



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 (15 psi g).

Optional extras (see 'Valve selection guide'):

- 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			•	•	•	•

Technical details

Leakage		PTFE soft seal		ASME Class VI	
Flow characteristic		Fast opening		On/off	
Flow direction	PF51G-NC	Flow over seat		Port 1 to 2	
	PF51G-NO	Flow under seat		Port 2 to 1	
	PF51GG-BD	Flow over seat		Port 1 to 2	
		Flow under seat		Port 2 to 1	
Pilot media		Air or water		60 °C maximum	
Actuator rotation		360°			
Actuator type and size	Pilot connection		Maximum pilot pressure		
	Type 1 = 45 mm diameter		⅛" BSP	10 bar g (145 psi g)	
	Type 2 = 63 mm diameter		¼" BSP	10 bar g (145 psi g)	
	Type 3 = 90 mm diameter		¼" BSP	8 bar g (116 psi g)	

Kvs values

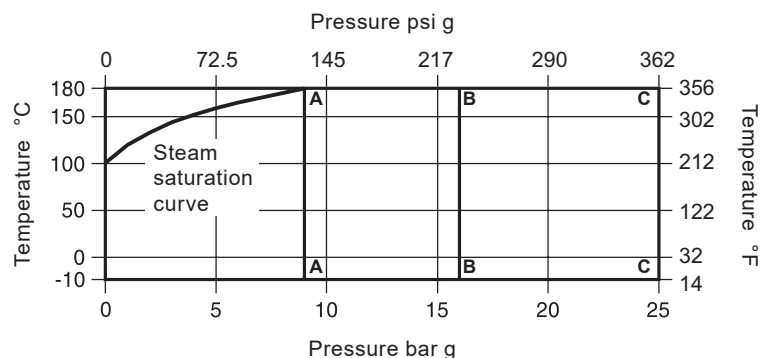
Size	DN15 ½"	DN20 ¾"	DN25 1"	DN32 1¼"	DN40 1½"	DN50 2"
Kvs	4.5	8.0	15.6	24.6	42.0	57.0

For conversion:

Cv (UK) = Kv x 0.963

Cv (US) = Kv x 1.156

Pressure/temperature limits

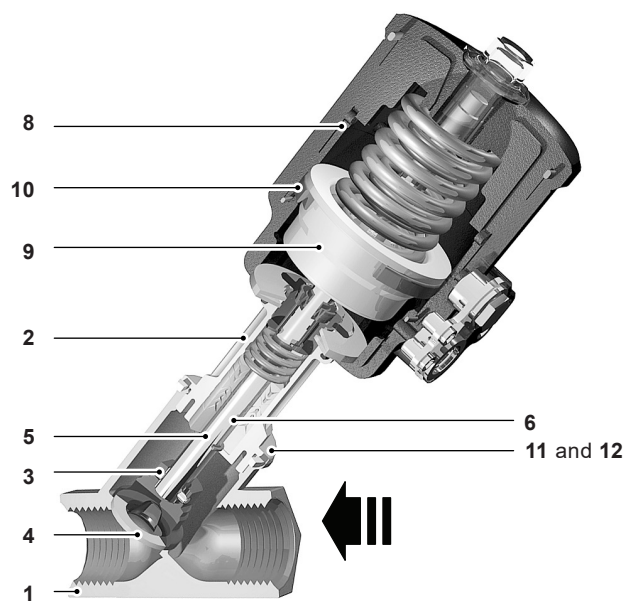


A - A	Maximum operating pressure on saturated steam	9 bar g	(130 psi g)
B - B	Maximum operating pressure on size 2"	16 bar g	(230 psi g)
C - C	Maximum operating pressure on sizes ¼" to 1½"	25 bar g	(360 psi g)

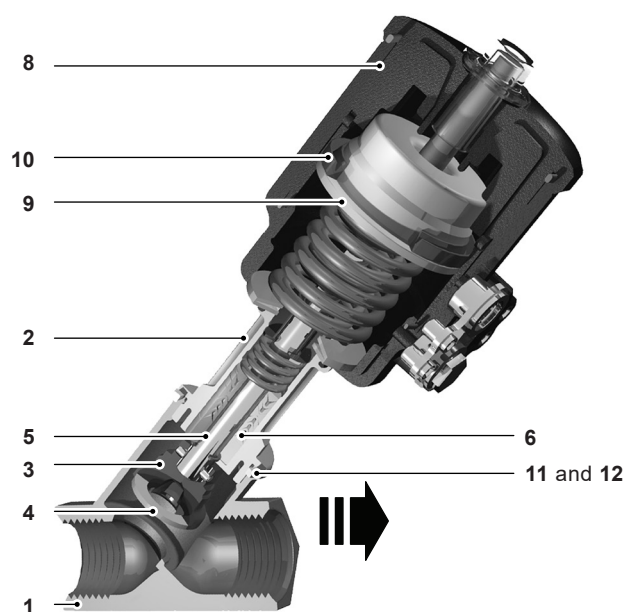
Body design conditions		Screwed BSP or NPT	DN15 - DN40 (½" - 1½")	PN25	
			DN50 (2")	PN16	
PMA	Maximum allowable pressure		25 bar g	360 psi g	
TMA	Maximum allowable temperature		180 °C	356 °F	
Minimum allowable temperature			-10 °C	14 °F	
PMO	Maximum operating pressure for saturated steam service		9 bar g @ 180 °C	130 psi g @ 356 °F	
TMO	Maximum operating temperature		180 °C	356 °F	
Minimum operating temperature (Note: For lower operating temperatures consult Spirax Sarco)			-10 °C	14 °F	
Ambient temperature limits			Maximum	60 °C	140 °F
			Minimum	-10 °C	14 °F
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 5)
Designed for a maximum cold hydraulic test pressure of:					
Note: With internals fitted, test pressure must not exceed ΔPMX				1.5 x PMA (PN rating)	

Materials

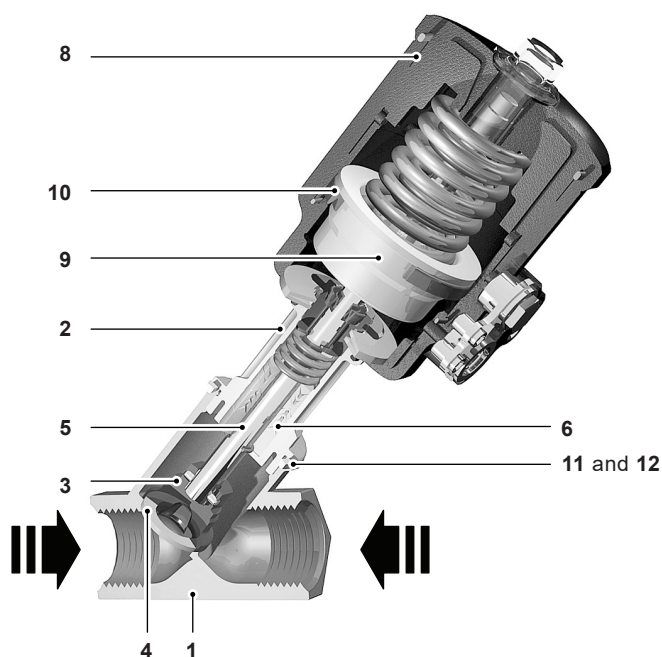
NC (Normally Closed)



NO (Normally Open)



BD (Bi-Directional normally closed)



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

No.	Part	Material
7*	Stem 'O' ring (not shown)	Viton
8	Actuator housing	Glass filled polyamide
9	Piston	Glass filled polyamide
10	Piston lip seal	Viton
11	Gasket	PTFE

ΔPMX - Maximum differential pressures for PF51G piston actuated valves

PF51G-NC (Normally closed)

		Actuator diameter mm (in)	Flow direction (port 1 to 2)	Maximum differential pressure bar (psi g)	Pilot Pressure		
Model	Valve size				Minimum bar (psi g)	Maximum bar (psi g)	
PF51G-1NC	DN15 - (½")	45 (1.8)	over seat	16 (232)	1.8 (26)	10 (145)	
	DN20 - (¾")		over seat				
	DN25 - (1")		over seat				
PF51G-2NC	DN15 - (½")	63 (2.5)	over seat	20 (290)	1.5 (22)		10 (145)
	DN20 - (¾")		over seat				
	DN25 - (1")		over seat				
	DN32 - (1¼")		over seat	16 (232)	3 (44)		
	DN40 - (1½")		over seat				
	DN50 - (2")		over seat				
PF51G-3NC	DN25 - (1")	90 (3.5)	over seat	20 (290)	1 (15)	8 (116)	
	DN32 - (1¼")		over seat	16 (232)	2.5 (36)		
	DN40 - (1½")		over seat				
	DN50 - (2")		over seat	15 (218)			

PF51G-NO (Normally open)

		Actuator diameter mm (in)	Flow direction (port 2 to 1)	Maximum differential pressure bar (psi g)	Pilot Pressure	
Model	Valve size				Minimum bar (psi g)	Maximum bar (psi g)
PF51G-1NO	DN15 - (½")	45 (1.8)	under seat		1.8 (26)	10 (145)
	DN20 - (¾")		under seat			
	DN25 - (1")		under seat			
PF51G-2NO	DN15 - (½")	63 (2.5)	under seat	16 (232)	1.5 (22)	
	DN20 - (¾")		under seat			
	DN25 - (1")		under seat			
	DN32 - (1¼")		under seat			
	DN40 - (1½")		under seat			
	DN50 - (2")		under seat	12 (174)		
PF51G-3NO	DN25 - (1")	90 (3.5)	under seat	16 (232)	1 (15)	8 (116)
	DN32 - (1¼")		under seat			
	DN40 - (1½")		under seat			
	DN50 - (2")		under seat			

Maximum differential pressures continued on next page

ΔPMX - Maximum differential pressures for PF51G piston actuated valves (continued)

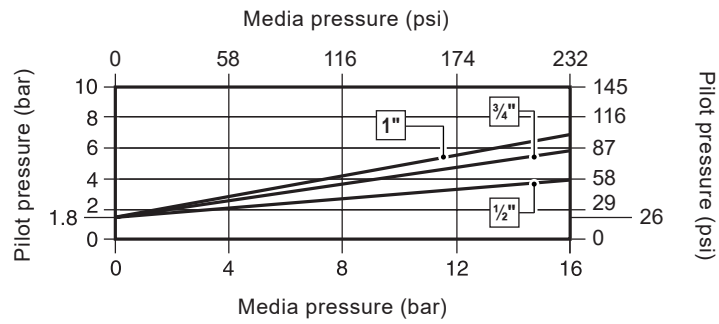
PF51G-BD (Bi-Directional normally closed)

Model	Valve size	Actuator diameter mm (in)	Flow direction (port 1 to 2)	* Maximum differential pressure (port 1 to 2) bar (psi)	Flow direction (port 2 to 1)	* Maximum differential pressure (port 2 to 1) bar (psi)	Pilot pressure	
							Minimum bar (psi)	Maximum bar (psi)
PF51G-1BD	DN15 - (½")	45 (1.8)	over seat	16 (232)	under seat	16 (232)	5 (73)	10 (145)
	DN20 - (¾")		over seat		under seat	7 (102)		
	DN25 - (1")		over seat		under seat	5 (73)		
PF51G-2BD	DN15 - (½")	63 (2.5)	over seat	16 (232)	under seat	16 (232)	3.8 (55)	
	DN20 - (¾")		over seat		under seat	11 (160)		
	DN25 - (1")		over seat		under seat	6 (87)		
	DN32 - (1¼")		over seat	12 (174)	under seat	4 (58)	3.3 (48)	
	DN40 - (1½")		over seat		under seat			
	DN50 - (2")		over seat		under seat			
PF51G-3BD	DN25 - (1")	90 (3.5)	over seat	16 (232)	under seat	14 (203)	3.3 (48)	8 (116)
	DN32 - (1¼")		over seat		under seat	12 (174)		
	DN40 - (1½")		over seat		under seat	8 (116)		
	DN50 - (2")		over seat	14 (203)	under seat	5 (73)		

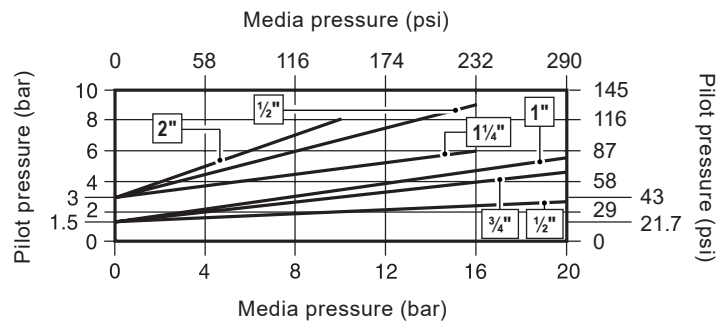
Pilot/media pressure relationship

PF51G-NC (Normally Closed)

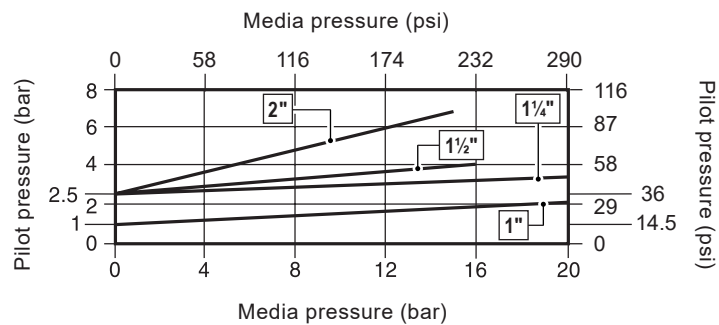
PF51G-1NC flow over seat (1 to 2)



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



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

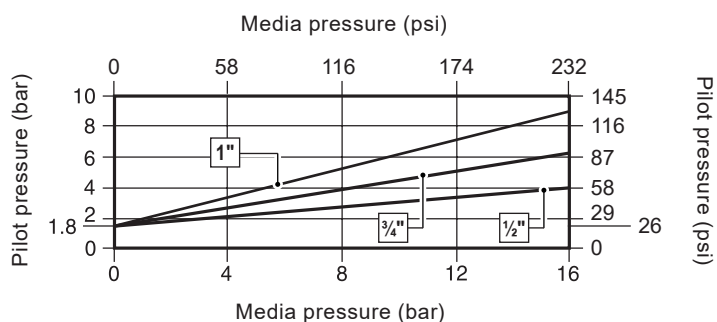


Pilot/media pressure relationship continued on next page

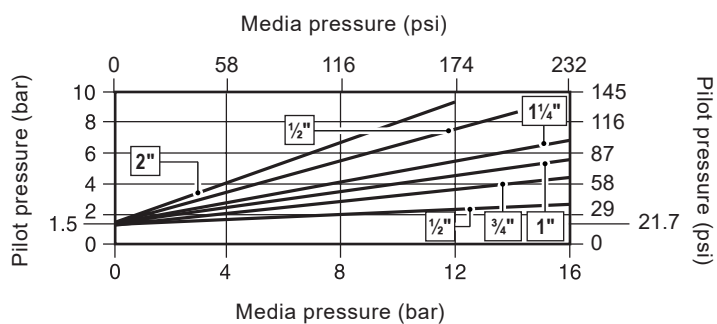
Pilot/media pressure relationship (continued)

PF51G-NO (Normally Open)

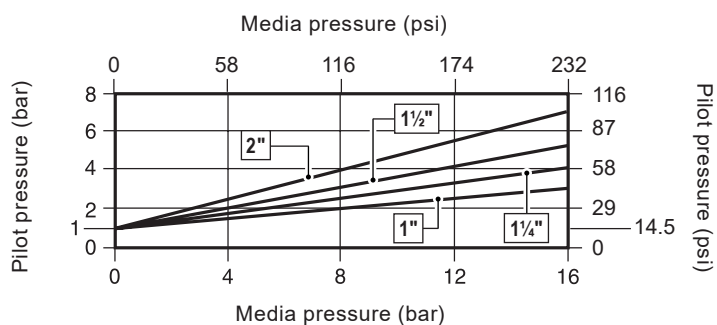
PF51G-1NO flow under seat (2 to 1)



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



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

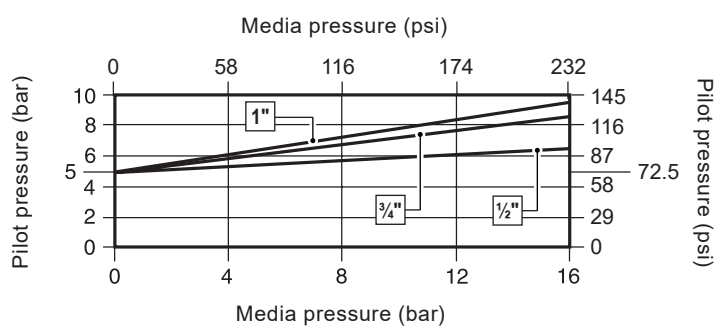


Pilot/media pressure relationship continued on next page

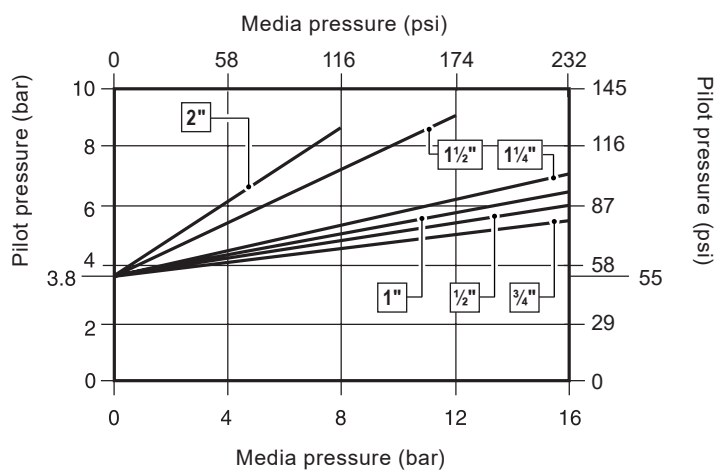
Pilot/media pressure relationship (continued)

PF51G-BD (Bi-Directional normally closed)

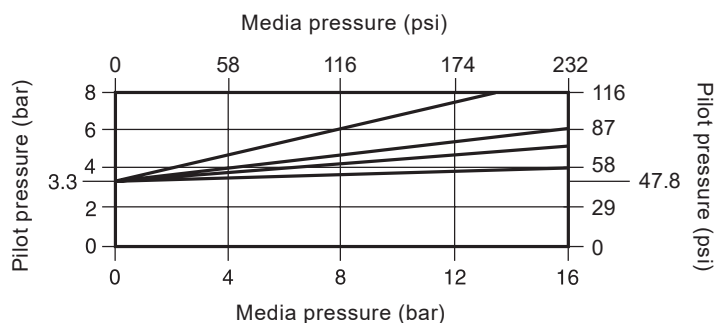
PF51G-1BD flow over seat (1 to 2)



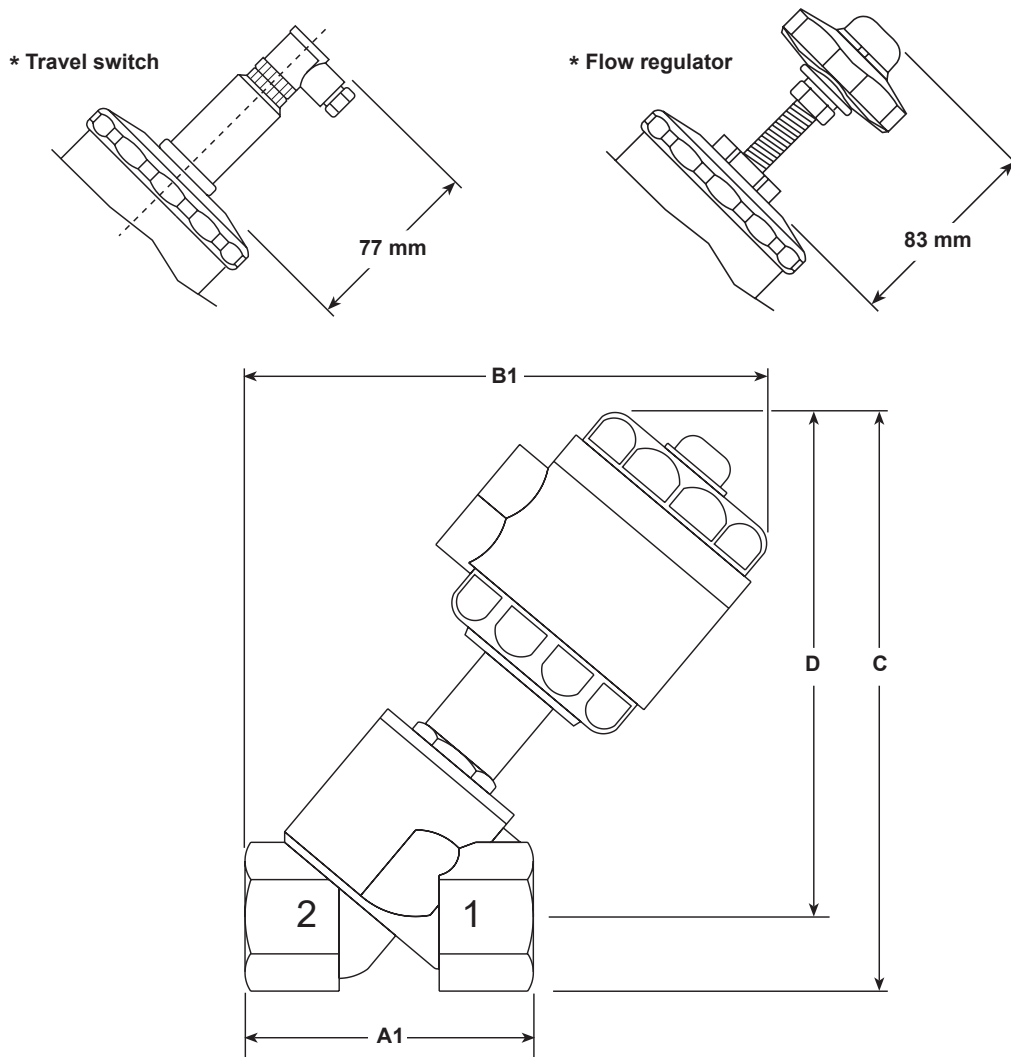
PF51G-2BD flow over seat (1 to 2)



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



Dimensions/weights (approximate) in mm (inches) and kg (lbs)



Valve size		Actuator type and size		A1		B1		C		D		Weight*	
		mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	kg	lbs
DN15 - ½"	1	45 mm	1.8	65	2.56	144	5.67	136	5.36	123	4.85	0.8	1.8
	2	63 mm	2.5			192	7.56	184	7.25	171	6.74	1.2	2.7
DN20 - ¾"	1	45 mm	1.8	75	2.96	49	5.87	142	5.60	126	4.97	0.9	2.0
	2	63 mm	2.5			198	7.80	192	7.57	176	6.94	1.3	2.9
DN25 - 1"	1	45 mm	1.8	90	3.55	168	5.87	161	6.35	141	5.56	1.1	2.5
	2	63 mm	2.5			212	8.35	205	8.08	185	7.29	1.5	3.3
	3	90 mm	3.5			223	8.79	216	8.51	196	7.73	2.2	4.9
DN32 - 1¼"	2	63 mm	2.5	110	4.33	225	8.87	217	8.55	193	7.61	1.9	4.2
	3	90 mm	3.5			234	9.22	227	8.94	202	7.96	2.4	5.3
DN40 - 1½"	2	63 mm	2.5	120	4.73	230	9.06	25	8.87	198	7.80		
	3	90 mm	3.5			239	9.42	235	9.26	207	8.16		
DN50 - 2"	2	63 mm	2.5	150	5.91	248	9.77	241	9.50	207	8.16	2.9	6.4
	3	90 mm	3.5			257	10.13	250	9.85	216	8.51	3.3	7.3

*Note: Add 0.2 kg (0.4 lbs) for travel switch or flow regulator options (not available for use with the Type 1 actuator).

Valve selection guide

Valve size	DN15 (½"), DN20 (¾"), DN25 (1"), DN32 (1¼"), DN40 (1½") and DN50 (2")			DN25
Valve type	P	=	Piston valve	P
Valve characteristic	F	=	Fast opening	F
Body material	5	=	Bronze	5
	1	=	Screwed	1
			BSP or NPT	
Valve plug seal	G	=	PTFE	G
	1	=	45 mm (1.8") diameter (for valve sizes ½" to 1")	2
Actuator type	2	=	63 mm (2.5") diameter (for valve sizes ½" to 2")	
	3	=	90 mm (3.5") diameter (for valve sizes 1" to 2")	
	NC	=	Normally Closed	NC
Valve position	NO	=	Normally Open	
	BD	=	Bi-Directional	
	Blank	=	No options required	
			Provides indication of open or closed valve position through a magnetic reed switch with volt free contacts.	
Optional	I	=	Travel switch 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.	
	R	=	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.

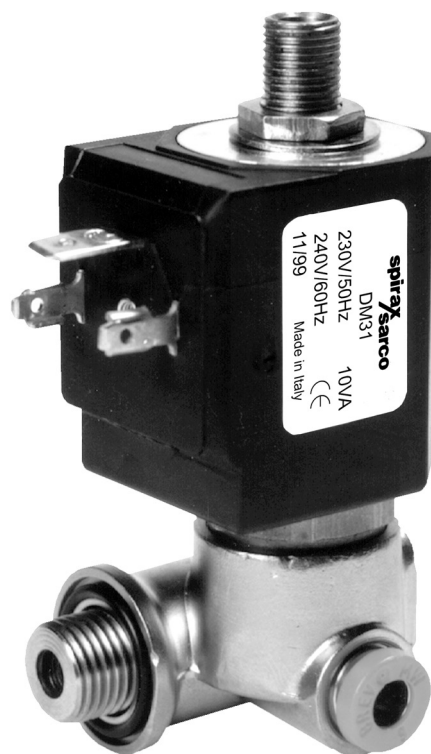
Associated equipment

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	Actuator connection	Line connection
DM11	1	45 mm (1.8")	230/50 or 240/60 Vac	1/8" BSP	1/8" BSP
DM12			110/50 or 120/60 Vac		
DM13			24/50 or 24/60 Vac		
DM14			24 Vdc		
DM21	2	63 mm (2.5")	230/50 or 240/60 Vac	1/4" BSP	
DM22			110/50 or 120/60 Vac		
DM23			24/50 or 24/60 Vac		
DM24			24 Vdc		
DM31	3	90 mm (3.5")	230/50 or 240/60 Vac		
DM32			110/50 or 120/60 Vac		
DM33			24/50 or 24/60 Vac		
DM34			24 Vdc		



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.