



PF6 Stainless Steel Piston Actuated On/Off Valves

Description

A 2-port pneumatically actuated on/off stainless steel valve for use on steam, water, air, oil and gases. A pneumatic signal acts on the actuator piston to open or close the valve with a spring return action. A valve position indicator is included on standard and flow regulator models.

Standard versions have PTFE stem seals for operation up to 180 °C (356 °F).

Optionally, high temperature stem seals (**H**) can be provided for operation up to 200 °C (392 °F).

Valves are available with one of three sizes of actuator:

Type 1 (45 mm (1.77")), **Type 2** (63 mm (2.48")) and **Type 3** (90 mm (3.54")) with the following action options:

- **NC (Normally Closed)** - Designed for flow over the seat (port 1 to 2).
Caution: Not recommended for waterhammer prevention.
- **NO (Normally Open)** - 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)** - 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', page 12):

Travel switch	Flow regulator	Position module
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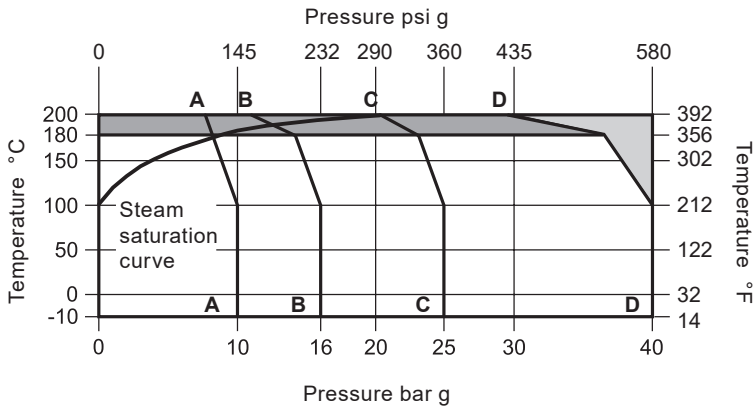
Sizes, pipe connections and actuator combinations

Valve type and pipe connections	Actuator type and version	DN15 ½"	DN20 ¾"	DN25 1"	DN32 1¼"	DN40 1½"	DN50 2"
PF60G Threaded spigots to ISO 228/1 (DN50 to ISO 338) PF61G Screwed to BSP or NPT PF62G Butt weld to DIN 11850 pipe, ASME B 36.10/ISO 65 pipe	1 PTFE version	•	•				
	2 PTFE version	•	•	•	•	•	•
	H version	•	•	•			
	3 PTFE version			•	•	•	•
PF63G Flanged to EN 1092 or ASME Class 150 (welded on flanges)	H version				•	•	•
	2 PTFE version	•	•	•	•	•	•
	H version	•	•	•			
	3 PTFE version			•	•	•	•
	H version				•	•	•

Available range

Valve action	Screwed (BSP or NPT)	Butt weld	Flanged (EN 1092 or ASME)	Threaded spigots
NC - Normally Closed (flow over seat)	PF61G-1NC	PF62G-1NC		PF60G-1NC
	PF61G-2NC	PF62G-2NC	PF63G-2NC	PF60G-2NC
	PF61G-3NC	PF62G-3NC	PF63G-3NC	PF60G-3NC
NO - Normally Open (flow under seat)	PF61G-1NO	PF62G-1NO		PF60G-1NO
	PF61G-2NO	PF62G-2NO	PF63G-2NO	PF60G-2NO
	PF61G-3NO	PF62G-3NO	PF63G-3NO	PF60G-3NO
BD - Bi-Directional normally closed (flow over or under seat)	PF61G-1BD	PF62G-1BD		PF60G-1BD
	PF61G-2BD	PF62G-2BD	PF63G-2BD	PF60G-2BD
	PF61G-3BD	PF62G-3BD	PF63G-3BD	PF60G-3BD

Pressure/temperature limits



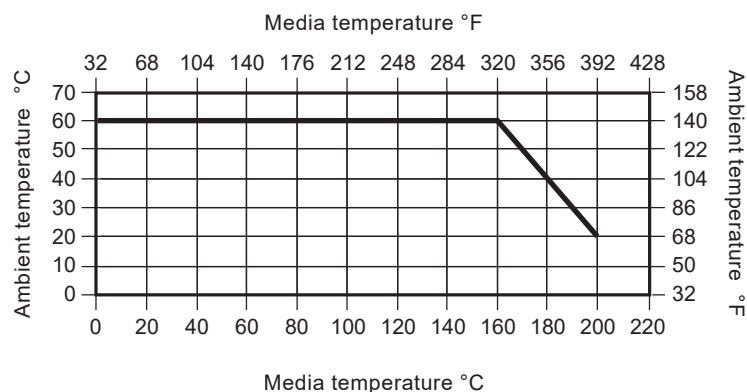
- A - A PN10
- B - B PN16 and ASME 150
- C - C PN25
- D - D PN40

The product **must not** be used in this region or beyond the body design conditions quoted in the table below as damage to the internals will occur.

High temperature stem seals (Option **H**) are required for use in this region.

Body design conditions	Screwed, butt weld, threaded spigots and flanged EN 1092	DN15 - DN25 (½" - 1")	PN40
		DN32 and DN40 (1¼" - 1½")	PN25
		DN50 (2")	PN16
	Flanged ASME	DN15 - DN50 (½" - 2")	Class 150
Maximum design pressure		Refer to the graph above	
Maximum design temperature		200 °C	392 °F
Minimum design temperature		-10 °C	14 °F
Maximum operating pressure for saturated steam service	Standard seals	9 bar g @ 180 °C	130 psi g @ 356 °F
	High temperature seals - Option H	14.5 bar g @ 200 °C	210 psi g @ 392 °F
Maximum operating temperature	Standard seals	180 °C @ 9 bar g	356 °F @ 130 psi g
	High temperature seals - Option H	200 °C @ 14.5 bar g	392 °F @ 210 psi g
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			
Maximum differential pressure		(see page 6)	
Designed for a maximum cold hydraulic test pressure of:		1.5 x PMA (PN rating)	
Maximum test pressure is equal to the maximum differential pressure			

Temperature degradation



Technical details

Leakage		TFM 1600 soft seal	ASME Class VI	
Flow characteristic		Fast opening	On/off	
Flow direction	PF6_G-NC	Flow over seat	Port 1 to 2	
	PF6_G-NO	Flow under seat	Port 2 to 1	
	PF6_G-BD	Flow over seat	Port 1 to 2	
		Flow under seat	Port 2 to 1	
Pilot media Instrument air or inert gases - For use with other flow media contact Spirax Sarco			60 °C (140 °F)maximum	
Actuator rotation		360°		
Actuator type and size	Pilot connection		Maximum pilot pressure	
			NC & BO	NO
	Type 1 = 45 mm (1.77")diameter	⅛" BSP	10 bar g (145 psi g)	10 bar g (145 psi g)
	Type 2 = 63 mm (2.48") diameter	¼" BSP	10 bar g (145 psi g)	8 bar g (116 psi g)
	Type 3 = 90 mm (3.54") diameter	¼"BSP	8 bar g (116 psi g)	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:

$C_v \text{ (UK)} = K_v \times 0.963$

$C_v \text{ (US)} = K_v \times 1.156$

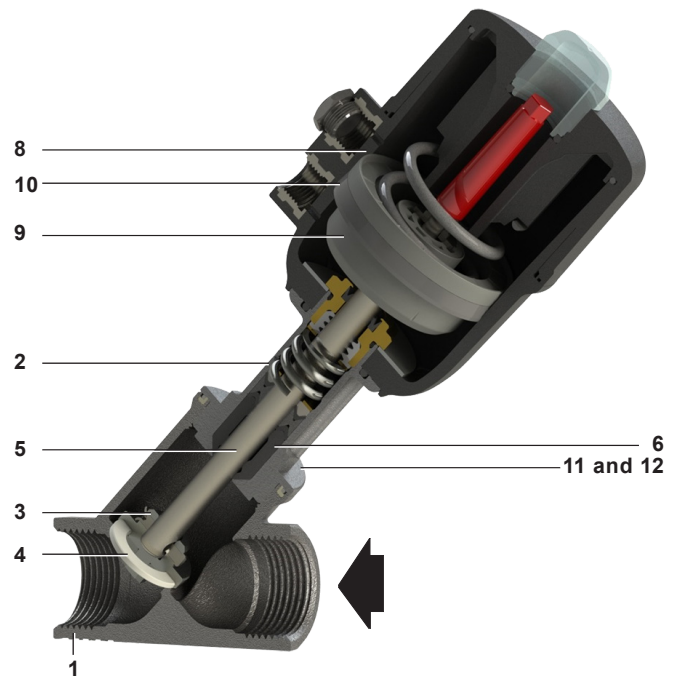
Materials

No.	Part	Material	
1	Body	Stainless steel	AISI 316L
2	Bonnet	Stainless steel	AISI 316L
3	Plug	Stainless steel	AISI 316L
4	Valve plug seal	Modified PTFE G500	
5	Valve stem	Stainless steel	AISI 316L
6	Stem seals	Standard	PTFE + 25% carbon graphite filled PTFE
			+ FKM chevron
		Option H	25% carbon graphite filled PTFE + FKM chevron
7*	Stem 'O' ring	FKM	
8**	Actuator housing	30% glass filled polyamide (for H version PA66)	
9	Piston	50% glass filled polyamide	
10	Piston lip seal	NBR	
11	Gasket	PTFE	
12	'O' ring	FKM	

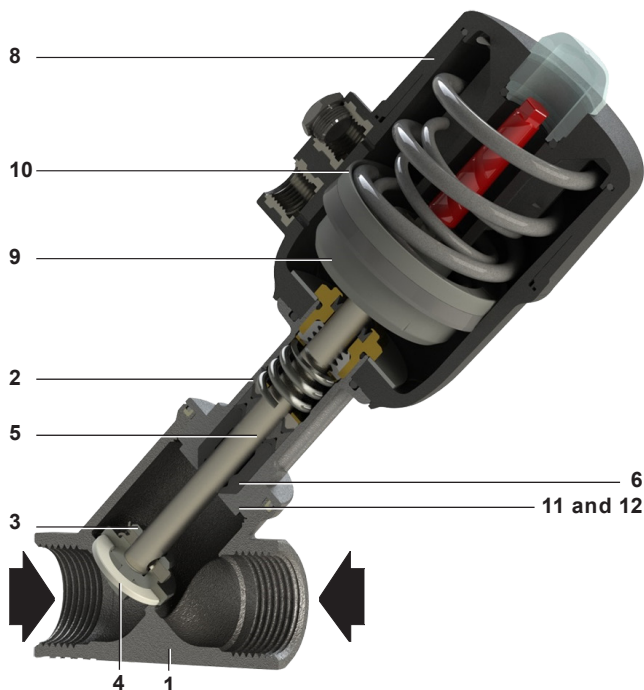
* **Note** Item 7 is not shown.

** **Note** Optional stainless steel actuator available on request.

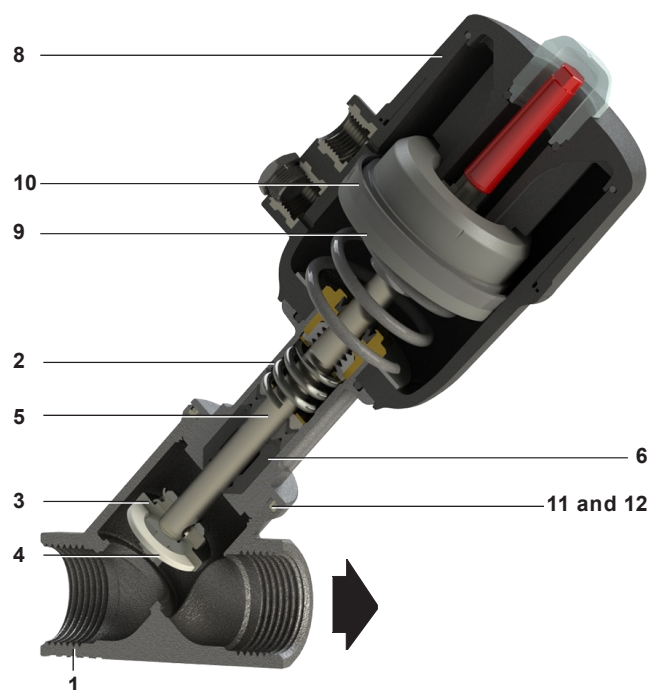
NC (Normally Closed)



BD (Bi-Directional normally closed)



NO (Normally Open)



ΔPMX - Maximum differential pressures for PF6 piston actuated valves

* Notes:

1. Maximum differential pressure for saturated steam service is 11.5 bar g (167 psi g) and 14.5 bar g (210 psi g) for high temperature valve versions.
2. ASME flange connections are limited to ASME 150 pressure rating.

PF6_G-NC (Normally closed)

Model	Valve size	Actuator diameter (mm)		Flow direction (port 1 to 2)	Maximum differential pressure (see Notes at the top of this page)		Pilot Pressure			
		mm	inches		bar	psi g	Minimum		Maximum	
PF6_G-1NC	DN15 - (½")	45	1.77	over seat	16	230	1.8	26	10	150
	DN20 - (¾")									
PF6_G-2NC	DN15 - (½")	63	2.48	over seat	20	290	3.9	57	10	150
	DN20 - (¾")						4.6	67	10	150
	DN25 - (1")						5.2	75	10	150
	DN32 - (1¼")				16	230	5.7	83	10	150
	DN40 - (1½")						8.8	128	10	150
	DN50 - (2")				11	160	7.8	113	10	150
PF6_G-3NC	DN25 - (1")	90	3.54	over seat	20	290	3.0	44	8	115
	DN32 - (1¼")				16	230	3.0	44	8	115
	DN40 - (1½")						4.0	58	8	115
	DN50 - (2")						5.8	84	8	115

PF6_G-NO (Normally open)

Model	Valve size	Actuator diameter (mm)		Flow direction (port 1 to 2)	Maximum differential pressure (see Notes at the top of this page)		Pilot Pressure			
		mm	inches		bar	psi g	Minimum		Maximum	
PF6_G-1NO	DN15 - (½")	45	1.77	under seat	16	230	1.8	26	10	150
	DN20 - (¾")									
PF6_G-2NO	DN15 - (½")	63	2.48	under seat	16	230	2.8	41	10	145
	DN20 - (¾")						4.5	65	10	145
	DN25 - (1")						5.7	83	10	145
	DN32 - (1¼")						6.7	97	10	145
	DN40 - (1½")						8.8	127	10	145
	DN50 - (2")				8	175	9.6	139	10	145
PF6_G-3NO	DN25 - (1")	90	3.54	under seat	16	230	4.5	65	8	116
	DN32 - (1¼")						4.0	58	8	116
	DN40 - (1½")						5.4	78	8	116
	DN50 - (2")						7.0	101	8	116

PF6_G-BD (Bi-Directional normally closed)

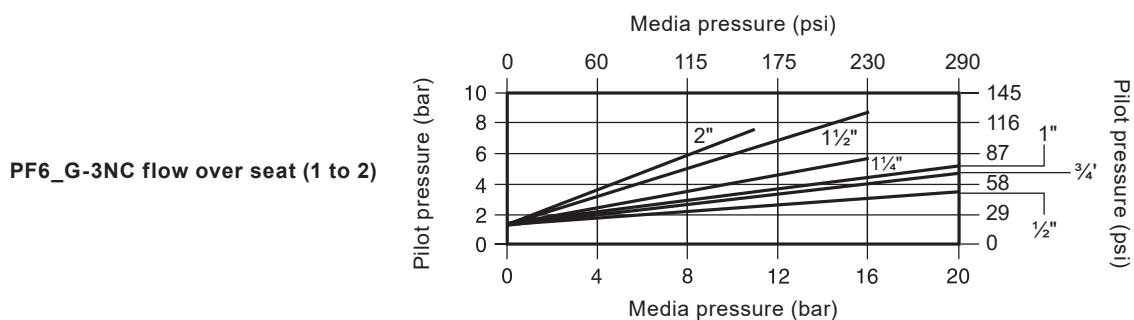
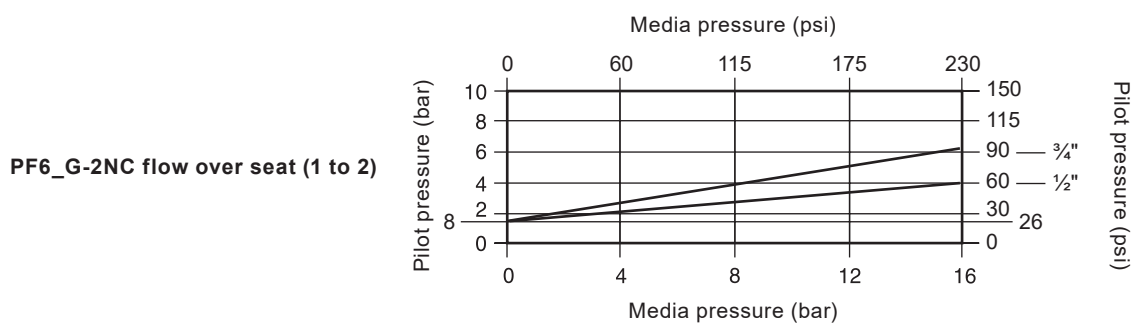
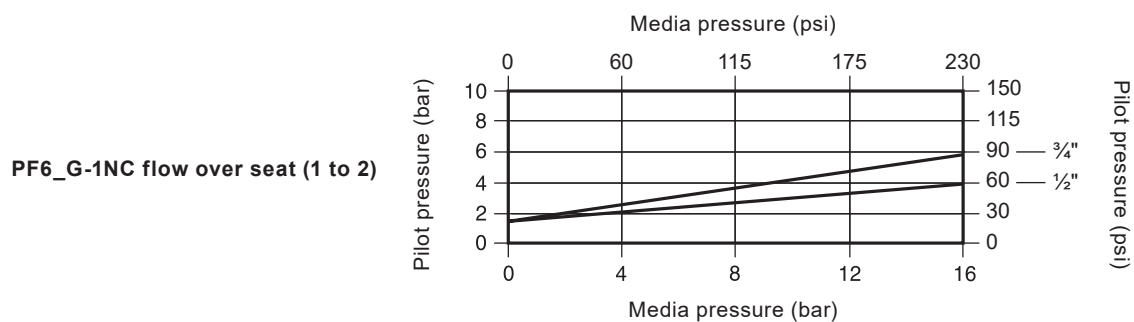
Model	Valve size	Actuator diameter (mm)		Flow direction (port 1 to 2)	* Maximum differential pressure (port 1 to 2)		Flow direction (port 2 to 1)	* Maximum differential pressure (port 2 to 1)		Pilot pressure			
										Minimum		Maximum	
		mm	inches		bar	psi g		bar	psi g	bar	psi g	bar	psi g
PF6_G-1BD	DN15 - (1/2")	45	1.77	over seat	16	230	under seat	16.0	230	5.0	60	10	150
	DN20 - (3/4")						under seat	7.0	100				
PF6_G-2BD	DN15 - (1/2")	63	2.48	over seat	16	230	under seat	16.0	230	4.2	61	10	150
	DN20 - (3/4")						under seat	16.0	230				
	DN25 - (1")						under seat	11.0	160				
	DN32 - (1 1/4")						under seat	6.0	87				
	DN40 - (1 1/2")				12	175	under seat	4.0	60				
	DN50 - (2")				8	115	under seat	2.5	36				
PF6_G-3BD	DN25 - (1")	90	3.54	over seat	16	230	under seat	14.0	205	3.8	55	8	115
	DN32 - (1 1/4")						under seat	12.0	175				
	DN40 - (1 1/2")						under seat	8.0	115				
	DN50 - (2")				14	205	under seat	6.0	73				

*** Notes:**

1. Maximum differential pressure for saturated steam service is 11.5 bar g (167 psi g) and 14.5 bar g (210 psi g) for high temperature valve versions.
2. ASME flange connections are limited to ASME 150 pressure rating.

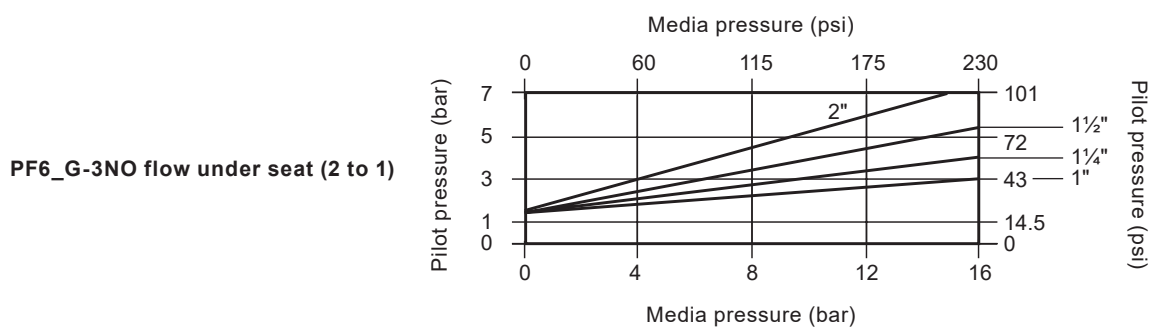
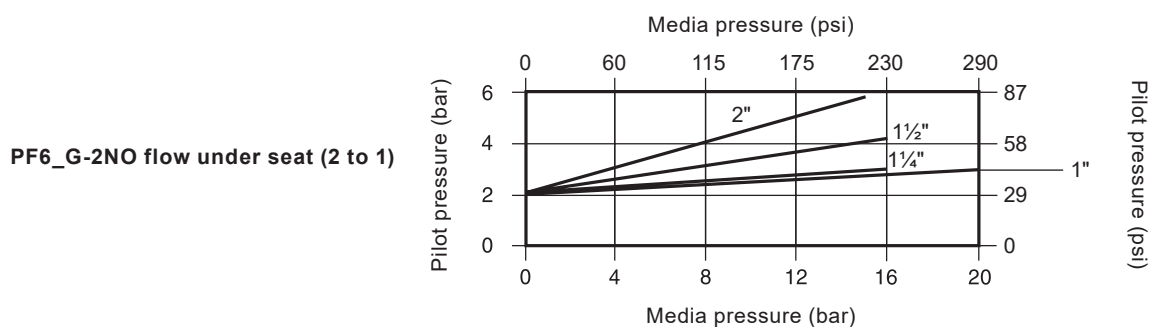
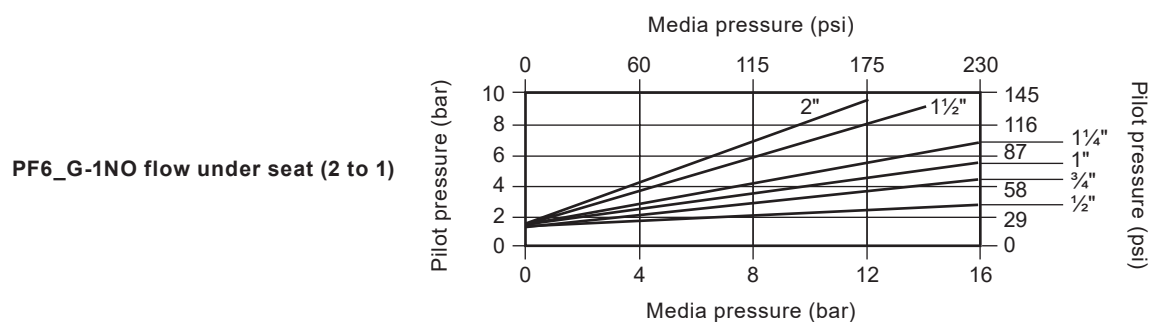
Pilot/media pressure relationship

PF6_G-NC (Normally Closed)



Pilot/media pressure relationship (continued)

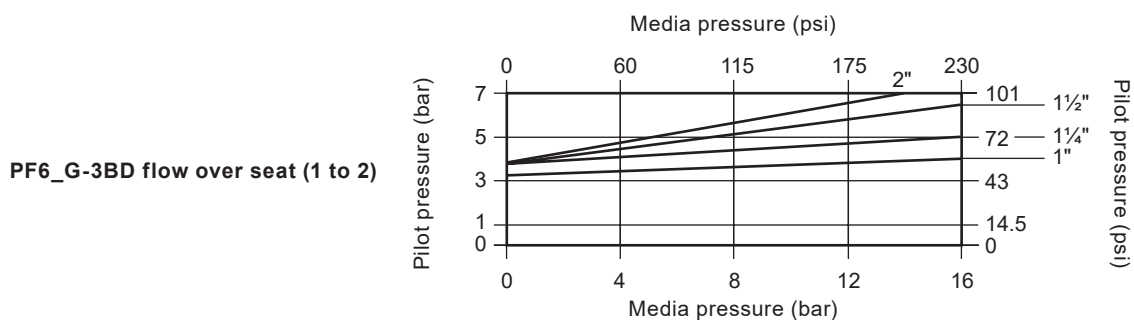
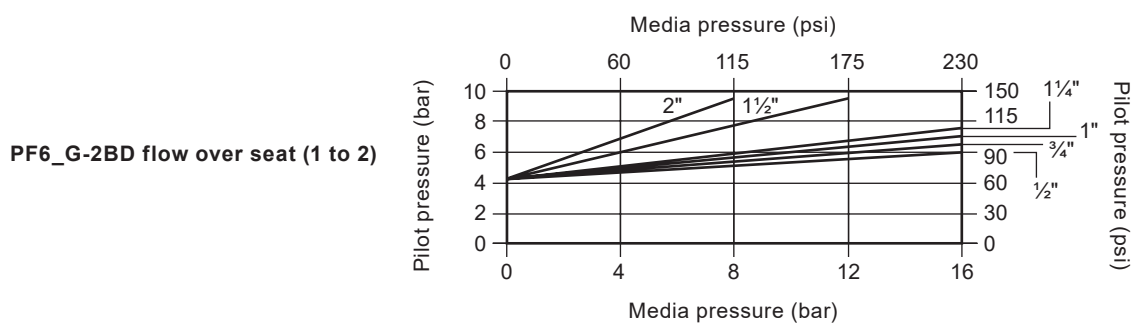
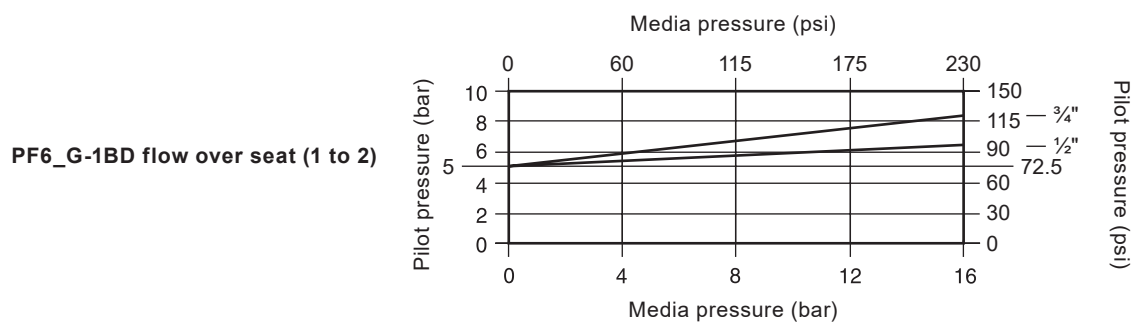
PF6_G-NO (Normally Open)



Pilot/media pressure relationship continued on next page

Pilot/media pressure relationship

PF6_G-BD (Bi-Directional normally closed)



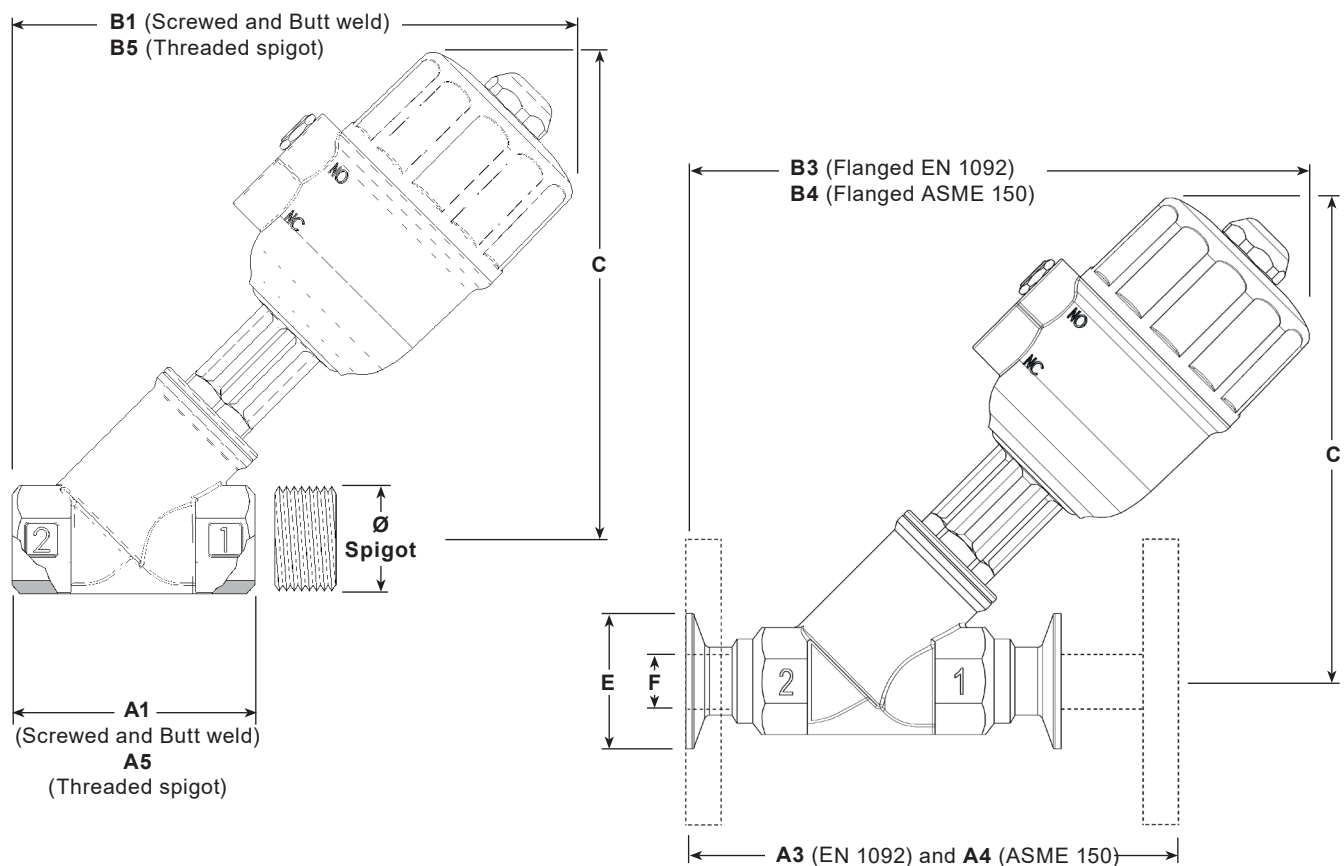
Dimensions and weights (approximate) in mm (inches) and kg (lb)

Notes:

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

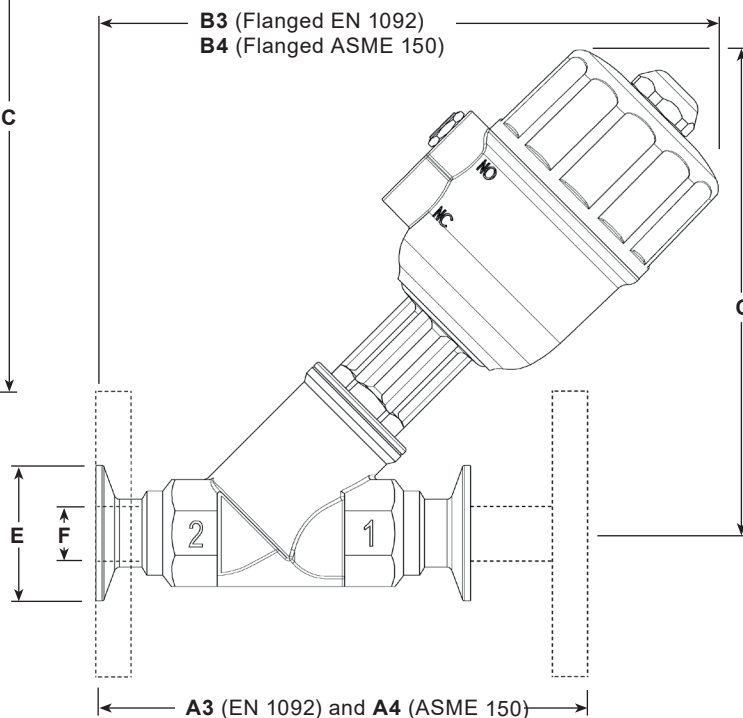
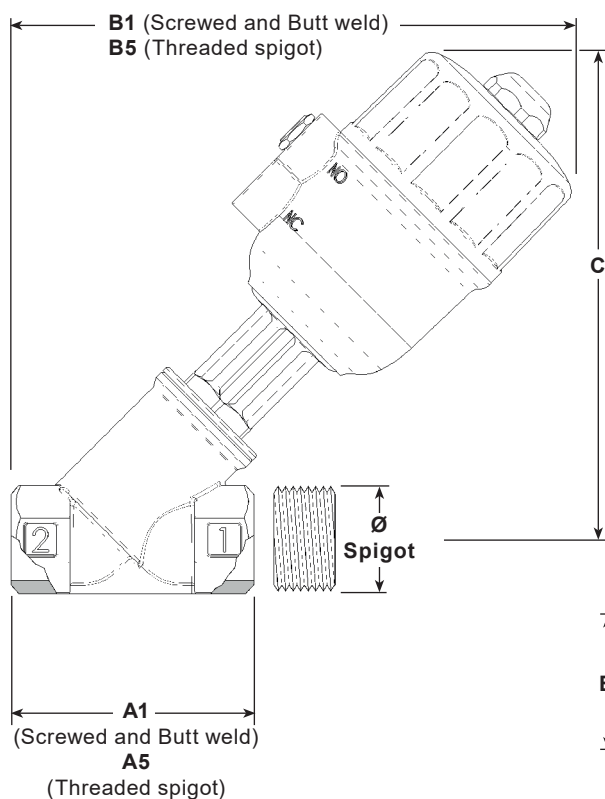
Add 0.45 kg (1 lb) for the position module.

Valve size	Actuator type and size	Screw and Butt weld							
		A1		B1		C		Weight *	
		mm	inches	mm	inches	mm	inches	kg	lbs
DN15 - ½"	1 (45 mm)	65	2.56	144	5.67	123	4.85	0.8	1.8
	2 (63 mm)	65	2.56	192	7.56	171	6.74	1.2	2.7
DN20 - ¾"	1 (45 mm)	75	2.96	155	6.11	126	4.97	0.9	2.0
	2 (63 mm)	75	2.96	198	7.80	176	6.93	1.3	2.9
DN25 - 1"	2 (63 mm)	90	3.55	212	8.35	185	7.29	1.5	3.3
	3 (90 mm)	90	3.55	223	8.79	196	7.72	2.0	4.9
DN32 - 1¼"	2 (63 mm)	110	4.33	225	8.87	193	7.60	1.9	4.2
	3 (90 mm)	110	4.33	234	9.22	202	7.96	2.4	5.3
DN40 - 1½"	2 (63 mm)	120	4.73	230	9.06	198	7.80	2.1	5.3
	3 (90 mm)	120	4.73	239	9.42	207	8.16	2.6	5.8
DN50 - 2"	2 (63 mm)	150	5.91	248	9.77	207	8.16	2.9	6.4
	3 (90 mm)	150	5.91	257	10.13	216	8.51	3.3	7.3



Dimensions and weights (approximate) in mm (inches) and kg (lb) (continued)

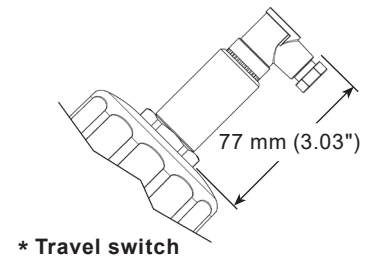
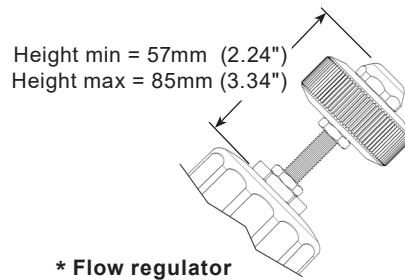
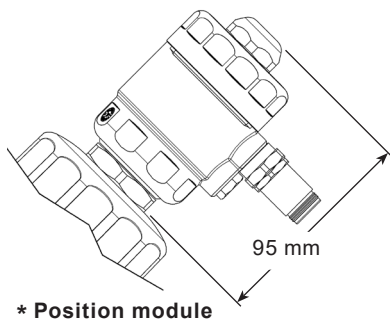
Valve size	Actuator type and size	Flanged											
		EN 1092 A3		ASME 150 A4		EN 1092 B3		ASME 150 B4		C		Weight *	
		mm	inches	mm	inches	mm	inches	mm	inches	mm	inches	kg	lbs
DN15 - 1/2"	1 (45 mm)	-	-	-	-	-	-	-	-	-	-	-	-
	2 (63 mm)	130	5.12	139.7	5.51	229.0	8.59	226.2	7.65	202.1	7.65	2.6	5.5
DN20 - 3/4"	1 (45 mm)	-	-	-	-	-	-	-	-	-	-	-	-
	2 (63 mm)	150	5.91	152.4	6.00	235.9	9.30	232.7	8.28	207.4	8.28	3.0	6.4
DN25 - 1"	2 (63 mm)	160	6.31	165.1	6.50	249.2	9.42	247.6	8.20	216.2	8.20	3.8	8.2
	3 (90 mm)	160	6.31	165.1	6.50	260.2	9.85	258.6	8.63	227.2	8.63	4.4	9.5
DN32 - 1 1/4"	2 (63 mm)	180	7.09	184.2	7.26	262.0	9.93	259.9	8.51	224.0	8.51	5.6	12.2
	3 (90 mm)	180	7.09	184.2	7.26	273.0	10.37	270.9	8.95	235.0	8.95	6.0	13.0
DN40 - 1 1/2"	2 (63 mm)	200	7.88	203.2	8.00	267.0	10.13	266.5	8.67	229.0	8.67	6.5	14.2
	3 (90 mm)	200	7.88	203.2	8.00	278.0	10.56	277.5	9.14	240.0	9.14	7.0	15.2
DN50 - 2"	2 (63 mm)	230	9.06	228.6	9.00	288.2	10.84	237.3	9.06	237.8	9.06	8.7	19.0
	3 (90 mm)	230	9.06	228.6	9.00	299.2	11.27	298.3	9.46	248.8	9.46	9.1	20.0



Dimensions and weights (approximate) in mm (inches) and kg (lb) (continued)

Valve size			Actuator type and size		Threaded spigot (to ISO 228/1)						
					A5		B5		C		Ø Spigot
			mm	inches	mm	inches	mm	inches		kg	lbs
DN15 - ½"	1	(45 mm)	90	3.54	148	5.82	123	4.84	G ¾"	0.90	1.98
	2	(63 mm)			196	7.71	171	6.73	G ¾"	1.30	2.86
DN20 - ¾"	1	(45 mm)	110	4.33	156	6.14	126	4.96	G 1"	1.00	2.20
	2	(63 mm)			206	8.11	176	6.92	G 1"	1.40	3.08
DN25 - 1"	2	(63 mm)	118	4.64	217	8.54	185	7.28	G 1¼"	1.65	3.63
	3	(90 mm)			228	8.97	196	7.71	G 1¼"	2.15	4.73
DN32 - 1¼"	2	(63 mm)	130	5.11	226	8.89	193	7.59	G 1½"	2.00	4.40
	3	(90 mm)			237	9.33	202	7.95	G 1½"	2.50	5.51
DN40 - 1½"	2	(63 mm)	140	5.51	224	8.81	198	7.79	G 1¾"	2.20	4.85
	3	(90 mm)			235	9.25	207	8.14	G 1¾"	2.70	5.95
DN50 - 2" **	2	(63 mm)	175	6.88	246	9.68					G 2⅝"
	3	(90 mm)			257	10.11	216	8.50	G 2⅝"	3.50	7.71

** Note: The DN50 threaded spigot is to ISO 338.



PF6 piston actuated valves - opening/closing times (seconds)

Notes:

1. Pilot pressure is 6 bar (87 psi)
2. Pressure in the body 0 bar (0 psi)

Valve size	Actuator Ø45 mm				Actuator Ø63 mm				Actuator Ø90 mm			
	NC valves		NO valves		NC valves		NO valves		NC valves		NO valves	
	opening	closing	opening	closing	opening	closing	opening	closing	opening	closing	opening	closing
DN15 - ½"	0.09	0.22	0.22	0.09	0.14	0.30	0.30	0.14	-	-	-	-
DN20 - ¾"	0.09	0.22	0.22	0.09	0.20	0.30	0.30	0.20	-	-	-	-
DN25 - 1"	-	-	-	-	0.32	0.34	0.34	0.32	0.32	0.34	0.34	0.32
DN32 - 1¼"	-	-	-	-	0.34	0.38	0.38	0.34	0.36	0.40	0.40	0.36
DN40 - 1½"	-	-	-	-	0.34	0.38	0.38	0.34	0.40	0.46	0.46	0.40
DN50 - 2"	-	-	-	-	0.36	0.38	0.38	0.36	0.40	0.46	0.46	0.40

Associated equipment

Pilot solenoid

Type DM 3-port two way electropneumatic pilot solenoid valve that can be directly mounted (banjo connection) to the PF61G-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.

Please refer to TI-P373-04 or IM-P373-12 for more information.

Available types

Model	Type	Actuator	Voltage/Frequency	Connection
DM11	1	45 mm (1.77")	230/50 or 240/60 Vac	⅛" BSP
DM12			110/50 or 120/60 Vac	⅛" BSP
DM13			24/50 or 24/60 Vac	⅛" BSP
DM14			24 Vdc	⅛" BSP
DM21	2	63 mm (2.48")	230/50 or 240/60 Vac	¼" BSP
DM22			110/50 or 120/60 Vac	¼" BSP
DM23			24/50 or 24/60 Vac	¼" BSP
DM24			24 Vdc	¼" BSP
DM31	3	90 mm (3.54")	230/50 or 240/60 Vac	¼" BSP
DM32			110/50 or 120/60 Vac	¼" BSP
DM33			24/50 or 24/60 Vac	¼" BSP
DM34			24 Vdc	¼" BSP



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	6	=	Stainless steel	6
	0	=	Threaded spigots to ISO 228/1	3
	1	=	Screwed BSP or NPT	
Connections	2	=	Butt weld Note: state pipeline connection when ordering: - DIN 11850 pipe - ASME B 36.10/ISO 65 pipe	
	3	=	Flanged EN 1092 or ASME Class 150 (welded on flanges)	
	4	=		
Valve plug seal	G	=	Modified PTFE G500 soft seat	G
	Blank	=	PTFE + 25% carbon graphite filled PTFE + FKM chevron (standard)	2
Stem seal	H	=	25% carbon graphite filled PTFE + FKM chevron Note: Option H is not available for valves fitted with Type 1 actuators.	
	1	=	45 mm diameter (1.77 inches)	
Actuator type	2	=	63 mm diameter (2.48 inches)	NC
	3	=	90 mm diameter (3.54 inches)	
	NC	=	Normally Closed	
Valve position	NO	=	Normally Open	
	BD	=	Bi-Directional	
	Blank	=	No options required	
	A	=	Position module with mechanical switch Change-over contacts, max. tension 230 Vac, Max. current 6 A	
	B	=	Position module with inductive switch PNP, supply 14 - 12 Vdc power 13 mA max.	
Optional			Provides indication of open or closed valve position through a magnetic reed switch with volt free contacts.	
	I	=	Travel switch Voltage (V) = 500 V, Maximum rating: 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	-	6	-	3	-	G	-		-	2	-	NC	-		-	Flanged EN 1092 PN40
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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 05/22.

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.