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Keeping the World Flowing
for Future Generations

09

Solenoid Valves

Gaseous

Bifold®
A rotork Brand

09 Solenoid Valves Gaseous

Contents

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SECTION		MEDIA	PRODUCT RANGES	PRESSURE (up to)	FLOW RATE (up to)
07 - 10 Solenoid Valves	09	Gaseous	Direct Acting & Indirect Acting Solenoid Valves, FP02G, FP05G & FP15G	210 bar	0.32 Cv

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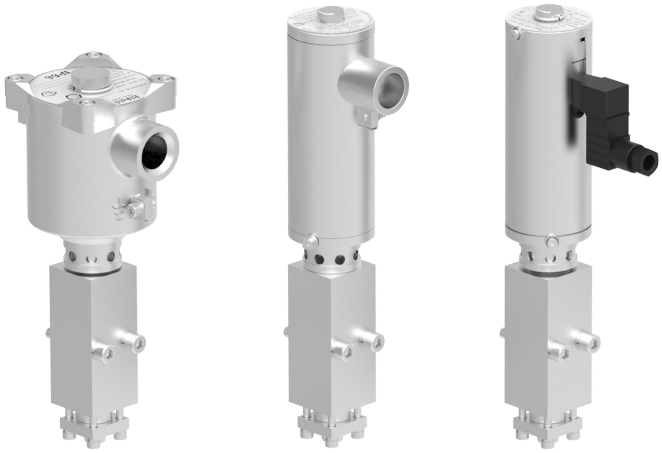
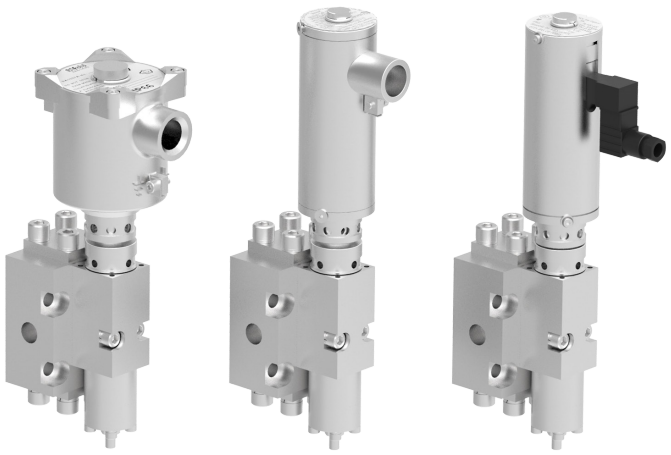
Direct Acting Solenoid Valve Range



Model Code	**FP02G & FP05G**		
Configuration	2/2 & 3/2		
Port Connections	NPT & BSP - ¼"		
Flow Rate	From 0.04 Cv, up to 0.2 Cv		
Pressure	Up to 3,045 psi / 210 bar		
Power	1.0 W - 10.0 W (Ex d)	6.8 W (Ex emb)	135 Ohms (Ex ia) / 80 mA
Mounting	Body Ported Sub-Base Mount ┐ (Multiple Options Available, Please Contact Bifold for Further Information)		

Indirect Acting Solenoid Valve Range



Model Code	**FP15G**		
Configuration	2/2 & 3/2		
Port Connections	NPT & BSP - ¼" & ⅜"		
Flow Rate	From 0.15 Cv, up to 0.32 Cv		
Pressure	Up to 3,045 psi / 210 bar		
Power	1.0 W - 10.0 W (Ex d)	6.8 W (Ex emb)	135 Ohms (Ex ia) / 80 mA
Mounting	Body Ported Sub-Base Mount ┐ (Multiple Options Available, Please Contact Bifold for Further Information)		

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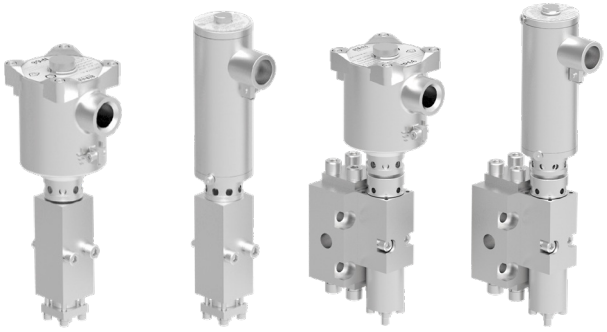
Product Spotlight



- SIL 2 & 3 certified
- Cycle tested up to 20,000 cycles
- Certified for hazardous (classified) locations and corrosive atmospheres
- Seated ball design offers extremely low leakage
- Block before bleed (two stage valves)

Solenoid Valve Enclosure & Valve Body Options

⑦x	74AT4 & 77 Series	316L Stainless Steel Enclosure and Valve Body
②x	24 & 27 Series	Aluminium Enclosure and 316L Stainless Steel Valve Body
⑤x	57 & 58 Series	Carbon Steel Enclosure with 316L Stainless Steel Over Sleeve and 316L Stainless Steel Valve Body
③x ⑥x	38, 67 & 68 Series	Carbon Steel Plated Enclosure and 316L Stainless Steel Valve Body

①	Standard	24 & 74AT4 Series (Ex emb), 27 & 77 Series (Ex d) & 77 Series (Explosion Proof)
②	Slimline	57 & 67 Series (Ex d)
③		38, 58 & 68 Series (Ex ia)

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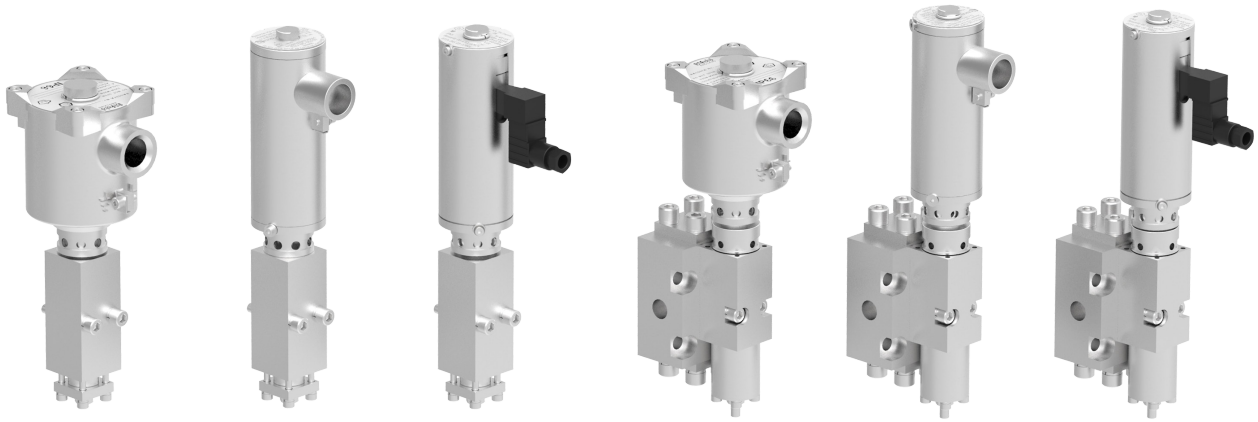
One Source..... One Solution



SETTING THE STANDARD:

100% Outperforms all other solenoid valves in the industry.

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

£$€ Low Cost Solution - Increase safety with no downtime and no leakage, without compromising on cost.

Fully configurable ranges in 316L stainless steel, carbon steel and aluminium.

Capability to offer an expedited delivery service.

Highest qualified safety factors in the industry - Worldwide Ex Hazardous Area solenoid approvals: Ex emb, Ex d, Ex ia, Explosion Proof & Safe Area use, SIL 3 third party certified options available.

Quickest technical response with worldwide service and support for peace of mind.

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

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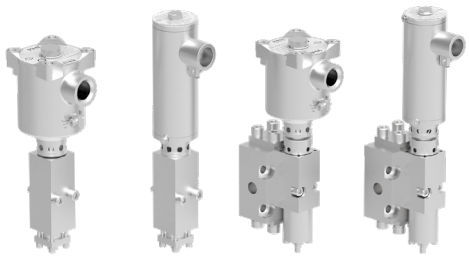
09 Solenoid Valves Gaseous

Overview

Direct Acting & Indirect Acting Solenoid Valves, FP02G, FP05G & FP15G



Manufactured from 316L stainless steel as standard, with aluminium & carbon steel options available, our range of gaseous solenoid valves are ideally suited for the safety and control of gas for shut-off in gas feed pipelines and gas over oil applications. Ultra low power consumption, 1.0 W continuous power ideal for solar applications up to 10.0 W.

- Suitable for air quality to ISO 8573.1 Class 4: dirt, water and oil
- High flow - up to 0.32 Cv
- Working pressure up to 3,045 psi / 210 bar

Market Sectors

- Shale Gas
- Process Skids & Modules
- HVAC, Fire Damper Actuator & Fire Water Deluge Controls
- Gas Compression & Turbine Controls
- Process Hook-up & Process Instrument Isolation

Application Example

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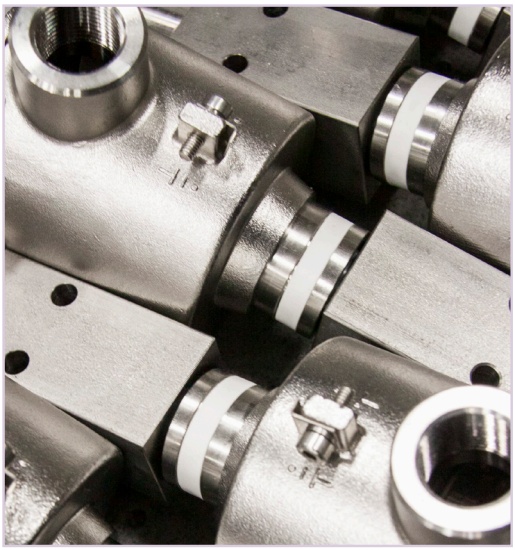
Standard & Slimline Solenoid Valve Features & Benefits



Equipment Design & 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, stayput manual override, manual push button override 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.
- PEEK plunger / seat design offers extremely low leakage and exotic material seat for chemical and high cycle life applications.
- All internal wetted and body materials conforming to NACE MR-01-75 (option).
- Suitable for filtered lubricated or unlubricated air, inert gas, sweet (natural) gas. For other gas services, alternative elastomer's are available.
- Simple installation and operation - single enclosure with integral override options.
- Low / high temperature options.
- Ultra low power consumption, 1.0 W continuous holding power, ideal for solar applications.
- Compatible within our valve assembly modular systems.

Commissioning & Maintenance

- Tropicalised solenoid operator design - 316L stainless steel as standard with aluminium and carbon steel options also available. Further mild steel valve mount options can be selected; stainless steel or Remko B magnetic parts (dependant upon solenoid Ex type). 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.

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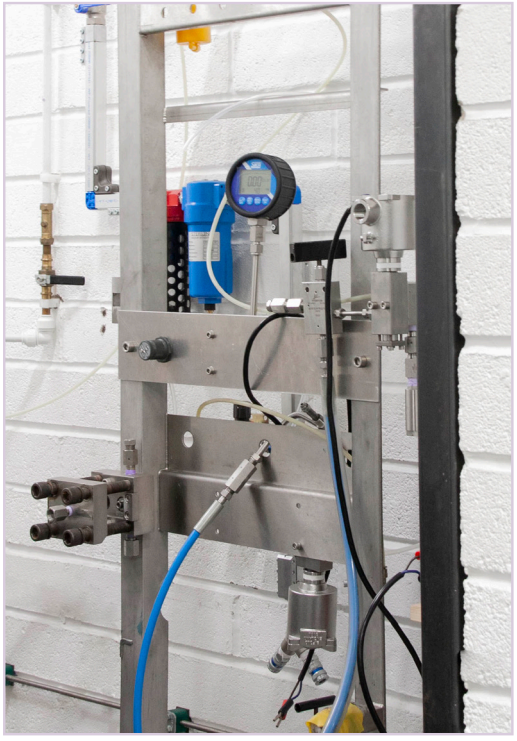
Standard & Slimline Solenoid Valve Features & Benefits



Safety & Environmental

- Worldwide Ex solenoid approvals Ex emb, Ex d, Ex ia & explosion proof.
- SIL 3 capability: The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3 in accordance with IEC 61508. (For the FP02G & FP05G).
- 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).
- 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 (-46°C 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.

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Standard & Slimline Solenoid Valve Technical Attributes

Solenoid Valve Information									
Model Codes	FP02G, FP05G & FP15G								
Connections	¼" up to ⅜" (NPT, BSP & via Sub-Base Mount)								
Cv	0.04 up to 0.32								
Working Pressure	3,045 psi / 210 bar (Maximum)								
Enclosure Type	Standard				Slimline				
Enclosure Series	24	74AT4	27	77	57	67	38	58	68
Solenoid Classification	Ex emb IIC Gb T3 / T4		Ex d IIC Gb T4 / T5 / T6		Ex d IIB Gb T80°C - T130°C		Ex ia IIC Ga T6		
Ingress Protection	IP66, IP67 and 4X		IP66, IP67 and 4X		IP66		IP66		
Maximum Leakage Rate	<2 bubbles per minute (Nitrogen)								

Materials of Construction		
Enclosure & Valve Body	316L stainless steel as standard with aluminium and carbon steel options also available	
Internal Components	316L stainless steel, AISI 440C, CA104 aluminium bronze, ceramic and PEEK	
Springs	302S26 & 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** Up to -20°C to +130°C (Dependant on seal type. Alternative elastomer's available for extreme conditions and to suit media) **Ambient Temperature Range** Up to -20°C to +90°C (Dependant on Solenoid Classification) Up to -46°C (Selected Arctic Service Models)
Operating Media	Filtered lubricated or unlubricated air, inert gas, sweet (natural) gas - please contact Bifold for other gas service media available	
Conformity	All internal wetted and body materials conforming to NACE MR-01-75 (option) SIL 3 capability: The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3 in accordance with IEC 61508. (For the FP02G & FP05G)	

Electrical Characteristics		
Duty cycle	100% continuously rated / energised	
Response Times	Pull in <100ms, 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 V DC up to 240 V DC	
Coil Voltage AC 50Hz and 60Hz (~)	24 V AC up to 240 V AC	
Cable Entry	M20 x 1.5, ½" NPT and Din 43650 Connector (38 Series (Ex ia))	

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.

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Standard & Slimline Solenoid Valve Technical Attributes

Enclosure	
Certification	 (Please contact bifold for available certification)
Protection Class (Ex emb) - 24 & 74AT4 Series	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)
Protection Class (Ex d) - 27, 57, 67 & 77 Series	27 & 77 - II 2 GD Ex db IIC Gb T6 (Tamb -60°C to +40°C) II 2 GD Ex db IIC Gb T5 (Tamb -60°C to +55°C) II 2 GD Ex db IIC Gb T4 (Tamb -60°C to +90°C) 57 & 67 - II 2 GD Ex d IIB Ex tD A21 IP66 T80°C (Tamb -40°C to +40°C)
Power	24 & 74 (Ex emb) - up to 6.8 Watts 27, 57, 67 & 77 (Ex d) - up to 10.0 Watts 77 (Ex d) - (90L) 9.0 W magnetically latched lower coil (115U) 11.5W magnetically de-latched upper coil 77 (Ex d) - (10LP)* 1.0W holding power 3.5W energise and (28LP)* 2.8W holding power 8.0W energise (Only available with selected models)
Protection Class (Ex ia) - 38, 58 & 68 Series	38 - II 1 G Ex ia IIC Ga T6 (-60°C ≤ Ta ≤ +60°C) 58 - II 1 GD Ex ia IIC Ga T6 (Tamb = -60°C to +60°C) 68 - II 1 GD Ex ia IIC Ga T6 (Tamb = -60°C to +60°C)
Resistance (Ω) and (Ex ia) - Safety Parameters	38, 58 & 68 - (Ex ia) - 135 Ohms **Safety Parameters: 38, 58 & 68 Series** Ui = 35 Vdc, Ii = 600mA, Pi = 3 W, Ci ≈ 0 µF, Li ≈ 0 mH Coil Resistance : 135 Ohm ± 5% Minimum Current Required @ solenoid coil = 80 mA
Terminal Block (FP Operator)	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
Repair Kit	For solenoid operator specific RK (Repair Kits), please contact Bifold sales department
Seal Repair Kit	For solenoid operator specific SK (Seal Kits), please contact Bifold sales department
Coil Repair Kit	For solenoid operator specific CRK (Coil Repair Kits), please contact Bifold sales department

* Low power

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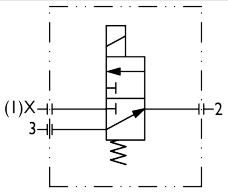
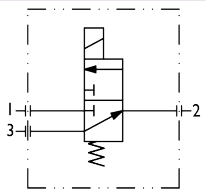
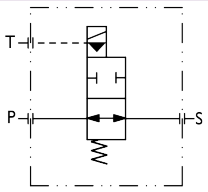
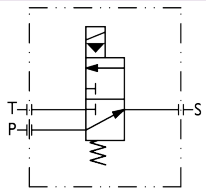
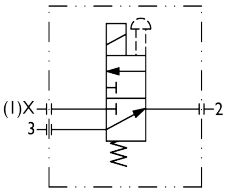
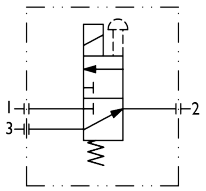
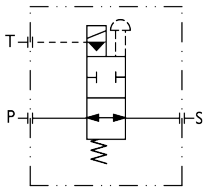
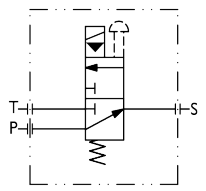
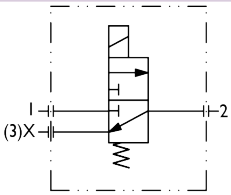
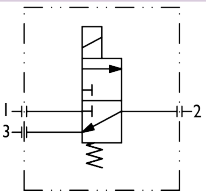
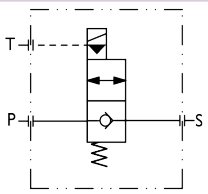
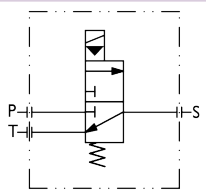
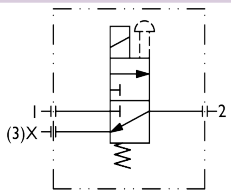
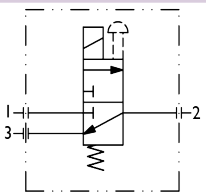
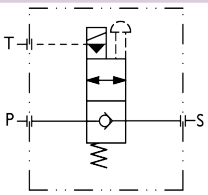
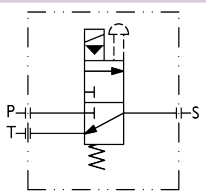
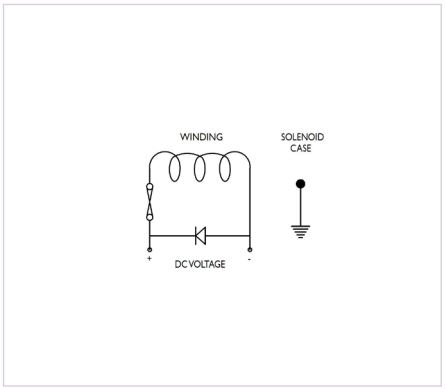
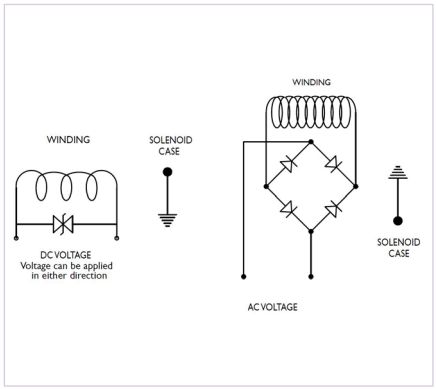
Direct Acting & Indirect Acting Schematics

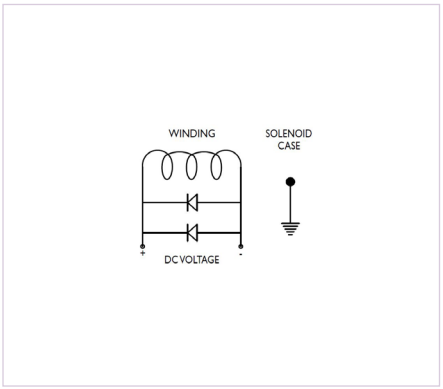
Configuration	Direct Acting Schematics		Indirect Acting Schematics	
	2/2	3/2	2/2	3/2
Auto Reset NO (Normally Open)				
Manual NO (Normally Open)				
Auto Reset NC (Normally Closed)				
Manual NC (Normally Closed)				

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 Bifold

Standard & Slimline Wiring Diagrams







- (Ex emb) - 24 & 74AT4 Series
- (Ex d) - (Ex d) - 27, 57, 67 & 77 Series
- (Ex ia) - 38, 58 & 68 Series

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Configurable Datasheet

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 page 13 or contact Bifold for products not listed.

FP02G Datasheet

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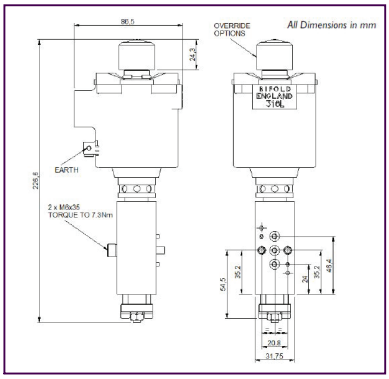

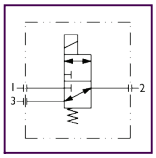

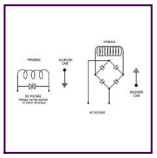

FP02G/S1/M/32/NC/V/77A-24D/65

FP02G	2 litre per minute - Gas Service	**Model Code**
S1	Direct Acting, Spring Return, 150bar	**Max Valve Pressure**
M	Subbase mounting	**Connections**
32	3 way, 2 position	**Valve Configuration**
NC	Normally Closed	**Valve Configuration**
V	Viton -20°C to +180°C	**O-ring Material**
77	Ex d	**Solenoid**
A	ATEX/IECEx Dual Certified	**Solenoid Approval**
24D	24VDC	**Voltage/Resistance**
	Auto Reset	**Override Options**
65	6.5 Watts	**Power**
	M20 x 1.5 Cable Entry	**Cable Entry**
	Standard	**Option**
	No Manifold	**Manifold Option**
FP02G /S1 /M /32 /NC /V /77 A -24D /65		**Model Number**

Protection Class

II 2 GD Ex db IIC Gb T6 (Tamb -60°C to +40°C)
II 2 GD Ex db IIC Gb T5 (Tamb -60°C to +55°C)
II 2 GD Ex db IIC Gb T4 (Tamb -60°C to +90°C)

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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.

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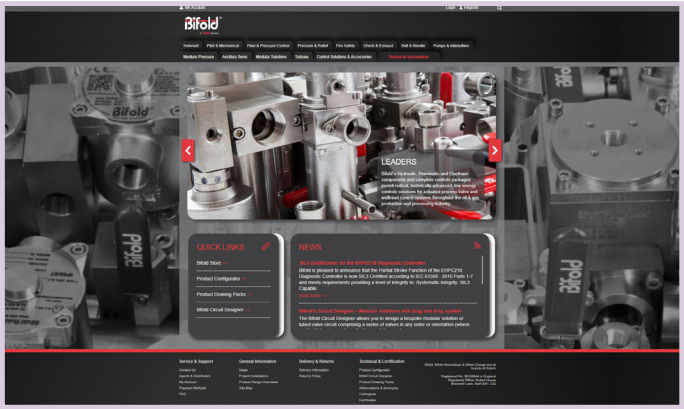
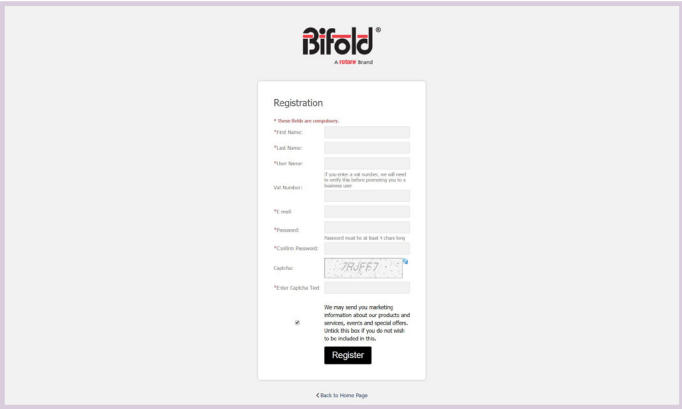
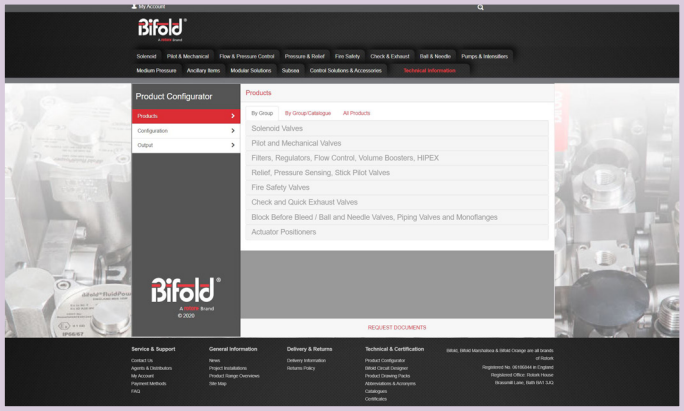
Product Configurator



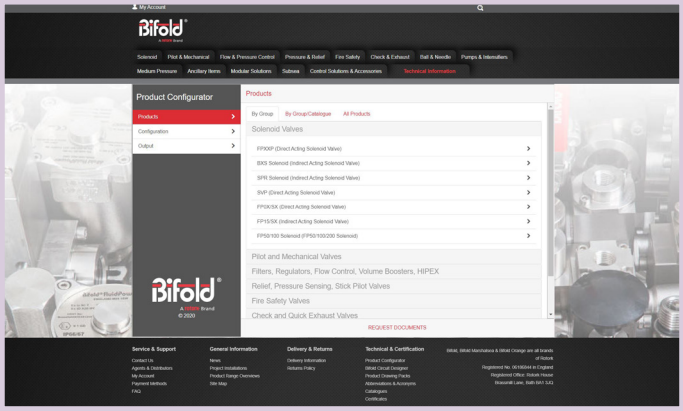
- **1.** Visit www.bifold.co.uk/Index.aspx and go to the technical information tab or the technical & certification section of the footer and click the product configurator link.



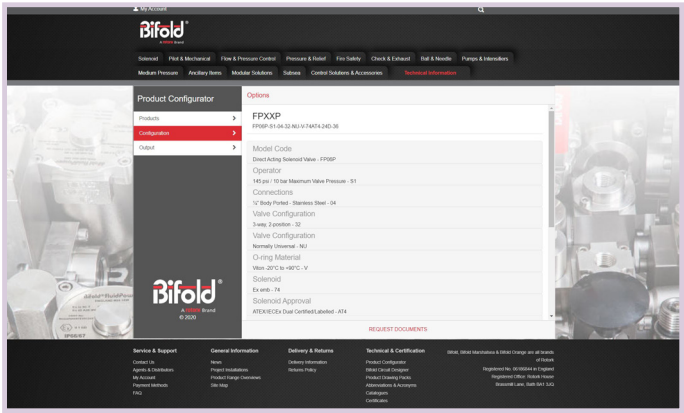
- **2.** Register or login to enter the product configurator.



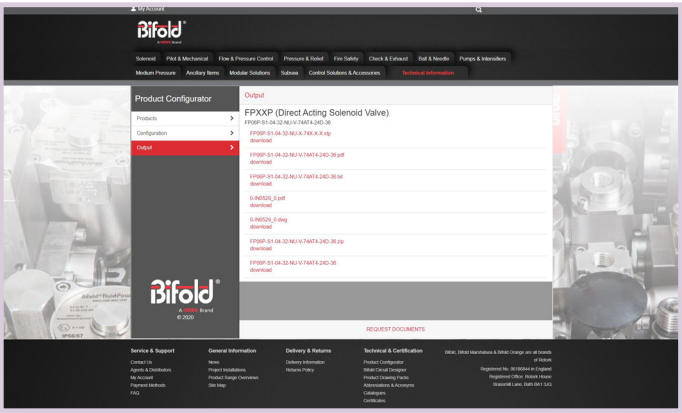
- **3.** Simply choose and click the product range you would like from the products list.



- **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.

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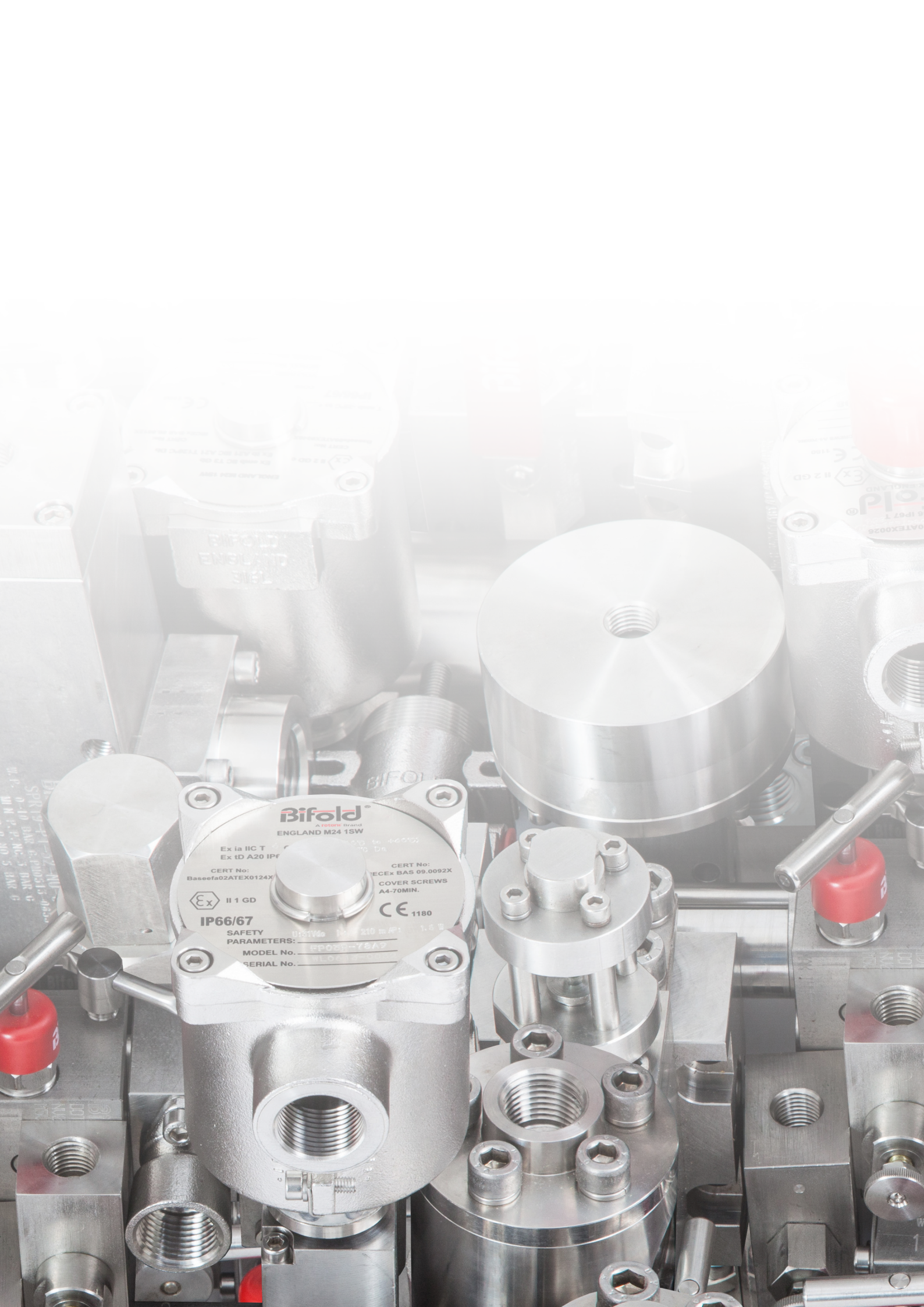
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We take care to ensure that product information in this catalogue is reasonably accurate and up-to-date. However, our products are continually developed and updated so to ensure accurate and up-to-date information please refer to the product catalogue 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.

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