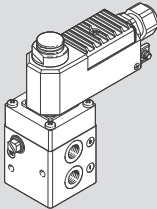


VOFC-LT-M32C

Valve



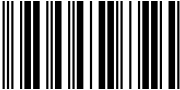
FESTO

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Operating instruction

8226101
2024-10b
[8226103]



8226101

Original instructions

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1 About this document

1.1 Purpose of the document

This document describes the use of the above-mentioned product. It contains additional information for the use of the product in safety-related systems (safety manual in accordance with IEC 61508).

1.2 Applicable documents

- Assembly instructions

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

1.3 Target group

This document is targeted towards individuals who mount and operate the product. It is additionally targeted towards individuals who are entrusted with the planning and application of the product in a safety-oriented system.

1.4 Specified standards

Version	
IEC 61508-1:2010	IEC 61508-4:2010
IEC 61508-2:2010	IEC 61511:2016

Tab. 1: Specified standards

2 Safety

2.1 Safety instructions

- Only use the product in its original condition without unauthorised modifications.
- Only use the product if it is in perfect technical condition.
- Observe the identifications on the product.
- Only use media in accordance with the specifications → 10 Technical data.
- The product must be regularly tested by a qualified technician, and the test must be documented → 9 Maintenance.

Return to Festo

- In the event of malfunctions or failure: replace the product and inform Festo of the failure.
- Before returning the product, contact your Festo specialist advisor.

2.2 Intended use

The valves VOFC-LT-M32C are directly actuated electromechanical control valves. The consist of a basic valve of the VOFC-LT-M32C series in combination with a solenoid coil of the VACC-S13 series. The valves are used to control pneumatic actuators.

2.3 Training of qualified personnel

Work on the product may only be carried out by qualified personnel who can evaluate the work and detect dangers. The qualified personnel have knowledge and experience in process automation.

3 Additional information

- Contact the regional Festo contact if you have technical problems → www.festo.com.
- Accessories and spare parts → www.festo.com/catalogue.

4 Information on functional safety

4.1 Achievable safety classification

The product is suitable for use as an element in a safety-oriented system in accordance with IEC 61511.

- in low-demand mode up to SIL 2
- in high-demand mode up to SIL 2.

Taking into account the necessary minimum hardware fault tolerance of HFT = 1, the product can also be used up to SIL 3 with a redundant design of the entire system.

NOTICE

It is only possible to determine whether the product is suitable for specific applications by also assessing further components of the subsystem.

4.2 Safety function

The safety function comprises the safe venting of an actuator connected to port 2. The safety function is triggered by switching off the power supply at the solenoid coil.

The connection between ports 2 and 3 remains open while the voltage remains switched off at the solenoid coil. This switching position represents the safe state.

4.3 Operating conditions

- General information on safe operation → 2 Safety.
- Periodic tests (performance test) → 9 Maintenance.
- Ambient conditions and additional technical specifications → 10 Technical data.

4.4 Limitations of use

If the operating conditions are in compliance, the service life is a maximum of 14 years.

5 Function

The valve is a 3/2-way valve with internal pilot air supply. If the operating pressure is less than 2 bar, an external pilot air supply with > 2 bar must be connected. When the system is de-energised, the armature is pressed onto the nozzle by a spring. This closes the internal pilot air line leading to the diaphragm.

- If voltage is applied at the solenoid coil: the armature opens the nozzle. The diaphragm pushes the control piston against a spring in the final control element. Exhaust port 3 is closed and the flow rate between ports 1 and 2 is unblocked.
- If there is no voltage at the solenoid coil: the compressed air supply from port 1 is closed. Port 2 is connected with exhaust port 3. This allows a downstream control unit to be exhausted.

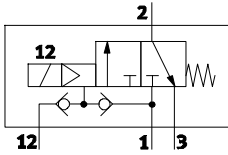


Fig. 1: Circuit symbol

6 Mounting

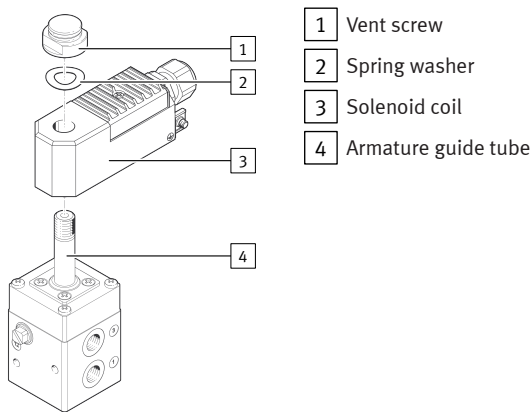


Fig. 2: Mounting the solenoid coil on the valve body

1. Ensure that moisture cannot accumulate in the valve.
2. Slide solenoid coil [3] onto the armature guide tube [4]. Check: sealing compound points to the valve body.
3. Slide spring washer [2] onto the armature guide tube.
4. Tighten vent screw [1]. Tightening torque: 5 Nm ± 20%.

7 Installation

7.1 Requirements

- The piping is unpressurised.
- Connecting cables and fittings are clean.
- The power supply is switched off.

7.2 Pneumatic installation

- Recommended: use feed line with ≥ 6 mm cross-section.
- Use only fittings with cylindrical threaded stud and sealing ring or cutting ring.
- Do not use additional sealing agents such as PTFE sealing band or hemp.
- Do not use anti-friction coating or lubricant.
- If port 1 is pressurised with a < 2 bar control signal, feed > 2 bar auxiliary energy to port 12.

For outdoor applications

NOTICE

Moisture, foreign matter and other contamination that enters the valve can damage the product and affect its function.

- Ensure exhaust.
- Use exhaust protection.

- Duct exhaust air. Make sure that moisture cannot penetrate the valve, e.g. through downward-facing pipes.
- Use exhaust protection VABD-D3-....
- Ensure protection against icing at an ambient temperature of ≤ 0 °C.

7.3 Electrical installation

- Take suitable measures for the protective circuit to limit peak disconnection voltages.
- Any polarity.

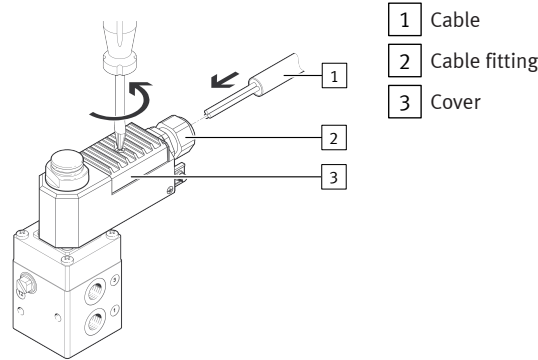


Fig. 3: Electrical connection of solenoid coil

1. Loosen the screw of the terminal housing and open the cover [3].
2. When loosening the cap nut of the cable fitting [2] hold the lock nut on the housing in position to prevent it from loosening (use second spanner).
3. Guide the cable [1] through the cable fitting and wire it to the terminals.
4. Connect the solenoid coil to the local equipotential bonding via the inner or outer protective earth connection.
5. Tighten the cap nut of the cable fitting [2].
 - Tightening torque: 4.3 Nm ± 10%
6. Close the cover [3] of the terminal housing and tighten the screw.
 - Tightening torque: 1.2 Nm ± 20%
7. Functional test: operate the solenoid valve a few times and check that it functions correctly.

8 Commissioning

- After complete assembly and installation, check and document the safety function.

9 Maintenance

9.1 General

- When used as intended, the product is maintenance-free.
- Repairs to the product are not permissible. In the event of malfunctions or failure: Replace the product and let Festo know about the failure. Return defective products to Festo.

9.2 Proof test (Proof test)

The proof test consists of switching off the voltage at the solenoid valve and then switching it on again.



During the proof test, the safety of the application must be ensured.

1. Switch off the voltage at the solenoid coil.
2. Measure the time until the pressure at port 2 has completely reached the ambient pressure (reached the safe state).
 - ↳ The test is successful if the safe state is reached within the given time and a downstream final control element has moved to its intended position.
3. Switch on the voltage at the solenoid coil.
 - ↳ The test is successful if the pressure at port 2 has reached the original value.
4. Check the valve externally, visual inspection.
 - ↳ The test is successful if no defect, leakage or contamination is detected.
5. Document the test results.

10 Technical data

10.1 Technical data, safety engineering

Approval information, safety engineering	
CE	
Type-examination	The functional safety engineering of the product has been certified by an independent testing body, see EC-type examination certificate → www.festo.com/sp
Certificate issuing authority	TÜV Rheinland Industrie Service GmbH
Certificate no.	968/V 1251.01/24

Tab. 2: Approval information, safety engineering

Safety characteristic in accordance with IEC 61508		Value
Safety function		Moving to the safe position by switching off the power supply
Results of Assessment		
Route of Assessment		2H/1s
Type of Subsystem		Type A
Mode of Operation		Low Demand Mode/High Demand Mode
Hardware Fault Tolerance	HFT	0
Systematic Capability		SC 3
Low Demand Mode		
Dangerous Failure Rate	λ _D	2.60 * 10 ⁻⁸ / h 26 FIT
Average Probability of Failure on Demand 1oo1	PFD _{avg} (T ₁)	1.16 * 10 ⁻⁴ Assumptions: DC = 0%, T ₁ = 1 year, MRT = 72 h
Average Probability of Failure on Demand 1oo2	PFD _{avg} (T ₁)	1.16 * 10 ⁻⁵ Assumptions: DC = 0%, T ₁ = 1 year, MRT = 72 h, β _{1oo2} = 10%
High Demand Mode		
Nominal Lifetime in accordance with EN 13611:2007+A2:2011 K.4.6	B _{10d}	1,478,101
Average Frequency of a Dangerous Failure per Hour	PFH	6.8 * 10 ⁻⁸ /h

Tab. 3: Safety characteristics

10.2 Technical data, general

VOFC-LT-M32C-...		...14	...12
Mounting position		any	
Medium		Compressed air to ISO 8573-1:2010 [7:2:2]	
Temperature of medium	[°C]	-25 ... 60	
Ambient temperature	[°C]	-25 ... 60	
Storage temperature	[°C]	-20 ... 40	
Corrosion resistance class CRC		4	
Degree of protection (in mounted state)		IP65	
Operating pressure	[MPa]	0.1 ... 0.8	0.2 ... 0.8
	[bar]	1 ... 8	2 ... 8
	[psi]	14.5 ... 116	29 ... 116
Operating pressure with external pilot air	[MPa]	0 ... 0.8	
	[bar]	0 ... 8	
	[psi]	0 ... 116	

Tab. 4: Technical data