spirax sarco

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 190°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 7):

- Travel switch.
- Flow regulator.

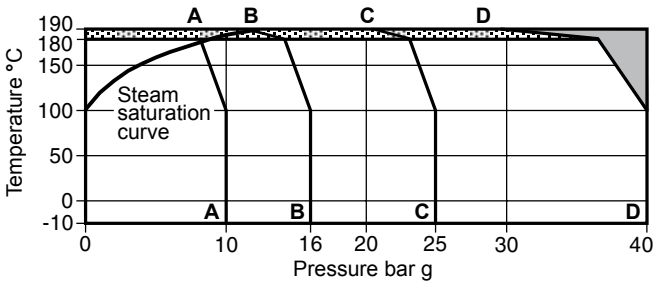
Sizes, pipe connections and actuator combinations

Valve type	Pipe connections	Actuator type		DN15 ½"	DN20 ¾"	DN25 1"	DN32 1¼"	DN40 1½"	DN50 2"
PF61G	Screwed to BSP or NPT	1	PTFE version	•	•				
PF62G	Butt weld to DIN 11850 pipe, ASME B 36.10 / ISO 65 pipe or ISO 4200 pipe	2	PTFE version	•	•	•	•	•	•
			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				•	•	•
PF64G	Socket weld to ASME B 36.10 / ISO 65 pipe	1	PTFE version	•	•				
PF65G	Sanitary clamp to ISO 2852 or ASME BPE.	2	PTFE version	•	•	•	•	•	•
Notes:			H version	•	•	•			
1. DN32 is not available with ASME BPE end connections		3	PTFE version			•	•	•	•
2. Clamp and clamp gasket are not included			H version				•	•	•

Available range

Valve action	Screwed (BSP or NPT)	Butt weld	Flanged (EN 1092 or ASME)	Socket weld	Sanitary clamp
NC - Normally Closed (flow over seat)	PF61G - 1NC	PF62G - 1NC	-	PF64G - 1NC	PF65G - 1NC
	PF61G - 2NC	PF62G - 2NC	PF63G - 2NC	PF64G - 2NC	PF65G - 2NC
	PF61G - 3NC	PF62G - 3NC	PF63G - 3NC	PF64G - 3NC	PF65G - 3NC
NO - Normally Open (flow under seat)	PF61G - 1NO	PF62G - 1NO	-	PF64G - 1NO	PF65G - 1NO
	PF61G - 2NO	PF62G - 2NO	PF63G - 2NO	PF64G - 2NO	PF65G - 2NO
	PF61G - 3NO	PF62G - 3NO	PF63G - 3NO	PF64G - 3NO	PF65G - 3NO
BD - Bi-Directional normally closed (flow over or under seat)	PF61G - 1BD	PF62G - 1BD	-	PF64G - 1BD	PF65G - 1BD
	PF61G - 2BD	PF62G - 2BD	PF63G - 2BD	PF64G - 2BD	PF65G - 2BD
	PF61G - 3BD	PF62G - 3BD	PF63G - 3BD	PF64G - 3BD	PF65G - 3BD

Pressure / temperature limits



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.

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

Body design conditions	Screwed, butt weld, socket weld 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
	Sanitary clamp compatible connections	DN15 - DN50	PN10
Maximum design pressure			Refer to the graph above
Maximum design temperature			190°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**		11.5 bar g @ 190°C
Maximum operating temperature	Standard seals		180°C @ 9 bar g
	High temperature seals - Option **H**		190°C @ 11.5 bar g
Minimum operating temperature	(**Note:** For lower operating temperatures consult Spirax Sarco)		-10°C
Ambient temperature limits	Maximum		60°C
	Minimum		-10°C
Maximum differential pressure			(see page 4)
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			

Technical details

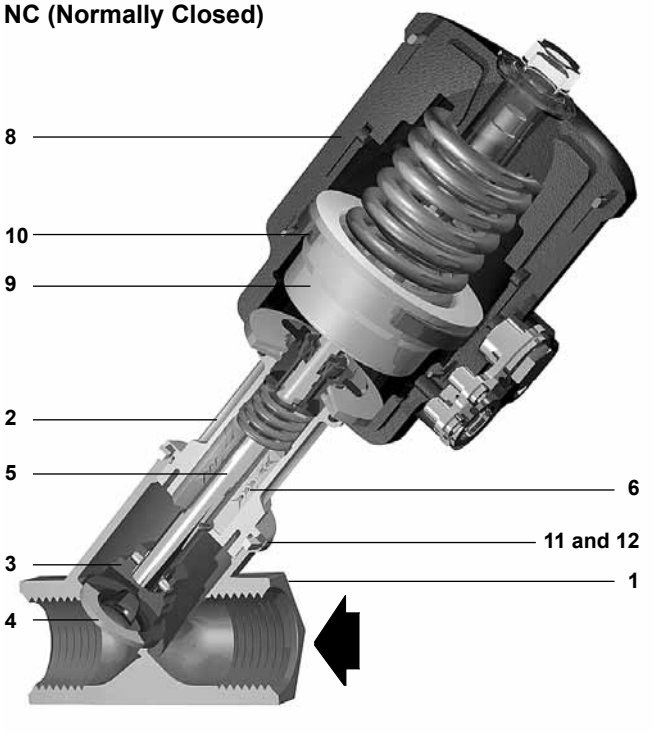
Leakage		TFM 1600 soft seal	ASME Class VI
Flow characteristic		Fast opening	On / off
Flow direction	**PF6_G-NC**	Flow over seat	Port 1 to 2
	PF6_G-NO	Flow under seat	Port 2 to 1
	PF6_G-BD	Flow over seat	Port 1 to 2
		Flow under seat	Port 2 to 1
Pilot media		Air or water	60°C maximum
Actuator rotation		360°	
Actuator type and size		**Pilot connection**	**Maximum pilot pressure**
	Type 1 = 45 mm diameter	⅛" BSP	10 bar g
	Type 2 = 63 mm diameter	¼" BSP	10 bar g
	Type 3 = 90 mm diameter	¼"BSP	8 bar g

Kvs values

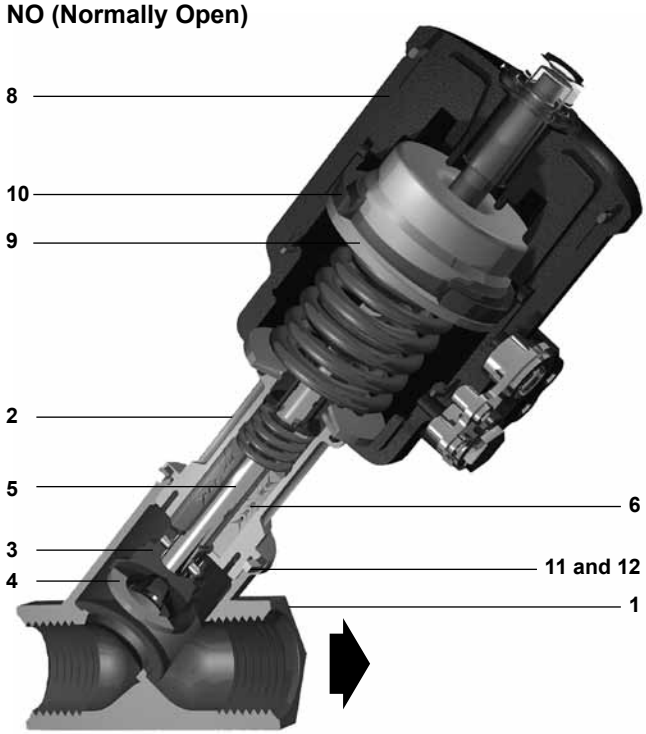
Size	**DN15**	**DN20**	**DN25**	**DN32**	**DN40**	**DN50**
	½"	**¾"**	**1"**	**1¼"**	**1½"**	**2"**
Kvs	4.5	8.0	15.6	24.6	42.0	57.0

For conversion: C_V (UK) = K_V x 0.963 C_V (US) = K_V x 1.156

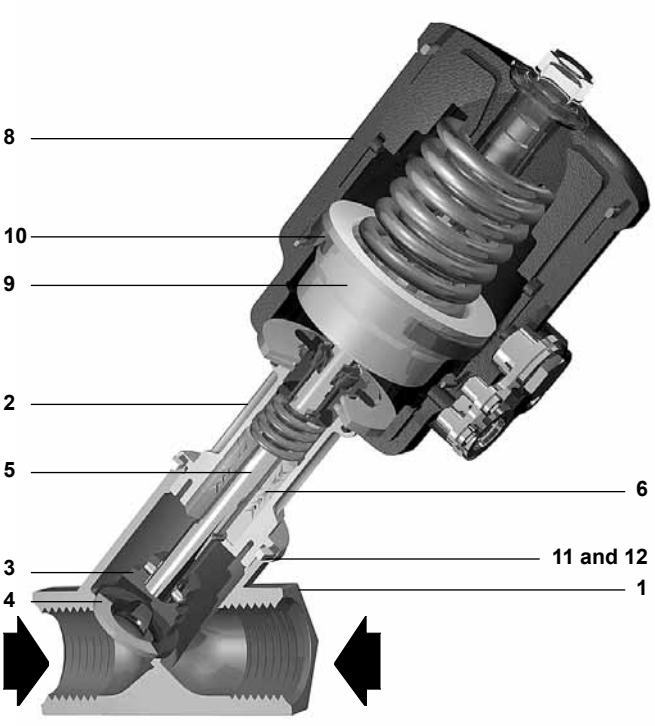
NC (Normally Closed)



NO (Normally Open)



BD (Bi-Directional normally closed)



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		TFM 1600	
5	Valve stem		Stainless steel	AISI 316L
6	Stem seals	Standard	PTFE + FKM chevron	
		Option **H**	25% carbon graphite filled PTFE	
* **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.

ΔPMX - Maximum differential pressures for PF6 piston actuated valves

*** Notes:**

1. Maximum differential pressure for saturated steam service is 11.5 bar g.
2. Sanitary clamp connections are limited to PN10 pressure rating.
3. 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)	Pilot Pressure Minimum (bar)	Pilot Pressure 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	1.5	10
	DN20 - (¾")	63	over seat	20	1.5	10
	DN25 - (1")	63	over seat	20	1.5	10
	DN32 - (1¼")	63	over seat	16	2.8	10
	DN40 - (1½")	63	over seat	16	2.8	10
	DN50 - (2")	63	over seat	11	2.8	10
PF6_G-3NC	**DN25 -** (1")	90	over seat	20	1.0	8
	DN32 - (1¼")	90	over seat	16	2.8	8
	DN40 - (1½")	90	over seat	16	2.8	8
	DN50 - (2")	90	over seat	15	2.8	8

*** see Notes at the top of this page**

PF6_G-NO (Normally open)

Model	Valve size	Actuator diameter (mm)	Flow direction (port 2 to 1)	* Maximum differential pressure (bar)	Pilot Pressure Minimum (bar)	Pilot Pressure 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	1.5	10
	DN20 - (¾")	63	under seat	16	1.5	10
	DN25 - (1")	63	under seat	16	1.5	10
	DN32 - (1¼")	63	under seat	16	1.5	10
	DN40 - (1½")	63	under seat	16	1.5	10
	DN50 - (2")	63	under seat	12	1.5	10
PF6_G-3NO	**DN25 -** (1")	90	under seat	16	1.0	8
	DN32 - (1¼")	90	under seat	16	1.0	8
	DN40 - (1½")	90	under seat	16	1.0	8
	DN50 - (2")	90	under seat	16	1.0	8

*** see Notes at the top of this page**

PF6_G-BD (Bi-Directional normally closed)

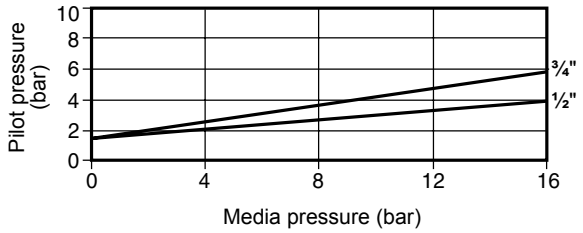
Model	Valve size	Actuator diameter (mm)	Flow direction (port 1 to 2)	* Maximum differential pressure (port 1 to 2) (bar)	Flow direction (port 2 to 1)	* Maximum differential pressure (port 2 to 1) (bar)	Pilot pressure Minimum (bar)	Pilot pressure Maximum (bar)
PF6_G-1BD	**DN15 -** (½")	45	over seat	16	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	3.8	10
	DN20 - (¾")	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 - (1¼")	63	over seat	16	under seat	6.0	3.8	10
	DN40 - (1½")	63	over seat	12	under seat	4.0	3.8	10
	DN50 - (2")	63	over seat	8	under seat	2.5	3.8	10
PF6_G-3BD	**DN25 -** (1")	90	over seat	16	under seat	14.0	3.3	8
	DN32 - (1¼")	90	over seat	16	under seat	12.0	3.3	8
	DN40 - (1½")	90	over seat	16	under seat	8.0	3.3	8
	DN50 - (2")	90	over seat	14	under seat	6.0	3.3	8

*** see Notes at the top of this page**

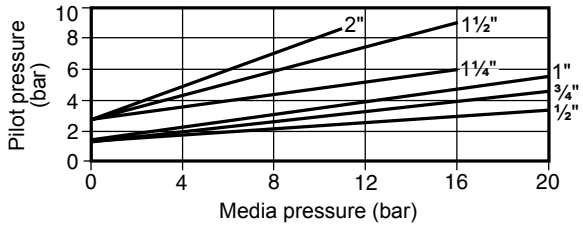
Pilot / media pressure relationship

PF6_G-NC (Normally Closed)

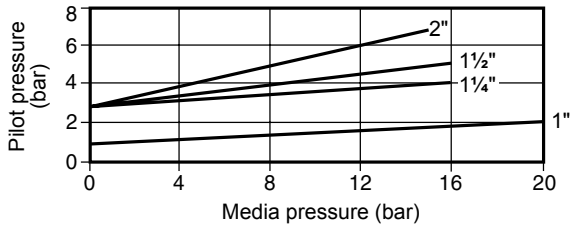
PF6_G-1NC flow over seat (1 to 2)



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

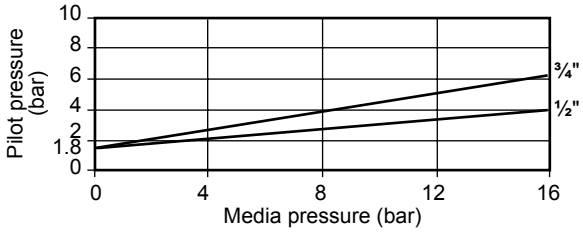


PF6_G-3NC flow over seat (1 to 2)

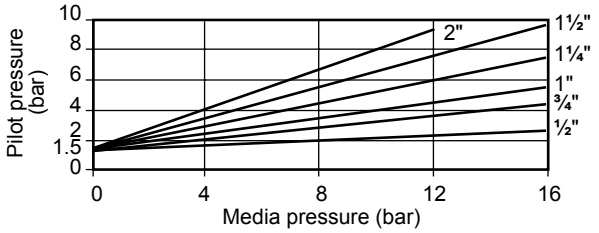


PF6_G-NO (Normally Open)

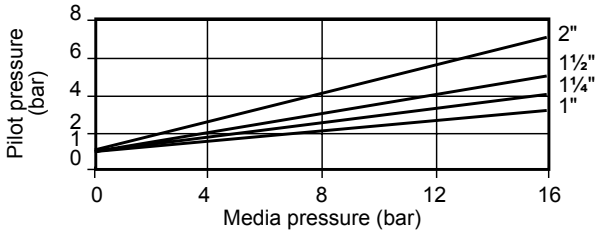
PF6_G-1NO flow under seat (2 to 1)



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

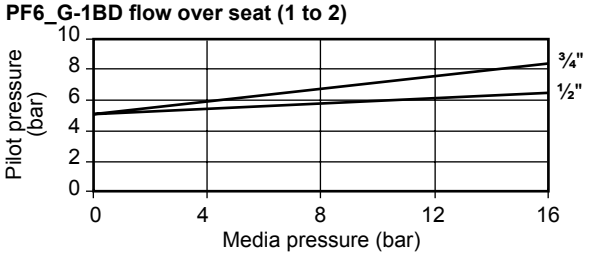


PF6_G-3NO flow under seat (2 to 1)

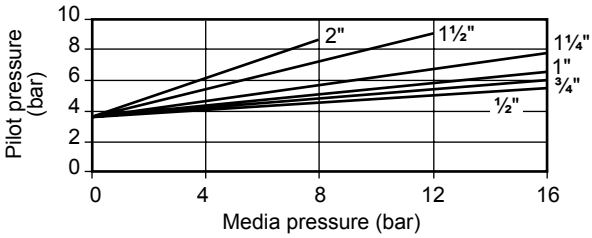


PF6_G-BD (Bi-Directional normally closed)

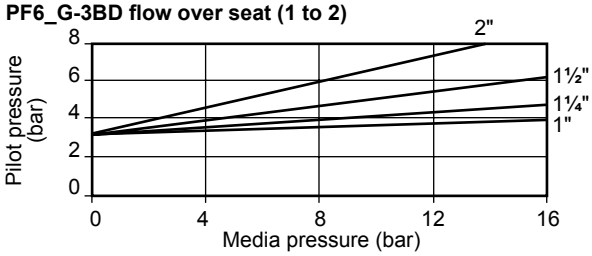
PF6_G-1BD flow over seat (1 to 2)



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



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



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

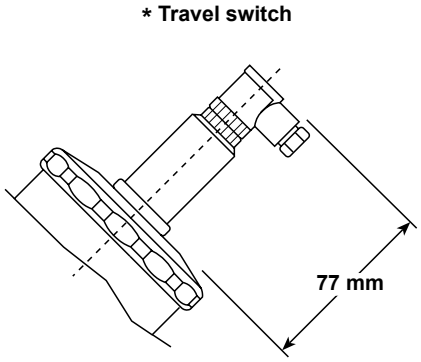
Dimensions and weights (approximate) in mm and kg

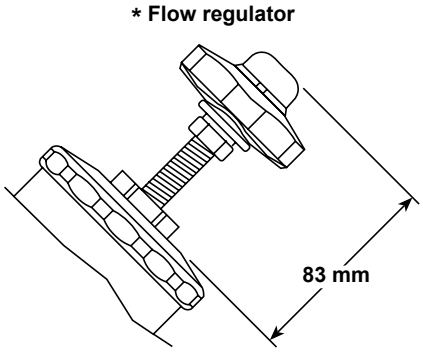
Valve size	Actuator type and size	Screwed, socket weld and butt weld					Flanged				
		A1	B1	C	D†	* Weight	EN 1092 A3	ASME 150 A4	B3	C	* Weight
DN15 - ½"	1 (45 mm)	65	144	123	5	0.8	-	-	-	-	-
	2 (63 mm)	65	192	171	5	1.2	130	139.7	218	194	2.6
DN20 - ¾"	1 (45 mm)	75	155	126	7	0.9	-	-	-	-	-
	2 (63 mm)	75	198	176	7	1.3	150	152.4	236	210	3.0
DN25 - 1"	2 (63 mm)	90	212	185	8	1.5	160	165.1	239	208	3.8
	3 (90 mm)	90	223	196	8	2.0	160	165.1	250	219	4.4
DN32 - 1¼"	2 (63 mm)	110	225	193	10	1.9	180	184.2	252	216	5.6
	3 (90 mm)	110	234	202	10	2.4	180	184.2	263	227	6.0
DN40 - 1½"	2 (63 mm)	120	230	198	12	2.1	200	203.2	257	220	6.5
	3 (90 mm)	120	239	207	12	2.6	200	203.2	268	232	7.0
DN50 - 2"	2 (63 mm)	150	248	207	16	2.9	230	228.6	275	230	8.7
	3 (90 mm)	150	257	216	16	3.3	230	228.6	286	240	9.1

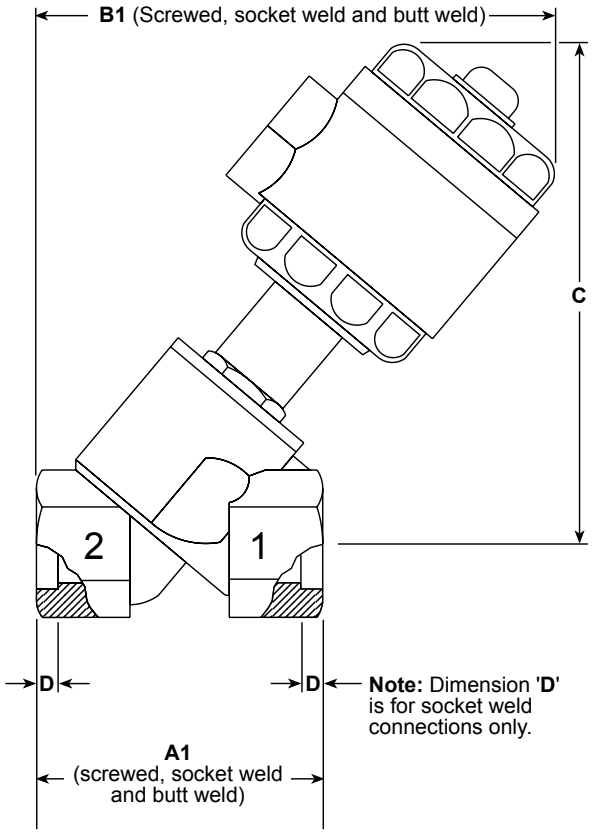
Notes: * Add 0.2 kg for travel switch or flow regulator options (not available for use with the Type 1 actuator).
† Dimension '**D**' is for socket weld connections only.

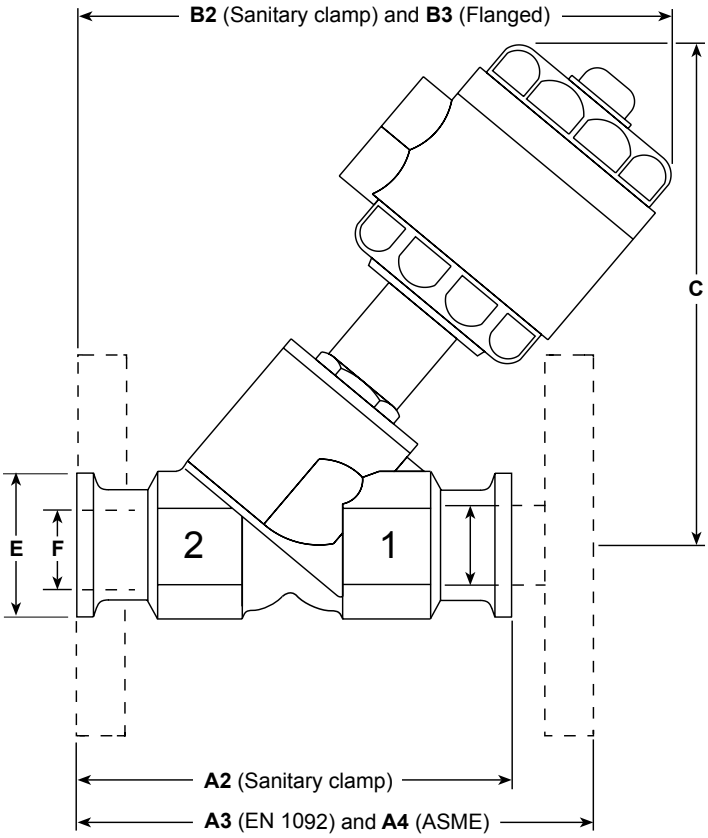
Valve size	Actuator type and size	Sanitary clamp (to ISO 2852)						Sanitary clamp (ASME BPE)					
		A2	B2	C	E	F	* Weight	A2	B2	C	E	F	* Weight
DN15 - ½"	1 (45 mm)	102	162	123	34	17.2	0.8	102	162	123	25	9.4	0.8
	2 (63 mm)	102	210	171	34	17.2	1.2	102	210	171	25	9.4	1.2
DN20 - ¾"	1 (45 mm)	114	167	126	34	21.3	1.3	114	167	126	25	15.75	1.3
	2 (63 mm)	114	217	176	34	21.3	1.5	114	217	176	25	15.75	1.5
DN25 - 1"	2 (63 mm)	140	231	185	50.5	25.0	1.8	140	231	185	50.5	22.1	1.8
	3 (90 mm)	140	243	196	50.5	25.0	2.4	140	243	196	50.5	22.1	2.4
DN32 - 1¼"	2 (63 mm)	159	240	193	50.5	33.7	2.4	-	-	-	-	-	-
	3 (90 mm)	159	251	202	50.5	33.7	2.8	-	-	-	-	-	-
DN40 - 1½"	2 (63 mm)	159	249	198	64	40.0	2.8	159	249	198	50.5	34.8	2.8
	3 (90 mm)	159	260	207	64	40.0	3.2	159	260	207	50.5	34.8	3.2
DN50 - 2"	2 (63 mm)	190	267	207	64	51.0	3.6	190	267	207	64	47.5	3.6
	3 (90 mm)	190	279	216	64	51.0	4.0	190	279	216	64	47.5	4.0

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









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.

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	**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

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	1 = Screwed	BSP or NPT	
	2 = Butt weld	**Note**: state pipeline connection when ordering: - DIN 11850 pipe - ASME B 36.10 / ISO 65 pipe - ISO 4200 pipe	
	3 = Flanged	EN 1092 or ASME Class 150 (welded on flanges)	**3**
	4 = Socket weld	ASME B 36.10 / ISO 65 pipe	
	5 = Sanitary clamp	**Note**: state pipeline connection ISO 2852 or ASME BPE when ordering	
Valve plug seal	G = TFM 1600 soft seat		**G**
Stem seal	Blank = PTFE chevron (standard) H = 25% graphite filled PTFE chevron **Note:** Option H is not available for the sanitary clamp version or valves fitted with Type 1 actuators.		
Actuator type	1 = 45 mm diameter		
	2 = 63 mm diameter		**2**
	3 = 90 mm diameter		
Valve position	NC = Normally Closed		
	NO = Normally Open		**NC**
	BD = Bi-Directional		
Optional	Blank = No options required		
	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 | PF6 | 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 (TFM 1600), 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. 120 = week 12, year 2000).

Example: 1 off Seal kit for a 1" PF61G-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.