Compact performance

Manual
CPV pneumatics
Individual valve connection

CPV valve terminal
Type CPV10-EX-VI

Manual
547040
en 1203d
[762328]
Contents and general instructions

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Internet: http://www.festo.com
E-Mail: service_international@festo.com

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Contents and general instructions
Designated use

The valve terminals type CPV10-EX-VI described in this manual are intended for fitting into a machine or automated system. Please observe the safety regulations specified in this manual as well as the instructions concerning the designated use of valve terminal type CPV10-EX-VI. Valve terminals type CPV10-EX-VI may only be used as follows:

– as designated in industrial applications.
– without any modifications by the user.
  Only the conversions or modifications described in the documentation supplied with the product are permitted.
– in perfect technical condition.

When used together with commercially available components, such as actuators, the specified limits for pressures, temperatures, electrical data, torques etc. must be observed. National and local safety regulations must also be observed.

Please note

Use in potentially explosive environments

Note the designated use and the operating conditions listed in the special ATEX documentation and device document provided with the product.

→ www.festo.com
Contents and general instructions

Target group

This manual is intended exclusively for technicians trained in control and automation technology who have experience in fitting, installing, commissioning, servicing and converting pneumatic components.

Service

Please consult your local Festo service centre if you have any technical problems.

Notes on the use of this manual

This manual contains specific information on fitting, installing, commissioning, servicing and converting valve terminal type CPV10-EX-VI. This manual deals only with the pneumatic and electric components of this valve terminal variant.

<table>
<thead>
<tr>
<th>Valve terminal type CPV10-EX-VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual valve connection</td>
</tr>
<tr>
<td>Information on the electric components in this manual</td>
</tr>
</tbody>
</table>

Tab. 0/1: Valve terminal type CPV10-EX-VI

This manual contains only information on valve terminals with individual electric valve connection. Each valve coil must be connected separately to an intrinsically safe current circuit which complies with protection class ia IIC or ib IIC. Note the accompanying ATEX special documentation and the device document.
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.

- **Please 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.
## List of abbreviations

The following product-specific terms and abbreviations are used in this manual:

<table>
<thead>
<tr>
<th>Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/3G valve extension</td>
<td>Module with two unlockable non-return valves. On the CPV10 valve terminals, the valve function “5/3-way in mid-position blocked” is implemented with this module and the valve sub-base Ident. code C.</td>
</tr>
<tr>
<td>Blanking plate</td>
<td>Plate without valve function, for reserving empty valve locations</td>
</tr>
<tr>
<td>Components</td>
<td>Common term for sub-bases, end plates, blanking plates, separator plates, valve sub-bases, valve extensions and pneumatic multipin</td>
</tr>
<tr>
<td>Connecting the tubing</td>
<td>Connecting the supply lines (tubing) to valve terminal type CPV10</td>
</tr>
<tr>
<td>CP</td>
<td>Compact Performance</td>
</tr>
<tr>
<td>CPV10</td>
<td>Size designations of the CPV valve terminals with micro valve sub-bases, grid 10 mm</td>
</tr>
<tr>
<td>End plate</td>
<td>Cover plate at the left and right-hand ends of the CPV valve terminal with channels or connections for supplying the valves with compressed air and for venting the exhaust air.</td>
</tr>
<tr>
<td>Individual valve connection</td>
<td>CPV valve terminal variant on which every valve solenoid coil can be connected individually with a socket and cable</td>
</tr>
<tr>
<td>Manual override</td>
<td>Manual override</td>
</tr>
<tr>
<td>Pneumatic multipin</td>
<td>Plate for central tubing connections on the valve terminal (connections for supply air, exhaust air and work air)</td>
</tr>
<tr>
<td>Pneumatic multiple connector plate</td>
<td>Plate for central tubing connections of the valve terminal on the wall of a control cabinet (connections for supply air, exhaust air and work air)</td>
</tr>
<tr>
<td>Separator plate</td>
<td>Plate for dividing the valve terminal into two/four pressure zones</td>
</tr>
<tr>
<td>Valve manifold</td>
<td>Basic unit with valve sub-bases, blanking plates and end plates</td>
</tr>
<tr>
<td>Valve sub-base</td>
<td>Plate with single-solenoid or double-solenoid valves</td>
</tr>
<tr>
<td>Valve terminal type CPV10-EX-VI</td>
<td>Valve terminal CPV10 with ATEX authorization Cat. 2 G</td>
</tr>
</tbody>
</table>

Tab. 0/2: Product-specific terms and abbreviations
Contents and general instructions
System summary

Chapter 1
1. System summary

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<tr>
<td>1.1 Valve terminal manual</td>
<td>1-3</td>
</tr>
<tr>
<td>1.2 Description of components</td>
<td>1-4</td>
</tr>
</tbody>
</table>
1. System summary

1.1 Valve terminal manual

Festo assists you in solving your automation task at the machine level with valve terminals.

Due to its compact design valve terminal type CPV10-EX-VI can be placed near to the actuators to be controlled. This means that short compressed air supply lines can be used. System losses will therefore be minimized and the times required for pressurizing and exhausting the compressed air tubing will be reduced. This is made possible by the use of very compact valves with sufficient flow, thereby helping to reduce costs.

Valve terminal type CPV10-EX-VI is available only with individual valve connections.

![Valve terminal type CPV10-EX-VI](image)

Fig. 1/1: Valve terminal type CPV10-EX-VI

Valve terminal type CPV10-EX-VI with individual valve connection is available with 2 to 8 valve sub-bases (also with an odd number of sub-bases). The electrical connection is made individually on each valve solenoid coil.
1. System summary

1.2 Description of components

Identification code
With the identification code (I.C.) you can ascertain the equipment fitted on your valve terminal type CPV10-EX-VI. The code is printed on the front between manual overrides 12 and 14.

<table>
<thead>
<tr>
<th>I.C.</th>
<th>Pneumatic components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Valve sub-bases with 2/2-way valves</td>
</tr>
<tr>
<td>D</td>
<td>Two 2/2-way valves, single-solenoid, basic position closed</td>
</tr>
<tr>
<td>DK</td>
<td>Two 2/2-way valves (with channel separation 1, 11), single-solenoid, basic position closed</td>
</tr>
<tr>
<td>I</td>
<td>Two 2/2-way valves, basic position control side 14 open, control side 12 closed</td>
</tr>
<tr>
<td>IK</td>
<td>Two 2/2-way valves (with channel separation 1, 11), single-solenoid, basic position control side 14 open, control side 12 closed</td>
</tr>
<tr>
<td></td>
<td>Valve sub-bases with 3/2-way valves</td>
</tr>
<tr>
<td>C</td>
<td>Two 3/2-way valves, single-solenoid, basic position closed</td>
</tr>
<tr>
<td>CK</td>
<td>Two 3/2-way valves (with channel separation 1, 11), single-solenoid, basic position closed</td>
</tr>
<tr>
<td>CY</td>
<td>Two 3/2-way valves (with back pressure flaps for exhaust channels 3, 5), single-solenoid, basic position closed, spring reset</td>
</tr>
<tr>
<td>H</td>
<td>Two 3/2-way valves, basic position control side 14 open, control side 12 closed</td>
</tr>
<tr>
<td>HK</td>
<td>Two 3/2-way valves (with channel separation 1, 11), single-solenoid, basic position control side 14 open, control side 12 closed</td>
</tr>
<tr>
<td>N</td>
<td>Two 3/2-way valves, basic position open</td>
</tr>
<tr>
<td>NK</td>
<td>Two 3/2-way valves (with channel separation 1, 11), single-solenoid, basic position open</td>
</tr>
<tr>
<td></td>
<td>Valve sub-bases with 5/2-way valves</td>
</tr>
<tr>
<td>J</td>
<td>5/2-way valve, double solenoid</td>
</tr>
<tr>
<td>JK</td>
<td>5/2-way valve (with channel separation 1, 11), double-solenoid</td>
</tr>
<tr>
<td>M</td>
<td>5/2-way valve, single solenoid</td>
</tr>
<tr>
<td>MK</td>
<td>5/2-way valve (with channel separation 1, 11), single solenoid</td>
</tr>
</tbody>
</table>
1. System summary

<table>
<thead>
<tr>
<th>I.C.</th>
<th>Pneumatic components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Valve sub-bases with 5/3-way valves</td>
</tr>
<tr>
<td>G</td>
<td>Two 3/2-way valves, basic position closed + valve extension 5/3G</td>
</tr>
<tr>
<td></td>
<td>Separator plates</td>
</tr>
<tr>
<td>S</td>
<td>Exhaust channel (3/5) and compressed air channels (1, 11) closed</td>
</tr>
<tr>
<td>T</td>
<td>Compressed air channels (1, 11) closed</td>
</tr>
<tr>
<td></td>
<td>Blanking plate</td>
</tr>
<tr>
<td>L</td>
<td>Plate without valve function for reserving a valve position</td>
</tr>
<tr>
<td></td>
<td>Valve extensions</td>
</tr>
<tr>
<td>P</td>
<td>One-way flow control valve for restricting the supply air</td>
</tr>
<tr>
<td>Q</td>
<td>One-way flow control valve for restricting the exhaust air</td>
</tr>
<tr>
<td>V</td>
<td>Flow control valve for setting the reject pulse</td>
</tr>
</tbody>
</table>

Tab. 1/1: Identification codes of the pneumatic components

Further information on the valve plates can be found in appendix B. Further information on the valve with ident. code CY can be found in the following section.
1. System summary

3/2-way valve (CY) with integrated one-way flow control function

The 2x3/2-way valves are provided with caps which prevent a reverse effect of back pressures in exhaust channels 3 and 5 on the drives connected to the valve.

Please note
- If used in safety relevant applications, additional measures are necessary, e.g. in Europe the standards listed under the EU machine guidelines must be observed. Without additional measures in accordance with legally specified minimum requirements, the product is not suitable as a safety relevant component in control systems.
- If a separator plate is to be used between the valve sub-bases (for forming pressure zones), we recommend that you use the separator plate with ident. code S. This plate separates the supply channels 1, 11 and the exhaust channel 3/5.
- Back pressure in the exhaust channel can impede the switching of the valve. The valve switches as soon as the back pressure is reduced and the control signal is still applied.
- Operate a CPV valve terminal fitted with valves with ident. code CY with external pilot air. You can then be sure that the back pressure flaps are reliably closed, even when the operating pressure is switched off.
1. System summary

Valve extension 5/3G

Valve extension 5/3G contains the function of two unlockable non-return valves. A function “5/3-way in mid-position blocked” can be implemented in conjunction with the valve sub-base with Ident code C (two 2/3-way valves in basic position blocked).

Please note
The valve extension 5/3G cannot be fitted in conjunction with the pneumatic multiple connector plate type CPV10-VI-P...-C or CPV10-VI-P...-D.

Further information on valve extension 5/3G can be found in the section 2.4 “Fitting the valve extensions” and in the section 4.1 “General instructions”.

Flow control valve or one-way flow control valve extension

With the following valve extensions you can adapt valve terminal type CPV10-EX-VI to the requirements of your machine/system.

For restricting the supply or exhaust air of the valve sub-bases use valve extensions as follows:

- One-way flow control valve for restricting the supply air (Ident. code P) (e.g. CPV...-BS-2xGRZZ-...)
- One-way flow control valve for restricting the exhaust air (Ident. code Q) (e.g. CPV...-BS-2xGRAZ-...)

The valve extensions are flange-fitted directly onto the valve sub-bases. It is not intended that the above-mentioned valve extensions should be combined.

Further information on the valve extensions can be found in the section 2.4 “Fitting the valve extensions” and in the section 4.1 “General instructions”.
Separator plates

By means of separator plates you can divide valve terminal type CPV10-EX-VI into 2 to 4 pressure zones. Two types of separator plates are available:

- separator plate with closed compressed air channels (1 and 11)
- separator plate with closed exhaust channel (3/5) and closed compressed air channels (1 and 11).

Valve sub-bases with channel separation

Pressure zones can be implemented on the CPV10-EX-VI with valve sub-bases with internal channel separation (Ident. code CK, DK, HK, IK, JK, MK and NK).

Channel separation takes place in the compressed air channels (1 and 11). 2 or 4 pressure zones can be formed.
Pneumatic multipin

The pneumatic multipin serves as a common connection for power supply and work lines. Valve terminal type CPV10-EX-VI is screwed together with the pneumatic multipin and sealed to it by means of sealing discs. The pneumatic multipin enables valve terminal type CPV10-EX-VI to be easily disconnected from the pneumatic supply and work tubing. The pneumatic multipin is available in two forms:

1. Without mounting flange:
   This variant for fitting onto a stand or a wall opening fits flush with the end plates. The fastening holes are in the connection side of the pneumatic multipin (CPV10-VI-P...-M7).

2. With mounting flange:
   With this variant for fitting onto a wall or stand the pneumatic multipin lies over the end plates. The mounting holes are located in the flange for ease of mounting. Two additional holes running crossways through this pneumatic multipin (CPV10-VI-P...-M7-B) also allow rear mounting of valve terminal type CPV10-VI-...

3. Fitting into a control cabinet:
   with sealing ring and supply connections (CPV10-VI-P...-M7-C).
   with sealing ring, but without supply connections (CPV10-VI-P...-M7-D).
1. System summary

Pneumatic multipin without flange

Pneumatic multipin with flange

Pneumatic multiple connector plate with supply connections

Pneumatic multiple connector plate without supply connections

1 Vertical mounting holes
2 Horizontal mounting holes
3 Sealing ring

Fig. 1/2: Variants of the pneumatic multipin or pneumatic multiple connector plate
1. System summary

Valve terminal type CPV10-EX-VI with individual valve connection consists of the following components:

Overview of components

Fig. 1/3: Components of valve terminal type CPV10-EX-VI

1. Right-hand end plate (designs see section B.2 “Overview of end plates”)

2. Blanking plate or separator plate (with closed compressed air channels 1 and 11 and exhaust channel (3/5) or only closed compressed air channels 1 and 11)

3. Valve sub-bases

4. Left-hand end plate (designs see section B.2 “Overview of end plates”)

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1. System summary

Supplementary components of the valve terminal

Valve terminal type CPV10-EX-VI can be supplemented if desired by the following components:

1. Pneumatic multipin or pneumatic multiple connector plate
2. Valve extensions: 5/3G function or one-way flow control valve
3. Support for hat rail mounting
4. Support for wall mounting

Fig. 1/4: Supplementary equipment for valve terminal type CPV10-EX-VI
1. System summary

Connecting, display and operating elements

You will find the following pneumatic connecting, display and operating elements on valve terminal type CPV10-EX-VI:

1. **Pneumatic multipin with flange**
2. **Manual override (per solenoid coil, locking or non-locking)**
3. **Clip for non-locking manual override**
4. **Supply air connections (1, 11, 12/14), exhaust connections (3/5, 82/84): with individual tubing on the left and/or right-hand end plate; with central tubing on the pneumatic multipin**
4. **Work connections (2, 4) per valve**

Fig. 1/5: Pneumatic connecting, display and operating elements of valve terminal type CPV10-EX-VI
1. System summary

You will find the following electrical connecting and display elements on valve terminal type CPV10-EX-VI with individual valve connection:

1. Pre-assembled connection socket (for each solenoid coil)
2. Identification sign (for each connector socket)
3. Earth connection
4. Terminal lugs of solenoid coil 14
5. Terminal lugs of solenoid coil 12

Fig. 1/6: Electrical connecting elements of valve terminal type CPV10-EX-VI with individual valve connection
Fitting

Chapter 2
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  2.3.2 Fitting the valve terminal to the pneumatic multipin ......... 2-16
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2.4 Fitting the valve extensions ......................................... 2-19

2.5 Fitting covers on the manual overrides ............................. 2-20
2. Fitting

2.1 General instructions on fitting and dismantling

**Warning**
Sudden unexpected movements of the connected actuators and uncontrolled movements of loose tubing can cause injury to human beings and/or damage to property.
Before carrying out installation and maintenance work, switch off the following:
– the compressed air supply
– the operating and load voltage supplies.

**Please note**
Handle all modules and components of the valve terminal with great care. Note especially the following:
– The specified torques must be observed.
– Electrostatically sensitive components.
Do not therefore touch any contact surfaces.

2.2 Valve terminal with individual tubing

**Fitting variants**
The CPV10-EX-VI valve terminal with individual tubing has been prepared for fitting into a system or machine in one of the following ways:
– mounted on a wall
– mounted on a hat rail
– mounted on a stand
– fitted into a control cabinet.
2. Fitting

Further information on fitting can be found in the assembly instructions and the special ATEX documentation. → www.festo.com

2.2.1 Mounting on a wall

In order to fit the CPV10-EX-VI valve terminal onto a wall, you will require the appropriate mounting kit, depending on the type of mounting. The following table provides an overview:

<table>
<thead>
<tr>
<th>Mounting method</th>
<th>Rear</th>
<th>Front</th>
</tr>
</thead>
</table>

**Mounting kits (consisting of 2 profile sections and 4 self-threading screws)**
See Festo catalogue → www.festo.com

Tab. 2/1: Fastening profile sections for fitting onto a wall

**Please note**
The CPV10-EX-VI valve terminal must not be operated on the Siemens SIMATIC ET200X. Mounting kit type CPV10-VI-BG-ET200X is to be used exclusively for front mounting onto a wall.
2. Fitting

Proceed as follows:

- Make sure that the fastening surface can support the weight of valve terminal type CPV10-EX-VI.

- Fit the fastening profile sections to the left-hand and the right-hand end plate (see Fig. 2/1). Use here the self-threading screws supplied (see Tab. 2/2). When fitting the CPV10-EX-VI valve terminal from the rear, make sure that the fixing bolts of the fastening profile sections grip into the recess in the end plates.

<table>
<thead>
<tr>
<th>Valve terminal</th>
<th>Type of mounting: rear</th>
<th>Type of mounting: front</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self-threading screw</td>
<td>Tightening torque</td>
</tr>
<tr>
<td>CPV10-EX-VI</td>
<td>M4 x 10</td>
<td>1.5 Nm</td>
</tr>
</tbody>
</table>

Tab. 2/2: Fitting onto a wall, tightening torques
2. Fitting

Type of mounting: rear

1. M4 screw for wall fastening
2. Self-threading screws for fastening the profile sections onto the CPV10-EX-VI valve terminal
3. Fixing bolts

Type of mounting: front

1. 5.5 mm bore for wall fastening
2. Self-threading screws for fastening the profile sections onto the CPV10-EX-VI valve terminal

Fig. 2/1: Fitting the CPV10-EX-VI valve terminal onto a wall

- Make sure there is sufficient space for connecting the supply cables and tubing. For front mounting it will be necessary to cut out a suitable section for the electrical connections or to use a suitable spacer.

A spacer must be provided by the customer.
2. Fitting

1 Mounting options

Fig. 2/2: Fastening holes for the rear fitting

Drill four mounting holes or threaded holes in the fastening surface (see table).

<table>
<thead>
<tr>
<th>Valve terminal</th>
<th>Type of mounting: rear</th>
<th>Type of mounting: front</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Diameter of the</td>
<td>Threaded hole for</td>
</tr>
<tr>
<td></td>
<td>fastening holes</td>
<td>fastening holes</td>
</tr>
<tr>
<td>CPV10-EX-VI</td>
<td>4.5 mm</td>
<td>M4 screw</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tab. 2/3: Holes for wall fitting

- Then fasten the valve terminal type CPV10-EX-VI with four M4 or M5 screws of sufficient length to the wall.
2.2.2 Hat rail mounting

For fitting valve terminal type CPV10-EX-VI onto a hat rail, you will require mounting kit type CPV10/14-VI-BG-NRH-35. This mounting kit consists of two brackets, two or four self-threading screws size M4 x 10 and two screws size M4 x 10 with clamping elements and springs.

Proceed as follows:

- Make sure that the fastening surface can support the weight of valve terminal type CPV10-EX-VI.
- Fit the following hat rail:

<table>
<thead>
<tr>
<th>Hat rail for valve terminal type CPV10-EX-VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support rail DIN 50022: 35 x 7.5 (width 35 mm, height 7.5 mm)</td>
</tr>
</tbody>
</table>

Make sure that there is sufficient space for connecting the supply cables and tubing and for fitting valve terminals type CPV10-EX-VI with large surface-mounted silencers.

Fasten the hat rail to the fastening surface approximately every 100 mm.

Screw the two brackets to the end plates with the screws provided, as shown in Fig. 2/3. Make sure that the fastening bolts of the brackets grip into the recess in valve terminal type CPV10-EX-VI.

<table>
<thead>
<tr>
<th>Valve terminal</th>
<th>Self-threading screw</th>
<th>Tightening torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPV10-EX-VI</td>
<td>M4 x 10</td>
<td>1.5 Nm</td>
</tr>
</tbody>
</table>

Tab. 2/5: Hat rail adapter, tightening torques
2. Fitting

- Hang valve terminal CPV10-EX-VI onto the hat rail. Fasten valve terminal type CPV10-EX-VI on both sides with the hat rail clamping unit against slipping or sliding down.
2. Fitting

2.2.3 Mounting on a stand

In order to fit valve terminal type CPV10-EX-VI onto a stand (fitting on the level of work connections 2 and 4), you will require four socket head screws size M4 x 45.

Proceed as follows:

- Prepare the fastening surface. If necessary, make a suitable bracket. The position of the fastening holes of valve terminal type CPV10-EX-VI are shown in the following Fig. 2/4.

![Fastening holes](image)

Fig. 2/4: Fastening holes for fitting onto a stand

- Make sure that there is sufficient space for connecting the supply cables and tubing and for fitting valve terminals type CPV10-EX-VI with large surface-mounted silencers.

- Insert the four socket head screws provided into the holes in the left-hand and right-hand end plates (see Fig. 2/5).
2. Fitting

Fig. 2/5: Position of the fastening holes

- Screw valve terminal type CPV10-EX-VI onto the fastening surface or to the fastening bracket.

2.2.4 Fitting into a control cabinet

See section 2.3.3.
2. Fitting

2.3 Valve terminal with pneumatic multipin

Only valve terminals type CPV10-EX-VI which are fitted with appropriate end plates may be mounted on the pneumatic multipin. Valve terminals type CPV10-EX-VI with end plates for individual tubing need to be converted before they can be fitted on the pneumatic multipin. For this purpose fit the appropriate end plates (see section 5.5 “Converting the end plates” and section B.2 “Overview of the end plates”).

The pneumatic multipin is available in four variants (see chapter 1 “System overview” Fig. 1/2).

1. Without mounting flange: (CPV10-VI-P...-M7)
2. With mounting flange: (CPV10-VI-P...-M7-B)
3. Fitting into a control cabinet: (CPV10-VI-P...-M7-C, CPV10-VI-P...-M7-D)

Valve terminals type CPV10-EX-VI with large surface-mounted silencers, which are fitted onto the pneumatic multipin with mounting flange (CPV10-VI-P...-M7-B), can only be fitted onto a wall. Use here the holes running diagonally through the pneumatic multipin. The mounting holes running vertically through the pneumatic multipin are covered by the large surface-mounted silencer.
2. Fitting

2.3.1 Fitting the pneumatic multipin

Make sure that the fastening surface can support the pneumatic multipin and valve terminal type CPV10-EX-VI. Make sure that there is sufficient space for connecting the supply cables and tubing and for fitting valve terminals type CPV10-EX-VI with large surface-mounted silencers.

Fitting the pneumatic multipin (connection side)

Proceed as follows in order to fit the pneumatic multipin with the connection side onto a fastening surface:

- Cut out an opening in the fastening surface.
- Drill four mounting holes in the fastening surface (diameter see Tab. 2/6). Position of these holes see Tab. 2/7.
- Screw the pneumatic multipin to the fastening surface with four screws of appropriate length (see Tab. 2/6).

<table>
<thead>
<tr>
<th>Pneumatic multipin without flange</th>
<th>Pneumatic multipin with flange</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5 mm</td>
<td>6.5 mm</td>
</tr>
<tr>
<td>M4</td>
<td>M6</td>
</tr>
</tbody>
</table>

Tab. 2/6: Diameter of the fastening holes and screw size
2. Fitting

Tab. 2/7: Position of the holes for the pneumatic multipin
2. Fitting

Fitting the pneumatic multipin (rear side)

Proceed as follows in order to fit the pneumatic multipin with flange (CPV10-VI-P...-M7-B) with its rear side onto a fastening surface:

- Drill two mounting holes in the fastening surface for screws of size M6. Position of and distance between these holes see Tab. 2/8.

![Diagram showing hole positions](image)

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Number of valve locations</th>
<th>CPV10-EX-VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
<td>62 mm</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>82 mm</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>102 mm</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>122 mm</td>
</tr>
</tbody>
</table>

Tab. 2/8: Hole dimensions for rear fitting

- Screw the pneumatic multipin to the fastening surface with two M6 screws of sufficient length.
2. Fitting

2.3.2 Fitting the valve terminal to the pneumatic multipin

Proceed as follows:

- Insert the socket head screws provided into the fastening holes.
- Place the 3-part or 4-part seal for sealing the supply channels into the grooves in the left or right-hand end plate.
- In order to seal the work channels, carefully press the two seals into the threads of the work connections.
- Fasten valve terminal type CPV10-EX-VI on the multipin with the 4 socket head screws. Tighten the screws in diagonally opposite sequence with max. 2 Nm.

Fig. 2/6: Fitting valve terminal type CPV10-EX-VI to the pneumatic multipin
2. Fitting

2.3.3 Fitting the valve terminal to the pneumatic multiple connector plate

Further information on fitting can be found in the assembly instructions and the special ATEX documentation. → www.festo.com

Overview of fitting

1. Fastening screws
2. Fastening holes
3. Control cabinet wall
4. Pneumatic multiple connector plate
5. Seals type CPV10-VI-P...-M7
6. Valve terminal type CPV10-EX-VI

Fig. 2/7: Overview of a valve terminal type CPV10-EX-VI fitted onto the pneumatic multiple connector plate

1. Press all the seals [5] supplied from the rear into the holes in the multiple connector plate [4].

Please note
Note that the 3- and 4-part seals, which are provided with the end plates of valve terminal CPV10-EX-VI, are only required with the pneumatic multiple connector plate [4] (type CPV10-P...-M7-C).
2. **Fitting**

**Please note**

In order to comply with protection class IP65:
- the surface is level,
- the surface is free of grooves and scratches.

2. Place the multiple connector plate from inside into the cut-out for fitting.

![Diagram of pneumatic multiple connector plate]

7.5 mm \( \leq (l-t) \leq 9.5 \text{ mm} \)

Fig. 2/8: Fitting the pneumatic multiple connector plate

3. Fasten the valve terminal type CPV10-EX-VI on the pneumatic multiple connector plate.
2.4 Fitting the valve extensions

Please note
- If the pneumatic multipin is used with mounting flange type CPV10-VI-P...-M7-B, the outer valve sub-bases cannot be fitted with valve extensions.
- Valve extension 5/3G is intended for use with a single operating pressure per valve sub-base. It must not be used in dual-pressure operation (different pressures at connections 1 and 11).
- If other valve sub-bases are to be used on valve terminal type CPV10-EX-VI in dual-pressure operation, the valve sub-base fitted with the 5/3G valve extension must be separated from compressed air channels 1 and 11 by means of a separator plate.
- The valve extension 5/3G cannot be fitted in conjunction with the pneumatic multiple connector plate type CPV10-VI-P...-C or CPV10-VI-P...-D.

Proceed as follows:
- Place the seals supplied with the product into the recesses in the appropriate valve extension.
- Fasten the valve extension with the screws supplied and tighten with 0.8 Nm.
- Connect the work tubing, see section 3.4.2 “Connecting the supply and work lines”.
- Note that the flow control valve extensions or one-way flow control valve extensions (Ident.code P, Q and V) require a minimum operating pressure of 0.5 bar.
2. Fitting

2.5 Fitting covers on the manual overrides

Individual covers can be fitted over the manual overrides to protect them against unauthorized use.

The manual override covers are not intended for re-use. Fit the manual override covers only if you no longer require the manual overrides (e.g. after testing the valves).

Proceed as follows:

• Clip the covers into the guide grooves on the manual overrides (see Fig. 2/9).

If your valve terminal type CPV10-EX-VI is equipped with non-locking manual overrides, you must remove the retaining clips before fitting the covers (see section 5.4).

Fig. 2/9: Fitting covers on the manual overrides
Installation

Chapter 3
3. Installation

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  3.1.1 Operation with non-lubricated compressed air ........... 3-3
  3.1.2 Operation with lubricated compressed air ................. 3-4

3.2 General instructions on installation ......................... 3-6

3.3 Laying the tubing ............................................. 3-7

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  3.4.1 Internal or external pilot air supply ....................... 3-9
  3.4.2 Connecting the supply and work lines ..................... 3-12
  3.4.3 Connecting the electric cables ............................ 3-17
3. Installation

3.1 Preparing the compressed air

Caution
Non-filtered or incorrectly lubricated compressed air will reduce the service life of the valve terminal.

3.1.1 Operation with non-lubricated compressed air

Caution
Too much residual oil 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 or methylester), the residual oil content must not exceed 0.1 mg/m$^3$ (see DIN 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 the basis of polyalphaolefine (PAO), the residual oil content must not exceed max. 5 mg/m$^3$ (see ISO 8573-1 class 4).

You will thereby avoid functional damage to the valves.

Excessive residual oil cannot be permitted irrespective of the compressor oil, as otherwise the basic lubrication will be washed out during the course of time.
3. Installation

3.1.2 Operation with lubricated compressed air

Operate your system with non-lubricated compressed air if possible. This will prevent pollution of 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 service life lubrication, which is necessary for non-lubricated operation, to be “washed out”.

Note the following instructions if lubricated compressed air must be used.
The compressed air prepared with the compressor must correspond in quality to non-lubricated compressed air. If possible, do not operate the complete system 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 (DIN ISO 8573-1 class 5).
- Check that the lubricator setting is correct, (see following section).
You will thereby avoid functional damage to the valves.
3. Installation

Setting the lubricator

With the machine running (typical operating status) 0.2 to max. 1 drop/min. or 0.5 to 5 drops/1000 l air.

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 cylinder which is furthest from the lubricator.

2. Ascertain the valve terminal which controls this cylinder.

3. Remove the silencer, if fitted, from connection 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 drops out, this is an indication that too much oil has been used.

Another indication of over-lubrication is the colouring 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**
Sudden unexpected movements of the connected actuators and uncontrolled movements of loose tubing can cause injury to human beings and/or damage to property.

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

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

3.3 Laying the tubing

If elbow screw connectors or multiple distributors are used, the airflow will be reduced slightly.

Connecting

Proceed as follows:

1. Push the tubing as far as possible into or over the tube connection of the screw connector.

2. Tighten the clamping screw 1 or pull the locking ring, if applicable, 2 over the tube coupling.

3. Seal connections that are not required with blanking plugs 3.

4. For reasons of clarity, group the tubing together with:
   – tube straps or
   – multiple hose holders.

Fig. 3/1: Fitting the tubing
Disconnecting

Proceed as follows:

**Warning**
If the pneumatic tubing is under pressure when dismounted, it may perform sudden unexpected movements, causing injury to persons. Carry out the following steps before disconnecting the pneumatic tubing on the valve manifold:

- Switch off the compressed air supply.
- Make sure that all pneumatic tubing is unpressurized.
- Exhaust all actuators controlled by valves that are blocked in the rest or mid-position.

1. Mark all pneumatic tubing.
2. Loosen the clamping screw[1] of the fitting or press down the locking ring of the fitting, if applicable, [2] e.g. with a Festo QSO releasing tool.
3. Remove the tubing from the screw connector.

![Fig. 3/2: Disconnecting the tubing](image)

Fig. 3/2: Disconnecting the tubing
3. Installation

3.4 Connecting the CPV valve terminal

In order to guarantee the optimum efficiency of your valve terminal type CPV-EX-VI, we recommend in the following cases that you connect the compressed air tubing and, if necessary, also the exhaust air tubing on both sides (appropriate end plate pairs see section B.2 “Overview of the end plates”):

– when large volume cylinders are operated at high speeds
– when several valves are switched simultaneously to the flow position.

Please note
• Valve terminals type CPV10-EX-VI with two pressure zones: Connect the supply pressures to the end plates or to both sides of the pneumatic multipin.

3.4.1 Internal or external pilot air supply

Caution
– Operate valve terminal type CPV10-EX-VI if possible with non-lubricated pilot air (connections 12/14). Otherwise observe the instructions in the section 3.1.2 “Operation with lubricated compressed air”.
– In the case of valve terminals type CPV10-EX-VI with internally branched pilot air, the above mentioned remark also applies to the supply air (connection 1/11).

Valve terminals type CPV10-EX-VI with two pressure zones and internally branched pilot air:
– Due to the internally branched pilot air in the right-hand end plate, the pressure in the right-hand pressure zone must be 3 ... 8 bar.
3. Installation

Valve terminal type CPV10-EX-VI is intended for internal or external pilot air, depending on the end plates fitted. Please refer to your order forms or to the tables in appendix B in order to ascertain the types of end plates which are fitted on your valve terminal type CPV10-EX-VI.

**Please note**
- Operate a CPV10-EX-VI valve terminal fitted with valves with Ident. code CY with external pilot air. You can then be sure that the back pressure flaps are reliably closed, even when the operating pressure is switched off.

Internal pilot air supply

If the supply pressure of your valve terminal type CPV10-EX-VI lies between 3 ... 8 bar, you can operate the terminal with internally branched pilot air. In this case the pilot air will be branched from connection 1 or 11 in the left or right-hand end plate.

**Please note**
- If you are using valve terminal type CPV10-EX-VI with internal pilot air:
  - Seal connection 12/14 with a blind plug.
External pilot air supply

If the supply pressure of your valve terminal type CPV10-EX-VI lies between 3 ... 8 bar, you can operate the terminal with external pilot air. In this case, the pilot air will be supplied externally via connection 12/14 on valve terminal type CPV10-EX-VI. End plates for supplying valve terminal type CPV10-EX-VI with external pilot air see section B.2, “Overview of end plates”.

Please note

- Use regulated external pilot air (3 ... 8 bar). This will ensure faultless operation of valve terminal type CPV10-EX-VI.
- Please note that the regulated externally supplied pilot air for all valve sub-bases on the CPV valve terminal need only be supplied or branched at one position with common tubing. This also applies when valve terminal type CPV10-EX-VI is operated with different pressure zones (see figure).

Fig. 3/3: Pilot air supply
3. Installation

3.4.2 Connecting the supply and work lines

Please note
- Unused connections Seal all connections not required for functioning with blanking plugs (see appendix B).
- Unused valve sub-bases Seal work connections 2 and 4 with blanking plugs.
- Valve sub-bases with Ident. code C (two 3/2-way valves closed in basic position): With the 5/3G valve extension you can implement the function “in mid-position blocked”. This valve extension is mounted on the connection side of the above-mentioned valve sub-base (see section 2.4 “Fitting the valve extensions”).
- Connect the work lines as follows, depending on the tool you are using:
  - screw connector with hexagon socket head: any sequence is possible.
  - screw connector with external hexagon socket head: connection must be made from left to right (space for wrench).
3. Installation

Fit the screw connector or the silencer as described in Tab. 3/1. Then connect the tubing.

### Connection identifier ISO 5599

<table>
<thead>
<tr>
<th>Connection identifier ISO 5599</th>
<th>Tubing</th>
<th>Connection size ISO 228 Specifications in brackets for pneumatic multipin with flange</th>
<th>Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 or 11</td>
<td>Compressed air</td>
<td>G1/8</td>
<td>Screw connector in end plates or pneumatic multipin</td>
</tr>
<tr>
<td>2 or 4</td>
<td>Work air</td>
<td>M7</td>
<td>Connector</td>
</tr>
<tr>
<td>3/5</td>
<td>Exhaust</td>
<td>- G3/8</td>
<td>Connector</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- G1/4</td>
<td>- for ducted exhaust air</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- for silencer</td>
</tr>
<tr>
<td>12/14 or 82/84</td>
<td>Pilot air supply or exhaust</td>
<td>- M5</td>
<td>Screw connector at connection 82/84</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- M7 (M5)</td>
<td>- for ducted exhaust air</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- for silencer</td>
</tr>
</tbody>
</table>

Tab. 3/1: Sizes of the pneumatic connections
3. Installation

Please note
In the case of several systems with centrally ducted exhaust:
use non-return valves in the common exhaust tubing.
You can then avoid functional impairment due to back pressures.

1. Valve terminal type CPV10-EX-VI 1
2. Valve terminal type CPV10-EX-VI 2
3. Common tubing 3/5
4. Common tubing 82/84
5. Central tubing 3/5
6. Central tubing 82/84

Fig. 3/4: Common lines with non-return valves

Please note
The exhaust is removed via channels 3/5 and 82/84. These connections must not be sealed with blanking plugs.
The exhaust channels 3 and 5 (see 3) are grouped together in valve terminal type CPV10-EX-VI. Separate exhaust restriction of channels 3 or 5 is not therefore possible.
3. Installation

Please note
On valve terminals type CPV10-EX-VI with ducted compressed air supply:
Seal connections 11 and 12/14 with blanking plugs

Pressure zones of valve terminal type CPV10-EX-VI

Valve terminal type CPV10-EX-VI can be operated with up to four pressure zones, depending on the components fitted. The maximum number of pressure zones possible is determined by the combination of the following:

– the use of a separator plate or a valve sub-base with channel separation (Ident. code CK, DK, HK, IK, JK, MK or NK, see section B.1, as well as section 1.2).

– the type of end plate pairs (see section B.2)

– the type of valve sub-bases (see section B.1).

Please note
On valve terminals type CPV10-EX-VI with two pressure zones and internally branched pilot air in the right-hand end plate:

• Due to the internally branched pilot air, the pressure in the right-hand pressure zone must be 3 ... 8 bar.
3. Installation

Please note
For building pressure zones with CPV10-EX-VI valve terminals with 3/2-way valves with back pressure flaps (Ident. code CY):

- Festo recommends the use of the separator plate with Ident. code S. This plate separates the supply channels 1, 11 and the exhaust channel 3/5.
- Always apply the same pressure in a pressure zone to connections 1 and 11.
- Back pressure in the exhaust channel can impede the switching of the valve. The valve switches as soon as the back pressure is reduced and the control signal is still applied.

Low pressure operation
Valve terminal type CPV10-EX-VI can be operated with low pressure (< 3 bar), if regulated external pilot air is supplied separately. An overview of the end plates required can be found in section B.2.
3. Installation

3.4.3 Connecting the electric cables

Note the accompanying ATEX special documentation and the device document. These documents can be found in Internet under: → www.festo.com

Please note
Only suitable control modules (e.g. from Stahl, ABB, P&F) may be used for controlling the valves, as these modules comply with ignition protection class ib with regard to their safe and functional design.

Please 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 load voltage for the valves, switching off the compressed air).
3. Installation

Earthing valve terminal type CPV10-EX-VI

The earth connection is on the left-hand end plate (see Fig. 3/5).

Please note

Earth your valve terminal type CPV10-EX-VI

- Connect the earth cable on the left-hand end plate (see Fig. 3/5) with low impedance (short cable with large cross-sectional area) to the earth potential.
- Tighten the earthing screw with max. 1 Nm.

In this way, you will avoid interference caused by electromagnetic influences.
3. Installation

Valve terminal type CPV10-EX-VI with individual valve connection

Each solenoid coil is connected separately to an intrinsically safe current circuit which complies with protection class ia or ib.

Please note

- Use only the following connector sockets from Festo for connecting the valve solenoid coils:
  - KMYZ-4-...-B-EX

Address assignment of the valves

- The addresses must be assigned in ascending order without gaps
- Counting begins from left to right, on the individual valve plates from the front to the rear (see Fig. 3/6).

Fig. 3/6: Valve terminal type CPV10-EX-VI with individual valve connection and 8 valve locations
Connect the valve solenoid coils as follows:

- Place connector socket KMYZ-4-...-B-EX on the terminal lugs of the relevant valve coil (see Fig. 3/7). Make sure that the centring bolt between the terminal lugs grips into the hole in the socket. Screw the socket together with the central locking screw with 0.3 Nm.

- Make sure that the socket is connected with the correct polarity. The positive terminal is always outside on the solenoid coil.

- Connect the blue cable to – (0 V DC), the blue-white striped cable to + (≤ 32 V DC or ≤ 36 V DC).

![Diagram](image.png)

Fig. 3/7: Fitting the individual connector sockets

**Please note**

- Incorrect polarity or swapped cables will impede the switching function.

- Each valve coil must be connected separately to an intrinsically safe current circuit which complies with protection class ia IIC or ib IIC.
Commissioning

Chapter 4
4. Commissioning

4.1 General instructions

4.1.1 Before commissioning

- Switch off the power supply before connecting or disconnecting plugs (otherwise this could lead to functional damage).

- Earth your valve terminal type CPV10-EX-VI at the left-hand end plate.

- Commission only a valve terminal which has been fitted 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 fitted
  - when the maximum load voltage is applied
  - when the solenoid coils are constantly under stress.

- If applicable, set the flow control valve extension or the one-way flow control valve extension.

Please note
- When unscrewing the adjusting screw of the flow control, make sure that you do not unscrew it beyond the resistance, as this could damage the cover.
- The flow control valve extensions or one-way flow control valve extensions (Ident. codes V, P and Q) require a minimum operating pressure of 0.5 bar.
4. Commissioning

**Warning**
If the build-up in pressure of the pilot air is too slow or delayed, this may cause the actuators to perform sudden unexpected movements under the following conditions:

– when the compressed air is switched on with a safety start-up valve (slow build up of pressure) and

– if there are electric signals (e.g. after EMERGENCY STOP).

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

• Supply the pilot air separately via the right-hand end plate (3 ... 8 bar).

The pilot air must reach a pressure of 3 ... 8 bar as soon as it is switched on, otherwise the valve cannot be guaranteed to switch (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 slow increase in pressure of the complete supply does not then affect the cylinder. Depending on the valve function, the cylinder would extend or retract suddenly.
4. Commissioning

Externally supplied pilot air (3 ... 8 bar), branched in front of the safety start-up valve

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

Fig. 4/1: Example of valve-cylinder combination with slow increase in pressure of the complete supply

The table below shows the effects of slow start-up pressurization when there are electric signals.

<table>
<thead>
<tr>
<th>External pilot air supply</th>
<th>Pressure incr. in complete supply</th>
<th>Pressure increase in the pilot air (12/14)</th>
<th>Time point when a valve switches</th>
<th>Movement of the cylinder</th>
</tr>
</thead>
<tbody>
<tr>
<td>branched after the safety start-up valve</td>
<td>slow</td>
<td>slow</td>
<td>after pressure increase at (1)</td>
<td>fast</td>
</tr>
<tr>
<td>branched in front of the safety start-up valve</td>
<td>slow</td>
<td>fast</td>
<td>before pressure increase at (1)</td>
<td>slow</td>
</tr>
</tbody>
</table>

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

4.2 Testing the valves

Please note
Before commissioning valve terminal type CPV10-EX-VI, observe the specifications concerning the medium in chapter 3.

Valve terminal type CPV10-EX-VI 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>Testing the valve-cylinder-combination by means of the manual override</td>
</tr>
<tr>
<td>Complete commissioning of the complete system</td>
<td>Installing and connecting the complete system Program control by PLC/industrial PC</td>
</tr>
</tbody>
</table>

Tab. 4/2: Commissioning variants

Commissioning the pneumatic components by means of the manual override is described below. Commissioning of the CP system is described in the appropriate manual for the CP node.
4. Commissioning

4.2.1 Checking the valve functions

**Manual override**

**Warning**
Before actuating the manual override:
- Disconnect the operating voltage supply for the valve coils from the relevant connections on valve terminal type CPV10-EX-VI. You will thereby avoid undesired actuation of the valve solenoid coils.
- Before switching on the power supply: make sure that all manual override locking actuations are in their basic positions. You will thereby avoid undefined switching states of the valves.

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

**Please note**
If valve terminal type CPV10-EX-VI is operated in a dusty or dirty environment:
- After commissioning use cover caps type CPV10.
In this way you can also protect the manual overrides from unauthorized operation.
4. Commissioning

Types of manual override

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

<table>
<thead>
<tr>
<th>Manual override design</th>
<th>Method of operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual override with automatic return (non-locking)</td>
<td>After actuation the manual override is reset by a spring.</td>
</tr>
<tr>
<td>Manual override locking</td>
<td>The manual override remains active until it is reset by hand</td>
</tr>
<tr>
<td>Manual override covered</td>
<td>The manual override is covered for safety reasons. It cannot be actuated</td>
</tr>
</tbody>
</table>

Tab. 4/3: Designs of manual override

The diagram below shows the assignment of the manual overrides to the pilot solenoids.

Fig. 4/2: Assignment of manual overrides to the pilot solenoids

1. Slide of the locking manual override to pilot solenoid 14 (in basic position)
2. Slide of the locking manual override to pilot solenoid 12 (in basic position)
3. Push button of non-locking manual override to pilot solenoid 14
4. Push button of non-locking manual override to pilot solenoid 12
4. Commissioning

4.2.2 Checking the valve-cylinder combination

Carry out the test Proceed as follows:

1. Switch on the compressed air supply.

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

Please note
Incorrect actuation of the non-locking manual override can lead to malfunctioning or damage to the manual override.

- Use a blunt pencil for actuating the non-locking manual override.
- Actuate the manual override only with max 30 N.

3. On valve terminals type CPV10-EX-VI with ducted compressed air supply: After testing the valves, make sure that all manual override actuations are in their basic positions again.

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

### Actuating the manual override with automatic reset (non-locking)

<table>
<thead>
<tr>
<th>Actuating the manual override with automatic reset (non-locking)</th>
<th>Valve response</th>
</tr>
</thead>
</table>
| Carefully press down the plunger of the manual override as far as possible. | The valve:  
  - moves to the switching position |
| Keep the plunger of the manual override pressed down. |  
  - remains in the switching position |
| Release the plunger. The spring returns the plunger of the manual override to the initial position. |  
  - returns to the basic position  
  (not with 5/2-way double-solenoid valve, Ident. code J and JK) |

**Tab. 4/4: Non-locking manual override**
4. Commissioning

Caution
Before commissioning your machine/system:

- Make sure that double-solenoid valves (Ident. code J and JK) are reset to their basic positions. Actuate here manual override 12 of the relevant valve or apply current to pilot control solenoid 12.
- Reset the locking manual override actuations to their basic positions again. The valve sub-bases with Ident. code D, I, C, N and H are each fitted with two valves. With manual override 14 you control the valve on control side 14; with manual override 12 you control the valve on control side 12 (see switching symbols of the valve sub-bases appendix B).

In this way, you can avoid undefined switching states when commissioning the machine/system.

<table>
<thead>
<tr>
<th>Actuating the manual override with stop (locking)</th>
<th>Valve response</th>
</tr>
</thead>
</table>
| ![Image of manual override] Press down the plunger of the manual override as far as possible. | The valve:  
- moves to the switching position |
| ![Image of manual override] Leave the plunger in the lower position. | - remains in the switching position |
| ![Image of manual override] Press the plunger of the manual override into the upper position as far as possible (basic position). | - returns to the basic position (not with 5/2-way double-solenoid valve, Ident. code J and JK) |

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

4.3 Troubleshooting

Impairment of function

When the compressed air supply is switched on or when the individual valves are subsequently checked, 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>Fault treatment when the compressed air supply has been switched off</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air escapes from ...</td>
<td>• Checking the seal rings or the tube fitting</td>
</tr>
<tr>
<td>– common line or work line connections</td>
<td>• Regulate the pilot air to 3 ... 8 bar</td>
</tr>
<tr>
<td>– between the modules</td>
<td>• Check the starting torque of the tie rods</td>
</tr>
<tr>
<td></td>
<td>• Or check the status and position of the seals between the valve discs</td>
</tr>
<tr>
<td>Valve or pneumatic system ...</td>
<td>• Check the tubing</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 locking manual override into the basic position</td>
</tr>
<tr>
<td></td>
<td>• After switching on again check the operating pressure (if necessary for each pressure zone)</td>
</tr>
<tr>
<td></td>
<td>• Check the controller connection (apply pressure &gt; 3 bar to external controller)</td>
</tr>
<tr>
<td></td>
<td>• Servicing required</td>
</tr>
</tbody>
</table>

Tab. 4/6: Function impairment of the pneumatic system
4. Commissioning

If the operating status of the pneumatic system differs from the desired pneumatic operating status, the following conditions are probably not fulfilled:

<table>
<thead>
<tr>
<th>Desired pneumatic operating status</th>
<th>Requirement</th>
<th>Comment</th>
</tr>
</thead>
</table>
| Free of leakage                   | – Tubing connected with care  
                                     | – Regulated pilot air supply | |
| Fast reaction                     | Sufficient pressure supply by means of pressure supply modules | – Exhaust the valve terminal at the left and right-hand end plates (3/5, 82/84) |
| Faultless                         | Non-return valves in common exhaust line | – This applies when several systems with centrally ducted exhaust are used |
| Two pressure zones                | Limiting the pressure zones with a separator plate | – Subsequent conversion possible |
| Low-pressure operation            | Separately supplied regulated pilot air (3 ... 8 bar) | – Controller can only be operated with pressure (between 3 ... 8 bar) |
| EMERGENCY STOP of pressure zones | Guaranteeing the controller function for the pilot air despite the complete supply being switched off | – The regulator regulates the pilot air supply of all valve sub-bases on a valve terminal |
| Slow start-up after EMERGENCY STOP | If there are control signals, the pilot air must have a pressure of 3 ... 8 bar immediately after being switched on | |

Tab. 4/7: Pneumatic operating states
4. Commissioning
Maintenance and conversion

Chapter 5
5. Maintenance and conversion

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  5.3.2 Fitting components onto valve locations ....................... 5-9
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5.6 Conversion to internal/external pilot air ................................ 5-14
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5. Maintenance and conversion

5.1 General precautionary measures

**Warning**
Sudden unexpected movements of the connected actuators and uncontrolled movements of loose tubing can cause injury to human beings and/or damage to property.

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

**Please note**
Handle all modules and components of the valve terminal with great care. Note especially the following when fitting components:
- Screws must be fitted accurately (otherwise threads will be damaged).
- Screws must be fastened at first only by hand. Screws must be placed so that the self-cutting threads can be used.
- The specified torques must be observed.
- Screw connections must be fitted free of offset and mechanical tension.
- Check the seals for damage.
- The contact surfaces must be dry and clean (sealing effect, avoid leakage and contact faults).
5. Maintenance and conversion

5.2 Cleaning/replacing the large surface-mounted silencer

**Caution**
Dirt on the large surface-mounted silencer can cause an increase in pressure in the exhaust channel.

- Clean the silencer insert if it is yellow/black or a dark colour or replace it by a new insert.

You can then guarantee faultless functioning of the large surface-mounted silencer and avoid malfunctioning of the valves.

Proceed as follows:

1. Loosen and remove the screws in the fastening frame.
2. Remove the silencer insert from the end plate.
3. Replace the silencer or clean it in benzine or petroleum. Do not use trichlorethene (TCE) for cleaning.
4. Place the cleaned or new silencer insert and the fastening frame onto the end plate.
5. Fasten the silencer insert only with the original screws (see Tab. 5/1).

<p>| Fastening screws of the silencer insert as per DIN 912, property class 12.9 |
|---------------------------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Valve terminal</th>
<th>Screw</th>
<th>Tightening torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPV10</td>
<td>M 2.5 x 8</td>
<td>1.0 Nm ±10 %</td>
</tr>
</tbody>
</table>

Tab. 5/1: Tightening torques for large surface-mounted silencer
5. Maintenance and conversion

5.3 Fitting/removing CPV valve terminal components

Some components on valve terminal type CPV10-EX-VI may only be operated in combination with other components, see the following compatibility list.

<table>
<thead>
<tr>
<th>Components, Ident. code 1)</th>
<th>Cover plate I.C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve sub-bases: C, CK, CY, D, DK, H, HK, I, IK, J, JK, M, MK, N, NK</td>
<td>No limits</td>
</tr>
<tr>
<td>Valve sub-base: G</td>
<td>If the pneumatic multipin with mounting flange is used, the outer valve sub-bases cannot be fitted with the necessary 5/3G valve extension.</td>
</tr>
<tr>
<td></td>
<td>If a pneumatic multipin connector plate type ...(C or ...(D is used, valve sub-base G cannot be used. A fixed connection is not possible.</td>
</tr>
<tr>
<td>Blanking plate: L</td>
<td>No limits</td>
</tr>
<tr>
<td>Separator plates: S, T</td>
<td>Combination depends on end plate combination 2)</td>
</tr>
</tbody>
</table>

1) List of the Ident. codes see section 1.2 “Identification code”
2) Combination list of the end plates see section B.2 “End plate combination”

Tab. 5/2: Compatibility list of valve location components
5. Maintenance and conversion

5.3.1 Removing components from valve locations

The components on valve terminal type CPV10-EX-VI can easily be removed to facilitate maintenance and conversion work.

Proceed as follows:

Loosen the electrical connections

**Individual valve connection**

- In order to remove the valve sub-bases, loosen the fastening screws on the connector sockets of the valve sub-base to be replaced.
- Pull the sockets carefully away from the terminal lugs. Mark the connector sockets.

Loosen the pneumatic connections

**Individually wired valve terminals without pneumatic multipin**

- Loosen the tubing at work connections 2 and 4 of the valve sub-base or valve extension to be replaced (see section 3.2 “General connection methods”).
5. Maintenance and conversion

Remove the valve terminal from the fastening surface

**Valve terminals with pneumatic multipin and pneumatic multipin connector plate**

- Loosen the fastening screws of the pneumatic multipin in the left and right-hand end plates one turn in diagonally opposite sequence. Then remove the screws completely. Remove valve terminal type CPV10-EX-VI from the pneumatic multipin.

**Fitting on a stand**

- Loosen the fastening screws in the right-hand end plate and pull them out.

**Fitting onto a wall or onto a hat rail**

- Loosen the right-hand wall fastening or hat rail clamping unit.

**Removing the components**

- Loosen the two lower tie rods one turn.
- Then loosen the upper tie rod and pull it out over the component to be replaced.
- Unscrew the two lower tie rods so that the screw heads are flush with the outer surface of the end plate (do not remove the tie rods).
- Pull the valve terminal apart so that the distance between the components to be replaced and the neighbouring components is approx. 2 mm in each case.
5. Maintenance and conversion

Fig. 5/1: Removing the valves

- Swing the component forwards around the front tie rod.

Fig. 5/2: Position of the tie rods

- Pull the component so that it snaps out of the front tie rod.
5. Maintenance and conversion

5.3.2 Fitting components onto valve locations

Proceed as follows:

1. Check that the seals are correctly positioned between the terminal components. They must lie correctly in the appropriate seal grooves.

2. Check the position of the seals when fitting valve sub-bases with pneumatic spring valves or double-solenoid valves. It is not symmetrical (see Fig. 5/3).

![Fig. 5/3: Position and designation of the seals with pneumatic spring valves or double-solenoid valves](image)

1. Valve sub-base with pneumatic spring (Ident. code M and MK):
   The designation “L” on the seal must face forwards

   The designation “J” on the seal must face forwards

3. The seal for valve sub-bases with 2/2 or 3/2-way valves (Ident. codes D, DK, I, IK or C, CK, H, HK and N, NK) as well as for all end plates is symmetrical and marked with 3/2

3. Place the component on the front tie rod. Press the component so that it snaps onto the tie rod.

4. Swing the component carefully backwards. Make sure that there is sufficient space for the flat seals.

5. Push the upper tie rod as far as possible into valve terminal type CPV10-EX-VI and screw it in a few turns.
5. Maintenance and conversion

6. Align the components of valve terminal type CPV10-EX-VI on a flat surface so that they are not offset.

7. Tighten first the upper, then the lower tie rod with 0.3 Nm. Then tighten all the tie rods with 2 Nm.

Fitting valve terminal type CPV10-EX-VI

Valve terminals with pneumatic multipin and pneumatic multipin connector plate

1. Place the 3-piece and 4-piece seals in the recesses in the left or right-hand end plate. Press the 2-piece seals carefully into the threads of the work connections.

2. Place valve terminal type CPV10-EX-VI on the pneumatic multipin or the pneumatic multipin connector plate and tighten the fastening screws in the left and right-hand end plates in diagonally opposite sequence with 0.3 Nm. Then tighten the screws in diagonally opposite sequence with 2 Nm.

Fitting on a stand

- Insert the fastening screws into the right-hand end plate and screw the valve terminal tight.

Fitting onto a wall or hat rail

- Fasten the right-hand fitting to the wall with two M4 screws or tighten the right-hand hat rail clamping unit.

Fitting the pneumatic connections

- Fit the connections (see chapter 3).
5. Maintenance and conversion

5.4  Conversion from non-locking to locking manual override

By removing a safety clip, you can convert your valve terminal type CPV10-EX-VI from non-locking to locking manual override. Proceed as follows:

If you do **not** wish to re-use the safety clip:

- press with a screwdriver in the centre of the safety clip, as shown under [1]. The safety clip will then bend and snap out of the support.

If you wish to re-use the safety clip:

- lift up the safety clip out of the support, as shown in [2] with a thin object (e.g. a spatula).

![Diagram](image_url)

1  Remove the safety clip by pressing it out

2  Removing the safety clip by lifting it out (clip can be re-used)

Fig. 5/4: Safety clip for the manual override
5. Maintenance and conversion

5.5 Converting the end plates

By exchanging the end plates you can adapt valve terminal type CPV10-EX-VI to new requirements of your machine or system. The following end plates are available:

- end plates with supply connections for internal or external pilot air
- end plates without supply connections
- end plates to suit the pneumatic multipin for internal or external pilot air
- end plates with large surface-mounted silencer.

A list of all available end plates can be found in section B.2.

Proceed as follows:

- Loosen the electrical and pneumatic connections (see section 5.3 “Removing components from valve locations”).
- Remove valve terminal type CPV10-EX-VI from the fastening surface. Proceed here in the reverse sequence to that described in the sections “Fitting onto a wall”, “Fitting onto a hat rail” or “Fitting onto a stand” (see section 2.2).
- Place valve terminal type CPV10-EX-VI on the left-hand end plate. Loosen the outer tie rods by maximum 1 turn (see Fig. 5/1). You will then avoid overloading the centre tie rod.
- Then loosen the centre tie rod and remove it.
- Unscrew the outer tie rod.
- Remove the end plate from valve terminal type CPV10-EX-VI. Make sure that the other components remain together.
5. Maintenance and conversion

- Place the right-hand end plate to be fitted onto valve terminal type CPV10-EX-VI and insert the tie rods.

- Place valve terminal type CPV10-EX-VI on the right-hand end plate. Make sure that the tie rods, which are not yet screwed tight, do not fall out of CPV valve terminal type CPV10-EX-VI.

- Remove the left-hand end plate from valve terminal type CPV10-EX-VI.

- Place the left-hand end plate to be fitted onto valve terminal type CPV10-EX-VI. Swing valve terminal type CPV10-EX-VI onto the left-hand end plate.

- Screw in the tie rods and tighten them equally with 0.3 Nm.

- Tighten first the centre and then the outer tie rods with 2 x 0.2 Nm.

- Fit valve terminal type CPV10-EX-VI onto the fastening surface (see sections “Fitting onto a wall”, “Fitting onto a hat rail” or “Fitting onto a stand” in the section 2.2).

- Then fit the pneumatic and electrical connections (see chapter 3 “Installation”).
5. Maintenance and conversion

5.6 Conversion to internal/external pilot air

By fitting the appropriate left and right-hand end plates, you can convert your valve terminal type CPV10-EX-VI to internal or external pilot air.

Please note
- Mixed operation of valve terminal type CPV10-EX-VI with internal and external pilot air is not intended. The supply channel will not be divided into two pressure zones by means of the optional separator plates.
- On the end plates CPV...-EPR-PG (part no. 161 373 and 162 543) connection 12/14 is sealed internally.
- Take into account the extra space required if end plates with large surface-mounted silencers are used.

Exchange the end plates of valve terminal type CPV10-EX-VI as described in the section 5.5 “Converting the end plates”.
5. Maintenance and conversion

5.7 Individual/central tubing conversion

In order to convert valve terminal type CPV10-EX-VI from individual tubing to tubing on the pneumatic multipin, you will require:

- the pneumatic multipin or the pneumatic multi connector plate
- special end plates for valve terminal type CPV10-EX-VI.

Proceed as follows:

- Exchange the end plates of valve terminal type CPV10-EX-VI as described in the section 5.5 “Converting the end plates”.
- Fit the pneumatic multipin as described under “Fitting the pneumatic multipin” or “Fitting the pneumatic multi connector plate” in section 2.3.

5.8 Conversion of the CPV valve terminal to two pressure zones

In order to convert valve terminal type CPV10-EX-VI to two pressure zones, you will require a separator plate (must be ordered separately).

Please note

- When installing valve terminal type CPV10-EX-VI note that the compressed air must be supplied on both sides of the valve terminal.
- Seal unused connections (pilot air internal or external) with blanking plugs.

Fit the separator plate as described in the section 5.3.2 “Fitting components in valve locations”.
5. Maintenance and conversion

5.9 Converting the CPV valve terminal to a variant with different electrical connections

It is not possible to convert valve terminal type CPV10-EX-VI to another electrical connection variant.

Please note
Note the designated use and the operating conditions listed in the special ATEX documentation provided with the product.

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   A.2 Accessories .................................................... A-8
## A.1 Technical specifications

### General information

| Permissible temperature range | - Storage: -20 ... +40 °C  
- Operation: -5 ... +50 °C  
- Medium: -5 ... +50 °C |
| Protection class as per EN 60529 | IP40 valve terminal  
IP65 pneumatic multiple connector plate |
| Relative air humidity | 90 % |
| Corrosion protection (as per FN 940070) | CRC 2 |
| Installation position | as desired |
| Torques |  
- Plug socket for IC connection: Max. 0.3 Nm  
- Mounting screw for wall support or H-rail: 1.5 Nm  
- Mounting screws for the CP valve terminal on the pneumatic multiple connector plate: 2.0 Nm  
- Electric sub-base: 1.0 Nm  
- Earth terminal: 1st step 0.3 Nm  
- Tie rod: 2nd step 2.0 Nm  
- Flat plate silencer element on end plate: 1.0 Nm ±10%  
- valve actuators: 0.8 Nm |
| Materials |  
- Plates, covers, pneumatic multipin: AL, AL-GD, Ms, PAXMD6, PET, POM, PPS, PA, ST  
- Seal: NBR, HNBR |
| Vibration and shock |  
- Vibration: Tested according to DIN/IEC 68/EN 60068 part 2-6: severity class 2  
- Shock: Tested according to DIN/IEC 68/EN 60068 part 2-27: severity class 2 |

Tab. A/1: Technical data: General information
### General information

**Approx. weights (in g)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>End plates (2 pieces)</td>
<td>160</td>
</tr>
<tr>
<td>Pneumatic multipin</td>
<td></td>
</tr>
<tr>
<td>– on CP valve terminals with 2 valve positions</td>
<td>120</td>
</tr>
<tr>
<td>– on CP valve terminals with 4 valve positions</td>
<td>165</td>
</tr>
<tr>
<td>– on CP valve terminals with 6 valve positions</td>
<td>225</td>
</tr>
<tr>
<td>– on CP valve terminals with 8 valve positions</td>
<td>270</td>
</tr>
<tr>
<td>Large surface-mounted silencer</td>
<td>147</td>
</tr>
<tr>
<td>Blanking plate</td>
<td>25</td>
</tr>
<tr>
<td>Separator plates</td>
<td>25</td>
</tr>
<tr>
<td>Valve sub-bases</td>
<td>73</td>
</tr>
<tr>
<td>Valve extension: 5/3G function</td>
<td>46</td>
</tr>
<tr>
<td>Valve extensions: One-way flow control valves</td>
<td>25</td>
</tr>
</tbody>
</table>

Tab. A/2: Technical data: Weight specification for valve terminal type CPV10-EX
Pneumatics

<table>
<thead>
<tr>
<th>Operating medium</th>
<th>Compressed air to ISO 8573-1:2010 [7:4:4], inert gases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructions on the operating/pilot medium</td>
<td>Operation with lubricated medium possible (in further operation required).</td>
</tr>
<tr>
<td>Design</td>
<td>Valve sub-bases with spool valves</td>
</tr>
<tr>
<td>Pressure range</td>
<td></td>
</tr>
<tr>
<td>– Optimum operating pressure</td>
<td>5 ... 7 bar</td>
</tr>
<tr>
<td>– Rated supply pressure</td>
<td>6 bar</td>
</tr>
<tr>
<td>– With pilot air branched internally from 1 or 11</td>
<td>3 ... 8 bar</td>
</tr>
<tr>
<td>– With externally supplied pilot air to:</td>
<td></td>
</tr>
<tr>
<td>Connection 12/14</td>
<td>3 ... 8 bar</td>
</tr>
<tr>
<td>Connection 1 or 11:</td>
<td>0.1 ... 10 bar</td>
</tr>
<tr>
<td>– 3/2-way valve (Ident. code CY)</td>
<td>0 ... 10 bar</td>
</tr>
<tr>
<td>– with all other valves</td>
<td></td>
</tr>
<tr>
<td>Manual override</td>
<td>Locking or non-locking</td>
</tr>
</tbody>
</table>

Tab. A/3: Technical data: Medium and pressure ranges

---

Caution

– Operate valve terminal type CPV10-EX-VI if possible with non-lubricated pilot air (connections 12/14). Otherwise observe the instructions in the section “Operation with lubricated compressed air” in chapter 3.

– In the case of valve terminals type CPV10-EX-VI with internally branched pilot air, the above mentioned remark also applies to the supply air (connection 1/11).

Please note

The screw connectors of the pneumatic ports cause a reduction in the flow rate of the valves.
A. Technical appendix

Pneumatics

Rated flows

(without screw connector) in [l/min]

- of 11 ⇒ 2 or 1 ⇒ 4
- of 2 ⇒ 3/5 or 4 ⇒ 3/5

Valve switching times in ms

<table>
<thead>
<tr>
<th>Measuring method 10 %, as per FN 942032</th>
<th>On/over</th>
<th>Off</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/2-way valve (Ident. codes D, DK, I, IK)</td>
<td>15</td>
<td>17 (at 0 %)</td>
</tr>
<tr>
<td>3/2-way valve, open or closed (Ident. code C, CK, H, HK, N, NK)</td>
<td>17</td>
<td>37</td>
</tr>
<tr>
<td>3/2-way valve (Ident. code CY)</td>
<td>17</td>
<td>37</td>
</tr>
<tr>
<td>5/2-way valve, monostable (Ident. code M, MK)</td>
<td>17</td>
<td>40</td>
</tr>
<tr>
<td>5/2-way solenoid valve, bistable (Ident. code J, JK)</td>
<td>10</td>
<td>—</td>
</tr>
</tbody>
</table>

Connections

(In parentheses, deviating values for pneumatic multiple connector plate)

- Compressed air (1; 11)
- Exhaust (3/5)
- Pilot air supply (12; 14; 82/84)
- Work air (2; 4)

1) with 3/2-way valve with back pressure flaps (Ident. code CY)

Tab. A/4: Technical data: Rated flows, valve switching times and connection sizes

Identification

CE mark (see declaration of conformity)

→ www.festo.com

In accordance with EU EMC directive
In accordance with EU explosion protection directive (ATEX)

Tab. A/5: Technical data: Designation
### Electrical data – Solenoid coil

<table>
<thead>
<tr>
<th>Parameter</th>
<th>+50 °C</th>
<th>+40 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. ambient temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. input voltage $V_i$ DC</td>
<td>32 V</td>
<td>36 V</td>
</tr>
<tr>
<td>Max. input current $I_i$</td>
<td>0.2 A</td>
<td>0.2 A</td>
</tr>
<tr>
<td>Max. input power $P_i$</td>
<td>0.76 W</td>
<td>0.93 W</td>
</tr>
<tr>
<td>Required current consumption at control pressure 3 bar *)</td>
<td>$\geq 15.4 \text{ mA}$</td>
<td>$\geq 15.4 \text{ mA}$</td>
</tr>
<tr>
<td>Effective inner inductance $L_i$</td>
<td>$= 0 \mu\text{H}$</td>
<td>$= 0 \mu\text{H}$</td>
</tr>
<tr>
<td>Effective inner capacity $L_{ni}$</td>
<td>$= 0 \text{nF}$</td>
<td>$= 0 \text{nF}$</td>
</tr>
<tr>
<td>Resistance $R_{20}$</td>
<td>920 Ω ±5 %</td>
<td>920 Ω ±5 %</td>
</tr>
<tr>
<td>Current supply</td>
<td>Only from certified intrinsically safe current circuits EEx ia IIC or ib IIC</td>
<td></td>
</tr>
</tbody>
</table>

*) With higher control pressures the minimum required current consumption is reduced.

#### Tab. A/6: Technical data: Electrical limit values

**Please note**

Ascertaining the maximum cable length
- Take the voltage drop into account.
A. Technical appendix

A.2 Accessories

Please note
Accessories for the product can be found under:
http://www.festo.com/catalog
Summary of components

Appendix B
B. Summary of components

Contents

B. Summary of components ........................................ B-1
  B.1 Overview of valve sub-bases .............................. B-3
  B.2 Overview of end plates ................................. B-7
## B.1 Overview of valve sub-bases

Valve terminal type CPV10-EX-VI is fitted with the following valve sub-bases:

**Please note**
The numbers on the following switching symbols are the designations of the connections, coils and manual over rides; e.g. designation 14 stands for manual override 14 or coils 14. They are not logic designations.

<table>
<thead>
<tr>
<th>Valve sub-base</th>
<th>Comment</th>
</tr>
</thead>
</table>
| ![Diagram](image1) | Ident. code D and DK  
Valves:  
- two 2/2-way valves  
- single-solenoid  
- closed in basic position  
- spring return |
| ![Diagram](image2) | Ident. code I and IK  
Valves:  
- two 2/2-way valves  
- single-solenoid  
- control side 14 normally closed  
- control side 12 normally open  
- spring return |

Tab. B/1: Overview: Valve sub-bases with 2/2-way valves
## B. Summary of components

<table>
<thead>
<tr>
<th>Valve sub-base (continued)</th>
<th>Comment</th>
</tr>
</thead>
</table>
| ![Diagram](image1) | Ident. code N and NK  
Valves:  
– two 3/2-way valves  
– single-solenoid  
– open in basic position  
– spring return  
Function:  
The function of a 5/3-way valve in mid-position pressurized can be implemented with these valves in basic position open. |
| ![Diagram](image2) | Ident. code C and CK  
Valves:  
– two 3/2-way valves  
– single-solenoid  
– closed in basic position  
– spring return  
Function:  
The function of a 5/3-way valve in mid-position exhausted can be implemented with these valves in basic position closed.  
With the 5/3G valve extension the function of a 5/3-way valve in mid-position closed can be implemented.  
**Note**  
If you control a double-acting cylinder with this valve sub-base, note that the function of a 5/3-way mid-position valve can be implemented if both valve solenoid coils are actuated simultaneously. |
| ![Diagram](image3) | Ident. code H and HK  
Valves:  
– two 3/2-way valves  
– single-solenoid  
– control side 14 normally closed  
– control side 12 normally open  
– spring return |
B. Summary of components

Valve sub-base (continued)

<table>
<thead>
<tr>
<th>Valve sub-base</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>82/84 4 2 12</td>
<td>Ident. code CY</td>
</tr>
<tr>
<td>14 3/5 11</td>
<td>Valves:</td>
</tr>
<tr>
<td>12/14</td>
<td>– two 3/2-way valves, with back-pressure flaps</td>
</tr>
<tr>
<td>3 and 5</td>
<td>– single-solenoid</td>
</tr>
<tr>
<td>82/84 4</td>
<td>– closed in basic position</td>
</tr>
<tr>
<td>2 12</td>
<td>– spring return</td>
</tr>
<tr>
<td>14</td>
<td>Function:</td>
</tr>
<tr>
<td>3/5</td>
<td>The function of the valve is identical to that of the valve with ident. code C.</td>
</tr>
<tr>
<td>11</td>
<td>Note</td>
</tr>
<tr>
<td>12/14</td>
<td>Back pressure in the exhaust channel can impede the switching of the valve. The valve switches as soon as the back pressure is reduced and the control signal is still applied.</td>
</tr>
</tbody>
</table>

Tab. B/2: Overview: Valve sub-bases with 3/2-way valves

Valve sub-base (continued)

<table>
<thead>
<tr>
<th>Valve sub-base</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>82/84 4</td>
<td>Ident. code M and MK</td>
</tr>
<tr>
<td>2 12</td>
<td>Valve:</td>
</tr>
<tr>
<td>14</td>
<td>– 5/2-way valve</td>
</tr>
<tr>
<td>3/5 11</td>
<td>– single-solenoid</td>
</tr>
<tr>
<td>12/14</td>
<td>– spring return</td>
</tr>
</tbody>
</table>

Tab. B/3: Overview: Valve sub-bases with 5/2-way valves
B. Summary of components

<table>
<thead>
<tr>
<th>Valve sub-base (continued)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ident. code G</td>
</tr>
<tr>
<td></td>
<td>Function:</td>
</tr>
<tr>
<td></td>
<td>– 5/3-way valve in mid-position closed</td>
</tr>
<tr>
<td></td>
<td>Valve:</td>
</tr>
<tr>
<td></td>
<td>– two 3/2-way valves</td>
</tr>
<tr>
<td></td>
<td>– single-solenoid</td>
</tr>
<tr>
<td></td>
<td>– normally closed</td>
</tr>
<tr>
<td></td>
<td>– spring return</td>
</tr>
<tr>
<td></td>
<td>– 5/3G valve extension (two unlockable non-return valves)</td>
</tr>
</tbody>
</table>

Tab. B/4: Overview: Valve sub-base or function 5/3-way valves
B. Summary of components

B.2 Overview of end plates

By means of the part number (position see Fig. B/1) and the following Tab. B/5, you can ascertain which end plates are fitted on your CPV10-EX valve terminal.

1 Part number

Fig. B/1: Position of end plate part number
### B. Summary of components

<table>
<thead>
<tr>
<th>End plate</th>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Left-hand end plates</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPV10-EPL</td>
<td>161 378</td>
<td>No connections</td>
</tr>
<tr>
<td>CPV10-EPL-E</td>
<td>161 374</td>
<td>Axial connections, connections 1 and 11 separate</td>
</tr>
<tr>
<td>CPV10-EPL-G</td>
<td>161 376</td>
<td>Axial connections, connections 1 and 11 connected</td>
</tr>
<tr>
<td>CPV10-EPL-PE</td>
<td>161 370</td>
<td>For pneumatic multipin, connections 1 and 11 separate</td>
</tr>
<tr>
<td>CPV10-EPL-PG</td>
<td>161 372</td>
<td>For pneumatic multipin, connections 1 and 11 connected</td>
</tr>
<tr>
<td>CPV10-EPL-EU-EX</td>
<td>547 463</td>
<td>With large surface-mounted silencer</td>
</tr>
<tr>
<td>CPV10-EPL-PEU-EX</td>
<td>547 462</td>
<td>With large surface-mounted silencer, for pneumatic multipin, connections 1 and 11 separate</td>
</tr>
<tr>
<td><strong>Right-hand end plates</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPV10-EPR</td>
<td>161 379</td>
<td>No connections</td>
</tr>
<tr>
<td>CPV10-EPR-E</td>
<td>161 375</td>
<td>Axial connections, connections 1 and 11 separate, external pilot air supply</td>
</tr>
<tr>
<td>CPV10-EPR-G</td>
<td>161 377</td>
<td>Axial connections, connections 1 and 11 connected, internal pilot air supply</td>
</tr>
<tr>
<td>CPV10-EPR-PE</td>
<td>161 371</td>
<td>For pneumatic multipin, connections 1 and 11 separate, external pilot air supply</td>
</tr>
<tr>
<td>CPV10-EPR-PG</td>
<td>161 373</td>
<td>For pneumatic multipin, connections 1 and 11 connected, internal pilot air supply</td>
</tr>
<tr>
<td>CPV10-EPR-EU-EX</td>
<td>547 460</td>
<td>With large surface-mounted silencer</td>
</tr>
<tr>
<td>CPV10-EPR-PEU-EX</td>
<td>547 459</td>
<td>With large surface-mounted silencer, for pneumatic multipin, connections 1 and 11 separate</td>
</tr>
<tr>
<td>CPV10-EPR-PGU-EX</td>
<td>547 461</td>
<td>With large surface-mounted silencer, for pneumatic multipin, connections 1 and 11 connected, internal pilot air supply</td>
</tr>
</tbody>
</table>

Tab. B/5: Overview: End plate identification
All available end plate combinations are listed in the following tables. Check the end plates, which you wish to fit, with regard to compatibility, see Tab. B/6 to Tab. B/13:

<table>
<thead>
<tr>
<th>End plate pairs for internal pilot air supply (intrinsic pilot air), with pneumatic connections</th>
<th>Description</th>
</tr>
</thead>
</table>
| CPV10-EPL | CPV10-EPR-G | Ident. code U  
– Connections only in the right-hand end plate  
– No pressure zone separation permitted |
| CPV10-EPL-E | CPV10-EPR-G | Ident. code Y  
– Connections in the left-hand and right-hand end plate  
– Pressure zone separation permitted  
– Maximum number of pressure zones: 3  
• Connections which are not required for the functioning of the valve terminal must be sealed (see also section 3.4.2 “Connecting the supply and work lines”). |
| CPV10-EPL-G | CPV10-EPR | Ident. code V  
– Connections only in the left-hand end plate  
– No pressure zone separation permitted |
### B. Summary of components

#### End plate pairs for internal pilot air supply (intrinsic pilot air), with pneumatic connections

<table>
<thead>
<tr>
<th>Description</th>
<th>CPV10-EPL-G</th>
<th>CPV10-EPR-E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ident. code ---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connections in the left-hand and right-hand end plate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure zone separation permitted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum number of pressure zones: 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection 12/14 in the right-hand end plate must be sealed with a blind plug.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connections which are not required for the functioning of the valve terminal must be sealed (see also section 3.4.2 “Connecting the supply and work lines”).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>CPV10-EPL-G</th>
<th>CPV10-EPR-G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ident. code ---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connections in the left-hand and right-hand end plate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure zone separation only permitted with separator plate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ident.code S for exhaust separation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum number of pressure zones: 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tab. B/6: End plates for internal pilot air supply
### B. Summary of components

<table>
<thead>
<tr>
<th>End plate pairs for internal pilot air supply (intrinsic pilot air), with pneumatic connections and large surface-mounted silencer</th>
<th>Description</th>
</tr>
</thead>
</table>
| CPV10-EPL-G | CPV10-EPR-EU-EX

Ident. code B
- Connections in the left-hand end plate
- No pressure zone separation permitted |

| CPV10-EPL-EU-EX | CPV10-EPR-G

Ident. code A
- Connections in the right-hand end plate
- No pressure zone separation permitted |

Tab. B/7: End plates for internal pilot air supply, with large surface-mounted silencer
### End plate pairs for external pilot air supply (external pilot air), with pneumatic connections

<table>
<thead>
<tr>
<th>Description</th>
<th>CPV10-EPL-E</th>
<th>CPV10-EPR</th>
<th>CPV10-EPL</th>
<th>CPV10-EPR-E</th>
<th>CPV10-EPL-E</th>
<th>CPV10-EPR-E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ident. code X</td>
<td>Connections only in the left-hand end plate</td>
<td>No pressure zone separation permitted</td>
<td>Connections only in the right-hand end plate</td>
<td>No pressure zone separation permitted</td>
<td>Connections in the left-hand and right-hand end plate</td>
<td>Pressure zone separation permitted</td>
</tr>
</tbody>
</table>

Tab. B/8: End plates for external pilot air supply
### End plate pairs for external pilot air supply (external pilot air), with pneumatic connections and large surface-mounted silencer

<table>
<thead>
<tr>
<th>Description</th>
<th>CPV10-EPL-E</th>
<th>CPV10-EPR-EU-EX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ident. code D</td>
<td>Connections in the left-hand end plate</td>
<td>No pressure zone separation permitted</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>CPV10-EPL-EU-EX</th>
<th>CPV10-EPR-E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ident. code C</td>
<td>Connections in the right-hand end plate</td>
<td>No pressure zone separation permitted</td>
</tr>
</tbody>
</table>

Tab. B/9: End plates for external pilot air supply, with large surface-mounted silencer
B. Summary of components

<table>
<thead>
<tr>
<th>End plate pairs for internal pilot air supply (intrinsic pilot air) and pneumatic multipin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPV...-EPL-PG</td>
<td>CPV...-EPR-PG</td>
</tr>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>Ident. code Y</td>
<td>Ident. code Y</td>
</tr>
<tr>
<td>– Connections on the pneumatic multipin</td>
<td>– Connections on the pneumatic multipin</td>
</tr>
<tr>
<td>– Pressure zone separation only permitted with separator plate</td>
<td>– Pressure zone separation only permitted with separator plate</td>
</tr>
<tr>
<td>Ident. code T</td>
<td>Ident. code T</td>
</tr>
<tr>
<td>– Maximum number of pressure zones: 2</td>
<td>– Maximum number of pressure zones: 2</td>
</tr>
<tr>
<td>– Right-hand end plate with internally branched pilot air supply is marked with <strong>INT</strong></td>
<td>– Right-hand end plate with internally branched pilot air supply is marked with <strong>INT</strong></td>
</tr>
</tbody>
</table>

Tab. B/10: End plate pairs for internal pilot air supply and pneumatic multipin
## B. Summary of components

<table>
<thead>
<tr>
<th>End plate pairs for internal pilot air supply (intrinsic pilot air) and pneumatic multipin, with large surface-mounted silencer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPV10-EPL-PEU-EX</td>
<td>CPV10-EPR-PG</td>
</tr>
<tr>
<td><img src="image1.png" alt="Diagram" /></td>
<td><img src="image2.png" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Ident. code G</strong></td>
<td></td>
</tr>
<tr>
<td>— Ports on pneumatic multiple connector plate</td>
<td></td>
</tr>
<tr>
<td>— Exhaust air vented via flat plate silencers</td>
<td></td>
</tr>
<tr>
<td>— Pressure zone separation only permissible with separator plate ident. code T</td>
<td></td>
</tr>
<tr>
<td>— Maximum number of pressure zones: 3</td>
<td></td>
</tr>
<tr>
<td>— Right end plate for internally branched pilot air supply is marked with <strong>INT.</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPV10-EPL-PE</th>
<th>CPV10-EPR-PGU-EX</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3.png" alt="Diagram" /></td>
<td><img src="image4.png" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Ident. code K</strong></td>
<td></td>
</tr>
<tr>
<td>— Connections on the pneumatic multipin *)</td>
<td></td>
</tr>
<tr>
<td>— Exhaust air vented via large surface-mounted silencer</td>
<td></td>
</tr>
<tr>
<td>— Pressure zone separation permitted</td>
<td></td>
</tr>
<tr>
<td>— Maximum number of pressure zones: 3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPV10-EPL-PG</th>
<th>CPV10-EPR-PGU-EX</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image5.png" alt="Diagram" /></td>
<td><img src="image6.png" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Ident. code ---</strong></td>
<td></td>
</tr>
<tr>
<td>— Connections on the pneumatic multipin *)</td>
<td></td>
</tr>
<tr>
<td>— Exhaust air vented via large surface-mounted silencer</td>
<td></td>
</tr>
<tr>
<td>— Pressure zone separation permitted</td>
<td></td>
</tr>
<tr>
<td>— Maximum number of pressure zones: 2</td>
<td></td>
</tr>
</tbody>
</table>
B. Summary of components

### End plate pairs for internal pilot air supply

#### (intrinsic pilot air) and pneumatic multipin, with large surface-mounted silencer

<table>
<thead>
<tr>
<th>Description</th>
<th>Ident. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connections on the pneumatic multipin</td>
<td>J</td>
</tr>
<tr>
<td>Exhaust air vented via large surface-mounted silencer</td>
<td></td>
</tr>
<tr>
<td>Pressure zone separation permitted</td>
<td></td>
</tr>
<tr>
<td>Maximum number of pressure zones: 3</td>
<td></td>
</tr>
</tbody>
</table>

*) Seal connections 11 and 12/14 on the pneumatic multipin below the right-hand end plate.

#### Description

<table>
<thead>
<tr>
<th>CPV10-EPL-PEU-EX</th>
<th>CPV10-EPR-PGU-EX</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Diagram 1]</td>
<td>![Diagram 2]</td>
</tr>
</tbody>
</table>

**Tab. B/11:** End plate pairs for internal pilot air supply and pneumatic multipin, with large surface-mounted silencer

### End plate pairs for external pilot air supply

#### (external pilot air) and pneumatic multipin

<table>
<thead>
<tr>
<th>Description</th>
<th>Ident. code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connections on the pneumatic multipin</td>
<td>Z</td>
</tr>
<tr>
<td>Pressure zone separation only permitted with separator plate</td>
<td>T</td>
</tr>
<tr>
<td>Maximum number of pressure zones: 4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPV10-EPL-PE</th>
<th>CPV10-EPR-PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Diagram 3]</td>
<td>![Diagram 4]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPV10-EPL-PG</th>
<th>CPV10-EPR-PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Diagram 5]</td>
<td>![Diagram 6]</td>
</tr>
</tbody>
</table>

**Tab. B/12:** End plate pairs for external pilot air supply and pneumatic multipin
### B. Summary of components

<table>
<thead>
<tr>
<th>End plate pairs for external pilot air supply (external pilot air) and pneumatic multipin, with large surface-mounted silencer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPV10-EPL-PE</strong></td>
<td><strong>CPV10-EPR-PEU-EX</strong></td>
</tr>
<tr>
<td><img src="image1.png" alt="Diagram" /></td>
<td><img src="image2.png" alt="Diagram" /></td>
</tr>
<tr>
<td>Ident. code E</td>
<td></td>
</tr>
</tbody>
</table>
- Connections on the pneumatic multipin  
- Exhaust air vented via large surface-mounted silencer  
- Pressure zone separation only permitted with separator plate  
- Ident. code T  
- Maximum number of pressure zones: 4 |
| **CPV10-EPL-PG** | **CPV10-EPR-PEU-EX** |
| ![Diagram](image3.png) | ![Diagram](image4.png) |
| Ident. code -- |
- Connections on the pneumatic multipin  
- Exhaust conducted via pneumatic multipin and large surface-mounted silencer  
- Pressure zone separation only permitted with separator plate  
- Ident. code T  
- Maximum number of pressure zones: 3 |
| **CPV10-EPL-PEU-EX** | **CPV10-EPR-PE** |
| ![Diagram](image5.png) | ![Diagram](image6.png) |
| Ident. code F |
- Connections on the pneumatic multipin  
- Exhaust air vented via large surface-mounted silencer  
- Pressure zone separation only permitted with separator plate  
- Ident. code T  
- Maximum number of pressure zones: 4 |
B. Summary of components

<table>
<thead>
<tr>
<th>End plate pairs for external pilot air supply (external pilot air) and pneumatic multipin, with large surface-mounted silencer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPV10-EPL-PEU-EX</td>
<td>CPV10-EPR-PEU-EX</td>
</tr>
<tr>
<td><img src="image1" alt="Diagram of CPV10-EPL-PEU-EX" /></td>
<td><img src="image2" alt="Diagram of CPV10-EPR-PEU-EX" /></td>
</tr>
<tr>
<td>Ident. code H</td>
<td></td>
</tr>
<tr>
<td>– Connections on the pneumatic multipin</td>
<td></td>
</tr>
<tr>
<td>– Pressure zone separation permitted</td>
<td></td>
</tr>
<tr>
<td>– Maximum number of pressure zones: 4</td>
<td></td>
</tr>
<tr>
<td>CPV10-EPL-EU-EX</td>
<td>CPV10-EPR-PEU-EX</td>
</tr>
<tr>
<td><img src="image3" alt="Diagram of CPV10-EPL-EU-EX" /></td>
<td><img src="image4" alt="Diagram of CPV10-EPR-PEU-EX" /></td>
</tr>
<tr>
<td>Ident. code ---</td>
<td></td>
</tr>
<tr>
<td>– Connections on the pneumatic multipin</td>
<td></td>
</tr>
<tr>
<td>– No pressure zone separation permitted</td>
<td></td>
</tr>
</tbody>
</table>

Tab. B/13: End plate pairs for external pilot air supply and pneumatic multipin, with large surface-mounted silencer
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