

Solenoid Valve

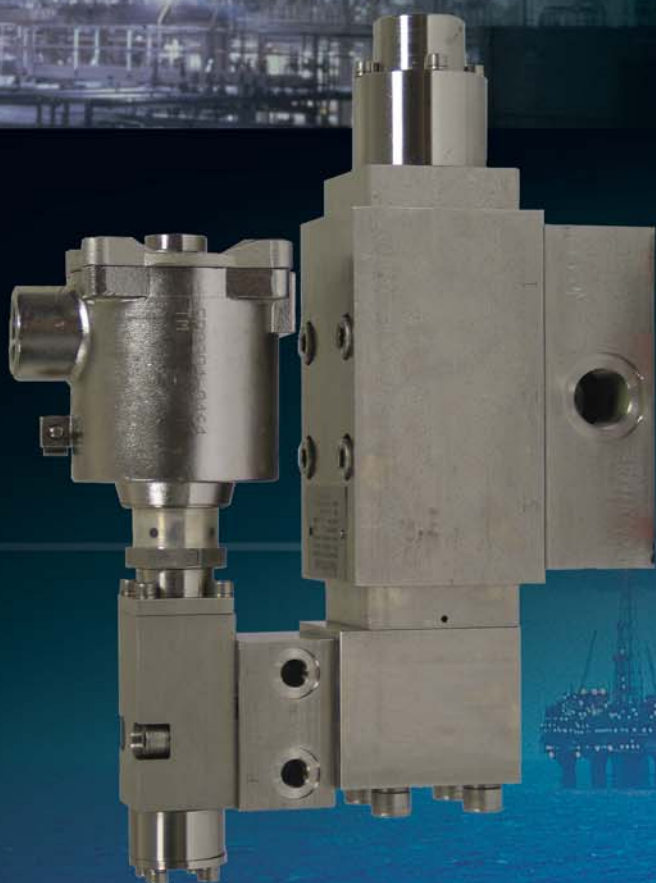
Model FP50, 100 & 200

up to 345 bar, 200 litres per minute

Superior performance
throughout the full
operational range

Features:

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



CONTENTS

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

TECHNICAL SPECIFICATIONS

MATERIALS OF CONSTRUCTION

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

MEDIA:

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

WORKING PRESSURE:

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

TEMPERATURE RANGE:

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

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

SOUR GAS SERVICE (REFER TO ORDERING CODE):

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

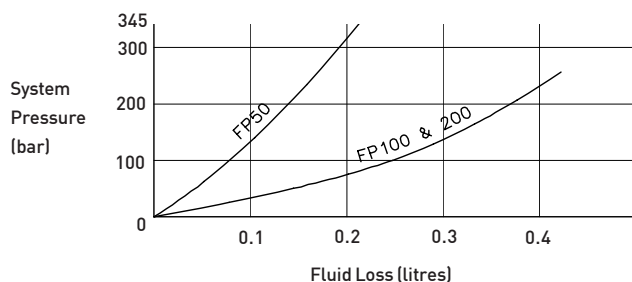
LAST CHANCE FILTRATION:

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

INSTALLATION:

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

INSTALLATION REQUIREMENTS



Graph illustrating typical fluid loss on SL'x' operators

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

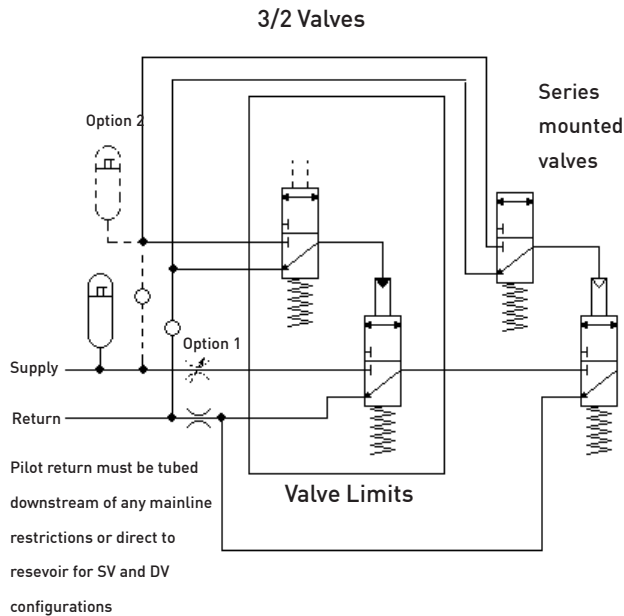
SELECTION CHART

Reliability and Innovation in directional control valves

FP50 FP100 FP200		50 lpm 100 lpm 200 lpm		Model Code & nominal flow rating									
SH 'X'	Solenoid valve operator (two stage) Refer to pilot pressure ranges	Pilot Pressure Range - bar										Standard operators (Other pressure ranges on request)	
		X'	FP50		FP100/200								
		0	30-60		32-70								
		0A	45-85		43-115								
		1	60-120		60-138								
		1A	75-150		80-170								
		2	120-250		110-235								
		2A	145-290		130-280								
		3	170-345		150-345								
		3A	240-490		190-415								
4	300-610		235-520										
SL 'X'		1	4.5 - 8.5		4.5 - 8.5								
M Subbase mounting - 32, DV & SV valves. Subbases ordered seperately. See page 5.												Connections	
08 1/2 NPT ported subbase assembly 12 3/4 NPT ported subbase assembly (FP 100/200 only)													
32 42 43	3 - way, 2 - position 4 - way, 2 - position 4 - way, 3 - position	Max working pressure - bar										Configuration	
		FP50		FP100/200									
		345		250									
		207											
DV SV	Diverter Valve Selector Valve												
S V A SA	Nitrile (standard) Viton Silicone/Fluorosilicone Low temperature Nitrile	(-30°C to +130°C) (-20°C to +180°C) (-50°C to +40°C) (-46°C to +130°C)		Refer to valve operating temperature range on page 2								O-ring material	
XXX (refer to solenoid options on page 7)												Voltage	
XXX (refer to solenoid options on page 7)												Solenoid	
A G I S U A G A A	ATEX Ex II 2 GD (standard) GOST 1 Exd IIC T6 (T5,T4) INMETRO Br-Exd IIC T6 (T5) SAA Exd IIC T6 (T5,T4) CSA Exd IIC (Canada) CSA AExd IIC (USA) ATEX Ex II 1 GD T75°C (T110°C) ATEX Ex II 1 GD T65°C (standard) GOST 0 Exia IIC T6 ATEX Ex II 2 GDc T120°C ATEX Ex II 2 G	87C, 87D, 97C, 97D, 97F, 97G,										Solenoid Approvals	
		87C, 87D											
		98C											
		981											
		94C											
		991											
		87C, 87D, 97C, 97D, 97F, 97G,											
		As above +98C											
4 5 6 7 8 9	T4 IIA T4 IIB T4 IIC T5 IIA T5 IIB T5 IIC T6 IIA T6 IIB T6 IIC (standard)	87C, 87D, 97C, 97D, 97F, 97G,										T-Rating & Gas Group	
		As above +98C											
		87C, 87D, 97C, 97D, 97F, 97G,											
		As above +98C											
		H2S NACE MR-01-75 - (solenoid options 97D, 87C & 87D only)											Options
		K6 BSPP Ported											
		K85 1/2" NPT cable entry											
		ML Manual reset											
M Manual override spring return													
MOR Manual override rotary stayput										Solenoid operators SH'X' only			
WS Weather seal solenoid core tube (90J only)													
FP50/ SH1/ M / 32 / S -24VDC/97C A 9 / ML												Ordering Example	

Standard Test Fluid: Marston Bentley HW540.

TWO STAGE VALVE INSTALLATION



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

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

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

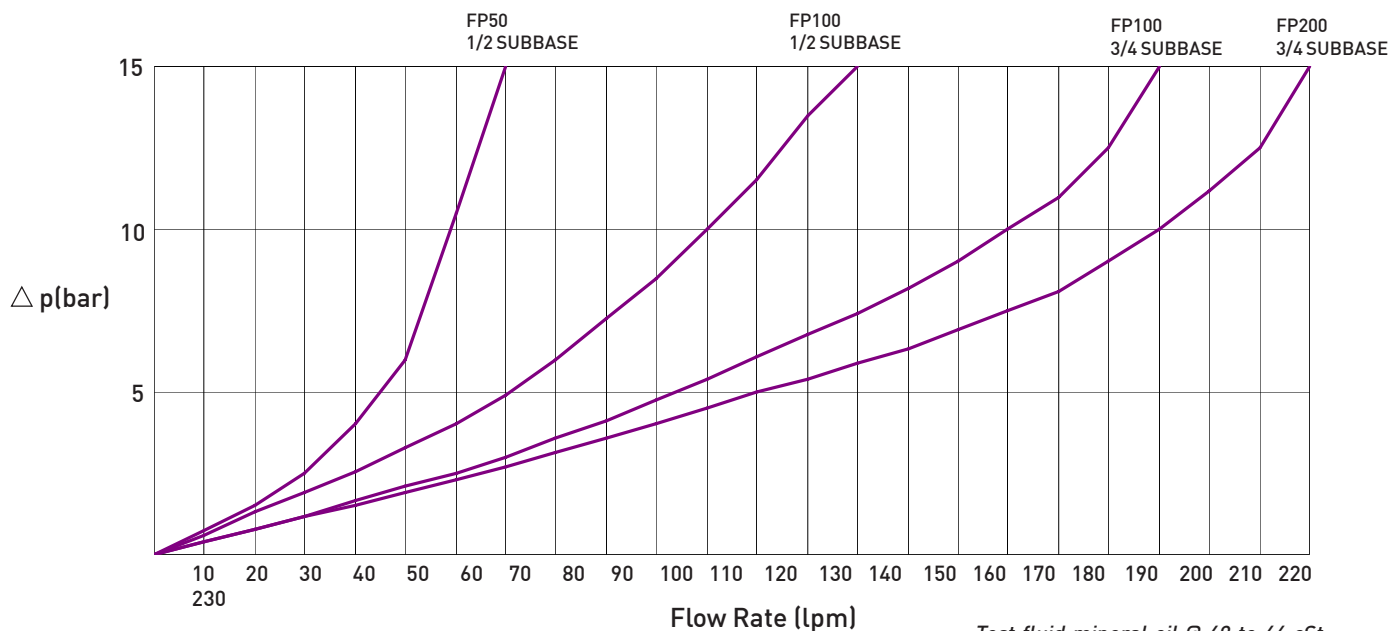
OPTION 3. Connect the pilot supply to a point in the system which is not influenced by the operation of the control valve.

NOTES:-

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

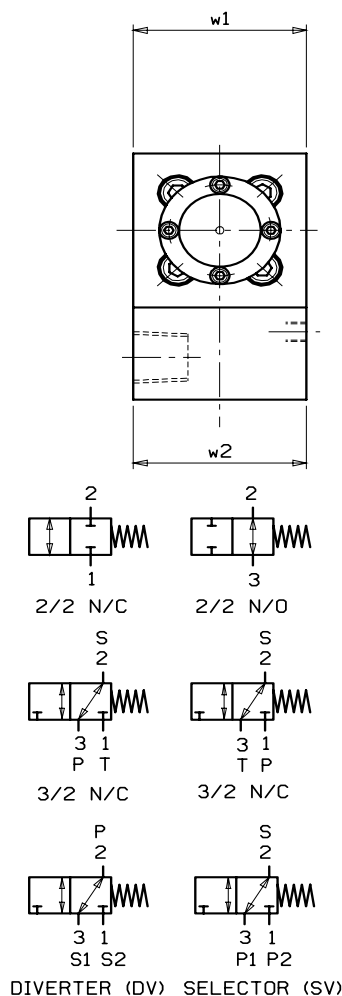
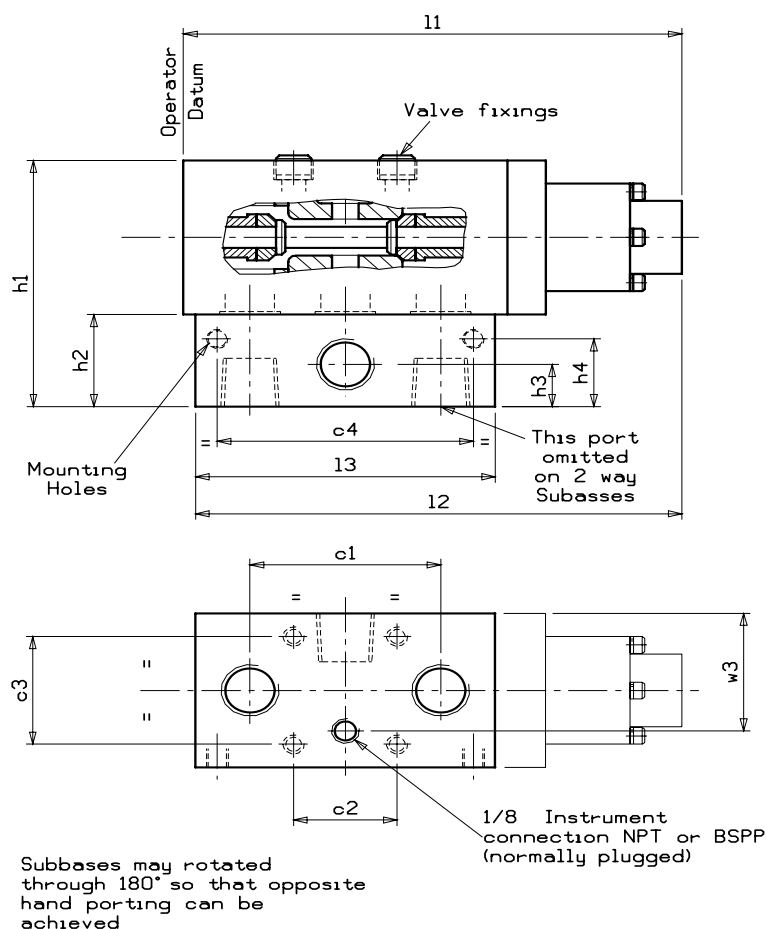
At no time during operation of the valve to the piloted position should the supply pressure be allowed to fall below the minimum pilot pressure quoted for the operator fitted. Refer to ordering code, operator SH'X'.

FLOW PERFORMANCE



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

Reliability and Innovation in directional control valves



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

ALL DIMENSIONS IN MILLIMETRES

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

For special multipurpose subbases consult Fluidpower

[illegible]

FIXING HOLES IN 2 PLACES ON OPPOSITE SIDE

OPERATOR DATUM

h1, h2, h3, w1, w2, w3, w4, l1, l3, l4, S1, S2, T, P

EQUIPMENT LIMITS

OPERATOR WEIGHT NOT INCLUDED

SOLENOID OPTIONS

HIGH PRESSURE PILOT STAGE SOLENOID VALVES



Reliability and Innovation in directional control valves

Order Code	Apparatus Code	Power Consumption	Standard Voltage	Voltage Tolerance	Temperature Range*		Protection	Cable Connection	Materials of Construction
					Media	Ambient			
90J	General Purpose	3 Watts	12, 24, 48 & 110 VDC 110, 240 VAC 50 or 60 Hz	+ / - 10 %	-20°C to +60°C		IP65 applies to connector	Hirschmann Connector	Glass filled nylon moulded coil
94C	EExemb II T3 T120°C	3.7 Watts			-20°C to +40°C		IP66	M20 x1.5	316 stainless steel
97C (std)	EExd IIC T85	3 Watts			-20°C to +40°C [T6] (std)				
97F	or T100	1.5 Watts			-60°C to +40°C (T6)				
97G	or T135	1.0 Watt			-20°C to +55°C (T5)				
97D		5.7 Watts			-60°C to +55°C (T5)				
98C	EExia IIC T6 or T4	refer to solenoid drivers table on the next page			-20°C to +60°C [T6] (std)				
					-60°C to +60°C (T6)				
					-20°C to +95°C (T4)				
					-60°C to +95°C (T4)				

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

*Refer to operating temperature range on page 2

LOW PRESSURE PILOT STAGE SOLENOID VALVES

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

INTRINSICALLY SAFE SOLENOID DRIVERS * (solenoid type 98C)

Interface Unit Manufacturer & Model Number	Apparatus Code	Solenoid Base model no.	Interface Unit Typical Input Characteristics			Typical Output Characteristics Measured At Solenoid		
			Voltage (V)	Current (mA)	Power (W)	Voltage (V)	Current (mA)	Power (W)
MTL 779+	EExia IIB	24VDC/98C & 24VDC/A98C	28	85.9	2.41	13.48	85.9	1.16
			24	73.7	1.77	11.57	73.7	0.85
			20	61.4	1.23	9.65	61.4	0.59
TURCK MK72-S13-Ex0	EExia IIC	24VDC/98C & 24VDC/A98C	30	88	2.63	11.81	74.3	0.86
			24	107	2.56			
			20	125	2.50			
PEPERL & FUCHS KFD2-SD-ExL36	EExia IIB	24VDC/98C & 24VDC/A98C	30.0	85.5	2.57	11.81	76.0	0.90
			24.0	105.1	2.52			
			20.0	125.4	2.51			
ELCON HiD 2881-YA1	EExia IIB	24VDC/98C & 24VDC/A98C	28.0	98.6	2.76	11.71	77.5	0.91
			24.0	96	2.30	11.45	76.0	0.87
			21.0	83.4	1.75	10.00	66.3	0.66
STAHL 9351/10/14/10	EExia EExib IIB & IIC	24VDC/98C & 24VDC/A98C	30.0	89.8	2.69	12.26	80.6	0.99
			24.0	115.6	2.77	12.18	80.0	0.97
			20.0	149.6	2.99	12.08	79.3	0.96

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

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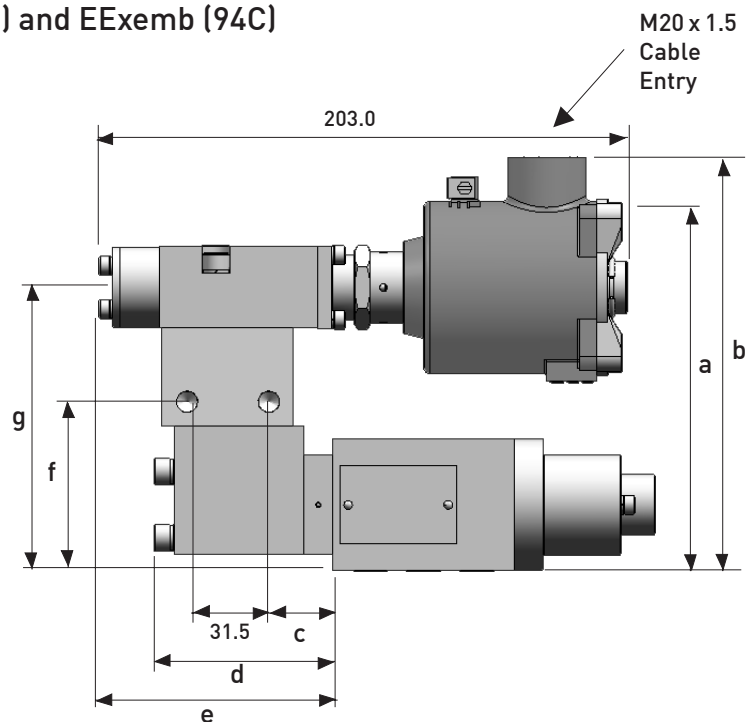
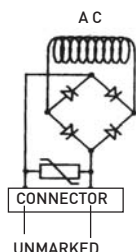
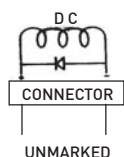
www.bifold-fluidpower.co.uk

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

High Pressure Pilot Stage Solenoid Valves

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

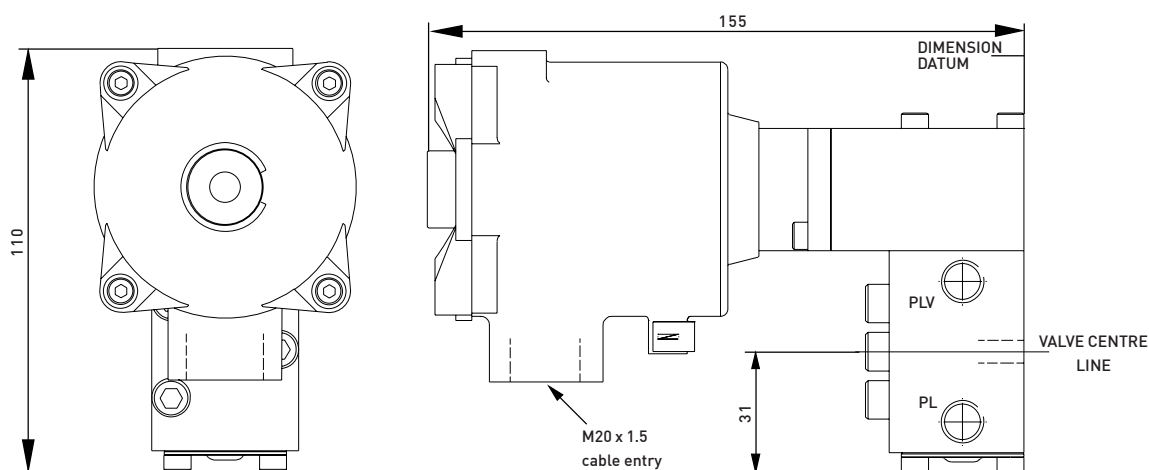
	FP50			FP100/200		
	Gas Group					
	IIA	IIB	IIC	IIA	IIB	IIC
a	138	144.4	157	148	167	176.3
b	154	160.4	173	164	183	192.3
c	24.5	24.5	24.5	27.5	27.5	27.5
d	68.6	68.6	68.6	74.1	74.1	74.1
e	89.8	89.8	89.8	92.8	92.8	92.8
f	65.1	65.1	65.1	78.8	78.8	78.8
g	104	110.4	123	114	133	142.3



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

Low Pressure Pilot Stage Solenoid Valve Operators

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



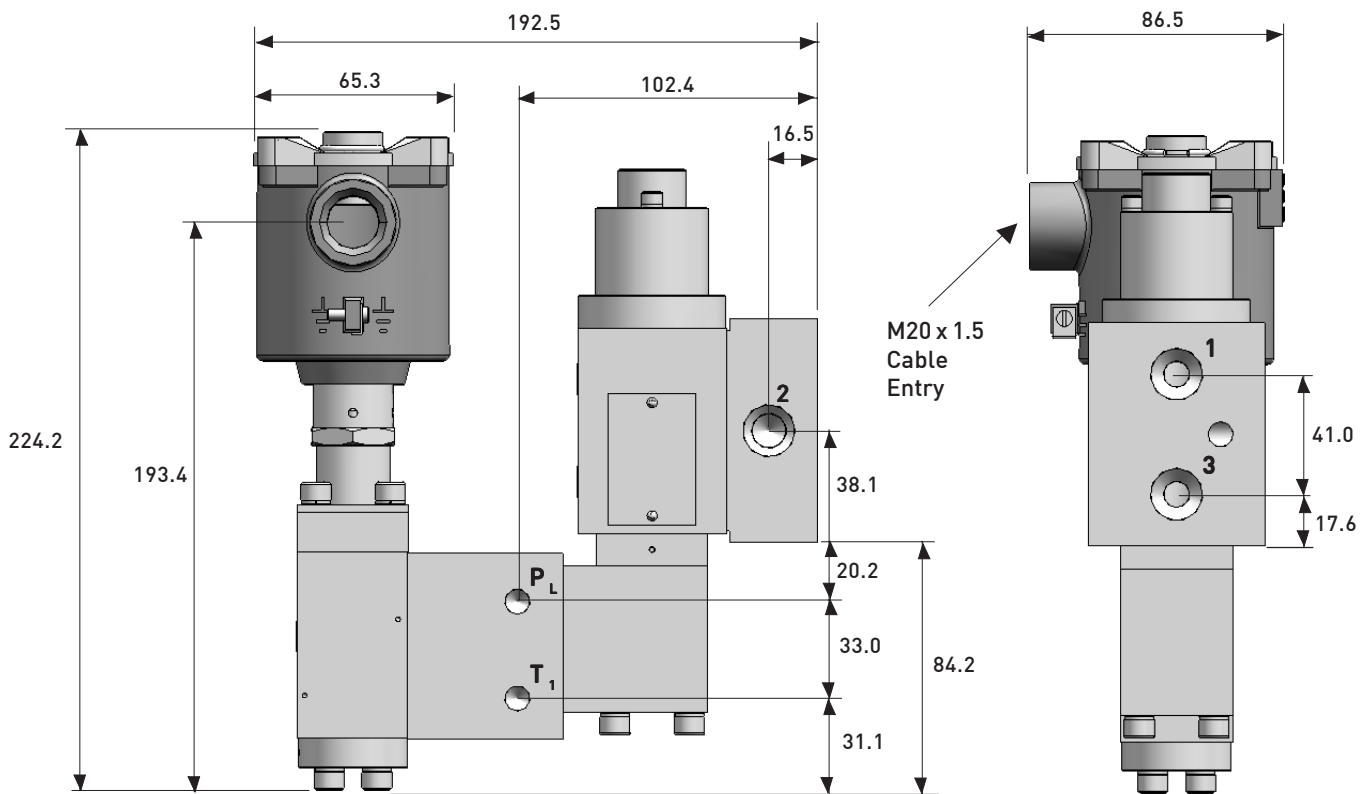
CONNECTIONS:

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

WEIGHT 2.2 Kg

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

Codes 97D, (EExd)

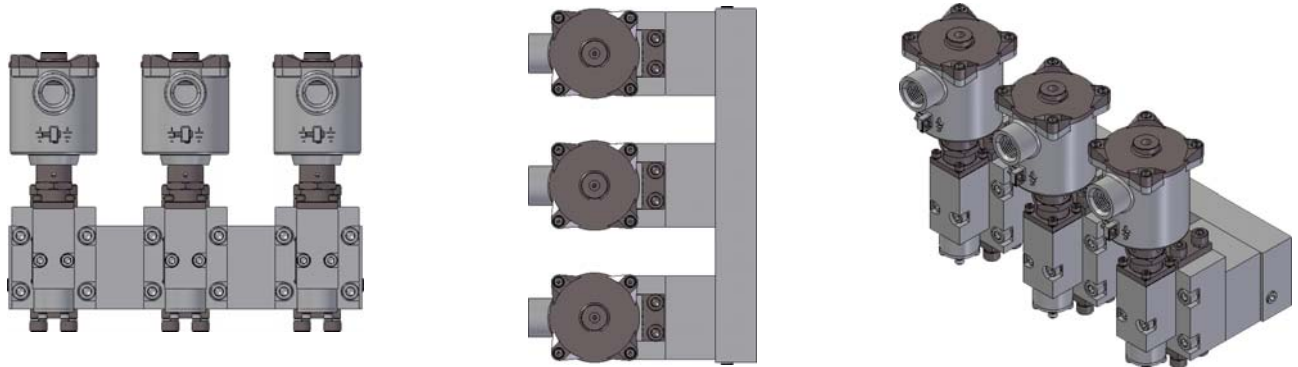


Example code :- FP50/SH1/M/32/S-24VDC/97DA9

Manifold Options

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

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



Contact Bifold Fluidpower with circuit requirements.

Model Shown is a 3 station FP15 with 97C solenoid

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Quality Assurance

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

Accuracy of information

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

