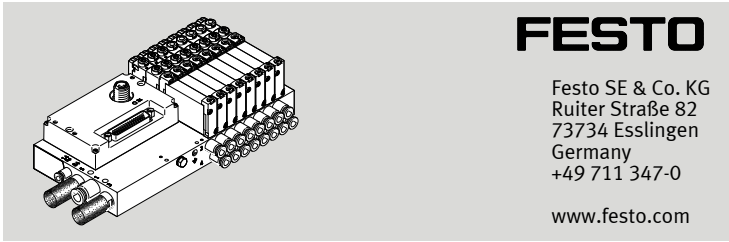


VTUG-PT-L
Valve terminal



Instructions | Assembly, Installation

8119794
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[8119796]



Translation of the original instructions

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1 Applicable Documents

All available documents for the product → www.festo.com/pk.

Documents	Product	Contents
Instructions	H-rail mounting VAME-T-M4	Assembly
Instructions	Inscription label holder ASCF-H-L1	Assembly
Instructions	Identification holders ASLR-D	Assembly
Instructions	Connecting cable NEBV-S1G...-K...-LE...-S6	Assembly
Instructions	Separator VABD-...-B	Assembly

Tab. 1 Applicable Documents

2 Safety

2.1 General Safety Instructions

- Prior to mounting, installation and maintenance work: Switch off power supply and secure it from being switched back on.
- Prior to mounting, installation and maintenance work: Switch off compressed air supply and secure it from being switched back on.
- Exhaust system parts with stored compressed air.
- This product can generate high frequency malfunctions, which may make it necessary to implement interference suppression measures in residential areas.
- For the electrical power supply with extra-low voltages, use only PELV circuits that guarantee a reinforced isolation from the mains network.
- Observe IEC 60204-1/EN 60204-1.
- Comply with the handling specifications for electrostatically sensitive devices.
- Only use the product if it is in perfect technical condition.
- Only use the product in original status without unauthorised modifications.
- Use exclusively in combination with modules and components that are certified for the specific product variant and have been tested and approved by Festo.

2.2 Intended Use

The product is used to control pneumatic actuators and for installation in machines and automated systems.

2.3 Training of Qualified Personnel

Installation, commissioning, maintenance and disassembly should only be conducted by qualified personnel. The specialized personnel must be familiar with the installation and operation of electrical and pneumatic control systems.

3 Additional Information

- Accessories → www.festo.com/catalogue.
- Connecting cable NEBV-S1G44-K...N-LE44-S6
- Spare parts → www.festo.com/spareparts.

4 Service

Contact your regional Festo contact person if you have technical questions → www.festo.com.

5 Product Overview

5.1 Display and Connection Elements of the Electronics

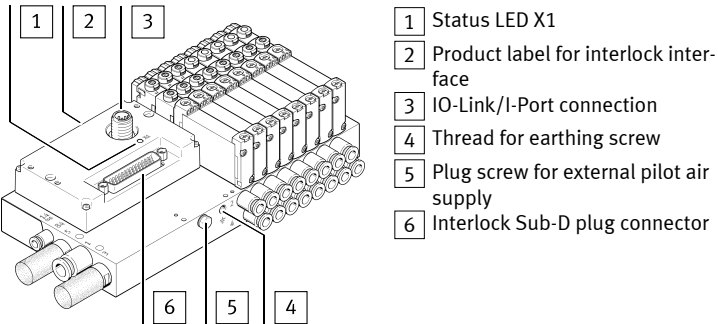


Fig. 1 Display and connecting elements

5.2 LED Display X1, IO-Link/ I-Port Communication

LED X1	Meaning
Lights up green	Normal operating status
Flashes green	Data communication faulty.
Flashing alternately red/green	24 V load voltage supply faulty.
Flashes red	Device error
Lights up red	24 V load voltage supply faulty. Data communication may be faulty.
Off	No operating voltage

Tab. 2 LED X1

5.3 Display and Operating Components of the Valves

Display Components

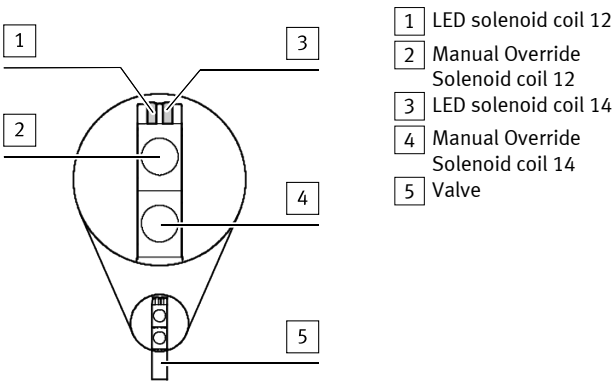


Fig. 2 LED solenoid coils

Manual Override

The manual override can be actuated either non-detenting or detenting by turning.

Observe the permissible actuating force of ≤ 20 N.



After mounting the inscription label holder ASCF-H-L1 or the identification holder ASLR-D, these valves can only be actuated non-detenting. A combination with the cover cap VAMC-L1-CD for detenting operation is not permissible.

6 Assembly

The valve terminal is designed for mounting on an H-rail.

NOTICE!

For vibration and shock loads, mounting on an H-rail is not permissible.

The valves can be labelled with an inscription label holder ASCF-H-L1 or with an identification holder ASLR-D. The IO-Link/I-Port connecting plate can be equipped with the inscription label ASLR-C-E4.

7 Pneumatic Installation

7.1 Pilot Air Supply for Pilot Control

Conversion of the pilot air variants is described in the VABM-L1 ... GR instructions → 1 Applicable Documents.

Internal Pilot Air Supply

The pilot pressure is branched from duct 1. The ports 14 in the manifold rail are sealed with blanking plugs.

External Pilot Air Supply

The pilot pressure is supplied via port 14. A special plug screw is fitted in the manifold rail → Fig.1.

7.2 Pressure Zones

The valve terminal can be divided into pressure zones using separators. Mounting of the separators is described in the VABD-... B instructions.

8 Electrical Installation

8.1 Power Supply

The operating voltage is supplied via the IO-Link master or the CTEU bus node. The load voltage is supplied via the IO-Link master port class B or the CTEU bus node. When using a IO-Link master port class A, the load voltage supply must be supplied separately. Separate fuses are required for operating and load voltage.

8.2 Earth Terminal

Connect the valve terminal to the functional earth via the earth terminal [4], → Fig.1.

8.3 Interlock Interface

The first 16 solenoid coils can be supplied individually through the interlock Sub-D plug connector. This permits the external release of these valves.

The interlock can be switched on as follows:

- Single-pin via external contacts
- Two-pin, via safe output terminals. In this case, check the compatibility of the safe output terminals with the VTUG-PT-L.

All valves of the VTUG-PT-L are supplied with load voltage via the interlock Sub-D plug connector, even if they are actuated via the bus node. The solenoid coils 17 ... 32 and 33 ... 48 cannot be supplied individually via the interlock Sub-D plug.

8.3.1 Pin Allocation of the Interlock Plug Connector

- i**
- When using Sub-D bushings from other manufacturers:
- Width of Sub-D bushing: ≤ 16.5 mm
 - Connect the cable screening to the plug socket housing.

Pin Allocation of the Interlock Plug Connector		
1 16 31	+++++ +++++ +++++	15 30 44
Pin	Coil	Signal
1 ... 3	–	24 V _{VAL/OUT}
4 ... 6	1 ... 48	0 V _{VAL/OUT}
Housing	FE	Functional earth
Do not use individually controllable coils ¹⁾		
7/8	1	V ₁₊ /V ₁₋
9/10	2	V ₂₊ /V ₂₋
11/12	3	V ₃₊ /V ₃₋
13/14	4	V ₄₊ /V ₄₋
15/16	5	V ₅₊ /V ₅₋
17/18	6	V ₆₊ /V ₆₋
19/20	7	V ₇₊ /V ₇₋
21/22	8	V ₈₊ /V ₈₋
23/24	9	V ₉₊ /V ₉₋
25/26	10	V ₁₀₊ /V ₁₀₋
27/28	11	V ₁₁₊ /V ₁₁₋
29/30	12	V ₁₂₊ /V ₁₂₋
31/32	13	V ₁₃₊ /V ₁₃₋
33/34	14	V ₁₄₊ /V ₁₄₋
35/36	15	V ₁₅₊ /V ₁₅₋
37/38	16	V ₁₆₊ /V ₁₆₋
Coils that can be controlled together		
39	17 ... 32	V ₁₇ ... 32+
40	33 ... 48	V ₃₃ ... 48+
41 ... 43	1 ... 48	0 V _{VAL/OUT}
44	–	Not connected

1) V– with a single-pin interlock interface

Tab. 3 Pin Allocation of the Interlock Plug Connector

8.3.2 Single-pin Interlock Interface

- i**
- The interlock contacts V₁₋ ... V₁₆₋ must not be used with the single-pin interlock interface.

- Interface via external positive switching contacts or unipolar switching safety terminals.
- 16 solenoid coils can be actuated through the interlock (V_{n+}).
- Solenoid coils without interlock control are supplied via pin 1 ... 3 with 24 V.
- The 24 V supply of all solenoid coils must be on the same potential.

- The application of the respective input voltage is reported via the fieldbus as a process image.

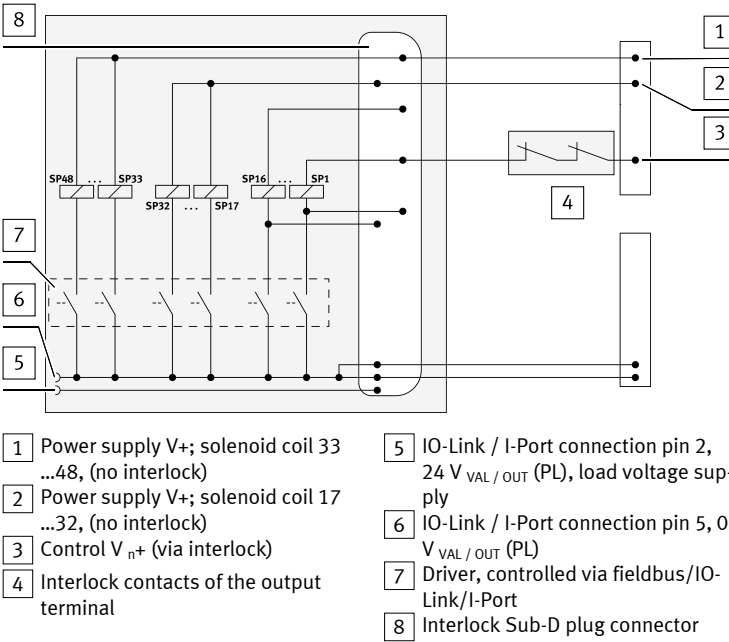


Fig. 3 Sample circuit diagram for single-pin interlock interface

8.3.3 Two-pin Interlock Interface

- i**
- With the two-pin interlock interface, the internal control of the valves 1 ... 16 via the fieldbus must not be used. Only use terminals that detect unintentional actuation via the fieldbus.

- Interface via external, positive-negative switching safety terminals.
 - Solenoid coils with interlock control are actuated via Pin 7 ... 38.
 - Solenoid coils without interlock control are supplied via pin 1 ... 3 with 24 V.
 - Permissible potential difference between V_{n-} and 0 V_{VAL / OUT}: ≤ 5 V.
 - The test impulses (≤ 1 ms) used for error detection by safe output terminals are suppressed by a special filter switch.
 - Current consumption per valve: ≤ 20 mA.
- If the safe terminals used detect current consumption ≤ 20 mA as a wire break, the wire break detection must be switched off.

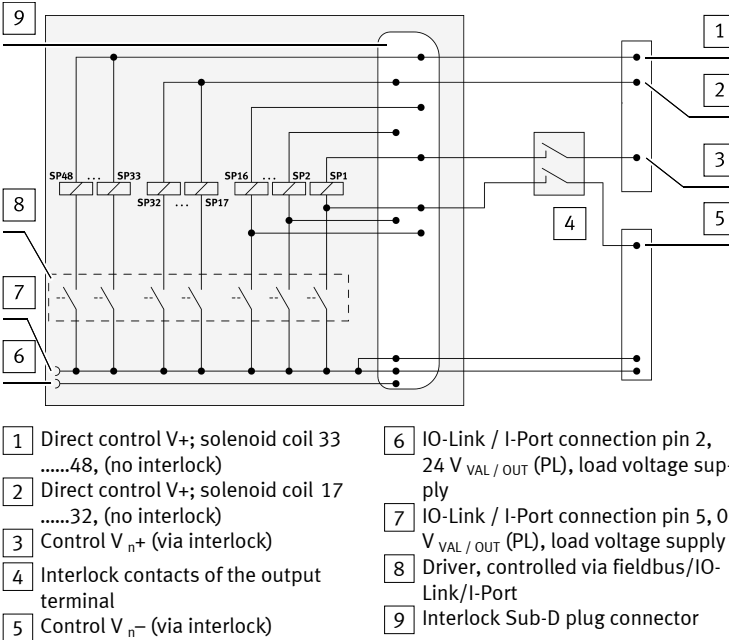


Fig. 4 Sample circuit diagram for two-pin interlock interface

8.4 IO-Link/I-port interface

Through the IO-Link/I-Port interface , the valve terminal can be connected as follows:

- Directly to the fieldbus, through mounting of a CTEU bus node on the valve terminal
- Decentralised to an external IO-Link master
- Decentralised at an external I-Port master (e.g. CTEU)

Electrical connection:

- Plug connector, 5-pin, M12x1, A-coded

Port Pin Allocation IO-Link/I-Port Interface

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

Tab. 4 Port Pin Allocation IO-Link/I-Port Interface

Device Description File IODD

If the valve terminal is operated as a IO-Link device, download the corresponding device description file: ➔ www.festo.com/sp.

9 Commissioning

NOTICE!

Material damage due to incorrect or incomplete installation.

The following conditions must be fulfilled for commissioning:

- The system must be fully assembled.
- The electrical installation must be complete and checked.
- The pneumatic installation must be complete and checked.

10 Operation

10.1 Address Assignment

- A maximum of 48 solenoid coils can be actuated.
- Valve position 0 is located on the left-hand side:
- Address assignment is in ascending order without gaps, from left to right.
- Address assignment does not depend on whether the module is equipped with blanking plates.
- A valve position always occupies two addresses. The following allocation applies here:
 - Solenoid coil for switching position 14: low-value address
 - Solenoid coil for switching position 12: higher-value address

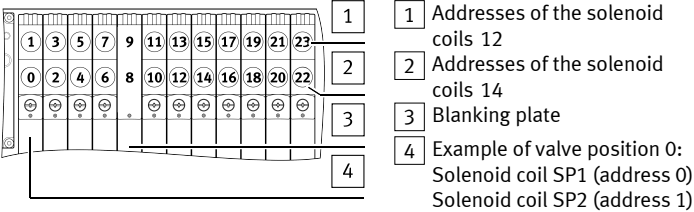


Fig. 5 Example of address assignment with 12 valve positions.

10.2 Assignment of Outputs and Inputs

The following tables show the assignment of the outputs and inputs to the corresponding solenoid coils (SP).

Assignment of Outputs								
Byte	Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7
0	SP 1	SP 2	SP 3	SP 4	SP 5	SP 6	SP 7	SP 8
1	SP 9	SP 10	SP 11	SP 12	SP 13	SP 14	SP 15	SP 16
2	SP 17	SP 18	SP 19	SP 20	SP 21	SP 22	SP 23	SP 24
3	SP 25	SP 26	SP 27	SP 28	SP 29	SP 30	SP 31	SP 32
4	SP 33	SP 34	SP 35	SP 36	SP 37	SP 38	SP 39	SP 40
5	SP 41	SP 42	SP 43	SP 44	SP 45	SP 46	SP 47	SP 48

Tab. 5 Assignment of Outputs

Assignment of inputs (V+)								
Byte	Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7
0	SP 1	SP 2	SP 3	SP 4	SP 5	SP 6	SP 7	SP 8
1	SP 9	SP 10	SP 11	SP 12	SP 13	SP 14	SP 15	SP 16
2	SP 17...32	SP 33...48	Not used					
3	Not used							

Tab. 6 Assignment of Inputs

11 Error Diagnostics

Event Code		Type	Error handling
MSB	LSB		
50h	00h	Error	Device error – Switch device off and back on. If the error still occurs, the device is defective

Event Code		Type	Error handling
MSB	LSB		
51h	12h	Warning	Error in the load voltage supply – Check the load voltage supply

Tab. 7 Error Diagnostics

12 Technical Data

VTUG-PT-L			
General			
Number of valve positions		4 ... 24	
Materials		AL, PA, POM, NBR, PU, PC	
Operating and pilot medium		Compressed air in accordance with ISO 8573-1:2010 [7:4:4] ¹⁾	
Mounting position			
Wall Mounting		Any	
H-rail mounting		Horizontal	
Environmental conditions			
Ambient temperature		[°C]	–5 ... +50
Storage temperature		[°C]	–20 ... +60
Relative humidity		[%]	93, non-condensing (at 40 °C)
Degree of protection		IP40 ²⁾	
Operating pressure with external pilot air (IC = ID code)			
5/3-way, 5/2-way valves (IC: B, E, G, A)		[bar]	–0.9 ... 10
5/2-way valve (impulse) (IC: J)		[bar]	–0.9 ... 10
5/2-; 3/2-way valve (IC: M, P, VX, VW)		[bar]	–0.9 ... 10
2x 3/2-way valve (IC: VH, VK, VN)		[bar]	–0.9 ... 10
2x 3/2-way valve with pneumatic spring (IC: H, K, N)		[bar]	1.5 ... 10
Pilot pressure with external pilot air ^{3a)} (IC = ID code)			
5/3-way, 5/2-way valves (IC: B, E, G, A)		[bar]	3 ... 8
5/2-way valve (impulse) (IC: J)		[bar]	1.5 ... 8
5/2-; 3/2-way valve (IC: M, P, VX, VW)		[bar]	2.5 ... 8
2x 3/2-way valve (IC: VH, VK, VN)		[bar]	2 ... 8
2x 3/2-way valve with pneumatic spring (IC: H, K, N)		[bar]	1.5 ... 8
Operating and pilot pressure with internal pilot air ³⁾			
5/3-way, 5/2-way valves (IC: B, E, G, A)		[bar]	3 ... 8
5/2-way valve (impulse) (IC: J)		[bar]	1.5 ... 8
5/2-; 3/2-way valve (IC: M, P, VX, VW)		[bar]	2.5 ... 8
2x 3/2-way valve (IC: VH, VK, VN)		[bar]	2.5 ... 8
2x 3/2-way valve with pneumatic spring (IC: H, K, D)		[bar]	1.5 ... 8
Tightening Torques			
CTEU.. on electrical interface VAEM-L1-S -...- PTK		[Nm]	1.0 ± 10 %
Electrical interface		[Nm]	0.3 ± 20 %
Valve on terminal strip		[Nm]	0.3 ± 50 %
Plug screw, blanking plug for pilot air		[Nm]	1.5 – 20 %
Earthing screw		[Nm]	1 ± 20 %
Power supply (reverse polarity protected)			
Load voltage (valves)		[V DC]	21.6 ... 26.4
Load voltage interlock (valves)		[V DC]	21.6 ... 26.4
Operating voltage (electronics)		[V DC]	18 ... 30
Data per solenoid coil		0 ... 30 ms	> 30 ms
Power consumption (load) at nominal voltage		[W]	1 0.4
Current consumption		[mA]	48 (inrush current) 16 (holding current)
Current consumption through IO-Link/I-Port		Valves	Electronics
Maximum		[A]	2.5 0.5
Intrinsic current		[mA]	40 30
Bypassing times			
Power failure (only operating voltage)		[ms]	10
Test pulse (valve supply V _n +)		[ms]	≤ 1
IO-Link Interface			
Specification		1.0	
Baud rate		COM 2 (38.4 kBit)	
Data out		6 bytes	
Data in		4 bytes	

1) Lubricated operation possible, in which case lubricated operation will always be required.
2) bus node, completely mounted, plug connector inserted or provided with protective cap.
3) For more than 12 simultaneously switched valves: reduce the pilot pressure to ≤ 6 bar.
4) When operating with external pilot air: the pilot pressure must be at least 50% of the operating pressure.

Tab. 8 Technical Data