



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).

Recommended for pneumatic applications. Not recommended for water applications.

- **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 15 psig.



Optional extras (see 'Valve selection guide', page 7):

- Travel switch.
- Flow regulator.

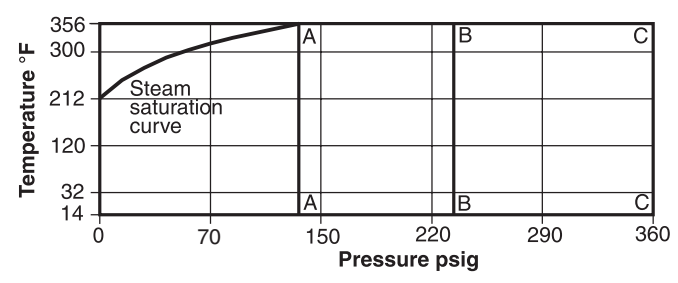
Sizes, pipe connections and actuator combinations

Valve type	Pipe connections	Valve action	Actuator type	Model	Sizes					
					1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
PF51G	Screwed 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			•	•	•	•

Local regulation may restrict the use of this product below the conditions quoted. Limiting conditions refer to standard connections only.
In the interests of development and improvement of the product, we reserve the right to change the specification.

PF51G Bronze Piston Actuated On/Off Valves

Pressure / temperature limits



- A - A Maximum operating pressure on saturated steam 130 psig
- B - B Maximum operating pressure on size 2" 230 psig
- C - C Maximum operating pressure on sizes 1/4" to 1-1/2" 360 psig

Body Design Conditions	Screwed BSP or NPT	1/2" - 2"
PMA	Maximum allowable pressure	360 psig
TMA	Maximum allowable temperature	356°F
Minimum allowable temperature		14°F
PMO	Maximum operating pressure	130 psig @ 356°F
TMO	Maximum operating temperature	356°F
Minimum operating temperature		(Note: For lower operating temperatures consult Spirax Sarco.) 14°F
ΔΔPMX	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 $\sqrt{\Delta\text{PMX}}$		

Technical details

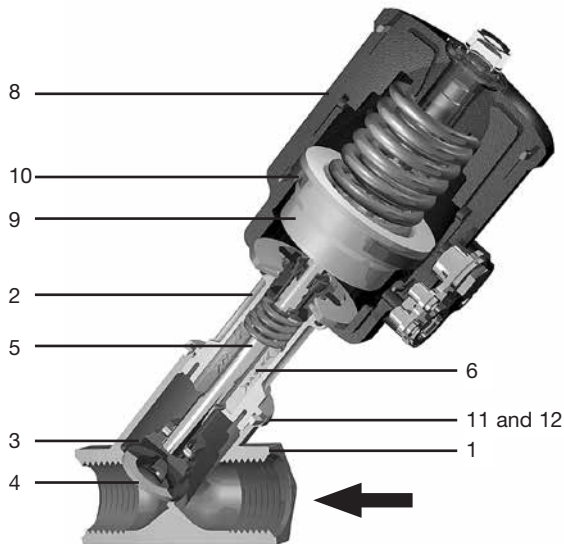
Leakage	PTFE soft seal	ANSI class V1
Flow characteristic	Fast opening	On/off
Flow direction	PF51G- NC	Flow over seat Port 1 to 2
	PF51G- NO	Flow under seat Port 2 to 1
	PF51G-BD	Flow over seat Port 1 to 2
Flow under seat Port 2 to 1		
Pilot media	Air or water	140°F maximum
Actuator rotation	360°	
Actuator type and size	Pilot connection	Maximum pilot pressure
	Type 1 = 45 mm diameter 1/8" BSP	150 psig
	Type 2 = 63 mm diameter 1/4" BSP	150 psig
	Type 3 = 90 mm diameter 1/4" BSP	115 psig

C_v values

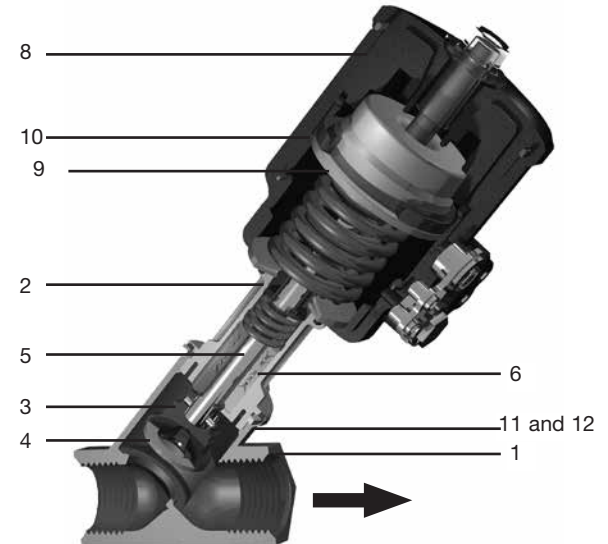
Size	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
C_{v,s}	4.7	8.8	20	29	46	58

PF51G Bronze Piston Actuated On/Off Valves

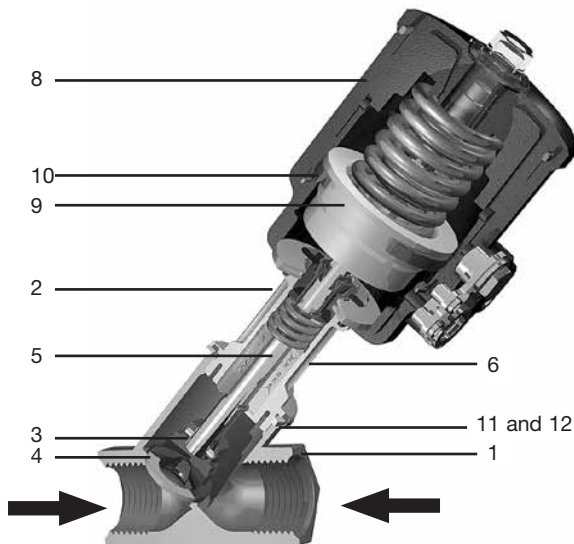
NC (Normally Closed)



NO (Normally Open)



BD (Bi-Directional normally closed)



Materials

No.	Part	Material
1	Body	Bronze EN1982 CC491K
2	Bonnet	Brass EN 12165 CW617N
3	Plug	Stainless steel AISI 316L
4	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

PF51G Bronze Piston Actuated On/Off Valves

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 (psig)	Pilot Pressure	
					Minimum (psig)	Maximum (psig)
PF51G-1NC	1/2"	45	over seat	230	26	150
	3/4"	45	over seat	230	26	150
	1"	45	over seat	230	26	150
PF51G-2NC	1/2"	63	over seat	290	22	150
	3/4"	63	over seat	290	22	150
	1"	63	over seat	290	22	150
	1-1/4"	63	over seat	230	44	150
	1-1/2"	63	over seat	230	44	150
	2"	63	over seat	160	44	150
PF51G-3NC	1"	90	over seat	290	15	115
	1-1/4"	90	over seat	230	36	115
	1-1/2"	90	over seat	230	36	115
	2"	90	over seat	220	36	115

PF51G-NO (Normally open)

Model	Valve size	Actuator diameter (mm)	Flow direction (port 2 to 1)	Maximum differential pressure (psig)	Pilot Pressure	
					Minimum (psig)	Maximum (psig)
PF51G-1NO	1/2"	45	under seat	230	26	150
	3/4"	45	under seat	230	26	150
	1"	45	under seat	230	26	150
PF51G-2NO	3/4"	45	under seat	230	22	150
	1"	63	under seat	230	22	150
	1-1/4"	63	under seat	230	22	150
	1-1/2"	63	under seat	230	22	150
	2"	63	under seat	175	22	150
PF51G-3NO	1"	90	under seat	230	15	115
	1-1/4"	90	under seat	230	15	115
	1-1/2"	90	under seat	230	15	115
	2"	90	under seat	230	15	115

PF51G-BD (Bi-Directional normally closed)

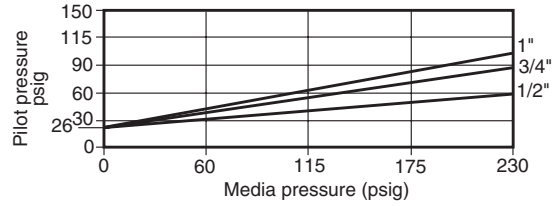
Model	Valve size	Actuator diameter (mm)	Flow direction (port 1 to 2)	Maximum differential pressure (port 1 to 2) (psig)	Flow direction (port 2 to 1)	Maximum differential pressure (port 2 to 1) (psig)	Pilot pressure	
							Minimum (psig)	Maximum (psig)
PF51G-1BD	1/2"	45	over seat	230	under seat	230	73	150
	3/4"	45	over seat	230	under seat	100	73	150
	1"	45	over seat	230	under seat	73	73	150
PF51G-2BD	3/4"	63	over seat	230	under seat	230	55	150
	1"	63	over seat	230	under seat	160	55	150
	1-1/4"	63	over seat	230	under seat	87	55	150
	1-1/2"	63	over seat	175	under seat	60	55	150
	2"	63	over seat	115	under seat	36	55	150
	1"	90	over seat	230	under seat	205	48	115
PF51G-3BD	1-1/4"	90	over seat	230	under seat	175	48	115
	1-1/2"	90	over seat	230	under seat	115	48	115
	2"	90	over seat	205	under seat	73	48	115

PF51G Bronze Piston Actuated On/Off Valves

Pilot / media pressure relationship

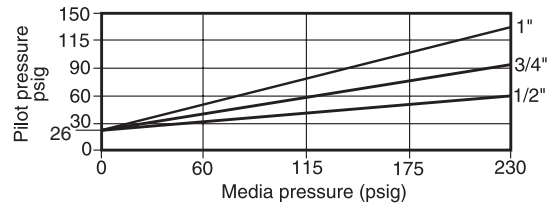
PF51G-NC (Normally Closed)

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

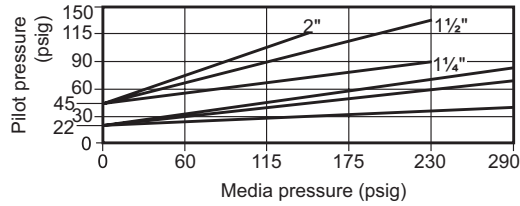


PF51G-NO (Normally Open)

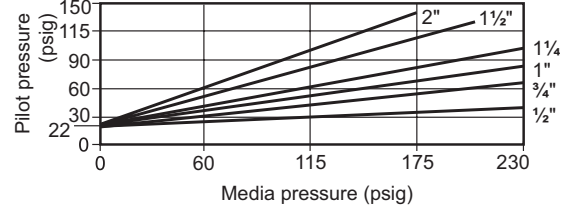
PF51G-1NO flow under seat (2 to 1)



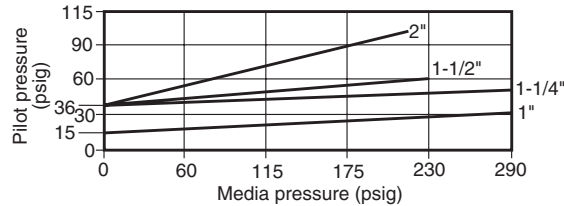
PF51G-2NC flow over seat (1 to 2)



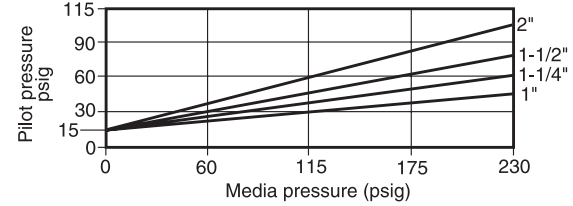
PF51G-2NO flow under seat (2 to 1)



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

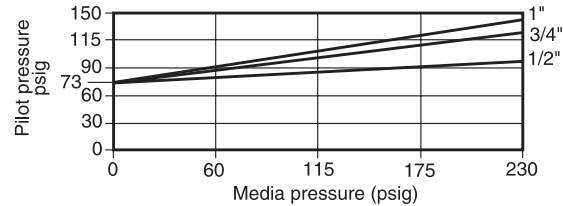


PF51G-1NC flow under seat (2 to 1)

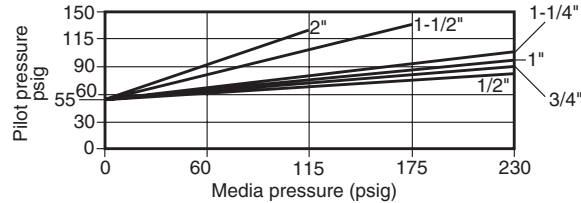


PF51G-BD (Bi-Directional normally closed)

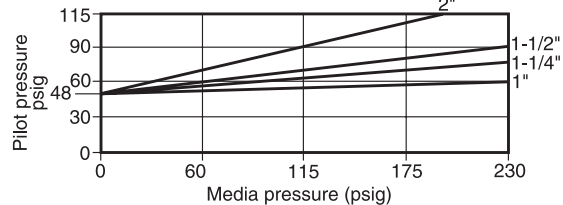
PF51G-1BD flow over seat (1 to 2)



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



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



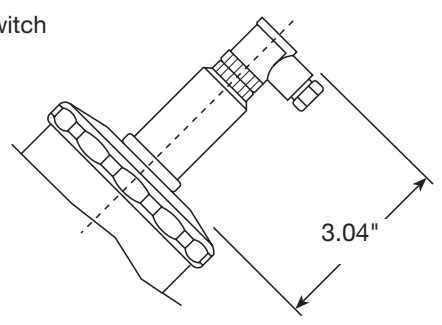
PF51G Bronze Piston Actuated On/Off Valves

Dimensions and weights (approximate) in inches and lbs.

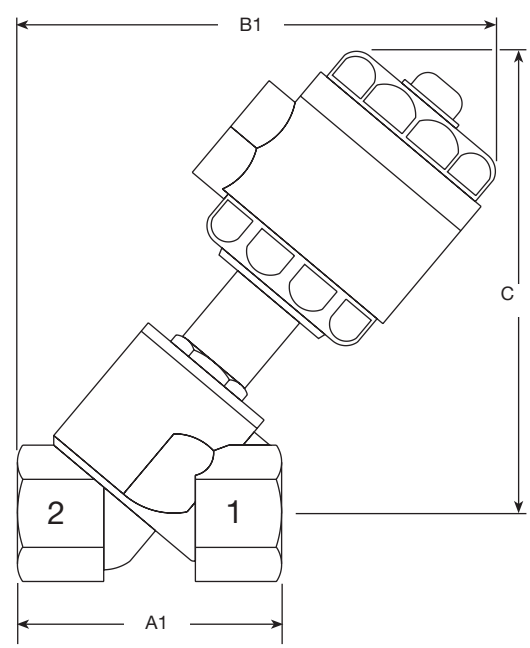
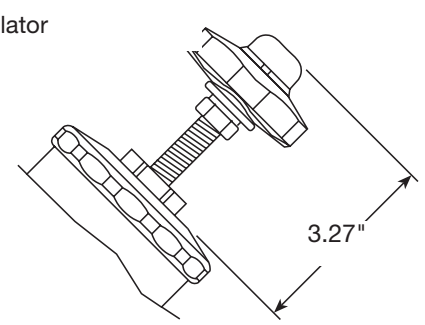
Valve size	Actuator type and size	A1	B1	C	D	Weight
1/2 "	1 (45 mm)	2.56	5.67	5.36	4.85	1.8
	2 (63 mm)	2.56	7.56	7.25	6.74	2.7
3/4"	1 (45 mm)	2.96	5.87	5.60	4.97	2.0
	2 (63 mm)	2.96	7.80	7.57	6.94	2.9
	3 (90 mm)	3.55	5.87	6.35	5.56	2.5
1"	2 (63 mm)	3.55	8.35	8.08	7.29	3.3
	3 (90 mm)	3.55	8.79	8.51	7.73	4.9
	1-1/4"	4.33	8.87	8.55	7.61	4.2
1-1/4"	2 (63 mm)	4.33	9.22	8.94	7.96	5.3
	3 (90 mm)	4.33	9.22	8.94	7.96	5.3
1-1/2"	2 (63 mm)	4.73	9.06	8.87	7.80	5.3
	3 (90 mm)	4.73	9.42	9.26	8.16	5.8
2"	2 (63 mm)	5.91	9.77	9.50	8.16	6.4
	3 (90 mm)	5.91	10.13	9.85	8.51	7.3

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

* Travel switch



* Flow regulator



PF51G Bronze Piston Actuated On/Off Valves

Valve selection guide

Valve type	P = Piston valve		P
Valve characteristic	F = Fast opening		F
Body material	5 = Bronze		5
Connections	1 = Screwed	BSP or NPT	1
Valve plug seal	G = PTFE		G
Actuator type	1 = 45 mm diameter (for valve sizes 1/2" to 1")		2
	2 = 63 mm diameter (for valve sizes 1/2" to 2")		
	3 = 90 mm diameter (for valve sizes 1" to 2")		
Valve position	NC = Normally Closed		NC
	NO = Normally Open		
	BD = Bi-Directional		
Valve size	1/2", 3/4", 1", 1-1/4", 1-1/2", 2"		1
Optional	I = 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.	
	R = Flow regulator	Available on Type 2 and Type 3 actuators with suffix 'I' if this option is required. 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

PF6 1 G

2 NC

1"

NPT

How to order

Example: 1 of Spirax Sarco PF51G-2NC-1" NPT 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 of Seal kit for a PF51G-2NC-1" NPT, 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.

PF51G Bronze Piston Actuated On/Off Valves

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	Frequency/ Voltage	Actuator Connection	Line Connection
DM11N	1	45 mm	230/50 or 240/60 Vac	1/8" BSP	1/8" NPT
DM12N	1	45 mm	110/50 or 120/60 Vac	1/8" BSP	1/8" NPT
DM13N	1	45 mm	24/50 or 24/60 Vac	1/8" BSP	1/8" NPT
DM14N	1	45 mm	24 Vdc	1/8" BSP	1/8" NPT
DM21N	2	63 mm	230/50 or 240/60 Vac	1/4" BSP	1/8" NPT
DM22N	2	63 mm	110/50 or 120/60 Vac	1/4" BSP	1/8" NPT
DM23N	2	63 mm	24/50 or 24/60 Vac	1/4" BSP	1/8" NPT
DM24N	2	63 mm	24 Vdc	1/4" BSP	1/8" NPT
DM31N	3	90 mm	230/50 or 240/60 Vac	1/4" BSP	1/8" NPT
DM32N	3	90 mm	110/50 or 120/60 Vac	1/4" BSP	1/8" NPT
DM33N	3	90 mm	24/50 or 24/60 Vac	1/4" BSP	1/8" NPT
DM34N	3	90 mm	24 Vdc	1/4" BSP	1/8" NPT

