

Архангельск (8182)63-90-72
 Астана (7172)727-132
 Астрахань (8512)99-46-04
 Барнаул (3852)73-04-60
 Белгород (4722)40-23-64
 Брянск (4832)59-03-52
 Владивосток (423)249-28-31
 Волгоград (844)278-03-48
 Вологда (8172)26-41-59
 Воронеж (473)204-51-73
 Екатеринбург (343)384-55-89
 Иваново (4932)77-34-06

Ижевск (3412)26-03-58
 Иркутск (395)279-98-46
 Казань (843)206-01-48
 Калининград (4012)72-03-81
 Калуга (4842)92-23-67
 Кемерово (3842)65-04-62
 Киров (8332)68-02-04
 Краснодар (861)203-40-90
 Красноярск (391)204-63-61
 Курск (4712)77-13-04
 Липецк (4742)52-20-81
 Киргизия (996)312-96-26-47

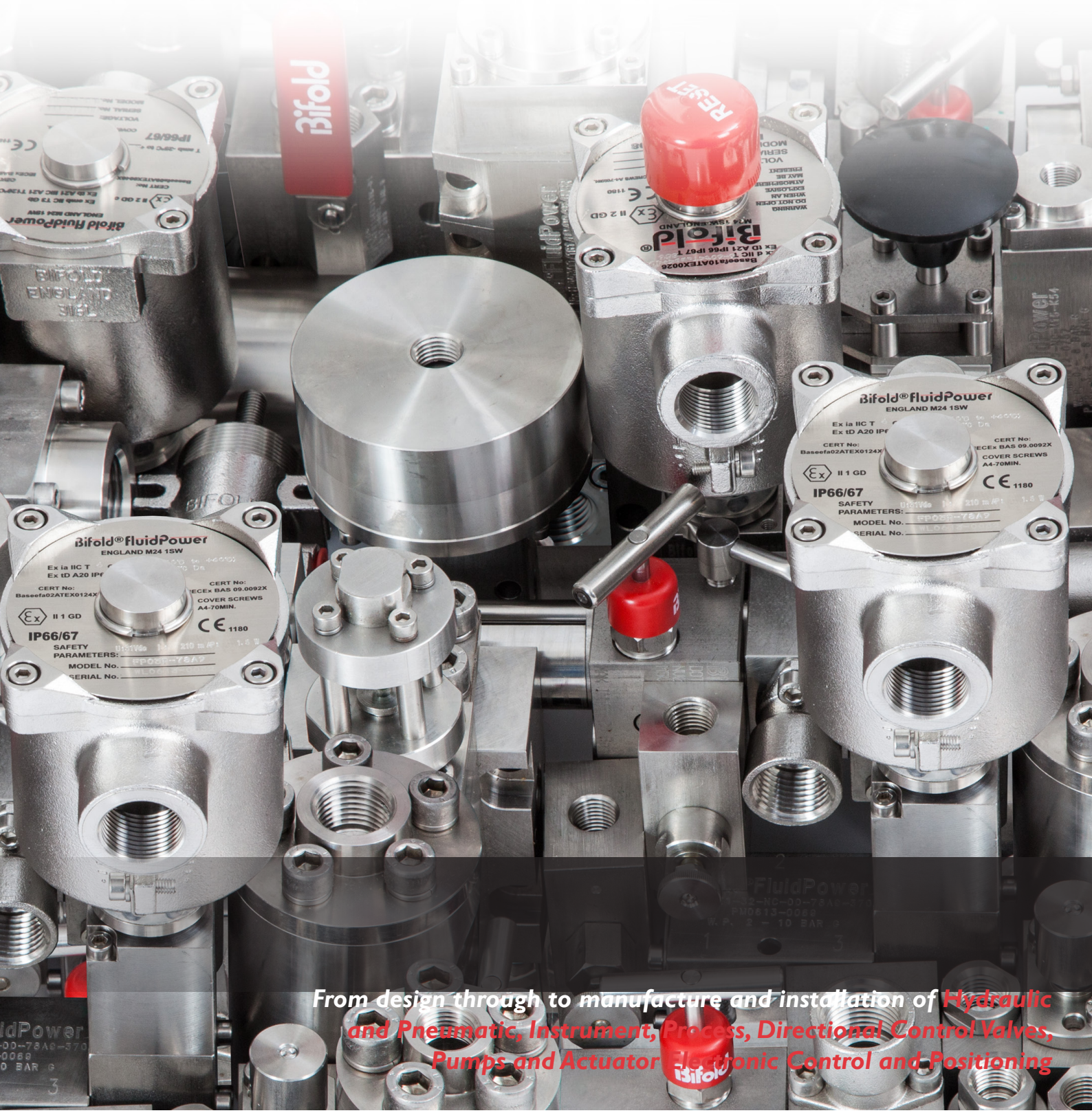
Магнитогорск (3519)55-03-13
 Москва (495)268-04-70
 Мурманск (8152)59-64-93
 Набережные Челны (8552)20-53-41
 Нижний Новгород (831)429-08-12
 Новокузнецк (3843)20-46-81
 Новосибирск (383)227-86-73
 Омск (3812)21-46-40
 Орел (4862)44-53-42
 Оренбург (3532)37-68-04
 Пенза (8412)22-31-16
 Казахстан (772)734-952-31

Пермь (342)205-81-47
 Ростов-на-Дону (863)308-18-15
 Рязань (4912)46-61-64
 Самара (846)206-03-16
 Санкт-Петербург (812)309-46-40
 Саратов (845)249-38-78
 Севастополь (8692)22-31-93
 Симферополь (3652)67-13-56
 Смоленск (4812)29-41-54
 Сочи (862)225-72-31
 Ставрополь (8652)20-65-13
 Таджикистан (992)427-82-92-69

Сургут (3462)77-98-35
 Тверь (4822)63-31-35
 Томск (3822)98-41-53
 Тула (4872)74-02-29
 Тюмень (3452)66-21-18
 Ульяновск (8422)24-23-59
 Уфа (347)229-48-12
 Хабаровск (4212)92-98-04
 Челябинск (351)202-03-61
 Череповец (8202)49-02-64
 Ярославль (4852)69-52-93

<https://bifoldgroup.nt-rt.ru/> || bpo@nt-rt.ru

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



From design through to manufacture and installation of Hydraulic and Pneumatic, Instrument, Process, Directional Control Valves, Pumps and Actuator Electronic Control and Positioning

Contents

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● 02	Wellhead Control Preferred Range			November 2006
● 02	Pneumatic Actuator Controls			BFD521 November 2016
● 03	Pneumatic Manifold System Model Axis			March 2011

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 Ex d	BFD370 November 2014 February 2007
● 05	250 bar	8 lpm	SVP8x08 Series	Ex d, Ex emb, Ex ia	BFD87 November 2013
● 06	690 bar	1 lpm	Direct Acting Solenoid Valves Model FP01	Ex d, Ex emb, Ex ia	BFD90 November 2013
● 06	690 bar	15 lpm	Indirect Acting Solenoid Valves Model FP15	Ex d, Ex emb, Ex ia	Issue 4 February 2005
● 07	610 bar	200 lpm	FP50, FP100, FP200 Series	Ex d, Ex emb, Ex ia	Issue 4 February 2005
● 07	1380 bar	40 lpm	Slide Valve SV and SVI Series	Ex d, Ex emb, Ex ia	Issue 4 February 2005
● 08	690 bar	1 lpm	FPS01 Subsea Series		Issue 4 February 2005
● 08	690 bar		FPS10 Subsea Series		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/1200/1201/1205/1206/1250		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, 14550		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 & Filter Booster Range Model VBP		BFD03/10 August 2017
● 13	20 bar	Cv 11.2	High Speed Exhaust Valve Range Model HIPEX Series		BFD20/6 August 2017
● 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



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.

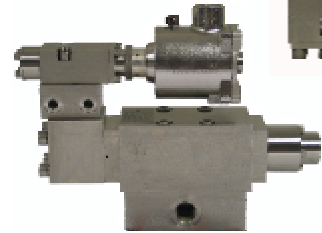
In recent years, Marshalsea has built on the experience and skills of its workforce to extend its product range. In addition to its high quality pumps and valves, Marshalsea now provides a range of stainless steel intensifiers for subsea and topside applications - plus a new range of water pumps specifically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

Product Series:- FP01
Pressure:- 0 - 690 bar
Size Range:- 1 litre per minute nominal
Solenoid Power / type:- 0.9 to 3.7W / direct acting
Explosion Protection:- EExd, EExemb, EExia
Primary Applications:- SSSV, Process, ESD, Choke Valve and Ballast System actuator controls



Product Series:- FP05
Pressure:- 0 - 345 bar
Size Range:- 5 litres per minute nominal
Solenoid Power / type:- 5.7W / direct acting
Explosion Protection:- EExd,
Primary Applications:- Process, ESD and choke valve actuator control, Ballast

Product Series:- FP15
Pressure:- 0 - 690 bar
Size Range:- 15 litres per minute nominal
Solenoid Power / type:- 0.9 to 3.7W / indirect acting
Explosion Protection:- EExd, EExemb, EExia
Primary Applications:- Wellhead, Process, ESD, Choke, Ballast, Turret and Mooring System actuator control



Product Series:- FP50, FP100 & FP200
Pressure:- 0 - 345 bar (FP50)
 0 - 250 bar (FP100 & FP200)
Size Range:- 50, 100 & 200 litres per minute nominal
Solenoid Power / type:- 0.9 to 3.7W / indirect acting
Explosion Protection:- EExd, EExemb, EExia
Primary Applications:- Process, ESD and HIPPS valve actuator control



Product Series:- SV/SVI Series
Pressure:- 0 - 1380 bar
Size Range:- up to 40 litres per minute nominal
Solenoid Power / type:- 0.9 to 3.7W / indirect acting
Explosion Protection:- EExd, EExemb, EExia
Primary Applications:- Special applications for high pressure, high temperature and contaminated control fluids



Solenoid Valves:-

Flameproof (EExd)

Product Series:- FP03P, FP06P, FP10P & FP12P
Pressure:- 0 - 10 bar
Size Range:- 1/4" to 1/2"
Solenoid Power / type:- 1.5 to 6.5 W / direct acting
Explosion Protection:- EExd, EExia+ EExemb(FP03P only)
Primary Applications:- Wellhead, Process and ESD valve actuator control

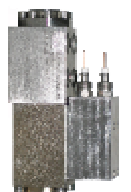


Product Series:- SVP8x08
Pressure:- 0 - 250 bar
Size Range:- 8 litres per minute nominal
Solenoid Power / type:- 5.7W / direct acting
Explosion Protection:- EExd
Primary Applications:- Process, ESD and choke valve actuator control

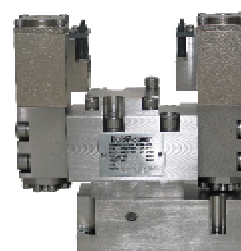
Solenoid Valves:-

Subsea

Product Series:- FPS01 Subsea
Pressure:- 0 - 690 bar
Size Range:- 1 litre per minute nominal
Solenoid Power / type:- 15W / direct acting
Primary Applications:- Subsea
Depth of operation:- 3000m



Product Series:- FPS10 Subsea
Pressure:- 0 - 690 bar
Size Range:- 10 litre per minute nominal
Solenoid Power / type:- 15W / indirect acting
Primary Applications:- Subsea
Depth of operation:- 3000m



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



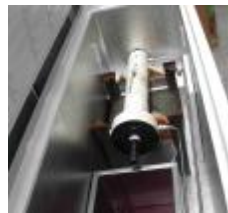
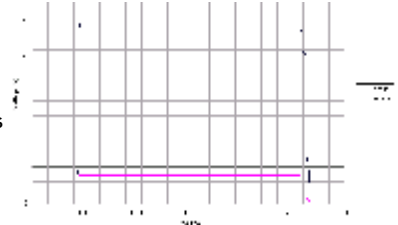
Approval Testing

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

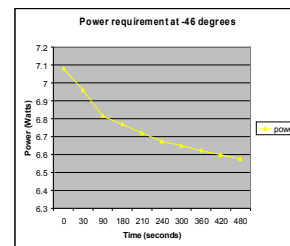
- Endurance testing to 600,000 cycles at the extremes of the operating temperature envelope.
- Environmental testing from -50°C to +180°C
- Full function testing, leak rate monitoring, proof testing 1.5 to 5 times operating pressure (dependent on approval body)
- Maximum and minimum pull-in voltage testing
- 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)	Control Valve	Process Valve	Control Valve	Process Valve
-50	10	10	10	10	10
-40	10	10	10	10	10
-30	10	10	10	10	10
-20	10	10	10	10	10



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

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:-

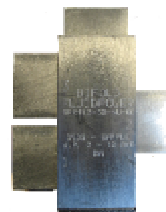


Product Series:- AXIS Manifold
Pressure :- 0 - 10 bar
Size Range:- 1/4" to 1"
Solenoid Power/Type:- 1.5 to 6.5W
Explosion Protection:- EExd, EExemb, EExia
Primary Applications:- Wellhead, Process and ESD valve actuator control

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



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



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

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



* pending summer 2007

Product Series:- FP01 (-36°C minimum)
Pressure :- 0 - 690 bar
Size Range:- 1 litre per minute nominal
Solenoid Power/Type:- 0.9 to 3.7W / direct acting
Explosion Protection:- EExd, EExemb, EExia
Primary Applications:- SSSV, Process, ESD, Choke Valve and Ballast System actuator controls



Product Series:- FP15
Pressure :- 0 - 690 bar (pilot stage); 0 - 1035 bar (main stage)
Size Range:- 15 litres per minute nominal
Solenoid Power/Type:- 0.9 to 5.7W / indirect acting
Explosion Protection:- EExd (-50°C), EExemb (-36°C), EExia (-36°C)
Primary Applications:- Wellhead, Process, ESD, Choke, Ballast, Turret and Mooring System actuator controls.



Product Series:- FP50, FP100 & FP200
Pressure :- 0 - 345 bar (FP50)
 0 - 250 bar (FP100, FP200)
Size Range:- 50, 100, 200 litres per minute nominal
Solenoid Power/Type:- 0.9 to 5.7W / indirect acting
Explosion Protection:- EExd (-50°C), EExemb (-36°C), EExia (-36°C)
Primary Applications:- Process, ESD and HIPPS valve actuator control



Product Series:- SV/SVI Series
Pressure :- 0 - 690 bar (pilot stage); 0 - 1380 bar (main stage)
Size Range:- 40 litres per minute nominal
Solenoid Power/Type:- 0.9 to 5.7W / indirect acting
Explosion Protection:- EExd (-50°C), EExemb (-36°C), EExia (-36°C)
Primary Applications:- Special applications for high pressure, high temperature and contaminated control fluids

Product Series:- Quick Exhaust Valves - Hydraulic / Pneumatic
Pressure :- 0 - 345 bar Hydraulic ; 0 - 12 bar Pneumatic
Size Range:- 1/4" - 1/2" Hydraulic ; 1/4" - 1" Pneumatic



Product Series:- Thermal Relief Valves
Pressure :- 0 - 1380 bar
Size Range:- 1/4" to 1/2"



Product Series:- Pressure Relief Valves
Pressure :- 0 - 12 bar
Size Range:- 1/4" to 1/2"



Product Series:- ASH Series Air Preparation
Pressure :- 0 - 40 bar
Size Range:- 1/4" to 1"

Product Series:- Ancillary Valves (Flow Control, Check Valves, Port Flow Regulators)
Pressure :- 0 - 1035 bar (subject to product type)
Size Range:- 1/4" to 1"



Product Series:- PSV5A - Flowline Pilot Range
Pressure :- 0 - 690 bar sensing; 0-16 bar control
Size Range:- 5 litres per minute nominal
Primary Applications:- 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).

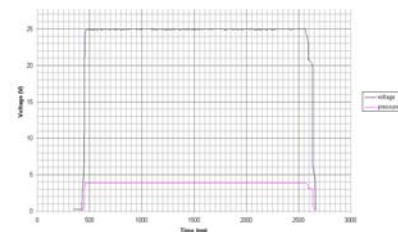
Approval Testing

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

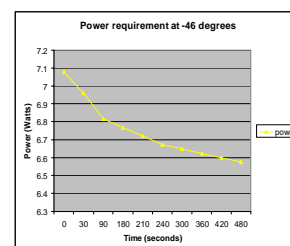
- Endurance testing to 600,000 cycles at the extremes of the operating temperature envelope.
- Environmental testing from -55°C to $+90^{\circ}\text{C}$
- Full function testing, leak rate monitoring, proof testing 1.5 to 5 times operating pressure (dependent on approval body)
- Maximum and minimum pull-in 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 $+180^{\circ}\text{C}$).
- 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	Tested Time	Corrected Time
-20	FB	6.4	9.2	6.24	8.58	6.29	9.05
	Anul	6.23	9.54	6.14	9.4	6.11	9.34
-40	FB	13.21	18.55	10.54	15.16	13	18.12
	Anul	12.21	19.09	14.45	22.52	10.18	15.58
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.

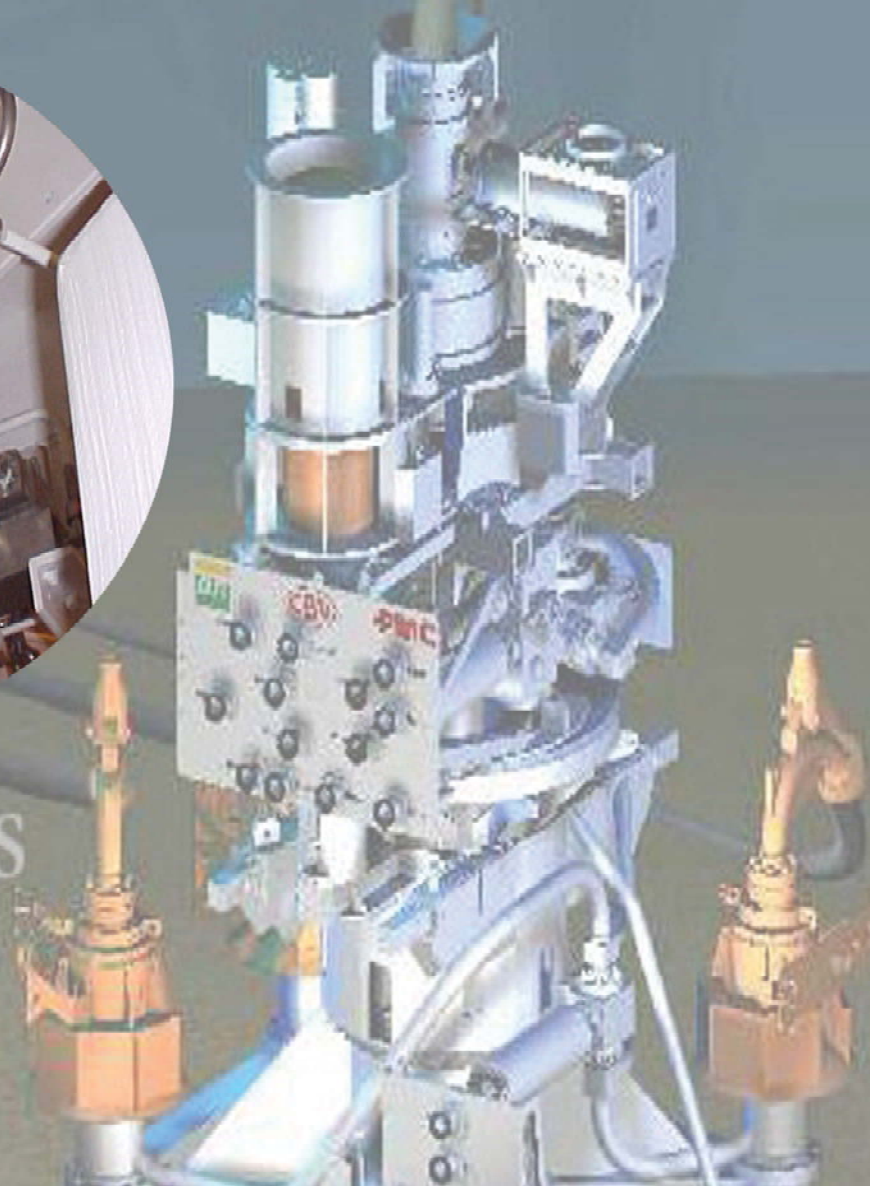
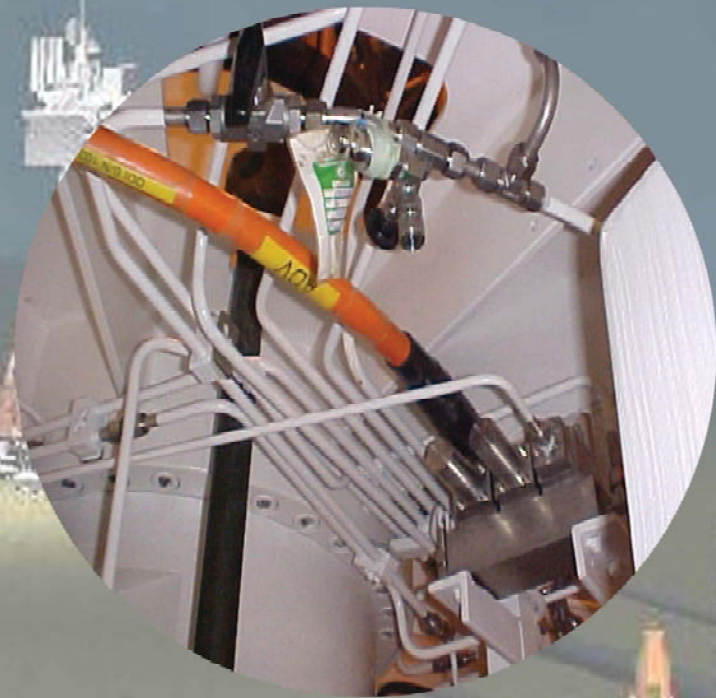
The end user can be sure that Bifold Fluidpower has the product portfolio and the technical and production capability to provide the right solution for your pneumatic and hydraulic system requirements.

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.

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-chargeable);
up to 20% sea water contamination
- Immersable in dielectric 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

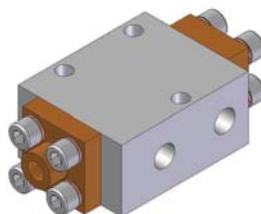
up to 690 bar



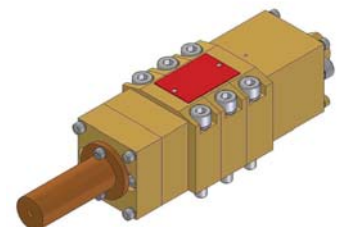
High pressure shuttle valve, subbase mounting

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

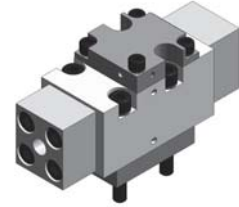
2/2, 3/2, 4/2



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



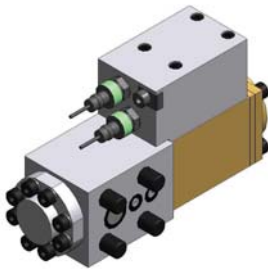
Single high pressure pilot. Adjustable pilot pressure. Cv = 0.24.



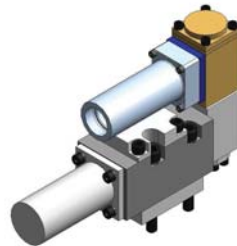
Bi-stable, high pressure pilot Cv = 0.24

SOLENOID VALVES - up to 690 bar

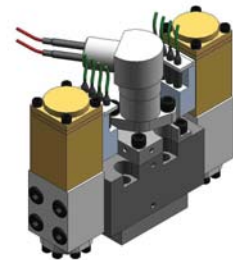
Dual or single coils ; direct acting and 2-stage configurations



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



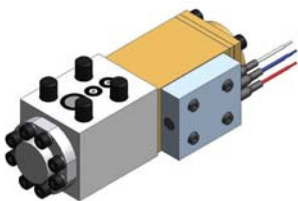
2/2 & 3/2, (normally open or normally closed) and 4/2 spring return, pilot stage solenoid valve operated shear plane sealing type directional control valve. Cv = 0.24.



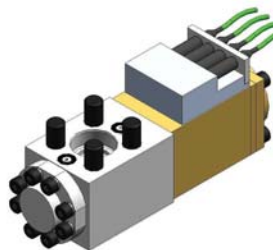
3/2, bi-stable, fail close on loss of pressure pilot stage solenoid valve operated shear plane sealing type directional control valve. Cv = 0.24.

Solenoid Connector Options

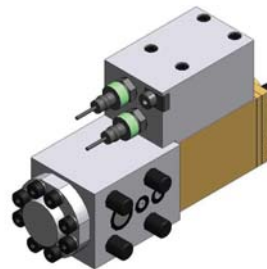
Connectors can be fitted to customer specification.



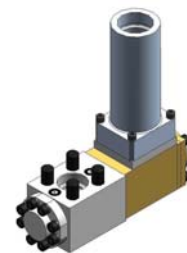
Flying leads



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



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



Bennex. To suit oil filled cables

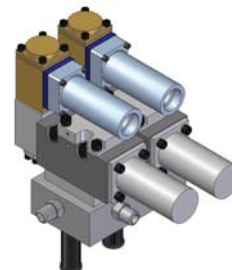
Reliability and innovation in directional control valves

SPECIAL VALVE PRODUCTS

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

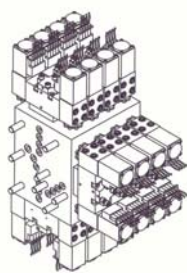


Series configured bi-stable pilot operated 3/2 valve, pilot operated 3/2 spring return valve and solenoid operated 3/2 spring return valve

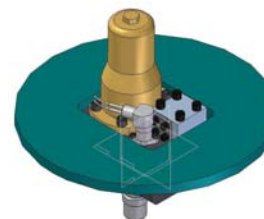
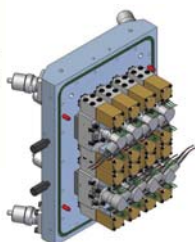


Dual, 3/2, spring return, 2-stage solenoid valves. Integral return line ingress filter protection.

CONTROL POD PRODUCTS:-



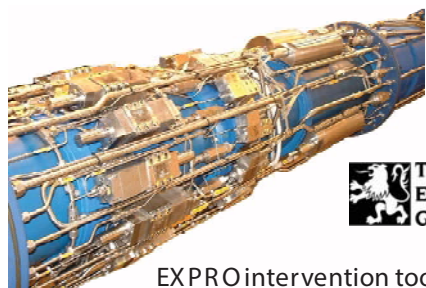
- SCM 8 function flange and 12 function cube manifolds



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

Examples of Installation:-

Pilot operated slide valves and direct acting solenoid valves



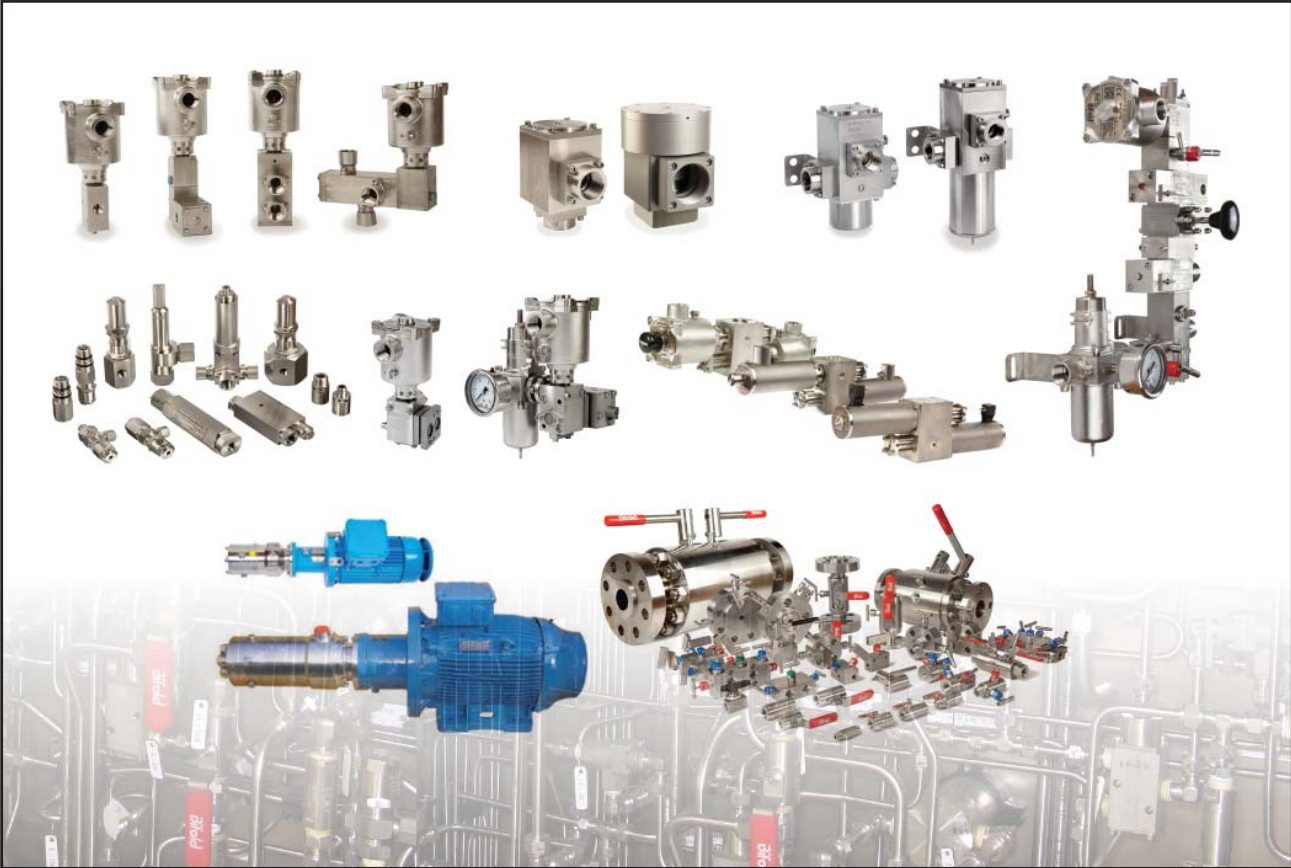
EXPRO intervention tool

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



RR C Controls Ltd Well head control module - Talisman Energy

Pneumatic and Hydraulic Installation Reference List September



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.

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

Project History

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

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	Villages	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

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	Darquan	Iran

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

Project History

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

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

Project History

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

Project History

MAJOR PROJECT SUCCESS		
Operator	Project Name	Location
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
Varyeganneftegaz	Bakhilov	Russia
Vietsoyepetro	White Tiger	Vietnam Offshore



Wellhead Control Preferred Range

Incorporating:-

Low Pressure Logic

Electro-Hydraulic

HPU

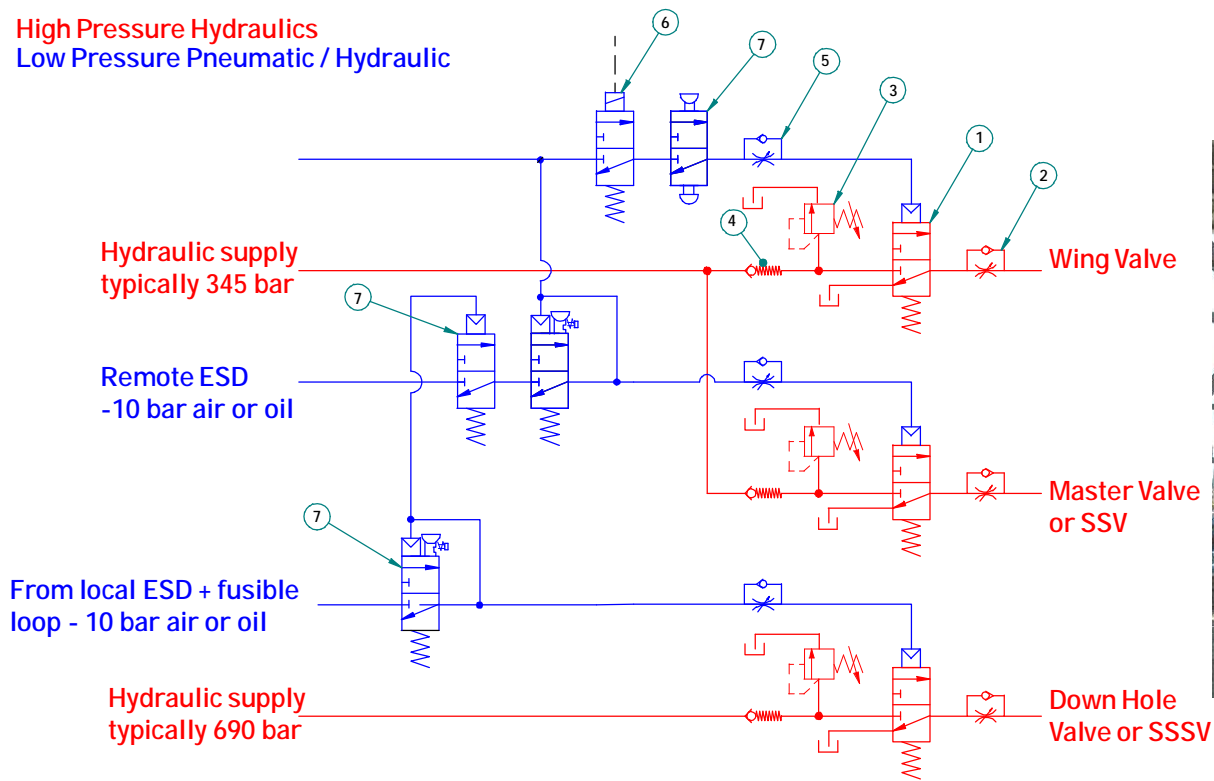
Field Items



Low Pressure Logic Wellhead Control

Opening sequence to protect down hole valves

High Pressure Hydraulics
Low Pressure Pneumatic / Hydraulic

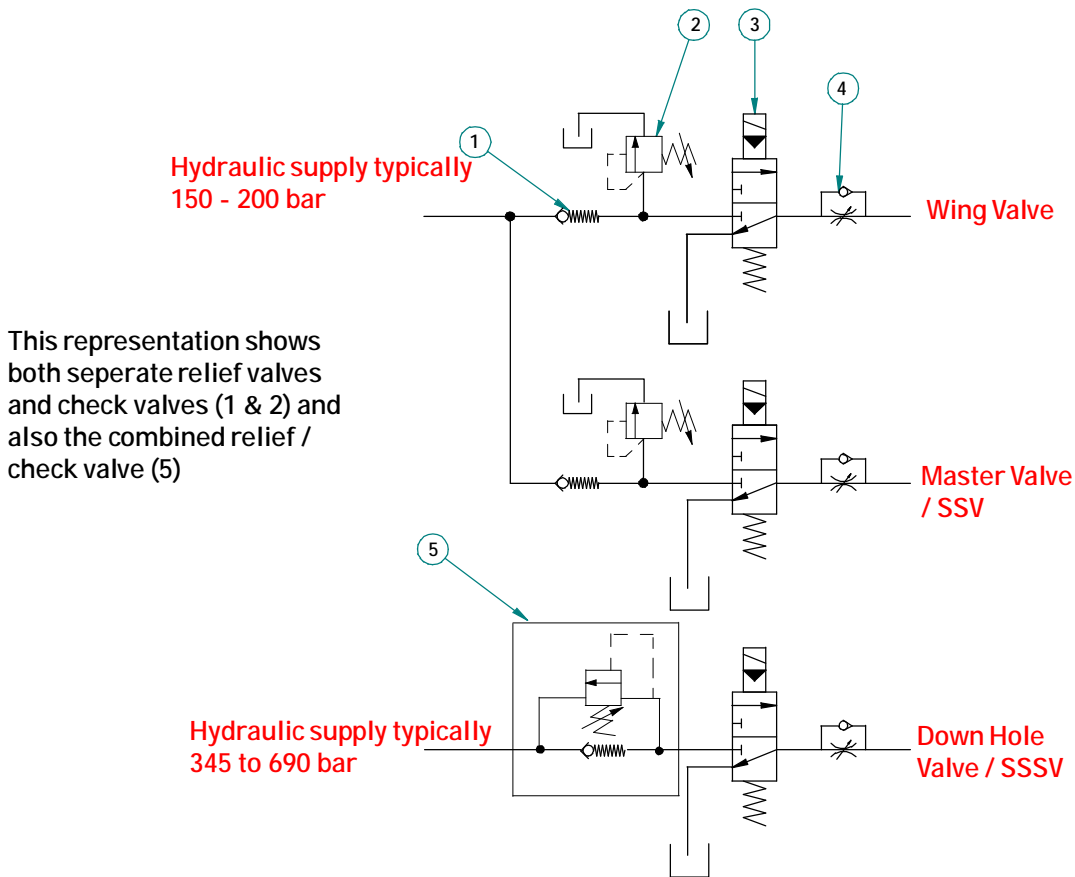


Check List

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



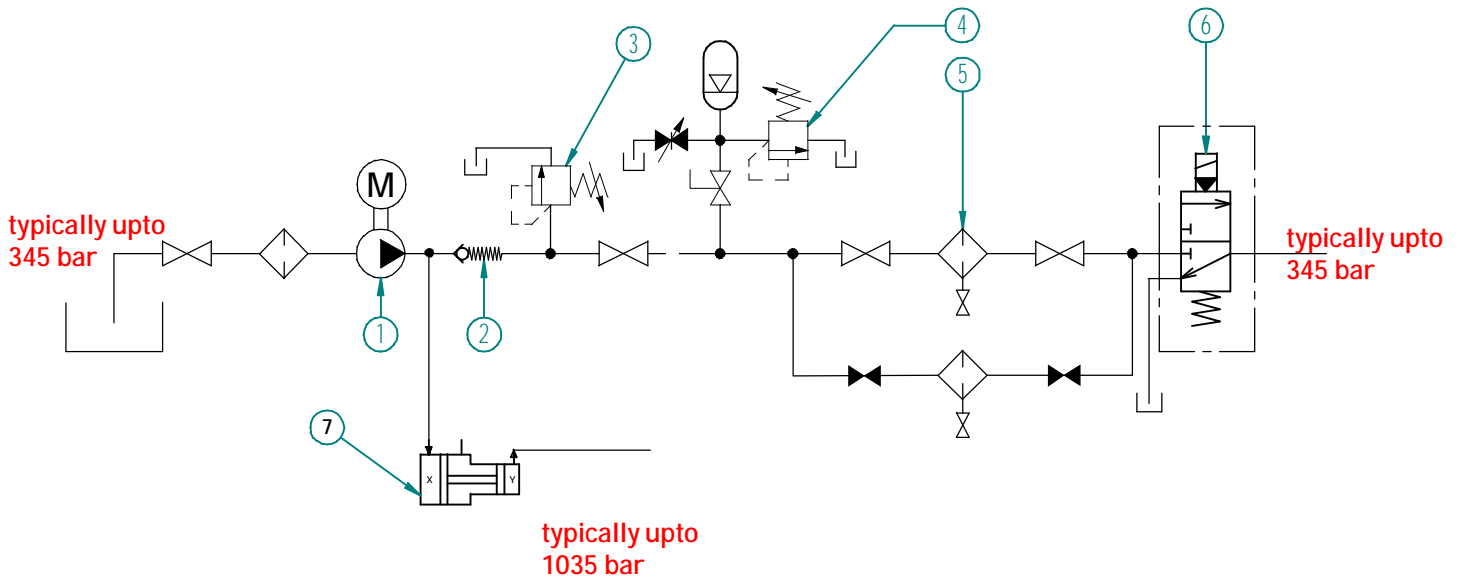
Check List

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



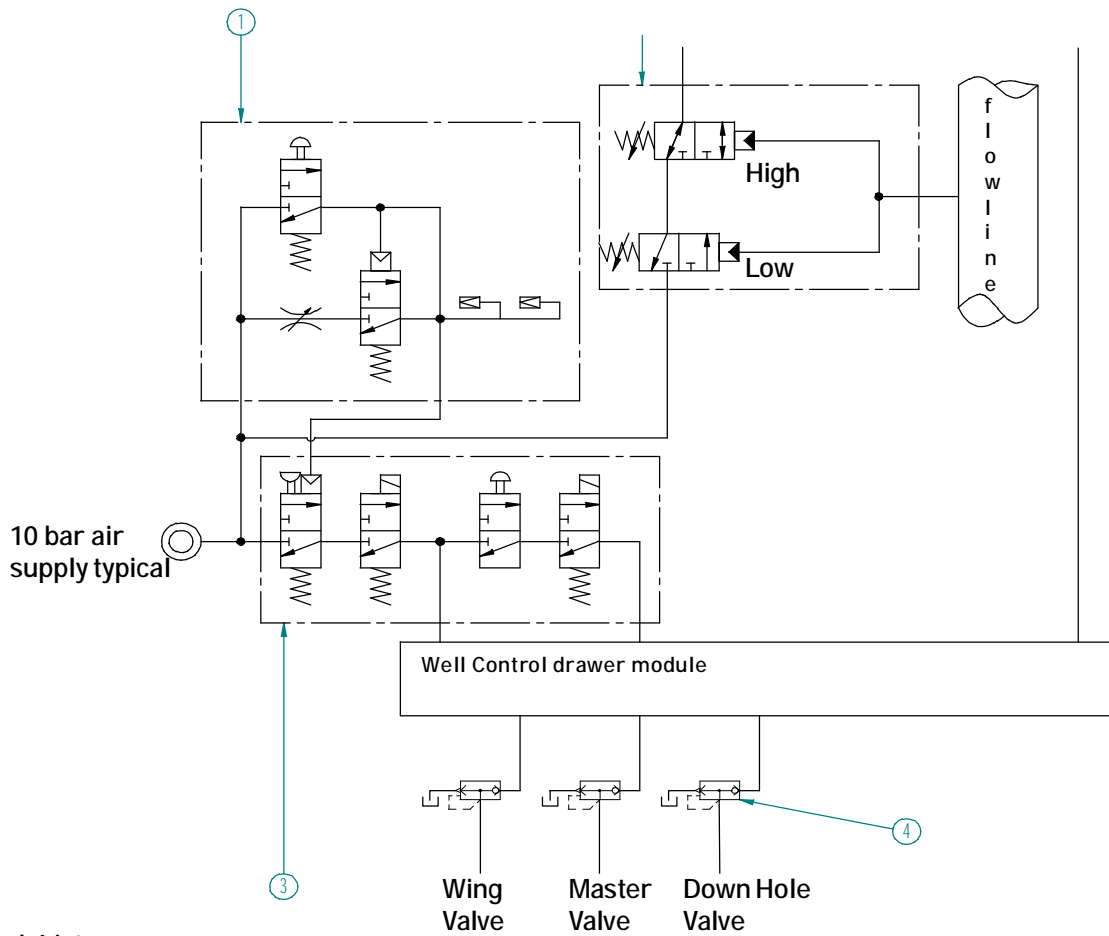
Check List

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.

Field Items

Wellhead Control



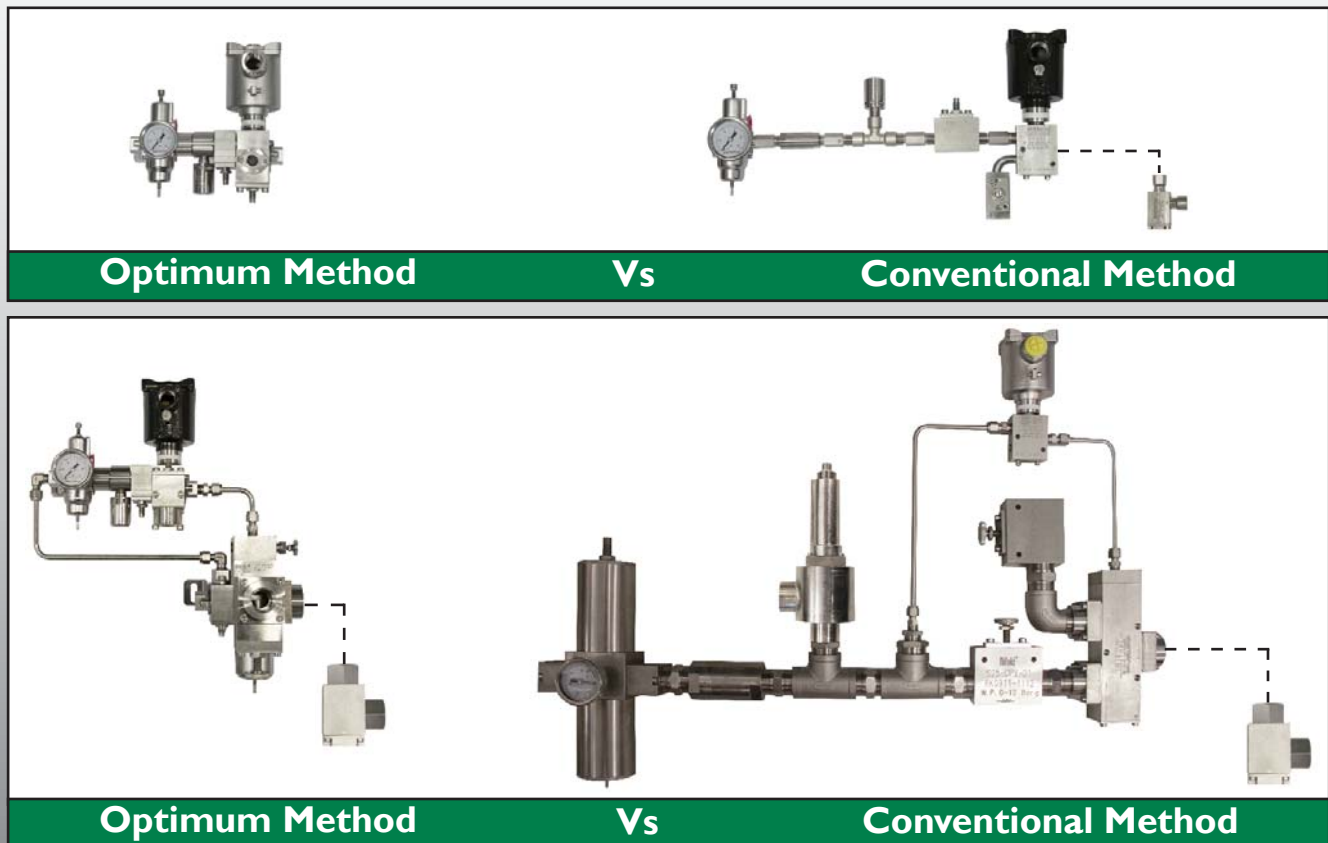
Check List

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.

Pneumatic Actuator Controls

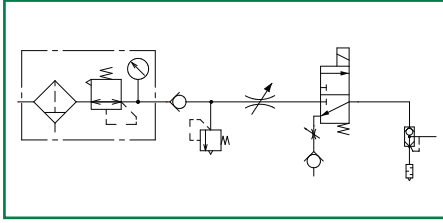
The Best Technology at the Lowest Cost = At Least 22% to 39% Cost Saving



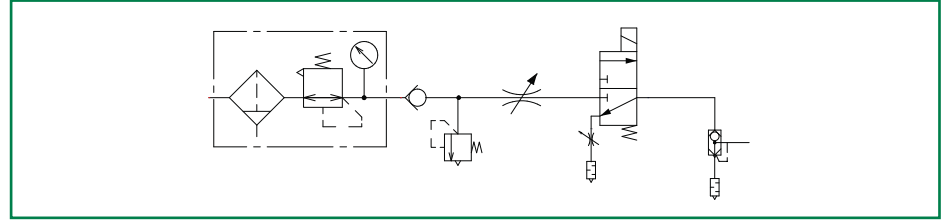
- At Least 22% to 39% Cost Saving
- Highest Safety Factors
- Relief Valves Correctly Sized and Safe to match the Filter Regulator
- Reduced Spares Requirement
- Highest Flow Products
Check Valves, Flow Control Valves, Pilot Valves,
Filter Regulators, Filter Boosters and Solenoid
Valves
- 48 Hr Despatch for Efficient and Quick Delivery
- Configurable Valve Control Products Simplified for Ease of Selection

Comparison

Optimum Method



Conventional Method



30% Cost Saving 132% More Flow

¼" MODULAR SOLUTION - CIRCUIT CV		
	Cv to Open	Cv to Close
No QEV	0.88	2
With QEV	0.77	3.5

Please note that Solenoid Cv is 2.0



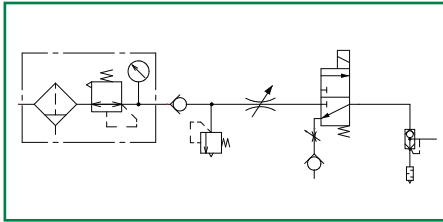
¼" NIPPLED CIRCUIT - CIRCUIT CV		
	Cv to Open	Cv to Close
No QEV	0.57	0.88
With QEV	0.54	3.5

Please note that Solenoid Cv is 1.0

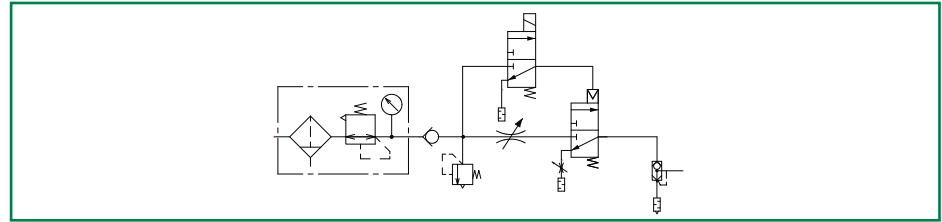


Relief Valves correctly sized and safe to match the Filter Regulator

Optimum Method



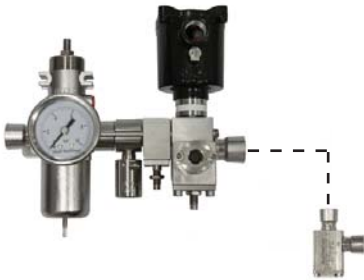
Conventional Method



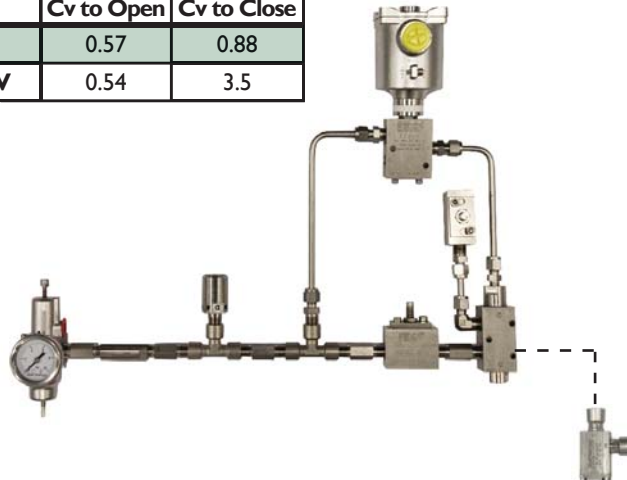
25% Cost Saving 135% More Flow

½" MODULAR SOLUTION - CIRCUIT CV		
	Cv to Open	Cv to Close
No QEV	1.33	2.0
With QEV	1.09	3.5

Please note that Solenoid Cv is 2.0



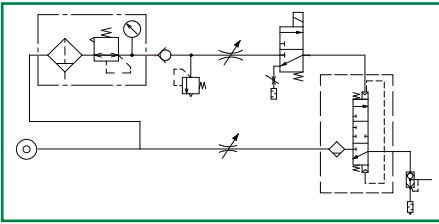
¼" PILOT VALVE CIRCUIT - CIRCUIT CV		
	Cv to Open	Cv to Close
No QEV	0.57	0.88
With QEV	0.54	3.5



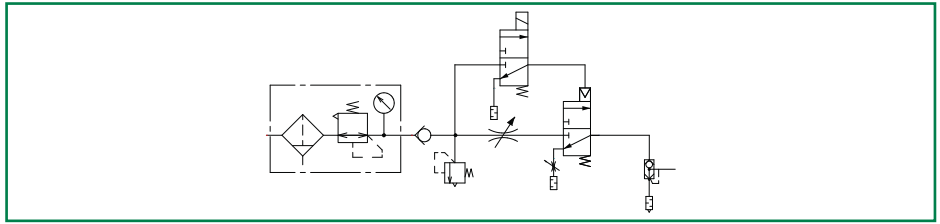
Relief Valves correctly sized and safe to match the Filter Regulator

Comparison

Optimum Method



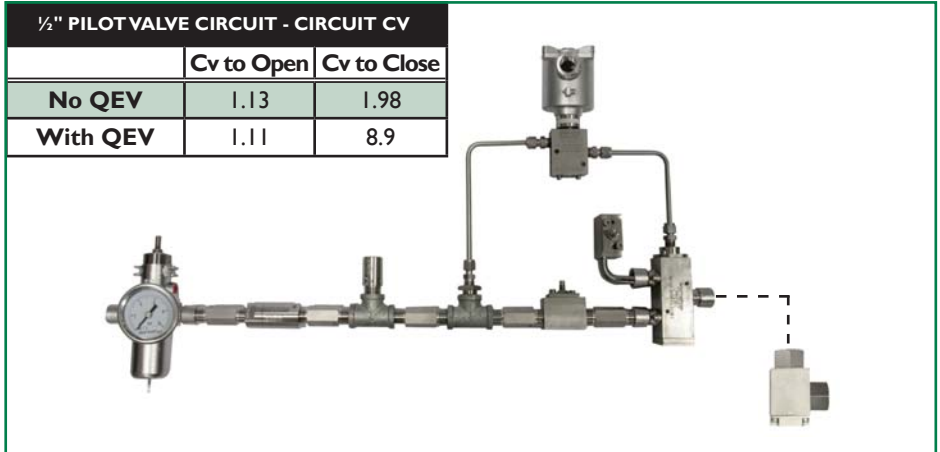
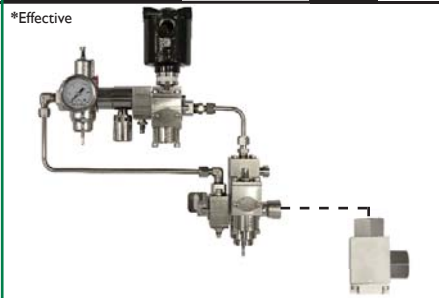
Conventional Method



22% Cost Saving 75% More Flow

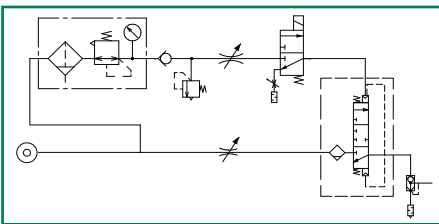
1/2" FILTER BOOSTER CIRCUIT - CIRCUIT CV		
	Cv to Open*	Cv to Close
No QEV	1.96	1.0
With QEV	1.94	8.9

1/2" PILOT VALVE CIRCUIT - CIRCUIT CV		
	Cv to Open	Cv to Close
No QEV	1.13	1.98
With QEV	1.11	8.9

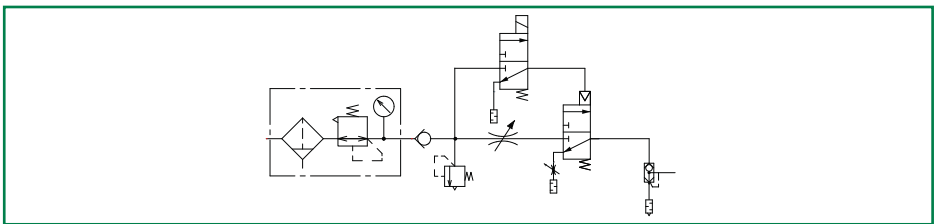


Relief Valves correctly sized and safe to match the Filter Regulator

Optimum Method



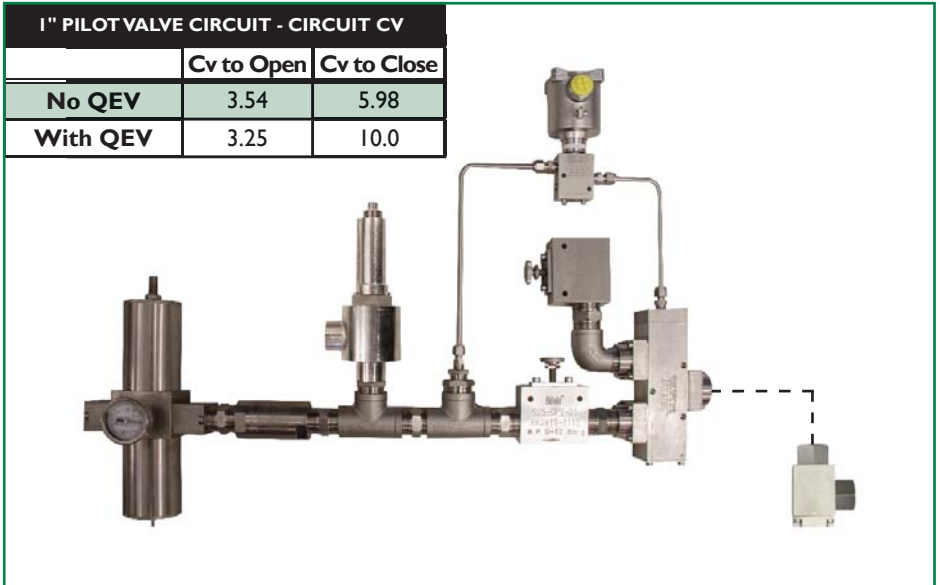
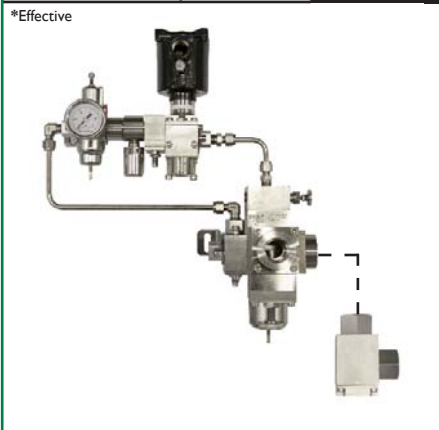
Conventional Method



39% Cost Saving 200% More Flow

1" FILTER BOOSTER CIRCUIT - CIRCUIT CV		
	Cv to Open*	Cv to Close
No QEV	10.73	6.0
With QEV	8.98	10.0

1" PILOT VALVE CIRCUIT - CIRCUIT CV		
	Cv to Open	Cv to Close
No QEV	3.54	5.98
With QEV	3.25	10.0

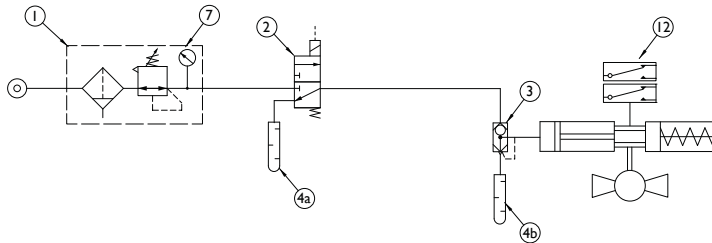


Relief Valves correctly sized and safe to match the Filter Regulator

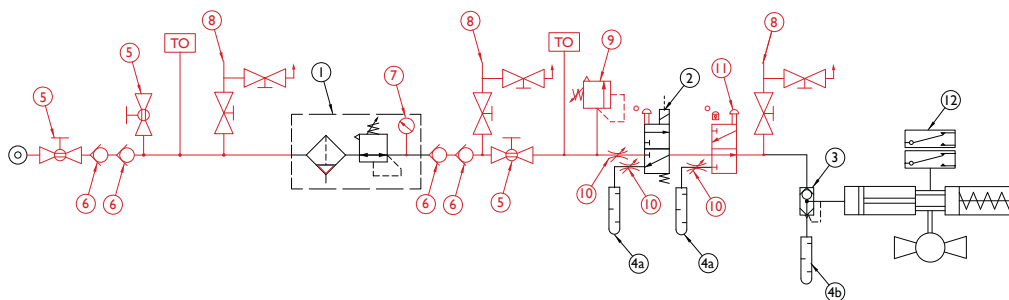
Circuit

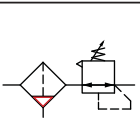
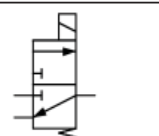
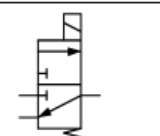
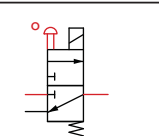


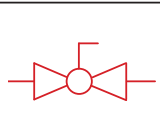







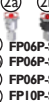
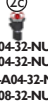
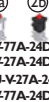





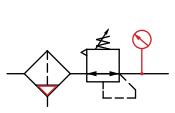
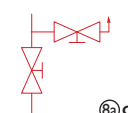
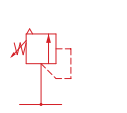

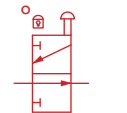
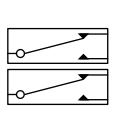








Schematic

¼" Simplest / Bare Circuit



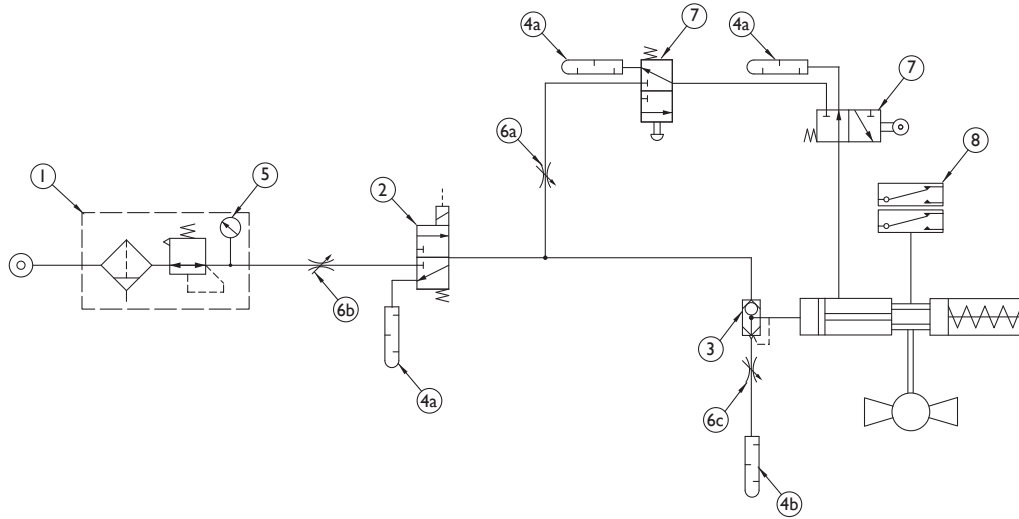
¼" Maximum Circuit Options (Non Partial Stroke)

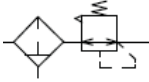
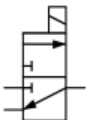









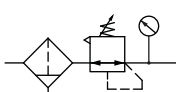

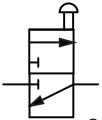
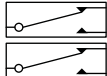









1	2			3	4	5	
Filter Regulator	Solenoid Valves (Auto Reset)			Solenoid Valves (Manual Override)	Quick Exhaust Valve	Bug Vent/Silencer	Ball Valve
 Cv 0.7	 Cv 1.0	 Cv 2.0	 Cv 2.0	 Cyl to Exh Cv 1.9 Into Cyl Cv 3.5		 Cv 2.1	
 SC06-20-FR-SR-MD-10-Y-X3	 2a  2b  2c 2a) FP06P-SI-04-32-NU-V-77A-24D-57 2b) FP06P-SI-04-32-NU-V-27A-24D-57 2c) FP06P-SI-A04-32-NU-V-27A-24D-57	 2a  2b  2c 2a) FP10P-SI-08-32-NU-V-77A-24D-28LP 2b) FP10P-SI-08-32-NU-V-27A-24D-28LP 2c) FP10P-SI-A08-32-NU-V-27A-24D-28LP	 2a  2b  2c 2a) FP06P-SI-04-32-NU-V-77A-24D-ML-30 2b) FP06P-SI-04-32-NU-V-27A-24D-ML-30 2c) FP06P-SI-A04-32-NU-V-27A-24D-ML-30 2a) FP10P-SI-08-32-NU-V-77A-24D-ML-28LP 2b) FP10P-SI-08-32-NU-V-27A-24D-ML-28LP 2c) FP10P-SI-A08-32-NU-V-27A-24D-ML-28LP	 S12-QEV	 4a  4b ¼ K4-(1/4NPT)-316 ½ K4-(1/2NPT)-316	 BV0104F025T1K1K-N	
Catalogue Section 13	Catalogue Section 04			Catalogue Section 04	Catalogue Section 19	Configurator	Catalogue Section 26a
6	7	8	9	10	11	12	
Check Valve	Gauge	Block and Bleed Valves	Pressure Relief Valve	Cylinder Plug Valve	Mechanical Valves	SW Soldo Limit Switch Box Series	
 Cv 1.2		 8a) Cv 0.5 8b) Cv 0.32	 Cv 1.5	 Cv 2.1	 Cv 0.73		
 PCV-04F-04F-13-023-V	 X10 or X11	 8a  8b NV0304F02M5V6K NV0404F02M5V6K	 S06-PR4.5	 CPV-04F-04F-V	 BXS-04-04-M9-32-NU-04-V BXS-04-A04-M9-32-NU-04-V	 SW0120E-10X23A6	
Catalogue Section 20	Catalogue Section 03	Catalogue Section 26a	Catalogue Section 16	Catalogue Section 14	Catalogue Section 09	Soldo Controls	

Partial Stroke

Schematic

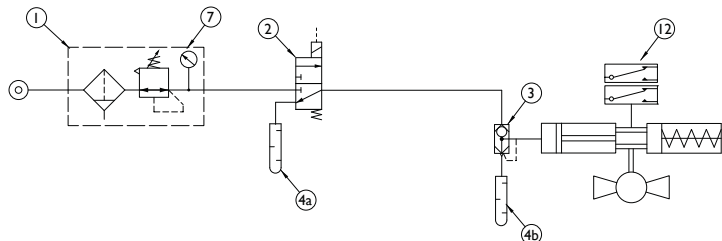


1	2	3	4
Filter Regulator	Solenoid Valves (Auto Reset)	Quick Exhaust Valve	Bug Vent / Silencer
 Cv 0.7	 Cv 1.0	 Cyl to Exh Cv 1.9 Into Cyl Cv 3.5	
 SC06-20-FR-SR-MD-10-V-X3	   2a FP06P-SI-04-32-NU-V-77A-24D-57 2b FP06P-SI-04-32-NU-V-27A-24D-57 2c FP06P-SI-A04-32-NU-V-27A-24D-57	 S12-QEV	  4a K4-(1/4NPT)-316 4b K4-(1/2NPT)-316
Catalogue Section 13	Catalogue Section 04	Catalogue Section 19	Configurator
5	6	7	8
Gauge	Cylinder Plug Valves	Mechanical Valves	SW Soldo Limit Switch Box Series
	 1/4" Cv 2.1 1/2" Cv 5.1 3/4" Cv 9.8	 Cv 0.73	
 X10 or X11	   6a CPV-04F-04F-V 6b S12-CPV 6c S19-CPV	  7a BXS-04-04-M1-32-NU-00-V BXS-04-A04-M1-32-NU-00-V 7b BXS-04-04-M13-32-NU-00-V BXS-04-A04-M13-32-NU-00-V	 SW0120E-10X23A6
Catalogue Section 03	Catalogue Section 14	Catalogue Section 09	Soldo Controls

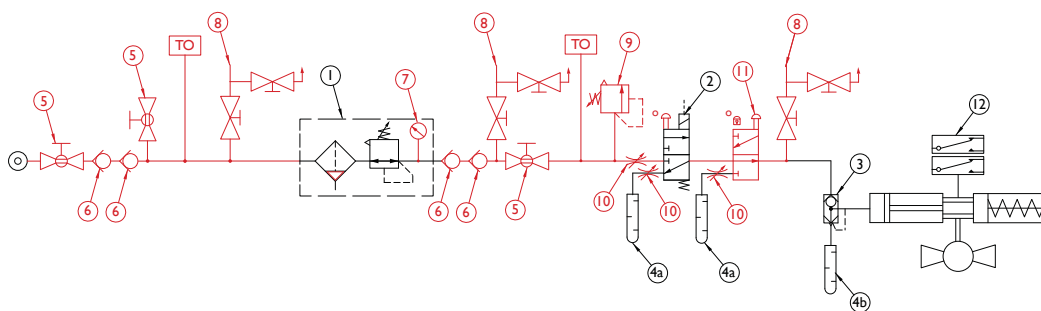
Circuit

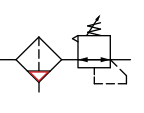
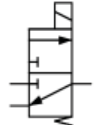
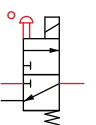
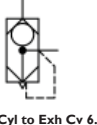
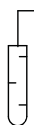









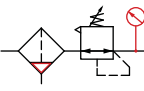
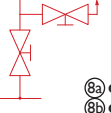
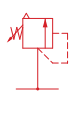


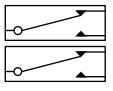






Schematic

1/2" Simplest / Bare Circuit

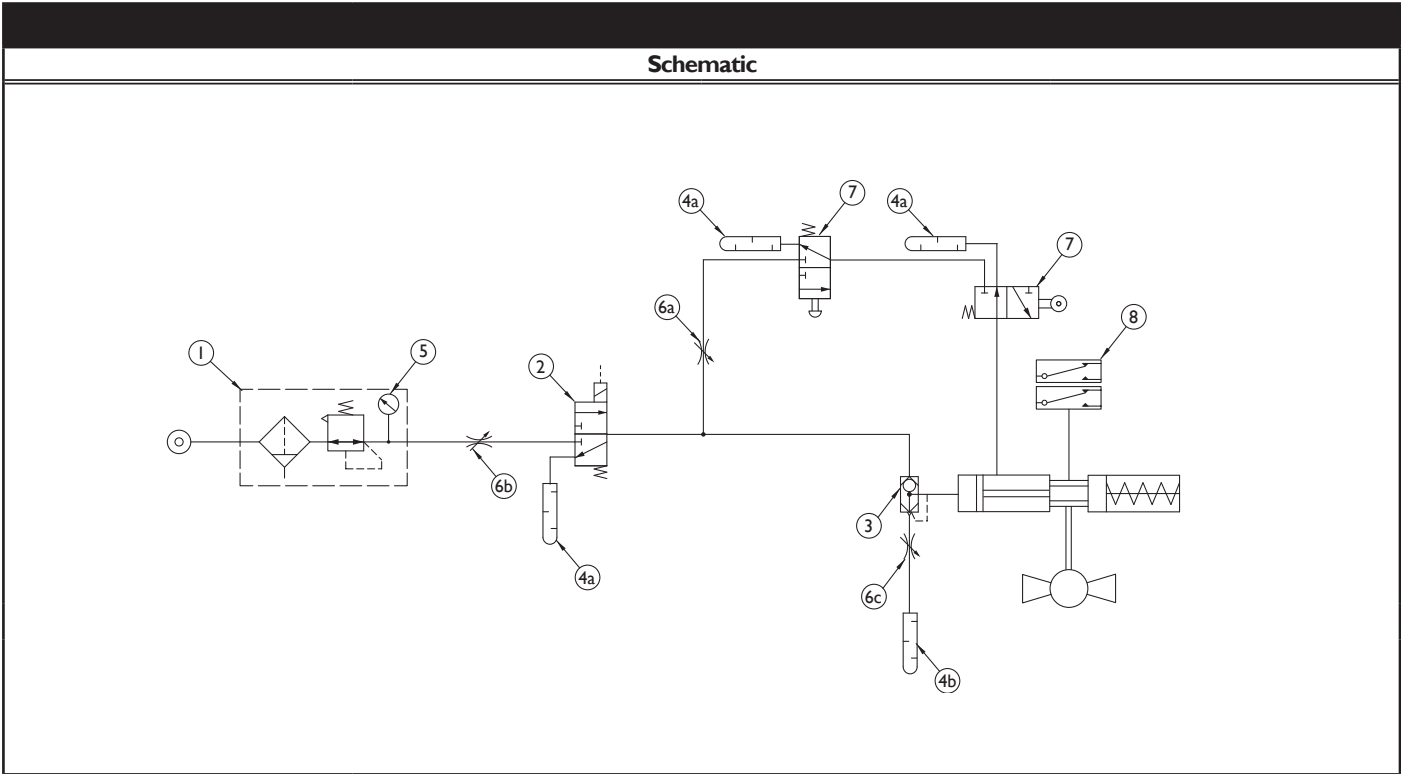


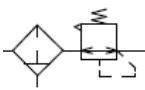
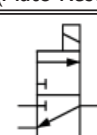



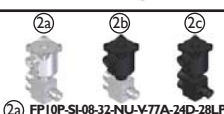


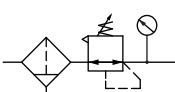

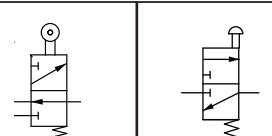
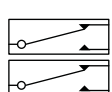

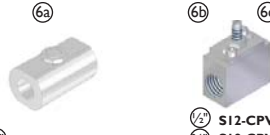


1/2" Maximum Circuit Options (Non Partial Stroke)



1	2	3	4	5	6	
Filter Regulator	Solenoid Valves (Auto Reset)	Solenoid Valves (Manual Override)	Quick Exhaust Valve	Bug Vent / Silencer	Ball Valve	Check Valve
 Cv 2.6	 Cv 2.0	 Cv 2.0	 Cyl to Exh Cv 6.5 Into Cyl Cv 8.3		 Cv 4.1	 Cv 4.25
 SH12-FR-SR-AD-10-X3	 2a) FP10P-SI-08-32-NU-V-77A-24D-28LP 2b) FP10P-SI-08-32-NU-V-27A-24D-28LP 2c) FP10P-SI-A08-32-NU-V-27A-24D-28LP	 2a) FP10P-SI-08-32-NU-V-77A-24D-ML-28LP 2b) FP10P-SI-08-32-NU-V-27A-24D-ML-28LP 2c) FP10P-SI-A08-32-NU-V-27A-24D-ML-28LP	 S19-QEV	 4a) K4-(1/4NPT)-316 4b) K4-(1/2NPT)-316	 BV0108F029.2TTIKLK-N	 PCV08F-08F-13-023-V
Catalogue Section I3	Catalogue Section 04		Catalogue Section 19	Configurator	Catalogue Section 26a	Catalogue Section 20
7	8	9	10	11	12	
Gauge	Block and Bleed Valves	Pressure Relief Valve	Cylinder Plug Valve	Mechanical Valves	SW Soldo Limit Switch Box Series	
	 8a) Cv 0.5 8b) Cv 0.32	 Cv 2.4	 Cv 5.1	 Cv 3.9		
 X5 or X8	 8a) NV0308F02M5V6K 8b) NV0408F02M5V6K	 S12-PR4.5	 S12-CPV	 SPR-08-08-M9-32-NU-05-V SPR-08-A08-M9-32-NU-05-V	 SW0120E-10X23A6	
Catalogue Section 03	Catalogue Section 26a	Catalogue Section 16	Catalogue Section 14	Catalogue Section 09	Soldo Controls	

Partial Stroke

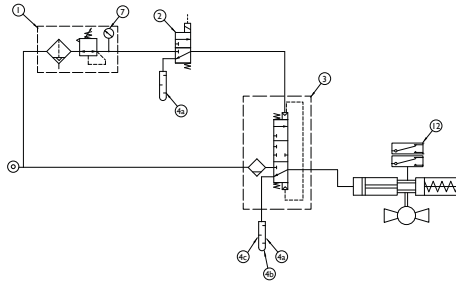


1	2	3	4
Filter Regulator	Solenoid Valves (Auto Reset)	Quick Exhaust Valve	Bug Vent / Silencer
 Cv 2.6	 Cv 2.0	 Cyl to Exh Cv 6.5 Into Cyl Cv 8.3	
 SH12-FR-SR-MD-10-X3	 2a) FP10P-SI-08-32-NU-V77A-24D-28LP 2b) FP10P-SI-08-32-NU-V27A-24D-28LP 2c) FP10P-SI-A08-32-NU-V27A-24D-28LP	 S19-QEV	 4a) K4-(1/4NPT)-316 4b) K4-(1/2NPT)-316
Catalogue Section 13	Catalogue Section 04	Catalogue Section 19	Configurator
5	6	7	8
Gauge	Cylinder Plug Valves	Mechanical Valves	SW Soldo Limit Switch Box Series
	 1/4" Cv 2.1 1/2" Cv 5.1 3/4" Cv 9.8	 Cv 0.73	
 X5 or X8	 6a) CPV-04F-04F-V 6b) S12-CPV 6c) S19-CPV	 7a) BXS-04-04-M13-32-NU-00-V BXS-04-A04-M13-32-NU-00-V 7b) BXS-04-04-M1-32-NU-00-V BXS-04-A04-M1-32-NU-00-V	 SW0120E-10X23A6
Catalogue Section 03	Catalogue Section 14	Catalogue Section 09	Soldo Controls

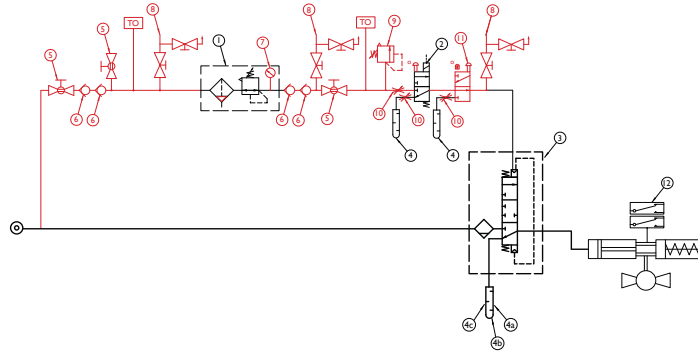
Circuit

Schematic

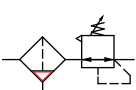
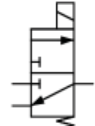
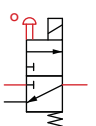
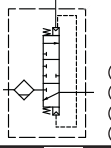








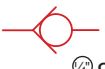
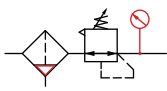
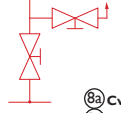


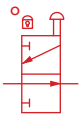
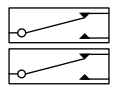


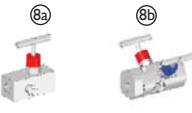




¼" Simplest / Bare Circuit



¼" Maximum Circuit Options (Non Partial Stroke)

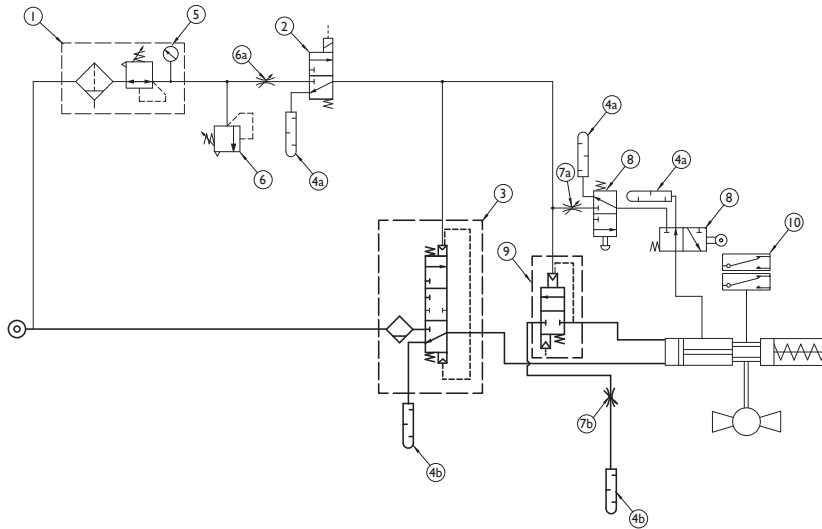


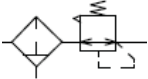
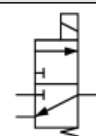
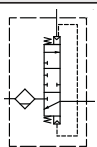

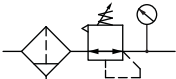



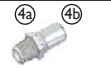

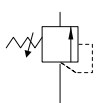

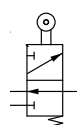
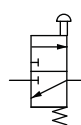
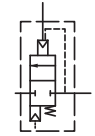
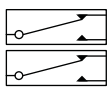






¼" Logic Line
¼", ½", 1" & 2" Flow Line

1	2			3	4	5
Filter Regulator	Solenoid Valves (Auto Reset)	Solenoid Valves (Manual Override)	Filter Booster	Bug Vent / Silencer	Ball Valve	
 Cv 0.7	 Cv 0.6		 ¼" Cv 2.0 ½" Cv 4.0 1" Cv 11.0 2" Cv 50.0		 ¼" Cv 2.1 ½" Cv 4.1 1" Cv 12.0 2" Cv 50.0	
 SC06-20-FR-SR-MD-10-V-X3	 2a) FP06P-SI-04-32-NU-V-77A-24D-35 2b) FP06P-SI-04-32-NU-V-27A-24D-35 2c) FP06P-SI-A04-32-NU-V-27A-24D-35	 2a) FP06P-SI-04-32-NU-V-77A-24D-ML-30 2b) FP06P-SI-04-32-NU-V-27A-24D-ML-30 2c) FP06P-SI-A04-32-NU-V-27A-24D-ML-30	 2a) VBP-04-04-11-V-MD-X4-L115 2b) VBP-08-11-V-MD-X4-L115 2c) VBP-16-11-V-MD-X4-L115 2) VBP-32-11-V-MD-X4-L115	 4a) K4-(1/4NPT)-316 4b) K4-(1/2NPT)-316 4c) K4-(1INPT)-316	 2a) BV0104F025TT1K1K-N 2b) BV0108F029.2TT1K1K-N 2c) BV0112F0212.5TT1K1K-N 2) BV0116F0215TT1K1K	
Catalogue Section 13	Catalogue Section 04			Catalogue Section 13a	Configurator	Catalogue Section 26a
6	7	8	9	10	11	12
Check Valve	Gauge	Block and Bleed Valves	Pressure Relief Valves	Cylinder Plug Valves	Manual ESD Valves	SW Soldo Limit Switch Box Series
 ¼" Cv 1.2 ½" Cv 4.25 1" Cv 8.6		 8a) Cv 0.5 8b) Cv 0.32	 Cv 1.5	 ¼" Cv 2.1 ½" Cv 5.1 1" Cv 11.2	 Cv 0.73	
 ¼" PCV-04F-04F-13-023-V ½" PCV-08F-08F-13-023-V 1" PCV-16F-16F-13-023-V	 X10 or X11	 8a) NV0304F02M5V6K 8b) NV0404F02M5V6K	 S06-PR4.5	 10a) CPV-04F-04F-V 10b) ½" S12-CPV 1" S25-CPV	 BXS-04-04-M9-32-NU-04-V BXS-04-A04-M9-32-NU-04-V	 SW0120E-10X23A6
Catalogue Section 20	Catalogue Section 03	Catalogue Section 26a	Catalogue Section 16	Catalogue Section 14	Catalogue Section 09	Soldo Controls

Partial Stroke

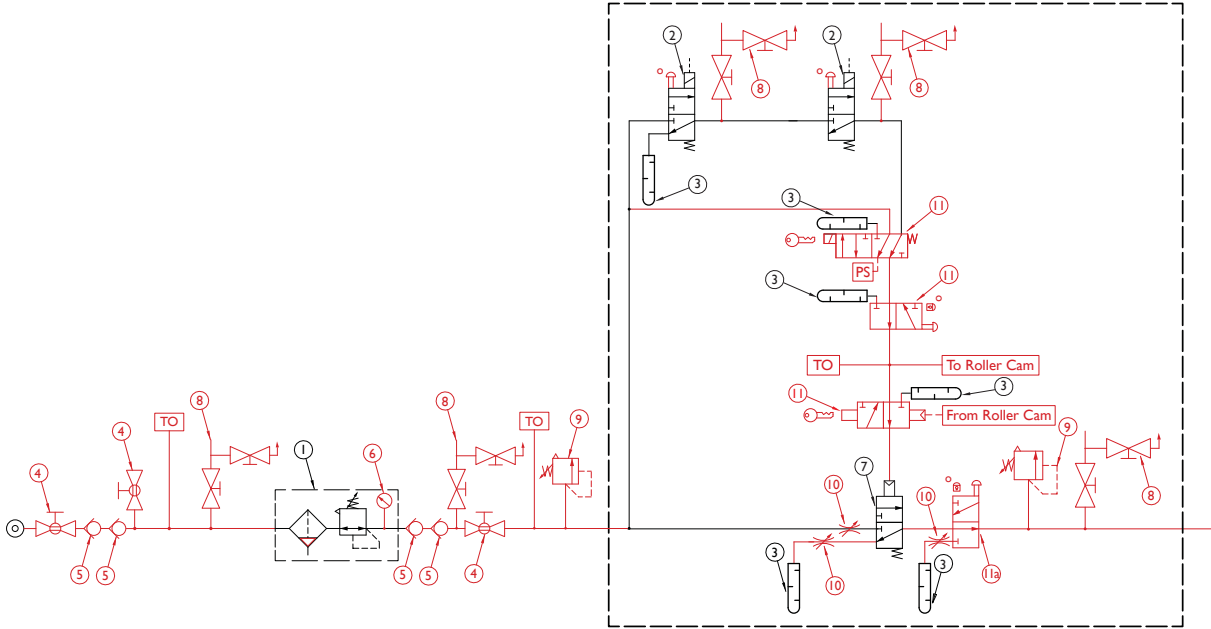
Schematic



1	2	3	4	5	
Filter Regulator	Solenoid Valves (Auto Reset)	Filter Booster	Bug Vent / Silencer	Gauge	
 Cv 0.7	 Cv 0.6	 ½ Cv 2.0 ½ Cv 4.0 1" Cv 11.0 2" Cv 50.0			
 SC06-20-FR-SR-MD-10-V-X3	 2a) FP06P-SI-04-32-NU-V-77A-24D-35 2b) FP06P-SI-04-32-NU-V-27A-24D-35 2c) FP06P-SI-A04-32-NU-V-27A-24D-35	 ½) VBP-04-04-11-V-MD-X4-L115 ½) VBP-08-11-V-MD-X4-L115 1" VBP-16-11-V-MD-X4-L115 2" VBP-32-11-V-MD-X4-L115	 ½) K4-(1/4NPT)-316 ½) K4-(1/2NPT)-316 1" K4-(1NPT)-316 2" K4-(2NPT)-316	 X10 or X11	
Catalogue Section 13	Catalogue Section 04	Catalogue Section 13a	Configurator	Catalogue Section 03	
6	7	8		9	10
Pressure Relief Valve	Cylinder Plug Valves	Mechanical Valves		HIPEX Valve	SW Soldo Limit Switch Box Series
 Cv 1.5	 ½) Cv 2.1 ½) Cv 5.1 1" Cv 11.2	 Cv 0.73	 Cv 0.73	 ½) Cv 2.0 ½) Cv 4.0 1" Cv 11.0 2" Cv 50.0	
 S06-PR4.5	 7a) CPV-04F-04F-V 7b) S12-CPV 7c) S25-CPV	 8a) BXS-04-04-MI3-32-NU-00-V 8b) BXS-04-A04-MI3-32-NU-00-V	 8b) BXS-04-04-MI-32-NU-00-V 8c) BXS-04-A04-MI-32-NU-00-V	 ½) HIPEX-04-11-VE ½) HIPEX-08-11-VE 1" HIPEX-16-11-VE 2" HIPEX-32-11-VE	 SW0120E-10X23A6
Catalogue Section 16	Catalogue Section 14	Catalogue Section 09		Catalogue Section 13b	Soldo Controls

Circuit

Schematic



1	2	3	4	5	6	
Filter Regulator	Solenoid Valves (Auto Reset)	Solenoid Valves (Manual Override)	Bug Vent / Silencer	Ball Valve	Check Valve	Gauge
Cv 0.7	Cv 0.6			1/2 Cv 4.1	Cv 4.25	
SH12-20-FR-SR-MD-10-V-X3	2a) FP06P-SI-04-32-NU-V-77A-24D-35 2b) FP06P-SI-04-32-NU-V-27A-24D-35 2c) FP06P-SI-A04-32-NU-V-27A-24D-35	2a) FP06P-SI-04-32-NU-V-77A-24D-ML-30 2b) FP06P-SI-04-32-NU-V-27A-24D-ML-30 2c) FP06P-SI-A04-32-NU-V-27A-24D-ML-30	K4-(1/2NPT)-316	BV0108F029.2TT KLN	PCV-08F-08F-13-023-V	X5 or X8
Catalogue Section 13	Catalogue Section 04		Configurator	Catalogue Section 26a	Catalogue Section 20	Catalogue Section 03
7	8	9	10	11		
Pilot Valve	Block and Bleed Valves	Pressure Relief Valve	Cylinder Plug Valves	Mechanical Valves		
	8a) Cv 0.5 8b) Cv 0.32	Cv 1.5	Cv 5.1	Cv 0.73		Cv 0.73
SPR-08-08-PI-32-NU-00-V	8a) NV0308F02M5V6K 8b) NV0408F02M5V6K	S06-PR4.5	S12-CPV	BXS-04-04-M5-32-NU-PI-V	BXS-04-04-M3-32-NU-04-V BXS-04-A04-M3-32-NU-04-V	SPR-08-08-M3-32-NU-04-V BXS-04-04-M5-52-XX-00-V
Catalogue Section 09	Catalogue Section 26a	Catalogue Section 16	Catalogue Section 14	Catalogue Section 09		

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

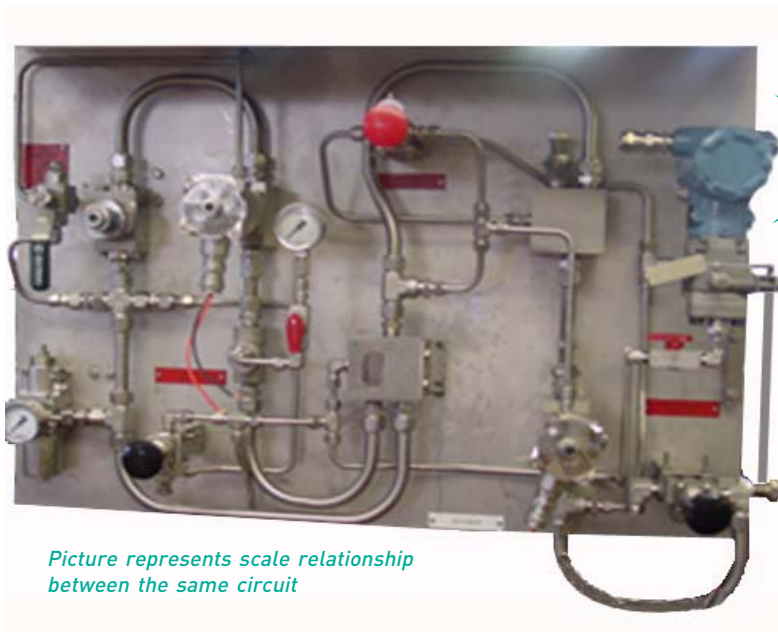
- General construction - stainless steel 316L
- Fastenings - stainless steel 316L
- Ports - 1/4", 3/8", 1/2" & 1" thread milled NPT

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.

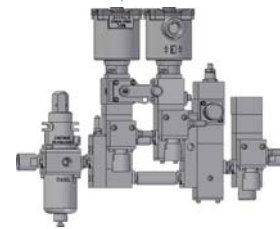


Picture represents scale relationship between the same circuit

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 EExia 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

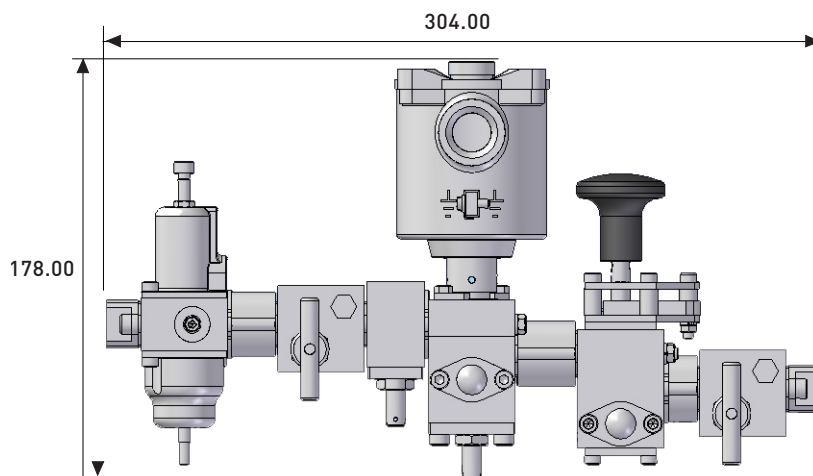
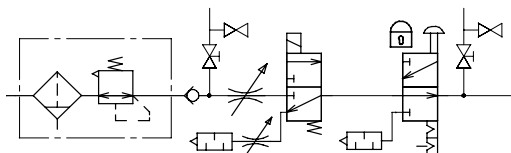
- Wide range of Manifolds available for positioner / DVC systems with Boosters incorporated into manifold

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)			
		5.7							
		3.0	12, 24, 48, 110 VDC, 110-120, 220-240 VAC 50 or 60 Hz						
		6.5							
		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 (1/2" & 3/4" also available)	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)				

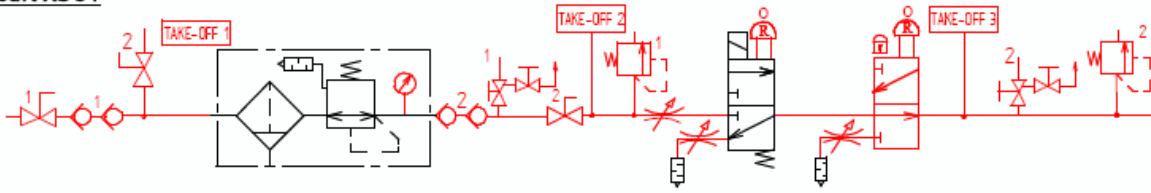
Intrinsically Safe Solenoid Drivers (solenoid type 78)

Interface Unit Typical Input Characteristics		Typical Output Characteristics Measured at Solenoid			Interface Unit Manufacturer & Model Number	Apparatus Code	Solenoid Base model no.
Voltage (V)		Voltage (V)	Current (mA)	Power (W)			
28.0		13.56	35.5	0.481	PEPERL & FUCHS KFD2-SD-Ex1.48	EExia IIC	78
24.0		13.40	35.3	0.473			
20.0		13.30	34.7	0.461			

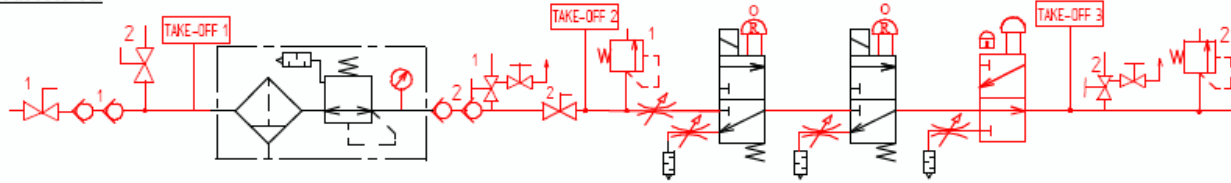
Selection table for Compact Manifold

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
	EEExd IIC T6 (316)	77
	EEExme 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

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

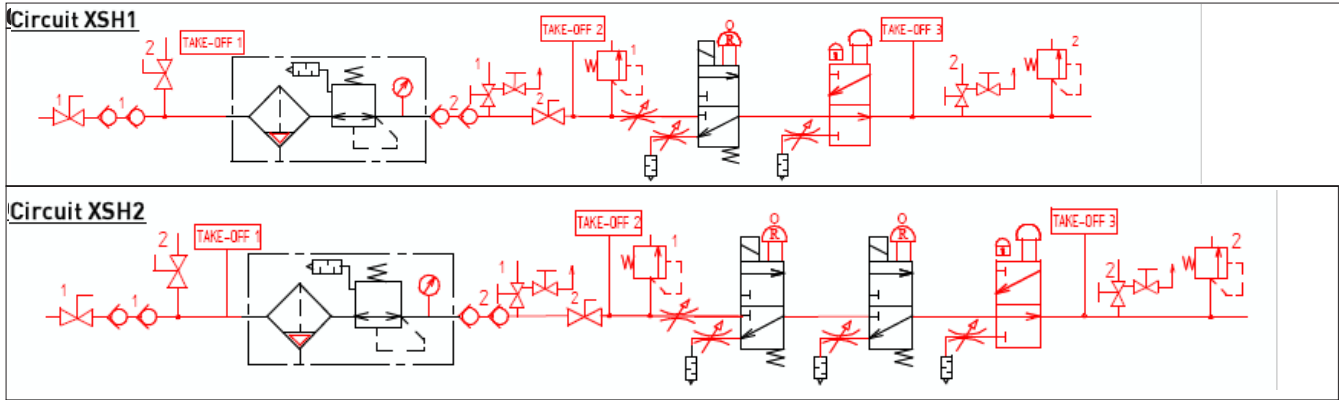
Requirements -

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

Reliability and Innovation in directional control valves

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

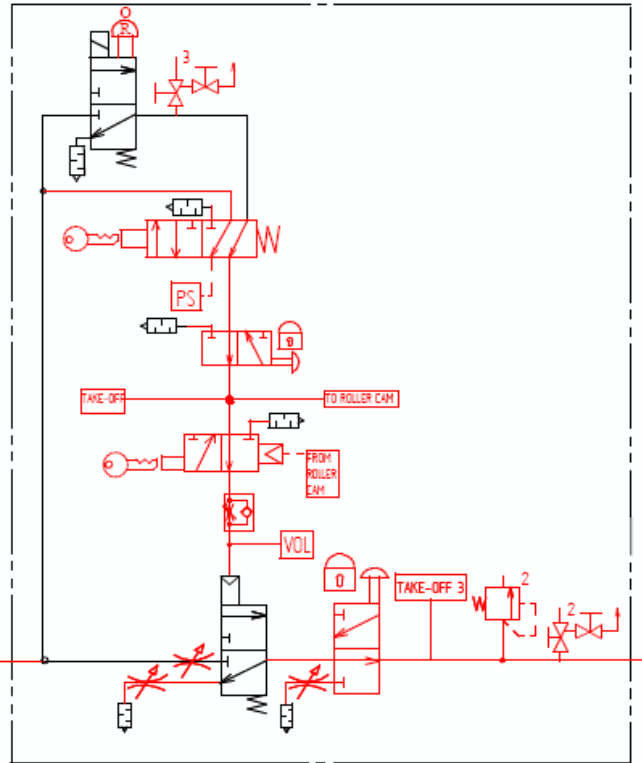
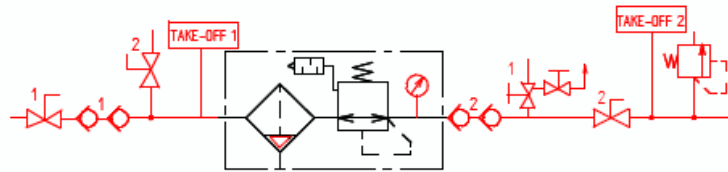
Single Acting Actuators

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

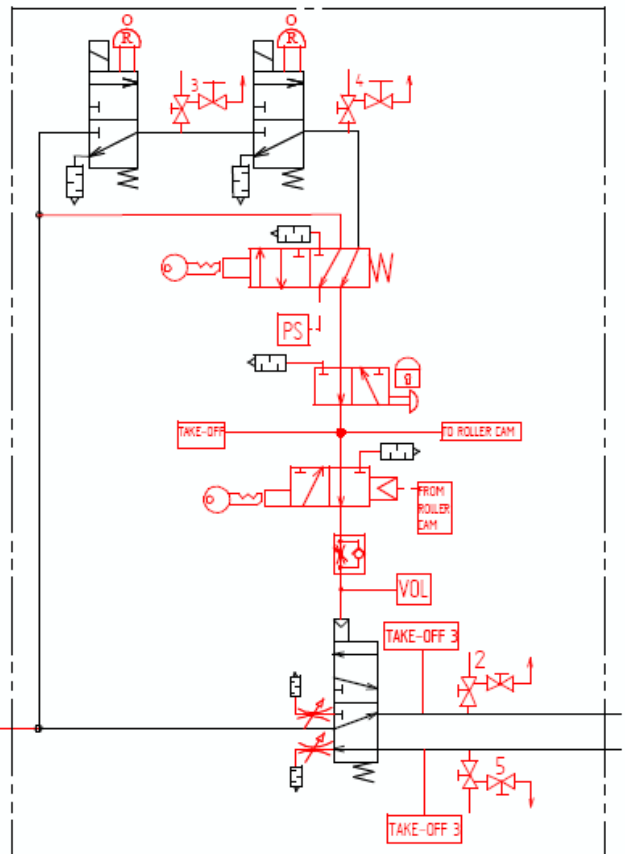
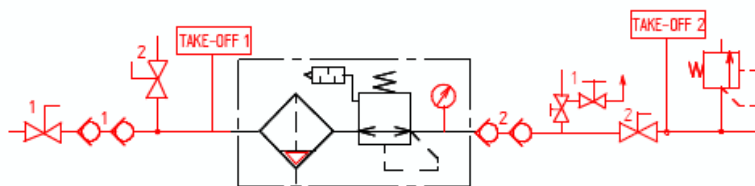
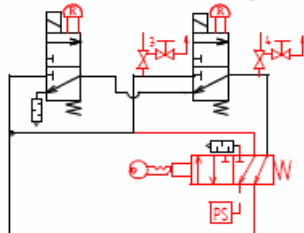
Filter Regulator, 5/2 SPR spool with 1 Solenoid Valve

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)	
Single Acting Actuators									
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
Double Acting Actuators									
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
Main Flow line Items									
1/4 turn ball valve		A		Pressure Relief				K / K2 - Exh to atmosphere K1 / K3 - Captive / adj	
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	
Double Check Valve		H		3/2 only - located on main flow line				R7 - Non - padlockable - button forward	
Block and Bleed		I		Auto Drain				Y	
Take Off		J		Take Off				Z	
				Take Off (5/2 only)				Z1	
Pilot Line Items - all 1/4"					Supplementary Information				
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	77			
Push / pull valve for ESD function - padlock not supplied			R - Padlockable R1 - Non Padlockable R4 - Padlockable - button forward R5 - Non - padlockable - button forward	Approval	EExme II T3 T120 - 3.7 watts	74			
					EExia IIC T6 or T4	78			
Key operated, pilot or key return for partial close system - includes take off to roller cam		S			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	N			
					NEPSI Exd, Exi				
					T Rating / Gas Group T4 IIC	3			
					T5 IIC	6			
					T6 IIC	9			
					Voltage	24VDC	24D		
					48VDC	Other voltages available	48D		
					Power (Watts)	See Table on Page 3	XX		
					Resistance (Ohms)	370 Ohms Exia	370		
					Seals	Viton	V		
						Silicone (gas service) Arctic	AG		
					Filter Regulator	0 to 10 bar - 25 micron element	10X3		
						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		
Examples					Requirements -				
Requirements -					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):-					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:- XS1-12-ABEL-SV1-77A9-24D-30-V-10X3-X5					Code:- XS4-12-ACEKO-QV1-77A9-24D-30-V-10X3-X5-PR6.2				

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

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-ACEKO-QV1-77A9-24D-30-V-10X3-X5-PR6.2

Selection Table
3/4" & 1" Stacker Manifold

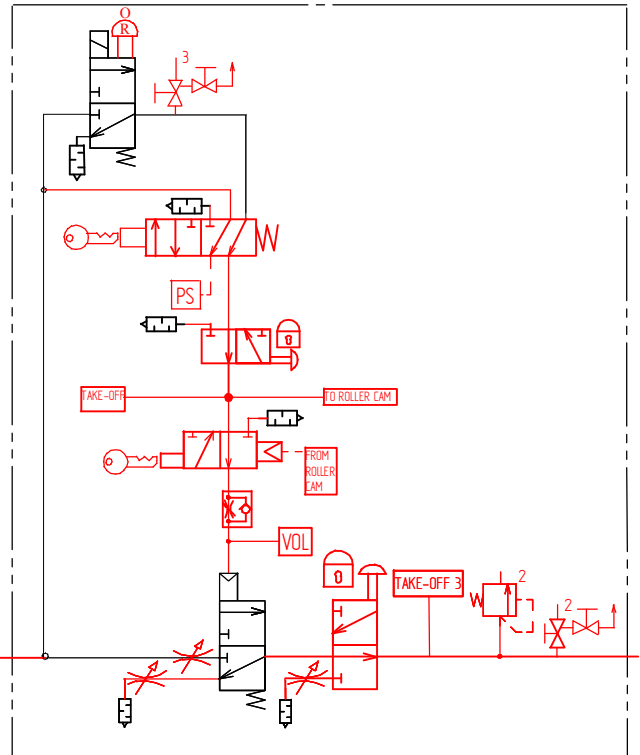
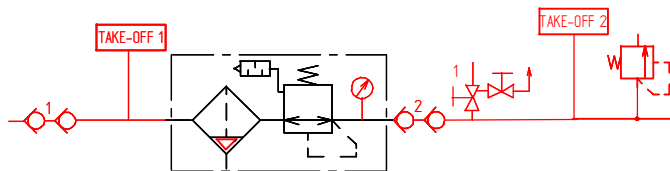
Single Acting Actuators

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

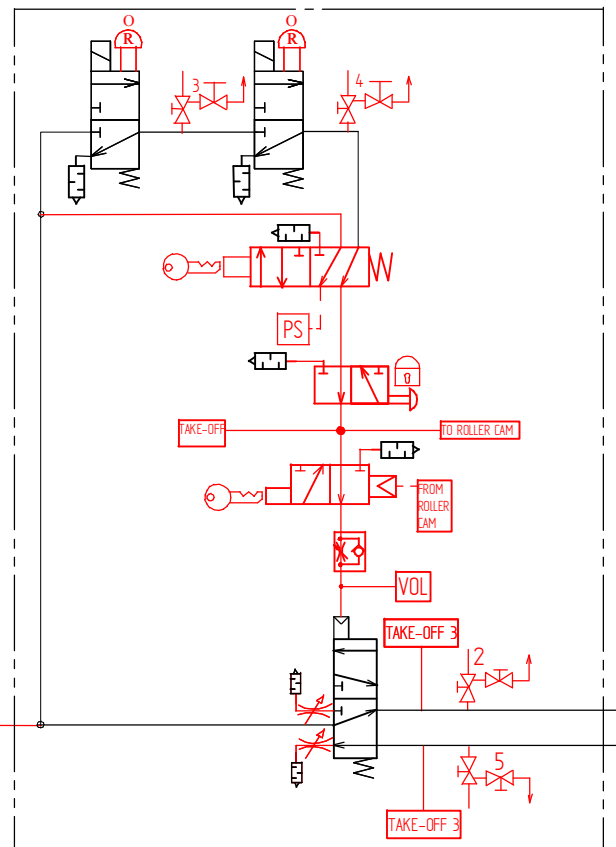
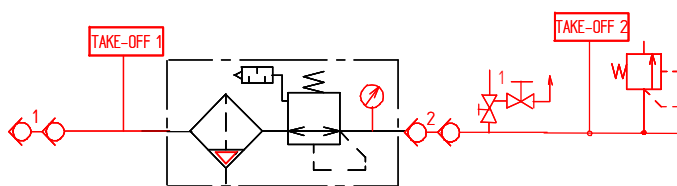
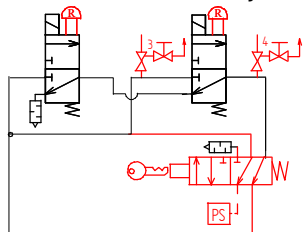
Filter Regulator, 5/2 SPR spool with 1 Solenoid Valve



















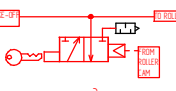







Circuit XS4 - as shown

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

Redundancy Functionality Circuit XSR2 or XSR4

Secondary Primary



Base System			Redundancy Function (R)	Redundancy Function (R)
Single Acting Actuators				
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
Double Acting Actuators				
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
Main Flow line Items				
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		
Pilot Line Items - all 1/4"				
5/2 Key Operated detented key return Solenoid By Pass Valve		Q - Detented Q1 - Spring Return		
Push / pull valve for ESD function - padlock not supplied		R - Padlockable R1 - Non Padlockable R4 - Padlockable - button front R5 - Non Padlockable - button front		
Key operated, pilot or key return for partial close system - includes take off to roller cam		S		
Block and Bleed		T		
Block and Bleed		U		
Manual Reset on sol 1 Manual Reset on sol 2	 	V1 V2		
Manual Override on sol 1 Manual Override on sol 2	 	V3 V4		
Time Delay		X		
Supplementary Information				
Solenoid	EExd IIC T6 T85/T100/T135 Exemb II T3 T120 EExia IIC T6 or T4	77 74 78		
Approval	ATEX Ex II 2 GD Other approvals available - contact Bifold Fluidpower Ltd	A		
T Rating / Gas Group	T4 IIC T5 IIC T6 IIC	3 6 9		
Voltage	24VDC 48VDC Other voltages available	24D 48D		Voltage & power options not applicable to IS solenoids
Power	3 Watt - EExd 77 solenoid 3.6 Watt - Exemb 74 solenoid	30 36		
Resistance	370 ohms - EExia solenoid only typical for a nominal 32mA barrier	370		
Seals	Viton Silicone (gas service) Arctic	V AG		
Filter Regulator	0 to 10 bar - 50 micron element	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		

**Global Presence for
Peace of Mind**

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

ATEX  IEC  Ex  CE  SP  INMETRIC  ENEC  PC  Ex  AFPS  

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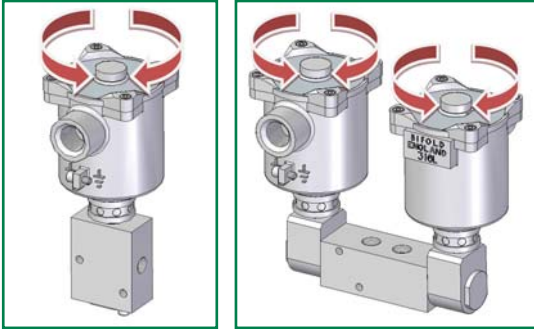
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Features & Benefits

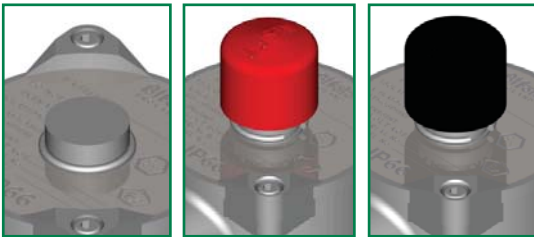
Worldwide Approvals



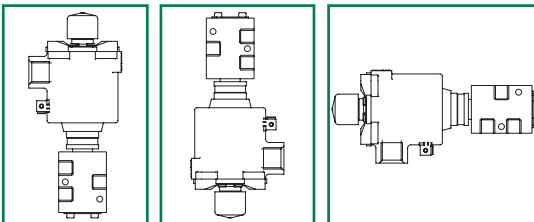
Solenoid Operator is Free to Rotate 360°



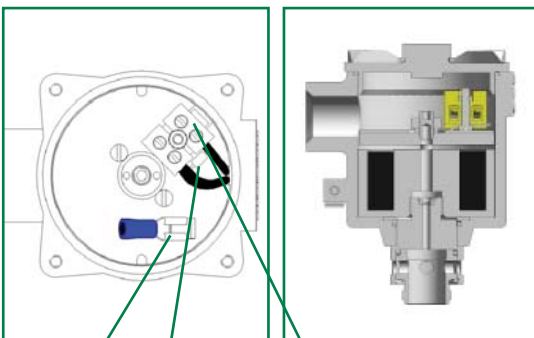
Widest Range of Override Options



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

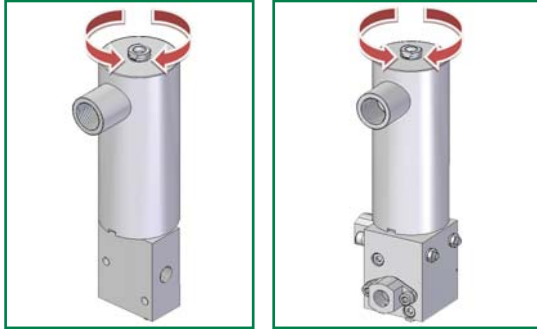
- Tropicalised solenoid operator design - 316L stainless steel enclosure with aluminium options also available; stainless steel or Remko B magnetic parts (dependent upon solenoid Ex type) Fully encapsulated coil.
- Spacious solenoid enclosure for ease of wiring.
- No time penalty for heat dissipation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

Features & Benefits

Worldwide Approvals



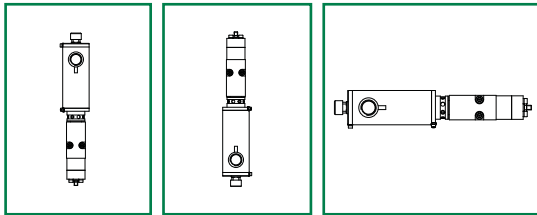
Solenoid Operator is Free to Rotate 360°



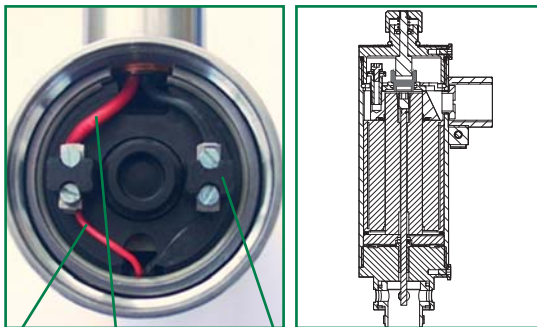
Override Options



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

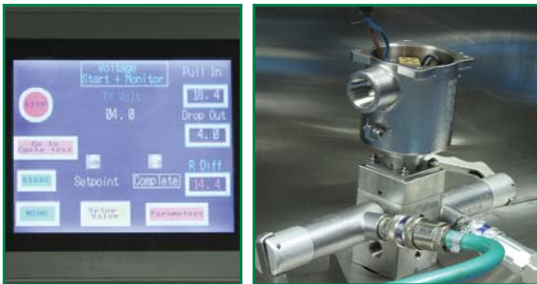
- Worldwide Approvals.
 - Solenoid operator is free to rotate 360° allowing for an easy cable layout and ease of connection wiring. Solenoid operator internals rotate with the enclosure and prevent cables being pulled out of terminal block.
 - 316L Stainless Steel Enclosure.
 - Override Options - Auto 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.

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


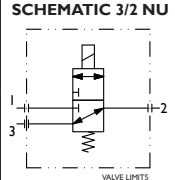









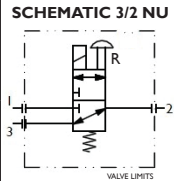










Safety and Environmental Benefits

- 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.


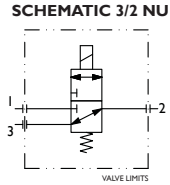




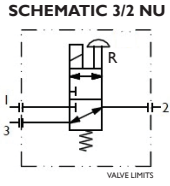




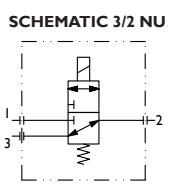




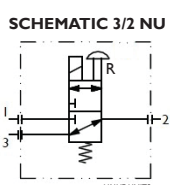



Preferred Range

DIRECT ACTING STANDARD SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>FP06P Auto Reset</p>	<p>SCHEMATIC 3/2 NU</p> 	24	<p>FP06P-SI-04-32-NU-V-74AT4-24D-36</p> <p>FP06P-SI-04-32-NU-V-74AT4-24D-44</p> <p>FP06P-SI-04-32-NU-V-74AT4-24D-68</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  IEC  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>FP06P-SI-04-32-NU-V-77A-24D-35</p> <p>FP06P-SI-04-32-NU-V-77A-24D-57</p>	<p>  ATEX  II 2 GD, Ex d IIC T4 / T5 / T6  IEC  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>FP06P Manual Reset</p>	<p>SCHEMATIC 3/2 NU</p> 	24	<p>FP06P-SI-04-32-NU-V-74AT4-24D-ML-36</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  IEC  Ex emb IIC T4...T3 Gb 3.6 Watt, Cv 1.0, 145 psi / 10 bar. </p>
			<p>FP06P-SI-04-32-NU-V-77A-24D-ML-30</p>	<p>  ATEX  II 2 GD, Ex d IIC T4 / T5 / T6  IEC  Ex d IIC T4 / T5 / T6 3.0 Watt, Cv 1.0, 145 psi / 10 bar. </p>


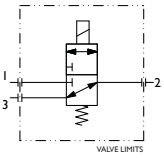



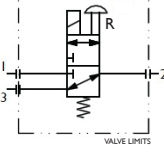


Preferred Range

DIRECT ACTING STANDARD SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>FP06P Aluminium Enclosure & Body Auto Reset</p>	 <p>SCHEMATIC 3/2 NU</p>	24	<p>FP06P-SI-A04-32-NU-V-27A-24D-35</p> <p>FP06P-SI-A04-32-NU-V-27A-24D-57</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>FP06P Aluminium Enclosure & Body Manual Reset</p>	 <p>SCHEMATIC 3/2 NU</p>	24	<p>FP06P-SI-A04-32-NU-V-27A-24D-ML-30</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>FP06P Aluminium Enclosure 316L Stainless Steel Body Auto Reset</p>	 <p>SCHEMATIC 3/2 NU</p>	24	<p>FP06P-SI-04-32-NU-V-27A-24D-35</p> <p>FP06P-SI-04-32-NU-V-27A-24D-57</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>FP06P Aluminium Enclosure 316L Stainless Steel Body Manual Reset</p>	 <p>SCHEMATIC 3/2 NU</p>	24	<p>FP06P-SI-04-32-NU-V-27A-24D-ML-30</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


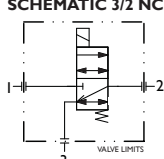





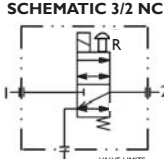




DIRECT ACTING SLIMLINE SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>FP06P Auto Reset</p>	<p>SCHEMATIC 3/2 NU</p> 	25	FP06P-SI-04-32-NU-V-58A-I35	<p>1/4" NPT Ports, 3Way 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 †</p> <p>135 Ohms, Cv 0.35, 145 psi / 10 bar.</p>
 <p>FP06P Manual Reset</p>	<p>SCHEMATIC 3/2 NU</p> 	25	FP06P-SI-04-32-NU-V-58A-ML-I35	<p>1/4" NPT Ports, 3Way 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 †</p> <p>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.


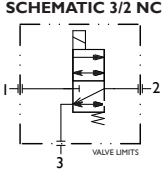



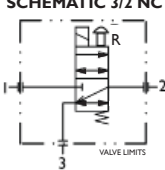



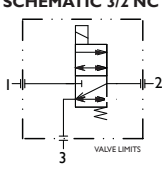



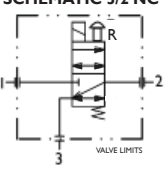


Preferred Range

DIRECT ACTING STANDARD SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>FP06P Namur Mount Auto Reset Left Hand Feed</p>	<p>SCHEMATIC 3/2 NC</p> 	26	<p>FP06P-SI-NI4-32-NC-V-74AT4-24D-36</p> <p>FP06P-SI-NI4-32-NC-V-74AT4-24D-44</p> <p>FP06P-SI-NI4-32-NC-V-74AT4-24D-68</p>	<p>1/4" NPT Ports, 3Way 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>FP06P-SI-NI4-32-NC-V-77A-24D-35</p> <p>FP06P-SI-NI4-32-NC-V-77A-24D-57</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>FP06P Namur Mount Manual Reset Left Hand Feed</p>	<p>SCHEMATIC 3/2 NC</p> 	26	<p>FP06P-SI-NI4-32-NC-V-74AT4-24D-ML-36</p>	<p>1/4" NPT Ports, 3Way 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>FP06P-SI-NI4-32-NC-V-77A-24D-ML-30</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


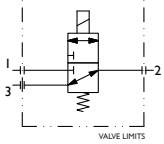



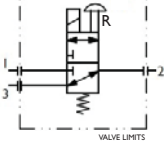


DIRECT ACTING SLIMLINE SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>FP06P NAMUR Mount Auto Reset Right Hand Feed</p>	<p>SCHEMATIC 3/2 NC</p> 	27	FP06P-S1-N4-32-NC-V-58A-135	<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>FP06P NAMUR Mount Manual Reset Right Hand Feed</p>	<p>SCHEMATIC 3/2 NC</p> 	27	FP06P-S1-N4-32-NC-V-58A-ML-135	<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>FP06P NAMUR Mount Auto Reset Left Hand Feed</p>	<p>SCHEMATIC 3/2 NC</p> 	27	FP06P-S1-N14-32-NC-V-58A-135	<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>FP06P NAMUR Mount Manual Reset Left Hand Feed</p>	<p>SCHEMATIC 3/2 NC</p> 	27	FP06P-S1-N14-32-NC-V-58A-ML-135	<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.


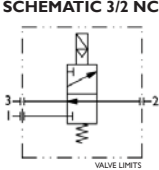







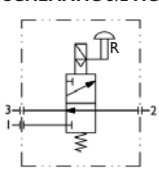







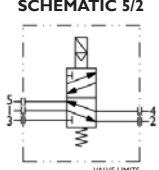







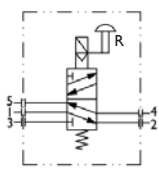






Preferred Range

DIRECT ACTING STANDARD SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>FPI2P Auto Reset</p>	<p>SCHEMATIC 3/2 NU</p> 	<p>29</p>	<p>FPI2P-SI-08-32-NU-V-77A-24D-120</p>	<p>1/2" NPT Ports, 3 Way 2 Position, Direct Acting, Normally Universal, 24Vdc, Auto Reset.</p> <p>  ATEX Ex 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>FPI2P Manual Reset</p>	<p>SCHEMATIC 3/2 NU</p> 	<p>29</p>	<p>FPI2P-SI-08-32-NU-V-77A-24D-ML-65</p>	<p>1/2" NPT Ports, 3 Way 2 Position, Direct Acting, Normally Universal, 24Vdc, Manual Reset.</p> <p>  ATEX Ex 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>

Preferred Range


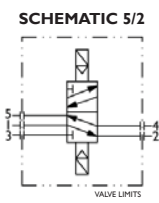

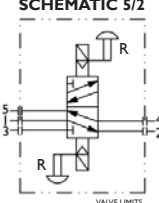
DIRECT ACTING STANDARD SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>BXS Auto Reset Internal Pilot</p>	<p>SCHEMATIC 3/2 NC</p> 	30	BXS-04-04-EI-32-NC-00-V-74AT4-24D-36	1/4" NPT Ports, 3 Way 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 0.73, 145 psi / 10 bar.
			BXS-04-04-EI-32-NC-00-V-77A-24D-18	ATEX  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.
			BXS-04-04-EI-32-NC-00-V-78A-260	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>BXS Manual Reset Internal Pilot</p>	<p>SCHEMATIC 3/2 NC</p> 	30	BXS-04-04-E5-32-NC-00-V-74AT4-24D-36	1/4" NPT Ports, 3 Way 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 0.73, 145 psi / 10 bar.
			BXS-04-04-E5-32-NC-00-V-77A-24D-18	ATEX  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.
			BXS-04-04-E5-32-NC-00-V-78A-260	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>BXS Auto Reset Internal Pilot</p>	<p>SCHEMATIC 5/2</p> 	31	BXS-04-04-EI-52-XX-00-V-74AT4-24D-36	1/4" NPT Ports, 5 Way 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 0.73, 145 psi / 10 bar.
			BXS-04-04-EI-52-XX-00-V-77A-24D-18	ATEX  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.
			BXS-04-04-EI-52-XX-00-V-78A-260	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>BXS Manual Reset Internal Pilot</p>	<p>SCHEMATIC 5/2</p> 	31	BXS-04-04-E5-52-XX-00-V-74AT4-24D-36	1/4" NPT Ports, 5 Way 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 0.73, 145 psi / 10 bar.
			BXS-04-04-E5-52-XX-00-V-77A-24D-18	ATEX  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.
			BXS-04-04-E5-52-XX-00-V-78A-260	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. †

† 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


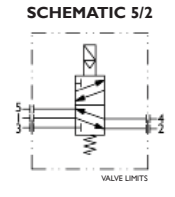

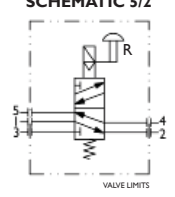

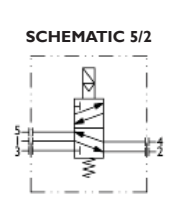

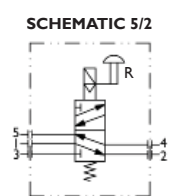
INDIRECT ACTING STANDARD SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>BXS Banjo Joint Auto Reset Internal Pilot</p>	 <p>SCHEMATIC 5/2 VALVE LIMITS</p>	31	BXS-04-04-EI-52-XX-EI-V-74AT4-24D-36-L142	1/4" NPT Ports, Dual Solenoid, 5Way 2 Position, Pilot Operated, Indirect Acting, Pilot Return, 24Vdc, Auto Reset Internal Pilot. ATEX 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.
			BXS-04-04-EI-52-XX-EI-V-77A-24D-30-L142	ATEX 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.
			BXS-04-04-EI-52-XX-EI-V-78A-260-L142	ATEX 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>BXS Banjo Joint Manual Reset Internal Pilot</p>	 <p>SCHEMATIC 5/2 VALVE LIMITS</p>	31	BXS-04-04-E5-52-XX-E5-V-74AT4-24D-36-L142	1/4" NPT Ports, Dual Solenoid, 5Way 2 Position, Pilot Operated, Indirect Acting, Pilot Return, 24Vdc, Manual Reset Internal Pilot. ATEX 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.
			BXS-04-04-E5-52-XX-E5-V-77A-24D-30-L142	ATEX 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.
			BXS-04-04-E5-52-XX-E5-V-78A-260-L142	ATEX 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.

† 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


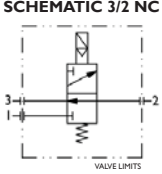

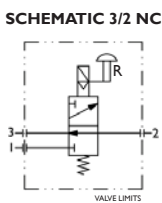

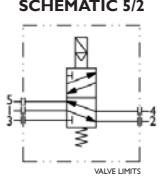

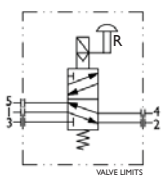
INDIRECT ACTING STANDARD SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>BXS NAMUR Mount Banjo Joint Auto Reset Internal Pilot</p>		32	BXS-04-N4-EI-52-XX-00-V74AT4-24D-36-LI42	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.
			BXS-04-N4-EI-52-XX-00-V77A-24D-30-LI42	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.
			BXS-04-N4-EI-52-XX-00-V78A-260-LI42	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>BXS NAMUR Mount Banjo Joint Manual Reset Internal Pilot</p>		32	BXS-04-N4-E5-52-XX-00-V74AT4-24D-36-LI42	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.
			BXS-04-N4-E5-52-XX-00-V77A-24D-30-LI42	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.
			BXS-04-N4-E5-52-XX-00-V78A-260-LI42	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>BXS Aluminium Enclosure & Body NAMUR Mount Banjo Joint Auto Reset Internal Pilot</p>		32	BXS-04-AN4-EI-52-XX-00-V27A-24D-30-LI42	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>BXS Aluminium Enclosure & Body NAMUR Mount Banjo Joint Manual Reset Internal Pilot</p>		32	BXS-04-AN4-E5-52-XX-00-V27A-24D-30-LI42	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.

† 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>SPR Auto Reset Internal Pilot</p>	<p>SCHEMATIC 3/2 NC</p> 	33	SPR-08-08-EI-32-NC-00-V-74AT4-24D-36	1/2" NPT Ports, 3 Way 2 Position, Pilot Operated, Direct Acting, Normally Closed, Spring Return, 24Vdc, Auto Reset Internal Pilot. ATEX Ex 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.
			SPR-08-08-EI-32-NC-00-V-77A-24D-30	ATEX Ex 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.
			SPR-08-08-EI-32-NC-00-V-78A-260	ATEX Ex II 1 GD, Ex ia IIC T4 / T6 Ga IECEx Ex ia IIC T4 / T6 Ga †
 <p>SPR Manual Reset Internal Pilot</p>	<p>SCHEMATIC 3/2 NC</p> 	33	SPR-08-08-E5-32-NC-00-V-74AT4-24D-36	1/2" NPT Ports, 3 Way 2 Position, Pilot Operated, Direct Acting, Normally Closed, Spring Return, 24Vdc, Manual Reset Internal Pilot. ATEX Ex 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.
			SPR-08-08-E5-32-NC-00-V-77A-24D-30	ATEX Ex 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.
			SPR-08-08-E5-32-NC-00-V-78A-260	ATEX Ex II 1 GD, Ex ia IIC T4 / T6 Ga IECEx Ex ia IIC T4 / T6 Ga †
 <p>SPR Auto Reset Internal Pilot</p>	<p>SCHEMATIC 5/2</p> 	34	SPR-08-08-EI-52-XX-00-V-74AT4-24D-36	1/2" NPT Ports, 5 Way 2 Position, Pilot Operated, Direct Acting, Spring Return, 24Vdc, Auto Reset Internal Pilot. ATEX Ex 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.
			SPR-08-08-EI-52-XX-00-V-77A-24D-30	ATEX Ex 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.
			SPR-08-08-EI-52-XX-00-V-78A-260	ATEX Ex II 1 GD, Ex ia IIC T4 / T6 Ga IECEx Ex ia IIC T4 / T6 Ga †
 <p>SPR Manual Reset Internal Pilot</p>	<p>SCHEMATIC 5/2</p> 	34	SPR-08-08-E5-52-XX-00-V-74AT4-24D-36	1/2" NPT Ports, 5 Way 2 Position, Pilot Operated, Direct Acting Spring Return, 24Vdc, Manual Reset Internal Pilot. ATEX Ex 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.
			SPR-08-08-E5-52-XX-00-V-77A-24D-30	ATEX Ex 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.
			SPR-08-08-E5-52-XX-00-V-78A-260	ATEX Ex II 1 GD, Ex ia IIC T4 / T6 Ga IECEx Ex ia IIC T4 / T6 Ga †

† 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.

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.

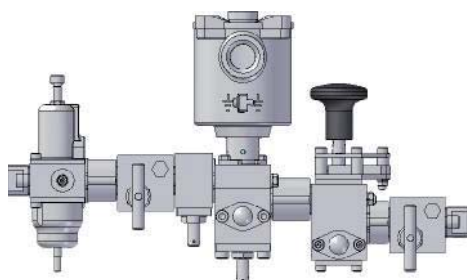
Working pressure up to 508 psi / 35 bar. Maximum working pressure according to valve model.

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 (mm²/s).

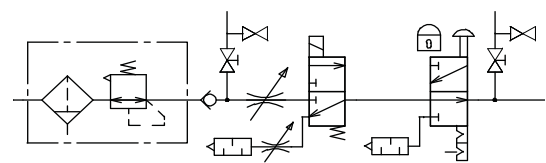
For operating temperature range, please see solenoid valve type and seal options.

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.

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.

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 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
	77 (Ex d)	110 & 240Vac
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 0.5mm² to 2.5mm² and flexible conductors between the range of 0.5mm² to 1.5mm².

Solenoid Coil Spare

Solenoid Coil Spare Selection Chart Ordering Example Type 58

58		Coil Type
135 Resistance (Ω)	58 (Ex ia)	135 Ohms
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
260 Resistance (Ω)	28 & 78 (Ex ia)	260 Ohms
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	Media # -20°C to +90°C -55°C to +90°C Ambient -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 (½" 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	Media # -20°C to +90°C -55°C to +90°C Ambient -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 (½" NPT Option)	
 BXS	74AT4	Ex emb II T3 / T4	24 Vdc 48 Vdc	3.6	0.73	Media # -15°C to +130°C -55°C to +130°C Ambient -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 (½" NPT Option)	
 SPR-08	74AT4	Ex emb II T3 / T4	24 Vdc 48 Vdc	3.6	3.0	Media # -20°C to +100°C -60°C to +100°C Ambient -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 (½" NPT Option)	
 SPR-16	74AT4	Ex emb II T3 / T4	24 Vdc 48 Vdc	3.6	11.1	Media # -20°C to +120°C -60°C to +90°C Ambient -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 (½" NPT Option)	




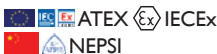
For detailed information on certification, please see page 16.

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.

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	Media # -20°C to +90°C -55°C to +90°C Ambient -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	Media # -15°C to +130°C -55°C to +130°C Ambient -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)	

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 & 30 to 32.

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	Media # -20°C to +90°C -55°C to +90°C Ambient -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)	
 FPI0P	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	Media # -20°C to +90°C -55°C to +90°C Ambient -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)	
 FPI2P	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	Media # -15°C to +90°C -30°C to +90°C Ambient -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)	
 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	Media # -15°C to +130°C -55°C to +130°C Ambient -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)	
 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	Media # -20°C to +100°C -60°C to +100°C Ambient -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)	
 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	Media # -20°C to +120°C -60°C to +90°C Ambient -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)	



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.

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	Media # -20°C to +90°C -55°C to +90°C Ambient -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	Media # -15°C to +130°C -55°C to +130°C Ambient -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	Media # -15°C to +130°C -55°C to +130°C Ambient -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	Media # -20°C to +95°C -60°C to +95°C Ambient -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	Media # -20°C to +120°C -60°C to +90°C Ambient -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_i = 35V dc, I_i = 600 mA, P_i = 3W, C_i = 0 µF, L_i = 0 mH
Coil Resistance : 135 Ohm ± 5%
Minimum Current @ solenoid coil = 80 mA

Safety Parameters: Type 28 & 78

U_i = 31V, I_i = 210 mA, P_i = 1.5W, C_i = 0 µF, L_i = 0 mH
Coil Resistance : 260 Ohm ± 5%
Minimum Current @ solenoid coil = 45 mA

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
S1	145 psi / 10 bar Maximum Valve Pressure		Operator
S2	232 psi / 16 bar Maximum Valve Pressure (For AC Coils = 6.5 Watts)		
04	1/4" Body Ported (Stainless Steel)		Connections
A04	1/4" Body Ported (Aluminium) (Option only available with the type 27 Ex d solenoid)		
32	3 Way 2 Position		Valve Configuration
NU	Normally Universal (for the port connections table, please refer to page 19)		Valve Configuration
S	Nitrile	(-20°C to +130°C)	O-ring Material
SA	Nitrile (Low Temperature)	(-25°C to +130°C)	
V	Viton (standard)	(-20°C to +90°C)	
AL	Fluorosilicone	(-55°C to +90°C)	
XX	Refer to Solenoid options tables	74AT4 (Ex emb) Page 20 - Table 1 27 & 77 (Ex d) Pages 21 & 22 - Tables 2 & 3	Solenoid**
A	ATEX/IECEX Dual Certified/Labelled	74AT4 (Ex emb) ✓	Solenoid Approval
G	GOST/IECEX Dual Certified/Labelled	27 & 77(Ex d) ✓ (77 Only)	
I	INMETRO/IECEX Dual Certified/Labelled	74AT4 (Ex emb) X	
N	NEPSI/IECEX Dual Certified/Labelled	27 & 77(Ex d) ✓ (77 Only)	
U	CSA (US)/ATEX Dual Certified/Labelled	74AT4 (Ex emb) X	
K	KTL/IECEX Dual Certified/Labelled	27 & 77(Ex d) ✓ (77 Only)	
XXX	Voltage, refer to Solenoid option tables	74AT4 (Ex emb) Page 20 - Table 1 27 & 77 (Ex d) Pages 21 & 22 - Tables 2 & 3	Voltage
M	Electrical to switch or temporary manual override		Options
ML	Electrical and manual required to switch or temporary manual override (3.0 Watts Ex d only)		
MLT	Electrical and manual required to latch - tamperproof		
MOR	Electrical to switch or stayput manual override		
LE	Latched Energised (Only available as NU on S1 option, LE only available as NO, 6.5 Watts, Ex d (77) on S2 option)		
XX	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
NO LETTER	M20 x 1.5 Cable Entry		Cable Entry
K85	1/2" NPT Cable Entry		
NO LETTER	NPT Ports		Option
K6	BSPP Ports		

FP06P-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, 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.

FP06P 3/2

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



FP06P Selection Chart - Ordering Example

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

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

FP06P 3/2 NAMUR

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



FP06P NAMUR Selection Chart - Ordering Example

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



FPI0P Selection Chart - Ordering Example

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

FPI2P 3/2

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



FPI2P Selection Chart - Ordering Example

FPI2P			Model Code
SI	145 psi / 10 bar Maximum Valve Pressure		Operator
08	1/2" Body Ported (Stainless Steel)		Connections
32	3 Way 2 Position		Valve Configuration
NU	Normally Universal (for the port connections table, please refer to page 19)		Valve Configuration
S	Nitrile (-15°C to +90°C)	For maximum operating temperatures see 'T' Rating Limitations for Ex d on page 22	O-ring Material
SA	Nitrile (Low Temperature) (-25°C to +130°C)		
V	Viton (Standard) (-15°C to +90°C)		
AL	Fluorosilicone (-30°C to +90°C)		
XX	Refer to Solenoid options tables	77 (Ex d) Page 22 - Table 3	Solenoid
A	ATEX/IECEX Dual Certified/Labelled	77 (Ex d)	Solenoid Approval
G	GOST/IECEX Dual Certified/Labelled	✓	
I	INMETRO/IECEX Dual Certified/Labelled	✓	
N	NEPSI/IECEX Dual Certified/Labelled	✓	
U	CSA (US)/ATEX Dual Certified/Labelled	✓	
K	KTL/IECEX Dual Certified/Labelled	✓	
XXX	Voltage, refer to Solenoid option tables	77 (Ex d) Page 22 - Table 3	Voltage
M	Electrical to switch or temporary manual override		Options
ML	Electrical and manual required to switch or temporary manual override (6.5 Watts Ex d only)		
MLT	Electrical and manual required to latch - tamperproof		
MOR	Electrical to switch or stayput manual override		
XX	Power (W)	77 (Ex d) 6.5 & 12.0 Watts Page 22 - Table 3	Power
NO LETTER	M20 x 1.5 Cable Entry		Cable Entry
K85	1/2" NPT Cable Entry		
NO LETTER	NPT Ports		Option
K6	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.



BXS-04 Selection Chart - Ordering Example

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

BXS-04 5/2

For dimensional drawings of these products please see page 40.



BXS-04 Selection Chart - Ordering Example

BXS-04	1/4"				Model Code
04	1/4" Body Ported (Stainless Steel)				Connections
A04	1/4" Body Ported (Aluminium) (Option only available with the type 27 Ex d and type 28 Ex ia solenoids)				
E1	Auto Reset Internal Pilot				Primary Operator
E3	Manual Override Internal Pilot (M)				
E5	Manual Reset Internal Pilot (ML)				
E13	Manual Reset Tamperproof Internal Pilot (MLT)				
E15	Manual Override Rotary Internal Pilot (MOR)				
52	5 Way 2 Position				Configuration
53	5 Way 3 Position				
XX	5/2 Valve				Configuration
YY	5/3 Valve All Ports Blocked			(for the port connections table, please refer to page 19)	
ZZ	5/3 Valve Cylinder Ports Vented				
00	Spring Return				Secondary Operator
02	Spring Return + Plunger				
E1	Auto Reset Internal Pilot				Secondary Operator
E3	Manual Override Internal Pilot (M)				
E5	Manual Reset Internal Pilot (ML)				
E13	Manual Reset Tamperproof Internal Pilot (MLT)				
E15	Manual Override Rotary Internal Pilot (MOR)				
SA	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, 21, 22 & 23	O-ring Material
V	Viton (Standard)	(-15°C to +130°C)			
AL	Fluorosilicone	(-55°C to +130°C)			
XX	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 **
A	ATEX/IECEx Dual Certified/Labelled			74AT4 (Ex emb) ✓ 27 & 77 (Ex d) ✓ 28 & 78 (Ex ia) ✓	Solenoid Approval *
G	*GOST/EAC/IECEx Dual Certified/Labelled			74AT4 (Ex emb) x 27 & 77 (Ex d) ✓ (77 Only) 28 & 78 (Ex ia) ✓	
I	INMETRO/IECEx Dual Certified/Labelled			74AT4 (Ex emb) x 27 & 77 (Ex d) ✓ (77 Only) 28 & 78 (Ex ia) ✓ (78 Only)	
N	NEPSI/IECEx Dual Certified/Labelled			74AT4 (Ex emb) x 27 & 77 (Ex d) ✓ 28 & 78 (Ex ia) ✓	
U	CSA (US)/ATEX Dual Certified/Labelled			74AT4 (Ex emb) x 27 & 77 (Ex d) ✓ (77 Only) 28 & 78 (Ex ia) x	
K	KTL IECEx Dual Certified/Labelled			74AT4 (Ex emb) x 27 & 77 (Ex d) ✓ (77 Only) 28 & 78 (Ex ia) x	
XXX	Voltage, refer to Solenoid option tables	74AT4 (Ex emb) 27 & 77 (Ex d)	Page 20 - Table 1 Pages 21 & 22 - Tables 2 & 3		Voltage
XX	Resistance (Ω)	28 & 78 (Ex ia)	- 260 Ohms	Page 23 - Table 5	Resistance †
XX	Power (W)	74AT4 (Ex emb) 27 & 77 (Ex d)	3.6 Watts 1.8 & 3.0 Watts	Page 20 - Table 1 Pages 21 & 22 - Tables 2 & 3	Power
NO LETTER	M20 x 1.5 Cable Entry				Cable Entry
K85	1/2" NPT Cable Entry				
L142	Banjo Assembly				Option
NO LETTER	NPT Ports - Block Before Bleed (BBB)				Options
K6	BSPP Ports				
K54	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 5/2 Standard Solenoid Valve Range with NAMUR Mount Selection Chart

BXS-04 5/2 NAMUR

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



BXS-04 Selection Chart - Ordering Example

BXS-04	1/4"		Model Code	
N4	1/4" Body Ported NAMUR Mount (Stainless Steel)		Connections	
AN4	1/4" Body Ported NAMUR Mount (Aluminium)(Option only available with the type 27 Ex d and type 28 Ex ia solenoids)			
E1	Auto Reset Internal Pilot		Primary Operator	
E3	Manual Override Internal Pilot (M)			
E5	Manual Reset Internal Pilot (ML)			
E13	Manual Reset Tamperproof Internal Pilot (MLT)			
E15	Manual Override Rotary Internal Pilot (MOR)			
52	5 Way 2 Position		Configuration	
53	5 Way 3 Position			
XX	5/2 Valve	(for the port connections table, please refer to page 19)	Configuration	
YY	5/3 Valve All Ports Blocked			
ZZ	5/3 Valve Cylinder Ports Vented			
00	Spring Return		Secondary Operator	
02	Spring Return + Plunger			
E1	Auto Reset Internal Pilot			
E3	Manual Override Internal Pilot (M)			
E5	Manual Reset Internal Pilot (ML)			
E13	Manual Reset Tamperproof Internal Pilot (MLT)			
E15	Manual Override Rotary Internal Pilot (MOR)			
SA	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, 21, 22 & 23	O-ring Material	
V	Viton (Standard)			
AL	Fluorosilicone			
XX	Refer to Solenoid options tables	74AT4 (Ex emb) Page 20 - Table 1 27 & 77 (Ex d) Pages 21 & 22 - Tables 2 & 3 28 & 78 (Ex ia) Page 23 - Table 5	Solenoid **	
A	ATEX/IECEX Dual Certified/Labelled	74AT4 (Ex emb) ✓ 27 & 77 (Ex d) ✓ 28 & 78 (Ex ia) ✓	Solenoid Approval *	
G	*GOST/EAC/IECEX Dual Certified/Labelled	74AT4 (Ex emb) x 27 & 77 (Ex d) ✓ (77 Only) 28 & 78 (Ex ia) ✓		
I	INMETRO/IECEX Dual Certified/Labelled	74AT4 (Ex emb) x 27 & 77 (Ex d) ✓ (77 Only) 28 & 78 (Ex ia) ✓ (78 Only)		
N	NEPSI/IECEX Dual Certified/Labelled	74AT4 (Ex emb) x 27 & 77 (Ex d) ✓ 28 & 78 (Ex ia) ✓		
U	CSA (US)/ATEX Dual Certified/Labelled	74AT4 (Ex emb) x 27 & 77 (Ex d) ✓ (77 Only) 28 & 78 (Ex ia) x		
K	KTL IECEx Dual Certified/Labelled	74AT4 (Ex emb) x 27 & 77 (Ex d) ✓ (77 Only) 28 & 78 (Ex ia) x		
XXX	Voltage, refer to Solenoid option tables	74AT4 (Ex emb) Page 20 - Table 1 27 & 77 (Ex d) Pages 21 & 22 - Tables 2 & 3	Voltage	
XX	Resistance (Ω)	28 & 78 (Ex ia) - 260 Ohms Page 23- Table 5	Resistance †	
XX	Power (W)	74AT4 (Ex emb) 3.6 Watts Page 20 - Table 1 27 & 77 (Ex d) 1.8 & 3.0 Watts Pages 21 & 22 - Tables 2 & 3	Power	
NO LETTER	M20 x 1.5 Cable Entry		Cable Entry	
K85	1/2" NPT Cable Entry			
L142	Banjo Assembly		Option	
NO LETTER	NPT Ports - Block Before Bleed (BBB)		Options	
K6	BSPP Ports			
K54	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.

SPR-08 3/2

For dimensional drawing of this product please see page 41.



SPR-08 Selection Chart - Ordering Example

SPR-08	1/2"								Model Code
04	1/4" Body Ported (Stainless Steel)								Ports
06	3/8" Body Ported (Stainless Steel)								
08	1/2" Body Ported (Stainless Steel)								
E1	Auto Reset Internal Pilot								Primary Operator
E3	Manual Override Internal Pilot (M)								
E5	Manual Reset Internal Pilot (ML)								
E13	Manual Reset Tamperproof Internal Pilot (MLT)								
E15	Manual Override Rotary Internal Pilot (MOR)								
32	3 Way 2 Position								Configuration
NC	Normally Closed							(for the port connections table, please refer to page 19)	Configuration
NO	Normally Open								
00	Spring Return								Secondary Operator
02	Spring Return + Plunger								
E1	Auto Reset Internal Pilot								
E3	Manual Override Internal Pilot (M)								
E5	Manual Reset Internal Pilot (ML)								
E13	Manual Reset Tamperproof Internal Pilot (MLT)								Secondary Operator
E15	Manual Override Rotary Internal Pilot (MOR)								
SA	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	O-ring Material
V	Viton (Standard)	(-20°C to +100°C)							
AL	Fluorosilicone	(-60°C to +100°C)							
XX	Refer to Solenoid options tables	74AT4 (Ex emb) 77 (Ex d) 78 (Ex ia)	Page 20 - Table 1 Page 22 - Table 3 Page 23 - Table 5						Solenoid **
A	ATEX/IECEX Dual Certified/Labelled			74AT4 (Ex emb)	77 (Ex d)	78 (Ex ia)			Solenoid Approval *
G	*GOST/EAC/IECEX Dual Certified/Labelled			X	✓	✓			
I	INMETRO/IECEX Dual Certified/Labelled			X	✓	✓			
N	NEPSI/IECEX Dual Certified/Labelled			X	✓	✓			
U	CSA (US)/ATEX Dual Certified/Labelled			X	✓	X			
K	KTL IECEX Dual Certified/Labelled			X	✓	X			
XXX	Voltage, refer to Solenoid option tables	74AT4 (Ex emb) 77 (Ex d)	Page 20 - Table 1 Page 22 - Table 3						Voltage
XX	Resistance (Ω)	78 (Ex ia) - 260 Ohms	Page 23 - Table 5						Resistance †
XX	Power (W)	74AT4 (Ex emb) 77 (Ex d)	3.6 Watts Page 20 - Table 1 1.8 & 3.0 Watts Page 22 - Table 3						Power
NO LETTER	M20 x 1.5 Cable Entry								Cable Entry
K85	1/2" NPT Cable Entry								
NO LETTER	NPT Ports - Block Before Bleed (BBB)								Option
K6	BSPF Ports								
SPR-08-08-E1-32-NC-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.

SPR 5/2 Standard Solenoid Valve Range Selection Chart

SPR-08 5/2

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



SPR-08 Selection Chart - Ordering Example

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

SPR-16 3/2

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



SPR-16 Selection Chart - Ordering Example

SPR-16		1"	Model Code
12	16	3/4" Body Ported (Stainless Steel) 1" Body Ported (Stainless Steel)	Ports
E2	Auto Reset External Pilot		Primary Operator
E4	Manual Override External Pilot (M)		
E6	Manual Reset External Pilot (ML)		
E14	Manual Reset Tamperproof External Pilot (MLT)		
E16	Manual Override Rotary External Pilot (MOR)		
32	3 Way 2 Position		Configuration
NU	Normally Universal (for the port connections table, please refer to page 19)		Configuration
00	Spring Return		Secondary Operator
E2	Auto Reset External Pilot		
E4	Manual Override External Pilot (M)		
E6	Manual Reset External Pilot (ML)		
E14	Manual Reset Tamperproof External Pilot (MLT)		
E16	Manual Override Rotary External Pilot (MOR)		
SA	Nitrile (Low Temperature)	(-25°C to +130°C)	O-ring Material
V	Viton (Standard)	(-20°C to +120°C)	
AL	Fluorosilicone	(-60°C to +90°C)	
For maximum operating temperatures see 'T' Rating Limitations for Ex emb, Ex d & Ex ia on pages 20, 22 & 23			
XX	Refer to Solenoid options tables	74AT4 (Ex emb) Page 20 - Table 1 (For the 74AT4 option only please go straight to voltage options 77 (Ex d) Page 22 - Table 3 78 (Ex ia) Page 23 - Table 5	Solenoid **
A	ATEX/IECEX Dual Certified/Labelled	74AT4 (Ex emb) ✓ 77 (Ex d) ✓ 78 (Ex ia) ✓	Solenoid Approval *
G	*GOST/EAC/IECEX Dual Certified/Labelled	74AT4 (Ex emb) X 77 (Ex d) ✓ 78 (Ex ia) ✓	
I	INMETRO/IECEX Dual Certified/Labelled	74AT4 (Ex emb) X 77 (Ex d) ✓ 78 (Ex ia) ✓	
N	NEPSI/IECEX Dual Certified/Labelled	74AT4 (Ex emb) X 77 (Ex d) ✓ 78 (Ex ia) ✓	
U	CSA (US)/ATEX Dual Certified/Labelled	74AT4 (Ex emb) X 77 (Ex d) ✓ 78 (Ex ia) X	
K	KTL IECEX Dual Certified/Labelled	74AT4 (Ex emb) X 77 (Ex d) ✓ 78 (Ex ia) X	
XXX	Voltage, refer to Solenoid option tables	74AT4 (Ex emb) Page 20 - Table 1 77 (Ex d) Page 22 - Table 3	Voltage
XX	Resistance (Ω)	78 (Ex ia) - 260 Ohms Page 23 - Table 5	Resistance †
XX	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
NO LETTER	M20 x 1.5 Cable Entry		Cable Entry
K85	1/2" NPT Cable Entry		
NO LETTER	NPT Ports - Block Before Bleed (BBB)		Option
K6	BSPP Ports		
SPR-16-16-E2-32-NU-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.

SPR 5/2 Standard Solenoid Valve Range Selection Chart

SPR-16 5/2

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



SPR-16 Selection Chart - Ordering Example

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

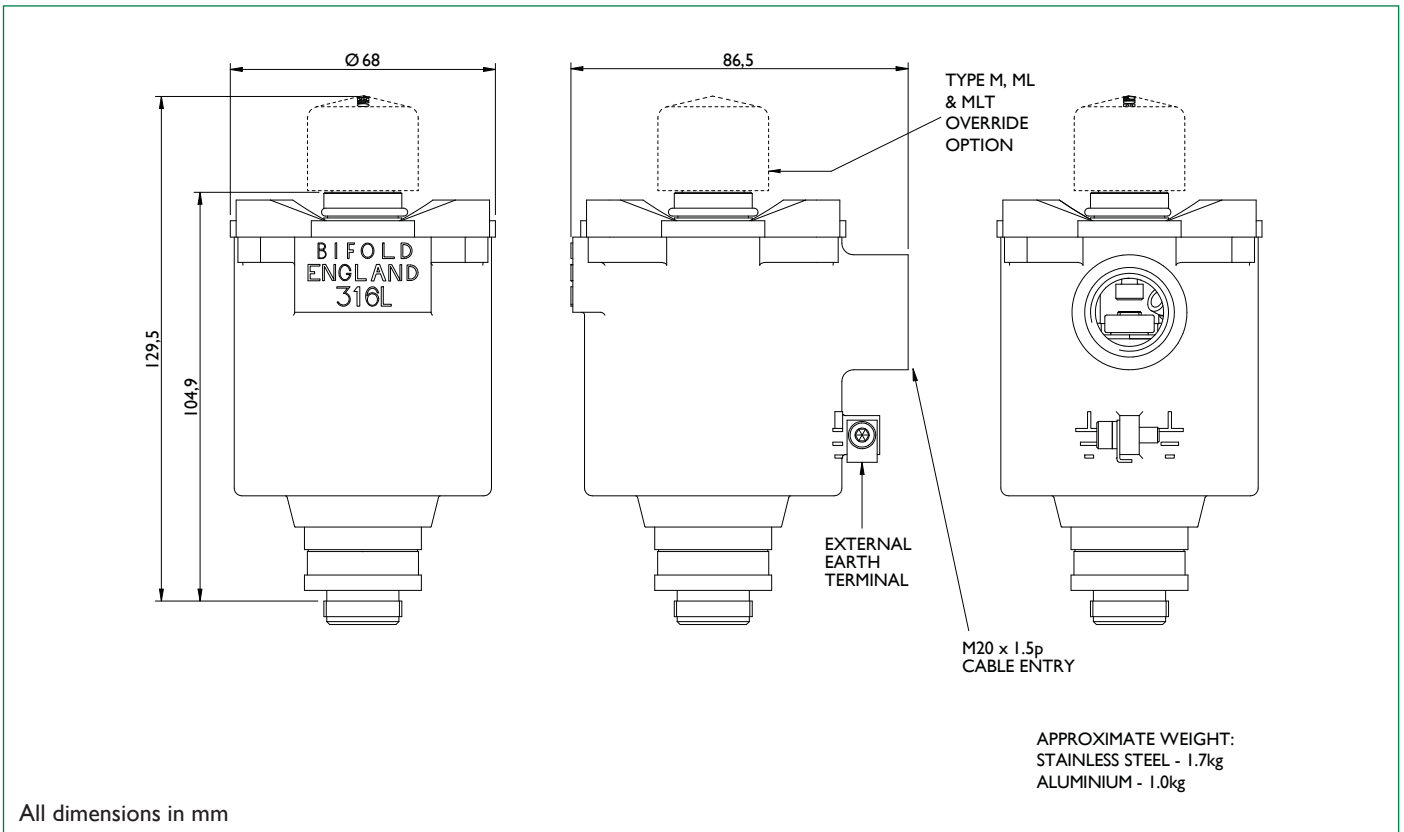
† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system. For further product options, please contact Bifold.

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

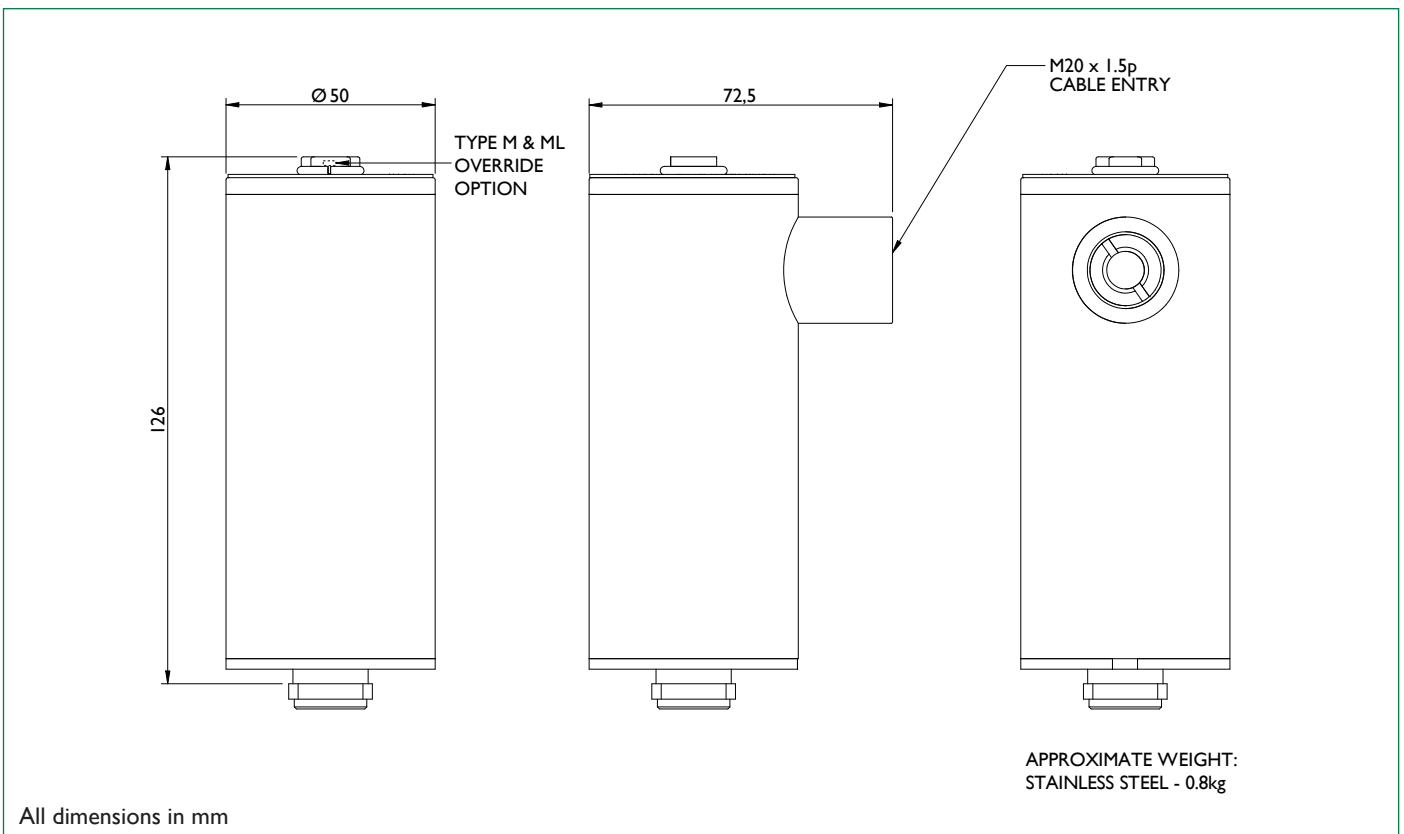
** Special conditions for safe use Type 74AT4 - The supply circuit shall be fitted with a fuse capable of meeting a 1500 Amp short circuit current. Must be compliant with special conditions for safe use as defined in EC Type Examination Certificate Sira01ATEX3248U.

Dimensional Drawings

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

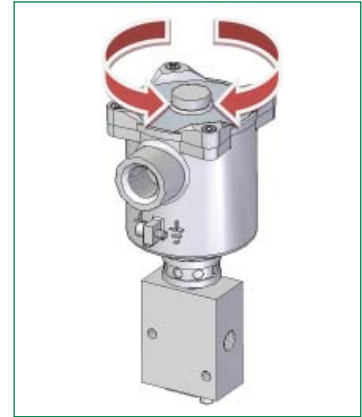
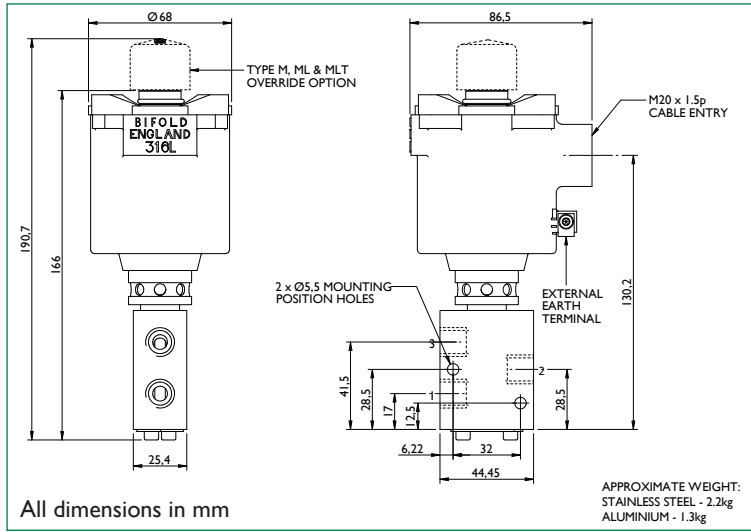


5 Series Slimline solenoid Enclosure (Ex ia)

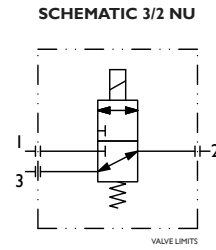


Dimensional Drawings

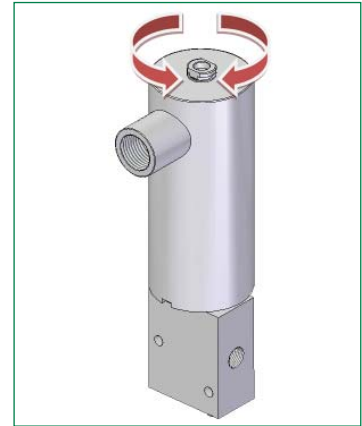
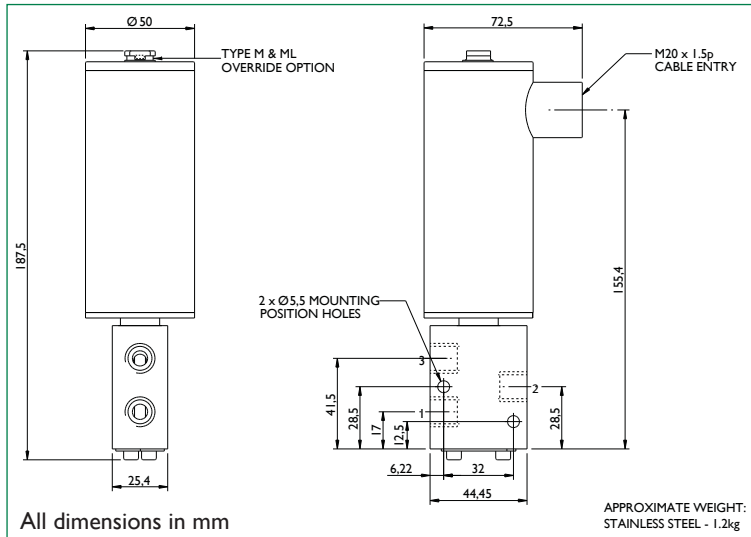
Example Code - FP06P-SI-04-32-NU-V-74AT4-24D-36



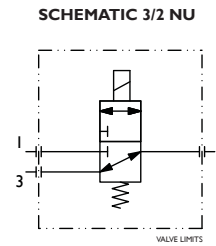
FP06P
Auto Reset



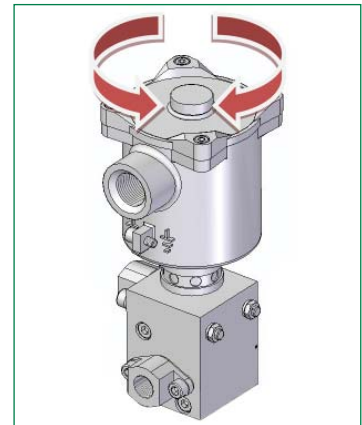
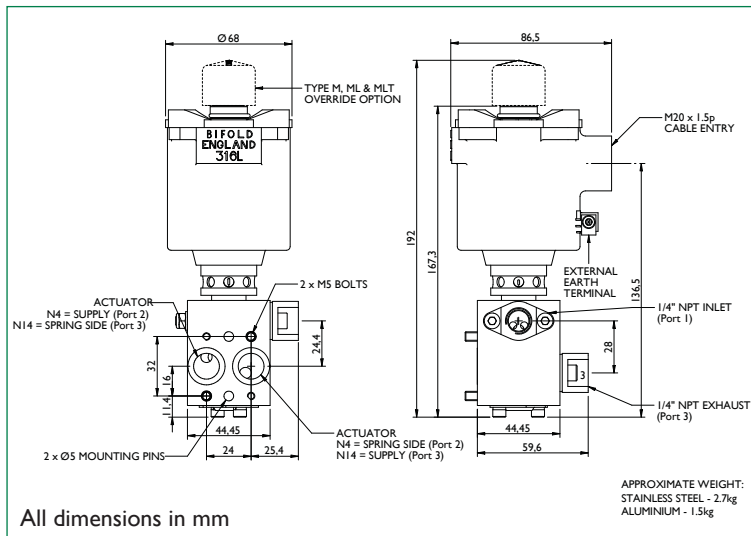
Example Code - FP06P-SI-04-32-NU-V-58A-135



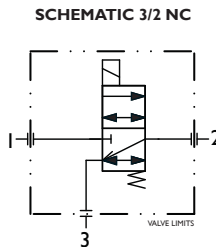
FP06P
Auto Reset



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

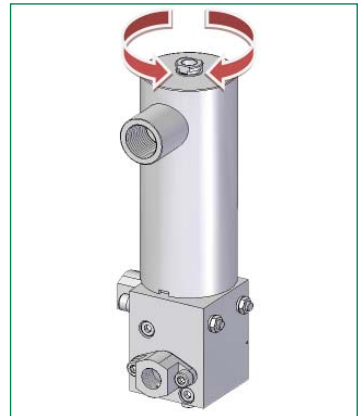
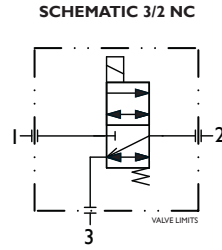
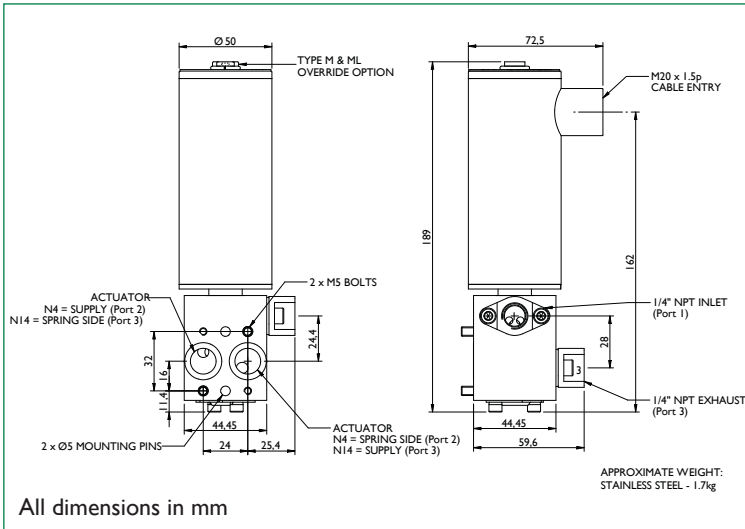


FP06P
Namur Mount Auto Reset
Left Hand Feed



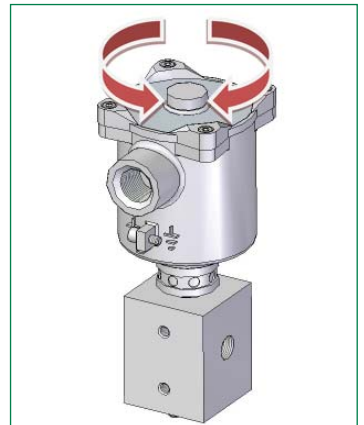
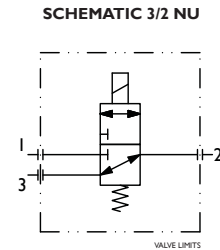
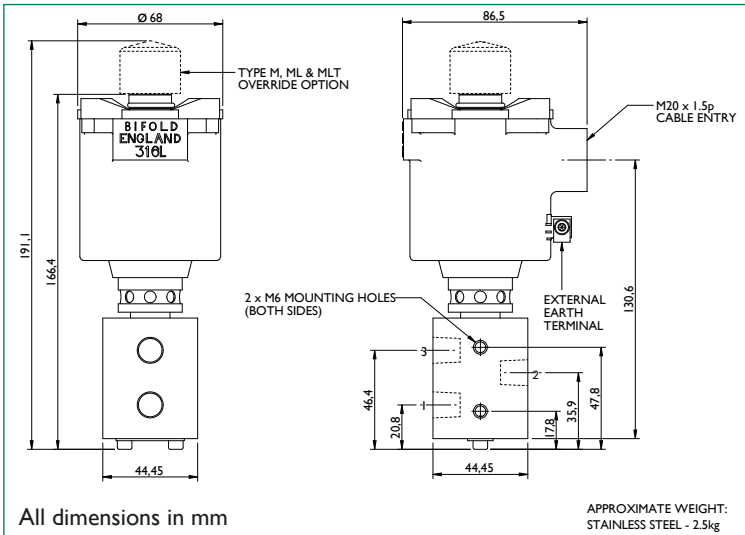
Dimensional Drawings

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



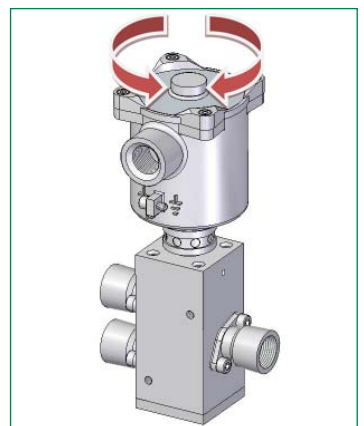
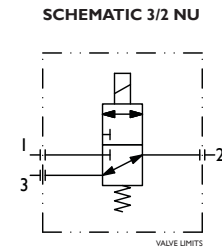
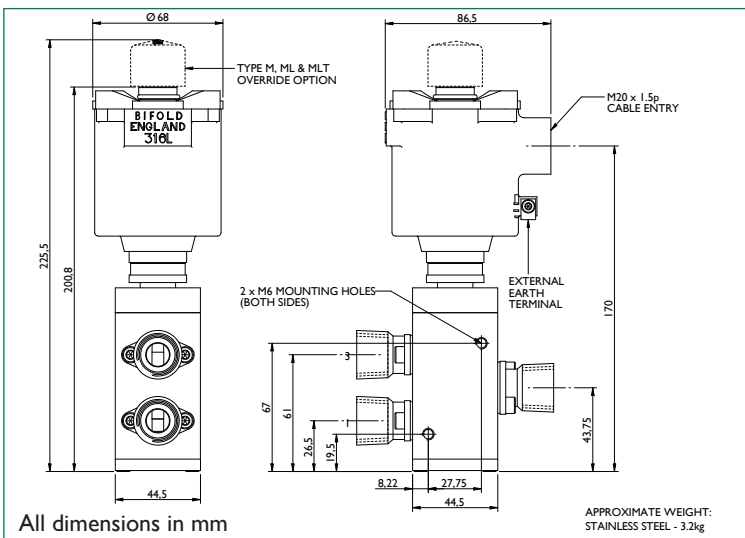
FP06P
NAMUR Mount Auto Reset
Right Hand Feed

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



FPI0P
Auto Reset

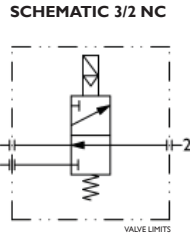
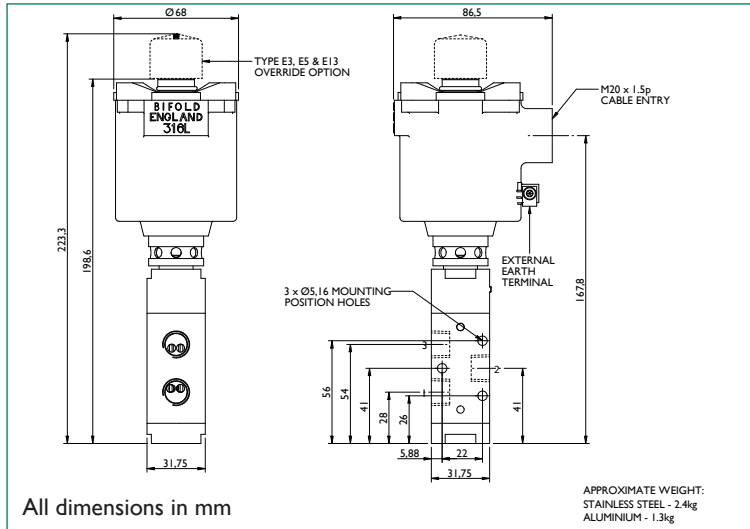
Example Code - FPI2P-SI-08-32-NU-V-77A-24D-120



FPI2P
Auto Reset

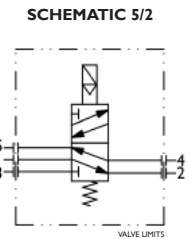
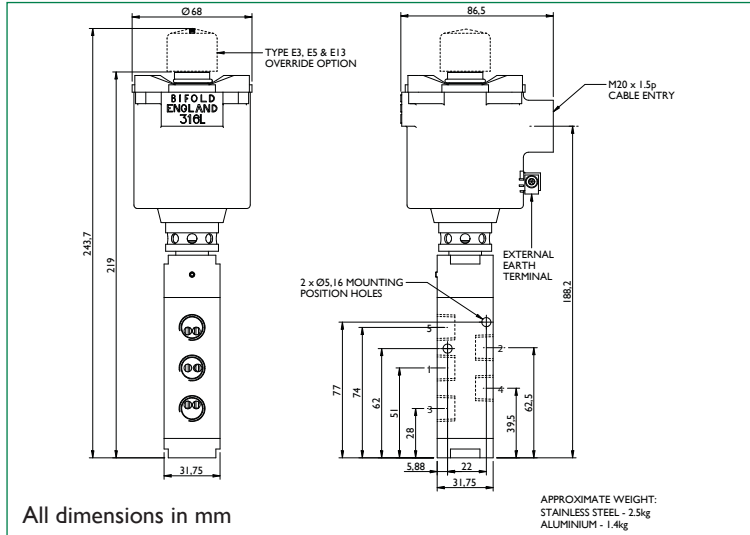
Dimensional Drawings

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



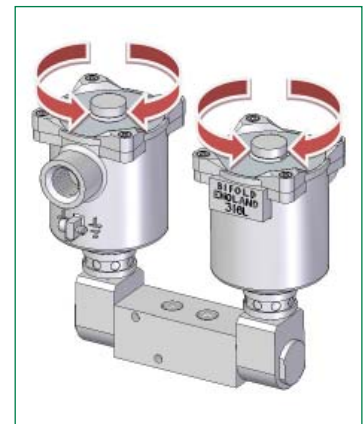
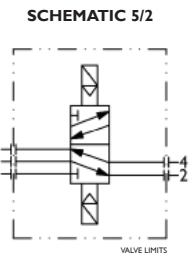
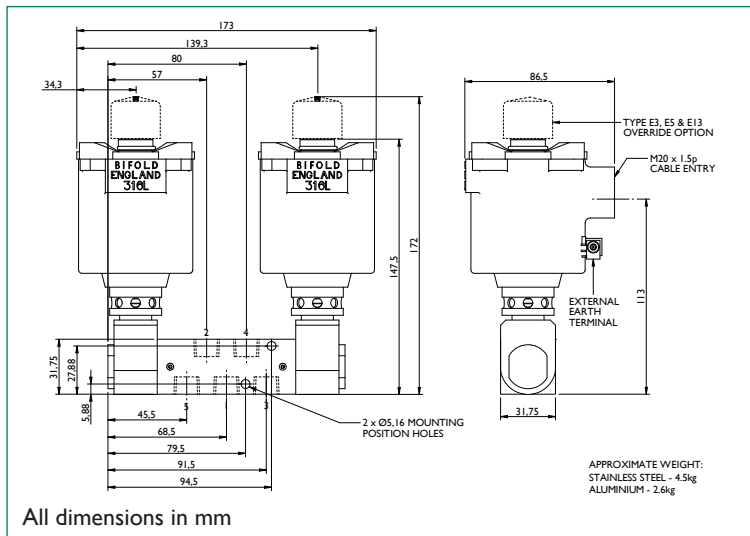
BXS
Auto Reset Internal Pilot

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



BXS
Auto Reset Internal Pilot

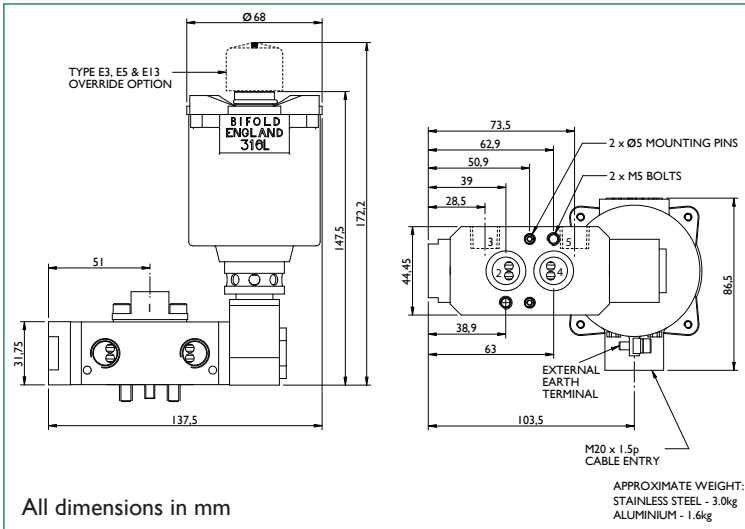
Example Code - BXS-04-04-EI-52-XX-EI-V-74AT4-24D-36-LI42



BXS
Banjo Joint Auto Reset
Internal Pilot

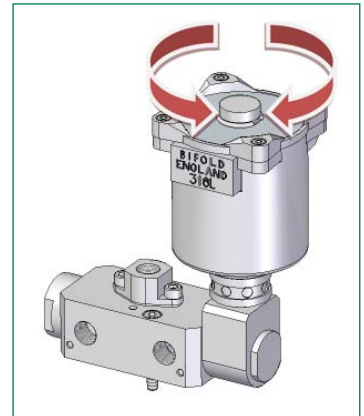
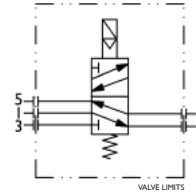
Dimensional Drawings

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



All dimensions in mm

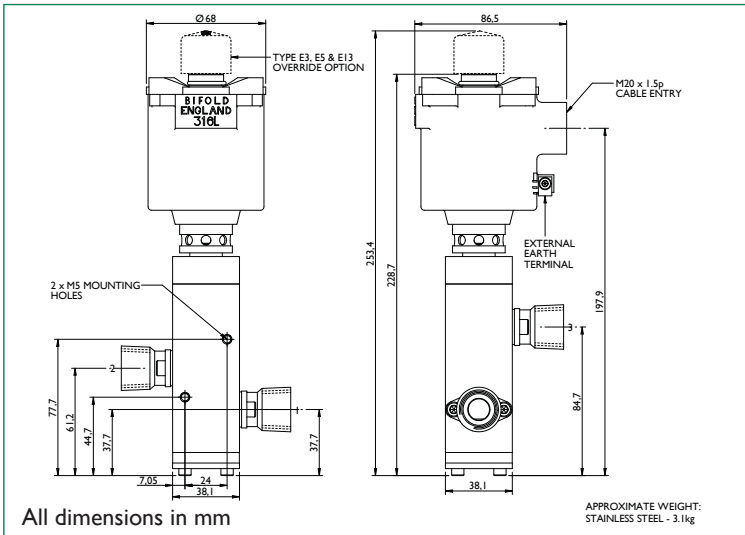
SCHEMATIC 5/2



BXS

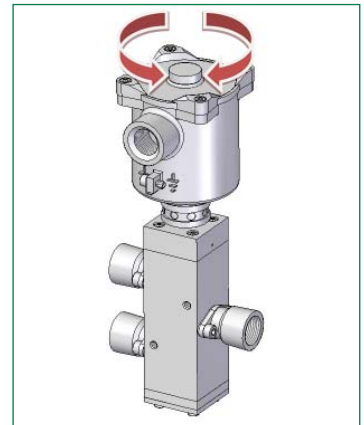
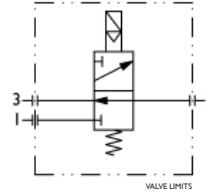
NAMUR Mount Banjo Joint
Auto Reset Internal Pilot

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



All dimensions in mm

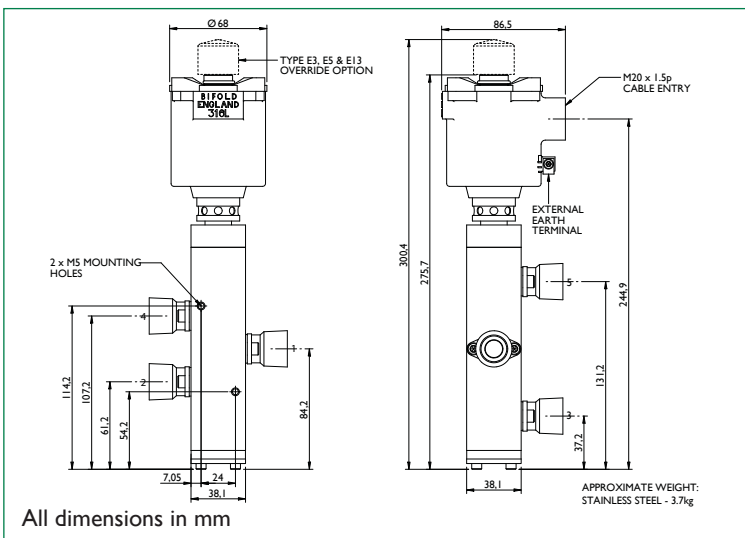
SCHEMATIC 3/2 NC



SPR

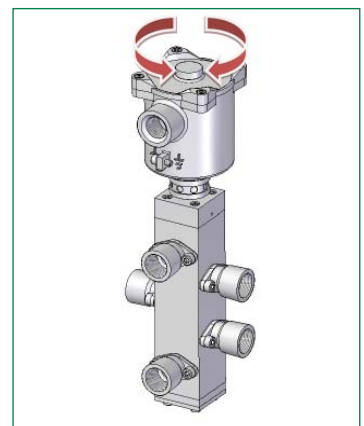
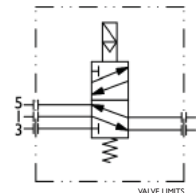
Auto Reset Internal Pilot

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



All dimensions in mm

SCHEMATIC 5/2

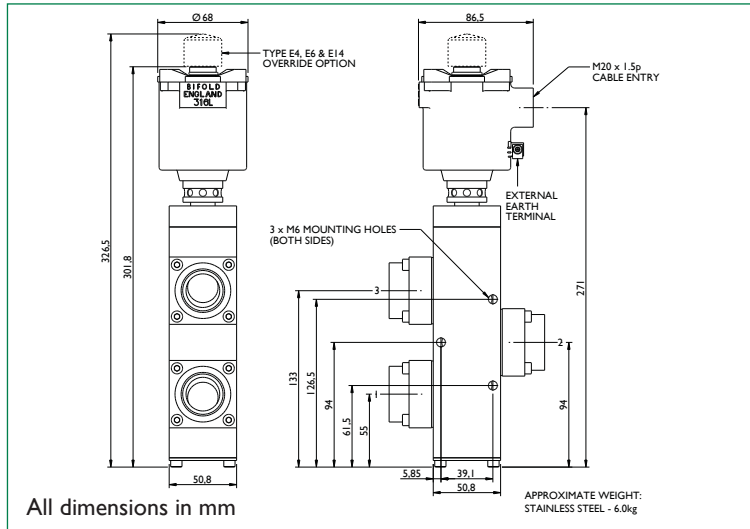


SPR

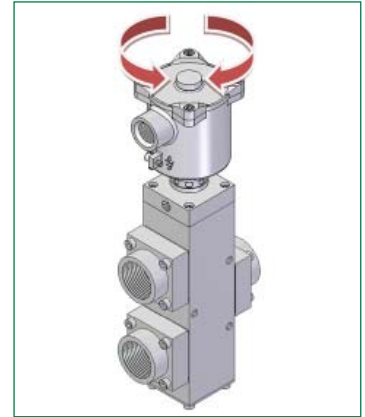
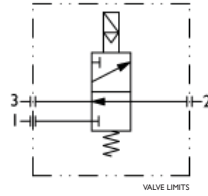
Auto Reset Internal Pilot

Dimensional Drawings

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

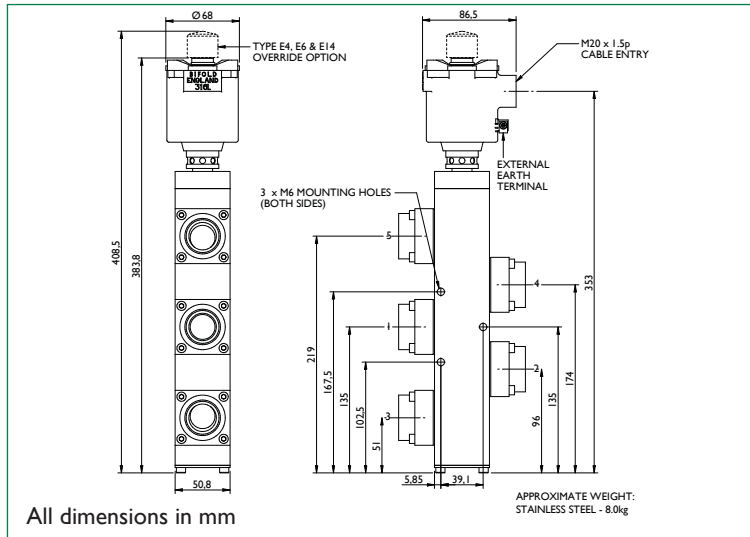


SCHEMATIC 3/2 NU

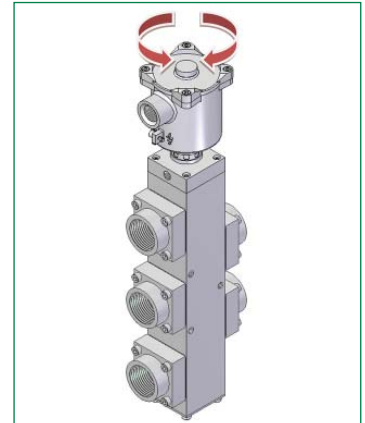
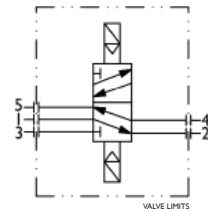


SPR
Auto Reset External Pilot

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



SCHEMATIC 5/2

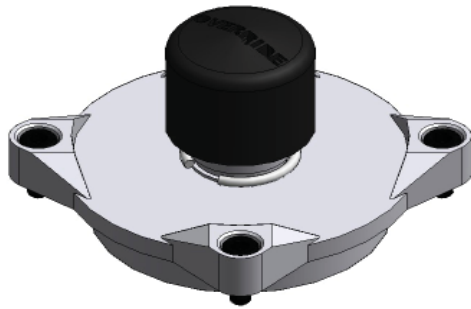


SPR
Auto Reset External Pilot

Options

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

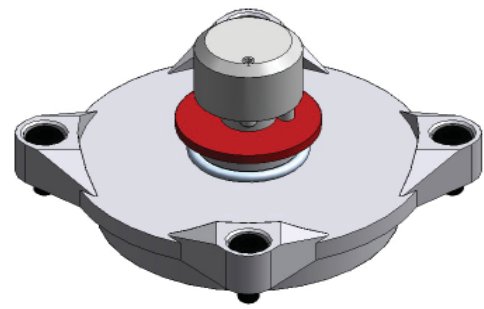
The range of products displayed in this brochure, are designed to accommodate all the options shown below. If the style or arrangement required for your application is not shown, please contact our office with full description and specification details.



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)

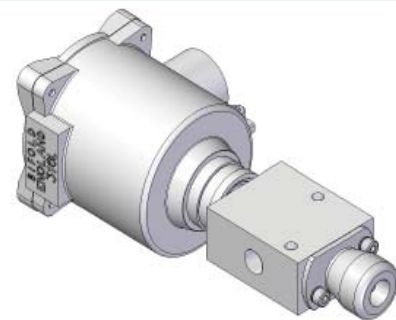
The solenoid valve switches on and off with the electrical supply. The manual override button is rotated through $\frac{3}{4}$ turn to operate the valve when the solenoid is in the electrically de-energised position. The manual override is detented, i.e. remains in position until rotated back to its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

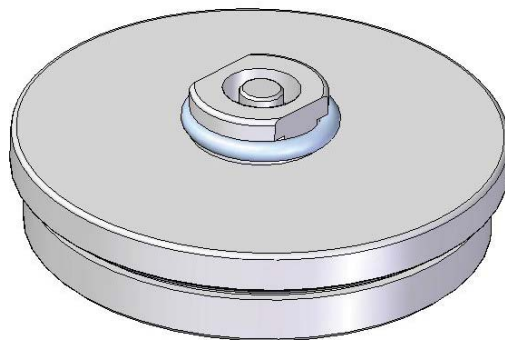
Latch Energised Type LE

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

The range of products displayed in this brochure, are designed to accommodate 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
Type ML - Electrical and Manual Required to Switch or Temporary Manual Override
(Slimline 58 - Series)

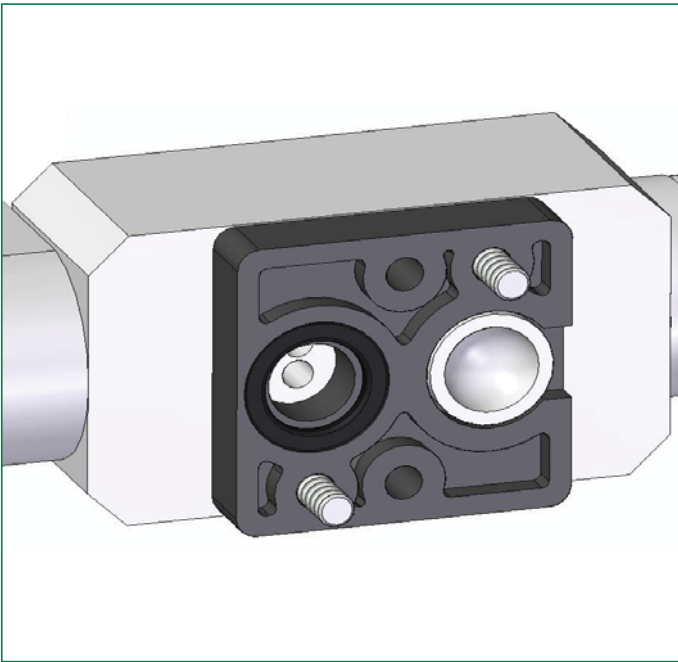
Manual Override Type M & Manual Reset Type ML

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.

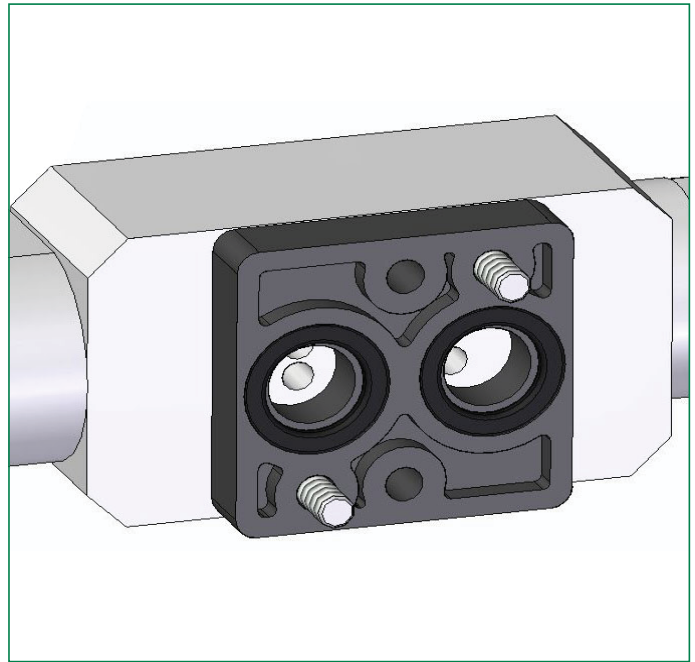
Options

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



Mounting Configuration:

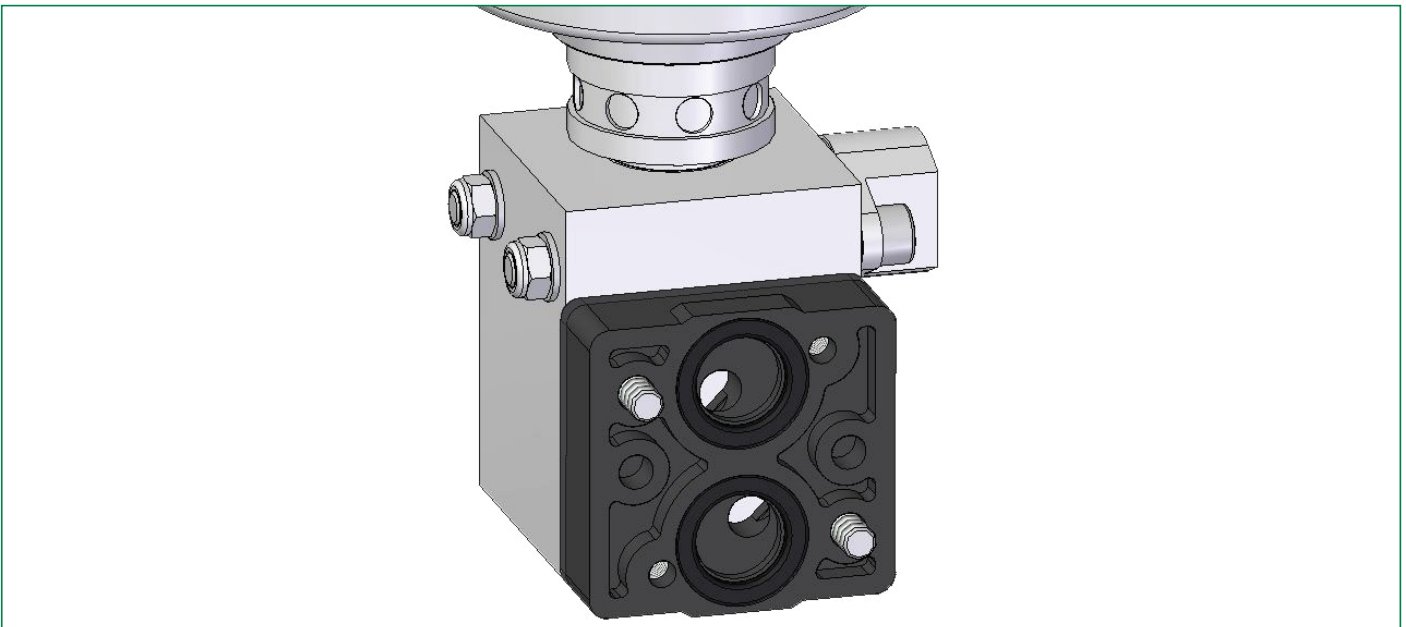
3 Way 2 Position



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

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

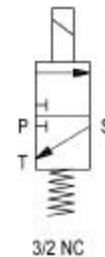
See solenoid and elastomer options

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

PREFERRED RANGE:

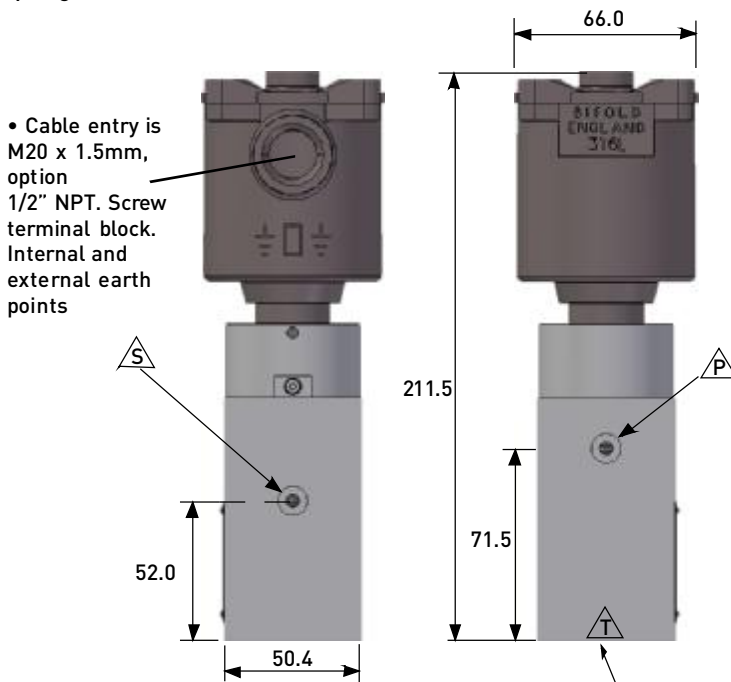
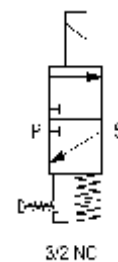
SVP8008/NC/04/S-24VDC/97HA9

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



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

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

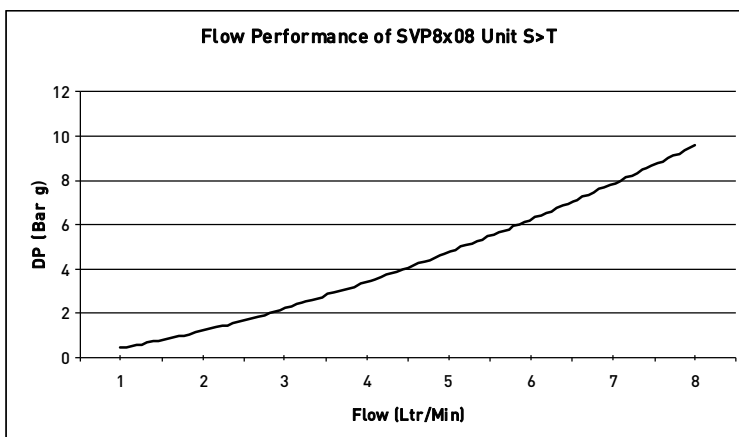
- Weight:- 4.0 Kg

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

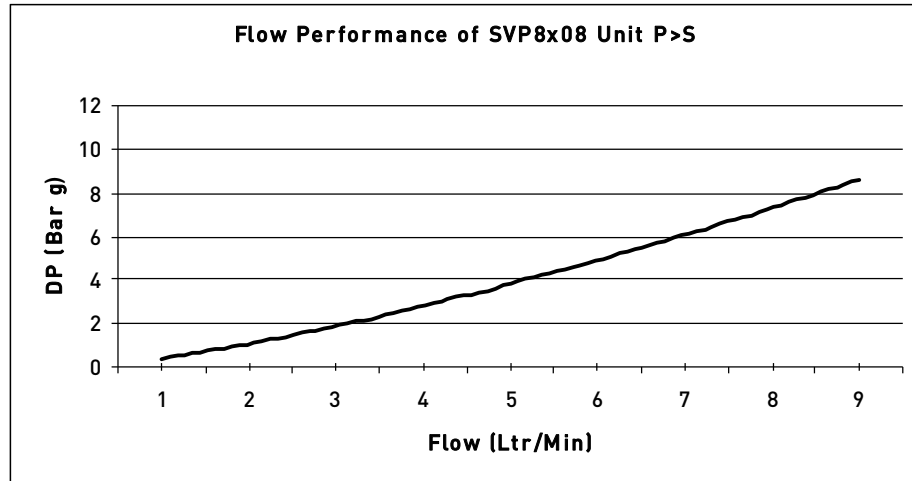
Tank Port in bottom face



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	Connections			
81	Body ported 1/4" NPT				
0	3-way, 2-position	Configuration			
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

*Global Presence for
Peace of Mind*

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

ATEX  IEC  Ex     

- Low Power
- Up to 690 bar Working Pressure

Features & Benefits

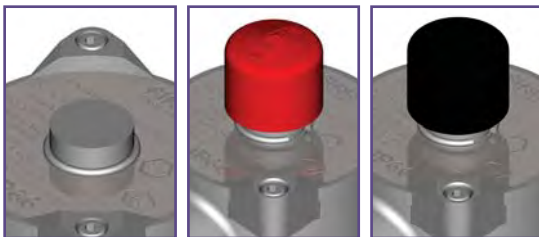
Worldwide Approvals



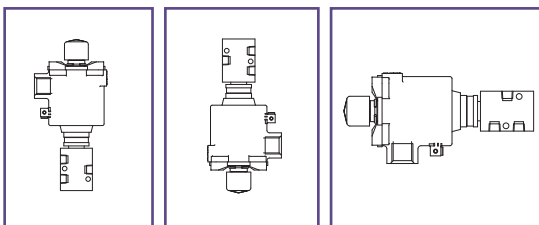
Solenoid Operator is Free to Rotate 360°



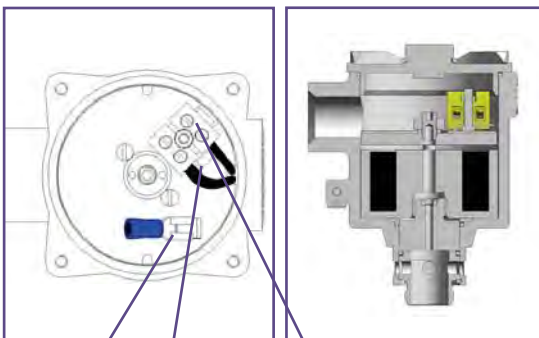
Widest Range of Override Options



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

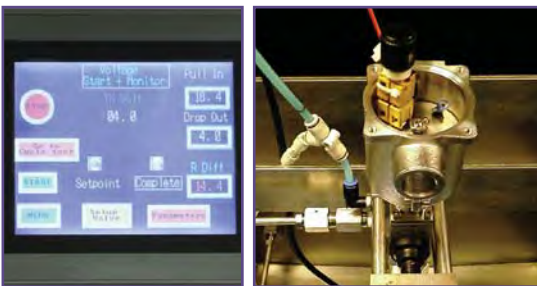
- Worldwide Approval
- Solenoid operator is free to rotate 360° allowing for an easy cable layout and ease of connection wiring. Solenoid operator internals rotate with the enclosure and prevent cables being pulled out of terminal block.
- Widest range of override options (Auto Reset, Spring Return Manual 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

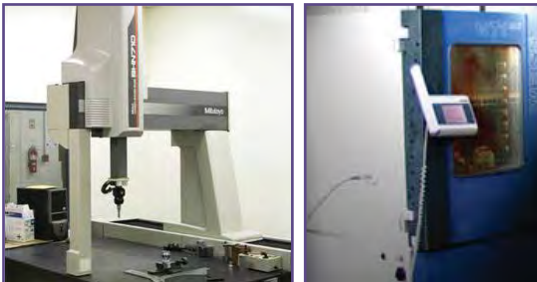
- Tropicalised solenoid operator design - 316L stainless steel enclosure; stainless steel or Remko B magnetic parts (dependant upon solenoid Ex type) Fully encapsulated coil.
- Spacious solenoid enclosure for ease of wiring.
- No time penalty for heat dissipation before removing solenoid enclosure cover.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

Features & Benefits

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



State of the Art Testing



Simple Maintenance


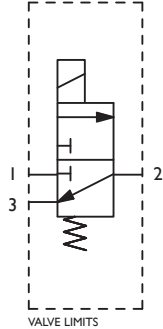







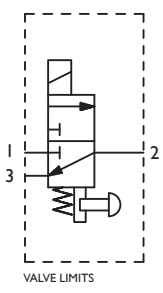







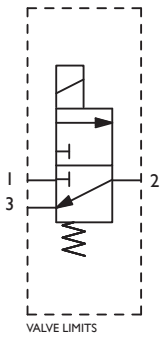







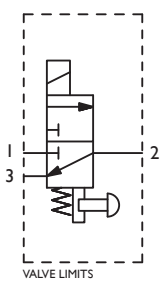








Safety and Environmental Benefits

- 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.

Preferred Range


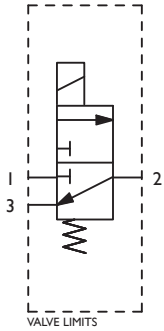







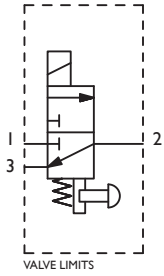






DIRECT ACTING SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>FP01 SI</p>	 <p>VALVE LIMITS</p>	13	FP01/SI/M/32/NC/S/74AT4-24D/36	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.
			FP01/SI/M/32/NC/S/77A-24D/30	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.
			FP01/SI/M/32/NC/S/78A-155	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>FP01 SI Manual Reset</p>	 <p>VALVE LIMITS</p>	13	FP01/SI/M/32/NC/S/74AT4-24D/ML/36	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.
			FP01/SI/M/32/NC/S/77A-24D/ML/30	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.
			FP01/SI/M/32/NC/S/78A-155/ML	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>FP01 S2</p>	 <p>VALVE LIMITS</p>	13	FP01/S2/M/32/NC/S/74AT4-24D/36	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.
			FP01/S2/M/32/NC/S/77A-24D/30	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.
			FP01/S2/M/32/NC/S/78A-155	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>FP01 S2 Manual Reset</p>	 <p>VALVE LIMITS</p>	13	FP01/S2/M/32/NC/S/74AT4-24D/ML/36	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.
			FP01/S2/M/32/NC/S/77A-24D/ML/30	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.
			FP01/S2/M/32/NC/S/78A-155/ML	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.

Preferred Range


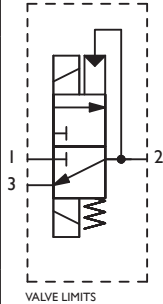

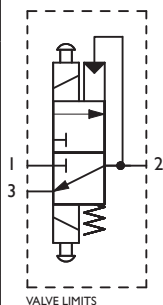
DIRECT ACTING SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>FP01 S3</p>		13	FP01/S3/M/32/NC/S/74AT4-24D/36	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.
			FP01/S3/M/32/NC/S/77A-24D/30	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.
			FP01/S3/M/32/NC/S/78A-155	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>FP01 S3 Manual Reset</p>		13	FP01/S3/M/32/NC/S/74AT4-24D/ML/36	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.
			FP01/S3/M/32/NC/S/77A-24D/ML/30	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.
			FP01/S3/M/32/NC/S/78A-155/ML	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>FP01 S1 / S1, S2 / S2 & S3 / S3</p>	 <p>VALVE LIMITS</p>	14	FP01/S1/S1/M/32/NC/S/74AT4-24D/SB/36	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.
			FP01/S2/S2/M/32/NC/S/77A-24D/SB/30	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.
			FP01/S3/S3/M/32/NC/S/78A-155/SB	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>FP01 S1 / S1, S2 / S2 & S3 / S3 Manual Override Spring Return</p>	 <p>VALVE LIMITS</p>	14	FP01/S1/S1/M/32/NC/S/74AT4-24D/SB/M/36	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.
			FP01/S2/S2/M/32/NC/S/77A-24D/SB/M/30	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.
			FP01/S3/S3/M/32/NC/S/78A-155/SB/M	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.

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 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.

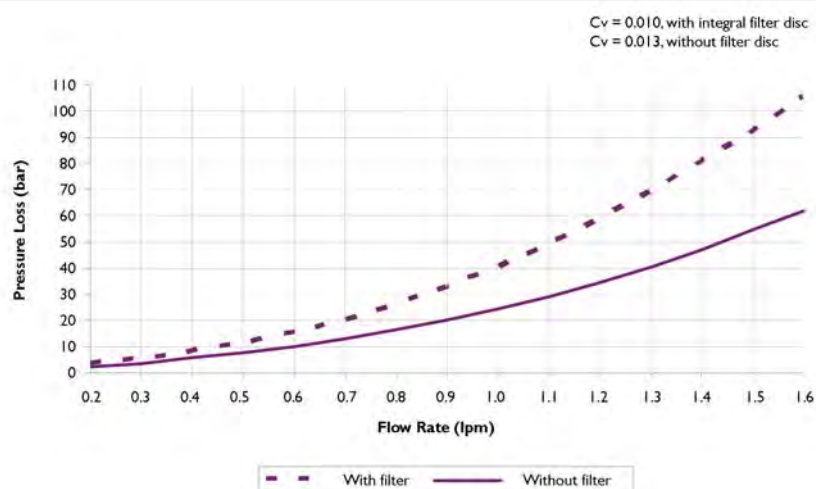
Operating media - Mineral oils, water glycol mixtures, sea water (filtered) and some chemicals.

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



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
XXX Voltage (V)	74 (Ex emb) 24 & 48 Vdc 77 (Ex d) 12, 24, 48 & 110 Vdc 77 (Ex d) 110 & 240 Vac	Voltage
XX Power (W)	74 (Ex emb) 1.8 & 3.6 Watts 77 (Ex d) 1.5 & 3.0 Watts	Power
EXM		74 Only
109-24DC-30 - EXM		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 †
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.

Seal Repair Kit

Seal Repair Kit Selection Chart - Ordering Example (FP01)









FP01		Model Code	
S1 345 bar S2 517 bar S3 690 bar	S1 / S1 345 bar S2 / S2 517 bar S3 / S3 690 bar	Maximum Valve Pressure	
M	Sub-base Mounting	Connections	
22 32	2-way, 2-position 3-way, 2-position	Valve Configuration	
NC NO SV DV	Normally Closed Normally Open Selector Valve Diverter Valve } 3 / 2 Only		
S V SA	Nitrile (standard) Viton Nitrile (Low Temperature)		O-ring Material
RK	Repair Kit		Repair Kit
FP01-SX-M32-NC-S-RK		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	Media # -20°C to +40°C -25°C to +40°C -20°C to +55°C -25°C to +55°C Ambient -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	Media # -20°C to +40°C -25°C to +40°C -20°C to +55°C -25°C to +55°C Ambient -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.

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	Media # -20°C to +90°C (T4) -60°C to +90°C (T4) Ambient -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	Media # -20°C to +90°C (T4) -60°C to +90°C (T4) Ambient -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.

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.

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	Media # -20°C to +95°C -60°C to +95°C Ambient -60°C to +60°C (T6) -60°C to +95°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (½" 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	Media # -20°C to +95°C -60°C to +95°C Ambient -60°C to +60°C (T6) -60°C to +95°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (½" 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

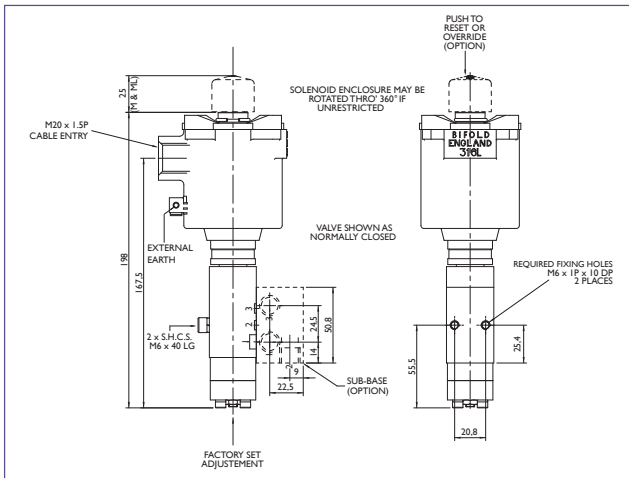
U_i = 31 V, I_i = 210 mA, P_i = 1.5 W, C_i = 0 µF, L_i = 0 mH

Coil Resistance : 155 Ohm ± 5%

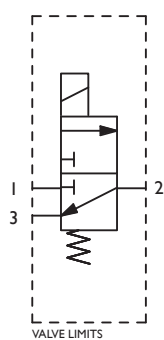
Minimum Current @ solenoid coil = 80 mA

FP01 (S1, S2 & S3)

Dimensional Drawing

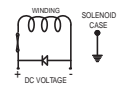


SCHMATIC 3/2 NC

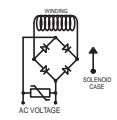
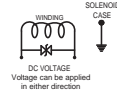


Wiring Diagrams

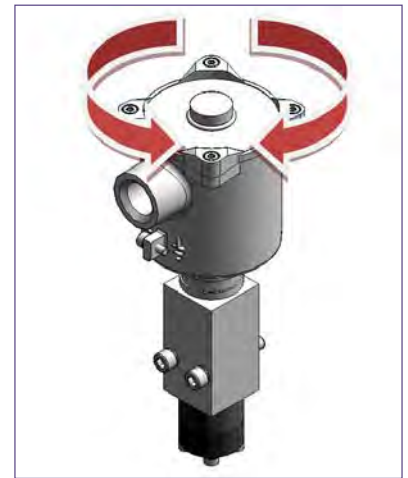
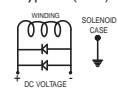
Type 74 (Ex emb)



Type 77 (Ex d)



Type 78 (Ex ia)



FP01 Selection Chart - Ordering Example

FP01		S1 345 bar S2 517 bar S3 690 bar		Direct acting, spring return	Model Code
M		Sub-base Mounting			Connections
22		2-way, 2-position (effected by omitting / plugging one port in the sub-base)			Valve Configuration
32		3-way, 2-position			
NC		Normally Closed			O-ring Material
NO		Normally Open			
SV		Selector Valve		3 / 2 Only	
DV		Diverter Valve			
S		Nitrile (standard) (-30°C to +130°C)		For maximum operating temperatures see 'T' Rating Limitations for Ex emb, Ex d & Ex ia on pages 10, 11 & 12.	Solenoid
V		Viton (-20°C to +180°C)			
SA		Nitrile (Low Temperature) (-36°C to +180°C)			
XX		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	
A		ATEX/IECEx Dual Certified/Labelled		74(Ex emb) ✓	Solenoid Approval
G		GOST		77(Ex d) ✓	
I		INMETRO		78(Ex ia) ✓	
U		CSA (US) ATEX Dual Certified/Labelled		74(Ex emb) X	
T4		Class ≤ 4.0 W (50°C maximum ambient temperature)			Ex emb 'T' Option
XXX		Voltage, refer to Solenoid option tables.		74 (Ex emb) Page 10 - Table 1 77 (Ex d) Page 11 - Table 2	Voltage
XX		Resistance (Ω)		78 (Ex ia) - 155 Ohms Page 12 - Table 3	Resistance †
M		Electrical to switch or temporary manual override			Options
ML		Electrical and manual required			
MOR		Electrical to switch or stayput manual override			
XX		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
K85		1/2" NPT cable entry			Option
H2S		NACE MR-01-75 compliant internal wetted and body materials			Option
M221		1/4" NPT			Sub-Base Options
M437		1/4" BSPP			

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

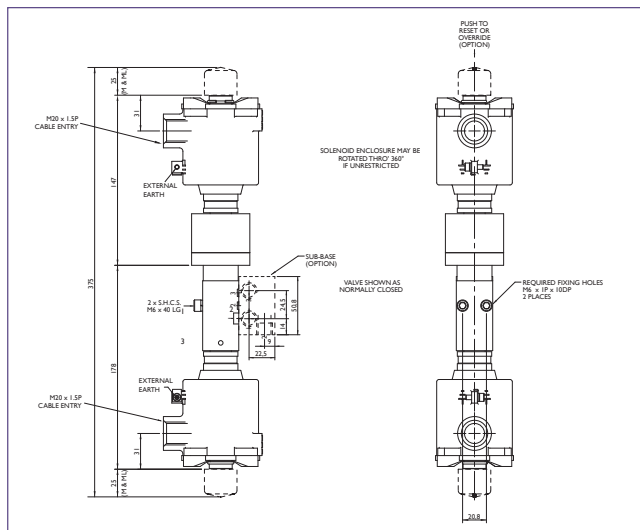
Ordering Example

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

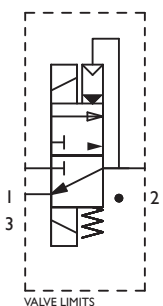
† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system. The solenoid valve installation operating and maintenance instruction reference is OP0165.

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

Dimensional Drawing

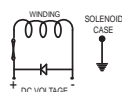


SCHEMATIC 3/2 NC

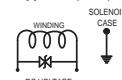


Wiring Diagrams

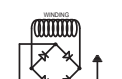
Type 74 (Ex emb)



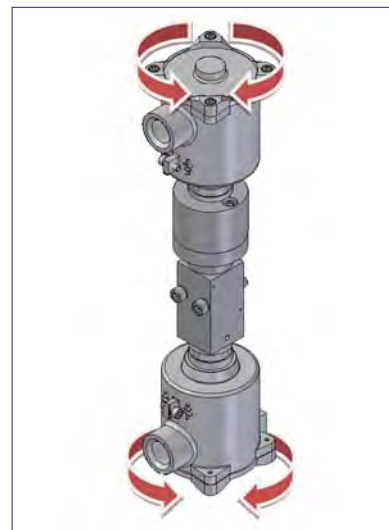
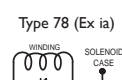
Type 77 (Ex d)



Type 78 (Ex ia)



Type 78 (Ex ia)



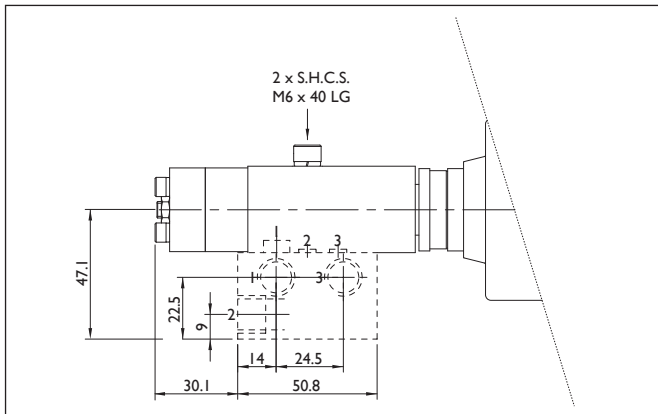
FP01 Selection Chart - Ordering Example

FP01			Model Code
SI / SI S2 / S2 S3 / S3	345 bar 517 bar 690 bar	Pulse operated, hydraulically latched, spring bias to close on loss of pressure	Maximum Valve Pressure
M	Sub-base Mounting		Connections
32	3-way, 2-position		Valve Configuration
NC	Normally Closed		
S V SA	Nitrile (standard) Viton Nitrile (Low Temperature)	(-30°C to +130°C) (-20°C to +180°C) (-36°C to +180°C)	O-ring Material
XX	Refer to solenoid options tables.	74 (Ex emb) 77 (Ex d) 78 (Ex ia)	Page 10 - Table 1 Page 11 - Table 2 Page 12 - Table 3
A G I U	ATEX/IECEX Dual Certified/Labelled GOST INMETRO CSA (US) ATEX Dual Certified/Labelled		74(Ex emb) 77(Ex d) 78(Ex ia) ✓ ✓ ✓ X ✓ ✓ X ✓ ✓ X ✓ X
T4	Class ≤ 4.0 W	(50°C maximum ambient temperature)	Ex emb 'T' Option
XXX	Voltage, refer to Solenoid option tables.	74 (Ex emb) 77 (Ex d)	Page 10 - Table 1 Page 11 - Table 2
XX	Resistance (Ω)	78 (Ex ia) - 155 Ohms	Page 12 - Table 3
SB	Spring bias to close on loss of hydraulic supply pressure		Default Position
M ML MOR	Electrical to switch or temporary manual override Electrical and manual required Electrical to switch or stayput manual override		Options
XX	Power (W)	74 (Ex emb) - 1.8 & 3.6 Watts 77 (Ex d) - 1.5 & 3.0 Watts	Page 10 - Table 1 Page 11 - Table 2
K85	1/2" NPT cable entry		Option
H2S	NACE MR-01-75 compliant internal wetted and body materials		Option
M221 M437	1/4" NPT 1/4" BSPP		Sub-Base Options
FP01/SI/SI/M/32/NC/S / 74 A T4-24D/SB / M / 36 / K85 / HS2 / [M221]			Ordering Example

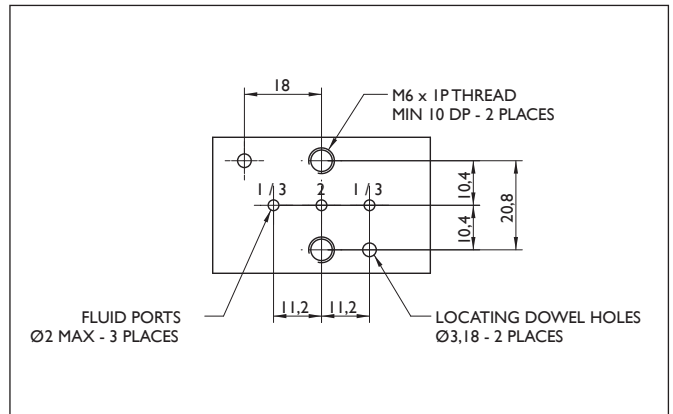
For the shaded block sections, please refer to the same shaded sections on pages 10, 11 & 12.
 † Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.
 The solenoid valve installation operating and maintenance instruction reference is OP0165.

Interface Details

Bifold Supplied Sub-Base Detail

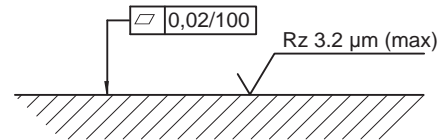


Interface Detail (For Customer Designed Sub-Base)



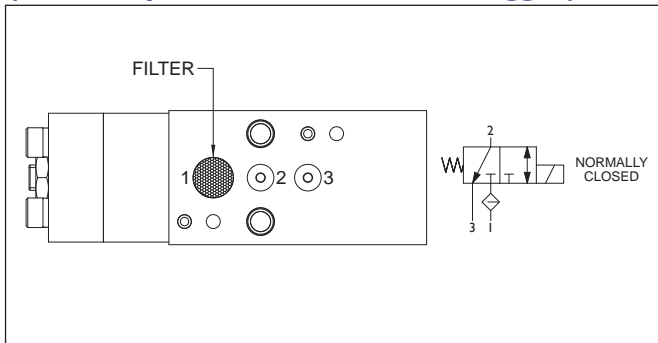
Surface Finish Requirements

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

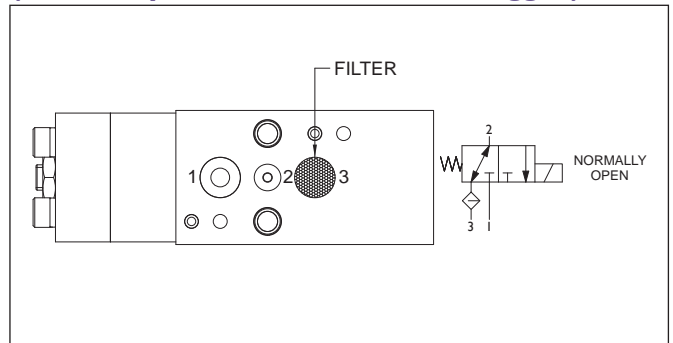


Configurations

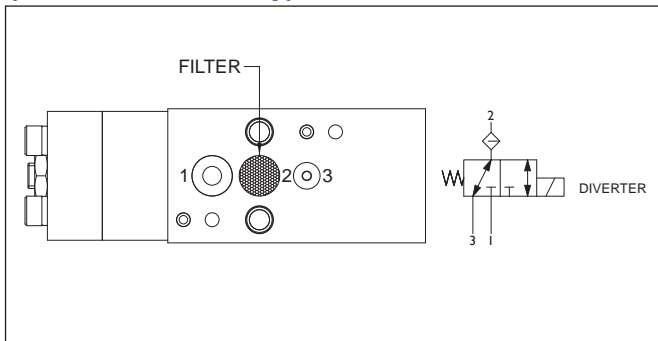
3-Way, 2-Position Normally Closed (For 2-Way Valve Port 3 Must Be Plugged)



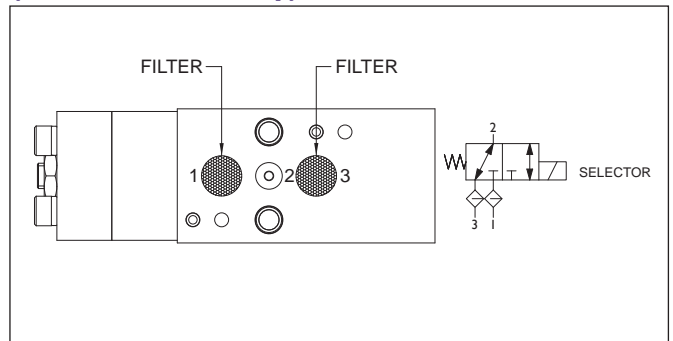
3-Way, 2-Position Normally Open (For 2-Way Valve Port 1 Must Be Plugged)



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



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



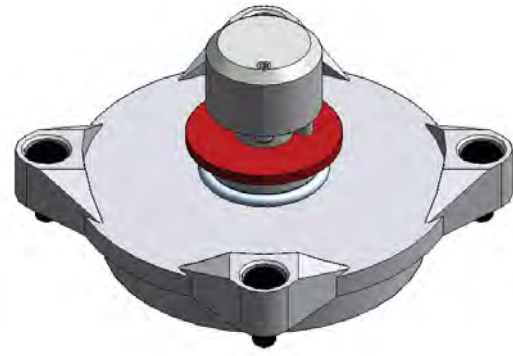
Options

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)



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

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.

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.



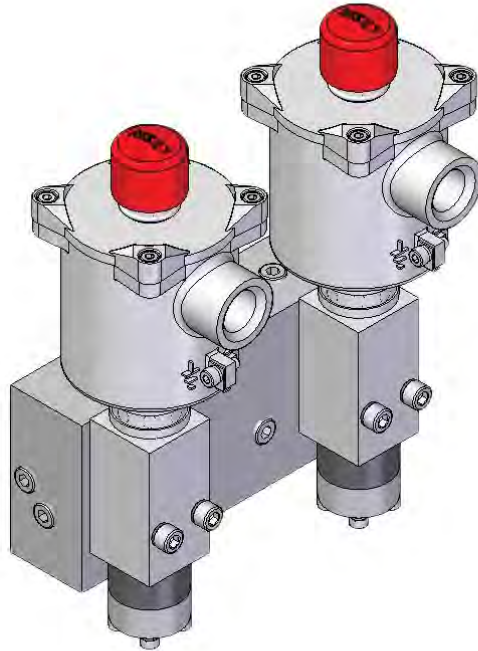
Type ML - Electrical and Manual Required to Latch

Manual Reset Type ML

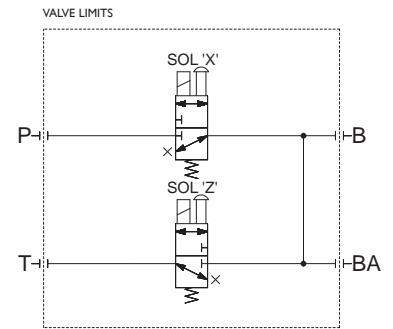
Apply the electrical signal and press the reset button. The valve moves to the energised position and will not de-energise until the electrical supply is removed. The manual reset is non-detented, spring return, i.e. does not latch in position. The valve cannot be moved to the energised position by pressing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

Typical Assemblies

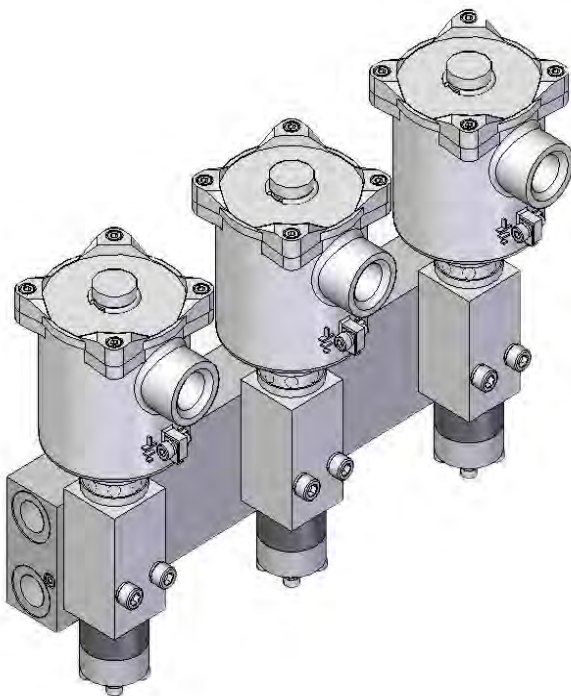
Typical Valve Assembly Showing FP01 Solenoid Valves - Manual Reset



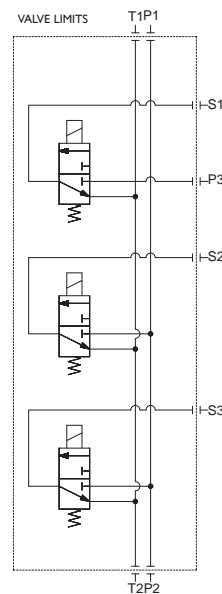
Schematic



Typical Valve Assembly Showing FP01 Solenoid Valves



Schematic











*Global Presence for
Peace of Mind*

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



Superior Performance Throughout the Full Operational Range

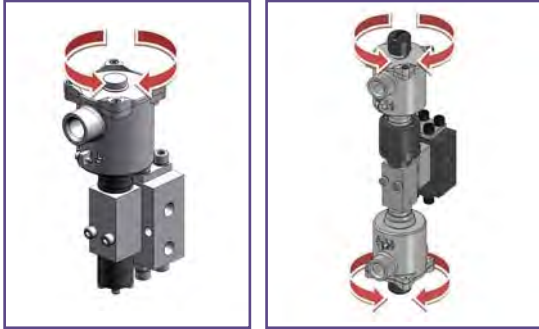
- Compact Design
 - Solenoid Valve
 - Certified as SIL 3 Capable
 - Solenoid Free to Rotate Through 360°
 - 316L Stainless Steel Solenoid Enclosure and Valve
 - NACE MR-01-75 Internal Wetted and Body Materials (Option)
 - Arctic Service Options to -36°C
 - Seated Ball design offers extremely low leakage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

Features & Benefits

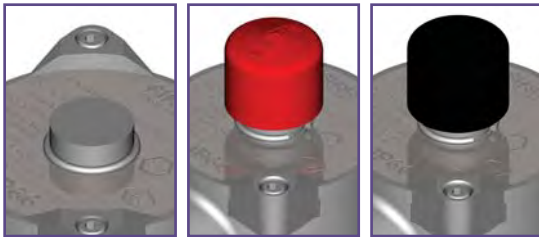
Worldwide Approvals



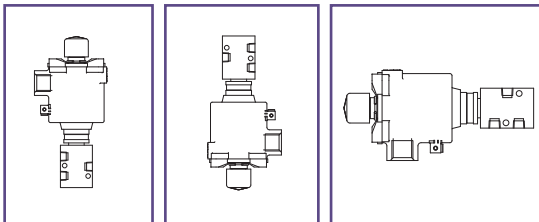
Solenoid Operator is Free to Rotate 360°



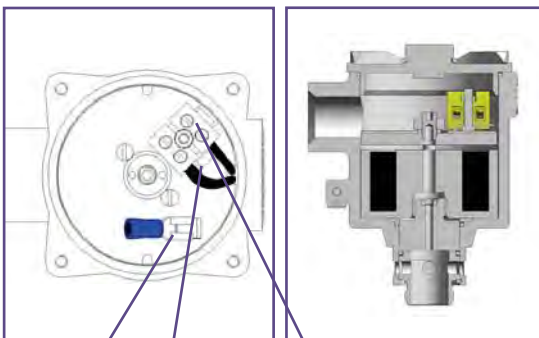
Widest Range of Override Options



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

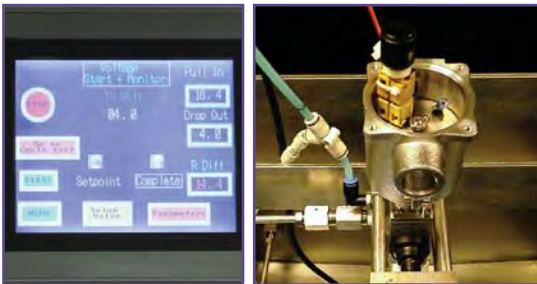
- Worldwide Approval
- Solenoid operator is free to rotate 360° allowing for an easy cable layout and ease of connection wiring. Solenoid operator internals rotate with the enclosure and prevent cables being pulled out of terminal block.
- Widest range of override options (Auto Reset, Spring Return Manual 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

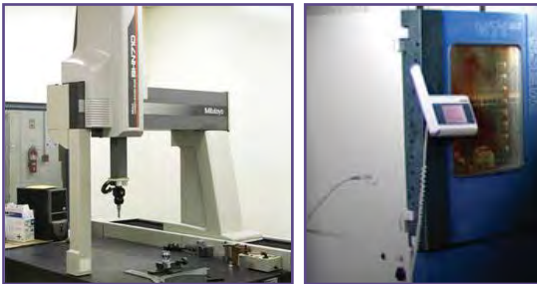
- Tropicalised solenoid operator design - 316L stainless steel enclosure; stainless steel or Remko B magnetic parts (dependant upon solenoid Ex type) Fully encapsulated coil.
- Spacious solenoid enclosure for ease of wiring.
- No time penalty for heat dissipation before removing solenoid enclosure cover.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

Features & Benefits

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



State of the Art Testing



Simple Maintenance


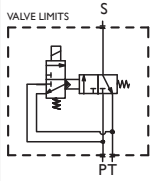

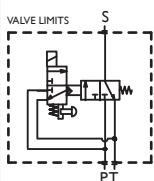

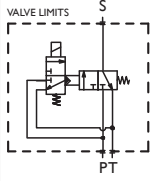

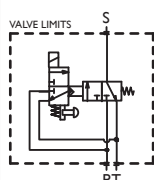


Safety and Environmental Benefits

- 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.

Preferred Range


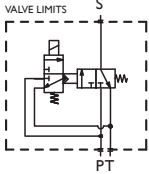







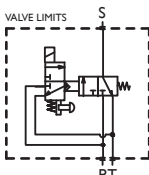






INDIRECT ACTING SOLENOID VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>FP15 S1</p>		17	FP15/S1/04/32/S/74AT4-24D/36	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.
			FP15/S1/04/32/S/77A-24D/30	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.
			FP15/S1/04/32/S/78A-155	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>FP15 S1 Manual Reset</p>		17	FP15/S1/04/32/S/74AT4-24D/ML/36	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.
			FP15/S1/04/32/S/77A-24D/ML/30	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.
			FP15/S1/04/32/S/78A-155/ML	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>FP15 S2</p>		17	FP15/S2/04/32/S/74AT4-24D/36	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.
			FP15/S2/04/32/S/77A-24D/30	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.
			FP15/S2/04/32/S/78A-155	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>FP15 S2 Manual Reset</p>		17	FP15/S2/04/32/S/74AT4-24D/ML/36	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.
			FP15/S2/04/32/S/77A-24D/ML/30	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.
			FP15/S2/04/32/S/78A-155/ML	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.

† 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


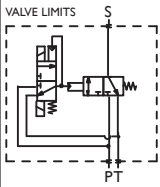

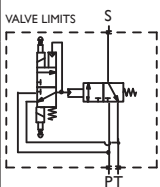

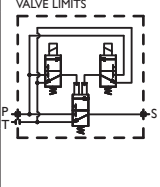

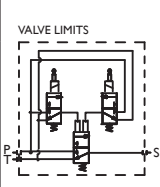
INDIRECT ACTING SOLENOID VALVES - PREFERRED RANGE

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

INDIRECT ACTING SOLENOID VALVES

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>FP15 S1 / S1, S2 / S2 & S3 / S3</p>		18	FP15/S1/S1/04/32/S/74AT4-24D/SB/36	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.
			FP15/S2/S2/04/32/S/77A-24D/SB/30	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.
			FP15/S3/S3/04/32/S/78A-155/SB	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>FP15 S1 / S1, S2 / S2 & S3 / S3 Manual Override Spring Return</p>		18	FP15/S1/S1/04/32/S/74AT4-24D/SB/M/36	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.
			FP15/S2/S2/04/32/S/77A-24D/SB/M/30	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.
			FP15/S3/S3/04/32/S/78A-155/SB/M	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>FP15 DPSS1, DPSS2 & DPSS3</p>		19	FP15/DPSS1/04/32/S/74AT4-24D/36	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.
			FP15/DPSS2/04/32/S/77A-24D/30	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.
			FP15/DPSS3/04/32/S/78A-155	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>FP15 DPSS1, DPSS2 & DPSS3 Manual Override Spring Return</p>		19	FP15/DPSS1/04/32/S/74AT4-24D/M/36	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.
			FP15/DPSS2/04/32/S/77A-24D/M/30	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.
			FP15/DPSS3/04/32/S/78A-155/M	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


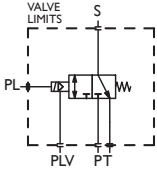

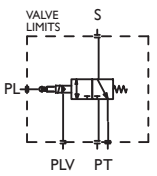

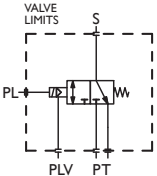

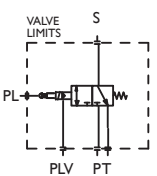
For the complete S1 / S1, S2 / S2 & S3 / S3 range, please see the selection chart on Page 18.

FP15 - DPSS1, DPSS2 & DPSS3

For the complete DPSS1, 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.

Solenoid Valves

INDIRECT ACTING SOLENOID VALVES				
Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>FPI5 S4 & S5</p>		20	FPI5/S4/04/32/S/74AT4-24D/36	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.
			FPI5/S5/04/32/S/77A-24D/30	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.
			FPI5/S5/06/32/S/78A-370	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>FPI5 S4 & S5 Manual Override Spring Return</p>		20	FPI5/S4/04/32/S/74AT4-24D/M/36	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.
			FPI5/S5/04/32/S/77A-24D/M/30	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.
			FPI5/S5/06/32/S/78A-370/M	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>FPI5 S6</p>		21	FPI5/S6/04/32/S/74AT4-24D/36	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.
			FPI5/S6/04/32/S/77A-24D/30	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.
			FPI5/S6/04/32/S/78A-370	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>FPI5 S6 Manual Override Spring Return</p>		21	FPI5/S6/04/32/S/74AT4-24D/M/36	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.
			FPI5/S6/04/32/S/77A-24D/M/30	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.
			FPI5/S6/04/32/S/78A-370/M	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.

FPI5 - S4 & S5

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

FPI5 - 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.

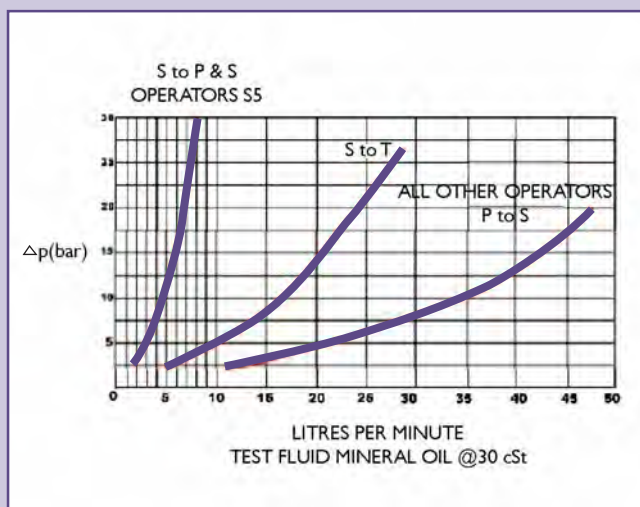
Product Options

Certification & Approval options available

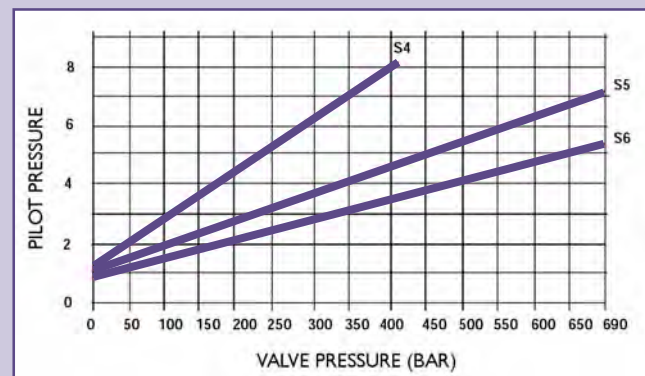


SIL 3 capability: The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3 in accordance with IEC 61508.
Solenoid valve assemblies can be mounted in any orientation. Solenoid enclosure can be rotated relative to the pilot stage valve body to suit cable entry.
Working 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.

Solenoid Valve Product Options

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
S1	345 bar	DPSS1	345 bar	Maximum Valve Pressure
S2	517 bar	DPSS2	517 bar	
S3	690 bar	DPSS3	690 bar	
S1 / S1	345 bar	S4	414 bar	Valve Configuration
S2 / S2	517 bar	S5	690 bar	
S3 / S3	690 bar	S6	690 bar	
22	2 way, 2 - position			O-ring Material
32	3 way, 2 - position			
S	Nitrile (standard)			Repair Kit
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
XXX Voltage (V)	74 (Ex emb)	24 & 48 Vdc
	77 (Ex d)	12, 24, 48 & 110 Vdc
	77 (Ex d)	110 & 240 Vac
XX Power (W)	74 (Ex emb)	1.8 & 3.6Watts
	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
XX Resistance (Ω)	78 (Ex ia)	155 Ohms
	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	Media # -20°C to +40°C -25°C to +40°C -20°C to +55°C -25°C to +55°C Ambient -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)									
 FP15 (S1 / S1)	74	Ex emb II C T3 / T4	24 Vdc 48 Vdc	1.8 3.6	0.32	Media # -20°C to +40°C -25°C to +40°C -20°C to +55°C -25°C to +55°C Ambient -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	Media # -20°C to +40°C -25°C to +40°C -20°C to +55°C -25°C to +55°C Ambient -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)	Media # -20°C to +40°C -25°C to +40°C -20°C to +55°C -25°C to +55°C Ambient -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.

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 3.0	0.32	Media # -20°C to +90°C (T4) -60°C to +90°C (T4) Ambient -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)	
 FP15 (S2)									
 FP15 (S3)									
HIGH PRESSURE TWO STAGE DUAL PULSE SOLENOID OPTIONS TABLE 2 77 (Ex d)									
 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 3.0	0.32	Media # -20°C to +90°C (T4) -60°C to +90°C (T4) Ambient -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)	
 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 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	Media # -20°C to +90°C (T4) -60°C to +90°C (T4) Ambient -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)	
 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)	Media # -20°C to +90°C (T4) -60°C to +90°C (T4) Ambient -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)	
 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.

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	Media # -20°C to +95°C -60°C to +95°C Ambient -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	Media # -20°C to +95°C -60°C to +95°C Ambient -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_i = 31 V, I_i = 210 mA, P_i = 1.5 W, C_i = 0 µF, L_i = 0 mH
 Coil Resistance : 155 Ohm ± 5%
 Minimum Current @ solenoid coil = 80 mA

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

U_i = 31 V, I_i = 210 mA, P_i = 1.5 W, C_i = 0 µF, L_i = 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	Media # -20°C to +95°C -60°C to +95°C Ambient -60°C to +60°C (T6) -60°C to +95°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (½" NPT Option)	 ATEX IECEx  INMETRO  GOST  GOST K GGTN
 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)	Media # -20°C to +95°C -60°C to +95°C Ambient -60°C to +60°C (T6) -60°C to +95°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (½" NPT Option)	 ATEX IECEx  INMETRO  GOST  GOST K GGTN
 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_i = 31 V, I_i = 210 mA, P_i = 1.5 W, C_i = 0 µF, L_i = 0 mH

Coil Resistance : 155 Ohm ± 5%

Minimum Current @ solenoid coil = 80 mA

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

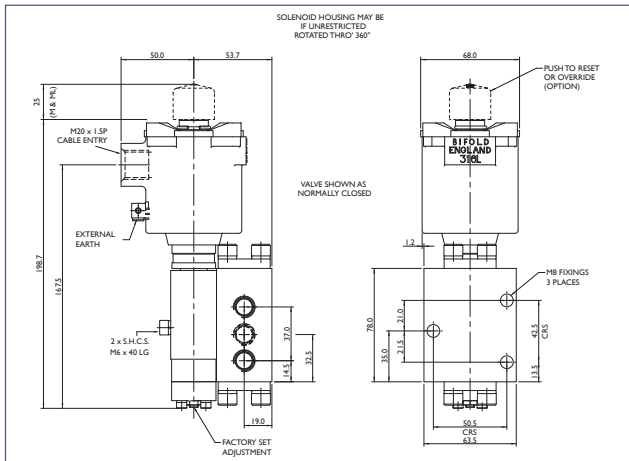
U_i = 31 V, I_i = 210 mA, P_i = 1.5 W, C_i = 0 µF, L_i = 0 mH

Coil Resistance : 370 Ohm ± 5%

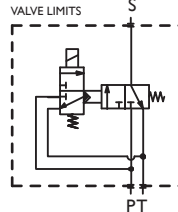
Minimum Current @ solenoid coil = 32 mA

FPI5 (S1, S2 & S3)

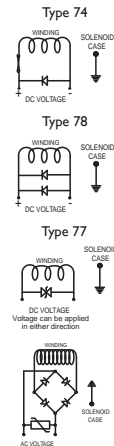
Dimensional Drawing



SCHEMATIC 3/2 NC



Wiring Diagrams



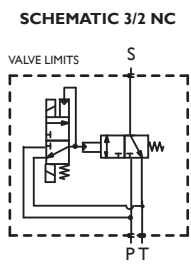
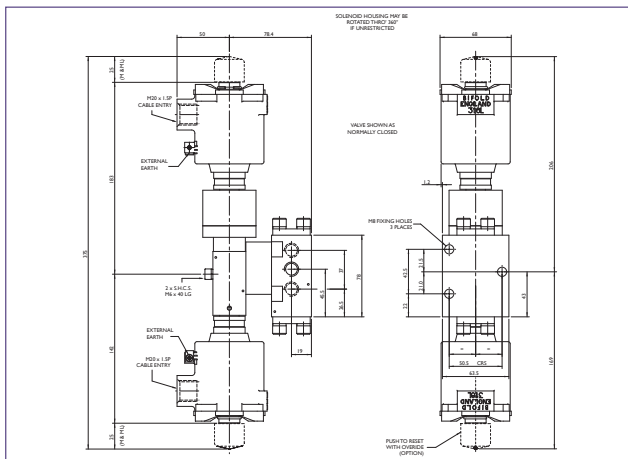
FPI5 Selection Chart - Ordering Example

FPI5		High Pressure, Pilot Stage Solenoid Valves			Model Code
S1 S2 S3	345 bar 517 bar 690 bar				Maximum Valve Pressure
M	Sub-base Mounting				Connections
04 06	1/4" NPT Body Ported 3/8" NPT Body Ported	38MP	3/8" MP Body Ported (Non Standard)		Valve Configuration
22 32 42	2 way, 2 - position 3 way, 2 - position 4 way, 2 - position	43 43 / BC	4 way, 3 - Position, Open Centre 4 Way, 3 - Position, Blocked Centre		O-ring Material
S V SA	Nitrile (standard) Viton Nitrile (Low Temperature)	(-30°C to +130°C) (-20°C to +180°C) (-36°C to +180°C)	For maximum operating temperatures see 'T' Rating Limitations for Ex emb, Ex d & Ex ia on pages 11, 13 & 15.		Option
NO	Normally Open	(NC Normally Closed as Standard)			Solenoid
XX	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 Approval
A G I U	ATEX/IECEX Dual Certified/Labelled GOST INMETRO CSA (US) ATEX Dual Certified/Labelled			74(Ex emb) ✓ 77(Ex d) ✓ 78(Ex ia) ✓	Ex emb 'T' Option
T4	Class ≤ 4.0 W (50°C maximum ambient temperature)				Voltage
XXX	Voltage, refer to Solenoid option tables.			74 (Ex emb) Page 11 - Table 1 77 (Ex d) Page 13 - Table 2	Resistance †
XX	Resistance (Ω) 78 (Ex ia) - 155 Ohms			Page 15 - Table 3	Options
M ML MOR	Electrical to switch or temporary manual override Electrical and manual required Electrical to switch or stayput manual override				Power
XX	Power (W) 74 (Ex emb) - 1.8 & 3.6Watts 77 (Ex d) - 1.5 & 3.0Watts			Page 11 - Table 1 Page 13 - Table 2	Option
K85	1/2" NPT cable entry				Option
H2S	NACE MR-01-75 compliant internal wetted and body materials				Option
K6	BSPP Ports				Option
EP EPT	External Pilot Supply External Pilot Supply & Vent				Sub-Base Options
M306 M229	1/4" NPT 1/2" NPT	M1236 M1211	1/4" BSP 1/2" BSP		
FPI5/S1 / 04 / 32 / S / NO / 74 A T4-24D/ML/36/K85/H2S/K6 / EP/[M306]					Ordering Example

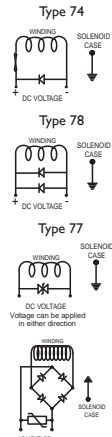
For the shaded block sections, please refer to the same shaded sections on pages 11, 13 & 15.
 † Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system.
 The solenoid valve installation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

FPI5 (SI/SI,S2/S2&S3/S3)

Dimensional Drawing



Wiring Diagrams



FPI5 Selection Chart - Ordering Example

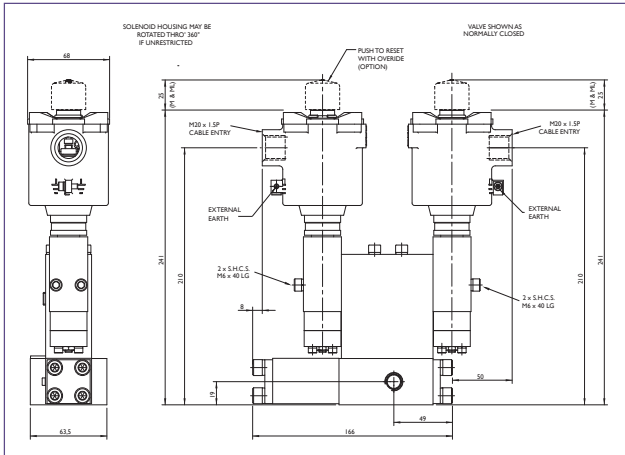
FPI5				Model Code
S1 / S1 S2 / S2 S3 / S3	345 bar 517 bar 690 bar	Pulse operated, hydraulically latched, spring bias to close on loss of pressure		Maximum Valve Pressure
M	Sub-base Mounting			Connections
04 06	1/4" NPT Body Ported 3/8" NPT Body Ported	38MP	3/8" MP Body Ported (Non Standard)	
22 32	2 way, 2 - position 3 way, 2 - position			Valve Configuration
S V SA	Nitrile (standard) Viton Nitrile (Low Temperature)	(-30°C to +130°C) (-20°C to +180°C) (-36°C to +180°C)	For maximum operating temperatures see 'T' Rating Limitations for Ex emb, Ex d & Ex ia on pages 11, 13 & 15.	O-ring Material
XX	Refer to Solenoid options tables.	74 (Ex emb) 77 (Ex d) 78 (Ex ia)	Page 11 - Table 1 Page 13 - Table 2 Page 15 - Table 3	Solenoid
A G I U	ATEX/IECEx Dual Certified/Labelled GOST INMETRO CSA (US) ATEX Dual Certified/Labelled	74(Ex emb) 77(Ex d) 78(Ex ia)	✓ X X X	Solenoid Approval
T4	Class ≤ 4.0 W	(50°C maximum ambient temperature)		Ex emb 'T' Option
XXX	Voltage, refer to Solenoid option tables.	74 (Ex emb) 77 (Ex d)	Page 11 - Table 1 Page 13 - Table 2	Voltage
XX	Resistance (Ω)	78 (Ex ia) - 155 Ohms	Page 15 - Table 3	Resistance †
SB	Spring Bias to close on loss of hydraulic supply pressure.			Default Position
M ML MOR	Electrical to switch or temporary manual override Electrical and manual required Electrical to switch or stayput manual override			Options
XX	Power (W)	74 (Ex emb) - 1.8 & 3.6 Watts 77 (Ex d) - 1.5 & 3.0 Watts	Page 11 - Table 1 Page 13 - Table 2	Power
K85	1/2" NPT cable entry			Option
H2S	NACE MR-01-75 compliant internal wetted and body materials			Option
K6	BSPP Ports			Option
EP EPT	External Pilot Supply External Pilot Supply & Vent			Options
M306 M229	1/4" NPT 1/2" NPT	M1236 M1211	1/4" BSP 1/2" BSP	Sub-Base Options

FPI5/SI/SI/04/32/S/74 A T4-24D/SB/ML/36/K85/H2S/K6/EP/[M306] Ordering Example

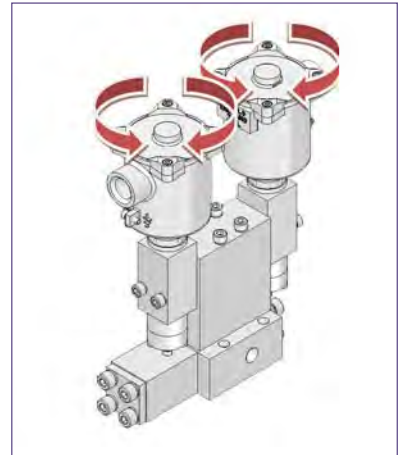
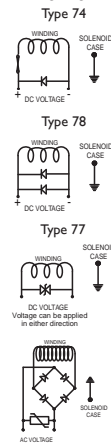
For the shaded block sections, please refer to the same shaded sections on pages 11, 13 & 15.
 † Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system. The solenoid valve installation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

FP15 (DPSSI, 2 & 3)

Dimensional Drawing



Wiring Diagrams



FP15 Selection Chart - Ordering Example

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

FP15/DPSSI/04 / 32 / S / 74 A T4-24D / ML / 36 / K85 / H2S/K6 / EP / [M306]

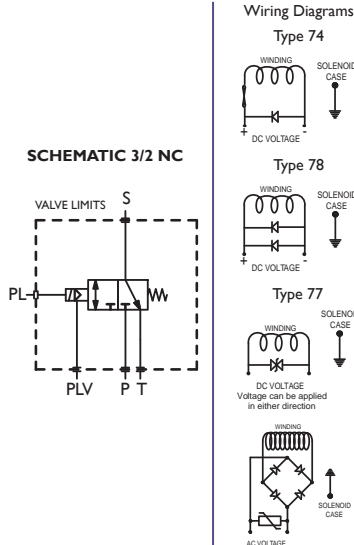
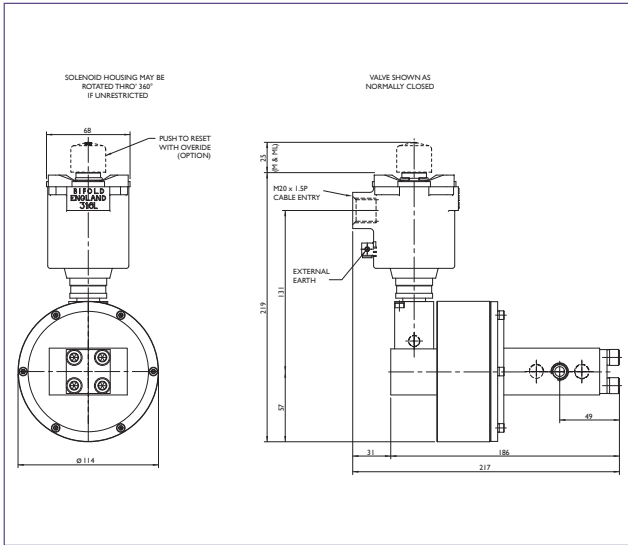
Ordering Example

For the shaded block sections, please refer to the same shaded sections on pages 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.

FPI5 (S6)

Dimensional Drawing



FPI5 Selection Chart - Ordering Example

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

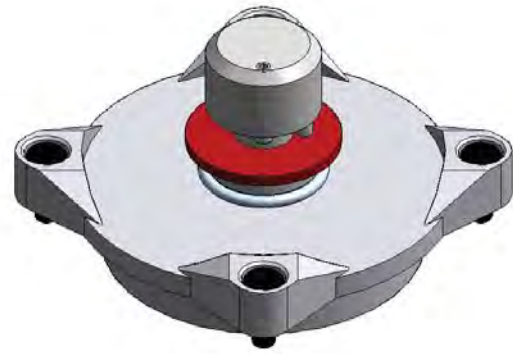
Options

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)



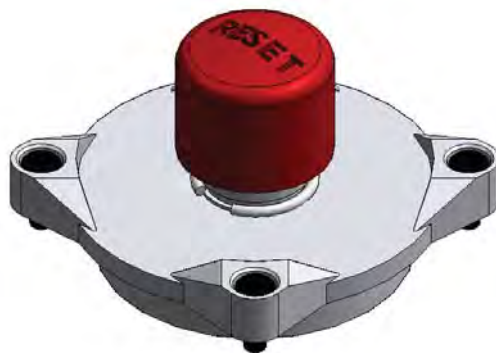
Type MOR - Electrical to Switch or Temporary Manual Rotary Override (Stayput)

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.

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.



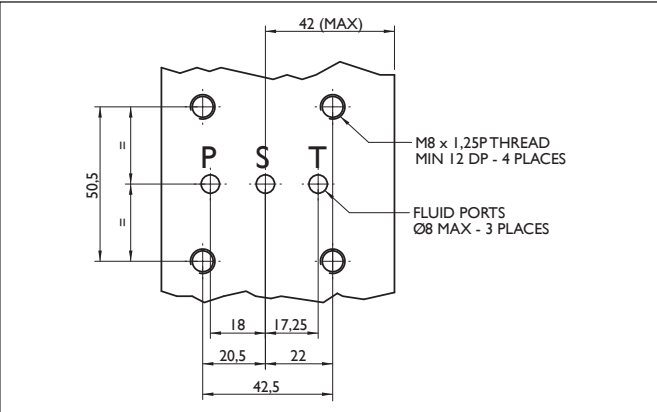
Type ML - Electrical and Manual Required to Latch

Manual Reset Type ML

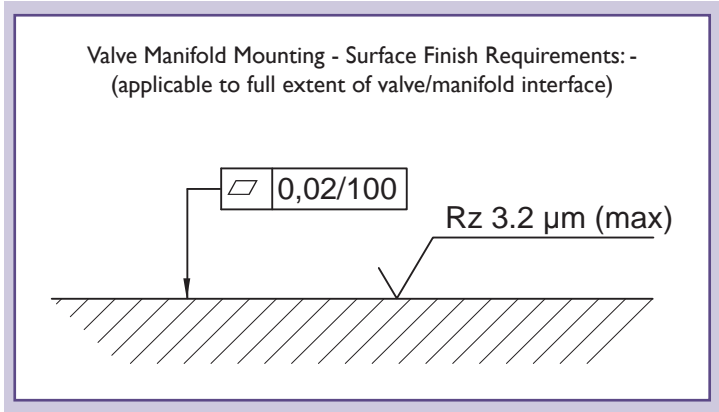
Apply the electrical signal and press the reset button. The valve moves to the energised position and will not de-energise until the electrical supply is removed. The manual reset is non-detented, spring return, i.e. does not latch in position. The valve cannot be moved to the energised position by pressing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

Interface Detail

Interface Detail (For Customer Designed Sub-Base)

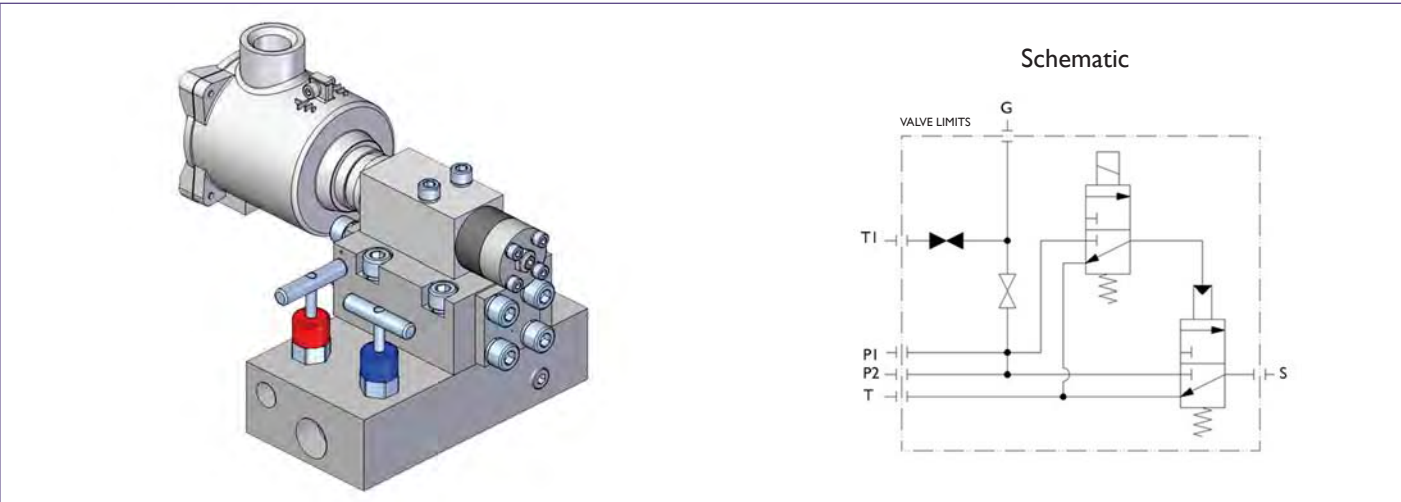


Surface Finish Requirements

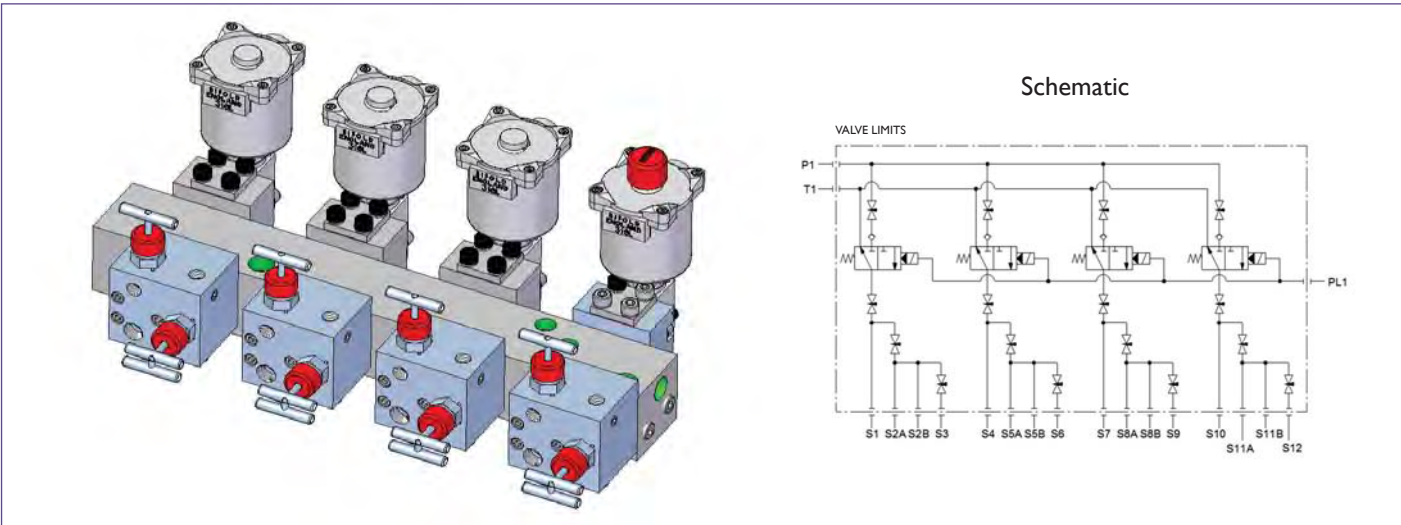


Typical Assemblies

Typical Valve Assembly Showing an FPI5 Solenoid Valve



Typical Valve assembly showing FPI5 Solenoid Valves



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

• TECHNICAL SPECIFICATIONS AND INSTALLATION REQUIREMENTS	2
• ORDERING CODE	3 - 4
• FLOW PERFORMANCE GRAPH	4
• 2/2, 3/2, DV & SV BODY & SUBBASE	5
• 4/2 & 4/3 BODY ASSEMBLY (CODE 42 & 43)	6
• SOLENOID TABLES	7
• LOW, HIGH PRESSURE SOLENOID OPERATORS	8
• OPTIONS	9

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.

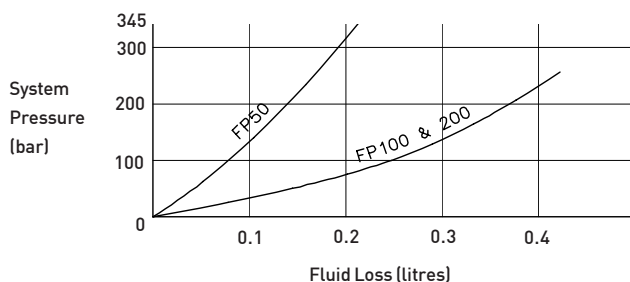
LAST CHANCE FILTRATION:

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



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.

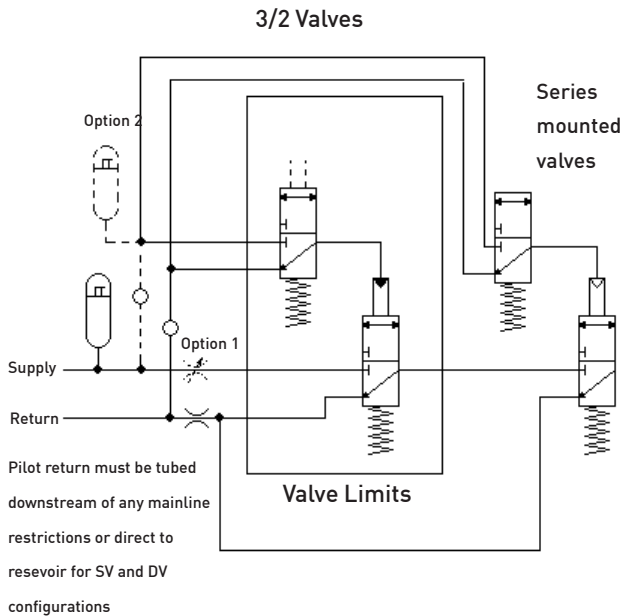
Graph illustrating typical fluid loss on SL'x' operators

SELECTION CHART

FP50	50 lpm	Model Code & nominal flow rating																												
FP100	100 lpm																													
FP200	200 lpm																													
SH 'X'	Solenoid valve operator (two stage) Refer to pilot pressure ranges	Pilot Pressure Range - bar																												
		<table border="1"> <tr> <th>'X'</th> <th>FP50</th> <th>FP100/200</th> </tr> <tr> <td>0</td> <td>30-60</td> <td>32-70</td> </tr> <tr> <td>0A</td> <td>45-85</td> <td>43-115</td> </tr> <tr> <td>1</td> <td>60-120</td> <td>60-138</td> </tr> <tr> <td>1A</td> <td>75-150</td> <td>80-170</td> </tr> <tr> <td>2</td> <td>120-250</td> <td>110-235</td> </tr> <tr> <td>2A</td> <td>145-290</td> <td>130-280</td> </tr> <tr> <td>3</td> <td>170-345</td> <td>150-345</td> </tr> <tr> <td>3A</td> <td>240-490</td> <td>190-415</td> </tr> <tr> <td>4</td> <td>300-610</td> <td>235-520</td> </tr> </table>	'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
'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																												
SL 'X'																														
M	Subbase mounting - 32, DV & SV valves. Subbases ordered seperately. See page 5.	Connections																												
08	1/2 NPT ported subbase assembly																													
12	3/4 NPT ported subbase assembly (FP 100/200 only)																													
32	3 - way, 2 - position	Max working pressure - bar																												
42	4 - way, 2 - position																													
43	4 - way, 3 - position	<table border="1"> <tr> <th>FP50</th> <th>FP100/200</th> </tr> <tr> <td>345</td> <td>250</td> </tr> </table>	FP50	FP100/200	345	250																								
FP50	FP100/200																													
345	250																													
DV	Diverter Valve	207																												
SV	Selecter Valve																													
S	Nitrile (standard)	(-30°C to +130°C)	Refer to valve operating temperature range on page 2																											
V	Viton	(-20°C to +180°C)																												
A	Silicone/Fluorosilicone	(-50°C to +40°C)																												
SA	Low temperature Nitrile	(-46°C to +130°C)																												
XXX	(refer to solenoid options on page 7)		O-ring material																											
XXX	(refer to solenoid options on page 7)		Voltage																											
A	ATEX Ex II 2 GD (standard)		Solenoid Approvals																											
G	GOST 1 Exd IIC T6 (T5,T4)	87C, 87D, 97C, 97D, 97F, 97G,																												
I	INMETRO Br-Exd IIC T6 (T5)																													
S	SAA Exd IIC T6 (T5,T4)																													
U	CSA Exd IIC (Canada) CSA AExd IIC (USA)	87C, 87D																												
A	ATEX Ex II 1 GD T75°C (T110°C)	98C																												
A	ATEX Ex II 1 GD T65°C (standard)	981																												
G	GOST 0 Exia IIC T6																													
A	ATEX Ex II 2 GDc T120°C	94C																												
A	ATEX Ex II 2 G	991																												
1	T4 IIA	87C, 87D, 97C, 97D, 97F, 97G,	T-Rating & Gas Group																											
2	T4 IIB																													
3	T4 IIC	As above +98C																												
4	T5 IIA																													
5	T5 IIB	87C, 87D, 97C, 97D, 97F, 97G,																												
6	T5 IIC																													
7	T6 IIA																													
8	T6 IIB																													
9	T6 IIC (standard)	As above +98C																												
H2S	NACE MR-01-75 - (solenoid options 97D, 87C & 87D only)		Options																											
K6	BSPP Ported																													
K85	1/2" NPT cable entry																													
ML	Manual reset																													
M	Manual override spring return	Solenoid operators SH'X' only																												
MOR	Manual override rotary stayput																													
WS	Weather seal solenoid core tube (90J only)																													
FP50/ SH1/ M / 32 / S -24VDC/97C A 9 / ML			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)

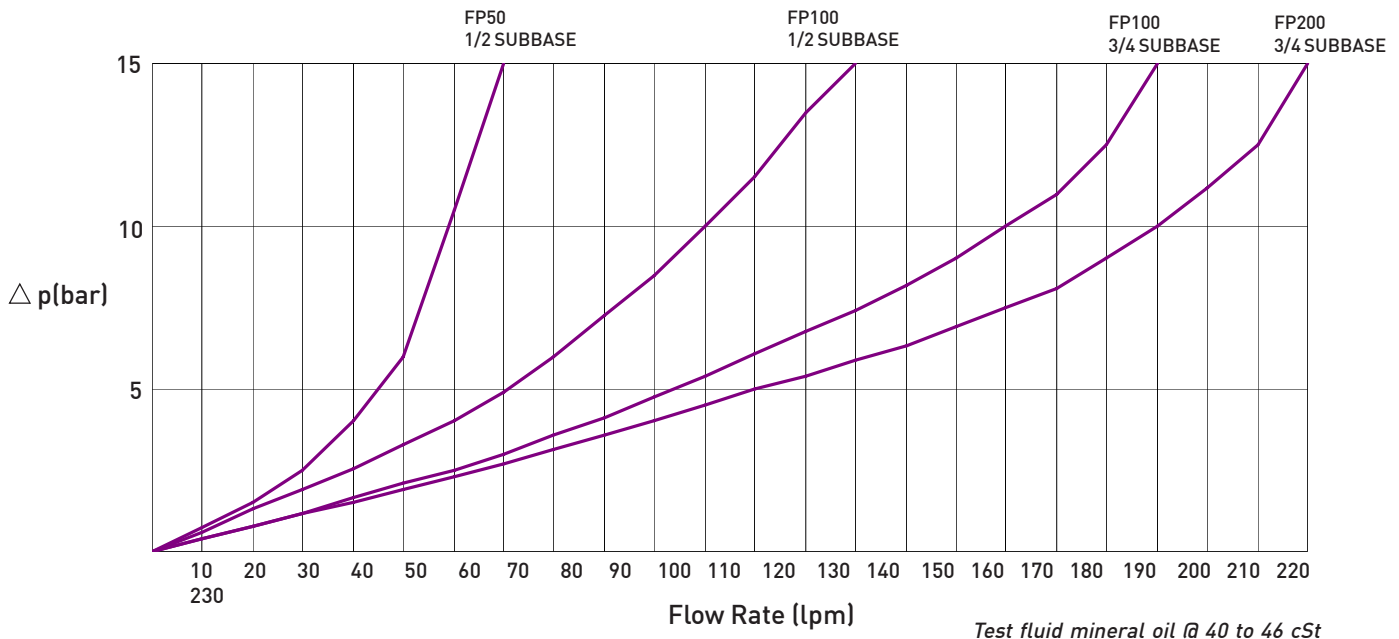
OPTION 3. Connect the pilot supply to a point in the system which is not influenced by the operation of the control valve.

NOTES:-

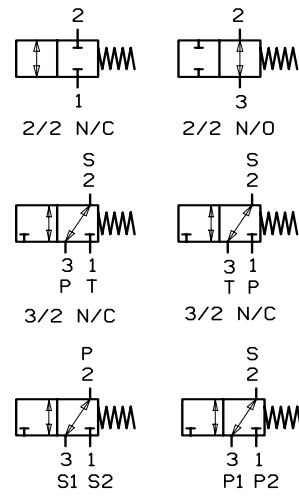
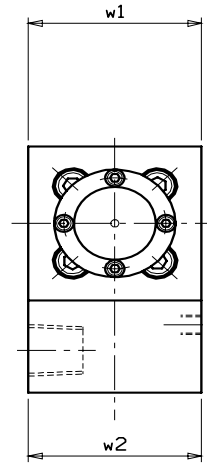
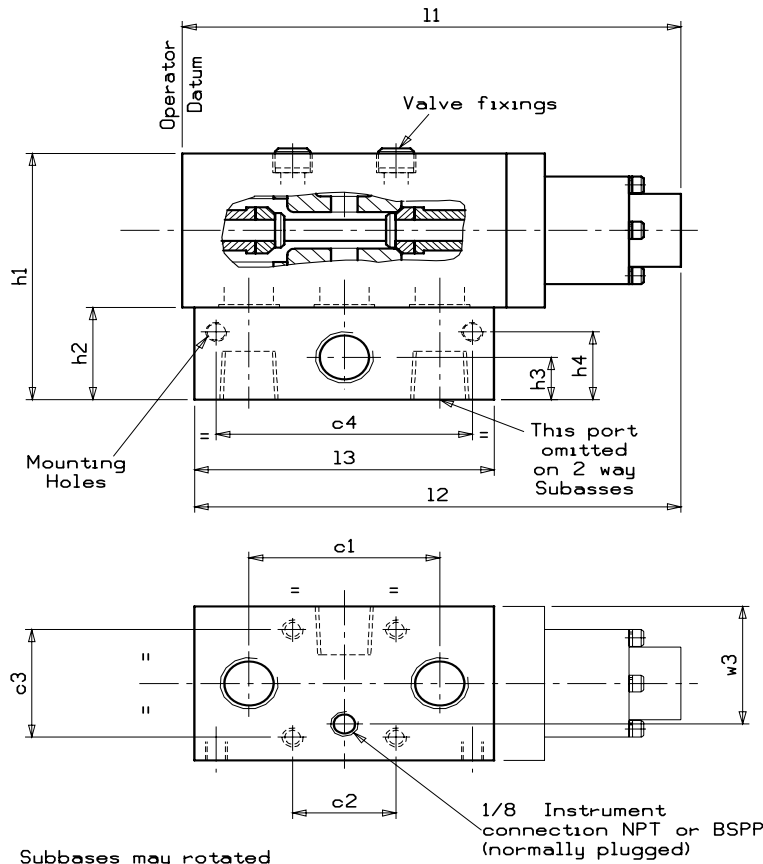
For 4 way, 2 position two stage valves, the above 3/2 installation requirements apply. For 4 way, 3 position two stage valves, refer to series mounted valve installation details.

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



DIVERTER (DV) SELECTOR (SV)

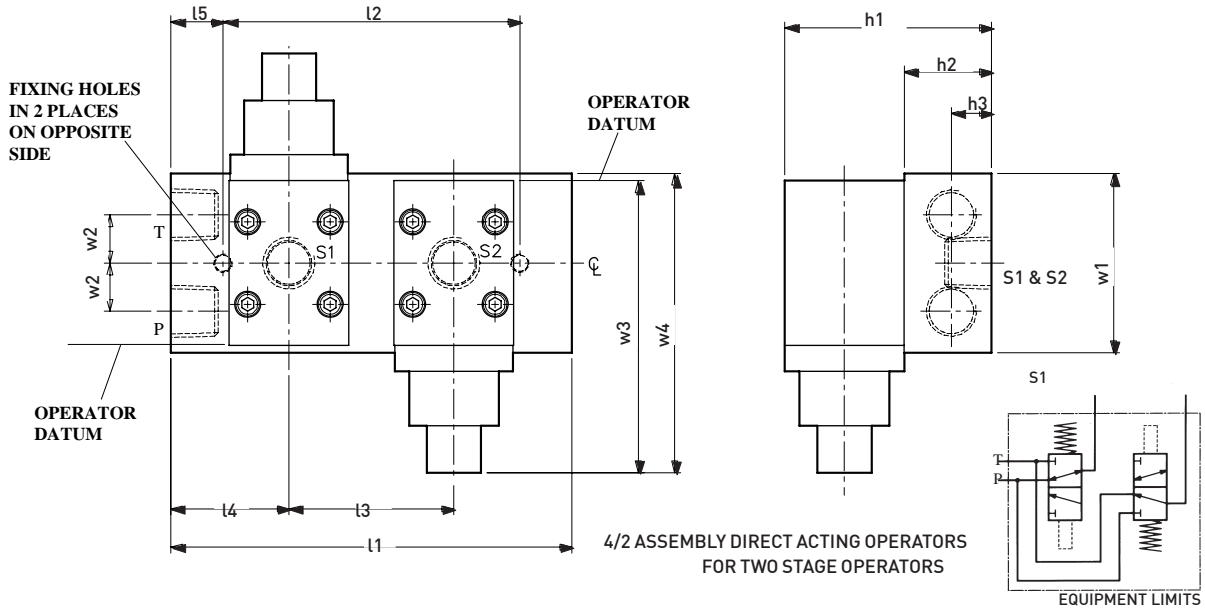
MODEL	c1	c2	c3	c4	h1	h2	h3	h4	l1	l2	l3	w1	w2	w3
FP50	41	35	35	60	82.6	31.8	16.5	22	124	127.1	76.2	50.8	60	45
FP100/200	70	38	45	94	101.6	38.1	17.5	28	183	178.5	110	63.5	63.5	48.5
MODEL	Valve Fixings				O-ring				Mounting holes			Weight (kg)		
	Size	Torque (Nm)		Engagement										
FP50	M6 X 50	7.3		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			M157/02	M140/02		
M165/02	M163/02	3/8 BSPP	1.0	M156/02	M152/02	1/2 BSPP	2.0
M160/02	M158/02			M155/02	M154/02		

For special multipurpose subbases consult Fluidpower

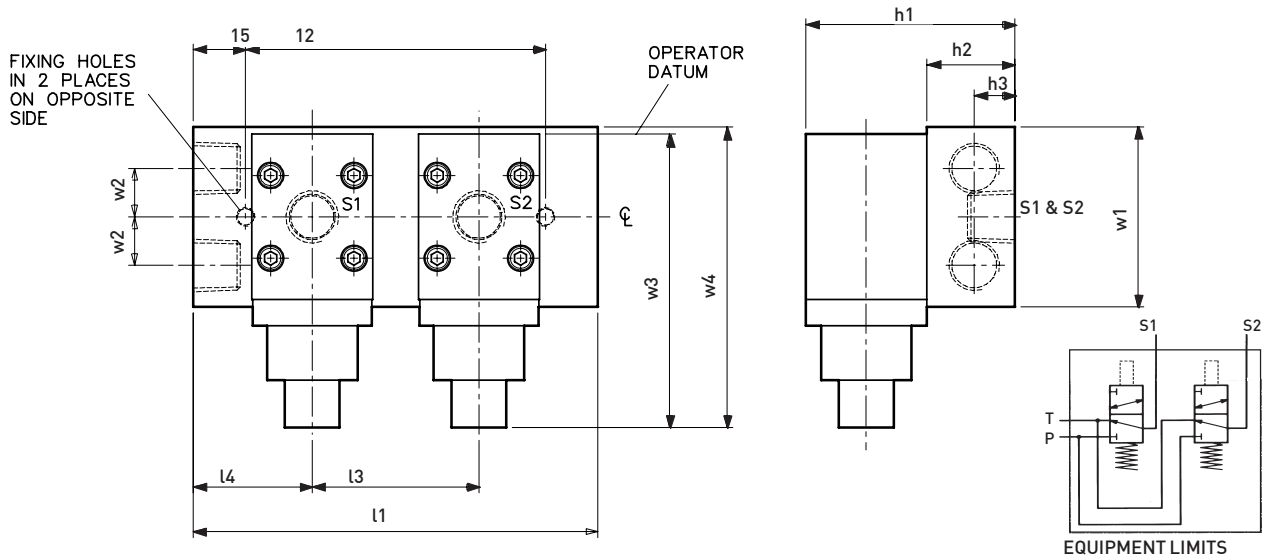
4/2 Body Assembly (Code 42) direct acting operators



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

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) -20°C to +90°C (T4)				
97D		5.7 Watts			-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)				

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)

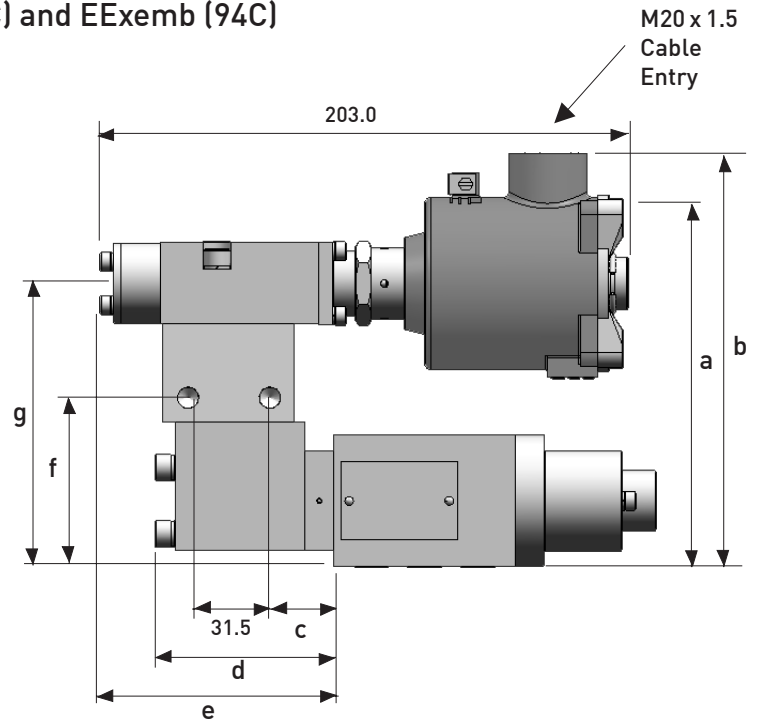
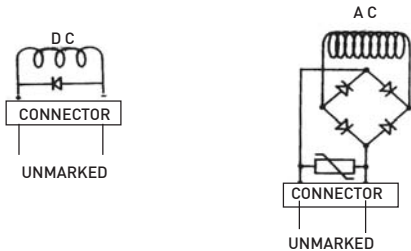
Interface Unit Manufacturer & Model Number	Apparatus Code	Solenoid Base model no.	Interface Unit Typical Input Characteristics			Typical Output Characteristics Measured At Solenoid					
			Voltage (V)	Current (mA)	Power (W)	Voltage (V)	Current (mA)	Power (W)			
MTL 779+	EExia IIB	24VDC/98C	28	85.9	2.41	13.48	85.9	1.16			
		&	24	73.7	1.77				11.57	73.7	0.85
		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	11.45	76.0	0.87			
		24VDC/A98C	21.0	83.4	1.75	10.00	66.3	0.66			
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	12.18	80.0	0.97			
		24VDC/A98C	20.0	149.6	2.99	12.08	79.3	0.96			

* 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)

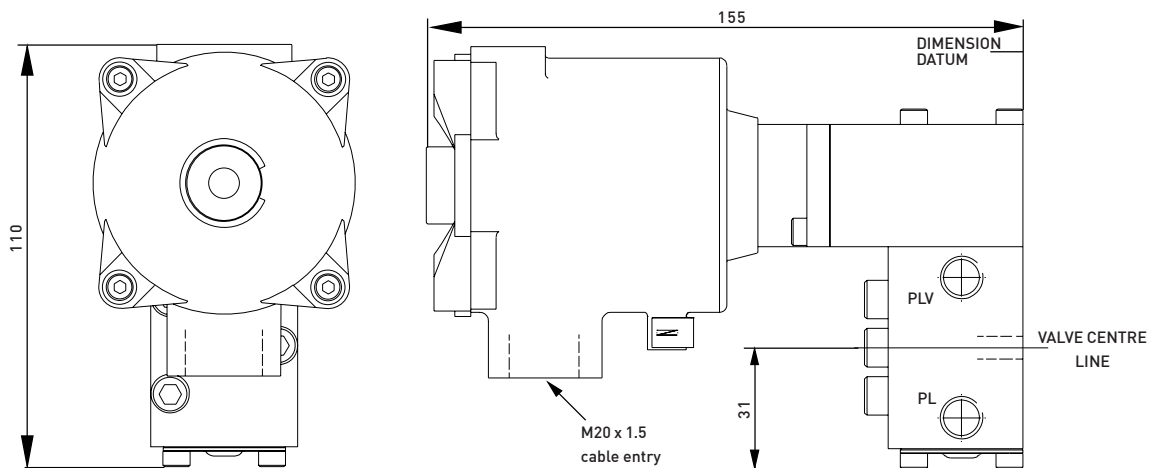
	FP50			FP100/200		
	Gas Group					
	IIA	IIB	IIC	IIA	IIB	IIC
a	138	144.4	157	148	167	176.3
b	154	160.4	173	164	183	192.3
c	24.5	24.5	24.5	27.5	27.5	27.5
d	68.6	68.6	68.6	74.1	74.1	74.1
e	89.8	89.8	89.8	92.8	92.8	92.8
f	65.1	65.1	65.1	78.8	78.8	78.8
g	104	110.4	123	114	133	142.3



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

Low Pressure Pilot Stage Solenoid Valve Operators

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



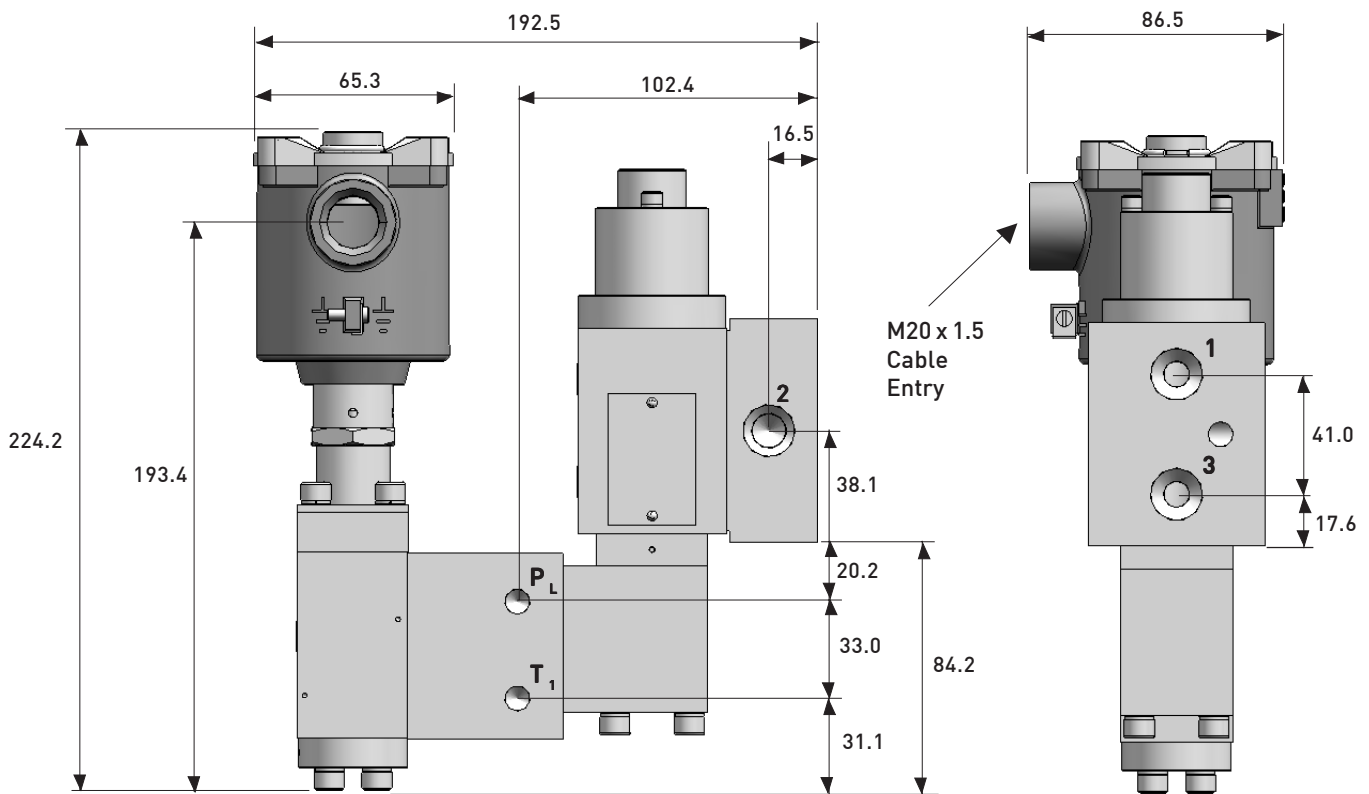
CONNECTIONS:

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)

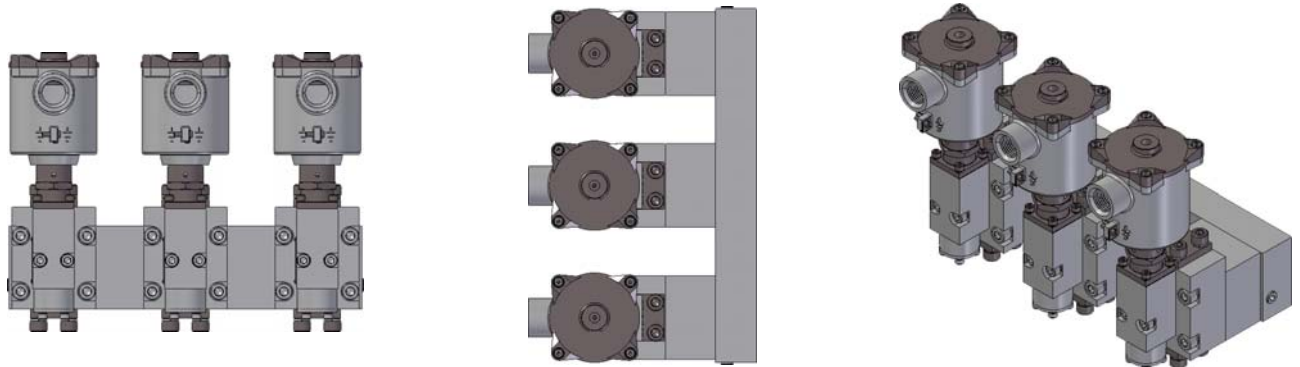


Example code :- FP50/SH1/M/32/S-24VDC/97DA9

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

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



CONTENTS

• TECHNICAL SPECIFICATIONS	2
• SELECTION CHART	3
• SOLENOID OPTION SELECTION TABLES	4
• INTRINSICALLY SAFE SOLENOID DRIVERS	4
• DIMENSIONAL DRAWINGS	5 - 6
• FLOW PERFORMANCE GRAPHS	7 - 8
• OPERATING LIMITATIONS	8 - 9

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

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

Standard Test Fluid: Marston Bentley HW540.

SOLENOID OPTIONS

HIGH 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			
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 or T100 or T135	3 Watts			-20°C to +40°C (T6) (std) -60°C to +40°C (T6)				
97F		1.5 Watts			-20°C to +55°C (T5) -60°C to +55°C (T5)				
97G		1.0 Watt			-20°C to +90°C (T4) -60°C to +90°C (T4)				
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)						

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)					
87D		5.7 Watts			-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) -60°C to +90°C (T4)				
	Class II Div1 Gp E,F,G					-20°C to +60°C				
92A					NEMA 4, 4X	1/2" NPT	316 stainless steel Nickel plated steel enc.			

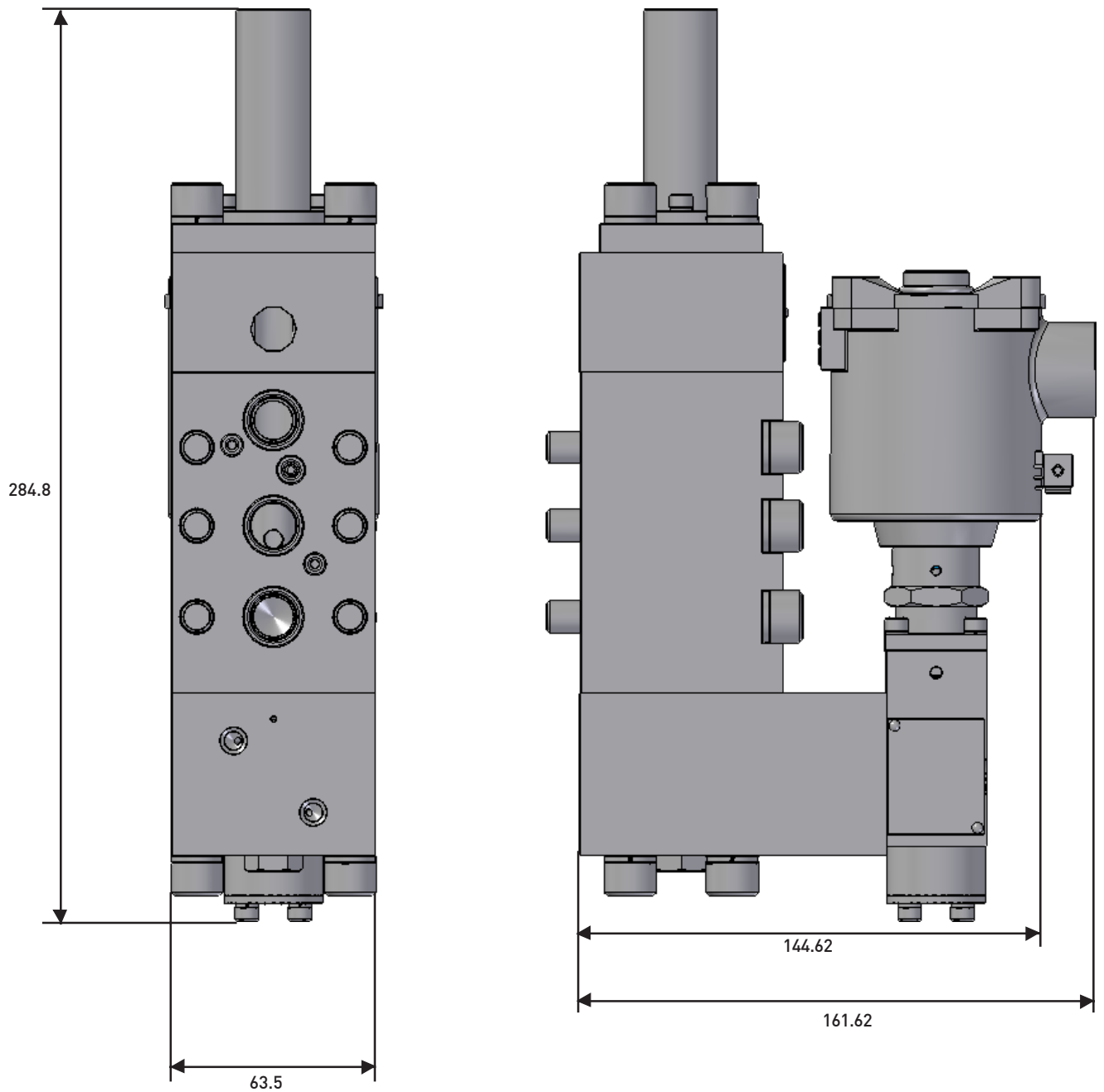
INTRINSICALLY SAFE SOLENOID DRIVERS * (solenoid type 98C)

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.



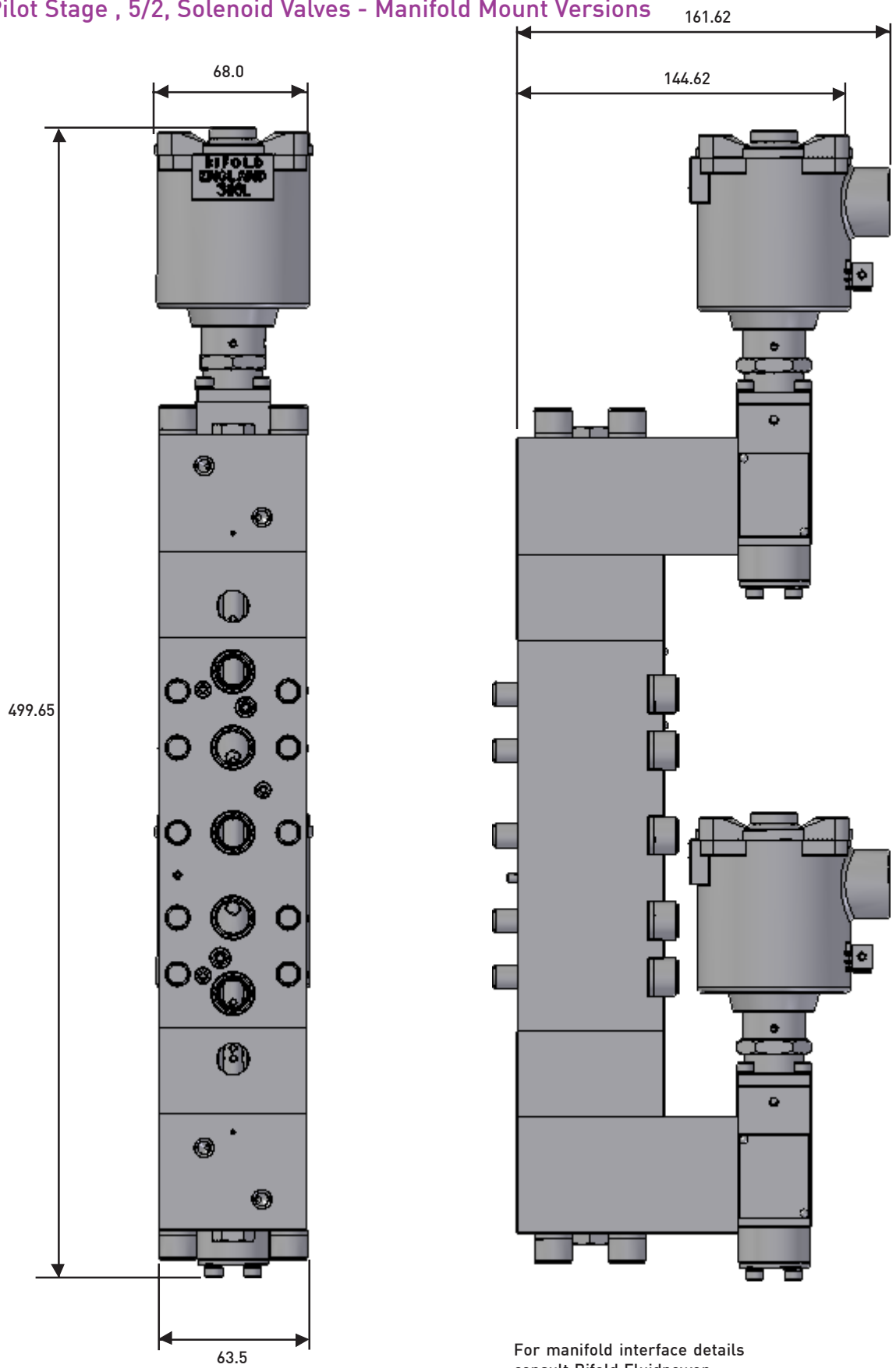
High Pressure Pilot Stage , 3/2, Solenoid Valves - Manifold Mount Versions



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

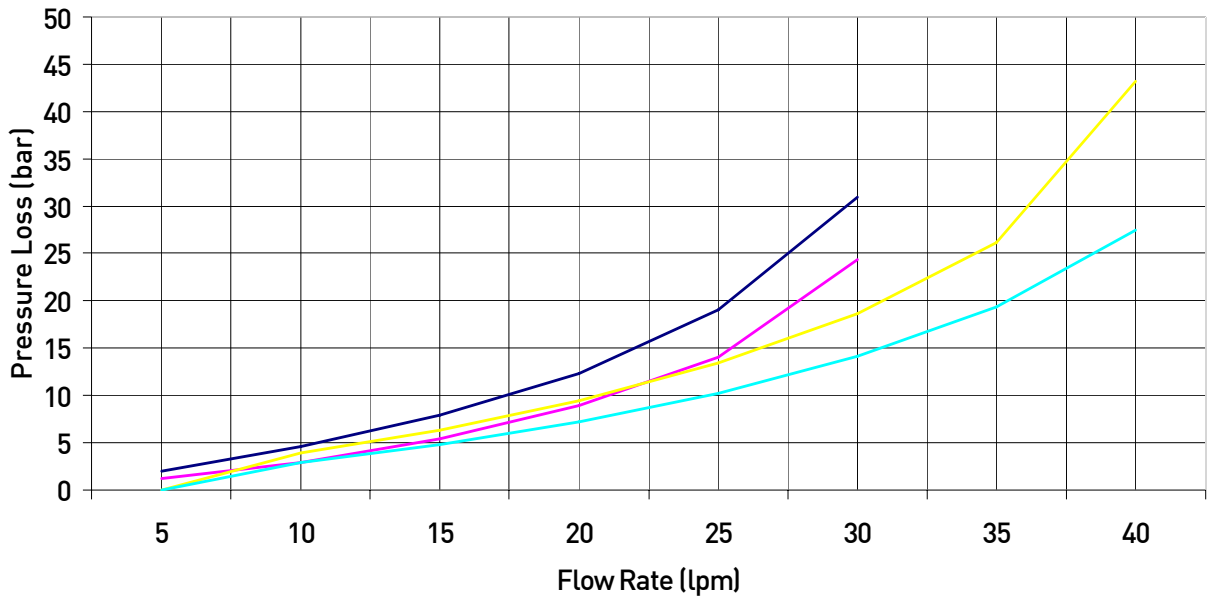


For manifold interface details
consult Bifold Fluidpower

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

TEST FLUID
MINERAL OIL @ 30 cST

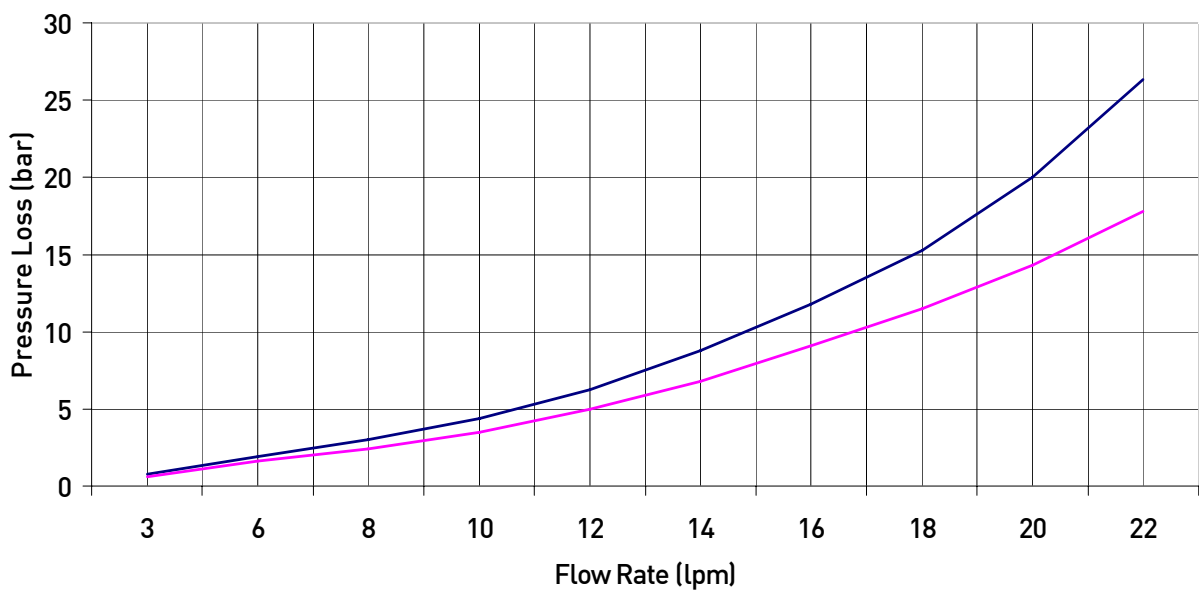
Flow Performance 80xx,8008 Slide Valves



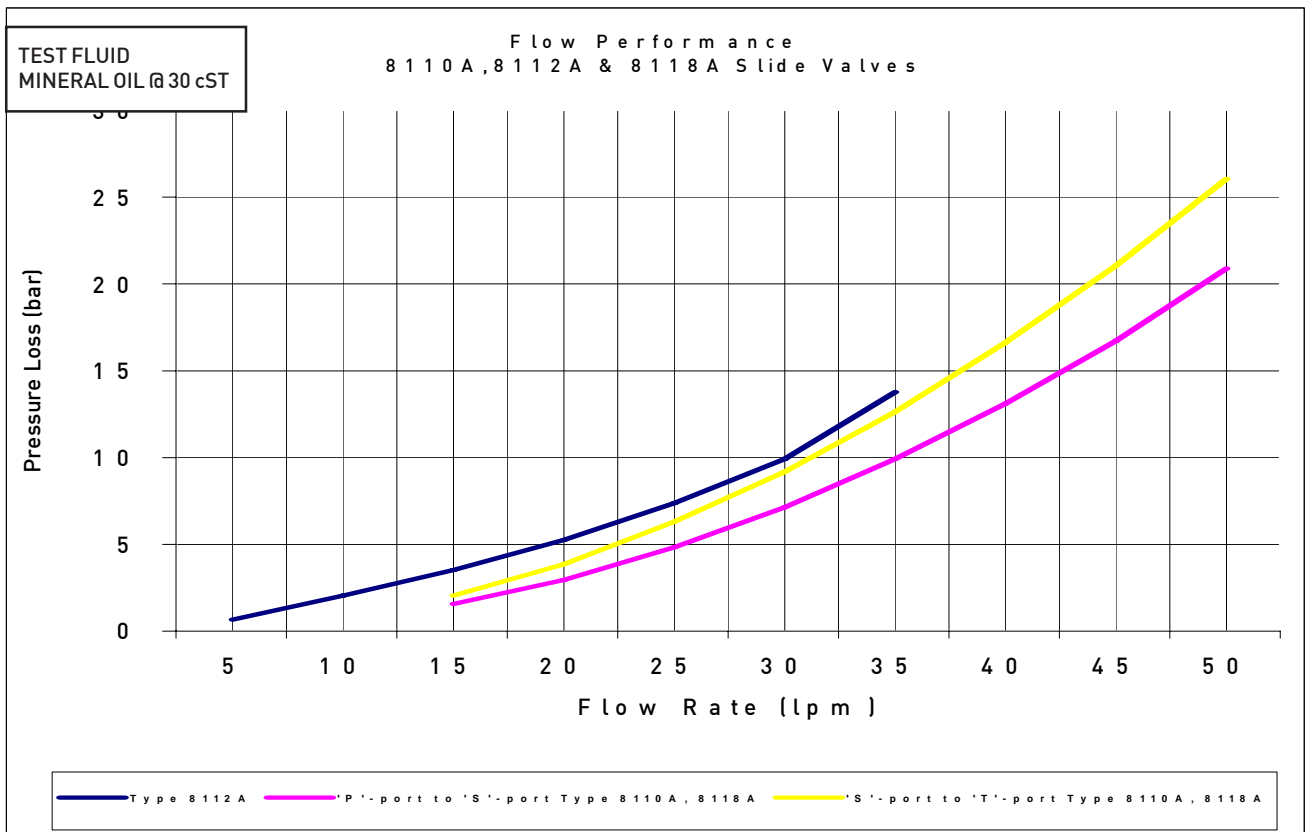
— 'S'-port to 'T'-port Type 80xx — 'P'-port to 'S'-port Type 80xx — 'S'-port to 'T'-port Type 8008 — 'P'-port to 'S'-port Type 8008

TEST FLUID
MINERAL OIL @ 30 cST

Flow Performance 51xx Slide Valves



— 'S'-port to 'T'-port — 'P'-port to 'S'-port



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.

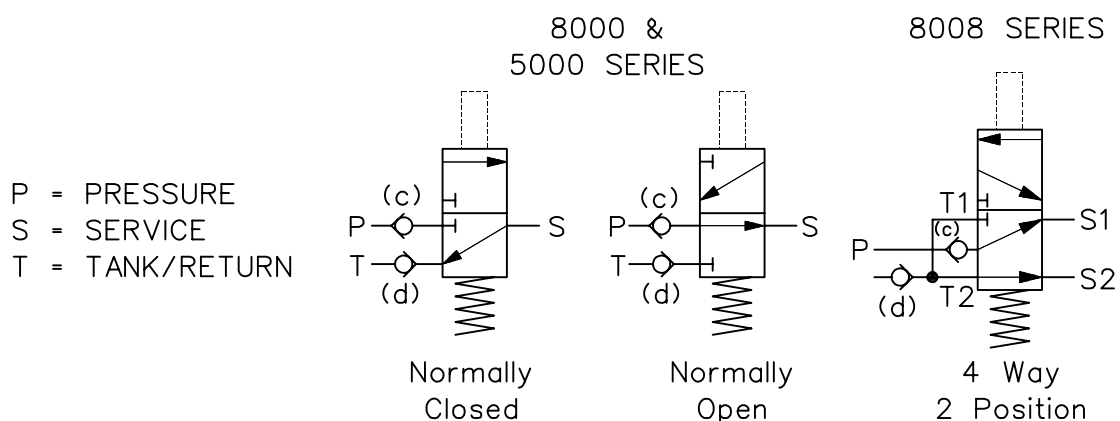
Seal failure will occur if the following operating conditions are introduced into the hydraulic system.

- 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.

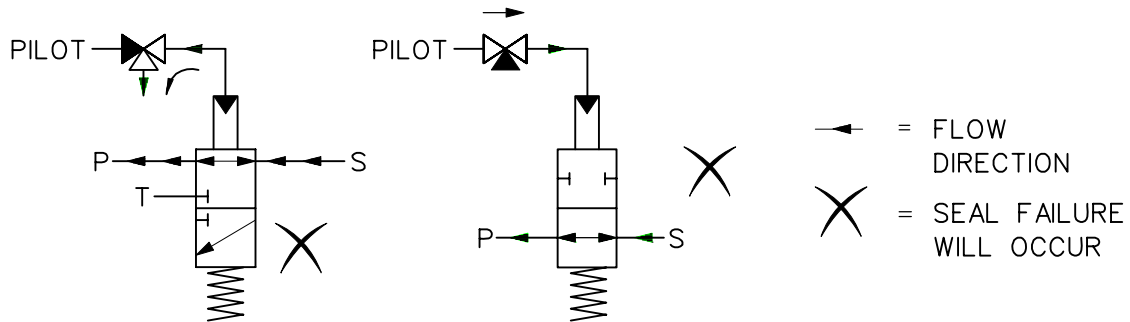
If conditions (c) and (d) can arise during normal operation we recommend the following action is taken.

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.

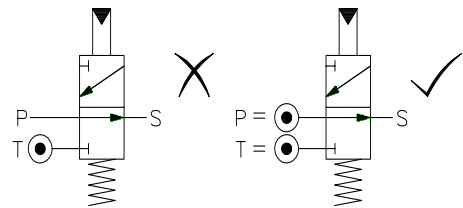


TESTING

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.

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 conditionseals:-

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.

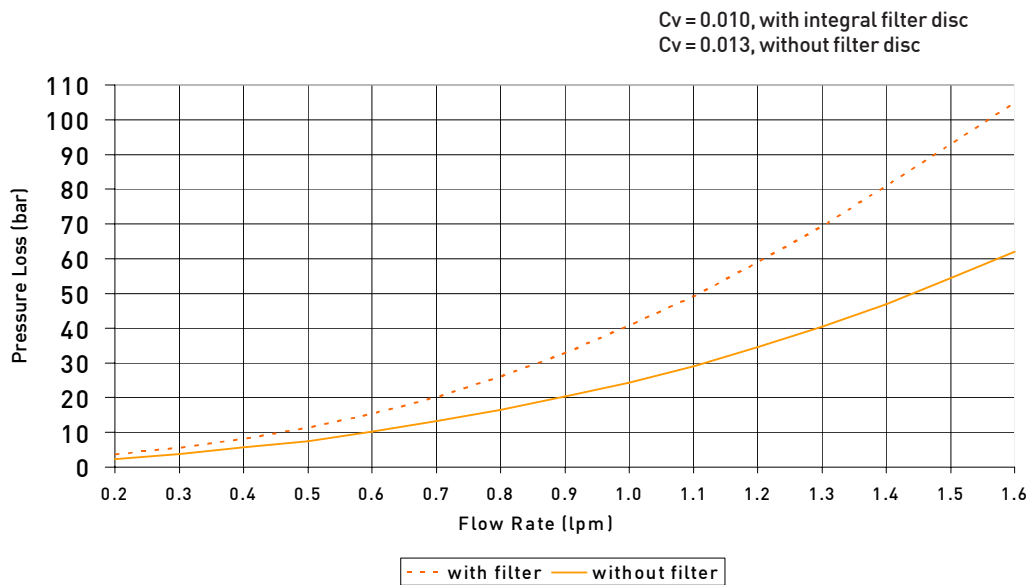
WORKING DEPTH:

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

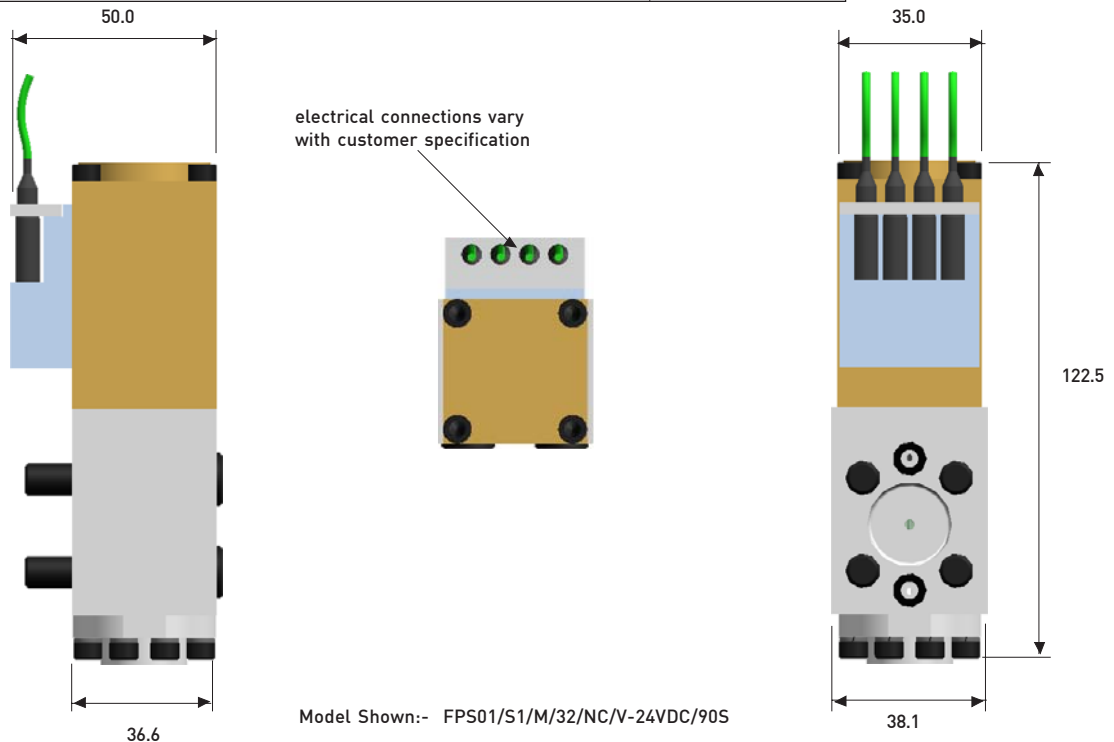
FPS01			Model Code
S1 S2 S3		345bar 518bar 690bar	Maximum Valve Pressure
M M2	Interface for mainstage valves type FPS10 To suit subbase M411/02 (1/4" NPT)	Subbase Mounting	Connections
32	3 - way, 2 - position		Configuration
NC NO	Normally Closed Normally Open		
S V	Nitrile (standard) [-30°C to +130°C]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



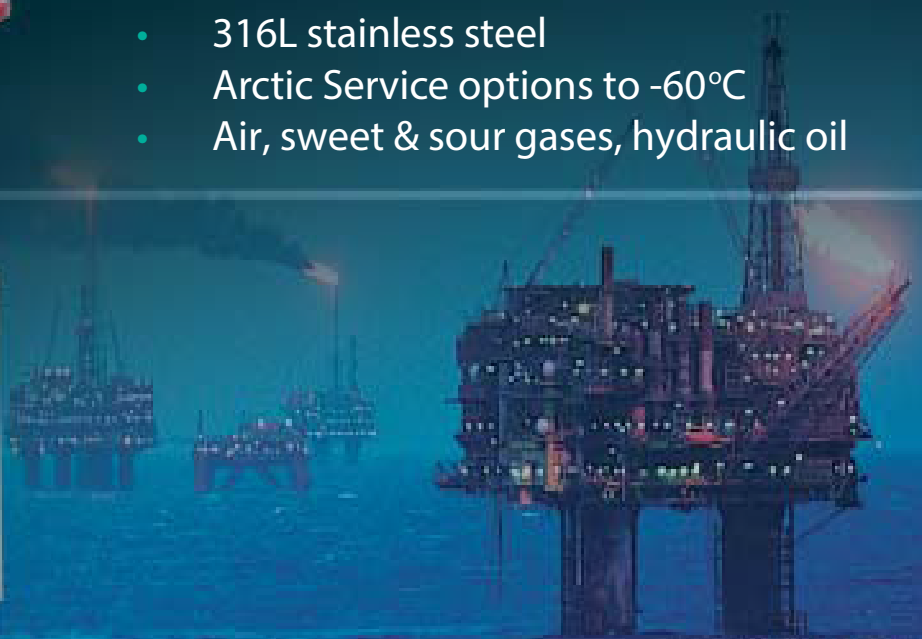
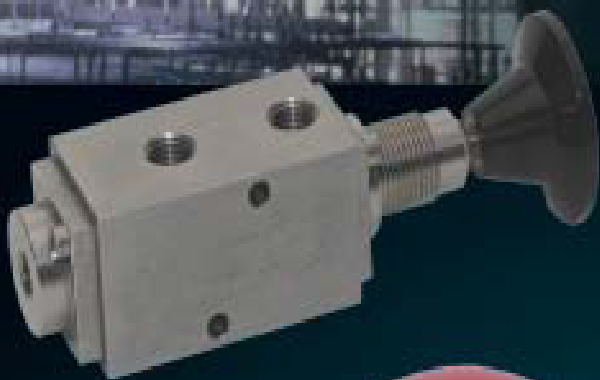
Pilot & Mechanical Valve Model Domino Junior

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

OPERATING MEDIA

• Air, sweet and sour gas, hydraulic oil

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

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)

SEAL REPAIR KITS

example codes:-

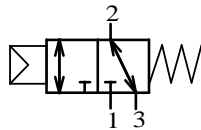
- SRKSJE06-P1/00-VITON
- SRKSJE06-P9-VITON
- SRKSJE06-M1-VITON

TEMPERATURE RANGE:

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

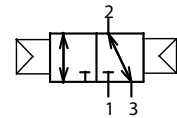
LOGIC VALVES - PREFERRED MODEL LIST

PILOT VALVES:



SJE06-P1-32-NU-00

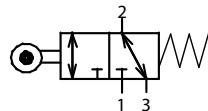
1/4" NPT, Pilot operated, 3 way 2 position, normally universal, (2/2 and 3/2 normally closed operation) spring return, C.v. 0.7, 10 bar (BBB)



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)

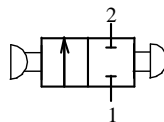
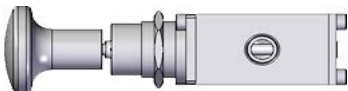
MECHANICAL VALVES:



SJE06-M12-32-NU-00

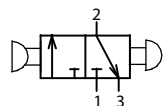
1/4" NPT, Cam operated, 3 way 2 position, normally universal, spring return, C.v. 0.7, 10 bar (BBB)

PANIC VALVES:



SJJE06-2-PV

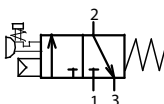
1/4" NPT, 2 way 2 position, push button to block, pull button to bleed, C.v. 0.7 10 bar (BBB)



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)



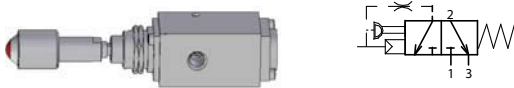
SJJ06-P9-32-NC-M16-K54-K27C

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)



SJJE06-P9-32-NC-M16-K54

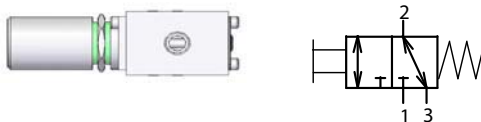
1/4" NPT, Pull button or energise pilot and pull button to operate, mechanical latch, normally closed, spring return, preliminary latch pin, C.v. 0.7, 10 bar (BAB)



SJJE06-P9X-32-NC-M15-K54-K27P

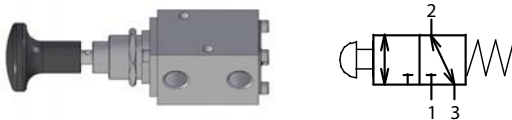
1/4" NPT, Pull button to energise air latch pilot, normally closed, spring return, with eyeball indicator from pilot with restricted feed to port 2 in energised state (green on, red off) C.v. 0.7, 10 bar (BAB)

RESET VALVES:



SJJE06-M2-32-NU-00

1/4" NPT, shrouded push button, normally universal, spring return, C.v. 0.7, 10 bar



SJJE06-M2-32-NU-00-K10

1/4" NPT, push button, normally universal, spring return, C.v. 0.78, 10 bar



SJJE06-M14-32-NU-04

1/4" NPT, push/pull button, normally universal, detented, C.v. 0.7, 10 bar

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, SJE06 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 - HSJJ or AHSJJ only		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 - M9 & M14 only detented action end cap - M9 & M14 only		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 - M15 / M16 only red plastic button block after bleed (std for M15/M16 and HSJ/AHSJ series) proximity switch (consult Bifold Fluidpower Ltd)		Options
SJJE06 - P9 - 32 - NC - M16 - K54			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. SJJE06, SJE06 etc. This is applicable to all options except for when using K27 and 5 way 2 position which will remain as SJJ06 etc.

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.

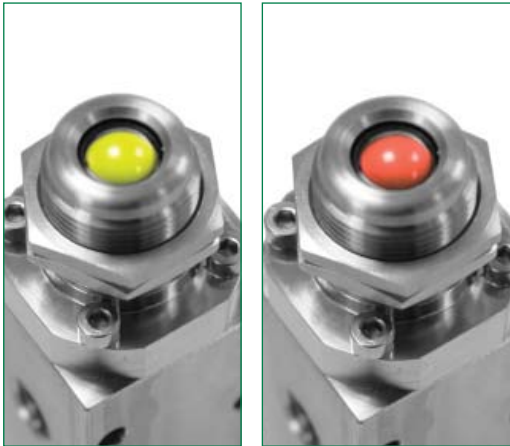
First Out / Visual Indicator Valve

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.

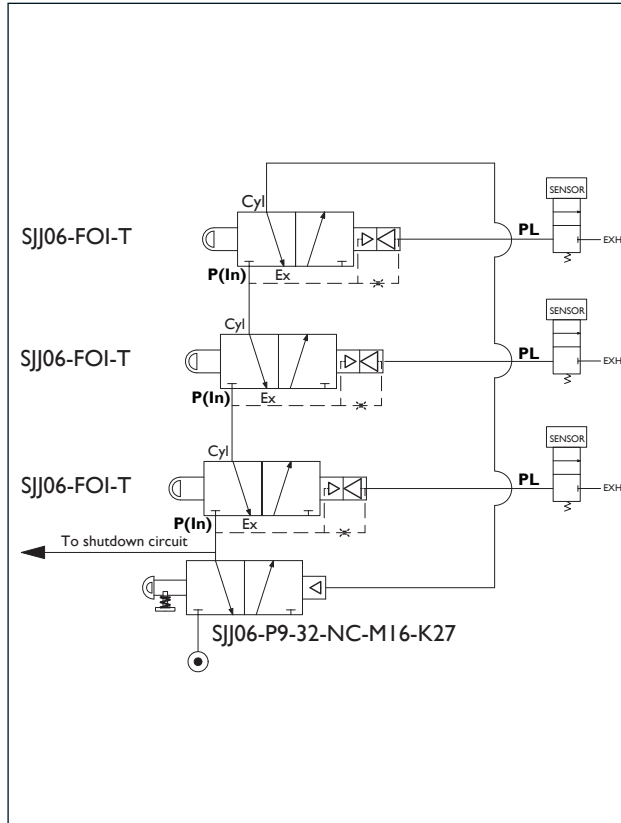
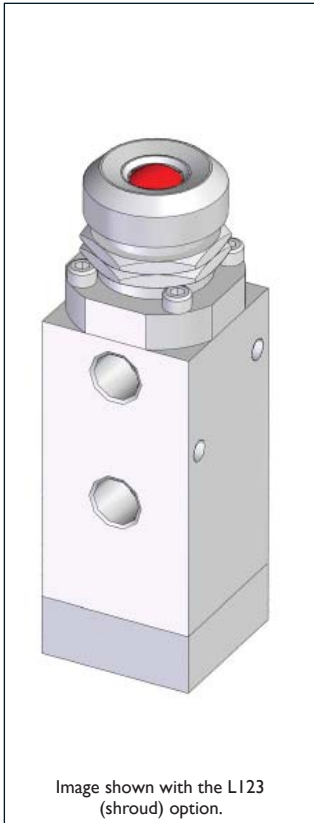
Safety and Environmental Benefits

- 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.



Overview

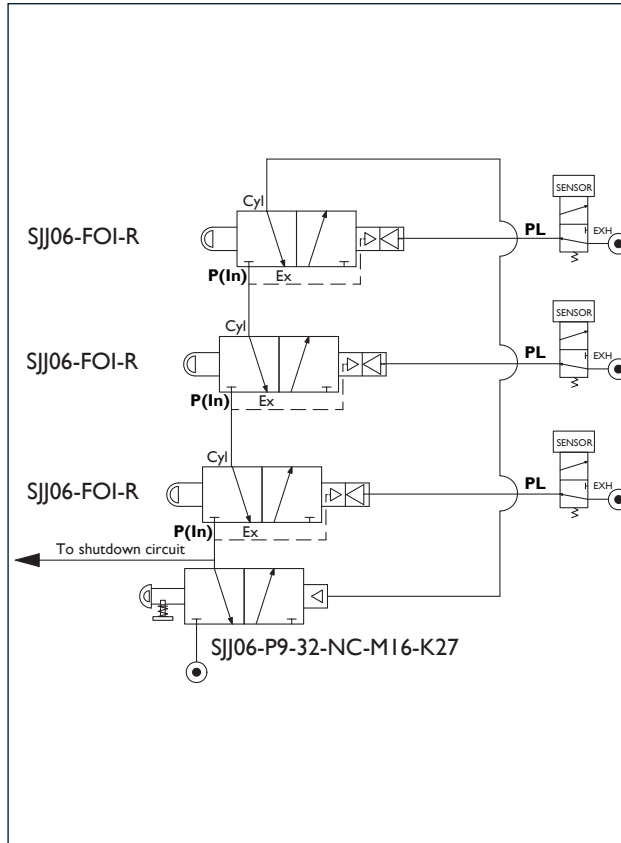
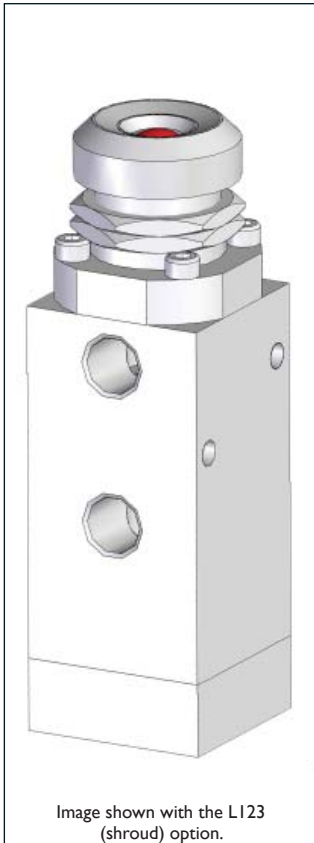
"T" Transmitting Type



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



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

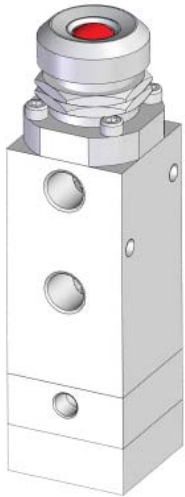
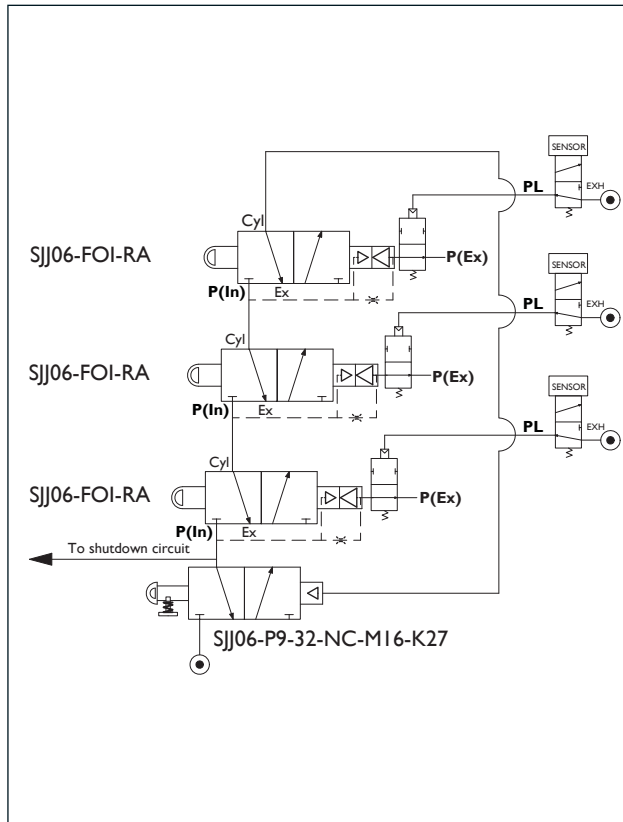


Image shown with the L123 (shroud) option.



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 exhaust **P(Ex)**.

"RB" Receiving Type

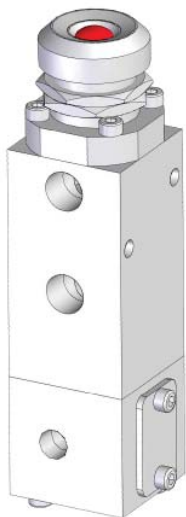
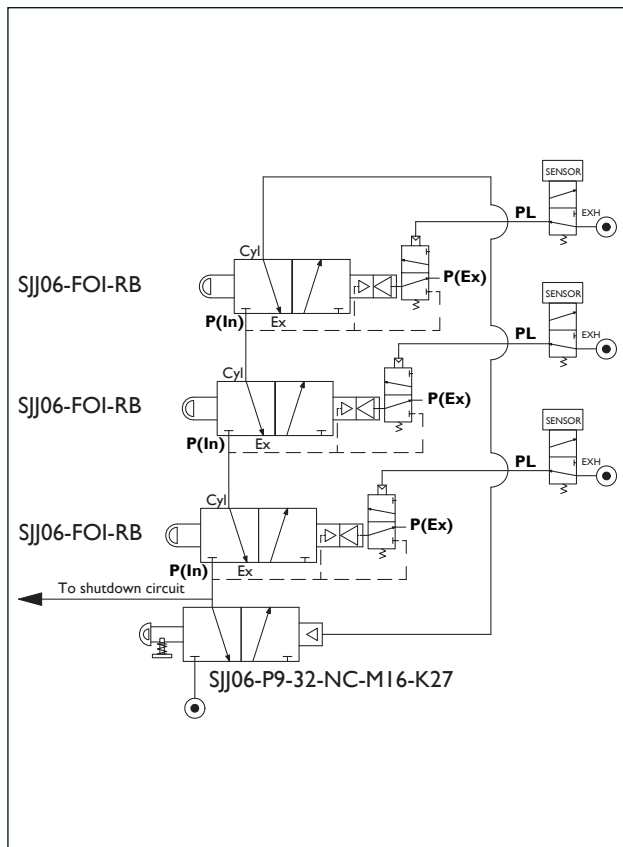


Image shown with the L123 (shroud) option.




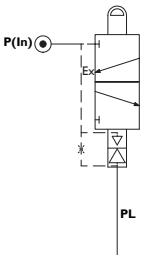

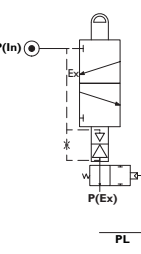

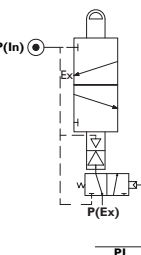
SJJ06-FOI-RB ("RB" Receiving Type)

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.

Preferred Range

FIRST OUT INDICATOR PILOT VALVES - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>SJJ06 Pilot Valve First Out Indicator "T" Transmitting Type</p>		6	SJJ06-FOI-T-L97	<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>SJJ06 Pilot Valve First Out Indicator "RA" Receiving Type</p>		6	SJJ06-FOI-RA-L97	<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>SJJ06 Pilot Valve First Out Indicator "RB" Receiving Type</p>		6	SJJ06-FOI-RB-L97	<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

SJJ	Standard	Model Code
06	1/4" NPT	Port Size
FOI	Pneumatic Pilot Valve	First Out / Visual Indicator
T	Transmitting Type	Transmitting & Receiving Types
R	Receiving Type	
RA	Receiving Type	
RB	Receiving Type	
L97	M25 x 1.5p Panel Mount Cap	Panel Mount Cap
K6	BSPP	Option
L123	Shroud	Option

SJJ 06 - FOI - R - L97 - K6 - L123

Ordering Example

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.

EXAMPLE CODE:

S09-P9-32-NC-M15

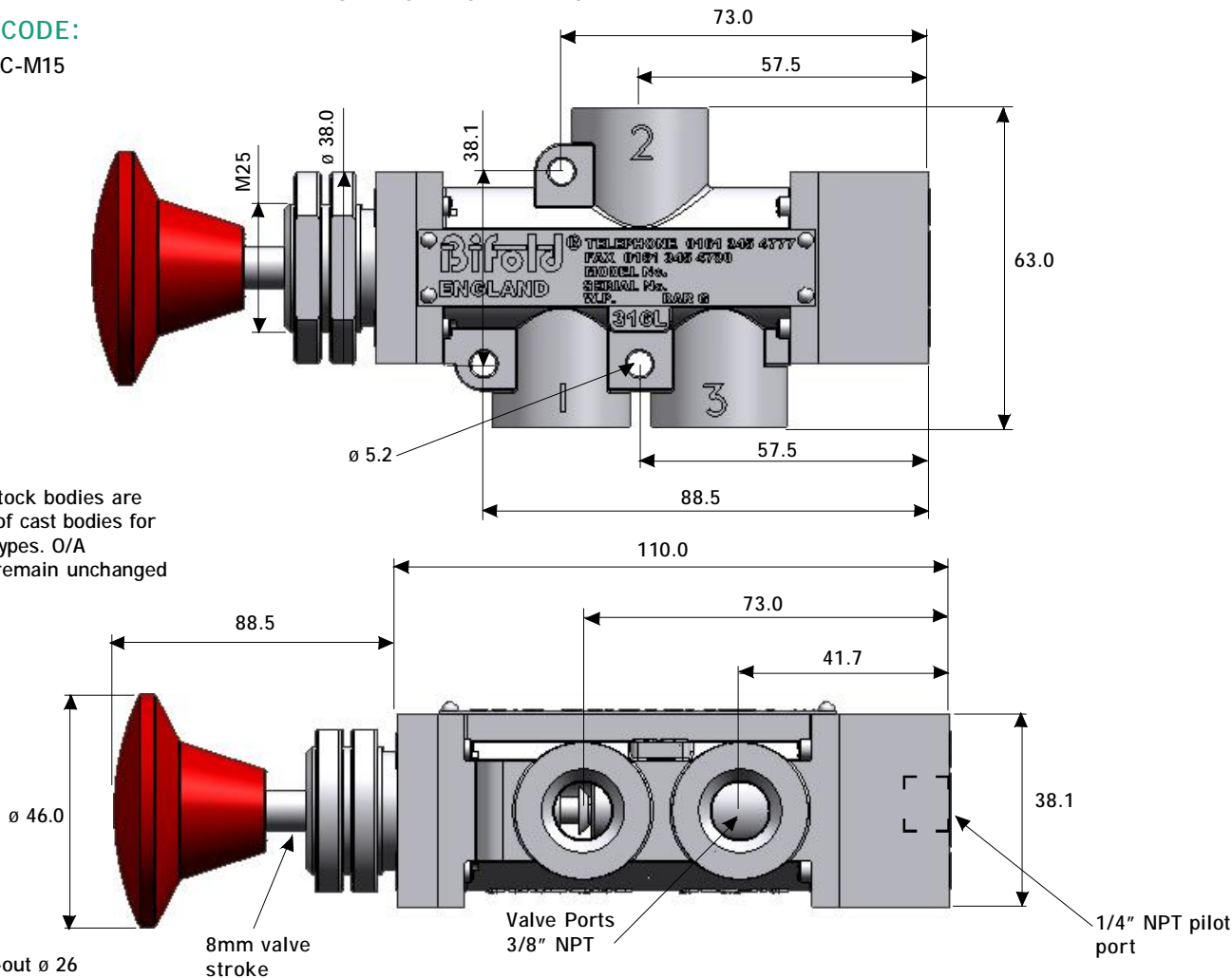
MECHANICAL CONSTRUCTION

- 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)

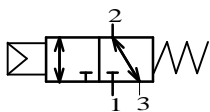
SEAL REPAIR KITS

example codes:-

- SRKDOMINO-P1/00-VITON
- SRKDOMINO-P9-VITON
- SRKDOMINO-M1-VITON

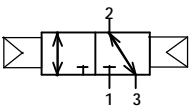


PREFERRED RANGE



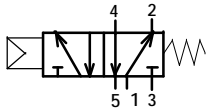
S06-P1-32-NC-00

1/4" NPT, pilot operated, 3 way 2 position, normally closed, spring return, C.v. 1.2, 12 bar max



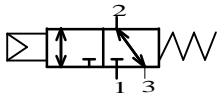
S06-P1-32-NC-P1

1/4" NPT, pilot operated, 3 way 2 position, normally closed, pilot return, C.v. 1.2, 12 bar max



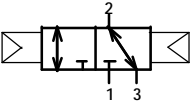
S06-P1-52-XX-00

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

A photograph of an industrial facility, possibly a refinery or chemical plant, at night. The scene is illuminated by various lights, creating a complex network of structures and pipes. The overall color palette is dark with highlights of white and yellow light.


High Flow Valves

Models SPR & PPV

Upto 10 bar Operating Pressure

Superior performance
throughout the
full operational range

Features:

- Cv up to 70
 - 316L stainless steel
 - 1/2" NPT, 3/4" NPT & 1" NPT
 - SIL 3 rated PPV Range
 - Multiple Exhaust Options
- 
- A photograph of an offshore oil rig at night. The rig is illuminated by its own lights, creating a stark contrast against the dark sea and sky. The rig's structure is complex, with many levels and platforms. The overall color palette is dark with highlights of white and yellow light.

INTRODUCTION

Bifold Fluidpower's SPR series spool type valves are positively sealed, for low pressure applications up to 10 bar (145 psi). Primarily designed for handling the high flow demands of large swept volume and/or fast acting valve actuators controlling pipeline ESD, process plant, or similar valve applications, these afford a compact, light weight product with exceptional installation versatility.

For systems where the actuator opening times are not critical and a small bore / OD tubing is used for the pressure supply, a smaller port block can be used for the pressure line connection. This eliminates the need for costly reducer fittings. The direction of the supply and vent tubing is also optional by the selection & orientation of direct entry or side entry port blocks.

SPR Valves can be configured as 5/3, 5/2, 3/2 or 2/2, normally closed, normally open or normally universal. Users should note that the pilot operating pressures are higher for normally open configured valves.

Manufactured from 316L grade stainless steel 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. Low temperature elastomer seals are also available for arctic service applications.

TECHNICAL INFORMATION

OPERATING MEDIA

- Air and sweet or sour gas

OPERATING PRESSURE

- 0 - 10 bar standard (145 psi)
- 3.0 bar - Minimum Pilot Pressure - Normally Closed
- 5.0 bar - Minimum Pilot Pressure - Normally Universal / Open

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:- See selection chart opposite

FLOW PERFORMANCE (CV)

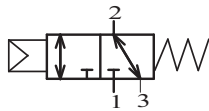
- 1/2" 3.1
- 3/4" 9.0
- 1" 11.1

* Maximum flow achievable using optimum porting blocks configuration

TEMPERATURE RANGE:

- 20°C to +80°C (standard)
- 40°C to +60°C (arctic service option)

PREFERRED RANGE

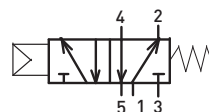
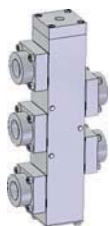


SPR12-P1-32-NC-00-02

1/2" NPT, pilot operated, 3 way 2 position, normally closed, spring return, C.v. 3.1, 10 bar

SPR25-P1-32-NC-00-02

1" NPT, pilot operated, 3 way 2 position, normally closed, spring return, C.v. 11.2, 10 bar



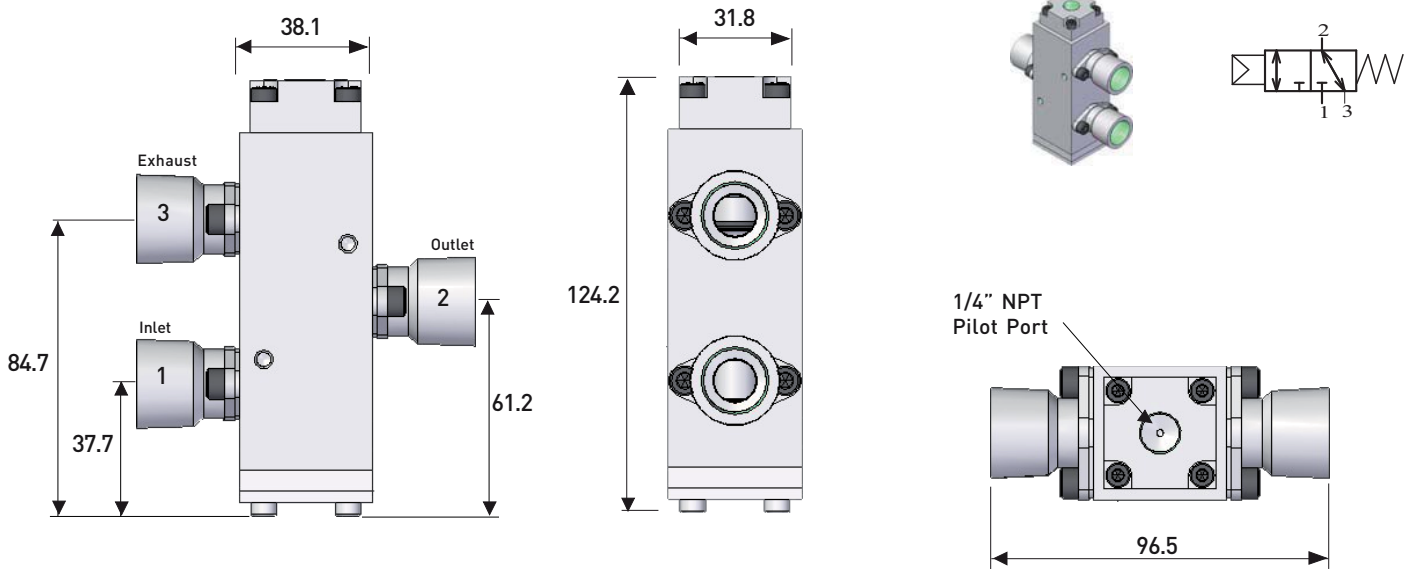
SPR12-P1-52-XX-00-02

1/2" NPT, pilot operated, 5 way 2 position, spring return, C.v. 3.1, 10 bar

SPR25-P1-52-XX-00-02

1" NPT, pilot operated, 5 way 2 position, spring return, C.v. 11.2, 10 bar

Example Unit:- SPR12-P1-32-NU-00-02



SELECTION CHART

SPR ASPR	Stainless Steel Poppet Valve Arctic Service Stainless Steel Poppet Valve	Model Code
12	1/2" NPT	Inlet Size
19	3/4" NPT	
25	1" NPT	
P1	Pilot Operator	Air Pilot Primary Actuator
P9	Air Latch Pilot Operator	
M1	Push button	Hand / Mechanical Primary Actuator
M6	Lever operated	
M9	Push pull (padlockable)	
M14	Push / pull panel mount	
22	2-way, 2-position	Configuration
32	3-way, 2-position	
52	5-way, 2-position	
53	5-way, 3-position <i>(Only available with pilot return)</i>	
NC	Normally closed - 2/2 and 3/2 only	Configuration
NO	Normally open - 2/2 and 3/2 only	
NU	Normally universal	
XX	- 5/2 only	
YY	- 5/3 only	
00	Spring return	Return Device - Secondary Actuator
04	Detent - M6, M9 & M14 only	
04/2	Detent with plunger - M6, M9 & M14 only	
P1	Pilot return	Air Pilot - Secondary Actuator
M15	Pull button spring return with panel mount	Hand / Mechanical - Secondary Actuator
M16	Pull button spring return preliminary latch with panel mount	
K4	Valve exhaust bug vent	Options
K6	BSPB ported option	
XX	Revision Number	
SPR 12 - P1 - 32 - NC - 00 - 02		Ordering Example

PPV Range

Bifold Fluidpower's PPV series poppet valves are positively sealed, for low pressure applications up to 10 bar (145 psi). This range of SIL 3 rated 1 1/2" and 2" valves offers the highest flow available in the market and satisfies the demands of exceedingly large swept volume and/or fast acting valve actuators controlling pipeline ESD, process plant, or similar valve applications. PPV Valves are available as 1, 2 or 3 port exhaust units offering exceptional versatility and flow.

Manufactured from 316L grade stainless steel 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. Low temperature elastomer seals are also available for arctic service applications.

TECHNICAL INFORMATION

OPERATING MEDIA

- Air and sweet or sour gas

OPERATING PRESSURE

- 0 - 10 bar standard (145 psi)
- 2 bar - Minimum Pilot Pressure

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:- See selection chart below

FLOW PERFORMANCE

- 1 1/2" tba
- 2" 70.0
- * Maximum flow achievable using optimum porting blocks configuration

TEMPERATURE RANGE:

- 20°C to +178°C (standard)
- 60°C to +60°C (arctic service option)

Please note that following test results were obtained from testing with a hydraulic damper present on the actuator

Large actuator - 580L - with hydraulic damping
P1 = 6 bar

Indoors - T amb. 19 degC

1 Valve

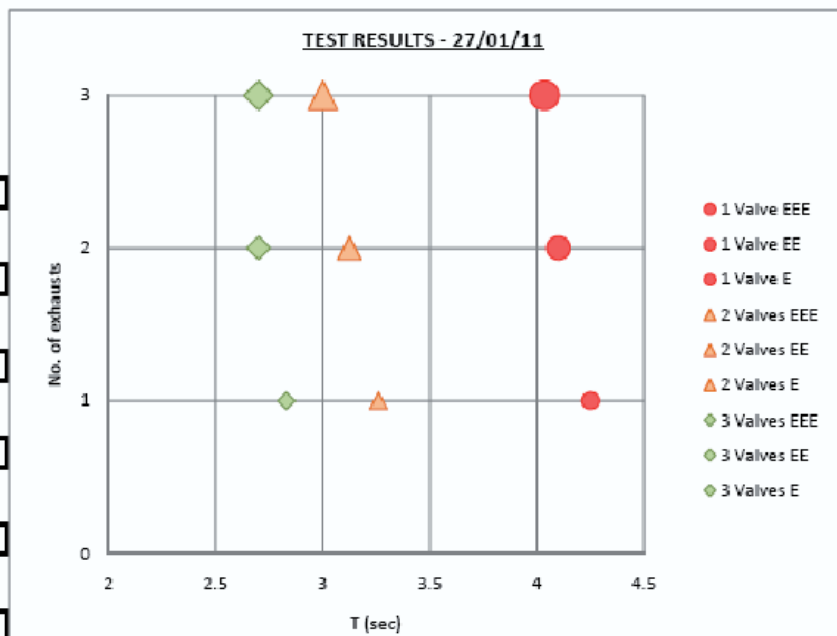
	EEE	EE	E
T1	4	4.1	4.3
T2	4.07	4.1	4.2
T _{avg}	4.035	4.1	4.25

2 Valves

	EEE	EE	E
T1	3	3.1	3.27
T2	3	3.15	3.25
T _{avg}	3	3.125	3.26

3 Valves

	EEE	EE	E
T1	2.7	2.7	2.83
T2	2.7	2.7	2.83
T _{avg}	2.7	2.7	2.83



CYCLES

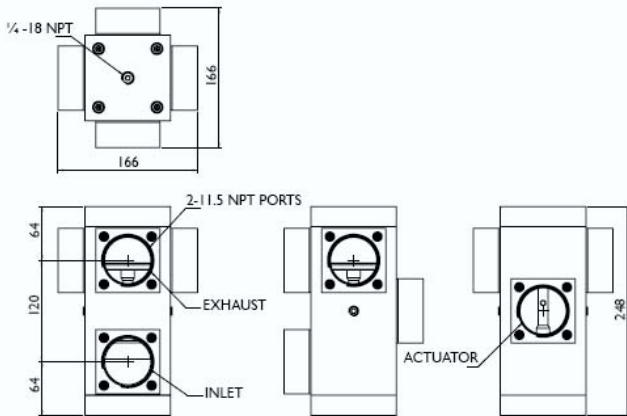
1 Valve with 'EEE' config was subjected to cycle testing. (Perceived as the most arduous setup)

For installation reasons this was the valve which recirculated it's exhaust back to the spring cavity

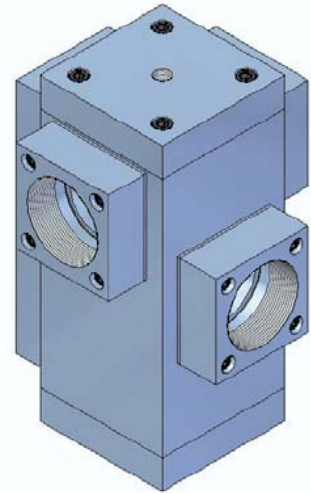
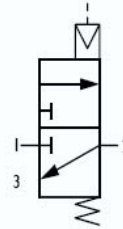
It underwent 10 cycles, the following times were recorded.

4	4.1	4.1	4.1
4.07	4.1	4.1	
4.07	4.1	4.1	

Dimensional Drawings



SCHMATIC 3/2 NC



3 Exhaust Port Model

PPV Selection Chart - Ordering Example

PPV		Model Code
24	1 1/2" NPT	Connections
32	2" NPT	
02	Stainless Steel 316L Mounting Block	Material
53	Aluminium Mounting Block	
22	2 - way, 2 - position	Valve Configuration
32	3 - way, 2 - position	
	Divertor Selector Configurations Available	
NO	Normally Open	Valve Configuration
NC	Normally Closed	
NU	Normally Universal (K54 Only)*	
00	Voltage 24 & 48 Vdc	Voltage
PI	(K54 Only)*	
E	Single Exhaust	Exhaust Options
EE	Double Exhaust	
EEE	Triple Exhaust	
V	Viton (Standard)	O-ring material
AL	Fluorosilicone	
K54	Block After Bleed (BAB)	Options
XX		Revision Number
PPV - 32 - 02 - 32 - NC - 00 - EEE - V - K54 - XX		Ordering Example

* K54 = Block After Bleed (BAB)

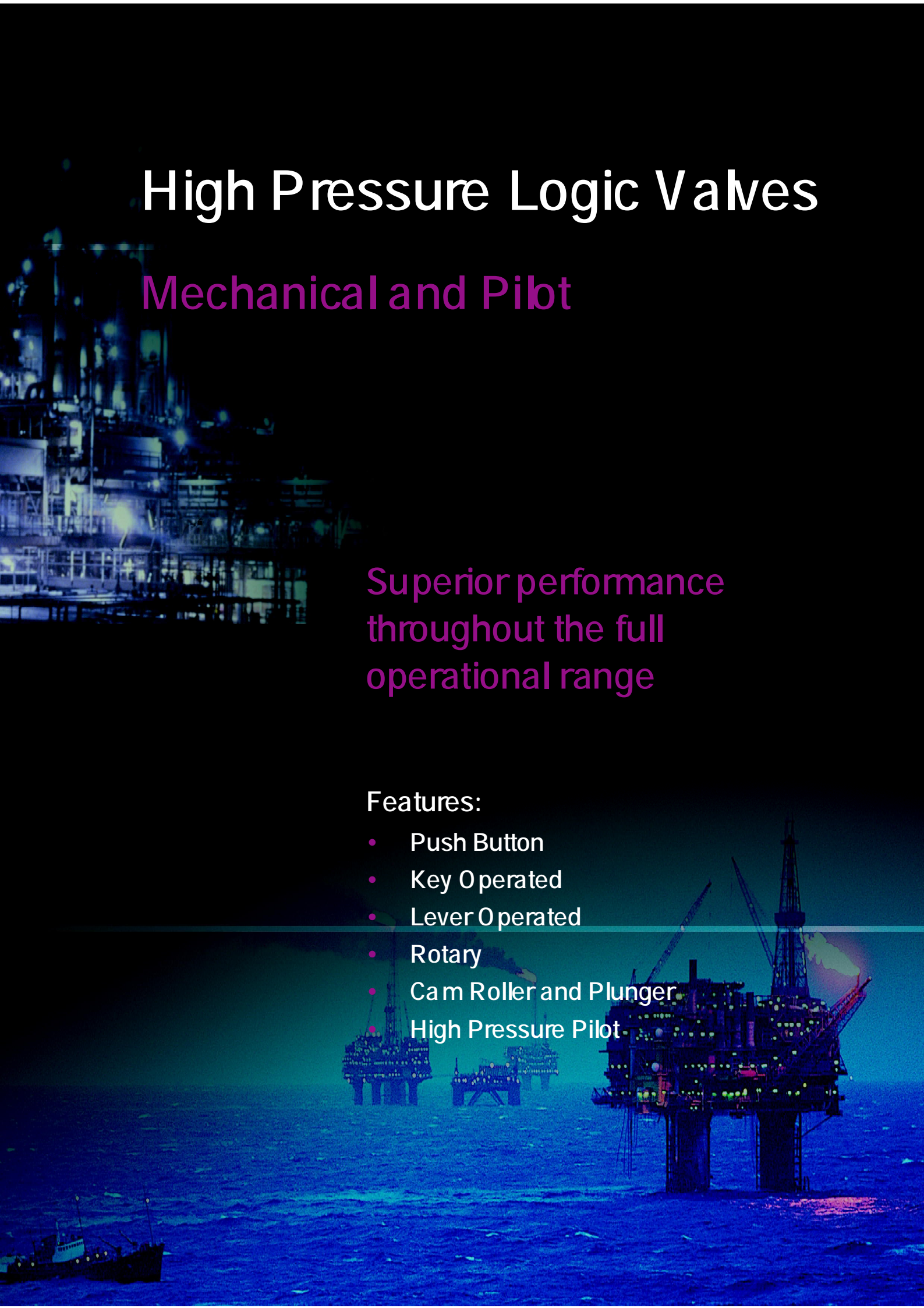
High Pressure Logic Valves

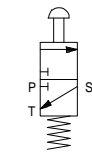
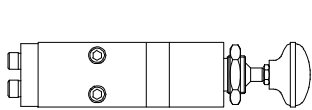
Mechanical and Pilot

Superior performance
throughout the full
operational range

Features:

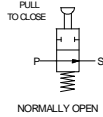
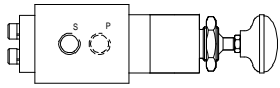
- Push Button
- Key Operated
- Lever Operated
- Rotary
- Cam Roller and Plunger
- High Pressure Pilot





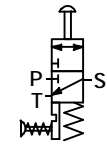
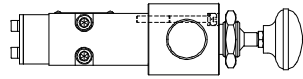
MVP8013/NC/03/S

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.



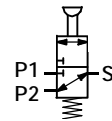
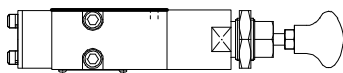
MVP8115/NO/03/S

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.



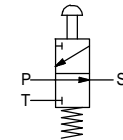
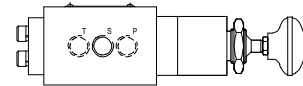
FP01/LPB1/M/32/NC/S

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.



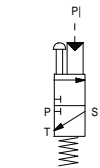
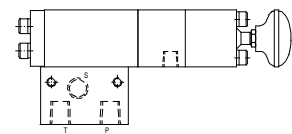
FP01/MV1/M/32/SV/S

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.



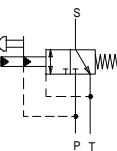
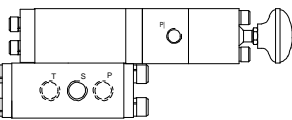
MVP8103/NO/05/S

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.



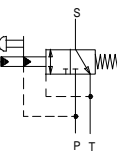
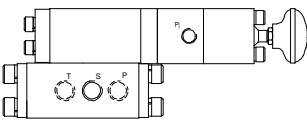
HPMVP8003/NC/05/S

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.



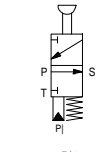
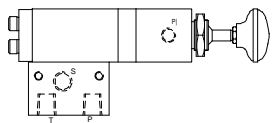
HPMVP8005/104/NC/07/S

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.



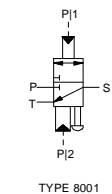
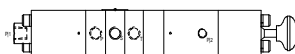
FP15/HPMVH1/04/32/S

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.



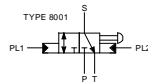
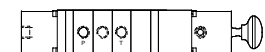
MHPVP8003/NO/05/S

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.

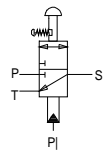
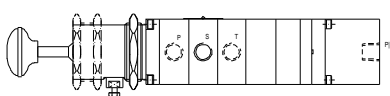


MPBLPV/LPV8001/05/S

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.

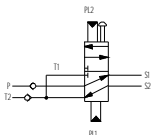
Marshalsea 3111/3115 series M055 option

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.



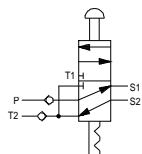
MPB/LPV8401/NC/05/S-PM-ML

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

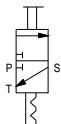
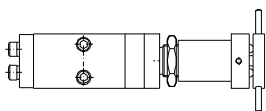
5 way 2 position manual pull/push button double high pressure pilot operated detented, block before bleed hydraulic control valve for uni-directional flow only. 3/8 NPT connections. Rated 345 bar, 23 lpm @ 10 bar DP. Pilot operating pressure range 40 to 345 bar, pilot connections PL1 (1/4") and PL2 (1/8 NPT)



MPBV8008/05/S

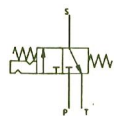
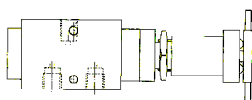
5 way 2 position push/pull detented operated, block before bleed slide type hydraulic control valve. 3/4" connections. Rated 345 bar, upto 23 lpm @ 10 bar DP. Panel mounting available.

HP LOGIC VALVES, Mechanical, Rotary



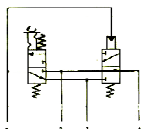
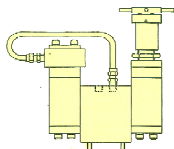
MVRP8005/NC/05/S

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.



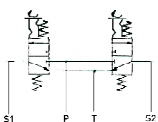
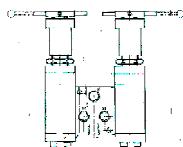
MVRP8103/NC/05/S

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.



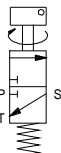
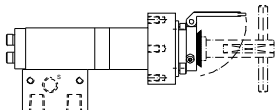
MVRP8033/05/S

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

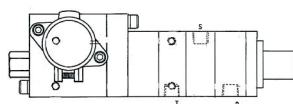
See drawing 14670-02/03

HP LOGIC VALVES, Mechanical, Key Operated



KOVP8005/NC/10/S

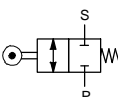
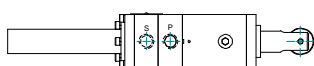
3 way 2 position 90 degree rotary turn, removable key operated, detented, normally closed poppet type hydraulic control valve. Manifold mount, rated 690 bar WP. Flow rate 1 lpm nominal.



KOV8001/NO/05/S

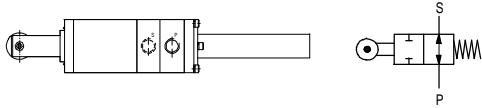
3 way 2 position 90 degree rotary turn, removable key operated, detented, normally closed slide type hydraulic control valve. 1/4" connections, rated 345 bar WP. Flow rate upto 20 lpm @ 10 bar DP.

HP LOGIC VALVES, Mechanical, CAM Roller and Plunger

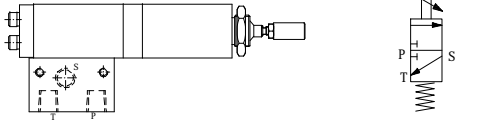


COV(A)8002/NC/05/S-R

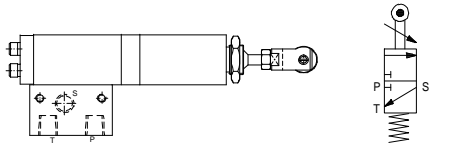
2 way 2 position roller cam operated, spring return, normally closed, slide type hydraulic control valve. 1/4" connections, rated upto 345 bar WP. Flow rate upto 20 lpm @ 10 bar DP



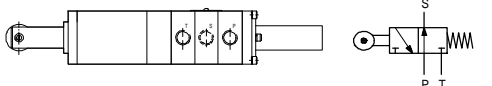
COV8002/NO/05/S-R 2 way 2 position roller cam operated, spring return, normally open, slide type hydraulic control valve. 1/4" connections, rated upto 345 bar WP. Flow rate upto 20 lpm @ 10 bar DP



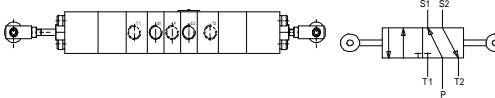
COVP8005/NC/05/S-P M034 3 way 2 position plunger cam operated, spring return, normally closed, poppet type hydraulic control valve. Manifold mount, rated 345 bar WP. Flow rate 1 lpm nominal.



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.

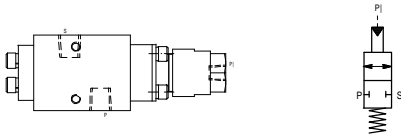


COV(A)8001/NO/05/S-R 3 way 2 position roller cam operated, spring return, normally open, slide type hydraulic control valve. 1/4" connections, rated upto 345 bar WP. Flow rate 20 lpm @ 10 bar DP

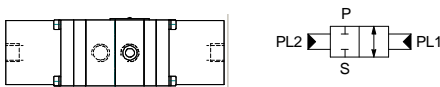


COV(A)/COV(A)8008/05/S/R 5 way 2 position dual roller cam operated slide type hydraulic control valve. 3/8" connections, rated 345 bar WP. Flow rate 23 lpm @ 10 bar DP

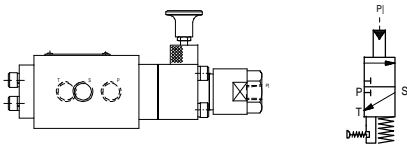
HP LOGIC VALVES, HP Pilot



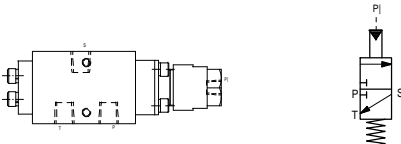
HPVP8113/NC/03/S(X) 2 way 2 position high pressure pilot operated, spring return, normally closed poppet type hydraulic control valve suitable for uni-directional flow. 1/4" in-line connections, rated 207 bar WP. Flow rate 5 lpm @ 10 bar DP. Pilot section 1/8 NPT connection. Various pilot operating pressure ranges



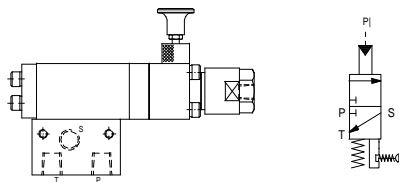
LPV/LPV8002/05/S 2 way 2 position low pressure pilot operated, detented, bi-stable, slide type, hydraulic control valve for bi-directional flow 'P' to 'S', 'S' to 'P'. 1/4" connections, rated 345 bar WP. Flow rate 20 lpm @ 10 bar DP. Pilot section 1/4 NPT connection. Pilot operating pressure range 4 to 10 bar.



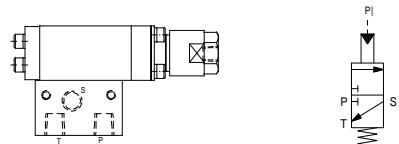
HPVP8103/NC/05/S -ML(X) 3 way 2 position high pressure pilot operated, spring return, normally closed poppet type hydraulic control valve suitable for uni-directional flow. 1/4" in-line connections, rated 345 bar WP. Flow rate 5 lpm @ 10 bar DP. Manual reset. Pilot section 1/8 NPT connection. Various pilot operating pressure ranges.



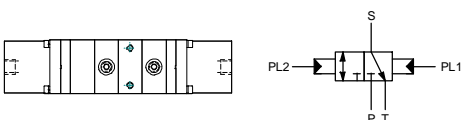
HPVP8103/NC/05/S(X) 3 way 2 position high pressure pilot operated, spring return, normally closed poppet type hydraulic control valve suitable for uni-directional flow. 1/4" in-line connections, rated 345 bar WP. Flow rate 5 lpm @ 10 bar DP. Pilot section 1/8 NPT connection. Various pilot operating pressure ranges.



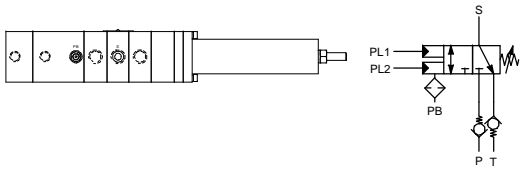
HPVP8005/NC/05/S -ML 3 way 2 position high pressure pilot operated, spring return, normally closed poppet type hydraulic control valve manifold mount. Rated 345 bar WP. Flow rate 1 lpm nominal. Manual reset, Pilot section 1/8 NPT connection. Various pilot operating pressure ranges.



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

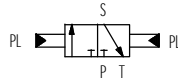
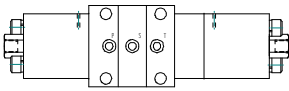


LPV/LPV8001/05/S 3 way 2 position low pressure pilot operated, bi-stable, block before bleed slide type, hydraulic control valve for bi-directional flow 'P' to 'S', 'S' to 'P'. 1/4" connections, rated upto 345 bar WP. Flow rate upto 20 lpm @ 10 bar DP. Pilot section 1/4 NPT connection. Pilot operating pressure range 4 to 10 bar.



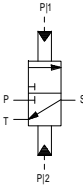
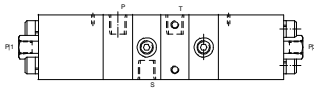
DHPV8100/05/NC/05/X

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.



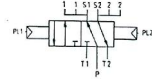
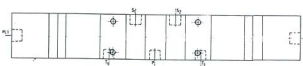
HPV/HPV5101/05/S

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

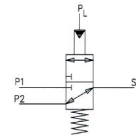
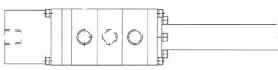
3 way 2 position high pressure pilot operated, bi-stable, block before bleed slide type, hydraulic control valve for bi-directional flow 'P' to 'S', 'S' to 'P'. 1/4" NPT connections, rated 345 bar WP. Flow rate 20 lpm @ 10 bar DP. Pilot section 1/8 NPT connection. Pilot operating pressure range 25 to 345 bar.



LPV/LPV8008/05/S

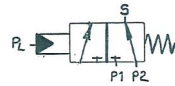
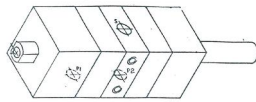
5 way 2 position low pressure pilot operated, detented, bi-stable, block before bleed slide type, hydraulic control valve for uni-directional flow. 3/8" connections, rated 345 bar WP. Flow rate 23 lpm @ 10 bar DP. Pilot section 1/4 NPT connection. Pilot operating pressure range 3 to 10 bar.

SELECTOR VALVE



LPV6000/10/S

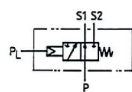
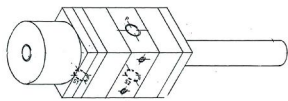
3 way 2 position low pressure pilot operated, spring return, pressure selector, block before bleed type hydraulic control valve. Rated 690 bar WP, 20 lpm @ 10 bar DP. Pilot section 1/8 connection. Operating pressure range 52 - 690 bar.



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.

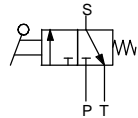
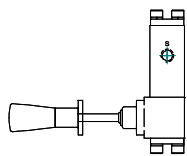
DIVERTER VALVE



LPV7000/10/S

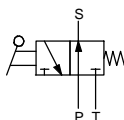
3 way 2 position low pressure pilot operated, spring return, pressure diverter, block before bleed type hydraulic control valve. Rated 690 bar WP, 20 lpm @ 10 bar DP.

HP LOGIC VALVES, Mechanical, Lever



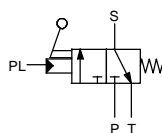
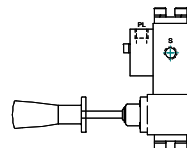
FP15/M/04/32/S

3 way 2 position lever operated, spring return, normally closed, block before bleed poppet type hydraulic control valve. 1/4 NPT connections. Rated 207 bar WP, 15 lpm @ 10 bar DP.



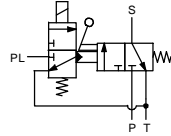
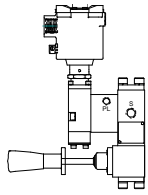
FP15/M/M/32/S-NO

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.



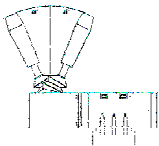
FP15/167/H2/04/32/S-M

3 way 2 position lever operated manual override, high pressure pilot operated, spring return, normally closed, block before bleed type hydraulic control valve. 1/4 NPT connections. Rated 207 bar WP, 15 lpm @ 10 bar DP. Pilot operating range - refer to literature



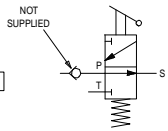
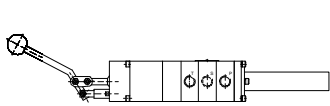
FP15/159/S1/32/S-xxVxC/9xxxx/EP-M

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.



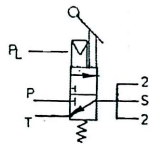
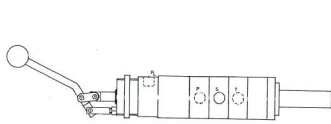
40-091-01-31XX-X

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.



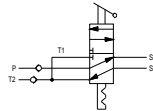
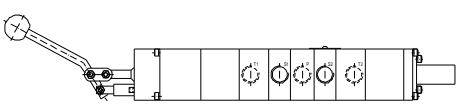
MV8000/N0/05/S

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.



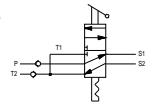
MLPV8000/NC/05/S

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



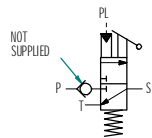
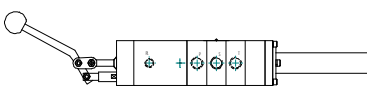
MDV8008/05/S

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



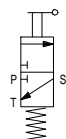
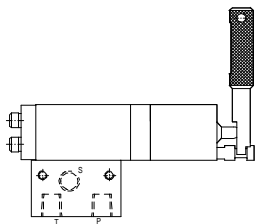
MDV8008/74/05/S

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.



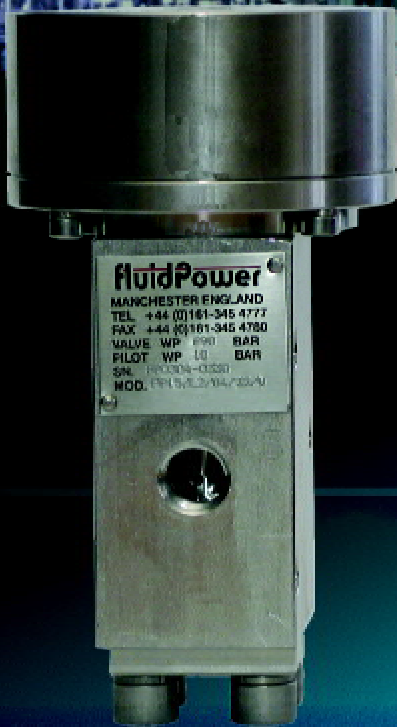
M(LR)VP8005/NC/10/S

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.

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

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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:

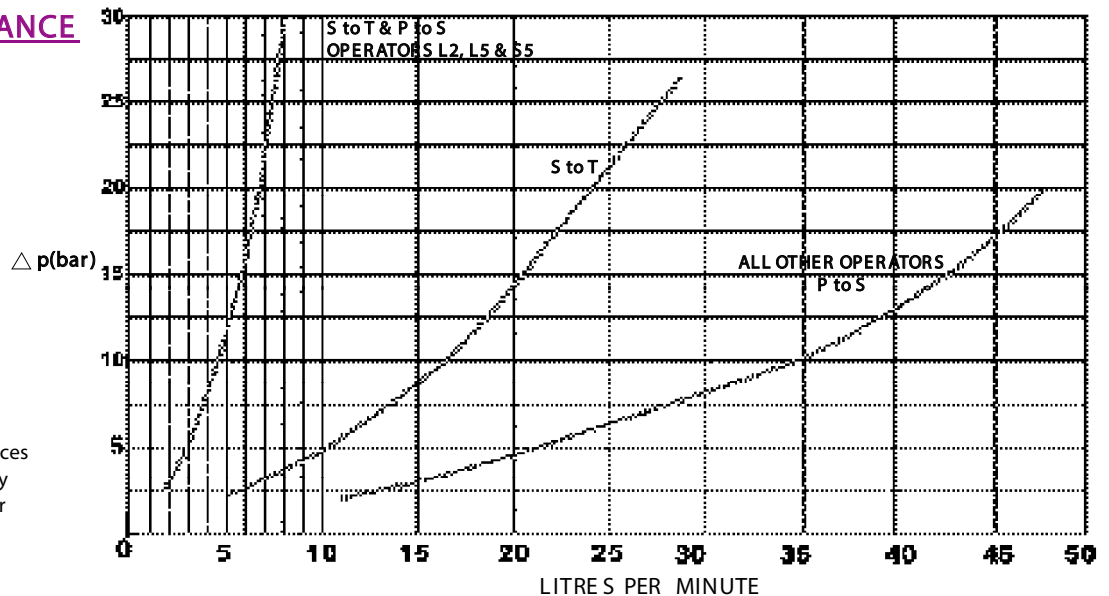
FP15E				Model Code
Operator	Max Pilot Pressure	Refer to Operating Pressure Graphs on page 4	Max. Valve Pressure	Flow Rate (All valves have a nominal flow of 15 lpm, except operators L2 which are 5 lpm)
L1	10bar		414bar	
L1A Low Pressure Pilot (Piston)	19bar		690bar	
L2	10bar		690bar	
L3	10bar		690bar	
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

SELECTION CHART

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	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

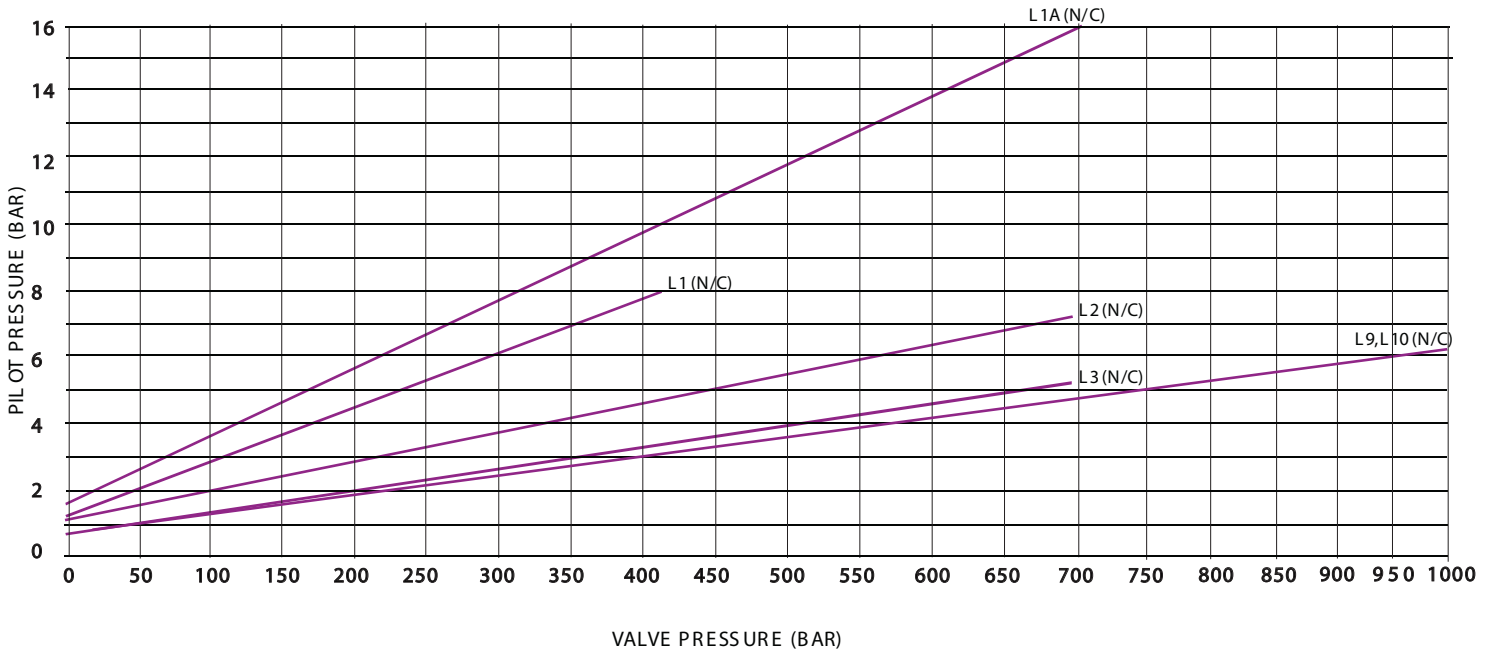
FLOW PERFORMANCE



Valve Porting References
P - Pressure/Supply
S - Service/Cylinder
T - Tank/Return

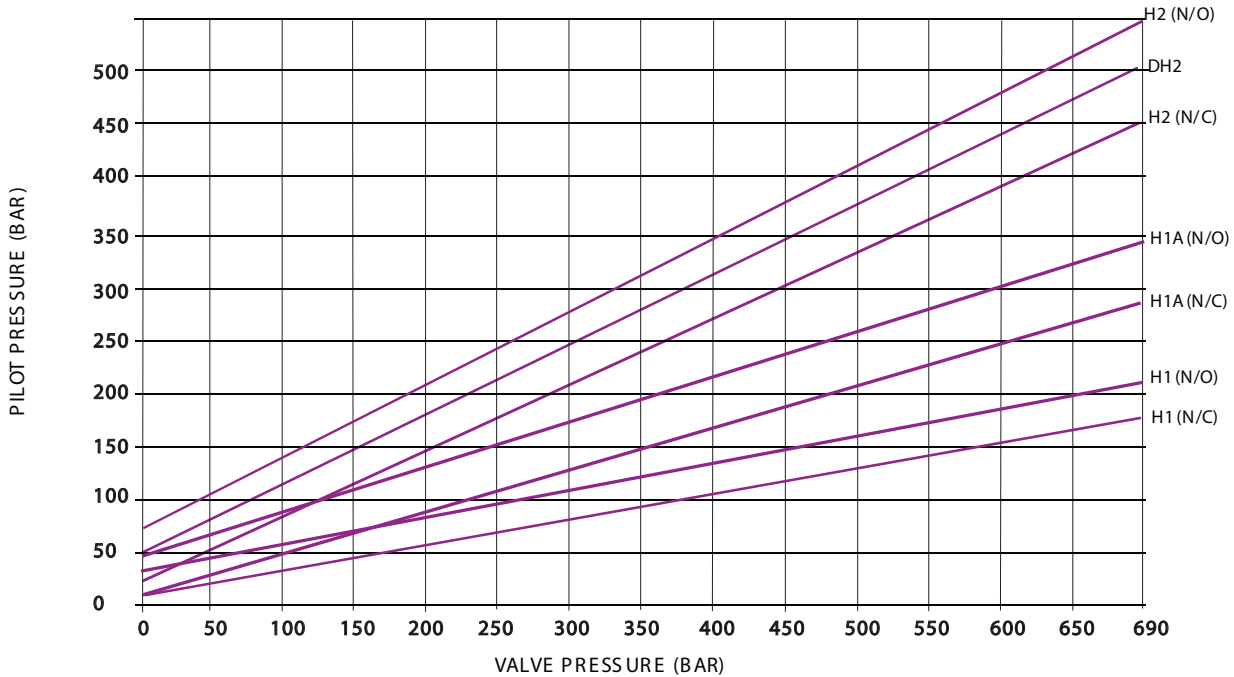
LOW PRESSURE PILOT OPERATOR INTERFACE VALVES

Pilot operating pressures



HIGH PRESSURE PILOT OPERATOR INTERFACE VALVES

Pilot operating pressures



Frangible Bulb Options

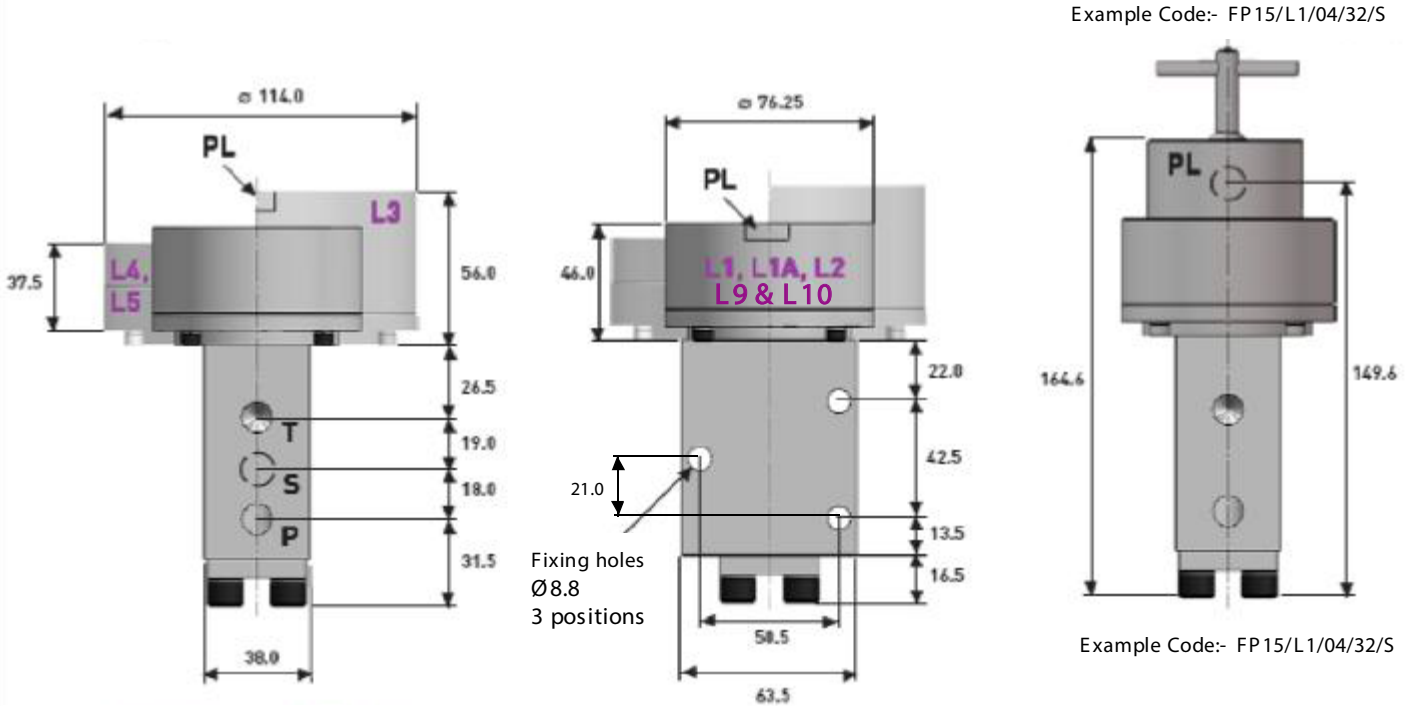
BULB COLOUR	TEMPERATURE RANGE Deg.C	ORDER CODE
Orange	57 (Tol +/- 3.5%)	57C
Red	68 (Tol +/- 3.5%)	68C
Yellow	79 (Tol +/- 3.5%)	79C
Green	93 (Tol +/- 3.5%)	93C
Blue	141 (Tol +/- 3.5%)	141C
Mauve	182 (Tol +/- 3.5%)	182C

(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)



Weights:- (not including MSO option)

L1, L1A, L2	2.6 Kg
L3	4.8 Kg
L4, L5	3.8 Kg

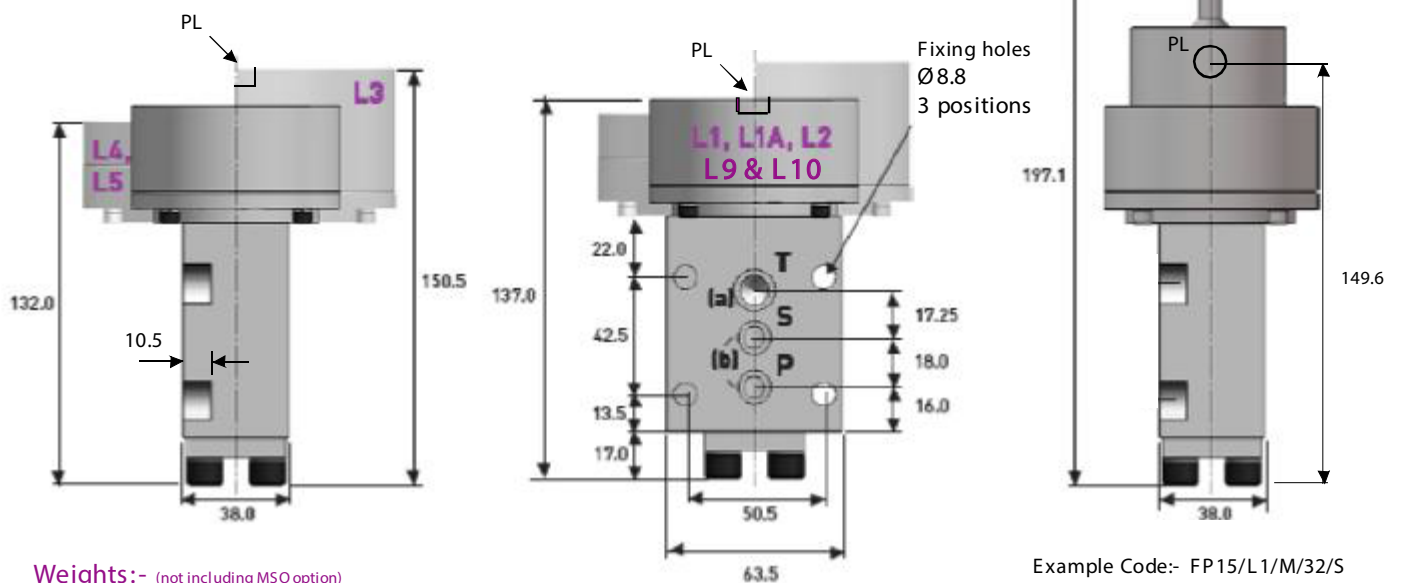
PL	- pilot connection
P	- pressure port
S	- service port
T	- tank port

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



Weights:- (not including MSO option)

L1, L1A, L2	2.8 Kg
L3	5.0 Kg
L4, L5	4.0 Kg

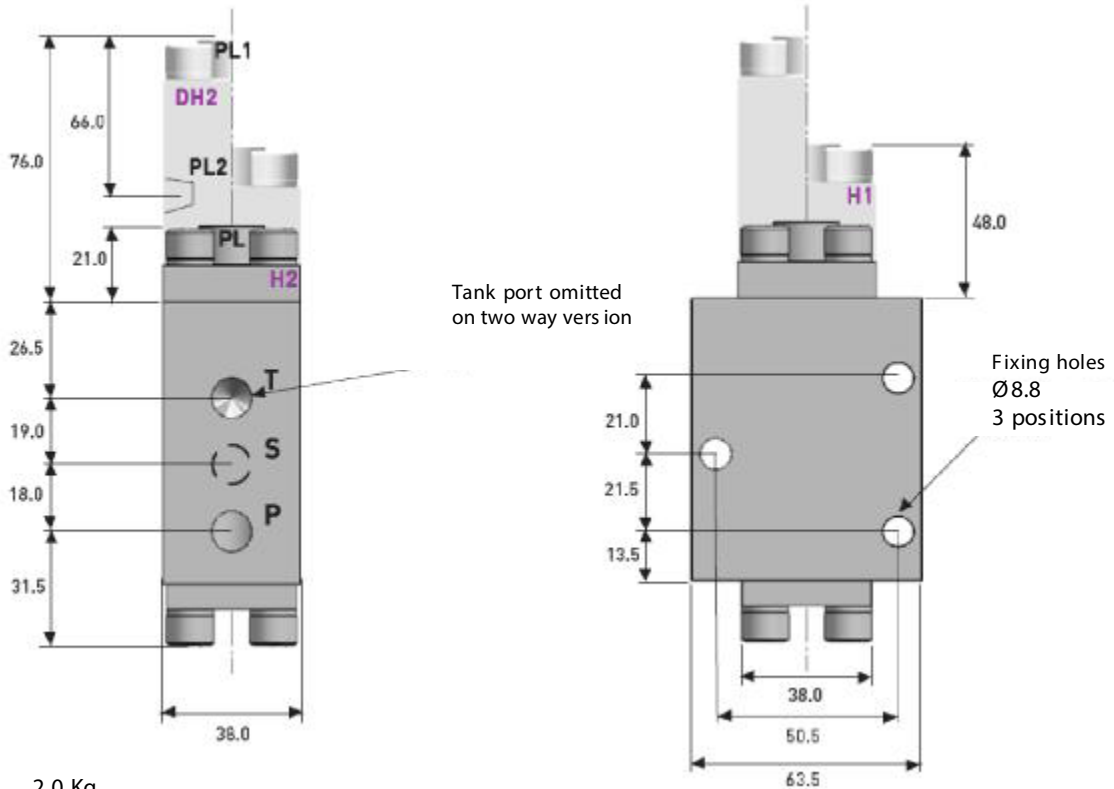
PL	- pilot connection
----	--------------------

1/4 NPT or G1/4 BSPP

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



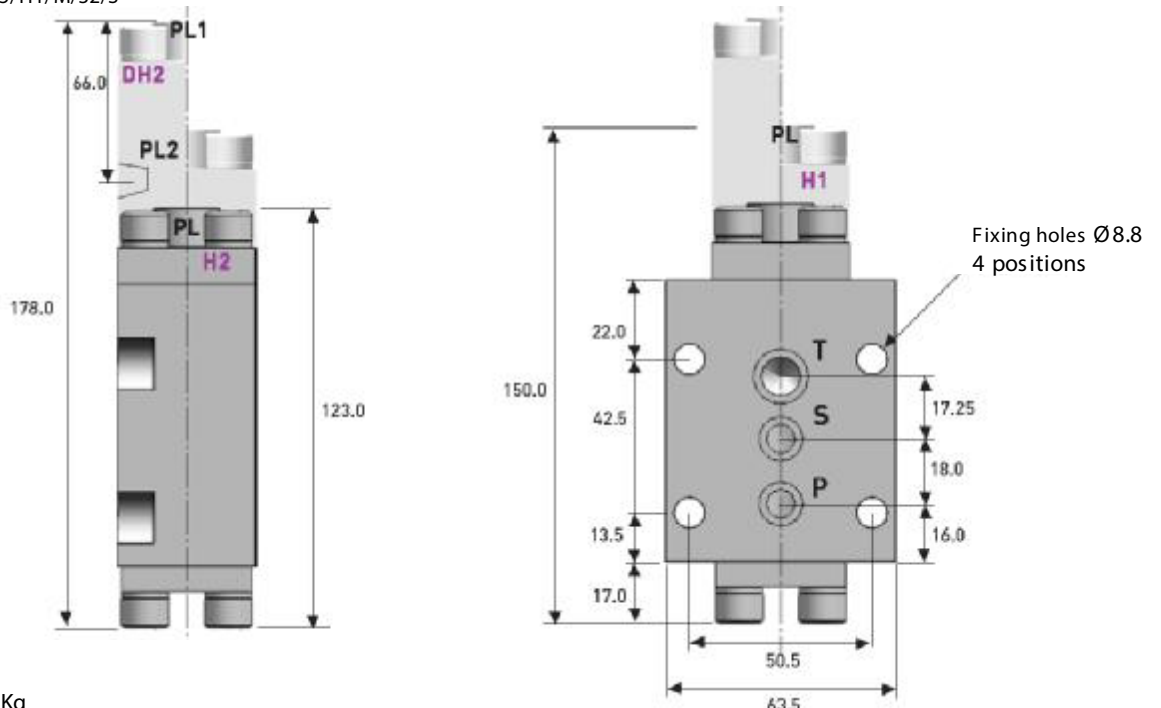
Weights:-

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:-

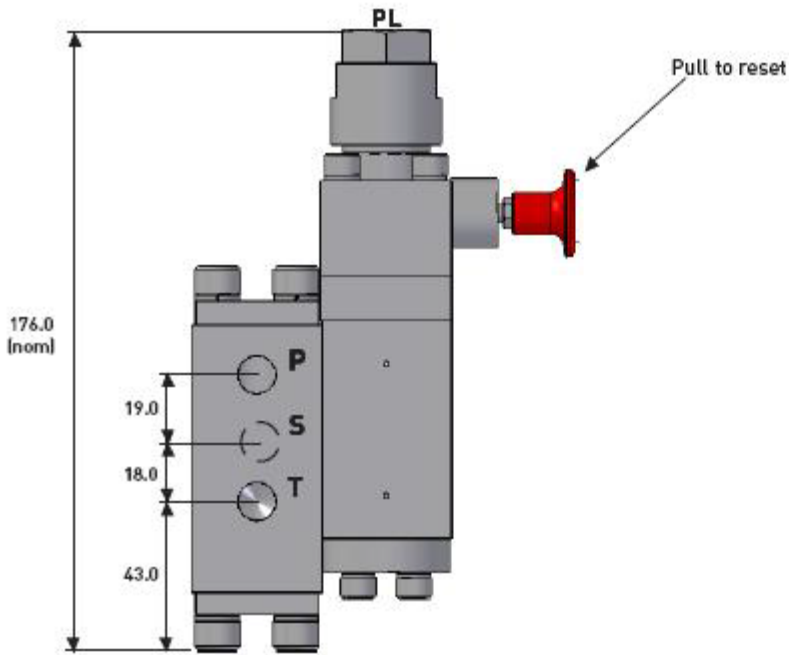
H1	2.2 Kg
H2	2.0 Kg
DH2	2.5 Kg

PL, PL1 - pilot connection	1/4 NPT or G1/4 BSPP
PL2 - pilot connection	1/8 NPT or G1/8 BSPP

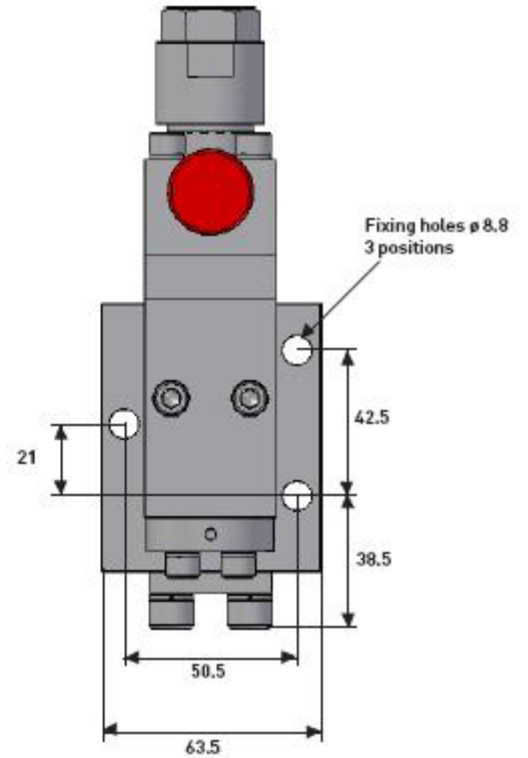
High Pressure Pilot Stage Interface Valves

Refer to pilot range table, page 4

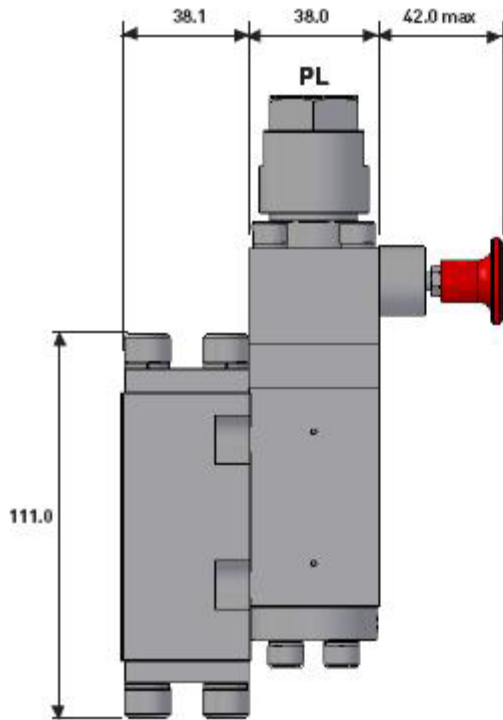
Body Ported FP15, 3/2 (H'x'...ML(x)&MLP(x) models)



Example Code:- FP15 /H1/04/32/S-ML(A)

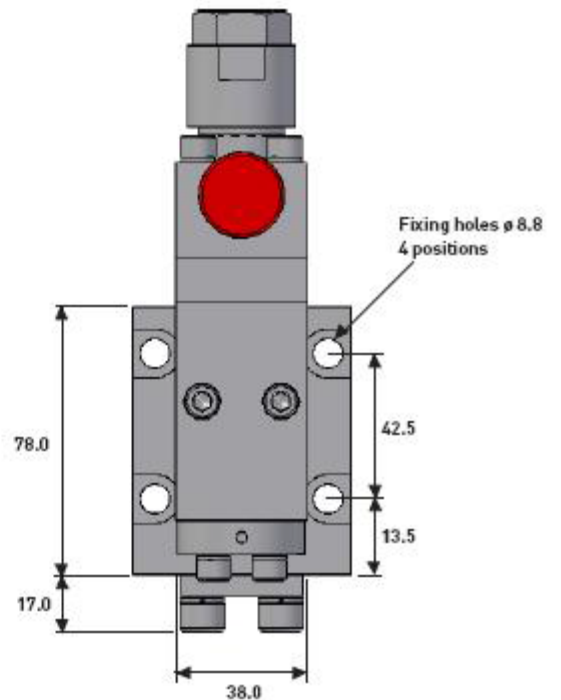


Manifold Mount FP15, 3/2 (H'x'...ML(x)&MLP(x) models)



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 |

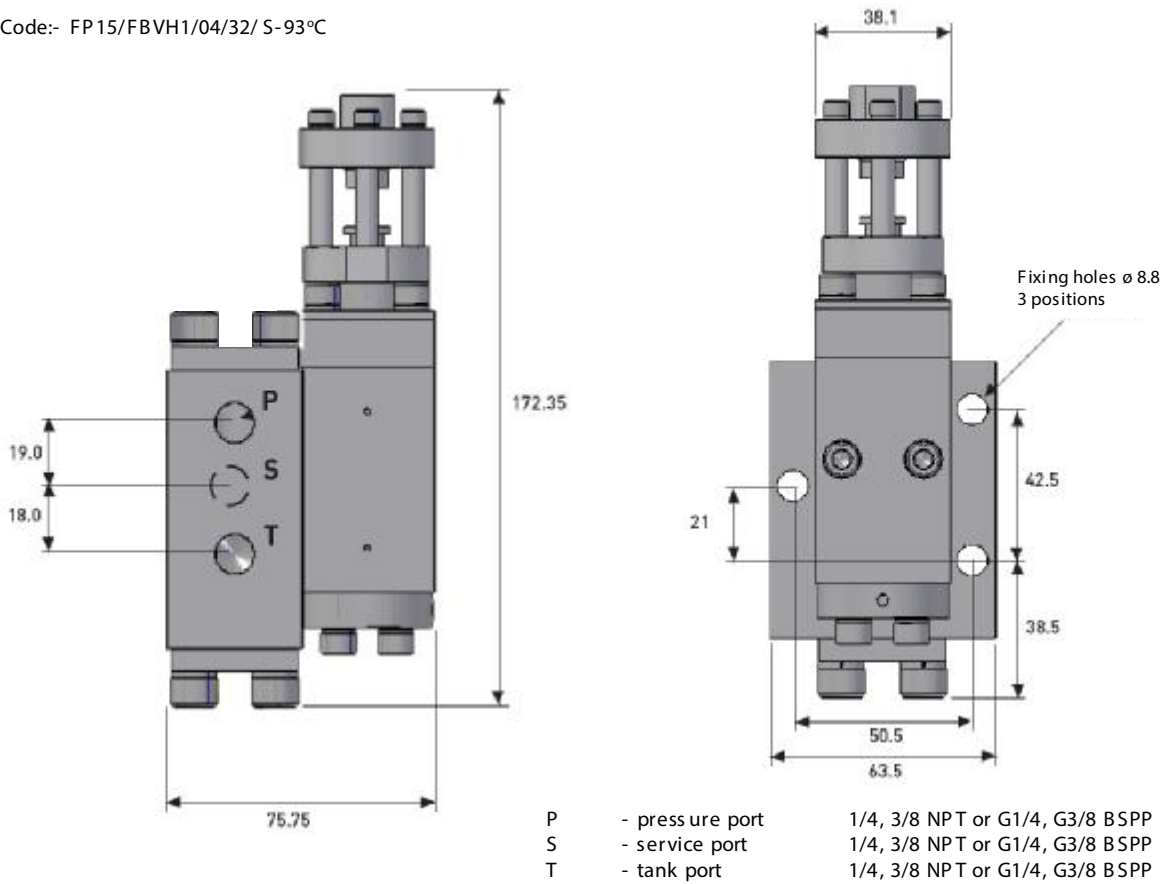


- | | | |
|----|--------------------|----------------------|
| PL | - pilot connection | 1/8 NPT or G1/8 BSPP |
|----|--------------------|----------------------|

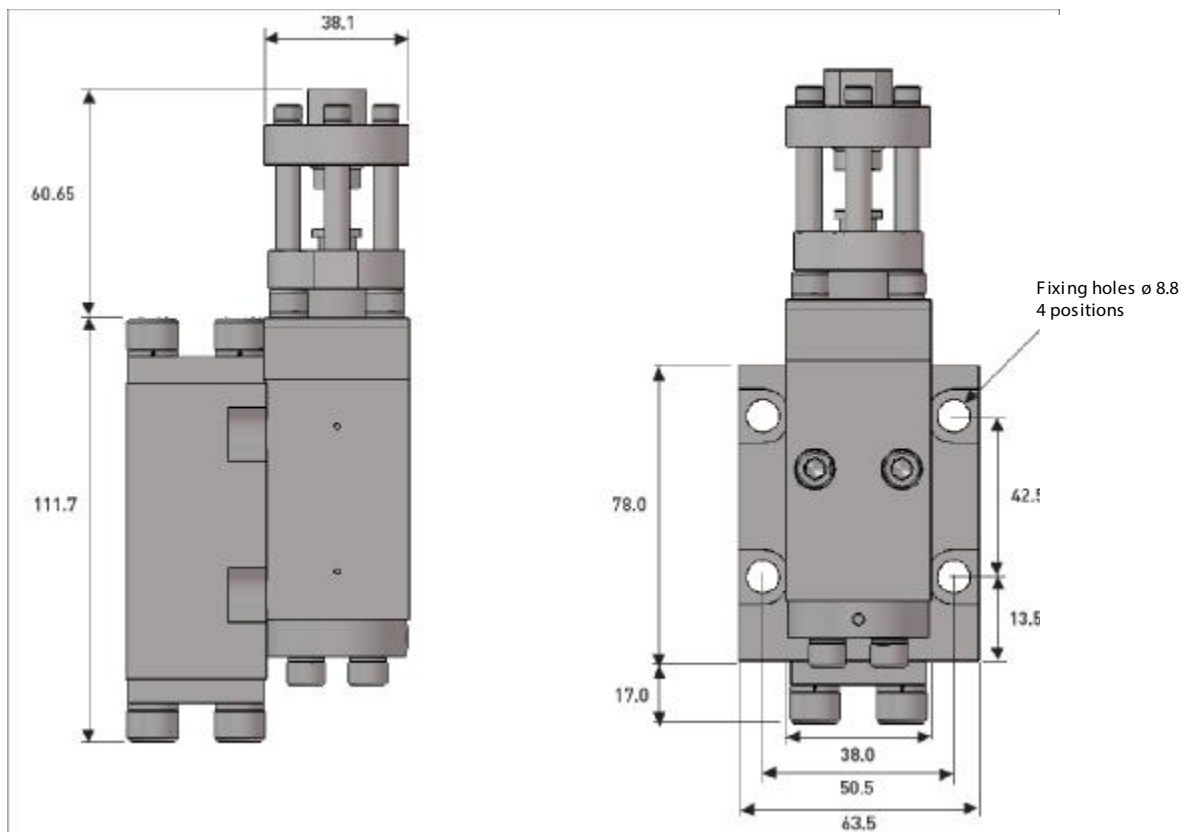
Frangible Bulb Valves

Body Ported, FP15, 3/2 (FBVHx models)

Example Code:- FP15/FBVH1/04/32/ S-93°C



Manifold Mount, FP15, 3/2 (FBVHx models)



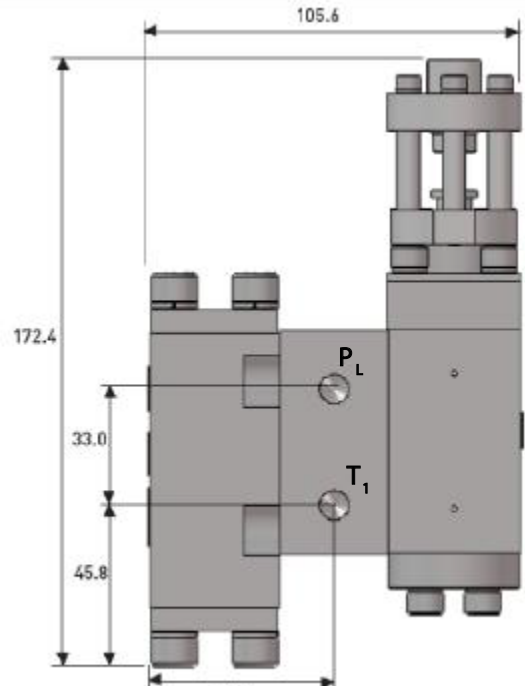
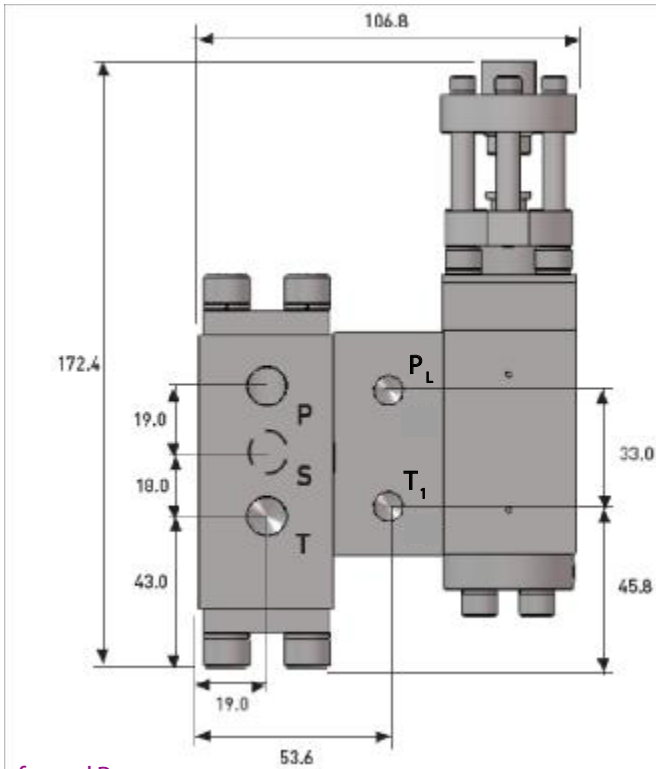
Example Code:- FP15/FBVH1/M/32/S-93°C

Body Ported EP/EPT option

Example Code:- FP15/FBVH1/04/32/S-EPT/93C


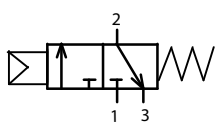
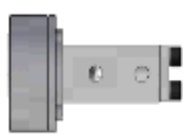
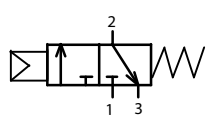

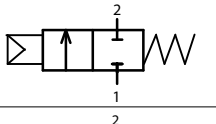

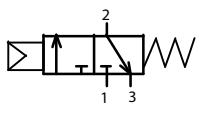

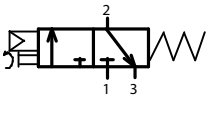
Manifold Mount EP/EPT option

Example Code:- FP15/FBVH1/M/32/S-EPT/93C



P_L = External pilot 1/8NPT or G1/8 BSPP
T₁ = 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

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.

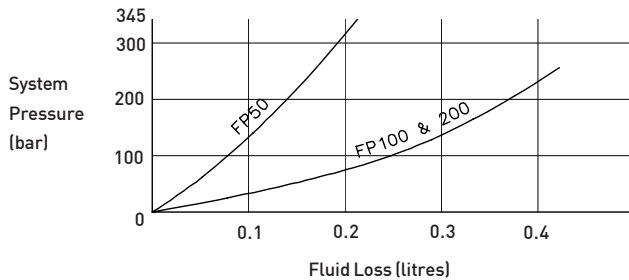
Weights detailed in this catalogue are approximate only

Selection Chart

FP50 FP100 FP200	50 lpm 100 lpm 200 lpm			Model Code and nominal Flow Rating
		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	
L1	Low pressure pilot operator			Connections
SL1	Low pressure solenoid operator	4.5-8.5	4.0-8.5	
M	Manual lever operated	N/A	N/A	
M	Subbase mounting - 32, DV & SV valves. Subbases ordered separately. See page 6.			Connections
08	1/2 NPT ported subbase assembly	42 & 43 valves		
12	3/4 NPT ported subbase assembly (FP 100/200 only)			
		Max working pressure - bar		Configuration
		FP50	FP100/200	
32	3 - way, 2 - position	345	250	
42	4 - way, 2 - position		207	
43	4 - way, 3 - position			
DV	diverter valve			
SV	selector valve			
S	Nitrile (standard)	(-30°C to +130°C)		O-ring material
V	Viton	(-20°C to +180°C)		
A	Silicone/Fluorosilicone	(-50°C to +40°C)		
SA	Low temperature Nitrile	(-46°C to +130°C)		
H2S	NACE MR-01-75-Consult Bifold Fluidpower			Options
K6	BSPP Ported			
MS0	Manual screw down override (L1 operator)			
		57C 68C 79C 93C 141C 182C		Frangible bulb temp rating °C (+/- 3.5%)
FP200 / H2 / 12 / 42 / S / H2S				Ordering Examples
FP50 / FBVH1 / M / 32 / V /	68C			

Standard Test Fluids: Marston Bentley HW540

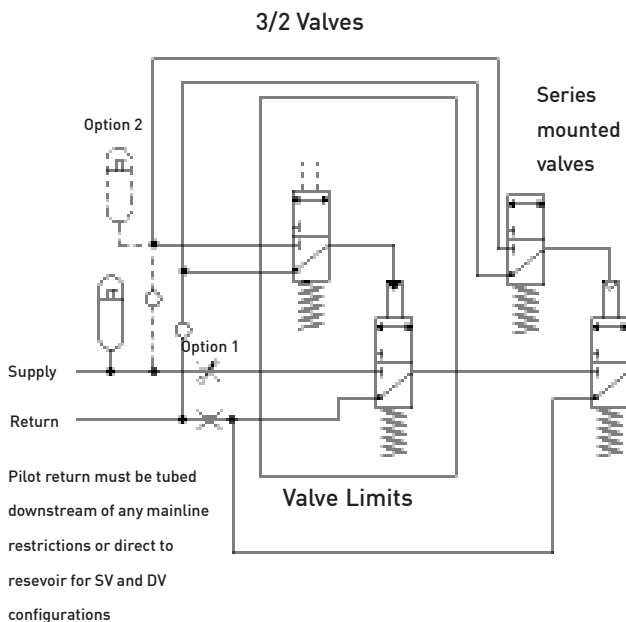
INSTALLATION REQUIREMENTS



Graph illustrating typical fluid loss on SL'x' operators

IMPORTANT NOTE: Bifold 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.

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.

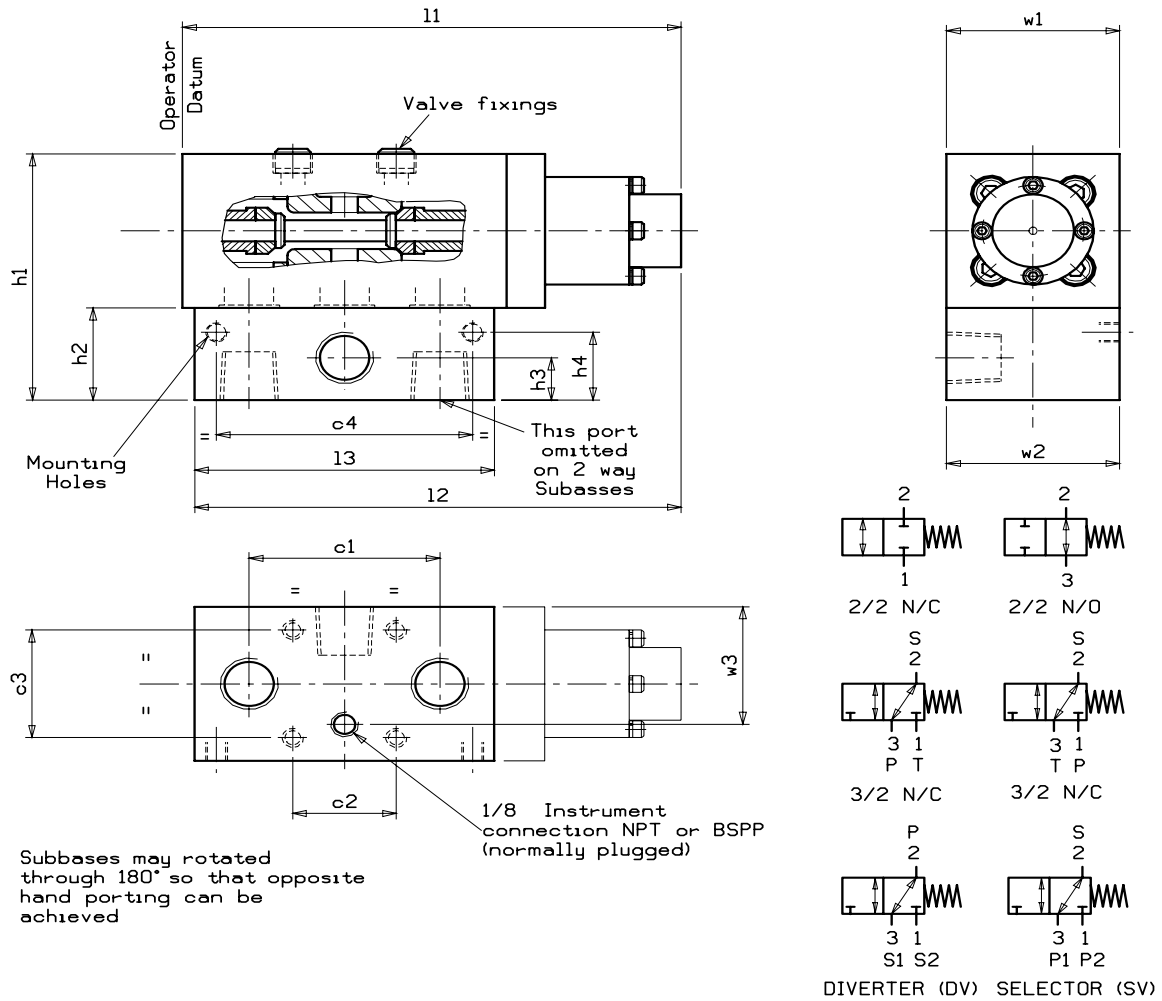
- OPTION 1.** Install a variable orifice in the supply line downstream of the pilot take-off. **Note:** This should be sized and set to maintain sufficient pilot pressure when the valve changes position.
- OPTION 2.** Install an accumulator and non-return valve. This option must be applied when an accumulated 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.

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



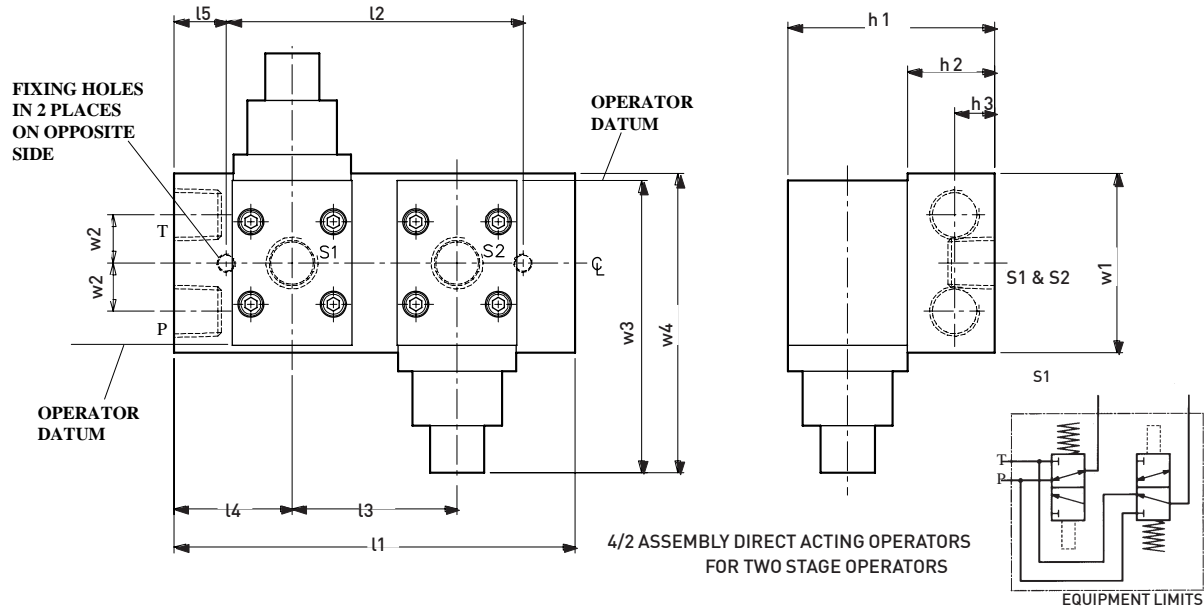
MODEL	c1	c2	c3	c4	h1	h2	h3	h4	l1	l2	l3	w1	w2	w3
FP50	41	35	35	60	82.6	31.8	16.5	22	124	127.1	76.2	50.8	60	45
FP100/200	70	38	45	94	101.6	38.1	17.5	28	183	178.5	110	63.5	63.5	48.5
MODEL	Valve Fixings			Engagement	O-ring	Mounting holes		Weight (kg)						
	Size	Torque (Nm)												
FP50	M6 X 50	7.3	10	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
2Way	3Way			2Way	3Way		
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 Bifold Fluidpower

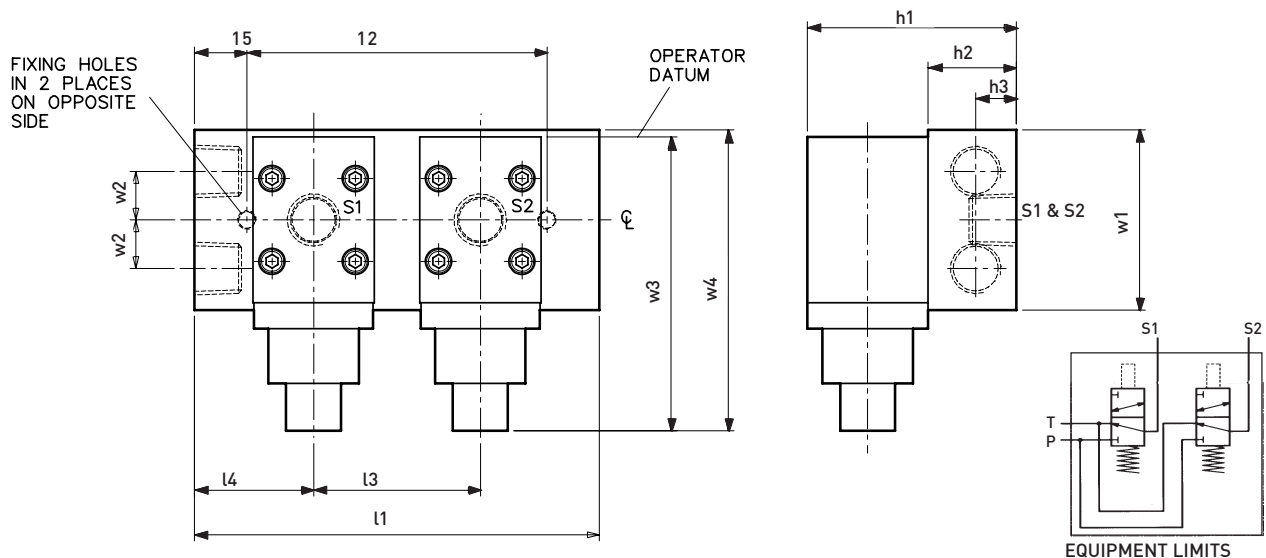
4/2 Body Assembly (Code 42) direct acting operators



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

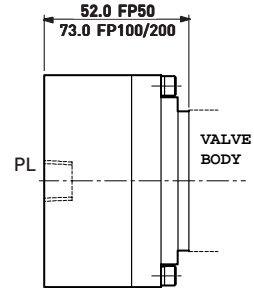
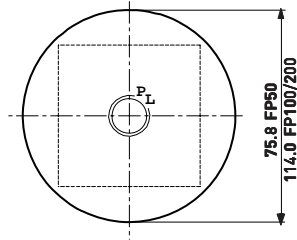
PILOT OPERATORS

Low Pressure Pilot Operators (Code L1)

LIQUID OR GASIOUS SERVICE

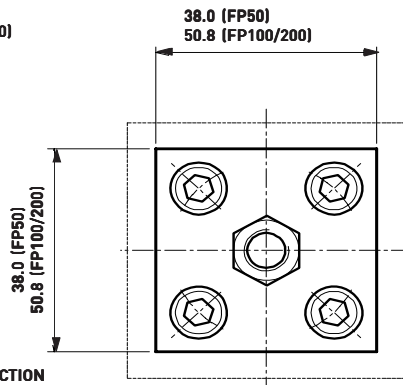
PL - PILOT CONNECTION
1/4 NPT/BSPP

WEIGHT (kg)
FP50 (1.5)
FP100/200 (4.5)

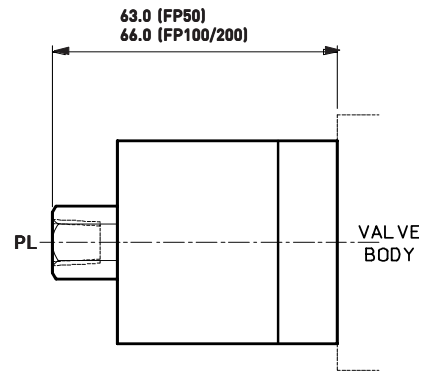


High Pressure Pilot Operators (Code Hx)

WEIGHT (kg)
FP50 (0.6) FP100/200 (1.0)

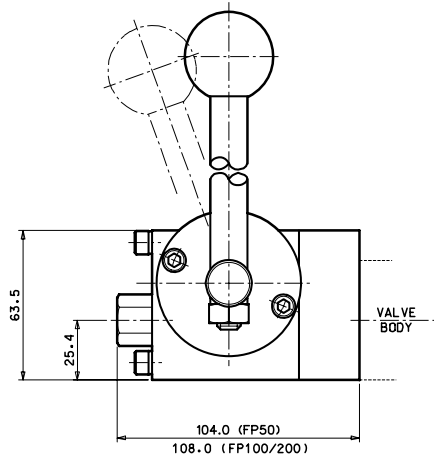
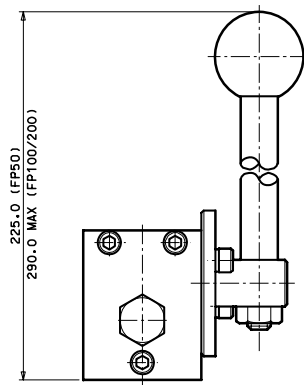


PL - PILOT CONNECTION
1/8 NPT/BSPP



MANUAL OPERATORS

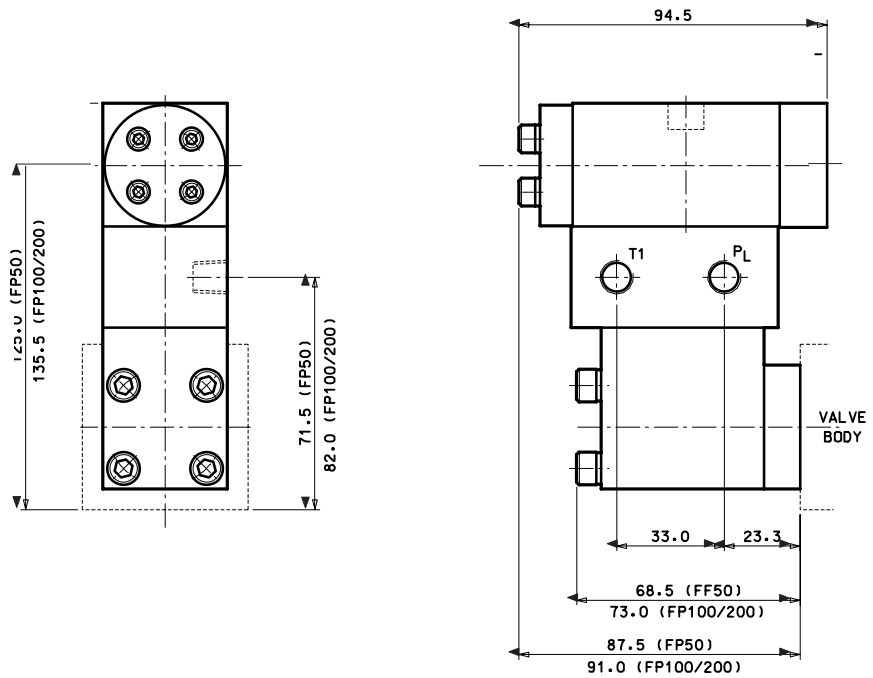
Manual Lever Operation (Code M)



WEIGHT:FP50/100/200 - 2.6Kg

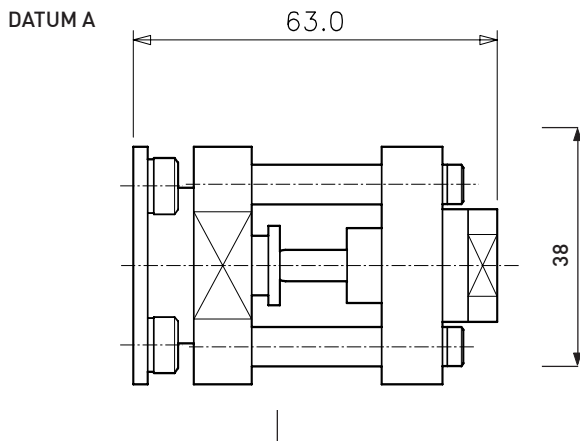
Pilot Stage Valve for Frangible Bulb Operators (Code FBVH'X')

CONNECTIONS
 SUPPLY P_L - 1/8 NPT/BSPP
 DRAIN T1 - 1/8 NPT/BSPP



WEIGHT: FP50 2.3 kg
 FP100/200 3kg

Frangible Bulb Operator (Code FBVH'X')

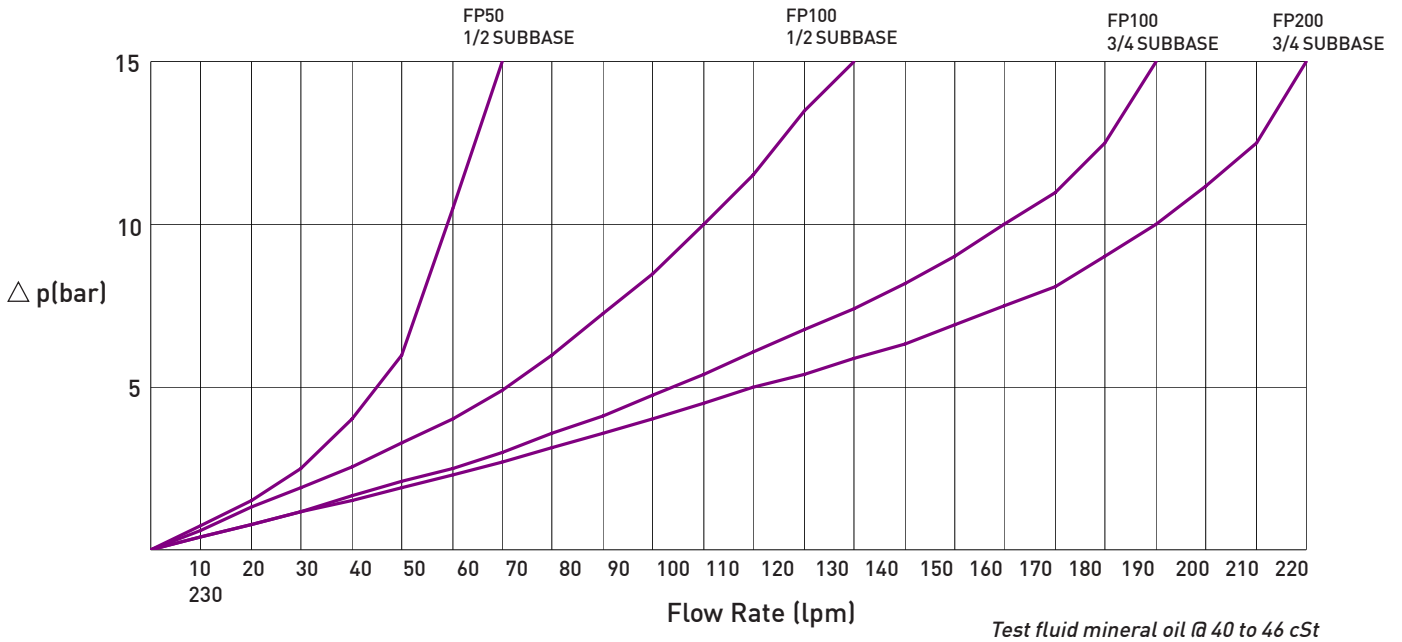


FRANGIBLE BULB

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

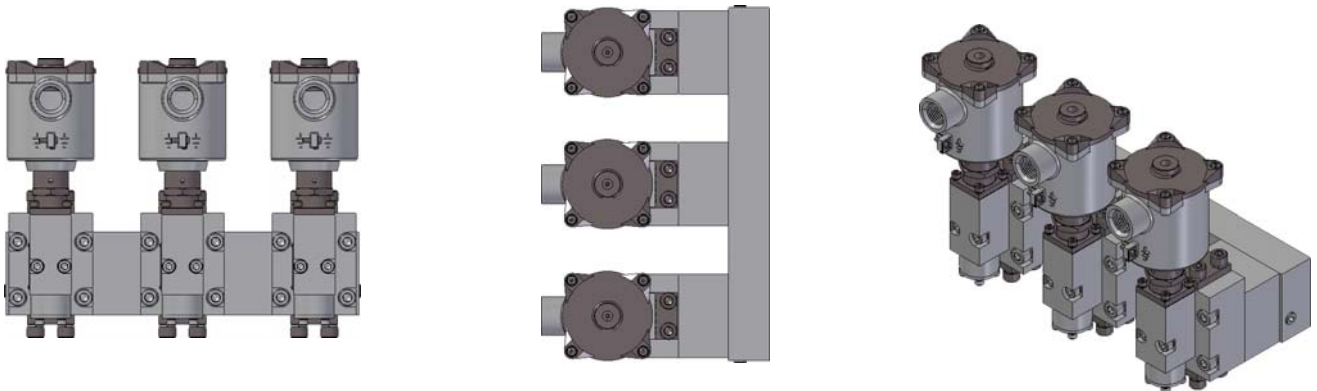
FLOW PERFORMANCE



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

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

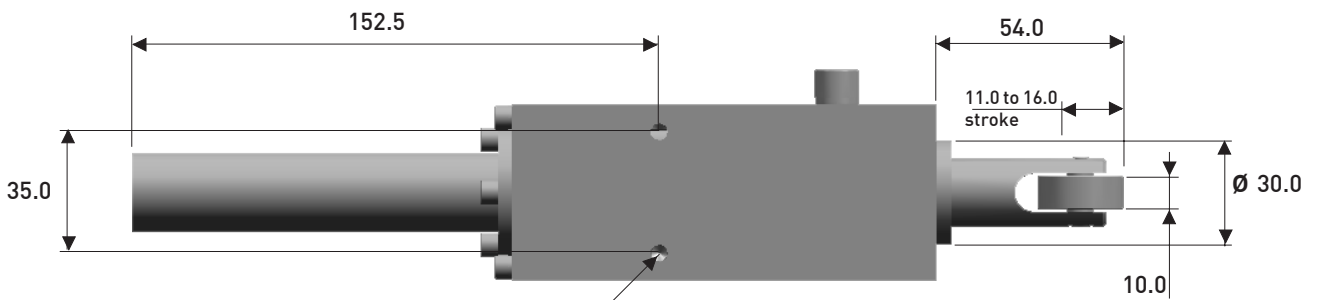
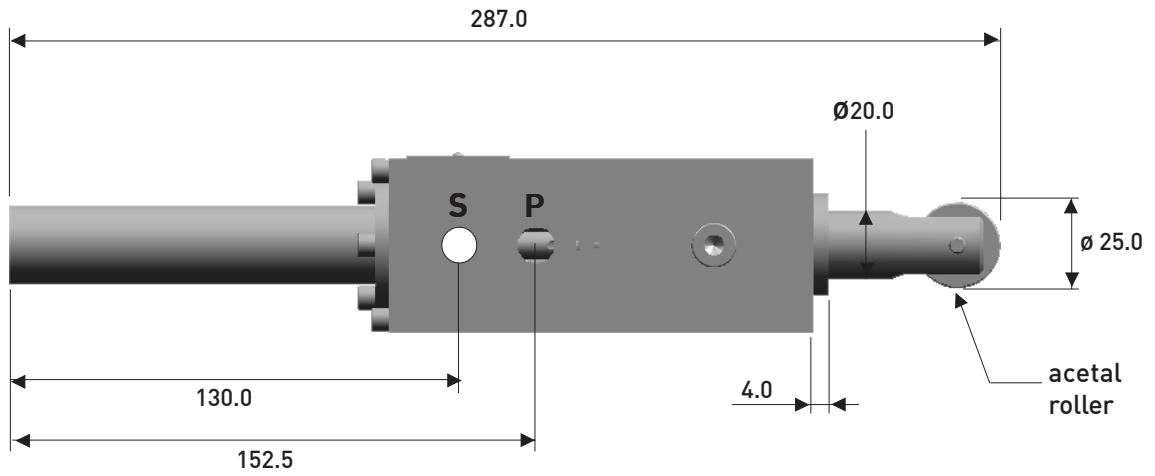
ORDER CODE	BULB COLOUR	TEMPERATURE RANGE °C
57C	Orange	57 +/- 3.5%
68C	Red	68 +/- 3.5%
79C	Yellow	79 +/- 3.5%
93C	Green	93 +/- 3.5%
141C	Blue	141 +/- 3.5%
182C	Mauve	182 +/- 3.5%

SELECTION CHART

<p>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</p>	<p>The maximum valve working pressure is dependant upon the operator type. Please consult Bifold Fluidpower prior to ordering</p> <p>For spring return valves leave the secondary operator code blank</p>	<p>Primary & Secondary Operator</p>
<p>80 Body ported 1/4 NPT (3/8 MP autoclave, pressure code 15) 81 Subbase mounting (10A, 12A & 18A configurations) 51 Subbase mounting</p>	<p>liquid service</p>	<p>Application & Configuration</p>
<p>82 Body ported (1/4 NPT (3/8 MP autoclave, pressure code 15) 53 Subbase mounting</p>	<p>liquid service - subsea</p>	
<p>84 Body ported 1/4 NPT 55 Subbase mounting</p>	<p>gaseous service</p>	<p>Configuration</p>
<p>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) 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)</p>		
<p>NC normally closed 2/2 & 3/2 NO normally open spring return valves</p>		<p>Configuration</p>
<p>02 138 bar 03 207 bar 05 345 bar 06 414 bar (10A, 12A & 18A only) 07 520 bar 10 690 bar 15 1035 bar 20 1380 bar (Type 5100 only) 180°C max fluid temp., 6 lpm nominal</p>	<p>gaseous service liquid service</p>	<p>Working Pressure</p>
<p>S Nitrile (standard) (-30°C to +130°C) V Viton (-20°C to +180°C) SA Low temperature nitrile (-46°C to +130°C)</p>		<p>O-Ring Material</p>
<p>XXX</p>		<p>Temp Rating * (Pg 2)</p>
<p>H2S NACE MR-01-75 K6 BSPP ported P Plunger R Roller</p>	<p>COV(A) operators</p>	<p>Options</p>
<p>LPV /80 02 / NC /10 / S MPBLPV/LPV/8001/ NC /10 / S</p>		<p>Ordering Examples</p>

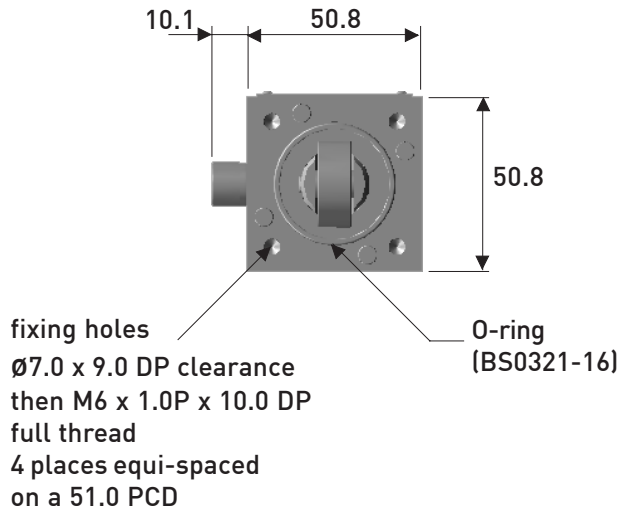
Standard Test Fluid: Marston Bentley HW540.

EXAMPLE MODEL
80 Series



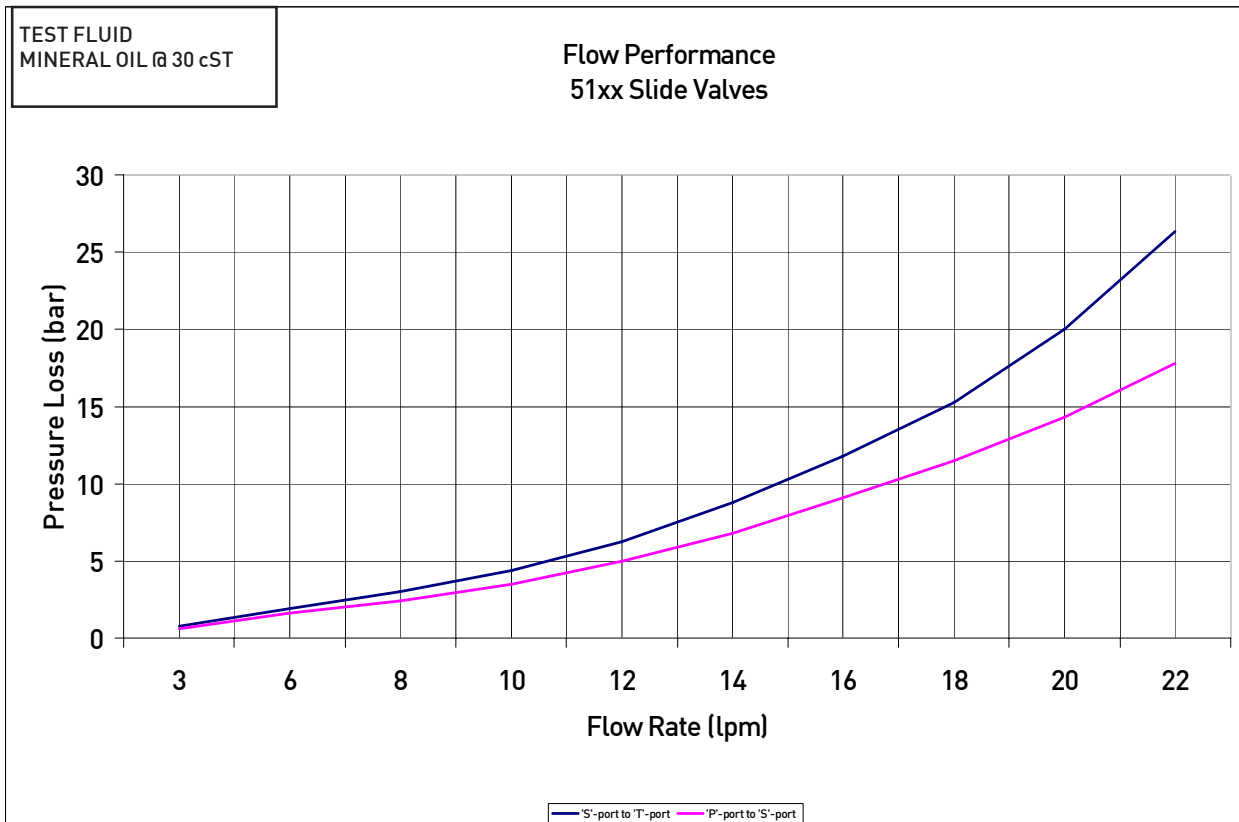
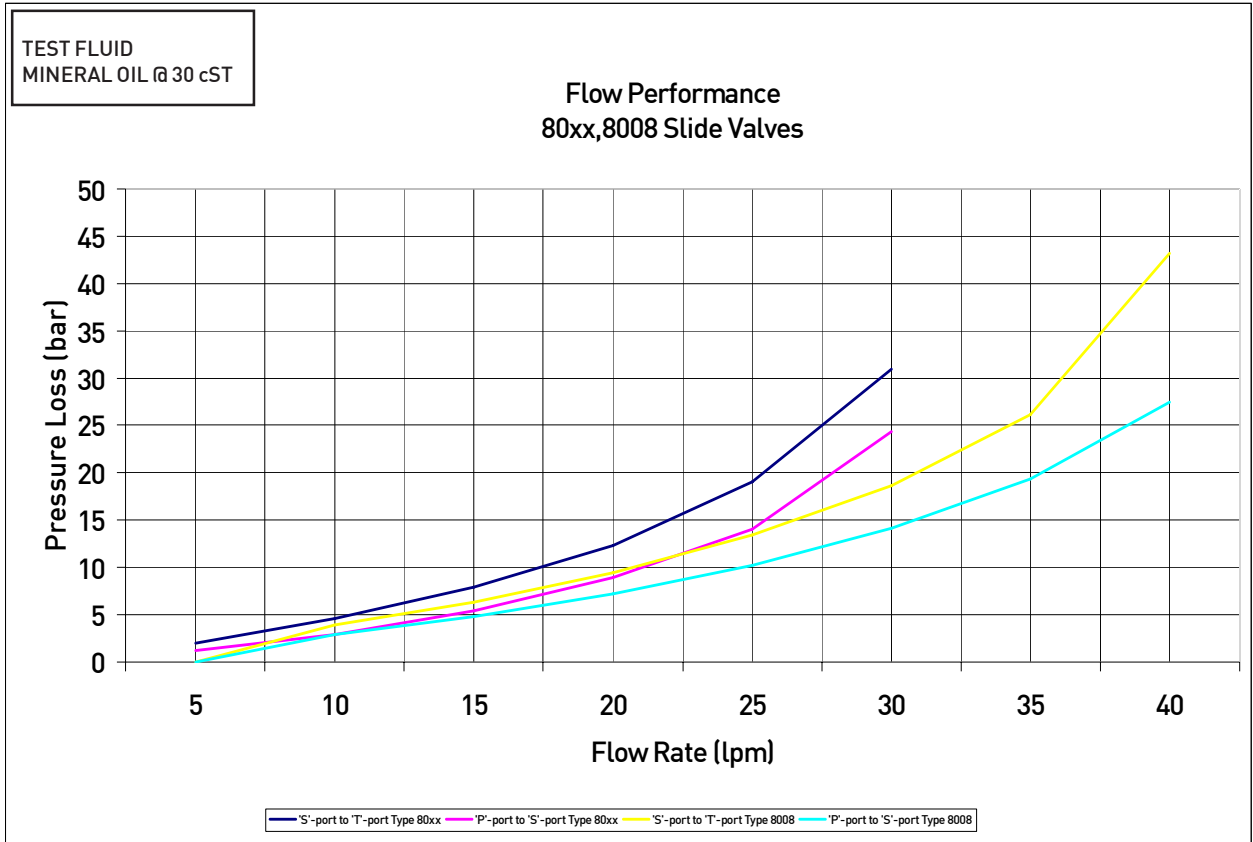
fixing holes
M6 x 1P x 8.0 DP
full thread
2 places

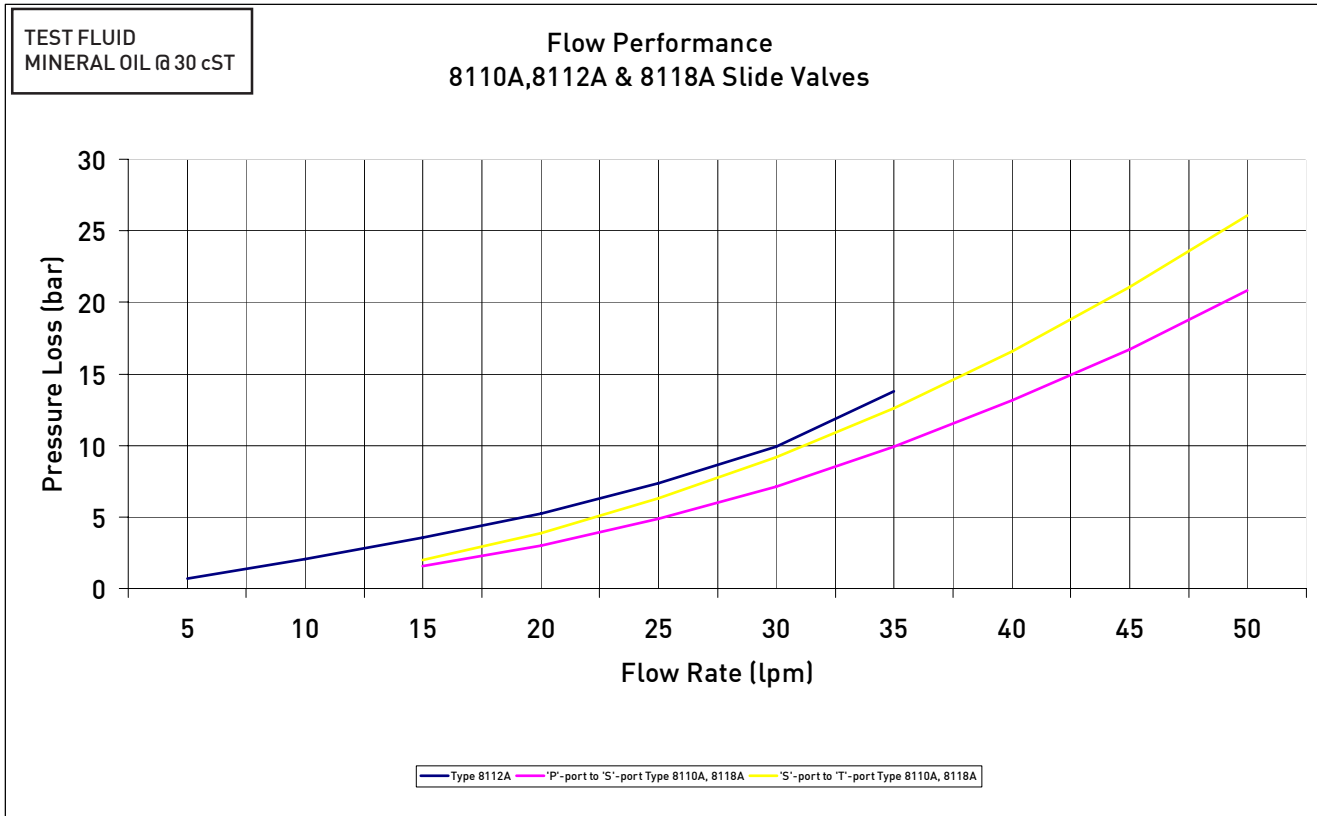
load required to fully
actuate 200N (45 lbf)
this load may be
increased to 300N (68 lbf)
if necessary



Example shown:- COV(A)8002/NC/05/S-R

FLOW PERFORMANCE





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.

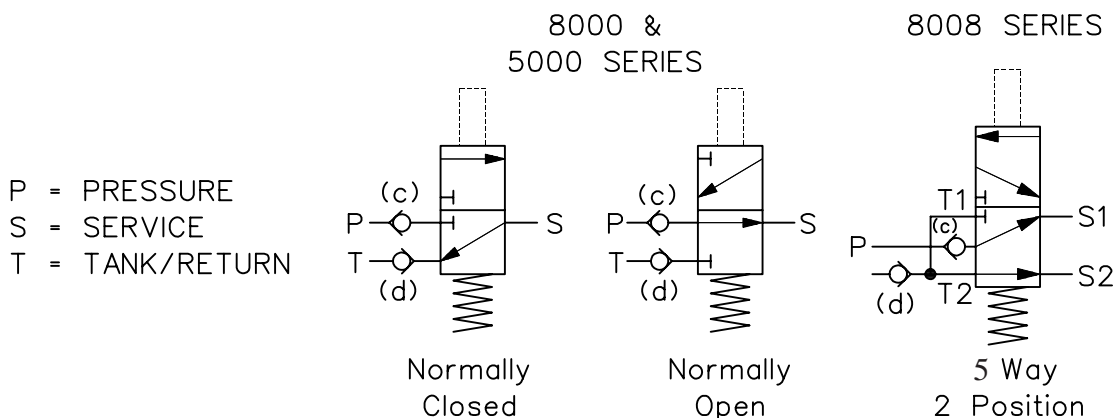
Seal failure will occur if the following operating conditions are introduced into the hydraulic system.

- 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.

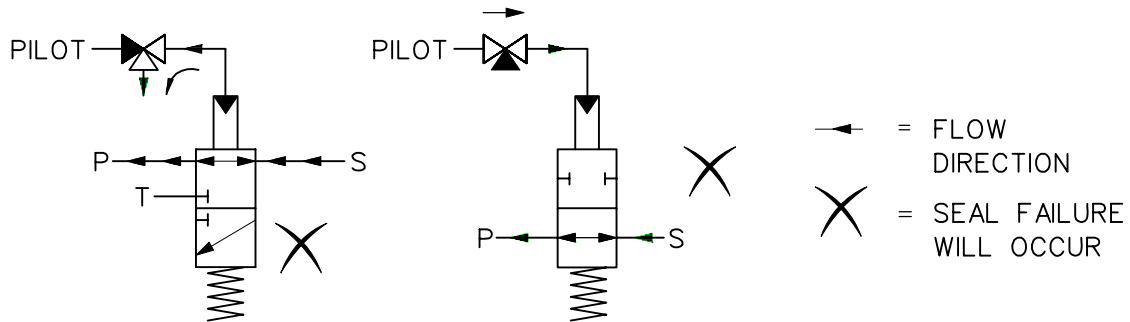
If conditions (c) and (d) can arise during normal operation we recommend the following action is taken.

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.

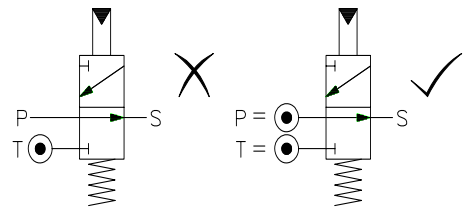


TESTING

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.

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

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

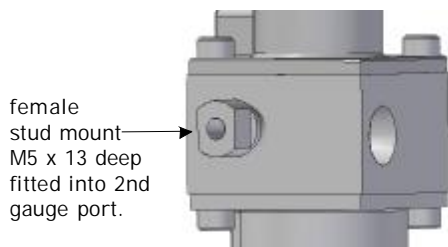
Relief Port

- 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 1.5cm³/sec
- Relief differential 0.15 bar at 2 bar secondary pressure (relieving type only)

Seal repair kits

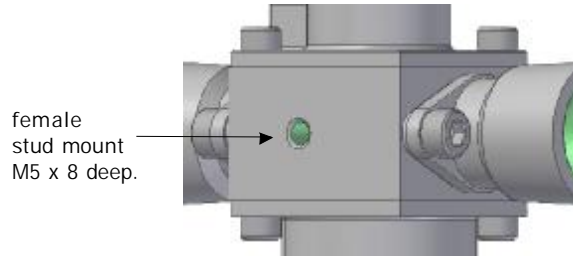
- Please add the prefix SRK on the models required leaving off port sizes (only require model number up to element reference)
- e.g. SRKSC-FR-SR-MD-10-X4-xx

1/4" Unit

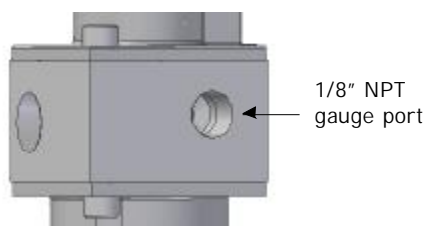


Mounting Details

3/8" & 1/2" Unit

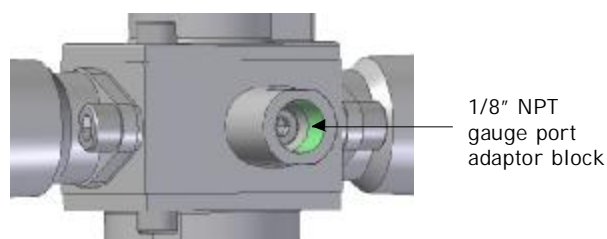


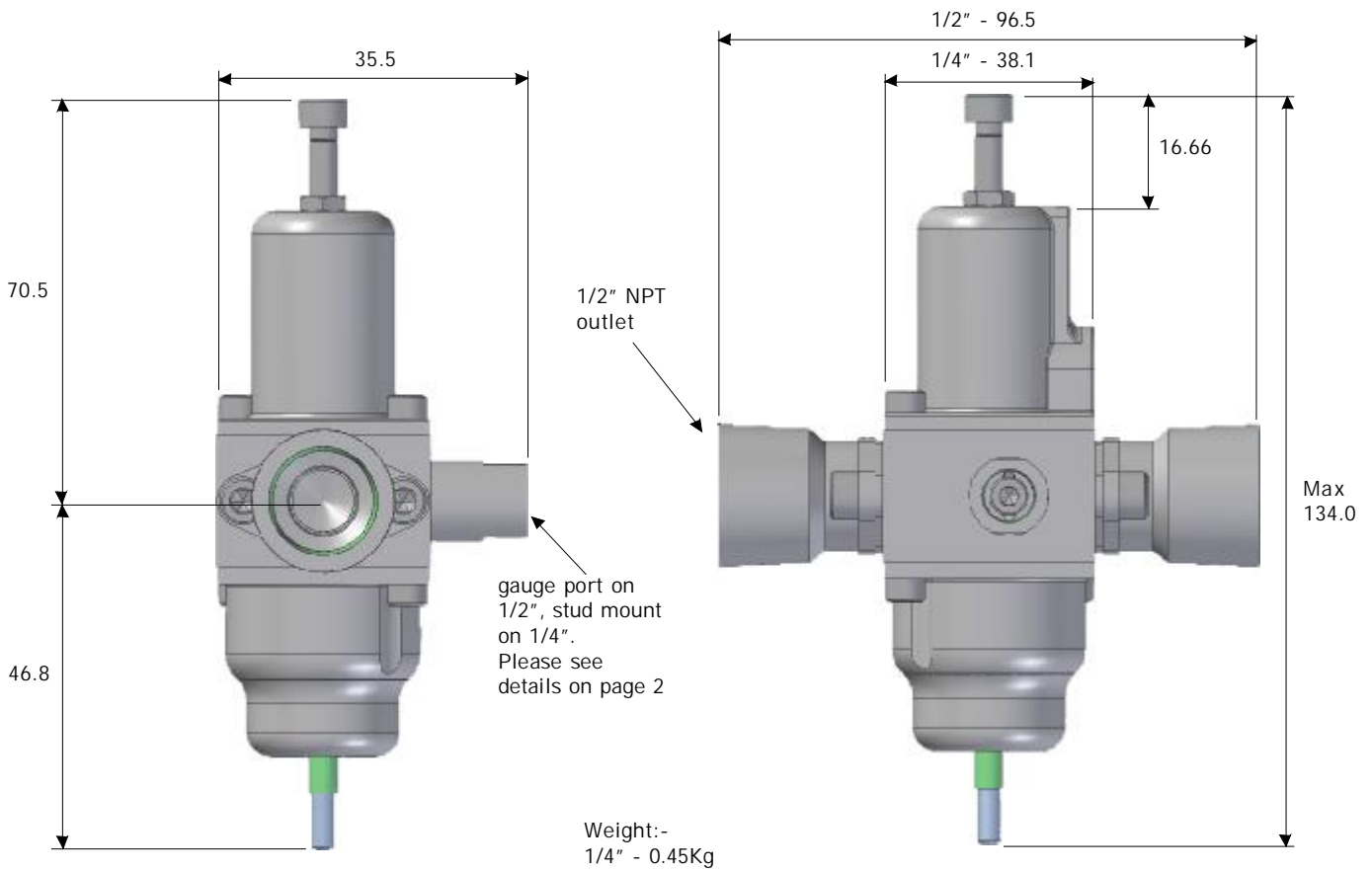
1/4" Unit



Gauge Details

3/8" & 1/2" Unit





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

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

Filter unit

10 micron, 20 - 30 micron (*standard*)
40 - 50 micron

Bowl retention capacity

25cc (manual drain), 50cc (auto drain)

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)

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



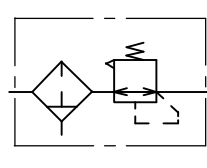


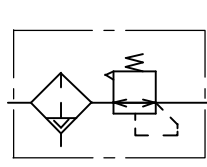


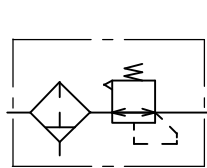


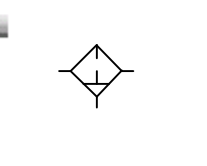


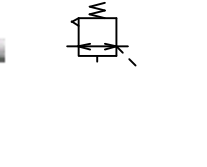



Relief Port

- 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 1.5cm³/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

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	- 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
	<i>Other scale plates available</i>

Mounting Options

	<i>(not available with -F1)</i>
L8	Panel Mount Kit
L9	Pillar Mount Kit
L46	Panel Mount and bracket

Bug Vent

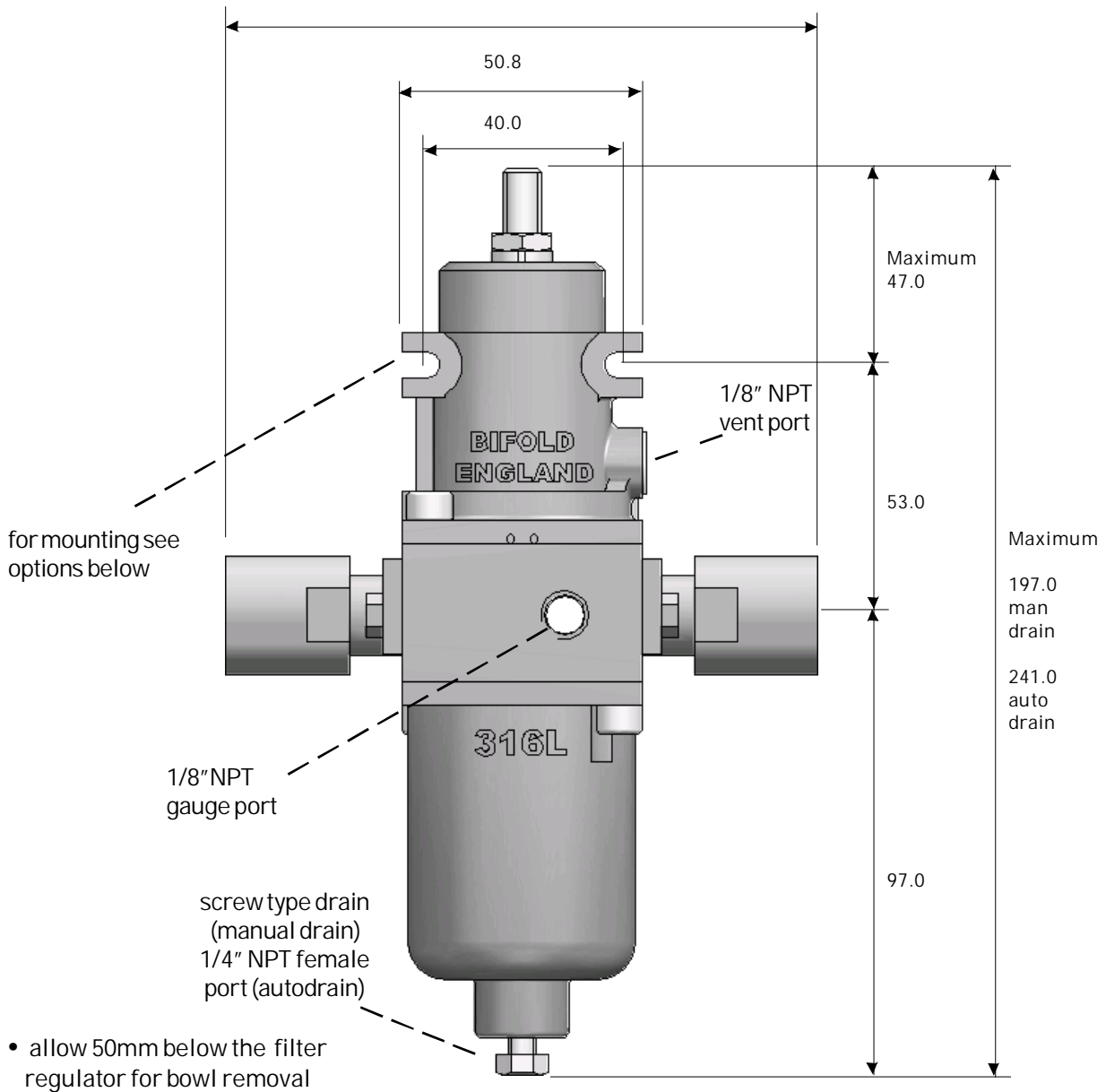
	<i>(not available with -F1)</i>
L15	13-1 bug vent

Tamperproof

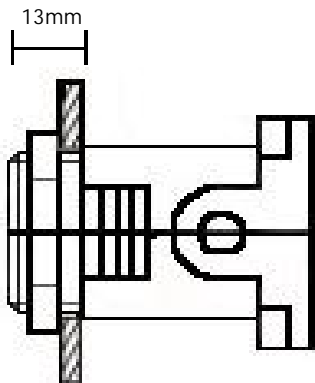
	<i>(not available with -F1 or K10)</i>
L11	Tamperproof Cap

Filter Regulator

50.8(1/4") 124.8 (3/8" & 1/2")

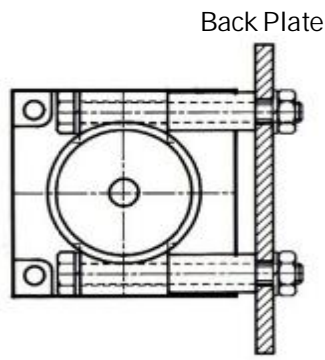


Panel Mount Kit (L8)



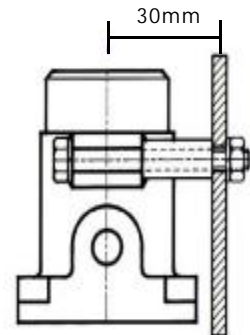
Top cap is threaded and supplied with a panel mount ring

Pillar Kit (L9)

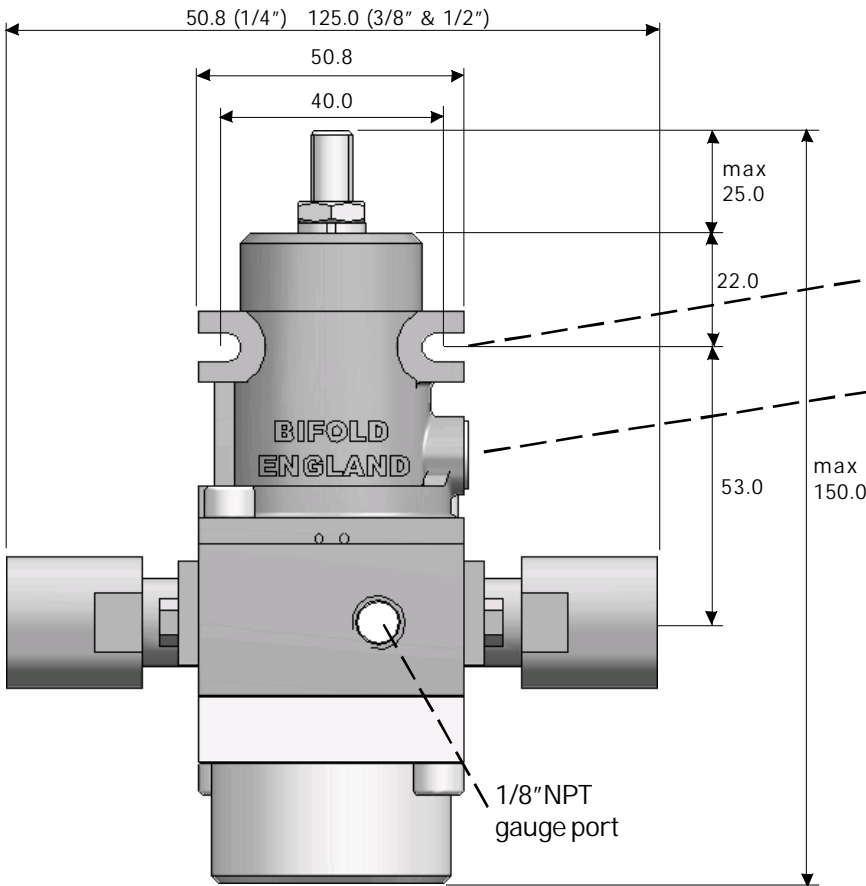


PLAN VIEW

minimum spacer size 20mm



SIDE VIEW

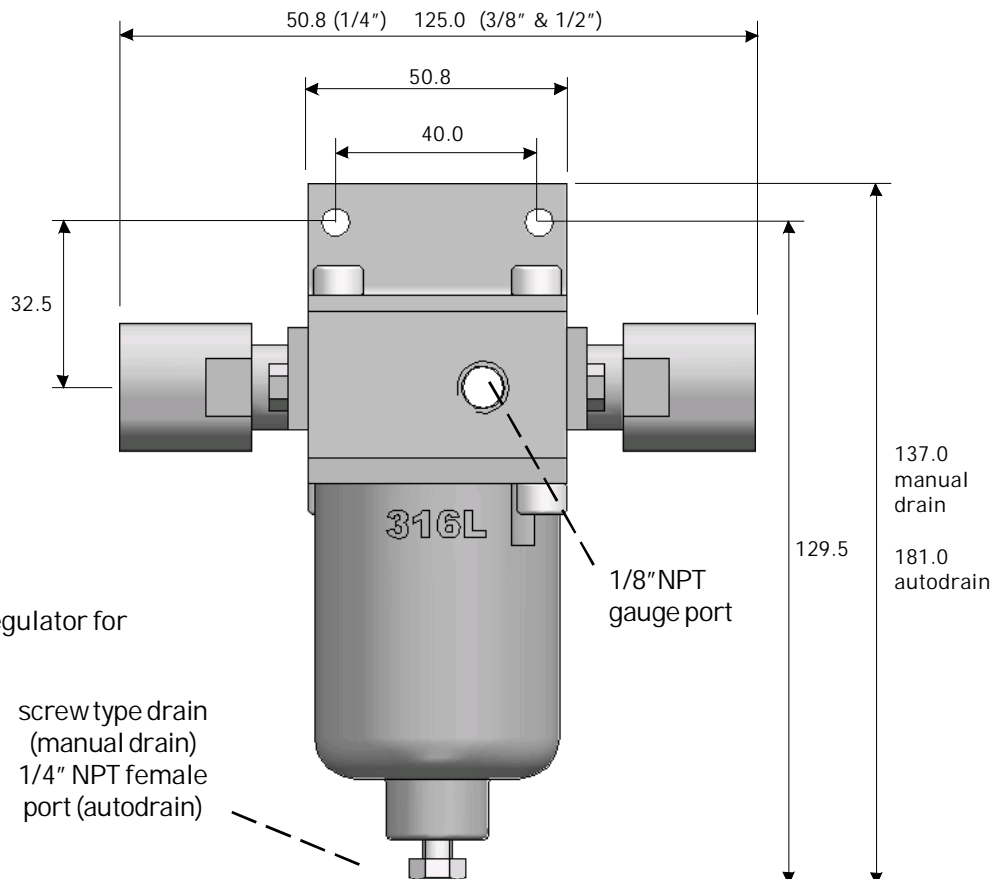


for mounting see options on previous page

1/8" NPT vent port

Regulators

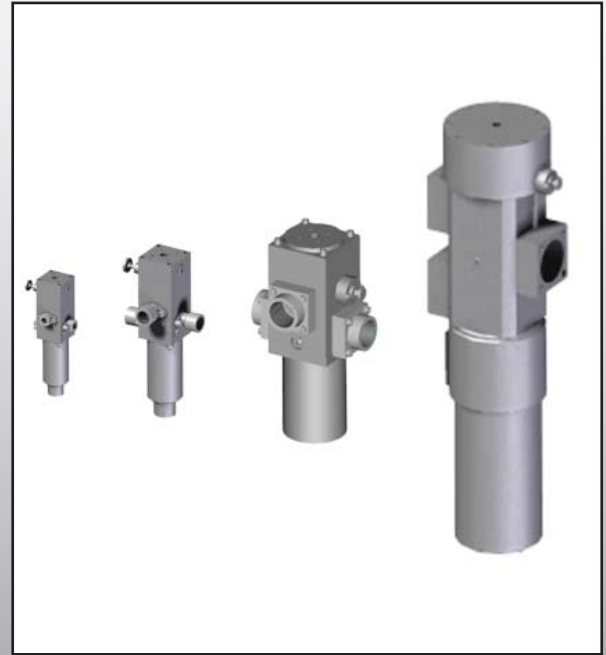
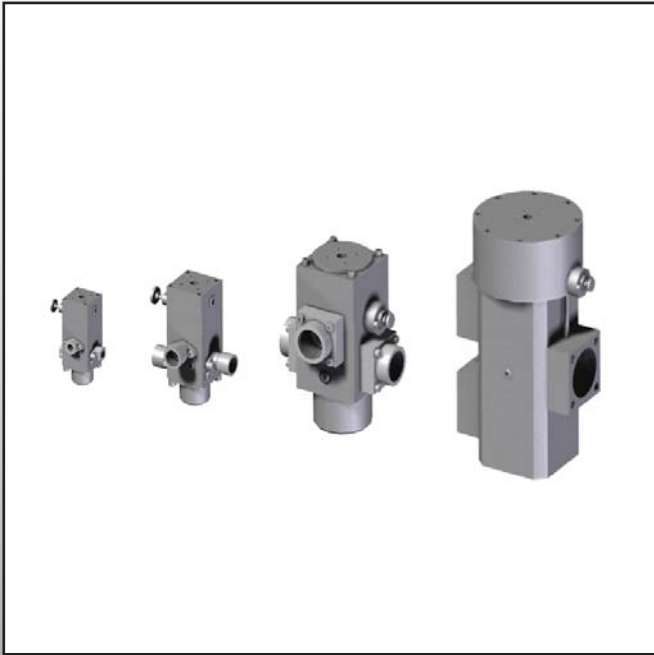
- designed specifically for use in severe and corrosive environments
- various mounting options
- 'lug' mounting as standard
- suitable for mounting in any position




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

Volume Booster & Filter Booster Range Model VBP



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: Patented
- Compact Modular Design
- 316L Stainless Steel
- Auto-Drain & Manual-Drain Filter Bowl Assembly Option

Contents

Page Number

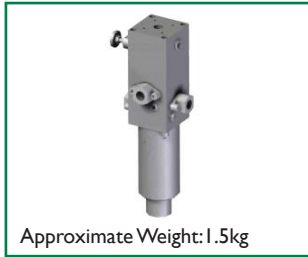
- VBP - Volume Booster & Filter Booster Range - Features & Benefits 3
- VBP - Volume Booster & Filter Booster Range - Product Ranges 4
- VBP - High Sensitivity Volume Booster Range - Product Range 5
- VBP - Volume Booster Range - Preferred Range 6
- VBP - Filter Booster Range - Preferred Range 7
- VBP - Volume Booster & Filter Booster Range - Overview 8
- VBP - Volume Booster & Filter Booster Range Selection Chart - VBP 9
- VBP - 1/4" & 1/2" Volume Booster & Filter Booster Dimensional Drawings 10
- VBP - 1" & 2" Volume Booster & Filter Booster Dimensional Drawings 11
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- Positioner Circuits Simplified - Simplified Circuits 13
- Traditionally Tubed System - Traditional System 14
- Improved Booster System Design - Booster System 15
- HIPEX - High Speed Exhaust Valve - HIPEX 16
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Features & Benefits

¼" Volume Booster



¼" Volume Booster with Filter



½" Volume Booster



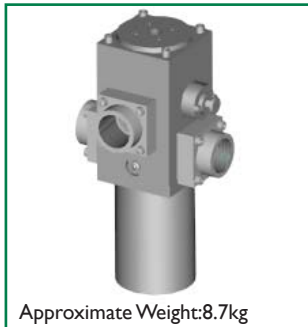
½" Volume Booster with Filter



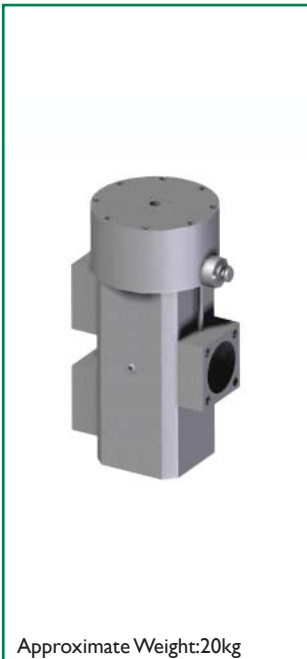
1" Volume Booster



1" Volume Booster with Filter



2" Volume Booster



2" Volume Booster with Filter



Standard Valve Equipment Design & Build

- 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.

Product Ranges



1/4" Volume Booster



1/2" Volume Booster



1" Volume Booster



2" Volume Booster



1/4" Volume Booster with Filter



1/2" Volume Booster with Filter



1" Volume Booster with Filter



2" Volume Booster with Filter



1/4" HIPEX Valve



1/2" HIPEX Valve



1" HIPEX Valve



2" HIPEX Valve

Widest range of boosters, filter boosters and HIPEX products on the market.

500% HIGHER FLOW = 1 TUBE SIZE DOWN

- Direct mounted to actuator
- Compact modular design
- Faster response times
- Inlet and venting speed control
- Block before bleed function
- Patented design

Product Range


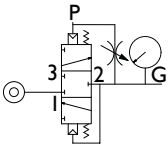


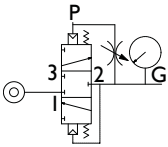


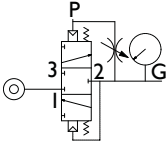


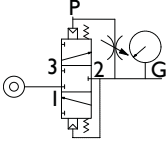

NEW!! Under development

High sensitivity version of our standard volume booster is specifically designed for increased accuracy on low pressure actuators.


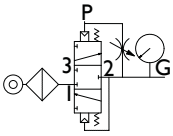


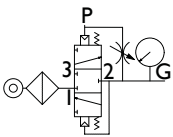

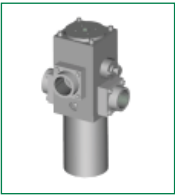
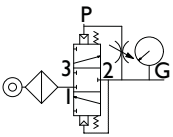


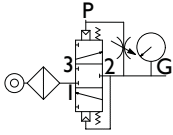



Preferred Range

VOLUME BOOSTER - PREFERRED RANGE

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>VBP 1/4" Volume Booster</p>	<p>SCHEMATIC</p> 	9	VBP-04-04-11-V-L115	<p>1/4" NPT Ports</p> <p> SIL 3 third party certified to IEC 61508 Parts 1 & 2</p>
 <p>VBP 1/2" Volume Booster</p>	<p>SCHEMATIC</p> 	9	VBP-08-08-11-V-L115	<p>1/2" NPT Ports</p> <p> SIL 3 third party certified to IEC 61508 Parts 1 & 2</p>
 <p>VBP 1" Volume Booster</p>	<p>SCHEMATIC</p> 	9	VBP-16-16-11-V-L115	<p>1" NPT Ports</p> <p> SIL 3 third party certified to IEC 61508 Parts 1 & 2</p>
 <p>VBP 2" Volume Booster</p>	<p>SCHEMATIC</p> 	9	VBP-32-32-11-V-L115	<p>2" NPT Ports</p> <p> SIL 3 third party certified to IEC 61508 Parts 1 & 2</p>

Preferred Range

FILTER BOOSTER - PREFERRED RANGE				
Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>VBP 1/4" Filter Booster</p>	<p>SCHEMATIC</p> 	9	<p>VBP-04-04-11-V-AD-X4-L115 VBP-04-04-11-V-MD-X4-L115</p>	<p>1/4" NPT Ports</p> <p> SIL 3 third party certified to IEC 61508 Parts 1 & 2</p>
 <p>VBP 1/2" Filter Booster</p>	<p>SCHEMATIC</p> 	9	<p>VBP-08-08-11-V-AD-X4-L115 VBP-08-08-11-V-MD-X4-L115</p>	<p>1/2" NPT Ports</p> <p> SIL 3 third party certified to IEC 61508 Parts 1 & 2</p>
 <p>VBP 1" Filter Booster</p>	<p>SCHEMATIC</p> 	9	<p>VBP-16-16-11-V-AD-X4-L115 VBP-16-16-11-V-MD-X4-L115</p>	<p>1" NPT Ports</p> <p> SIL 3 third party certified to IEC 61508 Parts 1 & 2</p>
 <p>VBP 2" Filter Booster</p>	<p>SCHEMATIC</p> 	9	<p>VBP-32-32-11-V-AD-X4-L115 VBP-32-32-11-V-MD-X4-L115</p>	<p>2" NPT Ports</p> <p> SIL 3 third party certified to IEC 61508 Parts 1 & 2</p>

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 ④, 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 Cv's					
Booster Size	Port Size	Conventional Schematic		Filter Booster	
		Cv		Cv	
		Output	Exhaust	Output (5 bar, effective Cv)	Exhaust
VBP-04 1/4"	04 1/4"	1	1	3	1
	06 3/8"	2	2	6.1	2
	08 1/2"	2	2	6.1	2
VBP-08 1/2"	08 1/2"	3.5	3.5	10.5	3.5
	12 3/4"	6	6	18.3	6
	16 1"	6	6	18.3	6
VBP-16 1"	12 3/4"	9	9	27	9
	16 1"	11	11	33	11
VBP-32 2"	24 1 1/2"	31	31	93	31
	32 2"	50	50	151	50

Please see opening and closing time tables on page 9.

Note: On smaller boosters CV is limited by tube or connection bore size.

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.

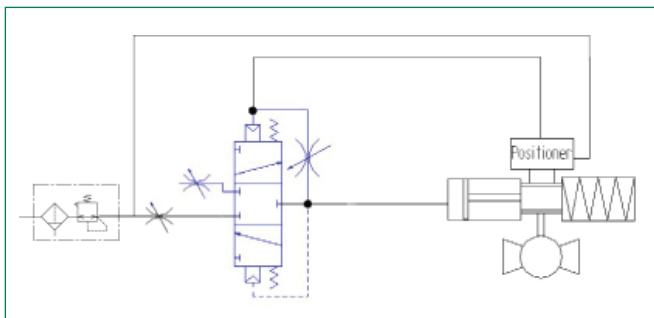
Main ports available as BSPP & BSPT options. Two gauge ports available as 1/4" NPT option or BSPP & BSPT.

VBP

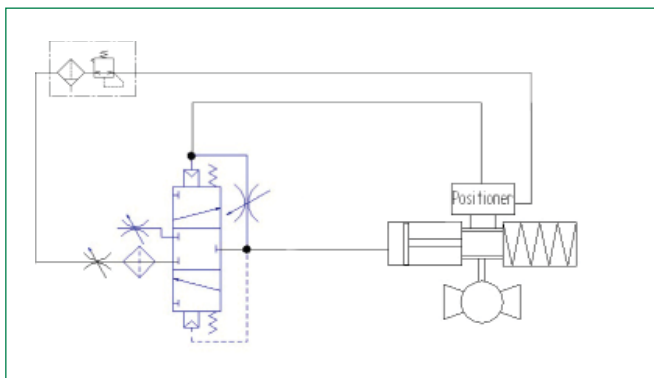
½" & 1" Volume Booster Opening and Closing Times

Example:

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)
½"	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)
½"	4	4.0	7.9
½"	5	3.1	8.8
½"	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

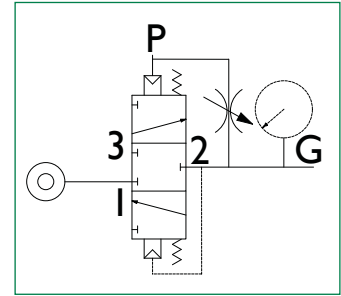
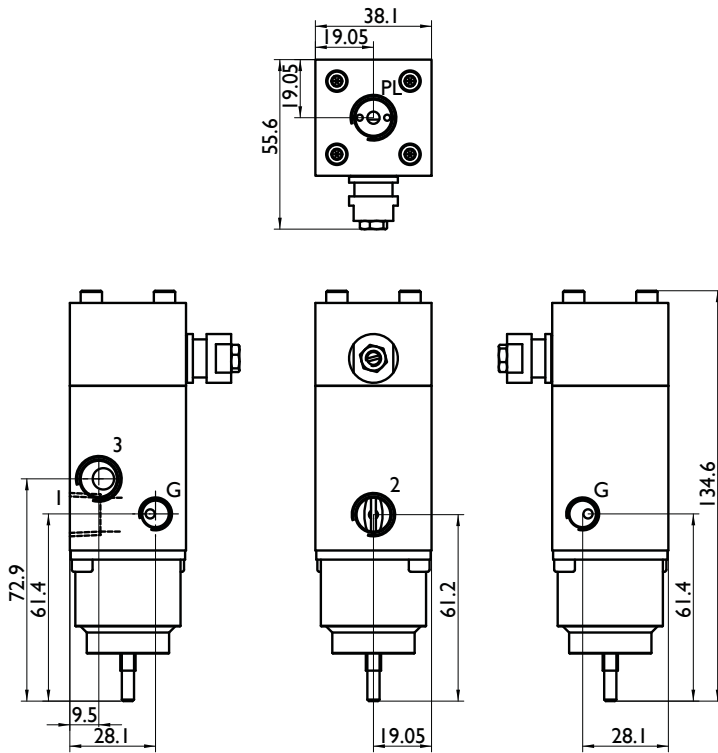
VBP-04 ¼"	Volume Booster (Piston Type) (316L stainless steel) (Port Size 04=¼", 06=⅜", 08=½")	Model Code
VBP-08 ½"	Volume Booster (Piston Type) (316L stainless steel) (Port Size 08=½", 12=¾", 16=1")	
VBP-16 1"	Volume Booster (Piston Type) (316L stainless steel) (Port Size 12=¾", 16=1")	
VBP-32 2"	Volume Booster (Piston Type) (316L stainless steel) (Port Size 24=1½", 32=2")	
04	¼" NPT	Port Sizes
06	⅜" NPT	
08	½" NPT	
12	¾" NPT	
16	1" NPT	
24	1½" NPT	
32	2" NPT	
11	Ratio pilot pressure to valve pressure (1:1)	Ratio
V	Viton (standard)	Seal Materials
AL	Fluorosilicone (arctic service)	
AD	Auto-drain* } (Filter Booster only)	Options
MD	Manual-drain* } (Filter Booster only)	
X4	40-50 Micron element* } (Filter Booster only)	Option
LI15	No brackets	Option
LI16	Knurled drain screw	Option
VBP-04-04 - 11 - V - MD - X4-LI15-LI16		Ordering Example

*Filter booster only. For alternative filter micron ratings please contact our office for details.

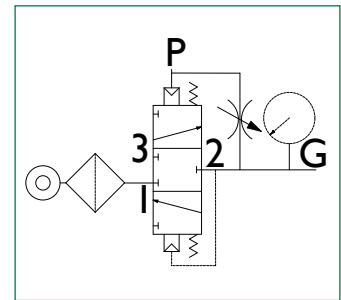
Dimensional Drawings

1/4" Volume Booster & Filter Booster

Shown with filter bowl assembly



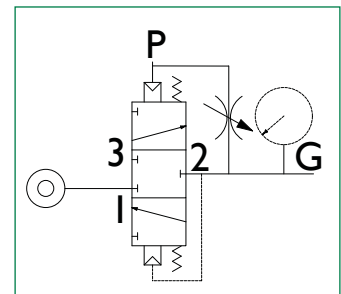
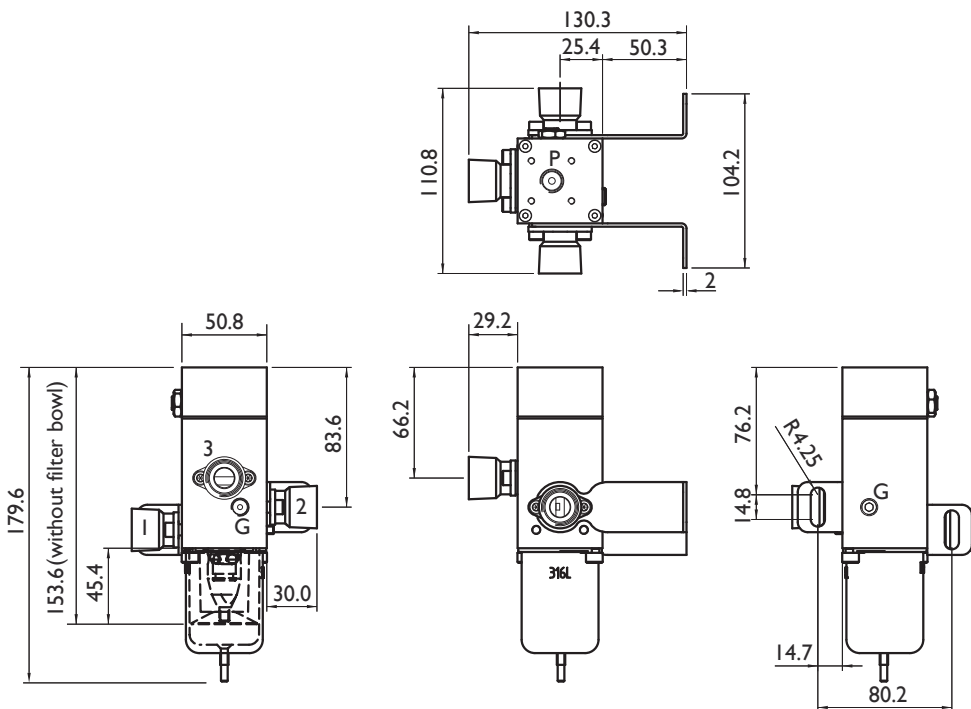
Shown without filter bowl assembly



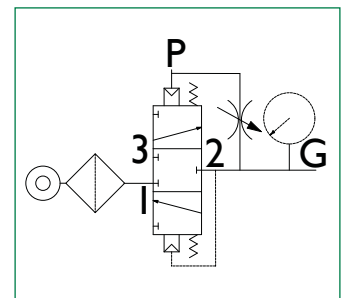
Shown with filter bowl assembly

1/2" Volume Booster & Filter Booster

Shown with filter bowl assembly



Shown without filter bowl assembly

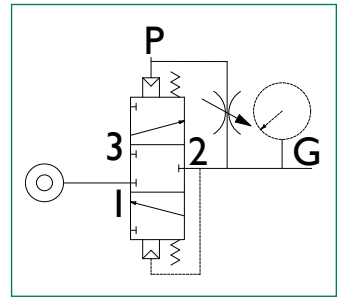
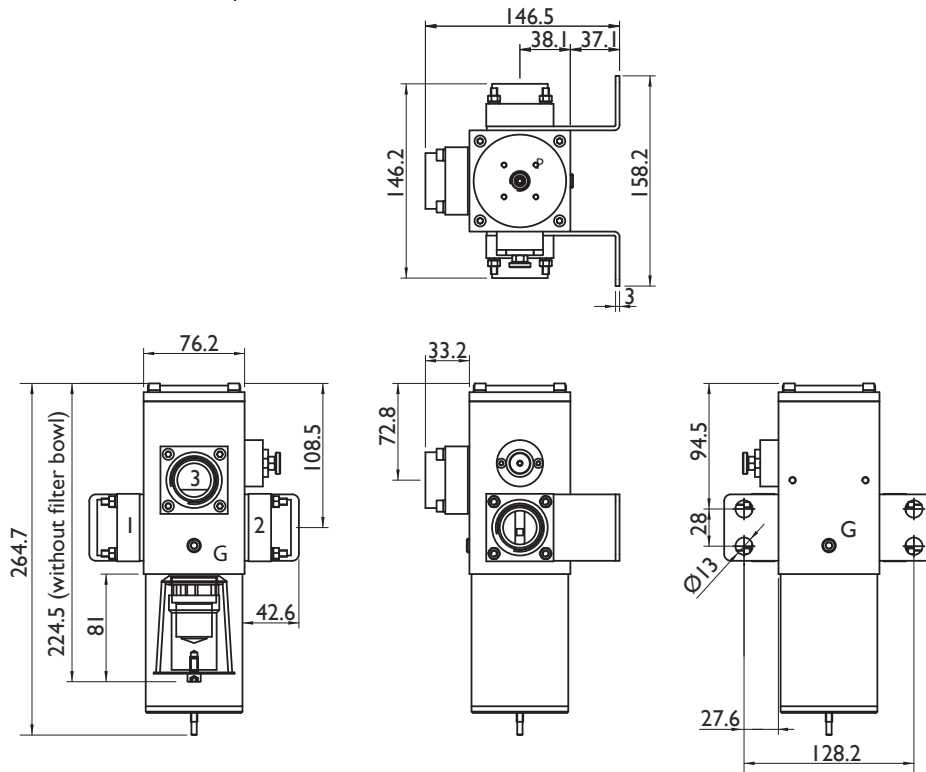


Shown with filter bowl assembly

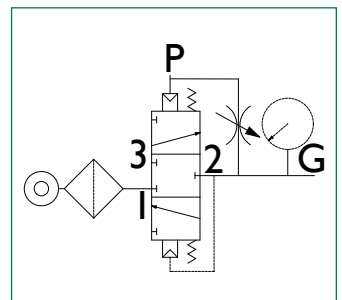
Dimensional Drawings

1" Volume Booster & Filter Booster

Shown with filter bowl assembly



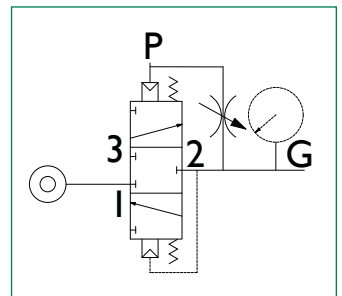
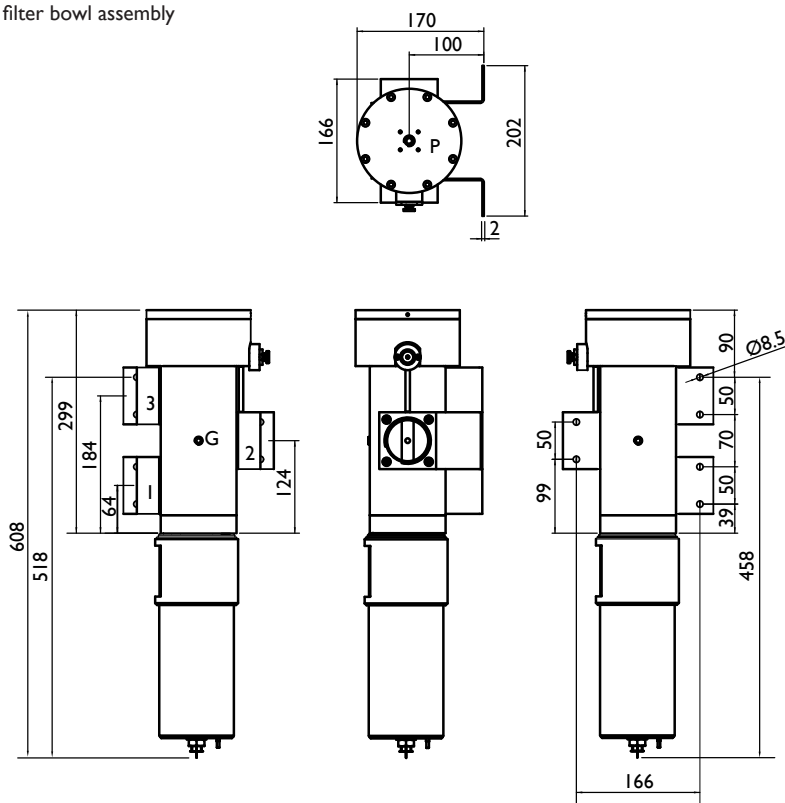
Shown without filter bowl assembly



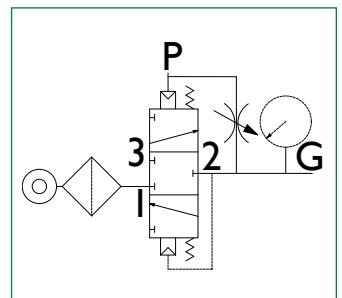
Shown with filter bowl assembly

2" Volume Booster & Filter Booster

Shown with filter bowl assembly



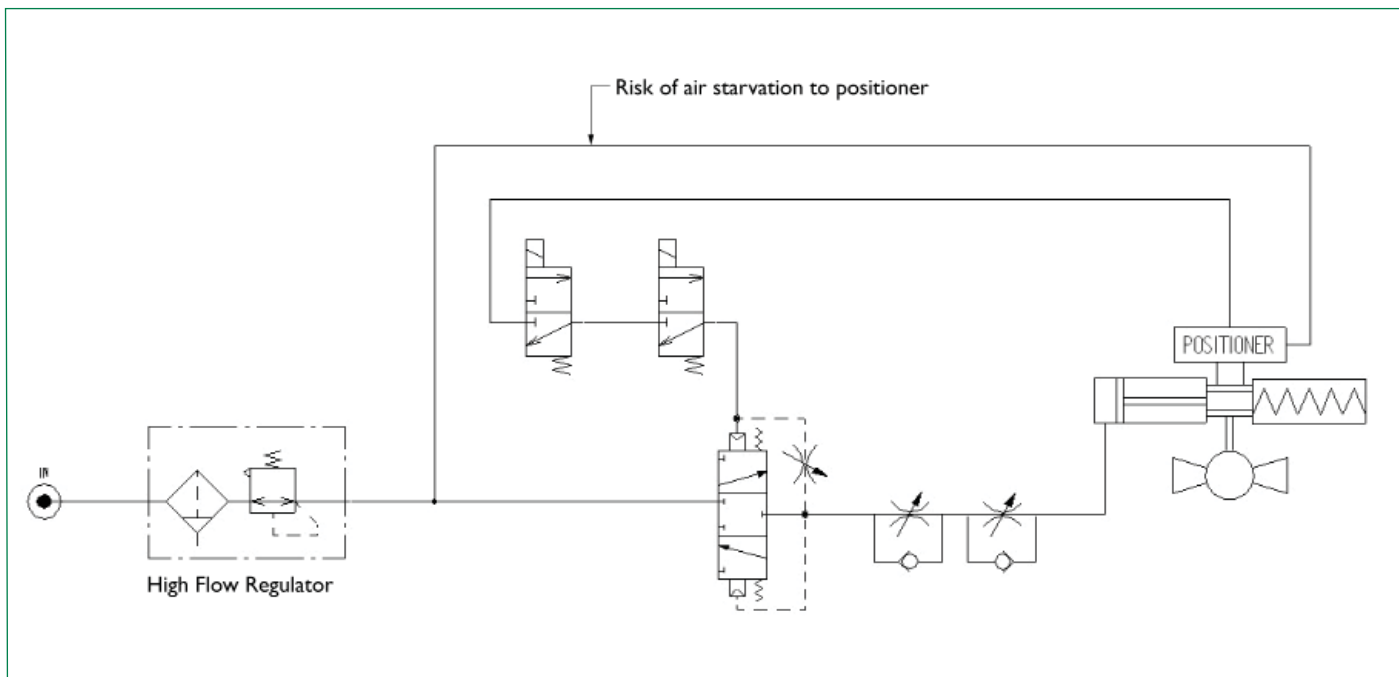
Shown without filter bowl assembly



Shown with filter bowl assembly

Simplified System

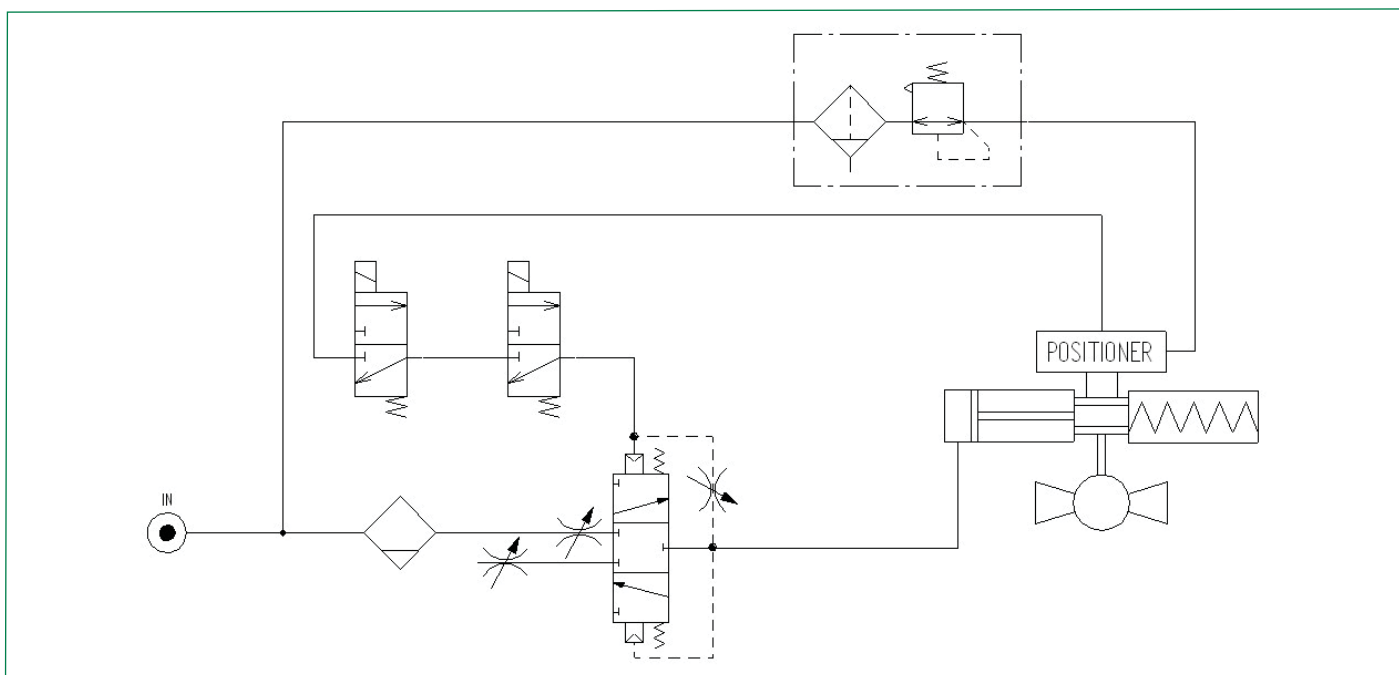
Conventional Setup



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!

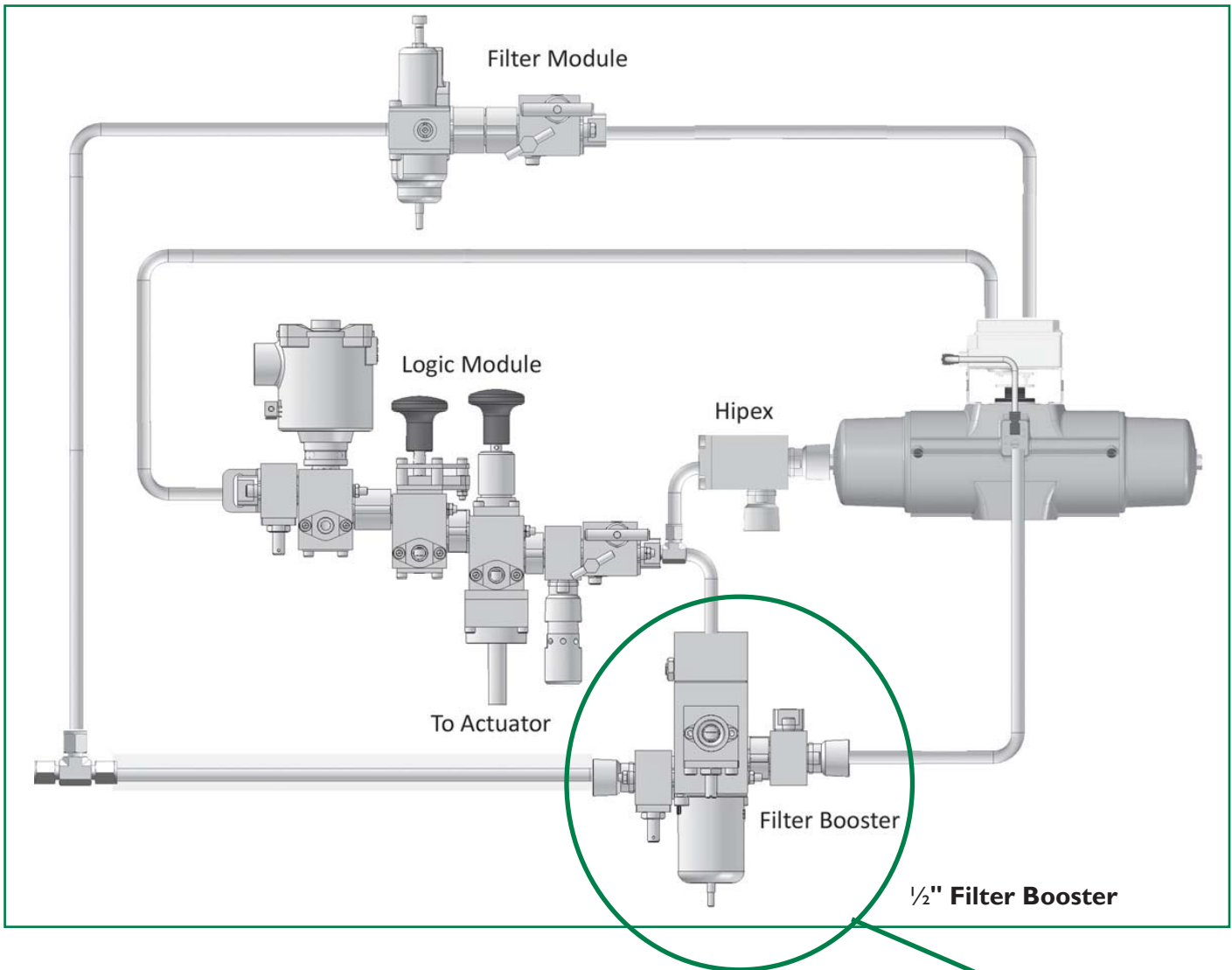
See Catalogue 03:-
 AXIS® Manifold
 System.
 See Catalogue 13b:-
 Model HIPEX Series.



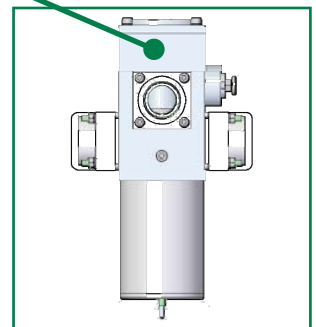
Simplified Circuits

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.



For larger circuits, simply select a larger Filter Booster.



1" Filter Booster

Traditional System

Coventional 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.

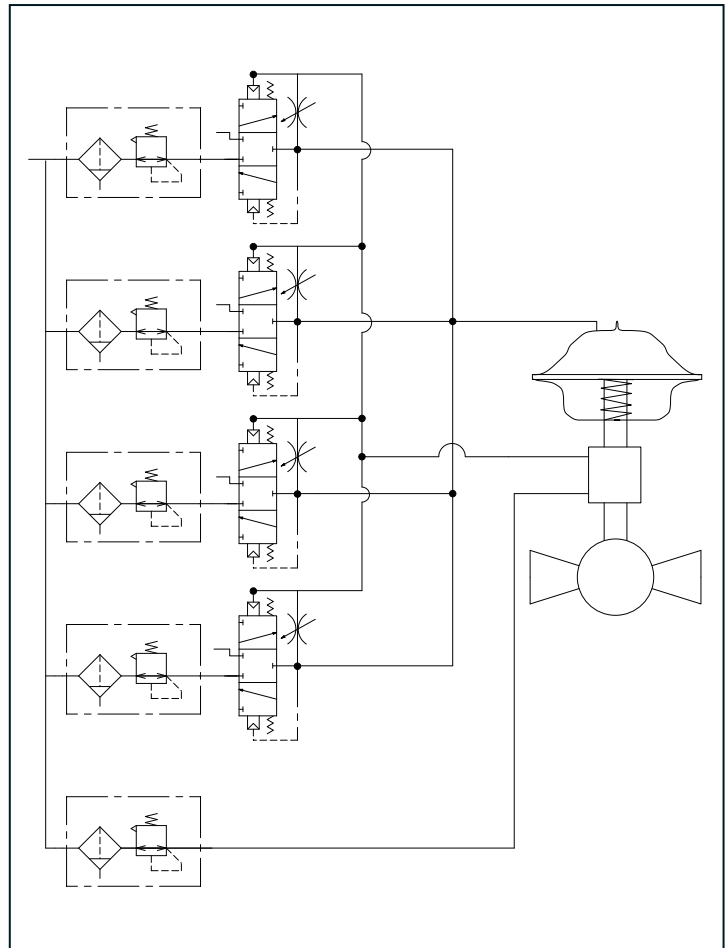
The picture below shows a traditionally tubed system with multiple Filter Regulators and Multiple Volume Boosters.

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



Conventional complicated circuit to follow
More components = **HIGHEST COST SOLUTION**

Booster System

Bifold Filter Booster System

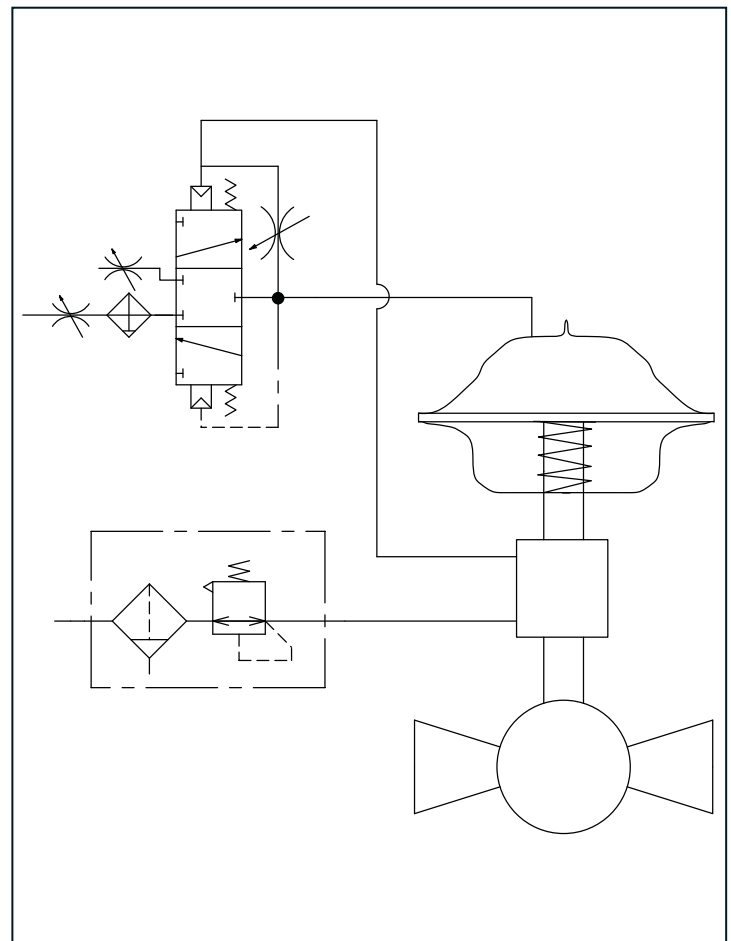
The picture below shows a simple tubed system with ONE Bifold Filter Regulator and ONE Bifold Volume Booster.

Advantages with this system are:-

This system = Faster Response Times and is simple to Install

- Optional inlet and venting speed control.
- Tidy and simple tubing/reduced fittings.
- Simple to install.
- Faster acting than 4 Filter regulators & 4 Boosters.
- Sizes available up to 2".
- Lowest overall system cost.

LOWEST COST SOLUTION



Simple circuit to follow

Fewer components = **LOWEST COST SOLUTION**

HIPEX

The Volume Booster range can be used in conjunction with the NEW Model HIPEX Series high flow, 2/2 exhaust valve range. See Catalogue I3b:- Model HIPEX Series.

¼" HIPEX Valve



½" HIPEX Valve



1" HIPEX Valve



2" HIPEX Valve



Standard Valve Equipment Design & Build

- 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 - 10 bar.
- 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

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.

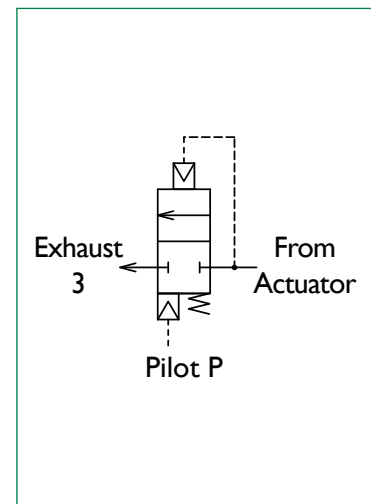
Pressure Relief Function

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'® valve actuator manifold ranges.

Schematic




*Global Presence for
Peace of Mind*

HighSpeed Exhaust Valve Range Model HIPEX Series



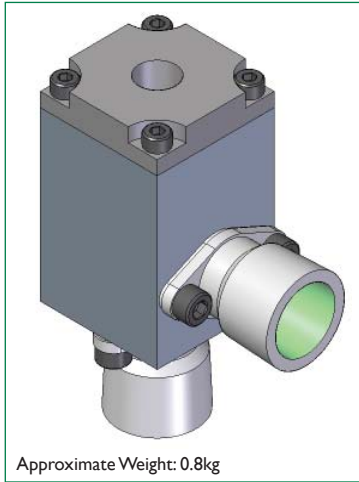
Superior Performance Throughout the Full Operational Range

-  SIL 3 Third Party Certified
- High Flow
- Additionally, Functions as a Pressure Relief Valve
- Arctic Service Options
- Sensing Pilot / Valve Seat Assembly: Patented
- Compact Modular Design
- 316L Stainless Steel or Aluminium

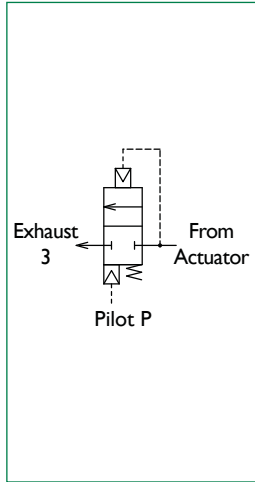
Product Features

Product

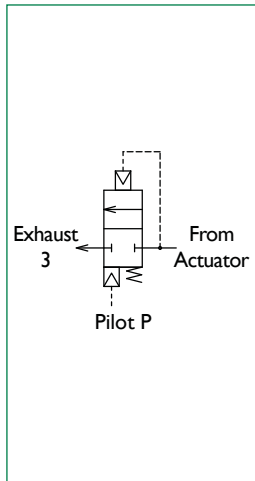
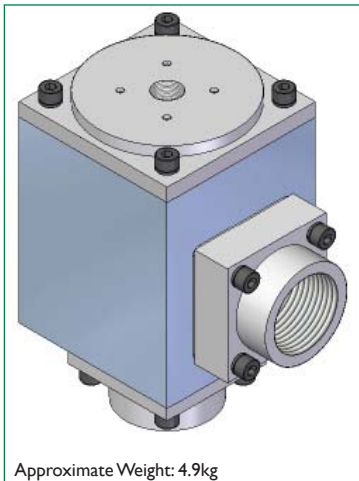
½" HIPEX Valve



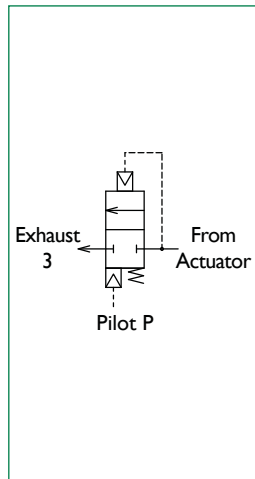
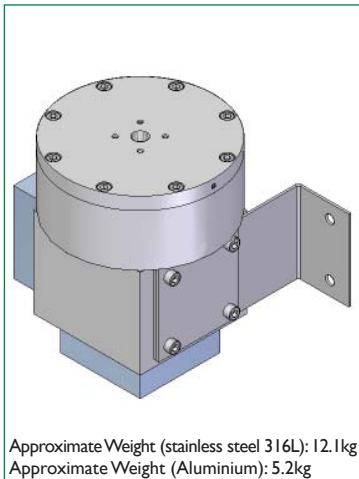
Schematic



1" HIPEX Valve



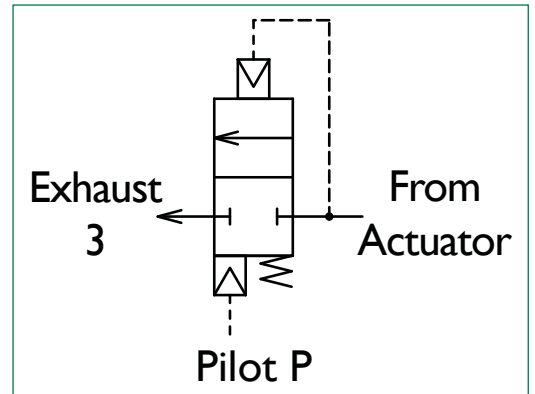
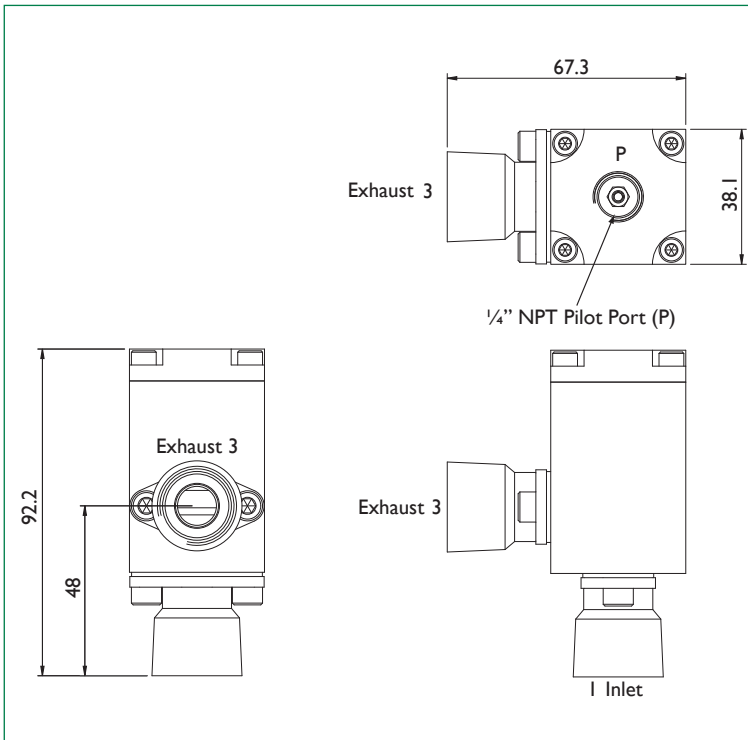
2" HIPEX Valve



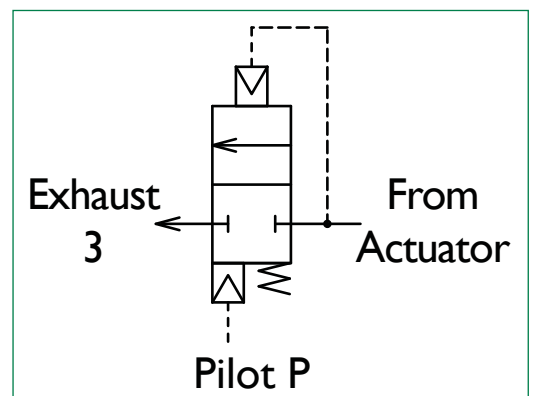
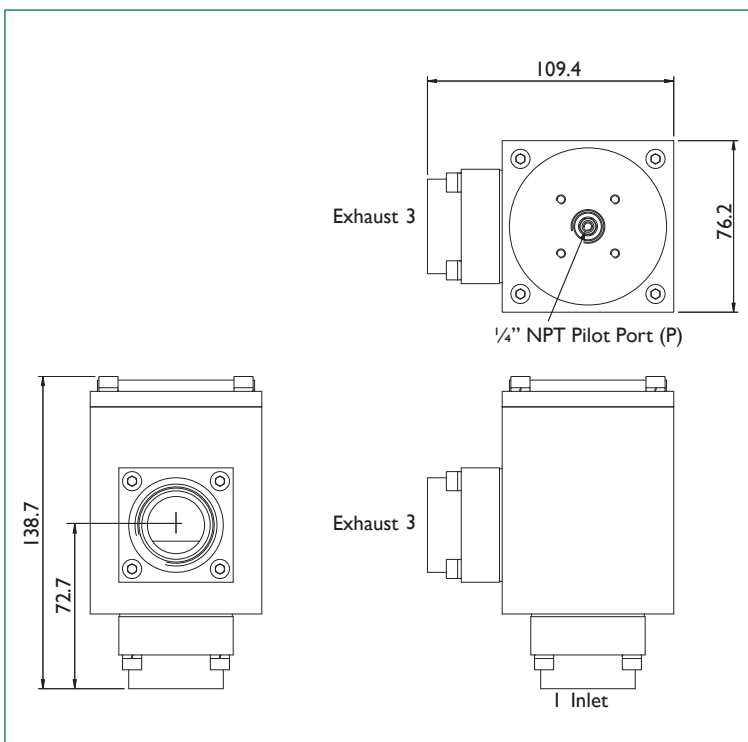
- Very high controlled exhaust flow, up to twice the equivalent Quick Exhaust Valve.
- High flow pilot operated Quick Exhaust Valve with automatic pressure sensing and pressure relief capability.
- Exhaust flow is proportional to the differential between inlet and pilot pressures.
- The valve is automatic 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.

Dimension Drawings

1/2" HIPEX Valve



1" HIPEX Valve



Overview

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 (P) 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 +40°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.

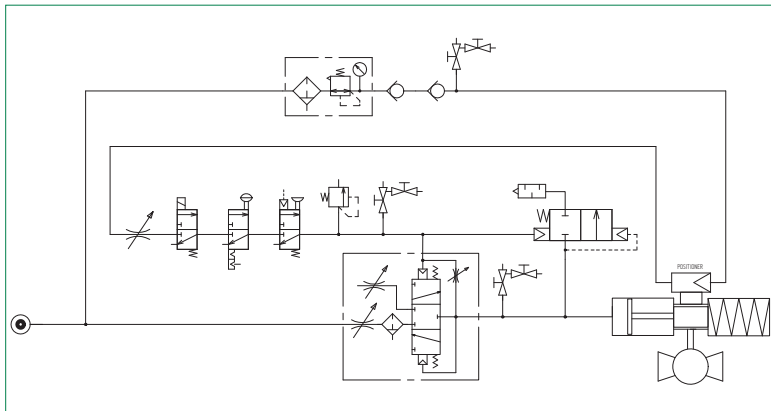
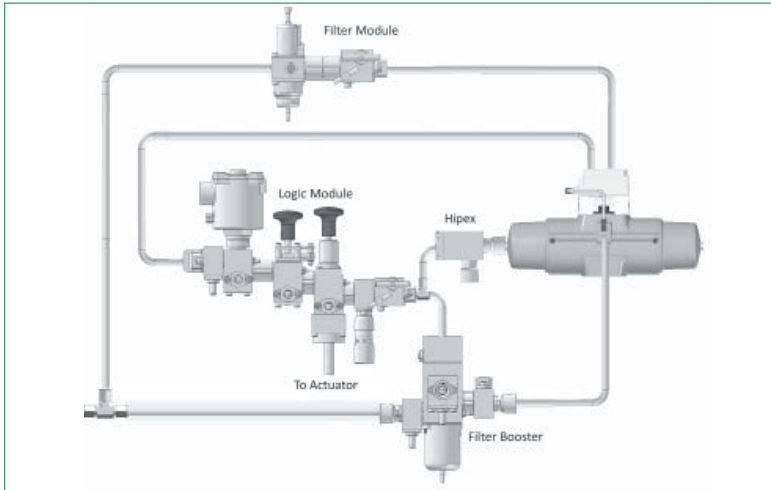
Product Options Available

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	
11	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
HIPEX - 08 - 11 - V - E - XX		Ordering Example

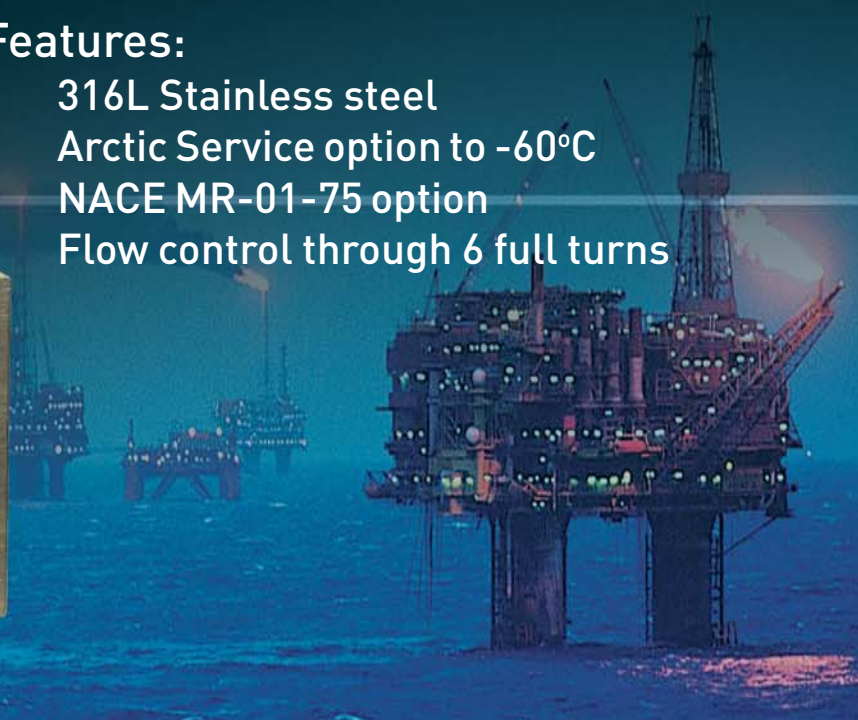
Pneumatic + Hydraulic Accessory Valves
**Flow Control Valves /
Cylinder Plug Valves**
upto 690 bar



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

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)	-	ø0.3 to 0.5 mm = 0.071mm ² to 0.192mm ² / 0.0001 in ² to 0.0003in ²
1/4" (std)	-	ø0.4 = 0.126mm ² / 0.0002in ²
3/8"	-	ø0.5 = 0.196mm ² / 0.0003in ²
1/2"	-	ø0.9 = 0.64mm ² / 0.0010in ²
3/4"	-	ø1.1 = 0.95mm ² / 0.0015in ²
1"	-	ø1.25 = 1.23mm ² / 0.0019in ²

TEMPERATURE RANGE:

See elastomer options

MEDIA:

Mineral oils, water based fluids, methanol, gases (others on request)

NEEDLE TYPE

SELECTION CHART

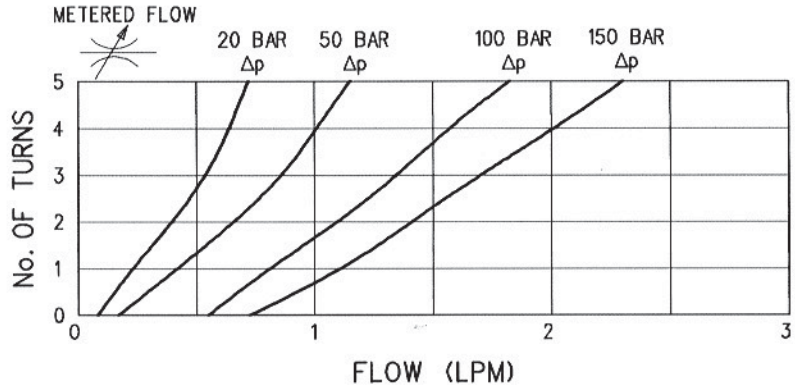
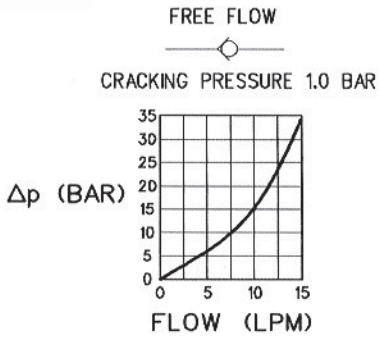
FCV		Model Code	
3	Uni-directional	Configuration	
4	Bi-directional		
0	non shut off	Metering	
1	shut off		
0	fine metering (1/4 only)	Connections	
1	standard metering		
2	coarse metering (1/2, 3/4 & 1 only)		
3	extra coarse metering (3/4 & 1 only)		
2	1/4" NPT	Maximum Working Pressure	
3	3/8" NPT		
4	1/2" NPT		
6	3/4" NPT		
8	1" NPT		
04	270 bar (3/4, 1)		Hydraulic Service
05	345 bar (1/4, 3/8 1/2)		
10	690 bar (1/4 only)		Gas Service (14 bar minimum)
02	172 bar (3/4, 1)		
03	207 bar (1/4, 3/8, 1/2)		
06	414 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	BSPP connections	Options	
PM	panel mount		
SM	side mount		
GS	gas service (high pressure)		
H2S	NACE MR-01-75		
TP	tamperproof domed locknut		
FCV 3 0 1 4 / 05 / S - K6		Example Code	

Standard hydraulic test fluid:- Marston Bentley HW540.

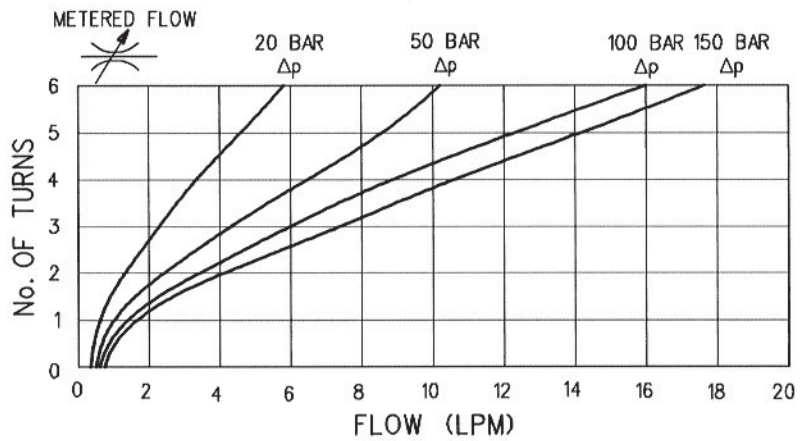
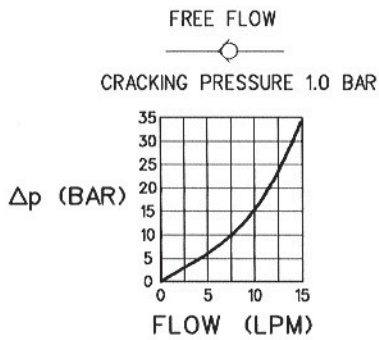
Valves for gas service tested with nitrogen and proof tested with Marston Bentley HW540

FLOW PERFORMANCE

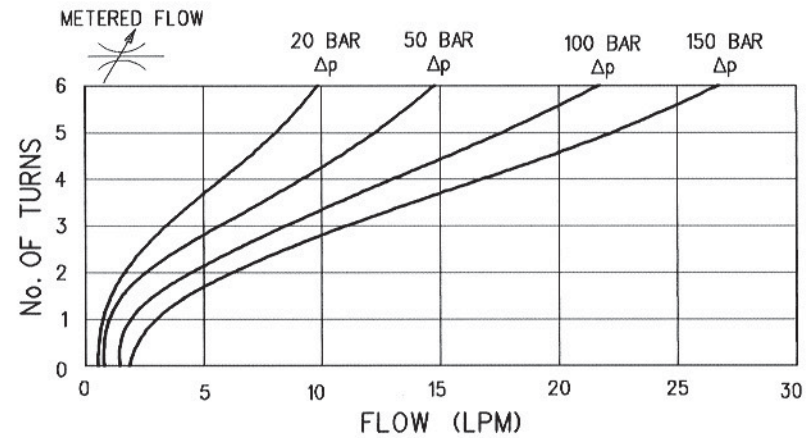
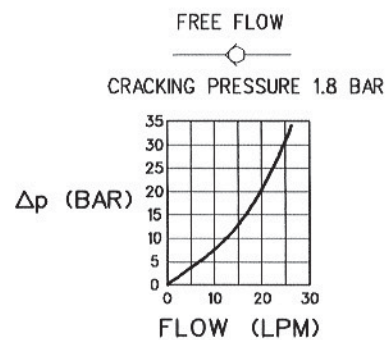
1/4" control valves (fine)



1/4" control valves (standard)

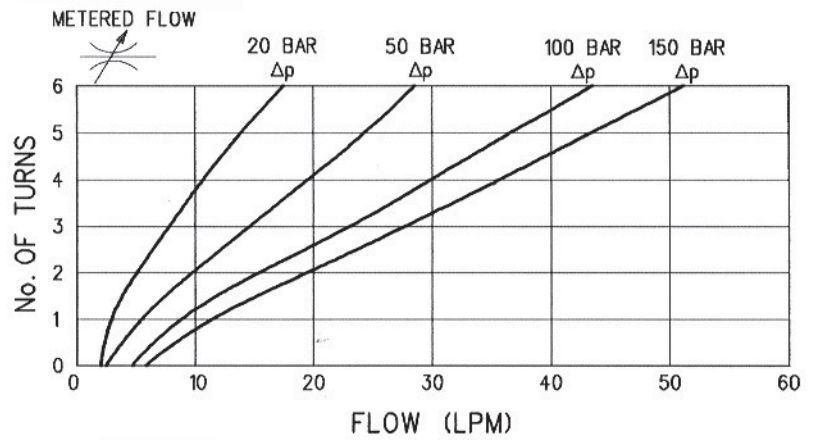
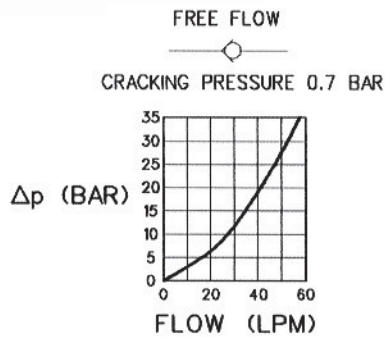


3/8" control valves (standard)

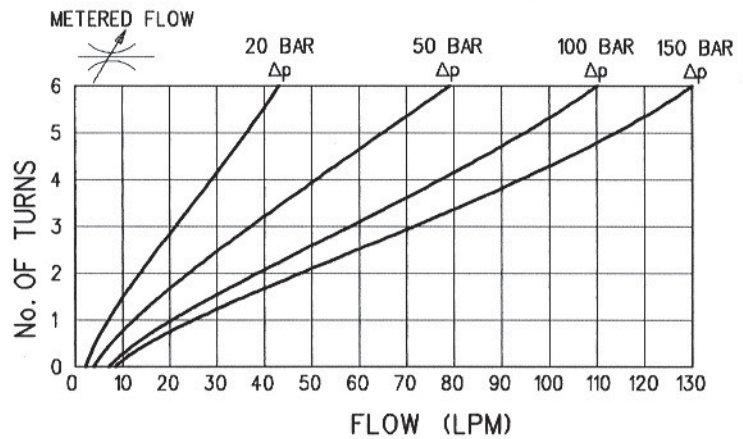
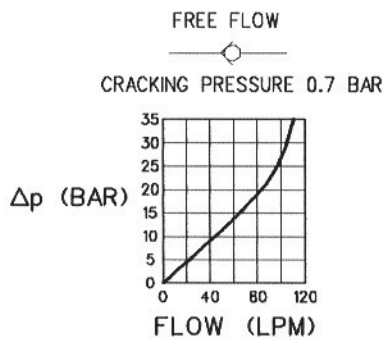


NOTES: Flow performance curves are provided as an aid to the correct selection of valve size and are only typical of a valve's performance. (Non- shut-off valves illustrated test fluid mineral oil @ 30cst).

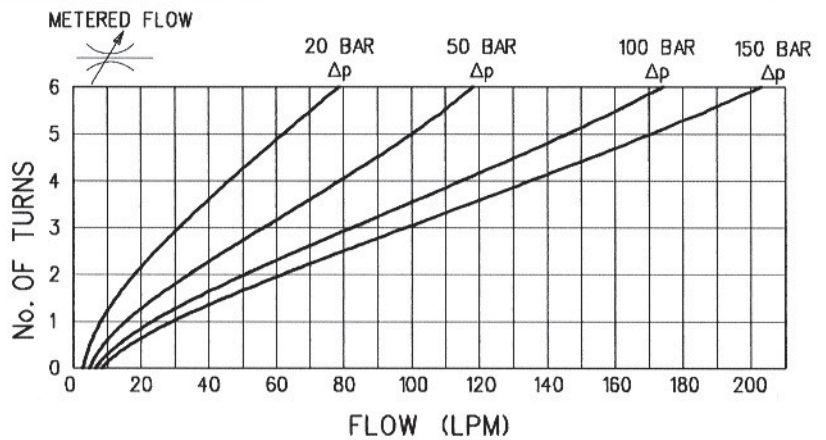
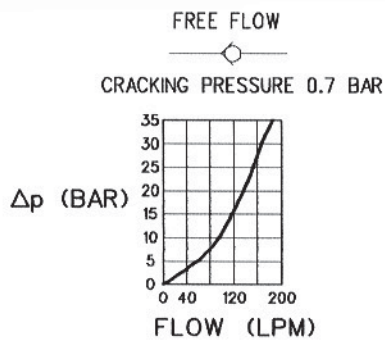
1/2" control valves (standard)



3/4" control valves (standard)



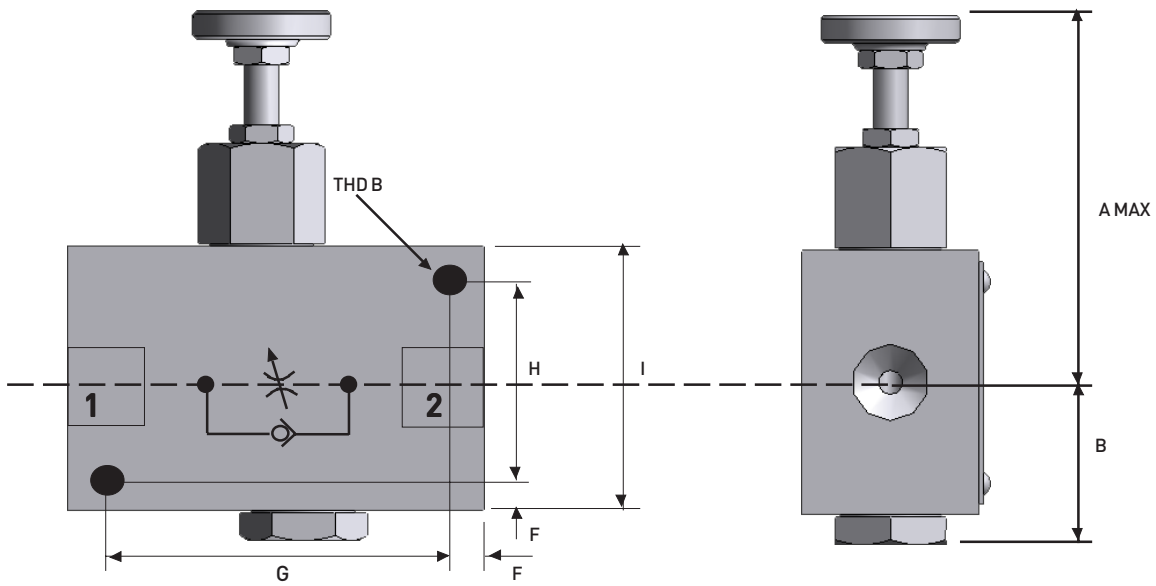
1" control valves (standard)



3000 SERIES

Fixing details

Side mount option



Panel mount option

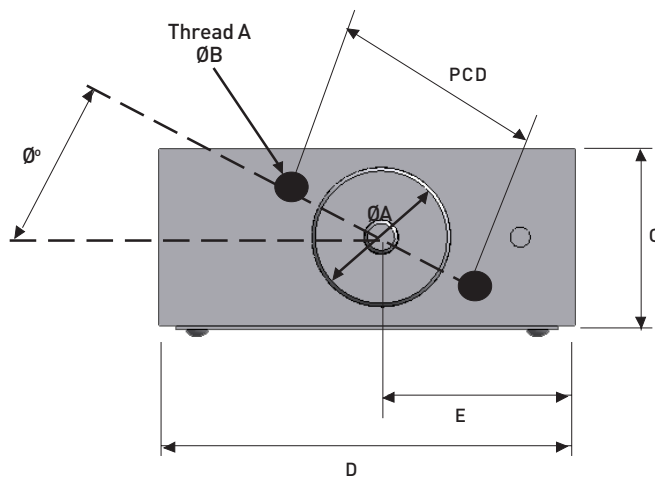


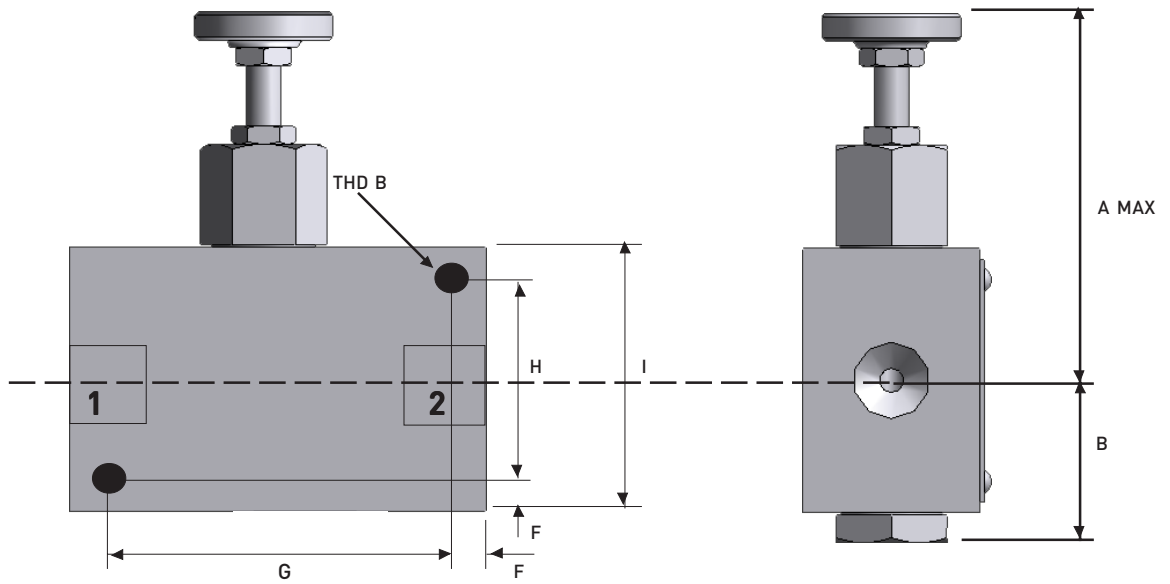
Table of dimensions

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



Panel mount option

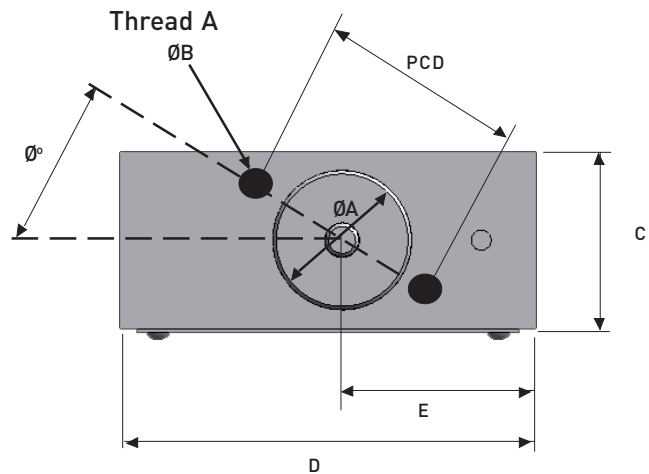


Table of dimensions																	
Valve Type	A	B	C	D	E	F	G	H	I	THD A	THD B	Panel Cut-Out				PORTS	WEIGHT
												ØA	ØB	Ø°	PCD		
4xx2	52.5	19	25.4	60	30	6	48	26	38	M5x7 DP	M5x7 DP	20.5	5.5	30°	30.0	1/4	0.45 KG
4xx3	61.5	19	25.4	63.5	31.8	5	53.5	28.1	38	M5x7 DP	M5x7 DP	24.5	5.5	25°	35.0	3/8	0.55 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

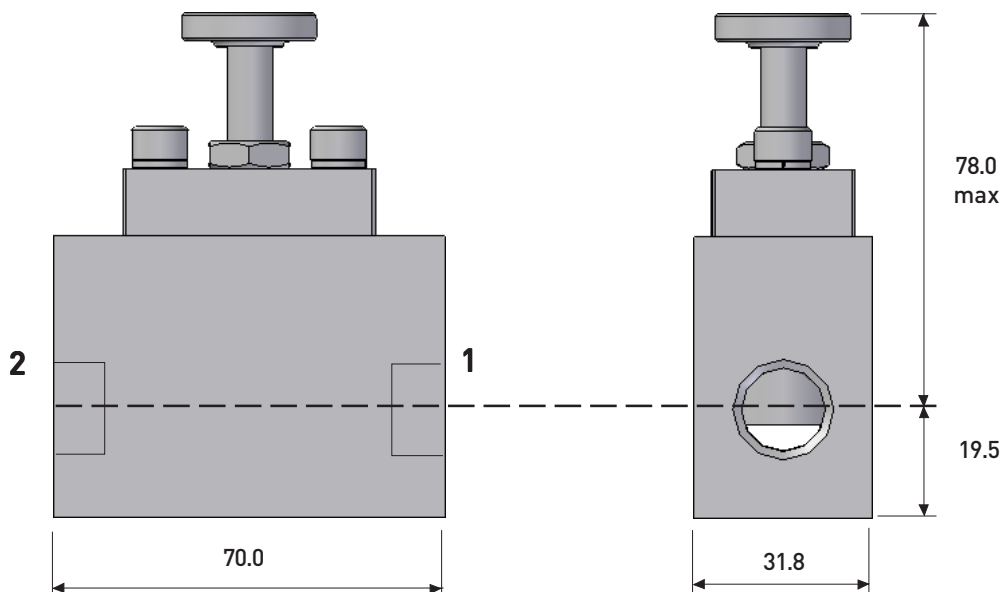
CYLINDER PLUG TYPE

SELECTION CHART

FCV							Model Code
5 Bi-directional							Configuration
0 non shut off							Metering
1 standard metering							Connections
2 1/4" NPT 3 3/8" NPT 4 1/2" NPT 6 3/4" NPT 8 1" NPT							Maximum Working Pressure
04 270 bar (3/4, 1) <i>Hydraulic</i> 05 345 bar (1/4, 3/8, 1/2) <i>Service</i> 10 690 bar (1/4 only)							O-Ring Material
S nitrile (standard) -30°C to +130°C V viton -20°C to +180°C A flourosilicone -50°C to +40°C							Options
K6 BSPP connections 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

TECHNICAL DATA

OPERATING MEDIA

- Air, sweet and sour gas, hydraulic oil

MECHANICAL CONSTRUCTION

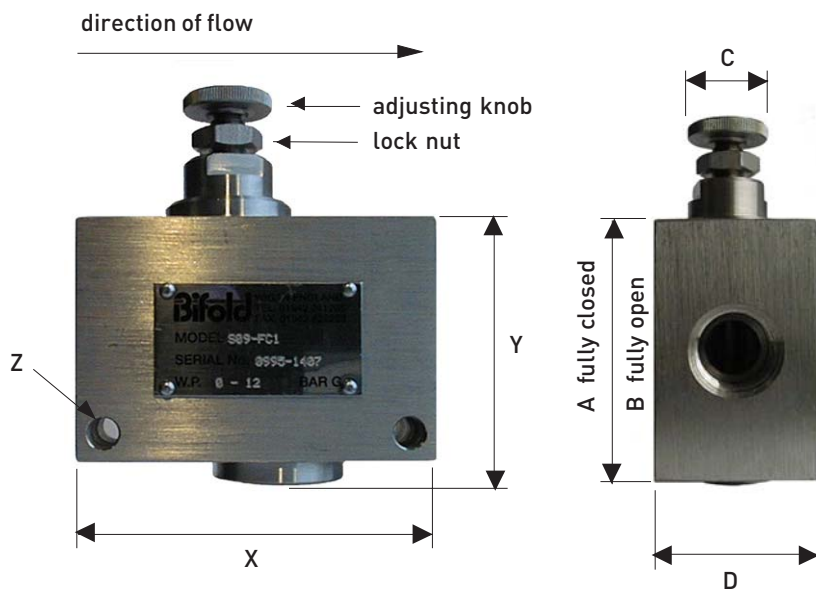
- Body:- stainless steel 316L
- Fasteners:- Metric A4 18/10 316 grade stainless steel
- Seals:- Viton (standard). Alternative elastomers available for extreme conditions
- Springs:- stainless steel 316 S42
- Hand buttons stainless steel 316L

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:

S	standard service	(-20°C to +180°C)	Model Code					
SE	standard service (engineered)	(-20°C to +180°C) - 1/4" NPT ONLY						
AS	arctic service	(-60°C to +40°C)						
06	1/4" NPT	Port Sizes						
09	3/8" NPT							
12	1/2" NPT							
19	3/4" NPT (FC1 only)							
25	1" NPT (FC1 only)							
FC1	Flow Control	- uni-directional	Configuration					
NV	Needle Valve	- bi-directional						
K6	BSP ported	Options						
FM	fine metering (FC1 only)							
K32	tamper proof							
L117	constant bleed							
S	12	-	FC1	-	K6	-	L117	Ordering Example

CYLINDER TYPE SELECTION CHART:

S	standard service	(-20°C to +180°C)	Model Code		
AS	arctic service	(-60°C to +40°C)			
06	1/4" NPT		Port Sizes		
09	3/8" NPT				
12	1/2" NPT				
19	3/4" NPT				
25	1" NPT				
	CPV	Cylinder plug valve - bi-directional	Configuration		
		K6 BSPP ported	Options		
		K32 Anti tamper cap			
		xx Revision Number	Revision		
S	06	- CPV	- K6	- 01	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:

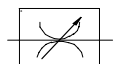


SE06-FC1

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

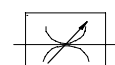


SE06-NV

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

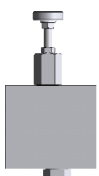


S06-CPV-01

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

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.

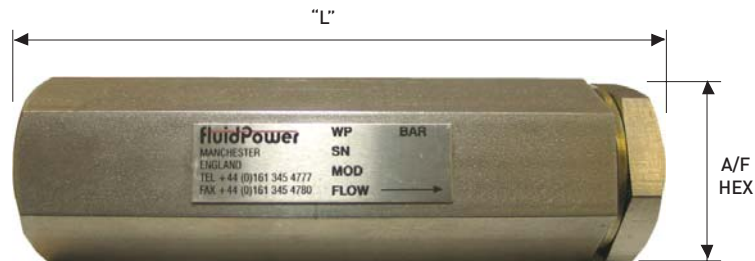
The filters are an all stainless steel construction; the body is 316L grade stainless steel and the pleated elements are also 316 stainless steel.

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:

F				Model Code
	4	1/4" NPT		Connections
	6	3/8" NPT		
	8	1/2" NPT		
	03	3 micron absolute		Filter Rating
	10	10 micron absolute		
	25	25 micron absolute		
	S	Nitrile	(-30°C to +130°C)	O-ring Material
	V	Viton	(-20°C to +180°C)	
F	8 / 10 / S			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.

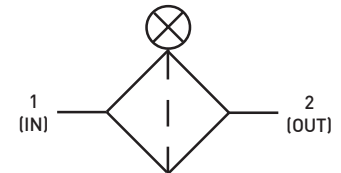
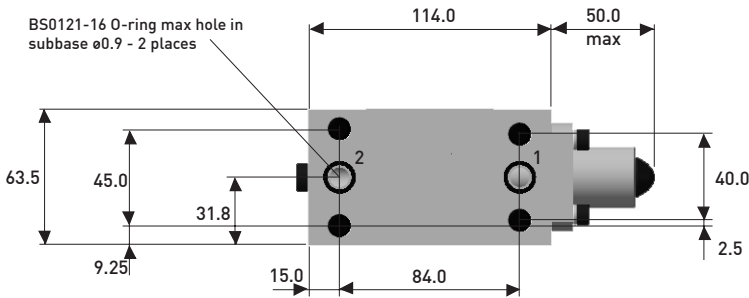
The filters have considerably greater dirt holding capacity and flow capability than most "last chance" filters and are therefore also suitable as primary filters for low flow hydraulic systems, particularly hand pump units.

Type BF(A)8 is body ported and Type BFM8 is manifold mounting.

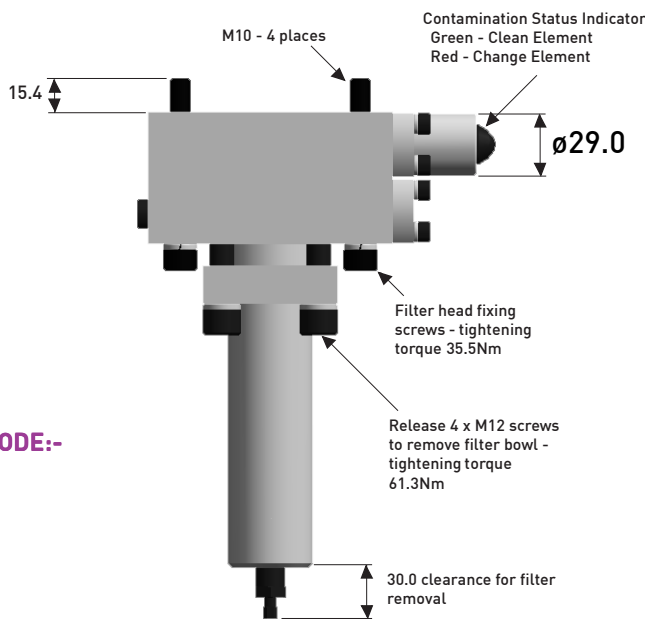
Element particle removal ratings are 3, 10 or 25 micron absolute, and the stainless steel mesh elements have a collapse pressure of 200 bar.

The filters are an all stainless steel construction; the body is 316L grade stainless steel and the pleated elements are also 316 stainless steel.

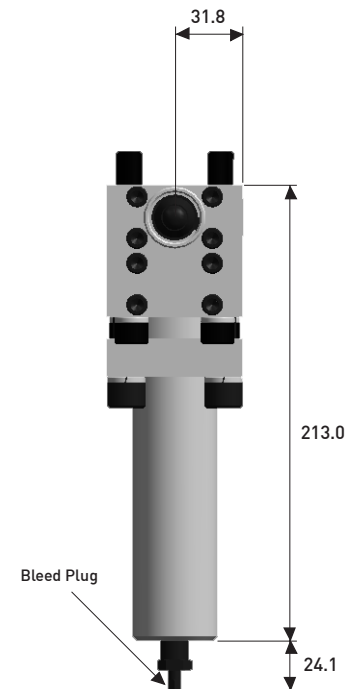
Filter Ratings (available all sizes)	
3 Micron absolute	1 Nominal
10 Micron absolute	3 Nominal
25 Micron absolute	15 Nominal



Weight:- Approx 5.0 Kg



EXAMPLE CODE:-
BFM8/10/S/SI



SELECTION CHART:

BF(A)8	1/2 NPT ported	Model Code
BFM8	manifold mounting	
03	3 micron absolute	Filter Rating
10	10 micron absolute	
25	25 micron absolute	
S	Nitrile (-30°C to +130°C)	O-ring Material
V	Viton (-20°C to +180°C)	
SI	Visual clogging indicator (BFM model only)	Options
BFM8 / 25 / S / SI		Example Code



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_L : 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

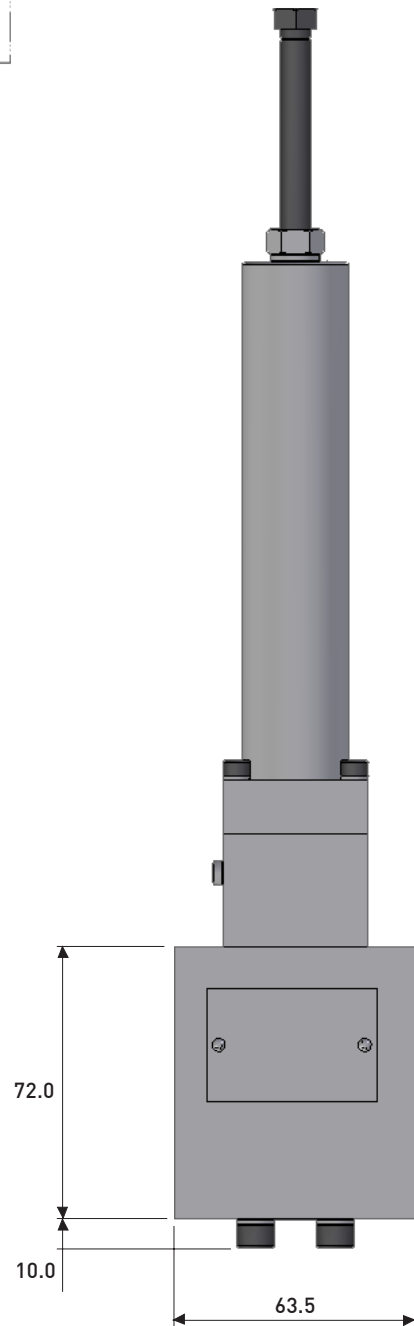
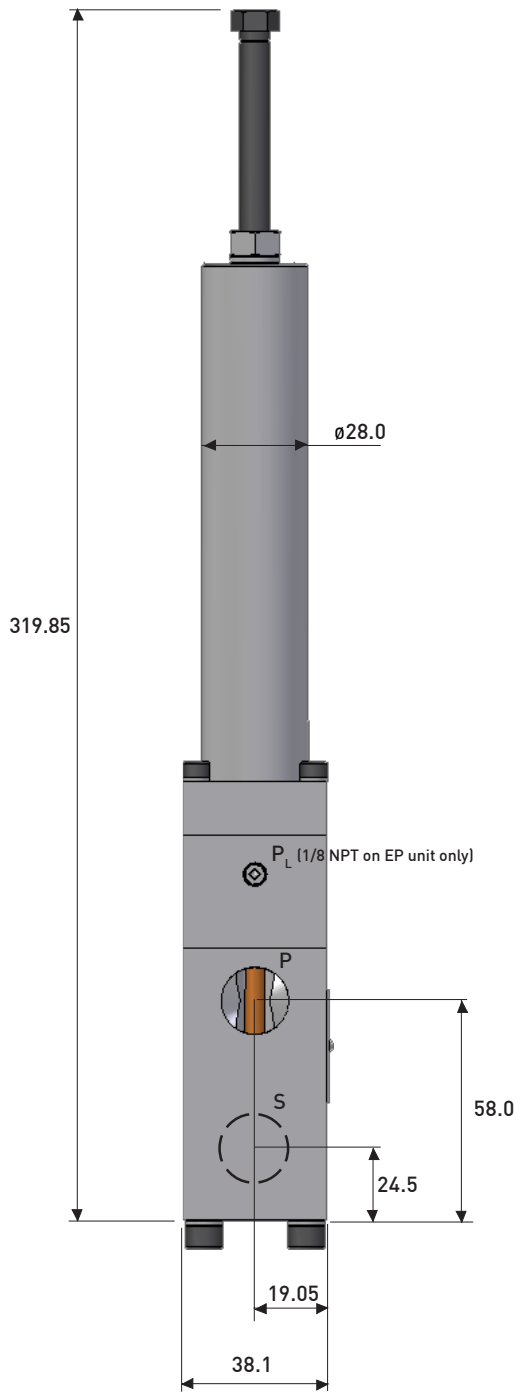
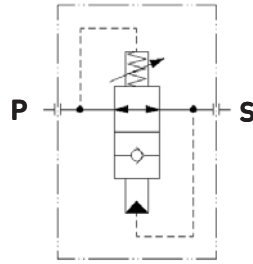
Prior to installation of the control valves it is recommended that the hydraulic system is thoroughly cleaned and flushed to NAS 1638 Class 9 (ISO 4406 Class 18/15) or better. Where this level of cleanliness cannot be guaranteed it is recommended that suitable filtration local to the valve or control system as appropriate is installed.

SELECTION CHART:

ASBV40		Model Code
18	50 lpm nominal	Flow Rating
35	150 lpm nominal (available 2005. Consult Bifold Fluidpower)	
05	345 bar	Working Pressure
S	Nitrile (-30°C to +130°C)	O-ring material
V	Viton (-20°C to +180°C)	
EP	Externally Piloted	
ASBV40 18 / 05 / S / EP		Example Code

EXAMPLE MODEL:-

ASBV4018/05/S



The background of the entire page is a dark, blue-tinted photograph of an industrial facility, likely an oil refinery or offshore platform, illuminated by various lights. The scene is complex, with many pipes, structures, and lights visible against the dark sky and sea.

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:

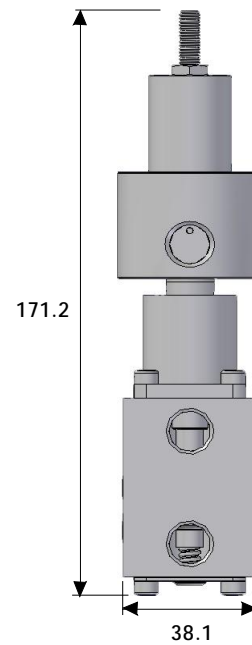
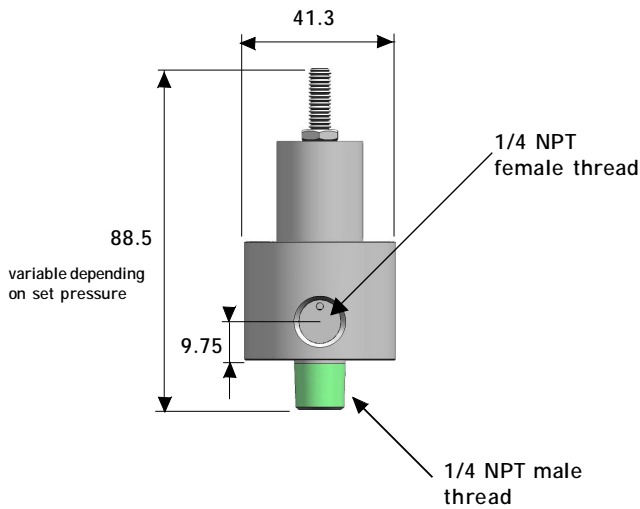
- -20°C to +180°C ambient.
- -50°C to +40°C ambient.

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

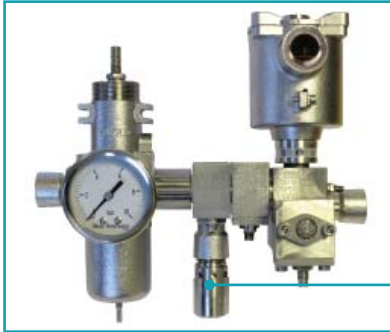
S06 AS06	1/4" NPT standard service 1/4" NPT arctic service	Model Code
	PSV Pressure Sensing Valve	
	K6 BSPP ports	Options
S06 - PSV - K6		Ordering Example

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 reseat.

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.

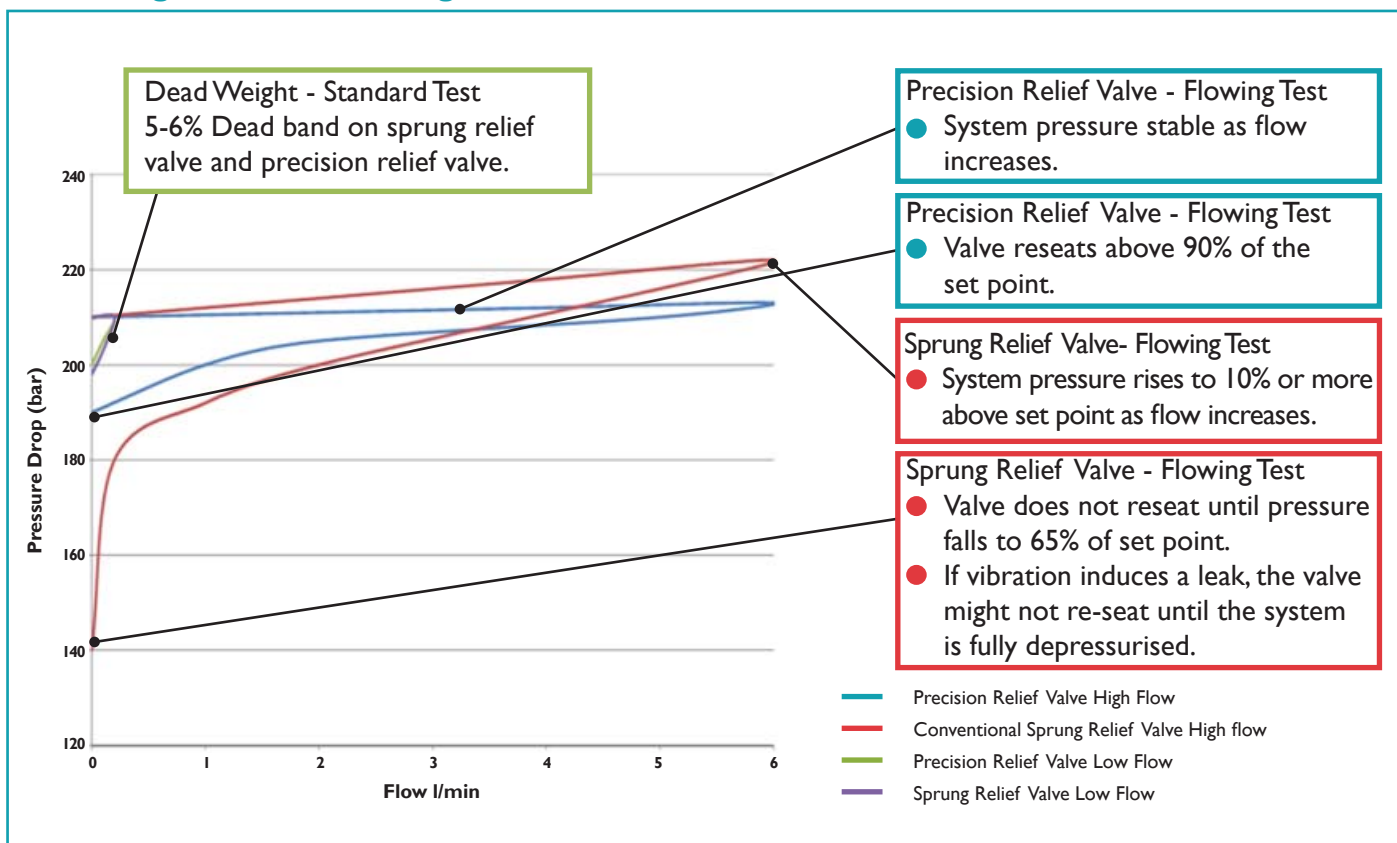
Summary

Precision relief valves are safe and leak free under almost all applications. Knowledge of relief valve performance is required when using simple sprung reliefs.

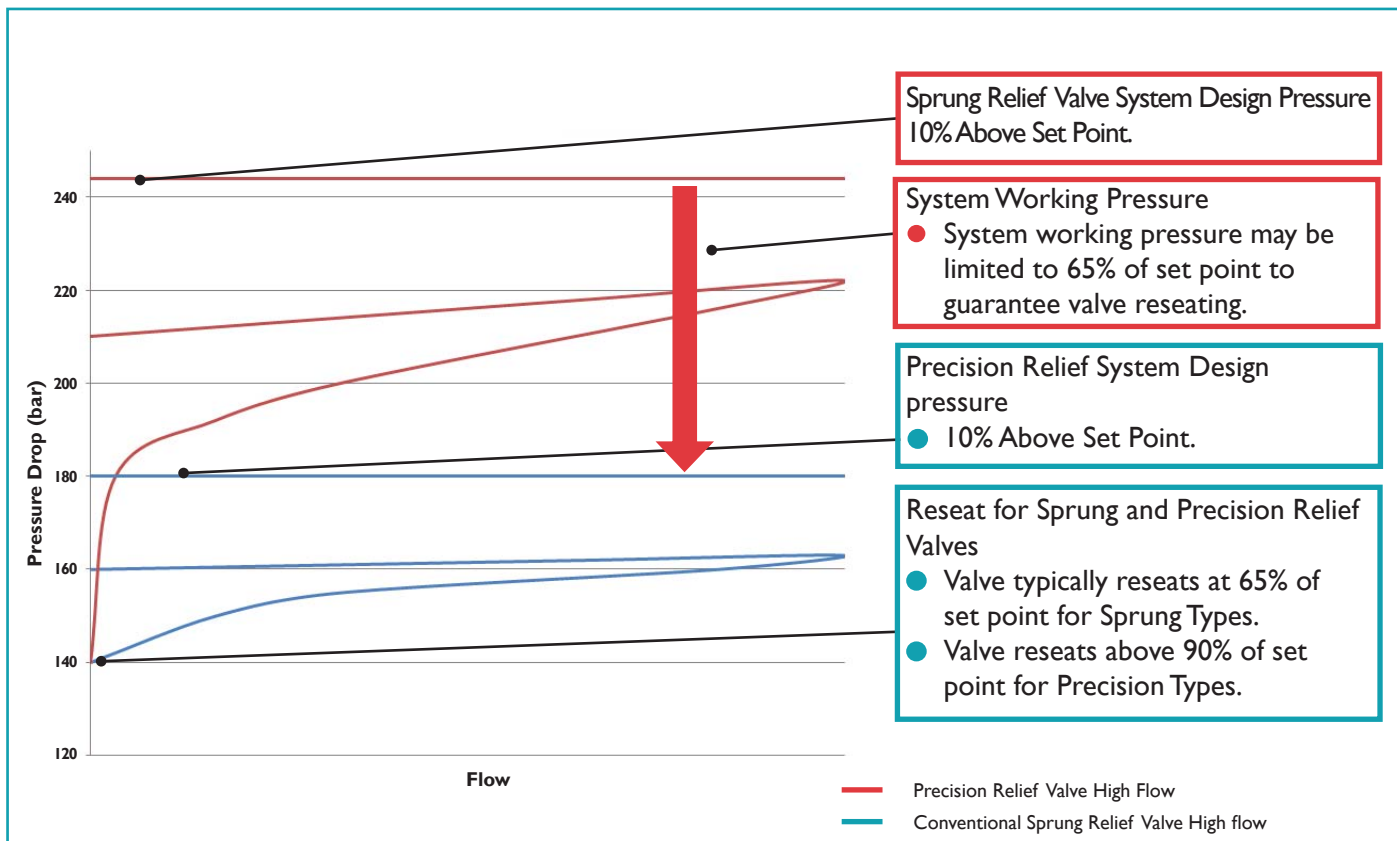


Performance


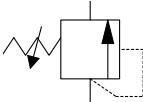

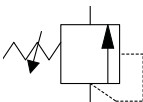

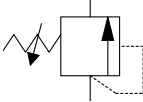


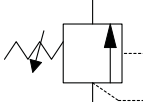


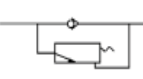

Dead Weight Test and Flowing test



System Design Pressure Benefits



Selection Table

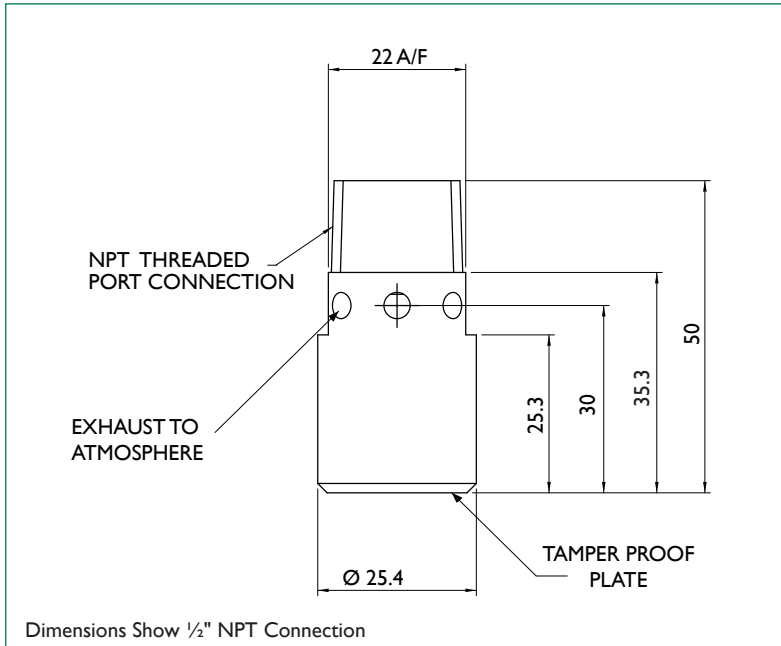
PNEUMATIC RELIEF VALVES				
Product	Schematic Representation	Page Number	Flow Rates and Pressures	Certification
 <p>Pressure Relief Valve</p>		8 / 9	0.8 - 12 bar Ø 9 mm Orifice Ø 10.5 mm Orifice Ø 11.4 mm Orifice	This valve conforms to the Pressure Equipment Directive 97/23/EC. All valves are supplied with a test certificate plus a declaration of conformity.
 <p>Pressure Relief Valve Type CPR</p>		10 / 11	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>Thermal Relief Valve Type 14480</p>		12 / 13	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>Semi-Capsule Relief Valves Types 14540 & 14640</p>		14 / 15	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>Integrated Check / Thermal Relief Valve Types 14460 & 14470</p>		16 / 17	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.

Selection Table

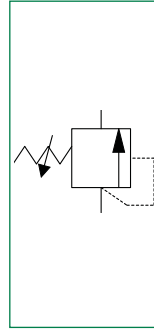
HYDRAULIC RELIEF VALVES				
Product	Schematic Representation	Page Number	Flow Rates and Pressure	Certification
 <p>Low Pressure Relief Valve Type 14340</p>		18 / 19	5 - 50 bar 50 - 100 bar Up to 112 l / m	 II 2 G T4 This relief valve conforms to European Directive 94/9/EC relating to equipment intended 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 marked and supplied with a test certificate plus a declaration of conformity.
 <p>Relief Valve Types 7608, 7668, 7708, 7768, 24100 & 24400</p>		20 / 21	Ø 3/16" Orifice 69 - 414 bar Ø 5/32" Orifice 90 - 620 bar Ø 1/8" Orifice 90 - 932 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 marked and supplied with a test certificate plus a declaration of conformity.
 <p>Precision Relief Valve Type 14450</p>		22 / 23	103 - 240 bar 207 - 414 bar 345 - 700 bar Up to 45 l / m	 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 marked and supplied with a test certificate plus a declaration of conformity.
 <p>Precision Relief Valve Types 14520, 14530, 14580 & 14570</p>		24 / 25	100 - 240 bar 207 - 414 bar 345 - 700 bar 600 - 1200 bar Up to 25 l / m	 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 marked and supplied with a test certificate plus a declaration of conformity.

Pneumatic Service

Pressure Relief Valves up to 12.0 bar Set Point



SCHEMATIC



Features and Benefits

- Set Point Repeatability ± 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: $\text{Ø } 9$ mm ($1/4$ " NPT), $\text{Ø } 10.5$ mm ($3/8$ " NPT) & $\text{Ø } 11.5$ 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.

Pneumatic Service

Product Description

The pressure relief valves vent to atmosphere, are direct acting and suitable for low pressure applications.

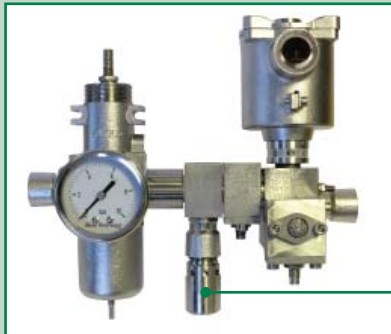
Rated up to 12 bar, the set point pressure is factory set according to user specification. It is not intended to be field adjustable. The valve seat incorporates a silicone face seal affording excellent resealing characteristics.

The relief valve weight is:- 0.13 Kg.

Selection Chart - Ordering Example

S	Pressure Relief Valve	Model Code
AS	Pressure Relief Valve low temperature service	
06	1/4" NPT	Port Size
09	3/8" NPT	
12	1/2" NPT	
PRX.X	Pressure relief setting (user specified 0.8 - 12 bar; 0.1 bar increments)	Configuration
K10	Override button	Option
K6	BSPB option	Option
S - 06 - PR4.5 - K10 - K6		Ordering Example

It is the responsibility of the system designer and user to select products that are suitable for their intended application of use.

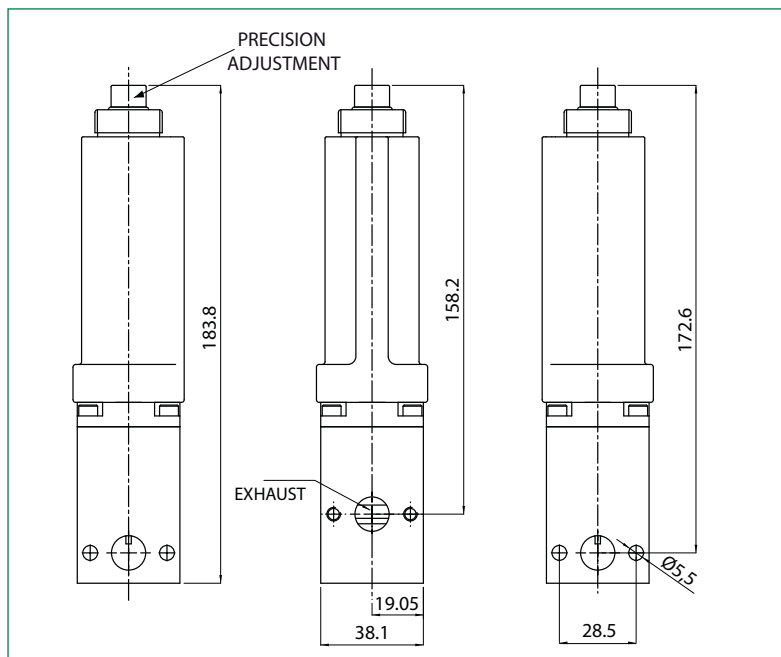


- Very high flow and low dead band. The Bifold pneumatic relief valves are a safety device designed to match Bifold's high flow filter regulators. The device will limit the over pressure to less than 110% of the set point in the event of a filter regulator mis-operation. Some competitor relief valves have insufficient flow to be used as a safety device in this application.

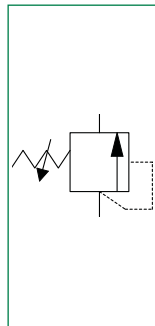
Image showing a Bifold pneumatic valve actuator control manifold. (See separate catalogue).

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 ± 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: $\varnothing 12.8$ mm ($1/4$ " & $1/2$ " NPT) & $\varnothing 27$ 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°C)

Working Temperature

Temperature Range:	
Viton -	(V) -20°C to $+180^{\circ}\text{C}$
Silicone -	(AG) -60°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.

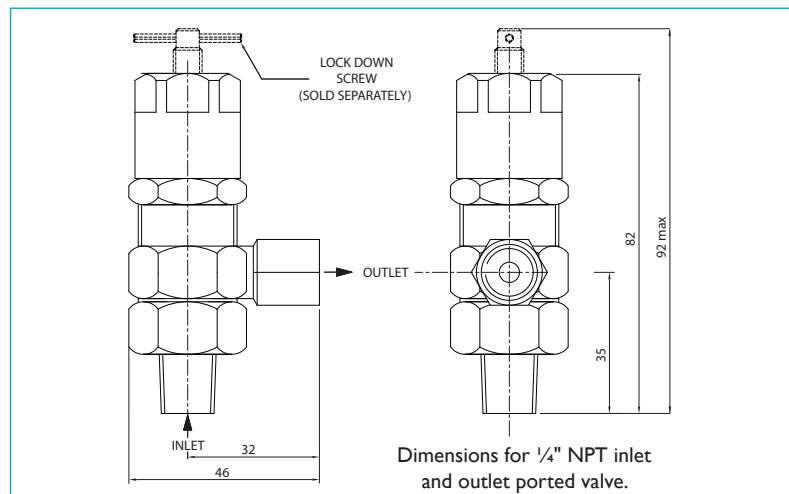
Selection Chart - Ordering Example

CPR	Captive Pressure Relief Valve	Model Code
04	1/4" NPT	Port Size
08	1/2" NPT	
12	3/4" NPT	
16	1" NPT	
V	Viton	Seat Material
AG	Flourosilicone - Low temperature service	
PRX.X	Pressure relief setting (user specified 0.8 - 8 bar; 0.1 bar increments)	Configuration
K6	BSPB option	Option
CPR - 08 - V - PR5.0 - K6		Ordering Example

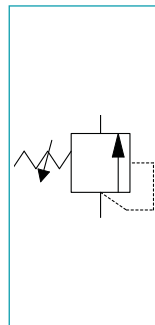
It is the responsibility of the system designer and user to select products that are suitable for their intended application of use.

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.

Hydraulic Service

Selection Chart - Ordering Example

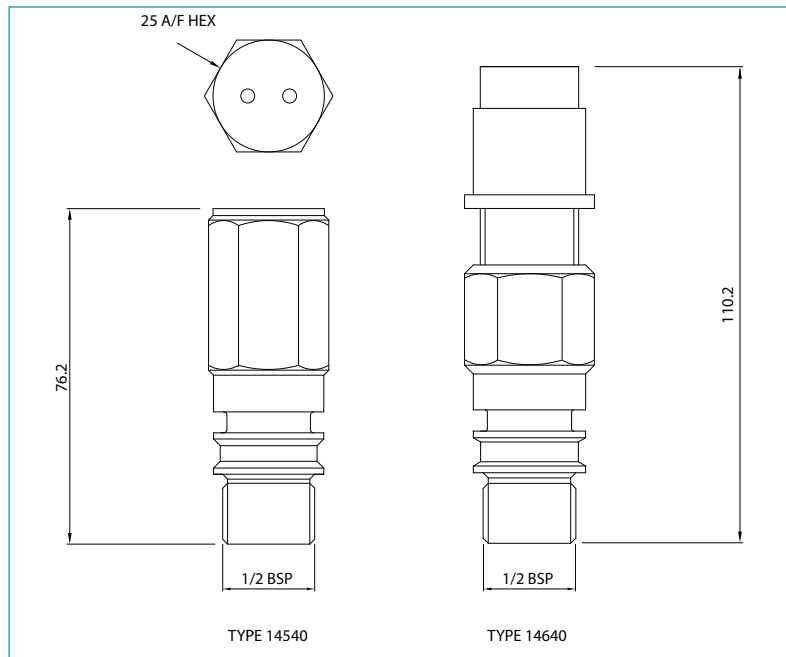
THERMAL RELIEF VALVE I4480 SPECIFICATIONS				
Part Number	Pressure Range (bar)	Inlet Connection	Outlet Connection	Repair Kit
I4480 - 24	7 - 50	¼" NPT Female	¼" NPT Female	RS I4480 - 24
I4480 - 25	50 - 200	¼" NPT Female	¼" NPT Female	RS I4480 - 25
I4480 - 26	200 - 600	¼" NPT Female	¼" NPT Female	RS I4480 - 26
I4480 - 27	600 - 800	¼" NPT Female	¼" NPT Female	RS I4480 - 27
I4480 - 20	7 - 50	¼" NPT Female	¼" NPT Female	RS I4480 - 20
I4480 - 03	35 - 345	¼" NPT Female	¼" NPT Female	RS I4480 - 03
I4480 - 21	50 - 200	¼" NPT Female	¼" NPT Female	RS I4480 - 21
I4480 - 22	200 - 600	¼" NPT Female	¼" NPT Female	RS I4480 - 22
I4480 - 04	345 - 690	¼" NPT Female	¼" NPT Female	RS I4480 - 04
I4480 - 23	600 - 800	¼" NPT Female	¼" NPT Female	RS I4480 - 23
I4480 - 30	7 - 50	¼" BSP Female	¼" BSP Female	RS I4480 - 30
I4480 - 31	50 - 200	¼" BSP Female	¼" BSP Female	RS I4480 - 31
I4480 - 32	200 - 600	¼" BSP Female	¼" BSP Female	RS I4480 - 32
I4480 - 33	600 - 800	¼" BSP Female	¼" BSP Female	RS I4480 - 33
I4480 - 49	7 - 50	¼" MP	¼" NPT	RS I4480 - 49
I4480 - 50	35 - 345	¼" MP	¼" NPT	RS I4480 - 50
I4480 - 51	50 - 200	¼" MP	¼" NPT	RS I4480 - 51
I4480 - 52	200 - 600	¼" MP	¼" NPT	RS I4480 - 52
I4480 - 53	345 - 690	¼" MP	¼" NPT	RS I4480 - 53
I4480 - 54	600 - 800	¼" MP	¼" NPT	RS I4480 - 54
I4480 - 55	600 - 1300	¼" MP	¼" NPT	RS I4480 - 55
I4480 - 44	7 - 50	¾" MP Female	¼" MP Female	RS I4480 - 44
I4480 - 46	200 - 600	¾" MP Female	¼" MP Female	RS I4480 - 46
I4480 - 47	600 - 1300	¾" MP Female	¼" MP Female	RS I4480 - 47
I4480 - 56	7 - 50	¾" NPT Female	¼" NPT Female	RS I4480 - 56
I4480 - 57	35 - 345	¾" NPT Female	¼" NPT Female	RS I4480 - 57
I4480 - 58	50 - 200	¾" NPT Female	¼" NPT Female	RS I4480 - 58
I4480 - 59	200 - 600	¾" NPT Female	¼" NPT Female	RS I4480 - 59
I4480 - 60	345 - 690	¾" NPT Female	¼" NPT Female	RS I4480 - 60
I4480 - 61	600 - 800	¾" NPT Female	¼" NPT Female	RS I4480 - 61
I4480 - 62	600 - 1300	¾" NPT Female	¼" NPT Female	RS I4480 - 62
I4480 - 63	7 - 50	¾" NPT	¾" NPT	RS I4480 - 63
I4480 - 64	35 - 345	¾" NPT	¾" NPT	RS I4480 - 64
I4480 - 65	50 - 200	¾" NPT	¾" NPT	RS I4480 - 65
I4480 - 66	200 - 600	¾" NPT	¾" NPT	RS I4480 - 66
I4480 - 67	345 - 690	¾" NPT	¾" NPT	RS I4480 - 67
I4480 - 68	600 - 800	¾" NPT	¾" NPT	RS I4480 - 68
I4480 - 69	600 - 1300	¾" NPT	¾" NPT	RS I4480 - 69
I4480 - 70	7 - 50	¾" BSP	¾" BSP	RS I4480 - 70
I4480 - 71	35 - 345	¾" BSP	¾" BSP	RS I4480 - 71
I4480 - 72	50 - 200	¾" BSP	¾" BSP	RS I4480 - 72
I4480 - 73	200 - 600	¾" BSP	¾" BSP	RS I4480 - 73
I4480 - 74	345 - 690	¾" BSP	¾" BSP	RS I4480 - 74
I4480 - 75	600 - 800	¾" BSP	¾" BSP	RS I4480 - 75
I4480 - 76	600 - 1300	¾" BSP	¾" BSP	RS I4480 - 76
I4480 - 77	7 - 50	¾" MP Female	¾" NPT Female	RS I4480 - 77
I4480 - 78	35 - 345	¾" MP Female	¾" NPT Female	RS I4480 - 78
I4480 - 79	50 - 200	¾" MP Female	¾" NPT Female	RS I4480 - 79
I4480 - 80	200 - 600	¾" MP Female	¾" NPT Female	RS I4480 - 80
I4480 - 81	345 - 690	¾" MP Female	¾" NPT Female	RS I4480 - 81
I4480 - 82	600 - 800	¾" MP Female	¾" NPT Female	RS I4480 - 82
I4480 - 83	600 - 1300	¾" MP Female	¾" NPT Female	RS I4480 - 83
I4480 - 84	7 - 50	⅝" MP	¼" NPT	RS I4480 - 84
I4480 - 85	35 - 345	⅝" MP	¼" NPT	RS I4480 - 85
I4480 - 86	50 - 200	⅝" MP	¼" NPT	RS I4480 - 86
I4480 - 87	200 - 600	⅝" MP	¼" NPT	RS I4480 - 87
I4480 - 88	345 - 690	⅝" MP	¼" NPT	RS I4480 - 88
I4480 - 89	600 - 800	⅝" MP	¼" NPT	RS I4480 - 89
I4480 - 90	600 - 1300	⅝" MP	¼" NPT	RS I4480 - 90
I4480 - 91	7 - 50	⅝" MP	¾" NPT	RS I4480 - 91
I4480 - 92	35 - 345	⅝" MP	¾" NPT	RS I4480 - 92
I4480 - 93	50 - 200	⅝" MP	¾" NPT	RS I4480 - 93
I4480 - 94	200 - 600	⅝" MP	¾" NPT	RS I4480 - 94
I4480 - 95	345 - 690	⅝" MP	¾" NPT	RS I4480 - 95
I4480 - 96	600 - 800	⅝" MP	¾" NPT	RS I4480 - 96
I4480 - 97	600 - 1300	⅝" MP	¾" NPT	RS I4480 - 97

Lock Down Screw Part Number: I4489 - 01

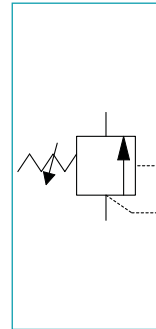
It is the responsibility of the system designer and user to select products that are suitable for their intended application of use.

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 4mm.
- 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.

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.

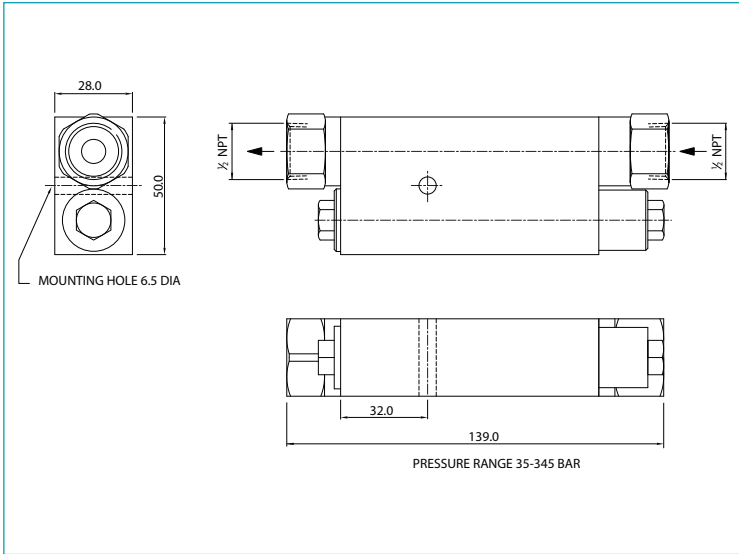
Selection Chart - Ordering Example

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

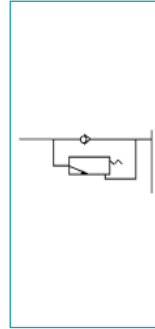
It is the responsibility of the system designer and user to select products that are suitable for their intended application of use.

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.

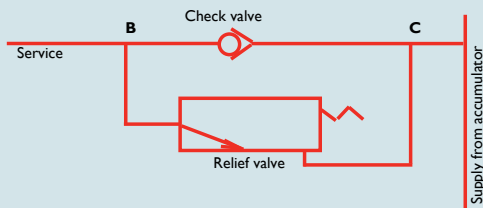
Hydraulic Service

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

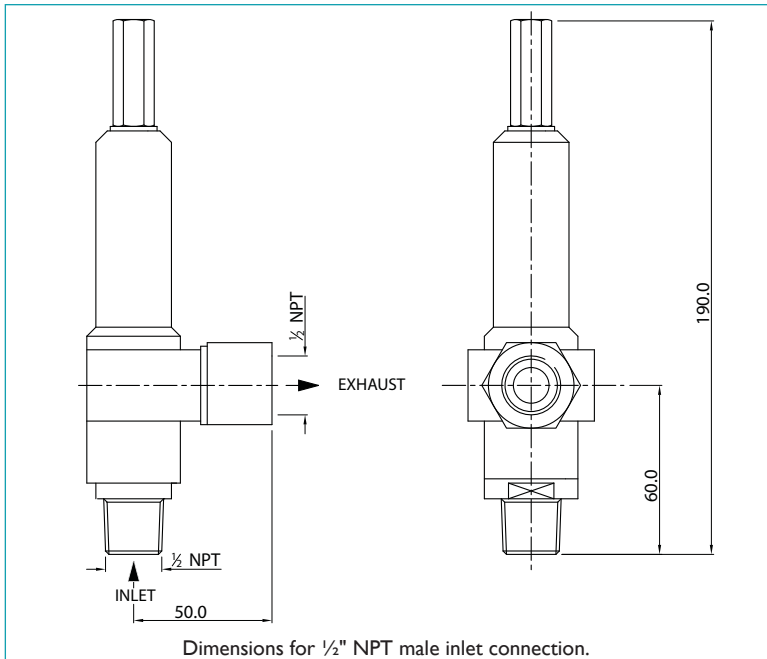
CHECK / THERMAL RELIEF VALVE I4460 AND I4470 SPECIFICATIONS								
Part Number	Pressure Range (bar)	Port Size	Dimension A	Check Valve Flow Rate Cv	Proof Test Pressure (bar)	Cracking Pressure (bar)	Thermal Expansion Max Flow (litres / min)	Repair Kit
*I4460 - 01	35 - 345	Manifold	132	0.56	1000	0.3	2	RS I4460 - 01
*I4460 - 02	345 - 700	Manifold	132	0.56	1000	0.3	2	RS I4460 - 02
I4470 - 01	35 - 345	¼" NPT	132	0.56	1000	0.3	2	RS I4470 - 01
I4470 - 02	345 - 700	¼" NPT	132	0.56	1000	0.3	2	RS I4470 - 02
I4470 - 03	35 - 345	⅜" NPT	132	0.56	1000	0.3	2	RS I4470 - 03
I4470 - 04	345 - 700	⅜" NPT	132	0.56	1000	0.3	2	RS I4470 - 04
I4470 - 07	35 - 345	½" NPT	139	1.60	400	0.4	6	RS I4470 - 07
I4470 - 08	345 - 700	½" NPT	132	0.56	1000	0.3	2	RS I4470 - 08
I4470 - 10	345 - 700	⅝" MP Butech	139	1.60	400	0.4	6	RS I4470 - 10

* Models I4460 are manifold mounted.

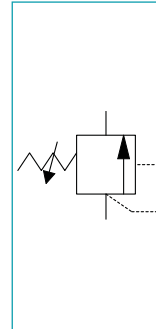
It is the responsibility of the system designer and user to select products that are suitable for their intended application of use.

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.

Hydraulic Service

Product Description

The Type 14340 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.

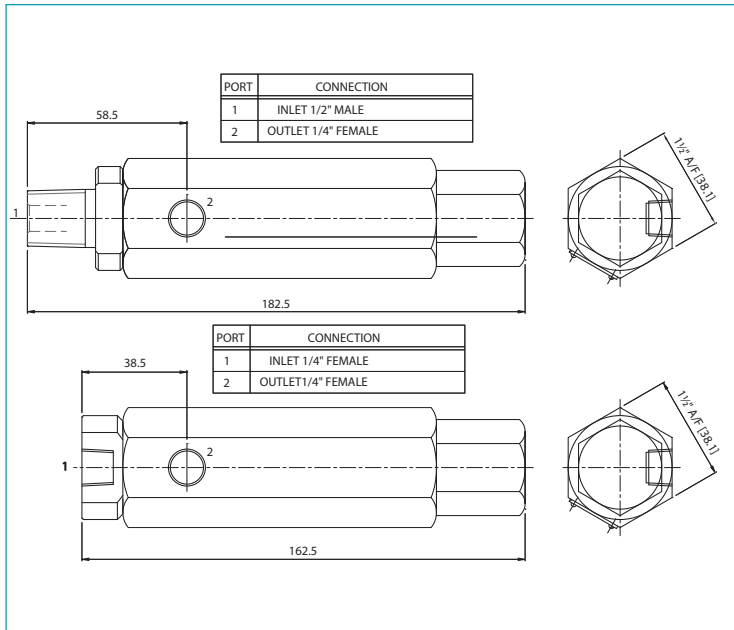
Selection Chart - Ordering Example

LOW PRESSURE RELIEF VALVE 14340 SPECIFICATIONS				
Part Number	Pressure Range (bar)	Inlet Connection	Outlet Connection	Repair Kit
14340 - 08	5 - 50	¼" NPT Female	¼" NPT Female	RS 14340 - 08
14340 - 12	5 - 100	¼" NPT Female	¼" NPT Female	RS 14340 - 12
14340 - 13	5 - 50	¼" BSP	¼" BSP	RS 14340 - 13
14340 - 14	5 - 100	¼" BSP	¼" BSP	RS 14340 - 14
14340 - 11	5 - 50	⅜" NPT	⅜" NPT	RS 14340 - 11
14340 - 15	5 - 100	⅜" NPT	⅜" NPT	RS 14340 - 15
14340 - 03	5 - 50	½" NPT Male	½" NPT Female	RS 14340 - 03
14340 - 04	5 - 100	½" NPT Male	½" NPT Female	RS 14340 - 04
14340 - 06	5 - 50	½" BSP Male	½" BSP Female	RS 14340 - 06
14340 - 02	5 - 50	¾" NPT Female	½" NPT Female	RS 14340 - 02
14340 - 07	5 - 50	¾" NPT Female	¾" NPT Female	RS 14340 - 07
14340 - 16	5 - 50	¾" BSP	¾" BSP	RS 14340 - 16
14340 - 17	5 - 100	¾" BSP	¾" BSP	RS 14340 - 17
14340 - 09	5 - 50	1" BSP Female	1" BSP Female	RS 14340 - 09
14340 - 05	5 - 50	1" NPT Male	1" NPT Female	RS 14340 - 05

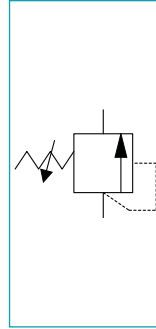
It is the responsibility of the system designer and user to select products that are suitable for their intended application of use.

Hydraulic Service

Relief Valves Direct Acting



SCHEMATIC



Features and Benefits

- Set Point Repeatability $\pm 3\%$.
- Set Point Range - user specified up to 932 bar.
- Sealing Re-Seat Pressure - Virtually zero leakage re-seat pressure $\geq 90\%$ of cracking pressure.
- Proof Test - proof test pressure: 1000 bar.
- Orifice Sizes: $\varnothing 1/8"$, $\varnothing 5/32"$ and $\varnothing 3/16"$.
- 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



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.

Hydraulic Service

Product Description

The type 7608, 7668, 7708 and 7768 relief valves offer a choice of three orifice sizes, each with either ¼" NPT female, or ½" 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.

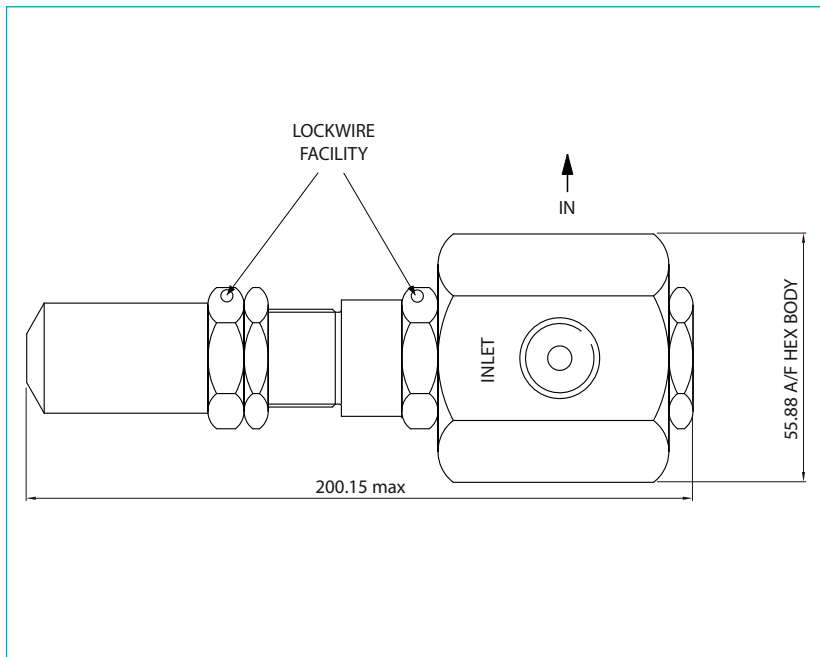
Selection Chart - Ordering Example

RELIEF VALVE 7608, 7668, 7708 and 7768 SPECIFICATIONS				
Part Number	Pressure Range (bar)	Inlet Connection	Outlet Connection	Repair Kit
7648	69 - 414	¼" NPT Female	¼" NPT Female	RS 7648
7608	90 - 620	¼" NPT Female	¼" NPT Female	RS 7608
7618	90 - 932	¼" NPT Female	¼" NPT Female	RS 7618
7748	69 - 414	¼" BSP Female	¼" BSP Female	RS 7748
7708	90 - 620	¼" BSP Female	¼" BSP Female	RS 7708
7718	90 - 932	¼" BSP Female	¼" BSP Female	RS 7718
24100-01	69 - 414	¾" MP	¼" NPT	RS 24100-01
24100-02	90 - 620	¾" MP	¼" NPT	RS 24100-02
24100-03	90 - 932	¾" MP	¼" NPT	RS 24100-03
24200-01	69 - 414	¾" NPT	¾" NPT	RS 24200-01
24200-02	90 - 620	¾" NPT	¾" NPT	RS 24200-02
24200-03	90 - 932	¾" NPT	¾" NPT	RS 24200-03
24100-04	69 - 414	¾" MP	¾" NPT	RS 24100-04
24100-05	90 - 620	¾" MP	¾" NPT	RS 24100-05
24100-06	90 - 932	¾" MP	¾" NPT	RS 24100-06
24100-07	69 - 414	¾" MP	¾" BSP	RS 24100-07
24100-08	90 - 620	¾" MP	¾" BSP	RS 24100-08
24100-09	90 - 932	¾" MP	¾" BSP	RS 24100-09
24300-01	69 - 414	¾" BSP	¾" BSP	RS 24300-01
24300-02	90 - 620	¾" BSP	¾" BSP	RS 24300-02
24300-03	90 - 932	¾" BSP	¾" BSP	RS 24300-03
7668	69 - 414	½" NPT Male	¼" MP Female	RS 7668
7638	90 - 620	½" NPT Male	¼" MP Female	RS 7638
7768	69 - 414	½" BSP Male	¼" BSP Female	RS 7768
7728	90 - 620	½" BSP Male	¼" BSP Female	RS 7728
7738	90 - 932	½" BSP Male	¼" BSP Female	RS 7738
7628	90 - 620	½" NPT Male	½" NPT Male	RS 7628
24400-01	69 - 414	⅞" MP	⅞" NPT	RS 24400-01
24400-02	90 - 620	⅞" MP	⅞" NPT	RS 24400-02
24400-03	90 - 932	⅞" MP	⅞" NPT	RS 24400-03
24400-04	69 - 414	⅞" MP	¾" NPT	RS 24400-04
24400-05	90 - 620	⅞" MP	¾" NPT	RS 24400-05
24400-06	90 - 932	⅞" MP	¾" NPT	RS 24400-06
24400-07	69 - 414	⅞" MP	¾" BSP	RS 24400-07
24400-08	90 - 620	⅞" MP	¾" BSP	RS 24400-08
24400-09	90 - 932	⅞" MP	¾" BSP	RS 24400-09

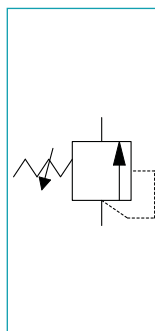
It is the responsibility of the system designer and user to select products that are suitable for their intended application of use.

Hydraulic Service

Relief Valves for Accurate Pressure Control



SCHEMATIC



Features and Benefits

- Up to 700 bar, 45 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.
- Flow Capacity - at 10% overpressure: 45 l / m.
- Orifice Size: $\varnothing 3/16"$.
- 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.

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.

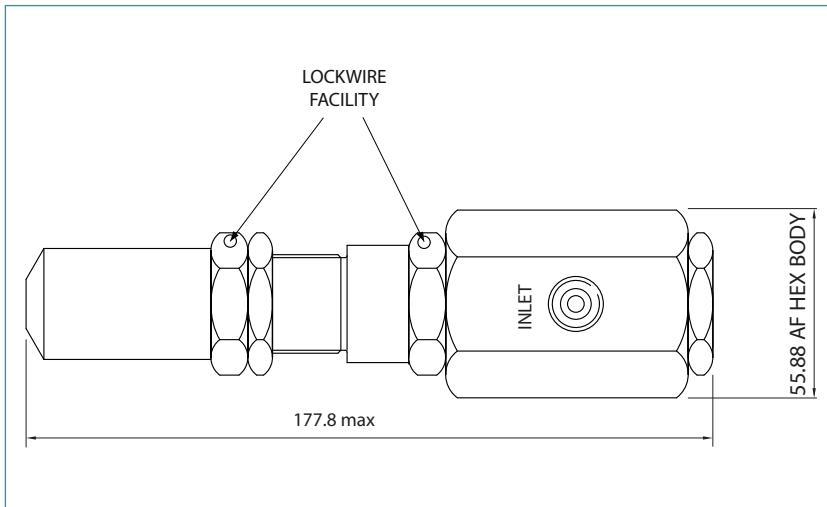
Selection Chart - Ordering Example

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

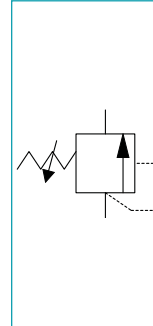
It is the responsibility of the system designer and user to select products that are suitable for their intended application of use.

Hydraulic Service

Relief Valves for Accurate Pressure Control



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. 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.

Hydraulic Service

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	¼" NPT	¼" NPT	RS I 4530 - 01
I 4530 - 02	207 - 414	¼" NPT	¼" NPT	RS I 4530 - 02
I 4530 - 03	345 - 700	¼" NPT	¼" NPT	RS I 4530 - 03
I 4530 - 04	100 - 240	¼" BSP	¼" BSP	RS I 4530 - 04
I 4530 - 05	207 - 414	¼" BSP	¼" BSP	RS I 4530 - 05
I 4530 - 06	345 - 700	¼" BSP	¼" BSP	RS I 4530 - 06
I 4580 - 13	100 - 240	¾" MP	¼" NPT	RS I 4580 - 13
I 4580 - 14	207 - 414	¾" MP	¼" NPT	RS I 4580 - 14
I 4580 - 15	345 - 700	¾" MP	¼" NPT	RS I 4580 - 15
I 4580 - 16	600 - 1200	¾" MP	¼" NPT	RS I 4580 - 16
I 4520 - 01	100 - 240	¾" NPT	¾" NPT	RS I 4520 - 01
I 4520 - 02	207 - 414	¾" NPT	¾" NPT	RS I 4520 - 02
I 4520 - 03	345 - 700	¾" NPT	¾" NPT	RS I 4520 - 03
I 4520 - 04	100 - 240	¾" BSP	¾" BSP	RS I 4520 - 04
I 4520 - 05	207 - 414	¾" BSP	¾" BSP	RS I 4520 - 05
I 4520 - 06	345 - 700	¾" BSP	¾" BSP	RS I 4520 - 06
I 4580 - 01	100 - 240	¾" MP	¾" NPT	RS I 4580 - 01
I 4580 - 02	207 - 414	¾" MP	¾" NPT	RS I 4580 - 02
I 4580 - 03	345 - 700	¾" MP	¾" NPT	RS I 4580 - 03
I 4580 - 04	600 - 1200	¾" MP	¾" NPT	RS I 4580 - 04
I 4580 - 07	100 - 240	¾" MP	¾" BSP	RS I 4580 - 07
I 4580 - 08	207 - 414	¾" MP	¾" BSP	RS I 4580 - 08
I 4580 - 09	345 - 700	¾" MP	¾" BSP	RS I 4580 - 09
I 4580 - 04	600 - 1200	¾" MP	¾" BSP	RS I 4580 - 04
I 4580 - 11	600 - 1200	¾" MP	¾" MP	RS I 4580 - 11
I 4580 - 17	100 - 240	¾" MP	½" NPT	RS I 4580 - 17
I 4580 - 18	207 - 414	¾" MP	½" NPT	RS I 4580 - 18
I 4580 - 19	345 - 700	¾" MP	½" NPT	RS I 4580 - 19
I 4580 - 20	600 - 1200	¾" MP	½" NPT	RS I 4580 - 20
23600 - 01	100 - 240	½" NPT	½" NPT	RS 23600 - 01
23600 - 02	207 - 414	½" NPT	½" NPT	RS 23600 - 02
23600 - 03	345 - 700	½" NPT	½" NPT	RS 23600 - 03
23600 - 04	600 - 1200	½" NPT	½" NPT	RS 23600 - 04
I 4570 - 01	100 - 240	⅞" MP	¾" NPT	RS I 4570 - 01
I 4570 - 02	207 - 414	⅞" MP	¾" NPT	RS I 4570 - 02
I 4570 - 03	345 - 700	⅞" MP	¾" NPT	RS I 4570 - 03
I 4570 - 10	600 - 1200	⅞" MP	¾" NPT	RS I 4570 - 10
I 4570 - 07	100 - 240	⅞" MP	¾" BSP	RS I 4570 - 07
I 4570 - 08	207 - 414	⅞" MP	¾" BSP	RS I 4570 - 08
I 4570 - 09	345 - 700	⅞" MP	¾" BSP	RS I 4570 - 09
I 4570 - 04	600 - 1200	⅞" MP	¾" BSP	RS I 4570 - 04
I 4570 - 11	600 - 1200	⅞" MP	⅞" MP	RS I 4570 - 11
I 4570 - 12	100 - 240	⅞" MP	½" NPT	RS I 4570 - 12
I 4570 - 13	207 - 414	⅞" MP	½" NPT	RS I 4570 - 13
I 4570 - 14	345 - 700	⅞" MP	½" NPT	RS I 4570 - 14
I 4570 - 15	600 - 1200	⅞" MP	½" NPT	RS I 4573 - 15
23700 - 01	100 - 240	¾" NPT	¾" NPT	RS 23700 - 01
23700 - 02	207 - 414	¾" NPT	¾" NPT	RS 23700 - 02
23700 - 03	345 - 700	¾" NPT	¾" NPT	RS 23700 - 03
23700 - 04	600 - 1200	¾" NPT	¾" NPT	RS 23700 - 04
23800 - 01	100 - 240	¾" MP	¾" MP	RS 23800 - 01
23800 - 02	207 - 414	¾" MP	¾" MP	RS 23800 - 02
23800 - 03	345 - 700	¾" MP	¾" MP	RS 23800 - 03
23800 - 04	600 - 1200	¾" MP	¾" 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.

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

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%

CONNECTIONS :-

1/2" NPT male / 1/4" NPT female flowline as standard
1/4" NPT female control lines

REPAIR KITS:-

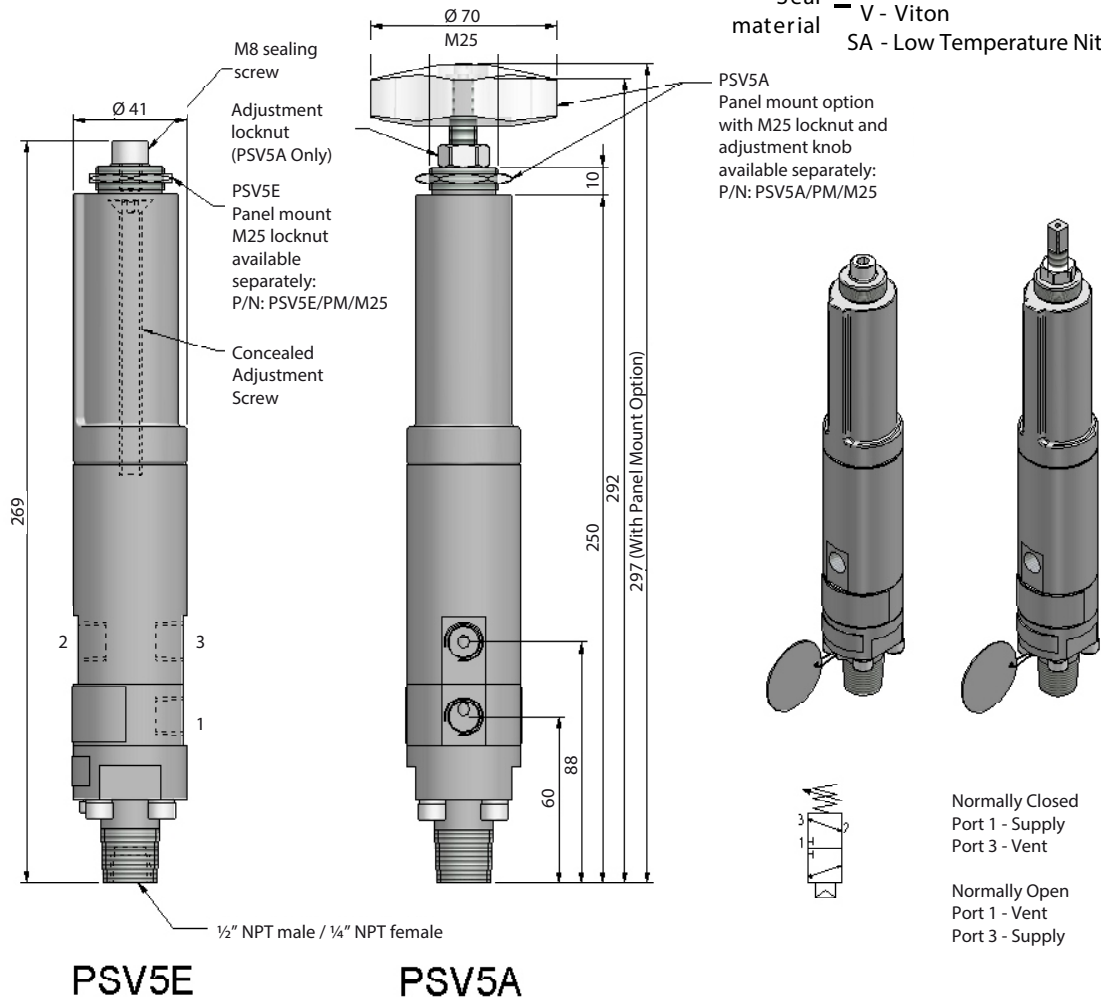
TEMPERATURE RANGE :-

See seal options

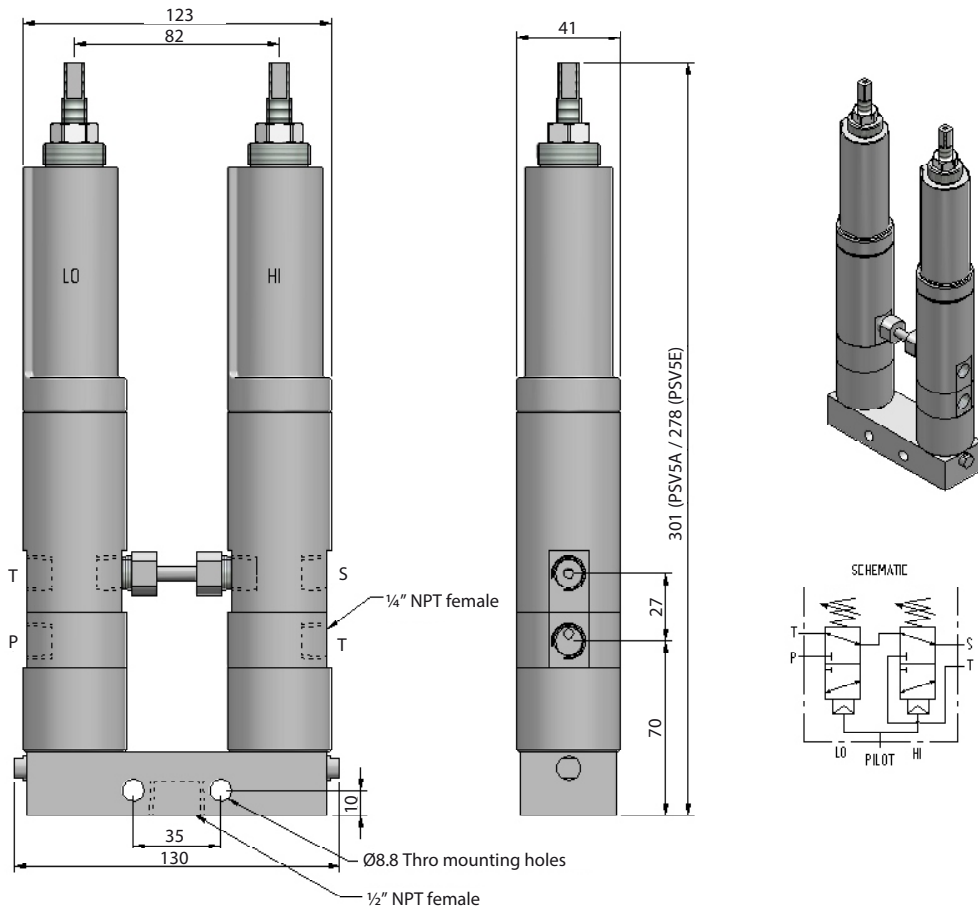
PSV5X/0010/H'X'/X/RK

Set point range code: 1 to 9
See selection chart

Seal material - S - Nitrile
- V - Viton
SA - Low Temperature Nitrile



DUAL FLOWLINE PILOT :-



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									

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,

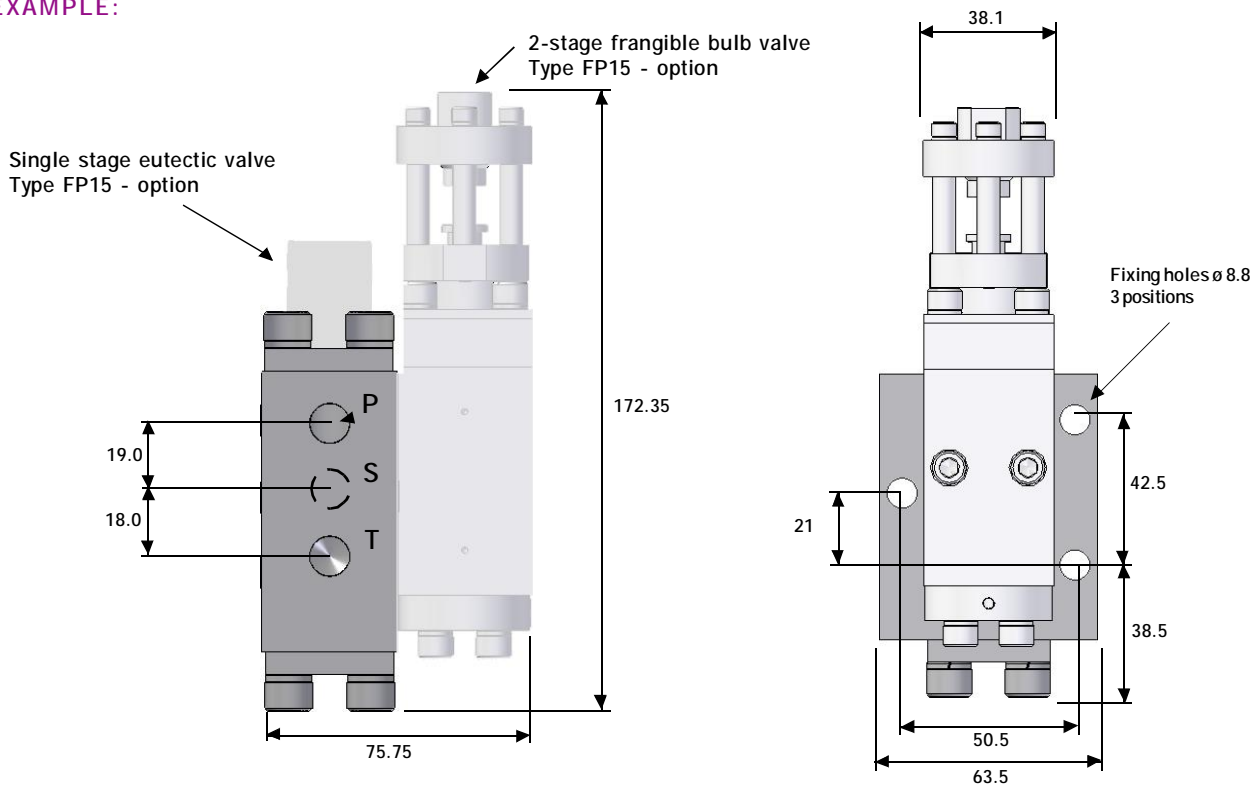
CONNECTIONS:

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	
04	1/4"NPT	15 lpm	Connections
06	3/8"NPT		
08	1/2"NPT	50 lpm	
22	2-way, 2-position		Configuration
32	3-way, 2-position		
NC	Normally Closed	(fail closed when plug melts)	Configuration
NO	Normally Open	(fail open when plug melts)	
S	Nitrile	(-30°C to +130°C)	O-ring Material
V	Viton	(-20°C to +180°C)	
72C ; 92C ; 125C ; 135C			Melt temperature (°C)
ETSV 50 / 08 / 22 / NO / V / 92C			Example Code

Direct Venting Plug - 12 bar pneumatic / liquid service:

ETSP	Eutectic Plug	Model Code
04	1/4"NPT	Connections
06	3/8"NPT	
08	1/2"NPT	
	72C ; 92C ; 125C ; 135C	Melt temperature (°C)
ETSP / 08 / 72C		Example Code

Direct Acting, Frangible Bulb - up to 690 bar liquid service 2/2 & 3/2

FBVP		Model Code
80	Subbase mounting	Connections
81	1/4NPT body ported Type 81x3 & 81x8 only	
0	3-way, 2-position	Configuration
1	2-way, 2-position	
3	5 lpm @10 bar Dp	Flow rating
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)	Configuration
03	207 bar Type 8xx8, 8x13, 8x15	Working Pressure
05	345 bar Type 8x03, 8x05	
07	518 bar Types 8x05	
10	690 bar	
S	Nitrile (-30°C to + 130°C)	O-ring Material
V	Viton (-20°C to + 180°C)	
	57C ; 68C ; 79C ; 93C ; 141C ; 182C	Bulb Rating (°C) (+/- 3.5%)
FBVP 80 0 3RF / NC / 05 / V / 93C		Example Code

Indirect Acting, Frangible Bulb - up to 690 bar liquid service 2/2 & 3/2

FP15	15 lpm nominal	2-stage frangible bulb valve	Model Code
FP50	50 lpm nominal		
FP100	100 lpm nominal		
FP200	200 lpm nominal		
FPV8xxx	up to 40 lpm nominal (contaminated fluids)		
REFER TO PRODUCT CATALOGUES FOR FULL ORDERING CODES			

Direct Acting, Frangible Bulb - 12 bar pneumatic / liquid service - Vent to atmosphere on bulb fracture.

S06	1/4 NPT	Connections
S09	3/8 NPT	
S12	1/2 NPT	
	FVMB	Model Code
	57C ; 68C ; 79C ; 93C ; 141C ; 182C ; 260C	Bulb Rating (°C) +/- 3.5%
S06 / FVMB / 79C		Example Code

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



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

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.

MEDIA:

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

WORKING PRESSURE:

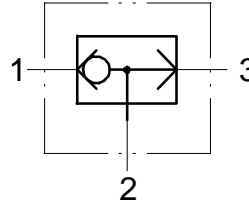
Up to 690 Bar (10,000PSI).

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.

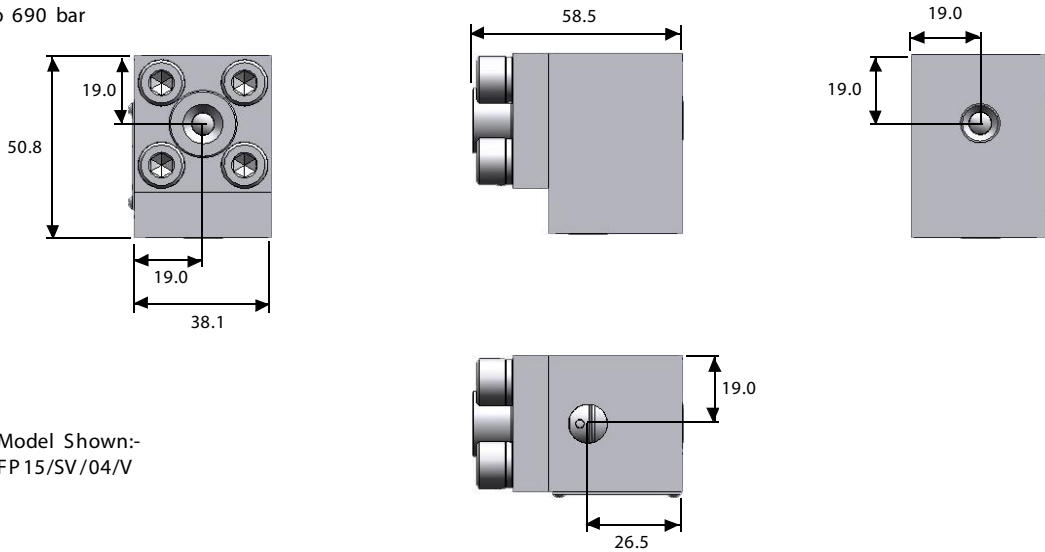


SELECTION CHART:

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

FP15 SHUTTLE VALVES

Upto 690 bar



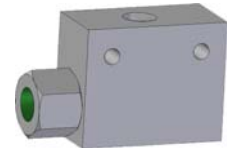
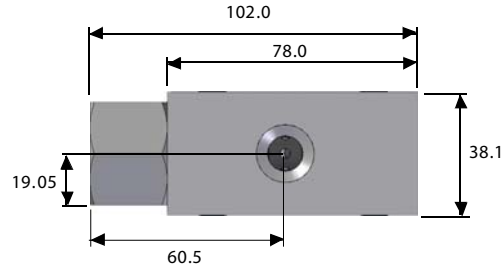
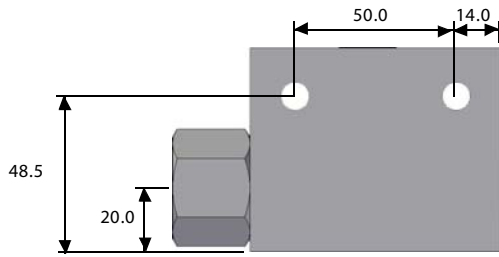
Model Shown:-
FP15/SV/04/V

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:

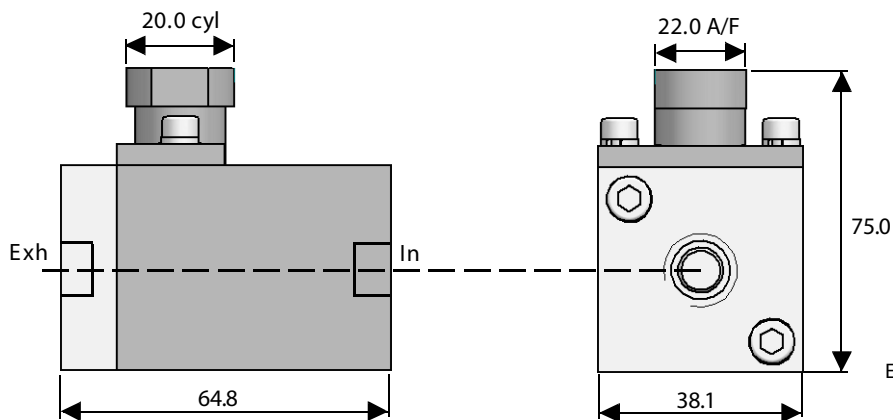
See selection chart model code.

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



Example:- S09-SV

	Working Pressures	Cv
1/4"	1 - 12 bar g	0.9 (in to cyl)
3/8"	0 - 12 bar g	1.7
1/2"	0 - 12 bar g	1.9
3/4"	1 - 12 bar g	6.5
1"	1 - 12 bar g	8.2

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



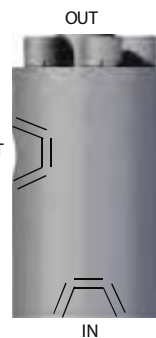
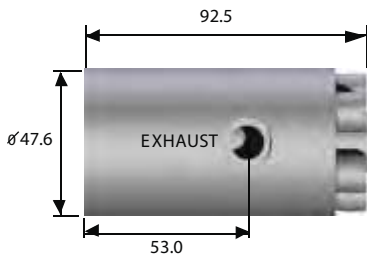
MATERIALS OF CONSTRUCTION

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

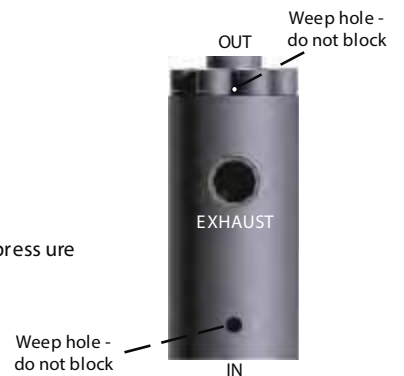
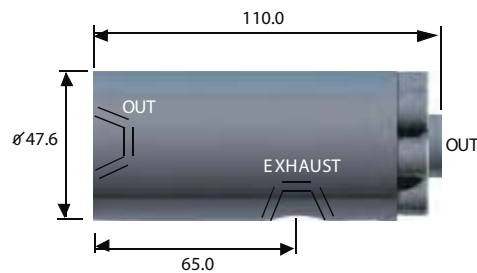
QEV15 RANGE



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.

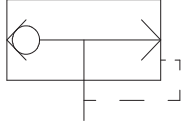
Exhaust Flow Rate: Flow rate between cylinder and exhaust.

For lower QEV trigger flow rates, contact Bifold Sales Office.

SELECTION CHART:

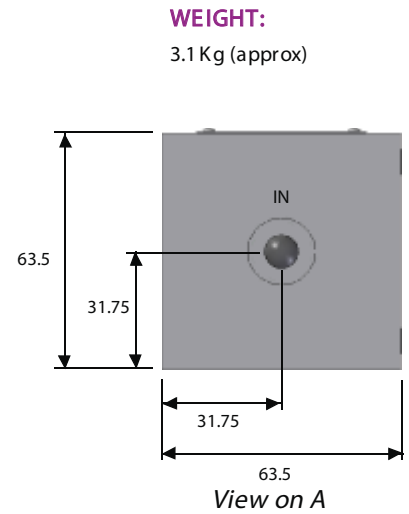
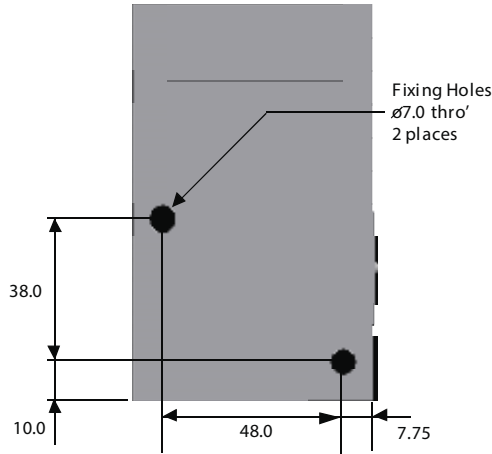
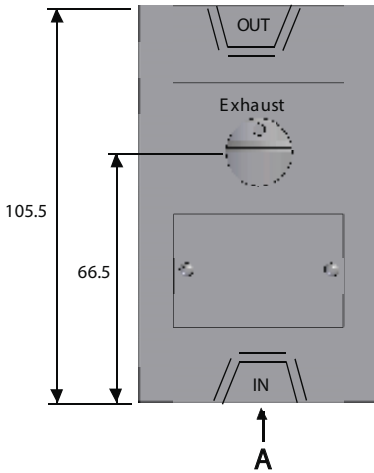
QEV15		Model Code	
04	1/4" NPT	Connections	
06	3/8" NPT, 1/2" NPT exhaust		
08	1/2" NPT		
38MP	3/8" MP connections - 1/4" NPT exhaust	Working Pressure	
06	414 bar		
10	690 bar		
	15	1035 bar (only 38MP)	O-ring Material
S	Nitrile	(-30°C to +130°C)	
V	Viton	(-20°C to +180°C)	
SA	Low Temp Nitrile	(-46°C 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

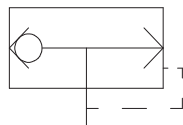
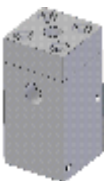
QEV50 RANGE



SELECTION CHART:

QEV50		Model Code
08	1/2" NPT	Connections
05	345 bar	Working Pressure
S	Nitrile (-30°C to +130°C)	O-ring Material
V	Viton (-20°C to +180°C)	
SA	Low Temp Nitrile (-46°C to +130°C)	
H2S NACE MR-01-75 (consult Bifold Fluidpower)		Options
QEV50 / 08 / 05 / S / H2S		Example Code

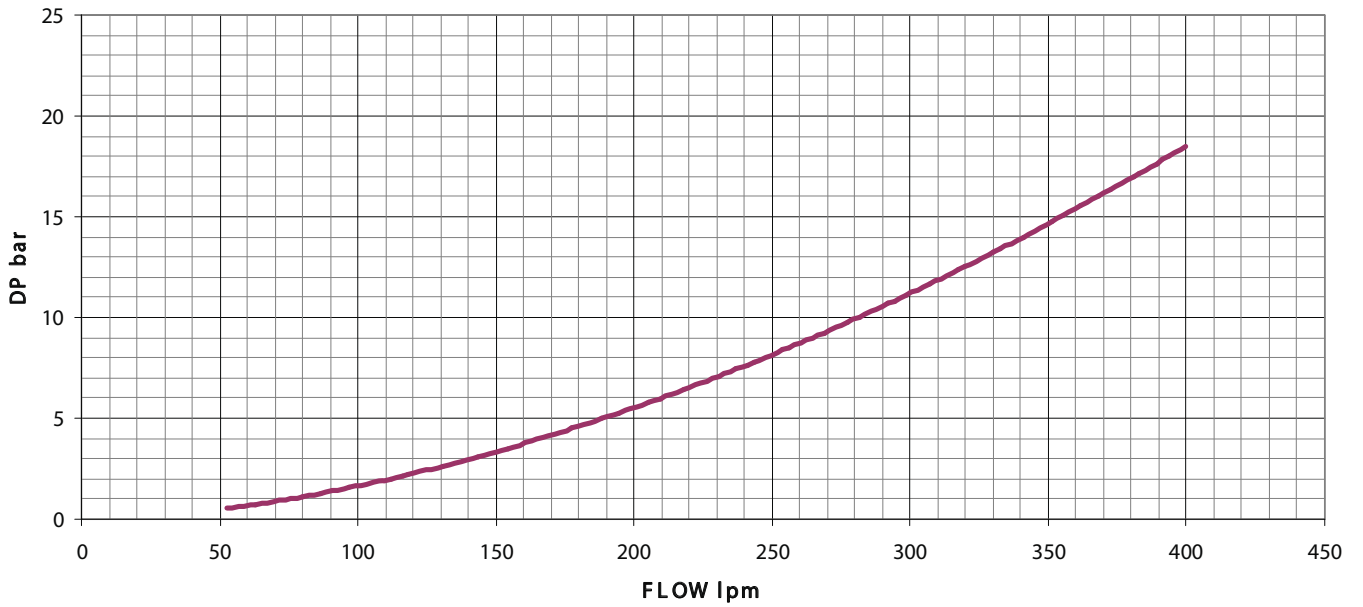
QEV50 PREFERRED RANGE:



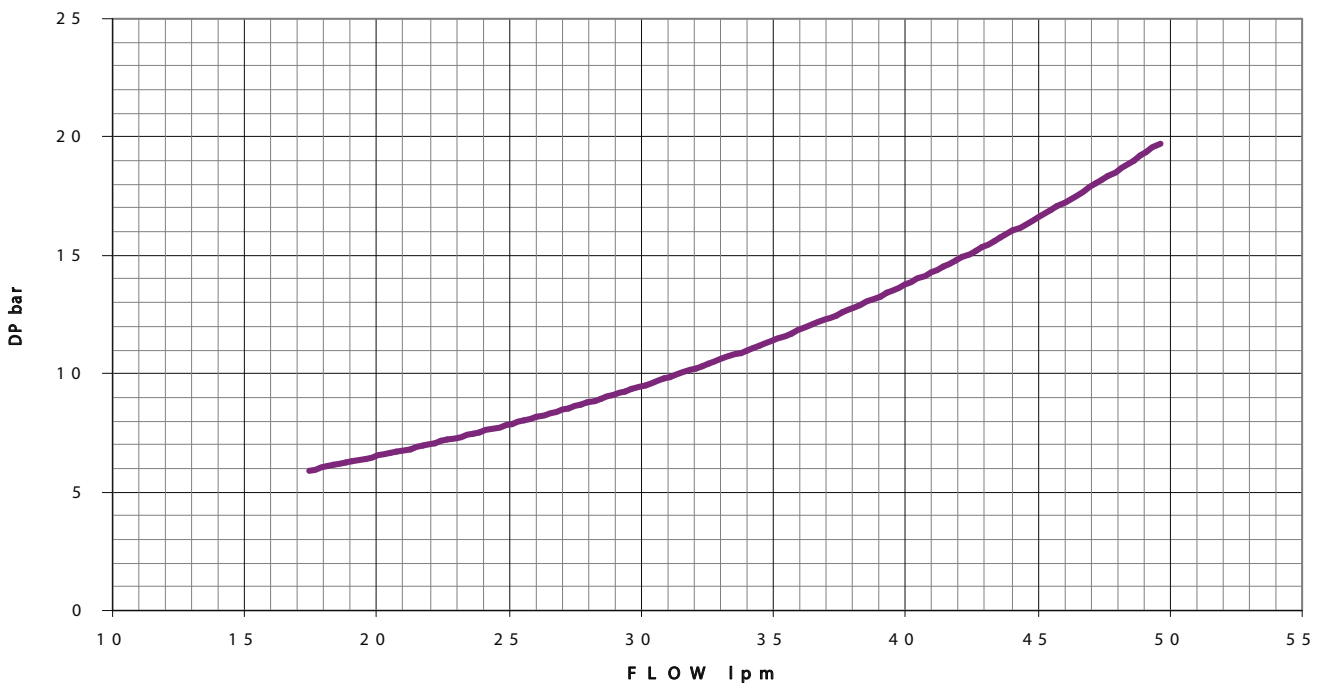
QEV50/08/05/S	345 bar, 1/2" NPT ports, 350 lpm @ 15 bar DP
---------------	----------------------------------------------



QEV50 EXHAUST FLOW - MINERAL OIL @ 30 cST



QEV50 SUPPLY FLOW - MINERAL OIL @ 30 cST



Pneumatic Quick Exhaust Valves

OPERATING MEDIA

• Air, sweet and sour gas

OPERATING PRESSURE

• 0-12 bar standard

TEMPERATURE RANGE:

See selection chart model code.

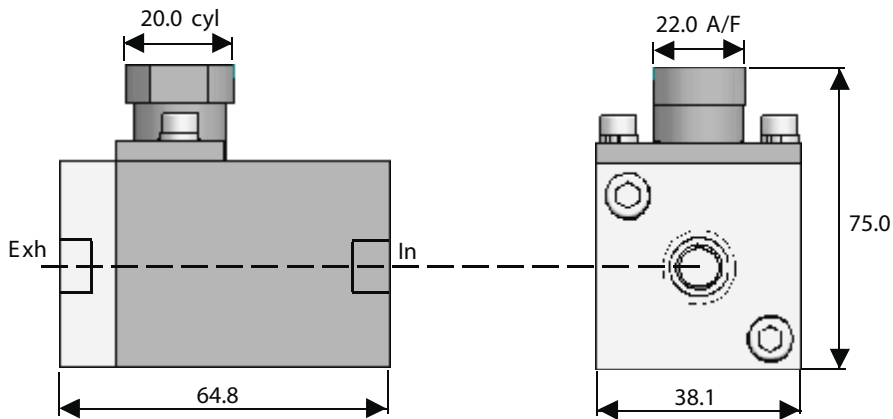
MECHANICAL CONSTRUCTION

- 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		Port Sizes					
09	3/8" NPT							
12	1/2" NPT							
19	3/4" NPT							
25	1" NPT							
QEV		Quick Exhaust Valve	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"

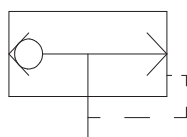
Working Pressures

- 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

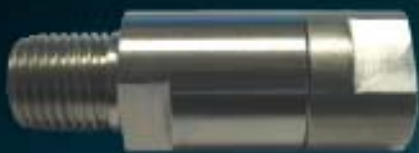
Hydraulic and Pneumatic Check Valves

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

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.

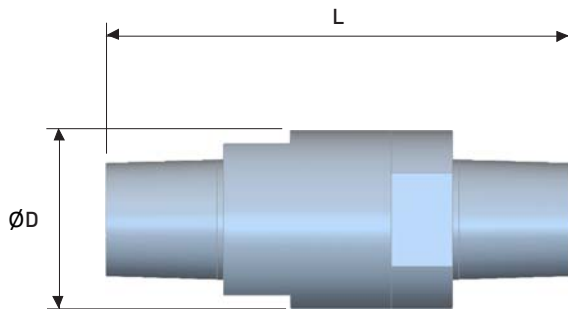
SELECTION CHART:-

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.

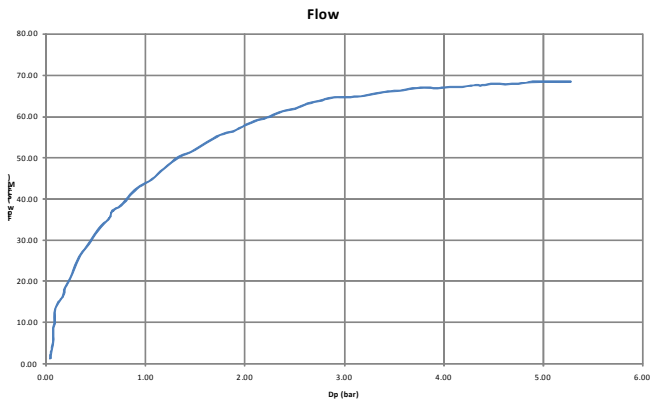
SELECTION CHART:

NOTE:- Inlet & outlet connections must be specified as equal sizes

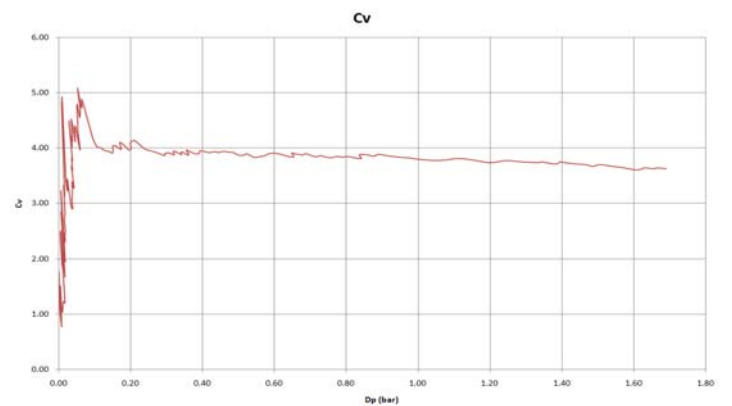
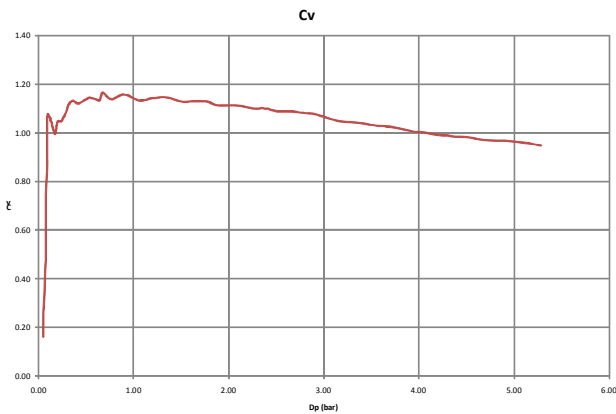
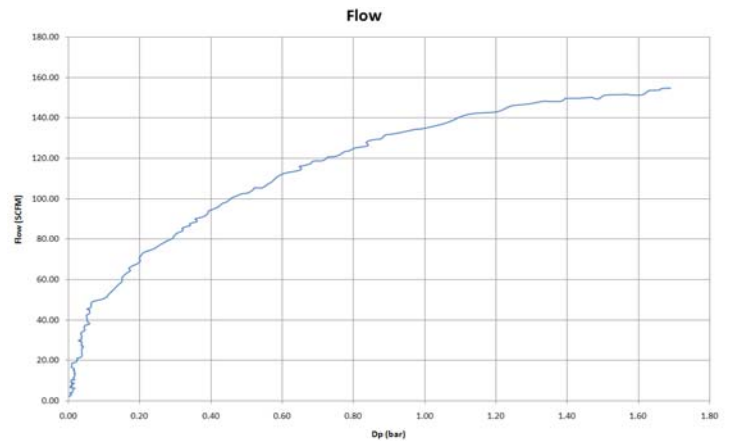
PCV	Pneumatic service check valve			Model Code
04F	1/4" NPT	female		Inlet Connection
04M	1/4" NPT	male		
06F	3/8" NPT	female		
06M	3/8" NPT	male		
08F	1/2" NPT	female		
08M	1/2" NPT	male		
12F	3/4" NPT	female		
12M	3/4" NPT	male		
16F	1" NPT	female		Outlet Connection
16M	1" NPT	male		
04F	1/4" NPT	female		
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
Type 4018:-	1/2 NPT	68 litres/min (15 igpm)	4.5 bar (65 psi) @ flow rating
Type 4035:-	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:

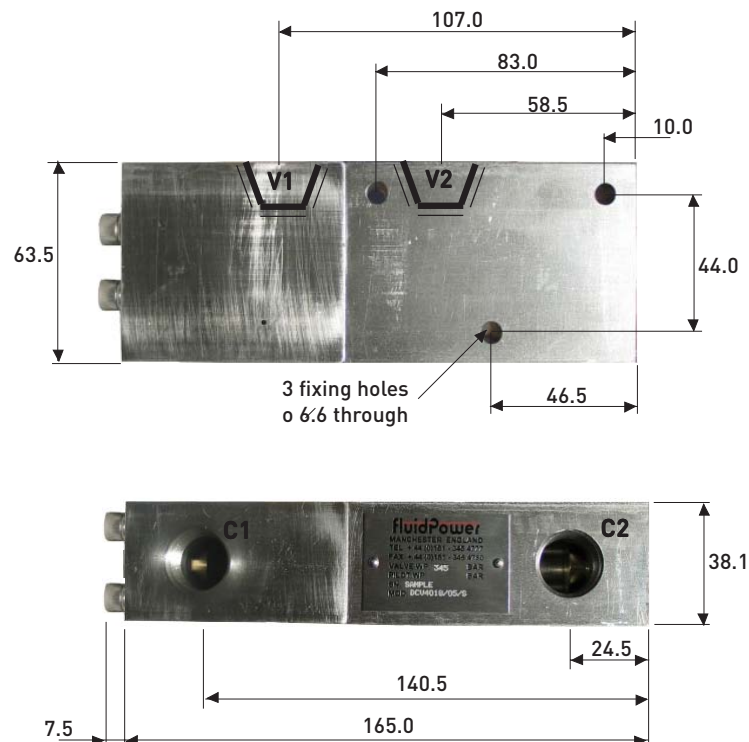
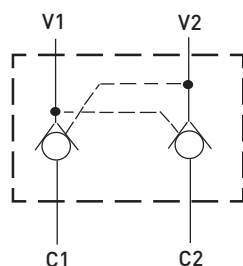
SCV	Single Check Valve	pilot to open		Model Code	
SCV (C)	Single Check Valve	pilot to close			
DCV	Dual Check Valve	internal pilot to open			
	4018	68 lpm		Flow Rating	
	4035	190 lpm			
		03	207bar	(4035 only)	Working Pressure
		05	345 bar	(4018 only)	
			S	Nitrile (-30°C to +130°C)	Seal Material
			V	Viton (-20°C to +180°C)	
			A	Fluorosilicone (-50°C to +40°C)	
SCV	4018	/ 05	/	S	Example Code

Standard Test Fluid: Marston Bentley HW540.

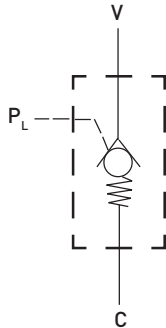
Example Valve:-

DCV4018/05/S

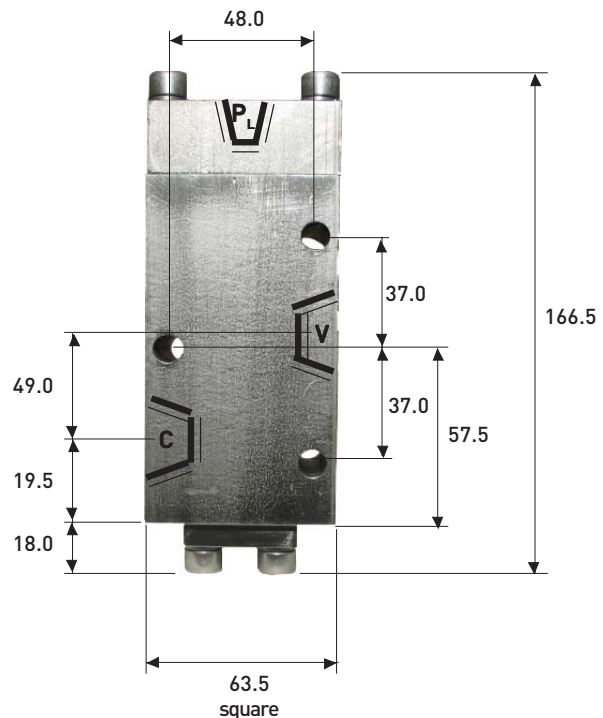
Schematic



Example Valve:-
SCV4035/03/S



Connections:-
 C = Cylinder 3/4" NPT
 V = Valve 3/4" NPT
 P_L = 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:

EFCV2	Excess Flow Check Valve		Model Code
0	Hydraulic Service		Media
4	Gas Service		
0	without by-pass valve		
1	with by-pass valve		
2	0.4 - 2 lpm		Shut Off Flow Ranges
5	2.0 - 5.0 lpm		
00	no reset orifice		Orifice
10	0.010" orifice		
15	0.015" orifice		
20	0.020" orifice		
25	0.025" orifice		
30	0.030" orifice		
06	414 bar	gas service	Working Pressure
10	690 bar	hydraulic service	
S	Nitrile (-30°C to +130°C)		O-ring Material
V	Viton (-20°C to +180°C)		
EFCV2 0 1 2 / 00 / 10 / S			Example Code

Standard Test Fluid: Marston Bentley HW540.

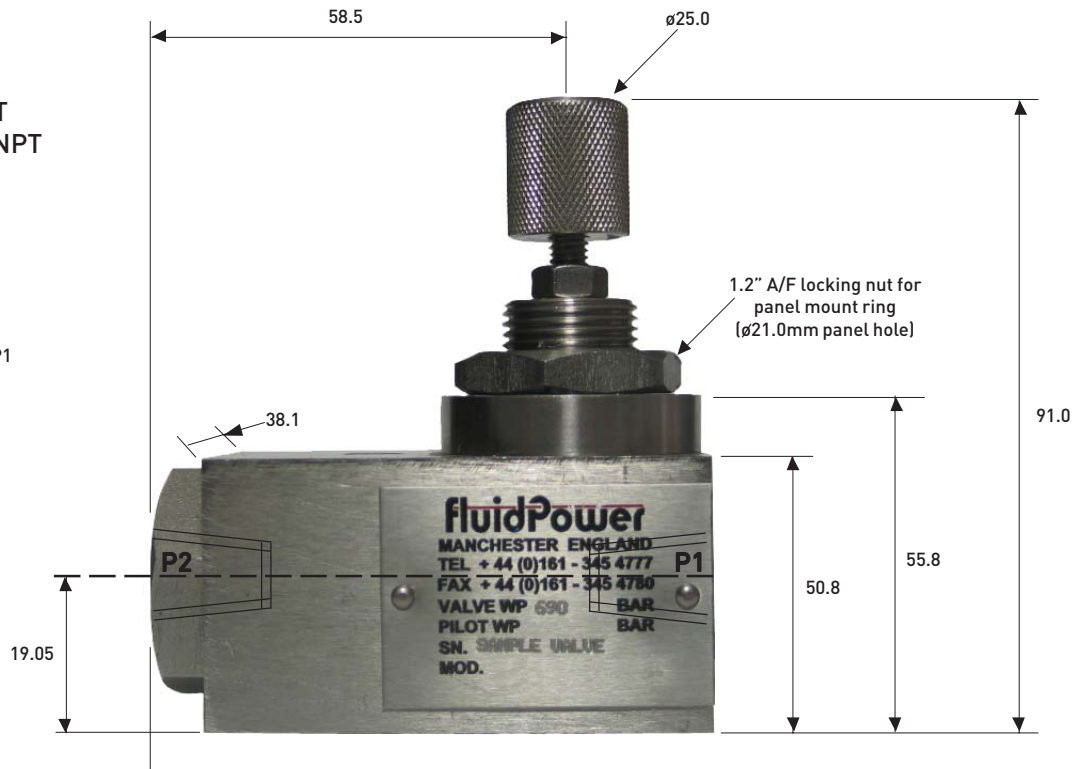
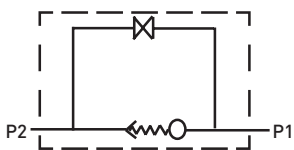
Excess Flow Check Valve

EFCV2015/00/10/S

Connections

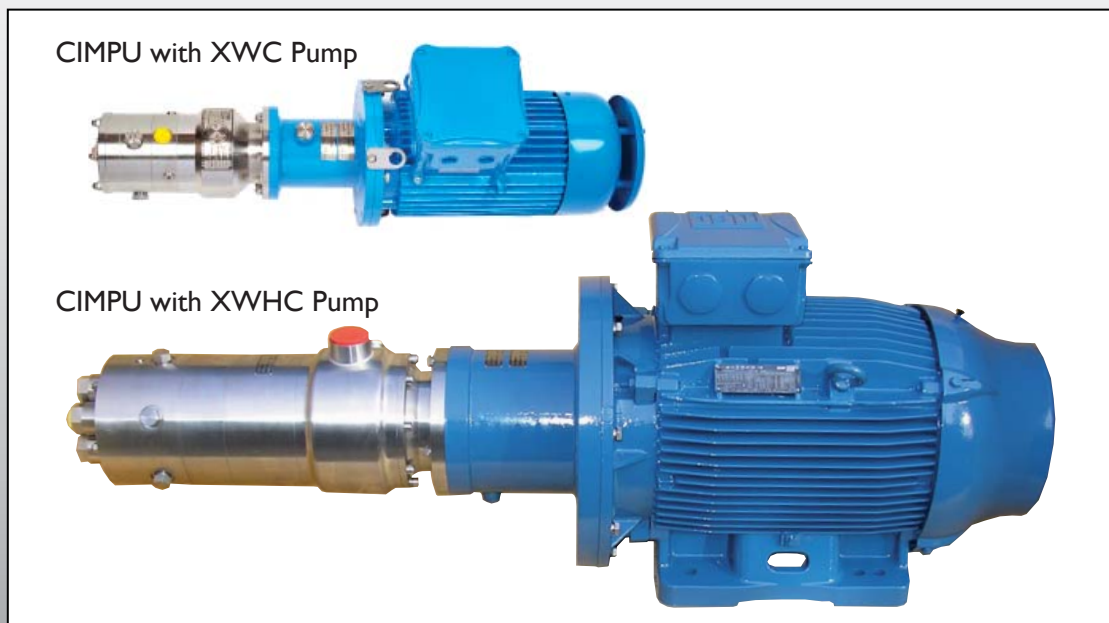
P1 = Inlet Port 1/4" NPT

P2 = Service Port 1/4" NPT



*Global Presence for
Peace of Mind*

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.

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

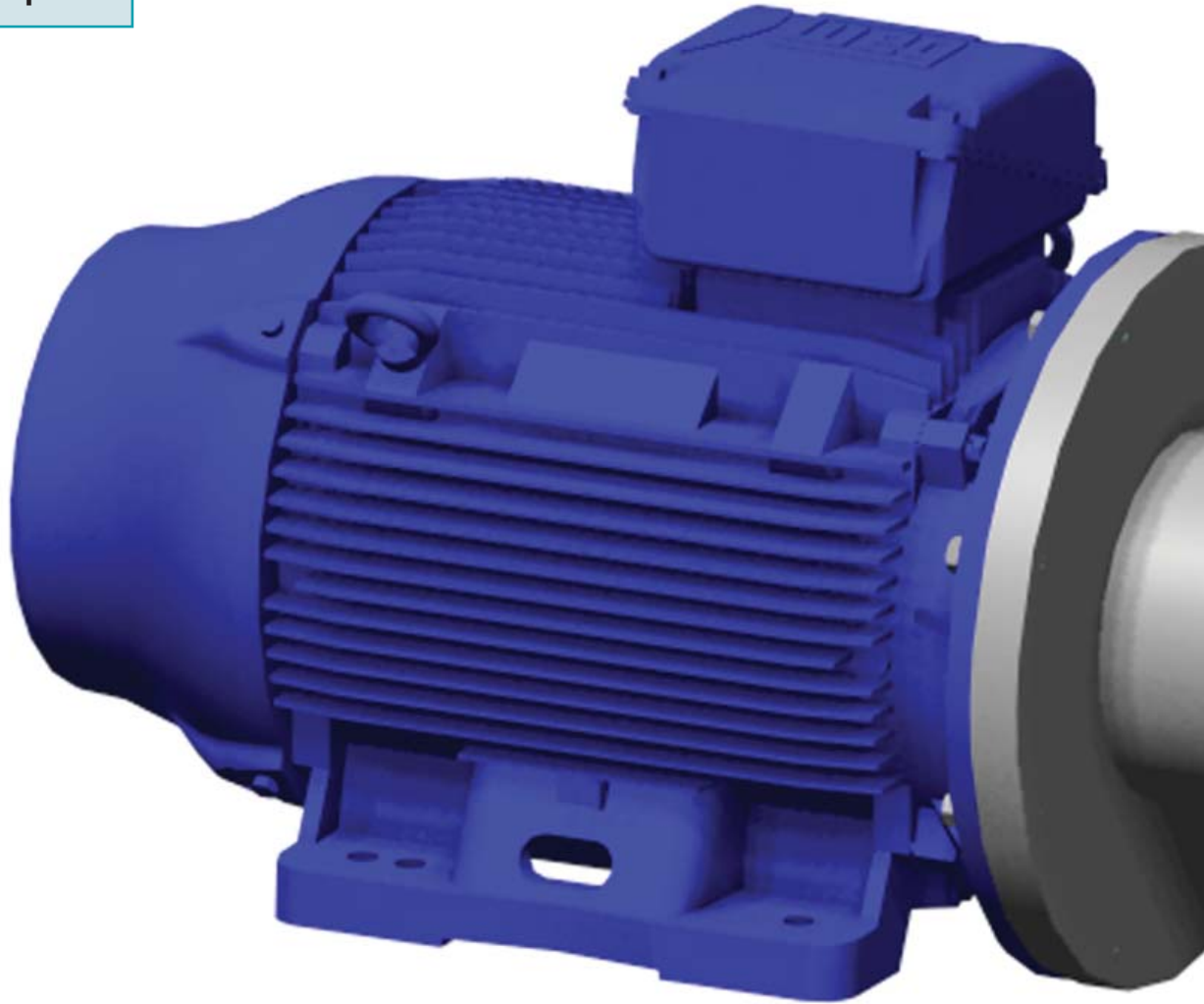


Figure 2

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**

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

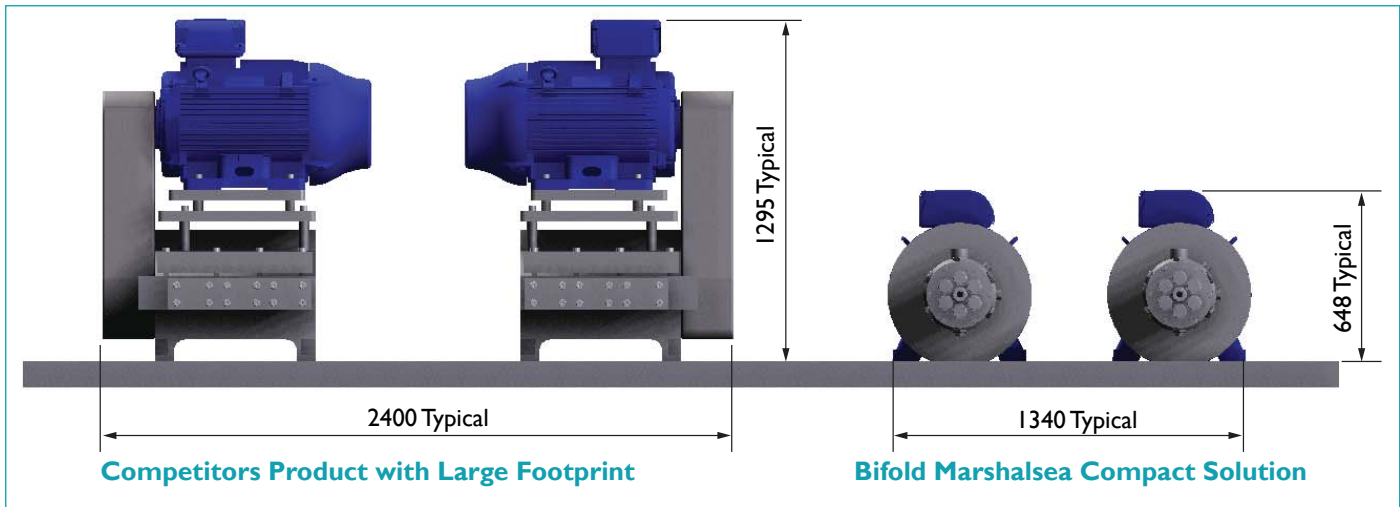


Figure 4

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.

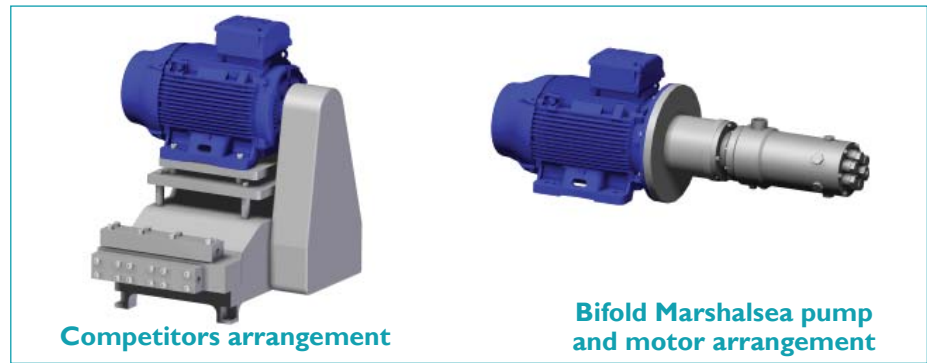


Figure 5

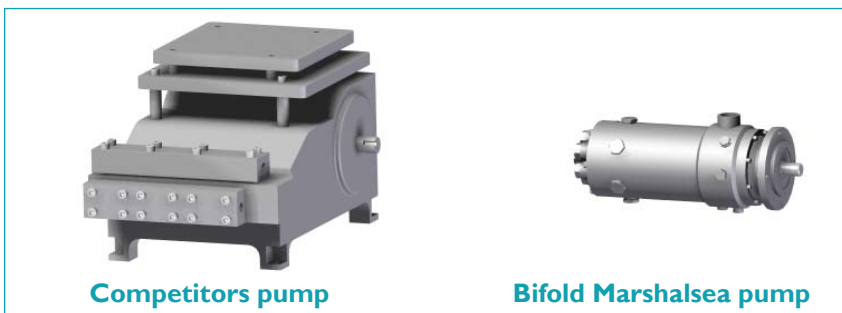


Figure 6

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.

Overview

Figure 7 Shows Relative Sizes of the Two CIMPU's

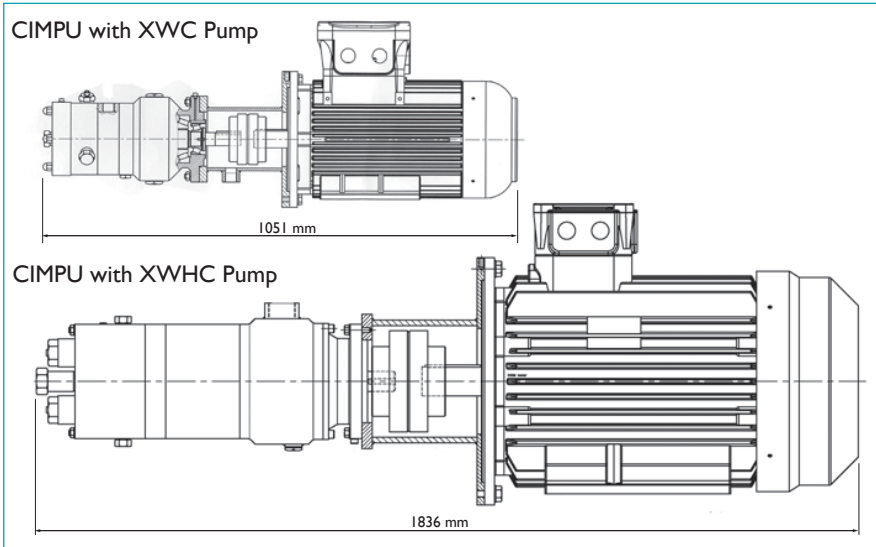


Figure 7 shows that two pumps are offered; either the 15 kW (45 kg) XWC pump or the larger 50 kW (350 kg) XWHC alternative. Both pumps can run continuously at 1,750 rpm with flow rate and pressure options as shown in tables 1 & 2 on pages 8 & 10. In the context of these performance figures, both pumps 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

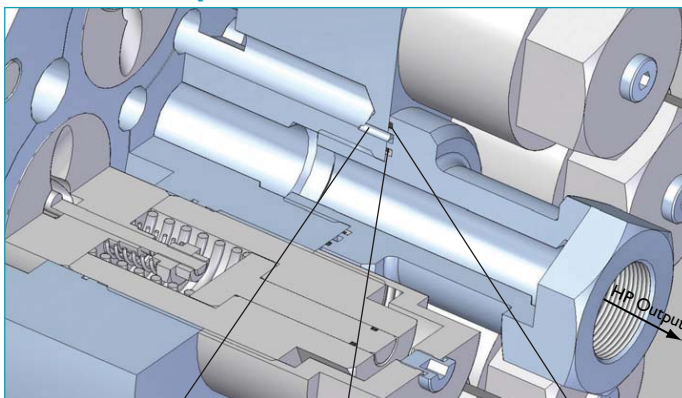


Figure 8

Return Gallery to Pump Inlet Primary High Pressure Seal Secondary Low Pressure Seal

XWHC Pump Delivery Valves

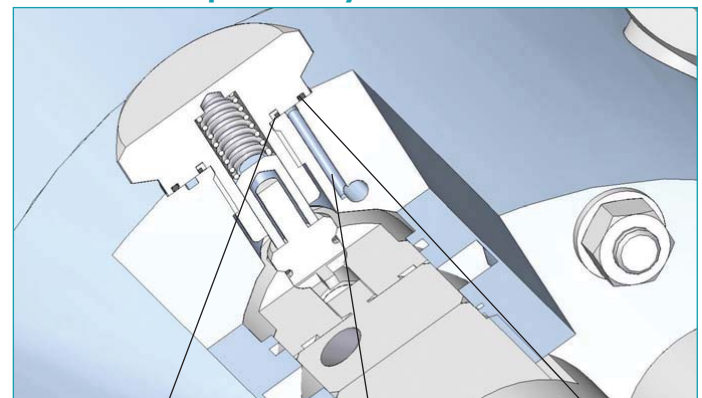


Figure 9

Primary High Pressure Seal Return Gallery to Pump Inlet Secondary Low Pressure Seal

Overview

High Density, Close Grained Ceramic Piston

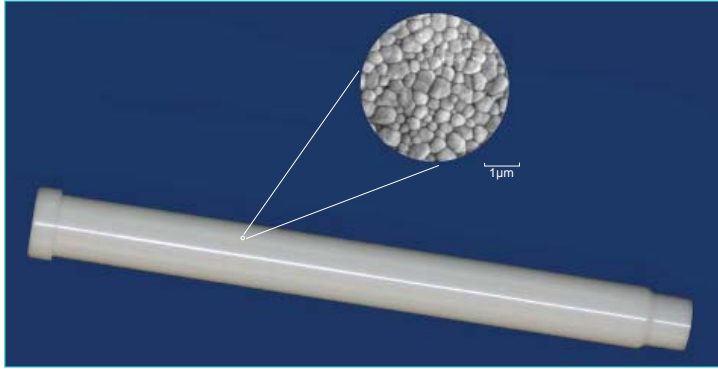


Figure 10

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

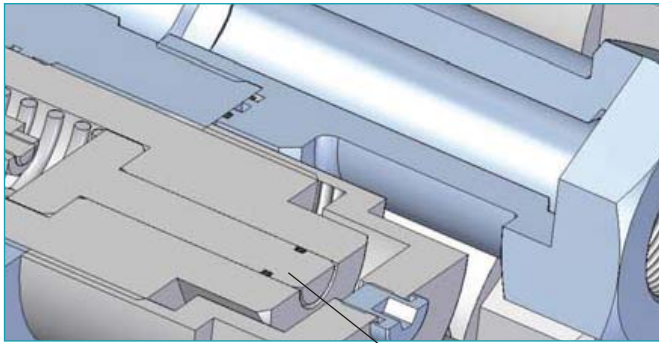


Figure 11

Suction Valve Lifter

The pumps are fitted with suction valve lifters to assist with priming.

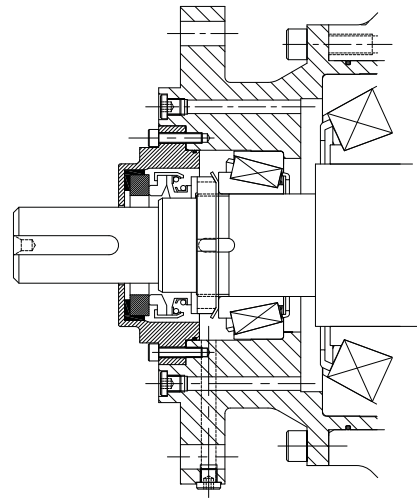


Figure 12

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.

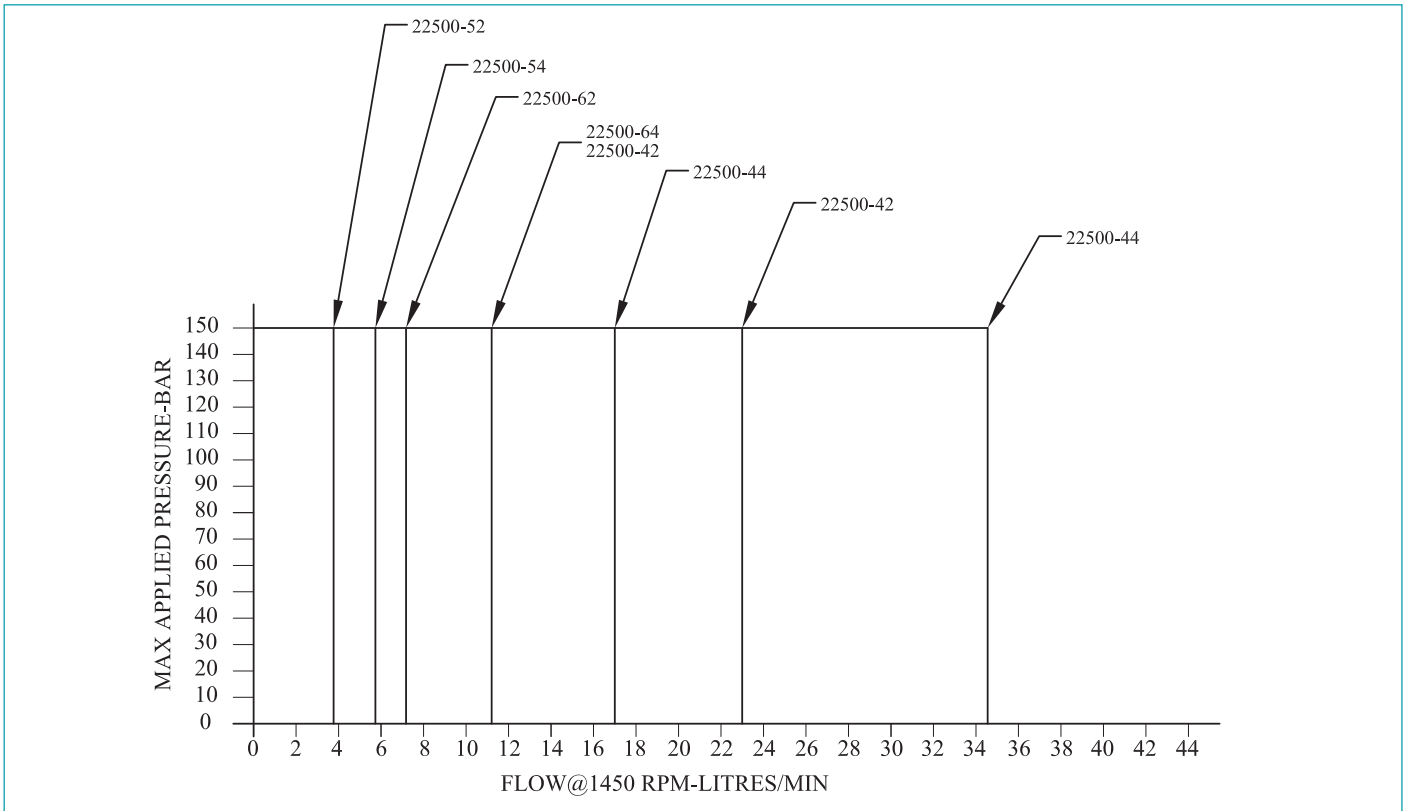
Pump Specifications

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

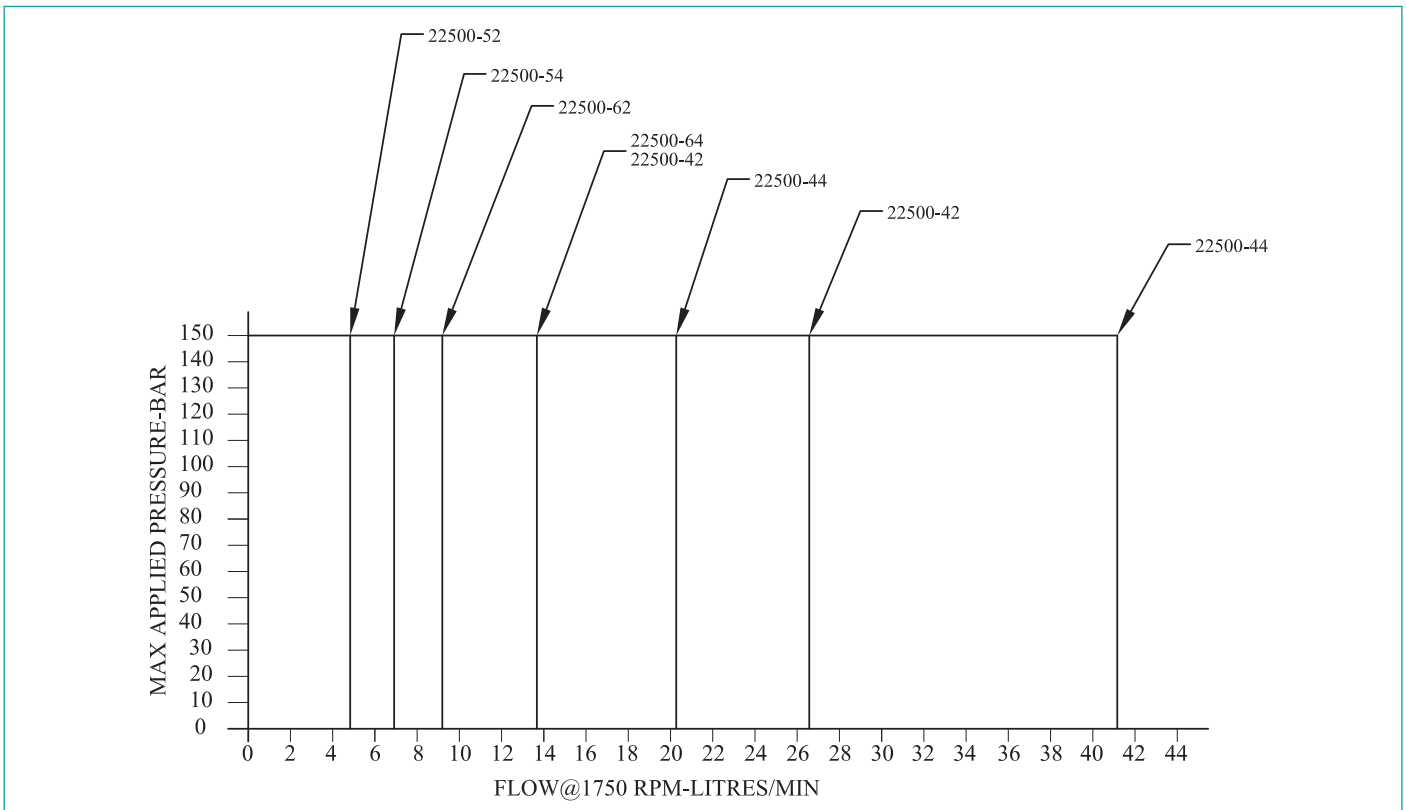
Table 1

Pump Performance

XWC Pump Performance



Graph 1



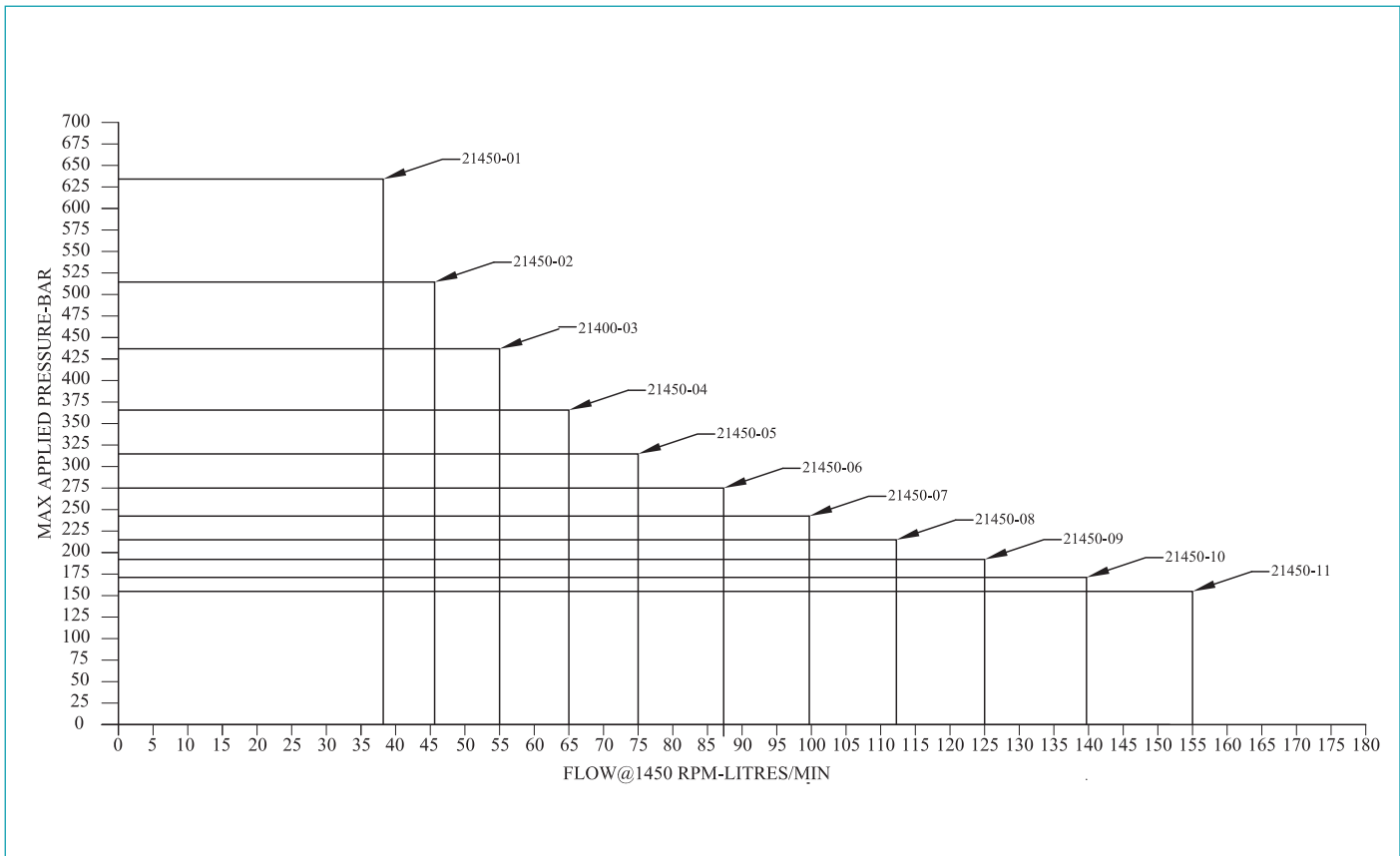
Graph 2

Pump Specifications

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

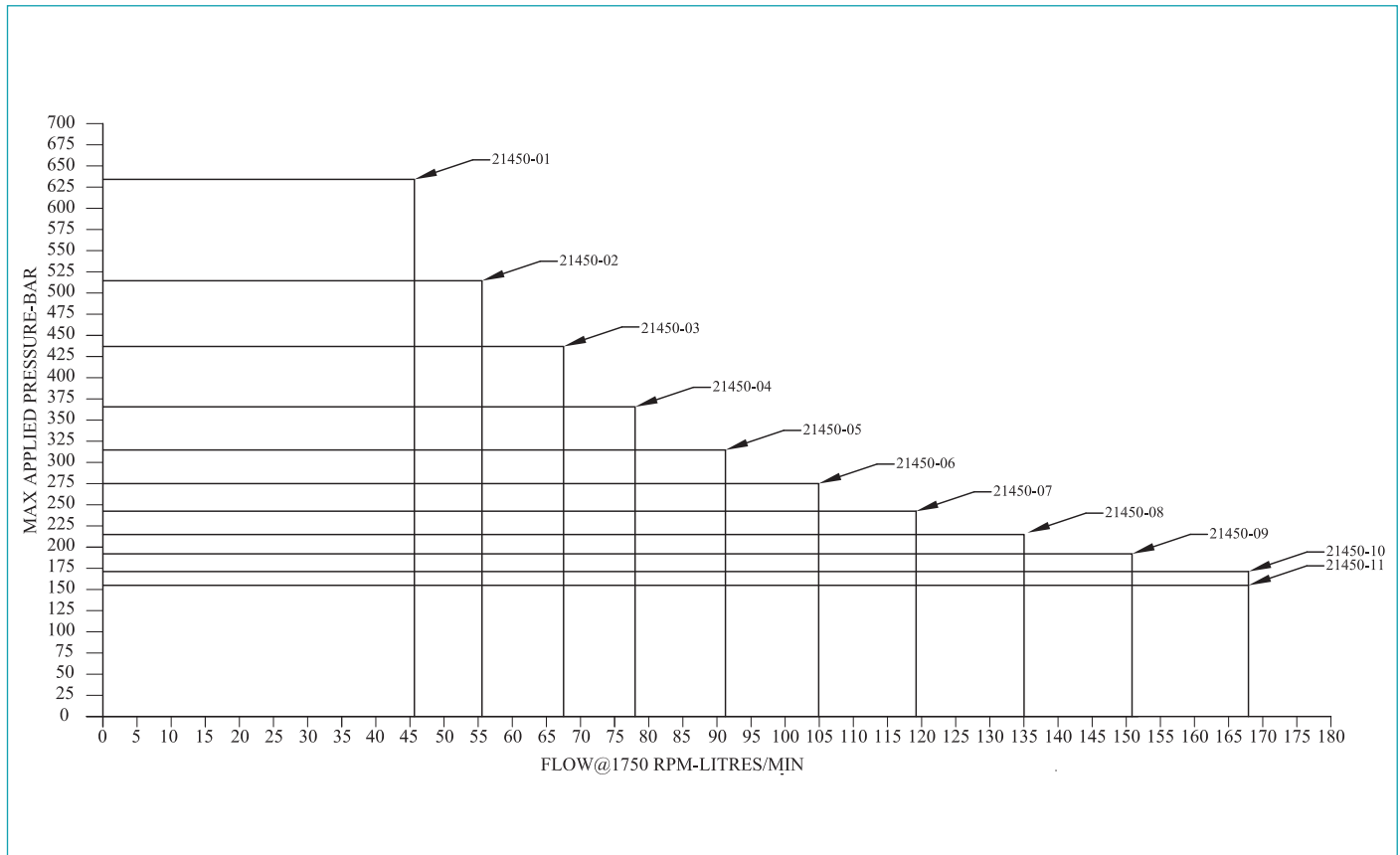
XWHC Pump Performance



Graph 3

Pump Performance

XWHC Pump Performance



Graph 4

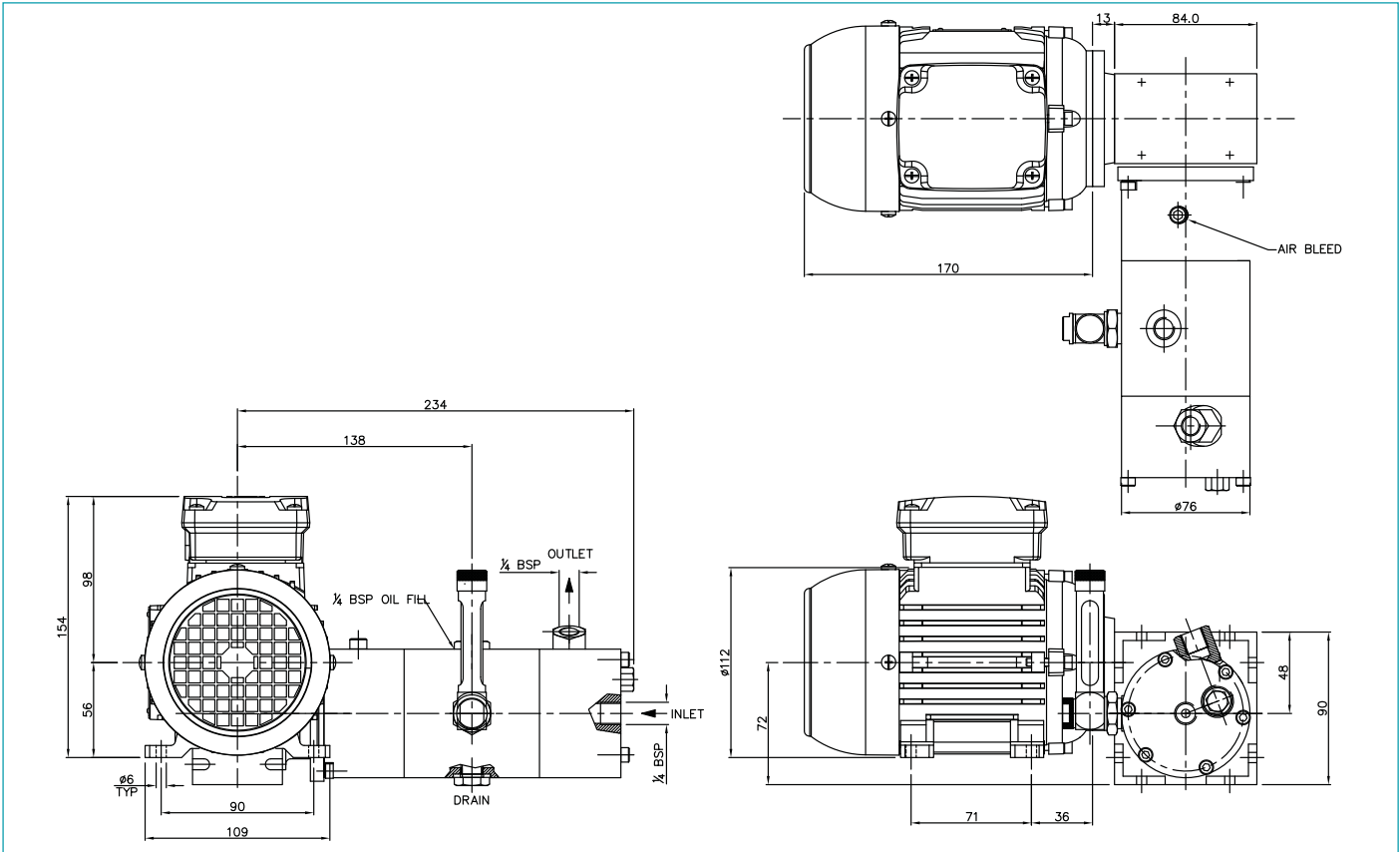
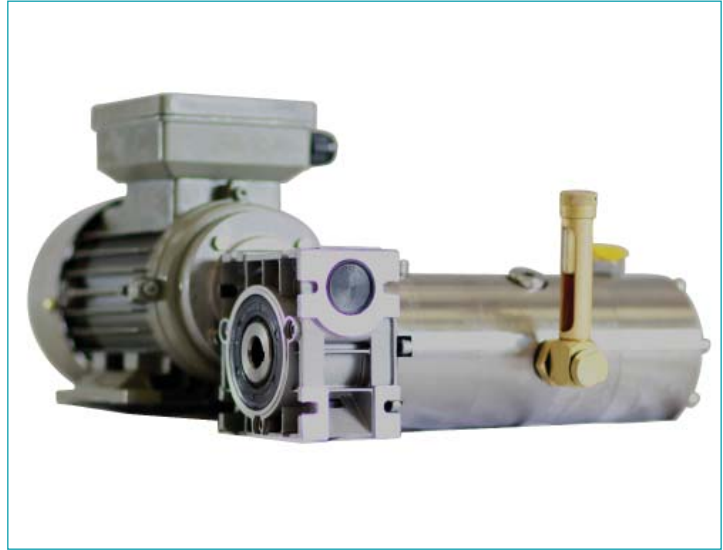
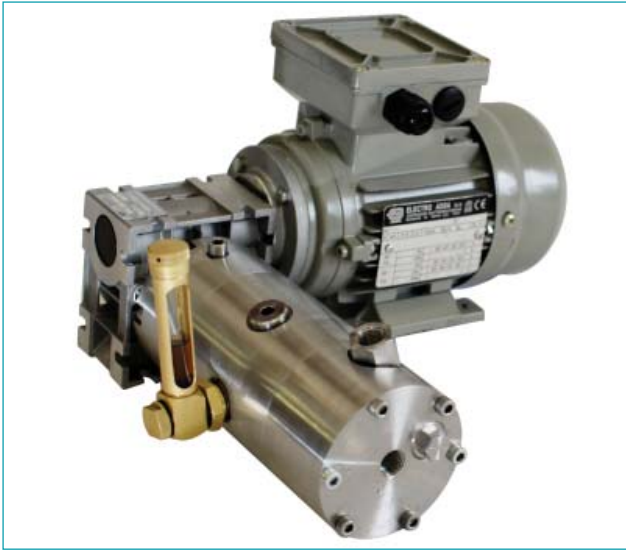
Different Pump Styles



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

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.

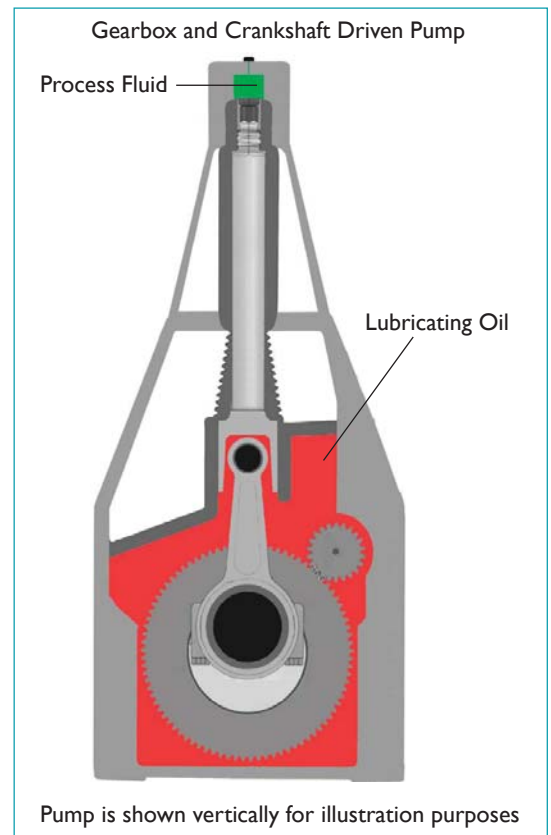


Figure 15

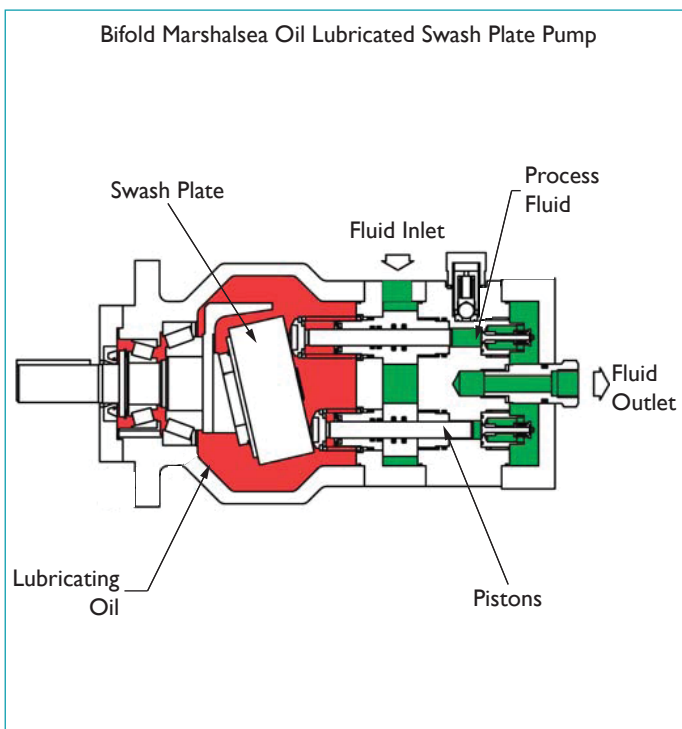


Figure 16

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.

Information

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/cm³.
Viscosity at max operating temperature ____ cP.
Solids content / solids density ____ %/g/cm³.
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.

**Global Presence for
Peace of Mind**

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  CE   
- 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.

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

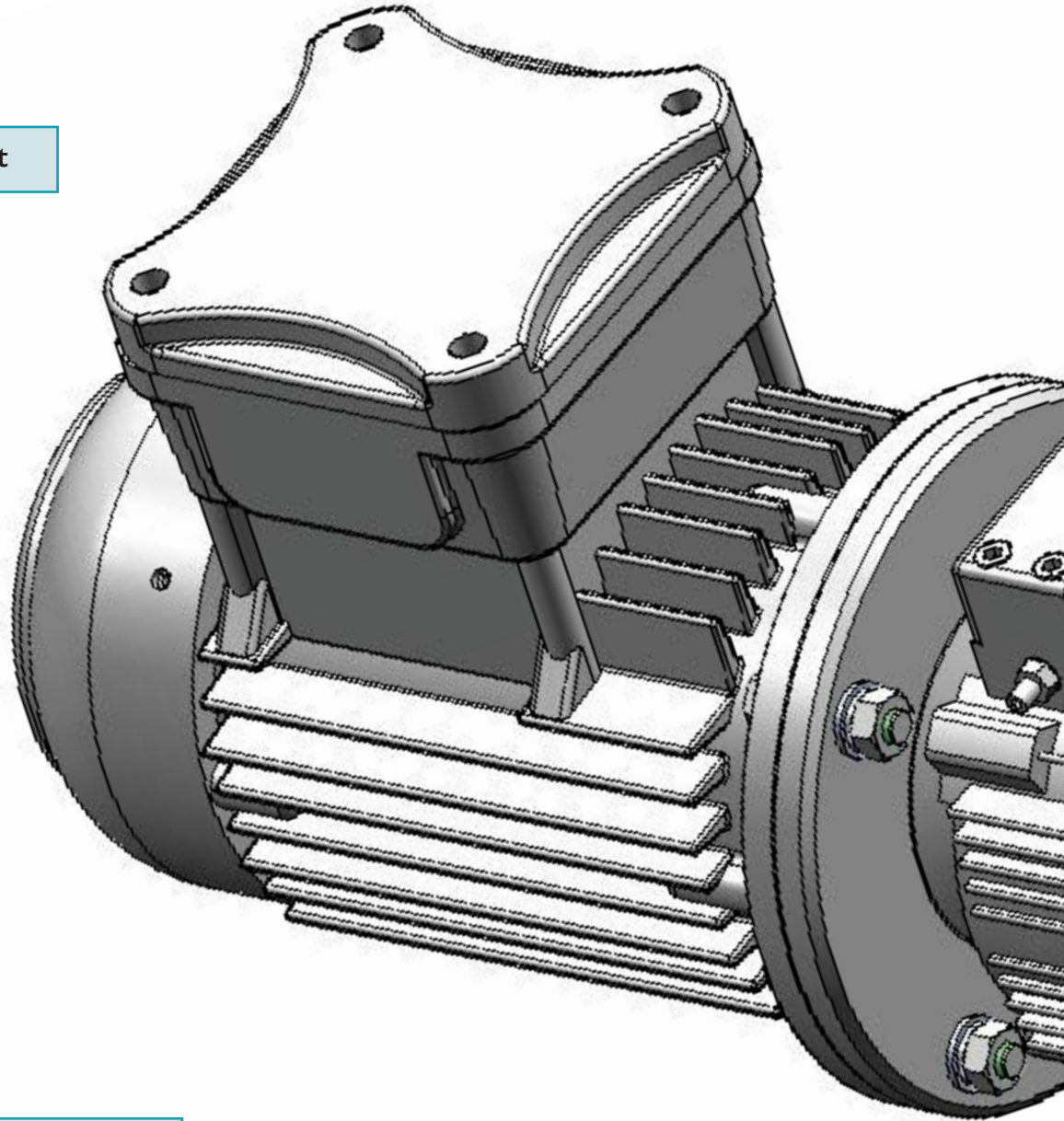


Figure 2

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

Features-SMC Pump

Ultra Compact Multi-Piston Pumps
Provide Minimal Pressure Pulsation

Chemically Inert, Low Friction
Ceramic Pistons

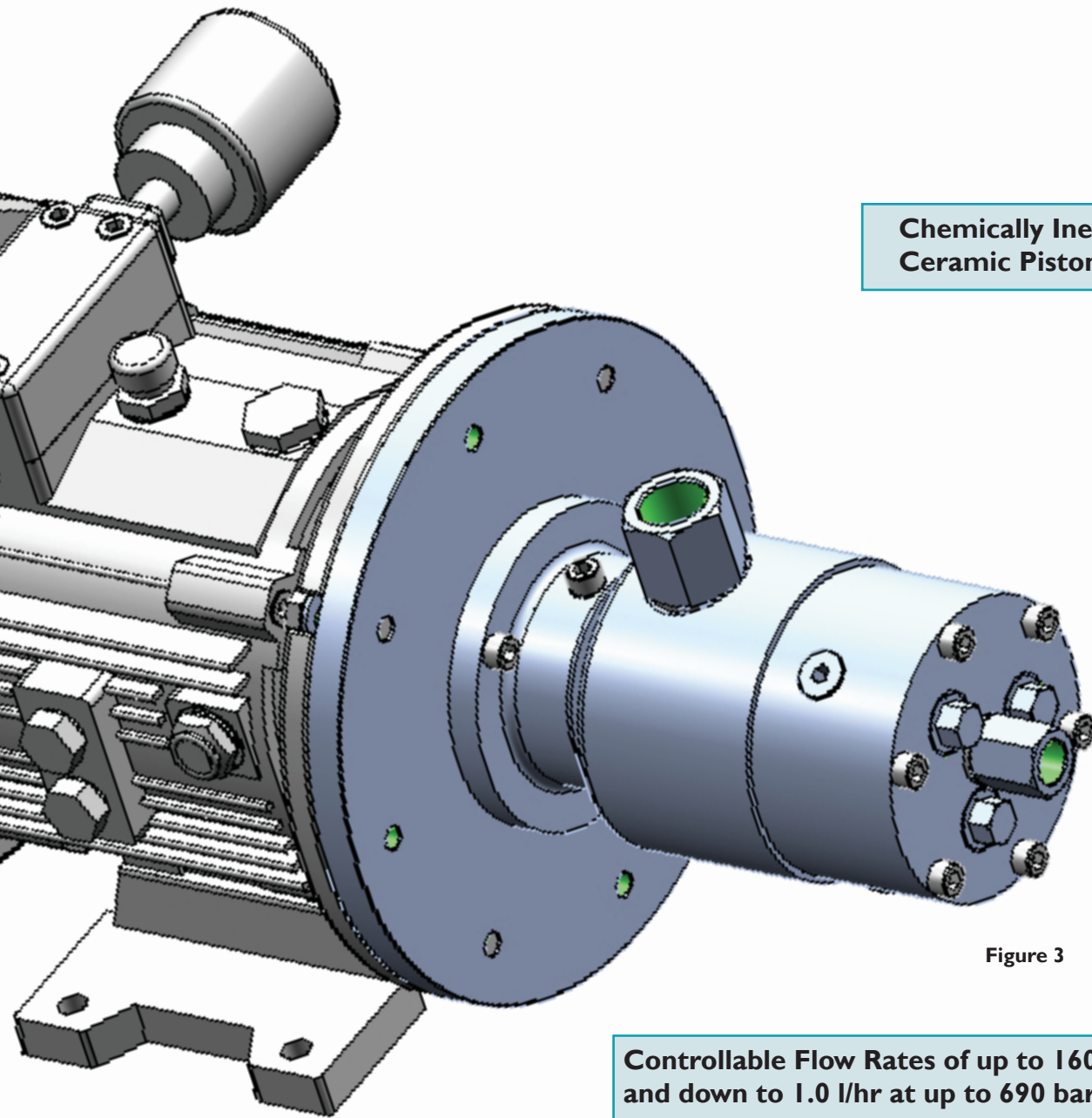


Figure 3

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

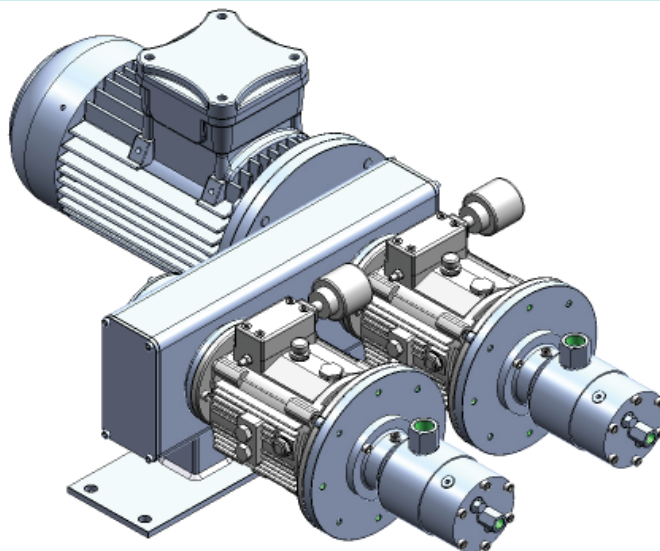


Figure 4

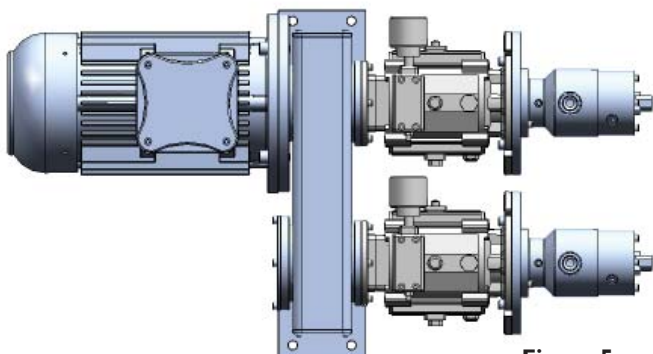


Figure 5

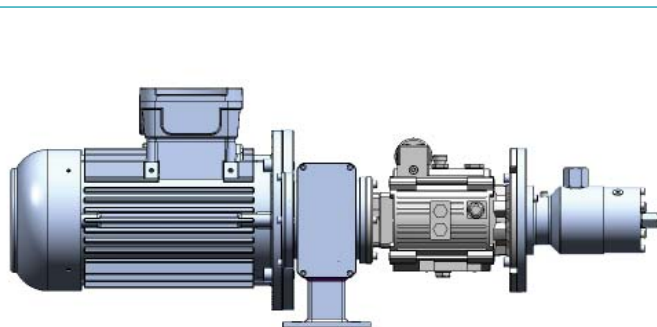


Figure 6

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.

Overview

Remote Speed Control

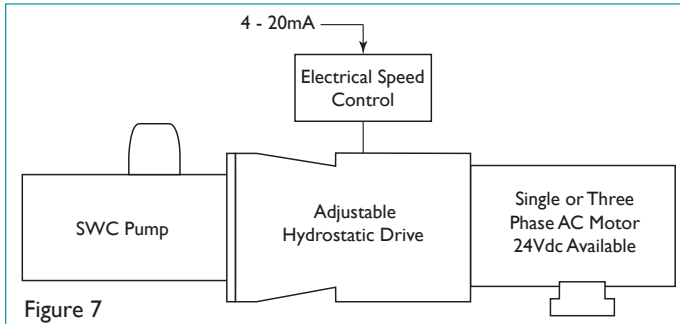


Figure 7

Local Manual Control

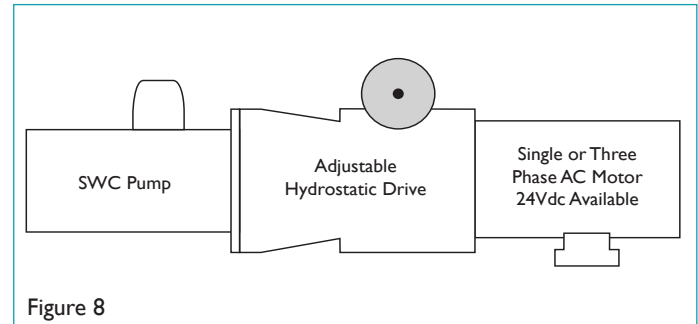


Figure 8



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

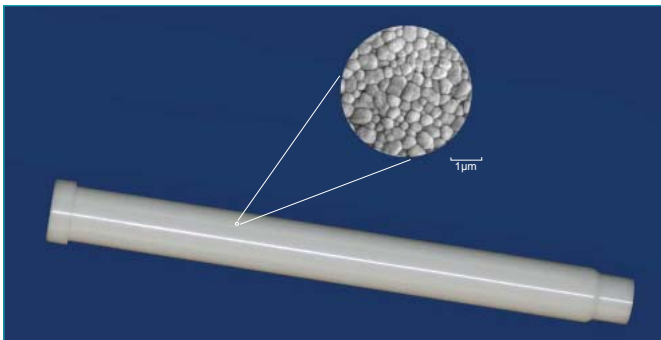


Figure 10

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

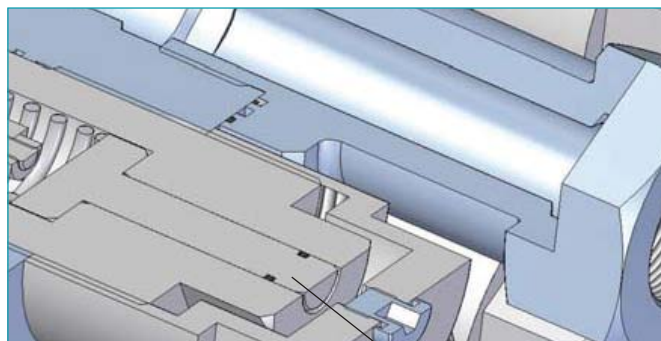


Figure 11

Suction Valve Lifter

The larger pumps are fitted with suction valve lifters to assist with priming.

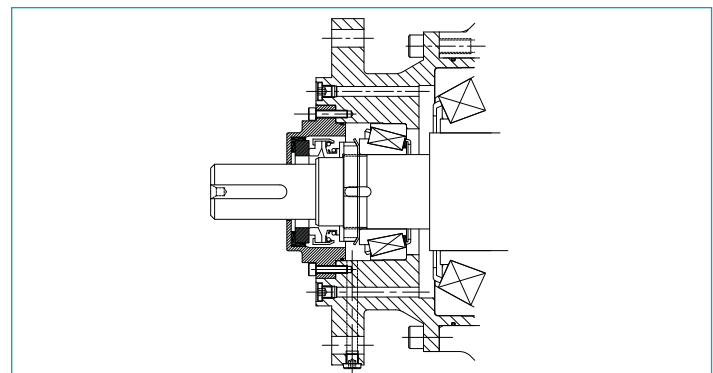
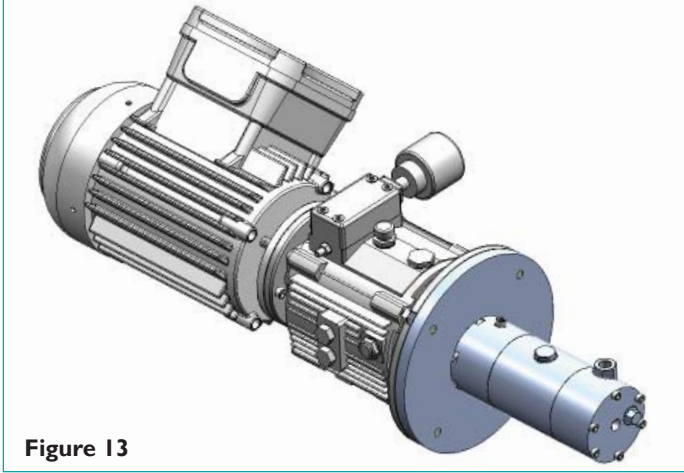


Figure 12

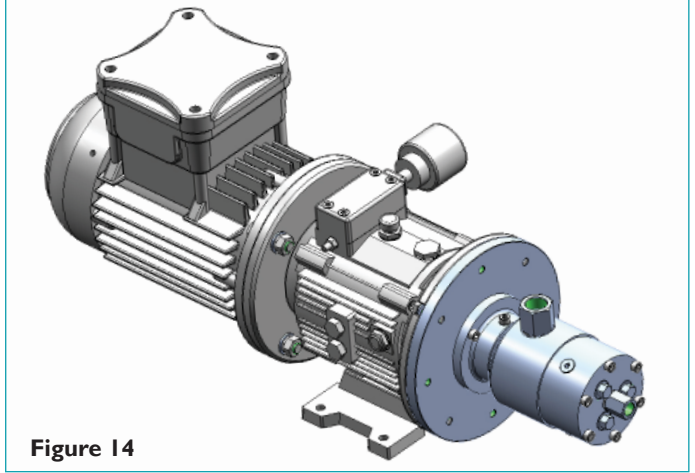
Figure 12 shows the high integrity mechanical shaft seal fitted to this range of pumps. The provision of this seal prevents fluid escaping from the pump in the event that the pump casing becomes contaminated with the process fluid.

Overview

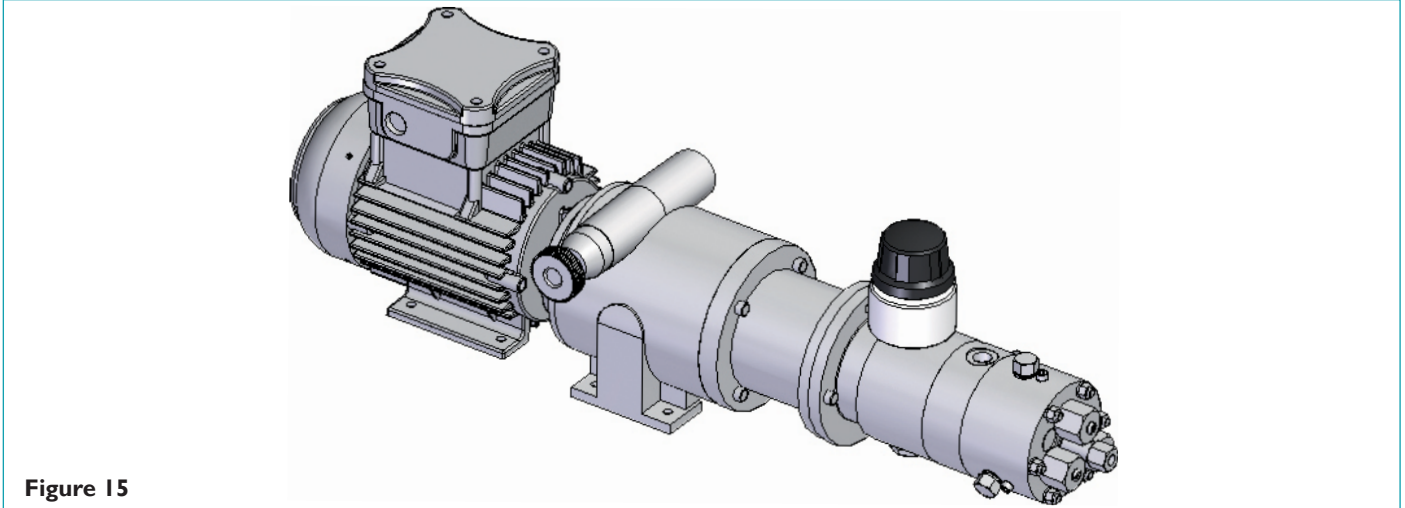
MMC Motor Pump Unit



SMC Motor Pump Unit

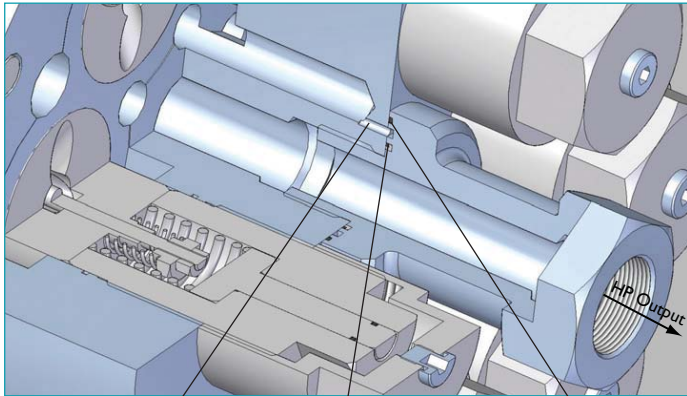


SWC Motor Pump Unit



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

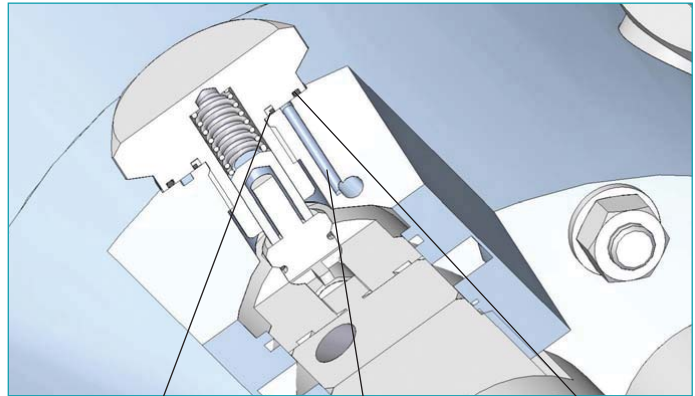


Return Gallery to Pump Inlet

Primary High Pressure Seal

Secondary Low Pressure Seal

XWHC Pump Delivery Valves



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

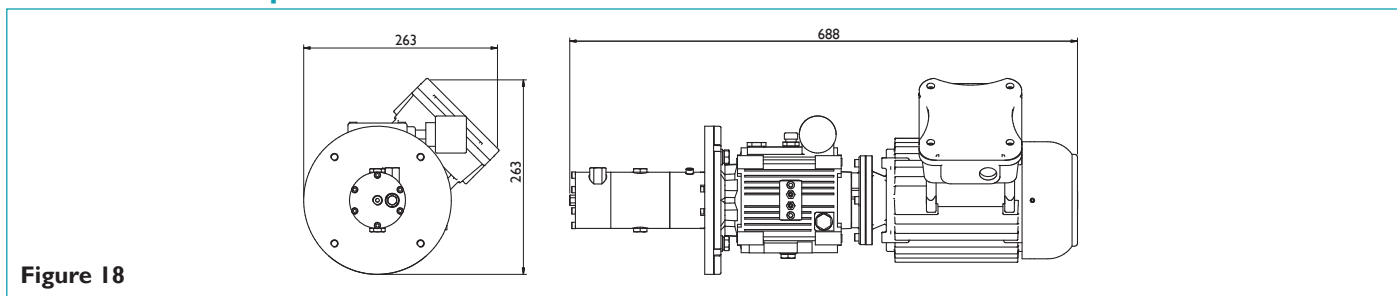


Figure 18

SMC Motor Pump Unit

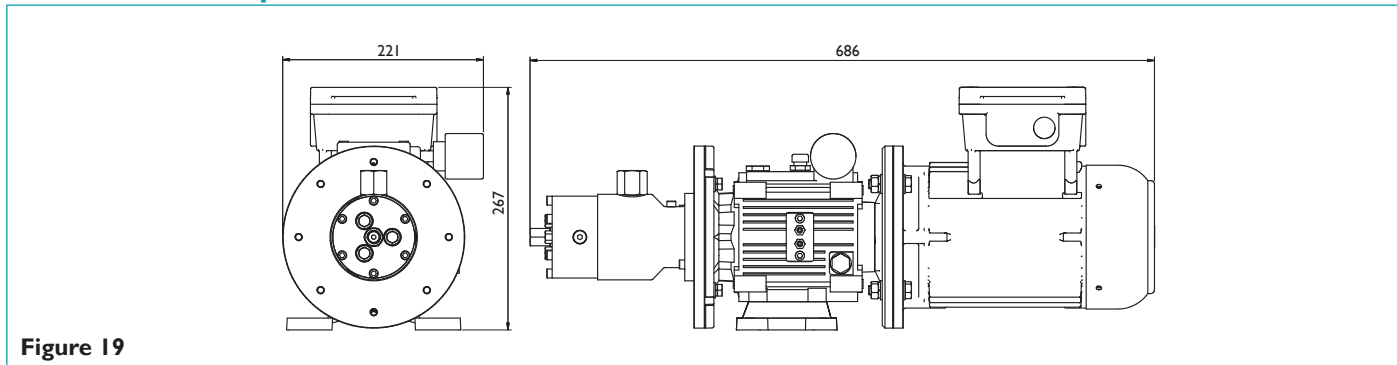


Figure 19

SWC Pump With Motor Dimensional Drawing

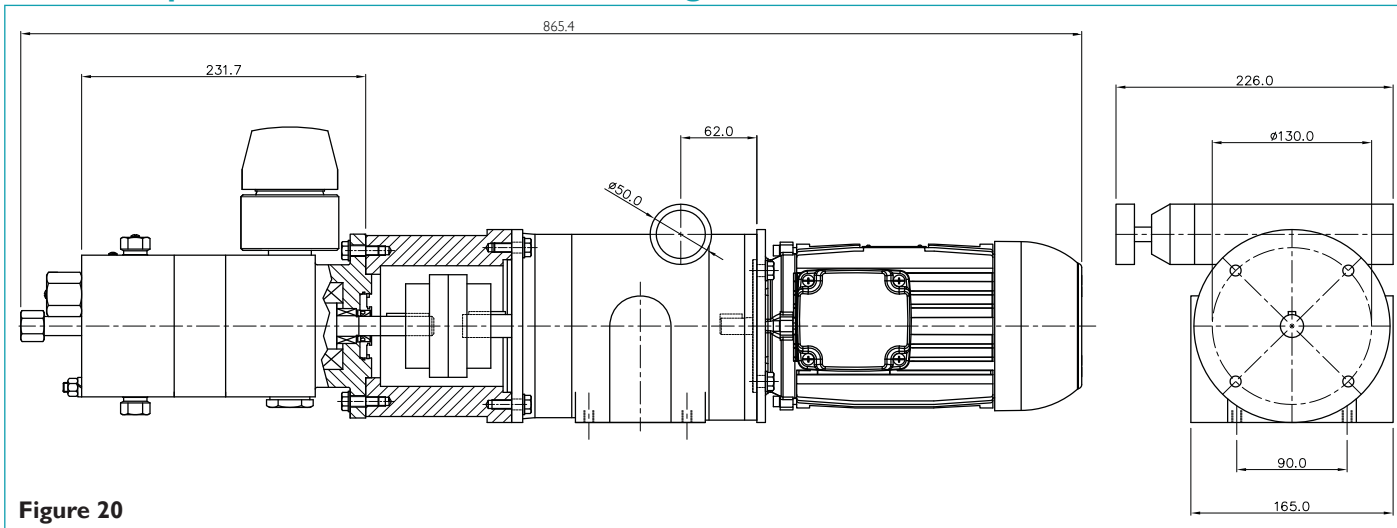


Figure 20

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.

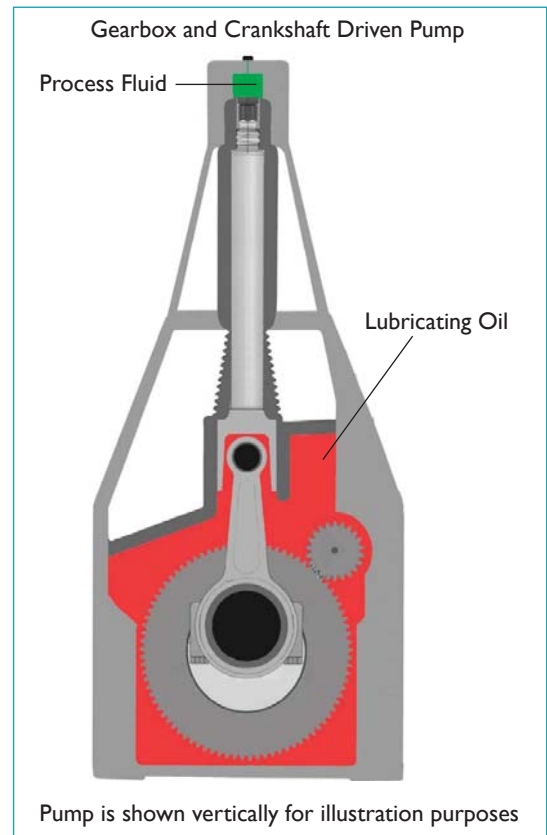


Figure 21

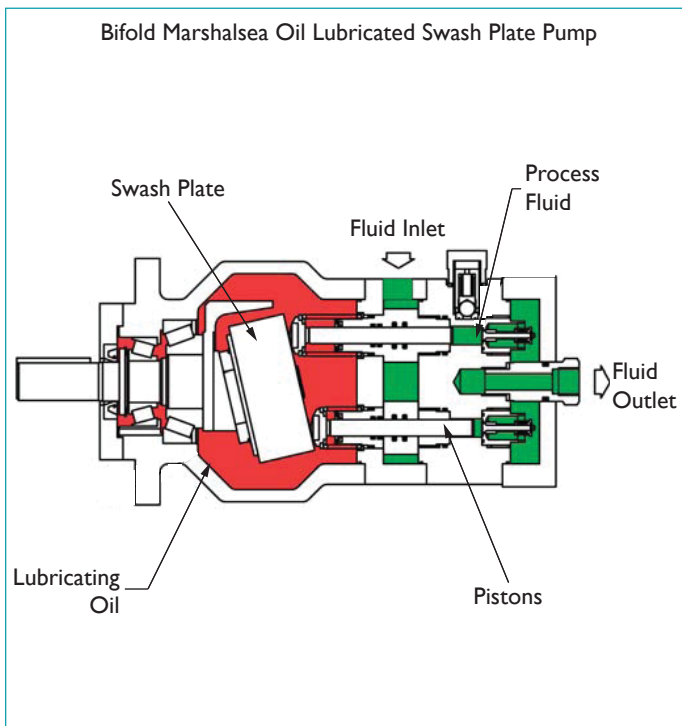


Figure 22

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.

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/cm³.
 Viscosity at max operating temperature ____ cP.
 Solids content / solids density ____ %/g/cm³.
 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

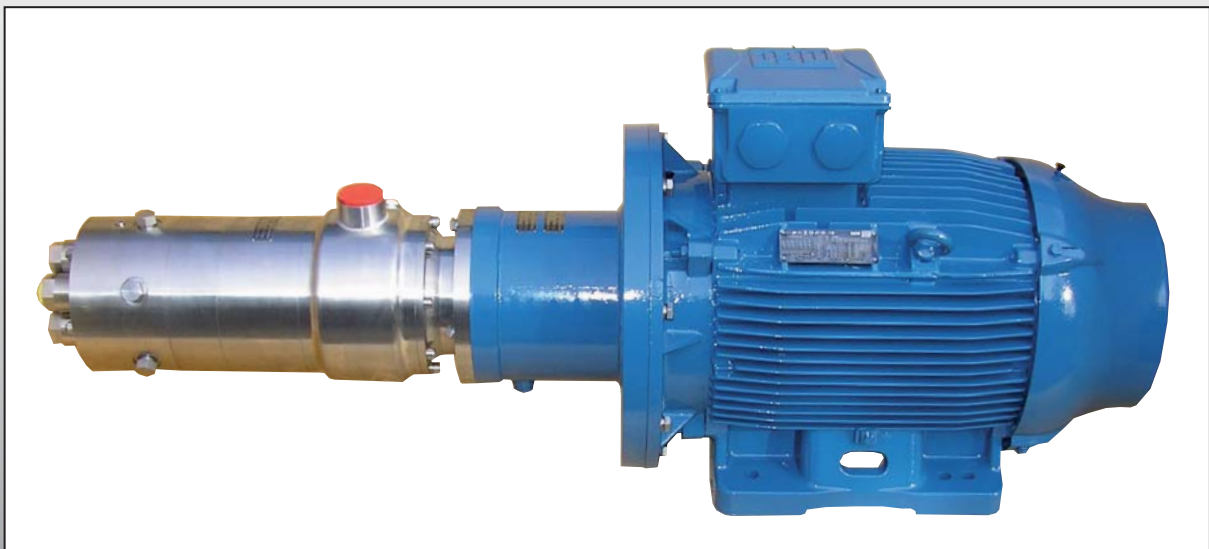
MAJOR PROJECT SUCCESS		
Operator	Project / Rig	Location
BP	Clair	North Sea
BP	Nam Con Son	Vietnam Offshore
BP	Shearwater	North Sea Central (UK)
BP	Thunderhorse	Gulf of Mexico
British Gas	Blake	North Sea
ConocoPhillips	Britannia	North Sea
Encana	Ross FPSO	North Sea (UK)
Esso	Balder	Norway
Statoil	Garn 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.

*Global Presence for
Peace of Mind*

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

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.

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.

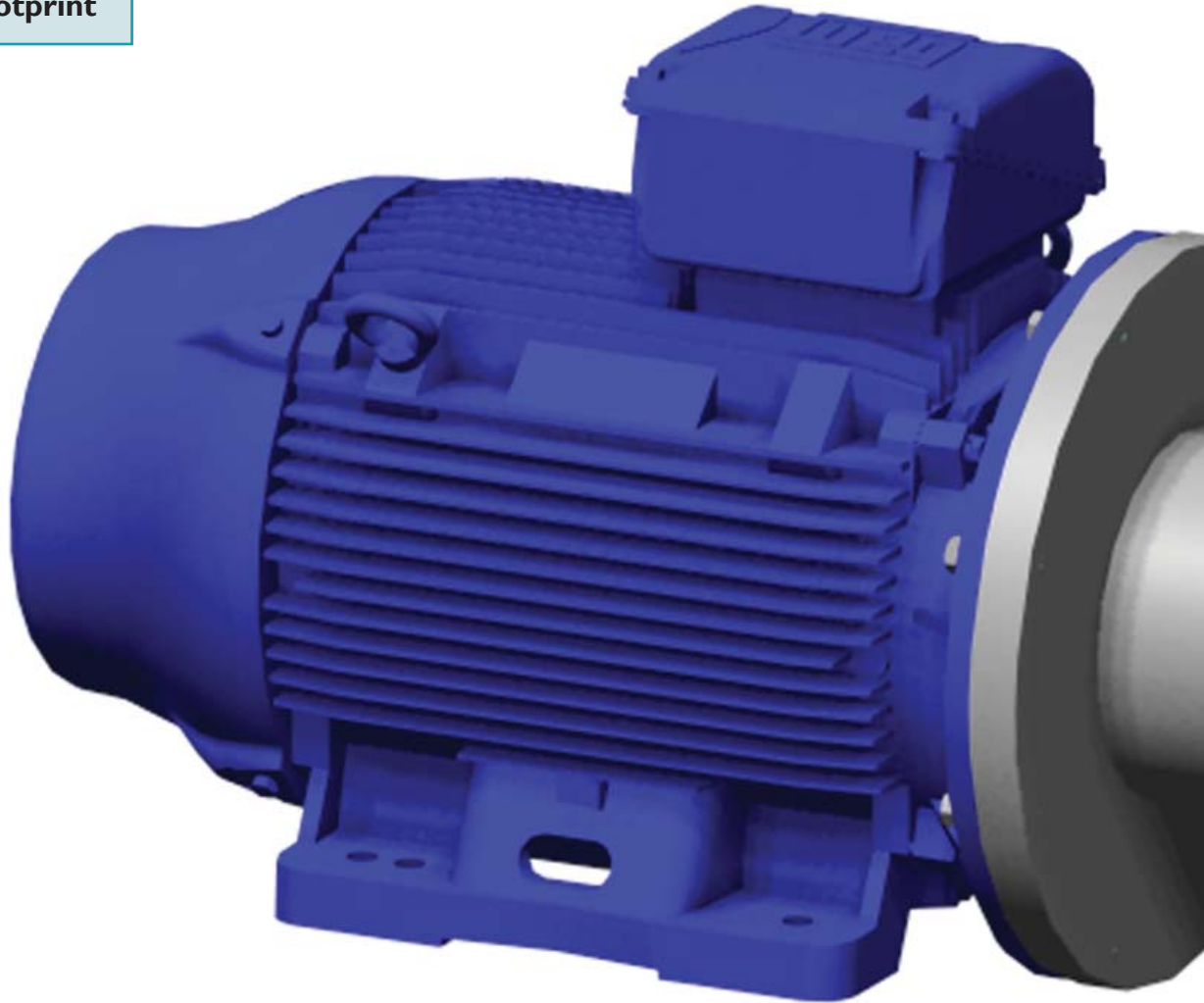


Bifold Marshalsea has been third party assessed and certified as meeting the requirements of ISO 9001: 2000 for the design, development, manufacture and servicing of Hydraulic Pumps, Relief Valves and Pressure Intensifiers.

Features

In Accordance with API 674

Smallest Overall Footprint



No External Lubrication or Cooling Systems

Direct Drive - No External Pulleys

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

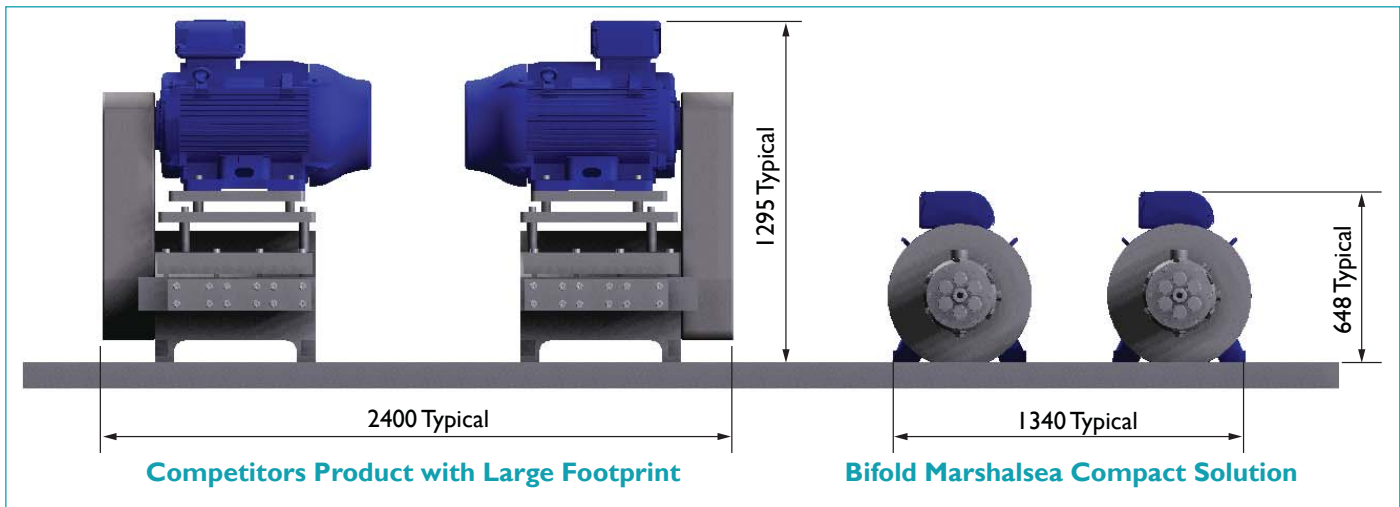


Figure 4

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.

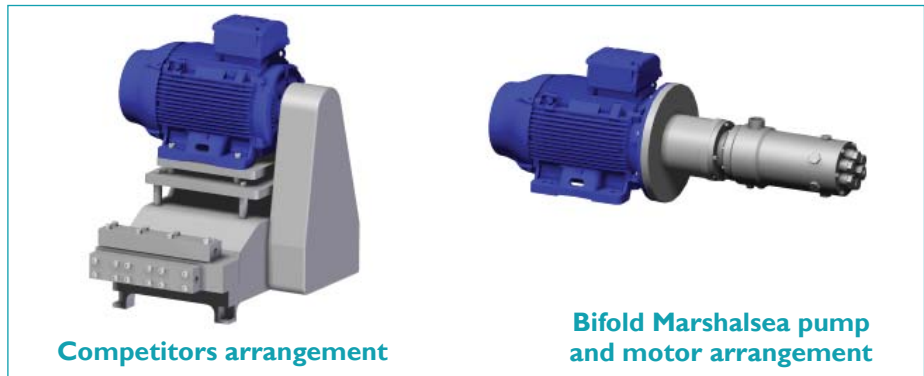


Figure 5

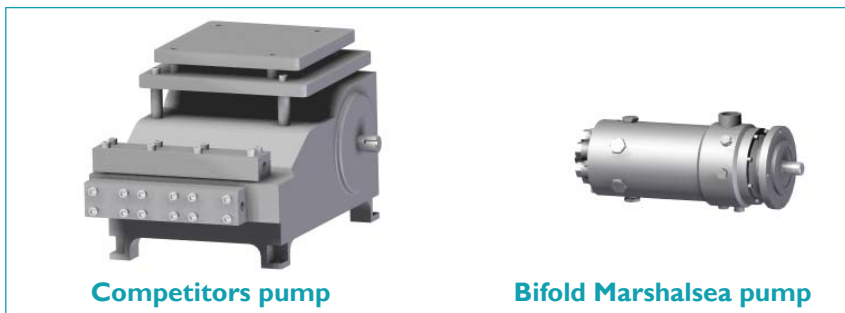


Figure 6

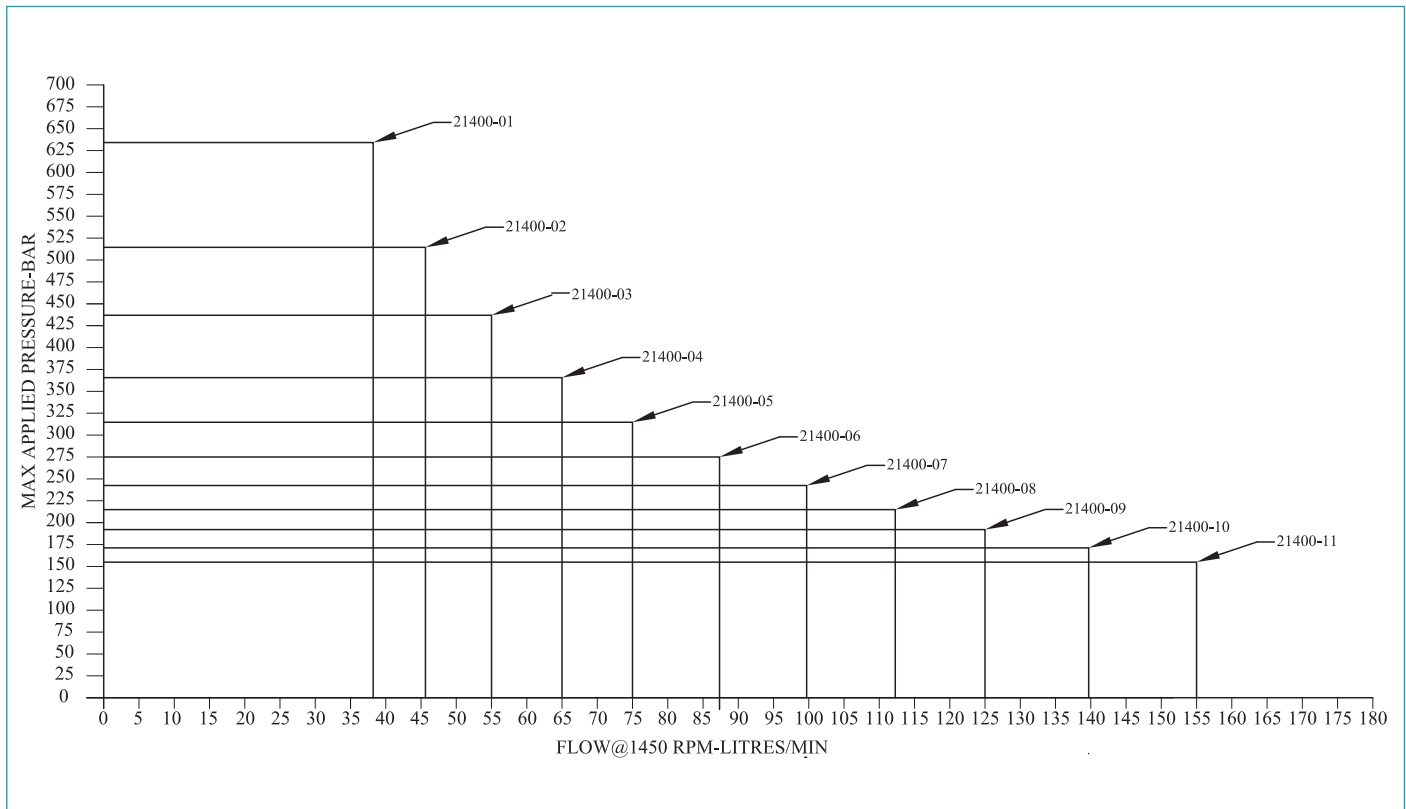
The pumps illustrated in figure 6 show the difference in size between a competitors pump with a large footprint compared to the Bifold Marshalsea compact pump.

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 I

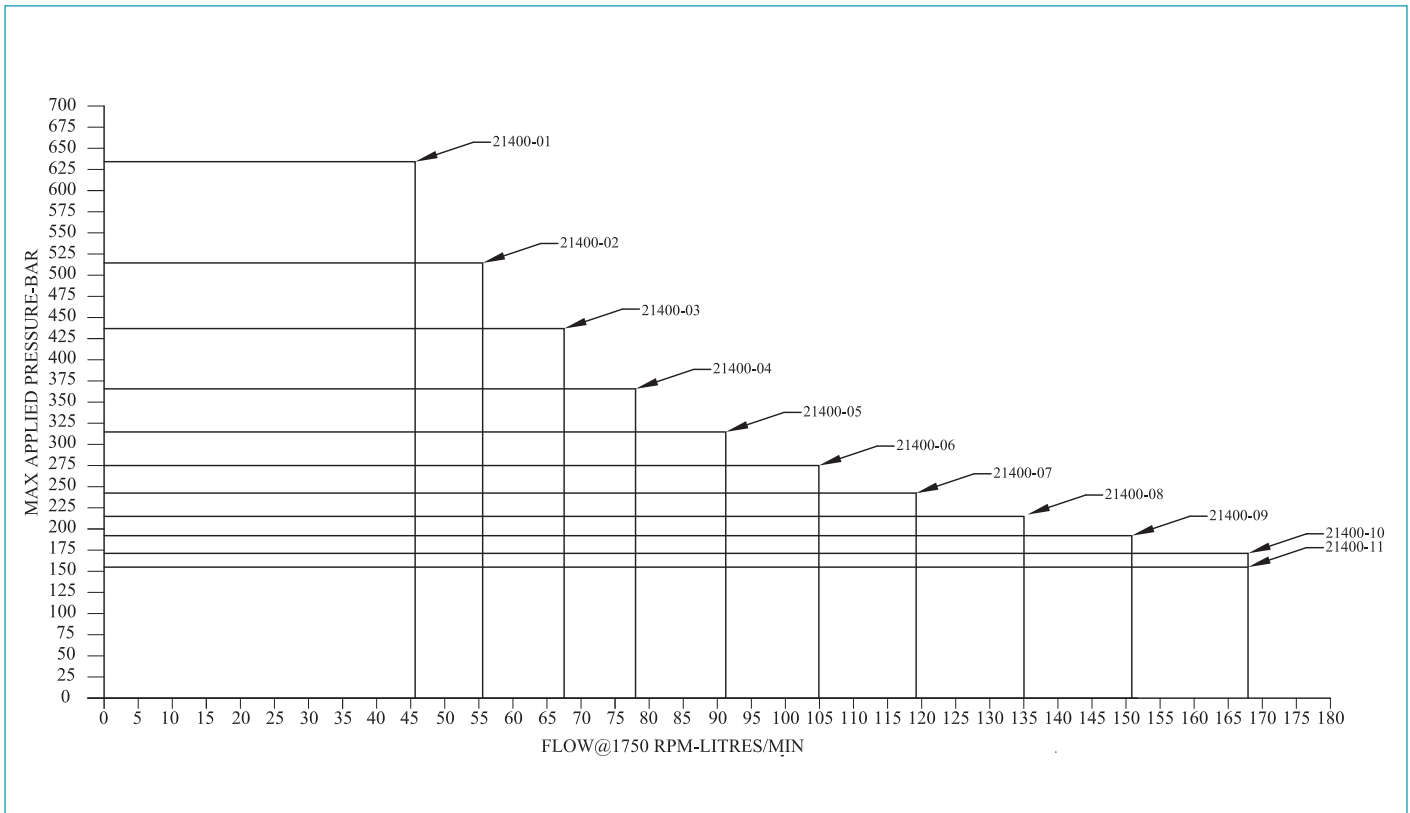
XWH Pump Performance



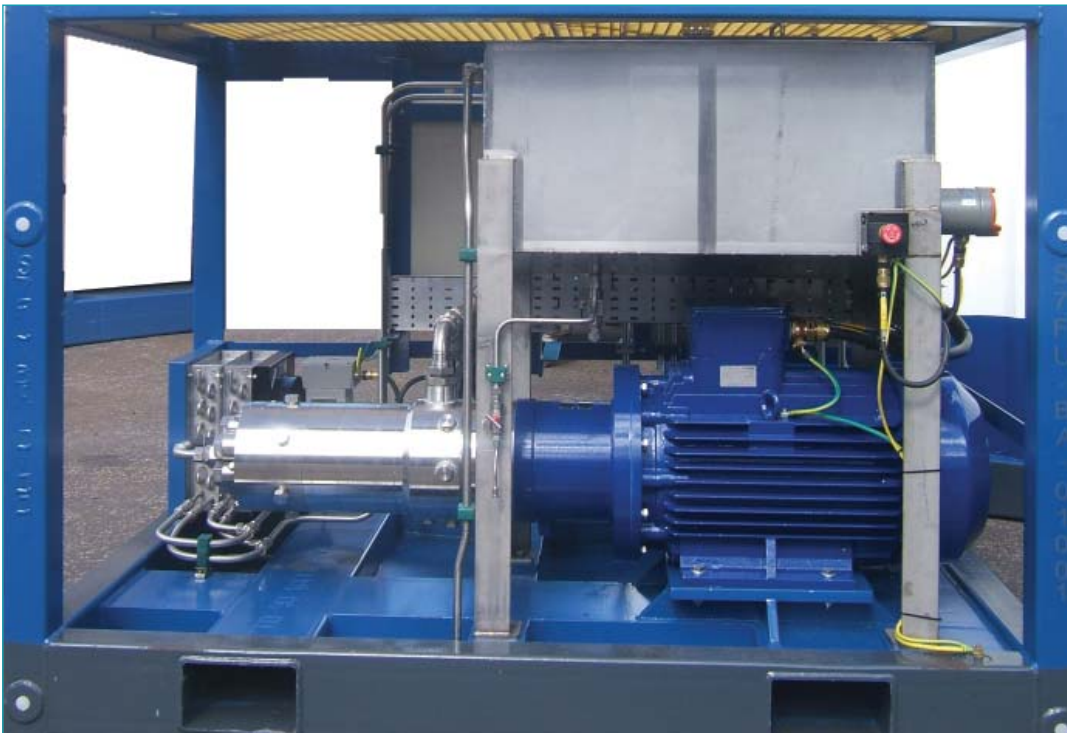
Graph I

Pump Performance

XWH Pump Performance



Graph 2



Typical Application - Flushing Rig

Figure 7

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.

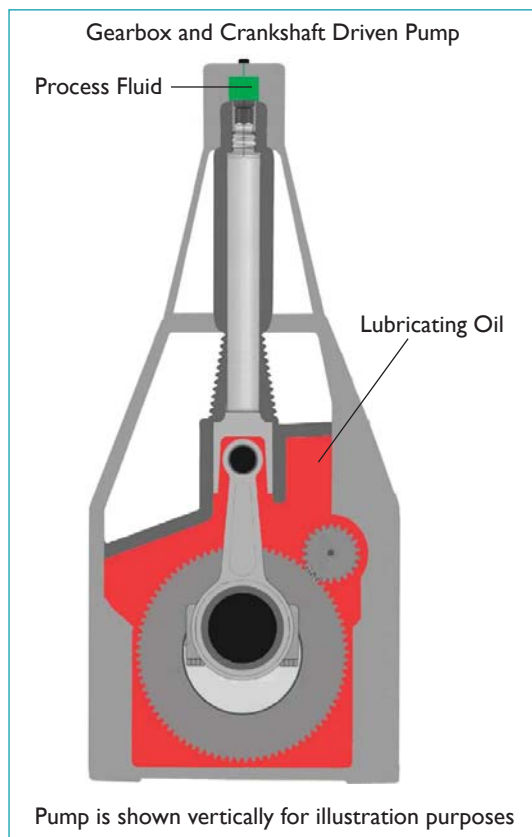


Figure 11

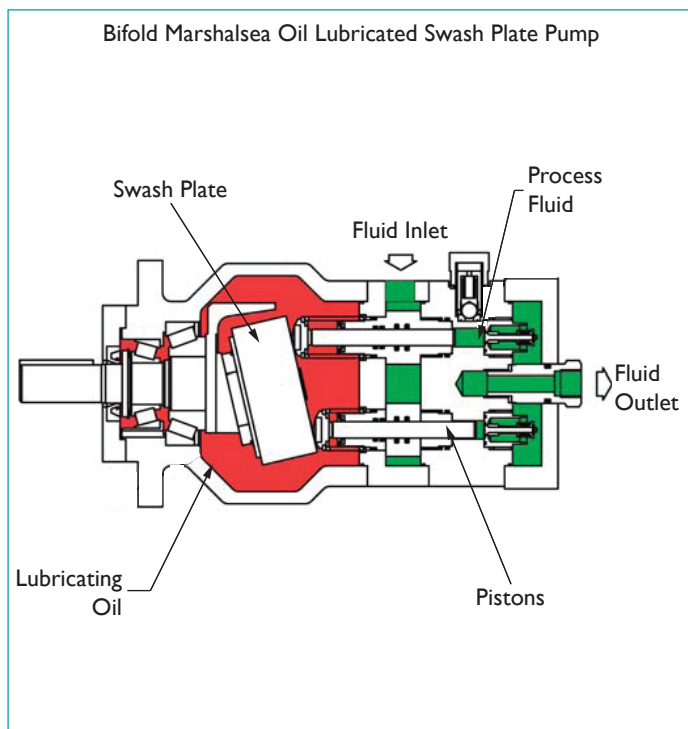


Figure 12

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.

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/cm³.
 Viscosity at max operating temperature ___ cP.
 Solids content / solids density ___ %/g/cm³.
 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.

**Global Presence for
Peace of Mind**

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

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.

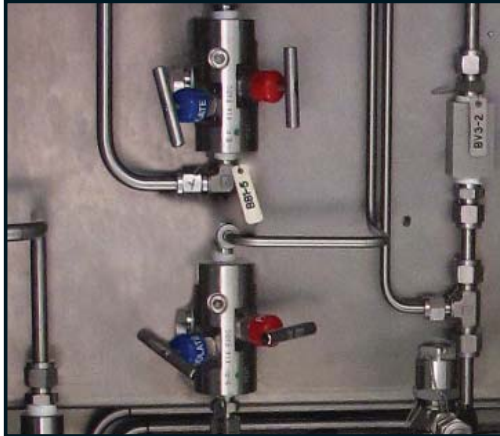
Non-Wetted Parts

- Needle head threads are clean from process fluid corrosion or contamination using a metal to metal bonnet seal and pre-thread stem seals.

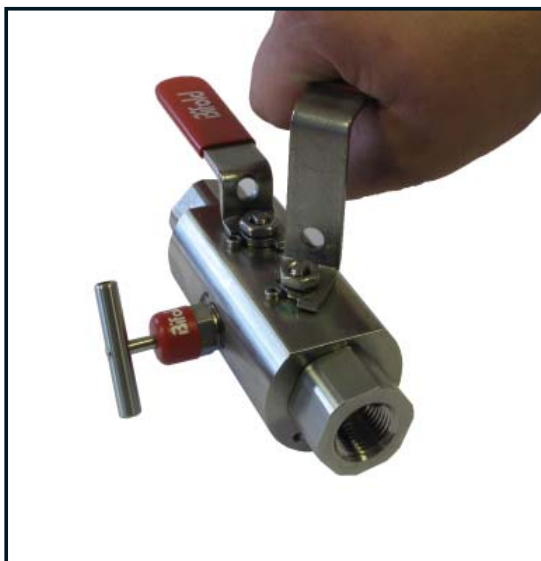
Lower Torque to Operate

- No need to mount on a back plate to counteract torque.

There are design differences between the fire safe and non-fire safe products.



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).



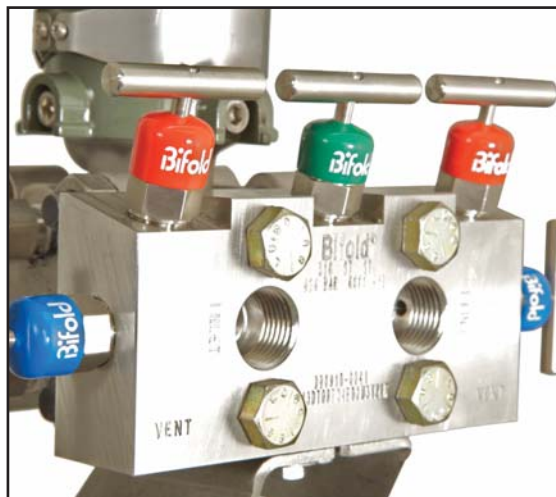
Ball Valves

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).



Product Portfolio

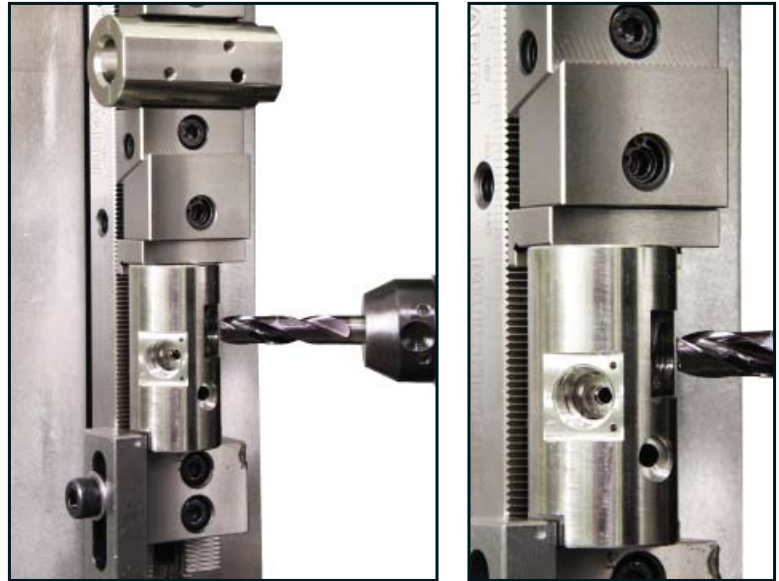
State of the Art Machining Centres

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).

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.



Installation Picture Using Our Ball And Needle Valves



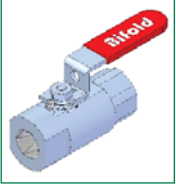

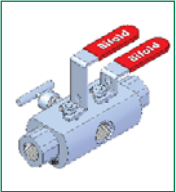



Installation Picture Using Our Ball And Needle Valves

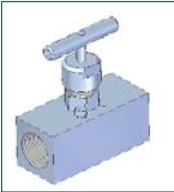

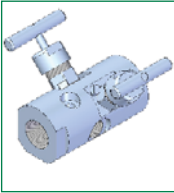
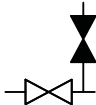
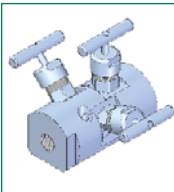
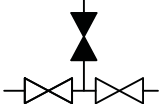
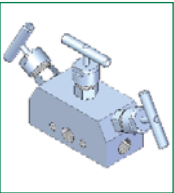
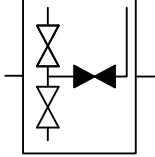


Preferred Range

INSTRUMENTATION PRODUCTS - NEEDLE VALVES (Up to and including 10,000 psi / 690 bar)

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>BV01 Single Isolate Low Pressure Ball Type</p>		9	BV0104F0211.5TG2KFSLK	1/4"NPT, Single Isolate, Ball configuration 2,000 psi / 140 bar 11.5mm Bore
			BV0108F0215TG2KFSLK	1/2"NPT, Single Isolate, Ball configuration 2,000 psi / 140 bar 15mm Bore
			BV0112F0220TG2KFSLK	3/4"NPT, Single Isolate, Ball configuration 2,000 psi / 140 bar 20mm Bore
			BV0116F0225TG2KFSLK	1"NPT, Single Isolate, Ball configuration 2,000 psi / 140 bar 25mm Bore
			BV0132F0250TG2KFSLK	2"NPT, Single Isolate, Ball configuration 1,000 psi / 70 bar 50mm Bore
 <p>BV01 Single Isolate Ball Type</p>		10 / 11	BV0104F0210EG6KFS	1/4"NPT, Single Isolate, Ball configuration, 6,000 psi / 414 bar 10mm Bore
			BV0104F0210EG10KFS	1/4"NPT, Single Isolate, Ball configuration, 10,000 psi / 690 bar 10mm Bore
			BV0108F0210EG6KFS	1/2"NPT, Single Isolate, Ball configuration, 6,000 psi / 414 bar 10mm Bore
			BV0108F0210EG10KFS	1/2"NPT, Single Isolate, Ball configuration, 10,000 psi / 690 bar 10mm Bore
			BV0112F0210EG6KFS	3/4"NPT, Single Isolate, Ball configuration, 6,000 psi / 414 bar 10mm Bore
 <p>BV05 Double Block & Bleed Manifold</p>		12 / 13	BV0504F0210EGV6KFS	1/4"NPT, DBB Manifold, Ball - Needle - Ball configuration, 6,000 psi / 414 bar 10mm Bore 1/4"Vent Bleed
			BV0504F0210EGV10KFS	1/4"NPT, DBB Manifold, Ball - Needle - Ball configuration, 10,000 psi / 690 bar 10mm Bore 1/4"Vent Bleed
			BV0508F04F0210EGV6KFS	1/2"NPT, DBB Manifold, Ball - Needle - Ball configuration, 6,000 psi / 414 bar 10mm Bore 1/4"Vent Bleed
			BV0508F04F0210EGV10KFS	1/2"NPT, DBB Manifold, Ball - Needle - Ball configuration, 10,000 psi / 690 bar 10mm Bore 1/4"Vent Bleed
			BV0512F04F0210EGV6KFS	3/4"NPT, DBB Manifold, Ball - Needle - Ball configuration, 6,000 psi / 414 bar 10mm Bore 1/4"Vent Bleed

Preferred Range

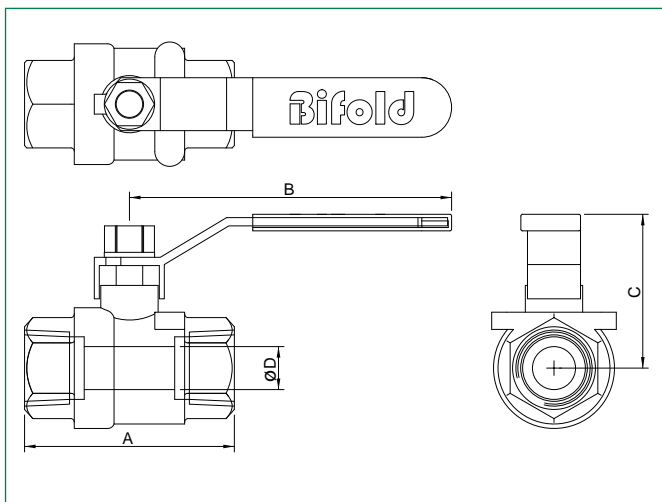
INSTRUMENTATION PRODUCTS - NEEDLE VALVES (Up to and including 10,000 psi / 690 bar)				
Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>NV01 Single Isolate</p>		14 / 15	NV0104F02M5V6KFS	1/4"NPT, Single Isolate, Needle configuration, 6,000 psi / 414 bar
			NV0104F02M5V10KFS	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>NV04 Block & 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
THIS PRODUCT DESIGN IS UNIQUE TO BIFOLD AND PATENTED				
 <p>NV05 Double Block & 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
THIS PRODUCT DESIGN IS UNIQUE TO BIFOLD AND PATENTED				
 <p>NV06 Double Block & 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
THIS PRODUCT DESIGN IS UNIQUE TO BIFOLD AND PATENTED				

Needle Valves



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

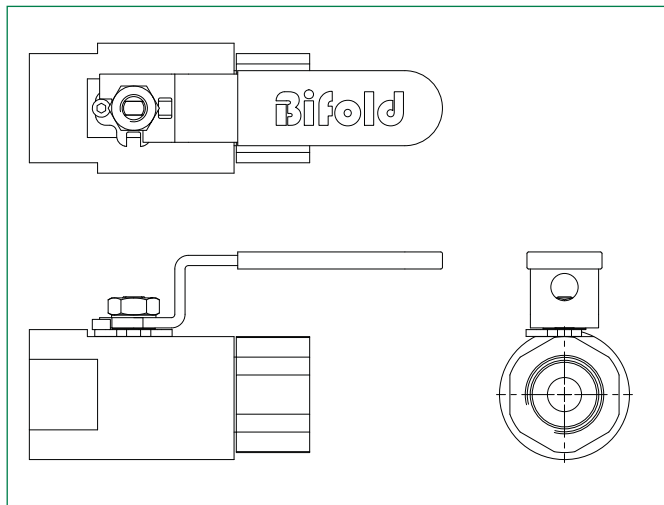
- Two piece construction reducing leak paths.
- Bi-directional.
- Precision machined stainless steel ball.
- RTFE seating to the ball.
- Anti Tamperproof lockable handle as standard.
- Compact design to save space and weight.
- Bubble tight shut-off.
- Fire Safe in Accordance with API 607, API 6FA, ISO 10497.

Technical Data

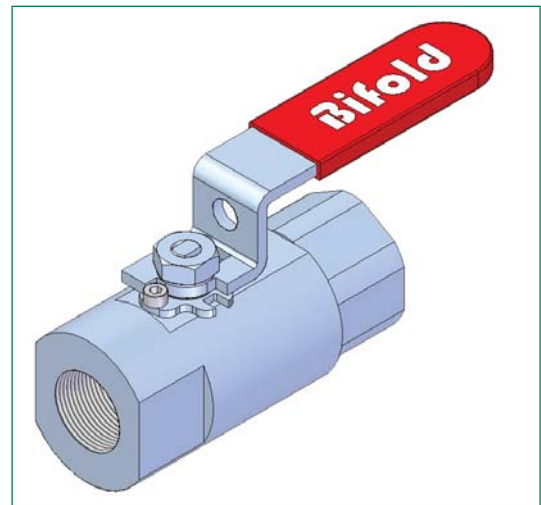
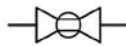
Material grade - ASTM A351 CF8M stainless steel body as standard.
 Operating temperature range -20°C to +200°C as standard.

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	<p>Single Isolate Ball Configuration.</p> <p>Full dimensions and additional details on request.</p> <p>See selection table on page 11 for options</p>
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	

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.

BV01

BV01 Selection Chart - Ordering Example

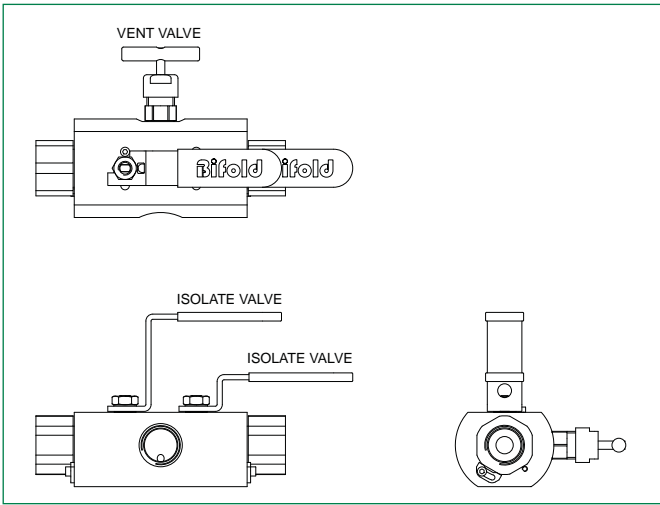
BV01		Single Isolation Ball Valve		Model Code
04 06 08 09 12 16	1/4" 3/8" 1/2" 9/16" 3/4" 1"	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Nominal Pipe Size
F M FM MF SW BW FMP	Female 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
10	10mm Bore	04 06 08 09 12		Bore Size
20	20mm Bore	12 16		
T TG CG E P TC	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
G	Graphite			Seal Arrangement
1K 3K 6K 10K	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
NO LETTER LK PM PH	Lockable Handle Panel Mount Pointer Paddle Handle			Options
FS	Fire Safe			Fire Safe

BV01 08 F 02 10 E G 10K FS → **BV0108F0210EG10KFS** Ordering Example

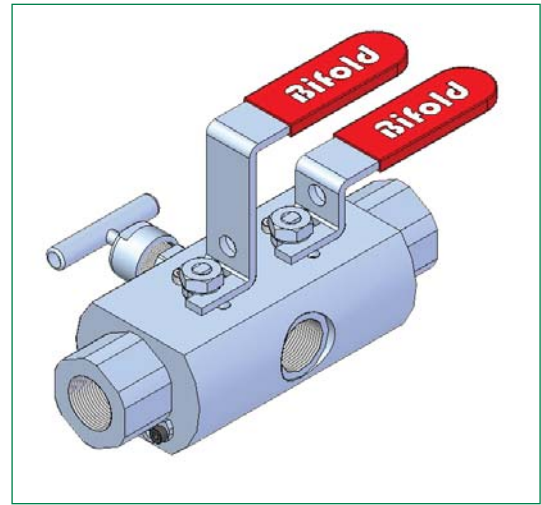
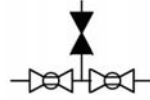
Other options may be available upon request. For more information, please contact Bifold Sales Department.

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	<p>Double Block & Bleed Manifold, Ball - Needle - Ball configuration.</p> <p>Full dimensions and additional details on request.</p> <p>See selection table on page 13 for options</p>
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	

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.

BV05

BV05 Selection Chart - Ordering Example

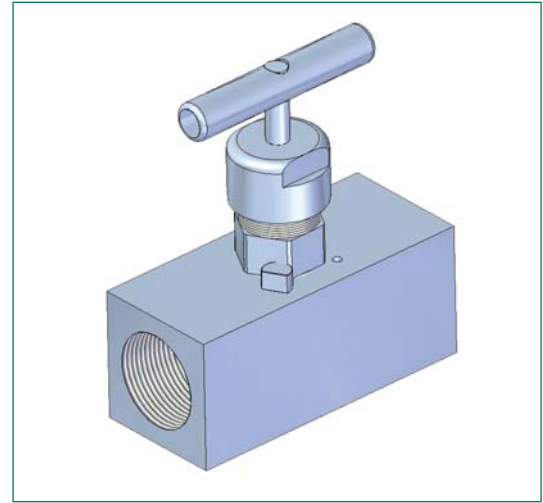
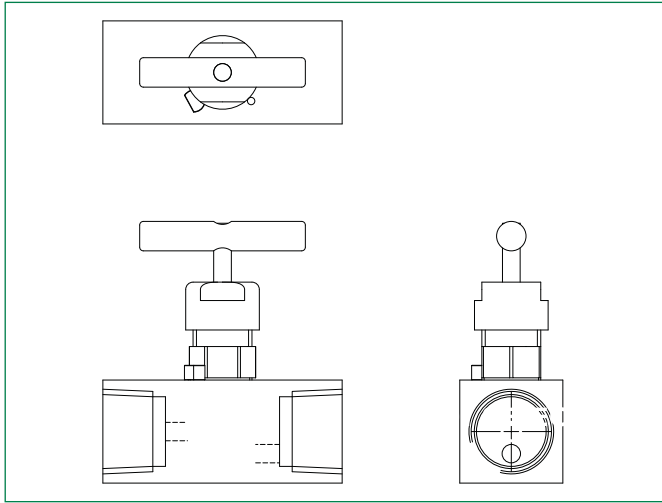
BV05		Double Block & Bleed Manifold		Model Code
04 06 08 09 12 16	1/4" 3/8" 1/2" 9/16" 3/4" 1"	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Nominal Pipe Size
F M FM MF SW BW FMP	Female 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
NO LETTER 04F 08F	(For 04F In, Out and Vent) 1/4" NPT 1/2" 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
10	10mm Bore	04 06 08 09 12		Bore Size
20	20mm Bore	12 16		
T TG CG E P TC	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
GV GV9 GE9	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
1K 3K 6K 10K	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
NO LETTER LK AV PV PH NT	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
FS	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



PREFERRED RANGE NV01 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	
NV0104F02M5V6KFS	¼" NPT	6,000 psi / 414 bar	10mm	<p>Single Isolate, Needle configuration.</p> <p>Full dimensions and additional details on request.</p> <p>See selection table on page 15 for options</p>
NV0104F02M5V10KFS	¼" NPT	10,000 psi / 690 bar	10mm	
NV0106F02M5V6KFS	⅜" NPT	6,000 psi / 414 bar	10mm	
NV0106F02M5V10KFS	⅜" NPT	10,000 psi / 690bar	10mm	
NV0108F02M5V6KFS	½" NPT	6,000 psi / 414 bar	10mm	
NV0108F02M5V10KFS	½" NPT	10,000 psi / 690bar	10mm	

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.

NV01

NV01 Selection Chart - Ordering Example

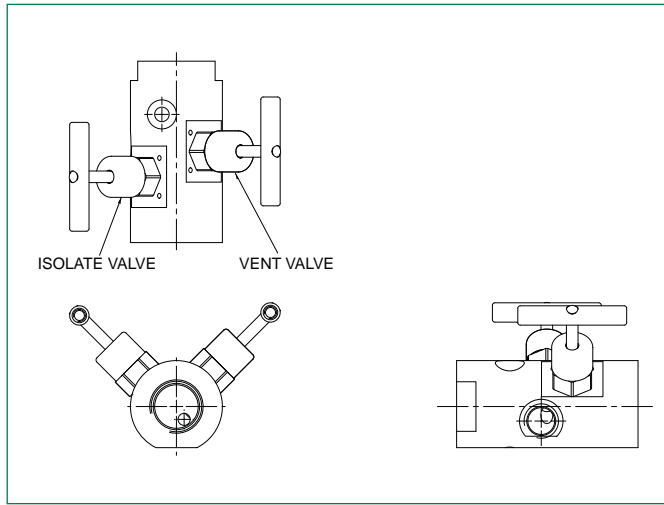
NV01		Single Isolate	Model Code
04 06 08 09 12 16	1/4" 3/8" 1/2" 9/16" 3/4" 1"	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)	Nominal Pipe Size
F M FM MF SW BW FMP	Female Thread Male Thread 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	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
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 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.			
FS	Fire Safe		Fire Safe

NV0108 F 02 M 5 V 6K LK FS → **NV0108F02M5V6K LK FS** Ordering Example

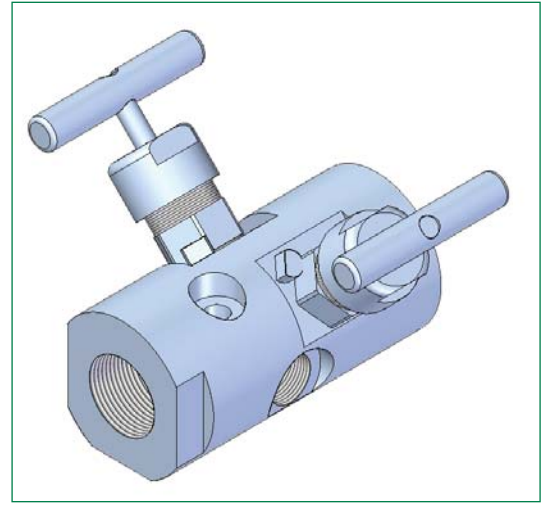
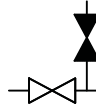
Other options may be available upon request. For more information, please contact Bifold Sales Department.

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.

NV04

NV04 Selection Chart - Ordering Example

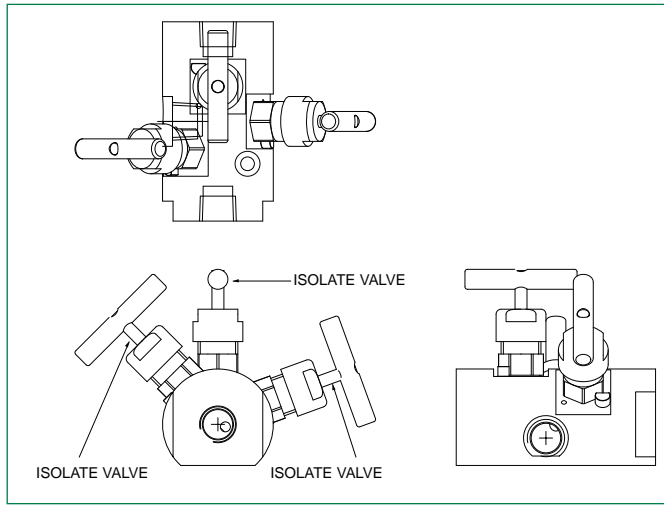
NV04		Block & Bleed Manifold		Model Code
04 06 08 09 12 16	1/4" 3/8" 1/2" 9/16" 3/4" 1"	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Nominal Pipe Size
F M FM MF SW BW FMP	Female Thread 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
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	5mm Bore	04 06 08 09 12		Bore Size
8	8mm Bore	12 16		
V V9 E9	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
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

NV0404 F 02 M 5 V 6K FS → **NV0404F02M5V6KFS** Ordering Example

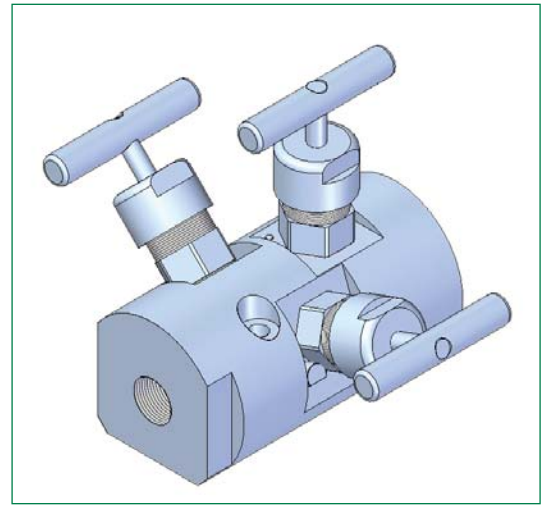
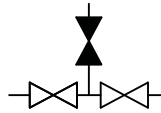
Other options may be available upon request. For more information, please contact Bifold Sales Department.

NV05

Typical GA Drawings



SCHEMATIC



PREFERRED RANGE NV05 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	<p>Double Block & Bleed Manifold, Needle - Needle configuration.</p> <p>Full dimensions and additional details on request.</p> <p>See selection table on page 19 for options</p>
NV0504F02M5V6KFS	¼" NPT	6,000 psi / 414 bar	5mm	
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.

NV05

NV05 Selection Chart - Ordering Example

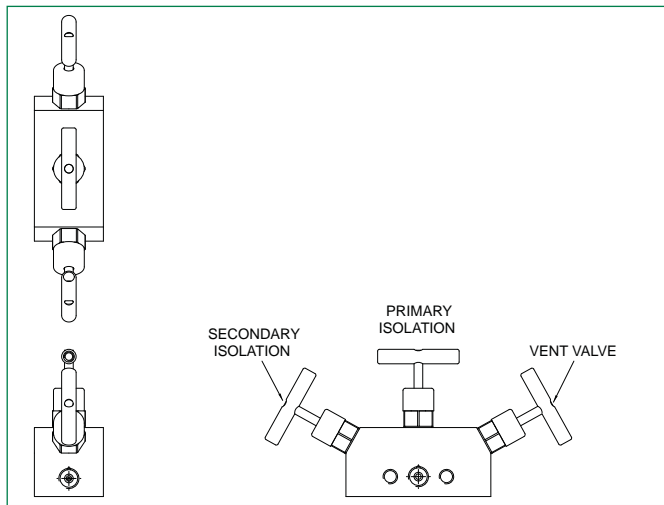
NV05		Double Block & Bleed Manifold		Model Code
04	1/4"	6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum) 6,000 psi Maximum Cold Working Pressure (For Medium Pressure 10,000 psi Maximum)		Nominal Pipe Size
06	3/8"			
08	1/2"			
09	9/16"			
12	3/4"			
16	1"			
F	Female Thread			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			
NO LETTER	(For 04F In, Out and Vent)			Vent Connection
04F	1/4" NPT			
02	UNS S31600 / S31603 Stainless Steel (Standard Material)			Material
26	F51 / UNS S31803 Duplex			
38	LF2 / Carbon Steel			
39	F55 / UNS S32760 Super Duplex			
M	Metal Ball			Tip Style
MT	Metal Tip			
5	5mm Bore			Bore Size
06				
08				
09				
12				
8	8mm Bore			Bore Size
16				
V	Graphite / Viton Elastomer			
V9	Graphite / V91A Elastomer			
E9	Graphite / E985 Elastomer			
6K	6,000 psi / 414 bar Maximum Cold Working Pressure			Pressure Rating
10K	10,000 psi / 690 bar Maximum Cold Working Pressure			
NO LETTER	Lockable T-Bar Isolate			Options
LK	Anti Tamper Vent			
AV	Plugged Vent			
PV	Gas Service / Nitrogen test *			
NT	* 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

NV0504 F 02 M 5 V 10K FS → **NV0404F02M5V6KFS** Ordering Example

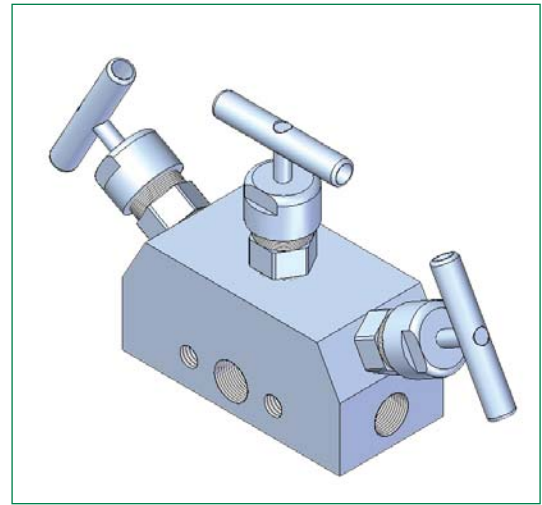
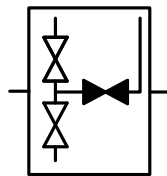
Other options may be available upon request. For more information, please contact Bifold Sales Department.

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
NV06104F02M5V6KFS	1/4" NPT	6,000 psi / 414 bar	5mm	
NV06104F02M5V10KFS	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.

NV06

NV06 Selection Chart - Ordering Example

NV06 I		Double Block & Bleed Single Station Manifold	Model Code
04 06	1/4" 3/8"		Nominal Pipe Size
F FMP	Female Thread Female Medium Pressure		Connection Type
NO LETTER K6 BSPT SAE	(NPT, 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 04FMP	(For 04F In, Out and Vent) 1/4" NPT 1/4" Medium Pressure		Vent and Gauge 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	5mm Bore		Bore Size
V V9 E9	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
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
FS	Fire Safe		Fire Safe
* 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.			

NV06I04F02M5V10KFS → **NV06I04F02M5V10KFS** Ordering Example

Other options may be available upon request. For more information, please contact Bifold Sales Department.

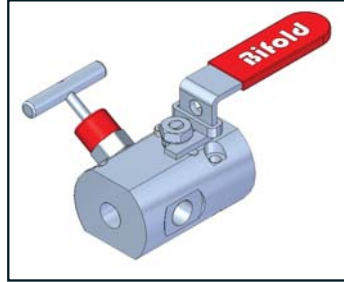
Product Range

BV02



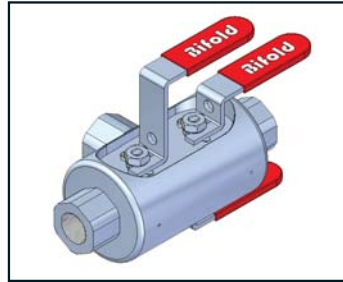
3-Way Diverting Ball Valve,
T-Port & L-Port Versions
Available.

BV04



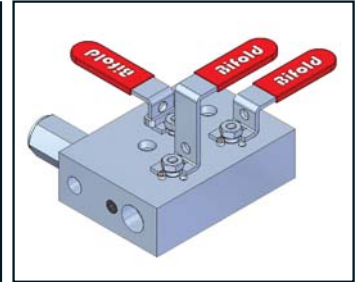
Block & Bleed,
Ball - Needle Manifold.

BV19



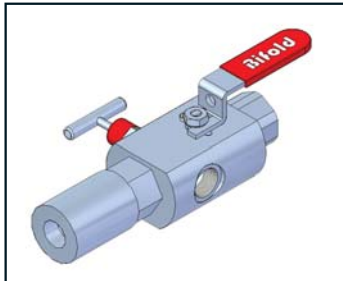
Double Block & Bleed,
Ball - Ball - Ball Manifold.

BV21



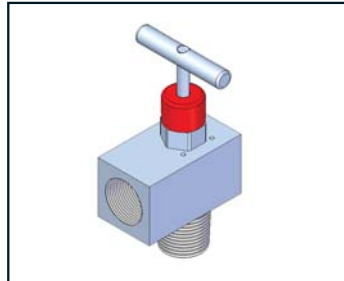
Accumulator Manifold with
Pressure Relief.

BV24



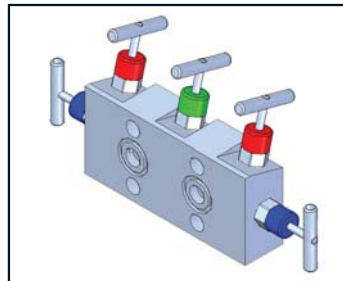
Block & Bleed with Integral
Check Valve.

NV02



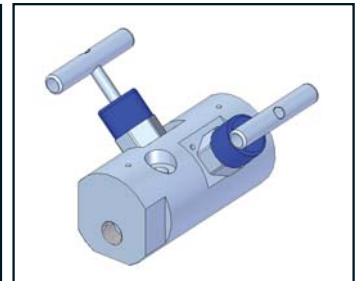
Single Isolate Angled
Pattern Needle Valve.

NV13



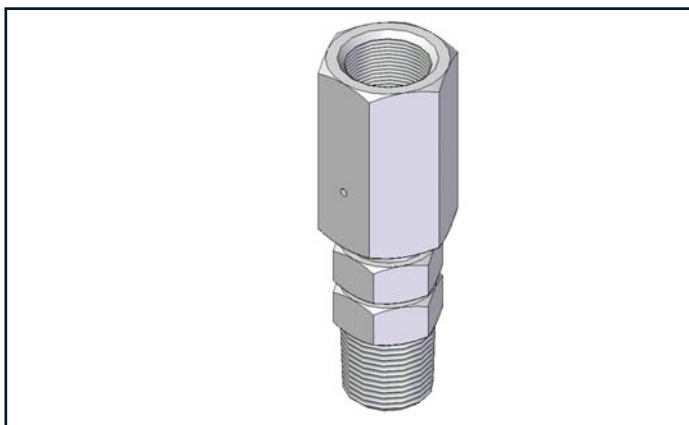
Manifold, Direct & Remote
Mount (2, 3, 4 & 5 Valve Options
Available).

NV17



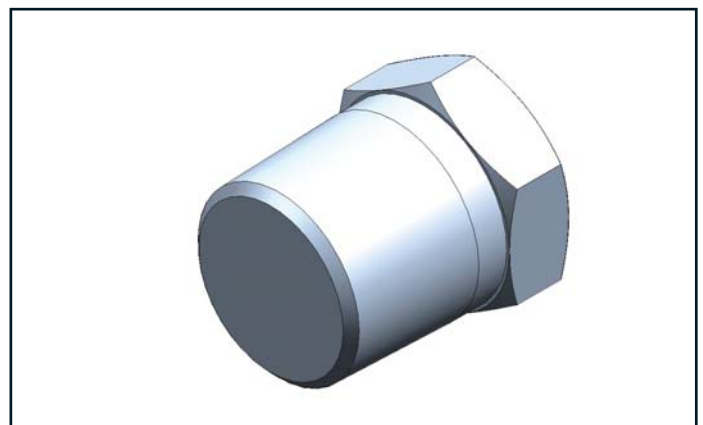
Block, Block,
Needle - Needle, Manifold.

GA01



Gauge Adaptors.

Blanking Plug

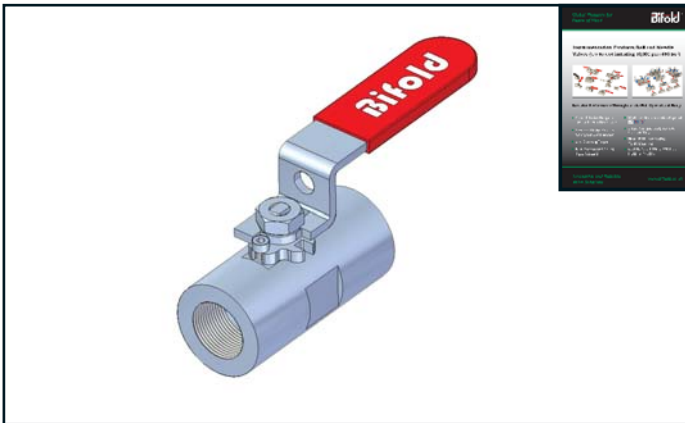


Blanking Plugs & Captive Venting Plugs.

Please contact Bifold sales department for further enquires on our extended product range.

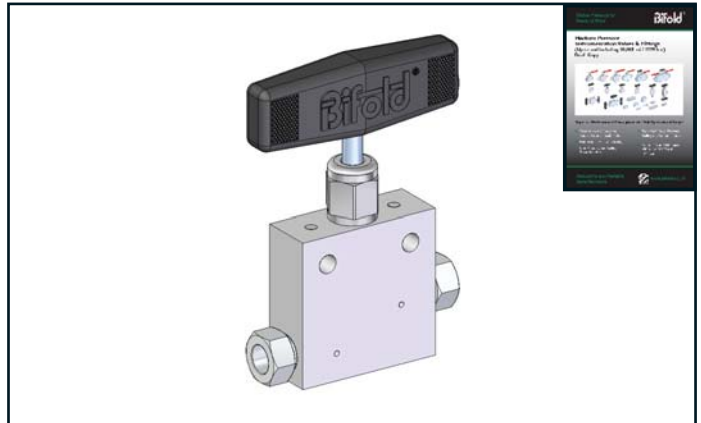
Product Range

Non Fire Safe



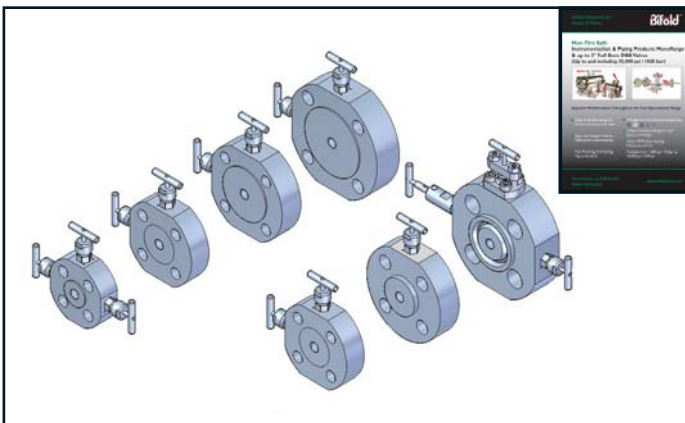
Please see the Ball and Needle Valve Non Fire Safe Catalogue for the full product range.

Medium Pressure



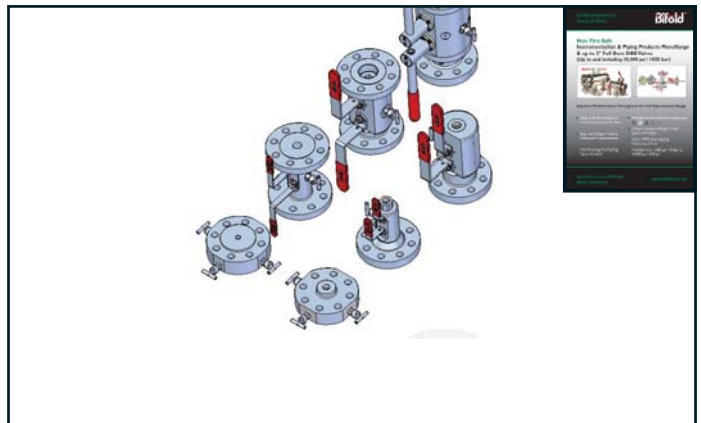
Please see the Medium Pressure Catalogue for the full product range.

Monoflanges



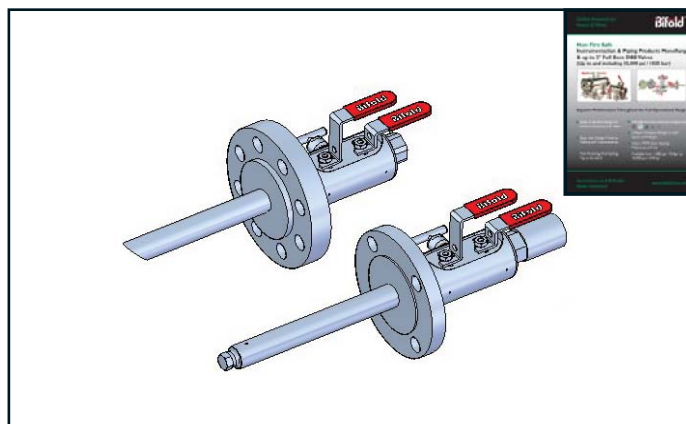
Please see the Instrumentation & Piping Catalogue for the full product range of monoflanges.

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.

*Global Presence for
Peace of Mind*

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.

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).



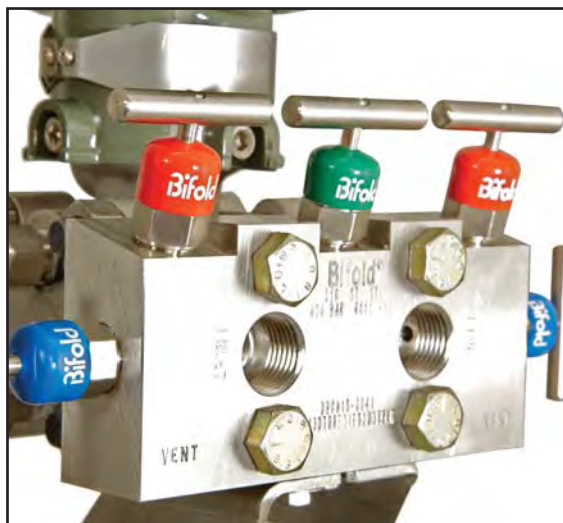
Ball Valves

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).



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).

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.



Installation Picture Using Our Ball And Needle Valves


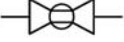



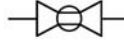


Installation Picture Using Our Ball And Needle Valves


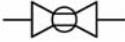

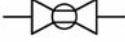

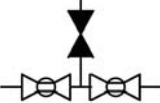

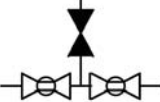


Preferred Range

INSTRUMENTATION PRODUCTS - BALL VALVES (Up to and including 10,000 psi / 690 bar)




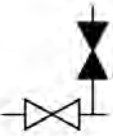
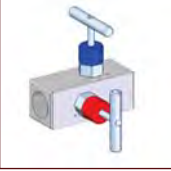
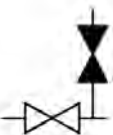



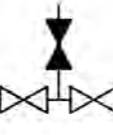
Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>BV01 Single Isolate Low Pressure Ball Type Reduced Bore</p>		12	BV0104F025TT1KLK	1/4"NPT, Single Isolate, Ball configuration 1,000 psi / 70 bar 5mm Bore Lockable Handle
			BV0108F029.2TT1KLK	1/2"NPT, Single Isolate, Ball configuration 1,000 psi / 70 bar 9.2mm Bore Lockable Handle
			BV0112F0212.5TT1KLK	3/4"NPT, Single Isolate, Ball configuration 1,000 psi / 70 bar 12.5mm Bore Lockable Handle
			BV0116F0215TT1KLK	1"NPT, Single Isolate, Ball configuration 1,000 psi / 70 bar 15mm Bore Lockable Handle
			BV0132F0232TT1KLK	2"NPT, Single Isolate, Ball configuration 1,000 psi / 70 bar 32mm Bore Lockable Handle
 <p>BV01 Single Isolate Low Pressure Ball Type Full Bore</p>		13	BV0104F0211.5TT2KLK	1/4"NPT, Single Isolate, Ball configuration 2,000 psi / 140 bar 11.5mm Bore Lockable Handle
			BV0108F0215TT2KLK	1/2"NPT, Single Isolate, Ball configuration 2,000 psi / 140 bar 15mm Bore Lockable Handle
			BV0112F0220TT2KLK	3/4"NPT, Single Isolate, Ball configuration 2,000 psi / 140 bar 20mm Bore Lockable Handle
			BV0116F0225TT2KLK	1"NPT, Single Isolate, Ball configuration 2,000 psi / 140 bar 25mm Bore Lockable Handle
			BV0132F0250TT1KLK	2"NPT, Single Isolate, Ball configuration 1,000 psi / 70 bar 50mm Bore Lockable Handle
 <p>BV01 Single Isolate Ball Type 5mm Bore</p>		14 / 15	BV0104F025ERV6K	1/4"NPT, Single Isolate, Ball configuration, 6,000 psi / 414 bar 5mm Bore / Hex Body
			BV0104F025ERV10K	1/4"NPT, Single Isolate, Ball configuration, 10,000 psi / 690 bar 5mm Bore / Hex Body
			BV0106F025ERV6K	3/8"NPT, Single Isolate, Ball configuration, 6,000 psi / 414 bar 5mm Bore / Hex Body
			BV0106F025ERV10K	3/8"NPT, Single Isolate, Ball configuration, 10,000 psi / 690 bar 5mm Bore / Hex Body

Preferred Range


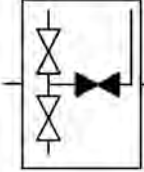

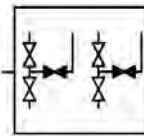

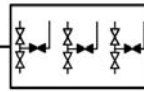
INSTRUMENTATION PRODUCTS - BALL & NEEDLE VALVES (Up to and including 10,000 psi / 690 bar)				
Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>BV01 Single Isolate Ball Type 5mm Bore Panel Mount</p>		16 / 17	BV0104F025EV6KPM	1/4"NPT, Single Isolate, Ball configuration, 6,000 psi / 414 bar 5mm Bore Panel Mount
			BV0104F025EV10KPM	1/4"NPT, Single Isolate, Ball configuration, 10,000 psi / 690 bar 5mm Bore Panel Mount
			BV0106F025EV6KPM	3/8"NPT, Single Isolate, Ball configuration, 6,000 psi / 414 bar 5mm Bore Panel Mount
			BV0106F025EV10KPM	3/8"NPT, Single Isolate, Ball configuration, 10,000 psi / 690 bar 5mm Bore Panel Mount
 <p>BV01 Single Isolate Ball Type 10mm Bore</p>		18 / 19	BV0108F0210ERV6K	1/2"NPT, Single Isolate, Ball configuration, 6,000 psi / 414 bar 10mm Bore
			BV0108F0210ERV10K	1/2"NPT, Single Isolate, Ball configuration, 10,000 psi / 690 bar 10mm Bore
 <p>BV05 Double Block & Bleed Manifold / Hex Body</p>		20 / 21	BV0504F02F025ERV6K	1/4"NPT, DBB Manifold / Hex Body, Ball - Needle - Ball configuration, 6,000 psi / 414 bar 5mm Bore 1/8"Vent Bleed
			BV0504F02F025ERV10K	1/4"NPT, DBB Manifold / Hex Body, Ball - Needle - Ball configuration, 10,000 psi / 690 bar 5mm Bore 1/8"Vent Bleed
			BV0506F02F025ERV6K	3/8"NPT, DBB Manifold / Hex Body, Ball - Needle - Ball configuration, 6,000 psi / 414 bar 5mm Bore 1/8"Vent Bleed
			BV0506F02F025ERV10K	3/8"NPT, DBB Manifold / Hex Body, Ball - Needle - Ball configuration, 10,000 psi / 690 bar 5mm Bore 1/8"Vent Bleed
 <p>BV05 Double Block & Bleed Manifold</p>		22 / 23	BV0504F0210ERV6K	1/4"NPT, DBB Manifold, Ball - Needle - Ball configuration, 6,000 psi / 414 bar 10mm Bore 1/4"Vent Bleed
			BV0504F0210ERV10K	1/4"NPT, DBB Manifold, Ball - Needle - Ball configuration, 10,000 psi / 690 bar 10mm Bore 1/4"Vent Bleed
			BV0508F04F0210ERV6K	1/2"NPT, DBB Manifold, Ball - Needle - Ball configuration, 6,000 psi / 414 bar 10mm Bore 1/4"Vent Bleed
			BV0508F04F0210ERV10K	1/2"NPT, DBB Manifold, Ball - Needle - Ball configuration, 10,000 psi / 690 bar 10mm Bore 1/4"Vent Bleed

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>NV01 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>NV03 Block & 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>NV22 Block & 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>NV04 Block & 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
THIS PRODUCT DESIGN IS UNIQUE TO BIFOLD AND PATENTED				
 <p>NV05 Double Block & 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
THIS PRODUCT DESIGN IS UNIQUE TO BIFOLD AND PATENTED				

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>NV06 Double Block & 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
THIS PRODUCT DESIGN IS UNIQUE TO BIFOLD AND PATENTED				
 <p>NV06 Double Block & 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
THIS PRODUCT DESIGN IS UNIQUE TO BIFOLD AND PATENTED				
 <p>NV06 Double Block & 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
THIS PRODUCT DESIGN IS UNIQUE TO BIFOLD AND PATENTED				

Needle Valves

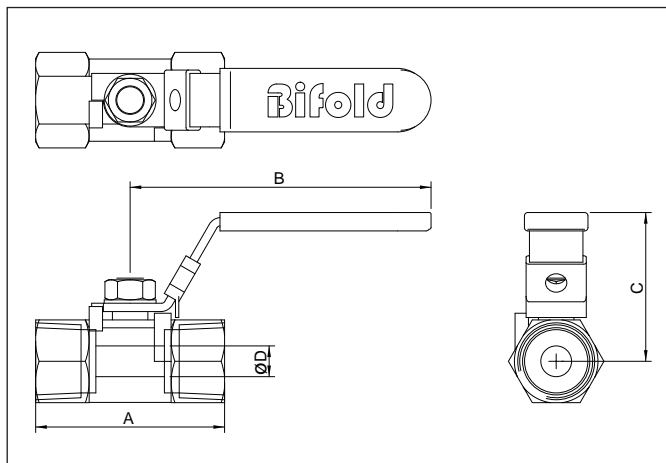


Needle Valves

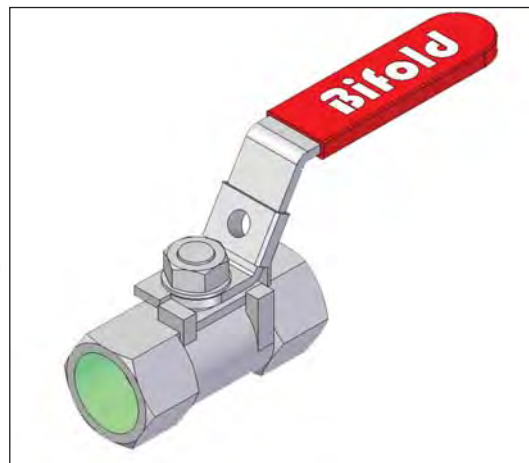
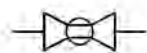


BV01

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

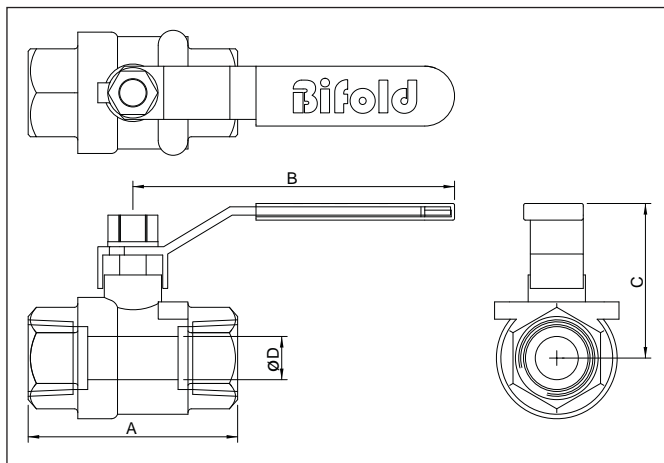
- Two piece construction reducing leak paths.
- Bi-directional.
- Precision machined stainless steel ball.
- PTFE seating to the ball.
- Tamperproof lockable handle as standard.
- Compact design to save space and weight.
- Bubble tight shut-off.

Technical Data

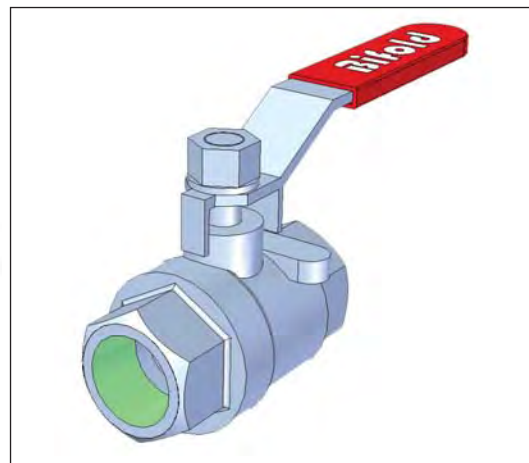
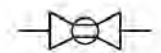
Material grade - ASTM A351 CF8M stainless steel body as standard.
 Operating temperature range -40°C to +200°C as standard.

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

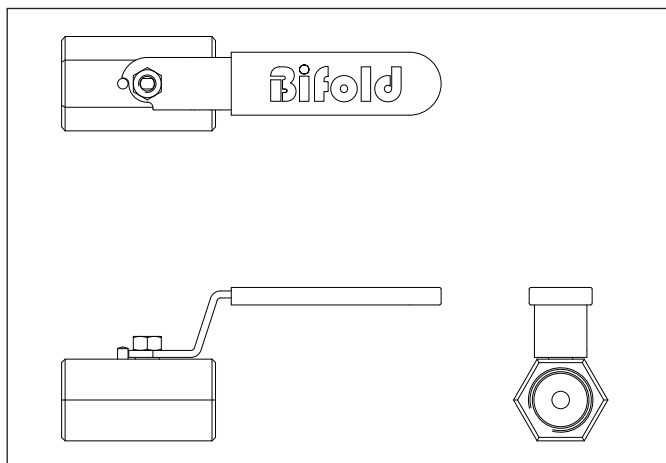
- Two piece construction reducing leak paths.
- Bi-directional.
- Precision machined stainless steel ball.
- PTFE seating to the ball.
- Tamperproof lockable handle as standard.
- Compact design to save space and weight.
- Bubble tight shut-off.

Technical Data

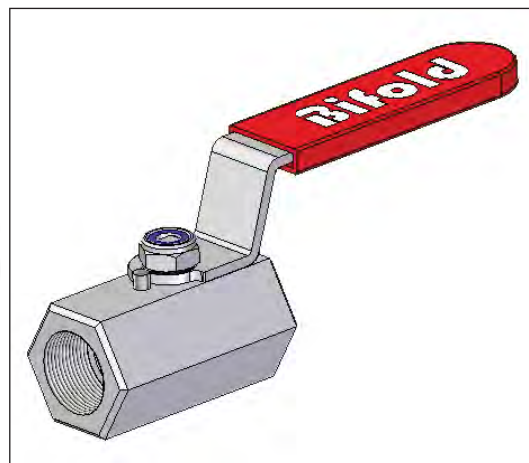
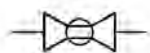
Material grade - ASTM A351 CF8M stainless steel body as standard.
 Operating temperature range -40°C to +200°C as standard.

BV01

Typical GA Drawing



SCHEMATIC



PREFERRED RANGE BV01 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	<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>
BV0104F025ERV6K	1/4" NPT	6,000 psi / 414 bar	5mm	
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.

BV01

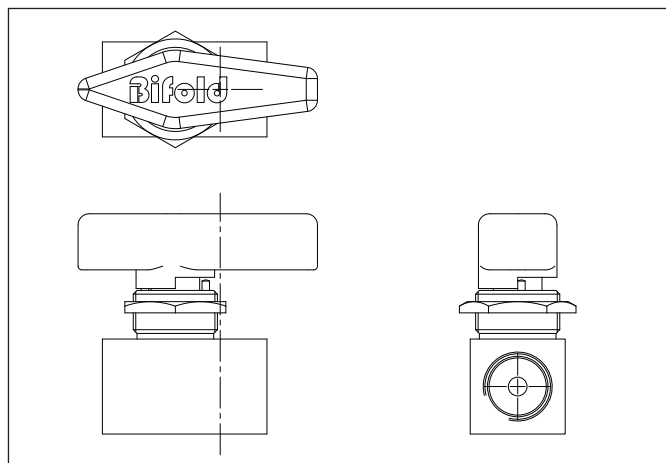
BV01 Selection Chart - Ordering Example

BV01		Single Isolation Ball Valve / Hex Body		Model Code
04 06	1/4" 3/8"			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
5	5mm Bore			Bore Size
T TG E TC	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
RV RV9 RE9	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
1K 3K 6K 10K	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
NO LETTER NT	(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)	<p>Single Isolate Ball Configuration, 5mm Bore, Panel Mount.</p> <p>Full dimensions and additional details on request.</p> <p>See selection table on page 17 for options</p>
BV0104F025EV6KPM	1/4" NPT	6,000 psi / 414 bar	5mm	
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.

BV01

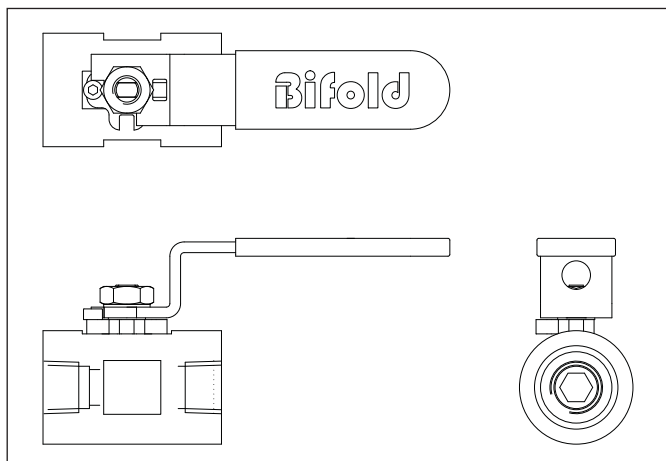
BV01 Selection Chart - Ordering Example

BV01		Single Isolation Ball Valve Panel Mount		Model Code
04 06	1/4" 3/8"			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
5	5mm Bore			Bore Size
T TG E TC	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
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 Stem and Body
1K 3K 6K 10K	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
PM NT	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
BV01 04 F	02 5 E V	10K PM	BV0104F025EV10KPM	Ordering Example

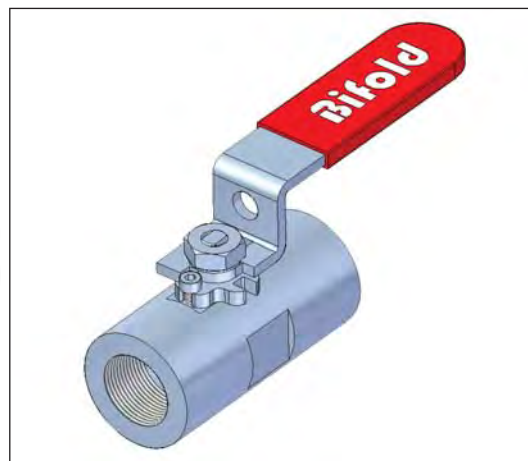
Other options may be available upon request. For more information, please contact Bifold Sales Department.

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.

BV01

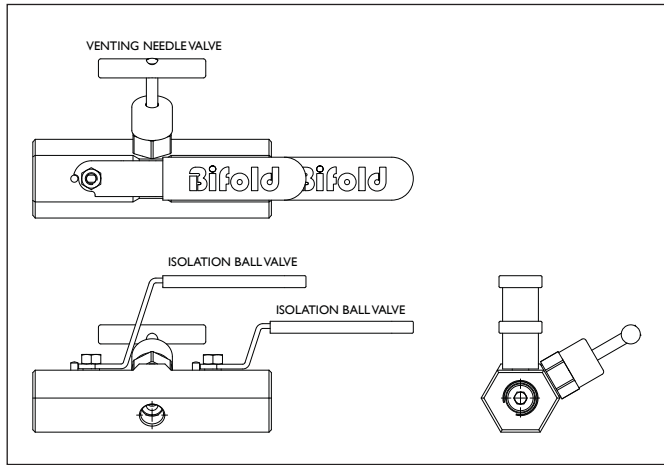
BV01 Selection Chart - Ordering Example

BV01		Single Isolation Ball Valve		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
10 20	10mm Bore 20mm Bore	04 06 08 09 12 12 16		Bore Size
T TG CG E TC	PTFE Glass Filled PTFE Carbon Graphite PEEK 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		Seat Material
H RV RV9 RE9	RTFE RTFE / Viton Elastomer RTFE / V91A Elastomer RTFE / E985 Elastomer	-100°C to +225°C -20°C to +180°C -45°C to +225°C -46°C to +160°C		Seal Arrangement Stem and Body
1K 3K 6K 10K	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
NO LETTER LK PM PH NT	Lockable Handle Panel Mount Pointer Paddle Handle 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.				
BV01 08 F		02 10 E RV 10K		BV0108F0210ERV10K Ordering Example

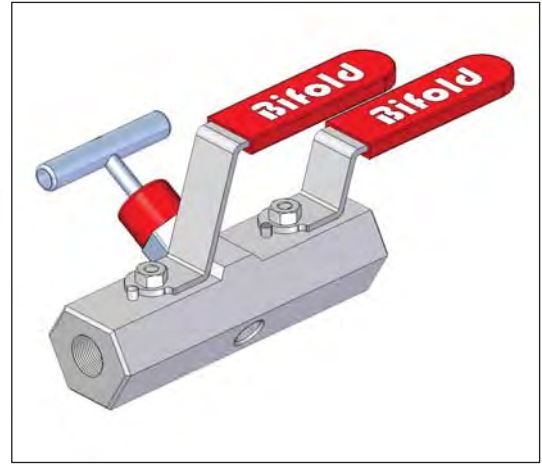
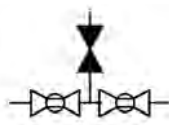
Other options may be available upon request. For more information, please contact Bifold Sales Department.

BV05

Typical GA Drawing



SCHEMATIC



PREFERRED RANGE BV05 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	<p>Double Block & Bleed Manifold, Ball - Needle - Ball configuration. 5mm Bore / Hex Body</p> <p>Full dimensions and additional details on request.</p> <p>See selection table on page 21 for options.</p>
BV0504F02F025ERV6K	1/4" NPT	6,000 psi / 414 bar	5mm	
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.

BV05

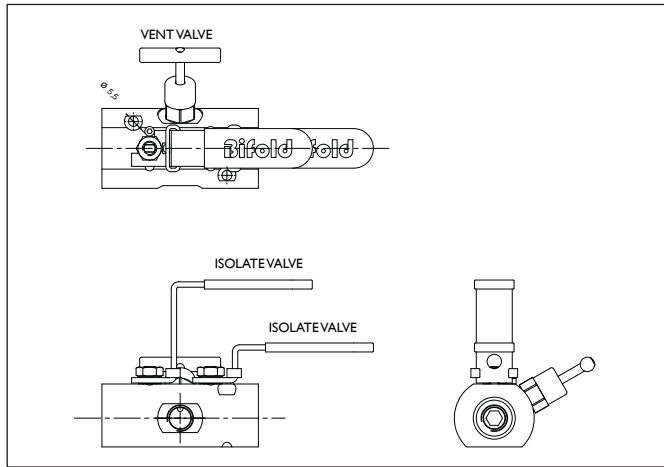
BV05 Selection Chart - Ordering Example

BV05		Double Block & Bleed Manifold / Hex Body		Model Code
04 06	1/4" 3/8"			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
02F	1/8" 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
5	5mm Bore			Bore Size
T TG E P TC	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
RV RV9 RE9	RTFE / Viton Elastomer RTFE / V91A Elastomer RTFE / E98E Elastomer			Seal Arrangement
1K 3K 6K 10K	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
Note: Higher pressures available within the medium pressure range (see separate catalogue).				
NO LETTER AV PV NT	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.				
BV05 04 F	02F 02 5 E RV 10K	BV0504F02F025ERV10K		Ordering Example

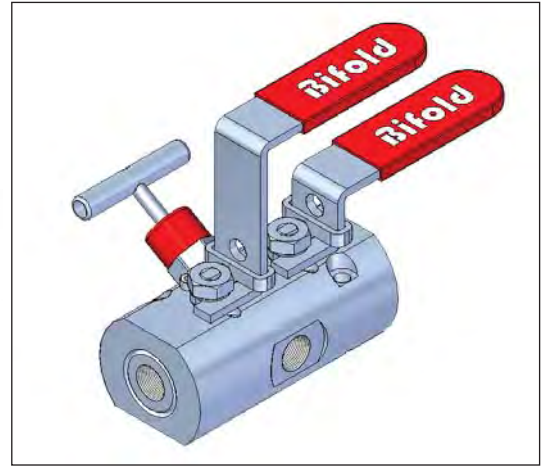
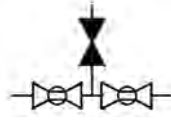
Other options may be available upon request. For more information, please contact Bifold Sales Department.

BV05

Typical GA Drawing



SCHEMATIC



PREFERRED RANGE BV05 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	<p>Double Block & Bleed Manifold, Ball - Needle - Ball configuration.</p> <p>Full dimensions and additional details on request.</p> <p>See selection table on page 23 for options.</p>
BV0504F0210ERV6K	¼" NPT	6,000 psi / 414 bar	10mm	
BV0504F0210ERV10K	¼" NPT	10,000 psi / 690 bar	10mm	
BV0508F04F0210ERV6K	½" NPT	6,000 psi / 414 bar	10mm	
BV0508F04F0210ERV10K	½" NPT	10,000 psi / 690 bar	10mm	

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.

BV05

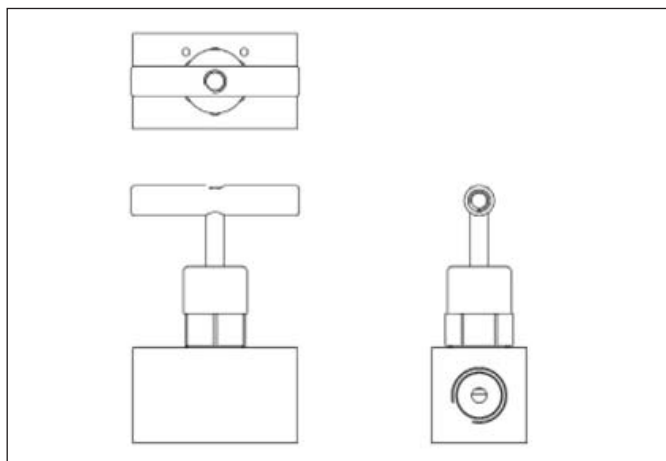
BV05 Selection Chart - Ordering Example

BV05		Double Block & Bleed Manifold		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
NO LETTER 04F 08F	(For 04F In, Out and Vent) 1/4" NPT 1/2" 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
10	10mm Bore	04 06 08 09 12		Bore Size
20	20mm Bore	12 16		
T TG CG E P TC	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
RV RV9 RE9	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
1K 3K 6K 10K	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
NO LETTER LK AV PV PH NT	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
BV05 04 F	02 10 E RV 10K	BV0504F0210ERV10K		Ordering Example

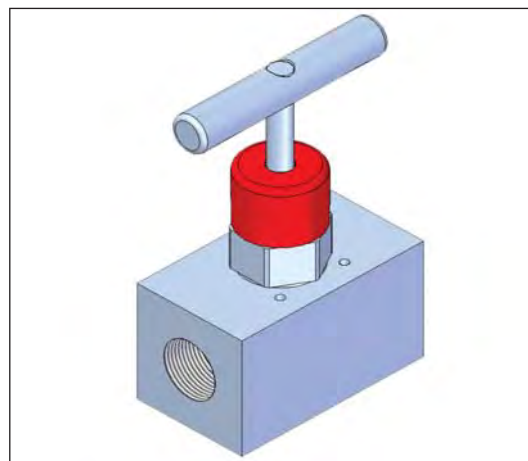
Other options may be available upon request. For more information, please contact Bifold Sales Department.

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	¼" NPT	6,000 psi / 414 bar	5mm	
NV0104F02M5V10K	¼" NPT	10,000 psi / 690 bar	5mm	
NV0108F02M5V6K	½" NPT	6,000 psi / 414 bar	5mm	
NV0108F02M5V10K	½" 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.

NV01

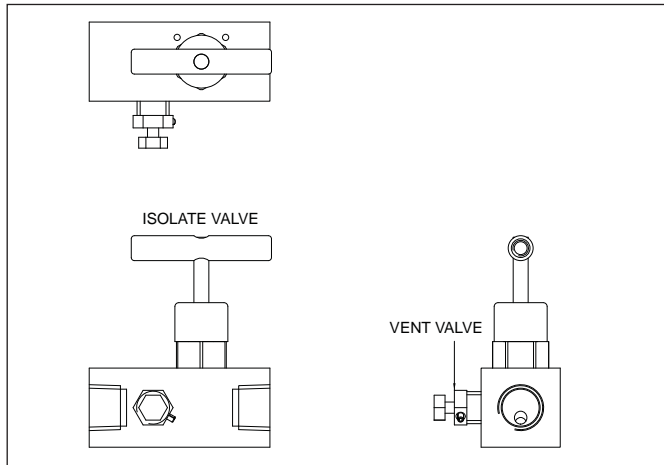
NV01 Selection Chart - Ordering Example

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 * * 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
NV01 08 F	02 M 5 V 6K	NV0108F02M5V6K	Ordering Example

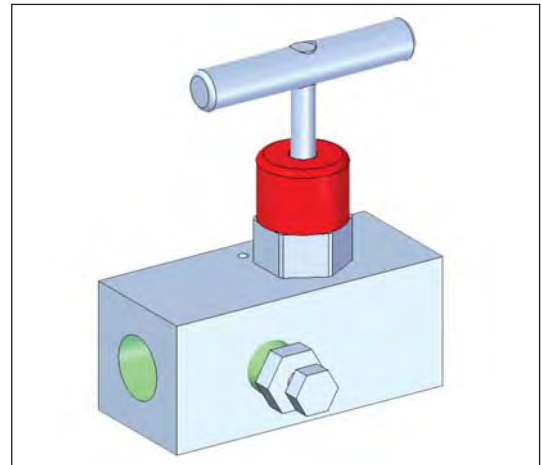
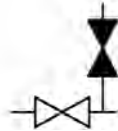
Other options may be available upon request. For more information, please contact Bifold Sales Department.

NV03

Typical GA Drawing



SCHEMATIC



PREFERRED RANGE NV03 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	<p>Block & Bleed Manifold, Needle - Captive Vent Plug configuration.</p> <p>Full dimensions and additional details on request.</p> <p>See selection table on page 27 for options.</p>
NV0304F02M5V6K	¼" NPT	6,000 psi / 414 bar	5mm	
NV0304F02M5V10K	¼" NPT	10,000 psi / 690 bar	5mm	
NV0308F02M5V6K	½" NPT	6,000 psi / 414 bar	5mm	
NV0308F02M5V10K	½" 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.

NV03

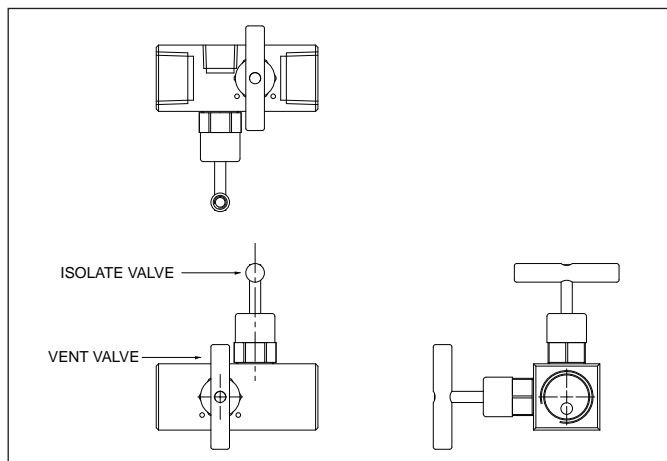
NV03 Selection Chart - Ordering Example

NV03		Block & Bleed Manifold		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.								
NV0308	F	02	M	5	V	6K	NV0308F02M5V6K	Ordering Example

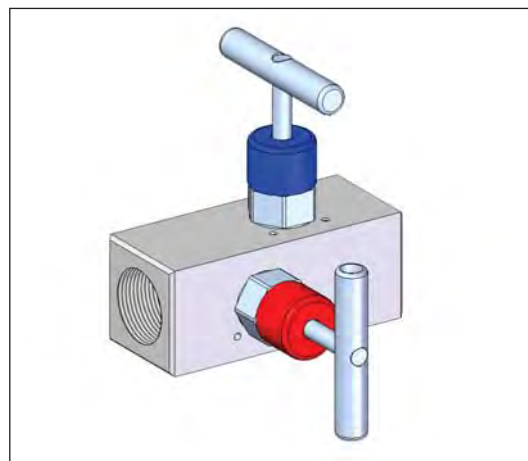
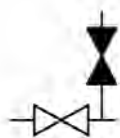
Other options may be available upon request. For more information, please contact Bifold Sales Department.

NV22

Typical GA Drawing



SCHEMATIC



PREFERRED RANGE NV22 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	<p>Block & Bleed Compact Manifold, Needle - Needle configuration.</p> <p>Full dimensions and additional details on request.</p> <p>See selection table on page 29 for options.</p>
NV2204F02M3V6K	¼" NPT	6,000 psi / 414 bar	3mm	
NV2204F02M3V10K	¼" NPT	10,000 psi / 690 bar	3mm	
NV2208F04F02M3V6K	½" NPT	6,000 psi / 414 bar	3mm	
NV2208F04F02M3V10K	½" 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.

NV22

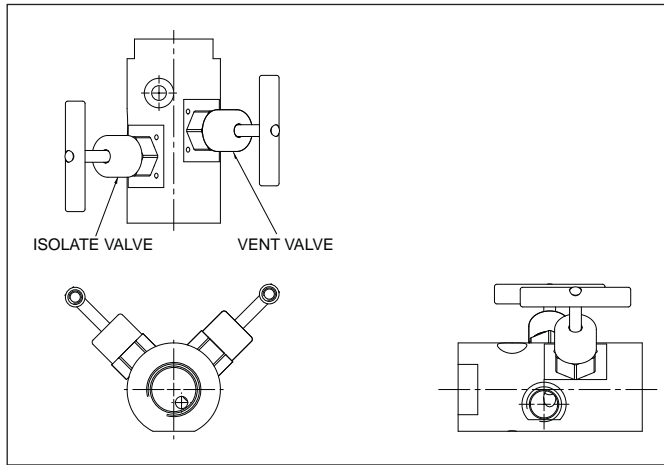
NV22 Selection Chart - Ordering Example

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					
NV2204	F	02	M	3	V	10K	NV2204F02M3V10K	Ordering Example

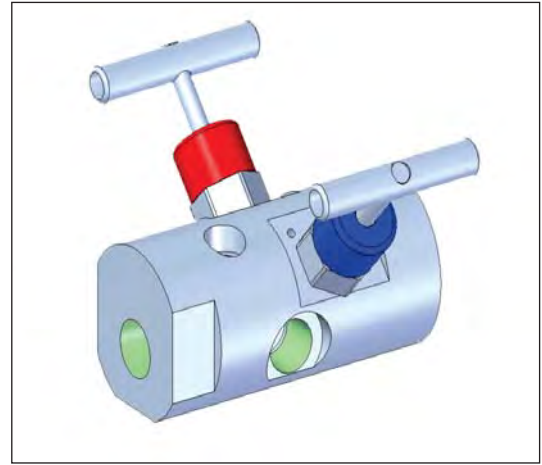
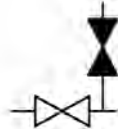
Other options may be available upon request. For more information, please contact Bifold Sales Department.

NV04

Typical GA Drawing



SCHEMATIC



PREFERRED RANGE NV04 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	<p>Block & Bleed Manifold, Needle - Needle configuration.</p> <p>Full dimensions and additional details on request.</p> <p>See selection table on page 31 for options.</p>
NV0404F02M5V6K	¼" NPT	6,000 psi / 414 bar	5mm	
NV0404F02M5V10K	¼" NPT	10,000 psi / 690 bar	5mm	
NV0408F04F02M5V6K	½" NPT	6,000 psi / 414 bar	5mm	
NV0408F04F02M5V10K	½" 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.

NV04

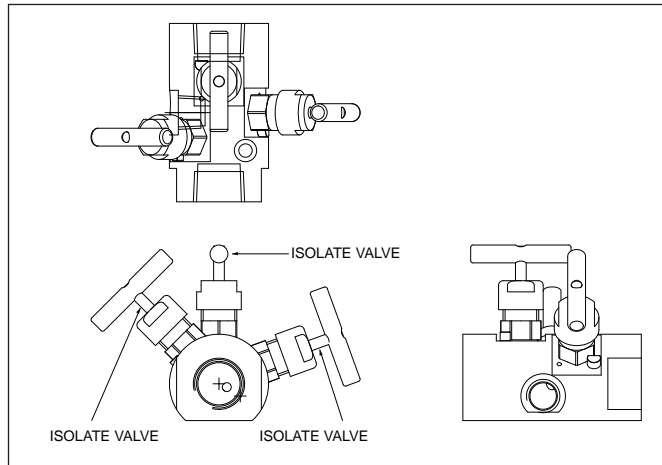
NV04 Selection Chart - Ordering Example

NV04		Block & Bleed Manifold		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				
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	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 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.								
NV0404	F	02	M	5	V	6K	NV0404F02M5V6K	Ordering Example

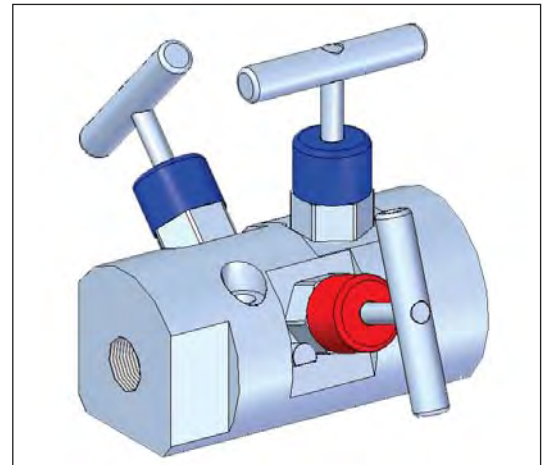
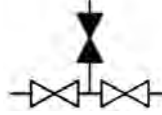
Other options may be available upon request. For more information, please contact Bifold Sales Department.

NV05

Typical GA Drawing



SCHEMATIC



PREFERRED RANGE NV05 SELECTION TABLE

Product Code	Size	Rated	Bore (mm)	<p>Double Block & Bleed Manifold, Needle - Needle - Needle configuration.</p> <p>Full dimensions and additional details on request.</p> <p>See selection table on page 33 for options.</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.

NV05

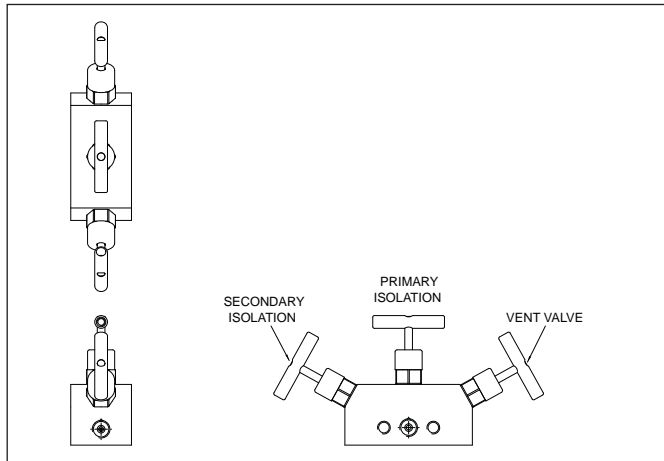
NV05 Selection Chart - Ordering Example

NV05		Double Block & Bleed Manifold		Model Code				
04 06 08 09 12 16	1/4" 3/8" 1/2" 9/16" 3/4" 1"	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				
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	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 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.								
NV05 04	F	02	M	5	V	10K	NV0404F02M5V10K	Ordering Example

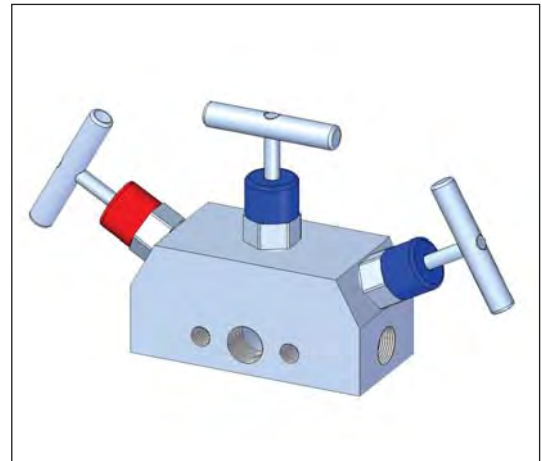
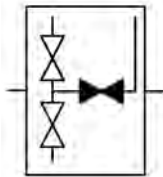
Other options may be available upon request. For more information, please contact Bifold Sales Department.

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.

NV06

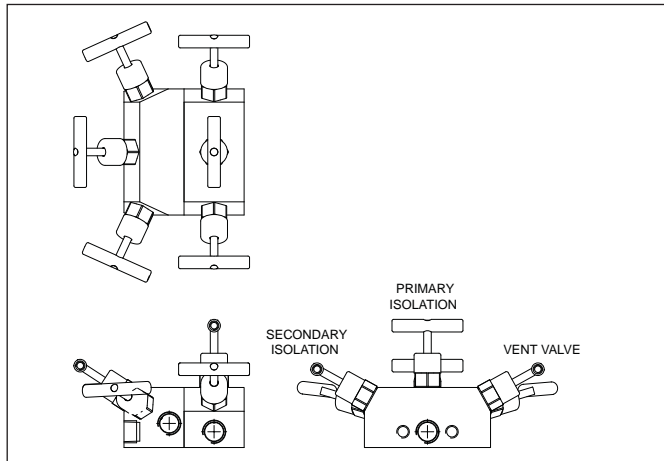
NV06 Selection Chart - Ordering Example

NV06 I		Double Block & Bleed Single Station Manifold		Model Code
04 06	1/4" 3/8"			Nominal Pipe Size
F FMP	Female Thread Female Medium Pressure			Connection Type
NO LETTER K6 BSPT SAE	(NPT, 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 04FMP	(For 04F In, Out and Vent) 1/4" NPT 1/4" Medium Pressure			Vent and Gauge 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	5mm Bore			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 *			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.				
NV06 I04 F		02 M 5 V 10K	NV06 I04F02M5V10K Ordering Example	

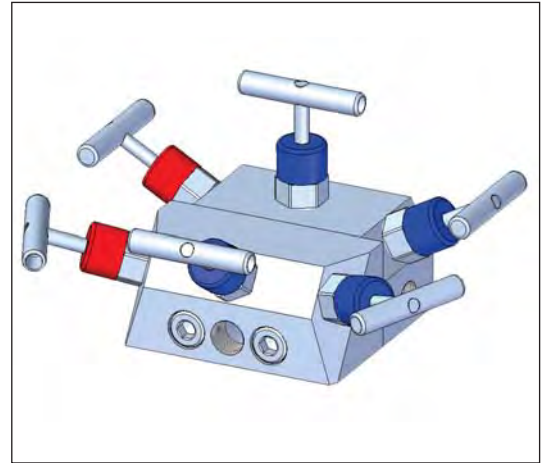
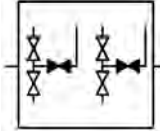
Other options may be available upon request. For more information, please contact Bifold Sales Department.

NV06

Typical GA Drawing



SCHEMATIC



PREFERRED RANGE NV06 SELECTION TABLE

Product Code	Size	Rated	'A' (mm)	Double Block & Bleed Two Station Manifold, Needle - Needle - Needle configuration. 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.

NV06

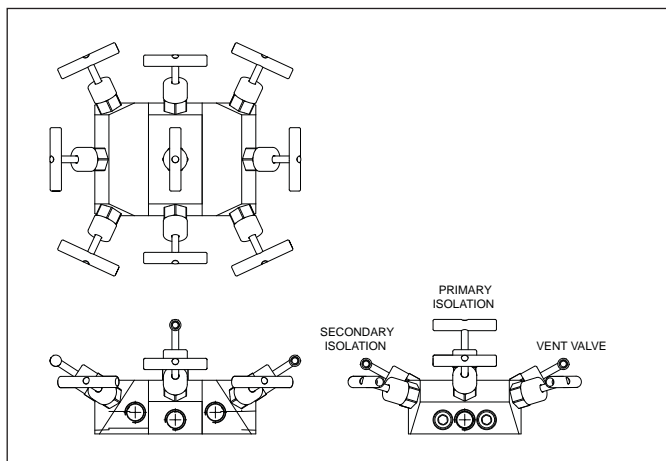
NV06 Selection Chart - Ordering Example

NV06 2		Double Block & Bleed Two Station Manifold		Model Code
04 06	1/4" 3/8"			Nominal Pipe Size
F FMP	Female Thread Female Medium Pressure			Connection Type
NO LETTER K6 BSPT SAE	(NPT, 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 04FMP	(For 04F In, Out and Vent) 1/4" NPT 1/4" Medium Pressure			Vent and Gauge 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	5mm Bore			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
NV06204 F		02 M 5 V 10K	NV06204F02M5V10K Ordering Example	

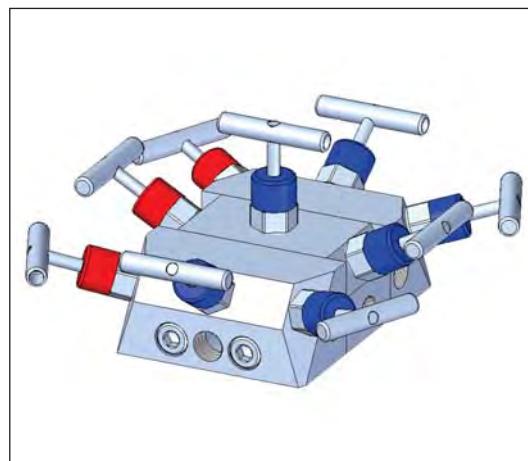
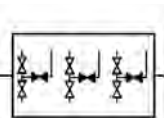
Other options may be available upon request. For more information, please contact Bifold Sales Department.

NV06

Typical GA Drawing



SCHEMATIC



PREFERRED RANGE NV06 SELECTION TABLE

Product Code	Size	Rated	'A' (mm)	Double Block & Bleed Three Station Manifold, Needle - Needle - Needle configuration. 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.

NV06

NV06 Selection Chart - Ordering Example

NV06 3		Double Block & Bleed Three Station Manifold	Model Code
04 06	$\frac{1}{4}$ " $\frac{3}{8}$ "		Nominal Pipe Size
F FMP	Female Thread Female Medium Pressure		Connection Type
NO LETTER K6 BSPT SAE	(NPT, 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 04FMP	(For 04F In, Out and Vent) $\frac{1}{4}$ " NPT $\frac{1}{4}$ " Medium Pressure		Vent and Gauge 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	5mm Bore		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

NV06304 F 02 M 5 V 10K NV06304F02M5V10K Ordering Example

Other options may be available upon request. For more information, please contact Bifold Sales Department.

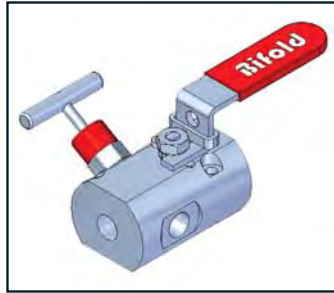
Product Range

BV02



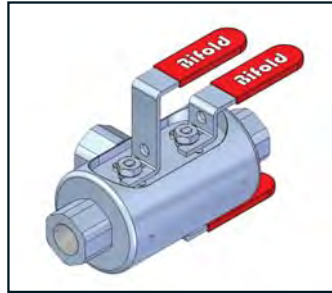
3-Way Diverting Ball Valve,
T-Port & L-Port Versions
Available.

BV04



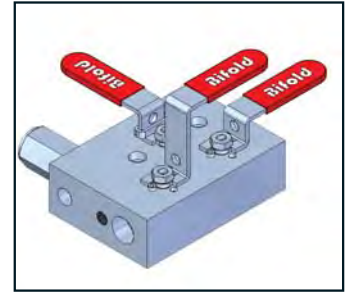
Block & Bleed,
Ball - Needle Manifold.

BV19



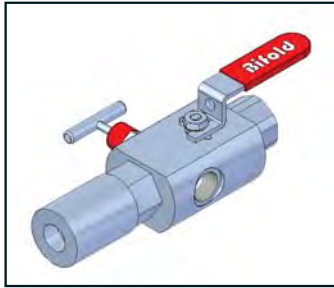
Double Block & Bleed,
Ball - Ball - Ball Manifold.

BV21



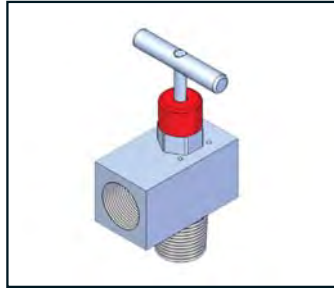
Accumulator Manifold with
Pressure Relief.

BV24



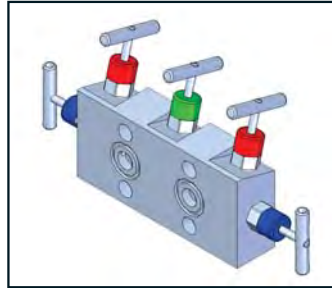
Block & Bleed with Integral
Check Valve.

NV02



Single Isolate Angled
Pattern Needle Valve.

NV13



Manifold, Direct & Remote
Mount (2, 3, 4 & 5 Valve Options
Available).

NV17



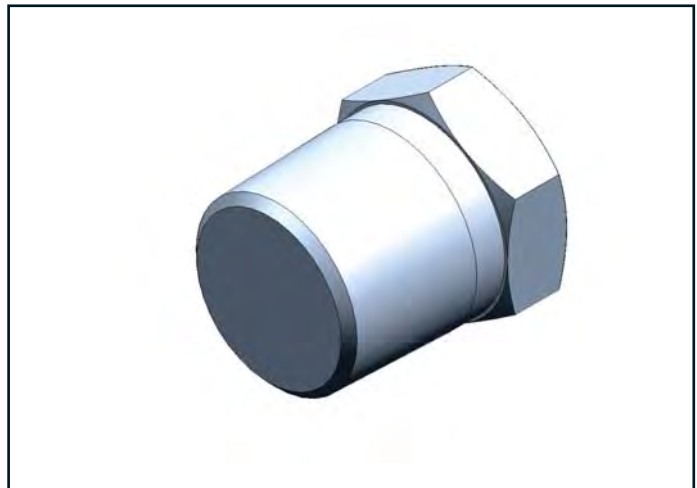
Block, Block,
Needle - Needle, Manifold.

GA01



Gauge Adaptors.

Blanking Plug

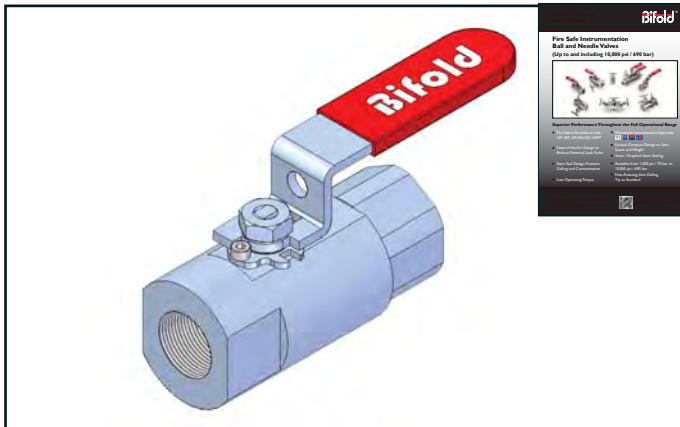


Blanking Plugs & Captive Venting Plugs.

Please contact Bifold sales department for further enquires on our extended product range.

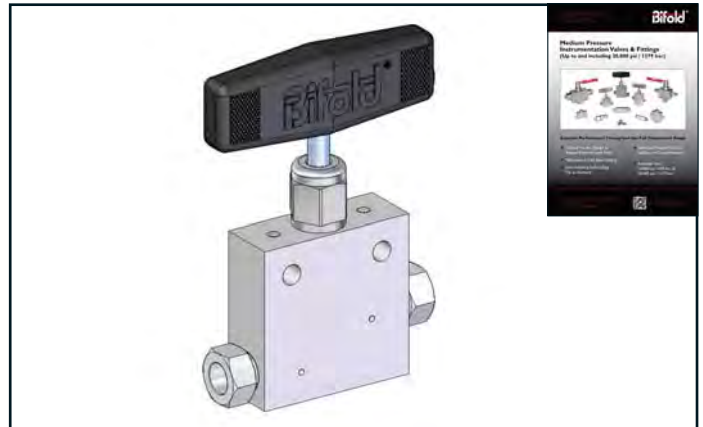
Product Range

Fire Safe Instrumentation Valves



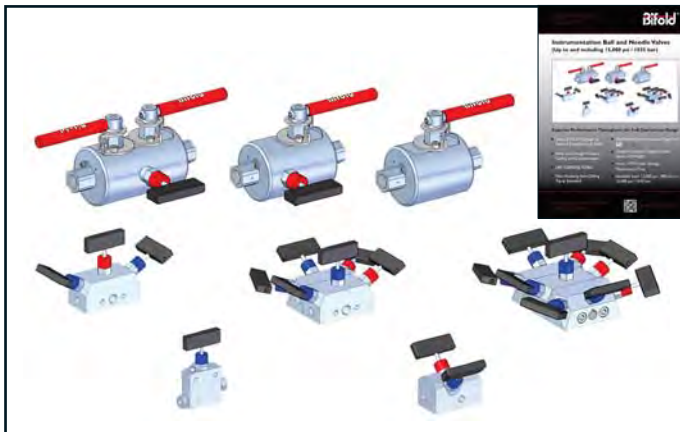
Please see the Ball and Needle Valve Fire Safe Catalogue for the full product range.

Medium Pressure



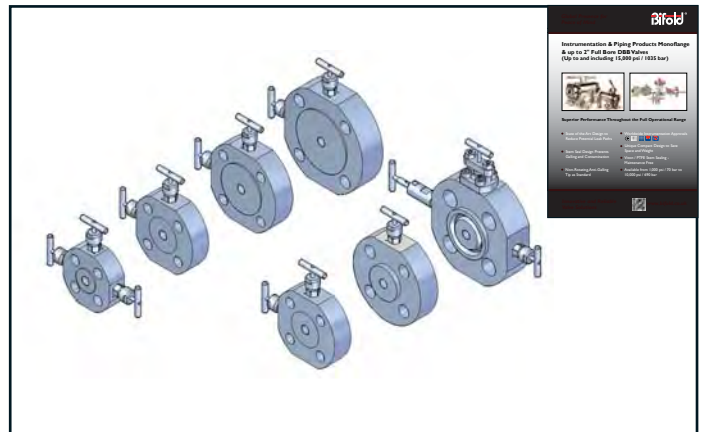
Please see the Instrumentation Ball and Needle Valve Catalogue for the full product range.

13K and 15K



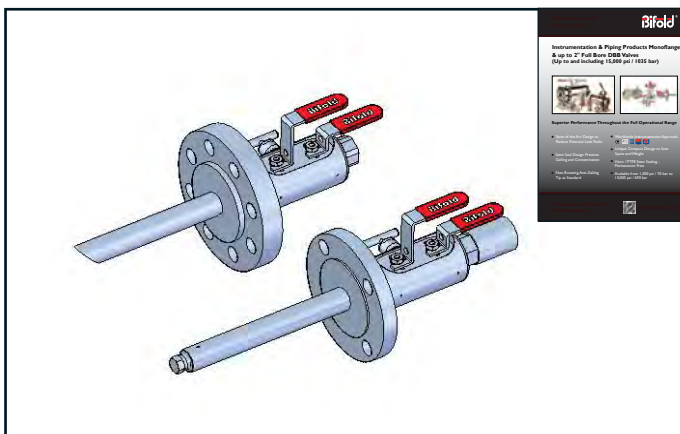
Please see the Instrumentation Ball and Needle Valve 13K and 15K Catalogue for the full product range.

Monoflanges



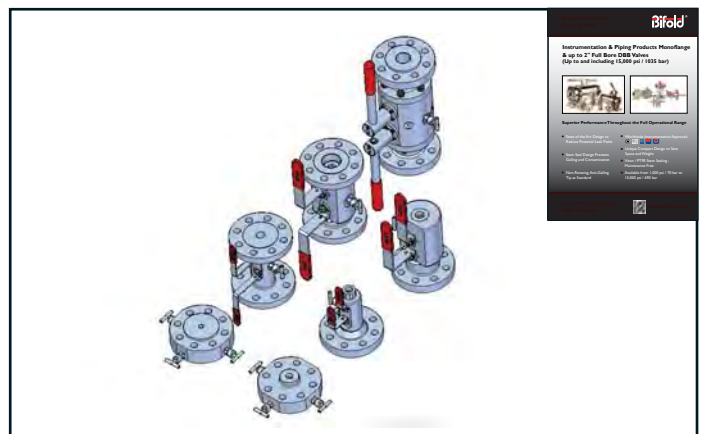
Please see the Instrumentation and Piping Catalogue for the full product range of monoflanges.

Double Block & Bleed Injection / Sampling Valves



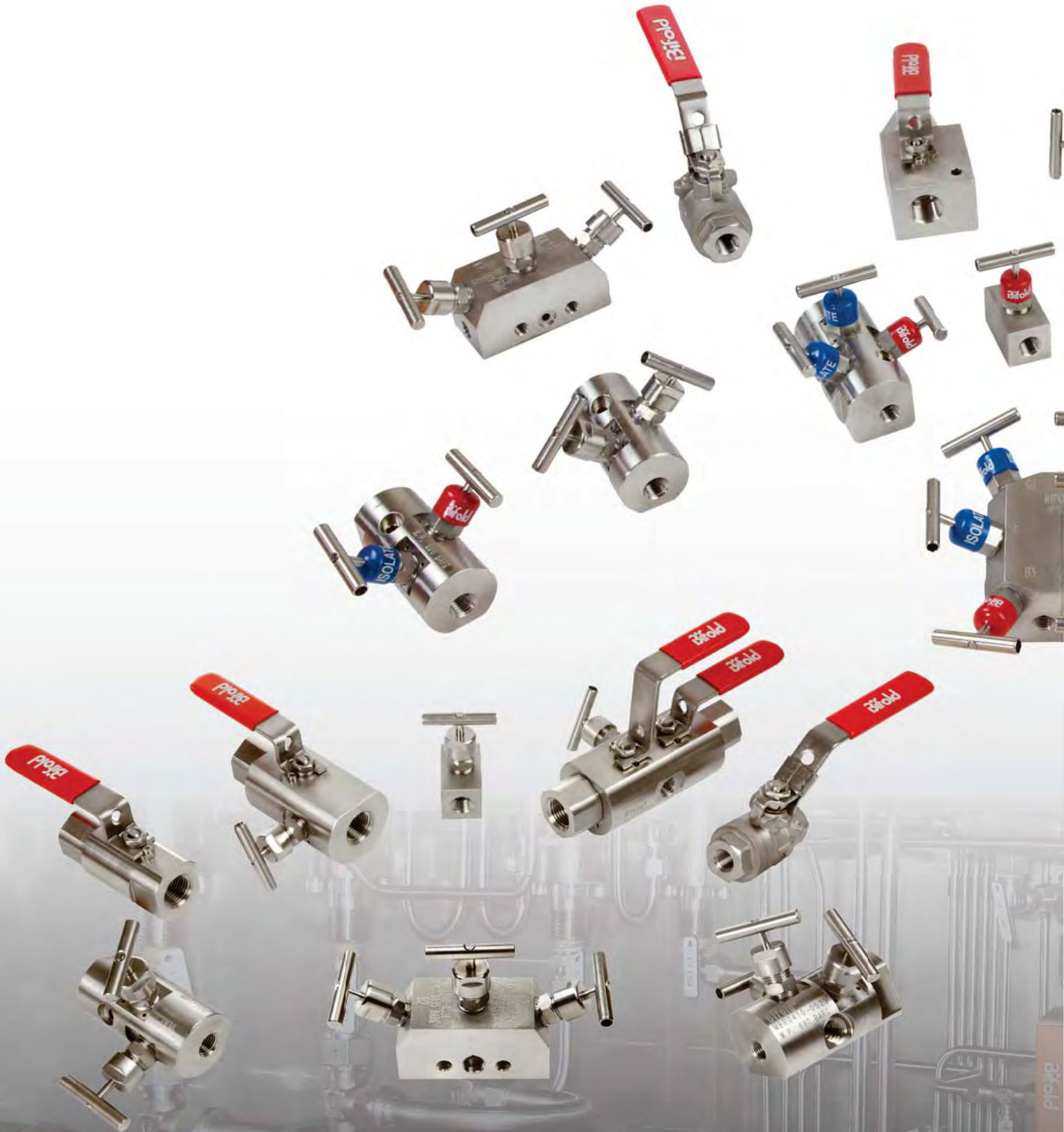
Please see the Instrumentation and Piping Catalogue for the full product range of DBB Injection / Sampling Valves.

Double Block & Bleed Valves



Please see the Instrumentation and Piping Catalogue for the full product range of Double Block & Bleed Valves.

Preferred Range



Preferred Range



*Global Presence for
Peace of Mind*

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

Features & Benefits

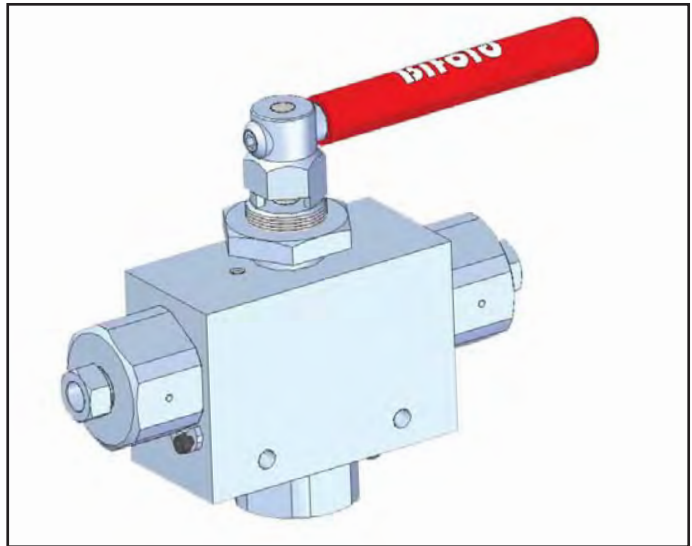
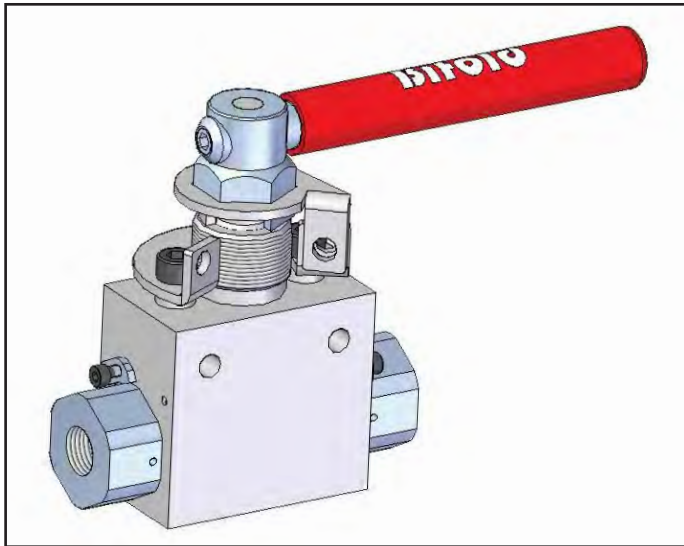
Bifold has manufactured Ball & Needle valves with a maximum pressure of 10,000 psi / 690 bar for more than 20 years. To add to this portfolio of valves, a range of Medium Pressure products have been developed, combining unique innovations with highest standards of quality already being provided.

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.

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.

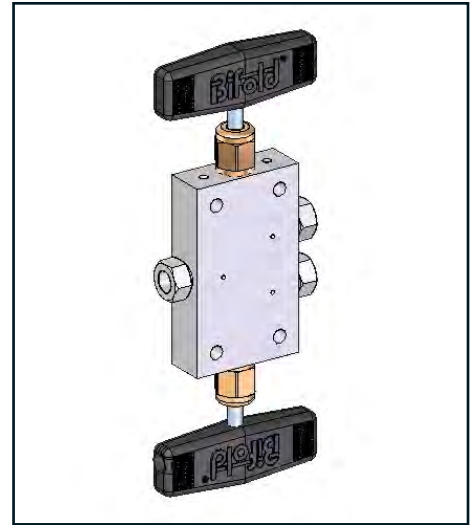
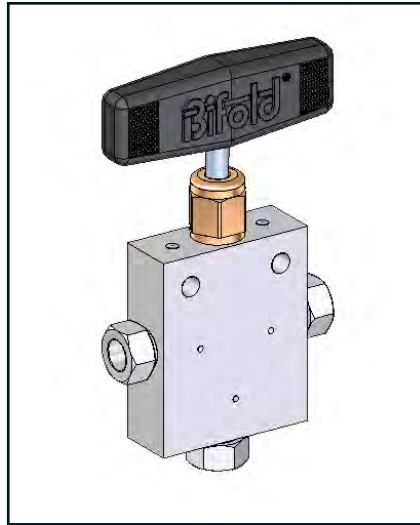
Thread Rolled Stem

- The stem thread portion is manufactured using thread rolling techniques to help maintain the material strength.

Product Portfolio

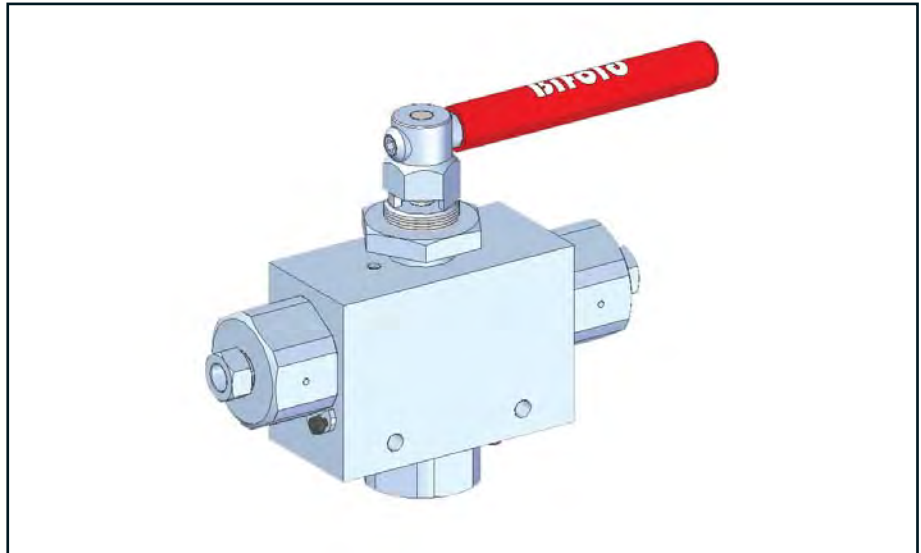
Medium Pressure Needle Valves

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".



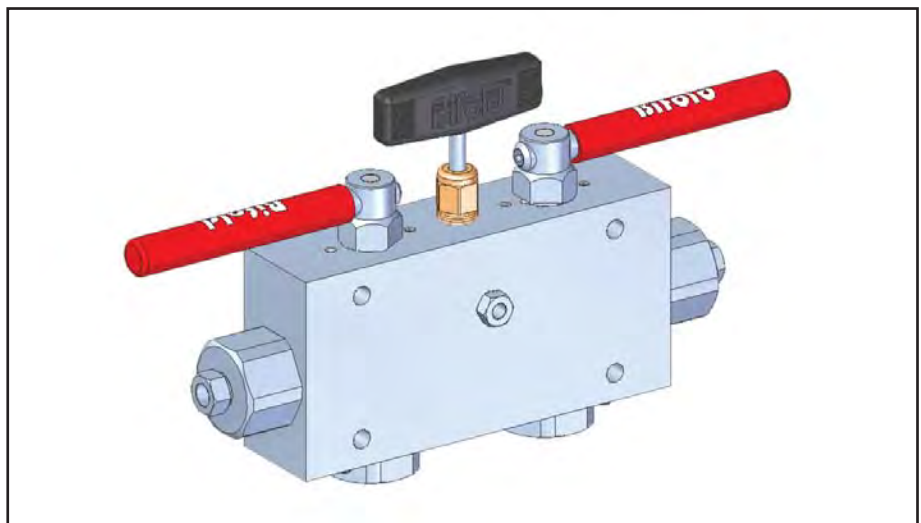
Medium Pressure Ball Valves

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".



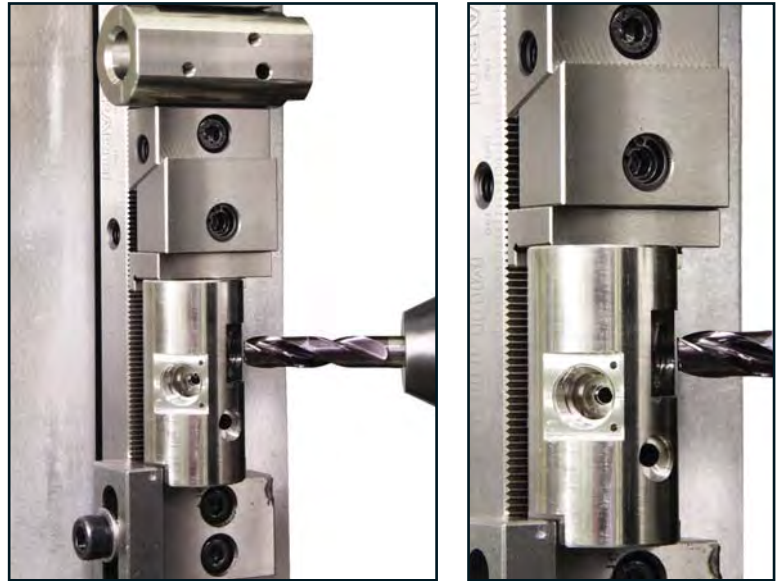
Product Portfolio

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.





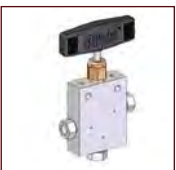
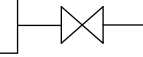



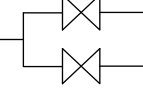




Installation Picture using our Standard Range of Ball and Needle Valves




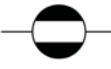
Preferred Range

INSTRUMENTATION PRODUCTS - MPN NEEDLE VALVES (up to and Including 20,000 psi / 1379 bar)

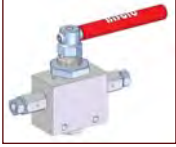







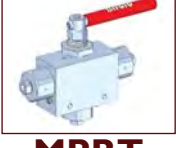



Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>MPN 2-Way Straight Needle Valves</p>		14 / 17	MPN-20-04-1-V	1/4" MP, 2-Way Straight, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-06-1-V	3/8" MP, 2-Way Straight, Needle Configuration, 20,000 psi / 1379 bar
			MPN-20-09-1-V	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>MPN 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>MPN 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>MPN 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>MPN 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>MPN 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

Preferred Range


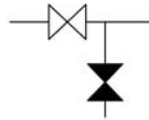

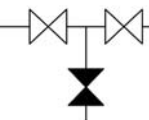

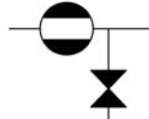
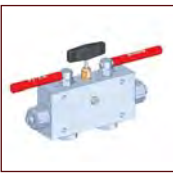
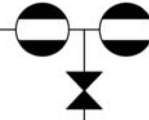

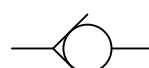
INSTRUMENTATION PRODUCTS - MPBF BALL VALVES (up to and Including 10,000 psi / 690 bar)

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>MPBF 2-Way Floating Style Ball Valves</p>		18	MPBF-10-10-04-V	1/4" MP, 2-Way Floating Style, Ball Configuration, 10,000 psi / 690 bar, 10mm Bore
			MPBF-10-10-06-V	3/8" MP, 2-Way Floating Style, Ball Configuration, 10,000 psi / 690 bar, 10mm Bore
			MPBF-10-10-09-V	1/2" 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)

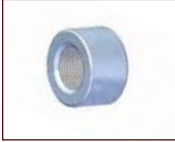


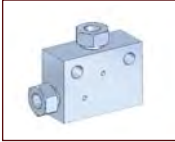

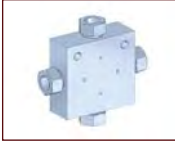


 <p>MPBT 2-Way Trunnion Style Ball Valves</p>		19 / 22	MPBT-20-5-04-1-V	1/4" MP, 2-Way Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
			MPBT-20-5-06-1-V	3/8" MP, 2-Way Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
			MPBT-20-5-09-1-V	1/2" MP, 2-Way Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
 <p>MPBT 3-Way Diverting Trunnion Style Ball Valves</p>	 <p>90° Operation</p>	19 / 22	MPBT-20-5-04-2-V	1/4" MP, 3-Way Diverting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
			MPBT-20-5-06-2-V	3/8" MP, 3-Way Diverting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
			MPBT-20-5-09-2-V	1/2" MP, 3-Way Diverting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
 <p>MPBT 3-Way Selecting Trunnion Style Ball Valves</p>	 <p>180° Operation</p>	19 / 22	MPBT-20-5-04-3-V	1/4" MP, 3-Way Selecting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
			MPBT-20-5-06-3-V	3/8" MP, 3-Way Selecting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
			MPBT-20-5-09-3-V	1/2" MP, 3-Way Selecting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 5mm Bore
 <p>MPBT 2-Way Trunnion Style Ball Valves</p>		19 / 22	MPBT-20-10-04-1-V	1/4" MP, 2-Way Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore
			MPBT-20-10-06-1-V	3/8" MP, 2-Way Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore
			MPBT-20-10-09-1-V	1/2" MP, 2-Way Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore
 <p>MPBT 3-Way Diverting Trunnion Style Ball Valves</p>	 <p>90° Operation</p>	19 / 22	MPBT-20-10-04-2-V	1/4" MP, 3-Way Diverting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore
			MPBT-20-10-06-2-V	3/8" MP, 3-Way Diverting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore
			MPBT-20-10-09-2-V	1/2" MP, 3-Way Diverting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore
 <p>MPBT 3-Way Selecting Trunnion Style Ball Valves</p>	 <p>180° Operation</p>	19 / 22	MPBT-20-10-04-3-V	1/4" MP, 3-Way Selecting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore
			MPBT-20-10-06-3-V	3/8" MP, 3-Way Selecting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore
			MPBT-20-10-09-3-V	1/2" MP, 3-Way Selecting Trunnion Style, Ball Configuration, 20,000 psi / 1379 bar, 10mm Bore

Preferred Range

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>MPNM Single Block & Bleed Needle Valve Manifolds</p>		23 / 24	MPNM-20-04-04-1	¼" MP, Single Block & Bleed Manifold, Needle - Needle Configuration, 20,000 psi / 1379 bar; ¼" MP Vent Bleed
			MPNM-20-06-04-1	¾" MP, Single Block & Bleed Manifold, Needle - Needle Configuration, 20,000 psi / 1379 bar; ¼" MP Vent Bleed
 <p>MPNM Double Block & Bleed Needle Valve Manifolds</p>		23 / 24	MPNM-20-04-04-2	¼" MP, Double Block & Bleed Manifold, Needle - Needle - Needle Configuration, 20,000 psi / 1379 bar; ¼" MP Vent Bleed
			MPNM-20-06-04-2	¾" MP, Double Block & Bleed Manifold, Needle - Needle - Needle Configuration, 20,000 psi / 1379 bar; ¼" MP Vent Bleed
INSTRUMENTATION PRODUCTS - MPBM TRUNNION BALL VALVE MANIFOLDS (up to and including 20,000 psi / 1379 bar)				
 <p>MPBM Trunnion Style Single Block & Bleed Manifolds</p>		25 / 26	MPBM-20-10-04-04-1-V	¼" MP, Trunnion Style Single Block & Bleed Manifold, Ball - Needle Configuration, 20,000 psi / 1379 bar; 10mm Bore, ¼" MP Vent Bleed
			MPBM-20-10-06-04-1-V	¾" MP, Trunnion Style Single Block & Bleed Manifold, Ball - Needle Configuration, 20,000 psi / 1379 bar; 10mm Bore, ¼" MP Vent Bleed
			MPBM-20-10-09-04-1-V	⅞" MP, Trunnion Style Single Block & Bleed Manifold, Ball - Needle Configuration, 20,000 psi / 1379 bar; 10mm Bore, ¼" MP Vent Bleed
 <p>MPBM Trunnion Style Double Block & Bleed Manifolds</p>		25 / 26	MPBM-20-10-04-04-2-V	¼" MP, Trunnion Style Double Block & Bleed Manifold, Ball - Needle - Ball Configuration, 20,000 psi / 1379 bar; 10mm Bore, ¼" MP Vent Bleed
			MPBM-20-10-06-04-2-V	¾" MP, Trunnion Style Double Block & Bleed Manifold, Ball - Needle - Ball Configuration, 20,000 psi / 1379 bar; 10mm Bore, ¼" MP Vent Bleed
			MPBM-20-10-09-04-2-V	⅞" MP, Trunnion Style Double Block & Bleed Manifold, Ball - Needle - Ball Configuration, 20,000 psi / 1379 bar; 10mm Bore, ¼" MP Vent Bleed
INSTRUMENTATION PRODUCTS - MPCV CHECK VALVES (up to and including 20,000 psi / 1379 bar)				
 <p>MPCV Check Valves</p>		27	MPCV-20-04-1	¼" MP, Check Valve, Ball Configuration, 20,000 psi / 1379 bar
			MPCV-20-06-1	¾" MP, Check Valve, Ball Configuration, 20,000 psi / 1379 bar
			MPCV-20-09-1	⅞" MP, Check Valve, Ball Configuration, 20,000 psi / 1379 bar
			MPCV-20-12-1	¾" MP, Check Valve, Ball Configuration, 20,000 psi / 1379 bar
			MPCV-20-16-1	1" MP, Check Valve, Ball Configuration, 20,000 psi / 1379 bar

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


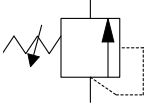

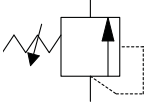

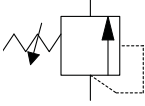

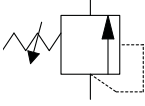

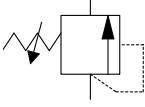
- The special, removable lock down screw facility can be applied to override the relief valve during system pressure test without affecting the pre-set, set point.

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.


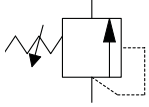
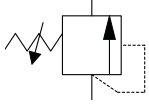

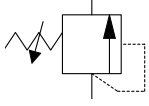
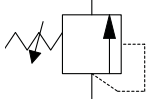


Selection Table

HYDRAULIC SERVICE PRODUCTS - THERMAL RELIEF VALVES I4480 (up to 1300 bar set point)				
Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>Hydraulic Service 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>Hydraulic Service 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>Hydraulic Service 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>Hydraulic Service Thermal Relief Valves Type I4480 - 90</p>		36 / 37	I4480 - 90	1/6" MP, Inlet Connection and 1/4" NPT, Outlet Connection. Thermal Relief Valve. 600 bar to 1300 bar; Ø 4 mm Orifice.
 <p>Hydraulic Service Thermal Relief Valves Type I4480 - 97</p>		36 / 37	I4480 - 97	1/6" MP, Inlet Connection and 3/8" NPT, Outlet Connection. Thermal Relief Valve. 600 bar to 1300 bar; Ø 4 mm Orifice.


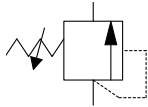

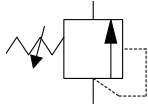

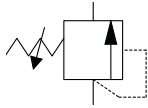

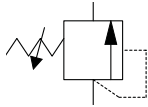
Selection Table

HYDRAULIC SERVICE PRODUCTS - PRECISION RELIEF VALVES 14580 (up to 1200 bar set point)

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p>Hydraulic Service 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>Hydraulic Service 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>Hydraulic Service 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>Hydraulic Service 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>Hydraulic Service 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

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>Hydraulic Service 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>Hydraulic Service 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>Hydraulic Service 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>Hydraulic Service 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.

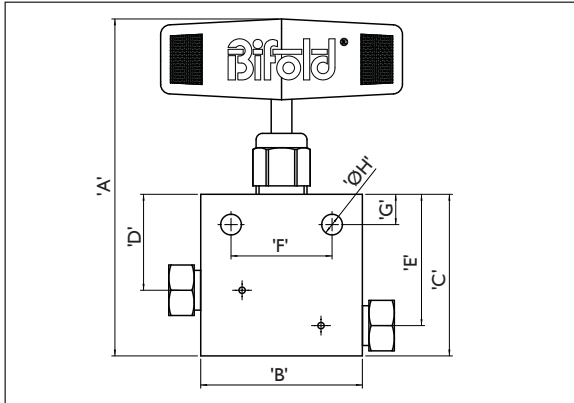
Features and Benefits

- 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".

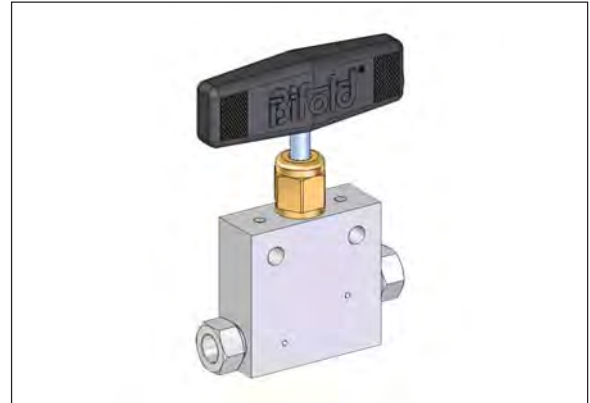
MPN

2-Way Straight Needle Valves

Dimensional Drawing



SCHEMATIC



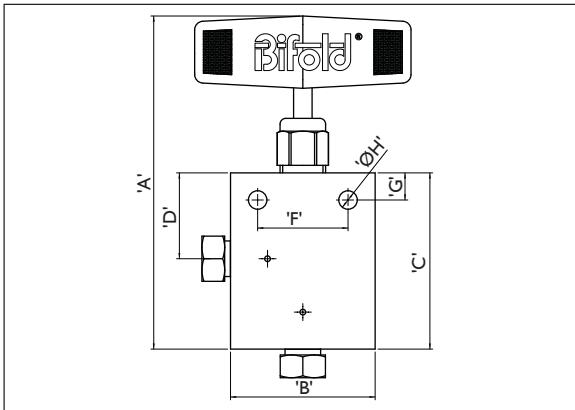
PREFERRED RANGE MPN - SELECTION TABLE

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	1/2" 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

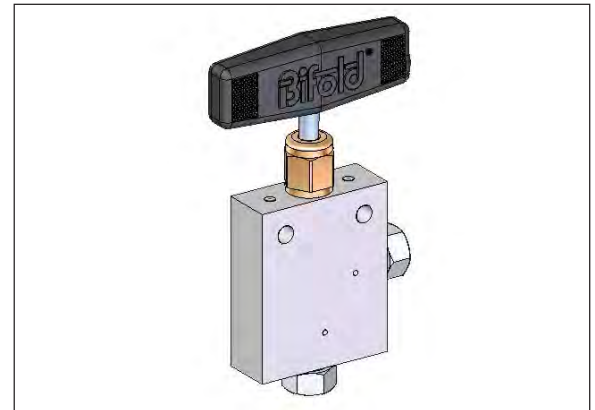
MPN

2-Way Angle Needle Valves

Dimensional Drawing



SCHEMATIC



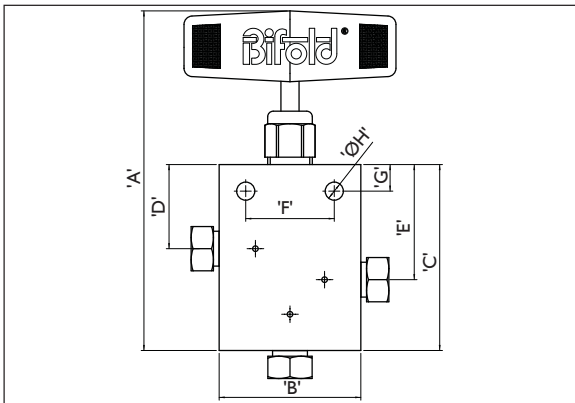
PREFERRED RANGE MPN - SELECTION TABLE

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

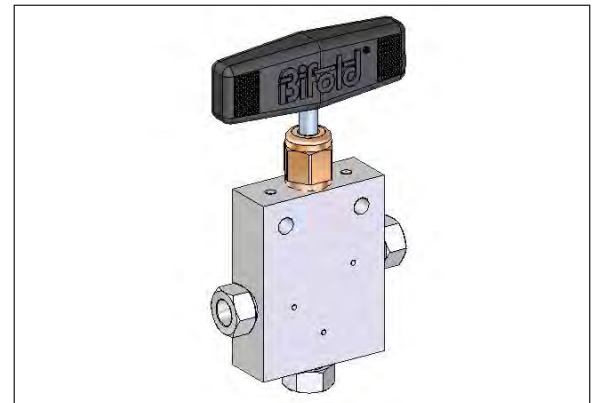
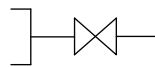
MPN

3-Way, 2-On Pressure Needle Valves

Dimensional Drawing



SCHEMATIC



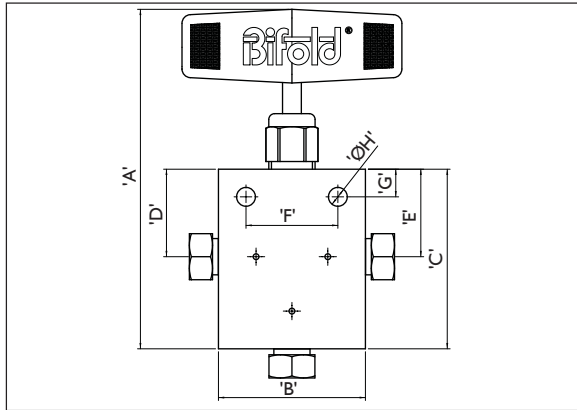
PREFERRED RANGE MPN - SELECTION TABLE

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

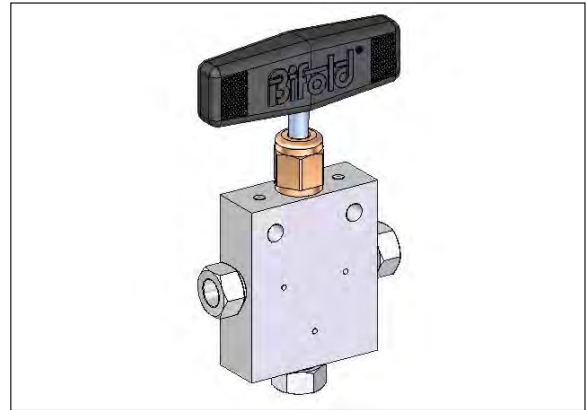
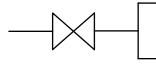
MPN

3-Way, 1-On Pressure Needle Valves

Dimensional Drawing



SCHEMATIC



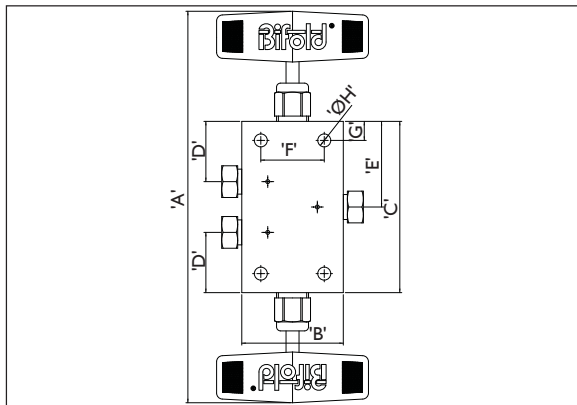
PREFERRED RANGE MPN - SELECTION TABLE

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

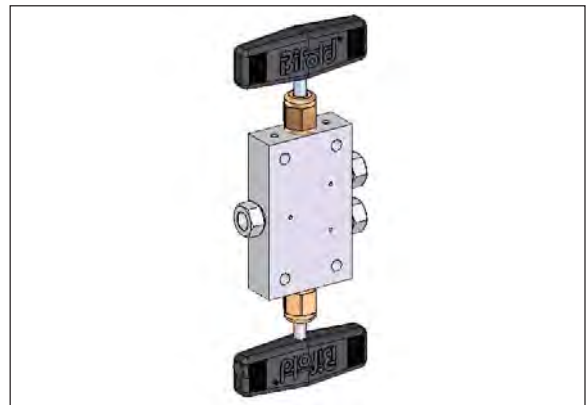
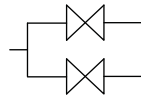
MPN

2-Stem Manifold Needle Valves

Dimensional Drawing



SCHEMATIC



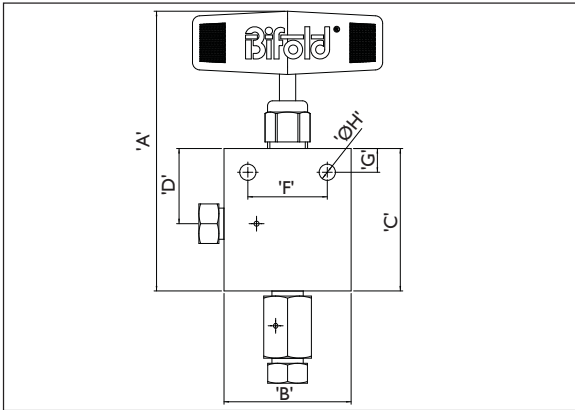
PREFERRED RANGE MPN - SELECTION TABLE

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

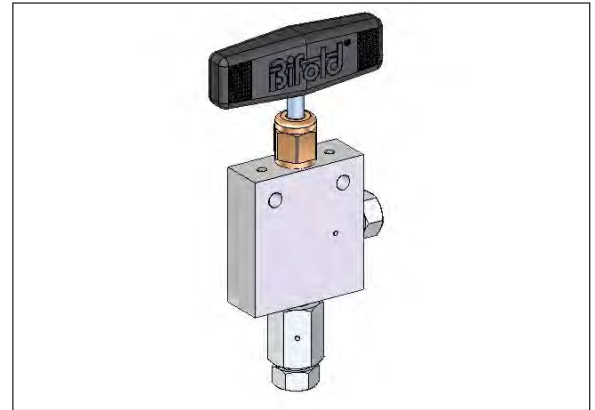
MPN

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

MPN	Medium Pressure Needle Valve, 20,000 psi / 1379 bar	Model Code	
20	20,000 psi / 1379 bar, Maximum Cold Working Pressure	Pressure Rating	
04 06 09 12 16	1/4" MP 3/8" MP 9/16" MP 3/4" MP 1" MP	Connection Size	
1 2 3 4 5 6	2-Way Straight 2-Way Angle 3-Way, 2-On Pressure 3-Way, 1-On Pressure 2-Stem Manifold Replaceable Seat	Configuration	
V R S	Vee Regulating Soft Tip	Tip	
NO LETTER V A G	HNBR Viton Aflas Graphite	-20°C to +170°C -20°C to +200°C -20°C to +250°C -73°C to +315°C	Seal Material
NO LETTER S LK PM	Stainless Steel Handle (Standard for 3/4" and 1" MP) Lockable Handle Panel Mount Gland		Options
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
MPN-20-04-3-V		Ordering Example	

MPBF - Medium Pressure Floating Ball Valve

MPBF

2-Way Floating Style Ball Valves, 10mm Bore

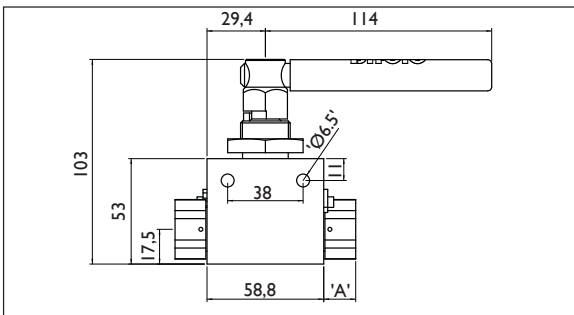
Product Description

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.

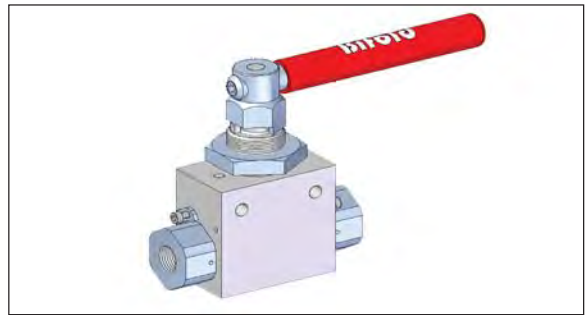
Features and Benefits

- 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	1/2" MP	10,000 psi / 690 bar	31.80	38.10	7.90

MPBF Selection Chart - Ordering Example

MPBF	Medium Pressure Floating Style Ball Valve, 10,000 psi / 690 bar	Model Code
10	10,000 psi / 690 bar, Maximum Cold Working Pressure	Pressure Rating
5	5mm	Bore Size
10	10mm	Bore Size
04	1/4"	Connection Size
06	3/8"	Connection Size
09	1/2"	Connection Size
12	3/4"	Connection Size
16	1"	Connection Size
NO LETTER	MP Female	Connection Type
M	MP Male	Connection Type
V	Viton (80 Shore)	O-ring Material
V9	Endura V91A	O-ring Material
S	Nitrile	O-ring Material
H	HNBR	O-ring Material
NO LETTER	(Standard Handle)	Options
LK	Lockable Handle	Options
NO LETTER	316L CW	Material
08	(6MO) 254MO	Material
26	Duplex UNS S31803	Material
39	Super Duplex UNS S32750/32760	Material
42	Inconel 625 UNS N06625	Material
45	Monel 400 UNS N04400	Material
49	Inconel 825 UNS N08825	Material
50	Hastelloy C276	Material
89	Titanium Gr2 UNS R50400	Material
90	Nickel 200 UNS N02200	Material
MPBF-10-10-06	- V	Ordering Example

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.

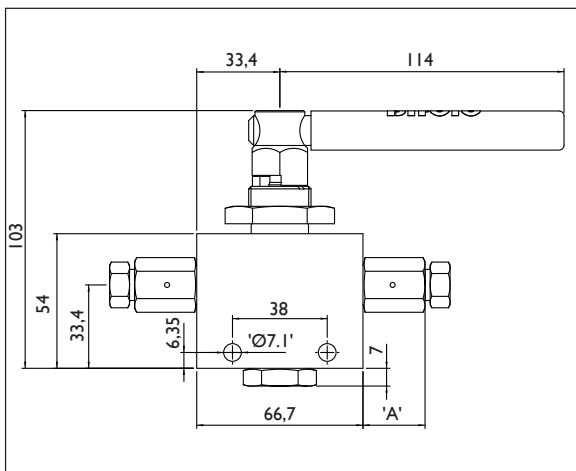
Features and Benefits

- 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.

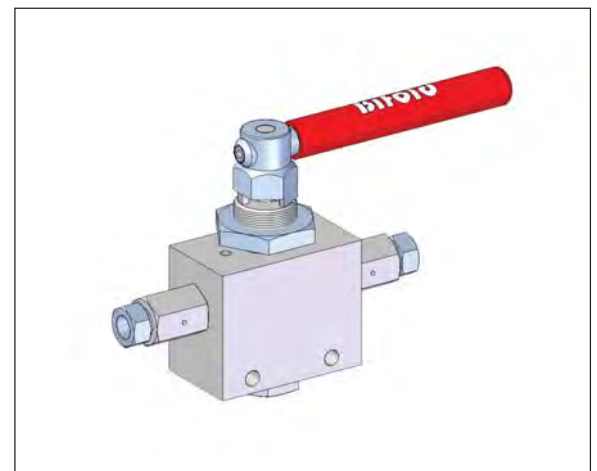
MPBT

2-Way Trunnion Style Ball Valves, 5mm Bore

Dimensional Drawing



SCHEMATIC



PREFERRED RANGE MPBT SELECTION TABLE

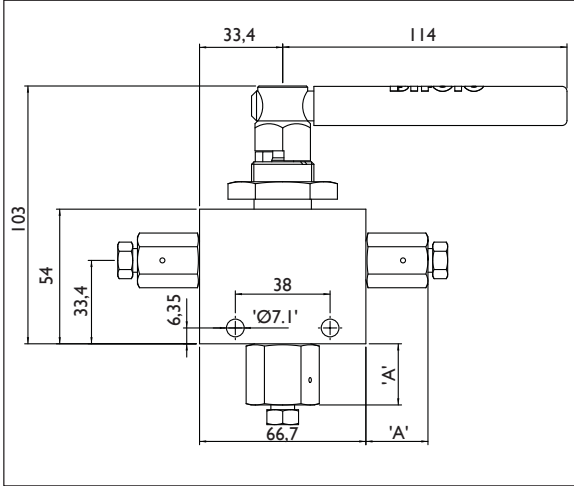
Product Code	Size	Rated	'A' (mm)	Thickness (mm)	Minimum Orifice Size
MPBT-20-5-04-I-V	1/4" MP	20,000 psi / 1379 bar	25.40	38.10	2.80
MPBT-20-5-06-I-V	3/8" MP	20,000 psi / 1379 bar	25.40	38.10	5.00
MPBT-20-5-09-I-V	9/16" MP	20,000 psi / 1379 bar	31.80	38.10	5.00

MPBT - Medium Pressure Trunnion Ball Valves

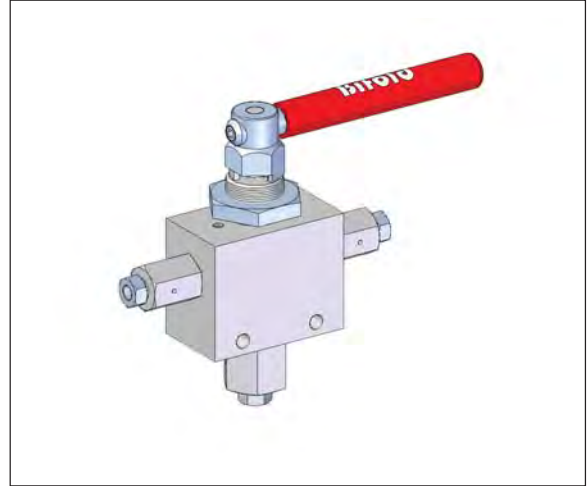
MPBT

3-Way Diverting Trunnion Style Ball Valves, 5mm Bore

Dimensional Drawing



SCHEMATIC



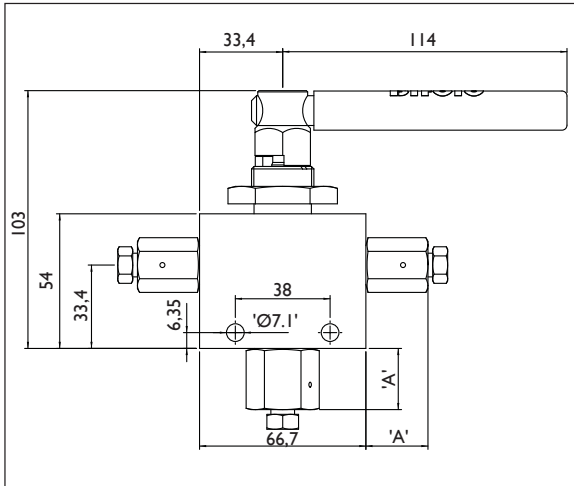
PREFERRED RANGE MPBT SELECTION TABLE

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

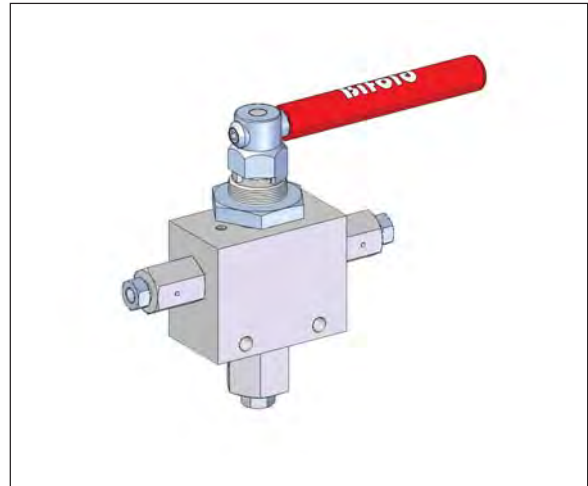
MPBT

3-Way Selecting Trunnion Style Ball Valves, 5mm Bore

Dimensional Drawing



SCHEMATIC



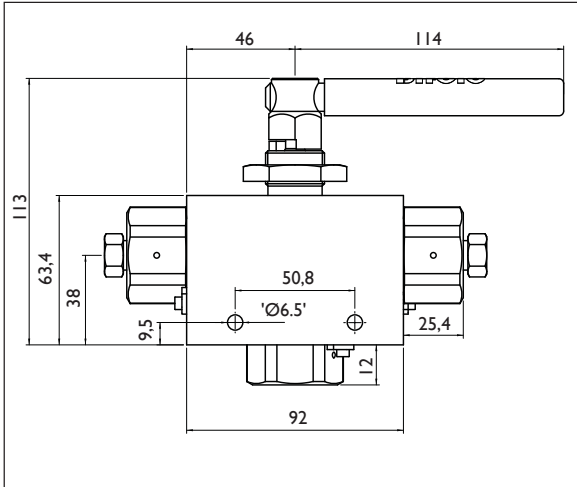
PREFERRED RANGE MPBT SELECTION TABLE

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

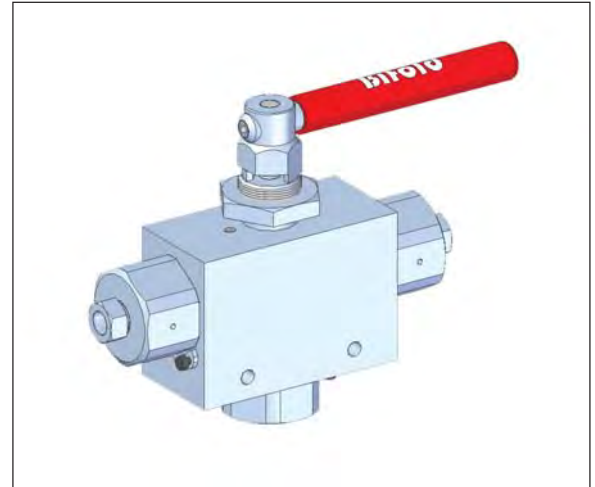
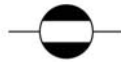
MPBT

2-Way Trunnion Style Ball Valves, 10mm Bore

Dimensional Drawing



SCHEMATIC



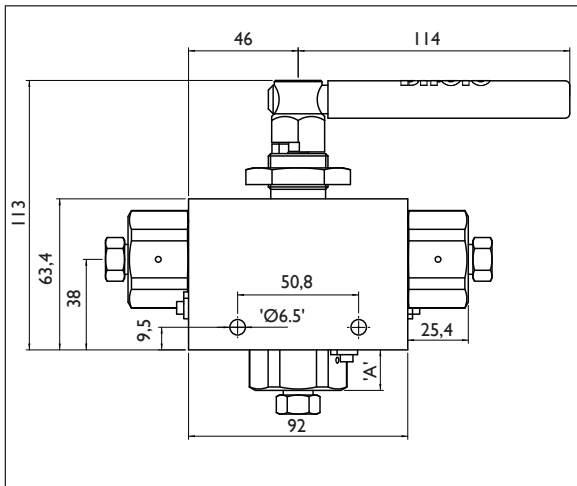
PREFERRED RANGE MPBT SELECTION TABLE

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

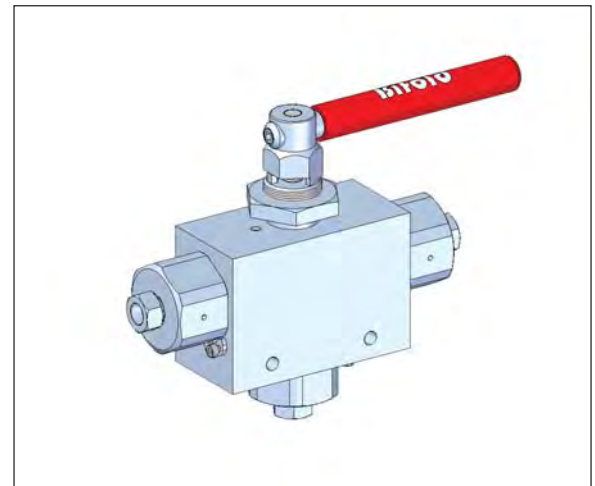
Dimensional Drawing



SCHEMATIC



90° Operation



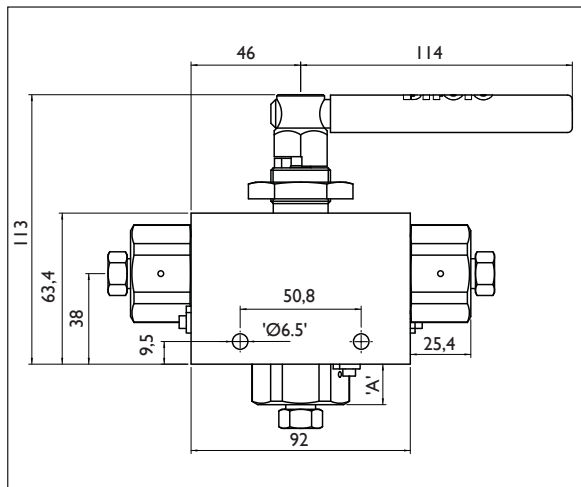
PREFERRED RANGE MPBT SELECTION TABLE

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

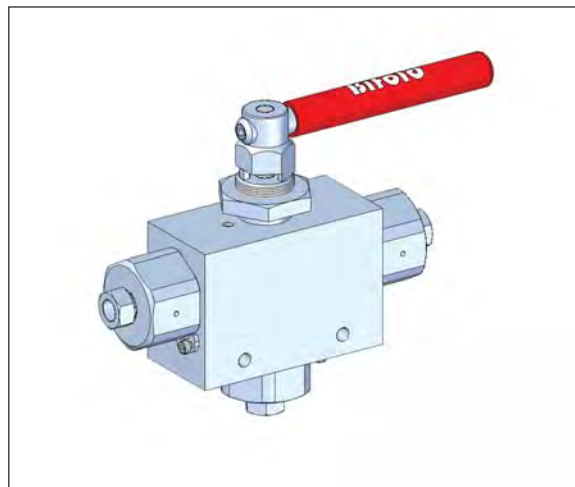
MPBT

**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	9/16" MP	20,000 psi / 1379 bar	25.40	44.45	7.90

MPBT Selection Chart - Ordering Example

MPBT	Medium Pressure Trunnion Style Ball Valve, up to 20,000 psi / 1379 bar	Model Code
10	10,000 psi / 690 bar, Maximum Cold Working Pressure	Pressure Rating
20	20,000 psi / 1379 bar, Maximum Cold Working Pressure	
5	5mm (3/16" Maximum)	Bore Size
10	10mm	
04	1/4"	Connection Size
06	3/8"	
09	9/16"	
12	3/4"	
16	1"	
NO LETTER	MP Female	Connection Type
M	MP Male	
1	2-Way	Configuration
2	3-Way Diverting	
3	3-Way Selecting	
4	4-Way (10,000 psi / 690 bar, Maximum Cold Working Pressure)	
5	5-Way (10,000 psi / 690 bar, Maximum Cold Working Pressure)	
V	Viton (80 Shore)	O-ring Material
V9	Endura V91A	
S	Nitrile	
H	HNBR	
NO LETTER	(Standard Handle)	Options
LK	Lockable Handle	
NO LETTER	316L CW	Material
08	(6MO) 254MO	
26	Duplex UNS S31803	
39	Super Duplex UNS S32750/32760	
42	Inconel 625 UNS N06625	
45	Monel 400 UNS N04400	
49	Inconel 825 UNS N08825	
50	Hastelloy C276	
89	Titanium Gr2 UNS R50400	
90	Nickel 200 UNS N02200	

MPBT-20 - 10 - 06 - 1 - V

Ordering Example

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.

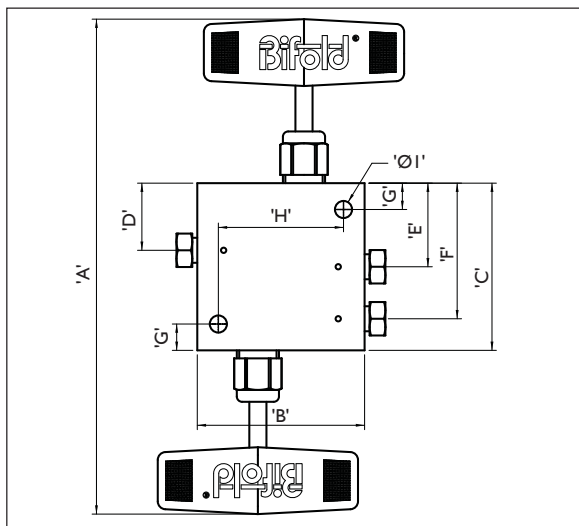
Features and Benefits

- 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".

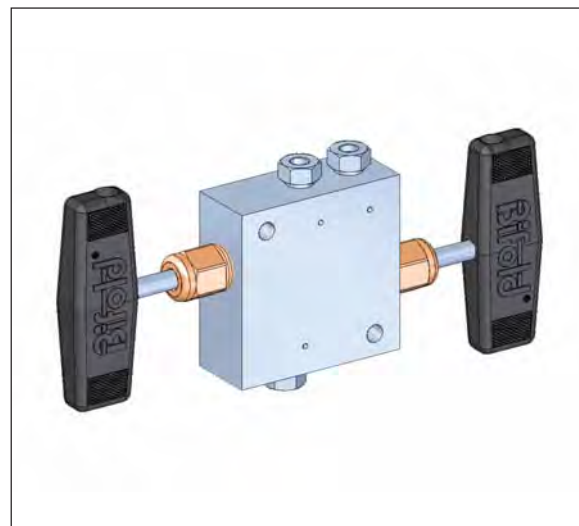
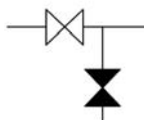
MPNM

Single Block & Bleed Needle Valve Manifolds

Dimensional Drawing



SCHEMATIC



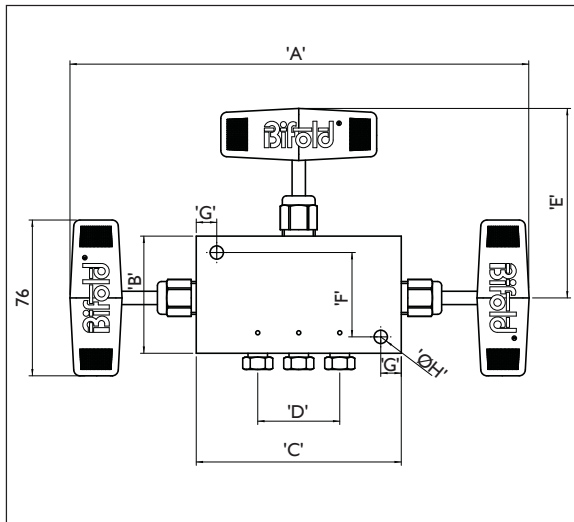
PREFERRED RANGE MPNM SELECTION TABLE

Product Code	Size	Rated	'A' (mm)	'B' (mm)	'C' (mm)	'D' (mm)	'E' (mm)	'F' (mm)	'G' (mm)	'H' (mm)	'ØI' (mm)	Thickness (mm)	Minimum Orifice Size
MPNM-20-04-04-1	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-20-06-04-1	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

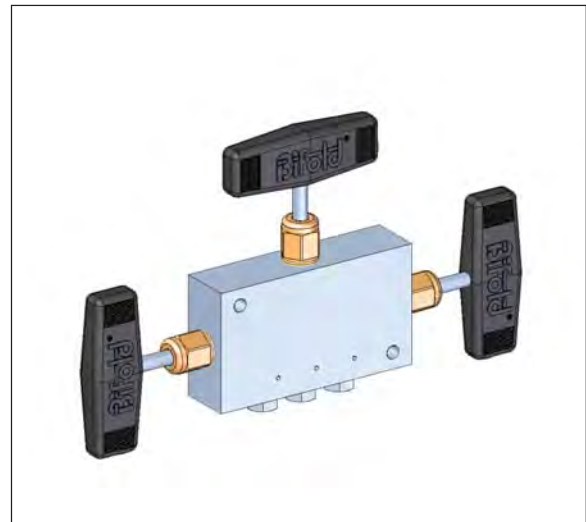
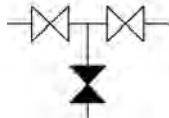
MPNM

Double Block & Bleed Needle Valve Manifolds

Dimensional Drawing



SCHMATIC



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

MPNM Medium Pressure, Needle Valve Manifold, 20,000 psi / 1379 bar	Model Code
20 20,000 psi / 1379 bar, Maximum Cold Working Pressure	Pressure Rating
04 1/4" 06 3/8" 09 9/16" 12 3/4" 16 1"	Connection Size
04 1/4" 06 3/8"	Vent Connection
1 Single Block & Bleed 2 Double Block & Bleed 3 Double Block 4 Double Block & Bleed (with Gauge Ports) 5 Single Block & Bleed (inline pattern) 6 Double Block & Bleed (inline pattern)	Configuration
NO LETTER HNBR -20°C to +170°C V Viton -20°C to +200°C A Aflas -20°C to +250°C G Graphite -73°C to +315°C	O-ring Material
NO LETTER (Standard Handle) S Stainless Steel Handle (Standard for 3/4" and 1" MP) LK Lockable Handle AV Anti Tamper Vent	Options
NO LETTER 316L CW 08 (6MO) 254MO 26 Duplex UNS S31803 39 Super Duplex UNS S32750/32760 42 Inconel 625 UNS N06625 45 Monel 400 UNS N04400 49 Inconel 825 UNS N08825 50 Hastelloy C276 89 Titanium Gr2 UNS R50400 90 Nickel 200 UNS N02200	Material

MPNM-20-06-04-2

Ordering Example

Other configurations available upon request.

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.

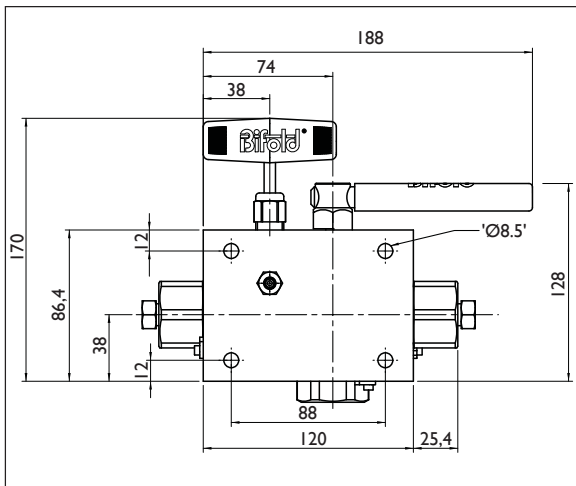
Features and Benefits

- 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".

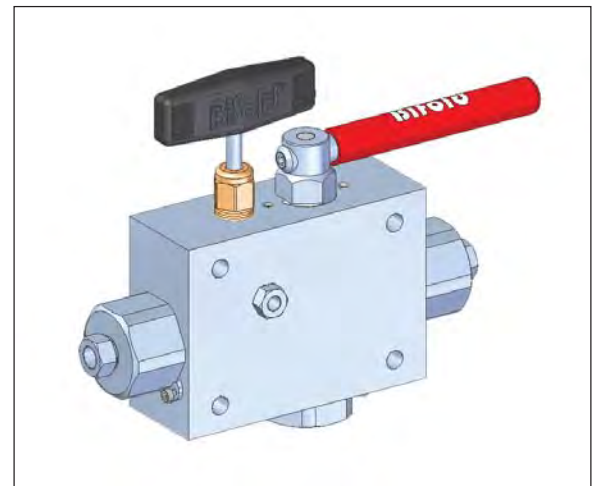
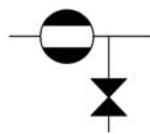
MPBM

Trunnion Style Single Block & Bleed Manifolds, 10mm Bore

Dimensional Drawing



SCHEMATIC



PREFERRED RANGE MPBM SELECTION TABLE

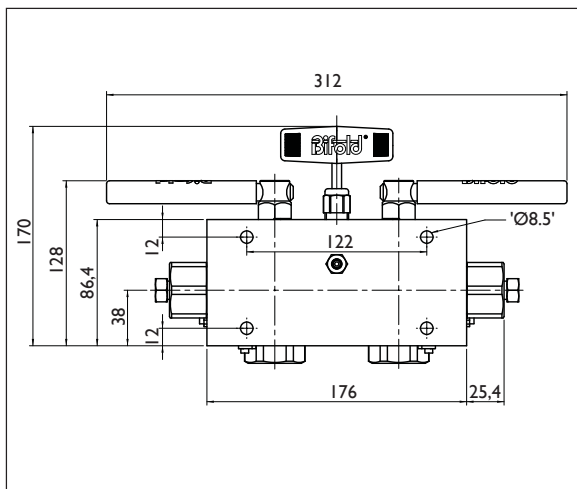
Product Code	Size	Rated	Thickness	Minimum Orifice Size
MPBM-20-10-04-04-I-V	1/4" MP	20,000 psi / 1379 bar	44.45	2.80
MPBM-20-10-06-04-I-V	3/8" MP	20,000 psi / 1379 bar	44.45	5.20
MPBM-20-10-09-04-I-V	1/2" MP	20,000 psi / 1379 bar	44.45	7.90

MPBM - Medium Pressure Trunnion Ball Valve Manifolds

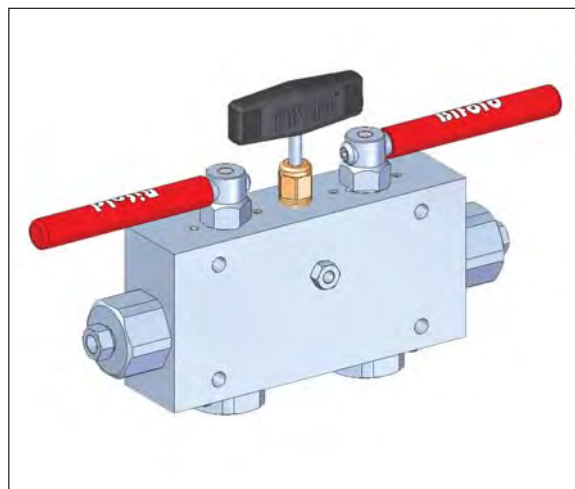
MPBM

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

MPBM	Medium Pressure, Trunnion Ball Valve Manifold, 20,000 psi / 1379 bar	Model Code	
20	20,000 psi / 1379 bar, Maximum Cold Working Pressure	Pressure Rating	
5	5mm (3/16" Maximum)	Bore Size	
10	10mm		
04	1/4"	Connection Size	
06	3/8"		
09	1/2"		
12	3/4"		
16	1"		
04	1/4"	Vent Connection	
06	3/8"		
1	Single Block & Bleed	Configuration	
2	Double Block & Bleed		
3	Double Block		
4	Double Block & Bleed (with Gauge Ports)		
V	Viton (80 Shore)	-20°C to +170°C	O-ring Material
V9	Endura V91A	-20°C to +170°C	
S	Nitrile	-20°C to +120°C	
H	HNBR	-20°C to +160°C	
NO LETTER			Options
LK	Lockable Handle		
AV	Anti Tamper Vent		
NO LETTER	316L CW	Material	
08	(6MO) 254MO		
26	Duplex UNS S31803		
39	Super Duplex UNS S32750/32760		
42	Inconel 625 UNS N06625		
45	Monel 400 UNS N04400		
49	Inconel 825 UNS N08825		
50	Hastelloy C276		
89	Titanium Gr2 UNS R50400		
90	Nickel 200 UNS N02200		

MPBM-20-10-09-04-2-V

Ordering Example

MPCV

Check Valves

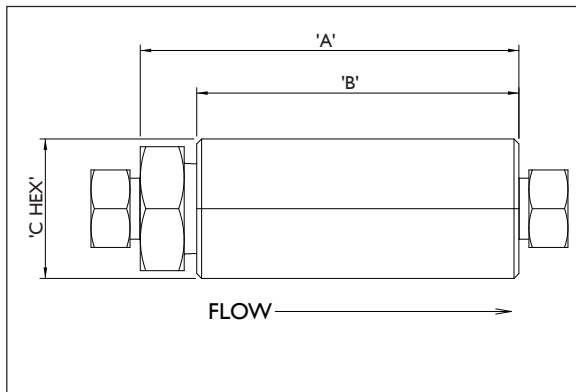
Product Description

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.

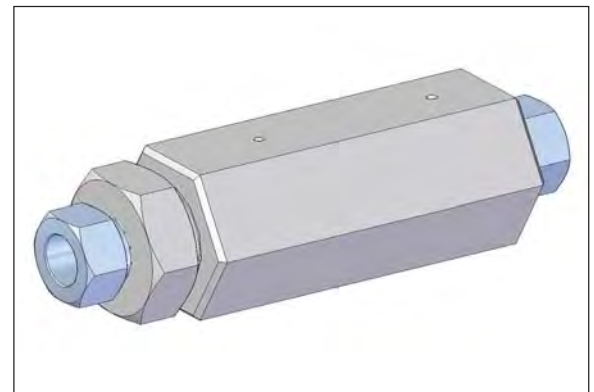
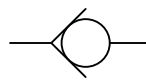
Features and Benefits

- 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-20-04-1	1/4" MP	20,000 psi / 1379 bar	69.50	57.40	25.40	2.80
MPCV-20-06-1	3/8" MP	20,000 psi / 1379 bar	77.60	66.00	28.58	5.20
MPCV-20-09-1	9/16" MP	20,000 psi / 1379 bar	109.40	94.00	34.92	7.90
MPCV-20-12-1	3/4" MP	20,000 psi / 1379 bar	155.00	131.00	44.45	11.10
MPCV-20-16-1	1" MP	20,000 psi / 1379 bar	174.00	157.00	53.98	14.30

MPCV Selection Chart - Ordering Example

MPCV	Medium Pressure Check Valve, 20,000 psi / 1379 bar	Model Code
20	20,000 psi / 1379 bar, Maximum Cold Working Pressure	Pressure Rating
04 06 09 12 16	1/4" 3/8" 9/16" 3/4" 1"	Connection Size
1 2	Ball Type Soft Seat Type	Configuration
NO LETTER V S	(for Ball Type only) Viton (80 Shore) Nitrile	O-ring Material
MPCV-20 - 06 - 1		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.

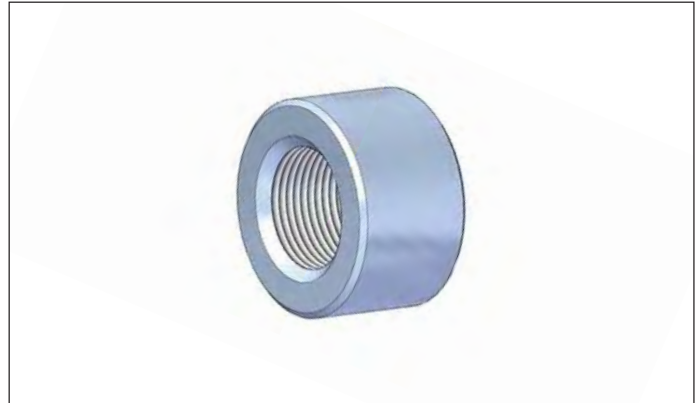
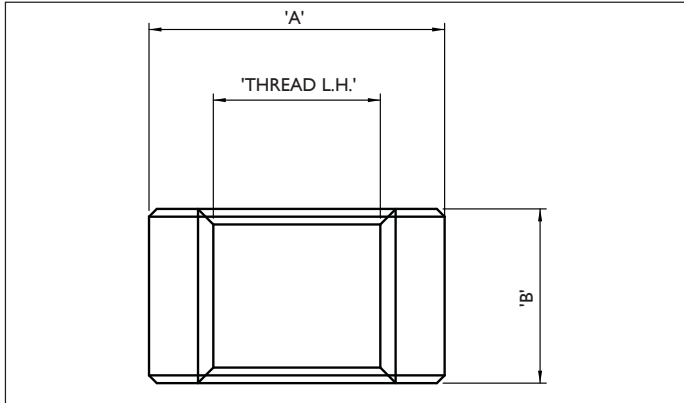
Features and Benefits

- 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



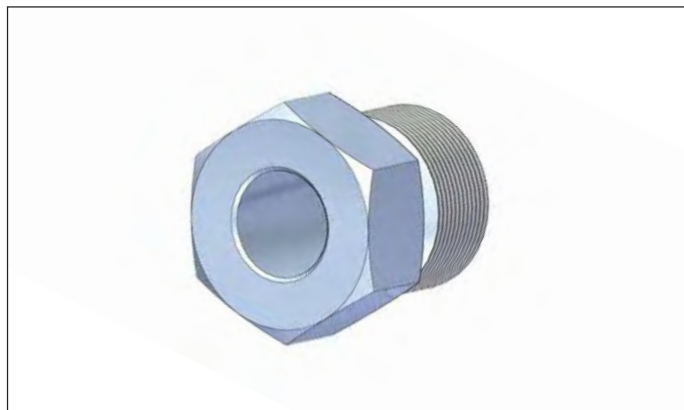
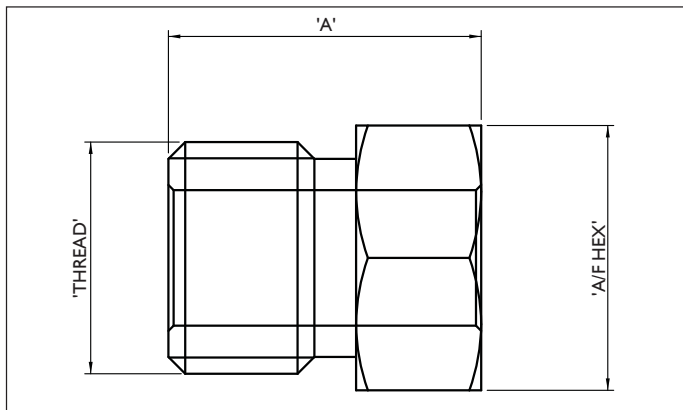
PREFERRED RANGE MPF SELECTION TABLE

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

MPF

Gland Nut

Dimensional Drawing



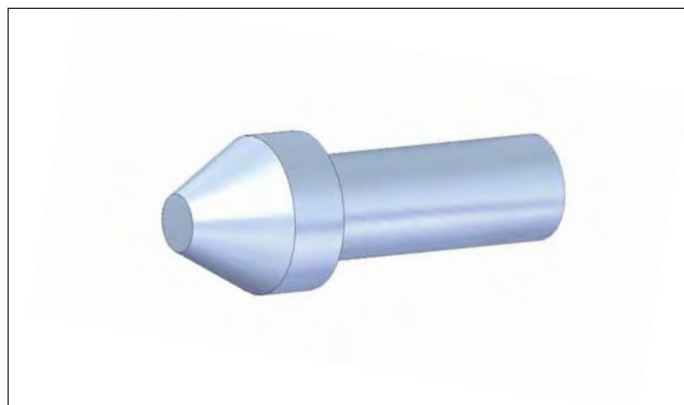
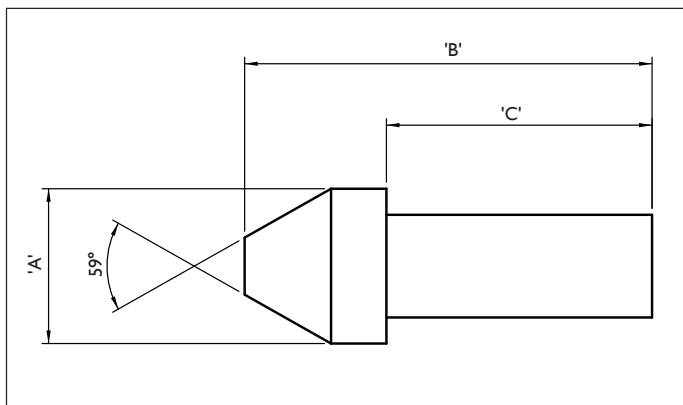
PREFERRED RANGE MPF SELECTION TABLE

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



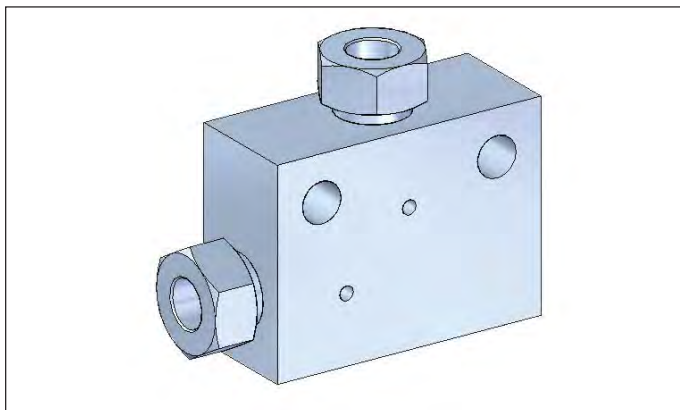
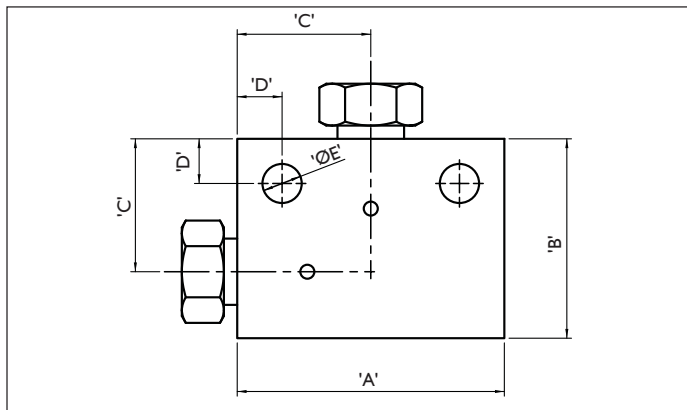
PREFERRED RANGE MPF SELECTION TABLE

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



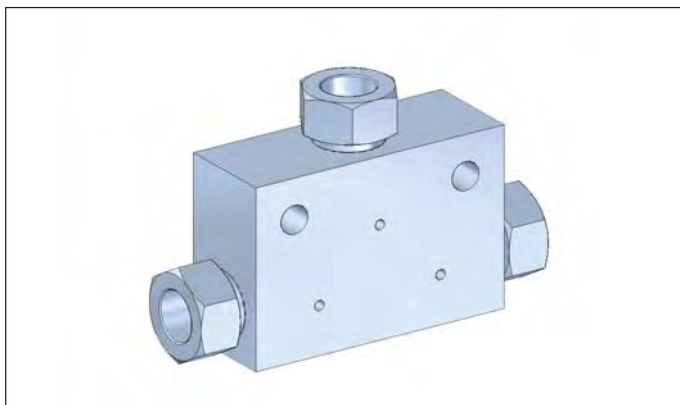
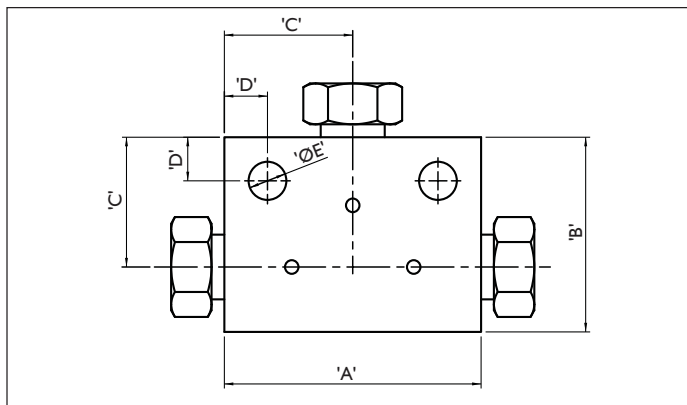
PREFERRED RANGE MPF SELECTION TABLE

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



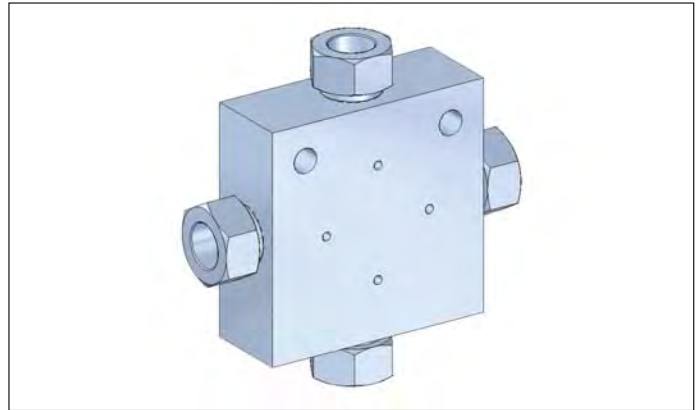
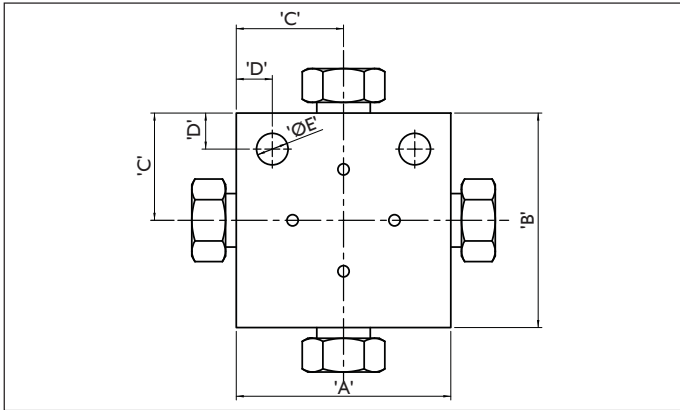
PREFERRED RANGE MPF SELECTION TABLE

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

MPF

Cross

Dimensional Drawing



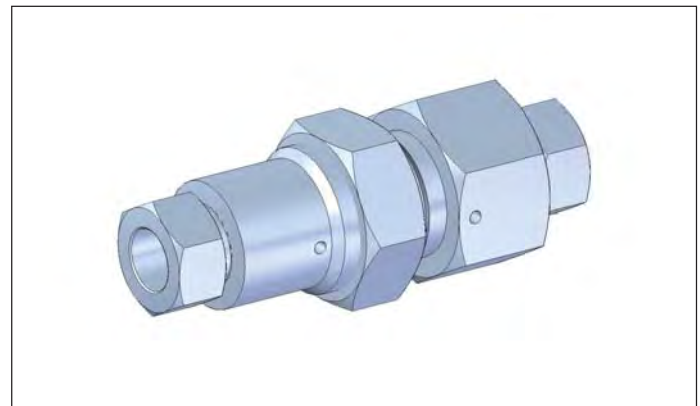
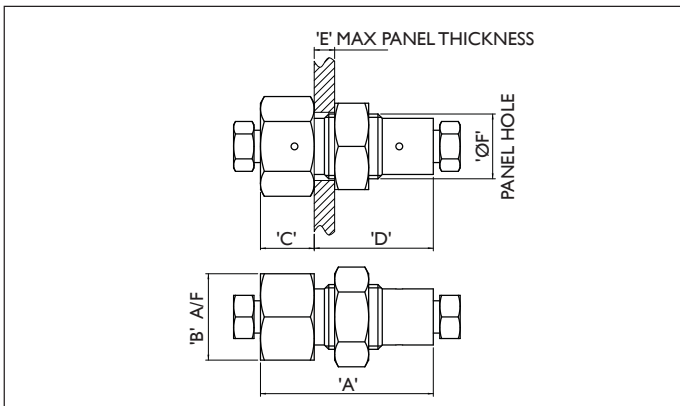
PREFERRED RANGE MPF SELECTION TABLE

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



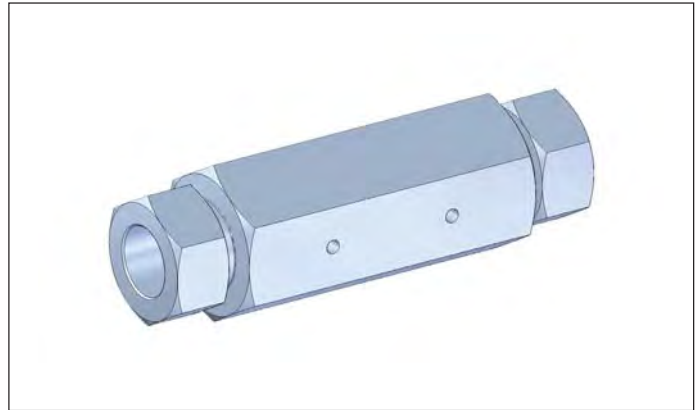
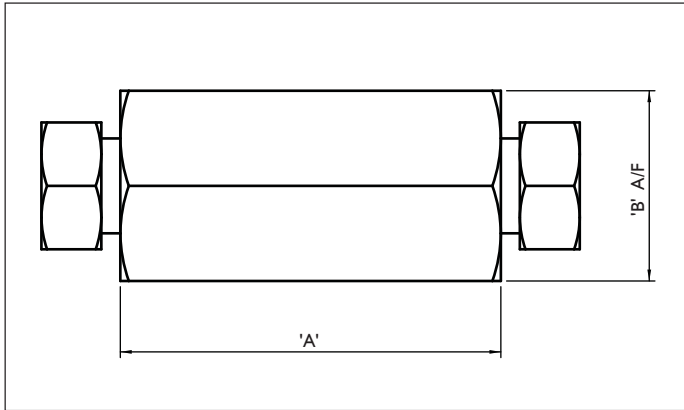
PREFERRED RANGE MPF SELECTION TABLE

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	1/2" 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	1/4" MP (Minimum Orifice Size 2.8)	Connection Size
06	3/8" MP (Minimum Orifice Size 5.2)	
09	1/2" MP (Minimum Orifice Size 7.9)	
12	3/4" MP (Minimum Orifice Size 11.10)	
16	1" MP (Minimum Orifice Size 14.30)	
C	Collar	Type
G	Gland Nut	
P	Plug	
L	Elbow	
T	Tee	
X	Cross	
B	Bulkhead Coupler	Material
S	Straight Coupler	
NO LETTER	316L CW	
08	(6MO) 254MO	
26	Duplex UNS S31803	
39	Super Duplex UNS S32750/32760	
42	Inconel 625 UNS N06625	
45	Monel 400 UNS N04400	
49	Inconel 825 UNS N08825	
50	Hastelloy C276	
89	Titanium Gr2 UNS R50400	
90	Nickel 200 UNS N02200	
WO	Without Glands & Collars	Option
AP	All Parts* (exotic materials only)	
AVA	Anti Vibration Assemblies*	
	*Exotic material glands and collars rather than the default of only wetted parts.	
	*Anti vibration assemblies added to all ports in place of default collars & glands	

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

MPF - Medium Pressure Fittings - Adaptors

MPF

Adaptors

Adaptors Male NPT x Female MP

		FEMALE				
		ADAPTORS MALE NPT x FEMALE MP SELECTION TABLE				
		¼" MP	⅜" MP	⅝" 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
	⅝" 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	⅝" 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
	⅝" 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

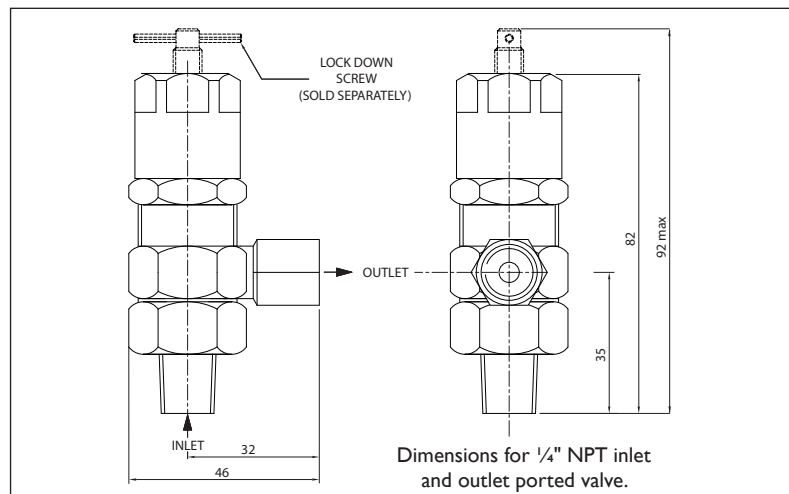
Other adaptors available upon request.

Relief Valves

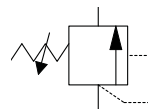


Hydraulic Service

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	
	- standard	
	- add suffix M089	eg. I4480 - 08 - M089
	- add suffix M065	eg. I4480 - 08 - M065
	- add suffix M106	eg. I4480 - 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.

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.

Hydraulic Service

Selection Chart - Ordering Example

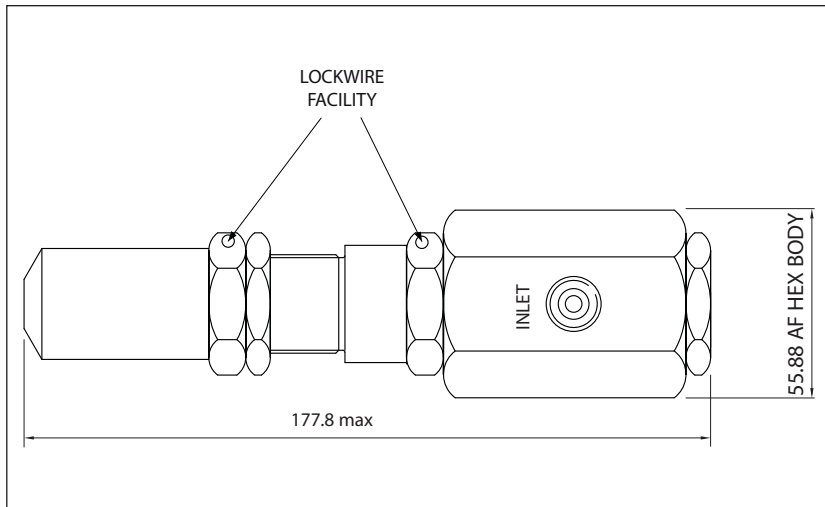
THERMAL RELIEF VALVE I4480 SPECIFICATIONS				
Part Number	Pressure Range (bar)	Inlet Connection	Outlet Connection	Repair Kit
I4480 - 24	7 - 50	1/4" NPT Female	1/4" NPT Female	RS I4480 - 24
I4480 - 25	50 - 200	1/4" NPT Female	1/4" NPT Female	RS I4480 - 25
I4480 - 26	200 - 600	1/4" NPT Female	1/4" NPT 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

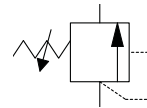
It is the responsibility of the system designer and user to select products that are suitable for their intended application of use.

Hydraulic Service

Dimensional Drawing



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. 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)
Flourosilicone -	(-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.

Hydraulic Service

Selection Chart - Ordering Example

PRECISION RELIEF VALVE I4520, I4530, I4580 & I4570 SPECIFICATIONS

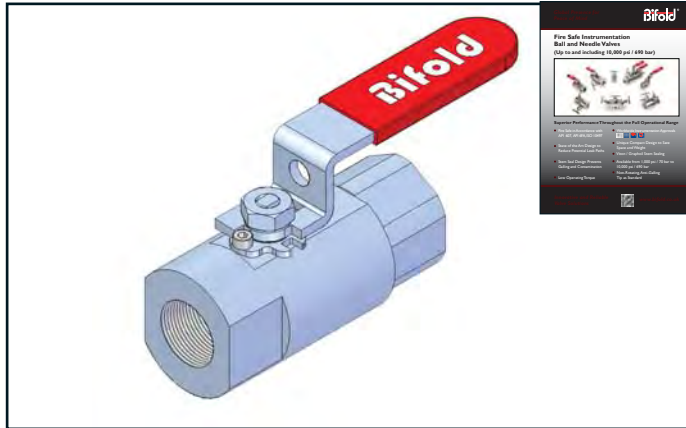
Part Number	Pressure Range (bar)	Inlet Connection	Outlet Connection	Repair Kit
I4530 - 01	100 - 240	¼" NPT	¼" NPT	RS I4530 - 01
I4530 - 02	207 - 414	¼" NPT	¼" NPT	RS I4530 - 02
I4530 - 03	345 - 700	¼" NPT	¼" NPT	RS I4530 - 03
I4530 - 04	100 - 240	¼" BSP	¼" BSP	RS I4530 - 04
I4530 - 05	207 - 414	¼" BSP	¼" BSP	RS I4530 - 05
I4530 - 06	345 - 700	¼" BSP	¼" BSP	RS I4530 - 06
I4580 - 13	100 - 240	¾" MP	¼" NPT	RS I4580 - 13
I4580 - 14	207 - 414	¾" MP	¼" NPT	RS I4580 - 14
I4580 - 15	345 - 700	¾" MP	¼" NPT	RS I4580 - 15
I4580 - 16	600 - 1200	¾" MP	¼" NPT	RS I4580 - 16
I4520 - 01	100 - 240	¾" NPT	¾" NPT	RS I4520 - 01
I4520 - 02	207 - 414	¾" NPT	¾" NPT	RS I4520 - 02
I4520 - 03	345 - 700	¾" NPT	¾" NPT	RS I4520 - 03
I4520 - 04	100 - 240	¾" BSP	¾" BSP	RS I4520 - 04
I4520 - 05	207 - 414	¾" BSP	¾" BSP	RS I4520 - 05
I4520 - 06	345 - 700	¾" BSP	¾" BSP	RS I4520 - 06
I4580 - 01	100 - 240	¾" MP	¾" NPT	RS I4580 - 01
I4580 - 02	207 - 414	¾" MP	¾" NPT	RS I4580 - 02
I4580 - 03	345 - 700	¾" MP	¾" NPT	RS I4580 - 03
I4580 - 04	600 - 1200	¾" MP	¾" NPT	RS I4580 - 04
I4580 - 07	100 - 240	¾" MP	¾" BSP	RS I4580 - 07
I4580 - 08	207 - 414	¾" MP	¾" BSP	RS I4580 - 08
I4580 - 09	600 - 1200	¾" MP	¾" BSP	RS I4580 - 09
I4580 - 10	345 - 700	¾" MP	¾" BSP	RS I4580 - 10
I4580 - 11	600 - 1200	¾" MP	¾" MP	RS I4580 - 11
I4580 - 17	100 - 240	¾" MP	½" NPT	RS I4580 - 17
I4580 - 18	207 - 414	¾" MP	½" NPT	RS I4580 - 18
I4580 - 19	345 - 700	¾" MP	½" NPT	RS I4580 - 19
I4580 - 20	600 - 1200	¾" MP	½" NPT	RS I4580 - 20
23600 - 01	100 - 240	½" NPT	½" NPT	RS 23600 - 01
23600 - 02	207 - 414	½" NPT	½" NPT	RS 23600 - 02
23600 - 03	345 - 700	½" NPT	½" NPT	RS 23600 - 03
23600 - 04	600 - 1200	½" NPT	½" NPT	RS 23600 - 04
I4570 - 01	100 - 240	⅞" MP	¾" NPT	RS I4570 - 01
I4570 - 02	207 - 414	⅞" MP	¾" NPT	RS I4570 - 02
I4570 - 03	345 - 700	⅞" MP	¾" NPT	RS I4570 - 03
I4570 - 04	345 - 700	⅞" MP	¾" NPT	RS I4570 - 04
I4570 - 07	100 - 240	⅞" MP	¾" BSP	RS I4570 - 07
I4570 - 08	207 - 414	⅞" MP	¾" BSP	RS I4570 - 08
I4570 - 09	600 - 1200	⅞" MP	¾" BSP	RS I4570 - 09
I4570 - 10	345 - 700	⅞" MP	¾" BSP	RS I4570 - 10
I4570 - 11	600 - 1200	⅞" MP	⅞" MP	RS I4570 - 11
I4570 - 12	100 - 240	⅞" MP	½" NPT	RS I4570 - 12
I4570 - 13	207 - 414	⅞" MP	½" NPT	RS I4570 - 13
I4570 - 14	345 - 700	⅞" MP	½" NPT	RS I4570 - 14
I4570 - 15	600 - 1200	⅞" MP	½" NPT	RS I4573 - 15
23700 - 01	100 - 240	¾" NPT	¾" NPT	RS 23700 - 01
23700 - 02	207 - 414	¾" NPT	¾" NPT	RS 23700 - 02
23700 - 03	345 - 700	¾" NPT	¾" NPT	RS 23700 - 03
23700 - 04	600 - 1200	¾" NPT	¾" NPT	RS 23700 - 04
23800 - 01	100 - 240	¾" MP	¾" MP	RS 23800 - 01
23800 - 02	207 - 414	¾" MP	¾" MP	RS 23800 - 02
23800 - 03	345 - 700	¾" MP	¾" MP	RS 23800 - 03
23800 - 04	600 - 1200	¾" MP	¾" 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

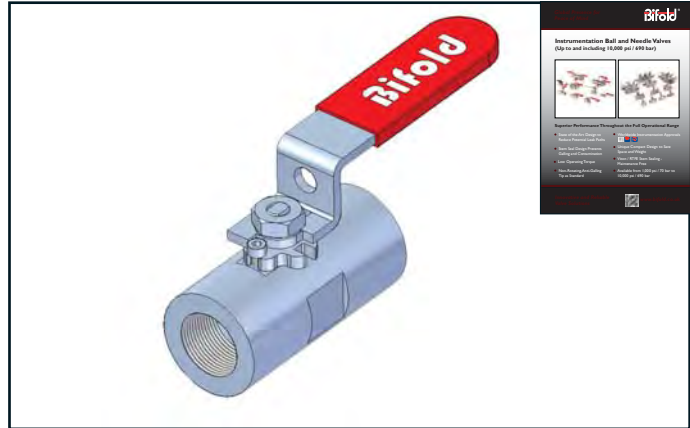
These Products Do Not Fall Within The Medium Pressure Range

Fire Safe Instrumentation Valves



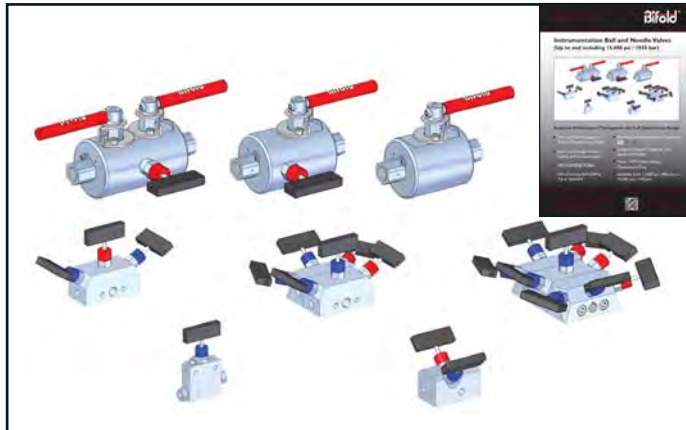
Please see the Ball and Needle Valve Fire Safe Catalogue for the full product range.

Instrumentation Valves



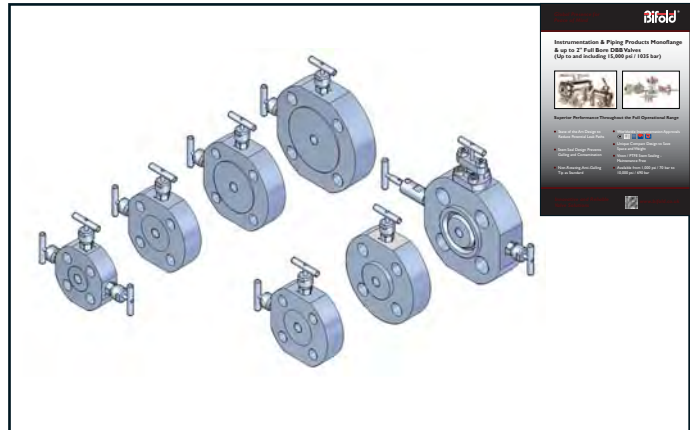
Please see the Instrumentation Ball and Needle Valve Catalogue for the full product range.

13K and 15K



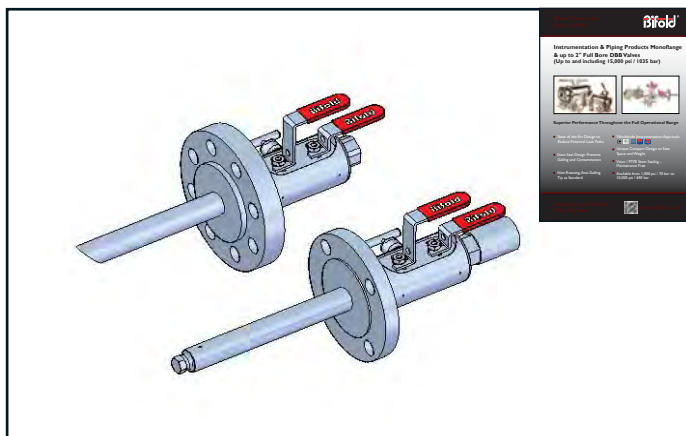
Please see the Instrumentation Ball and Needle Valve 13K and 15K Catalogue for the full product range.

Monoflanges



Please see the Instrumentation and Piping Catalogue for the full product range of monoflanges.

Double Block & Bleed Injection / Sampling Valves

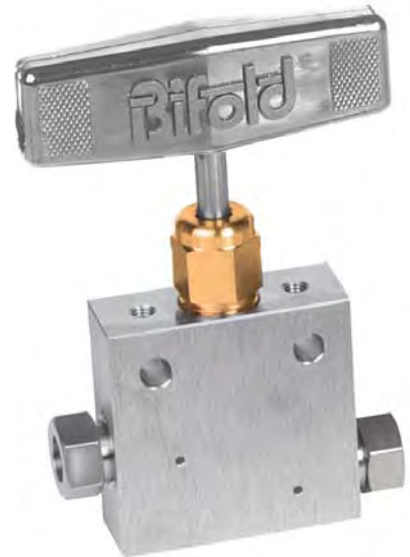
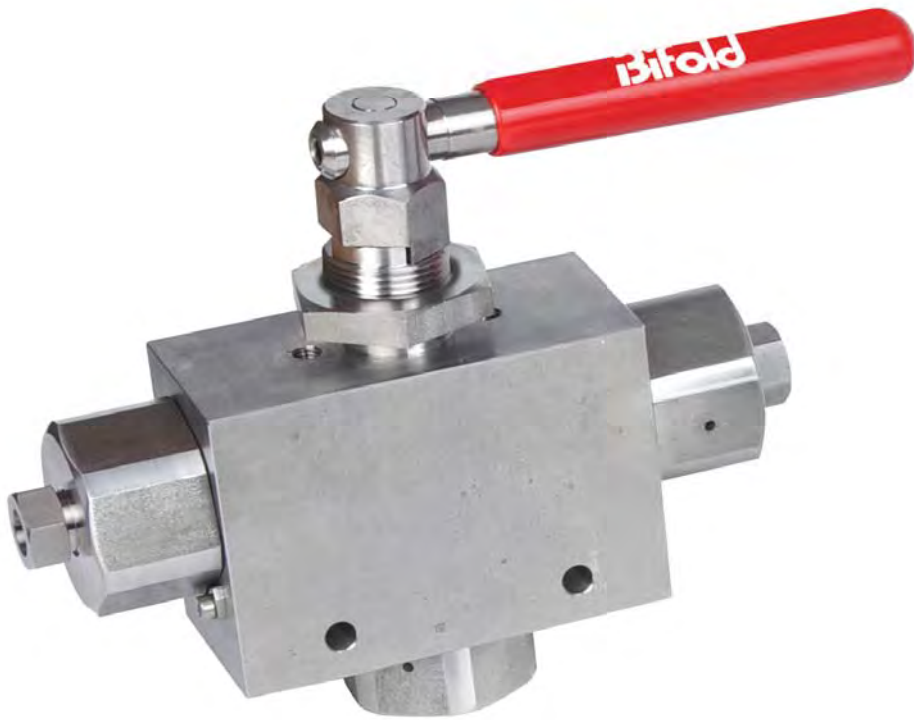


Please see the Instrumentation and Piping Catalogue for the full product range of DBB Injection / Sampling Valves.

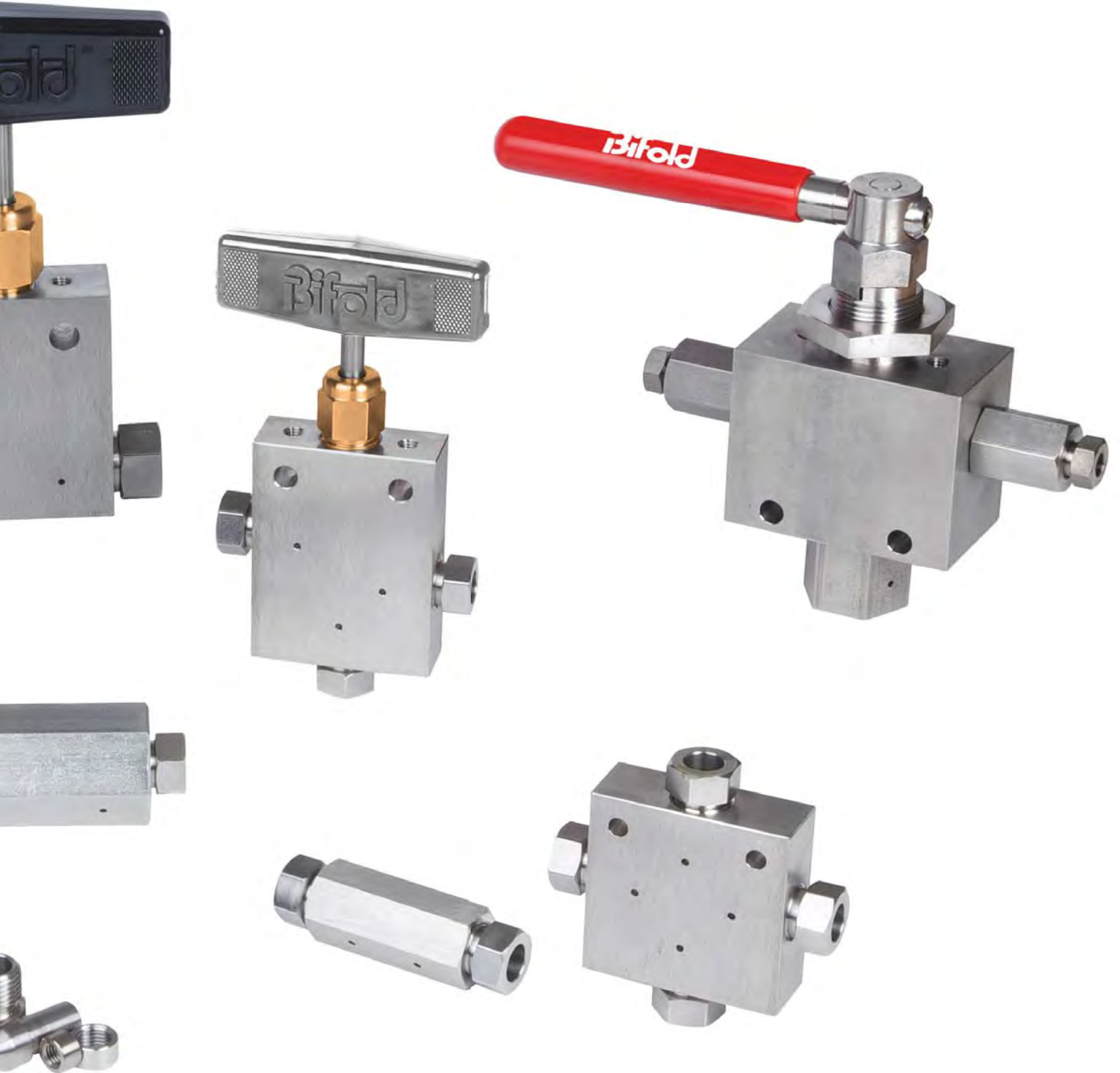
Double Block & Bleed Valves

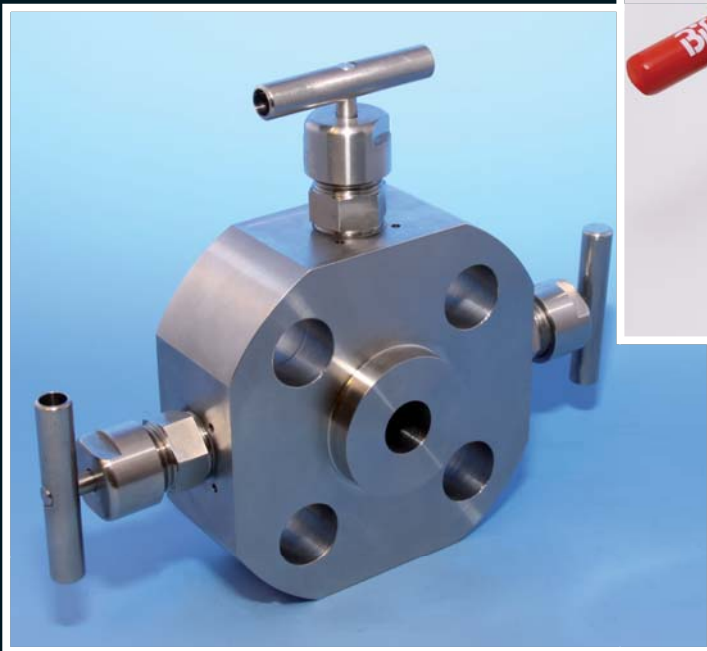


Please see the Instrumentation and Piping Catalogue for the full product range of Double Block & Bleed Valves.



Medium Pressure





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

NV Order Code

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 I8 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	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
08F	1/2" NPT
04FMP	1/4" MP
06FMP	3/8" MP
Blank	NPT Size as per Threaded Connection

Product Features

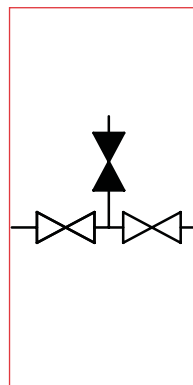
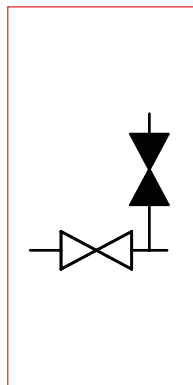
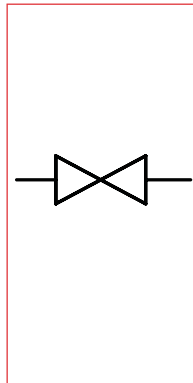
Product Description

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.

Flanged Instrumentation Ordering Information

BV Order Code

BV06-L-08I50RF-12F-O04F37B-10-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
½"	08
¾"	12
1"	16
1½"	24
1¾"	29
2"	32
2 ¼"	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
¼" NPT	04F
½" NPT	Blank
¾" NPT	12F
¼" MP	04FMP
¾" MP	06FMP
⅝" 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	¼" NPT
Blank	½" NPT
12F	¾" NPT

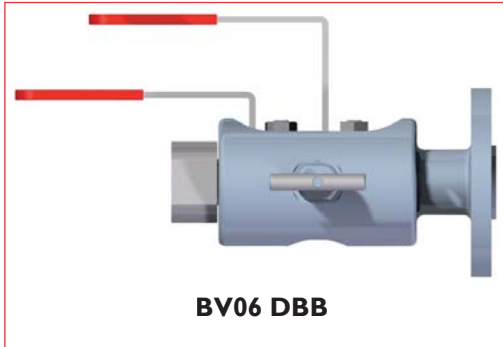
CODE	VENT OPERATOR TYPE
Blank	Screwed do not repeat if all 'S'
B	Bolted
O	OS & Y Outside Screw and Yoke
AS	Anti Tamper Screwed
BH	Bolted with Hand Wheel
OH	OS & Y with Hand Wheel
BHL	Bolted with Hand Wheel Lockable
OHL	OS & Y with Hand Wheel Lockable

Product Features

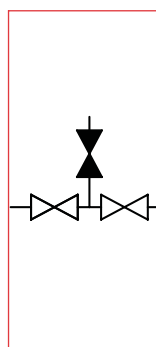
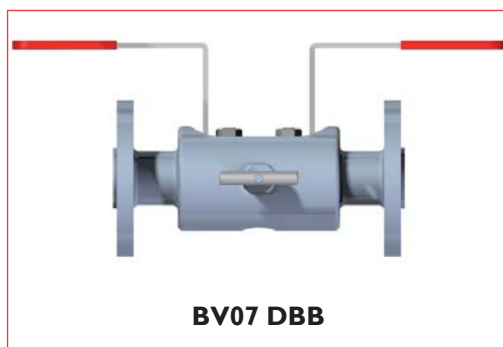
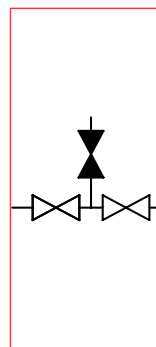
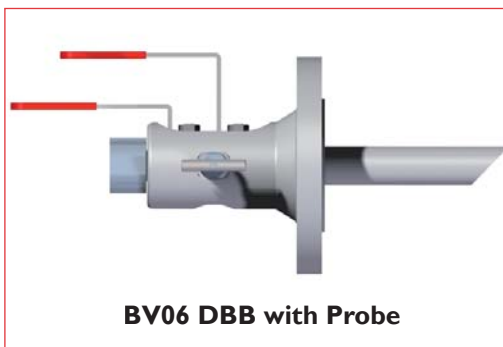
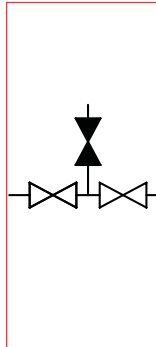
Product Description

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 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.

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
1½"	24
1¾"	29
2"	32
2 ¼"	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
¼" NPT	04F
½" NPT	Blank
¾" NPT	12F

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	1½"
29	1¾"
32	2"
33	2 ¼"
42	3"

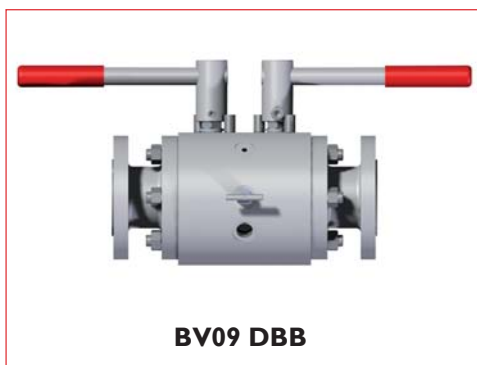
Grey Sections of the product code represent possible configuration options

Product Features

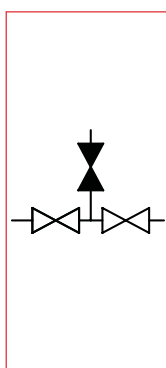
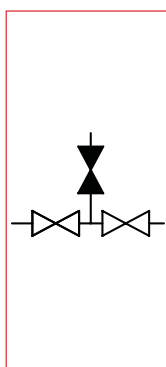
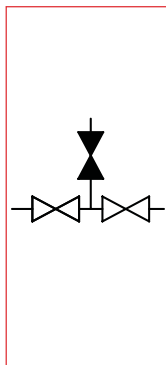
Product Description

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.

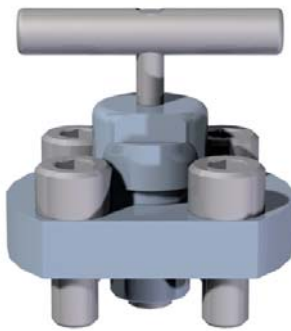
Options

Product Options

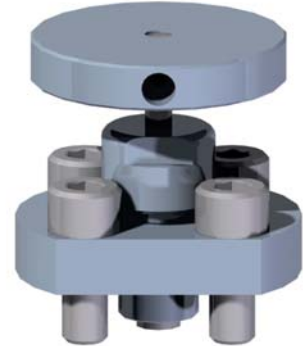
The range of products displayed in this brochure, are designed to accommodate all the options shown below. If the style or arrangement required for your application is not shown please contact our office with full description and specification details.



Anti Tamper Fire Safe



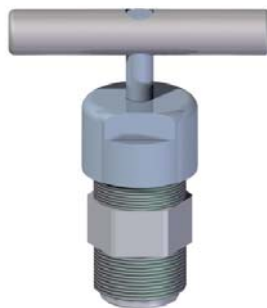
Bolted Fire Safe



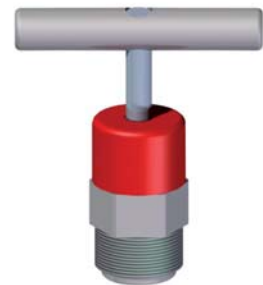
Bolted Hand Wheel Fire Safe



OS & Y Fire Safe



Screwed Fire Safe



Screwed Non Fire Safe

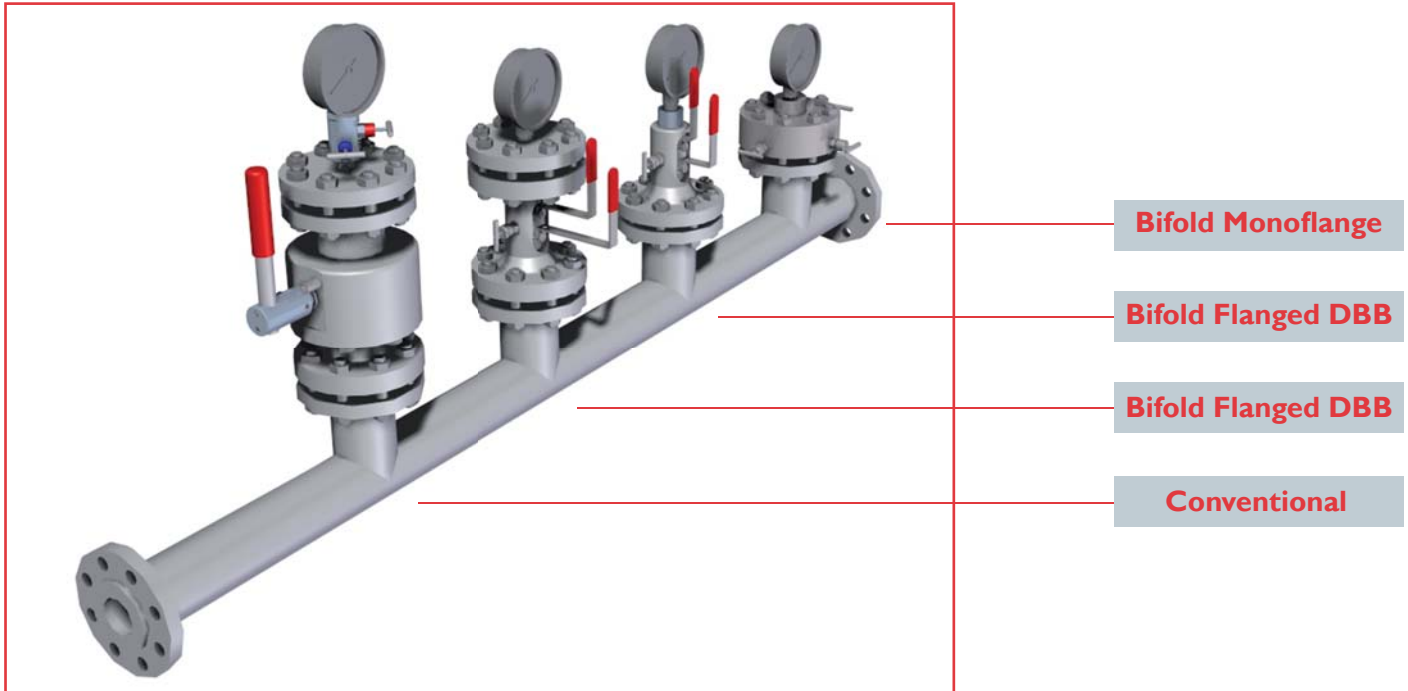


OS & Y Fire Safe Ball Valve

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.

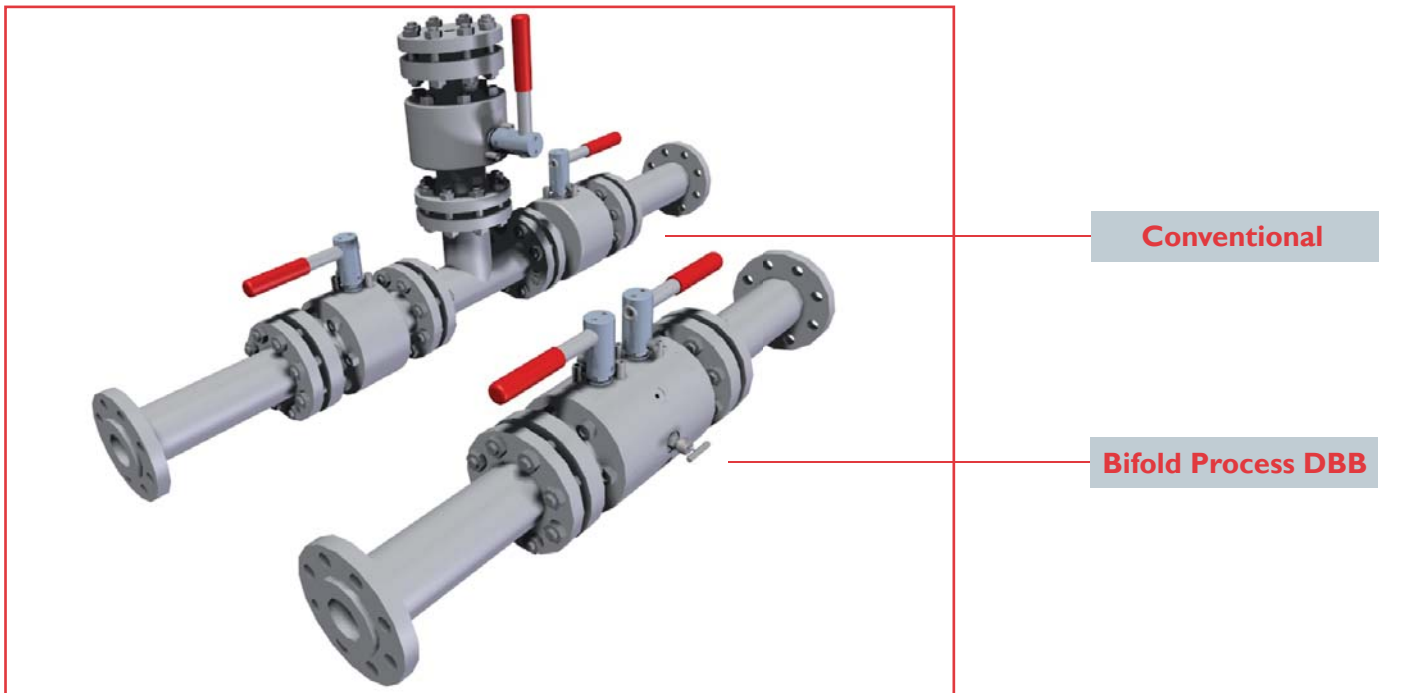


Bifold Monoflange

Bifold Flanged DBB

Bifold Flanged DBB

Conventional



Conventional

Bifold Process DBB

Архангельск (8182)63-90-72
 Астана (7172)727-132
 Астрахань (8512)99-46-04
 Барнаул (3852)73-04-60
 Белгород (4722)40-23-64
 Брянск (4832)59-03-52
 Владивосток (423)249-28-31
 Волгоград (844)278-03-48
 Вологда (8172)26-41-59
 Воронеж (473)204-51-73
 Екатеринбург (343)384-55-89
 Иваново (4932)77-34-06

Ижевск (3412)26-03-58
 Иркутск (395)279-98-46
 Казань (843)206-01-48
 Калининград (4012)72-03-81
 Калуга (4842)92-23-67
 Кемерово (3842)65-04-62
 Киров (8332)68-02-04
 Краснодар (861)203-40-90
 Красноярск (391)204-63-61
 Курск (4712)77-13-04
 Липецк (4742)52-20-81
 Киргизия (996)312-96-26-47

Магнитогорск (3519)55-03-13
 Москва (495)268-04-70
 Мурманск (8152)59-64-93
 Набережные Челны (8552)20-53-41
 Нижний Новгород (831)429-08-12
 Новокузнецк (3843)20-46-81
 Новосибирск (383)227-86-73
 Омск (3812)21-46-40
 Орел (4862)44-53-42
 Оренбург (3532)37-68-04
 Пенза (8412)22-31-16
 Казахстан (772)734-952-31

Пермь (342)205-81-47
 Ростов-на-Дону (863)308-18-15
 Рязань (4912)46-61-64
 Самара (846)206-03-16
 Санкт-Петербург (812)309-46-40
 Севастополь (8692)22-31-93
 Саратов (845)249-38-78
 Симферополь (3652)67-13-56
 Смоленск (4812)29-41-54
 Сочи (862)225-72-31
 Ставрополь (8652)20-65-13
 Таджикистан (992)427-82-92-69

Сургут (3462)77-98-35
 Тверь (4822)63-31-35
 Томск (3822)98-41-53
 Тула (4872)74-02-29
 Тюмень (3452)66-21-18
 Ульяновск (8422)24-23-59
 Уфа (347)229-48-12
 Хабаровск (4212)92-98-04
 Челябинск (351)202-03-61
 Череповец (8202)49-02-64
 Ярославль (4852)69-52-93