Pressure regulating valve
PREL-90

1 Design

2) Only in combination with pressure regulator PREL-90...

1) The diagnostics interface should only be used by Festo service staff.

The output pressure of the PREL pressure regulating valve VPPL is determined by an integrated pressure sensor and internally compared to the setpoint value. In case of deviations, the VPPL actuates the controller of the pressure regulator PREL until the output pressure reaches the setpoint value.

In basic setting (no setpoint specification), the output pressure is reduced with the vent seat fully open.

2 Function

The pressure regulator PREL can only be operated together with the proportional-pressure regulator VPPL.

- Operate the pressure regulating valve only in the marked flow direction.
- Comply with all applicable national and international regulations.

3 Application

The pressure regulating valve PREL-90 is intended to regulate the air pressure in the subsequent string to an electrically specified output pressure.

- Only use the product in original status without unauthorized modifications.
- Only use pre-filtered compressed air as an operating medium in accordance with the specification (Technical data).
- Operation with fluids or gases is impermissible.
- Use the pressure regulating valve only in the marked flow direction.
- Comply with all applicable national and international regulations.

4 Installation

Note

- Installation only by qualified personnel and only in accordance with the operating instructions.
- For direct mounting of an individual device, connecting plates of the type PAML-CP-90-HP3... are required.
- Information on mounting of module connectors, connecting plate and mounting brackets can be found in the documentation enclosed with the accessories.

Mounting the proportional pressure regulator VPPL

Mounting of the proportional pressure regulator VPPL to the pressure regulating valve PREL is described in the operating instructions of the VPPL. The VPPL is pre-assembled on delivery.

For all available product documentation ➔ www.festo.com/pk
5 Electrical connection

Warning
Injuries caused by electric shock, damage to the machine and system.
- Electrical connection must be made only by qualified personnel.
- For the electrical power supply, use only PELV power circuits in accordance with IEC 60204-1/A1 (Protective Extra Low Voltage, PELV).
- Take account of the general requirements of IEC 60204-1 for PELV power circuits.
- Use only voltage sources which ensure reliable electric separation of operating voltage in accordance with IEC 60204-1.

1. Use pre-assembled cables from Festo.
2. Before establishing the electrical connection, check the connecting cable:
   - Max. length of the signal lines: 30 m.
   - The cables are installed free of crimping, kinking and stretching.
3. Connection of two-channel exhaust module. ➔ Operating instructions PAHL

Note
The connection [7] is used only for diagnostics. If this plug connector is used for operation of the valve, it can result in damage to the electronic controls.
- Never connect port [2] to the power supply.

4. Screw signal cable onto port [9] (➔ Fig. 1).
   - Pin allocation for M12 plug:
     - Tightening torque 0.5 Nm ± 20 %.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Cable colour1)</th>
<th>Assignment</th>
<th>M12 plug connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>—</td>
<td>Unused</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>White (WH)</td>
<td>Analogue out+ (actual value)</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>—</td>
<td>Unused</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Black (BK)</td>
<td>Analogue out– (actual value)</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Grey (GY)</td>
<td>FE</td>
<td>5</td>
</tr>
</tbody>
</table>

1) When using the pre-assembled Festo cables

Fig. 3

Note
With use of a screened cable:
- Earth screening on the cable end away from the VPPL.

5. Screw the connecting cable to the port [8] (➔ Fig. 1).
   - Pin allocation for M12 plug:
     - Tightening torque 0.5 Nm ± 20 %.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Cable colour1)</th>
<th>Assignment</th>
<th>M12 plug connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown (BN)</td>
<td>24 V DC</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>White (WH)</td>
<td>Analogue in+ (setpoint value)</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Blue (BU)</td>
<td>0 V</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Black (BK)</td>
<td>Analogue in– (setpoint value)</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Grey (GY)</td>
<td>FE</td>
<td>5</td>
</tr>
</tbody>
</table>

1) When using the pre-assembled Festo cables

Fig. 4

6 Commissioning

Note
The pressure regulator PREL can only be operated together with the proportional-pressure regulator VPPL.
- Commissioning should only be conducted by qualified personnel.
- Note operating instructions of the proportional pressure regulator PREL.

1. Prior to commissioning, check the following requirements:
   - The VPPL is flange-mounted to the PREL.
   - The PREL is completely connected and ready for operation.
   - The connection points are tight.
   - Any necessary safety equipment is present and active.
2. Switch on the supply voltage.
3. Switch on supply pressure.
4. Switch on analogue setpoint signal (0 ... 10 V / 4 ... 20 mA).
5. Place the VPPL and PREL into operation together (➔ VPPL operating instructions).

Note
The pressure regulating valve PREL has an integrated soft start function. That means, when a setpoint value is being applied, the pressure rise at the output of the pressure regulating valve is delayed.

7 Operation

Note
To avoid malfunctions of the setpoint value signal:
- Keep sources of high frequency electromagnetic radiation (e.g. radios, mobile phones, other interfering transmitters) away from the device.
- Comply with operating conditions.
- Always comply with the permissible limits.
- Observe the operational status displays of the VPPL (➔ Operating instructions VPPL).

Warning
Safety setting: In case of a wire break, the output pressure is lowered to 0 bar. The VPPL interprets setpoint signals less than 1 % of full scale as 0 V. In this case, the working pressure is set to ambient pressure.

8 Maintenance and care

Note
Clogging of the silencer may result in reduced bleeding (back pressure).
- Check silencer at regular intervals and replace when necessary.
- Always use approved silencers (➔ 11 Accessories).

Warning
Risk of injury from compressed air.
Products under pressure can cause personal injury and material damage.
- Maintenance only by qualified personnel.
- Before all maintenance work, valve, service unit and piping.

Prior to all maintenance work:
1. Switch off pressure to valve and adjacent pneumatic devices.
2. Switch off analogue setpoint signal.
3. Let the device cool off.
4. Switch off supply voltage and safeguard it against being switched on again.

Cleaning:
- Regularly clean the outside of the product with a soft cloth.
- The permissible cleaning agent is water or soap suds (max. 50 °C).

9 Dismantling

Warning
Risk of injury from compressed air.
Products under pressure can cause personal injury and material damage.
- Dismantling only by qualified personnel.
- Before all dismantling work, depressurize the valve, service unit and piping.

Caution
Risk of injury from falling loads.
- Take the weight of an individual device or a service unit into consideration.
- Depending on the design, an installed service unit can weigh more than 50 kg.

1. Switch off pressure to the pneumatic system.
2. Switch off analogue setpoint signal.
3. Let the device cool off.
4. Switch off supply voltage and safeguard it against being switched on again.
5. Disconnect electrical connections of the VPPL.
6. Shut down the PREL and VPPL together.
7. Remove the service unit.
   - If installed before or after the service unit: Remove the compressed air line or the connecting plate on the service unit.
   - If installed between two service units: Loosen the screws of the module connector.
### 10 Fault clearance

**Warning**

Risk of injury from compressed air/pressure surge. Products under pressure can cause personal injury and material damage. - Before applying the supply pressure: Set the setpoint value of the VPPL to zero.

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Display</th>
<th>Possible cause</th>
<th>Remedy</th>
</tr>
</thead>
</table>
| The valve switches off after 5 s | LED status at the VPPL flashes red | Supply pressure lacking | 1. Set setpoint value to zero  
2. Apply supply pressure  
3. Set required setpoint value |

**Fig. 5**

**Note**

For additional information on fault clearance ➔ Operating instructions VPPL

### 11 Accessories

<table>
<thead>
<tr>
<th>Designation</th>
<th>Product type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-base</td>
<td>PAML-CP-90-HP3</td>
</tr>
<tr>
<td>Module connector</td>
<td>PAML-MK-90-HP3</td>
</tr>
<tr>
<td>Mounting bracket</td>
<td>PAML-MB-90-HP3</td>
</tr>
<tr>
<td>Proportional pressure regulator</td>
<td>VPPL</td>
</tr>
<tr>
<td>Pneumatic silencers</td>
<td>U-G1-HD-SA</td>
</tr>
</tbody>
</table>

1) The low-pressure silencer (10 bar) can be used with a permanently installed restrictor that limits the flow rate in the silencer(s).

**Fig. 6**

### 12 Technical data

**PREL-90**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply pressure $p_1$ [bar]</td>
<td>0 ... 50</td>
</tr>
<tr>
<td>Auxiliary pilot air port 1 (at VPPL)</td>
<td>G1/4</td>
</tr>
<tr>
<td>Pressure range, auxiliary pilot air (at VPPL)</td>
<td>$&gt; p_1 + 3; \leq 50$</td>
</tr>
<tr>
<td>Pressure regulation range: [bar]</td>
<td>$0.5 ... 20$</td>
</tr>
<tr>
<td>Signal setpoint value (Analogue input)</td>
<td>Voltage [V DC]</td>
</tr>
<tr>
<td>Operating voltage [V DC]</td>
<td>21.6 ... 27.6</td>
</tr>
<tr>
<td>Temperature of medium [°C]</td>
<td>+5 ... +50</td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>+5 ... +50</td>
</tr>
<tr>
<td>Mounting position</td>
<td>Vertical with VPPL on top</td>
</tr>
<tr>
<td>Alternative mounting position</td>
<td>Vertical with VPPL underneath</td>
</tr>
<tr>
<td>Flow direction</td>
<td>Marking on the housing: from 1 to 2</td>
</tr>
</tbody>
</table>
| Type of mounting | - In-line installation  
- Module connector  
- Sub-bases |
| Classification in accordance with EC Pressure Equipment Directive | Good engineering practice |
| CE marking (see declaration of conformity) | ➔ www.festo.com/sp |
| Max. cable length [m] | 30 |
| Weight [kg] | 6.2 |

1) Due to the design, the output pressure is limited to 17.5 bar
2) Due to the design, the output pressure is limited to 37.5 bar
3) The device is intended for use in an industrial environment. Measures for interference suppression may need to be implemented in residential areas.

**Fig. 7**

**Dependence of $p_1$ on $p_{2\text{max}}$**

**Pressure ramp at switch-on of the PREL**

(Not activated with ongoing controlled operation)

**Fig. 8**

**Fig. 9**