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ISO 9001

spirax sarco

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CH Issue 3

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.

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

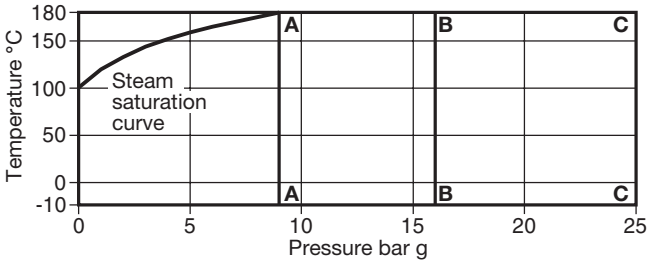
- Travel switch.
- Flow regulator.

Available range - sizes, pipe connections and actuator combinations

Valve type	Pipe connections	Valve action	type	Actuator Model	Sizes ½"	¾"	1"	1¼"	1½"	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 regulations may restrict the use of this product to below the conditions quoted.
In the interests of development and improvement of the product, we reserve the right to change the specification without notice.

Pressure / temperature limits



A - A Maximum operating pressure on saturated steam 9 bar g
B - B Maximum operating pressure on size 2" 16 bar g
C - C Maximum operating pressure on sizes ½" to 1½" 25 bar g

Body design conditions	Screwed BSP or NPT	½" - 1½"	PN25
		2"	PN16
PMA Maximum allowable pressure			25 bar g
TMA Maximum allowable temperature			180°C
Minimum allowable temperature			-10°C
PMO Maximum operating pressure for saturated steam service			9 bar @ 180°C
TMO Maximum operating temperature			180°C
Minimum operating temperature (**Note:** For lower operating temperatures consult Spirax Sarco.)			-10°C
ΔPMX Maximum differential pressure			(see page 4)
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)

Technical details

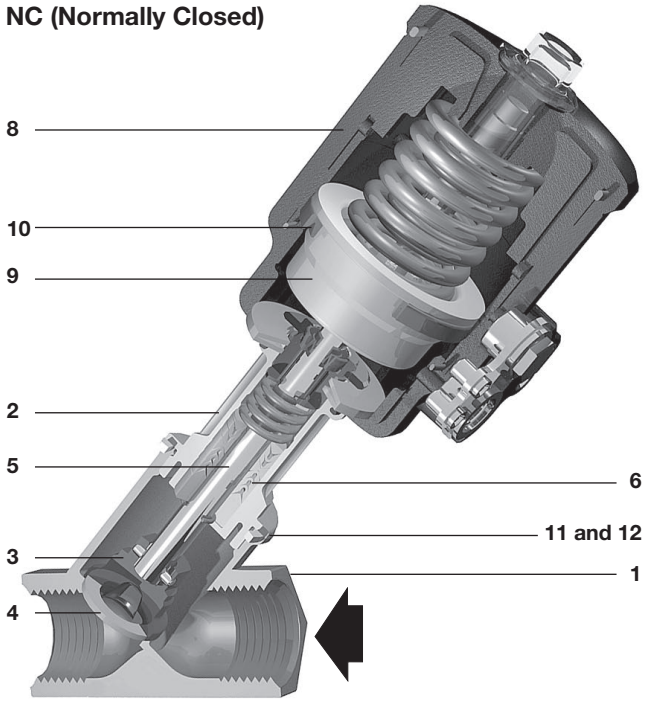
Leakage		PTFE soft seal	ANSI class V1
Flow characteristic		Fast opening	On/off
Flow direction	**PF51G-NC**	Flow over seat	Port 1 to 2
	PF51G-NO	Flow under seat	Port 2 to 1
	PF51G-BD	Flow over seat	Port 1 to 2
		Flow under seat	Port 2 to 1
Pilot media		Air or water	60°C maximum
Actuator rotation		360°	
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

K_{VS} values

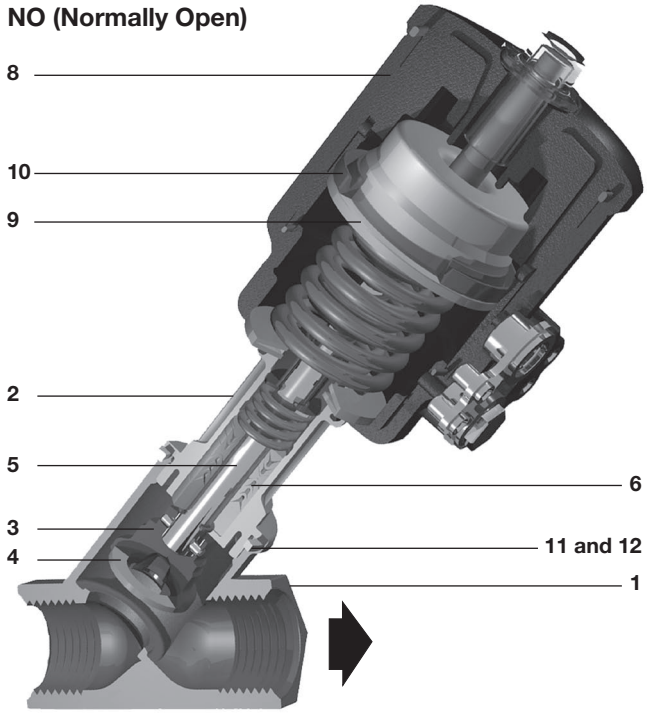
Size	**½"**	**¾"**	**1"**	**1¼"**	**1½"**	**2"**
K_{VS}	4.5	8	15.6	24.6	42	57

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

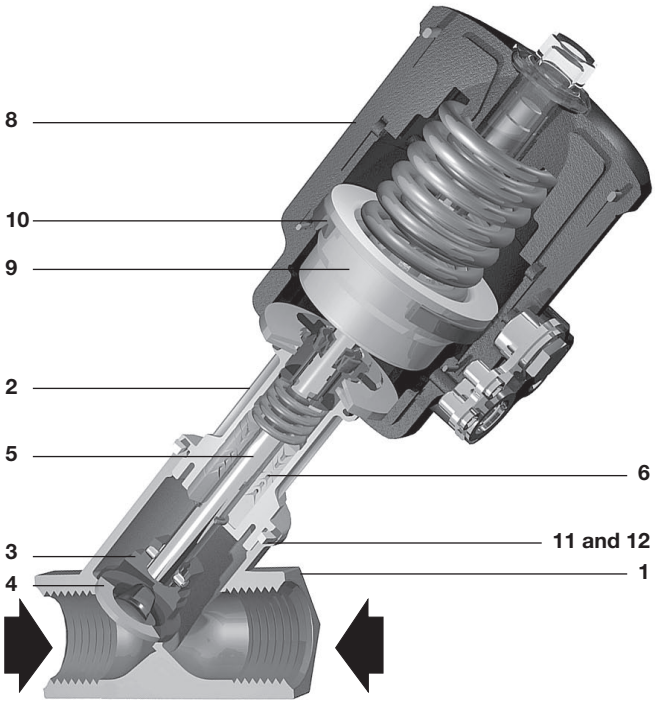
NC (Normally Closed)



NO (Normally Open)



BD (Bi-Directional normally closed)



Materials

No.	Part	Material	
1	Body	Bronze	EN 1982 CC491K
2	Bonnet	Bronze ½" and 1"	EN 1982 CC491K
		Brass ¾", 1¼", 1½" and 2"	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	

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

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 (bar)	Pilot Pressure Minimum (bar)	Pilot Pressure Maximum (bar)
PF51G-1NC	½"	45	over seat	16	1.8	10
	¾"	45	over seat	16	1.8	10
	1"	45	over seat	16	1.8	10
PF51G-2NC	½"	63	over seat	20	1.5	10
	¾"	63	over seat	20	1.5	10
	1"	63	over seat	20	1.5	10
	1¼"	63	over seat	16	3.0	10
	1½"	63	over seat	16	3.0	10
	2"	63	over seat	11	3.0	10
PF51G-3NC	1"	90	over seat	20	1.0	8
	1¼"	90	over seat	16	2.5	8
	1½"	90	over seat	16	2.5	8
	2"	90	over seat	15	2.5	8

PF51G-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)
PF51G-1NO	½"	45	under seat	16	1.8	10
	¾"	45	under seat	16	1.8	10
	1"	45	under seat	16	1.8	10
PF51G-2NO	½"	63	under seat	16	1.5	10
	¾"	63	under seat	16	1.5	10
	1"	63	under seat	16	1.5	10
	1¼"	63	under seat	16	1.5	10
	1½"	63	under seat	16	1.5	10
	2"	63	under seat	12	1.5	10
PF51G-3NO	1"	90	under seat	16	1.0	8
	1¼"	90	under seat	16	1.0	8
	1½"	90	under seat	16	1.0	8
	2"	90	under seat	16	1.0	8

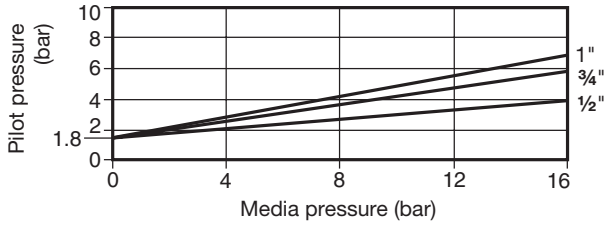
PF51G-BD (Bi-Directional normally closed)

Model	Valve size	Actuator diameter (mm)	Flow direction (port 1 to 2)	Maximum differential pressure (port 1 to 2) (bar)	Flow direction (port 2 to 1)	Maximum differential pressure (port 2 to 1) (bar)	Pilot pressure Minimum (bar)	Pilot pressure Maximum (bar)
PF51G-1BD	½"	45	over seat	16	under seat	16.0	5.0	10
	¾"	45	over seat	16	under seat	7.0	5.0	10
	1"	45	over seat	16	under seat	5.0	5.0	10
PF51G-2BD	½"	63	over seat	16	under seat	16.0	3.8	10
	¾"	63	over seat	16	under seat	16.0	3.8	10
	1"	63	over seat	16	under seat	11.0	3.8	10
	1¼"	63	over seat	16	under seat	6.0	3.8	10
	1½"	63	over seat	12	under seat	4.0	3.8	10
	2"	63	over seat	8	under seat	2.5	3.8	10
PF51G-3BD	1"	90	over seat	16	under seat	14.0	3.3	8
	1¼"	90	over seat	16	under seat	12.0	3.3	8
	1½"	90	over seat	16	under seat	8.0	3.3	8
	2"	90	over seat	14	under seat	5.0	3.3	8

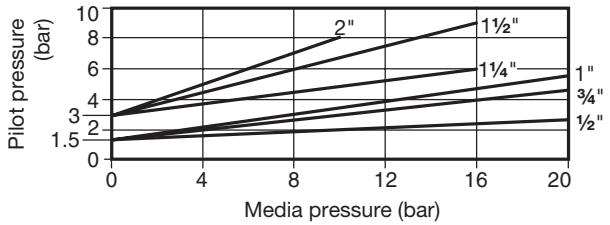
Pilot / media pressure relationship

PF51G-NC (Normally Closed)

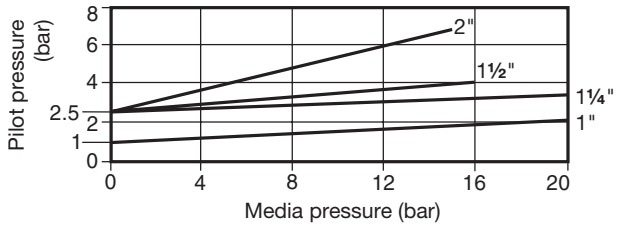
PF51G-1NC flow over seat (1 to 2)



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

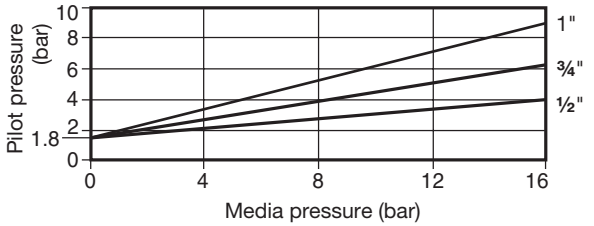


PF51G-3NC flow over seat (1 to 2)

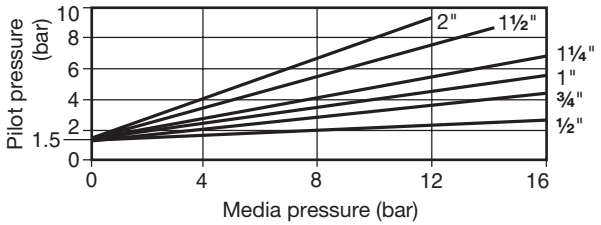


PF51G-NO (Normally Open)

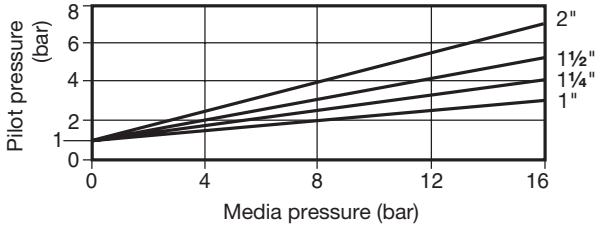
PF51G-1NO flow under seat (2 to 1)



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

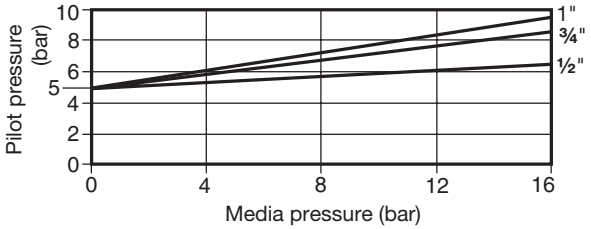


PF51G-3NO flow under seat (2 to 1)

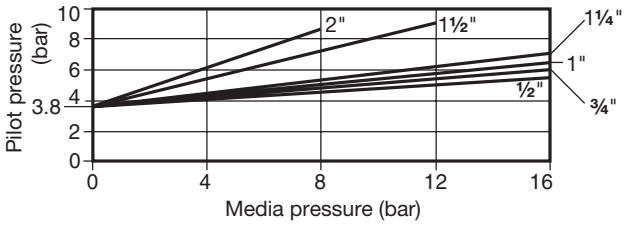


PF51G-BD (Bi-Directional normally closed)

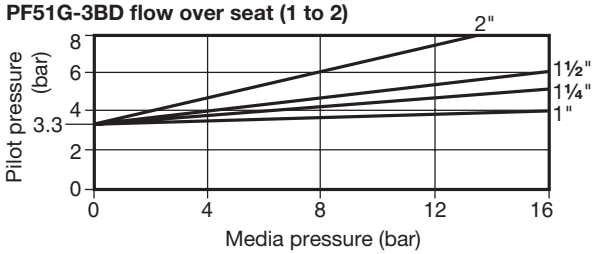
PF51G-1BD flow over seat (1 to 2)



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



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

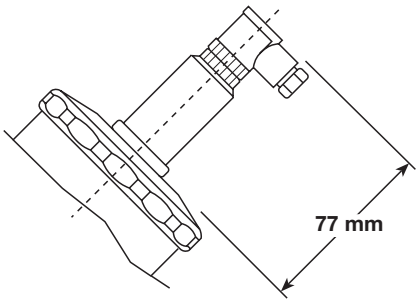


Dimensions and weights (approximate) in mm and kg

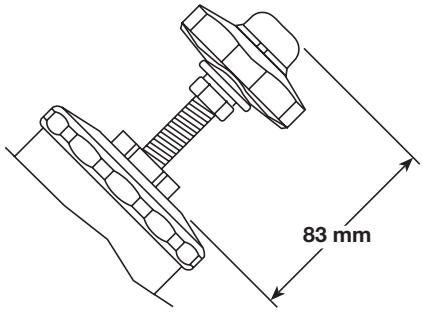
Valve size	Actuator type and size	A1	B1	C	D	Weight*
½"	**1** (45 mm)	65	144	136	123	0.8
	2 (63 mm)	65	192	184	171	1.2
¾"	**1** (45 mm)	75	149	142	126	0.9
	2 (63 mm)	75	198	192	176	1.3
1"	**1** (45 mm)	90	168	161	141	1.1
	2 (63 mm)	90	212	205	185	1.5
	3 (90 mm)	90	223	216	196	2.2
1¼"	**2** (63 mm)	110	225	217	193	1.9
	3 (90 mm)	110	234	227	202	2.4
1½"	**2** (63 mm)	120	230	225	198	2.4
	3 (90 mm)	120	239	235	207	2.6
2"	**2** (63 mm)	150	248	241	207	2.9
	3 (90 mm)	150	257	250	216	3.3

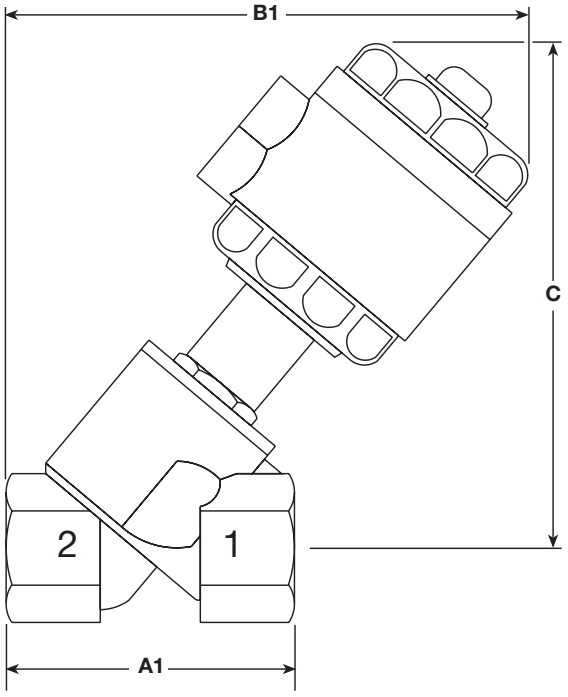
Notes: * Add 0.2 kg for travel switch or flow regulator options (not available for use with the Type 1 actuator).

*** Travel switch**



*** Flow regulator**





Valve selection guide

Valve size	½", ¾", 1", 1¼", 1½" and 2"		**1"**
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 ½" to 1")	
	2 = 63 mm diameter	(for valve sizes ½" to 2")	**2**
	3 = 90 mm diameter	(for valve sizes 1" to 2")	
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 | 1" | PF5 1 G - 2 NC - | Screwed BSP

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	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	1/4" BSP
DM22	2	63 mm	110/50 or 120/60 Vac	1/4" BSP
DM23	2	63 mm	24/50 or 24/60 Vac	1/4" BSP
DM24	2	63 mm	24 Vdc	1/4" BSP
DM31	3	90 mm	230/50 or 240/60 Vac	1/4" BSP
DM32	3	90 mm	110/50 or 120/60 Vac	1/4" BSP
DM33	3	90 mm	24/50 or 24/60 Vac	1/4" BSP
DM34	3	90 mm	24 Vdc	1/4" BSP