

## Vacuum generators OVM, NPT

**FESTO**



## Key features

### At a glance

Rapid purging of vacuum for safe placement of the workpiece using an integrated solenoid valve to control the ejector pulse

Central electrical connection via an M12 plug

#### OVEM-...-2P/2N/PU/PI

Monitoring and visualisation of the vacuum pressure using a vacuum sensor with LCD display (inHg)

Adjustment of the ejector pulse via a flow control screw

Contamination of the vacuum generator is prevented by an integrated filter



Quick and secure installation thanks to QS fitting

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

#### OVEM-...-1P/1N

Monitoring of the vacuum pressure and status displays for switching output and solenoid valves using a vacuum sensor with LED display

Prevention of pressure drop using an integrated check valve

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



### The modular vacuum generator series

The modular series of vacuum generators OVEM offers a wide range of individually selectable functions, providing numerous solutions for a wide variety of applications.

| Functions                               | Values   |
|---|--|
| Laval nozzle                            | 0.45 mm  |
|   | 0.7 mm   |
|   | 0.95 mm  |
|   | 1.4 mm   |
|   | 2.0 mm <sup>1)</sup>   |
|   | 3.0 mm <sup>1)</sup>   |
| Vacuum generator characteristics        | High vacuum  |
|   | High suction rate  |
| Housing size                            | 20 mm, metric version, display in bar <sup>1)</sup>          |
|   | 20 mm, NPT version, display inHg                             |
|   | 36 mm, metric version, display in bar <sup>1)</sup>          |
| Pneumatic connections                   | QS fittings, with or without open silencer <sup>1)</sup>     |
|   | QS fittings (inch), with or without open silencer            |
|   | G female thread, with or without open silencer <sup>1)</sup> |
|   | NPT female thread, with or without open silencer             |
|   | Prepared for supply manifold                                 |
| Normal position of the vacuum generator | Normally open, with or without ejector pulse                 |
|   | Normally closed, with or without ejector pulse               |
| Electrical connection                   | M12 plug (5-pin)   |
| Vacuum sensor                           | Without vacuum sensor  |
|   | 1 switching output PNP or NPN, LED indicator                 |
|   | 1 switching output PNP, LCD display <sup>1)</sup>            |
|   | 2 switching outputs PNP or NPN, LCD indicator                |
|   | 1 switching output PNP and 1 analogue output, LCD display    |
| IO-Link, LCD display <sup>1)</sup>      |  |
| Alternative vacuum display              | inHg <sup>2)</sup>   |
|   | inH <sub>2</sub> O <sup>2)</sup>                             |
|   | bar <sup>2)</sup>  |

1) Product documentation → Internet: ovem

2) Vacuum sensor with LCD display

## Key features

### The innovative vacuum generator

#### Economical

- Short switching times thanks to integrated solenoid valves
  - Vacuum on/off
  - Ejector pulse
- Quick, precise and safe placing of the workpiece via ejector pulse
- Cost saving through preventive maintenance/service thanks to maintenance indicator
- Cost saving through integrated air-saving function
- Powerful supply of multiple vacuum generators via a common supply manifold (→ page 18)
- Low-cost variants with one switching output (OVEM-...-1P/1N)

#### Easy to use

- Simple installation via M12 plugs and QS fittings
- Simple mounting via screws
- All control elements are on one side
- Low-noise operation due to integrated silencer
- Vacuum sensor with LCD display (OVEM-...-2P/2N/PU/PI)
  - Vacuum is displayed numerically and as a bar chart
  - Important parameters and diagnostic information are displayed

#### Reliable

- Permanent monitoring of the entire vacuum system via a vacuum sensor to reduce downtimes (condition monitoring)
- Prevention of pressure drop using an integrated air-saving function in conjunction with an integrated check valve

#### Space-saving

- All functions are compactly integrated in one unit.
- No protruding elements such as valves or vacuum sensors
  - Space-optimised installation is possible as all the control elements can be accessed from one side

#### Easy to maintain

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

#### Choice of mounting types

- Direct mounting or via mounting bracket
- Straightforward mounting on H-rail via accessories
- Blocking of multiple vacuum generators on a common supply manifold (→ page 18)

### Functional principle of OVEM

#### Vacuum ON/OFF

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

- N/C - 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.

#### Vacuum sensor

The set or taught-in reference value for the generated vacuum is monitored via an integrated vacuum sensor. If the setpoint value is reached or if it is not reached due to malfunctions (e.g. leaks, dropped workpiece), the vacuum sensor emits an electrical signal.

#### Ejector pulse

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

#### Connection to higher-level systems

The connection to higher-level systems as well as the configuration of the switching outputs depends on the type of vacuum sensor.

#### OVEM-...-1P/1N

- Switching inputs for actuating the solenoid valves for vacuum generation and ejector pulse
- One switching output for supplying a control signal
  - Configured as an N/O contact
  - Switching function configured as a threshold value comparator

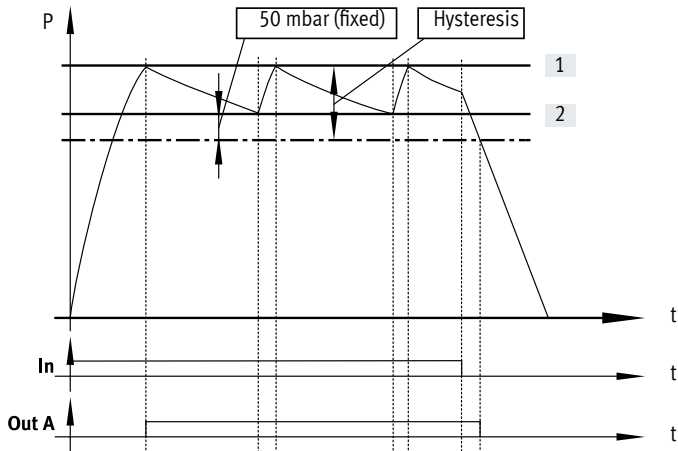
#### OVEM-...-2P/2N/PU/PI

- One digital switching input for actuating the solenoid valves
- Two digital switching outputs or One digital switching output and one analogue output for supplying control signals
  - Switching outputs can be configured as N/C or N/O contacts
  - Switching function of the outputs can be configured as a threshold value or window comparator

- If there are two switching outputs, these can be configured independently of each other. This enables tasks to be performed in parallel with one vacuum generator, reducing the time needed for sorting good and reject parts, for example.

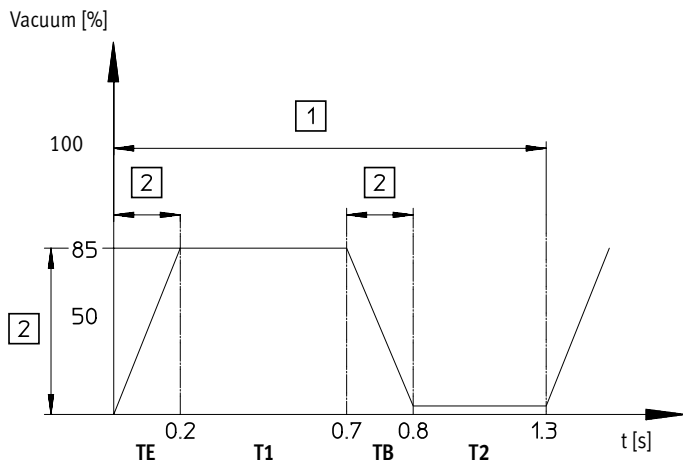
### Key features

OVEM-...-2P/2N/PU/PI – air saving function LS (-CE, -OE)



If the desired threshold value [1] for the vacuum is reached, vacuum generation is automatically switched off. A check valve prevents a decrease of the vacuum. Nonetheless, leakage (e.g. due to rough workpiece surfaces) will slowly reduce the vacuum. If the vacuum drops below the threshold value [2], vacuum generation is automatically switched on. Vacuum is generated until the set threshold value [1] is reached again.

OVEM-...-2P/2N/PU/PI – condition monitoring and diagnostics



The most important operating parameters:

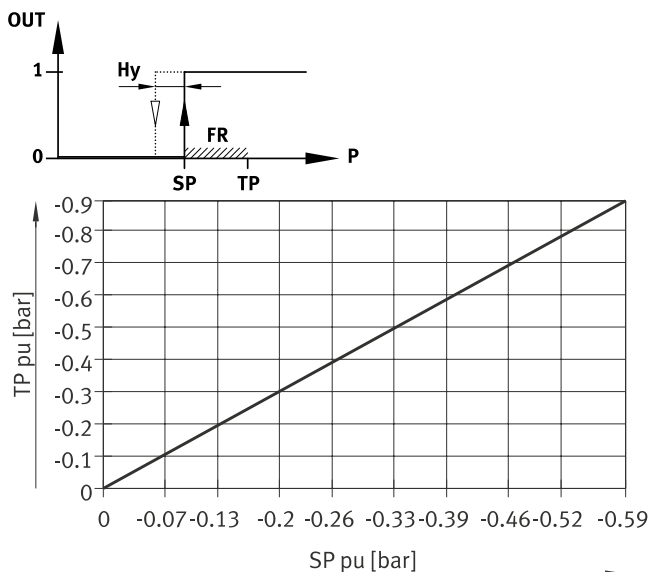
- Vacuum
  - Evacuation time
  - Air supply time
- are continuously measured in the vacuum generator and compared with the individually set reference values (condition monitoring). If deviations in the reference values occur, these will be determined by the vacuum generator and shown on the display (diagnostics). An electrical signal will also be transmitted to the higher-order controller.

This permits preventive action:

- in order to prevent machine failure or downtime, for example, through timely maintenance
- and to ensure process reliability (adherence to the cycle time).

- |                    |                    |
|--------------------|--------------------|
| [1] Cycle time     | T1 Transport time  |
| [2] Monitoring     | TB Air supply time |
| TE Evacuation time | T2 Return time     |

OVEM-...-1P/1N – From the teach-in point to the switching point



The switching point is determined from the teach pressure and the function reserve.

A function reserve (35% of the teach pressure) is deducted from the teach pressure ( $SP = TP - 0.35 \cdot TP$ ).

For example, with a teach pressure of  $-0.5$  bar, a switching point of  $-0.33$  bar is set.

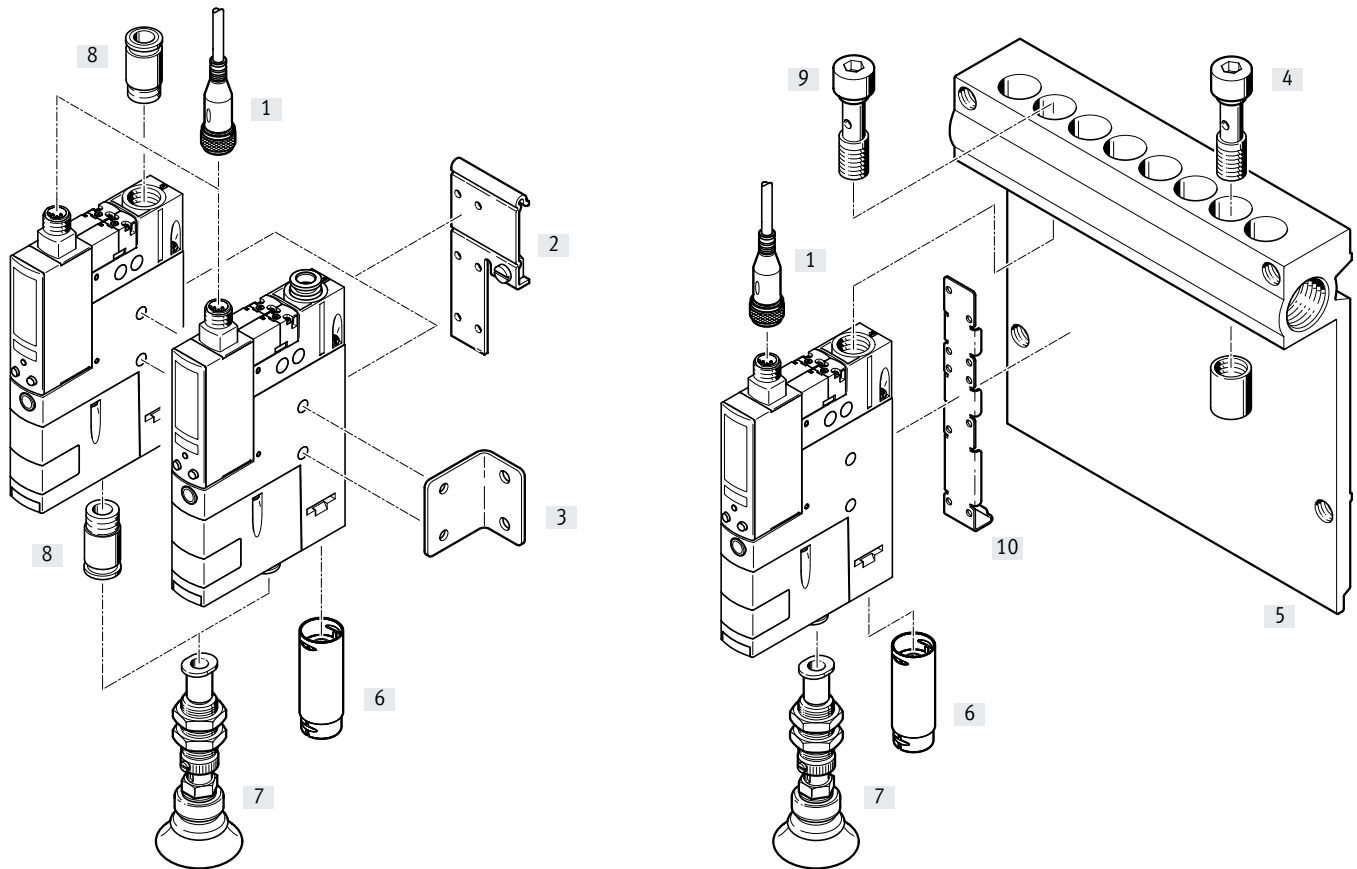
The hysteresis has a fixed value.

- |                    |                     |
|--------------------|---------------------|
| TP Teach-in point  | Hy Hysteresis       |
| SP Switching point | FR Function reserve |

## Peripherals overview

OVEM-...-QS/QO/GN/GO

OVEM-...-PL/PO<sup>1)</sup>



1) Hollow bolt [9] and mounting bracket [10] are included in the scope of delivery for the OVEM-...-PL/PO.

### Mounting attachments and accessories

|                                      | OVEM-...-QS/QO/GN/GO |    |    |    | OVEM-...-PL/PO |    | → Page/Internet |
|--------------------------------------|----------------------|----|----|----|----------------|----|-----------------|
|                                      | QS                   | QO | GN | GO | PL             | PO |                 |
| [1] Connecting cable<br>NEBU-M12     |                      | ■  |    |    |                | ■  | 21              |
| [2] H-rail mounting<br>OABM-H        |                      | ■  |    |    |                | -  | 20              |
| [3] Mounting bracket<br>HRM-1        |                      | ■  |    |    |                | -  | 21              |
| [4] Blanking plug<br>OASC-G1-P       |                      | -  |    |    |                | ■  | 20              |
| [5] Common supply manifold<br>OABM-P |                      | -  |    |    |                | ■  | 18              |
| [6] Silencer extension<br>UOMS-1/4   | -                    | ■  | -  | ■  | -              | ■  | 21              |
| [7] Suction gripper<br>ESG           |                      |    | ■  |    |                | ■  | esg             |
| [8] Push-in fitting<br>QS            | -                    |    |    | ■  |                | -  | qs              |
| - Suction cup complete holder<br>ESH |                      |    | ■  |    |                | ■  | esh             |
| - Suction cup with connection<br>ESS |                      |    | ■  |    |                | ■  | ess             |

## Type codes

| 001 Series                        |   |
|-----------------------------------|---|
| <b>OVEM</b>                       | Vacuum generator  |
| 002 Nominal width of Laval nozzle |   |
| <b>05</b>                         | 0.45 mm   |
| <b>07</b>                         | 0.70 mm   |
| <b>10</b>                         | 0.95 mm   |
| <b>14</b>                         | 1.4 mm  |
| 003 Ejector characteristics       |   |
| <b>H</b>                          | High vacuum/standard  |
| <b>L</b>                          | High suction rate/standard  |
| 004 Housing width                 |   |
| <b>BN</b>                         | 20 mm wide, inch version  |
| 005 Pneumatic connections         |   |
| <b>QS</b>                         | All connections with QS fittings  |
| <b>QO</b>                         | Supply/vacuum port with QS fittings, exhaust port with open silencer                        |
| <b>GN</b>                         | All connections with G female thread  |
| <b>GO</b>                         | Supply/vacuum port with G female thread, exhaust port with open silencer                    |
| <b>PL</b>                         | Prepared for supply manifold, vacuum port and exhaust port with QS fittings                 |
| <b>PO</b>                         | Prepared for supply manifold, vacuum port with QS fittings, exhaust port with open silencer |


| 006 Normal position of the vacuum generator |   |
|---|---|
| <b>ON</b>                                   | NO, normally open (vacuum generation)                         |
| <b>OE</b>                                   | NO, normally open (vacuum generation) with ejector pulse      |
| <b>CN</b>                                   | NC, normally closed (no vacuum generation)                    |
| <b>CE</b>                                   | NC, normally closed (no vacuum generation) with ejector pulse |
| 007 Electrical connection                   |   |
| <b>N</b>                                    | Plug M12 (5-pin)  |
| 008 Vacuum sensor                           |   |
|   | Without vacuum sensor (switching input PNP)                   |
| <b>1N</b>                                   | Switching output 1 x NPN                                      |
| <b>1P</b>                                   | Switching output 1x PNP                                       |
| <b>2N</b>                                   | Switching output 2 x NPN                                      |
| <b>2P</b>                                   | Switching output 2x PNP                                       |
| <b>PI</b>                                   | Switching output 1 x PNP + I                                  |
| <b>PU</b>                                   | Switching output 1 x PNP + U                                  |
| 009 Alternative vacuum display              |   |
|   | Without   |
| <b>W</b>                                    | Inch H2O  |
| <b>B</b>                                    | Bar   |


## Datasheet

### Function

N/C, normally closed:

- Ejector pulse
- QS fitting (inch) or NPT female thread
- With open silencer
- Prepared for common supply manifold

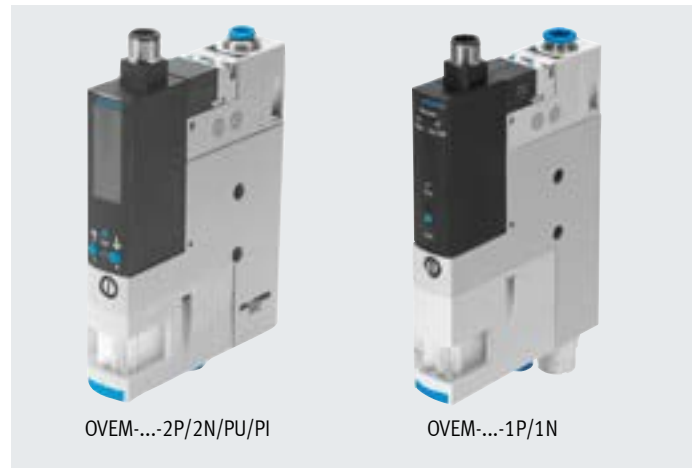
 Temperature range  
0 ... +50°C

 Operating pressure  
2 ... 8 bar

 [www.festo.com](http://www.festo.com)

NO, normally open:

- Ejector pulse
- QS fitting (inch) or NPT female thread
- With open silencer
- Prepared for common supply manifold



| General technical data        |      | OVEM-05                 | OVEM-07 | OVEM-10 | OVEM-14 |
|-------------------------------|------|-------------------------|---------|---------|---------|
| Type                          |      |                         |         |         |         |
| Nominal width of Laval nozzle | [mm] | 0.45                    | 0.7     | 0.95    | 1.4     |
| Grid dimension                | [mm] | 20                      |         |         |         |
| Grade of filtration           | [µm] | 40                      |         |         |         |
| Mounting position             |      | Any                     |         |         |         |
| Type of mounting              |      | Via through-hole        |         |         |         |
|                               |      | With female thread      |         |         |         |
|                               |      | With accessories        |         |         |         |
| Pneumatic connection 1 (P)    |      | → Dimensions on page 15 |         |         |         |
| Vacuum port (V)               |      | → Dimensions on page 15 |         |         |         |
| Pneumatic connection 3 (R)    |      | → Dimensions on page 15 |         |         |         |

| Technical data – design |       | OVEM-05/07/10/14-...-QO/PO/GO                    | OVEM-05/07/10/14-...-QS/GN/PL |
|-------------------------|-------|--|-------------------------------|
| Type                    |       |  |                               |
| Design                  |       | Modular  |                               |
| Ejector characteristic  |       | High vacuum/standard H                           |                               |
|                         |       | High suction rate/standard L                     |                               |
| Silencer design         |       | Open   |                               |
| Integrated function     | ON/CN | Electric on/off valve                            |                               |
|                         |       | Vacuum sensor <sup>1)</sup>                      |                               |
|                         |       | Filter   |                               |
|                         |       | Open silencer                                    |                               |
|                         | OE/CE | Electric on/off valve                            |                               |
|                         |       | Ejector pulse, electrical                        |                               |
|                         |       | Flow control valve                               |                               |
|                         |       | Vacuum sensor <sup>1)</sup>                      |                               |
|                         |       | Air saving function, electrical <sup>2)</sup>    |                               |
|                         |       | Check valve                                      |                               |
| Valve function          | ON/OE | Open   |                               |
|                         | CN/CE | Closed   |                               |
| Manual override         |       | Non-detenting                                    |                               |
|                         |       | Additionally via operating buttons <sup>2)</sup> |                               |

1) Only with OVEM-...-1P/1N/2P/2N/PU/PI

2) Only possible with OVEM-...-2P/2N/PU/PI

## Datasheet

| Operating and environmental conditions       |       | OVEM-05/07/10/14-...-QO/PO/GO             | OVEM-05/07/10/14-...-QS/GN/PL |
|--|-------|---|-------------------------------|
| Type   |       |   |                               |
| Operating pressure                           | [bar] | 2 ... 8                                   | 2 ... 6                       |
| Nominal operating pressure                   | [bar] | 6   |                               |
| Operating medium                             |       | Compressed air to ISO 8573-1:2010 [7:4:4] |                               |
| Note on the operating/pilot medium           |       | Lubricated operation not possible         |                               |
| Ambient temperature                          | [°C]  | 0 ... +50                                 |                               |
| Temperature of medium                        | [°C]  | 0 ... +50                                 |                               |
| Relative humidity                            | [%]   | 5 ... 85                                  |                               |
| Protection class                             |       | III                                       |                               |
| Degree of protection                         |       | IP65                                      |                               |
| Corrosion resistance class CRC <sup>1)</sup> |       | 2   |                               |
| CE marking (see declaration of conformity)   |       | To EU EMC Directive <sup>2)</sup>         |                               |
| UKCA marking (see declaration of conformity) |       | UK regs EMC <sup>2)</sup>                 |                               |
| Certification                                |       | c UL us listed (OL)                       |                               |
|  |       | RCM                                       |                               |
| KC mark                                      |       | KC EMC                                    |                               |

- 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/catalogue/...](http://www.festo.com/catalogue/...) → Support/Downloads.  
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  |         | OVEM-05 |    |     |    | OVEM-07 |     |     |     | OVEM-10 |     |     |     | OVEM-14 |     |     |     |
|---|---------|---------|----|-----|----|---------|-----|-----|-----|---------|-----|-----|-----|---------|-----|-----|-----|
| Type  |         | ON      | OE | CN  | CE | ON      | OE  | CN  | CE  | ON      | OE  | CN  | CE  | ON      | OE  | CN  | CE  |
| <b>Normal position of the vacuum generator</b>                          |         |         |    |     |    |         |     |     |     |         |     |     |     |         |     |     |     |
| Max. vacuum   | [%]     | 93      |    |     |    |         |     |     |     |         |     |     |     |         |     |     |     |
| Operating pressure for max. vacuum                                      | [bar]   | 5.1     |    |     |    | 4.1     |     |     |     | 3.5     |     |     |     | 3.6     |     |     |     |
| Max. suction rate with respect to atmosphere                            | [l/min] | 6       |    |     |    | 16      |     |     |     | 19.5    |     |     |     | 50.5    |     |     |     |
| Suction rate at p <sub>1</sub> = 6 bar                                  | [l/min] | 5.9     |    |     |    | 15.1    |     |     |     | 18.6    |     |     |     | 46      |     |     |     |
| Air supply time <sup>1)</sup> for 1 l volume, at p <sub>1</sub> = 6 bar | [s]     | 4.8     | 2  | 4.8 | 2  | 1.9     | 0.4 | 1.9 | 0.4 | 1.2     | 0.2 | 1.2 | 0.2 | 0.6     | 0.2 | 0.6 | 0.2 |
| Noise level at p <sub>1</sub> = 6 bar                                   | [db(A)] | 51      |    |     |    | 58      |     |     |     | 73      |     |     |     | 77      |     |     |     |

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

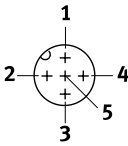
| Performance data – high suction rate                                    |         | OVEM-05 |     |    |     | OVEM-07 |     |    |     | OVEM-10 |     |     |     | OVEM-14 |     |     |     |
|---|---------|---------|-----|----|-----|---------|-----|----|-----|---------|-----|-----|-----|---------|-----|-----|-----|
| Type  |         | ON      | OE  | CN | CE  | ON      | OE  | CN | CE  | ON      | OE  | CN  | CE  | ON      | OE  | CN  | CE  |
| <b>Normal position of the vacuum generator</b>                          |         |         |     |    |     |         |     |    |     |         |     |     |     |         |     |     |     |
| Max. suction rate with respect to atmosphere                            | [l/min] | 13      |     |    |     | 31.5    |     |    |     | 45      |     |     |     | 92      |     |     |     |
| Suction rate at p <sub>1</sub> = 6 bar                                  | [l/min] | 12.8    |     |    |     | 31.5    |     |    |     | 45.1    |     |     |     | 88.7    |     |     |     |
| Air supply time <sup>1)</sup> for 1 l volume, at p <sub>1</sub> = 6 bar | [s]     | 2       | 1.3 | 2  | 1.3 | 1       | 0.2 | 1  | 0.2 | 0.8     | 0.2 | 0.8 | 0.2 | 0.4     | 0.2 | 0.4 | 0.2 |
| Noise level at p <sub>1</sub> = 6 bar                                   | [db(A)] | 45      |     |    |     | 53      |     |    |     | 64      |     |     |     | 70      |     |     |     |

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



## Datasheet

| Technical data – Electrical data, general |        |                                |                    |                |
|---|--------|--------------------------------|--------------------|----------------|
| Type                                      |        | Without vacuum sensor          | With vacuum sensor |                |
|   |        |                                | OVEM-...-1P/1N     | OVEM-...-2P/2N |
| Electrical connection                     |        | Plug M12x1, 5-pin              |                    |                |
| Standard switching input                  |        | IEC 61131-2                    |                    |                |
| Operating voltage range                   | [V DC] | 20.4 ... 27.6                  |                    |                |
| Duty cycle                                | [%]    | 100                            |                    |                |
| Coil characteristics 24 V DC              | [W]    | Low-current phase: 0.3         |                    |                |
|   |        | High-current phase: 2.55       |                    |                |
| Max. current consumption                  | [mA]   | 30                             | 180                | 270            |
| Insulation voltage                        | [V]    | 50                             |                    |                |
| Surge resistance                          | [kV]   | 0.8                            |                    |                |
| Pollution degree                          |        | 3                              |                    |                |
| Reverse polarity protection               |        | For all electrical connections |                    |                |
| Switching position indication             |        | LED                            |                    | LCD            |

| Pin allocation  |                                   |   |
|---|-----------------------------------|---|
| Plug M12x1, 5-pin   | Pin                               | Meaning   |
|  | <b>OVEM without vacuum sensor</b> |   |
|   | 1                                 | Supply voltage +24 V DC                                   |
|   | 2                                 | Switching input for vacuum ON/OFF                         |
|   | 3                                 | 0 V   |
|   | 4                                 | No function   |
|   | 5                                 | Switching input for ejector pulse ON/OFF                  |
|   | <b>OVEM-...-1P/1N</b>             |   |
|   | 1                                 | Supply voltage +24 V DC                                   |
|   | 2                                 | Switching input for vacuum ON/OFF                         |
|   | 3                                 | 0 V   |
|   | 4                                 | Switching output (switching output for vacuum sensor)     |
|   | 5                                 | Switching input for ejector pulse ON/OFF                  |
|   | <b>OVEM-...-2P/2N/PU/PI</b>       |   |
|   | 1                                 | Supply voltage +24 V DC                                   |
|   | 2                                 | Digital output Out B (OVEM-...-2P/2N)                     |
|   |                                   | Analogue output Out B (OVEM-...-PU/PI)                    |
|   | 3                                 | 0 V   |
|   | 4                                 | Digital output Out A (switching output for vacuum sensor) |
|   | 5                                 | Digital switching input (vacuum ON/OFF and ejector pulse) |

## Datasheet

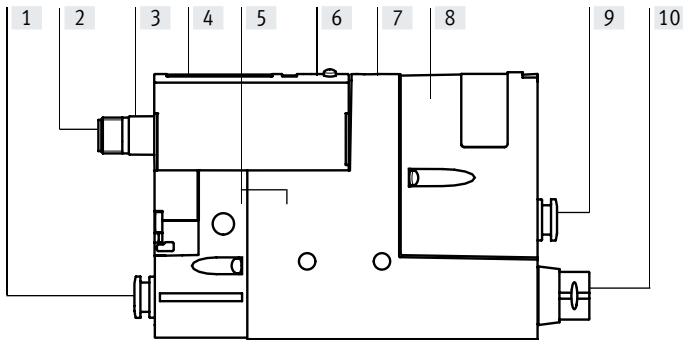
| Technical data – vacuum sensor                      |         | 2P                                       | 2N     | PU        | PI       | 1P       | 1N     |
|---|---------|--|--------|-----------|----------|----------|--------|
| Electrical switching output                         |         |  |        |           |          |          |        |
| <b>Input signal/measuring element</b>               |         |  |        |           |          |          |        |
| Measured variable                                   |         | Relative pressure                        |        |           |          |          |        |
| Measuring principle                                 |         | Piezoresistive                           |        |           |          |          |        |
| Pressure measuring range                            | [bar]   | -1 ... 0                                 |        |           |          |          |        |
| <b>Display/operation</b>                            |         |  |        |           |          |          |        |
| Setting options                                     |         | Via display and buttons                  |        |           |          | Teach-in |        |
| Threshold value setting range                       | [bar]   | -0.999 ... 0                             |        |           |          | -1 ... 0 |        |
| Hysteresis setting range                            | [bar]   | -0.9 ... 0                               |        |           |          | -        |        |
| Setting range ejector pulse duration                | [ms]    | 20 ... 9999 (OVEM-05)                    |        |           |          | -        |        |
|   |         | 40 ... 9999 (OVEM-0 7/10/14)             |        |           |          | -        |        |
| Display type  |         | 4-character alphanumeric, backlit LCD    |        |           |          | LED      |        |
| Displayable units                                   | -       | inHg                                     |        |           |          | -        |        |
|   | W       | inH2O                                    |        |           |          | -        |        |
|   | B       | bar                                      |        |           |          | -        |        |
| Display range                                       | [inHg]  | -29.5 ... 0                              |        |           |          | -        |        |
|   | [inH2O] | -401.9 ... 0                             |        |           |          | -        |        |
|   | [bar]   | -0.999 ... 0                             |        |           |          | -        |        |
| <b>Accuracy</b>                                     |         |  |        |           |          |          |        |
| Accuracy FS <sup>1)</sup>                           | [%]     | ±3                                       |        |           |          | ±0.5     |        |
| Reproducibility of switching value FS <sup>1)</sup> | [%]     | 0.6                                      |        |           |          | 0.6      |        |
| <b>Inputs/outputs</b>                               |         |  |        |           |          |          |        |
| Switching logic at inputs                           |         | PNP                                      | NPN    | PNP       | PNP      | PNP      | NPN    |
| Switching output                                    |         | 2x PNP                                   | 2x NPN | 1x PNP    | 1x PNP   | 1x PNP   | 1x NPN |
| Switching function                                  |         | Window comparator                        |        |           |          | -        |        |
|   |         | Threshold value comparator <sup>2)</sup> |        |           |          | -        |        |
| Switching status indication                         |         | Optical                                  |        |           |          |          |        |
| Switching element function                          |         | N/O                                      |        |           |          |          |        |
|   |         | N/C                                      |        |           |          | -        |        |
| Fixed hysteresis                                    | [mbar]  | -  |        |           |          | 20       |        |
| Max. output current                                 | [mA]    | 100                                      |        |           |          |          |        |
| No-load supply current                              | [mA]    | < 70                                     |        |           |          | < 80     |        |
| Residual current                                    | [mA]    | 0.1                                      |        |           |          |          |        |
| Voltage drop  | [V]     | ≤ 1.5                                    |        |           |          |          |        |
| Analogue output                                     | [V]     | -  |        | 0 ... 10  | -        | -        |        |
|   | [mA]    | -  |        | -         | 4 ... 20 | -        |        |
| Permitted load resistance analogue output           | [ohm]   | -  |        | Min. 2000 | Max. 500 | -        |        |
| Accuracy of analogue output FS <sup>1)</sup>        | [%]     | -  |        | 4         |          | -        |        |
| Short circuit current rating                        |         | Yes                                      |        |           |          |          |        |
| Inductive protective circuit                        |         | Adapted to MZ, MY, ME coils              |        |           |          |          |        |
| Overload protection                                 |         | Available                                |        |           |          |          |        |

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

2) OVEM-...-1P/1N threshold value with fixed hysteresis

## Datasheet

## Materials

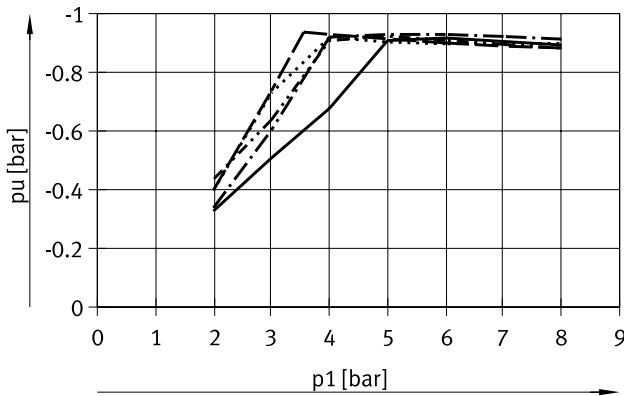


| Type              |                   | OVEM-...-2P/2N/PU/PI | OVEM-...-1P/1N                               |
|-------------------|-------------------|----------------------|--|
| [1]               | Fitting           | QS/QO                | Nickel-plated brass                          |
|                   | Connecting thread | GN/GO                | Anodised wrought aluminium alloy             |
| [2]               | Pin contacts      |                      | Gold-plated brass                            |
| [3]               | Plug housing      |                      | Nickel-plated brass                          |
| [4]               | Inspection window |                      | PA   |
| [5]               | Housing           |                      | Die-cast aluminium, PA reinforced            |
| [6]               | Keypad            |                      | TPE-U  |
| [7]               | Adjusting screw   | CE/OE                | Steel  |
| [8]               | Filter housing    |                      | Reinforced PA                                |
| [9]               | Fitting           | QS/QO/PL/PO          | Nickel-plated brass                          |
|                   | Connecting thread | GN/GO                | Anodised wrought aluminium alloy             |
| [10]              | Silencer          | QO/GO/PO             | Wrought aluminium alloy, PU foam             |
|                   | Fitting           | QS/QO/PL/PO          | Nickel-plated brass                          |
|                   |                   | GN/GO                | Anodised wrought aluminium alloy             |
| -                 | Screws            |                      | Steel  |
| -                 | Pins              |                      | Steel  |
| -                 | Jet nozzle        |                      | Wrought aluminium alloy                      |
| -                 | Female nozzle     |                      | POM  |
| -                 | Filter            |                      | Fabric, PA, sintered steel                   |
| -                 | Seals             |                      | NBR  |
| -                 | Hollow bolt       | PL/PO                | Wrought aluminium alloy                      |
| -                 | Mounting bracket  | PL/PO                | Stainless steel                              |
| Note on materials |                   |                      | RoHS-compliant                               |
|                   |                   | QO/GO/PO             | Contains paint-wetting impairment substances |

## Datasheet

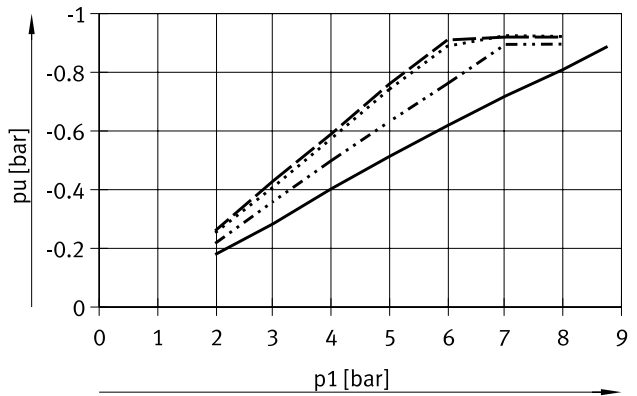
### Vacuum $p_u$ as a function of operating pressure $p_1$

High vacuum



- OVEM-05-H
- · - · - · OVEM-07-H
- - - - - OVEM-10-H
- · · · · OVEM-14-H

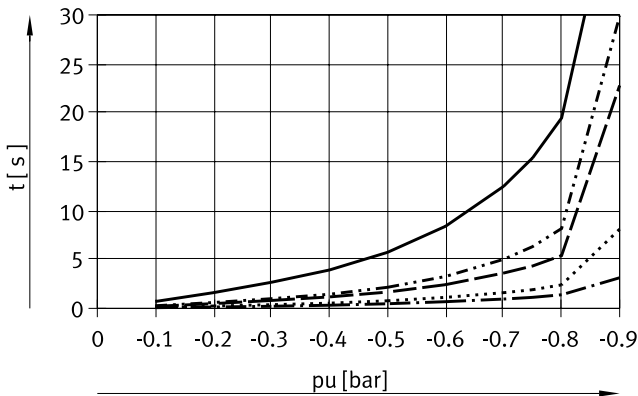
High suction rate



- OVEM-05-L
- · - · - · OVEM-07-L
- - - - - OVEM-10-L
- · · · · OVEM-14-L

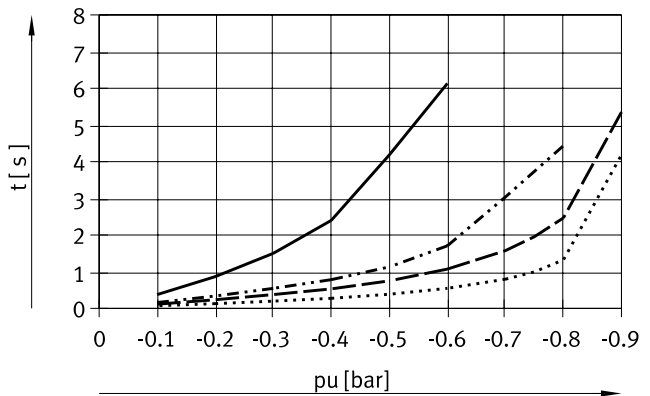
### Evacuation time $t$ as a function of vacuum $p_u$ for 1 l volume at 6 bar operating pressure

High vacuum



- OVEM-05-H
- · - · - · OVEM-07-H
- - - - - OVEM-10-H
- · · · · OVEM-14-H

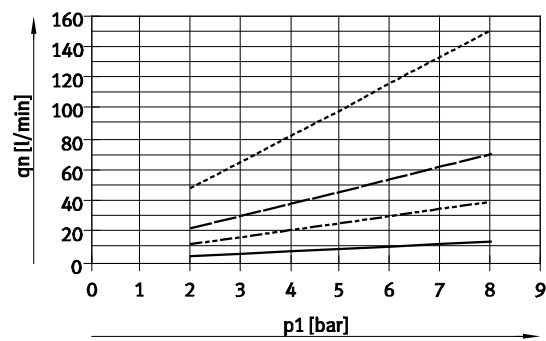
High suction rate



- OVEM-05-L
- · - · - · OVEM-07-L
- - - - - OVEM-10-L
- · · · · OVEM-14-L

### Air consumption $q_n$ as a function of operating pressure $p_1$

High vacuum/high suction rate



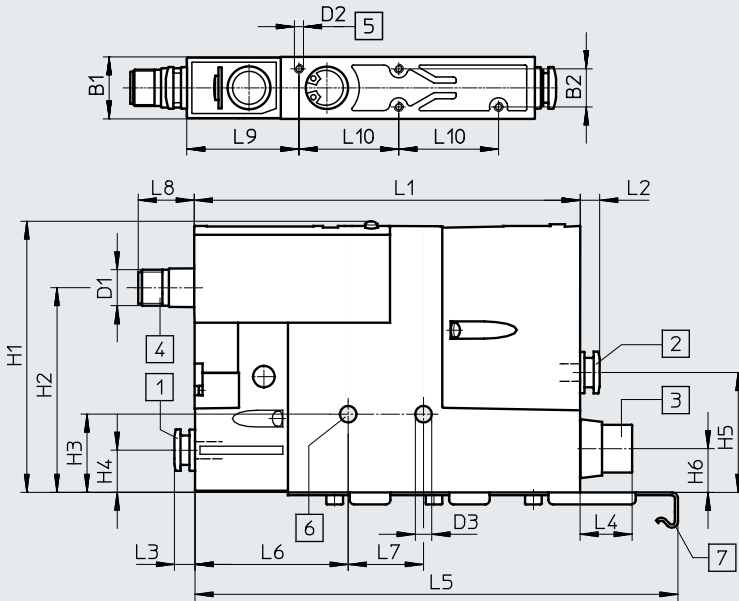
- OVEM-05
- · - · - · OVEM-07
- - - - - OVEM-10
- · · · · OVEM-14

Datasheet

Dimensions

OVEM-05

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- [1] Supply port (P)
- [2] Vacuum port (V)
- [3] Exhaust port (R)
- [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
- [7] Mounting bracket, only with OVEM-...-PL/PO

| Type           | Pneumatic connections |         |                  | D1    | D2 | D3  | B1   | B2   | H1 | H2 | H3 | H4   |
|----------------|-----------------------|---------|------------------|-------|----|-----|------|------|----|----|----|------|
|                | P                     | V       | R                |       |    |     |      |      |    |    |    |      |
| OVEM-05-...-QS | QS-1/4                | QS-1/4  | QS-5/16          | M12x1 | M3 | 5.5 | 20.5 | 12.6 | 90 | 68 | 26 | 14.5 |
| OVEM-05-...-QO |                       |         | SD <sup>2)</sup> |       |    |     |      |      |    |    |    |      |
| OVEM-05-...-PL | (G1/4) <sup>1)</sup>  | QS-1/4  | QS-5/16          |       |    |     |      |      |    |    |    |      |
| OVEM-05-...-PO |                       |         | SD <sup>2)</sup> |       |    |     |      |      |    |    |    |      |
| OVEM-05-...-GN | 1/8 NPT               | 1/8 NPT | 1/8 NPT          |       |    |     |      |      |    |    |    |      |
| OVEM-05-...-GO |                       |         | SD <sup>2)</sup> |       |    |     |      |      |    |    |    |      |

| Type           | H5 | H6   | L1  | L2  | L3    | L4 | L5 | L6 | L7 | L8 | L9 | L10 |
|----------------|----|------|-----|-----|-------|----|----|----|----|----|----|-----|
| OVEM-05-...-QS | 40 | 14.5 | 115 | 6.5 | 6.5   | 13 | -  | 51 | 25 | 18 | 37 | 33  |
| OVEM-05-...-QO |    |      |     |     |       | -  |    |    |    |    |    |     |
| OVEM-05-...-PL |    |      |     |     |       | 13 |    |    |    |    |    |     |
| OVEM-05-...-PO |    |      |     | -   | 160.5 |    |    |    |    |    |    |     |
| OVEM-05-...-GN |    |      |     | 8.2 | 8.2   | -  |    |    |    |    |    |     |
| OVEM-05-...-GO | -  | -    | -   |     |       |    |    |    |    |    |    |     |

1) Thread for mounting on the common supply manifold (→ page 18)  
 2) SD = Silencer

Minimum inside diameter [mm] of the connection tubes for connections with female thread

| Type                       | OVEM-05-...-GN/GO |       |
|----------------------------|-------------------|-------|
| Tube length                | < 0.5 m           | < 2 m |
| Pneumatic connection 1 (P) | 1                 | 2     |
| Vacuum port (V)            | 2                 | 3     |
| Pneumatic connection 3 (R) | 2                 | 3     |

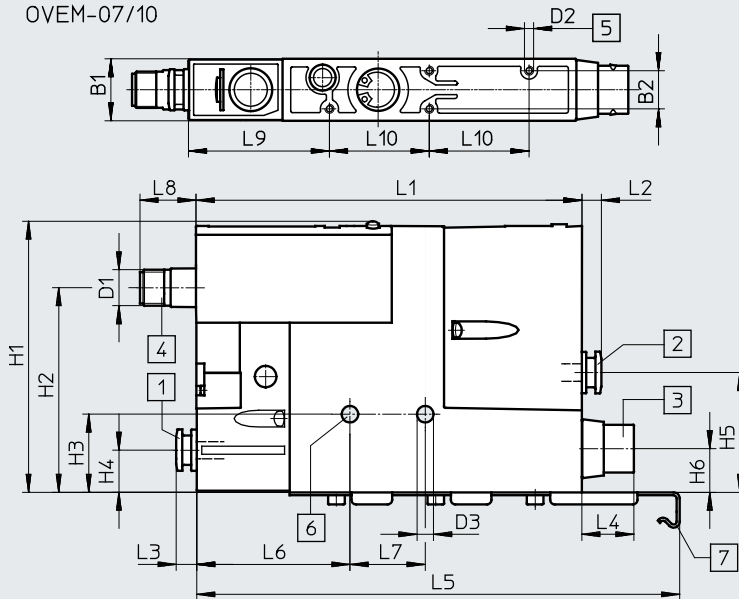
# Datasheet

## Dimensions

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OVEM-07/10

OVEM-07/10



- [1] Supply port (P)
- [2] Vacuum port (V)
- [3] Exhaust port (R)
- [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
- [7] Mounting bracket, only with OVEM-...-PL/PO

| Type              | Pneumatic connections |         |                  | D1    | D2 | D3  | B1   | B2   | H1 | H2 | H3 | H4   |
|-------------------|-----------------------|---------|------------------|-------|----|-----|------|------|----|----|----|------|
|                   | P                     | V       | R                |       |    |     |      |      |    |    |    |      |
| OVEM-07/10-...-QS | QS-5/16               | QS-5/16 | QS-5/16          | M12x1 | M3 | 5.5 | 20.5 | 12.6 | 90 | 68 | 26 | 14.5 |
| OVEM-07/10-...-QO |                       |         | SD <sup>2)</sup> |       |    |     |      |      |    |    |    |      |
| OVEM-07/10-...-PL | (G1/4) <sup>1)</sup>  | QS-5/16 | QS-5/16          |       |    |     |      |      |    |    |    |      |
| OVEM-07/10-...-PO |                       |         | SD <sup>2)</sup> |       |    |     |      |      |    |    |    |      |
| OVEM-07/10-...-GN | 1/4 NPT               | 1/4 NPT | 1/4 NPT          |       |    |     |      |      |    |    |    |      |
| OVEM-07/10-...-GO |                       |         | SD <sup>2)</sup> |       |    |     |      |      |    |    |    |      |

| Type              | H5   | H6   | L1  | L2   | L3   | L4   | L5 | L6 | L7 | L8 | L9   | L10 |
|-------------------|------|------|-----|------|------|------|----|----|----|----|------|-----|
| OVEM-07/10-...-QS | 40   | 14.5 | 128 | 6.5  | 6.5  | 13   | -  | 51 | 25 | 18 | 46.5 | 33  |
| OVEM-07/10-...-QO |      |      |     |      |      | 17.3 |    |    |    |    |      |     |
| OVEM-07/10-...-PL |      |      |     |      |      | 13   |    |    |    |    |      |     |
| OVEM-07/10-...-PO |      |      |     | 17.3 |      |      |    |    |    |    |      |     |
| OVEM-07/10-...-GN |      |      |     | 17.2 | 17.2 | -    |    |    |    |    |      |     |
| OVEM-07/10-...-GO | 17.3 |      |     |      |      |      |    |    |    |    |      |     |

1) Thread for mounting on the common supply manifold (→ page 18)  
 2) SD = Silencer

| Minimum inside diameter [mm] of the connection tubes for connections with female thread |                   |       |                   |
|---|-------------------|-------|-------------------|
| Type  | OVEM-07-...-GN/GO |       | OVEM-10-...-GN/GO |
| Tube length   | < 0.5 m           | < 2 m | < 0.5 m < 2 m     |
| Pneumatic connection 1 (P)  | 1.5               | 2     | 3                 |
| Vacuum port (V)   | 3                 | 4     | 5                 |
| Pneumatic connection 3 (R)  | 3                 | 4     | 5                 |

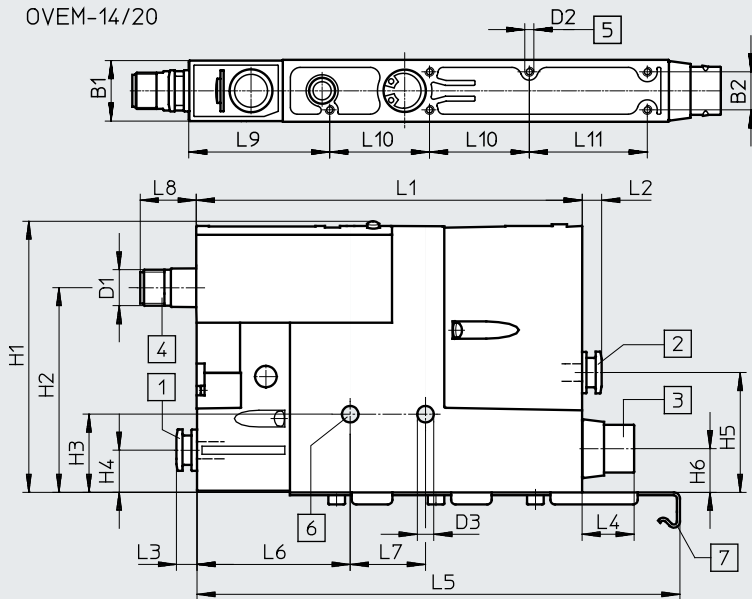
Datasheet

Dimensions

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OVEM-14

OVEM-14/20



- [1] Supply port (P)
- [2] Vacuum port (V)
- [3] Exhaust port (R)
- [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
- [7] Mounting bracket, only with OVEM-...-PL/PO

| Type           | Pneumatic connections |         |                  | D1    | D2 | D3  | B1   | B2   | H1 | H2 | H3 | H4   |
|----------------|-----------------------|---------|------------------|-------|----|-----|------|------|----|----|----|------|
|                | P                     | V       | R                |       |    |     |      |      |    |    |    |      |
| OVEM-14-...-QS | QS-5/16               | QS-5/16 | QS-5/16          | M12x1 | M3 | 4.3 | 20.5 | 12.6 | 90 | 68 | 25 | 14.5 |
| OVEM-14-...-QO |                       |         | SD <sup>2)</sup> |       |    |     |      |      |    |    |    |      |
| OVEM-14-...-PL | (G1/4) <sup>1)</sup>  | QS-5/16 | QS-5/16          |       |    |     |      |      |    |    |    |      |
| OVEM-14-...-PO |                       |         | SD <sup>2)</sup> |       |    |     |      |      |    |    |    |      |
| OVEM-14-...-GN | 1/4 NPT               | 1/4 NPT | 1/4 NPT          |       |    |     |      |      |    |    |    |      |
| OVEM-14-...-GO |                       |         | SD <sup>2)</sup> |       |    |     |      |      |    |    |    |      |

| Type           | H5   | H6   | L1   | L2   | L3    | L4   | L5 | L6 | L7 | L8 | L9   | L10 | L11 |
|----------------|------|------|------|------|-------|------|----|----|----|----|------|-----|-----|
| OVEM-14-...-QS | 40   | 14.5 | 158  | 6.5  | 6.5   | 13   | -  | 57 | 25 | 18 | 46.5 | 33  | 39  |
| OVEM-14-...-QO |      |      |      |      |       | 17.3 |    |    |    |    |      |     |     |
| OVEM-14-...-PL |      |      |      |      |       | 13   |    |    |    |    |      |     |     |
| OVEM-14-...-PO |      |      |      | 17.3 | 160.5 |      |    |    |    |    |      |     |     |
| OVEM-14-...-GN |      |      |      | 15   |       |      |    |    |    |    |      |     |     |
| OVEM-14-...-GO | 17.2 | 17.2 | 17.3 |      |       |      |    |    |    |    |      |     |     |

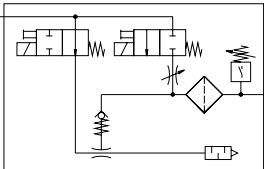
1) Thread for mounting on the common supply manifold (→ page 18)

2) SD = Silencer

Minimum inside diameter [mm] of the connection tubes for connections with female thread

| Type                       | OVEM-14-...-GN/GO |       |
|----------------------------|-------------------|-------|
| Tube length                | < 0.5 m           | < 2 m |
| Pneumatic connection 1 (P) | 3                 | 4     |
| Vacuum port (V)            | 5.5               | 6     |
| Pneumatic connection 3 (R) | 5.5               | 6     |

## Datasheet

| Ordering data and weight  |  |                             |         |                                    |            |               |                                |
|---|--|-----------------------------|---------|------------------------------------|------------|---------------|--------------------------------|
| Circuit symbol  | Description  | Electrical switching output | Display | Nominal width of Laval nozzle [mm] | Weight [g] | Part no.      | Type                           |
| <b>NO – normally open</b>   |  |                             |         |                                    |            |               |                                |
|  | With ejector pulse, P-V with QS fitting (inch), R with open silencer | 2x PNP                      | LCD     | 1.4                                | 380        | <b>539999</b> | <b>OVEM-14-H-BN-QO-OE-N-2P</b> |



## Ordering data – Modular product system

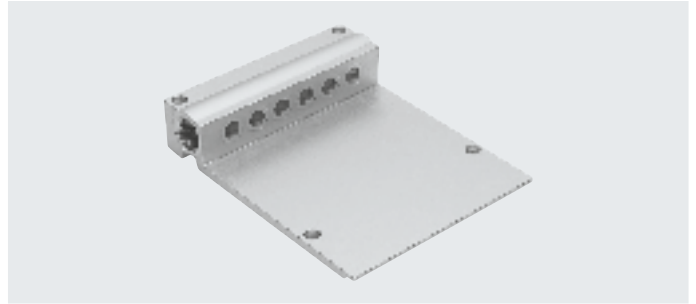
| Ordering table                          |   | Conditions | Code        | Enter code |
|---|---|------------|-------------|------------|
| Type                                    | OVEM  |            |             |            |
| Module no.                              | <b>539075</b>   |            |             |            |
| Vacuum generator                        | Vacuum generator with solenoid valve for vacuum on/off and manual override                            |            | <b>OVEM</b> | OVEM       |
| Nominal width of Laval nozzle [mm]      | 0.45  |            | <b>-05</b>  |            |
|   | 0.7   |            | <b>-07</b>  |            |
|   | 0.95  |            | <b>-10</b>  |            |
|   | 1.4   |            | <b>-14</b>  |            |
| Ejector characteristic                  | High vacuum   |            | <b>-H</b>   |            |
|   | High suction rate   |            | <b>-L</b>   |            |
| Housing size/width [mm]                 | 20 (inch version)   |            | <b>-BN</b>  | -BN        |
| Pneumatic connections                   | All connections with inch fittings  |            | <b>-QS</b>  |            |
|   | Supply/vacuum port with inch fittings, exhaust port with open silencer                                |            | <b>-QO</b>  |            |
|   | All connections with NPT female thread  |            | <b>-GN</b>  |            |
|   | Supply/vacuum port with NPT female thread, exhaust port with open silencer                            |            | <b>-GO</b>  |            |
|   | Prepared for supply manifold, vacuum port and exhaust port with fittings in inches                    |            | <b>-PL</b>  |            |
|   | Prepared for supply strip, vacuum connection with fittings in inches, exhaust port with open silencer |            | <b>-PO</b>  |            |
| Normal position of the vacuum generator | NO, normally open (vacuum generation)   |            | <b>-ON</b>  |            |
|   | NO, normally open (vacuum generation) with ejector pulse  |            | <b>-OE</b>  |            |
|   | NC, normally closed (no vacuum generation)  |            | <b>-CN</b>  |            |
|   | NC, normally closed (no vacuum generation) with ejector pulse   |            | <b>-CE</b>  |            |
| Electrical connection                   | M12 plug (5-pin)  |            | <b>-N</b>   | -N         |
| Vacuum sensor, (standard scale in inHg) | Without vacuum sensor   |            |             |            |
|   | 1 switching output PNP  |            | <b>-1P</b>  |            |
|   | 1 switching output NPN  |            | <b>-1N</b>  |            |
|   | 2 switching outputs PNP   |            | <b>-2P</b>  |            |
|   | 1 switching output PNP, 1 analogue output 0 ... 10 V  |            | <b>-PU</b>  |            |
|   | 1 switching output PNP, 1 analogue output 4 ... 20 mA   |            | <b>-PI</b>  |            |
| Alternative vacuum display              | None  |            |             |            |
|   | inH2O   | [1]        | <b>-W</b>   |            |
|   | bar   | [1]        | <b>-B</b>   |            |

1) W, B Only with vacuum sensor 2P, PU, PI, 2N.

## Accessories

### Common supply manifold OABM-P

For vacuum generator  
OVM-...-PL/PO



#### General technical data

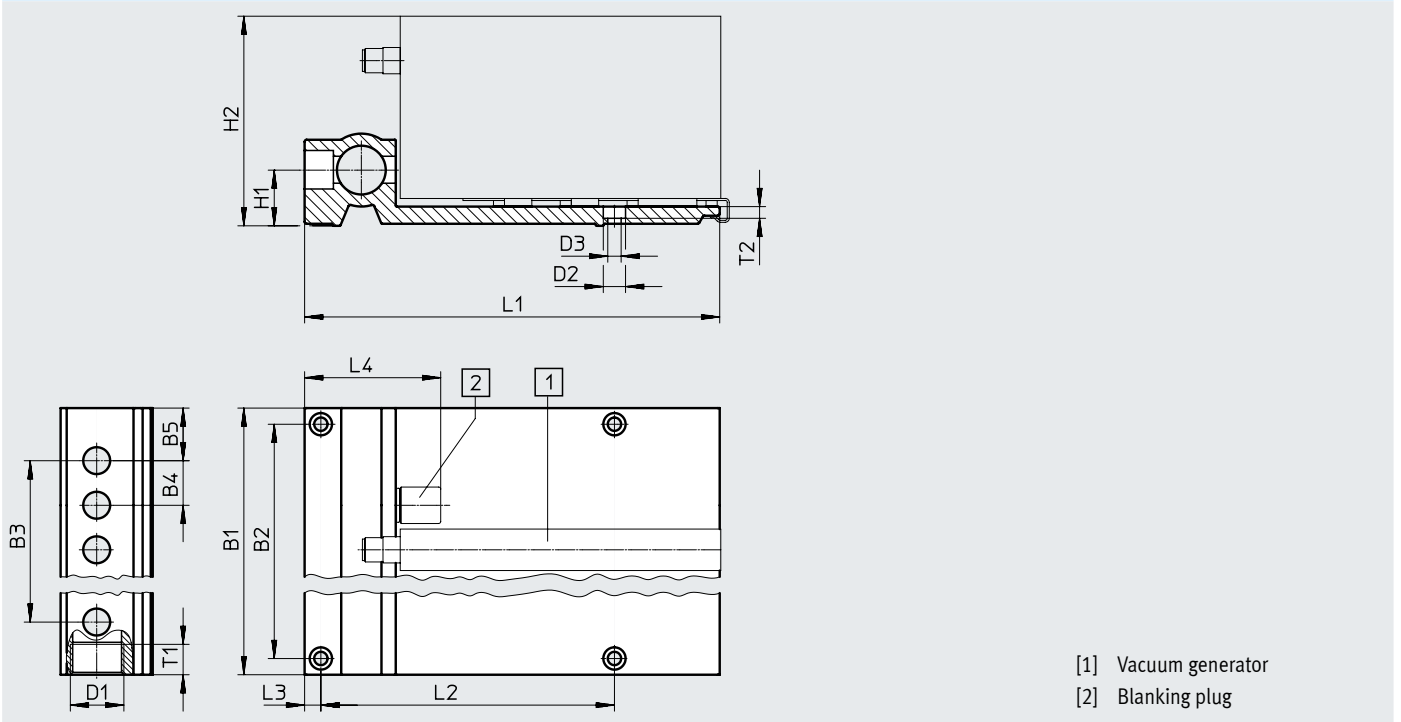
|                        |                  |
|------------------------|------------------|
| Pneumatic connection 1 | G3/4             |
| Type of mounting       | Via through-hole |

#### Materials

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

#### Dimensions

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| Type     | Number of device positions | B1  | B2  | B3  | B4 | B5 | D1   | D2<br>∅ | D3<br>∅ | H1 | H2    | L1  | L2  | L3 | L4 | T1 | T2  |
|----------|----------------------------|-----|-----|-----|----|----|------|---------|---------|----|-------|-----|-----|----|----|----|-----|
| OABM-P-4 | 4                          | 118 | 102 | 66  | 22 | 26 | G3/4 | 11      | 6.6     | 28 | 103.5 | 205 | 145 | 8  | 67 | 15 | 5.8 |
| OABM-P-6 | 6                          | 162 | 146 | 110 |    |    |      |         |         |    |       |     |     |    |    |    |     |
| OABM-P-8 | 8                          | 206 | 190 | 154 |    |    |      |         |         |    |       |     |     |    |    |    |     |

## Accessories

| Tubing inside diameter $d_i$ as a function of total air consumption $q_{mN}$ |       |       |        |        |        |                                 |       |     |     |       |      |       |       |      |        |      |      |
|--|-------|-------|--------|--------|--------|---------------------------------|-------|-----|-----|-------|------|-------|-------|------|--------|------|------|
| Total air consumption [l/min]  |       |       |        |        |        |                                 |       |     |     |       |      |       |       |      |        |      |      |
| 50   | 75    | 154   | 175    | 225    | 310    | 400                             | 480   | 500 | 750 | 890   | 1000 | 1190  | 1340  | 1850 | 2240   | 2300 | 2900 |
| Tubing inside diameter <sup>1)</sup> [mm]                                    |       |       |        |        |        |                                 |       |     |     |       |      |       |       |      |        |      |      |
| ≥ 2.5  | ≥ 2.9 | ≥ 3.8 | ≥ 4    | ≥ 4.4  | ≥ 5    | ≥ 5.5                           | ≥ 5.9 | ≥ 6 | ≥ 7 | ≥ 7.5 | ≥ 8  | ≥ 8.4 | ≥ 8.8 | ≥ 10 | ≥ 10.8 | ≥ 11 | ≥ 12 |
| Recommended tubing   |       |       |        |        |        |                                 |       |     |     |       |      |       |       |      |        |      |      |
| PUN-4  | PUN-6 | PUN-8 | PUN-10 | PUN-12 | PUN-16 | Datasheets → Internet: pun, pan |       |     |     |       |      |       |       |      |        |      |      |

1) With a tubing length of 3 m

### Note

The total air consumption of the fully equipped common supply manifold can be determined by adding the individual consumption of each generator used. Note that in the case of vacuum generators with ejector pulse (OE, CE), the individually set values for the ejector pulse (duration and intensity) can result in much higher air consumption.

| Ordering data and weight |                            |                   |            |               |                 |
|--------------------------|----------------------------|-------------------|------------|---------------|-----------------|
|                          | Number of device positions | CRC <sup>1)</sup> | Weight [g] | Part no.      | Type            |
| For OVEM-...-PL/PO       | 4                          | 2                 | 767        | <b>549456</b> | <b>OABM-P-4</b> |
|                          | 6                          | 2                 | 1045       | <b>549457</b> | <b>OABM-P-6</b> |
|                          | 8                          | 2                 | 1330       | <b>549458</b> | <b>OABM-P-8</b> |

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

### Blanking plug OASC-G1-P

For common supply manifold OABM-P

Type of mounting: threaded  
Max. tightening torque: 10 Nm

Material:  
Hollow bolt: Wrought aluminium alloy  
Blanking cap: Steel  
Seals: Steel, nitrile rubber  
Note on materials:  
RoHS-compliant



| Ordering data | CRC <sup>1)</sup> | Weight [g] | Part no. | Type      |
|---------------|-------------------|------------|----------|-----------|
| Blanking plug | 2                 | 53         | 549460   | OASC-G1-P |

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.

### H-rail mounting

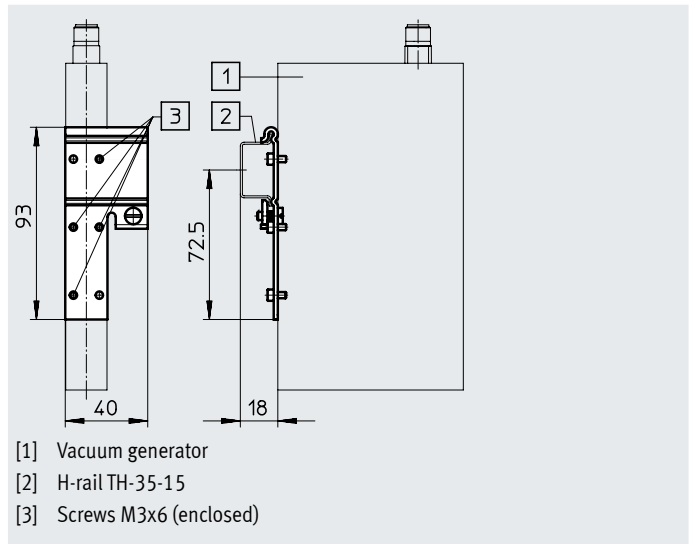
#### OABM-H

For vacuum generator OVEM

Max. tightening torque for H-rail mounting: 0.8 Nm

Material: Galvanised steel

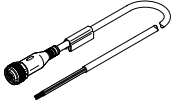
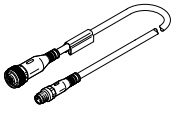
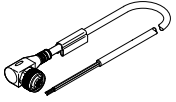
Note on materials:  
RoHS-compliant




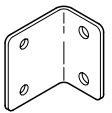
- [1] Vacuum generator
- [2] H-rail TH-35-15
- [3] Screws M3x6 (enclosed)

| Ordering data   | Weight [g] | Part no. | Type   |
|-----------------|------------|----------|--------|
| H-rail mounting | 52         | 549461   | OABM-H |

## Accessories

| Ordering data – Connecting cable NEBU-M12   |                               |  |                  | Datasheets → Internet: nebu |                       |
|---|-------------------------------|--|------------------|-----------------------------|-----------------------|
|   | Electrical connection         |  | Cable length [m] | Part no.                    | Type                  |
|  | Straight socket, M12x1, 5-pin | Open end, 5-wire                             | 2.5              | 541330                      | NEBU-M12G5-K-2.5-LE5  |
|   |                               |  | 5                | 541331                      | NEBU-M12G5-K-5-LE5    |
|   |                               |  | 10               | 554038                      | NEBU-M12G5-K-10-LE5   |
|  | Straight socket, M12x1, 5-pin | Straight plug, M8x1, 4-pin, rotatable thread | 2.5              | 554036                      | NEBU-M12G5-K-2.5-M8G4 |
|   |                               |  |                  |                             |                       |
|  | Angled socket, M12x1, 5-pin   | Open end, 5-wire                             | 2.5              | 567843                      | NEBU-M12W5-K-2.5-LE5  |
|   |                               |  | 5                | 567844                      | NEBU-M12W5-K-5-LE5    |

| Ordering data – Silencer extension UOMS   |               |                  |          | Datasheets → Internet: uoms |  |
|---|---------------|------------------|----------|-----------------------------|--|
| Description   | Design        | Type of mounting | Part no. | Type                        |  |
|  | Open silencer | Latching         | 538436   | UOMS-1/4                    |  |
|   |               |                  |          |                             |  |

| Ordering data – Mounting bracket HRM  |                  |  |          | Datasheets → Internet: hrm |  |
|---|------------------|--|----------|----------------------------|--|
| Description   | Material         |  | Part no. | Type                       |  |
|  | Galvanised steel |  | 9769     | HRM-1                      |  |
|   |                  |  |          |                            |  |