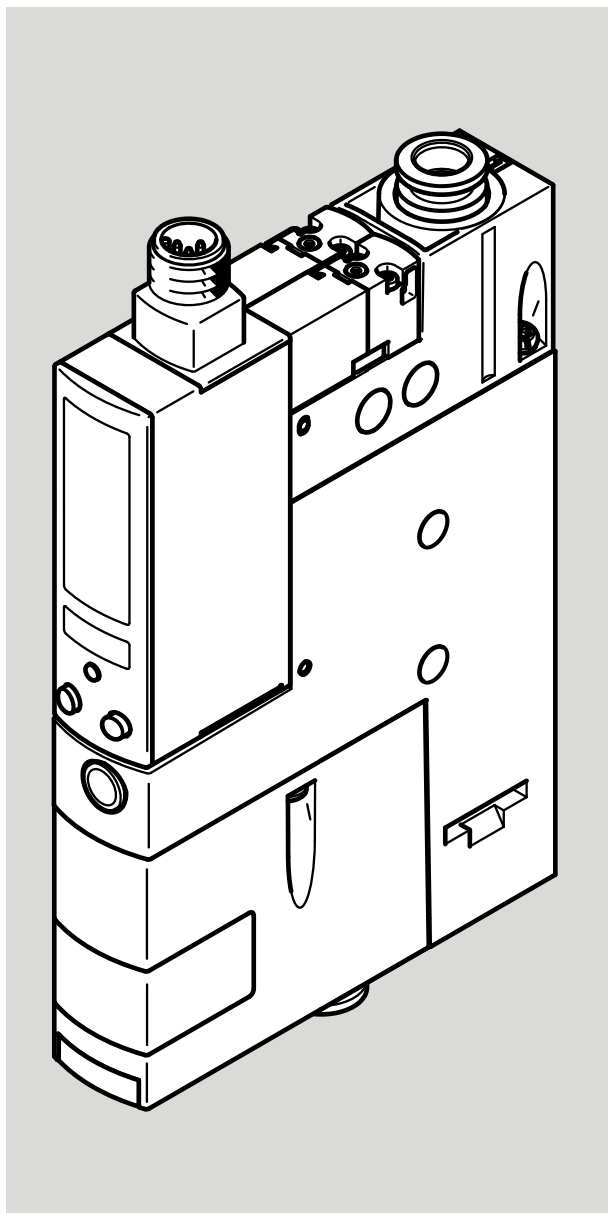


OVEM
Vacuum generator



FESTO

Operating instructions



8125662
2020-05h
[8125664]

Translation of the original instructions

Table of contents

1	About this document.....	5
1.1	Applicable documents.....	5
2	Safety.....	5
2.1	Safety instructions.....	5
2.2	Intended use.....	5
2.3	UL certification.....	5
3	Further information.....	6
4	Service.....	6
5	Product overview.....	6
5.1	Product design.....	7
5.1.1	Product variants.....	7
5.1.2	Display components.....	10
5.2	Function.....	14
5.2.1	Switching functions.....	15
5.2.2	Valve control.....	16
5.2.3	Air saving function.....	17
5.2.4	Optimisation of the transport time.....	18
5.2.5	Monitoring and diagnostics.....	18
5.2.6	Measured variables.....	19
5.2.7	Teach function.....	20
5.2.8	Operating statuses and menu structure.....	21
6	Assembly.....	25
7	Installation.....	28
7.1	Pneumatic installation.....	28
7.2	Electrical installation.....	30
8	Commissioning.....	32
8.1	Commissioning the vacuum generator.....	32
8.2	Setting the intensity of the ejector pulse.....	33
9	Operation and use.....	34
9.1	Setting the ejector pulse duration.....	34
9.2	Configuring switching outputs.....	35
9.3	Setting the switching characteristics of a switching output.....	35
9.4	Set diagnostic message channel.....	36
9.5	Teach-in switching point.....	37
9.6	Deleting minimum or maximum pressure value.....	37
9.7	Setting critical limits for the evacuation and air supply times.....	38
9.8	Teaching evacuation and air supply time.....	38
9.9	Displaying evacuation and air supply times.....	39
9.10	Deleting evacuation and air supply times.....	39
9.11	Mechanical manual override.....	40

9.12	Electrical manual override.....	40
9.13	Activating the security code.....	41
9.14	Switching air saving function on or off.....	41
9.15	Restore factory settings.....	41
10	Maintenance and care.....	42
11	Fault clearance.....	43
11.1	Diagnostic levels.....	43
11.2	Error messages and error codes.....	44
11.3	Malfunctions.....	45
12	Disassembly.....	46
13	Disposal.....	47
14	Technical data.....	47

1 About this document

1.1 Applicable documents



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

Document	Product	Contents
Instruction manual	Manifold rail OABM-P	Assembly

Tab. 1 Applicable documents

2 Safety

2.1 Safety instructions


- The product may only be used in its original status without unauthorised modifications.
- Only use the product if it is in perfect technical condition.
- Use the product only inside buildings.
- Take into consideration the ambient conditions at the location of use.
- The product is intended for use in industrial environments. This product can generate high frequency malfunctions, which may make it necessary to implement interference suppression measures in residential areas.
- Observe the specifications on the product labelling.
- Comply with all applicable national and international regulations.
- Observe the local regulations for environmentally friendly disposal.

2.2 Intended use

The intended use of the product is to generate a vacuum.

2.3 UL certification

In combination with the UL inspection mark on the product, the information in this section must also be observed in order to comply with the certification conditions of Underwriters Laboratories Inc. (UL) for USA and Canada.

UL approval information	
Product category code	QUYX (USA) QUYX7 (Canada)
File number	E322346
Standards taken into account	UL 61010-1 C22.2 No. 61010-1
UL symbol	 US LISTED

Further information

The unit shall be supplied by a power source which fulfils the requirements on a limited-energy circuit in accordance to IEC/EN/UL/CSA 61010-1 or on a Limited Power Source (LPS) in accordance to IEC/EN/UL/CSA 60950-1 or IEC/EN/UL/CSA 62368-1 or a Class 2 circuit in accordance to NEC or CEC.

3 Further information

- Accessories → www.festo.com/catalogue.
- 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 Product design

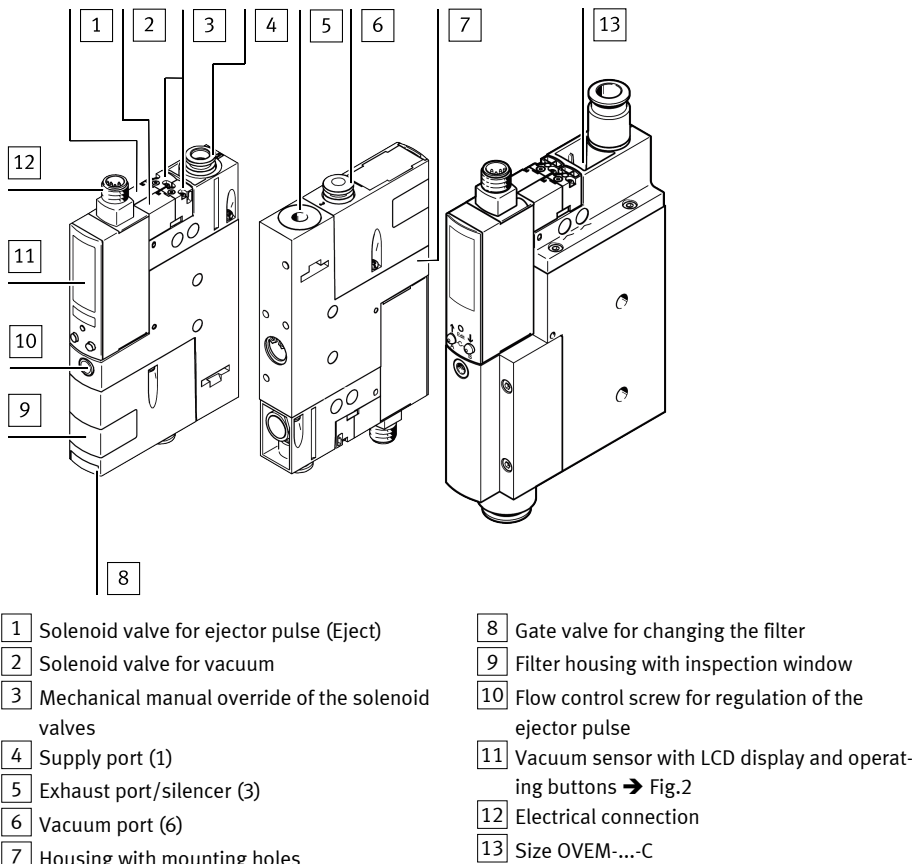


Fig. 1 Operating elements and connections

i

Filter housing with inspection window only with OVEM-...-B/-BN

5.1.1 Product variants

Product variant	Code	Meaning
Vacuum generator	OVEM	Vacuum generator with solenoid valve and manual override

Product variant	Code	Meaning
Nominal width of Laval nozzle	-05	0.45 mm
	-07	0.7 mm
	-10	0.95 mm
	-14	1.4 mm
	-20	2.0 mm
	-30	3.0 mm
Vacuum type	-H	high negative pressure
	-L	high suction volume
Housing size/width	-B	20 mm wide, ISO standard
	-BN	20 mm wide, NPT
	-C	36 mm wide, ISO standard
Pneumatic ports	-QS	all ports with QS push-in fittings (-B-QS/-C-QS)
		all ports with QS push-in fittings inch (-BN-QS)
	-QO	Supply/vacuum port with QS push-in fittings, exhaust port with open silencer (-B-QO/-C-QO)
		Supply/vacuum port with QS push-in fittings inch, exhaust port with open silencer (-BN-QO)
	-GN	all ports with G female thread (-B-GN/-C-GN)
		all ports with NPT female thread (-BN-GN)
	-GO	Supply/vacuum port with G female thread, exhaust port with open silencer (-B-GO/-C-GO)
		Supply/vacuum port with NPT female thread, exhaust port with open silencer (-BN-GO)
	-PL	prepared for common supply manifold, vacuum and exhaust port with QS push-in fittings (-B-PL/-C-PL)
		prepared for common supply manifold, vacuum and exhaust port with QS push-in fittings inch (-BN-PL)
	-PO	prepared for common supply manifold, vacuum port with QS push-in fittings, exhaust port with open silencer (-B-PO/-C-PO)
		prepared for common supply manifold, vacuum port with QS push-in fittings inch, exhaust port with open silencer (-BN-PO)

Product variant	Code	Meaning
Normal position of the vacuum generator	-ON	N/O, normally open (vacuum generation)
	-OE	N/O, normally open (vacuum generation) with ejector pulse
	-OPE	N/O, normally open (vacuum generation) with power ejector pulse (-C)
	-CN	N/C, normally closed (no vacuum generation)
	-CE	N/C, normally closed (no vacuum generation) with ejector pulse
	-CPE	N/C, normally closed (no vacuum generation) with power ejector pulse (-C)
Electrical connection	-N	M12 plug (5-pin)
Vacuum sensor		
	-	Without vacuum sensor (switching input PNP)
	-1PD	1 switching output PNP, with display
	-2P	2 switching outputs PNP
	-2N	2 switching outputs NPN
	-PU	1 switching output PNP, 1 analogue output 0 ... 10 V
	-PI	1 switching output PNP, 1 analogue output 4 ... 20 mA
Alternative vacuum display		
	-	bar (-B/-C), InHg (-BN)
	-B	bar (-BN)
	-W	InH ₂ O (-BN)
	-H	InHg (-B/-C)

Tab. 3 Overview of variants

5.1.2 Display components

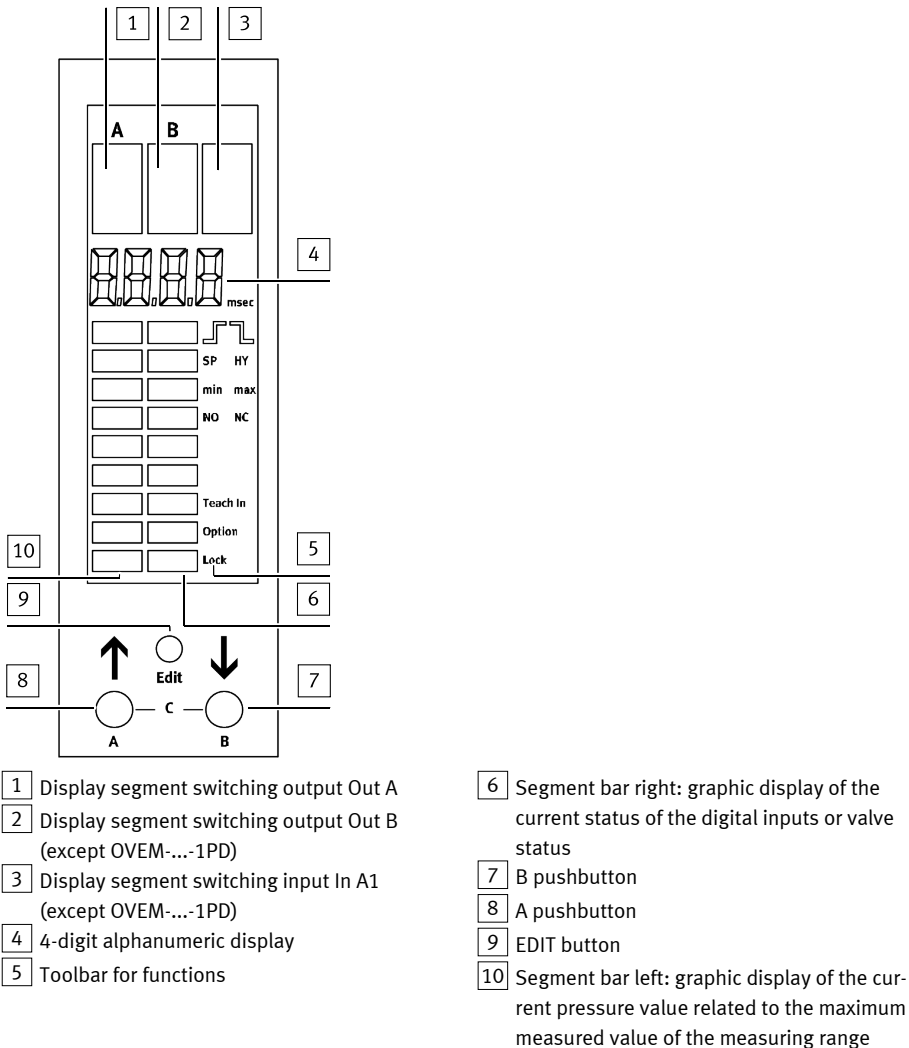



















Fig. 2 LCD display and operating keys

Symbol	Description
	Threshold value comparator selected
"[SP]"	Switching point







Symbol	Description
	Window comparator selected
"[SP]" + "[min]"	lower switching point
"[SP]" + "[max]"	upper switching point
"[HY]"	Hysteresis
"[NO]" / "[NC]"	Switching logic N/O contact (normally open) / N/C contact (normally closed)
"[TeachIn]"	Teach function (teach-in) active
"[Option]"	Air saving function active
"[Lock]"	Security code active
	Segments display the following: <ul style="list-style-type: none">– current status of the digital inputs– current valve status → Tab. 5 OVEM-...-2P/-2N/PU/PI: additional displays of segment bars – examples and → Tab. 6 OVEM-...-1PD: additional displays of segment bars – examples




Tab. 4 Symbols in display

Display	Description	
	Segment L10 is lit	Vacuum solenoid valve is switched.
	Segment L14 is lit	Ejector pulse solenoid valve is switched.
	Segment L17 + "[A]" lit and "[min]" flashing	Minimum pressure value display
	Segment L17 + "[A]" lit and "[max]" flashing	Maximum pressure value display

Display		Description
	Segment L18 + "[B]" lit and "[msec]" + "[]" flashing	Duration of ejector pulse
	Segments L1, L3, L4, L5 lit and "[msec]" + "[]" + "[min]" flashing	Diagnostics of evacuation and pressurisation times
	"[msec]" + "[]" + "[max]" flashing	Display of minimum evacuation time
	"[msec]" + "[]" + "[min]" flashing	Display of maximum evacuation time
	"[msec]" + "[]" + "[max]" flashing	Display of minimum pressurisation time
	"[msec]" + "[]" + "[SP]" + "[max]" flashing	Display of maximum pressurisation time
	"[msec]" + "[]" + "[SP]" + "[max]" flashing	Display/setting of evacuation time critical limit value
	Segments L1, L2, L5, L6 lit and display "<ON>" - "[Option]" flashing	Display/setting of pressurisation time critical limit value
	Segments L1, L2, L5, L6 lit and display "<ON>" - "[Option]" flashing	Setting of air saving function (EDIT mode) "<ON>": air saving function active "<OFF>": air saving function not active
	Segments L1, L2, L5, L6 lit and "[Lock]" flashing	Setting the security code (1...9999) "<OFF>": security code is not active
	Segment L10 + "[B]" lit + display "<FORC>"	additional function of the electrical manual override via operating buttons Vacuum solenoid valve switched
	Segment L14 + "[B]" lit + display "<FORC>"	additional function of the electrical manual override via operating buttons Ejector pulse solenoid valve (Eject) switched

Tab. 5 OVE-M-...-2P/-2N/PU/PI: additional displays of segment bars – examples

Display		Description
	Segment L10 is lit	Vacuum solenoid valve is switched.
	Segment L12 is lit	Ejector pulse solenoid valve is switched.
	Segment L16 is lit	digital switching input DI1 (suction) is set.
	Segment L18 is lit	digital switching input DI2 (ejection) is set.
	Segment L17 + "[A]" lit and "[min]" flashing	Minimum pressure value display
	Segment L17 + "[A]" lit and "[max]" flashing	Maximum pressure value display
	Segments L1, L3, L4, L5 lit and	Diagnostics of evacuation and pressurisation times
	"[msec]" + "[_]" + "[min]" flashing	Display of minimum evacuation time
	"[msec]" + "[_]" + "[max]" flashing	Display of maximum evacuation time
	"[msec]" + "[_]" + "[min]" flashing	Display of minimum pressurisation time
	"[msec]" + "[_]" + "[max]" flashing	Display of maximum pressurisation time
	"[msec]" + "[_]" + "[SP]" + "[max]" flashing	Display/setting of evacuation time critical limit value
	"[msec]" + "[_]" + "[SP]" + "[max]" flashing	Display/setting of pressurisation time critical limit value

Display		Description
	Segments L1, L2, L5, L6 lit and display "«ON»" - "[Option]" flashing	Setting of air saving function (EDIT mode) "«ON»": air saving function active "«OFF»": air saving function not active
	Segments L1, L2, L5, L6 lit and "[Lock]" flashing	Setting the security code (1...9999) «OFF»: security code is not active
	Segment L10 + "[B]" lit + display "«FORC»"	additional function of the electrical manual override via operating buttons. Vacuum solenoid valve switched
	Segment L12 + "[B]" lit + display "«FORC»"	additional function of the electrical manual override via operating buttons. Ejector pulse solenoid valve (Eject) switched

Tab. 6 OVEM-...-1PD: additional displays of segment bars – examples

5.2 Function

Function overview

The OVEM is a vacuum generator with digital transmission of setpoint and actual value as well as diagnostics and parameterisation options. It is configured with the operating keys. Diagnostic messages are shown on the display.

Function	OVEM-... -2P/2N/P- U/PI	OVEM-... -1PD
Control of the compressed air supply with 2 valve functions → 5.2.2 Valve control	x	x
Air saving function → 5.2.3 Air saving function	x	x
Electrical and mechanical manual override → 9.12 Electrical manual override and → 9.11 Mechanical manual override	x	x
Monitoring of the vacuum build-up by integrated pressure sensor and advanced monitoring functions → 5.2.5 Monitoring and diagnostics	x	x
Auto-drop function: Generation of an automatic ejector pulse/power ejector pulse for accelerated vacuum purging and safe set-down → 5.2.2 Valve control	x	-

Function	OVEM-... -2P/2N/P- U/PI	OVEM-... -1PD
Generation of an ejector pulse/power ejector pulse via a control signal at the digital switching input (Eject) DI2	-	x

Tab. 7 Function overview

5.2.1 Switching functions

The solenoid valve for vacuum generation switches as an N/C or N/O contact, depending on the version, when pressurised with compressed air.

The switching outputs can be configured via the switching functions. The switching mode of the switching outputs can be set as threshold value or window comparators.

Threshold value comparator	Normally open (N/O contact)	Normally closed (N/C contact)
Switching function: – 1 switching point (SP1) TEACH mode ¹⁾ : – 2 teach points (TP1, TP2) – $SP1 = \frac{1}{2} (TP1 + TP2)$		

1) TP1 = minimum pressure value, TP2 = maximum pressure value, independent of the teach-in sequence

Tab. 8 Threshold value comparator: setting of switching point SP1 and hysteresis HY

Window comparator	Normally open (N/O contact)	Normally closed (N/C contact)
Switching function: – 2 switching points (SP1, SP2) TEACH mode ¹⁾ : – 2 teach points (TP1, TP2)		

1) TP1 = minimum pressure value, TP2 = maximum pressure value, independent of the teach-in sequence

Tab. 9 Window comparator: setting of switching points SP1, SP2 and hysteresis HY

Code	Switching output A	Switching output B	Switching inputs
-1PD	Switching output positive switching pressure sensor output A	-	2 switching inputs, positive switching
-2P	Switching output positive switching pressure sensor output A	Switching output positive switching pressure sensor output B or diagnostic message channel	Switching input positive switching

Code	Switching output A	Switching output B	Switching inputs
-2N	Switching output negative switching pressure sensor output A	Switching output negative switching pressure sensor output B or diagnostic message channel	Switching input negative switching
-PI	Switching output positive switching pressure sensor output A	Analogue output 4 ... 20 mA vacuum	Switching input positive switching
-PU	Switching output positive switching pressure sensor output A	Analogue output 0 ... 10 V vacuum	Switching input positive switching

Tab. 10 Switching output and switching input variants

5.2.2 Valve control

Control of the ejector pulse

- Auto-drop function (except for OVEM-...-1PD)
The ejector pulse is generated after the “Suction” signal change.
The duration of the ejector pulse can be set → 9.1 Setting the ejector pulse duration.
- Signal-controlled ejector pulse/power ejector pulse (OVEM-...-1PD only)
The ejector pulse is generated via a control signal at the digital switching input (ejection) DI2. The duration of the ejector pulse can be set via the duration of the control signal at the digital switching input (ejector) DI2. The vacuum solenoid valve or the ejector pulse solenoid valve is controlled as defined by the input signal.



Destruction of the vacuum sensor due to overpressure (-CPE/-OPE)

The exhaust duct is sealed tightly during the power ejector pulse. This can cause overpressure at the vacuum port and destroy the vacuum sensor.

- Use power ejector pulse only in open vacuum systems.
-

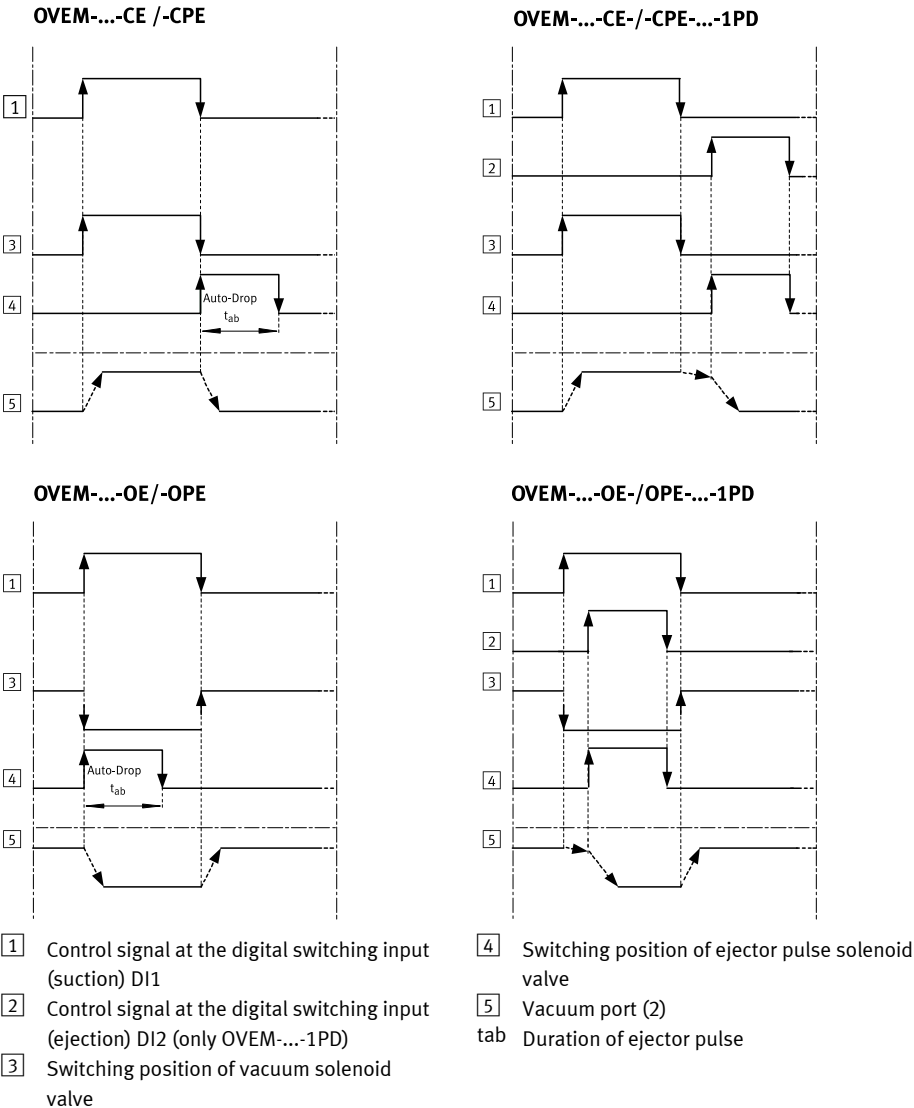


Fig. 3 Valve control switching characteristics

5.2.3 Air saving function

The air saving function reduces air consumption during the evacuation phase.

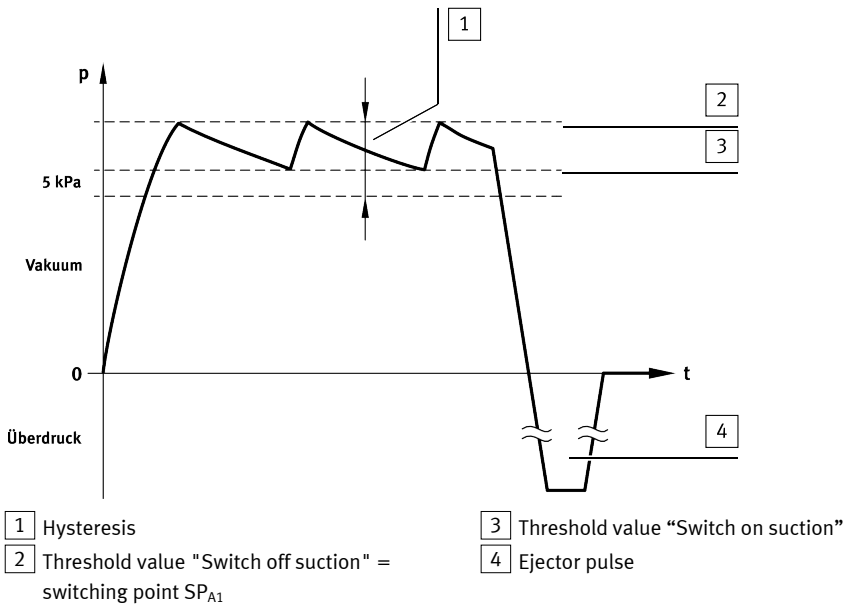


Fig. 4 Mode of operation of the air saving function

If the pressure value has reached switching point SP1 [2], vacuum generation is deactivated. An internal check valve prevents reduction of the vacuum. Vacuum can still be reduced slowly due to leakage in the overall system (e.g. due to rough workpiece surfaces). To reduce power consumption, vacuum generation is not switched on until it falls below the lower threshold value [3].

The air saving function is activated in the factory.

If air-permeable workpieces are transported, the vacuum is reduced more quickly, which would cause the vacuum generation to switch unnecessarily often. In this case, it makes sense to deactivate the air saving function → 9.14 Switching air saving function on or off.

5.2.4 Optimisation of the transport time

The transport time can be optimised for variants with 2 switching outputs (OVEM....-2P/-2N/-PU/-PI) by using switching output Out B.

The vacuum required for the transport is controlled by switching output Out A. To optimise the transport time, the workpiece can e.g. be gripped by the usable vacuum while the vacuum is building up. The minimum usable vacuum required is monitored by switching output Out B.

5.2.5 Monitoring and diagnostics

The vacuum generator has monitoring functions that enable early detection of malfunctions or faults during operation.

- Monitoring of process parameters (pressure value at the vacuum connection, switching points, switching outputs and switching inputs, evacuation time t_e , pressurisation time t_b and critical limit values)
- Diagnostic messages → 11.1 Diagnostic levels

- Fault detection → 11 Fault clearance

The diagnostic messages are shown on the display.

Switching output Out B can also be set as a diagnostic message channel (dl 1 or dl 2) for variants with 2 switching outputs (OVEM-...-2P/-2N) → 9.4 Set diagnostic message channel.

The monitoring functions are activated at the factory (except for monitoring of the evacuation and pressurisation times). The time monitoring can be activated through setting of the critical limits for evacuation time and pressurisation

time → 9.7 Setting critical limits for the evacuation and air supply times.

5.2.6 Measured variables

Pressure value (vacuum)

The pressure value (vacuum) between the vacuum port and filter is continuously measured.



In the OVEM-...-20/30-C, the pressure value (vacuum) between the filter and the check valve is continuously monitored.

The minimum and maximum measured pressure values are saved. If the operating voltage of the vacuum generator is switched off, these values are reset.

Cycle time

A cycle covers the time from the start of evacuation through ejection to the start of the new evacuation.

Evacuation time and pressurisation time

The evacuation time t_E is measured from the start of evacuation until switching point SP1 of the switching output is reached.

The pressurisation time t_B is measured from the start of pressurisation up to the time at which the pressure value (vacuum) falls below –50 mbar.

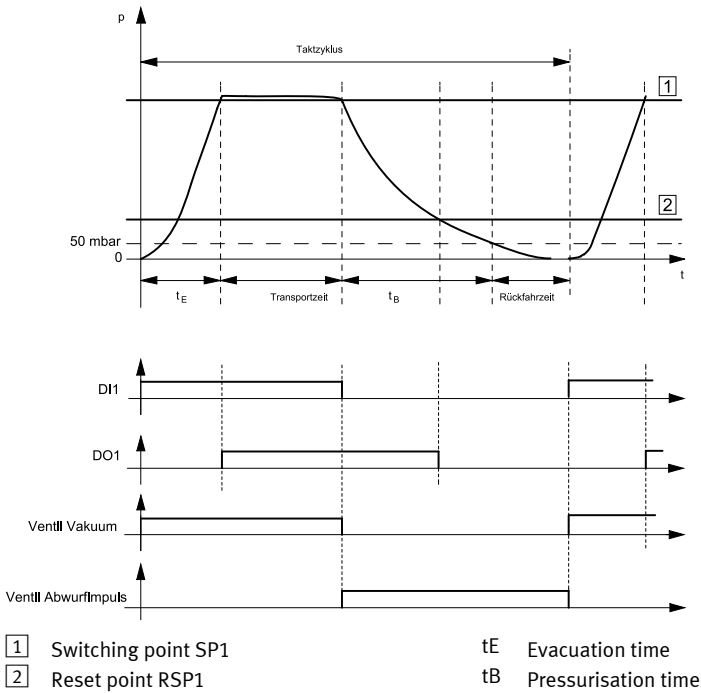


Fig. 5 Cycle time - example for Out A (air save)

The displayed sequence of the switching statuses and control signals applies to all product variants except OVEM-...-1PD. Sequence for OVEM-...-1PD → Fig.3

5.2.7 Teach function

The Teach function enables configuration of the switching points and time monitoring during runtime.

Static teach-in

Depending on the Teach command, one switching point (SP) or 2 switching points (SP1, SP2) are determined from 2 teach points. The switching points are determined statically, that is, the measurement value remains constant during the entire teach-in procedure. The air saving function is deactivated during execution of the teach-in procedure.

Dynamic teach-in

Setpoint values are calculated within the teach-in procedure from a time period. The procedure is used to determine evacuation and air supply times. → Fig.6

After the start of the teach-in, time t_E and t_B are measured at every cycle. The times are averaged over multiple cycle times. At the end of the teach-in, a function reserve of 100% is added to the averaged values.

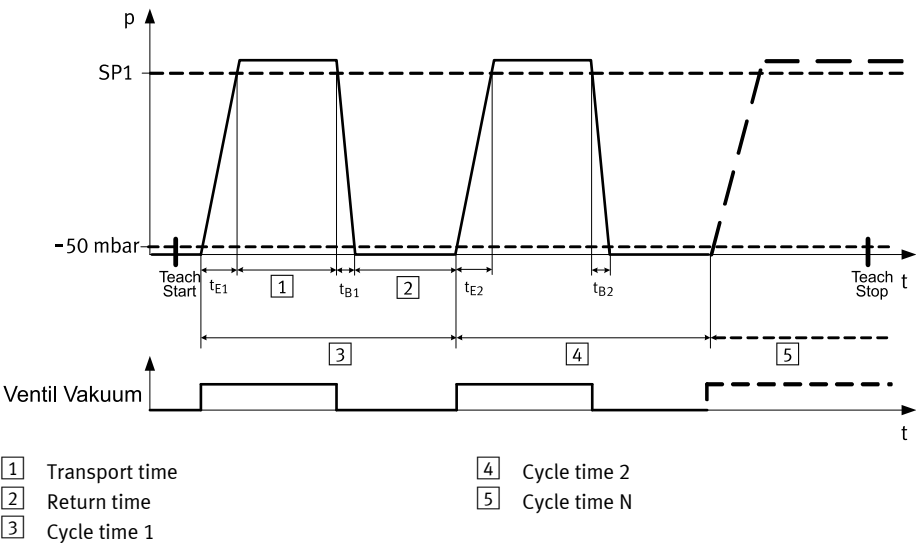


















Fig. 6 Mode of operation of dynamic teach-in - example OVEM-...-CE/-CPE

5.2.8 Operating statuses and menu structure

Meaning of symbols for representing the menu structure

Symbol	Meaning
 (Timeout) 80s	Automatic return to the RUN mode when the monitoring time has expired (here 80 seconds)
 EDIT(Cancel) 3s	Press EDIT button for 3 seconds: manual return to RUN mode
 A	Symbol on the display flashes (here display segment for switching output Out A)
	Input blocked/not blocked
 A	Press individual pushbutton (here A pushbutton)
	Press A or B pushbutton, set value
	Press buttons simultaneously (here: B pushbutton and EDIT button)
 EDIT	Press the EDIT button

Symbol	Meaning
	Branching
	Error display
	Reset values
	Cycle
	Vacuum solenoid valve switched
	Ejector pulse solenoid valve switched
	Teach point is accepted
	Special menu (SPEC) is active (setting air saving function, security code, max. evacuation and max. air supply time)

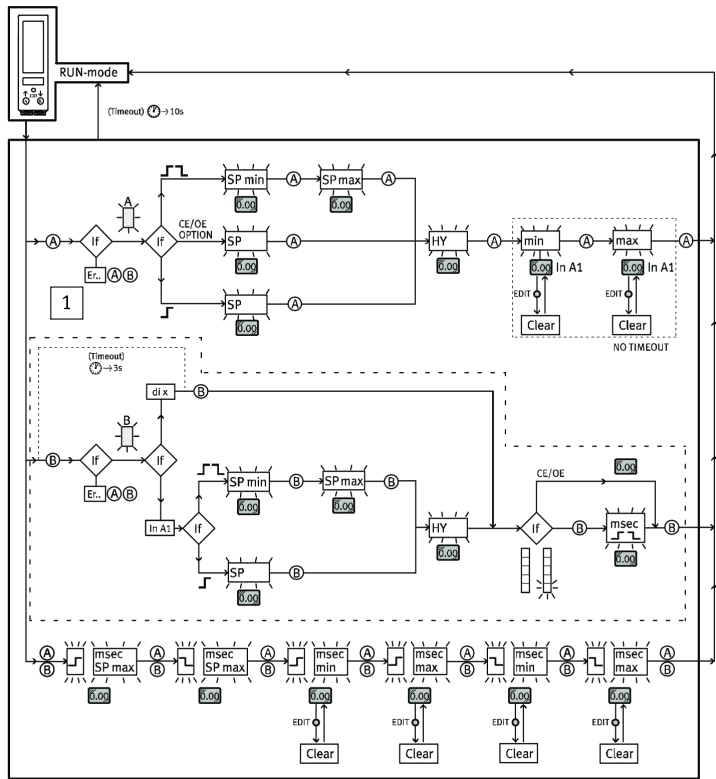
Tab. 11 Meaning of symbols for representing the menu structure

RUN mode

- Basic status after the operating voltage is applied
- Display of the current measured value (relative pressure)
- Display of the signal statuses of the solenoid valves
- Display of the selected inputs and outputs

SHOW mode

- Display of the current settings
- Display and delete minimum and maximum pressure values
- Display and delete minimum and maximum evacuation and pressurisation time
- Display of diagnostic messages



1 Submenu only available with
OVEM...-2P/-2N/-PU/-PI

Fig. 7 Menu structure for SHOW mode

- Setting of parameters

- Operation of the electrical manual override (FORC)

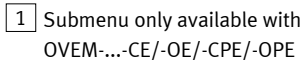
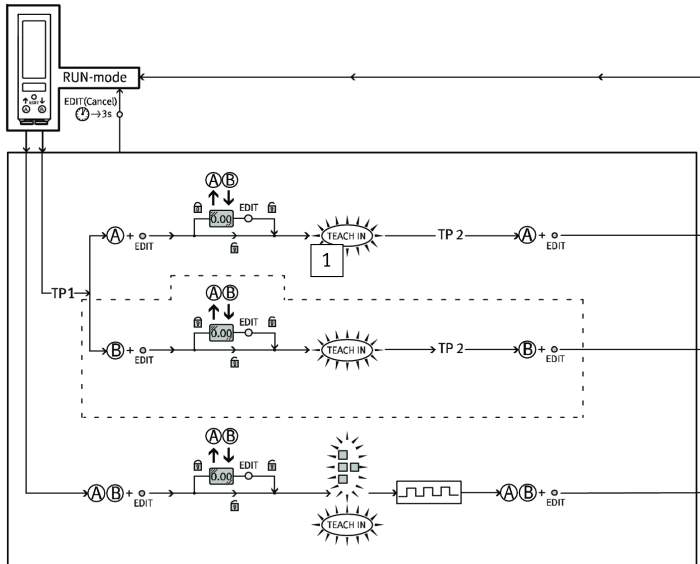


Fig. 8 EDIT mode menu structure

TEACH mode

- Acceptance of the current measured value to determine switching points



- 1 Submenu only available with
OVEM-...-2P/-2N

Fig. 9 TEACH mode menu structure

6 Assembly

i

An unfavourable mounting position may impair the function of the product.

- Avoid condensate accumulation in the device through a suitable mounting position.
- Exhaust air must be able to flow out unhindered.

Direct mounting

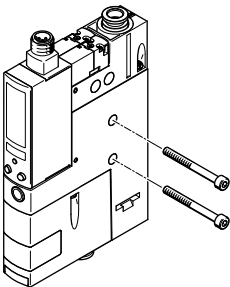


Fig. 10 Direct mounting on the side

Variant	Screws	Tightening torque
OVEM-...-05/-07/-10-...-B/-BN	M5	max. 2.5 Nm
OVEM-...-14/-20-...-B/-BN	M4	max. 2.5 Nm
OVEM-...-20/-30-...-C	M6	max. 2.5 Nm

Tab. 12 Size and tightening torque of the screws for direct mounting on the side

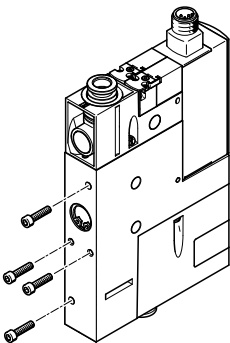


Fig. 11 Direct mounting on the back

Variant	Screw	Tightening torque
OVEM-...-05/-07/-10/-14/-20-...-B/-BN	M3	max. 0.8 Nm
OVEM-...-20/-30-...-C	M4	max. 0.8 Nm

Tab. 13 Size and tightening torque of the screws with direct mounting on the back

H-rail mounting



Type of mounting permissible only for sizes OVEM-...-05/-07/-10/-14/-20-...-B/-BN

H-rail mounting accessories → www.festo.com/catalogue

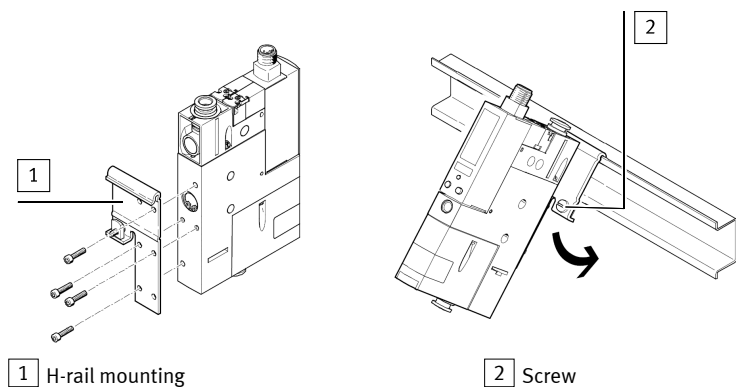


Fig. 12 H-rail mounting

1. Attach mounting plate on H-rail mounting **1**.
2. Attach OVEM with H-rail mounting to the H-rail and press in the direction of the arrow.
3. Secure to the H-rail with screw **2**.

Mounting with mounting bracket



Type of mounting permissible only for sizes OVEM-...-05/-07/-10/-14/-20-...-B/-BN

Accessories for mounting bracket → www.festo.com/catalogue

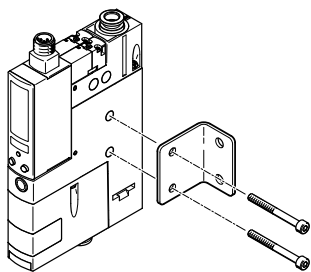


Fig. 13 Mounting with mounting bracket

Variant	Screws	Tightening torque
OVEM-...-05/-07/-10-...-B/-BN	M5	max. 2.5 Nm
OVEM-...-14/-20-...-B/-BN	M4	max. 2.5 Nm

Tab. 14 Size and tightening torque of the screws for mounting with mounting bracket

Mounting on common supply manifold

OVEM-...-B/-BN: Mounting is possible on a common supply manifold with a maximum of 8 places.

OVEM-...-C: Mounting is possible on a common supply manifold with a maximum of 4 places.

Assembly instructions for common supply manifold OABM-P → www.festo.com/sp

7 Installation

7.1 Pneumatic installation

Variant	Circuit symbol	Variant	Circuit symbol
OVEM-...-QO-CN OVEM-...-GO-CN		OVEM-...-QO-CE OVEM-...-GO-CE	
OVEM -...- QO-CPE OVEM -...- GO-CPE		OVEM -...- QO-CPE OVEM -...- GO-CPE	
OVEM-...-QS-CN OVEM-...-GN-CN		OVEM-...-QS-CE OVEM-...-GN-CE	
OVEM -...- QS-CPE OVEM -...- GN-CPE		OVEM -...- QS-CPE OVEM -...- GN-CPE	
OVEM-...-QO-ON OVEM-...-GO-ON		OVEM-...-QO-OE OVEM-...-GO-OE	

Variant	Circuit symbol	Variant	Circuit symbol
OVEM -...- QO-OPE OVEM -...- GO-OPE		OVEM -...- QO-OPE OVEM -...- GO-OPE	
OVEM-...-QS-ON OVEM-...-GN-ON		OVEM-...-QS-OE OVEM-...-GN-OE	
OVEM -...- QS-OPE OVEM -...- GN-OPE		OVEM -...- QS-OPE OVEM -...- GN-OPE	

Tab. 15 Circuit symbols, pneumatic

OVEM-...	-05-...-GN	-07-...-GN	-10-...-GN	-14-...-GN	-20-...-GN	-30-...-GN
	-05-...-GO	-07-...-GO	-10-...-GO	-14-...-GO	-20-...-GO	-30-...-GO
Tube length [m]	< 0.5	< 2	< 0.5	< 2	< 0.5	< 2
Min. internal diameter of tubing [mm]						
- Supply port	1	2	1.5	2	2	3
- Vacuum port	2	3	3	4	4	5
- Exhaust port	2	3	3	4	4	5

Tab. 16 Minimum inside diameter of the connection tubes for connections with G-female thread

Notes on the pneumatic connection

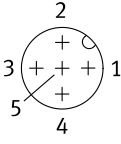
- Maximum permissible tube length 2 m
- OVEM-...-GN/-GO: minimum inside diameter of the connection tubes
➔ Tab. 16 Minimum inside diameter of the connection tubes for connections with G-female thread.
- Do not seal exhaust port.
- OVEM-...-07/-10/-14/-20/-30: If necessary, lengthen silencers with a silencer extension
➔ www.festo.com/catalogue.
- Recommendation: Use type PUN tubes ➔ www.festo.com/catalogue.

7.2 Electrical installation

⚠ WARNING!

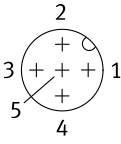
Risk of injury due to electric shock.

- For the electrical power supply, use only PELV circuits in accordance with IEC 60204-1/EN 60204-1 (Protective Extra-Low Voltage, PELV).
 - Observe the general requirements of IEC 60204-1/EN60204-1 for PELV circuits.
 - Only use voltage sources that ensure a reliable electric separation from the mains network in accordance with IEC 60204-1/EN 60204-1.
-
- Connect the vacuum generator to the electrical connection.
 - 5-pin plug, M12x1
 - Maximum tightening torque of M12 plug: 0.5 Nm
 - Maximum permissible cable length: 20 m

Plug	Pin	Wire colour ¹⁾	Function	
	1	brown (BN)	L+	+24 V
	2	white (WH)	DO2	digital output Out B
	3	blue (BU)	L-	0 V
	4	black (BK)	DO1	digital output Out A/Out A (air-save)
	5	grey (GY)	DI1	Digital switching input (suction) ²⁾

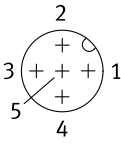
1) When using the connecting cable as per Accessories
2) The workpiece is set down with a falling edge of the “Suction” control signal.

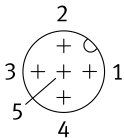
Tab. 17 Pin allocation OVEM-...-2P/-2N

Plug	Pin	Wire colour ¹⁾	Function	
	1	brown (BN)	L+	+24 V
	2	white (WH)	AO1	Analogue output Out B
	3	blue (BU)	L-	0 V
	4	black (BK)	DO1	digital output Out A/Out A (air-save)
	5	grey (GY)	DI1	Digital switching input (suction) ²⁾

1) When using the connecting cable as per Accessories
2) The workpiece is set down with a falling edge of the “Suction” control signal.

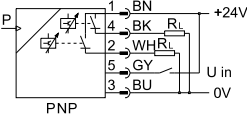
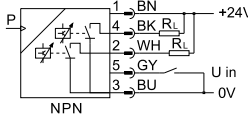
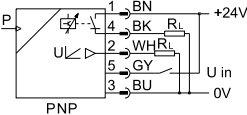
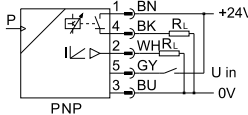
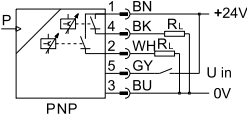
Tab. 18 Pin allocation OVEM ... PU/PI

Plug	Pin	Wire colour ¹⁾	Function	
	1	brown (BN)	L+	+24 V
	2	white (WH)	DO1	digital output Out A/Out A (air-save) (PNP)
	3	blue (BU)	L-	0 V
	4	black (BK)	DI2	digital switching input (ejection) (PNP)

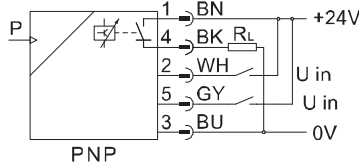
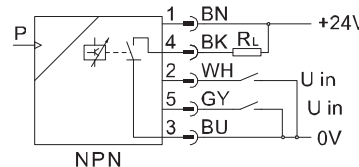
Plug	Pin	Wire colour ¹⁾	Function
	5	grey (GY)	DI1 digital switching input (suction) (PNP)

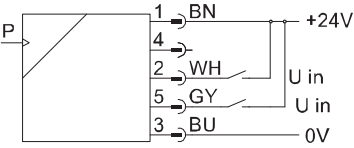
1) When using the connecting cable as per Accessories

Tab. 19 Pin allocation OVEM-...-1PD

Circuit Diagrams	
OVEM-...-2P	OVEM-...-2N
	
OVEM-...-PU	OVEM-...-PI
	
OVEM-...-1PD	
	

Tab. 20 Circuit diagrams for vacuum generator

Circuit Diagrams	
OVEM-...-1P	OVEM-...-1N
	

Circuit Diagrams	
OVEM without vacuum sensor	
	

Tab. 21 Circuit diagrams for vacuum generator

8 Commissioning

i

Commissioning by qualified personnel.

8.1 Commissioning the vacuum generator

At initial commissioning, the vacuum generator is placed in operation with the factory settings
→ Tab. 22 Factory settings.

Requirement

Vacuum generator is fully mounted and connected → 6 Assembly.

Checking operating conditions

- Check operating conditions and critical limits → 14 Technical data.

Commissioning the vacuum generator OVEM-...-OE/-OPE

1. Apply operating pressure to supply port (1).
 ↳ Negative pressure is generated at the vacuum port (2).
2. Switch on the operating voltage.
 ↳ The current pressure is displayed and the vacuum generator is ready for operation.

Commissioning the vacuum generator OVEM-...-CE/-CPE

1. Apply operating pressure to supply port (1).
2. Switch on the operating voltage.
3. Activate suction: apply input signal to pin 5.
 ↳ Negative pressure is generated at the vacuum port (2). The current pressure is displayed and the vacuum generator is ready for operation.

Changing the operating pressure changes the power of the negative pressure at the vacuum port. This allows the vacuum to be adjusted.

Functions and parameters can be specified:

- manually at the device → EDIT mode
- by teach-in → TEACH mode

8.2 Setting the intensity of the ejector pulse

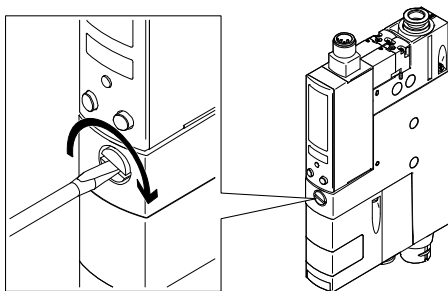



Fig. 14 Set the intensity of the ejector pulse

Requirement

- Vacuum generator is in operation

Feed through with automatic ejector pulse (-2P/-2N/-NU/-NI/-PU/-PI)

1. Screw in the flow control screw  completely
 - ↳ The channel for the ejector pulse is closed. An ejector pulse is not generated.
2. Switch on vacuum generation.
 - ↳ Negative pressure is generated at the vacuum port.
3. Switch off vacuum generation.
4. Unscrew flow control screw slightly.
 - ↳ An automatic ejector pulse is generated. If an automatic ejector pulse is not generated, operate the mechanical manual override of the ejector pulse solenoid valve.
5. Screw the flow control screw out or in to adjust the ejector pulse to the required intensity.



Setting the ejector pulse duration → 9.1 Setting the ejector pulse duration



The use of large suction cups with connectors can create a device-independent vacuum due to the interference resistance when the suction cup with connector is detached from the workpiece. Set up the ejector pulse accordingly.

Requirement

- Vacuum generator is in operation

Procedure without automatic ejector pulse (1PD)

1. Completely screw in flow control screw for regulation of the ejector pulse.
2. Switch on vacuum generation.
 - ↳ Negative pressure is generated at the vacuum port (2).
3. Switch off vacuum generation.

4. Switch on solenoid valve for ejector pulse.
 - ↳ An ejector pulse is not generated.
5. Switch off solenoid valve for ejector pulse.
6. Slightly unscrew the flow control screw to regulate the ejector pulse.
7. Switch on solenoid valve for ejector pulse.
 - ↳ An ejector pulse is generated.
8. Repeat steps 1 to 7 until the required intensity of the ejector pulse is set.

i

The use of large suction cups with connectors can create a device-independent vacuum due to the interference resistance when the suction cup with connector is detached from the workpiece.
Set up the ejector pulse accordingly.

9 Operation and use

Additional information on operating statuses and menu structure

→ 5.2.8 Operating statuses and menu structure

9.1 Setting the ejector pulse duration

Requirements

- RUN mode is active.
- Security code is not active.

Processing

1. Press the EDIT button.
 - ↳ [A] flashes and EDIT mode is active.
2. Press B pushbutton.
 - ↳ [B] + segment L18 flash.
3. Press the EDIT button.
 - ↳ [msec], [] and [] flash.
4. Set time (in ms) with the A button and the B button. To deactivate the ejector pulse, set to OFF.
5. Press and hold the EDIT button for 3 seconds.
 - ↳ RUN mode is active.

i

When large suction grippers are used, a vacuum independent of the device may be built up for physical reasons. The result is that the workpiece may not be released from the suction gripper, even if the ejector pulse is set to a sufficiently long duration.

9.2 Configuring switching outputs

Display settings of the switching outputs



The process for displaying the settings of the switching outputs Out A (A-pushbutton) and Out B (B-pushbutton) is basically identical. In addition, the configuration of the switching output and the duration of the ejector pulse is displayed for switching output Out B. The process is described below using switching output Out A as an example.

Requirement

- RUN mode is active.

Processing

1. Press the A pushbutton.
 - ↳ SHOW mode is active. The error number is displayed in case of errors.
2. Press the A pushbutton.
 - ↳ The following settings will be displayed:
 - switching function (threshold value comparator or window comparator)
 - Switching points [SP] or [SP][min].
 - Switching characteristic [NO/NC]
3. Press the A pushbutton.
 - ↳ Only with Window comparator switching function: switching point [SP], [max] is displayed.
 - Press the A pushbutton.
 - Hysteresis [HY] is displayed.
4. Press the A pushbutton.
 - ↳ Minimum pressure value is displayed.
5. Press the A pushbutton.
 - ↳ Maximum pressure value is displayed.
6. Press the A pushbutton.
 - ↳ RUN mode is active.

9.3 Setting the switching characteristics of a switching output



The process for setting the switching outputs Out A (A-pushbutton) and Out B (B-pushbutton) is basically identical. The switching output Out B must also be defined as switching output In A1, because Out B can also be configured as a diagnostic message channel → 9.4 Set diagnostic message channel. The process is described below using switching output Out A as an example.

Requirements

- RUN mode is active.
- Switching output Out B is defined as switching output In A1.
- Security code is not active.

Processing

1. Press the EDIT button.
 - ↳ [A] flashes. EDIT mode is active.
2. Press B pushbutton.
 - ↳ [B] flashes.
3. Press the EDIT button.
 - ↳ Display <InA1>
4. Press the EDIT button.
 - ↳ The currently set switching function flashes (threshold value comparator or window comparator).
5. Set switching function using the A or B pushbutton.
6. Press the EDIT button.
 - ↳ [SP] flashes (threshold value comparator) or [SP], [min] flashes (window comparator).
7. Set switching point (SP or SPmin) with the A or B pushbutton.
8. Press the EDIT button.
 - ↳ Only with switching function window comparator: [SP], [max] flashes.
 - Set switching point (SPmax) with the A or B pushbutton.
 - Press the EDIT button.
 - [HY] flashes.
9. Set hysteresis [HY] with the A or B pushbutton.
10. Press the EDIT button.
 - ↳ [NO] or [NC] flashes.
11. Set the switching characteristic [NO/NC] with the A or B pushbutton.
12. Press the EDIT button.
 - ↳ RUN mode is active.

9.4 Set diagnostic message channel



If switching output Out B is set as diagnostic message channel (dl 1 or dl 2), switching output Out B can no longer be used as switching output In A1.

Requirements

- RUN mode is active.
- Security code is not active.

Processing

1. Press the EDIT button.
 - ↳ [A] flashes. EDIT mode is active.
2. Press B pushbutton.
 - ↳ [B] flashes.
3. Press the EDIT button.
 - ↳ If Out B is defined as switching output, <InA1> is displayed.
4. Set the diagnostic message channel (dl 1 or dl 2) using the A or B pushbutton.

5. Press the EDIT button.
 ↳ [NO] or [NC] flashes.
6. Set the switching characteristic [NO/NC] with the A or B pushbutton.
7. Press the EDIT button.
 ↳ RUN mode is active.

9.5 Teach-in switching point



The air saving function is automatically deactivated during teach-in. If the pressure differential between the teach points is too low, teach-in will not work.



The process is the same for teach-in of switching outputs Out A (A pushbutton) and Out B (B pushbutton). The process is described below using switching output Out A as an example.

Requirements

- RUN mode is active.
- Switching function is set.
- Security code is not active.

Procedure

Object gripped or object not gripped – the sequence is freely selectable.

1. Set the vacuum for the first teach point.
2. Press the A pushbutton and the EDIT button simultaneously.
 ↳ – TEACH mode is active.
 – Air saving function is deactivated.
 – Measured value will then be taken as first teach point (TP1).
 – [A] and [TeachIn] flash.
3. Set the vacuum for the second teach point (TP2).
4. Press the A pushbutton and the EDIT button simultaneously.
 ↳ – Measured value is taken as second teach point (TP2).
 – Switching points (SP or SPmin and SPmax) are valid.
 – Air saving function is activated.
 – RUN mode is active.



The hysteresis is adjusted to the teach-in values. Set hysteresis (→ 9.2 Configuring switching outputs).

Recommendation: check the teach-in values in a test run.

9.6 Deleting minimum or maximum pressure value

Requirements

- RUN mode is active.

Processing

1. Press the A pushbutton.
↳ SHOW mode is active.
If there are errors, the error numbers are shown.
2. Repeatedly press the A pushbutton until the minimum pressure value is displayed.
3. Press the A pushbutton to see the next value.
Press the EDIT button to delete the minimum pressure value.
↳ The minimum pressure value is deleted.
4. Press the A pushbutton.
↳ Maximum pressure value is displayed.
5. Press the A pushbutton to return to RUN mode.
Press the EDIT button to delete the maximum pressure value.
↳ The maximum pressure value is deleted.
6. Press the A pushbutton.
↳ RUN mode is active.

9.7 Setting critical limits for the evacuation and air supply times

Requirements

- EDIT mode is active and [Out A] flashes.
- Security code is not active.

Processing

1. Press the A pushbutton.
↳ Display <SPEC>
2. Press the EDIT button.
↳ [Option] flashes.
3. Press the EDIT button.
↳ [Lock] flashes.
4. Press the EDIT button.
↳ [msec] + [] + [SP] + [max] flash.
5. Set the maximum evacuation time using the A pushbutton and B pushbutton.
[OFF]: evacuation time monitoring is not active.
6. Press the EDIT button.
↳ [msec] + [SP] + [max] and [] flash.
7. Set the maximum air supply time using the A pushbutton and B pushbutton.
[OFF]: air supply time monitoring is not active.
8. Press the EDIT button.
↳ RUN mode is active.

9.8 Teaching evacuation and air supply time

Requirements

- RUN mode is active.
- Security code is not active.
- Switching function is set.

Processing

1. Press the A and B pushbuttons and EDIT button simultaneously.
 - ↳ – TEACH mode is active.
 - [TeachIn] and the diagnostics segments flash.
2. Measure at least one clock cycle.



An average is calculated from the measured cycles.

The more cycles are run the better the value. The teach-in values are applied with a function reserve of 100%.

3. Press the A pushbutton, B pushbutton and EDIT button.
 - ↳ RUN mode is active.



If the switching points or the intensity of the ejector pulse are changed, teach-in the evacuation and air supply times again.

Recommendation: check the teach-in values in a test run.

9.9 Displaying evacuation and air supply times

Requirement

- RUN mode is active.

Processing

1. Press A and B pushbuttons simultaneously.
 - ↳ – SHOW mode is active.
 - Evacuation time critical limit is displayed.
2. Press A and B pushbuttons simultaneously.
 - ↳ Air supply critical limit is displayed.
3. Press A and B pushbuttons simultaneously.
 - ↳ Minimum evacuation time is displayed.
4. Press A and B pushbuttons simultaneously.
 - ↳ Maximum evacuation time is displayed.
5. Press A and B pushbuttons simultaneously.
 - ↳ Minimum air supply time is displayed.
6. Press A and B pushbuttons simultaneously.
 - ↳ Maximum air supply time is displayed.
7. Press A and B pushbuttons simultaneously.
 - ↳ RUN mode is active.

9.10 Deleting evacuation and air supply times

Requirements

- SHOW mode is active.
- Minimum evacuation time is displayed.

Processing

1. Press the A and B pushbuttons simultaneously to display the next value.
Press the EDIT button to delete the displayed value.
2. Press A and B pushbuttons simultaneously.
↳ RUN mode is active.

9.11 Mechanical manual override

Both solenoid valves can be manually switched with the manual override.

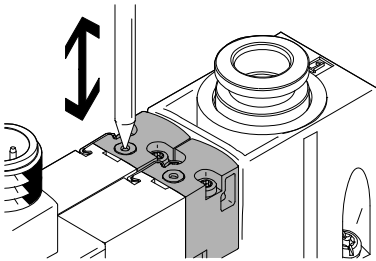


Fig. 15

1. Press in the plunger of the manual override with a blunt pin.
↳ The solenoid valve switches.
2. Remove pin.
↳ The plunger of the manual override is automatically reset. The solenoid valve returns to the initial position.

9.12 Electrical manual override

Requirements

- RUN mode is active.
- Security code is not active.

Procedure

1. Press the EDIT button.
↳ – [A] flashes.
– EDIT mode is active.
2. Press B pushbutton.
↳ [B] flashes + segment L18 illuminated.
3. Press the EDIT button.
↳ [msec], [] and [] flash. The duration of the ejector pulse is displayed.
4. Press the EDIT button.
↳ <FORC> display. Electrical manual override is active.
5. Switch solenoid valves.
 - Vacuum solenoid valve: press A pushbutton.
 - Ejector pulse solenoid valve: press B pushbutton.

6. Press the EDIT button to exit the submenu.
 - ↳ RUN mode is active.

9.13 Activating the security code

A security code can be set and activated to prevent changes by unauthorised persons.

- Factory setting: “OFF”
- The security code is reset when factory settings are restored.

Requirements

- RUN mode is active.
- Security code is not active.

Procedure

1. Press the EDIT button.
 - ↳ – [A] flashes.
 - EDIT mode is active.
2. Press the A pushbutton.
 - ↳ Display <SPEC>
3. Press the EDIT button.
 - ↳ [Option] flashes.
4. Press the EDIT button.
 - ↳ [Lock] flashes.
5. Set the security code with the A and B pushbuttons.
[OFF]: security code is not active.
6. Press and hold the EDIT button for 3 seconds.
 - ↳ RUN mode is active.

9.14 Switching air saving function on or off

Requirements

- EDIT mode is active and [Out A] flashes.
- Security code is not active.

Processing

1. Press the A pushbutton.
 - ↳ Display <SPEC>
2. Press the EDIT button.
 - ↳ [Option] flashes.
3. Switch the air saving function on or off using the A or B pushbutton.
 - [ON]: air saving function active.
 - [OFF]: air-saving function not active.
4. Press and hold the EDIT button for 3 seconds.
 - ↳ RUN mode is active.

9.15 Restore factory settings

Restoring the factory settings resets the parameters, configuration and security code to the delivery status. → Tab. 22 Factory settings

The current settings are lost.

- 1. Switch off operating voltage.
- 2. Press and hold the A-pushbutton + B-pushbutton + EDIT button.
- 3. Switch on the operating voltage.
 - ↳ Display <CLEA>
- 4. Release A-pushbutton + B-pushbutton + EDIT button.
 - ↳ The factory settings are restored.

Factory settings

Parameter		OVEM-...-H	OVEM-...-L
Switching mode of the electrical output		Threshold value comparator	
Switching logic of the electrical output		NO (normally open)	
Air saving function		Active	
Security code		OFF	
Out A (air save)	SP1 [bar]	-0.7	-0.4
	Hysteresis [bar]	0.25	
Out A	SP1 [bar]	-0.7	-0.4
	SP2 [bar]	-0.97	-0.67
	Hysteresis [bar]	0.25	0.1
Out B ¹⁾	SP1 [bar]	-0.5	-0.2
	SP2 [bar]	-0.71	-0.41
	Hysteresis [bar]	0.2	0.1
Duration of ejector pulse ¹⁾	[ms]	200	

1) parameter not available for OVEM-...-1PD


Tab. 22 Factory settings

10 Maintenance and care

Clean device

- 1. Switch off energy sources:
 - Operating voltage
 - Compressed air
- 2. Clean device with non-abrasive cleaning agents.
- 3. Check air filter through the display window for dirt.

Replace air filter



The air filter cannot be replaced in the vacuum generator OVEM-...-20/-30-C

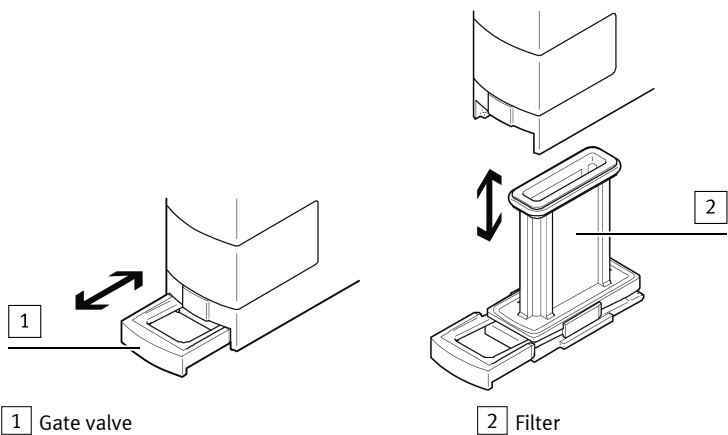


Fig. 16 Remove/install air filter

1. Exhaust the vacuum generator.
2. Carefully pull gate valve **1** out to the first detent. The gate valve must stay in this position on the filter.
3. Pull filter **2** out. Clean with white spirit.
4. Push filter into the housing.
5. Push in gate valve.
↳ The gate valve pushes the filter into the vacuum generator.

11 Fault clearance

The diagnostic messages are shown as error code on the display. For variants with 2 switching outputs (OVEM-...-2P/-2N) one of the two logical channels of the switching output Out B can also be used as a diagnostic message channel → 9.4 Set diagnostic message channel. The diagnostic message channel can be configured as a normally open (N/O contact) or a normally closed (N/C contact).

11.1 Diagnostic levels

There are 4 diagnostic levels. The backlight of the display shows red for messages of diagnostic levels 1 to 3.

Diagnostic level	Diagnostic message channel	Description
0	no message	Device is OK.
1	logical channel dl 1 is active	no restriction in function yet but operating parameters are deteriorating

Dia- gnostic level	Diagnostic message channel	Description
2	logical channel dl 1 or dl 2 is active	Function still ensured, but with restrictions (e.g. higher power consumption). Emergency operation, maintenance urgently required.
3	logical channel dl 1 or dl 2 is active	Function no longer ensured. All controllable outputs of the device are inactive.

Tab. 23 Diagnostic levels for switching output Out B and display

If the evacuation and pressurisation time is to be monitored, set the critical limits for the evacuation and pressurisation time → 9.14 Switching air saving function on or off.

11.2 Error messages and error codes

Display	Dia- gnostic level	Description	Remedy
Er01	3	Hardware errors in device	– Replace device.
Er17	3	Supply voltage is too high or too low (error)	– Check supply voltage.
Er20	2	permissible device temperature exceeded	– Keep device away from heat sources.
Er21	2	Short-circuit Out A	– Check output for overload. – Check installation.
Er32	2	OVEM-...-1PD: Vacuum solenoid valve does not switch or does not switch correctly	– Press mechanical manual override several times. – Check supply voltage. – Replace device.
Er33	2	except for OVEM-...-1PD: Solenoid valve does not switch or does not switch correctly. Plunger does not move; current through solenoid coil is too low; short circuit in solenoid coil	– Press mechanical manual override several times. – Check supply voltage. – Replace device.
		OVEM-...-1PD: Ejector pulse solenoid valve does not switch or does not switch correctly	

Display	Diagnostic level	Description	Remedy
Er34	1	Evacuation time exceeded in 2 of 5 cycles	– Check for leakage.
Er35	2	Evacuation time exceeded by a factor of two in 2 of 5 cycles	
Er36	1	Air supply time exceeded in 2 of 5 cycles	– Check for leakage. – Extend air supply time. – Check throttle setting.
Er37	2	Air supply time exceeded in 2 of 5 cycles	
Er38	2	Switching frequency of air saving function > 1 Hz (warning)	– Check for leakage.
Er39	2	SP1 for Out A not reached after 10 s	– Check for leakage. – Check compressed air supply.
		Switch-back threshold below specification (active air saving function and threshold value comparator)	– Check switching thresholds. – Check settings for Out A. – Check compressed air supply.
		upper trigger level above or lower trigger level below specification (window comparator)	
Er40	2	Supply voltage too high (warning)	– Check supply voltage.
Er41	2	Supply voltage too low (warning)	

Tab. 24 Error messages, error codes, diagnostic levels and error description

11.3 Malfunctions

Malfunction	Possible cause	Remedy
Workpiece is not released by the suction gripper	device-independent vacuum between workpiece and suction gripper, ejector pulse not activated or sufficiently dimensioned	– Activate ejector pulse when lifting the suction gripper. – Increase duration and intensity of ejector pulse.
	Tubing dimensioned incorrectly	– Replace tubing (tubing dimensions → 7.1 Pneumatic installation).
	Flow control screw closed	– Open flow control screw.

Malfunction	Possible cause	Remedy
Switching output does not react in accordance with the settings	Short circuit or overload at the output	– Eliminate short circuit/overload.
	Device faulty	– Replace device.
	Incorrect switching point taught (e.g. at 0 bar)	Repeat teach procedure
No display	Operating voltage faulty	– Apply permissible operating voltage → 7.2 Electrical installation.
	Electrical connections swapped	– Connect device correctly → 7.1 Pneumatic installation.
	No control signal	Check controller
	Device faulty	– Replace device.
Incomplete display	Display faulty	– Replace device.
Pressure indicator incorrect	Pneumatic connections swapped	– Connect device correctly → 7.1 Pneumatic installation.
Settings cannot be edited, "[Lock]" is displayed	Security code is active	– Enter the security code → 9.13 Activating the security code.
"[min]" + "[max]" flashing simultaneously	Diagnostic level 1 active	– → 11.1 Diagnostic levels
Display + "[min]" + "[max]" flashing simultaneously	Diagnostic level 2 active	– → 11.1 Diagnostic levels
Display flashes and error code appears	Diagnostic level 3 active	– → 11.1 Diagnostic levels
"[Option]" flashing	Air saving function deactivated because outside the limit value	– Check for leakage.

Tab. 25 Malfunctions

12 Disassembly

- Switch off energy sources:
 - Operating voltage
 - Compressed air
- Disconnect pneumatic and electrical connections from the device.
- Loosen mountings and remove device.

13 Disposal

ENVIRONMENT!

Send the packaging and product for environmentally sound recycling in accordance with the current regulations → www.festo.com/sp.

14 Technical data

OVEM-...	-05	-07/-10	-14/-20-B/-BN	-20/-30-C	
General					
Approvals	c UL us - listed (OL)				
	RCM compliance mark				
	KC mark				
Characteristic values					
Operating pressure OVEM-...-QS/-GN/-PL	[bar]	2 ... 6			
Operating pressure OVEM-...-QO/-GO/-PO	[bar]	2 ... 8			
Pressure measuring range	[bar]	-1 ... 0			
Overload pressure at vacuum port	[bar]	≤ 5			
Ready-state delay	[ms]	≤ 500			
Dead time (evacuation and ejection)	[ms]	< 10	≤ 20	≤ 35	≤ 60
Electronics					
Nominal operating voltage	[V DC]	24 ± 15 %			
Max. output current (per switching output)	[mA]	100			
Voltage drop (for all switching outputs)	[V]	≤ 1.5			
No-load supply current	[mA]	< 70			
Coil characteristics 24 V DC – low current phase	[W]	0.3			

Technical data

OVEM-...		-05	-07/-10	-14/-20-B/-BN	-20/-30-C
Coil characteristics 24 V DC – high current phase	[W]	2.55			
Time until current reduction	[ms]	80			
Capacitive load maximum DC	[mF]	≤ 100			
Overload protection		Present			
Inductive protective circuit		adapted to MZ, MY, ME coils			
Insulation voltage	[V]	50			
Surge resistance	[kV]	0.8			
Max. current consumption					
OVEM-...-2P/-2N	[mA]	270			
OVEM-...-PI/-PU	[mA]	180			
OVEM-...-1PD	[mA]	170			
Accuracy	[% FS]	± 3			
Hysteresis	[% FS]	± 0.1			
Short circuit current rating		Yes			
Reverse polarity protection		For all electrical connections			
Display/operation					
Setting range threshold values	[bar]	-0.999 ... 0			
Hysteresis setting range	[bar]	-0.9 ... 0			
Setting range ejector pulse duration	[ms]	20 ... 9999	40 ... 9999		
Environment					
Ambient temperature	[°C]	0 ... 50			
Temperature of medium	[°C]	0 ... 50			

Technical data

OVEM...	-05	-07/-10	-14/-20-B/-BN	-20/-30-C
Contamination level	3			
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]			
Note on the operating medium	Lubricated operation not possible			
Shock resistance (in accordance with IEC 60068/EN 60068)	30 g acceleration with 11 ms duration (half-sine)			
Vibration resistance (in accordance with EN 60068-2)	10...60 Hz: 0.35 mm/ 60...150 Hz: 5g			
Protection class	III			
Degree of protection	IP 65 ¹⁾			
Relative humidity [%]	5 ... 85			
Interference emission	as per EN 61000-6-4			
Immunity to interference	as per EN 61000-6-2			
Maximum permissible signal line length [m]	20			
Materials				
Information on materials – seals	NBR			HNBR
Information on materials – housing	Die-cast aluminium, PA reinforced			Wrought aluminium alloy
Information on materials – plug housing	Nickel-plated brass			

1) Degree of protection has not been evaluated by UL

Tab. 26 Technical data

Copyright:
Festo SE & Co. KG
73734 Esslingen
Ruiter Straße 82
Germany

Phone:
+49 711 347-0

Internet:
www.festo.com