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

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) -** 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.

Optional extras (see 'Valve selection guide', page 12):

Travel switch	Flow regulator	Position module

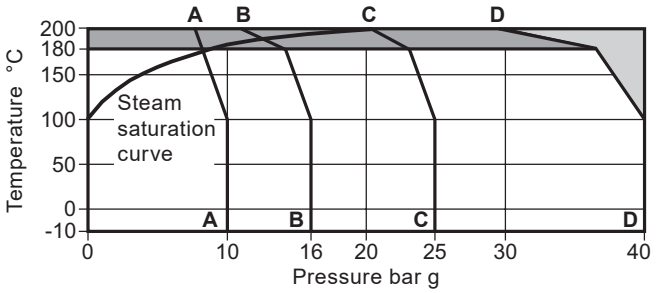
Sizes, pipe connections and actuator combinations

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)	**1**	PTFE version	•	•				
PF61G Screwed to BSP or NPT	**2**	PTFE version	•	•	•	•	•	•
PF62G Butt weld to DIN 11850 pipe, ASME B 36.10/ISO 65 pipe		H version	•	•	•			
	3	PTFE version			•	•	•	•
		H version				•	•	•
PF63G Flanged to EN 1092 or ASME Class 150 (welded on flanges)	**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

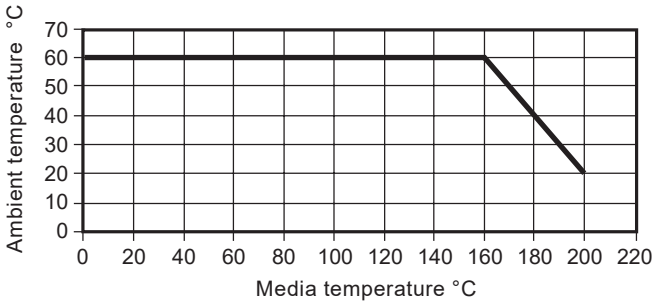
D - D PN40

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
Minimum design temperature			-10 °C
Maximum operating pressure for saturated steam service	Standard seals		9 bar g @ 180 °C
	High temperature seals - Option **H**		14.5 bar g @ 200 °C
Maximum operating temperature	Standard seals		180 °C @ 9 bar g
	High temperature seals - Option **H**		200 °C @ 14.5 bar g
Minimum operating temperature	(**Note:** For lower operating temperatures consult Spirax Sarco)		-10 °C
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			
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 degredation



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 maximum
Actuator rotation		360°		
Actuator type and size		**Pilot connection**	**Maximum pilot pressure**	
			NC & BO	NO
	Type 1 = 45 mm diameter	⅛" BSP	10 bar g (145 psi g)	10 bar g (145 psi g)
	Type 2 = 63 mm diameter	¼" BSP	10 bar g (145 psi g)	8 bar g (116 psi g)
	Type 3 = 90 mm diameter	¼"BSP	8 bar g (116 psi g)	8 bar g (116 psi g)

K_{vs} values

Size	**DN15 ½"**	**DN20 ¾"**	**DN25 1"**	**DN32 1¼"**	**DN40 1½"**	**DN50 2"**
K_{vs}	4.5	8.0	15.6	24.6	42.0	57.0

For conversion:
C_v (UK) = K_v x 0.963
C_v (US) = K_v x 1.156

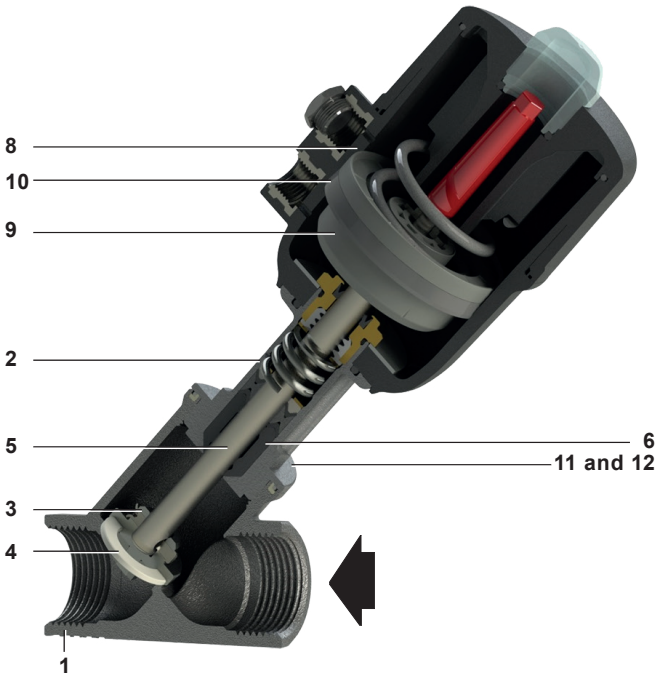
Materials

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	

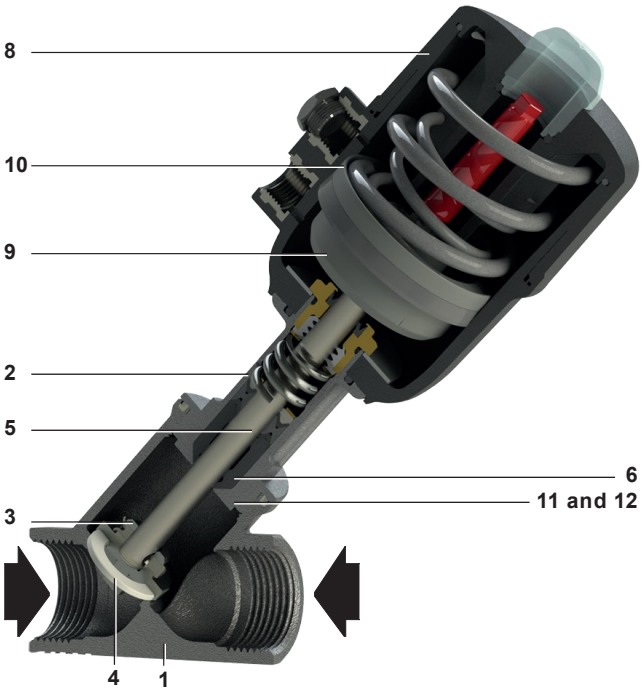
* **Note** Item 7 is not shown.

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

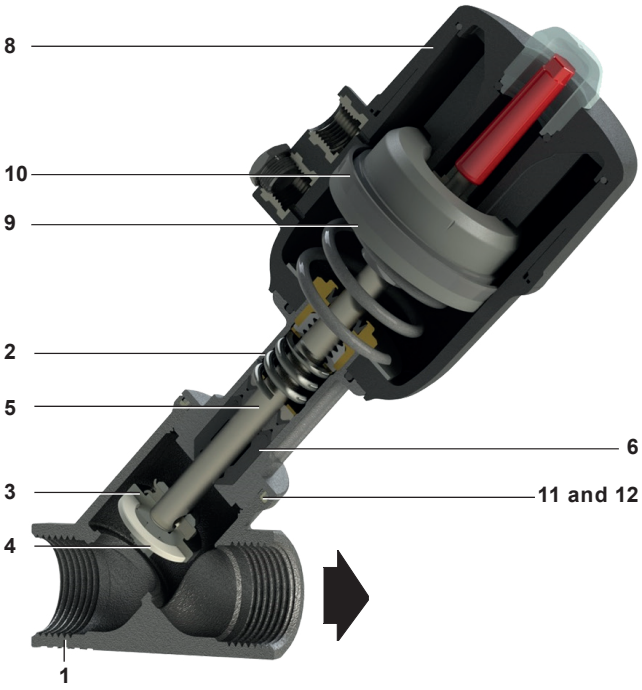
NC (Normally Closed)



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 and 14.5 bar 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 (bar) (see Notes at the top of this page)	Pilot Pressure	
					Minimum (bar)	Maximum (bar)
PF6_G-1NC	**DN15 -** (½")	45	over seat	16	1.8	10
	DN20 - (¾")	45	over seat	16	1.8	10
PF6_G-2NC	**DN15 -** (½")	63	over seat	20	3.9	10
	DN20 - (¾")	63	over seat	20	4.6	10
	DN25 - (1")	63	over seat	20	5.2	10
	DN32 - (1¼")	63	over seat	16	5.7	10
	DN40 - (1½")	63	over seat	16	8.8	10
	DN50 - (2")	63	over seat	11	7.8	10
PF6_G-3NC	**DN25 -** (1")	90	over seat	20	3.0	8
	DN32 - (1¼")	90	over seat	16	3.0	8
	DN40 - (1½")	90	over seat	16	4.0	8
	DN50 - (2")	90	over seat	15	5.8	8

PF6_G-NO (Normally open)

Model	Valve size	Actuator diameter (mm)	Flow direction (port 1 to 2)	Maximum differential pressure (bar) (see Notes at the top of this page)	Pilot Pressure	
					Minimum (bar)	Maximum (bar)
PF6_G-1NO	**DN15 -** (½")	45	under seat	16	1.8	10
	DN20 - (¾")	45	under seat	16	1.8	10
PF6_G-2NO	**DN15 -** (½")	63	under seat	16	2.8	10
	DN20 - (¾")	63	under seat	16	4.5	10
	DN25 - (1")	63	under seat	16	5.7	10
	DN32 - (1¼")	63	under seat	16	6.7	10
	DN40 - (1½")	63	under seat	12	8.8	10
	DN50 - (2")	63	under seat	8	9.6	10
PF6_G-3NO	**DN25 -** (1")	90	under seat	16	4.5	8
	DN32 - (1¼")	90	under seat	16	4.0	8
	DN40 - (1½")	90	under seat	16	5.4	8
	DN50 - (2")	90	under seat	10	7.0	8

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) (bar)	Flow direction (port 2 to 1)	* Maximum differential pressure (port 2 to 1) (bar)	Pilot pressure	
							Minimum (bar)	Maximum (bar)
PF6_G-1BD	**DN15 -** (½")	45	over seat	16	under seat	16.0	5.0	10
	DN20 - (¾")	45	over seat	16	under seat	7.0	5.0	10
PF6_G-2BD	**DN15 -** (½")	63	over seat	16	under seat	16.0	4.2	10
	DN20 - (¾")	63	over seat	16	under seat	16.0	4.2	10
	DN25 - (1")	63	over seat	16	under seat	11.0	4.2	10
	DN32 - (1¼")	63	over seat	16	under seat	6.0	4.2	10
	DN40 - (1½")	63	over seat	12	under seat	4.0	4.2	10
	DN50 - (2")	63	over seat	8	under seat	2.5	4.2	10
PF6_G-3BD	**DN25 -** (1")	90	over seat	16	under seat	14.0	3.8	8
	DN32 - (1¼")	90	over seat	16	under seat	12.0	3.8	8
	DN40 - (1½")	90	over seat	16	under seat	8.0	3.8	8
	DN50 - (2")	90	over seat	14	under seat	6.0	3.8	8

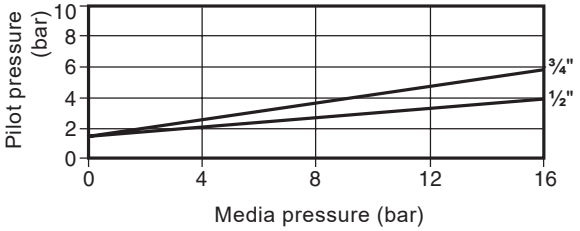
*** Notes:**

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

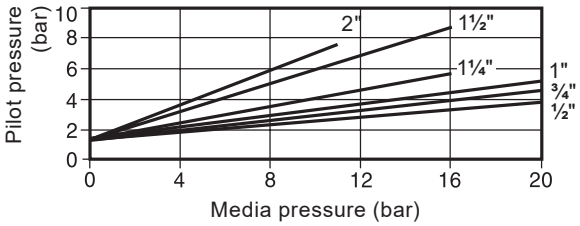
Pilot/media pressure relationship

PF6_G-NC (Normally Closed)

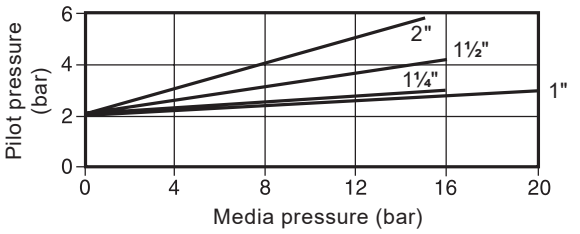
PF6_G-1NC flow over seat (1 to 2)



PF6_G-2NC flow over seat (1 to 2)

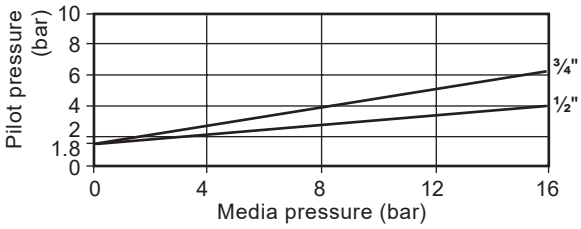


PF6_G-3NC flow over seat (1 to 2)

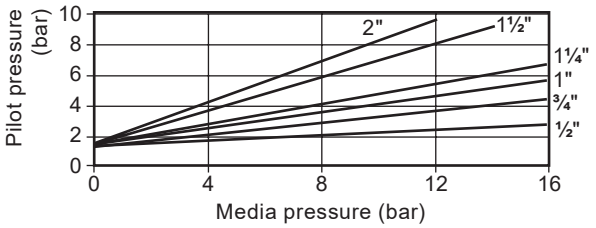


PF6_G-NO (Normally Open)

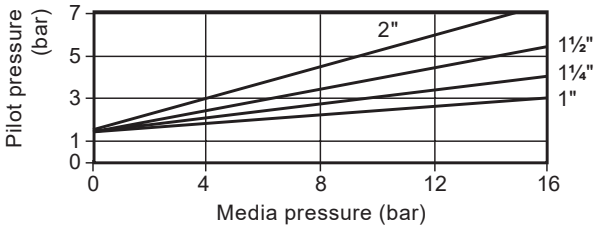
PF6_G-1NO flow under seat (2 to 1)



PF6_G-2NO flow under seat (2 to 1)

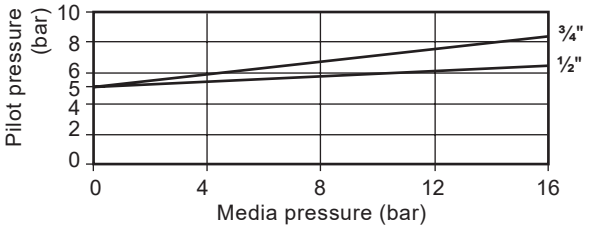


PF6_G-3NO flow under seat (2 to 1)

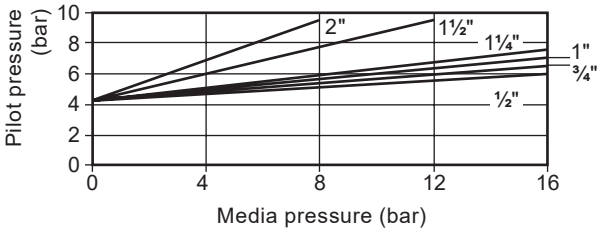


PF6_G-BD (Bi-Directional normally closed)

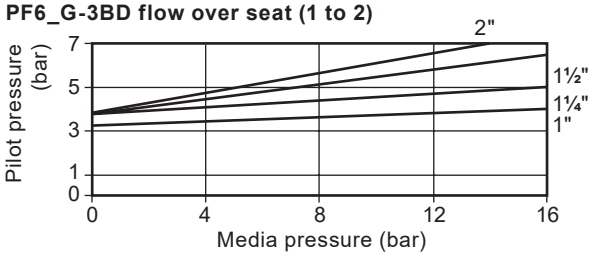
PF6_G-1BD flow over seat (1 to 2)



PF6_G-2BD flow over seat (1 to 2)



PF6_G-3BD flow over seat (1 to 2)



Dimensions and weights (approximate) in mm and kg

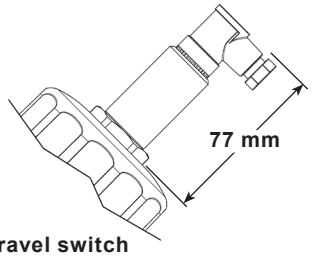
Notes:

*** Add** 0.2 kg for travel switch or flow regulator options (not available for use with the Type 1 actuator).
Add 0.45 kg for the position module.

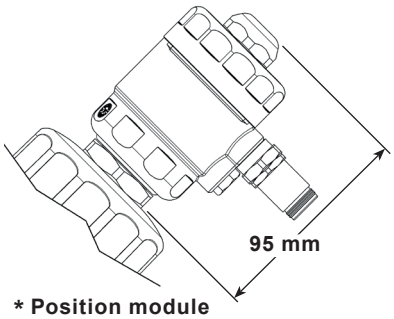
Valve size	Actuator type and size		Screwed and Butt weld				Flanged					
			A1	B1	C	* Weight	EN 1092 A3	ASME 150 A4	EN 1092 B3	ASME 150 B4	C	* Weight
DN15 - ½"	1	(45 mm)	65	144	123	0.8	-	-	-	-	-	-
	2	(63 mm)	65	192	171	1.2	130	139.7	229.0	226.2	202.1	2.6
DN20 - ¾"	1	(45 mm)	75	155	126	0.9	-	-	-	-	-	-
	2	(63 mm)	75	198	176	1.3	150	152.4	235.9	232.7	207.4	3.0
DN25 - 1"	2	(63 mm)	90	212	185	1.5	160	165.1	249.2	247.6	216.2	3.8
	3	(90 mm)	90	223	196	2.0	160	165.1	260.2	258.6	227.2	4.4
DN32 - 1¼"	2	(63 mm)	110	225	193	1.9	180	184.2	262.0	259.9	224.0	5.6
	3	(90 mm)	110	234	202	2.4	180	184.2	273.0	270.9	235.0	6.0
DN40 - 1½"	2	(63 mm)	120	230	198	2.1	200	203.2	267.0	266.5	229.0	6.5
	3	(90 mm)	120	239	207	2.6	200	203.2	278.0	277.5	240.0	7.0
DN50 - 2"	2	(63 mm)	150	248	207	2.9	230	228.6	288.2	237.3	237.8	8.7
	3	(90 mm)	150	257	216	3.3	230	228.6	299.2	298.3	248.8	9.1

Valve size	Actuator type and size		Threaded spigot (to ISO 228/1)				
			A5	B5	C	Ø Spigot	* Weight
DN15 - ½"	1	(45 mm)	90	148	123	G ¾"	0.90
	2	(63 mm)	90	196	171	G ¾"	1.30
DN20 - ¾"	1	(45 mm)	110	156	126	G 1"	1.00
	2	(63 mm)	110	206	176	G 1"	1.40
DN25 - 1"	2	(63 mm)	118	217	185	G 1¼"	1.65
	3	(90 mm)	118	228	196	G 1¼"	2.15
DN32 - 1¼"	2	(63 mm)	130	226	193	G 1½"	2.00
	3	(90 mm)	130	237	202	G 1½"	2.50
DN40 - 1½"	2	(63 mm)	140	224	198	G 1¾"	2.20
	3	(90 mm)	140	235	207	G 1¾"	2.70
DN50 - 2" **	2	(63 mm)	175	246	207	G 2⅜"	3.10
	3	(90 mm)	175	257	216	G 2⅜"	3.50

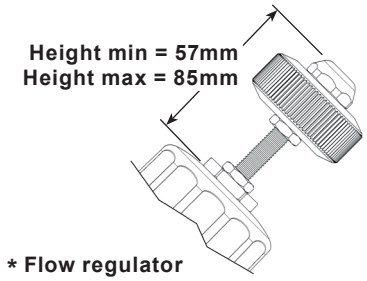
**** Note:** The DN50 threaded spigot is to ISO 338.



*** Travel switch**



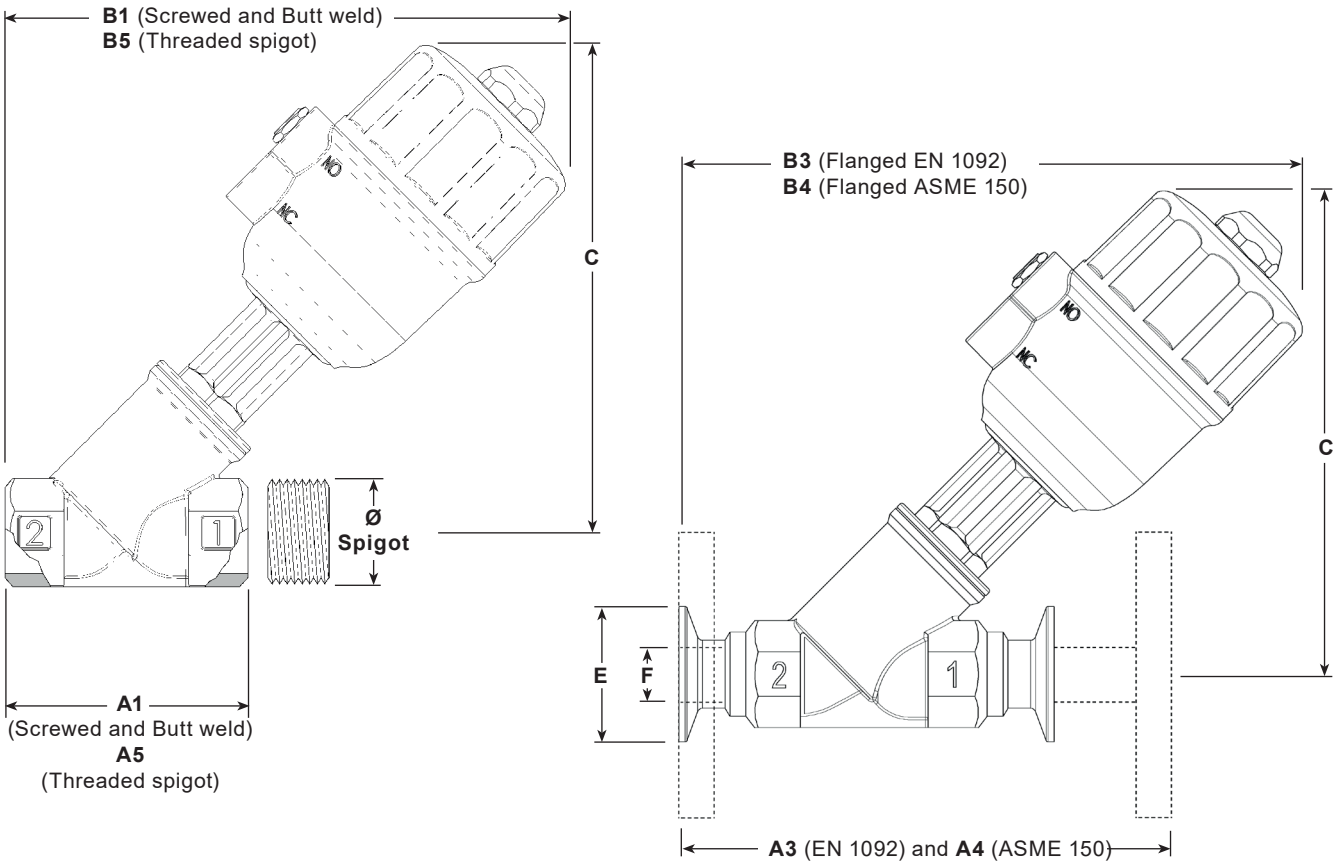
*** Position module**



*** Flow regulator**

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

Notes:
1. Pilot pressure is 6 bar
2. Pressure in the body 0 bar



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

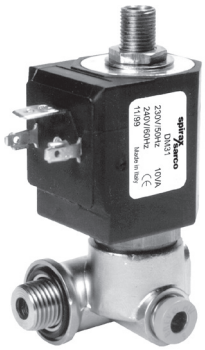
Pilot solenoid

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	230/50 or 240/60 Vac	⅛" BSP
DM12	1	45 mm	110/50 or 120/60 Vac	⅛" BSP
DM13	1	45 mm	24/50 or 24/60 Vac	⅛" BSP
DM14	1	45 mm	24 Vdc	⅛" BSP
DM21	2	63 mm	230/50 or 240/60 Vac	¼" BSP
DM22	2	63 mm	110/50 or 120/60 Vac	¼" BSP
DM23	2	63 mm	24/50 or 24/60 Vac	¼" BSP
DM24	2	63 mm	24 Vdc	¼" BSP
DM31	3	90 mm	230/50 or 240/60 Vac	¼" BSP
DM32	3	90 mm	110/50 or 120/60 Vac	¼" BSP
DM33	3	90 mm	24/50 or 24/60 Vac	¼" BSP
DM34	3	90 mm	24 Vdc	¼" BSP



Valve selection guide

					DN25
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**
Connections	**0**	=	Threaded spigots to ISO 228/1		**3**
	1	=	Screwed	BSP or NPT	
	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**
Stem seal	**Blank**	=	PTFE + 25% carbon graphite filled PTFE + FKM chevron (standard)		
	H	=	25% carbon graphite filled PTFE + FKM chevron **Note:** Option **H** is not available for valves fitted with Type 1 actuators.		
Actuator type	**1**	=	45 mm diameter		**2**
	2	=	63 mm diameter		
	3	=	90 mm diameter		
Valve position	**NC**	=	Normally Closed		**NC**
	NO	=	Normally Open		
	BD	=	Bi-Directional		
Optional	**Blank**	=	No options required		
	A	=	Position module with mechanical switch	Change-over contacts, max. tension 230 Vac, Max. current 6 A	**Provides indication of open and closed valve position through an inductive or mechanical switch. Available on all actuators types.**
	B	=	Position module with inductive switch	PNP, supply 14 - 12 Vdc power 13 mA max.	
	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.	
				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

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.