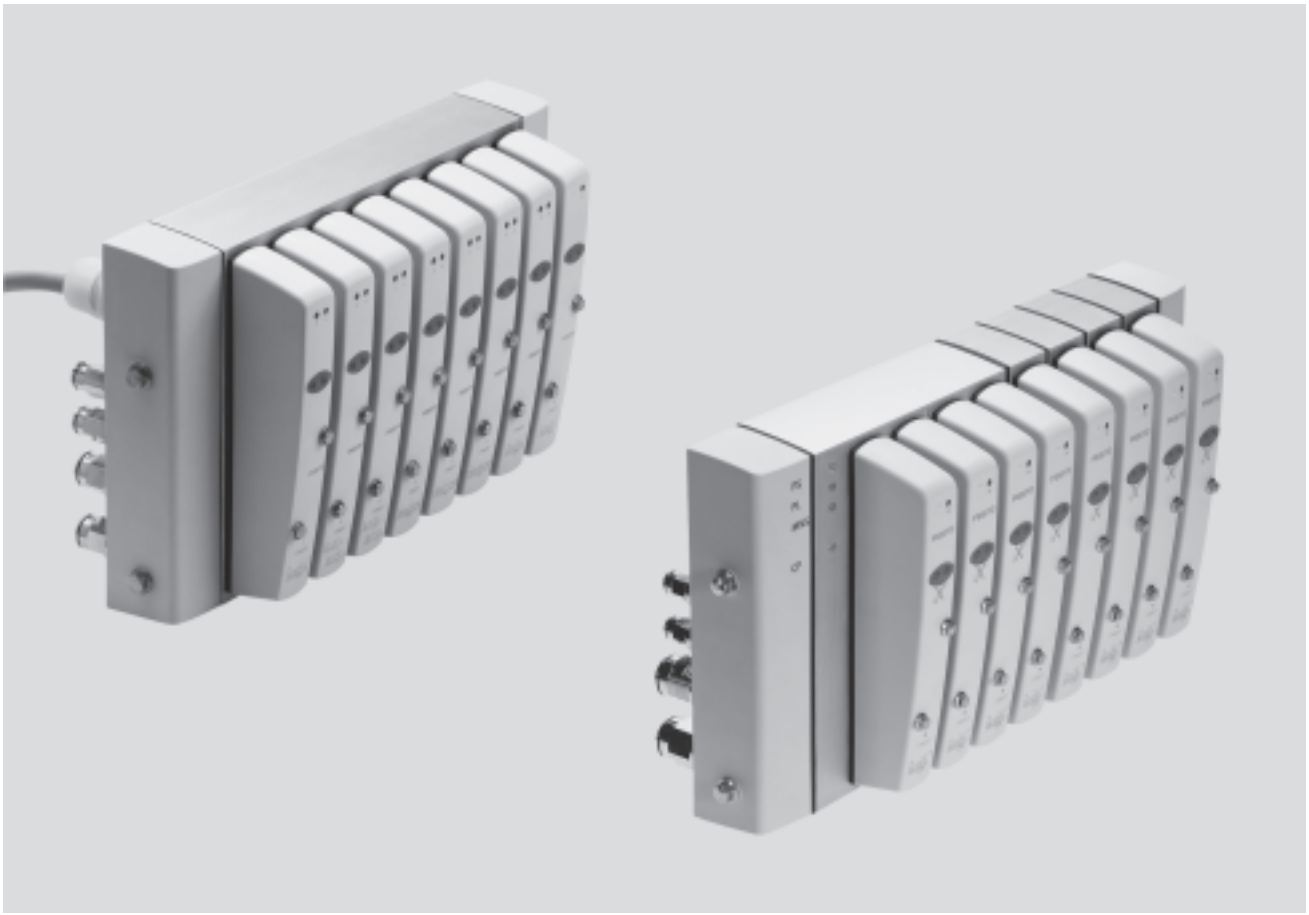
Valve terminals type 15 CDVI, Clean Design

FESTO

Valve terminals type 15 CDVI, Clean Design

Key features



Innovative

- Proven valve technology combined with a highly resistant polymer material
- Modular structure with 4 or 8-valve basic block
- Extension modules with 1 and 2 valve positions
- Extension modules with 1 and 2 valve positions with separate electrical (fieldbus only) and/or pneumatic additional supply
- Multi-pin plug connection
- Fieldbus connection
- Additional valve terminals and I/O modules can be connected via a CP string extension.
  Additional information
  ➔ Internet: ctec

Versatile

- 4 ... 16 valve positions
- Max. 24 solenoid coils
- Standardised from the individual valve up to multi-pin plug and fieldbus connections
- Flow rates from 300 ... 650 l/min
- Valve width 18 mm
- 1 ... 9 electrical voltage zones
- 1 ... 9 pneumatic pressure zones

Reliable

Developed with practical considerations in mind

- Hygienic
- Corrosion resistant
- Easy to clean

Easy to mount

As is the case with all Festo products, all CDVI and CDSV are fully pre-assembled and equipped according to customer requirements

- With QS...-F fittings on the working lines and end plates
- Tested for electrical and pneumatic functions

Valve terminals type 15 CDVI, Clean Design

Key features

CDVI – The requirements

The food industry has stricter hygiene requirements than any other sector. There can therefore be no compromise when it comes to easy cleaning and corrosion resistance.

Result: the CDVI.
Developed in close consultation with leading names from the food and packaging industry, the CDVI represents a totally new valve terminal solution for splash zones. The Clean Design valve terminal CDVI has a revolutionary corrosion-resistant and easy-to-clean design that makes it stand out from its competitors.

CDVI – The solution

The new Clean Design
Valve terminal CDVI – simply a neat solution
Apart from reduced cleaning times, the CDVI also takes less time to install and assemble. Stainless steel control cabinets have become a thing of the past and the electrical connection is now established using the pre-fitted, ready to connect cable. The valve terminal is, of course, supplied fully assembled and in particular tested ex works to IP65, IP66, IP67 and NEMA 4.
This results in minimal installation time.
The valve terminal includes common supply ports and exhausts for all valves. The common lines are connected to the end plates.
The CDVI is available with four or eight valve positions in the basic designs and can optimally be extended up to 16 valve positions in grids of one or two, taking into consideration the maximum number of coils. Appropriate expansion blocks are used for this.

Individual sub-base
An individual sub-base for Clean Design valves (Clean Design Single Valve – CDSV) rounds off the lower end of the product range so that even upstream machines and system components can be incorporated into the Clean Design concept.

Clean in theory and practice – the CDVI
The requirements for the hygienic design of machine components to DIN EN 1672-2 and DIN ISO 14159 have been implemented in the CDVI. They are easy to clean thanks to:

- no sharp edges
- no small radii
- no crevices where dirt can gather
- space between the valves for easy cleaning
- corrosion-resistant materials

The CDVI can be cleaned using special cleaning agents that are compatible with aluminium, available from the following manufacturers

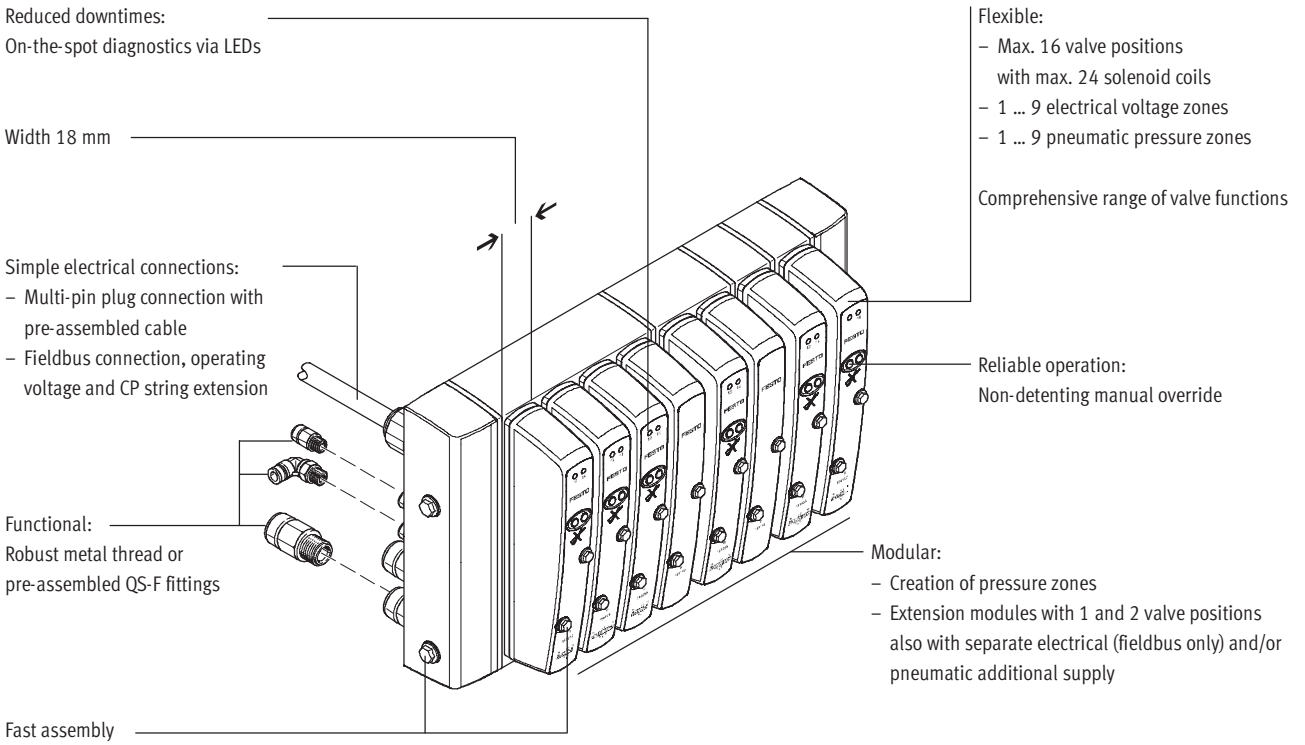
- Henkel
- Ecolab
- Johnson Diversy
- Kärcher

Certified cleanliness
The CDVI is certified to HACCP.

New
2/2-way valve

Valve terminals type 15 CDVI, Clean Design

Key features



Equipment options

Valve functions

- 2/2-way valve, normally closed
- 2/2-way valve, normally open
- 3/2-way valve, normally closed
- 3/2-way valve, normally open
- 2x 3/2-way valve, normally closed
- 2x 3/2-way valve, normally open
- 2x 3/2-way valve, 1x normally open, 1x normally closed
- 5/2-way valve, single solenoid
- 5/2-way valve, double solenoid
- 5/3-way valve, mid-position closed
- 5/3-way valve, mid-position pressurised
- 5/3-way valve, mid-position exhausted

Special features

Individual valve
- Electrical connection via multi-pin cable

Multi-pin terminal
- Max. 16 valve positions
- Max. 24 solenoid coils
- Compressed air supply possible via both end plates as well as power supply module
- 1 ... 9 pressure zones
- Detergent resistant PVC cable already assembled
- Cable length 5 m or 10 m

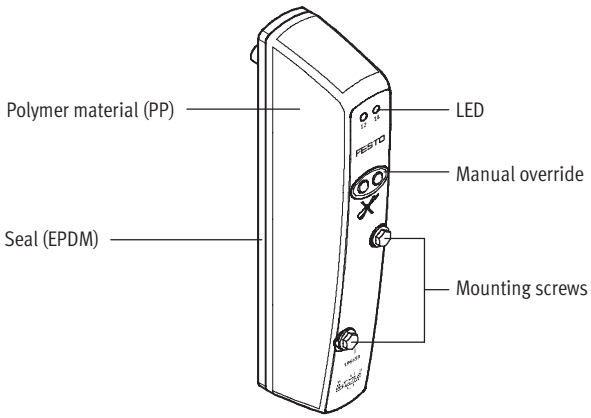
Fieldbus terminal
- Max. 16 valve positions
- Max. 24 solenoid coils
- Compressed air supply possible via both end plates as well as power supply module
- 1 ... 9 pressure zones
- 1 ... 9 voltage zones
- Enhanced diagnostic function
- Easy to clean connections at the rear

CP string extension
- Additional valve terminals or
- Electrical I/O modules.
  Additional information
  ➔ Internet: ctec

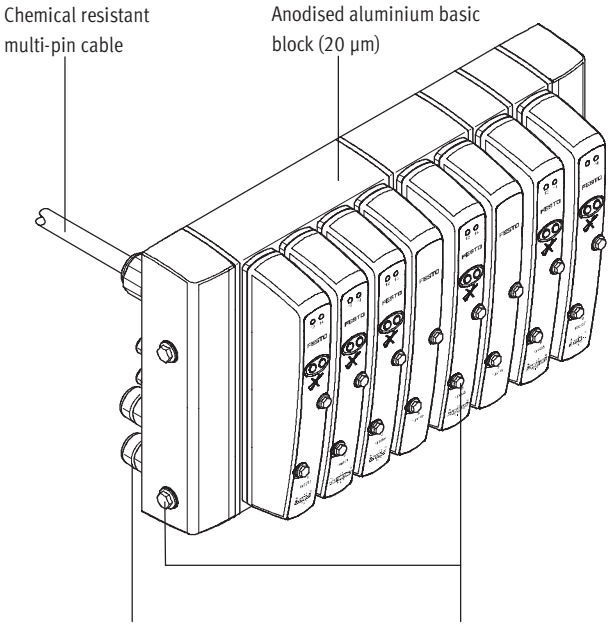
Valve terminals type 15 CDVI, Clean Design

Key features

The features



The ideal range for the food industry



Choose from

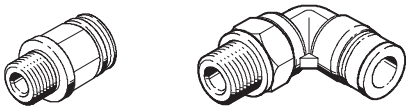
- a wide range comprising actuators to accessories in corrosion resistant designs that are easy to clean,
- as well as valves,
- stainless steel fittings and flow control valves and
- tubing approved for use in the food industry.

All have been tested using cleaning agents from leading manufacturers.

The accessories

Tubing PLN

Push-in fitting QS-F/QSL-F-...



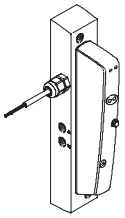
You should only use accessories that have been suggested by Festo. This is the only way of ensuring optimum performance from the CDVI in the following areas:

- Resilience
- Corrosion resistance class
- Ease of cleaning

Valve terminals type 15 CDVI, Clean Design

Key features

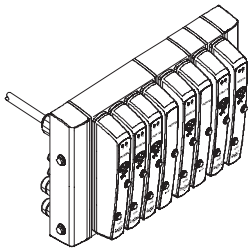
Individual connection



Valves can also be used on individual sub-bases for actuators further away from the valve terminal.

The electrical connection is established via a 10 m pre-assembled PVC cable.

Multi-pin plug connection

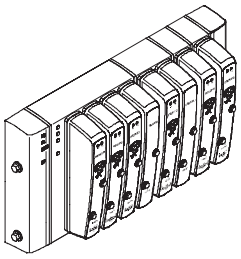


Control signals from the controller to the valve terminal are transmitted via a pre-assembled multi-wire cable or a self-assembly multi-pin plug connection, which substantially reduces installation time.

Valve terminals with multi-pin plug connections can be equipped with 4 to 16 valve positions with max. 24 solenoid coils.

Designs
- Multi-pin cable, 5 m long, pre-assembled with open wire ends
- Multi-pin cable, 10 m long, pre-assembled with open wire ends

Fieldbus connection



An integrated fieldbus node manages the communication connection to a higher-order PLC. This enables a space-saving pneumatic and electronic solution.

Valve terminals with fieldbus interfaces can be equipped with 4 to 16 valve positions with max. 24 solenoid coils.

Designs
- DeviceNet connection 2x M12
- Ethernet Powerlink on request

Note

The basic blocks of the valve terminals can be extended by a maximum of 8 valve positions. The extension modules used are of no relevance here.

Valve terminals type 15 CDVI, Clean Design

Key features

CP string extension

The optional string extension enables an additional valve terminal and I/O modules to be connected to Fieldbus Direct. A CP string of the CPI installation system is integrated in the fieldbus node as an extension. Different input and output modules as well as CPV and CPA valve terminals can be connected.

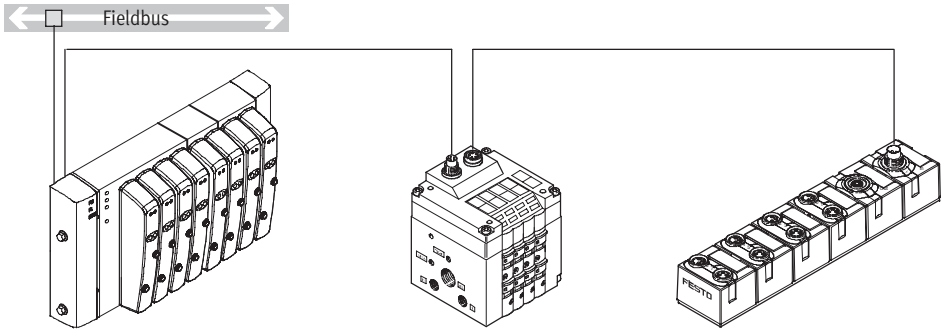
The maximum length of the CP string extension is 10 metres, which means that the extension modules can be mounted directly on-site. All of the required electrical signals are transmitted via the CP cable, which in turn means that no further installation is needed on the extension module.

The CP string interface offers:

- 16 input signals
- 16 output signals for output modules 24 V DC or solenoid coils
- Logic and sensor supply for the input modules
- Load voltage supply for the valve terminals
- Logic supply for the output module

Additional information

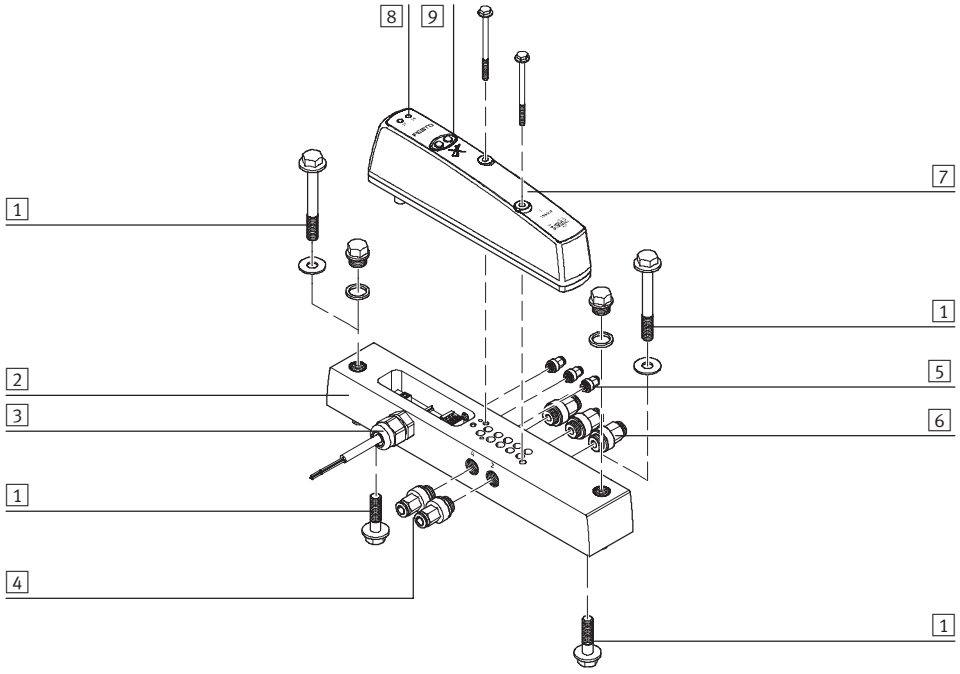
➔ Internet: ctec



- Note

Valve terminals can be ordered quickly and easily online.
The convenient product configurator can be found on:
➔ Internet: type 15

Overview – Clean Design valve terminal
Individual sub-base



		Brief description	➔ Page/Internet
1	Mounting kit	Mounting from above or below	34
2	Sub-base for individual valve	–	31
3	Individual electrical connection	–	–
4	Push-in fitting	For working lines	34
5	Push-in fitting	For pilot air supply and venting, venting hole	quick star
6	Push-in fitting	For compressed air supply and venting	34
7	Valve	–	31
8	LED display	–	–
9	Manual override	For each solenoid coil, non-detenting	–

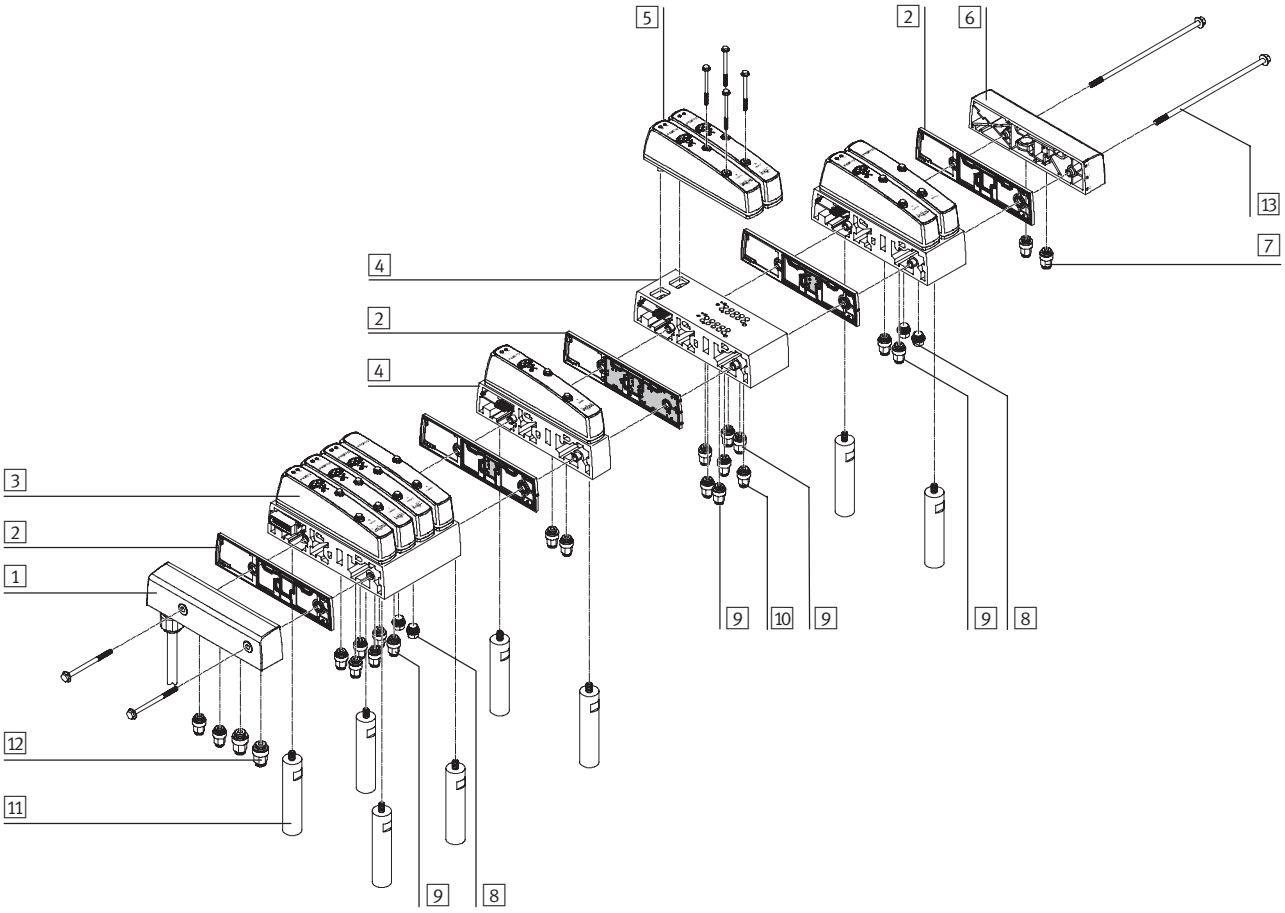
All valves on the valve terminal CDVI can be assembled on the individual sub-base CDSV. The individual sub-base CDSV has a connection for external pilot air supply, is pre-assembled with valve and 10 m PVC cable and is fully inspected before shipment.

Assembled push-in fittings included on request. A Clean Design mounting kit comprising two screws (18 mm and 40 mm) and two stainless steel blanking plugs permits mounting from above or below. If you have included fittings with your order, the pressure compensation hole is also equipped with a QS fitting.
The collected exhaust air from the pilot solenoid coils of the valves is drawn off via the pressure compensation hole (venting hole) on the rear side.

Note

All ports and mounting holes that are not required must be sealed with a blanking plug.
Exception: venting hole

Overview – Clean Design valve terminal
Valve terminal with multi-pin plug connection



	Brief description	➔ Page/Internet
1 Left-hand end plate	With multi-pin plug connection	33
2 Separator plate	–	33
3 4/8-valve basic block	–	32
4 Extension module/power supply module	–	32
5 Valves	–	31
6 Right-hand end plate	–	33
7 Push-in fitting	For right-hand end plate	34
8 Blanking plug	–	34
9 Push-in fitting	For working lines	34
10 Push-in fitting	For power supply module	34
11 Spacer bolt	–	34
12 Push-in fitting	For left-hand end plate	34
13 Screw kit	For attaching the extension modules to the basic block	34

The collected exhaust air from the pilot solenoid coils of the valves is drawn off via the pressure compensation hole (venting hole) on the rear side.

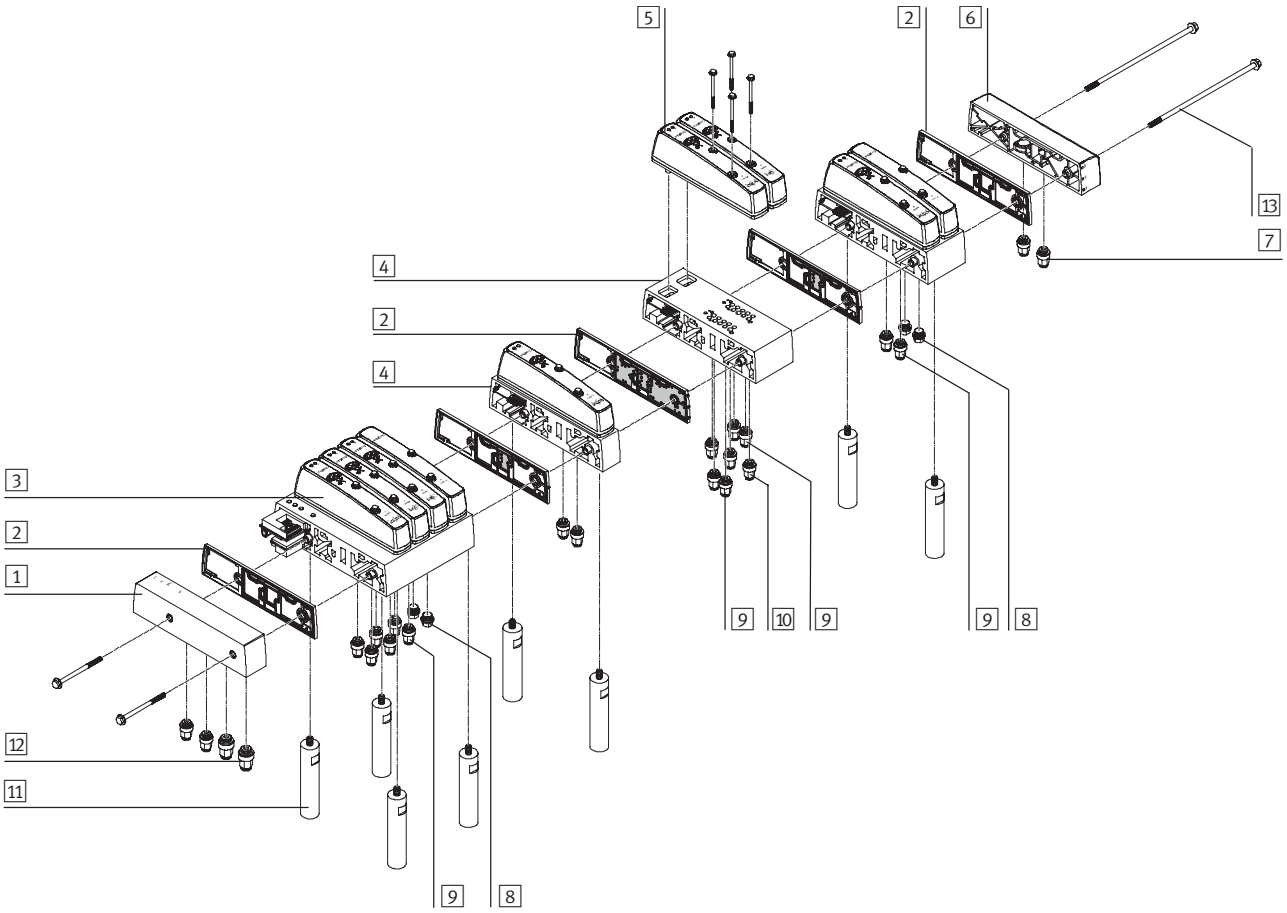
If you have included fittings with your order, the pressure compensation hole is also equipped with a QS fitting.

If extension modules are added to the valve terminal later, the appropriate screw kit must be ordered (page 34).

Note

All ports and mounting holes that are not required must be sealed with a blanking plug.
Exception: venting hole

Overview – Clean Design valve terminal
Valve terminal with fieldbus connection



		Brief description	➔ Page/Internet
1	Left-hand end plate	With fieldbus connection	33
2	Separator plate	–	33
3	4/8-valve basic block	–	32
4	Extension module/power supply module	–	32
5	Valves	–	31
6	Right-hand end plate	–	33
7	Push-in fitting	For right-hand end plate	34
8	Blanking plug	–	34
9	Push-in fitting	For working lines	34
10	Push-in fitting	For power supply module	34
11	Spacer bolt	–	34
12	Push-in fitting	For left-hand end plate	34
13	Screw kit	For attaching the extension modules to the basic block	34

The collected exhaust air from the pilot solenoid coils of the valves is drawn off via the pressure compensation hole (venting hole) on the rear side.

If you have included fittings with your order, the pressure compensation hole is also equipped with a QS fitting.

If extension modules are added to the valve terminal later, the appropriate screw kit must be ordered (page 34).

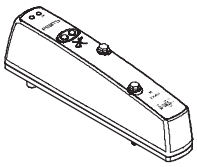
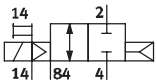
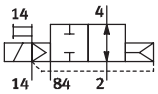
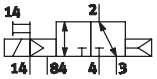
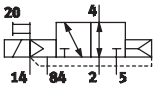
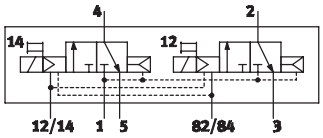
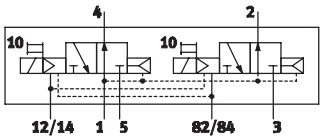
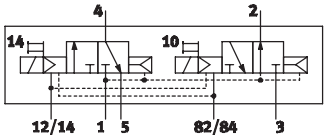
Note

All ports and mounting holes that are not required must be sealed with a blanking plug.
Exception: venting hole

Valve terminals type 15 CDVI, Clean Design

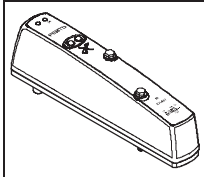
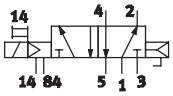
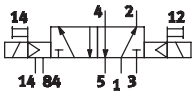
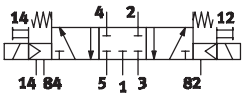
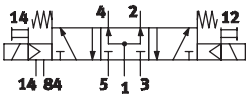
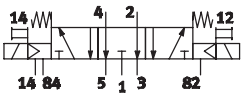
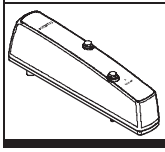
Key features – Pneumatic components

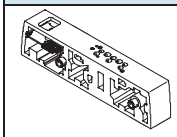
FESTO

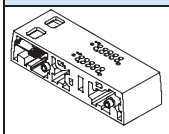
Valves			
	Code	Circuit symbol	Description
	R		2/2-way single solenoid valve • Normally closed • Pneumatic spring return • Suitable for vacuum • Supplied externally with supply air
	S		2/2-way single solenoid valve • Normally open • Pneumatic spring return • Suitable for vacuum • Supplied externally with supply air
	X		3/2-way single solenoid valve • Normally closed • Pneumatic spring return • Suitable for vacuum • Supplied externally with supply air
	W		3/2-way single solenoid valve • Normally open • Pneumatic spring return • Suitable for vacuum • Supplied externally with supply air
	K		2x 3/2-way single solenoid valve • Normally closed • Pneumatic spring return • Not suitable for vacuum
	N		2x 3/2-way single solenoid valve • Normally open • Pneumatic spring return • Not suitable for vacuum
	H		2x 3/2-way single solenoid valve • 1x normally closed, 1x normally open • Pneumatic spring return • Not suitable for vacuum

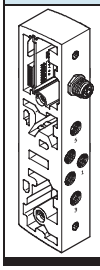
Note

A filter must be installed upstream of valves operated in vacuum mode. This prevents any foreign matter in the intake air getting into the valve (e.g. when operating a suction cup).

Valves and cover			
	Code	Circuit symbol	Description
	M		5/2-way single solenoid valve • Pneumatic spring return • Suitable for vacuum
	J		5/2-way double solenoid valve • Suitable for vacuum
	G		5/3-way valve • Mid-position closed • Mechanical spring return • The piston rod side of the cylinder remains under pressure in the normal valve position • Suitable for vacuum
	B		5/3-way valve • Mid-position pressurised • Mechanical spring return • The piston rod of the cylinder advances when the valve is in the normal position due to the differential piston areas • Suitable for vacuum
	E		5/3-way valve • Mid-position exhausted • Mechanical spring return • In the normal valve position, the piston rod can be moved freely • Suitable for vacuum
	A	Cover for valve position	For valve terminal only

1-valve extension modules (valve terminal only)			
	Code	Designation	Description
	B1	Extension module for 1 valve position	Without additional pneumatic supply
	D1	Extension module for 1 valve position	Duct 1 separated with separating seal on left for creating a pressure zone with separate supply air
	F1	Extension module for 1 valve position	Ducts 3 and 5 separated with separating seal on left
	H1	Extension module for 1 valve position	Ducts 1, 3 and 5 separated with separating seal on left for creating a pressure zone with separate supply and exhaust air
	T	Only one solenoid coil per valve position	

2-valve extension modules (valve terminal only)			
	Code	Designation	Description
	B	Extension module for 2 valve positions	Without additional pneumatic supply
	D	Extension module for 2 valve positions	Duct 1 separated with separating seal on left for creating a pressure zone with separate supply air
	F	Extension module for 2 valve positions	Ducts 3 and 5 separated with separating seal on left
	H	Extension module for 2 valve positions	Ducts 1, 3 and 5 separated with separating seal on left for creating a pressure zone with separate supply and exhaust air
	K	Extension module for 2 valve positions	Duct 1 separated with separating seal on left with separate supply port for creating pressure zones
	I	Extension module for 2 valve positions	Ducts 1, 3 and 5 separated with separating seal on left with separate supply and exhaust ports for creating pressure zones
	T	Only one solenoid coil per valve position	

Additional function for 1 and 2-valve extension modules (valve terminal only)			
	Code	Designation	Description
	V	Extension module with separate electrical power supply	Only in combination with fieldbus
	P	Extension module with separate supply and exhaust ports	
	C	Extension module with separate electrical power supply as well as separate supply and exhaust ports	Only in combination with fieldbus

- Note

The structure of the valve terminal with extension modules and their additional functions can be conveniently defined using the product configurator. You can find it on:

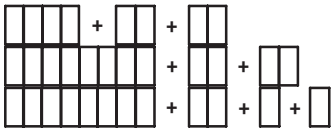
➔ Internet: type 15

Valve terminals type 15 CDVI, Clean Design

Key features – Pneumatic components

Modularity

Consistently modular valve terminal in a grid of 4 ... 16 valve positions/ 8 ... 24 solenoid coils.
See sample representation on right.



4 + 2 + 2 valve positions
8 + 2 + 2 valve positions
8 + 2 + 1 + 1 valve positions

Pilot air supply

The valves used are pneumatically piloted solenoid valves.
The ports on the valve terminal different for the following pilot air supply types:

- internal pilot air supply
- external pilot air supply

The pilot air supply duct 12/14 is supplied from the duct 1 supply air (internal pilot air supply) or via a separate pilot air supply in the left-hand end plate (external pilot air supply).

A separate pilot air supply is required in any event if supply pressure is less than 3 bar or greater than 8 bar.
In this case it is advisable to restrict the pilot air supply to max. 8 bar with a suitable regulator.

The pilot air supply is selected by including a corresponding code letter in the order code (end plates/ compressed air supply code U, V, Y, Z).

Pneumatic pressure zones

CDVI offers a number of options for creating pressure zones, if different working pressures are required.

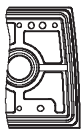
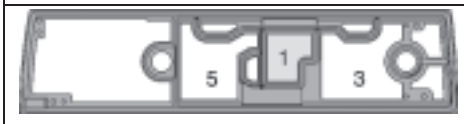
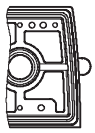
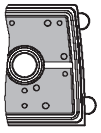
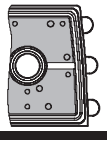
Pressure zones are created by isolating the internal supply ducts between the basic block and extension module or by using extension modules with separate supply ports with an appropriate separator plate.

A maximum of two different pressure zones can be created on valve terminals with one extension module without separate supply port. The compressed air is supplied at both ends through the end plates.
Up to three different pressure zones can be created on valve terminals with two extension modules. In this case, the compressed air is supplied via the two end plates as well as via the first extension module with separate supply port.

If more than three pressure zones are required, extension modules with a separate supply port must be used. Up to nine pressure zones are possible taking into consideration the maximum valve positions and number of coils. In this case, the compressed air is supplied via the two end plates as well as via the separate supply ports of the respective extension modules.

Separator plates are integrated ex-works as per your order. Separator plates can be distinguished through their coding, even when the valve terminal is assembled.
A label on the right-hand end plate makes it easier to allocate the separator plates when the valve terminal is assembled.

Separator plates

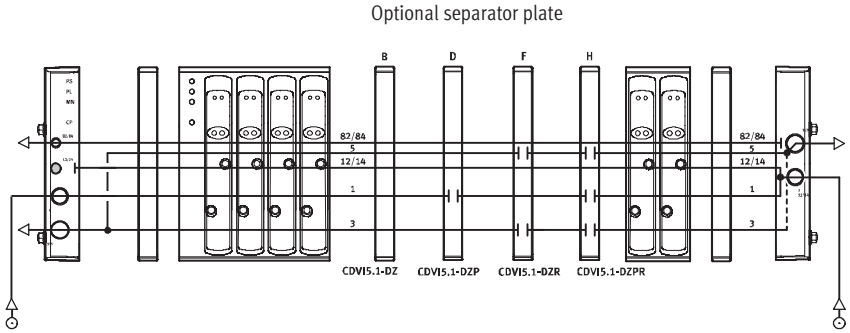
Pictorial examples	Coding	Notes	
		Separator plate No duct separation	
		Separator plate Duct 1 separated Ducts 3 and 5 open	
		Separator plate Duct 1 open Ducts 3 and 5 separated	- - Note Normally only duct 1 is closed. Ducts 3 and 5 or 1, 3 and 5 can also be closed for special applications.
		Separator plate Ducts 1, 3 and 5 separated	

Examples: Compressed air supply and pilot air supply

Internal pilot air supply

Code U, Y

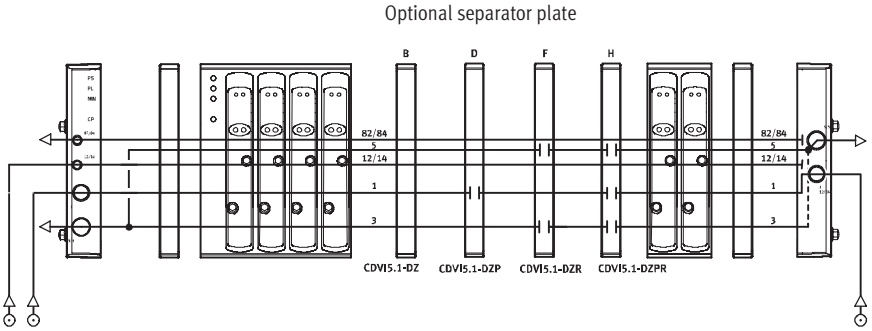
The diagram opposite shows an example of the configuration and connection of the compressed air supply with internal pilot air supply. Port 12/14 on the left-hand end plate is tightly sealed. The pilot air is supplied internally via the right-hand end plate.
Separator plates can be used optionally to create pressure zones.



External pilot air supply

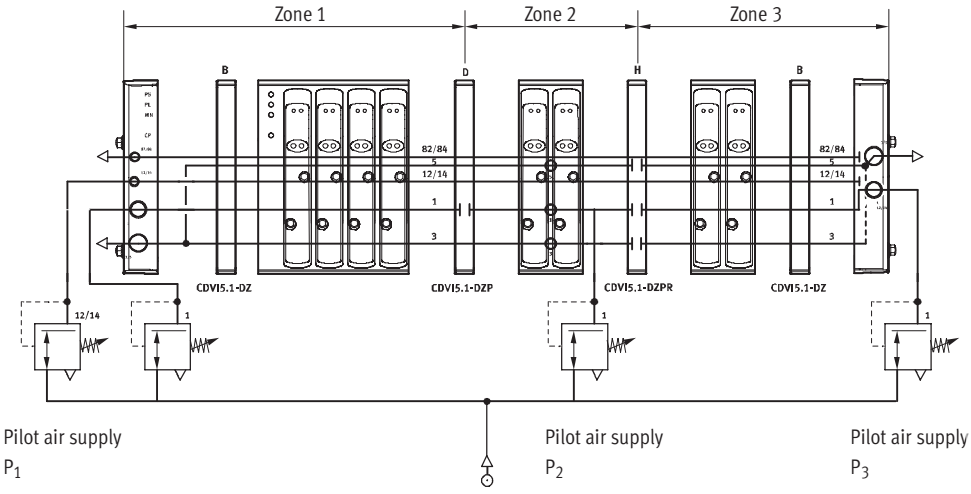
Code V, Z

The diagram opposite shows an example of the configuration and connection of the compressed air supply with external pilot air supply. Port 12/14 on the left-hand end plate is equipped with a fitting for this purpose.
Separator plates can be used optionally to create pressure zones. In this case it is advisable to restrict the pilot air supply to max. 8 bar with a suitable regulator.



Examples: Creation of pressure zones

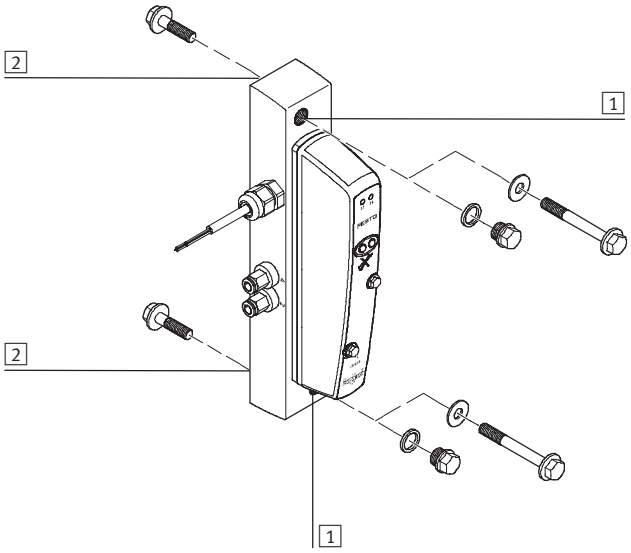
The CDVI facilitates the creation of up to 9 pressure zones. The diagram opposite shows an example of the configuration and connection of three pressure zones using separator plates with an external pilot air supply of 3 ... 8 bar.



- Note

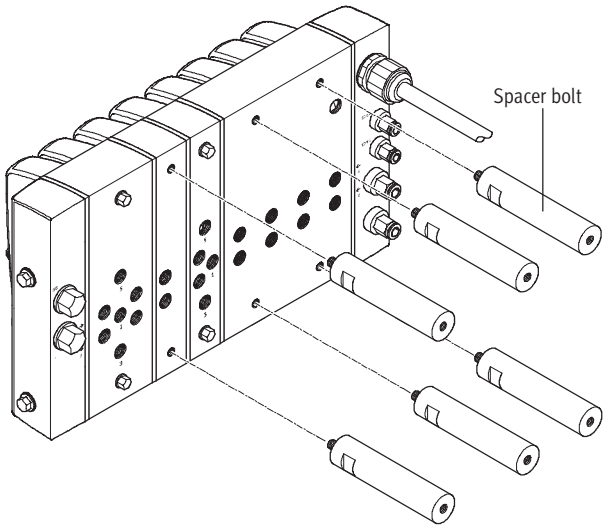
Particular attention must be paid to the assembly of the right-hand end plate when converting a valve terminal from internal to external pilot air supply.

Individual sub-base assembly



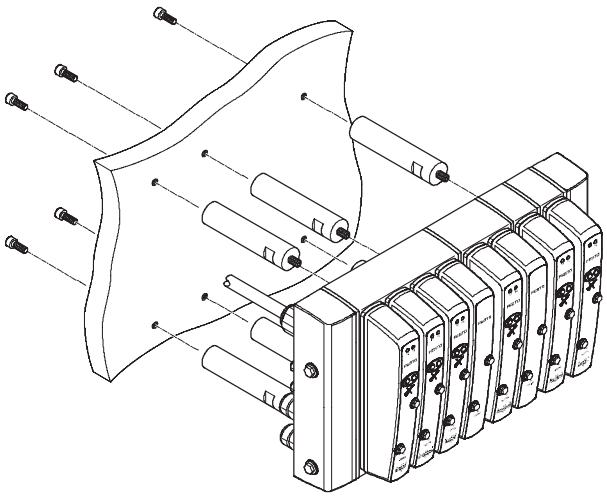
1 Hole for front mounting (CDSV) using M6 screws; the hole can be covered with blanking plug G1⁄8 if not required
2 Hole for rear mounting (CDSV) using M6 screws

Valve terminal assembly



The CDVI can be mounted directly on earthed mounting surfaces using the four threaded holes in the basic block and the spacer bolts ordered via the order code (accessories order code Y).

The CDVI can be mounted in any position. However, the selected mounting position should allow for the cleaning off of dirt and the draining of cleaning agent.



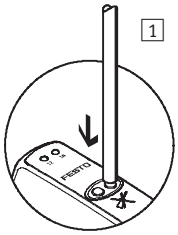
Note

If extension modules are added to the valve terminal at a later stage, the following points must be observed:

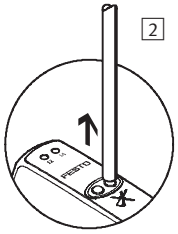
- Basic block:
  Always attach using 4 spacer bolts
- Extension modules:
  After the second module, max. 4 extension modules between 2 attachment points
- Appropriate screw kit for attaching the extension modules to the basic block (page 34)

Manual override (MO)

Manual override with automatic return (non-detenting)

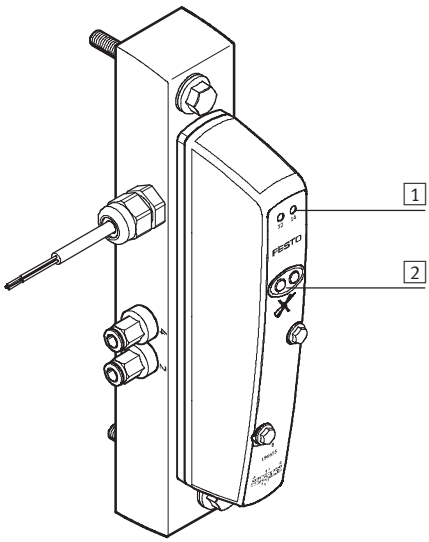


1 Press in the stem of the manual override with a pointed object.
Valve is then actuated.



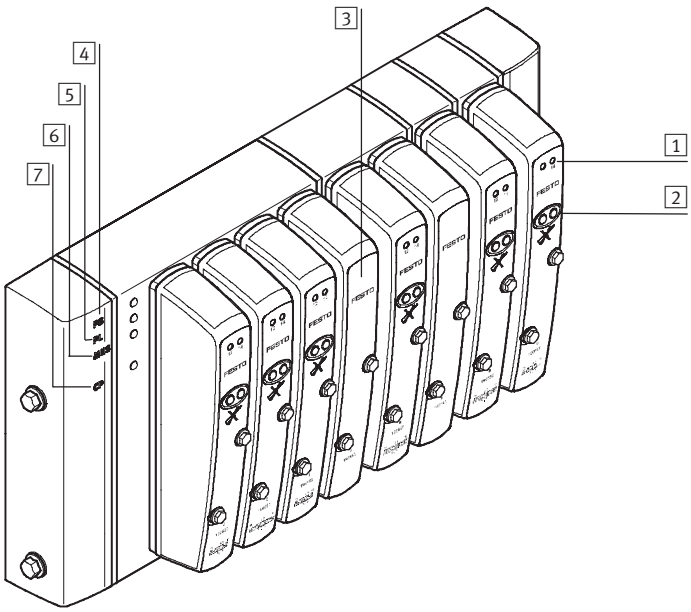
2 Remove the pointed object.
Mechanical force pushes the stem of the manual override back.
Valve returns to initial position (not with 5/2-way double solenoid valve, code J).

Display and control elements – Individual sub-base



1 Yellow LEDs (one per solenoid coil)
2 Non-detenting manual override (per solenoid coil)

Display and control elements – Valve terminal



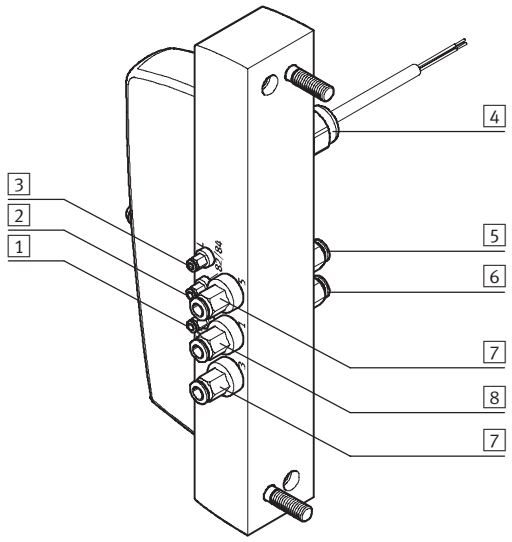
1 Yellow LEDs (one per solenoid coil)
2 Non-detenting manual override (per solenoid coil)
3 Vacant valve position with blanking plate

With fieldbus:
4 Green PS LED
"Power System"
Operating voltage of electronics
5 Green PL LED
"Power Load"
Load voltage of valves
6 Green/red MNS LED
"Module/Network Status"
7 Green/red CP LED
"Compact Performance"
CP extension modules

Valve terminals type 15 CDVI, Clean Design

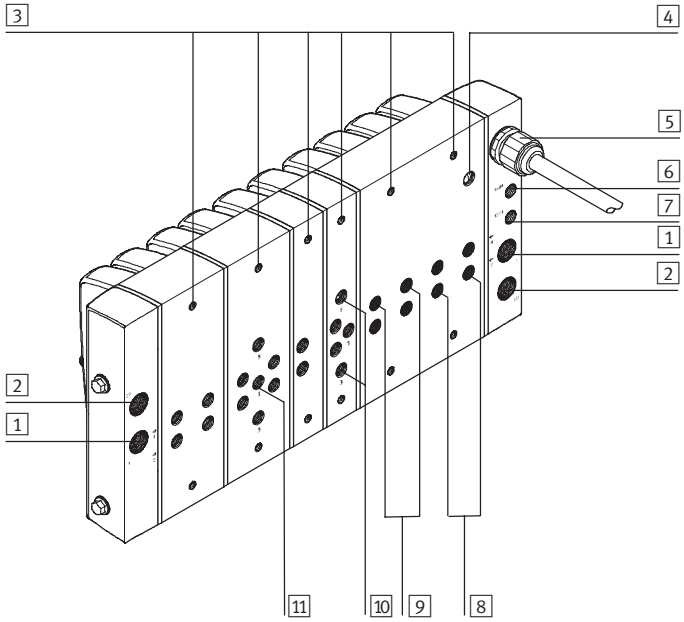
Key features – Pneumatic components

Connections – Individual sub-base



1 Pilot exhaust port (82/84)
2 Pilot air supply port (12/14)
3 Pressure compensation port/ venting hole
4 Electrical connection
5 Working line (4) per valve
6 Working line (2) per valve
7 Exhaust port (3/5)
8 Supply port (1)

Connections – Valve terminal

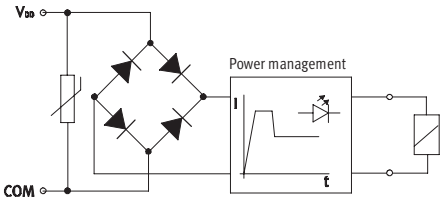


1 Supply port (1)
2 Exhaust port (3/5)
3 Threaded holes for spacer bolts (top and bottom)
4 Pressure compensation port/ venting hole
5 Electrical multi-pin plug connection
6 Pilot exhaust port (82/84)
7 Pilot air supply port (12/14)
8 Working line (2) per valve
9 Working line (4) per valve
10 Exhaust ports (3 + 5) with extension module
11 Supply port (1) with extension module

Line		Port code (ISO 5599)	Connection size (ISO 228)	Connector fitting[1)]
Supply air/vacuum	1	1	G3/8	– In the left-hand/right-hand end plate
	11		G1/8	– In the extension module with additional supply
Exhaust air	2	3/5	G3/8	– In the left-hand/right-hand end plate
	10	3, 5	G1/8	– In the extension module with additional supply
Pressure compensation	4	–	G1/8	– In the basic block
Pilot exhaust air	6	82/84	G1/8	– In the left-hand end plate
Pilot air supply	7	12/14	G1/8	– In the left-hand end plate
Working line/vacuum	8	2, 4	G1/8	– In the basic block
	9		G1/8	– In the extension module with additional supply

1) The CDVI valve terminal can be pre-equipped with QS-F push-in fittings depending on the order.

Electrical power as a result of current reduction



Each solenoid coil is protected with a spark arresting protective circuit as well as against polarity reversal. All valve types are also equipped with integrated current reduction.

Advantages:

- Lower power consumption
- Lower temperature rise

Terminal allocation – Cable for individual sub-base CDSV	
Core colour	Allocation
Brown	Solenoid coil 14
Black	Solenoid coil 12 (not on 5/2-way single solenoid valve)
Blue	com[1)]

1) 0 V for positive switching valves; 24 V can be connected for negative switching control signals

Terminal allocation – Multi-pin cable[1)]				
Pin	Address	Valve position/solenoid coil		Wire colour[2)]
		4-valve basic block	8-valve basic block	
A01	0	0/14	0/14	WH
A02	1	0/12	0/12	GN
B01	2	1/14	1/14	YE
B02	3	1/12	1/12	GY
C01	4	2/14	2/14	PK
C02	5	2/12	2/12	BU
A03	6	3/14	3/14	RD
A04	7	3/12	3/12	VT
B03	8		4/14	GY PK
B04	9		4/12	RD BU
C03	10		5/14	WH GN
C04	11		5/12	BN GN
A05	12		6/14	WH YE
A06	13		6/12	YE BN
B05	14		7/14	WH GY
B06	15		7/12	GY BN
C05	16	–		WH PK
C06	17	–		PK BN
A07	18	–		WH BU
A08	19	–		BN BU
B07	20	–		WH RD
B08	21	–		BN RD
C07	22	–		WH BK
C08	23	–		BN BK
B10	com	0 V [3)]	0 V [3)]	BN
C10	com	0 V [3)]	0 V [3)]	BK
–	–	–	–	GY GN [4)]

1) Max. 24 solenoid coils
2) To IEC 757
3) 0 V for positive switching control signals; connect 24 V for negative switching control signals; mixed operation is not permitted.
4) This core is not used and can be cut off.

Address allocation – Valves with multi-pin plug

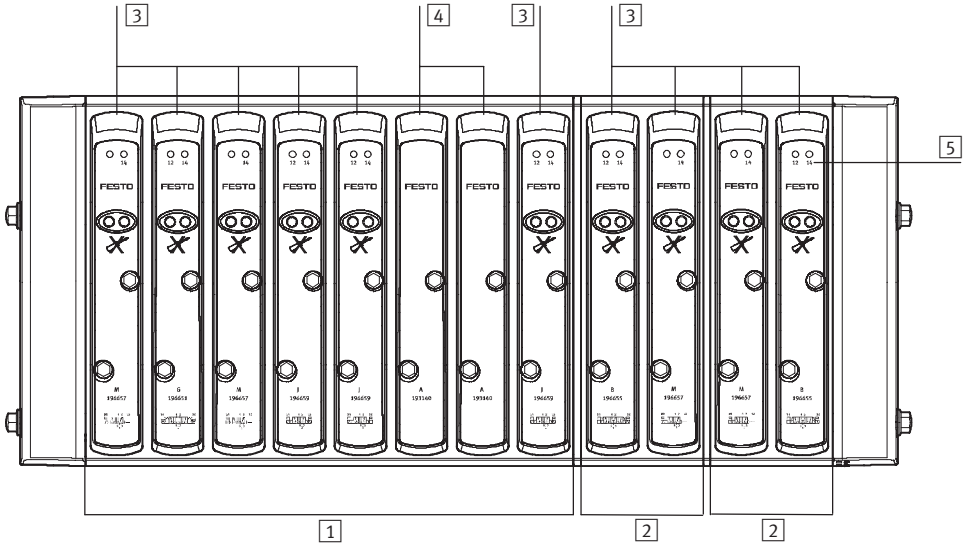
A valve position on the CDVI valve terminal always occupies 2 addresses on the basic block, even if one of these is equipped with a blanking plate.

Addresses should be assigned in ascending consecutive order.
The numbering goes from left to right.

A valve terminal extension occupies 2 addresses on an extension module for 1 valve position and 4 addresses on an extension module for 2 valve positions.

If the extension module is additionally configured with the option T (only one solenoid coil per valve position), only one address is occupied per valve position.

Example: Address allocation for a CDVI valve terminal with a basic block with 8 valves and 2 extension modules for 2 valve positions



1 Basic block with 8 valve positions: 16 addresses
2 Extension module for 2 valve positions: 4 addresses
=› 24 addresses (coils)

3 Valves
4 Vacant positions
5 Number of the solenoid coil

Addressing order for valves with fieldbus

The CDVI valve terminal occupies 8, 16 or, depending on the extension, up to 24 addresses, regardless of the number of solenoid coils.
A 4-valve basic block occupies 8 addresses and an 8-valve basic block 16 addresses, while the 1-valve and 2-valve extension modules occupy 2 and 4 addresses respectively.

If a valve position is equipped with a valve with 2 pilot solenoid coils, the following allocation applies:
– Pilot solenoid coil 14 occupies the less significant address
– Pilot solenoid coil 12 occupies the more significant address

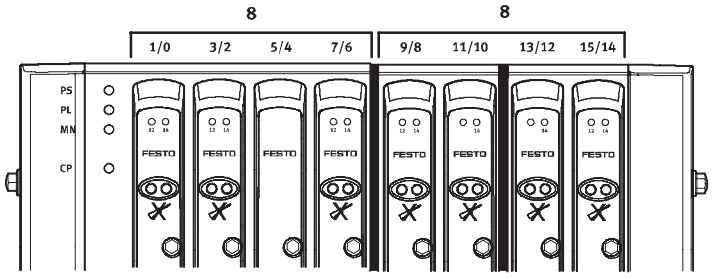
The more significant address is not used in valves with only one pilot solenoid coil.

The addresses of the CDVI valve terminal are allocated from left to right, while the addresses of the individual valve positions are allocated from right (pilot solenoid coil 14) to left (pilot solenoid coil 12).

- - Note

If the extension module is additionally configured with the option T (only one solenoid coil per valve position), only one address is occupied per valve position.

Example: Addressing order for a basic block with 4 valve positions and two extension modules for 2 valve positions



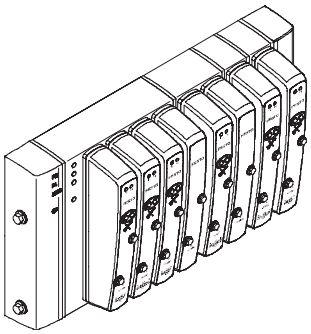
- - Note

Address shifts can occur if one expansion block is replaced by another type of expansion block. For example, replacing a 2-valve bi expansion block with a 2-valve mono expansion block shifts the address allocation to the right by 2 addresses.

Valve terminals type 15 CDVI, Clean Design

Key features – Electrical components

Fieldbus Direct



Fieldbus Direct is a system for the compact connection of a valve terminal of various sizes to different fieldbus standards.

The CP string extension option allows the functions and components of the CP installation system to be used.

The I/O modules and cables for the CP string extension are ordered using the order code for the CP installation system.

Additional information
➔ Internet: ctec

Enhanced fieldbus diagnostics

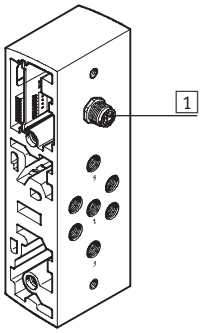
Enhanced diagnostics (supplied load voltage) is only possible with new basic blocks and new expansion blocks with additional electrical power supply (code C and V).

These new blocks can be identified by the 16-pin terminal strip (old = 12-pin) as well as the designation printed on the PCB. The green “Power Loss” LED on the basic block flashes in the case of undervoltage/voltage failure of the additional power supply at the extension module (code C and V).

- Note

Enhanced diagnostics is not possible with combinations of old and new expansion blocks.

Electrical voltage zones



Up to 9 electrical voltage zones can be created with the help of extension modules with separate electrical power supply (code V and C), taking into consideration the maximum valve positions and number of coils.

By using an extension module with separate electrical power supply, the solenoid coils following to the right including the coils of the extension module are supplied separately with electrical power or disconnected separately.

1 Connection of separate electrical power supply

Valve terminals type 15 CDVI, Clean Design

Configuration and ident. code

Valve terminal configurator

Online via: ➔ www.festo.com

A valve terminal configurator is available online to help you select a suitable CDVI valve terminal.

Like all valve terminals, the CDVI is ordered using an ident. code. This ident. code specifies the valve functions, the number of valves, vacant positions as well as the additional functions and the type of compressed air supply.

As is the case with all Festo products, all CDVI and CDSV are supplied:

- fully pre-assembled
- fitted with QS...-F fittings on the working lines and end plates on request
- tested for electrical function
- tested for pneumatic function
- securely packaged
- manuals can be downloaded free of charge

Ordering system for type 15 CDVI

➔ Internet: type 15

Example of an ident. code

15P	–	K10	–	4A	–	UR	–	3MJ-B-JG	–	E	+	Y

Valve terminal family

15P	Type 15 CDVI

Electrical connection

K10	Multi-pin plug, cable 10 m

Valve positions/type of connection

4	Valves on basic block
A	Straight push-in fittings, QS-8

Pneumatic supply/type of seal

U	Supply at left, internal pilot air supply
R	Resistant to cleaning agents

Selected valve equipment...

	...basic block (position 0 ... 3)
3M	5/2-way single solenoid valve
J	5/2-way double solenoid valve
	...additional valves (position 4 and 5)
B	Extension module for 2 valve positions
J	5/2-way double solenoid valve
G	5/3-way valve, mid-position closed

Manual

E	Manual in English

Type of mounting

Y	Spacer bolt, length 1

Equipment

Operate system equipment with unlubricated compressed air if possible. Festo valves and cylinders are designed so that, if used as designated, they will not require additional lubrication and will still achieve a long service life.
The quality of compressed air downstream from the compressor must correspond to that of unlubricated compressed air. If possible, do not operate all of your system equipment with lubricated compressed air. The lubricators should, where possible, always be installed directly upstream of the consuming actuator.

Incorrect additional oil and too high an oil content in the compressed air reduces the service life of a valve terminal.
Use Festo special oil OFSW-32 or the alternatives listed in the Festo catalogue (as specified in DIN 51524 HLP32; basic oil viscosity 32 CST at 40 °C).

Bio-oils
When using bio-oils (oils which are based on synthetic or native ester, e.g. rapeseed oil methyl ester), the maximum residual oil content of 0.1 mg/m^3 must not be exceeded (see ISO 8573-1 Class 2).

Mineral oils
When using mineral oils (e.g. HLP oils to DIN 51524, parts 1 through 3) or similar oils based on poly-alpha-olefins (PAO), the maximum residual oil content of 5 mg/m^3 must not be exceeded (see ISO 8573-1 Class 4).
A higher residual oil content irrespective of the compressor oil cannot be permitted, as the basic lubricant would be flushed out over time.

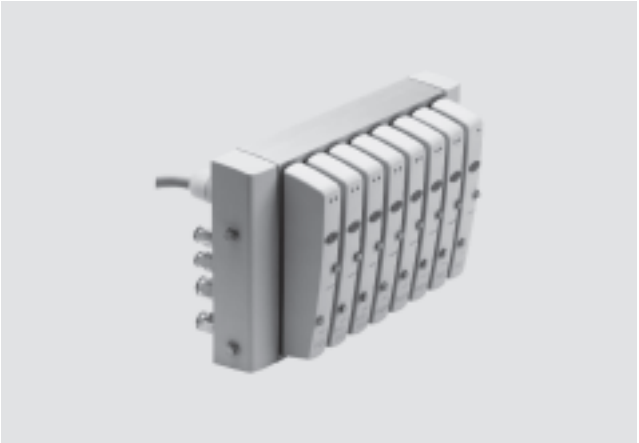
Valve terminals type 15 CDVI, Clean Design

Technical data

FESTO

- Flow rate
  300 ... 650 l/min

- Valve width
  24 mm



General technical data		
		CDVI
Constructional design		Piston spool valve
Actuation type		Electrical
Width	[mm]	24
Nominal diameter	[mm]	5
Lubrication		Lifetime lubrication, PWIS-free (free of paint-wetting impairment substances)
Type of mounting • Valves and end plate • Valve terminal		 Via 2 screws (DIN 6921) Via spacer bolts
Tightening torque of valve/ blanking plate	[Nm]	0.8
Exhaust function		With flow control
Mounting position		Any
Manual override		Non-detenting
Pneumatic connections		
Supply port	1	G3/8 (G1/8 on extension module CDVI5.0-EBX and CDSV)
Exhaust port	3/5	G3/8 (G1/8 on extension module CDVI5.0-EBX and CDSV)
Working lines	2/4	G1/8
Pilot air supply port	12/14	G1/8 (M5 on CDSV)
Pilot exhaust air port	82/84	G1/8 (M5 on CDSV)
Pressure compensation port		G1/8 (M5 on CDSV)

Valve switching times [ms]													
Valve function order code		R	S	X	W	K	N	H	M	J	G	B	E
Switching times	on	14	14	10.3	10.3	10	10	10	12	–	12	12	12
	off	10	10	14.1	14.1	22	22	22	22	–	25	25	25
	change-over	–	–	–	–	–	–	–	–	10	17	17	17

Valve terminals type 15 CDVI, Clean Design

Technical data

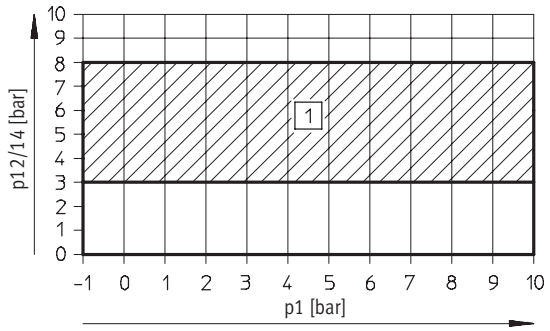
Operating and environmental conditions												
Valve function order code	R	S	X	W	K	N	H	M	J	G	B	E
Operating medium	Filtered compressed air, lubricated or unlubricated											
Grade of filtration [µm]	40											
Operating pressure [bar]	–0.9 … +10				3 … 10[2]			–0.9 … +10				
Operating pressure for valve terminal with internal pilot air supply [bar]	3 … 8 (not available on the CDSV)											
Pilot pressure [bar]	3 … 8											
Storage temperature [°C]	–20 … +40											
Operating temperature [°C]	–5 … +50											
Temperature of medium [°C]	–5 … +50											
CE mark (see declaration of conformity)	To EU EMC Directive											
Food industry approval	DIN EN ISO 14159											
Corrosion resistance class CRC[1]	3											

1) Corrosion resistance class 3 as per Festo standard 940 070
Components subject to higher corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as solvents and cleaning agents.

2) 2x 3/2-way valves not suitable for vacuum

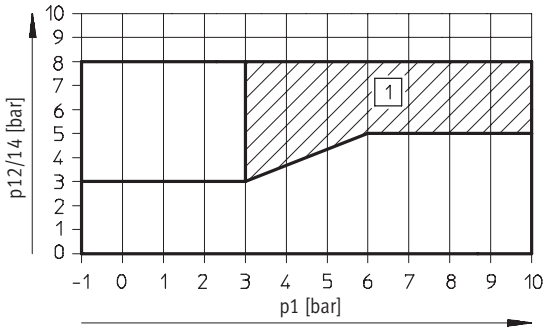
Pilot pressure with external pilot air supply

Switch-on pilot pressure of 5/2-way and 5/3-way valves and 3/2-way valves with external air supply (EXT)



1 Permissible pressure range

Switch-on pilot pressure of 3/2-way valves



1 Permissible pressure range

Valve terminals type 15 CDVI, Clean Design

Technical data

Electrical data													
Valve function order code		R	S	X	W	K	N	H	M	J	G	B	E
Electromagnetic compatibility		Interference immunity tested to EN 61000-6-2											
Nominal operating voltage	[V DC]	24, reverse polarity protected											
Operating voltage	[V DC]	21.6 ... 26.4											
Minimum power supply requirement	[V/ms]	0.4 minimum voltage increase time to reach the high-current phase											
Residual ripple	[Vss]	4											
Switch-on current consumption													
• per solenoid coil at 24 V (with LEDs)	[mA]	Typ. 120											
• total at 24 V and max. number of solenoid coils (with LEDs)	[A]	Typ. 2.88											
Current consumption during operation													
• per solenoid coil at 24 V (with LEDs)	[mA]	Min. 26											
• total at 24 V and max. number of solenoid coils (with LEDs)	[A]	Typ. 0.62											
Electrical power consumption per solenoid coil (with LED)	[W]	2.88											
Duty cycle		100%											
Protection class to EN 60529		IP65, IP66, IP67, NEMA 4 (fully assembled)											
Vibration resistance		To DIN/IEC 68/EN 60068, Part 2-6 and IEC 721/EN 60 068 Part 2-3											
Shock resistance		To DIN/IEC 68/EN 60068, Part 2-27 and IEC 721											
Continuous shock resistance		To DIN/IEC 68/EN 60068, Part 2-29: +/–15 g at 6 ms, 1000 cycles											

Multi-pin cable		
Cable design	[mm^2]	25x0.34
Bending radius during flexible use		Min. 15x cable ∅
Outer ∅	[mm]	Approx. 11.4

Materials													
Valve function order code	R	S	X	W	K	N	H	M	J	G	B	E
Blanking plate	Polypropylene (PP), thermoplastic rubber (TPE), polyamide (PA)											
Manifold sub-base	Aluminium (anodised min. 20 µm)											
Blanking plug	Polybutylene terephthalate (material no.: 1.4303 or 1.4301)											
End plate	Polypropylene											
Screws	Polybutylene terephthalate (material no.: 1.4303 or 1.4301)											
Spacer bolt	Aluminium (anodised min. 20 µm)											
Valve	Aluminium, polyacetate (POM), polyphenylene sulphide (PPS), polyamide (PA), nitrile rubber (NBR), brass (Ms), steel (St), polycarbonate (PC), polypropylene (PP)											

Valve terminals type 15 CDVI, Clean Design

Technical data

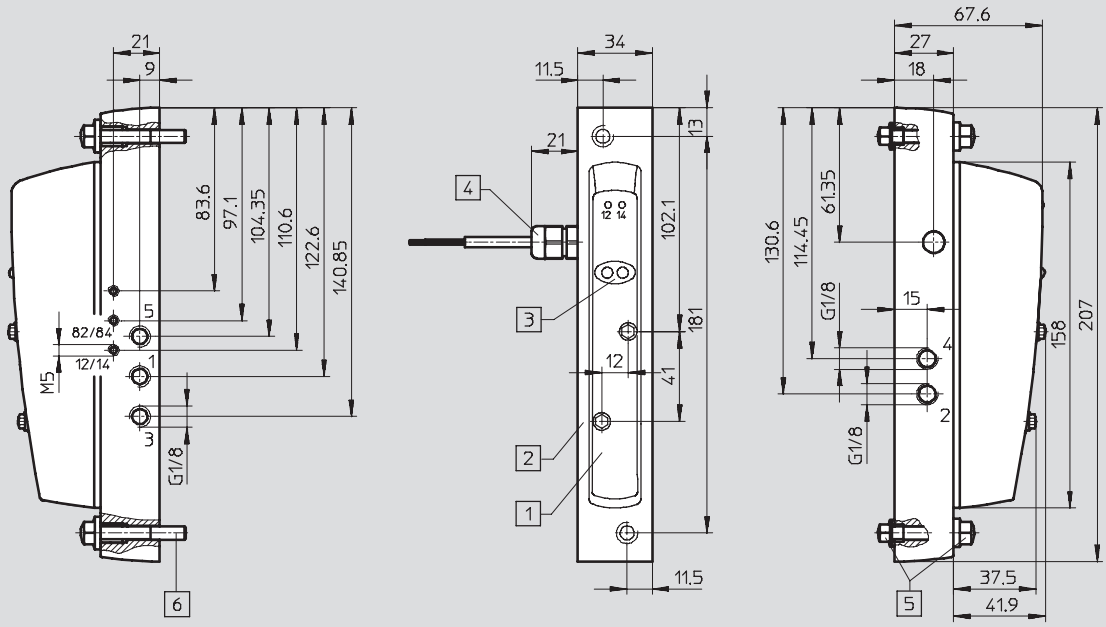
Weight [g]	Approx. weights	
	CDVI multi-pin plug	CDVI fieldbus
Basic block with 4 valve positions[1)]	1,050	1,320
Basic block with 8 valve positions[1)]	2,090	2,360
Extension module for 1 valve position with/ without additional supply[2)]	255	255
Extension module for 2 valve positions with/ without additional supply[2)]	510	510
Valve	210	
Blanking plate	85	
Left-hand/right-hand end plate	120	
Separator plate	30-40	
CDSV individual sub-base[3)]	690	
Spacer bolt (2 pieces)	160	
Connecting cable per metre	168	

1) Basic block, without: separator plates, right-hand and left-hand end plates, pneumatic fittings, cables, valves and cover plates.
2) Extension module, without: separator plate, pneumatic fittings, valves and cover plates.
3) Individual sub-base, without: pneumatic fittings and valve.

Nominal flow rate [l/min]												
Valve function order code	R	S	X	W	K	N	H	M	J	G	B	E
Pressurised	500	300	500	500	300	300	300	650	650	650	650	400
Exhausted	500	300	500	500	300	300	300	650	650	650	400	650
Mid-position	–	–	–	–	–	–	–	–	–	–	150	150

Dimensions Download CAD data ➔ **www.festo.com**

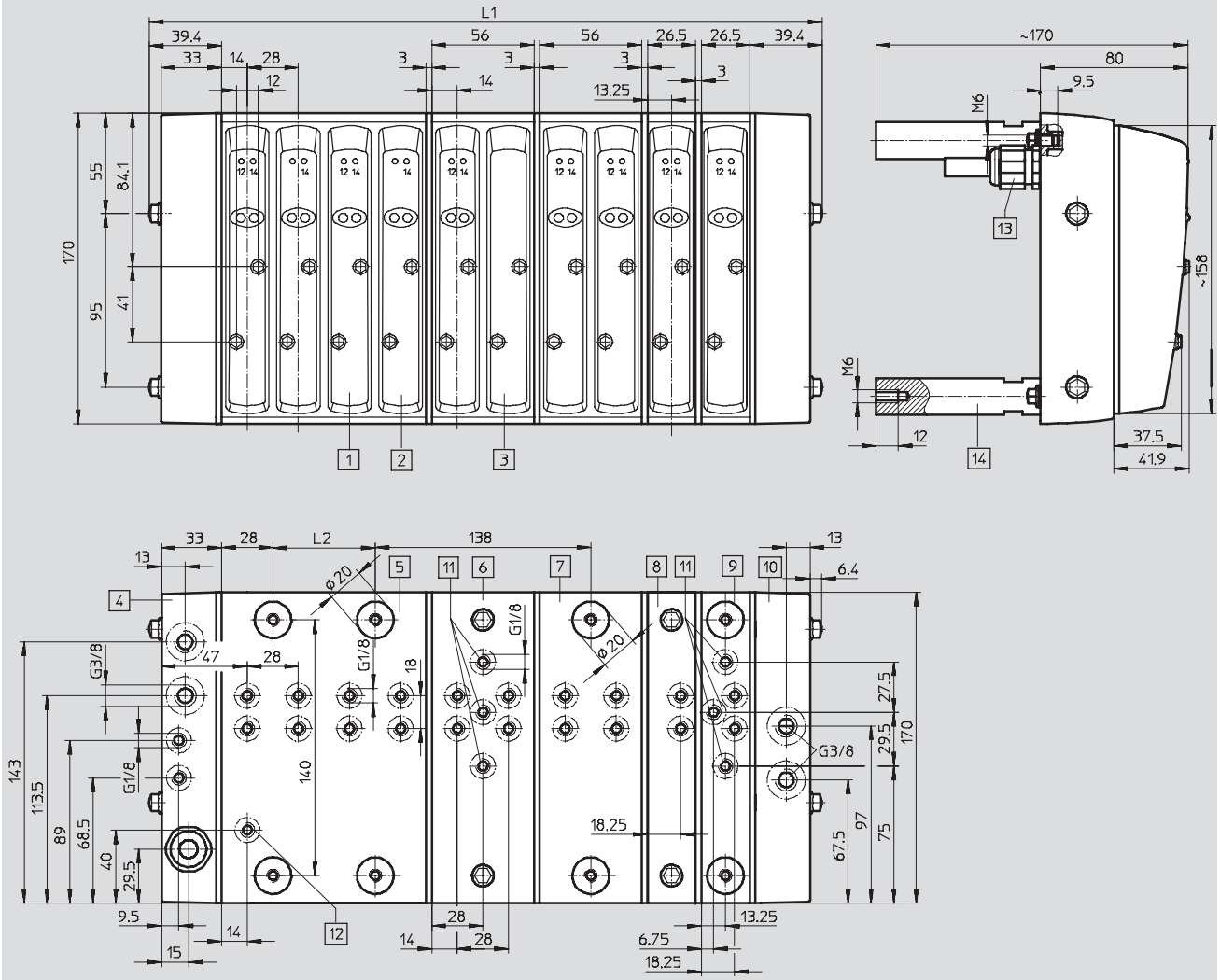
Individual sub-base



1 Choice of single solenoid or double solenoid valve
2 Manifold sub-base
3 Manual override
4 Cable connector M20x1.5
5 For mounting from below:
2x screw M6x18-A2-80
2x sealing ring CRO-M6
2x blanking plug G⅛
2x sealing ring G⅛
6 For mounting from above:
2x screw M6x40-A2-80
2x sealing ring CRO-M6

Dimensions Download CAD data ➔ **www.festo.com**

Basic block with 4 valve positions and extension modules, design with multi-pin plug connection

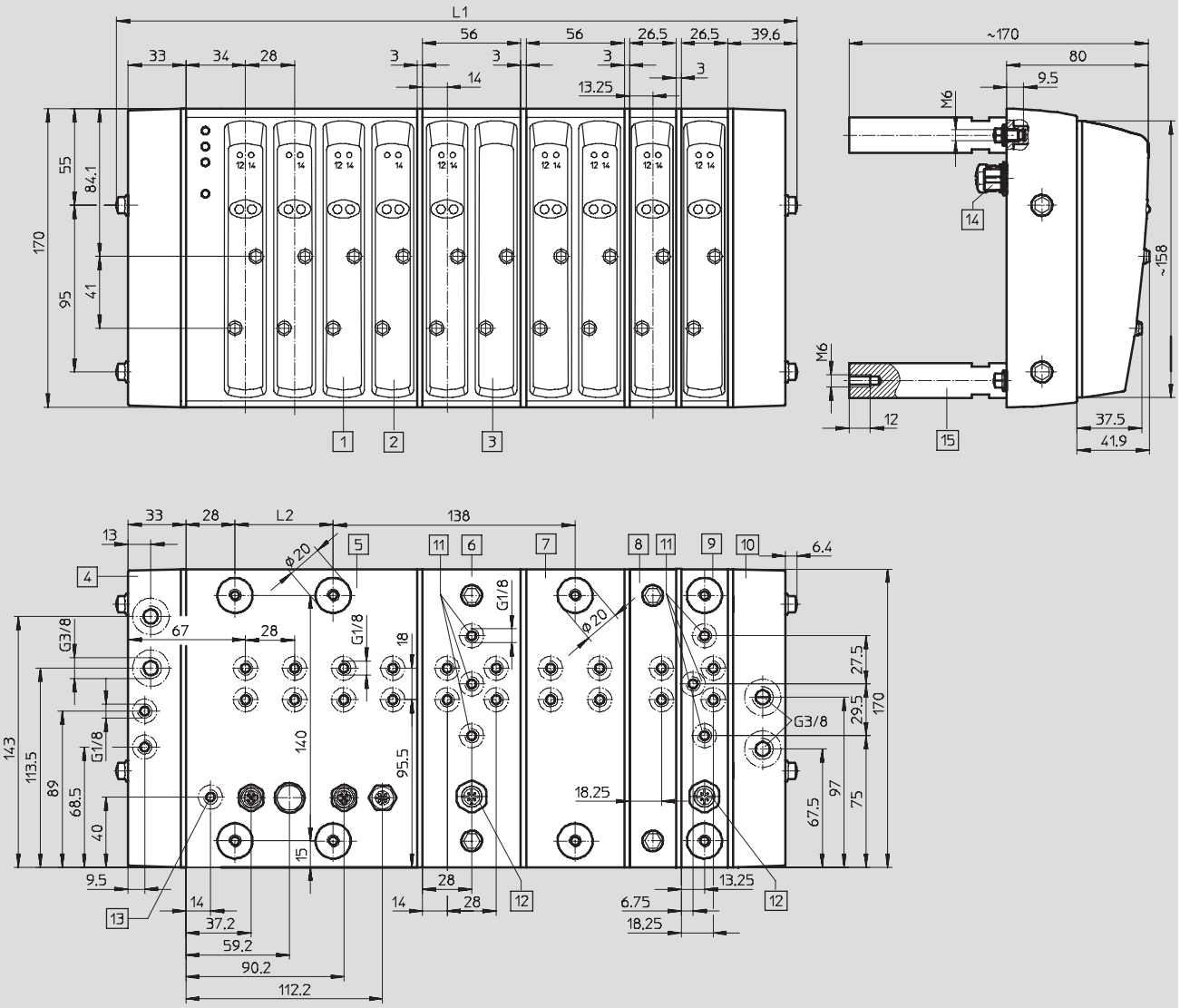


1 Double solenoid valve
2 Single solenoid valve
3 Blanking plate
4 Left-hand end plate
5 4-valve or 8-valve basic block
6 2-valve extension module, optionally with additional pneumatic power supply
7 2-valve extension module
8 1-valve extension module
9 1-valve extension module, optionally with additional pneumatic power supply
10 Right-hand end plate
11 Port for further pressure zones or additional pneumatic power supply
12 Venting hole
13 Cable connector M20 x 1.5 for multi-pin cable
14 Threaded pin required after every second extension module. An extension module may protrude without attachment.

Basic block			Valve positions											
			5	6	7	8	9	10	11	12	13	14	15	16
4-valve	L1	190.8	220.3	249.8	279.3	308.8	338.3	367.8	397.3	426.8	456.3	485.8	515.3	544.8
	L2	56												
8-valve	L1	302.8					332.3	361.8	391.3	420.8	450.3	479.8	509.3	538.8
	L2	168												

Dimensions Download CAD data ➔ **www.festo.com**

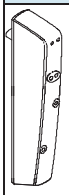
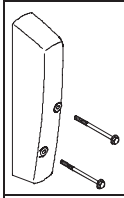
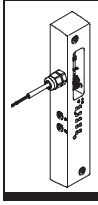
Basic block with 4 valve positions and extension modules, design with fieldbus connection

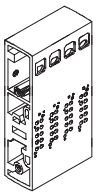
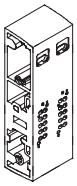
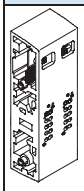


1 Double solenoid valve
2 Single solenoid valve
3 Blanking plate
4 Left-hand end plate
5 4-valve or 8-valve basic block
6 2-valve extension module, optionally with additional electrical and/or pneumatic power supply
7 2-valve extension module
8 1-valve extension module
9 1-valve extension module, optionally with additional electrical and/or pneumatic power supply
10 Right-hand end plate
11 Port for further pressure zones or additional pneumatic power supply
12 Port for further electrical voltage zones M12, 4-pin
13 Venting hole
14 Bus connection
15 Threaded pin required after every second extension module. An extension module may protrude without attachment.

Basic block			Valve positions 5	6	7	8	9	10	11	12	13	14	15	16
4-valve	L1	210.8	240.3	269.8	299.3	328.8	358.3	367.8	417.3	446.8	476.3	505.8	535.3	564.8
	L2	56												
8-valve	L1	322.8					352.3	381.8	411.3	440.8	470.3	499.8	529.3	558.3
	L2	168												

Ordering data

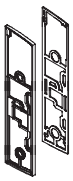
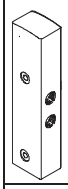
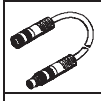
	Code	Description	Type	Part No.
Individual sub-base valve				
	R	2/2-way single solenoid valve, normally closed, external supply air	**CDVI5.0-MT2H-1X2GLS-EXT**	**556 379**
	S	2/2-way single solenoid valve, normally closed, external supply air	**CDVI5.0-MT2H-1X2OLS-EXT**	**556 380**
	X	3/2-way valve, normally closed, external supply air	**CDVI5.0-MT2H-1X3GLS-EXT**	**547 013**
	W	3/2-way valve, normally open, external supply air	**CDVI5.0-MT2H-1X3OLS-EXT**	**547 014**
	K	2x 3/2-way valve, normally closed	**CDVI5.0-MT2H-2x3GLS**	**196 661**
	N	2x 3/2-way valve, normally open	**CDVI5.0-MT2H-2x3OLS**	**196 663**
	H	2x 3/2-way valve, 1x normally open, 1x normally closed	**CDVI5.0-MT2H-3OLS-3GLS**	**196 665**
	M	5/2-way valve, single solenoid	**CDVI5.0-MT2H-5LS**	**196 657**
	J	5/2-way valve, double solenoid	**CDVI5.0-MT2H-5JS**	**196 659**
	B	5/3-way valve, mid-position closed	**CDVI5.0-MT2H-5/3GS**	**196 651**
	E	5/3-way valve, mid-position pressurised	**CDVI5.0-MT2H-5/3BS**	**196 655**
	G	5/3-way valve, mid-position exhausted	**CDVI5.0-MT2H-5/3ES**	**196 653**
	A	Blanking plate for vacant valve position Valve terminal only	**CDVI5.0-A-P-2**	**193 140**
Sub-bases				
	1	Sub-base, individual connection	**CDSV5.0-AS-1/8**	**534 434**

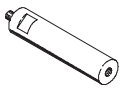
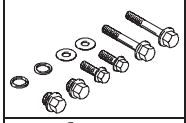
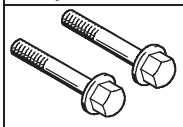
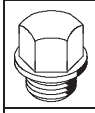
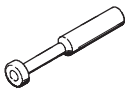
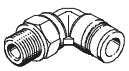
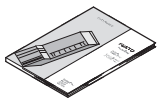
Ordering data				
	Code	Description	Type	Part No.
Basic block				
	4	Basic block with 4 valve positions for multi-pin plug	**CDVI5.0-GB4-MP**	**196 714**
		Basic block with 4 valve positions for fieldbus	**CDVI5.0-GB4-DN**	**535 840**
	8	Basic block with 8 valve positions for multi-pin plug	**CDVI5.0-GB8-MP**	**196 690**
		Basic block with 8 valve positions for fieldbus	**CDVI5.0-GB8-DN**	**535 839**
Extension modules for multi-pin plug				
	B1, D1, F1, H1	Extension module for 1 valve position, multi-pin plug, single solenoid	**CDVI5.0-EB1-MP-MO**	**548 422**
	B1, D1, F1, H1	Extension module for 1 valve position, multi-pin plug, double solenoid	**CDVI5.0-EB1-MP-BI**	**548 423**
	B, D, F, H	Extension module for 2 valve positions, multi-pin plug, single solenoid	**CDVI5.0-EB2-MP-MO**	**548 428**
	B, D, F, H	Extension module for 2 valve positions, multi-pin plug, double solenoid	**CDVI5.0-EB2-MP-BI**	**554 369**
	P	Extension module for 1 valve position, separate supply and exhaust ports, multi-pin plug, single solenoid	**CDVI5.0-EB1X-MP-MO**	**548 430**
	P	Extension module for 1 valve position, separate supply and exhaust ports, multi-pin plug, double solenoid	**CDVI5.0-EB1X-MP-BI**	**548 431**
	P	Extension module for 2 valve positions, separate supply and exhaust ports, multi-pin plug, single solenoid	**CDVI5.0-EB2X-MP-MO**	**548 436**
	P	Extension module for 2 valve positions, separate supply and exhaust ports, multi-pin plug, double solenoid	**CDVI5.0-EB2X-MP-BI**	**554 370**
Extension modules for fieldbus				
	B1, D1, F1, H1	Extension module for 1 valve position, fieldbus, single solenoid	**CDVI5.0-EB1-DN-MO**	**548 424**
	B1, D1, F1, H1	Extension module for 1 valve position, fieldbus, double solenoid	**CDVI5.0-EB1-DN-BI**	**548 426**
	B, D, F, H	Extension module for 2 valve positions, fieldbus, single solenoid	**CDVI5.0-EB2-DN-MO**	**548 429**
	B, D, F, H	Extension module for 2 valve positions, fieldbus, double solenoid	**CDVI5.0-EB2-DN-BI**	**554 371**
	V	Extension module for 1 valve position, separate electrical additional supply, fieldbus, single solenoid	**CDVI5.0-EB1Z-DN-MO**	**548 425**
	V	Extension module for 1 valve position, separate electrical additional supply, fieldbus, double solenoid	**CDVI5.0-EB1Z-DN-BI**	**548 427**
	V	Extension module for 2 valve positions, separate electrical additional supply, fieldbus, single solenoid	**CDVI5.0-EB2Z-DN-MO**	**549 616**
	V	Extension module for 2 valve positions, separate electrical additional supply, fieldbus, double solenoid	**CDVI5.0-EB2Z-DN-BI**	**549 619**
	P	Extension module for 1 valve position, separate supply and exhaust ports, fieldbus, single solenoid	**CDVI5.0-EB1X-DN-MO**	**548 432**
	P	Extension module for 1 valve position, separate supply and exhaust ports, fieldbus, double solenoid	**CDVI5.0-EB1X-DN-BI**	**548 434**
	P	Extension module for 2 valve positions, separate supply and exhaust ports, fieldbus, single solenoid	**CDVI5.0-EB2X-DN-MO**	**548 437**
	P	Extension module for 2 valve positions, separate supply and exhaust ports, fieldbus, double solenoid	**CDVI5.0-EB2X-DN-BI**	**554 372**
	C	Extension module with separate electrical additional supply as well as separate supply and exhaust ports, fieldbus, single solenoid	**CDVI5.0-EB1XZ-DN-MO**	**548 433**
	C	Extension module with separate electrical additional supply as well as separate supply and exhaust ports, fieldbus, double solenoid	**CDVI5.0-EB1XZ-DN-BI**	**548 435**
	C	Extension module with separate electrical additional supply as well as separate supply and exhaust ports, fieldbus, single solenoid	**CDVI5.0-EB2XZ-DN-MO**	**549 617**
	C	Extension module with separate electrical additional supply as well as separate supply and exhaust ports, fieldbus, double solenoid	**CDVI5.0-EB2XZ-DN-BI**	**548 438**

Valve terminals type 15 CDVI, Clean Design

Accessories

FESTO

Ordering data					
	Code	Description		Type	Part No.
Separator plates					
	B	No duct separation		**CDVI5.0-DZ**	**196 700**
	D	Duct 1 separated Ducts 3 and 5 open		**CDVI5.0-DZP**	**196 702**
	F	Duct 1 open Ducts 3 and 5 separated		**CDVI5.0-DZR**	**196 704**
	H	Ducts 1, 3 and 5 separated		**CDVI5.0-DZPR**	**196 706**
Left-hand end plate					
	K05	Electrical multi-pin plug, cable length 5 m		**CDVI5.0-EPL-MP-K05**	**196 692**
	K10	Electrical multi-pin plug, cable length 10 m		**CDVI5.0-EPL-MP-K10**	**196 694**
	F11	DeviceNet fieldbus connection		**CDVI5.0-EPL-DN:LI**	**535 838**
Right-hand end plate					
	–	Internal pilot air supply		**CDVI5.0-EPR**	**196 696**
	–	External pilot air supply		**CDVI5.0-EPR-S**	**196 698**
Bus connection					
	–	DeviceNet plug socket/Micro Style connection, M12, 5-pin, straight socket (A-coded), IP65, Pg9		**FBSD-GD-9-5POL**	**18 324**
	–	DeviceNet plug/power supply/Micro Style connection, M12, 5-pin, straight plug (A-coded), IP65, Pg9		**FBS-M12-5GS-PG9**	**175 380**
Valve terminal connection					
	–	Connecting cable WS-WD, angled plug-angled socket	0.25 m	**KVI-CP-3-WS-WD-0,25**	**540 327**
			0.5 m	**KVI-CP-3-WS-WD-0,5**	**540 328**
			2 m	**KVI-CP-3-WS-WD-2**	**540 329**
			5 m	**KVI-CP-3-WS-WD-5**	**540 330**
			8 m	**KVI-CP-3-WS-WD-8**	**540 331**
	–	Connecting cable GS-GD, straight plug-straight socket	2 m	**KVI-CP-3-GS-GD-2**	**540 332**
			5 m	**KVI-CP-3-GS-GD-5**	**540 333**
			8 m	**KVI-CP-3-GS-GD-8**	**540 334**
Input and output modules					
	–	Input and output modules, CPI system ➔ Internet: ctec			

Ordering data					
	Code	Description		Type	Part No.
Mounting attachments					
	Y	Spacer bolt (2 pieces)		**CDVI5.0-STB**	**196 718**
	–	Mounting kit		**CDSV5.0**	**534 436**
	–	Screw kit for attaching the extension modules to the basic block (2 pieces)	for 1 valve position	**CDVI5.0-ZA-EB1**	**548 442**
			for 2 valve positions	**CDVI5.0-ZA-EB2**	**548 443**
			for 3 valve positions	**CDVI5.0-ZA-EB3**	**548 444**
			for 4 valve positions	**CDVI5.0-ZA-EB4**	**548 445**
			for 5 valve positions	**CDVI5.0-ZA-EB5**	**548 446**
			for 6 valve positions	**CDVI5.0-ZA-EB6**	**548 447**
			for 7 valve positions	**CDVI5.0-ZA-EB7**	**548 448**
			for 8 valve positions	**CDVI5.0-ZA-EB8**	**548 449**
Blanking plug					
	–	Blanking plug	G3/8 for end plates	**CDVI-5.0-B-G3/8**	**196 712**
	–		G1/8 for end plates	**CDVI-5.0-B-G1/8**	**196 720**
	–		for spacer bolt thread	**CDVI5.0-B-M6**	**532 476**
Plug					
	–	Blanking plug	for tubing O.D. 6 mm	**QSC-6H**	**153 268**
	–		for tubing O.D. 8 mm	**QSC-8H**	**153 269**
	–		for tubing O.D. 10 mm	**QSC-10H**	**153 270**
	–		for tubing O.D. 12 mm	**QSC-12H**	**153 271**
Push-in fittings					
	B	Push-in fitting	for tubing O.D. 6 mm	**QS-F-G1/8-6**	**193 409**
	A		for tubing O.D. 8 mm	**QS-F-G1/8-8**	**193 410**
	–		for tubing O.D. 12 mm	**QS-F-G3/8-12**	**197 487**
	D	Push-in L-fitting	for tubing O.D. 6 mm	**QSL-F-G1/8-6**	**193 419**
	C		for tubing O.D. 8 mm	**QSL-F-G1/8-8**	**193 420**
	–		for tubing O.D. 12 mm	**QSL-F-G3/8-12**	**197 486**
Manual					
	D	Pneumatic components – CDVI	German	**P.BE-CDVI-DE**	**197 361**
	E		English	**P.BE-CDVI-EN**	**197 363**
	I		Italian	**P.BE-CDVI-IT**	**197 369**
	S		Spanish	**P.BE-CDVI-ES**	**197 367**
	V		Swedish	**P.BE-CDVI-SV**	**197 371**
	D	Electrical components – CDVI-DN	German	**P.BE-CDVI-DN-DE**	**539 044**
	E		English	**P.BE-CDVI-DN-EN**	**539 045**
	I		Italian	**P.BE-CDVI-DN-IT**	**539 048**
	S		Spanish	**P.BE-CDVI-DN-ES**	**539 046**
	V		Swedish	**P.BE-CDVI-DN-SV**	**539 049**