

**Product Information**

**LABO-VHZ-I / U / F / C**

# Flow Transmitter LABO-VHZ-I / U / F / C



- Volumetric flow measurement
- Almost no effect from differing viscosities
- 0..10 V, 4..20 mA , frequency/pulse output, completely configurable
- Robust construction
- Compact design

## 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 LABO electronics make various output signals available:

- Analog signal 0/4..20 mA (LABO-VHZ-...I)
- Analog signal 0/2..10 V (LABO-VHZ-...U)
- Frequency signal (LABO-VHZ-...F) or
- A value signal Pulse / x Litres (LABO-VHZ-...C)

A model with switching output is also available.

If desired, the range end value can be set to the currently existing flow using "teaching".


## Technical data

|                                      |  |                  |
|--------------------------------------|--|------------------|
| <b>Sensor</b>                        | gearwheel volumeter  |                  |
| <b>Nominal width</b>                 | DN 8..25   |                  |
| <b>Process connection</b>            | female thread 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 mm <sup>2</sup> /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<br>benefits - volumetric, gearwheel"   |                  |
| <b>Materials medium-contact</b>      | see table "Materials"  |                  |
| <b>Materials, non-medium-contact</b> | Sensor tube  | CW614N nickelled |
|                                      | Adhesive   | Epoxy resin      |
|                                      | Flange bolts   | stainless steel  |
| <b>Supply voltage</b>                | 10..30 V DC at voltage output 10 V:<br>15..30 V DC   |                  |
| <b>Power consumption</b>             | < 1 W (for no-load outputs)  |                  |
| <b>Output data:</b>                  | all outputs are resistant to short circuits and<br>reversal polarity protected   |                  |
| Current output:                      | 4..20 mA (0..20 mA available on request)   |                  |
| Voltage output:                      | 0..10 V (2..10 V available on request)<br>output current max. 20 mA  |                  |
| Frequency output:                    | transistor output "push-pull"  |                  |
| Pulse output:                        | I <sub>out</sub> = 100 mA max.<br>transistor output "push-pull"<br>I <sub>out</sub> = 100 mA max.<br>pulse width 50 ms<br>pulse per volume is to be stated |                  |
| <b>Display</b>                       | yellow LED indicates operating voltage<br>(LABO-VHZ-I / U) or<br>output status (LABO-VHZ-F / C)<br>(rapid flashing = Programming)                          |                  |
| <b>Electrical connection</b>         | for round plug connector M12x1, 4-pole   |                  |
| <b>Ingress protection</b>            | IP 67  |                  |
| <b>Weight</b>                        | see table "Connection, pressure resistance,<br>and weight"   |                  |
| <b>Conformity</b>                    | CE   |                  |

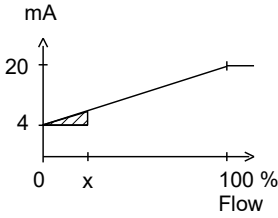
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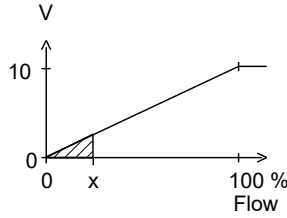
**Signal output curves**

Value x = Begin of the specified range  
 = not specified range

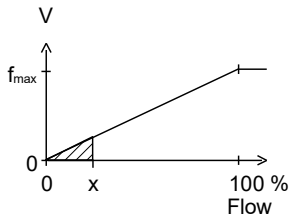
Current output



Voltage output



Frequency output



f<sub>max</sub> selectable in the range of up to 2000 Hz

Other characters on request.

**Pressure resistance and weight**

| G     | Types           | PN bar | Housing material  | Weight kg |
|-------|-----------------|--------|-------------------|-----------|
| G 1/4 | LABO-VHZ-008GA  | 200    | Aluminium         | 0.5       |
| G 1/4 | LABO-VHZ-008GK  | 160    | Stainless steel   | 1.5       |
| G 3/8 | LABO-VHZ-010GA  | 160    | Aluminium         | 0.5       |
| G 3/8 | LABO-VHZ-010GK  | 160    | Stainless steel   | 1.5       |
| G 3/4 | LABO-VHZ-020GA  | 160    | Aluminium         | 1.6       |
| G 3/4 | LABO-VHZO-020GA | 100    | Aluminium / glass | 1.6       |
| G 1   | LABO-VHZ-025GA  | 80     | Aluminium         | 6.3       |

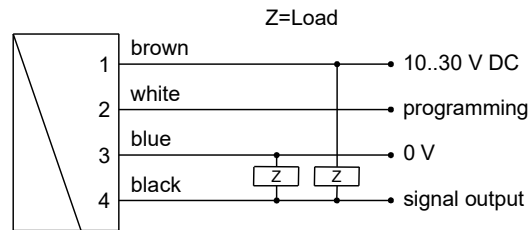
**Ranges**

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

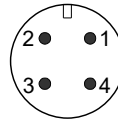
**Materials**

|                            | LABO-VHZ-008..025GA    | LABO-VHZ-008GK                              | LABO-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



Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

It is recommended to use shielded wiring.

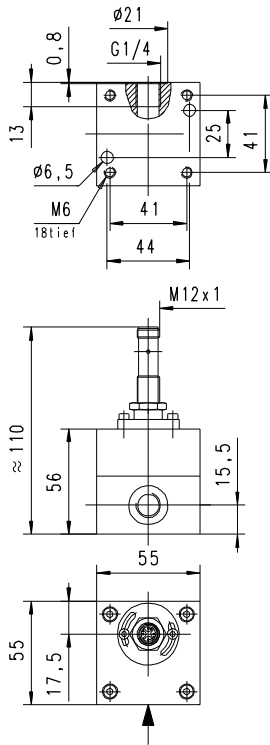
The push-pull output) of the frequency or pulse output version can as desired be switched as a PNP or an NPN output.

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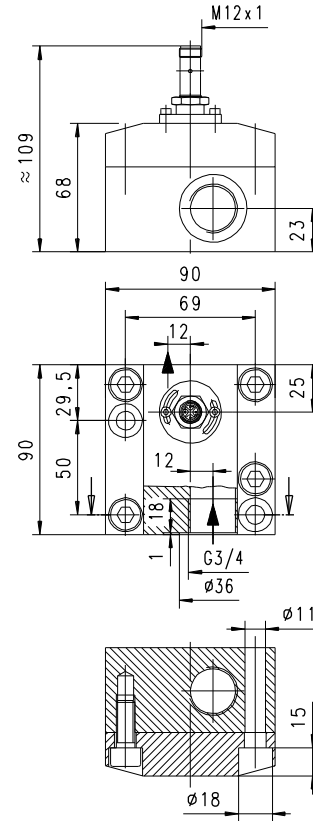
**LABO-VHZ-I / U / F / C**

**Dimensions**

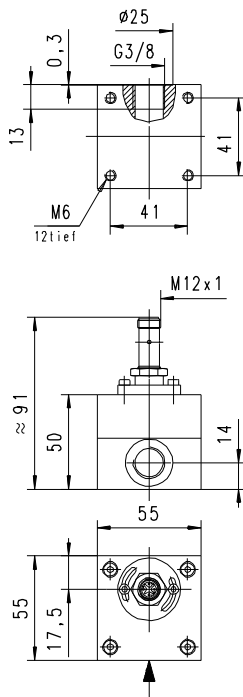
**LABO-VHZ-008**



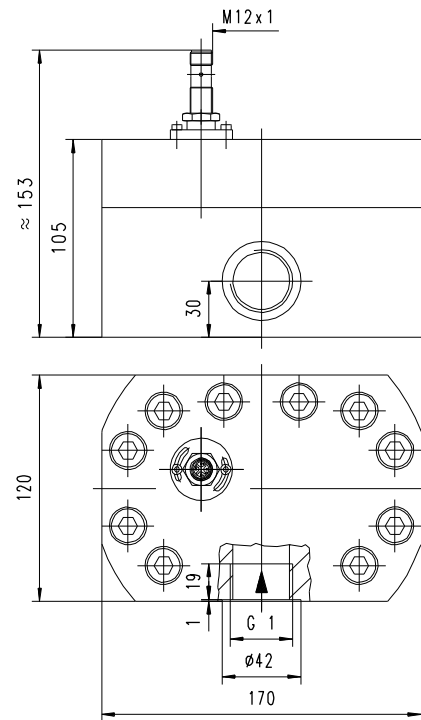
**LABO-VHZ-020**



**LABO-VHZ-010**



**LABO-VHZ-025**



## Product Information

LABO-VHZ-I / U / F / C

### 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).

#### Note

The metering range end value can be programmed by the user via "teaching". Requirement for programmability must be stated when ordering, otherwise the device cannot be programmed. The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment.

The teaching option is not available for the pulse output version.

### Operation and programming

The teaching process can be carried out by the user as follows:

- The flow rate to be set is applied to the device.
- Apply an impulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the supply voltage or a pulse from the PLC), in order to accept the measured value.
- When the teaching is complete, pin 2 should be connected to 0 V, so as to prevent unintended programming.

The devices have a yellow LED which flashes during the programming pulse. During operation, the LED serves as an indicator of operating voltage (for analog output) or of switching status (for frequency or pulse output).

In order to avoid the need to transit to an undesired operating status during the teach-in, the device can be provided ex-works with a teach-offset. The teach-offset point is added to the currently measured value before saving. The offset point can be positive or negative.

*Example: The end of the metering range should be set to 80 %. However, only 60 % can be achieved without problem. In this case, the device would be ordered with a "teach-offset" of +20 %.. At a flow rate of 60 % in the process, teaching would then store a value of 80 %.*

There are many more parameters which can be programmed by the ECI-1 device configurator if necessary.

### Ordering code

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

1. 2. 3. 4. 5. 6.  
VHZ-

7. 8. 9. 10. 11.  
LABO-VHZ-

○=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                                | ○ 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. Signal output</b>          |  |  |  |  |  |  |         |
| I                                | current output 4..20 mA                              |  |  |  |  |  |         |
| U                                | voltage output 0..10 V                               |  |  |  |  |  |         |
| F                                | frequency output                                     |  |  |  |  |  |         |
| C                                | pulse output   |  |  |  |  |  |         |
| <b>9. Programming</b>            |  |  |  |  |  |  |         |
| N                                | cannot be programmed (no teaching)                   |  |  |  |  |  |         |
| P                                | ○ programmable (teaching possible)                   |  |  |  |  |  |         |
| <b>10. Electrical connection</b> |  |  |  |  |  |  |         |
| S                                | for round plug connector M12x1, 4-pole               |  |  |  |  |  |         |
| <b>11. Option</b>                |  |  |  |  |  |  |         |
| H                                | ○ medium temperature max. 120 °C (with 300 mm cable) |  |  |  |  |  |         |

## Product Information

LABO-VHZ-I / U / F / C

### Required ordering information

For LABO-VHZ-...F:

Output frequency at full scale  Hz

Maximum value: 2.000 Hz

For LABO-VHZ-...C:

The volume must be specified for the pulse output version (with numerical value and unit) which will correspond to one pulse.

Volume per pulse (numerical value)

Volume per pulse (unit)

### Options

Special range for analog output:  l/min

<= metering range (standard=metering range)

Special range for frequency output:  l/min

<= metering range (standard=metering range)

Power-On delay period (0..99 s)  s

(time after applying power during which the outputs are not activated or set to defined values)

Further options available on request.

### Accessories

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