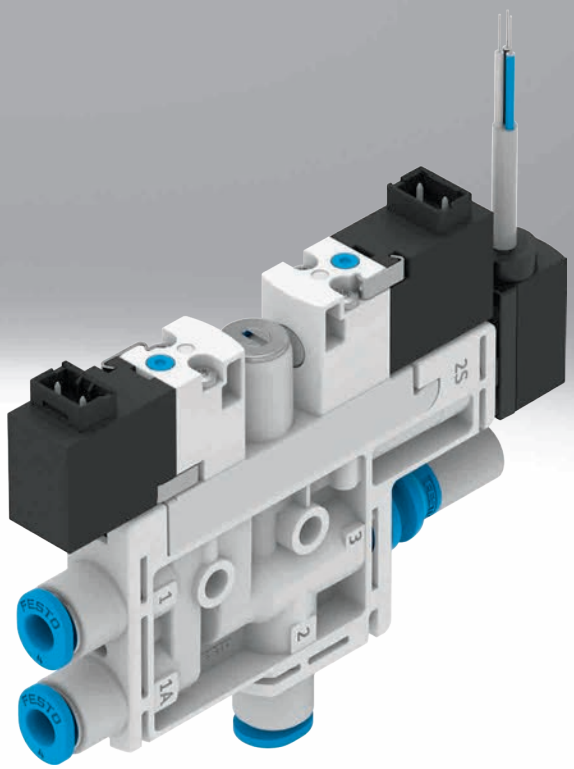
Vacuum generators OVEL/OVTL

FESTO



Key features

At a glance

Rapid reduction of vacuum for safe placement of the workpiece by a solenoid valve to control the ejector pulse, optional

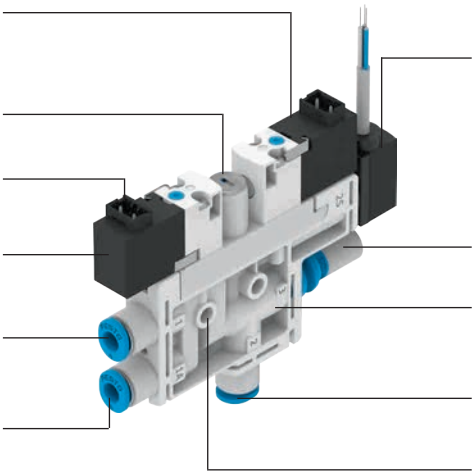
Flow control screw for adjusting the ejector pulse

Electrical connection via H3 plug

Fast vacuum build-up using a solenoid valve to control the compressed air supply

Supply port, secured with clamp strap

Additional supply port for the separate supply of the ejector pulse, optional, secured with clamp strap



Pressure transmitter SPTE/pressure sensor SPAE to monitor the vacuum, optional, secured with clamp strap

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

Vacuum generator cartridge, secured with clamp strap

Vacuum connection, secured with clamp strap

Housing with mounting holes

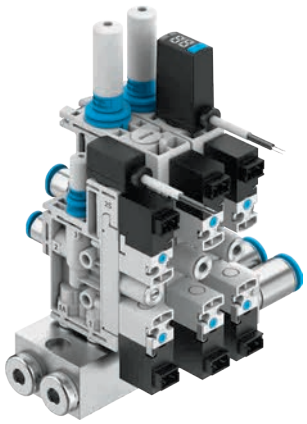
The compact vacuum generator

OVEL ➔ page 3

- Low-cost, compact vacuum generator
- Low weight
- Various output stages and vacuum types
- Short switching times thanks to integrated solenoid valves
  - Vacuum on/off
  - Ejector pulse
- Simple installation via H3 plugs and push-in fittings
- Straightforward mounting with mounting screws
- Low-noise operation due to integrated silencer
- Integrated filter
- Reduced contamination of the vacuum generator thanks to an open silencer
- Solenoid valves are switched via mechanical manual override
- Monitoring of the vacuum by a vacuum sensor
- Blocking of up to 8 vacuum generators on a single common supply manifold.

OVTL ➔ page 12

The vacuum generator OVTL is a configurable module comprising vacuum generators OVEL, the common supply manifold OABM-P and connection accessories.
All products are available from the factory fully assembled.



Functional principle OVEL

Vacuum ON/OFF

The compressed air supply is controlled by a solenoid valve. The solenoid valve can be supplied with the NC (normally closed) switching function, i.e. the vacuum is not generated until the vacuum generator is pressurised with compressed air and the solenoid valve has been switched.

Ejector pulse, optional

After the vacuum is switched off, an ejector pulse is activated and generated by a second solenoid valve to release the workpiece safely from the suction cup and to purge the vacuum quickly.

The compressed air for the ejector pulse can be supplied either via the supply port or a separate connection.

Vacuum sensor, optional

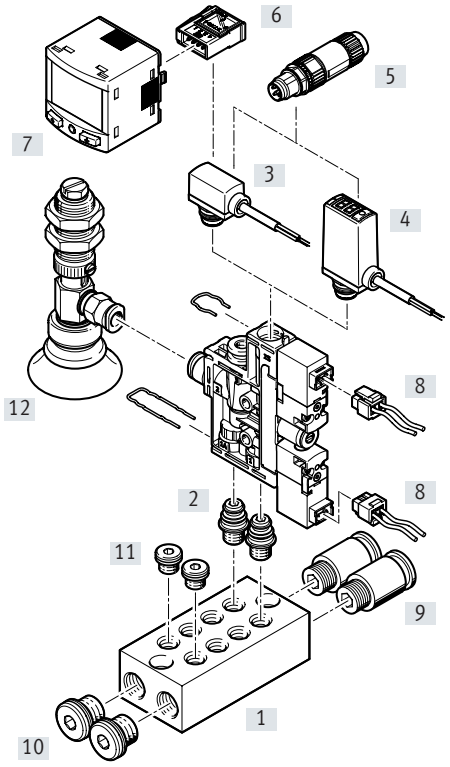
The set or taught-in reference value for the generated vacuum is monitored via a vacuum sensor.

If the reference value is reached or if it is not reached due to malfunctions (e.g. leakages, dropped workpiece), the vacuum sensor emits an electrical signal.

OVEL-...-V1B/V1V/B2B/B2V:
Pressure transmitter SPTE with an analogue output (➔ page 22).
Detection of analogue signals and conversion into digital switching signals with downstream signal converter SCDN with LCD display (➔ page 27).

OVEL-...-V1PNLK/B2PNLK:
Pressure sensor SPAE with various switching outputs and LCD display, IO-Link and teach-in function (➔ page 24).

Peripherals overview



Mounting components and accessories

		OVEL-...-PQ	OVEL-...-P	→ Page/Internet
[1]	Common supply manifold OABM-P	–	■	18
[2]	Mounting kit OABM-MK	–	■	20
[3]	Pressure transmitter SPTE	■	■	22
[4]	Pressure sensor SPAE	■	■	24
[5]	Plug NECU-S-M8G3/M12G3	■	■	27
[6]	Plug NECU-S-ECG4	■	■	27
[7]	Signal converter SCDN	■	■	27
[8]	Plug socket with cable NEBV	■	■	27
[9]	Push-in fitting QS	–	■	27
[10]	Blanking plug B-1/8	–	■	27
[11]	Blanking plug B-M7	–	■	27
[12]	Suction gripper ESG	■	■	esg
–	Suction cup holder ESH	■	■	esh
–	Suction cup with connection ESS	■	■	ess
–	Vacuum filter OAFF	■	■	21

Type codes

001	Series	
OVEL	Vacuum suction nozzle, electropneumatic	

002	Vacuum generation	
5	Laval nozzle 0.45 mm	
7	Laval nozzle 0.7 mm	
10	Laval nozzle 0.95 mm	

003	Vacuum type	
H	High vacuum	
L	High suction rate	

004	Size	
10	10	
15	15	

005	Supply air connection	
P	For P linking	
PQ	QS connections, metric	

006	Vacuum connection	
VQ3	Push-in connector 3 mm	
VQ4	Push-in connector 4 mm	
VQ6	Push-in connector 6 mm	

007	Exhaust connection	
RQ	QS connections, metric	
UA	Open silencer UO	

008	Ejector pulse connection	
	Via supply air connection	
Z	Additional connection	

009	Vacuum valve	
C	Normally closed	

010	Additional function	
	Without ejector pulse	
A	Electric ejector pulse	

011	Pressure measuring range vacuum sensor	
	Without vacuum sensor	
V1	0 ... -1 bar	
B2	-1 ... 1 bar	

012	Output signal vacuum sensor	
	Without vacuum sensor	
B	1 ... 5 V	
V	0 ... 10 V	
PNLK	PNP or NPN or IO-Link®	

013	Electrical connection	
H3	Connection pattern H, vertical plug	

Note

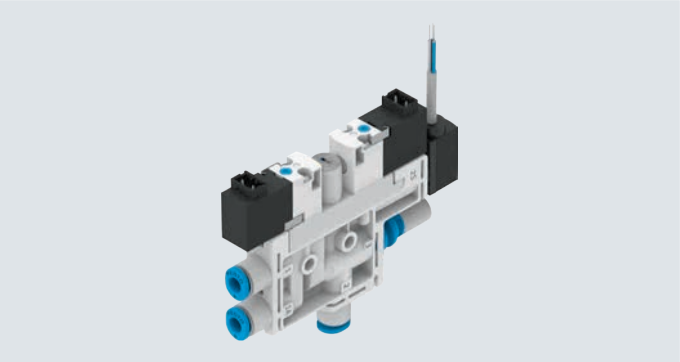
The ordering data include possible combinations.

Data sheet

Function
NC, normally closed:
- With/without ejector pulse
- Push-in connectors
- Open silencer
- With/without vacuum sensor
- Prepared for common supply manifold

Temperature range
0 ... +50°C

Operating pressure
2 ... 7 bar



General technical data

Type			OVEL-5-H/L	OVEL-7-H	OVEL-7-L	OVEL-10-H/L
Nominal width of Laval nozzle		[mm]	0.45	0.7		0.95
Grid dimension		[mm]	10	15		15
Grade of filtration		[µm]	40			
Mounting position			Any			
Type of mounting			With through-hole			
			On manifold rail			
Pneumatic connection 1	OVEL-...-P		Common line via manifold rail			
	OVEL-...-PQ-VQ3		For tubing O.D. 3 mm	–		–
	OVEL-...-PQ-VQ4		For tubing O.D. 4 mm	For tubing O.D. 4 mm		–
	OVEL-...-PQ-VQ6		–	–		For tubing O.D. 6 mm
Vacuum connection	OVEL-...-VQ3		For tubing O.D. 3 mm	–	–	–
	OVEL-...-VQ4		For tubing O.D. 4 mm	For tubing O.D. 4 mm	–	–
	OVEL-...-VQ6		–	–	For tubing O.D. 6 mm	For tubing O.D. 6 mm
Pneumatic connection 3	OVEL-...-UA		Open silencer			
	OVEL-...-RQ		For tubing O.D. 4 mm	For tubing O.D. 6 mm		For tubing O.D. 6 mm
Connection for ejector pulse[1)]	OVEL-...-Z-A		Corresponds to the selected size of pneumatic connection 1			

1) If there is no ejector pulse or the ejector pulse is generated via pneumatic connection 1, the additional connection for the ejector pulse is sealed with a blanking plug.

Technical data – Design

Type		OVEL-...-UA	OVEL-...-RQ
Design		T-shape	
Ejector characteristic	OVEL-...-H	High vacuum/standard	
	OVEL-...-L	High suction rate/standard	
Silencer design		Open	–
Integrated function		Electric on/off valve	
		Filter	
		Silencer open	–
	OVEL-...-A	Ejector pulse, electrical	
	OVEL-...-A	Flow control	
	OVEL-...-V1B/V1V/B2B/B2V	Pressure transmitter	
	OVEL-...-V1PNLK/B2PNLK	Pressure sensor	
Valve function		Closed	
Manual override		Non-detenting	

Data sheet

Operating and environmental conditions		
Operating pressure	[bar]	2 ... 7
Nominal operating pressure	[bar]	4
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
Note on the operating/pilot medium		Operation with lubricated medium not possible
Ambient temperature	[°C]	0 ... +50
Temperature of medium	[°C]	0 ... +50
Corrosion resistance CRC[1)]		2
CE marking (see declaration of conformity)[2)]		To EU EMC Directive
Degree of protection		IP40

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

2) For information about the area of use, see the EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.

Performance data – High vacuum				
Type		OVEL-5-H	OVEL-7-H	OVEL-10-H
Max. vacuum	[%]	89	92	92
Operating pressure for max. vacuum	[bar]	4.2	4.5	3.8
Operating pressure for max. suction rate	[bar]	3	4	4
Max. suction rate with respect to atmosphere	[l/min]	4	17	21
Pressurisation time at nominal operating pressure 4 bar (for 1 l volume)[1)]	[s]	2	1.2	1
Noise level at p_1 = 4 bar	[db(A)]	64	61	68

1) Time required to reduce the vacuum to a residual vacuum of –0.05 bar after switching off the operating pressure.

Performance data – High suction rate				
Type		OVEL-5-L	OVEL-7-L	OVEL-10-L
Operating pressure for max. suction rate	[bar]	5	5	6
Max. suction rate with respect to atmosphere	[l/min]	11	33	45
Pressurisation time at nominal operating pressure 4 bar (for 1 l volume)[1)]	[s]	0.8	0.4	0.4
Noise level at p_1 = 4 bar	[db(A)]	52	64	67

1) Time required to reduce the vacuum to a residual vacuum of –0.05 bar after switching off the operating pressure.

Data sheet

Technical data – Electrical connection			
Type		OVEL without ejector pulse	OVEL with ejector pulse
Solenoid valve			
Electrical connection input	Function	Vacuum generation	
		–	Ejector pulse
	Connection type	Plug	2x plug
	Connection technology	Connection pattern H	
	Number of pins/wires	2	
	Connection pattern		
	Type of mounting	Snap-locking	
Operating voltage range [V DC]		21.6 ... 26.4	
Duty cycle [%]		100	
Coil characteristics, 24 V DC [W]		1.0	
Vacuum sensor			
Electrical connection output	Function	Sensor	
	Connection type	Cable	
	Connection technology	Open end	
	Number of pins/wires	3	
Cable diameter [mm]		2.9 ±0.1	
Cable length [m]		2.5	
Conductor nominal cross section [mm^2]		0.14	
Cable characteristics		Suitable for energy chains	

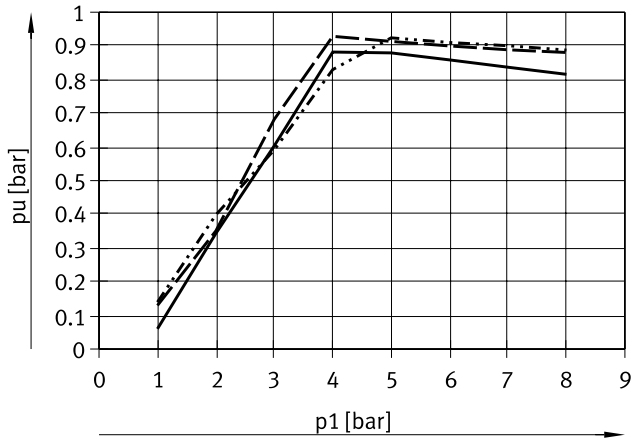
Technical data – Vacuum sensor							
Type		OVEL-...-V1B	OVEL-...-V1V	OVEL-...-B2B	OVEL-...-B2V	OVEL-...-V1PNLK	OVEL-...-B2PNLK
Mechanical							
Method of measurement		Piezoresistive pressure sensor				Piezoresistive pressure sensor with display	
Pressure measuring range	[bar]	–1 ... 0		–1 ... 1		–1 ... 0	–1 ... 1
Setting options		–				Teach-in	
						IO-Link	
						Via display and keys	
Display type		–				LED display, 2-digit	
Electrical							
Operating voltage range, sensor	[V DC]	10 ... 30	18 ... 30	10 ... 30	18 ... 30	18 ... 30	
Switching output		–				PNP/NPN switchable	
Switching element function		–				N/C or N/O contact, switchable	
Switching function		–				Freely programmable	
Analogue output	[V]	1 ... 5	0 ... 10	1 ... 5	0 ... 10	–	

Materials	
Housing	Reinforced PA
Silencer	PE
Jet nozzle	Wrought aluminium alloy
Receiving nozzle	POM
Filter	POM
Adjusting screw	Steel
Connecting thread	POM
Screws	Steel
Cable sheath	PVC (colour: grey)
Seals	NBR
Note on materials	RoHS-compliant

Data sheet

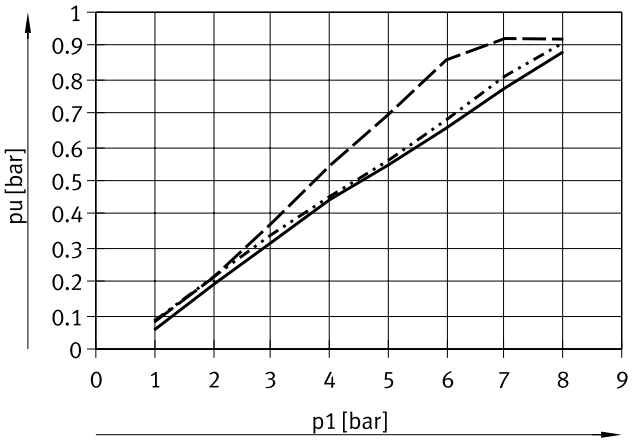
Vacuum p_u as a function of operating pressure p_1

High vacuum



OVEL-5-H
OVEL-7-H
OVEL-10-H

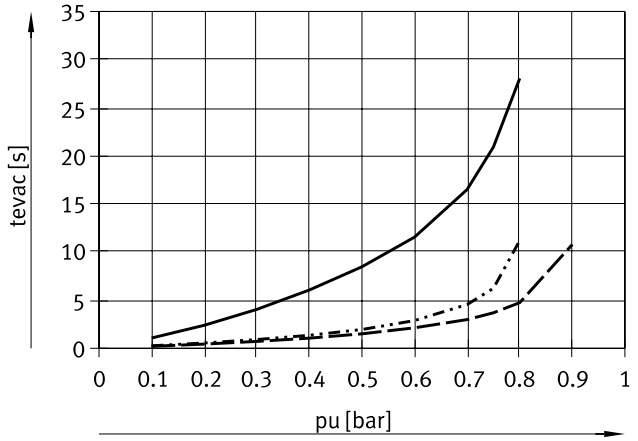
High suction rate



OVEL-5-L
OVEL-7-L
OVEL-10-L

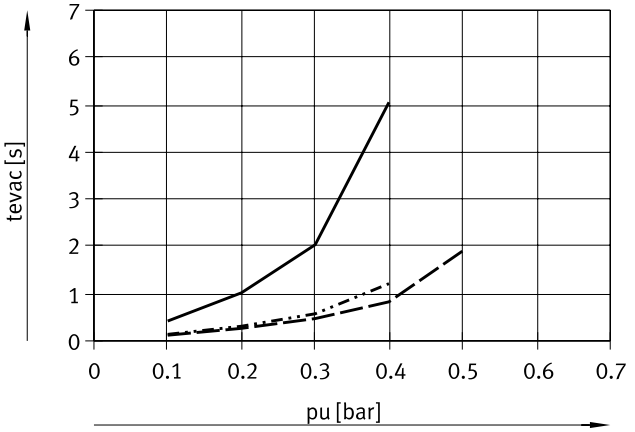
Evacuation time t_{evac} as a function of vacuum p_u for 1 l volume at 4 bar operating pressure

High vacuum



OVEL-5-H
OVEL-7-H
OVEL-10-H

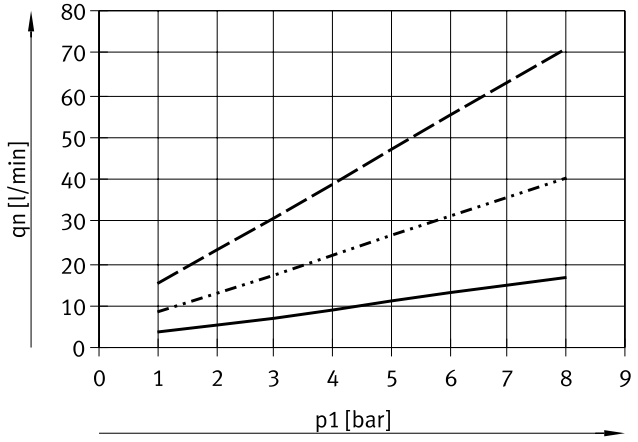
High suction rate



OVEL-5-L
OVEL-7-L
OVEL-10-L

Air consumption q_n as a function of operating pressure p_1

High vacuum/high suction rate



OVEL-5
OVEL-7
OVEL-10

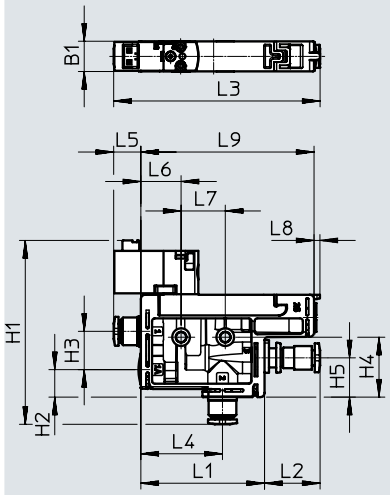
Data sheet

Dimensions Download CAD data ➔ www.festo.com

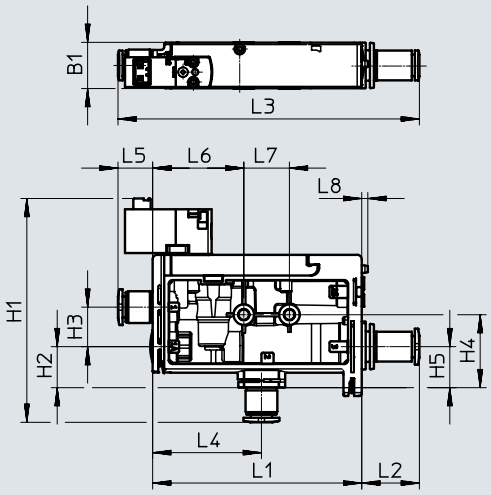
[ ] Without ejector pulse and vacuum sensor

[RQ] Push-in connector on pneumatic connection 3

OVEL-5



OVEL-7/10

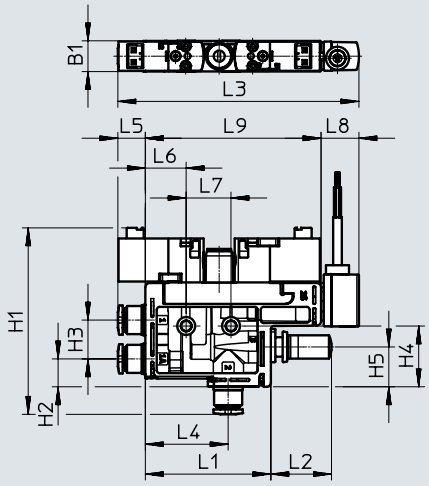


[A] With ejector pulse

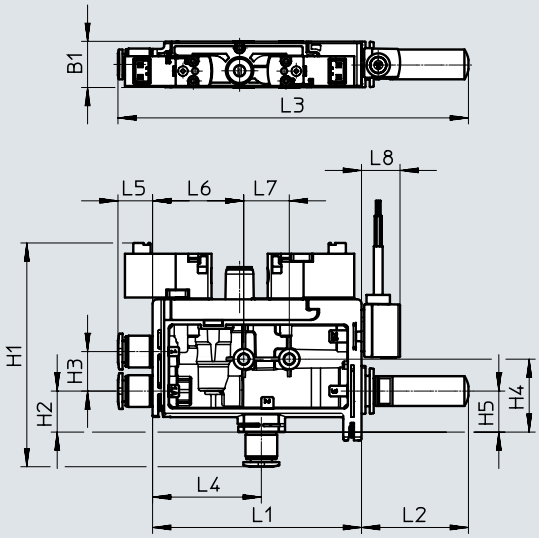
[UA] Open silencer on pneumatic connection 3

[V1B]/[V1V]/[B2B]/[B2V]/[V1PNLK]/[B2PNLK] Vacuum sensor

OVEL-5



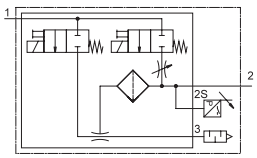
OVEL-7/10



Type	B1 ±0.3	H1 ±0.8	H2 ±0.5	H3 ±0.5	H4 ±0.2	H5 ±0.5	L1 ±0.8	L2 ±0.8		L3 ±2		L4 ±0.5	L5 ±0.5	L6 ±0.2	L7 ±0.2	L8 ±0.8	L9 ±0.8
								[RQ]	[UA]	[RQ]	[UA]						
OVEL-5	10.3	62	9.4	13	20.4	13	42	19	20.2	70	71	27.7	9.4	13.7	15	2	59
OVEL-5-...-V1B/V1V/B2B/B2V										81	81					13	
OVEL-5-...-V1PNLK/B2PNLK										99	99					31	
OVEL-7-H	15.2	72	13.5	13	24	13.5	68.8	19	35.5	97	114	35.8	9.4	30	15	2	–
OVEL-7-H-...-V1B/V1V/B2B/B2V										97	114					13	
OVEL-7-H-...-V1PNLK/B2PNLK										109	114					31	
OVEL-7-L	15.2	74	13.5	13	24	13.5	68.8	19	35.5	99	116	35.8	11.4	30	15	2	–
OVEL-7-L-...-V1B/V1V/B2B/B2V										99	116					13	
OVEL-7-L-...-V1PNLK/B2PNLK										111	116					31	
OVEL-10	15.2	74	13.5	13	24	13.5	68.8	19	35.5	99	116	35.8	11.4	30	15	2	–
OVEL-10-...-V1B/V1V/B2B/B2V										99	116					13	
OVEL-10-...-V1PNLK/B2PLNK										111	116					31	

Data sheet

Ordering data – High vacuum
Push-in connector at pneumatic connection 1 and vacuum connection, open silencer at pneumatic connection 3, with vacuum sensor and ejector pulse

Circuit symbol	Pressure measuring range of vacuum sensor [bar]	Vacuum sensor output signal	Nominal width of Laval nozzle [mm]	Weight [g]	Part no.	Type
NC – normally closed						
	–1 ... 0	1 ... 5 V	0.45	72	**8049046**	**OVEL-5-H-10-PQ-VQ4-UA-C-A-V1B-H3**
			0.7	89	**8049047**	**OVEL-7-H-15-PQ-VQ4-UA-C-A-V1B-H3**
			0.95	88	**8049048**	**OVEL-10-H-15-PQ-VQ6-UA-C-A-V1B-H3**
		0 ... 10 V	0.45	72	**8049049**	**OVEL-5-H-10-PQ-VQ4-UA-C-A-V1V-H3**
			0.7	87	**8049050**	**OVEL-7-H-15-PQ-VQ4-UA-C-A-V1V-H3**
			0.95	88	**8049051**	**OVEL-10-H-15-PQ-VQ6-UA-C-A-V1V-H3**
		PNP or NPN or IO-Link	0.45	75	**8049052**	**OVEL-5-H-10-PQ-VQ4-UA-C-A-V1PNLK-H3**
			0.7	91	**8049053**	**OVEL-7-H-15-PQ-VQ4-UA-C-A-V1PNLK-H3**
			0.95	91	**8049054**	**OVEL-10-H-15-PQ-VQ6-UA-C-A-V1PNLK-H3**
	–1 ... 1	0 ... 10 V	0.45	72	**8069567**	**OVEL-5-H-10-PQ-VQ4-UA-C-A-B2V-H3**
			0.7	87	**8069568**	**OVEL-7-H-15-PQ-VQ4-UA-C-A-B2V-H3**
			0.95	88	**8069569**	**OVEL-10-H-15-PQ-VQ6-UA-C-A-B2V-H3**
		PNP or NPN or IO-Link	0.45	75	**8069570**	**OVEL-5-H-10-PQ-VQ4-UA-C-A-B2PNLK-H3**
			0.7	91	**8069571**	**OVEL-7-H-15-PQ-VQ4-UA-C-A-B2PNLK-H3**
			0.95	88	**8069572**	**OVEL-10-H-15-PQ-VQ6-UA-C-A-B2PNLK-H3**

Ordering data – Modular product system

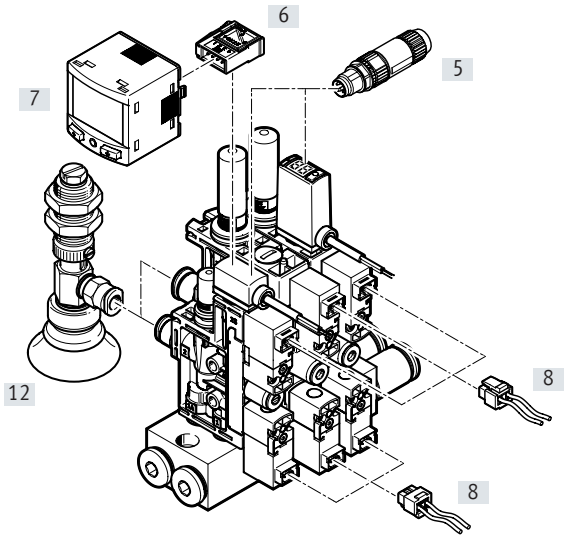
Ordering table

Type	OVEL	Conditions	Code	Enter code
Module no.	**8049045**			
Vacuum generator	Vacuum generator, electropneumatic		**OVEL**	OVEL
Nominal width of Laval nozzle [mm]	0.45		**-5**	
	0.7		**-7**	
	0.95		**-10**	
Ejector characteristic	High vacuum		**-H**	
	High suction rate		**-L**	
Housing size/width [mm]	10	[1]	**-10**	
	15	[2]	**-15**	
Pneumatic connection 1	For pneumatic connections via manifold rail		**-P**	
	Push-in connectors, metric		**-PQ**	
Vacuum connection	Push-in connector 3 mm	[3]	**-VQ3**	
	Push-in connector 4 mm	[4]	**-VQ4**	
	Push-in connector 6 mm	[5]	**-VQ6**	
Pneumatic connection 3	Push-in connectors, metric		**-RQ**	
	Silencer open		**-UA**	
Ejector pulse connection	Via pneumatic connection 1			
	Additional connection (as pneumatic connection 1)		**-Z**	
Vacuum valve	Normally closed		**-C**	-C
Additional function	Without ejector pulse			
	Ejector pulse, electrical	[6]	**-A**	
Pressure measuring range of vacuum sensor	Without vacuum sensor			
	–1 ... 0 bar		**-V1**	
	–1 ... 1 bar		**-B2**	
Vacuum sensor output signal	Without vacuum sensor			
	1 ... 5 V	[7]	**B**	
	0 ... 10 V	[7]	**V**	
	PNP or NPN or IO-Link	[7]	**PNLK**	
Electrical connection	Connection pattern H, vertical plug		**-H3**	-H3

[1] 10 Not with Laval nozzle nominal width 7, 10.
[2] 15 Not with Laval nozzle nominal width 5.
[3] VQ3 Only with Laval nozzle nominal width 5.
[4] VQ4 Only with Laval nozzle nominal width 5 or Laval nozzle nominal width 7 in combination with ejector characteristic H.
[5] VQ6 Only with Laval nozzle nominal width 10 or Laval nozzle nominal width 7 in combination with ejector characteristic L.
[6] A Mandatory information in combination with ejector pulse connection Z.
[7] B, V, PNLK Mandatory information in combination with vacuum sensor pressure measuring range B2, V1.

Peripherals overview and type codes

Peripherals overview



Mounting components and accessories		→ Page/Internet
[5]	Plug NECU-S-M8G3/M12G3	27
[6]	Plug NECU-S-ECG4	27
[7]	Signal converter SCDN	27
[8]	Plug socket with cable NEBV	27
[12]	Suction gripper ESG	esg
–	Suction cup holder ESH	esh
–	Suction cup with connection ESS	ess
–	Vacuum filter OAFF	21

Type codes

001	Series	
OVTL	Vacuum generator	

002	Size	
10	10 mm	
15	15 mm	

003	Compressed air supply connection	
Q6	Push-in connector 6 mm	
Q8	Push-in connector 8 mm	
G18	G1/8	

004	Compressed air supply connection position	
	Both sides	
L	Left	
R	Right	

005	Exhaust connection	
RQ	QS connections, metric	
UA	Open silencer UO	

006	Number of vacuum generators	
2	2 pieces	
4	4 pieces	
8	8 pieces	

007	Position function	
SL	Vacant position	
SA	Laval nozzle 0.45 mm, for high vacuum, push-in connector 4 mm	
SB	Laval nozzle 0.7 mm, for high suction rate, push-in connector 6 mm	
SC	Laval nozzle 0.7 mm, for high vacuum, push-in connector 4 mm	
SD	Laval nozzle 0.95 mm, for high suction rate, push-in connector 6 mm	
SE	Laval nozzle 0.95 mm, for high vacuum, push-in connector 6 mm	

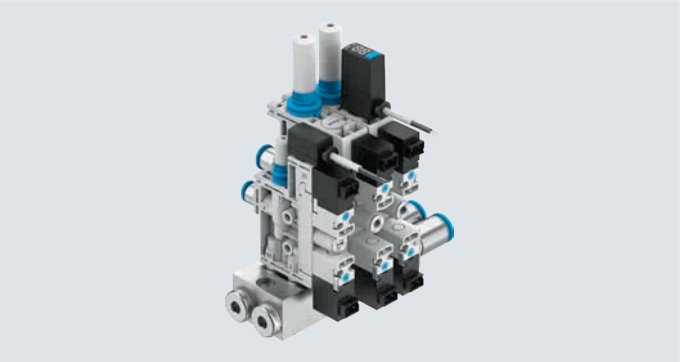
008	Sensor signal	
	None	
V	0 ... 10 V	
PNLK	PNP or NPN or IO-Link®	

Data sheet

Vacuum generator OVTL:
- Vacuum generators OVEL
- Common supply manifold OABM-P with 2, 4 or 8 positions
- Mounting kits OABM-MK
- Push-in fittings QS
- Blanking plug B

Temperature range
0 ... +50°C

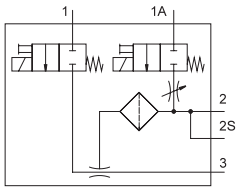
Operating pressure
2 ... 7 bar



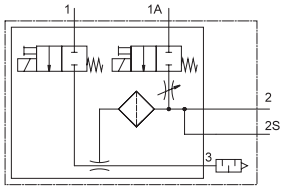
The vacuum generator OVTL is a module comprising vacuum generators OVEL, the common supply manifold OABM-P and connection accessories. All products are available from the factory fully assembled.
The vacuum generator OVTL can be ordered using the modular product system, which is a simpler and quicker alternative than ordering and assembling the various individual products.

Each vacuum generator OVEL has
- a solenoid valve for controlling the ejector pulse
- a flow control screw for adjusting the ejector pulse
- an additional supply port for the separate supply of the ejector pulse

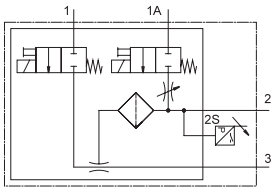
Without vacuum sensor
OVEL-...-RQ



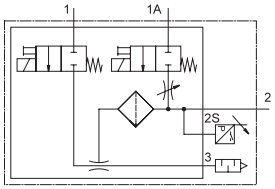
OVEL-...-UA



With vacuum sensor
OVEL-...-RQ



OVEL-...-UA



General technical data

Type			OVTL-10	OVTL-15
Number of device positions			2 ... 8	
Grid dimension		[mm]	10	15
Nominal width of Laval nozzle	OVTL-...-SA	[mm]	0.45	
	OVTL-...-SB/SC	[mm]	–	0.7
	OVTL-...-SD/SE	[mm]	–	0.95
Grade of filtration		[µm]	40	
Mounting position			Any	
Type of mounting			With through-hole	
Pneumatic connection 1 (common supply manifold)	OVTL-...-Q6		For tubing O.D. 6 mm	
	OVTL-...-Q8		For tubing O.D. 8 mm	
	OVTL-...-G18		Female thread G1/8	
Vacuum connection	OVTL-...-SA		For tubing O.D. 4 mm	
	OVTL-...-SC		–	For tubing O.D. 4 mm
	OVTL-...-SB/SD/SE		–	For tubing O.D. 6 mm
Pneumatic connection 3	OVTL-...-UA		Open silencer	
	OVTL-...-RQ-...-SA		For tubing O.D. 4 mm	
	OVTL-...-RQ-...-SB/SC/SD/SE		–	For tubing O.D. 6 mm
Product weight		[g]	118 ... 890	

Data sheet

Technical data – Design			
Type		OVTL-...-UA	OVTL-...-RQ
Design		For connection position on both sides	
	OVTL-...-L/R	For connection position on the side	
Ejector characteristic	OVTL-...-SA/SC/SE	High vacuum/standard	
	OVTL-...-SB/SD	High suction rate/standard	
Silencer design		Open	–
Integrated function		Electric on/off valve	
		Filter	
		Silencer open	–
		Ejector pulse, electrical	
		Flow control	
	OVTL-...-V	Pressure transmitter	
	OVTL-...-PNLK	Pressure sensor	
Valve function		Closed	
Manual override		Non-detenting	

Operating and environmental conditions		
Operating pressure	[bar]	2 ... 7
Nominal operating pressure	[bar]	4
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
Note on the operating/pilot medium		Operation with lubricated medium not possible
Ambient temperature	[°C]	0 ... +50
Temperature of medium	[°C]	0 ... +50
Corrosion resistance CRC[1)]		2
CE marking (see declaration of conformity)[2)]		To EU EMC Directive
Degree of protection		IP40

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

2) For information about the area of use, see the EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.

Performance data		
Max. vacuum	[%]	89 ... 92
Operating pressure for max. vacuum	[bar]	3.8 ... 4.5
Operating pressure for max. suction rate	[bar]	3 ... 6
Max. suction rate with respect to atmosphere	[l/min]	4 ... 45
Pressurisation time at nominal operating pressure 4 bar (for 1 l volume)[1)]	[s]	0.4 ... 2
Noise level at p_1 = 4 bar	[db(A)]	52 ... 68

1) Time required to reduce the vacuum to a residual vacuum of –0.05 bar after switching off the operating pressure.

Data sheet

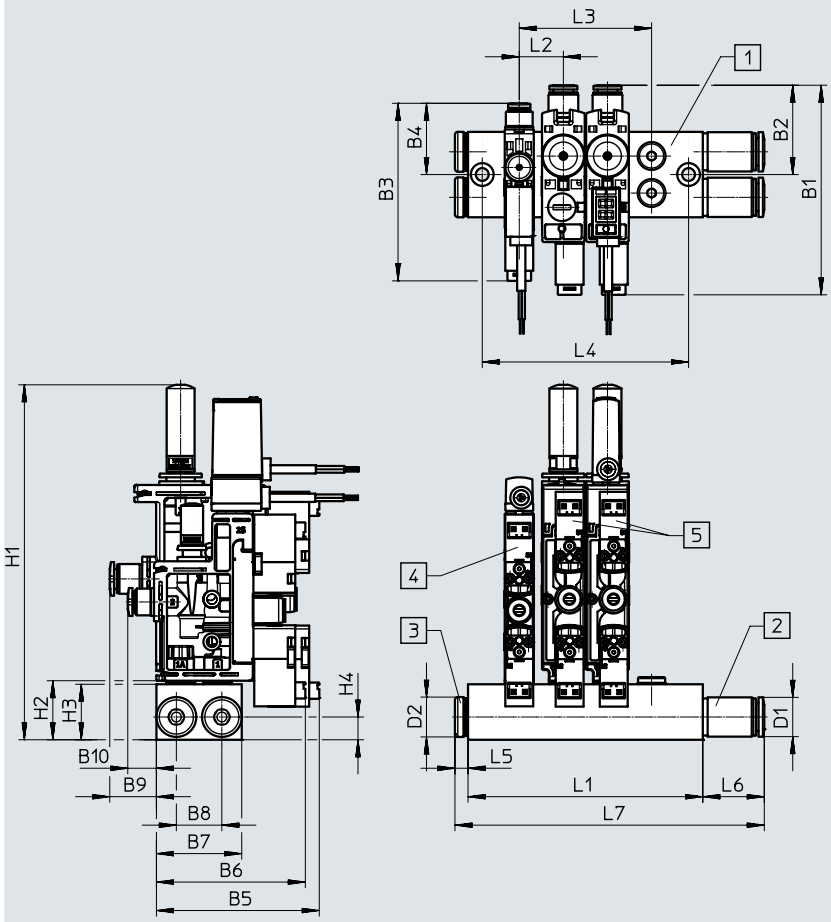
Technical data – Electrical connection		
Solenoid valve		
Electrical connection input	Function	Ejector pulse
		Vacuum generation
	Connection type	2x plug
	Connection technology	Connection pattern H
	Number of pins/wires	2
	Connection pattern	
	Type of mounting	Snap-locking
Operating voltage range [V DC]		21.6 ... 26.4
Duty cycle [%]		100
Coil characteristics, 24 V DC [W]		1.0
Vacuum sensor		
Electrical connection output	Function	Sensor
	Connection type	Cable
	Connection technology	Open end
	Number of pins/wires	3
Cable diameter [mm]		2.9 ±0.1
Cable length [m]		2.5
Conductor nominal cross section [mm^2]		0.14
Cable characteristics		Suitable for energy chains

Technical data – Vacuum sensor			
Type		OVTL-...V	OVTL-...PNLK
Mechanical			
Method of measurement		Piezoresistive pressure sensor	Piezoresistive pressure sensor with display
Pressure measuring range [bar]		–1 ... 0	
Setting options		–	Teach-in
		–	IO-Link
		–	Via display and keys
Display type		–	LED display, 2-digit
Electrical			
Operating voltage range, sensor [V DC]		18 ... 30	
Switching output		–	PNP/NPN switchable
Switching element function		–	N/C or N/O contact, switchable
Switching function		–	Freely programmable
Analogue output [V]		0 ... 10	–

Materials	
Sub-base	Wrought aluminium alloy
Hollow bolt	Wrought aluminium alloy
Fitting	Nickel-plated brass
Housing	Reinforced PA
Silencer	PE
Jet nozzle	Wrought aluminium alloy
Receiving nozzle	POM
Filter	POM
Adjusting screw	Steel
Connecting thread	POM
Screws	Steel
Cable sheath	PVC (colour: grey)
Seals	NBR
Note on materials	RoHS-compliant

Data sheet

Dimensions Download CAD data ➔ www.festo.com



[1] Common supply manifold
[2] Push-in fitting
[3] Blanking plug
[4] Vacuum generator OVEL-5
[5] Vacuum generator OVEL-7/10

Type	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	D2 ø	H1	H2	H3	H4
OVTL	74	31	62	25	57	52	30	16	16	10	14	125	21	19.5	8

Type	L1	L2	L3	L4
OVTL-10-...-2	40.5	10.5	10.5	30.5
OVTL-10-...-4	61.5		31.5	51.5
OVTL-10-...-8	103.5		73.5	93.5
OVTL-15-...-2	51.5	15.5	15.5	41.5
OVTL-15-...-4	82.5		46.5	72.5
OVTL-15-...-8	144.5		108.5	134.5

Type	D1	L5	L6	L7					
				OVTL-10-...-2	OVTL-10-...-4	OVTL-10-...-8	OVTL-15-...-2	OVTL-15-...-4	OVTL-15-...-8
OVTL-...-G18	–	–	–	40.5	61.5	103.5	51.5	82.5	144.5
OVTL-...-G18-L	–	–	5	45.5	66.5	108.5	56.5	87.5	149.5
OVTL-...-G18-R	–	5	–	45.5	66.5	108.5	56.5	87.5	149.5
OVTL-...-Q6	12	17	17	74.5	95.5	137.5	85.5	116.5	178.5
OVTL-...-Q6-L	12	17	5	62.5	83.5	125.5	73.5	104.5	166.5
OVTL-...-Q6-R	12	5	17	62.5	83.5	125.5	73.5	104.5	166.5
OVTL-...-Q8	14	22	22	84.5	105.5	147.5	95.5	126.5	188.5
OVTL-...-Q8-L	14	18	5	63.5	84.5	126.5	74.5	105.5	167.5
OVTL-...-Q8-R	14	5	18	63.5	84.5	126.5	74.5	105.5	167.5

Ordering data – Modular product system

Ordering table

Type	OVTL	Conditions	Code	Enter code
Module no.	**8103599**			
Vacuum generator	Vacuum generators module, series L		**OVTL**	OVTL
Size	10 mm		**-10**	
	15 mm		**-15**	
Compressed air supply connection	Push-in connector 6 mm		**-Q6**	
	Push-in connector 8 mm		**-Q8**	
	G1/8		**-G18**	
Compressed air supply connection position	Both sides			
	Left		**-L**	
	Right		**-R**	
Exhaust connection	QS connections, metric		**-RQ**	
	Silencer open UO		**-UA**	
Number of vacuum generators	2 pieces		**-2**	
	4 pieces		**-4**	
	8 pieces		**-8**	
Position function	Vacant position		**-SL**	
	Laval nozzle 0.45 mm, for high vacuum, push-in connector 4 mm		**-SA**	
	Laval nozzle 0.7 mm, for high suction rate, push-in connector 6 mm	[1]	**-SB**	
	Laval nozzle 0.7 mm, for high vacuum, push-in connector 4 mm	[1]	**-SC**	
	Laval nozzle 0.95 mm, for high suction rate, push-in connector 6 mm	[1]	**-SD**	
	Laval nozzle 0.95 mm, for high vacuum, push-in connector 6 mm	[1]	**-SE**	
Sensor signal	Without vacuum sensor			
	0 ... 10 V	[2]	**V**	
	PNP or NPN or IO-Link	[2]	**PNLK**	

[1] SB, SC, SD, SE Not with size 10.
[2] V, PNLK Not with position function SL.

Note

The position function and sensor signal must be selected for each vacuum generator in accordance with the number of vacuum generators configured.

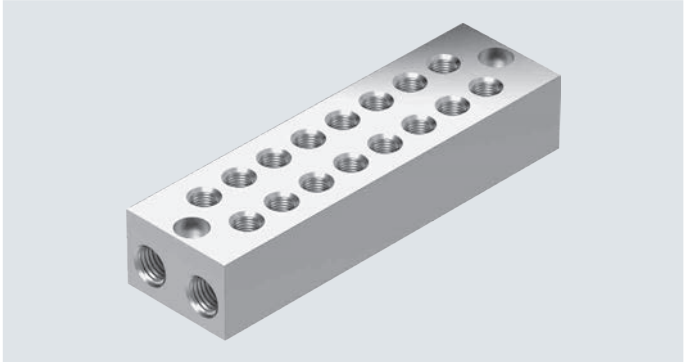
Example with 4:

- OVTL-10-Q8R-UA-4-SAVSESEPNLKSL

Accessories

Common supply manifold OABM-P
For vacuum generator
OVEL-...-P
- Up to 8 vacuum generators OVEL on a single common supply manifold
- Common compressed air supply via common supply manifold

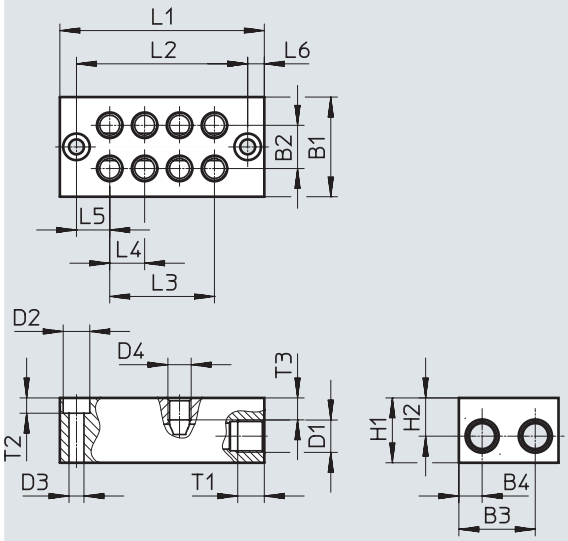
Note
Vacuum generators with additional connection for ejector pulse (OVEL-...-Z-C-A) cannot be combined on the common supply manifold with vacuum generators without an additional connection (OVEL-...-C-A).



General technical data	
Pneumatic connection 1	G1/8
Type of mounting	With through-hole

Materials	
Sub-base	Wrought aluminium alloy
Note on materials	RoHS-compliant

Dimensions Download CAD data ➔ www.festo.com

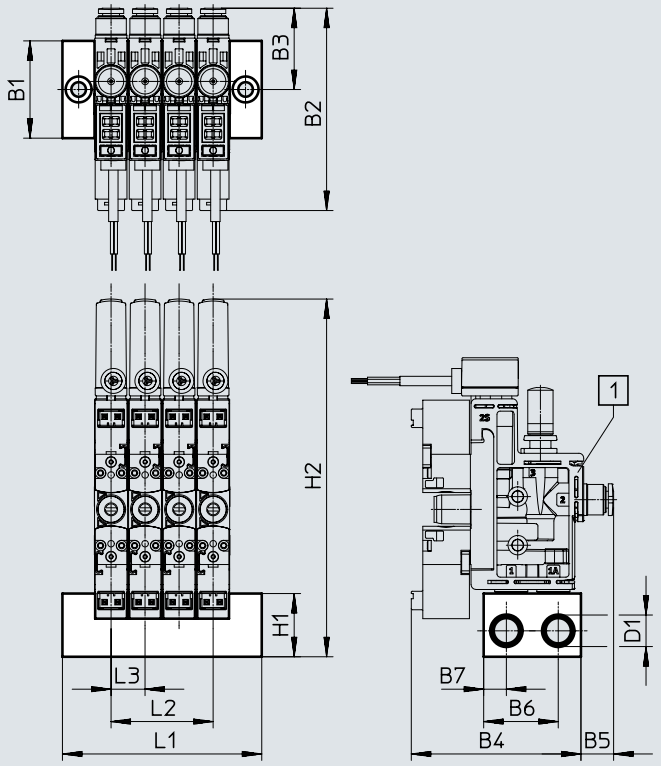


Type	B1	B2	B3	B4	D1	D2 ⌀	D3 ⌀	D4	H1	H2
OABM-P-G3-10-2	30	13	23	7	G1/8	8	4.5	M7	19.5	11.5
OABM-P-G3-10-4										
OABM-P-G3-10-8										
OABM-P-G3-15-2	30	13	23	7	G1/8	8	4.5	M7	19.5	11.5
OABM-P-G3-15-4										
OABM-P-G3-15-8										

Type	L1	L2	L3	L4	L5	L6	T1	T2	T3
OABM-P-G3-10-2	40.5	30.5	10.5	10.5	10	5	8	4.6	6.6
OABM-P-G3-10-4	61.5	51.5	31.5						
OABM-P-G3-10-8	103.5	93.5	73.5						
OABM-P-G3-15-2	51.5	41.5	15.5	15.5	13	5	8	4.6	6.6
OABM-P-G3-15-4	82.5	72.5	46.5						
OABM-P-G3-15-8	144.5	134.5	108.5						

Accessories

Dimensions Download CAD data ➔ www.festo.com



Note

Combined use of OVEL-5 and OVEL-7/-10 is possible only with common supply manifolds OABM-...-15.

Use mounting kit OABM-MK for mounting the OVEL on the common supply manifold.
Min. tightening torque: 0.3 Nm
Max. tightening torque: 3.3 Nm

[1] Vacuum generator OVEL-5/7/10

Type		B1	B2	B3	B4	B5	B6	B7	D1	H1	H2	L1	L2	L3
OABM-P-G3-10-2	With OVEL-5	30	62	25	52	10	23	7	G1/8	19.5	110	40.5	10.5	10.5
OABM-P-G3-10-4												61.5	31.5	
OABM-P-G3-10-8												103.5	73.5	
OABM-P-G3-15-2	With OVEL-7/10	30	74	31	57	16	23	7	G1/8	19.5	125	51.5	15.5	15.5
OABM-P-G3-15-4												82.5	46.5	
OABM-P-G3-15-8												144.5	108.5	

Ordering data

Common supply manifold	Number of device positions	CRC[1)]	Weight [g]	Part no.	Type
For OVEL-5	2	2	45.2	**8049141**	**OABM-P-G3-10-2**
	4	2	69.6	**8049142**	**OABM-P-G3-10-4**
	8	2	118.6	**8049143**	**OABM-P-G3-10-8**
For OVEL-5/7/10	2	2	59.6	**8049144**	**OABM-P-G3-15-2**
	4	2	97.1	**8049145**	**OABM-P-G3-15-4**
	8	2	172	**8049146**	**OABM-P-G3-15-8**

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

Accessories

Mounting kit OABM-MK
For common supply manifold OABM-P

General technical data		
Type of mounting		Fixing clips
		Can be screwed onto manifold rail
Min. tightening torque	[Nm]	0.3
Max. tightening torque	[Nm]	3.3

Materials	
Hollow bolt	Wrought aluminium alloy
Seals	NBR
Note on materials	RoHS-compliant

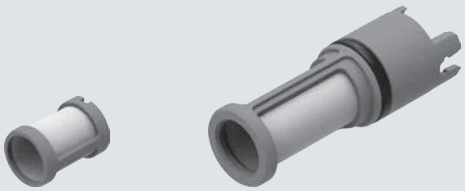
Ordering data

	CRC[1)]	Weight [g]	Part no.	Type
For common supply manifold OABM-P	2	7	**8065850**	**OABM-MK-G3**

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

Accessories

Vacuum filter OAFF



OAFF-G3-5 OAFF-G3-7

General technical data		
Type of mounting		Push-on
		Latching
Grade of filtration	[µm]	40
Ejector pulse suitability	[bar]	≤7

Operating and environmental conditions		
Operating pressure	[bar]	–0.95
Operating medium		Atmospheric air based on ISO 8573-1:2010 [7:-:-]

Materials		
Type	OAFF-G3-5	OAFF-G3-7
Housing	POM	
Filter	Fabric, PA	
Seals	–	NBR
Note on materials	RoHS-compliant	

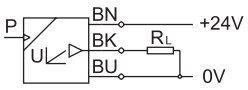
Ordering data

	Weight [g]	Part no.	Type	PU[1]
For vacuum generator OVEL-5	1	**8068944**	**OAFF-G3-5**	**10**
For vacuum generator OVEL-7/10	1.5	**8068945**	**OAFF-G3-7**	**10**

1) Packaging unit

Accessories

Pressure transmitter SPTE
(Order code in the modular product system: V1B/V1V/B2B/B2V)
- Pressure measuring ranges –1 ... 0 bar or –1 ... 1 bar
- Analogue outputs 1 ... 5 V or 0 ... 10 V



Detection of analogue signals and conversion into digital switching signals with downstream signal converter SCDN with LCD display (➔ page 27).

General technical data	
Certification	RCM compliance mark
	c UL us - Recognized (OL)
CE mark (see declaration of conformity)[1)]	To EU EMC Directive
Note on materials	RoHS-compliant

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.

Input signal/measuring element			
Type		SPTE-V1R	SPTE-B2R
Measured variable		Relative pressure	
Method of measurement		Piezoresistive pressure sensor	
Pressure measuring range start value	[bar]	0	–1
Pressure measuring range end value	[bar]	–1	1
Max. overload pressure	[bar]	5	5
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]	
Note on operating/pilot medium		Lubricated operation possible	
Temperature of medium	[°C]	0 ... 50	
Ambient temperature	[°C]	0 ... 50	

Output, general		
Precision ±FS[1)]	[%]	3 (at room temperature of approx. 23°C)
		4 (in ambient temperature range 0 ... 50°C)
Repetition accuracy ±FS[1)]	[%]	0.3
Temperature coefficient ±FS/K[1)]	[%]	0.05

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

Analogue output			
Type		SPTE-...-V-2.5K	SPTE-...-B-2.5K
Analogue output	[V]	0 ... 10	1 ... 5
Rise time	[ms]	1	
Min. load resistance of voltage output	[kΩ]	15	

Accessories

Additional output data	
Short circuit protection	For all electrical connections

Electronics			
Type		SPTE-...-V-2.5K	SPTE-...-B-2.5K
Operating voltage range DC	[V]	18 ... 30	10 ... 30
Reverse polarity protection		For all electrical connections	

Electromechanical components		
Electrical connection		Cable, 3-wire, open end
Cable length	[m]	2.5

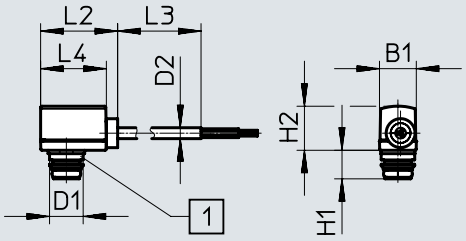
Mechanical system		
Type of mounting		Pin-type connection
Mounting position		Any
Pneumatic connection		Cartridge 10 mm
Product weight	[g]	35
magicInformation on housing materials		Reinforced PA

Immission/Emission	
Degree of protection	IP40
Corrosion resistance class CRC[1)]	2

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

Dimensions

Download CAD data ➔ www.festo.com



[1] Supply port: pin-type cartridge 10 mm

Type	B1	D1 ø	D2 ø	H1	H2	L2	L3	L4
SPTE-...-PC10	9.8	8.9	2.9	7.6	11.7	20.5	2500	17.5

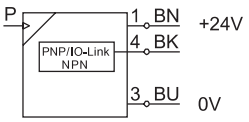
Ordering data

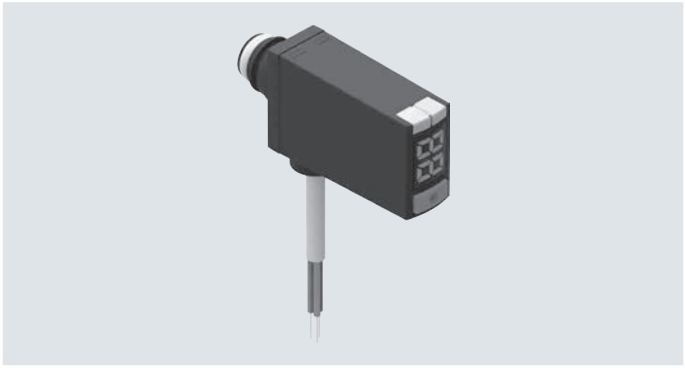
Pneumatic connection	Electrical connection	Pressure measuring range [bar]	Analogue output [V]	Order code in the modular product system	Part no.	Type
Cartridge 10 mm	Cable, 3-wire, open end	–1 ... 0	0 ... 10	V1V	**8025974**	**SPTE-V1R-PC10-V-2.5K**
			1 ... 5	V1B	**8025975**	**SPTE-V1R-PC10-B-2.5K**
		–1 ... 1	0 ... 10	B2V	**8025976**	**SPTE-B2R-PC10-V-2.5K**
			1 ... 5	B2B	**8025977**	**SPTE-B2R-PC10-B-2.5K**

Accessories

Pressure sensor SPAE
(Order code in the modular product system: V1PNLK/B2PNLK)

- Pressure measuring ranges –1 ... 0 bar or –1 ... 1 bar
- Switching output PNP/NPN, switchable
- IO-Link
- LCD display
- Teach-in function





General technical data		
Certification		RCM compliance mark
		c UL us - Recognized (OL)
CE mark (see declaration of conformity)[1]		To EU EMC Directive
Note on materials		RoHS-compliant

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.

Input signal/measuring element			
Type		SPAE-V1R	SPAE-B2R
Measured variable		Relative pressure	
Method of measurement		Piezoresistive pressure sensor	
Pressure measuring range start value	[bar]	0	–1
Pressure measuring range end value	[bar]	–1	1
Max. overload pressure	[bar]	5	5
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]	
Note on operating/pilot medium		Lubricated operation possible	
Temperature of medium	[°C]	0 ... 50	
Ambient temperature	[°C]	0 ... 50	

Signal processing		
Resolution ADC		10 bits

Output, general		
Precision ±FS[1]	[%]	1.5 (at room temperature of approx. 23°C)
		2.5 (in ambient temperature range 0 ... 50°C)
Repetition accuracy ±FS[1]	[%]	0.3
Temperature coefficient ±FS/K[1]	[%]	0.05

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

Switching output		
Switching output		PNP/NPN switchable
Switching function		Freely programmable
Switching element function		N/C or N/O contact, switchable
Max. output current	[mA]	100

Accessories

Measured value display		
Display range start value	[% FS]	0
Display range end value	[% FS]	99

Additional output data	
Short circuit protection	For all electrical connections

Communication interface		
Protocol		IO-Link
IO-Link, protocol version		Device V 1.1
IO-Link, profile		Smart sensor profile
IO-Link, function classes		Binary data channel (BDC)
		Diagnostics
		Identification
		Process data variable (PDV)
		Teach channel
IO-Link, communication mode		COM2 (38.4 kBaud)
IO-Link, SIO mode support		Yes
IO-Link, port class		A
IO-Link, process data width OUT		0 bytes
IO-Link, process data width IN		2 bytes
IO-Link, process data content IN		2 bit BDC (pressure monitoring)
		14 bit PDV (pressure measurement value)
IO-Link, minimum cycle time	[ms]	3
IO-Link, data memory required		0.5 KB

Electronics		
Operating voltage range DC	[V]	18 ... 30
Reverse polarity protection		For all electrical connections

Electromechanical components		
Electrical connection		Cable, 3-wire, open end
Cable length	[m]	2.5

Mechanical system		
Type of mounting		Pin-type connection
Mounting position		Any
Pneumatic connection		Cartridge 10 mm
Product weight	[g]	40
Information on housing materials		Reinforced PA

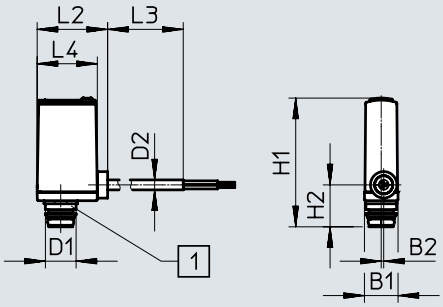
Display/operation		
Display type		LED display, 2-digit
Displayable units		% FS
Switching status indication		LED yellow
Setting options		Via display and keys, teach-in, IO-Link
Threshold value setting range	[%]	1 ... 98
Protection against tampering		PIN code

Accessories

Immission/Emission	
Degree of protection	IP40
Corrosion resistance class CRC[1)]	2

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

Dimensions Download CAD data ➔ www.festo.com



[1] Supply port: pin-type cartridge 10 mm

Type	B1	B2	D1 ⌀	D2 ⌀	H1	H2	L2	L3	L4
SPAE-...-PC10	9.8	0.7	8.9	2.9	~37.5	12.2	20.5	2500	17.5

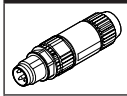
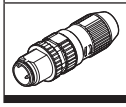
Ordering data

Pneumatic connection	Electrical connection	Pressure measuring range [bar]	Order code in the modular product system	Part no.	Type
Cartridge 10 mm	Cable, 3-wire, open end	–1 ... 0	V1PNLK	**8025978**	**SPAE-V1R-PC10-PNLK-2.5K**
		–1 ... 1	B2PNLK	**8025979**	**SPAE-B2R-PC10-PNLK-2.5K**

Accessories

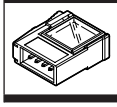
Ordering data – Plug NECU-S-M8G3/M12G3

Data sheets → Internet: necu

	Electrical connection	Part no.	Type
	Plug M8x1, 3-pin, straight, insulation displacement connector	**562024**	**NECU-S-M8G3-HX**
	Plug M12x1, A-coded, 3-pin, straight, insulation displacement connector	**562027**	**NECU-S-M12G3-HX**

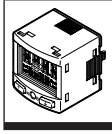
Ordering data – Plug NECU-S-ECG4

Data sheets → Internet: necu

	Electrical connection	Part no.	Type
	Plug, square design, 4-pin, straight, insulation displacement connector	**570922**	**NECU-S-ECG4-HX-Q3**

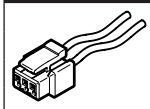
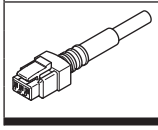
Ordering data – Signal converter SCDN

Data sheets → Internet: scdn

	Measured variable	Part no.	Type
	Voltage	**8035555**	**SCDN-2V-EC4-PNLK-L1**

Ordering data – Plug socket with cable NEBV

Data sheets → Internet: nebv

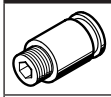
	Electrical connection		Cable length [m]	Part no.	Type
	Socket, 2-pin Connection pattern H	Flying leads Open end	0.5	**566654**	**NEBV-H1G2-KN-0.5-N-LE2**
			1	**566655**	**NEBV-H1G2-KN-1-N-LE2**
			2.5	**566656**	**NEBV-H1G2-KN-2.5-N-LE2**
			5	**566657**	**NEBV-H1G2-KN-5-N-LE2**
	Socket, 2-pin Connection pattern H	Cable Open end	0.5	**566658**	**NEBV-H1G2-P-0.5-N-LE2**
			1	**566659**	**NEBV-H1G2-P-1-N-LE2**
			2.5	**566660**	**NEBV-H1G2-P-2.5-N-LE2**
			5	**566661**	**NEBV-H1G2-P-5-N-LE2**

Ordering data – Blanking plug B

	Pneumatic connection	Part no.	Type	PU[1]
	M7	**174309**	**B-M7**	**10**
	G1/8	**3568**	**B-1/8**	**10**

1) Packaging unit.

Ordering data – Push-in fitting QS

	Pneumatic connection		Part no.	Type	PU[1]
	G1/8	Tubing O.D. 8°mm	**186098**	**QS-G1/8-8**	**10**
	G1/8	Tubing O.D. 8°mm	**186109**	**QS-G1/8-8-I**	**10**

1) Packaging unit.

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