MPA-S Valve Terminal

Valve terminal with MPA-S pneumatics
Type:
MPA-FB-...
MPA-CPI-...
MPA-MPM-... and
MPA-ASI-...
Contents and general instructions

Original .................................................... de
Edition .................................................... en 0910d
Designation .......................... P.BE-MPA-EN
Order no. ................................. 534 241
Contents and general instructions
Contents and general instructions

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Contents and general instructions
Contents and general instructions

Intended use

The MPA-S valve terminals documented in this description are intended for installation into a machine or automated system. The user must at all times observe the safety regulations specified in this manual as well as the instructions concerning the designated use of the relevant MPA-S valve terminal. The MPA-S valve terminals may only be used as follows:

- As intended in an industrial environment
- In its original condition without unauthorised modifications.
  Only the conversions or modifications described in the documentation accompanying the product are permitted.
- In perfect technical condition.

When commercially available components, such as actuators, are connected, the specified limits for pressures, temperatures, electrical data, torques etc. must be maintained. Comply with the regulations of the trade associations and the German Technical Control Board (TÜV) and the VDE conditions or corresponding national conditions.

Range of application and certifications

The product fulfils the requirements of the EU directives and is marked with the CE certification.

![CE Mark](image)

Standards and test values which the product maintains and fulfils can be found in the section “Technical data.” The product-relevant EU directives can be found in the declaration of conformity.
Contents and general instructions

Certain product configurations have been certified by the Underwriters Laboratories Inc. (UL) for the USA and Canada. These configurations are marked as follows:

Note
Observe the following if the UL requirements have to be complied with in your application:

- Rules for complying with the UL certification can be found in the separate UL-specific documentation. The technical data listed there have priority.
- The technical data in this documentation may show values deviating from this.

Target group

This description is directed exclusively at technicians trained in control and automation technology.

Service

Please consult your local Festo repair service if you have any technical problems.
Contents and general instructions

Notes on this description

This description contains specific information on mounting, installing, commissioning, servicing and converting the MPA-S valve terminal. It includes only the description of the pneumatic components and refers to the valve terminal variants listed in the following table:

<table>
<thead>
<tr>
<th>Variants of the MPA-...-VI valve terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPA-S with CPX terminal</td>
</tr>
<tr>
<td>Information on CPX modules can be found in the description for the relevant module. An overview is provided in the system description of your CPX terminal, in the “Descriptions of the CPX terminal” table.</td>
</tr>
</tbody>
</table>

| MPA-S with multi-pin plug connection      |
| Information on the electrical/electronic components: see package insert |

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### Contents and general instructions

#### Variants of the MPA-...-VI valve terminal

<table>
<thead>
<tr>
<th>MPA-S with CPI interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information on the electrical/electronic components:</td>
</tr>
<tr>
<td>see package insert</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MPA-S with AS interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information on the electrical/electronic components:</td>
</tr>
<tr>
<td>see package insert</td>
</tr>
</tbody>
</table>

Tab. 0/1: Connection variants of the MPA-S valve terminal

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An overview of all user documentation for the CPX terminal is provided in the corresponding system description.
The MPA-S valve terminal consists of the following pneumatic and electrical components: The most important components are shown in the following Fig.

Fig. 0/1: Main components of the MPA-S valve terminal

1. Flat plate silencer or exhaust plate
2. Blanking plate
3. Valves
4. Pressure sensor plate
5. Electrical supply plate
6. Proportional pressure regulator
7. Right end plate
8. Pneumatic Supply plate
9. Pressure regulator plate
10. Sub-base
11. Multiple connector plate; AS interface, CPI interface or pneumatic interface
Contents and general instructions

Important user instructions

Danger categories

This manual contains instructions on the possible dangers which may occur if the product is not used correctly. These instructions are marked (Warning, Caution, etc.), printed on a shaded background and marked additionally with a pictogram. A distinction is made between the following danger warnings:

**Warning**
This means that failure to observe this instruction may result in serious personal injury or damage to property.

**Caution**
This means that failure to observe this instruction may result in personal injury or damage to property.

**Note**
This means that failure to observe this instruction may result in damage to property.

The following pictogram marks passages in the text which describe activities with electrostatically sensitive components.

Electrostatically sensitive components may be damaged if they are not handled correctly.
Marking special information

The following pictograms mark passages in the text containing special information.

**Pictograms**

Information: Recommendations, tips and references to other sources of information.

Accessories: Information on necessary or sensible accessories for the Festo product.

Environment: Information on environment-friendly use of Festo products.

**Text markings**

- The bullet indicates activities which may be carried out in any order.

1. Figures denote activities which must be carried out in the numerical order specified.
   - Hyphens indicate general activities.
The following product-specific terms and abbreviations are used in this description:

<table>
<thead>
<tr>
<th>Term/abbreviation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic components</td>
<td>Component (pneumatic interface, multiple connector plate, pneumatic sub-base or pneumatic supply plate) on which further components (exhaust plates, flat plate silencers, pressure regulators, valves or blanking plates) are fitted.</td>
</tr>
<tr>
<td>Blanking plate</td>
<td>Plate without valve function for sealing unused valve positions on manifold blocks.</td>
</tr>
<tr>
<td>Components</td>
<td>Common term for pneumatic interface, multiple connector plate, exhaust plate, flat plate silencer, pneumatic sub-base or pneumatic supply plate, electric supply plate, pressure sensor plate, proportional pressure regulator, end plate, pressure regulator plate, valve and blanking plate.</td>
</tr>
<tr>
<td>CPX modules</td>
<td>Common term for the various modules which can be incorporated into a CPX terminal</td>
</tr>
<tr>
<td>CPX Terminal</td>
<td>Modular electric terminal type 50 or type 53</td>
</tr>
<tr>
<td>Electrical interface</td>
<td>Common term for pneumatic interface, CPI interface, multiple connector plate and AS interface.</td>
</tr>
<tr>
<td>Electrical supply plate</td>
<td>Plate for additional supply of the valves with load voltage.</td>
</tr>
<tr>
<td>Electronics module</td>
<td>Module in the sub-base with an LED and solenoid coil management</td>
</tr>
<tr>
<td>End plate</td>
<td>Extreme right-hand plate of the MPA-S valve terminal and extreme left-hand plate of the CPX terminal with holes for mounting onto a wall</td>
</tr>
<tr>
<td>Exhaust plate</td>
<td>Plate for ducted exhaust with connection (3/5)</td>
</tr>
<tr>
<td>I/O</td>
<td>Input/output modules</td>
</tr>
<tr>
<td>MO</td>
<td>Manual override facility</td>
</tr>
<tr>
<td>MPA1 or MPA2</td>
<td>Size of the valves: MPA1 = 10 mm, MPA2 = 20 mm.</td>
</tr>
<tr>
<td>MPA-S valve terminal</td>
<td>Modular Performance Sub-base Size-optimized valve terminal (type 32) with multi-pin plug connection, AS interface, CPX terminal or CPI interface.</td>
</tr>
</tbody>
</table>
### Contents and general instructions

<table>
<thead>
<tr>
<th>Term/abbreviation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPA-S valve terminal with multi-pin plug connection type MPA...-MPM-...</td>
<td>Variant of the MPA-S valve terminal with Sub-D plug. All solenoid coils are connected centrally via the Sub-D plug. The electrical interlinking is modular, i.e. every sub-base has its own circuit board.</td>
</tr>
<tr>
<td>Multi-pin plug connection</td>
<td>Connection with modular electric linking type MPA...-MPM-...</td>
</tr>
<tr>
<td>Pneumatic interface</td>
<td>The pneumatic interface is the interface between the modular electrical periphery of the CPX terminal and the pneumatic MPA-S.</td>
</tr>
<tr>
<td>Pneumatic module</td>
<td>Module consisting of pneumatic sub-base, electronic module, valves or cover plates</td>
</tr>
<tr>
<td>Pneumatic supply plate</td>
<td>Plate for additional supply of compressed air to the valves, e.g. with several pressure zones.</td>
</tr>
<tr>
<td>Separating seal</td>
<td>Special seals for forming pressure zones.</td>
</tr>
<tr>
<td>Sub-base</td>
<td>Plate for mounting monostable, impulse or mid-position valves, with working lines (2) and (4).</td>
</tr>
<tr>
<td></td>
<td>– size MPA1 (type MPAS...4) with 4 valve locations</td>
</tr>
<tr>
<td></td>
<td>– size MPA2 (type MPAS...2) with 2 valve locations</td>
</tr>
<tr>
<td>Tubing connection</td>
<td>Connecting the pneumatic supply lines (tubing) to the MPA-S valve terminal</td>
</tr>
<tr>
<td>Valve</td>
<td>monostable, bistable or mid-position valves</td>
</tr>
</tbody>
</table>

Tab. 0/2:  Product-specific terms and abbreviations
Contents and general instructions
Summary of components

Chapter 1
1. Summary of components

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1. Summary of components

Contents of this chapter

This chapter provides an overview of the following aspects of the MPA-S valve terminal:

- The connection variants and components of the valve terminal
- The maximum number of valve positions
- The identification code of the valves
- Connection, display and operating elements

Further information

Instructions on connecting the electric multi-pin plug can be found in the accompanying leaflet.

Information on the modules of the CPX terminal can be found in the CPX system description.

Information on the electronics module of the MPA-S valve terminal can be found in the MPA-... electronics descriptions.
1. Summary of components

1.1 The MPA-S valve terminal

Festo supports your automation tasks at machine level with the MPA-S valve terminal. The modular structure of the MPA-S valve terminal enables you to match this valve terminal optimally to your machine or system.

The valve terminal pneumatics establish the following connections:

- Common ducts for supply and exhaust air
- Electric signals from all solenoid coils

Working lines (2) and (4) are provided for each valve position on the individual pneumatic modules. The valves are supplied with compressed air (operating pressure and pilot pressure) via the common channels and connections in the basic components. The exhaust air (from the valves and the pilot exhaust air) is also exhausted via these common channels. Further components for pressure supply are also available, e.g. in order to supply pressure zones.

The MPA-S valve terminal is equipped with current reduction. The nominal current of the solenoid coils is then reduced after the high-current phase (switching operation). The current reduction offers the following advantages:

- The MPA-S valve terminal has a lower energy consumption
- The power unit for the voltage supply to the MPA-S valve terminal can be designed more economically depending on the individual case
- The solenoid coils have less power loss and produce less waste heat
1. Summary of components

1.1.1 Overview of variants

Sizes of the MPA-S valve terminal

The valve terminal is available with valves in the following sizes:

- MPA1: Valves of size 10 mm
- MPA2: Valves of size 20 mm

MPA-S valve terminal with CPX terminal

This variant of the MPA-S valve terminal is available in the following grades:

<table>
<thead>
<tr>
<th>MPA-S valve terminal with CPX terminal</th>
<th>Number of valve positions 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load voltage supply for the valves via ...</td>
<td>MPA1</td>
</tr>
<tr>
<td>- CPX terminal 2)</td>
<td>4, 8, 12 ... 32</td>
</tr>
<tr>
<td>- CPX terminal and electric supply plate (MPA) 3)</td>
<td>4, 8, 12 ... 64</td>
</tr>
</tbody>
</table>

1) Two solenoid coils can be controlled per valve position.
2) A max. of 64 solenoid coils can be supplied.
3) A max. of 128 solenoid coils can be supplied.

Tab. 1/1: Number of valve locations of the MPA-S valve terminal with CPX terminal

Fig. 1/1: MPA-S valve terminal with CPX terminal
1. Summary of components

MPA-S valve terminal with CPI module

This variant of the MPA-S valve terminal is available in the following grades:

<table>
<thead>
<tr>
<th>MPA-S valve terminal with CPI module</th>
<th>Number of valve positions 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load voltage supply for the valves via ...</td>
<td>MPA1</td>
</tr>
<tr>
<td>– CPI interface 2)</td>
<td>4, 8 ... 12</td>
</tr>
<tr>
<td>– CPI interface and electric supply plate (MPA) 3)</td>
<td>4, 8, 12 ... 16</td>
</tr>
</tbody>
</table>

1) Two solenoid coils can be controlled per valve position.
2) A max. of 24 solenoid coils can be supplied.
3) A max. of 32 solenoid coils can be supplied.

Tab. 1/2: Number of valve locations of the MPA-S valve terminal with CPI module

Fig. 1/2: MPA-S valve terminal with CPI module
1. Summary of components

MPA-S valve terminal with multi-pin plug connection

This variant of the MPA-S valve terminal is available in the following grades:

<table>
<thead>
<tr>
<th>MPA-S valve terminal with ...</th>
<th>Number of valve positions</th>
</tr>
</thead>
<tbody>
<tr>
<td>... Multi-pin plug connection ¹)</td>
<td>MPA1 4, 8, 12 ... 24</td>
</tr>
<tr>
<td></td>
<td>MPA2 2, 4, 6, ... 24</td>
</tr>
</tbody>
</table>

¹) A maximum of 24 solenoid coils can be actuated. The electrical connection of the solenoid coils is made centrally via the multi-pin plug connector.

Tab. 1/3: Number of valve locations on the MPA-S valve terminal with multi-pin plug connection

![Fig. 1/3: MPA-S valve terminal with multi-pin plug connection]

MPA-S valve terminal with AS interface

This variant of the MPA-S valve terminal is available in the following grades:
1. Summary of components

<table>
<thead>
<tr>
<th>MPA-S valve terminal with AS interface ...</th>
<th>Number of valve positions 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>... with 4 inputs and 4 outputs of type VPMA-ASI-...-4E4A-Z 2)</td>
<td>MPA1</td>
</tr>
<tr>
<td>... with 8 inputs and 8 outputs of type VPMA-ASI-...-8E8A-Z 3)</td>
<td>4, 8</td>
</tr>
</tbody>
</table>

1) The maximum number of valve positions which can be controlled depends on the electronic module:
   - VMPA1-MPM-EMM-8 and VMPA2-MPM-EMM-4 occupy 2 addresses per valve position
   - VMPA1-MPM-EMM-4 and VMPA2-MPM-EMM-2 occupy 1 address per valve position
2) A max. of 4 solenoid coils can be supplied.
3) A max. of 8 solenoid coils can be supplied.

Tab. 1/4: Number of valve locations on the MPA-S valve terminal with AS interface

Fig. 1/4: MPA-S valve terminal with AS interface
1. Summary of components

1.1.2 Description of components

The MPA-S valve terminal with CPX terminal or CPI module consists of the following pneumatic components:

1 Only with MPA-S valve terminal with CPX terminal: Pressure sensor plate (optional)
2 Only with MPA-S valve terminal with CPX terminal: Proportional-pressure regulator or blanking plate (optional)
3 Right end plate
4 Pneumatic supply plate (optional)
5 Inscription labels with support (optional)
6 Sub-base with work connections and serial linking (bus)
7 Electric supply plate (optional)
8 Seal (optional separating seal for pressure zone separation)

Fig. 1/5: Pneumatic components of the MPA-S valve terminal with CPX terminal or CPI module, 1st. level
1. Summary of components

Fig. 1/6: Pneumatic components of the MPA-S valve terminal with CPX terminal or CPI module, 2nd. level

1. Exhaust plate (3/5) or flat plate silencer
2. Electronic module with LEDs
3. Valves or cover plates
4. Pressure regulator plate (optional)
1. Summary of components

The MPA-S valve terminal with electric multi-pin or AS interface consists of the following pneumatic components:

1. Right end plate
2. Pneumatic supply plate (optional)
3. Inscription labels with support (optional)
4. Sub-base with work connections and electric linking
5. Seal (optional isolating seal for forming pressure zones)

Fig. 1/7: Pneumatic components of the MPA-S valve terminal with electric multi-pin or AS interface, 1st. level
1. Summary of components

1. Exhaust plate (3/5) or flat plate silencer
2. Electronic module with LEDs
3. Valves or cover plates
4. Pressure regulator plate (optional)

Fig. 1/8: Pneumatic components of the MPA-S valve terminal with electric multi-pin or AS interface, 2nd. level
1. Summary of components

A description of the electric components of the MPA-S valve terminal with CPI module or with AS interface can be found in the corresponding package insert.

The MPA-S valve terminal with CPX terminal consists of the following electric components:

1. CPX bus node
2. Electrical part of the pneumatic interface
3. Further optional CPX modules
4. Left end plate (CPX)

Fig. 1/9: Electric components of the MPA-S valve terminal with CPX terminal

The MPA-S valve terminal with multi-pin plug connection Sub-D consists of the following electric components:

1. Multi-pin plug socket with cable
2. Electrical part of the multiple connector plate with Sub-D connection

Fig. 1/10: Electric components of the MPA-S valve terminal with multi-pin plug connection Sub-D
1. Summary of components

Valves

The MPA-S valve terminal can be equipped with 2 x 2/2-way valves, 2 x 3/2-way valves, 5/2-way valves (monostable and bistable), 5/3-mid-position valves and proportional-pressure regulators.

All 5/2-way valves and 5/3-way mid-position valves can be used under all operating conditions:

- Standard operation
- Reversible operation
- Low-pressure operation
- Vacuum operation

Identification of the valves

The valves on the MPA-S valve terminal are marked by identification codes. By means of this identification on the front of the valve, you can ascertain the equipment fitted on your MPA-S valve terminal.

<table>
<thead>
<tr>
<th>ID code</th>
<th>Valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>5/3-way valve, mid-position open</td>
</tr>
<tr>
<td>D</td>
<td>Two monostable 2/2-way valves, normally closed, pneumatic spring return</td>
</tr>
<tr>
<td>DS</td>
<td>Two monostable 2/2-way valves, normally closed, pneumatic spring return</td>
</tr>
<tr>
<td>I</td>
<td>5/3-way valve, mid position exhausted</td>
</tr>
<tr>
<td>R</td>
<td>5/3-way valve, mid position closed</td>
</tr>
<tr>
<td>H</td>
<td>Two monostable 3/2-way valves, control side 12, normal position open, control side 14, normal position closed, pneumatic spring return</td>
</tr>
<tr>
<td>HS</td>
<td>Two monostable 3/2-way valves, control side 12, normal position open, control side 14, normal position closed, mechanical spring return</td>
</tr>
</tbody>
</table>
1. Summary of components

<table>
<thead>
<tr>
<th>ID code</th>
<th>Valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Two 2/2-way valves, normal position closed, pneumatic spring return</td>
</tr>
<tr>
<td></td>
<td>With dual-pressure operation:</td>
</tr>
<tr>
<td></td>
<td>Operating pressure via connection (1) or connection (5)</td>
</tr>
<tr>
<td></td>
<td>With vacuum operation:</td>
</tr>
<tr>
<td></td>
<td>Operating pressure at connection (1), vacuum at connection (5)</td>
</tr>
<tr>
<td></td>
<td>(e.g. for vacuum switching with ejector pulse)</td>
</tr>
<tr>
<td></td>
<td>See also the instructions in the chapter 3.4.2 Pressure zone separation and 3.4.5 Vacuum/low pressure operation as well as in Appendix B1 Valve overview, Tab. B/4.</td>
</tr>
<tr>
<td>J</td>
<td>Bistable 5/2-way valve</td>
</tr>
<tr>
<td>K</td>
<td>Two monostable 3/2-way valves, normally closed, pneumatic spring return</td>
</tr>
<tr>
<td>KS</td>
<td>Two monostable 3/2-way valves, normally closed, pneumatic spring return</td>
</tr>
<tr>
<td>M</td>
<td>Monostable 5/2-way valve, pneumatic spring return</td>
</tr>
<tr>
<td>N</td>
<td>Two monostable 3/2-way valves, normally closed, pneumatic spring return</td>
</tr>
<tr>
<td>NS</td>
<td>Two monostable 3/2-way valves, normally open, pneumatic spring return</td>
</tr>
<tr>
<td>W</td>
<td>Monostable 3/2-way valve, normally open, external compressed air supply via connection (2), pneumatic spring return</td>
</tr>
<tr>
<td>X</td>
<td>Monostable 3/2-way valve, normal position closed, external compressed air supply via connection (4)), pneumatic spring return</td>
</tr>
</tbody>
</table>

Tab. 1/5: Identification codes of the valves

Further information on the valves can be found in Appendix B.

Proportional-pressure regulator

The VPPM-6TA-... proportional pressure regulator has been designed to regulate a pressure proportional to a specified setpoint value. An integrated pressure sensor records the pressure at the work connection and compares this with the setpoint value. In the event of deviations between the
1. Summary of components

setpoint/actual values, the valve regulates until the output pressure has reached the setpoint value.
For constant pressure supply, which is necessary for accurate control quality, the proportional pressure regulator has an additional supply connection.

Configure the proportional pressure regulator via the PLC or the Festo Handheld (CPX-MMI).
Mounting of the proportional pressure regulator is described in the mounting instructions VPPM-6TA-...
Information on parameterising the proportional-pressure regulator is provided in the MPA-... electronics description.

Identification of the proportional pressure regulator
The proportional pressure regulators on the MPA-S valve terminal are marked by identification codes. With this identification you can ascertain the type of proportional pressure regulator.

<table>
<thead>
<tr>
<th>ID code</th>
<th>Proportional pressure regulator, normally closed ...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 % accuracy:</td>
</tr>
<tr>
<td>QA</td>
<td>0 ... 2 bar output pressure</td>
</tr>
<tr>
<td>QB</td>
<td>0 ... 6 bar output pressure</td>
</tr>
<tr>
<td>QC</td>
<td>0 ... 10 bar output pressure</td>
</tr>
<tr>
<td></td>
<td>1 % accuracy:</td>
</tr>
<tr>
<td>QD</td>
<td>0 ... 2 bar output pressure,</td>
</tr>
<tr>
<td>QE</td>
<td>0 ... 6 bar output pressure</td>
</tr>
<tr>
<td>QF</td>
<td>0 ... 10 bar output pressure</td>
</tr>
</tbody>
</table>

Tab. 1/6: Identification code of the proportional pressure regulator
1. Summary of components

Pressure sensor plate

Depending on the type, the pressure sensor plate monitors
- the operating pressure in channel (1) (type VMPA-FB-PS-1)
- an external processing pressure (type VMPA-FB-PS-P1)
- the pressure in exhaust ducts (3) and (5) (type VMPA-FB-PS-3/5).

The pressure sensor indicates whether the applied pressure exceeds, conforms to or falls below the setpoint value using three LEDs. An additional LED indicates common errors.

The MPA-S valve terminal can be equipped with up to 4 pressure sensor plates.

The limits for pressure monitoring are set by means of parameter settings. The pressure sensor plate can be parameterised via the PLC or the Festo Handheld (CPX-MMI).

Mounting of the pressure sensor plate is described in the mounting instructions VMPA-FB-PS-... Information on parameterising the pressure sensor is provided in the MPA-... electronics description from Festo.

Pneumatic supply plate

You can supply the valves with operating pressure separately via the pneumatic supply plate. This is for example necessary in the case of valve terminals equipped with several pressure zones or when a large number of valves on the valve terminal are switched simultaneously to flow.

Mounting of the pneumatic supply plate is described in chapter 5 under “Replace sub-base, supply plate or MPA-S end plate.”
1. Summary of components

Electrical supply plate
You can separately supply the valves with load voltage via the electrical supply plate.

The assembly of the electrical supply plate is described in the VMPA-FB-SP-....V-... assembly instructions.

Pressure zone separation
The MPA-S valve terminal can be equipped with pressure zones.

The pressure zones are formed either by special sub-bases or by special separating seals.

Separation of the pilot channels (12/14) and (82/84) is not intended, as on the MPA-S valve terminal the pilot air supply for pilot control of the valves is supplied centrally via the corresponding electrical interface (pneumatic interface, multiple connector plate, AS interface or CPI interface).

Pressure zone separation with sub-bases

Sub-base for the proportional pressure regulator
The sub-base (type VMPA-...) for the proportional pressure regulator always has a pressure zone separation and this is not therefore marked additionally on the exterior of the sub-base. Pressure zone separation takes place:

– for the channel (1) on the left side of the sub-base.
– for the channels (3) and (5) on the left and right side of the sub-base.

If the proportional-pressure regulator is to regulate the operating pressure for the valves on the MPA-S valve terminal, the valves must be positioned to the right of the proportional-pressure regulator.
1. Summary of components

Sub-bases to the valves

On the sub-bases with integrated pressure zone separation the separation is made in the centre of the sub-base, i.e. on the

- MPA1: after the second valve position
- MPA2: after the first valve position.

The sub-bases are available in the following designs:

- only supply channel (1) separate
- supply channel (1) and exhaust channels (3) and (5) separate
The sub-bases with integrated pressure zone separation are marked with a notch. By means of the marking you can ascertain with which sub-base variant your valve terminal is equipped (see Tab. 1/7).

<table>
<thead>
<tr>
<th>Sub-base design</th>
<th>MPA1</th>
<th>MPA2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-base with separate supply channel (1)</td>
<td><img src="image1.png" alt="Diagram" /></td>
<td><img src="image2.png" alt="Diagram" /></td>
</tr>
<tr>
<td></td>
<td>Type: VMPA1-FB-AP-4-1-T1</td>
<td>Type: VMPA2-FB-AP-2-2-T0</td>
</tr>
<tr>
<td>Sub-base with separate supply channel (1) and separate exhaust channels (3) and (5).</td>
<td><img src="image3.png" alt="Diagram" /></td>
<td><img src="image4.png" alt="Diagram" /></td>
</tr>
<tr>
<td></td>
<td>Type: VMPA1-FB-AP-4-1-S1</td>
<td>Type: VMPA2-FB-AP-2-2-S0</td>
</tr>
</tbody>
</table>

Tab. 1/7: Variants of the sub-bases with pressure zone separation
1. Summary of components

**Pressure zone separation with isolating seals**

The following channels can be separated with the isolating seals (see also Tab. 1/8):

- Supply duct (1) only
- Supply duct (1) and exhaust ducts (3) and (5)
- Exhaust ducts (3) and (5) only

You can recognize whether your MPA-S valve terminal is equipped with pressure zones, and if so how many either by the marking on the sub-base (see Tab. 1/7) or by the marking on the seal (see Tab. 1/8).
1. Summary of components

### MPA-S valve terminal with ...

<table>
<thead>
<tr>
<th></th>
<th><strong>Additional identification of the seals/separating seals for the MPA-S valve terminal with exhaust plates</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Position of the marking for separating seals</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Exhaust plate</strong></td>
</tr>
<tr>
<td>3</td>
<td>Without identification: Seal with open channels (1), (3) and (5)</td>
</tr>
<tr>
<td>7</td>
<td>Separating seal, channels (3) and (5) blocked (Ident. code R)</td>
</tr>
<tr>
<td>4</td>
<td>Separating seal, channels (1), (3) and (5) blocked (Ident. code S)</td>
</tr>
<tr>
<td>8</td>
<td>Separating seal, channel (1) blocked (Ident. code I)</td>
</tr>
<tr>
<td>5</td>
<td>Separating seal, channel (1) blocked (Ident. code I)</td>
</tr>
<tr>
<td>9</td>
<td>Separating seal, channels (1), (3) and (5) blocked (Ident. code S)</td>
</tr>
<tr>
<td>6</td>
<td>Separating seal, channels (3) and (5) blocked (Ident. code R)</td>
</tr>
<tr>
<td>10</td>
<td>Without marking Seal with open channels (1), (3) and (5)</td>
</tr>
</tbody>
</table>

Tab. 1/8: Marking of the seal variants for the sub-bases
1. Summary of components

Vertical stacking

You can fit further pneumatic components to each valve position between the sub-base and the valve. These components will enable you to implement certain additional effects as desired. The following components are available:

| Component | Alternative: 2 x 2/2-, 2 x 3/2-way valve or a 5/2-way double pilot valve or a 5/3-way mid-position valve | Alternative: Cover plate, for sealing an unused valve location Type: MPA...
| --- | --- | --- |

**Vertical stacking, optional component: ¹)**

Pressure regulator plate type: VMPA... B8-R...C2-C-... (with or without pressure gauge).

The Tab. 1/10 provides you with an overview of the available pressure regulator plate variants. The following section describes the functions of the major pressure regulator plates.

Sub-base type MPA...-...-AP-... with electronic module type VMPA...-...-EM...

¹) For notes on installing the vertical stacking components, see Chapter 3

Tab. 1/9: Components of the pneumatic module of the MPA-S valve terminal
1. Summary of components

Pressure regulator plates

The pressure regulator plates of the vertical stacking are marked on the MPA-S valve terminal with the ident. code. This is marked on the side of the pressure regulator plate. You can identify the pressure regulator plate using the following table.

<table>
<thead>
<tr>
<th>ID code</th>
<th>Vertical stacking components</th>
</tr>
</thead>
<tbody>
<tr>
<td>PF</td>
<td>P pressure regulator plate for port (1), control range 0.5 ... 6 bar</td>
</tr>
<tr>
<td>PH</td>
<td>P pressure regulator plate for port (2), control range 2 ... 6 bar</td>
</tr>
<tr>
<td>PG</td>
<td>A pressure regulator plate for port (4), control range 2 ... 6 bar</td>
</tr>
<tr>
<td>PN</td>
<td>Reversible B pressure regulator plate for port (2), control range 0.5 ... 6 bar</td>
</tr>
<tr>
<td>PM</td>
<td>Reversible A pressure regulator plate for port (4), control range 0.5 ... 6 bar</td>
</tr>
<tr>
<td>PA</td>
<td>P pressure regulator plate for port (1), control range 0.5 ... 10 bar</td>
</tr>
<tr>
<td>PC</td>
<td>B pressure regulator plate for port (2), control range 2 ... 10 bar</td>
</tr>
<tr>
<td>PB</td>
<td>A pressure regulator plate for port (4), control range 2 ... 10 bar</td>
</tr>
<tr>
<td>PM</td>
<td>Reversible B pressure regulator plate for port (2), control range 0.5 ... 10 bar</td>
</tr>
<tr>
<td>PK</td>
<td>Reversible A pressure regulator plate for port (4), control range 0.5 ... 10 bar</td>
</tr>
<tr>
<td>T</td>
<td>Pressure gauge for pressure regulator plate</td>
</tr>
</tbody>
</table>

Tab. 1/10: Identification of the pressure regulator plates in the type code

The circuit symbol of the pressure regulating valve is provided in appendix B tab. B/5.
1. Summary of components

P pressure regulating valve (identification PF, PA)  Mode of operation:

Supply process:
The P pressure regulating valve regulates the pressure in front of the valve in duct (1) (P). This provides the same regulated working air pressure in channels (2) and (4).

Exhaust process:
The exhaust flow is from channel (2) to channel (3) and from channel (4) to channel (5).

The advantages of this pressure regulating valve are:

- The pressure regulating valve is not affected by exhausting, since the pressure is regulated upstream of the valve.

- The pressure regulating valve can always be adjusted because the pressure from the valve terminal is always present.

Application example:

- An equal working pressure is required at working lines (2) and (4).

- A lower air pressure (e.g. 3 bar) is required than the operating pressure present at the valve terminal (e.g. 8 bar).

B or A pressure regulator (Ident. code PH, PC, PG, PB)  Mode of operation of the B pressure regulating valve:

Supply process:
The B pressure regulating valve regulates the working pressure in channel (2) after the pressure medium flows through the valve. The exhaust air is channelled through the intermediate plate and switched from channel (4) to channel (5) in the valve.

Exhaust process:
During venting, the exhaust flow in the valve is unregulated from channel (2) to channel (3) via the pressure regulating valve.
1. Summary of components

Fig. 1/11 shows the following switching position of the B pressure regulating valve:
The air is passed from channel (1) through the intermediate plate and the valve to pressure regulating valve B, where it is regulated and then passed to the port (2) of the sub-base. The unregulated exhaust air is then fed via channel (4) through the intermediate plate and then to channel (5) and vented.

1. Pressure regulating valve
2. Valve
3. Intermediate plate
4. Sub-base

Fig. 1/11: B pressure regulating valve

Mode of operation of the A pressure regulating valve:

Supply process:
The A pressure regulating valve regulates the air pressure in channel (4) after the pressure medium flows through the valve. The exhaust air is channelled through the intermediate plate and switched from channel (2) to channel (3) in the valve.

Exhaust process:
During venting, the exhaust flow in the valve is unregulated from channel (4) to channel (5) via the pressure regulating valve.
1. Summary of components

Restrictions:

- The exhaust flow in the regulating direction is limited by the pressure regulating valve.

- The pressure of the operating pressure in channel (2) can only be set and read at the pressure gauge when the valve is activated (flow from 1 → 2).

Application examples:

- If a supply air pressure that is different from the operating pressure of the valve terminals is required at ports (2) or (4).

- If it is not possible to use the reversible pressure regulator, e.g. when 2 x 3/2-way valves with ducted solenoid exhaust (82/84) are used.
1. Summary of components

Reversible B or A pressure regulating valve (identifier PN, PL, PM, PK)

Mode of operation of the reversible B pressure regulating valve:

Supply process:
The reversible B pressure regulating valve splits the supply in channel (1) and regulates the pressure upstream of the valve in channel (3) (channel (5) receives the unregulated pressure from channel (1)). Thereafter the regulated air is switched to working channel (2). The valve is thus operated in reversible mode.

Exhaust process:
Venting occurs in the valve from working channel (2) to channel (1) and in the intermediate plate to the manifold block exhaust duct (3).

Fig. 1/12 shows the following switching position of the reversible B pressure regulating valve:
The air in channel (1) is split:

- The regulated air pressure is present in the channel (3). The pressure is regulated before the valve.
- The unregulated working pressure from channel (1) is present at channel (5).

The regulated pressure is switched to channel (2) inside the valve. The unregulated exhaust air is switched inside the valve from channel (4) to channel (1) and then in the intermediate plate to channel (3).
1. Summary of components

Mode of operation of the reversible A pressure regulating valve:

Supply process:
The reversible B pressure regulating valve splits the supply in channel (1) and regulates the pressure upstream of the valve in channel (5) (channel (3) receives the unregulated pressure from channel (1)). Thereafter the regulated air is switched to working channel (4). The valve is thus operated in reversible mode.

Exhaust process:
Venting occurs in the valve from working channel (4) to channel (1) and in the intermediate plate to the sub-base exhaust duct (5).
Advantages compared to the A or B pressure regulating valve:

- Faster cycle times
- 50 % higher exhaust flow rate, as air is not exhausted via the pressure regulating valve. The load on the pressure regulating valve is also reduced.
- No quick exhaust valves are required. The exhaust is ducted completely via the valve terminal.
- Operating pressure is always present at the pressure regulating valve, as the pressure is regulated upstream of the valve, i.e. the regulator can always be adjusted. With A or B pressure regulating valves, the valve must switch.

Disadvantages compared to the A or B pressure regulating valve:

- Cannot be combined with 2 x 2/2-way valves with Ident. code D, I and 2 x 3/2-way valves with Ident. code N, K, H (non-reversible valves). These valves require working pressure in channel (1) for the pneumatic spring (see circuit symbol in appendix B, tab. B/4 and tab. B/3).

Application examples:

- When the air pressure in channel (2) or (4) should not be the same as the operating pressure of the valve terminal.
- When fast exhaust performance is required.
- When the pressure regulator must always be adjustable.

Notes on the installation of these pressure regulator plates are provided in the assembly instructions VMPA...-B8-R...C2-C...
1. Summary of components

1.1.3 Connection and display components

You will find the following pneumatic connecting, display and operating elements on the MPA-S valve terminal:

1. Manual override (per pilot solenoid, turning/locking or non-locking)
2. Manual override cover cap
4. Working lines (2) and (4) per valve
5. Connection (82/84) only with variant for ducted exhaust, “Pilot exhaust”
7. Pressure output (2) of the proportional pressure regulator
8. Exhaust (3) of the proportional pressure regulator
9. Pressure input (1) of the proportional pressure regulator
10. External pressure input of pressure sensor type VMFA-FB-PS-P1

Fig. 1/13: Pneumatic connecting and operating elements of the MPA-S valve terminal
1. Summary of components

On the pressure regulator plate you will find the following connecting and operating elements:

1. Pressure regulator plate MPA2 adjusting screw with free-wheeling and snap-in locking
2. Pressure gauge (optional)
3. Connection for pressure gauge (can be turned 90°)

Fig. 1/14: Operating and connection elements of the pressure regulator plates
1. Summary of components

You will find the following electric connecting and display elements on the pneumatic components of the MPA-S valve terminal with CPX terminal or CPI module:

1. Inscription fields
2. Optional pressure sensor (only for MPA-S with CPX terminal): LEDs of the pressure sensor see Fig. 1/16
3. LEDs on the valve: on the MPA1 a dual colour LED/valve; on the MPA2 two LEDs/valve:
   - yellow: Signal status display of the pilot solenoids
   - red: Error status
4. Optional additional electrical supply: green power LED
5. Optional proportional-pressure regulator (only for MPA-S with CPX terminal): LEDs of the proportional pressure regulator see Fig. 1/17
6. Optional additional electrical supply: Valve load voltage connection

Fig. 1/15: Electric connecting and display elements of the MPA-S valve terminal with CPX terminal or CPI module
Information on the electric connecting and display elements of the CPX bus node can be found in the relevant electronics manual (see system manual for your CPX terminal, table “Descriptions of the CPX terminal”). Information on the electric connecting and display elements of the CPI module can be found in the leaflet supplied with the product.

Additional information on the LEDs of the electronic module VMPA...-FB-EM... is provided in the MPA-... electronics description.

**Pressure sensor plate**

The pressure sensor plate has the following display elements:

1. Pressure sensor plate
2. Red LED: Pressure exceeded
3. Green LED: Pressure complies
4. Red LED: Pressure too low
5. Red LED: Common error display

Fig. 1/16: Display elements of the pressure sensor plate
1. Summary of components

Proportional-pressure regulator

The proportional pressure regulator has the following display elements:

1. green power LED
2. Proportional-pressure regulator
3. red error LED

Fig. 1/17: Display elements of the proportional pressure regulator
1. Summary of components

You will find the following electric connecting elements on the multi-pin plug connection of the MPA-S valve terminal:

1. Multi-pin plug cover with cable
2. Connection for functional earth
3. Sub-D connection

Fig. 1/18: Electric connecting elements of MPA-S valve terminal with multi-pin plug connection
1. Summary of components

You will find the following display elements on the pneumatic modules of the MPA-S valve terminal with multi-pin plug connection or AS interface:

1. **MPA1:**
   - Yellow LEDs:
   - Signal status display of the pilot solenoid coils

2. **MPA2:**
   - Yellow LEDs:
   - Signal status display of the pilot solenoid coils

3. **Label supports with inscription field**

Fig. 1/19: Electric display elements of MPA-S valve terminal with multi-pin plug connection or with AS interface

Information on the electric connecting and display elements of the AS interface can be found in the package insert.
1. Summary of components
Fitting

Chapter 2
2. Fitting

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<th>Section</th>
<th>Page</th>
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<td>2-16</td>
</tr>
</tbody>
</table>
2. Fitting

Contents of this chapter

The MPA-S valve terminal is already assembled when supplied from the factory. Accessories such as inscription labels and manual override caps (optional) must be mounted on site.

This chapter describes how to mount and remove:

- the complete MPA-S valve terminal
- the inscription label holders
- the manual override caps

Additional information

Special information on replacing or adding pneumatic components can be found in chapter 5.

MPA-S valve terminal with CPX terminal:

- Information on mounting the MPA-S valve terminal with CPX terminal can be found in the CPX system manual.

- Information on dismounting and mounting I/O modules is provided in the I/O module description (see the system description for your CPX terminal, table “Descriptions of the CPX terminal”).

- Information on mounting modules and components ordered at a later stage can be found in the package insert.
2. Fitting

2.1 General instructions on mounting and dismantling

**Warning**
Uncontrolled movements of the connected actuators and loose tubing can cause injury to persons and/or damage to property.

Before carrying out fitting, installation and maintenance work, switch off the following:
- compressed air supply
- the operating and load voltage supplies.

**Note**
Handle all modules and components of the MPA-S valve terminal with great care. Note especially the following:
- compliance with the specified torques.
- electrostatically sensitive devices.
  Therefore, do not touch any contact surfaces.
2. Fitting

2.2 Mounting variants

You can mount the MPA-S valve terminal in one of two ways:

<table>
<thead>
<tr>
<th>Mounting method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-rail mounting</td>
<td>The MPA-S valve terminal is suitable for fitting onto a hat rail (support rail as per EN 60715). There is a guide groove on the back for hanging the valve terminal onto the H-rail.</td>
</tr>
<tr>
<td>Wall mounting</td>
<td>The multiple connector plate or the pneumatic interface and the end plates contain holes for wall mounting. With MPA-S valve terminals which are longer than 280 mm, additional fastening brackets on the supply plate are necessary (see instructions on vibration and shock in Appendix A, Tab. A/2).</td>
</tr>
</tbody>
</table>

Tab. 2/1: Mounting methods of the MPA-S valve terminal

**Note**

Mount the MPA-S valve terminal so that there is sufficient space for heat dissipation and ensure that the maximum limits for temperatures are observed (see Technical data).
2. Fitting

2.2.1 Mounting/dismounting on an H-rail

**Caution**

H-rails with mounted valve terminals can break if they are subjected to vibrations which exceed severity grade 1:
- 0.15 mm path at 15 ... 58 Hz
- 2 g acceleration at 58 ... 150 Hz
This can cause damage to the valve terminal or to your machine or system.
- In this case use wall mounting.
- Observe the permissible values for vibration and shock in Appendix A “Technical data.”

**Caution**

- H-rail mounting without an H-rail clamping unit is not permitted.
- If the terminal is mounted in a sloping position or if it is subjected to vibration, secure the H-rail clamping unit additionally
  - against sliding down with the retaining screws intended for this purpose (see Tab. 2/2 and Fig. 2/1)
  - against unintentional releasing/opening.

In order to mount the valve terminal onto an H-rail you will require the following mounting kits:

- MPA-S valve terminal with multi-pin plug connection: CPA-BG-NRH. This kit contains 2 M4x10 screws and 2 clamping components.

- MPA-S valve terminals with CPX terminal: CPX-CPA-BG-NRH. This kit contains 3 clamping components and 3 M4x10 screws.
### 2. Fitting

<table>
<thead>
<tr>
<th>Variant</th>
<th>Fastening points</th>
</tr>
</thead>
</table>
| **MPA-S valve terminal with CPX terminal** | Required mounting of the H-rail clamping units:  
- In the end plates: each with one M4 screw 1  
- In the pneumatic interface: with an M4 screw 2 |

![Diagram of MPA-S valve terminal with CPX terminal]

| **MPA-S valve terminal with multi-pin plug connection** | Required mounting of the H-rail clamping units:  
- In the right-hand end plate and the multiple connector plate: each with one M4 screw 1 |

![Diagram of MPA-S valve terminal with multi-pin plug connection]

Tab. 2/2: Required mounting points for H-rail mounting

**Mounting**

Proceed as follows:

1. Make sure that the fastening surface can support the weight of the MPA-S valve terminal (weights see appendix A, Tab. A/1).

2. Mount the H-rail (DIN mounting rail EN 60715 - 35x7.5; width 35 mm, height 7.5 mm). Make sure there is sufficient space for connecting the power supply cables and tubing.

3. Fasten the H-rail to the mounting surface at intervals of approx. every 100 mm.
2. Fitting

4. Mount the H-rail clamping units at all required mounting points (see Tab. 2/2).

5. Hang the MPA-S valve terminal onto the H-rail (see Fig. 2/1, arrow A).

6. Swing the MPA-S valve terminal onto the H-rail (see Fig. 2/1, arrow B). Make sure that the clamping component lies horizontally with respect to the H-rail.

Fig. 2/1: Mounting the MPA-S valve terminal onto an H-rail

7. Fasten the MPA-S valve terminal, as with the CPX terminal, against tilting or sliding by tightening the locking screw with 1.3 Nm.
2. Fitting

![Diagram of H-rail and clamping component]

Fig. 2/2: Rear view: H-rail mounting, using the CPX terminal as an example

Information on mounting the MPA-S valve terminal with CPX terminal can be found in the CPX system description.

Dismounting

Proceed as follows:

1. Loosen the retaining screw of the H-rail clamping unit (for position of the screws, see Tab. 2/2). Make sure that the clamping component lies horizontally with respect to the H-rail.

2. Swing the MPA-S valve terminal forwards away from the H-rail (see Fig. 2/3).

3. Lift the MPA-S valve terminal away from the H-rail (see Fig. 2/3).
2. Fitting

1. H-rail
2. Retaining screw of the H-rail clamping unit
3. Clamping component of the H-rail clamping unit

Fig. 2/3: Dismantling the MPA-S valve terminal
2. Fitting

2.2.2 Mounting/dismounting from a wall

The end plates, the MP sub-base and pneumatic interface contain holes for mounting the terminal onto a wall (see Tab. 2/3).

**Caution**

MPA-S valve terminals can become distorted and therefore damaged if they are mounted on an uneven pliable surface.

- Mount the MPA-S valve terminal only onto a flat fixed surface.

Overstressing the fastening holes, bending the MPA-S valve terminal with CPX terminal or internal vibrations can cause damage.

- Observe the instructions in Appendix A, Tab. A/2 for additional fastening of the MPA-S valve terminals if this is longer than 280 mm.

- In these cases, use the additional mountings for the CPX terminal (see instructions in the description of the CPX system).

**Mounting**

Proceed as follows:

1. Make sure that the fastening surface is flat and that it can support the MPA-S valve terminal (weights see appendix A, Tab. A/1).

   Make sure there is sufficient space for connecting the power supply cables and tubing.

2. Drill mounting holes in the mounting surface.

3. Fasten the MPA-S valve terminal with M4 or M6 screws of sufficient length to the fastening surface as per Tab. 2/3).
2. Fitting

### Variant

**MPA-S valve terminal with CPX terminal**

<table>
<thead>
<tr>
<th>Variant</th>
<th>Fastening points</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required mounting:</strong></td>
<td><strong>Note:</strong></td>
</tr>
<tr>
<td>- End plates:</td>
<td>If your MPA-S valve terminal is equipped with four or more CPX sub-bases, fastening clips type CPXBG-RW-... must be used as additional fastenings (see system manual for the CPX terminal).</td>
</tr>
<tr>
<td>two M4 or M6 screws each</td>
<td></td>
</tr>
<tr>
<td>- Pneumatic interface:</td>
<td></td>
</tr>
<tr>
<td>two M4 screws</td>
<td></td>
</tr>
<tr>
<td>- Per fastening bracket to the pneumatic supply plate or the proportional pressure regulator (see also Notes in Appendix A, Tab. A/2):</td>
<td></td>
</tr>
<tr>
<td>one M6 screw</td>
<td></td>
</tr>
</tbody>
</table>

**MPA-S valve terminal with multi-pin plug connection**

<table>
<thead>
<tr>
<th>Variant</th>
<th>Fastening points</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required mounting:</strong></td>
<td></td>
</tr>
<tr>
<td>- Multiple connector plate:</td>
<td></td>
</tr>
<tr>
<td>two M4 or M6 screws each</td>
<td></td>
</tr>
<tr>
<td>- Right end plate:</td>
<td></td>
</tr>
<tr>
<td>two M4 or M6 screws each</td>
<td></td>
</tr>
<tr>
<td>- Per fastening bracket to the pneumatic supply plate (see also instructions in Appendix A, Tab. A/2):</td>
<td></td>
</tr>
<tr>
<td>one M6 screw</td>
<td></td>
</tr>
</tbody>
</table>

Tab. 2/3: Methods of fastening the MPA-S valve terminal
2. Fitting

Dismounting

Proceed as follows:

1. Prevent a hanging-mounted MPA-S valve terminal from falling down before you loosen it from the fastening surface.

2. Loosen the mounting screws (see Tab. 2/3).

3. Remove the MPA-S valve terminal from the fastening surface.
2. Fitting

2.3 Mounting/removing the inscription label holder

An inscription label holder can be mounted onto each sub-base to enable the valves or work connections to be distinguished.

Mounting

Proceed as follows:

- Clip the inscription label holders into the grooves in the sub-bases (see diagram):

![Diagram of fixture and inscription label holder]

1. Fixture for the inscription label holder on the sub-base
2. Inscription label holder

Fig. 2/4: Mounting the inscription label holder
2. Fitting

Dismounting

Proceed as follows:

1. Remove the 3rd and 4th valves from the corresponding sub-base.

2. Unlock the inscription label holder by using a screwdriver (blade width max. 3.5 mm) to press down the snap hook (see diagram).

Fig. 2/5: Removing the inscription label holder

3. Pull the inscription label holder out of the fixture in the sub-base.
2. Fitting

2.4 Fitting/removing the manual override caps (optional)

The locking/non-locking function of the manual override can be modified to only non-locking actuation if a cap is fitted in the manual override.

Mounting

Proceed as follows:

1. Make sure that the relevant manual overrides are in a non-actuated state. If necessary, set locking manual overrides to the basic position (see chapter 4, Tab. 4/5).

2. Place the cap on the manual override so that the snap hooks of the cover can grip into the recess on the manual override.

3. Clip the manual override caps into the grooves in the manual overrides (see diagram):

   ![Diagram of manual override caps]

   Fig. 2/6: Mounting the MO cover caps
2. Fitting

Dismounting Proceed as follows:

- Use a suitable screwdriver to lift the manual override caps out of the manual overrides (see fig.):

![Fig. 2/7: Dismounting the manual override cover caps](image)

**Note**
The manual override cover caps serve for limiting the function of the manual override and are constructed so that they can only be removed with a great deal of strength. During dismantling the snap hooks of the cover will be damaged.
2. Fitting
Installation

Chapter 3
3. Installation

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3. Installation

Contents of this chapter

This chapter describes the tubing and cabling of the MPA-S valve terminal. This includes, in particular:

- General instructions on preparing the compressed air and on connecting the tubing
- Instructions on pilot control with an internal or external pilot air supply
- Instructions on operating the MPA-S valve terminal with pressure zone separation
- Mounting the QS fittings
- Connecting the power supply
- Earthing the MPA-S valve terminal
- Address assignment of the valves

Further information

Instructions on electrical connection of the MPA-S valve terminal with multi-pin plug connection can be found in the package insert.

Requirements for observing the UL certified conditions if the product is operated in the USA or Canada can be found in the separate special UL-specific documentation.

Instructions on connecting the operating voltage can be found in the system description of your CPX terminal.

Detailed instructions on connecting the CPX modules (bus nodes, I/O modules etc.) can be found in the relevant descriptions for the CPX module (see the system description of your CPX terminal, table “Descriptions of the CPX terminal”).

Detailed instructions on addressing the pneumatic modules of the MPA-S valve terminal with CPX terminal can be found in the MPA-... electronics description and the corresponding description for your bus node (see system description for your CPX terminal, table “Descriptions of the CPX terminal”).
3. Installation

3.1 Compressed air preparation

Caution
Unfiltered or incorrectly lubricated compressed air will reduce the service life of the valve terminal.

3.1.1 Operation with unlubricated compressed air

Caution
Too much residual oil content in the compressed air will reduce the service life of the valve terminal.

- If bio-oils are used (oils with synthetic ester or true ester basis, e.g. rape oil methylester) the residual oil content must not exceed 0.1 mg/m³ (see ISO 8573-1 class 2).
- If mineral oils are used (e.g. HLP oils as per DIN 51524 parts 1 to 3) or corresponding oils on a polyalphaolefine basis (PAO), the residual oil content must not exceed 5 mg/m³ (see ISO 8573-1 class 4).

This avoids operative malfunction of the valves.

Excessive residual oil is not permissible irrespective of the compressor oil, as otherwise the basic lubrication will be washed out with time.
3. Installation

3.1.2 Operation with lubricated compressed air

Operate system equipment with unlubricated compressed air if possible. This is better for the environment. Festo pneumatic valves and actuators have been designed so that, if used as intended, they will not require additional lubrication and will still achieve a long service life.

**Caution**
Operation with lubricated compressed air will cause the life-time lubrication, which is necessary for unlubricated operation, to be “washed out”.

Observe the following instructions if lubricated compressed air must be used:
The compressed air prepared with the compressor must correspond in quality to unlubricated compressed air. If possible, do not operate all of your equipment with lubricated compressed air. If possible, always install the lubricators directly in front of the consuming actuator.

**Caution**
Incorrect additional oil and too much residual oil content in the compressed air will reduce the service life of the valve terminal.

- Use Festo special oil OFSW-32 or the other oils listed in the Festo catalogue (as per DIN 51524-HLP32, basic viscosity 32 CST at 40 °C).
- The additional lubrication must not exceed 25 mg/m³ (ISO 8573-1 class 5).
- Make sure that the lubricator setting is correct (see following section)

This avoids operative malfunction of the valves.

Setting the lubricator: With the machine running (typical operating status) 0.2 to max. 1 drops/min. or 0.5 to 5 drops/1000 l air.
3. Installation

Checking the setting: The procedure described below can be used for checking the setting of the lubricator.

Proceed as follows:

- Check the service units in respect of condensate and lubricator setting twice a week.

1. Ascertain the actuator which is furthest from the lubricator.

2. Ascertain the valve terminal which controls this cylinder.

3. Remove the silencer, if fitted, from port (3/5).

4. Hold a piece of white cardboard 10 cm in front of the exhaust port.

5. Let the system run for a short period.

- There must be only a slight yellow colouring on the cardboard. If oil droplets appear, this is an indication that too much oil has been used.

Another indicator of over-lubrication is the coloration or the condition of the exhaust air silencer. A distinctly yellow colouring of the filter element or drops of oil on the silencer indicate that the lubricator setting is too high.
3. Installation

3.2 General instructions on installation

**Warning**
Uncontrolled movements of the connected actuators and loose tubing can cause injury to persons and/or damage to property.
Before carrying out mounting, installation and maintenance work, switch off the following:
- compressed air supply
- operating and load voltage supplies.

**Note**
Observe the following if the UL requirements have to be complied with in your application:
- Rules for complying with the UL certification can be found in the separate UL-specific documentation.
  The technical data listed there have priority.
- The technical data in this documentation may show values deviating from this.

Pay attention to the following:
The components of the valve terminal contain electrostatically sensitive components. The components will be damaged if you touch the contact surfaces of the plug connectors or if you do not observe the handling specifications for electrostatically sensitive devices.
3. Installation

Note
When exhausting large-volume actuators or if the exhaust performance is too small, back pressures can build up in the valve terminal exhaust ducts. The back pressures can lead to pneumatic actuation of other valves, especially with unswitched 3/2-way valves that are closed in the normal position.
To avoid back pressures:
- Optimize the exhaust capacity of the valve terminal, e.g. by using additional pneumatic air supply plates.
- If necessary, separate the exhaust ducts using the separating seal with ident. code: R (ducts (3) and (5) locked, see Tab. 1/8).
3. Installation

3.3 Installing the tubing

If elbow connectors or multiple distributors are used, the air flow will be reduced slightly.

Connecting

Proceed as follows:

1. Push the tubing as far as possible into or over the tube coupling of the threaded connector.

2. Pull the locking ring 1 over the tube coupling or tighten the clamping screw 2.

3. For reasons of clarity, group the tubing together with:
   - Tubing straps
   - Multiple hose holders

![Fig. 3/1: Mounting the tubing connections](image)

Disconnecting

Proceed as follows:

**Warning**

If the pneumatic tubing is under pressure when dismantled, it may perform sudden unexpected movements, causing injury to persons. Carry out the following steps before disconnecting the pneumatic tubing on the MPA-S valve terminal:

- Switch off the compressed air supply.
- Make sure that all pneumatic tubing is unpressurized.
- Exhaust all actuators controlled by valves which are closed in normal or mid-positions.
3. **Installation**

1. Mark all pneumatic tubing.

2. Press down the locking ring of the fitting [1] e.g. with a screwdriver or the loosening tool QSO from Festo, or loosen the locking screw [2] of the fitting.

3. Remove the tube from the fitting.

4. Seal non-required fittings with blanking plugs [3].

Fig. 3/2: Disconnecting the tube
3. **Installation**

### 3.4 Connecting the MPA-S valve terminal

On sub-bases fitted with blanking plates, seal the working lines (2) or (4) with blanking plugs or threaded blanking plugs. This measure will protect the ports from dirt.

For the optimum performance of the valve terminal we recommend that the valves be supplied via more than one supply and exhaust line when:

- more than 6 valves of size MPA1 or
- more than 3 valves of size MPA2

are switched simultaneously to flow.

Connections on the following components are available for supplying the valve terminal:

- on the electrical interface (pneumatic interface, CPI interface, multiple connector plate, AS interface)
- on the optional pneumatic supply plate, maximum between each sub-base
3. Installation

3.4.1 Pilot control (pilot air supply)

Depending on the variant of the pneumatic interface, CPI interface, multiple connector plate or AS interface, the pilot control is supplied with internal or external pilot air. You can ascertain the pilot control variant for which your MPA-S valve terminal is equipped, by the following features (see table).

<table>
<thead>
<tr>
<th>Pilot control variants</th>
<th>Pilot connection (12/14) on the electrical interface:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation with external pilot air</td>
<td>marked and open.</td>
</tr>
<tr>
<td>Operation with internal pilot air</td>
<td>not marked and closed.</td>
</tr>
</tbody>
</table>

Tab. 3/1: Recognition features of the pilot control variants

Internal pilot air supply

If the operating pressure lies between 3 ... 8 bar, you can operate the terminal with internally branched pilot air.

Note

- Internal pilot air is branched centrally from the supply connection (1) in the pneumatic interface or multiple connector plate. This also applies when the MPA-S valve terminal is operated with several pressure zones (see Fig. 3/3).

External pilot air supply

If the operating pressure lies below 3 bar or above 8 bar, pilot control must be carried out with external pilot air.
3. Installation

Note
• Use closed-loop regulated external pilot air (3 ... 8 bar). Reliable faultless operation of the MPA-S valve terminal is then possible, e.g. even with fluctuating operating pressure.
• The external pilot air is supplied centrally via the pilot port (12/14) on the pneumatic interface or the multiple connector plate. This is the case even if the MPA-S valve terminal is operated with different pressure zones.
• Set the external pilot air supply to correspond to the operating pressure at which these valves are operated (see diagrams in appendix A, fig. A/1, fig. A/2 and fig. A/3).

3.4.2 MPA-S valve terminal with pressure zone separation

Basic information on pressure zone separation is provided in chapter 1, section “Pressure zone separation”.

Note
• Operate the valves with ident. code I (2 x 2/2-way valve) in a separate pressure zone with separate exhaust channel (5) if the MPA-S valve terminal is also fitted with other valves.

Note the following in the case of the MPA-S valve terminals which are operated with internal pilot air and which have several pressure zones:
• The internal pilot air supply is branched centrally from the supply connection (1) of the pneumatic interface or from the multiple connector plate (see fig. 3/3).
• The pressure zone, which is supplied via the supply connection (1) of the pneumatic interface or the multiple connector plate, must be operated at a pressure between 3 ... 8 bar.
If the proportional-pressure regulator is to regulate the operating pressure for the valves on the MPA-S valve terminal, the valves must be positioned to the right of the proportional-pressure regulator.

The following diagram shows as an example the assignment of the supply and exhaust connections to the valves on an MPA-S valve terminal with blocked channels (1), (3) and (5).

A pressure zone seal and a pneumatic air supply plate is required for every pressure zone (see diagram).

The ports (1) or (3/5) are:

- for the pressure zone on the outside left of the pneumatic interface or multiple connector plate.

- for all other pressure zones on the pneumatic supply plate which lies within the relevant pressure zones. The position of the supply plate in the pressure zone (left, centre or right) is optional, but two supply plates (e.g. of neighbouring pressure zones) must not lie next to each other.

By fitting an additional pneumatic air supply plate within a pressure zone you can feed additional supply air or extract exhaust air.
3. Installation

Pneumatic interface or multiple connector plate with supply port (1) for pressure zone 1 and pilot connection (12/14) for the complete valve terminal

Pressure zone 1
Pressure zone 2

Fig. 3/3: Example of MPA-S valve terminal with 3 pressure zones
3. Installation

3.4.3 Operation of the MPA-S valve terminal with reversible pressure regulators

**Note**
Operation of the MPA-S valve terminal with reversible pressure regulators (Ident. code PN, PM, PL, PK):

- No 2x2/2-way valves with Ident. code D, I or 2 x 3/2-way valves with Ident. code N, K, H (non-reversible valves) may be operated with these pressure regulators.
- Reversible pressure regulating valves must not be used on reversibly operated valve terminals.

3.4.4 Setting the pressure regulating valve

The pressure regulator plates can be set using the following operator control elements:

- For size MPA2, using the adjusting knob or the adjusting screw.

**Note**
For the A and B pressure regulator plates of type VMPA...B8-R...C2-C-... (ident code: PH, PG, PC, PB), the control pressure should not be below 2 bar. For control pressures below 2 bar, use the **reversible** A or B pressure regulating valves (identifier in the type code: PN, PM, PL, PK) see Tab. 1/10.

Setting the pressure regulating valve (MPA2) with the adjusting knob

Proceed as follows:

1. Pull the adjusting knob 2 as far as possible out of the locking level 1 into the setting level 3 (see Fig. 3/4).
3. Installation

2. Set the desired regulating variable at this level by turning the adjusting knob (see “Flow diagrams of the pressure regulating plates” in appendix A).

3. Press the adjusting knob into the freewheel level \(4\). In this position you can turn the setting wheel without modifying the controlled variable.

4. Turn the adjusting knob lengthwise to the pressure regulator plate.

5. Press the adjusting knob in this position into the snap-in locking of the locking level \(1\).

Fig. 3/4: Setting the pressure regulator plates (size MPA2) with the aid of the adjusting screw

Setting the pressure regulating valve via the adjusting screw in the adjusting knob (MPA2)

Note
If the space around the adjusting knob is not sufficient for setting the pressure regulating valve (size MPA2), use the socket head screw in the adjusting knob.
3. Installation

Proceed as follows:

- Turn the adjusting screw (for position see Fig. 3/5) to set the desired controlled variable (see “Flow diagrams of the pressure regulator valve plates” in Appendix A).

1 Adjusting screw, Socket head (A/F 2,0)

Fig. 3/5: Setting the pressure regulating valve plates (size MPA2) with the aid of the adjusting screw
3. Installation

3.4.5 Vacuum/low pressure operation

**Note**

If valves are used for switching a vacuum, then filters must be used in the suction line to avoid operative malfunctions caused by foreign matter sucked into the line.

The 2 x 2/way valves with ident. codes D, I and the 2 x 3/way valves with ident. codes N, K, H cannot be used in vacuum or low pressure applications. If you supply the MPA-S with vacuum or low pressure via port (1):

- Operate these valves in a separate pressure zone.
- The operating pressure for this pressure zone must be set in accordance with the diagram in Fig. A/1.
3. Installation

The following conditions must be fulfilled in order to operate your MPA-S valve terminal at supply connection (1) with vacuum or low pressure between -0.9 ... 3 bar:

- The pilot control is operated with regulated external pilot air supply.
- The valve terminal is fitted with the following valve sub-bases and sometimes has additional pressure zones.

<table>
<thead>
<tr>
<th>Valve sub-bases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure zone with vacuum or low pressure supply via connection (1) 1) 2)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Pressure zone with excess pressure supply 3) via port (1)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

1) The valve plates with Ident. code D, H, K, N and I are not suitable for vacuum or low-pressure operation if they are supplied via port (1).
2) Pilot pressure as per diagram in appendix A, Fig. A/3
3) Pilot pressure as per diagram in appendix A, Fig. A/1
3. Installation

Note
Valve plates with Ident. code I, 2 x 2/2-way valves:
- With this valve vacuum is supplied via port (5).
  The vacuum is switched to port (4) with valve coil 14.
- The operating pressure at port (1) can be used as a reject pulse at port (2). The operating pressure is switched to port (2) with valve coil 12.
If the MPA-S valve terminal is also equipped with other valves, operate this valve in a separate pressure zone with separate exhaust channel (5).

Valves with Ident. codes W and X, 3/2-way valve:
- These valves can be supplied individually and therefore operated in the pressure range of −0.9 ... 10 bar.
  They are independent of supply connection (1) of the valve terminal. The connections via which these valves are supplied with compressed air or vacuum and via which exhaust air is removed are shown in tab. 3/3.
The pilot air is supplied via the valve terminal.

<table>
<thead>
<tr>
<th>3/2-way valve</th>
<th>Compressed air or vacuum via connection</th>
<th>Exhaust via port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ident. code X</td>
<td>(4)</td>
<td>(3)</td>
</tr>
<tr>
<td>Ident. code W</td>
<td>(2)</td>
<td>(5)</td>
</tr>
</tbody>
</table>

Tab. 3/3: Connections to the valves with Ident. code X and W
3. Installation

3.4.6 Connecting the pneumatic lines

**Note**
- Use blanking plugs to seal all connections **not required** for the functioning of the MPA-S valve terminal.

Position of the pneumatic ports

**Note**
If the MPA-S valve terminals are equipped with flat plate silencers, the exhaust (3/5) and (82/84) will be vented through the flat plate silencers.

**Note**
On the MPA-S valve terminal with exhaust plates, the pilot exhaust is vented on at least one supply plate via connection (82/84).

Fit the threaded connector or the silencers according to the table below. Then lay the tubing.

**Note**
Make sure that the proportional pressure regulator is supplied with a constant pressure. A constant supply pressure is necessary for good control quality. For a constant pressure supply use the separate supply connection on the sub-base of the proportional pressure regulator.
3. Installation

Fig. 3/6: Pneumatic connections of the MPA-S valve terminal
3. Installation

<table>
<thead>
<tr>
<th>line</th>
<th>Connection code (ISO 5599)</th>
<th>Connection size (ISO 228)</th>
<th>Connection 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressed air or vacuum</td>
<td>(1)</td>
<td>G¾&quot;</td>
<td>Fitting in electrical interface or in the pneumatic supply plate</td>
</tr>
<tr>
<td>Pilot air (external pilot air supply)</td>
<td>(12/14)</td>
<td>M7</td>
<td>Fitting in electrical interface or in the multiple connecto plate</td>
</tr>
<tr>
<td>Ducted exhaust air from the valves</td>
<td>(3/5)</td>
<td>QS10</td>
<td>Fitting in exhaust plate ²)</td>
</tr>
<tr>
<td>Ducted exhaust from the pilot control</td>
<td>(82/84)</td>
<td>M7</td>
<td>Fitting in the supply plate ²)</td>
</tr>
<tr>
<td>Work air or vacuum</td>
<td>(2) or (4)</td>
<td>MPA1: M7 MPA2: G &quot;</td>
<td>Fitting in the sub-base</td>
</tr>
<tr>
<td>Connection for external pressure</td>
<td>P1</td>
<td>M7</td>
<td>Fitting in pressure sensor plate type VMPA-FB-PS-P1</td>
</tr>
<tr>
<td>Supply port Pressure output Exhaust of the VPPM-6TA</td>
<td>(1) (2) (3)</td>
<td>G ¾&quot; G ¼&quot; G ¼&quot;</td>
<td>Fitting in the sub-base of the proportional pressure regulator</td>
</tr>
</tbody>
</table>

1) Depending on what you have ordered, the MPA-S valve terminal may already be fitted with QS fittings.
2) Only with MPA-S valve terminals with exhaust plate or supply plate.

Tab. 3/4: Assignment of the connections

Observe the following instructions on installing the pneumatic components. Only then can you guarantee trouble-free operation.

**Note**
In the case of several systems with centrally ducted exhaust air:
- Use non-return valves in the common exhaust lines (3/5) or (82/84) in order to prevent functional impairment due to back pressures.
3. Installation

Fig. 3/7: Common lines with non-return valves

3.4.7 Connecting the electric cables

**Warning**
- Use only PELV circuits as per IEC/DIN EN 60204-1 for the electric power supply (protective extra-low voltage, PELV). Also observe the general requirements for PELV circuits in accordance with IEC/DIN EN 60204-1.
- Use only **power sources** that guarantee reliable electrical isolation of the operating voltage as per IEC/DIN EN 60204-1.
3. Installation

Protection against electric shock (protection against direct and indirect contact) is guaranteed in accordance with IEC/DIN EN 60204-1 by using PELV circuits (electrical equipment of machines, general requirements).

**Note**
Check within the framework of your EMERGENCY STOP circuit to ascertain the measures necessary for putting your machine/system into a safe state in the event of an EMERGENCY STOP (e.g. switching off the operating voltage for the valves and output modules, switching off the compressed air).

MPA-F valve terminal with multi-pin plug connection:
Instructions on connecting the electric elements of the MPA-S valve terminal with multi-pin plug connection can be found in the package insert.

MPA-F valve terminal with CPX terminal:
Instructions on connecting the operating voltage can be found in the system description of your CPX terminal.

Detailed instructions on connecting the CPX modules (bus node, I/O modules etc.) can be found in the relevant descriptions for the CPX module (see the system description of your CPX terminal, table “Descriptions of the CPX terminal”).
3. Installation

Load voltage supply via electrical supply plate
(only for MPA-S valve terminal with CPX terminal or CPI interface)

The electric supply plate type VMPA-FB-SP-...-V-... supplies the valves additionally with load voltage when, for example, the valve terminal is to be operated with different voltage zones or when the necessary load voltage cannot be provided by the CPX terminal alone.

**Note**
Damage to components and operative malfunctions!

Please note:
- that with MPA-S valve terminals with more than 8 sub-bases, an electric supply plate is required for supplemental supply of load voltage.
- that only the electronic modules with separate circuits of type VMPA-..-FB-EMG-.. are permitted to the right of the electric supply plate (see also Chapter 5.3.5). If your MPA-S valve terminal is only equipped with electronic modules with a common circuit (type VMPA-..-FB-EMS-..), then you can supply the pneumatics as follows:
  - for valve terminals with CPX terminals:
    - only via an interlinking block with 4-pin system supply of type CPX-GE-EV-S or CPX-GE-EV-S-7/8-4POL of the CPX terminal.
  - for valve terminals with CPI interface:
    - via the CPI interface of type VMPA-CPI.
- that the electric supply plate must not be installed directly to the left of a pneumatic supply plate (type VMPA1-FB-SP-..).
- that you do not touch the electrostatically sensitive contact surfaces of the plug connectors on the side of the electric supply plate.
3. Installation

Connect the relevant electric supply plate as described in the following table.

<table>
<thead>
<tr>
<th>Plug M18</th>
<th>Pin allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pin 2</td>
</tr>
<tr>
<td></td>
<td>Pin 3</td>
</tr>
<tr>
<td></td>
<td>Pin 4</td>
</tr>
</tbody>
</table>

Tab. 3/5: Pin assignment of the electric supply plate type VMPA-FB-SP-V

<table>
<thead>
<tr>
<th>7/8&quot; plug, (4-pin)</th>
<th>Pin allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pin A</td>
</tr>
<tr>
<td></td>
<td>Pin B</td>
</tr>
<tr>
<td></td>
<td>Pin C</td>
</tr>
<tr>
<td></td>
<td>Pin D</td>
</tr>
</tbody>
</table>

Tab. 3/6: Pin assignment of the electric supply plate type VMPA-FB-SP-7/8-V-4POL
3. Installation

<table>
<thead>
<tr>
<th>7/8” plug, (5-pin)</th>
<th>Pin allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2</td>
<td>Pin 1 0 V DC valves (incoming)</td>
</tr>
<tr>
<td>3</td>
<td>Pin 2 n.c.</td>
</tr>
<tr>
<td>4</td>
<td>Pin 3 FE (leading)</td>
</tr>
<tr>
<td>5</td>
<td>Pin 4 n.c.</td>
</tr>
<tr>
<td></td>
<td>Pin 5 24 V DC valves</td>
</tr>
</tbody>
</table>

Tab. 3/7: Pin assignment of the electric supply plate type VMPA-FB-SP-7/8-V-5POL

Earthing the MPA-S valve terminal

**Note**
Earth your MPA-S valve terminal.

- Connect the earth connection to the left-hand end plate or the multiple connector plate (see fig.) at low impedance (short cable with large cross-sectional area) with the earth potential.
- Please note the supplementary instructions on the MPA-S valve terminals with CPX terminal in the system manual of your CPX terminal.

You can thereby avoid interference from electromagnetic sources and ensure electromagnetic compatibility in accordance with EMC directives.
3. Installation

MPA-S valve terminal with CPX terminal  MPA-S valve terminal with multi-pin plug connection

MPA-S valve terminal with CPI interface  MPA-S valve terminal with AS interface

1 Earth terminal

Fig. 3/8: Earthing the MPA-S valve terminal
3. Installation

3.5 Address assignment of the valves

3.5.1 MPA-S valve terminal with CPX terminal

Maximum 16 MPA pneumatic modules are permitted on the MPA-S valve terminal with CPX terminal. The following number of solenoid coils is therefore possible (if only valves of the same size are used):
- MPA1: up to 128 solenoid coils (maximum of 64 valve positions)
- MPA2: up to 64 solenoid coils (maximum of 32 valve positions)

Note
Note with the addressing that an MPA2 pneumatic module has only 4 addresses compared to an MPA1 pneumatic module.

Assigning the addresses
- The assignment of the addresses is module-orientated
- A pneumatic module always occupies
  - MPA1: 8 addresses
  - MPA2: 4 addresses
- Counting begins on the valve terminal from left to right
- Each valve position occupies 2 addresses, irrespective of the valve or blanking plate fitted. The following assignment applies:
  - solenoid coil 14 occupies the lower-value address,
  - solenoid coil 12 occupies the higher-value address.
3. Installation

1) unused addresses

1) Valve sub-bases with two solenoid coils
2) Valve sub-bases with one solenoid coil
3) Blanking plate
4) Pneumatic modules (MPA2)
5) Pneumatic modules (MPA1)
6) Addresses of the solenoid coils 14
7) Addresses of the solenoid coils 12

Fig. 3/9: Example: Address assignment of an MPA-S valve terminal with CPX terminal and 6 valve locations (top view)

Detailed instructions on addressing the pneumatic modules of the MPA-S valve terminal with CPX terminal can be found in the MPA-... electronics description or the corresponding description for the bus node (see system description for your CPX terminal, table “Descriptions of the CPX terminal”).

3-32
3. Installation

3.5.2 MPA-S valve terminal with CPI module or AS-Interface

Instructions on addressing the pneumatic modules can be found in the leaflet supplied with the product.

3.5.3 MPA-S valve terminal with multi-pin plug connection:

- Assign the addresses in ascending order without gaps (see example)
- Address assignment does not depend on whether blanking plates or valve plates are fitted.
- Depending on the electronics modules a valve position occupies the following number of addresses:

<table>
<thead>
<tr>
<th>Number addresses</th>
<th>Electronics module</th>
</tr>
</thead>
<tbody>
<tr>
<td>One address</td>
<td>VMPA1-MPM-EMM-4</td>
</tr>
<tr>
<td></td>
<td>VMPA2-MPM-EMM-2</td>
</tr>
<tr>
<td>Two addresses</td>
<td>VMPA1-MPM-EMM-8</td>
</tr>
<tr>
<td></td>
<td>VMPA2-MPM-EMM-4</td>
</tr>
</tbody>
</table>

Tab. 3/8: Electronics module for multi-pin plug connection

- If a valve location occupies 2 addresses, the following applies:
  - solenoid coil 14 occupies the lower-value address,
  - solenoid coil 12 occupies the higher-value address.
3. Installation

Example of address assignment

**Caution**
Note that addresses may be shifted if the valve terminal is extended at a later stage.

In the following example an MPA-S valve terminal type MPA-MPM-PI with the following components is addressed:

<table>
<thead>
<tr>
<th>Component</th>
<th>MPA1</th>
<th>MPA2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manifold blocks</td>
<td>2 (8 valve positions)</td>
<td>2 (4 valve positions)</td>
</tr>
<tr>
<td>Electronic module</td>
<td>1 \text{ VMPA1-PM-PMM-8}</td>
<td>1 \text{ VMPA2-PM-PMM-4}</td>
</tr>
<tr>
<td></td>
<td>1 \text{ VMPA1-PM-PMM-4}</td>
<td>1 \text{ VMPA2-PM-PMM-2}</td>
</tr>
</tbody>
</table>

Tab. 3/9: Example: Electronics module for multi-pin plug connection
3. Installation

For controlling the valves, each solenoid coil is assigned to a certain pin of the multi-pin plug socket.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Address</th>
<th>Valve position number</th>
<th>Solenoid coil</th>
<th>Electronics module</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>VMPA1-MPM-EMM-8</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>0</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>1</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>1</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>2</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>2</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>3</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>7</td>
<td>3</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>8</td>
<td>4</td>
<td>14</td>
<td>VMPA1-MPM-EMM-2</td>
</tr>
<tr>
<td>10</td>
<td>9</td>
<td>5</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>10</td>
<td>6</td>
<td>14</td>
<td>VMPA2-MPM-EMM-4</td>
</tr>
<tr>
<td>12</td>
<td>11</td>
<td>7</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>12</td>
<td>8</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>13</td>
<td>9</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>14</td>
<td>10</td>
<td>14</td>
<td>VMPA2-MPM-EMM-4</td>
</tr>
<tr>
<td>16</td>
<td>15</td>
<td>10</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>16</td>
<td>11</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>17</td>
<td>11</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>25</td>
<td>0 V 1)</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

1) Connect 0 V with positive-switching control signals, 24 V with negative-switching control signals; mixed operation is not permitted.

Tab. 3/10: Example: Address assignment of the MPA-S valve terminal with multi-pin plug connection and 12 valve locations
Example of address assignment (seen from above):

1. Addresses of the solenoid coils 14 (manual override 14)
2. Addresses of the solenoid coils 12 (manual override 12)
3. LED for solenoid coil 12
4. LED for solenoid coil 14
5. Unused valve position
6. Sub-base with electronic module VMPA2-MPM-EMM-8 occupies two addresses per valve location
7. Supply plate for additional pressure supply
8. Sub-base with electronic module VMPA1-MPM-EMM-2 occupies one address per valve location
9. Sub-base with electronic module VMPA1-MPM-EMM-4 occupies one address per valve location
10. Sub-base with electronic module VMPA1-MPM-EMM-8 occupies two addresses per valve location

Fig. 3/10: Example: Address assignment of the MPA-S valve terminal with multi-pin plug connection and 12 valve locations, type MPA...-MPM-... (top view)
Commissioning

Chapter 4
4. Commissioning

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## 4. Commissioning

### Contents of this chapter

This chapter describes the commissioning of the MPA-S valve terminal. This includes, in particular:

- Instructions on building up pressure in the overall supply
- Operating the manual overrides
- Checking the valves and the valve-actuator combination
- The assignment of LEDs and manual overrides to the solenoid coils
- Function impairments
- Operating states of the pneumatic system

### Additional information

Commissioning of the CPX terminal is described in the appropriate description for the CPX bus node (see the system description of your CPX terminal, table “Descriptions of the CPX terminal”).
4. Commissioning

4.1 General Information

4.1.1 Before commissioning

- Switch off the power supply before connecting or disconnecting plug connectors (otherwise functional damage).
- Only commission a valve terminal that has been mounted and wired completely.
- Make sure that there is a sufficient supply of fresh air (cooling) for the following operating conditions:
  - When the maximum number of valves are equipped
  - When the maximum operating voltage is applied
  - When the solenoid coil is constantly under load
- Please observe the following instructions on building up pressure in the overall supply.

4.1.2 Pressure build-up in the overall supply

**Warning**

If the pressure build-up of the pilot air supply is too slow or delayed, this may cause the actuators to perform sudden unexpected movements under the following conditions:
- when the compressed air is connected via a soft-start valve (gradual pressure build-up) and
- with electric signals (e.g. after EMERGENCY STOP).

This can cause damage to the machine or system and even injury to persons.

- Operate the valve terminal with an external pilot air supply (3 ... 8 bar) Branch the pilot air supply before the soft-start valve (see diagram).
4. Commissioning

The pilot air supply must reach a pressure of 3 ... 8 bar immediately after it is switched on. Otherwise it is not ensured that the valve will switch directly (see diagram). If the pressure is less than 3 bar, there may be a delay before the valve is switched, in spite of an electric signal being present. The gradual pressure build-up of the overall supply does not affect the actuator in that case. The actuator would react suddenly (e.g. a cylinder would extend or retract suddenly, depending on the valve function).

1 Externally supplied pilot air supply (3 ... 8 bar), branched before the soft-start valve

2 Safety start-up valve (slow build up in pressure of complete supply)

Fig. 4/1: Example of valve-cylinder combination with gradual pressure build-up of the overall supply
4. Commissioning

The table below shows the effects of gradual start-up pressurisation when there are electric signals:

<table>
<thead>
<tr>
<th>External pilot air supply</th>
<th>Pressure rise in overall supply</th>
<th>Pressure rise in the pilot air supply (12/14)</th>
<th>Time when a valve reverses</th>
<th>Movement of the actuator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Branched after the soft-start valve</td>
<td>Slow</td>
<td>Slow</td>
<td>After pressure rise at (1)</td>
<td>Fast</td>
</tr>
<tr>
<td>Branched in front of the soft-start valve</td>
<td>Slow</td>
<td>Fast</td>
<td>Before pressure rise at (1)</td>
<td>Slow</td>
</tr>
</tbody>
</table>

Tab. 4/1: Effects of slow start-up pressurisation

4.2 Manual override (MO)

You should use the manual override especially when commissioning the pneumatic system, in order to check the function and operation of the valve or the valve-actuator combination.

By actuating the manual override, you can switch the valve without an electric signal. You only need to switch on the compressed air supply.

The manual override has been designed to be used as follows:

<table>
<thead>
<tr>
<th>Type of actuation</th>
<th>Mode of operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-detenting</td>
<td>After actuation the manual override is reset automatically by a spring.</td>
</tr>
<tr>
<td>Turning with detent</td>
<td>The manual override remains actuated until it is reset by hand.</td>
</tr>
</tbody>
</table>

Tab. 4/2: Actuation types of the manual override
4. Commissioning

The detenting/non-detenting function of the manual override can be modified to only non-detenting actuation if a cap is fitted.

The assignment of the manual overrides to the solenoid coils is as follows:

1. Manual override for solenoid coils 12
2. Manual override for solenoid coils 14
3. Valve size MPA2
4. Valve size MPA1

Fig. 4/2: Position of the manual overrides (top view)
4. Commissioning

4.3 Checking the valves and the valve/actuator combination

Note
Before commissioning the MPA-S valve terminal, observe the specifications concerning the medium, see “Installation” chapter, “Pilot control (pilot air supply)” section.

The MPA-S valve terminal should be commissioned as follows:

<table>
<thead>
<tr>
<th>Commissioning variants</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary test of the pneumatic tubing</td>
<td>Test the valve-actuator combination by means of the manual override</td>
</tr>
<tr>
<td>Complete commissioning of the overall system</td>
<td>Installing and connecting the overall system. Program control via PLC/industrial PC.</td>
</tr>
</tbody>
</table>

Tab. 4/3: Commissioning variants

Commissioning the pneumatic components by means of the manual override is described below.

Commissioning of the CPX terminal is described in the appropriate description for the CPX bus node (see the system description of your CPX terminal, table “Descriptions of the CPX terminal”).
4. Commissioning

Warning
Before actuating the MO:
Uncontrolled actuation of solenoid coils can cause the actuators to perform sudden unexpected movements which may cause personal injury and material damage.

- Disconnect the operating power supply for the solenoid coils from the relevant connections on the MPA-S valve terminal.

You will thereby avoid undesired actuation of the solenoid coils.

Before switching on the power supply:
During commissioning, manual overrides that are in the switched state can cause actuators to perform sudden unexpected movements. These movements can cause injury to persons and damage to property.

- Make sure that all manual overrides are reset to their initial position.

You will thereby avoid undefined switching states of the valves.

Proceed as follows:

Warning
Before testing the valve/actuator combination:
- Make sure that nobody is in the danger zone.

Note
A valve that has been switched by an electric signal cannot be reset by the manual override. The electric signal is dominant in this case.

- Reset the electric signal before actuating the manual override.
4. Commissioning

1. Switch on the compressed air supply.

2. Check the functioning and operation of each individual valve/actuator combination by actuating the manual override as shown in the following diagrams.

**Note**
Incorrect actuation of the non-detenting manual override can lead to malfunctioning or damage to the manual override.
- Use a screwdriver (blade width max. 3 mm) to actuate the manual override.
- Actuate the manual override with a max. of 25 N only.

3. With a detenting manual override: After testing the valves, make sure that all manual overrides are in their initial positions again.

**Caution**
Valves with activated manual overrides can move actuators unintentionally during commissioning. This can cause injury to people and damage to property.
- Prior to commissioning, reset all manual overrides to their initial positions again.

If the manual override is in the actuated state, it is not possible to reset the valve to its neutral position with an electric signal. The manual override is dominant in this case.

4. Switch off the compressed air supply after testing the valves.
4. Commissioning

Non-detenting operation of manual override (automatic)

<table>
<thead>
<tr>
<th>Operation</th>
<th>Valve response</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Use a screwdriver (max. blade width 3 mm) to press down the plunger of</td>
<td>The valve:</td>
</tr>
<tr>
<td>the manual override until the valve switches.</td>
<td>– moves to the switching position</td>
</tr>
<tr>
<td><strong>Note:</strong></td>
<td></td>
</tr>
<tr>
<td>In the case of manual overrides</td>
<td></td>
</tr>
<tr>
<td>without a cap, do <strong>not</strong> turn the pressed-down plunger, as otherwise</td>
<td></td>
</tr>
<tr>
<td>the manual override will lock.</td>
<td></td>
</tr>
<tr>
<td>Keep the plunger of the MO pressed.</td>
<td>– remains in the switching position</td>
</tr>
<tr>
<td>• Release the plunger (the spring resets the plunger of the manual</td>
<td>– moves back to the normal position (not with double-solenoid valve,</td>
</tr>
<tr>
<td>override to the initial position).</td>
<td>(ident. code J))</td>
</tr>
</tbody>
</table>

Tab. 4/4: Non-detenting actuation of the manual override
4. Commissioning

**Note**
The detenting actuation of the manual override is only possible if a manual override cap is not fitted.

### Detenting actuation of the manual override (manual reset)

<table>
<thead>
<tr>
<th>Operation</th>
<th>Valve response</th>
</tr>
</thead>
</table>
| · Use a screwdriver (max. blade width 3 mm) to press down the plunger of the manual override until the valve switches.  
· Then turn the plunger in a clockwise direction as far as possible. | The valve:  
· moves to the switching position |
| · Leave the plunger in position.                                           | remains in the switching position            |
| · Then turn the plunger in an anti-clockwise direction as far as possible.  
· Then release the plunger.                                               | · moves back to the basic position (not with double-solenoid valve, (Ident. code J)) |

Tab. 4/5: Turning/locking actuation of the manual override
4. Commissioning

4.4 LED display of the valves

There is an LED and a manual override (MO) for each solenoid coil. The position of the LED and MO for the corresponding solenoid coil is as follows:

Fig. 4/3: The assignment of LEDs and manual overrides to the solenoid coils

1 MPA1: MO and red/yellow LED for solenoid coil 12
2 MPA1: MO and red/yellow LED for solenoid coil 14
3 MPA2: Yellow LED for solenoid coil 12
4 MPA2: MO for solenoid coil 12
5 MPA2: Red LED for solenoid coil 12
6 MPA2: Yellow LED for solenoid coil 14
7 MPA2: MO for solenoid coil 14
8 MPA2: Red LED for solenoid coil 14
9 Valve size MPA2
10 Valve size MPA1
4. Commissioning

**MPA-S valve terminal with CPX terminal or CPI module**

The two-colour LEDs on the valves have a double function.

- When yellow, the LEDs indicate the switching status of the solenoid coils.
- When red during operation, the LEDs indicate an error in the electronic module.

<table>
<thead>
<tr>
<th>LED</th>
<th>Position of the valve</th>
<th>Correct state</th>
<th>Error condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>– Normal position</td>
<td>Logical 0 (signal not applied)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– Switching position</td>
<td>Logical 0 after MO actuated</td>
<td></td>
</tr>
<tr>
<td>Yellow illuminated</td>
<td>– Switching position</td>
<td>Logical 1 (signal is present)</td>
<td>Logical 1 but:</td>
</tr>
<tr>
<td></td>
<td>– Normal position</td>
<td></td>
<td>– The compressed air supply is not OK or</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– The pilot exhaust is blocked or</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– Servicing required</td>
</tr>
<tr>
<td>Red illuminated</td>
<td>– In the starting phase for approx. 2 seconds</td>
<td>Check phase when the supply voltage has been switched on</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– During operation</td>
<td></td>
<td>See electronics description of the MPA pneumatic module</td>
</tr>
<tr>
<td>Red flashing</td>
<td>– During operation</td>
<td></td>
<td>MPA-S with electronics module VMPA...-FB-EM...-D2...: See electronics description of the MPA pneumatic module</td>
</tr>
</tbody>
</table>

**Tab. 4/6: Meaning of the LED display (MPA-S valve terminal with CPX terminal or CPI module)**

Further instructions on commissioning and diagnosing the MPA pneumatic modules can be found in the MPA-... electronics description.
4. Commissioning

MPA-S valve terminal with multipin connection or AS-Interface

The LEDs on the valves show the switching status of the valve solenoid coils.

<table>
<thead>
<tr>
<th>LED</th>
<th>Position of the valve</th>
<th>Correct state</th>
<th>Error condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>– Normal position</td>
<td>Logical 0 (signal not applied)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– Switching position</td>
<td></td>
<td>Logical 0 after MO actuated</td>
</tr>
<tr>
<td>Lights up yellow</td>
<td>– Switching position</td>
<td>Logical 1 (signal is present)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– Normal position</td>
<td></td>
<td>Logical 1 but:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– Load voltage of the valves lies below the permitted tolerance range (18 V ... 30 V)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– Compressed air supply not OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– Pilot exhaust air blocked</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– Servicing required</td>
</tr>
</tbody>
</table>

Tab. 4/7: Meaning of the LED display (MPA-S valve terminal with multipin connection or AS-Interface)
4. Commissioning

4.5 LED display of the proportional pressure regulator

The two LEDs on the proportional pressure regulator show the operating status of the valve.

<table>
<thead>
<tr>
<th>Status of the LED display</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power LED (green)</td>
<td>Fault LED (red)</td>
</tr>
<tr>
<td>Lights up</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td>– Normal operating status</td>
</tr>
<tr>
<td>Lights up</td>
<td>Lights up</td>
</tr>
<tr>
<td></td>
<td>– Non-permitted setpoint value</td>
</tr>
<tr>
<td></td>
<td>– Non-permitted parameter</td>
</tr>
<tr>
<td></td>
<td>– Condition counter reached</td>
</tr>
<tr>
<td></td>
<td>– Upper limit value exceeded</td>
</tr>
<tr>
<td></td>
<td>– Lower limit value exceeded</td>
</tr>
<tr>
<td></td>
<td>– Error in parameterising</td>
</tr>
<tr>
<td></td>
<td>– Incorrect valve type mounted</td>
</tr>
<tr>
<td>Lights up</td>
<td>Flashing</td>
</tr>
<tr>
<td></td>
<td>– Hardware error</td>
</tr>
<tr>
<td></td>
<td>– Undervoltage of the load supply</td>
</tr>
<tr>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td>– Undervoltage in the load and logic voltage supply</td>
</tr>
</tbody>
</table>

Tab. 4/8: Meaning of the LED display on the proportional pressure regulator
4. Commissioning

4.6 Commissioning instructions for the proportional pressure regulator

Note

- Make sure there is sufficient space for the connecting elements. In this way you will prevent the connecting cable from being bent.

- Make sure that the proportional pressure regulator is not subjected to high-frequency irradiation (e.g. by radio sets, mobile telephones or other devices which cause interference). In this way you will avoid increased tolerances in the output pressure (compare specifications on EMC in Appendix A).

- The proportional pressure regulator interprets nominal values which are smaller than 1 % full scale as zero point switching off, i.e. the valve is force-ventilated and therefore assumes a defined position.

- Pressurise the proportional pressure regulator with an input pressure at least 1 bar higher than the maximum required output pressure. A proportional output pressure P2 sets itself as the nominal value. Tab. 4/9 shows the output pressure which is assigned to the end ranges (1 % FS or 100 % FS) of the nominal value.

- When switching off the proportional pressure regulator, make sure that first the supply pressure, then the supply voltage is switched off.
4. Commissioning

<table>
<thead>
<tr>
<th>VPPM-6TA-...</th>
<th>Output pressure with signal 1 % FS 1) 2)</th>
<th>Output pressure with signal 100 % FS 1) 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 bar type</td>
<td>0.02 bar</td>
<td>2 bar</td>
</tr>
<tr>
<td>6 bar type</td>
<td>0.06 bar</td>
<td>6 bar</td>
</tr>
<tr>
<td>10 bar type</td>
<td>0.1 bar</td>
<td>10 bar</td>
</tr>
</tbody>
</table>

1) FS = Full scale (1 % FS = 0.1 V / 100 % FS = 10 V)  
2) 0 V = 0 bar

Tab. 4/9: Output signal of the proportional pressure regulator

Additional important specifications on commissioning the proportional-pressure regulator, such as parameterisation, is provided in the MPA-... electronics description.
4. Commissioning

4.7 Troubleshooting

4.7.1 Impairment of function

After switching on the compressed air supply or when subsequently testing the individual valves, you can learn the following about the operating status of the pneumatic system:

<table>
<thead>
<tr>
<th>Operating status of: the pneumatic system</th>
<th>Error handling when the compressed air supply has been switched off</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air escapes from ...</td>
<td>• Check the tube mounting</td>
</tr>
<tr>
<td>– common line or working line connections</td>
<td></td>
</tr>
<tr>
<td>The valve or the pneumatic system ...</td>
<td>• Check the installation of the tubing lines</td>
</tr>
<tr>
<td>– does not react as expected</td>
<td>• Check the electric cables</td>
</tr>
<tr>
<td>– does not react</td>
<td>• Bring the detenting manual override into the initial position</td>
</tr>
<tr>
<td></td>
<td>• After switching on again, check the operating pressure (if necessary for each pressure zone). Set operating pressure in accordance with instructions in chapter 3.</td>
</tr>
<tr>
<td></td>
<td>• Servicing required</td>
</tr>
<tr>
<td></td>
<td>Valve terminals with regulated external pilot air supply:</td>
</tr>
<tr>
<td></td>
<td>• After restarting, check the pilot pressure</td>
</tr>
<tr>
<td></td>
<td>(if necessary, set this depending on the operating pressure, see chapter 3)</td>
</tr>
</tbody>
</table>

Tab. 4/10: Function impairment of the pneumatic system
### 4. Commissioning

<table>
<thead>
<tr>
<th>Operating status of the proportional pressure regulator</th>
<th>Possible cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportional pressure regulator does not react</td>
<td>Supply voltage not applied, POWER LED does not light up.</td>
<td>Check the 24 V DC supply voltage</td>
</tr>
<tr>
<td></td>
<td>No supply pressure</td>
<td>Switch on supply pressure</td>
</tr>
<tr>
<td></td>
<td>Setpoint value reached</td>
<td>Modify setpoint value</td>
</tr>
<tr>
<td></td>
<td>Proportional pressure regulator defective</td>
<td>Send the device to Festo for repairs</td>
</tr>
<tr>
<td>Flow too low</td>
<td>Restriction of the flow cross section due to connection design (swivel fittings).</td>
<td>Use different type of connection</td>
</tr>
<tr>
<td>Pressure increase too slow</td>
<td>Large cylinder volume and long tubing</td>
<td>Select different parameter record</td>
</tr>
<tr>
<td>Pressure constant despite modified setpoint value specification</td>
<td>Too little supply pressure p1</td>
<td>Increase supply pressure</td>
</tr>
</tbody>
</table>

Tab. 4/11: Functional impairment of the proportional pressure regulator
4. Commissioning

4.7.2 Operating states of the pneumatic system

The following conditions should be fulfilled, so that the desired pneumatic operating states listed below can be achieved:

<table>
<thead>
<tr>
<th>Desired pneumatic operating status</th>
<th>Prerequisites</th>
<th>Comment</th>
</tr>
</thead>
</table>
| Zero-leakage                     | – Tubing connected with care  
– Regulated pilot air supply     |         |
| Fast reaction                    | Sufficient pressure supply by means of pressure supply modules               | Exhaust the MPA-S valve terminal via all exhaust plates or flat plate silencer |
| Trouble-free                     | Non-return valves in common exhaust line                                     | This applies when several systems with centrally ducted exhaust are used |
| Two or more pressure zones       | – Limiting the pressure zones by means of isolating seals with blocked channels 
– Appropriate number of pneumatic air supply plates for supplying the different pressure zones. | Subsequent conversion possible (see Chapter 5) |
| Vacuum or low-pressure operation | Externally supplied regulated pilot air supply (3 ... 8 bar)                | Vacuum/Low pressure operation not with 2 x 2/2- and 2 x 3/2-way valves (Ident. code D, I, H, K, N) |
| EMERGENCY STOP of pressure zones | Guaranteeing the controller function for the pilot air supply despite the overall supply being switched off | The controller regulates the pilot air supply to all the valve plates on an MPA-S valve terminal |
| Slow start-up after EMERGENCY STOP | If control signals are present, the pilot air supply must have a pressure of 3 ... 8 bar immediately after being switched on |         |

Tab. 4/12: Pneumatic operating states
4. Commissioning
Maintenance and conversion

Chapter 5
## 5. Maintenance and conversion

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<td>General preventive action</td>
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<td>5.3.2</td>
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<td>Replacing valves or blanking plates</td>
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<td>5.4.3</td>
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<td>5-35</td>
</tr>
<tr>
<td>5.4.4</td>
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<td>5-39</td>
</tr>
<tr>
<td>5.4.5</td>
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</tr>
<tr>
<td>5.4.6</td>
<td>Adding a proportional pressure regulator</td>
<td>5-42</td>
</tr>
</tbody>
</table>
5. Maintenance and conversion

Contents of this chapter

This chapter explains how to mount and remove the following components for maintenance work and conversion:

- Valve or blanking plate
- Electronics module
- Exhaust plate or flat plate silencer
- sub-base, supply plate and end plate

The following activities are also described:

- Adding of pressure zones
- Converting the valve terminal to internal or external pilot air supply

Further information

MPA-S valve terminal with CPX terminal:
Information on mounting/removing components and on the electrical connections can be found in the CPX System Manual.

MPA-S valve terminal with multi-pin plug connection:
Instructions on electrical connection can be found in the package insert.
5. Maintenance and conversion

5.1 General preventive action

**Warning**
Unintended movements of the connected actuators and uncontrollable movements of loose tubing can cause injury to persons and/or damage to property.
Before carrying out installation and maintenance work, switch off the following:
- compressed air supply
- operating and load voltage supplies.

**Note**
Handle all modules and components of the MPA-S valve terminal with great care. Note especially the following when mounting components:
- Screws must be fitted exactly (otherwise threads will be damaged).
- Screws must be only screwed in by hand. Screws must be fitted so that the self-cutting threads can be used.
- The specified torques must be observed.
- Fittings must be mounted free of offset and mechanical tension.
- Check the seals for damage (IP65).
- The contact surfaces must be dry and clean (sealing effect, avoid leakage and contact errors).
5. Maintenance and conversion

5.2 Dismantling the MPA-S valve terminal

Providing the MPA-S valve terminal is easily accessible, it need not be dismantled when the following components are replaced or removed:

- Valves or blanking plates
- Electronics module
- Exhaust plates or flat plate silencer

Disconnecting the electrical connections

<table>
<thead>
<tr>
<th>Connection variants</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPX terminal</td>
<td>• Instructions on disconnecting the electrical connections can be found in the CPX system description.</td>
</tr>
<tr>
<td>Multi-pin plug connection</td>
<td>• Loosen the fastening screws and remove the Sub-D multi-pin plug.</td>
</tr>
</tbody>
</table>

Tab. 5/1: Disconnecting the electrical connections

Disconnecting the pneumatic connections

Disconnecting the pneumatic connections is described in Chapter 3.

Dismantling the MPA-S valve terminal

The procedure for dismantling the MPA-S valve terminal is described in chapter 2.
5. Maintenance and conversion

5.3 Maintenance of the MPA-S valve terminal

5.3.1 Cleaning the flat plate silencer

Caution
Dirt in the flat plate silencer can cause an increase in pressure in exhaust channels (3) and (5).

- Clean the flat plate silencer insert if it is yellow/black or a dark colour, or replace it by a new insert.
- Do not use TRI for cleaning, but rather petrol or paraffin.
- Observe the safety regulations for handling easily inflammable cleaning agents.

In this way you can ensure that the flat plate silencer functions correctly and that the valves operate correctly.

Proceed as follows:

1. Loosen the 6 fastening screws of the flat plate silencer and remove it from the basis components.

2. Clean the flat plate silencer with petrol or paraffin.

3. Check the seal between the basis component and the flat plate silencer for damage. Replace the seal if it is damaged.

4. Fasten the flat plate silencer only with the original screws. Tighten the screws in diagonally opposite sequence to 1.0 Nm (± 10 %).
5. Maintenance and conversion

5.3.2 Replace the flat plate silencer or the exhaust plate

Proceed as follows:

1. Loosen the 6 fastening screws of the flat plate silencer or exhaust plate and remove it from the basis component.

2. Check the seal between the basis component and the surface-mounted silencer or exhaust plate for damage. Replace the seal if it is damaged.

3. Make sure that the seal is seated correctly. The seating is determined by guides in the flat plate silencer or exhaust plate.

4. Fasten the flat plate silencer or exhaust plate only with the original screws. Tighten the sub-bases in diagonally opposite sequence with 0.65 Nm (± 10 %) or the flat plate silencer with 1.0 Nm (± 10 %).

5.3.3 Replacing valves or blanking plates

**Note**

The sub-bases of the MPA-S valve terminal with multi-pin plug connection support the control of one or two solenoid coils per valve position, depending on the built-in MPA electronics module (see Tab. 5/4).

**Dismounting**

Proceed as follows:

- Use a screwdriver with a narrow blade to loosen the fastening screws and remove the components from the sub-bases (see diagram).
5. Maintenance and conversion

Mounting

Proceed as follows:

1. Make sure the seal is not damaged.
2. Replace seals if they are damaged.
3. Make sure that the cord seal between the sub-base and components is in the correct position: The cord seal must sit in the component cut-outs.
5. Maintenance and conversion

**Fig. 5/2: Mounting valve or blanking plate (MPA1)**

1. Fastening screws of the valve or blanking plate
2. Valve or blanking plate
3. Cord seal
4. Electronics module
5. Sub-base

**Fig. 5/3: Mounting valves or blanking plates (MPA2)**

1. Fastening screws of the component
2. Valve or blanking plate
3. Cord seal
4. Sub-base
5. Electronics module
5. Maintenance and conversion

4. Place the component on the sub-base.

5. Screw the component at first only slightly and then tighten with the following torque:
   - MPA1: 0.25 Nm (± 20 %)
   - MPA2: 0.65 Nm (± 10 %)

5.3.4 Replace the proportional pressure regulator

Mounting the proportional pressure regulator is described in the mounting instructions VMPA-6TA-...

Fig. 5/4: Mounting the proportional pressure regulator and the electronics module
5. Maintenance and conversion

5.3.5 Replacing electronics modules

Mounting the electronics module to the proportional pressure regulator is described in the mounting instructions VMPA-6TA-...

The MPA-S valve terminal is equipped with one electronics module per sub-base. It provides the following number of contacts between the electrical linking and the solenoid coils, depending on the size of the sub-bases.

- for size MPA1 contacts for 4 valve positions
- for size MPA2 contacts for 2 valve positions

The LEDs (function see chapter 4) and additional electronic components are integral parts of the electronics module.

**Caution**
The electronics modules may be damaged if they are not handled correctly.

- Switch off the power supply before removing the electronics modules.
- Do not touch any components
- Observe the handling specifications for electrostatically sensitive devices.
- Discharge yourself electrostatically before mounting or removing components in order to protect the components against discharges of static electricity.

**Caution**
Replace an electronics module only by an electronics module of the same type.
5. Maintenance and conversion

Before mounting the electronics module

There are different designs of the electronics module depending on the connection variant.

Electronics modules for the MPA-S valve terminal with CPX terminal

Caution
Damage to components and functional damage
It is **not** permitted to supply MPA pneumatic modules that are equipped with electronics modules and have a common circuit via interlinking blocks of type CPX-GE-EV-V... (valve supply) or 5-pin system supply (type CPX-GE-EV-S-7/8-5POL).

- If your MPA-S pneumatics are equipped with electronics modules of type VMPA1-FB-EMS-... or VMPA2-FB-EMS-..., you must supply the MPA-S pneumatics **exclusively** via a four pin system supply module of type CPX-GE-EV-S or CPX-GE-EV-S-7/8-4POL of the CPX terminal.

Observe the overview in Tab. 5/2.
Note that MPA electronics modules may only be supplied with power via the following supply modules:

<table>
<thead>
<tr>
<th>MPA electronics module ...</th>
<th>Permitted supply modules</th>
</tr>
</thead>
</table>
| ... with **common** circuit:  
  - VMPA1-FB-EMS-...  
  - VMPA2-FB-EMS-... |  
  - System supply (M18, 4-pin):  
    type CPX-GE-EV-S  
  - System supply (7/8”, 4-pin):  
    type CPX-GE-EV-S-7/8-4POL  
  - MPA-S valve terminal with CPI interface:  
    via the CPI interface of type VMPA-CPI. |
| ... with **separate** circuits:  
  - VMPA1-FB-EMG-...  
  - VMPA2-FB-EMG-... |  
  - Valve supplies (M18 or 7/8”):  
    type CPX-GE-EV-V...  
  - Electrical supply plate MPA-S:  
    type VMPA-FB-SP-...-V...  
  - System supplies (M18 or 7/8”) **1)**:  
    type CPX-GE-EV-S...  
  - MPA-S valve terminal with CPI interface:  
    Electrical supply plate MPA-S:  
    type VMPA-FB-SP-...-V... |

**1)** If a 4-pin system supply is used, separation of the circuits will be removed.

Tab. 5/2: Permitted supply modules for MPA electronics modules

In the case of MPA electronics modules with **separate** circuits of type VMPA1-FB-EMG-... or VMPA2-FB-EMG-..., \( V_{EL/SEN} \) and \( V_{VAL} \) are completely electrically isolated. In conjunction with the following voltage supplies, it is therefore possible to switch off the valve supply voltage at all poles:

- Interlinking block with valve supplies (M18 or 7/8”):  
  type CPX-GE-EV-V...
- System supply (7/8”, 5-pin):  
  type CPX-GE-EV-S-7/8-5POL
- Electrical supply plate MPA:  
  type VMPA-FB-SP-...-V...
5. Maintenance and conversion

Note
The electrical function of an MPA pneumatic module is determined by the electronics module used, e.g.:
- electromagnetic compatibility (EMC)
- switching off the valve supply voltage at all poles
You must observe the instructions in the MPA-... electronics description if you wish to install an electronics module of a different type.
Recommendation:
Replace only with electronics modules of the same type.

The electronics modules type VMPA...-FB-... support the control of two valve solenoid coils per valve position.
5. Maintenance and conversion

The following electronics modules are available:

<table>
<thead>
<tr>
<th>Type</th>
<th>Description of the electronics module</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMPA1-FB...</td>
<td>VMPA1-FB-EMG-8: 4 valve positions / 8 outputs with separate circuits</td>
</tr>
<tr>
<td></td>
<td>VMPA1-FB-EMG-D2-8: 4 valve positions / 8 outputs with separate circuits, with diagnostic functions D2</td>
</tr>
<tr>
<td></td>
<td>VMPA1-FB-EMS-8: 4 valve positions / 8 outputs with common circuit</td>
</tr>
<tr>
<td></td>
<td>VMPA1-FB-EMS-D2-8: 4 valve positions / 8 outputs with common circuit, with diagnostic functions D2</td>
</tr>
<tr>
<td>VMPA2-FB...</td>
<td>VMPA2-FB-EMG-4: 2 valve positions / 4 outputs with separate circuits</td>
</tr>
<tr>
<td></td>
<td>VMPA2-FB-EMG-D2-4: 2 valve positions / 4 outputs with separate circuits, with diagnostic functions D2</td>
</tr>
<tr>
<td></td>
<td>VMPA2-FB-EMS-4: 2 valve positions / 4 outputs with common circuit</td>
</tr>
<tr>
<td></td>
<td>VMPA2-FB-EMS-D2-4: 2 valve positions / 4 outputs with common circuit, with diagnostic functions D2</td>
</tr>
</tbody>
</table>

Outputs correspond to solenoid coils

Tab. 5/3: Electronics modules for MPA-S valve terminal with CPX terminal

Additional information on MPA electronics modules can be found in the package insert and in the corresponding MPA-... electronics description.
5. Maintenance and conversion

**MPA-S valve terminal with multi-pin plug connection or AS interface**

The following types are available:

<table>
<thead>
<tr>
<th>Type</th>
<th>Description of the electronics module</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMPA1...</td>
<td>VMPA1-MPM-EMM-8 4 valve positions / 8 outputs ¹)</td>
</tr>
<tr>
<td>VMPA2...</td>
<td>VMPA1-MPM-EMM-4 4 valve positions / 4 outputs ²)</td>
</tr>
<tr>
<td></td>
<td>VMPA2-MPM-EMM-2 2 valve positions / 2 outputs ²)</td>
</tr>
</tbody>
</table>

Outputs correspond to solenoid coils

1) *Two* solenoid coils can be controlled per valve position.

2) *One* solenoid coil can be controlled per valve position.

Tab. 5/4: Electronics modules for the MPA-S valve terminal with multi-pin plug connection (type MPA...-MPM-...)

**Removing/mounting the electronics module**

**Dismounting**

Proceed as follows:

Before removing the electronics module, you must first remove all valves or blanking plates on the relevant electronics module (see section “Removing valves or blanking plates”).

1. Loosen the screws with which the electronics module is fastened to the sub-base.

2. Pull the electronics module upwards out of the body of the sub-base.
5. Maintenance and conversion

1. Fastening screws of the valve or blanking plate
2. Valve or blanking plates
3. Cord seal
4. Electronics module
5. Sub-base
6. Inscription label holder
7. The seals of the electronics module
8. Fastening screws of the electronics module
9. 2 conical ring seals per valve or blanking plate

Fig. 5/5: Dismantling and mounting the electronics module (example MPA1)
Mounting Proceed as follows:

**Caution**
Replace an electronics module only by an electronics module of the same type.
- You can then avoid problems in controlling the solenoid coils and damage to the electrical contacts.

**Note**
Before mounting, check the condition and position of the following seals:
- The seals of the electronics module
- The ring seal of the electrical contacts
- The cord seal of the valves or blanking plates

1. Place the electronics module in the sub-base and fasten it (tightening torque of the screws 0.4 Nm (± 20 %)).
2. Then mount the valves or blanking plates (see section “Mounting valves or blanking plates”).
5. Maintenance and conversion

5.3.6 Replacing the sub-base, supply plate or MPA-S end plate

Dismounting

Proceed as follows:

1. Loosen the electric and pneumatic connections and remove the MPA-S valve terminal from its fastening surface (see Chapter 5.2).

2. Place the MPA-S valve terminal on a flat working surface.

3. Loosen the screws of the component (sub-base, supply plate or end plate) which you wish to remove in the sequence 3 2 1 (see diagram).

4. Then remove the screws. The sub-bases are now held together only by the electrical linking or by the bus.

Fig. 5/6: Position of the fittings on sub-bases and the right-hand end plate

5. Pull the relevant component away from the adjacent component.
5. Maintenance and conversion

Mounting

Proceed as follows:

1. Make sure the seals are not damaged. Replace the seals if they are damaged.

2. Place the seal onto the guide pin of the sub-base or supply plate.

Fig. 5/7: Connecting plate mounting
5. Maintenance and conversion

3. Screw the sub-bases together. Tighten the screws in the sequence 1, 2, 3 as shown in the diagram by hand. Then tighten the screws with a torque of to 1.8 Nm (± 10 %).

Fig. 5/8: Connecting plate fittings

4. Mount the MPA-S valve terminal onto the fastening surface (see chapter 2 “Mounting onto a wall” or “Mounting onto an H-rail”).

5. Then install the pneumatic and electrical connections (see chapter 3 “Installation, connecting the MPA-S valve terminal”).
5. Maintenance and conversion

5.3.7 Replacing the interlinking boards

**MPA-S valve terminal with multi-pin plug connection or AS interface**

With the multi-pin plug connection, the electrical linking is constructed on a modular basis. Each sub-base has its own board. The following interlinking boards are available for the MPA-S valve terminal with multi-pin plug connection:

<table>
<thead>
<tr>
<th>Interlinking board for ...</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>one sub-base</td>
<td></td>
</tr>
<tr>
<td>Type: VMPA1-MPM-EV-AB-8</td>
<td></td>
</tr>
<tr>
<td>Type: VMPA1-MPM-EV-ABV-8</td>
<td>Only for size MPA1: Printed circuit board for controlling a total of 8 solenoid coils per sub-base.</td>
</tr>
<tr>
<td>Type: VMPA1-MPM-EV-AB-4</td>
<td></td>
</tr>
<tr>
<td>Type: VMPA1-MPM-EV-ABV-4</td>
<td>For sizes MPA1 and MPA2: Printed circuit board for controlling a total of 4 solenoid coils per sub-base.</td>
</tr>
<tr>
<td>Type: VMPA2-MPM-EV-AB-2</td>
<td></td>
</tr>
<tr>
<td>Type: VMPA2-MPM-EV-ABV-2</td>
<td>Only for size MPA2: Printed circuit board for controlling a total of 2 solenoid coils per sub-base.</td>
</tr>
<tr>
<td>one sub-base and one supply plate</td>
<td></td>
</tr>
<tr>
<td>Type: VMPA1-MPM-EV-AB-8</td>
<td></td>
</tr>
<tr>
<td>Type: VMPA1-MPM-EV-ABV-8</td>
<td></td>
</tr>
<tr>
<td>Type: VMPA1-MPM-EV-AB-4</td>
<td></td>
</tr>
<tr>
<td>Type: VMPA1-MPM-EV-ABV-4</td>
<td></td>
</tr>
<tr>
<td>Type: VMPA2-MPM-EV-AB-2</td>
<td></td>
</tr>
<tr>
<td>Type: VMPA2-MPM-EV-ABV-2</td>
<td></td>
</tr>
</tbody>
</table>

Tab. 5/5: Interlinking boards type VMPA-MPM-...
5. Maintenance and conversion

Dismounting Proceed as follows:

1. Loosen all valve plates and blanking plates on the sub-base from which you wish to remove the interlinking board (see section 5.3.3).

2. Remove the electronics module from the sub-base (see section 5.3.5).

3. Loosen the sub-base from the neighbouring components (see section 5.3.6).

4. If you wish to remove the last interlinking board in front of the right-hand MPA end plate, you must remove the end piece type MPA from this interlinking board.

![End piece Type MPA](image)

Fig. 5/9: Removing the end piece from the last interlinking board

5. Loosen the corresponding interlinking board from above by unlocking the locking clips (e.g. with a small screwdriver). Then pull the interlinking board to the right out of the sub-base.
5. Maintenance and conversion

1. Locking clip

Fig. 5/10: Unlocking the interlinking board

Mounting Proceed as follows:

1. Push the interlinking board to be mounted into the sub-base from the right until it clips into position.

Fig. 5/11: Mounting the interlinking board

2. If the mounted interlinking board is the last one in front of the right-hand MPA end plate, you must insert the end piece type MPA into this interlinking board.
5. Maintenance and conversion

1 End piece
   Type MPA

Fig. 5/12: Mounting the end piece into the last interlinking board

3. Mount the sub-base to the neighbouring components (see section 5.3.6).

4. Mount the electronics module into the sub-base (see section 5.3.5).

5. Mount all the valves and blanking plates again onto the sub-base (see section 5.3.3).
5. Maintenance and conversion

5.4 Converting the MPA-S valve terminal

The MPA-S valve terminal can be extended/converted at a later stage. Information on permitted possibilities of combining MPA-S components can be found in the Festo Catalogue (see www.festo.comcatalogue).

The following conversion work can be undertaken on the MPA-S valve terminal:

- Conversion of the MPA-S valve terminal to internal or external pilot air.
- Conversion of the MPA-S valve terminal to different pressure zones
- Adding valve positions (sub-bases)

5.4.1 Conversion to internal or external pilot air supply

Pilot control can be undertaken with internal or external pilot air depending on the pneumatic interface or the multiple connector plate.

**Note**
Mixed operation of the MPA-S valve terminal with internal and external pilot air is not intended. Irrespective of the available pressure zones, all pilot controls of the MPA-S valve terminal are supplied with the same pilot air.
5. Maintenance and conversion

You can ascertain the pilot control variant for which your MPA-S is equipped by the following features listed in Chapter 5 Tab. 3/1.

The following pneumatic interfaces or multiple connector plates are available for pilot control of the MPA-S valve terminal:

<table>
<thead>
<tr>
<th>Variant</th>
<th>Pneumatic interface</th>
<th>Multiple connector plates</th>
<th>Identification features</th>
</tr>
</thead>
</table>
| − Operation with internal pilot air  
− Ducted exhaust air | VMPA...-FB-EPL-G | MPA1-MP-EPL-G / VMPA1-MPM-EPL-G | − Sealed connection (12/14)  
− Exhaust plate |
| − Operation with internal pilot air  
− Exhausting via flat plate silencer | VMPA...-FB-EPL-GU | MPA1-MP-EPL-GU / VMPA1-MPM-EPL-GU | − Sealed connection (12/14)  
− Flat plate silencer |
| − Operation with external pilot air  
− Ducted exhaust air | VMPA...-FB-EPL-E | MPA1-MP-EPL-E / VMPA1-MPM-EPL-E | − Open connection (12/14)  
− Exhaust plate |
| − Operation with external pilot air  
− Exhausting via flat plate silencer | VMPA...-FB-EPL-EU | MPA1-MP-EPL-EU / VMPA1-MPM-EPL-EU | − Open connection (12/14)  
− Flat plate silencer |

Tab. 5/6: Variants of the pneumatic interface and multiple connector plate

MPA-S valve terminal with CPX terminal

Removing the CPX pneumatic interface:
− from the sub-base of the MPA-S valve terminal is described in Appendix B.
− from the CPX terminal is described in the system manual for the CPX terminal.
5. Maintenance and conversion

MPA-S valve terminal with multi-pin plug connection

Dismounting

Proceed as follows:

1. Loosen the electrical and pneumatic connections and remove the MPA-S valve terminal from its fastening surface (see this chapter “Dismantling the MPA-S valve terminal”).

2. Place the MPA-S valve terminal on a flat working surface.

3. Loosen the fastening screws between the multiple connector plate and the pneumatic sub-bases in the sequence 3 2 1 (see following diagram).

4. Then loosen and remove the fastening screws.

Fig. 5/13: Position of the screw connectors on the sub-base
5. Maintenance and conversion

5. Pull the multiple connector plate away from the pneumatic sub-bases.

Mounting

Proceed as follows:

1. Make sure the seals are not damaged. Replace the seals if they are damaged.

2. Place the seal onto the guide pins of the multiple connector plate.

3. Pull the multiple connector plate away from the pneumatic sub-bases. Make sure that the seal and the components are correctly positioned.
5. Maintenance and conversion

4. Screw the multiple connector plate to the pneumatic sub-bases. Tighten the screws in the sequence 1, 2, 3 as shown in the diagram at first slightly and then with 1.8 Nm (± 10%).

Fig. 5/15: Sub-base fittings

5. Mount the MPA-S valve terminal onto the fastening surface (see chapter 2 “Mounting onto a wall” or “Mounting onto an H-rail”).

6. Then install the pneumatic and electrical connections (see chapter 3 “Installation, connecting the MPA-S valve terminal”).
5. Maintenance and conversion

5.4.2 Converting the MPA-S valve terminal to different pressure zones

Basic information on pressure zone separation is provided in chapter 1, section “Pressure zone separation”.

The MPA-S valve terminal can be equipped with the following number of pressure zones depending on the connection variant:

<table>
<thead>
<tr>
<th>Electrical connection variant</th>
<th>MPA-S valve terminal with ...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CPX terminal</td>
</tr>
<tr>
<td>Pressure zones</td>
<td>1 ... 8 1) or 1 ... 16 2)</td>
</tr>
<tr>
<td></td>
<td>Multi-pin plug connection</td>
</tr>
<tr>
<td></td>
<td>1 ... 12</td>
</tr>
</tbody>
</table>

1) electric supply of the valves via the CPX terminal
2) electric supply of the valves via the electric supply plate

Tab. 5/7: Number of pressure zones

The pressure zones are formed by using either special sub-bases or special separating seals (see chapter 1, section “Pressure zone separation”).

The formation of pressure zones with the aid of separating seals is described below.

Note

Note the following if the MPA-S valve terminal is extended or converted at a later stage:

The separating seals for forming pressure zones are divided into two groups (see Chapter 1, tab. 1/8):

- Separating seals for MPA-S valve terminals equipped with flat plate silencers
- Separating seals for MPA-S valve terminals equipped with exhaust plates
5. Maintenance and conversion

For converting the valve terminal, you will require the following components for each pressure zone:

- Separating seal with pressure zone separation (see chapter 1, Tab. 1/8)
- If not already provided, one of the following supply units with exhaust plate or flat plate silencer:

<table>
<thead>
<tr>
<th>Pneumatic supply plates for the MPA-S valve terminal with ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPX terminal</td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td>VMPA...-FB-SP  or VMPA...-FB-SPU</td>
</tr>
</tbody>
</table>

Tab. 5/8: Pneumatic supply plates

- When adding a pneumatic supply plate:
  
  - MPA-S valve terminal with multi-pin plug connection: an appropriately lengthened interlinking board (see section “Overview of the interlinking boards”).
  
  - MPA-S valve terminal with CPX terminal: for the pneumatic supply unit the appropriate interlinking board type: MPA1-FB-EV-V.

Dismounting:

Proceed as follows:

1. Loosen the electrical and pneumatic connections and remove the MPA-S valve terminal from its fastening surface (see this chapter section “Dismantling the MPA-S valve terminal”).

2. Place the MPA-S valve terminal on a flat working surface.

3. Loosen the sub-base at the point where you wish to insert the separating seal for the pressure zone separation (see section “Dismantling the sub-bases”).
5. Maintenance and conversion

Mounting

Proceed as follows:

1. Insert the separating seal for the pressure zone separation.

2. If not already provided, mount the following for pressure zones 2 ... 8: an appropriate pneumatic supply unit for each pressure zone (see section 5.3.6).

3. MPA-S valve terminal with multi-pin plug connection: A lengthened version of the interlinking board is required for bridging the pneumatic supply plate. In the sub-base which follows the pneumatic supply plate, replace the short interlinking board with a longer version (see section 5.3.7 Replacing interlinking boards).

4. Mount the sub-base (see section 5.3.6).

5. Mount the MPA-S valve terminal onto the fastening surface (see chapter 2 “Mounting onto a wall” or “Mounting onto an H-rail”).

6. Then install the pneumatic and electrical connections (see chapter 3 “Installation, connecting the MPA-S valve terminal”).
The following diagram shows the structure of pressure zones using as an example an MPA-S valve terminal with CPX terminal.

Fig. 5/16: Example of MPA-S valve terminal with CPX terminal and 3 pressure zones
5. Maintenance and conversion

5.4.3 Adding valve positions

You can easily adapt the MPA-S valve terminal to the requirements of your machine or system by adding valve locations. The smallest extension unit is a sub-base with 4 valve locations (MPA1) or 2 valve locations (MPA2).

MPA-S valve terminal with multi-pin plug connection

The valve terminals can be configured with as many sub-bases as there are addresses available (see table). With these valve terminals, the maximum number of solenoid coils which can be actuated by the multi-pin connection is limited to 24 addresses.

If equipped exclusively with one size (MPA 1 or MPA 2) and valves with the same number of solenoid coils, this will result in the following maximum number of sub-bases:

<table>
<thead>
<tr>
<th>MPA-S valve terminal</th>
<th>Valve positions per sub-base ( (n_1) )</th>
<th>Solenoid coils per valve position ( (n_2) )</th>
<th>max. (^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPA1</td>
<td>4</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>MPA2</td>
<td>2</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

\(^1\) Maximum number of sub-bases when equipped exclusively with one size and with valves with the same number of solenoid coils

Tab. 5/9: Maximum number of sub-bases

With 24 controllable solenoid coils the maximum number of sub-bases \( X_{\text{max}} \) can be calculated as follows:

\[
X_{\text{max}} = \frac{24}{(n_1 \times n_2)}
\]
5. Maintenance and conversion

MPA-S valve terminal with CPX terminal

Note
Maximum 16 MPA sub-bases are permitted on the MPA-S valve terminal with CPX terminal and electric supply plate. Without the electric supply plate 8 MPA sub-bases are permitted.

Necessary components
For extension you will require:

<table>
<thead>
<tr>
<th>Components</th>
<th>MPA-S valve terminal with CPX terminal</th>
<th>Multi-pin plug connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>One sub-base per:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– MPA1: 4 valve positions</td>
<td>VMPA1-FB-AP-4-1</td>
<td>VMPA1-FB-AP-4-1,...</td>
</tr>
<tr>
<td>– MPA2: 2 valve positions</td>
<td>VMPA2-FB-AP-2-2</td>
<td>VMPA2-FB-AP-2-2,...</td>
</tr>
<tr>
<td>One electronics module per sub-base</td>
<td>see Tab. 5/3</td>
<td>see Tab. 5/4</td>
</tr>
<tr>
<td>Valve or blanking plates:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– MPA1: 4 per sub-base</td>
<td>VMPA...-M1H...</td>
<td></td>
</tr>
<tr>
<td>– MPA2: 2 per sub-base</td>
<td>VMPA...-M1H...</td>
<td></td>
</tr>
<tr>
<td>If necessary, additional pneumatic supply plate:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– with exhaust plate</td>
<td>VMPA...-FB-SP</td>
<td></td>
</tr>
<tr>
<td>– with flat plate silencer</td>
<td>VMPA...-FB-SPU</td>
<td></td>
</tr>
<tr>
<td>If necessary, additional electric supply plate:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– With plug M18</td>
<td>VMPA-FB-SP-V</td>
<td></td>
</tr>
<tr>
<td>– With plug 7/8” (4-pin)</td>
<td>VMPA-FB-SP-7/8-V-4POL</td>
<td></td>
</tr>
<tr>
<td>– With plug 7/8” (5-pin)</td>
<td>VMPA-FB-SP-7/8-V-5POL</td>
<td></td>
</tr>
<tr>
<td>For every added sub-base or pneumatic supply plate, the appropriate interlinking boards:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Interlinking board for sub-base</td>
<td>VMPA1-FB-EV-AB</td>
<td></td>
</tr>
<tr>
<td>– Interlinking boards for pneumatic supply plate</td>
<td>VMPA1-FB-EV-V</td>
<td>see Tab. 5/5</td>
</tr>
</tbody>
</table>
5. Maintenance and conversion

### Components

<table>
<thead>
<tr>
<th>CPX terminal</th>
<th>Multi-pin plug connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>For every added sub-base or pneumatic supply plate, the appropriate seal or separating seal</td>
<td>See chapter 1, tab. 1/8</td>
</tr>
</tbody>
</table>

1) Sub-bases **without** pressure zone separation
2) Sub-bases **with** pressure zone separation in channel (1). See also Chapter 1, tab. 1/7

Tab. 5/10: Valve position extension

**Dismounting**

Proceed as follows:

1. Loosen the MPA-S valve terminal from the fastening surface (see section “Dismantling the MPA-S valve terminal”).

2. Dismantle the sub-base or supply plate at the point where you wish to extend the terminal (see section 5.3.6).

3. Only MPA-S valve terminal with multi-pin plug connection: If you wish to mount a further sub-base on the last sub-base before the right-hand MPA end plate, you must remove the end piece type MPA from the last interlinking board.

**Fig. 5/17:** Removing/mounting the end piece of the last interlinking board
5. Maintenance and conversion

Mounting

Proceed as follows:

1. Mount the new sub-base and, if necessary, an additional pneumatic supply plate (see section 5.3.6).

2. Only MPA-S valve terminal with multi-pin plug connection: If the new sub-base added is the last one in front of the right-hand MPA end plate, you must insert the type MPA end piece into the last interlinking board (see fig. 5/17).

3. Mount the valves or blanking plates onto the empty valve positions (see section 5.3.3).

4. Mount the MPA-S valve terminal on the fastening surface (see chapter 2 “Mounting onto a wall” or “Mounting onto an H-rail”).

5. Then install the pneumatic and electrical connections (see chapter 3 “Installation, connecting the MPA-S valve terminal”).

Note
If a sub-base is inserted between existing sub-bases, the address assignment of all valves to the right of the inserted sub-base will be shifted.
5. Maintenance and conversion

5.4.4 Adding an electrical supply plate (only for MPA-S valve terminal with CPX terminal or CPI interface)

The intended use of the electrical supply plate is as an intermediate valve load power supply.

**Note**

Damage to components and operative malfunctions!

Please note:

- that with MPA-S valve terminals with more than 8 sub-bases, an electric supply plate is required for supplemental supply of load voltage.

- that only the electronics modules with separate circuits of type VMPA...-FB-EMG. are permitted to the right of the electric supply plate (see also Chapter 5.3.5).

If your MPA-S valve terminal is only equipped with electronics modules with a common circuit (type VMPA...-FB-EMS...), then you can supply the pneumatics as follows:

- for valve terminals with CPX terminals:
  - only via an interlinking block with 4-pin system supply of type CPX-GE-EV-S or CPX-GE-EV-S-7/8-4POL of the CPX terminal.

- for valve terminals with CPI interface:
  - via the CPI interface of type VMPA-CPI.

- that the electric supply plate must not be installed directly to the left of a pneumatic supply plate (type VMPA1-FB-SP...).

- that you do not touch the electrostatically sensitive contact surfaces of the plug connectors on the side of the electric supply plate.
5. Maintenance and conversion

Necessary components

For extension you will require:

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>One of the following electric MPA supply plates:</td>
<td></td>
</tr>
<tr>
<td>– With plug M18, (3-pin)</td>
<td>VMPA-FB-SP-V</td>
</tr>
<tr>
<td>– With plug 7/8&quot; (4-pin)</td>
<td>VMPA-FB-SP-7/8-V-4POL</td>
</tr>
<tr>
<td>– With plug 7/8&quot; (5-pin)</td>
<td>VMPA-FB-SP-7/8-V-5POL</td>
</tr>
<tr>
<td>also a seal without channel separation or a separating seal with</td>
<td></td>
</tr>
<tr>
<td>channel separation</td>
<td>See chapter 1, Tab. 1/8</td>
</tr>
</tbody>
</table>

Tab. 5/11: Electrical supply plates

Mounting

Proceed as follows:

1. Loosen the electric and pneumatic connections and remove the MPA-S valve terminal from its fastening surface (see Chapter 5.2).

2. Mount the electric supply plate as described in the VMPA-FB-SP-....-V.... assembly instructions.

3. Mount the MPA-S valve terminal onto the fastening surface (see chapter 2 “Mounting onto a wall” or “Mounting onto an H-rail”).

4. Then install the pneumatic and electrical connections (see chapter 3 “Installation, connecting the MPA-S valve terminal”).
5. Maintenance and conversion

5.4.5 Adding a pressure sensor plate

Necessary components

For extension you will require:

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>One of the following pressure sensor plates:</td>
<td></td>
</tr>
<tr>
<td>- For displaying the operating pressure in channel (1)</td>
<td>VMPA-FB-PS-1</td>
</tr>
<tr>
<td>- For displaying the pressure in exhaust channels (3) and (5)</td>
<td>VMPA-FB-PS-3/5</td>
</tr>
<tr>
<td>- For displaying an external pressure (P1)</td>
<td>VMPA-FB-PS-P1</td>
</tr>
<tr>
<td>also a seal without channel separation or a separating seal with channel separation</td>
<td>See chapter 3, Tab. 1/8</td>
</tr>
</tbody>
</table>

Tab. 5/12: Pressure sensor plates

Mounting

Proceed as follows:

1. Loosen the electric and pneumatic connections and remove the MPA-S valve terminal from its fastening surface (see Chapter 5.2).

2. Mounting the pressure sensor plate is described in the mounting instructions VMPA-FB-PS-...

3. Mount the MPA-S valve terminal onto the fastening surface (see chapter 2 “Mounting onto a wall” or “Mounting onto an H-rail”).

4. Then install the pneumatic and electrical connections (see chapter 3 “Installation, connecting the MPA-S valve terminal”).
5. Maintenance and conversion

5.4.6 Adding a proportional pressure regulator

Necessary components

For extension you will require:

<table>
<thead>
<tr>
<th>Components</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportional-pressure regulator</td>
<td>VPPM-6TA-L-1-F-0L...</td>
</tr>
<tr>
<td>Electronics module</td>
<td></td>
</tr>
<tr>
<td>Sub-base</td>
<td>VMPA-FB-EMG-P1</td>
</tr>
<tr>
<td>Interlinking board</td>
<td>VMPA-FB-AP-P1</td>
</tr>
<tr>
<td>also a seal without channel separation or a separating seal with channel separation</td>
<td>MPA</td>
</tr>
<tr>
<td>See Tab. 1/8</td>
<td></td>
</tr>
</tbody>
</table>

Tab. 5/13: Components of the proportional pressure regulator

Dismounting  Proceed as follows:

1. Loosen the electric and pneumatic connections and remove the MPA-S valve terminal from its fastening surface (see Chapter 5.2).

2. Dismantle the sub-base or supply plate at the point where you wish to extend the terminal (see section 5.3.6 under Dismantling).

Mounting  Proceed as follows:

1. Do as described in section 5.3.6, under Mounting points 1 ... 3.

2. Mount the proportional pressure regulator as described in the mounting instructions VMPA-6TA-...

3. Mount the MPA-S valve terminal onto the fastening surface (see chapter 2 “Mounting onto a wall” or “Mounting onto an H-rail”).

4. Then install the pneumatic and electrical connections (see chapter 3 “Installation, connecting the MPA-S valve terminal”).
Technical appendix

Appendix A
A. Technical appendix

Contents

A. Technical appendix ......................................................... A-1
A.1 Technical Data ............................................................ A-3
A.2 Festo accessories .......................................................... A-18
A. Technical appendix

A.1 Technical Data

**Note**
The valves can be used at temperatures down to -5 °C. In order to prevent the condensate and the humidity from freezing, we recommend that you install a dryer with which condensate and humidity can be removed.

<table>
<thead>
<tr>
<th>General information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Permitted temperature range</strong></td>
</tr>
<tr>
<td>- Long-term storage</td>
</tr>
<tr>
<td>- Operation</td>
</tr>
<tr>
<td>- Medium</td>
</tr>
<tr>
<td><strong>Protection class as per EN 60 529</strong></td>
</tr>
<tr>
<td><strong>Relative humidity</strong></td>
</tr>
<tr>
<td><strong>Corrosion protection</strong></td>
</tr>
<tr>
<td><strong>Mounting position</strong></td>
</tr>
<tr>
<td><strong>Tightening torque (MA)</strong></td>
</tr>
<tr>
<td>- Electronics modules on sub-bases</td>
</tr>
<tr>
<td>- Proportional pressure regulator on sub-base</td>
</tr>
<tr>
<td>- Exhaust plates</td>
</tr>
<tr>
<td>- Flat plate silencer</td>
</tr>
<tr>
<td>- Fastening of sub-bases, electric and pneumatic supply plates (linking)</td>
</tr>
<tr>
<td>- Board in multiple connector plate</td>
</tr>
<tr>
<td>- Multi-pin hood on multiple connector plate</td>
</tr>
<tr>
<td>- Support bracket on sub-bases or supply plates</td>
</tr>
<tr>
<td>- Retaining screw for H-rail clamping</td>
</tr>
<tr>
<td>- Components on sub-bases (valve, blanking plate or pressure regulator)</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
## General information

<table>
<thead>
<tr>
<th>Materials</th>
<th>Al</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve, sub-bases, supply plates and end plates</td>
<td>POM/polycarbonate</td>
</tr>
<tr>
<td>Electronics module</td>
<td>Polyamide 6</td>
</tr>
<tr>
<td>Multi-pin plug connection</td>
<td>elastomer, NBR</td>
</tr>
<tr>
<td>Seals</td>
<td>PAXMD6-GF50/gr-P; PA6-GB20, GF10/gr-P</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weights (in g):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumatic interface or multiple connector plate with exhaust plate/flat plate silencer</td>
<td>324 g/315 g</td>
</tr>
<tr>
<td>CPI sub-base (with exhaust plate / flat plate silencer)</td>
<td>427 g/418 g</td>
</tr>
<tr>
<td>AS interface (with exhaust plate / flat plate silencer)</td>
<td>396 g / 360 g</td>
</tr>
<tr>
<td>Per sub-base (with seal, electronics module, electrical interlinking, inscription label holder, screws)</td>
<td>185 g</td>
</tr>
<tr>
<td>Per pneumatic supply plate (with seal, electrical interlinking, screws, exhaust plate / flat plate silencer)</td>
<td>120 g/111 g</td>
</tr>
<tr>
<td>Per electrical air supply plate (with seal, electrical interlinking, screws)</td>
<td>200 g</td>
</tr>
<tr>
<td>Per pressure sensor plate</td>
<td>200 g</td>
</tr>
<tr>
<td>Per proportional pressure regulator with sub-base and electronic module)</td>
<td>approx. 575 g</td>
</tr>
<tr>
<td>Per complete CPX module</td>
<td>approx. 210 g</td>
</tr>
<tr>
<td>Left-hand end plate (CPX terminal)</td>
<td>approx. 80 g</td>
</tr>
<tr>
<td>Right-hand end plate (MPA-S)</td>
<td>55 g</td>
</tr>
<tr>
<td>Per valve</td>
<td>MPA1</td>
</tr>
<tr>
<td>Per cover plate</td>
<td>MPA2</td>
</tr>
<tr>
<td>Per pressure regulator plate</td>
<td></td>
</tr>
<tr>
<td>approx. 56 g</td>
<td>approx. 100 g</td>
</tr>
<tr>
<td>24 g</td>
<td>44 g</td>
</tr>
<tr>
<td>100 g</td>
<td>180 g</td>
</tr>
</tbody>
</table>

Tab. A/1: General technical data
A. Technical appendix

Note

MPA-S valve terminal with multi-pin plug connection:
- The maximum number of sub-base that can be configured corresponds to the number of addresses available. The maximum number of solenoid coils which can be actuated is limited by the multi-pin plug connection to 24 addresses.

MPA-S valve terminal with CPX terminal:
- A maximum 16 sub-bases (MPA-S with electric supply plate) or 8 sub-bases (MPA-S without electric supply plate) are permitted.

MPA-S valve terminal with CPX terminal or multi-pin plug connection:
- For wall mounting, with 7 or more sub-bases, additional fasteners (wall brackets) must be mounted after every 2 to max. 4 sub-bases.
### General information

<table>
<thead>
<tr>
<th>Vibration and shock</th>
<th>Tested as per DIN/IEC68 / EN60068 part 2 - 6, With horizontal H-rail fitting: Severity class 1</th>
<th>With wall mounting: 2) 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vibration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous shock</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Specifications on vibration and shock of the CPX terminal can be found in the description of the CPX system.

2) MPA-S valve terminal with CPX terminal:
   - up to a length of 280 mm between the pneumatic interface and the right-hand end plate, without additional fastening: Severity class 2
   - as from a length of 280 mm between the pneumatic interface and the right-hand end plate, with additional fastening on the pneumatic supply plates: Severity class 2

3) MPA-S valve terminal with CPI, with ASI or with multi-pin plug connection:
   - up to a length of 280 mm of the valve terminal without additional fastening Severity class 2
   - as from a length of 280 mm of the valve terminal with at least one additional fastening in the centre of the valve terminal to the pneumatic supply plate: Severity class 2

4) See following table for explanations of the severity levels.

#### Tab. A/2: Vibration and shock

<table>
<thead>
<tr>
<th>Severity level</th>
<th>Vibration</th>
<th>Shock</th>
<th>Continuous shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.15 mm travel at 10 - 58 Hz; 2 g acceleration at 58 - 150 Hz</td>
<td>± 15 g for 11 ms duration, 5 shocks per direction</td>
<td>± 15 g for 6 ms duration; 1000 shocks per direction</td>
</tr>
<tr>
<td>2</td>
<td>0.35 mm travel at 10 - 60 Hz; 5 g acceleration at 60 - 150 Hz</td>
<td>± 30 g for 11 ms duration, 5 shocks per direction</td>
<td>-----</td>
</tr>
</tbody>
</table>

#### Tab. A/3: Values for vibration and shock as per DIN/IEC68
A. Technical appendix

<table>
<thead>
<tr>
<th>Pneumatic components</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medium</strong></td>
</tr>
<tr>
<td><strong>Design</strong></td>
</tr>
<tr>
<td><strong>Operating pressure/pilot control</strong></td>
</tr>
<tr>
<td><strong>Pressure sensor:</strong></td>
</tr>
<tr>
<td><strong>valves:</strong></td>
</tr>
<tr>
<td>– with internal pilot air supply (branched from port (1)):</td>
</tr>
<tr>
<td>– All valve sub-bases on port (1):</td>
</tr>
<tr>
<td>– with external pilot air supply:</td>
</tr>
<tr>
<td>– Valve sub-base ident. code B, E, G, J and M on port (1):</td>
</tr>
<tr>
<td>– Valve sub-base ident. code DS, HS, KS and NS on port (1):</td>
</tr>
<tr>
<td>– Valve sub-base ident. code W on port (2):</td>
</tr>
<tr>
<td>– Valve sub-base ident. code X on port (4):</td>
</tr>
<tr>
<td>– Valve sub-base ident. code D, H, I, K and N on port (1):</td>
</tr>
<tr>
<td>All valve sub-bases on port (12/14):</td>
</tr>
<tr>
<td><strong>Proportional pressure regulator</strong></td>
</tr>
<tr>
<td><strong>Pressure range</strong> 0 ... 10 bar</td>
</tr>
<tr>
<td><strong>2 bar type</strong></td>
</tr>
<tr>
<td>– Input pressure 1)</td>
</tr>
<tr>
<td>– Control range</td>
</tr>
<tr>
<td>– Control accuracy:</td>
</tr>
<tr>
<td>– Standard (2 %)</td>
</tr>
<tr>
<td>– Class S1 (1 %)</td>
</tr>
<tr>
<td><strong>Nominal size of proportional pressure regulator:</strong></td>
</tr>
<tr>
<td>– Pressurization</td>
</tr>
<tr>
<td>– Exhausting</td>
</tr>
</tbody>
</table>

1) The input pressure p1 must be at least 1 bar over output pressure p2.

Tab. A/4: Medium and pressure range
A. Technical appendix

1. Pressure of the external pilot air supply at pilot connection (12/14) [bar]
2. Work range for valves with external pilot air supply
3. Operating pressure at port (1) [bar]

Fig. A/1: Diagram: Required pilot pressure related to the operating pressure with external pilot air supply and use of valve sub-bases with ident. codes D, H, I, K and N

1. Pressure of the external pilot air supply at pilot connection (12/14) [bar]
2. Work range for valves with external pilot air supply
3. Operating pressure at port (1) [bar]

Fig. A/2: Diagram: Required pilot pressure relative to operating pressure with external pilot air supply and using valve sub-bases with ident. codes DS, HS, KS and NS
A. Technical appendix

1. Pressure of the external pilot air supply at pilot connection (12/14) [bar]

2. Work range for valves with external pilot air supply

3. Operating pressure at port (1) [bar]

Fig. A/3: Diagram: Required pilot pressure related to the operating pressure with external pilot air supply and using valve sub-bases with ident. codes M, J, B, E, G, W and X
Note
The fittings of the pneumatic ports cause a reduction in the
nominal flow rate of the valves.

<table>
<thead>
<tr>
<th>Pneumatic components</th>
<th>MPA1</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.C. 1)</td>
<td>Valve</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>M, J</td>
<td>5/2-way</td>
</tr>
<tr>
<td>B</td>
<td>5/3-way, pressurised</td>
</tr>
<tr>
<td>R</td>
<td>5/3-way, closed</td>
</tr>
<tr>
<td>I</td>
<td>5/3-way, exhausted</td>
</tr>
<tr>
<td>H, HS</td>
<td>2 x 3/2-way</td>
</tr>
<tr>
<td>K, KS</td>
<td>2 x 3/2-way</td>
</tr>
<tr>
<td>N, NS</td>
<td>2 x 3/2-way</td>
</tr>
<tr>
<td>W, X</td>
<td>1 x 3/2 way</td>
</tr>
<tr>
<td>D, DS</td>
<td>2 x 2/2-way</td>
</tr>
<tr>
<td>I</td>
<td>2 x 2/2-way</td>
</tr>
</tbody>
</table>

Valve switching times in [ms]
(Measuring method 0 ... 10 % as per FN 942032)

<table>
<thead>
<tr>
<th></th>
<th>On/changeover</th>
<th>Off</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>5/2-way, single solenoid</td>
<td>10</td>
</tr>
<tr>
<td>J</td>
<td>5/2-way, double solenoid</td>
<td>10/15</td>
</tr>
<tr>
<td>B, G, E</td>
<td>5/3-way valves</td>
<td>10</td>
</tr>
<tr>
<td>H, K, N</td>
<td>2 x 3/2-way</td>
<td>10</td>
</tr>
<tr>
<td>HS, KS, NS</td>
<td>2 x 3/2-way</td>
<td>14</td>
</tr>
<tr>
<td>W, X</td>
<td>1 x 3/2 way</td>
<td>10</td>
</tr>
<tr>
<td>D, I</td>
<td>2 x 2/2-way</td>
<td>10</td>
</tr>
<tr>
<td>DS</td>
<td>2 x 2/2-way</td>
<td>14</td>
</tr>
</tbody>
</table>

1) I.C. = Identification code of the valve sub-base
2) Flow direction 1 \(\rightarrow\) 4 or 4 \(\rightarrow\) 3/5 not with valves having ident. codes I, W and X.
3) Values for the mid-position are quoted in brackets

Tab. A/5: Nominal flow rates and valve switching times for MPA1
## A. Technical appendix

### Pneumatic components

<table>
<thead>
<tr>
<th>I.C.</th>
<th>Valve</th>
<th>MPA2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard nominal flow rates [l/min] measured:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Without fitting</td>
<td>With fitting QS G1/8-8-I</td>
</tr>
<tr>
<td></td>
<td>1 → 2 or 1 → 4 2)</td>
<td>2 → 3/5 or 4 → 3/5 2)</td>
</tr>
<tr>
<td>M, J</td>
<td>5/2-way</td>
<td>700</td>
</tr>
<tr>
<td>B</td>
<td>5/3-way, pressurised</td>
<td>520</td>
</tr>
<tr>
<td>R</td>
<td>5/3-way, closed</td>
<td>630</td>
</tr>
<tr>
<td>I</td>
<td>5/3-way, exhausted</td>
<td>610</td>
</tr>
<tr>
<td>H, N</td>
<td>2 x 3/2-way</td>
<td>560</td>
</tr>
<tr>
<td>K</td>
<td>2 x 3/2-way</td>
<td>500</td>
</tr>
<tr>
<td>W, X</td>
<td>1 x 3/2 way</td>
<td>500</td>
</tr>
<tr>
<td>D</td>
<td>2 x 2/2-way</td>
<td>680</td>
</tr>
<tr>
<td>I</td>
<td>2 x 2/2-way</td>
<td>680</td>
</tr>
</tbody>
</table>

### Valve switching times in [ms]

(Measuring method 0 ... 10 % as per FN 942032)

<table>
<thead>
<tr>
<th>Valve</th>
<th>On/changeover</th>
<th>Off</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>5/2-way, single solenoid</td>
<td>15</td>
</tr>
<tr>
<td>J</td>
<td>5/2-way, bistable</td>
<td>9/22</td>
</tr>
<tr>
<td>B</td>
<td>5/3-way, pressurised</td>
<td>11/23</td>
</tr>
<tr>
<td>R</td>
<td>5/3-way, closed</td>
<td>10/21</td>
</tr>
<tr>
<td>I</td>
<td>5/3-way, exhausted</td>
<td>11/23</td>
</tr>
<tr>
<td>H, K, N</td>
<td>2 x 3/2-way</td>
<td>8</td>
</tr>
<tr>
<td>W, X</td>
<td>1 x 3/2 way</td>
<td>13</td>
</tr>
<tr>
<td>D, I</td>
<td>2 x 2/2-way</td>
<td>7</td>
</tr>
</tbody>
</table>

1) I.C. = Identification code of the valve sub-base
2) Flow direction 1 → 4 or 4 → 3/5 not with valves having Ident. codes I, W and X.
3) Values for the mid-position are quoted in brackets

Tab. A/6: Nominal flow rates and valve switching times for MPA2
A. Technical appendix

Flow diagrams of the pressure regulator plates

P pressure regulator

1. Output pressure
2. Flow rate

Fig. A/4: Diagram for size MPA2 of the P pressure regulator (ident. code: PF and PA): Flow rate dependent on output pressure

B pressure regulator

1. Output pressure
2. Flow rate

Fig. A/5: Diagram for size MPA2 of the B pressure regulator (ident. code: PH and PC): Flow rate dependent on output pressure
A. Technical appendix

A pressure regulator

1. Output pressure
2. Flow rate

Fig. A/6: Diagram for size MPA2 of the A pressure regulator (ident. code: PG and PB):
Flow rate dependent on output pressure
Reversible B pressure regulator

1. Output pressure
2. Flow rate

Fig. A/7: Diagram for size MPA2 of the reversible B pressure regulator
(ident. code: PN and PL): Flow rate dependent on output pressure

Reversible A pressure regulator

1. Output pressure
2. Flow rate

Fig. A/8: Diagram for size MPA2 of the reversible A pressure regulator
(ident. code: PM and PK): Flow rate dependent on output pressure
### Characteristic curves for flow rate for type VPPM-6TA-L-1-...:

#### 2 bar valve variant:
Type VPPM-6TA-L-1-F-OL2H-...:

<table>
<thead>
<tr>
<th>p2 [bar]</th>
<th>qn1-2 [l/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>0.2</td>
<td></td>
</tr>
</tbody>
</table>

#### 6 bar valve variant:
Type VPPM-6TA-L-1-F-OL6H-...:

<table>
<thead>
<tr>
<th>p2 [bar]</th>
<th>qn1-2 [l/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td></td>
</tr>
</tbody>
</table>

#### 10 bar valve variant:
Type VPPM-6TA-L-1-F-OL10H-...:

<table>
<thead>
<tr>
<th>p2 [bar]</th>
<th>qn1-2 [l/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Tab. A/7: Characteristic curves for flow rate of the proportional pressure regulator
A. Technical appendix

<table>
<thead>
<tr>
<th>Electric components, general</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electromagnetic compatibility (EMC)</strong></td>
</tr>
<tr>
<td>- Emitted interference 1)</td>
</tr>
<tr>
<td>- Resistance to interference 2)</td>
</tr>
<tr>
<td>See conformity declaration</td>
</tr>
<tr>
<td>- See conformity declaration</td>
</tr>
<tr>
<td>- <a href="http://www.festo.com">www.festo.com</a></td>
</tr>
<tr>
<td><strong>Protection against electric shock</strong></td>
</tr>
</tbody>
</table>
| (protection against direct and indirect contact as per IEC/DIN EN 60204-1) | By means of PELV power circuit (Protected Extra-Low Voltage)

1) The MPA valve terminal is intended for use in an industrial environment
2) The maximum signal cable length with the MPA-S valve terminal with multi-pin plug connection is 10 m

Tab. A/8: Technical data for electrical, general

<table>
<thead>
<tr>
<th>Electrical, MPA-S valve terminal with multi-pin plug connection or AS interface</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voltage supply</strong></td>
</tr>
<tr>
<td>- Nominal voltage</td>
</tr>
<tr>
<td>- Residual ripple</td>
</tr>
<tr>
<td><strong>Current consumption per pin at the Sub-D multi-pin plug connection (for each valve solenoid coil) at 24 V</strong></td>
</tr>
<tr>
<td>MPA1</td>
</tr>
<tr>
<td>24 V DC ± 25 %</td>
</tr>
<tr>
<td>4 Vss</td>
</tr>
<tr>
<td>80 mA / 25 ms</td>
</tr>
<tr>
<td>25 mA after 25 ms</td>
</tr>
</tbody>
</table>

Tab. A/9: Technical data on electrical, MPA-S valve terminal with multi-pin plug connection

Technical data on electric components of the MPA-S valve terminal with multi-pin plug connection or AS interface can be found in the package insert.
### Electric components, MPA-S valve terminal with CPX terminal or CPI interface

<table>
<thead>
<tr>
<th><strong>Electronics module VMPA...-FB-...</strong></th>
<th><strong>MPA1</strong></th>
<th><strong>MPA2</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage supply for electronic components ($V_{EL/SEN}$):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Nominal voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Max. intrinsic current consumption at 24 V (internal electronics, all outputs 0 signal)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Load voltage supply for valves ($V_{VAL}$)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Nominal voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Max. intrinsic current consumption at 24 V (internal electronics, without valves)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Diagnostic message undervoltage $V_{VAL}$, load voltage outside function range</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maximum current consumption per solenoid coil from load voltage $V_{VAL}$ at 24 V</strong></td>
<td><strong>MPA1</strong></td>
<td><strong>MPA2</strong></td>
</tr>
<tr>
<td>- Nominal pick-up current/duration</td>
<td>58 mA / 24 ms</td>
<td>99 mA / 24 ms</td>
</tr>
<tr>
<td>- Nominal current with current reduction</td>
<td>9 mA after 24 ms</td>
<td>18 mA after 24 ms</td>
</tr>
<tr>
<td><strong>Pressure sensor plate</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Current consumption $V_{EL/SEN}$ at 24 V</td>
<td>21 mA</td>
<td></td>
</tr>
<tr>
<td>- Accuracy</td>
<td>$\leq 2.5 %$ FS (Fullscale)</td>
<td></td>
</tr>
<tr>
<td>- Display increments</td>
<td>20 mbar</td>
<td></td>
</tr>
<tr>
<td><strong>Proportional pressure regulator VMPA-6TA...</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating voltage supply</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Nominal voltage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Current consumption</td>
<td>24 V DC (permitted residual ripple max. $\pm 10 %$)</td>
<td>max. 300 mA</td>
</tr>
<tr>
<td><strong>Example of current calculation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current consumption with two solenoid coils MPA2 switched in parallel and one electronics module <strong>without</strong> separate circuits:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- $I_{EL/SEN} = 1 \times 8 \text{ mA} = 8 \text{ mA}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Current consumption during pick-up phase (24 ms): $I_{VAL} = 3 \text{ mA} + 2 \times 99 \text{ mA} = 202 \text{ mA}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Current consumption with current reduction: $I_{VAL} = 3 \text{ mA} + 2 \times 18 \text{ mA} = 39 \text{ mA}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tab. A/10: Technical data on electric components, MPA-S valve terminal with CPX terminal or CPI module
A. Technical appendix

Technical data on the electronics module of the MPA-S valve terminal with CPX terminal or CPI interface can be found in electronics description for the module (see system description for your CPX terminal, table “Descriptions of the CPX terminal”).

A.2 Festo accessories

→ www.festo.com/catalogue
Supplementary component summary

Appendix B
B. Supplementary component summary

Contents

B. Supplementary component summary .............................................. B-1
B.1 Overview of valve position components ................................. B-3
B.2 Separating the MPA-S valve terminal from the CPX terminal .......... B-12
B. Supplementary component summary

B.1 Overview of valve position components

If the designations of the connections and control elements on the valve terminal differ from the logical designation of the circuit symbols, the designations of the connections and control elements are specified additionally in the circuit symbols in brackets.

Note
MPA-S valve terminal with multi-pin plug connection and modular electrical linking (type MPA-MPM-...):
The number of addresses that a module occupies depends on:
– the relevant electronics module (see Chapter 3, Tab. 3/8)
– the relevant interlinking board (see Chapter 5, Tab. 5/5)

<table>
<thead>
<tr>
<th>5/2-way valves</th>
<th>Ident. code: J</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function:</td>
<td>One bistable 5/2-way valve</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5/2-way valves</th>
<th>Ident. code: M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function:</td>
<td>One monostable 5/2-way valve, Pneumatic spring return</td>
</tr>
</tbody>
</table>

Tab. B/1: 5/2-way valves
B. Supplementary component summary

**Note**
- In a currentless state 5/3-way valves assume the mid-position by means of spring force.
- If both solenoid coils on 5/3-way valves are energised simultaneously, the valve remains in the previous switching position.

### 5/3-way valves

<table>
<thead>
<tr>
<th>Ident. code: B</th>
<th>Function:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5/3-way valve</td>
</tr>
<tr>
<td></td>
<td>open in mid-position</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ident. code: E</th>
<th>Function:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5/3-way valve</td>
</tr>
<tr>
<td></td>
<td>mid-position exhausted</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ident. code: G</th>
<th>Function:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5/3-way valve</td>
</tr>
<tr>
<td></td>
<td>closed in mid-position</td>
</tr>
</tbody>
</table>

Tab. B/2: 5/3-way valves
### Supplementary component summary

#### 3/2-way valves

<table>
<thead>
<tr>
<th>Diagram</th>
<th>Ident. code: H</th>
<th>Function:</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td>on control side 14, one monostable 3/2-way valve (normal position closed)</td>
<td></td>
</tr>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td>on control side 12, one monostable 3/2-way valve (normal position open)</td>
<td></td>
</tr>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td>Pneumatic spring return</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diagram</th>
<th>Ident. code: HS</th>
<th>Function:</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td>on control side 14, one monostable 3/2-way valve (normal position closed)</td>
<td></td>
</tr>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td>on control side 12, one monostable 3/2-way valve (normal position open)</td>
<td></td>
</tr>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td>Mechanical spring return</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diagram</th>
<th>Ident. code: K</th>
<th>Function:</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td>Two monostable 3/2-way valves</td>
<td></td>
</tr>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td>Normal position closed</td>
<td></td>
</tr>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td>Pneumatic spring return</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diagram</th>
<th>Ident. code: KS</th>
<th>Function:</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td>Two monostable 3/2-way valves</td>
<td></td>
</tr>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td>Normal position closed</td>
<td></td>
</tr>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td>Mechanical spring return</td>
<td></td>
</tr>
</tbody>
</table>
B. Supplementary component summary

<table>
<thead>
<tr>
<th>3/2-way valves</th>
<th>Ident. code: N</th>
<th>Function:</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td>Two monostable 3/2-way valves</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal position open.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pneumatic spring return</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3/2-way valves</th>
<th>Ident. code: NS</th>
<th>Function:</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image2" alt="Diagram" /></td>
<td>Two monostable 3/2-way valves</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal position open.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mechanical spring return</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3/2-way valves</th>
<th>Ident. code: W</th>
<th>Function:</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3" alt="Diagram" /></td>
<td>One 3/2-way valve, monostable, normal position open, external compressed air supply</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pneumatic spring return</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3/2-way valves</th>
<th>Ident. code: X</th>
<th>Function:</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image4" alt="Diagram" /></td>
<td>One 3/2-way valve, monostable, normal position closed, external compressed air supply</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pneumatic spring return</td>
<td></td>
</tr>
</tbody>
</table>

Tab. B/3: 3/2-way valves
### B. Supplementary component summary

<table>
<thead>
<tr>
<th>2/2-way valves</th>
<th>Ident. code: D</th>
<th>Function:</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="#" alt="Diagram" /></td>
<td>Two monostable 2/2-way valves, normal position closed</td>
<td>Pneumatic spring return</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2/2-way valves</th>
<th>Ident. code: DS</th>
<th>Function:</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="#" alt="Diagram" /></td>
<td>Two monostable 2/2-way valves, normal position closed</td>
<td>Mechanical spring return</td>
</tr>
</tbody>
</table>
Ident. code: I, Function: 1)
- Two monostable 2/2-way valves, both valves closed in normal position, valve on control side 14 reversible
- Pneumatic spring return
- With dual-pressure operation:
  - supply operating pressure via port 1
  - at port (3/5) separate operating pressure can be supplied.
  - with valve coil 14 operating pressure is switched from port (5) to port (4)
  - with valve coil 12 operating pressure is switched from port (1) to port (2)
- With vacuum operation:
  - feed operating pressure via port (1)
  - feed vacuum via port (5)
  - with solenoid coil 14, vacuum is switched to port (4)
  - at port (4) or in line 4, a filter is intended so that no dirt can enter the valve.
  - with solenoid coil 12, operating pressure is switched to port (2) (e.g. for reject pulse with vacuum operation)
  - For reject pulse between port (2), (4) and vacuum suction cup, create connection via T-piece

1) **Note:** If this 2/2-way valve (ident. code I) is also operated with other valves on the MPA-S valve terminal, this 2/2-way valve must be operated in a separate pressure zone with separate exhaust channel (5).
### Pressure regulator plates

<table>
<thead>
<tr>
<th>Pressure regulator plate for port 1 (P regulator)</th>
<th>Function:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ident. code: PF or PA</td>
<td>- Regulates the operating pressure in duct (1) upstream of the directional control valve</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pressure regulator plate for port 2 (B regulator)</th>
<th>Function:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ident. code: PH or PC</td>
<td>- Regulates the operating pressure in channel (2) downstream of the directional control valve.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pressure regulator plate for port 4 (A regulator)</th>
<th>Function:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ident. code: PG or PB</td>
<td>- Regulates the operating pressure in channel (4) downstream of the directional control valve.</td>
</tr>
</tbody>
</table>
### Pressure regulator plates

<table>
<thead>
<tr>
<th>Number</th>
<th>Diagram</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1 | ![Diagram 1](image1.png) | Pressure regulator plate for port (2), reversible (B regulator)  
Ident. code: PN or PL  
Function:  
- Channels the operating pressure upstream of the directional control valve from channel (1) to channels (3) and (5)  
- Regulates the pressure in channel (3) upstream of the directional control valve.  
- Conducts the exhaust from channel 1 to channel (3) after the directional control valve  
**Note:** Combinations with 2 x 2/2-way valves (ident. codes D and I) and 2 x 3/2-way valves (ident. codes H, K and N) are not permitted. |
| 2 | ![Diagram 2](image2.png) | Pressure regulator plate for port (4), reversible (A regulator)  
Ident. code: PM or PK  
Function:  
- Conducts the operating pressure from channel 1 to channels (5) and (3)  
- Regulates the pressure in channel (3) upstream of the directional control valve.  
- Channels the exhaust air downstream of the directional control valve from channel (5) to channel (5)  
**Note:** Combinations with 2 x 2/2-way valves (ident. codes D and I) and 2 x 3/2-way valves (ident. codes H, K and N) are not permitted. |

Tab. B/5: Pressure regulator plates for regulating outputs (1), (2) and (4)
B. Supplementary component summary

**Proportional pressure regulator VPPM-6TA-...**

<table>
<thead>
<tr>
<th>Ident. code: QA, QB, QC, QD, QE, QF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function:</td>
</tr>
<tr>
<td>- Regulates the pressure proportional to a specified nominal value</td>
</tr>
</tbody>
</table>

Tab. B/6: Proportional-pressure regulator
B. Supplementary component summary

B.2 Separating the MPA-S valve terminal from the CPX terminal

The MPA-S valve terminal is connected to the CPX terminal by means of a pneumatic interface (see following diagram).

![Diagram of pneumatic interface]

**Fig. B/1: Pneumatic interface**

**Dismounting**

**Proceed as follows:**

1. Loosen the electrical and pneumatic connections and remove the MPA-S valve terminal from its fastening surface (see Chapter 5, “Dismantling the MPA-S valve terminal”).

2. Loosen the fastening screws between the pneumatic interface and the MPA sub-base in the sequence 3 2 1 (see Fig. B/2).

3. Then loosen the retaining screws.
B. Supplementary component summary

Fig. B/2: Removing the MPA-S valve terminal from the pneumatic interface

Information on replacing the pneumatic interface can be found in the CPX system description.
B. Supplementary component summary

Mounting

Proceed as follows:

1. Make sure the seals are not damaged. Replace the seals if they are damaged.

2. Place the seal onto the guide pins of the pneumatic interface.

3. Push the pneumatic interface together with the pneumatic manifold blocks. Make sure that the seal and the components are correctly positioned.

Fig. B/3: Mounting the MPA-S valve terminal to the pneumatic interface
B. Supplementary component summary

4. Insert the retaining screws in the appropriate holes. Tighten the screws in the sequence 1 2 3 (see following diagram) at first slightly and then with 1.8 Nm (± 10 %).

Fig. B/4: Fastening the MPA-S valve terminal to the pneumatic interface

5. Fasten the MPA-S valve terminal onto the fastening surface (see CPX system manual).

6. Complete the electrical and pneumatic connections of the MPA-S valve terminal with CPX terminal. Information on this can be found,
   - in the electrical section of the CPX system description
   - in the pneumatics section in chapter 3 of this description
B. Supplementary component summary
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