Balance Systems

COMPACT PERFORMANCE SISTEMA CP

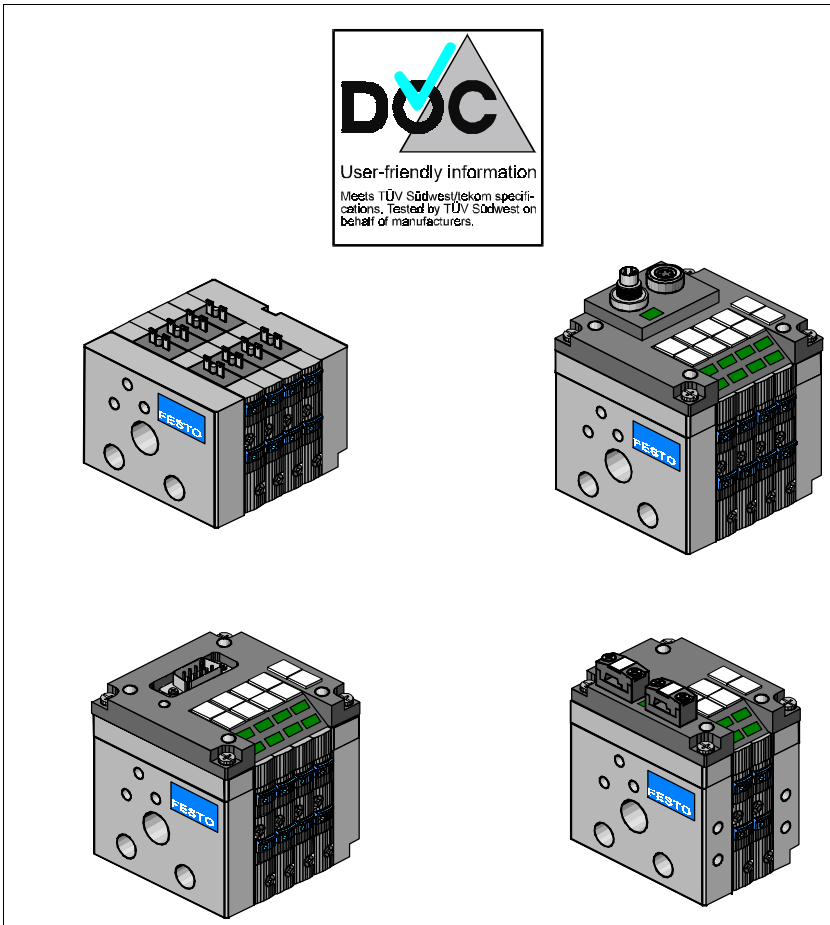
CP SYSTEM COMPACT PERFORMANCE

Serie CP
CP *Series*

Documento Nr. / Document Nr. Z00000000020

Compact Performance
CPV valve terminal

Pneumatics



Typ: CPV..-VI

FESTO

Manual
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9811d

FESTO

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Contents

4. Commissioning

5. Maintenance and conversion

A. Technical appendix

Designated use

The CPV valve terminals documented in this manual are designated exclusively for controlling pneumatic actuators and may only be used in conjunction with devices and components from other manufacturers providing these are recommended by Festo:

– as intended for use

– in original condition

– without unauthorized modifications

– in faultless technical condition.

The specified limit values for pressures, temperatures, electrical data, torques etc. must be observed.
Please comply also with national and local safety laws and regulations.

Target group

This manual is directed exclusively at technicians who are trained in control and automation technology and who have experience in the installation, commissioning and maintenance of pneumatic components.

Important user instructions

Danger categories

This manual contains instructions on the dangers which may occur if the CPV valve terminal is not used correctly. These instructions are always printed in italics, are framed and also signalled by pictograms.

A distinction is made between the following:

WARNING
This means that personal injury or damage to property may occur if these instructions are not observed.

CAUTION
This means that damage to property may occur if these instructions are not observed.

PLEASE NOTE
This means that this instruction must also be observed.

Pictograms

Pictograms and symbols complement the danger warnings and draw attention to the nature and consequences of dangers.

The following pictograms are used:

Uncontrolled movements of loose tubing.

Unintentional movements of the connected actuators.

High voltages or undefined switching states of the electronic components which may influence connected circuits.

Electrostatically vulnerable components.
These will be damaged if you touch the contact surfaces.

Text markings

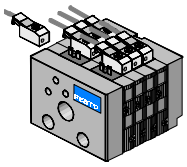
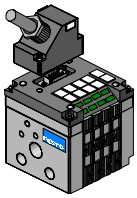
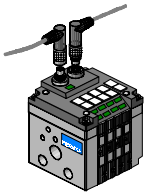
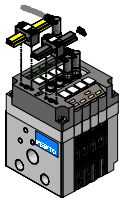
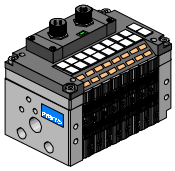
- This mark indicates activities which can be carried out in any order.

1. Figures indicate activites which must be carried out in the numerical order of the figures.

– Hyphens indicate general, non-compulsory activites.

Information on this manual

This manual contains specific information on the fitting, installation, commissioning, maintenance and conversion of the CPV valve terminal. It includes only the description of the pneumatic components and refers to the variations of the CPV valve terminal 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 product packing 
With CP connection Information on the electric/electronic components See manual "CP system, Installation and commissioning" 	With AS-i connection Information on the electric/electronic components See product packing 
With CP direct connection Information on the electric/electronic components See manual "CPV valve terminal with direct connection" for the relevant field bus 	

Information on further CP modules can be found in the manual for the relevant module. The following table gives a summary.

Manuals on the CP system				Peripherals
Manual	"CP system, installation and commissioning"			
Content	General basic information on the method of operation, fitting, installation and commissioning of CP systems.			
Manual	"CP field bus node, programming and diagnosis"	"CVP valve terminal, pneumatics"	"CP modules, electronics"	
Content	Special information on commissioning, programming and diagnosis related to the nodes used.	Information on fitting, installing and commissioning CPV valve terminals.	Information on fitting, installing and commissioning CP input/output modules.	

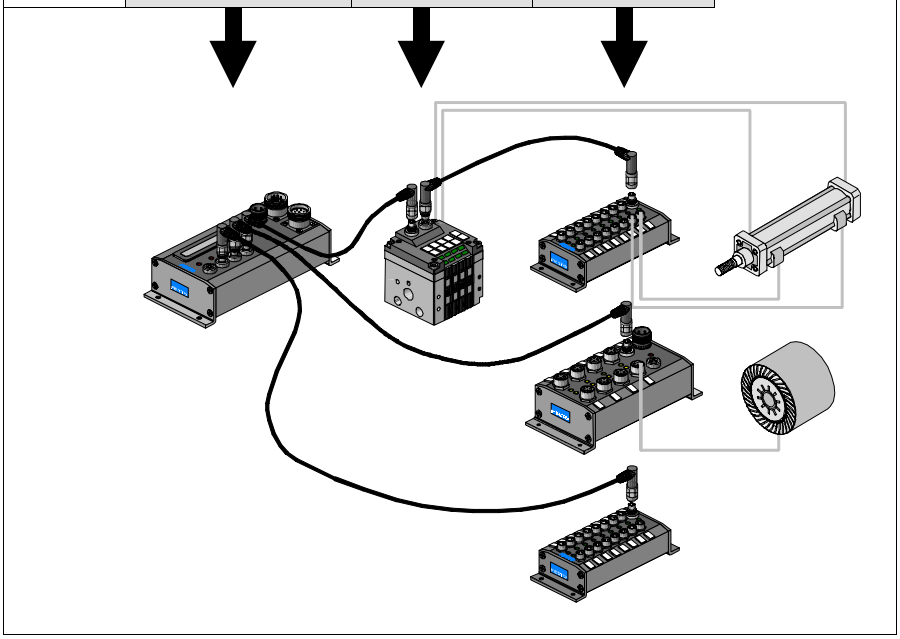
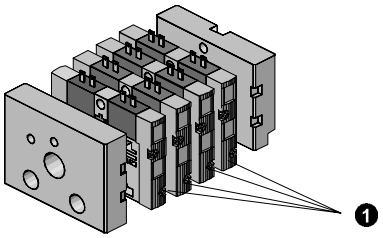


Fig. 0/1: Manuals for the CP system

The CPV valve terminal consists of different plates. The main components of the CPV valve terminal are the valve plates (see drawing).



1 Valve plates

Fig. 0/2: Valve plates

This manual contains documentation on the following valve plates:

Product	Equipment on terminal	Number of valve locations depending on electrical connection		
		IC connection	MP, CP connection	AS-i connection
CPV valve terminal	CP valve boards with auxiliary pilot air and the following micro or mini valves:			
	– a 5/2-way single solenoid valve	2....8	4, 6 or 8	2, 4
	or			
	– a 5/2-way double solenoid valve	2....8	4, 6 or 8	2
	or			
	– two 3/2-way valves (used as mid-position valves)	2....8	4, 6 or 8	2
	or	2....8	4, 6 or 8	2
	– a 5/3-way valve blocked in midposition (only for CPV18)	2....8	4, 6 or 8	2
	or			
	– two 2/2-way valves	2...8	4, 6 or 8	2

Abbreviations

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

Term	Meaning
AS-i	**A**ctuator-**S**ensor **i**nterface
Blanking plate	Plate without valve function, for filling empty locations
Components	Common term for connector plates, end plates, blanking plates, isolating plates, valve plates and pneumatic multiple connector plates
CP	**C**ompact **P**erformance
CP cable	Special cable for coupling the various CP modules
CP modules	Common term for the various modules which can be integrated in a CP system
CP system	Complete system consisting of the CP field bus node and the CP modules
CPV valve terminal	CPV valve terminal (type 10) for fieldbus systems or with IC, MP or AS-i-connection
CPV valve terminal with AS-i connection	CPV valve terminal variant with serial connections enabling the CPV valve terminal to be connected to the AS-i bus
CPV valve terminal with CP connection	CPV valve terminal variant with plug and socket enabling the CPV valve terminal to be connected to the field bus and further CP modules
CPV valve terminal with direct connection	CPV valve terminal variant with plug and socket. This valve terminal variant can be connected directly to the field bus and, depending on type, also with further CP modules.
CPV valve terminal with IC connection	CPV valve terminal variant on which each valve solenoid coil is connected individually with a special CP cable
CPV valve terminal with MP connection (multipin connection)	CPV valve terminal variant with sub-D plug by means of which all valve solenoid coils can be centrally connected
CPV10 CPV14 CPV18	Designation of CPV terminal sizes CPV terminal with micro valve plates CPV terminal with mini valve plates CPV terminal with midi valve plates

Term	Meaning
Electrical connector plate	Plate with MP, AS-i or CP connections
End plate	Plate at the left and right-hand ends of the CPV valve terminal with channels or connections for compressed air supply to the valves and for the exhaust.
HHB	Manual override
I/O	Input/output modules
Isolating plate	Plate for dividing the valve terminal into two pressure zones
Pneumatic multiple connector plate	Board for central wiring of the valve terminal (connections for supply air, exhaust and work air)
Relay plate	Plate with relay coils for controlling two electrically isolated outputs
Tubing connections	Connection of supply tubing (hoses) to the CPV valve terminal
Valve plate	Plate with single or double solenoid valves
Valve block	Basic unit with valve, isolating, blanking, relay and end plates

Chapter 1

System overview

Contents

1.1 Summary of variants

Festo can assist you with your automation problems at the machine level by means of valve terminals. The modular structure of the CP system enables you to incorporate the CPV valve terminals and I/O modules to best advantage in your machine or system.

Due to its compact structure, the CPV valve terminal can be mounted near to the actuators which it is to control. This means that shorter compressed air tubing can be used. Loss of air is therefore minimized and the time required for pressurizing and exhausting the pressure tubing is reduced. This is made possible by the use of very compact valves with high flow which help to reduce costs.

CPV valve terminal variants

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

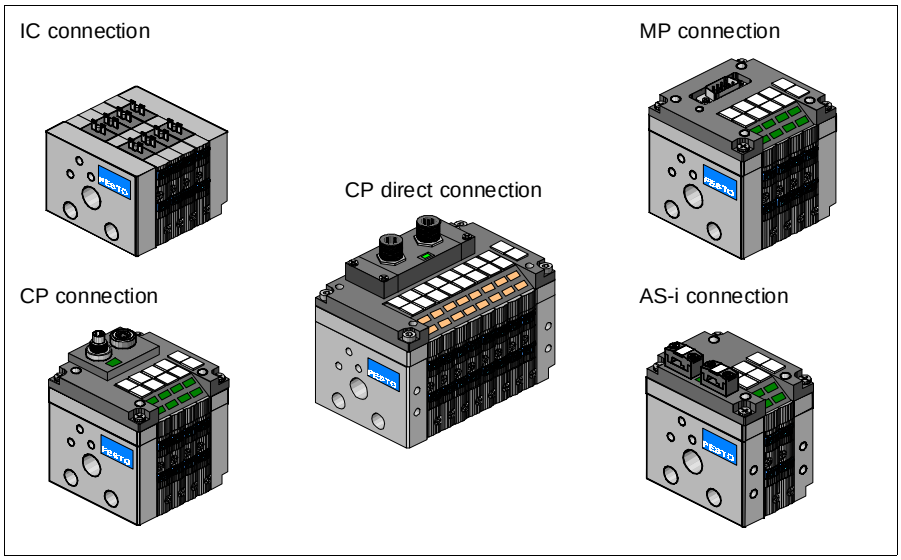


Fig. 1/1: Variants of the CPV valve terminal

CPV valve terminal with IC connection

The CPV valve terminal with IC (single) connection is available with 2 to 8 valve plates (also in uneven spacing). The electrical connection on this type of terminal is made separately by means of a socket on each solenoid coil.

CPV valve terminal with MP connection

This CPV valve terminal is available with 4, 6 or 8 valve plates. The electrical connection of the solenoid coils is made centrally via the multiple connector plate.

CPV valve terminal with CP connection

The CPV valve terminal with CP connection is available with 4, 6 or 8 valve plates. Connection to the higher-order fieldbus node is made by means of a special CP cable.

CPV valve terminal with direct connection

The CPV valve terminal with direct connection is available with 8 valve plates. It can be connected directly to the relevant fieldbus.

CPV valve terminal with AS-i connection

This CPV valve terminal is connected to the AS-i bus by means of a special AS-i cable. It is available with four types of electrical connections:

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

The CPV valve terminals with AS-i connection can be fitted with the following valve plates:

- two or four valve plates with 5/2-way single solenoid valves
- two valve plates with 5/2-way double solenoid valves
- two valve plates each with 3/2-way single solenoid valves
- two valve plates each with 2/2-way single solenoid valves
- Only CPV18: two valve plates with 5/3-way valves blocked in mid-position.

PLEASE NOTE
The CPV valve terminal with AS-i connection and 4 inputs is always fitted with 4 valve locations. Depending on the equipment fitted, these CPV valve terminals are filled, where necessary, with 1 or 2 reserve plates.

Grid sizes of the CPV valve terminals

The CPV valve terminals are available in the following sizes:

Designation	Valve plate	Valve
CPV10	10 mm	Micro valves
CPV14	14 mm	Mini valves
CPV18	18 mm	Midi valves

Mixed operation with both grid sizes on one CPV valve terminal is not permitted.

Isolating plate

You can divide the CPV valve terminal into two pressure zones with the aid of the isolating plate. The isolating plate is available in two variants:

– Isolating plate with blocked compressed air channels (1 and 11)
– Only CPV14: isolating plate with blocked exhaust channels (3/5) and blocked compressed air channels (1 and 11)

Relay plate

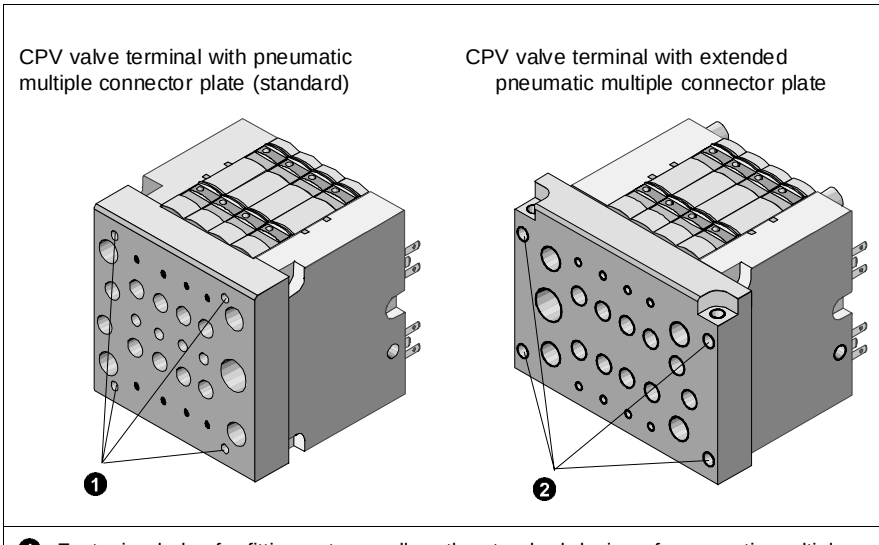
The CPV valve terminal with CP connection can be fitted with relay plates. Each relay plate contains two relays for controlling two electrically-isolated outputs.

Pneumatic multiple connector plate

The supply and work tubing can be connected centrally on CPV valve terminals with the pneumatic multiple connector plate. The CPV valve terminals can be separated quickly from the supply and work tubing. By means of appropriate end plates, conversion from individual tubing to tubing with the pneumatic multiple connector plate can be made at any time. The pneumatic multiple connector plate is available in two variants:

– Standard design of pneumatic multiple connector plate which fits flush with the end plates of the CPV valve terminal. The holes for fastening to the wall or for foot mounting are on the connection side of the pneumatic multiple connector plate.

– Extended pneumatic multiple connector plate with external fastening holes.

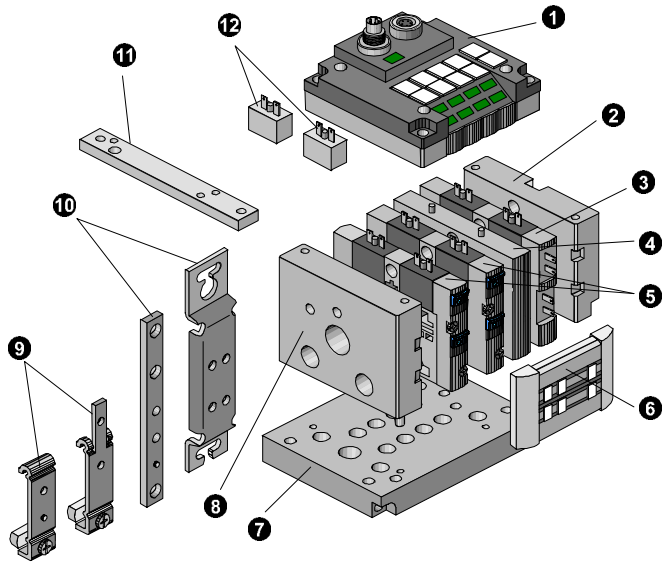


1 Fastening holes for fitting onto a wall on the standard design of pneumatic multiple connector plate
2 Fastening holes for fitting onto a wall on the extended pneumatic multiple connector plate

Fig. 1/2: Versions of the pneumatic multiple connector plate

1.2 Description of components

The CPV valve terminal consists of the following components:



1. Electrical connector plate with MP, AS-i or CP connection
2. Right-hand end plate (with/without supply connections or for pneum. m.c. plate)
3. Relay plate (only for CPV10/14 terminals with CP connection)
4. Blanking or isolating plate (with blocked air channels 1 and 11 and exhaust channel (3/5) or only blocked air channels 1 and 11
5. Valve plates fitted with single or double solenoid valves
6. Identifying plate and cover of manual override for inscription clips (optional) not in connection with relay plate
7. Pneumatic multiple connector plate (optional)
8. Left-hand end plate (with/without supply connections or for pneum. m.c. plate)
9. Support for hat-rail mounting (optional) for CPV10/14 or CPV18
10. Support for wall fastening (optional) for CPV10/14 or CPV18
11. Support for wall fastening (optional) for CPV10/14
12. Intermediate plug with current reduction

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

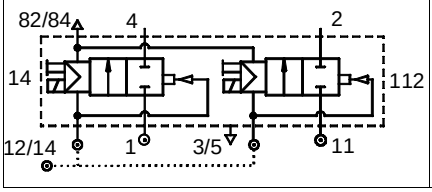
Identification code

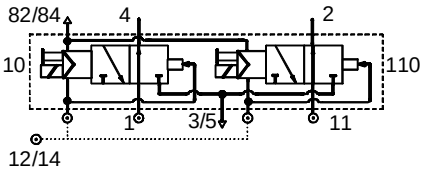
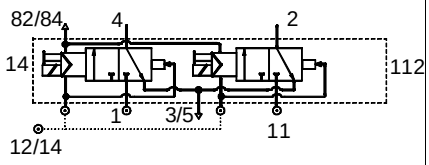
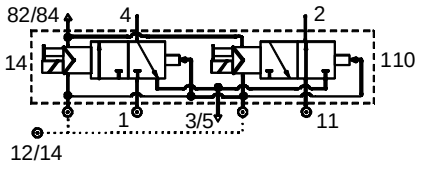
By means of the identification code, you can ascertain which plates are fitted on your CPV valve terminal. This code is printed on the front between the manual overrides 12 and 14. The identification codes are as follows:

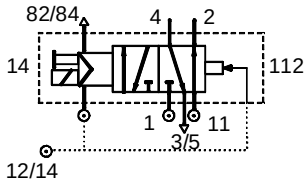
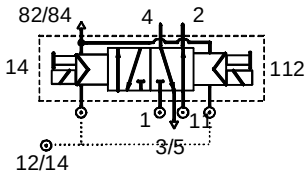
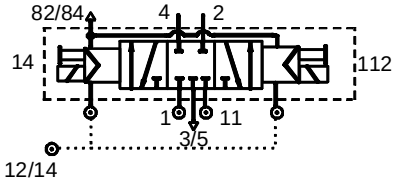
Ident. codes	Pneumatic component
C	Valve plate, two 3/2-way, basic position closed
D	Valve plate, two 2/2-way, basic position closed
F	Valve plate, 5/2-way, single solenoid
G	Valve plate, 5/3-way, mid-position blocked
H	Valve plate, two 3/2-way, one open in basic position, one closed in basic position
J	Valve plate, 5/2-way, double solenoid
L	Blanking plate
M	Valve plate, 5/2-way, single solenoid
N	Valve plate, two 3/2-way, basic position open
R	Relay plate
S	Isolating plate, exhaust channel (3/5) and air channels (1, 11) blocked
T	Isolating plate, air channels (1, 11) blocked

Valve plates

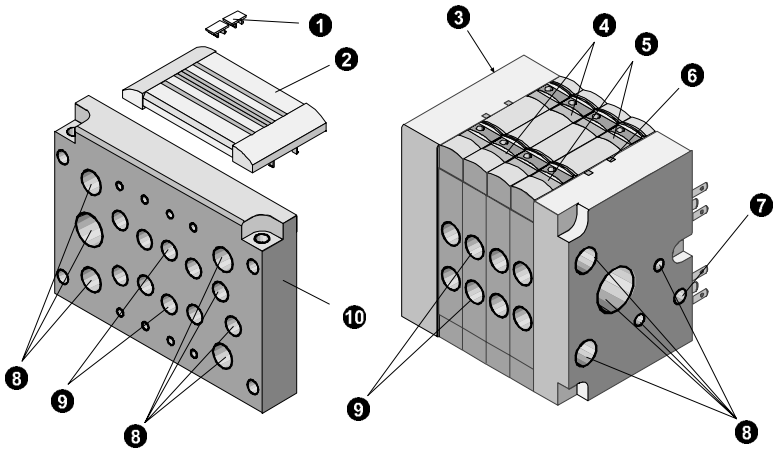
The CPV valve terminals are available with the following valve plates:

Valve plate	
Ident. code: D 	Function: two 2/2-way single solenoid valves

Valve plate (continuing)	
Ident. code: N  	Function: – Two single 3/2-way valves open in basic position – 5/3-way valve pressurized in mid-position. This function is implemented with two 3/2-way valves open in basic position.
Ident. code: C  	Function: - Two 3/2-way valves, blocked in basic position - 5/3-way valve exhausted in mid-position. This function is implemented with two 3/2-way valves blocked in basic position. - In preparation: 5/3-way valve blocked in mid-position. This function is implemented on the CPV10/14 terminals with two 3/2-way valves blocked in basic position in combination with externally fitted switchable non-return valves. **PLEASE NOTE** • If you are using the 3/2-way valves as a 5/3-way mid-position valve, make sure that your control program does not actuate both valve solenoid coils of the 3/2-way valves at the same time, thereby actuating a double-acting cylinder.
Ident. code: H  	Function: two 3/2-way valves on control side 110 basic position open and on control side 14 basic position closed.

Valve plate (continuing)	
Ident. code F (only CPV10 valve terminal) or M  	Function: 5/2-way single solenoid valve **PLEASE NOTE** Observe the following limitations on using the "F valve plate" (Ident. code F) with CPV valve terminals • With MP connection "F valve plates" may only occupy every second valve location. • With IC connection "F valve plates" may only be used with intermediate plugs for current reduction. • With AS-i connection "F valve plates" may only be operated in valve terminals of type CPV10-GE-ASI-4E4A-... . • With direct connection "F valve plates" must not be operated in valve terminals of type CPV10-GE-IBL-... .
Ident. code: J  	Function: 5/2-way double solenoid valve
Ident. code: G only for CPV18 terminal  	Function: 5/3-way valve blocked in mid-position

On the CPV valve terminal you will find the following pneumatic connections and operating elements:

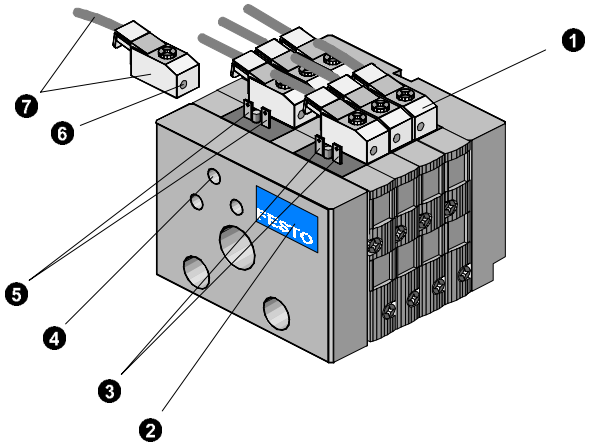


1. Valve location inscription clip (per valve)
2. Support for inscription clip and cover of manual override
3. Type plate
4. Manual override (per pilot solenoid, automatic reset or locking)
5. Clip of pushing manual override
6. Recess for label support
7. Earth/ground connection (left/right-hand end plate)
8. Supply connections (1, 11, 12/14), exhaust connections (3/5, 82/84):
   with individual tubing on left and/or right-hand end plate
   with central tubing on pneumatic multiple connector plate
9. Work connections (2, 4), per valve
10. Pneumatic multiple connector plate

Fig. 1/4: Pneumatic connections and operating elements on the CPV valve terminal

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

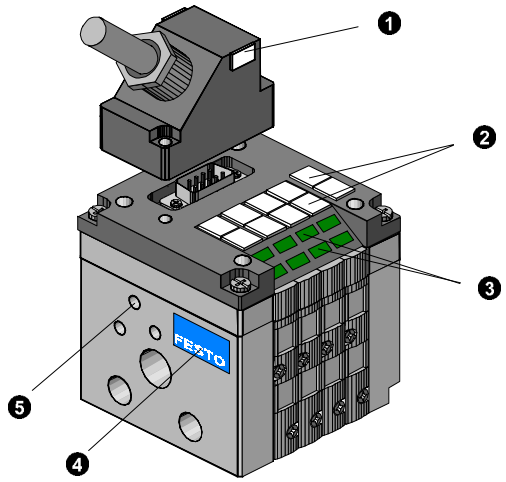
On the CPV valve terminal with IC connections you will find the following electrical connections and display elements:



1. Label fields (per cable socket)
2. Intermediate plug for current reduction (optional)
3. Type plate
4. Connecting lugs for pilot solenoid coil 14
5. Earth/ground connection (per end plate)
6. Connecting lugs for pilot solenoid coil 12
7. Yellow LEDs, signal status displays of pilot solenoids (per cable socket)
8. Ready-to use cable with socket for individual connection (per pilot solenoid), can be turned 180°.

Fig. 1/5: Electrical connections and display elements of the CPV valve terminal with IC connection

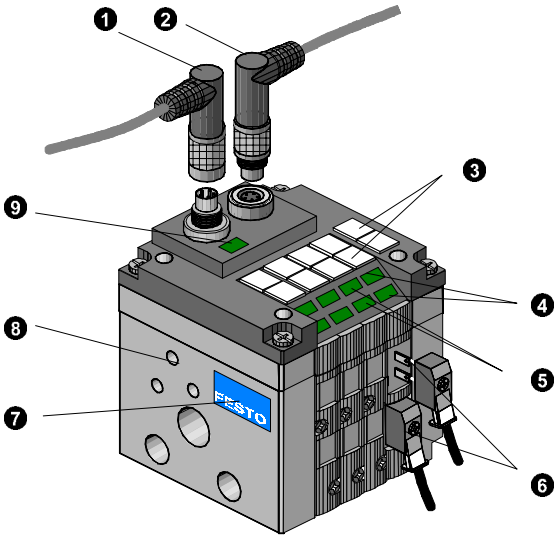
On the CPV valve terminal with MC connection you will find the following connections and display elements:



1	SUB-D multipin plug (9-pin for terminals with 4 valves, 25-pin for terminals with 6 or 8 valves)
2	Label clip
3	Yellow LEDs, signal status displays of the pilot solenoids
4	Type plate
5	Earth/ground connection (per end plate)

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

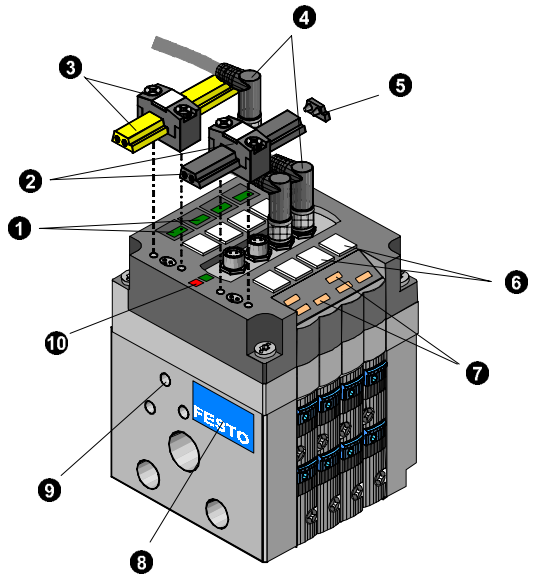
On the CPV valve terminal with CP connection you will find the following electrical connections and display elements:



1 Incoming CP cable
2 Continuing CP cable
3 Label clip
4 Yellow LEDs, signal status display of relays
5 Yellow LEDs, signal status display of the pilot solenoids
6 Relay connections with cable
7 Type plate
8 Earth/ground connection (per end plate)
9 Green LED, Status display of CP connection

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

On the CPV valve terminal with AS-i connection you will find the following electrical connections and display elements:



1. Green LED status display of the inputs (only CPV..-GE-ASI-4E4A-...)
2. Cable socket for additional supply with black supply cable (only CPV..-GE-ASI-.-Z)
3. AS-i bus socket with yellow bus cable
4. Sensor cable with plug (only CPV..-GE-ASI-4E4A-...)
5. AS-i cable cap (only CPV..-GE-ASI-.-Z)
6. Label clip
7. Yellow LED status displays of the pilot solenoids
8. Type plate
9. Earth/ground connection (per end plate)
10. BUS LED 1 (green), BUS LED 2 (red) (only CPV..-GE-ASI-4E4A-...)

Fig. 1/8: Electrical connections and display elements of the CPV valve terminal with AS-i connection

Chapter 2

Fitting

Contents

2. Fitting

WARNING
Before undertaking installation or maintenance work, switch off the following:
- *the compressed air supply*
- *the power supply to the valve solenoid coils*

You thereby avoid:

– uncontrolled movements of loose tubing

– unintentional movements of the connected actuators

– undefined switching states of the electronic components

2.1 CPV valve terminal with individual tubing

Fitting variants

The CPV valve terminal with individual tubing has been designed for use on a system or machine which is fitted in one of the following ways:
– Fitting onto a wall

– Fitting onto a hat rail

– Fitting with feet

PLEASE NOTE
If your application is subjected to vibration in excess of the following values:
– 0.15 mm travel at 10-58 Hz
– 2 g acceleration at 58-150 Hz
the CPV14 or CPV 18 valve terminals should be mounted on a wall or with feet.

2.1.1 Fitting onto a wall

In order to fit the CPV valve terminal onto a wall, you will require the appropriate fitting kit depending on the type of fitting. These kits are shown in the table below.

PLEASE NOTE There is a special fitting kit, which is not shown here, for rear fitting of the CPV10/14 valve terminals with direct connection for Interbus Loop (type CPV..-GE-IBL-..) or for AS-i connection with inputs/outputs (type CPV..-GE-ASI..E/..A).

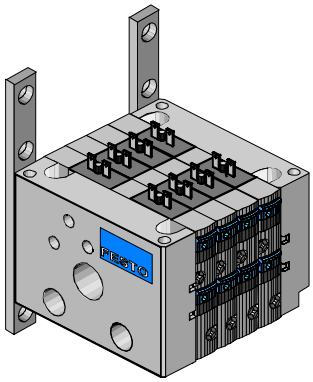
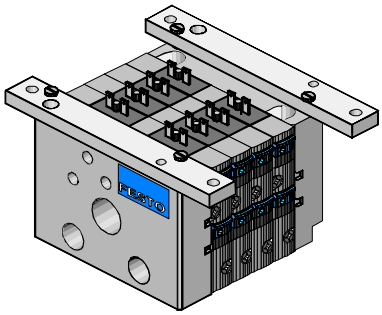
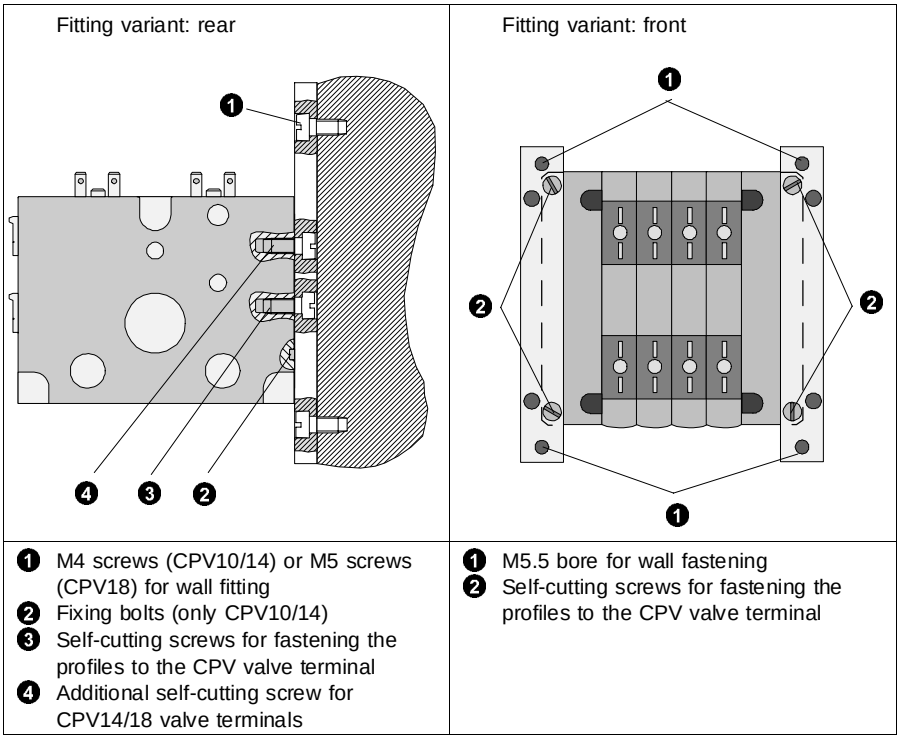
Fitting variant	
Rear 	Front (only CPV10/14 with IC connection) 
Fitting kit CPV10/14: CPV10/14-VI-BG-RWL	Fitting kit CPV10: CPV10-VI-BG-ET200X
Fitting kit CPV18: CPV18-VI-BG-RW	Fitting kit CPV14: CPV14-VI-BG-ET200X
The fitting kits consist of 2 profile sections and 4 self-cutting screws.	

Fig. 2/1: Fastening profiles for wall fitting

Proceed as follows:

- Make sure that the mounting surface can support the weight of the CPV valve terminal.
- Fit the fastening profiles to the left and right hand end plates (see Fig. 2/2). Use the self-cutting screws supplied for this purpose (see table). When fitting the valve terminal from the rear, make sure that the fixing bolts of the profile sections grip into the groove in the end plates.

Valve terminal	Fitting variant: rear		Fitting variant: front	
	Self-cutting screw	Tightening torque	Self-cutting 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	----------	----------



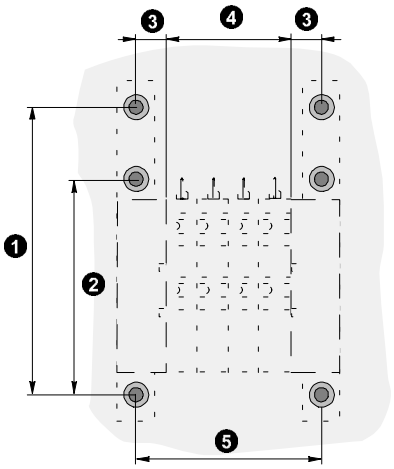
❶ M4 screws (CPV10/14) or M5 screws (CPV18) for wall fitting ❷ Fixing bolts (only CPV10/14) ❸ Self-cutting screws for fastening the profiles to the CPV valve terminal ❹ Additional self-cutting screw for CPV14/18 valve terminals	❶ M5.5 bore for wall fastening ❷ Self-cutting screws for fastening the profiles to the CPV valve terminal

Fig. 2/2: Fitting the CPV valve terminal onto a wall

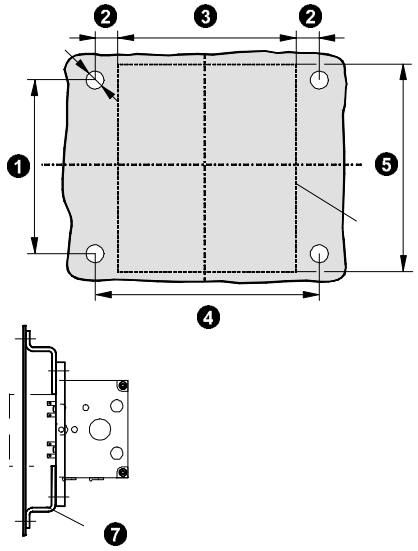
- Make sure that there is enough room to connect the power cables and the pneumatic tubing. In the case of front fitting, a suitable spacer or cutout section must be provided to permit access to the electrical connections (see Fig. 2/3).

PLEASE NOTE
The boring dimensions for rear fitting of the CPV valve terminal (Fig. 2/3) do not apply to the CPV10/14 valve terminals with direct connection for Interbus Loop (type CPV..-GE-IBL-..) or for AS-i connection with inputs/outputs (type CPV..-GE-ASI..E/..A).

Fitting variant: rear



Fitting variant: front



CPV10	CPV14	CPV18	CPC10	CPV14
❶ 92 mm*)	92 mm*)	120 mm	❶ 109.5 mm	109.5 mm
❷ 62 mm*)	62 mm*)		❷ 26 mm	10 mm
❸ 9 mm	13 mm	15 mm	❸ 10 mm x no. of plates	14 mm x no. of plates
❹ 10 mm x no. of plates	14 mm x no. of plates	18 mm x no. of plates	❹ 52 mm + ❸	20 mm + ❸
			❺ 120 mm*)	120 mm*)
❺ 18 mm + ❹	26 mm + ❹	30 mm + ❹	❻ Cut out wall section if spacer is not used	
			❼ Spacer	

*) The following applies with CPV10/14 valve terminals:
- Dimension ❶ for CPV valve terminal with MP, CP or AS-i connection (without inputs/outputs)
- Dimension ❷ for CPV10/14 valve terminals with IC connection

*) Dimension ❺ depends on the design of the electrical connector sockets

Fig. 2/3: Dimensions for fastening holes/cutout wall section

Drill 4 holes with 5.5 mm diameter or a threaded bore for M5 screws in the fastening surface

Valve terminal	Rear fitting		Front fitting	
	Diameter of hole	Threaded bore for:	Diameter of hole	Threaded bore for:
CPV10/14	4.5 mm	M4 screw	5.5 mm	M5 screw
CPV18	5.5 mm	M5 screw	----------	----------

- Then fasten the CPV valve terminal onto the wall with four M4 or M5 screws of suitable length.

2.1.2 Fitting onto a hat rail

PLEASE NOTE
In order to fit the CPV valve terminal onto a hat rail you require the following fitting kits:
– For CPV10/14 valve terminals:
fitting kit CPV10/14-VI-BG-NRH-35
– For CPV18 valve terminals:
fitting kit CPV18-VI-BG-NRH-35
These kits consist of 2 brackets, 2 or 4 M4 x 10 self-cutting screws (CPV10/14) or M5 x 10 (CPV18) and 2 M4 x 10 screws with clamping pieces and springs.

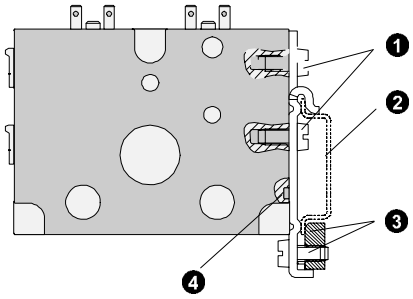
Proceed as follows:

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

Hat rail for CPV10/14 terminal	Hat rail for CPV18 terminal
Support rail as per EN 50022 - 35 x 7.5 (width 35 mm, height 7.5 mm)	Support rail as per EN 50022 - 35 x 15 (width 35 mm, height 15 mm)

- Make sure that there is enough room to connect the power cables and the pneumatic tubing.
- Fasten the hat rail to the surface approximately every 100 mm.
- Screw the 2 brackets onto the end plates with the screws supplied, as shown in the diagram below. With the CPV10/14 valve terminals, make sure that the fixing bolts of the brackets grip into the recess in the CPV valve terminal.

CP terminal	Self-cutting screws	Tightening torque
CPV10/14	M4 x 10	1.5 Nm
CPV18	M5 x 10	4 Nm



1. For each end plate one M4 x 10 screw (CPV10), two M4 x 10 screws (CPV14) or two M5 x 10 screws (CPV18)
2. Hat rail
3. Hat rail clamping unit
4. Fixing bolts (only CPV10/14)

Fig. 2/4: Fitting the valve terminal onto a hat rail

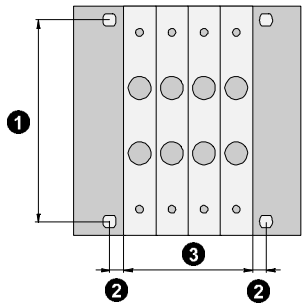
- Hang the CPV valve terminal onto the hat rail. and fasten it on both sides with the hat rail clamping unit. This will prevent it from tilting or slipping.

2.1.3 Fitting with feet

PLEASE NOTE
In order to fit the CPV valve terminal with feet (at the level of work connections 2 and 4) you require the following fastening screws:
- *4 M4 x 45 socket head screws (CPV10)*
- *4 M4 x 50 socket head screws (CPV14)*
- *4 M6 x 65 socket headscrews (CPV18)*

Proceed as follows:

- First you must prepare your fastening surface, and make a suitable bracket where necessary. The position and distances between the fastening holes of the CPV valve terminals are shown in the diagram below.

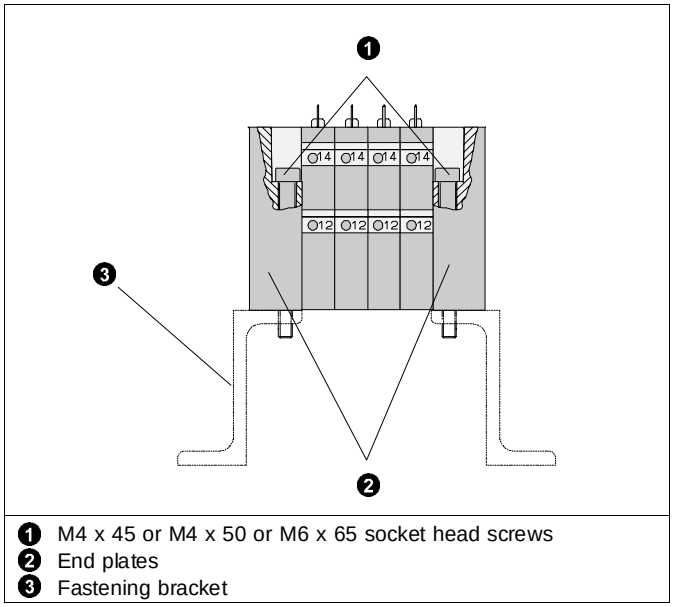


CPV 10 terminal	CPV 14 terminal	CPV 18 terminal
1 53 mm 2 4 mm 3 10 mm x number of plates	66 mm 5 mm 14 mm x number of plates	87 mm 8.1 mm 18 mm x number of plates

Fig. 2/5: Position of the fastening holes

- Make sure that there is enough room to connect the power cables and the pneumatic tubing.
- In the case of CPV terminals with IC connection, you must insert the 4 socket head screws supplied into the holes intended for this purpose on the left and right-hand end plates (see diagram).

	CPV10	CPV14	CPV18
Socket head screws	M4 x 45	M4 x 50	M6 x 65



1 M4 x 45 or M4 x 50 or M6 x 65 socket head screws
2 End plates
3 Fastening bracket

Fig. 2/6: Position of fastening screws

- Screw the CPV valve terminal onto the fastening surface or onto a support bracket.

2.1.4 Fitting the CPV valve terminal onto the SIMATIC ET 200X

PLEASE NOTE
Instructions on the decentral periphery device ET 200X can be found in the SIEMENS AG manual.

A CPV valve terminal with:

- IC connection
- 8 valve plates
- fitted fastening CPV..-VI-BG-ET200X
- and relevant seals

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

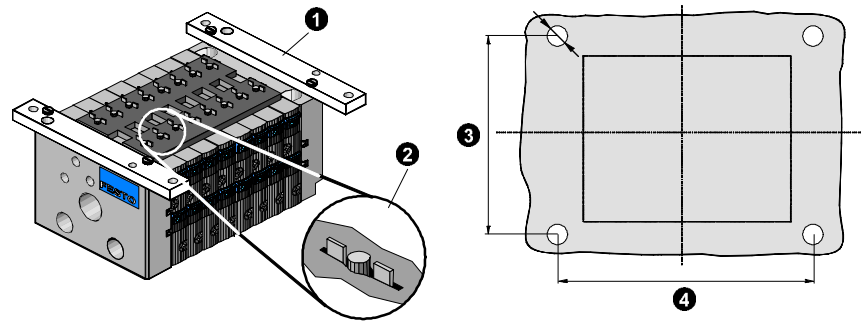
When the device is fitted, the switching status of the valve solenoid coil can be recognized by the LED on the pneumatic interface module.

Fitting

Proceed as follows:

1. The fastening is already fitted to the CPV valve terminal. Check that the flat seal is placed correctly over the connecting lugs and the centring bolts between them (see Fig. 2/7).

2. Mark the positions of the 4 holes for the fastening screws on the base (see diagram). Tip: Hold the pneumatic interface module by the mounting surface and mark the position of the holes. Drill the 4 holes for M5 screws.

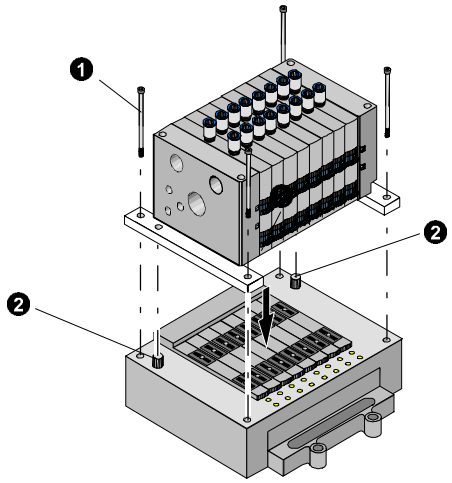


1 Fastening type CPV..-VI-BG-ET200X
2 Connecting lug with centring bolt
3 109.5 mm
4 132 mm

Fig. 2/7: Dimensions for fitting onto the SIMATIC ET200X

3. Place the valve terminal carefully and without tilting onto the pneumatic interface module. Make sure that:
   - the holes are placed over the centring bolts
   - the connecting lugs are not bent.

   Screw the valve terminal and the pneumatic interface module with 4 screws onto the mounting surface.



1 M5 screws, length at least 60 mm (ISO 1207/ISO 1580 - DIN 84 or DIN 912)
2 Centring bolts

Fig. 2/8: Fitting the CPV valve terminal onto the Siemens SIMATIC ET200X

PLEASE NOTE
In order to remove the CPV valve terminal, lift it up carefully and without tilting. If the valve terminal is operated in a dirty environment, the seal should be replaced.
– for CPV10: seal type CPV10-GE-8
– for CPV14: seal type CPV14-GE-8

2.2 CPV valve terminal with pneumatic multiple connector plate

If you are using a pneumatic multiple connector plate, the power supply and work lines will be connected at a central point. This enables the supply and work lines to be disconnected from the CPV valve terminal easily and quickly.

PLEASE NOTE
Only CPV valve terminals, which have been fitted with appropriate end plates, may be mounted on the pneumatic multiple connector plate.
CPV valve terminals, which have been fitted with end plates for individual tubing, can be converted before they are fitted onto the pneumatic multiple connector plate.
In this case replace the end plates with multiple connector end plates.

The pneumatic multiple connector plate is available in two variants:

– Standard design of the pneumatic multiple connector plate which fits flush with the end plates of the CPV valve terminal. The holes for fastening the valve terminal onto a wall or for mounting on feet are on the same side as the connections on the pneumatic multiple connector plate.

– Extended pneumatic multiple connector plate which projects over the end plates. Due to its external fastening bores, this plate can be fitted very easily. Two additional holes running transversely through this pneumatic multiple connector plate enable the valve terminal to be fitted by the rear to a wall (see chapter "System summary" Fig. 1/2).

2.2.1 Fitting the pneumatic multiple connector plate

Make sure that the mounting surface can support the weight of the pneumatic multiple connector plate and the CPV valve terminal. Make sure also that there is enough room to connect the power cables and the pneumatic tubing.

Fitting the pneumatic multiple connector plate (connection side)

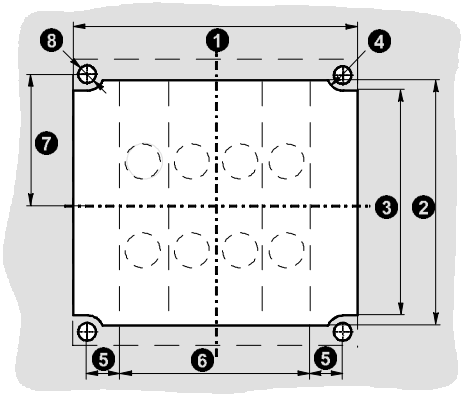
In order to fit the pneumatic multiple connector plate in the standard or extended design by the connection side to a mounting surface, proceed as follows:

- Cut out a section of the mounting surface (dimensions see Figs. 2/9 and 2/10).
- Drill four holes in the mounting surface. The position and distances between these holes is shown in Figs. 2/9 and 2/10.
- Fasten the pneumatic multiple connector plate onto the mounting surface with 4 screws of suitable length.

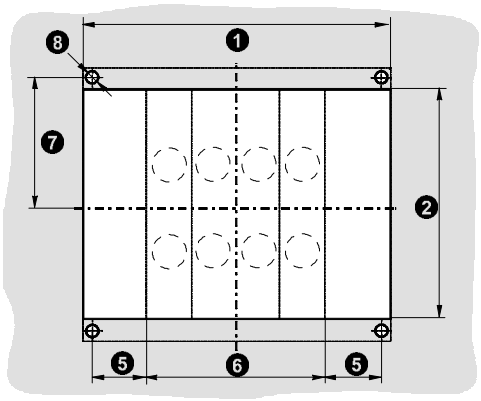
Diameter of mounting holes and screw sizes		
Pneumatic multiple connector plate (standard version)		Pneumatic multiple connector plate (extended version)
CPV10/14	CPV18	CPV10/14/18
4.5 mm	5.5 mm	6.5 mm
M4	M5	M6

Wall cutout dimensions for CPV valve terminals with standard pneumatic multiple connector plate

CPV10/14:



CPV18:

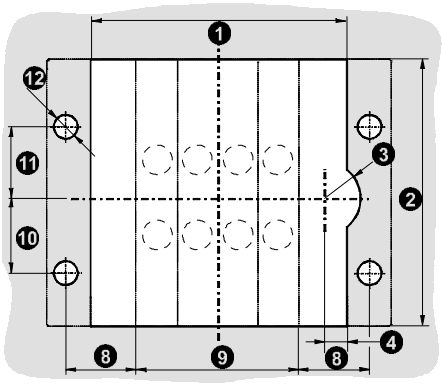


CPV10 terminal	CPV14 terminal	CPV18 terminal
❶ 29.5 mm + ❻	39.5 mm + ❻	59.0 mm + ❻
❷ 60 mm	76.6 mm	98 mm
❸ 55 mm	68.6 mm	----------
❹ R4	R4	----------
❺ 11.25 mm	12.75 mm	25.5 mm
❻ 10 mm x number of plates	14 mm x number of plates	18 mm x number of plates
❼ 31.5 mm	38.3 mm	54 mm
❽ Diameter 4.3 mm	Diameter 4.3 mm	Diameter 5.5 mm

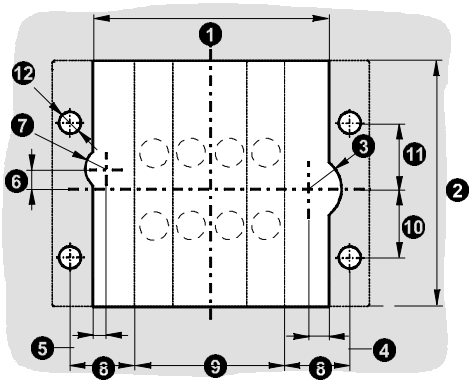
Fig. 2/9: Wall cutout dimensions for the standard pneumatic multiple connector plate

Wall cutout dimensions for CPV valve terminals with extended pneumatic multiple connector plate

CPV10/18



CPV14



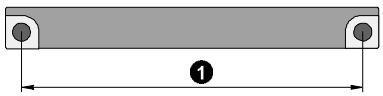
CPV10 terminal	CPV14 terminal	CPV18 terminal
❶ 30 mm + ❾	40 mm + ❾	60 mm + ❾
❷ 73 mm	89 mm	118 mm
❸ R12	R14	R22
❹ 6.3 mm	9.0 mm	15 mm
❺ ----------	4.7 mm	----------
❻ ----------	5.55 mm	----------
❼ ----------	R8	----------
❽ 21 mm	26 mm	35.5 mm
❾ 10 mm x number of plates	14 mm x number of plates	18 mm x number of plates
❿ 21.5 mm	29.5 mm	44 mm
⓫ 18.5 mm	29.5 mm	44 mm
⓬ Diameter 6.5 mm	Diameter 6.5 mm	Diameter 6.5 mm

Fig. 2/10: Wall cutout dimensions for the extended pneumatic multiple connector plate

Fitting the pneumatic multiple connector plate (rear side)

In order to fit the pneumatic multiple connector plate in the extended version by the rear side to a mounting surface, proceed as follows:

- Drill 2 holes in the mounting surface for M6 screws. The position of and distance between these holes can be seen in Fig.2/11.



Dimension ❶

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

Fig. 2/11: Hole dimensions for rear fitting

- Screw the pneumatic multiple connector plate onto the mounting surface with two M6 screws of suitable length.

2.2.2 Fitting the CPV valve terminal onto the pneumatic multiple connector plate

Proceed as follows:

- In the case of CPV valve terminals with individual connection, insert the socket head screws supplied into the fastening holes of the CPV valve terminal. In the case of CPV valve terminals with MP, AS-i or CP connection, the socket head screws are already inserted with a retaining device in the fastening holes under the electrical connector plate.
- Place the 3-seal or 4-seal strips 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 2 individual seals into the threads of the work connections.
- Screw the CPV valve terminal onto the pneumatic multiple connector plate with the 4 socket head screws. Tighten the screws in diagonally opposite sequence with 2 Nm (CPV10/14) or 4 Nm (CPV18).

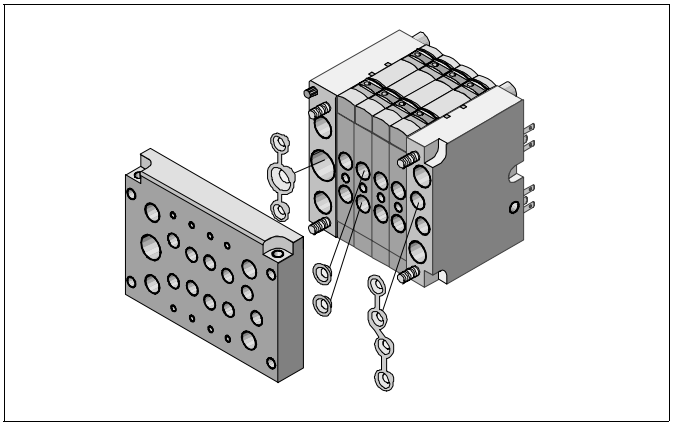


Fig. 2/12: Fitting the CPV valve terminal onto the pneumatic multiple connector plate

2.3 Fitting the designation support

As a protection against unauthorized operation of the manual override and for mounting the designation clips for the valves, the CPV valve terminal has a designation support. This is fitted on the front above the manual override.

PLEASE NOTE
The designation support cannot be fitted onto CPV valve terminals which are equipped with relay plates.

Proceed as follows:

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

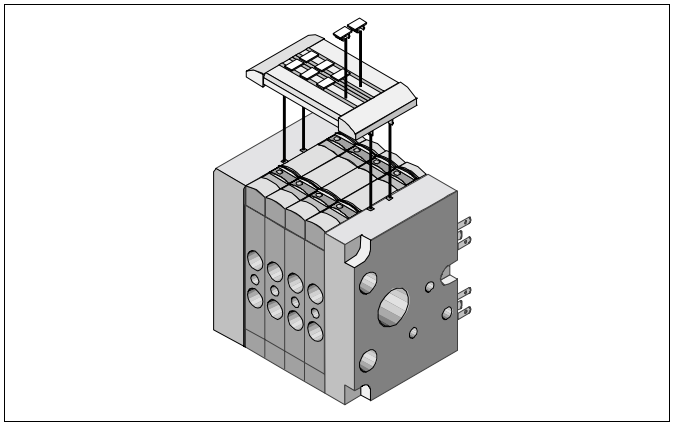


Fig. 2/13: Fitting the designation support

- Press the designation clips into the recesses on the designation support (see Fig. 2/13).

Chapter 3

Installation

Contents

3. Installation

3.1 General connecting principles

WARNING
Before undertaking installation or maintenance work, switch off the following:
- *the compressed air supply*
- *the power supply to the valve solenoid coils*

You thereby avoid:

– uncontrolled movements of loose tubing

– unintentional and sudden movements of the connected actuators

– undefined switching states of the electronic components

Please observe the following:
The components on the valve terminal contain electrostatically vulnerable components. Do not touch the contact surfaces of the plug connnectors. These components may be damaged if the regulations for handling electrostatically vulnerable components are not observed.

Laying the pneumatic tubing

PLEASE NOTE
- *If necessary, place a seal under the screw connectors or silencers in order to avoid leakage.*

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

Basic installation

– Connecting
  1. Push the tubing as far as it will go over the port on the screw connector.
  2. If necessary, pull the locking ring (A) over the tubing connection and tighten clamping screw (B).
  3. Group the tubing together for reasons of clarity with:
     - tubing connectors or
     - multiple hose holders

– Disconnecting
  1. Loosen the locking screw or locking ring of the screw connector.
  2. Pull the tubing out.
  3. Replace non-required tubing with blind plugs (C).

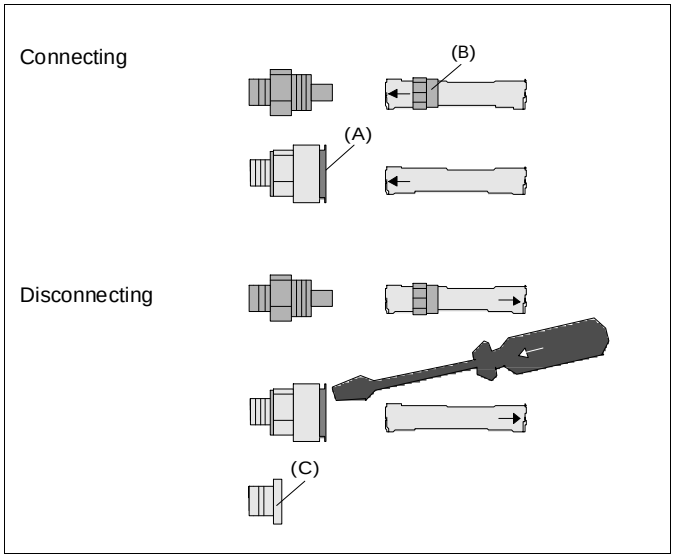


Fig. 3/1: Tubing variants

3.2 Connecting the CPV valve terminal

PLEASE NOTE

- *If valves are fitted but not used, seal the work connections*
  2 and 4 with blind plugs.
- *Depending on the tool you are using, observe the following sequence when you connect the work lines:*
  - if using a socket head wrench, you can connect the work lines in any sequence.
  - if using an external socket head wrench, you must connect the work lines from left to right (room for wrench).

In order to guarantee optimum efficiency of your CPV valve terminal, we recommend that the compressed air and, if necessary, the exhaust lines be connected on both sides in the following cases:

– when large-volume cylinders are to be operated at high speed

– when several valves are switched simultaneously to through flow

PLEASE NOTE

- *Connect the supply pressure to both sides of the end plates or pneumatic multiple connector plate, if the CPV valve terminal is operated with two pressure zones.*

3.2.1 Auxiliary pilot air

CAUTION
Operate the CPV valve terminal only with the medium described below.
- *If possible, use non-lubricated auxiliary pilot air (connections 12/14). Otherwise use hydraulic oil of type DIN 51524-HLP32/ISO 6743-4. The oil content in the auxiliary pilot air must not exceed 3-5 drops per 1000 l of air consumed. This corresponds to 6 bar supply pressure and a medium flow rate of approximately 1 drop/4 minutes. Observe the instructions on special oil for service units in the Festo Pneumatics Catalogue.*
- *In the case of CPV valve terminals with internally branched auxiliary pilot air, the above mentioned instruction also applies to the supply air (connection 1/11).*

The CPV valve terminal is intended for internal or external pilot air, depending on the end plates. Refer to your order documentation or to the table in chapter 5.3 "Internal/external pilot air" to see which end plates are fitted on your CPV valve terminal.

Internal pilot air

If the supply pressure of your CPV valve terminal is between 3 and 8 bar, you can work with internal auxiliary pilot air. In this case the auxiliary pilot air is taken from port 1 or 11 on the left or right-hand end plate.

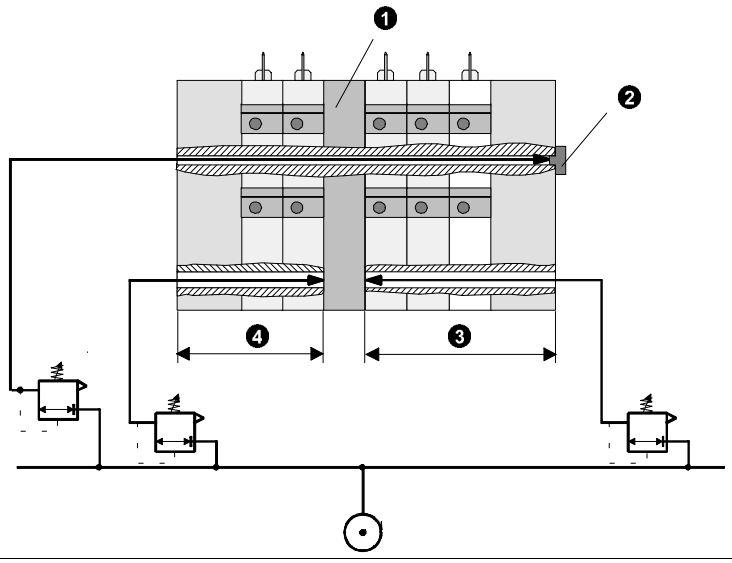
PLEASE NOTE
If you are using a CPV valve terminal with internal pilot air:
- *port 12/14 must be sealed with a blind plug.*

External pilot air

If the supply pressure of your CPV valve terminal is in the range 3 to 8 bar, you must operate it with external pilot air. In this case the external pilot air is supplied via port 12/14 on the CPV valve terminal.

PLEASE NOTE

- *Use regulated external pilot air (3 to 8 bar). This will ensure reliable faultless and operation of the CPV valve terminal.*
- *Ensure that the regulated external pilot air is supplied or taken at only one point by means of common tubing for all valve plates on the CPV valve terminal. This also applies when the CPV valve terminal is operated with different pressure zones (see diagram).*



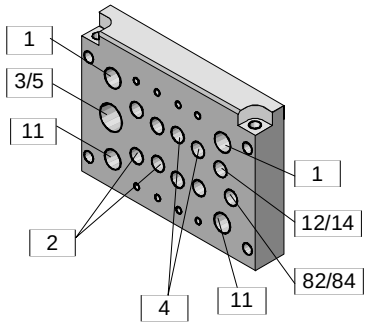
1 Isolating plate
2 Blind plug
3 Pressure zone 2
4 Pressure zone 1

Fig. 3/2: Auxiliary pilot air

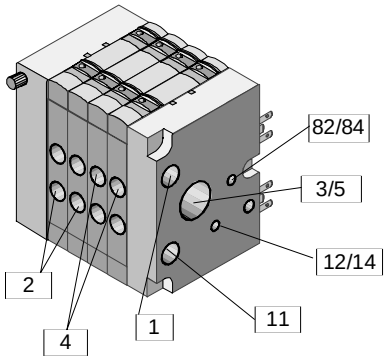
3.2.2 Connecting the supply and work tubing

Fit the screw connectors or silencers as shown in the table below. Then connect the tubing.

With pneumatic multiple connector plate



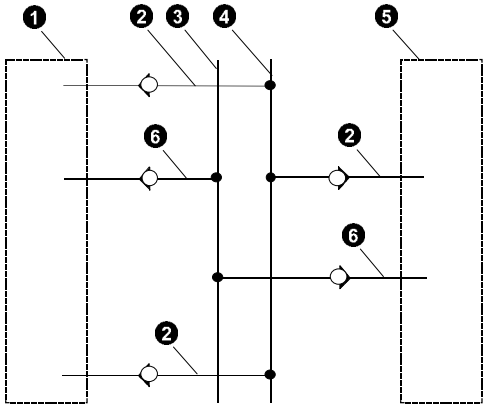
Without pneumatic multiple connector plate



Connection code ISO 5599	Tubing	Connection size ISO 228, Specifications in brackets for extended pneum. multiple connector plate			Connection
		CPV10	CPC14	CPV18	
1 or 11	Compressed air/ vacuum	G 1/8	G 1/4	G 3/8	Screw connector in end plates or pneumatic multiple connector plate
2 or 4	Work air/vacuum	M7	G 1/8	G 1/4	Screw connector
3/5	Exhaust right/ left-hand end plate Pneum. multiple connector plate	G 3/8 G 1/4	G1/2 G3/8	G 1/2 G 1/2	Screw connector - for ducted exhaust air - for silencers
12/14 or 82/84	Auxiliary pilot air/ exhaust right/ left-hand end plate Pneum. multiple connector plate	M5 M7 (M5)	G 1/8 G 1/8	G 1/4 G 1/4	Screw connector on connection 82/84 - for ducted exhaust air - for silencers

Fig. 3/3: Assigning the connections

PLEASE NOTE
If there are several systems with ducted exhaust air, use non-return valves in the common exhaust tubing, in order to avoid impairment of function as a result of back pressures.



1. CPV valve terminal 1
2. Common 3/5
3. Central 82/84
4. Central 3/5
5. CPV valve terminal 2
6. Common 82/84

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

PLEASE NOTE
The exhaust channels 3 and 5 are combined in the CPV valve terminal. Separate exhaust restriction of channels 3 and 5 is not therefore possible.

PLEASE NOTE
In the case of CPV valve terminals with two pressure zones and auxiliary pilot air taken internally on the right-hand side, the pressure on the right-hand side must be between 3 bar and 8 bar.

PLEASE NOTE
In the case of CPV valve terminals with ducted supply air, connections 11 and 12/14 must be sealed with blind plugs.

Vacuum/low pressure operation

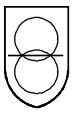
The CPV valve terminal can be operated with vacuum or low pressure (< 3 bar), providing regulated auxiliary pilot air is supplied separately A summary of the end plates required can be found in chapter 5 under "Conversion from internal to external auxiliary pilot air").

3.2.3 Connecting the electrical cables

Information on the procedure, as well as on connecting cables and current requirements can be found in the manual "CP system, installation and commissioning."

WARNING
Use only power units which guarantee reliable isolation of the operating voltages as per IEC 742/ EN 60742/VDE 0551 with at least 4 kV isolation resistance (protected extra low voltage, PELV). Switch power packs are permitted providing they guarantee reliable isolation in accordance with EN 60950/VDE 0805.

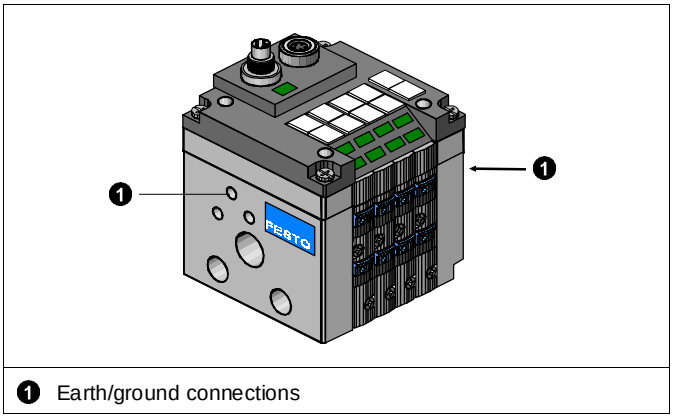
Remark:
By using PELV power units, protection against electric shock (protection against direct and indirect contact) in accordance with EN 60204-1/IEC 204 is guaranteed on Festo valve terminals. Safety transformers with the adjacent designation must be used for supplying PELV networks. The valve terminals must be earthed in order to ensure their function (e.g. EMC).



PLEASE NOTE
Check your EMERGENCY STOP circuitry, to see which measures are required in order to place your machine/system in a safe state in the event of an EMERGENCY STOP (e.g. switching off the power supply to the valves and output modules, switching off the compressed air supply).

Earthing the CPV valve terminal

All variants have an earth/ground connection for earthing the CPV valve terminal. This is on both the left and right-hand end plates (see diagram).



1 Earth/ground connections

Fig. 3/5: Earth/ground connection of CPV valve terminal

PLEASE NOTE
Earth the CPV valve terminal.
- *Connect the earth connection on the left or right-hand end plate (see Fig. 2/5) with low impedance (short cable with large cross-sectional area) to the earth potential.*

You thereby avoid electromagnetic interference (EMC).

Connecting current-consuming devices to the relay plate

PLEASE NOTE
Use only the ready made cable 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 insert the socket first onto the connecting lug of the lower relay output (see diagram).
- Screw the socket tight with the central locking screw (tightening torque 0.15 Nm).
- Fit the second socket to the upper relay output in the same manner.

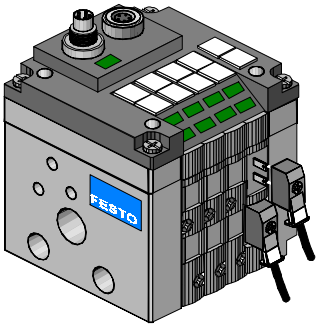


Fig. 3/6: Fitting the relay output sockets

CPV valve terminal with individual connection

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

PLEASE NOTE
- *Use only the following pre-assembled Festo connecting sockets for connecting the valve solenoid coils.*
- *KMYZ-3-24-...-LED / KMYZ-5-24-...-LED. An LED is incorporated in the transparent plugs of each of these connecting sockets. The LED indicates the switching status of the valve solenoid coil.*
- *KMYZ-4-24-... .This socket offers a low-cost alternative. There is no LED in the plug, but it complies with protection class IP40.*

Address assignment of the valves

- The addresses must be assigned in ascending order without gaps
- A valve location always occupies two addresses (even if it is occupied by a reserve, isolating or relay plate)
- Counting begins from left to right, on the individual valve plates from the front to the rear (see Fig. 3/7)

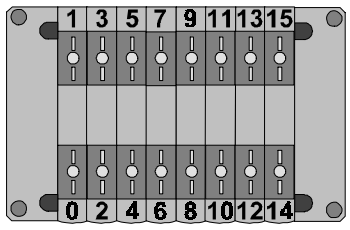


Fig. 3/7: Address assignment of the CPV valve terminal with IC connection and 8 valve locations

Connect the valve solenoid coils as follows:

- For current reduction, insert the intermediate plug into the connecting lug of the appropriate pilot solenoid.
- Insert the socket into the connecting lugs of the appropriate pilot solenoid or of the intermediate lug (see diagram). The socket can be turned 180°. Make sure that the centring bolt grips into the hole in the socket between the connecting lugs. Fasten the socket with the central locking screw (tightening torque 0.3 Nm).

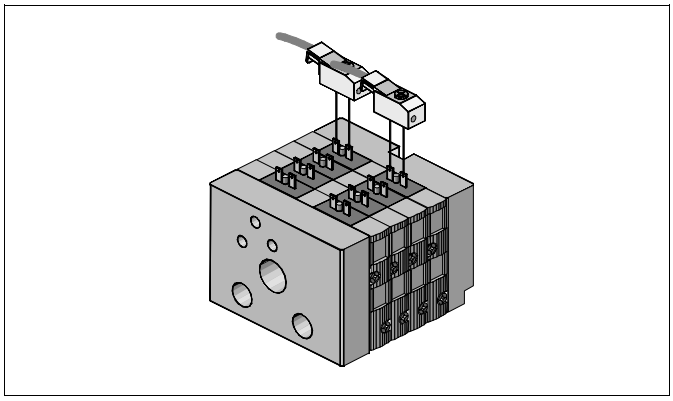


Fig. 3/8: Fitting the sockets for individual connection

CPV valve terminal with multipin or AS-i connection

Connecting the multipin or AS-i cable

PLEASE NOTE
Detailed instructions on the electrical installation of the CPV valve terminal with multipin or AS-i connections can be found with the relevant product.

CP terminal with CP connection

Connecting the CP cable

PLEASE NOTE
Detailed instructions on the electrical installation of the CPV valve terminal with CP connection can be found in the manual "CP system – General installation and commissioning", chapter 3.

CP terminal with direct connection

Connecting the field bus cable

PLEASE NOTE
Detailed instructions on the electrical installation of the CPV valve terminal with direct connection can be found in the manual "CPV valve terminal with direct connection."

Chapter 4

Commissioning

Contents

4. Commissioning

4.1 General instructions

Before commissioning

- Switch off the power supply before connecting or disconnecting plugs (otherwise functioning may be impaired).
- Earth the CPV valve terminal at an end plate.
- Commission only a completely fitted and wired valve terminal.
- Make sure that there is a sufficient supply of air (cooling) for the following operating conditions:
  - when the maximum number of valves are fitted
  - when operating at maximum voltage
  - when the solenoid coils are under constant stress.

4.2 Testing the valves

PLEASE NOTE
Before commissioning the CPV valve terminal, observe the specifications on medium, see chapter "Installation", section 3.2.1 Auxiliary pilot air.

Proceed as follows when commissioning the CPV valve terminal:

Commissioning variants	Activity
Preliminary test of the pneumatic tubing	Test the valve-cylinder combination with the manual override.
Complete commissioning of the complete system	Install and connect the complete system. Program control by PLC/ industrial PC.

There now follows a description of how to commission the pneumatic components with the manual override. Commissioning the CP system is described in the appropriate manual for the CP node.

Checking the valve functions

Manual override

WARNING
Before operating the manual override:
- *Disconnect the operating voltage supply to the valve solenoid coils by unplugging the contact (IC, MP AS-i or CP connection).*
  You then avoid undesired actuation of the valve solenoid coils.
- *Before applying the operating voltage, make sure that all manual overrides are set again at their basic positions.*
  You then avoid undefined switching states of the valves.

You should use the manual override principally when commissioning the pneumatic system, in order to check the functioning and effectiveness of the valve or valve-cylinder combination.
By actuating the manual override, you can switch the valve without an electrical signal. Only the compressed air supply needs to be switched on.

Different types of manual override

The manual override is intended for use as follows:

Manual override design	Mode of operation
Manual override with automatic reset (pushing)	Manual override is reset by spring force.
Manual override locking	Manual override remains active, until it is reset by hand.

The following types of manual override can be used with the CPV valve terminal.

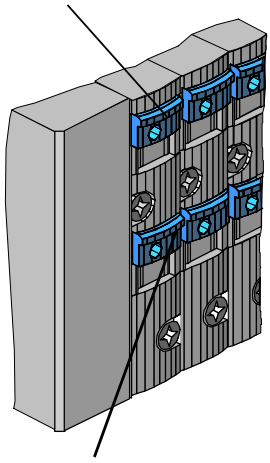
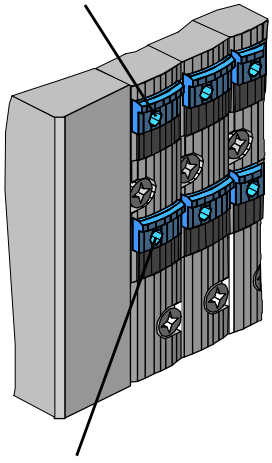
Locking manual override	Manual override with automatic reset
Slide of locking manual override to pilot solenoid 14	Button of automatic reset manual override to pilot solenoid 14
	
Slide of locking manual override to pilot solenoid 12	Button of automatic reset manual override to pilot solenoid 12

Fig. 4/1: Different types of manual override

Checking the valve-cylinder combination

WARNING
When pressurizing or repressurizing the valve terminal under the following conditions:
– with safety start-up valve
(slow pressure build-up) and
– when there is an electrical signal
(e.g. after EMERGENCY STOP)
supply the auxiliary pilot air separately (3 to 8 bar).

The auxiliary pilot air must reach its full level immediately after being switched on, otherwise the slow pressure build-up of the overall supply will have no effect with cylinders actuated as follows:

– by means of single solenoid valves

– by means of double solenoid valves which are switched to flow-through during the pressureless phase.

The effects of slow pressure build-up when there is an electrical signal are shown in the table below.

Separately supplied auxiliary pilot air	**Pressure increase in overall supply**	**Pressure increase in auxiliary pilot air (12/14)**	**Moment when valve switches over**	**Movement of cylinder**
taken behind safety start-up valve	**slow**	slow	after pressure increase at (1)	**fast**
taken in front of safety start-up valve	**slow**	fast	**before** pressure increase at (1)	**slow**

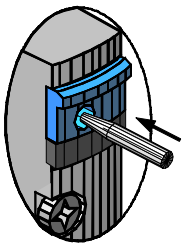
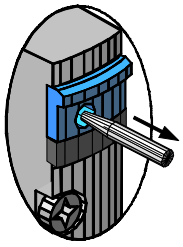
PLEASE NOTE
- *Use a blunt pointed object for actuating the manual override with automatic reset.*
- *Actuate the manual override with max. 30 N.*

You thereby avoid functional interference or damage to the manual override.

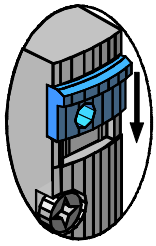
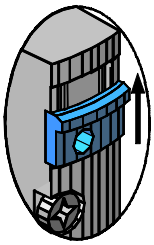
Testing

Proceed as follows:

- Switch on the compressed air supply.
- Check the functioning and mode of operation of each individual valve cylinder combination with the manual override as shown in the diagrams below.
- When the test is finished, switch off the compressed air supply again.

Actuate the manual override with automatic reset (pushing)		Reaction of valve
	Carefully press the plunger of the manual override as far as it will go.	The valve: – switches.
	Hold the plunger of the manual override pressed down.	– remains switched
	Release plunger. Spring resets the plunger to basic position.	– returns to basic position (not with 5/2-way double solenoid valve, Ident. code J)

CAUTION
Before commissioning the CPV valve terminal, return the manual override to basic position.

Actuate the manual override with locking		Reaction of valve
	Push the slide of the manual override down as far as possible.	The valve: – switches
	Leave slide in lower position.	– remains switched
	Push the slide of the manual override up as far as possible.	– returns to basic position (not with 5/2-way double solenoid valve, Ident. code J)

4.2 Locating faults

Impairment of function

When you switch on the compressed air supply or when you have tested the individual valves, you can learn the following about the operating status of the pneumatic system.

Operating status of the pneumatic system	Valve position	Error treatment when compressed air has been switched off
Air comes out... – of common tubing connections – of work tubing connections	– basic position – switch position	• Check the seal or tubing fitting
– between the modules	– basic position	• When switching on again regulate separate auxiliary pilot air 3 to 8 bar
Valve or pneumatic system – does not react as expected	– switch position	• Check tubing
– does not react	– switch position	• When switching on again, check operating pressure (e.g. pressure zones) • Return for servicing
– does not react	– basic position	– Check regulator connection (apply pressure > 3 bar to regulator)

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

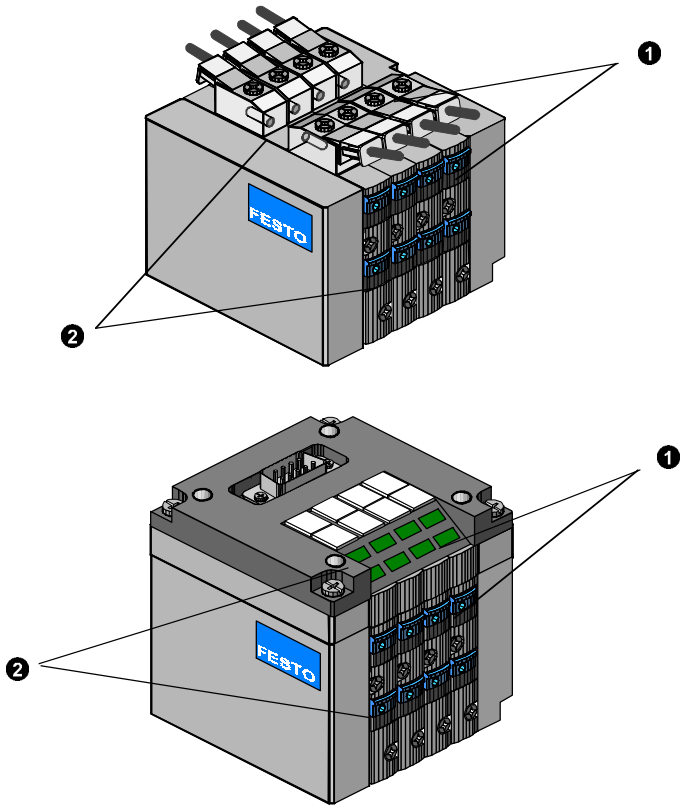
Desired pneumatic operating status	Requirement	Remarks
Free of leakage	– carefully laid tubing – regulated auxiliary pilot air	—
Fast reaction	Sufficient pressure supply via intermediate pressure modules	• Exhaust valve terminal at left and right-hand end plates (3/5 , 82/84)
Free of interference	Non-return valves in common exhaust tubing	– Applies when several systems with central ducted exhaust are used
Two pressure zones	Pressure zones are limited by isolating plate	– Can be fitted later
Vacuum operation/ low pressure operation	Separately regulated auxiliary pilot air (3-8 bar)	– Regulator can only be operated with pressure (between 3 and 8 bar)
EMERGENCY STOP of pressure zones	Regulator function for auxilary pilot air guaranteed in spite of complete supply being switched off	– Regulator regulates auxiliary pilot air for all valve plates on a terminal
Slow switching on after EMERGENCY STOP	When there are control signals the auxiliary pilot air must be at full level immediately after it is switched on	

LED display of valves

There is a yellow LED for each valve solenoid coil. This LED indicates the switching status of the valve solenoid coil when the CPV valve terminal is ready to operate.

PLEASE NOTE
Observe the assignment of the LED to the appropriate manual override:
With IC connection:
– *LED in front plug to upper manual override (14)*
– *LED in rear plug to lower manual override (12)*
With MP, AS-i or CP connection:
– *lower LED in plug cover to upper manual override (14)*
– *upper LED in plug cover to lower manual override (12)*

The relationship of the LEDs to the manual override is shown in the diagram below.



1 LEDs and manual override for pilot solenoid 14
2 LEDs and manual override for pilot solenoid 12

Fig. 4/2: Relationship of the LEDs to the manual override

The LEDs show the switching status of the valve solenoid coils. The meaning of the LEDs is shown in the table below.

LED	Switching position of valve	Meaning
Yellow out	Basic position	Logic 0 (signal **not** applied)
Yellow alight	– Switch position or – basic position	Logic 1 (signal applied) Logic 1 but: – operating voltage of outputs is below permitted tolerance range (DC 20.4 V to 26.4 V) or – compressed air supply not correct or – pilot exhaust blocked or – return for servicing

Chapter 5

Maintenance and conversion

Contents

5. Maintenance and conversion

5.1 Fitting/removing CPV valve terminal components

WARNING
Before fitting, switch off the following:
- *the compressed air supply*
- *the power supply to the valve solenoid coils*

You thereby avoid:

– Uncontrolled movements of loose tubing.

– Sudden and undesired movements of the connected actuators.

– Undefined switching states of the electronic components.

5.1.1 Removing components from valve locations

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

Proceed as follows:

1. Loosening the electrical connections:

   – MP, AS-i or CP connections
     - Loosen the multipin plug, the AS-i or CP plug and carefuly disconnect it.
     - Then loosen the four fastening screws on the electrical connector plate. Pull the electrical connector plate away from the connecting lugs on the valve plates.
     - Remove, if necessary, the plugs on the relay outputs of CPV valve terminals with CP connection. To do this, loosen first the locking screws of the upper plugs. Carefully pull the plug away from the connecting lugs. Then loosen the lower plugs in the same manner.

   – IC connection of valve solenoid coils
     - Loosen the locking screws on the connector plugs of the valve plates in order to remove them.
     - Pull the plugs and, where applicable, the intermediate plug for current reduction carefully away from the connecting lugs. Mark the sockets.
     - In the case of CPV valve terminals with pneumatic multiple connector plate, we recommend that the connector plugs be removed from each valve plate.

2. Loosening the pneumatic connections

- Individually wired CPV valve terminals (without pneumatic multiple connector plate):
  Loosen the work tubing of the valve plate which is to be removed.

3. Loosening the CPV valve terminal from the mounting surface.

– CPV valve terminals with pneumatic multiple connector plate

- Loosen the fastening screws of the pneumatic multiple connector plate in the left and right-hand end plates one turn in diagonally opposite sequence. Then remove the screws completely. Now remove the CPV valve terminal from the pneumatic multiple connector plate.

– CP valve terminals with foot fastening

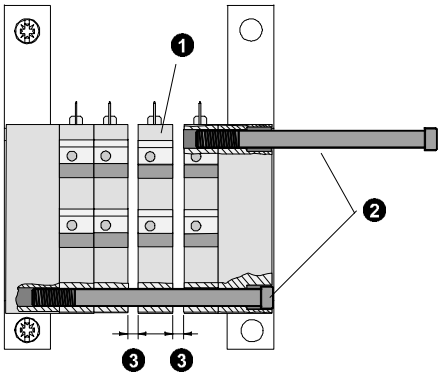
- Loosen the fastening screws in the right-hand end plate and remove them.

– CP valve terminal fitted onto a wall or hat rail

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

4. Removing the components.

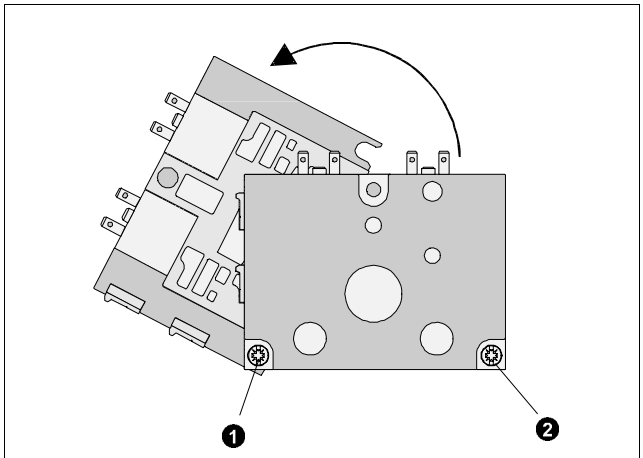
- Loosen both lower tie rods one turn.
- Then loosen the upper tie rod and pull it over the components which are to be replaced.
- Unscrew the two lower tie rods until the heads of the screws are flush with the outer surface of the end plate (do not remove the tie rod).
- Pull the valve terminal apart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



1 Component to be replaced
2 Tie rod
3 Gap approx. 2 mm

Fig. 5/1: Removing the valves

- Turn the component forwards around the front tie rod.



1 Front tie bolt
2 Rear tie bolt

Fig. 5/2: Position of the tie bolt

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

5.1.2 Fitting components into the valve locations

Proceed as follows:

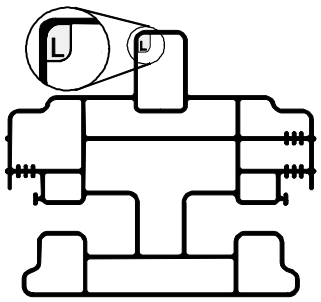
1. Fitting components

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

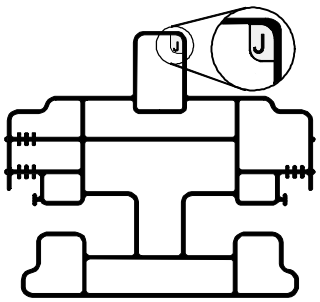
PLEASE NOTE
- *To equip the CPV10 Valve Terminal with "F valve plates" (Ident. code F), please note the assembly and application references in the "System Overview" chapter under "Valve Plate Overview".*
- *Note that only CPV valve terminals with a CP connector can be assembled with relay plates (Ident. code R).*

- Only CPV10/14 valve terminals: Check that the seals are seated correctly when valve plates with pneumatic springs or double solenoid valves are fitted. The seating is not symmetrical (see diagram).

Pneumatic spring valve (Ident code M):
Designation "**L**" on the seal must point forwards.



Double solenoid valve (Ident code J):
Designation "**J**" on the seal must point forwards.



The flat seal for valve plates with 3/2-way valves (Ident code C, H and N) as well as for all end plates is symmetrical and marked with 3/2.

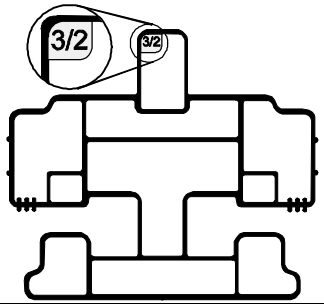


Fig. 5/3: Position and designation of seals with pneumatic spring valves or double solenoid valves (only CPV10/14 valve terminals)

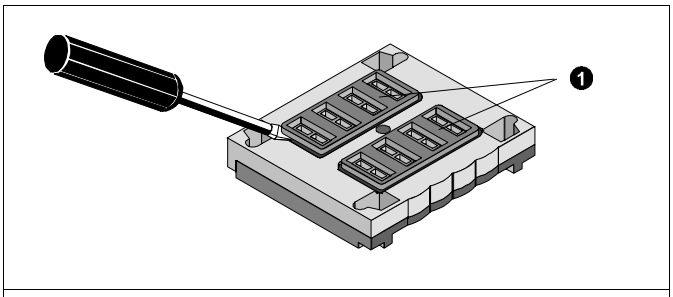
PLEASE NOTE
There is only one version of the seal for all valve plates of the CPV18 valve terminal. The position of the seal is the same for all valve plates.

- Place the components on the front tie rod. Press the components down so that they snap into the tie rod.
- Swing the components carefully backwards. Make sure 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 components of the CPV valve terminal on a flat surface so that they are not offset against each other.
- Tighten first the upper tie rod and then the lower tie rod with 0.3 Nm. Then tighten both tie rods with 2 Nm.

– With MP, AS-i or CP connections

PLEASE NOTE
The flat seals between the valve block and the connecting plate have been modifed. Replace the glued flat seals if they are more than one year old. You thereby guarantee reliable sealing on your CPV valve terminal.

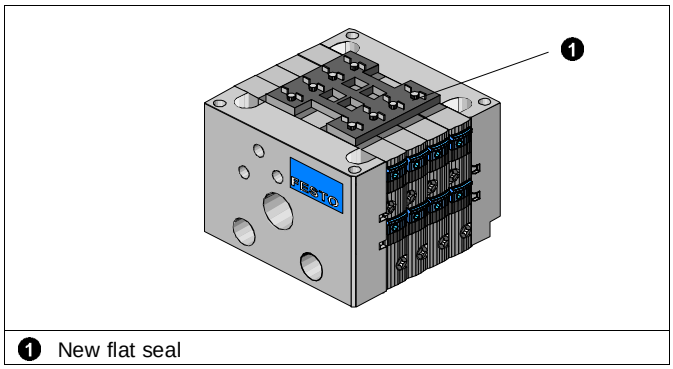
- The flat seals are seated at the bottom of the electrical connector plate (see digram).
- Remove the self-adhesive flat seal from the recess. To do this, carefully loosen a corner of the seal (see Fig. 5/4) with the aid of a screwdriver. Then carefully pull the seal away from the electrical sub-base.



1 Flat seals

Fig. 5/4: Position of the flat seal on the electrical connector plate

- The new single-part flat seal is no longer glued to the bottom of the electrical sub-base, but simply placed on the connecting lugs of the valve solenoid coils (see diagram).



1 New flat seal

Fig. 5/5: Flat seal

- Place the end cover on the connecting lugs of the valve block. Carefully press down the end cover.
- Tighten the screws of the electrical connector plate in diagonally opposite sequence with 0.6 Nm (CPV10/14) or with 3 Nm (CPV18).

– CPV valve terminals with CP connection and relay plates

- Fit the plugs onto the relay outputs as described under "Connecting current-consuming devices to the relay plate."

2. Fitting the CPV valve terminal

CPV valve terminal with pneumatic multiple connector plate

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

CP terminal with foot fastening

- Insert the fastening screws in the right-hand end plate and tighten the terminal.

CPV valve terminal with wall or hat rail fastening

- Fix the right-hand fastening onto the wall with two M4 screws or tighten the right-hand hat rail clamping unit.

3. Fitting the pneumatic and electrical connections

- Fit the connections in the reverse sequence to that described in "Removing CPV valve terminal components".

5.2 Conversion from automatic reset manual override to locking manual override

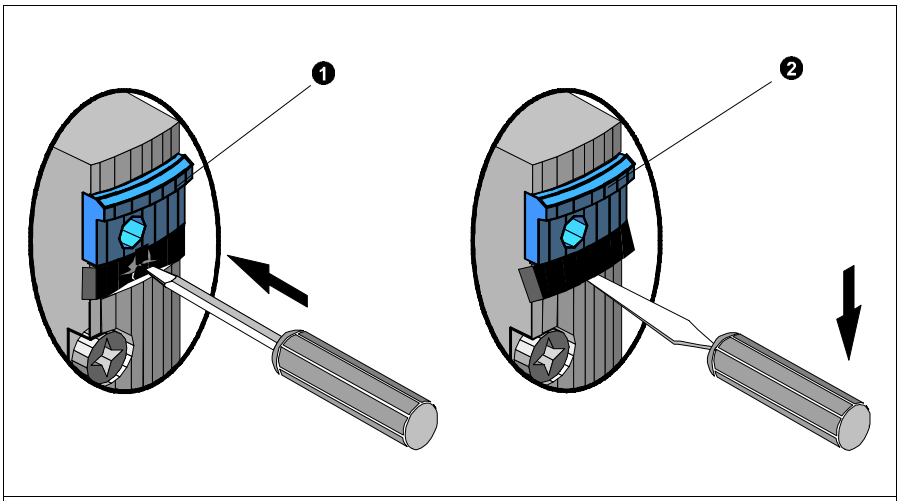
By removing a safety clip, you can convert your CPV valve terminal from automatic reset manual override to locking manual override. Proceed as follows:

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

- Use a screwdriver to press in the centre of the safety clip, as shown in ❶. The safety clip will then bend and can be removed from the fastening.

If you wish to use the safety clip again:

- Use a thin object (e.g. a spatula) to lift the safety clip out of the fastening as shown in ❷.



❶ Remove the safety clip by pressing it out
❷ Remove the safety clip by lifting it out (clip can be used again)

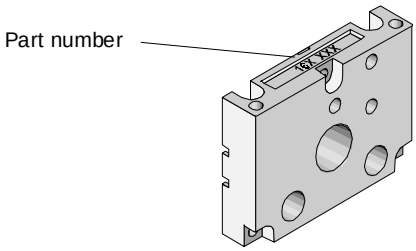
Fig. 5/5: Safety clip of the manual override

5.3 Conversion from internal to 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.

PLEASE NOTE
Mixed operation of the CPV valve terminal with internal and external control air is not permitted. The auxiliary pilot air channel is not divided into two pressure zones by the optionally available isolating plate.

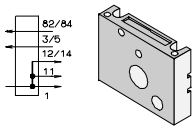
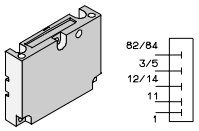
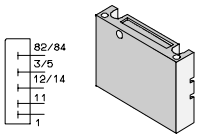
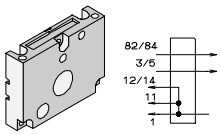
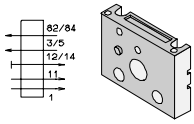
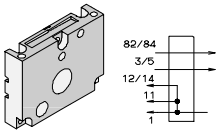
You can ascertain which end plates are fitted on your CPV valve terminal by means of the part numbers (position see below). In the case of CPV valve terminals with AS-i, CP or MP connections, the electrical connector plate must be dismantled.

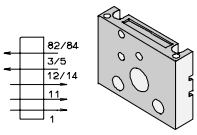
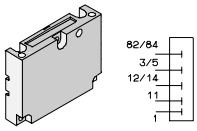
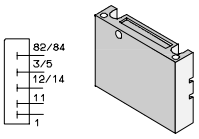
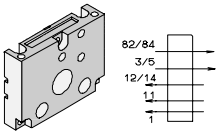
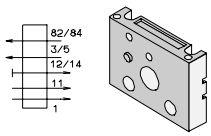
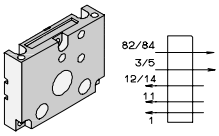


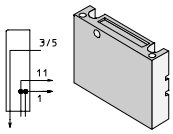
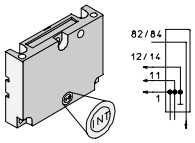
Designation	Part number		
	CPV10	CPV14	CPV18
CPV..-EPL	161 378	162 548	163 280
CPV..-EPL-E	161 374	162 544	163 196
CPV..-EPL-G	161 376	162 546	163 198
CPV..-EPL-PE	161 370	162 540	163 194
CPV..-EPL-PG	161 372	162 542	163 192
CPV..-EPR	161 379	162 549	163 281
CPV..-EPR-E	161 375	162 545	163 197
CPV..-EPR-G	161 377	162 547	163 199
CPV..-EPR-PE	161 371	162 541	163 195
CPV..-EPR-PG	161 373	162 543	163 193

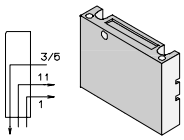
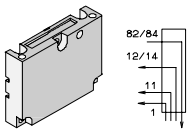
PLEASE NOTE
With end plates CPV..-EPL-PG (part nos. 161 372 and 162 542) as well as with CPV..-EPR-PG (part nos. 161 373 and 162 543), connection 12/14 is sealed internally.

All available end plate combinations are listed in the table below. Check that the end plates, which you wish to fit, can in fact be combined (see end plate pairs listed below).

End plate pairs with internal auxiliary pilot air for individual tubing		Description
CPV..-EPL-G 	CPV..-EPR 	– Connections only in left-hand end plate – Division into pressure zones not permitted – Not suitable for vacuum. • Unused connections must be sealed
CPV..-EPL 	CPV..-EPR-G 	– Connections only in right-hand end plate – Division into pressure zones not permitted – Not suitable for vacuum. • Unused connections must be sealed
CPV..-EPL-E 	CPV..-EPR-G 	– Connections in left and right-hand end plates – Division into pressure zones permitted – Valves to left of isolating plate suitable for vacuum. • Unused connections must be sealed

End plate pairs with external auxiliary pilot air for single tubing		Description
CPV..-EPL-E 	CPV..-EPR 	– Connections only in left-hand end plate – Division into pressure zones not permitted – Suitable for vacuum
CPV..-EPL 	CPV..-EPR-E 	– Connections only in right-hand end plate – Division into pressure zones not permitted – Suitable for vacuum
CPV..-EPL-E 	CPV..-EPR-E 	– Connections in left and right-hand end plates – Division into pressure zones permitted – Suitable for vacuum. • Unused connections must be sealed.

End plate pairs with internal auxiliary pilot air and tubing via pneumatic multiple connector plate		Description
CPV..-EPL-PG	CPV..-EPR-PG	– Connections on the pneumatic multiple connector plate – Division into pressure zones only permitted with isolating plate Ident. code T – Valves to left of isolating plate suitable for vacuum – Right end plate with internal auxiliary pilot air is marked with **INT**
		

End plate pairs with external auxiliary pilot air and tubing via pneumatic multiple connector plate		Description
CPV..-EPL-PE	CPV..-EPR-PE	– Connections on the pneumatic multiple connector plate – Division into pressure zones only permitted with isolating plate Ident. code T – Suitable for vacuum
		

Proceed as follows:

- Loosen the electrical and pneumatic connections (see section "Removing components from valve locations").
- Loosen the CPV valve terminal from the mounting surface. Proceed in the reverse sequence to that described in the sections "Fitting onto a wall", "Fitting onto a hat rail" or "Fitting with feet" in the chapter "Fitting".
- In the case of CPV valve terminals with CP, AS-i or MP connections, remove the appropriate cover (see section "Removing components from valve locations").
- Place the CPV valve terminal on the left-hand end plate. Loosen the outer tie bolts max. 1 turn (see Fig. 5/1). You thereby avoid overloading the centre tie bolt.
- Then loosen the centre tie bolt and remove it.
- Unscrew the outer tie bolts.
- Remove the end plate from the CPV valve terminal. Make sure that the other components on the CPV valve terminal remain together.
- Place the right-hand end plate on the CPV valve terminal and insert the tie bolts.

- Place the CPV valve terminal on the right-hand end plate. Make sure that the tie rod, which has not yet been tightened, does 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 on the CPV valve terminal. Swing the CPV valve terminal onto the left-hand end plate.
- Screw in the tie rod and tighten it with 0.3 Nm.
- Then tighten first the centre and then the outer tie rod with 2 Nm (CPV10/14) or with 4 Nm (CPV18).
- In the case of CPV valve terminals with CP, AS-i or MP connections, fit the appropriate connector plate (see section "Fitting components onto valve locations").
- Fit the CPV valve terminals onto their mounting surfaces (see sections "Fitting onto a wall", "Fitting onto a hat rail" or "Fitting with feet" in the chapter "Fitting").
- Finally connect the pneumatic tubing and the electrical cables (see chapter "Installation").

5.4 Conversion from individual to central tubing

In order to convert your CPV valve terminal from individual to central tubing with the pneumatic multiple connector plate, you will require the following:

– the pneumatic multiple connector plate

– special end plates for the CPV valve terminal

Proceed as follows:

- Replace the end plates of the CPV valve terminal as described in the section "Conversion from internal to external control air".
- Fit the pneumatic multiple connector plate as described in the section "Fitting the pneumatic multiple connector plate" in chapter 2.

5.5 Converting the CPV valve terminal to two pressure zones

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

Fit the isolating plate as described in the section "Fitting components into the valve locations".

PLEASE NOTE

- *When installing the CPV valve terminal, you must supply compressed air to both sides of the terminal.*
- *Seal unused connections (supply and auxiliary pilot air connections) with blind plugs.*

5.6 Converting the CPV valve terminal to different electrical connections

Due to the modular structure of the CPV valve terminal, you can convert it to IC, MP, AS-i or CP connections.

PLEASE NOTE
With this conversion you should observe:
– *the instructions for fitting the CPV valve terminal with "F valve plates" (Ident. Code F). See section "Valve plates" under "Description of components" in the chapter "System summary."*
– *that only a CPV valve terminal with a CP connection may be fitted with relay plates.*

Proceed as follows:

CPV valve terminals with IC connection

- Loosen the locking screws on the connecting sockets.
- Pull the socket carefully away from the connecting lugs on the pilot solenoid coil.
- Insert the MP, AS-i or CP connection onto the connecting lugs of the pilot solenoid coils.
- Fasten the connector plate with the 4 socket head screws. Tighten the screws in a diagonally opposite sequence.

CPV valve terminals with MP, AS-i or CP connection

- Loosen the 4 socket head screws of the connector plate.
- Pull the connector plate carefully away from the connecting lugs of the pilot solenoid coils.

MP, AS-i or CP connector plate

- Insert the connector plate onto the connecting lugs of the pilot solenoid coils.
- Fasten the connector plate with the 4 socket head screws.
- Tighten the screws in a diagonally opposite sequence.

IC connections

- In the case of "F valve plates" (Ident. code F), insert the intermediate plugs for current reduction onto the connecting lugs of the pilot solenoid coils.
- Insert the connector sockets onto the connecting lugs of the pilot solenoid coils. Make sure that the guide bolts grip into the connector socket.
- Fasten the socket with the central locking screw.

Appendix A

Technical appendix

Contents

Technical appendix

A.1 Accessories

General		
	CPV10/14	**CPV18**
Hat-rail mounting kit	CPV10/14-VI-BG-NRH-35	CPV18-VI-BG-NRH-35
Wall mounting kit (rear)	CPV10/14-VI-BG-RWL	CPV18-VI-BG-RW
Wall mounting kit (front)	CPV..-VI-BG-ER200X	
Identifier clip	IBS6x10	IBS9x20
Manual override cover	CPV..-VI-BZ-T...	CPV18-VI-BZ-T...
CPV valve terminal with AS-i connection		
AS-i combi power unit	ASI-CNT-115/230 V AC	
AS-i bus cable (yellow)	ASI-1,5-Y-100	
AS-i additional supply cable (black)	ASI-1,5-Z-100	
Sensor cable	KM8-M8-GSGD	
AS-i cable cap	ASI-FK-KK	
AS-i cable sleeve	ASI-KT-FK	
CPV valve terminal with CP connection		
CP cable	KVI-CP-1... KVI-CP-2... (for drag chain use)	
Relay cable	KRP-1-24...	
CPV valve terminal with IC connection		
Individual plug	KMYZ-3-24-...-LED, KMYZ-5-24-...-LED KMYZ-4-24-... (without LED, complies with IP 40)	
CPV valve terminal with MP connection		
Ready-to-use multipin cable	KMP3-...P-...-X	
Multipin socket	SD-SUB-D-BU	

A.2 Technical specifications

General		
Permitted temperature range: – storage – operation – medium	 - 20 to + 40 °C - 5 to + 50 °C - 5 to + 50 °C	
Protection class as per EN 60 529	IP 65 (with FESTO accessories cable)	
Relative humidity	90 % at 20 °C or 40 % at 50 °C	
Corrosion protection (as per FN940070)	KBK 2	
Fitting position	As desired	
Tightening torques	**CPV10/14**	**CPV18**
– Socket for IC connection – Connecting socket for relay outputs – Fastening screw for wall support or hat rail – Screws for fastening CPV valve terminal to pneumatic multipin – Electrical connector plate – Earth connection – Tie rod	0.15 Nm 0.15 Nm 1.5 Nm 2.0 Nm 0.7 Nm 1.0 Nm 1st. stage 0.3 Nm 2nd. stage 2.0 Nm	 4.0 Nm 4.0 Nm 3.0 Nm 1.0 Nm 1st. stage 0.3 Nm 2nd. stage 4.0 Nm
Materials Plates, cover, pneumatic multiple connector plate: Seal:	 AL, AL-GD, Ms, PAXMD6, PET, POM, PPS, ST, NBR, HNBR	
Oscillation (as per DIN/IEC 68 part 2–6) – Transport: – Operation/use: Shock: (as per DIN/IEC 68 part 2–27)	 3.5 mm travel at 2–9 Hz 1 g acceleration at 9–200 Hz 0.35 mm travel at 10–60 Hz 5 g acceleration at 60–150 Hz 30 g acceleration at 11 ms duration	

General			
Approximate weights (in kg)	**CPV10**	**CPV14**	**CPV18**
Electrical connector plate with AS-i connection			
- on CPV valve terminals with 2 valve locations	0.085	0.130	0.275
- on CPV valve terminals with 4 valve locations	0.110	0.175	0.355
Electrical connector plate with CP connection			
- on CPV valve terminals with 4 valve locations	0.145	0.230	0.375
- on CPV valve terminals with 6 valve locations	0.180	0.250	0.450
- on CPV valve terminals with 8 valve locations	0.200	0.300	0.540
Electrical connector plate with MP connection			
- on CPV valve terminals with 4 valve locations	0.110	0.170	0.400
- on CPV valve terminals with 6 valve locations	0.140	0.230	0.425
- on CPV valve terminals with 8 valve locations	0.165	0.275	0.515
End plates	0.160	0.280	0.740
Pneumatic multiple connector plate			
- on CPV valve terminals with 2 valve locations	0.120	0.270	0.520
- on CPV valve terminals with 4 valve locations	0.165	0.390	0.750
- on CPV valve terminals with 6 valve locations	0.225	0.510	0.870
- on CPV valve terminals with 8 valve locations	0.270	0.630	1.300
Relay plate	0.035	0.055	-----
Reserve plate	0.025	0.045	0.090
Isolating plate	0.025	0.045	0.090
Valve plates	0.65	0.110	0.260

CAUTION
Operate the CPV valve terminal only with the medium described below.
– *If possible use non-lubricated auxiliary pilot air (connection 12/14). Otherwise use hydraulic oil type DIN 51524-HL32/ISO 6743-4. The oil content must not exceed 3 drops per 1000 l of air consumed. This corresponds to 1 drop/4 minutes at 6 bar supply pressure and with medium flow. Observe the specifications on special oil for maintenance units in the Festo Pneumatics Catalogue.*
– *In the case of CPV valve terminals with internally branched auxiliary pilot air the above mentioned instruction also applies to the supply air (connection 1/11).*

Pneumatic components		
Medium	Compressed air, filtered (40 µm), lubricated (Oil: VG 32) or non-lubricated/vacuum	
Design	Valve plates with spool valves	
Pressure range	**CPV10/14**	**CPV18**
– with internal auxiliary pilot air taken from 1 or 11	3-8 bar	3-8 bar
– with externally supplied auxiliary pilot air	- 0.9-10 bar	- 0.9-10 bar
– 12/14	3-8 bar	3.5-8 bar (ident. code G) 2-8 bar (ident. code J) 3-8 bar (all other valves),
Manual override	pushing or locking	

PLEASE NOTE
The flow rates of the valves are reduced by the screw couplings of the pneumatic connections.

Pneumatik						
Rated flow	**CPV10**		**CPV14**		**CPV18**	
(without screw connectors) in [l/min] micro valves (CPV10), mini valves (CPV14) and midi valves (CPV18)						
of **11** ⇒ **2** or **1** ⇒ **4**	400		800		1600 1400 (5/3-valve)	
of **2** ⇒ **3/5** or **4** ⇒ **3/5**	400		800		1600	
Valve switching times in ms	**CPC10**		**CPV14**		**CPV18**	
Measuring method 10 %, as per FN 942032	on switch	off	on switch	off	on switch	off
2/2-way valve closed (Ident.code D)	15	17 (at 0%)	13	16 (at 0%)	14	20 (at 0%)
3/2-way valve open or closed (Ident. code C, H, N)	17	25	24	30	18	24
5/2-way single solenoid valve (Ident. code M)	17	27	25	35	18.5	26
5/2-way single solenoid valve (Ident. code F)	13	17	...	...	...	...
5/2-way double solenoid valve (Ident. code J)	10	...	12	...	12	...
5/3-way valve, mid-position blocked (Ident. code G)	...	---	...	...	14	32
Connections	**CPV10**		**CPV14**		**CPV18**	
(Values in brackets for pneum. multiple connector plate)						
– 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)	M 5 (M 7)		G 1/8 (G 1/8)		G 1/4	
– work air (2; 4)	M 7		G 1/8		G 1/4	

Electrical components (CPV valve terminal with individual or CP connection)			
Electromagnetic compatibility of the CPV valve terminal with CP connection Interference emission: Resistance to interference	 Tested as per EN 55011, limit value class B Tested as per EN 50082–2		
Protection against electric shock (protection against direct and indirect contact as per EN 60204-1/IEC 204)	By means of PELV power units (protected extra low voltage)		
Relay plate	Consisting of 2 relays for controlling 2 electrically isolated outputs		
Operating voltage Tolerance: – CPV valve terminal with CP connection – CPV valve terminal with IC connection	24 V DC 20.4–26.4 V 18.0–26.4 V		
Power consumption at 21 V Values in brackets for 24 V	**CPV10**	**CPV14**	**CPV18**
CPV valve terminal all connection variants: – per solenoid coilvalve	0.46 W (0,6 W)	0.65 W (0,85 W)	1.16 W (1.5 W)
CPV valve terminal with CP connection: – per relay plate	(1.2 W)	(1.2 W)	---------
CPV valve terminal with IC connection: – additional per individual connector plug	≤ 0.26 W	≤ 0.26 W	≤ 0.26 W
Input current consumption of electronic components: CPV valve terminal with CP connection	20 mA		25 mA
Load circuit data for relay outputs (at 24 V + 10%)	1 A ; Contacts floating		
Switching times of the relay outputs (with normal voltage) – pickup time – drop-off tiime	 5 ms 2 ms		

PLEASE NOTE
Data on the electrical components of the CPV valve terminal with multipin or AS-i connection is supplied with the relevant product.

A.3 Index

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1. Festo products are developed further as regards their hardware and software. The status of the hardware and software in the product can be seen on the type plate of the product. Festo does not guarantee that the electronic documentation corresponds to each hardware and software status of the product. The printed Festo documentation accompanying the product is decisive for the correspondance of the hardware and software status of the product.
2. The information contained in this electronic documentation may be amended by Festo without prior notice and does not represent any commitment by Festo.

IV. Liability/Limitation of liability

1. Festo provides this electronic documentation in order to assist the user in creating his own machine and system documentation. Festo does not guarantee that the electronic documentation supplied corresponds to the product used by the user. The latter applies also to the use of extracts for the user's own documentation.
2. Festo is also not liable for lack of economic success or for damages or claims from third parties, with the exception of claims arising from violation of the protective rights of third parties concerning the use of the electronic documentation.
3. The limitations of liability specified in paragraphs 1 and 2 do not apply in cases of malice aforethought or gross negligence where liability is compulsory. In such cases, Festo's liability is limited to the damages recognizable to Festo based on the situation at hand.

V. Safety regulations/Documentation

The guarantee and liability claims specified above (sections III and IV) only apply if the user has observed the safety regulations in the documentation and the safety regulations regarding the use of the machine. The user is responsible for ensuring the compatibility of the electronic documentation with the machine he is using.

Balance Systems

Handbook list for the CPV valve terminals.

Product	German	English	Spanish	Franch	Italian	Swedish
CPV valve pneumatic	**165 100**	**165 200**	**165 230**	**165 130**	***165 160***	**165 260**
type	P.BE CPV-D	P.BE CPV-GB	P.BE CPV-E	P.BE CPV-F	P.BE CPV-I	P.BE CPV-S
I/O module	**165 125**	**165 225**	**165 227**	**165 127**	***165 157***	**165 257**
type	P.BE CPEA-D	P.BE CPEA-GB	P.BE CPEA-E	P.BE CPEA-F	P.BE CPEA-I	P.BE CPEA-S
Installation System	**165 126**	**165 226**	**165 228**	**165 128**	***165 158***	**165 258**
Type	P.BE CPSYS-D	P.BE CPSYS-GB	P.BE CPSYS-E	P.BE CPSYS-F	P.BE CPSYS-I	P.BE CPSYS-S
Fielbus Node FB6	**165 106**	**165 206**	**165 236**	**165 136**	**165 166**	**165 266**
type	P.BE CP-FB6-E-D	P.BE CP-FB6-E-GB	P.BE CP FB6-E-E	P.BE CP FB6-E-F	P.BE CP FB6-E-I	P.BE CP FB6-E-S
Fielbus Node FB8	**165 108**	**165 208**	**165 238**	**165 138**	**165 168**	**165 268**
type	P.BE CP-FB8-E-D	P.BE CP-FB8-E-GB	P.BE CP-FB8-E-E	P.BE CP-FB8-E-F	P.BE CP-FB8-E-I	P.BE CP-FB8-E-S
Fielbus Node FB9	**165 109**	**165 209**	**165 239**	**165 139**	**165 169**	**165 269**
type	P.BE CP-FB9-E-D	P.BE CP-FB9-E-GB	P.BE CP-FB9-E-E	P.BE CP-FB9-E-F	P.BE CP-FB9-E-I	P.BE CP-FB9-E-S