



PF51G

## Bronze Piston Actuated On/Off Valves

### Description

A 2-port pneumatically actuated on/off bronze valve for use on water, air, oil and gases. It can also be used on lower specification steam applications.

A pneumatic signal acts on the actuator piston to open or close the valve with a spring return action. The valve plugs have a PTFE soft seal (G) to provide a tight shut-off. A valve position indicator is included on standard and flow regulator models.

Valves are available with one of three sizes of actuator:

Type 1 (45 mm), Type 2 (63 mm) and Type 3 (90 mm) with the following action options:

- **NC (Normally Closed)** - These valves are designed for flow over the seat (port 1 to 2). Caution: Not recommended for waterhammer prevention.
- **NO (Normally Open)** - These valves are designed for flow under the seat (port 2 to 1). Can be used to prevent waterhammer on valve closure in liquid applications.
- **BD (Bi-Directional normally closed)** - These valves are designed for special applications that require flow in both directions and incorporates an anti-waterhammer design for liquid applications flowing under the seat (port 2 to 1). Note: To help prevent the possibility of waterhammer on liquid applications flowing over the seat (port 1 to 2) the pressure should not exceed 1 bar g.

Optional extras (see 'Valve selection guide', page 9):

Travel switch

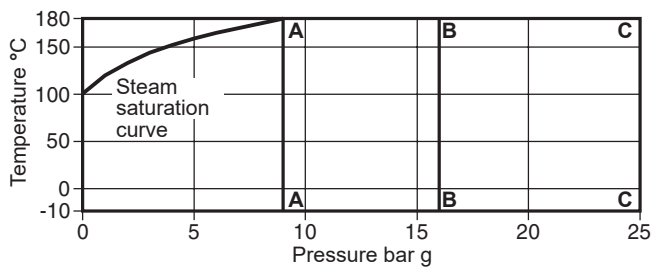
Flow regulator



## Sizes, pipe connections and actuator combinations

Valve type	Pipe connections	Valve action		Type	Actuator model	DN15 ½"	DN20 ¾"	DN25 1"	DN32 1¼"	DN40 1½"	DN50 2"
PF51G	Screwed to BSP or NPT	NC	Normally Closed (flow over seat)	1	PF51G - 1NC	•	•	•			
				2	PF51G - 2NC	•	•	•	•	•	•
				3	PF51G - 3NC			•	•	•	•
		NO	Normally Open (flow under seat)	1	PF51G - 1NO	•	•	•			
				2	PF51G - 2NO	•	•	•	•	•	•
				3	PF51G - 3NO			•	•	•	•
		BD	Bi-Directional normally closed (flow over or flow under seat)	1	PF51G - 1BD	•	•	•			
				2	PF51G - 2BD	•	•	•	•	•	•
				3	PF51G - 3BD			•	•	•	•

## Pressure/temperature limits



- A - A** Maximum operating pressure on saturated steam 9 bar g
- B - B** Maximum operating pressure on size 2" 16 bar g
- C - C** Maximum operating pressure on sizes ½" to 1½" 25 bar g

Body design conditions	Screwed BSP or NPT	DN15 - DN32 (½" - 1½")	PN25
		DN50 (2")	PN16
PMA	Maximum allowable pressure		25 bar g
TMA	Maximum allowable temperature		180 °C
	Minimum allowable temperature		-10 °C
PMO	Maximum operating pressure for saturated steam service		9 bar g @ 180 °C
TMO	Maximum operating temperature		180 °C
	Minimum operating temperature	<b>(Note: For lower operating temperatures consult Spirax Sarco)</b>	
	Ambient temperature limits	Maximum	60 °C
		Minimum	-10 °C

**Note:** Protection from environmental influences (e.g. UV radiation, humidity, chemicals) is required. Ensure that adequate shelter is provided for outdoor installations.

ΔPMX Maximum differential pressure (see page 4)

Designed for a maximum cold hydraulic test pressure of: 1.5 x PMA (PN rating)

**Note:** With internals fitted, test pressure must not exceed ΔPMX

## Technical details

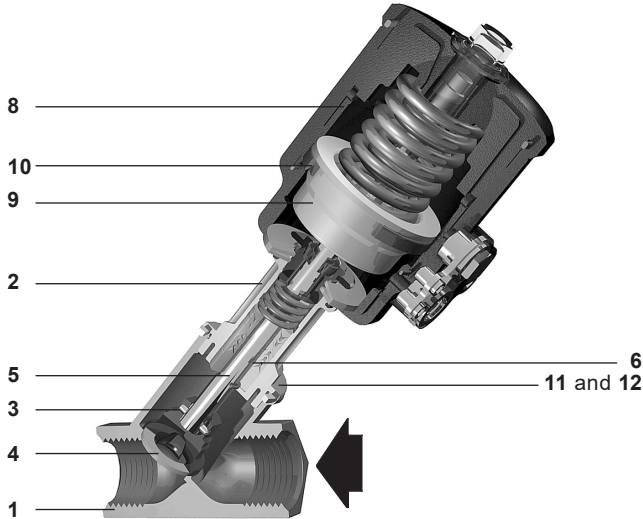
<b>Leakage</b>	PTFE soft seal	ASME Class VI	
<b>Flow characteristic</b>	Fast opening	On/off	
<b>Flow direction</b>	<b>PF51G-NC</b>	Flow over seat Port 1 to 2	
	<b>PF51G-NO</b>	Flow under seat Port 2 to 1	
	<b>PF51GG-BD</b>	Flow over seat Port 1 to 2	
		Flow under seat Port 2 to 1	
<b>Pilot media</b>	Air or water	60 °C maximum	
<b>Actuator rotation</b>	360°		
<b>Actuator type and size</b>	<b>Pilot connection</b>	<b>Maximum pilot pressure</b>	
	<b>Type 1</b> = 45 mm diameter	⅝" BSP	10 bar g (145 psi g)
	<b>Type 2</b> = 63 mm diameter	¼" BSP	10 bar g (145 psi g)
	<b>Type 3</b> = 90 mm diameter	¼" BSP	8 bar g (116 psi g)

## Kvs values

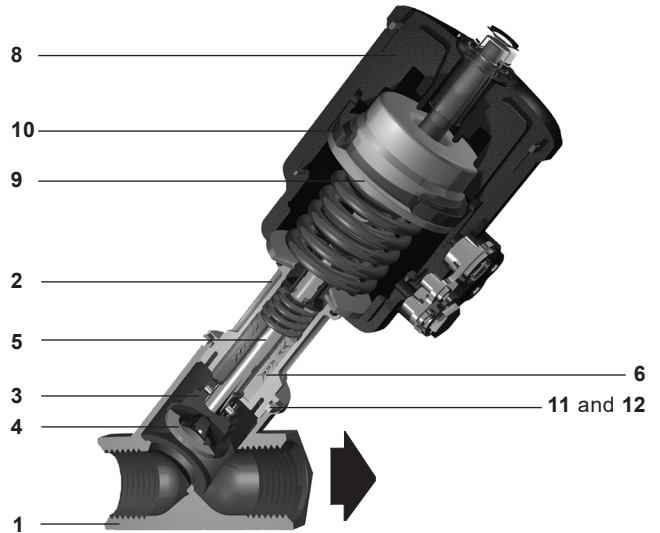
Size	DN15 ½"	DN20 ¾"	DN25 1"	DN32 1¼"	DN40 1½"	DN50 2"	For conversion: Cv (UK) = Kv x 0.963 Cv (US) = Kv x 1.156
Kvs	4.5	8.0	15.6	24.6	42.0	57.0	

## Materials

### NC (Normally Closed)



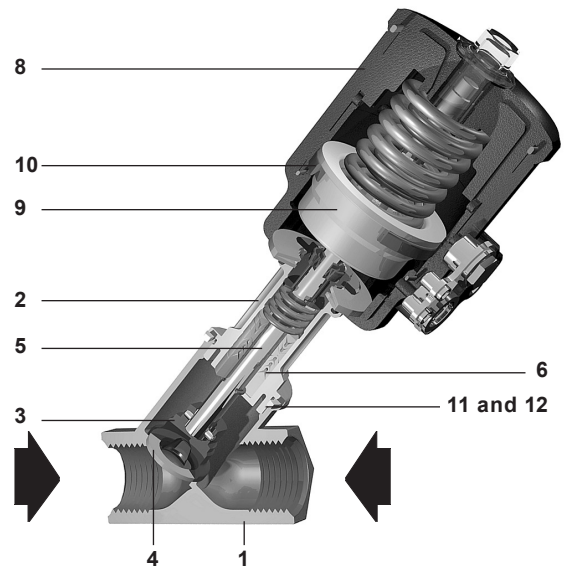
### NO (Normally Open)



No.	Part	Material	
1	Body	Bronze	EN 1982 CC491K
2	Bonnet	Bronze ½" and 1"	EN 1982 CC491K
3	Plug	Stainless steel	AISI 316L
4	Valve plug seal	PTFE	
5	Valve stem	Stainless steel	AISI 316
6	Stem seals	PTFE chevrons	
7*	Stem 'O' ring	Viton	
8	Actuator housing	Glass filled polyamide	
9	Piston	Glass filled polyamide	
10	Piston lip seal	Viton	
11	Gasket	PTFE	

\* Note: Item 7 is not shown.

### BD (Bi-Directional normally closed)



## ΔPMX - Maximum differential pressures for PF51G piston actuated valves

### PF51G-NC (Normally closed)

Model	Valve size	Actuator diameter (mm)	Flow direction (port 1 to 2)	Maximum differential pressure (bar)	Pilot Pressure	
					Minimum (bar)	Maximum (bar)
PF51G-1NC	DN15 - (1/2")	45	over seat	16	1.8	10
	DN20 - (3/4")	45	over seat	16	1.8	10
	DN25 - (1")	45	over seat	16	1.8	10
PF51G-2NC	DN15 - (1/2")	63	over seat	20	1.5	10
	DN20 - (3/4")	63	over seat	20	1.5	10
	DN25 - (1")	63	over seat	20	1.5	10
	DN32 - (1 1/4")	63	over seat	16	3.0	10
	DN40 - (1 1/2")	63	over seat	16	3.0	10
	DN50 - (2")	63	over seat	11	3.0	10
PF51G-3NC	DN25 - (1")	90	over seat	20	1.0	8
	DN32 - (1 1/4")	90	over seat	16	2.5	8
	DN40 - (1 1/2")	90	over seat	16	2.5	8
	DN50 - (2")	90	over seat	15	2.5	8

### PF51G-NO (Normally open)

Model	Valve size	Actuator diameter (mm)	Flow direction (port 2 to 1)	Maximum differential pressure (bar)	Pilot Pressure	
					Minimum (bar)	Maximum (bar)
PF51G-1NO	DN15 - (1/2")	45	under seat	16	1.8	10
	DN20 - (3/4")	45	under seat	16	1.8	10
	DN25 - (1")	45	under seat	16	1.8	10
PF51G-2NO	DN15 - (1/2")	63	under seat	16	1.5	10
	DN20 - (3/4")	63	under seat	16	1.5	10
	DN25 - (1")	63	under seat	16	1.5	10
	DN32 - (1 1/4")	63	under seat	16	1.5	10
	DN40 - (1 1/2")	63	under seat	16	1.5	10
	DN50 - (2")	63	under seat	12	1.5	10
PF51G-3NO	DN25 - (1")	90	under seat	16	1.0	8
	DN32 - (1 1/4")	90	under seat	16	1.0	8
	DN40 - (1 1/2")	90	under seat	16	1.0	8
	DN50 - (2")	90	under seat	16	1.0	8

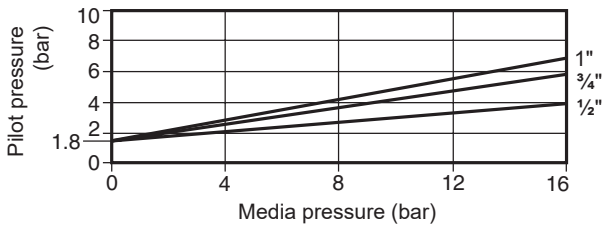
**PF51G-BD (Bi-Directional normally closed)**

Model	Valve size	Actuator diameter (mm)	Flow direction (port 1 to 2)	* Maximum differential pressure (port 1 to 2) (bar)	Flow direction (port 2 to 1)	* Maximum differential pressure (port 2 to 1) (bar)	Pilot pressure	
							Minimum (bar)	Maximum (bar)
PF51G-1BD	DN15 - (1/2")	45	over seat	16	under seat	16.0	5.0	10
	DN20 - (3/4")	45	over seat	16	under seat	7.0	5.0	10
	DN25 - (1")	45	over seat	16	under seat	5.0	5.0	10
PF51G-2BD	DN15 - (1/2")	63	over seat	16	under seat	16.0	3.8	10
	DN20 - (3/4")	63	over seat	16	under seat	16.0	3.8	10
	DN25 - (1")	63	over seat	16	under seat	11.0	3.8	10
	DN32 - (1 1/4")	63	over seat	16	under seat	6.0	3.3	10
	DN40 - (1 1/2")	63	over seat	12	under seat	4.0	3.3	10
	DN50 - (2")	63	over seat	8	under seat	2.5	3.8	10
PF51G-3BD	DN25 - (1")	90	over seat	16	under seat	14.0	3.3	8
	DN32 - (1 1/4")	90	over seat	16	under seat	12.0	3.3	8
	DN40 - (1 1/2")	90	over seat	16	under seat	8.0	3.3	8
	DN50 - (2")	90	over seat	14	under seat	5.0	3.3	8

# Pilot/media pressure relationship

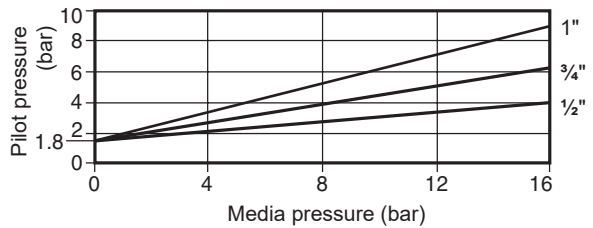
## PF51G-NC (Normally Closed)

PF51G-1NC flow over seat (1 to 2)

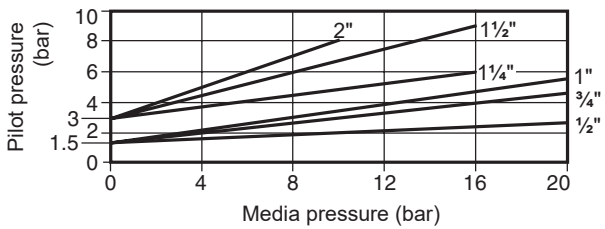


## PF51G-NO (Normally Open)

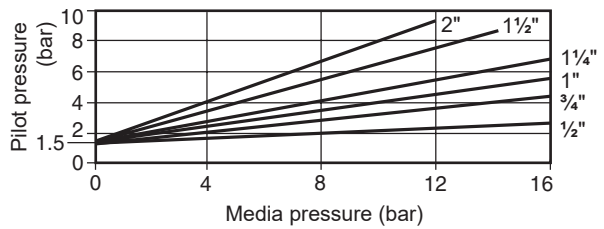
PF51G-1NO flow under seat (2 to 1)



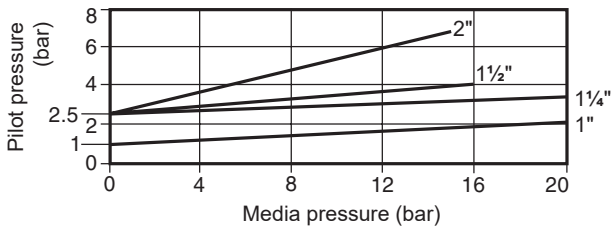
PF51G-2NC flow over seat (1 to 2)



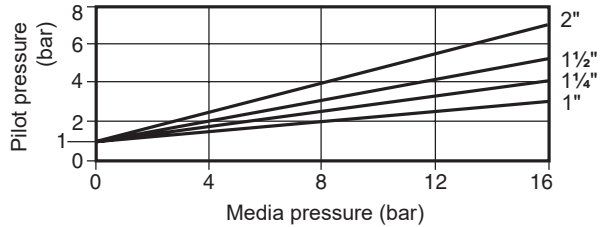
PF51G-2NO flow under seat (2 to 1)



PF51G-3NC flow over seat (1 to 2)

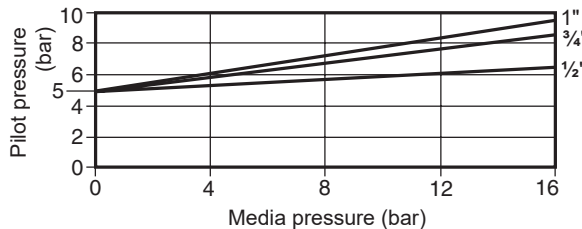


PF51G-3NO flow under seat (2 to 1)

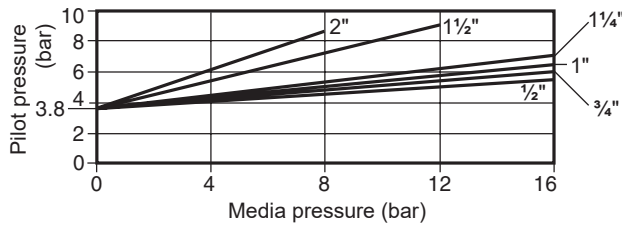


## PF51G-BD (Bi-Directional normally closed)

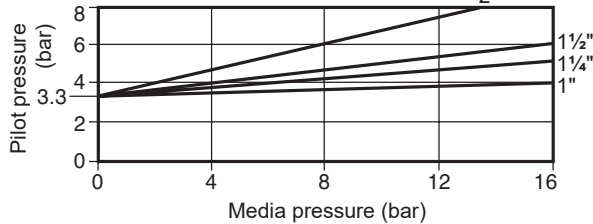
PF51G-1BD flow over seat (1 to 2)



PF51G-2BD flow over seat (1 to 2)



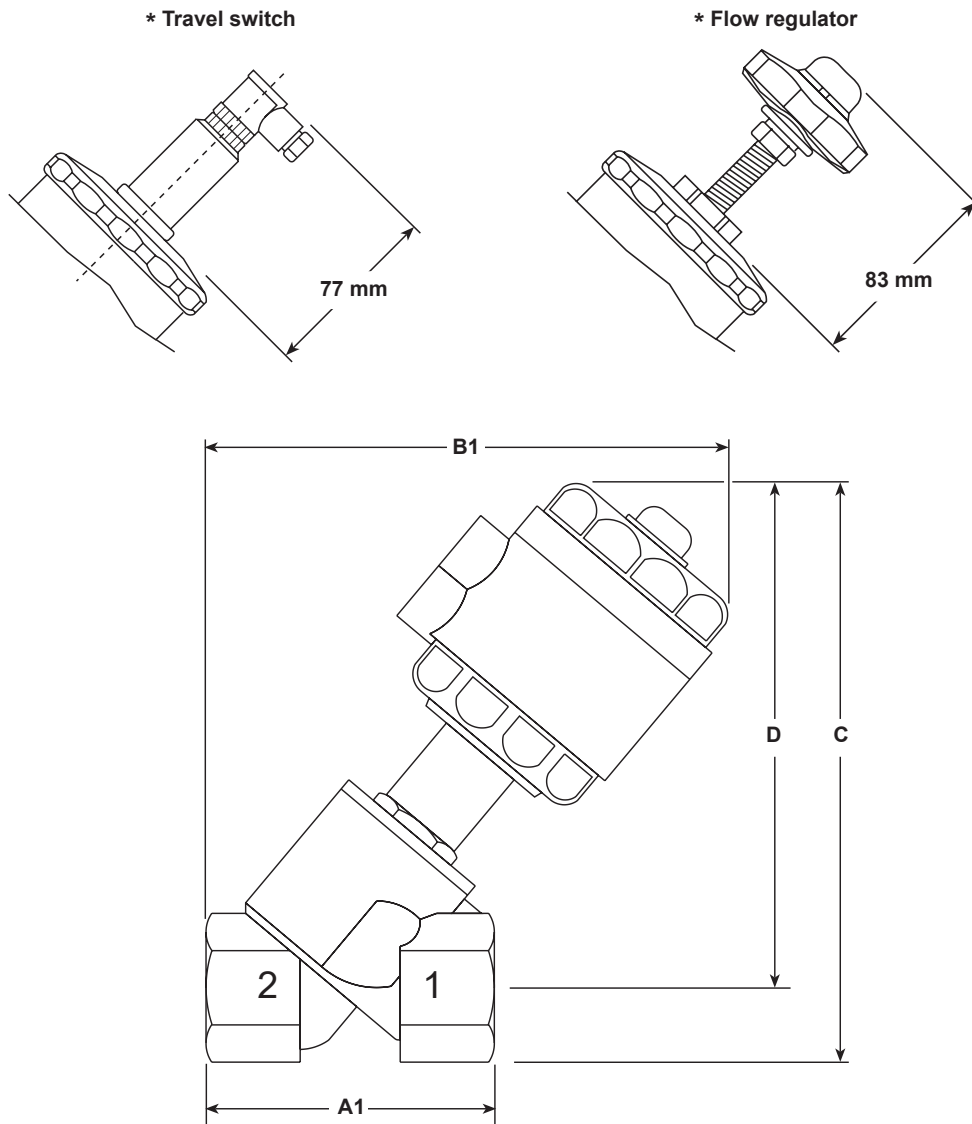
PF51G-3BD flow over seat (1 to 2)



**Dimensions and weights (approximate) in mm and kg**

Valve size	Actuator type and size	A1	B1	C	D	Weight*
DN15 - ½"	1 (45 mm)	65	144	136	123	0.8
	2 (63 mm)	65	192	184	171	1.2
DN20 - ¾"	1 (45 mm)	75	49	142	126	0.9
	2 (63 mm)	75	198	192	176	1.3
DN25 - 1"	1 (45 mm)	90	168	161	141	1.1
	2 (63 mm)	90	212	205	185	1.5
	3 (90 mm)	90	223	216	196	2.2
DN32 - 1¼"	2 (63 mm)	110	225	217	193	1.9
	3 (90 mm)	110	234	227	202	2.4
DN40 - 1½"	2 (63 mm)	120	230	25	198	2.4
	3 (90 mm)	120	239	235	207	2.6
DN50 - 2"	2 (63 mm)	150	248	241	207	2.9
	3 (90 mm)	150	257	250	216	3.3

\*Note: Add 0.2 kg for travel switch or flow regulator options (not available for use with the Type 1 actuator).





## Valve selection guide

<b>Valve size</b>	DN15 (½"), DN20 (¾"), DN25 (1"), DN32 (1¼"), DN40 (1½") and DN50 (2")		<b>DN25</b>
<b>Valve type</b>	<b>P</b>	= Piston valve	<b>P</b>
<b>Valve characteristic</b>	<b>F</b>	= Fast opening	<b>F</b>
<b>Body material</b>	<b>5</b>	= Bronze	<b>5</b>
	<b>1</b>	= Screwed      BSP or NPT	<b>1</b>
<b>Valve plug seal</b>	<b>G</b>	= PTFE	<b>G</b>
	<b>1</b>	= 45 mm diameter (for valve sizes ½" to 1")	<b>2</b>
<b>Actuator type</b>	<b>2</b>	= 63 mm diameter (for valve sizes ½" to 2")	
	<b>3</b>	= 90 mm diameter (for valve sizes 1" to 2")	
	<b>NC</b>	= Normally Closed	<b>NC</b>
<b>Valve position</b>	<b>NO</b>	= Normally Open	
	<b>BD</b>	= Bi-Directional	
	<b>Blank</b>	= No options required	
<b>Optional</b>	<b>I</b>	= Travel switch Provides indication of open or closed valve position through a magnetic reed switch with volt free contacts. Maximum rating: Voltage (V) = 500 V, Current (I) = 0.5 A, Power (P) = 30 VA. Available on Type 2 and Type 3 actuators with suffix 'I' if this option is required.	
	<b>R</b>	= Flow regulator Provides manual control of maximum flow through the valve. Can also provide manual shut-off on normally open valves. Available on Type 2 and Type 3 actuators with suffix 'R' if this option is required.	

**Note:** Shaded areas represent fixed parameters

### Valve selection guide example

DN25	-	P	-	F	-	5	-	1	-	G	-	2	-	NC	-		-	Screwed BSP
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## How to order

**Example:** 1 off Spirax Sarco 1" PF51G-2NC bronze piston actuated on/off valve having screwed BSP connections.

## Spare parts

A seal kit is available for all valve and actuator sizes comprising: Piston lip seal, stem 'O' ring, valve head seal (PTFE), body seal.

### How to order spare seal kits

Always order spares by specifying the valve size, type and date code (given on the actuator label i.e. 120 = week 12, year 2000).

**Example:** 1 off Seal kit for a 1" PF51G-2NC, date code 120.

## Safety information, installation and maintenance

For full details, see the Installation and Maintenance Instructions supplied with the product.

**Installation note:** These valves can be mounted in any orientation. The actuator can be rotated 360° in the direction indicated on the product label to facilitate easy pilot mounting connection.

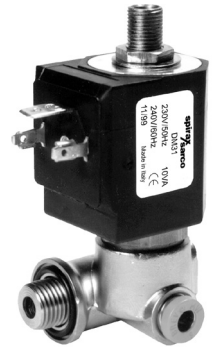
## Associated equipment

### Pilot solenoid

Type DM 3-port two way electropneumatic pilot solenoid valve that can be directly mounted (banjo connection) to the PF51G-NC, NO and BD series piston actuated valves to provide actuator pilot pressure to open normally closed or close normally open valves. Suitable for air or water operating media. The valve is supplied with a DIN connector. For full details refer to the relevant Technical Information Sheet.

### Available types

Model	Type	Actuator	Voltage/Frequency	Connection
DM11	1	45 mm	230/50 or 240/60 Vac	1/8" BSP
DM12	1	45 mm	110/50 or 120/60 Vac	1/8" BSP
DM13	1	45 mm	24/50 or 24/60 Vac	1/8" BSP
DM14	1	45 mm	24 Vdc	1/8" BSP
DM21	2	63 mm	230/50 or 240/60 Vac	1/4" BSP
DM22	2	63 mm	110/50 or 120/60 Vac	1/4" BSP
DM23	2	63 mm	24/50 or 24/60 Vac	1/4" BSP
DM24	2	63 mm	24 Vdc	1/4" BSP
DM31	3	90 mm	230/50 or 240/60 Vac	1/4" BSP
DM32	3	90 mm	110/50 or 120/60 Vac	1/4" BSP
DM33	3	90 mm	24/50 or 24/60 Vac	1/4" BSP
DM34	3	90 mm	24 Vdc	1/4" BSP



## How to order

**Example:** 1 off Spirax Sarco DN25 PF63G-2NC stainless steel piston actuated on/off valve having flanged EN 1092 PN40 connections.

## Spare parts

A seal kit is available for all valve and actuator sizes comprising: Piston lip seal, stem 'O' ring, valve head seal (Modified PTFE G500), body seal and 'O' ring.

## How to order spare seal kits

Always order spares by specifying the valve size, type and date code (given on the actuator label i.e. 02/14 = Month 02, Year 2014).

**Example:** 1 off Seal kit for a 1" PF61G-2NC, date code 02/14.

## Safety information, installation and maintenance

For full details, see the Installation and Maintenance Instructions supplied with the product.

**Installation note:** These valves can be mounted in any orientation. The actuator can be rotated 360° in the direction indicated on the product label to facilitate easy pilot mounting connection.