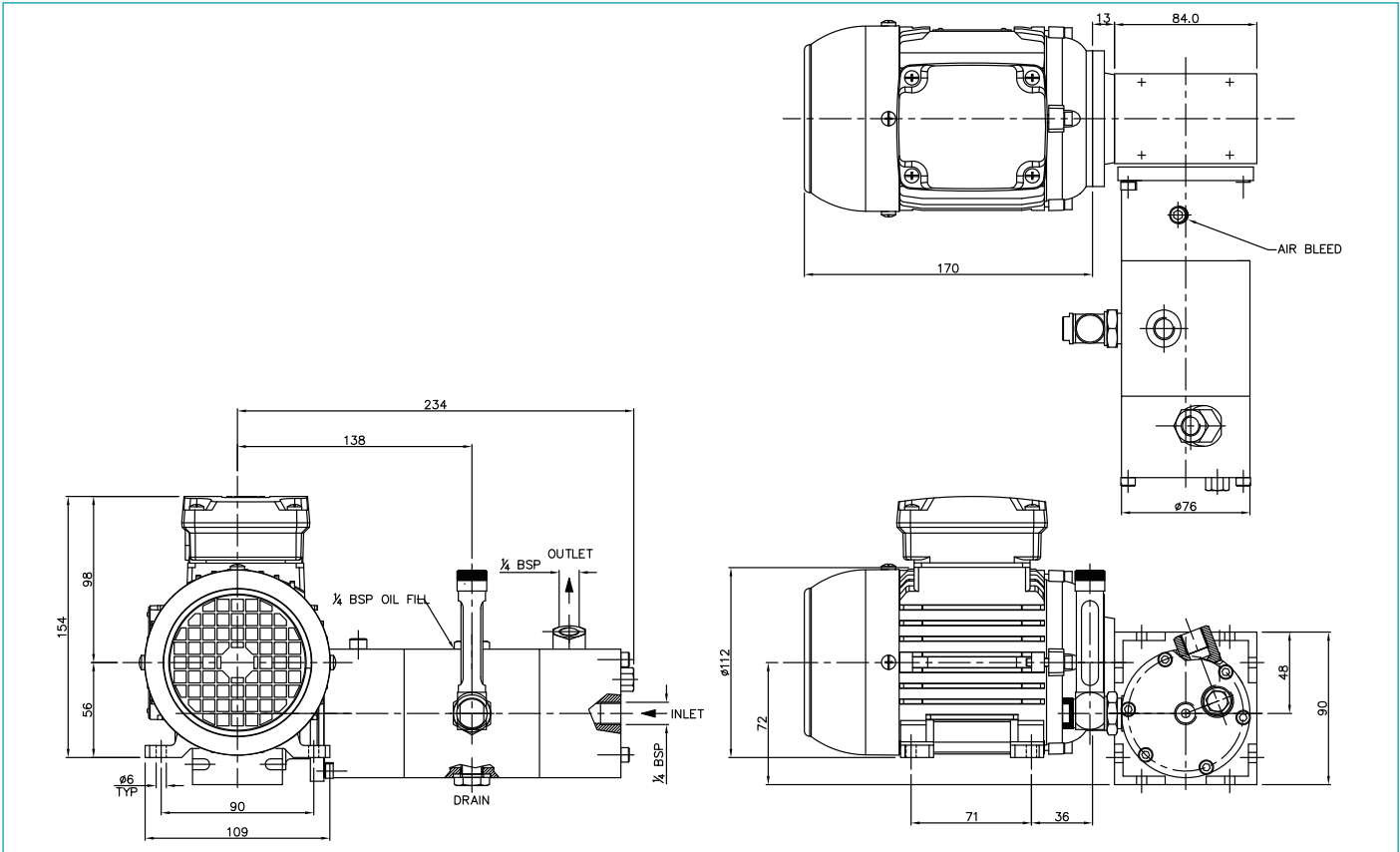
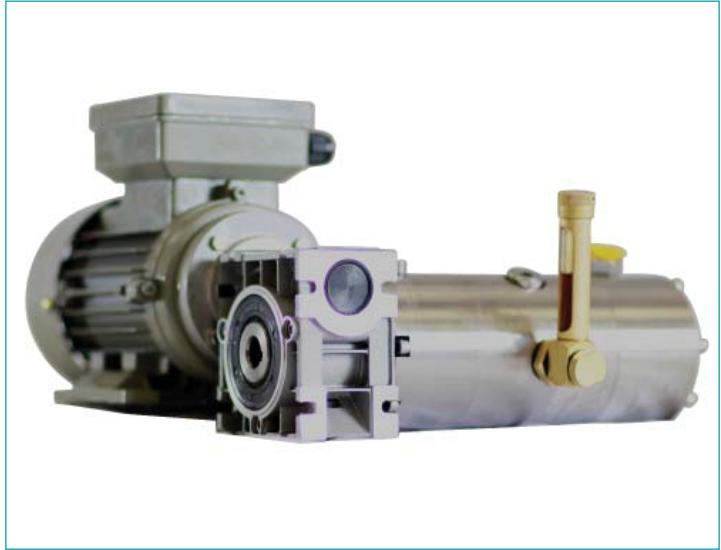
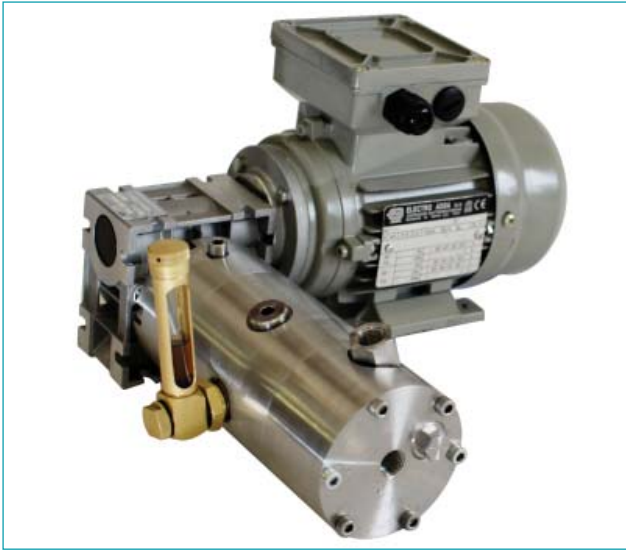
Figure 13



Figure 14



MMC Pump



Pump Specifications

MMC PUMP SPECIFICATIONS						
Pump No	No. of pistons	Theoretical Flow			Maximum Pressure	
	Size (inches)	cc/rev	l/m at 1450 RPM	l/m at 1750 RPM	bar	psi
22700 - 01	1 x 0.250	0.2	0.29	0.35	207	3000

Table 3

12 [www.bifold.co.uk](http://www.bifold.co.uk)

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of companies

Pump Comparisons



Comparison of Pump Types for Water-Based Fluids

Figure 15 shows the internal arrangement of a typical three piston triplex pump design. As can be seen from previous illustrations, pumps of this design are large and occupy a significant level of skid space. An external drive belt and pulley system is needed to drive these pumps. Typically, motors are mounted on top of the pump producing a large unit.

Guarding is required to enclose the belts further adding to the overall footprint and cost. Anti-sparking materials and corrosion protection are necessary for the external drive system components and guards. It is unusual for pumps of this type to be manufactured from stainless steel and as such further corrosion protection required.

Pulsation dampers are generally required when using triplex pumps.

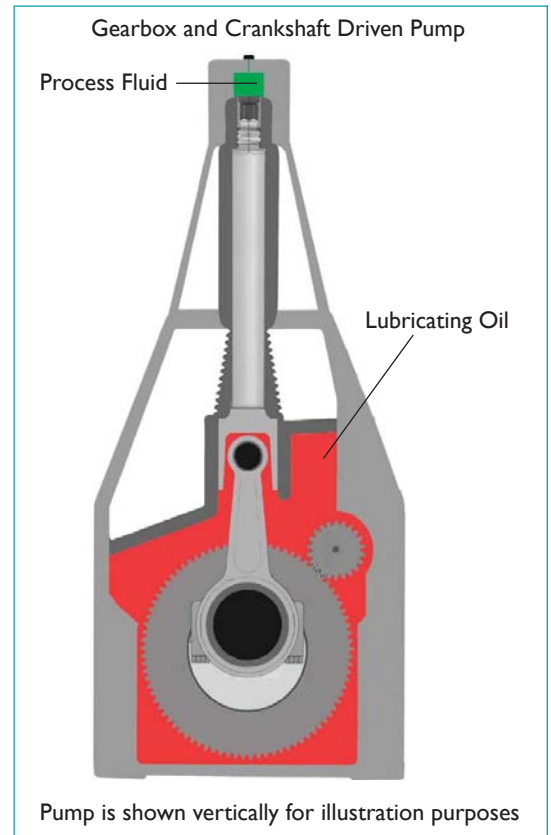


Figure 15

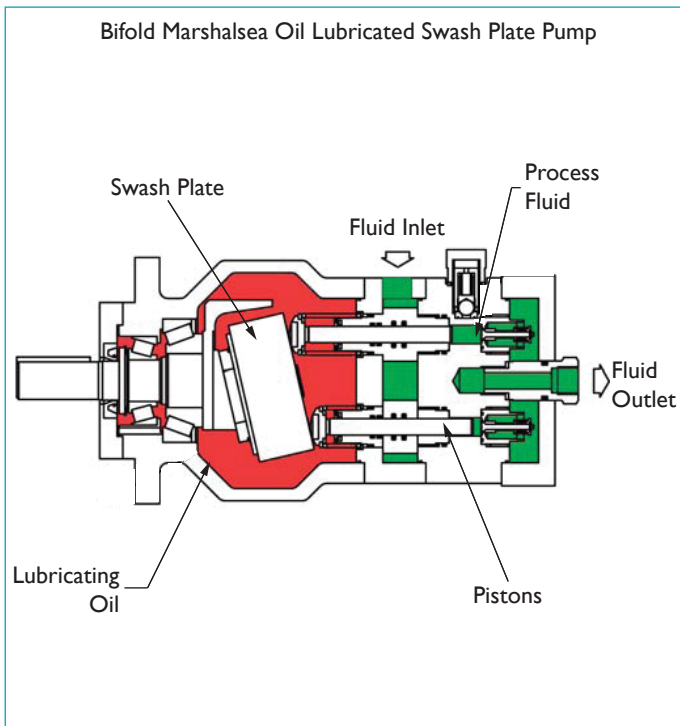


Figure 16

The Bifold Marshalsea compact pump design is shown in figure 16. The motor is close-coupled to the pump, negating the requirement for pulleys and drive belts. There are no exposed rotating parts resulting in improved user and application safety, particularly in hazardous (classified) locations. These pumps are manufactured from 316 Stainless Steel. The flow delivery of these pumps is smoother than with triplex pumps and there is generally no requirement for pulsation dampers. Since the design does not have belts or pulleys and is dynamically balanced, it has extremely low levels of vibration.

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### Weight

The 15 kW pump weighs 45 kg.  
The 50 kW pump weighs 350 kg.

### Installation

The units must be mounted horizontally. To ensure that low speed self-priming operates, a positive head must be provided by mounting the process fluid tank above the suction intake line.

### Quotations

For this product, variations in ranges of flow rates, operating pressures, control options and other parameters are extensive. If you can provide the information shown opposite, we will be delighted to respond with a specific quotation.

### Information Required

#### Pump Fluid

Flow rate range required from \_\_\_\_ l/m to \_\_\_\_ l/m.  
Operating pressure at discharge flange \_\_\_\_ bar.  
Operating pressure at suction flange \_\_\_\_ bar.  
Operating temperature, min \_\_\_\_ °C to max \_\_\_\_ °C.  
Density at max operating temperature \_\_\_\_ g/cm<sup>3</sup>.  
Viscosity at max operating temperature \_\_\_\_ cP.  
Solids content / solids density \_\_\_\_ %/g/cm<sup>3</sup>.  
Solids grain size / solids hardness \_\_\_\_ mm/Mohs.

#### Motor Data

Hazardous (classified) location and protection technique requirements.  
Voltage, phases and frequency or dc.

## Examples of Projects Supply for Pumps of this type

MAJOR PROJECT SUCCESS		
Operator	Project / Rig	Location
BP	Clair	North Sea
BP	Nam Con Son	Vietnam Offshore
BP	Shearwater	North Sea Central (UK)
BP	Thunderhorse	Gulf of Mexico
British Gas	Blake	North Sea
ConocoPhillips	Britannia	North Sea
Encana	Ross FPSO	North Sea (UK)
Esso	Balder	Norway
Statoil	Garn West	North Sea
Total	Nuggets	North Sea

Table 4

The table above is an extract taken from our main Project Reference List, where our range of pumps have been utilized.

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Directional Control Valves,  
and Pumps**

**Bifold® Group**

**Pneumatic and  
Instrumentation Valves**

**Hydraulic Valves**

**Subsea Valves**

**Hydraulic Pumps,  
Intensifiers and Valves**

**Bifold®**

**Bifold FluidPower®**

**Bifold® Subsea**

**Bifold®  Marshalsea**

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Fax: +44 (0) 1823 323382  
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Pump Solutions**

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## Chemical Metering Hydrodrive Motor Pump Unit CMMPU(H)



Chemical Metering Motor Pump Unit with Hydrodrive

- Controllable Flow Rates of up to 160 l/hr and down to 1.0 l/hr at up to 690 bar
- Established Piston Pump Designs Developed for use with Potentially Hazardous Chemicals
- Pump Speed Controlled By Adjustable Hydrostatic Drive
- Ultra Compact Multi-Piston Pump with Minimal Pressure Pulsation
- Worldwide Approvals  
ATEX      
- Chemically Inert, Low Friction Ceramic Pistons
- Self-Priming on Start-up
- Hermetically Tight, Environmentally Friendly Product
- In Accordance with API 674 and 675 Standards



Leading Technology



Product Innovation

The Bifold Group of companies have provided peace of mind to contractors, installers and end users for over a century. Our innovative range of products, specifically designed with the customer in mind, have gained worldwide approval and credibility for the onerous conditions as found in hazardous (classified) locations, hostile and subsea environments.

The customer requirements for sustained safety and reliability under extreme operating conditions are Bifold Marshalsea's primary objectives.

Our state of the art production facilities based in the UK, allows our superior and innovative designs to be manufactured to rigorous manufacturing and quality standards.

The policy and overall business objective of Bifold Marshalsea, is to provide system packages of the highest quality and in compliance with customer requirements. We guarantee ease of installation and low lifetime cost of ownership - due to superior design, long-life materials, precision manufacturing and testing facilities.



Worldwide Service and Support

Located in Taunton, UK, Bifold Marshalsea has subsidiary locations in Houston, USA, Singapore and Manchester, UK. The Bifold Group of Companies are supported worldwide with our engineers and a global network of agents and distributors.

The Group have invested in state of the art machining centres ensuring accuracy of close tolerances, and a rapid turnaround capability together with state of the art assembly and testing facilities.

The customer can be confident that Bifold Marshalsea has the product portfolio and the technical and production capability to provide the correct solution for their system requirements, and provide support during and after installation.

Pumps for Special Fluids

Bifold Marshalsea provide pumps for use with fluids which include a variety of water-based, fire resistant and other media types. The properties of these fluids include a combination of high or low viscosity with either high or low lubricity.

Various pump models are available for use with water glycol and other calibration fluids.

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Overview



The CMMPU(H) is designed to provide accurate chemical metering for oil and gas industry applications. This range of pumps has been developed for chemical fluids from the tried and tested Bifold Marshalsea water glycol pumps. These positive displacement, variable delivery, axial piston pumps feature a double sealing system to prevent the ingress of bearing housing oil into the process fluid. Bypass from the pistons is collected in an isolated cavity and returned to the inlet side of the pump. These pumps can have additional galleries and seals designed to prevent high pressure fugitive emissions and provide a hermetically tight product in the event of primary seal failures (shown in figures 16 & 17).

Chemically inert ceramic pistons with an extremely low coefficient of friction are fitted. Ceramic pistons extend the life of the seals and make for pumps with particularly long service intervals. The compact, three piston pump operates with minimal pressure pulsation and is in accordance with API 674 and 675 standards.

Motors can be either single or three phase AC or 24Vdc, subject to the power rating, and typically run at 1,450 rpm (max 1,800 rpm). The speed of the pump is controlled through either manual or electrical adjustment

Certification Details



This pump conforms to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX compliant.



Bifold Marshalsea has been third party assessed and certified as meeting the requirements of ISO 9001:2000 for the design, development, manufacture and servicing of Hydraulic Pumps, Relief Valves and Pressure Intensifiers.

CMMPU(H) with SWC Pump



Figure 1

SWC Pump



Figure 2

[www.bifold.co.uk](http://www.bifold.co.uk)

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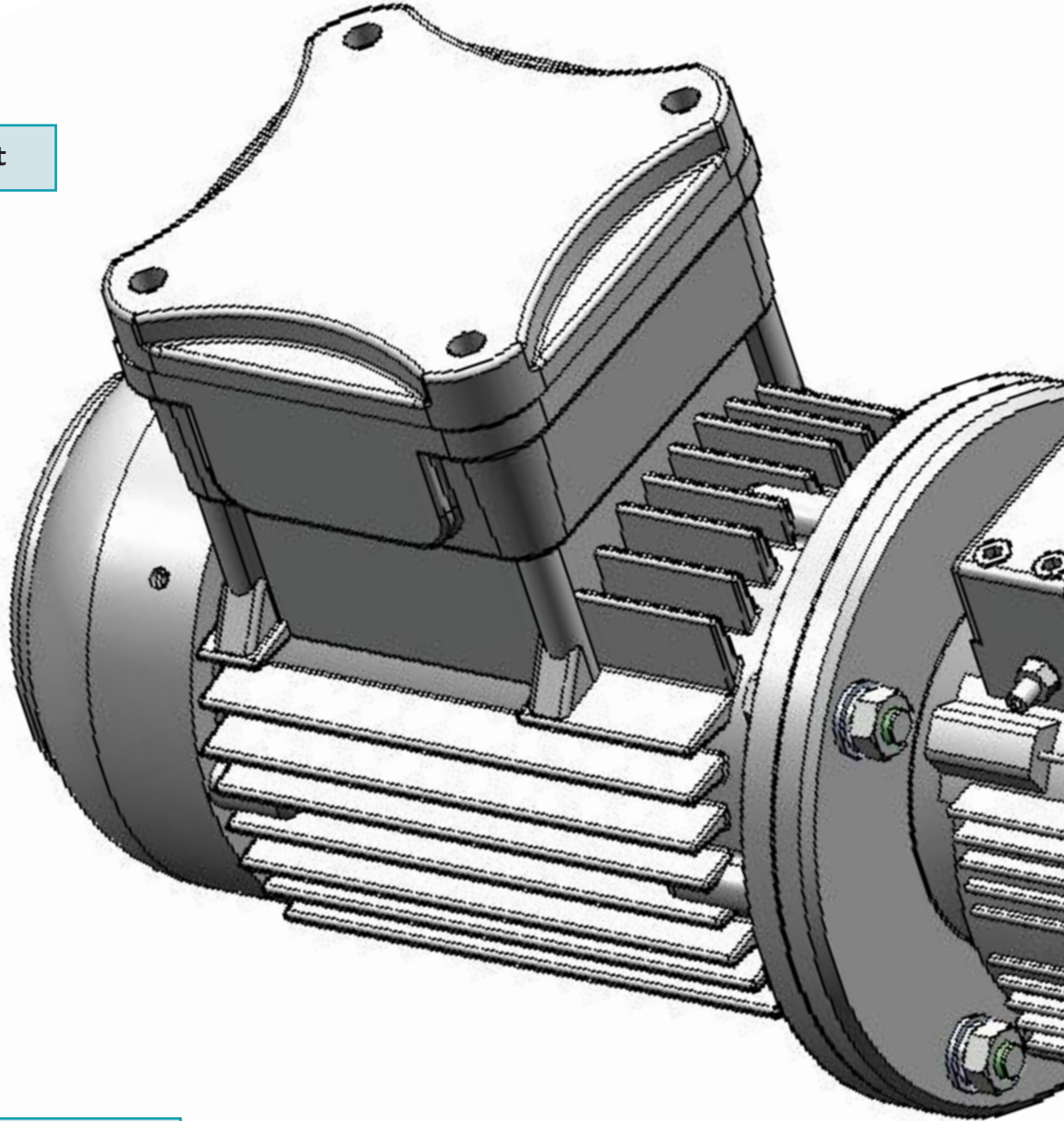
Bifold Marshalsea is a member of the Bifold Group of companies

Features-SMC Pump



In Accordance with API 674 & 675

Small Overall Footprint



Hermetically Tight, Environmentally Friendly Product Option

Established Piston Pump Designs Developed for use with Potentially Hazardous Chemicals

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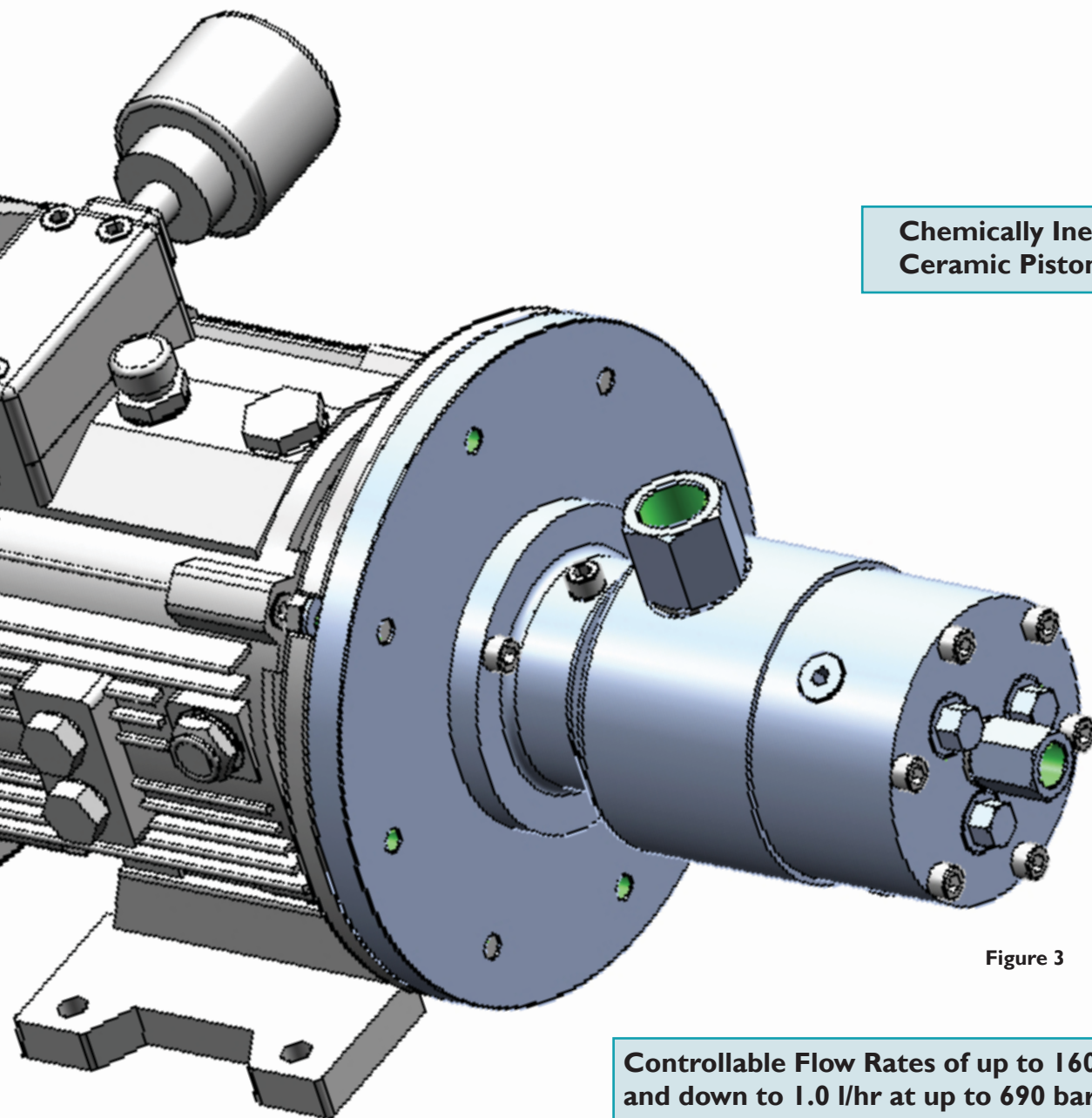
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Features-SMC Pump



Ultra Compact Multi-Piston Pumps Provide Minimal Pressure Pulsation



Chemically Inert, Low Friction Ceramic Pistons

Figure 3

Controllable Flow Rates of up to 160 l/hr and down to 1.0 l/hr at up to 690 bar



Splitter Box Options



The pictures below show different views of the Bifold Marshalsea Belt Drive Splitter Box options, twin pump drive. A triple drive is also configurable. A gearbox option is also available as an alternative to the belt drive.

Twin SMC Motor Pump Unit

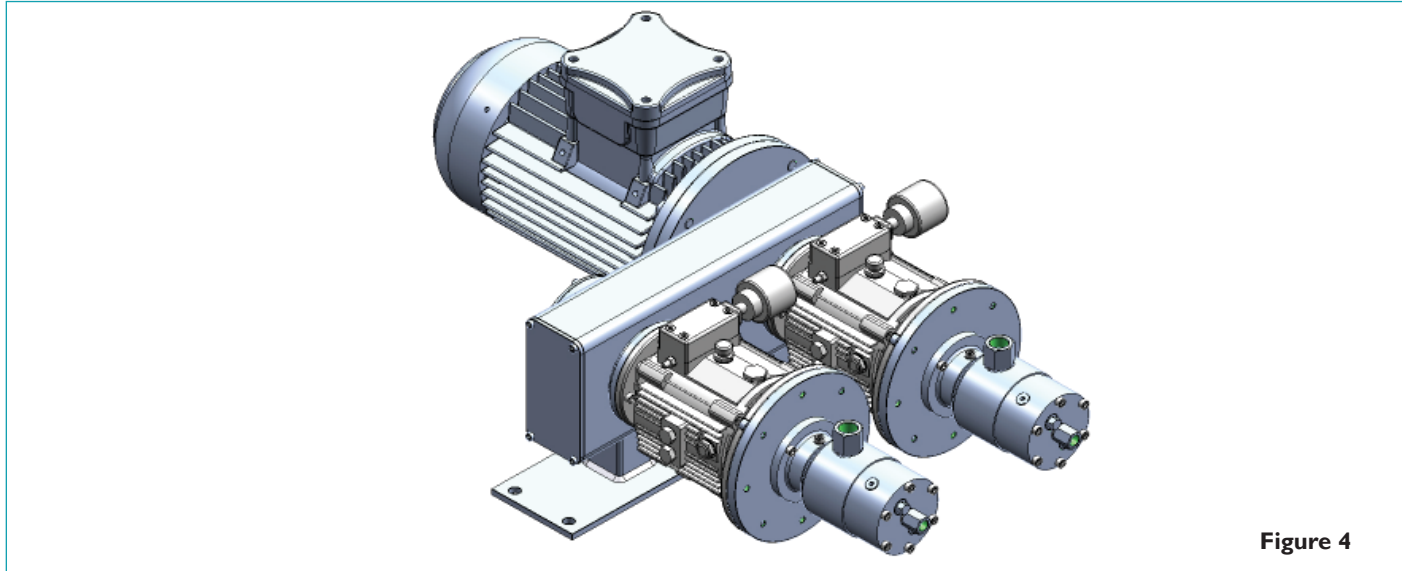


Figure 4

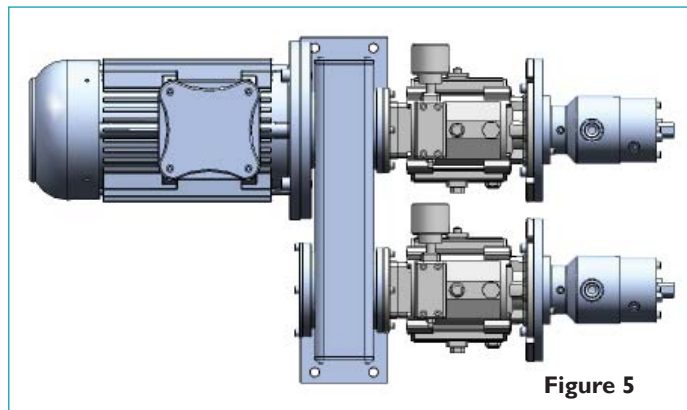


Figure 5

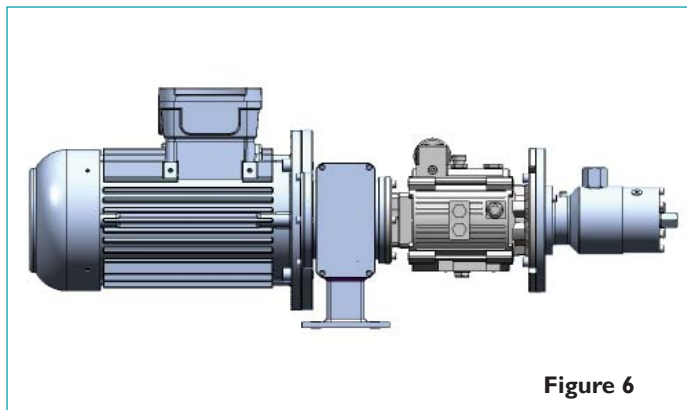


Figure 6

Multiple Pump/Motor Sets Vs Multi-Head Drives

Whilst Bifold Marshalsea offers twin and triple pump configurations, multiple single pump/motor units are recommended in lieu of a single, high power, motor driving a multiple pump train.

Advantages of multiple single motor/pump units are:-

- Eliminates large power rated motor with very large start-up loads.
- Avoids Multiple Pump Shutdowns for a Single Pump Maintenance Requirement.
- Greater Installation Flexibility.
- Increased Life Expectancy for Pumps - Run only when Required.
- Reduced Installation Cost.
- Reduced Capital Spend.

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Overview



Remote Speed Control

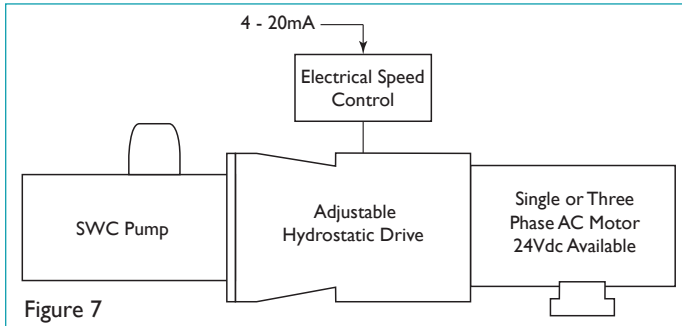


Figure 7

Local Manual Control

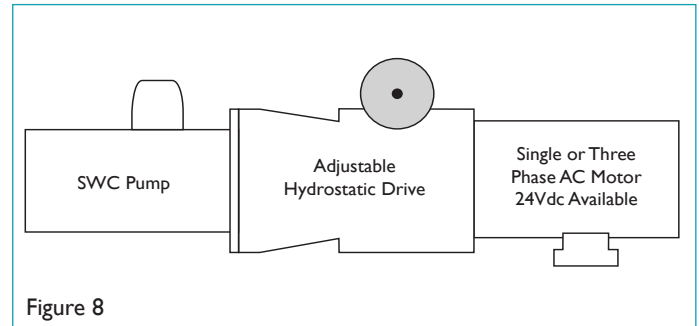


Figure 8



Figure 9

As shown in Figure 7 above, the Hydrodrive can be adjusted electronically with a 4 - 20mA signal into a speed controller. Alternatively, as shown in Figure 8 above and in the picture on the left, the variable speed Hydrodrive can be directly controlled manually. Typically, a flow meter and flow rate readout are customer provided.

High Density, Close Grained Ceramic Piston

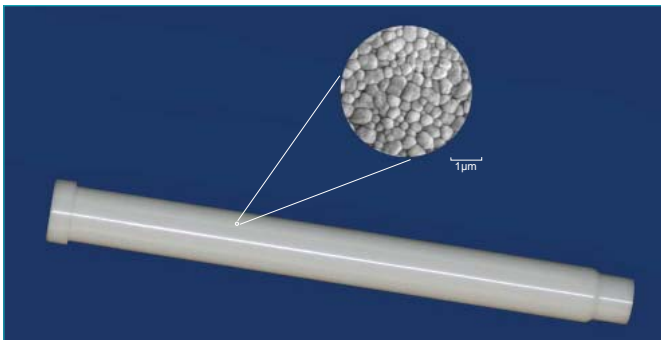


Figure 10

The pump pistons are made from close-grained, high density ceramic material. Figure 10 shows the spherical nature of the grain structure which results in a very low friction running surface. This, in turn, results in a product with a particularly long service life. The chemically inert nature of ceramic also makes it an excellent material for pistons designed to pump chemical fluids.

Suction Valve Lifters

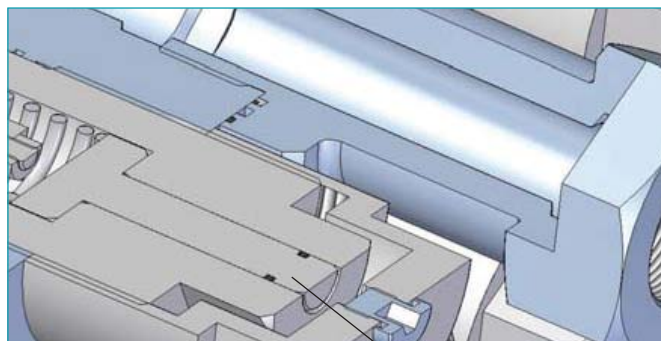


Figure 11

Suction Valve Lifter

The larger pumps are fitted with suction valve lifters to assist with priming.

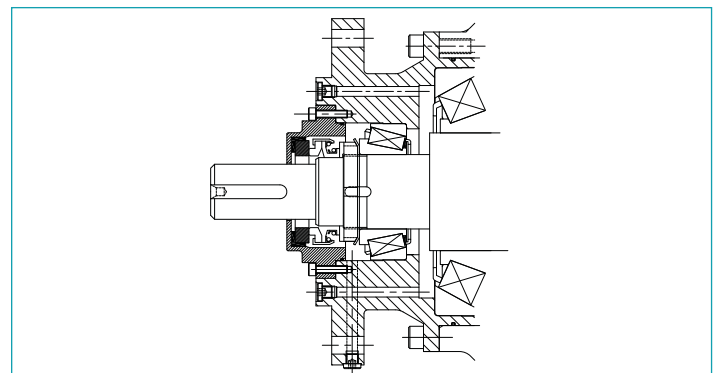


Figure 12

Figure 12 shows the high integrity mechanical shaft seal fitted to this range of pumps. The provision of this seal prevents fluid escaping from the pump in the event that the pump casing becomes contaminated with the process fluid.



Overview



MMC Motor Pump Unit

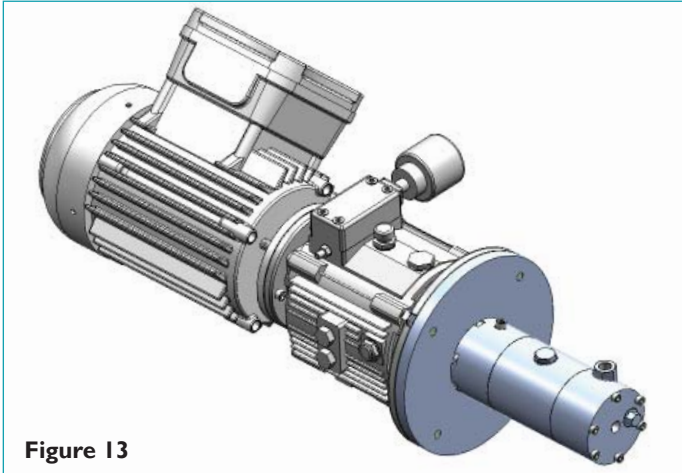


Figure 13

SMC Motor Pump Unit

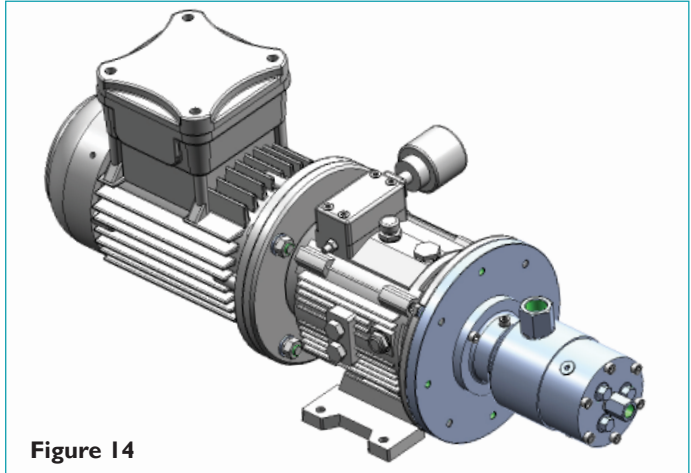


Figure 14

SWC Motor Pump Unit

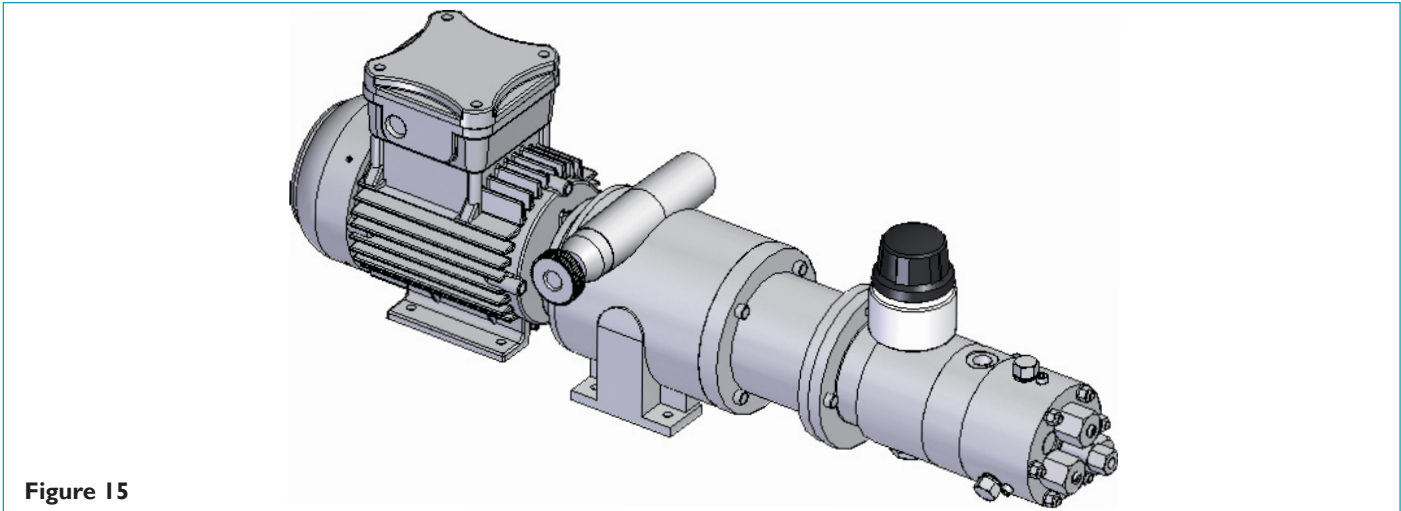


Figure 15

Figures 16 & 17 Show Optional Additional Galleries and Seals Designed to Provide a Hermetically Tight Product for use with Toxic Chemical Fluids

XWHC Pump HP Outlet

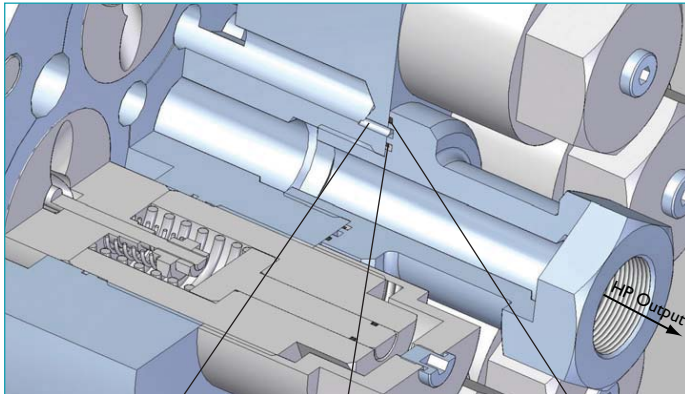


Figure 16

Return Gallery to Pump Inlet

Primary High Pressure Seal

Secondary Low Pressure Seal

XWHC Pump Delivery Valves

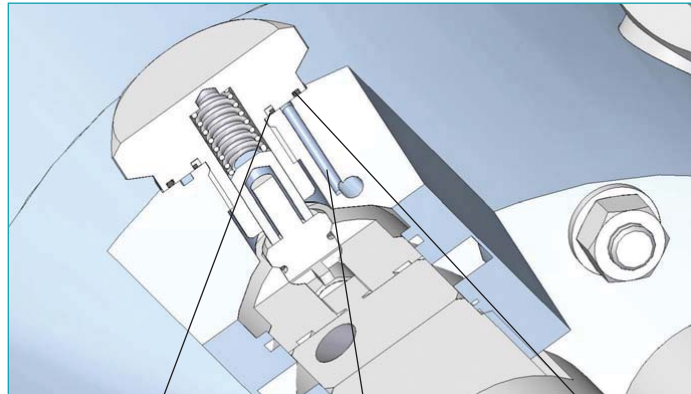


Figure 17

Primary High Pressure Seal

Return Gallery to Pump Inlet

Secondary Low Pressure Seal

Pump Specification



PUMP SPECIFICATIONS					
Pump Type	cc/rev	Flow Range		Maximum Pressure	
		l/hr	USg/hr	bar	psi
MMC	0.17	1 to 14.5	0.26 to 3.83	200	2900
SMC	0.5	3 to 43.0	0.79 to 11.36	200	2900
LMC (Pending)	1.0	8 to 80.0	2.1 to 21.0	400	5800
LMC (Pending)	2.0	16 to 160	4.2 to 42.0	400	5800
SWC	0.65	1 to 56.0	0.26 to 14.8	690	10000
SWC	1.0	8 to 160	2.1 to 42.0	690	10000

Table 1

MMC Motor Pump Unit

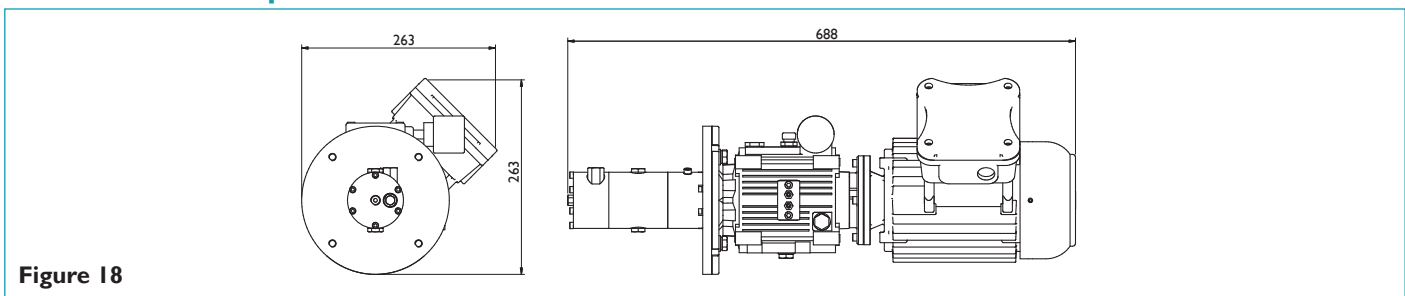


Figure 18

SMC Motor Pump Unit

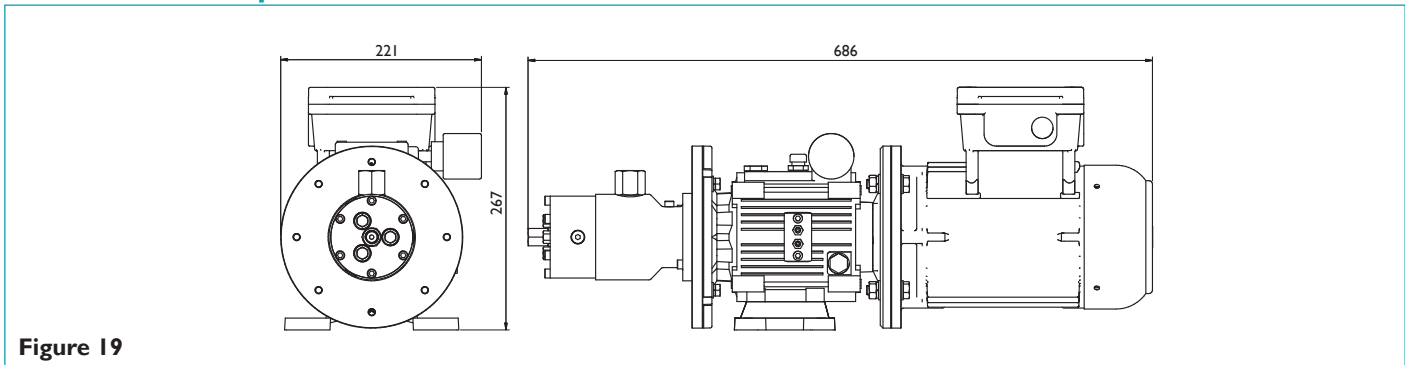


Figure 19

SWC Pump With Motor Dimensional Drawing

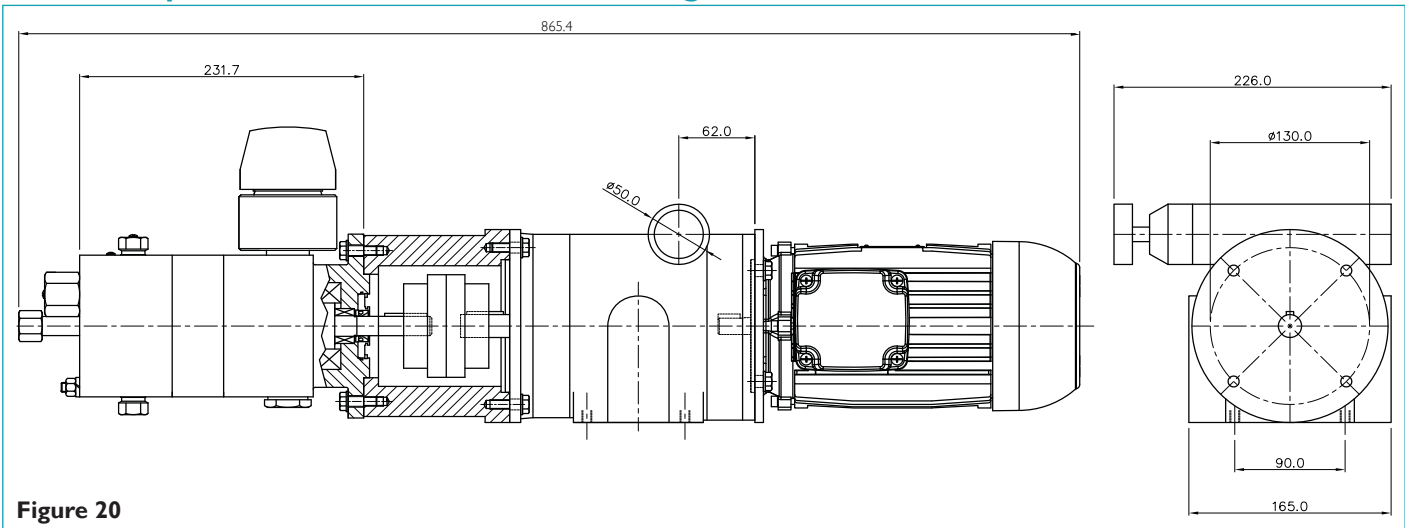


Figure 20

[www.bifold.co.uk](http://www.bifold.co.uk)

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 is a member of the  
**Bifold Group** 9  
 of companies

Pump Comparisons

Comparison of Pump Types for Water-Based Fluids

Figure 21 shows the internal arrangement of a typical three piston triplex pump design. As can be seen from previous illustrations, pumps of this design are large and occupy a significant level of skid space. An external drive belt and pulley system is needed to drive these pumps. Typically, motors are mounted on top of the pump producing a large unit.

Guarding is required to enclose the belts further adding to the overall footprint and cost. Anti-sparking materials and corrosion protection are necessary for the external drive system components and guards. It is unusual for pumps of this type to be manufactured from stainless steel and as such further corrosion protection required.

Pulsation dampers are generally required when using triplex pumps.

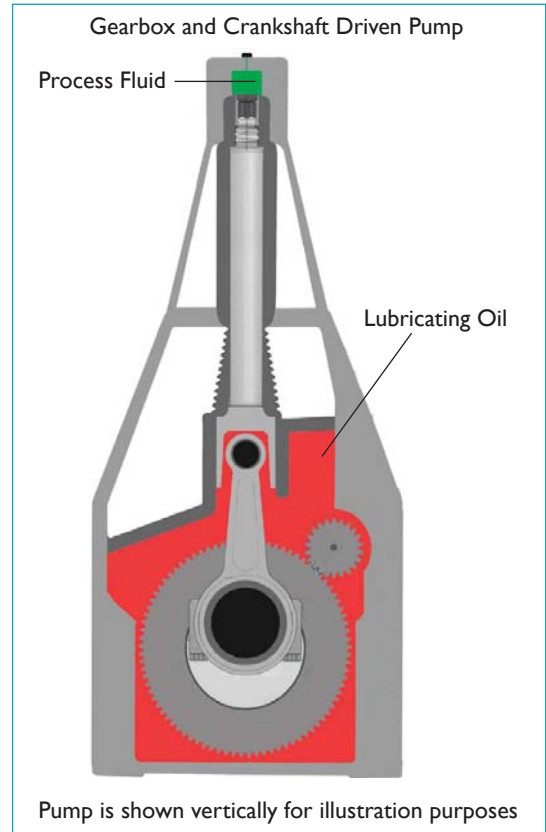


Figure 21

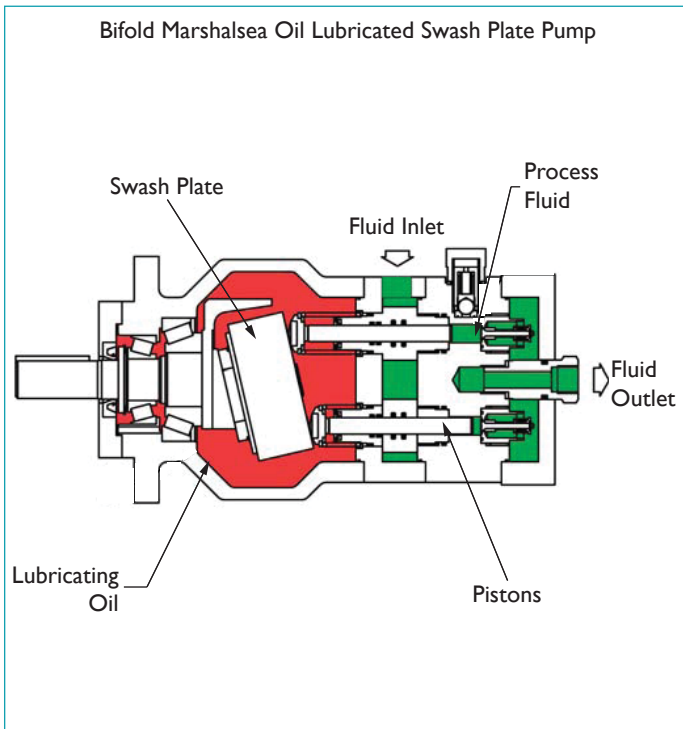


Figure 22

The Bifold Marshalsea compact pump design is shown in figure 22. The motor is close-coupled to the pump, negating the requirement for pulleys and drive belts. There are no exposed rotating parts resulting in improved user and application safety, particularly in hazardous (classified) locations. These pumps are manufactured from 316 Stainless Steel. The flow delivery of these pumps is smoother than with triplex pumps and there is generally no requirement for pulsation dampers. Since the design does not have belts or pulleys and is dynamically balanced, it has extremely low levels of vibration.

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Information



**Installation**

The units can be mounted either horizontally or vertically. To ensure that low speed self-priming operates, a positive head must be provided by mounting the process fluid tank above the suction intake line. Standard configurations have the pump driven through a Hydrodrive variable speed gearbox. For some applications, having a single motor driving multiple pumps can be an attractive option - each pump individually controllable.

**Quotations**

For this product, variations in ranges of flow rates, operating pressures, control options and other parameters are extensive. If you can provide the information shown opposite, we will be delighted to respond with a specific quotation.

**Information Required for a Quotation**

**Metered Fluid**

- Flow rate range required from \_\_\_\_ l/hr to \_\_\_\_ l/hr.
- Operating pressure at discharge flange \_\_\_\_ bar.
- Operating pressure at suction flange \_\_\_\_ bar.
- Operating temperature, min \_\_\_\_°C to max \_\_\_\_°C.
- Density at max operating temperature \_\_\_\_ g/cm<sup>3</sup>.
- Viscosity at max operating temperature \_\_\_\_ cP.
- Solids content / solids density \_\_\_\_ %/g/cm<sup>3</sup>.
- Solids grain size / solids hardness \_\_\_\_ mm/Mohs.

**Motor Data**

- Hazardous area protection requirements.
- Voltage, phases and frequency or whether dc.

**Control Options**

- Remote or local manual.

**Examples of Projects Supply for Pumps of this type**

MAJOR PROJECT SUCCESS		
Operator	Project / Rig	Location
BP	Clair	North Sea
BP	Nam Con Son	Vietnam Offshore
BP	Shearwater	North Sea Central (UK)
BP	Thunderhorse	Gulf of Mexico
British Gas	Blake	North Sea
ConocoPhillips	Britannia	North Sea
Encana	Ross FPSO	North Sea (UK)
Esso	Balder	Norway
Statoil	Garn West	North Sea
Total	Nuggets	North Sea

Table 2

The table above is an extract taken from our main Project Reference List, where our range of pumps have been utilized.

**Instrument, Process,  
Directional Control Valves,  
and Pumps**

**Bifold® Group**

**Pneumatic and  
Instrumentation Valves**

**Hydraulic Valves**

**Subsea Valves**

**Hydraulic Pumps,  
Intensifiers and Valves**

**Bifold®**

**Bifold FluidPower®**

**Bifold® Subsea**

**Bifold®  Marshalsea**

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Fax: +44 (0) 161 345 4780  
Email: [marketing@bifold.co.uk](mailto:marketing@bifold.co.uk)  
Web: [www.bifold.co.uk](http://www.bifold.co.uk)

**Marshalsea Hydraulics Limited**  
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Fax: +44 (0) 1823 323382  
Email: [info@marshalsea.co.uk](mailto:info@marshalsea.co.uk)  
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Web: [www.bifold.co.uk](http://www.bifold.co.uk)

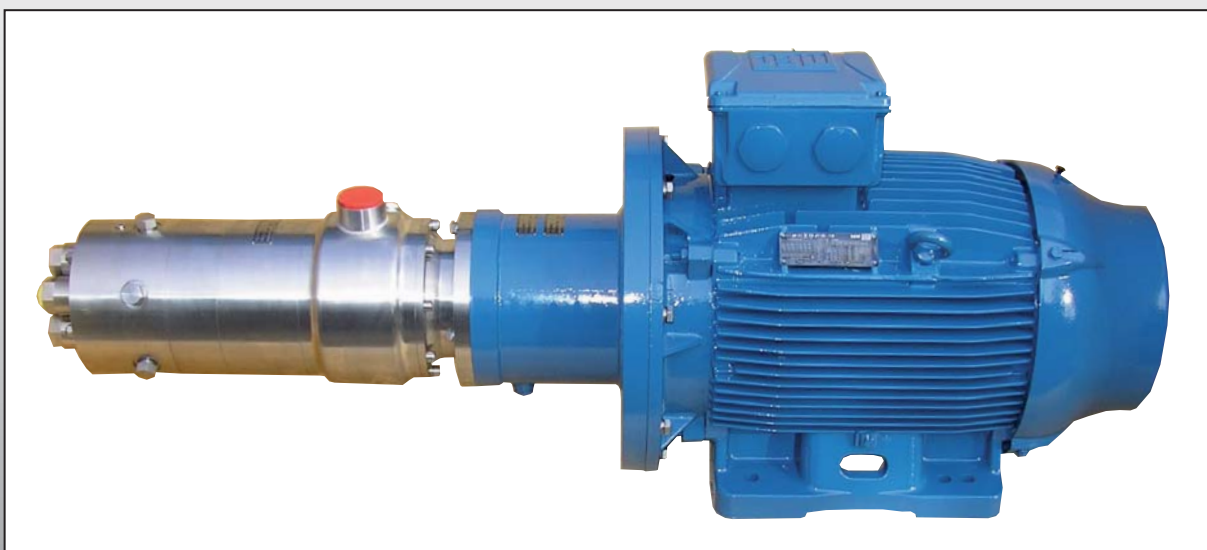
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Fax: +65 6735 1367  
Email: [marketing@bifold.co.uk](mailto:marketing@bifold.co.uk)  
Web: [www.bifold.co.uk](http://www.bifold.co.uk)


**Innovative and Reliable  
Pump Solutions**

**[www.bifold.co.uk](http://www.bifold.co.uk)**



## Water and Oil Based Fluids Pump / Motor Pump Unit Type XWH



- Flow Rates of up to 168 l/m at 155 bar and 46 l/m at 636 bar
- Ultra Compact for Given Pressure and Flow Rates
- All External Pump Components 316 Stainless Steel
- Worldwide Approvals  
ATEX     
- In Accordance with API 674
- No External Lubrication or Cooling Systems
- Direct Drive - No External Pulleys



Product Innovation

The Bifold Group of companies have provided peace of mind to contractors, installers and end users for over a century. Our innovative range of products, specifically designed with the customer in mind, have gained worldwide approval and credibility for the onerous conditions as found in hazardous (classified) locations, hostile and subsea environments.

The customer requirements for sustained safety and reliability under extreme operating conditions are Bifold Marshalsea's primary objectives.

Our state of the art production facilities based in the UK, allows our superior and innovative designs to be manufactured to rigorous manufacturing and quality standards.

The policy and overall business objective of Bifold Marshalsea, is to provide system packages of the highest quality and in compliance with customer requirements. We guarantee ease of installation and low lifetime cost of ownership - due to superior design, long-life materials, precision manufacturing and testing facilities.



Worldwide Service and Support

Located in Taunton, UK, Bifold Marshalsea has subsidiary locations in Houston, USA, Singapore and Manchester, UK. The Bifold Group of Companies are supported worldwide with our engineers and a global network of agents and distributors.

The Group have invested in state of the art machining centres ensuring accuracy of close tolerances, and a rapid turnaround capability together with state of the art assembly and testing facilities.

The customer can be confident that Bifold Marshalsea has the product portfolio and the technical and production capability to provide the correct solution for their system requirements, and provide support during and after installation.

Pumps for Special Fluids

Bifold Marshalsea provide pumps for use with fluids which include a variety of water-based, fire resistant and other media types. The properties of these fluids include a combination of high or low viscosity with either high or low lubricity.

Various pump models are available for use with water glycol and other calibration fluids.

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Overview



The high pressure 50 kW (350 kg) Type XWH Hydraulic Pump is specifically designed for water-based fluids. Separation of the lubricating oil and the pumped fluid is achieved by the installation of a cavity between the cylinder block and the case. Bypass from the pistons is collected in this cavity and returned to the inlet side of the pump. The XWH pump incorporates six axial pistons actuated by a single rotating swash plate. This high powered pump is highly suitable for Blow Out Preventer (BOP) applications, hydraulic power units (HPUs) and flushing skids.

All external pump components are manufactured from 316 Stainless Steel.

Rotation is bi-directional and the pump is mounted horizontally. A suction filter of at least 60 microns should be used, and care should be taken to ensure that the filter is of adequate size and does not cause more than 300mm Hg depression. Pipes/tubing should be of sufficient size to give not more than 3.7m/sec velocity in the delivery line and 1.2m/sec in the suction line. The suction line should be kept under positive pressure when the pump is stationary to allow priming.

The pump model XWH is compliant to API 674.

Certification Details



This pump conforms to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX compliant.



Bifold Marshalsea has been third party assessed and certified as meeting the requirements of ISO 9001: 2000 for the design, development, manufacture and servicing of Hydraulic Pumps, Relief Valves and Pressure Intensifiers.

To Whom It May Concern:

This document is to confirm that MacDermid and our customers have had positive experiences with Marshalsea pumps running on the Oceanic HW subsea control fluids.

The Marshalsea pumps have been tested with the Oceanic fluids at the MacDermid Wigan facility with highly satisfactory results.

Marshalsea Hydraulics is on the MacDermid list of recommended pump manufacturers for use in the oil and gas industry.

Simon McManus  
Technical Director  
MacDermid Offshore Solutions

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VAT No. GB 655 1343 46  
A branch of MacDermid Offshore Solutions LLC  
222N Brockman St, Pasadena, Texas 77506  
A Limited Liability Corporation (registered in England No. FC205149)  
With Branch No. BR007538

TEL: +44 (0) 1942 501000  
FAX: +44 (0) 1942 501110  
http://www.macdermid.com/offshore

Figure 1

**Use of Marshalsea Pumps with Castrol Transaqua Water Based Subsea Control Fluids**

Castrol Offshore has worked closely with Marshalsea Hydraulics to ensure that Marshalsea's range of Water Glycol Pumps are fully compatible with Castrol's Transaqua range of products.

Castrol has an extensive track record with Transaqua fluids in these types of high pressure Water Glycol Pumps. The Marshalsea design of pump provides a separate bearing oil lubrication system that separates the pumped product from the bearing oil. This provides a robust design, which gives long and reliable operation with Castrol water based control fluids. We recommend Castrol Alphasyn PG gear oils for use in the bearing lubrication system; these oils are fully compatible with the Transaqua range of control fluids.

Marshalsea pumps which incorporate separation of the lubricating oil and the pumped fluid are approved for use with the following Castrol Transaqua grades.

Castrol Transaqua HT  
Castrol Transaqua HT2  
Castrol Transaqua DW  
Castrol Transaqua HC10, HC20  
Castrol Transaqua EE1 (Superseded by HT2)

Chris Morrissey  
Product Performance Manager  
Castrol Offshore  
28/11/07

Report: Marshalsea Approval  
Date: 28/11/07  
Issue: 1  
Visit our website: [www.castrolsubsea.com](http://www.castrolsubsea.com)

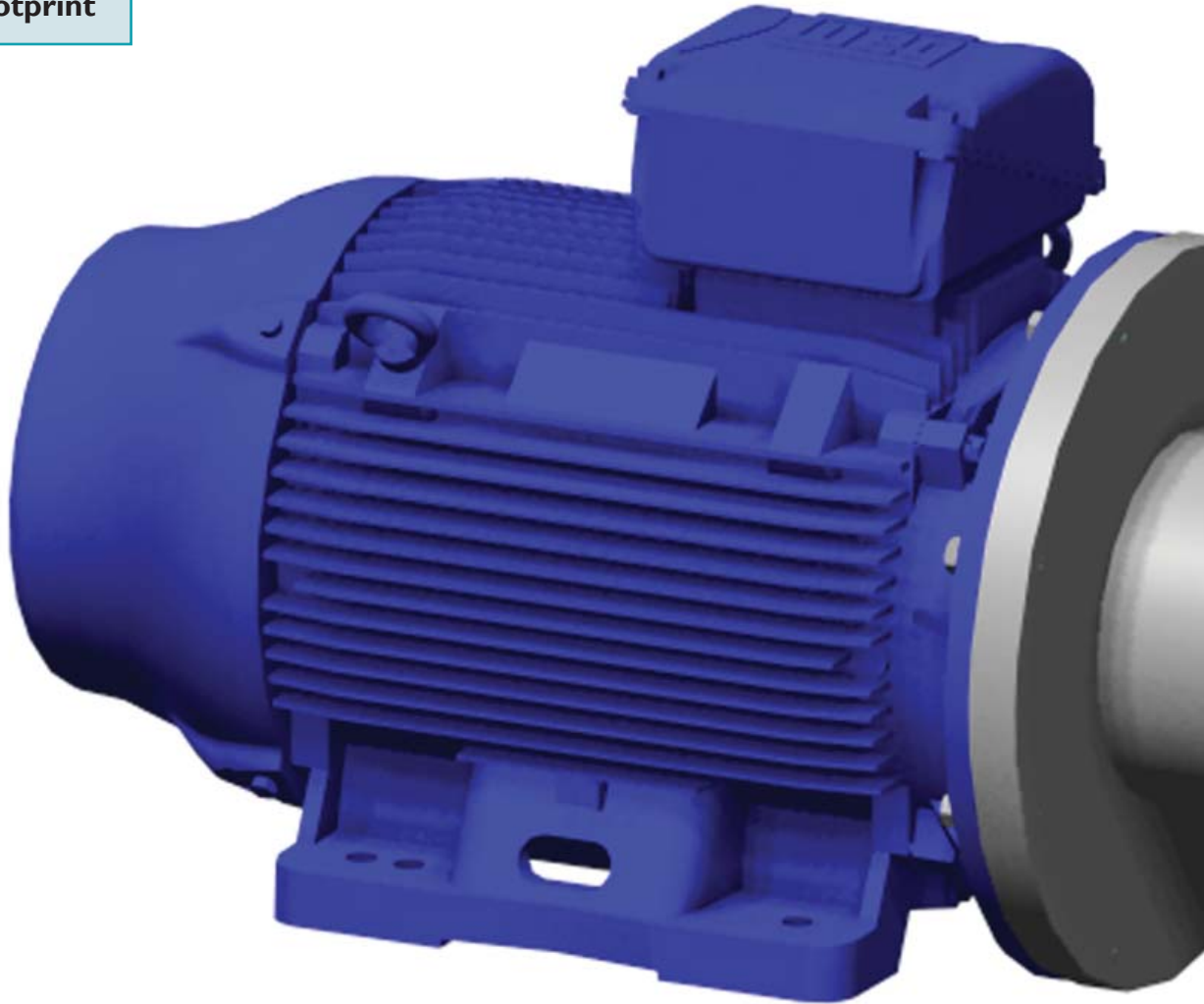
Figure 2

Features



In Accordance with API 674

Smallest Overall Footprint



No External Lubrication or Cooling Systems

Direct Drive - No External Pulleys

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Features



Ultra Compact for Given Pressure and Flow Rates

All External Pump Components 316 Stainless Steel



Figure 3

Flow Rates of up to 168 l/m at 155 bar and 46 l/m at 636 bar

Compact Solution



The pictures below show the difference in size between a Bifold Marshalsea pump and motor arrangement and a competitors equivalent product.

Advantages with the Bifold Marshalsea arrangement are:-

- Smallest Overall Footprint.
- Ultra Compact for given pressures & flow rates.
- No external lubrication or cooling systems.
- In Accordance with API 674.
- All external components 316 Stainless Steel.
- Direct drive - no external pulleys.

LOWEST COST SOLUTION

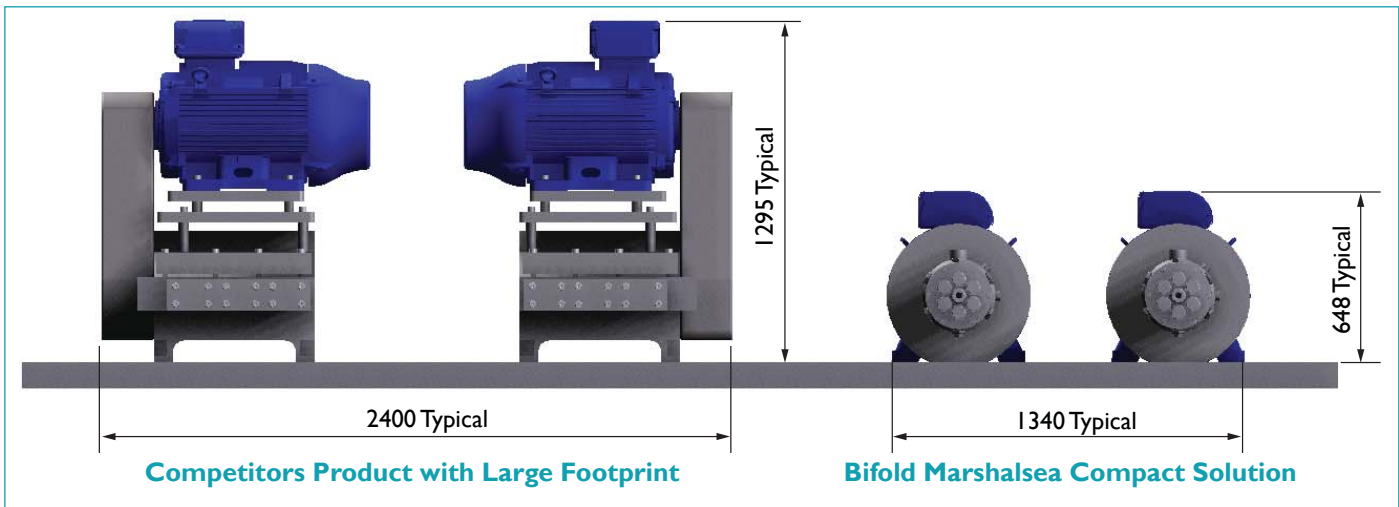


Figure 4

The pump arrangements illustrated in figure 5 show the difference in size between a competitors arrangement with a large footprint compared to the Bifold Marshalsea compact pump and motor arrangement. All our pump packages provide high performance, and reduction in maintenance and service requirements.

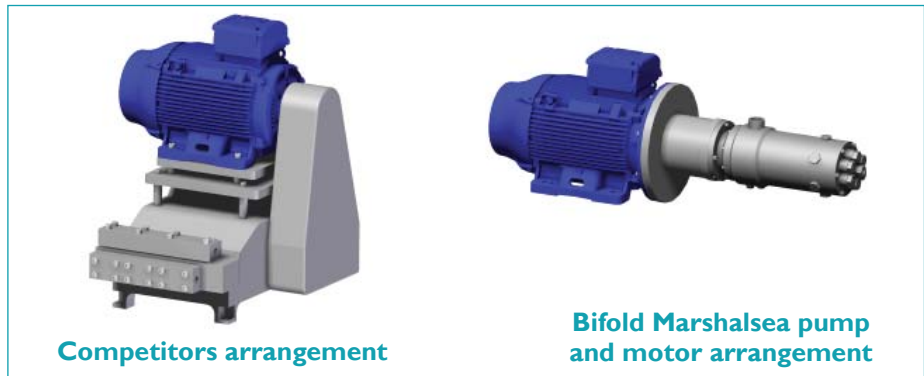


Figure 5

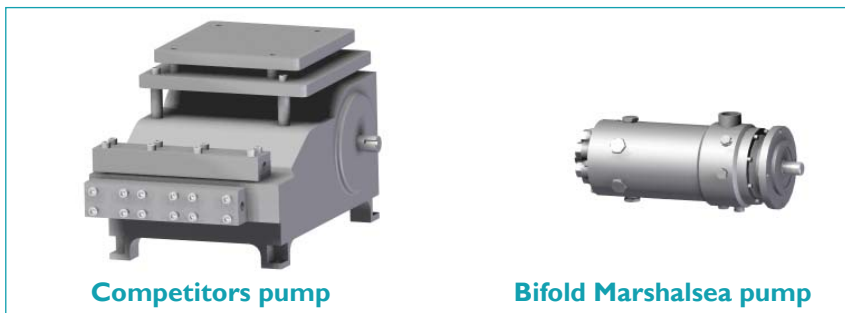


Figure 6

The pumps illustrated in figure 6 show the difference in size between a competitors pump with a large footprint compared to the Bifold Marshalsea compact pump.

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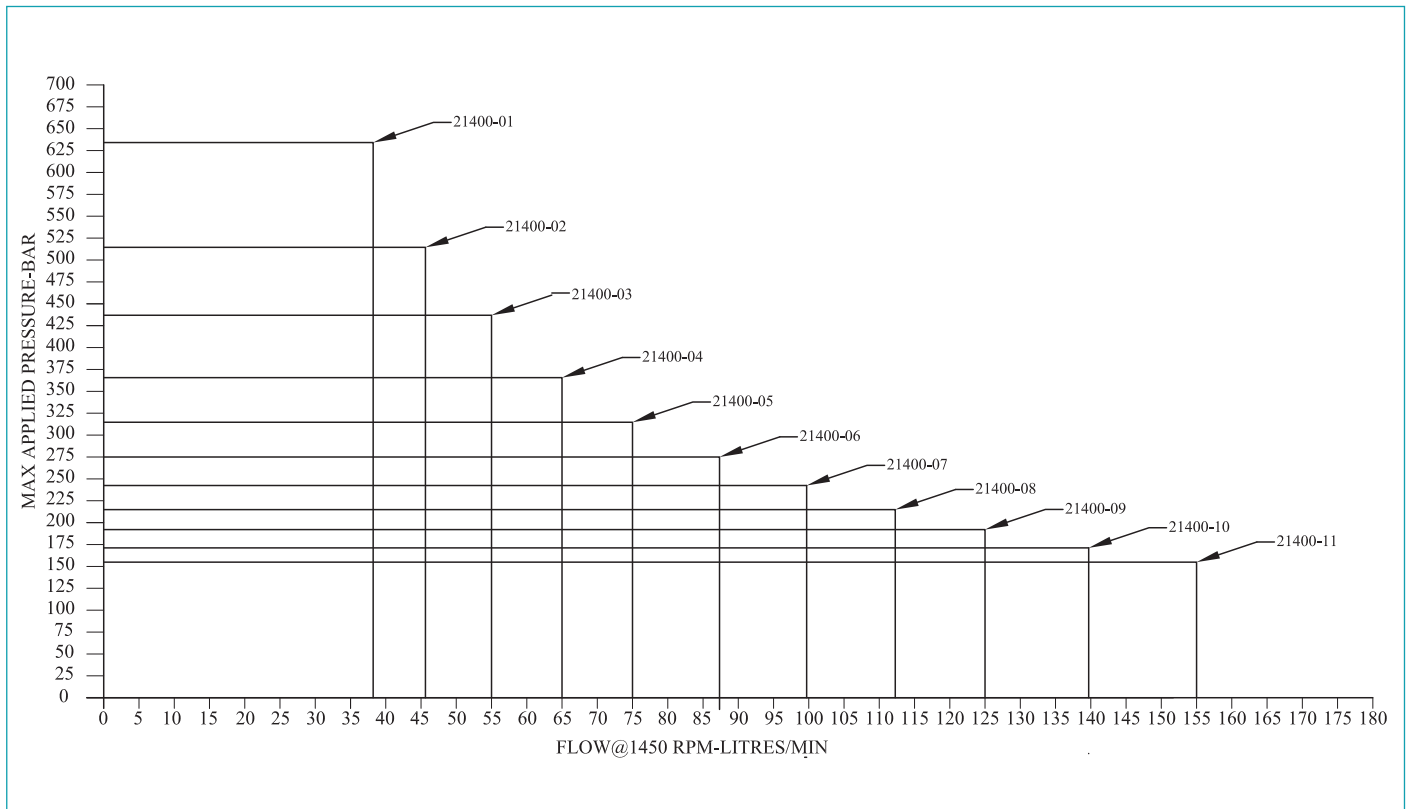
Pump Specifications



PRESSURE AND FLOW COMBINATIONS								
Pump No	No. of pistons	Theoretical Flow					Maximum Pressure	
	Size (inches)	cc/rev	l/m at 1450 RPM	l/m at 1750 RPM	USg/m at 1450 RPM	USg/m at 1750 RPM	bar	psi
21400 - 01	6 x 0.625	26	38	46	10	12	636	9225
21400 - 02	6 x 0.688	32	46	56	12	15	517	7500
21400 - 03	6 x 0.750	38	55	67	14	18	435	6309
21400 - 04	6 x 0.813	45	65	78	17	21	368	5337
21400 - 05	6 x 0.875	52	75	91	20	24	318	4612
21400 - 06	6 x 0.938	60	87	105	23	28	275	3989
21400 - 07	6 x 1.000	68	99	119	26	31	243	3524
21400 - 08	6 x 1.063	77	112	135	29	36	215	3118
21400 - 09	6 x 1.125	86	125	151	33	40	192	2785
21400 - 10	6 x 1.188	96	139	168	37	44	172	2495
21400 - 11	6 x 1.250	107	155	168	41	44	155	2248

Table 1

XWH Pump Performance



Graph 1

[www.bifold.co.uk](http://www.bifold.co.uk)

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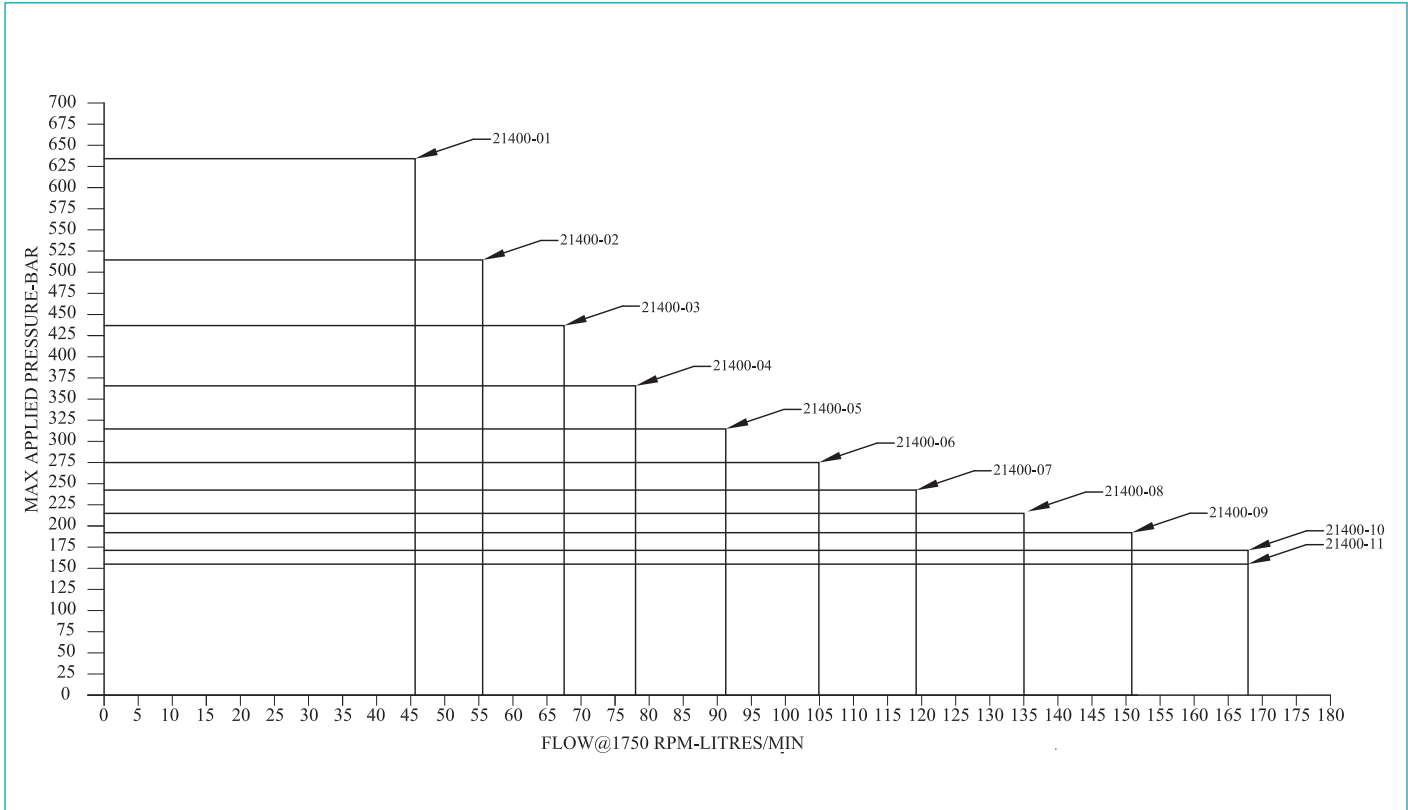




Pump Performance



XWH Pump Performance



Graph 2



Typical Application - Flushing Rig

Figure 7

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Pump Specifications



Figure 8 Shows Dimensions

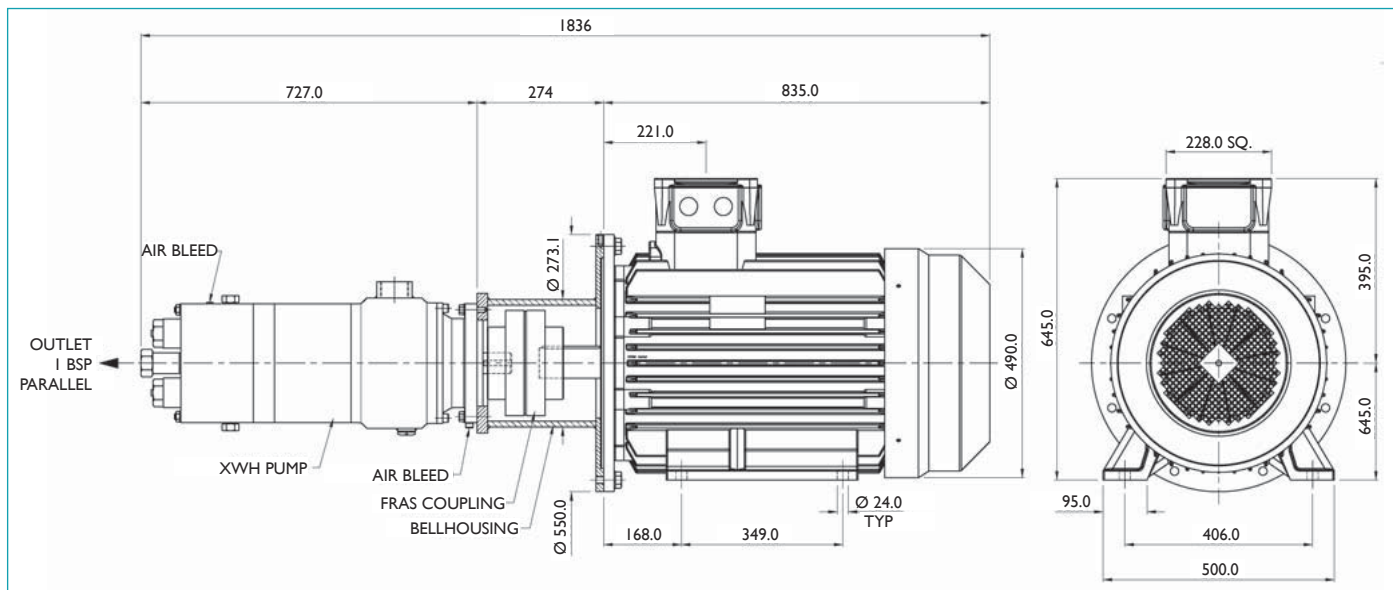
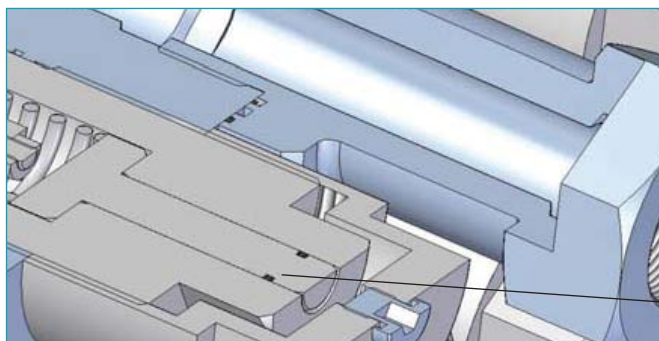


Figure 8

Suction Valve Lifters



The pumps are fitted with suction valve lifters to assist with priming.

Suction Valve Lifter

Figure 9

Alternative Pump for Aggressive Fluids

The XWH Water Glycol / Oil Based Fluids pump can be configured with alternative pistons and back-up sealing safety features for pumping chemicals. For details of this pump, designated Type XWHC, refer to the Bifold Marshalsea Brochure for Chemical Injection Motor Pump Unit (CIMPU). Issue Number BFD52 August 2011.



XWHC Pump

Figure 10

Pump Comparisons

Comparison of Pump Types for Water-Based Fluids

Figure 11 shows the internal arrangement of a typical three piston triplex pump design. As can be seen from previous illustrations, pumps of this design are large and occupy a significant level of skid space. An external drive belt and pulley system is needed to drive these pumps. Typically, motors are mounted on top of the pump producing a large unit.

Guarding is required to enclose the belts further adding to the overall footprint and cost. Anti-sparking materials and corrosion protection are necessary for the external drive system components and guards. It is unusual for pumps of this type to be manufactured from stainless steel and as such further corrosion protection required.

Pulsation dampers are generally required when using triplex pumps.

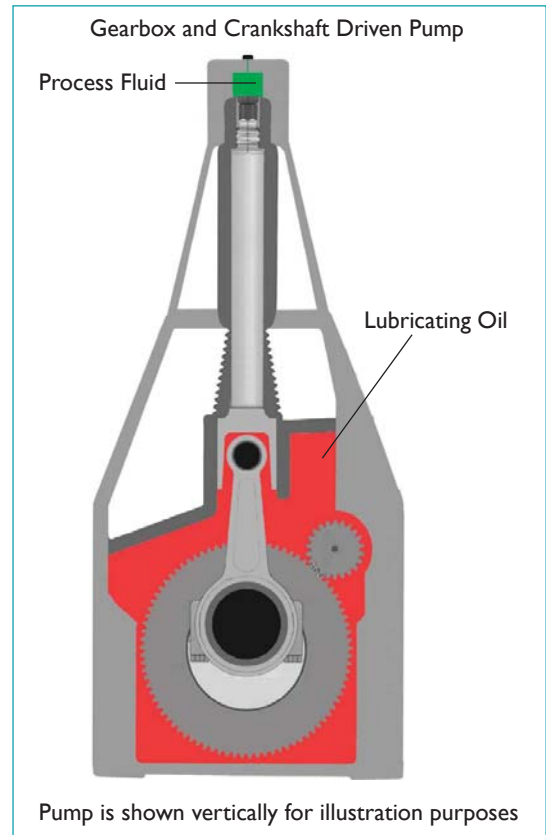


Figure 11

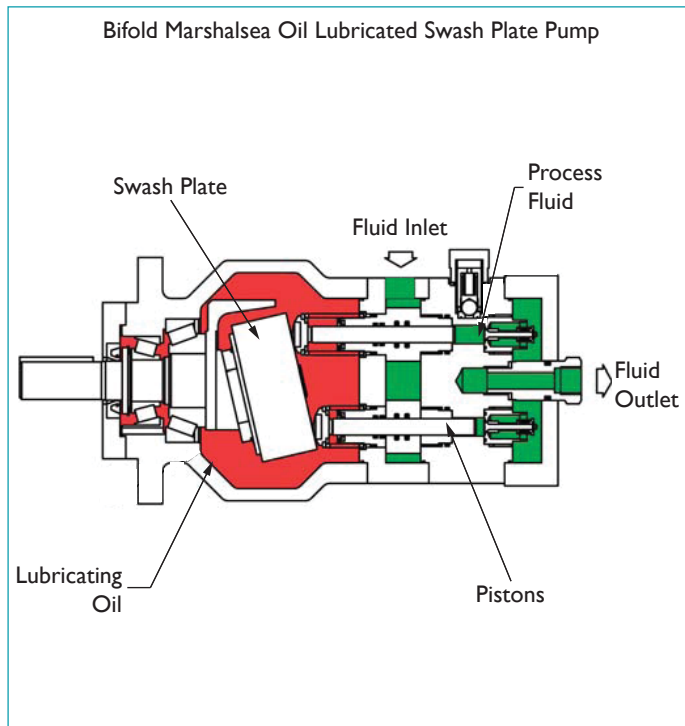


Figure 12

The Bifold Marshalsea compact pump design is shown in figure 12. The motor is close-coupled to the pump, negating the requirement for pulleys and drive belts. There are no exposed rotating parts resulting in improved user and application safety, particularly in hazardous (classified) locations. These pumps are manufactured from 316 Stainless Steel. The flow delivery of these pumps is smoother than with triplex pumps and there is generally no requirement for pulsation dampers. Since the design does not have belts or pulleys and is dynamically balanced, it has extremely low levels of vibration.

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Information



**Weight**

The pump weighs 350 kg.

**Installation**

The units must be mounted horizontally. To ensure that low speed self-priming operates, a positive head must be provided by mounting the process fluid tank above the suction intake line.

**Quotations**

For this product, variations in ranges of flow rates, operating pressures, control options and other parameters are extensive. If you can provide the information shown opposite, we will be delighted to respond with a specific quotation.

**Information Required**

**Pump Fluid**

Flow rate range required from \_\_\_ l/m to \_\_\_ l/m.  
 Operating pressure at discharge flange \_\_\_ bar.  
 Operating pressure at suction flange \_\_\_ bar.  
 Operating temperature, min \_\_\_°C to max \_\_\_°C.  
 Density at max operating temperature \_\_\_ g/cm<sup>3</sup>.  
 Viscosity at max operating temperature \_\_\_ cP.  
 Solids content / solids density \_\_\_ %/g/cm<sup>3</sup>.  
 Solids grain size / solids hardness \_\_\_ mm/Mohs.

**Motor Data**

Hazardous (classified) location and protection technique requirements.  
 Voltage, phases and frequency or dc.

Examples of Projects Supply for Pumps of this type

XWHC Pump MAJOR PROJECT SUCCESS		
Operator	Project / Rig	Location
BP	Clair	North Sea
BP	Nam Con Son	Vietnam Offshore
BP	Shearwater	North Sea Central (UK)
BP	Thunderhorse	Gulf of Mexico
British Gas	Blake	North Sea
ConocoPhillips	Britannia	North Sea
Encana	Ross FPSO	North Sea (UK)
Esso	Balder	Norway
Statoil	Garn West	North Sea
Total	Nuggets	North Sea

Table 2

The table above is an extract taken from our main Project Reference List, where our range of pumps have been utilized.

**Instrument, Process,  
Directional Control Valves,  
and Pumps**

**Bifold® Group**

**Pneumatic and  
Instrumentation Valves**

**Hydraulic Valves**

**Subsea Valves**

**Hydraulic Pumps,  
Intensifiers and Valves**

**Bifold®**

**Bifold FluidPower®**

**Bifold® Subsea**

**Bifold®  Marshalsea**

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## Type TW 11470 & 11480

### Hydraulic pump for water – with ceramic pistons

The high pressure Type TW hydraulic pump is specifically designed for water applications. Since water is the most demanding fluid, the Type TW pump can also be used with most other fluids including water-based solutions and oil-based fluids. Separation of the lubricating oil and the pumped fluid is achieved by the installation of a cavity between the cylinder block and the case. Bypass from the pistons is collected in this cavity and returned to the inlet side of the pump.



*The water-cooled version of the TW pump*

The 316 stainless steel pump has three ceramic pistons. The standard pump is suitable for intermittent operation, while a water-cooled version is designed for continuous running.

**Material** 316 stainless steel wetted parts; ceramic pistons; cast iron casing. Weight 47 Kg.

**Installation** Rotation is bi-directional and the pump may be mounted horizontally or vertically. If vertical mounting is selected, our Technical Department should be consulted. A suction filter of at least 55 microns should be used, and care should be taken to ensure that the filter is of adequate size and does not cause more than 300 mm Hg depression.

Pipes should be of sufficient size to give not more than 3.70 m/sec velocity in the delivery line and 1.20 m/sec in the suction line. The suction line should be kept under positive pressure when the pump is stationary to allow priming.

We recommend that the fluid reservoir should be between 50 mm and 3 m above the suction port.



This pump conforms to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



Marshalsea Hydraulics has been assessed by SGS Société Générale de Surveillance SA and certified as meeting the requirements of ISO 9001:2000 for the design, development, manufacture and servicing of hydraulic pumps, relief valves and intensifiers.



**Pressure and flow combinations**

Pump No	No. of pistons and size (ins)	Theoretical flow (cc/rev)	Max pres. (bar)	Water cooled	Seals kit	Repair kit
11470-51	3 x 0.375 x 1/3	1.17	1,000		RSS11470-51	RS11470-51
11470-52	3 x 0.437 x 1/3	1.59	850		RSS11470-52	RS11470-52
11470-53	3 x 0.500 x 1/3	2.08	690		RSS11470-53	RS11470-53
11470-61	3 x 0.375 x 2/3	2.30	1,000		RSS11470-61	RS11470-61
11470-62	3 x 0.437 x 2/3	3.20	850		RSS11470-62	RS11470-62
11470-63	3 x 0.500 x 2/3	4.16	690		RSS11470-63	RS11470-63
11470-51CC	3 x 0.375 x 1/3	1.17	1,000	✓	RSS11470-51cc	RS11470-51cc
11470-52CC	3 x 0.437 x 1/3	1.59	850	✓	RSS11470-52cc	RS11470-52cc
11470-53CC	3 x 0.500 x 1/3	2.08	690	✓	RSS11470-53cc	RS11470-53cc
11470-61CC	3 x 0.375 x 2/3	2.30	1,000	✓	RSS11470-61cc	RS11470-61cc
11470-62CC	3 x 0.437 x 2/3	3.20	850	✓	RSS11470-62cc	RS11470-62cc
11470-63CC	3 x 0.500 x 2/3	4.16	690	✓	RSS11470-63cc	RS11470-63cc
11480-51	6 x 0.375 x 1/3	2.34	690		RSS11480-51	RS11480-51
11480-52	6 x 0.437 x 1/3	3.18	690		RSS11480-52	RS11480-52
11480-53	6 x 0.500 x 1/3	4.16	690		RSS11480-53	RS11480-53
11480-61	6 x 0.375 x 2/3	4.60	690		RSS11480-61	RS11480-61
11480-62	6 x 0.437 x 2/3	6.40	690		RSS11480-62	RS11480-62
11480-63	6 x 0.500 x 2/3	8.32	690		RSS11480-63	RS11480-63
11480-51CC	6 x 0.375 x 1/3	2.34	690	✓	RSS11480-51cc	RS11480-51cc
11480-52CC	6 x 0.437 x 1/3	3.18	690	✓	RSS11480-52cc	RS11480-52cc
11480-53CC	6 x 0.500 x 1/3	4.16	690	✓	RSS11480-53cc	RS11480-53cc
11480-61CC	6 x 0.375 x 2/3	4.60	690	✓	RSS11480-61cc	RS11480-61cc
11480-62CC	6 x 0.437 x 2/3	6.40	690	✓	RSS11480-62cc	RS11480-62cc
11480-63CC	6 x 0.500 x 2/3	8.32	690	✓	RSS11480-63cc	RS11480-63cc



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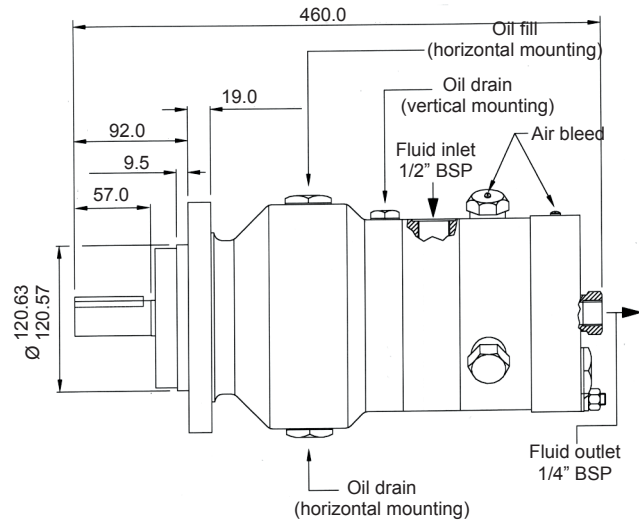
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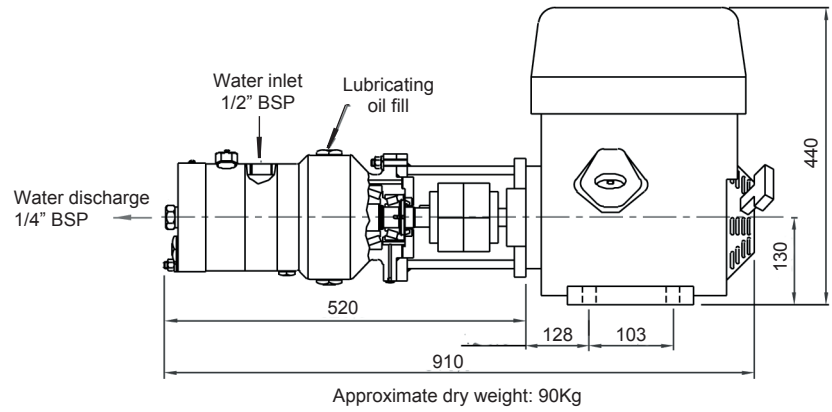
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**We reserve the right to alter specifications or withdraw products without notice**

**Drawing (standard model) giving dimensions in mm**



**Installation diagram**



This is a typical installation with a 1,300 rpm engine.



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## Type SW 11440

### Low power hydraulic pump for water or water/glycol mixes

The SW high pressure pump is designed principally for operation with water and water-based fluids where limited power is available, but the requirement is for pressure up to 700bars. This pump can be powered by a 0.5 to 0.75 Kw 24v DC motor where only wind or battery power or backup is available.



Ideal for the charging of accumulators on unmanned platforms or for use in remote and inaccessible locations. The SW pump is manufactured from 316 stainless steel to withstand hostile environments.

### Pressure and flow combinations

Pump No	No. of pistons and size (ins)	Theoretical flow (cc/rev)	Max pressure (bar)	Seals kit	Repair kit
11440-41	3 x 0.250	0.65	690	RSS11440-41	RS11440-41
11440-42	3 x 0.313	1.00	690	RSS11440-42	RS11440-42
11440-43	3 x 0.375	1.45	690	RSS11440-43	RS11440-43
11440-44	3 x 0.437	2.00	690	RSS11440-44	RS11440-44

**Material** 316 stainless steel. Weight 19 Kg.



This pump conforms to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



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Rotation is bi-directional and the pump may be mounted horizontally or vertically. If vertical mounting is selected, our Technical Department should be consulted.

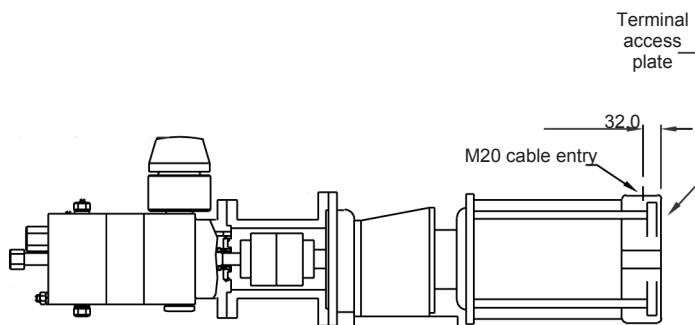
## Installation

A suction filter of at least 60 microns should be used, and care should be taken to ensure that the filter is of adequate size and does not cause more than 300 mm Hg depression.

Pipes should be of sufficient size to give not more than 3.70 m/sec velocity in the delivery line and 1.20 m/sec in the suction line.

The suction line should be kept under positive pressure when the pump is stationary to allow priming.

We recommend that the fluid reservoir should be between 50 mm and 3 m above the suction port.



## Installation diagram



The picture indicates the size of a typical motor pump unit that operates on water-based fluids. One assembly offers 1.5 lpm at 207 bars with 1,500 rpm. The other offers 0.3 lpm at 690 bars with 500 rpm. Both assemblies are driven by a 0.75 Kw 24v DC powered flameproof rated motor.



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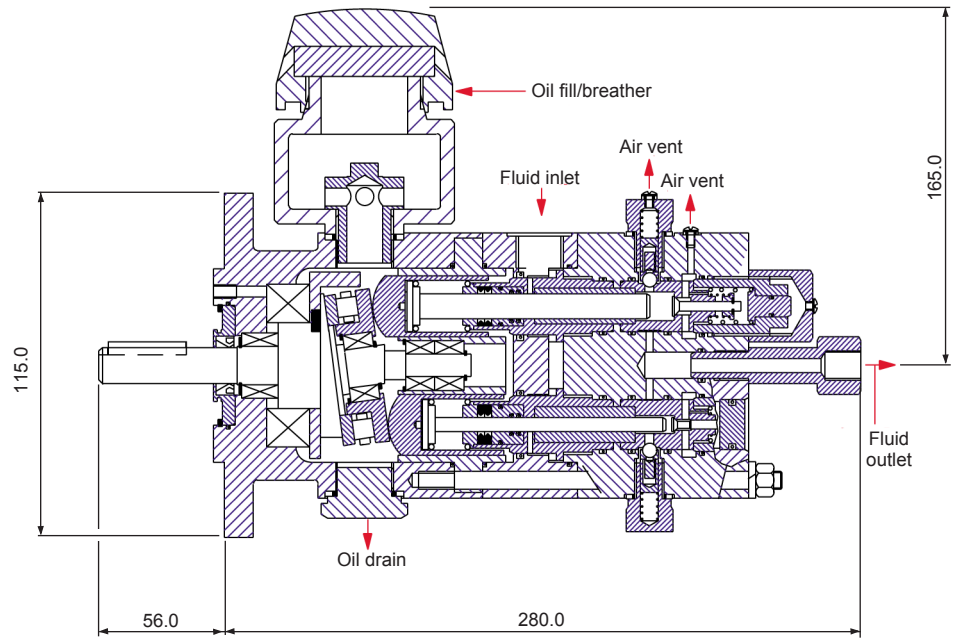
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**Drawing giving  
dimensions (in mm)**







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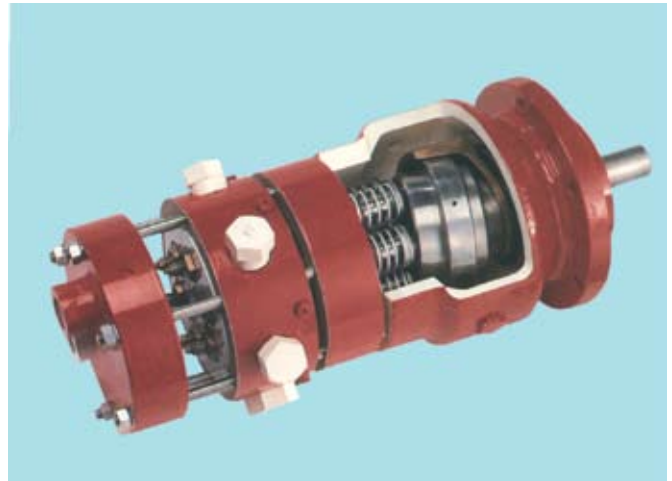
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## Type XW 11196/11197/11202

### 20HP (15Kw) Hydraulic pump for water/glycol applications

The high pressure Type XW hydraulic pump is suitable for a wide range of fluids including water-based solutions and oil-based fluids. Separation of the lubricating oil and the pumped fluid is achieved by the installation of a cavity between the cylinder block and the case.



Bypass from the pistons is collected in this cavity and returned to the inlet side of the pump.

The pump is available with either three or six pistons. The six piston version can be supplied with duplex deliveries which may be used for simultaneous high and low pressure applications when used with an automatic unloading valve. Additional variations are possible by varying the input speed to a maximum of 1,800rpm.

**Material** 316 Stainless steel wetted parts; cast iron casing. Weight 45lbs.

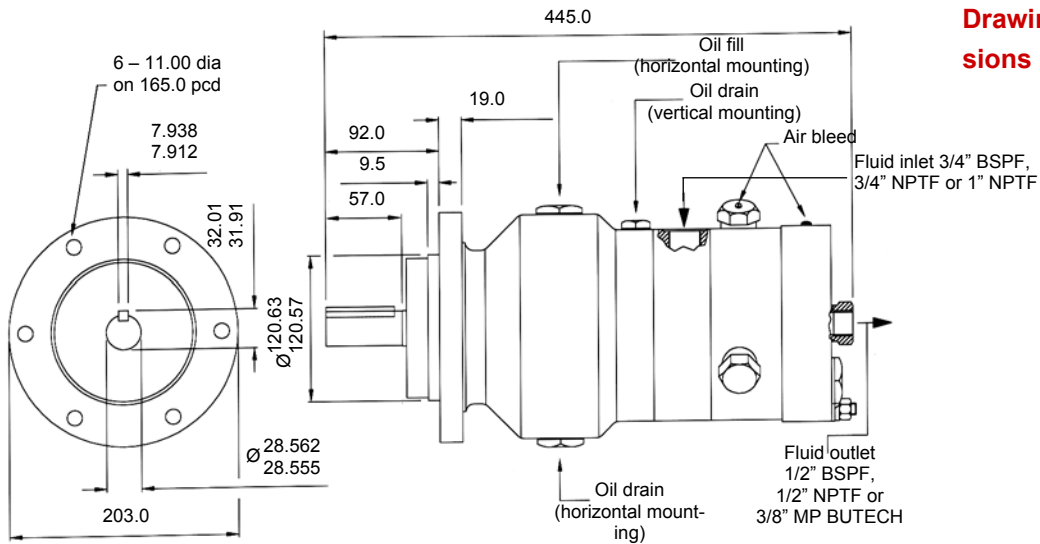
**Installation** Rotation is bi-directional and the pump may be mounted horizontally or vertically. A suction filter of at least 60 microns should be used, and care should be taken to ensure that the filter is of adequate size and does not cause more than 300 mm Hg depression. Pipes should be of sufficient size to give not more than 12ft/sec velocity in the delivery line and 3.9ft/sec in the suction line. The suction line should be kept under positive pressure when the pump is stationary to allow priming.



This pump conforms to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



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### Drawing giving dimensions (in mm)

### Pressure and flow combinations

Maximum power is 20HP (15Kw). Pressure and flow combinations are at 1,750rpm using a 4-pole motor at 60Hz.

### Spares

Pump no. prefixed with RSS is the code for the seal kit.

Pump no. prefixed with RS is the code for the repair kit.

Pump no.	No. of pistons size and stroke	Flow (theoretical)			Max pressure	
		(US)g/m	l/m	cc/rev	psi	bar
<b>1/3 stroke pumps (3 piston)</b>						
11196 – 50	3 x 0.437 x 1/3	0.7	2.8	1.59	12,750	870
11196 – 51	3 x 0.500 x 1/3	0.9	3.6	2.08	10,000	700
11197 – 50	3 x 0.437 x 1/3	0.7	2.8	1.59	7,500	520
11197 – 51	3 x 0.500 x 1/3	0.9	3.6	2.08	7,500	520
11197 – 52	3 x 0.562 x 1/3	1.2	4.6	2.63	7,500	520
11197 – 53	3 x 0.625 x 1/3	1.5	5.6	3.70	6,000	420
11197 – 54	3 x 0.687 x 1/3	1.8	6.8	3.93	5,000	345
<b>2/3 stroke pumps (3 piston)</b>						
11196 – 60	3 x 0.437 x 2/3	1.5	5.6	3.20	12,750	870
11196 – 61	3 x 0.500 x 2/3	1.9	7.3	4.16	10,000	700
11197 – 60	3 x 0.437 x 2/3	1.5	5.6	3.20	7,500	520
11197 – 61	3 x 0.500 x 2/3	1.9	7.3	4.16	7,500	520
11197 – 62	3 x 0.5627 x 2/3	2.4	9.2	5.26	7,500	520
11197 – 63	3 x 0.625 x 2/3	3.0	11.4	6.53	6,000	420
11197 – 64	3 x 0.687 x 2/3	3.6	13.7	7.86	5,000	345
<b>Full stroke pumps (3 piston)</b>						
11196 – 40	3 x 0.437	2.2	8.4	4.80	10,000	700
11196 – 41	3 x 0.500	2.8	10.9	6.25	10,000	700
11197 – 40	3 x 0.437	2.2	8.4	4.80	7,500	520
11197 – 41	3 x 0.500	2.8	10.9	6.25	7,500	520
11197 – 42	3 x 0.562	3.6	13.8	7.90	7,500	520
11197 – 43	3 x 0.625	4.5	17.1	9.79	6,000	420
11197 – 44	3 x 0.687	5.4	20.6	11.79	5,000	345
<b>Full stroke pumps (6 piston)</b>						
11202 – 40	6 x 0.437	4.4	16.8	9.60	7,500	520
11202 – 41	6 x 0.500	5.6	21.8	12.50	6,000	420
11202 – 42	6 x 0.562	7.2	27.6	15.80	4,800	330
11202 – 43	6 x 0.625	9.0	34.2	19.58	3,750	260
11202 – 44	6 x 0.687	10.8	41.2	23.58	3,200	220



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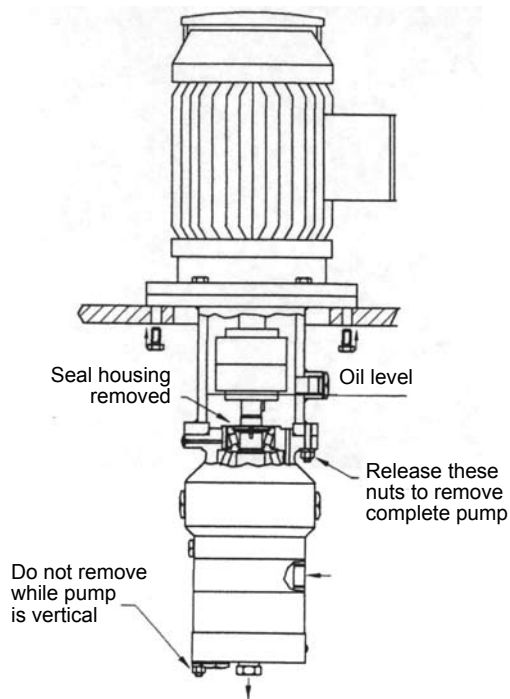
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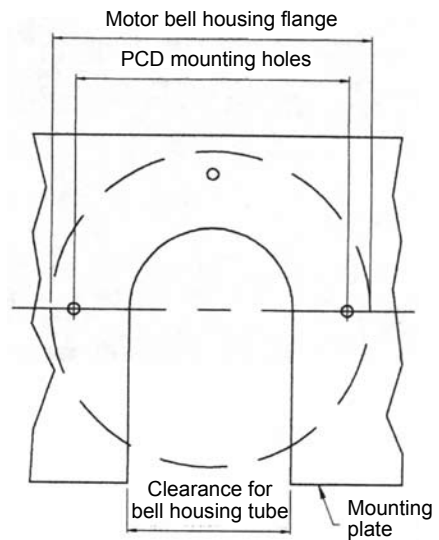
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## Installation and start up of XW series pumps 11196/11197/11202 and motor pump units

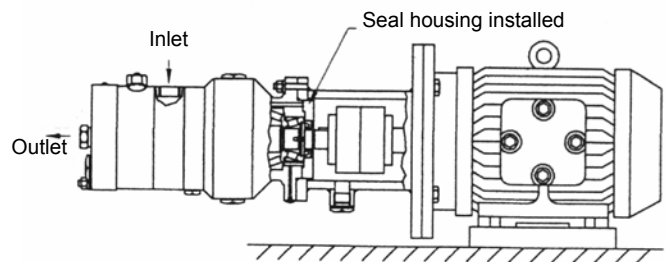
XW motor/pump units may be installed either horizontally or vertically. It is recommended that vertical units are mounted through a slot cut into a support plate or platform, typically as shown in *Figure 1* and *Figure 2*. This allows the unit to be removed with minimum overhead clearance. Marshalsea bell housings carry an additional 4 tapped holes on the same PCD as the motor fixing bolts to allow the complete motor/pump assembly to be secured to a suitable mounting platform. Refer to Marshalsea Hydraulics for details of the bolt sizes for each type of bell housing. Horizontally mounted units are secured using the motor mounting feet as shown in *Figure 3*.



*Figure 1. Typical vertical installation.*



*Figure 2. Recommended mounting method for vertical installation.*



*Figure 3. Typical horizontal installation.*

- 1 Connect the motor to the power supply — do not rotate the pump under power at this stage. Fluid is left in the pump after factory testing to assist with priming. Rotating the pump will eject this fluid and make priming more difficult.
- 2 Before connecting the suction line to the pump, ensure that the free flow of fluid from the tank via the suction line is greater than the maximum flow required through the pump.
- 3 The suction side of the pump should be fitted with a filter of at most 125 microns — this is a maximum figure and should be improved on if flow conditions allow. Connect the suction line, and ensure that the inlet is fully flooded before the pump is rotated.
- 4 Connect the delivery pipework. The pump should be protected from over-pressurisation by a relief valve set 5–10% above the maximum pressure.
- 5 Fill the pump case with good quality general purpose lubricating oil to the level indicated on the installation drawing. In the case of vertically mounted pumps, allow time for the oil to drain down to the case before establishing the final level. For ambient temperatures below 35°C the oil viscosity should be ISO 100. For ambient temperatures above 35°C, or for constant running applications where the case temperature is above 55°C, oil of ISO 150 viscosity should be used.
- 6 Before starting the pump, loosen the air bleed screws as indicated on the installation drawing and ensure that all air is vented from the inlet, bulkhead and valve gear.
- 7 Ensure that the pump is started off load. Apply pressure and check the flow rate. Loss of flow and/or vibration indicates that air is trapped in the cylinder block. In this case it may be necessary to open the bleed screws a number of times. If opening the bleed screws fails to remove all the trapped air, it will be necessary to purge the pump by pressurising the inlet and forcing fluid through the chambers. This can be achieved by connecting a flushing or charging pump to the inlet. The maximum pressure applied should not exceed 100 PSI (7.0 bar).

**Recommended installation and start up procedure for all motor pump units (horizontal or vertical mounting)**



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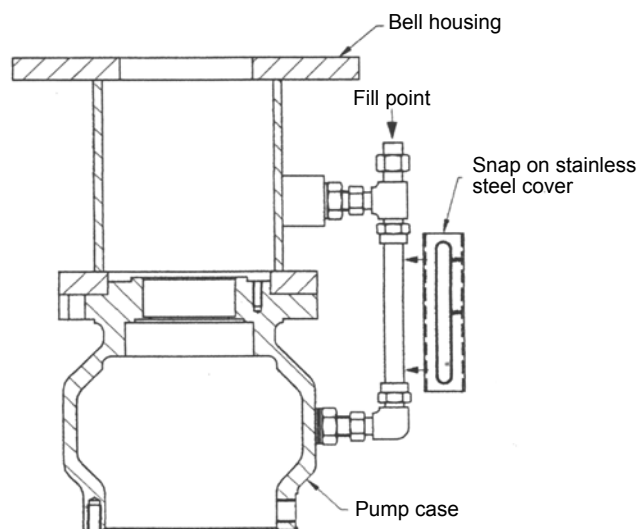
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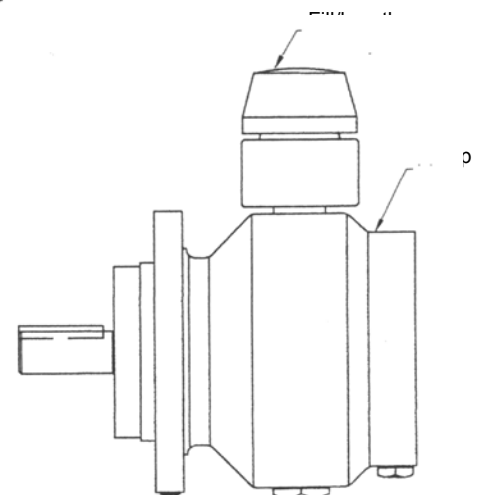
## Maintenance

Maintenance of the lubricating oil level and condition is a major component of routine service. During running, a small amount of lubricating oil is consumed (typically 1–2 cc/hour) and a degree of cross-contamination between the oil and the process fluid takes place. For these reasons, the oil level should be monitored routinely and changed at intervals of 100 hours running time. If operational circumstances do not permit this regime, consideration should be given to increasing the oil volume with an auxiliary reservoir to increase the service intervals.

Maintenance of the oil level is particularly important when pumps are mounted vertically. If the oil level is allowed to fall below MIN, the upper bearing can be deprived of oil and suffer damage. To alleviate this, Marshalsea Hydraulics manufactures a level indicator for vertically mounted pumps (*Figure 4*), to provide an easily read indication of the oil level. The indicator also provides an external circulation path which allows the natural pumping action of the rotating swashplate to circulate oil from the case to the fill point on the bell housing. This provides a degree of protection to the upper bearing should the oil level fall. For horizontally mounted pumps, a fill/breather assembly (*Figure 5*) is available to prevent pressure build up within the case as the temperature increases. This assembly also provides an indication of the oil level when the pump is running.



*Figure 4. Oil level indicator for vertical installations.*



*Figure 5. Oil fill/breather for horizontal installations.*



- 1 Check and maintain oil levels shown on the installation drawing at regular intervals.
- 2 Change oil at 100 running hour intervals.
- 3 Regularly clean or replace the inlet filter.
- 4 Periodically check tightness of fasteners and hydraulic connections.

## Maintenance schedule

Pumps that are stored prior to installation will have been flushed with oil at pressure prior to dispatch to allow for temporary storage. When the pump is installed and connected to the system, it should be run with the outlet to waste until all the storage oil is purged from the pump.

## Storage



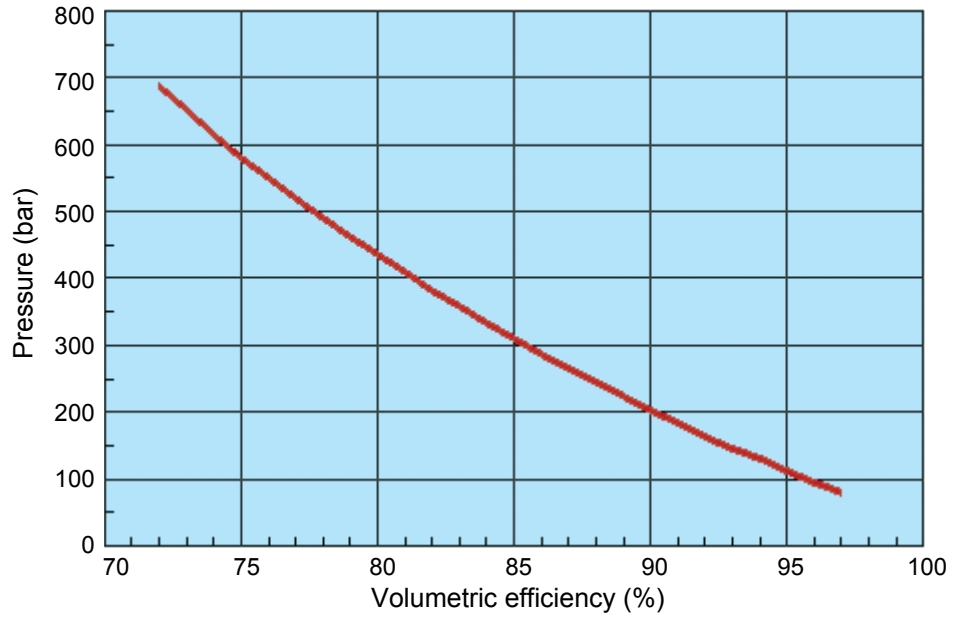
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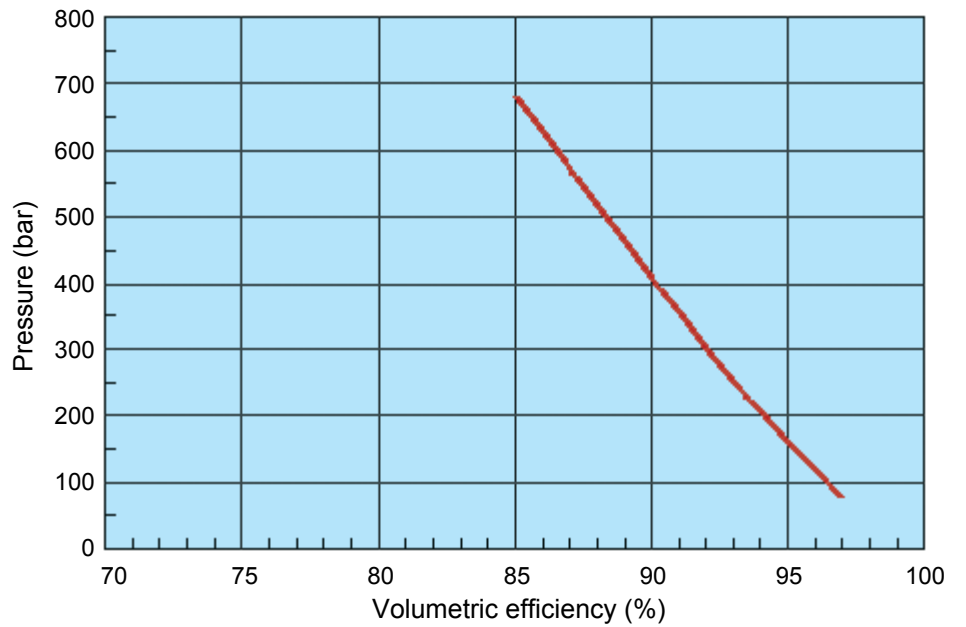
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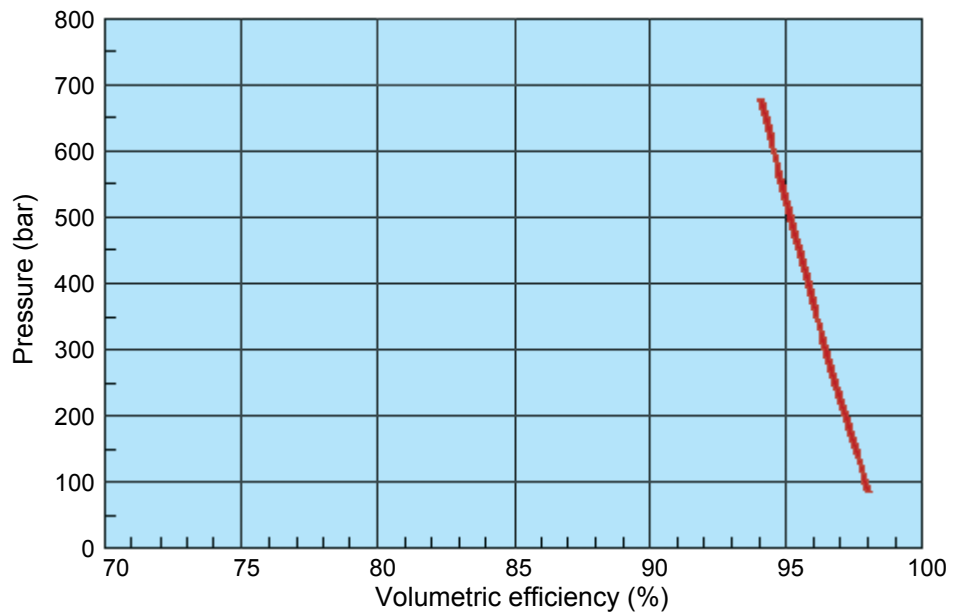
**Pressure/efficiency  
curve for 3 piston  
1/3 stroke Types  
11196/97 – 50 to 54**



**Pressure/efficiency  
curve for 3 piston  
2/3 stroke Types  
11196/97 – 60 to 64**



**Pressure/efficiency  
curve for full stroke  
3 piston Types  
11196/97 – 40 to 46  
and 6 piston Types  
11202 – 40 to 46**



XW 11196 40 1 1 1 1

**Pump type**

Water/glycol pump

**Pump no.**

11196 – 3 piston – max 12,750psi  
 11197 – 3 piston – max 7,500psi  
 11202 – 6 piston – max 7,500psi

**Piston stroke**

4 – full stroke  
 5 – 1/3 stroke  
 6 – 2/3 stroke

**Piston diameter**

0 – 7/16"  
 1 – 1/2"  
 2 – 9/16"  
 3 – 5/8"  
 4 – 11/16"

**Oil indicator**

1 – without oil  
 2 – vertical indicator  
 3 – horizontal indicator

**Case finish**

1 – primer  
 2 – Offshore 2

**Outlet connection**

1 – 1/2" BSPF  
 2 – 1/2" NPTF  
 3 – 3/8" Butech

**Input connection**

1 – 3/4" BSPF  
 2 – 3/4" NPTF (adaptor)  
 3 – 1" NPTF

**Ordering code**



**Vertical mounting**

Frequently mounted horizontally, the XW pump can also be mounted vertically, for example with a motor drive unit as shown here. In the background a typical installation is shown incorporating this structure.



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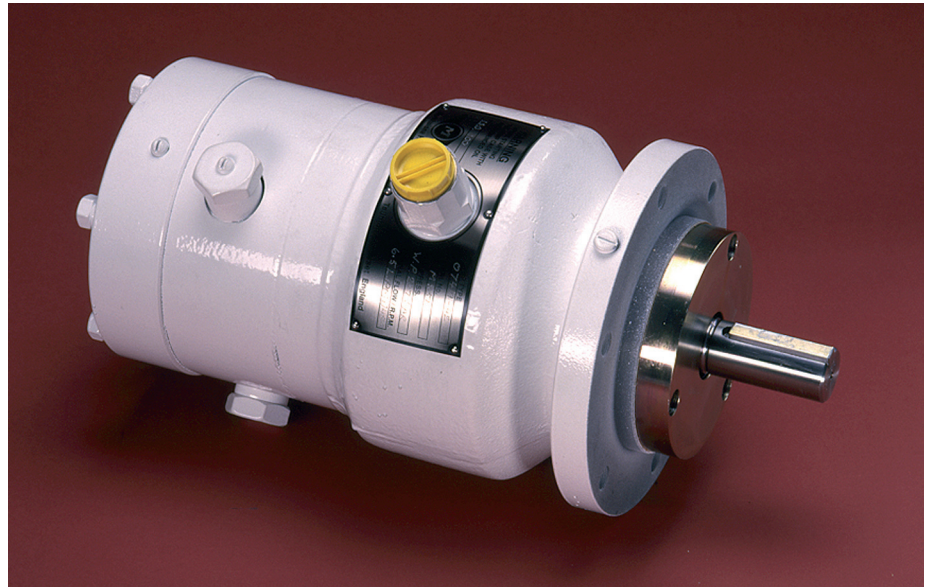
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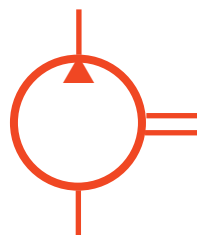
## Type X

### Hydraulic oil pump

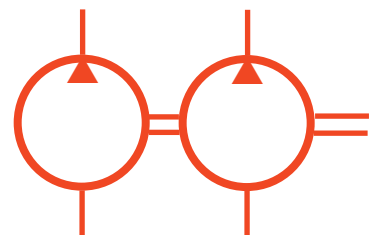


The high pressure Type X hydraulic pump is available with either three or six axial pistons actuated by a single rotating swash plate.

The six piston version can also be supplied with duplex deliveries which may be used for simultaneous high and low pressure applications when used in conjunction with an automatic unloading valve. Other output combinations are available.



*Simplex*



*Duplex*



This pump conforms to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



Marshalsea Hydraulics has been assessed by SGS Société Générale de Surveillance SA and certified as meeting the requirements of ISO 9001:2000 for the design, development, manufacture and servicing of hydraulic pumps, relief valves and intensifiers.

Various combinations of flows and pressures are possible within the 10 kw range up to a maximum of 690 bar (10,000 psi) at 6.96 litres/min (1.53 gpm). Special high pressure versions are available for pressures up to 1,000 bar.

A modified form of this pump, **Type XW** (see page D01), is available for pumping water/glycol fluids.

Cast iron casing. Mild steel cylinder block/shaft. (Other materials available for special purposes).

A mineral-based oil is recommended with additives to resist corrosion, oxidisation and foaming.

Minimum -10°C; maximum +70°C.

35 Kg.

**Material**

**Fluids**

**System temperature**

**Weight**

**Pressure and flow combinations**

Pump No	No. of pistons and size (ins)	Stroke length	Theoretical flow (cc/rev)	Max pressure (bar)
<b>Three piston versions</b>				
07400 – 41	3 x 0.375	full	3.51	690
07400 – 42	3 x 0.438	full	4.80	690
07400 – 43	3 x 0.500	full	6.25	690
07400 – 44	3 x 0.562	full	7.90	520
07400 – 45	3 x 0.625	full	9.79	420
07400 – 46	3 x 0.687	full	11.79	345
07400 – 51	3 x 0.375	1/3	1.17	690
07400 – 52	3 x 0.437	1/3	1.59	690
07400 – 53	3 x 0.500	1/3	2.08	690
07400 – 54	3 x 0.562	1/3	2.63	520
07400 – 55	3 x 0.625	1/3	3.20	420
07400 – 56	3 x 0.687	1/3	3.93	345
07400 – 61	3 x 0.375	2/3	2.34	690
07400 – 62	3 x 0.437	2/3	3.20	690
07400 – 63	3 x 0.500	2/3	4.16	690
07400 – 64	3 x 0.562	2/3	5.26	520
07400 – 65	3 x 0.625	2/3	6.53	420
07400 – 66	3 x 0.687	2/3	7.86	345
07400 – 71	3 x 0.375	1/3	1.17	950
07400 – 72	3 x 0.437	1/3	1.59	950
07400 – 81	3 x 0.375	2/3	2.34	950
07400 – 82	3 x 0.437	2/3	3.20	950
<b>Six piston versions</b>				
07410 – 41	6 x 0.375	full	7.20	690
07410 – 42	6 x 0.438	full	9.60	520
07410 – 43	6 x 0.500	full	12.50	420
07410 – 44	6 x 0.562	full	15.80	330
07410 – 45	6 x 0.625	full	19.58	260
07410 – 46	6 x 0.687	full	23.58	220

Pump output is proportional to drive speed to a maximum of 1,800 rpm.



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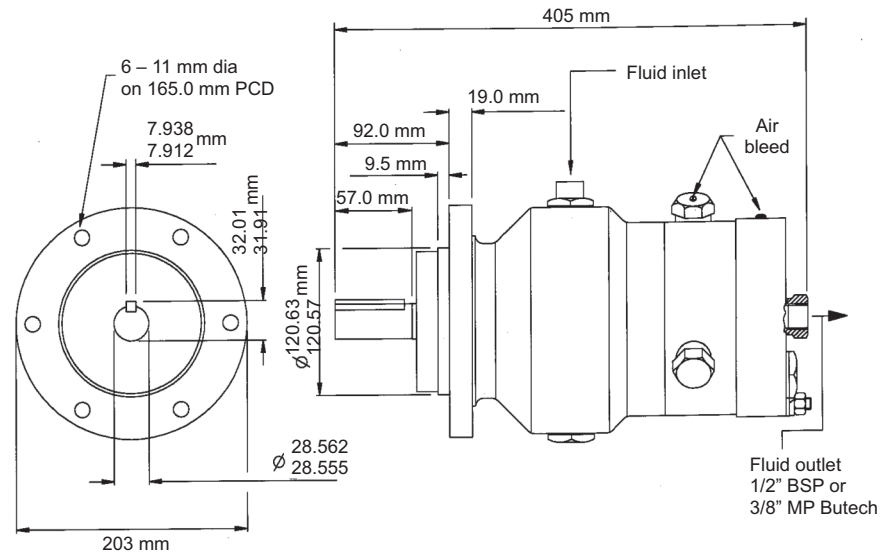
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## Type X

### Drawing giving dimensions



### Installation

Rotation is bi-directional and the pump may be mounted horizontally or vertically using a three piece flexible drive coupling between the pump and prime mover. If vertical mounting is selected, our Technical Department should be consulted.

A suction filter of at least 125 microns should be used, and care should be taken to ensure that the filter is of adequate size and does not cause more than 300 mm Hg depression at the pump suction port when operating at full flow. A return line filter of 10 microns rating should be fitted. Pipes should be of sufficient size to give not more than 3.70 m/sec (12 ft/sec) fluid velocity in the delivery line and not more than 1.20 m/sec (4 ft/sec) in the suction line.

We recommend that the fluid reservoir should be between 50 mm (2 in) and 3 m (10ft) above the suction port. A safety relief valve set at the maximum pump rating should be fitted immediately downstream of the pump delivery port.

Maintenance instructions and a spares list are provided with each pump.



This pump conforms to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



Marshalsea Hydraulics has been assessed by SGS Société Générale de Surveillance SA and certified as meeting the requirements of ISO 9001:2000 for the design, development, manufacture and servicing of hydraulic pumps, relief valves and intensifiers.



Typical installation  
involving Type X pumps



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## Type M

### Hydraulic oil pump

The high pressure Type M hydraulic axial piston pump is of a rotating swash plate design which enables either single or multiple deliveries from the same pump.

Various combinations of flows and pressures are possible within the 2.0 kw range up to a maximum of 690 bar (10,000 psi) at 1.15 litres/min (0.25 gpm).

The pump is quiet in operation; its numerous applications include laboratory use, swaging, pressing and tensioning machines.

Under normal working conditions the M pump gives long life and requires little maintenance.

### Pressure and flow combinations

Pump No	No. of pistons and size	Stroke length	Theoretical flow (cc/rev)	Max pressure (bar)
<b>Three piston versions</b>				
11350 – 01	3 x 6 mm	full	0.43	690
11350 – 02	3 x 0.250 in	full	0.50	690
11350 – 03	3 x 0.313 in	full	0.79	690
11350 – 04	3 x 0.375 in	full	1.12	550
11350 – 05*	3 x 6 mm	full	0.43	690
11350 – 06	3 x 6.3 mm	full	0.47	690
11350 – 10	3 x 6 mm	full	0.43	850
<b>Six piston versions</b>				
11360 – 01	6 x 0.250 in	full	0.96	690
11360 – 02	6 x 0.313 in	full	1.60	500
11360 – 03	6 x 0.375 in	full	2.29	350
Pump output is directly proportional to drive speed to a maximum of 1,800 rpm.				
* Inlet port in end cover for 11350-05				



This pump conforms to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



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Cast iron casing. Mild steel cylinder block/shaft. (Other materials available for special purposes).

A mineral-based oil is recommended with additives to resist corrosion, oxidation and foaming.

Minimum – 10°C; maximum + 70°C.

10.50 Kg.

Rotation is bi-directional and the pump may be mounted horizontally or vertically (shaft up) using a three piece flexible drive coupling between the pump and prime mover. If vertical mounting is selected, our Technical Department should be consulted.

A suction filter of at least 125 microns should be used, and care should be taken to ensure that the filter is of adequate size and does not cause more than 300 mm (12 in) Hg depression at the pump suction port when operating at full flow.

A return line filter of 10 microns rating should be fitted. Pipes should be of sufficient size to give not more than 3.70 m/sec (12 ft/sec) fluid velocity in the delivery line and not more than 1.3 m/sec (4 ft/sec) in the suction line.

As a guide, based on the port sizes of the pump, delivery lines should be 6.5 mm (1/4 in) bore and suction lines 13 mm (1/2 in) bore.

We recommend that the fluid reservoir should be kept between 50 mm (2 in) and 3 m (10ft) above the suction port.

A safety relief valve set at the maximum pump rating should be fitted immediately downstream of the pump delivery port.

Maintenance instructions and a spares list are provided with each pump.

## Material

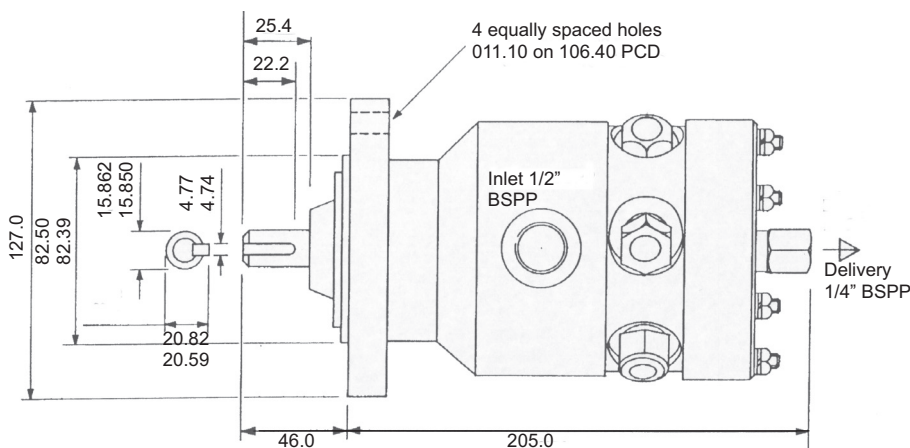
## Fluids

## System temperature

## Weight

## Installation

## Drawing giving dimensions (in mm)



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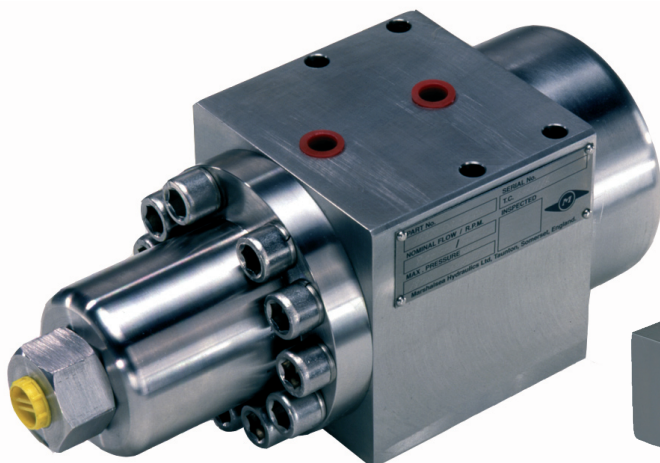
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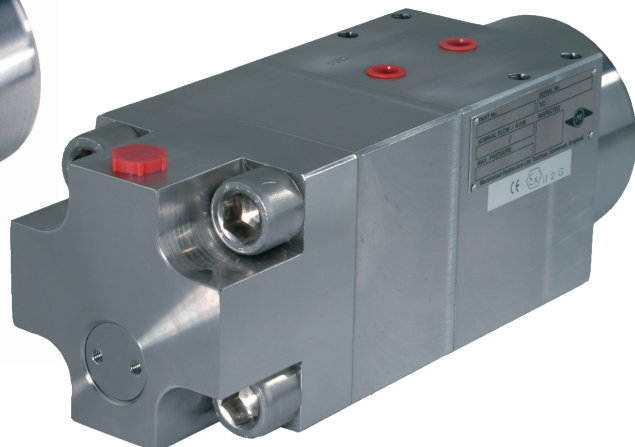
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## HI 11380 Pressure Intensifier (topside model)



*HI 11380-xx-01 model (without vent valve)*



*HI 11380-xx-02 model (with vent valve)*

- ▶ Designed to boost any water-based or mineral/synthetic oil-based fluid.
- ▶ Boosts inlet pressure up to 10 times without external power.
- ▶ When system pressure is achieved, no consumption of expensive hydraulic fluid. Maximum outlet 1,500 bars.
- ▶ Manufactured from 316 (standard), or from duplex stainless steels; – no painting required for hostile environments.
- ▶ Costs reduced – no electrical supply or controls required.
- ▶ Two versions – with and without a pilot-operated vent valve for the high pressure line.



This pressure intensifier conforms to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



Marshalsea Hydraulics has been assessed by SGS Société Générale de Surveillance SA and certified as meeting the requirements of ISO 9001:2000 for the design, development, manufacture and servicing of hydraulic pumps, relief valves and intensifiers.



The HI 11380 Intensifier amplifies the inlet pressure to a higher outlet pressure by a pre-determined ratio. Standard ratios are shown in the table below; special ratios are available on request.

Pressure in the high pressure line can become reduced as a result of a system leak or the use of the stored (pressure) energy. Using virtually no energy, the HI 11380 restores and maintains that pressure in such instances. Rapid adjustment of the high pressure line can be achieved by varying the inlet pressure as the high pressure is directly proportional to the inlet pressure. Check and changeover valves are integrated within the main body of the intensifier as is the pilot-operated vent valve in the 11380-xx-02 version. When *the inlet pressure x the ratio = the outlet pressure*, then the HI 11380 is in a stalled condition and there is no consumption of fluid. The maximum outlet pressure that can be offered is currently 1,500 bars.

The HI 11380 was designed principally for applications in the offshore oil and gas industry where the highest standards of product performance and durability are essential. The HI 11380 is manufactured from 316 stainless steel to withstand hostile environments; it can operate on all water-based glycol fluids or on mineral and synthetic oils. This product is ideal for charging accumulators from a low pressure supply; it may also be used for operating several different systems from a single supply.

The *required ratio = required high pressure / inlet pumped or regulated pressure*. Available ratios can be selected from the table below. Ensure that the inlet pressure does not exceed the pressure given in this table which also offers a guide to approximate charging flow rates in litres/min.

Product number	Ratio	Maximum inlet pressure (bars)	HP piston swept volume (cc)	Flow at 1 stroke/sec (l/m)
11380-02	2:1	345	36.37	2.18
11380-H2	2.5:1	345	26.00	1.56
11380-03	3:1	345	24.22	1.45
11380-04	4:1	345	18.17	1.10
11380-05	5:1	300	14.54	0.87
11380-06	6:1	250	12.11	0.73
11380-07	7:1	215	10.36	0.62
11380-08	8:1	185	9.06	0.54
11380-09	9:1	165	8.06	0.48
11380-10	10:1	150	7.25	0.44

## General description

## Applications

## Product selection



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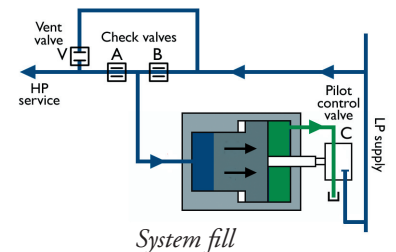
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These basic product numbers (**BPN**) can be extended to accommodate additional options as indicated in the following table.

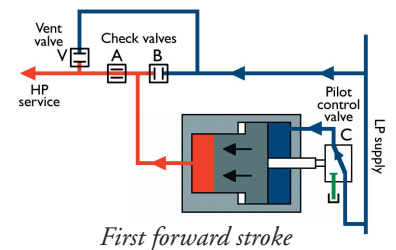
Product number	Inlet connection	Outlet connection
<b>Model without pilot-operated vent valve</b>		
<b>BPN-01-11</b>	1/4" NPT	1/4" NPT
<b>BPN-01-12</b>	1/4" NPT	1/4" BSP
<b>BPN-01-13</b>	1/4" NPT	3/8" MP Butech
<b>BPN-01-21</b>	1/4" BSP	1/4" NPT
<b>BPN-01-22</b>	1/4" BSP	1/4" BSP
<b>BPN-01-23</b>	1/4" BSP	3/8" MP Butech
<b>Model which includes pilot-operated vent valve</b>		
<b>BPN-02-11</b>	1/4" NPT	1/4" NPT
<b>BPN-02-12</b>	1/4" NPT	1/4" BSP
<b>BPN-02-13</b>	1/4" NPT	3/8" MP Butech
<b>BPN-02-21</b>	1/4" BSP	1/4" NPT
<b>BPN-02-22</b>	1/4" BSP	1/4" BSP
<b>BPN-02-23</b>	1/4" BSP	3/8" MP Butech

### Method of operation

On startup the system fills from the low pressure (LP) supply line. The LP pressure on the left of the piston pushes it to the right against the zero pressure tank fluid. When it reaches the end of its travel, the pilot control valve C reverses.



The LP supply fluid can now invade the right hand end of the cylinder where the piston's surface area is larger than at the HP end. The greater force (pressure x area) pushes the piston to the left on its first forward stroke. The increased pressure generated at the HP end closes check valve B and is the first step in building the pressure in the HP service line.



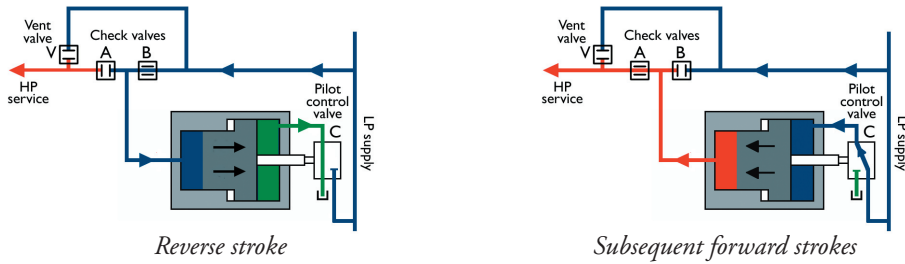
Subsequent forward and reverse strokes are shown below. With valve A open and valve B closed the piston moves forward to inject fluid into the HP service line. For the reverse stroke valve B is open and valve A closed..

On these diagrams:  
 Red = high pressure  
 Blue = low pressure  
 Green = exhausted fluid

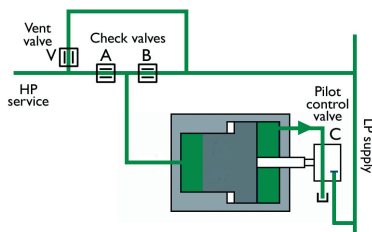


The intensifier typically becomes stalled in the forward stroke position with *the LP inlet pressure x the ratio = the HP outlet pressure*. In this situation there is no consumption of hydraulic fluid with both pistons in a static state with pressure locked between the valves **A** and **B**. The device can sit indefinitely in this position . . . but the instant there is a drop in the HP pressure line, the piston moves further forward to recover the desired pressure.

On these diagrams:  
**Red = high pressure**  
**Blue = low pressure**  
**Green = exhausted fluid**



The pilot-operated vent valve shown as **V** in these diagrams is included on the HI 11380–xx–02 models but omitted in the HI 11380–xx–01 models. With the HI 11380–xx–02, if for any reason the low pressure supply is interrupted, the system floods with zero pressure "tank" fluid. In such a circumstance, the pilot-operated vent valve **V** is no longer held closed by the input pressure – it opens so that the high pressure is safely vented away.



Manufactured from 316 stainless steel with nitrile seals. Weight 11 kgs (HI 11380–xx–01 model) or 26 kgs (HI 11380–xx–02 models) .

**Material**

Suitable for use with mineral/synthetic oils and all water-based fluids such as HW540, HW443 and Tranaqua HT, plus many others. The fluids used should be to a cleanliness standard of NAS 1638 class 6.

**Fluids**



The pressure intensifier can be mounted vertically or horizontally.

**Mounting**

Customised versions can be produced. For example, the intensifier pictured here has customer specified connections and mounting.

**Custom versions**



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### System temperature

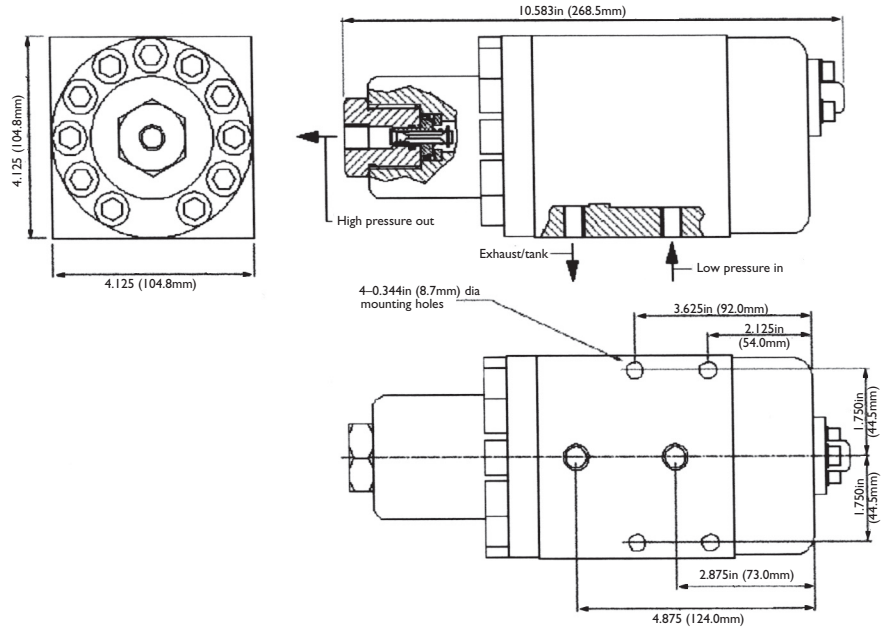
The HI 11380 has been qualified to operate at temperatures from  $-10^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$  at pressures up to a maximum of 1,500 bars.

### Safety note

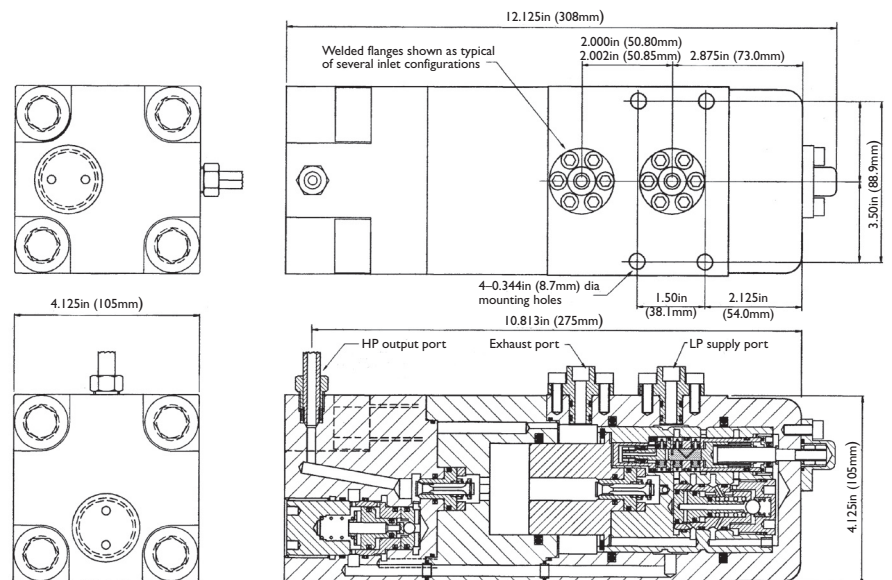
The inlet pressure of the intensifier should be carefully controlled, as the outlet pressure increases by the ratio of the pump in use. For example, if an 8:1 intensifier is being used, a rise in the inlet pressure of 125 bars will immediately increase the outlet pressure by 1,000 bars.

A relief valve set at the maximum pump rating should be fitted immediately downstream of the pump delivery port.

### HI 11380-xx-01 drawing giving dimensions



### HI 11380-xx-02 drawing giving dimensions





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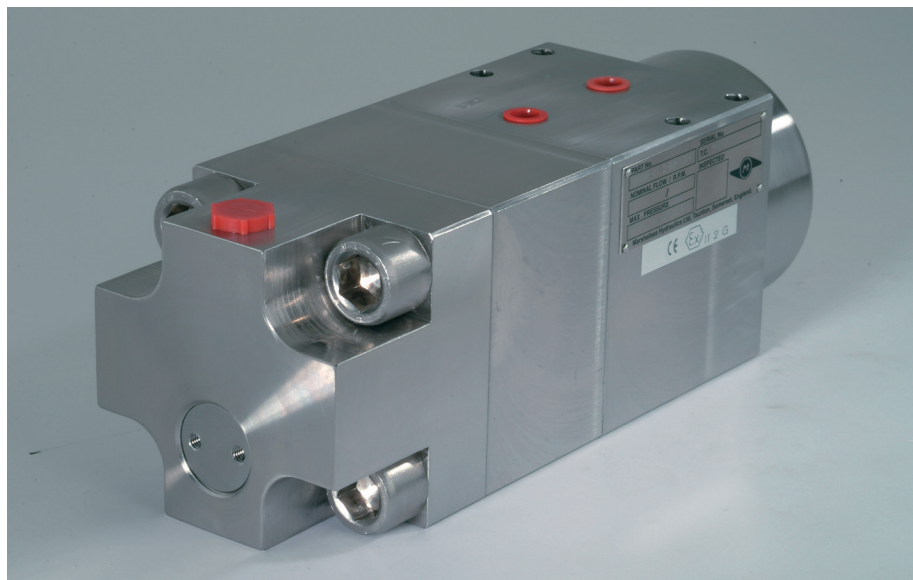
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## HI 11400 Pressure Intensifier (subsea model)



- ▶ Designed to boost any water-based or mineral/synthetic oil-based fluid.
- ▶ Boosts inlet pressure up to 10 times without external power.
- ▶ When system pressure is achieved, no consumption of expensive hydraulic fluid. Maximum outlet 1,500 bars.
- ▶ Manufactured from 316 (standard), or from duplex stainless steels; – no painting required for hostile environments.
- ▶ Costs reduced – no electrical supply or controls required.
- ▶ Production quality to the stringent standards required for hostile subsea environments.
- ▶ Two versions – with and without a pilot-operated vent valve for the high pressure line.



This pressure intensifier conforms to Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and is ATEX (ATmosphere EXplosible) certified.



Marshalsea Hydraulics has been assessed by SGS Société Générale de Surveillance SA and certified as meeting the requirements of ISO 9001:2000 for the design, development, manufacture and servicing of hydraulic pumps, relief valves and intensifiers.

The HI 11400 subsea pressure intensifier amplifies the inlet pressure to a higher outlet pressure by a predetermined ratio. Standard ratios are shown in the table below; special ratios are available on request.

Pressure in the high pressure line can become reduced as a result of a system leak or the use of the stored (pressure) energy. Using virtually no energy, the HI 11400 restores and maintains that pressure in such instances. Rapid adjustment of the high pressure line can be achieved by varying the inlet pressure as the high pressure is directly proportional to the inlet pressure. Check and changeover valves are integrated within the main body of the intensifier as is the pilot-operated vent valve in the 11400-xx-02 version. When *the inlet pressure x the ratio = the outlet pressure*, then the HI 11400 is in a stalled condition and there is no consumption of fluid. The maximum outlet pressure that can be offered is currently 1,500 bars.

The HI 11400 was designed for subsea applications in the offshore oil and gas industry where the highest standards of product performance and durability are essential. The HI 11400 is manufactured from 316 stainless steel to withstand hostile environments; it can operate on all water-based glycol fluids or on mineral and synthetic oils. This product is ideal for charging accumulators from a low pressure umbilical; it may also be used for operating several different systems from a single supply.

The *required ratio = required high pressure / inlet pumped or regulated pressure*. Available ratios can be selected from the table below. Ensure that the inlet pressure does not exceed the pressure given in this table which also offers a guide to approximate charging flow rates in litres/min.

Product number	Ratio	Maximum inlet pressure (bars)	HP piston swept volume (cc)	Flow at 1 stroke/sec (l/m)
11400-02	2:1	345	36.37	2.18
11400-H2	2.5:1	345	26.00	1.56
11400-03	3:1	345	24.22	1.45
11400-04	4:1	345	18.17	1.10
11400-05	5:1	300	14.54	0.87
11400-06	6:1	250	12.11	0.73
11400-07	7:1	215	10.36	0.62
11400-08	8:1	185	9.06	0.54
11400-09	9:1	165	8.06	0.48
11400-10	10:1	150	7.25	0.44

## General description

## Applications

## Product selection



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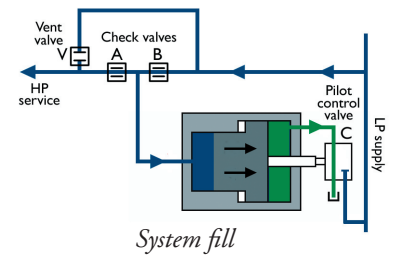
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These basic product numbers (**BPN**) can be extended to accommodate additional options as indicated in the following table.

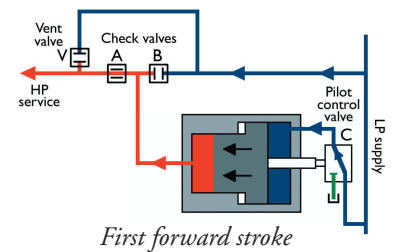
Product number	Inlet connection	Outlet connection
<b>Model without pilot-operated vent valve</b>		
<b>BPN-01-11</b>	1/4" NPT	1/4" NPT
<b>BPN-01-12</b>	1/4" NPT	1/4" BSP
<b>BPN-01-13</b>	1/4" NPT	3/8" MP Butech
<b>BPN-01-21</b>	1/4" BSP	1/4" NPT
<b>BPN-01-22</b>	1/4" BSP	1/4" BSP
<b>BPN-01-23</b>	1/4" BSP	3/8" MP Butech
<b>Model which includes pilot-operated vent valve</b>		
<b>BPN-02-11</b>	1/4" NPT	1/4" NPT
<b>BPN-02-12</b>	1/4" NPT	1/4" BSP
<b>BPN-02-13</b>	1/4" NPT	3/8" MP Butech
<b>BPN-02-21</b>	1/4" BSP	1/4" NPT
<b>BPN-02-22</b>	1/4" BSP	1/4" BSP
<b>BPN-02-23</b>	1/4" BSP	3/8" MP Butech

### Method of operation

On startup the system fills from the low pressure (LP) supply line. The LP pressure on the left of the piston pushes it to the right against the zero pressure tank fluid. When it reaches the end of its travel, the pilot control valve C reverses.



The LP supply fluid can now invade the right hand end of the cylinder where the piston's surface area is larger than at the HP end. The greater force (pressure x area) pushes the piston to the left on its first forward stroke. The increased pressure generated at the HP end closes check valve B and is the first step in building the pressure in the HP service line.



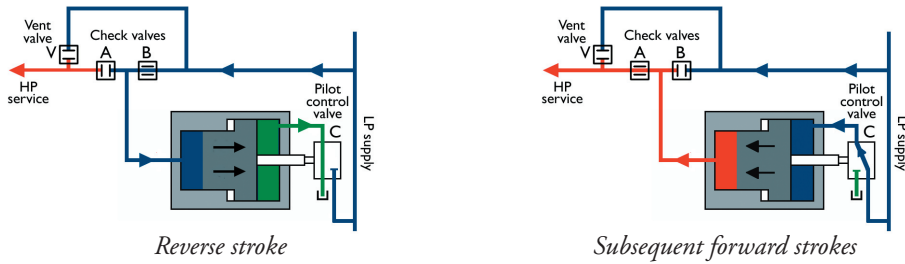
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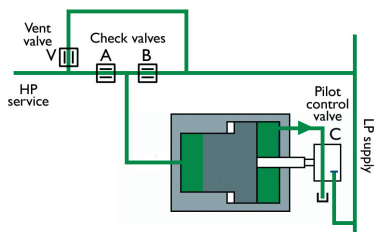


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On these diagrams:  
**Red = high pressure**  
**Blue = low pressure**  
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The pilot-operated vent valve shown as **V** in these diagrams is included on the HI 11400–xx–02 models but omitted in the HI 11400–xx–01 models. With the HI 11400–xx–02, if for any reason the low pressure supply is interrupted, the system floods with zero pressure "tank" fluid. In such a circumstance, the pilot-operated vent valve **V** is no longer held closed by the input pressure – it opens so that the high pressure is safely vented away.



Manufactured from 316 stainless steel with nitrile seals. Weight 11 kgs (HI 11400–xx–01 model) or 26 kgs (HI 11400–xx–02 models) .

**Material**

Suitable for use with mineral/synthetic oils and all water-based fluids such as HW540, HW443 and Tranaqua HT, plus many others. The fluids used should be to a cleanliness standard of NAS 1638 class 6.

**Fluids**

The pressure intensifier can be mounted vertically or horizontally.

**Mounting**

Customised versions can be produced with customer specified connections and mounting.

**Custom versions**



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### System temperature

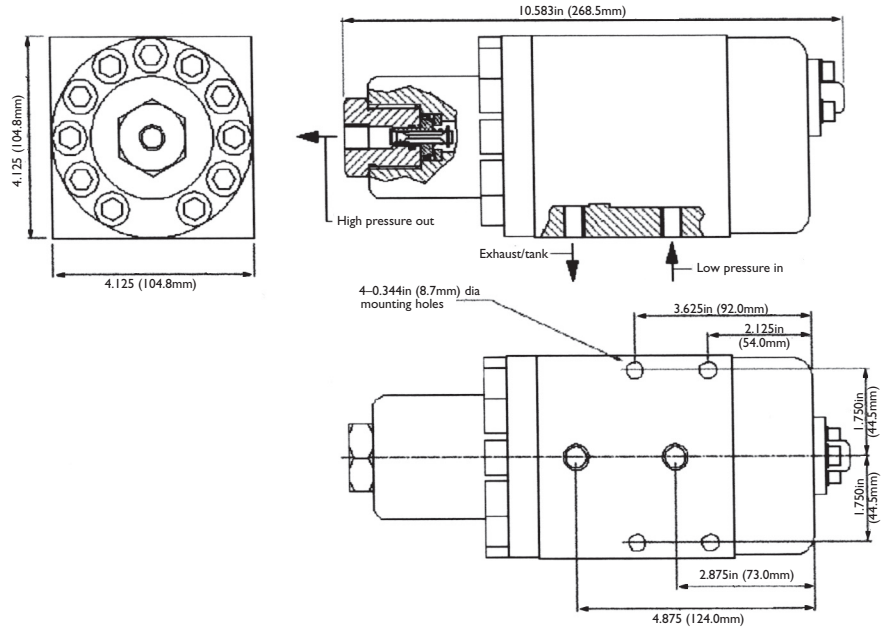
The HI 11400 has been qualified to operate at temperatures from  $-10^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$  at pressures up to a maximum of 1,500 bars.

### Safety note

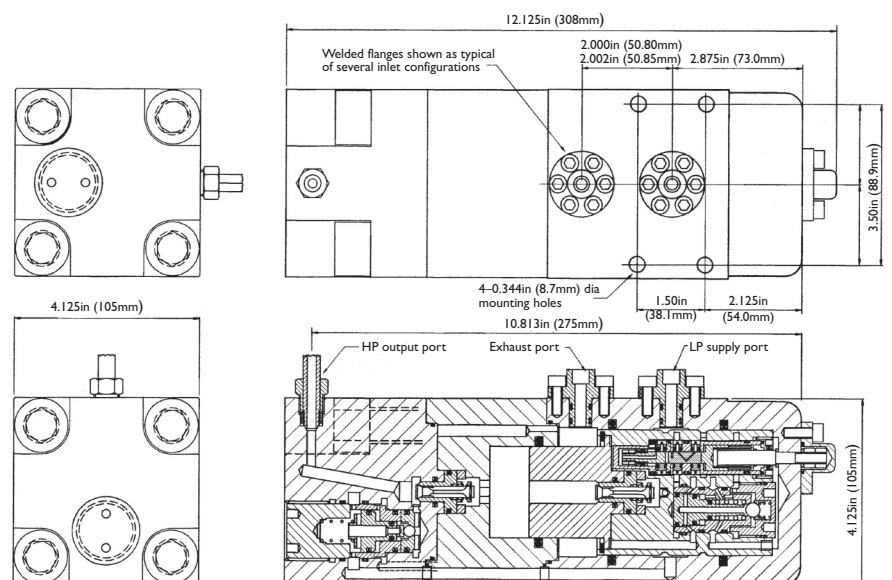
The inlet pressure of the intensifier should be carefully controlled, as the outlet pressure increases by the ratio of the pump in use. For example, if an 8:1 intensifier is being used, a rise in the inlet pressure of 125 bars will immediately increase the outlet pressure by 1,000 bars.

A relief valve set at the maximum pump rating should be fitted immediately downstream of the pump delivery port.

### HI 11400-xx-01 drawing giving dimensions



### HI 11400-xx-02 drawing giving dimensions





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# HI 11400 Qualification Testing

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It is recognised that reliability and consistent performance are critical in subsea operations where the cost of failure can be extremely high. The operational benefits which the HI 11400 can provide are significant and attractive (see page G010). For this reason, Marshalsea Hydraulics and various client companies have run a number of qualification trials of this innovative product. The following summarises trials that have taken place:

<b>External Testing (Wormald)</b>	8 to 1 ratio intensifier, discharge pressure 1,250 bars mineral oil @ 80 deg C (artificially heated), total number of cycles 4,000. Application: topside high temperature/pressure wells. Projects: Shearwater/Elgin Frankling/Sable.
<b>Internal Testing</b>	5 to 1 ratio intensifier, discharge pressure 1,500 bars; water glycol <i>Transaqua HT</i> at 20°C; total number of cycles 174,000. Application: subsea.
<b>Internal life Test</b>	5 to 1 ratio intensifier, discharge pressure 1,500 bars; water glycol <i>Transaqua HT</i> at 20°C; total number of cycles 500,000. Application: subsea, sea water washed. Project: Shell/Cook/Kvaerner.
<b>Internal life Test</b>	5 to 1 ratio Intensifier, discharge pressure 1,000 bars; water glycol <i>Transaqua HT</i> at 20°C; total number of cycles 526,000. Application: subsea.
<b>Internal life Test</b>	2.5 to 1 intensifier, discharge pressure 950 bar; water glycol <i>HW443</i> at 20°C; total number of cycles 100,000. Application: subsea control module mounted (dual redundant module), Project: Vigdis/Norsk Hydro/FMC Kongsberg. <b>See page G011 for the published conclusions of this test.</b>
<b>Internal life Test</b>	3 to 1 intensifier, discharge pressure 1035 bars; water glycol <i>HW740R</i> at 20°C; total number of cycles 750,000. Application: subsea control module mounted (dual redundant intensifiers). Project: Rhum BP/ABB Offshore. <b>See page G012 for the published conclusions of this test.</b>
<b>External Testing (READ)</b>	8 to 1 down hole intensifier (less than 4 in/100mm in diameter); discharge pressure 22,500 psig of water glycol. Application: subsea swaging of casing tube.

## BENEFITS DERIVED FROM USING HI 11400 SUBSEA PRESSURE INTENSIFIERS

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### Cost savings

Reduce number of umbilical lines

Simplification of Control Module (no HP rated components)

Development of fields with different well bore shut in pressures at each well without additional HP umbilical lines from topsides.

Avoidance of very high pressure lines on topside installation, in risers and subsea.

### New development opportunities

Allows high pressure developments to be tied back to existing subsea infrastructure, with lower rated HP pressure infrastructures.

Mitigation for damaged/old umbilicals – derating, providing reduced OPEX/extended field life for existing infrastructures

Selection of downhole valve not dependent on HP pressure and position in wellbore

Development of fields where required HP pressure is in excess of current reliable umbilical technology.

### Reliability

Reduce number of moving parts

Based on proven, reliable technology (300 topside operational units)

Reduced number of subsea connections

### Enhanced safety

Avoidance of very high pressure lines on topside installation, in risers and subsea.



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### RESULTS OF CYCLING TESTS

The cycling tests are designed to monitor the forward to return stroke transition of the test intensifier and any deterioration in leakage rates.

The graphs of HP and LP taken at 25,000 cycle intervals show the transition from forward stroke to reverse stroke as indicated by the drop in the supply pressure (the first of these graphs is marked with the return stroke duration). The unit was set to travel forward at the slowest possible speed by setting the smallest achievable leak from the HP control valve (PV2), at the point of return stroke a screen capture was taken showing the condition of the HP and LP and the duration of the return stroke. The depression in the lower trace is the drop in supply pressure caused by the ~ return stroke of the intensifier, this is used to mark the start and finish points of the return stroke. The graphs show that during the return stroke there is no falloff in HP indicating zero or near zero leakage across the HP piston seal and primary check valve. The traces show rapid transition from forward to return stroke with no dead band and associated fall in HP, this provided clear evidence that the hydraulic over center mechanism is functioning correctly and has not deteriorated. There has been no observable change in performance over the 100,000 cycles.

Leakage rates to exhaust and HP to LP interflow have shown an increase during the test from 0.01cc/min and 0.003cc/min respectively to 0.020cc/min and 0.008cc/min. Readings taken prior to the contamination test of 0.015cc/min and 0.005cc/min show a reversal of this trend. Fractional changes in the supply pressure have a marked effect on the position of the LP piston which is used to determine true leakage rates and with such very small movements and leakage a degree of drift is to be expected. As with all hydraulic equipment containing valves and seats deterioration will take place during the life of the unit but as the intensifier is expected to be moving slowly in service the measured leakage expressed as a fraction of the consumed fluid is very small.

### RESULTS OF HYPERBARIC CHAMBER TEST

The test intensifier was subjected to a series of pressure regimes while contained in a hyperbaric chamber. Inlet and hyperbaric pressures were varied across a prescribed band and the resulting effects plotted in graph form. The test was to simulate the effect of an intensifier being deployed sub sea with the supply line, exhaust line and HP outlet being

effectively returning to the surface. The graphs clearly show the result of varying either of the pressure parameters and that the results can be accurately predicted. Providing the inlet, exhaust and HP outlet see the same depth pressure an intensifier can be deployed at any water depth with no loss of function.

### RESULTS OF CONTAMINATION TEST

The complete test rig and associated pipework was deliberately contaminated to class IOB to determine the test intensifier resistance to fluid contamination. Pall Machinery were commissioned to provide the technical support necessary to contaminate the system to a specific level and provide constant on line cleanliness monitoring during the test. The test intensifier's performance and system cleanliness (5B/6B) was logged prior to any changes being made to the hydraulic system and the data recorded. All three filters were removed and the system rechecked (8B/9B) ISO medium test dust was added until the required contamination level was reached and 5,000 cycles was initiated. The intensifier performance was logged on completion of 5,000 cycles and the data recorded. Comparison of the performance figures prior and post test show the ~ test intensifier to be unaffected by this level of contamination, it is clear that much higher levels of contamination will be required before any change in performance becomes evident. The performance figures recorded were witnessed by a representative of Pall Machinery.

### RESULTS OF PROOF PRESSURE TEST

The results from this test are self-evidently satisfactory.

### DETERMINATION OF OUTPUT PRESSURE BAND

The purpose of this test is to establish the percentage loss in output pressure due to the internal seal friction and manufacturing tolerances. The results of measurements and calculations indicate ~ an expected loss of 1.6% on the theoretical output pressure due to friction. When this figure is applied to the manufacturing tolerances an overall output pressure tolerance band of -1.5 to -1.7 % is determined. At the outset of the cycling test it was observed that the output pressure was marginally lower than at the completion of the test due to a higher frictional loss. During a period of cycling internal polishing takes place reducing the frictional loss with a subsequent rise in output pressure. In view of this it is prudent to use a loss figure of -2.0 % when calculating pressures.



## DETERMINATION OF VENT VALVE RELEASE POINT

A series of tests were performed to establish the point at which the vent valve releases while discharging the supply pressure. Although this test was carried out during the cycling tests the results are not considered sufficiently accurate for detailed analysis. The tests were repeated with the HP discharging from pressures of 950 bar to 500 bar in 100 bar increments and the results plotted in graph form. The graph

traces indicate that the point at which the vent valve releases is dependant upon the level of HP being vented. The higher the HP the higher the vent valve release pressure. This is simply a function of loads, pressures and areas. The pressure at which the valve releases is not a precise value, small variations will be present due to changing frictional values with different process fluids and variations in manufactured parts.

## QUALIFICATION TEST FOR ABB OFFSHORE SYSTEMS – CONCLUSIONS

### DATA LOGGER SCOPE TRACES

The graphs of HP and LP taken at intervals through out the test show the transition from forward stroke to reverse stroke as indicated by the drop in the supply pressure ( the first of these graphs is marked with the return stroke duration). The unit was set to travel forward at the slowest possible speed by setting the smallest achievable leak from the HP control valve (PV2), at the point of return stroke a screen capture was taken showing the condition of the HP and LP and the duration of the return stroke. The depression in the lower trace is the drop in supply pressure caused by the return stroke of the intensifier, this is used to mark the start and finish points of the return stroke.

The graphs show that during the return stroke there is no fall off in HP indicating zero or near zero leakage across the HP piston seal and primary check valve. The traces shows rapid transition from forward to return stroke with no dead band and associated fall in HP, this provided clear evidence that the hydraulic over center mechanism is functioning correctly and has not deteriorated. There has been no observable change in performance over the 700,000 cycle duration of this test.

### LEAKAGE TO EXHAUST AND LP PISTON FORWARD MOVEMENT

The purpose of recording the total leakage to exhaust and the forward movement of the LP piston is to distinguish between the discharged/displaced fluid which derives from the normal operation of the intensifier and leakage across

the various internal valves. Fluid from both these sources is discharged into the exhaust line. During the course of the test the measured leakage from the exhaust has increased from one drip (0.045cc) in 5 minutes to 2 drips (0.09cc) in 5 minutes and the forward movement of the LP piston has increased from 0.006mm to 0.012mm. These measurements are so small as to be insignificant, Marshalsea acceptance for an FAT on an intensifier is 0.20cc in 5 minutes and this is considered to be a low value.

Fractional changes in the supply pressure have a marked effect on the position of the LP piston which is used to determine true leakage rates and with such very small movements and leakage a degree of drift is to be expected. As with all hydraulic equipment containing valves and seats deterioration will take place during the life of the unit but as the intensifier is expected to be moving slowly in service the measured leakage expressed as a fraction of the consumed fluid is very small

### OUTPUT PRESSURE

The measurements taken of output pressure show a variation of 4 bars (1025 bars-1029 bars) spread over the 14 test points. This would indicate a variation in supply pressure better than 1.5 bars due to the 3:1 multiplication from LP to HP. The nominal calculated output pressure is 1035 bars, the measured output pressure of 1025 bars is 1 % low compared with the calculated figure. A loss between 1 % and 2 % in normal for all intensifiers and is a result of internal friction and /or manufacturing tolerances..



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## **Fire Safe Instrumentation Ball and Needle Valves (Up to and including 10,000 psi / 690 bar)**



### **Superior Performance Throughout the Full Operational Range**

- Fire Safe in Accordance with API 607, API 6FA, ISO 10497
- State of the Art Design to Reduce Potential Leak Paths
- Stem Seal Design Prevents Galling and Contamination
- Low Operating Torque
- Worldwide Instrumentation Approvals
- Unique Compact Design to Save Space and Weight
- Viton / Graphoil Stem Sealing
- Available from 1,000 psi / 70 bar to 10,000 psi / 690 bar
- Non-Rotating, Anti-Galling Tip as Standard



Bifold has manufactured Ball and Needle Valve products for more than 20 years.

The product range has been designed to overcome the problems of traditional assemblies on primary isolation and venting duties.

Our Needle Valve range incorporates a dynamic sealing system along with a compact design. These valves can be direct mounted to the back plate of a panel and offer a lower torque to operate.

Our Ball Valve range is manufactured from a single piece body design and is supplied complete with an anti blow out stem and lower torque to operate.

### Needle Valves



#### Dynamic Sealing

- Eliminates the loss of sealing integrity often experienced over the life time of traditional packing glands, reducing the risk of fugitive emissions.

#### Compact Patented Design

- Sleek light weight body with smaller envelope enabling closer mounting, ease of installation and a significant reduction in overall panel size and weight.

#### Direct Mount to Back Plate

- All needles and vents off the back plate enabling lower cost panel construction. No panel cut-outs or spacers required for vents and needle heads.

#### Non-Wetted Parts

- Needle head threads are clean from process fluid corrosion or contamination using a metal to metal bonnet seal and pre-thread stem seals.

#### Lower Torque to Operate

- No need to mount on a back plate to counteract torque.

There are design differences between the fire safe and non-fire safe products.

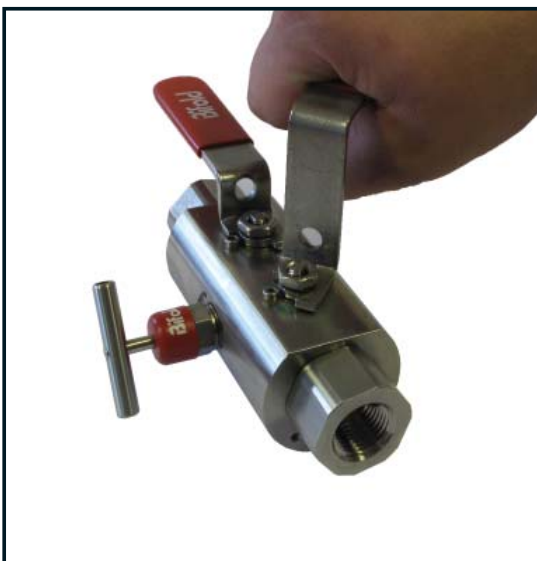
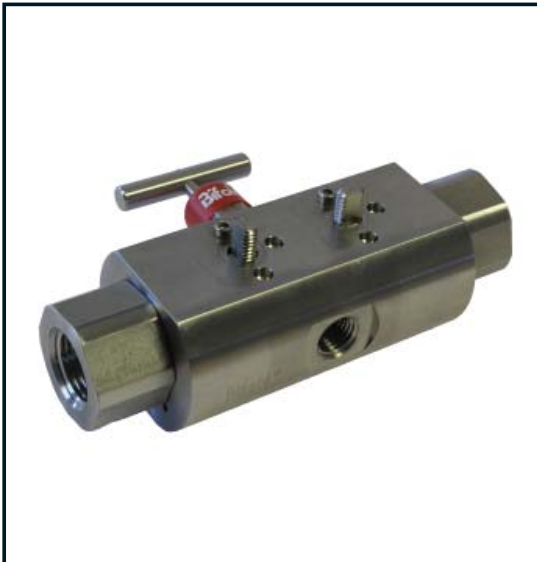
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Features & Benefits

Ball Valves



**Single piece Body**

- Reduces potential leak paths to the outside environment.

**Anti Blow Out Stem**

- The internally loaded and retained stem eliminates risk of injury to operators caused by potential stem blow outs.

**Pressure Energised Stem Seal**

- Combined with an anti-blow out stem, the internally loaded pressure energised stem seals, ensure sealing integrity is maintained regardless of outside influences / interferences such as removal of the handle.

**Lower and Consistent Torque to Operate**

- The unique design principles eliminate the effect of manufacturing variance, ensuring operating torques are both low and consistent throughout the batch.

**Pressure Tested**

- Pressure tested in accordance with API 598 & BS EN 12266-1. Proof tested to 1.5 times maximum working pressure.

**Why Use Bifold?**

- Innovatively progressed and optimised designs throughout our product range.
- Here at Bifold, we are constantly carrying out vigorous research and development on all of our products, ensuring that our valves represent the best of what we do.
- Our state of the art production facilities based in the UK, allow our superior and innovative designs of components to be manufactured on site, assembled to the finished product and tested to rigorous quality standards.
- There are design differences between the fire safe and non-fire safe products.



Product Portfolio



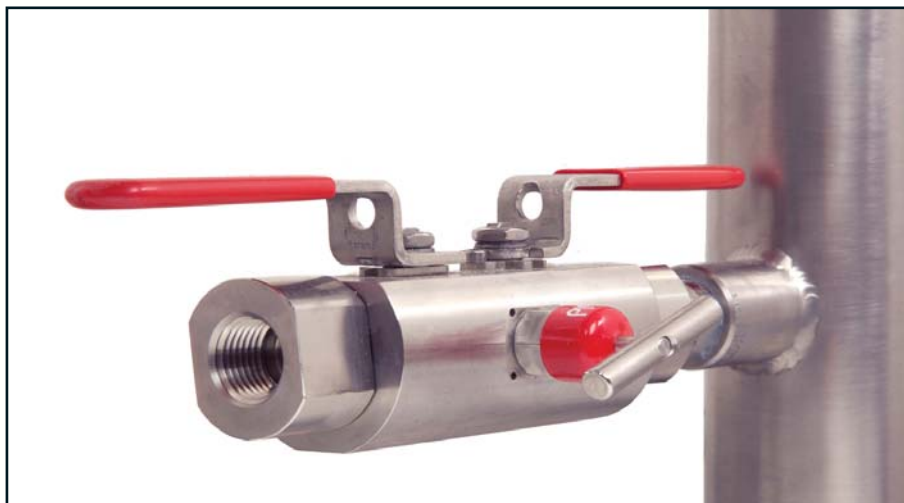
Needle Valves

The Needle Valve range is available as a one piece body construction with pressures ranging from 6,000 psi / 414 bar up to 10,000 psi / 690 bar and sizes 1/4" NPT to 1" NPT. Within the needle valve range, we also offer a medium pressure design ranging from 10,000 psi / 690 bar up to 20,000 psi / 1380 bar (See our Medium Pressure Catalogue).



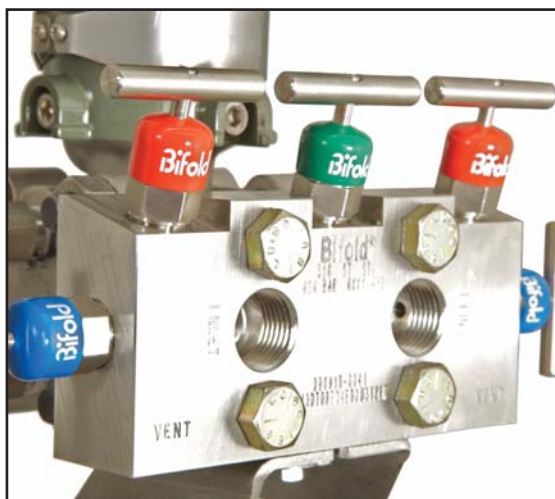
Ball Valves

The Bifold range of ball valves utilise a state of the art design to reduce potential leak paths with a standard pressure ranging from 1,000 psi / 70 bar up to 10,000 psi / 690 bar and sizes 1/4" NPT to 2" NPT. Within the ball valve range, we also offer a medium pressure design range from 10,000 psi / 690 bar up to 20,000 psi / 1380 bar (See our Medium Pressure Catalogue).



Manifolds

Suitable for shutting off the impulse lines and for mounting pressure and directional pressure instruments. These manifolds are for direct mounting onto pressure transmitters furnished with mounting interface in accordance with DIN 61518. The manifolds are supplied as standard with 1/2" NPT female threaded inlet and vent connections. (See our Manifold Catalogue).



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## Product Portfolio

### State of the Art Machining Centres

Bifold is enhanced by an in house lean and integrated manufacturing policy, alongside a unique business model, effectively reducing lead times and providing peace of mind to contractors, installers and end users for over a century. Our state of the art production facilities based in the UK, allow our superior and innovative designs of components to be manufactured on site, assembled to the finished product and tested to rigorous quality standards.

All Bifold valves have product traceability via unique serial number stamped on all valve bodies, linking them with their testing and component certificates, materials of construction together with full manufacturers record book (MRB).



Installation Picture Using Our Ball And Needle Valves



Installation Picture Using Our Ball And Needle Valves





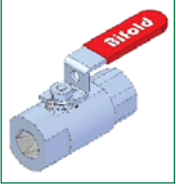

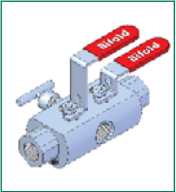

### Bifold ISO9001 Product Certification and Specialist Testing Options Include

- NACE MR-01-75 / ISO 15156 compliant materials as standard.
- Non destructive testing including LPI, MPI, PMI and Ferrite testing.
- Hydrostatic & Pneumatic testing.
- Nitrogen gas testing.
- Nitrogen / Helium leak detection.
- Low temperature testing.
- Fugitive Emission testing.
- HIC testing and other specialist material tests.



Preferred Range

INSTRUMENTATION PRODUCTS - NEEDLE VALVES (Up to and including 10,000 psi / 690 bar)

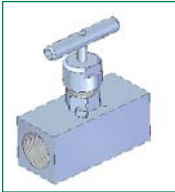

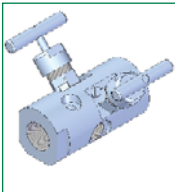
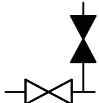
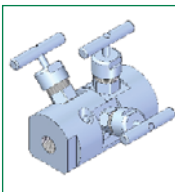
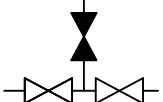
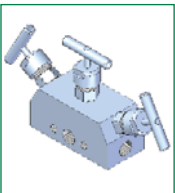
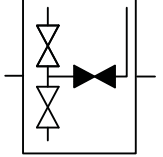
Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>BV01</b> Single Isolate Low Pressure Ball Type</p>		9	<b>BV0104F0211.5TG2KFSLK</b>	1/4"NPT, Single Isolate, Ball configuration 2,000 psi / 140 bar 11.5mm Bore
			<b>BV0108F0215TG2KFSLK</b>	1/2"NPT, Single Isolate, Ball configuration 2,000 psi / 140 bar 15mm Bore
			<b>BV0112F0220TG2KFSLK</b>	3/4"NPT, Single Isolate, Ball configuration 2,000 psi / 140 bar 20mm Bore
			<b>BV0116F0225TG2KFSLK</b>	1"NPT, Single Isolate, Ball configuration 2,000 psi / 140 bar 25mm Bore
			<b>BV0132F0250TG2KFSLK</b>	2"NPT, Single Isolate, Ball configuration 1,000 psi / 70 bar 50mm Bore
 <p><b>BV01</b> Single Isolate Ball Type</p>		10 / 11	<b>BV0104F0210EG6KFS</b>	1/4"NPT, Single Isolate, Ball configuration, 6,000 psi / 414 bar 10mm Bore
			<b>BV0104F0210EG10KFS</b>	1/4"NPT, Single Isolate, Ball configuration, 10,000 psi / 690 bar 10mm Bore
			<b>BV0108F0210EG6KFS</b>	1/2"NPT, Single Isolate, Ball configuration, 6,000 psi / 414 bar 10mm Bore
			<b>BV0108F0210EG10KFS</b>	1/2"NPT, Single Isolate, Ball configuration, 10,000 psi / 690 bar 10mm Bore
			<b>BV0112F0210EG6KFS</b>	3/4"NPT, Single Isolate, Ball configuration, 6,000 psi / 414 bar 10mm Bore
 <p><b>BV05</b> Double Block &amp; Bleed Manifold</p>		12 / 13	<b>BV0504F0210EGV6KFS</b>	1/4"NPT, DBB Manifold, Ball - Needle - Ball configuration, 6,000 psi / 414 bar 10mm Bore 1/4"Vent Bleed
			<b>BV0504F0210EGV10KFS</b>	1/4"NPT, DBB Manifold, Ball - Needle - Ball configuration, 10,000 psi / 690 bar 10mm Bore 1/4"Vent Bleed
			<b>BV0508F04F0210EGV6KFS</b>	1/2"NPT, DBB Manifold, Ball - Needle - Ball configuration, 6,000 psi / 414 bar 10mm Bore 1/4"Vent Bleed
			<b>BV0508F04F0210EGV10KFS</b>	1/2"NPT, DBB Manifold, Ball - Needle - Ball configuration, 10,000 psi / 690 bar 10mm Bore 1/4"Vent Bleed
			<b>BV0512F04F0210EGV6KFS</b>	3/4"NPT, DBB Manifold, Ball - Needle - Ball configuration, 6,000 psi / 414 bar 10mm Bore 1/4"Vent Bleed

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Preferred Range

INSTRUMENTATION PRODUCTS - NEEDLE VALVES (Up to and including 10,000 psi / 690 bar)				
Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>NV01</b> Single Isolate</p>		14 / 15	NV0104F02M5V6KFS	1/4" NPT, Single Isolate, Needle configuration, 6,000 psi / 414 bar
			NV0104F02M5V10KFS	1/4" NPT, Single Isolate, Needle configuration, 10,000 psi / 690 bar
			NV0106F02M5V6KFS	3/8" NPT, Single Isolate, Needle configuration, 6,000 psi / 414 bar
			NV0106F02M5V10KFS	3/8" NPT, Single Isolate, Needle configuration, 10,000 psi / 690 bar
			NV0108F02M5V6KFS	1/2" NPT, Single Isolate, Needle configuration, 6,000 psi / 414 bar
			NV0108F02M5V10KFS	1/2" NPT, Single Isolate, Needle configuration, 10,000 psi / 690 bar
 <p><b>NV04</b> Block &amp; Bleed Manifold</p>		16 / 17	NV0404F02M5V6KFS	1/4" NPT, Block & Bleed Manifold, Needle - Needle configuration, 6,000 psi / 414 bar; 1/4" Vent Bleed
			NV0404F02M5V10KFS	1/4" NPT, Block & Bleed Manifold, Needle - Needle configuration, 10,000 psi / 690 bar; 1/4" Vent Bleed
			NV0408F04F02M5V6KFS	1/2" NPT, Block & Bleed Manifold, Needle - Needle configuration, 6,000 psi / 414 bar; 1/4" Vent Bleed
			NV0408F04F02M5V10KFS	1/2" NPT, Block & Bleed Manifold, Needle - Needle configuration, 10,000 psi / 690 bar; 1/4" Vent Bleed
<b>THIS PRODUCT DESIGN IS UNIQUE TO BIFOLD AND PATENTED</b>				
 <p><b>NV05</b> Double Block &amp; Bleed Manifold</p>		18 / 19	NV0504F02M5V6KFS	1/4" NPT, DBB Manifold, Needle - Needle - Needle configuration, 6,000 psi / 414 bar; 1/4" Vent Bleed
			NV0504F02M5V10KFS	1/4" NPT, DBB Manifold, Needle - Needle - Needle configuration, 10,000 psi / 690 bar; 1/4" Vent Bleed
			NV0508F04F02M5V6KFS	1/2" NPT, DBB Manifold, Needle - Needle - Needle configuration, 6,000 psi / 414 bar; 1/4" Vent Bleed
			NV0508F04F02M5V10KFS	1/2" NPT, DBB Manifold, Needle - Needle - Needle configuration, 10,000 psi / 690 bar; 1/4" Vent Bleed
<b>THIS PRODUCT DESIGN IS UNIQUE TO BIFOLD AND PATENTED</b>				
 <p><b>NV06</b> Double Block &amp; Bleed Single Station Manifold</p>		20 / 21	NV06104F02M5V6KFS	1/4" NPT, DBB Single Station Manifold, Needle - Needle - Needle configuration, 6,000 psi / 414 bar
			NV06104F02M5V10KFS	1/4" NPT, DBB Single Station Manifold, Needle - Needle - Needle configuration, 10,000 psi / 690 bar
<b>THIS PRODUCT DESIGN IS UNIQUE TO BIFOLD AND PATENTED</b>				



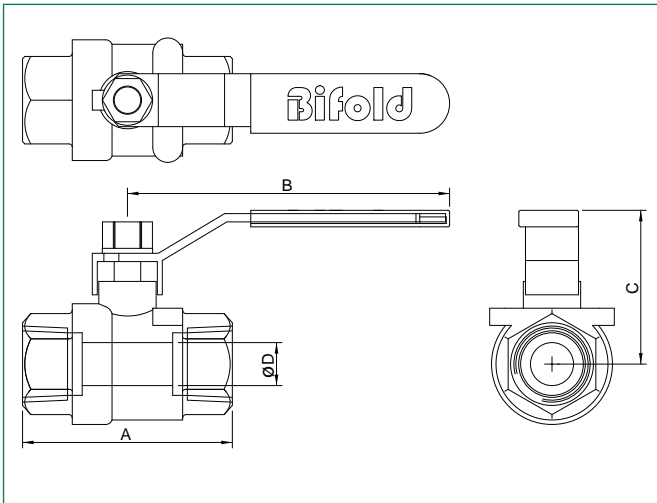
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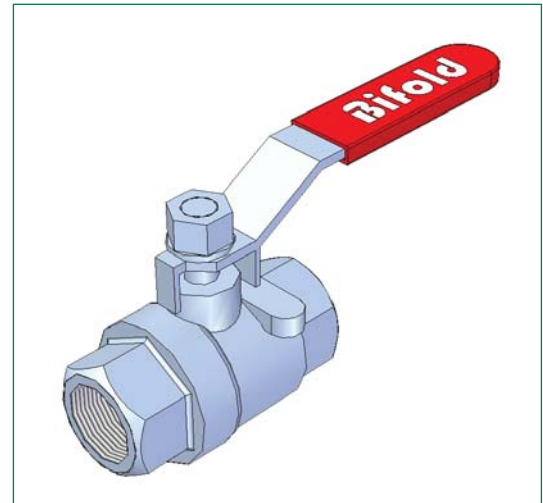
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**BV01**

**Dimensional Drawings**



**SCHEMATIC**



BV01 SELECTION TABLE						
Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C' (mm)	Ø 'D' (mm)
BV0104F0211.5TG2KFSLK	¼" NPT	2,000 psi / 140 bar	11.5mm	9.5mm	65mm	69.5mm
BV0108F0215TG2KFSLK	½" NPT	2,000 psi / 140 bar	15mm	9.5mm	65mm	69.5mm
BV0112F0220TG2KFSLK	¾" NPT	2,000 psi / 140 bar	20mm	9.5mm	74.6mm	72.5mm
BV0116F0225TG2KFSLK	1" NPT	2,000 psi / 140 bar	25mm	11mm	88mm	78.8mm
BV0132F0250TG2KFSLK	2" NPT	2,000 psi / 140 bar	50mm	14mm	125mm	105.7mm

**Product Description**

A 1,000 psi / 70 bar rated Single Isolate Ball Valve, designed to give bubble tight shut off through 90° operation across the full operating temperature range. Totally enclosed soft seats offer both positive sealing and low operating torques. The spindle is of anti-blow out design.

**Features and Benefits**

- Two piece construction reducing leak paths.
- Bi-directional.
- Precision machined stainless steel ball.
- RTFE seating to the ball.
- Anti Tamperproof lockable handle as standard.
- Compact design to save space and weight.
- Bubble tight shut-off.
- Fire Safe in Accordance with API 607, API 6FA, ISO 10497.

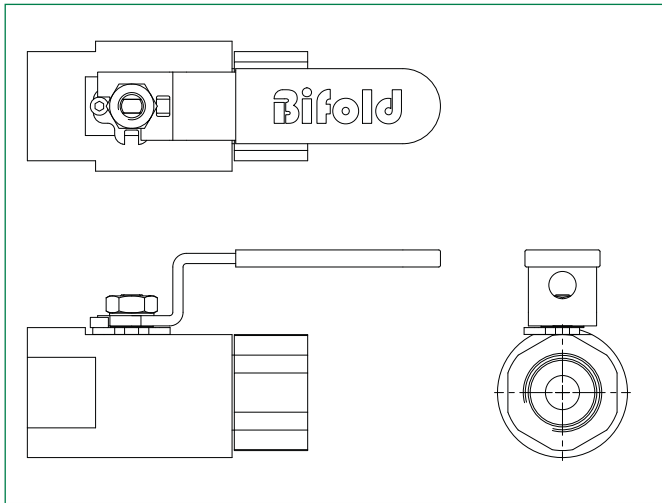
**Technical Data**

Material grade - ASTM A351 CF8M stainless steel body as standard.  
 Operating temperature range -20°C to +200°C as standard.

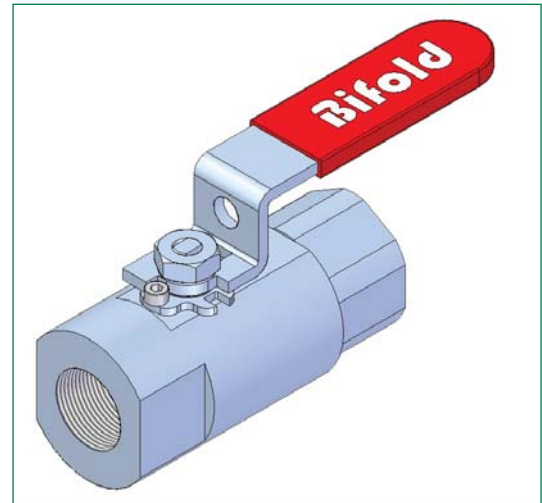


## BV01

### Typical GA Drawings



**SCHEMATIC**



### PREFERRED RANGE BV01 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)
BV0104F0210EG6KFS	1/4" NPT	6,000 psi / 414 bar	10mm
BV0104F0210EG10KFS	1/4" NPT	10,000 psi / 690 bar	10mm
BV0108F0210EG6KFS	1/2" NPT	6,000 psi / 414 bar	10mm
BV0108F0210EG10KFS	1/2" NPT	10,000 psi / 690 bar	10mm
BV0112F0210EG6KFS	3/4" NPT	6,000 psi / 414 bar	10mm

**Single Isolate Ball Configuration.**

**Full dimensions and additional details on request.**

**See selection table on page 11 for options**

### Product Description

A Single Isolate Ball Valve with pressures rated up to 10,000 psi / 690 bar. The single isolating ball valve is designed to give bubble tight shut off through 90° operation across the full operating temperature range of the valve. Totally enclosed soft seats offer both positive sealing and low operating torques.

### Features and Benefits

- Anti-blow out stem internally loaded.
- Bi-directional.
- Precision machined stainless steel ball.
- Peek seating to the Ball.
- Lever type handle as standard.
- Tamperproof lockable handle (Option available).
- Compact design to save space and weight.
- Full material traceability and individual serial number stamped on the valve.
- Grafoil stem and body seals.
- Thread milled connections for improved sealing.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- Bubble tight shut-off.
- Low operating torque.
- Pressure energised stem sealing.
- Metal to Metal body joint to prevent thread contamination.
- Seal integrity maintained if handle is removed.
- Fire Safe in Accordance with API 607, API 6FA, ISO 10497.

### Technical Data

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 11 for alternative materials. Operating temperature range -45°C to +225°C. Inlet / Outlet connections can be threaded Male / Male, Male / Female, Female / Male, butt weld and socket weld.

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**BV01**

**BV01 Selection Chart - Ordering Example**

BV01		Single Isolation Ball Valve		Model Code
04	1/4"	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Nominal Pipe Size
06	3/8"			
08	1/2"			
09	9/16"			
12	3/4"			
16	1"			
F	Female Thread			Connection Type
M	Male Thread			
FM	Female Thread Inlet / Male Thread Outlet			
MF	Male Thread Inlet / Female Thread Outlet			
SW	Socket Weld			
BW	Butt Weld			
FMP	Female Medium Pressure			
NO LETTER	(NPT, SW+ BW+ FMP)			Thread Form
K6	BSP Parallel			
BSPT	BSP Taper			
SAE	SAE Straight Thread			
NO LETTER	(Standard Inlet / Outlet)			Option For Threaded Inlet / Outlet
PG	Outlet Fitted With A Pressure Plug			
02	UNS S31600 / S31603 Stainless Steel (Standard Material)			Material
26	F51 / UNS S31803 Duplex			
38	LF2 / Carbon Steel			
39	F55 / UNS S32760 Super Duplex			
10	10mm Bore	04	Bore Size	
		06		
		08		
		09		
		12		
20	20mm Bore	12		
		16		
T	PTFE	1,000 psi Maximum Cold Working Pressure	Seat Material	
TG	Glass Filled PTFE	6,000 psi Maximum Cold Working Pressure		
CG	Carbon Graphite	6,000 psi Maximum Cold Working Pressure		
E	PEEK	10,000 psi Maximum Cold Working Pressure		
P	PPS	10,000 psi Maximum Cold Working Pressure		
TC	Carbon Filled PEEK	10,000 psi Maximum Cold Working Pressure		
G	Graphite			Seal Arrangement
1K	1,000 psi / 70 bar Maximum Cold Working Pressure			Pressure Rating
3K	3,000 psi / 207 bar Maximum Cold Working Pressure			
6K	6,000 psi / 414 bar Maximum Cold Working Pressure			
10K	10,000 psi / 690 bar Maximum Cold Working Pressure			
NO LETTER				Options
LK	Lockable Handle			
PM	Panel Mount			
PH	Pointer Paddle Handle			
FS	Fire Safe			Fire Safe

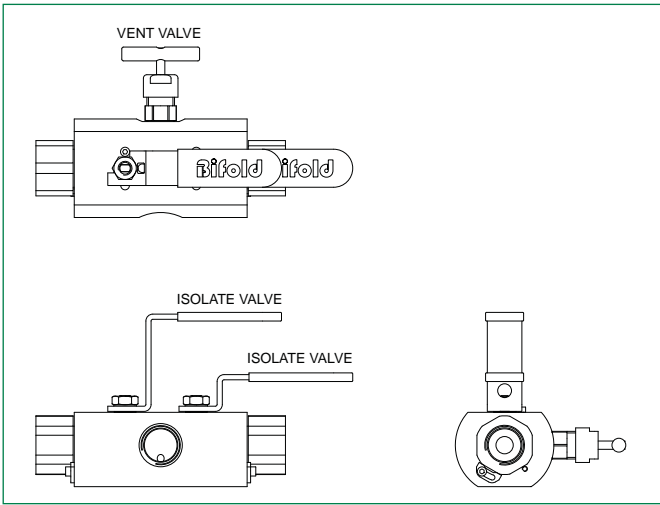
**BV01 08 F 02 10 E G 10K FS** → **BV0108F0210EG10KFS** Ordering Example

Other options may be available upon request. For more information, please contact Bifold Sales Department.

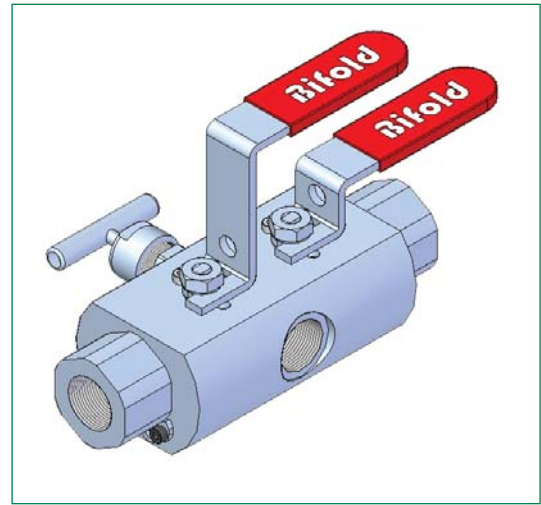
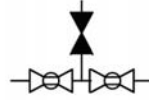


## BV05

### Typical GA Drawings



**SCHEMATIC**



### PREFERRED RANGE BV05 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)
BV0504F0210EGV6KFS	1/4" NPT	6,000 psi / 414 bar	10mm
BV0504F0210EGV10KFS	1/4" NPT	10,000 psi / 690 bar	10mm
BV0508F04F0210EGV6KFS	1/2" NPT	6,000 psi / 414 bar	10mm
BV0508F04F0210EGV10KFS	1/2" NPT	10,000 psi / 690bar	10mm
BV0512F04F0210EGV6KFS	3/4" NPT	6,000 psi / 414 bar	10mm

**Double Block & Bleed Manifold, Ball - Needle - Ball configuration.**

**Full dimensions and additional details on request.**

**See selection table on page 13 for options**

### Product Description

A Double Block & Bleed Ball-Needle-Ball Valve Manifold with pressures rated up to 10,000 psi / 690 bar. Manufactured from barstock, the two inline balls provide unrestricted flow with the facility to push through a metal rod, and are the primary and secondary isolating valves with a needle type valve for the vent facility. The ball valve is designed to give bubble tight shut off through a 90° operation across the full operating temperature range of the valve.

### Features and Benefits

- Anti-blow out stem internally loaded.
- Bi-directional.
- Precision machined stainless steel balls.
- Peek seating to the Ball.
- Lever type handles as standard.
- Tamperproof lockable handle (Option available).
- Compact design to save space and weight.
- Full material traceability and individual serial number stamped on the valve.
- Grafoil stem and body seals.
- Stem seal design prevents galling and contamination.
- Thread milled connections for improved sealing.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- Bubble tight shut-off.
- Low operating torque.
- Pressure energised stem sealing.
- Metal to Metal body joint to prevent thread contamination.
- Fire Safe in Accordance with API 607, API 6FA, ISO 10497.

### Technical Data

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 13 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C. Inlet / Outlet connections can be threaded Male / Male, Male / Female, Female / Male, butt weld and socket weld.

**Accuracy of information**  
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**Quality Assurance**  
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**BV05**

**BV05 Selection Chart - Ordering Example**

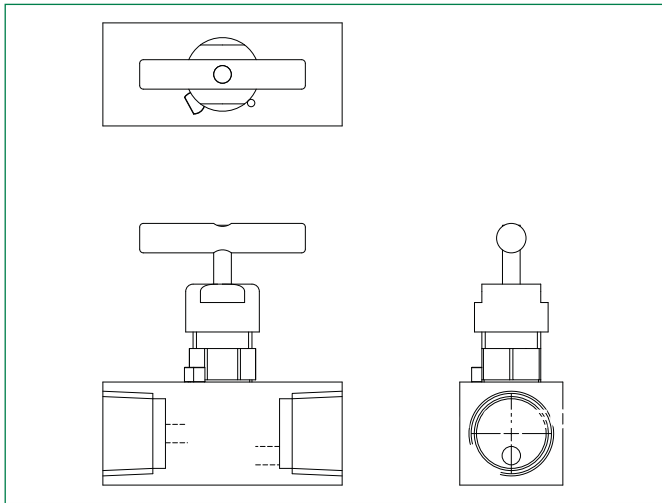
<b>BV05</b>		Double Block & Bleed Manifold		Model Code
<b>04</b> <b>06</b> <b>08</b> <b>09</b> <b>12</b> <b>16</b>	1/4" 3/8" 1/2" 9/16" 3/4" 1"	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Nominal Pipe Size
<b>F</b> <b>M</b> <b>FM</b> <b>MF</b> <b>SW</b> <b>BW</b> <b>FMP</b>	Female Thread Male Thread Female Thread Inlet / Male Thread Outlet Male Thread Inlet / Female Thread Outlet Socket Weld Butt Weld Female Medium Pressure			Connection Type
<b>NO LETTER</b> <b>K6</b> <b>BSPT</b> <b>SAE</b>	(NPT, SW, BW, FMP) BSP Parallel BSP Taper SAE Straight Thread			Thread Form
<b>NO LETTER</b> <b>PG</b>	(Standard Inlet / Outlet) Outlet Fitted With A Pressure Plug			Option For Threaded Inlet / Outlet
<b>NO LETTER</b> <b>04F</b> <b>08F</b>	(For 04F In, Out and Vent) 1/4" NPT 1/2" NPT			Vent Connection
<b>02</b> <b>26</b> <b>38</b> <b>39</b>	UNS S31600 / S31603 Stainless Steel (Standard Material) F51 / UNS S31803 Duplex LF2 / Carbon Steel F55 / UNS S32760 Super Duplex			Material
<b>10</b>	10mm Bore	<b>04</b> <b>06</b> <b>08</b> <b>09</b> <b>12</b>		Bore Size
<b>20</b>	20mm Bore	<b>12</b> <b>16</b>		
<b>T</b> <b>TG</b> <b>CG</b> <b>E</b> <b>P</b> <b>TC</b>	PTFE Glass Filled PTFE Carbon Graphite PEEK PPS Carbon Filled PEEK	1,000 psi Maximum Cold Working Pressure 6,000 psi Maximum Cold Working Pressure 6,000 psi Maximum Cold Working Pressure 10,000 psi Maximum Cold Working Pressure 10,000 psi Maximum Cold Working Pressure 10,000 psi Maximum Cold Working Pressure		Seat Material
<b>GV</b> <b>GV9</b> <b>GE9</b>	Graphite / Viton Elastomer Graphite / V91A Elastomer Graphite / E985 Elastomer	-20°C to +180°C -45°C to +225°C -46°C to +160°C		Seal Arrangement
<b>1K</b> <b>3K</b> <b>6K</b> <b>10K</b>	1,000 psi / 70 bar Maximum Cold Working Pressure 3,000 psi / 207 bar Maximum Cold Working Pressure 6,000 psi / 414 bar Maximum Cold Working Pressure 10,000 psi / 690 bar Maximum Cold Working Pressure			Pressure Rating
<b>NO LETTER</b> <b>LK</b> <b>AV</b> <b>PV</b> <b>PH</b> <b>NT</b>	Lockable Handle Anti Tamper Vent Plugged Vent Pointer Paddle Handle Gas Service / Nitrogen test *	* Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.		Options
<b>FS</b>	Fire Safe			Fire Safe

**BV05 04 F 02 10 E GV 10K FS** → **BV0504F0210EGV10KFS** Ordering Example

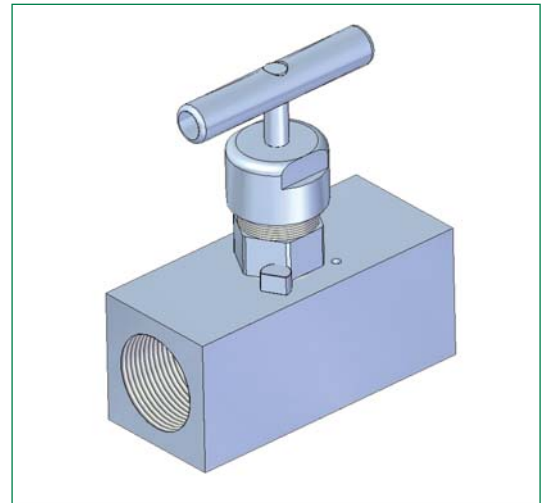
Other options may be available upon request. For more information, please contact Bifold Sales Department.

## NV01

### Typical GA Drawings



SCHMATIC



### PREFERRED RANGE NV01 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)
NV0104F02M5V6KFS	1/4" NPT	6,000 psi / 414 bar	10mm
NV0104F02M5V10KFS	1/4" NPT	10,000 psi / 690 bar	10mm
NV0106F02M5V6KFS	3/8" NPT	6,000 psi / 414 bar	10mm
NV0106F02M5V10KFS	3/8" NPT	10,000 psi / 690bar	10mm
NV0108F02M5V6KFS	1/2" NPT	6,000 psi / 414 bar	10mm
NV0108F02M5V10KFS	1/2" NPT	10,000 psi / 690bar	10mm

**Single Isolate, Needle configuration.**

**Full dimensions and additional details on request.**

**See selection table on page 15 for options**

### Product Description

A 6,000 psi / 414 bar or 10,000 psi / 690 bar rated Single Isolate Needle Valve. The metal to metal non-rotating tip and metal to metal body to bonnet interface offer leak tight sealing across the full operating temperature range of the valve.

### Features and Benefits

- Robust one piece body construction.
- Anti-blow out stem.
- Non-rotating, anti-galling tip as standard.
- Viton / Graphite stem sealing.
- Metal to Metal seating.
- Unique compact design to save space and weight.
- Full material traceability and individual serial number stamped on the valve.
- Back seating needle.
- Stem seal design prevents galling and contamination.
- Thread milled connections for improved sealing.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- Bubble tight shut-off.
- Anti Tamper T-Bar option.
- Handwheel option.
- Pressure energised stem sealing.
- Metal to Metal body joint to prevent thread contamination.
- Fire Safe in Accordance with API 607, API 6FA, ISO 10497.

### Technical Data

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 15 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C. Inlet / Outlet connections can be threaded Male / Male, Male / Female, Female / Male, butt weld and socket weld.

**Accuracy of information**  
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NV01

NV01 Selection Chart - Ordering Example

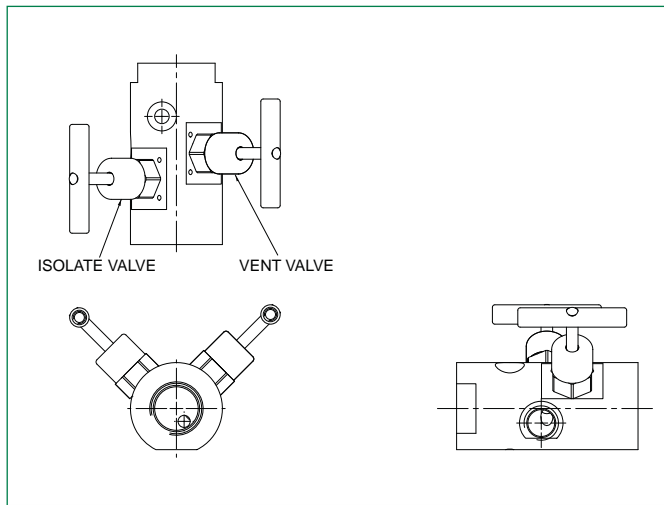
<b>NV01</b>		Single Isolate	Model Code
04 06 08 09 12 16	1/4" 3/8" 1/2" 9/16" 3/4" 1"	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)	Nominal Pipe Size
<b>F</b> <b>M</b> <b>FM</b> <b>MF</b> <b>SW</b> <b>BW</b> <b>FMP</b>	Female Thread Male Thread Female Thread Inlet / Male Thread Outlet Male Thread Inlet / Female Thread Outlet Socket Weld Butt Weld Female Medium Pressure		Connection Type
<b>NO LETTER</b> <b>K6</b> <b>BSPT</b> <b>SAE</b>	(NPT, SW, BW, FMP) BSP Parallel BSP Taper SAE Straight Thread		Thread Form
<b>NO LETTER</b> <b>PG</b>	(Standard Inlet / Outlet) Outlet Fitted With A Pressure Plug		Option For Threaded Inlet / Outlet
02 26 38 39	UNS S31600 / S31603 Stainless Steel (Standard Material) F51 / UNS S31803 Duplex LF2 / Carbon Steel F55 / UNS S32760 Super Duplex		Material
<b>M</b> <b>MT</b>	Metal Ball Metal Tip		Tip Style
5	5mm Bore	04 06 08 09 12	Bore Size
8	8mm Bore	12 16	
<b>V</b> <b>V9</b> <b>E9</b>	Graphite / Viton Elastomer Graphite / V91A Elastomer Graphite / E985 Elastomer	-20°C to +180°C -45°C to +225°C -46°C to +160°C	Seal Arrangement
<b>6K</b> <b>10K</b>	6,000 psi / 414 bar Maximum Cold Working Pressure 10,000 psi / 690 bar Maximum Cold Working Pressure		Pressure Rating
<b>NO LETTER</b> <b>LK</b> <b>PM</b> <b>NT</b>	Lockable T-Bar Isolate Panel Mount Gas Service / Nitrogen test *		Options
* Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.			
<b>FS</b>	Fire Safe		Fire Safe

**NV0108 F 02 M 5 V 6K LK FS** → **NV0108F02M5V6K LK FS** Ordering Example

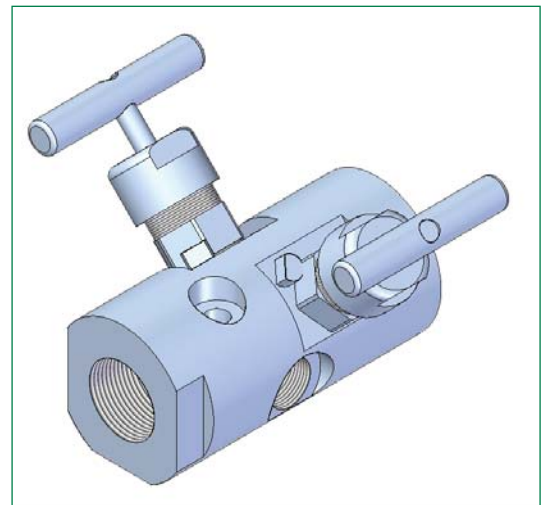
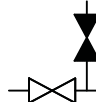
Other options may be available upon request. For more information, please contact Bifold Sales Department.

NV04

Typical GA Drawings



SCHEMATIC



PREFERRED RANGE NV04 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	Block & Bleed Manifold, Needle - Needle configuration.
NV0404F02M5V6KFS	1/4" NPT	6,000 psi / 414 bar	5mm	Full dimensions and additional details on request.  See selection table on page 17 for options
NV0404F02M5V10KFS	1/4" NPT	10,000 psi / 690 bar	5mm	
NV0408F04F02M5V6KFS	1/2" NPT	6,000 psi / 414 bar	5mm	
NV0408F04F02M5V10KFS	1/2" NPT	10,000 psi / 690bar	5mm	

Product Description

A 6,000 psi / 414 bar or 10,000 psi / 690 bar rated 2 Valve Block & Bleed Gauge / Instrument Manifold. The angled bonnets allow for either panel or pipe mounting. The manifold design permits controlled venting of the instrument for calibration and or removal from the circuit, whilst leaving the process intact.

Features and Benefits

- Robust one piece body construction.
- Anti-blow out stem.
- Non-rotating, anti-galling tip as standard.
- Viton / Graphite stem sealing.
- Metal to Metal seating.
- Back seating needle.
- Unique patented product compact in design to save space and weight.
- European patent granted EP2242943.
- Full material traceability and individual serial number stamped on the valve.
- Stem seal design prevents galling and contamination.
- Thread milled connections for improved sealing.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- Bubble tight shut-off.
- Anti Tamper T-Bar option.
- Pressure energised stem sealing.
- Metal to Metal body joint to prevent thread contamination.
- Fire Safe in Accordance with API 607, API 6FA, ISO 10497.

Technical Data

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 17 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C. Inlet / Outlet connections can be threaded Male / Male, Male / Female, Female / Male, butt weld and socket weld.

**Accuracy of information**  
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NV04

NV04 Selection Chart - Ordering Example

<b>NV04</b>		Block & Bleed Manifold		Model Code	
<b>04</b>	1/4"	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Nominal Pipe Size	
<b>06</b>	3/8"				
<b>08</b>	1/2"				
<b>09</b>	9/16"				
<b>12</b>	3/4"				
<b>16</b>	1"				
<b>F</b>	Female Thread	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Connection Type	
<b>M</b>	Male Thread				
<b>FM</b>	Female Thread Inlet / Male Thread Outlet				
<b>MF</b>	Male Thread Inlet / Female Thread Outlet				
<b>SW</b>	Socket Weld				
<b>BW</b>	Butt Weld				
<b>FMP</b>	Female Medium Pressure				
<b>NO LETTER</b>	(NPT, SW, BW, FMP)	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Thread Form	
<b>K6</b>	BSP Parallel				
<b>BSPT</b>	BSP Taper				
<b>SAE</b>	SAE Straight Thread				
<b>NO LETTER</b>	(Standard Inlet / Outlet)	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Option For Threaded Inlet / Outlet	
<b>PG</b>	Outlet Fitted With A Pressure Plug				
<b>NO LETTER</b>	(For 04F In, Out and Vent)	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Vent Connection	
<b>04F</b>	1/4" NPT				
<b>02</b>	UNS S31600 / S31603 Stainless Steel (Standard Material)	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Material	
<b>26</b>	F51 / UNS S31803 Duplex				
<b>38</b>	LF2 / Carbon Steel				
<b>39</b>	F55 / UNS S32760 Super Duplex				
<b>M</b>	Metal Ball	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Tip Style	
<b>MT</b>	Metal Tip				
<b>5</b>	5mm Bore	<b>04</b>	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Bore Size
		<b>06</b>			
		<b>08</b>			
		<b>09</b>			
<b>8</b>	8mm Bore	<b>12</b>	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Bore Size
		<b>16</b>			
<b>V</b>	Graphite / Viton Elastomer	-20°C to +180°C	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Seal Arrangement
<b>V9</b>	Graphite / V91A Elastomer	-45°C to +225°C			
<b>E9</b>	Graphite / E985 Elastomer	-46°C to +160°C			
<b>6K</b>	6,000 psi / 414 bar Maximum Cold Working Pressure	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Pressure Rating	
<b>10K</b>	10,000 psi / 690 bar Maximum Cold Working Pressure				
<b>NO LETTER</b>	Lockable T-Bar Isolate	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Options	
<b>LK</b>	Lockable T-Bar Isolate				
<b>AV</b>	Anti Tamper Vent				
<b>PV</b>	Plugged Vent				
<b>NT</b>	Gas Service / Nitrogen test *				
* Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.					
<b>FS</b>	Fire Safe	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Fire Safe	

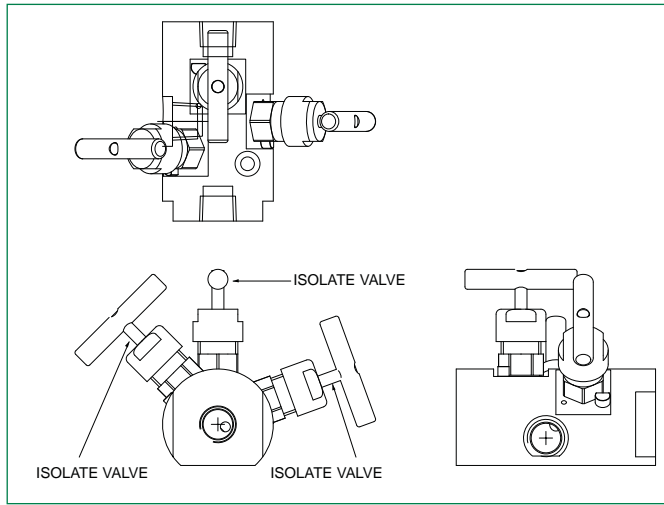
**NV0404 F 02 M 5 V 6K FS** → **NV0404F02M5V6KFS** Ordering Example

Other options may be available upon request. For more information, please contact Bifold Sales Department.

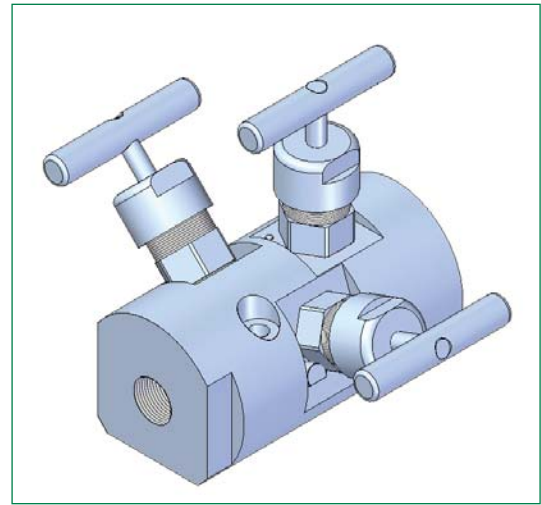
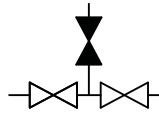


## NV05

### Typical GA Drawings



**SCHEMATIC**



### PREFERRED RANGE NV05 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	Double Block & Bleed Manifold, Needle - Needle configuration.
NV0504F02M5V6KFS	¼" NPT	6,000 psi / 414 bar	5mm	Full dimensions and additional details on request.  See selection table on page 19 for options
NV0504F02M5V10KFS	¼" NPT	10,000 psi / 690 bar	5mm	
NV0508F04F02M5V6KFS	½" NPT	6,000 psi / 414 bar	5mm	
NV0508F04F02M5V10KFS	½" NPT	10,000 psi / 690bar	5mm	

### Product Description

A 6,000 psi / 414 bar or 10,000 psi / 690 bar rated Double Block & Bleed Manifold. The angled bonnets allow for either panel or pipe mounting. The manifold design permits controlled venting of the instrument for calibration and or removal from the circuit, whilst leaving the process intact.

### Features and Benefits

- Robust one piece body construction.
- Anti-blow out stem.
- Non-rotating, anti-galling tip as standard.
- Viton / Graphite stem sealing.
- Metal to Metal seating.
- Back seating needle.
- Unique patented product compact in design to save space and weight.
- European patent granted EP2242943.
- Full material traceability and individual serial number stamped on the valve.
- Stem seal design prevents galling and contamination.
- Thread milled connections for improved sealing.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- Bubble tight shut-off.
- Anti Tamper T-Bar option.
- Pressure energised stem sealing.
- Metal to Metal body joint to prevent thread contamination.
- Fire Safe in Accordance with API 607, API 6FA, ISO 10497.

### Technical Data

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 19 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C. Inlet / Outlet connections can be threaded Male / Male, Male / Female, Female / Male, butt weld and socket weld.

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NV05

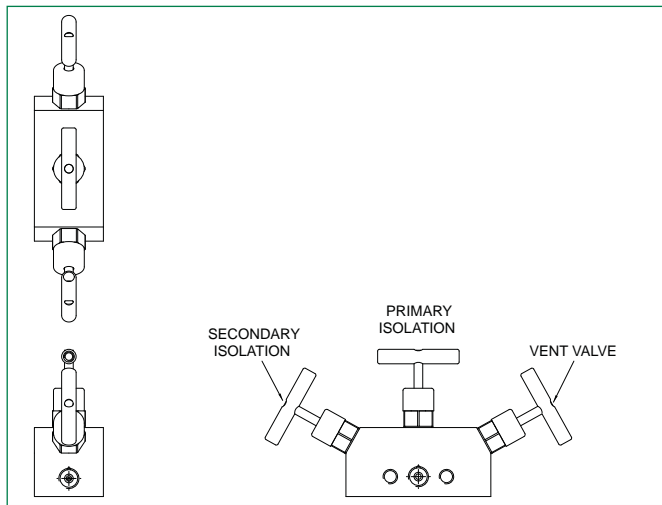
NV05 Selection Chart - Ordering Example

NV05 Double Block & Bleed Manifold		Model Code
04 06 08 09 12 16	1/4" 3/8" 1/2" 9/16" 3/4" 1"	Nominal Pipe Size
6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		
F M FM MF SW BW FMP	Female Thread Male Thread Female Thread Inlet / Male Thread Outlet Male Thread Inlet / Female Thread Outlet Socket Weld Butt Weld Female Medium Pressure	Connection Type
NO LETTER K6 BSPT SAE	(NPT, SW, BW, FMP) BSP Parallel BSP Taper SAE Straight Thread	Thread Form
NO LETTER PG	(Standard Inlet / Outlet) Outlet Fitted With A Pressure Plug	Option For Threaded Inlet / Outlet
NO LETTER 04F	(For 04F In, Out and Vent) 1/4" NPT	Vent Connection
02 26 38 39	UNS S31600 / S31603 Stainless Steel (Standard Material) F51 / UNS S31803 Duplex LF2 / Carbon Steel F55 / UNS S32760 Super Duplex	Material
M MT	Metal Ball Metal Tip	Tip Style
5 8	5mm Bore 8mm Bore	Bore Size
V V9 E9	Graphite / Viton Elastomer Graphite / V91A Elastomer Graphite / E985 Elastomer	Seal Arrangement
6K 10K	6,000 psi / 414 bar Maximum Cold Working Pressure 10,000 psi / 690 bar Maximum Cold Working Pressure	Pressure Rating
NO LETTER LK AV PV NT	Lockable T-Bar Isolate Anti Tamper Vent Plugged Vent Gas Service / Nitrogen test *	Options
* Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.		
FS	Fire Safe	Fire Safe
<b>NV0504 F 02 M 5 V 10K FS</b>	<b>NV0404F02M5V6KFS</b>	Ordering Example

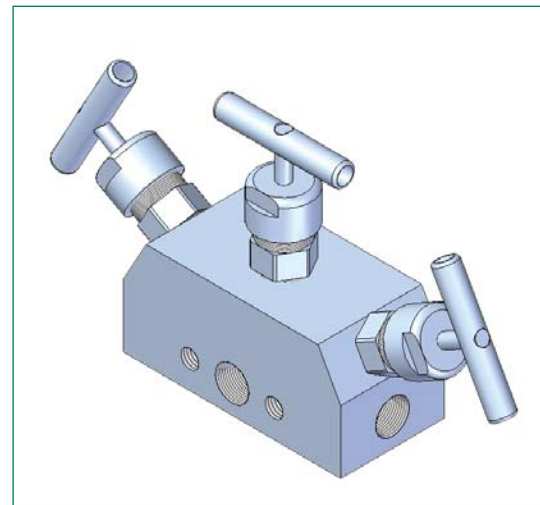
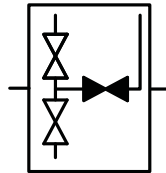
Other options may be available upon request. For more information, please contact Bifold Sales Department.

## NV06

### Typical GA Drawings



#### SCHEMATIC



### PREFERRED RANGE NV06 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	Double Block & Bleed Single Station Manifold, Needle - Needle - Needle configuration. Full dimensions and additional details on request. See selection table on page 21 for options
NV06 I04F02M5V6KFS	1/4" NPT	6,000 psi / 414 bar	5mm	
NV06 I04F02M5V10KFS	1/4" NPT	10,000 psi / 690 bar	5mm	

### Product Description

A 6,000 psi / 414 bar or 10,000 psi / 690 bar rated Double Block & Bleed Gauge / Instrument Compact Panel Mounted Manifold. The manifold design permits controlled venting of the instrument for calibration and or removal from the circuit, whilst leaving the process intact. This unique design allows direct inline connection to pipe systems, through 1/4" NPT connections, thus eliminating the requirement for addition 'T' and on elbow fittings.

### Features and Benefits

- Robust one piece body construction.
- Anti-blow out stem.
- Non-rotating, anti-galling tip as standard.
- Viton / Graphite stem sealing.
- Metal to Metal seating.
- Back seating needle.
- Unique patented product compact in design to save space and weight.
- European patent granted EP2225485.
- Full material traceability and individual serial number stamped on the valve.
- Stem seal design prevents galling and contamination.
- Thread milled connections for improved sealing.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- Bubble tight shut-off.
- Anti Tamper T-Bar option.
- Pressure energised stem sealing.
- Metal to Metal body joint to prevent thread contamination.
- Fire Safe in Accordance with API 607, API 6FA, ISO 10497.

### Technical Data

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 21 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C.

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NV06

NV06 Selection Chart - Ordering Example

<b>NV06 I</b>		Double Block & Bleed Single Station Manifold		Model Code
<b>04</b> <b>06</b>	$\frac{1}{4}$ " $\frac{3}{8}$ "			Nominal Pipe Size
<b>F</b> <b>FMP</b>	Female Thread Female Medium Pressure			Connection Type
<b>NO LETTER</b> <b>K6</b> <b>BSPT</b> <b>SAE</b>	(NPT, FMP) BSP Parallel BSP Taper SAE Straight Thread			Thread Form
<b>NO LETTER</b> <b>PG</b>	(Standard Inlet / Outlet) Outlet Fitted With A Pressure Plug			Option For Threaded Inlet / Outlet
<b>NO LETTER</b> <b>04F</b> <b>04FMP</b>	(For 04F In, Out and Vent) $\frac{1}{4}$ " NPT $\frac{1}{4}$ " Medium Pressure			Vent and Gauge Connection
<b>02</b> <b>26</b> <b>38</b> <b>39</b>	UNS S31600 / S31603 Stainless Steel (Standard Material) F51 / UNS S31803 Duplex LF2 / Carbon Steel F55 / UNS S32760 Super Duplex			Material
<b>M</b> <b>MT</b>	Metal Ball Metal Tip			Tip Style
<b>5</b>	5mm Bore			Bore Size
<b>V</b> <b>V9</b> <b>E9</b>	Graphite / Viton Elastomer Graphite / V91A Elastomer Graphite / E985 Elastomer	-20°C to +180°C -45°C to +225°C -46°C to +160°C	Seal Arrangement	
<b>6K</b> <b>10K</b>	6,000 psi / 414 bar Maximum Cold Working Pressure 10,000 psi / 690 bar Maximum Cold Working Pressure			Pressure Rating
<b>NO LETTER</b> <b>LK</b> <b>AV</b> <b>PV</b> <b>NT</b>	Lockable T-Bar Isolate Anti Tamper Vent Plugged Vent Gas Service / Nitrogen test *			Options
* Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.				
<b>FS</b>	Fire Safe			Fire Safe
<b>NV061 04 F 02 M 5 V 10K FS</b>				Ordering Example

Other options may be available upon request. For more information, please contact Bifold Sales Department.

Product Range

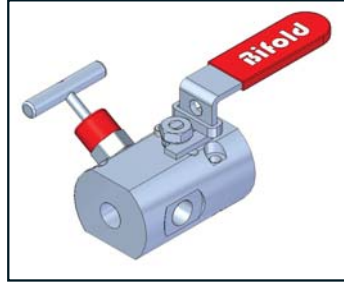


**BV02**



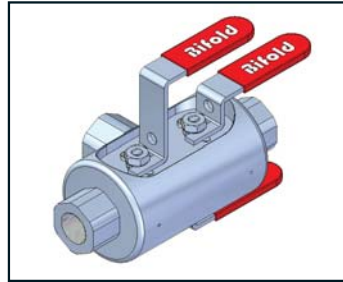
3-Way Diverting Ball Valve, T-Port & L-Port Versions Available.

**BV04**



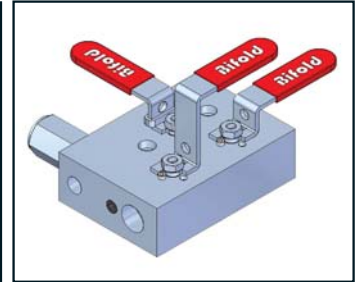
Block & Bleed, Ball - Needle Manifold.

**BV19**



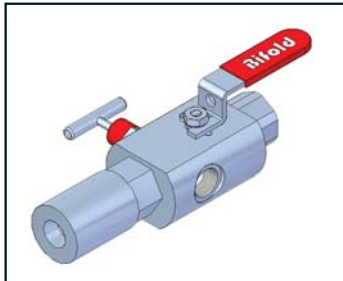
Double Block & Bleed, Ball - Ball - Ball Manifold.

**BV21**



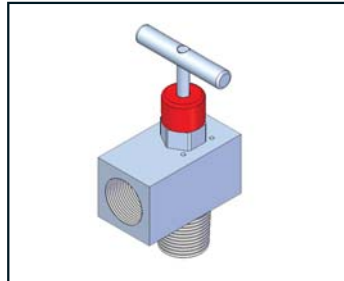
Accumulator Manifold with Pressure Relief.

**BV24**



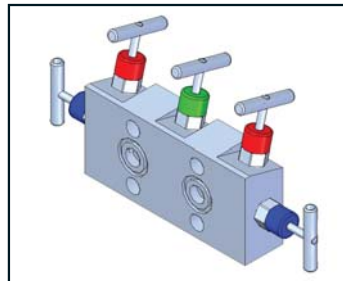
Block & Bleed with Integral Check Valve.

**NV02**



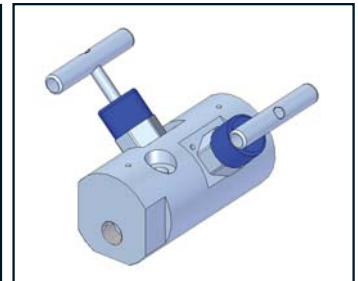
Single Isolate Angled Pattern Needle Valve.

**NV13**



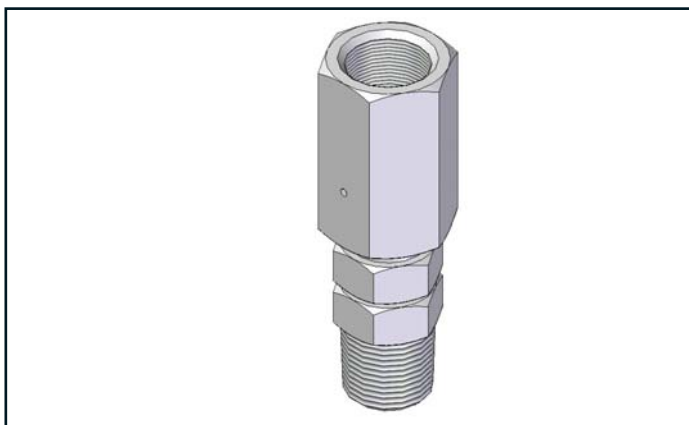
Manifold, Direct & Remote Mount (2, 3, 4 & 5 Valve Options Available).

**NV17**



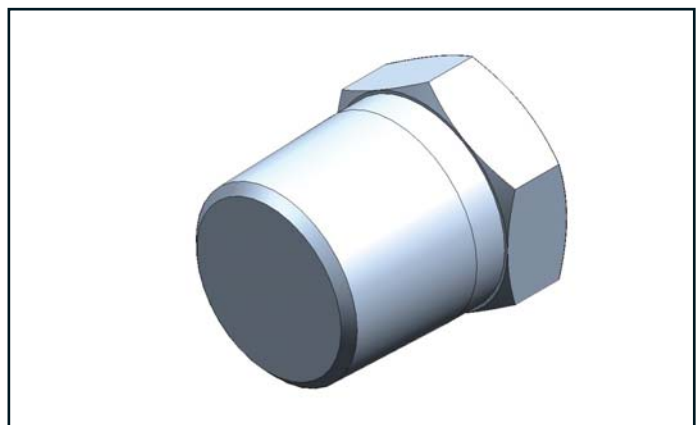
Block, Block, Needle - Needle, Manifold.

**GA01**



Gauge Adaptors.

**Blanking Plug**

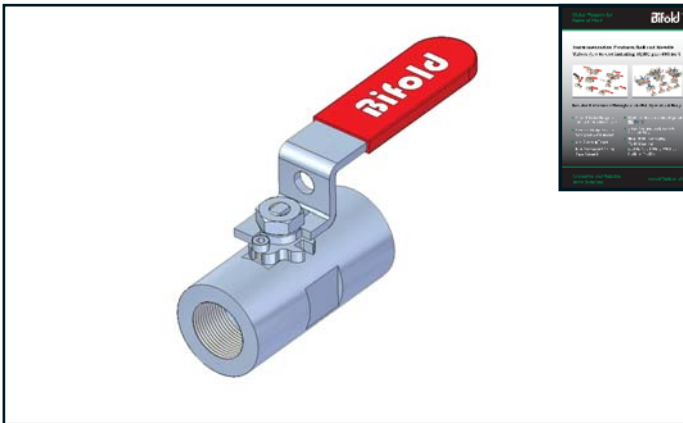


Blanking Plugs & Captive Venting Plugs.

Please contact Bifold sales department for further enquires on our extended product range.

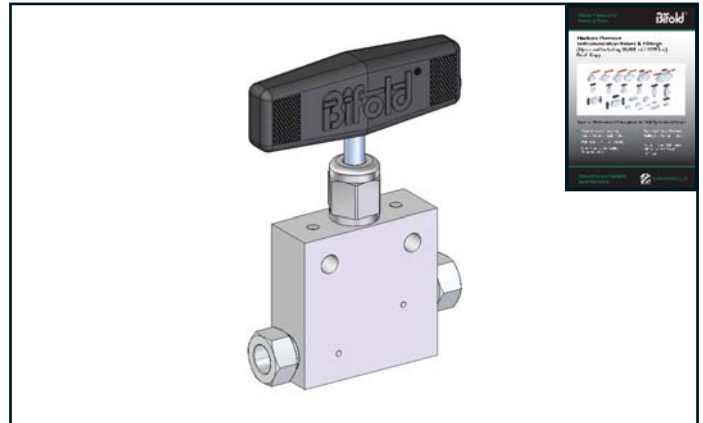
**Product Range**

**Non Fire Safe**



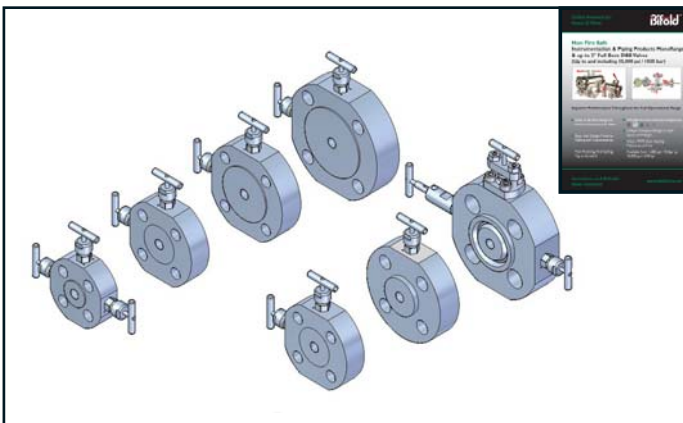
Please see the Ball and Needle Valve Non Fire Safe Catalogue for the full product range.

**Medium Pressure**



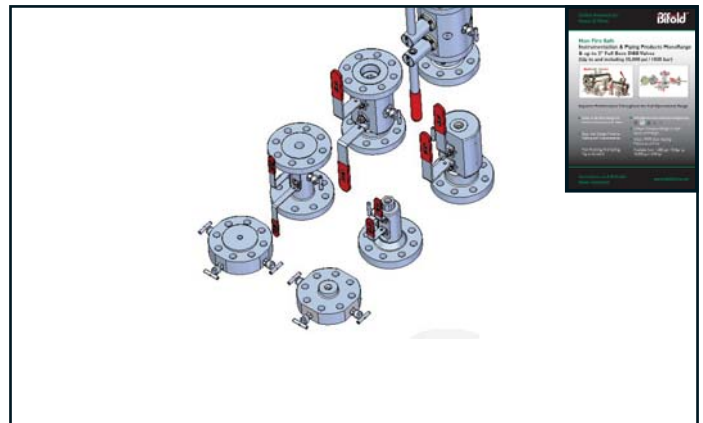
Please see the Medium Pressure Catalogue for the full product range.

**Monoflanges**



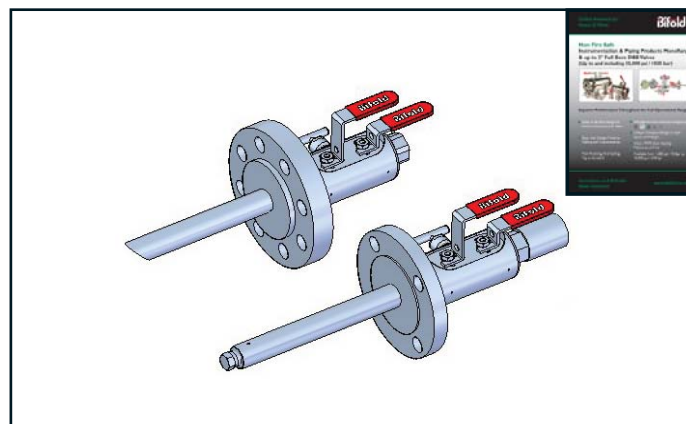
Please see the Instrumentation & Piping Catalogue for the full product range of monoflanges.

**Double Block & Bleed Valves**



Please see the Instrumentation & Piping Catalogue for the full product range of Double Block & Bleed Valves.

**Double Block & Bleed Injection / Sampling Valves**



Please see the Instrumentation & Piping Catalogue for the full product range of DBB Injection / Sampling Valves.



**Instrument, Process,  
Directional Control Valves,  
and Pumps**

**Bifold® Group**

**Pneumatic and  
Instrumentation Valves**

**Hydraulic Valves**

**Subsea Valves**

**Hydraulic Pumps,  
Intensifiers and Valves**

**Bifold®**

**Bifold FluidPower®**

**Bifold® Subsea**

**Bifold®  Marshalsea**

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**Singapore Office**  
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Email: [marketing@bifold.co.uk](mailto:marketing@bifold.co.uk)  
Web: [www.bifold.co.uk](http://www.bifold.co.uk)

**Innovative and Reliable  
Valve Solutions**



**[www.bifold.co.uk](http://www.bifold.co.uk)**

## **Instrumentation Ball and Needle Valves (Up to and including 10,000 psi / 690 bar)**



### **Superior Performance Throughout the Full Operational Range**

- State of the Art Design to Reduce Potential Leak Paths
- Stem Seal Design Prevents Galling and Contamination
- Low Operating Torque
- Non-Rotating, Anti-Galling Tip as Standard
- Worldwide Instrumentation Approvals  

- Unique Compact Design to Save Space and Weight
- Viton / RTFE Stem Sealing - Maintenance Free
- Available from 1,000 psi / 70 bar to 10,000 psi / 690 bar



Features & Benefits

Bifold has manufactured Ball and Needle Valve products for more than 20 years.

The product range has been designed to overcome the problems of traditional assemblies on primary isolation and venting duties.

Our Needle Valve range incorporates a dynamic sealing system along with a compact design. These valves can be direct mounted to the back plate of a panel and offer a lower torque to operate.

Our Ball Valve range is manufactured from a single piece body design and is supplied complete with an anti blow out stem and lower torque to operate.

Needle Valves



**Dynamic Sealing**

- Eliminates the loss of sealing integrity often experienced over the life time of traditional packing glands, reducing the risk of fugitive emissions.

**Compact Patented Design**

- Sleek light weight body with smaller envelope enabling closer mounting, ease of installation and a significant reduction in overall panel size and weight.

**Direct Mount to Back Plate**

- All needles and vents off the back plate enabling lower cost panel construction. No panel cut-outs or spacers required for vents and needle heads.

**Non-Wetted Parts**

- Needle head threads are clean from process fluid corrosion or contamination using a metal to metal bonnet seal and pre-thread stem seals.

**Lower Torque to Operate**

- No need to mount on a back plate to counteract torque.

There are design differences between the fire safe and non-fire safe products.

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## Features & Benefits

### Ball Valves



#### Single piece Body

- Reduces potential leak paths to the outside environment.

#### Anti Blow Out Stem

- The internally loaded and retained stem eliminates risk of injury to operators caused by potential stem blow outs.

#### Pressure Energised Stem Seal

- Combined with an anti-blow out stem, the internally loaded pressure energised stem seals, ensure sealing integrity is maintained regardless of outside influences / interferences such as removal of the handle.

#### Lower and Consistent Torque to Operate

- The unique design principles eliminate the effect of manufacturing variance, ensuring operating torques are both low and consistent throughout the batch.

#### Pressure Tested

- Pressure tested in accordance with API 598 & BS EN 12266-1. Proof tested to 1.5 times maximum working pressure.

#### Why Use Bifold?

- Innovatively progressed and optimised designs throughout our product range.
- Here at Bifold, we are constantly carrying out vigorous research and development on all of our products, ensuring that our valves represent the best of what we do.
- Our state of the art production facilities based in the UK, allow our superior and innovative designs of components to be manufactured on site, assembled to the finished product and tested to rigorous quality standards.
- There are design differences between the fire safe and non-fire safe products.



Product Portfolio



Needle Valves

The Needle Valve range is available as a one piece body construction with pressures ranging from 6,000 psi / 414 bar up to 10,000 psi / 690 bar and sizes 1/4" NPT to 1" NPT. Within the needle valve range, we also offer a medium pressure design ranging from 10,000 psi / 690 bar up to 20,000 psi / 1380 bar (See our Medium Pressure Catalogue).



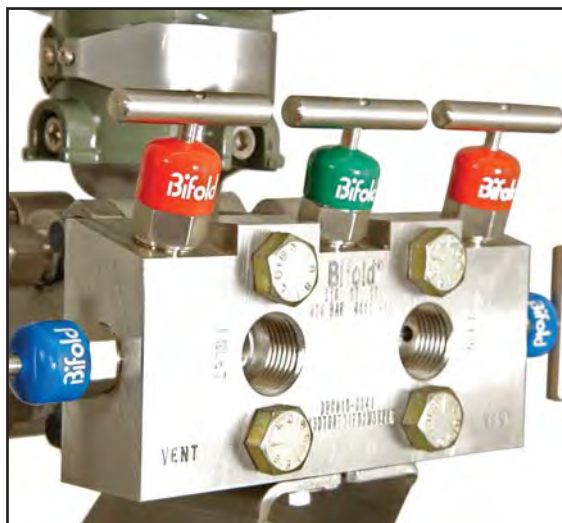
Ball Valves

The Bifold range of ball valves utilise a state of the art design to reduce potential leak paths with a standard pressure ranging from 1,000 psi / 70 bar up to 10,000 psi / 690 bar and sizes 1/4" NPT to 2" NPT. Within the ball valve range, we also offer a medium pressure design range from 10,000 psi / 690 bar up to 20,000 psi / 1380 bar (See our Medium Pressure Catalogue).



Manifolds

Suitable for shutting off the impulse lines and for mounting pressure and directional pressure instruments. These manifolds are for direct mounting onto pressure transmitters furnished with mounting interface in accordance with DIN 61518. The manifolds are supplied as standard with 1/2" NPT female threaded inlet and vent connections. (See our Manifold Catalogue).



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**Product Portfolio**

**State of the Art Machining Centres**

Bifold is enhanced by an in house lean and integrated manufacturing policy, alongside a unique business model, effectively reducing lead times and providing peace of mind to contractors, installers and end users for over a century. Our state of the art production facilities based in the UK, allow our superior and innovative designs of components to be manufactured on site, assembled to the finished product and tested to rigorous quality standards.

All Bifold valves have product traceability via unique serial number stamped on all valve bodies, linking them with their testing and component certificates, materials of construction together with full manufacturers record book (MRB).



**Installation Picture Using Our Ball And Needle Valves**



**Installation Picture Using Our Ball And Needle Valves**



**Bifold ISO9001 Product Certification and Specialist Testing Options Include**

- NACE MR-01-75 / ISO 15156 compliant materials as standard.
- Non destructive testing including LPI, MPI, PMI and Ferrite testing.
- Hydrostatic & Pneumatic testing.
- Nitrogen gas testing.
- Nitrogen / Helium leak detection.
- Low temperature testing.
- Fugitive Emission testing.
- HIC testing and other specialist material tests.


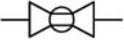



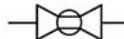
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**INSTRUMENTATION PRODUCTS - BALL VALVES (Up to and including 10,000 psi / 690 bar)**


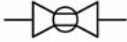

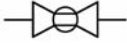

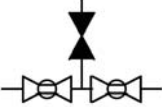


Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>BV01</b> Single Isolate Low Pressure Ball Type Reduced Bore</p>		12	<b>BV0104F025TT1K1K</b>	1/4" NPT, Single Isolate, Ball configuration 1,000 psi / 70 bar 5mm Bore Lockable Handle
			<b>BV0108F029.2TT1K1K</b>	1/2" NPT, Single Isolate, Ball configuration 1,000 psi / 70 bar 9.2mm Bore Lockable Handle
			<b>BV0112F0212.5TT1K1K</b>	3/4" NPT, Single Isolate, Ball configuration 1,000 psi / 70 bar 12.5mm Bore Lockable Handle
			<b>BV0116F0215TT1K1K</b>	1" NPT, Single Isolate, Ball configuration 1,000 psi / 70 bar 15mm Bore Lockable Handle
			<b>BV0132F0232TT1K1K</b>	2" NPT, Single Isolate, Ball configuration 1,000 psi / 70 bar 32mm Bore Lockable Handle
 <p><b>BV01</b> Single Isolate Low Pressure Ball Type Full Bore</p>		13	<b>BV0104F0211.5TT2K1K</b>	1/4" NPT, Single Isolate, Ball configuration 2,000 psi / 140 bar 11.5mm Bore Lockable Handle
			<b>BV0108F0215TT2K1K</b>	1/2" NPT, Single Isolate, Ball configuration 2,000 psi / 140 bar 15mm Bore Lockable Handle
			<b>BV0112F0220TT2K1K</b>	3/4" NPT, Single Isolate, Ball configuration 2,000 psi / 140 bar 20mm Bore Lockable Handle
			<b>BV0116F0225TT2K1K</b>	1" NPT, Single Isolate, Ball configuration 2,000 psi / 140 bar 25mm Bore Lockable Handle
			<b>BV0132F0250TT1K1K</b>	2" NPT, Single Isolate, Ball configuration 1,000 psi / 70 bar 50mm Bore Lockable Handle
 <p><b>BV01</b> Single Isolate Ball Type 5mm Bore</p>		14 / 15	<b>BV0104F025ERV6K</b>	1/4" NPT, Single Isolate, Ball configuration, 6,000 psi / 414 bar 5mm Bore / Hex Body
			<b>BV0104F025ERV10K</b>	1/4" NPT, Single Isolate, Ball configuration, 10,000 psi / 690 bar 5mm Bore / Hex Body
			<b>BV0106F025ERV6K</b>	3/8" NPT, Single Isolate, Ball configuration, 6,000 psi / 414 bar 5mm Bore / Hex Body
			<b>BV0106F025ERV10K</b>	3/8" NPT, Single Isolate, Ball configuration, 10,000 psi / 690 bar 5mm Bore / Hex Body

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Preferred Range

INSTRUMENTATION PRODUCTS - BALL & NEEDLE VALVES (Up to and including 10,000 psi / 690 bar)				
Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>BV01</b> Single Isolate Ball Type 5mm Bore Panel Mount</p>		16 / 17	<b>BV0104F025EV6KPM</b>	1/4" NPT, Single Isolate, Ball configuration, 6,000 psi / 414 bar 5mm Bore Panel Mount
			<b>BV0104F025EV10KPM</b>	1/4" NPT, Single Isolate, Ball configuration, 10,000 psi / 690 bar 5mm Bore Panel Mount
			<b>BV0106F025EV6KPM</b>	3/8" NPT, Single Isolate, Ball configuration, 6,000 psi / 414 bar 5mm Bore Panel Mount
			<b>BV0106F025EV10KPM</b>	3/8" NPT, Single Isolate, Ball configuration, 10,000 psi / 690 bar 5mm Bore Panel Mount
 <p><b>BV01</b> Single Isolate Ball Type 10mm Bore</p>		18 / 19	<b>BV0108F0210ERV6K</b>	1/2" NPT, Single Isolate, Ball configuration, 6,000 psi / 414 bar 10mm Bore
			<b>BV0108F0210ERV10K</b>	1/2" NPT, Single Isolate, Ball configuration, 10,000 psi / 690 bar 10mm Bore
 <p><b>BV05</b> Double Block &amp; Bleed Manifold / Hex Body</p>		20 / 21	<b>BV0504F02F025ERV6K</b>	1/4" NPT, DBB Manifold / Hex Body, Ball - Needle - Ball configuration, 6,000 psi / 414 bar 5mm Bore 1/8" Vent Bleed
			<b>BV0504F02F025ERV10K</b>	1/4" NPT, DBB Manifold / Hex Body, Ball - Needle - Ball configuration, 10,000 psi / 690 bar 5mm Bore 1/8" Vent Bleed
			<b>BV0506F02F025ERV6K</b>	3/8" NPT, DBB Manifold / Hex Body, Ball - Needle - Ball configuration, 6,000 psi / 414 bar 5mm Bore 1/8" Vent Bleed
			<b>BV0506F02F025ERV10K</b>	3/8" NPT, DBB Manifold / Hex Body, Ball - Needle - Ball configuration, 10,000 psi / 690 bar 5mm Bore 1/8" Vent Bleed
 <p><b>BV05</b> Double Block &amp; Bleed Manifold</p>		22 / 23	<b>BV0504F0210ERV6K</b>	1/4" NPT, DBB Manifold, Ball - Needle - Ball configuration, 6,000 psi / 414 bar 10mm Bore 1/4" Vent Bleed
			<b>BV0504F0210ERV10K</b>	1/4" NPT, DBB Manifold, Ball - Needle - Ball configuration, 10,000 psi / 690 bar 10mm Bore 1/4" Vent Bleed
			<b>BV0508F04F0210ERV6K</b>	1/2" NPT, DBB Manifold, Ball - Needle - Ball configuration, 6,000 psi / 414 bar 10mm Bore 1/4" Vent Bleed
			<b>BV0508F04F0210ERV10K</b>	1/2" NPT, DBB Manifold, Ball - Needle - Ball configuration, 10,000 psi / 690 bar 10mm Bore 1/4" Vent Bleed




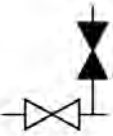
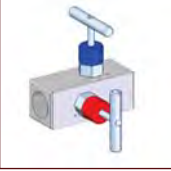
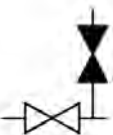



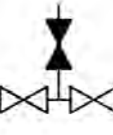
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Preferred Range

**INSTRUMENTATION PRODUCTS - NEEDLE VALVES (Up to and including 10,000 psi / 690 bar)**


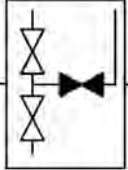

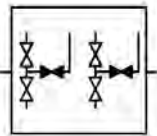

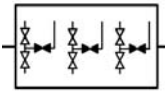
Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>NV01</b> Single Isolate</p>		24 / 25	NV0104F02M5V6K	1/4"NPT, Single Isolate, Needle configuration, 6,000 psi / 414 bar
			NV0104F02M5V10K	1/4"NPT, Single Isolate, Needle configuration, 10,000 psi / 690 bar
			NV0108F02M5V6K	1/2"NPT, Single Isolate, Needle configuration, 6,000 psi / 414 bar
			NV0108F02M5V10K	1/2"NPT, Single Isolate, Needle configuration, 10,000 psi / 690 bar
 <p><b>NV03</b> Block &amp; Bleed Manifold</p>		26 / 27	NV0304F02M5V6K	1/4"NPT, Block & Bleed Manifold, Needle - Captive Vent Plug configuration, 6,000 psi / 414 bar
			NV0304F02M5V10K	1/4"NPT, Block & Bleed Manifold, Needle - Captive Vent Plug configuration, 10,000 psi / 690 bar
			NV0308F02M5V6K	1/2"NPT, Block & Bleed Manifold, Needle - Captive Vent Plug configuration, 6,000 psi / 414 bar
			NV0308F02M5V10K	1/2"NPT, Block & Bleed Manifold, Needle - Captive Vent Plug configuration, 10,000 psi / 690 bar
 <p><b>NV22</b> Block &amp; Bleed Compact Manifold</p>		28 / 29	NV2204F02M3V6K	1/4"NPT, Compact Manifold, Needle - Needle configuration, 6,000 psi / 414 bar, 1/4"Vent Bleed
			NV2204F02M3V10K	1/4"NPT, Compact Manifold, Needle - Needle configuration, 10,000 psi / 690 bar, 1/4"Vent Bleed
			NV2208F04F02M3V6K	1/2"NPT, Compact Manifold, Needle - Needle configuration, 6,000 psi / 414 bar, 1/4"Vent Bleed
			NV2208F04F02M3V10K	1/2"NPT, Compact Manifold, Needle - Needle configuration, 10,000 psi / 690 bar, 1/4"Vent Bleed
 <p><b>NV04</b> Block &amp; Bleed Manifold</p>		30 / 31	NV0404F02M5V6K	1/4"NPT, Block & Bleed Manifold, Needle - Needle configuration, 6,000 psi / 414 bar, 1/4"Vent Bleed
			NV0404F02M5V10K	1/4"NPT, Block & Bleed Manifold, Needle - Needle configuration, 10,000 psi / 690 bar, 1/4"Vent Bleed
			NV0408F04F02M5V6K	1/2"NPT, Block & Bleed Manifold, Needle - Needle configuration, 6,000 psi / 414 bar, 1/4"Vent Bleed
			NV0408F04F02M5V10K	1/2"NPT, Block & Bleed Manifold, Needle - Needle configuration, 10,000 psi / 690 bar, 1/4"Vent Bleed
<b>THIS PRODUCT DESIGN IS UNIQUE TO BIFOLD AND PATENTED</b>				
 <p><b>NV05</b> Double Block &amp; Bleed Manifold</p>		32 / 33	NV0504F02M5V6K	1/4"NPT, DBB Manifold, Needle - Needle - Needle configuration, 6,000 psi / 414 bar, 1/4"Vent Bleed
			NV0504F02M5V10K	1/4"NPT, DBB Manifold, Needle - Needle - Needle configuration, 10,000 psi / 690 bar, 1/4"Vent Bleed
			NV0508F04F02M5V6K	1/2"NPT, DBB Manifold, Needle - Needle - Needle configuration, 6,000 psi / 414 bar, 1/4"Vent Bleed
			NV0508F04F02M5V10K	1/2"NPT, DBB Manifold, Needle - Needle - Needle configuration, 10,000 psi / 690 bar, 1/4"Vent Bleed
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Preferred Range

INSTRUMENTATION PRODUCTS - NEEDLE VALVES (Up to and including 10,000 psi / 690 bar)				
Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>NV06</b> Double Block &amp; Bleed Single Station Manifold</p>		34 / 35	NV06104F02M5V6K	1/4"NPT, DBB Single Station Manifold, Needle - Needle - Needle configuration, 6,000 psi / 414 bar
			NV06104F02M5V10K	1/4"NPT, DBB Single Station Manifold, Needle - Needle - Needle configuration, 10,000 psi / 690 bar
<b>THIS PRODUCT DESIGN IS UNIQUE TO BIFOLD AND PATENTED</b>				
 <p><b>NV06</b> Double Block &amp; Bleed Two Station Manifold</p>		36 / 37	NV06204F02M5V6K	1/4"NPT, DBB Two Station Manifold, Needle - Needle - Needle configuration, 6,000 psi / 414 bar
			NV06204F02M5V10K	1/4"NPT, DBB Two Station Manifold, Needle - Needle - Needle configuration, 10,000 psi / 690 bar
<b>THIS PRODUCT DESIGN IS UNIQUE TO BIFOLD AND PATENTED</b>				
 <p><b>NV06</b> Double Block &amp; Bleed Three Station Manifold</p>		38 / 39	NV06304F02M5V6K	1/4"NPT, DBB Three Station Manifold, Needle - Needle - Needle configuration, 6,000 psi / 414 bar
			NV06304F02M5V10K	1/4"NPT, DBB Three Station Manifold, Needle - Needle - Needle configuration, 10,000 psi / 690 bar
<b>THIS PRODUCT DESIGN IS UNIQUE TO BIFOLD AND PATENTED</b>				





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Needle Valves



[www.bifold.co.uk](http://www.bifold.co.uk)

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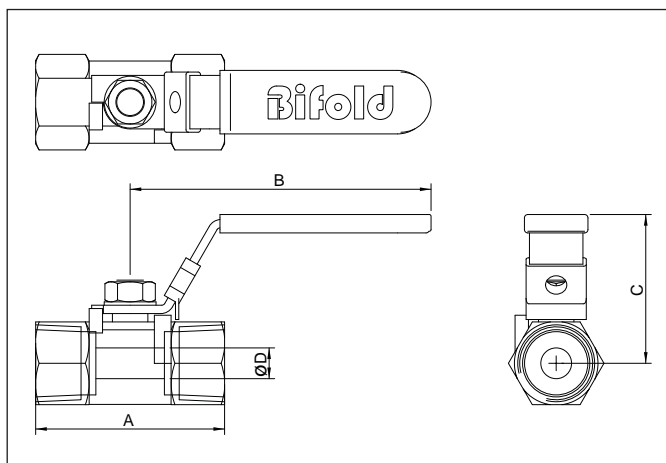
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of companies

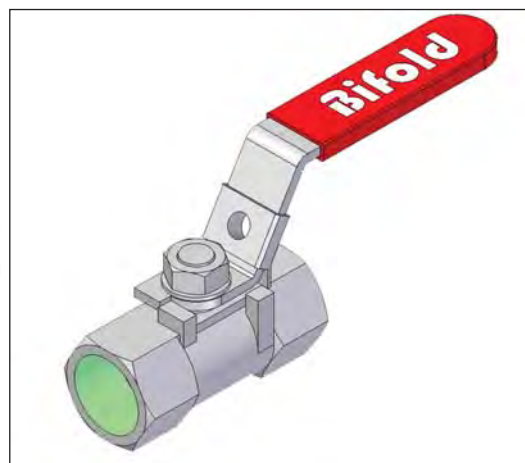


## BV01

### Typical GA Drawing



**SCHEMATIC**



### BV01 SELECTION TABLE

Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C' (mm)	Ø 'D' (mm)	Weight (Kg)
BV0104F025TTIKLK	1/4" NPT	1,000 psi / 70 bar	39mm	64mm	35mm	5mm	0.07
BV0108F029.2TTIKLK	1/2" NPT	1,000 psi / 70 bar	56.5mm	90mm	43.5mm	9.2mm	0.16
BV0112F0212.5TTIKLK	3/4" NPT	1,000 psi / 70 bar	58mm	90mm	47mm	12.5mm	0.25
BV0116F0215TTIKLK	1" NPT	1,000 psi / 70 bar	71mm	103mm	50mm	15mm	0.43
BV0132F0232TTIKLK	2" NPT	1,000 psi / 70 bar	100mm	127mm	74.5mm	32mm	1.50

### Product Description

A 1,000 psi / 70 bar rated Single Isolate Ball Valve, designed to give bubble tight shut off through 90° operation across the full operating temperature range. Totally enclosed soft seats offer both positive sealing and low operating torques.

### Features and Benefits

- Two piece construction reducing leak paths.
- Bi-directional.
- Precision machined stainless steel ball.
- PTFE seating to the ball.
- Tamperproof lockable handle as standard.
- Compact design to save space and weight.
- Bubble tight shut-off.

### Technical Data

Material grade - ASTM A351 CF8M stainless steel body as standard.  
 Operating temperature range -40°C to +200°C as standard.

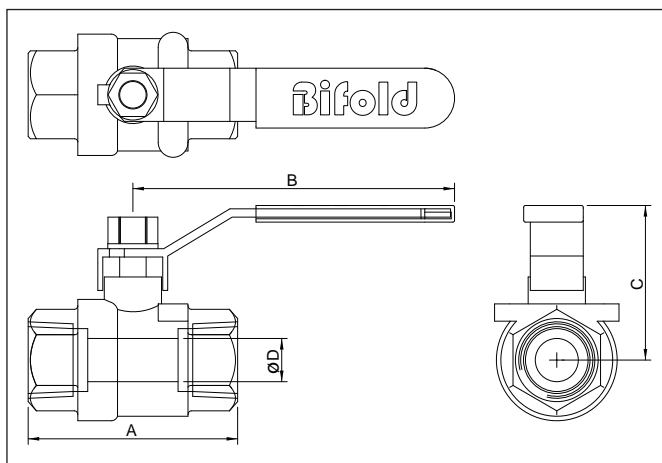
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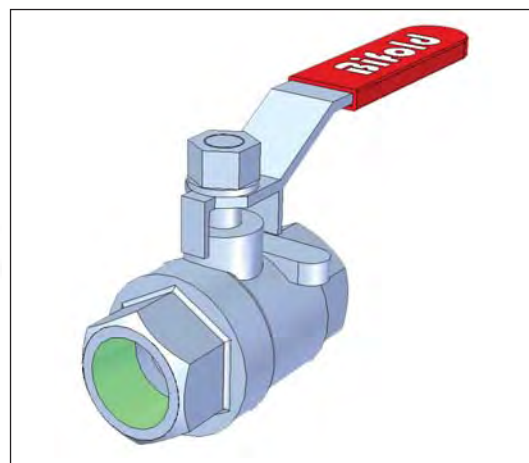
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**BV01**

**Typical GA Drawing**



SCHEMATIC



**BV01 SELECTION TABLE**

Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C' (mm)	Ø 'D' (mm)	Weight (Kg)
BV0104F0211.5TT2KCLK	1/4" NPT	2,000 psi / 140 bar	55mm	100mm	50mm	11.5mm	0.285
BV0108F0215TT2KCLK	1/2" NPT	2,000 psi / 140 bar	65mm	130mm	60mm	15mm	0.430
BV0112F0220TT2KCLK	3/4" NPT	2,000 psi / 140 bar	74mm	130mm	64mm	20mm	0.660
BV0116F0225TT2KCLK	1" NPT	2,000 psi / 140 bar	88mm	165mm	71mm	25mm	0.895
BV0132F0250TT1KCLK	2" NPT	1,000 psi / 70 bar	125mm	190mm	95mm	50mm	3.400

**Product Description**

A 1,000 psi / 70 bar or 2,000 psi / 140 bar rated Single Isolate Ball Valve, designed to give bubble tight shut off through 90° operation across the full operating temperature range. Totally enclosed soft seats offer both positive sealing and low operating torques.

**Features and Benefits**

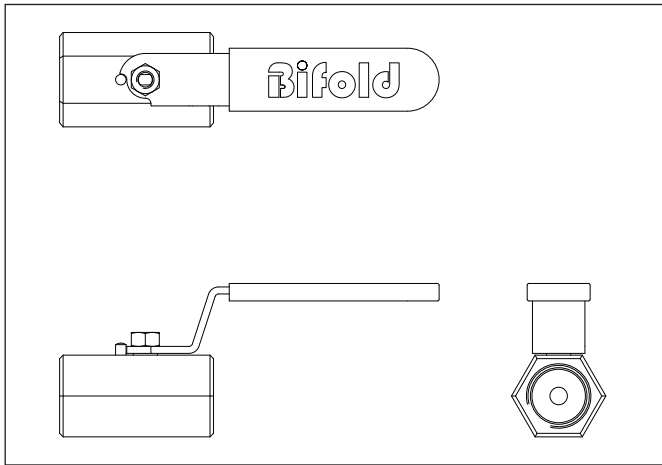
- Two piece construction reducing leak paths.
- Bi-directional.
- Precision machined stainless steel ball.
- PTFE seating to the ball.
- Tamperproof lockable handle as standard.
- Compact design to save space and weight.
- Bubble tight shut-off.

**Technical Data**

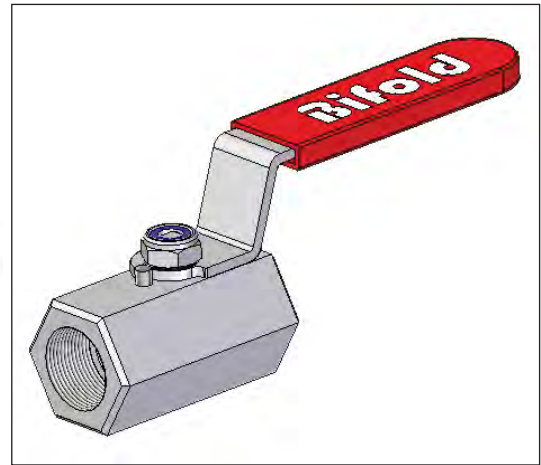
Material grade - ASTM A351 CF8M stainless steel body as standard.  
 Operating temperature range -40°C to +200°C as standard.

## BV01

### Typical GA Drawing



SCHEMATIC



### PREFERRED RANGE BV01 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	
BV0104F025ERV6K	1/4" NPT	6,000 psi / 414 bar	5mm	<p>Single Isolate Ball Configuration, 5mm Bore, Hex Body</p> <p>Full dimensions and additional details on request.</p> <p>See selection table on page 15 for options</p>
BV0104F025ERV10K	1/4" NPT	10,000 psi / 690 bar	5mm	
BV0106F025ERV6K	3/8" NPT	6,000 psi / 414 bar	5mm	
BV0106F025ERV10K	3/8" NPT	10,000 psi / 690 bar	5mm	

### Product Description

A Single Isolate Ball Valve with pressures rated up to 10,000 psi / 690 bar. The single isolating ball valve is designed to give bubble tight shut off through 90° operation across the full operating temperature range of the valve. Totally enclosed soft seats offer both positive sealing and low operating torques.

### Features and Benefits

- Two piece construction reducing leak paths.
- Anti-blow out stem internally loaded.
- Bi-directional.
- Precision machined stainless steel ball.
- Lever type handle as standard.
- Compact design to save space and weight.
- Full material traceability and individual serial number stamped on the valve.
- RTFE stem seals and o-ring body seals.
- Thread milled connections for improved sealing.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- Bubble tight shut-off.
- Low operating torque.
- Pressure energised stem sealing.

### Technical Data

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 15 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C. Inlet / Outlet connections can be threaded Male / Male, Male / Female, Female / Male, butt weld and socket weld.

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**BV01**

**BV01 Selection Chart - Ordering Example**

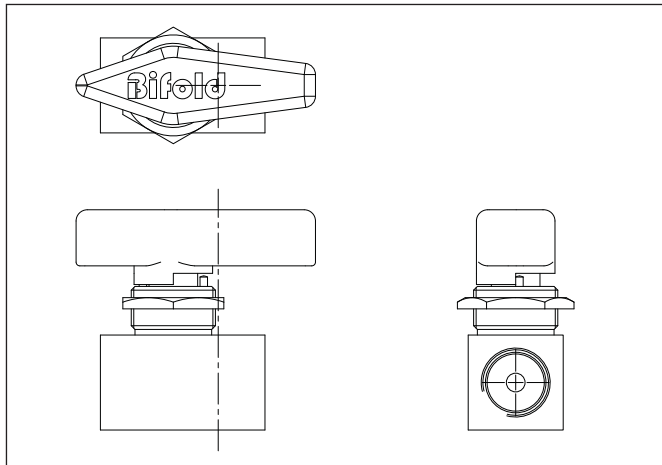
<b>BV01</b>		Single Isolation Ball Valve / Hex Body		Model Code
<b>04</b> <b>06</b>	1/4" 3/8"			Nominal Pipe Size
<b>F</b> <b>M</b> <b>FM</b> <b>MF</b> <b>SW</b> <b>BW</b> <b>FMP</b>	Female Thread Male Thread Female Thread Inlet / Male Thread Outlet Male Thread Inlet / Female Thread Outlet Socket Weld Butt Weld Female Medium Pressure			Connection Type
<b>NO LETTER</b> <b>K6</b> <b>BSPT</b> <b>SAE</b>	(NPT, SW, BW, FMP) BSP Parallel BSP Taper SAE Straight Thread			Thread Form
<b>NO LETTER</b> <b>PG</b>	(Standard Inlet / Outlet) Outlet Fitted With A Pressure Plug			Option For Threaded Inlet / Outlet
<b>02</b> <b>26</b> <b>38</b> <b>39</b>	UNS S31600 / S31603 Stainless Steel (Standard Material) F51 / UNS S31803 Duplex LF2 / Carbon Steel F55 / UNS S32760 Super Duplex			Material
<b>5</b>	5mm Bore			Bore Size
<b>T</b> <b>TG</b> <b>E</b> <b>TC</b>	PTFE Glass Filled PTFE PEEK Carbon Filled PEEK	1,000 psi Maximum Cold Working Pressure 6,000 psi Maximum Cold Working Pressure 10,000 psi Maximum Cold Working Pressure 10,000 psi Maximum Cold Working Pressure		Seat Material
<b>RV</b> <b>RV9</b> <b>RE9</b>	RTFE / Viton Elastomer RTFE / V91A Elastomer RTFE / E985 Elastomer	-20°C to +180°C -45°C to +225°C -46°C to +160°C		Seal Arrangement Stem and Body
<b>1K</b> <b>3K</b> <b>6K</b> <b>10K</b>	1,000 psi / 70 bar Maximum Cold Working Pressure 3,000 psi / 207 bar Maximum Cold Working Pressure 6,000 psi / 414 bar Maximum Cold Working Pressure 10,000 psi / 690 bar Maximum Cold Working Pressure Note: Higher pressures available within the medium pressure range (see separate catalogue).			Pressure Rating
<b>NO LETTER</b> <b>NT</b>	(No Options required) Gas Service / Nitrogen test * * Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.			Options

**BV01 04 F 02 5 E RV 10K BV0104F025ERV10K** Ordering Example

Other options may be available upon request. For more information, please contact Bifold Sales Department.

## BV01

### Typical GA Drawing



**SCHEMATIC**



### PREFERRED RANGE BV01 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	
BV0104F025EV6KPM	1/4" NPT	6,000 psi / 414 bar	5mm	<p><b>Single Isolate Ball Configuration, 5mm Bore, Panel Mount.</b></p> <p><b>Full dimensions and additional details on request.</b></p> <p><b>See selection table on page 17 for options</b></p>
BV0104F025EV10KPM	1/4" NPT	10,000 psi / 690 bar	5mm	
BV0106F025EV6KPM	3/8" NPT	6,000 psi / 414 bar	5mm	
BV0106F025EV10KPM	3/8" NPT	10,000 psi / 690 bar	5mm	

### Product Description

A Single Isolate Ball Valve with pressures rated up to 10,000 psi / 690 bar. The single isolating ball valve is designed to give bubble tight shut off through 90° operation across the full operating temperature range of the valve. Totally enclosed soft seats offer both positive sealing and low operating torques.

### Features and Benefits

- Two piece construction reducing leak paths.
- Bi-directional.
- Precision machined stainless steel ball.
- Pointer type handle as standard.
- Compact design to save space and weight.
- Full material traceability and individual serial number stamped on the valve.
- O-ring stem and body seals.
- Thread milled connections for improved sealing.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- Bubble tight shut-off.
- Low operating torque.
- Panel mount as standard.

### Technical Data

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 17 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C. Inlet / Outlet connections can be threaded Male / Male, Male / Female, Female / Male, butt weld and socket weld.

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**BV01**

**BV01 Selection Chart - Ordering Example**

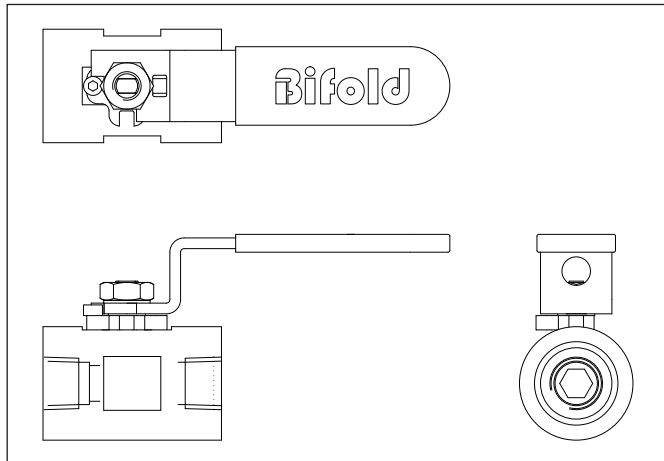
<b>BV01</b>		Single Isolation Ball Valve Panel Mount		Model Code
<b>04</b> <b>06</b>	1/4" 3/8"			Nominal Pipe Size
<b>F</b> <b>M</b> <b>FM</b> <b>MF</b> <b>SW</b> <b>BW</b> <b>FMP</b>	Female Thread Male Thread Female Thread Inlet / Male Thread Outlet Male Thread Inlet / Female Thread Outlet Socket Weld Butt Weld Female Medium Pressure			Connection Type
<b>NO LETTER</b> <b>K6</b> <b>BSPT</b> <b>SAE</b>	(NPT, SW, BW, FMP) BSP Parallel BSP Taper SAE Straight Thread			Thread Form
<b>NO LETTER</b> <b>PG</b>	(Standard Inlet / Outlet) Outlet Fitted With A Pressure Plug			Option For Threaded Inlet / Outlet
<b>02</b> <b>26</b> <b>38</b> <b>39</b>	UNS S31600 / S31603 Stainless Steel (Standard Material) F51 / UNS S31803 Duplex LF2 / Carbon Steel F55 / UNS S32760 Super Duplex			Material
<b>5</b>	5mm Bore			Bore Size
<b>T</b> <b>TG</b> <b>E</b> <b>TC</b>	PTFE Glass Filled PTFE PEEK Carbon Filled PEEK	1,000 psi Maximum Cold Working Pressure 6,000 psi Maximum Cold Working Pressure 10,000 psi Maximum Cold Working Pressure 10,000 psi Maximum Cold Working Pressure		Seat Material
<b>V</b> <b>V9</b> <b>E9</b>	Viton Elastomer V91A Elastomer E985 Elastomer	-20°C to +180°C -45°C to +225°C -46°C to +160°C		Seal Arrangement Stem and Body
<b>1K</b> <b>3K</b> <b>6K</b> <b>10K</b>	1,000 psi / 70 bar Maximum Cold Working Pressure 3,000 psi / 207 bar Maximum Cold Working Pressure 6,000 psi / 414 bar Maximum Cold Working Pressure 10,000 psi / 690 bar Maximum Cold Working Pressure Note: Higher pressures available within the medium pressure range (see separate catalogue).			Pressure Rating
<b>PM</b> <b>NT</b>	Panel Mount as Standard Gas Service / Nitrogen test * * Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.			Options
<b>BV01 04 F</b>	<b>02 5 E V</b>	<b>10K PM</b>	<b>BV0104F025EV10KPM</b>	Ordering Example

Other options may be available upon request. For more information, please contact Bifold Sales Department.

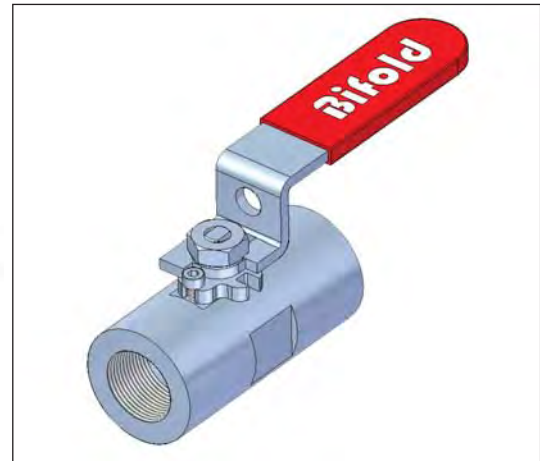


**BV01**

**Typical GA Drawing**



**SCHEMATIC**



**PREFERRED RANGE BV01 SELECTION TABLE**

Product Code	Size	Rated	'A' (mm)	Single Isolate, Ball Configuration. Full dimensions and additional details on request. See selection table on page 19 for options.
BV0108F0210ERV6K	1/2" NPT	6,000 psi / 414 bar	10mm	
BV0108F0210ERV10K	1/2" NPT	10,000 psi / 690 bar	10mm	

**Product Description**

A Single Isolate Ball Valve with pressures rated up to 10,000 psi / 690 bar. The single isolating ball valve is designed to give bubble tight shut off through 90° operation across the full operating temperature range of the valve. Totally enclosed soft seats offer both positive sealing and low operating torques.

**Features and Benefits**

- Two piece construction reducing leak paths.
- Anti-blow out stem internally loaded.
- Bi-directional.
- Precision machined stainless steel ball.
- Lever type handle as standard.
- Tamperproof lockable handle (Option available).
- Compact design to save space and weight.
- Full material traceability and individual serial number stamped on the valve.
- RTFE stem seals and O-Ring body seals
- Thread milled connections for improved sealing.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- Bubble tight shut-off.
- Low operating torque.
- Pressure energised stem sealing.
- Seal integrity maintained if handle is removed.

**Technical Data**

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 19 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C. Inlet / Outlet connections can be threaded Male / Male, Male / Female, Female / Male, butt weld and socket weld.

**Accuracy of information**  
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**Quality Assurance**  
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**BV01**

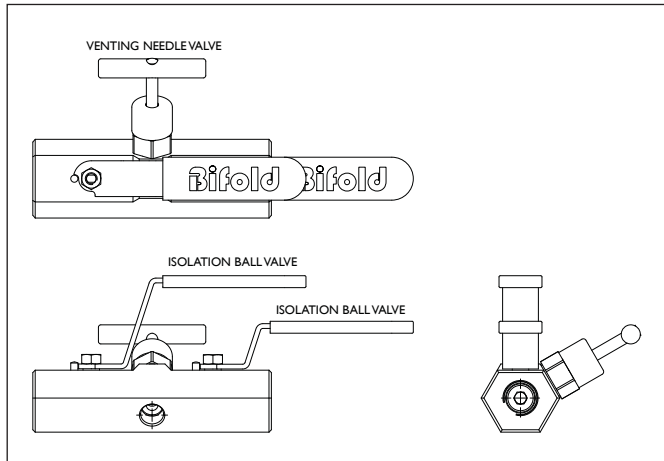
**BV01 Selection Chart - Ordering Example**

BV01		Single Isolation Ball Valve		Model Code
04	1/4"	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Nominal Pipe Size
06	3/8"			
08	1/2"			
09	9/16"			
12	3/4"			
16	1"			
<b>F</b>	Female Thread			Connection Type
<b>M</b>	Male Thread			
<b>FM</b>	Female Thread Inlet / Male Thread Outlet			
<b>MF</b>	Male Thread Inlet / Female Thread Outlet			
<b>SW</b>	Socket Weld			
<b>BW</b>	Butt Weld			
<b>FMP</b>	Female Medium Pressure			
<b>NO LETTER</b>	(NPT, SW, BW, FMP)			Thread Form
<b>K6</b>	BSP Parallel			
<b>BSPT</b>	BSP Taper			
<b>SAE</b>	SAE Straight Thread			
<b>NO LETTER</b>	(Standard Inlet / Outlet)			Option For Threaded Inlet / Outlet
<b>PG</b>	Outlet Fitted With A Pressure Plug			
<b>02</b>	UNS S31600 / S31603 Stainless Steel (Standard Material)			Material
<b>26</b>	F51 / UNS S31803 Duplex			
<b>38</b>	LF2 / Carbon Steel			
<b>39</b>	F55 / UNS S32760 Super Duplex			
<b>10</b>	10mm Bore	<b>04</b> <b>06</b> <b>08</b> <b>09</b> <b>12</b>	Bore Size	
<b>20</b>	20mm Bore	<b>12</b> <b>16</b>		
<b>T</b>	PTFE	1,000 psi Maximum Cold Working Pressure	Seat Material	
<b>TG</b>	Glass Filled PTFE	6,000 psi Maximum Cold Working Pressure		
<b>CG</b>	Carbon Graphite	6,000 psi Maximum Cold Working Pressure		
<b>E</b>	PEEK	10,000 psi Maximum Cold Working Pressure		
<b>TC</b>	Carbon Filled PEEK	10,000 psi Maximum Cold Working Pressure		
<b>H</b>	RTFE	-100°C to +225°C	Seal Arrangement Stem and Body	
<b>RV</b>	RTFE / Viton Elastomer	-20°C to +180°C		
<b>RV9</b>	RTFE / V91A Elastomer	-45°C to +225°C		
<b>RE9</b>	RTFE / E985 Elastomer	-46°C to +160°C		
<b>1K</b>	1,000 psi / 70 bar Maximum Cold Working Pressure	Pressure Rating		
<b>3K</b>	3,000 psi / 207 bar Maximum Cold Working Pressure			
<b>6K</b>	6,000 psi / 414 bar Maximum Cold Working Pressure			
<b>10K</b>	10,000 psi / 690 bar Maximum Cold Working Pressure			
Note: Higher pressures available within the medium pressure range (see separate catalogue).				
<b>NO LETTER</b>	Lockable Handle	Options		
<b>LK</b>	Panel Mount			
<b>PM</b>	Pointer Paddle Handle			
<b>PH</b>	Gas Service / Nitrogen test *			
<b>NT</b>				
* Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.				
<b>BV01 08 F</b>	<b>02 10 E RV 10K</b>	<b>BV0108F0210ERV10K</b>	Ordering Example	

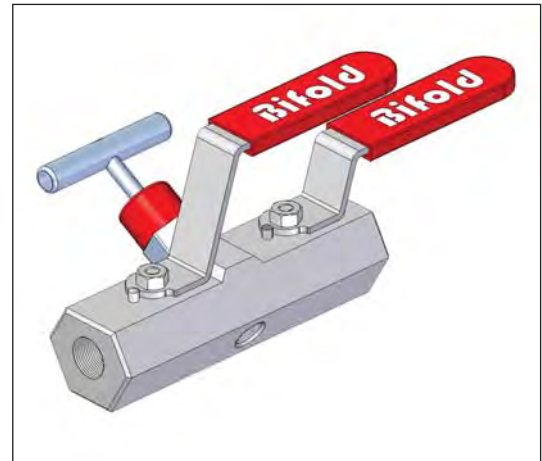
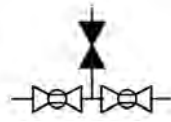
Other options may be available upon request. For more information, please contact Bifold Sales Department.

**BV05**

**Typical GA Drawing**



**SCHEMATIC**



**PREFERRED RANGE BV05 SELECTION TABLE**

Product Code	Size	Rated	Bore (mm)	
BV0504F02F025ERV6K	1/4" NPT	6,000 psi / 414 bar	5mm	<p><b>Double Block &amp; Bleed Manifold, Ball - Needle - Ball configuration. 5mm Bore / Hex Body</b></p> <p>Full dimensions and additional details on request.</p> <p>See selection table on page 21 for options.</p>
BV0504F02F025ERV10K	1/4" NPT	10,000 psi / 690 bar	5mm	
BV0506F02F025ERV6K	3/8" NPT	6,000 psi / 414 bar	5mm	
BV0506F02F025ERV10K	3/8" NPT	10,000 psi / 690 bar	5mm	

**Product Description**

A Double Block & Bleed Ball-Needle-Ball Valve Manifold with pressures rated up to 10,000 psi / 690 bar. Manufactured from forged barstock, the two inline balls are the primary and secondary isolating valves with a needle type valve for the vent facility. The ball valve is designed to give bubble tight shut off through a 90° operation across the full operating temperature range of the valve.

**Features and Benefits**

- Anti-blow out stem internally loaded.
- Bi-directional.
- Precision machined stainless steel balls.
- Lever type handles as standard.
- Tamperproof lockable handle is available on the vent. (Option available).
- Compact design to save space and weight.
- Full material traceability and individual serial number stamped on the valve.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- RTFE stem seal and O-Ring body seals.
- Stem seal design prevents galling and contamination.
- Panel mount as standard.
- Thread milled connections for improved sealing.
- Bubble tight shut-off.
- Low operating torque.
- Pressure energised stem sealing.

**Technical Data**

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 21 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C. Inlet / Outlet connections can be threaded Male / Male, Male / Female, Female / Male, butt weld and socket weld.

**Accuracy of information**  
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**BV05**

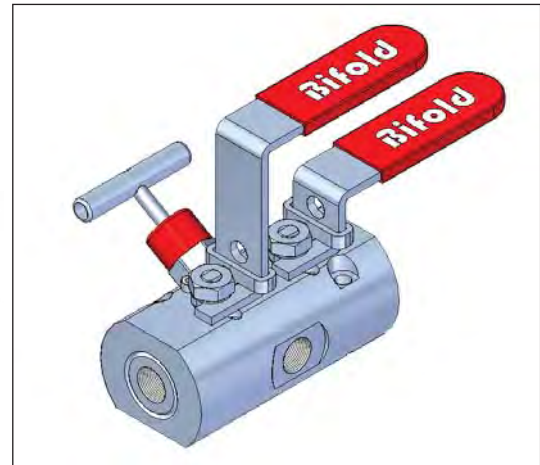
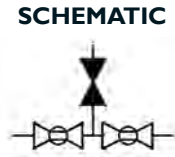
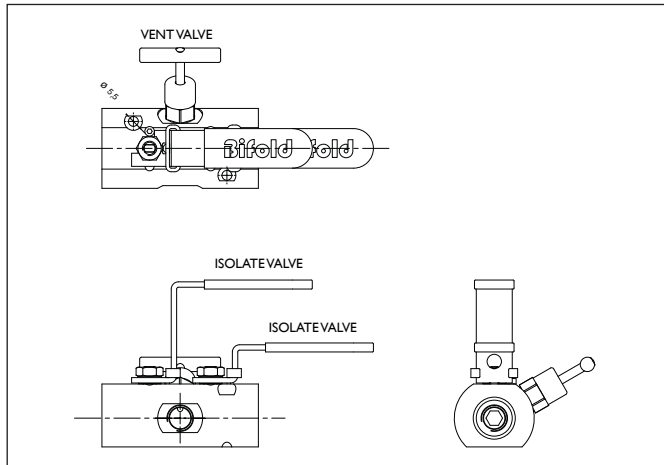
**BV05 Selection Chart - Ordering Example**

BV05		Double Block & Bleed Manifold / Hex Body		Model Code
<b>04</b> <b>06</b>	1/4" 3/8"			Nominal Pipe Size
<b>F</b> <b>M</b> <b>FM</b> <b>MF</b> <b>SW</b> <b>BW</b> <b>FMP</b>	Female Thread Male Thread Female Thread Inlet / Male Thread Outlet Male Thread Inlet / Female Thread Outlet Socket Weld Butt Weld Female Medium Pressure			Connection Type
<b>NO LETTER</b> <b>K6</b> <b>BSPT</b> <b>SAE</b>	(NPT, SW, BW, FMP) BSP Parallel BSP Taper SAE Straight Thread			Thread Form
<b>NO LETTER</b> <b>PG</b>	(Standard Inlet / Outlet) Outlet Fitted With A Pressure Plug			Option For Threaded Inlet / Outlet
<b>02F</b>	1/8" NPT			Vent Connection
<b>02</b> <b>26</b> <b>38</b> <b>39</b>	UNS S31600 / S31603 Stainless Steel (Standard Material) F51 / UNS S31803 Duplex LF2 / Carbon Steel F55 / UNS S32760 Super Duplex			Material
<b>5</b>	5mm Bore			Bore Size
<b>T</b> <b>TG</b> <b>E</b> <b>P</b> <b>TC</b>	PTFE Glass Filled PTFE PEEK PPS Carbon Filled PEEK	1,000 psi Maximum Cold Working Pressure 6,000 psi Maximum Cold Working Pressure 10,000 psi Maximum Cold Working Pressure 10,000 psi Maximum Cold Working Pressure 10,000 psi Maximum Cold Working Pressure	Seat Material	
<b>RV</b> <b>RV9</b> <b>RE9</b>	RTFE / Viton Elastomer RTFE / V91A Elastomer RTFE / E98E Elastomer			Seal Arrangement
<b>1K</b> <b>3K</b> <b>6K</b> <b>10K</b>	1,000 psi / 70 bar Maximum Cold Working Pressure 3,000 psi / 207 bar Maximum Cold Working Pressure 6,000 psi / 414 bar Maximum Cold Working Pressure 10,000 psi / 690 bar Maximum Cold Working Pressure Note: Higher pressures available within the medium pressure range (see separate catalogue).			Pressure Rating
<b>NO LETTER</b> <b>AV</b> <b>PV</b> <b>NT</b>	Anti Tamper Vent Plugged Vent Gas Service / Nitrogen test * * Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.			Options
<b>BV05 04 F</b>	<b>02F 02 5 E RV 10K</b>	<b>BV0504F02F025ERV10K</b>		Ordering Example

Other options may be available upon request. For more information, please contact Bifold Sales Department.

**BV05**

**Typical GA Drawing**



**PREFERRED RANGE BV05 SELECTION TABLE**

Product Code	Size	Rated	Bore (mm)
BV0504F0210ERV6K	1/4" NPT	6,000 psi / 414 bar	10mm
BV0504F0210ERV10K	1/4" NPT	10,000 psi / 690 bar	10mm
BV0508F04F0210ERV6K	1/2" NPT	6,000 psi / 414 bar	10mm
BV0508F04F0210ERV10K	1/2" NPT	10,000 psi / 690 bar	10mm

**Double Block & Bleed Manifold, Ball - Needle - Ball configuration.**

**Full dimensions and additional details on request.**

**See selection table on page 23 for options.**

**Product Description**

A Double Block & Bleed Ball-Needle-Ball Valve Manifold with pressures rated up to 10,000 psi / 690 bar. Manufactured from forged barstock, the two inline balls provide unrestricted flow with a roddable facility, and are the primary and secondary isolating valves with a needle type valve for the vent facility. The ball valve is designed to give bubble tight shut off through a 90° operation across the full operating temperature range of the valve.

**Features and Benefits**

- Anti-blow out stem internally loaded.
- Bi-directional.
- Precision machined stainless steel balls.
- Lever type handles as standard.
- Tamperproof lockable handle is available on both isolates and vents. (Option available).
- Compact design to save space and weight.
- Full material traceability and individual serial number stamped on the valve.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- RTFE stem seal and O-Ring body seals.
- Stem seal design prevents galling and contamination.
- Panel mount as standard.
- Thread milled connections for improved sealing.
- Bubble tight shut-off.
- Low operating torque.
- Pressure energised stem sealing.

**Technical Data**

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 23 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C. Inlet / Outlet connections can be threaded Male / Male, Male / Female, Female / Male, butt weld and socket weld.

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**BV05**

**BV05 Selection Chart - Ordering Example**

BV05		Double Block & Bleed Manifold		Model Code
04	1/4"	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)	Nominal Pipe Size
06	3/8"			
08	1/2"			
09	9/16"			
12	3/4"			
16	1"			
<b>F</b>	Female Thread			Connection Type
<b>M</b>	Male Thread			
<b>FM</b>	Female Thread Inlet / Male Thread Outlet			
<b>MF</b>	Male Thread Inlet / Female Thread Outlet			
<b>SW</b>	Socket Weld			
<b>BW</b>	Butt Weld			
<b>FMP</b>	Female Medium Pressure			
<b>NO LETTER</b>	(NPT, SW, BW, FMP)			Thread Form
<b>K6</b>	BSP Parallel			
<b>BSPT</b>	BSP Taper			
<b>SAE</b>	SAE Straight Thread			
<b>NO LETTER</b>	(Standard Inlet / Outlet)			Option For Threaded Inlet / Outlet
<b>PG</b>	Outlet Fitted With A Pressure Plug			
<b>NO LETTER</b>	(For 04F In, Out and Vent)			Vent Connection
<b>04F</b>	1/4" NPT			
<b>08F</b>	1/2" NPT			
<b>02</b>	UNS S31600 / S31603 Stainless Steel (Standard Material)			Material
<b>26</b>	F51 / UNS S31803 Duplex			
<b>38</b>	LF2 / Carbon Steel			
<b>39</b>	F55 / UNS S32760 Super Duplex			
<b>10</b>	10mm Bore	<b>04</b>	Bore Size	
		<b>06</b>		
		<b>08</b>		
		<b>12</b>		
<b>20</b>	20mm Bore	<b>12</b>	Bore Size	
		<b>16</b>		
<b>T</b>	PTFE	1,000 psi Maximum Cold Working Pressure	Seat Material	
<b>TG</b>	Glass Filled PTFE	6,000 psi Maximum Cold Working Pressure		
<b>CG</b>	Carbon Graphite	6,000 psi Maximum Cold Working Pressure		
<b>E</b>	PEEK	10,000 psi Maximum Cold Working Pressure		
<b>P</b>	PPS	10,000 psi Maximum Cold Working Pressure		
<b>TC</b>	Carbon Filled PEEK	10,000 psi Maximum Cold Working Pressure		
<b>RV</b>	RTFE / Viton Elastomer	-20°C to +180°C	Seal Arrangement	
<b>RV9</b>	RTFE / V91A Elastomer	-45°C to +225°C		
<b>RE9</b>	RTFE / E985 Elastomer	-46°C to +160°C		
<b>1K</b>	1,000 psi / 70 bar Maximum Cold Working Pressure	Pressure Rating		
<b>3K</b>	3,000 psi / 207 bar Maximum Cold Working Pressure			
<b>6K</b>	6,000 psi / 414 bar Maximum Cold Working Pressure			
<b>10K</b>	10,000 psi / 690 bar Maximum Cold Working Pressure			
Note: Higher pressures available within the medium pressure range (see separate catalogue).				
<b>NO LETTER</b>	Lockable Handle	Options		
<b>LK</b>	Lockable Handle			
<b>AV</b>	Anti Tamper Vent			
<b>PV</b>	Plugged Vent			
<b>PH</b>	Pointer Paddle Handle			
<b>NT</b>	Gas Service / Nitrogen test *			
* Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.				

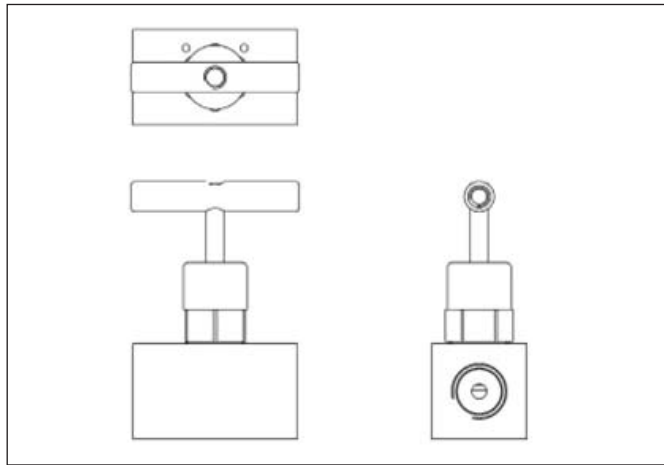
**BV05 04 F 02 10 E RV 10K BV0504F0210ERV10K** Ordering Example

Other options may be available upon request. For more information, please contact Bifold Sales Department.

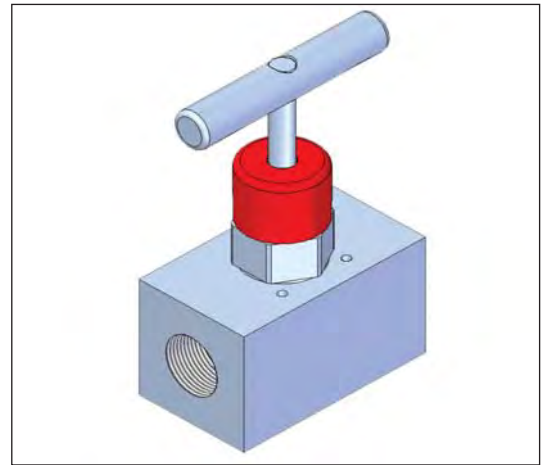


NV01

Typical GA Drawing



SCHEMATIC



PREFERRED RANGE NV01 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	<p>Single Isolate, Needle configuration.</p> <p>Full dimensions and additional details on request.</p> <p>See selection table on page 25 for options.</p>
NV0104F02M5V6K	1/4" NPT	6,000 psi / 414 bar	5mm	
NV0104F02M5V10K	1/4" NPT	10,000 psi / 690 bar	5mm	
NV0108F02M5V6K	1/2" NPT	6,000 psi / 414 bar	5mm	
NV0108F02M5V10K	1/2" NPT	10,000 psi / 690 bar	5mm	

Product Description

A 6,000 psi / 414 bar or 10,000 psi / 690 bar rated Single Isolate Needle Valve. The metal to metal non-rotating tip and metal to metal body to bonnet interface offer leak tight sealing across the full operating temperature range of the valve.

Features and Benefits

- Robust one piece body construction.
- Anti-blow out stem.
- Non-rotating, anti-galling tip as standard.
- Viton / RTFE stem sealing - maintenance free.
- Metal to Metal seating.
- Unique compact design to save space and weight.
- Full material traceability and individual serial number stamped on the valve.
- Back seating needle.
- Stem seal design prevents galling and contamination.
- Thread milled connections for improved sealing.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- Bubble tight shut-off.
- Anti Tamper T-Bar option.
- Pressure energised stem sealing.
- Metal to Metal body joint to prevent thread contamination.

Technical Data

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 25 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C. Inlet / Outlet connections can be threaded Male / Male, Male / Female, Female / Male, butt weld and socket weld.

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NV01

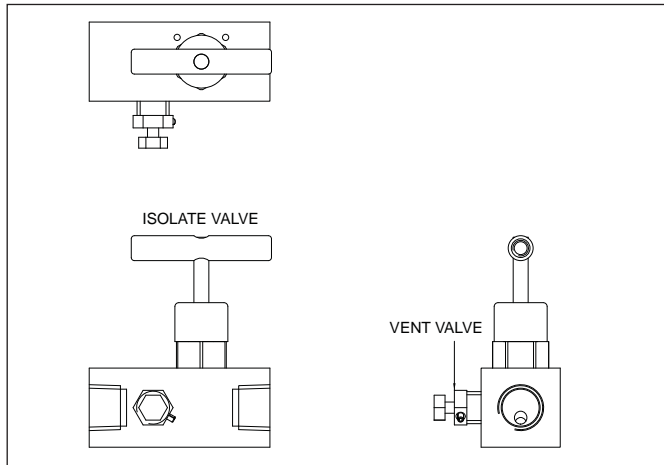
NV01 Selection Chart - Ordering Example

NV01		Single Isolate	Model Code	
04 06 08 09 12 16	1/4" 3/8" 1/2" 9/16" 3/4" 1"	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)	Nominal Pipe Size	
F M FM MF SW BW FMP	Female Thread Male Thread Female Thread Inlet / Male Thread Outlet Male Thread Inlet / Female Thread Outlet Socket Weld Butt Weld Female Medium Pressure		Connection Type	
NO LETTER K6 BSPT SAE	(NPT, SW, BW, FMP) BSP Parallel BSP Taper SAE Straight Thread		Thread Form	
NO LETTER PG	(Standard Inlet / Outlet) Outlet Fitted With A Pressure Plug		Option For Threaded Inlet / Outlet	
02 26 38 39	UNS S31600 / S31603 Stainless Steel (Standard Material) F51 / UNS S31803 Duplex LF2 / Carbon Steel F55 / UNS S32760 Super Duplex		Material	
M MT	Metal Ball Metal Tip		Tip Style	
5	5mm Bore	04 06 08 09 12	Bore Size	
8	8mm Bore	12 16		
V V9 E9	Viton Elastomer V91A Elastomer E985 Elastomer	-20°C to +180°C -45°C to +225°C -46°C to +160°C	Seal Arrangement	
6K 10K	6,000 psi / 414 bar Maximum Cold Working Pressure 10,000 psi / 690 bar Maximum Cold Working Pressure Note: Higher pressures available within the medium pressure range (see separate catalogue).		Pressure Rating	
NO LETTER LK PM NT	Lockable T-Bar Isolate Panel Mount Gas Service / Nitrogen test *		Options	
* Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.				
NV01 08 F		02 M 5 V 6K	NV0108F02M5V6K	Ordering Example

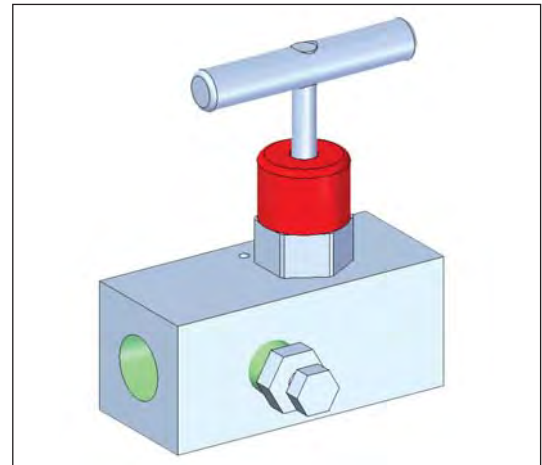
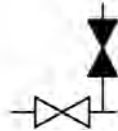
Other options may be available upon request. For more information, please contact Bifold Sales Department.

NV03

Typical GA Drawing



SCHEMATIC



PREFERRED RANGE NV03 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	<p><b>Block &amp; Bleed Manifold, Needle - Captive Vent Plug configuration.</b></p> <p>Full dimensions and additional details on request.</p> <p>See selection table on page 27 for options.</p>
NV0304F02M5V6K	1/4" NPT	6,000 psi / 414 bar	5mm	
NV0304F02M5V10K	1/4" NPT	10,000 psi / 690 bar	5mm	
NV0308F02M5V6K	1/2" NPT	6,000 psi / 414 bar	5mm	
NV0308F02M5V10K	1/2" NPT	10,000 psi / 690 bar	5mm	

Product Description

A Single Isolate Valve Block and Captive Vent Plug Bleed Gauge / Instrument Manifold, with pressures rated up to 10,000 psi / 690 bar. The valve is suitable for either panel or pipe mounting. The manifold design permits isolation and controlled venting of the instrument for calibration and or removal from the circuit, whilst leaving the process intact.

Features and Benefits

- Robust one piece body construction.
- Anti-blow out stem.
- Non-rotating, anti-galling tip as standard.
- Non-removable stem on the captive vent plug.
- Viton / RTFE stem sealing - maintenance free.
- Metal to Metal seating.
- Unique compact design to save space and weight.
- Full material traceability and individual serial number stamped on the valve.
- Back seating needle.
- Stem seal design prevents galling and contamination.
- Thread milled connections for improved sealing.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- Bubble tight shut-off.
- Anti Tamper T-Bar option.
- Pressure energised stem sealing.
- Metal to Metal body joint to prevent thread contamination.

Technical Data

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 27 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C. Inlet / Outlet connections can be threaded Male / Male, Male / Female, Female / Male, butt weld and socket weld.

**Accuracy of information**  
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**Quality Assurance**  
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NV03

NV03 Selection Chart - Ordering Example

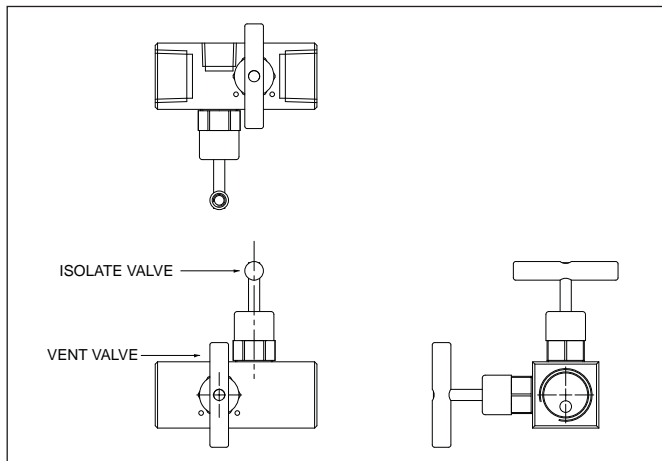
<b>NV03</b>		Block & Bleed Manifold	Model Code
<b>04</b> 1/4" <b>06</b> 3/8" <b>08</b> 1/2" <b>09</b> 9/16" <b>12</b> 3/4" <b>16</b> 1"	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Nominal Pipe Size
<b>F</b> Female Thread <b>M</b> Male Thread <b>FM</b> Female Thread Inlet / Male Thread Outlet <b>MF</b> Male Thread Inlet / Female Thread Outlet <b>SW</b> Socket Weld <b>BW</b> Butt Weld <b>FMP</b> Female Medium Pressure			Connection Type
<b>NO LETTER</b> (NPT, SW, BW, FMP) <b>K6</b> BSP Parallel <b>BSPT</b> BSP Taper <b>SAE</b> SAE Straight Thread			Thread Form
<b>NO LETTER</b> (Standard Inlet / Outlet) <b>PG</b> Outlet Fitted With A Pressure Plug			Option For Threaded Inlet / Outlet
<b>02</b> UNS S31600 / S31603 Stainless Steel (Standard Material) <b>26</b> F51 / UNS S31803 Duplex <b>38</b> LF2 / Carbon Steel <b>39</b> F55 / UNS S32760 Super Duplex			Material
<b>M</b> Metal Ball <b>MT</b> Metal Tip			Tip Style
<b>5</b> 5mm Bore <b>8</b> 8mm Bore	<b>04</b> <b>06</b> <b>08</b> <b>09</b> <b>12</b> <b>16</b>	Bore Size	
<b>V</b> Viton Elastomer <b>V9</b> V91A Elastomer <b>E9</b> E985 Elastomer	-20°C to +180°C -45°C to +225°C -46°C to +160°C	Seal Arrangement	
<b>6K</b> 6,000 psi / 414 bar Maximum Cold Working Pressure <b>10K</b> 10,000 psi / 690 bar Maximum Cold Working Pressure Note: Higher pressures available within the medium pressure range (see separate catalogue).			Pressure Rating
<b>NO LETTER</b> <b>LK</b> Lockable T-Bar Isolate <b>PM</b> Panel Mount <b>NT</b> Gas Service / Nitrogen test * * Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.			Options

**NV0308 F 02 M 5 V 6K NV0308F02M5V6K** Ordering Example

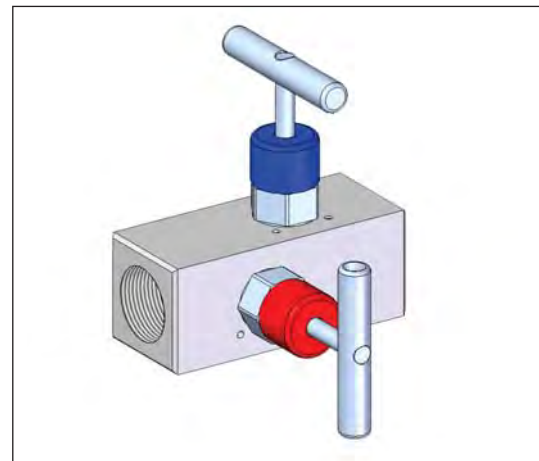
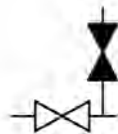
Other options may be available upon request. For more information, please contact Bifold Sales Department.

## NV22

### Typical GA Drawing



### SCHEMATIC



### PREFERRED RANGE NV22 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	<p><b>Block &amp; Bleed Compact Manifold, Needle - Needle configuration.</b></p> <p>Full dimensions and additional details on request.</p> <p>See selection table on page 29 for options.</p>
NV2204F02M3V6K	1/4" NPT	6,000 psi / 414 bar	3mm	
NV2204F02M3V10K	1/4" NPT	10,000 psi / 690 bar	3mm	
NV2208F04F02M3V6K	1/2" NPT	6,000 psi / 414 bar	3mm	
NV2208F04F02M3V10K	1/2" NPT	10,000 psi / 690 bar	3mm	

### Product Description

A 6,000 psi / 414 bar or 10,000 psi / 690 bar rated 2 Valve compact Block & Bleed Gauge / Instrument Manifold. The manifold design permits controlled venting of the instrument for calibration and or removal from the circuit, whilst leaving the process intact.

### Features and Benefits

- Robust one piece body construction.
- Anti-blow out stem.
- Non-rotating, anti-galling tip as standard.
- Viton / RTFE stem sealing - maintenance free.
- Metal to Metal seating.
- Back seating needle.
- Compact in design to save space and weight.
- Full material traceability and individual serial number stamped on the valve.
- Stem seal design prevents galling and contamination.
- Thread milled connections for improved sealing.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- Bubble tight shut-off.
- Anti Tamper T-Bar option.
- Pressure energised stem sealing.
- Metal to Metal body joint to prevent thread contamination.

### Technical Data

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 29 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C. Inlet / Outlet connections can be threaded Male / Male, Male / Female, Female / Male, butt weld and socket weld.

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NV22



NV22 Selection Chart - Ordering Example

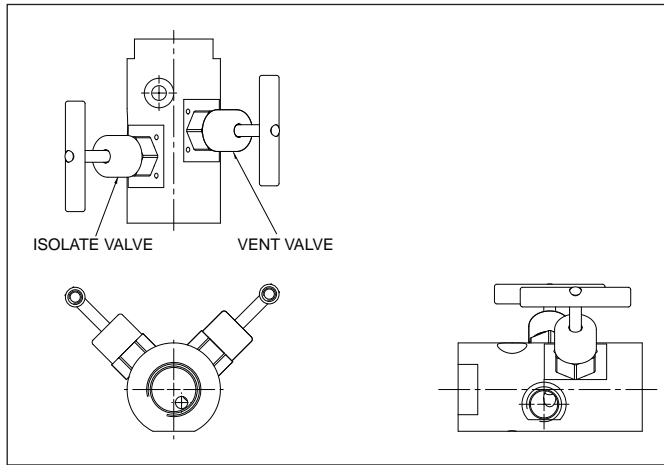
NV22		Block and Bleed Compact Manifold	Model Code					
04 06 08 12 16	1/4" 3/8" 1/2" 3/4" 1"	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)	Nominal Pipe Size					
F M FM MF SW BW	Female Thread Male Thread Female Thread Inlet / Male Thread Outlet Male Thread Inlet / Female Thread Outlet Socket Weld Butt Weld		Connection Type					
NO LETTER K6 BSPT SAE	(NPT, SW, BW) BSP Parallel BSP Taper SAE Straight Thread		Thread Form					
NO LETTER PG	(Standard Inlet / Outlet) Outlet Fitted With A Pressure Plug		Option For Threaded Inlet / Outlet					
NO LETTER 04F	(For 04F In, Out and Vent) 1/4" NPT		Vent Connection					
02 26 38 39	UNS S31600 / S31603 Stainless Steel (Standard Material) F51 / UNS S31803 Duplex LF2 / Carbon Steel F55 / UNS S32760 Super Duplex		Material					
M MT	Metal Ball Metal Tip		Tip Style					
3 5	3mm Bore 5mm Bore	04 06 08 12 12 16	Bore Size					
V V9 E9	Viton Elastomer V91A Elastomer E985 Elastomer	-20°C to +180°C -45°C to +225°C -46°C to +160°C	Seal Arrangement					
6K 10K	6,000 psi / 414 bar Maximum Cold Working Pressure 10,000 psi / 690 bar Maximum Cold Working Pressure Note: Higher pressures available within the medium pressure range (see separate catalogue).		Pressure Rating					
NO LETTER LK AV PV NT	Lockable T-Bar Isolate Anti Tamper Vent Plugged Vent Gas Service / Nitrogen test * * Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.		Options					
<b>NV2204</b>	<b>F</b>	<b>02</b>	<b>M</b>	<b>3</b>	<b>V</b>	<b>10K</b>	<b>NV2204F02M3V10K</b>	Ordering Example

Other options may be available upon request. For more information, please contact Bifold Sales Department.

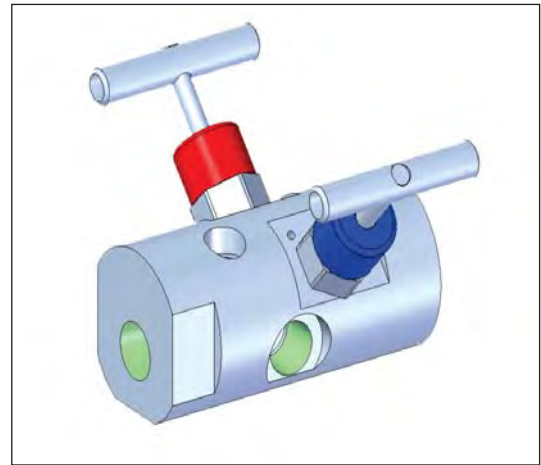
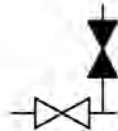


NV04

Typical GA Drawing



SCHEMATIC



PREFERRED RANGE NV04 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	<p><b>Block &amp; Bleed Manifold, Needle - Needle configuration.</b></p> <p><b>Full dimensions and additional details on request.</b></p> <p><b>See selection table on page 31 for options.</b></p>
NV0404F02M5V6K	1/4" NPT	6,000 psi / 414 bar	5mm	
NV0404F02M5V10K	1/4" NPT	10,000 psi / 690 bar	5mm	
NV0408F04F02M5V6K	1/2" NPT	6,000 psi / 414 bar	5mm	
NV0408F04F02M5V10K	1/2" NPT	10,000 psi / 690 bar	5mm	

Product Description

A 6,000 psi / 414 bar or 10,000 psi / 690 bar rated 2 Valve Block & Bleed Gauge / Instrument Manifold. The angled bonnets allow for either panel or pipe mounting. The manifold design permits controlled venting of the instrument for calibration and or removal from the circuit, whilst leaving the process intact.

Features and Benefits

- Robust one piece body construction.
- Anti-blow out stem.
- Non-rotating, anti-galling tip as standard.
- Viton / RTFE stem sealing - maintenance free.
- Metal to Metal seating.
- Back seating needle.
- Unique patented product compact in design to save space and weight.
- European patent granted EP2242943.
- Full material traceability and individual serial number stamped on the valve.
- Stem seal design prevents galling and contamination.
- Thread milled connections for improved sealing.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- Bubble tight shut-off.
- Anti Tamper T-Bar option.
- Pressure energised stem sealing.
- Metal to Metal body joint to prevent thread contamination.
- Panel mount as standard.

Technical Data

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 31 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C. Inlet / Outlet connections can be threaded Male / Male, Male / Female, Female / Male, butt weld and socket weld.

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NV04

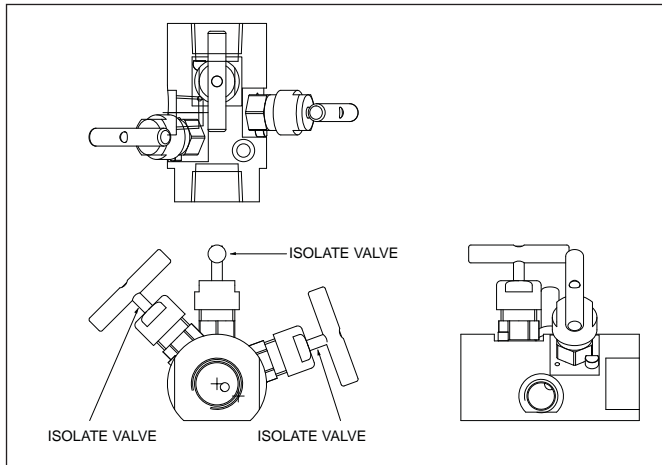
NV04 Selection Chart - Ordering Example

<b>NV04</b>		Block & Bleed Manifold		Model Code				
<b>04</b> <b>06</b> <b>08</b> <b>09</b> <b>12</b> <b>16</b>	1/4" 3/8" 1/2" 9/16" 3/4" 1"	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Nominal Pipe Size				
<b>F</b> <b>M</b> <b>FM</b> <b>MF</b> <b>SW</b> <b>BW</b> <b>FMP</b>	Female Thread Male Thread Female Thread Inlet / Male Thread Outlet Male Thread Inlet / Female Thread Outlet Socket Weld Butt Weld Female Medium Pressure			Connection Type				
<b>NO LETTER</b> <b>K6</b> <b>BSPT</b> <b>SAE</b>	(NPT, SW, BW, FMP) BSP Parallel BSP Taper SAE Straight Thread			Thread Form				
<b>NO LETTER</b> <b>PG</b>	(Standard Inlet / Outlet) Outlet Fitted With A Pressure Plug			Option For Threaded-Inlet / Outlet				
<b>NO LETTER</b> <b>04F</b>	(For 04F In, Out and Vent) 1/4" NPT			Vent Connection				
<b>02</b> <b>26</b> <b>38</b> <b>39</b>	UNS S31600 / S31603 Stainless Steel (Standard Material) F51 / UNS S31803 Duplex LF2 / Carbon Steel F55 / UNS S32760 Super Duplex			Material				
<b>M</b> <b>MT</b>	Metal Ball Metal Tip			Tip Style				
<b>5</b>	5mm Bore	<b>04</b> <b>06</b> <b>08</b> <b>09</b> <b>12</b>		Bore Size				
<b>8</b>	8mm Bore	<b>12</b> <b>16</b>						
<b>V</b> <b>V9</b> <b>E9</b>	Viton Elastomer V91A Elastomer E985 Elastomer	-20°C to +180°C -45°C to +225°C -46°C to +160°C		Seal Arrangement				
<b>6K</b> <b>10K</b>	6,000 psi / 414 bar Maximum Cold Working Pressure 10,000 psi / 690 bar Maximum Cold Working Pressure Note: Higher pressures available within the medium pressure range (see separate catalogue).			Pressure Rating				
<b>NO LETTER</b> <b>LK</b> <b>AV</b> <b>PV</b> <b>NT</b>	Lockable T-Bar Isolate Anti Tamper Vent Plugged Vent Gas Service / Nitrogen test *			Options				
* Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.								
<b>NV0404</b>	<b>F</b>	<b>02</b>	<b>M</b>	<b>5</b>	<b>V</b>	<b>6K</b>	<b>NV0404F02M5V6K</b>	Ordering Example

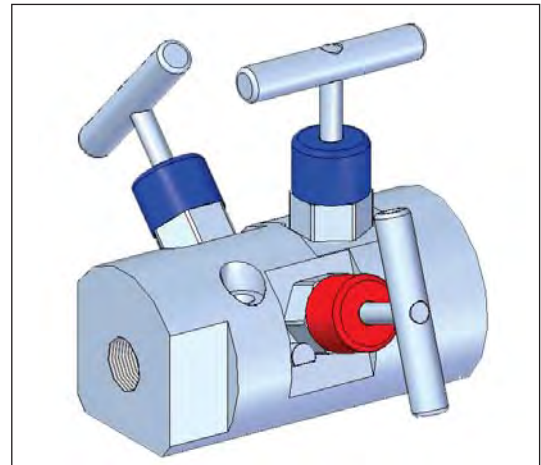
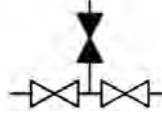
Other options may be available upon request. For more information, please contact Bifold Sales Department.

## NV05

### Typical GA Drawing



### SCHEMATIC



### PREFERRED RANGE NV05 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	<p><b>Double Block &amp; Bleed Manifold, Needle - Needle - Needle configuration.</b></p> <p><b>Full dimensions and additional details on request.</b></p> <p><b>See selection table on page 33 for options.</b></p>
NV0504F02M5V6K	¼" NPT	6,000 psi / 414 bar	5mm	
NV0504F02M5V10K	¼" NPT	10,000 psi / 690 bar	5mm	
NV0508F04F02M5V6K	½" NPT	6,000 psi / 414 bar	5mm	
NV0508F04F02M5V10K	½" NPT	10,000 psi / 690 bar	5mm	

### Product Description

A 6,000 psi / 414 bar or 10,000 psi / 690 bar rated Double Block & Bleed Manifold. The angled bonnets allow for either panel or pipe mounting. The manifold design permits controlled venting of the instrument for calibration and or removal from the circuit, whilst leaving the process intact.

### Features and Benefits

- Robust one piece body construction.
- Anti-blow out stem.
- Non-rotating, anti-galling tip as standard.
- Viton / RTFE stem sealing - maintenance free.
- Metal to Metal seating.
- Back seating needle.
- Unique patented product compact in design to save space and weight.
- European patent granted EP2242943.
- Full material traceability and individual serial number stamped on the valve.
- Stem seal design prevents galling and contamination.
- Thread milled connections for improved sealing.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- Bubble tight shut-off.
- Anti Tamper T-Bar option.
- Pressure energised stem sealing.
- Metal to Metal body joint to prevent thread contamination.
- Panel mount as standard.

### Technical Data

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 33 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C. Inlet / Outlet connections can be threaded Male / Male, Male / Female, Female / Male, butt weld and socket weld.

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NV05

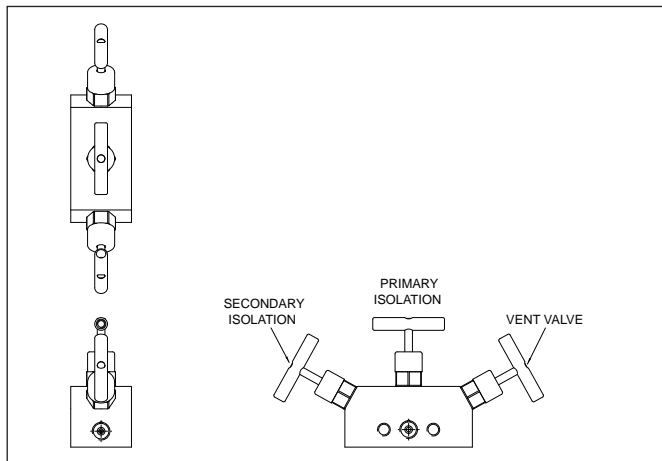
NV05 Selection Chart - Ordering Example

NV05		Double Block & Bleed Manifold		Model Code				
04	1/4"	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Nominal Pipe Size				
06	3/8"							
08	1/2"							
09	9/16"							
12	3/4"							
16	1"							
<b>F</b>	Female Thread			Connection Type				
<b>M</b>	Male Thread							
<b>FM</b>	Female Thread Inlet / Male Thread Outlet							
<b>MF</b>	Male Thread Inlet / Female Thread Outlet							
<b>SW</b>	Socket Weld							
<b>BW</b>	Butt Weld							
<b>FMP</b>	Female Medium Pressure							
<b>NO LETTER</b>	(NPT, SW, BW, FMP)			Thread Form				
<b>K6</b>	BSP Parallel							
<b>BSPT</b>	BSP Taper							
<b>SAE</b>	SAE Straight Thread							
<b>NO LETTER</b>	(Standard Inlet / Outlet)			Option For Threaded Inlet / Outlet				
<b>PG</b>	Outlet Fitted With A Pressure Plug							
<b>NO LETTER</b>	(For 04F In, Out and Vent)			Vent Connection				
<b>04F</b>	1/4" NPT							
<b>02</b>	UNS S31600 / S31603 Stainless Steel (Standard Material)			Material				
<b>26</b>	F51 / UNS S31803 Duplex							
<b>38</b>	LF2 / Carbon Steel							
<b>39</b>	F55 / UNS S32760 Super Duplex							
<b>M</b>	Metal Ball			Tip Style				
<b>MT</b>	Metal Tip							
<b>5</b>	5mm Bore	<b>04</b>		Bore Size				
		<b>06</b>						
<b>08</b>								
<b>09</b>								
<b>8</b>	8mm Bore	<b>12</b>						
		<b>16</b>						
<b>V</b>	Viton Elastomer	-20°C to +180°C	Seal Arrangement					
<b>V9</b>	V91A Elastomer	-45°C to +225°C						
<b>E9</b>	E985 Elastomer	-46°C to +160°C						
<b>6K</b>	6,000 psi / 414 bar Maximum Cold Working Pressure			Pressure Rating				
<b>10K</b>	10,000 psi / 690 bar Maximum Cold Working Pressure							
Note: Higher pressures available within the medium pressure range (see separate catalogue).								
<b>NO LETTER</b>				Options				
<b>LK</b>	Lockable T-Bar Isolate							
<b>AV</b>	Anti Tamper Vent							
<b>PV</b>	Plugged Vent							
<b>NT</b>	Gas Service / Nitrogen test *							
* Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.								
<b>NV05 04</b>	<b>F</b>	<b>02</b>	<b>M</b>	<b>5</b>	<b>V</b>	<b>10K</b>	<b>NV0404F02M5V10K</b>	Ordering Example

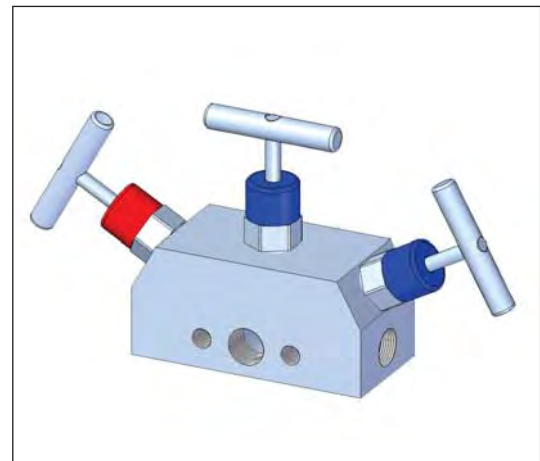
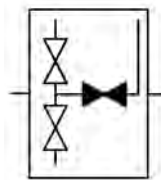
Other options may be available upon request. For more information, please contact Bifold Sales Department.

## NV06

### Typical GA Drawing



SCHMATIC



### PREFERRED RANGE NV06 SELECTION TABLE

Product Code	Size	Rated	'A' (mm)	Double Block & Bleed Single Station Manifold, Needle - Needle - Needle configuration. Full dimensions and additional details on request. See selection table on page 35 for options.
NV06I04F02M5V6K	1/4" NPT	6,000 psi / 414 bar	5mm	
NV06I04F02M5V10K	1/4" NPT	10,000 psi / 690 bar	5mm	

### Product Description

A 6,000 psi / 414 bar or 10,000 psi / 690 bar rated Double Block & Bleed Gauge / Instrument Compact Panel Mounted Manifold. The manifold design permits controlled venting of the instrument for calibration and or removal from the circuit, whilst leaving the process intact. This unique design allows direct inline connection to pipe systems, through 1/4" NPT connections, thus eliminating the requirement for additional 'T' and elbow fittings.

### Features and Benefits

- Robust one piece body construction.
- Anti-blow out stem.
- Non-rotating, anti-galling tip as standard.
- Viton / RTFE stem sealing - maintenance free.
- Metal to Metal seating.
- Back seating needle.
- Unique patented product compact in design to save space and weight.
- European patent granted EP2225485.
- Full material traceability and individual serial number stamped on the valve.
- Stem seal design prevents galling and contamination.
- Thread milled connections for improved sealing.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- Bubble tight shut-off.
- Anti Tamper T-Bar option.
- Pressure energised stem sealing.
- Metal to Metal body joint to prevent thread contamination.
- Panel mount as standard.

### Technical Data

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 35 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C.

**Accuracy of information**  
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**Quality Assurance**  
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NV06

NV06 Selection Chart - Ordering Example

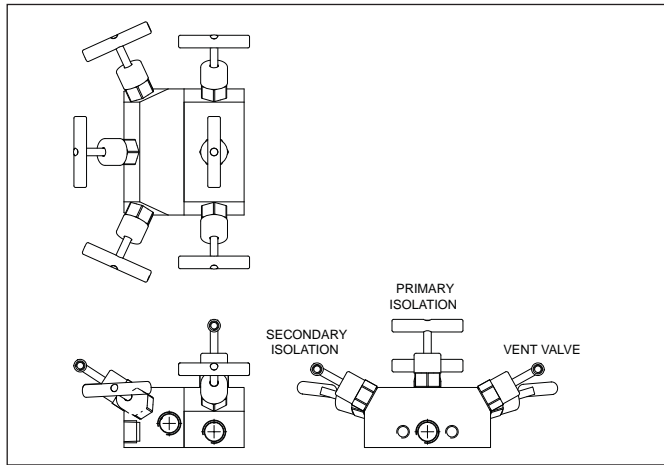
<b>NV06 I</b>		Double Block & Bleed Single Station Manifold		Model Code
<b>04</b> <b>06</b>	$\frac{1}{4}$ " $\frac{3}{8}$ "			Nominal Pipe Size
<b>F</b> <b>FMP</b>	Female Thread Female Medium Pressure			Connection Type
<b>NO LETTER</b> <b>K6</b> <b>BSPT</b> <b>SAE</b>	(NPT, FMP) BSP Parallel BSP Taper SAE Straight Thread			Thread Form
<b>NO LETTER</b> <b>PG</b>	(Standard Inlet / Outlet) Outlet Fitted With A Pressure Plug			Option For Threaded Inlet / Outlet
<b>NO LETTER</b> <b>04F</b> <b>04FMP</b>	(For 04F In, Out and Vent) $\frac{1}{4}$ " NPT $\frac{1}{4}$ " Medium Pressure			Vent and Gauge Connection
<b>02</b> <b>26</b> <b>38</b> <b>39</b>	UNS S31600 / S31603 Stainless Steel (Standard Material) F51 / UNS S31803 Duplex LF2 / Carbon Steel F55 / UNS S32760 Super Duplex			Material
<b>M</b> <b>MT</b>	Metal Ball Metal Tip			Tip Style
<b>5</b>	5mm Bore			Bore Size
<b>V</b> <b>V9</b> <b>E9</b>	Viton Elastomer V91A Elastomer E985 Elastomer	-20°C to +180°C -45°C to +225°C -46°C to +160°C	Seal Arrangement	
<b>6K</b> <b>10K</b>	6,000 psi / 414 bar Maximum Cold Working Pressure 10,000 psi / 690 bar Maximum Cold Working Pressure Note: Higher pressures available within the medium pressure range (see separate catalogue).			Pressure Rating
<b>NO LETTER</b> <b>LK</b> <b>AV</b> <b>PV</b> <b>NT</b>	Lockable T-Bar Isolate Anti Tamper Vent Plugged Vent Gas Service / Nitrogen test *			Options
* Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.				
<b>NV06 I04 F</b>		<b>02 M 5 V 10K</b>	<b>NV06 I04F02M5V10K</b> Ordering Example	

Other options may be available upon request. For more information, please contact Bifold Sales Department.

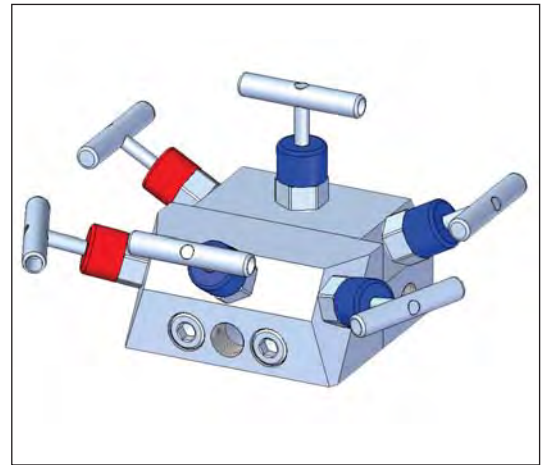
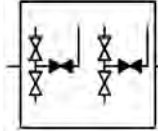


## NV06

### Typical GA Drawing



### SCHEMATIC



### PREFERRED RANGE NV06 SELECTION TABLE

Product Code	Size	Rated	'A' (mm)	<b>Double Block &amp; Bleed Two Station Manifold, Needle - Needle - Needle configuration.</b> Full dimensions and additional details on request. See selection table on page 37 for options.
NV06204F02M5V6K	1/4" NPT	6,000 psi / 414 bar	5mm	
NV06204F02M5V10K	1/4" NPT	10,000 psi / 690 bar	5mm	

### Product Description

A 6,000 psi / 414 bar or 10,000 psi / 690 bar rated 2 Station Double Block & Bleed Gauge / Instrument Compact Panel Mounted Manifold. The manifold design permits controlled venting of the instrument for calibration and or removal from the circuit, whilst leaving the process intact. This unique design allows direct inline connection to pipe systems, through 1/4" NPT connections, thus eliminating the requirement for additional 'T' and elbow fittings.

### Features and Benefits

- Each station is a robust one piece body construction.
- Anti-blow out stem.
- Non-rotating, anti-galling tip as standard.
- Viton / RTFE stem sealing - maintenance free.
- Metal to Metal seating.
- Back seating needle.
- Unique patented product compact in design to save space and weight.
- European patent granted EP2225485.
- Full material traceability and individual serial number stamped on the valve.
- Unrestricted through the bore.
- Stem seal design prevents galling and contamination.
- Thread milled connections for improved sealing.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- Bubble tight shut-off.
- Anti Tamper T-Bar option.
- Pressure energised stem sealing.
- Metal to Metal body joint to prevent thread contamination.
- Panel mount as standard.

### Technical Data

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 37 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C.

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NV06

NV06 Selection Chart - Ordering Example

<b>NV06 2</b>		Double Block & Bleed Two Station Manifold		Model Code
<b>04</b> <b>06</b>	$\frac{1}{4}$ " $\frac{3}{8}$ "			Nominal Pipe Size
<b>F</b> <b>FMP</b>	Female Thread Female Medium Pressure			Connection Type
<b>NO LETTER</b> <b>K6</b> <b>BSPT</b> <b>SAE</b>	(NPT, FMP) BSP Parallel BSP Taper SAE Straight Thread			Thread Form
<b>NO LETTER</b> <b>PG</b>	(Standard Inlet / Outlet) Outlet Fitted With A Pressure Plug			Option For Threaded Inlet / Outlet
<b>NO LETTER</b> <b>04F</b> <b>04FMP</b>	(For 04F In, Out and Vent) $\frac{1}{4}$ " NPT $\frac{1}{4}$ " Medium Pressure			Vent and Gauge Connection
<b>02</b> <b>26</b> <b>38</b> <b>39</b>	UNS S31600 / S31603 Stainless Steel (Standard Material) F51 / UNS S31803 Duplex LF2 / Carbon Steel F55 / UNS S32760 Super Duplex			Material
<b>M</b> <b>MT</b>	Metal Ball Metal Tip			Tip Style
<b>5</b>	5mm Bore			Bore Size
<b>V</b> <b>V9</b> <b>E9</b>	Viton Elastomer V91A Elastomer E985 Elastomer	-20°C to +180°C -45°C to +225°C -46°C to +160°C	Seal Arrangement	
<b>6K</b> <b>10K</b>	6,000 psi / 414 bar Maximum Cold Working Pressure 10,000 psi / 690 bar Maximum Cold Working Pressure Note: Higher pressures available within the medium pressure range (see separate catalogue).			Pressure Rating
<b>NO LETTER</b> <b>LK</b> <b>AV</b> <b>PV</b> <b>NT</b>	Lockable T-Bar Isolate Anti Tamper Vent Plugged Vent Gas Service / Nitrogen test *			Options
* Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.				

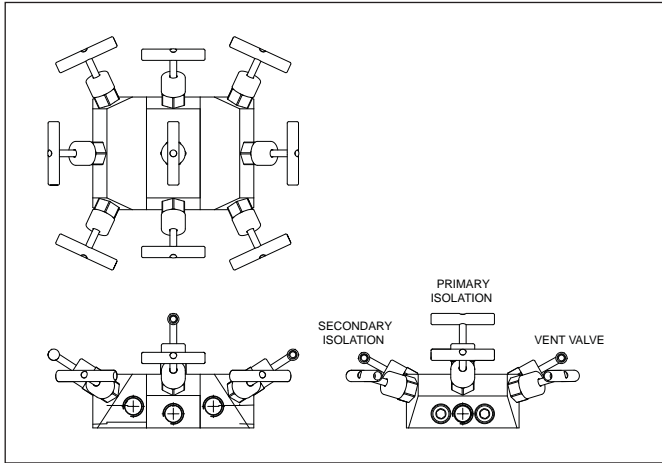
**NV06204 F 02 M 5 V 10K NV06204F02M5V10K** Ordering Example

Other options may be available upon request. For more information, please contact Bifold Sales Department.

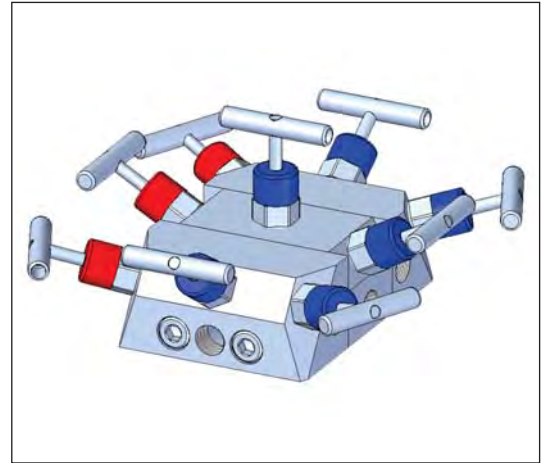
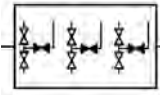
## NV06



### Typical GA Drawing



### SCHEMATIC



### PREFERRED RANGE NV06 SELECTION TABLE

Product Code	Size	Rated	'A' (mm)	<b>Double Block &amp; Bleed Three Station Manifold, Needle - Needle - Needle configuration.</b> Full dimensions and additional details on request. See selection table on page 39 for options.
NV06304F02M5V6K	1/4" NPT	6,000 psi / 414 bar	5mm	
NV06304F02M5V10K	1/4" NPT	10,000 psi / 690 bar	5mm	

### Product Description

A 6,000 psi / 414 bar or 10,000 psi / 690 bar rated 3 Station Double Block & Bleed Gauge / Instrument Compact Panel Mounted Manifold. The manifold design permits controlled venting of the instrument for calibration and or removal from the circuit, whilst leaving the process intact. This unique design allows direct inline connection to pipe systems, through 1/4" NPT connections, thus eliminating the requirement for additional 'T' and elbow fittings.

### Features and Benefits

- Each station is a robust one piece body construction.
- Anti-blow out stem.
- Non-rotating, anti-galling tip as standard.
- Viton / RTFE stem sealing - maintenance free.
- Metal to Metal seating.
- Back seating needle.
- Unique patented product compact in design to save space and weight.
- European patent granted EP2225485.
- Full material traceability and individual serial number stamped on the valve.
- Unrestricted through bore.
- Stem seal design prevents galling and contamination.
- Thread milled connections for improved sealing.
- In compliance with NACE MR-01-75 / ISO 15156 as standard.
- Bubble tight shut-off.
- Anti Tamper T-Bar option.
- Pressure energised stem sealing.
- Metal to Metal body joint to prevent thread contamination.
- Panel mount as standard.

### Technical Data

Material grades - UNS S31600 / S31603 Stainless Steel (Standard Material). See selection table on page 39 for alternative materials. Operating temperature range -20°C to +180°C as standard. Alternative temperature range -45°C to +225°C.

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NV06

NV06 Selection Chart - Ordering Example

<b>NV06 3</b>		Double Block & Bleed Three Station Manifold	Model Code
<b>04</b> <b>06</b>	$\frac{1}{4}$ " $\frac{3}{8}$ "		Nominal Pipe Size
<b>F</b> <b>FMP</b>	Female Thread Female Medium Pressure		Connection Type
<b>NO LETTER</b> <b>K6</b> <b>BSPT</b> <b>SAE</b>	(NPT, FMP) BSP Parallel BSP Taper SAE Straight Thread		Thread Form
<b>NO LETTER</b> <b>PG</b>	(Standard Inlet / Outlet) Outlet Fitted With A Pressure Plug		Option For Threaded Inlet / Outlet
<b>NO LETTER</b> <b>04F</b> <b>04FMP</b>	(For 04F In, Out and Vent) $\frac{1}{4}$ " NPT $\frac{1}{4}$ " Medium Pressure		Vent and Gauge Connection
<b>02</b> <b>26</b> <b>38</b> <b>39</b>	UNS S31600 / S31603 Stainless Steel (Standard Material) F51 / UNS S31803 Duplex LF2 / Carbon Steel F55 / UNS S32760 Super Duplex		Material
<b>M</b> <b>MT</b>	Metal Ball Metal Tip		Tip Style
<b>5</b>	5mm Bore		Bore Size
<b>V</b> <b>V9</b> <b>E9</b>	Viton Elastomer V91A Elastomer E985 Elastomer	-20°C to +180°C -45°C to +225°C -46°C to +160°C	Seal Arrangement
<b>6K</b> <b>10K</b>	6,000 psi / 414 bar Maximum Cold Working Pressure 10,000 psi / 690 bar Maximum Cold Working Pressure Note: Higher pressures available within the medium pressure range (see separate catalogue).		Pressure Rating
<b>NO LETTER</b> <b>LK</b> <b>AV</b> <b>PV</b> <b>NT</b>	Lockable T-Bar Isolate Anti Tamper Vent Plugged Vent Gas Service / Nitrogen test * * Standard F.A.T only includes hydrostatic and 6 bar air test. For valves to be used on gas service, optional nitrogen test must be specified.		Options
<b>NV06304 F</b>		<b>02 M 5 V 10K</b>	<b>NV06304F02M5V10K</b> Ordering Example

Other options may be available upon request. For more information, please contact Bifold Sales Department.

Product Range

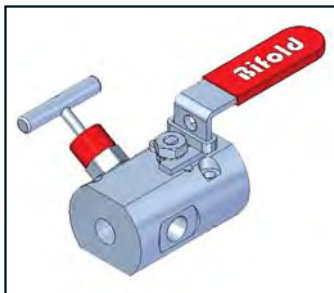


**BV02**



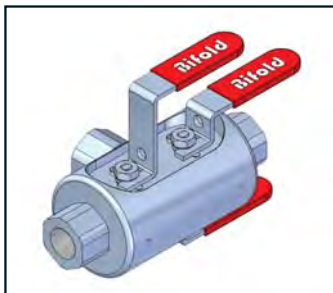
3-Way Diverting Ball Valve, T-Port & L-Port Versions Available.

**BV04**



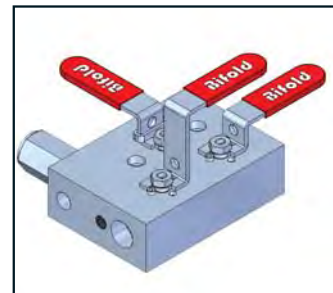
Block & Bleed, Ball - Needle Manifold.

**BV19**



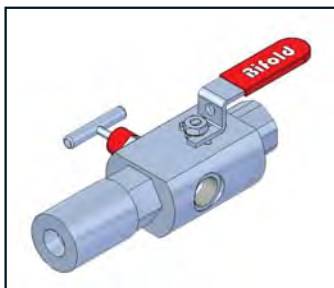
Double Block & Bleed, Ball - Ball - Ball Manifold.

**BV21**



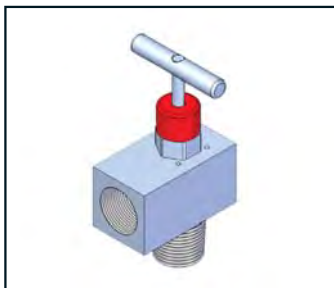
Accumulator Manifold with Pressure Relief.

**BV24**



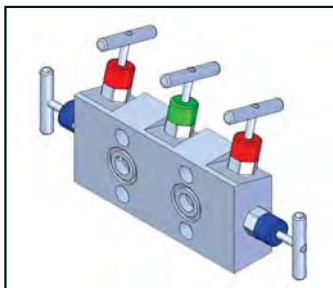
Block & Bleed with Integral Check Valve.

**NV02**



Single Isolate Angled Pattern Needle Valve.

**NV13**



Manifold, Direct & Remote Mount (2, 3, 4 & 5 Valve Options Available).

**NV17**



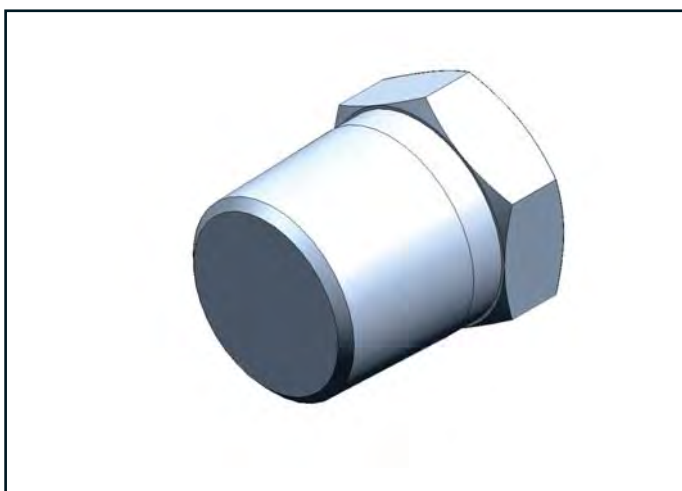
Block, Block, Needle - Needle, Manifold.

**GA01**



Gauge Adaptors.

**Blanking Plug**



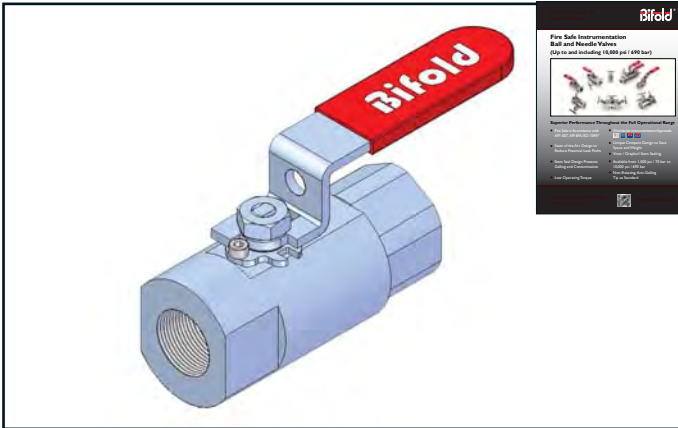
Blanking Plugs & Captive Venting Plugs.

Please contact Bifold sales department for further enquires on our extended product range.



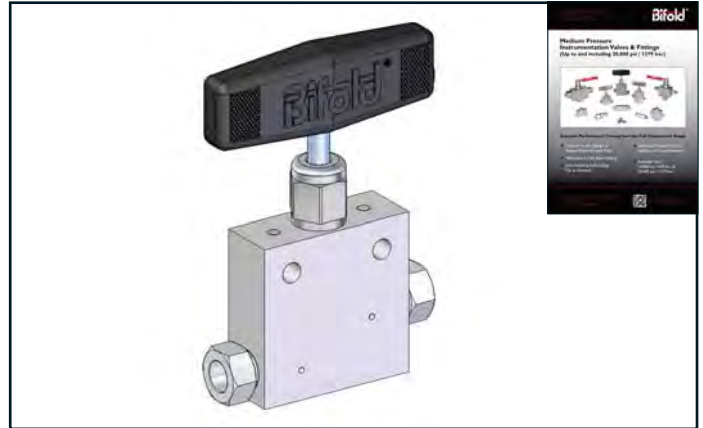
**Product Range**

**Fire Safe Instrumentation Valves**



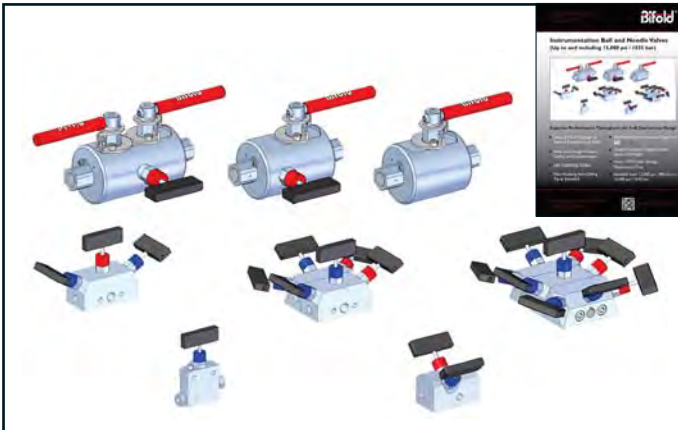
Please see the Ball and Needle Valve Fire Safe Catalogue for the full product range.

**Medium Pressure**



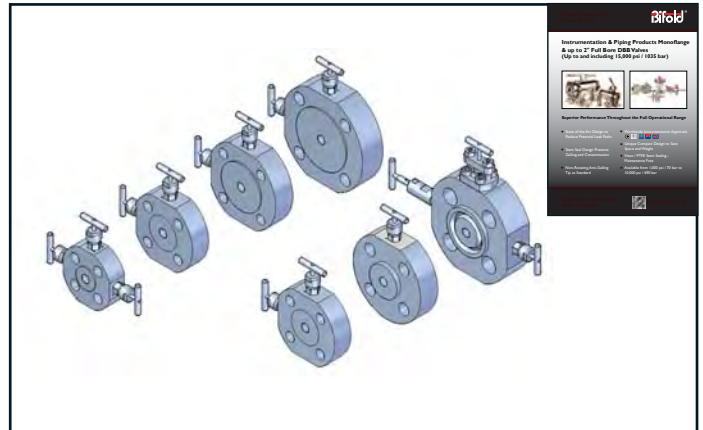
Please see the Instrumentation Ball and Needle Valve Catalogue for the full product range.

**13K and 15K**



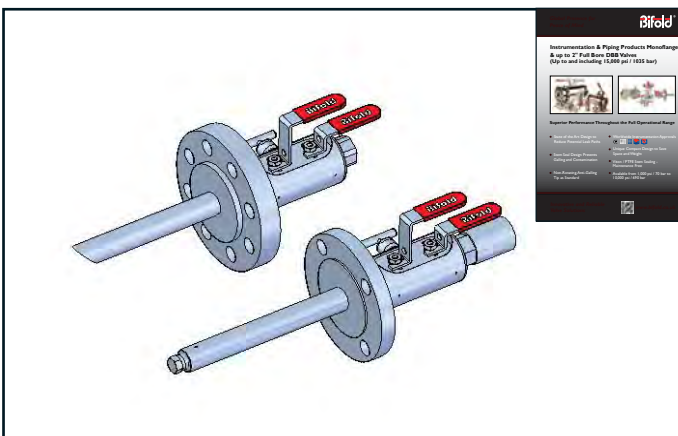
Please see the Instrumentation Ball and Needle Valve 13K and 15K Catalogue for the full product range.

**Monoflanges**



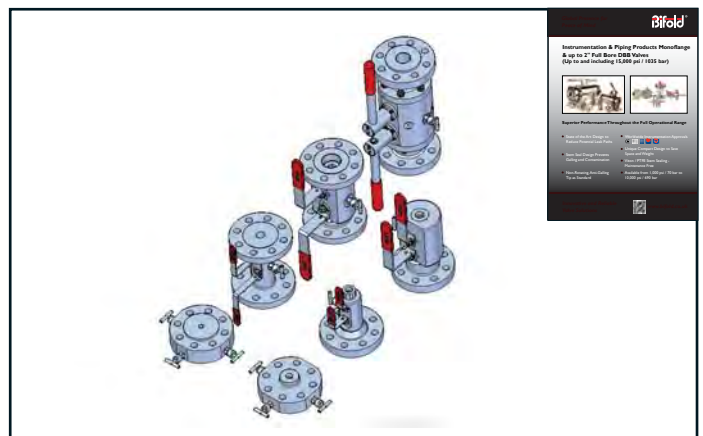
Please see the Instrumentation and Piping Catalogue for the full product range of monoflanges.

**Double Block & Bleed Injection / Sampling Valves**



Please see the Instrumentation and Piping Catalogue for the full product range of DBB Injection / Sampling Valves.

**Double Block & Bleed Valves**



Please see the Instrumentation and Piping Catalogue for the full product range of Double Block & Bleed Valves.



Preferred Range



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**Preferred Range**



[www.bifold.co.uk](http://www.bifold.co.uk)

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**Instrument, Process,  
Directional Control Valves,  
and Pumps**

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**Pneumatic and  
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**Subsea Valves**

**Hydraulic Pumps,  
Intensifiers and Valves**

**Bifold®**

**Bifold FluidPower®**

**Bifold® Subsea**

**Bifold®  Marshalsea**

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**Innovative and Reliable  
Valve Solutions**



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*Global Presence for  
Peace of Mind*

**Bifold®**

## **Medium Pressure Instrumentation Valves & Fittings (Up to and including 20,000 psi / 1379 bar)**



### **Superior Performance Throughout the Full Operational Range**

- State of the Art Design to Reduce Potential Leak Paths
- Maintenance Free Stem Sealing
- Non-Rotating, Anti-Galling Tip as Standard
- Stem Seal Design Prevents Galling and Contamination
- Available from 10,000 psi / 690 bar to 20,000 psi / 1379 bar

*Innovative and Reliable  
Valve Solutions*



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Features & Benefits

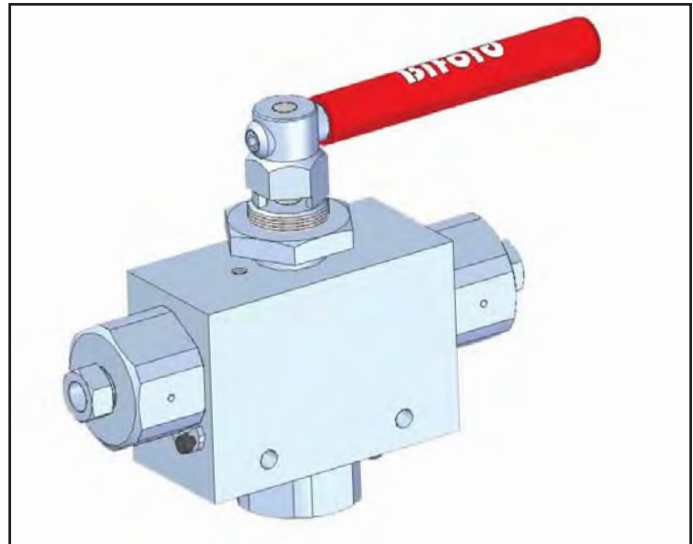
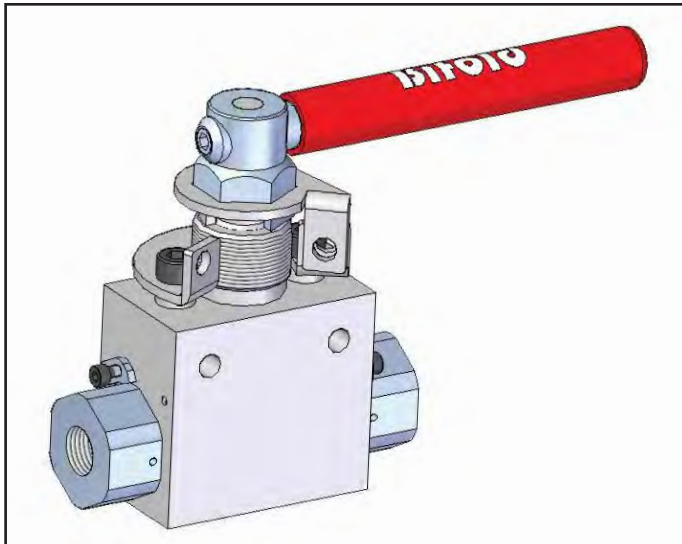
Bifold has manufactured Ball & Needle valves with a maximum pressure of 10,000 psi / 690 bar for more than 20 years. To add to this portfolio of valves, a range of Medium Pressure products have been developed, combining unique innovations with highest standards of quality already being provided.

The portfolio of Medium Pressure products allows for the safe and reliable implementation of 20,000 psi / 1379 bar pressure systems incorporating Needle Valves, Ball Valves (floating & trunnion styles), Single Block & Bleed Manifolds, Double Block & Bleed Manifolds, Check Valves, Fittings and Adaptors.

The Medium Pressure valves are available in 1/4", 3/8", 1/2", 3/4" and 1" tubing sizes comprising of a coned and threaded connection. This connection method allows for increased flow rates due to the larger bore sizes, common within this pressure range.

Bifold has incorporated unique product features within this range alongside the many standard features which makes the product far superior to conventional products on the market.

Ball Valves



Innovative Locking Device

- Bifold Medium Pressure Ball Valves can be supplied with or without a handle locking device. The innovative design allows the valve to maintain its through panel mount function.

Pressure Tested

- Pressure tested in accordance with API 598 & BS EN 12266-1. Proof tested to 1.5 times maximum working pressure.

Why Use Bifold?

- Innovatively progressed and optimised designs throughout our product range.
- Here at Bifold, we are constantly carrying out vigorous research and development on all of our products, ensuring that our valves represent the best of what we do.
- Our state of the art production facilities based in the UK, allow our superior and innovative designs of components to be manufactured on site, assembled to the finished product and tested to rigorous quality standards.

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## Features & Benefits

### Needle Valves



#### Maintenance Free Stem Sealing

- The unique stem seal design eliminates the loss of sealing integrity often experienced over the life time of traditional packing glands, reducing the risk of fugitive emissions.

#### None Wetted Threads

- Needle head threads are isolated from process fluid corrosion or contamination using a pre-thread stem seal and a secondary metal to metal bonnet seal.

#### Lower Torque to Operate

- The unique stem seal is designed to reduce the effects of friction resulting in a reduced operating torque throughout the full operational pressure range.

#### Secondary Metal To Metal Seal Reduces Potential Leak Paths

- The needle valve bonnet seal using the unique stem seal and also a secondary metal to metal seal provides further product advantages:

#### Fail Safe Open and Closed System

- In the unlikely event of a full stem seal failure, the valve can be made safe in either the open or closed state. Closing the valve will isolate process fluid at the primary seat preventing passage of any process fluid into the needle valve cavity, whilst fully opening against the inbuilt back seating feature will isolate the damaged stem seal from the process fluid.

#### Non Rotating Anti-Galling Tip as Standard

- The lower stem section is manufactured from 17/4 PH stainless steel and is assembled in such a way to prevent rotation whilst being operated. In turn this reduces the likelihood of galling on the valve seat.

#### Thread Rolled Stem

- The stem thread portion is manufactured using thread rolling techniques to help maintain the material strength.

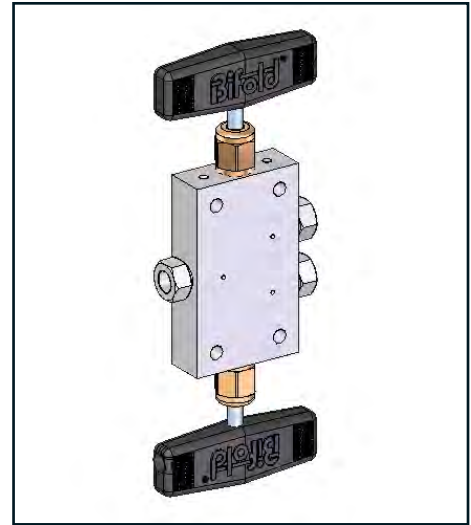
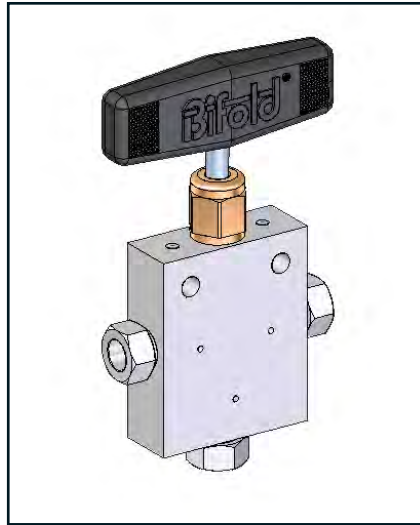


Product Portfolio



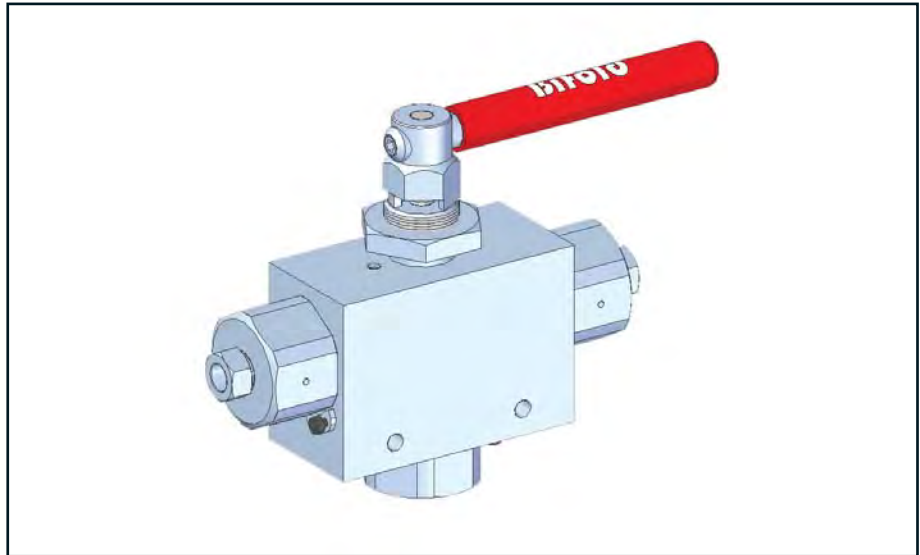
Medium Pressure Needle Valves

The Needle Valve range is a one piece body construction with a maximum working pressure of 20,000 psi / 1379 bar and tube sizes from 1/4" through to 1". Within the Needle Valve range, we also offer a standard instrumentation design with a maximum working pressure of 10,000 psi / 690 bar and pipe sizes from 1/4" through to 1".



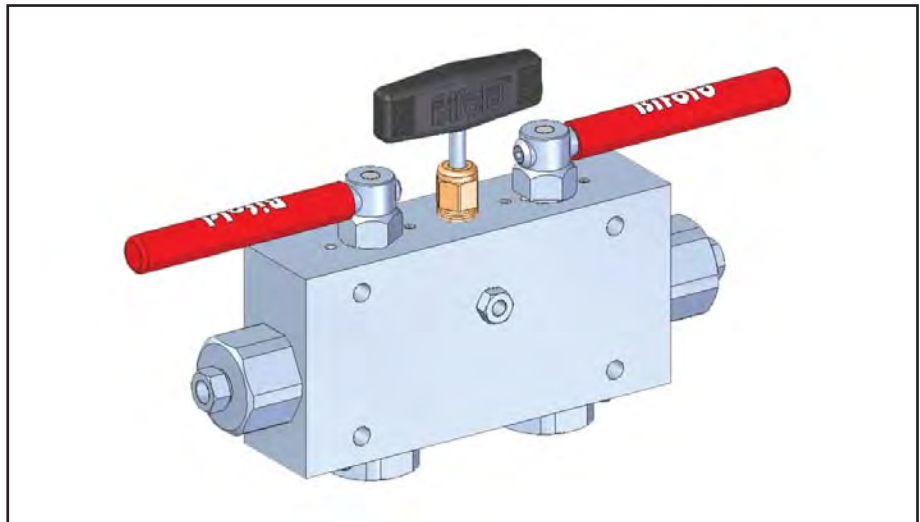
Medium Pressure Ball Valves

The Bifold range of Ball Valves are available in a floating style with a maximum working pressure of 10,000 psi / 690 bar, or a trunnion style with a maximum working pressure of 20,000 psi / 1379 bar. They are available in a variety of configurations to suit the specific application with tube sizes ranging from 1/4" through to 1". Within the Ball Valve range, we also offer a standard instrumentation design with a maximum working pressure of 10,000 psi / 690 bar and pipe sizes from 1/4" through to 1".



Medium Pressure Manifolds

The Manifold range includes standard configurations of Ball and Needle, Single Block and Bleed or Double Block and Bleed valves. We can also design custom manifolds to suit the application. Manifolds are rated up to pressures of 20,000 psi / 1379 bar in a variety of tube sizes ranging from 1/4" through to 1".



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**Product Portfolio**

**State of the Art Machining Centres**

Bifold is enhanced by an in house lean and integrated manufacturing policy, alongside a unique business model, effectively reducing lead times and providing peace of mind to contractors, installers and end users for over a century.

Our state of the art production facilities based in the UK, allow our superior and innovative designs of components to be manufactured on site, assembled to the finished product and tested to rigorous quality standards.

All Bifold valves have product traceability via a unique serial number stamped on all valve bodies, linking them with their testing and component certificates, materials of construction together with full manufacturers record book (MRB).



**Installation Picture using our Standard Range of Ball and Needle Valves**

**Bifold ISO9001 Product Certification and Specialist Testing Options Include**






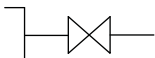
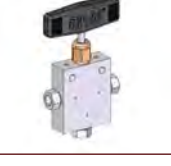
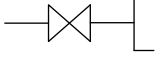
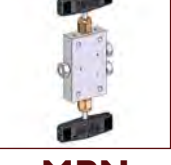
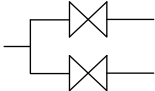


- Non destructive testing including LPI, MPI, PMI and Ferrite testing.
- Hydrostatic & Pneumatic testing.
- Nitrogen gas testing.
- Nitrogen / Helium leak detection.
- Low temperature testing.
- Fugitive Emission testing.
- HIC testing and other specialist material tests.



**Installation Picture using our Standard Range of Ball and Needle Valves**



Preferred Range

INSTRUMENTATION PRODUCTS - MPN NEEDLE VALVES (up to and Including 20,000 psi / 1379 bar)				
Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>MPN</b> 2-Way Straight Needle Valves</p>		14 / 17	MPN-20-04-1-V	1/4" MP, 2-Way Straight, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-06-1-V	3/8" MP, 2-Way Straight, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-09-1-V	1/2" MP, 2-Way Straight, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-12-1-V	3/4" MP, 2-Way Straight, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-16-1-V	1" MP, 2-Way Straight, Needle Configuration, 20,000 psi / 1379 bar
 <p><b>MPN</b> 2-Way Angle Needle Valves</p>		14 / 17	MPN-20-04-2-V	1/4" MP, 2-Way Angle, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-06-2-V	3/8" MP, 2-Way Angle, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-09-2-V	1/2" MP, 2-Way Angle, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-12-2-V	3/4" MP, 2-Way Angle, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-16-2-V	1" MP, 2-Way Angle, Needle Configuration, 20,000 psi / 1379 bar
 <p><b>MPN</b> 3-Way, 2-On Pressure Needle Valves</p>		14 / 17	MPN-20-04-3-V	1/4" MP, 3-Way, 2-On Pressure, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-06-3-V	3/8" MP, 3-Way, 2-On Pressure, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-09-3-V	1/2" MP, 3-Way, 2-On Pressure, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-12-3-V	3/4" MP, 3-Way, 2-On Pressure, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-16-3-V	1" MP, 3-Way, 2-On Pressure, Needle Configuration, 20,000 psi / 1379 bar
 <p><b>MPN</b> 3-Way, 1-On Pressure Needle Valves</p>		14 / 17	MPN-20-04-4-V	1/4" MP, 3-Way, 1-On Pressure, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-06-4-V	3/8" MP, 3-Way, 1-On Pressure, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-09-4-V	1/2" MP, 3-Way, 1-On Pressure, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-12-4-V	3/4" MP, 3-Way, 1-On Pressure, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-16-4-V	1" MP, 3-Way, 1-On Pressure, Needle Configuration, 20,000 psi / 1379 bar
 <p><b>MPN</b> 2-Stem Manifold Needle Valves</p>		14 / 17	MPN-20-04-5-V	1/4" MP, 2-Stem Manifold, Needle - Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-06-5-V	3/8" MP, 2-Stem Manifold, Needle - Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-09-5-V	1/2" MP, 2-Stem Manifold, Needle - Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-12-5-V	3/4" MP, 2-Stem Manifold, Needle - Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-16-5-V	1" MP, 2-Stem Manifold, Needle - Needle Configuration, 20,000 psi / 1379 bar
 <p><b>MPN</b> Replaceable Seat Needle Valves</p>		14 / 17	MPN-20-04-6-V	1/4" MP, Replaceable Seat, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-06-6-V	3/8" MP, Replaceable Seat, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-09-6-V	1/2" MP, Replaceable Seat, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-12-6-V	3/4" MP, Replaceable Seat, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-16-6-V	1" MP, Replaceable Seat, Needle Configuration, 20,000 psi / 1379 bar

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Preferred Range

**INSTRUMENTATION PRODUCTS - MPBF BALL VALVES (up to and Including 10,000 psi / 690 bar)**

Product	Schematic Representation	Page Number	Product Code	Product Description
 <b>MPBF</b> 2-Way Floating Style Ball Valves		18	<b>MPBF-10-10-04-V</b>	1/4" MP, 2-Way Floating Style, Ball Configuration, 10,000 psi / 690 bar, 10mm Bore
			<b>MPBF-10-10-06-V</b>	3/8" MP, 2-Way Floating Style, Ball Configuration, 10,000 psi / 690 bar, 10mm Bore
			<b>MPBF-10-10-09-V</b>	9/16" MP, 2-Way Floating Style, Ball Configuration, 10,000 psi / 690 bar, 10mm Bore

**INSTRUMENTATION PRODUCTS - MPBT BALL VALVES (up to and Including 20,000 psi / 1379 bar)**

 <b>MPBT</b> 2-Way Trunnion Style Ball Valves		19 / 22	<b>MPBT-20-5-04-1-V</b>	1/4" MP, 2-Way Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
			<b>MPBT-20-5-06-1-V</b>	3/8" MP, 2-Way Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
			<b>MPBT-20-5-09-1-V</b>	9/16" MP, 2-Way Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
 <b>MPBT</b> 3-Way Diverting Trunnion Style Ball Valves	 90° Operation	19 / 22	<b>MPBT-20-5-04-2-V</b>	1/4" MP, 3-Way Diverting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
			<b>MPBT-20-5-06-2-V</b>	3/8" MP, 3-Way Diverting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
			<b>MPBT-20-5-09-2-V</b>	9/16" MP, 3-Way Diverting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
 <b>MPBT</b> 3-Way Selecting Trunnion Style Ball Valves	 180° Operation	19 / 22	<b>MPBT-20-5-04-3-V</b>	1/4" MP, 3-Way Selecting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
			<b>MPBT-20-5-06-3-V</b>	3/8" MP, 3-Way Selecting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
			<b>MPBT-20-5-09-3-V</b>	9/16" MP, 3-Way Selecting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
 <b>MPBT</b> 2-Way Trunnion Style Ball Valves		19 / 22	<b>MPBT-20-10-04-1-V</b>	1/4" MP, 2-Way Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore
			<b>MPBT-20-10-06-1-V</b>	3/8" MP, 2-Way Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore
			<b>MPBT-20-10-09-1-V</b>	9/16" MP, 2-Way Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore
 <b>MPBT</b> 3-Way Diverting Trunnion Style Ball Valves	 90° Operation	19 / 22	<b>MPBT-20-10-04-2-V</b>	1/4" MP, 3-Way Diverting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore
			<b>MPBT-20-10-06-2-V</b>	3/8" MP, 3-Way Diverting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore
			<b>MPBT-20-10-09-2-V</b>	9/16" MP, 3-Way Diverting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore
 <b>MPBT</b> 3-Way Selecting Trunnion Style Ball Valves	 180° Operation	19 / 22	<b>MPBT-20-10-04-3-V</b>	1/4" MP, 3-Way Selecting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore
			<b>MPBT-20-10-06-3-V</b>	3/8" MP, 3-Way Selecting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore
			<b>MPBT-20-10-09-3-V</b>	9/16" MP, 3-Way Selecting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore


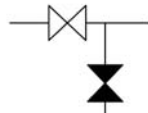

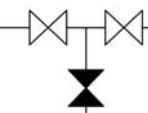
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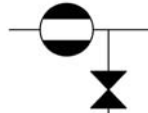

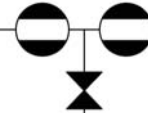
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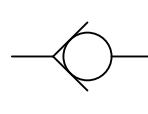
**INSTRUMENTATION PRODUCTS - MPNM NEEDLE VALVE MANIFOLDS (up to and including 20,000 psi / 1379 bar)**

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>MPNM</b> Single Block &amp; Bleed Needle Valve Manifolds</p>		23 / 24	<b>MPNM-20-04-04-1</b>	1/4" MP, Single Block & Bleed Manifold, Needle - Needle Configuration, 20,000 psi / 1379 bar, 1/4" MP Vent Bleed
			<b>MPNM-20-06-04-1</b>	3/8" MP, Single Block & Bleed Manifold, Needle - Needle Configuration, 20,000 psi / 1379 bar, 1/4" MP Vent Bleed
 <p><b>MPNM</b> Double Block &amp; Bleed Needle Valve Manifolds</p>		23 / 24	<b>MPNM-20-04-04-2</b>	1/4" MP, Double Block & Bleed Manifold, Needle - Needle - Needle Configuration, 20,000 psi / 1379 bar, 1/4" MP Vent Bleed
			<b>MPNM-20-06-04-2</b>	3/8" MP, Double Block & Bleed Manifold, Needle - Needle - Needle Configuration, 20,000 psi / 1379 bar, 1/4" MP Vent Bleed

**INSTRUMENTATION PRODUCTS - MPBM TRUNNION BALL VALVE MANIFOLDS (up to and including 20,000 psi / 1379 bar)**

 <p><b>MPBM</b> Trunnion Style Single Block &amp; Bleed Manifolds</p>		25 / 26	<b>MPBM-20-10-04-04-1-V</b>	1/4" MP, Trunnion Style Single Block & Bleed Manifold, Ball - Needle Configuration, 20,000 psi / 1379 bar, 10mm Bore, 1/4" MP Vent Bleed
			<b>MPBM-20-10-06-04-1-V</b>	3/8" MP, Trunnion Style Single Block & Bleed Manifold, Ball - Needle Configuration, 20,000 psi / 1379 bar, 10mm Bore, 1/4" MP Vent Bleed
			<b>MPBM-20-10-09-04-1-V</b>	1/2" MP, Trunnion Style Single Block & Bleed Manifold, Ball - Needle Configuration, 20,000 psi / 1379 bar, 10mm Bore, 1/4" MP Vent Bleed
 <p><b>MPBM</b> Trunnion Style Double Block &amp; Bleed Manifolds</p>		25 / 26	<b>MPBM-20-10-04-04-2-V</b>	1/4" MP, Trunnion Style Double Block & Bleed Manifold, Ball - Needle - Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore, 1/4" MP Vent Bleed
			<b>MPBM-20-10-06-04-2-V</b>	3/8" MP, Trunnion Style Double Block & Bleed Manifold, Ball - Needle - Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore, 1/4" MP Vent Bleed
			<b>MPBM-20-10-09-04-2-V</b>	1/2" MP, Trunnion Style Double Block & Bleed Manifold, Ball - Needle - Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore, 1/4" MP Vent Bleed

**INSTRUMENTATION PRODUCTS - MPCV CHECK VALVES (up to and including 20,000 psi / 1379 bar)**

 <p><b>MPCV</b> Check Valves</p>		27	<b>MPCV-20-04-1</b>	1/4" MP, Check Valve, Ball Configuration, 20,000 psi / 1379 bar
			<b>MPCV-20-06-1</b>	3/8" MP, Check Valve, Ball Configuration, 20,000 psi / 1379 bar
			<b>MPCV-20-09-1</b>	1/2" MP, Check Valve, Ball Configuration, 20,000 psi / 1379 bar
			<b>MPCV-20-12-1</b>	3/4" MP, Check Valve, Ball Configuration, 20,000 psi / 1379 bar
			<b>MPCV-20-16-1</b>	1" MP, Check Valve, Ball Configuration, 20,000 psi / 1379 bar

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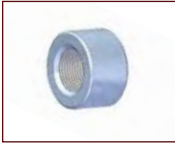


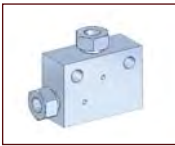

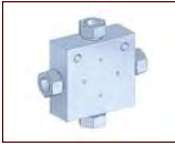


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## Preferred Range



## INSTRUMENTATION PRODUCTS - MPF (up to and including 20,000 psi / 1379 bar)

Product	Page Number	Product Code	Product Description
 <p>Collar</p>	28 / 32	MPF-04-C	1/4" MP, Collar, 20,000 psi / 1379 bar
		MPF-06-C	3/8" MP, Collar, 20,000 psi / 1379 bar
		MPF-09-C	1/2" MP, Collar, 20,000 psi / 1379 bar
		MPF-12-C	3/4" MP, Collar, 20,000 psi / 1379 bar
		MPF-16-C	1" MP, Collar, 20,000 psi / 1379 bar
 <p>Gland Nut</p>	28 / 32	MPF-04-G	1/4" MP, Gland Nut, 20,000 psi / 1379 bar
		MPF-06-G	3/8" MP, Gland Nut, 20,000 psi / 1379 bar
		MPF-09-G	1/2" MP, Gland Nut, 20,000 psi / 1379 bar
		MPF-12-G	3/4" MP, Gland Nut, 20,000 psi / 1379 bar
		MPF-16-G	1" MP, Gland Nut, 20,000 psi / 1379 bar
 <p>Plug</p>	28 / 32	MPF-04-P	1/4" MP, Plug, 20,000 psi / 1379 bar
		MPF-06-P	3/8" MP, Plug, 20,000 psi / 1379 bar
		MPF-09-P	1/2" MP, Plug, 20,000 psi / 1379 bar
		MPF-12-P	3/4" MP, Plug, 20,000 psi / 1379 bar
		MPF-16-P	1" MP, Plug, 20,000 psi / 1379 bar
 <p>Elbow</p>	28 / 32	MPF-04-L	1/4" MP, Elbow, 20,000 psi / 1379 bar
		MPF-06-L	3/8" MP, Elbow, 20,000 psi / 1379 bar
		MPF-09-L	1/2" MP, Elbow, 20,000 psi / 1379 bar
		MPF-12-L	3/4" MP, Elbow, 20,000 psi / 1379 bar
		MPF-16-L	1" MP, Elbow, 20,000 psi / 1379 bar
 <p>Tee</p>	28 / 32	MPF-04-T	1/4" MP, Tee, 20,000 psi / 1379 bar
		MPF-06-T	3/8" MP, Tee, 20,000 psi / 1379 bar
		MPF-09-T	1/2" MP, Tee, 20,000 psi / 1379 bar
		MPF-12-T	3/4" MP, Tee, 20,000 psi / 1379 bar
		MPF-16-T	1" MP, Tee, 20,000 psi / 1379 bar
 <p>Cross</p>	28 / 32	MPF-04-X	1/4" MP, Cross, 20,000 psi / 1379 bar
		MPF-06-X	3/8" MP, Cross, 20,000 psi / 1379 bar
		MPF-09-X	1/2" MP, Cross, 20,000 psi / 1379 bar
		MPF-12-X	3/4" MP, Cross, 20,000 psi / 1379 bar
		MPF-16-X	1" MP, Cross, 20,000 psi / 1379 bar
 <p>Bulkhead Coupler</p>	28 / 32	MPF-04-B	1/4" MP, Bulkhead Coupler, 20,000 psi / 1379 bar
		MPF-06-B	3/8" MP, Bulkhead Coupler, 20,000 psi / 1379 bar
		MPF-09-B	1/2" MP, Bulkhead Coupler, 20,000 psi / 1379 bar
		MPF-12-B	3/4" MP, Bulkhead Coupler, 20,000 psi / 1379 bar
		MPF-16-B	1" MP, Bulkhead Coupler, 20,000 psi / 1379 bar
 <p>Straight Coupler</p>	28 / 32	MPF-04-S	1/4" MP, Straight Coupler, 20,000 psi / 1379 bar
		MPF-06-S	3/8" MP, Straight Coupler, 20,000 psi / 1379 bar
		MPF-09-S	1/2" MP, Straight Coupler, 20,000 psi / 1379 bar
		MPF-12-S	3/4" MP, Straight Coupler, 20,000 psi / 1379 bar
		MPF-16-S	1" MP, Straight Coupler, 20,000 psi / 1379 bar

MPF - Medium Pressure Fittings - Adapters & Nipples, Please refer to the product selection charts on pages 33 & 34.



Features & Benefits



Bifold Marshalsea Product Range

Bifold Marshalsea provides pumps for use with fluids which include a variety of water-based, fire resistant and other media types. The properties of these fluids include a combination of high or low viscosity with either high or low lubricity.

Various pump models are available for use with water glycol and other calibration fluids.

Bifold Marshalsea provide Relief Valves for both gaseous and liquid service.

Bifold Marshalsea also provide surface and subsea Pressure Intensifiers for pressure boosting of water based or synthetic oil-based fluids.

Certification Details



This relief valve conforms to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and are ATEX compliant. This valve also conforms to the Pressure Equipment Directive 97/23/EC. All valves are CE marked and supplied with a test certificate plus a declaration of conformity.

Relief Valves



Hydraulic Thermal Relief Valve

- The special, removable lock down screw facility can be applied to override the relief valve during system pressure test without affecting the pre-set, set point.



Hydraulic Precision Relief Valve

- Precision relief valves have very high sealing forces along with accurate and narrow dead bands. Precision relief valves should be used in preference to sprung relief valves where there is risk of vibration induced leakage or where low dead bands are important to system safety performance. Sprung relief valves typically will have a narrow dead band when tested on a static dead weight tester but will have a much wider dead band under flowing conditions that will require a significant drop in system pressure to enable the valve to reset.

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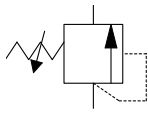

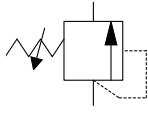

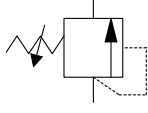

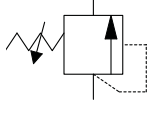

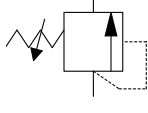
When selecting a product, the applicable operating system design must be considered to ensure safe use. The products function, material compatibility, adequate ratings, correct installation, operation and maintenance are the responsibilities of the system designer and user.

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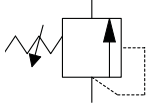

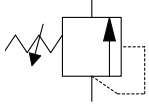

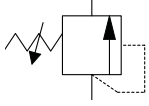

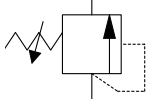

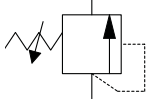
Selection Table



HYDRAULIC SERVICE PRODUCTS - THERMAL RELIEF VALVES I 4480 (up to 1300 bar set point)

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>Hydraulic Service</b> Thermal Relief Valves Type I4480 - 55</p>		36 / 37	I4480 - 55	1/4" MP, Inlet Connection and 1/4" NPT, Outlet Connection. Thermal Relief Valve. 600 bar to 1300 bar; Ø 4 mm Orifice.
 <p><b>Hydraulic Service</b> Thermal Relief Valves Type I4480 - 47</p>		36 / 37	I4480 - 47	3/8" MP, Inlet Connection and 1/4" MP, Outlet Connection. Thermal Relief Valve. 600 bar to 1300 bar; Ø 4 mm Orifice.
 <p><b>Hydraulic Service</b> Thermal Relief Valves Type I4480 - 83</p>		36 / 37	I4480 - 83	3/8" MP, Inlet Connection and 3/8" NPT, Outlet Connection. Thermal Relief Valve. 600 bar to 1300 bar; Ø 4 mm Orifice.
 <p><b>Hydraulic Service</b> Thermal Relief Valves Type I4480 - 90</p>		36 / 37	I4480 - 90	5/16" MP, Inlet Connection and 1/4" NPT, Outlet Connection. Thermal Relief Valve. 600 bar to 1300 bar; Ø 4 mm Orifice.
 <p><b>Hydraulic Service</b> Thermal Relief Valves Type I4480 - 97</p>		36 / 37	I4480 - 97	5/16" MP, Inlet Connection and 3/8" NPT, Outlet Connection. Thermal Relief Valve. 600 bar to 1300 bar; Ø 4 mm Orifice.

**HYDRAULIC SERVICE PRODUCTS - PRECISION RELIEF VALVES 14580 (up to 1200 bar set point)**

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>Hydraulic Service</b> Precision Relief Valves Type 14580 - 16</p>		38 / 39	14580 - 16	3/8" MP, Inlet Connection and 1/4" NPT, Outlet Connection. Precision Relief Valve. 600 bar to 1200 bar
 <p><b>Hydraulic Service</b> Precision Relief Valves Type 14580 - 04</p>		38 / 39	14580 - 04	3/8" MP, Inlet Connection and 3/8" NPT, Outlet Connection. Precision Relief Valve. 600 bar to 1200 bar
 <p><b>Hydraulic Service</b> Precision Relief Valves Type 14580 - 09</p>		38 / 39	14580 - 09	3/8" MP, Inlet Connection and 3/8" BSP, Outlet Connection. Precision Relief Valve. 600 bar to 1200 bar
 <p><b>Hydraulic Service</b> Precision Relief Valves Type 14580 - 11</p>		38 / 39	14580 - 11	3/8" MP, Inlet Connection and 3/8" MP, Outlet Connection. Precision Relief Valve. 600 bar to 1200 bar
 <p><b>Hydraulic Service</b> Precision Relief Valves Type 14580 - 20</p>		38 / 39	14580 - 20	3/8" MP, Inlet Connection and 1/2" NPT, Outlet Connection. Precision Relief Valve. 600 bar to 1200 bar

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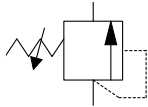

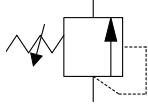

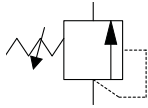

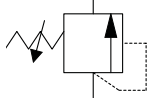
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Selection Table



HYDRAULIC SERVICE PRODUCTS - PRECISION RELIEF VALVES 14570 & 23800 (up to 1200 bar set point)

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>Hydraulic Service</b> Precision Relief Valves Type 14570 - 09</p>		38 / 39	14570 - 09	3/8" MP, Inlet Connection and 3/8" BSP, Outlet Connection. Precision Relief Valve. 600 bar to 1200 bar
 <p><b>Hydraulic Service</b> Precision Relief Valves Type 14570 - 11</p>		38 / 39	14570 - 11	3/8" MP, Inlet Connection and 3/8" MP, Outlet Connection. Precision Relief Valve. 600 bar to 1200 bar
 <p><b>Hydraulic Service</b> Precision Relief Valves Type 14570 - 15</p>		38 / 39	14570 - 15	3/8" MP, Inlet Connection and 1/2" NPT, Outlet Connection. Precision Relief Valve. 600 bar to 1200 bar
 <p><b>Hydraulic Service</b> Precision Relief Valves Type 23800 - 04</p>		38 / 39	23800 - 04	3/4" MP, Inlet Connection and 3/4" MP, Outlet Connection. Precision Relief Valve. 600 bar to 1200 bar

MPN

Product Description

The Bifold range of Medium Pressure Needle Valves have been developed to provide the safe and reliable control of both liquid and gas service applications up to 20,000 psi / 1379 bar. Typical applications include Hydraulic Control Panels, Hydrostatic testing equipment, Chemical Injection skids, Water Jetting and other general industrial applications.

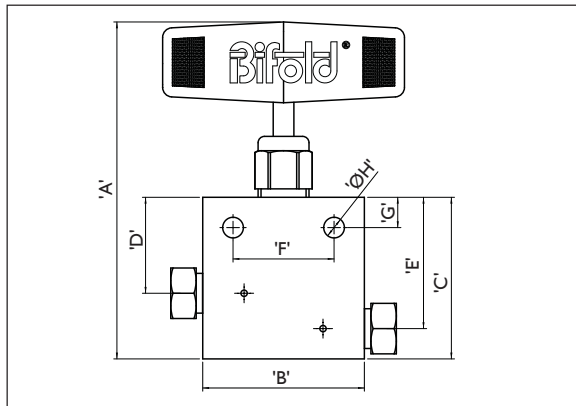
Features and Benefits

- Available in 6 body styles for a variety of applications.
- Maintenance Free Stem Sealing.
- Non rotating anti-galling tip as standard.
- Vee, Regulating or Soft Tip options available.
- High tensile 316L CW stainless steel bodies as standard.
- Exotic materials available upon request.
- Traceability via a unique serial number stamped on the valve body.
- Available in a number of temperature ranges from -73°C to +315°C (-20°C to +170°C as standard).
- Tube Sizes from 1/4" to 1".

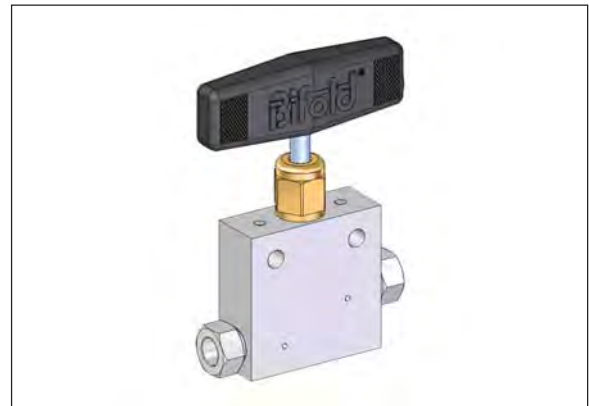
MPN

2-Way Straight Needle Valves

Dimensional Drawing



SCHEMATIC



PREFERRED RANGE MPN - SELECTION TABLE

Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C' (mm)	'D' (mm)	'E' (mm)	'F' (mm)	'G' (mm)	'ØH' (mm)	Thickness (mm)	Minimum Orifice Size
MPN-20-04-I-V	1/4" MP	20,000 psi / 1379 bar	106.00	50.80	50.80	30.16	41.28	31.75	9.53	6.50	19.05	2.80
MPN-20-06-I-V	3/8" MP	20,000 psi / 1379 bar	106.00	50.80	50.80	30.16	41.28	31.75	9.53	6.50	19.05	5.20
MPN-20-09-I-V	9/16" MP	20,000 psi / 1379 bar	152.00	63.50	73.03	44.45	60.33	34.93	12.70	8.70	25.4	7.90
MPN-20-12-I-V	3/4" MP	20,000 psi / 1379 bar	215.00	76.20	95.25	57.15	76.20	44.45	15.88	11.50	34.93	11.10
MPN-20-16-I-V	1" MP	20,000 psi / 1379 bar	250.00	104.78	120.65	71.44	95.25	63.5	28.58	14.50	44.45	14.30

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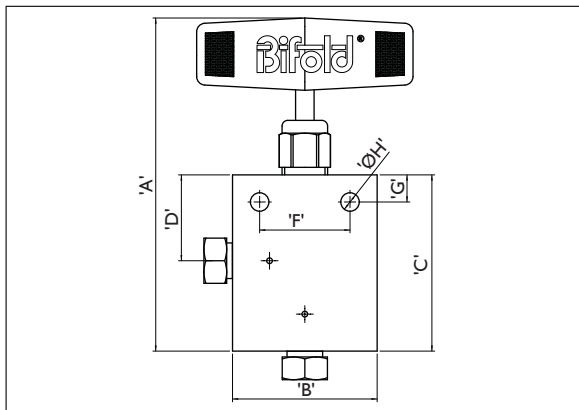




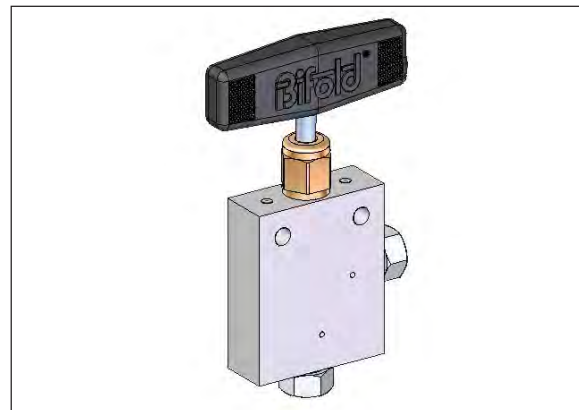
**MPN**

**2-Way Angle Needle Valves**

**Dimensional Drawing**



**SCHEMATIC**



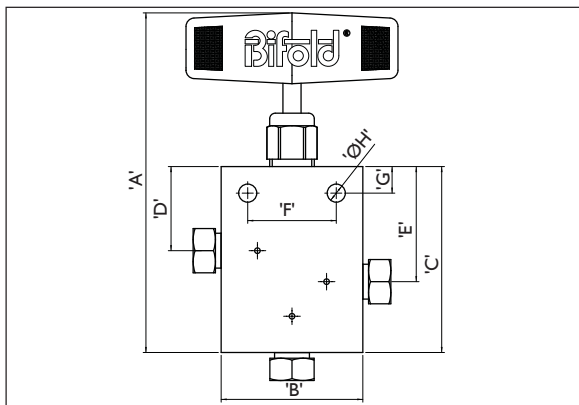
**PREFERRED RANGE MPN - SELECTION TABLE**

Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C' (mm)	'D' (mm)	'F' (mm)	'G' (mm)	'ØH' (mm)	Thickness (mm)	Minimum Orifice Size
MPN-20-04-2-V	1/4" MP	20,000 psi / 1379 bar	117.00	50.80	61.91	30.16	31.75	9.53	6.50	19.05	2.80
MPN-20-06-2-V	3/8" MP	20,000 psi / 1379 bar	117.00	50.80	61.91	30.16	31.75	9.53	6.50	19.05	5.20
MPN-20-09-2-V	1/2" MP	20,000 psi / 1379 bar	165.00	63.50	85.73	44.45	34.93	12.70	8.70	25.40	7.90
MPN-20-12-2-V	3/4" MP	20,000 psi / 1379 bar	234.00	76.20	114.30	57.15	44.45	15.88	11.50	34.93	11.10
MPN-20-16-2-V	1" MP	20,000 psi / 1379 bar	269.00	104.78	139.70	71.44	63.50	28.58	14.50	44.45	14.30

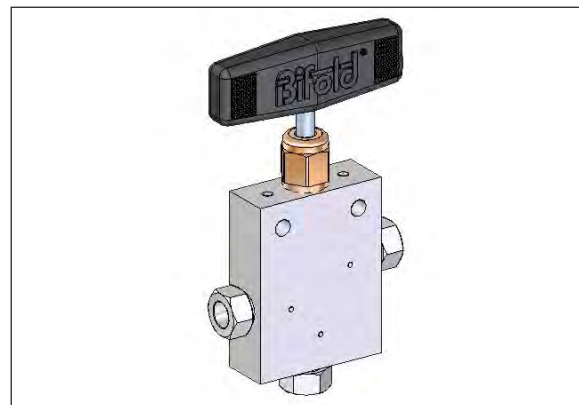
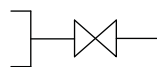
**MPN**

**3-Way, 2-On Pressure Needle Valves**

**Dimensional Drawing**



**SCHEMATIC**



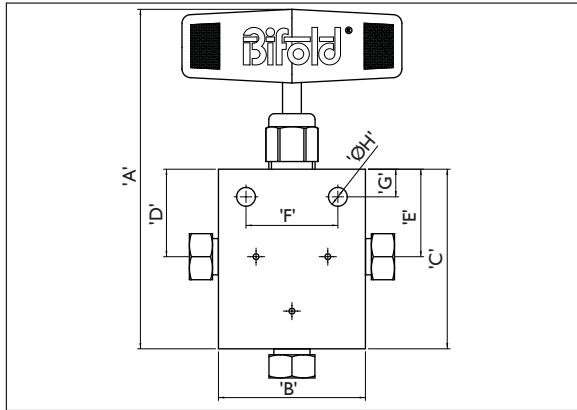
**PREFERRED RANGE MPN - SELECTION TABLE**

Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C' (mm)	'D' (mm)	'E' (mm)	'F' (mm)	'G' (mm)	'ØH' (mm)	Thickness (mm)	Minimum Orifice Size
MPN-20-04-3-V	1/4" MP	20,000 psi / 1379 bar	122.00	50.80	66.68	30.16	41.28	31.75	9.53	6.50	19.05	2.80
MPN-20-06-3-V	3/8" MP	20,000 psi / 1379 bar	122.00	50.80	66.68	30.16	41.28	31.75	9.53	6.50	19.05	5.20
MPN-20-09-3-V	1/2" MP	20,000 psi / 1379 bar	171.00	63.50	92.08	44.45	60.33	34.93	12.70	8.70	25.40	7.90
MPN-20-12-3-V	3/4" MP	20,000 psi / 1379 bar	247.00	76.20	127.00	57.15	76.20	44.45	15.88	11.50	34.93	11.10
MPN-20-16-3-V	1" MP	20,000 psi / 1379 bar	282.00	104.78	152.40	71.44	95.25	63.50	28.58	14.50	44.45	14.30

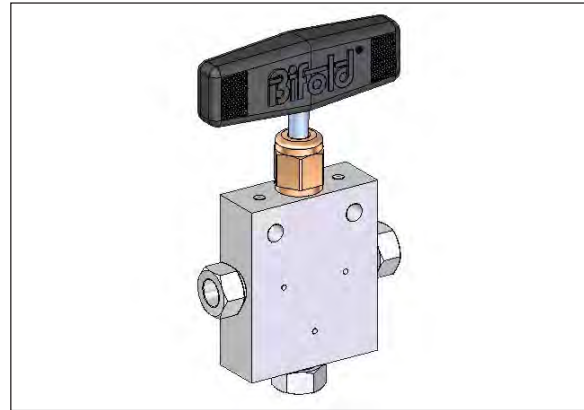
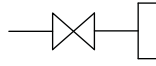
**MPN**

**3-Way, 1-On Pressure Needle Valves**

**Dimensional Drawing**



**SCHEMATIC**



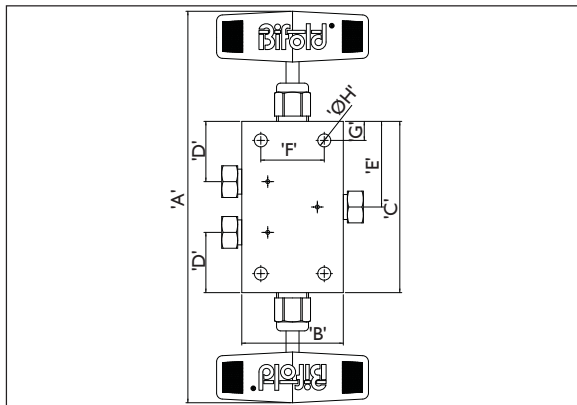
**PREFERRED RANGE MPN - SELECTION TABLE**

Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C' (mm)	'D' (mm)	'E' (mm)	'F' (mm)	'G' (mm)	'ØH' (mm)	Thickness (mm)	Minimum Orifice Size
MPN-20-04-4-V	1/4" MP	20,000 psi / 1379 bar	117.00	50.80	61.91	30.16	30.16	31.75	9.53	6.50	19.05	2.80
MPN-20-06-4-V	3/8" MP	20,000 psi / 1379 bar	117.00	50.80	61.91	30.16	30.16	31.75	9.53	6.50	19.05	5.20
MPN-20-09-4-V	1/2" MP	20,000 psi / 1379 bar	165.00	63.50	85.73	44.45	44.45	34.93	12.70	8.70	25.40	7.90
MPN-20-12-4-V	3/4" MP	20,000 psi / 1379 bar	234.00	76.20	114.30	57.15	57.15	44.45	15.88	11.50	34.93	11.10
MPN-20-16-4-V	1" MP	20,000 psi / 1379 bar	269.00	104.78	139.70	71.44	71.44	63.50	28.58	14.50	44.45	14.30

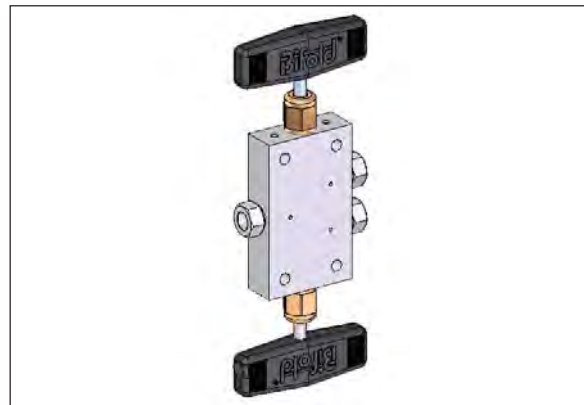
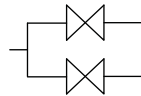
**MPN**

**2-Stem Manifold Needle Valves**

**Dimensional Drawing**



**SCHEMATIC**



**PREFERRED RANGE MPN - SELECTION TABLE**

Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C' (mm)	'D' (mm)	'E' (mm)	'F' (mm)	'G' (mm)	'ØH' (mm)	Thickness (mm)	Minimum Orifice Size
MPN-20-04-5-V	1/4" MP	20,000 psi / 1379 bar	196.00	50.80	85.73	30.16	42.86	31.75	9.53	6.50	19.05	2.80
MPN-20-06-5-V	3/8" MP	20,000 psi / 1379 bar	196.00	50.80	85.73	30.16	42.86	31.75	9.53	6.50	19.05	5.20
MPN-20-09-5-V	1/2" MP	20,000 psi / 1379 bar	288.00	63.50	130.18	44.45	65.09	34.93	12.70	8.70	25.40	7.90
MPN-20-12-5-V	3/4" MP	20,000 psi / 1379 bar	417.00	76.20	177.80	57.15	88.90	44.45	15.88	11.50	34.93	11.10
MPN-20-16-5-V	1" MP	20,000 psi / 1379 bar	462.00	104.78	203.20	71.44	101.60	63.50	28.58	14.50	44.45	14.30

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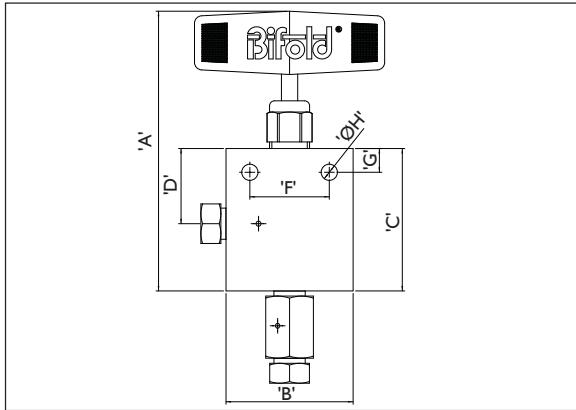
**Quality Assurance**  
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**MPN**

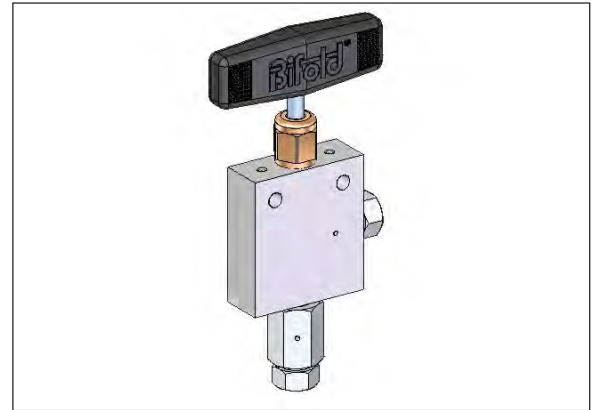
**Replaceable Seat Needle Valves**



**Dimensional Drawing**



**SCHEMATIC**



**PREFERRED RANGE MPN - SELECTION TABLE**

Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C' (mm)	'D' (mm)	'F' (mm)	'G' (mm)	'ØH' (mm)	Thickness (mm)	Minimum Orifice Size
MPN-20-04-6-V	1/4" MP	20,000 psi / 1379 bar	112.00	50.80	57.15	30.16	31.75	9.53	6.50	19.05	2.80
MPN-20-06-6-V	3/8" MP	20,000 psi / 1379 bar	112.00	50.80	57.15	30.16	31.75	9.53	6.50	19.05	5.20
MPN-20-09-6-V	9/16" MP	20,000 psi / 1379 bar	161.50	63.50	82.55	44.45	34.93	12.70	8.70	25.40	7.90
MPN-20-12-6-V	3/4" MP	20,000 psi / 1379 bar	215.00	76.20	95.25	57.15	44.45	15.88	11.50	34.93	11.10
MPN-20-16-6-V	1" MP	20,000 psi / 1379 bar	253.00	104.78	123.83	71.44	63.50	28.58	14.50	44.45	14.30

**MPN Selection Chart - Ordering Example**

<b>MPN</b>	Medium Pressure Needle Valve, 20,000 psi / 1379 bar	Model Code
<b>20</b>	20,000 psi / 1379 bar, Maximum Cold Working Pressure	Pressure Rating
<b>04</b> <b>06</b> <b>09</b> <b>12</b> <b>16</b>	1/4" MP 3/8" MP 9/16" MP 3/4" MP 1" MP	Connection Size
<b>1</b> <b>2</b> <b>3</b> <b>4</b> <b>5</b> <b>6</b>	2-Way Straight 2-Way Angle 3-Way, 2-On Pressure 3-Way, 1-On Pressure 2-Stem Manifold Replaceable Seat	Configuration
<b>V</b> <b>R</b> <b>S</b>	Vee Regulating Soft Tip	Tip
<b>NO LETTER</b> <b>V</b> <b>A</b> <b>G</b>	HNBR Viton Aflas Graphite	Seal Material
<b>NO LETTER</b> <b>S</b> <b>LK</b> <b>PM</b>	Stainless Steel Handle (Standard for 3/4" and 1" MP) Lockable Handle Panel Mount Gland	Options
<b>NO LETTER</b> <b>08</b> <b>26</b> <b>39</b> <b>42</b> <b>45</b> <b>49</b> <b>50</b> <b>89</b> <b>90</b>	316L CW (6MO) 254MO Duplex UNS S31803 Super Duplex UNS S32750/32760 Inconel 625 UNS N06625 Monel 400 UNS N04400 Inconel 825 UNS N08825 Hastelloy C276 Titanium Gr2 UNS R50400 Nickel 200 UNS N02200	Material
<b>MPN-20-04-3-V</b>		Ordering Example

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## MPBF

## 2-Way Floating Style Ball Valves, 10mm Bore



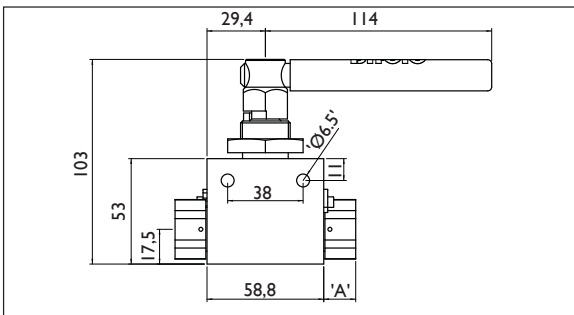
### Product Description

The Bifold range of Medium Pressure Floating Ball Valves are an economical, 2-way solution for most on/off liquid and gas service applications up to 10,000 psi / 690 bar. They are available in a wide range of seal arrangements and can be manufactured from exotic materials for extreme environments. Typical applications include Hydraulic Control Panels, Hydrostatic testing equipment, Chemical Injection skids and other general industrial applications.

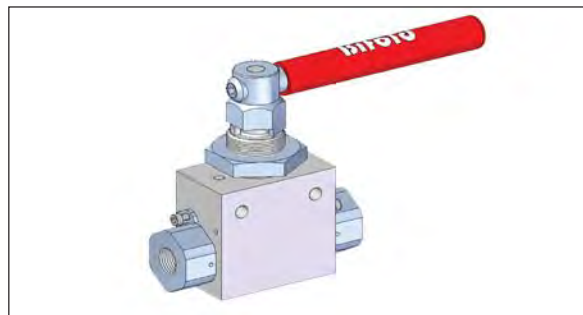
### Features and Benefits

- Low operating torque.
- Optional Handle Locking device that does not jeopardise through panel mounting.
- Bi-directional straight through flow path minimising pressure drop.
- High tensile 316L CW stainless steel bodies as standard.
- PEEK seats as standard.
- NACE MR-01-75 / ISO 15156 compliant materials of construction are available up on request.

### Dimensional Drawing



SCHEMATIC



### PREFERRED RANGE MPBF SELECTION TABLE

Product Code	Size	Rated	'A' (mm)	Thickness (mm)	Minimum Orifice Size
MPBF-10-10-04-V	1/4" MP	10,000 psi / 690 bar	25.40	38.10	2.80
MPBF-10-10-06-V	3/8" MP	10,000 psi / 690 bar	25.40	38.10	5.20
MPBF-10-10-09-V	9/16" MP	10,000 psi / 690 bar	31.80	38.10	7.90

### MPBF Selection Chart - Ordering Example

<b>MPBF</b>	Medium Pressure Floating Style Ball Valve, 10,000 psi / 690 bar	Model Code
<b>10</b>	10,000 psi / 690 bar, Maximum Cold Working Pressure	Pressure Rating
<b>5</b>	5mm	Bore Size
<b>10</b>	10mm	Bore Size
<b>04</b>	1/4"	Connection Size
<b>06</b>	3/8"	
<b>09</b>	9/16"	
<b>12</b>	3/4"	
<b>16</b>	1"	
<b>NO LETTER</b>	MP Female	Connection Type
<b>M</b>	MP Male	
<b>V</b>	Viton (80 Shore)	O-ring Material
<b>V9</b>	Endura V91A	
<b>S</b>	Nitrile	
<b>H</b>	HNBR	
<b>NO LETTER</b>	(Standard Handle)	Options
<b>LK</b>	Lockable Handle	
<b>NO LETTER</b>	316L CW	Material
<b>08</b>	(6MO) 254MO	
<b>26</b>	Duplex UNS S31803	
<b>39</b>	Super Duplex UNS S32750/32760	
<b>42</b>	Inconel 625 UNS N06625	
<b>45</b>	Monel 400 UNS N04400	
<b>49</b>	Inconel 825 UNS N08825	
<b>50</b>	Hastelloy C276	
<b>89</b>	Titanium Gr2 UNS R50400	
<b>90</b>	Nickel 200 UNS N02200	
<b>MPBF-10-10-06</b>	<b>- V</b>	Ordering Example

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**MPBT**

**Product Description**

The Bifold range of Medium Pressure Trunnion Ball Valves have been developed to the highest quality for uppermost performance. They are available in a wide range of configurations for most liquid service applications up to 20,000 psi / 1379 bar. An extensive range of seal materials available, which are suitable for extreme environments. Typical applications include Hydraulic Control Panels, Hydrostatic testing equipment, Chemical Injection skids, Water Jetting and other general industrial applications.

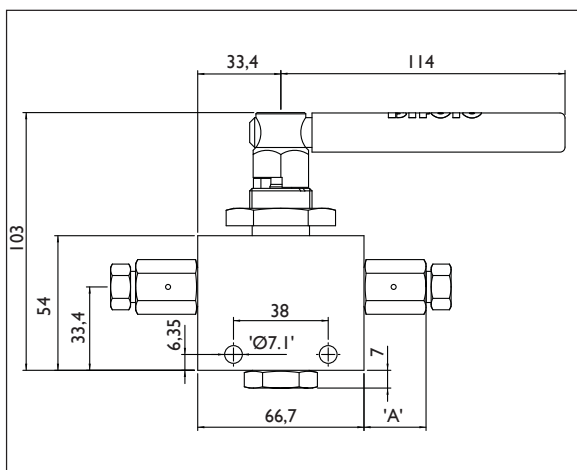
**Features and Benefits**

- Blow out proof stem design.
- Maintenance free stem sealing.
- Low operating torque.
- Pressure loaded seats creating a positive seal.
- Bi-directional straight through flow path minimising pressure drop.
- High tensile 316L CW stainless steel bodies as standard.
- Glass Reinforced PEEK seats as standard for excellent chemical resistance.
- Exotic materials available upon request.
- Traceability via a unique serial number stamped on the valve body, gland and collar.
- Available in a number of temperature ranges from -46°C to +225°C (-20°C to +180°C as standard).
- NACE MR-01-75 / ISO 15156 compliant materials of construction are available up on request.

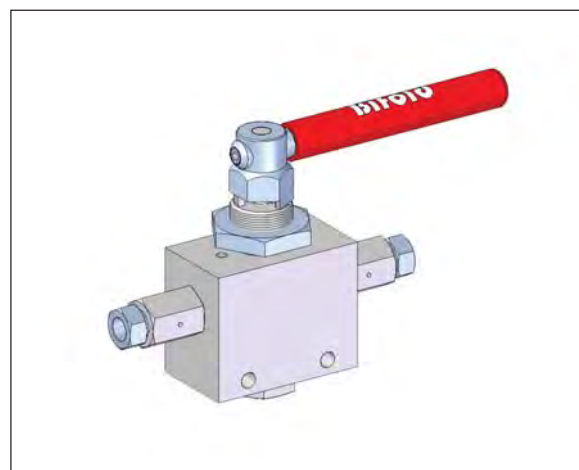
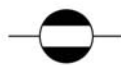
**MPBT**

**2-Way Trunnion Style Ball Valves, 5mm Bore**

**Dimensional Drawing**



SCHEMATIC



**PREFERRED RANGE MPBT SELECTION TABLE**

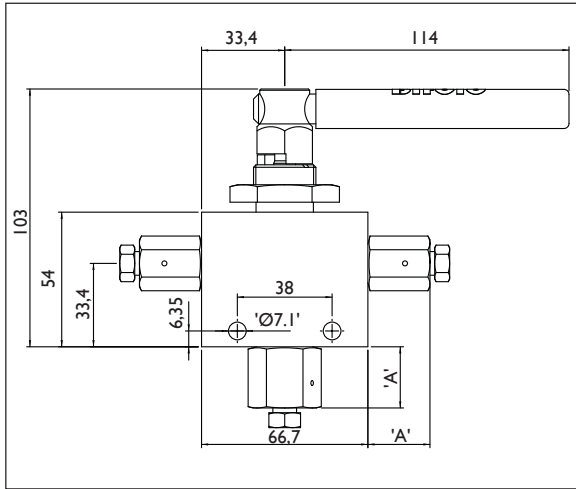
Product Code	Size	Rated	'A' (mm)	Thickness (mm)	Minimum Orifice Size
MPBT-20-5-04-I-V	1/4" MP	20,000 psi / 1379 bar	25.40	38.10	2.80
MPBT-20-5-06-I-V	3/8" MP	20,000 psi / 1379 bar	25.40	38.10	5.00
MPBT-20-5-09-I-V	9/16" MP	20,000 psi / 1379 bar	31.80	38.10	5.00

**MPBT**

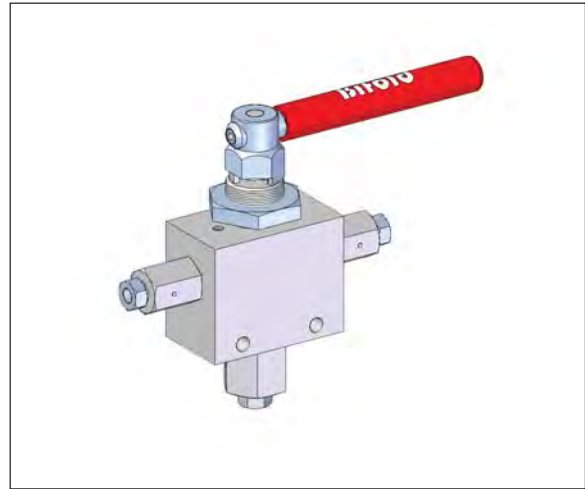
**3-Way Diverting Trunnion Style Ball Valves, 5mm Bore**



**Dimensional Drawing**



**SCHEMATIC**

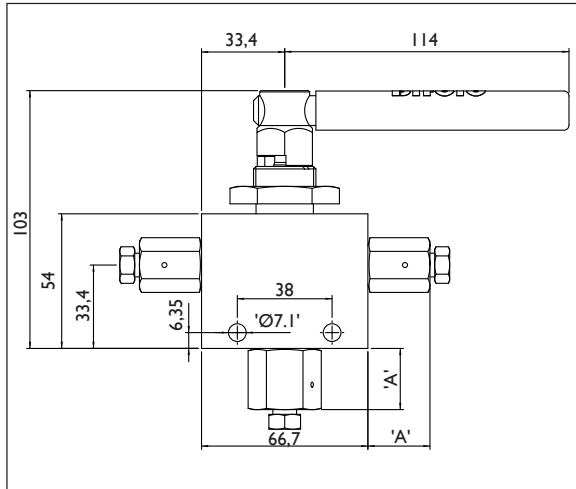


PREFERRED RANGE MPBT SELECTION TABLE					
Product Code	Size	Rated	'A' (mm)	Thickness (mm)	Minimum Orifice Size
MPBT-20-5-04-2-V	1/4" MP	20,000 psi / 1379 bar	25.40	38.10	2.80
MPBT-20-5-06-2-V	3/8" MP	20,000 psi / 1379 bar	25.40	38.10	5.00
MPBT-20-5-09-2-V	1/2" MP	20,000 psi / 1379 bar	31.80	38.10	5.00

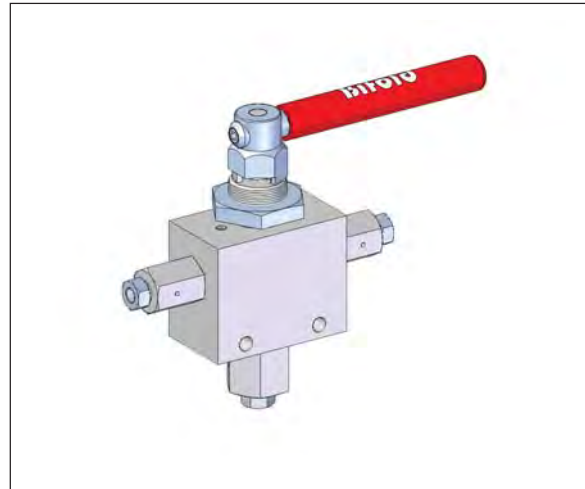
**MPBT**

**3-Way Selecting Trunnion Style Ball Valves, 5mm Bore**

**Dimensional Drawing**



**SCHEMATIC**



PREFERRED RANGE MPBT SELECTION TABLE					
Product Code	Size	Rated	'A' (mm)	Thickness (mm)	Minimum Orifice Size
MPBT-20-5-04-3-V	1/4" MP	20,000 psi / 1379 bar	25.40	38.10	2.80
MPBT-20-5-06-3-V	3/8" MP	20,000 psi / 1379 bar	25.40	38.10	5.00
MPBT-20-5-09-3-V	1/2" MP	20,000 psi / 1379 bar	31.80	38.10	5.00

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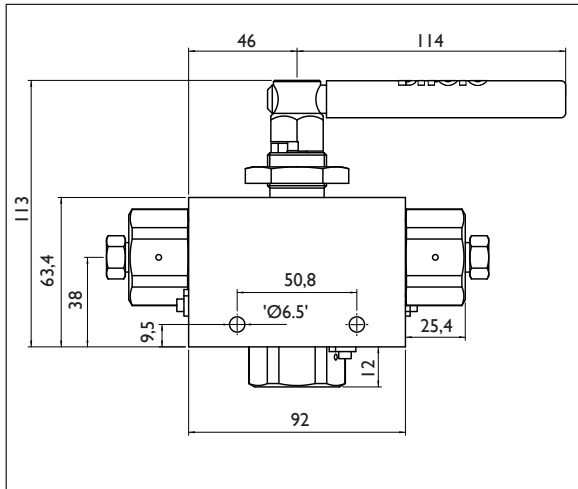
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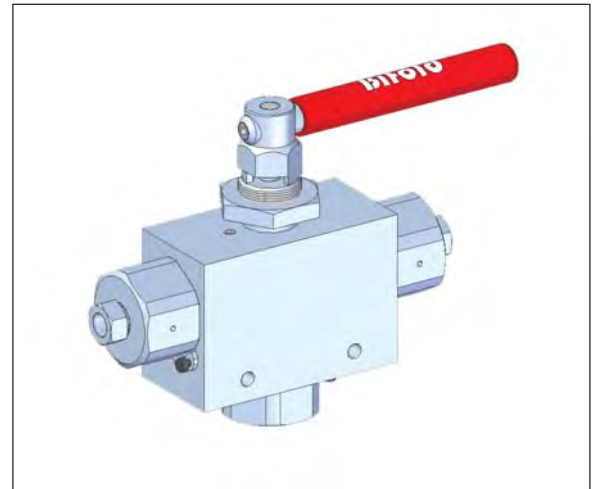
**MPBT**

**2-Way Trunnion Style Ball Valves, 10mm Bore**

**Dimensional Drawing**



**SCHEMATIC**



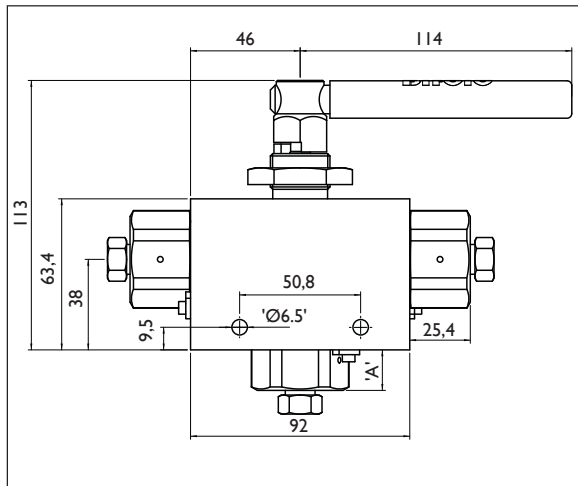
**PREFERRED RANGE MPBT SELECTION TABLE**

Product Code	Size	Rated	Thickness (mm)	Minimum Orifice Size
MPBT-20-10-04-1-V	1/4" MP	20,000 psi / 1379 bar	44.45	2.80
MPBT-20-10-06-1-V	3/8" MP	20,000 psi / 1379 bar	44.45	5.20
MPBT-20-10-09-1-V	1/2" MP	20,000 psi / 1379 bar	44.45	7.90

**MPBT**

**3-Way Diverting Trunnion Style Ball Valves, 10mm Bore**

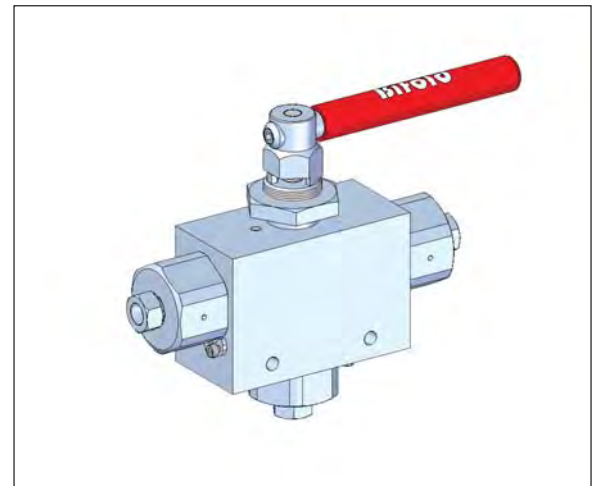
**Dimensional Drawing**



**SCHEMATIC**



90° Operation



**PREFERRED RANGE MPBT SELECTION TABLE**

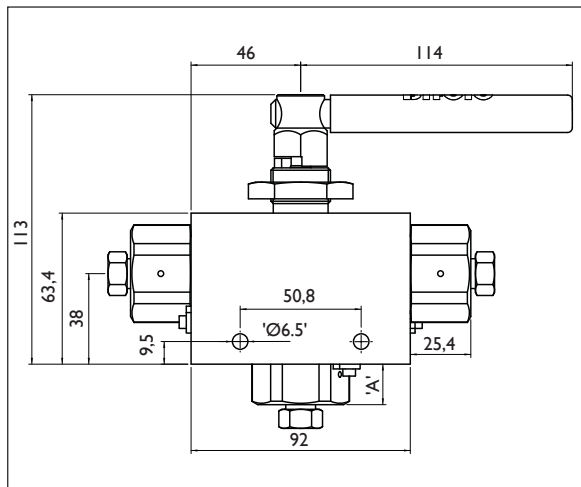
Product Code	Size	Rated	'A' (mm)	Thickness (mm)	Minimum Orifice Size
MPBT-20-10-04-2-V	1/4" MP	20,000 psi / 1379 bar	17.00	44.45	2.80
MPBT-20-10-06-2-V	3/8" MP	20,000 psi / 1379 bar	17.00	44.45	5.20
MPBT-20-10-09-2-V	1/2" MP	20,000 psi / 1379 bar	25.40	44.45	7.90

MPBT

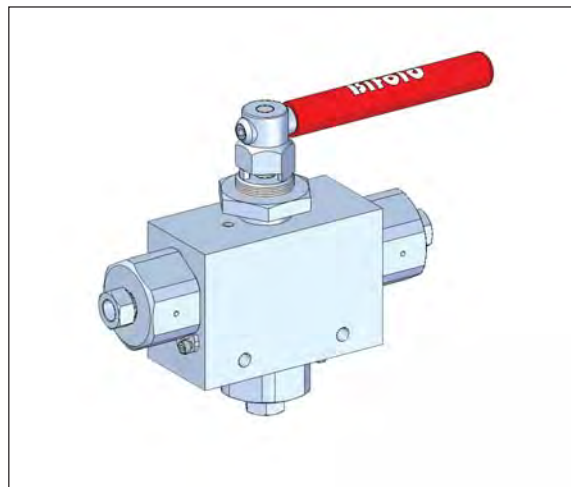
3-Way Selecting Trunnion Style Ball Valves, 10mm Bore



Dimensional Drawing



SCHEMATIC



PREFERRED RANGE MPBT SELECTION TABLE

Product Code	Size	Rated	'A' (mm)	Thickness (mm)	Minimum Orifice Size
MPBT-20-10-04-3-V	1/4" MP	20,000 psi / 1379 bar	17.00	44.45	2.80
MPBT-20-10-06-3-V	3/8" MP	20,000 psi / 1379 bar	17.00	44.45	5.20
MPBT-20-10-09-3-V	1/2" MP	20,000 psi / 1379 bar	25.40	44.45	7.90

MPBT Selection Chart - Ordering Example

<b>MPBT</b>	Medium Pressure Trunnion Style Ball Valve, up to 20,000 psi / 1379 bar	Model Code
<b>10</b>	10,000 psi / 690 bar, Maximum Cold Working Pressure	Pressure Rating
<b>20</b>	20,000 psi / 1379 bar, Maximum Cold Working Pressure	Pressure Rating
<b>5</b>	5mm (3/16" Maximum)	Bore Size
<b>10</b>	10mm	Bore Size
<b>04</b>	1/4"	Connection Size
<b>06</b>	3/8"	
<b>09</b>	9/16"	
<b>12</b>	3/4"	
<b>16</b>	1"	
<b>NO LETTER</b>	MP Female	Connection Type
<b>M</b>	MP Male	
<b>1</b>	2-Way	Configuration
<b>2</b>	3-Way Diverting	
<b>3</b>	3-Way Selecting	
<b>4</b>	4-Way (10,000 psi / 690 bar, Maximum Cold Working Pressure)	
<b>5</b>	5-Way (10,000 psi / 690 bar, Maximum Cold Working Pressure)	
<b>V</b>	Viton (80 Shore)	O-ring Material
<b>V9</b>	Endura V91A	
<b>S</b>	Nitrile	
<b>H</b>	HNBR	
<b>NO LETTER</b>	(Standard Handle)	Options
<b>LK</b>	Lockable Handle	
<b>NO LETTER</b>	316L CW	Material
<b>08</b>	(6MO) 254MO	
<b>26</b>	Duplex UNS S31803	
<b>39</b>	Super Duplex UNS S32750/32760	
<b>42</b>	Inconel 625 UNS N06625	
<b>45</b>	Monel 400 UNS N04400	
<b>49</b>	Inconel 825 UNS N08825	
<b>50</b>	Hastelloy C276	
<b>89</b>	Titanium Gr2 UNS R50400	
<b>90</b>	Nickel 200 UNS N02200	
<b>MPBT-20-10-06</b>	<b>-1-V</b>	Ordering Example

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**MPNM**

**Product Description**

The Bifold range of Medium Pressure Needle Valve Manifolds have been developed to provide safe and reliable intervention and control of both liquid and gas service applications up to 20,000 psi / 1379 bar. They are available in a variety of configurations including single block & bleed and a double block & bleed designed for instrument calibration or repair. The manifolds house numerous needle valves, reducing the number of possible leak paths and in turn reducing system costs and weight.

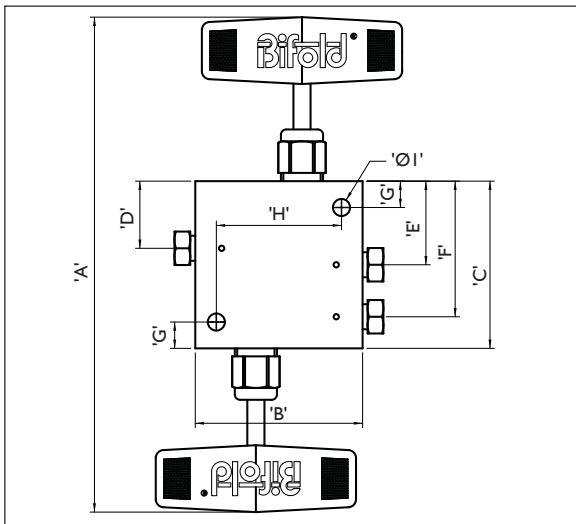
**Features and Benefits**

- Available in a number of configurations for a variety of applications.
- Maintenance free stem sealing.
- Non rotating anti-galling tip as standard.
- Vee tip stem.
- High tensile 316L CW stainless steel bodies as standard.
- Compact Design.
- Exotic materials available upon request.
- Traceability via a unique serial number stamped on the valve body.
- Available in a number of temperature ranges from -73°C to +315°C (-20°C to +170°C as standard).
- Tube Sizes from 1/4" to 1".

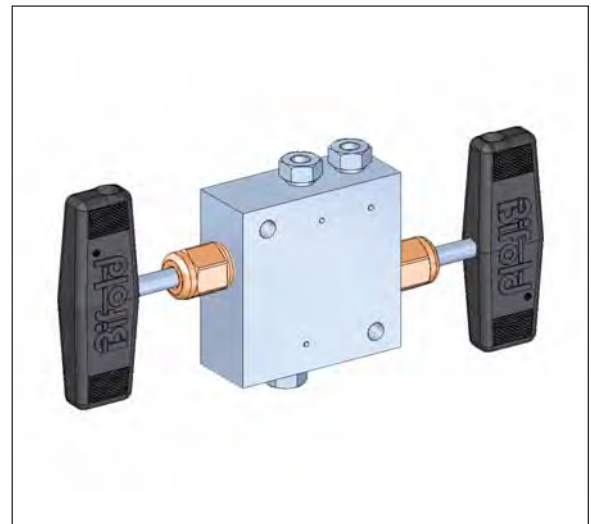
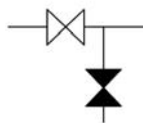
**MPNM**

**Single Block & Bleed Needle Valve Manifolds**

**Dimensional Drawing**



**SCHEMATIC**



**PREFERRED RANGE MPNM SELECTION TABLE**

Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C' (mm)	'D' (mm)	'E' (mm)	'F' (mm)	'G' (mm)	'H' (mm)	'Ø1' (mm)	Thickness (mm)	Minimum Orifice Size
MPNM-20-04-04-I	1/4" MP	20,000 psi / 1379 bar	188.00	63.50	63.50	25.50	31.75	51.50	10.00	49.30	6.50	25.40	2.80
MPNM-20-06-04-I	3/8" MP	20,000 psi / 1379 bar	200.00	63.50	75.00	25.50	31.75	63.00	10.00	49.30	6.50	25.40	5.20

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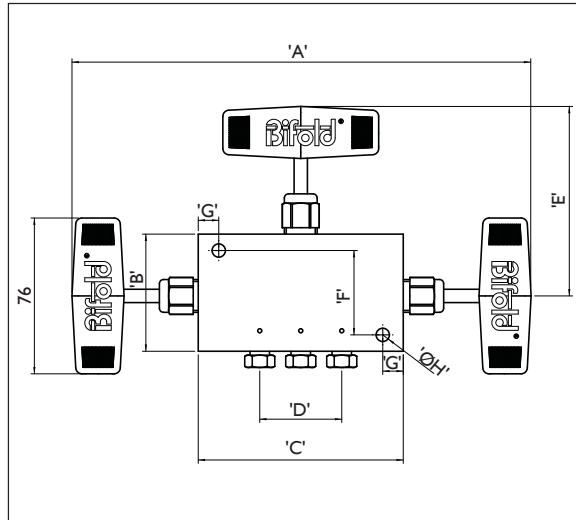
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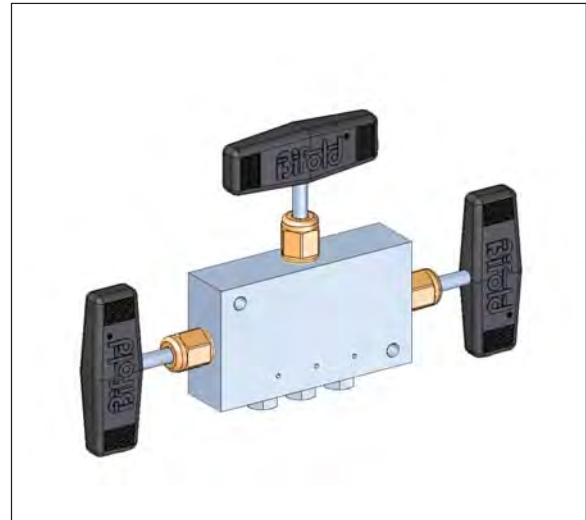
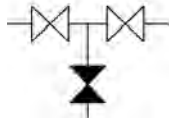
**MPNM**

**Double Block & Bleed Needle Valve Manifolds**

**Dimensional Drawing**



**SCHEMATIC**



**PREFERRED RANGE MPNM SELECTION TABLE**

Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C' (mm)	'D' (mm)	'E' (mm)	'F' (mm)	'G' (mm)	'ØH' (mm)	Thickness (mm)	Minimum Orifice Size
MPNM-20-04-04-2	1/4" MP	20,000 psi / 1379 bar	224.00	57.20	100.00	40.00	92.00	37.20	8.00	6.50	25.40	2.80
MPNM-20-06-04-2	3/8" MP	20,000 psi / 1379 bar	244.00	57.20	120.00	60.00	92.00	37.20	8.00	6.50	25.40	5.20

**MPNM Selection Chart - Ordering Example**

<b>MPNM</b> Medium Pressure, Needle Valve Manifold, 20,000 psi / 1379 bar	Model Code
<b>20</b> 20,000 psi / 1379 bar, Maximum Cold Working Pressure	Pressure Rating
<b>04</b> 1/4" <b>06</b> 3/8" <b>09</b> 9/16" <b>12</b> 3/4" <b>16</b> 1"	Connection Size
<b>04</b> 1/4" <b>06</b> 3/8"	Vent Connection
<b>1</b> Single Block & Bleed <b>2</b> Double Block & Bleed <b>3</b> Double Block <b>4</b> Double Block & Bleed (with Gauge Ports) <b>5</b> Single Block & Bleed (inline pattern) <b>6</b> Double Block & Bleed (inline pattern)	Configuration
<b>NO LETTER</b> HNBR -20°C to +170°C <b>V</b> Viton -20°C to +200°C <b>A</b> Aflas -20°C to +250°C <b>G</b> Graphite -73°C to +315°C	O-ring Material
<b>NO LETTER</b> (Standard Handle) <b>S</b> Stainless Steel Handle (Standard for 3/4" and 1" MP) <b>LK</b> Lockable Handle <b>AV</b> Anti Tamper Vent	Options
<b>NO LETTER</b> 316L CW <b>08</b> (6MO) 254MO <b>26</b> Duplex UNS S31803 <b>39</b> Super Duplex UNS S32750/32760 <b>42</b> Inconel 625 UNS N06625 <b>45</b> Monel 400 UNS N04400 <b>49</b> Inconel 825 UNS N08825 <b>50</b> Hastelloy C276 <b>89</b> Titanium Gr2 UNS R50400 <b>90</b> Nickel 200 UNS N02200	Material

**MPNM-20-06-04-2** Ordering Example

Other configurations available upon request.

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**MPBM**

**Product Description**

The Bifold range of Medium Pressure Trunnion Ball Manifolds have been developed to provide safe and reliable intervention and control of liquid service applications up to 20,000 psi / 1379 bar. They are available in a variety of configurations including single block & bleed and a double block & bleed, designed for instrument calibration or repair. The manifolds consist of trunnion ball valve isolation valves and a needle valve vent, reducing the number of possible leak paths and in turn reducing system costs and weight.

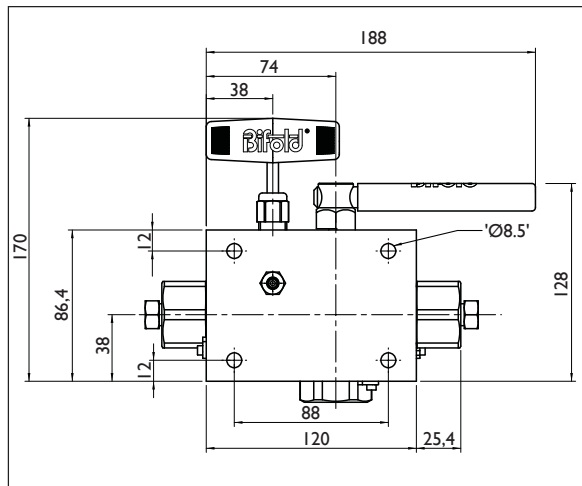
**Features and Benefits**

- Available in a number of configurations for a variety of applications.
- Maintenance free stem sealing.
- Bi-directional straight through flow path minimising pressure drop.
- Non rotating anti-galling tip as standard.
- Vee tip vent valve.
- Compact design.
- High tensile 316L CW stainless steel bodies as standard.
- Exotic materials available upon request.
- Traceability via a unique serial number stamped on the valve body.
- Operating temperature range of -20°C to +170°C.
- Tube Sizes from 1/4" to 1".

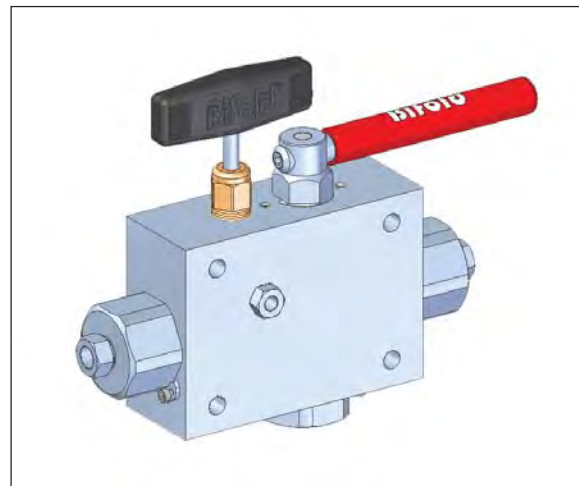
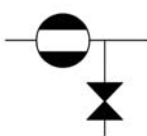
**MPBM**

**Trunnion Style Single Block & Bleed Manifolds, 10mm Bore**

**Dimensional Drawing**



SCHEMATIC



**PREFERRED RANGE MPBM SELECTION TABLE**

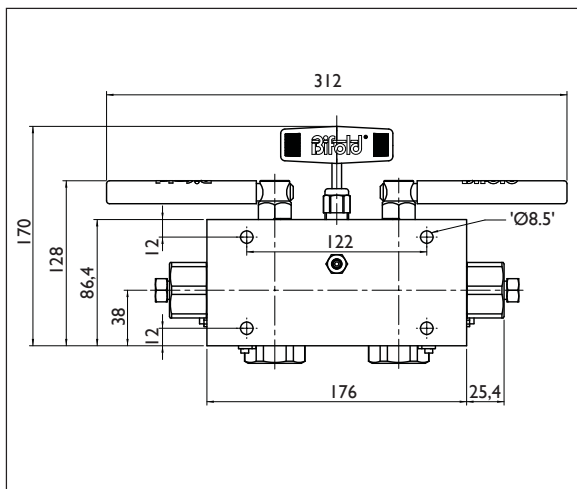
Product Code	Size	Rated	Thickness	Minimum Orifice Size
MPBM-20-10-04-04-1-V	1/4" MP	20,000 psi / 1379 bar	44.45	2.80
MPBM-20-10-06-04-1-V	3/8" MP	20,000 psi / 1379 bar	44.45	5.20
MPBM-20-10-09-04-1-V	9/16" MP	20,000 psi / 1379 bar	44.45	7.90

**MPBM**

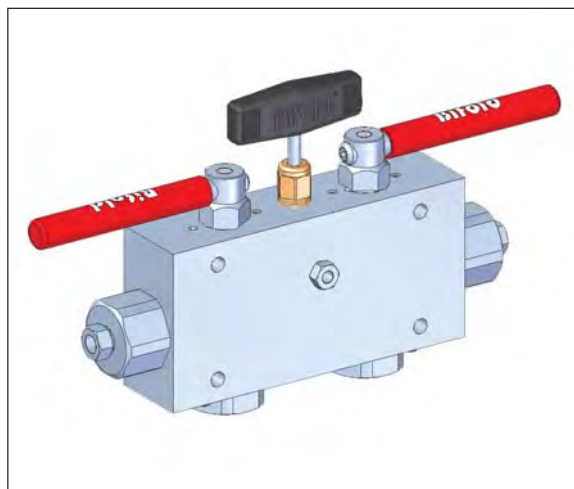
**Trunnion Style Double Block & Bleed Manifolds,  
10mm Bore**



**Dimensional Drawing**



**SCHEMATIC**



**PREFERRED RANGE MPBM SELECTION TABLE**

Product Code	Size	Rated	Thickness	Minimum Orifice Size
MPBM-20-10-04-04-2-V	1/4" MP	20,000 psi / 1379 bar	44.45	2.80
MPBM-20-10-06-04-2-V	3/8" MP	20,000 psi / 1379 bar	44.45	5.20
MPBM-20-10-09-04-2-V	1/2" MP	20,000 psi / 1379 bar	44.45	7.90

**MPBM Selection Chart - Ordering Example**

<b>MPBM</b> Medium Pressure, Trunnion Ball Valve Manifold, 20,000 psi 1379 bar	Model Code
<b>20</b> 20,000 psi / 1379 bar, Maximum Cold Working Pressure	Pressure Rating
<b>5</b> 5mm (3/16" Maximum)	Bore Size
<b>10</b> 10mm	
<b>04</b> 1/4" <b>06</b> 3/8" <b>09</b> 1/2" <b>12</b> 3/4" <b>16</b> 1"	Connection Size
<b>04</b> 1/4" <b>06</b> 3/8"	Vent Connection
<b>1</b> Single Block & Bleed <b>2</b> Double Block & Bleed <b>3</b> Double Block <b>4</b> Double Block & Bleed (with Gauge Ports)	Configuration
<b>V</b> Viton (80 Shore)      -20°C to +170°C <b>V9</b> Endura V91A        -20°C to +170°C <b>S</b> Nitrile                    -20°C to +120°C <b>H</b> HNBR                    -20°C to +160°C	O-ring Material
<b>NO LETTER</b> <b>LK</b> Lockable Handle <b>AV</b> Anti Tamper Vent	Options
<b>NO LETTER</b> 316L CW <b>08</b> (6MO) 254MO <b>26</b> Duplex UNS S31803 <b>39</b> Super Duplex UNS S32750/32760 <b>42</b> Inconel 625 UNS N06625 <b>45</b> Monel 400 UNS N04400 <b>49</b> Inconel 825 UNS N08825 <b>50</b> Hastelloy C276 <b>89</b> Titanium Gr2 UNS R50400 <b>90</b> Nickel 200 UNS N02200	Material

**MPBM-20-10-09-04-2-V**

Ordering Example

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**MPCV**

**Check Valves**

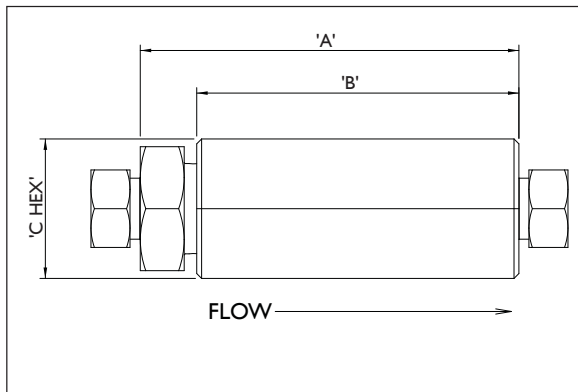
**Product Description**

The Bifold range of Check Valves have been developed using advanced sealing techniques from within the existing hydraulic control valve products. These sealing techniques ensure the ball check valve prevents reverse flow by providing a leak-tight shutoff. Typical applications include Hydraulic Control Panels, Hydrostatic testing equipment, Chemical Injection Skids, Water Jet and other general industrial applications.

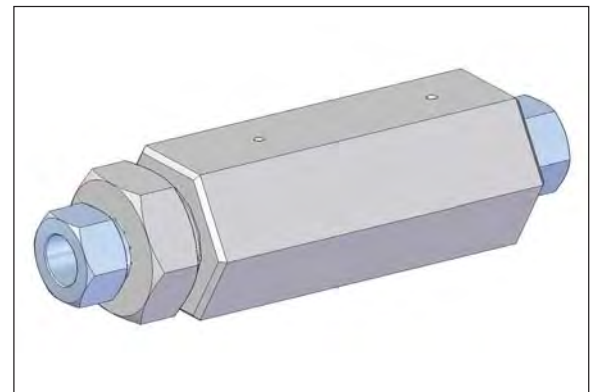
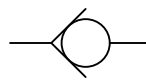
**Features and Benefits**

- 15 psi Nominal Cracking Pressure.
- Optimised Flow path.
- High tensile 316L CW stainless steel bodies as standard.
- Exotic materials available upon request.
- Traceability via a unique serial number stamped on the valve body.
- Operating temperature range of -20°C to +120°C.
- Tube Sizes from 1/4" to 1".

**Dimensional Drawing**



**SCHEMATIC**



**PREFERRED RANGE MPCV SELECTION TABLE**

Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C HEX' (mm)	Minimum Orifice Size
MPCV-20-04-I	1/4" MP	20,000 psi / 1379 bar	69.50	57.40	25.40	2.80
MPCV-20-06-I	3/8" MP	20,000 psi / 1379 bar	77.60	66.00	28.58	5.20
MPCV-20-09-I	9/16" MP	20,000 psi / 1379 bar	109.40	94.00	34.92	7.90
MPCV-20-12-I	3/4" MP	20,000 psi / 1379 bar	155.00	131.00	44.45	11.10
MPCV-20-16-I	1" MP	20,000 psi / 1379 bar	174.00	157.00	53.98	14.30

**MPCV Selection Chart - Ordering Example**

<b>MPCV</b>	Medium Pressure Check Valve, 20,000 psi / 1379 bar	Model Code
<b>20</b>	20,000 psi / 1379 bar, Maximum Cold Working Pressure	Pressure Rating
<b>04</b> <b>06</b> <b>09</b> <b>12</b> <b>16</b>	1/4" 3/8" 9/16" 3/4" 1"	Connection Size
<b>1</b> <b>2</b>	Ball Type Soft Seat Type	Configuration
<b>NO LETTER</b> <b>V</b> <b>S</b>	(for Ball Type only) Viton (80 Shore) Nitrile	O-ring Material
<b>MPCV-20 - 06 - 1</b>		Ordering Example

MPF

Product Description

The Bifold range of medium pressure valves also includes a range of fittings. Typical applications include Hydraulic Control Panels, Hydrostatic testing equipment, Chemical Injection Skids, Water Jet and other general industrial applications.

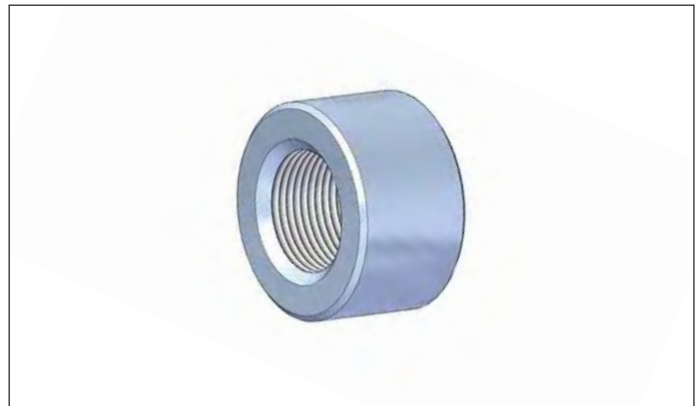
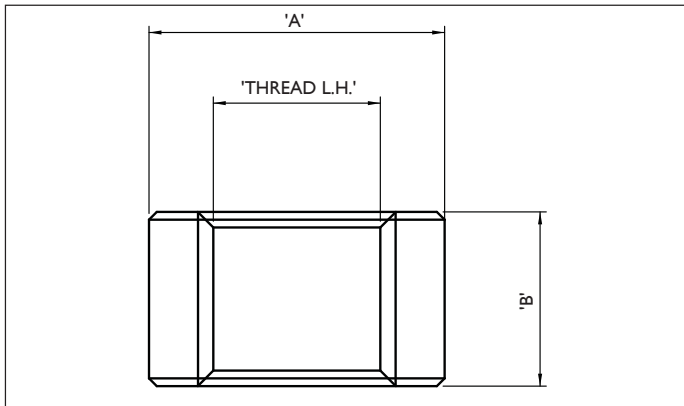
Features and Benefits

- High tensile 316L CW stainless steel as standard.
- Operating temperature range of -252°C to +649°C
- Exotic materials available upon request.
- Tube Sizes from 1/4" to 1".

MPF

Collar

Dimensional Drawing



PREFERRED RANGE MPF SELECTION TABLE

Product Code	Size	Rated	'A' (mm)	'B' (mm)	'Thread L.H'
MPF-04-C	1/4" MP	20,000 psi / 1379 bar	9.50	5.60	1/4" - 28 UNF
MPF-06-C	3/8" MP	20,000 psi / 1379 bar	11.90	6.30	3/8" - 24 UNF
MPF-09-C	9/16" MP	20,000 psi / 1379 bar	18.25	7.90	9/16" - 18 UNF
MPF-12-C	3/4" MP	20,000 psi / 1379 bar	23.80	9.50	3/4" - 16 UNF
MPF-16-C	1" MP	20,000 psi / 1379 bar	31.75	12.70	1" - 14 UN

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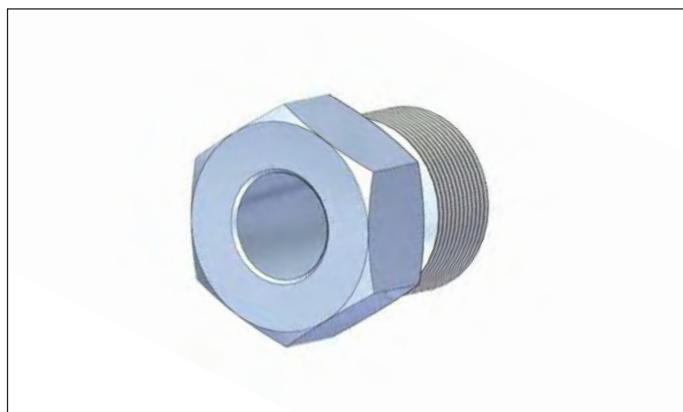
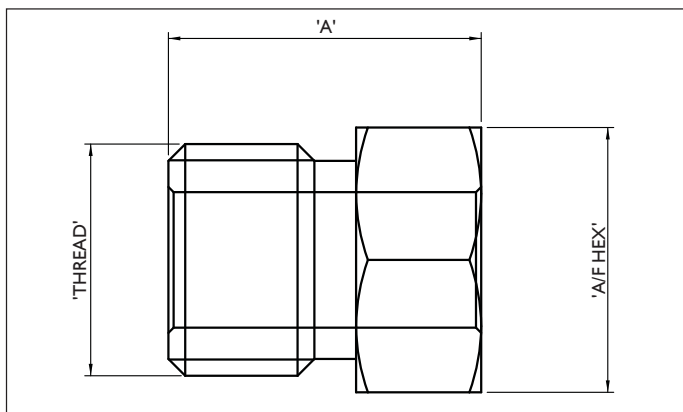
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**MPF**

**Gland Nut**

**Dimensional Drawing**



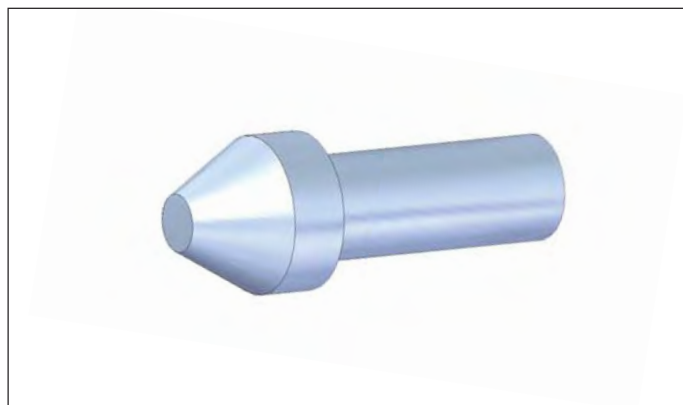
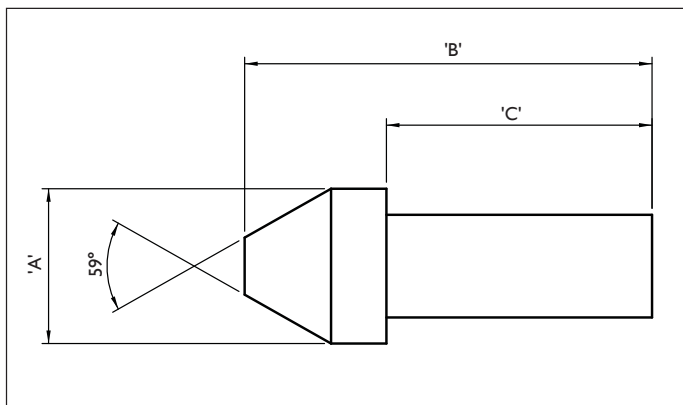
**PREFERRED RANGE MPF SELECTION TABLE**

Product Code	Size	Rated	'A/F Hex'	'A' (mm)	'Thread'
MPF-04-G	1/4" MP	20,000 psi / 1379 bar	12.70	15.00	7/16" - 20 UNF
MPF-06-G	3/8" MP	20,000 psi / 1379 bar	15.88	19.50	9/16" - 18 UNF
MPF-09-G	1/2" MP	20,000 psi / 1379 bar	22.22	25.40	13/16" - 16 UN
MPF-12-G	3/4" MP	20,000 psi / 1379 bar	30.00	26.00	3/4" - 14 NPSM
MPF-16-G	1" MP	20,000 psi / 1379 bar	35.00	36.00	1 3/8" - 12 UNF

**MPF**

**Plug**

**Dimensional Drawing**



**PREFERRED RANGE MPF SELECTION TABLE**

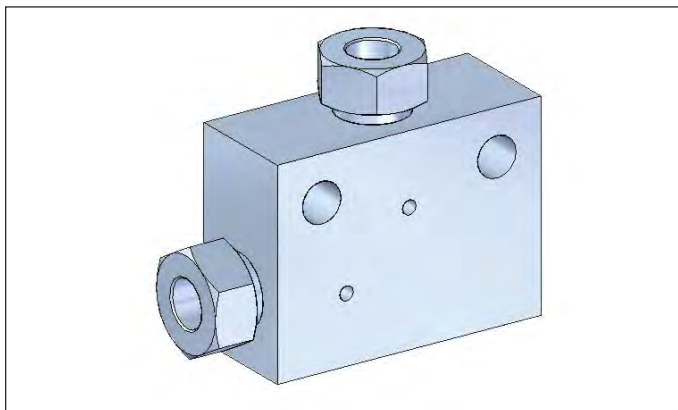
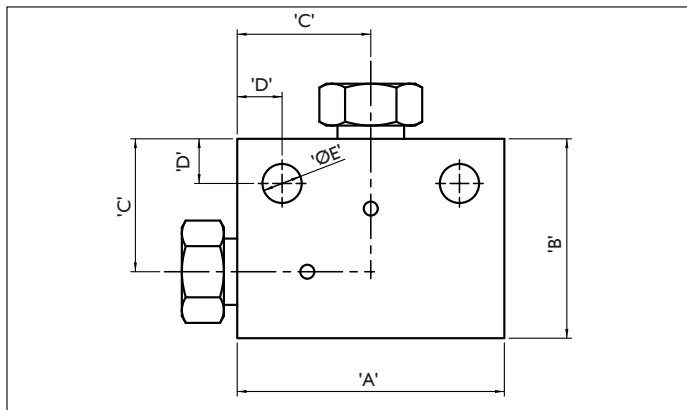
Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C' (mm)
MPF-04-P	1/4" MP	20,000 psi / 1379 bar	9.50	25.00	16.30
MPF-06-P	3/8" MP	20,000 psi / 1379 bar	11.90	28.00	16.90
MPF-09-P	1/2" MP	20,000 psi / 1379 bar	18.25	40.00	27.30
MPF-12-P	3/4" MP	20,000 psi / 1379 bar	23.80	44.50	28.60
MPF-16-P	1" MP	20,000 psi / 1379 bar	31.75	60.00	39.40

MPF

Elbow



Dimensional Drawing



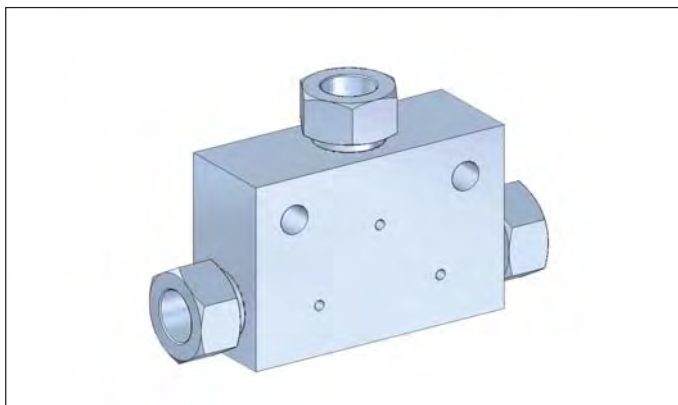
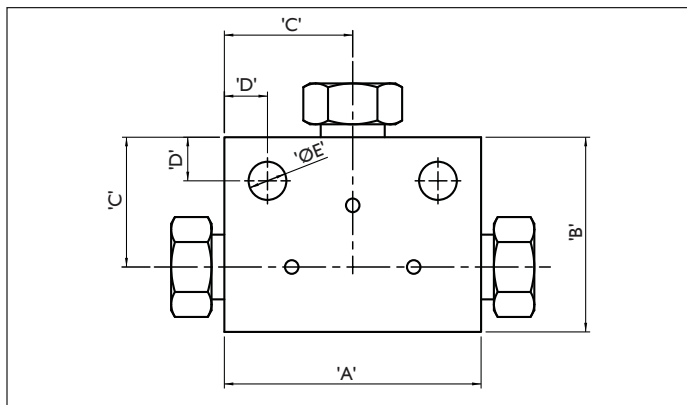
PREFERRED RANGE MPF SELECTION TABLE

Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C' (mm)	'D' (mm)	'ØE' (mm)	Thickness (mm)
MPF-04-L	1/4" MP	20,000 psi / 1379 bar	38.10	28.60	19.05	6.40	5.60	15.80
MPF-06-L	3/8" MP	20,000 psi / 1379 bar	50.80	34.9	25.4	7.90	5.60	19.05
MPF-09-L	1/2" MP	20,000 psi / 1379 bar	63.50	44.40	31.75	12.70	7.10	25.4
MPF-12-L	3/4" MP	20,000 psi / 1379 bar	76.20	57.20	38.10	12.70	8.60	34.9
MPF-16-L	1" MP	20,000 psi / 1379 bar	104.80	76.2	52.40	17.50	10.40	44.45

MPF

Tee

Dimensional Drawing



PREFERRED RANGE MPF SELECTION TABLE

Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C' (mm)	'D' (mm)	'ØE' (mm)	Thickness (mm)
MPF-04-T	1/4" MP	20,000 psi / 1379 bar	38.10	28.60	19.05	6.40	5.60	15.80
MPF-06-T	3/8" MP	20,000 psi / 1379 bar	50.80	34.90	25.40	7.90	5.60	19.05
MPF-09-T	1/2" MP	20,000 psi / 1379 bar	63.50	44.40	31.75	12.7	7.10	25.40
MPF-12-T	3/4" MP	20,000 psi / 1379 bar	76.20	57.20	38.10	12.7	8.60	34.90
MPF-16-T	1" MP	20,000 psi / 1379 bar	104.80	76.20	52.40	17.5	10.40	44.45

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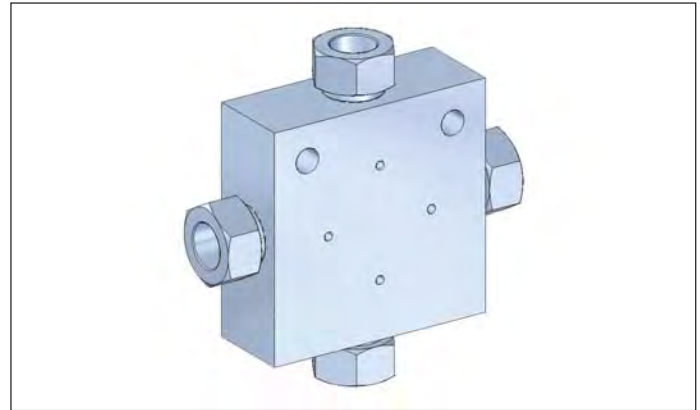
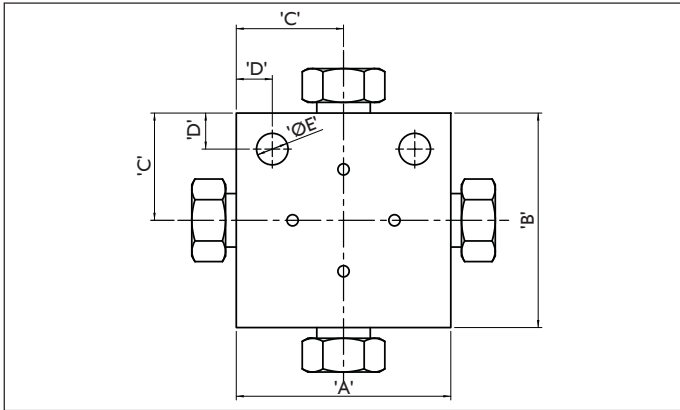
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**MPF**

**Cross**

**Dimensional Drawing**



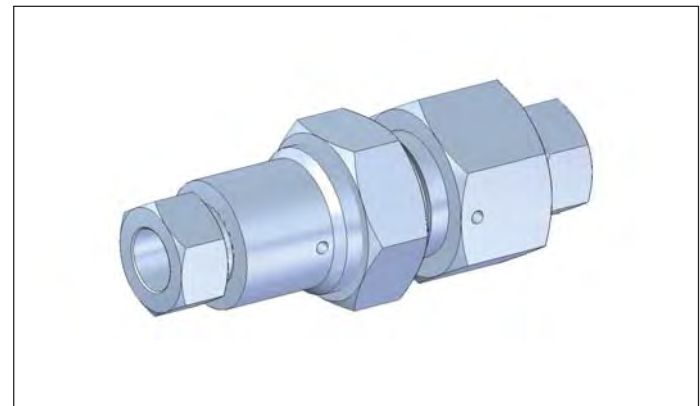
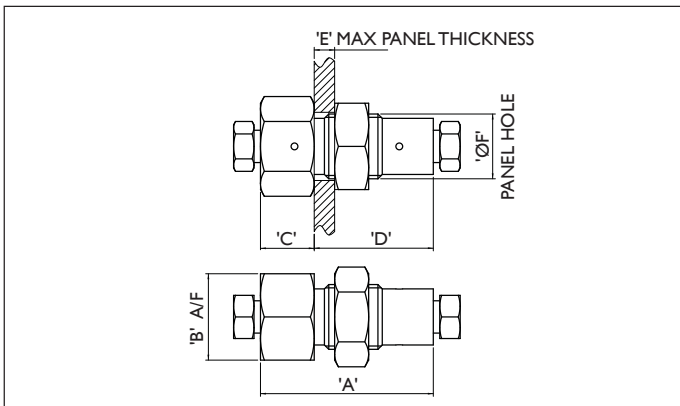
**PREFERRED RANGE MPF SELECTION TABLE**

Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C' (mm)	'D' (mm)	'ØE' (mm)	Thickness (mm)
MPF-04-X	1/4" MP	20,000 psi / 1379 bar	38.10	38.10	19.05	6.40	5.60	15.80
MPF-06-X	3/8" MP	20,000 psi / 1379 bar	50.80	50.80	25.40	7.90	5.60	19.05
MPF-09-X	1/2" MP	20,000 psi / 1379 bar	63.50	63.50	31.75	12.70	7.10	25.40
MPF-12-X	3/4" MP	20,000 psi / 1379 bar	76.20	76.20	38.10	12.70	8.60	34.90
MPF-16-X	1" MP	20,000 psi / 1379 bar	104.80	104.80	52.40	17.5	10.4	44.45

**MPF**

**Bulkhead Coupler**

**Dimensional Drawing**



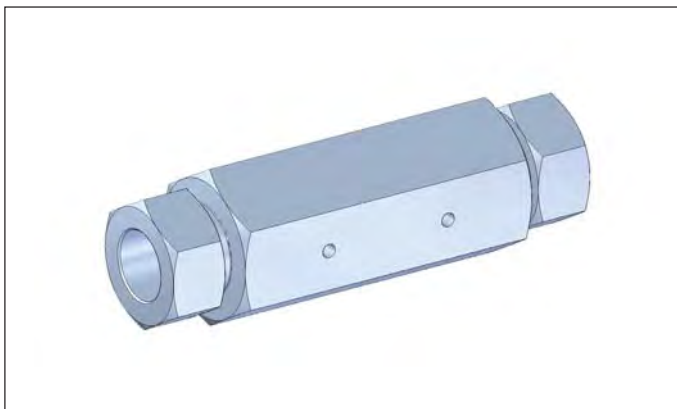
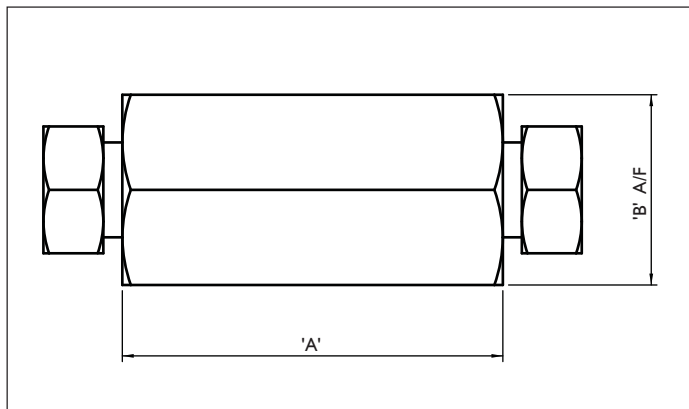
**PREFERRED RANGE MPF SELECTION TABLE**

Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C' (mm)	'D' (mm)	'ØF' (mm)	'E' (mm)
MPF-04-B	1/4" MP	20,000 psi / 1379 bar	50.80	25.40	15.80	35.00	20.00	10.00
MPF-06-B	3/8" MP	20,000 psi / 1379 bar	50.80	25.40	15.80	35.00	23.00	10.00
MPF-09-B	1/2" MP	20,000 psi / 1379 bar	66.70	34.90	22.20	44.50	28.00	16.00
MPF-12-B	3/4" MP	20,000 psi / 1379 bar	66.70	47.60	22.70	44.00	43.00	13.00
MPF-16-B	1" MP	20,000 psi / 1379 bar	89.00	54.00	38.00	51.00	49.00	10.00

MPF

Straight Coupler

Dimensional Drawing



PREFERRED RANGE MPF SELECTION TABLE

Product Code	Size	Rated	'A' (mm)	'B' (mm)
MPF-04-S	1/4" MP	20,000 psi / 1379 bar	38.10	19.05
MPF-06-S	3/8" MP	20,000 psi / 1379 bar	44.50	19.05
MPF-09-S	9/16" MP	20,000 psi / 1379 bar	54.00	25.40
MPF-12-S	3/4" MP	20,000 psi / 1379 bar	63.50	34.90
MPF-16-S	1" MP	20,000 psi / 1379 bar	88.90	44.45

MPF Selection Chart - Ordering Example

MPF	Medium Pressure Fittings, up to and including 20,000 / 1379 bar	Model Code
04 06 09 12 16	1/4" MP (Minimum Orifice Size 2.8) 3/8" MP (Minimum Orifice Size 5.2) 9/16" MP (Minimum Orifice Size 7.9) 3/4" MP (Minimum Orifice Size 11.10) 1" MP (Minimum Orifice Size 14.30)	Connection Size
C G P L T X B S	Collar Gland Nut Plug Elbow Tee Cross Bulkhead Coupler Straight Coupler	Type
NO LETTER 08 26 39 42 45 49 50 89 90	316L CW (6MO) 254MO Duplex UNS S31803 Super Duplex UNS S32750/32760 Inconel 625 UNS N06625 Monel 400 UNS N04400 Inconel 825 UNS N08825 Hastelloy C276 Titanium Gr2 UNS R50400 Nickel 200 UNS N02200	Material
WO AP AVA	Without Glands & Collars All Parts* (exotic materials only) *Exotic material glands and collars rather than the default of only wetted parts. Anti Vibration Assemblies* *Anti vibration assemblies added to all ports in place of default collars & glands	Option

MPF-04 - G

Ordering Example



**MPF**

**Adaptors**



**Product Description**

The Bifold range of medium pressure valves also includes a range of adaptors. Typical applications include Hydraulic Control Panels, Hydrostatic testing equipment, Chemical Injection Skids, Water Jet and other general industrial applications.

**Features and Benefits**

- High tensile 316L CW stainless steel as standard.
- Operating temperature range of -252°C to +649°C
- Exotic materials available upon request.
- Tube Sizes from 1/4" to 1".

**MPF**

**Adaptors**

**Adaptors Male NPT x Male MP**

ADAPTORS MALE NPT x MALE MP SELECTION TABLE					
	1/4" MP	3/8" MP	1/2" MP	3/4" MP	1" MP
1/8" NPT	MPF-02N-04-N	MPF-02N-06-N	MPF-02N-09-N	MPF-02N-12-N	MPF-02N-16-N
1/4" NPT	MPF-04N-04-N	MPF-04N-06-N	MPF-04N-09-N	MPF-04N-12-N	MPF-04N-16-N
3/8" NPT	MPF-06N-04-N	MPF-06N-06-N	MPF-06N-09-N	MPF-06N-12-N	MPF-06N-16-N
1/2" NPT	MPF-08N-04-N	MPF-08N-06-N	MPF-08N-09-N	MPF-08N-12-N	MPF-08N-16-N
3/4" NPT	MPF-12N-04-N	MPF-12N-06-N	MPF-12N-09-N	MPF-12N-12-N	MPF-12N-16-N
1" NPT	MPF-16N-04-N	MPF-16N-06-N	MPF-16N-09-N	MPF-16N-12-N	MPF-16N-16-N

**Adaptors Male MP x Male MP**

ADAPTORS MALE MP x MALE MP SELECTION TABLE					
	1/4" MP	3/8" MP	1/2" MP	3/4" MP	1" MP
1/4" MP	MPF-04-04-N	MPF-04-06-N	MPF-04-09-N	MPF-04-12-N	MPF-04-16-N
3/8" MP	MPF-04-06-N	MPF-06-06-N	MPF-06-09-N	MPF-06-12-N	MPF-06-16-N
1/2" MP	MPF-04-09-N	MPF-06-09-N	MPF-09-09-N	MPF-09-12-N	MPF-09-16-N
3/4" MP	MPF-04-12-N	MPF-06-12-N	MPF-09-12-N	MPF-12-12-N	MPF-12-16-N
1" MP	MPF-04-16-N	MPF-06-16-N	MPF-09-16-N	MPF-12-16-N	MPF-16-16-N

**Adaptors Male NPT x Female MP**

		FEMALE				
		ADAPTORS MALE NPT x FEMALE MP SELECTION TABLE				
		¼" MP	⅜" MP	⅞" MP	¾" MP	1" MP
MALE	⅛" NPT	MPF-02N-04-A	MPF-02N-06-A	MPF-02N-09-A	MPF-02N-12-A	MPF-02N-16-A
	¼" NPT	MPF-04N-04-A	MPF-04N-06-A	MPF-04N-09-A	MPF-04N-12-A	MPF-04N-16-A
	⅜" NPT	MPF-06N-04-A	MPF-06N-06-A	MPF-06N-09-A	MPF-06N-12-A	MPF-06N-16-A
	½" NPT	MPF-08N-04-A	MPF-08N-06-A	MPF-08N-09-A	MPF-08N-12-A	MPF-08N-16-A
	¾" NPT	MPF-12N-04-A	MPF-12N-06-A	MPF-12N-09-A	MPF-12N-12-A	MPF-12N-16-A
	1" NPT	MPF-16N-04-A	MPF-16N-06-A	MPF-16N-09-A	MPF-16N-12-A	MPF-16N-16-A

**Adaptors Male MP x Female NPT**

		FEMALE					
		ADAPTORS MALE MP x FEMALE NPT SELECTION TABLE					
		⅛" NPT	¼" NPT	⅜" NPT	½" NPT	¾" NPT	1" NPT
MALE	¼" MP	MPF-04-02N-A	MPF-04-04N-A	MPF-04-06N-A	MPF-04-08N-A	MPF-04-12N-A	MPF-04-16N-A
	⅜" MP	MPF-06-02N-A	MPF-06-04N-A	MPF-06-06N-A	MPF-06-08N-A	MPF-06-12N-A	MPF-06-16N-A
	⅞" MP	MPF-09-02N-A	MPF-09-04N-A	MPF-09-06N-A	MPF-09-08N-A	MPF-09-12N-A	MPF-09-16N-A
	¾" MP	MPF-12-02N-A	MPF-12-04N-A	MPF-12-06N-A	MPF-12-08N-A	MPF-12-12N-A	MPF-12-16N-A
	1" MP	MPF-16-02N-A	MPF-16-04N-A	MPF-16-06N-A	MPF-16-09N-A	MPF-16-12N-A	MPF-16-16N-A

**Adaptors Male MP x Female MP**

		FEMALE				
		ADAPTORS MALE MP x FEMALE MP SELECTION TABLE				
		¼" MP	⅜" MP	⅞" MP	¾" MP	1" MP
MALE	¼" MP	MPF-04-04-A	MPF-04-06-A	MPF-04-09-A	MPF-04-12-A	MPF-04-16-A
	⅜" MP	MPF-06-04-A	MPF-06-06-A	MPF-06-09-A	MPF-06-12-A	MPF-06-16-A
	⅞" MP	MPF-09-04-A	MPF-09-06-A	MPF-09-09-A	MPF-09-12-A	MPF-09-16-A
	¾" MP	MPF-12-04-A	MPF-12-06-A	MPF-12-09-A	MPF-12-12-A	MPF-12-16-A
	1" MP	MPF-16-04-A	MPF-16-06-A	MPF-16-09-A	MPF-16-12-A	MPF-16-16-A

Other adaptors available upon request.

**Accuracy of information**  
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When selecting a product, the applicable operating system design must be considered to ensure safe use. The products function, material compatibility, adequate ratings, correct installation, operation and maintenance are the responsibilities of the system designer and user.

**Quality Assurance**  
All Bifold products are manufactured to a most stringent QA programme to ensure that every product will give optimum performance and reliability. We are third party certified to BS EN ISO 9001:2008. Functional test certificates, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BS EN 10204 3.1 where available. We reserve the right to make changes to the specifications and design etc., without prior notice.

Relief Valves



[www.bifold.co.uk](http://www.bifold.co.uk)

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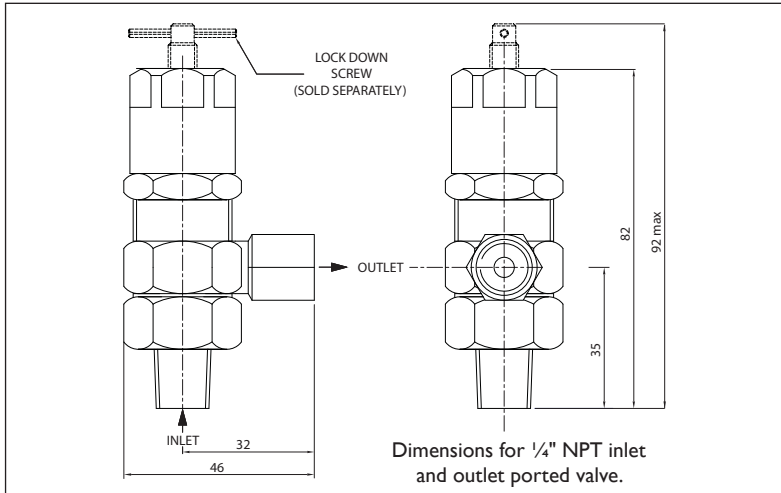
Bifold Marshalsea  
 is a member of the  
**Bifold Group 35**  
 of companies

Hydraulic Service

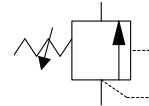


Thermal Relief Valves up to 1300 bar Set Point

Dimensional Drawing



SCHEMATIC



Features and Benefits

- No need to remove from the system for proof testing.
- Unique lock down screw facility.
- Set Point Repeatability  $\pm 2\%$ .
- Set Point Range - user specified up to 1300 bar.
- Sealing Re-Seat Pressure - Virtually zero leakage re-seat pressure  $\geq 90\%$  of cracking pressure.
- Proof Test - proof test pressure: 1000 bar. proof test pressure: 1700 bar.
- Orifice Size:  $\varnothing 4\text{mm}$ .
- Back Pressure - set point is not affected by vent back pressure. Maximum permissible back pressure 100 bar.
- Operating Media - mineral oils, water glycol fluids and some chemicals. Consult Bifold Marshalsea for specific chemicals and synthetic oils compatibility.
- Long Life and Repeatable Performance - are ensured through the use of hardened elements.

Materials

Body	- 316L stainless steel
Spring	- 316S42 and 302S26 stainless steel
Seal Material	- Nitrile
	- Viton
	- Silicone
	- Low Temp Nitrile
Seat Material	- PEEK, Stainless Steel, Polyurethane

Approvals Details



These relief valves conform to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and are ATEX compliant. These valves also conform to the Pressure Equipment Directive 97/23/EC. All valves are CE marked and supplied with a test certificate plus a declaration of conformity.

Product Description

The Type I4480 thermal relief valve has been designed primarily to provide over pressure protection in systems subject to fluid thermal expansion, but it can also be reliably used as the primary relief valve in systems with low volume pump flow rates.

A unique feature of this valve is the lock down facility that eliminates the need to remove or disconnect the valve during proof testing of the system. Provision is made in the cap for a special lock down screw to be inserted to disable the valve and hold it closed against the increasing pressures applied during testing of the system pipe work and components. This eliminates the

need to remove or disconnect the valve during test procedures. When the lock down screw is removed, the valve reverts to its as set condition without further adjustment or re-calibration.

The thread in the cap is a non-preferred size, thereby preventing unauthorised insertion of other types of screw. Lock down screws are not provided with each valve to prevent unauthorised use; they are available on request.

The relief valve weight is :- 0.24 Kg.

**Accuracy of information**  
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When selecting a product, the applicable operating system design must be considered to ensure safe use. The products function, material compatibility, adequate ratings, correct installation, operation and maintenance are the responsibilities of the system designer and user.

**Quality Assurance**  
All Bifold products are manufactured to a most stringent QA programme to ensure that every product will give optimum performance and reliability. We are third party certified to BS EN ISO 9001:2008. Functional test certificates, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BS EN 10204 3.1 where available. We reserve the right to make changes to the specifications and design etc., without prior notice.

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Selection Chart - Ordering Example

THERMAL RELIEF VALVE I4480 SPECIFICATIONS				
Part Number	Pressure Range (bar)	Inlet Connection	Outlet Connection	Repair Kit
I4480 - 24	7 - 50	1/4" NPT Female	1/4" NPT Female	RS I4480 - 24
I4480 - 25	50 - 200	1/4" NPT Female	1/4" NPT Female	RS I4480 - 25
I4480 - 26	200 - 600	1/4" NPT Female	1/4" NPT Female	RS I4480 - 26
I4480 - 27	600 - 800	1/4" NPT Female	1/4" NPT Female	RS I4480 - 27
I4480 - 20	7 - 50	1/4" NPT Female	1/4" NPT Female	RS I4480 - 20
I4480 - 03	35 - 345	1/4" NPT Female	1/4" NPT Female	RS I4480 - 03
I4480 - 21	50 - 200	1/4" NPT Female	1/4" NPT Female	RS I4480 - 21
I4480 - 22	200 - 600	1/4" NPT Female	1/4" NPT Female	RS I4480 - 22
I4480 - 04	345 - 690	1/4" NPT Female	1/4" NPT Female	RS I4480 - 04
I4480 - 23	600 - 800	1/4" NPT Female	1/4" NPT Female	RS I4480 -23
I4480 - 30	7 - 50	1/4" BSP Female	1/4" BSP Female	RS I4480 - 30
I4480 - 31	50 - 200	1/4" BSP Female	1/4" BSP Female	RS I4480 - 31
I4480 - 32	200 - 600	1/4" BSP Female	1/4" BSP Female	RS I4480 - 32
I4480 - 33	600 - 800	1/4" BSP Female	1/4" BSP Female	RS I4480 - 33
I4480 - 49	7 - 50	1/4" MP	1/4" NPT	RS I4480 - 49
I4480 - 50	35 - 345	1/4" MP	1/4" NPT	RS I4480 - 50
I4480 - 51	50 - 200	1/4" MP	1/4" NPT	RS I4480 - 51
I4480 - 52	200 - 600	1/4" MP	1/4" NPT	RS I4480 - 52
I4480 - 53	345 - 690	1/4" MP	1/4" NPT	RS I4480 - 53
I4480 - 54	600 - 800	1/4" MP	1/4" NPT	RS I4480 - 54
I4480 - 55	600 - 1300	1/4" MP	1/4" NPT	RS I4480 - 55
I4480 - 44	7 - 50	3/8" MP Female	1/4" MP Female	RS I4480 - 44
I4480 - 46	200 - 600	3/8" MP Female	1/4" MP Female	RS I4480 - 46
I4480 - 47	600 - 1300	3/8" MP Female	1/4" MP Female	RS I4480 - 47
I4480 - 56	7 - 50	3/8" NPT Female	1/4" NPT Female	RS I4480 - 56
I4480 - 57	35 - 345	3/8" NPT Female	1/4" NPT Female	RS I4480 - 57
I4480 - 58	50 - 200	3/8" NPT Female	1/4" NPT Female	RS I4480 - 58
I4480 - 59	200 - 600	3/8" NPT Female	1/4" NPT Female	RS I4480 - 59
I4480 - 60	345 - 690	3/8" NPT Female	1/4" NPT Female	RS I4480 - 60
I4480 - 61	600 - 800	3/8" NPT Female	1/4" NPT Female	RS I4480 - 61
I4480 - 62	600 - 1300	3/8" NPT Female	1/4" NPT Female	RS I4480 - 62
I4480 - 63	7 - 50	3/8" NPT	3/8" NPT	RS I4480 - 63
I4480 - 64	35 - 345	3/8" NPT	3/8" NPT	RS I4480 - 64
I4480 - 65	50 - 200	3/8" NPT	3/8" NPT	RS I4480 - 65
I4480 - 66	200 - 600	3/8" NPT	3/8" NPT	RS I4480 - 66
I4480 - 67	345 - 690	3/8" NPT	3/8" NPT	RS I4480 - 67
I4480 - 68	600 - 800	3/8" NPT	3/8" NPT	RS I4480 - 68
I4480 - 69	600 - 1300	3/8" NPT	3/8" NPT	RS I4480 - 69
I4480 - 70	7 - 50	3/8" BSP	3/8" BSP	RS I4480 - 70
I4480 - 71	35 - 345	3/8" BSP	3/8" BSP	RS I4480 - 71
I4480 - 72	50 - 200	3/8" BSP	3/8" BSP	RS I4480 - 72
I4480 - 73	200 - 600	3/8" BSP	3/8" BSP	RS I4480 - 73
I4480 - 74	345 - 690	3/8" BSP	3/8" BSP	RS I4480 - 74
I4480 - 75	600 - 800	3/8" BSP	3/8" BSP	RS I4480 - 75
I4480 - 76	600 - 1300	3/8" BSP	3/8" BSP	RS I4480 - 76
I4480 - 77	7 - 50	3/8" MP Female	3/8" NPT Female	RS I4480 - 77
I4480 - 78	35 - 345	3/8" MP Female	3/8" NPT Female	RS I4480 - 78
I4480 - 79	50 - 200	3/8" MP Female	3/8" NPT Female	RS I4480 - 79
I4480 - 80	200 - 600	3/8" MP Female	3/8" NPT Female	RS I4480 - 80
I4480 - 81	345 - 690	3/8" MP Female	3/8" NPT Female	RS I4480 - 81
I4480 - 82	600 - 800	3/8" MP Female	3/8" NPT Female	RS I4480 - 82
I4480 - 83	600 - 1300	3/8" MP Female	3/8" NPT Female	RS I4480 - 83
I4480 - 84	7 - 50	1/6" MP	1/4" NPT	RS I4480 - 84
I4480 - 85	35 - 345	1/6" MP	1/4" NPT	RS I4480 - 85
I4480 - 86	50 - 200	1/6" MP	1/4" NPT	RS I4480 - 86
I4480 - 87	200 - 600	1/6" MP	1/4" NPT	RS I4480 - 87
I4480 - 88	345 - 690	1/6" MP	1/4" NPT	RS I4480 - 88
I4480 - 89	600 - 800	1/6" MP	1/4" NPT	RS I4480 - 89
I4480 - 90	600 - 1300	1/6" MP	1/4" NPT	RS I4480 - 90
I4480 - 91	7 - 50	1/6" MP	3/8" NPT	RS I4480 - 91
I4480 - 92	35 - 345	1/6" MP	3/8" NPT	RS I4480 - 92
I4480 - 93	50 - 200	1/6" MP	3/8" NPT	RS I4480 - 93
I4480 - 94	200 - 600	1/6" MP	3/8" NPT	RS I4480 - 94
I4480 - 95	345 - 690	1/6" MP	3/8" NPT	RS I4480 - 95
I4480 - 96	600 - 800	1/6" MP	3/8" NPT	RS I4480 - 96
I4480 - 97	600 - 1300	1/6" MP	3/8" NPT	RS I4480 - 97

Lock Down Screw Part Number: I4489 - 01

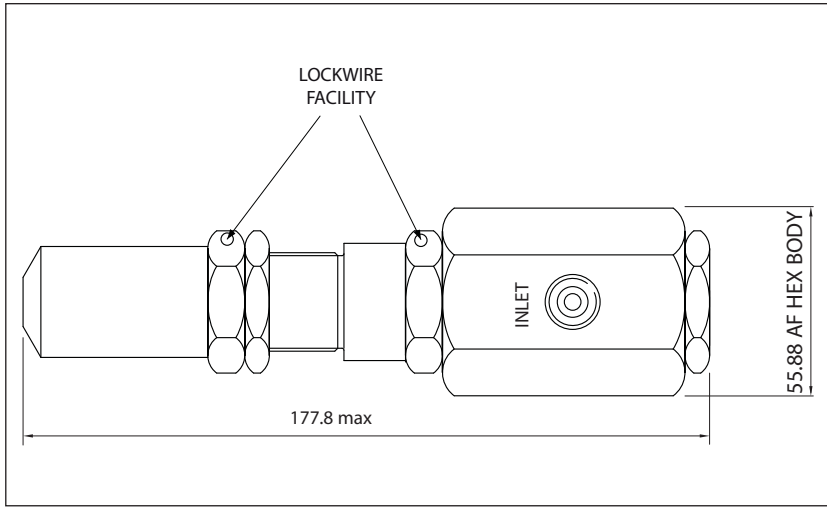
It is the responsibility of the system designer and user to select products that are suitable for their intended application of use.

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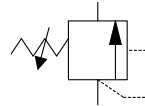


Dimensional Drawing

Relief Valves for Accurate Pressure Control up to 1200 bar Set Point



SCHEMATIC



Features and Benefits

- Up to 1200 bar, 25 l / m.
- Set Point Repeatability  $\pm 2\%$ .
- Sealing Re-Seat Pressure - Virtually zero leakage re-seat pressure  $\geq 90\%$  of cracking pressure.
- Proof Test - proof test pressure: 1000 bar.  
\* proof test pressure: 1350 bar.
- Flow Capacity - at up to 10% overpressure: 25 l / m.
- Orifice Size:  $\varnothing$  1/8".
- Important - Set point is affected by vent port back pressure and will DECREASE accordingly.
- The Main Spring Load - is not transmitted to the seat, thus reducing distortion and wear.

Materials

External & Wetted Parts	- 316L stainless steel	
	- M390	
Seal Material	- Nitrile	- standard
	- Viton	- add suffix M089 eg. 14520 - 08 - M089
	- Silicone	- add suffix M065 eg. 14520 - 08 - M065
	- Low Temp Nitrile	- add suffix M106 eg. 14520 - 08 - M106
Seat Material	- M340	

Working Temperature

Temperature Range:	
Viton -	(-20°C to +180°C)
Nitrile -	(-20°C to +80°C)
Fluorosilicone -	(-60°C to +60°C)
Acetal -	(-60°C to +60°C)

Approvals Details



These relief valves conform to European Directive 94/9/EC relating to equipment intended for use in potentially explosive atmospheres and are ATEX compliant. These valves also conform to the Pressure Equipment Directive 97/23/EC. All valves are marked and supplied with a test certificate plus a declaration of conformity.

Product Description

The Type I 4520, I 4530, I 4580 and I 4570 precision relief valve has been designed to provide accurate over pressure protection in systems operating at pressures of up to 1200 bar and flows of up to 25 l / m.

Precision relief valves have very high sealing forces along with accurate and narrow dead bands. Precision relief valves should be used in preference to sprung relief valves where there is risk of vibration induced leakage or where dead bands are important to system safety performance. Sprung relief valves typically will have a narrow dead band when tested on a static dead weight

tester but will have a much wider dead band under flowing conditions and will require a significant drop in system pressure to enable the valve to reseat. The floating poppet design enhanced by the use of linear bearings produces characteristics which are non flow dependent and ensures long life with repeatable performance.

Installation and removal of system pipe work is simplified by the right angled porting configuration.

The relief valve weight is 0.97 Kg.

**Accuracy of information**  
We take care to ensure that product information in this catalogue is reasonably accurate and up-to-date. However, our products are continually developed and updated so to ensure accurate and up-to-date information please refer to the product catalogue issue list on our web site or contact a member of our sales team.

When selecting a product, the applicable operating system design must be considered to ensure safe use. The products function, material compatibility, adequate ratings, correct installation, operation and maintenance are the responsibilities of the system designer and user.

**Quality Assurance**  
All Bifold products are manufactured to a most stringent QA programme to ensure that every product will give optimum performance and reliability. We are third party certified to BS EN ISO 9001:2008. Functional test certificates, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BS EN 10204 3.1 where available. We reserve the right to make changes to the specifications and design etc., without prior notice.



Hydraulic Service



Selection Chart - Ordering Example

PRECISION RELIEF VALVE I 4520, I 4530, I 4580 & I 4570 SPECIFICATIONS

Part Number	Pressure Range (bar)	Inlet Connection	Outlet Connection	Repair Kit
I 4530 - 01	100 - 240	1/4" NPT	1/4" NPT	RS I 4530 - 01
I 4530 - 02	207 - 414	1/4" NPT	1/4" NPT	RS I 4530 - 02
I 4530 - 03	345 - 700	1/4" NPT	1/4" NPT	RS I 4530 - 03
I 4530 - 04	100 - 240	1/4" BSP	1/4" BSP	RS I 4530 - 04
I 4530 - 05	207 - 414	1/4" BSP	1/4" BSP	RS I 4530 - 05
I 4530 - 06	345 - 700	1/4" BSP	1/4" BSP	RS I 4530 - 06
I 4580 - 13	100 - 240	3/8" MP	1/4" NPT	RS I 4580 - 13
I 4580 - 14	207 - 414	3/8" MP	1/4" NPT	RS I 4580 - 14
I 4580 - 15	345 - 700	3/8" MP	1/4" NPT	RS I 4580 - 15
I 4580 - 16	600 - 1200	3/8" MP	1/4" NPT	RS I 4580 - 16
I 4520 - 01	100 - 240	3/8" NPT	3/8" NPT	RS I 4520 - 01
I 4520 - 02	207 - 414	3/8" NPT	3/8" NPT	RS I 4520 - 02
I 4520 - 03	345 - 700	3/8" NPT	3/8" NPT	RS I 4520 - 03
I 4520 - 04	100 - 240	3/8" BSP	3/8" BSP	RS I 4520 - 04
I 4520 - 05	207 - 414	3/8" BSP	3/8" BSP	RS I 4520 - 05
I 4520 - 06	345 - 700	3/8" BSP	3/8" BSP	RS I 4520 - 06
I 4580 - 01	100 - 240	3/8" MP	3/8" NPT	RS I 4580 - 01
I 4580 - 02	207 - 414	3/8" MP	3/8" NPT	RS I 4580 - 02
I 4580 - 03	345 - 700	3/8" MP	3/8" NPT	RS I 4580 - 03
I 4580 - 04	600 - 1200	3/8" MP	3/8" NPT	RS I 4580 - 04
I 4580 - 07	100 - 240	3/8" MP	3/8" BSP	RS I 4580 - 07
I 4580 - 08	207 - 414	3/8" MP	3/8" BSP	RS I 4580 - 08
I 4580 - 09	600 - 1200	3/8" MP	3/8" BSP	RS I 4580 - 09
I 4580 - 10	345 - 700	3/8" MP	3/8" BSP	RS I 4580 - 10
I 4580 - 11	600 - 1200	3/8" MP	3/8" MP	RS I 4580 - 11
I 4580 - 17	100 - 240	3/8" MP	1/2" NPT	RS I 4580 - 17
I 4580 - 18	207 - 414	3/8" MP	1/2" NPT	RS I 4580 - 18
I 4580 - 19	345 - 700	3/8" MP	1/2" NPT	RS I 4580 - 19
I 4580 - 20	600 - 1200	3/8" MP	1/2" NPT	RS I 4580 - 20
23600 - 01	100 - 240	1/2" NPT	1/2" NPT	RS 23600 - 01
23600 - 02	207 - 414	1/2" NPT	1/2" NPT	RS 23600 - 02
23600 - 03	345 - 700	1/2" NPT	1/2" NPT	RS 23600 - 03
23600 - 04	600 - 1200	1/2" NPT	1/2" NPT	RS 23600 - 04
I 4570 - 01	100 - 240	9/16" MP	3/8" NPT	RS I 4570 - 01
I 4570 - 02	207 - 414	9/16" MP	3/8" NPT	RS I 4570 - 02
I 4570 - 03	345 - 700	9/16" MP	3/8" NPT	RS I 4570 - 03
I 4570 - 04	345 - 700	9/16" MP	3/8" NPT	RS I 4570 - 04
I 4570 - 07	100 - 240	9/16" MP	3/8" BSP	RS I 4570 - 07
I 4570 - 08	207 - 414	9/16" MP	3/8" BSP	RS I 4570 - 08
I 4570 - 09	600 - 1200	9/16" MP	3/8" BSP	RS I 4570 - 09
I 4570 - 10	345 - 700	9/16" MP	3/8" BSP	RS I 4570 - 10
I 4570 - 11	600 - 1200	9/16" MP	9/16" MP	RS I 4570 - 11
I 4570 - 12	100 - 240	9/16" MP	1/2" NPT	RS I 4570 - 12
I 4570 - 13	207 - 414	9/16" MP	1/2" NPT	RS I 4570 - 13
I 4570 - 14	345 - 700	9/16" MP	1/2" NPT	RS I 4570 - 14
I 4570 - 15	600 - 1200	9/16" MP	1/2" NPT	RS I 4573 - 15
23700 - 01	100 - 240	3/4" NPT	3/4" NPT	RS 23700 - 01
23700 - 02	207 - 414	3/4" NPT	3/4" NPT	RS 23700 - 02
23700 - 03	345 - 700	3/4" NPT	3/4" NPT	RS 23700 - 03
23700 - 04	600 - 1200	3/4" NPT	3/4" NPT	RS 23700 - 04
23800 - 01	100 - 240	3/4" MP	3/4" MP	RS 23800 - 01
23800 - 02	207 - 414	3/4" MP	3/4" MP	RS 23800 - 02
23800 - 03	345 - 700	3/4" MP	3/4" MP	RS 23800 - 03
23800 - 04	600 - 1200	3/4" MP	3/4" MP	RS 28700 - 04

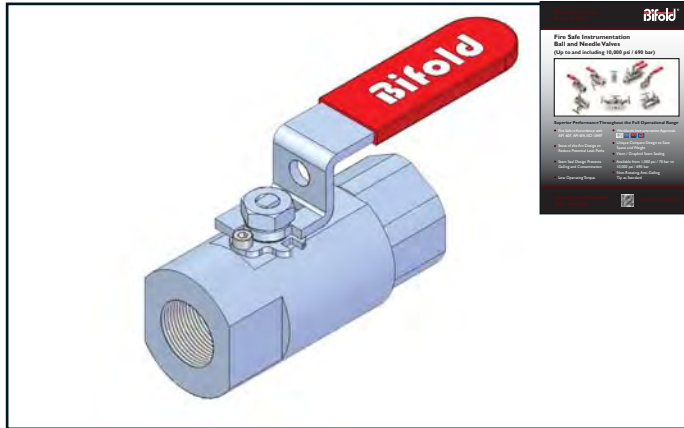
It is the responsibility of the system designer and user to select products that are suitable for their intended application of use.

Product Range

These Products Do Not Fall Within The Medium Pressure Range

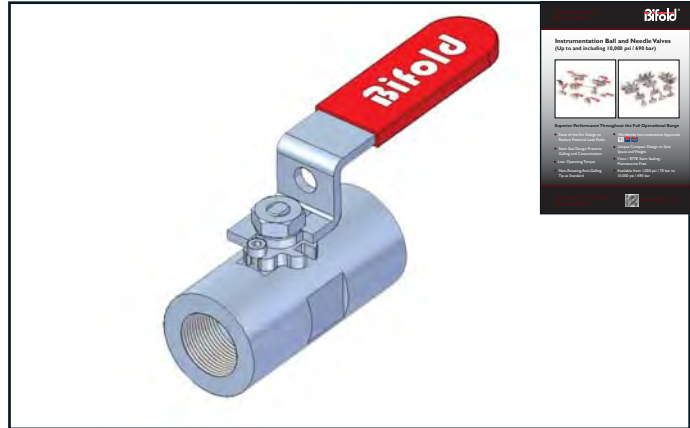


Fire Safe Instrumentation Valves



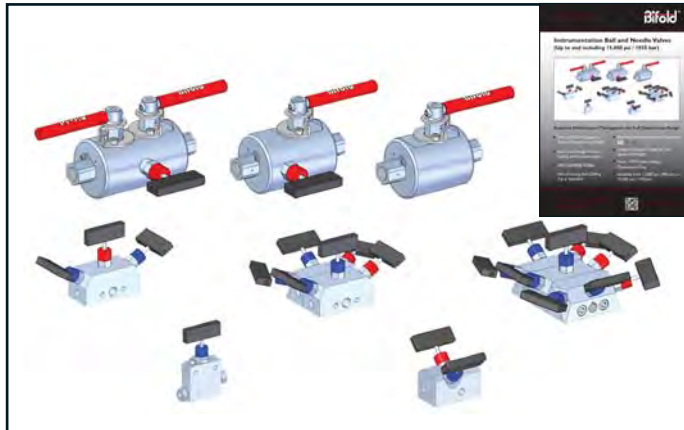
Please see the Ball and Needle Valve Fire Safe Catalogue for the full product range.

Instrumentation Valves



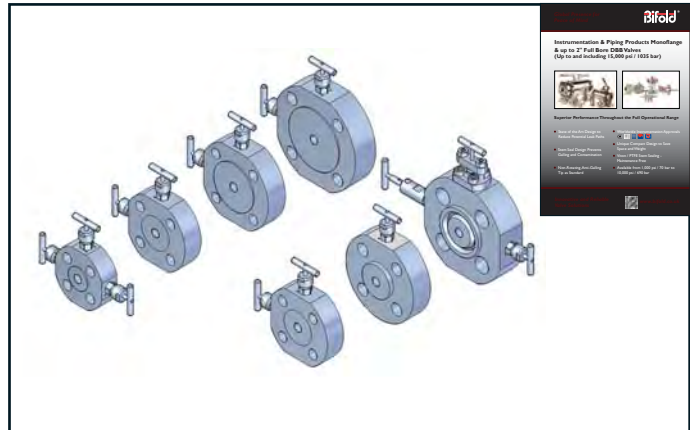
Please see the Instrumentation Ball and Needle Valve Catalogue for the full product range.

13K and 15K



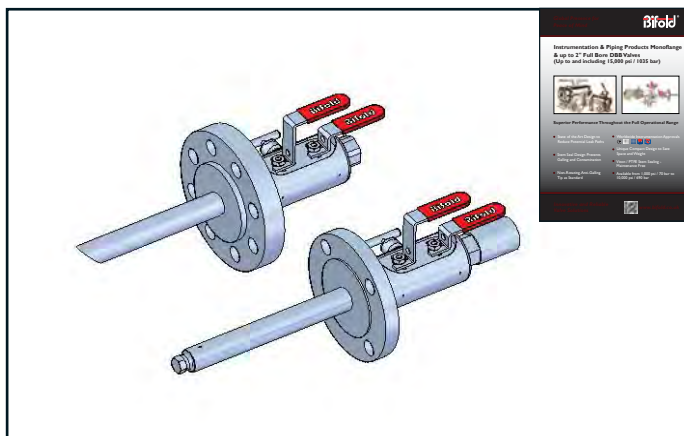
Please see the Instrumentation Ball and Needle Valve 13K and 15K Catalogue for the full product range.

Monoflanges



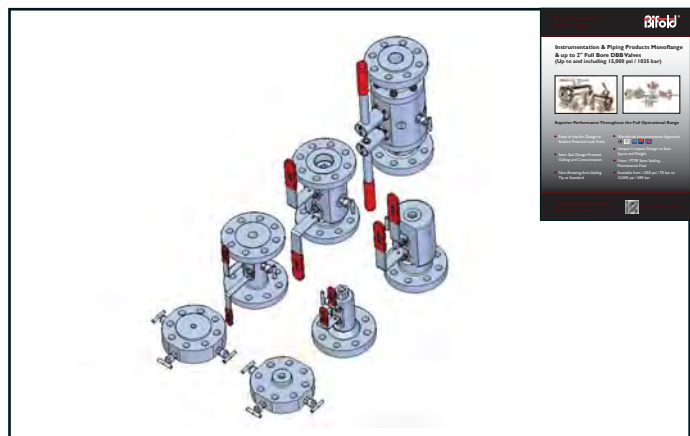
Please see the Instrumentation and Piping Catalogue for the full product range of monoflanges.

Double Block & Bleed Injection / Sampling Valves



Please see the Instrumentation and Piping Catalogue for the full product range of DBB Injection / Sampling Valves.

Double Block & Bleed Valves



Please see the Instrumentation and Piping Catalogue for the full product range of Double Block & Bleed Valves.

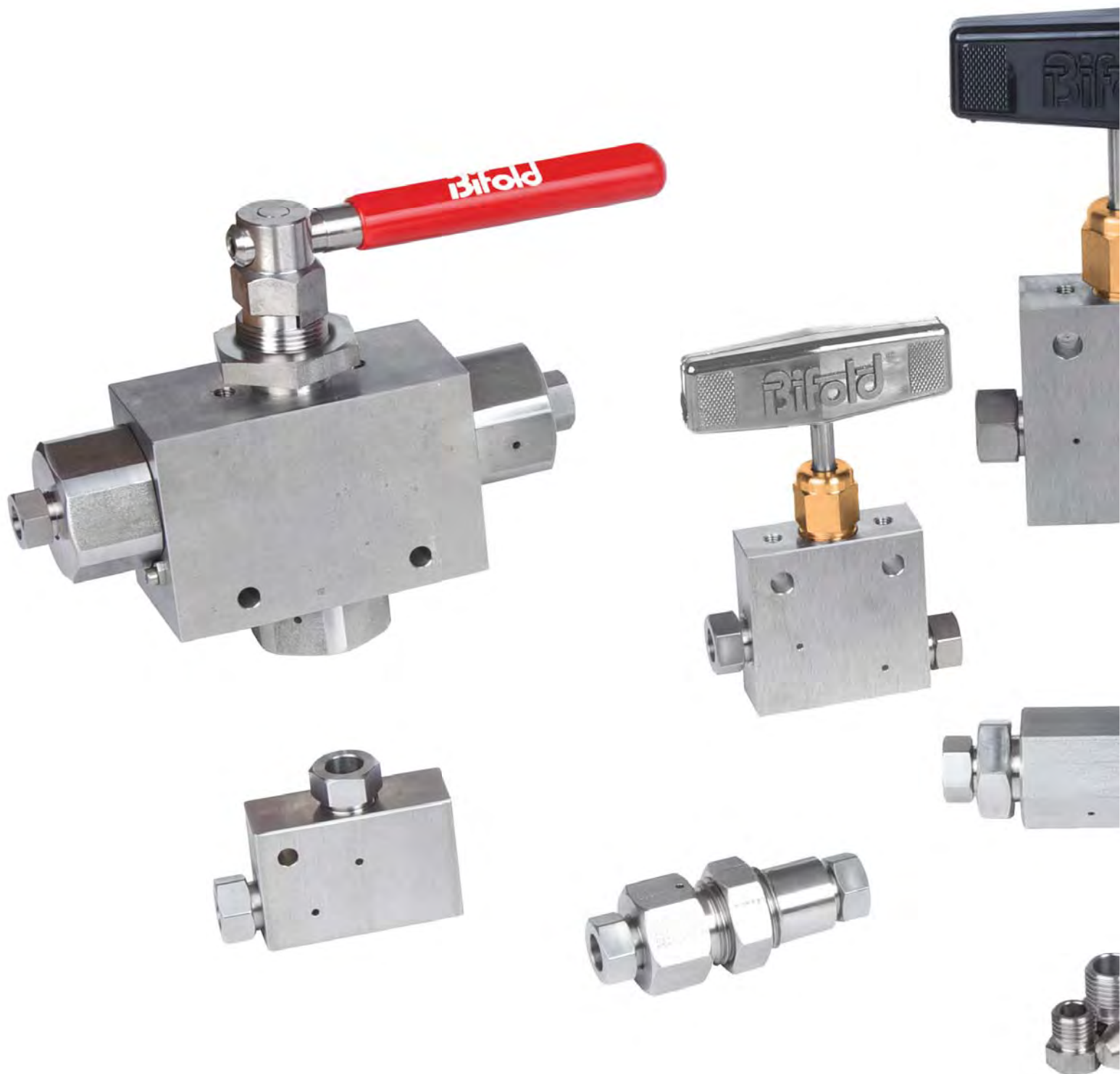
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Notes



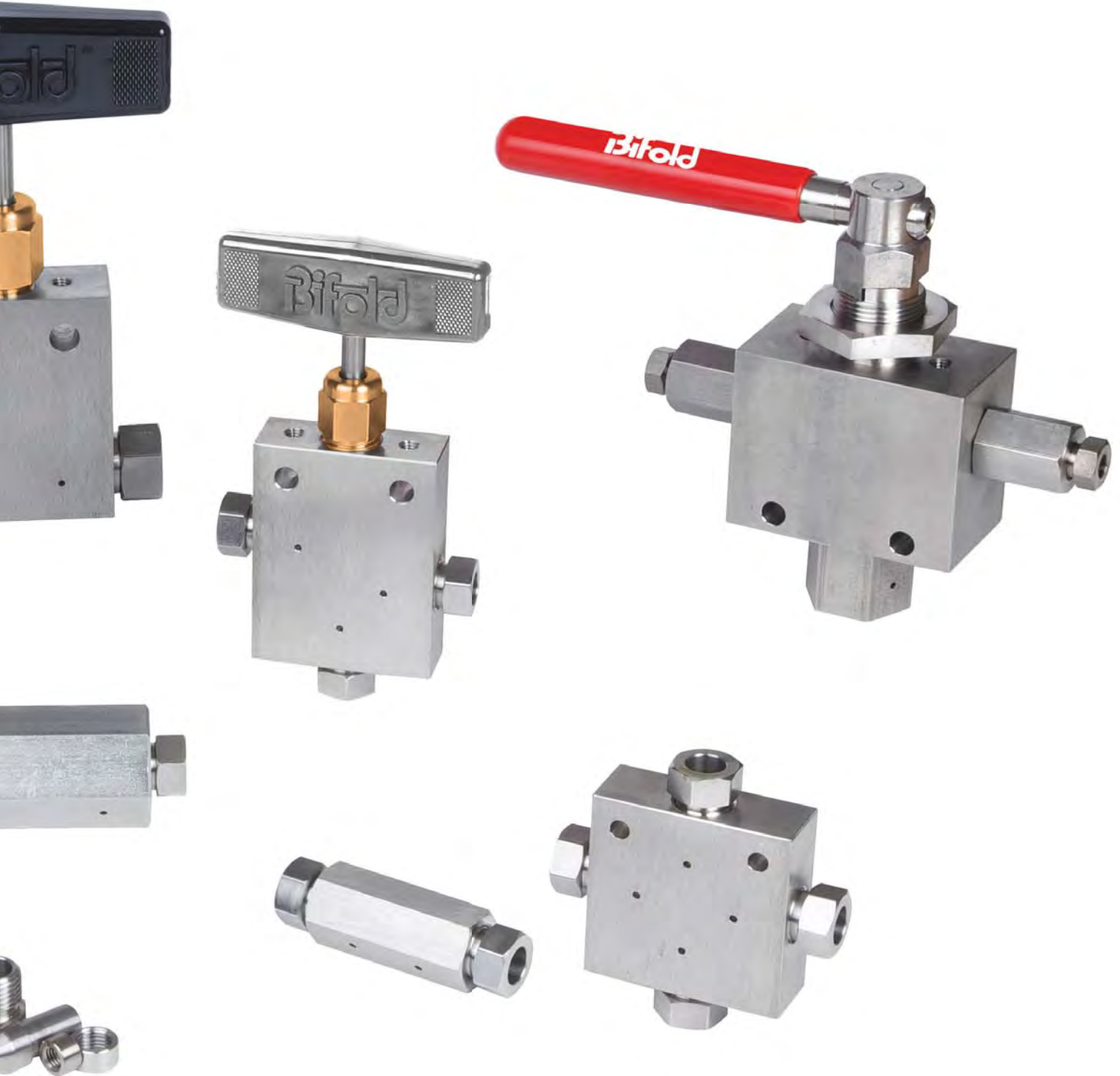


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Medium Pressure



[www.bifold.co.uk](http://www.bifold.co.uk)

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 of companies



**Instrument, Process,  
Directional Control Valves,  
and Pumps**

# Bifold® Group

**Pneumatic and  
Instrumentation Valves**

**Hydraulic Valves**

**Subsea Valves**

**Hydraulic Pumps,  
Intensifiers and Valves**

**Bifold®**

**Bifold FluidPower®**

**Bifold® Subsea**

**Bifold®  Marshalsea**

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#### Quality Assurance

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Web: [www.bifold.co.uk](http://www.bifold.co.uk)

**Innovative and Reliable  
Valve Solutions**



[www.bifold.co.uk](http://www.bifold.co.uk)





## Instrumentation & Piping Products Monoflange & up to 2" Full Bore DBB Valves

(Up to and including 15,000 psi / 1035 bar)

*Innovative and Reliable Valve Solutions*

### NV09-F-BBO-08 I 50RF-04F04F-37L-E4-V9G-S###-P

VALVE CONFIGURATION	CODE
Single Block	NV07
Single Block and Bleed	NV08
Double Block and Bleed	NV09

CONFIGURATION	CODE
Flange x Thread	Blank
Flange x Flange	F
Thread x Flange Outlet	FR

OPERATOR TYPE	CODE
Screwed Fire Safe	Blank
Bolted	B
OS & Y Outside Screw and Yoke	O
Anti Tamper Screwed	AS
Bolted with Hand Wheel	BH
Bolted with Hand Wheel Lockable	BHL
OS & Y with Hand Wheel Lockable	OHL

FLANGE SIZE	CODE
1/2"	08
3/4"	12
1"	16
1 1/2"	24
1 3/4"	29
2"	32
2 1/4"	33

CLASS RATING	CODE
150	150
300	300
600	600
900	900
1500	1500
2500	2500
5K	A5
10K	A10

FLANGE STYLE	CODE
RTJ	RTJ
RF	RF
API	Blank
Flat Face	FF

THREADED CONNECTION	CODE
1/4" NPT	04F
1/2" NPT	Blank
1/4" MP	04FMP
3/8" MP	06FMP
1/2" MP	10FMP

Grey Sections of the product code represent possible configuration options

CODE	SURFACE COATINGS
Blank	Not Required
P	Paint
Z	Zinc

CODE	ADDITIONAL
Blank	Not Required
S###	Sample Probe
I###	Injection Quill
IC###	Injection Quill with Check Valve
CV	Check Valve Inlet, Thread x Flange Outlet

Note: ### To be replaced with probe/quill length in mm.

CODE	FIRE SAFE SEAL
G	Graphite 98%

CODE	STEM SEAL
Blank	Viton/RTFE
V9	V9 I 8 Elastomer/RTFE
HNBR	HNBR/RTFE

CODE	BORE
4	4mm

CODE	TIP MATERIAL
E	PEEK
Blank	Metal

CODE	BOLTING MATERIAL
Blank	316 ST/ST
L	A320 L7M Z&Y
B	A193 B8M

CODE	MATERIAL
26	A 182 F51
35	A 182 F55
36	A 182 F44
37	A 182 F316
38	A350 LF2
42	625
49	825

CODE	VENT CONNECTION
04F	1/4" NPT
08F	1/2" NPT
04FMP	1/4" MP
06FMP	3/8" MP
Blank	NPT Size as per Threaded Connection

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Product Features

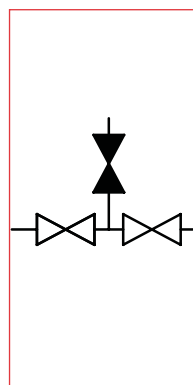
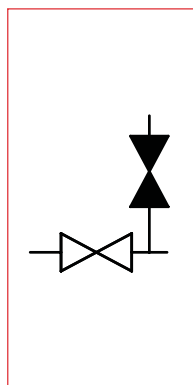
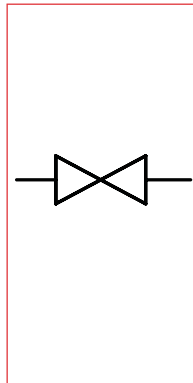
Product Description

This range of products is designed to replace conventional multi-valve installations currently in use for interface with pressure measuring systems. By combining customer specified valves into a single manifold the number of leak paths is reduced resulting in a one piece solution also providing positive installation cost savings.

Product



Schematic



- ½" to 2" N.B. Flanges (15 to 50 DN).
- ANSI B16.5 150 2500 flange class and API 10,000.
- ½" NPT (female) standard outlet.
- ½" NPT (female) standard vent.
- Variety of optional end connection sizes and thread forms.
- Standard materials of construction: Stainless steel
- ASTM A182 F316/F316L, Carbon steel ASTM A350 LF2/A105, Duplex ASTM A182 F51.
- Optional materials include Super Duplex, Monel, Hastelloy, 6Mo, Incoloy.
- Combined needle and O.S. & Y. valves available.
- Raised face and ring type joint flange face styles.
- One-piece forged construction flange as standard.
- Optional fire safe designed to meet BS6755 part 2/API 607.
- Pressure boundary designs calculated to ASME VIII Div. I.
- 4:1 Factor of safety.
- Heat code traceable material to EN10204.3.1.
- Bubble tight shut off valve seats.
- Optional PEEK tips available.
- Optional locking and anti tamper devices for all valve types available.
- NACE MR 0175/ISO 15156 compliant material available on request.
- Permanent marked body with full specification details.
- Available with various non-threaded connections.

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## BV Order Code



### BV06-L-08 I 50RF- I 2F-O04F37B-I0-V9TC-IC320-P

VALVE CONFIGURATION	CODE
Flange by Thread	BV06
Flange by Flange	BV07

BALL OPERATOR TYPE	CODE
Standard	Blank
Standard Lockable	L
Bolted	B
Bolted Lockable	BL
OS & Y	O
OS & Y Lockable	OL

FLANGE SIZE	CODE
1/2"	08
3/4"	12
1"	16
1 1/2"	24
1 3/4"	29
2"	32
2 1/4"	33

CLASS RATING	CODE
150	150
300	300
600	600
900	900
1500	1500
2500	2500
5K	A5
10K	A10

FLANGE STYLE	CODE
RTJ	RTJ
RF	RF
API	Blank
Flat Face	FF

THREADED CONNECTION BV06 ONLY	CODE
1/4" NPT	04F
1/2" NPT	Blank
3/4" NPT	I2F
1/4" MP	04FMP
3/8" MP	06FMP
1/2" MP	10FMP

Grey Sections of the product code represent possible configuration options

CODE	SURFACE COATINGS
Blank	Not Required
P	Paint
Z	Zinc

CODE	ADDITIONAL
Blank	Not Required
S###	Sample Probe
I###	Injection Quill
IC###	Injection Quill with Check Valve
CV	Check Valve Inlet, Thread x Flange Outlet

Note: ### To be replaced with probe/quill length in mm.

CODE	SEAL TYPE
Blank	Viton/Graphite/PEEK
V9TC	V918 Elastomer/Graphite/PEEK
HNBRTC	HNBR/Graphite/PEEK
VTG	Viton/Graphite/RTFE
V9TG	V918 Elastomer/Graphite/RTFE
HNBRTG	HNBR/Graphite/RTFE

CODE	BORE
10	10mm
15	15mm
20	20mm
25	25mm

CODE	BOLTING MATERIAL
Blank	316 ST/ST/N/R
L	A320 L7M Z&Y
B	A193 B8M

CODE	MATERIAL
26	A182 F51
35	A182 F55
36	A182 F44
37	A182 F316
38	A350 LF2
42	625
49	825

CODE	VENT CONNECTION
04F	1/4" NPT
Blank	1/2" NPT
I2F	3/4" NPT

CODE	VENT OPERATOR TYPE
Blank	Screwed do not repeat if all 'S'
B	Bolted
O	OS & Y Outside Screw and Yoke
AS	Anti Tamper Screwed
BH	Bolted with Hand Wheel
OH	OS & Y with Hand Wheel
BHL	Bolted with Hand Wheel Lockable
OHL	OS & Y with Hand Wheel Lockable

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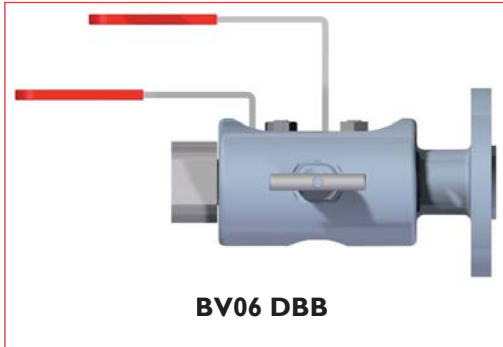
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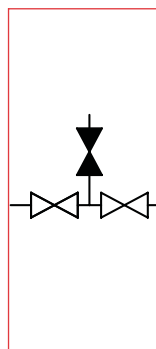
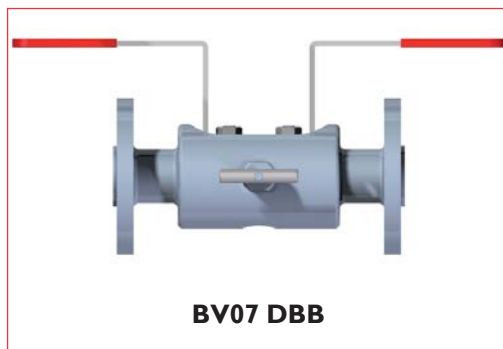
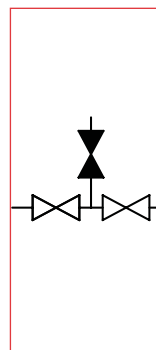
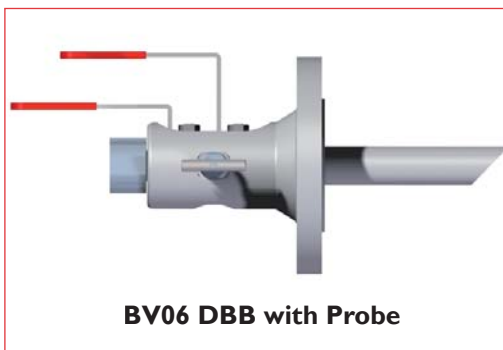
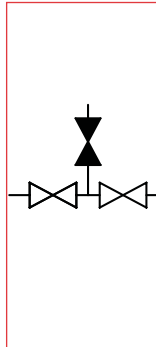
Product Description

This range of products is designed to replace conventional multi-valve installations currently in use for interface with pressure measuring systems. By combining customer specified valves into a single manifold the number of leak paths is reduced resulting in a one piece solution also providing positive installation cost savings and operational safety factors.

Features



Schematic



- 1/2" to 3" N.B. Flanges (15 to 50 DN).
  - ANSI B16.5 150 2500 flange class and API 10,000.
  - 10mm/15mm/20mm/25mm full bore valve design.
  - 1/2" NPT (female) standard outlet.
  - 1/2" NPT (female) standard vent.
  - Variety of optional end connection sizes and thread forms.
- Standard materials of construction: Stainless steel
- ASTM A182 F316/F316L, Carbon steel ASTM A350 LF2/A105, Duplex ASTM A182 F51.
  - Optional materials include Super Duplex, Monel, Hastelloy, 6Mo, Incoloy.
- Instrument connections available.
  - Raised face and ring type joint flange face styles.
  - One-piece forged construction flange as standard.
  - Optional fire safe designed to meet BS6755 part 2/API 607.
  - Pressure boundary designs calculated to ASME VIII Div. I.
  - 4:1 Factor of safety.
  - Heat code traceable material to EN10204.3.1.
  - Bubble tight shut off.
  - Positive lever stop.
  - Optional locking and anti tamper devices for all valve types available.
  - NACE MR 0175/ISO 15156 compliant material available on request.
  - Permanent marked body with full specification details.
  - Available with various non-threaded connections.

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BV Order Code

BV09-L-32I50RF-B04F-37-L-50-V9TC-P

VALVE CONFIGURATION	CODE
Double Block & Bleed	BV09

BALL OPERATOR TYPE	CODE
Standard	Blank
Standard Lockable	L
Bolted	B
Bolted Lockable	BL

FLANGE SIZE	CODE
1 1/2"	24
1 3/4"	29
2"	32
2 1/6"	33
3"	42

CLASS RATING	CODE
150	150
300	300
600	600
900	900
1500	1500
2500	2500
5K	A5
10K	A10

FLANGE STYLE	CODE
RTJ	RTJ
RF	RF
API	Blank
Flat Face	FF

VENT OPERATOR TYPE	CODE
Screwed Fire Safe	Blank
Bolted	B
OS & Y Outside Screw and Yoke	O
Anti Tamper Screwed	AS
Bolted with Hand Wheel	BH
OS & Y with Hand Wheel	OH
Bolted with Hand Wheel Lockable	BHL
OS & Y with Hand Wheel Lockable	OHL

VENT CONNECTION	CODE
1/4" NPT	04F
1/2" NPT	Blank
3/4" NPT	12F

Grey Sections of the product code represent possible configuration options

CODE	SURFACE COATINGS
Blank	Not Required
P	Paint
Z	Zinc
N	Additional Material Requirements

CODE	SEAL TYPE
Blank	Viton/Graphite/PEEK
V9TC	V918 Elastomer/Graphite/PEEK
HNBRTC	HNBR/Graphite/PEEK
VTG	Viton/Graphite/RTFE
V9TG	V918 Elastomer/Graphite/RTFE

CODE	BORE
38	38mm
50	50mm

CODE	BOLTING MATERIAL
L	A320 L7M Z&Y
Blank	A193 B&M

CODE	MATERIAL
26	A182 F51
35	A182 F55
36	A182 F44
37	A182 F316
38	A350 LF2
42	625
49	825

CODE	FLANGE STYLE
RTJ	RTJ
RF	RF
API	API
Flat Face	FF

CODE	FLANGE STYLE
150	150
300	300
600	600
900	900
1500	1500
2500	2500
5K	5K
10K	A10

CODE	FLANGE SIZE
24	1 1/2"
29	1 3/4"
32	2"
33	2 1/6"
42	3"

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**Quality Assurance**  
All Bifold products are manufactured to a most stringent QA programme to ensure that every product will give optimum performance and reliability. We are third party certified to EN ISO 9001:2000. Functional test certificates, letter of conformity and copies of original mill certificates, providing total traceability are available on request, to BSEN 10204.3.1.B where available. We reserve the right to make changes to the specifications and design etc., without prior notice.



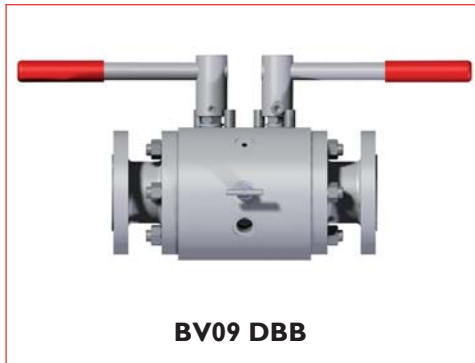
## Product Features



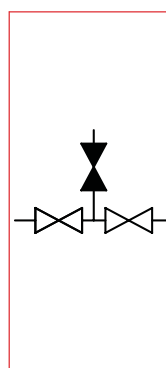
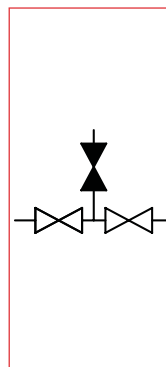
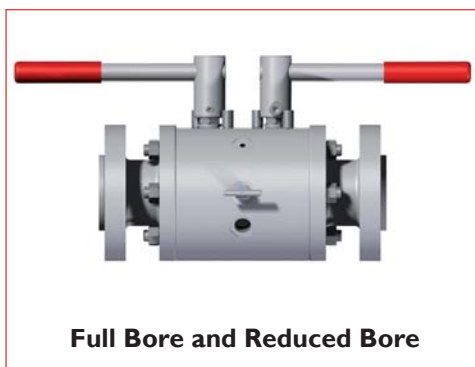
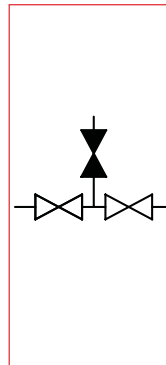
### Product Description

This range of products is designed to replace conventional multi-valve installations currently in use on process lines. By combining customer specified valves into a single manifold the number of leak paths is reduced resulting in a one unit solution also providing positive installation space, cost and weight saving.

#### Product



#### Schematic



- ½" to 2" N.B. Flanges (15 to 50 DN).
- ANSI B16.5 150 2500 flange class and API 10,000.
- ½" NPT (female) standard outlet.
- ½" NPT (female) standard vent.
- Variety of optional end connection sizes and thread forms.

Standard materials of construction: Stainless steel

- ASTM A182 F316/F316L, Carbon steel ASTM A350 LF2/A105, Duplex ASTM A182 F51.

- Optional materials include Super Duplex, Monel, Hastelloy, 6Mo, Incoloy.
- Combined needle and O.S. & Y. valves available.
- Raised face and ring type joint flange face styles.
- One-piece forged construction flange as standard.
- Optional fire safe designed to meet BS6755 part 2/API 607.
- Pressure boundary designs calculated to ASME VIII Div. I.
- Full ASME B16.34 design.
- Heat code traceable material to EN10204.3.1.
- Bubble tight shut off valve seats.
- Optional PEEK tips available.
- Optional locking and anti tamper devices for all valve types available.
- NACE MR 0175/ISO 15156 compliant material available on request.
- Permanent marked body with full specification details.
- Available with various non-threaded connections.

Options

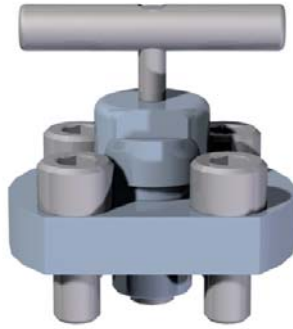


Product Options

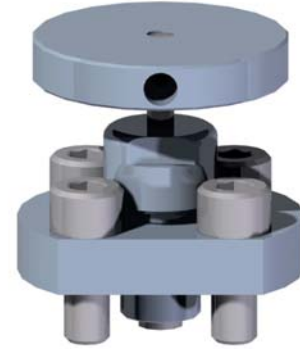
The range of products displayed in this brochure, are designed to accommodate all the options shown below. If the style or arrangement required for your application is not shown please contact our office with full description and specification details.



Anti Tamper Fire Safe



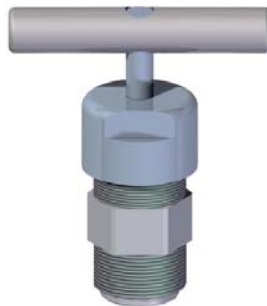
Bolted Fire Safe



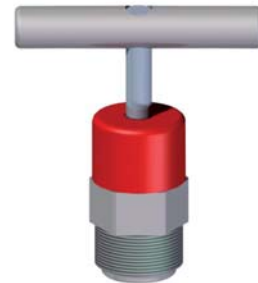
Bolted Hand Wheel Fire Safe



OS & Y Fire Safe



Screwed Fire Safe



Screwed Non Fire Safe



OS & Y Fire Safe Ball Valve

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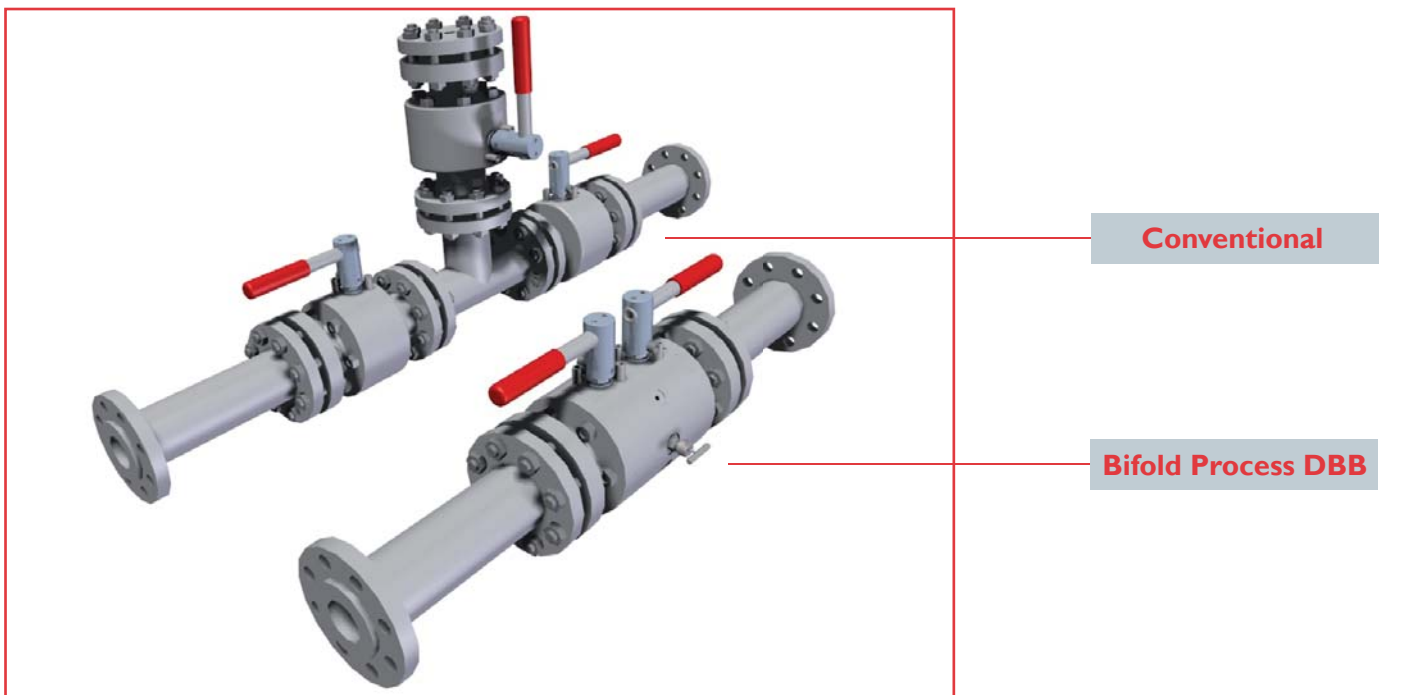
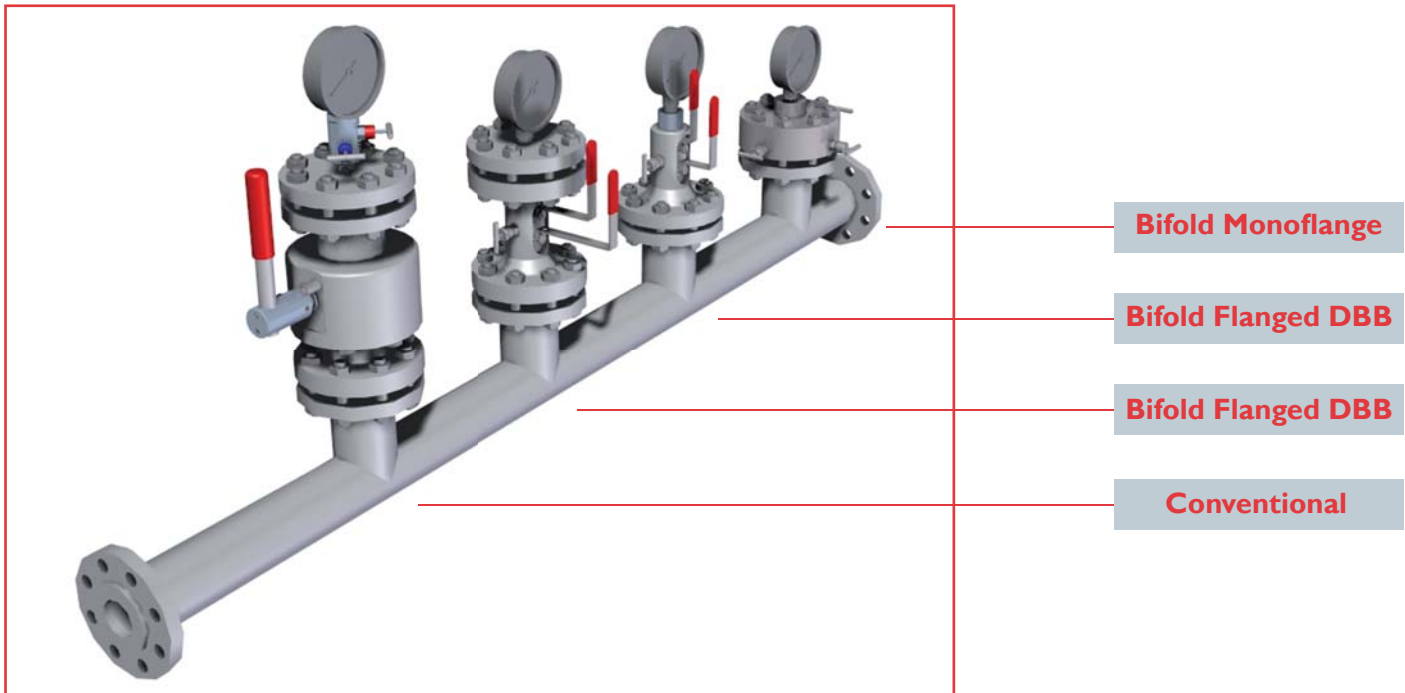
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Overview

Overview

The Bifold Monoflanges, Flanged Double Block and Bleed and Process Double Block and Bleed products are designed to overcome the problems of traditional assemblies on primary isolation duties. By combining piping and instrument valves in a single assembly, they provide weight and space savings, along with other benefits including a reduction in potential leak paths. This compact and efficient arrangement reduces installation and maintenance costs.



**Innovative and Reliable  
Valve Solutions**

**Bifold® Group**

**Bifold®**

**Bifold FluidPower®**

**Bifold® Subsea**

**Bifold®  Marshalsea**

**[www.bifold.co.uk](http://www.bifold.co.uk)**

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**Quality Assurance**

All Marshalsea products are manufactured to a most stringent QA programme. Every care is taken at all stages of manufacture to ensure that every product will give optimum performance and reliability. We are third party certified to EN ISO 9001:2000. Functional test certificate, letter of conformity and copies of original mill certificates, providing total traceability are available on request to BSEN 10204.3.1.B where available. We reserve the right to make changes to the specifications and design etc., without prior notice.

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Bifold, Bifold Fluidpower, Bifold Subsea and Marshalsea Hydraulics Ltd are all members of the Bifold Group. Registered No. 1787729 in England. Registered Office: Greenside Way, Middleton, Manchester, M24 1SV.

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