



OMNIPLUS-VHSX



OMNIPLUS-VHZ

For download of manual see  
[www.ghm-group.de](http://www.ghm-group.de)

**General Safety Instructions**

Keep this document ready to hand or read, and preferably in the immediate vicinity of the product, so that you or the staff/users can consult or read it at any time in case of doubt. All operations described in this Quick Start Guide may only be carried out by trained specialists authorized by the operator. Personal protective equipment is the responsibility of the operator. The respective national safety regulations apply to be observed by the operator. Qualified personnel must have carefully read and understood the Quick Start Guide before starting any work. If it can be assumed that the product can no longer be operated safely, it must be taken out of service. Return to the manufacturer is recommended.

**Legal information**

The manufacturer's liability and warranty for damages and consequential damages expires in the event of improper use, non-observance of this document, non-observance of general safety regulations, use of insufficiently qualified specialist personnel and unauthorized modification of the product. This document is entrusted to the recipient for personal use only. Any unauthorized transmission, duplication, translation into other languages or excerpts from this Quick Start Guide are prohibited. The manufacturer assumes no liability for printing errors.

**Product description**

The products of the OMNIPLUS-VHZ and OMNIPLUS-VHSX series are flowmeters for industrial use. The OMNIPLUS-VHZ products measure the flow rate volumetrically with the help of two interlocking gears. The OMNIPLUS-VHSX products measure the flow rate volumetrically with the help of two interlocking screws. Both versions can be operated bi-directionally. The integrated evaluation electronics display the flow rate, add up the volume flown and provide analog output signals and threshold switches as well as digital communication options via IO-Link.

**Intended Use**

The products OMNIPLUS-VHZ and OMNIPLUS-VHSX are intended for measuring the flow rate of liquids in pipelines. They are intended for use in machinery and systems and for the use of fluid group II media in accordance with Directive 2014/68/EU, in particular for hydraulic and lubricating oils.

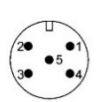
**Assembly**

**General Information**

The instruments have internal threads on both sides for mounting in the pipeline. The thread size depends on the nominal diameter. Installation must be carried out using appropriate sealants. The permissible compressive load capacity depends on the selected design and can be found in the respective data sheet. This must be observed. Particles in the flowing medium can lead to blocking and damage to the instrument and must be avoided by appropriate filtering. The permissible particle sizes can be found in the respective data sheet. The mesh size of the filter must be selected accordingly. There is no need for inlet and outlet sections. The installation position of the instruments is arbitrary. However, care must be taken to ensure that air or other gases do not flow through the instruments (e.g. when filling the system during commissioning). Therefore, the installation location and the installation position should be chosen in such a way that the instruments do not run empty even during breaks in operation.

**Pin assignment**

Circular connector  
M12x1



1 BN L+ Supply voltage  
2 WH Analog Analog output  
3 BU L- 0 V  
4 BK IO-Link/DO Switch 1 and IO-Link  
5 GY DI/DO Switch 2 and Reset input

**Operation**

**Control element**

The OMNIPLUS head has a rotatable ring as a control element, the *multifunction ring*, which has a tactile grid in 15° increments (24 positions). It can be turned to the left or right without stopping. In this way, it enables, for example, scrolling through menus or changing values.

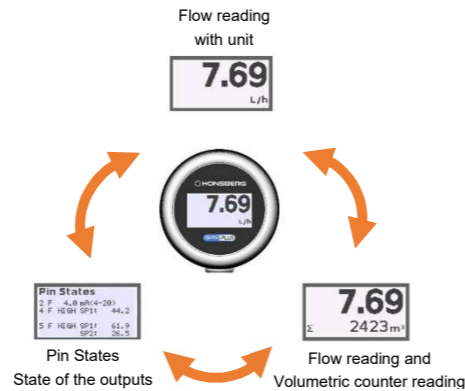
In addition, the ring can be moved in the axial direction away from the viewer by approx. 2.5 mm against the force of a spring and returns to its original position when released. This implements a tactile function that is used, for example, to select menu items or to confirm entries.

In the following text, the following abbreviations are used for the operation of the ring:

RING LEFT	Rotation of the multifunction ring by one position to the left
RING RIGHT	Rotation of the multifunction ring by one position to the right
RING TURN	Rotation of the multifunction ring by one or more position(s) to the left or right
RING SHIFT	Axial displacement of the multifunction ring (tactile function)

**Appearance of the main displays**

The first display shows the flow reading with unit. With RING TURN, up to two additional main displays can be selected.



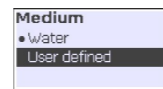
The display with volume counter reading is only visible if the volume totalizer is activated in the configuration. Further information on the display of **Pin states** (status of the outputs) can be found below in the corresponding chapter.

**Menu structure**

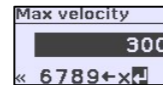
From each of the three main displays, the **Main menu** can be called up by a RING SHIFT for 2 seconds. The display shows the possible submenus **Configuration**, **Simulation**, **Information** and **Factory Reset** as well as <<<. Another submenu **Reset totalizer** is offered when the **Volume totalizer** is set to **On** and **Reset Mode** is set to **Ring**.

In general, the following applies:  
RING TURN makes a selection.  
RING SHIFT confirms the selection.  
Selecting <<< and RING SHIFT reverts to the previous menu level.

When selecting out of a list, the active parameter is marked with a dot. The selected parameter is displayed inversely. It is not possible to exit the edit mode without confirming a selection.



In the case of numeric values, the following selections are also available:



Symbol	Name	Meaning
←	Back space	Delete the last character you entered
X	Escape	Exit without changing the previous value
<J	Enter	Confirm and exit

**Blocking access to the main menu**

Access to the main menu can be blocked. To do this, a RING SHIFT must first be executed in one of the main displays for 7 seconds: After 2 seconds of RING SHIFT, the **Main menu** appears. If the RING SHIFT is executed without interruption for another 5 seconds, the **Lock device** query appears with the option YES | NO. After selecting YES and RING SHIFT, a text display appears



It is no longer possible to enter the main menu by pressing RING SHIFT for 2 seconds. Instead, the **Locked** display appears for 1 sec and the previous main display becomes visible again. With the multifunction ring, only the main displays can be selected.

The unlocking is achieved in the same way as the blocking. In the **Locked** state, a RING SHIFT for 7 seconds causes the query **Unlock device** with the selection option YES | NO. If you select YES, a text display will appear



If no selection is made, the instrument will return to its previous state after 1 min. in both cases. Alternatively, the blocking can also be effected via an IO-Link command. If the blocking is carried out via IO-Link, it cannot be cancelled with the help of the multifunction ring.

**Menu**

**Submenu Configuration / Flow measuring**

Here you will find all parameters that affect the flow measurement on the input side.

**Parameter Unit**  
**Function:** Sets the unit for the display of the flow measurement value and the related parameters  
**Settings:**  
% FS Display as a percentage of the measuring range  
L/min Display in L/min  
L/h Display in L/h  
m³/h Display in m³/h  
% Bargraph Bargraph display with percentage value in the bottom row

**Parameter Decimals**  
**Function:** Determines the maximum number of decimal places for displaying the flow value and the parameters related to it  
**Settings:**  
0000. - no decimal place / 000.0 - one decimal place, etc.

**Parameter Response time**  
**Function:** Determines the response time of the flow measurement  
**Adjustment range:** 0.1 ... 99.9 sec.

**Submenu Configuration / Volume Totalizer**  
The volume counter has a preset value, the achievement of which is signaled by flashing the total counter reading. At the same time, a switching signal can be output on pin 4. For this purpose, pin 4 must be configured accordingly (see "Pin 4 settings").

**Parameter Totalizer**  
**Settings:**  
On Enables the volume counter display  
Off Switches off the volume counter (the parameters described below are not visible in this case)

**Parameter Reset Mode**  
**Function:** Selection of the reset method of the volume counter  
**Settings:**  
None No reset possible  
Preset counter Reset occurs when the preset value is reached. The counting then starts again (cycle operation).  
External (pin 5) The reset is carried out by an external signal on pin 5.  
Ring The reset is carried out with the help of the multifunctional ring.

**Parameter Preset counter**  
**Settings:**  
On Enables the preset counter  
Off Disables the preset counter (the parameters described below are not visible in this case)

**Parameter Preset unit**  
Unit of preset value: Liter | m³

**Parameter Preset value**  
**Function:** Preset value in the previously set unit  
**Adjustment range:** 0.001 ... 9999.999

**Submenu Configuration / Pin settings**  
In addition to its IO-Link functionality, the instrument has an analog output (pin 2) and digital inputs and outputs (pins 4 and 5). Pin 2 can be configured both as a current output (e.g. 4-20 mA) and as a voltage output (e.g. 0-10 V). Pins 4 and 5 can be used as limit switches or frequency outputs. Pin 4 can also be configured as the pulse output or signal output of the preset counter. Pin 5 can be the reset input of the sum counter or inversely represent the output signal of pin 4. Each pin has its own settings menu. However, due to the extensive equality of the parameters of pin 4 and 5, they are displayed together.

**Submenu Configuration / Pin settings / Pin 2 settings**

**Parameter Function**  
**Function:** Enables or disables the analog output  
**Settings:**  
Off | Analog out flow

**Parameter Analog out mode**  
**Function:** Determines the type of analog output at pin 2  
**Settings:**  
Off | 4-20 mA | 0-20 mA | 0-10 V | 2-10 V | 0-5 V | 1-5 V | 0.5-4.5 V

**Parameter Analog out min / Analog out max**  
These two parameters determine the range of the measured value that should correspond to the output range of the analog output.

**Submenus Configuration / Pin settings / Pin 4 settings und Configuration / Pin settings / Pin 5 settings**

**Parameter Function**  
Functions of Pin 4 and Pin 5  
**Settings:**  
Off Disables pin 4 or pin 5  
Flow switch output Adjustable limit switch  
Flow freq output Adjustable frequency output  
Flow pulse output (pin 4 only) Pulse signal after passing of an adjustable volume  
Flow preset counter (pin 4 only) Signal when the preset counter value is reached  
Totalizer reset input (pin 5 only) Reset input for volume counter  
Inversed pin 4 (pin 5 only) Inverse signal from pin 4  
Sensor input signal (pin 5 only) Direct output of input frequency (not adjustable)

**Parameter Output Driver**  
**Function:** Determines the circuit technology of the output driver  
If the **Totalizer reset input** function is selected for pin 5, this parameter is not visible for pin 5.  
**Settings:** Push-Pull | NPN o.c.

**Note:**  
The following parameters are only visible if **Flow switch output** has been selected as the function!

**Parameter Switch mode**  
**Function:** Determines the type of limit switch  
**Settings:**  
Single point max Alarm when reading exceeds limit value  
Single point min Alarm when reading is below limit value  
Window Two limits: Signals whether the reading is inside or outside the window

**Parameter Switch logic**  
**Settings:**  
Alarm low In the event of an alarm, the initial state changes from high to low  
Alarm high In the event of an alarm, the initial state changes from low to high

**Parameter Setpoint 1 | Setpoint 2**  
**Function:** Limit value for flow, display depends on selection under **Function**  
**Adjustment range:** corresponds to measuring range  
Value is display with the selected unit and number of decimal places.

In the two **single point modes**, **Setpoint 1** is used. **Setpoint 1 and Setpoint 2** are used in **Window mode**.

In **Single point max** mode, an alarm message is sent if **Setpoint 1** is exceeded. Alarm withdrawal if **Setpoint 1 - Hysteresis** is not reached.

In **Single point min** mode, an alarm message is sent if **Setpoint 1** is not reached. Alarm withdrawal if **Setpoint 1 + hysteresis** is exceeded.

In **Window mode**, an alarm message is displayed if **Setpoint 1** is exceeded or **Setpoint 2** is not reached. If the value of **Setpoint 1** is less than that of **Setpoint 2**, an alarm message appears in the window between the two values. Outside the window, the alarm is withdrawn.

**Parameter Hysteresis**  
**Function:** Hysteresis for the limits.  
In **Window mode**, the hysteresis acts accordingly on both limits.

**Parameter Set time delay**  
**Function:** Switching delay: time after the occurrence of an alarm event until the output is switched  
**Adjustment range:** 0.0 ... 100.0 s

**Parameter Reset time delay**  
**Function:** Switch-back delay: Time after an alarm event is withdrawn until the output is switched back  
**Adjustment range:** 0.0 ... 100.0 s

**Note:**  
The following parameters are only visible if **Flow freq out** has been selected as the function!

**Parameter Frequency min**  
**Function:** Smallest frequency to be put out  
**Adjustment range:** 0.00 ... 1995.00 Hz

**Parameter Frequency max**  
**Function:** Highest frequency to be put out  
**Adjustment range:** 5.00 ... 2000.00 Hz

**Parameter Freq scale min**  
**Function:** Measured value at which the smallest frequency **Frequency min** is to be put out  
**Adjustment range:** corresponds to measuring range

**Parameter Freq scale max**  
**Function:** Measured value at which the highest frequency **Frequency max** is to be put out  
**Adjustment range:** corresponds to measuring range

**Note:**  
The following parameters are only visible if **Pulse output** has been selected as the function!

**Parameter Pulse unit**  
**Function:** Unit of the numerical value of the volume to flow per pulse (**Pulse value**)  
**Settings:** Liter | m<sup>3</sup>

**Parameter Pulse value**  
**Function:** Numerical value of the volume to flow per pulse in the unit set under **Pulse unit**  
**Adjustment range:** 0.0 ... 20000.0

**Parameter Pulse duration**  
**Function:** Duration of the pulse to be put out after the set pulse volume has flown  
**Adjustment range:** 10 ... 1000 ms

**Parameter Pulse polarity**  
**Function:** Pulse polarity of the pulse output  
**Settings:**  
positive pulse = high level / pulse pause = low level  
negative pulse = low level / pulse pause = high level

**Parameter Sync totalizer**  
**Function:** Synchronization with volume counter  
**Settings:**  
Yes The pulse volume count is started again (at zero) synchronously with the reset of the volume counter.  
No A reset of the volume counter has no effect on the pulse output. Volumetric counters and pulses are independent of each other.

**Note:**  
The following parameters are only visible if **Flow preset counter** has been selected as the function! This option is only available for pin 4.

**Parameter Preset counter**  
**Settings:**  
Output signal static The output changes its state when the preset value is reached and remains there until the preset counter is reset.  
Output pulse The output changes its state when the preset value is reached and falls back after an adjustable time.

**Parameter Counter duration**  
**Function:** Signal duration (only visible, if **Output pulse** is selected in the parameter **Preset counter**)  
**Adjustment range:** 0.1 ... 100.0 s

**Parameter Counter polarity**  
**Function:** Determines the pulse polarity at the output of the preset counter (pin 4)  
**Settings:**  
positive signal = high level / resting state = low level  
negative signal = low level / resting state = high level

**Note:**  
The following parameter is only visible if **Totalizer reset input** has been selected as the function! This option is only available for pin 5.

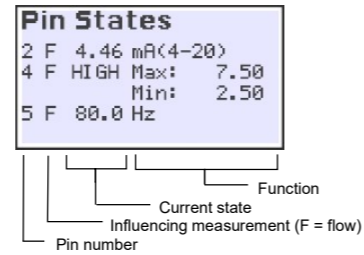
**Parameter Reset input**  
**Settings:**

Edge low-high	The counter is reset to 0 in the event of a low-high signal edge and continues to run immediately.
Edge high-low	The counter is reset to 0 in the event of a signal edge high-low and continues to run immediately.
Static high	The counter is set to 0 at high signal at the input and only continues to run at low signal.
Static low	The counter is set to 0 at low signal at the input and only continues to run at high signal.

**Menu item Display**  
**Parameter Orientation**  
Allows the display content to be rotated by 180°. This makes it possible to operate the device with a plug outlet upwards.

**Menu item Factory Reset**  
Resets the instrument to the factory settings after a query (yes/no).

**Display Pin States**  
The pin states screen shows the current state of the three pins of the circular connector, which can be used as input or output (pins 2, 4 and 5, see also pin assignment).



**Pin 2**

Function	Appearance	Remarks
4 ... 20 mA	XX.XX mA (4-20)	XX.XX = Actual current output value
0 ... 20 mA	XX.XX mA (0-20)	XX.XX = Actual current output value
0 ... 10 V	XX.XX V (0-10)	XX.XX = Actual voltage output value
2 ... 10 V	XX.XX V (2-10)	XX.XX = Actual voltage output value
0 ... 5 V	X.XX V (0-5)	X.XX = Actual voltage output value
1 ... 5 V	X.XX V (1-5)	X.XX = Actual voltage output value
0.5 ... 4.5 V	X.XX V (0.5 - 4.5)	X.XX = Actual voltage output value
No analog output active	OFF	

**Pin 4 and 5**

Function	Appearance	Remarks
Limit switch (single point)	LOW Min: 30.0 Hyst: 1.2	The switching status of the output is displayed (LOW in the example). Behind this it can be seen that it is a minimum switch whose limit value is set to 30.0 with a hysteresis of 1.2. Falling below the limit value would be indicated by flashing Min: 30.0
Limit switch (window mode)	LOW Max: 7.50 Min: 2.50	The switching status of the output is displayed (LOW in the example). Behind it, the boundaries of the monitored window can be seen. Leaving the the window would be indicated by flashing the value exceeded
Frequency output	XXX.X Hz	The currently output frequency is displayed directly.
Output is disabled	OFF	Indicates that the pin does not have a special function assigned to it. IO-Link functionality at pin 4 is nevertheless available.

**Pin 4 only**

Function	Appearance	Remarks
Pulse output	HIGH XXXXX L/pls t=50 ms	The switching state of the output is displayed (HIGH in the example). Behind it, the set pulse value and the pulse duration are noted.
Preset counter output	LOW Preset cntr	The switching status of the output is displayed (LOW in the example). The function "Preset cntr" is recognizable.

**Pin 5 only**

Function	Appearance	Remarks
Totalizer reset input	HIGH Σ Reset in	The status of the input is displayed (HIGH in the example). The function "Σ Reset in" is recognizable.
Inversed pin 4	Inversed pin 4	The function as an inversion of pin 4 is recognizable.
Mirroring the input signal	Sensor input signal	Indicates that pin 5 is the direct output of the sensor input signal.

**Disposal**  
The product must not be disposed off in the residual waste bin. Disposal only via municipal collection points or return shipment to manufacturer (shipping costs at the expense of the sender) for disposal.



**Manufacturer**  
GHM Messtechnik GmbH  
GHM GROUP – Honsberg  
Tenter Weg 2-8  
42897 Remscheid GERMANY  
E-mail: [info@ghm-messtechnik.de](mailto:info@ghm-messtechnik.de)  
Web: [www.ghm-group.de](http://www.ghm-group.de)  
WEEE Reg. No. DE 93889386