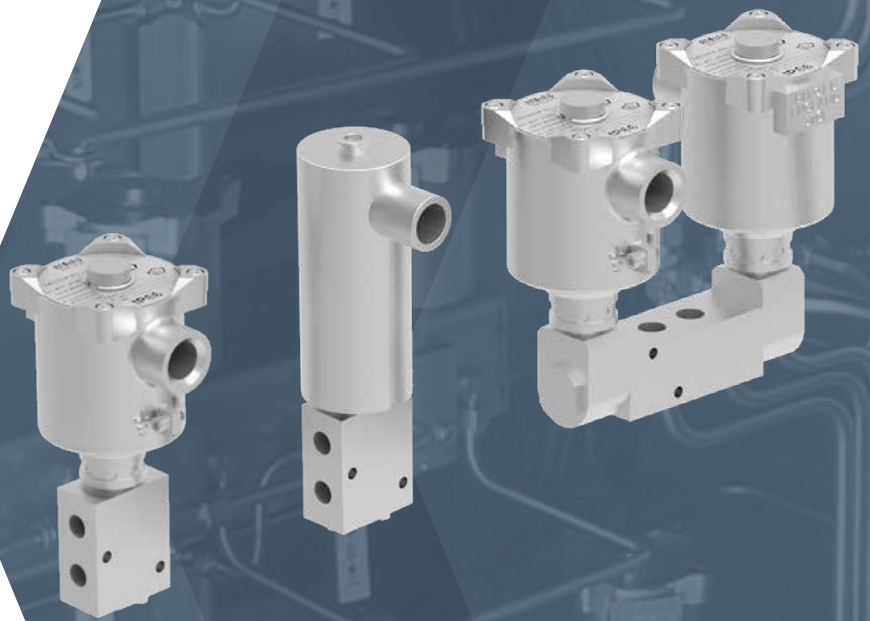


rotork[®]

Keeping the World Flowing
for Future Generations



07 Pneumatic Solenoid Valves

Direct-Acting and Indirect-Acting

Rotork pneumatic solenoid valves are used in industrial applications requiring precise control of compressed air for automation and control systems.

Rotork is a market-leading global provider of mission-critical flow control and instrumentation solutions for the industrial actuation and flow control markets. These include oil and gas, water and wastewater, power, chemical, process and industrial applications.

Customers rely on us for innovative, high quality and dependable solutions for managing the flow of liquids, gases and powders. We help customers around the world to improve efficiency, reduce emissions, minimise their environmental impact and assure safety.

Our reliability record is second to none. Our products are designed with safety and performance at their core and are put through vigorous testing and certified to international standards. Our products are certified for use in the world's most dangerous and hazardous areas.

Partnering with us provides the following:

- Assured safety and reliability
- Industry leading accuracy and efficiency
- Proven technology that works with all network control systems
- Product range with solutions to suit every application
- Assistance with plant planning, development and maintenance through our local support services
- We have innovative research and development centers throughout the world

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Pneumatic Direct-Acting and Indirect-Acting Solenoid Valves

FP03P, FP06P, FP10P, FP12P, BXS, SPR and PPV

Manufactured from 316L stainless steel as standard with aluminium options available, our range of pneumatic solenoid valves are ideally suited for hazardous (classified) locations and corrosive atmospheres and can also be used in low pressure hydraulic applications. Ultra low power consumption, under 1.0 W continuous power ideal for solar applications up to 12.0 W.

- Suitable for air quality to ISO 8573.1 Class 4: dirt, water and oil
- High flow – up to 11.2 Cv
- Versions available for up to 725 psi / 50 bar working pressure
- NAMUR interface available

Market Sectors

- Wellhead controls and associated field instrumentation
- Shale gas
- Process choke valve actuation
- Process skids and modules
- HVAC, fire damper actuator and fire water deluge controls
- Gas compression and turbine controls
- Process valve actuator and pipeline Emergency Shut Down (ESD) valve actuator controls



Application Example

One **source** ... one **solution**



› Outperforms all other solenoid valves in the industry

› Ultra low power consumption, under 1.0 W continuous power ideal for solar applications

› No.1 for global wellhead, process, choke, valve actuation, deluge and fire damper markets

› Low cost solution – increase safety with no downtime and no leakage, without compromising on cost

› The operator is a flat plate armature, ensuring the valve will operate in all conditions

› Capability to offer an expedited delivery service

› Wide range of operating media covered – 1/8" to 1" ports, 2/2, 3/2, 5/2, 5/3, 2 out of 3 voting and over 1.5×10^9 permutations – every application covered

› Highest qualified safety factors in the industry – worldwide Ex Hazardous Area solenoid approvals: Ex emb, Ex d, Ex ia, Explosionproof and Safe Area use, SIL 3 third party certified options available

› World leading supplier of control valves for low and high temperature applications

Equipment Design and Build

- Standard and slimline 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 the terminal block
- Widest range of override options: auto reset, spring return manual override, stayput manual override, manual latch and manual reset
- Standard solenoid valve can be mounted in any orientation to simplify installation and also due to all the components having enhanced rotational capabilities
- Coils fully encapsulated as standard
- A NAMUR interface is available on 5/2 port configuration valves. These types are supplied with multi-functional adaptor plates to permit valve orientation through 90° or conversion to a 3/2 configuration
- All internal wetted and body materials conforming to NACE MR-01-75 as standard on the FP03P, FP06P, FP10P and FP12P with options available on the BXS and SPR
- Suitable for air quality to ISO 8573.1 Class 4: dirt, water and oil
- Simple installation and operation – single enclosure with integral override options
- Low/high temperature options
- Ultra low power consumption, under 1.0 W continuous holding power, ideal for solar applications
- Compatible within our 'AXIS' valve actuator control modular systems

Commissioning and Maintenance

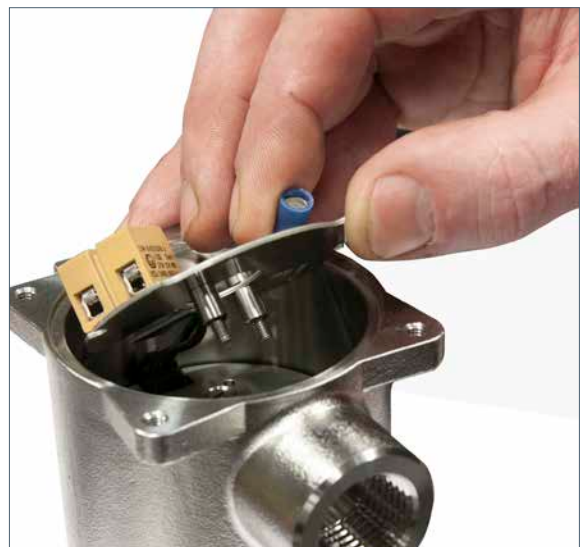
- Tropicalised solenoid operator design – 316L stainless steel enclosure with aluminium options also available; stainless steel or Remko B magnetic parts (dependant upon solenoid Ex series). Fully encapsulated coil
- Worldwide technical and field support
- Spacious solenoid enclosure for ease of wiring
- No special high temperature cable requirements
- No time penalty for heat dissipation before removing solenoid enclosure cover
- Simple maintenance – Removable transient suppression diode on Ex d DC solenoid valve assemblies as standard and removable solenoid coil without removing valve from the tubing
- Compact design and space envelope



Solenoid Valve Features and Benefits

Safety and Environmental

- Worldwide Ex hazardous area solenoid approvals: Ex emb, Ex d, Ex ia, explosionproof and safe area use
- SIL 3 capability: The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3 in accordance with IEC 61508. (For the FP03P, FP06P, FP10P, BXS and SPR)
- Consistent high safety factors
- The 77 series Ex d solenoid enclosure has been designed with 'spigot' and 'threaded' type flamepath joints. The minimum spacing requirements for obstruction of 'flange' joints— regarding the installation of the solenoid enclosure and its proximity with other objects is not applicable (in accordance with IEC/BS EN 60079-14 Explosive atmospheres: Electrical installations design, selection and erection)
- Our safe area operator option is designed for continuous duty in conformity to the EN60730 safety standards. They are encapsulated in a self-extinguishing synthetic material and offer high mechanical protection and excellent thermal dissipation
- 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 (-60 to +180 °C), function and leakage testing and data logging
- The standard solenoid operator is a flat plate armature type which ensures the valve will operate in all conditions. Other solenoid valve types using core tube design solenoid operators risk corrosion and seizure of the armature within the core tube
- Tolerant to moist air in control lines
- High tolerance to field misuse
- 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



Low Power Operator

FP06P-(10LP and 28LP)

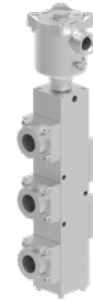
- (10LP) 1.0 W holding power 3.5 W energise (less than 100 mS)
- (28LP) 2.8 W holding power 8.0 W energise (less than 100 mS)
- High flow, low holding power
- Low power consumption
- High cycle capability up to 1 million cycles



High Flow

SPR and PPV

- Low power consumption
- High flow capabilities
- Up to 1" NPT
- Operates down to -60 °C
- High cycle capability up to 1 million cycles (PPV)



Solenoid Valve Enclosure and Valve Body Options



7x

2x

2x

5x

130
and
140

130
and
140



1



1



2



3 and 4

7x	74AT4, 77 and 78 Series	316L Stainless Steel Enclosure and Valve Body
2x	24, 27 and 28 Series	Aluminium Enclosure and 316L Stainless Steel Valve Body
		Aluminium Enclosure and Valve Body
5x	58 Series	316L Stainless Steel Enclosure and Valve Body
130	130 Series	PBT – Polybutylene Terephthalate (Reinforced Fiberglass 30%) Enclosure and 316L Stainless Steel Valve Body
		PBT – Polybutylene Terephthalate (Reinforced Fiberglass 30%) Enclosure and Aluminium Valve Body
140	140 Series	Thermoplastic Resin Enclosure and 316L Stainless Steel Valve Body
		Thermoplastic Resin Enclosure and Aluminium Valve Body

1	Standard	Standard – 24 and 74AT4 Series (Ex emb), 27 and 77 Series (Ex d) and 77 Series (Explosion Proof)
2	Slimline	28, 58 and 78 Series (Ex ia)
3	Safe Area	130 Series (Safe Area) (BXS and SPR Only)
4	Hazardous Area	140 Series (Ex ia) (BXS and SPR Only)

FP03P

model



Configuration	2/2 and 3/2		
Port Connections	NPT and BSP - 1/8" and 1/4"		
Flow Rate	0.1 Cv		
Pressure	Up to 145 psi / 10 bar		
Power	1.5 W - 3.0 W (Ex d)	1.8 W - 3.6 W (Ex emb)	370 Ohms (Ex ia) / 32 mA
Mounting	Body Ported		
Cycle Testing	Up to 1,000,000 Cycles		

FP06P

model



Configuration	2/2 and 3/2		
Port Connections	NPT and BSP - 1/4"		
Flow Rate	From 0.32 Cv, up to 1.2 Cv		
Pressure	Up to 232 psi / 16 bar		
Power	1.5 W - 6.5 W (Ex d)	1.8 W - 6.8 W (Ex emb)	135 Ohms (Ex ia) / 80 mA
Mounting	Body Ported NAMUR		
Cycle Testing	Up to 1,000,000 Cycles		

FP10P

model



Configuration	2/2 and 3/2	
Port Connections	NPT and BSP - ¼", ⅜" and ½"	
Flow Rate	From 0.4 Cv, up to 1.2 Cv	
Pressure	Up to 725 psi / 50 bar	
Power	1.5 W - 6.5 W (Ex d)	1.8 W - 6.8 W (Ex emb)
Mounting	Body Ported	
Cycle Testing	Up to 1,000,000 Cycles	

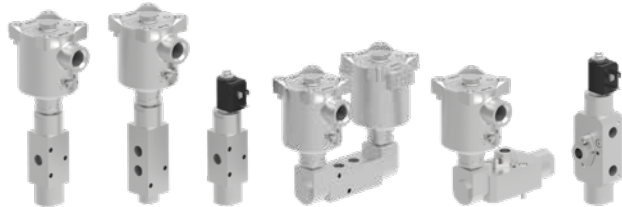
FP12P

model



Configuration	2/2 and 3/2		
Port Connections	NPT and BSP - 1/2"		
Flow Rate	2.5 Cv		
Pressure	Up to 145 psi / 10 bar		
Power	6.5 W - 12.0 W (Ex d)		
Mounting	Body Ported		
Cycle Testing	Up to 50,000 Cycles		

BXS model

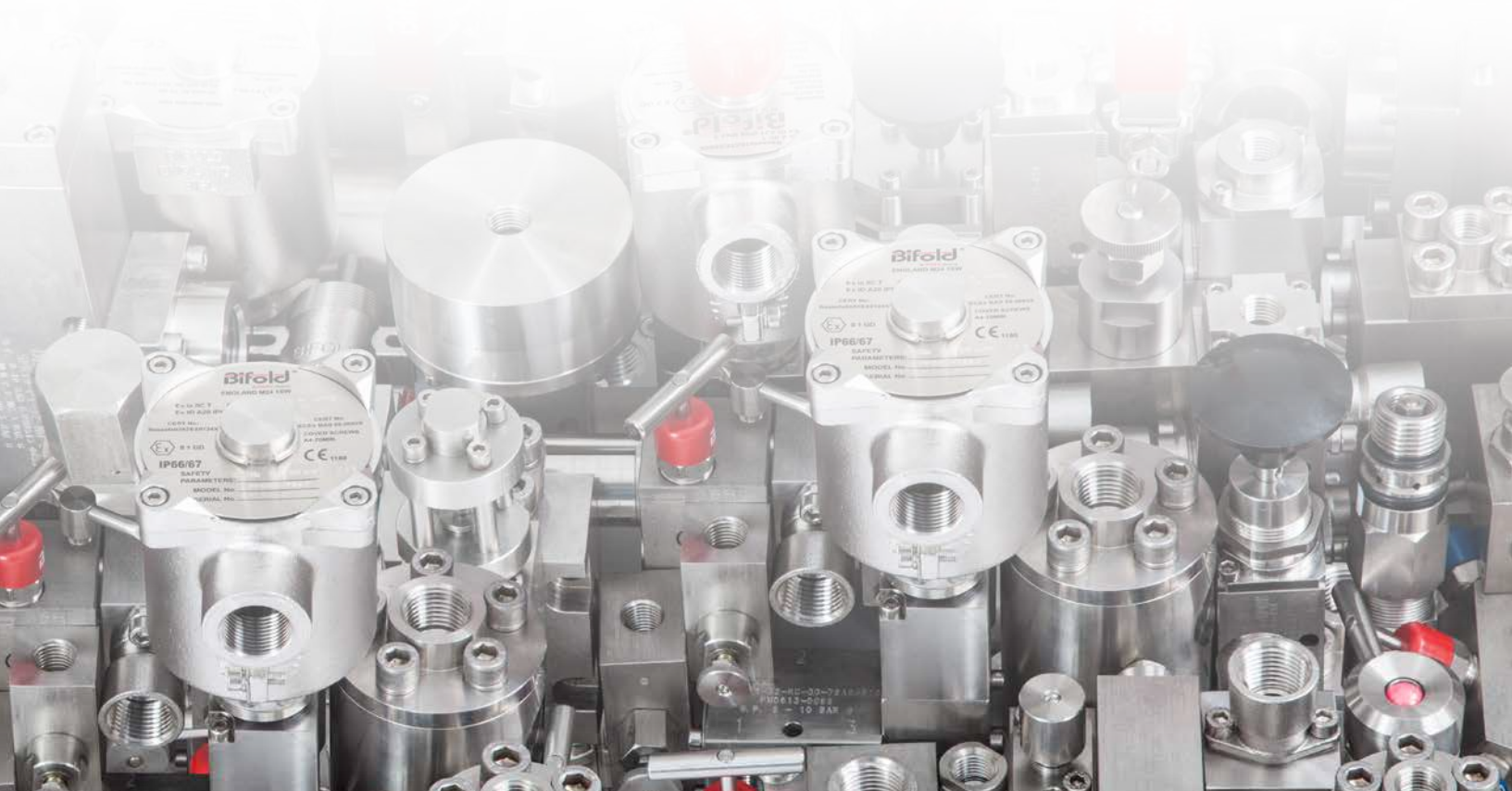


Configuration	2/2, 3/2, 5/2 and 5/3		
Port Connections	NPT and BSP - 1/4"		
Flow Rate	0.73 Cv		
Pressure	Up to 145 psi / 10 bar		
Power	0.8 W - 3.0 W (Ex d)	1.8 W (Ex emb)	260 Ohms - 45mA 370 Ohms - 32mA (Ex ia)
Mounting	Body Ported NAMUR		
Cycle Testing	Up to 1,000,000 Cycles		

SPR and PPV model



Configuration	2/2, 3/2 and 5/2		
Port Connections	NPT and BSP - 1/4" up to 1"		
Flow Rate	From 2.0 Cv, up to 11.2 Cv		
Pressure	Up to 145 psi / 10 bar		
Power	0.8 W - 3.0 W (Ex d)	1.8 W (Ex emb)	260 Ohms - 45mA 370 Ohms - 32mA (Ex ia)
Mounting	Body Ported		
Cycle Testing	Up to 20,000 Cycles (SPR)	Up to 1,000,000 Cycles (PPV)	



Technical Specifications

Standard and Slimline

Solenoid Valve Information

Model Codes	FP03P, FP06P, FP10P, FP12P, BXS and SPR									
Connections	1/8" up to 1" (NPT and BSP)									
Cv	0.1 up to 11.2									
Working Pressure	0 - 725 psi / 0 - 50 bar (Maximum)									
Enclosure Type	Standard						Slimline	Safe Area	Hazardous Area	
Enclosure Series	24	74AT4	27	77	28	78	58	130	140	
Solenoid Classification	Ex emb IIC Gb T3 / T4		Ex d IIC Gb T4 / T5 / T6		Ex ia IIC Gb T4 / T6		Ex ia IIC Ga T4 / T6	Ex ia IIC Ga T6	N/A	Ex ia IIC Ga T4 / T6
Ingress Protection	IP66, IP67 and 4X		IP66, IP67 and 4X		IP66, IP67 and 4X		IP66, IP67 and 4X	IP66	IP65	IP65
Maximum Leakage Rate	40 Pa/S Maximum (Closed) Compressed Air									

Materials of Construction

Enclosure and Valve Body	316L stainless steel as standard with aluminium options also available	
Internal Components	316L stainless steel	
Springs	302S26 and 316S42 stainless steel as standard	
Fasteners	Metric A4 18/10 grade stainless steel; equivalent to 316L grade stainless steel	
O-ring Material	NBR - Nitrile (Standard) HNBR - Nitrile (Low Temperature) FKM - Fluoroelastomer FVMQ - Fluorosilicone FFKM - Perfluoroelastomer	
	Media Temperature Range -60 to +130 °C (Dependant on seal type. Alternative elastomer's available for extreme conditions and to suit media) Ambient Temperature Range -60 to +90 °C (Dependant on Solenoid Classification)	
Operating Media	Filtered lubricated or unlubricated air, inert gas, sweet (natural) and sour gas options. Water, water glycol mixtures and mineral oil (excluding IPV operated valves)	
Conformity	All internal wetted and body materials conforming to NACE MR-01-75 as standard on the FP06P, FP10P and FP12P with options available on the BXS and SPR SIL 3 capability: The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3 in accordance with IEC 61508. (For the FP03P, FP06P, FP10P, BXS and SPR)	

Electrical Characteristics

Duty Cycle	100% continuously rated/energised	
Response Times	Pull in <100 ms, drop out <70ms	
Solenoid Insulation	Class H	
Volts	Pull-In volts 90% up to 110% nominal	Drop-out volts, typically 10 - 20% of nominal
Coil Voltage DC (=)	12 VDC up to 240 VDC	
Coil Voltage AC 50 Hz and 60 Hz (~)	24 VAC up to 240 VAC	
Cable Entry	M20 x 1.5 and 1/2" NPT	

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.

Technical Specifications

Safe Area and Hazardous Area

Safe Area Solenoid Valve Information

Enclosure Series	130
Compatible with Valve Model Codes	BXS and SPR

Materials of Construction

Enclosure and Valve Body	PBT - Polybutylene Terephthalate (Reinforced Fiberglass 30%) enclosure and 316L stainless steel valve body as standard with aluminium options also available	
Tube	Stainless Steel AISI 304	
Flange	Stainless Steel 1.4305 EN 10088 (AISI 303)	
Plunger	Stainless Steel 1.4105 EN 10088 (AISI 430F) or equivalent	
Top Stop	Stainless Steel 1.4105 EN 10088 (AISI 430F)	
Springs	Stainless Steel AISI 302	
O-ring Material	FKM – Fluoroelastomer	Media Temperature Range -10 to +130 °C
		Ambient Temperature Range -10 to +50 °C

Electrical Characteristics

Duty Cycle	100%
Coil Insulation	Class F 155 °C
Coil Voltage DC	24 VDC
Voltage Tolerance	+10% / -5%
Electrical Connection	PG9 EN 175301-803 Form B

Hazardous Area Solenoid Valve Information

Enclosure Series	140
Compatible with Valve Model Codes	BXS and SPR

Materials of Construction

Enclosure and Valve Body	Thermoplastic Resin enclosure and 316L stainless steel valve body as standard with aluminium options also available	
Tube	Brass	
Flange	Brass	
Plunger	Magnetic Steel	
Top Stop	Magnetic Steel	
O-ring Material	FKM - Fluoroelastomer	Media Temperature Range -10 to +50 °C
		Ambient Temperature Range -40 to +50 °C

Electrical Characteristics

Duty Cycle	100%
Coil Insulation	Class F 155°C
Coil Voltage DC	28 V DC
Voltage Tolerance	± 10 %
Electrical Connection	PG9 EN 175301-803 Form A

Impregnated coils for use in damp/humid environments are available on request, must be used with connector and gasket.

Direct-Acting and Indirect-Acting Schematics

Configuration	Direct-Acting Schematics		Indirect-Acting Schematics	
	2/2	3/2	2/2	3/2
Auto Reset NO (Normally Open)		*		
Manual NO (Normally Open)		*		
Auto Reset NC (Normally Closed)		*		
Manual NC (Normally Closed)		*		
Auto Reset NU (Normally Universal)				
Manual NU (Normally Universal)				

Configuration	Indirect-Acting Schematics	
	5/2	5/3
Auto Reset		
Manual		

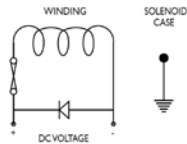
* NAMUR Mounted

The manual operator feature attached to the valve schematics in this table defines the push button/spring return manual override option, other manual options are also available – please contact Rotork

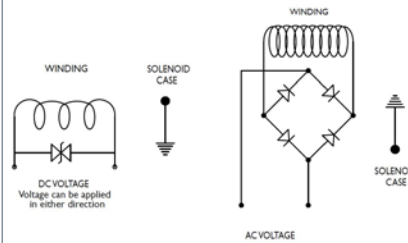
Wiring Diagrams

Standard and Slimline

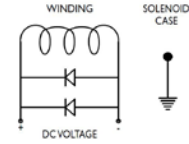
(Ex emb) – 24 and 74AT4 Series



(Ex d) – 27 and 77 Series

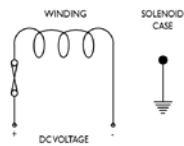


(Ex ia) – 28, 58 and 78 Series



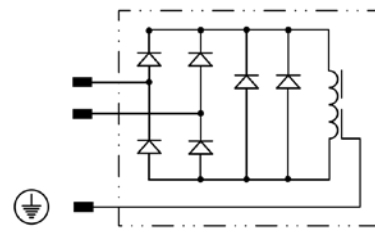
Safe Area

(Safe Area) – 130 Series



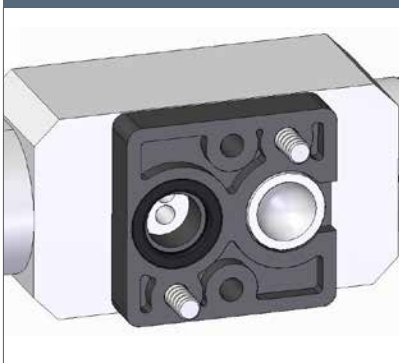
Hazardous Area

(Hazardous Area) – 140 Series

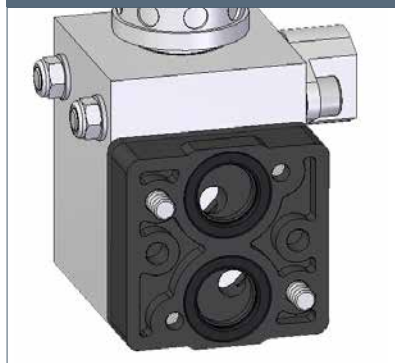


3/2 and 5/2 NAMUR Mounting Options

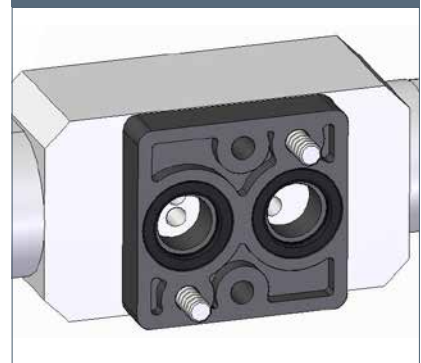
3/2 (BXS)



3/2 with 90° Rotation (FP06P)



5/2 and 5/3 (BXS)



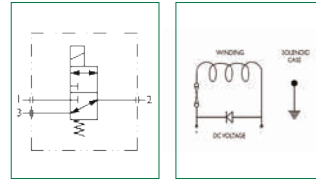
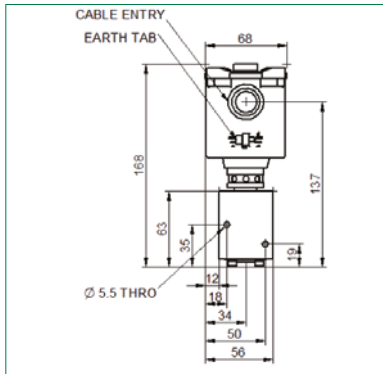
Supplied as Standard with NAMUR mounted valves

The Bifold Product Configurator can be used to configure valves to your exact specifications and automatically create a bespoke datasheet, 2D dimensional drawing and 3D CAD / Step file in real time, ready to download. Simply choose the product you would like from the products list and configure each option to your exact specification. Then simply click 'Request Documents' to download the relevant documents. To configure your product online visit www.bifold.co.uk/Product-Configurator.aspx, follow the instructions detailed on the following page or contact Bifold for products not listed.

FP06P Datasheet

rotork®

Bifold®
A rotork® Brand



FP06P-SI-04-32-NU-S-74AT4-24D-36

FP06P	Direct Acting Solenoid Valve	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	Valve Configuration
S	Nitrile -20°C to +130°C	O-ring Material
74	Ex emb	Solenoid
AT4	ATEX/IECEx Dual Certified/Labelled	Solenoid Approval
24D	24VDC	Voltage
	Auto Reset	Options
36	3.6 Watts	Power
	M20 x 1.5 Cable Entry	Cable Entry
	NPT Ports	Port Type
	No Identifier	Identifier
FP06P -SI -04 -32 -NU -S -74 AT4 -24D -36		Model Number

Protection Class

II 2 GD c Ex emb IIC Gb T3 Tamb -25°C to +55°C (powers up to 3.0W or below)
II 2 GD c Ex emb IIC Gb T4 Tamb -25°C to +50°C (powers up to 4.0W or below)
II 2 GD c Ex emb IIC Gb T3 Tamb -25°C to +45°C (powers up to 4.5W or below)
II 2 GD c Ex emb IIC Gb T3 Tamb -25°C to +40°C (powers up to 6.8W or below)

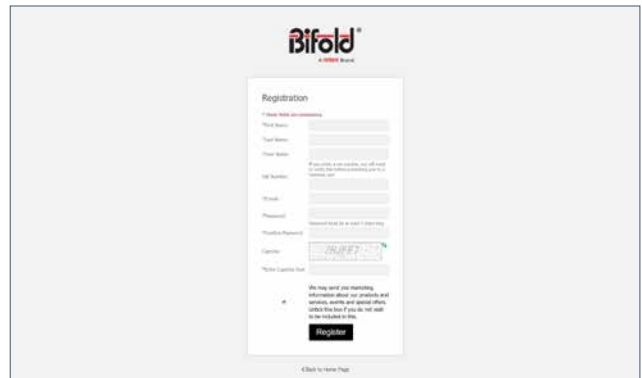
www.bifold.co.uk

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

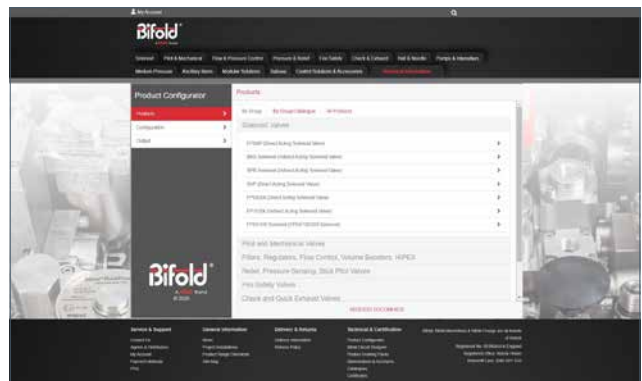
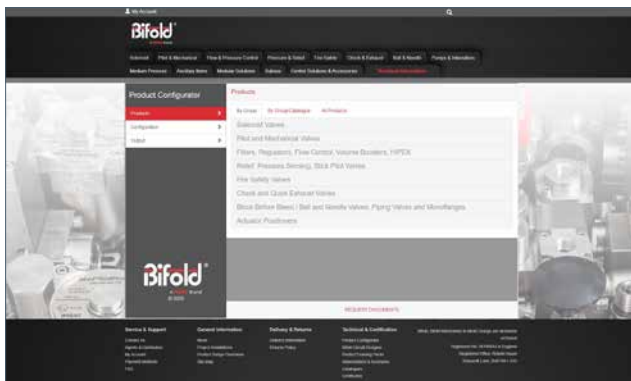
When selecting a product, the applicable operating system design must be considered to ensure safe use. The products function, material compatibility, adequate ratings, correct installation, operation and maintenance are the responsibilities of the system designer and user.

Quality Assurance
All Bifold products are manufactured to a stringent QA programme to ensure that every product will give optimum performance and reliability. We are third party certified to BS EN ISO 9001. We reserve the right to make changes to the specifications and design etc., without prior notice.

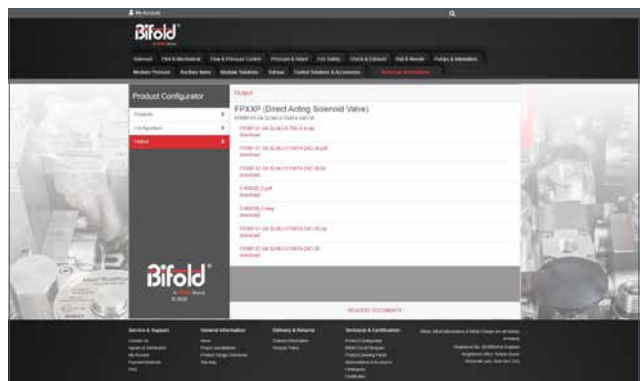
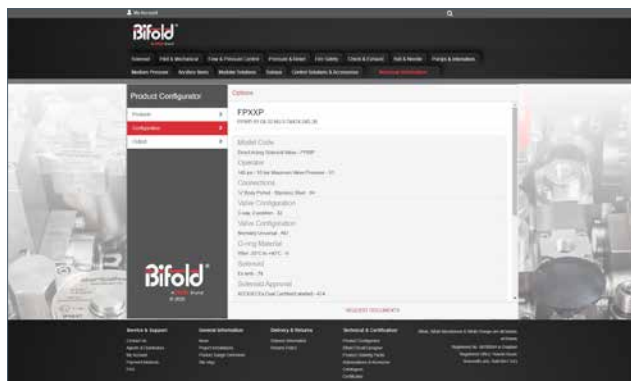
Product Configurator



1. Visit www.bifold.co.uk/Index.aspx and go to the technical information tab or the technical and certification section of the footer and click the product configurator link.
2. Register or login to enter the product configurator.



3. Simply choose and click the product range you would like from the products list.
4. Choose and click the model code you would like to configure from the products list.



5. Configure the selected product to your required specification.
6. Once you have configured the products to your exact specifications, simply click 'request documents' which will automatically create a bespoke datasheet, 2D dimensional drawing and 3D CAD / Step file in real time, ready to download.

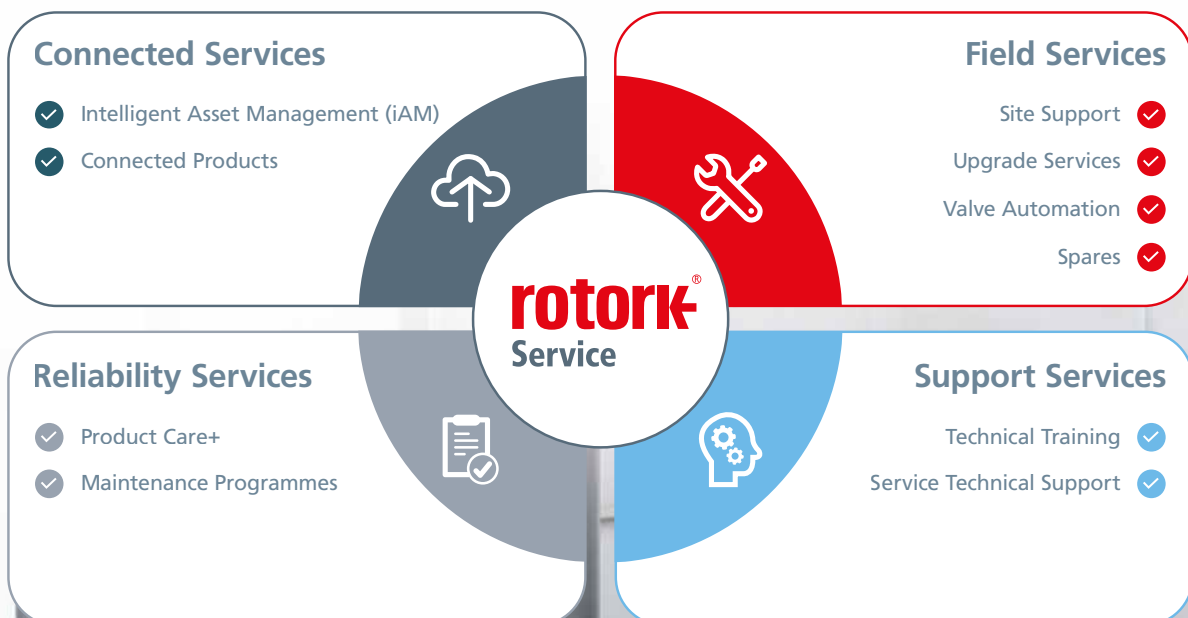
We offer specialist expertise to support mission-critical flow control and instrumentation solutions across oil and gas, water and power, and chemical, process and industrial markets.

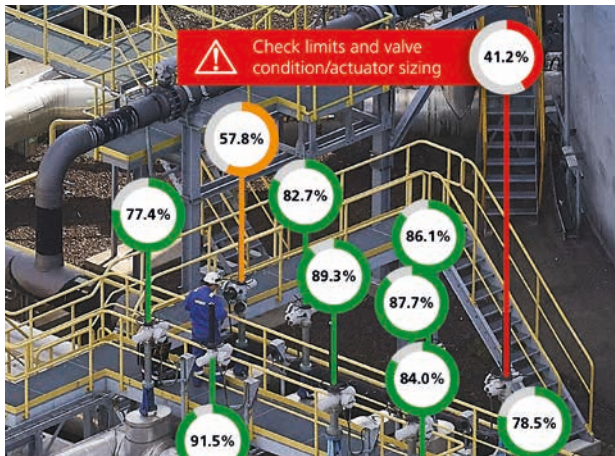
With a global presence and decades of experience, we offer services including installation, commissioning, Reliability Services, Intelligent Asset Management (iAM), product upgrades, spare parts, and overhauls.

Our engineers are highly trained, ensuring consistent, high-quality service worldwide. We operate dedicated workshops for the repair, calibration and testing of our products and only use genuine parts to guarantee top-level performance and reliability.

Our service offering covers four key areas:

- **Connected Services** including Rotork's Intelligent Asset Management (iAM) system
- **Field Services** including site support, upgrade solutions, valve automation and spares
- **Reliability Services** including health checks and product maintenance
- **Support Services** including technical training and support





Connected Services

Intelligent Asset Management (iAM) is a cloud-based system for intelligent Rotork actuators and the flow control equipment they operate. Effective asset management and maintenance are essential for maintaining site uptime.



Reliability Services

Reliability Services is a customisable approach to maintenance, with options that provide progressively increased levels of coverage and support. Our tailor-made programmes increase reliability and availability and allow customers to have flexibility about what services are most appropriate for them.



Field Services

Site Support

Benefit from our on-site support, from installation to emergency repairs.

Upgrade Solutions

Make sure your assets are prepared for the future with suitable upgrade options.

Valve Automation

Achieve precise and consistent flow control with automation of existing valves and replacement actuator/valve packages.

Spares

Maximise performance and reliability with genuine OEM spare parts.



Support Services

Technical Training

Our products and solutions are used in mission-critical applications and it is critical that any workforce is highly trained to ensure a safe and efficient plant. We provide advanced technical training from our strategically located facilities around the world.

Technical Support

We provide expert technical support exactly when you need it – trusted by global industries for over 60 years. Our technical experts draw on decades of our experience to provide you with the right answers and solutions.



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