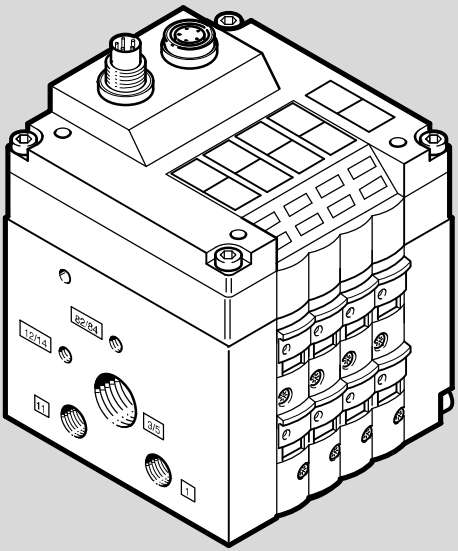
Compact performance



FESTO

Manual
CPV pneumatics

CPV valve terminal
Type CPV...-VI

Manual
165200
en 1609i
[8064940]

Contents and general instructions

Original ..... de

Edition ..... en 1609i

Designation ..... P.BE-CPV-EN

Order no. 165200

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Designated use

The CPV valve terminals described in this manual are intended for fitting into a machine or automated system. The user must at all times observe the safety regulations specified in this manual as well as the instructions concerning the designated use of the relevant CPV valve terminal. CPV valve terminals 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.

Areas of application and approval by authorities

Standards and test values, which the product must observe and fulfil, can be found in the section “Technical specifications”. The product-relevant EU directive can be found in the conformity declaration.

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



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

- Rules for observing the UL certification can be found in the separate UL-specific documentation. The relevant technical specifications listed there also apply here.
- The technical specifications in this documentation may show different values.

Target group

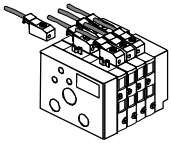
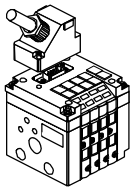
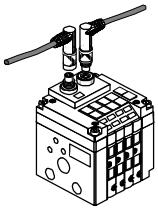
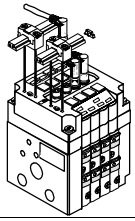
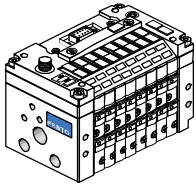
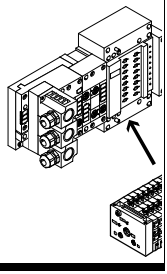
This manual is intended exclusively for technicians trained in control and automation technology who have experience in fitting, installing, commissioning, servicing and converting pneumatic components.

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 the CPV valve terminal. This manual describes only the pneumatic components and refers to the CPV valve terminal variants listed in the table below.

Variants of the CPV valve terminal type CPV...-VI...	
with IC connection Information on the electric/electronic components: in this manual 	with MP connection Information on the electric/electronic components: see leaflet with product 
with CPI/CP connection Information on the electric/electronic components: See manual “CP system, installation and commissioning” 	with AS-Interface connection Information on the electric/electronic components: see leaflet with product 
with CP direct connection Information on the electric/electronic components: see manual “CPV valve terminal with direct connection” for the relevant field bus. 	with ET200X/ET200pro from Siemens Information on the electrical/electronic components: see corresponding manual from Siemens AG 

Tab. 0/1: Variants of the CPV valve terminal

From the colour of the electrical sub-base (CP = black sub-base, CPI = grey sub-base), you can ascertain whether you have a CPV valve terminal with normal functions (CP) or one with extended functions (CPI).

Information on further CP modules, as well as basic information which must be observed in conjunction with the higher-order system, can be found in the manuals for the relevant modules/systems.

The table below gives an overview.

Type	Title	Manuals
Manual Electronics	"CP system, installation and commissioning" type P.BE-CPSYS-...	General basic information on fitting, installing and commissioning CP systems and on their method of operation.
	"CP field bus node, programming and diagnosis" type P.BE-CP-FB... or P.BE-VIFB...-10...	Special information on commissioning, programming and diagnosing related to the node used.
	"CP modules, electronics" type P.BE-CPEA-...	Information on fitting, installing and commissioning CP I/O modules.
	"CPX-CP interface" type P.BE-CPX-CP-...	Instructions on fitting, installing, commissioning and diagnosing CP systems with the CP interface type CPX-CP-4-FB
Manual Pneumatics	"CPV valve terminal, pneumatics" or "CPA valve terminal, pneumatics" type P.BE-CPV-... or P.BE-CPA-...	Information on fitting, installing and commissioning CPA or CPV valve terminals

Tab. 0/2: Manuals on the CP system

Type	Title	Manuals
Manual Electronics	SPC200 Smart Positioning Controller, User manual type P.BE-SPC200-... 	Installation, commissioning and diagnosis with SPC200; standard components and modules
	WinPISA manual type P.SW-WIN-PISA-... 	Functions of the WinPISA software package

Tab. 0/3: Manuals on the SPC200



Note
The CPV valve terminals can also be operated with further Festo products, e.g. the SPC200.

Further information see: → www.festo.com

Important user instructions

Danger categories

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



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



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



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

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



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

Marking special information

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

Pictograms



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



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



Antipollution:
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:

Term	Meaning
5/3G valve extension	Module with two unlockable check valves. With the CPV10/14 valve terminals, the valve function “5/3-way in mid-position closed” is implemented with this module and the valve sub-base Ident. code C.
AS-Interface	**A**ctuator **S**ensor **I**nterface
AS-Interface connection	CPV valve terminal variant with serial connections which enables the CPV valve terminal to be connected to the AS-Interface bus
Blanking plate	Plate without valve function, for reserving empty valve locations
Components	Common term for sub-bases, end plates, relay plates, blanking plates, separator plates, valve sub-bases, valve extensions, vacuum generator plates and pneumatic multipin
Connecting the tubing	Connecting the supply lines (tubing) to the CPV valve terminal
CP	**C**ompact **P**erformance
CP cable	Special cable for coupling the various CP modules
CP connection	CPV valve terminal variant with plug and socket which enables the CPV valve terminal to be connected to a field bus node and further CP modules
CP modules	Common term for the various modules which can be incorporated in a CP system
CP system	Complete system consisting of CP field bus node and CP modules
CPI connection	Socket or plug on the CPI modules which allows the modules to be connected using the CPI or CP cable
CPV10 CPV14 CPV18	Size designations of the CPV valve terminals: – with micro valve sub-bases (CPV10) – with mini valve sub-bases (CPV14) – with midi valve sub-bases (CPV18)
CPV valve terminal	CPV valve terminal (type 10) fir field bus systems or with IC, MP, DI or AS-Interface connections

Term	Meaning
DI connection	CPV valve terminal variant with plug and socket which can be connected directly with the field bus and with further CP modules, depending on type
Electrical sub-base	Sub-base with multipin, AS-Interface, DI or CPI/CP connections
End plate	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 conducting the exhaust air
I/O	Input/output modules
IC connection (individual connection)	CPV valve terminal variant on which every valve solenoid coil can be connected individually with a special CP cable
Manual override	Manual override
MP connection (multipin connection)	CPV valve terminal variant with sub-D plug via which all valve solenoid coils are connected centrally
Pneumatic multipin	Plate for central tubing connections on the valve terminal (supply air, exhaust air and work air connections)
Pneumatic multiple connector plate	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)
Relay plate	Plate with relay coils for actuating two electrically-isolated outputs
Separator plate	Plate for dividing the valve terminal into two/four pressure zones
Vacuum generator plate	Plate with vacuum generator (with or without reject pulse)
Valve manifold	Basic unit with valve sub-base, vacuum generator plate, separator, blanking, relay and end plates
Valve sub-base	Sub-base with single-solenoid or double-solenoid valves

Tab. 0/4: Product-specific terms and abbreviations

System summary

Chapter 1

Contents

1. System summary 1-1

1.1 Description of variants 1-3
1.2 Description of components 1-7

1.1 Description of variants

Festo assists you in solving your automation task at the machine level with valve terminals. The modular structure of the CP system enables you to incorporate the CP valve terminals and I/O modules optimally in your machine or system.

Due to its compact structure the CP valve terminal can be mounted close 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.

CPV valve terminal variants

The CPV valve terminals are available with the following types of electrical connections:

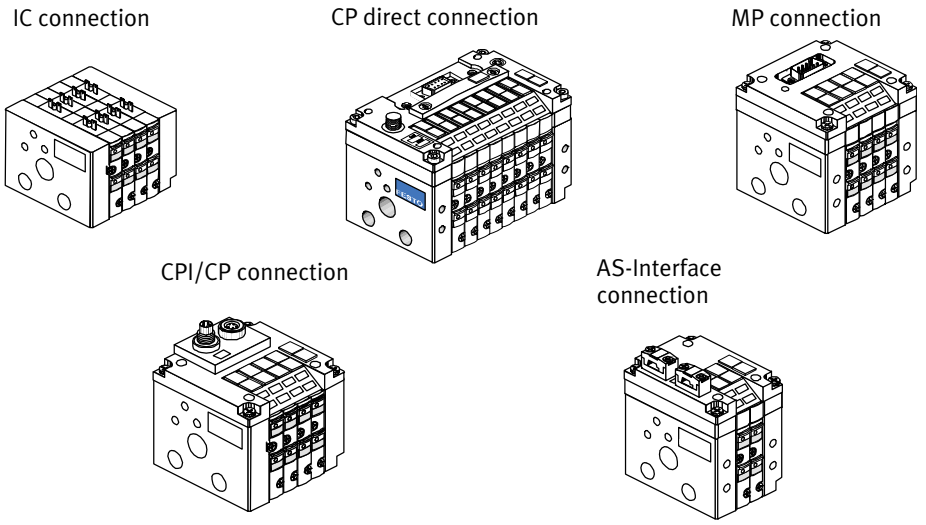


Fig. 1/1: Variants of the CPV valve terminal

CPV valve terminal with IC connection

The CPV valve terminal with IC connection is available with 2 to 8 valve sub-bases (also in odd gradation). The electrical connection is made individually on each valve solenoid coil.

CPV valve terminal with MP connection

This CPV valve terminal is available with 4, 6 or 8 valve sub-bases. The valve solenoid coils are connected electrically via the multipin connection.

CPV valve terminal with CPI/CP connection

The CPV valve terminal with CPI/CP connection is available with 4, 6 or 8 valve sub-bases. The connection to the higher-order field bus node is made via special ready-to-use CP cables.

CPV valve terminal with DI connection

The CPV valve terminals with direct connection are available for the following field bus systems in the sizes CPV10/14/18:

- CANopen
- DeviceNet
- IP link (CPV10/14)
- CC link
- Interbus
- PROFIBUS-DP, Festo field bus, ABB CS 31, Klöckner-Moeller SUCOnet K

These valve terminals can be connected directly to the relevant field bus. These CPV valve terminals are fitted with 4 or 8 valve sub-bases depending on the field bus system.

CPV valve terminal with CT200X/CT200pro connection

This CPV valve terminal is an adaptation of the CPV valve terminal to the input/output module ET200X/ET200pro from Siemens:

- 8 valve slices/16 solenoid coils
- Size CPV10 and CPV14

CPV valve terminal with AS-Interface connection

This CPV valve terminal is connected to the AS-Interface bus via special AS-Interface cables. It is available with 2, 4 or 8 valve sub-bases depending on the variant and with four different kinds of electrical connections:

- with additional supply connection for implementing an emergency stop function
- with additional supply connection and 4 or 8 inputs (not CPV18)
- without additional supply connection
- without additional supply connection with 4 or 8 inputs (not CPV18).

The CPV valve terminals with AS-Interface connection can be fitted with max. following valve sub-bases:

Valve sub-base with...	**ASI-2 (...-Z)**	**ASI-4 (...Z) ...ASI-4E4A (...-Z)**	**...ASI-8E8A-Z**
... two 2/2-way valves (single-solenoid)	1	2	4
... two 3/2-way valves (single-solenoid)	1	2	4
... 5/2-way valve (single-solenoid)	2	4	8
... 5/2-way valve (double-solenoid)	1	2	4
... 5/3-way valve	1	2	–

Tab. 1/1: Maximum number of sub-bases on the CPV valve terminals with AS-Interface connection



The CPV valve terminals with AS-Interface connection and 4 or 8 inputs have 4 or 8 valve sub-bases. These CPV valve terminals also have blanking plates depending on the number of valve sub-bases.

1.2 Description of components

Sizes of the CPV valve terminals

The CPV valve terminals are available in the following sizes:

CPV10	10 mm	Micro valves
CPV14	14 mm	Mini valves
CPV18	18 mm	Midi valves

Tab. 1/2: Sizes of the CPV valve terminals

Identification code

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

I.C.	Pneumatic components
Valve sub-bases with 2/2-way valves	
D	Two 2/2-way valves, single-solenoid, basic position closed
DK	Only for CPV10/14: two 2/2-way valves (with channel separation 1, 11), single-solenoid, basic position closed
I	Two 2/2-way valves, basic position control side 14 open, control side 12 closed
IK	Only for CPV10/14: two 2/2-way valves (with channel separation 1, 11), basic position control side 14 open, control side 12 closed
Valve sub-bases with 3/2-way valves	
C	Two 3/2-way valves, single-solenoid, basic position closed
CK	Two 3/2-way valves (with channel separation 1, 11), single-solenoid, basic position closed
CY	Two 3/2-way valves (with back pressure flaps for exhaust channels 3, 5), single-solenoid, basic position closed, spring reset
H	Two 3/2-way valves, basic position control side 14 open, control side 12 closed
HK	Only for CPV10/14: two 3/2-way valves (with channel separation 1, 11), basic position control side 14 open, control side 12 closed
N	Two 3/2-way valves, basic position open
NK	Only for CPV10/14: two 3/2-way valves (with channel separation 1, 11), basic position open
Valve sub-bases with 5/2-way valves	
F	5/2-way valve, single-solenoid, fast-switching
J	5/2-way valve, double solenoid
JK	Only for CPV10/14: 5/2-way valve (with channel separation 1, 11), double solenoid
M	5/2-way valve, single solenoid
MK	Only for CPV10/14: 5/2-way valve (with channel separation 1, 11) single solenoid

I.C.	Pneumatic components
Valve sub-bases with 5/3-way valves	
G	CPV10/14: two 3/2-way valves, basic position closed + valve extension 5/3G CPV18: 5/3-way valve, mid-position closed
Vacuum generator plates	
A	Without reject pulse
E	With 2/2-way valve for reject pulse
Separator plates	
S	Exhaust channel (3/5) and compressed air channels (1, 11) closed
T	Compressed air channels (1, 11) closed
Blanking plate	
L	Plate without valve function for reserving a valve position
Relay plate	
R	Plate with two electrically-isolated relays
Valve extensions	
P	One-way flow control valve for restricting the supply air
Q	One-way flow control valve for restricting the exhaust air
V	Flow control valve for setting the reject pulse

Tab. 1/3: Identification codes of the pneumatic components



Further information on the valve sub-bases and vacuum generator plates can be found in appendix B.
Important information on the valve with ident. code CY can be found in the following section.

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 drive connected to the valve.

Note

– Additional measures are needed when used in safety-relevant applications, e.g. in Europe, compliance with standards listed under the EC Directive on Machinery. Without additional measures corresponding to legally specified minimum requirements, the product is not suited as a safety-relevant part of controls.
– If a separator plate is used between the valve plates (for forming pressure zones), we recommend the use of separator plate Ident. code S. This plate separates the supply channnels 1, 11 and the exhaust channel 3/5.
– Back pressures in the exhaust channel can prevent the valve from switching. The valve switches as soon as the back pressure is reduced and the control signal is still applied.
• Operate the CPV valve terminal fitted with valves with Ident. code CY with external pilot air. This ensures that the back pressure flaps are securely closed even with the operating pressure switched off.

Valve extension 5/3G (only CPV10/14)

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

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

Flow control valve or one-way flow control valve extension

With the following valve extensions you can adapt the CPV valve terminal to the requirements of your machine or 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)

– One-way flow control valve for restricting the exhaust air (Ident. code Q)

For setting the reject pulse of the vacuum generator plate (Ident. code E):

– Flow control valve (Ident. code V).

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 under “Fitting the valve extensions” in section 2.4 and under “General instructions” in section 4.1.

Vacuum generator plates

CPV valve terminals can be fitted with vacuum generator plates for generating vacuum. Work items with a smooth and tight surface can then be sucked in.

Two types of vacuum generators are available:

– Plate with switchable vacuum generator (Ident. code A).

– Plate with switchable vacuum generator and additional 2/2-way valve for generating the reject pulse (Ident. code A).



Further information on the vacuum generator plates can be found under “Vacuum generator plates” in section 3.4.2.

Separator plate

By means of separator plates you can divide the CPV valve terminals into 2 to 4 pressure zones. Two types of separator plates are available:

– Separator plate with closed compressed air channels (1 and 11).

– Only CPV10/14: Separator plate with closed exhaust channel (3/5) and closed compressed air channels (1 and 11).

Valve plates with channel separation

You can implement pressure zones on CPV10/14 valve terminals also with valve plates 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.

Relay plate

CPV10/14 valve terminals which have holding current reduction can be fitted with relay plates. This applies to CPV valve terminals with the following connection:

– CPI/CP connection

– CPV direct connection

– AS-Interface connection (only CPV10 valve terminals)

– IC connection (only in combination with connector socket NEBV-Z3WA2L-R-E-...-LE2-S1 (CPV10/14)

– MP connection

Each relay plate has two relays for actuating two electrically isolated outputs.

Pneumatic multipin

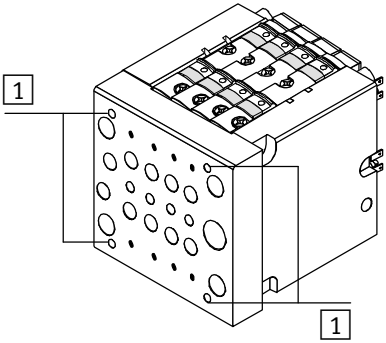
The pneumatic multipin serves as a common connection for power supply and work lines. Valve terminal type CPV10-...-VI is screwed together with the pneumatic multipin and sealed to it by means of sealing discs. The pneumatic multipin enables valve terminal type CPV10-...-VI to be easily disconnected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

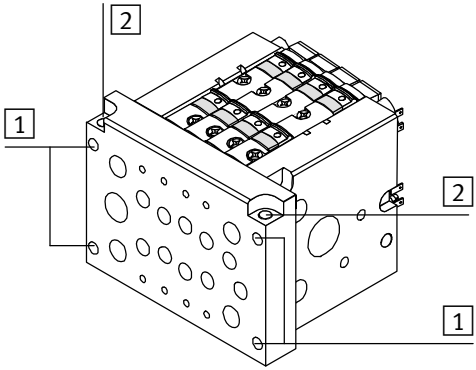
2. With mounting flange:
   With this variant for fitting onto a wall or stand the pneumatic multipin lies over the end plates: The mounting holes are located in the flange for ease of mounting. Two additional holes running crossways through this pneumatic multipin (CPV10-VI-B) also allow rear mounting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

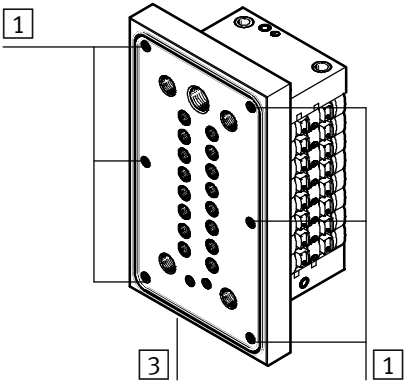
Pneumatic multipin without flange



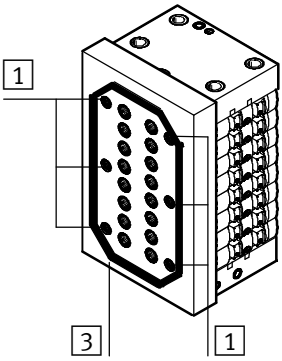
Pneumatic multipin with flange



Pneumatic multiple connector plate with supply connctions



Pneumatic multiple connector plate without supply connctions



1 Vertical mounting holes

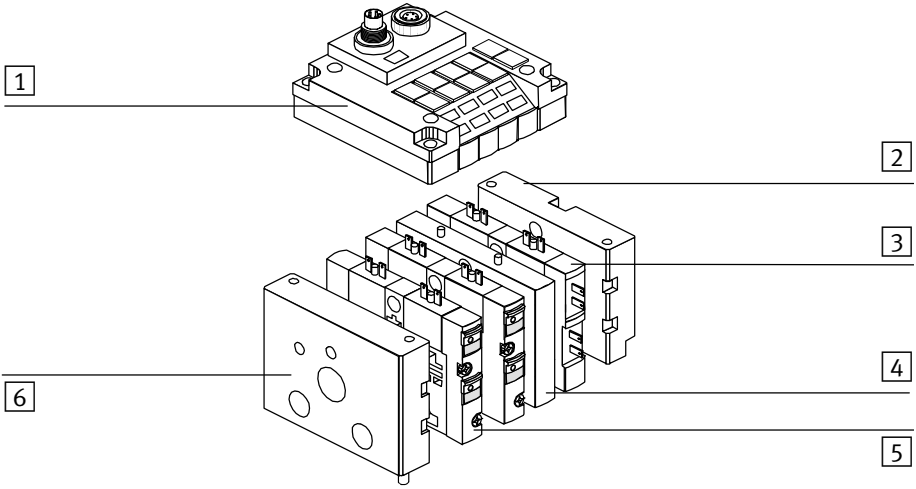
2 Horizontal mounting holes

3 Sealing ring

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

The CPV valve terminal can consist of the following components, depending on what has been ordered:

Overview of components



1 Electrical sub-base
(only CPV valve terminals with MP, AS-Interface or CPI/CP connections)

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

3 Relay plate (see also compatibility list in Tab. 5/2)

4 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)

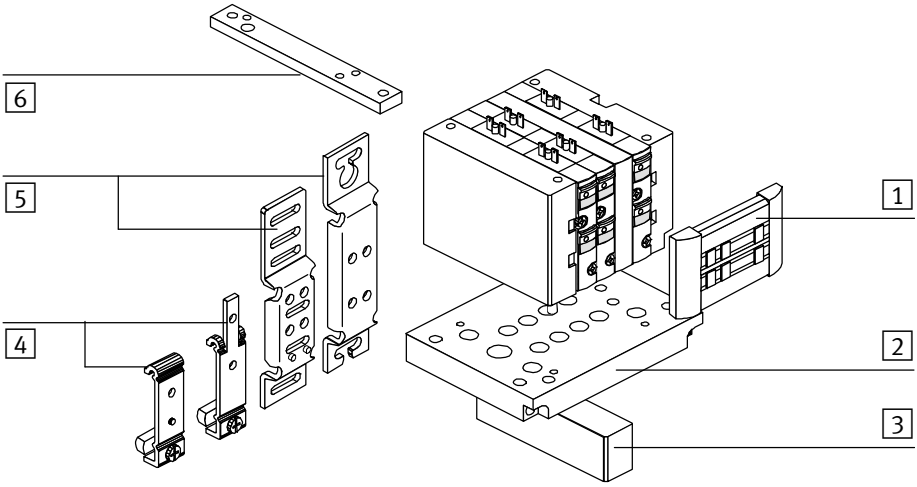
5 Valve sub-bases fitted with single-solenoid, double-solenoid or vacuum valves

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

Fig. 1/3: Components of the CPV valve terminal

Supplementary components of the CPV valve terminal

The CPV valve terminal can be supplemented optionally by the following components:



1 Manual override cover and support for identification signs, not in conjunction with relay plate

2 Pneumatic multipin

3 Valve extensions (5/3G function (only CPV10/14), vacuum restrictor valve or one-way flow control valve)

4 Support for hat rail fitting for CPV10/14 or CPV18

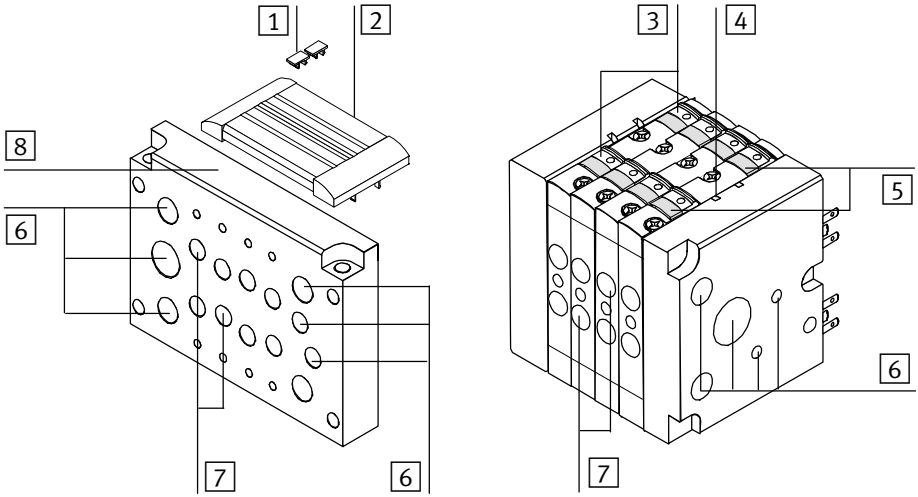
5 Support for wall fitting for CPV10/14 or CPV18

6 Support for wall fitting for CPV10/14

Fig. 1/4: Supplements to the CPV valve terminal

Connecting, display and operating elements

You will find the following connecting, display and operating elements on the CPV valve terminal:



1 Valve location for identification signs

2 Manual override cover and support for identification signs

3 Manual override (per pilot solenoid, locking or non-locking)

4 Removing the manual override cover

5 Operating the non-locking manual override

6 Supply air connections (1, 11, 12/14), exhaust air connections (3/5, 82/84): with individual tubing on the left and/or right-hand end plate, with central tubing on the pneumatic multipin

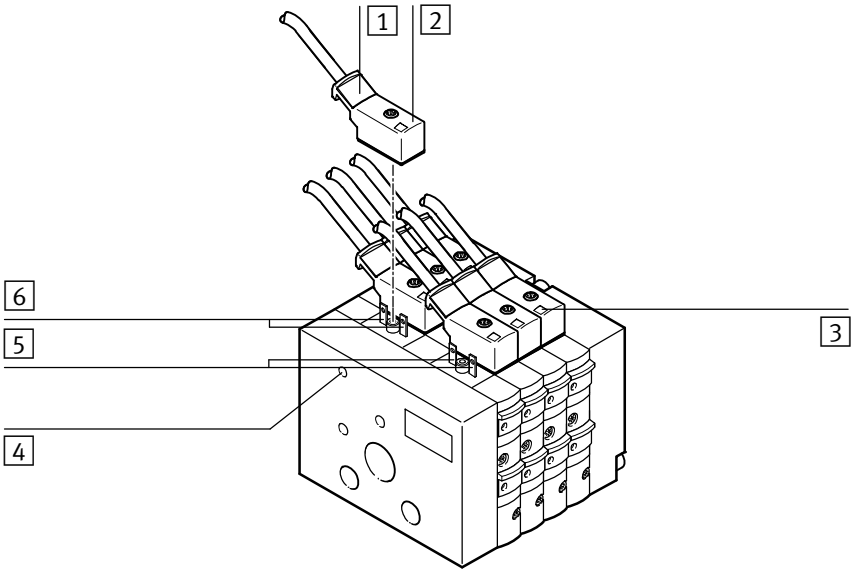
7 Work connections (2, 4) per valve

8 Pneumatic multipin

Fig. 1/5: Pneumatic connecting, display and operating elements of the CPV valve terminal

Instructions on the electrical connecting and display elements of the CPV valve terminals with direct connection can be found in the appropriate electronics manuals.

You will find the following electrical connecting and display elements on the CPV valve terminal with IC connection:



1 Identification sign
(for each connector socket)

2 Ready-to-use connector socket
(for each pilot solenoid),
can be turned 180°

3 Yellow LED, signal status displays
for pilot solenoid
(for each connector socket)

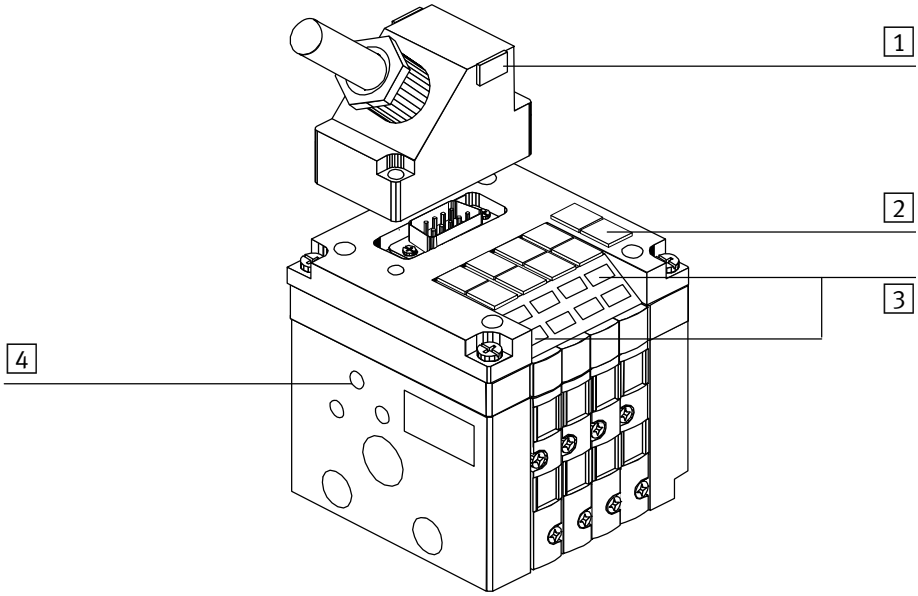
4 Earth connection

5 Terminal lugs of pilot solenoid coil 14

6 Terminal lugs of pilot solenoid coil 12

Fig. 1/6: Electrical connecting and display elements of the CPV valve terminal with IC connection

You will find the following electrical connecting and display elements on the CPV valve terminal with MP connection:



1 SUB-D multipin plug (9-pin for terminals with 4 valves, 25-pin for terminals with 6 or 8 valves)

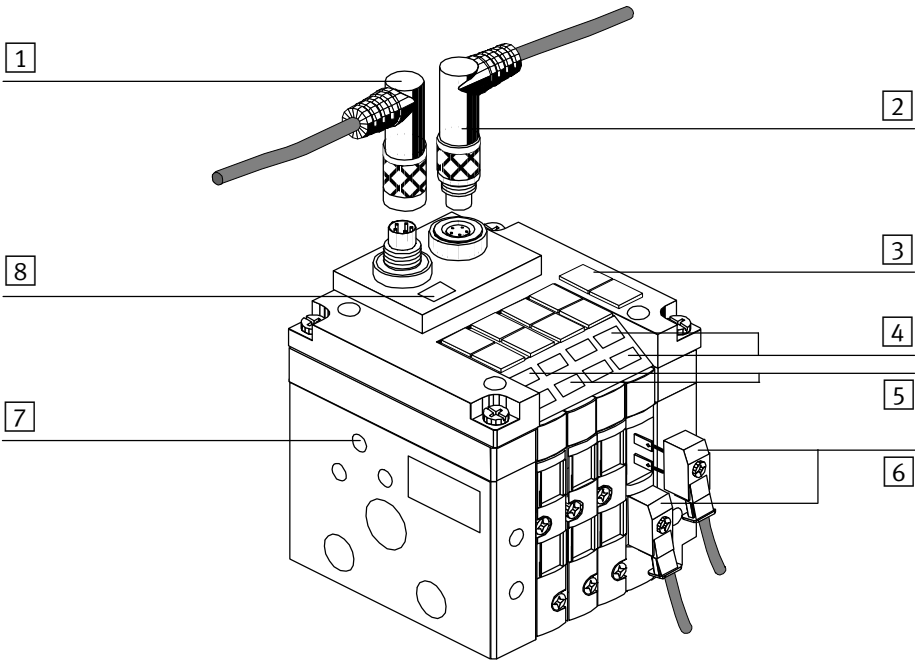
2 Identification signs

3 Yellow LED, signal status displays of the pilot solenoids

4 Earth connection

Fig. 1/7: Electrical connecting and display elements of the CPV valve terminal with MP connection

You will find the following electrical connecting and display elements on the CPV valve terminal with CPI/CP connection:



1 Incoming CP cable

2 Continuing CP cable

3 Identification signs

4 Yellow LED, signal status display of the relays

5 Yellow LED, signal status displays of the pilot solenoids

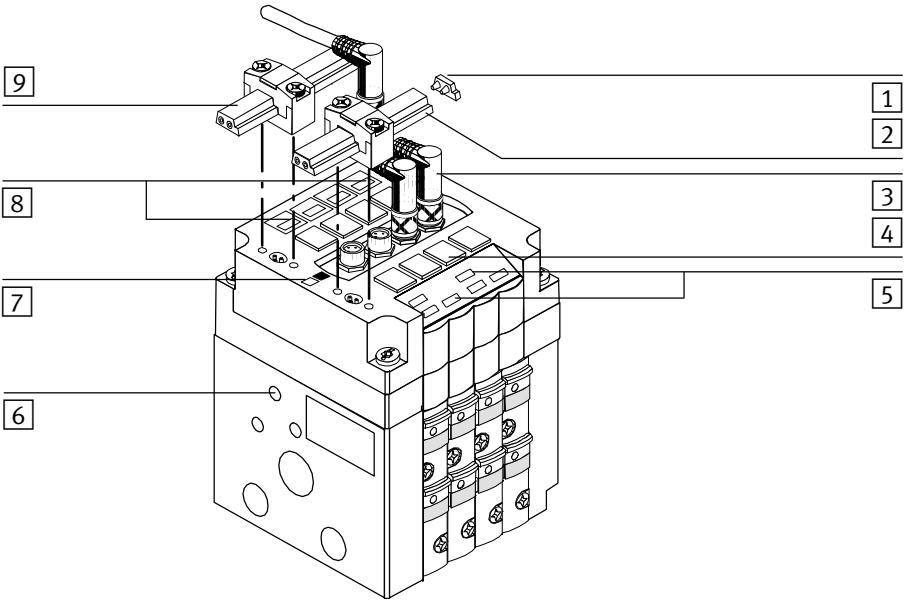
6 Relay connectionswith connecting cable

7 Earth connection

8 Green LED, status dislpay of the CP connection

Fig. 1/8: Electrical connecting and display elements of the CPV valve terminal with CPI/CP connection

You will find the following electrical connecting and display elements on the CPV valve terminal with AS-Interface connection:



1 AS-Interface cable cap, (only CPV...-GE-ASI-...-Z)

2 Cable socket of the additional supply with black cable, (only CPV...-GE-ASI-...-Z)

3 Sensor cable with plug (only CPV...-GE-ASI-...E...A-...)

4 Identification signs

5 Yellow LED, signal status displays of the pilot solenoids

6 Earth connection

7 BUS LED 1 (green), BUS LED 2 (red), (only CPV...-GE-ASI-...E...A-...)

8 Green LED status displays of the inputs, (only CPV...-GE-ASI-...E...A-...)

9 AS-Interface bus socket with yellow bus cable

Fig. 1/9: Electrical connecting and display elements of the CPV valve terminal with AS-Interface connection

Fitting

Chapter 2

Contents

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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.





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 CPV valve terminal with individual tubing

Fitting variants

The CPV valve terminal with individual tubing has already been prepared for integration in a system or machine for the following fitting variants:

– Wall mounting

– H-rail mounting

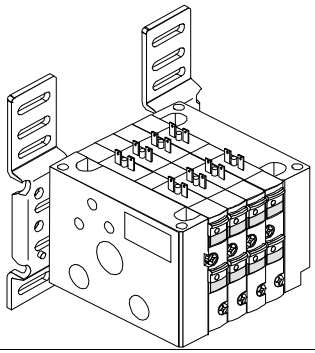
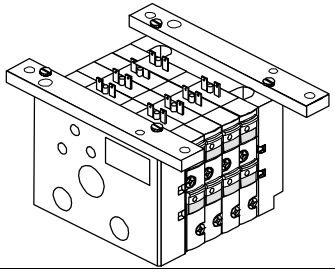
– Fitting onto a stand

– Fitting into a control cabinet

Note
If vibrations, which exceed the following values, occur on your application:
– 0.15 mm path at 10 ... 58 Hz
– 2 g acceleration at 58 ... 150 Hz
you should mount the CPV14 or CPV18 valve terminal on a wall or on a stand.

2.2.1 Wall mounting

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

Mounting method	
Rear	On head side (only CPV10/14 with IC connection)
	
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

For rear fitting of the CPV10/14 valve terminals with direct connection for Interbus Loop (type CPV...-GE-IL-...) or AS-Interface connection with inputs/outputs (type CPV...-GE-ASI...E/...A) there is a special mounting kit which is not listed here.

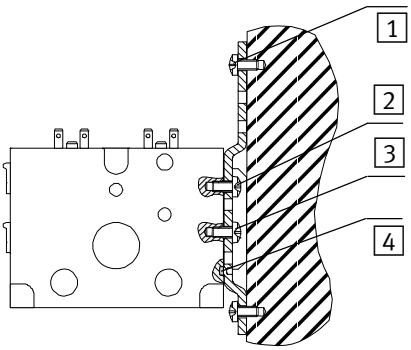
Proceed as follows:

- Make sure that the fastening surface can support the weight of the CPV valve terminal.
- Fit the fastening profile section to the left-hand and right-hand end plates (see Fig. 2/2). Use here the self-threading screws supplied (see table). When fitting the CPV10/14 valve terminals “from the rear”, make sure that the fixing bolts of the fastening profile sections grip into the recess in the end plates.

Valve terminal	**Type of mounting: Rear**		**Type of mounting: Front**	
	self-threading screw	**tightening torque**	**self-threading screw**	**tightening torque**
CPV10/14	M4 x 10	1.5 Nm	M3 x 18	1.5 Nm ± 0.2 Nm
CPV18	M5 x 10	4 Nm	–	–

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

Type of mounting: Rear



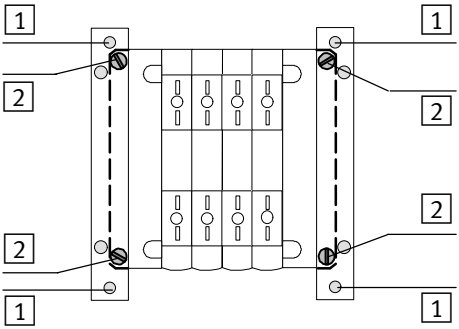
1 M4 (CPV10/14) or M5 screw (CPV18) for fastening onto a wall

2 Additional self-threading screw with CPV18 valve terminals

3 Self-threading screws for fastening the profile sections onto the CPV valve terminal

4 Fixing bolts (only CPV10/14)

Type of mounting: Front



1 5.5 mm bore for wall fastening

2 Self-threading screws for fastening the profile sections onto the CPV valve terminal

Fig. 2/1: Connecting the CPV valve terminal

- 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.



Note
The hole dimensions for rear fitting of the CPV valve terminal (Tab. 2/3) do not apply to CPV10/14 valve terminals with direct connection for Interbus Loop (type CPV...-GE-IL-...) or AS-Interface connection with inputs/outputs (type CPV...-GE-ASI...E/...A).

1 Mounting options

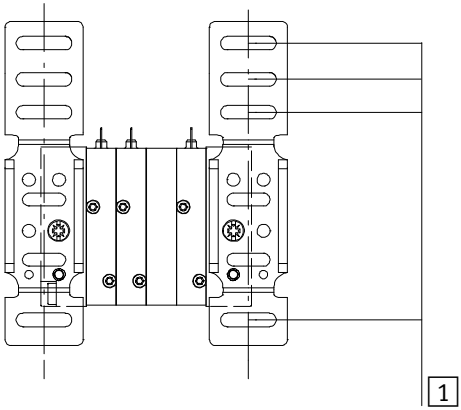


Fig. 2/2: Fastening holes for the rear fitting

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

Valve terminal	Type of mounting: Rear		Type of mounting: Front	
	Diameter of the fastening holes	Threaded hole for	Diameter of the fastening holes	Threaded hole for
CPV10/14	4.5 mm	M4 screw	5.5 mm	M5 screw
CPV18	5.5 mm	M5 screw	–	–

Tab. 2/3: Holes for wall fitting

- Fasten the CPV valve terminal with four M4 or M5 screws of sufficient length to the wall.

2.2.2 Hat rail mounting

In order to fit the CPV valve terminal onto a hat rail you will require the following mounting kits (see Festo catalogue: ⟶ www.festo.com):
Both mounting kits consist of 2 brackets, 2 or 4 M4x10 self-threading screws (CPV10/14) or M5x10 (CPV18) and 2 M4x10 screws with clamping elements and springs.

Proceed as follows:

- Make sure that the fastening surface can support the weight of the CPV valve terminal.
- Fit the following hat rail:

Hat rail for CPV10/14 valve terminal	**Hat rail for CPV18 valve terminal**
Support rail DIN 50022 – 35x7.5, (width 35 mm, height 7.5 mm)	Support rail DIN 50022 – 35x15 (width 35 mm, height 15 mm)

Tab. 2/4: Hat rails

- Make sure that there is sufficient space for connecting the supply cables and tubing, and that extra space is available for fitting CPV valve terminals with large surface-mounted silencers.
- Fasten the hat rail to the fastening surface approximately every 100 mm.
- Fasten the two brackets to the end plates with the screws supplied as shown in the diagram below. With CPV10/14 valve terminals, make sure that the fastening bolts of the brackets grip into the recess in the CPV valve terminal.

CPV valve terminal	**Self-threading screw**	**Tightening torque**
CPV10/14	M4x10	1.5 Nm
CPV18	M5x10	4 Nm

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

1 Per end plate one M4x10 screw (CPV10), two M4x10 screws (CPV14) or M5x10 (CPV18)

2 H-rail

3 Fixing bolts (only CPV10/14)

4 H-rail clamping unit

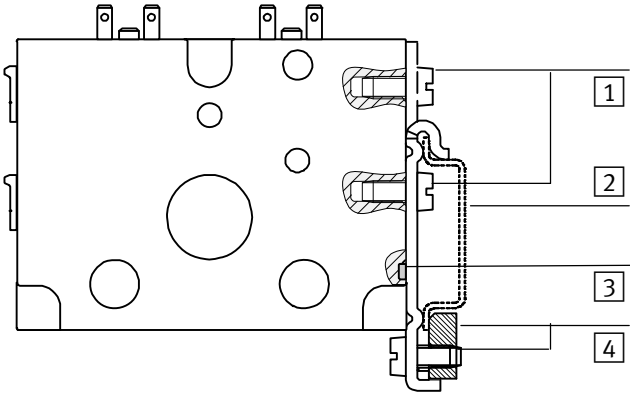


Fig. 2/3: Fitting the valve terminal on a hat rail

- Hang the CPV valve terminal onto the hat rail. Secure the CPV valve terminal on both sides with the hat rail clamping unit against slipping or sliding down.

2.2.3 Fitting onto a stand

In order to fit the CPV valve terminal onto a stand (fitting on the level of work connections 2 and 4), you will require the following fastening screws:
– 4 M4x45 socket head screws (CPV10)
– 4 M4x50 socket head screws (CPV14)
– 4 M6x65 socket head screws (CPV18)

Proceed as follows:

- Prepare the fastening surface. If necessary, make a suitable bracket. The position of the mounting holes of the CPV valve terminal is shown in the following diagram:

[1] Fastening holes

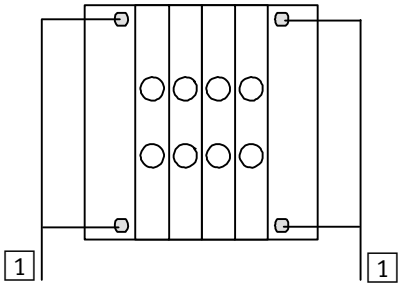


Fig. 2/4: Fastening holes for fitting onto a stand

- Make sure that there is sufficient space for connecting the supply cables and tubing, and that extra space is available for fitting CPV valve terminals with large surface-mounted silencers.
- With CPV valve terminals with IC connection:
  Insert the four socket head screws supplied into the holes in the left-hand and right-hand end plates (see diagram).

1 Socket head screws M4 x 45 or M4 x 50 or M6 x 65

2 End plates

3 Fastening bracket

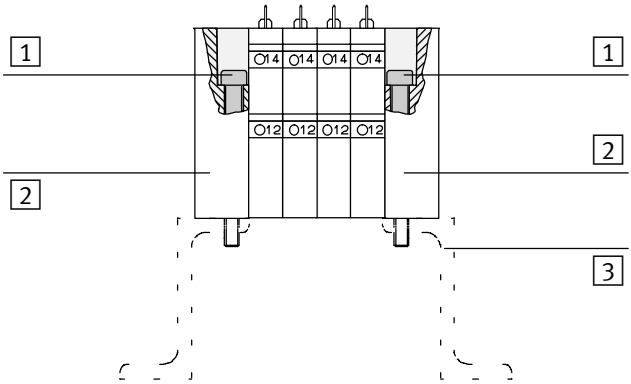


Fig. 2/5: Position of the fastening holes

- Screw the CPV valve terminal to the connection surface or to the fastening bracket.

2.2.4 Fitting into a control cabinet

See chapter 2.2.3.

2.2.5 Fitting the CPV valve terminal to the SIMATIC ET200X

Instructions on the decentral periphery device ET200X can be found in the relevant manual from SIEMENS AG.

A CPV valve terminal with

- IC connection,
- 8 valve sub-bases,
- mounted fastening CPV...-VI-BG-ET200X and
- appropriate flat seal

can be mounted on a pneumatic interface module type EM 148-P-DO 16 x P/CPV... for the decentral periphery device ET200X.

When the terminal is fitted into place, the switching status of the valve solenoid coils can be seen on the relevant LED on the pneumatic interface module.

Assembly

Proceed as follows:

1. The fastening is already fitted to the CPV valve terminal. Make sure that the flat seal is placed correctly over the terminal lugs and the centring bolt which lies between them (see Fig. 2/6).

2. Mark the positions of the four holes for the fastening screws on the background.
   Tip: Hold the pneumatic interface module against the mounting surface and mark the positions of the holes. Drill the four fastening holes for screws of size M5.

[1] Fastening

[2] Terminal lug with centring bolt

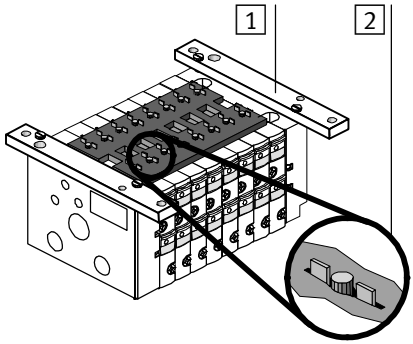


Fig. 2/6: Preparing for fitting onto the SIMATIC ET200X

3. Place the valve terminal carefully and without tilting onto the pneumatic interface module.
   – Insert the centring pins in the appropriate holes.
   – Do not bend the terminal lugs.
   Screw tight the valve terminal and the pneumatic interface module on the mounting surface with four screws (see Fig. 2/7).

1 M5 screws, at least 60 mm long (ISO 1207/ ISO 1580 – DIN 84 or DIN 912)

2 Centering pins

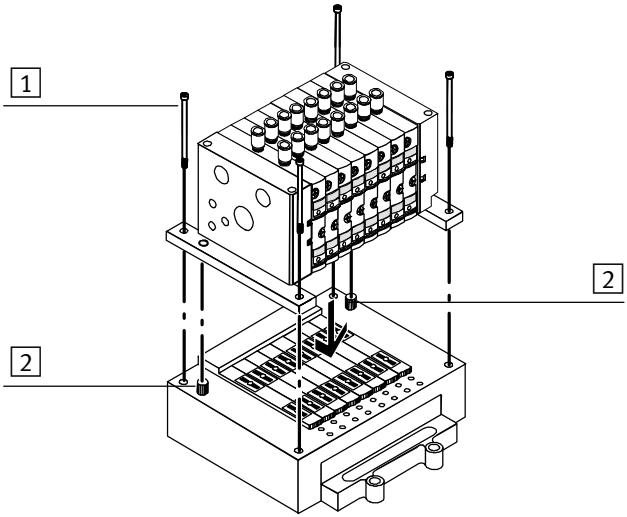


Fig. 2/7: Fitting the CPV valve terminal onto the Siemens SIMATIC ET200X

Note

Removing the CPV valve terminal from the pneumatic interface module:

- pull the CPV valve terminal carefully upwards without tilting.

When refitting the CPV valve terminal onto the pneumatic interface module:

- replace the flat seals on the following CPV valve terminals if they have been operated in a dirty environment:
  - type CPV10-GE-8
  - type CPV14-GE-8

2.2.6 Fitting the CPV valve terminal onto SIMATIC ET200pro

A CPV valve terminal with:

- IC connection,
- 8 valve sub-bases,
- and appropriate flat seal

can be mounted on the SIEMENS pneumatic interface module 16 DO DC24V CPV... for the decentral periphery device ET200pro.

Instructions on fitting the CPV valve terminal to the decentral periphery device ET200pro can be found in the corresponding manual from SIEMENS AG.

2.3 CPV valve terminal with pneumatic multipin

Only CPV valve terminals fitted with appropriate end plates may be mounted on the pneumatic multipin. CPV valve terminals with end plates for individual tubing need to be converted before they can be fitted onto 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
2. with mounting flange
3. fitting into a control cabinet.

CPV valve terminals with large surface-mounted silencers, which are fitted onto the pneumatic multipin with mounting flange, 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.

2.3.1 Fitting the pneumatic multipin

Make sure that the fastening surface can support the pneumatic multipin and the CPV valve terminal. Make sure that there is sufficient space for connecting the supply cables and tubing, and that extra space is available for fitting CPV valve terminals with large surface-mounted silencers.

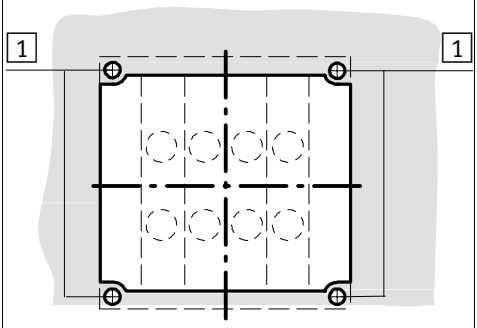
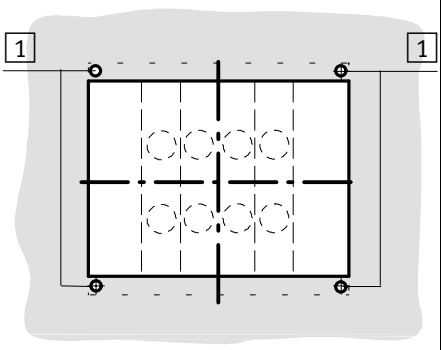
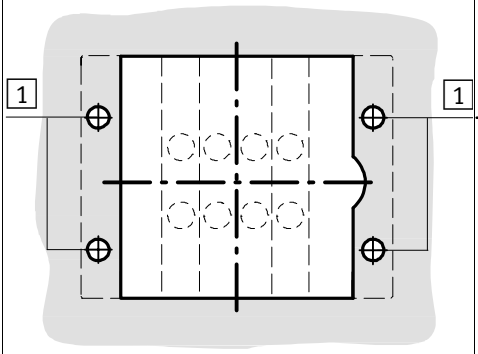
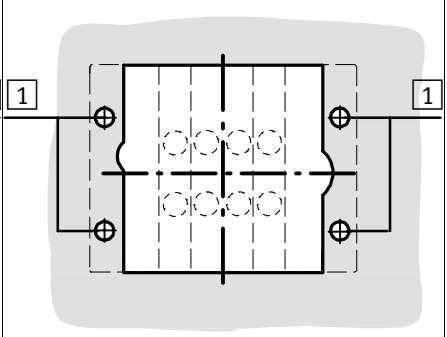
Fitting the pneumatic multipin (connection side)

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 sufficient length (see table).

Pneumatic multipin (without flange)		**Pneumatic multipin (with flange)**
CPV10/14	CPV18	CPV10/14/18
4.5 mm	5.5 mm	6.5 mm
M4	M5	M6

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

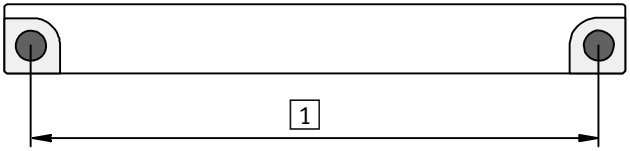
CPV10/14	CPV18
without flange:	
	
with flange:	
	

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

Fitting the pneumatic multipin (rear side)

Proceed as follows in order to fit the pneumatic multipin (with flange) with its rear side onto a mounting surface:

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



Dimensions 1			
Number of valve locations	**CPV10**	**CPV14**	**CPV18**
2	62 mm	80 mm	107 mm
4	82 mm	108 mm	143 mm
6	102mm	136 mm	179 mm
8	122 mm	164 mm	215 mm

Tab. 2/8: Hole dimensions for rear fitting

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

2.3.2 Fitting the CPV valve terminal to the pneumatic multipin

Proceed as follows:

- With CPV valve terminals with IC connection, insert the socket head screws supplied into the fastening holes. With MP, AS-Interface, DI or CPI/CP connections, the socket head screws are already in the fastening holes under the electrical sub-base and are secured against loss.
- 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 the CPV valve terminal with the 4 socket head screws on the multipin. Tighten the screws in diagonally opposite sequence with 2 Nm (CPV10/14) or 4 Nm (CPV18).

1 3-part seal in the connections of the left-hand end plate

2 2 seals per valve sub-base for the work connections

3 4-part seal in the connections of the right-hand end plate

4 Socket head fastening screws of the pneumatic multipin

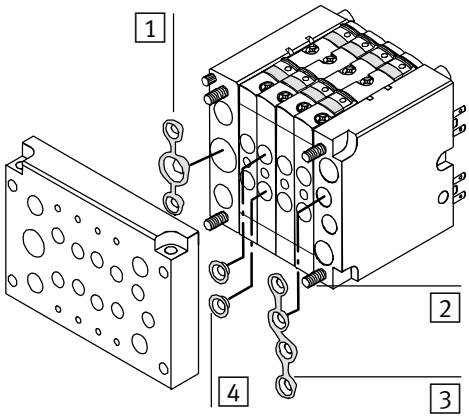


Fig. 2/8: Fitting the CPV valve terminal onto the pneumatic multipin



Instructions on fitting the CPV valve terminal to the pneumatic multiple connector plate can be found in the following assembly instructions:

1. CPV10-VI-P... – for valve terminal CPV10
2. CPV14-VI-P... – for valve terminal CPV14.

2.4 Fitting the valve extensions



Note

- If the pneumatic multipin is used with mounting flange, the outer valve sub-bases cannot be fitted with valve extensions.
- The valve extension 5/3G is intended for use with one working pressure for each valve sub-base, i.e. it must not be used in two-pressure operation (different pressure at connections 1 and 11).
- If other valve sub-bases are to be fitted onto the CPV valve terminal in two-pressure mode, 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 dividing 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 with 0.8 Nm (CPV10) or 1.2 Nm (CPV14).
- Connect the work lines as described under “Connecting the supply and work lines” in the section 3.4.2.
- 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.

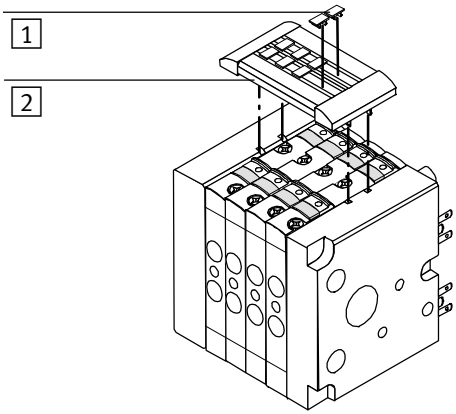
2.5 Fitting the identifier support

Before the valve identifier signs can be fitted, the CPV valve terminal must be fitted with an identifier support. This will also protect the manual overrides against unauthorised operation. It should be fitted at the front above the manual override.

The identifier support cannot be fitted if the CPV valve terminal is equipped with relay plates.

Proceed as follows:

- Clip the identifier support into the recess in the left and right-hand end plates (see diagram).
- Clip the identifier signs into the grooves in the identifier support (see diagram).



1 Valve identifier labels

2 Identifier support

Fig. 2/9: Fitting the identifier support

2.6 Fitting covers on the manual overrides

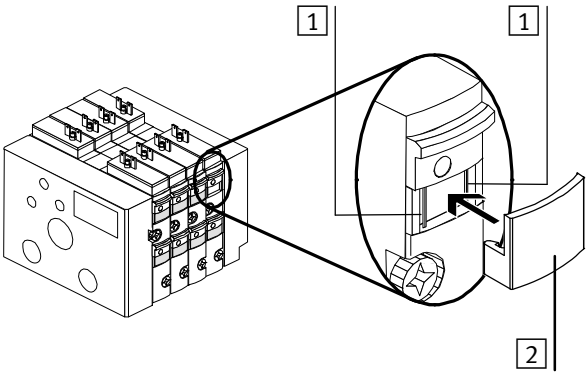
Individual covers can be fitted over the manual overrides to protect them against unauthorized use.

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. 2/10).

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. 5/6).



1 Guide grooves on the manual overrides

2 Cover for the manual override

Fig. 2/10: Fitting covers on the manual overrides

Installation

Chapter 3

Contents

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3.1	Preparing the compressed air	3-3
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3.1 Preparing the compressed air



Caution
Dirty 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 oil methylester), the residual oil content must not exceed 0.1 mg/m^3 (see ISO 8573-1 class 2).
- If mineral oils are used (e.g. HLP oils as per DIN 51524 parts 1 to 3) or corresponding oils on a polyalphaolefine basis (PAO), the residual oil content must not exceed 5 mg/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.

3.1.2 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/m^3 (ISO 8573-1 class 5).
- Make sure that the lubricator setting is correct (see following section)

You will thereby avoid functional damage to the valves.

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.

3.2 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.



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

– Rules for observing the UL certification can be found in the separate UL-specific documentation. The relevant technical specifications listed there also apply here.
– The technical specifications in this documentation may show different values.



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.

3.3 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 coupling of the threaded connector.
2. Tighten the clamping screw [1] or, if applicable, pull the locking ring [2] over the tube coupling.
3. Seal connections that are not required with blanking plugs [3].
4. For better system clarity, group the tubing together with:
   – tubing straps or
   – multiple hose holders

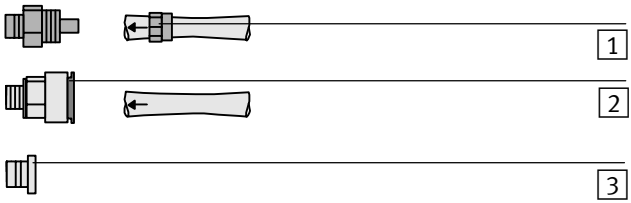


Fig. 3/1: Fitting the tubing

Disconnecting

Proceed as follows:

Warning
If the pneumatic tubing is under pressure when connections are loosened, it may perform sudden unexpected movements, thereby causing injury to human beings.
Carry out the following steps before disconnecting the pneumatic tubing on the CPV valve terminal:

- Switch off the compressed air supply.
- Make sure that all pneumatic tubing is pressureless.
- Exhaust all actuators controlled by valves which are closed in the rest or mid-positions.

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

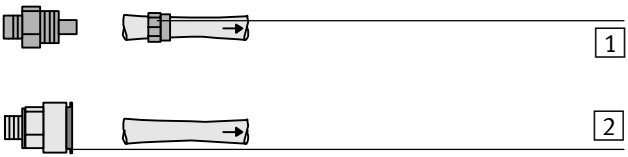


Fig. 3/2: Disconnecting the tubing

3.4 Connecting the CPV valve terminal

In order to guarantee the optimum efficiency of your CPV valve terminal, 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 appendix 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.



Note
- CPV valve terminal with two pressure zones:
  Connect the supply pressures to the end plates or to both sides of the pneumatic multipin.

3.4.1 Pilot air supply



Caution
– If possible, operate the CPV valve terminal 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 CP valve terminals with internally branched pilot air, the above mentioned remark also applies to the supply air (connection 1/11).

With CPV valve terminals 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.

The CPV valve terminal is intended for internal or external pilot air supply, depending on the end plates fitted. Please refer to your order forms or to the Tab. B/6 in section B.2 to ascertain which types of end plates are fitted on your CPV valve terminal.

Note
- 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.

Internal pilot air supply

If the supply pressure of your CPV valve terminal lies between 3 ... 8 bar, you can operate 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.

Note
Using the CPV valve terminal with internally supplied pilot air:
- Seal connection 12/14 with a blind plug.

External pilot air supply

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

Note

- Use regulated external pilot air (3 ... 8 bar). Reliable faultless operation of the CPV valve terminal is then possible.
- 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 if the CPV valve terminal is operated with different pressure zones (see figure).

1 Separator plate
2 Blanking plug
3 Pressure zone 2
4 Pressure zone 1

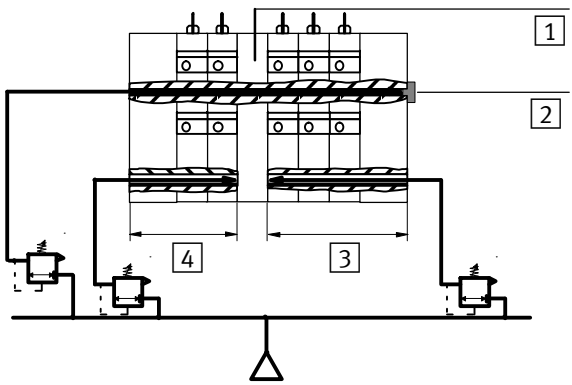


Fig. 3/3: Pilot air supply

3.4.2 Connecting the supply and work lines



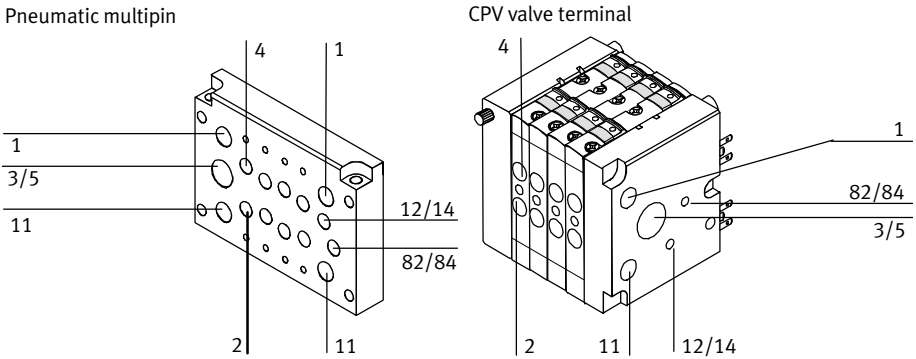
Note

- Unused connections Seal all connections **not** required for functioning with blind 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 “closed in mid-postion” with this CPV10/14 valve sub-base. 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).

Fit the screw connector or the silencers according to the table below. Then connect the tubing.



Connection identifier ISO 5599	Tubing	Connection size ISO 228, specification in bracket is for pneumatics multipin with flange			Connection
		CPV10	CPV14	CPV18	
1 or 11	Compressed air/ vacuum	G1/8	G1/4	G3/8	Screw connector in end plates or pneumatic multipin
2 or 4	Work air/vacuum	M7 G1/8	G1/8	G1/4	Connector
3/5	Exhaust right-hand/ left-hand end plate Pneumatic multipin,	 G3/8 G1/4	 G1/2 G3/8	 G1/2 G1/2	Connector – for ducted exhaust air – for silencer
12/14 or 82/84	Pilot air supply or exhaust right-hand/ left-hand end plate Pneumatic multipin	 M5 M7 (M5)	 G1/8 G1/8	 G1/4 G1/4	Screw connector at connection 82/84 – for ducted exhaust air – for silencer

Tab. 3/1: Sizes of the pneumatic connections

Note
In the case of several systems with centrally ducted exhaust:
Use check valves in the common exhaust lines in order to prevent functional impairment due to back pressures.

1 CPV valve terminal 1

2 Common 3/5

3 Common 82/84

4 CPV valve terminal 2

5 Central 3/5

6 Central 82/84

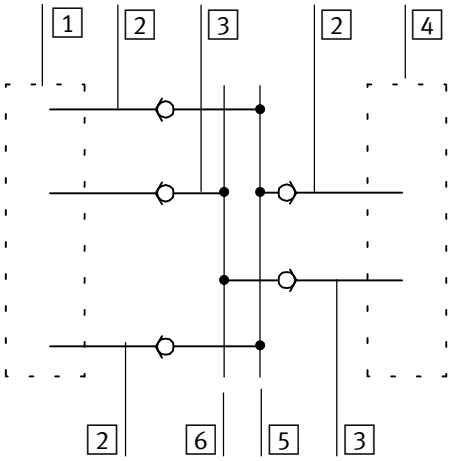


Fig. 3/4: Common lines with check valves

Note
The exhaust is removed via channels 3/5 and 82/84.
These connections must not be sealed with blanking plugs.

Exhaust channels 3 and 5 are grouped together in the CPV valve terminal. Separate exhaust restriction of channels 3 or 5 is not therefore possible.

Restriction of exhaust 3/5 on the vacuum generator plates (Ident. codes A and E) is not permitted.

Note
With CPV valve terminals with ducted supply air:
seal connections 11 and 12/14 with blanking plugs

Pressure zones of the CPV valve terminals

The CPV valve terminal can be operated with one, two or four pressure zones depending on the components fitted. The maximum number of pressure zones possible is determined by the combination of the following:

– using a separator plate or a valve plate with channel separation (Ident. Code CK, DK, HK, IK, JK, MK or NK, see appendix B, section B.1)

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

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

Note
With CPV valve terminals 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.

Note
For building pressure zones with CPV 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.
- Aways apply the same pressure in a pressure zone to connections 1 and 11.
- Back pressures in the exhaust channel can prevent the valve from switching. The valve switches as soon as the back pressure is reduced and the control signal is still applied.

Vacuum/low-pressure operation

The CPV valve terminal can be operated with vacuum or low pressure (< 3 bar), if regulated pilot air is applied separately. An overview of the end plates required can be found in section B.2.

Note
Note that the valve with Ident. code CY is not suitable for operation with vacuum.

Vacuum generator plates

Note
A high back pressure in exhaust channel 3/5 will impair the functioning of the vacuum generator.

- Make sure that there is optimal exhausting

If the CPV valve terminal is fitted with valve sub-bases and vacuum generator plates, the exhaust air from the valve sub-bases (in channel 3/5) can influence the vacuum generation.

- In this case, separate exhaust channel 3/5 between the vacuum generator plates and the valve sub-bases by means of the separator plate with Ident. code S.

Connect the work lines to the vacuum generator plate

Vacuum valve sub-base with Ident. code A:

- Connect the vacuum suction nozzle to work connection 4.
- Seal work connection 2 with a blanking plug.

Vacuum valve sub-base with Ident. code E:

- Connect the vacuum suction nozzle to work connection 4.
- Connect work connections 2 and 4 together with tubing or with the vacuum valve extension Ident. code V.

3.4.3 Connecting the electric cables

Information on the connection procedure as well as on cables and current requirements can be found in the manual P.BE-CPSYS-... “CP system, installation and commissioning”.



Warning

- Only use PELV (protective extra-low voltage) circuits as per EN 60204-1 for the electric power supply.
- Also observe the general requirements for PELV power circuits as per EN 60204-1.
- Only use power sources which guarantee reliable electrical isolation of the operating voltage as per EN 60204-1.

By the use of PELV power units, protection against electric shock (protection against direct and indirect contact) is guaranteed in accordance with EN 60204-1.



Note

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

Earthing the CPV valve terminal

For earthing purposes, all variants of the CPV valve terminal have an earthing connection. This is on the left-hand end plate (see diagram).

[1] Earth connection

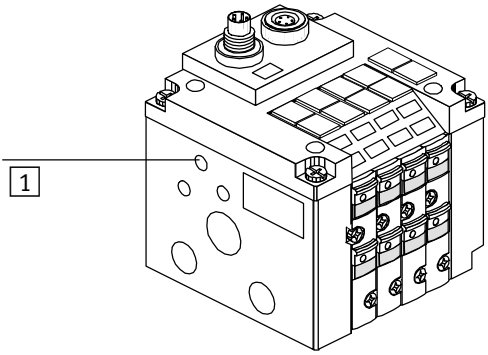


Fig. 3/5: Earthing connections on the CPV valve terminal

Note
Earth your CPV valve terminal.

- Connect the earth connection 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.

Connecting current-consuming devices to the relay plate

Note
- Use only ready-to-use connector sockets KRP-1-24-... from Festo for connecting current-consuming devices to the relay outputs.

Connect the current-consuming devices to the relay outputs as follows:

- Carefully place the socket first on the terminal lug of the lower relay output (see figure).
- Screw the socket together with the central locking screw with 0.15 Nm.
- Fit the second socket in the same way to the upper relay output.

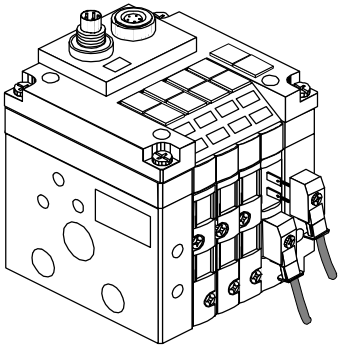


Fig. 3/6: Fitting the relay output sockets

CPV valve terminal with IC connection

With this CPV valve terminal variant each valve solenoid coil is connected separately.

Note

- Use only the following ready-to-use sockets from Festo for connecting the valve solenoid coils:

– for CPV10/14:
NEBV-Z3WA2L-R-E-...-LE2-S1, an LED and the holding current reduction are incorporated in the transparent socket. The LED indicates the switching status of the valve solenoid coil.

– for CPV18:
KMEB-2-24-...-LED, an LED is incorporated in the transparent socket. The LED indicates the switching status of the valve solenoid coil.

Address assignmentof 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. 3/7).

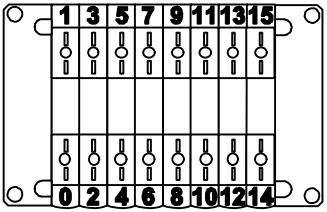


Fig. 3/7: Address assignment of a CPV valve terminal with IC connection and 8 valve locations

Connect the valve solenoid coils as follows:

- Use connector socket NEBV-Z3WA2L-R-E-...-LE2-S1 (CPV10/14) or KMEB-2-... (CPV18). Connector socket NEBV-Z3WA2L-R-E-...-LE2-S1 is fitted with current reduction.
- Insert the socket onto the terminal lugs of the appropriate pilot solenoid (see figure). The socket can also be fitted turned 180^0. 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 0.15 Nm.

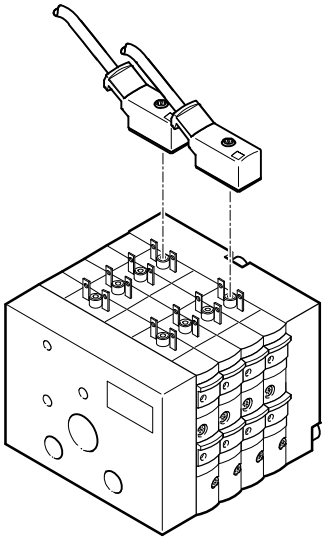


Fig. 3/8: Fitting the individual connecting sockets

CPV valve terminal with multipin, CPI or AS-Interface connection

Detailed information on fitting the electrical connections and on addressing can be found in the leaflet supplied with the product.

CPV valve terminal with CP connection

Detailed instructions on addressing and on the electrical installation of the CPV valve terminal can be found in chapter 1 “System summary” or in chapter 3 “Installation” of the manual P.BE-CPV-... “Installation and commissioning CP systems”.

CPV valve terminal with direct connection

Detailed instructions on addressing and on the electrical installation of the CPV valve terminal with direct connection can be found in the appropriate manual “CPV valve terminal with direct connection”.

Commissioning

Chapter 4

Contents

4. Commissioning 4-1

4.1 General instructions 4-3
4.2 Testing the valves 4-6
4.2.1 Checking the valve functions 4-7
4.2.2 Checking the valve-actuator combination 4-9
4.3 Troubleshooting 4-12

4.1 General instructions

Before commissioning

- Switch off the power supply before connecting or disconnecting plugs (otherwise this could lead to functional damage).
- Earth the CPV valve terminal on 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 operating 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.



Note

– When unscrewing the adjusting screw, make sure that you do not unscrew it beyond the resistance, as this would 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.



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:

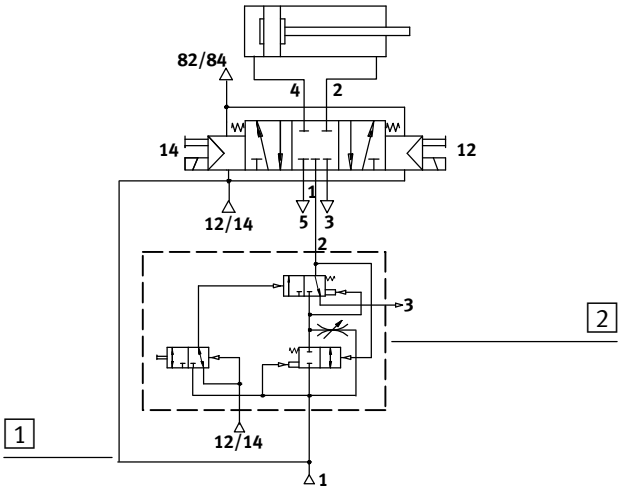
– when the compressed air is switched on with a safety start-up valve (slow build up of pressure) and

– 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.



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

2 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.

External pilot air supply	**Pressure increase in complete supply**	**Pressure increase in the pilot air (12/14)**	**Time point when a valve switches**	**Movement of the cylinder**
branched after the safety start-up valve	**slow**	slow	**after** pressure increase at (1)	**fast**
branched in front of the safety start-up valve	**slow**	fast	**before** pressure increase at (1)	**slow**

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

4.2 Testing the valves



Note
Before commissioning the CPV valve terminal, note the specifications concerning the medium in chapter 3.

The CPV valve terminal should be commissioned as follows:

Commissioning variants	Activity
Preliminary test of the pneumatic tubing	Checking the valve-actuator combination by means of the manual override (MO)
Complete commissioning of the complete system	Installing and connecting the complete system Program control by PLC/industrial PC

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.

4.2.1 Checking the valve functions

Manual override



Warning
Before actuating the manual override:

- Disconnect the power supply to the valve solenoid coils of the relevant connections (IC, MP, AS-Interface, DI or CPI/CP connections). 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 function and operation of the valve or the valve-actuator combination.

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

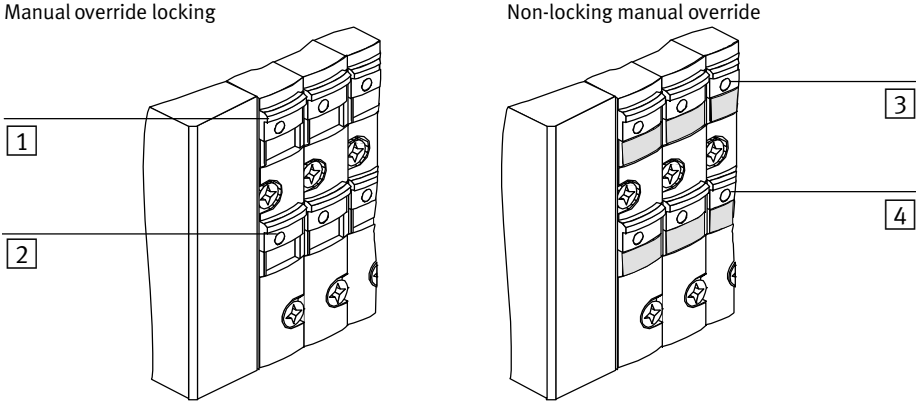
Types of manual override

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

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

Tab. 4/3: Designs of manual override

The diagram below shows the assignment of the 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

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

4.2.2 Checking the valve-actuator combination

Carry out the test

Proceed as follows:

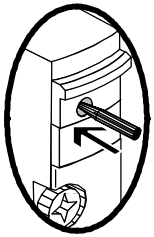
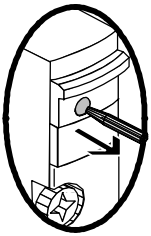
1. Switch on the compressed air supply.
2. Check the functioning and effect of each valve-actuator combination by actuating the manual override, as shown in the following diagrams.



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. With the CPV valve terminal with locking actuation: 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.

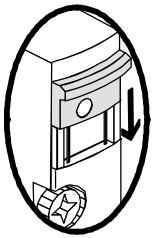
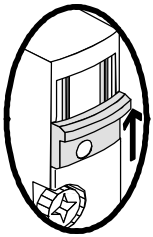
Actuating the manual override with automatic reset (non-locking)		**Valve response**
	Carefully press down the plunger of the manual override as far as possible.	The valve: – moves to the switching position
	Keep the plunger of the manual override pressed down.	– remains in the switching position
	Release 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

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 plates with Ident. codes D, DK, I, IK, C, CK, N, NK, H, HK and the vacuum generator plate with Ident. code E 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.

Actuating the manual override with stop (locking)		**Valve response**
	Press down the plunger of the manual override as far as possible.	The valve: – moves to the switching position
	Leave the plunger in the lower position	– remains in the switching position
	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

4.3 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:

Operating status of the pneumatic system	**Fault treatment when the compressed air supply has been switched off**
Air escapes from ... – common line or work line connections	• Checking the seal rings or the tube fitting
– between the modules	• After switching on again, regulate external pilot air to 3 ... 8 bar. • Check the starting torque of the tie rods • Or check the status and position of the seals between the valve discs.
Valve or pneumatic system ... – does not react as expected	• Check the tubing • Check the electric cables
– does not react	• Bring the locking manual override into the basic position • After switching on again check the operating pressure (if necessary for each pressure zone) • Check the controller connection (apply pressure > 3 bar to external controller) • Servicing required

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

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

Desired pneumatic operating status	**Requirement**	**Comment**
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	Check 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
Vacuum operation/ low-pressure operation	Separately supplied regulated pilot air (3 ... 8 bar)	– Controller can only be operated with pressure (between 3 ... 8 bar)
Maximum vacuum (created by vacuum generator)	– Sufficient compr. air supply – Minimum supply pressure – No back pressure in exhaust channel 3/5	• The supply pressure must not break down even when several vacuum generators are switched on at the same time. If necessary, increase the supply pressure. • Silencers must not generate a high back pressure in exhaust channel 3/5. If necessary, fit efficient silencers or increase the supply pressure. • In order to prevent the exhausting of the valve affecting the generation of vacuum, you must fit a separator plate with Ident. code S between the valve plate and the vacuum generator plate.

Desired pneumatic operating status	Requirement	Comment
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 valves 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

LED display of the valves

There is a yellow LED for every valve solenoid coil (see Fig. 4/3). With a ready to operate CPV valve terminal, this LED indicates the switching status of the valve solenoid coils.

Note

The LEDs indicate the signal states only if there are valve coils at the relevant valve locations. For this purpose the load voltage must lie within the permitted tolerance.

Note the assignment of the LEDs to the relevant manual override (see also following figure).

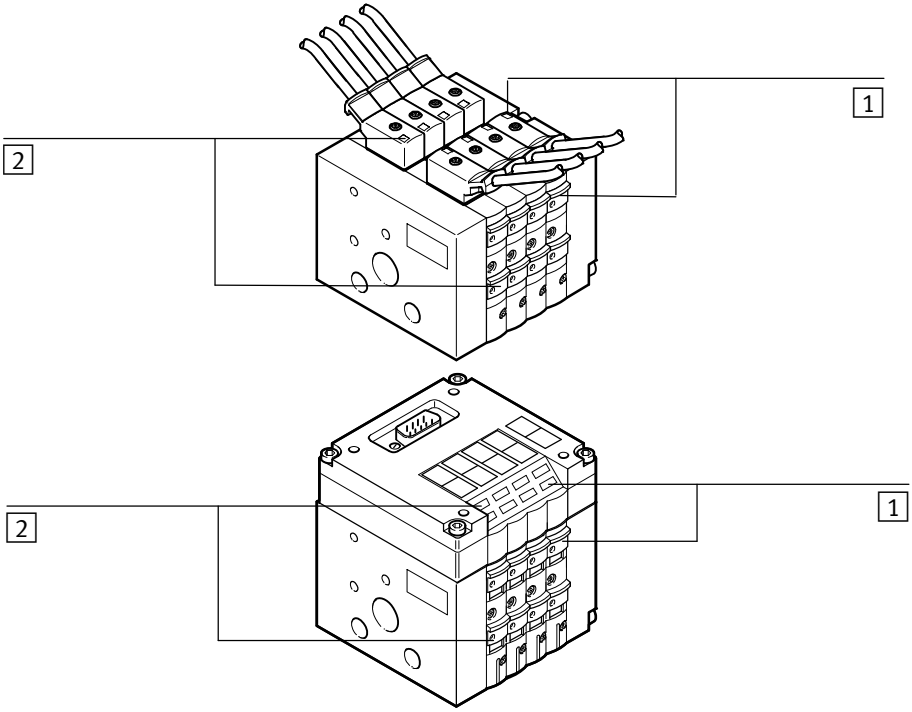
Note the following with the IC connection:

– LED in the front plug connector to upper manual override (14)
– LED in the rear plug connector to lower manual override (12).

Note the following with the MP, AS-Interface, DI or CPI/CP connections:

– lower LED in the connector cover to upper manual override (14)
– upper LED in the connector cover to lower manual override (12).

The diagram below shows the position of the LED in respect of the manual override actuations.



1 LED and manual override to pilot solenoid 14

2 LED and manual override to pilot solenoid 12

Fig. 4/3: LED assignment

With valve sub-bases, the LEDs show the switching status of the valve solenoid coils. The meaning is shown in the table below:

LED	Switching position of the valve	Meaning
yellow out	Basic position	Logical 0 (no signal)
yellow alight *)	– Switch position or – Basic position	Logical 1 (signal present) Logical 1 but: – the operating voltage of the outputs lies below permitted tolerance range (20.4 ... 26.4 V DC) or – compressed air supply not OK or – pilot exhaust blocked or – servicing required
*) With double-solenoid valves (Ident code J and JK) the LED lights up only when the signal is present.		

Tab. 4/8: Meaning of the LED display

LED display of the relays

There is a yellow LED for every relay. This LED indicates the switching status of the relay coil when the CPV valve terminal is ready for operation.



Note
Note the assignment of the LEDs to the relevant relay connection (see also following diagram).

Note the following with the MP, AS-Interface, DI or CPI/CP connections:

– lower LED in the connector cover to upper relay connection
– upper LED in the connector cover to lower relay connection.

The diagram below shows the assignment of the LEDs to the relay connections.

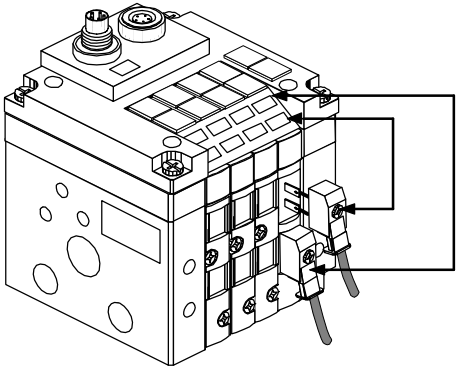


Fig. 4/4: LED assignment of relay plate

Maintenance and conversion

Chapter 5

Contents

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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 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.



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).

5.2 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 **TRI** 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).

Fastening screws for the silencer insert as per DIN 912, strength class 12.9

Valve terminal	Screw	Tightening torque
CPV10	M 2.5 x 8	1.0 Nm ± 10 %
CPV14	M 3 x 10	1.7 Nm ± 10 %
CPV18	M 5 x 28	5.0 Nm ± 1 Nm

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

5.3 Fitting/removing CPV valve terminal components

Some components on the CPV valve terminal may only be operated in combination with other components, see the following compatibility list.

Components / **Ident.code** [1]	**Cover plate** **AS-Interface**	**CP**	**IC** [2]	**MP**	**DI**
Vacuum generator plates: A, E	No limits Please note the recommendations in chapter 3				
Valve sub-bases: C, CK, CY [5] D, DK, H, HK, I, IK, J, JK, M, MK, N, NK	No limits				
Valve sub-base: F (only CPV10)	No limits	No limits	Only with connector socket with current reduction NEBV-Z3...	Without HSA [3]: – only every 2nd. valve sub-base With HSA: – no limits	No limits
Valve sub-base: G	CPV10/14: If the pneum. multipin with mounting flange is used, the outer valve sub-bases cannot be fitted with the necessary 5/3G valve extension. CPV18: No limits				
Blanking plate: L	No limits				
Relay plate: R	Not permitted with CPV14	No limits	---	Without HSA [3]: – not permitted With HSA: – no limits	No limits
Separator plates: S, T	Combination depends on end plate combination [4]				

[1] List of the Ident. codes see the section 1.2, Tab. 1/3 “Identification codes”
[2] CPV valve terminals for Siemens ET200X: Valve sub-base Ident. code F and relay plate not permitted
[3] MP connection with HSA (holding current reduction), CPV10 as from 10/2000, CPV14 as from 11/2000
[4] Combination list of the end plates see the section B.2, end plate combination
[5] The same pressure at connections 1 and 11, see the section 3.4.2, pressure zones

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

5.3.1 Removing components from valve locations

The components on the CPV valve terminal can easily be removed for maintenance and conversion work.

Proceed as follows:

Loosen the electrical connections

Note the following with the MP, AS-Interface and CP connections

- Loosen the multipin plug or the AS-Interface, DI or CP connector plug and pull it off carefully.
- Then loosen the four fastening screws in the electrical sub-base. Pull the sub-base carefully away from the terminal lugs of the valve sub-bases.
- If necessary remove the connector sockets on the relay outputs. Loosen first the locking screws of the upper connector socket. Pull the socket carefully away from the terminal lugs. Then loosen the lower connector socket in the same way.

Note the following with the IC connection

- In order to remove the valve sub-bases, loosen the locking screws on the connector sockets of the valve sub-bases to be replaced.
- Pull the sockets carefully away from the terminal lugs. Mark the connector sockets.
- With the CPV valve terminals with pneumatic multipin, we recommend that you remove the connector sockets from each valve sub-base.

Loosen the pneumatic connections

With the CPV valve terminal with individual tubing (CPV valve terminal 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 instructions on installation”).

Remove the CPV valve terminal from the fastening surface

CPV valve terminal with pneumatic multipin

- 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 the die CPV valve terminal from the pneumatic multipin.

Fitting the CPV valve terminal on a floor stand

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

Fitting the CPV valve terminal onto a wall or onto a hat rail

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

Remove the component

- 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.

1 Component to be replaced

2 Tie rod

3 Distance approx. 2 mm

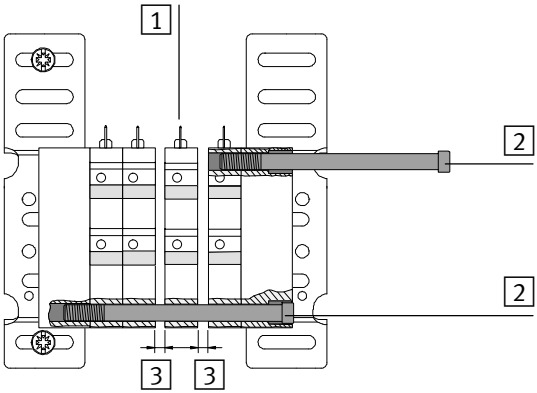


Fig. 5/1: Removing the valves

- Swing the component forwards around the front tie rod.

1 Front tie rod

2 Rear tie rod

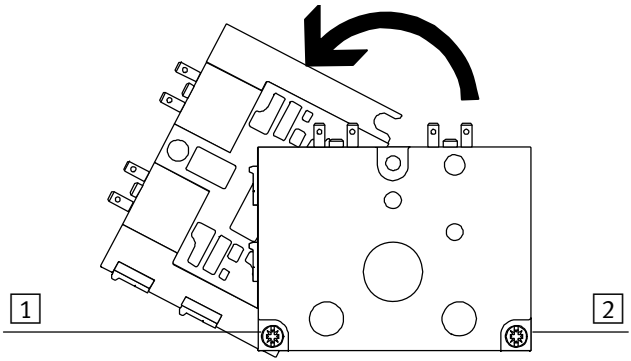


Fig. 5/2: Position of the tie rods

- Pull the component so that it snaps out of the front tie rod.

5.3.2 Fitting components in valve locations



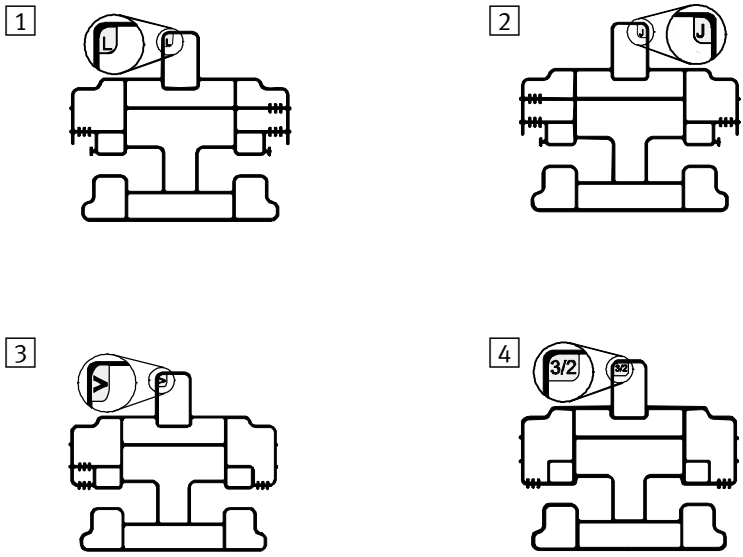
Note
Please note:
- Please note the instructions in the brief description of the relevant CPV valve terminal with AS-Interface connection or the instructions for fitting equipment on the valve sub-bases.
- Please note the instructions on fitting the valve terminal with valve sub-bases and vacuum generator plates under “Vacuum generator plates” in the section 3.4.2.
- If the CPV10 valve terminal is fitted with valve sub-bases with Ident.code F, please note the instructions on fitting and application in appendix B.1.
- Please note the limits for fitting the CPV valve terminals with relay plates (Ident. code R). See compatibility list in this chapter.

Proceed as follows:

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

Only CPV10/14 valve terminals

- When fitting valve sub-bases with pneumatic spring, double-solenoid or vacuum valves, check the position of the seals; it is not symmetrical (see following figures).



1 Pneumatic spring valve (Ident. code M, MK or F):
The designation “L” on the seal must face forwards

2 Double-solenoid valve (Ident. code J and JK):
The designation **“J”** on the seal must face forwards

3 Vacuum valve (Ident. code A or E):
The designation “V” on the seal must face forwards

4 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**

Fig. 5/3: Position and designation of the seals with pneumatic spring valves, double-solenoid or vacuum valves (only CPV10/14 valve terminals)

Note
There is only one type of seal for all valve plates on the CPV18 valve terminal. The position of the seal is the same on all valve plates.

- Place the component on the front tie rod.
  Press the component so that it snaps onto the tie rod.
- Swing the component carefully backwards.
  Make sure that there is sufficient space for the flat seals.
- Push the upper tie rod as far as possible into the CPV valve terminal and screw it in a few turns.
- Align the CPV valve terminal components on a flat surface so that they are not offset.
- Tighten first the upper, then the lower tie rod with 0.3 Nm. Then tighten all the tie rods with 2 Nm.

MP, AS-Interface, DI or CPI/CP connections

Note
The flat seals between the valve block and the sub-base have been modified. If the glued flat seals are more than one year old, replace them by new flat seals.
You can then be sure that your CPV valve terminal is sealed correctly.

The flat seals are situated on the bottom of the electrical sub-base (see figure below).

- Remove the self-adhesive flat seal from the recess. To do this, carefully loosen a corner of the seal with a screwdriver (see Fig. 5/4). Then pull the seal carefully away from the electrical sub-base.

1 Flat seals

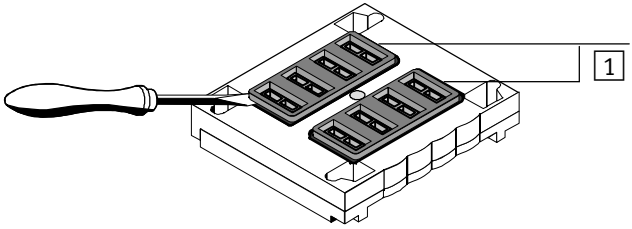


Fig. 5/4: Position of the flat seal on the electrical sub-base

- The new one-piece flat seal is no longer glued onto the bottom of the electric sub-base, but simply placed on the terminal lugs of the valve solenoid coils (see figure).

1 New flat seal

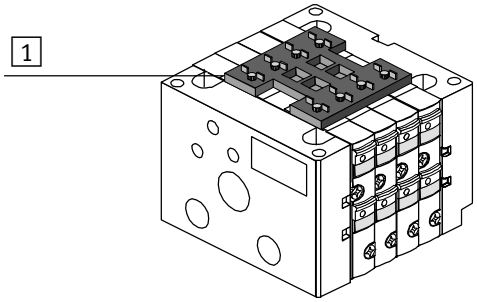


Fig. 5/5: Flat seal

- Place the connector cover onto the terminal lugs of the valve block. Carefully press down the connector cover.
- Tighten the screws on the electric sub-base in diagonally opposite sequence with 0.75 ± 0.15 (CPV10/14) or 3 Nm (CPV18).

With CPV valve terminals with relay plates

- Fit the connector plugs onto the relay outputs as described under “Connecting current-consuming devices to the relay plate” in the section 3.4.3.

Fitting the CPV valve terminal

CPV valve terminal with pneumatic multipin

- Place the 3-piece and 4-piece seals in the recesses in the left or fight-hand end plate. Press the 2-piece seals carefully into the threads of the work connections.
- Place the CPV valve terminal on the pneumatic multipin and tighten the fastening screws in the left and right-hand end plates in diagonally opposite sequence with 0.3 Nm. Tighten the screws in diagonally opposite sequence with 2 Nm (CPV10/14) or 4 Nm (CPV18).

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

Fitting the pneumatic and electrical connections

- Fit the connections (see chapter 3).

5.4 Conversion from non-locking to locking manual override

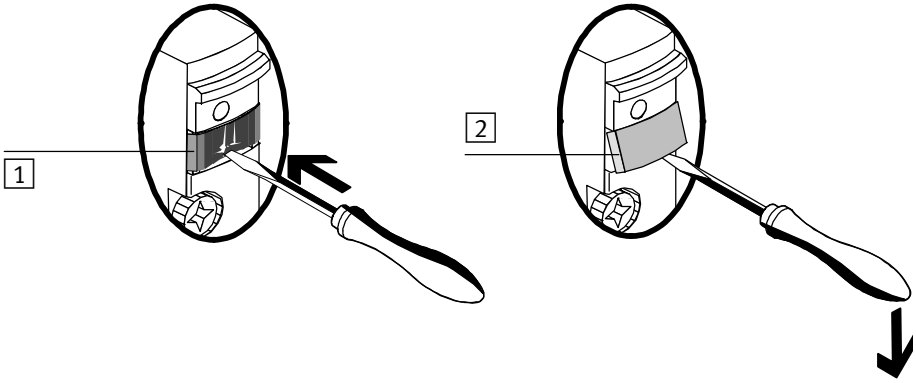
By removing a safety clip, you can convert your CPV valve terminal from non-locking to locking manual override. Proceed as follows:

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).



1 Remove the safety clip by pressing it out

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

Fig. 5/6: Safety clip for the manual override

5.5 Converting the end plates

By exchanging the end plates you can adapt the CPV valve terminal 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 suitable for 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 the section 5.3.1, “Removing components from valve locations”).
- Remove the CPV valve terminal from the fastening surface. Proceed here in the reverse sequence to that described under the section “Fitting onto a wall”, “Hat rail clamping unit” or “Fitting on a stand” in the chapter 2 “Fitting”.
- Remove the appropriate sub-base on CPV valve terminals with CP, AS-Interface, DI or MP connection (see the section 5.3.1 “Removing components from valve locations”).
- Place the CPV valve terminal on the left-hand end plate. Loosen the outer tie rod 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 the CPV valve terminal. Make sure that the other components remain together.
- Place the right-hand end plate to be fitted on the CPV valve terminal and insert the tie rods.
- Place the CPV valve terminal on the right-hand end plate. Make sure that the tie rods, which are not yet screwed tight, do not fall out of the CPV valve terminal.
- Remove the left-hand end plate from the CPV valve terminal.
- Place the left-hand end plate to be fitted on the CPV valve terminal. Swing the CPV valve terminal onto the left-hand end plate.
- Screw in the tie rods and tighten them to the same amount with 0.3 Nm.
- Tighten first the centre and then the outer tie rods with 2 + 0.2 Nm (CPV10/14) or 4 Nm (CPV18).
- Fit the appropriate sub-base on CPV valve terminals with CP, AS-Interface, DI or MP connection (see the section 5.3.2 “Fitting components in valve locations”).
- Fit the CPV valve terminals onto the fastening surface (see the sections “Fitting onto a wall”, “Hat rail clamping unit” or “Fitting onto a stand” in the chapter 2 “Fitting”).
- Then fit the pneumatic and electrical connections (see chapter 3 “Installation”).

5.6 Conversion to internal or external pilot air

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

Note
- Mixed operation of the CPV valve terminal with internal and external pilot air is not intended. The pilot air channel will not be divided into two pressure zones by means of the optional separator plates.
- With end plates CPV...-EPR-PG (part number 161373 and 162543), connection 12/14 is sealed internally.
- Take into account the extra space required if end plates with large surface-mounted silencers are used.

Change the end plates of the CPV valve terminal as described in the section 5.5 “Converting the end plates”.

5.7 Individual/Central tubing conversion

In order to convert your CPV valve terminal from individual tubing to tubing on the pneumatic multipin, you will require:

- the pneumatic multipin
- special end plates for the CPV valve terminal.

Proceed as follows:

- Change the end plates of the CPV valve terminal as described in the section 5.5 “Converting the end plates.”
- Fit the pneumatic multipin as described under “Fitting the pneumatic multipin” in the section 2.3.1.

5.8 Conversion of the CPV valve terminal to two pressure zones

In order to convert your CPV valve terminal to two pressure zones, you will require a separator plate (must be ordered separately).



Note

- When installing the CPV valve terminal, note that the compressed air must be supplied on both sides of the valve terminal.
- Seal unused connections (supply air and pilot air connections) with blanking plugs.

Fit the separator plate as described in the section 5.3.2 “Fitting components on valve locations”.

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

Due to the modular structure of the CPV valve terminal, you can easily convert it to IC, MP, AS-Interface, DI or CPI/CP connections.



Note

Please note the instructions in the compatibility list in this chapter as regards combining versions with different electrical connections with the following plates:

– single-solenoid 5/2-way valve (Ident.code F)

– relay plates (Ident.code R).

Proceed as follows:

CPV valve terminals with IC connection

- Loosen the locking screws on the connector sockets.
- Pull the sub-base carefully away from the terminal lugs of the pilot solenoids.
- Insert the MP, AS-Interface, DI or CP connection onto the terminal lugs of the pilot solenoids.
- Secure the sub-base with the 4 Philips screws. Tighten the screws in diagonally opposite sequence.

Note the following on CPV valve terminals with MP, AS-Interface, DI or CPI/CP connections

- Loosen the 4 Philips screws in the sub-base.
- Pull the sub-base carefully away from the terminal lugs of the pilot solenoids.
- Insert the sub-base of the other connection variants (MP, AS-Interface, DI or CPI/CP connection) into the terminal lugs of the pilot solenoids.
- Secure the sub-base with the 4 Philips screws.
- Tighten the screws in diagonally opposite sequence.

Technical appendix

Appendix A

Contents

A. Technical appendix A-1

A.1 Technical specifications A-3
A.2 Accessories A-8

A.1 Technical specifications

General information	CPV10/14	CPV18
Permitted temperature range – Storage – Operation – Medium	 -20 ... +40 °C -5 ... +50 °C (vacuum generator plates: -0 ... +50 °C) -5 ... +50 °C (vacuum generator plates: -0 ... +50 °C)	
Protection class as per EN 60529	IP65 (with cable from Festo accessories)	
Relative air humidity	90 %	
Protection against corrosion (as per FN 940070)	KBK 2 (vacuum generator plates: KBK1)	
Assembly position	as desired	
Tightening torques – Connector socket for IC connection – Connector socket for relay outputs – Field bus plug – Fastening screw for wall support or hat rail – Fastening screws of the CP valve terminal on the Multipin – Electrical sub-base – Earth connection – Tie rod – Large surface-mounted silencer element on end plate – Valve actuators	**CPV10/14** 0.15 Nm 0.15 Nm 1.15 ± 0.15 Nm. 1.5 Nm 2.0 Nm 0.75 ± 0.15 Nm. 1.0 Nm 1. Flange 0.3 Nm 2. Flange 2.0 Nm CPV10: 1.0 Nm ± 10 % CPV14: 1.7 Nm ± 10 % CPV10: 0.8 Nm CPV14: 1.2 Nm	**CPV18** 4.0 Nm 1.15 ± 0.15 Nm 4.0 Nm 3.0 Nm 1.0 Nm 1. Flange 0.3 Nm 2. Flange 4.0 Nm 5.0 Nm ± 1 Nm
Materials – Plates, covers, pneumatic multipin – Seal	 AL, AL-GD, Ms, PAXMD6, PET, POM, PPS, PA, ST NBR, HNBR	
Vibration and shock (as per DIN/IEC 68/EN 60068 part 2-6) – Vibration – Shock (as per DIN/IEC 68 part 2-27)	 3.5 mm path at 2 ... 9 Hz; 1 g acceleration at 9 ... 200 Hz 0.35 mm path at 10 ... 60 Hz; 5 g acceleration at 60 ... 150 Hz 30 g acceleration at 11 ms duration	

Tab. A/1: Technical data: General information

General information	CPV10	CPV14	CPV18
Approx. weights (in g)			
Electrical sub-base with AS-Interface connection			
– on CP valve terminals with 2 valve positions	85	130	275
– on CP valve terminals with 4 valve positions	110	175	355
Electrical sub-base with CPI/CP connection			
– on CP valve terminals with 4 valve positions	145	230	375
– on CP valve terminals with 6 valve positions	180	250	450
– on CP valve terminals with 8 valve positions	200	300	540
Electrical sub-base with MP connection			
– on CP valve terminals with 4 valve positions	110	170	400
– on CP valve terminals with 6 valve positions	140	230	425
– on CP valve terminals with 8 valve positions	165	275	515
End plates	160	280	740
Pneumatic multipin			
– on CP valve terminals with 2 valve positions	120	270	520
– on CP valve terminals with 4 valve positions	165	390	750
– on CP valve terminals with 6 valve positions	225	510	870
– on CP valve terminals with 8 valve positions	270	630	1300
Large surface-mounted silencer	147	234	—
Relay plate	35	55	—
Blanking plate	25	45	90
Separator plates	25	45	90
Valve sub-bases, vacuum generator plates	65	110	260
Valve extension: 5/3G function	46	105	—
Valve extensions: one-way flow control valves	25	54	125

Tab. A/2: Technical data: Weight of the CPV valve terminal



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

Pneumatics			
Medium	– compressed air, filtered (40 µm), lubricated (oil: VG 32) or non-lubricated/vacuum – inert gases permitted		
Design	valve sub-bases with spool valves		
Pressure range	**CPV10**	**CPV14**	**CPV18**
– Optimum operating pressure	5 ... 7 bar	5 ... 7 bar	5 ... 7 bar
– Rated supply pressure	6 bar	6 bar	6 bar
– With pilot air branched internally from 1 or 11	3 ... 8 bar	3 ... 8 bar	3 ... 8 bar
– With externally supplied pilot air to:			
Ports 12/14	3 ... 8 bar	3 ... 8 bar	Valves with Ident. code J and JK: 2 ... 8 bar; all other valves: 3 ... 8 bar
Connection 1 or 11:			
– 3/2-way valve (Ident. code CY)	1 ... 10 bar	—	—
– vacuum generator plates:			
(Ident. codes A and E) connection 1	2 ... 10 bar	2 ... 10 bar	—
(Ident. code E) connection 11	0 ... 10 bar	0 ... 10 bar	—
– with all other valves	-0.9 ... 10 bar	-0,9 ... 10 bar	-0,9 ... 10 bar
Manual override	locking or non-locking		

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



Note
The screw connectors of the pneumatic ports cause a reduction in the flow rate of the valves.

Pneumatics	**CPV10**		**CPV14**		**CPV18**	
Rated flows						
(without screw connector) in [l/min]						
– **of 11 ⇒ 2 or 1 ⇒ 4**	400		800		1600 1400 (5/3-way valve)	
– **of 2 ⇒ 3/5 or 4 ⇒ 3/5**	400 (330 [1])		800		1600	
Valve switching times in ms (metal design) **Measuring method 10 %**, as per FN 942032	**On, over**	**Off**	**On, over**	**Off**	**On, over**	**Off**
– 2/2-way valve (Ident. codes D, DK, I, IK)	15	17 (at 0 %)	13	16 (at 0 %)	14	20 (at 0 %)
– 2/2-way valve for reject pulse in vacuum generator plate (Ident.code E)	15	17 (at 0 %)	13	16 (at 0 %)	14	20 (at 0 %)
– 3/2-way valve, open or closed (Ident. codes C, CK, H, HK, N, NK)	17	25	24	30	18	24
– 3/2-way valve (Ident. code CY)	20	30	—	—	—	—
– 5/2-way valve, single-solen. (Ident.code M, MK)	17	27	25	35	18,5	26
– 5/2-way, single-solenoid (Ident.code F)	13	17	—	—	—	—
– 5/2-way valve, double-solen. (Ident. code J, JK)	10	—	12	—	12	—
– 5/3-way valve, mid-pos. closed (Ident. code G)	—	—	—	—	14	32
Vacuum generator plates – Vacuum (V_{max})	-0.85 bar (the highest possible vacuum is reached within the working pressure range)					
Connections (different values for pneu. multipin in brackets)						
– Compressed air (1; 11)	G 1/8		G 1/4		G 3/8	
– Exhaust (3/5)	G 3/8 (G 1/4)		G 1/2 (G 3/8)		G 1/2	
– Auxiliary pilot air (12; 14; 82/84)	M5 (M7)		G 1/8		G 1/4	
– Work air (2; 4)	M7		G 1/8		G 1/4	
[1] With 3/2-way valve with back pressure flaps (Ident. code CY)						

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

Electrics (CPV valve terminal with IC or CPI/CP connection)			
Electromagnetic compatibility of the CPV valve terminal with CPI/CP connection – Emitted interference [1] – Resistance to interference [2]	see declaration of conformity ➔ www.festo.com		
Protection against electric shock	through the use of PELV circuits (protection against direct and indirect contact as per EN 60204-1)		
Relay plate	consisting of two relays for controlling 2 electrically isolated outputs		
Operating voltage – Tolerance – Residual ripple	24 V DC 20.4 ... 26.4 V 4 Vpp		
Power consumption at 21 V values in brackets for 24 V	**CPV10**	**CPV14**	**CPV18**
CPV valve terminal all connection variants: – per valve solenoid coil valve sub-base with Ident.code F All CPV valve terminals: – per relay plate CPV valve terminal with IC connection: – additional per IC connector plug	0.46 W (0.6 W) (0.65 W) (1.2 W) ≤ 0.26 W	0.65 W (0.9 W) (1.2 W) ≤ 0.26 W	1.16 W (1.5 W) — ≤ 0.26 W
Input current consumption of electronics – CP valve terminal with CPI/CP connection	20 mA		25 mA
Current consumption – CP valve terminal with IC connection	20 mA for 35 ms at 24 V		typ. 70 mA
Data of load current circuit of the relay outputs (at 24 V + 10 %)	1 A; floating contacts		—
Switching times of the relay outputs (at nominal voltage) – Pick-up – Drop-out	 5 ms 2 ms		
[1] The CPV valve terminal is intended for industrial use. In residential areas, measures for radio interference suppression may have to be taken. [2] The maximum permitted signal cable length is 30 m			

Tab. A/5: Technical data: Electrical components

Data on the electric components of the CPV valve terminal with Multipin, AS-Interface or direct connection are enclosed with the relevant product.

CPV valve terminal	Min. drop-out time		Min. edge steepness	
	CPV10/14	CPV18	CPV10/14	CPV18
with MP connection	3 ms	—	0.4 V/ms	—
with CP connection	—	—	—	—
with direct connection	—	—	—	—
with AS-Interface connection	3 ms	3 ms	—	—

Tab. A/6: Technical data: Electrical components

Identification	
CE mark (see declaration of conformity) → www.festo.com	In accordance with EU EMC directive

Tab. A/7: Technical data: Designation

A.2 Accessories

Accessories for the product can be found under:
http://www.festo.com

Summary of components

Appendix B

Contents

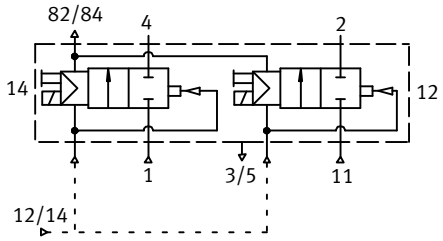
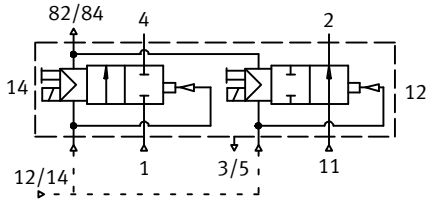
B. Summary of components B-1

B.1 Overview of valve sub-bases and vacuum generator plates B-3
B.2 Overview of end plates B-9

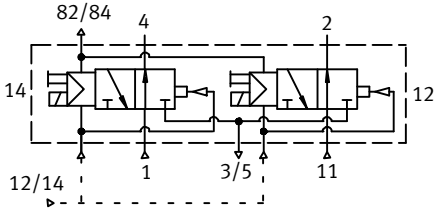
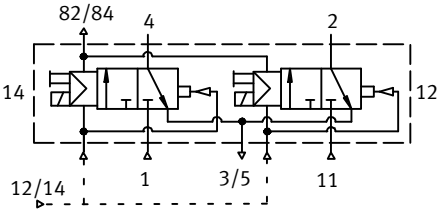
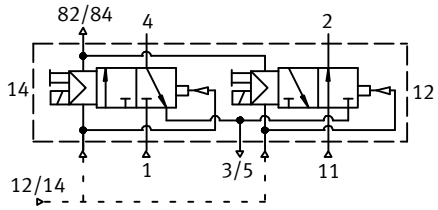
B.1 Overview of valve sub-bases and vacuum generator plates

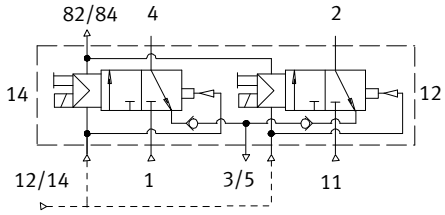
The CPV valve terminals are available with the following valve sub-bases and vacuum generator plates:

Note
The numbers on the following switching symbols are the designations of the connections, coils and manual overrides; e.g. designation 14 stands for manual override 14 or coil 14. They are not logic designations.

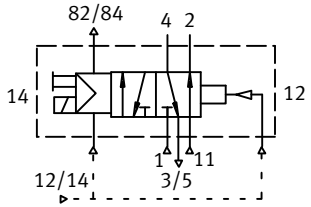
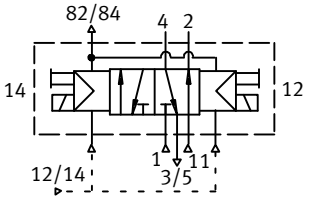
Valve sub-base	Comment
	Ident. code D and DK Valves: – two 2/2-way valves – single solenoid – closed in basic position – spring return
	Ident. code I and IK Valves: – two 2/2-way valves – single solenoid – control side 14 normally closed – control side 12 normally open – spring return

Tab. B/1: Overview: Valve sub-bases with 2/2-way valves

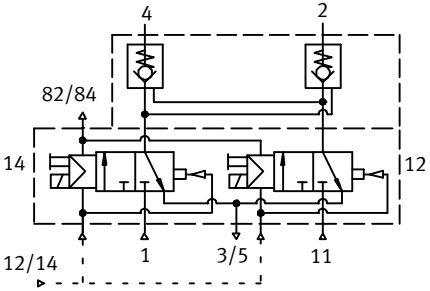
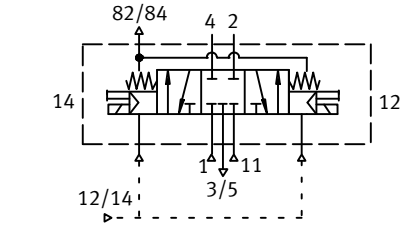
Valve sub-base (continued)	**Comment**
	Ident. code N and NK Valves: – two 3/2-way valves – single solenoid – open in basic position, – spring return Function: The function of a 5/3-way valve in mid-position pressurized can be implemented with these valves in basic position open.
	Ident. code C and CK 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. **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.
	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

Valve sub-base (continued)	**Comment**
	Ident. code CY Valves: – two 3/2-way valves, with back-pressure flaps for the exhaust channels 3 and 5 – single solenoid – closed in basic position – spring return Function: The function of the valve is identical to that of the valve with ident. code C. With the 5/3G valve extension the function of a 5/3-way valve in mid-position closed can be implemented. **Note:** Back pressures in the exhaust channel can prevent the valve from switching. The valve switches as soon as the back pressure is reduced and the control signal is still applied.

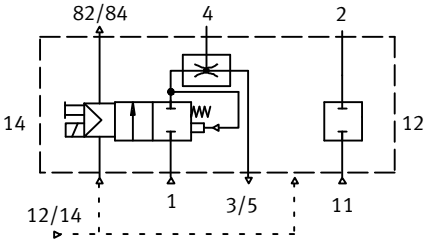
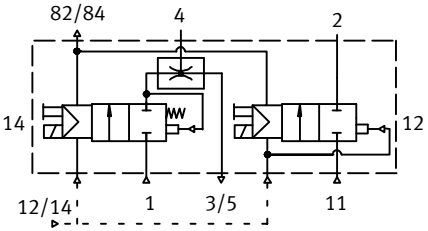
Tab. B/2: Overview: Valve sub-bases with 3/2-way valves

Valve sub-base (continued)	**Comment**
	Ident. code F (only CPV10 valve terminal) or M and MK Valve: – 5/2-way valve – single solenoid – spring return – with ident. code F fast switching **Note:** In the case of CPV valve terminals with the following connections, please note the limits on using the valve sub-base with ident. code F – IC connection: “F valve sub-bases” may only be used with a connector socket for current reduction NEBV-Z3WA2L-R-E-...-LE2-S1 – Interbus direct connection type CPV10-GE-IL-..: These CPV valve terminals must not be used with “F valve sub-bases”
	Ident. code J and JK Valve: – 5/2-way double solenoid valve

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

Valve sub-base (continued)	**Comment**
CPV10/14  	Ident. code G Function: – 5/3-way valve in mid-position closed Valve (CPV10/14): – two 3/2-way valves – single solenoid – normally closed – spring return – 5/3G valve extension (two unlockable check valves)
CPV18  	Valve (CPV18): – 5/3-way valve – closed in mid-position – single solenoid – mechanical return **Note:** – In a currentless state 5/3-way valves assume the mid-position by means of spring force. – If both valve coils on 5/3-way valves are energized simultaneously, the valve remains in the switch position.

Tab. B/4: Overview: Valve sub-base or function (5/3-way valves)

Vacuum generator plate	Comment
	Ident. code A Function: – vacuum generator (control side 14) Valve: – 2/2-way valve – single solenoid – normally closed – Mechanical return with air support – Flow control valve at output 4
	Ident. code E Function: – vacuum generator (control side 14) – reject pulse (control side 12) Valve at control side 14: – 2/2-way valve – single solenoid – normally closed – mechanical return with air support – flow control valve at output 4 Valve at control side 12: – 2/2-way valve – single solenoid – normally closed – spring return

Tab. B/5: Overview: Vacuum generator plates

B.2 Overview of end plates

By means of the part number (position see below) and the table below, you can ascertain which end plates are fitted on your CPV valve terminal. In the case of CPV valve terminals with AS-Interface, CP or MP connection, the electrical sub-base must be dismantled for this purpose.

1 Part number

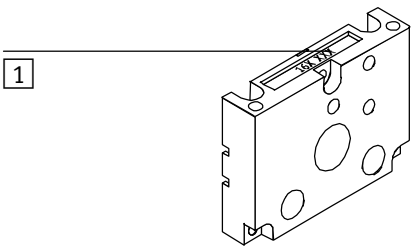
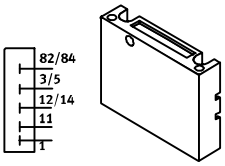
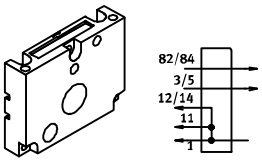
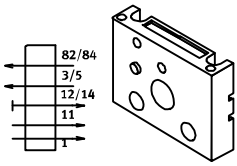
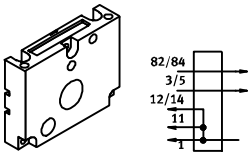
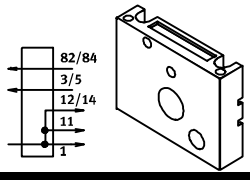
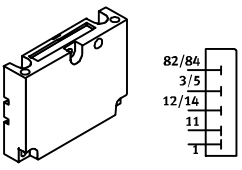


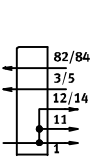
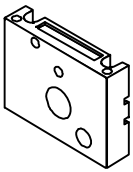
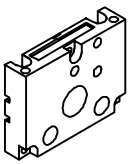
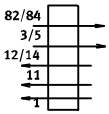
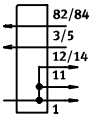
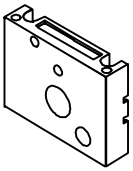
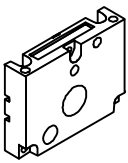
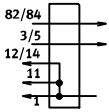
Fig. B/1: Position of end plate part number

End plate		Part number		
		CPV10	CPV14	CPV18
Left-hand end plates				
CPV...-EPL:	no connections	161 378	162 548	163 280
CPV...-EPL-E:	axial connections, connections 1 and 11 separate	161 374	162 544	163 196
CPV...-EPL-G:	axial connections, connections 1 and 11 connected	161 376	162 546	163 198
CPV...-EPL-PE:	for pneumatic multipin, connections 1 and 11 separate	161 370	162 540	163 194
CPV...-EPL-PG:	for pneumatic multipin, connections 1 and 11 connected	161 372	162 542	163 192
CPV...-EPL-EU:	with large surface-mounted silencer	188 454	188 458	192 939
CPV...-EPL-PEU:	with large surface-mounted silencer, for pneumatic multipin, connections 1 and 11 separate	188 452	188 456	192 938
Right-hand end plates				
CPV...-EPR:	no connections	161 379	162 549	163 281
CPV...-EPR-E:	axial connections, connections 1 and 11 separate external pilot air supply	161 375	162 545	163 197
CPV...-EPR-G:	axial connections, connections 1 and 11 connected, internal pilot air supply	161 377	162 547	163 199
CPV...-EPR-PE:	for pneumatic multipin, connections 1 and 11 separate external pilot air supply	161 371	162 541	163 195
CPV...-EPR-PG:	for pneumatic multipin, connections 1 and 11 connected internal pilot air supply	161 373	162 543	163 193
CPV...-EPR-EU:	with large surface-mounted silencer	188 455	188 459	192 941
CPV...-EPR-PEU:	with large surface-mounted silencer, for pneumatic multipin, connections 1 and 11 separate, external pilot air supply	188 453	188 457	192 940
CPV...-EPR-PGU:	with large surface-mounted silencer, for pneumatic multipin, connections 1 and 11 connected, internal pilot air supply	193 913	193 914	194 006

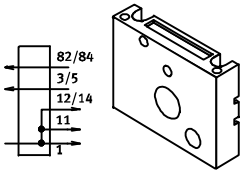
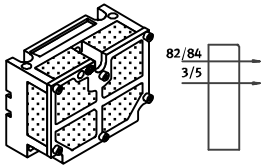
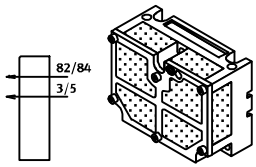
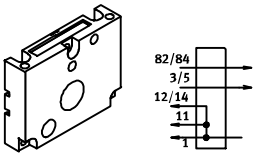
Tab. B/6: Overview: end plate identification

All available end plate combinations are listed in the following tables. Check the end plates you wish to use with regard to their compatibility, see following tables.

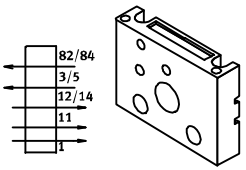
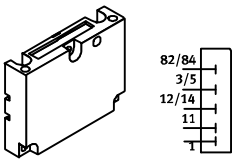
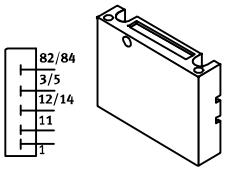
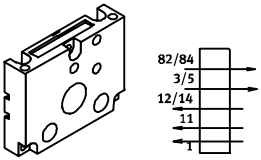
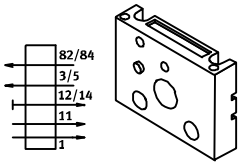
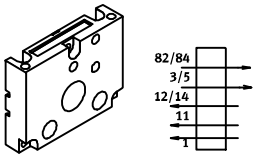
End plate pairs for internal pilot air (intrinsic pilot air), with pneumatic connections	**Description**
CPV...-EPL  CPV...-EPR-G 	Ident. code U – Connections only in the right-hand end plate – No pressure zone separation permitted – Not suitable for vacuum
CPV...-EPL-E  CPV...-EPR-G 	Ident. code Y – Connections in the left-hand and right-hand end plate – Pressure zone separation permitted – Maximum number of pressure zones: 3 – Valves to the left of the separator plate are suitable for vacuum • 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”).
CPV...-EPL-G  CPV...-EPR 	Ident. code: V – Connections only in the left-hand end plate – No pressure zone separation permitted – Not suitable for vacuum

End plate pairs for internal pilot air (intrinsic pilot air), with pneumatic connections	**Description**
CPV...-EPL-G   CPV...-EPR-E  	Ident. code --- – Connections in the left-hand and right-hand end plate – Pressure zone separation permitted – Maximum number of pressure zones: 3 – Valves to the right of the separator plate can be used for vacuum – Connection 12/14 in the right-hand end plate must be sealed with a blind plug • 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”).
CPV...-EPL-G   CPV...-EPR-G  	Ident. code --- – Connections in the left-hand and right-hand end plate – Pressure zone separation only permitted with separator plate Ident. code S for exhaust separation – Maximum number of pressure zones: 1 – Not suitable for vacuum

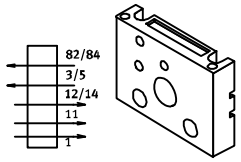
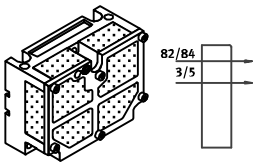
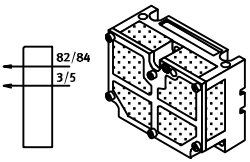
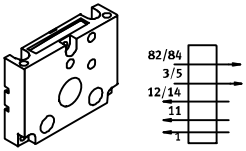
Tab. B/7: End plates for internal pilot air supply

End plate pairs for internal pilot air (intrinsic pilot air), with pneumatic connections and large surface-mounted silencer	**Description**
CPV...-EPL-G  CPV...-EPR-EU  	Ident. code B – Connections in the left-hand end plate – No pressure zone separation permitted – Not suitable for vacuum
CPV...-EPL-EU  CPV...-EPR-G  	Ident. code A – Connections in the right-hand end plate – No pressure zone separation permitted – Not suitable for vacuum

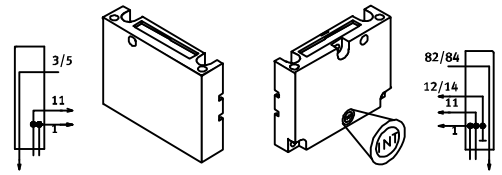
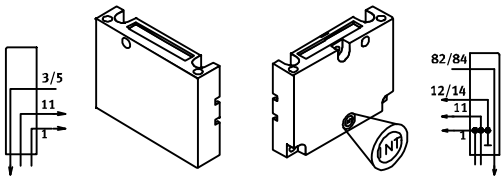
Tab. B/8: End plates for internal pilot air, with large surface-mounted silencer

End plate pairs for external pilot air supply (external pilot air), with pneumatic connections	**Description**
CPV...-EPL-E  CPV...-EPR 	Ident. code X – Connections only in the left-hand end plate – No pressure zone separation permitted – Suitable for vacuum
CPV...-EPL  CPV...-EPR-E 	Ident. code W – Connections only in the right-hand end plate – No pressure zone separation permitted – Suitable for vacuum
CPV...-EPL-E  CPV...-EPR-E 	Ident. code Z – Connections in the left-hand and right-hand end plate – Pressure zone separation permitted – Maximum number of pressure zones: 4 – Suitable for vacuum • 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”).

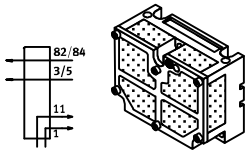
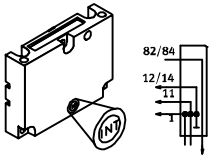
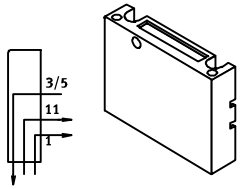
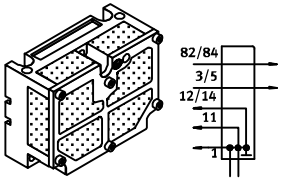
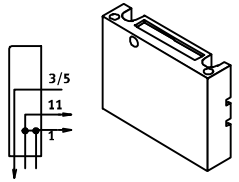
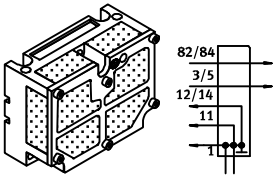
Tab. B/9: End plates for external pilot air supply

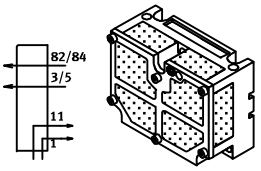
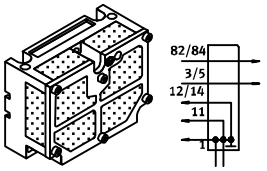
End plate pairs for external pilot air supply (external pilot air), with pneumatic connections and large surface-mounted silencer	**Description**
CPV...-EPL-E  CPV...-EPR-EU 	Ident. code D – Connections in the left-hand end plate – No pressure zone separation permitted – Suitable for vacuum
CPV...-EPL-EU  CPV...-EPR-E 	Ident. code C – Connections in the right-hand end plate – No pressure zone separation permitted – Suitable for vacuum

Tab. B/10: End plates for external pilot air supply, with large surface-mounted silencer

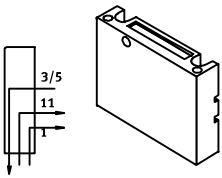
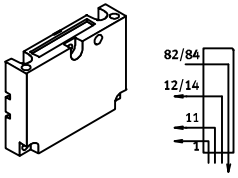
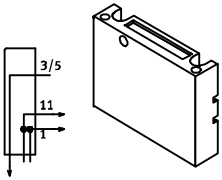
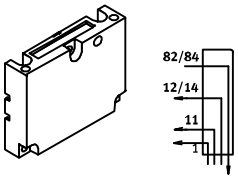
End plate pairs for internal pilot air supply (internal pilot air) and pneumatic multipin	**Description**
CPV...-EPL-PG CPV...-EPR-PG 	Ident. code Y – Connections on the pneumatic multipin – Pressure zone separation only permitted with separator plate Ident. code T – Maximum number of pressure zones: 2 – Valves to the left of the separator plate are suitable for vacuum – Right-hand end plate with internally branched pilot air supply is marked with **INT**
CPV...-EPL-PE CPV...-EPR-PG 	Ident. code --- – Connections on the pneumatic multipin – Pressure zone separation only permitted with separator plate Ident. code T – Maximum number of pressure zones: 3 – Valves to the left of the separator plate are suitable for vacuum – Right-hand end plate with internally branched pilot air supply is marked with **INT**

Tab. B/11: End plate pairs for internal pilot air supply and pneumatic multipin

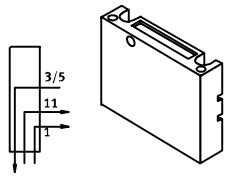
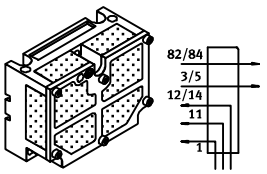
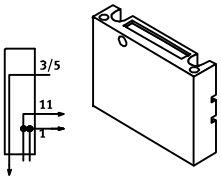
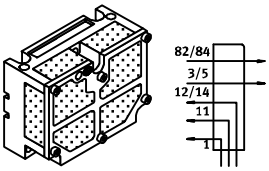
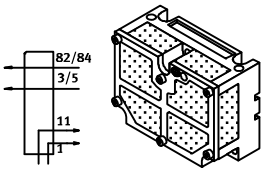
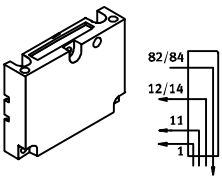
End plate pairs for internal pilot air supply (internal pilot air) and pneumatic multipin, with large surface-mounted silencer	**Description**
CPV...-EPL-PEU  CPV...-EPR-PG 	Ident. code G – Connections on the pneumatic multipin – Exhaust air vented via large surface-mounted silencers – Pressure zone separation only permitted with separator plate Ident. code T – Maximum number of pressure zones: 3 – Not suitable for vacuum – Right-hand end plate with internally branched pilot air supply is marked with **INT**
CPV...-EPL-PE  CPV...-EPR-PGU 	Ident. code K – Connections on the pneumatic multipin*) – Exhaust air vented via large surface-mounted silencers – Pressure zone separation permitted – Maximum number of pressure zones: 3 – In conjunction with separator plate can be used for vacuum
CPV...-EPL-PG  CPV...-EPR-PGU 	Ident. code --- – Connections on the pneumatic multipin*) – Exhaust air vented via large surface-mounted silencers – Pressure zone separation permitted – Maximum number of pressure zones: 2
*) Seal connections 11 and 12/14 on the pneumatic multipin below the right-hand end plate.	

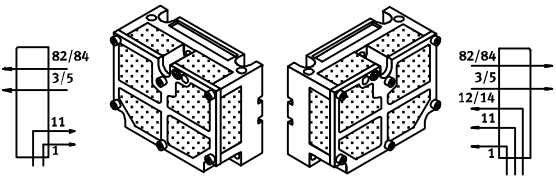
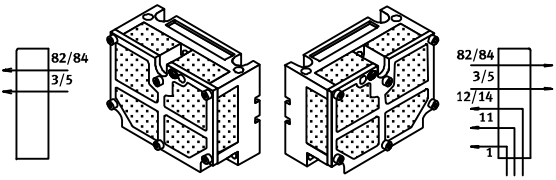
End plate pairs for internal pilot air supply (internal pilot air) and pneumatic multipin, with large surface-mounted silencer	**Description**
CPV...-EPL-PEU  CPV...-EPR-PGU 	Ident. code J – Connections on the pneumatic multipin*) – Exhaust air vented via large surface-mounted silencers – Pressure zone separation permitted – Maximum number of pressure zones: 3 – Valves to the left of the separator plate are suitable for vacuum
*) Seal connections 11 and 12/14 on the pneumatic multipin below the right-hand end plate.	

Tab. B/12: 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	**Description**
CPV...-EPL-PE  CPV...-EPR-PE 	Ident. code Z – Connections on the pneumatic multipin – Pressure zone separation only permitted with separator plate Ident. code T – Maximum number of pressure zones: 4 – Suitable for vacuum
CPV...-EPL-PG  CPV...-EPR-PE 	Ident. code --- – Connections on the pneumatic multipin – Pressure zone separation only permitted with separator plate Ident. code T – Maximum number of pressure zones: 3 – Suitable for vacuum

Tab. B/13: End plate pairs for external pilot air supply and pneumatic multipin

End plate pairs for external pilot air supply (external pilot air) and pneumatic multipin, with large surface-mounted silencer	**Description**
CPV...-EPL-PE  CPV...-EPR-PEU 	Ident. code E – Connections on the pneumatic multipin – Exhaust air vented via large surface-mounted silencers – Pressure zone separation only permitted with separator plate Ident. code T – Maximum number of pressure zones: 4 – Suitable for vacuum
CPV...-EPL-PG  CPV...-EPR-PEU 	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 – Suitable for vacuum
CPV...-EPL-PEU  CPV...-EPR-PE 	Ident. code F – Connections on the pneumatic multipin – Exhaust air vented via large surface-mounted silencers – Pressure zone separation only permitted with separator plate Ident. code T – Maximum number of pressure zones: 4 – Suitable for vacuum

End plate pairs for external pilot air supply (external pilot air) and pneumatic multipin, with large surface-mounted silencer	**Description**
CPV...-EPL-PEU CPV...-EPR-PEU 	Ident. code H – Connections on the pneumatic multipin – Pressure zone separation permitted – Maximum number of pressure zones: 4 – Suitable for vacuum
CPV...-EPL-EU CPV...-EPR-PEU 	Ident. code --- – Connections on the pneumatic multipin – No pressure zone separation permitted – Suitable for vacuum

Tab. B/14: End plate pairs for external pilot air supply and pneumatic multipin, with large surface-mounted silencer

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