Sub-base VABP

1 Requirements for product use

1.1 Intended use

The sub-base VABP is intended for operation in combination with servopneumatic axes and can be used to implement various switch-off functions. If you use the product as a component of safety equipment, an application-specific evaluation of all components and the circuit used regarding the achievable Performance Levels must be performed in advance.

Note

The product is not a safety device and not a complete safety solution, but it can be used as part of a safety solution.
- Observe the application brochure in the Internet (www.festo.com/sp).

1.2 Technical prerequisites

General conditions for the correct and safe use of the product, which must be observed at all times:
- Observe the specified limits for pressures, temperatures and electric voltage, for example, and ensure there is compressed air with correct preparation in accordance with the specifications for the medium (11 Technical data).
- Before mounting, remove particles in the supply lines.

1.3 Qualification of trained personnel

Installation, mounting, commissioning, maintenance and de-commissioning may only be performed by qualified personnel who are familiar with:
- the documentation for the product,
- installation and operation of electrical and pneumatic control systems,
- the applicable regulations for operation of electrical and pneumatic systems as well as for accident protection and operational reliability.

1.4 Service

- Consult your local Festo repair service if you have any technical problems.

2 Product overview

2.1 Control sections and connections

1 Manual override (covered)
2 Electric control port
3 Solenoid valve
4 Pilot air port [14]
5 Function ports [32] and [34]
6 Supply ports [22] and [44]
7 Sub-base VABP
8 Working lines [2] and [4]
9 Mounting screw

1) Figure shows an example for the sub-base VABP-S3-26V1G-G18-2M-R3 (ISO 15407-1).

2.2 Function and application

With the sub-base VABP, the following switch-off functions for servopneumatic axes can be implemented through the circuitry of the function ports [32] and [34] and use of conforming accessories:
- Halt movement (circuit 1)
- Venting (circuit 2)
- Reverse and reduce speed (circuit 3 and 4)
- Switch off power (circuit 5).

For a detailed description (4 Configuration of the switch-off functions).

If solenoid valves are used with switching position sensing, protection against unexpected restarting can also be achieved.

3 Assembly and installation

3.1 Mounting through mounting holes

Note

Mounting only through the proportional directional control valve VPWP is not sufficient. Always mount the sub-base VABP directly through the intended mounting holes and as close as possible to the assigned drive.
- Mount the sub-base VABP with two socket head screws through the mounting holes (Fig. 2).

Dimensions [mm]

<table>
<thead>
<tr>
<th>Size</th>
<th>L1</th>
<th>L2</th>
<th>B1</th>
<th>B2</th>
<th>D1</th>
</tr>
</thead>
<tbody>
<tr>
<td>VABP-S3-26V1G-G18-2 and VABP-S3-26V1G-G18-2M-R3</td>
<td>114.0</td>
<td>6.0</td>
<td>21.0</td>
<td>33.5</td>
<td>4.5</td>
</tr>
<tr>
<td>VABP-S1-1V1G-G14-2 and VABP-S1-1V1G-G14-2M-R3</td>
<td>141.0</td>
<td>7.0</td>
<td>28.0</td>
<td>61.0</td>
<td>5.5</td>
</tr>
<tr>
<td>VABP-S1-2V1G-G38-2 and VABP-S1-2V1G-G38-2M-A1</td>
<td>138.5</td>
<td>5.5</td>
<td>44.0</td>
<td>78.0</td>
<td>6.6</td>
</tr>
</tbody>
</table>

Fig. 2
3.2 Mounting the solenoid valves on the sub-base
- Fasten the solenoid valves with the corresponding screws through the threaded holes on the sub-base.
- Observe the maximum tightening torque (11 Technical data)
For the versions 2M-R3 and 2M-A1, the solenoid valves are already mounted.

3.3 Mounting onto a proportional directional control valve VPWP
The sub-base VABP can be attached directly to a corresponding proportional directional control valve (Fig. 3).

Note
- Observe the documentation of the proportional directional control valve VPWP.
- Use the two accompanying O-rings to seal the connections (22 and 44) between the sub-base VABP and the proportional directional control valve.
- For attachment, use the four accompanying mounting screws.
- Observe that the tightening torque is a maximum of 3 Nm ±10%.
- Always mount this combination through the holes in the sub-base VABP near the assigned drive.

4 Configuration of the switch-off functions

Note
The product is not a safety device and not a complete safety solution, but it can be used as part of a safety solution.
- Observe the application brochure in the Internet (www.festo.com/sp).
A corresponding accessory is mounted to the function ports [32] and [34] for configuration of the various switch-off functions.
- Choose the corresponding accessory from the following table (Fig. 5).

<table>
<thead>
<tr>
<th>Accessories</th>
<th>VABP-S3-26V16-6 (ISO 15407-1)</th>
<th>VABP-S1-1V16-6 (ISO 5599-1)</th>
<th>VABP-S1-2V16-6 (ISO 5599-1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blanking plug</td>
<td>B-1/8</td>
<td>B-1/8</td>
<td>B-1/4</td>
</tr>
<tr>
<td>Exhaust air flow control valve</td>
<td>GRE-1/8</td>
<td>GRE-1/8</td>
<td>GRE-1/4</td>
</tr>
<tr>
<td>Push-in fitting</td>
<td>QS-G1/8, -6 and -8</td>
<td>QS-G1/8, -6 and -8</td>
<td>QS-G1/4, -6 and -10</td>
</tr>
</tbody>
</table>

Fig. 5

Note
Switching variants 2, 3, 4 and 5:
If the drive is near the end stop, a jerky movement into the end position can occur when switched off and on.
- Use shock absorbers instead of the fixed stops.

4.1 Halt movement (circuit 1)

Caution
Danger of squeezing
- The drive is under pressure after the switch-off function is actuated.
- Pneumatic components always have leakage. With vertical top elements, the useful load will drop down slowly.

When the solenoid valves are switched off, the movement of the drive is halted.

4.2 Venting (circuit 2)

Caution
This circuit is not appropriate for vertical top elements without additional securing functions.
The cylinder is not exhausted with closed exhaust air flow control valves.

When the solenoid valves are switched off, the cylinder is exhausted.
4.3 Reverse and reduce speed (circuit 3 and 4)

**Caution**

- Pneumatic components have leakage, which limits the time of the halt function.
- To generate the reversing movement even with a compressed air failure, an air reservoir with non-return function can be inserted between the connection [32] or [34] for compressed air supply.

**Reverse extending and reduce speed (circuit 3)**

When the solenoid valves are switched off, the movement of a retracting drive is reversed with simultaneous reduction of speed. The drive travels into the end position.

**Reverse retracting and reduce speed (circuit 4)**

When the solenoid valves are switched off, the movement of an extending drive is reversed with simultaneous reduction of speed. The drive travels into the end position.

---

4.4 Switch off power (circuit 5)

**Caution**

- The drive is under pressure after the switch-off function is actuated.
- This circuit is not appropriate for vertical top elements without additional securing functions.
- To restrict the run-out movement, a thin tube (4 or 6 mm) to connect the ports [32] and [34] or use of a line restrictor (e.g. GRO...) is recommended.
- In the case of a closed line throttle, no force compensation is possible.

When the solenoid valves are switched off, both cylinder chambers are connected to each other and the movement of the drive comes to a stop.

---

4.5 Electrical connection of the solenoid valves

**Warning**

Electric shock

Injury to people, damage to the machine and system. Only use power sources which guarantee reliable electrical isolation of the operating voltage per IEC/EN 60204-1. Also observe the general requirements for PELV power circuits as per IEC/EN 60204-1.

Design of the electrical connections of the solenoid valves is dependent on the product variant.

**Table**

<table>
<thead>
<tr>
<th>Size</th>
<th>Solenoid valve</th>
<th>Activation (Solenoid coil)</th>
<th>Interrogation of the switching position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VABP-S3-26V16...</td>
<td>M12x1 (3-pin)</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>(ISO 15407-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>VSVA-B-M52-M2-A1-1R5L</td>
<td>Square plug design C</td>
<td>M8x1 (3-pin)</td>
</tr>
<tr>
<td></td>
<td>VSVA-B-M52-M2-A1-1C1-APP</td>
<td></td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>VABP-S1-1V16...</td>
<td>M12x1 (3-pin)</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>(ISO 5599-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>VSVA-B-M52-M2D-D1-1R5L</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>VABP-S1-2V16...</td>
<td>M12x1 (3-pin)</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>(ISO 5599-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MN1H-5/2-D-2-FR-5-C with</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MSN1G-24DC-0D</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) For this variant, a Y connecting cable is available for direct connection to the proportional directional control valve VPWP.

**Note**

- Select the corresponding lines from our catalogue (www.festo.com/catalogue).
- Observe the documentation of the solenoid valves and of the lines as well as the maximum tightening torque of the plugs.

**Ports**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>n. c.</td>
</tr>
<tr>
<td>3</td>
<td>Com (-)</td>
</tr>
<tr>
<td>4</td>
<td>Signal (+) solenoid 14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24 V</td>
</tr>
<tr>
<td>3</td>
<td>0 V</td>
</tr>
<tr>
<td>4</td>
<td>Signal</td>
</tr>
</tbody>
</table>

**Y connecting cable**

With direct mounting of the sub-base VABP to a corresponding proportional directional control valve VPWP, the Y connecting cable, which is available as an accessory, can be used for electrical control of the solenoid valves.

**Note**

- Observe the assembly instructions of the Y connecting cable.
- Observe the documentation of the proportional directional control valve VPWP and of the solenoid valves.
- Observe the maximum tightening torque of 0.3 Nm for the plugs.

4.6 Circuitry in the load voltage circuit

**Switch-off of the solenoid valves via direct connection to load voltage**

**Fig. 11**

- Select the corresponding lines from our catalogue (www.festo.com/catalogue).
- Observe the documentation of the solenoid valves and of the lines as well as the maximum tightening torque of the plugs.

**Fig. 12**

<table>
<thead>
<tr>
<th>Ports</th>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>n. c.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Com (-)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Signal (+) solenoid 14</td>
<td></td>
</tr>
</tbody>
</table>

**Square plug**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PE Protective conductor (protective earth)</td>
</tr>
</tbody>
</table>

**M8x1 (3-pin)**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24 V</td>
</tr>
<tr>
<td>3</td>
<td>0 V</td>
</tr>
<tr>
<td>4</td>
<td>Signal</td>
</tr>
</tbody>
</table>

**Note**

- Observe the assembly instructions of the Y connecting cable.
- Observe the documentation of the proportional directional control valve VPWP and of the solenoid valves.
- Observe the maximum tightening torque of 0.3 Nm for the plugs.

**Fig. 13**
Switch-off of the solenoid valves via the proportional directional control valve VPWP with separate load voltage circuit of the CPX terminal

Note

The modular power supply arrangement of the CPX terminal facilitates the formation of voltage zones. You can find details in the manual for the CPX terminal or in the system description for the CPX-CMAX or CPX-CMPX.

The load voltage is only switched through to the output DO of the VPWP if the operating voltage is also switched on.

For the CPX-CMPX, the error E51 must also be acknowledged (no load voltage present).

Fig. 14

5 Commissioning

Note

• Switch off the power supply before connecting or disconnecting plug connectors (danger of functional damage).
• Commission only a completely mounted and wired product.
• Check the switch-off function after completed installation.

General procedure
1. Apply operating voltage.
2. Switch on the operating pressure.

Fig. 15

Setting of the exhaust air flow control valve (only for the circuits 2, 3 and 4)

Note

• First close the adjusting screw of the exhaust air flow control valve completely and then set the flow rate of the exhaust air as required.

6 Operation

Note

To ensure intended use of the solenoid valves.
• Actuate the solenoid valves at least once per week.

7 Maintenance and care

Note

Permissible cleaning media include soap suds with a temperature of maximum 50 °C or other non-abrasive media.

8 Disassembly and repair

Note

The sub-base VABP is not repairable.
• In case of damage, replace a defective product.
• Before disassembly, switch off the operating voltage and compressed air supply and separate the respective connections from the product.

9 Accessories

Note

• Please select the corresponding accessories from our catalogue (www.festo.com/catalogue).

10 Fault clearance

If an error or failure is recognised, a check must be made whether this is based on external or internal influences so that corresponding measures for fault clearance can be introduced.
• Check the correct switching characteristics of the sub-base VABP – during commissioning or after fault clearance
– after interruption of the signal lines of the proximity sensors.

Check external influences

To exclude external influences, proceed as follows:
1. Check the compressed air and power supply and adjust them to the technical data (11 Technical data).
2. Check the pneumatic connections and tubing lines as well as the solenoid coil control and also the proximity sensors if solenoid valves are used.

Check internal influences

To exclude internal influences, do the following:
1. Check the switch-off function.
2. If necessary, replace one or both solenoid valves if they have been recognised as defective and check the switch-off function again.
3. Replace the complete product if the malfunction continues.

11 Technical data

<table>
<thead>
<tr>
<th>Size VABP-…</th>
<th>…-S3-26…</th>
<th>…-S1-1…</th>
<th>…-S1-2…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting position</td>
<td>Any</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actuation type</td>
<td>Electrical / pneumatic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manual override of the solenoid valves</td>
<td>without or covered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tightening torque of the solenoid valves [Nm]</td>
<td>2</td>
<td>3</td>
<td>6.5</td>
</tr>
<tr>
<td>Nominal operating voltage [V]</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible voltage fluctuations [%]</td>
<td>±10</td>
<td>±10</td>
<td>±15 / ±10</td>
</tr>
<tr>
<td>Standard nominal flow rate [l/min]</td>
<td>800</td>
<td>1400</td>
<td>2100</td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>in accordance with DIN/IEC 68 Part 2-6, severity level 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock resistance</td>
<td>in accordance with DIN/IEC 68 Part 2-27, severity level 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating pressure [bar]</td>
<td>3…10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pilot pressure1) [bar]</td>
<td>3…8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature [°C]</td>
<td>0…+50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage temperature [°C]</td>
<td>–10…+60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product weight (without solenoid valves) [g]</td>
<td>668</td>
<td>1623</td>
<td>2000</td>
</tr>
<tr>
<td>(with solenoid valves) [g]</td>
<td>1200</td>
<td>2480</td>
<td>3570</td>
</tr>
</tbody>
</table>

1) Dependent on the operating pressure (Fig. 14)

Fig. 16

Pilot pressure dependent on operating pressure

Note

Work range for solenoid valves with external auxiliary pilot air

Fig. 16