









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



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

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

## Features & Benefits

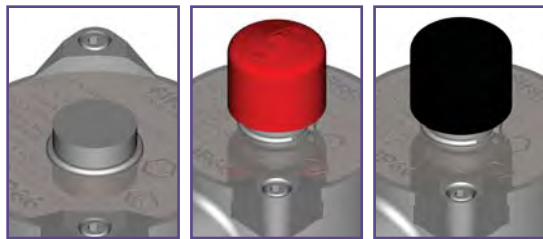
### Worldwide Approvals



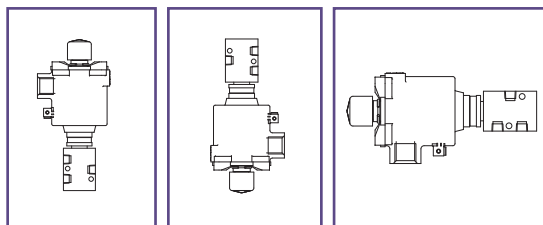
### Solenoid Operator is Free to Rotate 360°



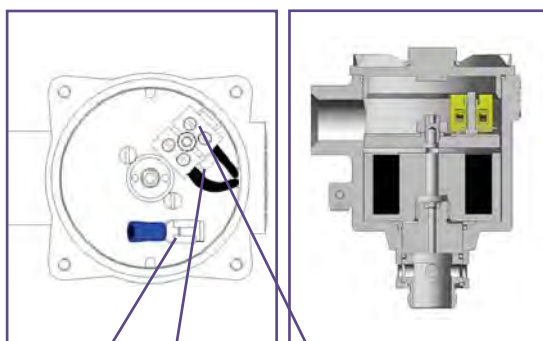
### Widest Range of Override Options



### Valve can be Mounted in any Orientation



### Spacious Enclosure for Ease of Wiring



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

### Standard Solenoid Operator Equipment Design & Build

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

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

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

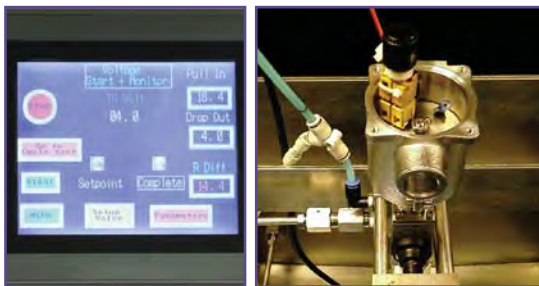
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## Features & Benefits

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



### State of the Art Testing



### Simple Maintenance


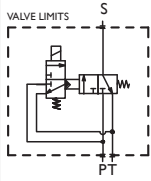

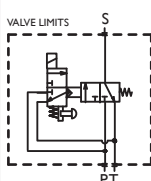

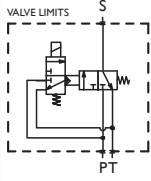

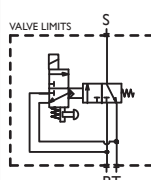


### Safety and Environmental Benefits

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

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


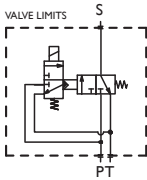

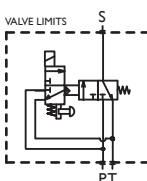
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Preferred Range

INDIRECT ACTING SOLENOID VALVES - PREFERRED RANGE


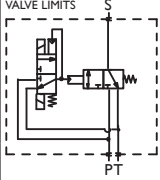

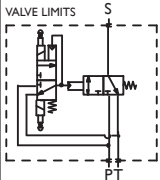

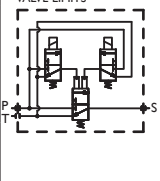

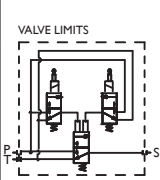
Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>FP15</b> S3</p>		17	<b>FP15/S3/04/32/S/74AT4-24D/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6 Watt, Cv 0.32,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

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Solenoid Valves



INDIRECT ACTING SOLENOID VALVES

Product	Schematic Representation	Page Number	Product Code	Product Description
 <p><b>FP15</b> S1 / S1, S2 / S2 &amp; S3 / S3</p>		18	<b>FP15/S1/S1/04/32/SI/74AT4-24D/SB/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, dual pulse operated, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6Watt, Cv 0.32, 345 bar.
			<b>FP15/S2/S2/04/32/SI/77A-24D/SB/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, dual pulse operated, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.32, 517 bar.
			<b>FP15/S3/S3/04/32/SI/78A-155/SB</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting dual pulse operated, Normally Closed, Auto Reset. ATEX II I GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.32, 690 bar.
 <p><b>FP15</b> S1 / S1, S2 / S2 &amp; S3 / S3 Manual Override Spring Return</p>		18	<b>FP15/S1/S1/04/32/SI/74AT4-24D/SB/M/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, dual pulse operated, Normally Closed, 24Vdc, *Manual override. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6Watt, Cv 0.32, 345 bar.
			<b>FP15/S2/S2/04/32/SI/77A-24D/SB/M/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, dual pulse operated, Normally Closed, 24Vdc, *Manual override. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.32, 517 bar.
			<b>FP15/S3/S3/04/32/SI/78A-155/SB/M</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting dual pulse operated, Normally Closed, *Manual override. ATEX II I GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.32, 690 bar.
 <p><b>FP15</b> DPSS1, DPSS2 &amp; DPSS3</p>		19	<b>FP15/DPSS1/04/32/SI/74AT4-24D/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6Watt, Cv 0.32, 345 bar.
			<b>FP15/DPSS2/04/32/SI/77A-24D/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, Auto Reset. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.32, 517 bar.
			<b>FP15/DPSS3/04/32/SI/78A-155</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, Auto Reset. ATEX II I GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.32, 690 bar.
 <p><b>FP15</b> DPSS1, DPSS2 &amp; DPSS3 Manual Override Spring Return</p>		19	<b>FP15/DPSS1/04/32/SI/74AT4-24D/M/36</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, *Manual override. ATEX II 2 GD c, Ex emb IIC T4 Gb IECEx Ex emb IIC T4 Gb 3.6Watt, Cv 0.32, 345 bar.
			<b>FP15/DPSS2/04/32/SI/77A-24D/M/30</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, 24Vdc, *Manual override. ATEX II 2 GD, Ex d IIC T6 IECEx Ex d IIC T6 3.0 Watt, Cv 0.32, 517 bar.
			<b>FP15/DPSS3/04/32/SI/78A-155/M</b>	1/4" NPT Ports, 3 way 2 position, Indirect Acting, Normally Closed, *Manual override. ATEX II I GD, Ex ia IIC T6 Ga † IECEx Ex ia IIC T6 Ga 155 Ohms, Cv 0.32, 690 bar.

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

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

FP15 - DPSS1, DPSS2 & DPSS3

For the complete DPSS1, DPSS2 & DPSS3 range, please see the selection chart on Page 19.

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 \* Manual Override Spring Return.

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Solenoid Valves

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

**FP15 - S4 & S5**

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

**FP15 - S6**

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

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

## Overview

### Materials of Construction

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

### Technical Data

#### Operating Performance for FP15

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

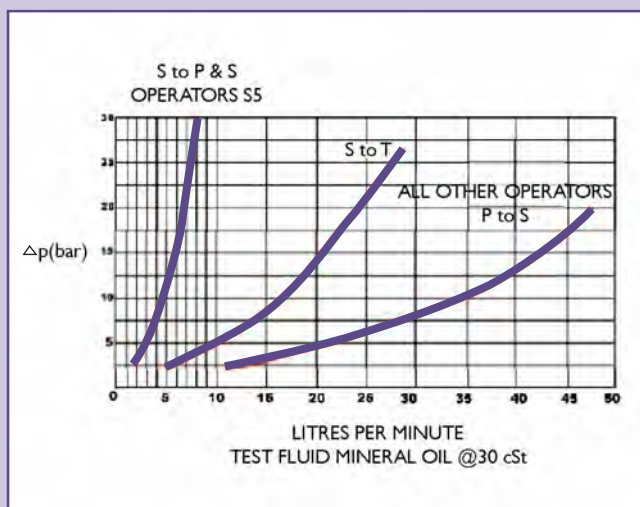
### Product Options

Certification & Approval options available

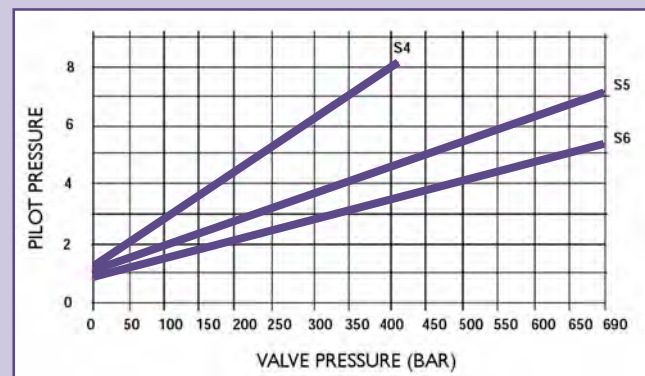


SIL 3 capability: The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3 in accordance with IEC 61508.  
 Solenoid valve assemblies can be mounted in any orientation. Solenoid enclosure can be rotated relative to the pilot stage valve body to suit cable entry.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

### Flow Performance



### Pilot Pressures



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



## Certification Details

### Certification & Approval Details

#### Type 74 Solenoid



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



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

Dual Labelled/Marked

#### Type 77 Solenoid



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



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

Dual Labelled/Marked

#### Type 78 Solenoid



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



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

Dual Labelled/Marked

#### Type 77 Solenoid



CSA (US), Certificate Number 1398692.  
 Class I, Division I, Groups B, C & D for both  
 Canada & USA.



Ex d IIC for Canada, AEx d IIC for USA.  
 T85°C -60°C to +40°C ambient.  
 T100°C -60°C to +55°C ambient.  
 T135°C -60°C to +90°C ambient.

#### Type 77 Solenoid



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

Dual Labelled/Marked

#### Type 77 Solenoid



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

#### Type 78 Solenoid



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

#### Type 77 Solenoid



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

#### Type 78 Solenoid



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

#### Type 77 & 78 Solenoid



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

### Label Rationalisation

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

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

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

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

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

## Port Connections

### Port Connections (FP15)

**PORT CONNECTIONS TABLE**

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

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

## Product Weights

### Approximate Standard Product Weights

**PRODUCT WEIGHTS**

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

## Seal Repair Kit

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

FP15	Model Code																								
<table border="1"> <tr> <td>S1</td> <td>345 bar</td> <td>DPSS1</td> <td>345 bar</td> </tr> <tr> <td>S2</td> <td>517 bar</td> <td>DPSS2</td> <td>517 bar</td> </tr> <tr> <td>S3</td> <td>690 bar</td> <td>DPSS3</td> <td>690 bar</td> </tr> <tr> <td>S1 / S1</td> <td>345 bar</td> <td>S4</td> <td>414 bar</td> </tr> <tr> <td>S2 / S2</td> <td>517 bar</td> <td>S5</td> <td>690 bar</td> </tr> <tr> <td>S3 / S3</td> <td>690 bar</td> <td>S6</td> <td>690 bar</td> </tr> </table>	S1	345 bar	DPSS1	345 bar	S2	517 bar	DPSS2	517 bar	S3	690 bar	DPSS3	690 bar	S1 / S1	345 bar	S4	414 bar	S2 / S2	517 bar	S5	690 bar	S3 / S3	690 bar	S6	690 bar	Maximum Valve Pressure
S1	345 bar	DPSS1	345 bar																						
S2	517 bar	DPSS2	517 bar																						
S3	690 bar	DPSS3	690 bar																						
S1 / S1	345 bar	S4	414 bar																						
S2 / S2	517 bar	S5	690 bar																						
S3 / S3	690 bar	S6	690 bar																						
<table border="1"> <tr> <td>22</td> <td>2 way, 2 - position</td> <td rowspan="2">Valve Configuration</td> </tr> <tr> <td>32</td> <td>3 way, 2 - position</td> </tr> </table>	22	2 way, 2 - position	Valve Configuration	32	3 way, 2 - position																				
22	2 way, 2 - position	Valve Configuration																							
32	3 way, 2 - position																								
<table border="1"> <tr> <td>S</td> <td>Nitrile (standard)</td> <td rowspan="3">O-ring Material</td> </tr> <tr> <td>V</td> <td>Viton</td> </tr> <tr> <td>SA</td> <td>Nitrile (Low Temperature)</td> </tr> </table>	S	Nitrile (standard)	O-ring Material	V	Viton	SA	Nitrile (Low Temperature)																		
S	Nitrile (standard)	O-ring Material																							
V	Viton																								
SA	Nitrile (Low Temperature)																								
RK	Repair Kit	Repair Kit																							
<b>FP15-SX-32-SRK</b>	<b>Ordering Example</b>																								

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

## Solenoid Coil Spare

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

109	Coil Type							
<table border="1"> <tr> <td>XXX Voltage (V)</td> <td>74 (Ex emb) 24 &amp; 48 Vdc</td> <td rowspan="3">Voltage</td> </tr> <tr> <td></td> <td>77 (Ex d) 12, 24, 48 &amp; 110 Vdc</td> </tr> <tr> <td></td> <td>77 (Ex d) 110 &amp; 240 Vac</td> </tr> </table>	XXX Voltage (V)	74 (Ex emb) 24 & 48 Vdc	Voltage		77 (Ex d) 12, 24, 48 & 110 Vdc		77 (Ex d) 110 & 240 Vac	
XXX Voltage (V)	74 (Ex emb) 24 & 48 Vdc	Voltage						
	77 (Ex d) 12, 24, 48 & 110 Vdc							
	77 (Ex d) 110 & 240 Vac							
<table border="1"> <tr> <td>XX Power (W)</td> <td>74 (Ex emb) 1.8 &amp; 3.6Watts</td> <td rowspan="2">Power</td> </tr> <tr> <td></td> <td>77 (Ex d) 1.5 &amp; 3.0Watts</td> </tr> </table>	XX Power (W)	74 (Ex emb) 1.8 & 3.6Watts	Power		77 (Ex d) 1.5 & 3.0Watts			
XX Power (W)	74 (Ex emb) 1.8 & 3.6Watts	Power						
	77 (Ex d) 1.5 & 3.0Watts							
<b>109-24DC-30</b>	<b>Ordering Example</b>							

For detailed information, please contact Bifold sales department.

## Solenoid Coil Spare

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





109	Coil Type					
<table border="1"> <tr> <td>XXX Nominal Voltage</td> <td>78 (Ex ia) 12V</td> <td rowspan="2">Nominal Voltage</td> </tr> <tr> <td>XX Resistance (Ω)</td> <td>78 (Ex ia) 155 Ohms</td> </tr> </table>	XXX Nominal Voltage	78 (Ex ia) 12V	Nominal Voltage	XX Resistance (Ω)	78 (Ex ia) 155 Ohms	
XXX Nominal Voltage	78 (Ex ia) 12V	Nominal Voltage				
XX Resistance (Ω)	78 (Ex ia) 155 Ohms					
<table border="1"> <tr> <td></td> <td>78 (Ex ia) 370 Ohms - (S4, S5 &amp; S6 only)</td> <td rowspan="2">Resistance †</td> </tr> <tr> <td></td> <td></td> </tr> </table>		78 (Ex ia) 370 Ohms - (S4, S5 & S6 only)	Resistance †			
	78 (Ex ia) 370 Ohms - (S4, S5 & S6 only)	Resistance †				
<b>109-12 - 155</b>	<b>Ordering Example</b>					





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



Ex emb Options

Options Table I 74 (Ex emb)

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

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





For detailed information on certification, please see page 9.





Other Wattages available upon request.

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

Ex emb Options

Options Table I 74 (Ex emb)

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

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

For detailed information on certification, please see page 9.

Other Wattages available upon request.

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

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









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









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



Ex d Options

Options Table 2 77 (Ex d)

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

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

For detailed information on certification, please see page 9.





Other Wattages available upon request.

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





Ex d Options

Options Table 2 77 (Ex d)

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

Product Type	Solenoid Order Code	Typical Apparatus Code	Standard Voltage	Power Consumption (W)	CV Rate	Temperature Range (°C)	Ingress Protection	Cable Entry Connection	Certification Options
 FP15 (DPSS1)	77	Ex d IIC T6, T5 or T4	12 Vdc 24 Vdc 48 Vdc 110 Vdc  110 Vac 240 Vac 50 or 60 Hz	1.5	0.32	<b>Media #</b> -20°C to +90°C (T4) -60°C to +90°C (T4)  <b>Ambient</b> -60°C to +40°C (T6) -60°C to +55°C (T5) -60°C to +90°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	 ATEX IECEx INMETRO GOST GOST K GGTN CSA (C, US)
 FP15 (DPSS2)				3.0					
 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	0.32 (S4&S6)  0.1 (S5)	<b>Media #</b> -20°C to +90°C (T4) -60°C to +90°C (T4)  <b>Ambient</b> -60°C to +40°C (T6) -60°C to +55°C (T5) -60°C to +90°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (1/2" NPT Option)	 ATEX IECEx INMETRO GOST GOST K GGTN CSA (C, US)
 FP15 (S5)				3.0					
 FP15 (S6)									

For detailed information on certification, please see page 9.

Other Wattages available upon request.

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









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Ex ia Options

Options Table 3 78 (Ex ia)

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

For detailed information on certification, please see page 9.

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

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

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









U<sub>i</sub> = 31 V, I<sub>i</sub> = 210 mA, P<sub>i</sub> = 1.5 W, C<sub>i</sub> = 0 µF, L<sub>i</sub> = 0 mH  
 Coil Resistance : 155 Ohm ± 5%  
 Minimum Current @ solenoid coil = 80 mA

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

U<sub>i</sub> = 31 V, I<sub>i</sub> = 210 mA, P<sub>i</sub> = 1.5 W, C<sub>i</sub> = 0 µF, L<sub>i</sub> = 0 mH  
 Coil Resistance : 370 Ohm ± 5%  
 Minimum Current @ solenoid coil = 32 mA

Ex ia Options

Options Table 3 78 (Ex ia)

HIGH PRESSURE, DUAL REDUNDANT SOLENOID OPTIONS TABLE 3 78 (Ex ia)							
Product Type	Solenoid Order Code	Typical Apparatus Code	CV Rate	Temperature Range (°C)	Ingress Protection	Cable Entry Connection	Certification Options
 FP15 (DPSS1)	78 †	Ex ia IIC T6 or T4	0.32	<b>Media #</b> -20°C to +95°C -60°C to +95°C  <b>Ambient</b> -60°C to +60°C (T6) -60°C to +95°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (½" NPT Option)	
 FP15 (DPSS2)							
 FP15 (DPSS3)							
LOW PRESSURE SOLENOID OPTIONS TABLE 3 78 (Ex ia)							
 FP15 (S4)	78 †	Ex ia IIC T6 or T4	0.32 (S4 & S6)	<b>Media #</b> -20°C to +95°C -60°C to +95°C  <b>Ambient</b> -60°C to +60°C (T6) -60°C to +95°C (T4)	IP66 IP67 NEMA 4X	M20 x 1.5 (½" NPT Option)	
 FP15 (S5)			0.1 (S5)				
 FP15 (S6)							

For detailed information on certification, please see page 9.

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

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

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

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

Coil Resistance : 155 Ohm ± 5%

Minimum Current @ solenoid coil = 80 mA

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

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

Coil Resistance : 370 Ohm ± 5%

Minimum Current @ solenoid coil = 32 mA

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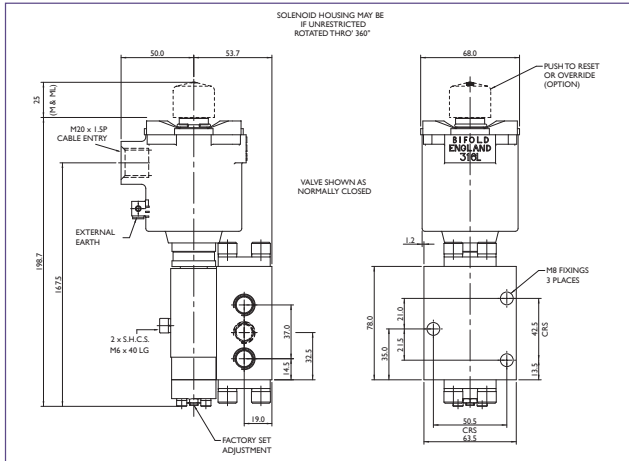
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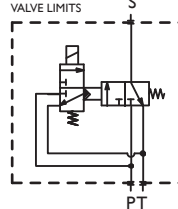


FPI5 (S1, S2 & S3)

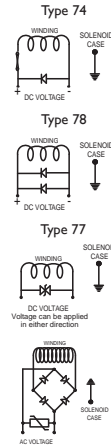
Dimensional Drawing



SCHEMATIC 3/2 NC



Wiring Diagrams



FPI5 Selection Chart - Ordering Example

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

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

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

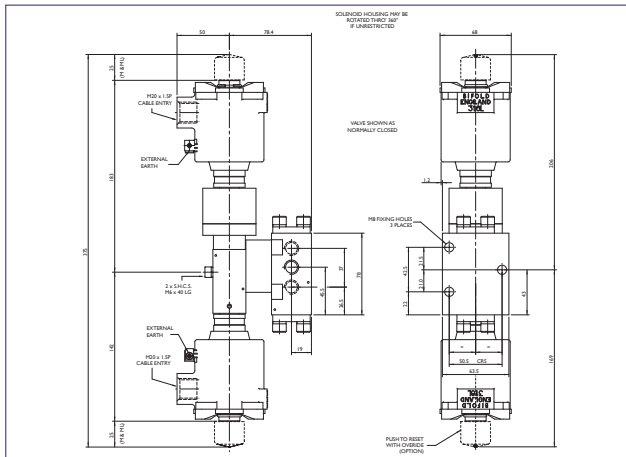
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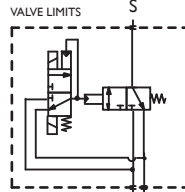
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FP15 (S1/S1,S2/S2&S3/S3)

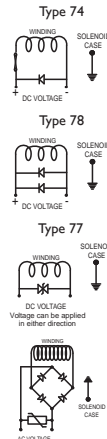
Dimensional Drawing



SCHEMATIC 3/2 NC



Wiring Diagrams



FP15 Selection Chart - Ordering Example

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

FP15/S1/S1/04/32 / S / 74 A T4-24D/SB/ML/36/K85/H2S/K6 / EP / [M306] Ordering Example

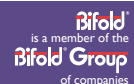
For the shaded block sections, please refer to the same shaded sections on pages 11, 13 & 15.

† 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.

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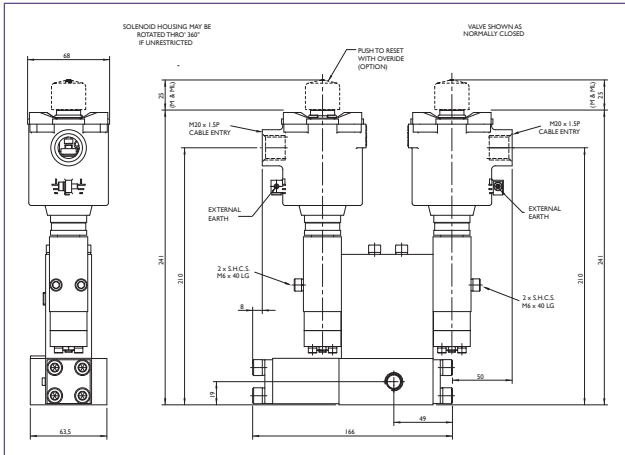
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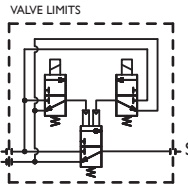


FP15 (DPSSI, 2 & 3)

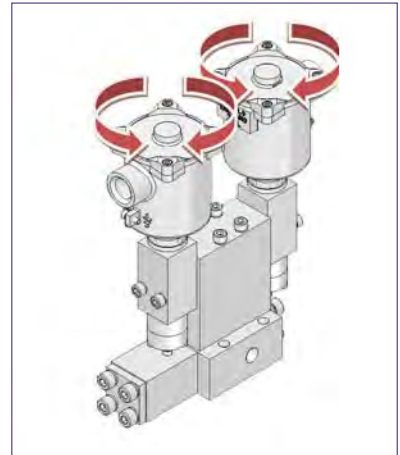
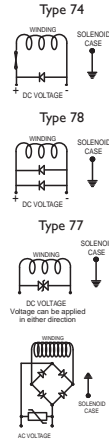
Dimensional Drawing



SCHEMATIC 3/2 NC



Wiring Diagrams



FP15 Selection Chart - Ordering Example

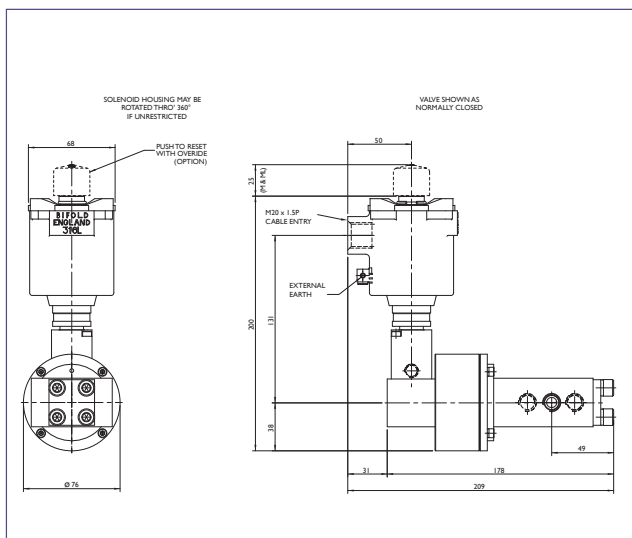
<b>FP15</b>		High Pressure, Pilot Stage, Dual Redundant Solenoid Valves		Model Code
<b>DPSSI</b>	345 bar			Maximum Valve Pressure
<b>DPSS2</b>	517 bar			
<b>DPSS3</b>	690 bar			
<b>M</b>	Sub-base Mounting			Connections
<b>04</b>	1/4" NPT Body Ported	<b>38MP</b>	3/8" MP Body Ported (Non Standard)	
<b>06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

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

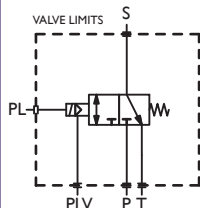
† Solenoid must be used in conjunction with a correctly matched Intrinsically Safe (IS) solenoid driver. The valve installer is responsible for a correct and safe IS system. The solenoid valve installation operating and maintenance instruction references are OP0001 & OP0165.

FP15 (S4 & S5)

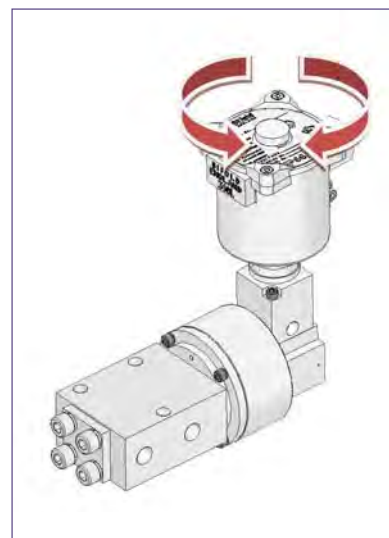
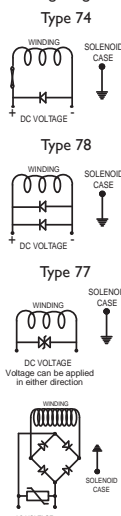
Dimensional Drawing



SCHEMATIC 3/2 NC



Wiring Diagrams



FP15 Selection Chart - Ordering Example

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

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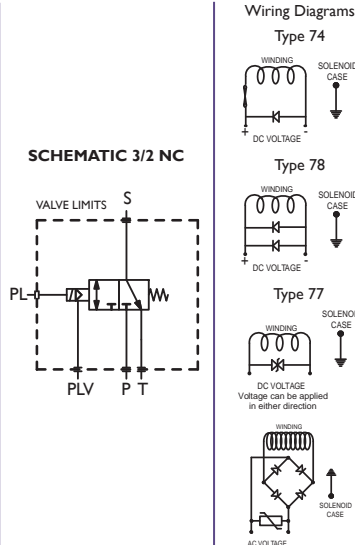
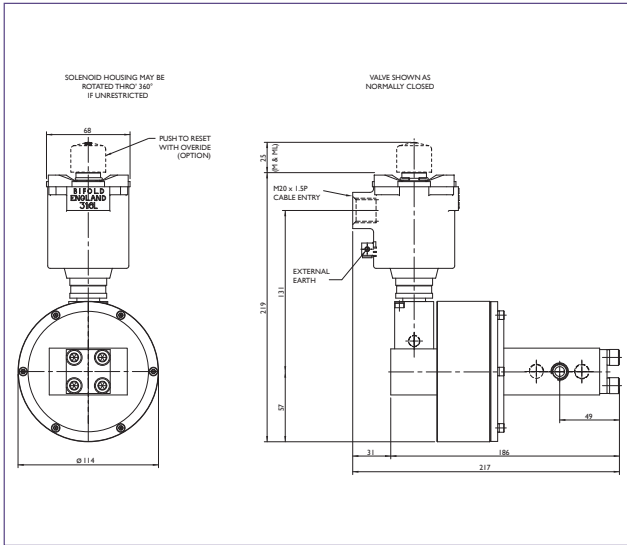
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FPI5 (S6)

Dimensional Drawing



FPI5 Selection Chart - Ordering Example

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

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Options

Product Options

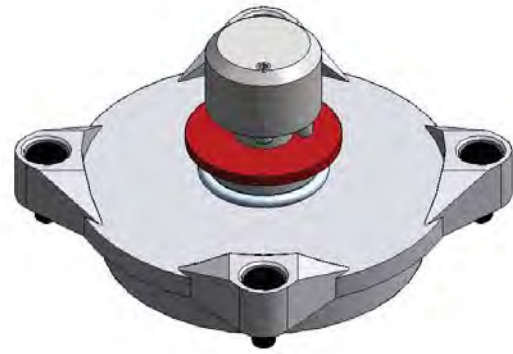
The range of products displayed in this brochure, are designed to accommodate all the options shown below. If the style or arrangement required for your application is not shown, please contact our office with full description and specification details.



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

Manual Override Type M

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



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

Manual Rotary Override Type MOR

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



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

Manual Reset Type ML

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

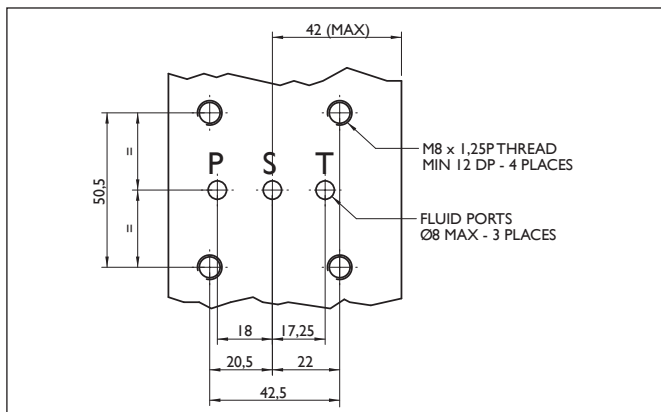
**Accuracy of information**  
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When selecting a product, the applicable operating system design must be considered to ensure safe use. The products function, material compatibility, adequate ratings, correct installation, operation and maintenance are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

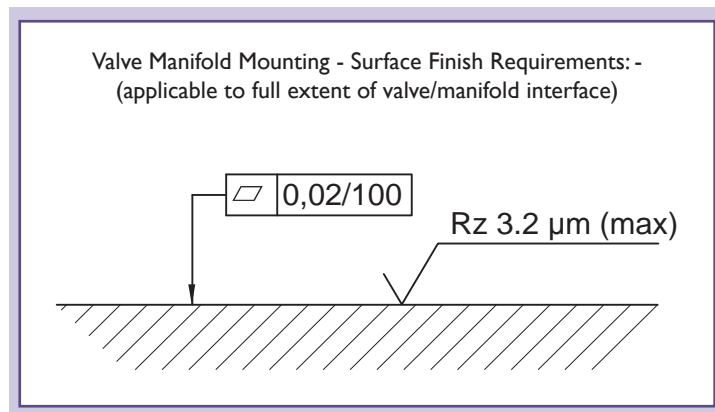
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## Interface Detail

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

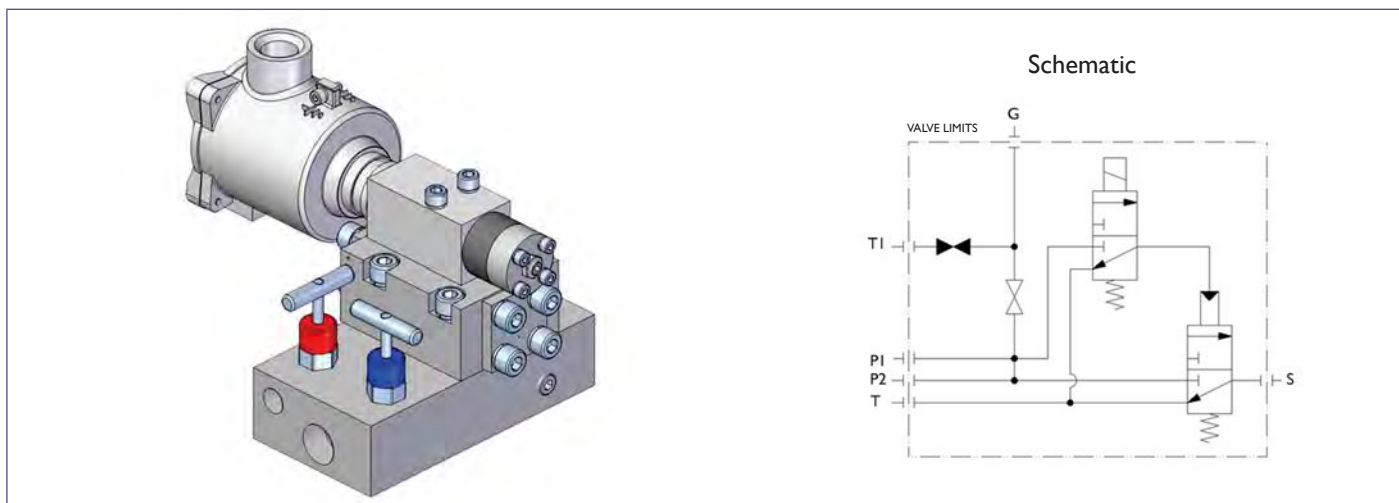


### Surface Finish Requirements

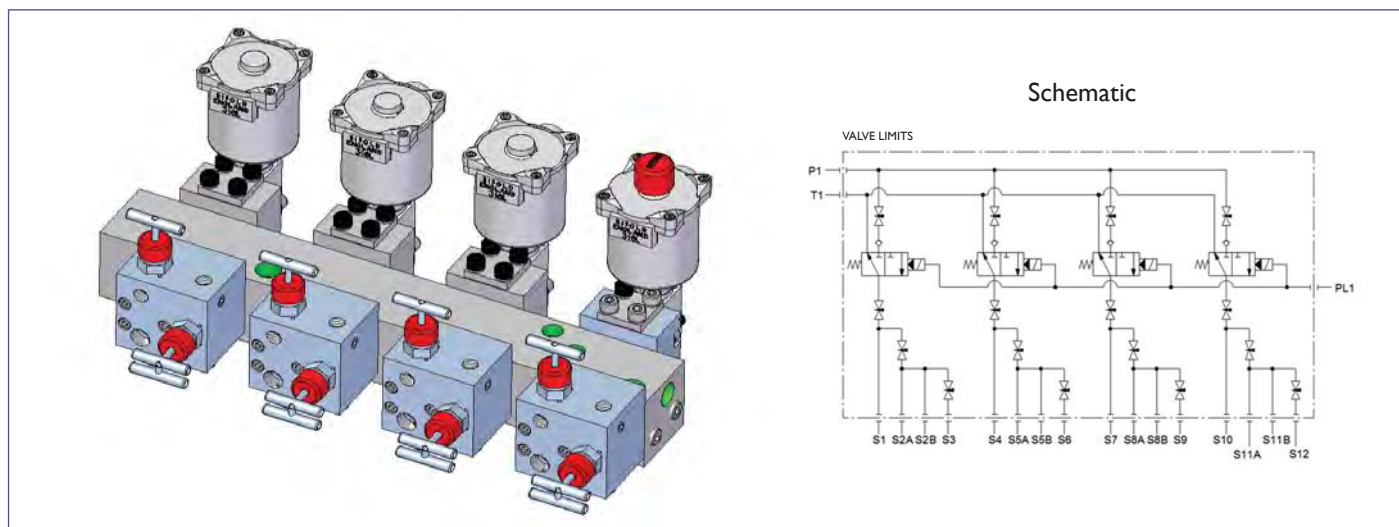


## Typical Assemblies

### Typical Valve Assembly Showing an FPI5 Solenoid Valve



### Typical Valve assembly showing FPI5 Solenoid Valves



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