

INSTALLATION AND MAINTENANCE INSTRUCTIONS

IMI 3.300

May 2002

Type PF51N Piston Actuated On/Off Valves

Safety Note Handling precautions

PTFE

Within its working temperature range PTFE is a completely inert material, but when heated to its sintering temperature it gives rise to a gaseous decomposition product or fumes which can produce unpleasant effects if inhaled. The inhalation of these fumes is easily prevented by applying local exhaust ventilation to atmosphere as near to their source as possible.

Smoking should be prohibited in workshops where PTFE is handled because tobacco contaminated with PTFE will during burning give rise to polymer fumes. It is therefore important to avoid contamination of clothing, especially the pockets, with PTFE and to maintain a reasonable standard of personal cleanliness by washing hands and removing any PTFE particles lodged under the fingernails.

Description

A 2-port angle seat pneumatic piston actuated on / off bronze and brass valve for use on steam, water, air and gas applications.

Available types

PF51-NC Normally closed with flow over the seat (ports 1 to 2)

PF51-NO Normally open with flow under the seat (ports 2 to 1)

PF51-BD Bi-directional normally closed suitable for flow over the seat (ports 1 to 2) or under seat (ports 2 to 1)

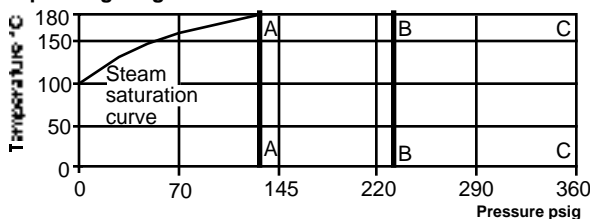
Technical data

Leakage	PTFE soft seal	ANSI class VI
Flow characteristic	Fast opening	on / off
Flow direction, see available types or refer to product label		
Anti-waterhammer	Flow under seat	port 2 to 1
Pilot media	Air or water	140°F (60°C max.)
Actuator housing rotation	360°	
	Pilot connection	Maximum pilot pressure
Actuator size	45 mm (1-3/4" dia.)	1/8" NPT 150 psig
	63 mm (2-1/2" dia.)	1/4" NPT 150 psig
	90 mm (3-1/2" dia.)	1/4" NPT 115 psig

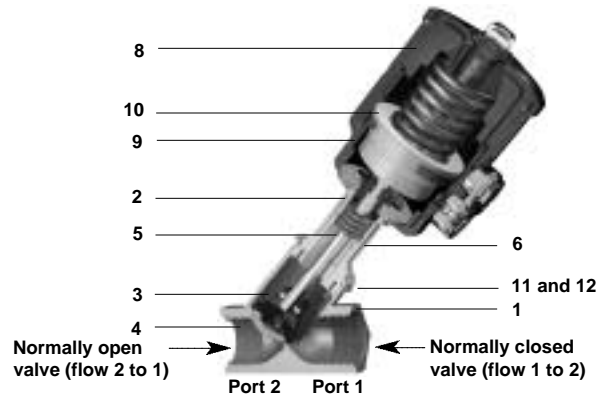
Limiting conditions

Maximum design temperature	356°F
Minimum design temperature	14°F
Maximum saturated steam pressure	130 psig
Maximum differential pressure	Refer to product TIS

Operating range



A-A	Maximum operating pressure on saturated steam	130 psig
B-B	Maximum operating pressure sizes 1-1/4" to 2"	232 psig
C-C	Maximum operating pressure sizes 1/2" to 1"	360 psig



Materials

No	Part	Material
1	Body	Bronze EN 1982 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
12	'O' ring	Viton

* Not shown

C_v values

Size	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"
C _v	4.7	8.8	19.6	29.4	45.5	57.8

Installation

1. Connecting pipework should be supported to prevent stresses being applied to the valve body.
2. The valve 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 and connection.
3. Ensure that the connecting pipework is isolated and free from scale, dirt etc. Any loose material entering the valve body may damage the PTFE head seal preventing tight shut-off.
4. Do not exceed the performance rating of the valve.
5. Refer to the limiting conditions and the product label details for limitations of pilot pressure and operating temperatures.
6. Refer to the limiting conditions and the valve body markings for limitation of body working pressure and operating temperature.
7. Ensure that the valve is mounted correctly for the flow direction required, as detailed in 'Available types' and as indicated on the product label.
8. A red travel indicator will appear in the actuator top cover when the valve is fully open (not with travel switch, manual override or flow regulator models).

Flow regulator

To regulate the maximum flow of NC (normally closed) or NO (normally open) valves. The flow regulator can also be used as a manual override on normally open valves.



Flow regulation - normally closed valves

1. Isolate the primary upstream and downstream valves.
2. Undo the flow regulator lock-nut.
3. Rotate the manual handle clockwise until the valve is fully closed. A red indicator will appear in the top of the handle.
4. Apply sufficient pilot pressure required to overcome the maximum differential pressure condition.
5. Open the primary upstream and downstream valves.
6. Gradually open the valve until the desired maximum flowrate is achieved.
7. Tighten the flow regulator lock-nut
8. Exhaust the pilot media pressure to check for valve tight shut-off.
9. Apply pilot pressure again to check maximum flow condition.

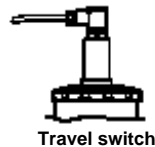
Flow regulation - normally open valves.

1. Ensure that the flow regulator is fully open. Undo the flow regulator lock-nut.
2. With the primary medium flowing gradually close the valve using the flow regulator until the desired flowrate is achieved.
3. Tighten the flow regulator lock-nut.
4. Apply sufficient pilot media pressure to ensure the valve achieves tight shut-off.
5. Exhaust the pilot pressure to check maximum flow once again - adjust if necessary.

Travel switch

This provides an electrical signal to indicate the open or closed position of the valve. The signal is provided by a magnetic sensor and non contact switch.

Maximum rating: Voltage (V) = 500 V
Current (I) = 0.5 A
Power (P) = 30 VA



Wiring connections



Valve open



Valve closed



Terminals

Table 1 Body/bonnet torque rating (ft/lbs)

Valve size	Torque	Valve size	Torque
1/2"	26	1-1/4"	41
3/4"	33	1-1/2"	44
1"	37	2"	52

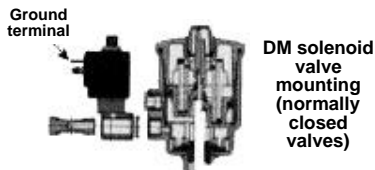
Solenoid valves (type DM)

DM type solenoid valves should be mounted onto the piston actuator as shown below. To fit a solenoid valve onto a normally closed valve use the pilot connection marked 'NC', for normally open valves use the connection marked 'NO'. When using water as a pilot media, remove the cap from the exhaust connection and connect a drain line.

Auto/manual operation selection

Normal (off) (automatic) operation

Manual (on) exhaust operation



Available spares

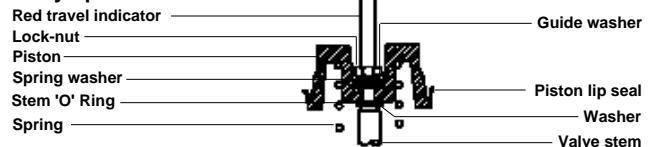
A spare seal kit is available containing: valve head seal, stem 'O' ring, piston lip seal, body seal and body 'O' ring.

To replace these items proceed as follows:

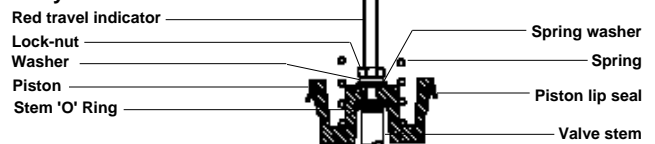
1. Isolate upstream and downstream valves.
2. Vent pilot pressure from actuator and disconnect pilot pipework / solenoid valve.
3. Remove piston actuated valve from the pipeline.
4. Remove the valve body and inspect the PTFE head seal. Replace if necessary. *Note:* Before removing the valve body on normally closed valves, the spring pressure acting down onto the head seal should be relaxed to prevent damage to the head seal. This can be carried out in two ways:
 - a- While retaining the valve body, undo the actuator cover to relax the spring force or
 - b- Apply air pressure at the inlet port of the actuator to compress the spring and remove the spring force acting down on the head seal.
5. To inspect or replace the stem 'O' ring or piston lip seal, remove the actuator housing cover while holding the valve body firmly.

Warning: The internal spring is under compression. Also remove the valve body as previously described in Step 4, above.
6. While holding the valve head, unscrew the red travel indicator and stem lock-nut and remove together with the two washers.
7. Remove the piston stem 'O' ring and washer. Inspect the piston lip seal and 'O' ring and replace if required.
8. Clean out any dirt or waste deposits from inside the piston housing area and carefully apply viton compatible inert grease to the 'O' ring and piston lip seal.
9. Reassemble in reverse order referring to the drawings showing correct location of components. While holding the valve head, tighten the stem lock-nut. Replace the red travel indicator and tighten.
10. Refit the actuator cover and tighten to 37 ft/lbs. for 45 and 63 mm actuators, and 52 ft/lbs. for 90 mm actuators.
11. Refit the valve body replacing the body seal and body 'O' ring and tighten to the recommended torque as specified in Table 1.

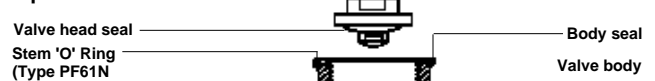
Normally open valves



Normally closed valves



Normally closed valves and open valves



How to order spare seal kits

Always order spares by specifying the valve size, type and data code (given on actuator label i.e. 120 = week 12, year 2000)

Example: 1-seal kit for 1" PF61N-2NC, plus the date code

Spirax Sarco Applications Engineering Department

Toll Free at: 1-800-833-3246

spirax/sarco

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