

# OMNI-HD1K, OMNI-HD2K, OMNI-HR1MV, OMNI-HR2E, OMNI-HR2VE

## Датчики протока поршневого типа

### GHM MESSTECHNIK



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# Flow meter / switch / indicator OMNI-HD1K



- 0/4..20 mA or 0/2..10 V output signal
- 2 x programmable switches (push-pull)
- Backlit graphical LCD display (transreflective), can be read in sunlight and in the dark
- Programmable parameters via rotatable, removable ring (programming protection)
- All metal housing with scratch and chemical resistant glass
- Unit is displayed (selectable)
- Rotatable electronic head for best reading position
- Parameter interface

### Characteristics

The electronics can be used on the spot to set switching values where process values are exceeded or fallen short of. This setting can be carried out via the display even without a process. The present values or error messages from the measuring point are visible at any time, and all major parameters can be accessed on the spot. The analog current signal can be evaluated from large distances, and the present values can be made available there. If desired, the sensor can be configured at the factory with your parameters. It is therefore ready for immediate use, without programming. If you wish to change parameters, you can set the device directly at the sensor, by means of the programming ring.

The entire family of OMNI sensors is made up in a modular way, by means of a building-block system (hardware and software). A 16-bit microcontroller with a 14-bit A/D converter and a 12-bit D/A converter ensure the necessary processing speed and accuracy. The signal is displayed with the unit of measure by a backlit LCD graphical display, and is converted into a 0/4 – 20 mA signal. Two switching values with a choice of PNP or NPN output can be programmed across the whole range. The hystereses of the switching values can be set separately in value and direction (min., max. switching value).

Exceeding or falling short of switching values, and error messages, are indicated by a flashing red LED visible from a long distance, together with a message in the display.

Further parameters can be modified by means of a code:

Signal filter, selectable unit (l/min, m<sup>3</sup>/h, etc.) incl. automatic conversion of the values, selectable output 0..20 mA, 4.0..20 mA, 0..10 V or 2..10 V, value assignment of 0/4..20 mA or 0/2..10 V (setting of zero point and range).

For commissioning, the sensor supports a simulation mode for the analog output. It is possible to create a programmable mA value at the output (without modifying the process variable). The range is 0..20 mA. This allows the wiring run between the sensor and the downstream electronics to be tested during commissioning.

The complete housing can be rotated around the mechanical connection, and so after sealing, the correct position for reading can be set. Operation is through dialog with the display messages. It is possible to reset to the factory settings at any time.

#### OPTION C:

Preset counter with external resetting option, antivalent switching outputs and current value display.

#### OPTION C1:

Current value display with analog output, volume pulse output and totaliser

### Technical data


<b>Sensor</b>	Analog Hall sensor	
<b>Nominal width</b>	DN 8..25	
<b>Process connection</b>	Female thread G ½ G 1 (further process connections available on request)	
<b>Metering range</b>	0.1..80 l/min	For details see table "Ranges"
<b>Pressure loss</b>	0.4..1.6 bar at Q <sub>max.</sub>	
<b>Q<sub>max.</sub></b>	to 100 l/min	
<b>Tolerance</b>	±3 % of full scale value	
<b>Pressure resistance</b>	PN 200 optionally PN 500 bar	
<b>Medium temperature</b>	-20..+85 °C optionally -20..+150 °C	
<b>Ambient temperature</b>	-20..+70 °C	
<b>Media</b>	Water, oils (Gases and aggressive media available on request)	
<b>Wiring</b>	see section "Wiring"	
<b>Power supply</b>	18..30 V DC	
<b>Power requirement</b>	< 1 W	
<b>Analogue output</b>	0/4..20 mA, 0/2..10 V via a 500 Ω resistance after 0 V.	
<b>Switching values S1 + S2</b>	PNP or NPN, selectable, 300 mA max. load in total, programmable as min. value or max. value, resistant to short circuits, reversed polarity protected.	
<b>Display</b>	graphical LCD display, extended temperature range -20..+70 °C, 32 x 16 pixels, Backlite, displays value and unit, flashing LED signal lamp with simultaneous message on the display.	
<b>Ingress protection</b>	IP 67	
<b>Electrical connection</b>	For round plug connector M12x1, 5-pole	
<b>Materials medium-contact</b>	<i>Brass construction:</i> CW614N nickelled, CW614N, 1.4310, hard ferrite, NBR	<i>Stainless steel construction:</i> 1.4571, 1.4404, 1.4310, hard ferrite PTFE-coated, FKM
<b>Materials, non-medium-contact</b>	CW614N, PPS, glass	
<b>Weight</b>	see table "Dimensions and weights"	

## Product Information

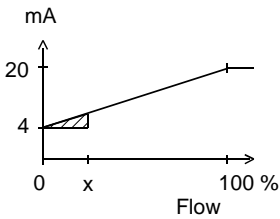
## Sensors and Instrumentation

<b>Installation location</b>	Standard: horizontal inwards flow; other installation positions are possible; the installation position affects the display, metering and switching range.
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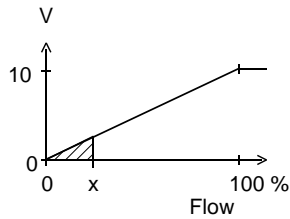
### Signal output characteristic curves

Value x = beginning of the specified metering range  
 = not specified range

Current output



Voltage output



Other characteristic curves on request

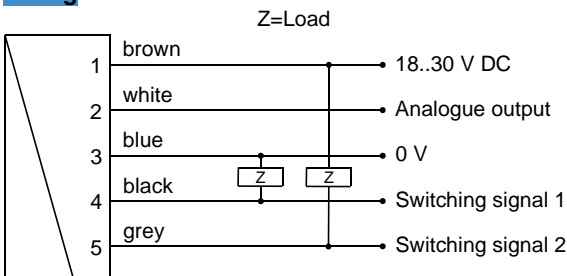
### Ranges

Details in the table correspond to horizontal inwards flow with increasing flow rate.

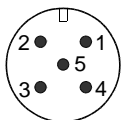
Metering range l/min H <sub>2</sub> O	Q <sub>max.</sub> recommen ded	Pressure loss bar at Q <sub>max.</sub> H <sub>2</sub> O
0.1 - 1	6	0,4
0.5 - 5	10	0,5
1.0 - 10	20	0,6
2.0 - 20	30	0,4
3.0 - 30	40	
4.0 - 40	60	0,8
6.0 - 60	80	1,4
20.0 - 80	100	1,6

Special ranges are available.

### Wiring



Connection example: PNP NPN

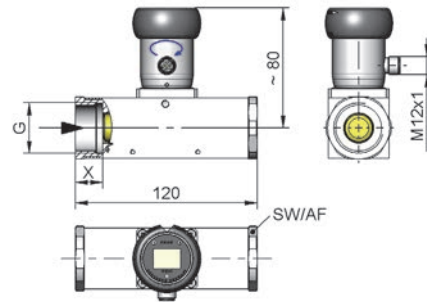


Plug connector M12x1

See separate wiring of Option C and C1 in separate descriptions.

### Dimensions and weights

	G	Types	SW	X	Weight kg
<b>Brass</b>	G 1/4	HD1K-008GM	40	15	1,6
	G 3/8	HD1K-010GM			
	G 1/2	HD1K-015GM		18	1,5
	G 3/4	HD1K-020GM			1,4
	G 1	HD1K-025GM			1,4
<b>stainless steel</b>	G 1/4	HD1K-008GK	41	15	1,6
	G 3/8	HD1K-010GK			
	G 1/2	HD1K-015GK		18	1,5
	G 3/4	HD1K-020GK			1,4
	G 1	HD1K-025GK			1,4



### Handling and operation

#### Note

- Include straight calming section of 5 x DN in inlet and outlet
- Include a filter if the media are dirty (use magnetic filter for ferritic components)

### 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**  
**Set to 2 = modify (EDIT)**  
**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 dialogue with the display messages, which makes its use very simple.

Starting from the normal display (currently measured value with 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 characteristics of S1
- (MIN = monitoring of minimum value, hysteresis greater than switching value,
- MAX = monitoring of maximum value, hysteresis less than switching value)
- Hysteresis 1 (hysteresis value of S1 in the set unit)

## Product Information

## Sensors and Instrumentation

- Switching value S2
- Switching characteristics of S2
- Hysteresis 2
- Code:  
After entering the code 111, further parameters can be defined:
- Filter (settling time of the display and output)
- Units: e.g. l/min or m<sup>3</sup>/h
- Output: 0..20 mA or 4..20 mA
- 0/4 mA (flow rate corresponding to 0/4 mA)
- 20 mA (flow rate corresponding to 20 mA)

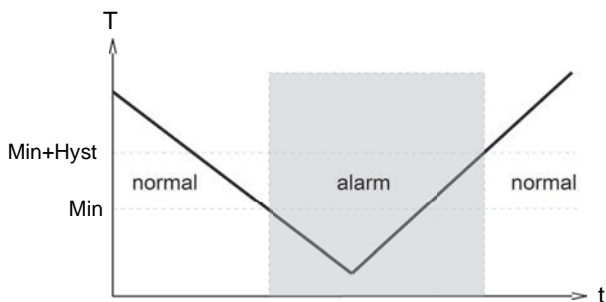
### Edit, using position 2

If the currently visible parameter is to be modified:

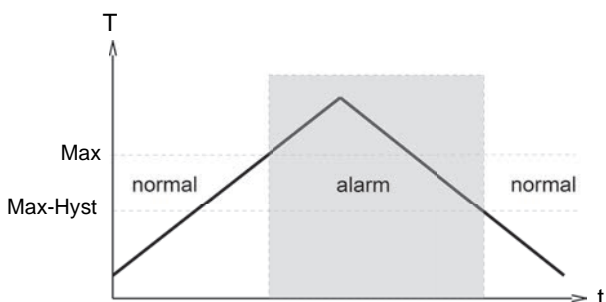
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the next digit is reached.
- Leave the parameter by turning to position 1 (until the cursor 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 for the monitoring of minima or maxima.

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 of the switching output is detected, indicated on the display ("Check S1/S2"), and the switching output is switched off.

### Simulation mode

To simplify commissioning, the sensor supports a simulation mode for the analog output. It is possible to create a programmable value in the range 0..21.0 mA (and/or 10 V) 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.

### Overload display

Overload of the switching output is detected, indicated on the display, and the switching output is set to high impedance.

### Default setting

After setting the configuration parameters, they can be reset to factory values at any time, by means of code 989.

Starting from the normal display (currently measured value with unit), if 1 (STEP) is selected repeatedly, then the display shows the following information:

### Display of the parameters, using position 1

- Switching values S1 and S2: Switching values in the selected unit.
- Hysteresis direction of S1 and S2:  
Max = hysteresis below S1 or S2  
Min = hysteresis above S1 or S2
- Hystereses Hyst 1 and Hyst 2:
- Hysteresis values of the switching values in the set unit
- After entering code S111, further parameters can be defined (this should take place only if necessary)
- Filter: Selectable filter constant in seconds (affects display and output)
- Units: e.g. bar or psi ...
- Output: 0..20 mA or 4..20 mA
- 0/4 mA: Displayed value for 0/4 mA
- 20 mA: Displayed value for 20 mA

### Edit, using position 2

- If the **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 next digit is reached. In this way, every digit can be modified. If there is no action within 5 seconds, the device returns to the normal display range without accepting the modification.

### Saving the changes using position 1

- After leaving the last value, turn once to position 1; this accepts the modification.

## Product Information

## Sensors and Instrumentation

### Ordering code

The basic device is ordered e.g. HD1K-015GM005E with Evaluation electronics, e.g. OMNI-HD1K-S

HD1K -  1.  2. **G** 3.  4.  5. **E**

OMNI-HD1K -  6.  7. **S** 8.  9.  10.

<b>1. Nominal width</b>		
008	DN 8 - G 1/4	
010	DN 10 - G 3/8	
015	DN 15 - G 1/2	
020	DN 20 - G 3/4	
025	DN 25 - G 1	
<b>2. Process connection</b>		
G	Female thread	
<b>3. Connection material</b>		
M	Brass	
K	stainless steel	
<b>4. Display range H<sub>2</sub>O for horizontal inwards flow</b>		
001	0.1 - 1 l/min	
005	0.5 - 5 l/min	
010	1.0 - 10 l/min	
020	2.0 - 20 l/min	
030	3.0 - 30 l/min	
040	4.0 - 40 l/min	
060	6.0 - 60 l/min	
080	20.0 - 80 l/min	
<b>5. Connection for</b>		
E	Evaluation electronics	
<b>6. Analogue output</b>		
I	Current output 0/4..20 mA	•
U	Voltage output 0/2..10 V	•
K	without	•
<b>7. Electrical connection</b>		
S	For round plug connector M12x1, 5-pole	
<b>8. Options 1</b>		
H	<input type="checkbox"/> Model with gooseneck	
O	<input type="checkbox"/> Tropical model with oil filling	
<b>9. High temperature</b>		
D	<input type="checkbox"/> Spacer	
<b>10. Options 2</b>		
C	<input type="checkbox"/> Counter C	
C1	<input type="checkbox"/> Counter C1	

### Options

- Counter C (hardware and software option): Preset counter with external resetting option, antivalent switching outputs and current value display (modified wiring!)
- Counter C1 (software option): Current value display with analog output, volume pulse output and totaliser

See separate data sheet for counter option C and C1.

- Tropical model (completely oil-filled for severe external applications or for rapidly changing temperatures. Reliably prevents condensation).
- Measured values for oil or gas
- Special quantities
- Version for 150 °C
- Temperature display 0..120 °C
- reinforced piston

### Accessories

- Round plug connector / cable (KB...) For additional information, refer to the main directory "Accessories"

### Ordering information

- Specify direction of flow, medium, and metering range.
- For viscous media specify viscosity, temperature and medium (e.g. ISO VG 68) (enquire about metering range).
- For gases, state pressure (relative or absolute), temperature and medium (e.g. air) (request metering range)



# Flow meter / switch / indicator OMNI-HD2K



- 0/4..20 mA or 0/2..10 V output signal
- 2 x programmable switches (push-pull)
- Backlit graphical LCD display (transreflective), can be read in sunlight and in the dark
- Programmable parameters via rotatable, removable ring (programming protection)
- All metal housing with scratch and chemical resistant glass
- Unit is displayed (selectable)
- Rotatable electronic head for best reading position
- Parameter interface
- Viscosity stabilised

### Characteristics

The electronics can be used on the spot to set switching values where process values are exceeded or fallen short of. This setting can be carried out via the display even without a process. The present values or error messages from the measuring point are visible at any time, and all major parameters can be accessed on the spot. The analog current signal can be evaluated from large distances, and the present values can be made available there. If desired, the sensor can be configured at the factory with your parameters. It is therefore ready for immediate use, without programming. If you wish to change parameters, you can set the device directly at the sensor, by means of the programming ring.

The entire family of OMNI sensors is made up in a modular way, by means of a building-block system (hardware and software). A 16-bit microcontroller with a 14-bit A/D converter and a 12-bit D/A converter ensure the necessary processing speed and accuracy. The signal is displayed with the unit of measure by a backlit LCD graphical display, and is converted into a 0/4..20 mA signal. Two switching values with a choice of PNP or NPN output can be programmed across the whole range. The hystereses of the switching values can be set separately in value and direction (min., max. switching value).

Exceeding or falling short of switching values, and error messages, are indicated by a flashing red LED visible from a long distance, together with a message in the display.

Further parameters can be modified by means of a code:

Signal filter, selectable unit (l/min, m<sup>3</sup>/h, etc.) incl. automatic conversion of the values, selectable output 0..20 mA, 4.0/20 mA, 0..10 V or 2..10 V, value assignment of 0/4..20 mA or 0/2..10 V (setting of zero point and range).

For commissioning, the sensor supports a simulation mode for the analog output. It is possible to create a programmable mA value at the output (without modifying the process variable). The range is 0..20 mA. This allows the wiring run between the sensor and the downstream electronics to be tested during commissioning.

The complete housing can be rotated around the mechanical connection, and so after sealing, the correct position for reading can be set. Operation is through dialog with the display messages. It is possible to reset to the factory settings at any time.

#### OPTION C:

Preset counter with external resetting option, antivalent switching outputs and current value display.

#### OPTION C1:

Current value display with analog output, volume pulse output and totaliser

### Technical data

<b>Sensor</b>	Analog Hall sensor	
<b>Nominal width</b>	DN 8.0.25	
<b>Process connection</b>	Female thread G $\frac{1}{2}$ G 1 (further process connections available on request)	
<b>Metering range</b>	0.5..60 l/min	For details see table "Ranges"
<b>Pressure loss</b>	1.1..3.5 bar at Q <sub>max.</sub>	
<b>Q<sub>max.</sub></b>	up to 80 l/min	
<b>Tolerance</b>	±3 % of full scale value	
<b>Pressure resistance</b>	PN 200 optionally PN 500 bar	
<b>Medium temperature</b>	-20..+85 °C optionally -20..+150 °C	
<b>Ambient temperature</b>	-20..+70 °C	
<b>Media</b>	Oils	
<b>Wiring</b>	see section "Wiring"	
<b>Power supply</b>	18..30 V DC	
<b>Power requirement</b>	< 1 W	
<b>Analogue output</b>	0/4..20 mA, 0/2..10 V via a 500 Ω resistance after 0 V.	
<b>Switching values S1 + S2</b>	PNP or NPN, selectable, 300 mA max. load in total, programmable as min. value or max. value, resistant to short circuits, reversed polarity protected.	
<b>Display</b>	graphical LCD display, extended temperature range -20..+70 °C, 32 x 16 pixels, Backlit, displays value and unit, flashing LED signal lamp with simultaneous message on the display.	
<b>Ingress protection</b>	IP 67	
<b>Electrical connection</b>	For round plug connector M12x1, 5-pole	
<b>Materials medium-contact</b>	<i>Brass construction:</i> CW614N nickelled, CW614N, 1.4310, hard ferrite, NBR	<i>Stainless steel construction:</i> 1.4571, 1.4404, 1.4310, hard ferrite PTFE-coated, FKM
<b>Materials, non-medium-contact</b>	CW614N, PPS, glass	
<b>Weight</b>	see table "Dimensions and weights"	

## Product Information

## Sensors and Instrumentation

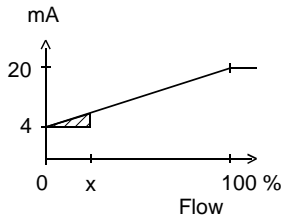
<b>Installation location</b>	Standard: horizontal inwards flow; other installation positions are possible; the installation position affects the display, metering and switching range.
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### Signal output characteristic curves

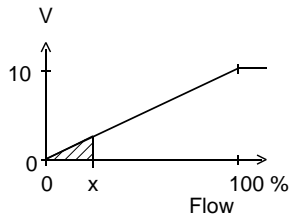
Value x = beginning of the specified metering range

= not specified range

Current output



Voltage output



Other characteristic curves on request

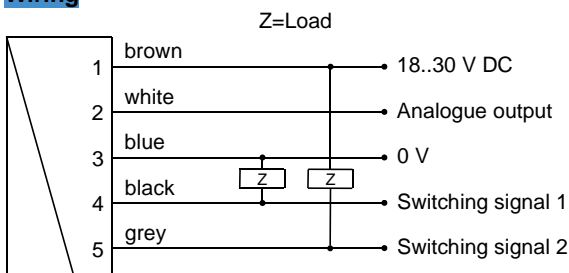
### Ranges

Details in the table correspond to horizontal inwards flow with increasing flow rate.

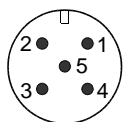
Metering range l/min oil 30 - 330 mm <sup>2</sup> /s	Q <sub>max.</sub> recom- mende- d	Pressure loss bar at Q <sub>max.</sub> oil mm <sup>2</sup> /s					Viscosity stability ±8 %, min.
		30	60	100	205	330	
0.5 - 8	12	1,1	1,4	1,6	2,8	3,5	±0.3 l/min
1.5 - 15	22	2,2	2,3	2,4			±0.5 l/min
2.5 - 25	35	1.9	2.0	2.1	2.3	2,9	±0.8 l/min
6.0 - 40	60					2,6	±2.7 l/min
12.0 - 60	80	2,1	2,3	2,4	2,6	2,8	±3.0 l/min

Special ranges are available.

### Wiring



Connection example: PNP NPN

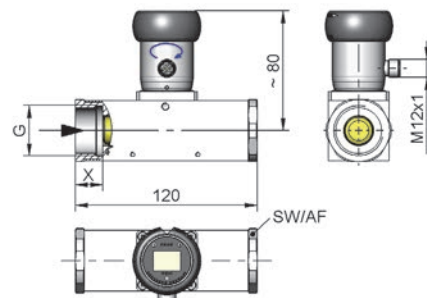


Plug connector M12x1

See separate wiring of Option C and C1 in separate descriptions.

### Dimensions and weights

	G	Types	SW	X	Weight kg
Brass	G 1/4	HD2K-008GM	40	15	1,6
	G 3/8	HD2K-010GM			
	G 1/2	HD2K-015GM		18	1,5
	G 3/4	HD2K-020GM			1,4
	G 1	HD2K-025GM			1,4
stainless steel	G 1/4	HD2K-008GK	41	15	1,6
	G 3/8	HD2K-010GK			
	G 1/2	HD2K-015GK		18	1,5
	G 3/4	HD2K-020GK			1,4
	G 1	HD2K-025GK			1,4



### Handling and operation

#### Note

- Include straight calming section of 5 x DN in inlet and outlet
- Include a filter if the media are dirty (use magnetic filter for ferritic components)

### 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**  
**Set to 2 = modify (EDIT)**  
**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 dialogue with the display messages, which makes its use very simple.

Starting from the normal display (currently measured value with 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 characteristics of S1
- (MIN = monitoring of minimum value, hysteresis greater than switching value,
- MAX = monitoring of maximum value, hysteresis less than switching value)

## Product Information

## Sensors and Instrumentation

- Hysteresis 1 (hysteresis value of S1 in the set unit)
- Switching value S2
- Switching characteristics of S2
- Hysteresis 2
- Code:  
After entering the code 111, further parameters can be defined:
- Filter (settling time of the display and output)
- Units: e.g. l/min or m<sup>3</sup>/h
- Output: 0..20 mA or 4..20 mA
- 0/4 mA (flow rate corresponding to 0/4 mA)
- 20 mA (flow rate corresponding to 20 mA)

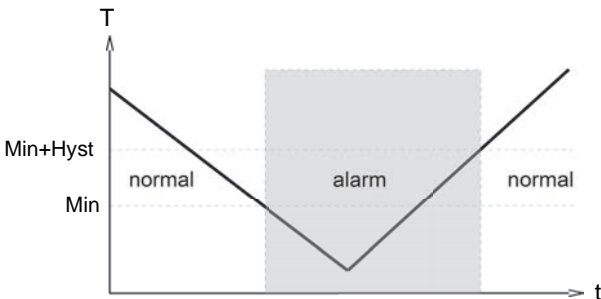
### Edit, using position 2

If the currently visible parameter is to be modified:

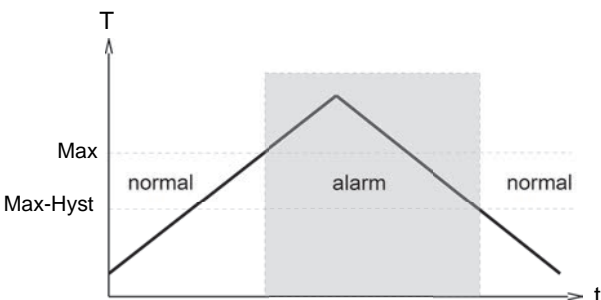
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the next digit is reached.
- Leave the parameter by turning to position 1 (until the cursor 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 for the monitoring of minima or maxima.

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 of the switching output is detected, indicated on the display ("Check S1/S2"), and the switching output is switched off.

### Simulation mode

To simplify commissioning, the sensor supports a simulation mode for the analog output. It is possible to create a programmable value in the range 0..26 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.

### Overload display

Overload of the switching output is detected, indicated on the display, and the switching output is set to high impedance.

### Default setting

After setting the configuration parameters, they can be reset to factory values at any time, by means of code 989.

Starting from the normal display (currently measured value with unit), if 1 (STEP) is selected repeatedly, then the display shows the following information:

### Display of the parameters, using position 1

- Switching values S1 and S2: Switching values in the selected unit.
- Hysteresis direction of S1 and S2:  
Max = hysteresis below S1 or S2
- Min = hysteresis above S1 or S2
- Hystereses Hyst 1 and Hyst 2:
- Hysteresis values of the switching values in the set unit
- After entering code S111, further parameters can be defined (this should take place only if necessary)
- Filter: Selectable filter constant in seconds (affects display and output)
- Units: e.g. bar or psi ...
- Output: 0..20 mA or 4..20 mA
- 0/4 mA: Displayed value for 0/4 mA
- 20 mA: Displayed value for 20 mA

### Edit, using position 2

- If the **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 next digit is reached. In this way, every digit can be modified. If there is no action within 5 seconds, the device returns to the normal display range without accepting the modification.

### Saving the changes using position 1

- After leaving the last value, turn once to position 1; this accepts the modification.



## Product Information

## Sensors and Instrumentation

### Ordering code

The base device is ordered, e.g. HD2K-015GM005E with Evaluation electronics, e.g. OMNI-HD2K-S

HD2K - 1.  2. **G** 3.  4.  5. **E**  
 OMNI-HD2K - 6.  7. **S** 8.  9.  10.

<b>1. Nominal width</b>		
008	DN 8 - G $\frac{1}{4}$	
010	DN 10 - G $\frac{3}{8}$	
015	DN 15 - G $\frac{1}{2}$	
020	DN 20 - G $\frac{3}{4}$	
025	DN 25 - G 1	
<b>2. Process connection</b>		
G	Female thread	
<b>3. Connection material</b>		
M	Brass	
K	stainless steel	
<b>4. Metering range oil 30 – 330 mm<sup>2</sup>/s for horizontal inwards flow</b>		
008	0.5 - 8 l/min	
015	1.5 - 15 l/min	
025	2.5 - 25 l/min	
040	6.0 - 40 l/min	
060	12.0 - 60 l/min	
<b>5. Connection for</b>		
E	Evaluation electronics	
<b>6. Analogue output</b>		
I	Current output 0/4..20 mA	•
U	Voltage output 0/2..10 V	•
K	without	•
<b>7. Electrical connection</b>		
S	For round plug connector M12x1, 5-pole	
<b>8. Options 1</b>		
H	<input type="radio"/> Model with gooseneck	
O	<input type="radio"/> Tropical model with oil filling	
<b>9. High temperature</b>		
D	<input type="radio"/> Spacer	
<b>10. Options 2</b>		
C	<input type="radio"/> Counter C	
C1	<input type="radio"/> Counter C1	

- Version for 150 °C
- Temperature display 0..120 °C

### Accessories

- Round plug connector / cable (KB...)

### Ordering information

- Specify direction of flow, medium, and metering range.
- For viscous media specify viscosity, temperature and medium (e.g. ISO VG 68) (enquire about metering range).
- For gases, state pressure (relative or absolute), temperature and medium (e.g. air) (request metering range)

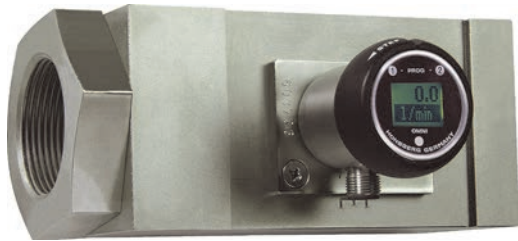
### Options

- Counter C (hardware and software option):  
Preset counter with external resetting option, antivalent switching outputs and current value display (modified wiring!)
- Counter C1 (software option):  
Current value display with analog output, volume pulse output and totaliser

See separate data sheet for counter option C and C1.

- Tropical model (completely oil-filled for severe external applications or for rapidly changing temperatures. Reliably prevents condensation).
- Special quantities

# Flow Meter / Switch / Indicator OMNI-HR1MV



- Viscosity stabilised from 30 to 200 mm<sup>2</sup>/s
- 0/4..20 mA or 0/2..10 V output signal
- 2 x programmable switches (push-pull)
- Backlit graphical LCD-Display (transreflective), can be read in sunlight and in the dark
- Programmable parameters via rotatable, removable ring (programming protection)
- All metal housing with scratch and chemical resistant glass
- Unit is displayed (selectable)
- Rotatable electronic head for best reading position
- Parameter interface

## Characteristics

The electronics can be used on the spot to set switching values where process values are exceeded or fallen short of. This setting can be carried out via the display even without a process. The present values or error messages from the measuring point are visible at any time, and all major parameters can be accessed on the spot. The analog current signal can be evaluated from large distances, and the present values can be made available there. If desired, the sensor can be configured at the factory with your parameters. It is therefore ready for immediate use, without programming. If you wish to change parameters, you can set the device directly at the sensor, by means of the programming ring.

The entire family of OMNI sensors is made up in a modular way, by means of a building-block system (hardware and software). A 16-bit microcontroller with a 14-bit A/D converter and a 12-bit D/A converter ensure the necessary processing speed and accuracy. The signal is displayed with the unit of measure by a backlit LCD graphical display, and is converted into a 0/4..20 mA signal. Two switching values with a choice of PNP or NPN output can be programmed across the whole range. The hystereses of the switching values can be set separately in value and direction (min., max. switching value).

Exceeding or falling short of switching values, and error messages, are indicated by a flashing red LED visible from a long distance, together with a message in the display.

Further parameters can be modified by means of a code:

Signal filter, selectable unit (l/min, m<sup>3</sup>/h ...) incl. automatic conversion of the values, selectable output 0..20 mA, 4.0..20mA, 0..10 V or 2..10 V, value assignment of 0/4..20 mA or 0/2..10 V (setting of zero point and range).

For commissioning, the sensor supports a simulation mode for the analog output. It is possible to create a programmable mA value at the output (without modifying the process variable). The range is 0..20 mA. This enables the commissioner to test the run between the sensor and the downstream electronics.

The complete housing can be rotated around the mechanical connection, and so after sealing, the correct position for reading can be set. Operation is through dialog with the display messages. It is possible to reset to the factory settings at any time.

### 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

<b>Sensor</b>	analog hall sensor	
<b>Nominal width</b>	DN 32..50	
<b>Process connection</b>	female thread G 1 1/4..G 2 (further process connections available on request)	
<b>Metering range</b>	2..220 l/min	for details see table "Ranges"
<b>Q<sub>max.</sub></b>	to 250 l/min	
<b>Tolerance</b>	±3 % of the full scale value plus viscosity variation	
<b>Pressure resistance</b>	PN 200 bar	
<b>Media temperature</b>	-20..+85 °C optionally -20..+150 °C	
<b>Ambient temperature</b>	-20..+70 °C	
<b>Media</b>	water, oils (gases and aggressive media available on request)	
<b>Wiring</b>	see section "Wiring"	
<b>Supply voltage</b>	18..30 V DC	
<b>Power consumption</b>	< 1 W	
<b>Analog output</b>	0/4..20 mA, 0/2..10 V via a 500 OhmΩ resistance after 0 V.	
<b>Switching values S1+S2</b>	PNP or NPN, selectable, 300 mA max. load in total, programmable as min. value or max. value, resistant to short circuits, reversal polarity protected.	
<b>Display</b>	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.	
<b>Ingress protection</b>	IP 67	
<b>Electrical connection</b>	for round plug connector M12x1, 5-pole	
<b>Materials medium-contact</b>	<i>Brass construction:</i> CW614N nickelled, CW614N, 1.4310, hard ferrite DN 32..40: NBR	<i>Stainless steel construction:</i> 1.4571, 1.4404, 1.4310, hard ferrite PTFE-coated, DN 32..40: FKM
<b>Materials, non-medium-contact</b>	CW614N, PPS, glass	
<b>Weight</b>	see table "Dimensions and weights"	
<b>Installation location</b>	Standard: horizontal inwards flow; other installation positions are possible; the installation position affects the display, metering and switching range.	

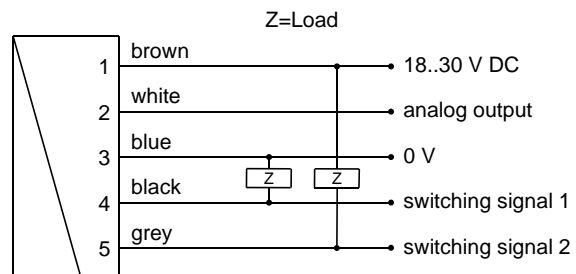
### Ranges

Details in the table correspond to horizontal inwards flow with increasing flow rate.

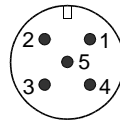
Switching range l/min H <sub>2</sub> O or oil 30..200mm <sup>2</sup> /s	Display range l/min H <sub>2</sub> O or oil 30..200mm <sup>2</sup> /s	Q <sub>max.</sub> recommended
2 - 12	2 - 15	50
5 - 20	5 - 25	60
10 - 40	10 - 45	100
20 - 60	20 - 65	150
30 - 100	30 - 110	200
50 - 150	50 - 160	230
100 - 200	100 - 220	250

Special ranges are available.

### Wiring



Connection example: PNP NPN



connector M12x1

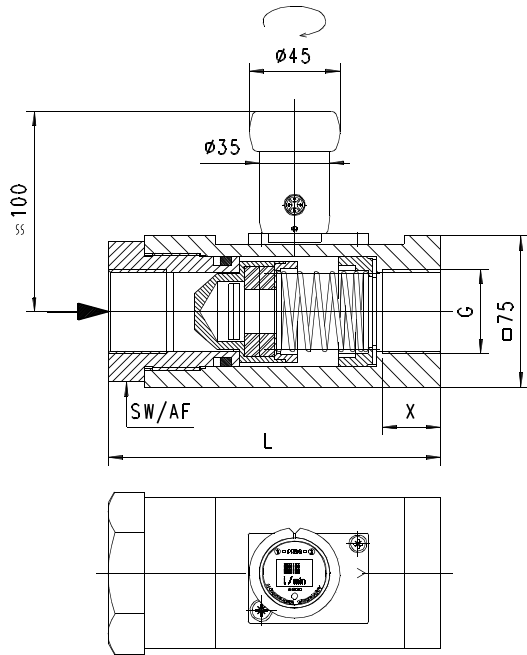
See separate wiring at C and C1 option in the separate descriptions.

## Product Information

## Sensors and Instrumentation

### Dimensions and weights

G	DN	Types	L	SW	X	Weight kg
G 1 1/4	32	HR1MV-0032G.E	165	70	29	5.8
G 1 1/2	40	HR1MV-0040G.E	165	-	-	5.5
G 2	50	HR1MV-0050G.E	150	-	26	5.0



### Handling and operation

#### Note

- Include straight calming section of 5 x DN in inlet and outlet.
- If the media are dirty, install a filter (use magnetic filter for ferritic components)

### 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 (EDIT)

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 (currently measured value with 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, hysteresis greater than switching value,
- MAX = monitoring of maximum value, hysteresis less than switching 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)
- Units: e.g. l/min or m<sup>3</sup>/h
- Output: 0..20 mA or 4..20 mA
- 0/4 mA (flow rate corresponding to 0/4 mA)
- 20 mA (flow rate corresponding to 20 mA)

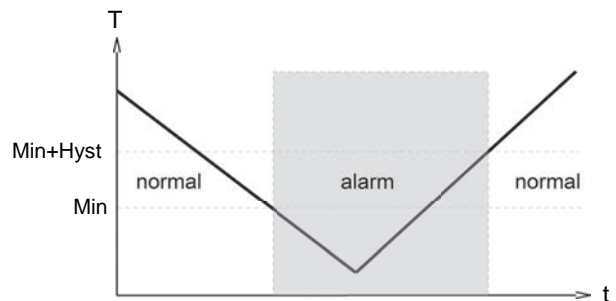
#### Edit, using position 2

If the currently visible parameter is to be modified:

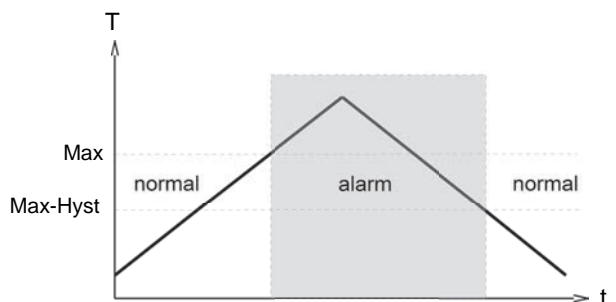
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the next digit is reached.
- Leave the parameter by turning to position 1 (until the cursor 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.

## Product Information

## Sensors and Instrumentation

Overload of the switching output is detected, indicated on the display ("Check S1/S2"), and the switching output is switched off.

### Simulation mode

To simplify commissioning, the sensor supports a simulation mode for the analog output. It is possible to create a programmable value in the range 0..26 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.

### Overload display

Overload of the switching output is detected, indicated on the display, and the switching output is set to high impedance.

### Default setting

After setting the configuration parameters, they can be reset to factory values at any time, by means of code 989.

Starting from the normal display (currently measured value with unit), if 1 (STEP) is selected repeatedly, then the display shows the following information:

### Display of the parameters, using position 1

- Switching values S1 and S2: Switching values in the selected unit.
- Hysteresis direction of S1 and S2:  
Max = Hysteresis less than S1 or S2
- Max = Hysteresis greater than S1 or S2
- Hystereses Hyst1 and Hyst2:
- Hysteresis values of the switching values in the set unit
- After entering code 111, further parameters can be defined (this should take place only if necessary)
- Filter: Selectable filter constant in seconds (affects display and output)
- Unit: e.g. bar or psi ...
- Output: 0..20 mA or 4..20 mA
- 0/4 mA: Displayed value for 0/4 mA
- 20 mA: Displayed value for 20 mA

### Edit, using position 2

- If the 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 next digit is reached. In this way, every digit can be modified. If there is no action within 5 seconds, the device returns to the normal display range without accepting the modification.

### Saving the changes using position 1

- After leaving the last value, turn once to position 1; this accepts the modification.

## Ordering code

The basic device is ordered e.g. HR1MV-032GM040E with electronics e.g. OMNI-HR1MVS

HR1MV -  1.  2. **G**  3.  4.  5. **E**

OMNI-HR1MV  6.  7. **S**  8.  9.

<b>1. Nominal width</b>		
032	DN 32 - G 1 <sup>1</sup> / <sub>4</sub>	
040	DN 40 - G 1 <sup>1</sup> / <sub>2</sub>	
050	DN 50 - G 2	
<b>2. Process connection</b>		
G	female thread	
<b>3. Connection material</b>		
M	brass	
K	stainless steel	
<b>4. Metering range H<sub>2</sub>O or oil 30..200 mm<sup>2</sup>/s for horizontal inwards flow</b>		
012	2 - 12 l/min	
025	5 - 25 l/min	
040	10 - 40 l/min	
060	20 - 60 l/min	
100	30 - 100 l/min	
150	50 - 150 l/min	
200	100 - 200 l/min	
<b>5. Connection for</b>		
E	electronics	
<b>6. Analog output</b>		
I	current output 0/4..20 mA	●
U	voltage output 0/2..10 V	●
K	without	●
<b>7. Electrical connection</b>		
S	for round plug connector M12x1, 5-pole	
<b>8. Option 1</b>		
H	model with gooseneck	
O	tropical model - oil-filled version for heavy duty or external use	
D	High temperature to 150 ° C	
<b>9. Option 2</b>		
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

- Tropical model (completely oil-filled for severe external applications or for rapidly changing temperatures. Reliably prevents condensation).
- Measured values for oil or gas
- Special quantities
- Temperature display 0..120 °C
- Reinforced piston

### Accessories

- Cable/round plug connector (KB...) see additional information "Accessories"

### Ordering information

- Specify direction of flow, medium, and metering range.
- For viscous media, state viscosity, temperature and medium (e.g. ISO VG 68) (enquire about metering range).
- For gases, state pressure (relative or absolute), temperature and medium (e.g. air) (request metering range)

### Combinations with OMNI

OMNI-converter / counter can be combined with very different types of pickup systems for flow rate, level, temperature, and pressure. This has created a family of sensors with which different types of applications can be supported.



# Flow transmitter / switch OMNI-HR2E



- Optimized for use with water
- Analog output 4..20 mA or 0..10 V
- Two programmable switches
- Graphical LCD display, backlit, can be read in sunlight and in the dark
- Selectable units in the display
- Programmable parameters via rotatable, removable ring (programming protection)
- Electronics housing with non-scratch, chemically resistant glass
- Rotatable electronic housing for best reading position
- Designed for industrial use

### Characteristics

Mechanical flow switch, for fluid media, with spring-supported piston and magnetic triggering of Hall sensors. Robust construction in brass or stainless steel.

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 signaled by a red LED which is visible over a long distance, and by a clear text in the display.

The stainless steel housing 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 left or right, 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 resetting option, antivalent switching outputs and current value display.

### OPTION C1:

Current value display with analog output, volume pulse output and totaliser

### Technical data

<b>Sensor</b>	analog Hall sensor	
<b>Nominal width</b>	DN 32 / 40 / 50	
<b>Process connection</b>	female thread G 1 1/4..G 2 (further process connections available on request)	
<b>Metering range</b>	5..300 l/min	for details see table "Ranges"
<b>Pressure loss</b>	~ 1 bar at Q <sub>max</sub>	
<b>Q<sub>max</sub></b>	up to 300 l/min	
<b>Measurement accuracy</b>	±8 % of full scale value	
<b>Pressure resistance</b>	PS 200 bar	
<b>Medium temperature</b>	-20..+85 °C, optionally -20..+100 °C	
<b>Ambient temperature</b>	-20..+70 °C	
<b>Media</b>	water	
<b>Wiring</b>	see section "Wiring"	
<b>Materials medium-contact</b>	<i>Brass construction:</i> CW614N nickelled, CW614N, 1.4305, 1.4310, hard ferrite,	<i>Stainless steel construction:</i> 1.4571, 1.4310, hard ferrite
<b>Materials, non-medium-contact</b>	Electronic adapter Electronics housing Glass  Magnet Ring	CW614N nickelled Stainless steel 1.4305 Mineral glass, hardened  Samarium-Cobalt POM
<b>Supply voltage</b>	18..30 V DC	
<b>Power consumption</b>	<1 W	
<b>Analog output</b>	4..20 mA / max. load 500 Ω or 0..10 V / min. load 1 kΩ	
<b>Switching output</b>	Transistor output "Push-Pull" (resistant to short circuits and polarity reversal) I <sub>out</sub> = 100 mA max.	
<b>Hysteresis</b>	adjustable, position of the hysteresis depends on minimum or maximum	
<b>Display</b>	extendable graphic LCD display 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	
<b>Electrical connection</b>	for round plug connector M12x1, 5-pole	
<b>Ingress protection</b>	IP 67 (IP 68 when oil-filled)	
<b>Weight</b>	see table "Dimensions and weights"	
<b>Conformity</b>	CE	
<b>Installation location</b>	Standard: horizontal inwards flow; other installation positions are possible; the installation position affects the display, metering and switching range.	

## Product Information

## Sensors and Instrumentation

### Ranges

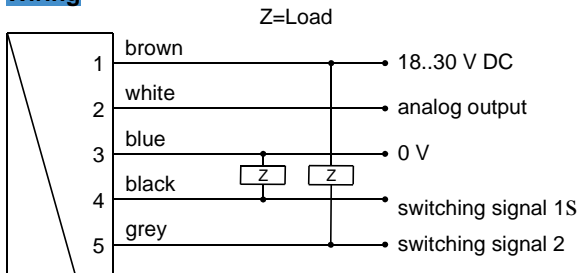
Details in the table correspond to metering ranges with horizontal inwards flow and increasing flow rate.

#### Standard type OMNI-HR2E

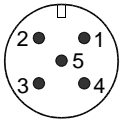
Metering range l/min H <sub>2</sub> O	Q <sub>max.</sub> recommended
5 - 60	300 l/min
10 -100	300 l/min
15 -200	300 l/min
25 -300	300 l/min

Special ranges are available.

### 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) can as desired be switched as a PNP or an NPN output.

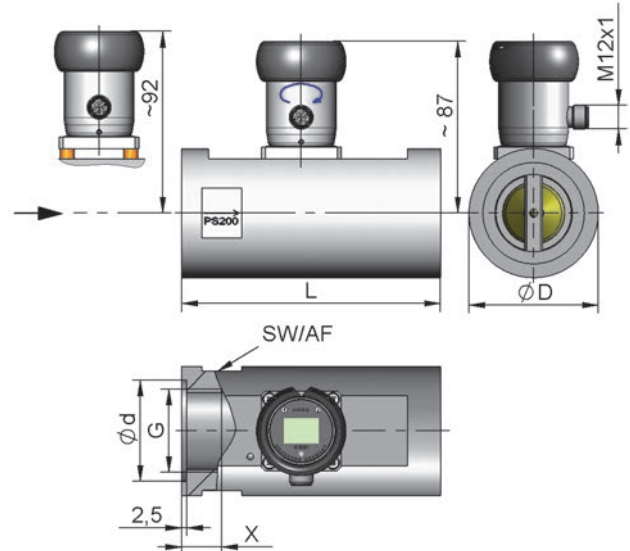
See separate wiring of Option C and C1 in separate descriptions.

### Dimensions and weights

..including OMNI electronics

DN	G	Types	L	ØD	SW	Ød	X	Weight kg
32	G 1 <sup>1</sup> / <sub>4</sub>	HR2E-032GM	130	65	60	51	23	2.8
40	G 1 <sup>1</sup> / <sub>2</sub>	HR2E-040GM	170	65	60	56	24	3.3
50	G 2	HR2E-050GM	185	80	75	70	26	5.5

High temperature



### 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

### Note

- Include straight calming section of 5 x DN in inlet and outlet
- If the media are dirty, install a filter (use magnetic filter for ferritic components)

The electronics housing is permanently connected to the primary sensor. There is no electrical connection between the electronics and the piston device. After installation, the electronic head can be turned to align the cable outlet.

It should be ensured that the piston device and the OMNI electronics are appropriately matched to each other.

## Product Information

## Sensors and Instrumentation

### 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)

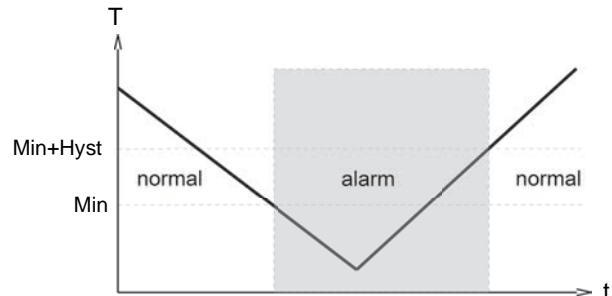
For models with a voltage output, replace 20 mA accordingly with 10 V.

#### Edit, using position 2

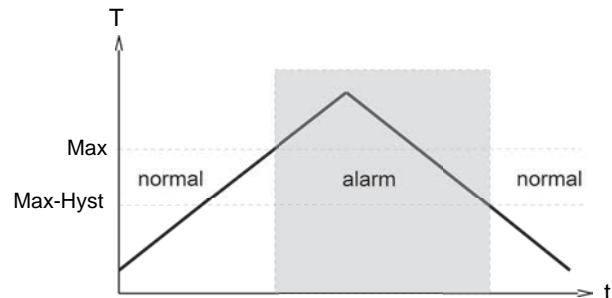
- If the currently visible parameter is to be modified:
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
  - By repeatedly turning to position 2, values are increased; by turning to position 1, the cursor moves to the next digit.
  - 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 clear text 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 S1 / S2"), 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**.

## Product Information

## Sensors and Instrumentation

### Ordering code

The basic device is ordered e.g. HR2E-032GM100 with electronics e.g. OMNI-HR2E-ISO

HR2E -  1.  2. **G**  3.  4.

OMNI - HR2E -  5.  6. **S**  7.  8.

○=Option

<b>1. Nominal width</b>	
032	DN 32 - G 1 <sup>1</sup> / <sub>4</sub>
040	DN 40 - G 1 <sup>1</sup> / <sub>2</sub>
050	DN 50 - G 2
<b>2. Process connection</b>	
G	female thread
<b>3. Connection material</b>	
M	brass
K	stainless steel
<b>4. HR2E - Metering range H<sub>2</sub>O for horizontal inwards flow</b>	
060	5 - 60 l/min
100	10 -100 l/min
200	15 -200 l/min
300	25 -300 l/min

<b>5. Analog output</b>		
I	current output 0/4..20 mA	●
U	voltage output 0/2..10 V	●
K	without	●
<b>6. Electrical connection</b>		
S	for round plug connector M12x1, 5-pole	
<b>7. Optional</b>		
D	high temperature up to 120°C	
H	model with gooseneck	
O	tropical model - oil-filled version for heavy duty or external use	○
<b>8. Options 2</b>		
C	Counter C	○
C1	Counter C1	○

### Options

- Counter C (hardware and software option):  
Preset counter with external resetting option, antivalent switching outputs and current value display (modified wiring!)
- Counter C1 (software option):  
Current value display with analog output, volume pulse output and totaliser

See separate data sheet for counter option C and C1.

- Special quantities

### Ordering information

- Specify direction of flow, medium, and metering range.

### Accessories

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



# Flow transmitter /-switch OMNI-HR2VE



- Optimized for use with oil
- Analog output 4..20 mA or 0..10 V
- Two programmable switches
- Graphical LCD display, backlit, can be read in sunlight and in the dark
- Selectable units in the display
- Programmable parameters via rotatable, removable ring (programming protection)
- Electronics housing with non-scratch, chemically resistant glass
- Rotatable electronic housing for best reading position
- Designed for industrial use

### Characteristics

Mechanical flow switch, for fluid media, with spring-supported piston and magnetic triggering of Hall sensors. Robust construction in brass or stainless steel.

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 signaled by a red LED which is visible over a long distance, and by a clear text in the display.

The stainless steel housing 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 left or right, 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


<b>Sensor</b>	analog Hall sensor	
<b>Nominal width</b>	DN 32 / 40 / 50	
<b>Process connection</b>	female thread G 1 1/4..G 2 (further process connections available on request)	
<b>Metering range</b>	10..160 l/min	for details see table "Ranges"
<b>Pressure loss</b>	~ 4..7 bar at Q <sub>max</sub>	
<b>Q<sub>max</sub></b>	up to 160 l/min	
<b>Measurement accuracy</b>	±5 % of full scale value at constant viscosity	
<b>Viscosity-stability</b>	±10 % of full scale value (20-330 mm <sup>2</sup> /s)	
<b>Pressure resistance</b>	PS 200 bar	
<b>Medium temperature</b>	-20..+85 °C, optionally -20..+100 °C	
<b>Ambient temperature</b>	-20..+70 °C	
<b>Media</b>	oil	
<b>Wiring</b>	see section "Wiring"	
<b>Materials medium-contact</b>	Brass construction: CW614N nickelled, CW614N, 1.4305, 1.4310, hard ferrite,	Stainless steel construction: 1.4571, 1.4310, hard ferrite
<b>Materials, non-medium-contact</b>	Electronic adapter Electronics housing Glass  Magnet Ring	CW614N nickelled Stainless steel 1.4305 Mineral glass, hardened Samarium-Cobalt POM
<b>Supply voltage</b>	18..30 V DC	
<b>Power consumption</b>	<1 W	
<b>Analog output</b>	4..20 mA / max. load 500 Ω or 0..10 V / min. load 1 kΩ	
<b>Switching output</b>	Transistor output "Push-Pull" (resistant to short circuits and polarity reversal) I <sub>out</sub> = 100 mA max.	
<b>Hysteresis</b>	adjustable, position of the hysteresis depends on minimum or maximum	
<b>Display</b>	extendable graphic LCD display 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	
<b>Electrical connection</b>	for round plug connector M12x1, 5-pole	
<b>Ingress protection</b>	IP 67 (IP 68 when oil-filled)	
<b>Weight</b>	see table "Dimensions and weights"	
<b>Conformity</b>	CE	

## Product Information

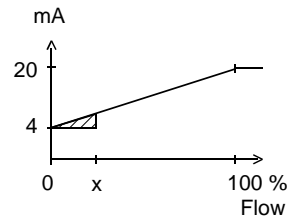
## Sensors and Instrumentation

<b>Installation location</b>	Standard: horizontal inwards flow; other installation positions are possible; the installation position affects the display, metering and switching range.
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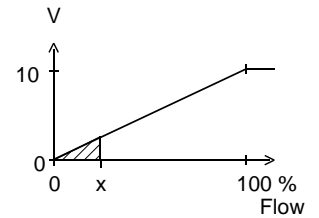
### Signal output curves

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

Current output



Voltage output



Other characteristics on request.

### Ranges

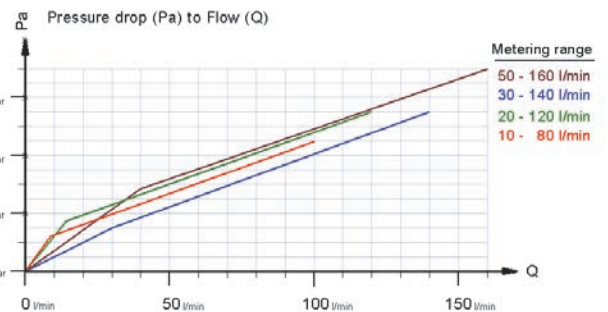
Details in the table correspond to metering ranges with horizontal inwards flow and increasing flow rate.

#### Standard type OMNI-HR2VE

Metering range l/min oil 20-330 mm <sup>2</sup> /s	Q <sub>max.</sub> Recommended l/min	Pressure loss bar at Q <sub>max.</sub> oil
10 - 80	100	4
20 - 120	120	5
30 - 140	140	5
50 - 160	160	7

Special ranges are available.

#### Reference Data:

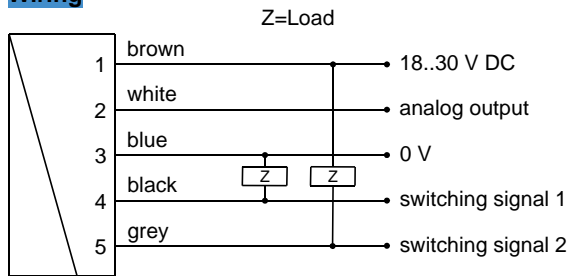


Metering spaces of the flow switch HR2VK1

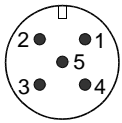
## Product Information

## Sensors and Instrumentation

### Wiring



Connection example: PNP NPN



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

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

It is recommended to use shielded wiring.

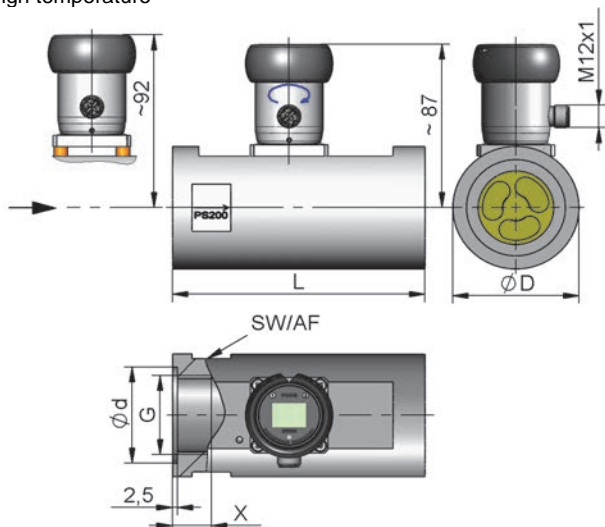
The Push-Pull output) can as desired be switched as a PNP or an NPN output.

### Dimensions and weights

..including OMNI-electronics

DN	G	Types	L	ØD	SW	Ød	X	Weight kg
32	G 1¼	HR2VE-032GM	130	65	60	51	23	2.8
40	G 1½	HR2VE-040GM	170	65	60	56	24	3.3
50	G 2	HR2VE-050GM	185	80	75	70	26	5.5

High temperature



### 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

#### Note

- Include straight calming section of 5 x DN in inlet and outlet
- If the media are dirty, install a filter (use magnetic filter for ferritic components)
- Under unfavorable pressure conditions, e.g. with a free outlet, there is a risk of cavitation.

The electronics housing is permanently connected to the primary sensor. There is no electrical connection between the electronics and the piston device. After installation, the electronic head can be turned to align the cable outlet.

It should be ensured that the piston device and the OMNI electronics are appropriately matched to each other.

### 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.

## Product Information

## Sensors and Instrumentation

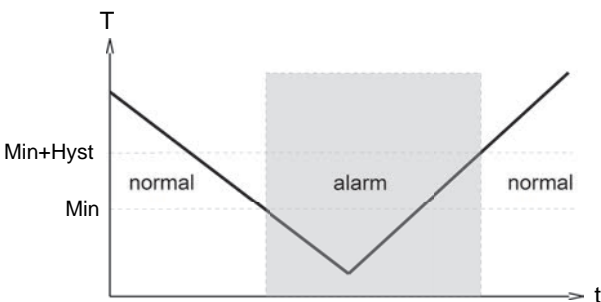
### Edit, using position 2

If the currently visible parameter is to be modified:

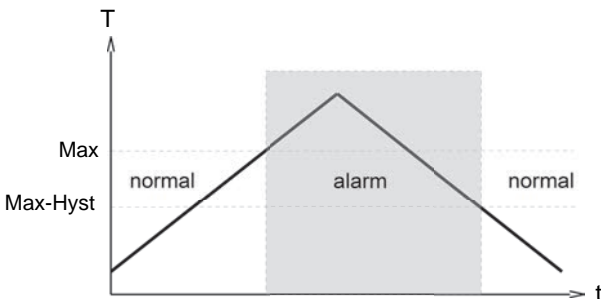
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the cursor moves to the next digit.
- Leave the parameter by turning to position 1 (until the 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 clear text 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 S1 / S2"), 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 basic device is ordered e.g. HR2VE-032GM100 with electronics e.g. OMNI-HR2VE-ISO

HR2VE -  1.  2.  3.  4.  4.  4.  4.

OMNI - HR2VE -  5.  6.  7.  7.  7.  7.

○=Option

<b>1. Nominal width</b>		
032	DN 32 - G 1 <sup>1</sup> / <sub>4</sub>	
040	DN 40 - G 1 <sup>1</sup> / <sub>2</sub>	
050	DN 50 - G 2	
<b>2. Process connection</b>		
G	female thread	
<b>3. Connection material</b>		
M	brass	
K	stainless steel	
<b>4. HR2VE - Metering range H<sub>2</sub>O for horizontal inwards flow</b>		
080	10.. 80 l/min	
120	20..120 l/min	
140	30..140 l/min	
160	50..160 l/min	
<b>5. Analog output</b>		
I	current output 0/4..20 mA	●
U	voltage output 0/2..10 V	●
K	without	●
<b>6. Electrical connection</b>		
S	for round plug connector M12x1, 5-pole	
<b>7. Option 1</b>		
D	high temperature up to 120°C	
H	model with gooseneck	
O	tropical model - oil-filled version for heavy duty or external use	
<b>8. Option 2</b>		
C	counter C	
C1	counter C1	

### Options

- Special quantities

### Ordering information

- Specify direction of flow, medium, and metering range.

### Accessories

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

contact us     



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