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# ZUBOVÝ PRŮTOKOMĚR FLEX-VHZ

## Flow Transmitter / Switch FLEX-VHZ



- Analog output and switching output
- Designed for industrial use
- Small, compact construction
- Simple installation
- Simple to use
- Cable outlet infinitely rotatable

### Characteristics

The VHZ gearwheel flow meter measures the flow on the 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 FLEX transducer on the sensor has an analog output (4..20 mA or 0..10 V) and one switching output, which can be configured as a limit switch for monitoring minimal or maximal, or as a frequency output. The switching output is designed as a push-pull driver, and can therefore be used both as a PNP or an NPN output. The state of the switching output is signalled with a yellow LED in the connection; the LED has all-round visibility.

The sensor is configured in the factory, or alternatively this can be done with the aid of the optionally available ECI-1 device configurator (USB interface for PC). A selectable parameter can be modified on the device, with the aid of the magnet clip provided. In this case, the current measured value is saved as the parameter value. Examples of these parameters are the switching value or the metering range end value.

The stainless steel electronics housing is rotatable, so it is possible to orient the cable outlet after installation.

### 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 mm <sup>2</sup> /s)  |
| <b>Repeatability</b>            | ±0.3 %  |
| <b>Medium temperature</b>       | -25..+80 °C, optionally -25..+120 °C  |
| <b>Ambient temperature</b>      | -20..+70 °C   |
| <b>Materials medium-contact</b> | see table "Materials"   |
| <b>Construction material</b>    | stainless steel 1.4305  |
| <b>Electronic housing</b>       | Adapter: CW614N nickelled   |
| <b>Pressure resistance</b>      | PN 100..200 bar<br>for details see table<br>"Pressure resistance and weight"  |
| <b>Pressure loss</b>            | see upstream page "Function and benefits - volumetric, gearwheel"   |
| <b>Supply voltage</b>           | 18..30 V DC   |
| <b>Power consumption</b>        | <1 W  |
| <b>Analog output</b>            | 4..20 mA / load 500 Ohm max. or<br>0..10 V / load min. 1 kOhm   |
| <b>Switching output</b>         | transistor output "push-pull"<br>(resistant to short circuits and polarity reversal)<br>I <sub>out</sub> = 100 mA max.  |
| <b>Switching hysteresis</b>     | adjustable (please state when ordering)<br>Standard setting:<br>2 % of full scale value, for Min-switch,<br>position of the hysteresis above the limit<br>value, and for Max-switch, below the limit<br>value |
| <b>Display</b>                  | yellow LED (On = Normal / Off = Alarm)  |
| <b>Electrical connection</b>    | for round plug connector M12x1, 4-pole  |
| <b>Ingress protection</b>       | IP 65   |
| <b>Weight</b>                   | see table "Pressure resistance and weight"  |
| <b>Conformity</b>               | CE  |

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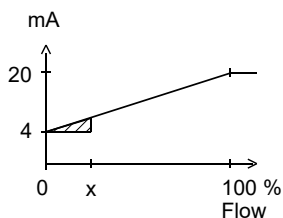
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## Signal output curves

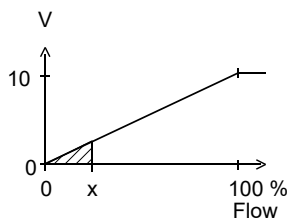
Value x = Begin of the specified range

= not specified range

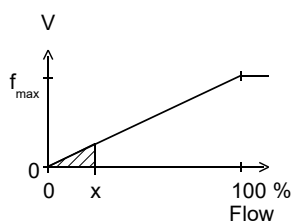
Current output



Voltage output



Frequency output



$f_{max}$  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 | FLEX-VHZ-008GA  | 200    | Aluminium         | 0.65      |
| G 1/4 | FLEX-VHZ-008GK  | 160    | Stainless steel   | 1.65      |
| G 3/8 | FLEX-VHZ-010GA  | 160    | Aluminium         | 0.65      |
| G 3/8 | FLEX-VHZ-010GK  | 160    | Stainless steel   | 1.65      |
| G 3/4 | FLEX-VHZ-020GA  | 160    | Aluminium         | 1.75      |
| G 3/4 | FLEX-VHZO-020GA | 100    | Aluminium / glass | 1.75      |
| G 1   | FLEX-VHZ-025GA  | 80     | Aluminium         | 6.50      |

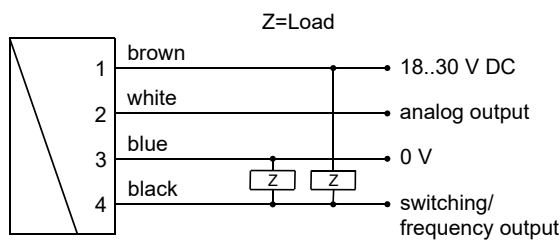
## Ranges

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

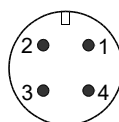
## Materials

|                           | FLEX-VHZ-008..025GA    | FLEX-VHZ-008GK                               | FLEX-VHZ-010..025GK    |
|---------------------------|------------------------|--|------------------------|
| <b>Housing</b>            | Al anodised            | stainless steel 1.4404                       | stainless steel 1.4404 |
| <b>gearwheel 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 with the data sheet. It is recommended to use shielded wiring.



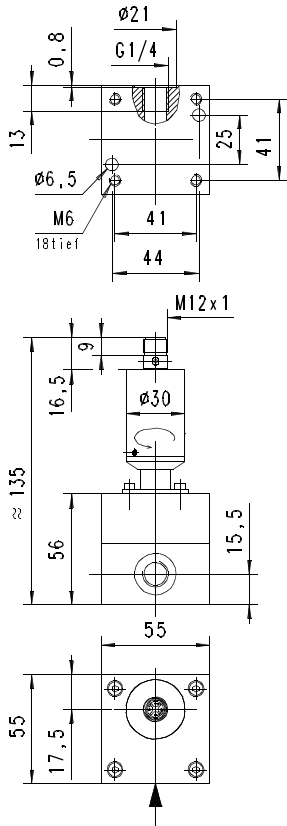
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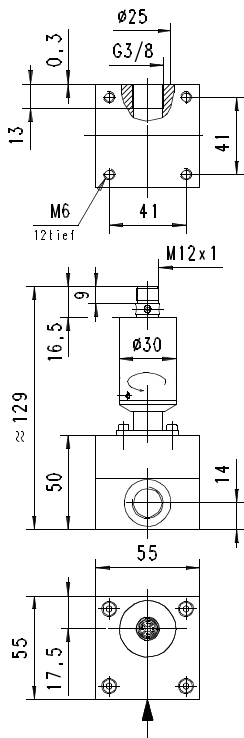
# ZUBOVÝ PRŮTOKOMĚŘ FLEX-VHZ

## Dimensions

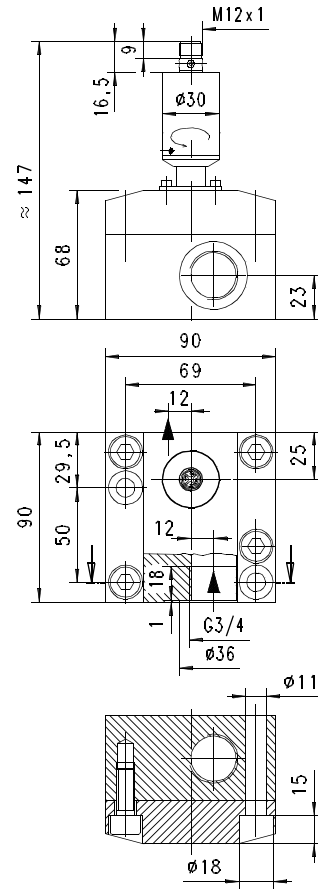
### FLEX-VHZ-008



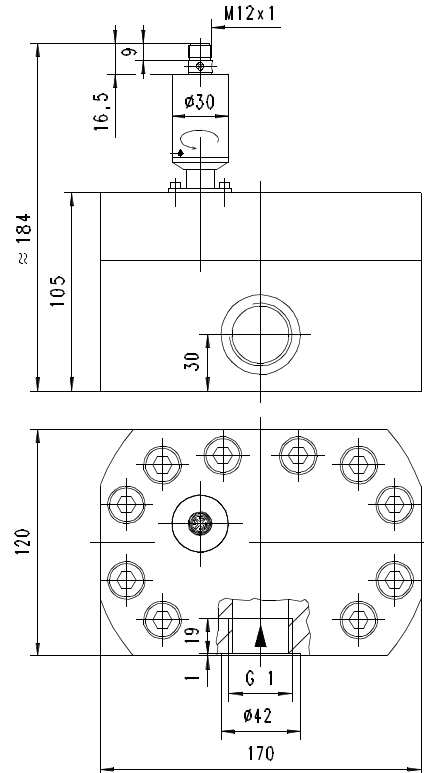
### FLEX-VHZ-010



### FLEX-VHZ-020



### FLEX-VHZ-025



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## 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 electronics contain a magnetic contact, with the aid of which different parameters can be programmed. Programming takes place when a magnet clip is applied for a period between 0.5 and 2 seconds to the marking located on the label. If the contact time is longer or shorter than this, no programming takes place (protection against external magnetic fields).



After the programming ("teaching"), the clip can either be left on the device, or removed to protect data.

The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.

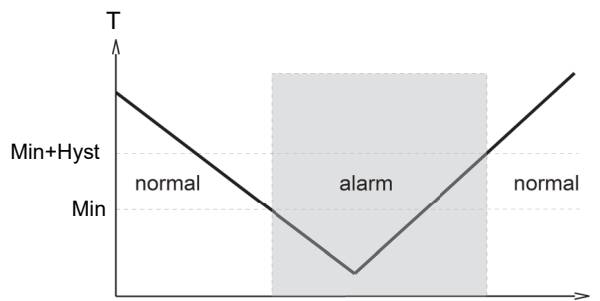
In order to avoid the need to transit to an undesired operating status during "teaching", the device can be provided ex-works with a "teach-offset". The "teach-offset" value is added to the currently measured value before saving (or is subtracted if a negative value is entered).

*Example: The switching value is to be set to 70 % of the metering range, because at this flow rate a critical process status is to be notified. However, only 50% can be achieved without danger. In this case, the device would be ordered with a "teach-offset" of +20 %. At 50 % in the process, a switching value of 70 % would then be stored during "teaching".*

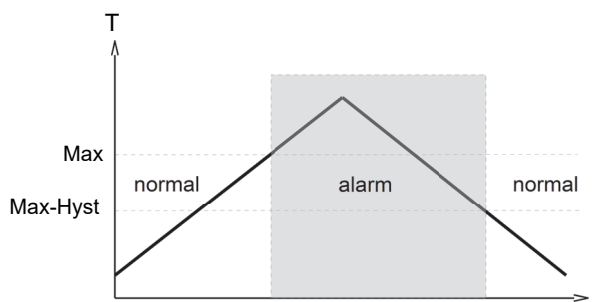
Normally, programming is used to set the limit switch. However, if desired, other parameters such as the end value of the analog or frequency output may also be set.

The limit switch can be used to monitor minimal or maximal.

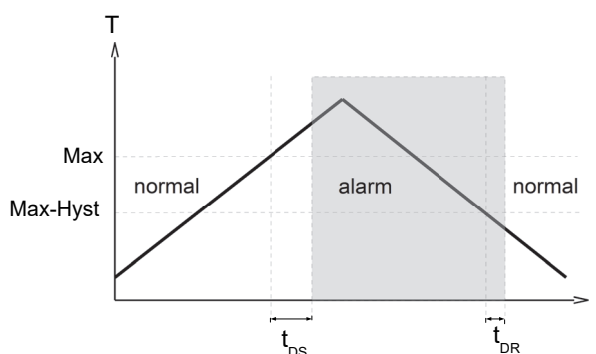
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is again exceeded.



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.



A switchover delay time ( $t_{DS}$ ) can be applied to the switchover to the alarm state. Equally, one switch-back delay time ( $t_{DR}$ ) of several can be applied to switching back to the normal state.



In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.

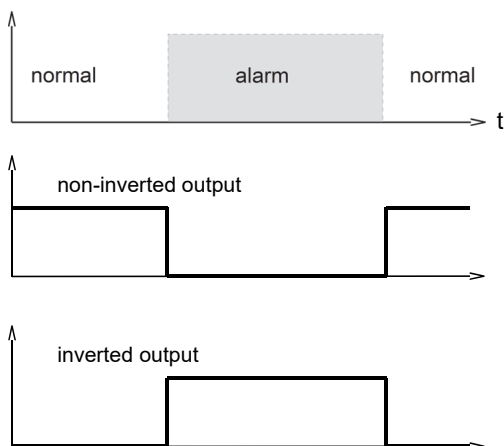
In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



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A Power-On delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

## Ordering code

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

VHZ

FLEX-VHZ-

○=Option

|                              |                         |  |  |  |  |  |  |  |   |
|------------------------------|-------------------------|--|--|--|--|--|--|--|---|
| <b>1. Sight glass</b>        |                         |  |  |  |  |  |  |  |   |
| -                            | no sight glass          |  |  |  |  |  |  |  |   |
| ○-                           | 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. Analog output</b>      |                         |  |  |  |  |  |  |  |   |
| I                            | current output 4..20 mA |  |  |  |  |  |  |  |   |
| U                            | voltage output 0..10 V  |  |  |  |  |  |  |  |   |

|   |                  |  |
|---|------------------|--|
| <b>9. Functioning of the switching output</b> |                  |  |
| L   | minimum-switch   |  |
| H   | maximum-switch   |  |
| R   | frequency output |  |
| <b>10. Switching signal</b>                   |                  |  |
| O   | standard output  |  |
| I   | inverted output  |  |

## Options

Special range for analog output:    l/min  
(not greater than the sensor's working range)

Special range for frequency output:    l/min  
(not greater than the sensor's working range)

End frequency (max. 2000 Hz)     Hz

Switch-on delay (from Alarm to OK)   s

Switch-off-delay (from OK to Alarm)   s

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

(time after power on, during which the outputs are not actuated)

Switching output fixed    l/min

Special hysteresis (standard = 2 % EW)   %

Gooseneck

(recommended at operating temperatures above 70 °C)

If the fields are not completed, the standard setting is selected automatically.

## Accessories

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