

**Product Information**

**OMNI-VHZ**

# Flow Transmitter / Switch OMNI-VHZ



- Flow sensor using the gearwheel principle
- Suitable for viscous media (oils, emulsions)
- Analog output 4..20 mA or 0..10 V
- Two programmable switches (push-pull)
- Graphical LCD display, backlit (transreflective), can be read in sunlight and in the dark
- Modifiable units in the display
- Programmable parameters via rotatable, removable ring (programming protection)
- Full metal housing with non-scratch, chemically resistant glass
- Rotatable electronic head for best reading position
- Small, compact construction
- Simple installation

## Characteristics

The VHZ gearwheel flow meter measures the flow by a volumetric principle, in which a pair of gearwheels is moved proportional to the flow rate. The movement of the gearwheels is measured through the enclosing housing wall by a sensor. The devices are suitable for viscous, fluid, self-lubricating media, as well as for aqueous fluids such as soaps, pasts, emulsions etc. which have a non-abrasive character. Because of the volumetric functioning principle, the devices are almost completely independent of viscosity.

The OMNI transducer located on the sensor has a backlit graphics LCD display which is very easy to read, both in the dark and in bright sunlight. The graphics display allows the presentation of measured values and parameters in a clearly understandable form.

The measured values are displayed to 4 places, together with their physical unit, which may also be modified by the user. The electronics have an analog output (4..20 mA or 0..10 V) and two switching outputs, which can be used as limit switches for monitoring minimal or maximal, or as two-point controllers.

The switching outputs are designed as push-pull drivers, and can therefore be used both as PNP and NPN outputs. Exceeding limit values is signalled by a red LED which is visible over a long distance, and by a cleartext in the display. The stainless steel case has a hardened non-scratch mineral glass pane. It is operated by a programming ring fitted with a magnet, so there is no need to open the operating controls housing, and its leakproofness is permanently ensured.

By turning the ring to right or left, it is simple to modify the parameters (e.g. switching point, hysteresis...). To protect from unintended programming, it can be removed, turned through 180 ° and replaced, or completely removed, thus acting as a key.



**OPTION C:**

Preset Counter with external reset option, complementary switching outputs and actual value display.

**OPTION C1:**

Instantaneous value display with analogue output, pulse-volume output and totalizer

## Technical data


|                                     |  |                         |
|-------------------------------------|--|-------------------------|
| <b>Sensor</b>                       | gearwheel volumeter  |                         |
| <b>Nominal width</b>                | DN 8..25   |                         |
| <b>Process connection</b>           | G 1/4..G 1   |                         |
| <b>Metering ranges</b>              | 0.02..150 l/min<br>for details, see table "Ranges"   |                         |
| <b>Measurement accuracy</b>         | ±3 % of the measured value<br>in the specified metering range<br>(measured at 20 mm²/s)                                |                         |
| <b>Repeatability</b>                | ±0.3 %   |                         |
| <b>Medium temperature</b>           | -25..+80 °C<br>optionally -25..+120 °C   |                         |
| <b>Ambient temperature</b>          | -20..+70 °C  |                         |
| <b>Pressure resistance</b>          | see table<br>"Pressure resistance and weight"  |                         |
| <b>Pressure loss</b>                | see upstream page "Function and benefits - volumetric, gearwheel"  |                         |
| <b>Materials medium-contact</b>     | see table "Materials"  |                         |
| <b>Materials non-medium-contact</b> | Electronic housing   | stainless steel 1.4305  |
|                                     | Glass  | mineral glass, hardened |
|                                     | Magnet   | Samarium-Cobalt         |
|                                     | Ring   | POM                     |
|                                     | Adapter  | CW614N nickelled        |
| <b>Supply voltage</b>               | 18..30 V DC  |                         |
| <b>Power consumption</b>            | < 1 W  |                         |
| <b>Analog output</b>                | 4..20 mA / max. load 500 Ω or<br>0..10 V / min. load 1 kΩ  |                         |
| <b>Switching outputs</b>            | transistor output "push-pull"<br>(resistant to short circuits and polarity reversal)<br>I <sub>out</sub> = 100 mA max. |                         |
| <b>Hysteresis</b>                   | adjustable, position of the hysteresis depends on minimum or maximum   |                         |

**Product Information**

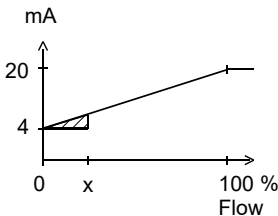
|                              |   |
|------------------------------|---|
| <b>Display</b>               | backlit graphical LCD-Display (transreflective), extended temperature range -20..+70 °C, 32 x 16 pixels, background illumination, displays value and unit, flashing LED signal lamp with simultaneous message on the display. |
| <b>Electrical connection</b> | for round plug connector M12x1, 5-pole  |
| <b>Ingress protection</b>    | IP 67 / (IP 68 when oil-filled)   |
| <b>Weight</b>                | see table<br>"Pressure resistance and weight"   |
| <b>Conformity</b>            | CE  |

**Signal output curves**

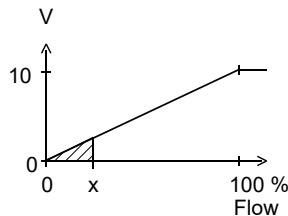
Value x = Begin of the specified range

 = not specified range

Current output



Voltage output



Other characters on request.

**Pressure resistance and weight**

| G     | Types           | PN bar | Housing material  | Weight kg |
|-------|-----------------|--------|-------------------|-----------|
| G 1/4 | OMNI-VHZ-008GA  | 200    | Aluminium         | 0.7       |
| G 1/4 | OMNI-VHZ-008GK  | 160    | Stainless steel   | 1.7       |
| G 3/8 | OMNI-VHZ-010GA  | 160    | Aluminium         | 0.7       |
| G 3/8 | OMNI-VHZ-010GK  | 160    | Stainless steel   | 1.7       |
| G 3/4 | OMNI-VHZ-020GA  | 160    | Aluminium         | 1.8       |
| G 3/4 | OMNI-VHZO-020GA | 100    | Aluminium / glass | 1.8       |
| G 1   | OMNI-VHZ-025GA  | 80     | Aluminium         | 6.7       |

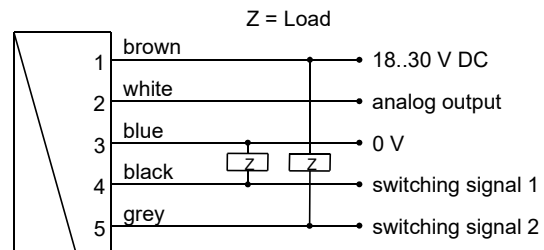
**Ranges**

| Metering range l/min | Types           | Pulse volume (= resolution) cm <sup>3</sup> |
|----------------------|-----------------|---|
| 0.02.. 2             | OMNI-VHZ-008    | 0.04  |
| 0.10.. 6             | OMNI-VHZ-010    | 0.20  |
| 0.50.. 50            | OMNI-VHZ(O)-020 | 2.00  |
| 3.00.. 150           | OMNI-VHZ-025    | 5.22  |

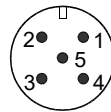
**Materials**

|                            | OMNI-VHZ-008..025GA    | OMNI-VHZ-008GK                               | OMNI-VHZ-010..025GK    |
|----------------------------|------------------------|--|------------------------|
| <b>Housing</b>             | Al anodised            | stainless steel 1.4404                       | stainless steel 1.4404 |
| <b>gear-wheel and Axis</b> | stainless steel 1.4462 | stainless steel 1.4462                       | stainless steel 1.4462 |
| <b>Bearing</b>             | Iglidur X              | stainless steel 1.4037 / 1.4016 / PVD-coated | Iglidur X              |
| <b>Seal</b>                | FKM                    | FKM  | FKM                    |
| <b>Sight glass</b>         | Glass (only with VHZO) |  |                        |

**Wiring**



Connection example: PNP NPN



connector M12x1

See separate wiring at C and C1 option in the separate descriptions.

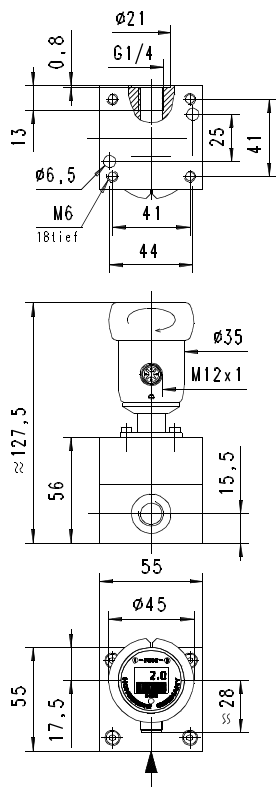
Before the electrical installation, it must be ensured that the supply voltage complies with the data sheet. The use of shielded cabling is recommended.

**Product Information**

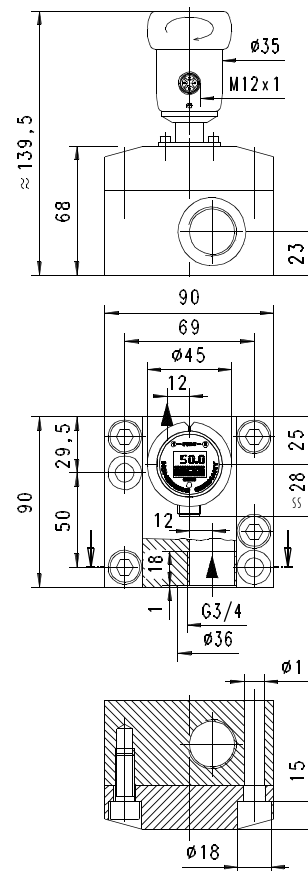
**OMNI-VHZ**

**Dimensions**

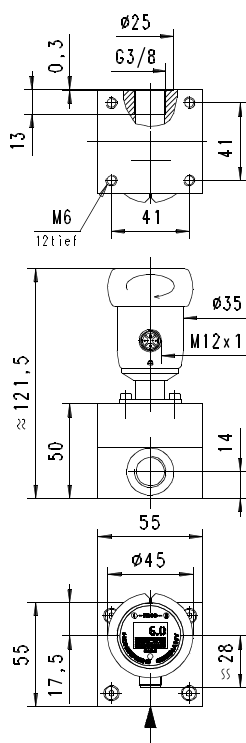
**OMNI-VHZ008**



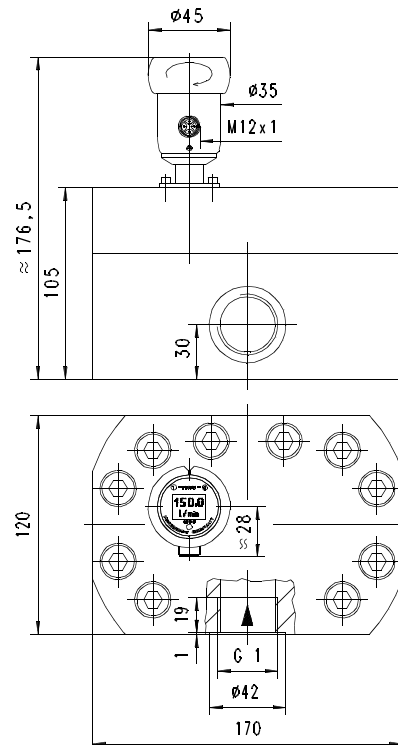
**OMNI-VHZ-020**



**OMNI-VHZ010**



**OMNI-VHZ-025**



## Product Information

### Gooseneck option



A gooseneck (optional) between the electronics head and the primary sensor provides freedom in the orientation of the sensor. This option simultaneously provides thermal decoupling between the two units.

## Handling and operation

### Installation

The VHZ flow measurement device can be installed anywhere in the pipework system. A run-in section is not required. The direction of flow may be freely chosen.

It should be ensured that no dirt particles (thread cutting swarf) can get into the flow space, as this could cause the blockage of the gearwheels. It may therefore be necessary to install filters upstream of the flow measurement device (mesh size 30 µm).

### Programming

The annular gap of the programming ring can be turned to positions 1 and 2. The following actions are possible:



Set to 1 = continue (STEP)  
 Set to 2 = modify (PROG)

Neutral position between 1 and 2

The ring can be removed to act as a key, or turned through 180° and replaced to create a programming protector. Operation is by dialog with the display messages, which makes its use very simple.

Starting from the normal display (present value and unit), if 1 (STEP) is repeatedly selected, then the display shows the following information in this order:

#### Display of the parameters, using position 1

- Switching value S1 (switching point 1 in the selected unit)
- Switching characteristic of S1  
 MIN = Monitoring of minimum value  
 MAX = Monitoring of maximum value
- Hysteresis 1 (hysteresis value of S1 in the set unit)
- Switching value S2
- Switching characteristic of S2
- Hysteresis 2
- Code  
 After entering the **code 111**, further parameters can be defined:
- Filter (settling time of the display and output)
- Physical unit (Units)
- Output: 0..20 mA or 4..20 mA
- 0/4 mA (measured value corresponding to 0/4 mA)
- 20 mA (measured value corresponding to 20 mA)

For models with a voltage output, replace 20 mA accordingly with 10 V.

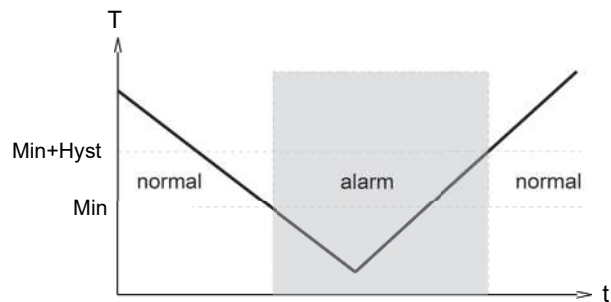
#### Edit, using position 2

If the currently visible parameter is to be modified:

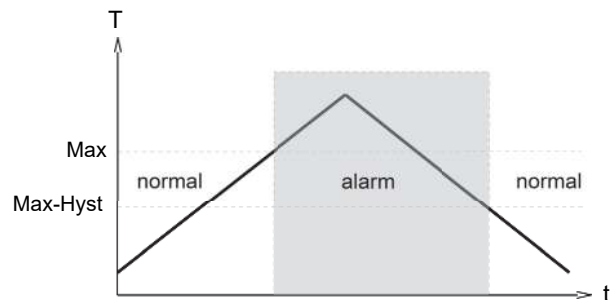
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the cursor moves to the next digit.
- Leave the parameter by turning to position 1 (until the cursor leaves the row); this accepts the modification.
- If there is no action within 30 seconds, the device returns to the normal display range without accepting the modification.

The limit switches S1 and S2 can be used to monitor minimal or maximal.

With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



The change to the alarm state is indicated by the integrated red LED and a cleartext in the display. While in the normal state the switching outputs are at the level of the supply voltage; in the alarm state they are at 0 V, so that a wire break would also display as an alarm state at the signal receiver.

#### Overload display

Overload of a switching output is detected and indicated on the display ("Check S 1 / S 2"), and the switching output is switched off.

#### Simulation mode

To simplify commissioning, the sensor provides a simulation mode for the analog output. It is possible to create a programmable value in the range 0..26.0 mA at the output (without modifying the process variable). This allows the wiring run between the sensor and the downstream electronics to be tested during commissioning. This mode is accessed by means of **Code 311**.

#### Factory settings

After modifying the configuration parameters, it is possible to reset them to the factory settings at any time using **Code 989**.

**Product Information**

**Ordering code**

The base device is ordered, e.g. VHZ-008GA002E with electronics, e.g. OMNI-VHZ-008ILO

|           |                      |                      |                                |                      |                                |
|-----------|----------------------|----------------------|--------------------------------|----------------------|--------------------------------|
| 1.        | 2.                   | 3.                   | 4.                             | 5.                   | 6.                             |
| VHZ-      | <input type="text"/> | <input type="text"/> | <input type="text" value="G"/> | <input type="text"/> | <input type="text" value="E"/> |
|           | 7.                   | 8.                   | 9.                             | 10.                  | 11.                            |
| OMNI-VHZ- | <input type="text"/> | <input type="text"/> | <input type="text" value="S"/> | <input type="text"/> | <input type="text"/>           |

○=Option

|                                 |   |  |  |  |  |  |  |  |  |         |
|---------------------------------|---|--|--|--|--|--|--|--|--|---------|
| <b>1. Sight glass</b>           |   |  |  |  |  |  |  |  |  |         |
| -                               | no sight glass  |  |  |  |  |  |  |  |  |         |
| O-                              | with sight glass  |  |  |  |  |  |  |  |  |         |
| <b>2. Nominal width</b>         |   |  |  |  |  |  |  |  |  |         |
| 008                             | DN 8 - G 1/4  |  |  |  |  |  |  |  |  | ●       |
| 010                             | DN 10 - G 3/8   |  |  |  |  |  |  |  |  | ●       |
| 020                             | DN 20 - G 3/4   |  |  |  |  |  |  |  |  | ● ●     |
| 025                             | DN 25 - G 1   |  |  |  |  |  |  |  |  | ●       |
| <b>3. Process connection</b>    |   |  |  |  |  |  |  |  |  |         |
| G                               | female thread   |  |  |  |  |  |  |  |  |         |
| <b>4. Body material</b>         |   |  |  |  |  |  |  |  |  |         |
| A                               | aluminium   |  |  |  |  |  |  |  |  | ● ● ● ● |
| K                               | <input type="radio"/> stainless steel   |  |  |  |  |  |  |  |  | ● ●     |
| <b>5. Ranges</b>                |   |  |  |  |  |  |  |  |  |         |
| 002                             | 0.02.. 2 l/min  |  |  |  |  |  |  |  |  | ●       |
| 006                             | 0.10.. 6 l/min  |  |  |  |  |  |  |  |  | ●       |
| 050                             | 0.50.. 50 l/min   |  |  |  |  |  |  |  |  | ●       |
| 150                             | 3.00..150 l/min   |  |  |  |  |  |  |  |  | ●       |
| <b>6. Connection for</b>        |   |  |  |  |  |  |  |  |  |         |
| E                               | electronics   |  |  |  |  |  |  |  |  | ● ● ● ● |
| <b>7. For base device</b>       |   |  |  |  |  |  |  |  |  |         |
| 008                             | VHZ-008G....E   |  |  |  |  |  |  |  |  | ●       |
| 010                             | VHZ-010G....E   |  |  |  |  |  |  |  |  | ●       |
| 020                             | VHZ(O)-020G....E  |  |  |  |  |  |  |  |  | ●       |
| 025                             | VHZ-025G....E   |  |  |  |  |  |  |  |  | ●       |
| <b>8. Analog output</b>         |   |  |  |  |  |  |  |  |  |         |
| I                               | current output 4..20 mA   |  |  |  |  |  |  |  |  | ●       |
| U                               | <input type="radio"/> voltage output 0..10 V  |  |  |  |  |  |  |  |  | ●       |
| K                               | without   |  |  |  |  |  |  |  |  | ●       |
| <b>9. Electrical connection</b> |   |  |  |  |  |  |  |  |  |         |
| S                               | for round plug connector M12x1, 5-pole  |  |  |  |  |  |  |  |  |         |
| <b>10. Option</b>               |   |  |  |  |  |  |  |  |  |         |
| H                               | <input type="radio"/> gooseneck   |  |  |  |  |  |  |  |  |         |
| O                               | <input type="radio"/> tropical model<br><input type="radio"/> Oil-filled version for heavy duty or external use |  |  |  |  |  |  |  |  |         |
| <b>11. Option 2</b>             |   |  |  |  |  |  |  |  |  |         |
| C                               | <input type="radio"/> Counter C   |  |  |  |  |  |  |  |  |         |
| C1                              | <input type="radio"/> Counter C1  |  |  |  |  |  |  |  |  |         |

**Options**

Counter C (hardware and software option):  
Preset Counter with external reset option, complementary switching outputs and actual value display  
(modified wiring diagram!)

Counter C1 (software option):  
Instantaneous value display with analogue output, pulse-volume output and totalizer

**Accessories**

- Cable/round plug connector (KB...) see additional information "Accessories"
- Device configurator ECI-1