

**EN** **Brief instructions for installation and operation**  
**OMNIPLUS-F**

Manual for download at  
[www.ghm-group.de/en/infodesk/](http://www.ghm-group.de/en/infodesk/)



**OMNIPLUS-F Thermal flow meter**

**General safety information**

Read this document carefully and familiarize yourself with the operation of the product before putting it to use. Keep this document ready to hand or read and ideally in the immediate vicinity of the product so that you or the staff / users can look it up or read it at any time in case of doubt. All the processes described in these brief instructions may only be carried out by trained specialist personnel authorized by the operator. The operator is responsible for personal protective equipment. The respective national safety regulations apply to be observed by the operator. The qualified personnel must have carefully read and understood the brief instructions 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. Returning to the manufacturer is recommended

**Legal Notice**

The manufacturer's liability and warranty for damage and consequential damage expire in the event of improper use, failure to comply with this document, failure to comply with general safety regulations, use of insufficiently qualified specialists and unauthorized changes to the product. Only carry out maintenance and repair work on this product that is described in this documentation. Keep to the given steps. For your own safety, only use original spare parts and accessory products from the manufacturer. We do not accept any liability for the use of other products and any damage resulting from them. This document has been entrusted to the recipient for personal use only. Any unauthorized transmission, reproduction, translation into other languages or excerpts from these brief instructions are prohibited. The manufacturer assumes no liability for typographical errors.

**Intended use**

The OMNIPLUS-F flow sensor records the flow volume in liquid media and/or the temperature in liquid media via a sensor immersed in the liquid. The product is used to measure the volume flow in pipelines and are factory-adjusted for function in water. Adaption to other media is possible on site. It must be ensured by the operator that the media to be measured have sufficient thermal conductivity. The operator must also ensure the suitability of the sensor for other media and the conditions of use, taking into account the technical limit values specified in the data sheet. This product is intended for use in machines and systems and for the use of media of fluid group II in accordance with directive 2014/68/EU.

**Scope of delivery**

Please check the completeness of your product after opening the packaging. You should find the following components:

- OMNIPLUS-F
- Brief instructions for installation and operation

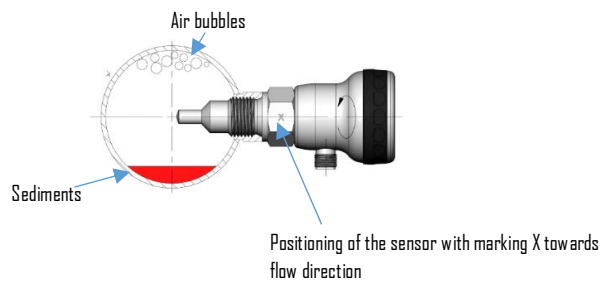
**Product description**

The products of the OMNIPLUS-F series are thermal flow sensors, suitable for recording volume flow and / or temperature in liquid media

**Assembly**

**General information**

The installation location of the sensor should be chosen so that no air bubbles can collect on the sensor. Air bubbles do not damage the sensor, but can cause incorrect measurements

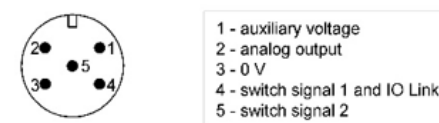


The installation location must be selected so that possible sediments in the pipeline do not cover the sensor. It must be possible to flow freely around the sensor tip at all times. Installation in vertical pipelines with the flow direction from bottom to top is ideal.

A calming section of at least 10xD must be provided in front of the sensor and 5xD behind the sensor (d= inside diameter of the pipeline). These values are intended as a guide. Longer calming sections may be necessary in individual cases. Calming sections should ensure reproducible flow conditions. A straight pipeline without edges, lateral outlets or disruptive bodies in the flow space is considered to be a calming section. It is essential, to avoid valves immediately in the front of the measuring point. The installation position should be chosen so that the sensor tip protrudes into the pipeline by at least a third of the pipe diameter. In any case, the cylindrical part of the sensor with a diameter of 7.4 mm must be completely surrounded by the medium, if there is a risk of deposits on the sensor tip due to contaminated media, adequate filtering should be provided at a sufficient distance in front of the sensor. If this is not possible, the sensor should be checked and cleaned regularly. The selection of an easily removable version can be advantageous here.

**Terminal assignment**

Plug connector M12x1 Pin assignment



**Operating**

**Operating element**

As a control element, the OMNIPLUS head has a rotatable ring, the multifunctional ring, which has a tactile detent in 15° steps (24 positions). It can be turned to the left or right without a stop. In this way, it enables to scroll through, for example menus or changing values.

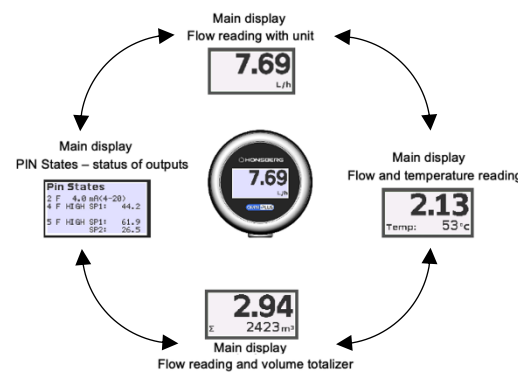


In addition, the ring can be moved in the axial direction away from the viewer by approx. 2.5 mm against the force of a spring and returns to its starting position when released. This realizes a push button function that is used, for example, to select menu items or to confirm entries.



<i>RING LEFT</i>	Rotation of the <i>multifunctional ring</i> one position to the left
<i>RING RIGHT</i>	Rotating of the <i>multifunctional ring</i> one position to the right
<i>RIN TURN</i>	Rotating of the <i>multifunctional ring</i> one or more positions to the left or right
<i>RING SHIFT</i>	Axial displacement of the <i>multifunctional ring</i> against the force of a spring

**Presentation of the main displays**



The measured flow value is shown with the unit as the start display. *RING TURN* displays a main page at a time. You can effect sub-actions with *RING SHIFT* for 2 seconds.

By turning the multifunctional ring one position to the right "*RING RIGHT*", the display for the measured flow and temperature value appears.

By turning the multifunctional ring one position to the left "*RING LEFT*", the display "*Pin States*" appears with the status display of the existing outputs. Further information on the status of the outputs can be found in the section *Pin States*.

These three displays are **main pages**. Every main page takes you to sub-menus with additional parameters.

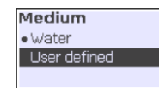
Another fourth main display, "Measured flow value and volume counter", is only visible with a "Ring Turn" if the configurable volume counter "Volume Totalizer" has been set to ON beforehand.

**Menu structure**

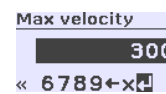
In order to obtain information about the product or to be able to configure it, you must first call up the main menu: Status: The measured flow value is shown in the display. A *RING SHIFT* for 2 seconds calls up the main menu. The possible sub-menus **Configuration**, **Simulation** and **Information** as well as <<< appear in the display.

Another submenu "*Reset totalizer*" is offered if the *volume totalizer* is set on ON beforehand and reset is configured via ring.

In general, a *RING TURN* makes a selection. With a *RING SHIFT*, the selections is confirmed. If you select <<< and *RING SHIFT*, you return to the previous menu level. When selecting the list, the active parameter is marked with a point. The selected parameter becomes inverse shown. It is not possible to leave the editing mode without making a selection.



The following options are also available for numerical values:



symbol	name	meaning
←	symbol for return	Delete the last entered value / character
X	symbol for cancellation	ESC. Exit the entry without changing the previous value / character
↵	symbol for input	Confirm and finish the entry

**Blocking the product**

The OMNIPLUS-F offers the option of blocking. Existing parameter settings cannot be changed by blocking. To do this, a *RING SHIFT* must be carried out for > 7 seconds in one of the main displays. The configuration level appears after approx. 2 seconds of *RING SHIFT*. Keep the ring pressed until the text display YES | NO appears. If you select YES and *RING SHIFT*, the text "Locked" appears.



Parameters can no longer be configured and are no longer visible. With the multifunctional ring, only the main pages can be selected and are visible.

The unblocking is achieved in the same way as blocking. In the "Locked" state, a *RING SHIFT* > 7 seconds results in the query YES | NO. If you select YES, the text "Unlocked" appears.



If no selection is made for both queries, a "timeout" will happen. The device returns to its existing state. In addition, blocking can also be effected via an IO-Link command.

**Menu navigation**

**Sub menu „Flow measuring“**

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

**Parameter „Medium“**

Setting values:  
- Water uses the factory adjustment for water  
- User defined allows use with further liquids

**Parameter „Max velocity“**

Setting range: 2...30 cm/s to 2... 300 cm/s

**Parameter „Pipe diameter“**

Setting range: 15.0 ... 500.0 mm

**Parameter „K-Factor“**

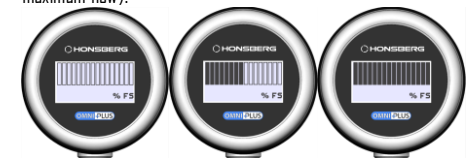
The correction factor offers the possibility of influencing the measurement result. To do this, it is multiplied by the set "K-Factor"  
Setting range: 0.10 ... 2.00 (1.00 = no influence)

**Parameter „Unit“**

Setting values:  
% FS % indication relatively to full scale  
cm/s Flow velocity in cm/s  
l/min Flow rate in l/min.  
m³/h Flow rate in m³/h  
m/s Flow velocity in m/s  
l/h Flow rate in l/h

**Bargraph display**

The bargraph display is a compact process display used to visualize the flow value in the range from 0 to 100% with a 16-segment display. The bar graph displays the current flow (segments 0 to 16 represent the range between flow standstill and maximum flow).



**Parameter „Decimals“**

Setting values:  
0000, - no decimal place  
000.0 - one decimal place etc.  
Variable: referring to the display value (max 4 digits), the decimal place can shift automatically

**Parameter „Max flow rate“**

Not editable. Value displayed is a calculation referring to "Max velocity" and "Pipe diameter".

**Parameter „Start of range | End of range | Display value**

These three parameters are used to adapt the instrument to liquids other than water. They are only visible if "Medium" has been set to "user defined". The factory adjustment is then inoperative. A new characteristic curve can be defined with the aid of the three parameters.  
For the procedure for setting the parameters, see chapter "Medium setting"  
Setting values:  
Start of range 0 ... 10000  
End of range 0 ... 10000  
Display value 0 ... 100 %

**Parameter „Response time“**

"Response time" defines the response time of the flow measurement.  
Setting values: 0.1 ... 99.9 sec.

**Sub menu „Volume Totalizer“**

The volume counter has a pre-selection value, the reaching of which is indicated by the flashing of the totalizer reading. At the same time, a switching signal can be output on Pin 4. To do this, Pin 4 must be configured accordingly (see "Pin 4 settings").

**Parameter „Totalizer“**

Activating or deactivating of the totalizer.  
Set values  
ON - activates the display of totalizing  
OFF - switches off the totalizer (the parameters described below are then not visible)

**Parameter „Reset Mode“**

Setting values  
None No reset possible  
Preset counter Reset happens, when the preset value is reached and the counting starts again (cycle operation)  
External (Pin 5) Reset happens by external signal to Pin 5  
Ring Reset is done via multifunctional ring

**Parameter „Preset counter“**

Set values  
 ON - activates the preset counter  
 OFF - switches off the preset counter **(the parameters described below are then not visible)**

**Parameter „Preset unit“**

Representable units of the preset values: cm<sup>3</sup> | Liter | m<sup>3</sup>

**Parameter „Preset value“**

The preset counter is shown in the unit previously set.  
 set value 1..999999

**Sub menu „Temp measuring“**

In addition to the flow velocity, the instrument also always measures the temperature and also displays it (using *RING-TURN* in the measured value display). The displayed unit can be selected here. The temperature can be output in the same way as the flow rate. The settings for this are made in the pin settings.

**Parameter „Unit“**

setting values: °C | °F | K

**Sub menu „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) that can be programmed in a variety of ways. 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). The measured flow or temperature value can be output. Pins 4 and 5 can be used as limit value switches or frequency outputs. Pin 4 can also be configured as a pulse output or a signal output for the preset counter. PIN 5 can be reset input of totalizer or showing the output signal of Pin 4 inversely. A separate settings menu is available for each pin. Due to the fact that the parameters of pin 4 and pin 5 are largely the same, they are shown together in the following descriptions.

**Sub menu „Pin 2 settings“**

**Parameter „Function“**

Set values:  
 Off Switch OFF of Pin 2  
 Analog out flow Analog output for flow  
 Analog out temp Analog output for temperature

**Parameter „Analog out mode“**

Type of analog output  
 Set values 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 define the range of the measured value that should correspond to the output range of the analog output.

**Parameter „Analog out min“**

Assignment of the measured value MIN for flow or temperature to the analog output

**Parameter „Analog out max“**

Assignment of the measured value MAX for flow or temperature to the analog output

**Sub menu „Pin 4 settings“ und „Pin 5 settings“**

**Parameter „Function“**

Functions of Pin 4 and Pin 5  
 Setting values:

OFF	Switch OFF of Pin 4 and/or Pin 5
Flow switch output	Adjustable limit values
Temp switch output	Adjustable limit values
Flow freq output	Adjustable frequency
Temp freq output	Adjustable Frequency
Flow pulse output (nur für Pin 4)	Pulse output for adjustable flow volume
Flow preset counter (nur für Pin 4)	Adjustable preset value
Totalizer reset input (nur für Pin 5)	Reset input for volume counter
Inversed Pin 4 (nur für Pin 5)	Inverse signal of Pin 4

**Parameter „Output Driver“**

Push-Pull or NPN o.c.

If the Reset Input function was selected for pin 5, this parameter is not visible for pin 5.

Setting values: Push-Pull | NPN o.c.

The following parameters are only visible if “Flow switch” or “Temp switch” has been selected as the function!

**Parameter „Switch mode“**

Setting values:  
 Single point max Alarm at exceeding setted limit value  
 Single point min Alarm at descending setted limit value  
 Window 2 limit switches. Alarm at exceeding or descending of one or the other limit value

**Parameter „Switch logic“**

Setting values:  
 Alarm low In the event of Alarm, the output status changes from high to low signal  
 Alarm high In the event of Alarm, the output status changes from low to high signal

**Parameter „Setpoint 1“ | “Setpoint 2“**

Limit value for Flow or Temperature, display depends on the selection under „Function“  
 Setting values:

The setting range corresponds to the measuring range of the measured variable selected for the output (Flow or Temperature). The display takes place with the selected unit and number of decimal places.

“Setpoint 1” is used in the two single point modes. “Setpoint 1” and “Setpoint 2” are used in the window mode. In the “Single point min” mode an alarm message is issued, if the value falls below “Setpoint 1”. The alarm is withdrawn, when “Setpoint 1” – hysteresis is exceeded. In the “Single point min” mode an alarm message is issued, if the value if the value falls below “Setpoint 1”. The alarm is canceled, when “Setpoint 1” + hysteresis is exceeded. In “window mode” an alarm is issued, when “Setpoint 1” is exceeded or a descending of “Setpoint 2”. If the value for “Setpoint 1” is lower than that of “Setpoint 2” an alarm message is issued in the window between the two values. The alarm is canceled outside the window.

**Parameter „ Hysteresis“**

Hysteresis for the limit values.  
 In Windows-Mode the hysteresis affects both limit values accordingly.

**Parameter „Switching Delay Time“**

Switch delay:  
 Time after the occurrence of an alarm event until the output is switched  
 Setting values: 0 ... 99 sec.

**Parameter „Reset Delay Time“**

Time after canceling an alarm event until the output is switched back  
 Setting values: 0 ... 99 sec.

The following parameters are only visible, if „Flow freq out“ or „Temp freq out“ has been selected as the function !

**Parameter „Frequency min“**

Smallest frequency that should be supplied at the output  
 Setting values: 0 ... 2000.0 Hz

**Parameter „Frequency max“**

Maximum frequency. Highest frequency that should be supplied at the output.  
 Setting values: 0 ... 2000.0 Hz

**Parameter „Scale min“**

Start of scale. Measured value at which the lowest frequency “Frequency min” is to be supplied. The setting is made with the unit and number of decimal places selected for the measured variable.

**Parameter „Scale max“**

End of scale. Measured value at which the highest frequency “Frequency max” is to be supplied. The setting is made with the unit and number of decimal places selected for the measured variable.

The following parameters are only visible, if “Pulse output” has been selected as the function!

**Parameter „Pulse unit“**

Unit for setting the volume that should flow per pulse.  
 Setting values: liter | m<sup>3</sup>

**Parameter „Pulse value“**

Numerical value of the volume that should flow per pulse in the unit set under „Pulse unit“.  
 Setting values: 0.01 ... 999.99

**Parameter „Pulse duration“**

Duration of the pulse that is to be supplied after flow of the setted pulse volume.  
 Setting values: 10 ... 1000 ms

**Parameter „Pulse polarity“**

Setting values: Positive - Pulse at High-Level | Negative - Pulse at Low-Level

**Parameter „Sync to totalizer“**

Synchronization with volume counter.  
 Setting values:  
 Yes - evaluation of the pulse volume at reset of volume counter at start again.  
 No - no influence of the volume counter on the pulse output

The following parameters are only visible if the Preset counter function has been selected! This option os only available for pin 4

**Parameter „Preset counter“**

Setting values:  
 Output signal static When the preset counter is reached, the output changes its state and remains there until the preset counter is reset  
 Output pulse The output signal changes its state when the preset value is reached and falls back after an adjustable time

**Parameter „counter duration“**

Signal duration Timed. Only visible at selecting „ Timed „ in parameter „Preset counter“.  
 Setting values: 0.1 ... 100.0 sec.

**Parameter „Counter polarity“**

Setting values  
 Positive - Signal is High-level. Rest status is low  
 Negative - Signal is Low-level. Rest status is high

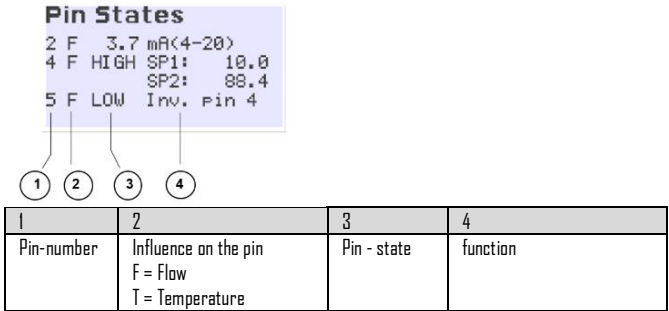
The following parameters are only visible if „Reset input“ has been selected as the function. This option is only available for pin 5

**Parameter „Reset input mode“**

Reset input for preset counter  
 Setting values:.  
 Edge Low-High The counter is reset to zero on a low-high signal edge and continues to run immediately  
 Edge High-Low The counter is reset to zero on a high-low signal edge and continues to run immediately  
 Static High The counter is set to zero with a high signal at the input and only continues to run with a low signal  
 Static Low The counter is set to zero with a low signal at the input and only continues to run with a high signal

**Pin States**

The Pin States screen shows the current state of the three pins of the plug connector that can be used as inputs or outputs  
 (Pin 2, 4 und 5, please see also connection assignment)



**Pin 2**

Function	presentation	remarks
Current output 4 ... 20 mA	XX.XX mA (4-20)	XX.XX = actual current output value
Current output 0 ... 20 mA	XX.XX mA (0-20)	XX.XX = actual current output value
Voltage output 0 ... 10 V	XX.XX V (0-10)	XX.XX = actual voltage output value
Voltage output 2 ... 10 V	XX.XX V (2-10)	XX.XX = actual voltage output value
Voltage output 0 ... 5 V	XX.XX V (0-5)	XX.XX = actual voltage output value
Voltage output 1 ... 5 V	XX.XX V (1-5)	XX.XX = actual voltage output value
Voltage output 0,5 ... 4,5 V	XX.XX V (0,5 – 4,5)	XX.XX = actual voltage output value
No analog output active	OFF	

**Pin 4 and 5**

Function	presentation	remarks
Limit switch (single point)	HIGH Min: 2.50	The switching status of the output is displayed (example HIGH). Behind it is visible, that it is a minimum switch, the limit value of which is set to 2.50. A falling below that limit value would be displayed by flashing of Min:2.50
Limit switch (window mode)	LOW Min: 2.50 LOW Max: 7.50	The switching status of the output is displayed (example LOW). The boundaries of the monitored window are visible behind. Leaving the window would be indicated by flashing of the decreased or exceeded values.
Frequency output	XXX.X Hz	The actual output frequency is displayed immediately.
Pulse output	HIGH XXXX I/pls t=50ms	The switching status of the output is displayed (example HIGH). The set pulse and the pulse duration are noted behind it.

**Pin 4**

Function	presentation	remarks
Preset counter output	LOW Preset cntr	The switching status of the output is displayed (example LOW). The function „ Preset cntr“ can be recognized.
Pin 4 = OFF	IO-Link only!	If no special function is assigned to pin 4, only the IO-Link function that is always present is noted.

**Pin 5**

Function	presentation	remarks
Totalizer-reset input	LOW ∑ Reset In	Only for Pin 5! The status of the input is displayed (example LOW). The function „∑ Reset In“ can be recognized.
Inverted Pin 4	HIGH Inv. Pin 4	Only for Pin 5! The status of the output is displayed (example HIGH). The function of inverted pin 4 can be recognized.
Pin 5 = OFF	OFF	displays, that no function is assigned to pin 5

**Medium setting**

For this purpose dimensionless primary measuring values are assigned to the parameters „Start of range“ and „End of range“, which will be measured by the instrument at standstill of the medium (0 cm/s) and maximum value of the flow (settable with „Max. flow speed“ or „Max. flow rate“.

**Disposal**

When disposing of the product, be sure to separate the materials and recycle the device components. The statutory specifications and directives applicable at the time should be observed. The product may be returned to the producer for disposing (delivery free manufacturer).

Producer	Postal adress	Contact
GHM Messtechnik GmbH	Tenter Weg 2 – 8	Mail: <a href="mailto:info@ghm-group.de">info@ghm-group.de</a> Web: <a href="http://www.ghm-group.de">www.ghm-group.de</a>
GHM Group – HONSBERG	42897 Remscheid GERMANY	FORN: +49 2191 9672-0 FAX: +49 2191 9672-40