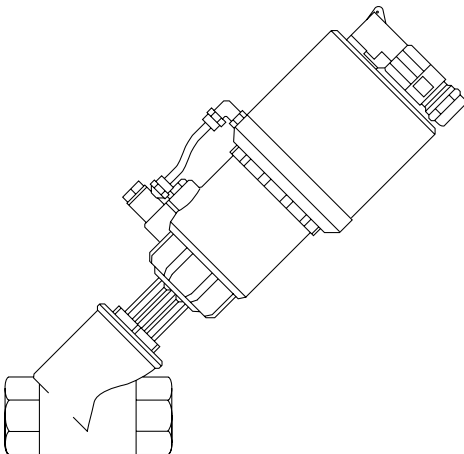


**PM6 Stainless Steel**  
**Piston Actuated Modulating Control Valves**  
Installation and Maintenance Instructions

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1. Safety information
2. General product and delivery information
3. Installation
4. Commissioning
5. Maintenance
6. Spare parts
7. Fault finding



# 1. Safety information

## CE marking

The positioner has been tested and approved by a Notified Body with regards to its compliance with the EN 61326-1: 2006-05 'Electrical equipment for measurement, control and laboratory use. EMC requirements'.

## Attention

This product complies with Electromagnetic Compatibility Directive 2004/108/EC and all its requirements.

### 1.1 Intended use

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended use/application. The product listed below complies with the requirements of the European Pressure Equipment Directive 97/23/EC and carries the CE mark when so required. The product falls within the following Pressure Equipment Directive categories:

	Product	Group 1 Gases	Group 2 Gases	Group 1 Liquids	Group 2 Liquids
PM6	DN15 - DN25 (PN40)	SEP	SEP	SEP	SEP
	DN32 - DN40 (PN25)	1	SEP	SEP	SEP
	DN50 (PN16)	1	SEP	SEP	SEP

- i) The products have been specifically designed for use on steam, water, compressed air, inert industrial gases and certain oils from Group 2 of the above mentioned Pressure Equipment Directive. The PM6 can also be used on propane or methane gases which are in Group 1 of the above Pressure Equipment Directive. The products' use on other fluids may be possible but, if this is contemplated, Spirax Sarco should be contacted to confirm the suitability of the product for the application being considered.
- ii) Check material suitability, pressure and temperature and their maximum and minimum values. If the maximum operating limits of the product are lower than those of the system in which it is being fitted, or if malfunction of the product could result in a dangerous overpressure or over temperature occurrence, ensure a safety device is included in the system to prevent such over-limit situations.
- iii) Determine the correct installation situation and direction of fluid flow.
- iv) Spirax Sarco products are not intended to withstand external stresses that may be induced by any system to which they are fitted. It is the responsibility of the installer to consider these stresses and take adequate precautions to minimise them.
- v) Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.

### 1.2 Access

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.

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### **1.3 Lighting**

Ensure adequate lighting, particularly where detailed or intricate work is required.

### **1.4 Hazardous liquids or gases in the pipeline**

Consider what is in the pipeline or what may have been in the pipeline at some previous time. Consider: flammable materials, substances hazardous to health, extremes of temperature.

### **1.5 Hazardous environment around the product**

Consider: explosion risk areas, lack of oxygen (e.g. tanks, pits), dangerous gases, extremes of temperature, hot surfaces, fire hazard (e.g. during welding), excessive noise, moving machinery.

### **1.6 The system**

Consider the effect on the complete system of the work proposed. Will any proposed action (e.g. closing isolation valves, electrical isolation) put any other part of the system or any personnel at risk?

Dangers might include isolation of vents or protective devices or the rendering ineffective of controls or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

### **1.7 Pressure systems**

Ensure that any pressure is isolated and safely vented to atmospheric pressure. Consider double isolation (double block and bleed) and the locking or labelling of closed valves. Do not assume that the system has depressurised even when the pressure gauge indicates zero.

### **1.8 Temperature**

Allow time for temperature to normalise after isolation to avoid danger of burns.

### **1.9 Tools and consumables**

Before starting work ensure that you have suitable tools and/or consumables available. Use only genuine Spirax Sarco replacement parts.

### **1.10 Protective clothing**

Consider whether you and/or others in the vicinity require any protective clothing to protect against the hazards of, for example, chemicals, high/low temperature, radiation, noise, falling objects, and dangers to eyes and face.

### **1.11 Permits to work**

All work must be carried out or be supervised by a suitably competent person. Installation and operating personnel should be trained in the correct use of the product according to the Installation and Maintenance Instructions.

Where a formal 'permit to work' system is in force it must be complied with. Where there is no such system, it is recommended that a responsible person should know what work is going on and, where necessary, arrange to have an assistant whose primary responsibility is safety. Post 'warning notices' if necessary.

### **1.12 Handling**

Manual handling of large and/or heavy products may present a risk of injury. Lifting, pushing, pulling, carrying or supporting a load by bodily force can cause injury particularly to the back. You are advised to assess the risks taking into account the task, the individual, the load and the working environment and use the appropriate handling method depending on the circumstances of the work being done.

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### 1.13 PTFE - Handling precautions

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.

### 1.14 Residual hazards

In normal use the external surface of the product may be very hot. If used at the maximum permitted operating conditions the surface temperature of some products may reach temperatures of 180°C (356°F).

Many products are not self-draining. Take due care when dismantling or removing the product from an installation (refer to 'Maintenance instructions').

### 1.15 Freezing

Provision must be made to protect products which are not self-draining against frost damage in environments where they may be exposed to temperatures below freezing point.

### 1.16 Disposal

Unless otherwise stated in the Installation and Maintenance Instructions, this product is recyclable and no ecological hazard is anticipated with its disposal providing due care is taken. However, if the valve is fitted with a FKM or PTFE seat, special care must be taken to avoid potential health hazards associated with decomposition/burning of these seats.

#### FKM:

- Can be landfilled, when in compliance with National and Local regulations.
- Can be incinerated, but a scrubber must be used to remove Hydrogen Fluoride, which is evolved from the product and with compliance to National and Local regulations.
- Is insoluble in aquatic media.

#### PTFE:

- Can only be disposed of by approved methods, not incineration.
- Keep PTFE waste in a separate container, do not mix it with other rubbish, and consign it to a landfill site.

### 1.17 Returning products

Customers and stockists are reminded that under EC Health, Safety and Environment Law, when returning products to Spirax Sarco they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk. This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

# 2. General product and delivery information

## 2.1 Description

This document is a general installation and maintenance manual intended for the PM6 2-port pneumatically actuated modulating stainless steel control valve. The PM6 has been designed for use on steam, water, air, oil, gases and vacuum applications. As standard it is fitted with a PEEK plug seal for operation up to 180°C (356°F), and both the body and shaped-plug have undergone a hardening treatment.

**Valves are available with one of two sizes of actuator:**

**Type 2** (63 mm) and **Type 3** (90 mm) with the following action:

- **NC (Normally Closed)** - Designed for flow under the seat (port 2 to 1).

**Valves are available with the following fail safe options:**

<b>C - Closed</b>	The valve fails in the closed position
<b>M - Maintained</b>	The valve fails in the last known operating position

## 2.2 Equipment delivery, handling and storage

### Factory shipment

The product is tested, calibrated and inspected prior to shipment, to ensure reliable operation.

### Receipt of shipment

Each carton should be inspected at the time of delivery for possible external damage. Any visible damage should be recorded immediately on the carrier's copy of the delivery slip.

Each carton should be unpacked carefully and its contents checked for damage. If it is found that some items have been damaged or are missing, notify Spirax Sarco immediately and provide full details. In addition, damage must be reported to the carrier with a request for their on-site inspection of the damaged item and its shipping carton.

### Storage

If the product is to be stored for a period prior to installation, the environmental storage conditions should be at a temperature between 0°C and 65°C (32°F and 149°F), and between 10% and 90% relative humidity (non-condensing).

Ensure there is no condensation within the unit before installing and connecting the power.

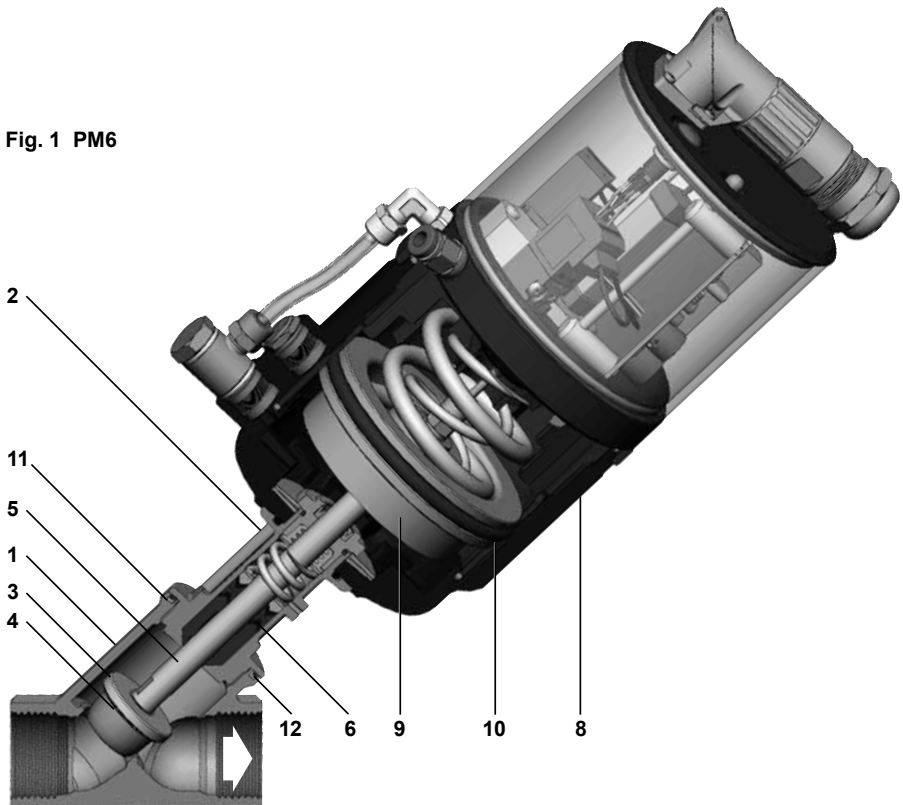
## 2.3 Technical details

<b>Leakage</b>	PEEK soft seal	ASME class VI
<b>Flow characteristic</b>		Equal percentage
<b>Flow direction</b>	Flow under seat	Port 2 to 1
<b>Pilot media</b>	Instrument quality air	60°C maximum
<b>Actuator rotation</b>		360°
	<b>Pilot connection</b>	<b>Maximum pilot pressure</b>
<b>Actuator type and size</b>	<b>Type 2</b> = 63 mm diameter	Push-in type to suit Ø6 mm pipe 8 bar g
	<b>Type 3</b> = 90 mm diameter	Push-in type to suit Ø6 mm pipe 8 bar g

## 2.4 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	PEEK	
5	Valve stem	Stainless steel	AISI 316L
6	Stem seals	PTFE + Carbographite	
7	Stem 'O' ring (Not shown)	FKM	
8	Actuator housing	30% glass filled polyamide	
9	Piston	Aluminium	
10	Piston 'O' ring	NBR	
11	Gasket	PTFE	
12	'O' ring	FKM	

Fig. 1 PM6

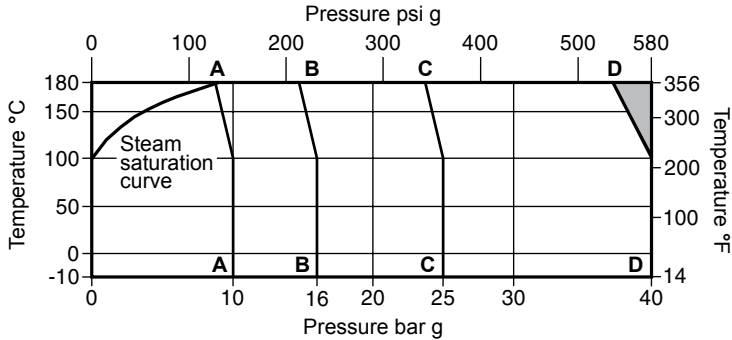


## 2.5 Kvs values

Size	DN15 ½"	DN20 ¾"	DN25 1"	DN32 1¼"	DN40 1½"	DN50 2"
Kvs	4.5	8.7	12.7	19.8	29.7	36.3

For conversion:  $C_V$  (UK) =  $K_V \times 0.963$      $C_V$  (US) =  $K_V \times 1.156$

## 2.6 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.

- 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
	Flanged ASME	DN32 and DN40 (1¼" - 1½")	PN25
		DN50 (2")	PN16
	Sanitary clamp compatible connections	DN15 - DN50 (½" - 2")	Class 150
			DN15 - DN50
Maximum design pressure	Refer to the graph above		
Maximum design temperature	180°C	(356°F)	
Minimum design temperature	-10°C	(14°F)	
Maximum operating pressure for saturated steam service	9 bar g @ 180°C	(130.5 psi g @ 356°F)	
Maximum operating temperature	180°C	(356°F)	
Minimum operating temperature	-10°C	(14°F)	
Ambient temperature limits	-10°C to +60°C	(14°F to 140°F)	
Maximum differential pressure	(see Section 2.7)		
Designed for a maximum cold hydraulic test pressure of:	1.5 x Maximum design pressure (PN rating)		
Maximum test pressure is equal to the maximum differential pressure			



## 2.7 ΔPMX - Maximum differential pressures for PM6 piston actuated valves

**\*Notes:**

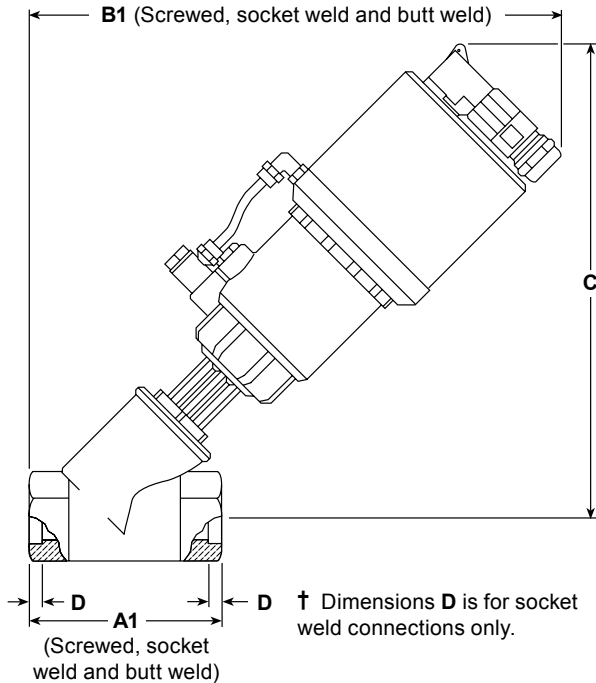
1. Maximum differential pressure for saturated steam service is 9 bar g.
2. Sanitary clamp connections are limited to PN10 pressure rating.
3. ASME flange connections are limited to ASME 150 pressure rating.

Model	Valve size	Actuator diameter (mm)	Flow direction (port 2 to 1)	* Maximum differential pressure (bar)	Pilot pressure	
					Minimum (bar)	Maximum (bar)
PM6_GC-2NC and PM6_GM-2NC	DN15 - (1/2")	63	under seat	16	4.5	8
	DN20 - (3/4")	63	under seat	16	4.5	8
	DN25 - (1")	90	under seat	14	4.5	8
PM6_GC-3NC and PM6_GM-3NC	DN32 - (1 1/4")	90	under seat	12	4.5	8
	DN40 - (1 1/2")	90	under seat	8	4.5	8
	DN50 - (2")	90	under seat	6	4.5	8

## 2.8 Dimensions and weights (approximate) in mm and kg

Valve size	Actuator type and size	Screwed, socket weld and butt weld				Weight
		A1	B1	C	D†	
DN15 - 1/2"	2 (63 mm)	65	294	269.0	5	2.4
DN20 - 3/4"	2 (63 mm)	75	301	274.0	7	2.5
DN25 - 1"	3 (90 mm)	90	316	285.0	8	3.3
DN32 - 1 1/4"	3 (90 mm)	110	329	292.5	10	3.7
DN40 - 1 1/2"	3 (90 mm)	120	334	297.5	12	3.9
DN50 - 2"	3 (90 mm)	150	352	306.5	16	4.6

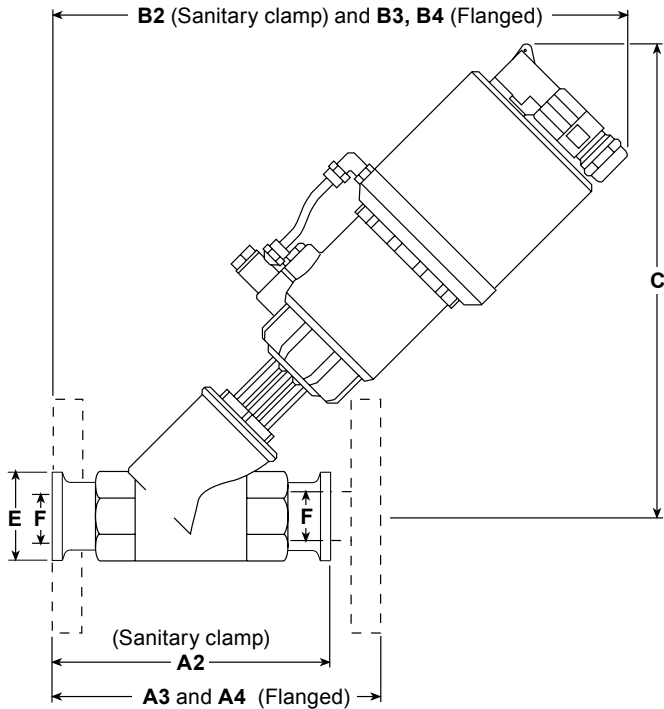
Fig. 2



Valve size	Actuator type and size	Flanged				C	Weight
		EN 1092 A3	ASME 150 A4	EN 1092 B3	ASME 150 B4		
DN15 - 1/2"	2 (63 mm)	130	139.7	323	321	292	3.8
DN20 - 3/4"	2 (63 mm)	150	152.4	330	327	297	4.2
DN25 - 1"	3 (90 mm)	160	165.1	344	343	307	5.7
DN32 - 1 1/4"	3 (90 mm)	180	184.2	359	357	316	7.3
DN40 - 1 1/2"	3 (90 mm)	200	203.2	361	361	319	8.2
DN50 - 2"	3 (90 mm)	230	228.6	384	384	330	10.4

Valve size	Actuator type and size	Sanitary clamp (ISO 2852)					Weight
		A2	B2	C	E	F	
DN15 - 1/2"	2 (63 mm)	102	313.0	269.0	34.0	17.2	2.5
DN20 - 3/4"	2 (63 mm)	114	320.5	274.0	34.0	21.3	2.7
DN25 - 1"	3 (90 mm)	140	341.0	285.0	50.5	25.0	3.7
DN32 - 1 1/4"	3 (90 mm)	159	353.5	292.5	50.5	33.7	4.1
DN40 - 1 1/2"	3 (90 mm)	159	353.5	297.5	64.0	40.0	4.5
DN50 - 2"	3 (90 mm)	190	372.0	306.5	64.0	51.0	5.3

Fig. 3



Valve size	Actuator type and size	Sanitary clamp (ASME BPE)					Weight
		A2	B2	C	E	F	
DN15 - 1/2"	2 (63 mm)	102	313.0	269.0	25.0	9.4	2.5
DN20 - 3/4"	2 (63 mm)	114	320.5	274.0	25.0	15.75	2.7
DN25 - 1"	3 (90 mm)	140	341.0	285.0	50.5	22.1	3.7
DN32 - 1 1/4"	3 (90 mm)	-	-	-	-	-	-
DN40 - 1 1/2"	3 (90 mm)	159	353.5	297.5	50.5	34.8	4.5
DN50 - 2"	3 (90 mm)	190	372.0	306.5	64.0	47.5	5.3

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## 3. Installation

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**Note: Before actioning any installation observe the 'Safety information' in Section 1.**

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended installation:

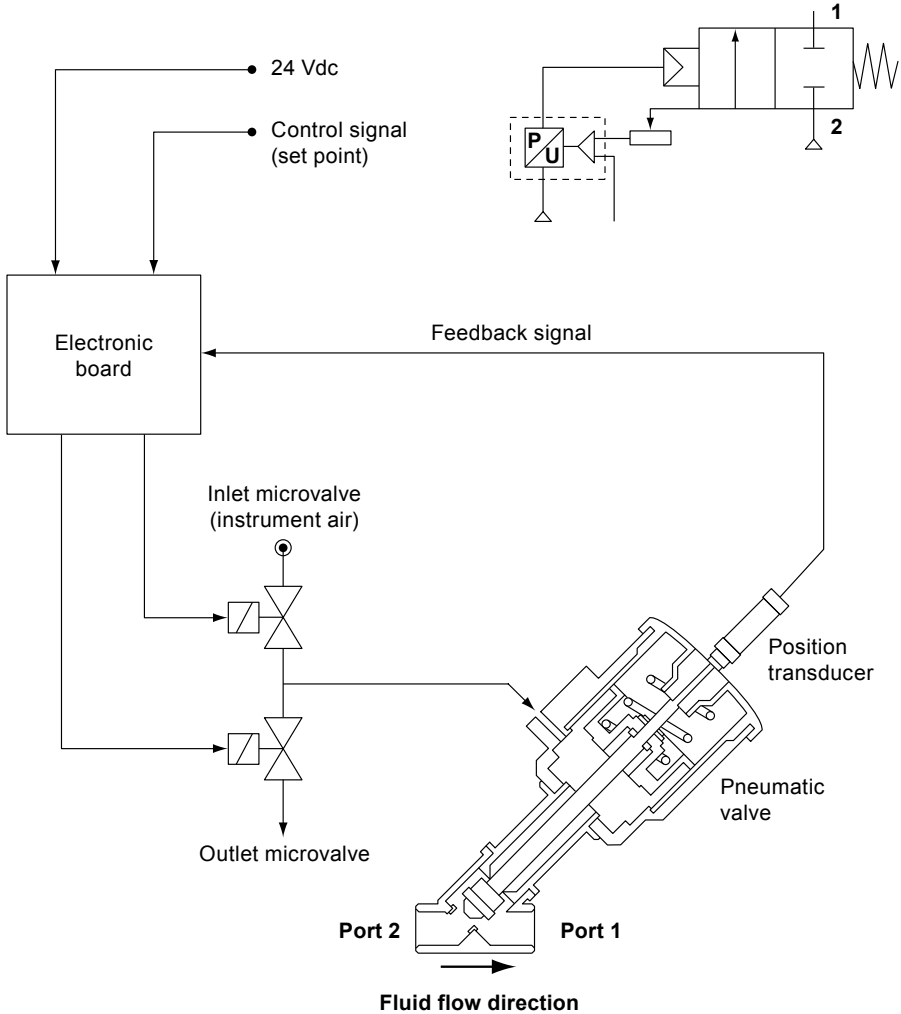
- 3.1** Check materials, pressure and temperature and their maximum values. **Do not exceed the performance rating of the valve. Check the limiting conditions and the product label details for pilot pressure limitations.** If the maximum operating limit of the product is lower than that of the system in which it is being fitted, ensure that a safety device is included in the system to prevent over-pressurisation.
- 3.2** Determine the correct installation situation and the direction of fluid flow.
- 3.3** Remove protective covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.
- 3.4** **Caution: Butt weld and Socket weld versions** must have the actuator and valve stem removed prior to welding the body into the pipeline.  
This can be carried out in one of two ways:
  - i - Undo the actuator cover to relax the spring force while retaining the valve body, then remove the actuator and valve stem.
  - ii - Apply air pressure at the inlet port of the actuator, which will compress the spring and remove the downward force, then remove the actuator and valve stem.
- 3.5** Support pipework should be used to prevent stresses being exerted on the valve body.
- 3.6** These valves can be mounted in any orientation. The actuator can also be rotated 360° in the direction indicated on the product label to facilitate easy pilot mounting and connection.
- 3.7** Isolate connecting pipework. Ensure it is clean from dirt, scale etc. Any debris entering the valve may damage the PEEK head seal preventing a tight shut-off.
- 3.8** Check for leaks.

# 4. Commissioning

## 4.1 Operating principles and description

Figure 4 illustrates the operating layout; the set-point signal coming from the control panel of the equipment is compared with the internal signal (feedback) of the position transducer. When the 2 values don't match, the electronic system inside the valve operates the 2 microvalves (which open or close the pilot air supply) to change the stroke until both signals match.

The balance between the stroke of the valve and the instantaneous flow is guaranteed by the plug design: equal-percentage plug. When fully closed, the valve meets ASME Class VI.



The fluid flow direction for the PM6 range of valves is always under the seat (ports 2 to 1) as illustrated

Fig. 4

The positioner is electronic and is not programmable. The relevant parameters are pre-set at the factory by means of 4 dip switches (see Figure 5). All calibration operations are implemented in one easy automatic operation (see auto set-up procedure in Section 4.4.2).

PM6 valves are supplied pre-set, calibrated and tested by the manufacturer according to the model ordered. It is possible to modify the valve set-up from its factory default setting to better suit a particular application if required. To alter the parameters please refer to Section 4.3.

**Caution: Care must be taken to avoid damaging the electrical connections when removing the top cover.**

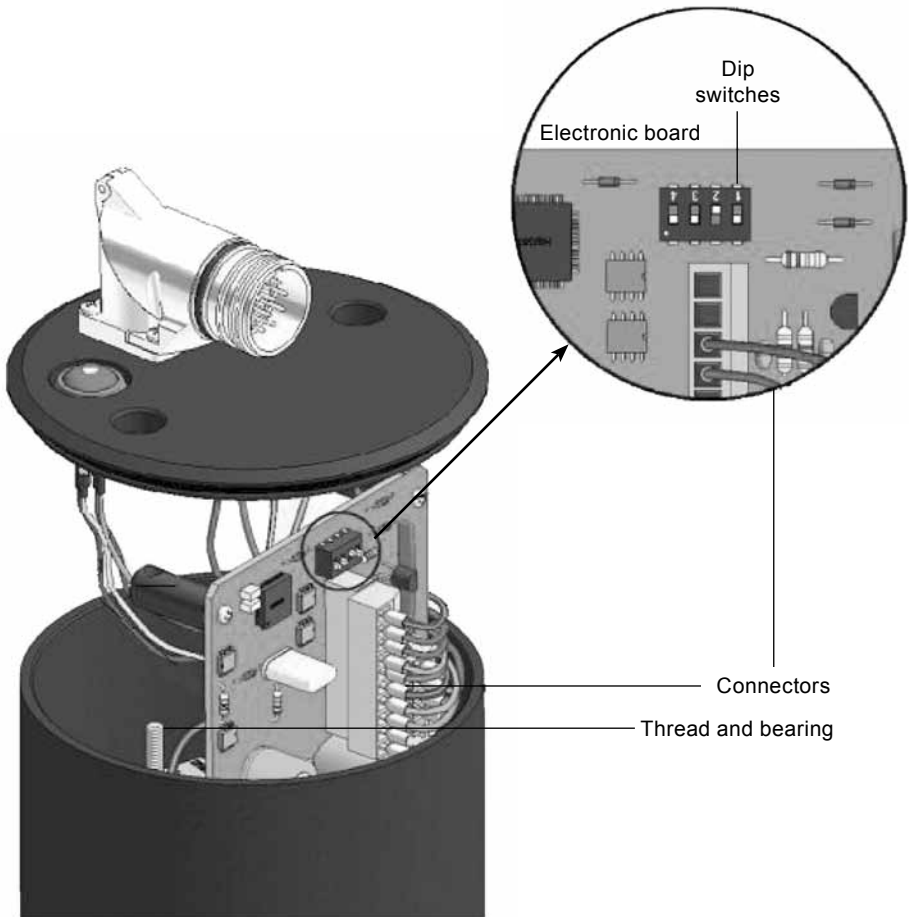


Fig. 5

## 4.2 Valve positioner disassembly

**Note:** Before actioning disassembly observe the 'Safety information' in Section 1.

**Caution:** Ensure that valve is both electrically and pneumatically disconnected before disassembly.

Unscrew the two blind nuts and remove the two rubber gaskets (as shown in Figure 6). Then, firmly hold the aluminium cylinder and then remove the top cover to access the electronic board (see Figure 5).

**Caution:** Care must be taken to avoid damaging the electrical connections when removing the top cover.

**Note:** A gasket for the ingress protection is assembled in the valve top cover; this offers some resistance when trying to lift it up.

Once the top cover has been removed, lift the electronic board very carefully to access the dip switches (indicated in Figure 5).

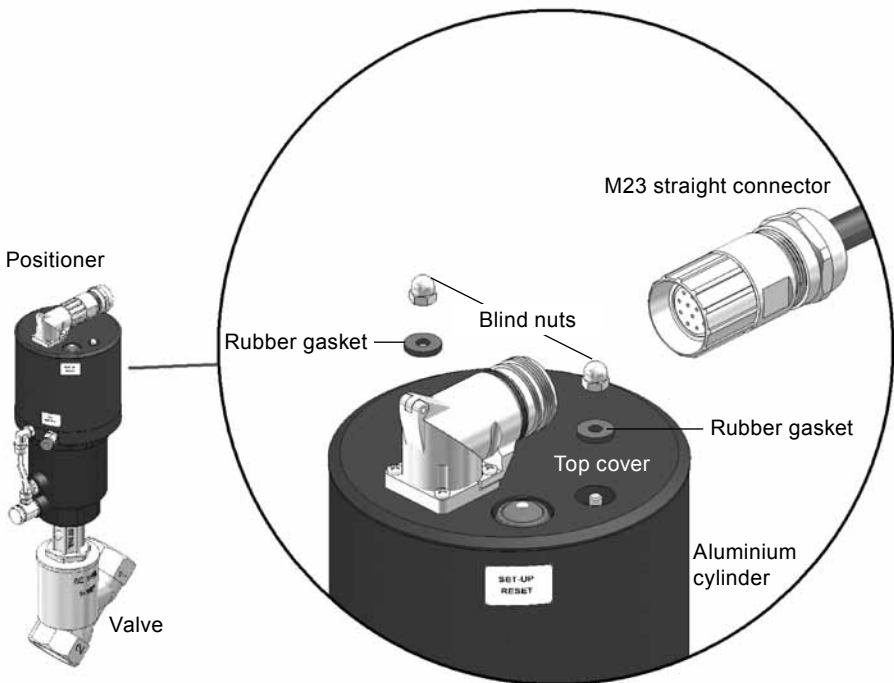


Fig. 6

### 4.3 Dip switces - Configuration

Altering the settings of the four dip switches gives different operating functions.

#### Contact 1 – Process temperature:

Switch 1 is factory set.

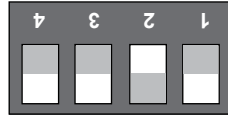


Fig. 7

#### Contact 2 – Fail safe position:

This parameter must be strictly defined upon order because it needs some specific components. Therefore, we recommend **not to modify the manufacturer configuration** in order to avoid malfunctioning problems.

This parameter allows modification of the valve behaviour in case of sudden power failure.

The two available options are:

**1. CLOSED (PM6\_GC)** in case of power failure, the valve closes completely.

**2. MAINTAINED (PM6\_GM)** in case of power failure, the valve stays in the position where it was working before power failure.

**Note:** Due to unavoidable leakage of air from the 2 microvalves, the valve will close slowly after some time.

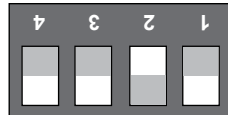


Fig. 8

#### Contact 3 – Function:

This parameter allows the user to choose if the valve has to work as 'normally closed' (Direct-acting) or 'normally open' (Reverse-acting). See the chart below:

Set-up	Set-point	Valve status
Direct (NC)	0 V or 4 mA	Closed
	10 V or 20 mA	100% Open
Reverse (NO)	0 V or 4 mA	100% Open
	10 V or 20 mA	Closed

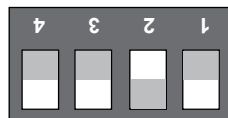


Fig. 9

#### Contact 4 – Set-point:

This parameter allows the user to select the type of inlet signal (set-point) between 0-10 V (voltage) or 4-20 mA (current). Please note that if the parameter changes, the related electrical connection of the 12-pole connector changes as shown in Figure 11.

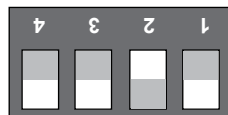


Fig. 10

**Once the set-up phase is finished, you can reassemble the valve.**



## 4.4 Connections and first start-up

**Caution:** in order to safeguard the valve from electrostatic shocks or other electrical problems, it is necessary to connect the valve to earth (Contact No. 9 of the connector).

### 4.4.1 Electrical connection

1. Unscrew and remove the connector from the positioner.
2. Disassemble the connector (see Figure 11).
3. Connect the wires to the terminals in the connector (See Table 1).
4. Reassemble the connector ensuring that Pin 9 is in line with the arrow on the outside and top of the connector.



Fig. 11

Table 1

Pin no.	Function
1	+24 Vdc (supply power)
2	0-10 V (+) set-point
3	4-20 mA (+) set-point
4	0 (common set-point)
5	Alarm signal: <b>0 V</b> -> the valve works properly; <b>24 V</b> -> valve on alarm
6	Transducer voltage (see paragraph 7). <b>It does not have to be connected when the valve is working properly</b>
7	NC
8	0 (supply power)
9	Earth
10	TRX(-) pin for programming the electronic board
11	NC
12	TRX(+) pin for programming the electronic board

#### 4.4.2 When the valve is connected in to the pipeline proceed as follows:

1. Connect the instrument quality air supply to the valve by means of flexible pipes  $\text{Ø}6$  mm.  
**CAUTION:** A  $25\ \mu\text{m}$  mesh filter must be installed on the air supply in order to protect the micro- valves.
2. Turn on electrical supply to the valve (24 Vdc).

**At this point we recommend running an auto set-up cycle.**

3. Starting auto set-up cycle: The set-up is an automatic data gathering process in which the electronics detect the stroke made by the valve. The cycle consists of 3 open-close cycles that may last about 40 seconds:
  - Once power is supplied to the valve, wait a few seconds then press and hold the LED push-button for 5 seconds to initiate the set-up cycle (see Figure 12).
  - The LED now flashes quickly (the cycle has now started).

**Note:** the set-up procedure is always done in the factory before shipping however we recommend doing it again at the first start-up of the valve and again periodically to ensure accurate calibration.

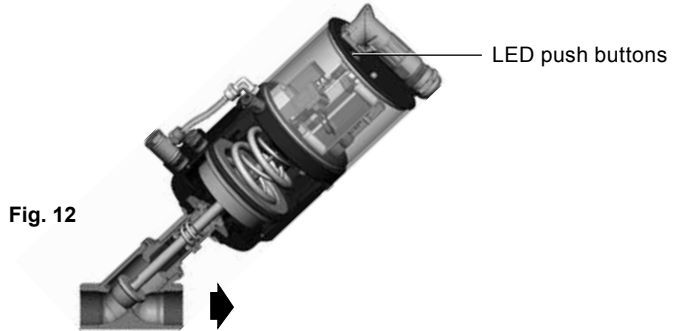


Fig. 12

#### 4.5 LED push-button functionality

The LED push-button allows the user to:

1. **Operate the valve according to the signals given by the inbuilt led-lit push-button:**
  - **NORMAL** – FLASHING EVERY SECOND – the valve is working properly
  - **AUTO SET-UP** – FLASHING QUICKLY – the valve is running an auto set-up cycle. The flashing light continues until the valve has finished the whole cycle.
  - **RED ALERT** - FIXED LIGHT – states that the valve is on red alert.
2. **Reset the valve after an alarm:** generally, the valve goes to ALARM when it does not reach the required position within an established time.
3. Identify and remove the cause of a problem. To reset the alarm, press the LED push-button once. Two complete open and close cycles will occur.

#### 4.6 General features

Actuator size	P min (bar)	P max (bar)
$\text{Ø}63$	4.5	8
$\text{Ø}90$	4.5	8

Electronic board inlet resistance for 0-10 V is 20 k $\Omega$

Electronic board inlet resistance for 4-20 mA is 500  $\Omega$

# 5. Maintenance

**Note:** Before actioning any maintenance observe the 'Safety information' in Section 1.

After replacing the spare parts, it is necessary to follow the first start-up procedure indicated in Section 4.4 and repeat the auto set-up cycle.

## 5.1 Reconfiguring the settings of the valve:

- Isolate the electricity supply to the unit (first the mA instrument signal, then the 24 Vdc power supply).
- Isolate any upstream or downstream isolation valves on the air supply to close the valve. Operate if necessary two or three open/close cycles to discharge all the remaining pressure from the valve and from the equipment. Remove the air tube from the positioner.
- Remove the M23 straight connector (female). Unscrew the two blind nuts from the top cover of the valve. Remove the gaskets present under the two blind nuts.

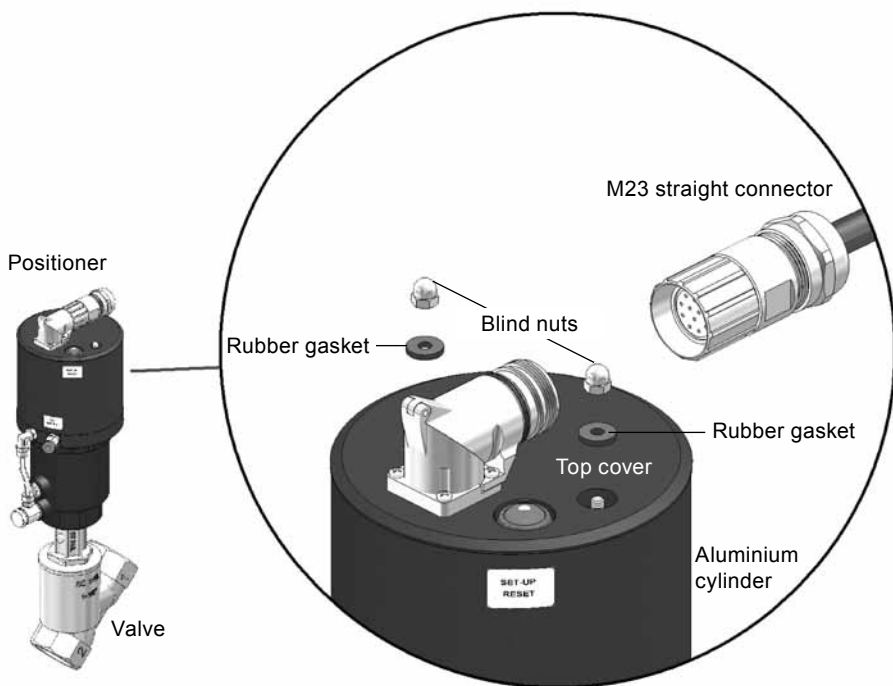


Fig. 13

- Carefully lift the valve top cover. **Caution:** Care must be taken to avoid damaging the electrical connections when removing the top cover. **Note:** A gasket for the Ingress protection is assembled in the valve top cover; this offers some resistance when trying to lift it up:
- Carefully lift the electronic board from the two threaded bearings to access the dip switches (see Figure 14).
- **Note:** Switch 1 and 2 must not be altered. Reset switches 3 and 4 to the required settings. (see Figure 14).
- Refit the electronic board on to the threaded bearings.
- Refit the top cover, blind nuts and gaskets.
- Carry out auto set-up cycle as stated in Section 4.4.

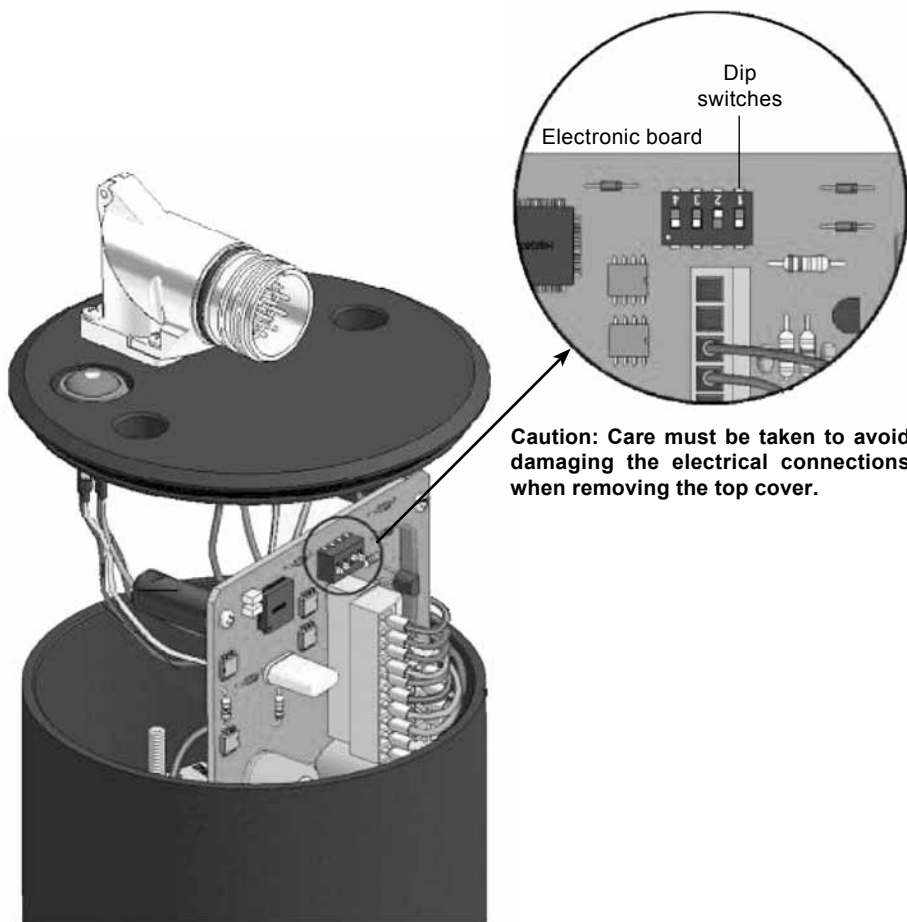


Fig. 14

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## 6. Spare parts

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### 6.1 Available spares

Electronic board spare kit

Transducer spare kit

Inlet microvalve spare kit

Outlet microvalve spare kit

**Spare seal kit** - Is available for all valve and actuator sizes comprising: Piston 'O' ring, stem 'O' ring, valve head seal (PEEK), body seal and 'O' ring.

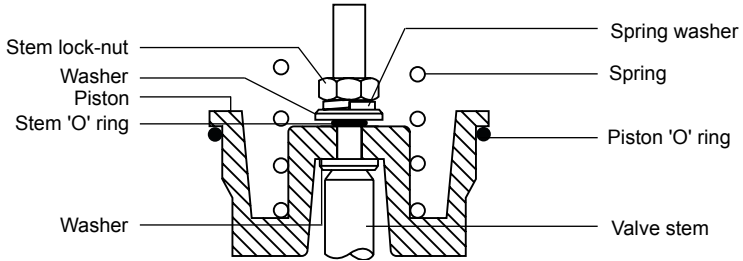


Fig. 15

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### 6.2 How to order spares

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 DN25 PM61GC-2NC, date code 120.

## 7. Fault finding

Problem	LED status	Solution
<p><b>The valve is always closed.</b></p>	Off	<p>Check that the 24 Vdc electrical supply is connected and switched on.</p>
	Flashing light	<p>If it is a NC valve, please check that the set-point signal reaches the connector properly and that its value is higher than 0.2 V (or 4.4 mA).</p> <p>If it is a NO valve, please check that the set-point signal reaches the connector properly and that its value is lower than 9.8 V (or 19.6 mA)</p>
	Fixed light	<ol style="list-style-type: none"> <li>1. Check if there is enough pressure in the air pipeline.</li> <li>2. Check if there are possible mechanical obstructions or unrelated components inside the valve which may block the opening of the valve.</li> <li>3. You hear a ticking: The inlet microvalve is stuck with dust or other dirty particles.</li> <li>4. You hear that the air is continuously giving off: the outlet microvalve is stuck with dust or other dirty particles.</li> </ol>
<p><b>The valve is always open (or cannot close completely).</b></p>	Flashing light	<p>If it is a NC valve, please check that the set-point signal reaches the connector properly and that its value is lower than 9.5 V (or 19 mA).</p> <p>If it is a NO valve, please check that the set-point signal reaches the connector properly and that its value is higher than 0.5 V (or 4.2 mA).</p>
	Fixed light	<ol style="list-style-type: none"> <li>1. Check if there are possible mechanical obstructions or unrelated components inside the valve which may block the closure of the valve.</li> <li>2. One of the two microvalves is stuck with dust or other dirty particles.</li> </ol>
<p><b>The valve alarm is activated after a few seconds of commissioning.</b></p>	Fixed light	<ol style="list-style-type: none"> <li>1. Check if there is enough pressure in the air pipeline.</li> <li>2. Check if there are possible mechanical obstructions or unrelated components inside the valve which may hinder the movement of the valve.</li> <li>3. Check the correct set-up of the contact No. 2 of the dip switches (fail safe position).</li> </ol>

<b>Problem</b>	<b>LED status</b>	<b>Solution</b>
<b>It takes more time than usual for the valve to move to the required position.</b>	Fixed or flashing light	<ol style="list-style-type: none"> <li>1. Check if there is enough pressure in the air pipeline.</li> <li>2. The microvalves are stuck with dust or other dirty particles.</li> </ol>
<b>The valve oscillates continuously.</b>	Fixed or flashing light	Please check the correct set-up of contact No. 1 of the dip switches (140°C – 180°C).
<b>The valve moves irregularly without any control from the set-point.</b>	Flashing light	Check that the set-point signal is stable (if necessary, please check if there are faulty contacts in the electrical equipment).
<b>The valve keeps opening and closing continuously.</b>	Flashing light	The led push-button has been pushed down when switching on the valve. Switch the valve off and switch it on again after 4-5 seconds.

