EN

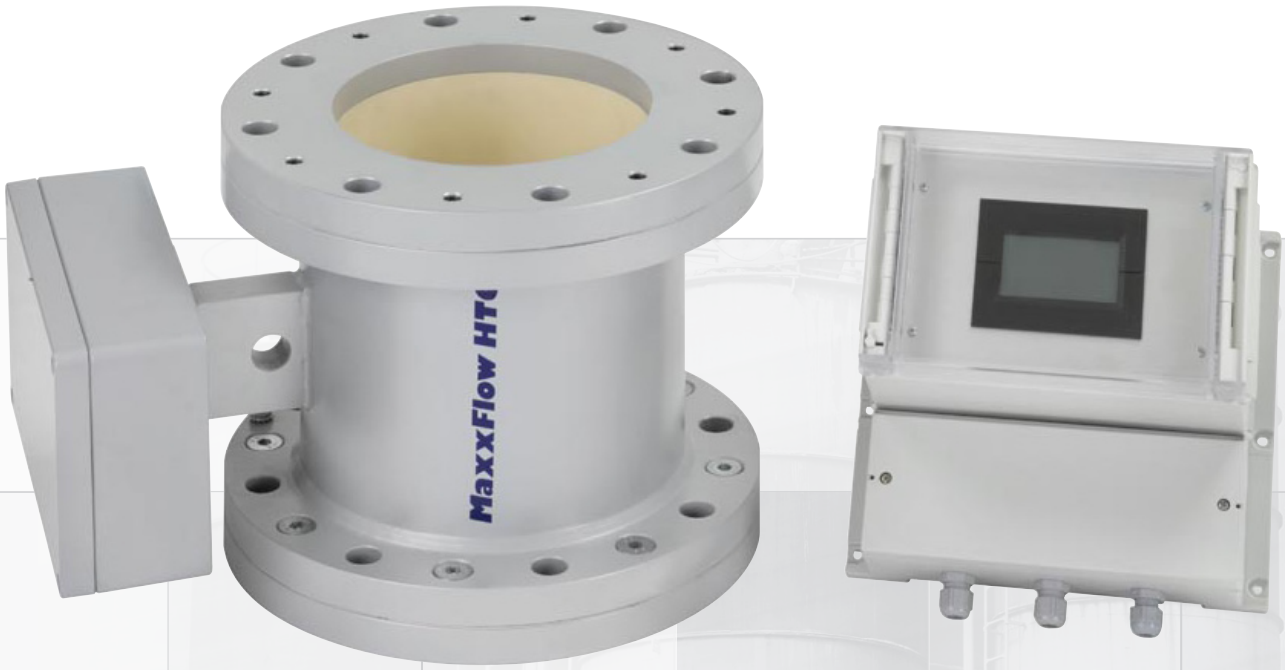
Competence in Solids

GLOBAL TECHNOLOGY SYSTEMS

SWR engineering

# MaxxFlow HTC

## Measurement of Bulk Solids for High Flow Rates




Operating Instructions

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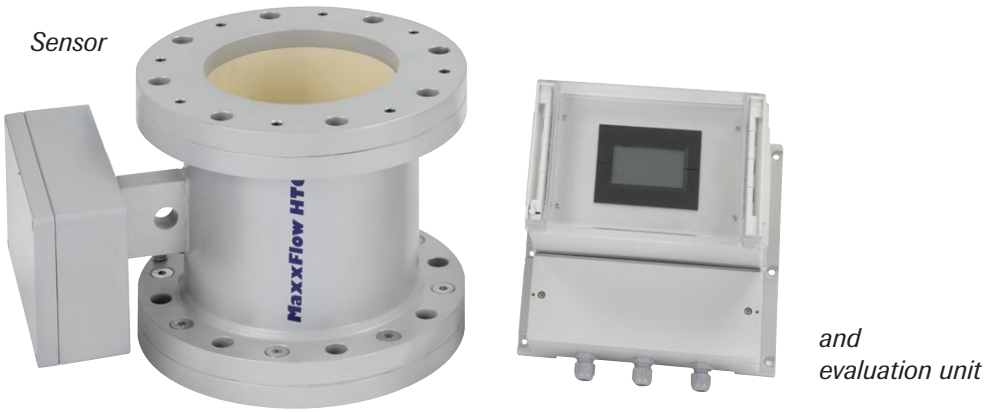
Thank you for your purchase. Please call for any questions or technical support 850-651-3388.

# 1. System Overview

**A MaxxFlow HTC measuring system consists of the following components:**




# 2. Function

- MaxxFlow HTC is a measuring system especially developed for the measurement of high flow rates under free fall conditions.
- MaxxFlow HTC is working according to the latest microprocessor technology. By special capacitive linking of an electromagnetic wave a homogeneous measuring field is produced in the pipe.
- The electromagnetic wave brought into the pipe is reciprocally acting with the solid particles. These signals are evaluated in frequency and amplitude.
- The measurement of the solid speed is done by means of correlation. Two sensors are used for the generation of the correlation signals.
- A complete measuring unit consists of the sensor (measuring pipe) and the evaluation unit.

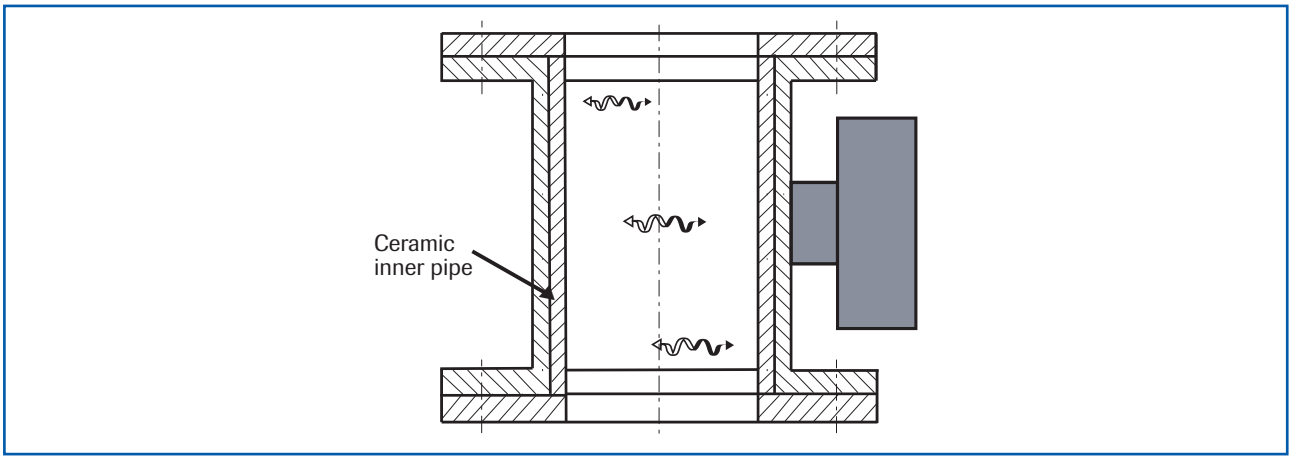



*Fig. 2: Coupling of the electromagnetic waves.*

# 3. Safety

The measuring system MaxxFlow HTC was designed, built and tested to be safe and was shipped in safe conditions. Nevertheless persons or objects may be endangered by components of the system if these are operated in an inexpert manner. Therefore the operational instructions must be read completely and the safety notes must be followed.
In case of inexpert or irregular use, the manufacturer will refuse any liability or guarantee.

## 3.1 Regular Use

- The measuring system must be installed for measuring the flow rate only.
  Other usage and modifications of the measuring system are not permitted.
- Only original spare parts and accessories of SWR engineering must be used.

## 3.2 Identification of Dangers

- Possible dangers when using the measuring system are marked by the following symbols in the operating instructions:

**Warning!**

- This symbol in the operating instructions marks actions, which may represent a danger for life and limb of persons when carried out in an inexpert manner.

**Attention!**

- All actions which may endanger objects are marked with this symbol in the operating instructions.

## 3.3 Operational Safety

- The measuring system must be installed by trained and authorised personnel only.
- Switch off the supply voltage for all maintenance, cleaning or inspection works on the tubes or on components of the MaxxFlow HTC. Follow the notes of the chapter maintenance.
- The components and electrical connections must be checked for damages regularly. If a damage is found, it is to repaired before further operation of the instruments.

## 3.4 Technical Progress

- The manufacturer reserves the right to adapt technical data to the technical progress without particular advance notice. If you have any questions, SWR engineering will be pleased to inform you on possible changes and extensions of the operating instructions.

# 4. Mounting and Installation

## 4.1 Delivery Range

- Measuring instrument in a field housing
- Sensor for installation into the pipe
- Operating Instructions

## 4.2 Auxiliary

- Appropriate wrench or ring wrench for screwing
- Tools for adjusting the wiring

## 4.3 Mounting of the Measuring Pipe

The sensor has to be mounted as follows:

- Determine the place of mounting on the pipe. On electronic housing or inclined pipes the sensor should be mounted from top.
- Follow the necessary distances of valves, bows, fans or cellular wheel sluices etc. and also other measurement devices like temperature and pressure etc. to the sensor (see fig. 3).

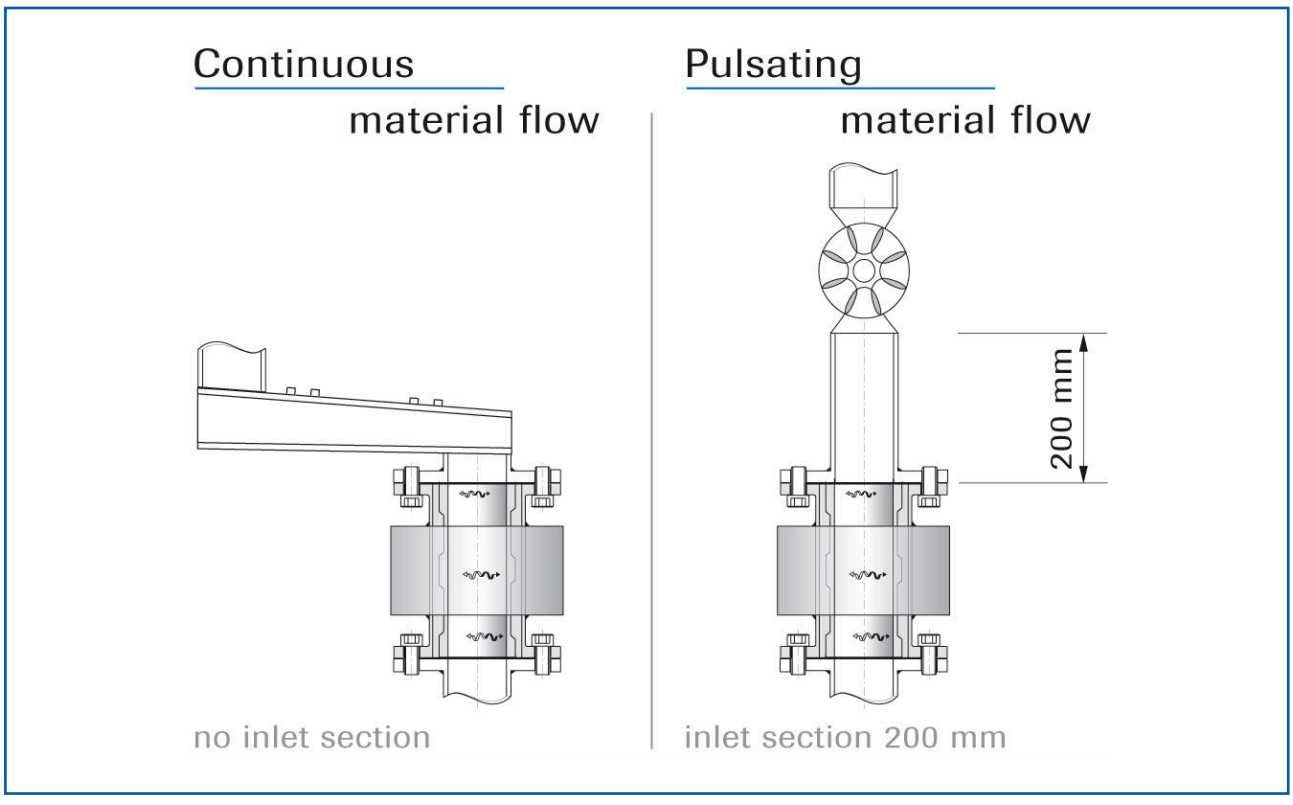



*Fig. 3: Minimal distances of the sensor to pipe bends and baffles.*

**Attention!**

- Before installation it has to be checked that no fin, mismatch or seals are inside the pipe. It is important to remove any resistors affecting the flow.


*Fig. 4: Mounting of the measuring tube.*

- It is possible to mount the evaluation unit up to 300 m away from the sensor.

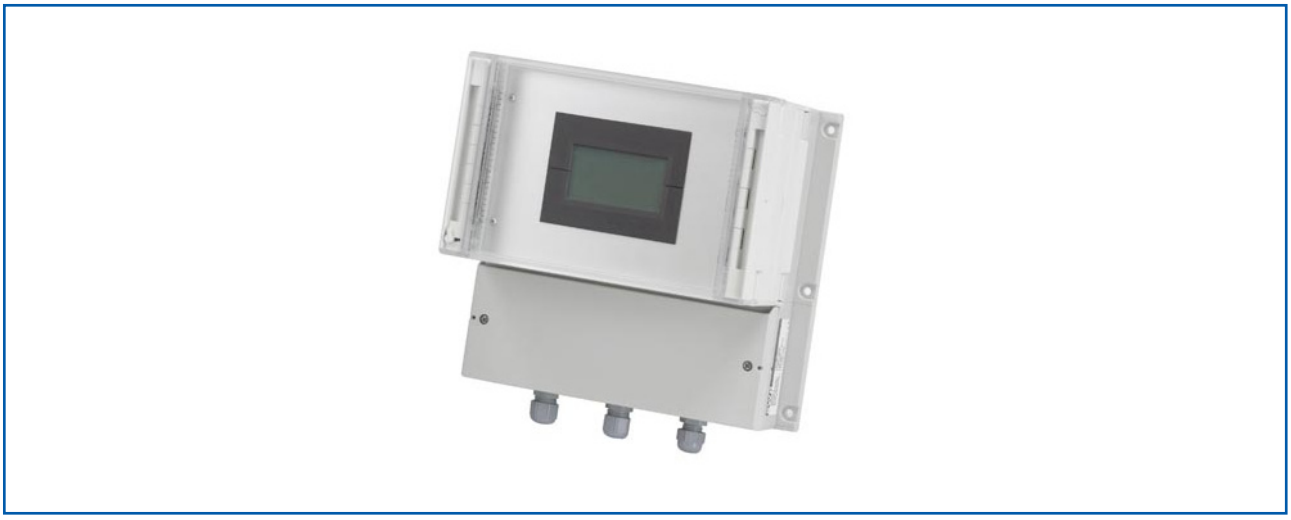


*Fig. 5: Evaluation unit.*

## 4.4 Overview of the Connection of the Sensor Pipe and Evaluation Unit

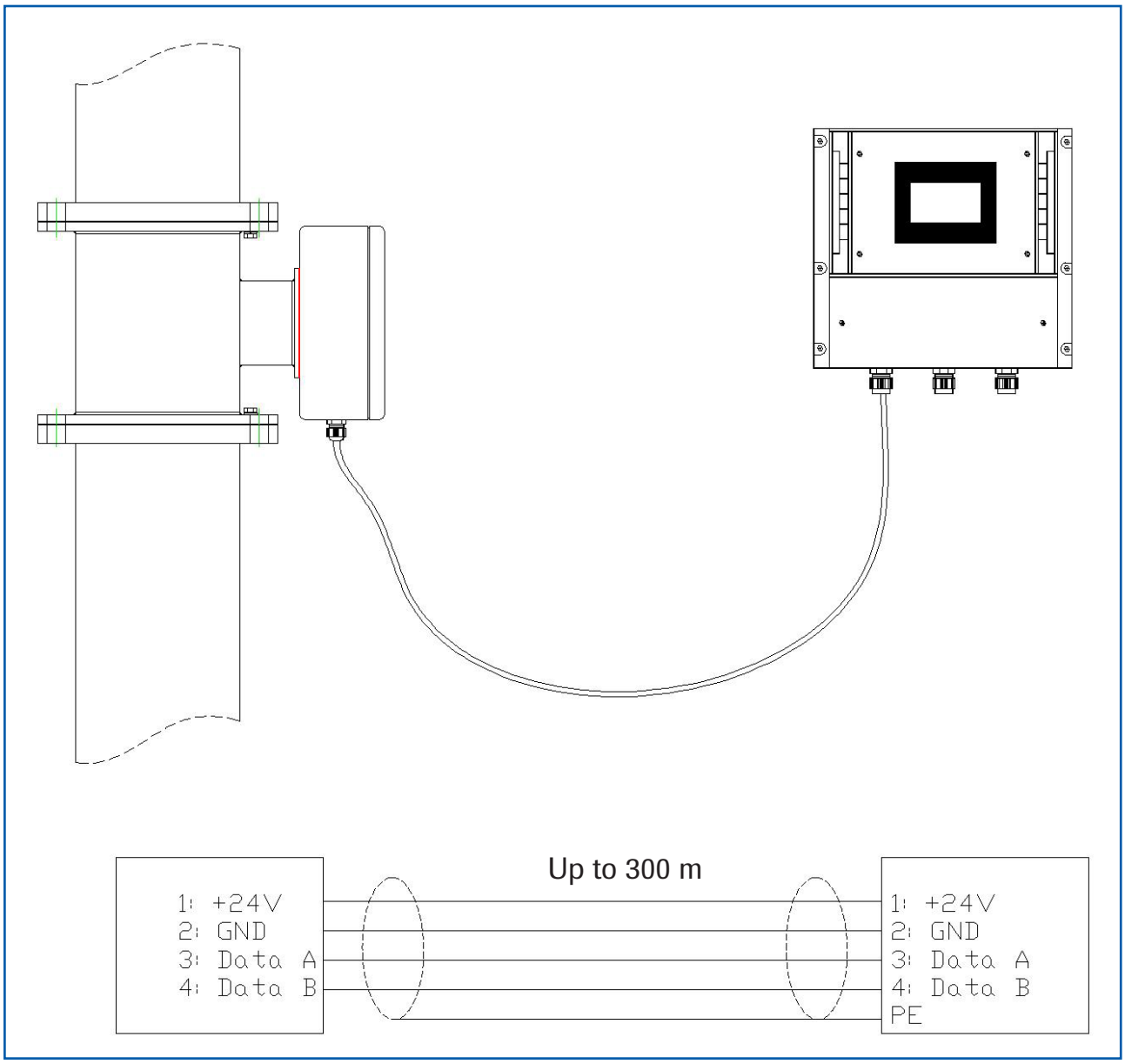



*Fig. 6: Wiring of the sensor pipe and measuring instrument.*

A maximum length of 300 m of the sensor cable should not be exceeded.
A 4-wired shielded cable is needed between sensor and evaluation unit.

## 4.5 Use in Ex Hazard Array

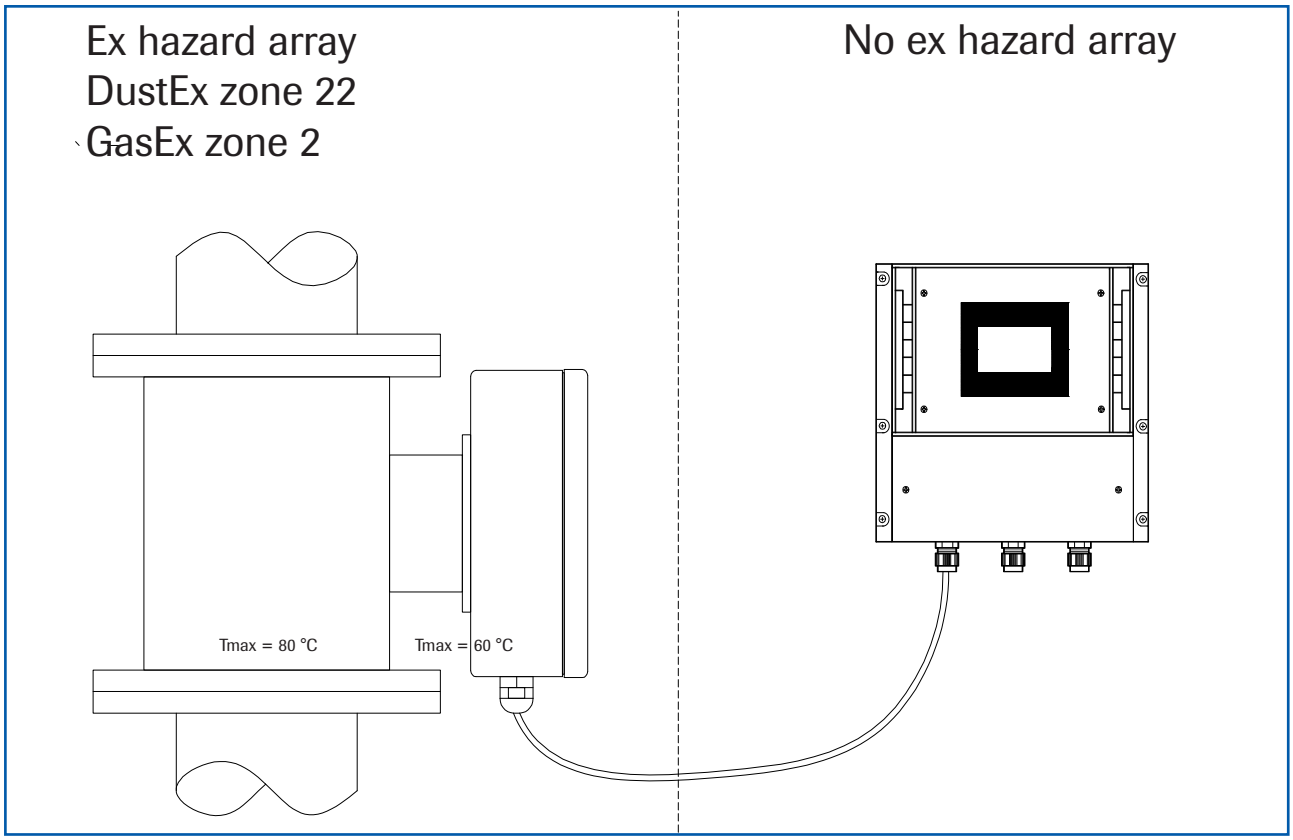
**Marking DustEx:** **II 3D Ex tD A21**

**Zone 22: 0 °C ≤ $T_{prozess}$ ≤ 80 °C**

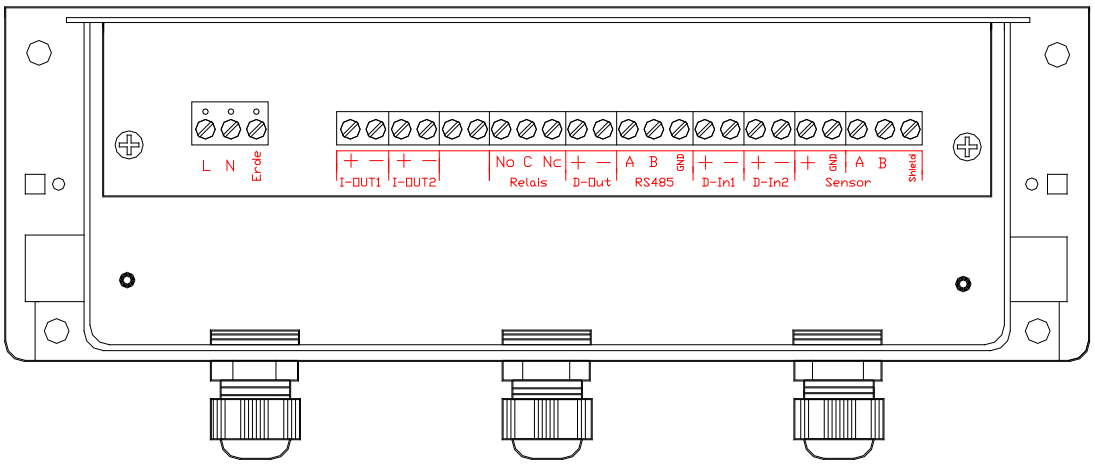
- Group of equipment 2
- Equipment category: 3
- For combustible mixtures from air and inflammable type of dust
- IP-Code 65
- Maximum surface temperature 84 °C with Ta = 60 °C

**Marking GasEx:** **II 3G Ex e IIC T4**

- Group of equipment 2
- Equipment category: 3
- Zone 2
- For combustible mixtures from air and inflammable type of gas
- Allowable process temperature 0 to 80 °C
- Class of temperature T4
- Maximum surface temperature 84 °C with Ta = 60 °C



# 5. Electrical Connection




## Evaluation Unit

| Evaluation Unit | | | |
|---|---|---|---|
| **Terminal No** | | **Connection** | |
| Connection of supply voltage | | | |
| L1 / +24 V | | Input Supply Voltage 230 V / 50 Hz | |
| N / 0 V | | Input Supply Voltage 230 V / 50 Hz | |
| PE | | Protective Earth | |
| **Connections** | | | |
| I-out 1 | + | Output 4 ... 20 mA + | Flow rate |
| | - | Output 4 ... 20 mA - | (GND) |
| I-out 2 | + | Output 4 ... 20 mA + | Density or velocity |
| | - | Output 4 ... 20 mA - | (GND) |
| NA | | NA | |
| | | NA | |
| Min. / Max.- Relais | NO | Potential-free Relay NO (Close) | |
| | C | Potential-free Relay COM (Common) | |
| | NC | Potential-free Relay NC (Open) | |
| D-out | + | Digital Output + | |
| | - | Digital Output - | |
| RS 485 | A | RS 485 Interface Data A | |
| | B | RS 485 Interface Data B | |
| | GND | RS 485 Interface Ground | |
| D-in1 | + | Digital Interface 1 (+) | |
| | - | Digital Interface 1 (-) | |
| D-in2 | + | Digital Interface 2 (+) | |
| | - | Digital Interface 2 (-) | |
| Sensor | + | Supply Voltage 24 V (+) | Cable No. 1 |
| | - | Supply Voltage 24 V (-) | Cable No. 2 |
| | A | RS 485 Data A | Cable No. 3 |
| | B | RS 485 Data B | Cable No. 4 |

* 230 V AC / 24 V DC resp. 230 V AC / 110 V AC / 24 V DC according to model

# 6. Commissioning

- For start-up the measurement system it is necessary to adjust the sensor to the local conditions. After switching on the power supply there is at least a warm-up time about 15 minutes required before any adjustment starts.

Please check again:

- The correct cabling between sensor and the evaluation unit.
- The correct adjustment of the sensor pipe.
- In case that despite these steps a successful measurement is impossible, please contact SWR.

**Commissioning of MaxxFlow HTC**

For start-up the sensor **has to be calibrated and parameterized to each product,** which will be measured. It is necessary to assign the mass flow to the display and initial value. The menu functions are mostly self-explaining. Following a short introduction to the overview:

By leaving the menu level and confirming the memory function all values changed are transferred.

| | |
|---|---|
| Basic function | At least a two point calibration (normally zero and max) are sufficient for measuring the density function. The velocity measurement is firmly defined as an absolute measurement by the distance of the sensor plates and does not have to be calibrated. |
| Zero point | Start zero point calibration in no-flow condition with **empty** pipe. |
| Max point | By normal support the 2nd point is put on known flow and a working point calibration is carried out. The value can be corrected with later weighing, afterwards by fitting of the correction factor 2.2. With it the basic function of the device is given and the measuring values are indicated. |
| Analog output 1 | Is firmly configured for the measuring of the flow rate. The measuring range is adjusted in menu point 3.1.1.<br>0 = 4 mA<br>Max = 20 mA |
| Analog output 2 | Is firmly configured for the measuring of the load. The measuring range is adjusted in menu point 3.2.1.<br>0 = 4 mA<br>Max = 20 mA |
| Damping | The measuring range filter is used for the adjustment to slower working devices or for a continuous output of the analog output. |

To enable MaxxFlow HTC for calculation a flow rate the following suppositions have to be given:

- Stable working velocity measurement resp. fixed velocity if a stable velocity measurement is not possible due to bad conveying conditions.

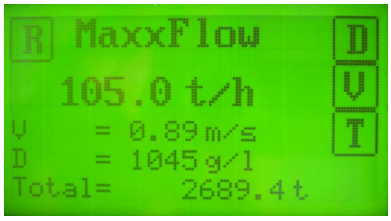
- Density measurement

As the operating point calibration needs a stable velocity measurement too, within the first commissioning you have to take care fort his. Therefore some hints:

- During flow the RMS values of the velocity signals have to be obvious higher than the noise level (NST, no signal threshold). There is no exact defined range, but, experienced values are about 1000 to 3000. If NST is now 500 or smaller a safe operating condition should be possible.

- If velocity still fails, caused of bad conveying conditions, fixed velocity has to be activated. Therefore the parameter “falling height” has to be set, the system will calculate with this value an averaged velocity of fall. Also important in this context is the NST level. This level will now work like switch, RMS values above NST level will switch velocity on, values below will switch velocity to zero.

# 7. Standard Display of MaxxFlow HTC




The standard display shows the actual flow rate as well as measuring values of density velocity and the totalizer value.

With four switch pads you are able to further information and configuration windows:

**R** Reset totalizer, choose OK or NO

**D** Density, further informations about density measurement, back with **M**

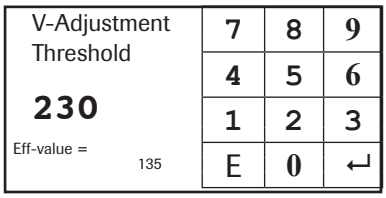
**V** (Velocity), further information about speed measurement, back with **M** or press **S** for velocity configuration.

**S** V-Adjustment, various settings for speed measurement

1. Threshold

   This is the no signal threshold. It defines the noise level of RMS values (root mean square values) of the velocity signals, which will be suppressed for speed measurement. All values below will be ignored for speed measurement resp. with activated fix-velocity the output will switch to 0 m/s.

   Possible values 1 - 65535, cancel with **E** (ESC)

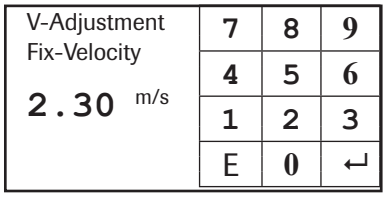



2. Display of the actual RMS value of velocity signals

3. Fix-velocity

   Setting of fix-velocity value, this will replace automatically the parameter falling height.

   Possible values 1 - 99.99, cancel with **E** (ESC)

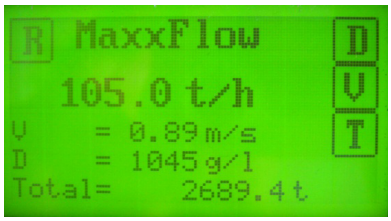



4. Vfix

   Fix-velocity **On / Off**

**T** Display the electronics temperature

# 8. Menu Structure Main Menu MaxxFlow HTC




**Switch to main menu:**
Press any pad of the touchscreen for about 5 s until the menu appears.

**1. Measurement**

| | |
|---|---|
| **1.1 Tag** | Name (10 digits) |
| **1.2 Unit** | Select: g / kg / t |
| **1.3 Time unit** | Select: h / min / s |
| **1.4 Decimal point** | Position of decimal point |
| **1.5 Density** | Range 1 --- 3000 g/l |
| **1.6 Aperture** | Range 10 --- 300 mm |
| **1.7 Drop height** | Range 10 --- 9999 mm |

**2. Calibration**

| | |
|---|---|
| **2.1 Sensor calibration** | Adjusting the sensor's behaviour to material and mounting situation |
| **2.1.1 Zero point** | … for the empty sensor |
| **2.1.2 Operating point** | … with material flowing |
| **2.1.3 Full calibration** | … with filled sensor |
| **2.2 Factor** | Correction factor density, Range 0.01 --- 9.99 |
| **2.3 Interpolation points** | Amount of interpolation points for linearization (max. 3) |
| **2.4 Interpolation table** | Linearization characteristic |
| **2.5 Min. Load** | Suppression of conveying breaks during auto acquisition |
| **2.6 Interpolation point 1** | |
| **2.6.1 Raw value** | Non linearized flow rate |
| **2.6.2 Calibrated** | Linearized flow rate |
| **2.6.3 Auto Acquisition** | Automatic calibration with a weighed mass |
| **2.7 Interpolation point 2** | Same as interpolation point 1 |
| **2.8 Interpolation point 3** | Same as interpolation point 1 |

## 3. Outputs

| | | |
|---|---|---|
| **3.1** | **Flow rate** | |
| **3.1.1** | **Value at 20 mA** | End of measuring range |
| **3.1.2** | **Filter** | Range: 0.1 --- 99.9 s (standard: 1 s) |
| **3.1.3** | **Calibration 4 mA** | |
| **3.1.4** | **Calibration 20 mA** | |
| **3.2** | **Density** | |
| **3.2.1** | **Value at 20 mA** | End of measuring range |
| **3.2.2** | **Filter** | Range: 0.1 --- 99.9 s (standard: 1 s) |
| **3.2.3** | **Calibration 4 mA** | |
| **3.2.4** | **Calibration 20 mA** | |
| **3.3** | **Alarm** | |
| **3.3.1** | **Type** | Select: MIN/MAX |
| **3.3.2** | **Value** | -10 to 110 % in physical units |
| **3.3.3** | **Delay** | Range: 0.1 --- 99.9 s |
| **3.3.4** | **Hysteresis** | 0.1 --- 99.9 % |
| **3.3.5** | **Mode** | Select: NO / NC |
| **3.3.6** | **Alarm sensor fault** | Select: On / Off |
| **3.4** | **Impuls Output** | |
| **3.4.1** | **Mass / Pulse** | Set the mass complying to one pulse |

## 4. Digital inputs

| | | |
|---|---|---|
| **4.1** | **Digital input 1** | |
| **4.1.1** | **Function** | Select: Function<br>(No / zero adjustment / full adjustment) |
| **4.1.2** | **Direction** | Select: direct / inverted |
| **4.1.3** | **Filter time** | Range: 0.1 --- 99.9 s |
| **4.2** | **Digital input 2** | |
| **4.2.1** | **Function** | Select: Function<br>(No / zero adjustment / full adjustment) |
| **4.2.2** | **Direction** | Select: direct / inverted |
| **4.2.3** | **Filter time** | Range: 0.1 --- 99.9 s |

## 5. System

| | | |
|---|---|---|
| **5.1** | **Baud rate** | Select: 4800 / 9600 / 19200 / 38400 Bd |
| **5.2** | **ModBus address** | Range: 1 --- 255 |
| **5.3** | **Contrast** | Contrast adjustment |
| **5.4** | **Language** | Select: D / F / E |

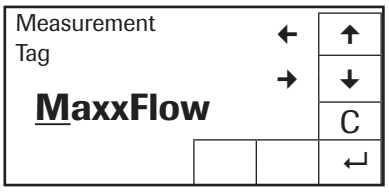
# 9. System Adjustments in Detail

## 1. MEASUREMENT

### 1.1 Tag

Freely selectable notation, max. 10 characters.

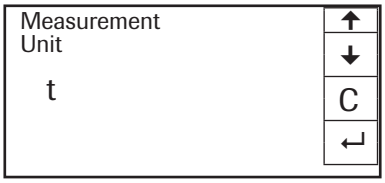
With ↑ and ↓ select the letters or symbols, with ← and → select place of the letter (1 ... 10). With C delete the respective letter and with ↵ transfer the entry and leave the menu level.




### 1.2 Unit

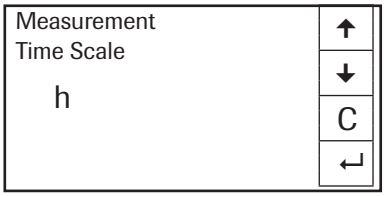
Selection of the mass unit: g / kg / t

With ↑ and ↓ select according to the display, with C leave the menu without any change, with ↵ transfer the entry and leave the menu level.




### 1.3 Time Scale

Choose of the time unit.
Choose: h / min / s
/ s per second
/ min per minute
/ h per hour

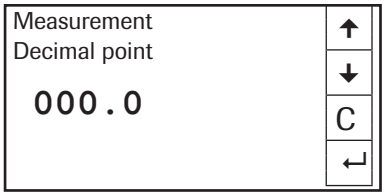



With ↑ and ↓ select according to the display, with C leave the menu without any change, with ↵ transfer the entry and leave the menu level.

### 1.4 Decimal Point

Adjust the digit in the display.

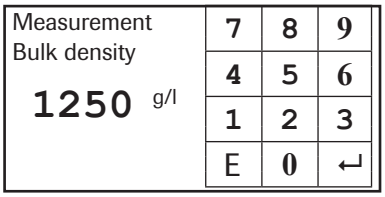
With ↑ and ↓ shift the comma. C is without function here and with ↵ transfer the entry and leave the menu level.




### 1.5 Density

Set bulk density in g/l.
Possible range 1 to 3000 g/l.

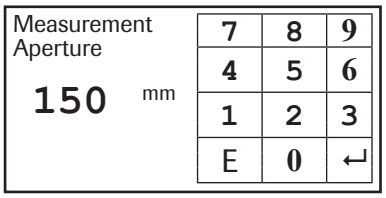
Enter the value. With E leave without changes, with ↵ transfer the entry and leave the menu level.



### 1.6 Aperture

Set value of pipe diameter.

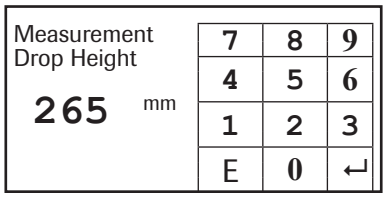
Enter the value. With [E] leave without changes, with [↵] transfer the entry and leave the menu level.




### 1.7 Drop Height

Enter drop height. This will affect fixed-velocity value automatically.

Enter the value. With [E] leave without changes, with [↵] transfer the entry and leave the menu level.

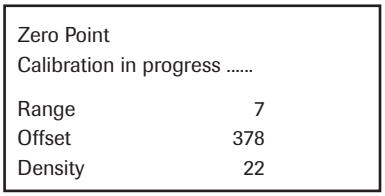



## 2. CALIBRATION

### 2.1 Sensor Calibration

#### 2.1.1 Zero Point

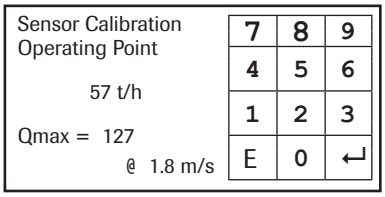
Start zero adjustment with empty pipe with [ok].
Cancel with [no].



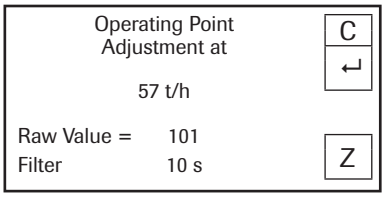

#### 2.1.2 Operating Point

Enter known flow rate.

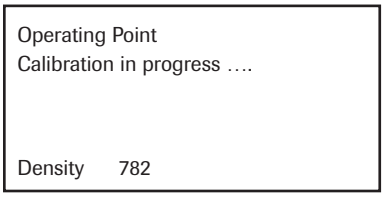
Enter the value. With [E] leave without changes, with [↵] transfer the entry and go to the next window.




Change filter value with [Z], adopt adjustment values with [↵].

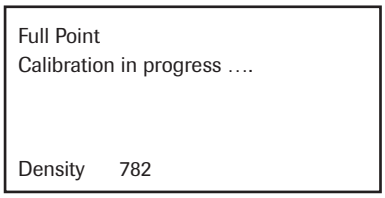



Display during calibration procedure.



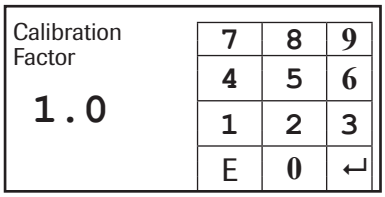
### 2.1.3 Full Calibration

Calibration with 100 % filled pipe in no-flow condition.




### 2.2 Factor

Correction factor affects directly the density measurement.
0.01 to 9.99
Default 1.0

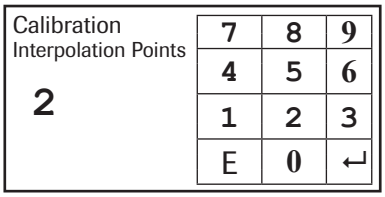



Enter the value. With [E] leave without changes, with [↵] transfer the entry and leave the menu level.

### 2.3 Interpolation Points

Set amount of required interpolation points.
Max. 3.

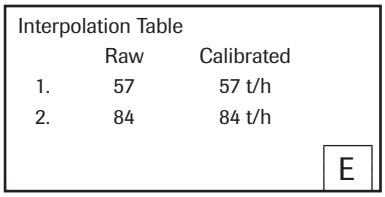
Enter the value. With [E] leave without changes, with [↵] transfer the entry and leave the menu level.




### 2.4 Interpolation Table

Display of the calibrated points.

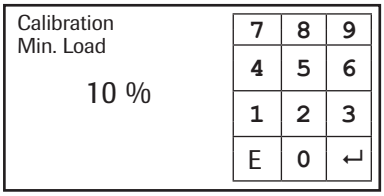
Back with [E].




### 2.5 Min. Load

Suppresses conveying breaks during auto acquisition.

Enter the value. With [E] leave without changes, with [↵] transfer the entry and leave the menu level.

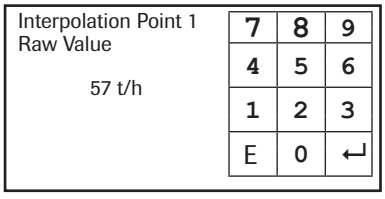



### 2.6 Interpolation Point 1

#### 2.6.1 Raw Value

Manual interpolation.
This is the non-linearized flow value.

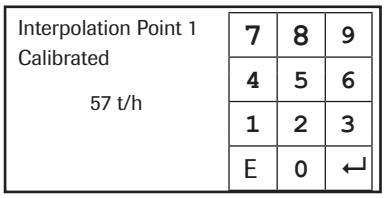
Enter the value. With [E] leave without changes, with [↵] transfer the entry and leave the menu level.



### 2.6.2 Calibrated

Manual interpolation.
Linearized flow value.

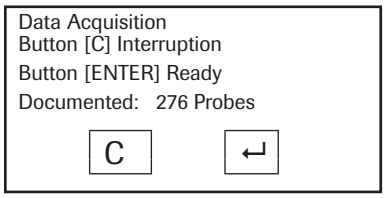
Enter the value. With [E] leave without changes, with [↵] transfer the entry and leave the menu level.

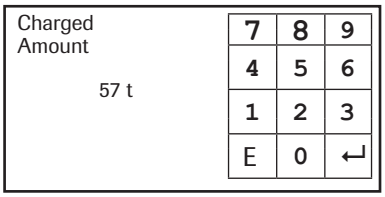



### 2.6.3 Auto Acquisition

Enables a calibration by means of a weighed mass. The collection of data starts with entering this menu point, but only flow rates above the min. load value will be counted.

Finish with [↵], enter the conveyed mass and confirm with [↵]. Press [E] to leave menu point without any changes.




**2.7. / 2.8 Interpolation Points 2 / 3** same as interpolation point 1

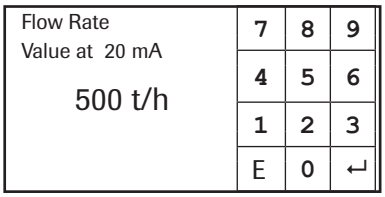
## 3. OUTPUTS

### 3.1 Flow Rate

### 3.1.1 at 20 mA

Enter end of measuring range, this will comply to 20 mA.

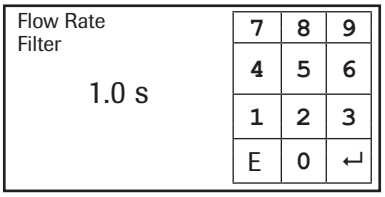
Enter the value. With [E] leave without changes, with [↵] transfer the entry and leave the menu level.




### 3.1.2 Filter

Adjustable damping for the flow rate.
Range: 0.1 ... 99.9 s (standard 1 s).

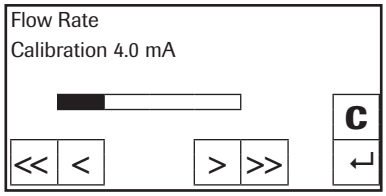
Enter the value. With [E] leave without changes, with [↵] transfer the entry and leave the menu level.



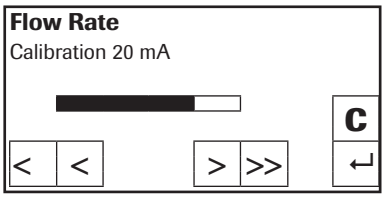

### 3.1.3 Calibration 4 mA

Value of current min.
Adjust to the external measuring system (if display differs).

With [<<] and [>>] adjust fast, with [<] and [>] adjust slowly the current to 4 mA.
With [↵] transfer the entry and leave the menu level, with [C] leave the menu without any change.



### 3.1.4 Calibration 20 mA

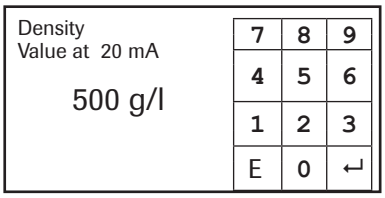



Value of current max.
Adjust to the external measuring system (if display differs).

With << and >> adjust fast, with < and > adjust slowly the current to 4 mA.
With ↵ transfer the entry and leave the menu level, with C leave the menu without any change.

## 3.2. DENSITY

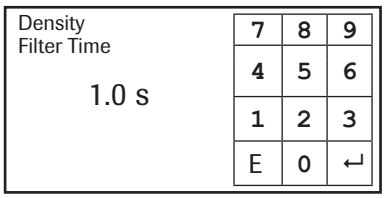
### 3.2.1 at 20 mA




Enter end of measuring range, this will comply to 20 mA.

Enter the value. With E leave without changes, with ↵ transfer the entry and leave the menu level.

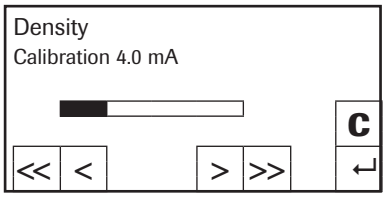
### 3.2.2 Filter




Adjustable damping for the density.
Range: 0.1 ... 99.9 s (standard 1 s).

Enter the value. With E leave without changes, with ↵ transfer the entry and leave the menu level.

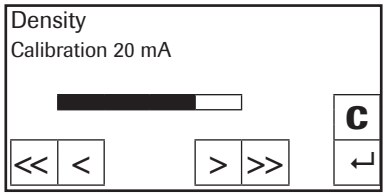
### 3.2.3 Calibration 4 mA




Value of current min. Adjust to the external measuring system (if display differs).

With << and >> adjust fast, with < and > adjust slowly the current to 4 mA.
With ↵ transfer the entry and leave the menu level, with C leave the menu without any change.

### 3.2.4 Calibration 20 mA




Value of current max. Adjust to the external measuring system (if display differs).

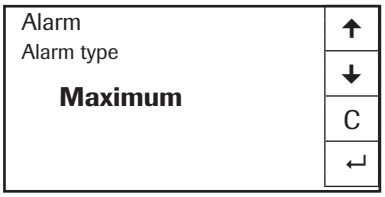
With << and >> adjust fast, with < and > adjust slowly the current to 4 mA.
With ↵ transfer the entry and leave the menu level, with C leave the menu without any change.

## 3.3 ALARM

### 3.3.1 Type

Upper and lower limit value.
Affects relay.

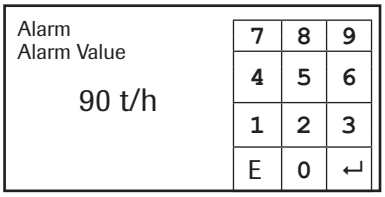
With ↑ and ↓ select according to your significance, with C leave the menu without any change, with ↵ transfer the entry and switch to a deeper menu level.




### 3.3.2 Value of Alarm

Threshold value.
Range: -10 ... 110 % of the measuring range in physical units.

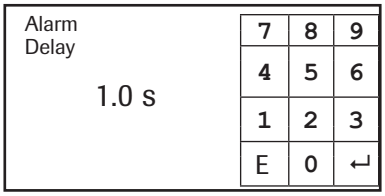
With E leave the menu without any change, with ↵ transfer the entry and leave the menu level.




### 3.3.3 Delay

Threshold value how long the value must be over or under the limit until the alarm relay reacts.
Range: 0.1 ... 99.9 s

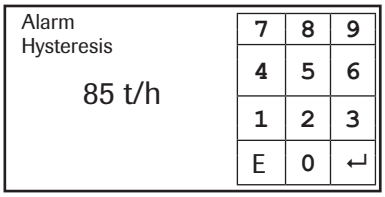
With E leave the menu without any change, with ↵ transfer the entry and leave the menu level.




### 3.3.4 Hysteresis

Threshold value of the alarm.
Range: 0 to 500 t/h

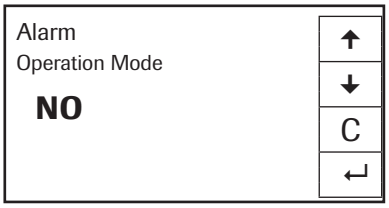
With E leave the menu without any change, with ↵ transfer the entry and leave the menu level.



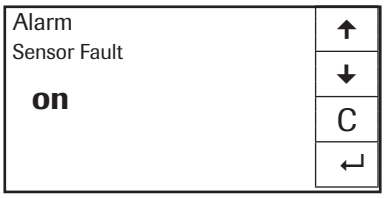

### 3.3.5 Mode

Choice of the contact work or interruption.
NO - Working current
NC- Static current

With ↑ and ↓ select according to the display, with C leave the menu without any change, with ↵ transfer the entry and leave the menu level.



#### 3.3.6 Sensor Fault

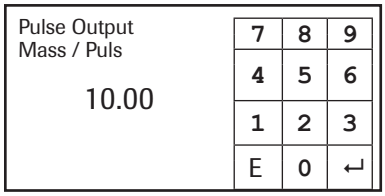



On / Off
Affects relay.

With ↑ and ↓ select according to the display, with C leave the menu without any change, with ↵ transfer the entry and leave the menu level.

### 3.4 Pulse Output

#### 3.4.1 Amount of Pulses / Mass Unit



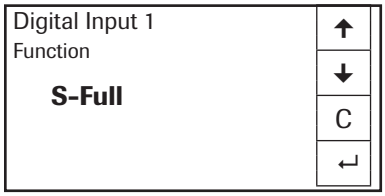

Input of the desired impulse number per indicated mass unity.
Range: 0.01 ... 99.9

With E leave the menu without any change, with ↵ transfer the entry and leave the menu level.

## 4. DIGITAL INPUTS

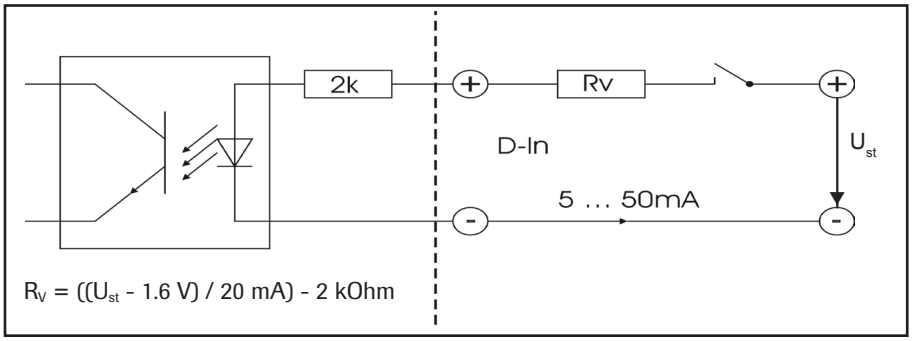
### 4.1 Digital Input 1

#### 4.1.1 Function

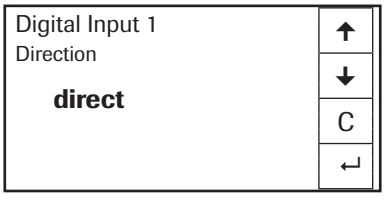



Select input function:
None
S-Zero / sensor zero adjustment
S-Full / sensor full adjustment
Possibility to start function with external signal.

With ↑ and ↓ select according to the display, with C leave the menu without any change, with ↵ transfer the entry and leave the menu level.




#### 4.1.2 Direction



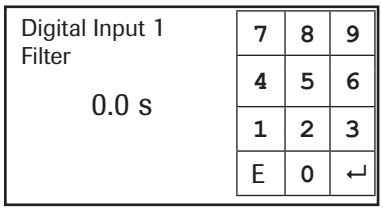

Direct / inverted

With ↑ and ↓ select according to the display, with C leave the menu without any change, with ↵ transfer the entry and leave the menu level.

#### 4.1.3 Filter

Dead time after activation (to debounce mechanical counter).

With [E] leave the menu without any change, with [↵] transfer the entry and leave the menu level.




### 4.2 Digital Input 2

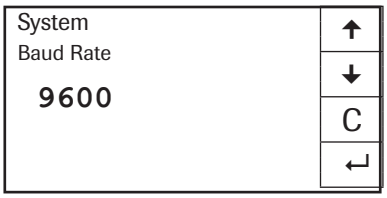
#### 4.2.4 same as Digital Input 1

## 5. SYSTEM

### 5.1 Baud Rate

Indicating of the baud rate.
Choose: 4800 / 9600 / 19200 / 38400 Bd

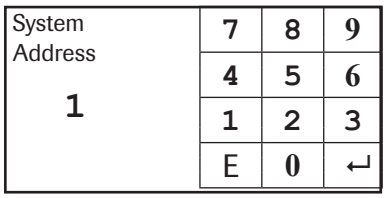
With [↑] and [↓] select according to your significance, with [C] leave the menu without any change, with [↵] transfer the entry and leave the menu level.




### 5.2 ModBus Address

Set 1 ... 255

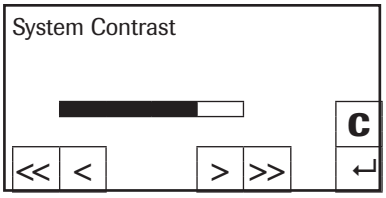
With [E] leave the menu without any change, with [↵] transfer the entry and leave the menu level.




### 5.3 Contrast

Display contrast for a better legibility.

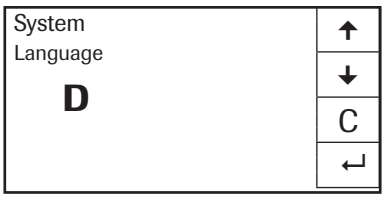
With [<<] and [>>] adjust fast, with [<] and [>] adjust slowly to the contrast required. With [↵] transfer the entry and leave the menu level, with [C] leave the menu without any change.




### 5.4 Language

Indicating of the language.
Choose: D / F / E

With [↑] and [↓] select according to your significance, with [C] leave the menu without any change, with [↵] transfer the entry and leave the menu level.



## 11. Maintenance

**Warning!**

- Danger of shock with opened housing!
- Switch off the supply voltage for all maintenance or repair works on the measuring system. The pipe must not be in operation during a sensor exchange.
- Repair and maintenance work must be carried out by trained or expert personnel only.

## 12. Warranty

Warranty is granted for one year starting from delivery date under the condition that the operating instructions have been followed, no interventions on the appliances have been made and the components of the system show no mechanical damage or wear resistance.

In case of a defect during the warranty period, defective components are repaired or are replaced free of charge. Replaced parts turn into the property of SWR. If desired by the costumer that the parts should be repaired or replaced in its factory, then the costumer has to take over the costs for the SWR-service staff.

SWR is not responsible for damage, which did not develop at the delivery article; especially SWR is not responsible for escaped profit or other financial damages of the customer.

## 13. Trouble Shooting

- **Warning!**
  The electrical installation must only be checked by expert personnel.

| Problem | Cause | Measure |
|---|---|---|
| Measuring system does not work. | Power supply interrupted. | Check the power supply. |
| | Break of a cable. | Check the connecting cables for a possible break of a cable. |
| | Device defective. | Exchange the fuse in the field housing. |
| Measuring system outputs wrong values. | Calibration not correct. | Delete input signal correction, new calibration according to section 9. |
| Sensor error. | Wrong connection of the sensor. | Check the wiring. |
| | Sensor out of order. | Exchange sensor. |
| **Do not open, as otherwise the warranty claim expires!** | | |

## 14. Technical Data

| | |
|---|---|
| **Sensor** | |
| Housing: | Steel St52, powder painted (optional stainless steel 1.4541)<br>NW 150 / 200, Flange DIN 2576 |
| Inner pipe: | Ceramic ($Al_2O_3$) |
| Protection category: | IP 65 |
| Operating temperature: | Sensor pipe: -20 ... + 120 °C<br>Sensor electronic: 0 ... + 60 °C |
| Max. working pressure: | 1 bar (optional 10 bar) |
| Working frequency: | 88 kHz |
| Transmitting power: | Max. 2 mW |
| Weight: | Depending to model |
| Dimensions: | NW 150: B = 420 mm, H = 290 mm<br>NW 200: B = 480 mm, H = 310 mm |
| Accuracy: | +/- 2 ... 5 % in calibrated measuring range |
| **Evaluation Unit** | |
| Power supply: | 110 / 240 V AC 50 Hz (optional 24 V DC) |
| Power consumption: | 20 W / 24 VA |
| Protection category: | IP 65 EN 60 529/10.91 |
| Operating temperature: | -10 ... +45 °C |
| Dimensions: | 225 x 237 x 174 (W x H x D) |
| Weight: | Approx. 2.5 kg |
| Additional data: | |
| Cable glands: | 3 x M16 (4.5 - 10 mm Ø) |
| Terminal clamp wire size: | 0.2 – 2.5 mm² [AWG 24-14] |
| Current output signal: | 2 x 4 ... 20 mA (0 ... 20 mA), Load < 700 Ω |
| Alarm output | Relay with toggle switch - max. 250 V AC, 1 A |
| Error output | |
| Data backup: | Flash memory |
| Impulse output | Open collector - max. 30 V, 20 mA |
| RS 485 interface | ModBus |

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