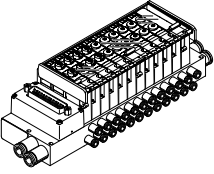
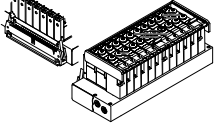
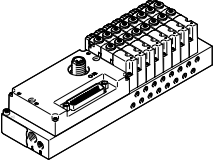


Valve terminals VTOC

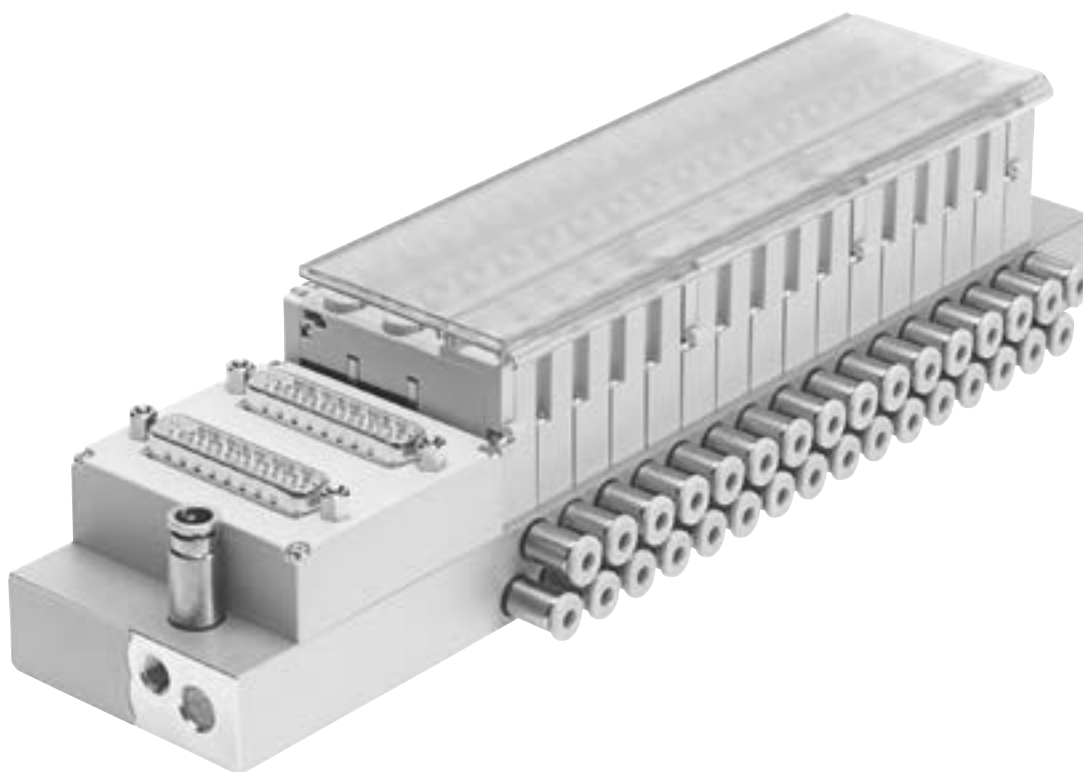
FESTO



Overview – Valve terminals

Design type	Type code	Description	→ Page/ Internet
Valve terminal VTOC with multi-pin plug connection, Sub-D			
	SD	<ul style="list-style-type: none"> • Sub-D 25-pin • Sub-D 44-pin 	29
Valve terminal VTOC with multi-pin plug connection, ribbon cable			
	RC	<ul style="list-style-type: none"> • Ribbon cable, 26-pin • Ribbon cable, 40-pin • Ribbon cable, 50-pin 	29
Valve terminal with I-Port interface, interlock/IO-Link			
	LK/PT	<ul style="list-style-type: none"> • I-Port interface: plug M12, 5-pin • Sub-D 44-pin • IO-Link 	31

Characteristics



Innovative

- Valve terminal for a wide range of pneumatic applications
- Weight-optimised metal manifold rail
- Space-saving thanks to 2x3/2-way valves on one valve position
- Great flexibility during planning, assembly and operation
- Configurable manifold rails (pneumatic and electric connections)

Flexible

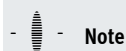
- Provides 2 ... 24 valve positions on one terminal
- Flexibility of the pneumatic working ports provides a practical solution to different requirements
- Wide range of electrical outlet directions
- Multi-pin plug connection with Sub-D plug or ribbon cable
- I-Port interface with interlock for bus node (CTEU)
- IO-Link mode for direct connection to a higher-level IO-Link master

Reliable

- Manual override – non-detenting, non-detenting/detenting, detenting
- Long service life
- Sturdy thanks to simple design

Easy to install

- Ready-to-install and tested unit
- Reduced ordering, assembly and commissioning costs
- Easy valve assembly



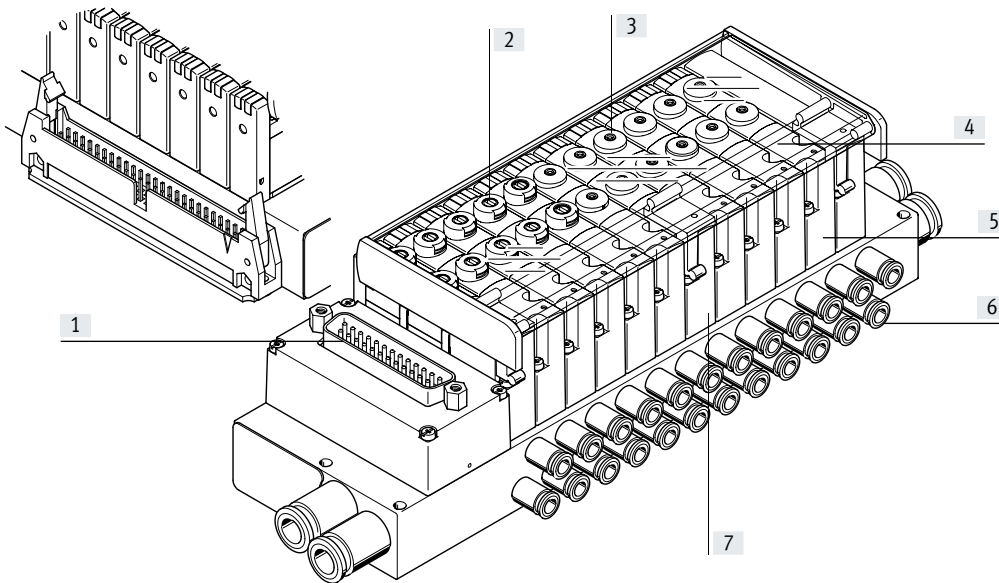
Note

Ordering system for valve terminal VTOC

→ Internet: vtoc

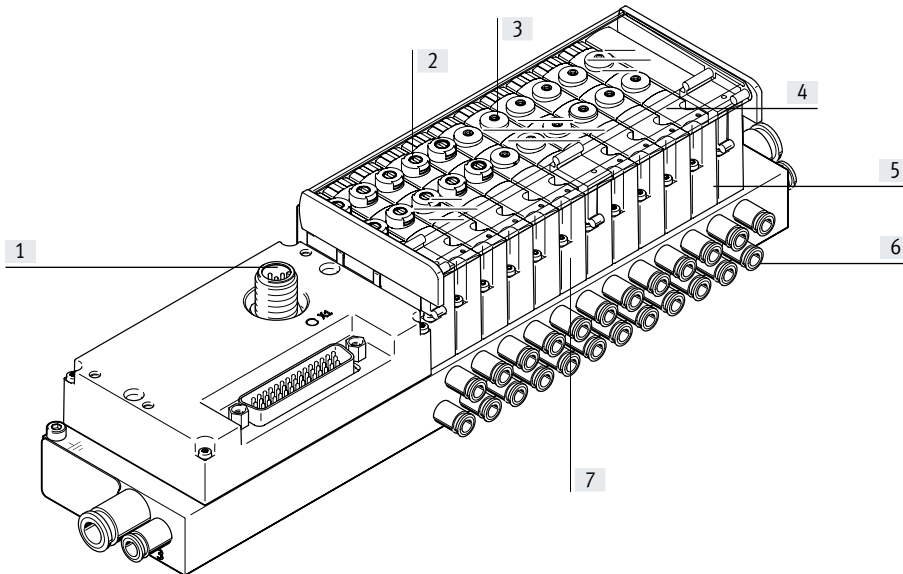
Characteristics – Valve terminals

Valve terminal with multi-pin plug connection



- [1] Simple electrical connections: ribbon cable or Sub-D
- [2] Valve with manual override, detenting, non-detenting
- [3] Valve with manual override, non-detenting
- [4] Valve with manual override, detenting
- [5] Valve width 10 mm
- [6] Choice of pneumatic outlets: QS push-in connectors, straight or angled
- [7] Space-saving thanks to 2x3/2-way valves

Valve terminal with I-Port interface, interlock/IO-Link



- [1] I-Port interface with interlock/IO-Link
- [2] Valve with manual override, detenting, non-detenting
- [3] Valve with manual override, non-detenting
- [4] Valve with manual override, detenting
- [5] Valve width 10 mm
- [6] Choice of pneumatic outlets: QS push-in connectors, straight or angled
- [7] Space-saving thanks to 2x3/2-way valves

Equipment options

Valve functions

- 2x3/2-way valve, single solenoid, normally closed
- Valve with manual override, non-detenting
- Valve with manual override, detenting, non-detenting
- Valve with manual override, detenting
- 2 ... 24 valve positions/ max. 48 solenoid coils

Electrical connection options

- Variable multi-pin plug connection: Sub-D or ribbon cable
- I-Port interface with interlock for bus node (CTEU)
- IO-Link mode for direct connection to a higher-level IO-Link master

Characteristics

Integration of the I-Port interface/IO-Link

Different bus nodes are used for integration into the control systems of various manufacturers.

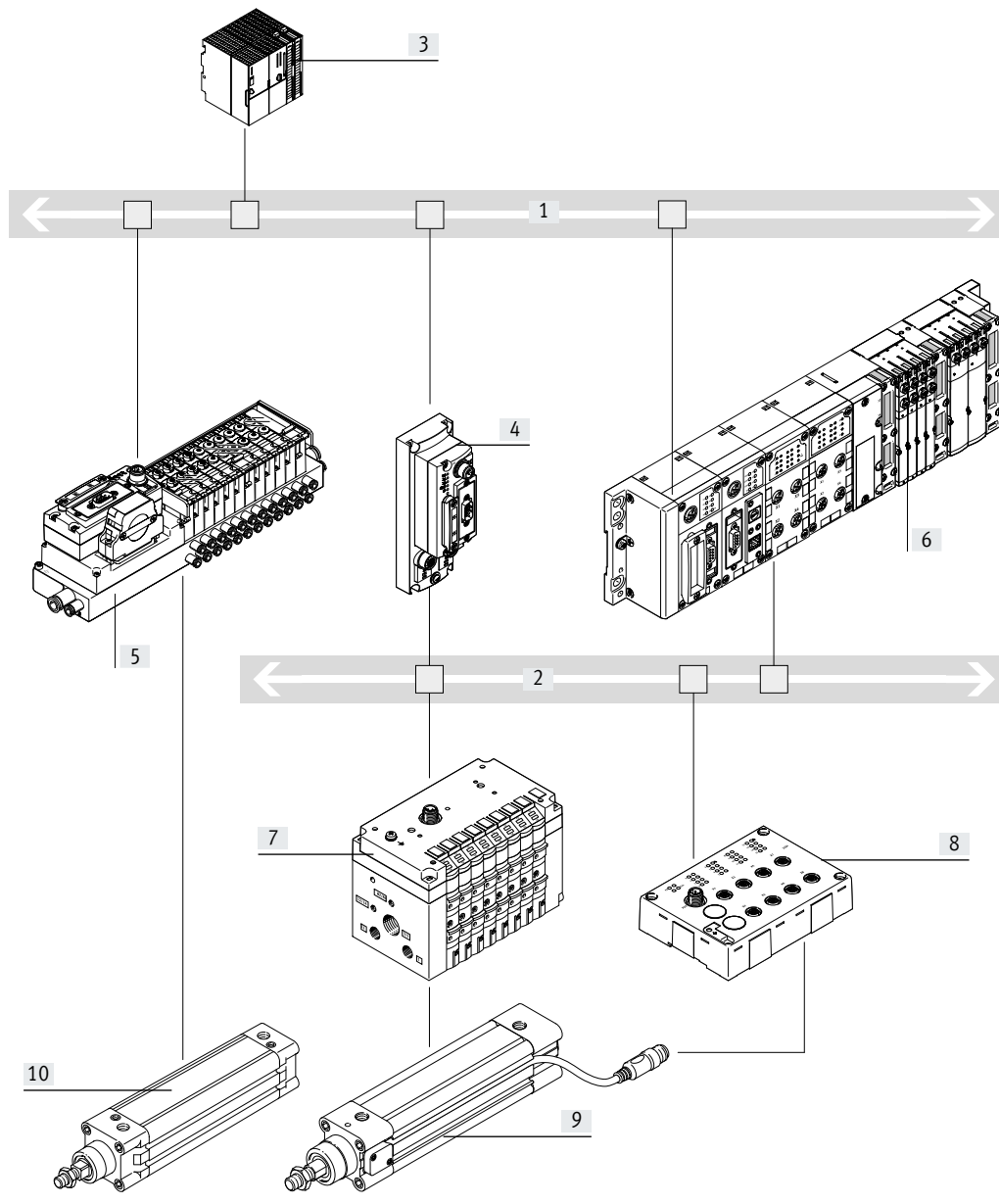
The following protocols are supported with the compatible bus node CTEU:

- CANopen
- DeviceNet

- EtherCAT
- CC-Link
- Profibus

Use of the electrical connection block CAPC permits decentralised installation of bus nodes CTEU on a further valve terminal or input modules with I-Port interfaces (→ installation system CTEU/CTEL)

System overview, example



- [1] Fieldbus
- [2] IO-Link/ I-Port
- [3] PLC
- [4] Bus node CTEU (I-Port master) on electrical connection block CAPC
- [5] Valve terminal VTOC, I-Port interface with bus node CTEU
- [6] CPX terminal with bus node and CTEL master
- [7] Valve terminal CPV with I-Port interface/IO-Link
- [8] Input module CTSL
- [9] Pneumatic drive with sensor
- [10] Pneumatic drive

- Communication with the higher-order controller via fieldbus
- Use a bus node CTEU compatible with the fieldbus protocol
- Up to 64 inputs/outputs (solenoid coils), depending on the valve terminal

Peripherals overview

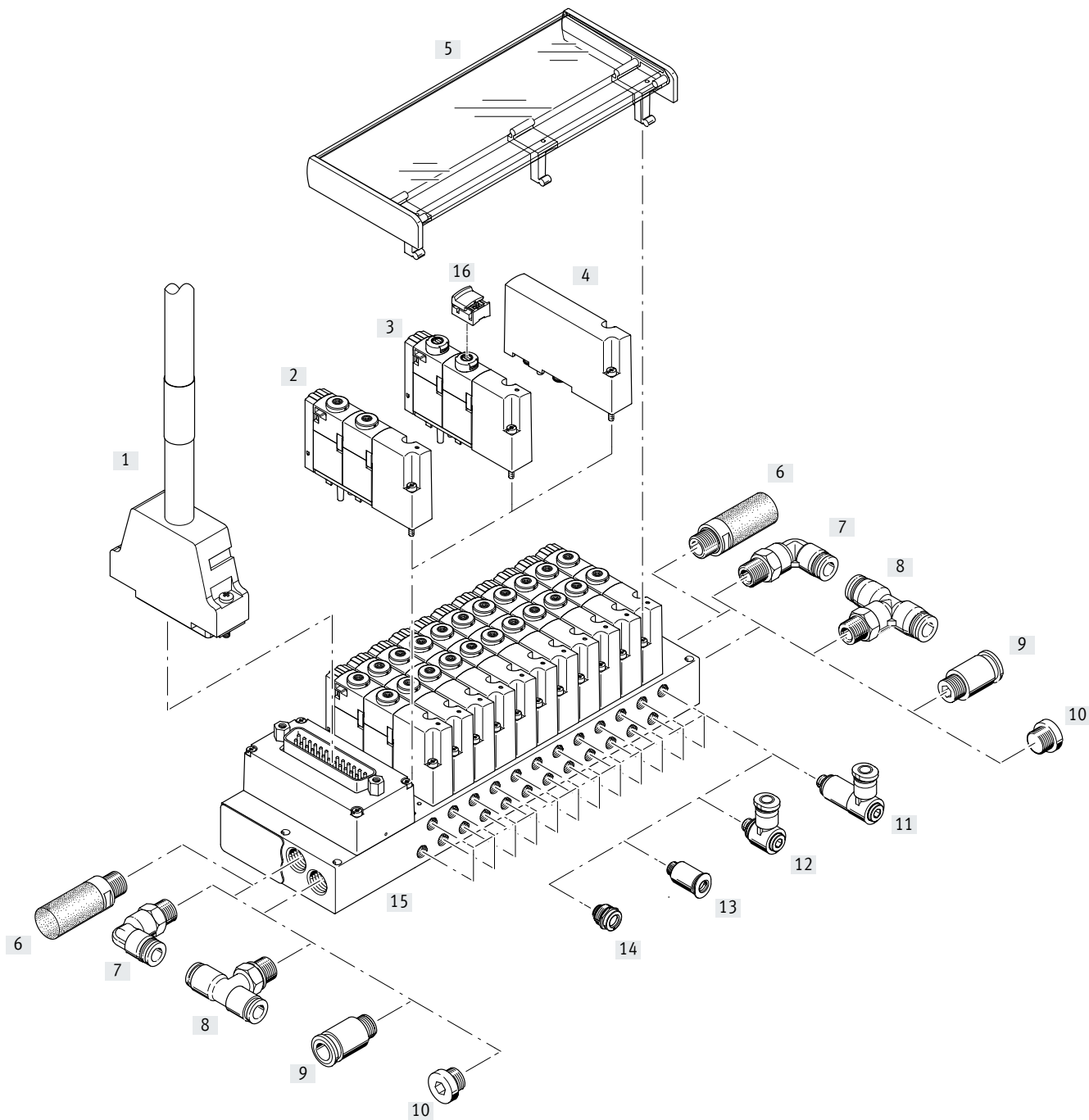
Overview – Valve terminal VTOC with multi-pin plug connection, Sub-D

- Up to 24 valve positions/
48 solenoid coils
- Connection type: ribbon cable,
code: RC
- Connection type: Sub-D plug, code:
SD

Valve terminals with electrical multi-pin plug connection are available with 2 to max. 24 valve positions. Each valve position can either be equipped with a valve body or a cover plate.

Only valve bodies containing two 3/2-way single solenoid valves are available.

A maximum of 48 solenoid coils can therefore be actuated via the electrical multi-pin plug connection.



Peripherals overview

Accessories		Type	Brief description	→ Page/ Internet
[1]	Connecting cable	KMP6/ NEBV	For multi-pin plug connection, with Sub-D plug, 25-pin or 44-pin	41
[2]	Solenoid valve, single solenoid	VOVC	With manual override, non-detenting	41
[3]	Solenoid valve, single solenoid	VOVC	With manual override, detenting, non-detenting	41
[4]	Cover plate	VABB	For vacant position	41
[5]	Inscription label holder	ASCF	For labelling the valves/covering the manual override	42
[6]	Silencer	U	For mounting in exhaust ports	42
[7]	Elbow connector	QSL	For connecting to the air supply or exhaust	42
[8]	T-fitting	QST	For connecting to the air supply or exhaust	42
[9]	Straight fitting	OS	For connecting to the air supply or exhaust	42
[10]	Blanking plug	B	For sealing the air supply or exhaust port	41
[11]	Push-in L-fitting, long	QSMLLV	Long elbow connector for working ports	42
[12]	Push-in L-fitting	QSMLV	Elbow connector for working ports	42
[13]	Push-in fitting	QS	Straight push-in fitting for working ports	42
[14]	Push-in fitting	QSIMG	Straight countersunk push-in fitting for working ports (compact)	–
[15]	Manifold rail	VABB	With multi-pin plug connection for max. 24 valve positions	–
[16]	Cover	VAMC	For manual override, detenting (without accessories)	41

Peripherals overview

Overview – Valve terminal VTOC with I-Port interface, interlock/IO-Link

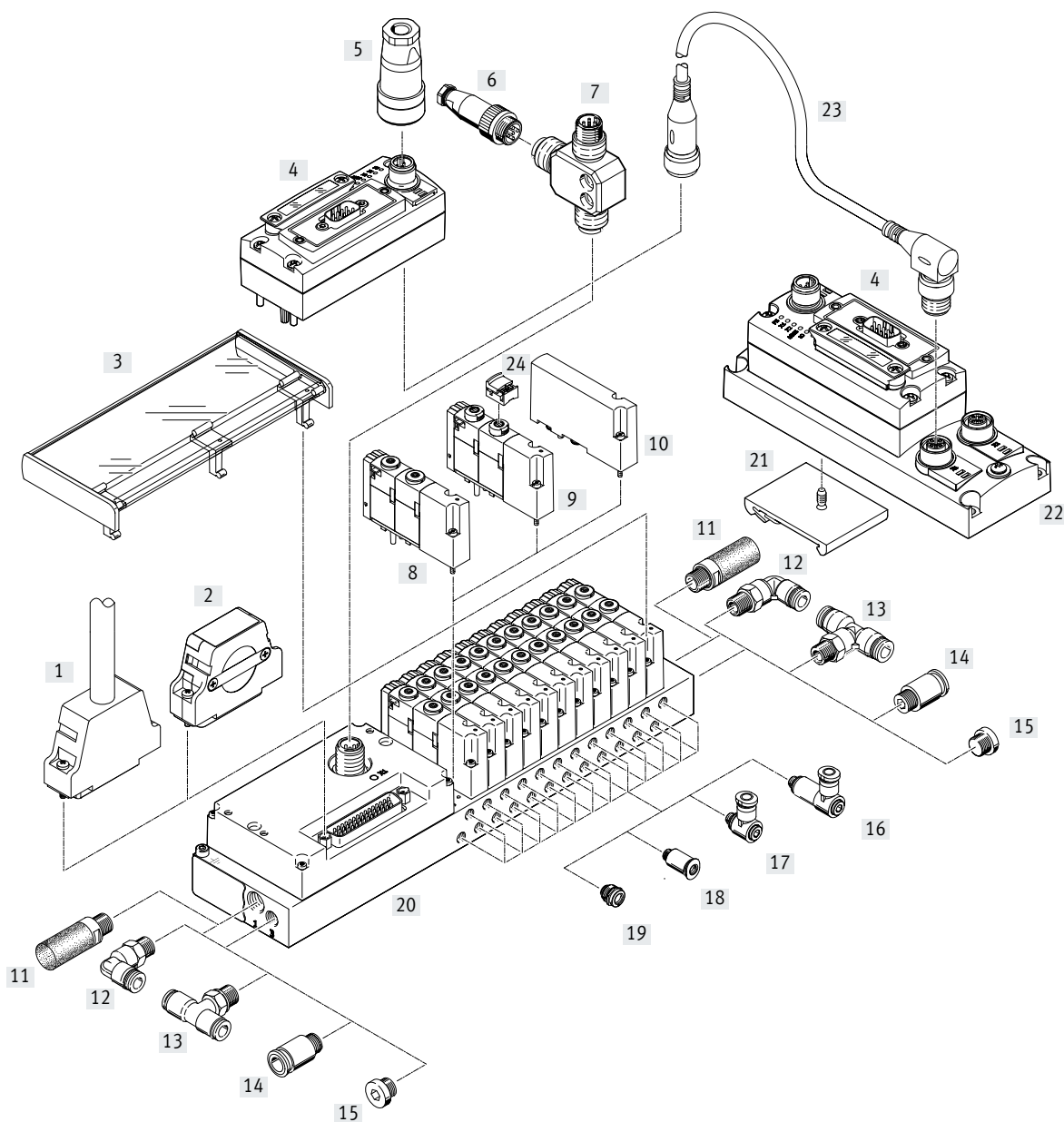
- Up to 24 valve positions/
48 solenoid coils
- Connection type: I-Port interface
with interlock
code: PT
- Code: LK

The electrical supply/transmission of communication takes place via an M12 plug.
The valve terminal can be equipped with 2 ... 24 valves.

Only valve bodies containing two single solenoid 3/2-way valves are available.

The following protocols are supported in connection with the associated CTEU bus node:

- DeviceNet
- CANopen
- Profibus DP
- EtherCAT
- CC-Link



Peripherals overview

Accessories		Type	Brief description	→ Page/ Internet
[1]	Connecting cable	KMP6/ NEBV	For multi-pin plug connection, with Sub-D plug, 44-pin	41
[2]	Plug socket	NEFF	For bypassing the interlock function	44
[3]	Inscription label holder	ASCF	For labelling the valves/covering the manual override	42
[4]	Fieldbus	CTEU	Bus node	43
[5]	Plug socket	FBSD/ NTSD	For bus node CTEU	44
[6]	Plug	SEA	Straight, for T-adapter FB-TA	44
[7]	T adapter	FB-TA	For IO-Link and load supply	44
[8]	Solenoid valve, single solenoid	VOVC	With manual override, non-detenting	41
[9]	Solenoid valve, single solenoid	VOVC	With manual override, detenting, non-detenting	41
[10]	Cover plate	VABB	For vacant position	41
[11]	Silencer	U	For mounting in exhaust ports	42
[12]	Elbow connector	QSL	For connecting to the air supply or exhaust	42
[13]	T-fitting	QST	For connecting to the air supply or exhaust	42
[14]	Straight fitting	OS	For connecting to the air supply or exhaust	42
[15]	Blanking plug	B	For sealing the air supply or exhaust port	41
[16]	Push-in L-fitting, long	QSMLLV	Long elbow connector for working ports	42
[17]	Push-in L-fitting	QSMLV	Elbow connector for working ports	42
[18]	Push-in fitting	QS	Straight, for working ports	42
[19]	Push-in fitting	QSIMG	Straight countersunk push-in fitting for working ports (compact)	–
[20]	Manifold rail	VABB	With I-Port interface/IO-Link, interlock	–
[21]	H-rail mounting	CAFM	For electrical connection block CAPC	44
[22]	Electrical connection block	CAPC	For connecting a second device with I-Port interface	44
[23]	Connecting cable	NEBU	–	44
[24]	Cover	VAMC	For manual override, detenting (without accessories)	41

Peripherals overview

Pin allocation variants

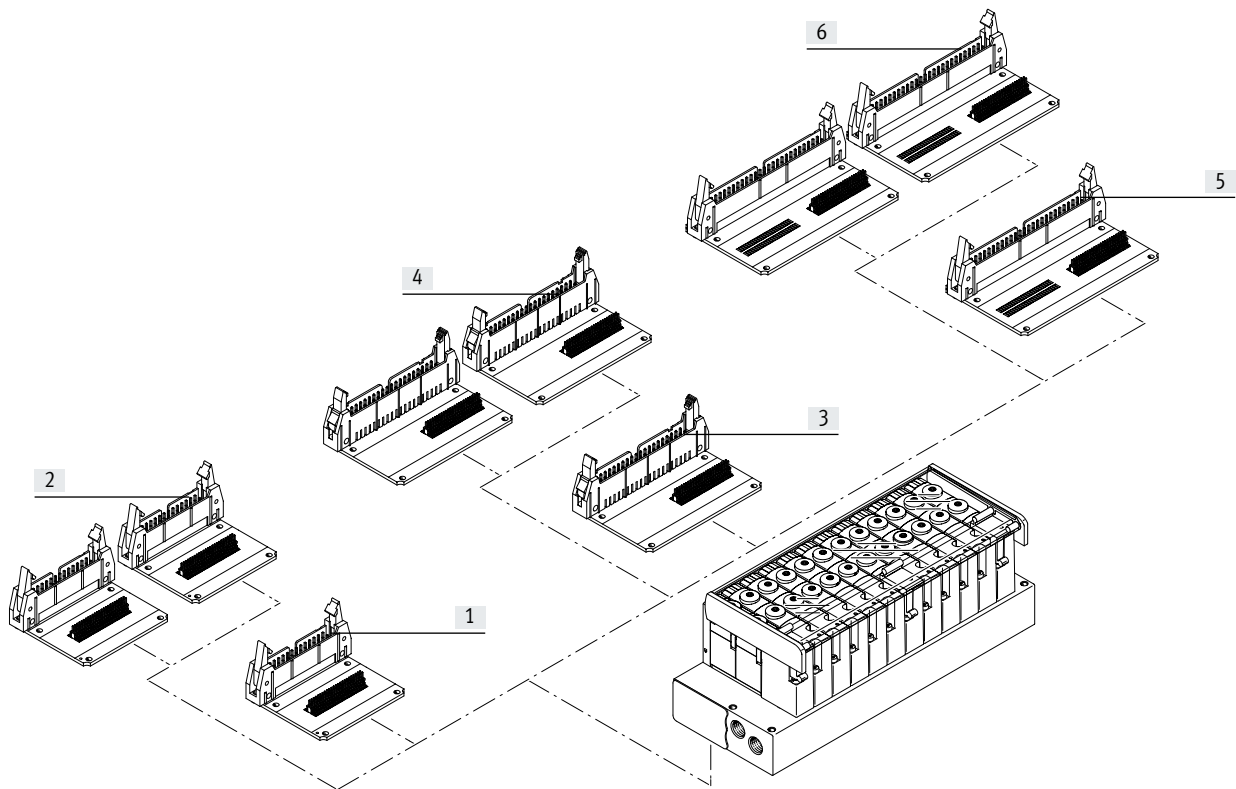
Ribbon cable	Number of valve positions	Top left (LT)				Bottom left (LB)		Top right (RT)			
		26-pin 1-way	26-pin 2-way	50-pin 1-way	50-pin 2-way	26-pin 1-way	26-pin 2-way	40-pin 1-way	40-pin 2-way	50-pin 1-way	50-pin 2-way
	4–12	V14	–	–	–	V8	–	–	–	–	–
	8–12	–	–	V11 ¹⁾	–	–	–	–	–	V10 ¹⁾	–
	6–10	–	–	–	–	–	–	V9 ¹⁾²⁾	–	–	–
	13–24	–	V15	–	–	–	V17	–	–	–	–
	16–24	–	–	–	V16 ¹⁾	–	–	–	–	–	–
	16–20	–	–	–	–	–	–	–	V18 ¹⁾²⁾	–	–
	18–24	–	–	–	–	–	–	–	–	–	V19 ¹⁾

- 1) Separate earth
2) Not bi-directional

Overview of electrical connections

Valve terminal with ribbon cable connection on top

- Connection type: ribbon cable, code: RC
 - Connection direction:
 - Top left (code LT)
 - Top right (code RT)
- A total of 10 pin allocation variants are available. Detailed pin allocation → p. 21



Accessories

	Code	Brief description	Number of valve positions	Variants
[1] Ribbon cable, 26-pin	LT	1-way, top left	4–12	V14
[2] Ribbon cable, 26-pin		2-way, top left	13–24	V15
[3] Ribbon cable, 40-pin	RT	1-way, top right	6–10	V9
[4] Ribbon cable, 40-pin		2-way, top right	16–20	V18
[5] Ribbon cable, 50-pin	RT	1-way, top right	8–12	V10
[6] Ribbon cable, 50-pin		2-way, top right	18–24	V19
[5] Ribbon cable, 50-pin	LT	1-way, top left	8–12	V11
[6] Ribbon cable, 50-pin		2-way, top left	16–24	V16

Peripherals overview

Overview of electrical connections

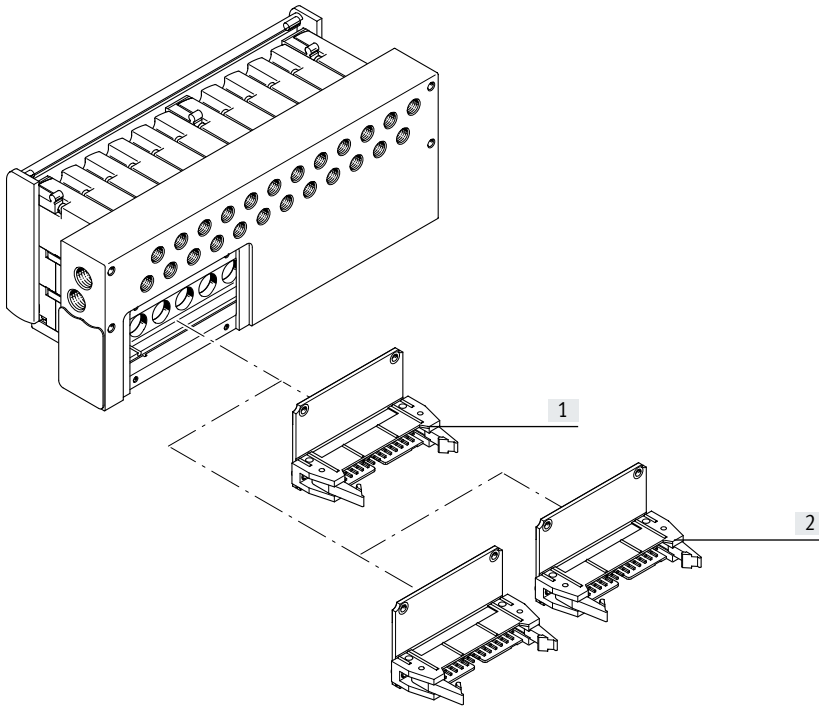
Valve terminal with ribbon cable connection underneath

- Connection type: ribbon cable, code: RC

- Connection direction: – Bottom left (code LB)

A total of 10 pin allocation variants are available.

Detailed pin allocation → p. 21



Accessories

	Code	Brief description	Number of valve positions	Variants
[1] Ribbon cable, 26-pin	LB	1-way, bottom left	4–12	V8
[2] Ribbon cable, 26-pin		2-way, bottom left	13–24	V17

Peripherals overview

Pin allocation variants

Sub-D	Number of valve positions	Top left (LT)			25-pin, 2-way	25-pin, 2-way	44-pin, 1-way	44-pin, 2-way		Top right (RT) 44-pin, 1-way
		25-pin, 1-way								
	2-12	V2	V3 ²⁾	V1	-	-	-	-	-	-
	4-12	-	-	-	-	V12 ¹⁾	-	-	-	-
	13-21	-	-	-	-	-	V5	-	-	V13
	13-22	-	-	-	-	-	-	V7 ¹⁾	V6 ¹⁾²⁾	-
	13-24	-	-	-	V4	-	-	-	-	-

- 1) Separate earth
- 2) Not bi-directional

Overview of electrical connections

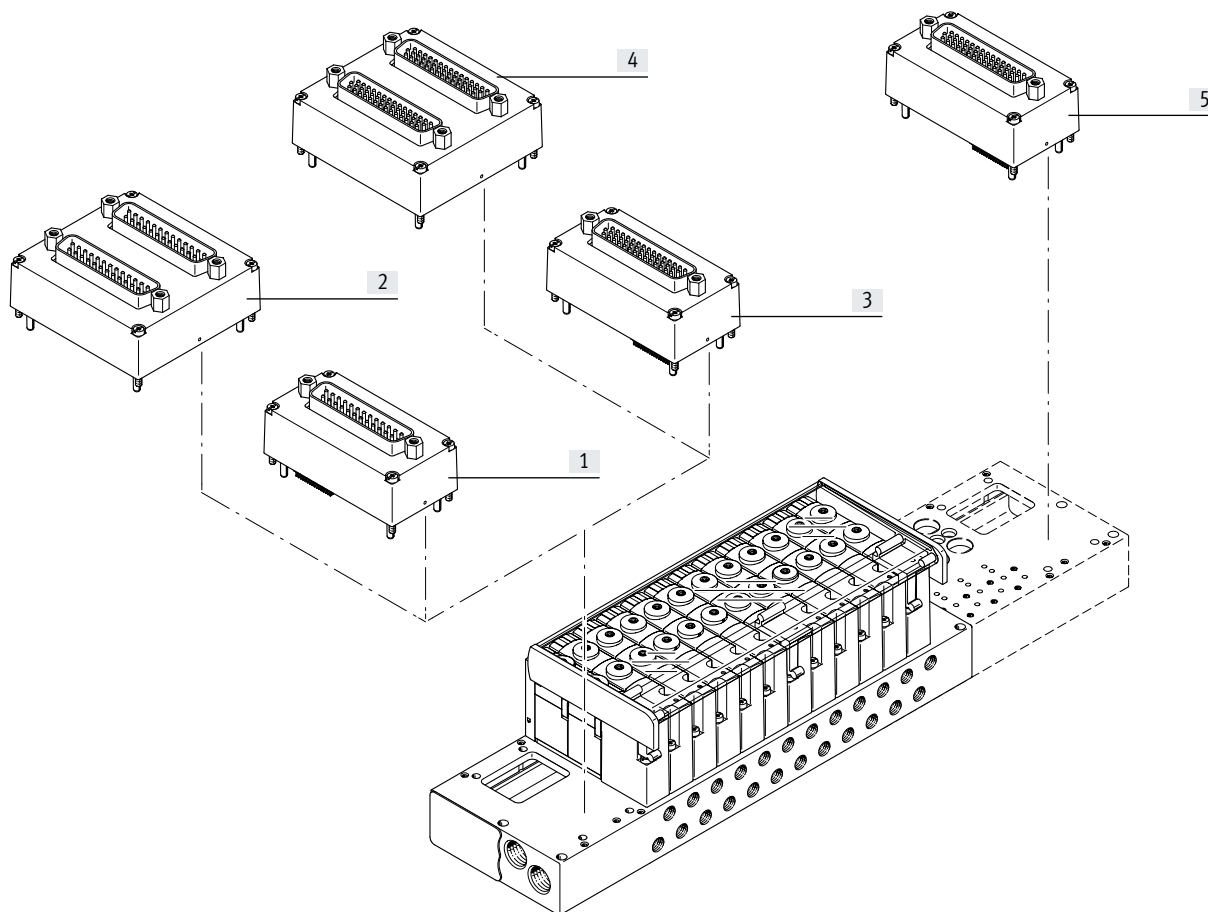
Valve terminal with Sub-D connection on top

- Connection type: Sub-D
code: SD

Connection direction:
 • Top left (code LT)
 • Top right (code RT)

A total of 9 pin allocation variants are available.

Detailed pin allocation
 → p. 18



Accessories

	Code	Brief description	Number of valve positions	Variants
[1] Sub-D 25-pin	LT	1-way, top left	2...12	V1, V2, V3
[2] Sub-D 25-pin		2-way, top left	13...24	V4
			4...12	V12
[3] Sub-D 44-pin	LT	1-way, top left	13...21	V5
[4] Sub-D 44-pin		2-way, top left	13...22	V6, V7
[5] Sub-D 44-pin	RT	1-way, top right	13...20	V13

Characteristics – Pneumatic components

Design

The valves are mounted on the metal manifold rail using two screws. The use of 2x3/2-way valves per valve position guarantees optimum use of space with maximum performance.

The valves only differ in the type of manual override. The assembled and tested units or individual components as modules enable a custom configuration.

Cover plates can be replaced by valves at a later date.

The existing dimensions, mounting points and the pneumatic and electrical installation do not change.

Valve function		Width	Description
Code	Circuit symbol		
K		10 mm	2x3/2-way valve, single solenoid <ul style="list-style-type: none"> • Reset via mechanical spring • Not reversible

Characteristics – Pneumatic components

Fittings

Ports 1/3

Wide range of connection sizes:

- Threaded connection M7, G1/8, 1/8 NPT
- Push-in connector QS6, QS8, QS3/8 or QS1/4 (compressed air supply)
- Push-in connector QS6, QS1/4 or silencer (exhaust air)

Choice of connection types for port 1, compressed air supply and port 3, exhaust air:

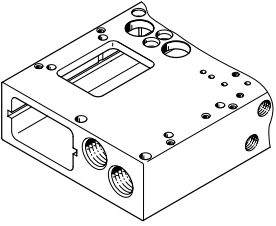
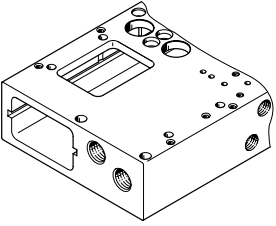
- Straight
- Elbow connector
- T-fitting

Flexible connection positions for the compressed air supply and exhaust:

- At both ends
- Left
- Right

Ports 1/3

Connection direction: front

	Code	Description
	-G18	Manifold block G1/8 (diagram shows example of Sub-D electrical connection on left) Basis for design: <ul style="list-style-type: none"> • Push-in connector QS8 • Push-in connector QS3/8"
	-M7	Manifold block M7 (diagram shows example of Sub-D electrical connection on left) Basis for design: <ul style="list-style-type: none"> • Push-in connector QS6 • Push-in connector QS1/4" • Exhaust port via push-in fitting or silencer

Characteristics – Pneumatic components

Fittings

Ports 2/4

Wide range of connection sizes:

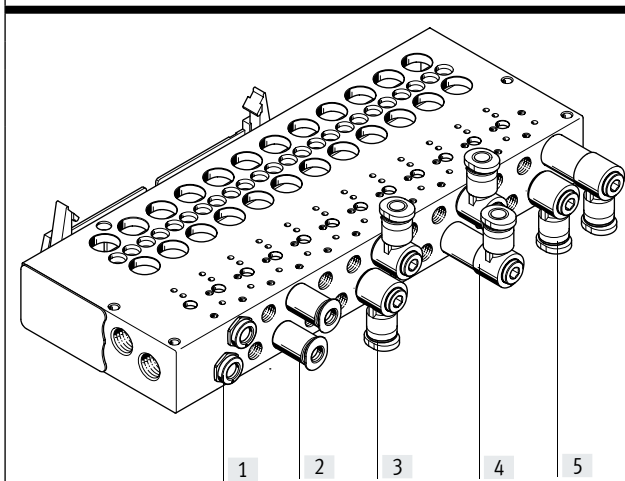
- Threaded connection M5
- 10-32 UNF
- Push-in connector QS3, QS4 or 1/8"

Outlet direction:

- At front
- At bottom

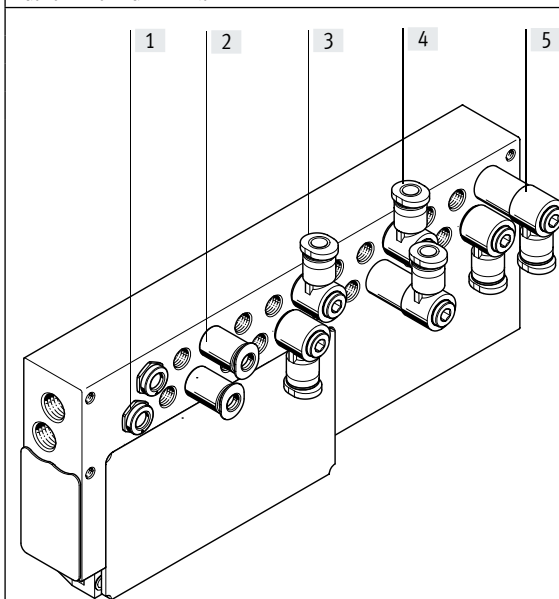
Connection on the valve (port 2/4)

Outlet direction at front



	Code	Description
[1]	X	Straight countersunk outlet (compact)
[2]	-	Straight outlet
[3]	FB	Angled outlet, upwards/downwards
[4]	FA	Angled outlet, upwards
[5]	FC	Angled outlet, downwards

Outlet direction underneath

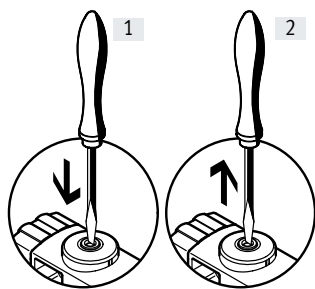


[1]	X	Straight countersunk outlet (compact)
[2]	U	Straight outlet
[3]	UB	Angled outlet, to the front/rear
[4]	UA	Angled outlet, to the front
[5]	UC	Angled outlet, to the rear

Characteristics – Display and operation

Manual override (MO)

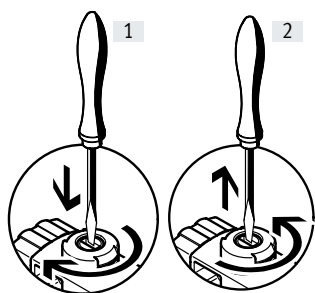
Manual override with automatic return (non-detenting)



[1] Press in the stem of the manual override with a pointed object or screwdriver.
The valve switches.

[2] Remove the pointed object or screwdriver.
Spring force pushes the manual override back.
The valve returns to its normal position.

Manual override with lock (non-detenting/detenting)



[1] Press in the stem of the manual override with a screwdriver until the valve switches and then turn the stem clockwise by 90° until the stop is reached.
The valve remains switched.

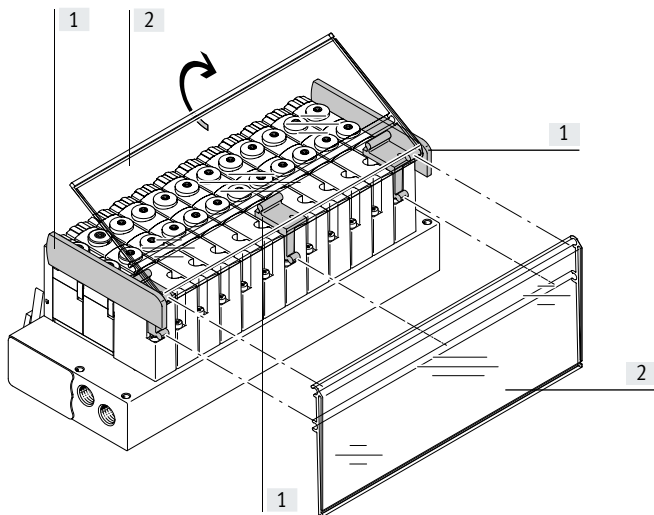
[2] Turn the stem anticlockwise by 90° until the stop is reached and then remove the screwdriver.
Spring force pushes the manual override back.
Valve returns to normal position.



Note

VTOC provides two valves with the same valve function but different types of manual override. There is no provision for subsequent modification of the type of manual override (e.g. by attaching a cover).

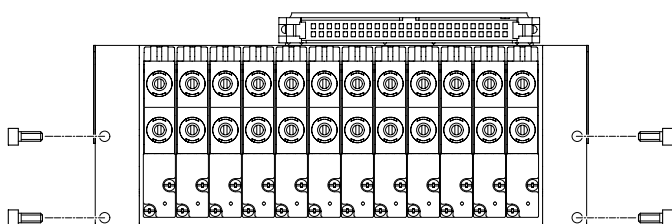
Inscription system



[1] Retaining bracket for inscription label holder
The retaining bracket for the inscription label holder is mounted on the valves using a screw.
It enables the inscription label holder to be mounted in two different directions. The retainers at the side are flanged, to prevent the inscription label sliding out.

[2] Inscription label holder
A transparent inscription label holder ASCF-H-L2 (code F/T in the order code) can be mounted for labelling the valves.
Inscription labels can be inserted in the holder for labelling purposes. Templates for printing the inscription label are available on request.

Mounting – Valve terminal



Sturdy terminal mounting via:

- Four through-holes for wall mounting (hole 3.3 mm Ø)
- Four holes with thread on the reverse side:
 - Thread M3
 - Thread M4

- Thread 8-32 UNC
- Thread 10-32 UNC-2B

Characteristics – Electrical components

Electrical connection

Multi-pin plug

The following multi-pin plug connections are available for the valve terminal VTOC:

- Sub-D multi-pin plug connection (25-pin, 1-way or 2-way)
- Sub-D multi-pin plug connection (44-pin, 1-way or 2-way)
- Ribbon cable connector (26-pin, 1-way or 2-way)
- Ribbon cable connector (40-pin, 1-way or 2-way)
- Ribbon cable connector (50-pin, 1-way or 2-way)

The multi-pin plug connection is available with 19 different pin allocation variants.

Other variants on request.

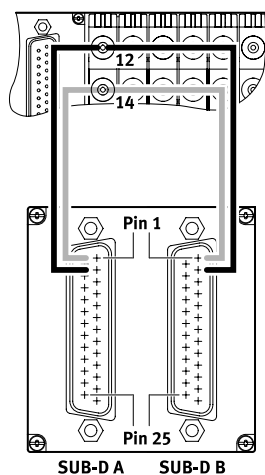
Connection directions:

Sub-D connection (top left/right)
 Ribbon cable (top/bottom left, top/bottom right)

Signals from the controller to the valve terminal are transmitted via the multi-core pre-assembled cable, which substantially reduces installation time.

The valves are switched by means of positive or negative logic (positive switching or negative switching). Mixed operation is not permitted. Each pin on the multi-pin plug can actuate exactly one solenoid coil. If the maximum configurable number of valve positions is 24, this means that 48 solenoid coils can be addressed.

Explanation of pin allocation (V12)



The example shows the pin allocation code V12. The solenoid coils are wired in ascending order of the valves so that solenoid coil 14 occupies the low-value pin and solenoid coil 12 the next pin of both Sub-D connections:

- Pin 1 of Sub-D A and Sub-D B at valve position 1, coil 14.
- Pin 2 of Sub-D A and Sub-D B at valve position 1, coil 12.

The following tables show the different pin allocation variants.

The circuitry may differ from the example depending on the multi-pin plug connection chosen.

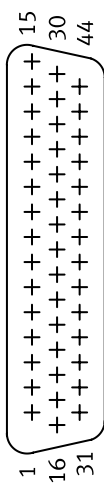
Characteristics – Electrical components

Pin allocation – Sub-D plug, 25-pin		-V1		-V2		-V3		-V4				-V12			
		Pin						Sub-D A ¹⁾		Sub-D B ²⁾		Sub-D A ¹⁾		Sub-D B ²⁾	
	1	VP1	12	VP1	14	VP1	14-	VP1	14	VP13	14	VP1	14	VP1	14
	2	VP1	14	VP2	14	VP2	14-	VP1	12	VP13	12	VP1	12	VP1	12
	3	VP2	12	VP3	14	VP3	14-	VP2	14	VP14	14	VP2	14	VP2	14
	4	VP2	14	VP4	14	VP4	14-	VP2	12	VP14	12	VP2	12	VP2	12
	5	VP3	12	VP5	14	VP5	14-	VP3	14	VP15	14	VP3	14	VP3	14
	6	VP3	14	VP6	14	VP6	14-	VP3	12	VP15	12	VP3	12	VP3	12
	7	VP4	12	VP7	14	VP7	14-	VP4	14	VP16	14	VP4	14	VP4	14
	8	VP4	14	VP8	14	VP8	14-	VP4	12	VP16	12	VP4	12	VP4	12
	9	VP5	12	VP9	14	VP9	14-	VP5	14	VP17	14	VP5	14	VP5	14
	10	VP5	14	VP10	14	VP10	14-	VP5	12	VP17	12	VP5	12	VP5	12
	11	VP6	12	VP11	14	VP11	14-	VP6	14	VP18	14	VP6	14	VP6	14
	12	VP6	14	VP12	14	VP12	14-	VP6	12	VP18	12	VP6	12	VP6	12
	13	VP7	12	Com		Com+		VP7	14	VP19	14	VP7	14	VP7	14
	14	VP7	14	VP1	12	VP1	12-	VP7	12	VP19	12	VP7	12	VP7	12
	15	VP8	12	VP2	12	VP2	12-	VP8	14	VP20	14	VP8	14	VP8	14
	16	VP8	14	VP3	12	VP3	12-	VP8	12	VP20	12	VP8	12	VP8	12
	17	VP9	12	VP4	12	VP4	12-	VP9	14	VP21	14	VP9	14	VP9	14
	18	VP9	14	VP5	12	VP5	12-	VP9	12	VP21	12	VP9	12	VP9	12
	19	VP10	12	VP6	12	VP6	12-	VP10	14	VP22	14	VP10	14	VP10	14
	20	VP10	14	VP7	12	VP7	12-	VP10	12	VP22	12	VP10	12	VP10	12
	21	VP11	12	VP8	12	VP8	12-	VP11	14	VP23	14	VP11	14	VP11	14
	22	VP11	14	VP9	12	VP9	12-	VP11	12	VP23	12	VP11	12	VP11	12
	23	VP12	12	VP10	12	VP10	12-	VP12	14	VP24	14	VP12	14	VP12	14
	24	VP12	14	VP11	12	VP11	12-	VP12	12	VP24	12	VP12	12	VP12	12
	25	Com		VP12	12	VP12	12-	Com 1-12		Com 13-24		-	-	-	-

VP Valve position
¹⁾ Sub-D A, first Sub-D plug
²⁾ Sub-D B, second Sub-D plug

Characteristics – Electrical components

Pin allocation – Sub-D plug, 44-pin												
Pin	-V5	-V6				-V7				-V13		
		Sub-D A ¹⁾		Sub-D B ²⁾		Sub-D A ¹⁾		Sub-D B ²⁾				
1	VP1	14	VP1	14+	VP1	14-	VP1	14	VP1	14	VP1	12
2	VP1	12	VP1	12+	VP1	12-	VP1	12	VP1	12	VP1	14
3	VP2	14	VP2	14+	VP2	14-	VP2	14	VP2	14	VP2	12
4	VP2	12	VP2	12+	VP2	12-	VP2	12	VP2	12	VP2	14
5	VP3	14	VP3	14+	VP3	14-	VP3	14	VP3	14	VP3	12
6	VP3	12	VP3	12+	VP3	12-	VP3	12	VP3	12	VP3	14
7	VP4	14	VP4	14+	VP4	14-	VP4	14	VP4	14	VP4	12
8	VP4	12	VP4	12+	VP4	12-	VP4	12	VP4	12	VP4	14
9	VP5	14	VP5	14+	VP5	14-	VP5	14	VP5	14	VP5	12
10	VP5	12	VP5	12+	VP5	12-	VP5	12	VP5	12	VP5	14
11	VP6	14	VP6	14+	VP6	14-	VP6	14	VP6	14	VP6	12
12	VP6	12	VP6	12+	VP6	12-	VP6	12	VP6	12	VP6	14
13	VP7	14	VP7	14+	VP7	14-	VP7	14	VP7	14	VP7	12
14	VP7	12	VP7	12+	VP7	12-	VP7	12	VP7	12	VP7	14
15	VP8	14	VP8	14+	VP8	14-	VP8	14	VP8	14	VP8	12
16	VP8	12	VP8	12+	VP8	12-	VP8	12	VP8	12	VP8	14
17	VP9	14	VP9	14+	VP9	14-	VP9	14	VP9	14	VP9	12
18	VP9	12	VP9	12+	VP9	12-	VP9	12	VP9	12	VP9	14
19	VP10	14	VP10	14+	VP10	14-	VP10	14	VP10	14	VP10	12
20	VP10	12	VP10	12+	VP10	12-	VP10	12	VP10	12	VP10	14
21	VP11	14	VP11	14+	VP11	14-	VP11	14	VP11	14	VP11	12
22	VP11	12	VP11	12+	VP11	12-	VP11	12	VP11	12	VP11	14
23	VP12	14	VP12	14+	VP12	14-	VP12	14	VP12	14	VP12	12
24	VP12	12	VP12	12+	VP12	12-	VP12	12	VP12	12	VP12	14
25	VP13	14	VP13	14+	VP13	14-	VP13	14	VP13	14	VP13	12
26	VP13	12	VP13	12+	VP13	12-	VP13	12	VP13	12	VP13	14
27	VP14	14	VP14	14+	VP14	14-	VP14	14	VP14	14	VP14	12
28	VP14	12	VP14	12+	VP14	12-	VP14	12	VP14	12	VP14	14
29	VP15	14	VP15	14+	VP15	14-	VP15	14	VP15	14	VP15	12
30	VP15	12	VP15	12+	VP15	12-	VP15	12	VP15	12	VP15	14
31	VP16	14	VP16	14+	VP16	14-	VP16	14	VP16	14	VP16	12
32	VP16	12	VP16	12+	VP16	12-	VP16	12	VP16	12	VP16	14
33	VP17	14	VP17	14+	VP17	14-	VP17	14	VP17	14	VP17	12
34	VP17	12	VP17	12+	VP17	12-	VP17	12	VP17	12	VP17	14
35	VP18	14	VP18	14+	VP18	14-	VP18	14	VP18	14	VP18	12
36	VP18	12	VP18	12+	VP18	12-	VP18	12	VP18	12	VP18	14
37	VP19	14	VP19	14+	VP19	14-	VP19	14	VP19	14	VP19	12
38	VP19	12	VP19	12+	VP19	12-	VP19	12	VP19	12	VP19	14
39	VP20	14	VP20	14+	VP20	14-	VP20	14	VP20	14	VP20	12
40	VP20	12	VP20	12+	VP20	12-	VP20	12	VP20	12	VP20	14
41	VP21	14	VP21	14+	VP21	14-	VP21	14	VP21	14	Com	
42	VP21	12	VP21	12+	VP21	12-	VP21	12	VP21	12	Com	
43	Com		VP22	14+	VP22	14-	VP22	14	VP22	14	Com	
44	Com		VP22	12+	VP22	12-	VP22	12	VP22	12	Com	



Note
The drawing shows a plan view of the Sub-D plug on the valve terminal.

VP Valve position
¹⁾ Sub-D A, first Sub-D plug
²⁾ Sub-D B, second Sub-D plug

Characteristics – Electrical components

Electrical connection

The solenoid coils are wired in ascending order of the valves so that solenoid coil 14 occupies the low-value pin and solenoid coil 12 the next pin:

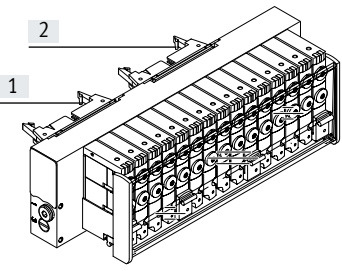
- Pin 1 of ribbon cable 1 valve position 1, coil 14.
- Pin 2 of ribbon cable 1 valve position 1, coil 12.


The valve positions are evenly divided between the two ribbon cable connectors.

If there is an odd number of valve positions, plug 2 controls one more valve position than plug 1.

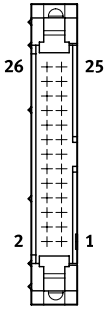
The following table shows the pin allocation variants.


Pin allocation – Ribbon cable, 26-pin

	Valve positions		-V15		-V17	
	Total	No.	Pin		Pin	
			[1] Plug 1	[2] Plug 2	[1] Plug 1	[2] Plug 2
	13	1 ... 6	1 ... 12	–	12 ... 1	–
		7 ... 13	–	1 ... 14	–	14 ... 1
		Com	25 ... 26	25 ... 26	25 ... 26	25 ... 26
	14	1 ... 7	1 ... 14	–	14 ... 1	–
		8 ... 14	–	1 ... 14	–	14 ... 1
		Com	25 ... 26	25 ... 26	25 ... 26	25 ... 26
	15	1 ... 8	1 ... 14	–	14 ... 1	–
		8 ... 15	–	1 ... 16	–	16 ... 1
		Com	25 ... 26	25 ... 26	25 ... 26	25 ... 26
	16	1 ... 8	1 ... 16	–	16 ... 1	–
9 ... 16		–	1 ... 16	–	16 ... 1	
Com		25 ... 26	25 ... 26	25 ... 26	25 ... 26	
17	1 ... 8	1 ... 16	–	16 ... 1	–	
	9 ... 17	–	1 ... 18	–	18 ... 1	
	Com	25 ... 26	25 ... 26	25 ... 26	25 ... 26	
18	1 ... 9	1 ... 18	–	18 ... 1	–	
	10 ... 18	–	1 ... 18	–	18 ... 1	
	Com	25 ... 26	25 ... 26	25 ... 26	25 ... 26	
19	1 ... 9	1 ... 18	–	18 ... 1	–	
	10 ... 19	–	1 ... 20	–	20 ... 1	
	Com	25 ... 26	25 ... 26	25 ... 26	25 ... 26	
20	1 ... 10	1 ... 20	–	20 ... 1	–	
	11 ... 20	–	1 ... 20	–	20 ... 1	
	Com	25 ... 26	25 ... 26	25 ... 26	25 ... 26	
21	1 ... 10	1 ... 20	–	20 ... 1	–	
	11 ... 21	–	1 ... 22	–	22 ... 1	
	Com	25 ... 26	25 ... 26	25 ... 26	25 ... 26	
22	1 ... 11	1 ... 22	–	22 ... 1	–	
	12 ... 22	–	1 ... 22	–	22 ... 1	
	Com	25 ... 26	25 ... 26	25 ... 26	25 ... 26	
23	1 ... 11	1 ... 22	–	22 ... 1	–	
	12 ... 23	–	1 ... 24	–	24 ... 1	
	Com	25 ... 26	25 ... 26	25 ... 26	25 ... 26	
24	1 ... 12	1 ... 24	–	24 ... 1	–	
	13 ... 24	–	1 ... 24	–	24 ... 1	
	Com	25 ... 26	25 ... 26	25 ... 26	25 ... 26	

 **Note**
The drawing shows a plan view of the ribbon cable connector on the valve terminal.

Characteristics – Electrical components

Pin allocation – Ribbon cable, 26-pin		Pin	-V8		-V14	
	1	VP12	14	VP1	14	
	2	VP12	12	VP1	12	
	3	VP11	14	VP2	14	
	4	VP11	12	VP2	12	
	5	VP10	14	VP3	14	
	6	VP10	12	VP3	12	
	7	VP9	14	VP4	14	
	8	VP9	12	VP4	12	
	9	VP8	14	VP5	14	
	10	VP8	12	VP5	12	
	11	VP7	14	VP6	14	
	12	VP7	12	VP6	12	
	13	VP6	14	VP7	14	
	14	VP6	12	VP7	12	
	15	VP5	14	VP8	14	
	16	VP5	12	VP8	12	
	17	VP4	14	VP9	14	
	18	VP4	12	VP9	12	
	19	VP3	14	VP10	14	
	20	VP3	14	VP10	14	
	21	VP2	14	VP11	14	
	22	VP2	12	VP11	12	
	23	VP1	14	VP12	14	
	24	VP1	12	VP12	12	
25	Com		Com			
26	Com		Com			

 **Note**

The drawing shows a plan view of the ribbon cable connector on the valve terminal.

VP Valve position

Characteristics – Electrical components

Electrical connection

The solenoid coils are wired in ascending order of the valves so that solenoid coil 14 occupies the two higher-value pins and solenoid coil 12 the next two pins:

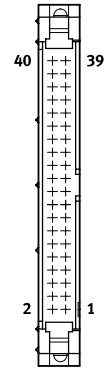
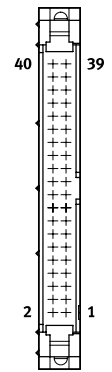
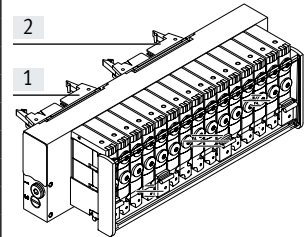
- Pin 40 and 39 of ribbon cable 1 valve position 1, coil 14.
- Pin 38 and 37 of ribbon cable 1 valve position 1, coil 12.

The valve positions are evenly divided between the two ribbon cable connectors.
If there is an odd number of valve positions, plug 2 controls one more valve position than plug 1.

The following table shows the pin allocation variants.

Pin allocation – Ribbon cable, 40-pin

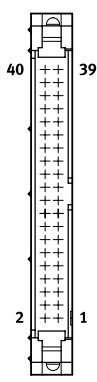
Number of valve positions	Pin	-V18									
		[1] Plug 1					[2] Plug 2				
		16	17	18	19	20	16	17	18	19	20
2	1	VP8	VP8	VP9	VP9	VP10	VP16	VP17	VP18	VP19	VP20
	2	VP8	VP8	VP9	VP9	VP10	VP16	VP17	VP18	VP19	VP20
	3	VP8	VP8	VP9	VP9	VP10	VP16	VP17	VP18	VP19	VP20
	4	VP8	VP8	VP9	VP9	VP10	VP16	VP17	VP18	VP19	VP20
	5	VP7	VP7	VP8	VP8	VP9	VP15	VP16	VP17	VP18	VP19
	6	VP7	VP7	VP8	VP8	VP9	VP15	VP16	VP17	VP18	VP19
	7	VP7	VP7	VP8	VP8	VP9	VP15	VP16	VP17	VP18	VP19
	8	VP7	VP7	VP8	VP8	VP9	VP15	VP16	VP17	VP18	VP19
	9	VP6	VP6	VP7	VP7	VP8	VP14	VP15	VP16	VP17	VP18
	10	VP6	VP6	VP7	VP7	VP8	VP14	VP15	VP16	VP17	VP18
	11	VP6	VP6	VP7	VP7	VP8	VP14	VP15	VP16	VP17	VP18
	12	VP6	VP6	VP7	VP7	VP8	VP14	VP15	VP16	VP17	VP18
	13	VP5	VP5	VP6	VP6	VP7	VP13	VP14	VP15	VP16	VP17
	14	VP5	VP5	VP6	VP6	VP7	VP13	VP14	VP15	VP16	VP17
	15	VP5	VP5	VP6	VP6	VP7	VP13	VP14	VP15	VP16	VP17
	16	VP5	VP5	VP6	VP6	VP7	VP13	VP14	VP15	VP16	VP17
	17	VP4	VP4	VP5	VP5	VP6	VP12	VP13	VP14	VP15	VP16
	18	VP4	VP4	VP5	VP5	VP6	VP12	VP13	VP14	VP15	VP16
	19	VP4	VP4	VP5	VP5	VP6	VP12	VP13	VP14	VP15	VP16
	20	VP4	VP4	VP5	VP5	VP6	VP12	VP13	VP14	VP15	VP16
	21	VP3	VP3	VP4	VP4	VP5	VP11	VP12	VP13	VP14	VP15
	22	VP3	VP3	VP4	VP4	VP5	VP11	VP12	VP13	VP14	VP15
	23	VP3	VP3	VP4	VP4	VP5	VP11	VP12	VP13	VP14	VP15
	24	VP3	VP3	VP4	VP4	VP5	VP11	VP12	VP13	VP14	VP15
	25	VP2	VP2	VP3	VP3	VP4	VP10	VP11	VP12	VP13	VP14
	26	VP2	VP2	VP3	VP3	VP4	VP10	VP11	VP12	VP13	VP14
	27	VP2	VP2	VP3	VP3	VP4	VP10	VP11	VP12	VP13	VP14
	28	VP2	VP2	VP3	VP3	VP4	VP10	VP11	VP12	VP13	VP14
	29	VP1	VP1	VP2	VP2	VP3	VP9	VP10	VP11	VP12	VP13
	30	VP1	VP1	VP2	VP2	VP3	VP9	VP10	VP11	VP12	VP13
	31	VP1	VP1	VP2	VP2	VP3	VP9	VP10	VP11	VP12	VP13
	32	VP1	VP1	VP2	VP2	VP3	VP9	VP10	VP11	VP12	VP13
	33	-	-	VP1	VP1	VP2	-	VP9	VP10	VP11	VP12
	34	-	-	VP1	VP1	VP2	-	VP9	VP10	VP11	VP12
	35	-	-	VP1	VP1	VP2	-	VP9	VP10	VP11	VP12
	36	-	-	VP1	VP1	VP2	-	VP9	VP10	VP11	VP12
	37	-	-	-	-	VP1	-	-	-	VP10	VP11
	38	-	-	-	-	VP1	-	-	-	VP10	VP11
	39	-	-	-	-	VP1	-	-	-	VP10	VP11
	40	-	-	-	-	VP1	-	-	-	VP10	VP11




Note
The drawing shows a plan view of the ribbon cable connector on the valve terminal.

VP Valve position

Characteristics – Electrical components

Pin allocation – Ribbon cable, 40-pin		Pin	-V9	
	1	VP10	12+	
	2	VP10	12-	
	3	VP10	14+	
	4	VP10	14-	
	5	VP9	12+	
	6	VP9	12-	
	7	VP9	14+	
	8	VP9	14-	
	9	VP8	12+	
	10	VP8	12-	
	11	VP8	14+	
	12	VP8	14-	
	13	VP7	12+	
	14	VP7	12-	
	15	VP7	14+	
	16	VP7	14-	
	17	VP6	12+	
	18	VP6	12-	
	19	VP6	14+	
	20	VP6	14-	
	21	VP5	12+	
	22	VP5	12-	
	23	VP5	14+	
	24	VP5	14-	
	25	VP4	12+	
	26	VP4	12-	
	27	VP4	14+	
	28	VP4	14-	
	29	VP3	12+	
	30	VP3	12-	
	31	VP3	14+	
	32	VP3	14-	
	33	VP2	12+	
	34	VP2	12-	
	35	VP2	14+	
	36	VP2	14-	
	37	VP1	12+	
	38	VP1	12-	
	39	VP1	14+	
	40	VP1	14-	

 **Note**

The drawing shows a plan view of the ribbon cable connector on the valve terminal.

VP Valve position

Characteristics – Electrical components

Electrical connection

The solenoid coils are wired in ascending order of the valves so that solenoid coil 14 occupies the two higher-value pins and solenoid coil 12 the two low-value pins:

Variant -V16:

- Pin 1 and 2 of ribbon cable 1 valve position 1, coil 12.
- Pin 3 and 4 of ribbon cable 1 valve position 1, coil 14.

Variant -V19:

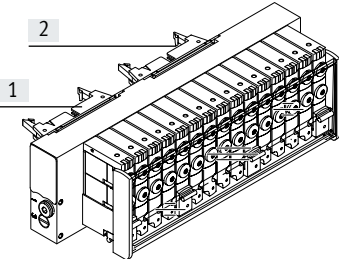
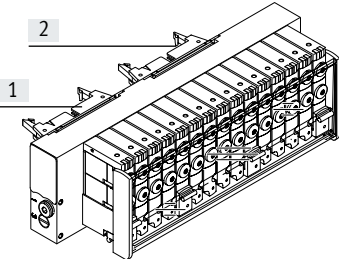
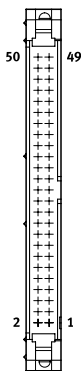
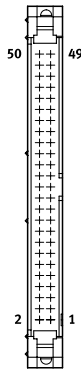
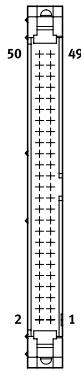
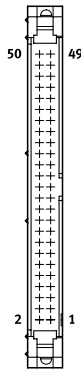
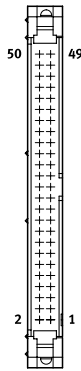
- Pin 48 and 47 of ribbon cable 1 valve position 1, coil 14.
- Pin 46 and 45 of ribbon cable 1 valve position 1, coil 12.


The valve positions are evenly divided between the two ribbon cable connectors.

If there is an odd number of valve positions, plug 2 controls one more valve position than plug 1.

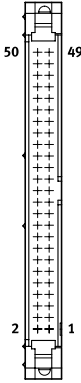
The following table shows the pin allocation variants.


Pin allocation – Ribbon cable, 50-pin

	Valve positions		-V16		-V19	
	Total	No.	Pin		Pin	
			[1] Plug 1	[2] Plug 2	[1] Plug 1	[2] Plug 2
	18	1 ... 9	1 ... 36	–	48 ... 13	–
		10 ... 18	–	1 ... 36	–	48 ... 13
	19	1 ... 9	1 ... 36	–	48 ... 13	–
		10 ... 19	–	1 ... 40	–	48 ... 9
	20	1 ... 10	1 ... 40	–	48 ... 9	–
		11 ... 20	–	1 ... 40	–	48 ... 9
	21	1 ... 10	1 ... 40	–	48 ... 9	–
		11 ... 21	–	1 ... 44	–	48 ... 5
	22	1 ... 11	1 ... 44	–	48 ... 5	–
		12 ... 22	–	1 ... 44	–	48 ... 5
	23	1 ... 11	1 ... 44	–	48 ... 5	–
		12 ... 23	–	1 ... 48	–	48 ... 1
	24	1 ... 12	1 ... 48	–	48 ... 1	–
		13 ... 24	–	1 ... 48	–	48 ... 1

 **Note**
The drawing shows a plan view of the ribbon cable connector on the valve terminal.

Characteristics – Electrical components

Pin allocation – Ribbon cable, 50-pin		Pin	-V11	-V10	
	1	VP1	12	VP12	12
	2	VP1	12	VP12	12
	3	VP1	14	VP12	14
	4	VP1	14	VP12	14
	5	VP2	12	VP11	12
	6	VP2	12	VP11	12
	7	VP2	14	VP11	14
	8	VP2	14	VP11	14
	9	VP3	12	VP10	12
	10	VP3	12	VP10	12
	11	VP3	14	VP10	14
	12	VP3	14	VP10	14
	13	VP4	12	VP9	12
	14	VP4	12	VP9	12
	15	VP4	14	VP9	14
	16	VP4	14	VP9	14
	17	VP5	12	VP8	12
	18	VP5	12	VP8	12
	19	VP5	14	VP8	14
	20	VP5	14	VP8	14
	21	VP6	12	VP7	12
	22	VP6	12	VP7	12
	23	VP6	14	VP7	14
	24	VP6	14	VP7	14
	25	VP7	12	VP6	12
	26	VP7	12	VP6	12
	27	VP7	14	VP6	14
	28	VP7	14	VP6	14
	29	VP8	12	VP5	12
	30	VP8	12	VP5	12
	31	VP8	14	VP5	14
	32	VP8	14	VP5	14
	33	VP9	12	VP4	12
	34	VP9	12	VP4	12
	35	VP9	14	VP4	14
	36	VP9	14	VP4	14
	37	VP10	12	VP3	12
	38	VP10	12	VP3	12
	39	VP10	14	VP3	14
	40	VP10	14	VP3	14
	41	VP11	12	VP2	12
	42	VP11	12	VP2	12
	43	VP11	14	VP2	14
	44	VP11	14	VP2	14
	45	VP12	12	VP1	12
	46	VP12	12	VP1	12
	47	VP12	14	VP1	14
	48	VP12	14	VP1	14
	49				
	50				

 **Note**
The drawing shows a plan view of the ribbon cable connector on the valve terminal.

VP Valve position

Characteristics – Electrical components

I-Port interface with interlock/IO-Link

IO-Link

IO-Link is an interface that supplies data for communication in addition to the power supply.

An IO-Link system consists of an IO-Link master and IO-Link devices. The IO-Link master acts as the interface to the higher-order controller (PLC) and controls communication with the connected IO-Link devices. One device with IO-Link (e.g. an IO-Link valve terminal from Festo) can be connected to each port on an IO-Link master.

I-Port

The Festo-specific I-Port interface based on IO-Link offers the following connection options:

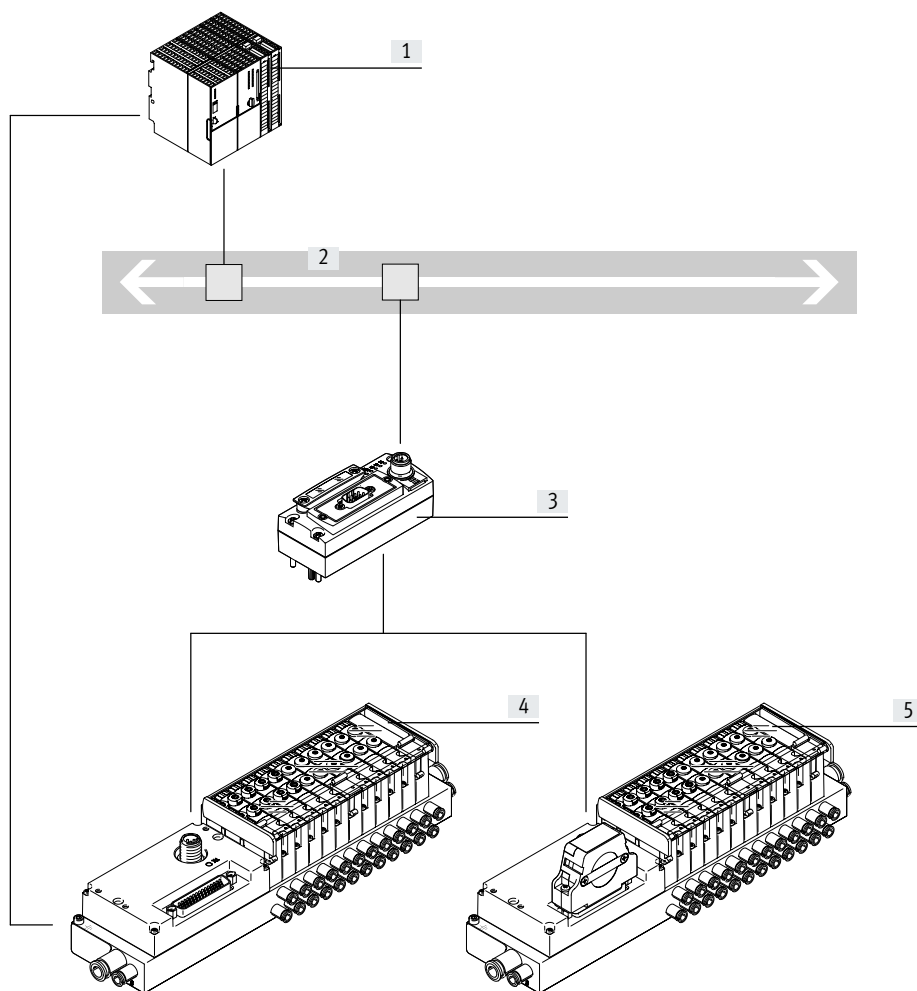
- Directly at the fieldbus, by mounting a bus node CTEU
- Connection to a higher-order I-Port master from Festo

Interlock

The interlock function enables the first 16 solenoid coils to be individually supplied externally. This guarantees the safe release of these valves. The interlock interface is established via external contacts for a single-pin connection or via safety output terminals for a double-pin connection.

For applications that do not require actuation of the solenoid coils via interlock, the Sub-D connection can be bypassed using a special Sub-D socket (NEFF...). The solenoid coils are then supplied with load voltage via the I-Port interface.

Overview



- [1] PLC
- [2] Fieldbus
- [3] Bus node CTEU (I-Port master)
- [4] Valve terminal VTOC, I-Port interface with interlock/IO-Link
- [5] Valve terminal VTOC, I-Port interface/IO-Link with Sub-D socket NEFF

Characteristics – Electrical components

Interlock interface

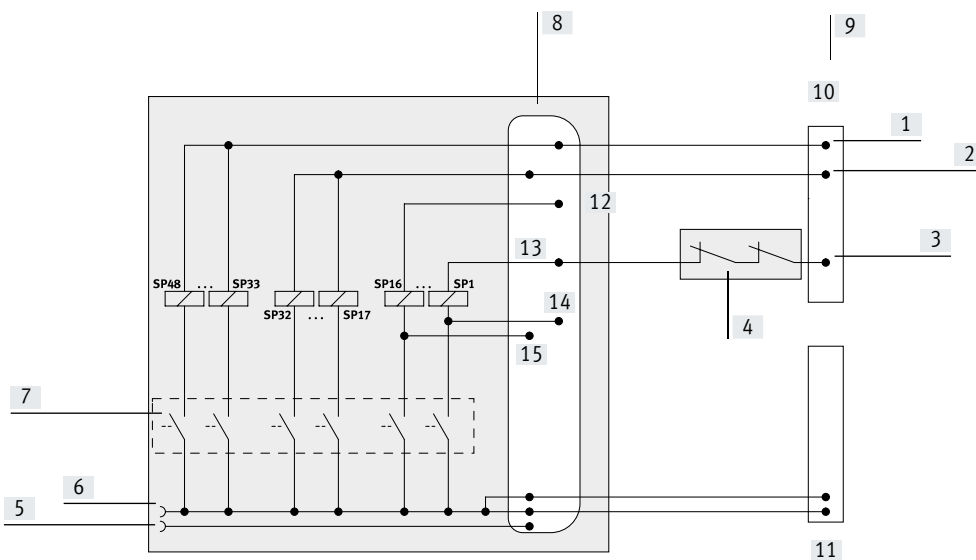
Single-pin interlock interface

- The interlock interface is established via external positive switching contacts or single-pin switching safety terminals
- 16 solenoid coils can be actuated via the interlock (Vn+)
- Solenoid coils that do not require interlock actuation can be supplied directly with 24 V from pins 1 ... 3
- Application of the respective input voltage is reported via the fieldbus as a process image

Double-pin interlock interface

- The interlock interface is established via external positive-negative switching safety terminals
- The solenoid coils of the interlock valves are actuated via the corresponding pins in the sub-D plug (pins 7 ... 38)
- The solenoid coils that do not require interlock actuation can be supplied directly with 24 V (e.g. from pins 1 ... 3)
- Any difference in potential between Vn- and 0 V VAL/OUT must be below 5 V

Sample circuit diagram for a single-pin interlock interface



- [1] Power supply V+; solenoid coil 33 ... 48 (no interlock)
- [2] Power supply V+; solenoid coil 17 ... 32 (no interlock)
- [3] Actuation Vn+ (via interlock)
- [4] Interlock contacts of the output terminal
- [5] I-Port connection pin 2, 24 V VAL/OUT (PL), load voltage supply
- [6] I-Port connection pin 5, 0 V VAL/OUT (PL), load voltage supply
- [7] Driver, actuated via fieldbus/I-Port
- [8] Interlock Sub-D connection
- [9] Power supply (interlock)

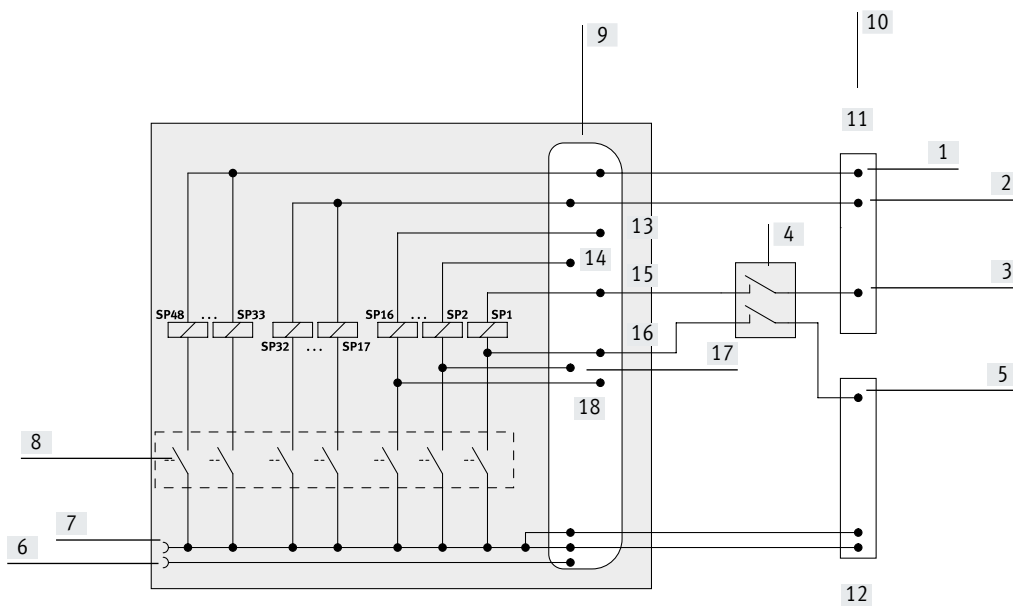
[10] 24 V_{VAL}
[11] 0 V_{VAL}

[12] V₁₆₊
[13] V₁₊

[14] V₁₋
[15] V₁₆₋

Characteristics – Electrical components

Sample circuit diagram for a double-pin interlock interface



- [1] Power supply V₊; solenoid coil 33 ... 48 (no interlock)
- [2] Power supply V₊; solenoid coil 17 ... 32 (no interlock)
- [3] Actuation V_{n+} (via interlock)
- [4] Interlock contacts of the output terminal
- [5] Actuation V_{n-} (via interlock)
- [6] I-Port connection pin 2, 24 V_{VAL/OUT} (PL), load voltage supply
- [7] I-Port connection pin 5, 0 V_{VAL/OUT} (PL), load voltage supply
- [8] Driver, actuated via fieldbus/ I-Port
- [9] Interlock Sub-D connection
- [10] Power supply (interlock)

[11] 24 V_{VAL}
[12] 0 V_{VAL}

[13] V₁₆₊
[14] V₂₊

[15] V₁₊
[16] V₁₋

[17] V₂₋
[18] V₁₆₋




Pin allocation – Interlock

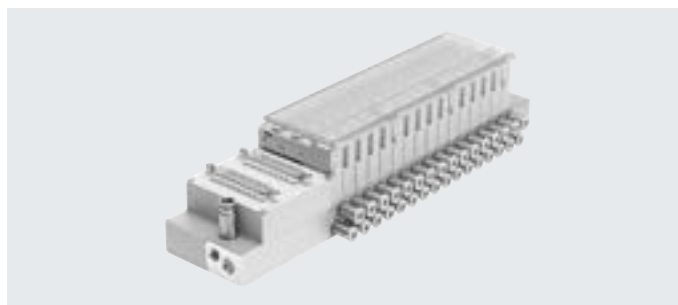
	Pin	Coil	Signal	Pin	Coil	Signal	Pin	Coil	Signal
	1	-	24 V _{VAL/OUT}	16	5	V5-	31	13	V13+
	2	-	24 V _{VAL/OUT}	17	6	V6+	32	13	V13-
	3	-	24 V _{VAL/OUT}	18	6	V6-	33	14	V14+
	4	1 ... 48	0 V _{VAL/OUT}	19	7	V7+	34	14	V14-
	5	1 ... 48	0 V _{VAL/OUT}	20	7	V7-	35	15	V15+
	6	1 ... 48	0 V _{VAL/OUT}	21	8	V8+	36	15	V15-
	7	1	V1+	22	8	V8-	37	16	V16+
	8	1	V1-	23	9	V9+	38	16	V16-
	9	2	V2+	24	9	V9-	39	17 ... 32	V17...32+
	10	2	V2-	25	10	V10+	40	33 ... 48	V33...48+
	11	3	V3+	26	10	V10-	41	1 ... 48	0 V _{VAL/OUT}
	12	3	V3-	27	11	V11+	42	1 ... 48	0 V _{VAL/OUT}
	13	4	V4+	28	11	V11-	43	1 ... 48	0 V _{VAL/OUT}
	14	4	V4-	29	12	V12+	44	-	n.c.
	15	5	V5+	30	12	V12-	Housing		FE

Pin allocation – I-Port interface/IO-Link

	Pin	Allocation	Function
	1	24V _{EL/SEN} (PS)	Operating voltage supply (electronics, sensors/inputs)
	2	24V _{VAL/OUT} (PL)	Load voltage supply (valves/outputs)
	3	0V _{EL/SEN} (PS)	Operating voltage supply (electronics, sensors/inputs)
	4	C/Q	Data communication
	5	0V _{VAL/OUT} (PL)	Load voltage supply (valves/outputs)
	Housing, FE		Functional earth

Data sheet – Valve terminal VTOC with multi-pin plug connection

-  Voltage
24 V DC
-  Pressure
0 ... +8 bar
-  Temperature range
-5 ... +50°C

**General technical data**

Valve function	2x3/2-way valve, closed, single solenoid		
Design	Poppet valve with spring return		
Overlap	Negative overlap		
Sealing principle	Soft		
Actuation type	Electric		
Reset method	Mechanical spring		
Type of control	Direct		
Flow direction	Non-reversible		
Exhaust air function	Cannot be throttled		
Manual override	Non-detenting, detenting and non-detenting, detenting (without accessories)		
Type of mounting	Via through-hole or thread		
Mounting position	Any		
Width	[mm]	10	
Nominal width	[mm]	0.65	
Max. no. of valve positions	24		
Standard nominal flow rate	qnN	[l/min]	10
Product weight	Valve	[g]	30
	Cover plate for vacant position	[g]	20
Corrosion resistance class ¹⁾	1		

1) More information: www.festo.com/x/topic/kbk




Operating and environmental conditions

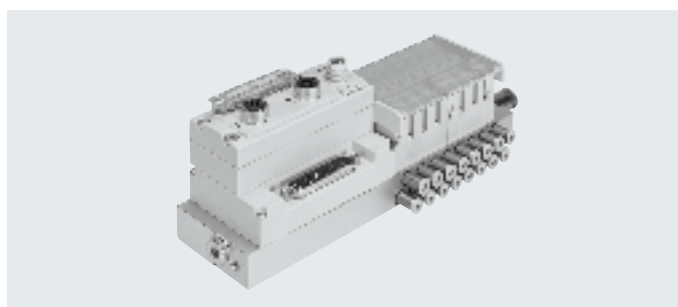
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]		
Note on operating/pilot medium	Lubricated operation possible (in which case lubricated operation will always be required)		
Operating pressure	[MPa]	0 ... +0.8	
	[bar]	0 ... +8	
	[psi]	0 ... +116	
Ambient temperature	[°C]	-5 ... +50	
Temperature of medium	[°C]	-5 ... +50	
Housing material	Reinforced PA		
Sealing material	NBR		
	PU		
Note on materials	RoHS-compliant		
CE marking	To EU EMC Directive		
KC mark	KC EMC		
Certification	c UL us - Recognized (OL)		

Data sheet – Valve terminal VTOC with multi-pin plug connection

Electrical data		
Electrical control		Multi-pin plug (Sub-D/ribbon cable)
Nominal operating voltage	[V DC]	24
Permissible voltage fluctuations	[%]	±10
Pick-up time	[ms]	100
Nominal pick-up current per solenoid coil (current consumption per coil during pick-up phase)	[mA]	55 to 100 ms
Nominal current with current reduction (current consumption per coil during holding phase)	[mA]	13 after 100 ms
Degree of protection to EN 60529		IP40
Signal status display		LED
Valve switching times		
		[ms]
On		5.2
Off		4.7
Safety data		
Well-tried component		Yes
Max. positive test pulse with 0 signal	[μs]	600
Max. negative test pulse with 1 signal	[μs]	800
Shock resistance		Shock test at severity level 2, to FN 942017-5 and EN 60068-2-27
Vibration resistance		Transport application test at severity level 2, to FN 942017-4 and EN 60068-2-6

Data sheet – Valve terminal VTOC with I-Port interface, interlock/IO-Link

-  Voltage
24 V DC
-  Pressure
0 ... +8 bar
-  Temperature range
-5 ... +50°C

**General technical data**

Valve	2x3/2 normally closed, reset via mechanical spring		
Design	Poppet valve with spring return		
Overlap	Negative overlap		
Reset method	Mechanical spring		
Type of control	Direct		
Flow direction	Non-reversible		
Exhaust air function	Cannot be throttled		
Manual override	Non-detenting, detenting and non-detenting, detenting (without accessories)		
Types of communication	I-Port/IO-Link		
Number of valve positions	2 ... 24		
Max. number of solenoid coils	48		
Number of interlock solenoid coils	16		
Number of inputs for voltage feedback	18 (16x interlock + 2 group supply)		
Mounting position	Any		
Nominal flow rate	[l/min]	10	
Residual ripple	[V _{SS}]	4	
Baud rate	COM3	[kbps]	230.4
	COM2	[kbps]	38.4
IO-Link	Protocol	V1.0	
	Connection technology	M12, A-coded	
	Port type	Type B	
	Number of ports	1	
	Process data width OUT	6 bytes	
	Process data width IN	4 bytes	
	Minimum cycle time	11.5 ms (2.3 ms per frame = 2 bytes of user data)	
Product weight	Valve	[g]	30
	Cover plate for vacant position	[g]	20
Corrosion resistance class ¹⁾	1		

1) More information: www.festo.com/x/topic/kbk

Operating and environmental conditions

Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]		
Note on operating/pilot medium	Lubricated operation possible (in which case lubricated operation will always be required)		
Operating pressure	[MPa]	0 ... +0.8	
	[bar]	0 ... +8	
	[psi]	0 ... +116	
Ambient temperature	[°C]	-5 ... +50	
Housing material	Reinforced PA		
Sealing material	NBR		
	PU		
Note on materials	RoHS-compliant		
CE marking	To EU EMC Directive		
KC mark	KC EMC		
Certification	c UL us - Recognized (OL)		

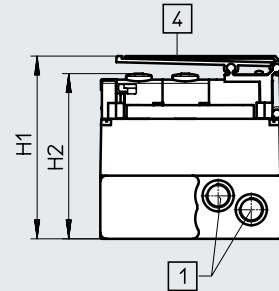
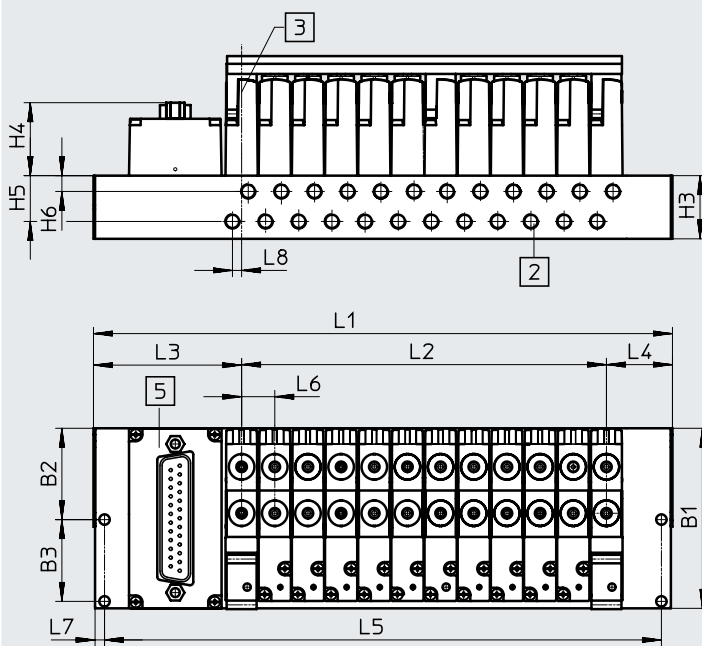
Data sheet – Valve terminal VTOC with I-Port interface, interlock/IO-Link

Electrical data			
Power supply	Load voltage interlock (valves)	[V DC]	24 (±10%)
	Load voltage (valves)	[V DC]	24 (±10%)
	Operating voltage (electronics)	[V DC]	24 (±25%)
Duration of pick-up phase		[ms]	100
Current consumption per coil at 24 V during pick-up phase (valves)		[mA]	55
Current consumption per coil at 24 V during holding phase (valves)		[mA]	13
Intrinsic current consumption via I-Port (valves/electronics)		[mA]	40/30
Degree of protection to EN 60529			IP40
Valve switching times			
		[ms]	
On			5.2
Off			4.7
Safety data			
Well-tried component			Yes
Max. positive test pulse with 0 signal		[μs]	600
Max. negative test pulse with 1 signal		[μs]	800
Shock resistance			Shock test at severity level 2, to FN 942017-5 and EN 60068-2-27
Vibration resistance			Transport application test at severity level 2, to FN 942017-4 and EN 60068-2-6

Data sheet – Valve terminal VTOC

Dimensions – Sub-D, single or double

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- [1] Ports 1 and 3, left and right, M7 or G1/8
- [2] Ports 2 and 4, front or underneath, M5 or 10-32 UNF
- [3] Centre of first valve position
- [4] Inscription label
- [5] Electrical connection via Sub-D, single or double (left or right)

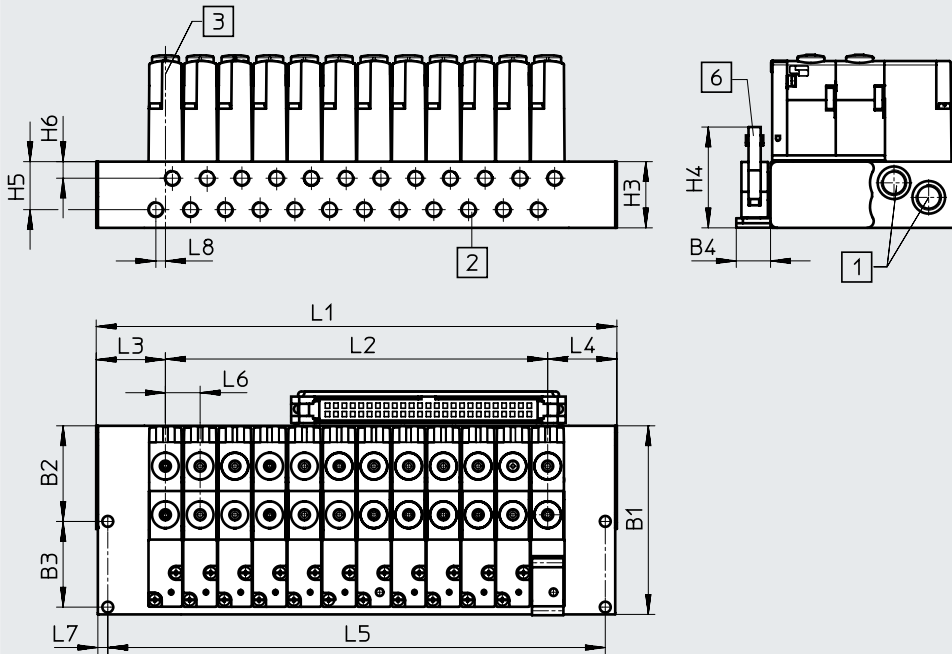
	Comment	Electrical connection on top, single			Electrical connection on top, double		
Pneumatic connection	–	M7	G1/8	G1/8	M7	G1/8	G1/8
Through-hole	–	∅ 3.3	∅ 3.3	M4	∅ 3.3	∅ 3.3	M4
L1	–	L2+L3+L4	L2+L3+L4	L2+L3+L4	L2+L3+L4	L2+L3+L4	L2+L3+L4
L2	–	(n-1)×10.5	(n-1)×10.5	(n-1)×10.5	(n-1)×10.5	(n-1)×10.5	(n-1)×10.5
L3	Distance from centre of first valve position to outer edge on left-hand side	41.4	46.4	36.9	66.4	71.4	66.4
	Sub-D connection, 44-pin, top right, 1-way: Distance from centre of first valve position to outer edge on left-hand side	14.4	20.4	20.4	–	–	–
L4	Distance from centre of last valve position to outer edge on right-hand side	14.4	20.4	20.4	–	–	–
	Sub-D connection, 44-pin, top right, 1-way: Distance from centre of last valve position to outer edge on right-hand side	41.4	46.4	36.9	–	–	–
L5	–	(L1-6)	(L1-6)	(L1-6)	(L1-6)	(L1-6)	(L1-6)

B1	B2	B3	H1	H2	H3	H4	H5	H6	L6	L7	L8
57	± 0.1	± 0.1	57.9	52.3	20	23.1	14.5	5	10.5	± 0.1	2.9

Data sheet – Valve terminal VTOC

Dimensions – Ribbon cable on top

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- [1] Ports 1 and 3, left and right, M7 or G1/8
- [2] Ports 2 and 4, front or underneath, M5 or 10-32 UNF
- [3] Centre of first valve position
- [6] Electrical connection via ribbon cable

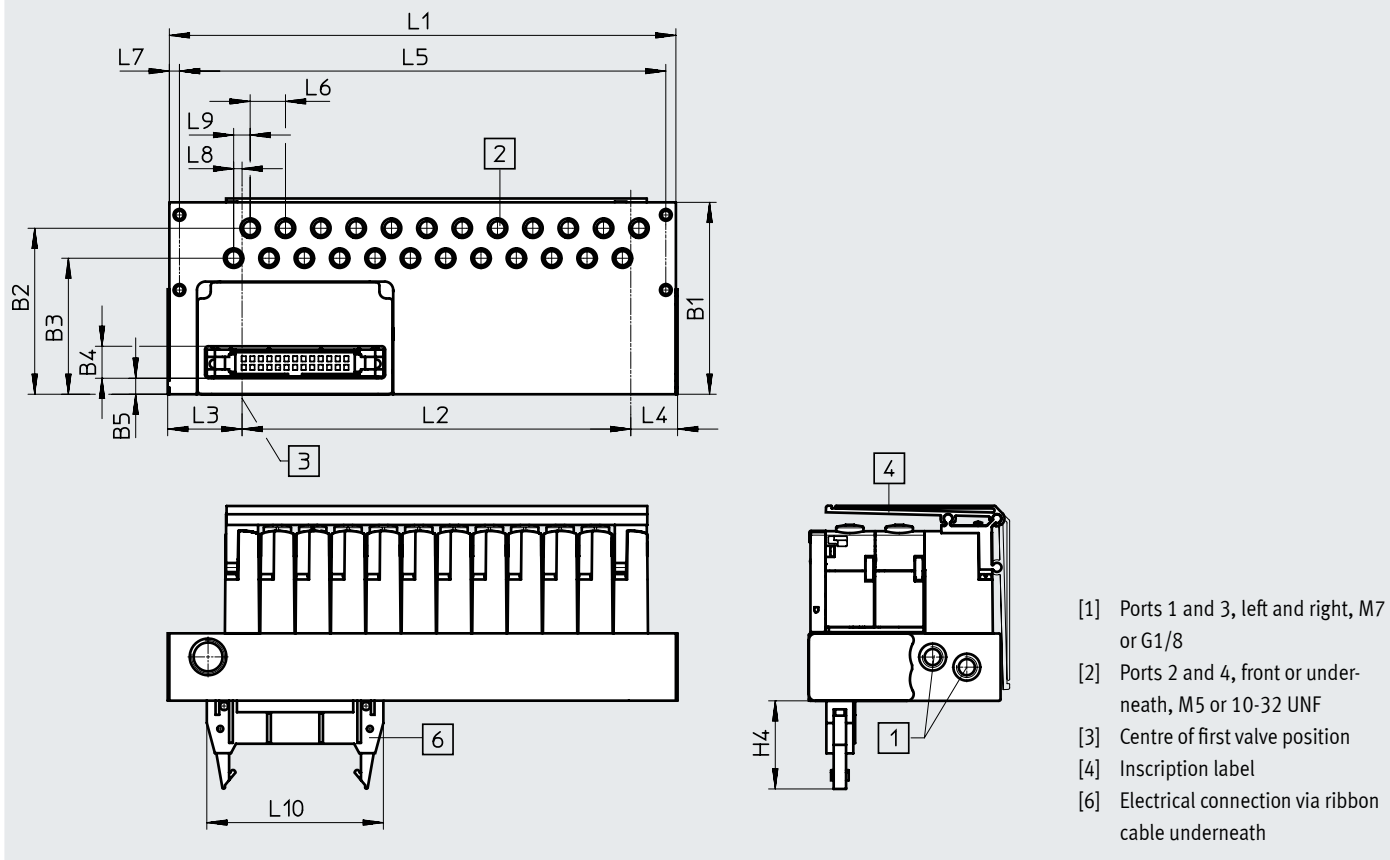
	Comment	Electrical connection via ribbon cable on top		
Pneumatic connection	-	M7	G1/8	G1/8
Through-hole	-	∅ 3.3	∅ 3.3	M4
L1	-	L2+L3+L4	L2+L3+L4	L2+L3+L4
L2	-	(n-1)×10.5	(n-1)×10.5	(n-1)×10.5
L3	Distance from centre of first valve position to outer edge on left-hand side	14.4	46.4	36.9
L4	Distance from centre of last valve position to outer edge on right-hand side	14.4	20.4	20.4
L5	-	(L1-6)	(L1-6)	(L1-6)

B1	B2	B3	B4	H3	H4	H5	H6	L6	L7	L8
	± 0.1	± 0.1							± 0.1	
57	28.9	25.9	10.4	20	30.5	14.5	5	10.5	3	2.9

Data sheet – Valve terminal VTOC

Dimensions – Ribbon cable underneath

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- [1] Ports 1 and 3, left and right, M7 or G1/8
- [2] Ports 2 and 4, front or underneath, M5 or 10-32 UNF
- [3] Centre of first valve position
- [4] Inscription label
- [6] Electrical connection via ribbon cable underneath

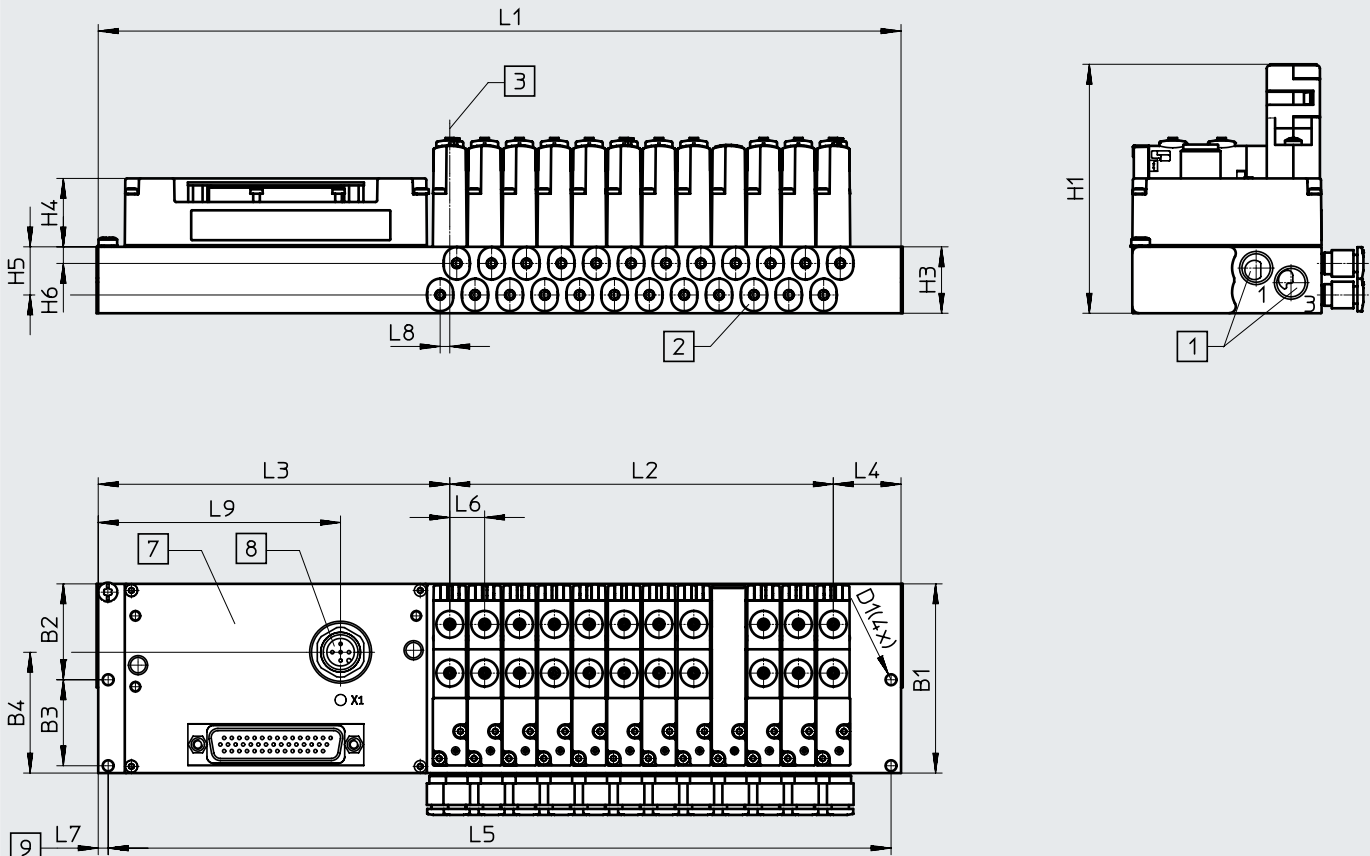
	Comment	Electrical connection via ribbon cable underneath				
Pneumatic connection	-	M7 left	M7 front	G1/8 front	G1/8 left	G1/8 left
Through-hole	-	∅ 3.3	∅ 3.3	∅ 3.3	∅ 3.3	M4
L1	-	L2+L3+L4	L2+L3+L4	L2+L3+L4		
L2	-	(n-1)x10.5	(n-1)x10.5	(n-1)x10.5		
L3	Distance from centre of first valve position to outer edge on left-hand side	14.4	25.55	21.6	20.4	20.4
L4	Distance from centre of last valve position to outer edge on right-hand side	14.4	28.55	20.4	20.4	20.4
L5	-	(L1-6)	(L1-6)	(L1-6)	(L1-6)	(L1-6)

B1	B2	B3	B4	H3	H4	H5	H6	L6	L7	L8	L9	L10
	± 0.1	± 0.1							± 0.1			
57	28.9	25.9	10.4	20	30.5	14.5	5	10.5	3	2.5	4.9	52.5

Data sheet – Valve terminal VTOC

Dimensions – I-Port interface with interlock

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- [1] Ports 1 and 3: M7 or G1/8, position: left and right
- [2] Ports 2 and 4: M5 or M8x0.5, position: front or underneath
- [3] Centre of first valve position
- [7] Electrical connection: I-Port interface
- [8] M12 plug
- [9] See dimensions for mounting holes

	Comment	Electrical connection on top, single		
Pneumatic connection	–	M7	G1/8	G1/8
Through-hole	–	∅ 3.3	∅ 3.3	M4
L1	–	L2+L3+L4	L2+L3+L4	L2+L3+L4
L2	–	(n-1)x10.5	(n-1)x10.5	(n-1)x10.5
L3	Distance from centre of first valve position to outer edge on left-hand side	105.9	105.9	105.9
L4	Distance from centre of first valve position to outer edge on right-hand side	14.4	20.4	20.4
L5	–	(L1-2)xL7	(L1-2)xL7	(L1-2)xL7

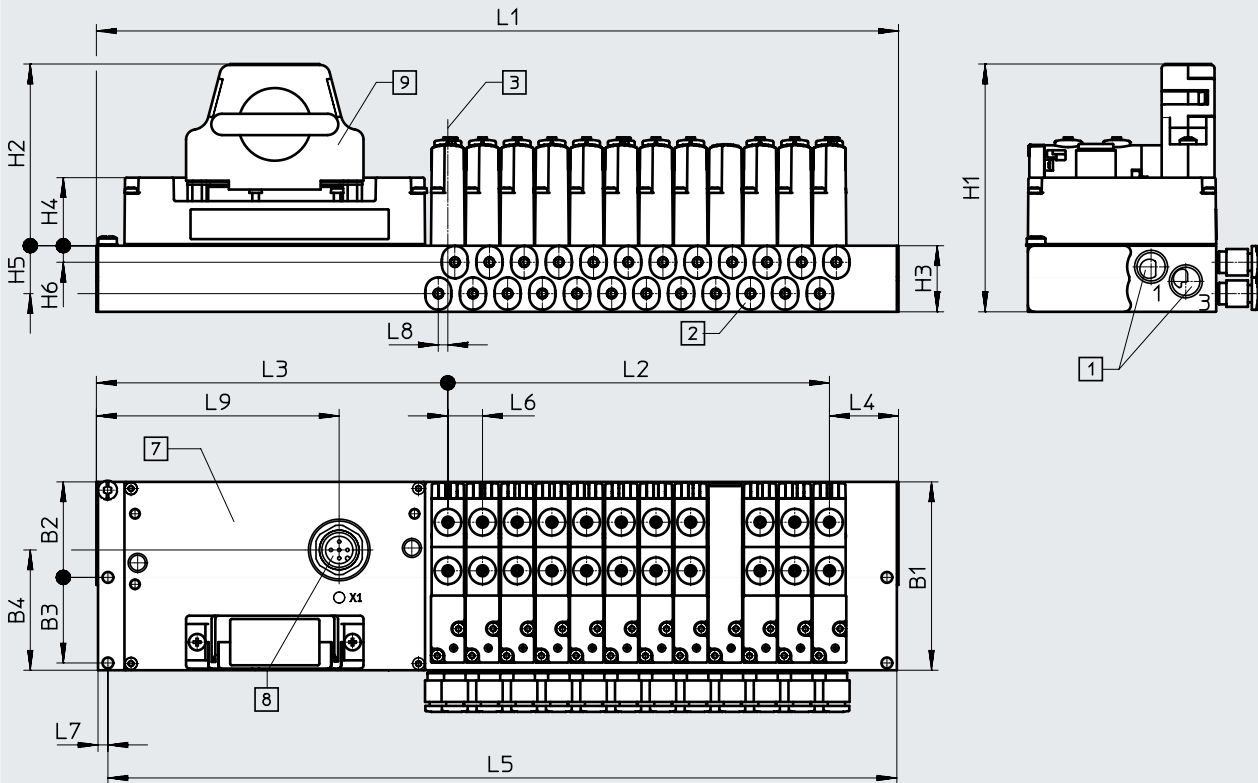
B1	B2	B3	B4	H1	H3	H4	H5	H6	L6	L7	L8	L9
57	± 0.1	± 0.1	36.4	74.7	20	20.6	± 0.1	± 0.1	± 0.05	± 0.1	2.9	73

Note
 Deviating dimensions following assembly of the bus node CTEU.
 Specified dimensions for the bus node CTEU → installation system CTEU/CTEL

Data sheet – Valve terminal VTOC

Dimensions – I-Port interface with Sub-D socket NEFF

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- [1] Ports 1 and 3: M7 or G1/8
- [2] Ports 2 and 4: M5 or M8x0.5
- [3] Centre of first valve position
- [7] Electrical connection: I-Port interface
- [8] M12 plug
- [9] Sub-D socket for bypassing the interlock function

B1	B2	B3	B4	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6	L7	L8	L9	
57	± 0.1	± 0.1	25.9	36.4	74.7	54.7	20	20.6	14.5	5	L2+L3+L4	(n-1)x10.5	105.9	14.4	(L1-6)	10.5	3	2.9	73

Note

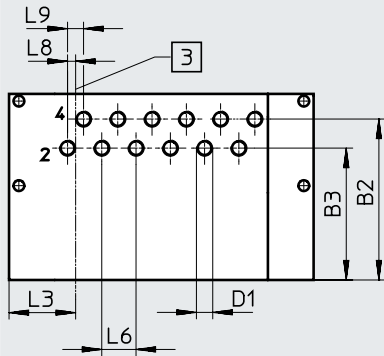
Deviating dimensions following assembly of the bus node CTEU.
 Specified dimensions for the bus node CTEU → installation system CTEU/CTEL

Data sheet – Valve terminal VTOC

Dimensions – Pneumatic connections

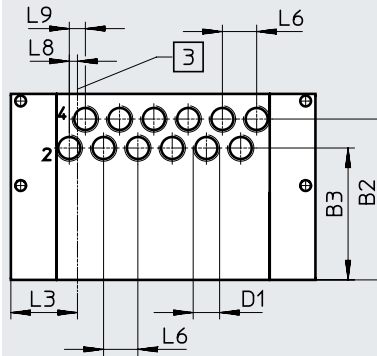
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Ports 2 and 4 underneath, M5 (10-32 UNF)



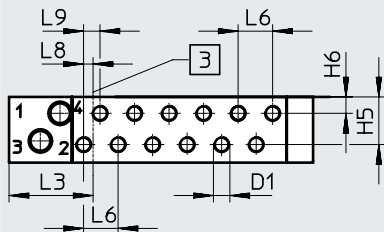
[3] Centre of first valve position

Ports 2 and 4 underneath, compact



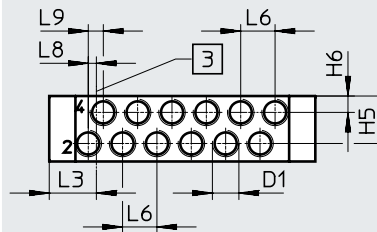
[3] Centre of first valve position

Ports 2 and 4 at front, M5 (10-32 UNF)



[3] Centre of first valve position

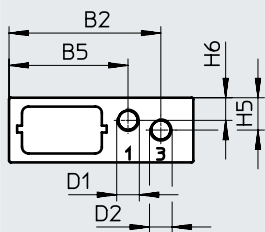
Ports 2 and 4 at front, compact



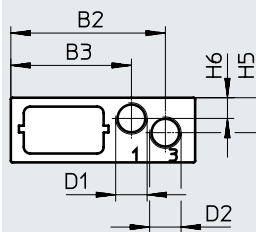
[3] Centre of first valve position

Connection	B2	B3 ± 0.1	D1	H5	H6	L6	L8	L9
Underneath, M5 (10-32 UNF)	49.3	40.4	M5	-	-	10.5	2.5	4.9
Underneath, compact	49.3	40.4	M8x0.5	-	-	10.5	2.5	4.9
Front, M5 (10-32 UNF)	-	-	M5	14.5	5	10.5	2.9	5
Front, compact	-	-	M8x0.5	14.5	5	10.5	2.5	4.6

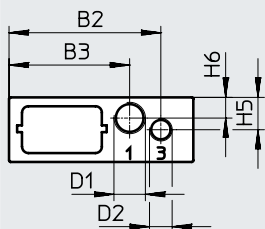
Ports 1 and 3, M7 left



Ports 1 and 3, G1/8 left



Ports 1 and 3, G1/8 left, with mounting hole M4



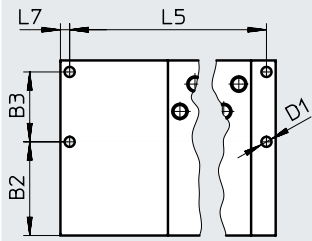
Ports 1 and 3	B2	B3	D1	D2	H5	H6
M7 left	47	36.8	M7	M7	10	7
G1/8 left, with mounting hole M4	47	37.3	G1/8	M7	10	6.4

Data sheet – Valve terminal VTOC

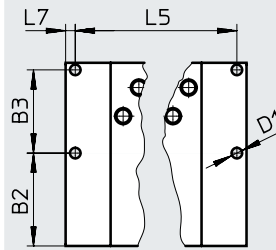
Download CAD data → www.festo.com

Dimensions – Mounting hole

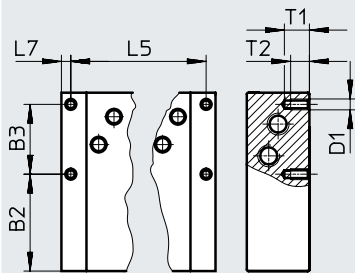
∅ 3.3 underneath, ports 1 and 3, M7



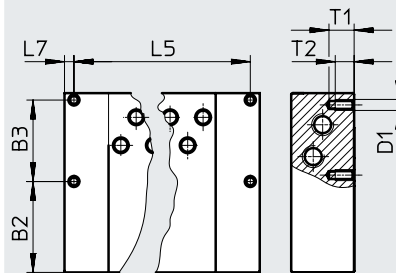
∅ 3.3 underneath, ports 1 and 3, G1/8



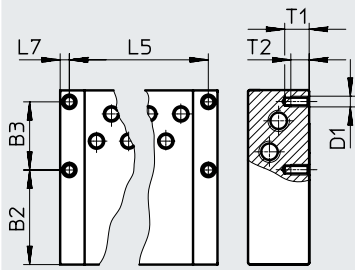
M3 underneath, ports 1 and 3, M7



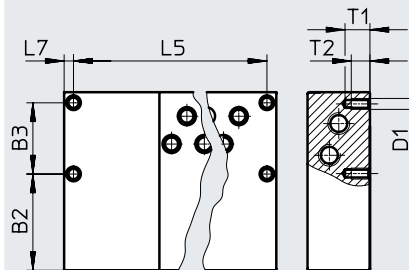
M3 underneath, ports 1 and 3, G1/8



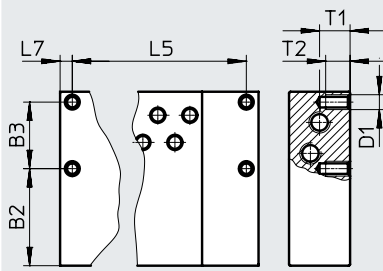
M4 underneath, ports 1 and 3, M7



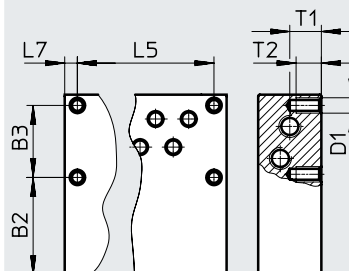
M4 or 8-32UNC underneath, ports 1 and 3, G1/8



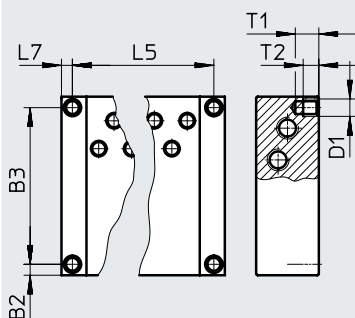
8-32UNC underneath, ports 1 and 3, M7



8-32UNC underneath, ports 1 and 3, G1/8



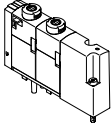
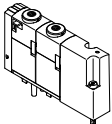
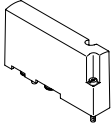


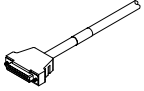
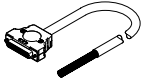
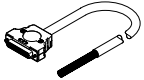
10-32UNF-2B underneath, ports 1 and 3, M7 or G1/8



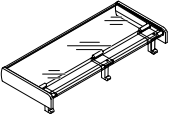
Data sheet – Valve terminal VTOC


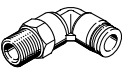

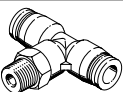
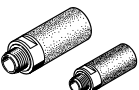
	B2	B3	D1	L5	L7	T1	T2
3.3 underneath, ports 1 and 3, M7	30.5	22.8	3.3	L1-2xL7	3	–	–
3.3 underneath, ports 1 and 3, G1/8	28.9	25.9	3.3		3	–	–
M3 underneath, ports 1 and 3 M7	31	22.3	M3		3	8	6
M3 underneath, ports 1 and 3, G1/8	28.9	25.9	M3		3	8	6
M4 underneath, ports 1 and 3 M7	31	22.3	M4		3	7.5	6
M4 or 8-32UNC underneath, ports 1 and 3, G1/8	30.8	22.8	M4/8-32UNC		3	7.5	6
8-32UNC underneath, ports 1 and 3 M7	31.8	21.8	8-32UNC		4	10	8
8-32UNC underneath, ports 1 and 3, G1/8	30.8	22.8	8-32UNC		4	10	8
10-32UNF-28 underneath, ports 1 and 3, M7 or G1/8	3.5	50	10-32UNF-28		3.5	7.5	5

Accessories

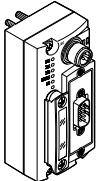
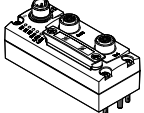
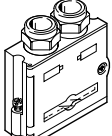
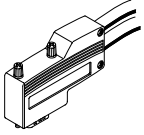

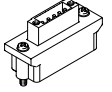
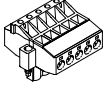

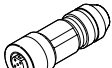
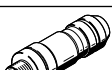
Ordering data		Code	Valve function	Part no.	Type
Solenoid valves					
	K	2x3/2-way valve, single solenoid, normally closed, manual override detenting, non-detenting/detenting		565450	VOVC-BT-T32C-MT-F-1T1
	K	2x 3/2-way valve, single solenoid, normally closed, manual override, non-detenting		565449	VOVC-BT-T32C-MH-F-1T1
Cover plate					
	L	Cover plate for vacant position		565451	VABB-L2-P3
Cover cap for manual override					
	-	Detenting, without accessories		8002234	VAMC-L1-CD
Blanking plug					
	-	For sealing the air supply or exhaust port		3568	B-1/8
	-			174309	B-M7
Connecting cable for multi-pin plug					
	-	<ul style="list-style-type: none"> Sub-D socket, 25-pin, IP40 Open cable end, 15-wire 	2.5	530049	KMP6-25P-12-2.5
			5	530050	KMP6-25P-12-5
			10	530051	KMP6-25P-12-10
	-	<ul style="list-style-type: none"> Sub-D socket, 25-pin, IP40 Open cable end 25-wire 	2.5	530046	KMP6-25P-20-2.5
			5	530047	KMP6-25P-20-5
			10	530048	KMP6-25P-20-10
	-	<ul style="list-style-type: none"> Sub-D socket, straight, 44-pin, up to 35 coils, IP40 Open cable end, 44-wire 	2.5	575113	NEBV-S1G44-K-2.5-N-LE44-S6
			5	575114	NEBV-S1G44-K-5-N-LE44-S6
			10	575115	NEBV-S1G44-K-10-N-LE44-S6

Accessories

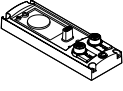
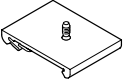
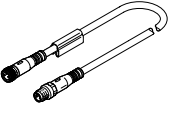
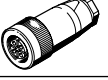



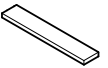
Ordering data		Code	Valve function	Part no.	Type	
Inscription label holder						
	-	Inscription label holder for identifying the valves	3 valve positions	9.9 g	565571	ASCF-H-L2-3V
			4 valve positions	11.5 g	565572	ASCF-H-L2-4V
			5 valve positions	13.1 g	565573	ASCF-H-L2-5V
			6 valve positions	14.7 g	565574	ASCF-H-L2-6V
			7 valve positions	17.2 g	565575	ASCF-H-L2-7V
			8 valve positions	18.8 g	565576	ASCF-H-L2-8V
			9 valve positions	20.4 g	565577	ASCF-H-L2-9V
			10 valve positions	22 g	565578	ASCF-H-L2-10V
			11 valve positions	23.6 g	565579	ASCF-H-L2-11V
			12 valve positions	25.2 g	565580	ASCF-H-L2-12V
			13 valve positions	27.7 g	565581	ASCF-H-L2-13V
			14 valve positions	29.3 g	565582	ASCF-H-L2-14V
			15 valve positions	30.9 g	565583	ASCF-H-L2-15V
			16 valve positions	32.5 g	565584	ASCF-H-L2-16V
			17 valve positions	34.1 g	565585	ASCF-H-L2-17V
			18 valve positions	35.7 g	565586	ASCF-H-L2-18V
			19 valve positions	38.2 g	565587	ASCF-H-L2-19V
			20 valve positions	39.8 g	565588	ASCF-H-L2-20V
			21 valve positions	41.4 g	565589	ASCF-H-L2-21V
			22 valve positions	43 g	565590	ASCF-H-L2-22V
			23 valve positions	44.6 g	565591	ASCF-H-L2-23V
			24 valve positions	46.2 g	565592	ASCF-H-L2-24V

Ordering data		Code	Description	Tubing O.D.	Packaging unit quantity	Part no.	Type
Push-in fittings							Data sheets → Internet: quick star
	-	QS push-in fitting	1/4"	1	183741	QS-1/8-1/4-I-U-M	
			8 mm	10	153015	QS-1/8-8-I	
			6 mm	10	153321	QSM-M7-6-I	
			1/4"	1	183740	QSM-M7-1/4-I-U-M	
			1/8"	10	183749	QSM-M5-1/8-I-U-M	
			5/32"	1	130593	QSM-M5-5/32-I-U-M	
			3 mm	10	153313	QSM-M5-3-I	
			4 mm	10	153315	QSM-M5-4-I	
	-	Push-in L-fitting	1/4"	1	533235	QBL-1/8-1/4-U-M	
			3/8"	1	562578	QBL-1/8-3/8-U-M	
			3 mm	10	130830	QSMLV-M5-3-I	
			4 mm	10	130831	QSMLV-M5-4-I	
	-	Push-in L-fitting, long	3 mm	10	130834	QSMLLV-M5-3-I	
			4 mm	10	130835	QSMLLV-M5-4-I	
	-	T-fitting	1/4"	1	533254	QBT-1/8-1/4-U-M	
			3/8"	1	562579	QBT-1/8-3/8-U-M	
			8 mm	1	153109	QST-1/8-8	
Silencer							Data sheets → Internet: quick star
	U	Silencer	-	1	161418	UC-M7	
				50	534218	UC-M7-50	

Accessories

Ordering data – CTEU			Part no.	Type
Bus node				
	–	CANopen bus node	570038	CTEUCO
	–	DeviceNet bus node	570039	CTEU-DN
	–	CC-Link bus node	1544198	CTEU-CC
	–	Profibus bus node	570040	CTEU-PB
	–	EtherCAT bus node	572556	CTEU-EC
Bus connection				
	–	Sub-D plug, straight, for DeviceNet/CANopen	532219	FBS-SUB-9-BU-2x5POL-B
	–	Sub-D plug, straight, for CC-Link	532220	FBS-SUB-9-GS-2x4POL-B
	–	Sub-D plug, straight, for PROFIBUS	532216	FBS-SUB-9-GS-DP-B
	–	Sub-D plug, angled, for CANopen, 9-pin	533783	FBS-SUB-9-WS-CO-K
	–	Sub-D plug, angled, for PROFIBUS, 9-pin	533780	FBS-SUB-9-WS-PB-K
	–	M12x1, 5-pin, A-coded, for DeviceNet/CANopen	525632	FBA-2-M12-5POL
	–	M12x1, 5-pin, B-coded, for PROFIBUS	533118	FBA-2-M12-5POL-RK
	–	For 5-pin terminal strip for DeviceNet/CANopen	525634	FBA-1-SL-5POL
	–	Terminal strip, 5-pin, for DeviceNet/CANopen	525635	FBSD-KL-2x5POL
	–	Fieldbus socket, M12x1, 5-pin, for DeviceNet/CANopen	18324	FBSD-GD-9-5POL
	–	Plug, M12x1, 5-pin, for DeviceNet/CANopen	–	FBS-M12-5GS-PG9
	–	Straight socket, M12x1, 5-pin, for assembling a connecting cable compatible with FBA-2-M12-5POL-RK for PROFIBUS	1067905	NECU-M-B12G5-C2-PB
	–	Straight plug, M12x1, 5-pin, for assembling a connecting cable compatible with FBA-2-M12-5POL-RK for PROFIBUS	1066354	NECU-M-S-B12G5-C2-PB
	–	Terminating resistor, M12, B-coded for PROFIBUS	1072128	CACR-S-B12G5-220-PB
	–	Plug M12x1, 4-pin, D-coded for EtherCAT	543109	NECU-M-S-D12G4-C2-ET

Accessories

Ordering data – CTEU			Part no.	Type	
Electrical connection block					
	–	For connecting a second device with I-Port interface	570042	CAPC-F1-E-M12	
H-rail mounting					
	–	For electrical connection block CAPC	570043	CAFM-F1-H	
Connecting cable Data sheets → Internet: nebu					
	–	<ul style="list-style-type: none"> • Straight socket, M12x1, 5-pin, • Straight plug, M12x1, 5-pin • Conductor nominal cross section 1 mm² 	5 m	574321	NEBU-M12G5-E-5-Q8N-M12G5
			7.5 m	574322	NEBU-M12G5-E-7.5-Q8N-M12G5
			10 m	574323	NEBU-M12G5-E-10-Q8N-M12G5
	–	<ul style="list-style-type: none"> • Angled socket, M12x1, 5-pin • Angled plug, M12x1, 5-pin 	0.5 m	570733	NEBU-M12W5-K-0.5-M12W5
			2 m	570734	NEBU-M12W5-K-2-M12W5
	–	<ul style="list-style-type: none"> • Straight socket, M12x1, 5-pin, • Angled plug, M12x1, 5-pin 	0.5 m	8003617	NEBU-M12G5-K-0.5-M12W5
2 m	8003618		NEBU-M12G5-K-2-M12W5		
Plug socket					
	–	For power supply, M12x1, 5-pin, B-coded for CANopen/DeviceNet	538999	NTSD-GD-9-M12-5POL-RK	
	–	For power supply, M12x1, 5-pin for CC-Link, PROFIBUS, EtherCAT	18324	FBSD-GD-9-5POL	
Connection technology for IO-Link					
	XM	T-adapter M12, 5-pin for IO-Link and load supply	171175	FB-TA-M12-5POL	
Straight plug, for I-Port interface/IO-Link					
	XN	M12, 5-pin, in combination with T-adapter for separate load voltage	175487	SEA-M12-5GS-PG7	
Plug socket					
	–	For bypassing the interlock function	1589339	NEFF-S1G44LB	
Inscription label					
	–	For bus node	565306	ASLR-C-E4	