# MAG X2 User Guide

USB RS232 RS485 BLUETOOTH TCP/IP 3G/GPRS/GSM Wi-Fi M-Bus 4-20mA CURRENT LOOP PULSE


arkon flow systems

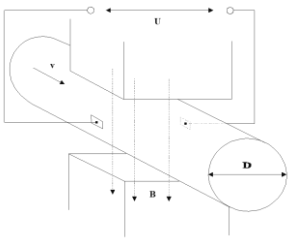
**Arkon Flow Systems**
Nováčkova 11, 614 00 Brno, Czech Republic
Tel. +420 543 214 822, Tel./Fax +420 543 215 249
Enquiries/ Orders/ General questions: arkon@arkon.co.uk
Technical support: support@arkon.co.uk
**www.arkon.co.uk**

# List of Contents

# 1. Introduction

## 1.1. Operating Principle

The measurement is based on the principle of Faraday‘s law on electromagnetic induction in which an electric voltage is induced in an electrically conductive body that moves in a magnetic field.



Liquid flows through a tube in the direction of the magnetic field. Liquid with a certain minimum electrical conductivity induces a voltage which is detected by two electrodes located in a 90 degree angle from the magnetic field and the flow direction.

## 1.2. Applications

| | | | | | |
|---|---|---|---|---|---|
| Water / waste water | Chemical industry | Food industry | Power engineering | Agriculture | Effluent Industry |

## 1.3. Safety Instructions

| | |
|---|---|
| | Please read this manual carefully before using the product. |
| | Keep this manual for future reference. Arkon Flow Systems, s.r.o will not be liable for any damage caused by improper use of the product or its accessories. |
| | If the device is used any different way than is specified, the electric protection may be disrupted. |
| | The MAGX2 flowmeter must not be mounted in explosive hazardous areas. |

## 1.4. Unpacking the flowmeter

❶ While unpacking the flowmeter, conduct a visual check of the flowmeter upon receipt to make sure the product has not been damaged during transport.
❷ Check the completeness of the package. In case of any problem, contact the Arkon sales department without delay.

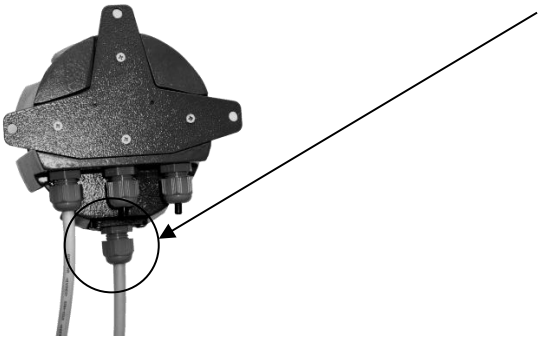
- Flowmeter
- Cables
- USB Flash drive + Manual
- Mounting kit

# 2. Installation

## 2.1. Remote or Compact

Any MAGX2 flowmeter can be delivered in two versions: Compact or Remote. The compact version has the transmitter unit connected directly to the sensor body. This version does not require any further mounting or installation of the transmitter.

The remote version has a separated transmitter. It is connected to the sensor with a cable. The cable entry into the sensor is protected by a junction box, which can be potted to IP68 (page 8).
The cable entry on the transmitter side is through a M20x1.5 gland.

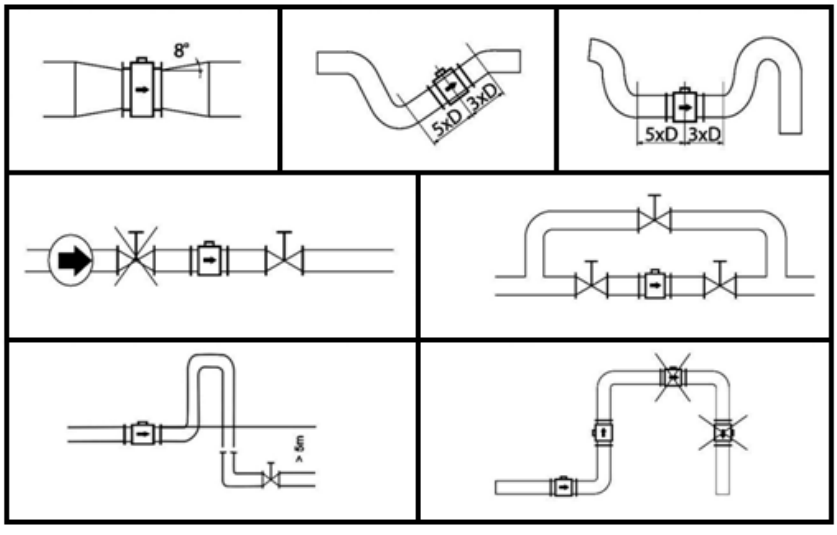


The cable type used for the connection between sensor and transmitter for remote versions: UNITRONIC® LiYCY (TP) 0035 810, 2x2x0.5
The MAGX2 is equipped with an electronic board located inside the sensor neck. This board sends a digital signal to the transmitter, unlike traditional flowmeters, which send an analogue signal. This allows the MAGX2 to carry its signal over much longer distances than conventional flowmeters; up to 500m is possible.

## 2.2. Sensor installation

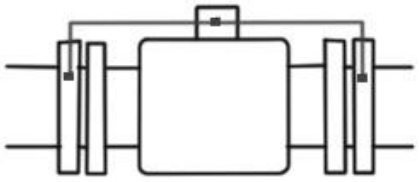
Sensor dimensions can be found on page 53.
Proper sensor installation is extremely important in order for your flowmeter to work correctly. Below, you will find minimum sensor installation requirements that need to be respected at all time. Sensor must not be installed neck facing down.

Sensor installation requirements:

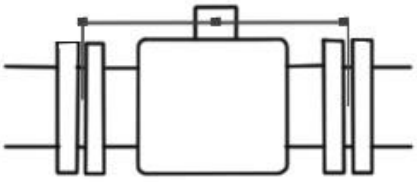



| | |
|---|---|
| | NOTE: 5×DN and 3×DN requirement NOT applicable for versions with Reduced-bore sensor body. |

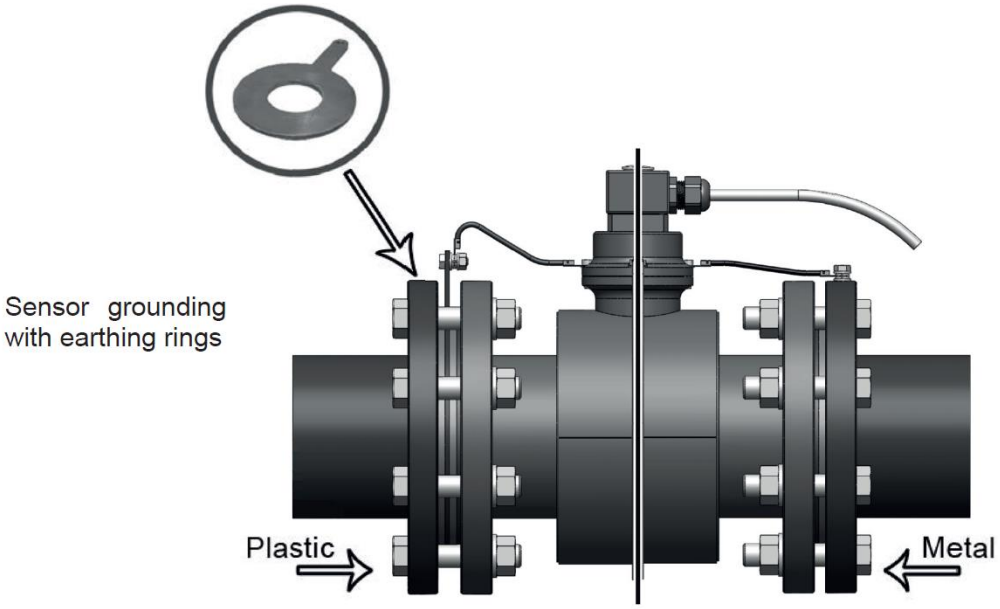
All MAGX2 sensors are supplied with 2 built in earthing electrodes which is sufficient for all applications with metal pipes and tanks. However, on applications where all pipes and tanks are manufactured from plastic, it is recommended that earthing rings are also installed to ensure the maximum resistance of the sensor to earth is <1 ohm.



Conductive (metal) pipe



Non-conductive (plastic, lined) pipe




| | |
|---|---|
|  | To ensure correct meter operation make sure the earthing rings and sealings around are centered. |

## 2.3. Dry liner

Flowmeters with a Hard Rubber liner can show incorrect readings during the first 2-3 days after installation. This is due to the fact that the time needed for transport and the time before installation is long enough for the liner to dry out, and thus it changes shape/size. This change, in effect, affects reading accuracy. Simply by keeping the meter wet, this problem solves itself within 2-3 days and no other action is required at all.

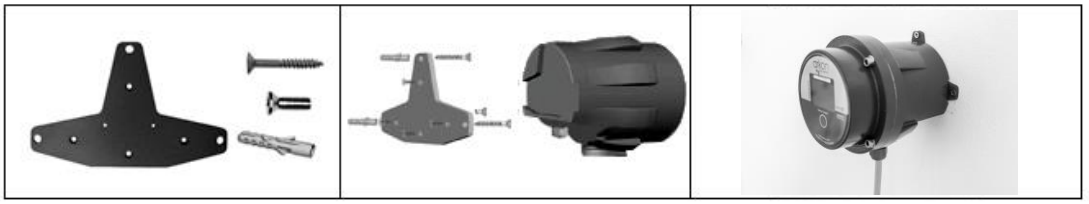
## 2.4. Installation of the transmitter

| | |
|---|---|
| | The transmitter contains harmless silica gel for moisture absorbent purpose.<br>Please do not remove from the meter. |

In case of a compact flowmeter version, the transmitter will need no further installation, and should be ready for use. In case of a remote version, the following 4 steps are necessary.

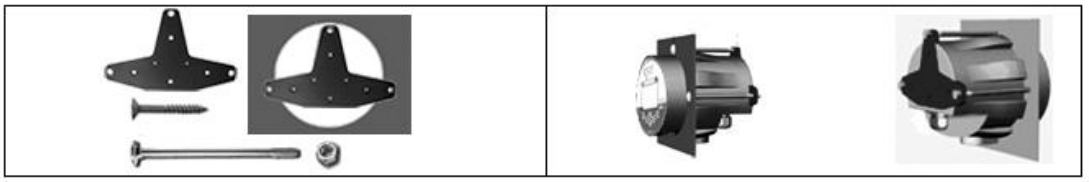
❶ Mount the transmitter to a wall, panel, or DIN-rail.

Wall mounting:

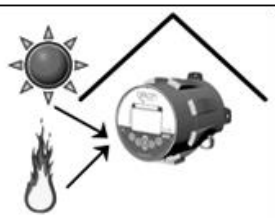


DIN-rail mounting:

Panel mounting:



The electronics have to be protected against direct sunlight and high temperatures!



The transmitter housing should be exposed to minimal mechanical strain only (max. 1kg)!


❷ Connect the transmitter to the signal cable from the sensor.

To do this undo four M6x22 screws using Allen key nr.5 that is part of the delivery.

After the meter is opened, pull the signal cable through the cable gland on the bottom of the transmitter housing. Connect the connector at the end of the signal cable from the sensor to the transmitter circuit board.

| | |
|---|---|
| | Electrical installation should only be done by a qualified person. Standard safety regulations for hazardous electrical installations have to be respected.<br><br>The O-ring sealing shall be exchanged every 6 months of operation. |

❸ Connect the transmitter to network power.

The customer is assumed to supply its own network power supply cable (90-250VAC, 12-36VDC)

First pull the cable end through one of the cable glands (ideally the closest one to used power supply terminal) on the bottom of the transmitter.

Recommend 3x1mm round crosscut cable, OD 7-11mm.
After connecting the power cable, close the housing and connect the cable to network power. This will make the flowmeter switch on.

| | |
|---|---|
| ⚠ | For electrical connection the appropriate temperature rated cables have to be used (Ta=70degC) |

❹ Set up the transmitter for use.
You are now ready to start using your flowmeter or to customize its settings as per your requirements. For example;
- Set-up the measurement unit of flow-rate displayed, e.g. m3/hr.
- Set up of the unit for the volume displayed. For all volume counters this same unit will be used.

## 2.5. Module installation

❶- Always check if the module does not have a bent or broken pin, before placing it in the correct module slot of the MAGX2 motherboard.


❷ - Always make sure you place the module in the correct slot of the motherboard! The name that is written on the module itself has to match the name written next to the slot. **Placing the module in an incorrect slot can cause damage to the module and the motherboard, and has to be avoided by careful module installation!**

❸- Check whether you are placing the module in the correct position. It does matter how you turn the module to fit the slot! The white line around the actual slot on the motherboard indicates the correct position of installation. The bevelled corner should be your point of orientation (note the picture below).

❹- Now you can place the module in its slot:

Correct installation


Incorrect installations

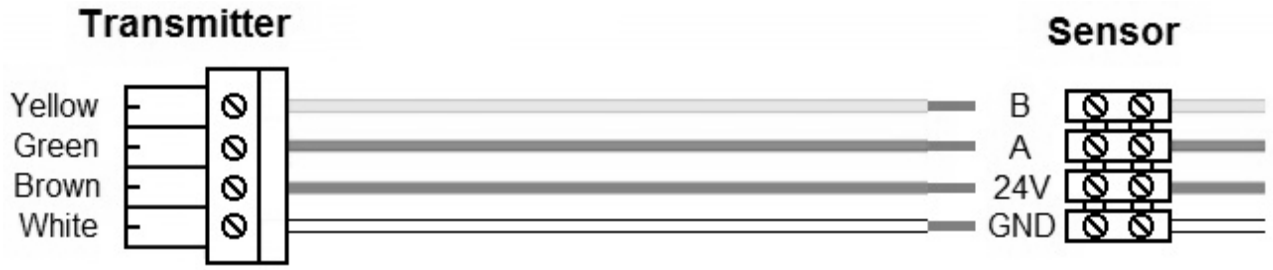

The RS232 Module is placed in a different slot.

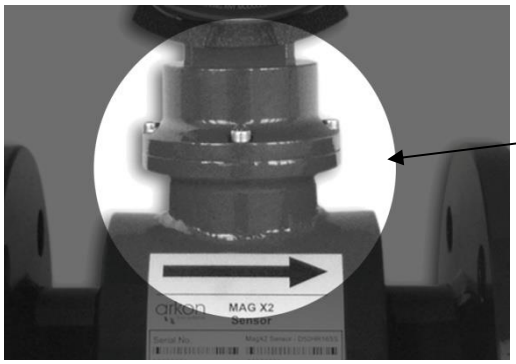

The RS232 Module is placed in the correct slot, but with the bevelled corner in the wrong direction.

| | |
|---|---|
| ❗ | Any connection or disconnection of any module has to be done with network power to the meter switched off. |

## 2.6. Cables connections

The following diagrams show the connections of the cables between sensor and transmitter.




Use this cable connection only for “sensor to transmitter communication module”.

Important: In case of IP68 transmitter it is needed to use silicone gel to extra protect cable glands from inside of the meter. Pour neutral silicone gel into the cable gland from inner side and pull the cable 3mm out of the housing to make the cable gland extra protected for IP68. Chapter 2.9.

## 2.7. Remote sensor terminal box for sensor communication module

For sensor communication module, to guarantee IP68 protection of the sensor, the entire sensor neck including wires connection is potted by dielectric gel.

## 2.8. IP68 Certificate

Strojírenský zkušební ústav, s.p. (Engineering Test Institute, Public Enterprise),
Hudcova 424/56b, 621 00 Brno, Czech Republic

# CERTIFICATE

## B-32-00337-16

| | |
|---|---|
| Manufacturer: | Arkon Flow Systems, s.r.o.<br>Berkova 534/92, 612 00 Brno - Královo Pole<br>Czech Republic |
| Company ID No.: | 27683826 |
| Products: | Electromagnetic flowmeters |
| Type designation: | MAGX2 |
| Versions: | Compact, Remote |

The Engineering Test Institute, Public Enterprise, hereby certifies that the characteristics of the sample of the products concerned have been found conforming to the applicable requirements

for the IP 68 protection rating as per ČSN EN 60529:1993 (at a water level of 1.25 m above the top edge of the sample for the duration of 15 hours).

This Certificate has been issued based on Final Report 32-0261 of 2016-03-23, issued by the Engineering Test Institute, Public Enterprise.

The rules for using the Certificate are specified on Page 2.

Brno, 2016-03-23

STROJÍRENSKÝ ZKUŠEBNÍ ÚSTAV, s.p. CZ 1

Ing. Tomáš Hruška
Director

B-32-00337-16, page 1 (2)

Strojírenský zkušební ústav, s.p., Hudcova 56b, 621 00 Brno, Česká republika
Engineering Test Institute, public enterprise, Hudcova 56b, 621 00 Brno, Czech Republic
www.szutest.cz

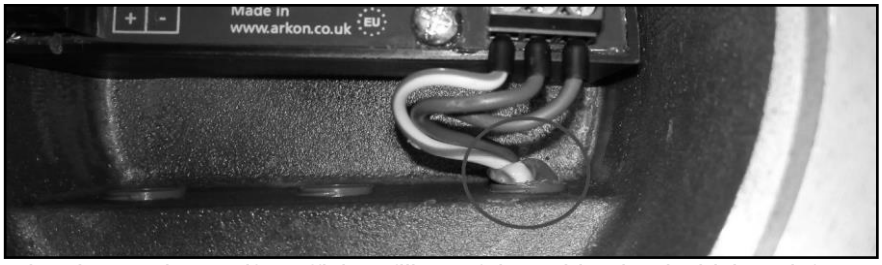
## 2.9. Fill up of a cable gland of MAGX2 IP68 housing

| | |
|---|---|
| ❶ | Fit MAGX2 IP68 housing with standard round cross-cut cable. Example: Power Supply (see pic. 1). |
| ❷ | Apply sufficient amount of silicone gel to cable gland of opened round cross cut cable end inside housing of MAGX2 (see pic. 2). |
| ❸ | Slightly pull out the cable while turning the cable to achieve sufficient spread of silicon around the cable in the cable gland (see pic. 3 and pic. 4). |
| ❹ | Do a visual control – focus on full spread of silicone gel around the cable. |


Pic. 1 round cross cut cable properly connected inside of MAGX2 IP68 housing


Pic. 2 Application of silicon gel on a cable of opened round cross cut cable end


Pic. 3 Manipulation with the cable to achieve sufficient fill up of a cable gland




Pic. 4 Do a visual control to verify sufficient fill up of the cable gland which satisfy IP68 standard

## 2.10. Ambient conditions

Ambient temperature: -20 – 60 ºC
Relative humidity: up to 100%, non-condensing

# 3. MAGX2 Transmitter Unit

| Module Name: | Module Short Name: | Ordering Code: |
|---|---|---|
| **MAGX2 Transmitter Unit** | **Transmitter** | **MAGX2 IP68 T******** |

The MAGX2 Transmitter unit is the main part of the flowmeter. It consists of the MAGX2 motherboard, a graphical display, touch-button controls and a transmitter housing.
Through the display and with help of the touch buttons, you can go through the various menus for data reading, configuration and setup of your flowmeter.

**The following symbols are used in this manual and on the flowmeter display.**

| | | | |
|---|---|---|---|
| ☑ | ENTER | ↺ | LEFT |
| ☒ | Esc | ↓↑ | Selection menu |
| ← | Back | 🔒 | Key-lock |
| ↓ | DOWN | ⚡ | Electrode cleaning |
| → | RIGHT | D | Demo mode |
| ↑ | UP | 🖴 | SD card present |

Touch-buttons are working on capacitance principle therefore any conductive material close to button's area will cause button press. Even water can do it so it is strongly recommended to use key lock when any presence of water is expected. 30 seconds after turning the flowmeter on, touch buttons autocalibration is started so function of the touch buttons may be unstable.


The MAGX2 transmitter has a key-lock possibility. You can lock touch-buttons by touching the Esc key first followed by the Enter key within one second. This will lock the flowmeter and there will be a lock symbol on display.

Touching the buttons will have no effect on flowmeters function. To unlock buttons, touch the buttons same way as for locking.

If flowmeter is in cleaning electrode there is a lightning symbol on display.

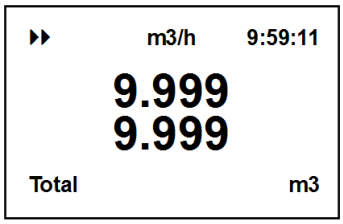
Upon starting the flowmeter, you will automatically see the main screen of the menu.

If transmitter is switched off from power supply longer than 3 months, output settings may be lost.

## 3.1. Main screen

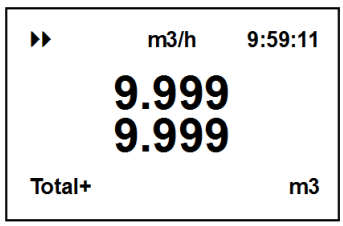
**Total Volume**

This is the total volume counter; the sum of all historical flows for a particular flowmeter. The user is not able to zero this counter without use of the service password. Direction of flow is ignored for this counter (negative flow is calculated the same way as positive flow).

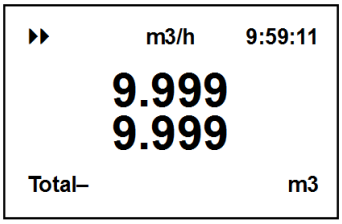



**Positive Volume**

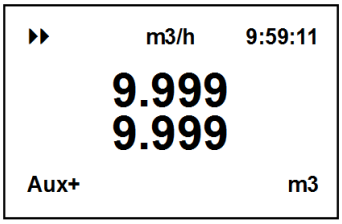
This counter is only credited when the measured medium is flowing in the chosen positive direction. In case the flow is 0, or if it is flowing in the opposite (negative) direction, the number on the counter remains the same.



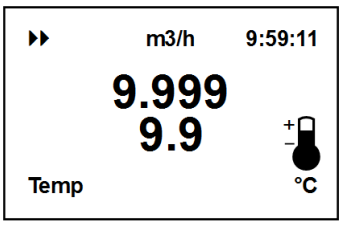
**Negative Volume**
This counter works the same way as the positive volume counter, yet in the opposite direction. In case the flow is 0, or flowing in the designated positive direction, the number on this counter will remain the same.



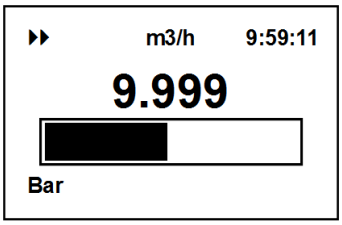

**Auxiliary Volume**
This is a 2nd total volume counter. It works the same as the Total Volume positive counter, yet with the only difference being that it can be reset to 0 at any time, with **User Settings** password.



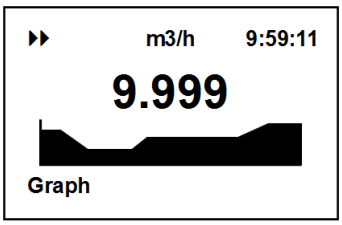

**Temperature**
This item is a temperature indication for the measured medium.




**Bar Graph**
Represents actual flowrate in a proportion to Qn (100%). The Qn – maximal flow value can be changed in **User Settings**.

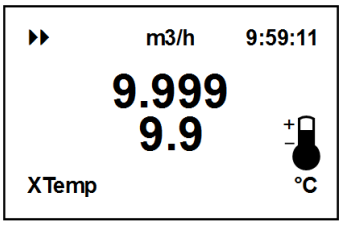



**Time Graph**
Shows last 2minutes of actual flow in time-based graph (1 second step). Maximum of the graph is Qn value, can be changed in **User Settings**.



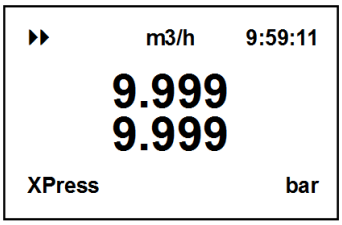

**External Measurements - Temperature**
This item is a temperature measured by the connected external temperature sensor.*

*External Measurement Temperature module must be used.

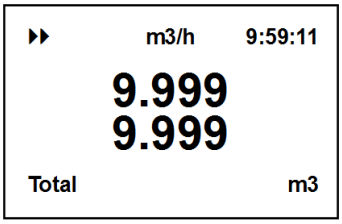
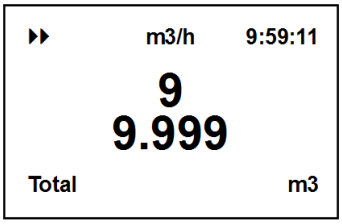



**External Measurements - Pressure**
This item is a pressure measured by the connected pressure sensor.*

*External Measurement Pressure module must be used.



You can cycle through these 9 indication screens by pressing the **up** and **down buttons** on the transmitter.

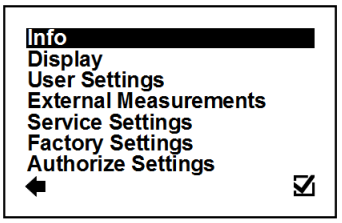
| | | |
|---|---|---|
|  | It is possible to change the number of decimal digits of the actual flow displayed in the main screen:<br><br>**decimal numbers➔**<br><br>By using the ➲➲ buttons |  |

| | |
|---|---|
|  | If value of any Volume counter higher than 4 000 000 m3, then value of Volume is displayed only in m3 unit. If value of any Volume counter higher than 999 999 999 m3, then this Volume will be reset to 0. |

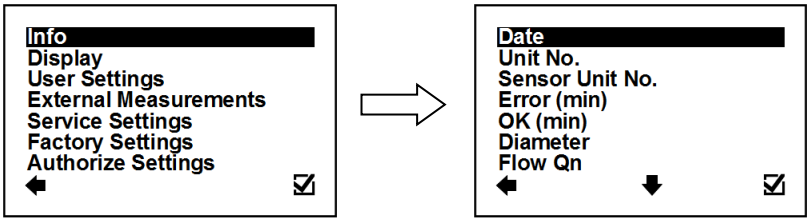
## 3.2. Flowmeter Menu

After pressing the enter button you get to into the root-menu. From here, you can chose any of the sub-menu's displayed in the picture on the right.

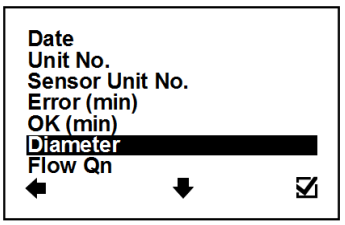
Navigate with 🡅🡇 and select your choice with ☑.

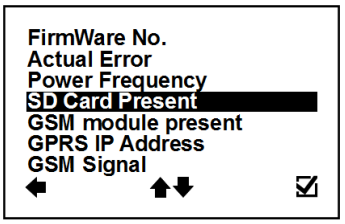


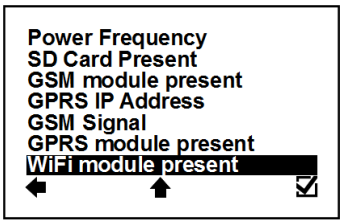

## 3.3. Info menu



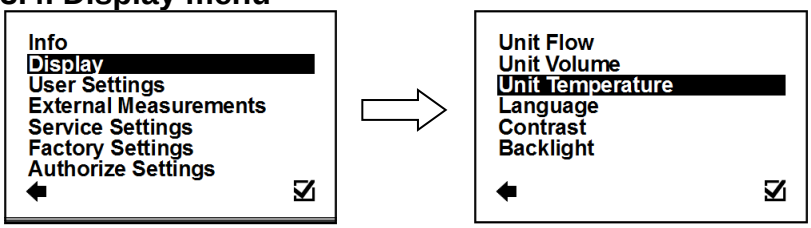

| | |
|---|---|
| **Date** | This item shows the current date according to the transmitter's setup. It can be changed in the User Settings menu. |
| **Unit No.** | Displays the serial number of the motherboard. This number is allocated during production by the manufacturer. |
| **Sensor Unit** | Displays the serial number of the sensor. This number is allocated during production by the manufacturer. This item is working with sensor ver. 8 and newer. |
| **Error (min)** | The number of minutes the device was not measuring because of errors. |
| **OK (min)** | The number of minutes that the device measured correctly. |
| **Diameter** | This item shows the nominal sensor diameter that is currently configured for the given flowmeter. |
| **Flow Qn** | Here, the flowmeter displays the predicted nominal flow. Values can be changed under User Settings. |
| **Firmware No.** | This shows the current firmware version. |
| **Actual Error** | This shows all actual errors (see chapter 10). |
| **FW Checksum** | Second FW identifier. |
| **SD card present** | Shows if the SD card is inserted in the flowmeter. |
| **GSM module present** | Shows if the GPRS module is inserted in the flowmeter. |
| **GPRS IP address** | Displays IP address of GPRS module. (Not used) |
| **GSM Signal** | Signal strength of the GSM SMS Module. (Not used) |
| **GPRS module present** | Shows if the GPRS module is inserted in the flowmeter. |
| **WiFi module present** | Shows if the Wi-Fi module is inserted in the flowmeter. |



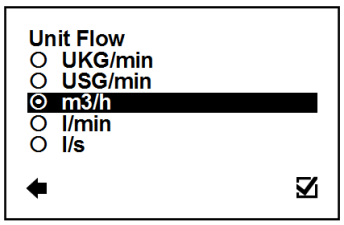
## 3.4. Display menu




### 3.4.1. Display > Unit Flow

Setup of the displayed measurement unit for current flow.

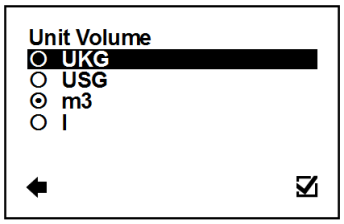
| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **UKG / min** | UK gallon per minute |
| **USG / min** | US gallon per minute |
| **m3 / h** | Cubic meters per hour |
| **l / min** | Litres per minute |
| **l / s** | Litres per second |




### 3.4.2. Display > Unit Volume

Setup of the displayed measurement unit for total flow.

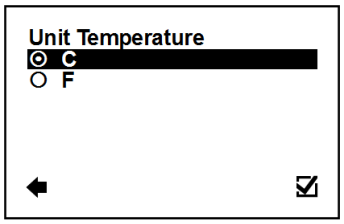
| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **UKG** | UK gallon |
| **USG** | US gallon |
| **m3** | Cubic meter |
| **l** | Litre |




### 3.4.3. Display > Unit Temperature

Setup of the displayed measurement unit of temperature indication and external measurement of temperature.

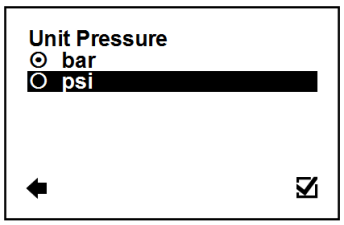
| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **C** | Degrees Celsius |
| **F** | Degrees Fahrenheit |




### 3.4.4. Display > Unit Pressure

Setup of the displayed measurement unit of the external pressure measurement.

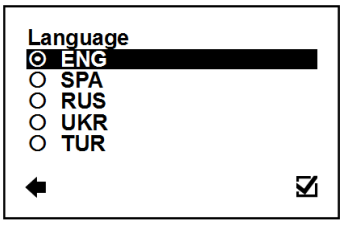
| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **bar** | Pressure in bar unit (1 bar = 100 kPa = 14,50 psi) |
| **psi** | Pressure in psi unit (1 psi = 6,89 kPa = 0,07 bar) |



### 3.4.5. Display > Language

Setup of the language for flowmeter menu.

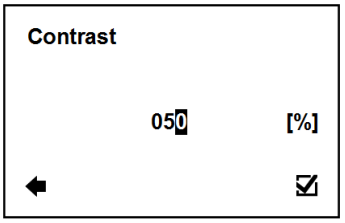
| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **ENG** | English |
| **SPA** | Spanish |
| **RUS** | Russian |
| **UKR** | Ukrainian |
| **TUR** | Turkish |
| **ARA** | Arabic (Only for FW21.37 Arabic) |




### 3.4.6. Display > Contrast

Contrast of the display setup.
Possible range: 0 – 100 %

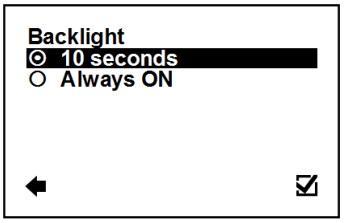
| | |
|---|---|
| ← | Back with no change |
| ↔ | Selection of digit position |
| ↑↓ | Value setting |
| ☑ | Confirmation of setup and saving to memory |



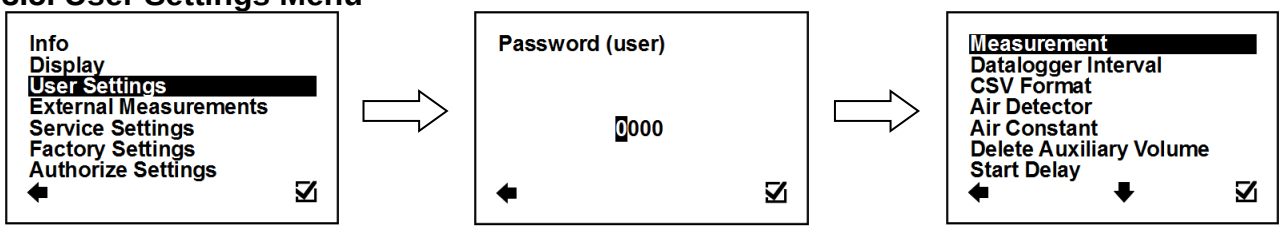

### 3.4.7. Display > Backlight

Setup of the backlight for flowmeter display.

| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **10 seconds** | The backlight would turn off 10 seconds after the last button touch |
| **Always ON** | The backlight will be always on |




## 3.5. User Settings Menu

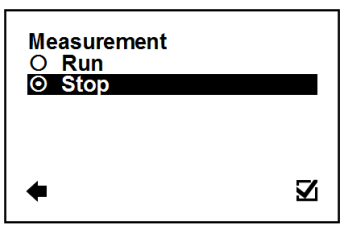



To enter this part of the menu, it is necessary to enter the **User** Password.
The default factory setting is **1111**. See page**24**. for user password settings.

### 3.5.1. User Settings>Measurement

This option allows selecting flow measurement to be on or off.

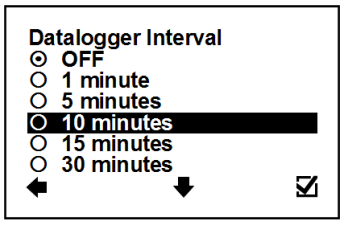
| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **Run** | The device is measuring, the totalizers are active |
| **Stop** | The display will show a value, yet the totalizers are off |

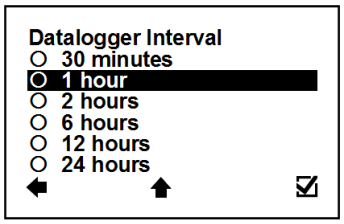


### 3.5.2. User Settings> Datalogger Interval

This option allows select how often will be totalizers saved on SD card.

| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **OFF** | Totalizer is not used (SD card not necessary) |
| **1 minute** | The interval of saving totalizers; SD card needed |
| **5 minutes** | |
| **10 minutes** | |
| **15 minutes** | |
| **30 minutes** | |
| **1 hour** | |
| **2 hours** | |
| **6 hours** | |
| **12 hours** | |
| **24 hours** | |



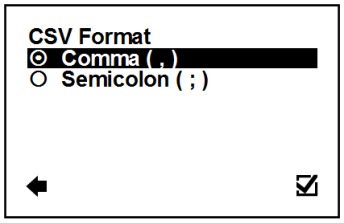




While there is an error “SD card not inserted” or “SD Open file” active and the user plugs in the SD card, error will disappear after next write to the datalogger. It is recommended to setup the datalogger interval again or restart the flowmeter after every SD card plug.
It is not recommended to use 1 minute statistic for a long-term logging. 1 minute datalogging is mainly used for troubleshooting of the meter.

### 3.5.3. User Settings> CSV Format

This option allows selecting separator between each data in datalogger.

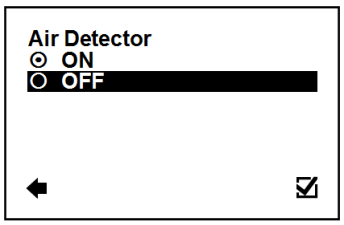
| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **Comma (,)** | Select comma |
| **Semicolon (;)** | Select semi-colon |




### 3.5.4. User Settings> Air Detector

This option allows selecting empty pipe check (air detector) to be on or off.

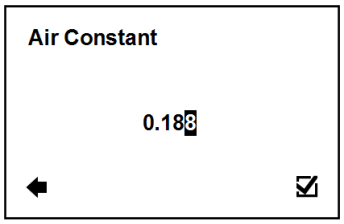
| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **ON** | The detector is active |
| **OFF** | The detector is switched off |




### 3.5.5. User Settings>Air Constant

Constant value to determine the empty pipe detection limit.
Possible range: **0.000 – 0.999**

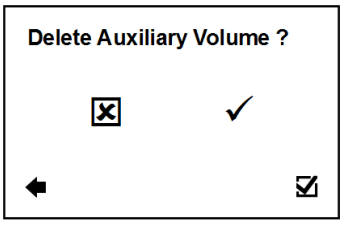
| | |
|---|---|
| ← | Back with no change |
| ↻↺ | Selection of digit position |
| ↑↓ | Value setting |
| ☑ | Confirmation of setup and saving to memory |



### 3.5.6. User Settings> Delete Auxiliary Volume

This function serves to zero the auxiliary flow totalizer.

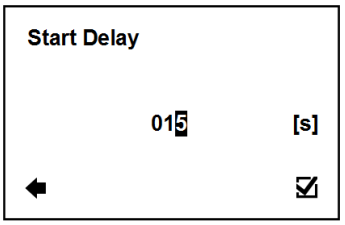
- ← Back with no change
- ➲➲ Item selection
- ☑ Confirmation of choice
- ☒ No change
- ☑ Zero the auxiliary totalizer




### 3.5.7. User Settings> Start Delay

Time delay for the flowmeter where it, after switching on, will not request measurement data from the sensor.
Possible range: **0 – 120 s**

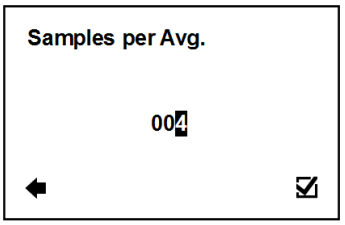
- ← Back with no change
- ➲➲ Selection of digit position
- ➲➲ Value setting
- ☑ Confirmation of setup and saving to memory




### 3.5.8. User Settings> Samples per Avg.

The number of samples that the flowmeter will use for calculation of its displayed average flow value/time unit.
Possible range: **0 – 120 samples/avg**

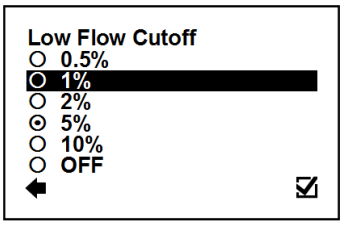
- ← Back with no change
- ➲➲ Selection of digit position
- ➲➲ Value setting
- ☑ Confirmation of setup and saving to memory




### 3.5.9. User Settings> Low Flow Cut-off

This function serves to set the minimum flow the flowmeter will react on. Sets in percentage of Flow Qn.

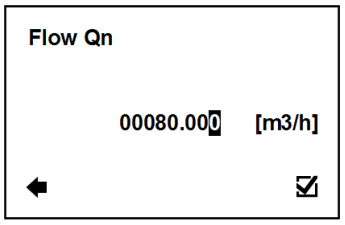
- ← Back with no change
- ➲➲ Item selection
- ⊙ Selection identification
- ☑ Confirmation of setup and saving to memory




### 3.5.10. User Settings> Flow Qn

This function serves to setup the nominal flow-rate.
Possible range: **0 – 36000 m3/h**

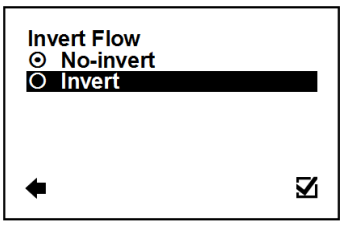
- ← Back with no change
- ➲➲ Selection of digit position
- ➲➲ Value setting
- ☑ Confirmation of setup and saving to memory



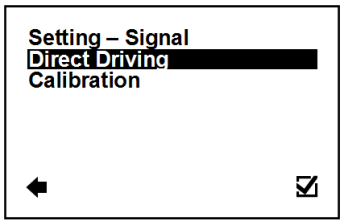

### 3.5.11. User Settings> Invert Flow

This function serves to change the definition of flow direction.

- ← Back with no change
- ➲➲ Item selection
- ⊙ Selection identification
- ☑ Confirmation of setup and saving to memory



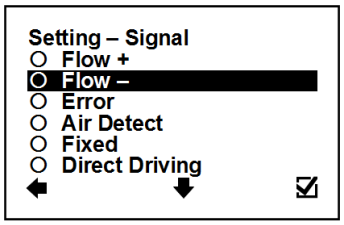
### 3.5.12. User Settings> Current Loop

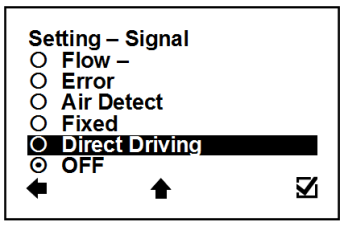



| | |
|---|---|
| ← | Back with no change |
| ⇳ | Item selection |
| ☑ | Enter this part of the menu |

**User Settings> Current Loop > Settings Signal**

This function serves to select which signal the output should be giving.



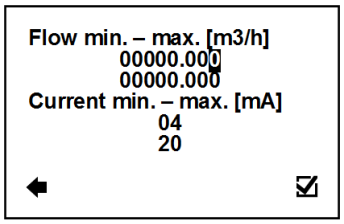




| | |
|---|---|
| ← | Back with no change |
| ⇳ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **Flow+** | Output: **10 mA**, for any positive flow |
| **Flow–** | Output: **10 mA**, for any negative flow |
| **Error** | Output: **10 mA**, for any error identified by the device<br>The signal can be cancelled by pressing any push button on the flowmeter. |
| **Air Detect** | Output: **10 mA**, during air detection (empty pipe) |
| **Fixed** | Output: fixed output of 10 mA |
| **Direct Driving** | Output: Direct Driving – setup is below |
| **OFF** | Output: fixed output of **4 mA** |

**User Settings> Current Loop > Direct Driving**

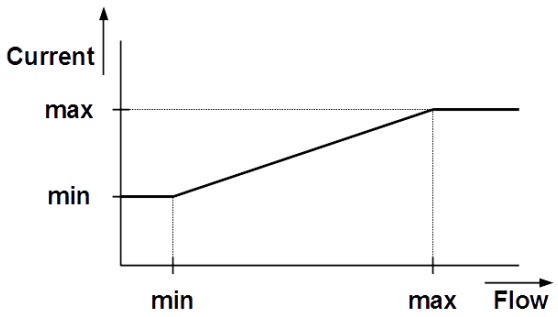
This function serves to set flow values in relation to current output.

Possible range: **0 – 36000 m3/h**;**4 – 20 mA**




| | |
|---|---|
| ← | Back with no change |
| ⇄ | Selection of digit position |
| ⇳ | Value setting |
| ☑ | Confirmation of setup and saving to memory |
| **Flow min. – max.** | Setup of measurement flow-range (only positive values) |
| **Current min. – max.** | Setup of the current output range, corresponding to the actual flow-rate within the given range |

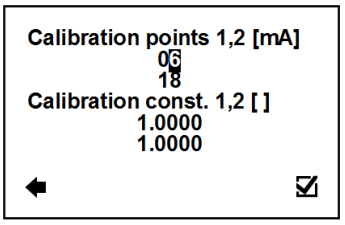
When changing an item for the current loop output, all settings for the voltage output are to be changed, to make sure there will be no signal conflict at the output port. The output that is not used has to be switched off (Settings – Signal – OFF).



**User Settings> Current Loop > Calibration**

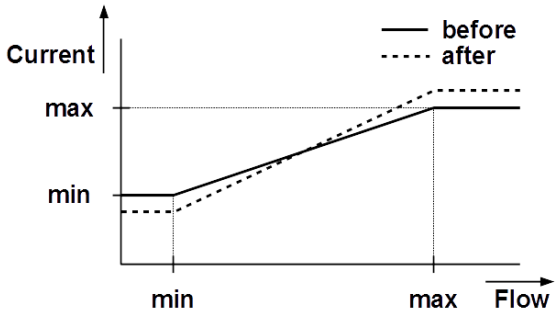
This function serves to modify current loop output signal.
Possible range: **4 – 20 mA**; **0.5000 – 1.5000**

| | |
|---|---|
| 🡐 | Back with no change |
| ⊃⊂ | Selection of digit position |
| ∩∪ | Value setting |
| ☑ | Confirmation of setup and saving to memory |
| **Calibration point 1,2** | Setup of calibration point 1, 2. First point must be less than second point. |
| **Calibration constant 1,2** | Setup of calibration constant for first and for second calibration point. |



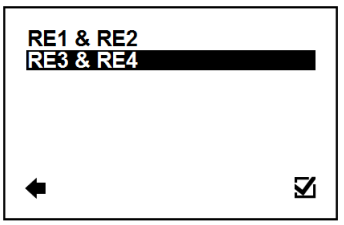

Formula for calibration constant calculation:
Expected value: 6 mA, Measured value: 6.1 mA
Calibration point one: 6mA
Calibration constant one = $\frac{6}{6.1}$ = 0.9836

Expected value: 18 mA, Measured value: 17.9 mA
Calibration point two: 18mA
Calibration constant two = $\frac{18}{17.9}$ = 1.0056



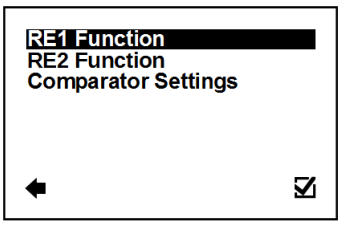

### 3.5.13. User Settings> Pulse Output

| | |
|---|---|
| 🡐 | Back with no change |
| ∩∪ | Item selection |
| ☑ | Enter this part of the menu |




**User Settings> Pulse Output > RE1 & RE2**

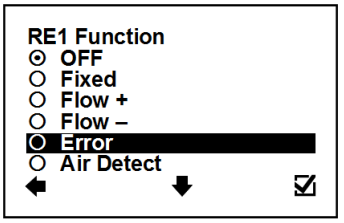
| | |
|---|---|
| 🡐 | Back with no change |
| ∩∪ | Item selection |
| ☑ | Enter this part of the menu |

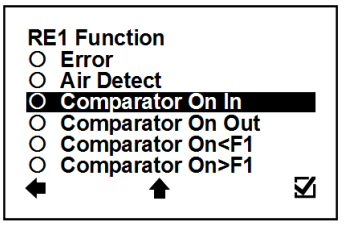



**User Settings> Pulse Output > RE1 & RE2 > RE1 (RE2) function**

This function serves to select which signal the output should be giving. The relays are independent to each other.

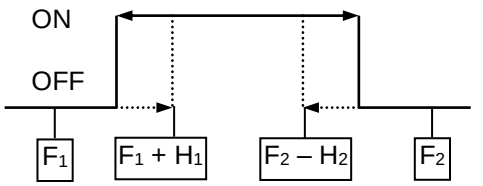
| | |
|---|---|
| 🡐 | Back with no change |
| ∩∪ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **OFF** | Output: **OFF**, fixed status signal |
| **Fixed** | Output: **ON**, fixed status signal |
| **Flow+** | Output: **ON**, for any positive flow |
| **Flow–** | Output: **ON**, for any negative flow |
| **Error** | Output: **ON**, for any error identified by the device The signal can be cancelled by pressing any push button on the flowmeter. |
| **Air Detect** | Output: **ON**, during air detection (empty pipe) |
| **Comparator On In** | Output: **ON**, if the actual flow-rate is within the given range (can be set under Comparator Flow) |



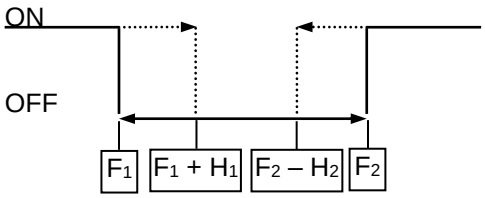



| | |
|---|---|
| **Comparator On Out** | Output: **ON**, if the actual flow-rate is outside the given range (can be set under Comparator Flow) |
| **Comparator On<F1** | Output: **ON**, if the actual flow flow-rate is smaller than the value set as “Flow1” (can be set under Comparator Flow) |
| **Comparator On>F1** | Output: **ON**, if the actual flow-rate is bigger than the value set as “Flow1” (can be set under Comparator Flow) |

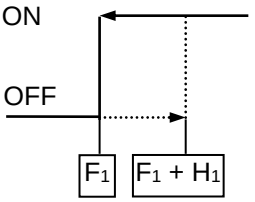
**On In:**



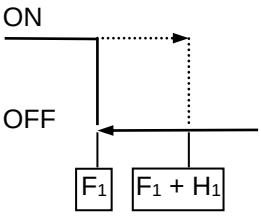

**On Out:**




**On > F1:**



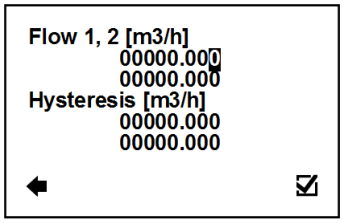

**On < F1:**




**User Settings> Pulse Output > RE1 & RE2 > Comparator Settings**

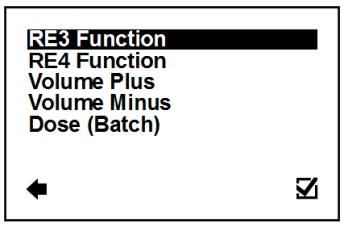
Possible range**: 0 – 36000 m3/h**; **0 – 36000 m3/h**

| | |
|---|---|
| ← | Back with no change |
| ↔ | Selection of digit position |
| ↕ | Value setting |
| ☑ | Confirmation of setup and saving to memory |
| **Flow 1, 2** | This function serves to configure the flow-range for the Comparator Mode. Flow1 < Flow2 |
| **Hysteresis** | Setup of hysteresis for the Comparator Mode |




**User Settings> Pulse Output > RE3 & RE4**

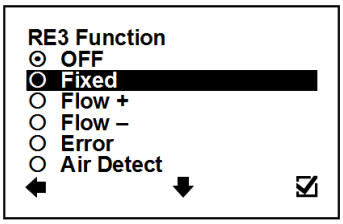
| | |
|---|---|
| ← | Back with no change |
| ↕ | Item selection |
| ☑ | Enter this part of the menu |

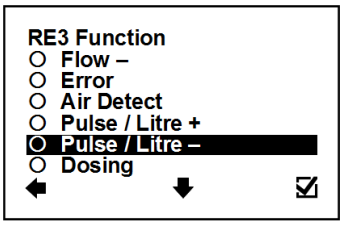


**User Settings> Pulse Output > RE3 & RE4 > RE3 (RE4) function**

This function serves to select which signal the output should be giving. The relays are independent to each other.

| | |
|---|---|
| 🡐 | Back with no change |
| 🡑🡓 | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **OFF** | Output: **OFF**, fixed status signal |
| **Fixed** | Output: **ON**, fixed status signal |
| **Flow+** | Output: **ON**, for any positive flow |
| **Flow–** | Output: **ON**, for any negative flow |
| **Error** | Output: **ON**, for any error identified by the device. The signal can be cancelled by pressing any push button on the flowmeter |
| **Air Detect** | Output: **ON**, during air detection (empty pipe) |
| **Pulse/litre+** | The unit generate pulse 160 ms when the volume plus pass through the flowmeter |
| **Pulse/litre–** | The unit generate pulse 160 ms when the volume minus pass through the flowmeter |
| **Dosing** | This function serves to control dosing (batching) |



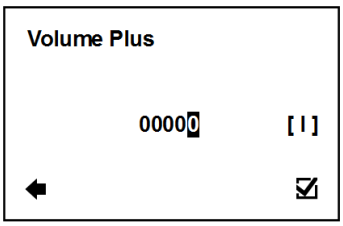




**User Settings> Pulse Output >RE3 & RE4 >Volume Plus**

This function serves to configure the positive flow volume after which a 160 ms output pulse is generated to correspondent Relay. In case of a power failure, the output will start counting volume from 0.

Possible range: **0 – 99999 l**

| | |
|---|---|
| 🡐 | Back with no change |
| ⊃⊂ | Selection of digit position |
| 🡑🡓 | Value setting |
| ☑ | Confirmation of setup and saving to memory |

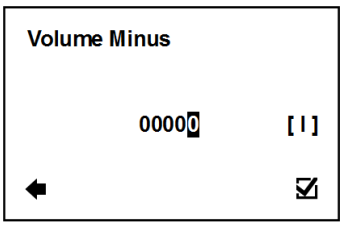



**User Settings> Pulse Output >RE3 & RE4 >Volume Minus**

This function serves to configure the negative flow volume after which a 160 ms output pulse is generated to correspondent Relay. In case of a power failure, the output will start counting volume from 0.

Possible range: **0 – 99999 l**

| | |
|---|---|
| 🡐 | Back with no change |
| ⊃⊂ | Selection of digit position |
| 🡑🡓 | Value setting |
| ☑ | Confirmation of setup and saving to memory |

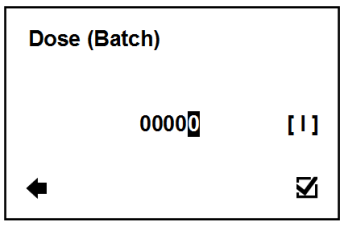



**User Settings> Pulse Output >RE3 & RE4 >Dose (Batch)**

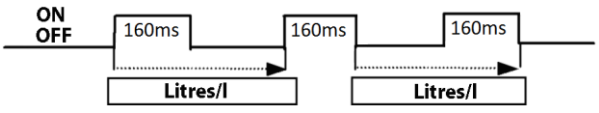
This function serves to control dosing (batching). A dose is activated through a pulse input on Pulse input. At the same time with the relay (RE3 and/or RE4) open. After reaching the required volume, relay (RE3 and/or RE4) is closed.

Possible range: **0 – 99999 l**

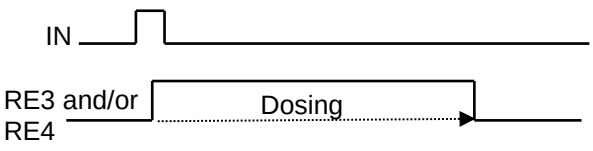
| | |
|---|---|
| 🡐 | Back with no change |
| ⊃⊂ | Selection of digit position |
| 🡑🡓 | Value setting |
| ☑ | Confirmation of setup and saving to memory |



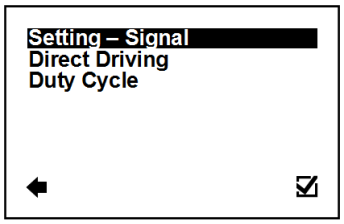

**Litres/1 (Q+)/(Q–):**




**Dosing:**

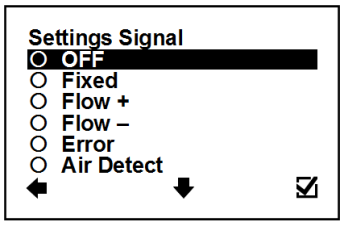


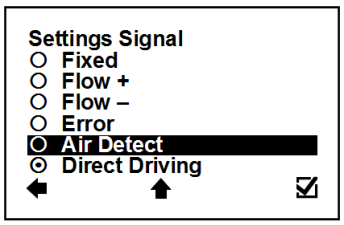
### 3.5.14. User Settings> Frequency output




| | |
|---|---|
| ← | Back with no change |
| ⇕ | Item selection |
| ☑ | Enter this part of the menu |

#### User Settings> Frequency output > Settings Signal

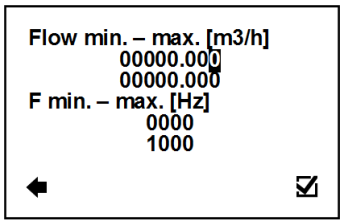



This function serves to select which signal the output should be giving.

| | |
|---|---|
| ← | Back with no change |
| ⇕ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **OFF** | Output: **OFF** |
| **Fixed** | Output: **100Hz** fixed output |
| **Flow+** | Output: **100Hz**, for any positive flow |
| **Flow–** | Output: **100Hz**, for any negative flow |
| **Error** | Output: **100Hz**, for any error identified by the device |
| **Air Detect** | Output: **100Hz**, during air detection (empty pipe) |
| **Direct Driving** | Frequency output changing according to actual flow |

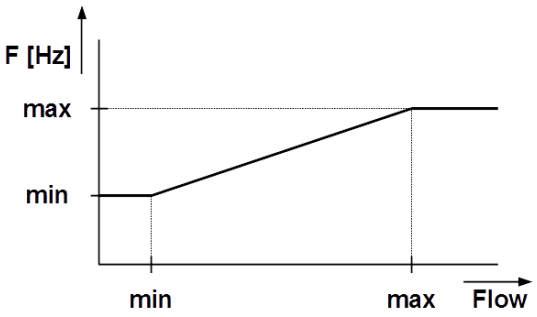
#### User Settings> Frequency output > Direct Driving




This function serves to set flow values in relation to frequency output.
Possible range: **0 – 36000 m3/h**; **0 – 1000 Hz**

| | |
|---|---|
| ← | Back with no change |
| ⇄ | Selection of digit position |
| ⇕ | Value setting |
| ☑ | Confirmation of setup and saving to memory |
| **Flow min. – max.** | Setup of the active flow-range for the Frequency output module |
| **F min. – max.** | Configuration of the Frequency output range, corresponding to the actual flow-rate within the given range. |

Minimal frequency 2 Hz
Maximal frequency 1000 Hz

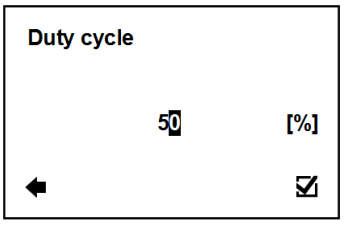


**User Settings> Frequency output > Duty Cycle**

Function to set duty cycle of the Frequency output. Percentage of high level.

Possible range: **1 – 99 %**

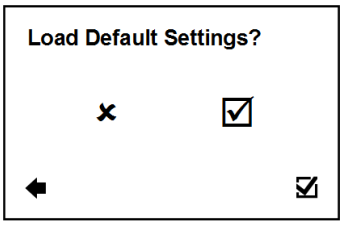
| | |
|---|---|
| 🡐 | Back with no change |
| ⊃⊂ | Selection of digit position |
| ∩∪ | Value setting |
| ☑ | Confirmation of setup and saving to memory |




### 3.5.15. User Settings> Load Default Settings

This function will load default factory settings.

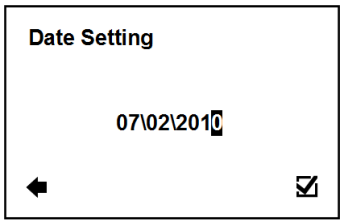
| | |
|---|---|
| 🡐 | Back with no change |
| ⊃⊂ | Item selection |
| ☑ | Confirmation of choice |
| ☒ | No change |
| ☑ | Loads default settings |




### 3.5.16. User Settings> Date Setting

Function to set date.

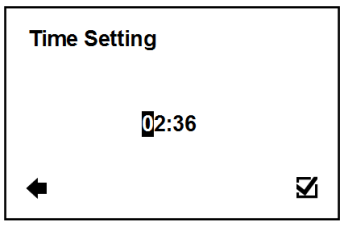
| | |
|---|---|
| 🡐 | Back with no change |
| ⊃⊂ | Selection of digit position |
| ∩∪ | Value setting |
| ☑ | Confirmation of setup and saving to memory |
| **Date format** | DD \ MM \ YYYY |




### 3.5.17. User Settings> Time Setting

This function serves to set current time.

| | |
|---|---|
| 🡐 | Back with no change |
| ⊃⊂ | Selection of digit position |
| ∩∪ | Value setting |
| ☑ | Confirmation of setup and saving to memory |
| **Time format** | HH : MM |

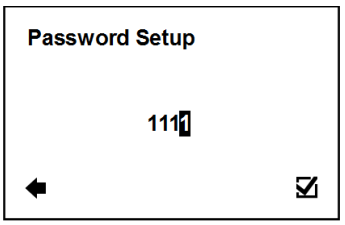



### 3.5.18. User Settings> Password Setup

This function serves to setup the flowmeter user password.

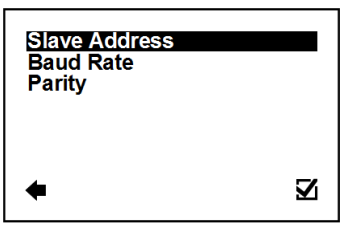
Possible range: **0000 – 9999**

| | |
|---|---|
| 🡐 | Back with no change |
| ⊃⊂ | Selection of digit position |
| ∩∪ | Value setting |
| ☑ | Confirmation of setup and saving to memory |




### 3.5.19. User Settings> Modbus

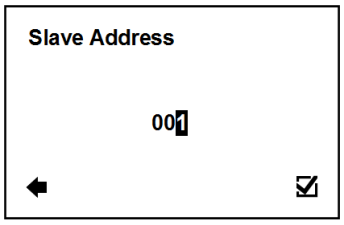
| | |
|---|---|
| 🡐 | Back with no change |
| ∩∪ | Item selection |
| ☑ | Enter this part of the menu |



**User Settings> Modbus > Slave Address**

Modbus device address (Factory settings: 1).

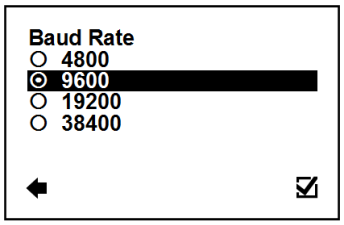
| | |
|---|---|
| ← | Back with no change |
| ↔ | Selection of digit position |
| ↑↓ | Value setting |
| ☑ | Confirmation of setup and saving to memory |




**User Settings> Modbus > Baud Rate**

Setup communication speed (Factory settings: 9600).

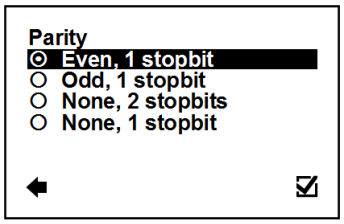
| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |




**User Settings> Modbus > Parity**

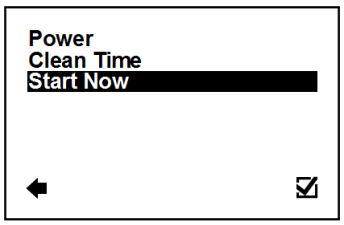
Setup communication parameters (Factory settings: Even, 1 stopbit).

| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |




### 3.5.20. User Settings> Electrode Cleaning

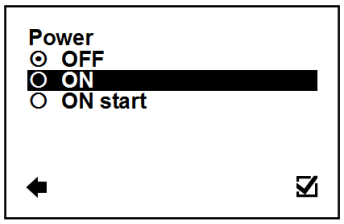
| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ☑ | Enter this part of the menu |




**User Settings> Electrode Cleaning > Power**

Setup automatic electrodes cleaning.

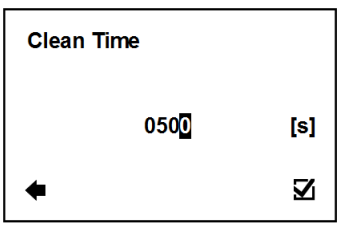
| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |




**User Settings> Electrode Cleaning > Clean Time**

Setup clean time for automatic electrode cleaning
(Factory setting: 500 s).
Possible range: **1 – 9999 s**

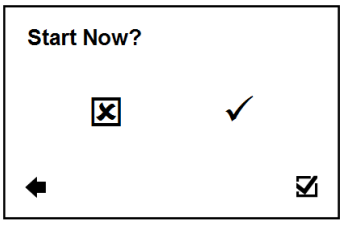
| | |
|---|---|
| ← | Back with no change |
| ↔ | Selection of digit position |
| ↑↓ | Value setting |
| ☑ | Confirmation of setup and saving to memory |



**User Settings> Electrode Cleaning > Start Now**

This function serves to start electrode cleaning now.

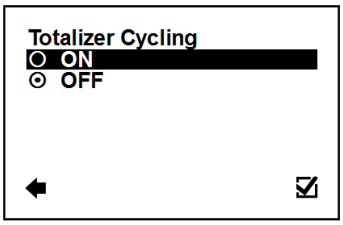
| | |
|---|---|
| 🡐 | Back with no change |
| ⮌⮎ | Item selection |
| ☑ | Confirmation of choice |
| ☒ | No change |
| ☑ | Start electrode cleaning now<br>Recommended time is 3sec. |




### 3.5.21. User Settings> Totalizer Cycling

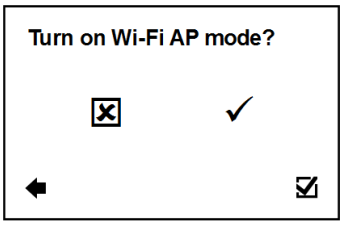
Automatic totalizer cycling (time is set to 3 seconds).

| | |
|---|---|
| 🡐 | Back with no change |
| ⮌⮎ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |




### 3.5.22. User Settings> Wi-Fi AP mode

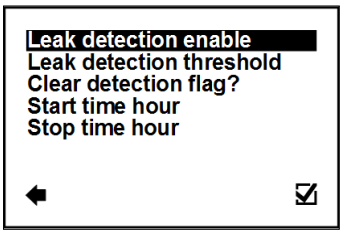
| | |
|---|---|
| 🡐 | Back with no change |
| ⮌⮎ | Item selection |
| ☑ | Confirmation of choice |
| ☒ | No change |
| ☑ | Turn on Wi-Fi AP mode |




Allowing Wi-Fi module to AP mode - prepares the module to be set for operation from external PC or mobile device. For more information please refer to P31 MAGX2 Wi-Fi module installation procedure.

### 3.5.23. User Settings> Leak detection (FW21.45 and above)

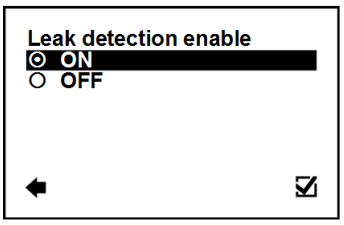
| | |
|---|---|
| 🡐 | Back with no change |
| ⮌⮎ | Item selection |
| ☑ | Enter this part of the menu |




**User Settings> Leak detection > Leak detection enable**

Setup leak detection function on/off.

| | |
|---|---|
| 🡐 | Back with no change |
| ⮌⮎ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |

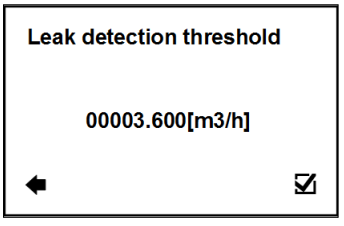



**User Settings> Leak detection > Leak detection threshold**

Setup threshold to decide whether the leak is detected. Above this value between start and stop hour the leak error is triggered

Possible range: **0 – 36000 m3/h**

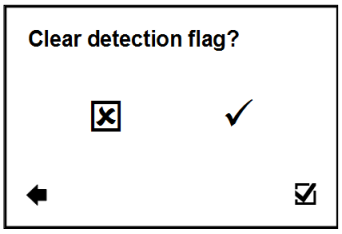
| | |
|---|---|
| 🡐 | Back with no change |
| ⮌⮎ | Selection of digit position |
| ⮌⮎ | Value setting |
| ☑ | Confirmation of setup and saving to memory |



**User Settings> Leak detection > Clear detection flag?**

When leak has been triggered, the error needs to be manually cleared by this function

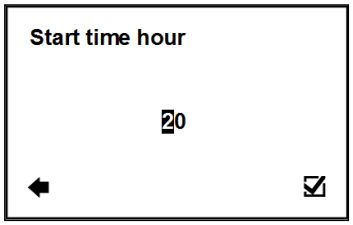
| | |
|---|---|
| ← | Back with no change |
| ↔ | Item selection |
| ☑ | Confirmation of choice |
| ☒ | No change |
| ☑ | Clear the error now |




**User Settings> Leak detection > Start time hour**

Defines from which hour the meter starts to detect the leaks.

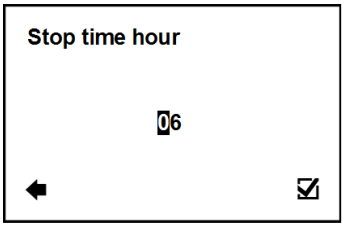
| | |
|---|---|
| ← | Back with no change |
| ↔ | Selection of digit position |
| ↕ | Value setting |
| ☑ | Confirmation of setup and saving to memory |



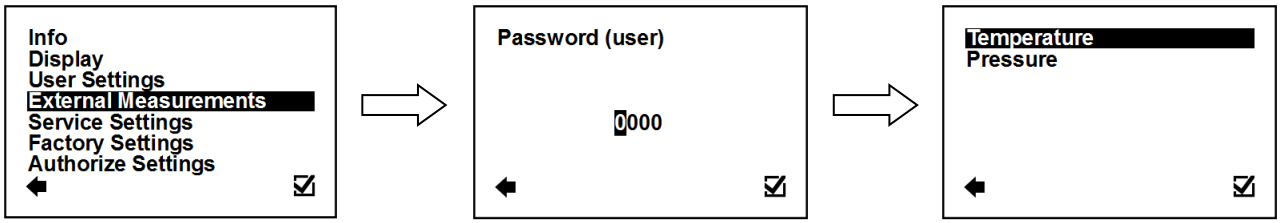

**User Settings> Leak detection > Stop time hour**

Defines from which hour the meter stops to detect the leaks.

| | |
|---|---|
| ← | Back with no change |
| ↔ | Selection of digit position |
| ↕ | Value setting |
| ☑ | Confirmation of setup and saving to memory |




## 3.6. External Measurements Menu

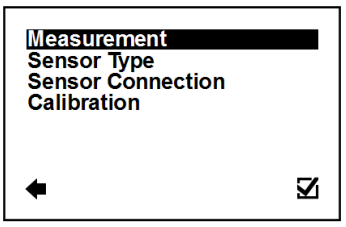



To enter this part of the menu, it is necessary to enter the **User** Password.

### 3.6.1. External Measurements > Temperature

Setup of the external measurement of temperature.

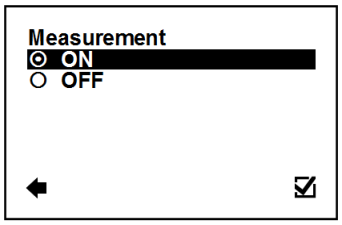
| | |
|---|---|
| ← | Back with no change |
| ↕ | Item selection |
| ☑ | Enter this part of the menu |




**External Measurements > Temperature > Measurement**

Measurement of external temperature.

| | |
|---|---|
| ← | Back with no change |
| ↕ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **ON** | When set ON, the value of external temperature is shown amongst totalizers (XTemp)* |

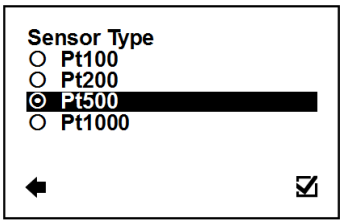



*It is not possible to use simultaneously External Temperature Module and Pulse module

**External Measurements > Temperature > Sensor Type**

Sensor type selection.

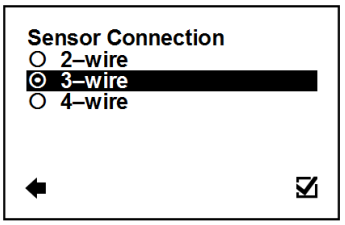
| | |
|---|---|
| 🡐 | Back with no change |
| 🡑🡓 | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |




**External Measurements > Temperature > Sensor Connection**

Sensor connection selection.

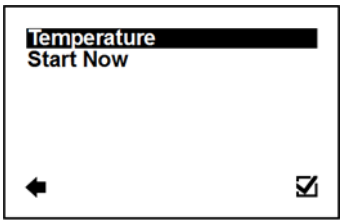
| | |
|---|---|
| 🡐 | Back with no change |
| 🡑🡓 | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |




**External Measurements > Temperature > Calibration**

Calibration of the external temperature sensor.

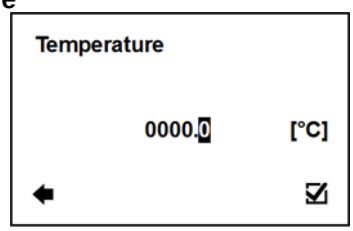
| | |
|---|---|
| 🡐 | Back with no change |
| 🡑🡓 | Item selection |
| ☑ | Enter this part of the menu |




**External Measurements > Temperature > Calibration > Temperature**

Calibration temperature at the time of calibration.*

| | |
|---|---|
| 🡐 | Back with no change |
| 🡒🡐 | Selection of digit position |
| 🡑🡓 | Value setting |
| ☑ | Confirmation of setup and saving to memory |

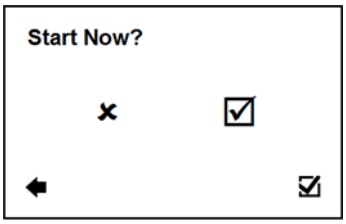



*Reference temperature of known temperature sensor at the time of calibration

**External Measurements > Temperature > Calibration > Start Now**

Start of the calibration.

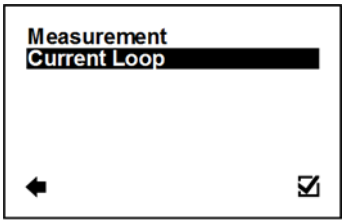
| | |
|---|---|
| 🡐 | Back with no change |
| 🡒🡐 | Item selection |
| ☑ | Confirmation of setup and saving to memory |
| ☒ | Calibration temperature will not change |
| ☑ | New calibration temperature changed |




### 3.6.2. External Measurements > Pressure

Setup of the external measurement of pressure.

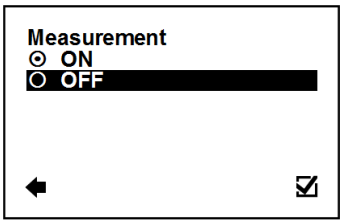
| | |
|---|---|
| 🡐 | Back with no change |
| 🡑🡓 | Item selection |
| ☑ | Enter this part of the menu |



**External Measurements > Pressure > Measurement**

Measurement of pressure.

| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **ON** | When set ON, the value of pressure is shown amongst totalizers (XPress)* |

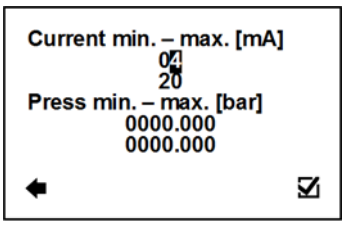



*It is not possible to use simultaneously Pressure Module and I-Out

4-20mA external pressure sensor settings.*

Possible range: **4 – 20mA**, **Pressure – according to sensor**

| | |
|---|---|
| ← | Back with no change |
| ↔ | Selection of digit position |
| ↑↓ | Value setting |
| ☑ | Confirmation of setup and saving to memory |

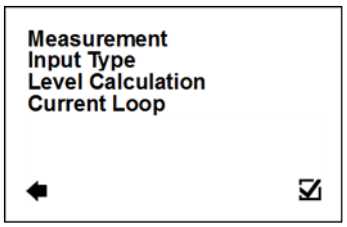



*Any external pressure sensor working on passive 4-20mA. i.e. WIKA A-10 (P#1105VX3J)

### 3.6.3. External Measurements > External Input (FW 21.50)

Setup of the external measurement..

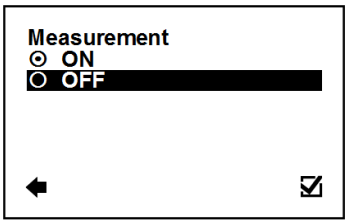
| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ☑ | Enter this part of the menu |




**External Measurements > External Input > Measurement**

External measurement on/off.

| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **ON** | When set ON, the value of external sensor is shown amongst totalizers (XPress, XTemp2, XLevel, XpH, XCust - dependent on Input Type setting)* |

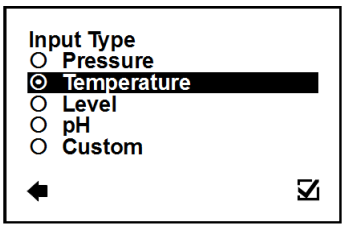



*It is not possible to use simultaneously External Input Module and I-Out

**External Measurements > External Input > Input Type**

4-20mA external module sensor type setting.

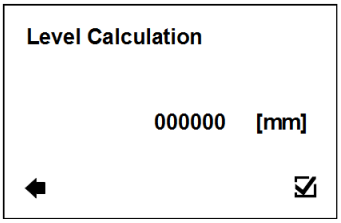
| | |
|---|---|
| ← | Back with no change |
| ⊙ | Selection identification |
| ↑↓ | Item selection |
| ☑ | Confirmation of setup and saving to memory |




**External Measurements > External Input > Level Calculation**

Used for Input Type Level sensor as installation height above the bottom of the tank.

| | |
|---|---|
| ← | Back with no change |
| ⊙ | Selection identification |
| ↑↓ | Item selection |
| ☑ | Confirmation of setup and saving to memory |

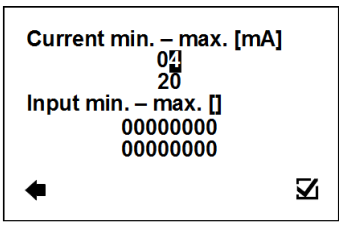


**External Measurements > External Input > Current Loop**

4-20mA external sensor settings.*

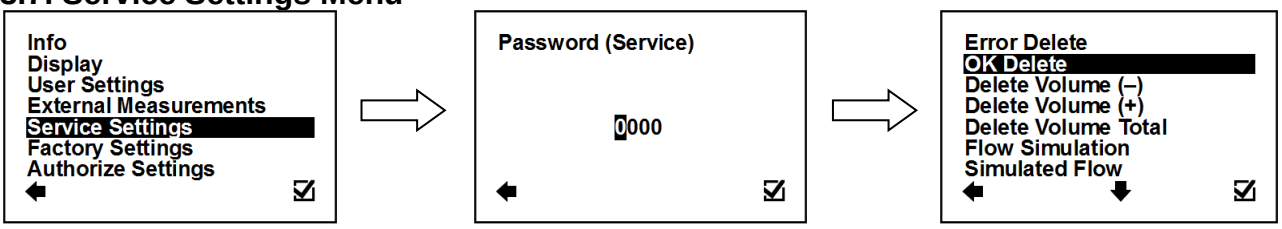
Possible range: **4 – 20mA**, **Input – according to sensor**

| | |
|---|---|
| ← | Back with no change |
| ↔ | Selection of digit position |
| ↕ | Value setting |
| ☑ | Confirmation of setup and saving to memory |




*Any external sensor working on passive 4-20mA. i.e. pressure sensor WIKA A-10 (P#1105VX3J)

## 3.7. Service Settings Menu

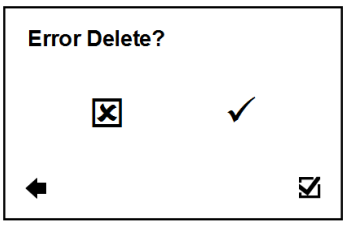



To enter this part of the menu, it is necessary to enter the **Service** Password.

### 3.7.1. Service Settings > Error Delete

This option serves to zero the totalizer for number of minutes the flowmeter signalised an error.

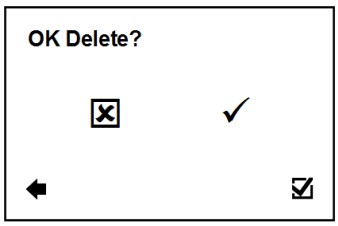
| | |
|---|---|
| ← | Back with no change |
| ↔ | Item selection |
| ☑ | Confirmation of choice |
| ☒ | No change |
| ☑ | Resets error minute totalizer |




### 3.7.2. Service Settings> OK Delete

This option serves to zero the totalizer for number of minutes of operation.

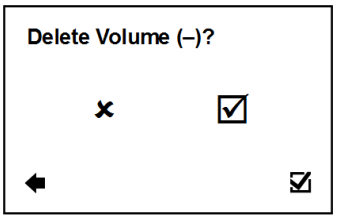
| | |
|---|---|
| ← | Back with no change |
| ↔ | Item selection |
| ☑ | Confirmation of choice |
| ☒ | No change |
| ☑ | Resets operation minute totalizer |




### 3.7.3. Service Settings> Delete Volume –

Option to zero the totalizer for negative flow.

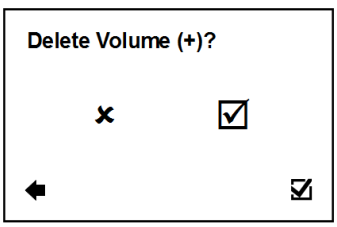
| | |
|---|---|
| ← | Back with no change |
| ↔ | Item selection |
| ☑ | Confirmation of choice |
| ☒ | No change |
| ☑ | Resets negative volume totalizer |




### 3.7.4. Service Settings> Delete Volume +

Option to zero the totalizer for positive flow.

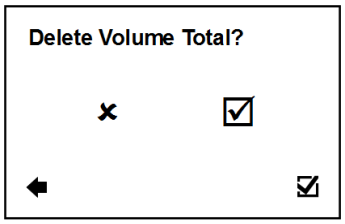
| | |
|---|---|
| ← | Back with no change |
| ↔ | Item selection |
| ☑ | Confirmation of choice |
| ☒ | No change |
| ☑ | Resets positive volume totalizer |



### 3.7.5. Service Settings> Delete Volume Total

Option to zero the totalizer for total flow.

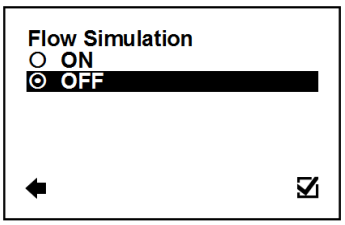
| | |
|---|---|
| ← | Back with no change |
| ↻↺ | Item selection |
| ☑ | Confirmation of choice |
| ☒ | No change |
| ☑ | Resets total volume totalizer |




### 3.7.6. Service Settings>Flow Simulation

Switching on/off the flow simulation mode.

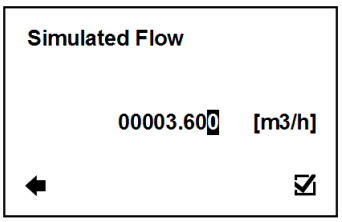
| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **ON** | Flow Simulation status is ON |
| **OFF** | Flow Simulation status is OFF |




### 3.7.7. Service Settings> Simulated Flow

Simulation flow in m3/hr (Factory setting: 3.6m3/h).
Possible range: **0 – 36000m3/h**

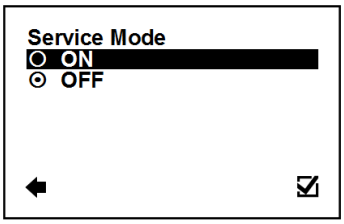
| | |
|---|---|
| ← | Back with no change |
| ↻↺ | Selection of digit position |
| ↑↓ | Value setting |
| ☑ | Confirmation of setup and saving to memory |



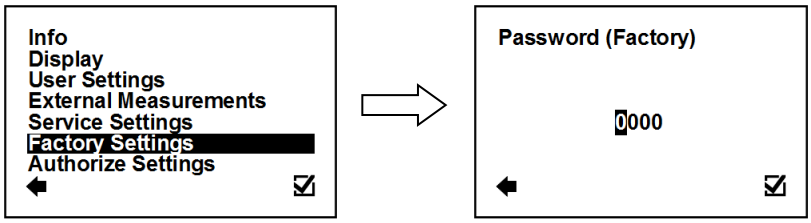

### 3.7.8. Service Settings> Service mode

Switching on/off the service mode for troubleshooting purposes.

| | |
|---|---|
| ← | Back with no change |
| ↑↓ | Item selection |
| ⊙ | Selection identification |
| ☑ | Confirmation of setup and saving to memory |
| **ON** | Service Mode is ON |
| **OFF** | Service Mode is OFF |



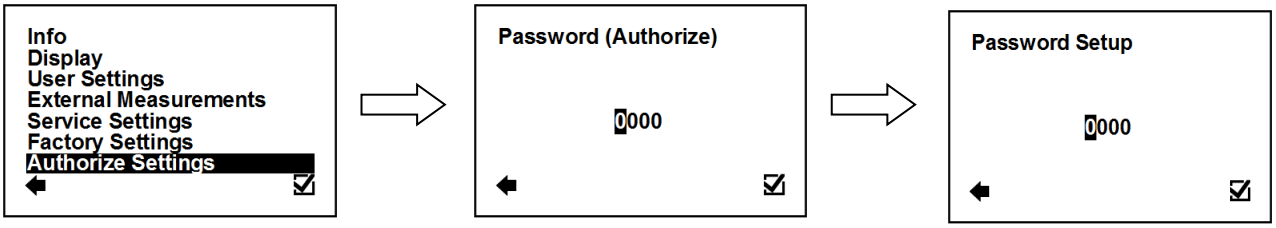

## 3.8. Factory Settings Menu




To enter this part of the menu, it is necessary to enter the **Factory** Password.

**This function is available to Arkon staff in the Arkon workshop.**

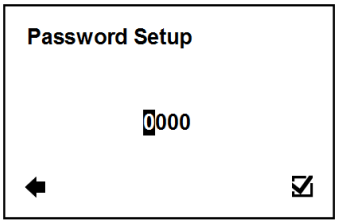
## 3.9. Authorize Menu




To enter this part of the menu, it is necessary to enter the **Authorize** Password.

**This function is available to Arkon staff in the Arkon workshop.**

### Authorize Settings > Password Setup




Here, it is possible to change a forgotten user password. It is necessary to call the Arkon sales office and provide the serial number. The authorisation number is provided based on this serial number.

| | |
|---|---|
| ← | Back with no change |
| ↔ | Selection of digit position |
| ↕ | Value setting |
| ☑ | Confirmation of setup and saving to memory |
| **Password** | Enter value between 0000 and 9999 |

# 4. Modules

## 4.1. Power Supply Module Version 5

| Module Name: | Symbol: | Ordering Code: |
|---|---|---|
| **Power Supply Module** | | ***5***** |

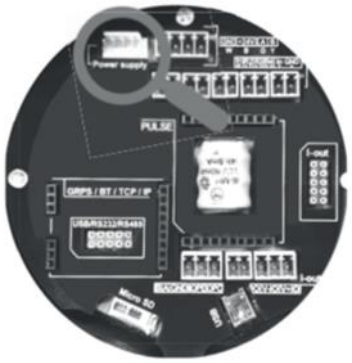
**APPLICATIONS:**

Industrial Power Supplies 90-250 V AC

12-36 V DC Distributed Power Systems.

This module is necessary for the complete flowmeter.

**PIN LOCATION**



**Electrical Specifications**

| | |
|---|---|
| **Input Voltages ±5% / max power / possible current consumption** | AC 90 - 250V (50-60 Hz) / max. 15 VA / max 170 mA<br>DC 12 – 36V / max 15W / max 1,25 A |
| External battery backup: | DC 12 – 36V / max 15W*<br>The power supply is not charging the backup battery |
| **Output Voltages** | **3.3V / 2A**<br>**23.6V/500mA** |
| **Temp. Range** | -20 – 70 °C |
| **Dimensions:** | R = 50mm<br>H(230V) = 58mm<br>H(12,24V) = 58mm |
| **Weight** | 300g |


| | |
|---|---|
| | The device does not have a network power switch. For any electrical work or housing open it is necessary to disconnect the device from the network power, and this has to be done via a switch. The mains protective earth wire has to be connected to the PE terminal (power supply class 1). A switch or circuit breaker (B6) has to be in the building installation if mains supply 90 – 250 V AC from building installation is connected to the power supply module. It must be in close proximity to the equipment and within easy reach of the operator, and it shall be marked as the disconnecting device for the flowmeter. |

| | | |
|---|---|---|
| 90-250 V AC / 15VA<br>Recommended power supply cable minimum 3xØ1mm$^2$ | 12 – 36 V DC / 15W<br>Recommended power supply cable minimum 2xØ0.5mm$^2$ | Backup power 12 – 36 V DC / 15W<br><br>*If using backup battery, its voltage needs to be lower than usually used DC power supply or less than 24V in case of using AC power source<br>See P32 - Backup battery procedure |
| All used wires have to be round crosscut cables. | | |

| | |
|---|---|
| | Any connection or disconnection of any module has to be done with the network power to the meter switched off. The flowmeter is CAT II – CAT III device. |

## 4.2. Battery backup

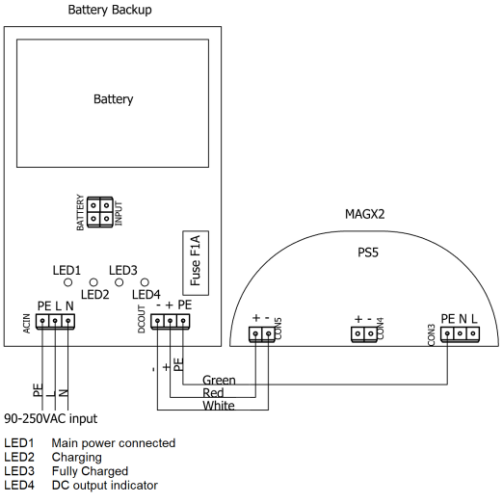
| Module Name: | Symbol: | Ordering Code: |
|---|---|---|
| **Battery back-up – Li-Ion 5200 mAh** |  | **11606** |

**Application:**
UPS for MAGX2 flowmeter

**Electrical Specifications:**

| | |
|---|---|
| **Input Voltage ±5%** | 90 - 250VAV (50-60 Hz) |
| **Max. input current** | 0,96A at 90 VAC |
| **Output voltage** | DC 12,5 – 24,0 VDC (unstabilized) |
| **Max. output current** | 0,5A |
| **Max. operation on battery time** | 20h |
| **Max. battery charging time** | 8h |
| **Temp. Range** | 0 - 60 °C |
| **Dimensions** | 100 x 225 x 85 mm |
| **Weight** | 2,5 kg |

**Electrical connection:**




**Order of power connection:**
1. Battery backup cable to the flowmeter (Interconnection between each)
2. Power supply cable to the battery backup
3. 4-port battery connector to the PCB 4-port connector

**Panel Mounting:**
To mount the battery pack onto the panel - recommended 4 bolts Allen head (DIN912 M4x40), spacing 66x186mm.
Please note 10mm of the bolt remain inside the housing.

| | |
|---|---|
|  | Take special care not to cross connect input and output terminals - doing so will cause severe damage to the battery backup. |

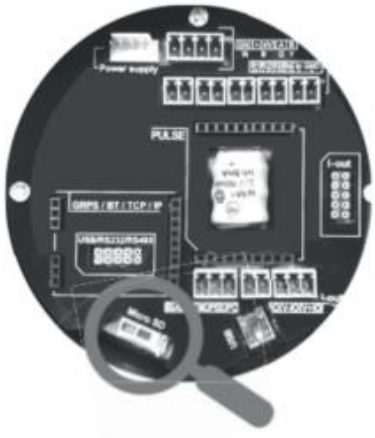
| | |
|---|---|
|  | The device does not have a network power switch. For any electrical work or housing open it is necessary to disconnect the device from the network power, and this has to be done via a switch.<br><br>The mains protective earth wire has to be connected to the PE terminal (power supply class 1). A switch or circuit breaker (B6) has to be in the building installation if mains supply 90 – 250 V AC from building installation is connected to the battery backup module. It must be in close proximity to the equipment and within easy reach of the operator. |

| | | |
|---|---|---|
| 90-250 VAC Recommended power supply cable minimum 3xØ1mm$^2$ | Cable for MAGX2 already fitted, length 2 meters | Short-circuit protection - fused by F1A. Spare fuse inside the battery backup - remove before use. |
| All used wires have to be round crosscut cables. | | |

| | |
|---|---|
|  | Any connection or disconnection of any MAGX2 module has to be done with the network power to the meter switched off. To do that disconnect power to battery backup and disconnect the 4pin battery input connector to unplug the batteries. After that the flowmeter should be de-powered. The flowmeter is CAT II – CAT III device. Lithium batteries inside!<br><br>In case LED4 is not on and batteries and/or mains supply is connected most likely there is a blown fuse. Fix the origin of the short on power system, change fuse and start the battery pack again.<br><br>In case LED4 is dim most likely internal electronic fuse took place. Fix the origin of the short on power system, change fuse and start the battery pack again. |

## 4.3. Datalogger

| Module Name: | Symbol: | Ordering Code: |
|---|---|---|
| **Micro SD card** |  | **4601** |

| **BASIC CIRCUIT CONNECTIONS:** |
|---|
|  Size: 11mm x 15mm x 1.0mm<br><br>Durability: 10,000 insertion/removal cycles<br><br>Weight: 0.4g<br><br>Minimal Capacity: 32 MB |
| The data are stored in *.csv format.<br>To read the datalogger simply plug the SD card to your computer and open the file using any table processor. |
| The logging interval is possible to set from 1 minute to 1 day<br>Each record consists of:<br>Date and time, FW number, Measurement (Run/Stop), Total, Total+, Total-, Aux, Error Min, OK min, Error Code, Temperature, External Temperature (if present), External Pressure/Input (if present) |
| While there is an error “SD card not inserted” or “SD Open file” active and the user plugs-in the SD card, error will disappear after next write to the datalogger. It is recommended to setup the datalogger interval again or restart the flowmeter after every SD card plug-in. |

## 4.4. Module positioning

Individual module installation is straightforward thanks to a plug-and-play system. Yet, some caution is required when selecting the correct installation slot according to the picture below.

**GPRS**
**BLUETOOTH**
**TCP/IP**
**GSM-SMS**

**PULSE**
**EXT. TEMPERATURE**

**RS232**
**RS485**
**USB**

**CURRENT-LOOP**
**EXT. PRESSURE/INPUT**

## 4.5. USB Module

| Module Name: | Symbol: | Ordering Code: |
|---|---|---|
| **MAGX2 USB Module** | USB | ******USB |

| **APPLICATIONS:** |
|---|
| Any System Requiring, USB Communications, Peripheral - PC and Terminal. USB 1.1 and USB 2.0 compatible |

| **BASIC CIRCUIT CONNECTIONS:** |
|---|
|  |
| Requirement: Microsoft Windows XP or newer version of operating system |

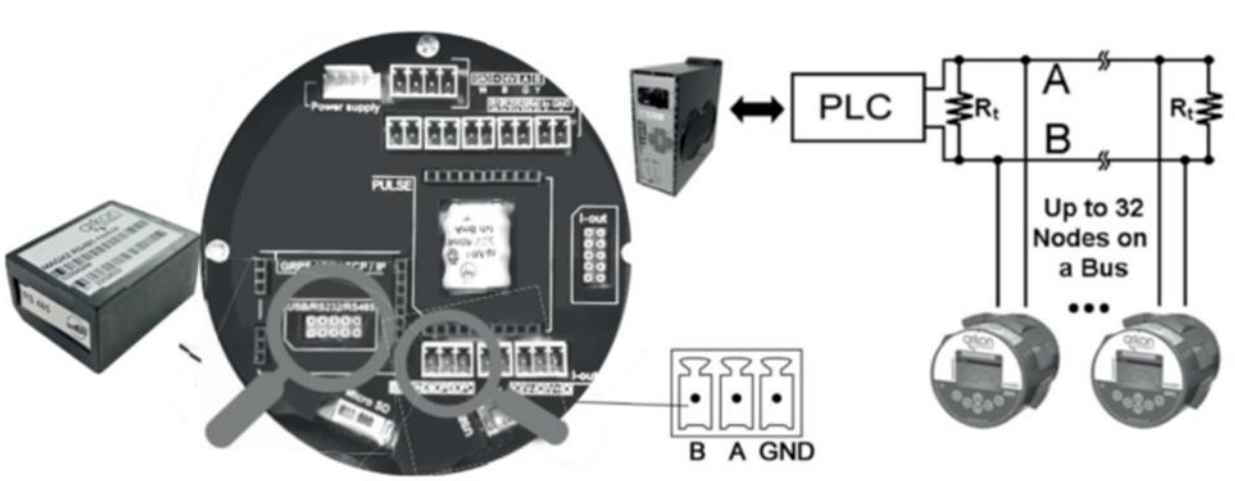
| | |
|---|---|
| | Drivers are included in MAGX2 SW. |
| | Any connection or disconnection of any module has to be done with the network power to the meter switched off. PELV device. |

## 4.6. RS485 Module

| Module Name: | Symbol: | Ordering Code: |
|---|---|---|
| **MAGX2 RS485 Module** | **RS 485** | ******485** |

| **APPLICATIONS:** | |
|---|---|
| Industrial Automation, Industrial Process Control, Peripheral - PC and Terminal. | |
| | |
| **Electrical Specifications** | |
| VCC to Ground | 3.3 VDC |
| Baud rate | Max. 115200 baud/s |

**BASIC CIRCUIT CONNECTIONS:**




Multi-Node Network with End Termination Using module RS485

**Terminator $R_t$ with resistance 100Ω should be connected to the end of line RS-485.**

| | |
|---|---|
| | Warning electrostatic sensitive device. |
| | Any connection or disconnection of any module has to be done with the network power to the meter switched off. |

## 4.7. RS232 Module

| Module Name: | Symbol: | Ordering Code: |
|---|---|---|
| **MAGX2 RS232 Module** | **RS 232** | ******232** |

| **APPLICATIONS:** | |
|---|---|
| Industrial Automation, Industrial Process Control, Peripheral - PC and Terminal. | |
| | |
| **Electrical Specifications** | |
| VCC to Ground | 3.3 VDC |
| Baud rate | Max. 115200 baud/s |

**BASIC CIRCUIT CONNECTIONS:**

**A special cable Cannon9 – mini USB is included.**

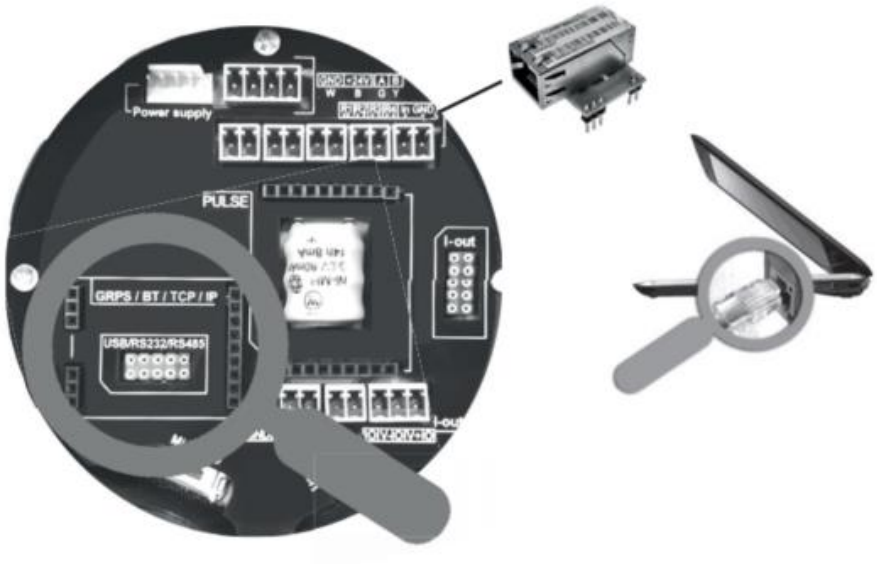
| | |
|---|---|
| | Warning electrostatic sensitive device. |
| | Any connection or disconnection of any module has to be done with the network power to the meter switched off. |

## 4.8. TCP/IP Module

| Module Name: | Symbol: | Ordering Code: |
|---|---|---|
| **MAGX2 TCP/IP Module** | **TCP/IP** | ******TCP** |

| **APPLICATIONS:** | |
|---|---|
| Industrial Automation, Industrial Process Control, Peripheral - PC and Terminal. | |
| | |
| **Electrical Specifications** | |
| VCC to Ground | 3.14V to 3.46V |
| Power Supply Current | 120 – 267mA |
| Ethernet | 10/100Mbit |
| Temp. Range | -20 – 70 °C |

| **BASIC CIRCUIT CONNECTIONS:** | **Using the TCP/IP Module** |
|---|---|




**See TCP/IP installation manual.**

**Warning!**: There is a condition that must be fulfilled for the TCP/IP module to be able to operate correctly: line speed of the communication protocol Modbus **must** be set up on **19200Bd, Parity none, 1 stop bit.** If there is a different setting the communication will not work. You can find the setting in the following MAGX2 flow meter menu: "Menu / User settings / Modbus / Baud rate" and "Menu / User settings / Modbus / Parity".

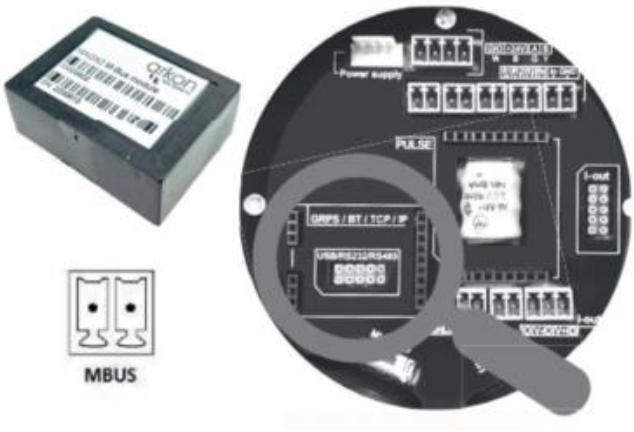
| | |
|---|---|
|  | Warning electrostatic sensitive device. |
|  | Any connection or disconnection of any module has to be done with the network power to the meter switched off. |

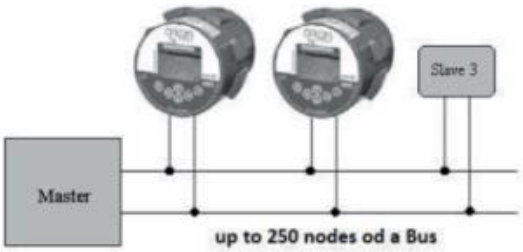
## 4.9. M-Bus Module

| Module Name: | Symbol: | Ordering Code: |
|---|---|---|
| **MAGX2 M-Bus Module** | M-Bus | ******MBUS |

| **APPLICATIONS:** | |
|---|---|
| Industrial Automation, Industrial Process Control | |
| | |
| **Electrical Specifications** | |
| Baud rate | 2400 baud |
| Temp. Range | -20 – 70 °C |

| **BASIC CIRCUIT CONNECTIONS:** | **Using the M-bus Module** |
|---|---|




**See M-Bus installation manual**

| | |
|---|---|
|  | Warning electrostatic sensitive device. |
|  | Any connection or disconnection of any module has to be done with the network power to the meter switched off. |

## 4.10. BLUETOOTH Module

| Module Name: | Symbol: | Ordering Code: |
|---|---|---|
| **MAGX2 BLUETOOTH Module** | **Bluetooth** | ******BTO** |

| **APPLICATIONS:** | |
|---|---|
| Wireless control of and communication between transmitter and PC or PLC systems<br>Any System Requiring Bluetooth Communications | |
| | |
| **Electrical Specifications** | |
| VCC to Ground | 3.3 VDC |
| Power Supply Current | 120 mA |
| Baud Rate | Max. 460.8 Kbaud/s |
| Carrier Frequency | 2.402 – 2.480 GHz |
| Range | 100m (class 1) |
| Temp. Range | –20 – 70 °C |

| **BASIC CIRCUIT CONNECTIONS:** | **Using the TCP/IP Module** |
|---|---|

**See Bluetooth installation manual.**

**Warning!**: There is a condition that must be fulfilled for the Bluetooth module to be able to operate correctly: line speed of the communication protocol Modbus **must** be set up on **19200Bd, Parity none, 1 stop bit.** If there is a different setting the communication will not work. You can find the setting in the following MAGX2 flow meter menu: "Menu / User settings / Modbus / Baud rate" and "Menu / User settings / Modbus / Parity".

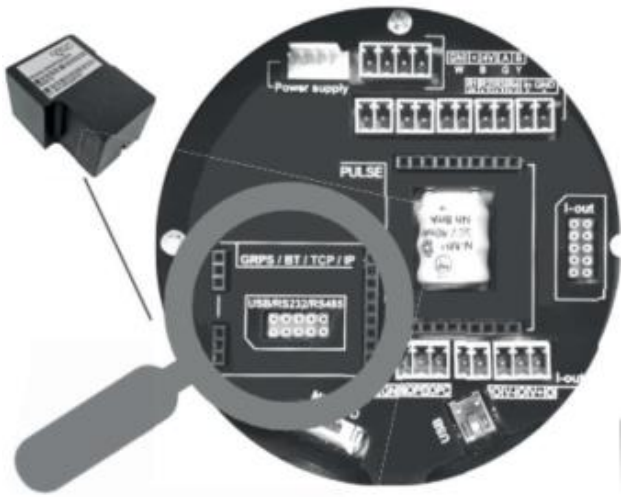
| | |
|---|---|
|  | Warning electrostatic sensitive device. |
|  | Any connection or disconnection of any module has to be done with the network power to the meter switched off. |

## 4.11. 3G/GPRS/SMS Module

| Module Name: | Symbol: | Ordering Code: |
|---|---|---|
| **MAGX2 3G/GPRS/GSM Module** | **GPRS** | ******GPRS** |

| **APPLICATIONS:** | |
|---|---|
| Wireless monitoring of the flowmeter via SMS messages and/or 3G/GPRS data transfer,<br>Wireless data collection systems, SCADA, Arkon.Track | |
| | |
| **Electrical Specifications** | |
| VCC to Ground | 3.3 VDC |
| Power Supply Current | RMS 400mA, MAX 1500mA |
| Operating Systems | GSM 850 / GSM 900<br>DCS 1800 / PCS 1900<br>3G |
| Multi-slot class | 10 (4 Rx / 2 Tx / 5 Sum) |
| SIM Card | 3.0 / 1.8 V |
| Temp. Range | –20 – 70 °C |

| **BASIC CIRCUIT CONNECTIONS:** | |
|---|---|




**See3G/GPRS/SMS Module Installation manual.**


**Warning!**: The module installation is described in separate document: MAGX2 3G-GPRS-GSM User Guide. Setting of the module is done through SMS commands described in the manual above. The meter is sending flow and totalizer information in selected time interval to maximum 3 phone numbers in form of SMS message and/or 3G/GPRS TCP packet to selected IP address and port. The module can be used in IOT platform Arkon.Track.

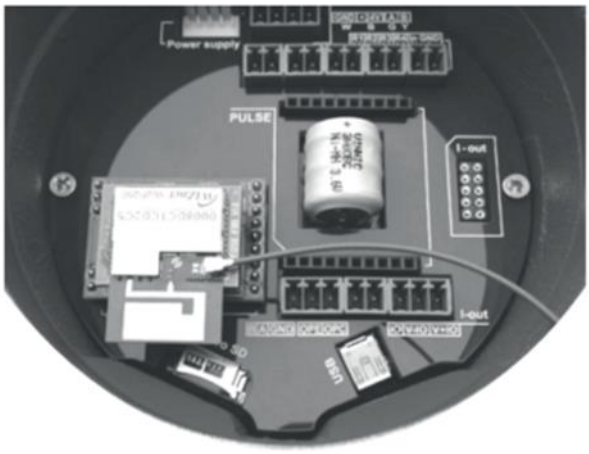
| | |
|---|---|
|  | Warning electrostatic sensitive device. |
|  | Any connection or disconnection of any module has to be done with the network power to the meter switched off. |

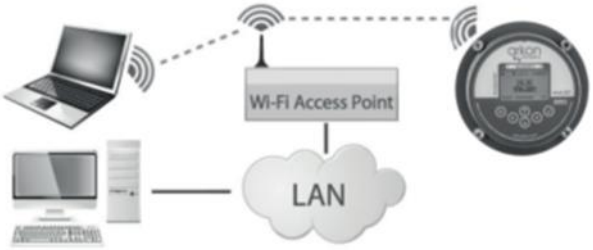
## 4.12. Wi-Fi Module

| Module Name: | Symbol: | Ordering Code: |
|---|---|---|
| **MAGX2 WiFi Module** | Wi–Fi | ******WIFI |

| **APPLICATIONS:** | |
|---|---|
| Wireless communication for short and medium distances. | |
| | |
| **Electrical Specifications** | |
| VCC to Ground | 3.3 VDC |
| Power Supply Current | up to 430 mA |
| Baud Rate | 4800 - 38400 baud/s |
| Carrier Frequency | 2,400 – 2,484 GHz |
| Range | up to 200 m |
| Temp. Range | -20 – 70 °C |

| **BASIC CIRCUIT CONNECTIONS:** | **Using the Wi-Fi Module** |
|---|---|




**See Wi-Fi module installation procedure (P31).**

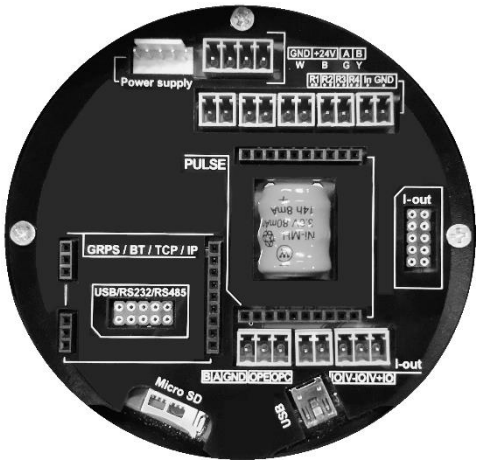
| | |
|---|---|
| | Warning electrostatic sensitive device. |
| | Any connection or disconnection of any module has to be done with the network power to the meter switched off. |

## 4.13. LoRa Module

| Module Name: | Symbol: | Ordering Code: |
|---|---|---|
| **MAGX2 LoRa Module** | LoRaWAN | ********LoRa** |

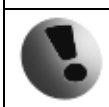
| **APPLICATIONS:** | |
|---|---|
| Wireless data collection systems, SCADA, AMR | |
| | |
| **Electrical Specifications** | |
| VCC to Ground | 3.3 VDC |
| Power Supply Current | Max 200mA |
| Operating Systems | 868 MHz |
| Output power | Up to +19dBm |
| Range | Up to 15km (Line of Sight) |
| Authentication method | OTAA |
| Temp. Range | -20 – 70 °C |

| **BASIC CIRCUIT CONNECTIONS:** | |
|---|---|




**See MAGX2 RF Module Installation user guide for more info.**

**Warning!**: The module is sending data automatically every 30 second. An identification tag with all need information (Device EUI, APP EUI and APPKey) is send with the module.

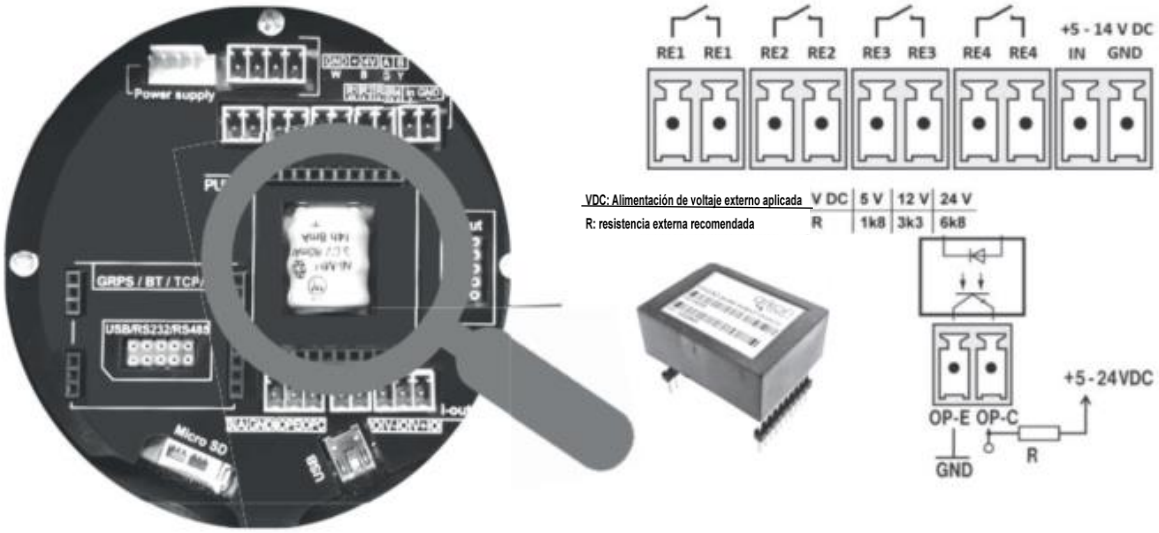
| | |
|---|---|
|  | Warning electrostatic sensitive device. |
|  | Any connection or disconnection of any module has to be done with the network power to the meter switched off. |

## 4.14. Pulse Output Module

| Module Name: | Symbol: | Ordering Code: |
|---|---|---|
| **MAGX2 Pulse Output Module** | **PULSE** | *****P* |

| **APPLICATIONS:** | |
|---|---|
| Industrial Automation, Industrial Process Control, Test Systems, Smart Transmitter | |
| | |
| **Electrical Specifications** | |
| VCC to Ground | 3.3 VDC |
| Output mode | Frequency, Pulse |
| Max Relay Voltage | 110VDC/0.5A |
| Output Frequency | 2-1000 Hz |
| Batching Voltage Input Rate | +5 - 14VDC |
| Temp. Range | -20 – 70 °C |

| **BASIC CIRCUIT CONNECTIONS:** | **Using the Pulse Output Module** |
|---|---|



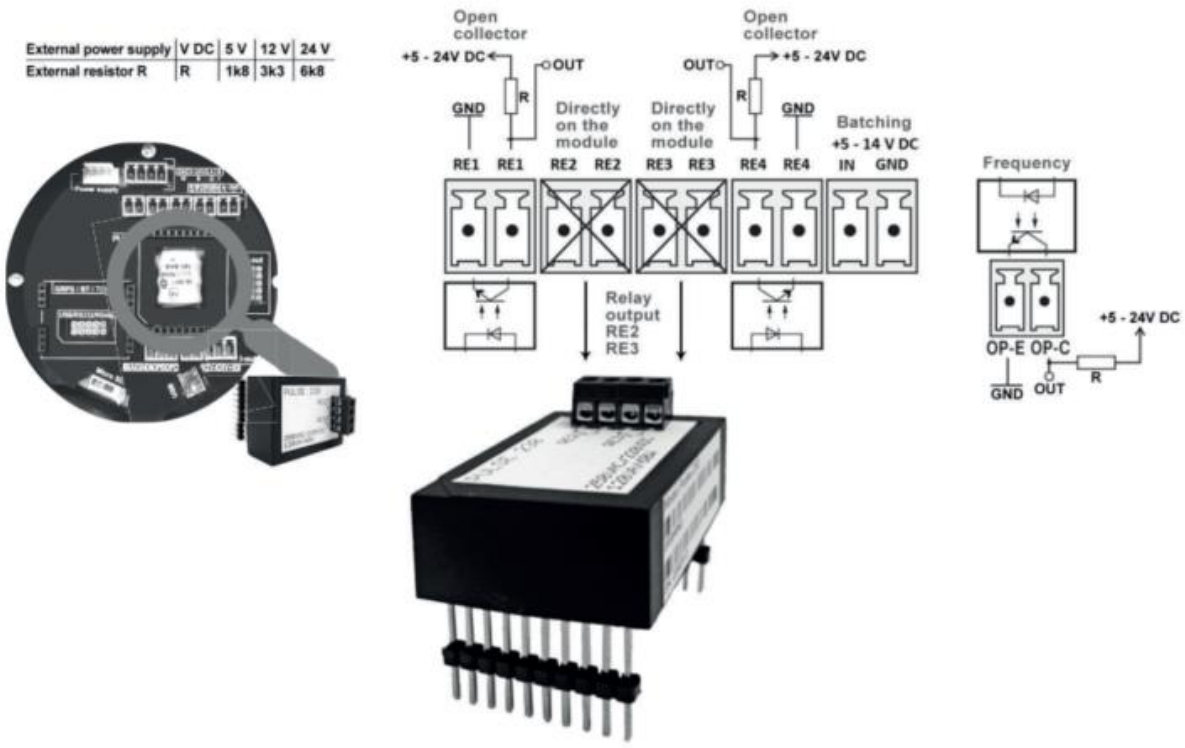

| | |
|---|---|
| | Warning electrostatic sensitive device. |
| | Any connection or disconnection of any module has to be done with the network power to the meter switched off. |

## 4.15. Pulse 230 Module

| Module Name: | Symbol: | Ordering Code: |
|---|---|---|
| **MAGX2 Pulse 230 Module** | **PULSE 230** | *****P2**** |

| **APPLICATIONS:** | |
|---|---|
| Industrial Automation, Industrial Process Control, Test Systems, Smart Transmitter | |
| | |
| **Electrical Specifications** | |
| VCC to Ground | 3.3 VDC |
| Output mode | Frequency, Pulse - relay and open collector |
| Max Relay Voltage (RE2,RE3) | 250VAC/220VDC at 120VA/60W |
| Output Frequency | 2-1000Hz |
| Batching Voltage Input Range | +5-14V DC |
| Temp. Range | -20 to +70C |

| **BASIC CIRCUIT CONNECTIONS:** | **Using the Pulse 230 Output Module** |
|---|---|




| | |
|---|---|
| | Warning electrostatic sensitive device. |
| | Any connection or disconnection of any module has to be done with the network power to the meter switched off. |

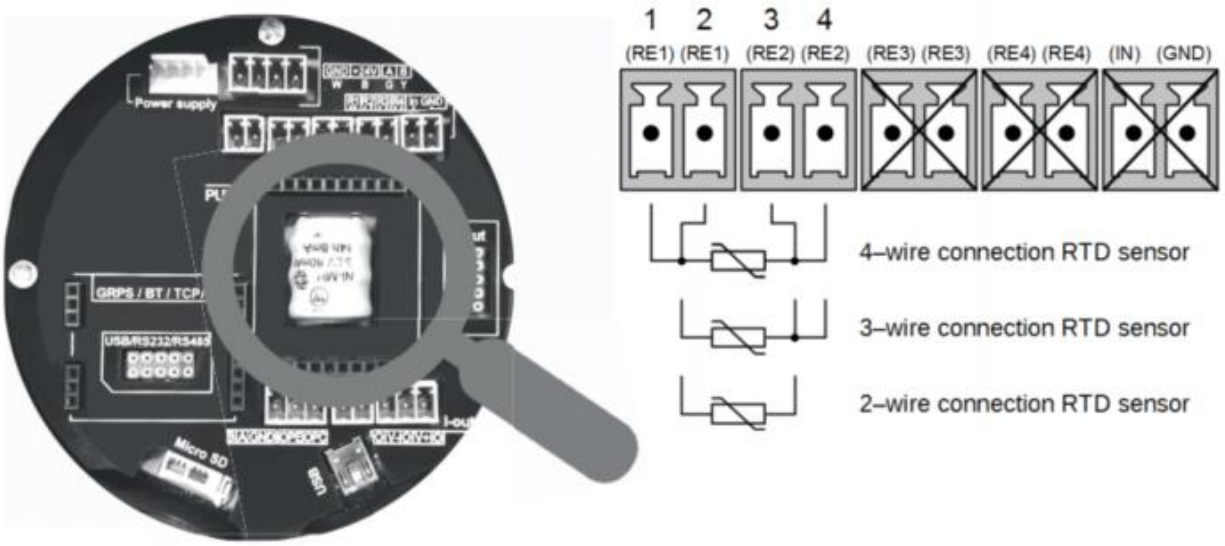
## 4.16. External Temperature Module

| Module Name: | Symbol: | Ordering Code: |
|---|---|---|
| **MAGX2 External Temperature Module** | **External Temperature** | ******ET**** |

| **APPLICATIONS:** | |
|---|---|
| Industrial Automation, Industrial Process Control, Test Systems, Smart Transmitter | |
| | |
| **Electrical Specifications** | |
| VCC to Ground | 3.3 VDC |
| RTD Sensor Type | Pt100, Pt200, Pt500, Pt1000 |
| Tolerance RTD Sensors | Class A, Class B |
| RTD Sensor connection | 2-wire, 3-wire, 4-wire |
| Measurement Range | -30 – 180 °C (or according to the manufacturer's specifications of the sensor) |
| Temp. Range | -20 – 70 °C |

**BASIC CIRCUIT CONNECTIONS:**

The actual physical connection have to be selected in menu: External measurements – Temperature – Sensor Type



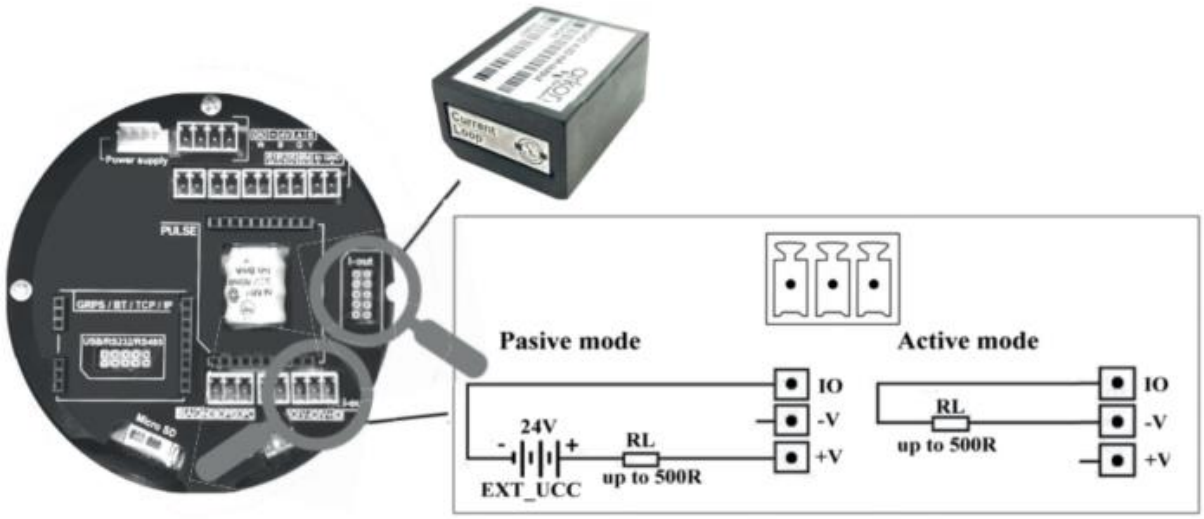

| | |
|---|---|
| | Warning electrostatic sensitive device. |
| | Any connection or disconnection of any module has to be done with the network power to the meter switched off. |

## 4.17. Current Loop Output Module

| Module Name: | Symbol: | Ordering Code: |
|---|---|---|
| **MAGX2 4-20mA Current Loop Output Module** | **Current Loop**  | ******C**** |

| **APPLICATIONS:** | |
|---|---|
| Industrial Automation, Industrial Process Control, Test Systems, Smart Transmitter | |
| | |
| **Electrical Specifications:** | |
| VCC to Ground | 3.3 VDC |
| Type | 12-bit DAC |
| Maximum resolution | 3.9 µA |
| Current out | 4 – 20 mA |
| Output mode | Active or Passive |
| Temp. Range | -20 – 70 °C |

| **BASIC CIRCUIT CONNECTIONS:** | **Using the Current Loop Module** |
|---|---|



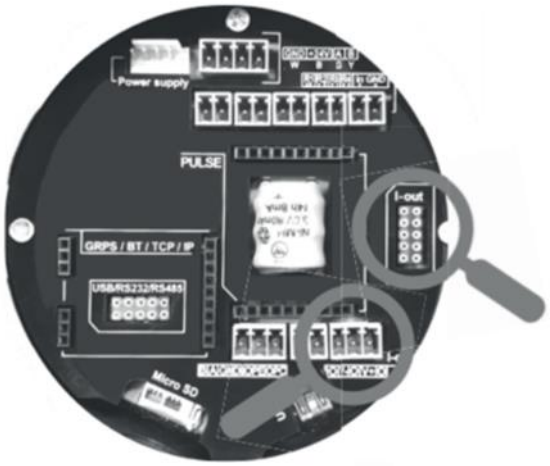

| | |
|---|---|
|  | Warning electrostatic sensitive device. |
|  | Any connection or disconnection of any module has to be done with the network power to the meter switched off. |

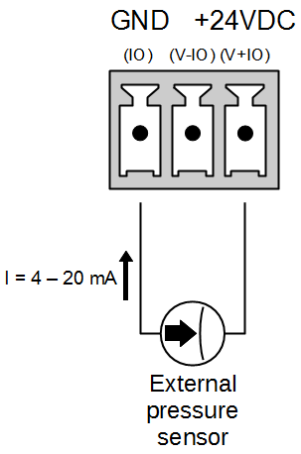
## 4.18. External Pressure Module

| Module Name: | Symbol: | Ordering Code: |
|---|---|---|
| **MAGX2 External Pressure Module** | **External Pressure** | ******EP**** |

| **APPLICATIONS:** | |
|---|---|
| Industrial Automation, Industrial Process Control, Test Systems, Smart Transmitter | |
| | |
| **Electrical Specifications:** | |
| VCC to Ground | 3.3 VDC |
| Output type Pressure Sensor | passive 4 – 20 mA (ext. power supply from Pressure Module) |
| Measurement Range | according to the manufacturer's specifications the sensor |
| Measurement Unit | bar, psi |
| Temp. Range | -20 – 70 °C |

**BASIC CIRCUIT CONNECTIONS:**




| | |
|---|---|
| | Warning electrostatic sensitive device. |
| | Any connection or disconnection of any module has to be done with the network power to the meter switched off. |

# 5. OIML R49 certification

MAGX2 have been type tested and internationally proven and endorsed to the highest accuracy class 2 for cold and hot potable water meters – OIML R49-1 (Organisation Internationale de Métrologie Légale). For full details, OIML R49 is available to download from www.oiml.org. Its requirements are in line with other international standards, such as ISO4064. MAGX2 flowmeter has been evaluated by type approval at the Czech Metrology Institute to OIML R49:2013 and passed the very highest accuracy designations for sizes DN25 to DN300 (1 to 12 in. NB).
The OIML R49-1 certificate of conformity is available on our website (www.arkon.co.uk).

Climatic class: **B**
Electromagnetic class: **E2**
Pressure class: **MAP10**
Temperature class: **T50**
Pressure loss: **ΔP 10**
Installation condition: **U5D3**, any installation position*****
Accuracy class: **2**
Flow direction: **positive**
Q3/Q1 ratio is described in following table:

| DN | R | Flow Rate [m3/hr] | | | | R | Flow Rate [m3/hr] | | | | R | Flow Rate [m3/hr] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Q1** | **Q2** | **Q3** | **Q4** | | **Q1** | **Q2** | **Q3** | **Q4** | | **Q1** | **Q2** | **Q3** | **Q4** |
| 25 | **50** | 0,32 | 0,51 | 16,00 | 20,00 | **100** | 0,16 | 0,26 | 16,00 | 20,00 | **160** | 0,10 | 0,16 | 16,00 | 20,00 |
| 32 | **50** | 0,50 | 0,80 | 25,00 | 31,25 | **100** | 0,25 | 0,40 | 25,00 | 31,25 | **160** | 0,16 | 0,25 | 25,00 | 31,25 |
| 40 | **50** | 0,80 | 1,28 | 40,00 | 50,00 | **100** | 0,40 | 0,64 | 40,00 | 50,00 | **160** | 0,25 | 0,40 | 40,00 | 50,00 |
| 50 | **50** | 1,26 | 2,02 | 63,00 | 78,75 | **100** | 0,63 | 1,01 | 63,00 | 78,75 | **160** | 0,39 | 0,63 | 63,00 | 78,75 |
| 65 | **50** | 2,00 | 3,20 | 100,00 | 125,00 | **100** | 1,00 | 1,60 | 100,00 | 125,00 | **160** | 0,63 | 1,00 | 100,00 | 125,00 |
| 80 | **50** | 3,20 | 5,12 | 160,00 | 200,00 | **100** | 1,60 | 2,56 | 160,00 | 200,00 | **160** | 1,00 | 1,60 | 160,00 | 200,00 |
| 100 | **50** | 4,00 | 6,40 | 200,00 | 250,00 | **100** | 2,00 | 3,20 | 200,00 | 250,00 | **160** | 1,25 | 2,00 | 200,00 | 250,00 |
| 125 | **50** | 8,00 | 12,80 | 400,00 | 500,00 | **100** | 4,00 | 6,40 | 400,00 | 500,00 | **160** | 2,50 | 4,00 | 400,00 | 500,00 |
| 150 | **50** | 12,60 | 20,16 | 630,00 | 787,50 | **100** | 6,30 | 10,08 | 630,00 | 787,50 | **160** | 3,94 | 6,30 | 630,00 | 787,50 |
| 200 | **50** | 16,00 | 25,60 | 800,00 | 1000,00 | **100** | 8,00 | 12,80 | 800,00 | 1000,00 | **160** | 5,00 | 8,00 | 800,00 | 1000,00 |
| 250 | **50** | 20,00 | 32,00 | 1000,00 | 1250,00 | **100** | 10,00 | 16,00 | 1000,00 | 1250,00 | **160** | 6,25 | 10,00 | 1000,00 | 1250,00 |
| 300 | **50** | 32,00 | 51,20 | 1600,00 | 2000,00 | **100** | 16,00 | 25,60 | 1600,00 | 2000,00 | **160** | 10,00 | 16,00 | 1600,00 | 2000,00 |

| DN | R | Flow Rate [m3/hr] | | | | R | Flow Rate [m3/hr] | | | | R | Flow Rate [m3/hr] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Q1** | **Q2** | **Q3** | **Q4** | | **Q1** | **Q2** | **Q3** | **Q4** | | **Q1** | **Q2** | **Q3** | **Q4** |
| 25 | **200** | 0,08 | 0,13 | 16,00 | 20,00 | **250** | 0,06 | 0,10 | 16,00 | 20,00 | **400** | 0,04 | 0,06 | 16,00 | 20,00 |
| 32 | **200** | 0,13 | 0,20 | 25,00 | 31,25 | **250** | 0,10 | 0,16 | 25,00 | 31,25 | **400** | 0,06 | 0,10 | 25,00 | 31,25 |
| 40 | **200** | 0,20 | 0,32 | 40,00 | 50,00 | **250** | 0,16 | 0,26 | 40,00 | 50,00 | **400** | 0,10 | 0,16 | 40,00 | 50,00 |
| 50 | **200** | 0,32 | 0,50 | 63,00 | 78,75 | **250** | 0,25 | 0,40 | 63,00 | 78,75 | **400** | 0,16 | 0,25 | 63,00 | 78,75 |
| 65 | **200** | 0,50 | 0,80 | 100,00 | 125,00 | **250** | 0,40 | 0,64 | 100,00 | 125,00 | **400** | 0,25 | 0,40 | 100,00 | 125,00 |
| 80 | **200** | 0,80 | 1,28 | 160,00 | 200,00 | **250** | 0,64 | 1,02 | 160,00 | 200,00 | **400** | 0,40 | 0,64 | 160,00 | 200,00 |
| 100 | **200** | 1,00 | 1,60 | 200,00 | 250,00 | **250** | 0,80 | 1,28 | 200,00 | 250,00 | **400** | 0,50 | 0,80 | 200,00 | 250,00 |
| 125 | **200** | 2,00 | 3,20 | 400,00 | 500,00 | **250** | 1,60 | 2,56 | 400,00 | 500,00 | **400** | 1,00 | 1,60 | 400,00 | 500,00 |
| 150 | **200** | 3,15 | 5,04 | 630,00 | 787,50 | **250** | 2,52 | 4,03 | 630,00 | 787,50 | **400** | 1,58 | 2,52 | 630,00 | 787,50 |
| 200 | **200** | 4,00 | 6,40 | 800,00 | 1000,00 | **250** | 3,20 | 5,12 | 800,00 | 1000,00 | **400** | 2,00 | 3,20 | 800,00 | 1000,00 |
| 250 | **200** | 5,00 | 8,00 | 1000,00 | 1250,00 | **250** | 4,00 | 6,40 | 1000,00 | 1250,00 | **400** | 2,50 | 4,00 | 1000,00 | 1250,00 |
| 300 | **200** | 8,00 | 12,80 | 1600,00 | 2000,00 | **250** | 6,40 | 10,24 | 1600,00 | 2000,00 | **400** | 4,00 | 6,40 | 1600,00 | 2000,00 |

***** NOTE: U5D3 requirement is NOT applicable for versions with Reduced-bore body.

# 6. Maintenance

MAGX2 flowmeter does not require any special maintenance. Dependent on the media being measured it is recommended that approximately once a year, to remove the sensor from the pipe and clean the liner. Method of cleaning consists of removing mechanical dirt and any non-conductive coating (like oil film) from the liner. A very dirty liner could cause inaccuracy of the measurement. Check mechanical state of the liner.

## 6.1. Self–cleaning electrodes

If mechanical cleaning is not possible, MAGX2 has electrolytic method to clean electrodes.

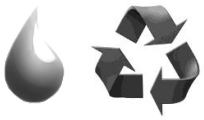
An electrolytic method is advantageous for its simplicity, however it can only be applied for the contamination that can be removed by electrolysis. (Low contamination and deposit).

24VAC voltage is applied directly to sensor electrodes to clean them. The time that that voltage is applied is selectable for user from 1 to 9999 seconds. For more info please go to section 3.5.20. User settings. Recommended time is 3sec.

# 7. Liner and electrode selection

Liner and electrode material selection are an important issue when choosing your flowmeter. The tables below serve to give you an idea of general material compatibility. If you are not sure about suitability of liner/electrode material for a particular medium, please contact the Arkon sales department for further assistance, and the site where the flowmeter is to be used for what materials are acceptable for the process media. Arkon can only recommend materials, we cannot guarantee them.
Please note that Arkon offer WRAS approved material for sizes up to DN600. For more info contact our sales department.

**Liner Selection:**

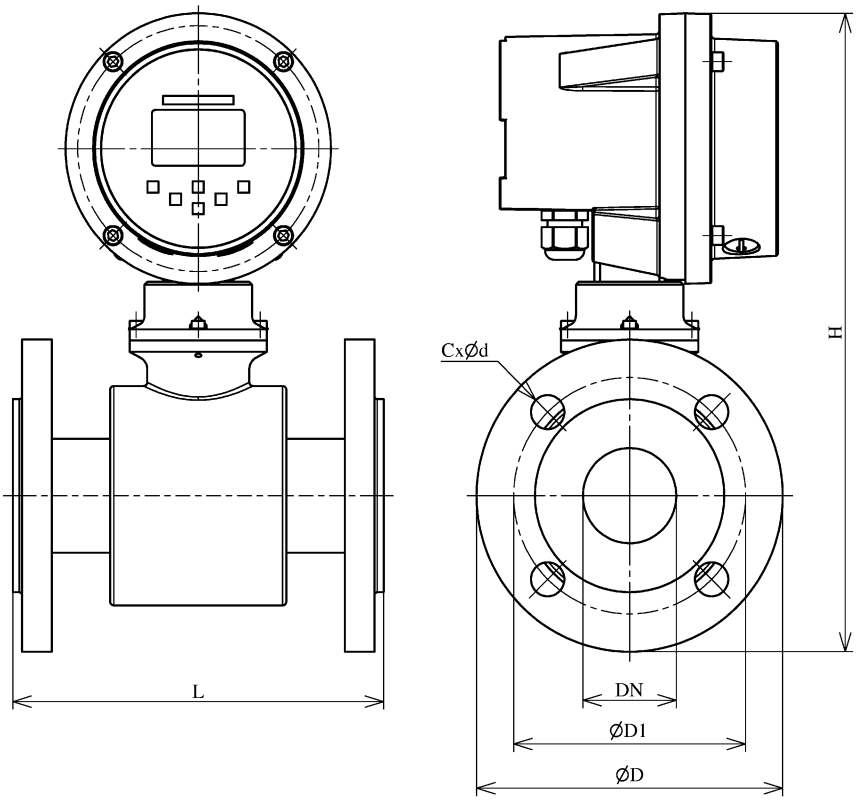
| | | | |
|---|---|---|---|
| Hard Rubber | Drinking water and wastewater |  | 0 - 70°C |
| Soft Rubber | Water with abrasive particles |  | 0 - 70°C |
| PTFE | Chemicals, food industries and drinking water |   | 0 - 130°C |
| Hygienic rubber | Potable water; WRAS approved |  | cold water |

**Electrode selection:**

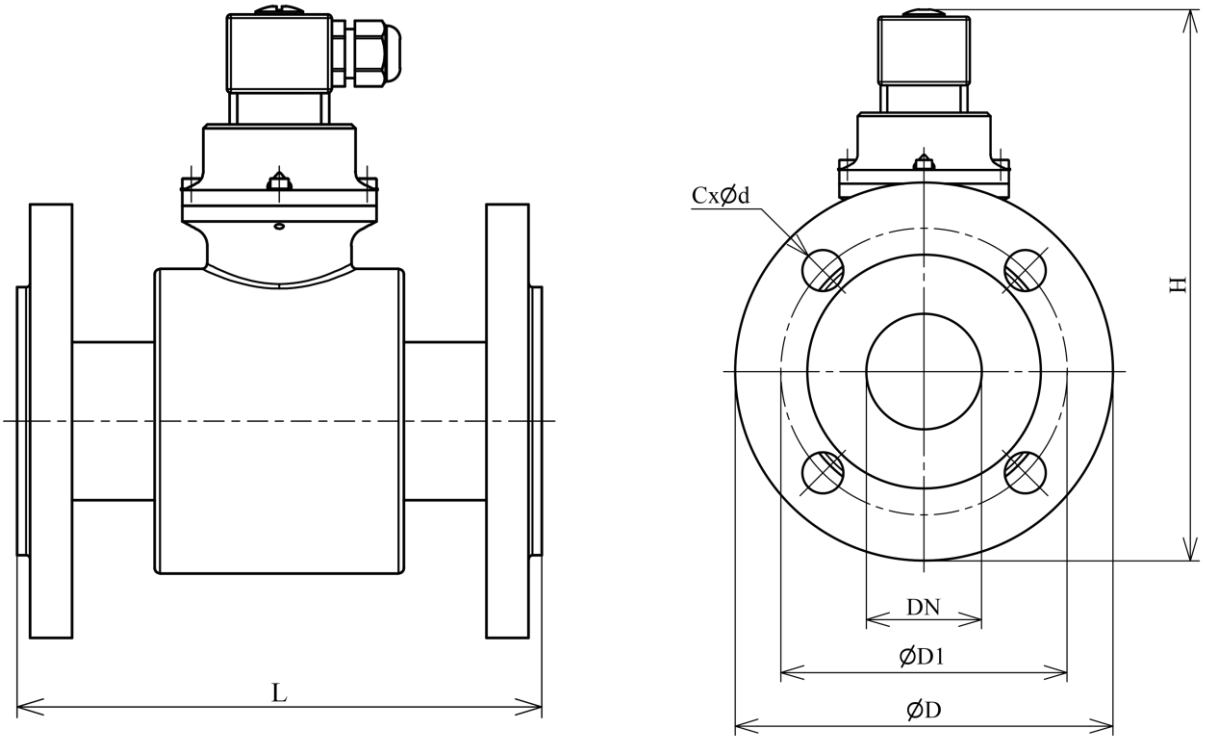
| | | |
|---|---|---|
| Hastelloy | General purpose, sewage, water, seawater, chemicals |   |
| Titanium | Aggressive chemicals |  |
| Platinum | Aggressive chemicals |  |

# 8. Flowmeter Dimensions

**Compact version**




**Remote version**



| DN | ØD | ØD1 | CxØd | H_compact | H_remote | L |
|---|---|---|---|---|---|---|
| **10** | 90 | 60 | 4x14 | 275 | 180 | 200 |
| **15** | 95 | 65 | 4x14 | 280 | 185 | 200 |
| **20** | 105 | 75 | 4x14 | 288 | 193 | 200 |
| **25** | 115 | 85 | 4x14 | 293 | 198 | 200 |
| **32** | 140 | 100 | 4x18 | 312 | 217 | 200 |
| **40** | 150 | 110 | 4x18 | 320 | 225 | 200 |
| **50** | 165 | 125 | 4x18 | 334 | 239 | 200 |
| **65** | 185 | 145 | 8x18 | 354 | 259 | 200 |
| **80** | 200 | 160 | 8x18 | 373 | 278 | 200 |
| **100** | 220 | 180 | 8x18 | 393 | 298 | 250 |
| **125** | 250 | 210 | 8x18 | 419 | 324 | 250 |
| **150** | 285 | 240 | 8x22 | 458 | 363 | 300 |
| **200** | 340 | 295 | 12x22 | 514 | 419 | 350 |
| **250** | 405 | 355 | 12x26 | 584 | 489 | 400 |
| **300** | 460 | 410 | 12x26 | 633 | 538 | 500 |
| **350** | 520 | 470 | 16x26 | 701 | 606 | 500 |
| **400** | 580 | 525 | 16x30 | 754 | 659 | 600 |
| **450** | 640 | 585 | 20x30 | 797 | 702 | 600 |
| **500** | 715 | 650 | 20x33 | 865 | 770 | 600 |
| **600** | 840 | 770 | 20x36 | 982 | 887 | 600 |

| DN | ØD | ØD1 | CxØd | H_compact | H_remote | L |
|---|---|---|---|---|---|---|
| **1/2"** | 88,9 | 60,5 | 4x16 | 277 | 182 | 200 |
| **3/4"** | 98,6 | 69,9 | 4x20 | 284 | 189 | 200 |
| **1"** | 108 | 79,2 | 4x20 | 290 | 195 | 200 |
| **1.1/4"** | 117,3 | 88,9 | 4x20 | 300 | 205 | 200 |
| **1.1/2"** | 127 | 98,6 | 4x23 | 309 | 214 | 200 |
| **2"** | 152,4 | 120,7 | 4x20 | 328 | 233 | 200 |
| **2.1/2"** | 177,8 | 139,7 | 4x20 | 350 | 255 | 200 |
| **3"** | 190,5 | 152,4 | 4x20 | 368 | 273 | 200 |
| **4"** | 228,6 | 190,5 | 8x20 | 397 | 302 | 250 |
| **5"** | 254 | 215,9 | 8x23 | 421 | 326 | 250 |
| **6"** | 279,4 | 241,3 | 8x23 | 455 | 360 | 300 |
| **8"** | 342,9 | 298,5 | 8x23 | 515 | 420 | 350 |
| **10"** | 406,4 | 362 | 12x26 | 584 | 489 | 400 |
| **12"** | 482,6 | 431,8 | 12x26 | 644 | 549 | 500 |
| **14"** | 533,4 | 476,3 | 12x29 | 708 | 613 | 500 |
| **16"** | 596,9 | 539,8 | 16x29 | 762 | 667 | 600 |
| **18"** | 635 | 577,9 | 16x32 | 795 | 700 | 600 |
| **20"** | 698,5 | 635 | 20x32 | 856 | 761 | 600 |
| **24"** | 812,8 | 749,3 | 20x35 | 968 | 873 | 600 |

Tolerance of built-in length:
DN 10 – DN 150 → L ± 5 mm
DN 200 – DN 1000 → L ± 10 mm

Standard pressure:
DN 10 – DN 50 → PN 40 / 150 lbs.
DN 65 – DN 150 → PN 16 / 150 lbs

# 9. How to order your MAGX2

| Model | Ordering code | | | | | | | Description |
|---|---|---|---|---|---|---|---|---|
| **MAGX2 IP68** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Standard calibration |
| **MAGX2 OIML IP68** | | | | | | | | OIML R49 Version (DN25-DN300) |
| **MAGX2 MID IP68** | | | | | | | | MID Version – MI-001, Class 2 (DN25-DN300) |
| | T | | | | | | | **MAGX2 main board, display, 6 buttons control unit** |
| | | | | | | | | ***Power supply module*** |
| | | 5 | | | | | | Version 5 – 12-35 VDC, 90-250 VAC, including battery back-up option |
| | | | CM | | | | | **Sensor to transmitter communication module - *Version 8*** |
| | | | | | | | | ***Remote mounting kit*** |
| | | | | N | | | | None |
| | | | | W | | | | WALL mounting kit (including 6m cable) |
| | | | | P | | | | PANEL mounting kit (including 6m cable) |
| | | | | D | | | | DIN-Rail mounting kit (including 6m cable) |
| | | | | | | | | ***Output 1*** |
| | | | | | N | | | None |
| | | | | | C | | | 4-20mA current output signal module |
| | | | | | EP | | | External pressure sensor* |
| | | | | | | | | ***Output 2*** |
| | | | | | | N | | None |
| | | | | | | P | | Pulse output module |
| | | | | | | P2 | | Pulse 230 output module |
| | | | | | | ET | | External temperature sensor* |
| | | | | | | | | ***Communication*** |
| | | | | | | | N | None |
| | | | | | | | 232 | RS232 communication module, including 1,8m cable |
| | | | | | | | USB | USB communication module, including 1,8m cable |
| | | | | | | | BTO | Bluetooth communication module |
| | | | | | | | GPR | GPRS communication module |
| | | | | | | | 485 | RS485 communication module, distance up to 1km |
| | | | | | | | TCP | TCP/IP communication module |
| | | | | | | | SMS | GSM-SMS communication module |
| | | | | | | | WIFI | Wi-Fi communication module |
| | | | | | | | MBUS | M-Bus communication module |

* Input

Example

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| MAGX2 IP68 | T | 5 | CM | N | C | N | USB |

Example OIML, IP68 unit

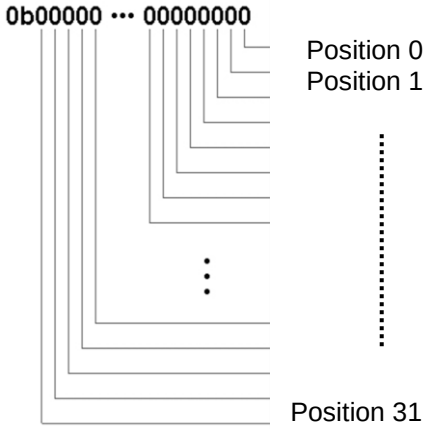
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| MAGX2 IP68 OIML | T | 5 | CM | N | N | N | 485 |

| Model | Ordering code | | | | | Description |
|---|---|---|---|---|---|---|
| Sensor | 1 | 2 | 3 | 4 | 5 | |
| | Z | | | | | Reduced-bore body (up to DN150 only) |
| | | | | | | ***Connection*** |
| | D | | | | | DIN |
| | A | | | | | ANSI |
| | DS | | | | | DIN Flange St. St. |
| | DSS | | | | | DIN St. St. body |
| | AS | | | | | ANSI Flange St. St. |
| | ASS | | | | | ANSI St. St. body |
| | S | | | | | DIN 11851 |
| | SSS | | | | | DIN 11851 St. St. body |
| | J | | | | | JIS |
| | E | | | | | Table E |
| | TD | | | | | Table D |
| | T | | | | | Tri-clamp |
| | W | | | | | Wafer |
| | | | | | | ***Size*** |
| | | 10 / 3/8 200 / 8 | | | | 10mm / 3/8" 200 mm / 8" |
| | | 15 / 1/2 250 / 10 | | | | 15mm / 1/2" 250 mm / 10" |
| | | 20 / 3/4 300 / 12 | | | | 20mm / 3/4" 300 mm / 12" |
| | | 25 / 1 350 / 14 | | | | 25mm / 1" 350 mm / 14" |
| | | 32 / 1.1/4 400 / 16 | | | | 32mm / 1.1/4" 400 mm / 16" |
| | | 40 / 1.1/2 450 / 18 | | | | 40mm / 1.1/2" 450 mm / 18" |
| | | 50 / 2 500 / 20 | | | | 50mm /2" 500 mm / 20" |
| | | 65 / 2.1/2 600 / 24 | | | | 65mm / 2.1/2" 600 mm / 24" |
| | | 80 / 3 700 / 28 | | | | 80mm / 3" 700 mm / 28" |
| | | 100 / 4 800 / 32 | | | | 100 mm/ 4" 800 mm / 32" |
| | | 125 / 5 900 / 36 | | | | 125 mm/ 5" 900 mm / 36" |
| | | 150 / 6 1000 / 40 | | | | 150 mm / 6" 1000 mm / 40" |
| | | | | | | ***Liner*** |
| | | | HR | | | HARD RUBBER |
| | | | PT | | | PTFE |
| | | | SR | | | SOFT RUBBER |
| | | | NR | | | HYGIENIC RUBBER |
| | | | CT | | | E-CTFE |
| | | | | | | ***Pressure*** |
| | | | | 150 | | 150 psi |
| | | | | 300 | | 300 psi |
| | | | | 10 | | PN10 |
| | | | | 16 | | PN16 |
| | | | | 25 | | PN25 |
| | | | | 40 | | PN40 |
| | | | | | | ***Electrodes*** |
| | | | | | HA | Hastelloy C |
| | | | | | TI | Titanium |
| | | | | | PL | Platinum |

Example

| Sensor | D | 100 | HR | 16 | HA |
|---|---|---|---|---|---|

# 10. MAGX2 Error Code Table




MAGX2 can detect and show a number of errors in one error code value.

| Error position | Error Description |
|---|---|
| 0 | Empty Pipe (Air Detect) |
| 1 | Overloaded |
| 2 | Excitation |
| 3 | Sensor not responding |
| 4 | SD open file |
| 5 | SD card not inserted |
| 6 | Write flash |
| 7 | ADC |
| 8 | GSM SMS Module Timeout |
| 9 | GSM SMS Module Low Signal |
| 10 | GSM SMS Module SIM card error |
| 11 | GSM SMS Module send SMS error |
| 12 | GSM SMS Module error |
| 13 | Very low or high temperature of the sensor |
| 14 | GPRS COMUNNICATION |
| 15 | GPRS CHECK |
| 16 | GPRS TIMEOUT |
| 17 | GPRS RESET |
| 18 | GPRS ECHO |
| 19 | GPRS SIM PIN |
| 20 | GPRS SIGNAL |
| 21 | GPRS CALL |
| 22 | GPRS IP |
| 23 | GPRS ONLINE |
| 24 | OVERLOAD 2 - Flow> 4x Qn |
| 25 | ERROR Buttons |
| 26 | ERROR External Temperature Module |
| 27 | ERROR External Pressure Module |
| 28 | ERROR FW Tamper (MID, OIML R49 version) |
| 29 | ERROR Leak Detection |
| 30-31 | RESERVED (non-use) |

**Errors on the display are indicated in hex format. This number must be converted to binary format! The MAGX2 software version 2.0.0.13 and newer decode and show error in Real time measurement tab.**

The error code has been converted to binary format, each position is related to a different error (see the table above). Number 1 indicates error and number 0 indicates no error.

Example:

| Error shown on display: | Error position: | Read errors: |
|---|---|---|
| 00000023 HEX | 0000 ... 0010 0011 BIN | SD card not inserted / Overloaded / Empty pipe |

# 11. Firmware version compatibility

It is possible to check the version of each MAGX2 in info menu> Firmware No.
MAGX2 offers the option of updating the firmware version using microSD memory card.
The following table shows compatibilities between different versions.

| FW version | MB | | Languages | External sensors | Wi-Fi |
|---|---|---|---|---|---|
| 21.18 | v7.1 | | ENG,SPA | No | No |
| 21.37 | v8.2 | | ENG, SPA, UKR, RUS, TUR | Yes | Yes |
| 21.37 ARA | v8.2 | | ENG, SPA, UKR, RUS, TUR, ARA | Yes | Yes |
| 21.39 | v8.2 | OIML R49/MID | ENG, SPA, UKR, RUS, TUR | Yes | Yes |
| 21.40 | v8.2 | VeriMAG2 | ENG, SPA, UKR, RUS, TUR | Yes | Yes |
| 21.45 | v8.2 | Leak Detection | ENG, SPA, UKR, RUS, TUR | Yes | Yes |
| 21.50 | v8.2 | External input | ENG, SPA, UKR, RUS, TUR | Yes | Yes |

# 12. Appendix

## 12.1. Country of Origin

The MAGX2 Electromagnetic flowmeter is made in Czech Republic.

## 12.2. CE requirements

The MAGX2 Electromagnetic flowmeter is manufactured conform CE requirements.

CE

## 12.3. Warranty

The warranty conditions are covered by Arkon Flow Systems, s.r.o. Terms & Conditions of Sale and by Arkon Flow Systems, s.r.o Return Regulations and Warranty Conditions. The Arkon Flow Systems, s.r.o Terms & Conditions of Sale and the Arkon Flow Systems, s.r.o Return Regulations and Warranty Conditions are an integral part of the Resellers contract and of any Order Confirmation. Please see your Resellers contract or www.arkon.co.uk; Support section. The Warranty sheet is part of the Packing note of any new goods sent. For the claim or return procedure, please consult our web site www.arkon.co.uk or call the Arkon Flow Systems, s.r.o sales office.

## 12.4. Contact

Technical support: support@arkon.co.uk
Skype: support.arkon

Sales office: arkon@arkon.co.uk

Office hours:
8:30 – 16:30 (GMT+1)

Direct technical support:
8:00 – 17:00 (GMT+1)