

Vacuum generators

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Vacuum generators OVEM

Key features

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At a glance

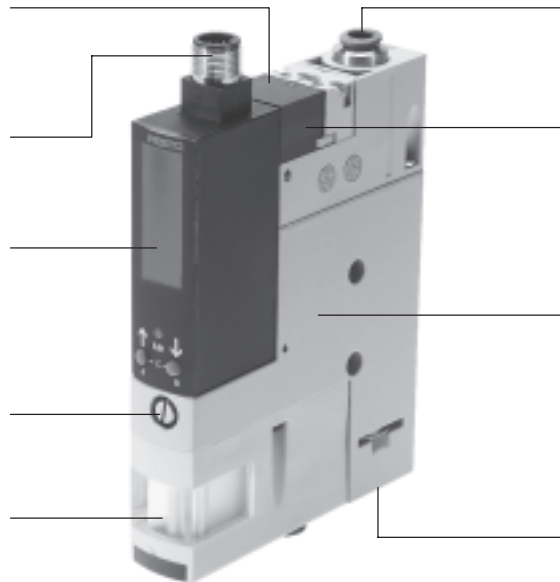
Accelerated vacuum reduction for placing the workpiece safely, through the use of an integrated solenoid valve to control the ejector pulse

Central electrical connection with M12 plug

Monitoring and visualization of the vacuum by means of a vacuum switch with LCD display (bar)

Adjustment of the ejector impulse via a flow control screw

An integrated filter prevents soiling of the vacuum generator



Quick and secure installation thanks to a QS fitting

Fast vacuum build-up through integrated solenoid valve for controlling the compressed air supply

Pressure drop is prevented by an integrated non-return valve

Maintenance-free operation and reduced noise level through integrated, open silencer

The innovative vacuum generator

Wide range of configuration options

The modular vacuum generator series OVEM offers a wide range of individual selectable functions, making it possible to achieve a solution for the most varied of applications.

- 3 nominal sizes
0.45 ... 0.95 mm
- Integrated solenoid valve for controlling the ejector pulse

- Integrated solenoid valve for controlling the compressed air using two different switching functions
 - NC – normally closed
 - NO – normally open

Space-saving

All functions are compactly integrated in one unit.

- No protruding elements such as e.g. valves or vacuum switches
- Space-optimised installation is possible as all the control elements can be accessed from one side

Process reliability

- Permanent monitoring of the entire vacuum system via a vacuum switch with LCD display to reduce downtimes (condition monitoring)
- Prevention of pressure loss by means of an integrated air-saving function in conjunction with an integrated non-return valve

Cost-effective

- Short switching times thanks to integrated solenoid valves
 - Vacuum ON/OFF
 - Ejector pulse
- Quick, precise and safe placement of the workpiece via the ejector pulse
- Cost saving through integrated air-saving function
- Cost saving through preventive maintenance/service thanks to maintenance indicator

User-friendly

- Simple installation with M12 plug and QS fittings
- Simple mounting via screws
- All control elements on one side
- Vacuum is displayed numerically and as a bar chart on the LCD display
- Important parameters and diagnostic information are displayed on the LCD display
- Quiet operation due to integrated silencers

Easy to maintain

- Integrated filter with inspection window for maintenance display
- Reduced soiling of the vacuum generator thanks to an open silencer

Vacuum generators OVEM

Key features

Operational principle of OVEM

Vacuum ON/OFF

The compressed air supply is controlled by an integrated solenoid valve. The solenoid valve can be supplied in two different switching functions NC/NO.

- NC – normally closed:
The vacuum is generated when the vacuum generator is pressurised with compressed air and the solenoid valve has been switched.
- NO – normally open:
The vacuum is generated when the vacuum generator is pressurised with compressed air and the solenoid valve is in the normal position.

Ejector pulse

With a second integrated solenoid valve, an ejector pulse is activated and generated after the vacuum is switched off to release the workpiece safely from the suction cup and to reduce the vacuum quickly.

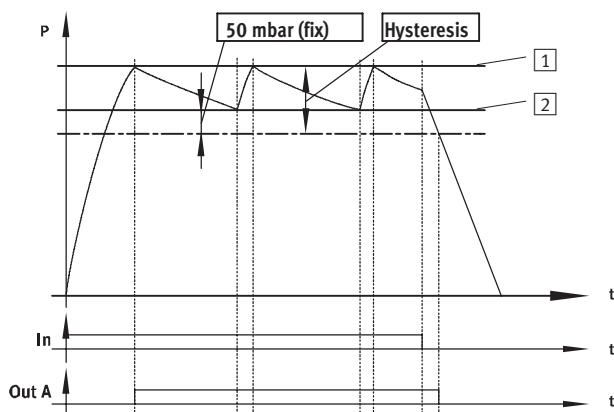
Vacuum switch

The set reference value for the generated vacuum is monitored by an integrated vacuum switch. If the reference value is reached or if it is not reached due to malfunctions (e.g. leak, dropped workpiece), the vacuum switch emits an electrical signal. Vacuum monitoring is the basis for the vacuum generator's air-saving function.

Switching outputs/Switching input

The vacuum generator can be connected to higher-level systems by means of two digital switching outputs and one digital switching input. The switching outputs can be configured as normally open or normally closed contacts. The switching function of the outputs can be stipulated as a threshold or window comparator.

Air-saving function LS (-CE, -OE)



If the desired threshold **1** is reached for the vacuum, vacuum generation is automatically switched off. A non-return valve prevents the reduction of the vacuum. Nonetheless, a leak (due to e. g. rough workpiece surfaces) will slowly reduce

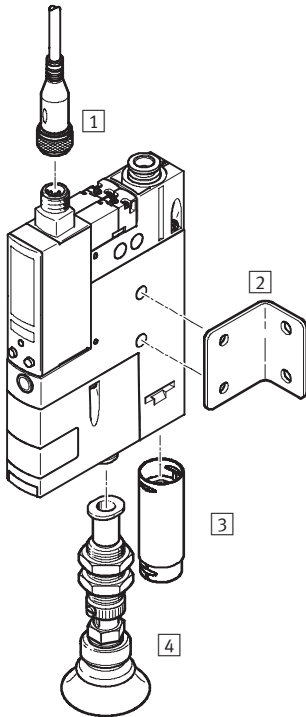
the vacuum. If the pressure drops below the set threshold value **2** vacuum generation is switched on automatically. Vacuum is generated until the set threshold value **1** is reached again.

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Peripherals overview

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Peripherals overview



Mounting attachments and accessories		OVEM		→ Page/ Internet
		05	07/10	
1	Connecting cable NEBU-M12G5	■	■	nebu
2	Mounting bracket HRM-1	■	■	hrm-1
3	Silencer extension UOMS-1/4	–	■	uoms
4	Suction gripper			
–	ESG	■	■	esg
–	Suction cup holder ESH	■	■	esh
–	Suction cup ESS	■	■	ess

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Type codes

		OVEM	–	10	–	H	–	B	–	QO	–	CE	–	N	–	2P
Type																
OVEM	Vacuum generator															
Nominal size of Laval nozzle [mm]																
05	0.45															
07	0.7															
10	0.95															
Ejector characteristic																
H	High vacuum															
Housing width																
B	Grid dimension 20 mm															
Pneumatic connections																
QO	P-V via QS fitting, R via open silencer															
Normal position of the vacuum generator																
ON	NO, normally open (vacuum generation)															
OE	NO, normally open with ejector pulse															
CN	NC, normally closed (vacuum generation)															
CE	NC, normally closed with ejector pulse															
Electrical connection																
N	M12 plug (5-pin)															
Vacuum sensor, electrical switching output																
2P	2 switching outputs PNP															

Vacuum generators OVEM

Technical data

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Function


NC, normally closed:

- Silencer, open
- Ejector pulse, silencer open

NO, normally open:

- Silencer, open
- Ejector pulse, silencer open

 Temperature range
0 ... +50 °C

 Operating pressure
2 ... 8 bar



General technical data				
Type		OVEM-05	OVEM-07	OVEM-10
Nominal size of Laval nozzle	[mm]	0.45	0.7	0.95
Ejector characteristic		High vacuum/Standard H		
Pneumatic connection 1		QS6	QS8	QS8
Vacuum port		QS8	QS8	QS8
Pneumatic connection 3		Open silencer, integrated		
Integrated function	ON/CN	On-off valve, electrical		
		Vacuum switch		
		Filter		
	OE/CE	On-off valve, electrical		
		Ejector pulse, electrical		
		Flow control		
		Vacuum switch		
		Air-saving function, electrical		
		Non-return valve		
		Filter		
Type of mounting		Via through-holes		
		With female thread		
		Via accessories		
Mounting position		Any		

Operating and environmental conditions				
Type		OVEM-05	OVEM-07	OVEM-10
Operating pressure	[bar]	2 ... 8		
Operating medium		Filtered compressed air, unlubricated, grade of filtration 40 µm		
Ambient temperature	[°C]	0 ... +50		
Temperature of medium	[°C]	0 ... +50		
CE mark (see declaration of conformity)		In accordance with EU EMC directive		
Certification		C tick		

Vacuum generators OVEM

Technical data

Performance data – High vacuum												
Type	OVEM-05				OVEM-07				OVEM-10			
Normal position of the vacuum generator	ON	OE	CN	CE	ON	OE	CN	CE	ON	OE	CN	CE
Max. vacuum [%]	93											
Operating pressure for max. vacuum [bar]	5.1				4.1				3.5			
Max. suction rate with respect to atmosphere [l/min]	6				16				19			
Suction rate at $p_1 = 6$ bar [l/min]	5.9				15.1				16.8			
Pressurisation time ¹⁾ for 1 l volume, at $p_1 = 6$ bar [s]	4.8	2	4.8	2	1.9	0.4	1.9	0.4	1.1	0.2	1.2	0.2
Noise level at $p_1 = 6$ bar db(A)	51.1				57.8				72.8			

1) Time required to build up vacuum to -0.05 bar.

Technical data – Vacuum switch	
Mechanical	
Measured variable	Relative pressure
Measuring principle	Piezoresistive
Pressure measuring range [bar]	$-1 \dots 0$
Accuracy FS ¹⁾ [%]	3
Reproducibility of switching point FS ¹⁾ [%]	0.6
Setting option	Via display and keys
Threshold value setting range [bar]	$-0.999 \dots 0$
Hysteresis setting range [bar]	$-0.9 \dots 0$
Type of display	4-character alphanumerical, backlit LCD
Indicating range [bar]	$-0.999 \dots 0$
Switching status display	Optical
Switching position display	LCD
Electrical	
Electrical connection	Plug M12x1, 5-pin
Switching output	2x PNP
Standard switching input	IEC 61131-2
Switching element function	NO contact NC contact
Switching function	Window comparator Threshold comparator
Operating voltage range [V DC]	$20.4 \dots 27.6$
Max. output current [mA]	100
Residual current [mA]	0.1
Voltage drop [V]	≤ 1.5
Protection against short circuit	Yes
Protection against overloading	Yes
Protection against polarity reversal	For all electrical connections
Protection class	IP65
Electrical protection class	III

1) FS = % of the measuring range final value (full scale)

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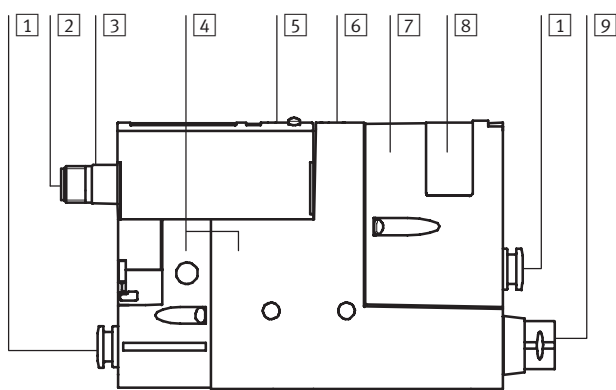
Technical data

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Technical data – Solenoid valve				
Normal position of the vacuum generator	ON	OE	CN	CE
Valve function	Open		Closed	
Duty cycle [%]	100 in conjunction with reduction of holding current			
Inductive protective circuit	Adapted to MZ, MY, ME coils			
Switch-on suppression	Yes			
Manual override	Non-detenting			
	Additionally via operating buttons			

Materials

Sectional view

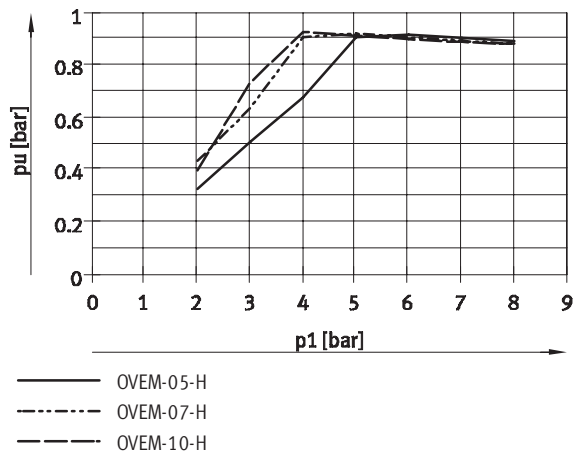


Vacuum generator OVEM-05/07/10		
1	Fitting	Nickel plated brass
2	Plug contacts	Gold-plated brass
3	Plug housing	Nickel plated brass
4	Housing	Die-cast aluminium, reinforced polyamide
5	Key pad	Thermoplastic polyurethane elastomer
6	Adjusting screw	Steel
7	Filter housing	Reinforced polyamide
8	Inspection window	Polymer
9	Silencers	Wrought aluminium alloy, PU foam
–	Jet nozzle	Wrought aluminium alloy
–	Receiver nozzle	Polyacetate
–	Filter	Fabric, polyamide, sintered steel
–	Seals	Nitrile rubber
	Note on materials	Contains paint wetting impairment substances

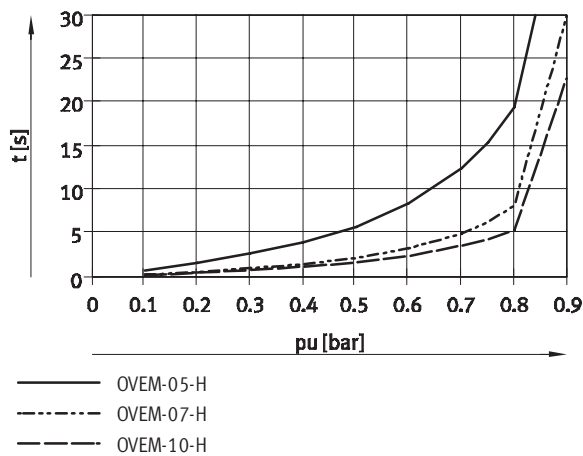
Vacuum generators OVEM

Technical data

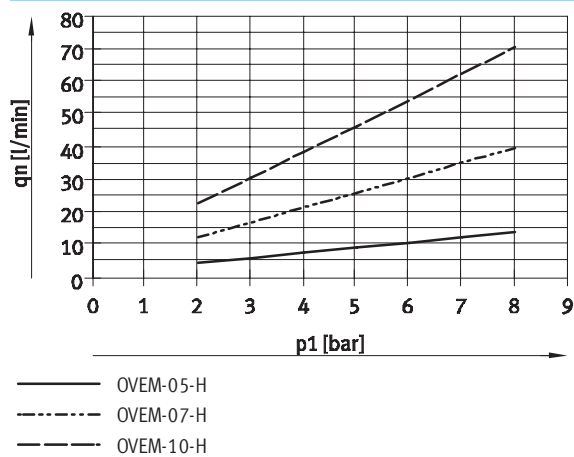
Vacuum p_u as a function of operating pressure p_1



Evacuation time t as a function of vacuum p_u for 1 l volume at 6 bar operating pressure



Air consumption q_n as a function of operating pressure p_1



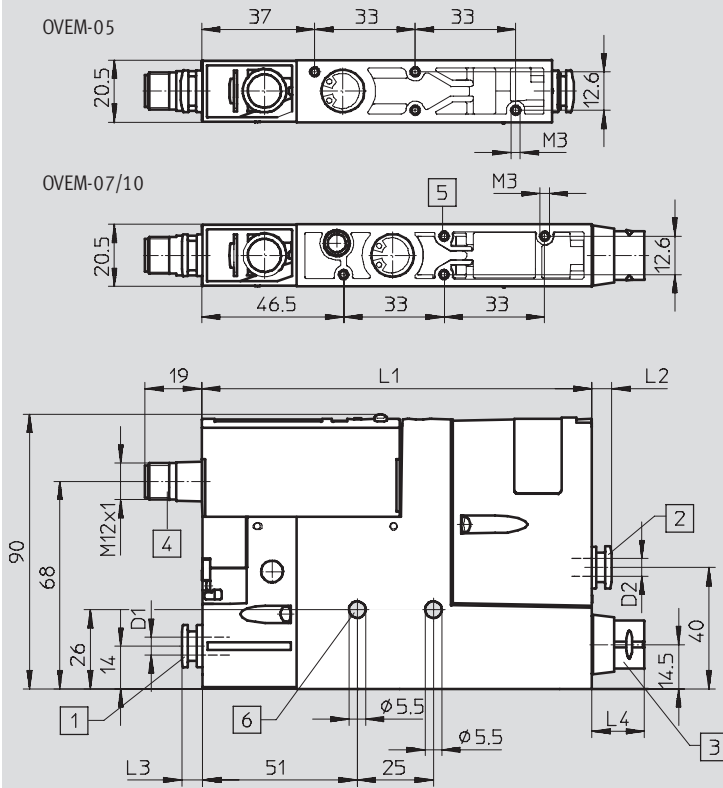
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Technical data

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Dimensions

Download CAD data → www.festo.com

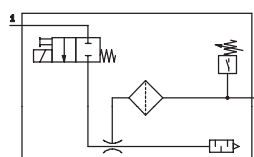
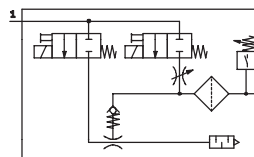
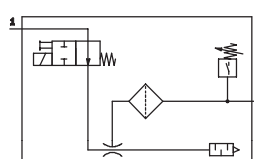
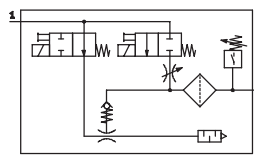


- 1 Compressed air connection
- 2 Vacuum port
- 3 Silencer
- 4 Electrical connection to fit NEBU-M12G5-K-...
- 5 Mounting thread M3
Max. tightening torque 0.8 Nm
- 6 Mounting hole
Max. tightening torque 2.5 Nm

Type	Ports		L1	L2	L3	L4
	P D1	V D2				
OVEM-05-...-Q0-...	QS6	QS6	115	6.5	6.5	—
OVEM-07-...-Q0-...	QS8	QS8	128			17.3
OVEM-10-...-Q0-...						

Vacuum generators OVEM

Technical data

Ordering data and weights					
Circuit symbol	Description	Nominal size [mm]	Weight [g]	Part No.	Type
Normally closed					
	With open silencer	0.45	317	538 834	OVEM-05-H-B-QO-CN-N-2P
		0.7	322	538 835	OVEM-07-H-B-QO-CN-N-2P
		0.95	322	538 836	OVEM-10-H-B-QO-CN-N-2P
	With ejector pulse and open silencer	0.45	325	538 831	OVEM-05-H-B-QO-CE-N-2P
		0.7	331	538 832	OVEM-07-H-B-QO-CE-N-2P
		0.95	331	538 833	OVEM-10-H-B-QO-CE-N-2P
Normally open					
	With open silencer	0.45	317	538 828	OVEM-05-H-B-QO-ON-N-2P
		0.7	322	538 829	OVEM-07-H-B-QO-ON-N-2P
		0.95	322	538 830	OVEM-10-H-B-QO-ON-N-2P
	With ejector pulse and open silencer	0.45	325	538 825	OVEM-05-H-B-QO-OE-N-2P
		0.7	331	538 826	OVEM-07-H-B-QO-OE-N-2P
		0.95	331	538 827	OVEM-10-H-B-QO-OE-N-2P

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Ordering data – Modular products

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M Mandatory data										O Options					
Module No.		Laval nozzle		Housing size/width		Normal position of the vacuum ejector		Vacuum switch, electrical switching output							
Vacuum generator		Vacuum type		Pneumatic connections		Electrical connection									
539 074	OVEM	05 07 10	H	B	QO	ON OE CN CE	N	2P							
Ordering example															
539 074	OVEM	-	05	-	H	-	B	-	QO	-	ON	-	N	-	2P

Ordering table					
Size	20	Condi- tions	Code	Enter code	
M Module No.	539 074				
Vacuum generator	Vacuum generator with vacuum valve on/off and manual override		OVEM		OVEM-
Laval nozzle [mm]	0.45		-05		
	0.7		-07		
	0.95		-10		
Vacuum type	High vacuum		-H		-H
Housing size/width [mm]	20		-B		-B
Pneumatic connections	Supply/vacuum port with QS fittings, exhaust port with open silencer		-QO		-QO
Normal position of the vacuum ejector	NO, normally open (vacuum generation)		-ON		
	NO, normally open (vacuum generation) with ejector pulse		-OE		
	NC, normally closed (no vacuum generation)		-CN		
	NC, normally closed (no vacuum generation) with ejector pulse		-CE		
Electrical connection	M12 plug (5-pin)		-N		-N
O Vacuum switch, electrical switching output	Switching output 2x PNP		-2P		

Transfer order code

539 074 OVEM - [] - H - B - QO - [] - N - []