MAG X2 User Guide

USB RS232 RS485 BLUETHOOTH TCP/IP GPRS GSM-SMS

4-20mA CURRENT LOOP

PULSE

90-250 VAC POWER SUPPLY

24 V DC POWER SUPPLY

12 V DC POWER SUPPLY

TRANSMITTER

00000001

Info
Display
User settings
Service settings
Factory settings
Authorize

MAG X2

CE

MODBUS IP67

WARNING!! SWITCH OFF THE POWER TO THE FLOWMETER BEFORE REMOVING ANY MODULES. FAILURE TO DO SO CAN RESULT IN DAMAGE TO THE FLOWMETER.

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flow systems

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 flow converter - flow-meter 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
CD ROM+ Manual
Mounting kit

2. Installation

2.1. Remote or Compact

Any MAGX2 flowmeter can be delivered in two versions; Compact with IP67 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 10).
The cable entry on the transmitter side is through a M16x1.5 gland.
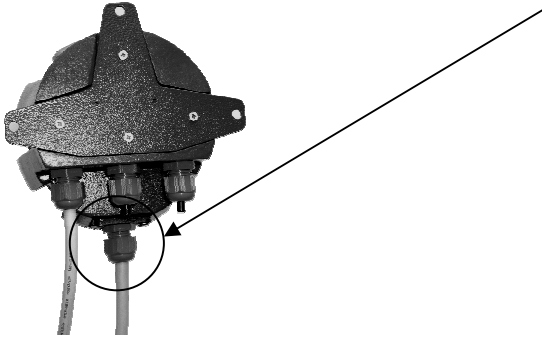
The cable type used for the connection between sensor and transmitter for remote versions: UNITRONIC® LiYCY (TP) 0035 830, 2x2x0.5
The MAGX2 is equipped with an electronic board located inside the sensor neck. This board sends a digital signal to the transmitter, unlike traditional flowmeters, which 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 42
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 installation requirements:
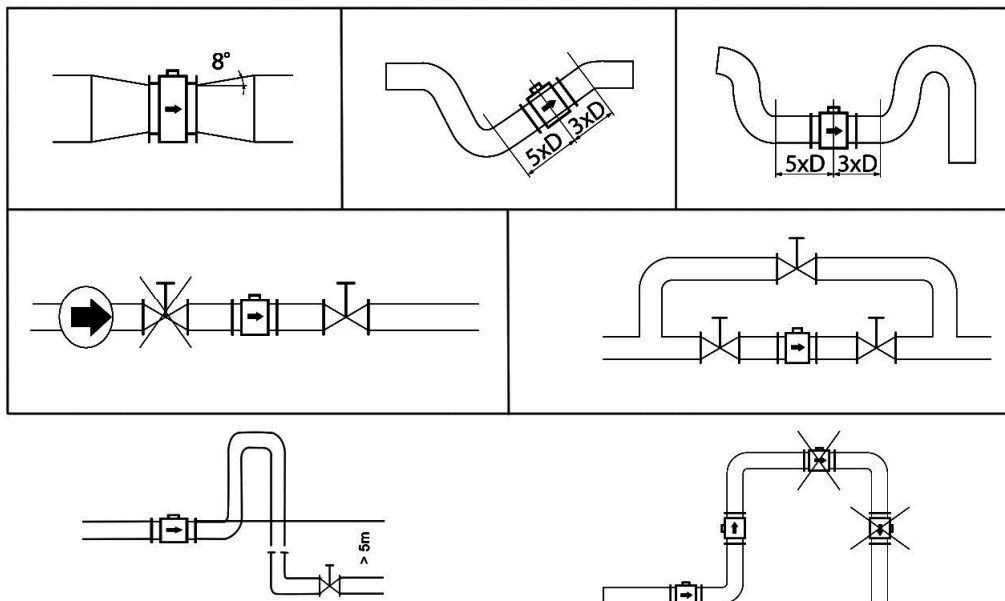
All MAGX2 sensors are supplied with 2 built in earthing electrodes which is sufficient for all applications with metal pipes and tanks. However on applications where all pipes and tanks are manufactured from plastic, it is recommended that earthing rings are also installed to ensure the maximum resistance of the sensor to earth is <1 ohm.

Steel Pipe   Plastic Pipe

Sensor grounding with earthing rings

Plastic   Metal
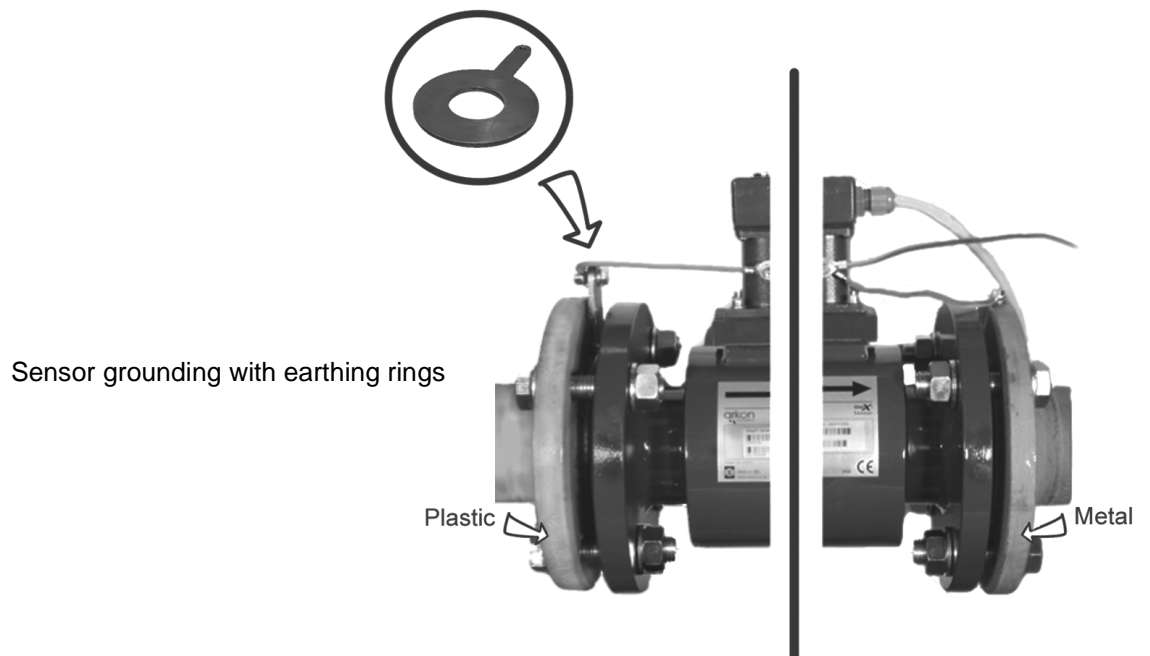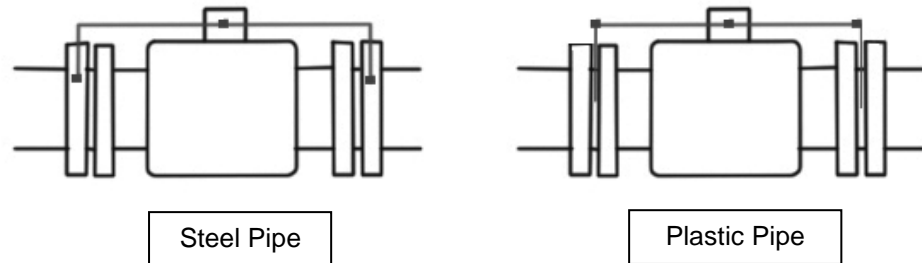
2.3. Dry liner

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 be keeping the meter wet, this problem solve itself within 2-3 days and no other action is required at all.

2.4. Installation of the transmitter

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)! | MAX 1 KG |

❷ Connect the transmitter to the signal cable from the sensor. To do this, first open the transmitter housing by disconnecting the two parts of the transmitter housing with the metal "key" that is provided with the meter

After the meter is opened, pull the signal cable through the cable gland on the bottom of the transmitter housing (see page 5).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.

❸ Connect the transmitter to network power.

The customer is assumed to supply its own network power supply cable (90-250VAC, 24VDC or 12VDC, depending on the type of power supply ordered with the flowmeter). Before connecting to network power, the cable needs to be properly connected to the transmitter.
First pull the cable end through one of the cable glands (ideally the first on the left looking at the transmitter housing from the back-side) on the bottom of the transmitter.
Recommend 3x1mm round crosscut cable.
After connecting the power cable, close the housing and connect the cable to network power. This will make the flowmeter switch on.

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:
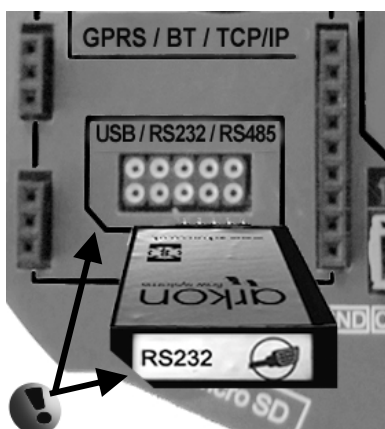
Correct installation   Incorrect installations

	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.

Sensor communication module version 7.1
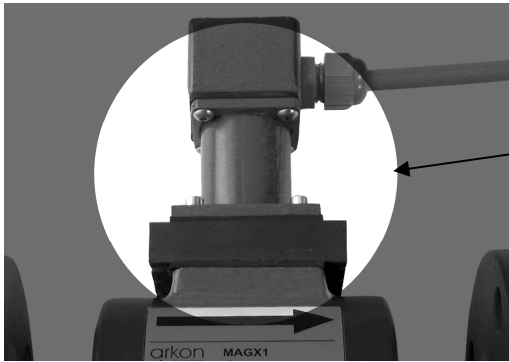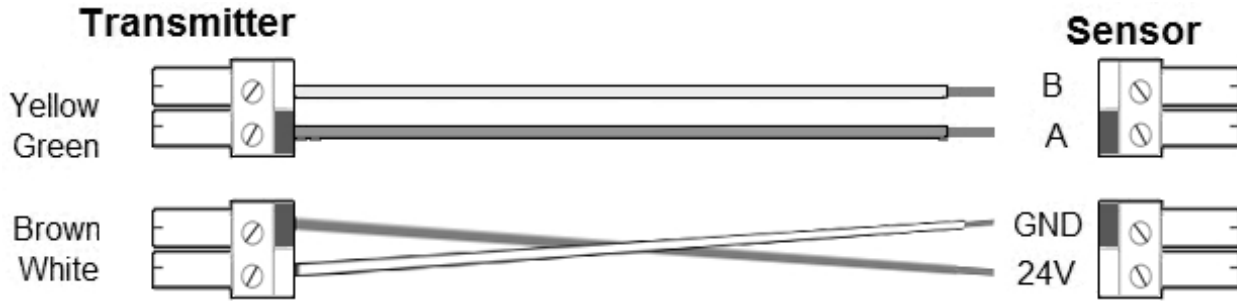
Use this cable connection only for "sensor to transmitter communication module - version 7.1".

Sensor communication module version 8.0
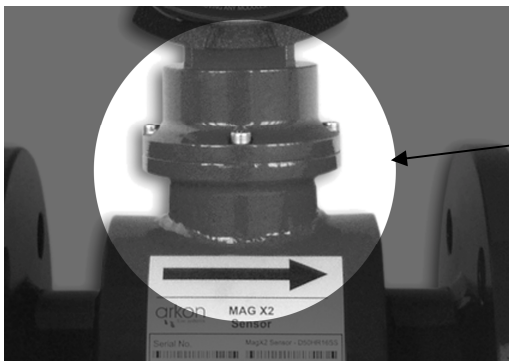
Use this cable connection only for "sensor to transmitter communication module – version 8.0".

"Please note that in different versions of the transmitter, 2 types of connections can be used. Theses are, 1 x 4-pin connector instead of a 2 x 2-pin connector as shown in the picture."

2.7. Potting the remote sensor terminal box for sensor communication module version 7.1.

For sensor communication module version 8.0 flowmeter sensor are delivered with IP68 from factory.

For sensor communication module version 7.1, to guarantee IP68 protection of the sensor, it is necessary to pot the sensor terminal box properly. The proper way to do this is described below:

❶	Plug the connectors into the sensor (white and green wire adjacent).
❷	Screw the small terminal box to the sensor neck (4 screws).
❸	Fill the terminal box completely with silicone, by squeezing it through the opening on top of the box.
❹	Close the small terminal box with the sealing screw.
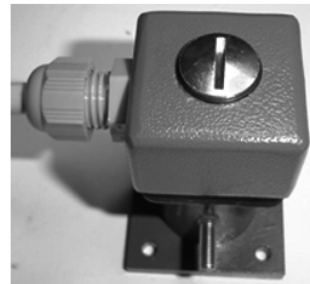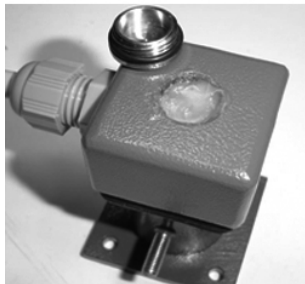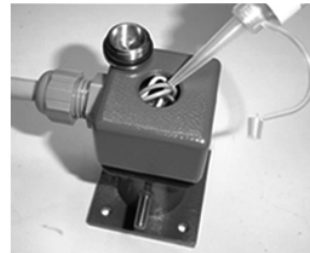
3. MAGX2 Transmitter Unit

Module Name:	Module Short Name:	Symbol:	Ordering Code:
MAGX2 Transmitter Unit	Transmitter		"MAGX2 Transmitter Unit"

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 menu's 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.
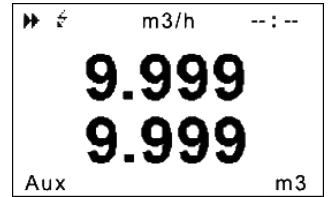
Temperature
This item is a temperature indication for the measured medium.
You can cycle through these 5 indication screens by pressing the up and down buttons on the transmitter.
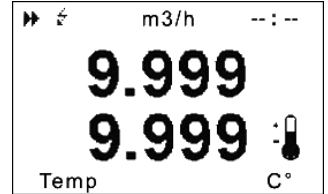
Total screen showing 9.999 / 9.999 m3	It is possible to change the number of decimal digits of the actual flow displayed in the main screen: **decimal numbers** --> By using the ⊃⊂ buttons.	Total screen showing 9 / 9.999 m3

> If value of any Volume counter higher than 4 000 000 m3, than value of Volume show 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 ʊᴒ and select your choice with ☑.

 Menu list: Info, Display, User Settings, Service Settings, Factory Settings, Authorize
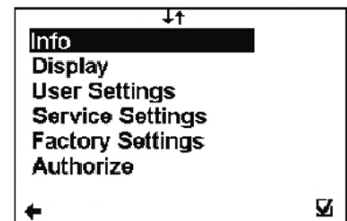
3.3. Info Menu

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 No.	Displays the serial number of the sensor. This number is allocated during production by the manufacturer. This item is working with sensor v.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 9)
Power frequency	Identifies the network power supply frequency.
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.
GSM Signal	Signal strength of the GSM SMS Module.
GPRS module present	Shows if the GPRS module is inserted in the flowmeter.

3.4. Display menu

```
            ↓↑
Info
Display
User Settings
Service Settings
Factory Settings
Authorize

←                      ☑
```
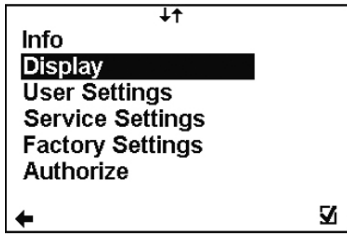
3.4.1 Display > Unit Flow

Setup of the displayed measurement unit for current flow.

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

```
Unit Flow
○ UKG/min
○ USG/min
○ m3/h
○ l/min
⊙ l/s

←                      ☑
```

(item selection ꙮꙮ confirm ☑, selection identification ⊙ back ←)
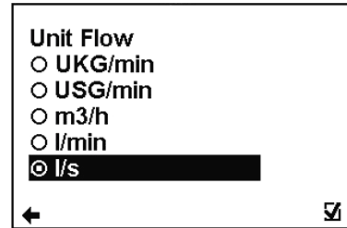
3.4.2 Display > Unit Volume

Setup of the displayed measurement unit for total flow.

UKG	UK gallon
USG	US gallon
m3	Cubic meter
l	Litre

```
Unit Volume
⊙ UKG
○ USG
○ m3
○ l

←                      ☑
```

(item selection ꙮꙮ confirm ☑, selection identification ⊙ back ←)
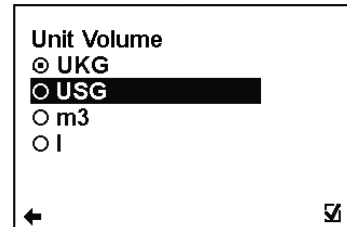
3.4.3 Display > Unit Temperature

Setup of the displayed measurement unit of temperature indication.

C	Degrees Celsius
F	Degrees Fahrenheit

```
Unit Temperature
⊙ C
○ F

←                      ☑
```

(item selection ꙮꙮ confirm ☑, selection identification ⊙ back ←)
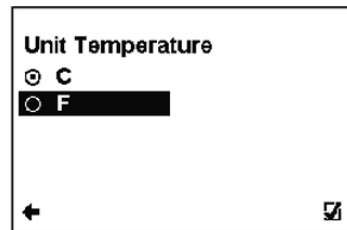
3.4.4 Display > Language

Setup of the language for flowmeter menu

ENG	English
SPA	Spanish

```
Language
⊙ ENG
○ SPA

←                      ☑
```

(item selection ꙮꙮ confirm ☑, selection identification ⊙ back ←)
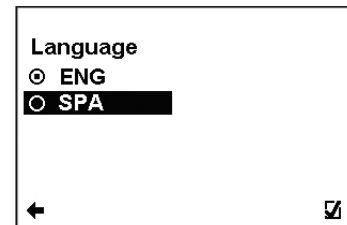
3.4.5 Display > Contrast

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

←	Back with no change
⊃⊂	Selection of digit position
ꙮꙮ	Value setting
☑	Confirmation of setup and saving to memory.

```
Contrast


        50       [%]


←                      ☑
```

3.5. User Settings Menu

```
Info
Display
User Settings
Service Settings
Factory Settings
Authorize
←                    ☑
```

```
Password (user)

      0000

←                    ☑
```
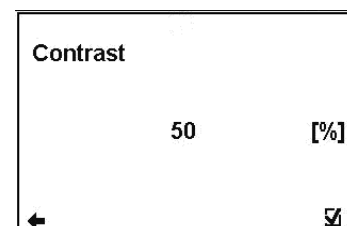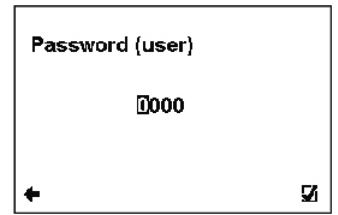
To enter the User Settings menu, it is necessary to enter the user password. The default factory setting is 1111. See page 22 for user password settings.

3.5.1 User Setting > Measurement

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

RUN   The device is measuring, the totalizers are active.

STOP   The display will show a value, yet the totalizers are off.

```
Measurement
○ RUN
⊙ STOP

←                    ☑
```
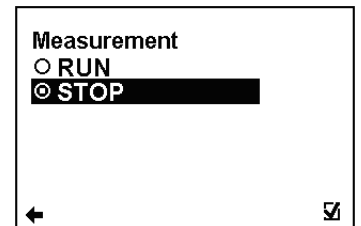
(item selection ↻↺ confirm   ☑, selection identification   ⊙ back ←)

3.5.2 User Setting > Datalogger Interval

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

OFF	Totalizer is not used (SD card not necessary)
1 minute	The interval of saving totalizers. SD card
5 minutes	needed.
10 minutes	
15 minutes	
30 minutes	
1 hour	
2 hours	
6 hours	
12 hours	
24 hours	

```
           ↓↑
Datalogger Interval
○ OFF
⊙ 1 minute
○ 5 minutes
○ 10 minutes
○ 15 minutes
○ 30 minutes
←                    ☑
```

```
           ↓↑
Datalogger Interval
○ 1 hour
⊙ 2 hours
○ 6 hours
○ 12 hours
○ 24 hours
←                    ☑
```
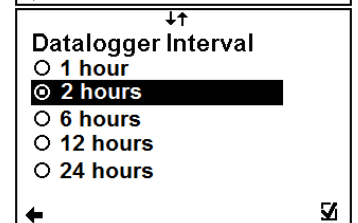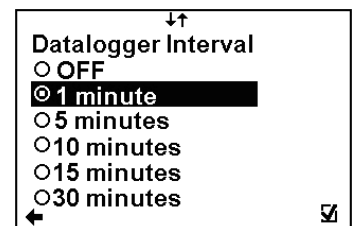
(item selection ↻↺ confirm   ☑, selection identification   ⊙ back ←)

While there is an error "SD card not inserted" or "SD Open file" active and the user plugs in the SD card, error will disapear after next write to the datalogger. It is recommended to setup the datalogger interval again or restart the flowmeter after every SD card plug

3.5.3 User Setting > CSV Format

This option allows selecting separator between each data in datalogger

Comma (,)	Select comma
Semicolon (;)	Select semi-colon

```
Csv format
⊙ Comma ( , )
○ Semicollon ( ; )



←                    ☑
```
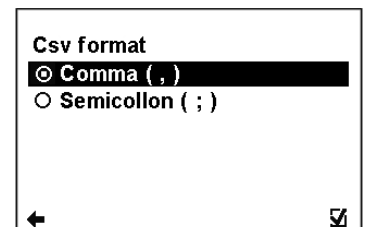
(item selection ↻↺ confirm ☑, selection identification ⊙ back ←)

3.5.4 User Setting > Air detector:

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

ON   The detector is active
OFF   The detector is switched off

(item selection ↻↺ confirm ☑, selection identification ⊙ back ←)
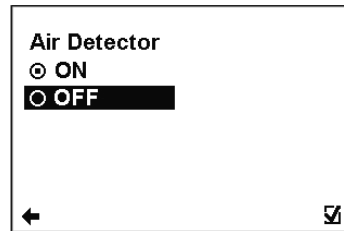
3.5.5 User Setting > Air Constant

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.
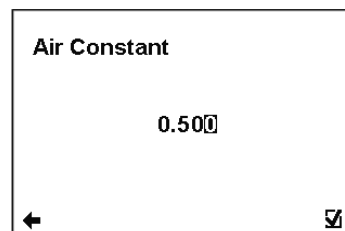
3.5.6 User Setting > Delete Auxiliary Volume

This function serves to zero the auxiliary flow totalizer.

☒ ←   No change
☑   Zero the auxiliary totalizer

(item selection ↻ ↺ confirm ☑, back ←☒)
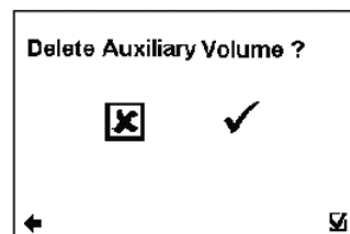
3.5.7 User Setting > Start Delay

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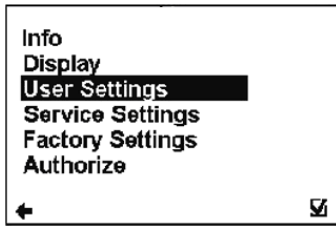Possible range: **0 – 120 s**

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

3.5.1.

3.5.8 User Setting > Samples per Avg.

The number of samples that the flowmeter will use for calculation of its displayed average flow value/time unit.
Possible range: **1-120** samples/avg

←   Back with no change
↻↺   Selection of digit position
↺↻   Value setting
☑   Confirmation of setup and saving to memory.
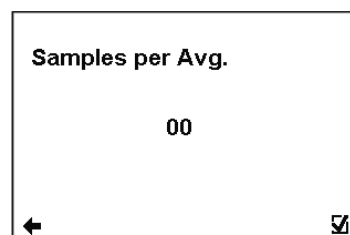
3.5.9 User Setting > Low Flow Cut-off

This function serves to set the minimum flow the flowmeter will react on.

←   Back with no change
↺↻   Value setting
☑   Confirmation of setup and saving to memory.

(item selection ↺↻ confirm ☑ selection identification ⊙ back ←)

3.5.10 User Setting > 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.

```
┌────────────────────────┐
│ Flow Qn                │
│                        │
│                        │
│        00001.000  [m3/h]│
│                        │
│ ←                    ☑ │
└────────────────────────┘
```
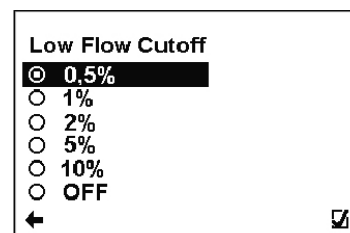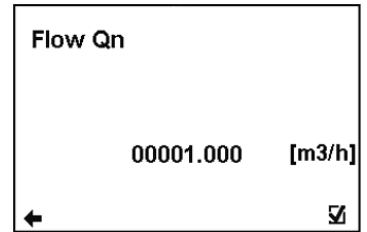
3.5.11. User Setting > Invert Flow
This function serves to change the definition of flow direction.
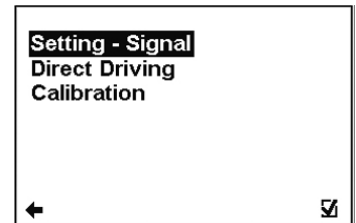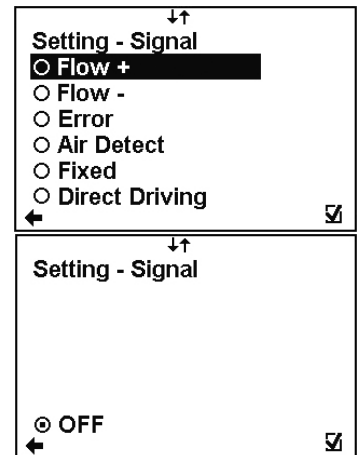
←	Back with no change
∩∪	Choice selection
☑	Confirmation of setup and saving to memory.

(item selection ∩∪ confirm ☑ selection identification ⊙ back ←)

```
┌────────────────────────┐
│ Invert Flow            │
│ ⊙ No-Invert            │
│ ○ Invert               │
│                        │
│                        │
│ ←                    ☑ │
└────────────────────────┘
```
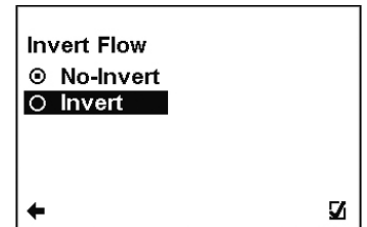
3.5.12 User Setting > Current Loop

←	Back with no change
∩∪	Item selection
☑	Confirmation of setup and saving to memory.

```
┌────────────────────────┐
│ Setting - Signal       │
│ Direct Driving         │
│ Calibration            │
│                        │
│                        │
│ ←                    ☑ │
└────────────────────────┘
```

User Setting > Current Loop > Settings Signal
This function serves to select which signal the output should be giving.

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

```
┌────────────────────────┐
│          ↓↑            │
│ Setting - Signal       │
│ ○ Flow +               │
│ ○ Flow -               │
│ ○ Error                │
│ ○ Air Detect           │
│ ○ Fixed                │
│ ○ Direct Driving       │
│ ←                    ☑ │
└────────────────────────┘
┌────────────────────────┐
│          ↓↑            │
│ Setting - Signal       │
│                        │
│                        │
│                        │
│ ⊙ OFF                  │
│ ←                    ☑ │
└────────────────────────┘
```

User Setting > Current Loop > Direct Driving
This function serves to set flow values in relation to current output.
Possible range: **0.000 – 36000 m3/h, 4 – 20mA**

←	Back with no change
⊃⊂	Selection of digit position
∩∪	Change of value
☑	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.

```
┌────────────────────────┐
│ Flow min.- max. [m3/h] │
│      00001.000         │
│      00001.000         │
│ Current min. - max. [mA]│
│         04             │
│         20             │
│ ←                    ☑ │
└────────────────────────┘
```

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).
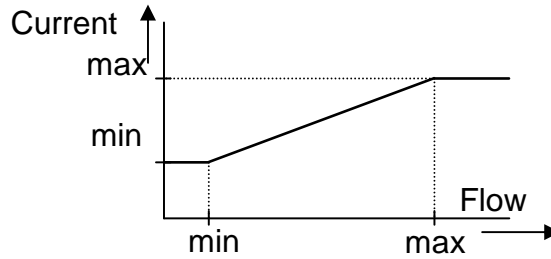
User Setting > Current Loop > Calibration

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

←	Back with no change
⊃⊂	Selection of digit position
∩∪	Change of value
☑	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 $= \dfrac{6}{6.1} = 0.9836$

Expected value: 18 mA, Measured value: 17.9 mA
Calibration point two: 18mA
Calibration constant two $= \dfrac{18}{17.9} = 1.0056$
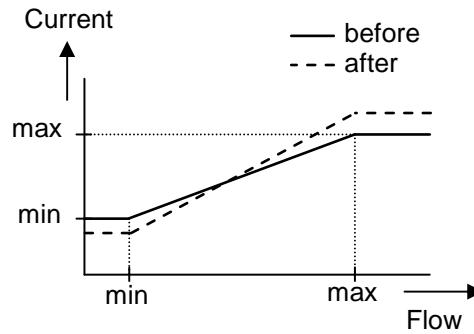
3.5.13 User Setting > Voltage Output

←	Back with no change
∩∪	Item selection
☑	Confirmation of setup and saving to memory.

User Setting > Voltage Output > Settings Signal

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

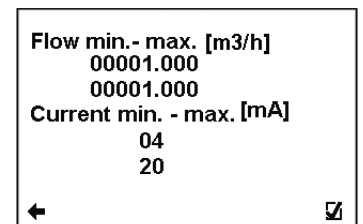|	
←	Back with no change
∩∪	Item selection
☑	Confirmation of setup and saving to memory.
Flow +	Output: 5V for any positive flow.
Flow -	Output: 5V for any negative flow.
Error	Output: 5V, for any error identified by the device. The signal can be cancelled by pressing any push button on the flowmeter.
Air Detect	Output: 5V, during air detection (empty pipe).
Fixed	Fixed output of 5V
Direct Driving	Output: Direct Driving – setup is below
OFF	Output is OFF (0V).

User Setting > Voltage Output > Direct Driving
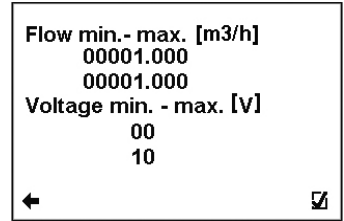This function serves to set flow values in relation to voltage output. Possible range: **0.000 – 36000 m3/h, 0 – 10V**
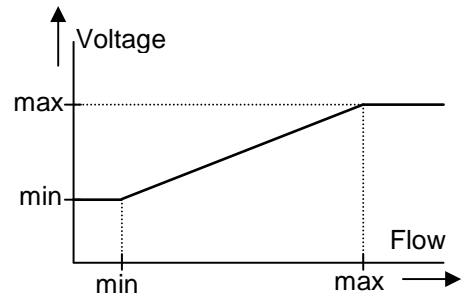
⬅	Back with no change
⟳⟲	Selection of digit position
⟰⟱	Change of value

```
Flow min.- max. [m3/h]
      00001.000
      00001.000
Voltage min. - max. [V]
        00
        10
⬅                    ☑
```

☑	Confirmation of setup and saving to memory.
Flow min.-max	Setup of measurement flow-range (only positive values)
Voltage min.-max	Setup of the voltage output range, corresponding to the actual flow-rate within the given range.

When changing an item for the Voltage output, all settings for the current 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).
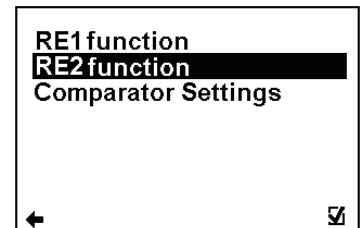

3.5.14 User Setting > Pulse Output
RE1 & RE2
RE3 & RE4

⬅	Back with no change
⟰⟱	Item selection
☑	Confirmation of setup and saving to memory.

```
○ RE1 & RE2
◉ RE3 & RE4


⬅                    ☑
```

User Setting > Pulse Output > RE1 & RE2
RE1 function
RE2 function
Comparator Settings

⬅	Back with no change
⟰⟱	Item selection
☑	Confirmation of setup and saving to memory.

```
RE1 function
RE2 function
Comparator Settings


⬅                    ☑
```
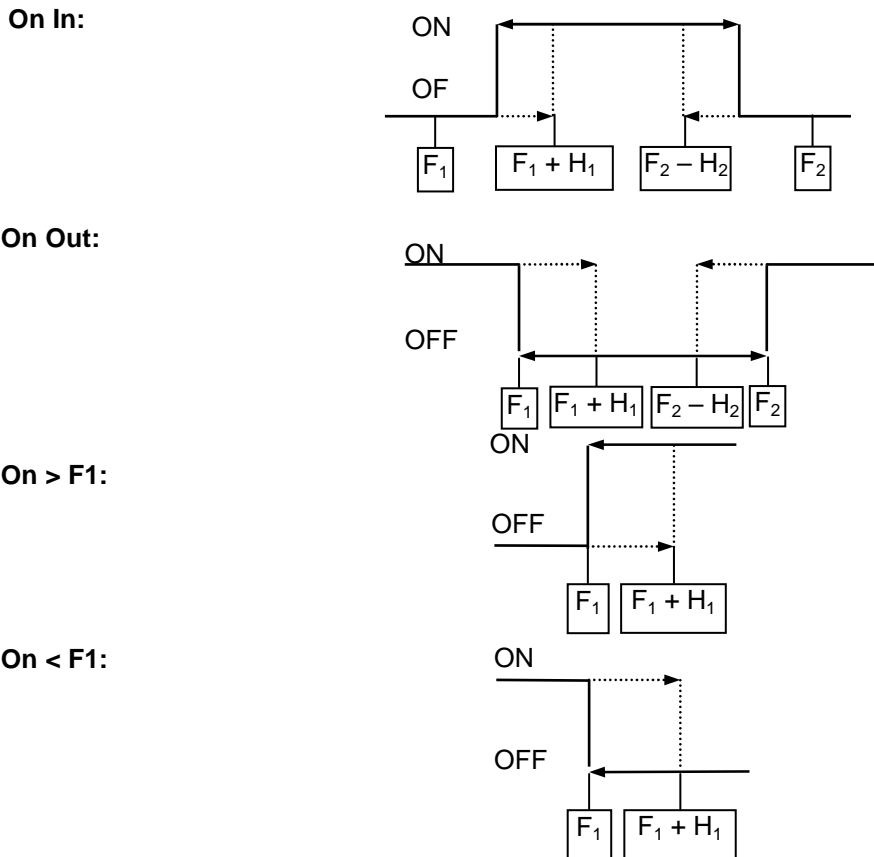
User Setting > Pulse Output > RE1 & RE2 > RE1 (RE2) function
This function serves to select which signal the output should be giving. The relays are independent to each other.

⬅	Back with no change
⟰⟱	Item selection
☑	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).

```
           ↓↑
RE1 Function
○ OFF
◉ Fixed
○ Flow +
○ Flow -
○ Error
○ Air Detect
⬅                    ☑
```
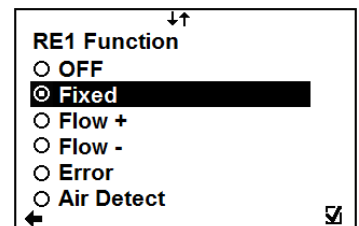
Comparator On Out	Output: ON, if the actual flow-rate is outside the given range (can be set under Comparator Flow).
Comparator On<F_1	Output: ON, if the actual flow flow-rate is smaller than the value set as "Flow1" (can be set under Comparator Flow).
Comparator On>F_1	Output: ON, if the actual flow-rate is bigger than the value set as "Flow1" (can be set under Comparator Flow).

```
                                    ↓↑
                         RE1 Function
                         ○ Comparator On In
                         ◉ Comparator On Out
                         ○ Comparator On < F1
                         ○ Comparator On > F1

                         ←                      ☑
```

On In:

```
ON          ┌──────────────────────┐
OF ─────────┘                      └──────────
        │F₁│ │F₁ + H₁│      │F₂ − H₂│  │F₂│
```

On Out:

```
ON  ───────┐                    ┌──────────
           │                    │
OFF        └────────────────────┘
        │F₁│ │F₁ + H₁│ │F₂ − H₂│ │F₂│
```

On > F1:

```
ON              ┌───────────────
OFF ────────────┘
        │F₁│ │F₁ + H₁│
```

On < F1:

```
ON  ────────────┐
OFF             └───────────────
        │F₁│ │F₁ + H₁│
```

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

Possible range: **0.000 – 36000 m3/h, 0.000 – 36000 m3/h**

←	Back with no change
↻↺	Selection of digit position
↥↧	Change of value
☑	Confirmation of setup and saving to memory.
Flow 1, 2	This function serves to configure the flow-range for the Comparator Mode. Flow 1 < Flow 2.
Hysteresis	Setup of hysteresis for the Comparator Mode.

```
Flow 1,2  [m3/h]
        00000.000
        00000.000
Hysteresis [m3/h]
        00000.000
        00000.000

←                      ☑
```

User Setting > Pulse Output > RE3 & RE4

RE3 function
RE4 function
Volume Plus
Volume Minus
Dose (Batch)

←	Back with no change
↥↧	Item selection
☑	Confirmation of setup and saving to memory.

```
RE3 function
RE4 function
Volume Plus
Volume Minus
Dose (Batch)

←                      ☑
```
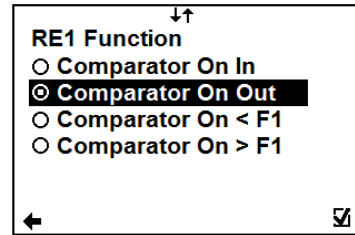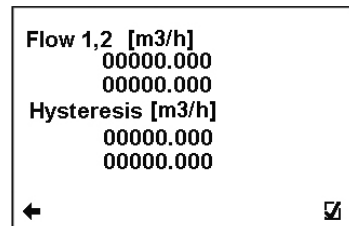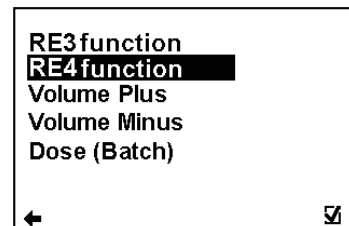
User Setting > Pulse Output > RE3 & RE4 > RE3 (RE4) function

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
☑	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).

```
              ↓↑
RE3 Function
○ OFF
⊙ Fixed
○ Flow +
○ Flow -
○ Error
○ Air Detect
←                    ☑
```

```
              ↓↑
RE3 Function
○ Pulse / Litre +
⊙ Pulse / Litre -
○ Dosing


←                    ☑
```
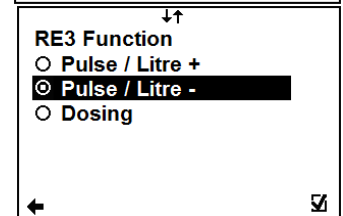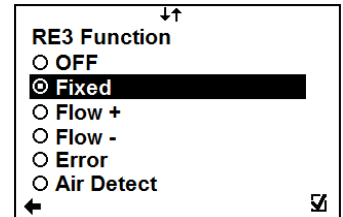
User Setting > Pulse Output > Volume Plus

This function serves to configure the positive flow volume after which a 160ms 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**
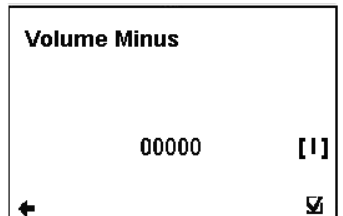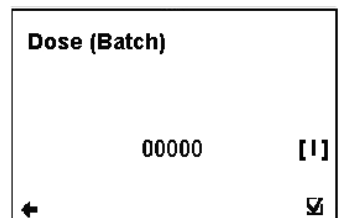
←	Back with no change
⊃⊂	Selection of digit position
∩∪	Change of value
☑	Confirmation of setup and saving to memory.

```
Volume Plus


        00000      [l]
←                    ☑
```
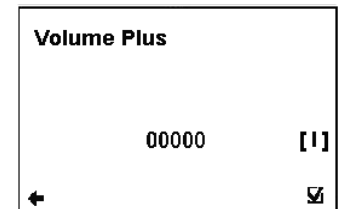
User Setting > Pulse Output > Volume Minus

This function serves to configure the negative flow volume after which a 160ms 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
∩∪	Change of value
☑	Confirmation of setup and saving to memory.

```
Volume Minus


        00000      [l]
←                    ☑
```

User Setting > Pulse Output > 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**
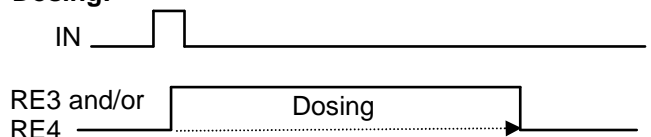
←	Back with no change
⊃⊂	Selection of digit position
∩∪	Change of value
☑	Confirmation of setup and saving to memory.

```
Dose (Batch)


        00000      [l]
←                    ☑
```

Litres/1 (Q+)/(Q−):
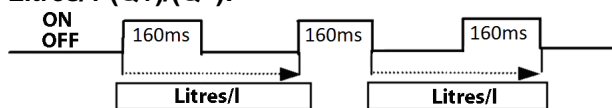
Dosing:

3.5.15 User Setting > Frequency output
Settings Signal
Direct Driving
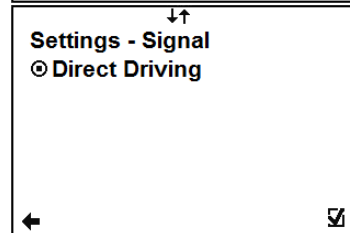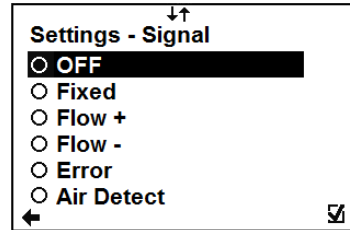**Duty cycle**
←	Back with no change
∩∪	Item selection
☑	Confirmation of setup and saving to memory.
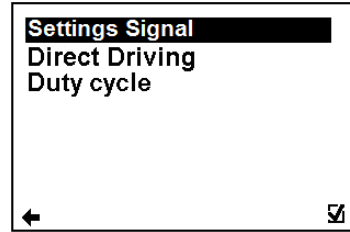
User Setting > Frequency output > Settings Signal
This function serves to select which signal the output should be giving.

|	
←	Back with no change
∩∪	Item selection
☑	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 Setting > Frequency output > Direct Driving
This function serves to set flow values in relation to frequency output. Possible range:
0.000 – 36000 m3/h, 0 – 1000 Hz

←	Back with no change
∩∪	Change of value
⊃⊂	Selection of digit position
☑	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.

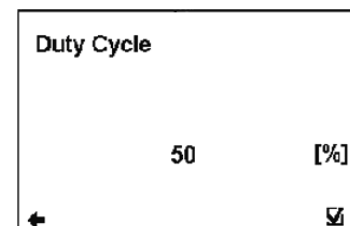Minimal frequency 2 Hz
Maximal frequency 1000 Hz
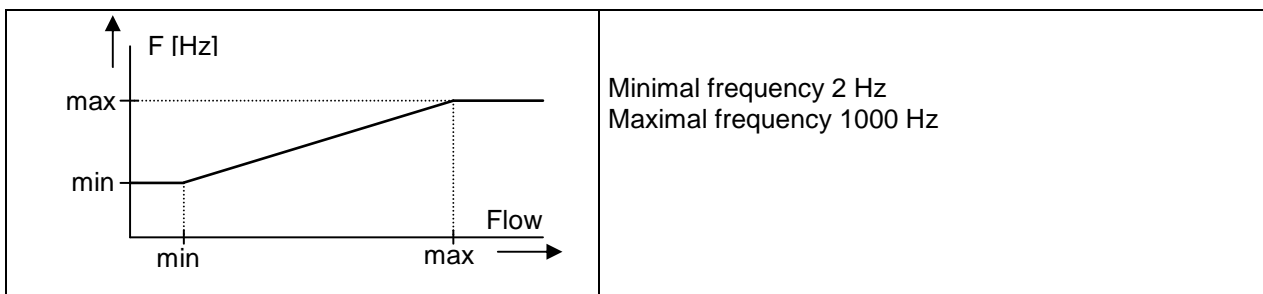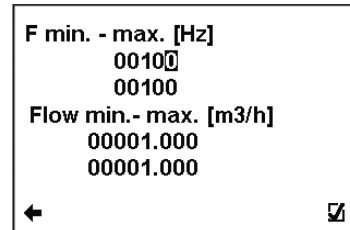
User Setting > Frequency output > Duty Cycle
Function to set duty cycle of the Frequency output.
Percentage of high level.
Possible range: **1 – 99 %**

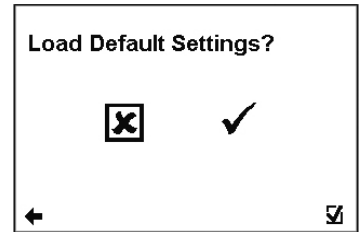|	
←	Back with no change
⊃⊂	Selection of digit position
∩∪	Change of value
☑	Confirmation of setup and saving to memory.

3.5.16 User Setting > Load Default Settings
This function will load default factory settings.
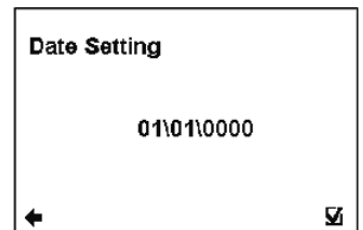☒   ←   Back with no change
☑   Loads default settings

(item selection ⊃ C confirm ☑, back ←☒)

3.5.17 User Setting > Date Setting
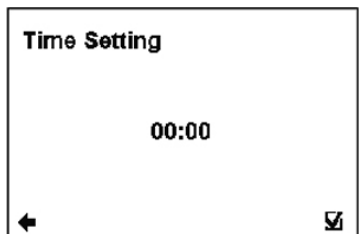Function to set date.
←   Back with no change
∩◡   Change of value
⊃C   Selection of digit position
☑   Confirmation of setup and saving to memory.
Date   DD\MM\YYYY
format.

3.5.18 User Setting > Time Setting
This function serves to set current time
←   Back with no change
∩◡   Change of value
⊃C   Selection of digit position
☑   Confirmation of setup and saving to memory.
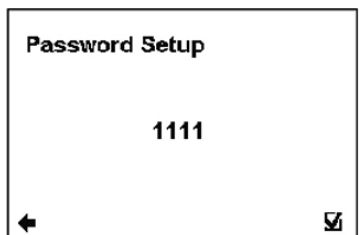**Time**   HH:MM
format.

3.5.19 User Setting > Password Setup
This function serves to setup the flowmeter user password.
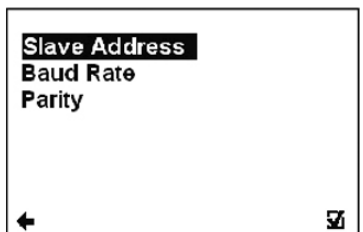Possible range: **0000 – 9999**
←   Back with no change
∩◡   Change of value
⊃C   Selection of digit position
☑   Confirmation of setup and saving to memory.

3.5.20 User Setting > Modbus

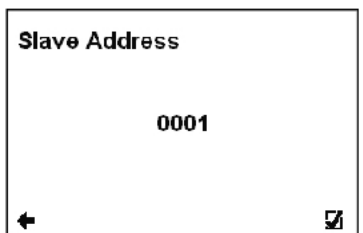←   Back with no change
∩◡   Item selection
☑   Confirmation

User Setting > Modbus > Slave Address
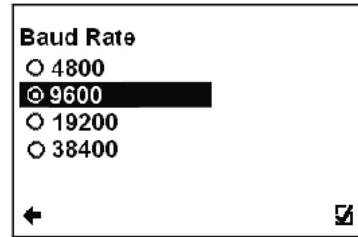Modbus device address (Factory settings: 1)
←   Back with no change
⊃C   Selection of digit position
∩◡   Change of value
☑   Confirmation of setup and saving to memory.

User Setting > Modbus > Baud Rate

Setup communication speed (Factory settings: 9600)
- ←   Back with no change
- ꙮꙮ   Value setting
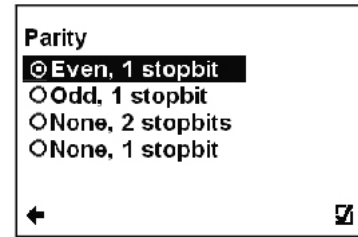- ☑   Confirmation of setup and saving to memory.

(item selection ꙮꙮ confirm ☑   selection identification ⊙ back ←)

User Setting > Modbus > Parity

Setup communication parameters (Factory settings: Even, 1 stopbit)
- ←   Back with no change
- ꙮꙮ   Value setting
- ☑   Confirmation of setup and saving to memory.

(item selection   ꙮꙮ confirm ☑ selection identification ⊙ back ←)

3.5.21 User Setting > Electrode Cleaning

- ←   Back with no change
- ꙮꙮ   Item selection
- ☑   Confirmation

User Setting > Electrode Cleaning > Power
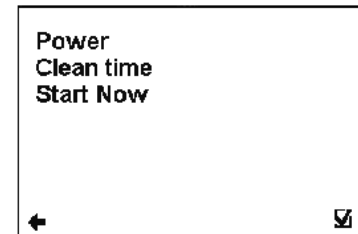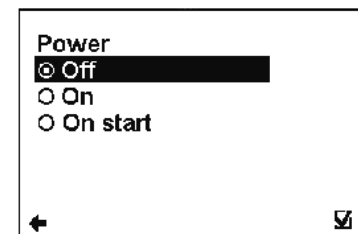
Setup automatic electrodes cleaning
- ←   Back with no change
- ꙮꙮ   Value setting
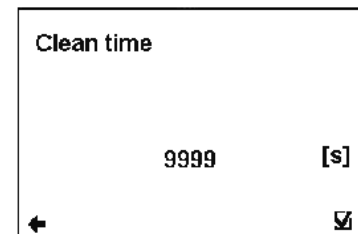- ☑   Confirmation of setup and saving to memory.

(item selection ꙮꙮ confirm ☑   selection identification ⊙ back   ←)

User Setting > Electrode Cleaning > Clean Time

Setup clean time for automatic electrode cleaning
(Factory setting: 500) Possible range: **1 – 9999 s**
- ←   Back with no change
- ➲➲   Selection of digit position
- ꙮꙮ   Change of value
- ☑   Confirmation of setup and saving to memory.

User Setting > Electrode Cleaning > Start Now

Start automatic electrode cleaning now
- ☒   ←   Back with no change
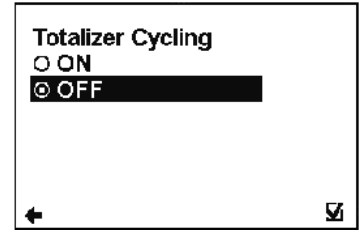- ☑   Loads default settings

(item selection ➲   ➲ confirm ☑, back   ←☒)

3.5.22. User Setting > Totalizer Cycling
Automatic totalizer cycling (time is set to 3 seconds)
- ←   Back with no change
- ꙮꙮ   Value setting
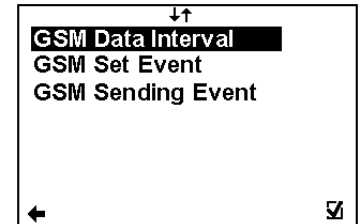- ☑   Confirmation of setup and saving to memory.

(item selection ꙮꙮ confirm ☑ selection identification ⊙ back ←)

3.5.23 User Setting > GSM Settings
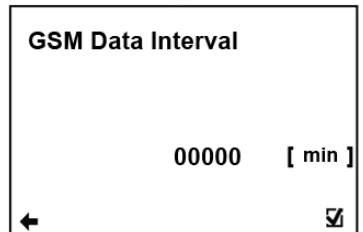Set all options for GSM
- ←   Back with no change
- ꙮꙮ   Value setting
- ☑   Confirmation of setup and saving to memory.

User Setting > GSM Settings > GSM Data Interval
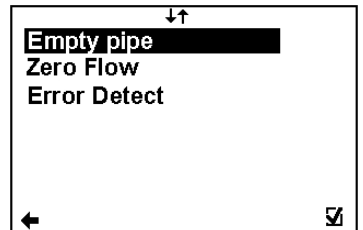Set time interval for sending text message with actual data
- ←   Back with no change
- ꙮꙮ   Change of value
- ꗝꗝ   Selection of digit position
- ☑   Confirmation of setup and saving to memory.

User Setting > GSM Settings > GSM Set Event
Select event for sending text message
- ←   Back with no change
- ꙮꙮ   Change of value
- ☑   Confirmation of setup and saving to memory.

User Setting > GSM Settings > GSM Set Event > Empty Pipe
Empty Pipe event sending
- ←   Back with no change
- ꙮꙮ   Change of value
- ☑   Confirmation of setup and saving to memory.

(item selection ꙮꙮ confirm ☑ selection identification ⊙ back ←)

User Setting > GSM Settings > GSM Set Event > Zero Flow
Zero Flow event sending
- ←   Back with no change
- ꙮꙮ   Change of value
- ☑   Confirmation of setup and saving to memory.

item selection ꙮꙮ confirm ☑ selection identification ⊙ back ←)

User Setting > GSM Settings > GSM Set Event > Error Detect

    Error detect event sending

    ←   Back with no change

    ↻↺   Change of value

    ☑   Confirmation of setup and saving to memory.

    (item selection ↻↺ confirm ☑ selection identification ⊙ back ←)

User Setting > GSM Setting > GSM Sending Event

    Select sending options for each event
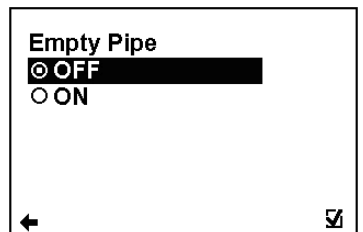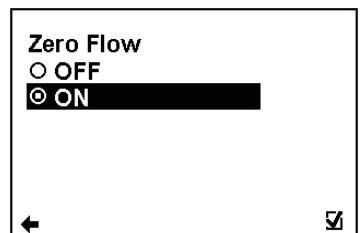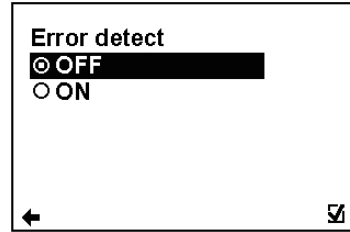
    ←   Back with no change

    ↻↺   Change of value

    ☑   Confirmation of setup and saving to memory.

User Setting > GSM Setting > GSM Sending Event > Empty Pipe

    Select options sending for Empty Pipe event

    ←   Back with no change

    ↻↺   Change of value

    ☑   Confirmation of setup and saving to memory.

    (item selection ↻↺ confirm ☑ selection identification ⊙ back ←)

User Setting > GSM Setting > GSM Sending Event > Zero Flow

    Select options sending for Zero Flow event

    ←   Back with no change

    ↻↺   Change of value

    ☑   Confirmation of setup and saving to memory.

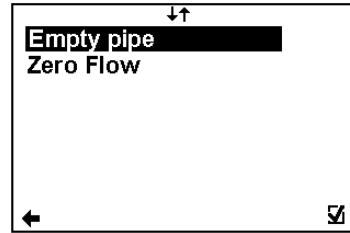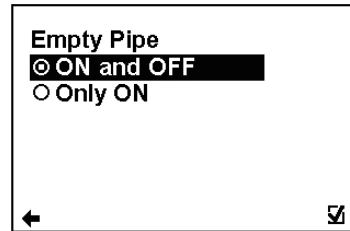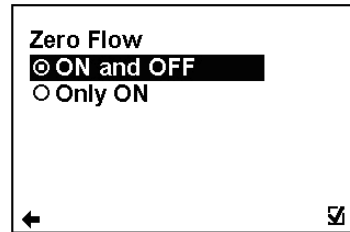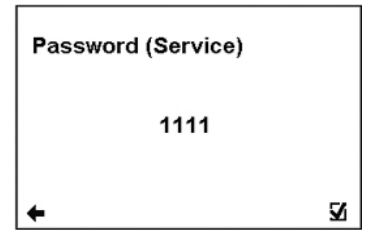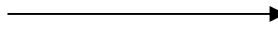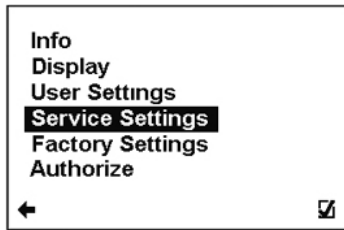   (item selection ↻↺ confirm ☑ selection identification ⊙ back ←)

3.6. Service Settings Menu

```
Info
Display
User Settings
[Service Settings]
Factory Settings
Authorize
←                    ☑
```

→

```
Password (Service)

        1111

←                    ☑
```

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

3.6.1 Service Settings > Error delete

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

➔➤	Item selection
☒←	No change
☑	Resets error minute totalizer

```
Error Delete?

    ☒        ✔

←                    ☑
```

3.6.2 Service Setting > OK delete

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

➔➤	Item selection
☒←	No change
☑	Resets error minute totalizer

```
OK Delete?

    ☒        ✔

←                    ☑
```

3.6.3 Service Setting > Delete volume –

Option to zero the totalizer for negative flow.

➔➤	Item selection
☑	Confirmation
☒	Back without change

```
Delete Volume (-)?

    ☒        ✔

←                    ☑
```
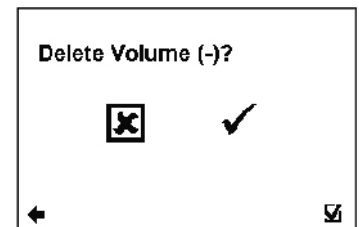
3.6.4 Service Setting > Delete volume +

Option to zero the totalizer for positive flow.

➔➤	Item selection
☑	Confirmation
☒	Back without change

```
Delete Volume (+)?

    ☒        ✔

←                    ☑
```
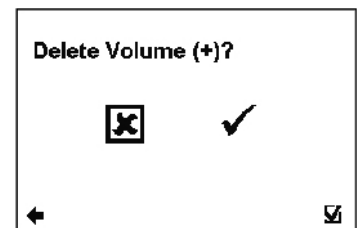
3.6.5 Service Setting > Delete volume total

Option to zero the totalizer for total flow.

➔➤	Item selection
☑	Confirmation
☒	Back without change

```
Delete Valume Total?

    ☒        ✔

←                    ☑
```
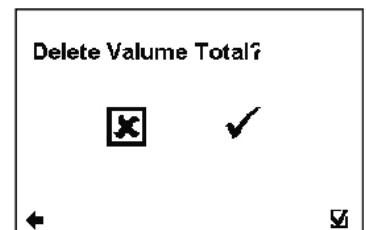
3.6.6 Service Setting > Flow Simulation

      Switching on/off the flow simulation status

ON	Flow Simulation status is ON
OFF	Flow Simulation status is OFF
♋	Item selection
☑	Confirmation

Flow Simulation
◉ ON
○ **OFF**

◄   ☑
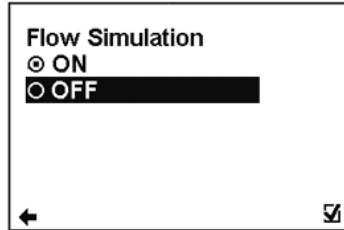
(item selection ♋ confirm ☑ selection identification ⊙ back ◄)

3.6.7 Service Setting > Simulated Flow

      Simulation flow percentage of Flow Qn

      (Factory setting: 3.6m3/h) Possible range: **0 – 36000m3/h**

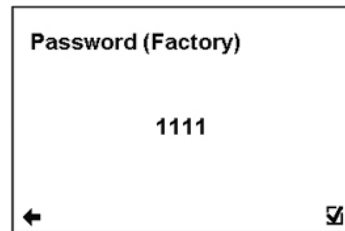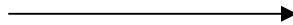|	
◄	Back with no change
⟳⟲	Selection of digit position
♋	Change of value
☑	Confirmation of setup and saving to memory.

Simulated Flow

000   **[m3/h]**

◄   ☑
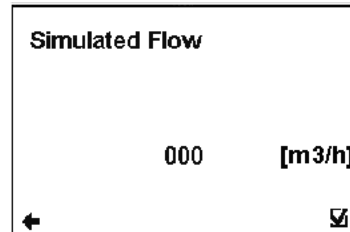
3.7. Factory Settings Menu

Info
Display
User Settings
Service Settings
Factory Settings
Authorize

◄   ☑

→

Password (Factory)

1111

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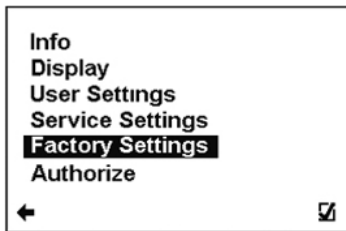
To enter this part of the menu, it is necessary to enter the Factory Password.

This function is only available to Arkon staff in the Arkon workshop

3.8. Authorize Menu

Info
Display
User Settings
Service Settings
Factory Settings
Authorize

◄   ☑

→

Password (Authorize)

1111

◄   ☑
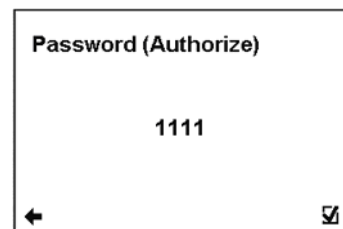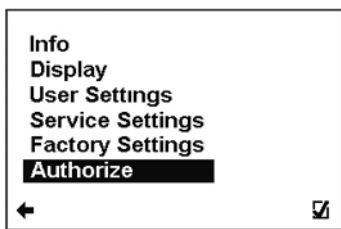
To enter this part of the menu, it is necessary to enter the Autorize Password.

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

Authorize - 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.

⟳⟲	Item selection
☑	Confirmation
☒	Back without change
	Enter value between 0000 and 9999.

Password Setup

1111

◄   ☑
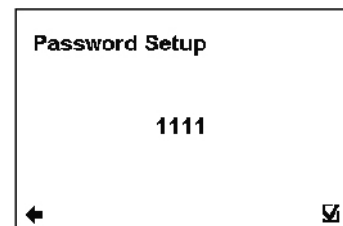
4. Modules

4.1. Power Supply Module

Module Name:	Module Short Name:	Symbol:	Ordering Code:
Power Supply Module	PS Module		V4 - "Power Supply Module 90-250VAC" V4 - "Power Supply Module 24VDC" V4 - "Power Supply Module 12VDC"

APPLICATIONS:

Industrial Power Supplies 90-250 V AC, 24 V DC or 12 V DC Distributed Power Systems.

This module is necessary for the complete flowmeter.

PIN LOCATION
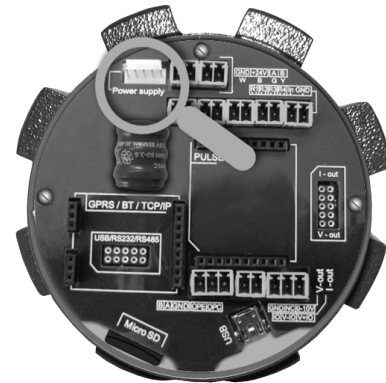
Electrical Specifications

Input Voltages ±5% / possible current consumption	AC 90 - 250V / max. 15 VA DC 24 V / max. 600mA DC 12 V / max. 1050mA
Output Voltages	**3.3V / 2A** **23.6V/300mA**
Frequency Outputs	50-60Hz
Temp. Range	-20 – 70 ℃
Dimensions:	R = 50mm H(230V) = 58mm 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 (max. 15A) 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 Recommended power supply cable minimum 3xØ1mm^2	24 V DC / 600mA Recommended power supply cable minimum 2xØ0.5mm^2	12 V DC / 1050mA Recommended power supply cable minimum 2xØ0.5mm^2
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.

4.2. Datalogger

Module Name:	Module Short Name:	Symbol:	Ordering Code:
Micro SD card	Micro SD		Micro SD

BASIC CIRCUIT CONNECTIONS:	

Size:
11mm x 15mm x 1.0mm

Durability:
10,000 insertion/removal cycles

Weight:
0.4g

Minimal Capacity:
32 MB

The data are stored in *.csv format.
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
Each record consist of:
Date and time, Total+, Total-, Error code, Error Min

While there is an error "SD card not inserted" or "SD Open file" active and the user plugs-in the SD card, error will disapear 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.

4.3. 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.
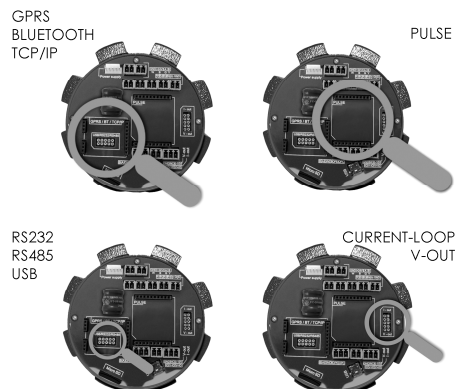
4.4. USB Module

Module Name:	Symbol:	Ordering Code:
MAGX2 USB Module	USB	"MAGX2 USB Communication Module"

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.

4.5. RS485 Module

Module Name:	Symbol:	Ordering Code:
MAGX2 RS485 Module	RS485	"MAGX2 RS485 Communication Module"

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 connect 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.

4.6. RS232 Module

Module Name:	Symbol:	Ordering Code:
MAGX2 RS232 Module	**RS 232**	"MAGX2 RS232 Communication Module"

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:	
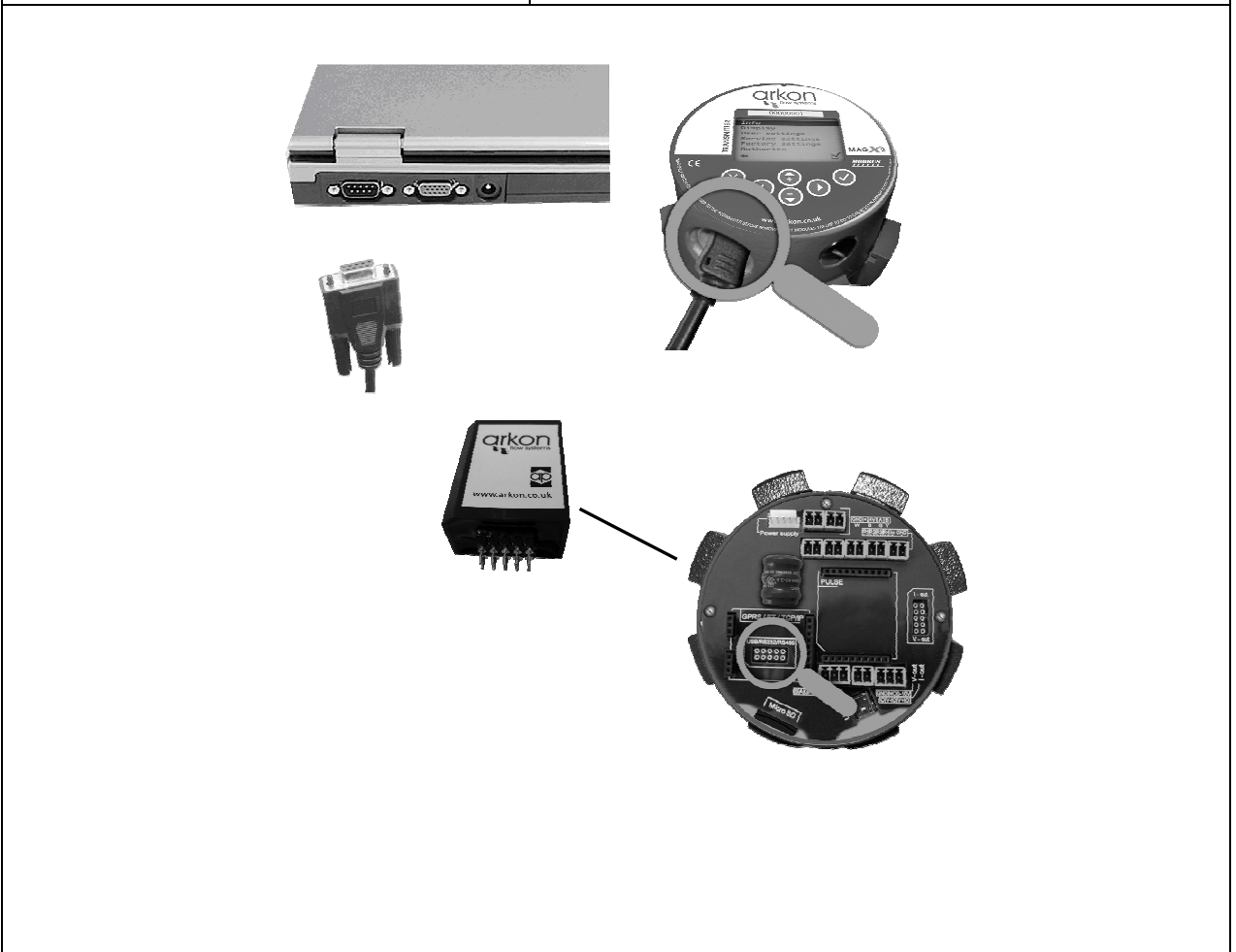
A special cable Cannon9 – mini USB is included.

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

4.7. TCP/IP Module

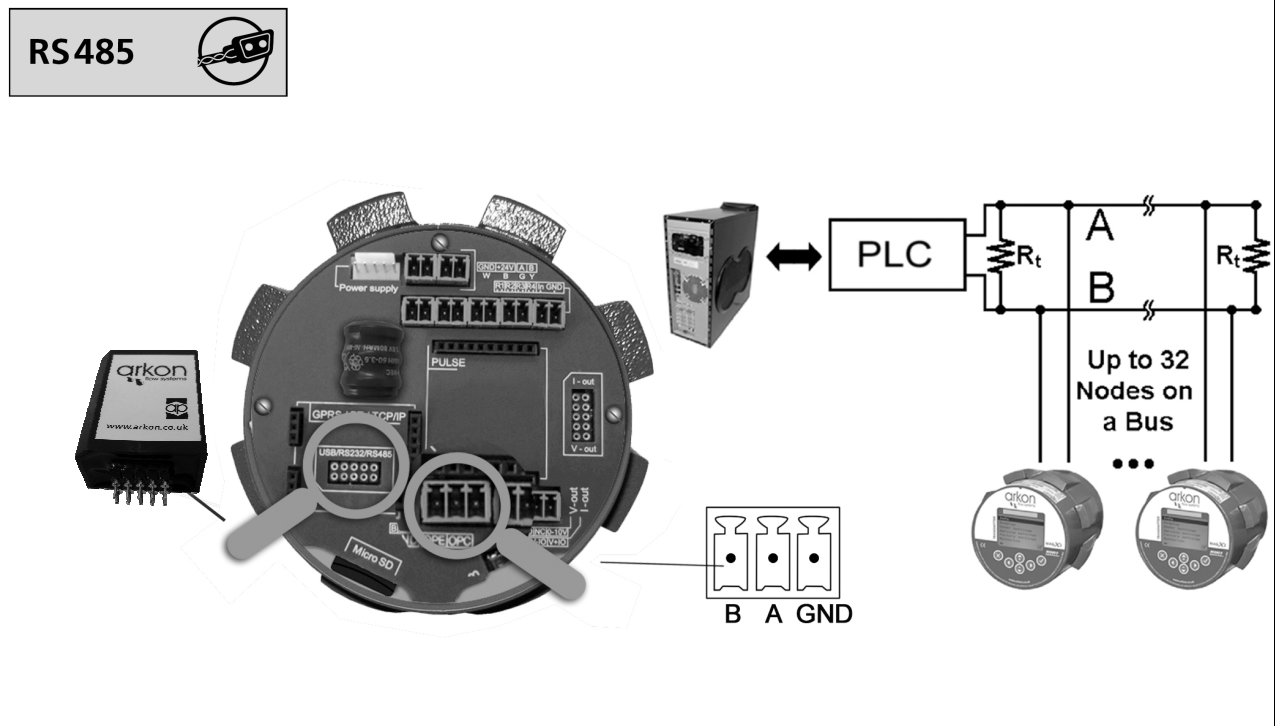| Module Name:	Symbol:	Ordering Code:
MAGX2 TCP/IP Module	TCP/IP	"MAGX2 TCP/IP Communication Module"

APPLICATIONS:
Industrial Automation, Industrial Process Control, Peripheral - PC and Terminal.

Electrical Specifications	
VCC to Ground	3.14V to 3.46V
Power Sup. Current	120 – 267mA
Ethernet	10/100Mbit
Temp. Range	-20 – 70 ℃

BASIC CIRCUIT CONNECTIONS:	Using the TCP/IP Module
See TCP/IP installation manual.	
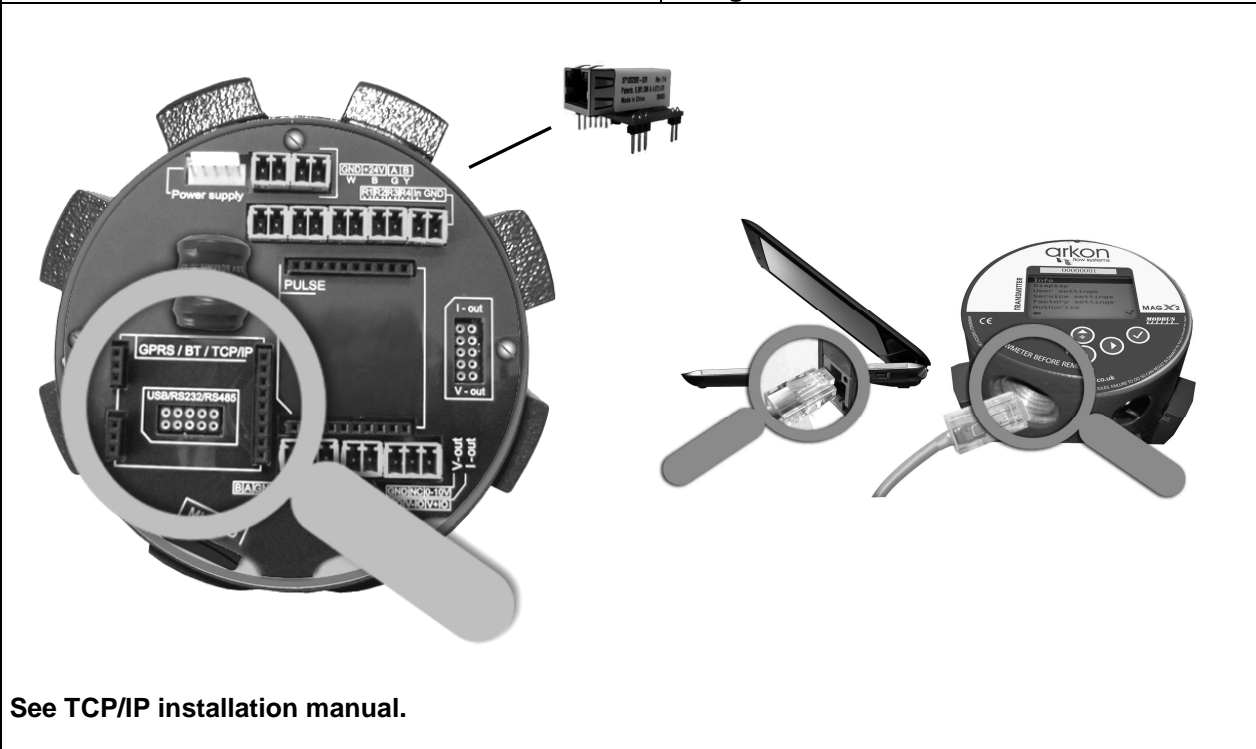
Warning!: There is a condition that must be fulfilled for the TCP/IP module to be able to operate correctly: line speed of the communication protocol Modbus **must** be set up on **19200Bd, Parity none, 1 stop bit.** If there is a different setting the communication will not work. You can find the setting 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.

4.8. BLUETOOTH Module

Module Name:	Module Short Name:	Symbol:	Ordering Code:
MAGX2 BLUETOOTH Module	BT Module	Bluetooth �	"MAGX2 BLUETOOTH Communication Module"

APPLICATIONS:
Wireless control of and communication between transmitter and PC or PLC systems
Any System Requiring BlueTooth Communications

Electrical Specifications	
VCC to Ground	3.3 VDC
Power Sup. 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 ℃

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.

4.9. GSM SMS Module

Module Name:	Symbol:	Ordering Code:
MAGX2 GSM SMS Module	GSM-SMS ✉	"MAGX2 GSM SMS Module"

APPLICATIONS:	
Wireless monitoring of the flowmeter (Flow, Datalogger, Event, Error)	
Electrical Specifications	
VCC to Ground	3.3 VDC
Power Sup. Current	RMS 400mA, MAX 1500mA
Baud Rate	19200 baud/s
Operating Systems	GSM 850 / GSM 900 DCS 1800 / PCS 1900
Multi-slot class	10 (4 Rx / 2 Tx / 5 Sum)
SIM Card	3.0 / 1.8 V
Temp. Range	−20 – 70 ℃

BASIC CIRCUIT CONNECTIONS:	Using the GSM SMS Module

For more information about installation and specification see document: P_29_MAGX2_GSM_SMS_Module in the CD.

Note: To avoid unauthorized access to the data, the customer is responsible for keeping flowmeter serial number and SIM card number secret.

Warning!: There is a condition that must be fulfilled for the GPRS 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".
For more information about GSM SMS Module see MAGX2 GSM SMS Module Specification.

⚠	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. GPRS Module

Module Name:	Symbol:	Ordering Code:
MAGX2 GPRS Module	**GPRS**	**"MAGX2 GPRS Communication Module"**
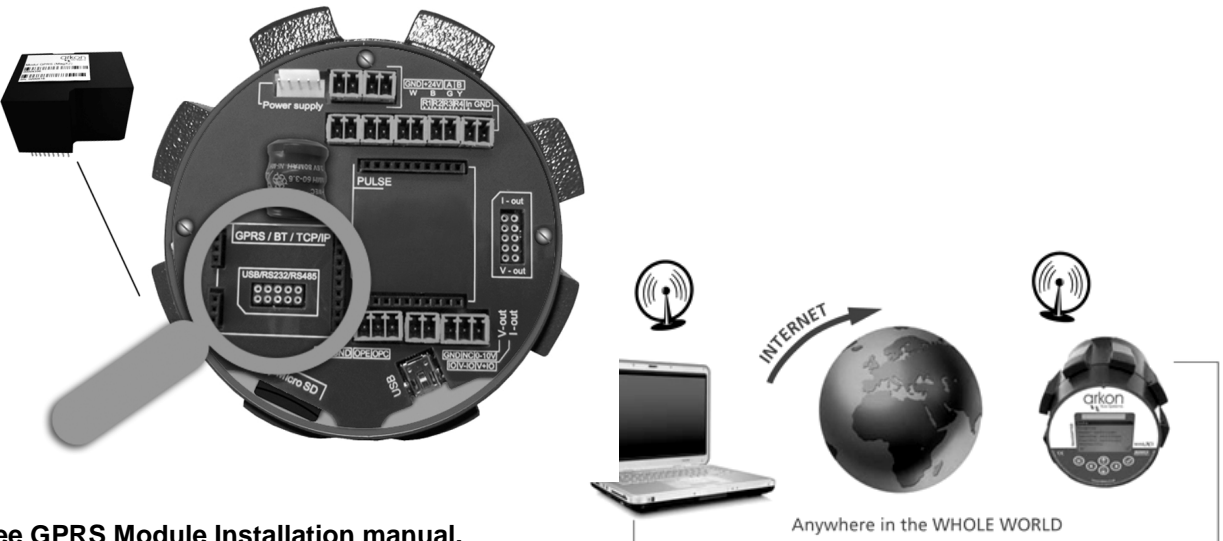
APPLICATIONS:
Wireless control of and communication between transmitter and PC or PLC systems Any System Requiring GPRS Communications

Electrical Specifications	
VCC to Ground	3.3 VDC
Power Sup. Current	RMS 400mA, MAX 1500mA
Baud Rate	19200 baud/s
Operating Systems	GSM 850 / GSM 900 DCS 1800 / PCS 1900
Multi-slot class	10 (4 Rx / 2 Tx / 5 Sum)
SIM Card	3.0 / 1.8 V
Temp. Range	–20 – 75 ℃

BASIC CIRCUIT CONNECTIONS:	Using the GPRS Module
See GPRS Module Installation manual. | |

Warning!: There is a condition that must be fulfilled for the GPRS 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. Current Loop Output Module

Module Name:	Module Short Name:	Symbol:	Ordering Code:
MAGX2 Current Loop Output Module	**I-OUT Module**	**Current Loop**	**"4-20mA current output signal module"**

APPLICATIONS:
Industrial Automation, Industrial Process Control, Test Systems, Smart Transmitter

Electrical Specifications:
12-bit DAC
Maximum Resolution 3.9 µA.

VCC to Ground	3.3 VDC
Current out	4 – 20 mA
Output mode	Active or Passive
Temp. Range	-20 – 70 ℃

BASIC CIRCUIT CONNECTIONS:	Using the Current Loop Module
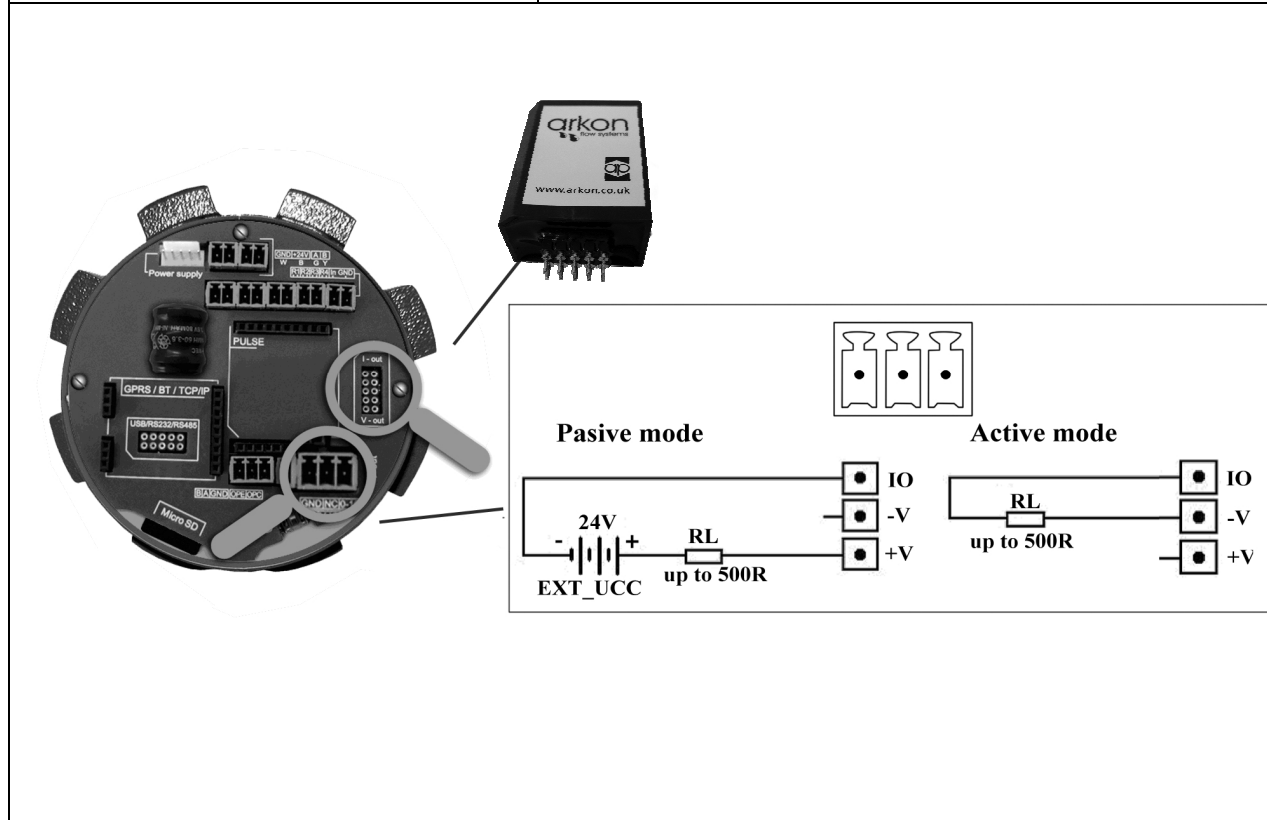
	Warning electrostatic sensitive device.
	Any connection or disconnection of any module has to be done with the network power to the meter switched off.

4.12. V-Out Module

Module Name:	Module Short Name:	Symbol:	Ordering Code:
MAGX2 Voltage Output Module	V-Out Module	V-out	"MAGX2 0-10V Voltage Output Module"

APPLICATIONS:
Industrial Automation, Industrial Process Control, Test Systems, Smart Transmitter
Electrical Specifications   **12-bit DAC**   **Maximum Resolution** 2.44 mV

VCC to Ground	3.3 VDC
Voltage Output	0 – 10V
R_Z	Min. 1kΩ
Temp. Range	-20 – 70 ℃

BASIC CIRCUIT CONNECTIONS:	Using the Voltage 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.

4.13. Pulse output

Module Name:	Module Short Name:	Symbol:	Ordering Code:
MAGX2 Pulse Output Module	**Pulse Output**	PULSE	**Pulse Output**
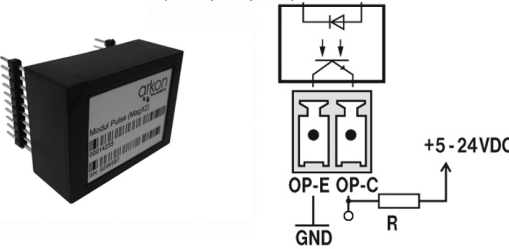
APPLICATIONS:
Industrial Automation, Industrial Process Control, Test Systems, Smart Transmitter

VCC to Ground	3.3 VDC
Output mode	Frequency, Pulse
Max Relay Voltage	110VDC/0.5A
Output Frequency	2-1000 Hz
Max Input Voltage	+5 - 14VDC
Temp. Range	-20 – 70 ℃

BASIC CIRCUIT CONNECTIONS:	Using the Pulse Output Module

External power supply	V DC	5 V	12 V	24 V
External resistor R	R	1k8	3k3	6k8

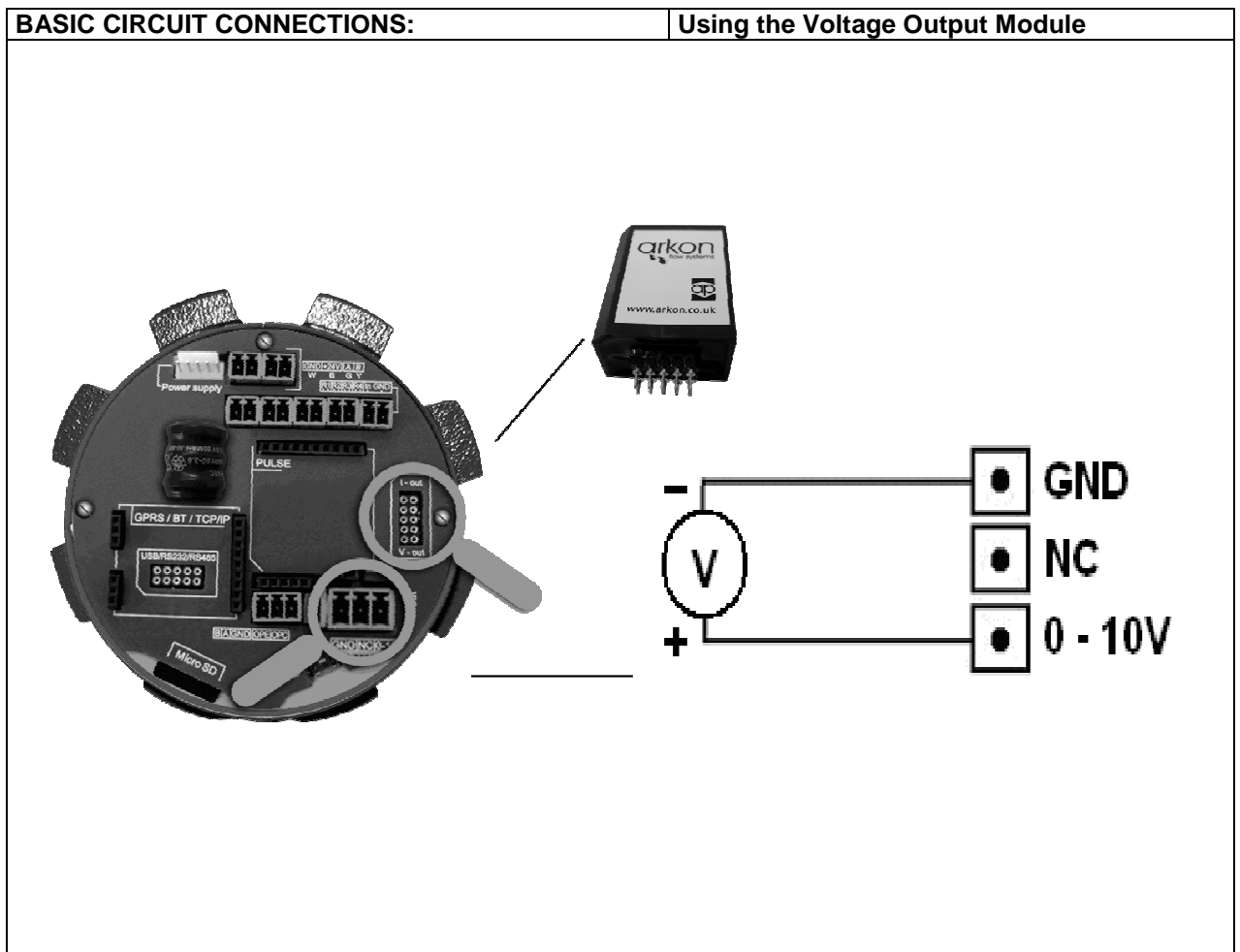|	
Warning electrostatic sensitive device.
Any connection or disconnection of any module has to be done with the network power to the meter switched off.

5. Maintenance

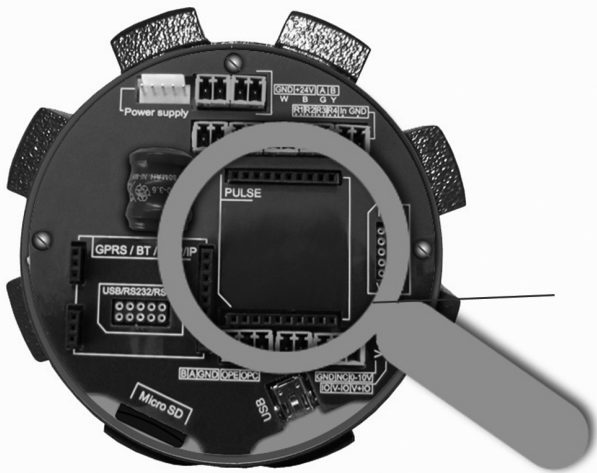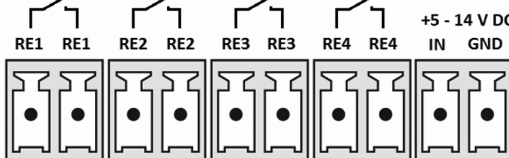MAGX2 flowmeter does not require any special maintenance. Dependent on the media being measured it is recommended that approximately once a year, to remove the sensor from the pipe and clean the liner. Method of cleaning consists of removing mechanical dirt and any non-conductive coating (like oil film)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

5.1. Self –cleaning electrodes

If mechanical cleaning is not possible, MAGX2 has electrolytic method to clean electrodes.
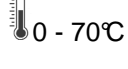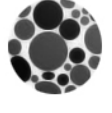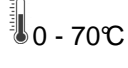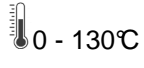
An electrolytic method is advantageous for its simplicity, however it can only be applied for the contamination that can be removed by electrolysis. (Low contamination and deposit).

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 User settings.

6. 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.

Liner Selection:

Hard Rubber	Drinking water and wastewater		0 - 70°C
Soft Rubber	Water with abrasive particles		0 - 70°C
Teflon	Chemicals, food industries and drinking water		0 - 130°C

Electrode selection:

Stainless Steel	General purpose, sewage, water	
Hastelloy	Seawater, Chemicals	
Titanium	Aggressive chemicals	
Platinum	Aggressive chemicals	

7. Flowmeter Dimensions

Compact version
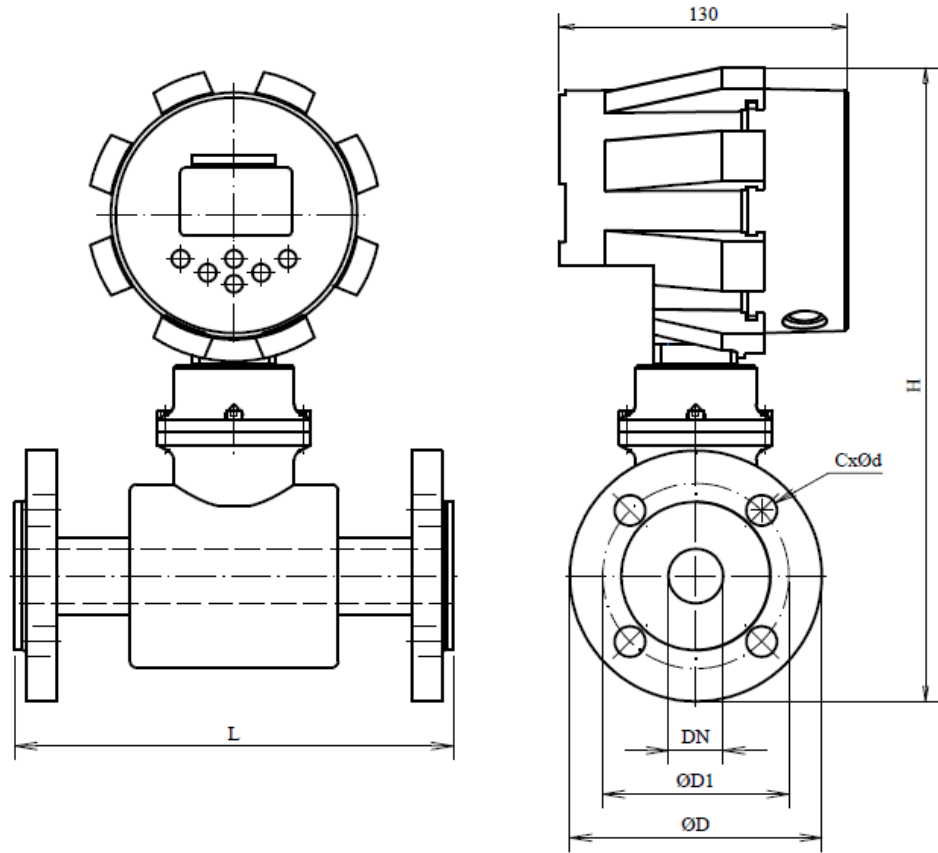
Remote version
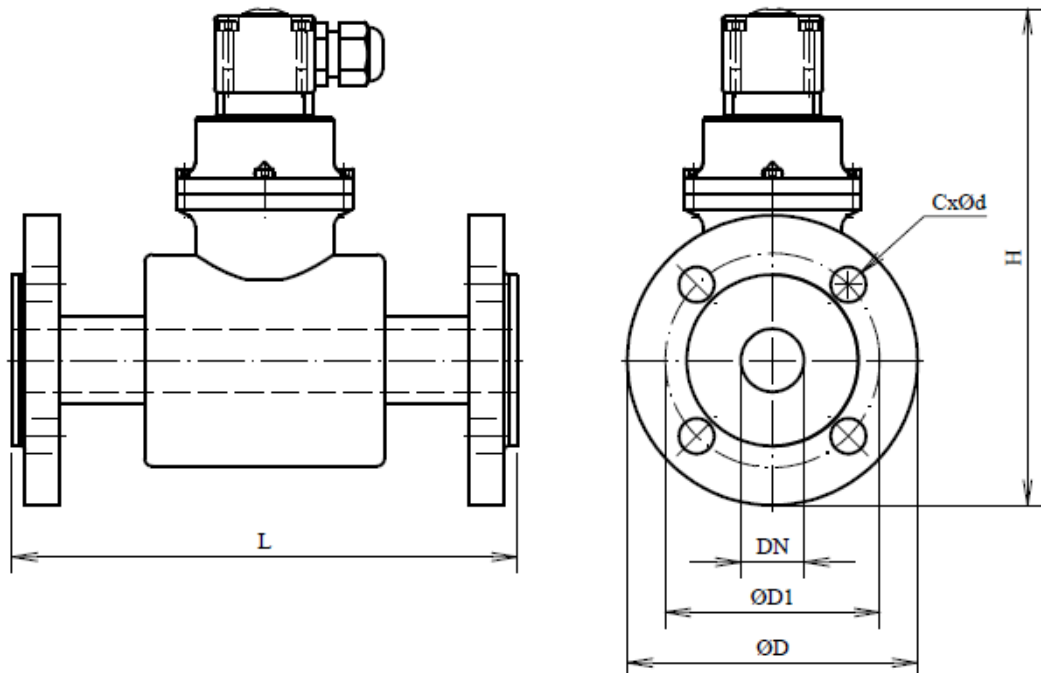
DN	ØD	ØD1	CxØd	H_compact	H_remote	L
10	90	60	4x14	258	168	200
15	95	65	4x14	263	173	200
20	105	75	4x14	270	181	200
25	115	85	4x14	276	186	200
32	140	100	4x18	294	205	200
40	150	110	4x18	303	213	200
50	165	125	4x18	317	227	200
65	185	145	8x18	337	247	200
80	200	160	8x18	355	266	200
100	220	180	8x18	375	286	250
125	250	210	8x18	401	312	250
150	285	240	8x22	440	351	300
200	340	295	12x22	511	421	350
250	405	355	12x26	581	491	400
300	460	410	12x26	630	540	500
350	520	470	16x26	698	608	500
400	580	525	16x30	751	661	600
450	640	585	20x30	794	704	600
500	715	650	20x33	863	773	600
600	840	770	20x36	980	890	600

DN	ØD	ØD1	CxØd	H_compact	H_remote	L
1/2"	95	66,7	4x16	263	173	200
3/4"	117	82,5	4x20	276	187	200
1"	124	88,9	4x20	280	191	200
1.1/4"	133	98,4	4x20	291	201	200
1.1/2"	156	114,3	4x23	306	216	200
2"	165	127	8x20	317	227	200
2.1/2"	178	139,7	4x20	333	244	200
3"	191	152,4	4x20	351	261	200
4"	229	190,5	8x20	380	290	250
5"	254	215,9	8x23	403	314	250
6"	279	241,3	8x23	437	348	300
8"	343	298,4	8x23	512	422	350
10"	406	361,9	12x26	581	491	400
12"	483	431,8	12x26	642	552	500
14"	535	476,2	12x29	706	616	500
16"	595	539,7	16x29	758	668	600
18"	635	577,8	16x32	792	702	600
20"	700	635	20x32	855	765	600
24"	815	749,3	20x35	968	878	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 / 600 lbs.
DN 65 – DN 150 → PN 16 / 150 lbs

8. How to order your MAGX2

Model	Ordering code							Description
MAGX2	**1**	**2**	**3**	**4**	**5**	**6**	**7**	
	T							**MAGX2 main board, display, touch buttons control unit, *Version V.7***
								Power supply module
		230						Power supply module 90-250VAC - *Version 3.*
		24						Power supply module 24VDC - *Version 3.*
		12						Power supply module 12VDC - *Version 3.*
			CM					**Sensor to transmitter communication module - *Version 7.1***
								Remote monting 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
					V			0-10V voltage output module
								Output 2
						N		None
						P		Pulse output module
								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*
							485	RS485 communication module, distance up to 1km
							TCP	TCP/IP communication module, amplifiers might be necessary

* Please note it is not possible to change MAGX2 transmitter settings using GPRS module. Other communication module will be required

Example	MAGX2	T	230	CM	N	C	N	USB

Model	Ordering code					Description
Sensor	1	2	3	4	5	
						Connection
	D		45			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 / 1/2 150 / 6				10mm / 1/2"
		15 / 2/3 200 / 8				15mm / 2/3"
		20 / 3/4 250 / 10				20mm / 3/4"
		25 / 1 300 / 12				25mm / 1"
		32 / 1.1/4 350 / 14				32mm / 1.1/4"
		40 / 1.1/2 400 / 16				40mm / 1.1/2"
		50 / 2 450 / 18				50mm /2"
		65 / 2.1/2 500 / 20				65mm / 2.1/2"
		80 / 3 600 / 24				80mm / 3"
		100 / 4 700 / 28				100 mm/ 4"
		125 / 5 800 / 32				125 mm/ 5"
						Liner
			HR			HARD RUBBER
			PT			PTFE
			SR			SOFT RUBBER
			NR			HYGIENIC RUBBER
			CR			CERAMIC
			CT			E-CTFE
						Pressure
				150		150 psi
				300		300 psi
				10		PN10
				16		PN16
				25		PN25
				40		PN40
						Electrodes
					SS	Stainless Steel
					HA	Hastelloy C
					TA	Tantalum
					TI	Titanium
					PL	Platinum

Example	Sensor	D	100	HR	16	SS	

9. MAGX2 Error Code Table

0b00000 ··· 00000000

Position 0
Position 1

⋮
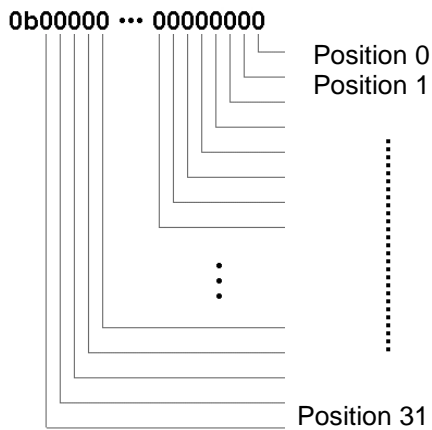
Position 31

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
25-31	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:	Readed errors:
083 HEX	100011 BIN	SD card not inserted / Overloaded / Empty pipe

10. Appendix

10.1. CE requirements

The MAGX2 Electromagnetic flowmeter is manufactured conform CE requirements.

Conformity requirements	EN 61010-1:2003
	EN 61326:1998 + Al. 1:1999, cor. 1:1999 + A2:2002 + A3:2005, Table A.1
	EN 61326:1998 + Al. 1:1999, cor. 1:1999 + A2:2002 + A3:2005, Class A

10.2. 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.

10.3. Contact

Technical support: support@arkon.co.uk
Windows life messenger: support@arkon.co.uk

Sales office: office@arkon.co.uk

Office hours:
8:30 – 18:00 (GMT+1)

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