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

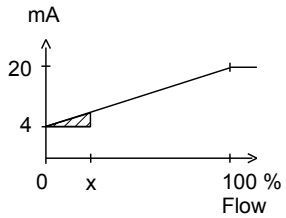
Sensor	gearwheel volumeter	
Nominal width	DN 8..25	
Process connection	G $^1/_4$..G 1	
Metering ranges	0.02..150 l/min for details, see table "Ranges"	
Measurement accuracy	±3 % of the measured value in the specified metering range (measured at 20 mm²/s)	
Repeatability	±0.3 %	
Medium temperature	-25..+80 °C optionally -25..+120 °C	
Ambient temperature	-20..+70 °C	
Pressure resistance	see table "Pressure resistance and weight"	
Pressure loss	see upstream page "Function and benefits - volumetric, gearwheel"	
Materials medium-contact	see table "Materials"	
Materials non-medium-contact	Electronic housing	stainless steel 1.4305
	Glass	mineral glass, hardened
	Magnet	Samarium-Cobalt
	Ring	POM
	Adapter	CW614N nickelled
Supply voltage	18..30 V DC	
Power consumption	< 1 W	
Analog output	4..20 mA / max. load 500 Ω or 0..10 V / min. load 1 kΩ	
Switching outputs	transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.	
Hysteresis	adjustable, position of the hysteresis depends on minimum or maximum	

Display	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.
Electrical connection	for round plug connector M12x1, 5-pole
Ingress protection	IP 67 / (IP 68 when oil-filled)
Weight	see table "Pressure resistance and weight"
Conformity	CE

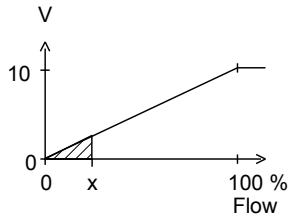
Signal output curves

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	200	Aluminium	0.7
G 3/8	OMNI-VHZ-010GK	200	Stainless steel	1.7
G 3/4	OMNI-VHZ-020GA	200	Aluminium	1.8
G 3/4	OMNI-VHZO-020GA	100	Aluminium / glass	1.8
G 1	OMNI-VHZ-025GA	100	Aluminium	6.7

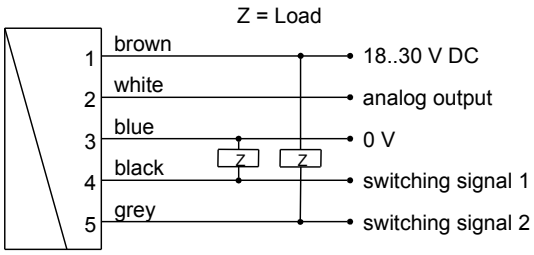
Ranges

Metering range l/min	Types	Pulse volume (= resolution) cm^3
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

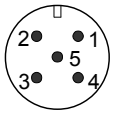
Materials

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

Wiring



Connection example:PNP NPN

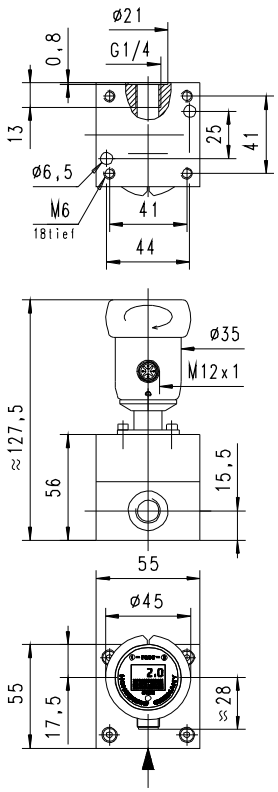


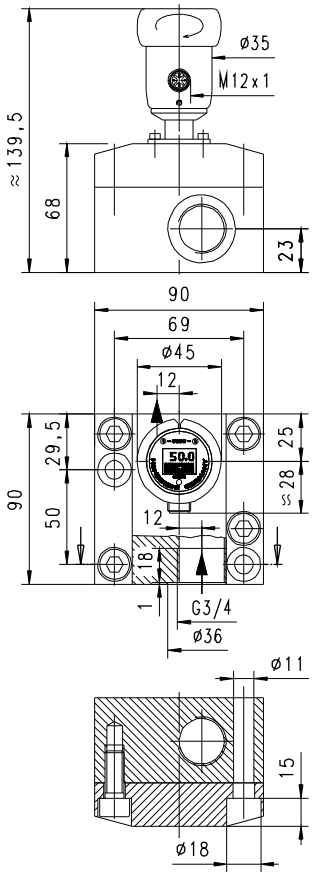
connector M12x1

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

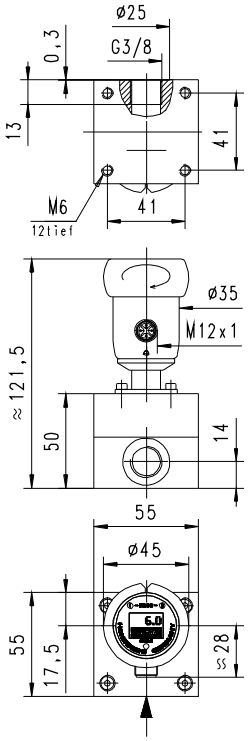
Before the electrical installation, it must be ensured that the supply voltage complies with the data sheet.
The use of shielded cabling is recommended.

OMNI-VHZ008

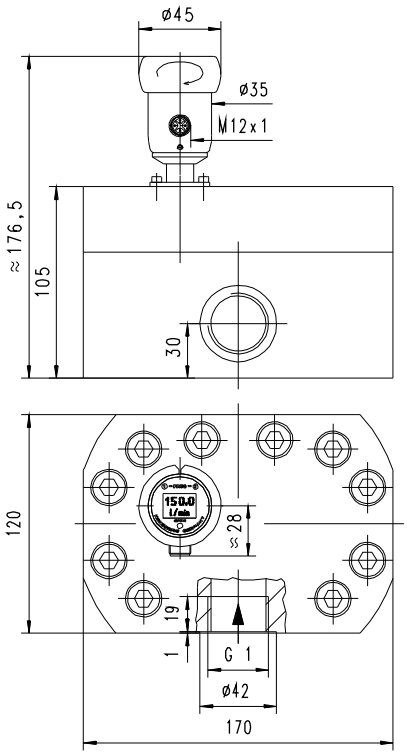




OMNI-VHZ010



OMNI-VHZ-025



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

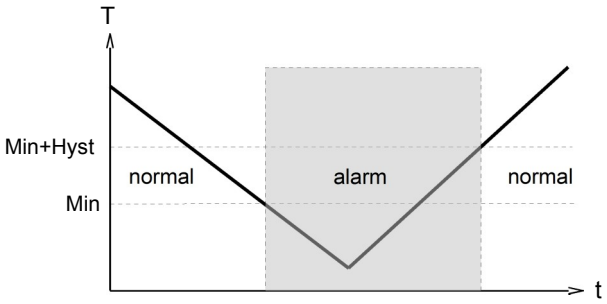
- Switching value S1 (switching point 1 in the selected unit)
- Switching characteristic of S1
  MIN = Monitoring of minimum value
  MAX = Monitoring of maximum value
- Hysteresis 1 (hysteresis value of S1 in the set unit)
- Switching value S2
- Switching characteristic of S2
- Hysteresis 2
- Code
  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.

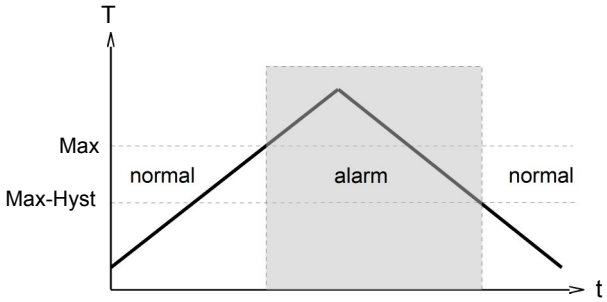
Edit, using position 2

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.**

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-			**G**			**E**

	7.	8.	9.	10.	11.
OMNI-VHZ-			**S**		

❍=Option

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