BA 004E/FM44i/07.10

Valid starting from
Hardware V 2.1
Software V 1.25

Flowmax® 44i

Ultrasonic flow metering / dosing device

Operating manual

MIB GmbH
Messtechnik & Industrieberatung

General safety instructions

Warning!

Please always observe the following safety instructions!

Intended use

- The flow meter Flowmax 44i may only be used for measuring the flow of pure, homogeneous liquids.
- The volume flow meter Flowmax 44i is built operationally safe according to the latest state of the art takes the relevant regulations according to EN 61010 (corresponds to VDE 0411 “Safety specifications for electrical measurement, control and laboratory devices”) into consideration.

  Please pay attention to the safety instructions with the following pictograms in these operating instructions:


Note!


Attention!

Warning!

- The manufacturer cannot be held liable for any damage from inappropriate or unintended use. Conversions and/or changes to the flow meter may only be made, if they are expressly admissible according to these operating instructions.

Personnel for installation, commissioning and operation

- Assembly, electronic installation, commissioning and maintenance o fthe flow meter must be carried out by qualified personnel authorized by the operator of the plant. The qualified personnel must have read and understood these operating instructions and must follow its instructions.
- The installer has to ensure that the flow meter is correctly connected according to the electric connection diagrams.

Technological progress

The manufacturer reserves the right to adapt the technological specifications to state of the art technological developments without special prior notice. Further information about the latest updates and potential additions to these operating instructions are available from MIB.

Tablet of contents

1. Planning information

1.1 Areas of application

The flow measurement device Flowmax 44i is in particular suited for measuring dynamic events in pipes and tubes. Liquids are measured. It is used among others in

- Chemicals supply for controlling, logistics, monitoring
- Filling machines in food industries
- Cooling systems, logistics, monitoring
- Production machinery for control and monitoring of formulas
- Valve control for continuous release of liquid volumes
- Supply with de-ionized water
- Very dynamic processes with dosing times of below 1 second

It has the following characteristics:

- No movable parts and therefore no wear
- High repeatability
- Easy to clean
- Safe manipulation
- Compact design
- Integrated detection of empty conduits
- Integrated dosing function with possibility of pre-setting and adjusting amounts
- Chemical resistance
- Integrated display with keypad

1.2 Measuring principle

It usually takes more energy to swim against the flow than with the flow. The ultrasonic flow measurement according to the phase-difference procedure is based on this simple physical fact:
Two sensors that are located opposite from each other alternatingly transmit and receive ultrasonic signals. With medium at standstill both sensors receive the transmitted ultrasonic signals in the same phase, i.e. without phase difference. With medium flowing there is a phase shift. It differs when measured in direction of the flow from when measured against the direction of the flow. This phase difference is directly proportional to the flow rate. The flow rate and the known diameter of the pipe are used to determine the flow volume.

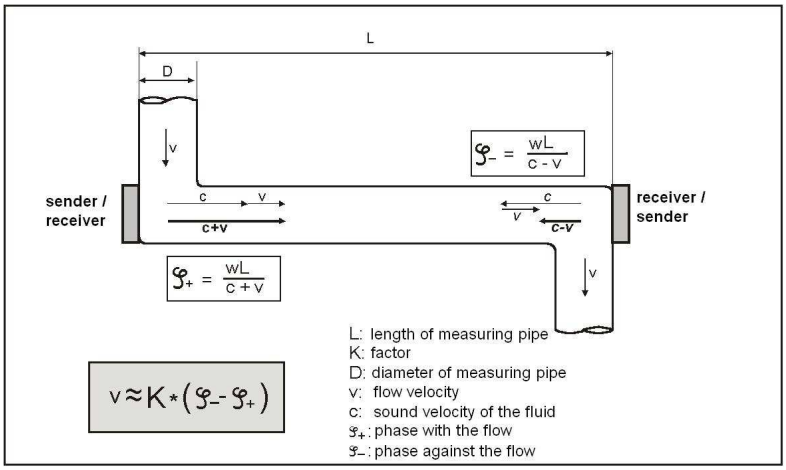


Fig. 1: Presentation of the principle of ultrasonic flow measuring

1.3 Dosing function

Dosing can basically be realized in different ways:

1. Flowmax 44i as dosing device (dosing control via Flowmax 44i, for 8-Pin option)

   Flowmax 44i does the entire dosing control. The dosing quantity (e.g. 400 ml) is pre-set in the Flowmax 44i via the digital interface (RS485) with the operating software. Dosing starts, as soon as line start of dosing is wired to 24 V, e.g. via a pushbutton. Flowmax 44i will now open the dosing valve via the output configured for it. When the pre-set dosing quantity is reached, the dosing valve is closed via the above output. The 2nd output can be used independently for signalling of empty pipe detection, limit control or flow direction.

2. Flowmax 44i as dosing device (dosing control via FlowSoft)

   Flowmax 44i does the entire dosing control. The dosing quantity (e.g. 400 ml) is pre-set in the Flowmax 44i via the digital interface (RS485) with the operating software. Dosing starts via the dosing-menu in the operating software. Flowmax 44i will now open the dosing valve via the output configured for it. When the pre-set dosing quantity is reached, the dosing valve is closed via the above output.

3. Flowmax 44i as flow meter (dosing control via dosing equipment)

   The dosing equipment is responsible for the entire dosing control. Therefore, the dosing quantity is fixed in the dosing equipment control during commissioning by pre-selecting the meter pulses. Dosing starts, when the relevant pushbutton of the dosing equipment is pushed. The control will now open the dosing valve. From now on Flowmax 44i will send a voltage pulse to the control for each volume unit that has flown through (e.g. per 1ml). When the pre-selected pulse quantity is reached, the control closes the dosing valve. In this case, output 1 is used to send out pulses.

1.4 Operational safety

Comprehensive self-tests ensure highest possible operational safety.

The protection class is IP 67.

Flowmax 44i meets the general EMC immunity requirements according to CE, EN 50081-2, and EN 50082-2.

Concerning the low voltage directive Flowmax 44i meets the safety requirements according to EN 60601-1.

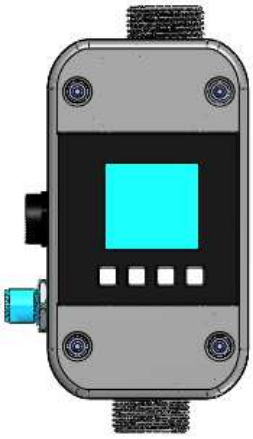
2. Assembly and installation

2.1 Installation instructions

The housing of Flowmax 44i shows an arrow symbolizing the direction of the flow measurement. The flow meter has to be installed in a way so that the flow-through is in direction of the arrow.

Attention!

TOP -> outlet



DOWN -> in feed

Fig. 2: Installation position of Flowmax 44i

For fastest possible gas detection it is important to keep the pipe distance from tank to Flowmax 44i should be kept as short as possible. Accurate measurement can only be guaranteed, if the pipe is completely filled and if it is ensured that the liquid does not outgas.

Notwithstanding it may be advantageous for dosing applications to place the Flowmax 44i as close as possible to the dosing valve, since tubes increase their cross-section depending on the system pressure. This may lead to repeatable differences.

Attention!

Please note that it is absolutely necessary to have a back pressure of at least 0.3 bar rel. (corresponds to 3 m water column) at the outlet of the Flowmax 44i.

Solid matter particles that are carried along may result in measuring errors.

Attention!

When using pumps, Flowmax 44i must be installed in flow direction behind the pump, on the pressure side, in order to ensure sufficient pressure. Regard the maximum pressure step of the Flowmax 44i.

For correct volume flow measurements straight and unobstructed inflow and outflow zones for Flowmax 44i have to be observed. Starting from the connection thread these have to be at least:

	DN 10	DN15	DN20	DN25
Inflow track	10cm	30cm	50cm	80cm
Outflow track	0cm	5cm	10cm	20cm

2.2 Assembly of the flow meter

The flow meter gets mounted into a pipe system by using the connection piece. To grant best measuring performance Flowmax 44i should be mounted vertically into the pipe. It is not recommend to place the flow meter after a dosing-vlave, in this case the flow meter can run empty. This causes a measuring deviation at the next measurement. To avoid getting bubbles in the liquid, Flowmax 44i should be installed on the pressure side of the pump.

Note!

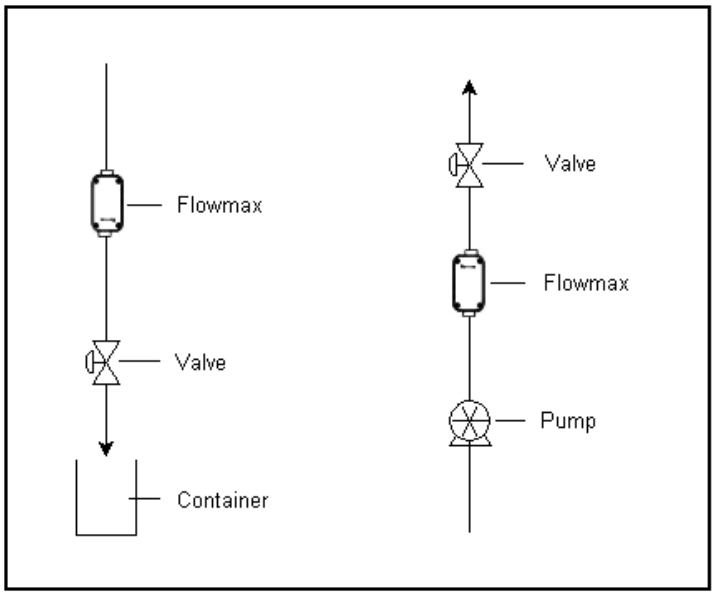


Fig.3: Mounting examples for Flowmax 44i

If it is not possible to mount the flow meter vertically, then the pipe where the device is mounted haves to be filled with liquid. The best measuring result is reached, when bubbles are not able to get into the Flowmax 44i.

Note!

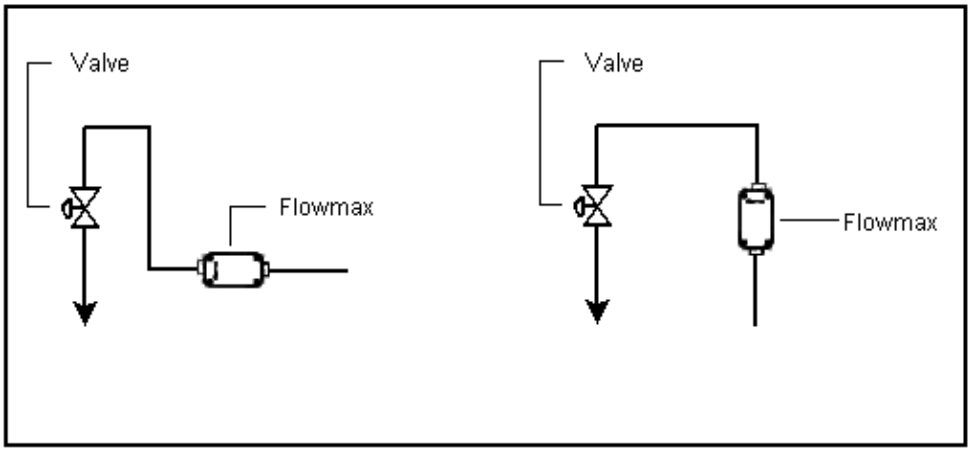


Fig.4: Mounting possibilities

Vibrations or mechanic forces may decrease the measuring accuracy.
It is possible to fix the flowmeter additionally with two clamps against vibrations or movements. Use the clamps as seen in the figure below at the inlet and outlet of Flowmax 44i.

Note!

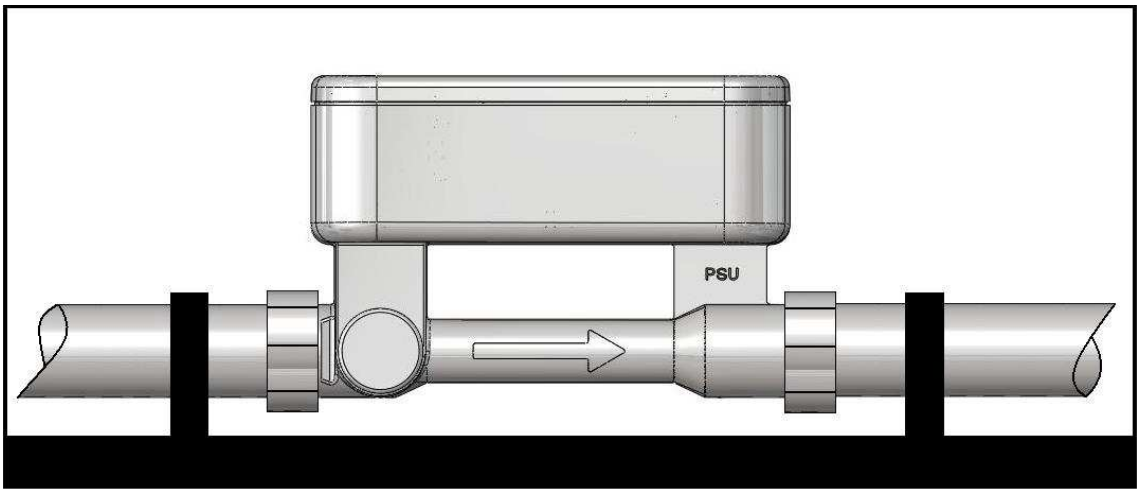


Fig.5: Fixing Flowmax 44i

Applications with hot liquids:

When Flowmax 44i is used in applications with liquid temperatures higher than 60℃ and is mounted horizontal it is recommend to mount the flowmeter with the electronic housing on the lower side. The stress for the electronic is reduced because the heat is able to rise up. When Flowmax is mounted vertical it makes no different on which side the housing is.

Attention!

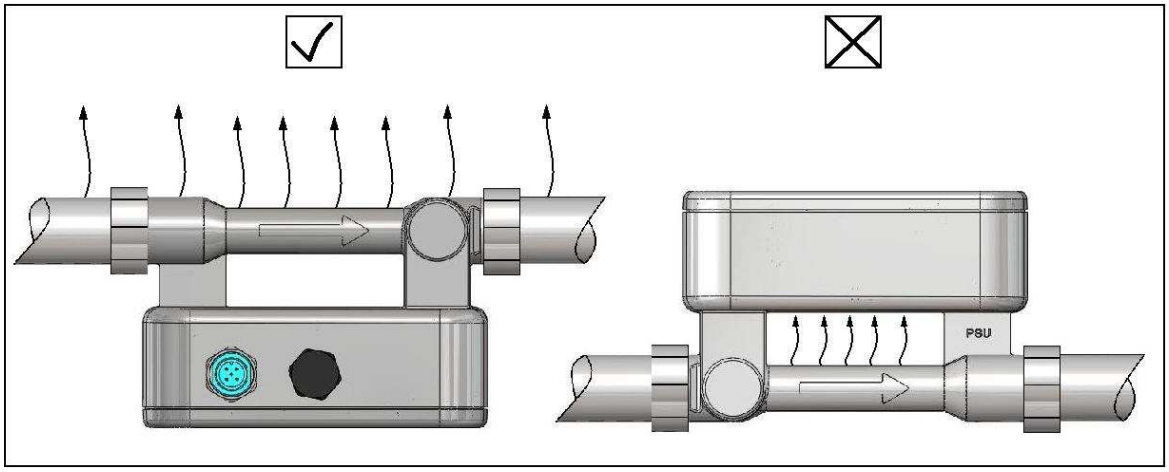


Fig.6: Flowmax 44i with hot media

2.3 Electrical wiring

The flow meter must not be installed, wired or disassembled when live (operating voltage). For any of these activities interrupt power supply of Flowmax 44i.

Attention!

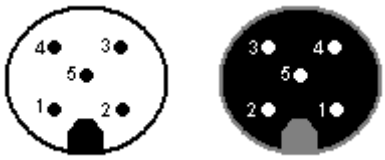


Fig.7: Pin code: Connection plug / socket

Connector cable configuration with outlets defined by manufacturer.
The outlets may be re-programmed for specific applications.

Pin	Function	Description
1	L+	Voltage supply: 18...30 VDC
2	Pulse alternative: 1. Empty-pipe output 2. Dosing output 3. Limit-control output 4. Negative flow	Digital Output 1 (O1) Freely adjustable ranging from 0.1 to 25 ml/pulse in 0.1 ml/pulse steps, npn-Transistor, max. load 30V/100mA. Configurable output of 0V or 24V when pipe is empty. Configurable output of 0V or 24V via dosing-menu by FlowSoft. Configurable output of 0V or 24V when reaching upper or lower limit Configurable output of 0V or 24V when liquid flows in negative direction
3	GND	Ground: 0 V
4	Communication	Communication interface
5	Analog output	4....20mA; 0....20mA Example: 0l/min => 4mA 36l/min => 20mA Alert => 2mA (4-20mA, depending on the configured limits)

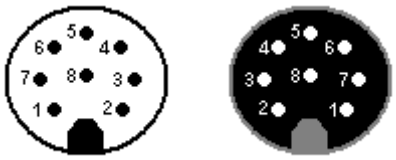


Fig.8: Pin code: Connection plug / socket

Connector cable configuration with outlets defined by manufacturer.
The outlets may be re-programmed for specific applications.

Pin	Function	Description
1	L+	Voltage supply: 18...30 VDC
2	Pulse alternative: 1. Empty pipe output 2. Dosing output 3. Limit control output 4. Negative flow	Digital Output 1 (O1) Freely adjustable ranging from 0.1 to 3000 ml/pulse in 0.1 ml/pulse steps, npn-Transistor, max. load 30V/100mA. Configurable output of 0V or 24V when pipe is empty. Configurable output of 0V or 24V via dosing-menu by FlowSoft. Configurable output of 0V or 24V when reaching upper or lower limit Configurable output of 0V or 24V when liquid flows in negative direction.
3	GND	Ground: 0 V
4	Digital Output 2 Functions: 1. Empty pipe output 2. Dosing output 3. Pulse output 4. Limit control output 5. Negative flow	Digital Output 2 (O2) Configurable npn- or pnp-Transistor, max. Load 30V/ 100mA. Configurable output of 0V or 24V when pipe is empty. Configurable output of 0V or 24V via dosing menu of FlowSoft. Freely adjustable ranging from 0.1 to 3000 ml/pulse in 0.1 ml/pulse steps. Configurable output of 0V or 24V when flow reaches upper or lower limit. Configurable output of 0V or 24V when liquid flows in negative direction.
5	Analog +	4....20mA; 0....20mA; 0....10V Example: 0l/min => 4mA 36l/min => 20mA Alert => 2mA (4-20mA, depending on the configured limits)
6	Communication	Communication interface
8	Shielding	EMC safety
7	Digital input 1 1. Dosing output 2. Set offset 3. Creeping flow	Digital input 1 (I1) Starts the dosage by a rising edge of 24V. The Offset is set by a rising edge of 24V. Creeping suppression is deactivated as long as there are 24V at the input.

3. Commissioning


Attention!

Attention: While commissioning take care to run the Basic Trim (FlowSoft Medium) with filled advice. Repeat this action until amplifier stage and receiving amplitude reach a steady value.

3.1 Operation


Note!

If Flowmax 44i is used as volume flow meter for water or water-like liquids according to section 1.3.2, it will not require on-site manipulation, because the following parameters set by the manufacturer will guarantee optimum functionality. Notwithstanding the Flowmax 44i may also be supplied with customized settings. The coordination must be done with the purchase order.


Attention!

If necessary, e.g. if viscosity and/or speed of sound deviate strongly from water, the pre-set parameters can be individually adjusted with the help of the integrated interface and the FlowSoft service software. This is always necessary when using Flowmax 44i as a dosing device according to section 1.3.1. This requires the USB to RS485-Converter Sonic.

The following parameters may be changed to settings suitable for the individual conditions: for 5-pin version
- Digital output 1 (O1), function and behavior
- Analog output
- Flow range, for which shall apply 4...20 mA
- Pulse value
- Creeping suppression
- Optimization of measurement curve with up to 8 interpolation values (medium matrix)

The following parameters may be changed to settings suitable for the individual conditions: for 8-pin version
- Digital output 1 (O1), function and behavior
- Digital output 2 (O2), function and behavior
- Digital input 1 (I1)
- Analog output
- Flow range, for which shall apply 4...20 mA
- Pulse value
- Creeping suppression
- Optimization of measurement curve with up to 8 interpolation values (medium matrix)

Among others, see FlowSoft operating instructions

3.2 Functionalities of flow meter and default settings

Display and user menu

Flowmax 44i is equipped with a display to visualize actual measuring values and change parameters of the flow meter. The navigation all over the menus is done by the four keys on the keypad.

When the “Set” key is pressed the device switch into the main menu. Different menu options can be selected by using the two arrow keys.
To enter e.g. analog limits “Analog output – Upper limit” use the arrow keys to change values and press “Set” to confirm. To switch back to the last menu level press the “Esc” key. As soon as the operator tries to changes values it is needed to enter a password. Password protection is used to ensure that just authorizes personal is able to change values or configurations. The default password for Flowmax 44i is 41414. The password can be changed with service tool FlowSoft.


Note!

Note that not all functions of Flowmax 44i can be changed by the user menus of the display. To configure more parameters the service software FlowSoft and an USBtoRS485-Converter Sonic is needed.

Attention:
Described functions that are marked with * are only available for the Flowmax 8-pin version. Flowmax 44i without user display supports the same functions like the display-version. To change configurations at Flowmax 44i without user display an USBtoRS485-Converter Sonic and the service software FlowSoft is needed.


Attention!

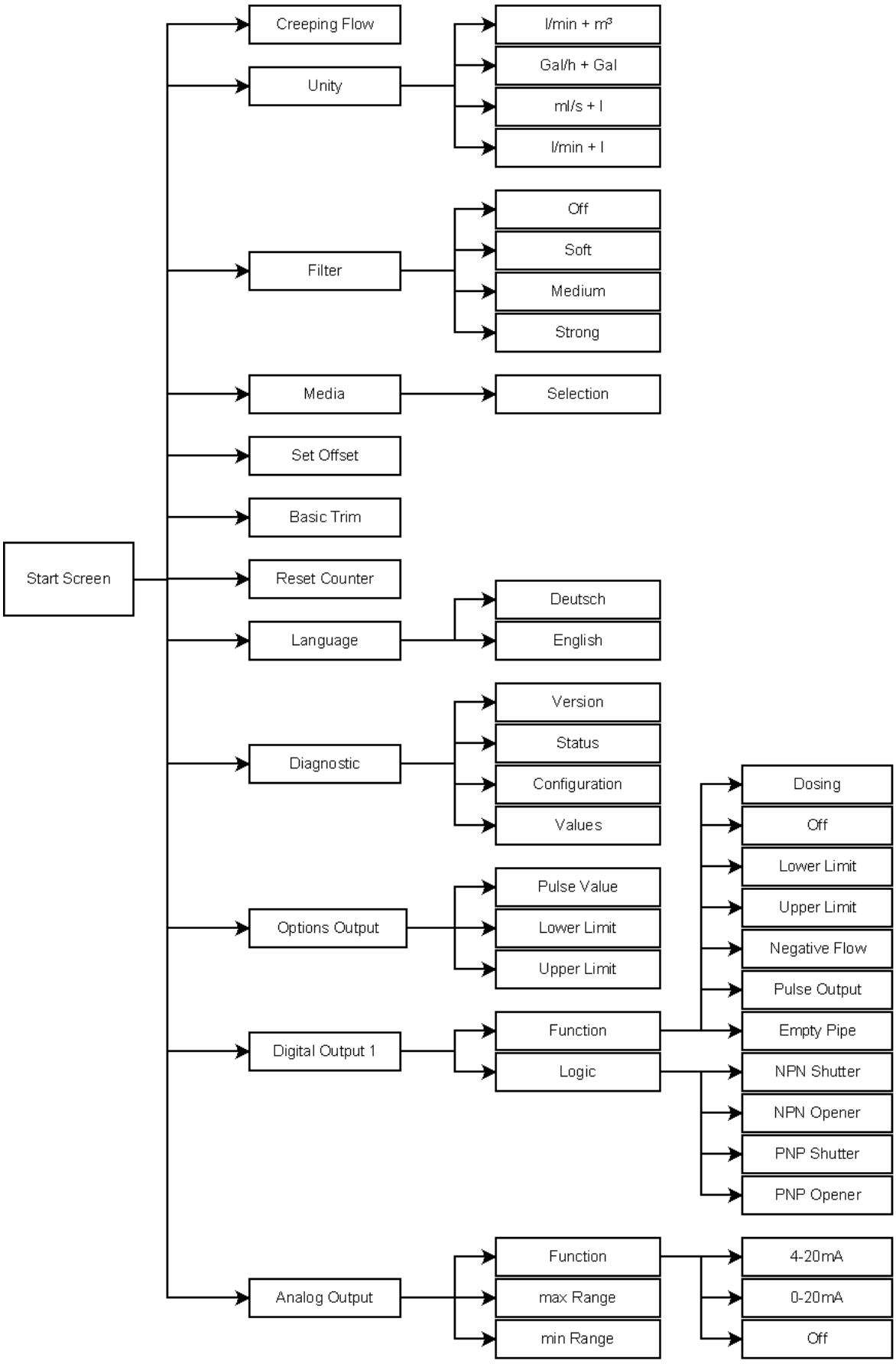


Fig.9: Menu organization for 5-pin version

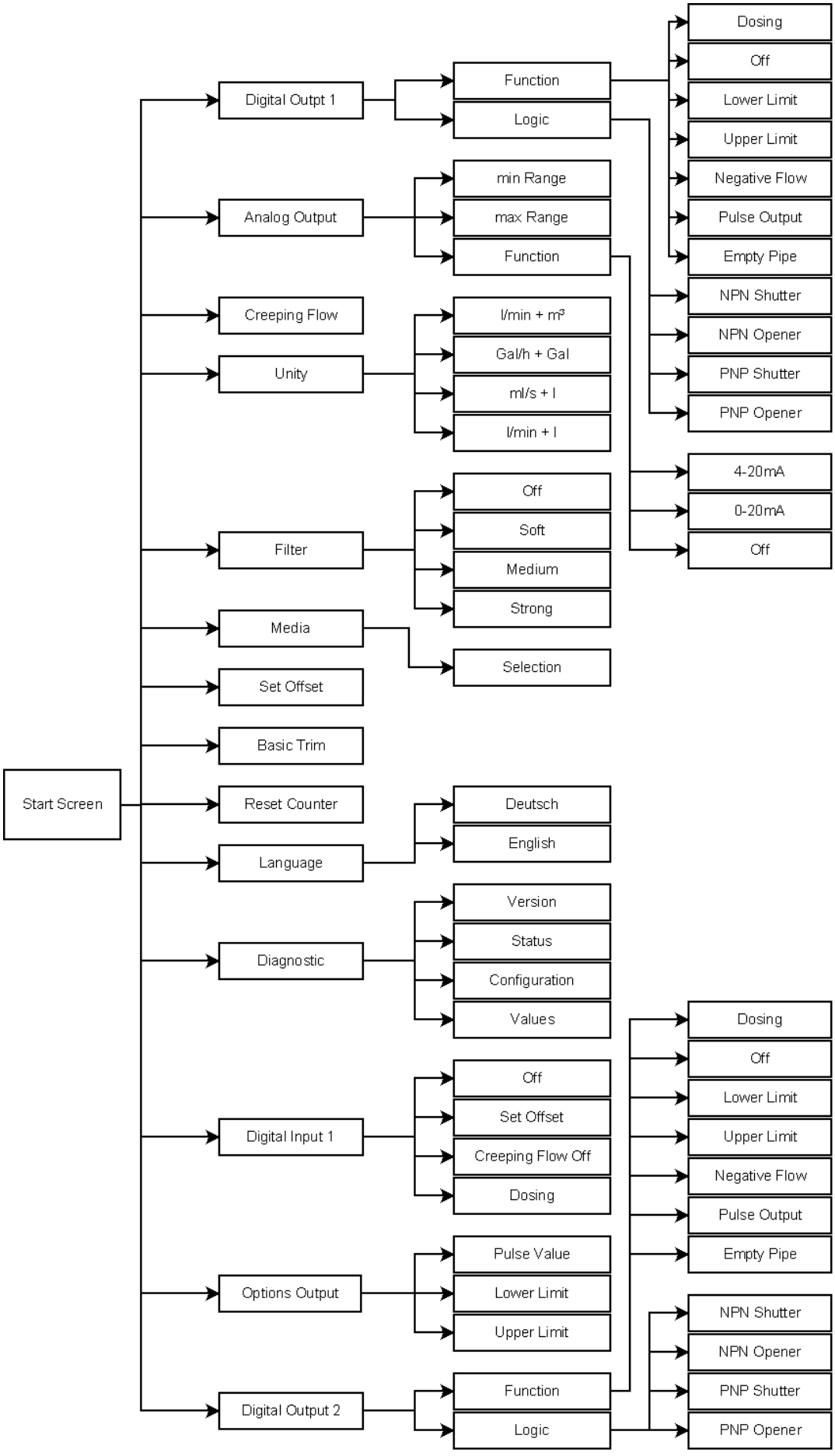


Fig.10: Menu organization for 8-pin version

Set Offset


Attention!

In the sub menu “Offset” it is possible to set the actual offset of the flow meter. This function should just be used when Flowmax 44i is completely filled with liquid and there is no flow.

A small offset change e.g. caused by variable temperatures is automatically done by the flow meter. It is also possible to set the offset via the configurable digital inputs.

Language

The language of the display can be changed. Available languages are English and German.

Filter

The function „Filter“ determines the average determination of the analog output signal. Possible configurations : Soft, Medium, Strong, Off


Note!

The analog output signal reacts faster to signal changes when average determination is soft. Whereas the output signal reacts slower when average determination is strong.

Unity

Flowmax 44i is able to show actual flow or the volume in different unities. Following unities can be selected:
ml/s + l , Gal/min +Gal , l/min + l , l/min + m³.

The first letters correspond the unity of the flow value. The letters after the + correspond the unity of the volume value.

Reset Counter


Note!

The volume counter of Flowmax 44i can be reseted. Note, accidentally erased counter values are permanent lost. After doing a reset the counting works normal.

Basic Trim

This function makes sure that the flow meter is conforming to the media specific characteristics. Through execute this function Flowmax 44i runs a self configuration which optimises all important parameters. This process may last app. 1 minute.


Attention!

To make sure the basic trim is correctly done the flow meter has to be filled with liquid without a flow.

When there is an error detected while doing the basic trim the display shows “Error”. After successful finishing the function basic trim the display shows “Done”.

Creeping suppression

The creeping suppression serves the purpose of excluding flows from the measurement that can evolve through convection in a narrow frame around zero, even with a closed valve. At the factory, the creeping suppression is set at a reasonable standard value in relation to the cross-section of the flow meter.

Attention!

There are higher tolerances below the standard default settings, see also section 5.2, measurement errors!

The creeping suppression works with a hysteresis of ± 25%.

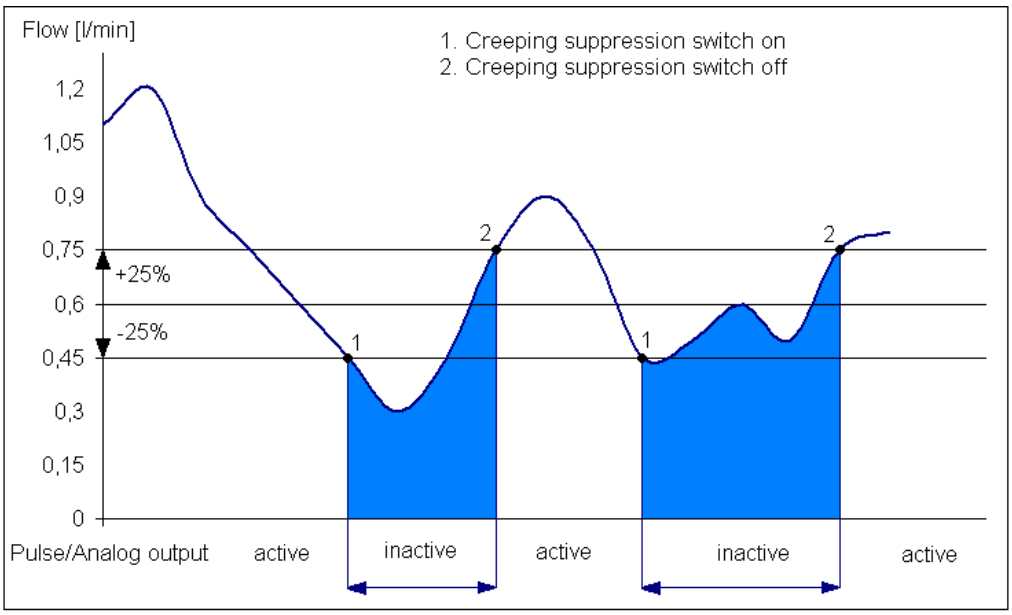


Fig.11: Function of the creeping suppression illustrated with 0.6 l/min

Example: Creeping suppression = 0,6 l/min
If the flow rate is lower than 0.45 l/min the pulse output/analog putput becomes inactive. If the flow rate exceeds 0.75 l/min a pulse is output again and added to the quantity counter. Similarly, a value is transmitted to the analog output again.

Note!

Setting range: 0,0...20 l/min, in 0,006 l/min steps
Default settings: 0,3 l/min for DN10
0,9 l/min for DN15
3,5 l/min for DN20
5,0 l/min for DN25

Diagnostic

The sub menu „Diagnostic“ shows the actual software/hardware version and many helpful values for analysis. Knowing about the actual values or the state bits makes it easy to review the measurement by the manufacturer.

Analog output

The analog output is available as current output 4-20mA or 0-20mA. Type depending on purchase order. As a standard it comes with current output 4-20mA. It can also be switched off with by using the display menu or FlowSoft operating software. This reduces the need of current of the Flowmax 44i.

The current output outputs flows from 0 to 22mA as measure for the flow or the state of the measuring pipe.

The values here signify for 4-20mA configuration:

- 20 mA the upper limit of the relevant measuring area
- 4 mA the lower limit of the relevant measuring area
- 3,8mA undershoot the lower limit
- 22 mA overshoot the upper limit
- 2 mA empty pipe


Note!

Upper and lower limit parameters can be set freely within the type-specific measuring areas of the device. By default zero flow is set at 4 mA and the respective maximum flow is set at 20 mA.

Setting range: 0-20mA, 4-20mA, off


Attention!

When current output is used make sure the load is not higher than 500Ohm. A higher load may cause the device can not provide the maximum current of 22mA.

Pulse value

This determines for what flow volumes an output pulse will be emitted.


Attention!

Choose configuration such as to neither exceed the maximum ouptput frequency of the Flowmax 44i (10kHz) nor the maximum input frequency of the control.

Example: 2,0 ml/Pulse

This means: a pulse is emitted every 2.0 ml.
Setting range: 0,1...3000,0 ml/Pulse, in 0,1 ml/Pulse steps
Default setting: 1,0 ml/Pulse

Digital output 1

Digital output 1 may be used as pulse output, empty pipe detection, for switching dosing valve or limit control. By using FlowSoft or the Display it is possible to switch between npn and pnp-transistor logic. In case of inductive load a freewheeling diode has to be connected parallel to the coil.

Note!

Flowmax 44i npn-out connected to a counter

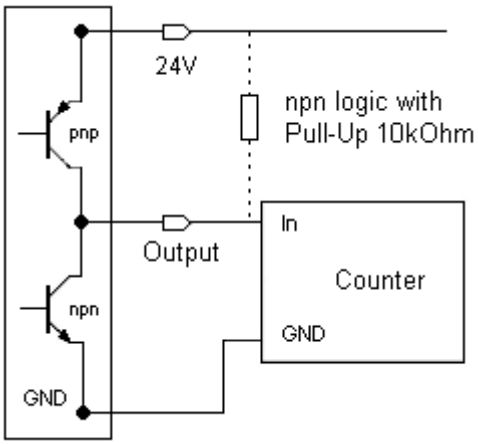


Fig.12: Connecting output 1 to external counter

Setting area: off, pulse output, empty pipe, dosing output, lower limit, upper limit, negative flow

Digital output 2 *

Digital outputs 2 may be used as pulse output, empty pipe detection, for switching dosing valve, limit control or flow direction control. See chapter 2.3 table connection plug 8-pins.

Note!

The npn or pnp logic can be chosen . When the output is connected to a inductive consumer a free-wheeling diode has to be installed parallel to the load.

Flowmax 44i pnp-out connected to a relay

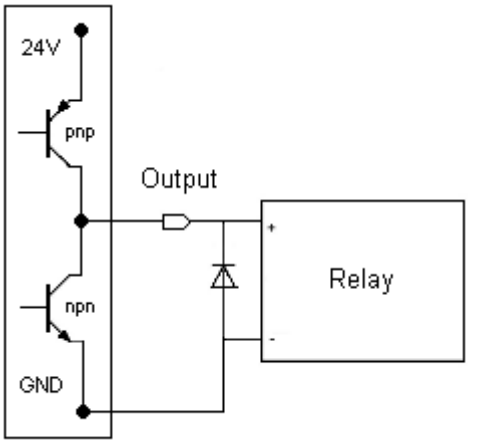


Fig.13: Connecting output 2 to relay

Setting area: off, pulse output, empty pipe, dosing output, lower limit, upper limit, negative flow

Media


Attention!

Flowmax 44i dispose of a medium matrix with up to 8 interpolation values. Different medias can be managed in the sub menu “Media”. Matrix values can be saved and if needed be loaded for different medias.

Digital input 1 *

Flowmax 44i has two digital inputs that are programmable to following functions: dosing input, set offset, creeping suppression inactive. In order to start a dosing process, wiring to 24V DC is required. The condition is the configuration of the dosing parameters with the FlowSoft service software via the USB to RS485 Converter Sonic.

Dosing input is debounced so that re-start is not possible during a running dosing process.


Attention!

Not all of the following functions are adjustable via the user display. See chapter 3.2 Fig.9 and Fig.10: Menu organization.

3.3 Overview of default settings

Function	Default settings
Digital output 1 (O1)	Pulse output
Digital output 2 (O2) *	Empty pipe output
Digital input 1 (I1) *	No function assigned
Current output	4-20mA
Pulse value	1 ml/Pulse
Creeping suppression	0,3 l/min 0,9 l/min 3,5 l/min 5,0 l/min

3.4 General Information


Note!

Please check the following before switching on the flow meter for the first time:

- Check the electrical connections and cable allocations.
- Check the installation position of the flow meter. Are the direction of the arrow on the housing/name plate and the actual flow direction in the pipe congruent?
- Is the measurement pipe completely filled with fluid?
- Check the back pressure in the system.


Note!

When everything has been checked and the relevant conditions are met switch on power supply. After a time period of 30 minutes with running power supply the measuring device reaches the maximum of accuracy.

Now, Flowmax 44i is operational!

4. Exchange of measuring device


Attention!

- Switch off power supply before disconnecting the electrical connections


Note!

- Please note that after exchanging of the flow meter
  a) potentially the programming of the previous flow meter should be taken on.
  b) a SET quantity has to be set when using the dosing function.

  If a change of the configuration of the device is necessary, the FlowSoft programming software and a USBtoRS485-Converter as well as a PC are required (see section 6. Accessories).

Repair, hazardous substances


Attention!

Before sending the flow meter Flowmax 44i to MIB for repair, the following measures have to be taken:

- Remove any adhering residues of the medium. Fully rinse measuring pipe. Please pay special attention to the area of the process fittings to which residues of the medium to be measured may adhere. This is particularly important, if the medium to be measured is health hazardous.


Attention!

Not or just insufficient cleaned devices will be returned to the sender for cleaning without having been checked.

- Please send a note with the flow meter with a precise description of the error, the application as well as the physical-chemical properties of the medium to be measured.


Note!

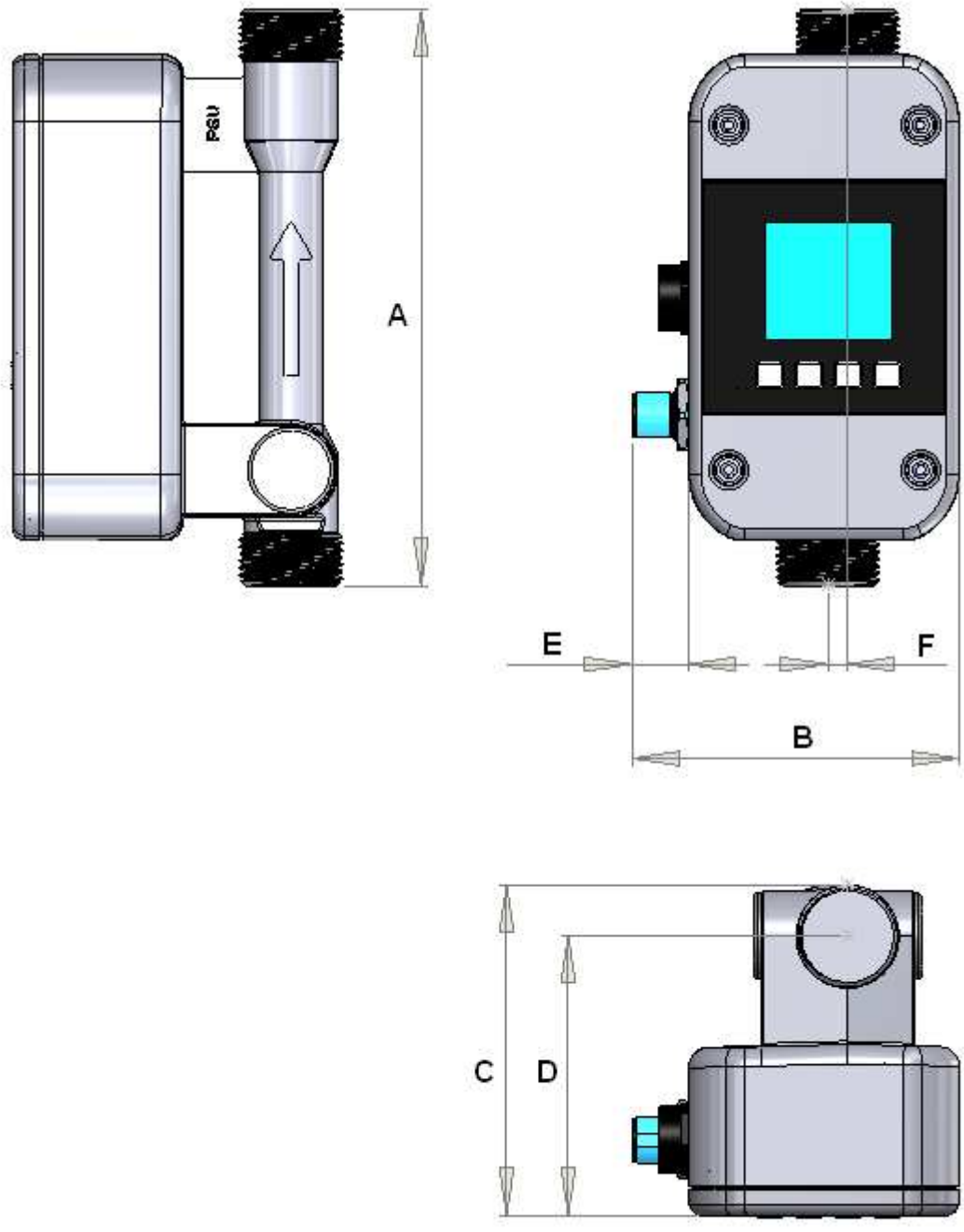
The owner of the flow meter will be charged for costs incurred because of inadequate cleaning of the flow meter, for potential disposal or personal injury such as chemical burns etc.


Attention!

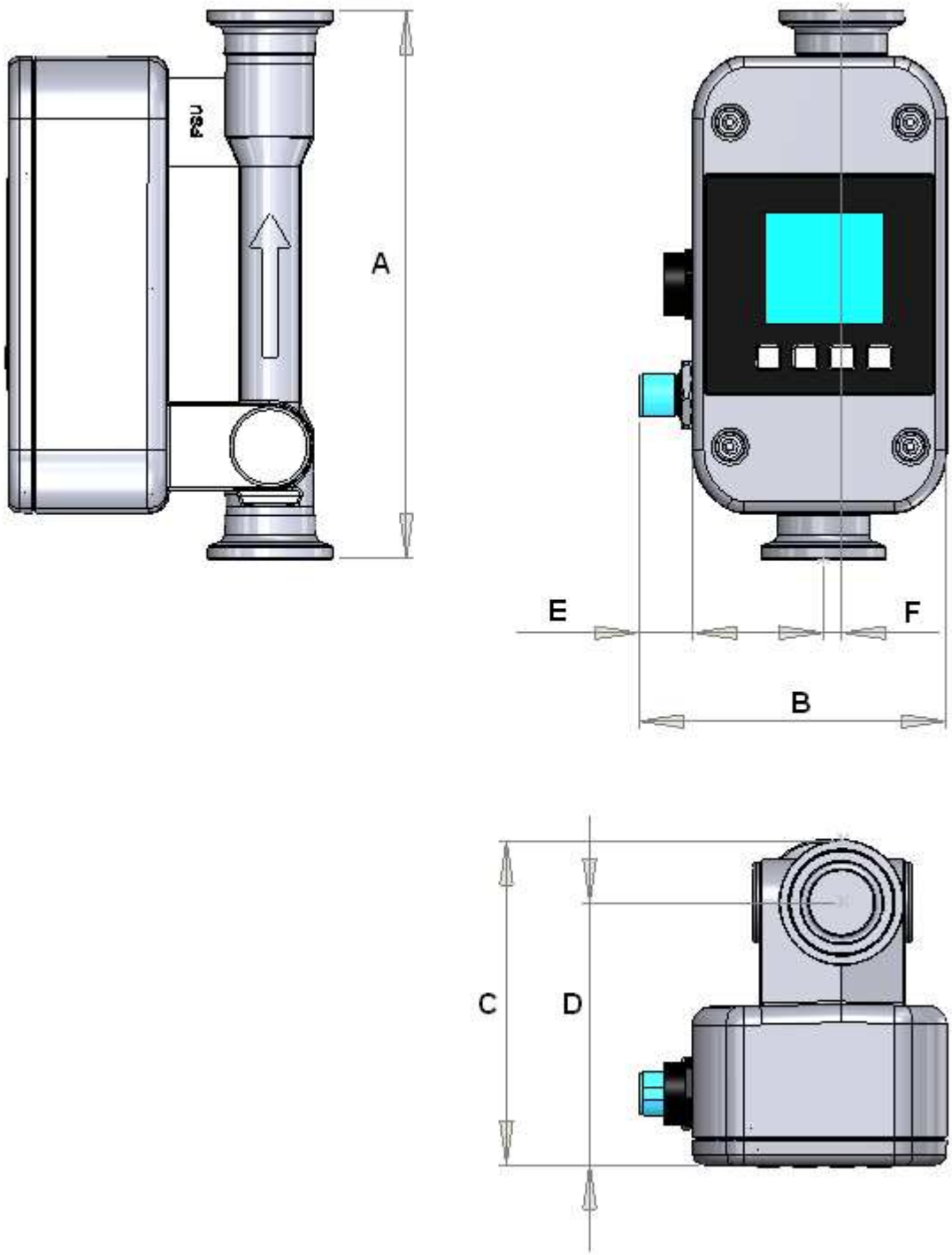
In order to be able to process your repair order fast and smoothly it is important that you name a contact person including phone and fax number as well as e-mail address, who is able to answer potential technical questions of our service and support staff.

5. Technical specifications

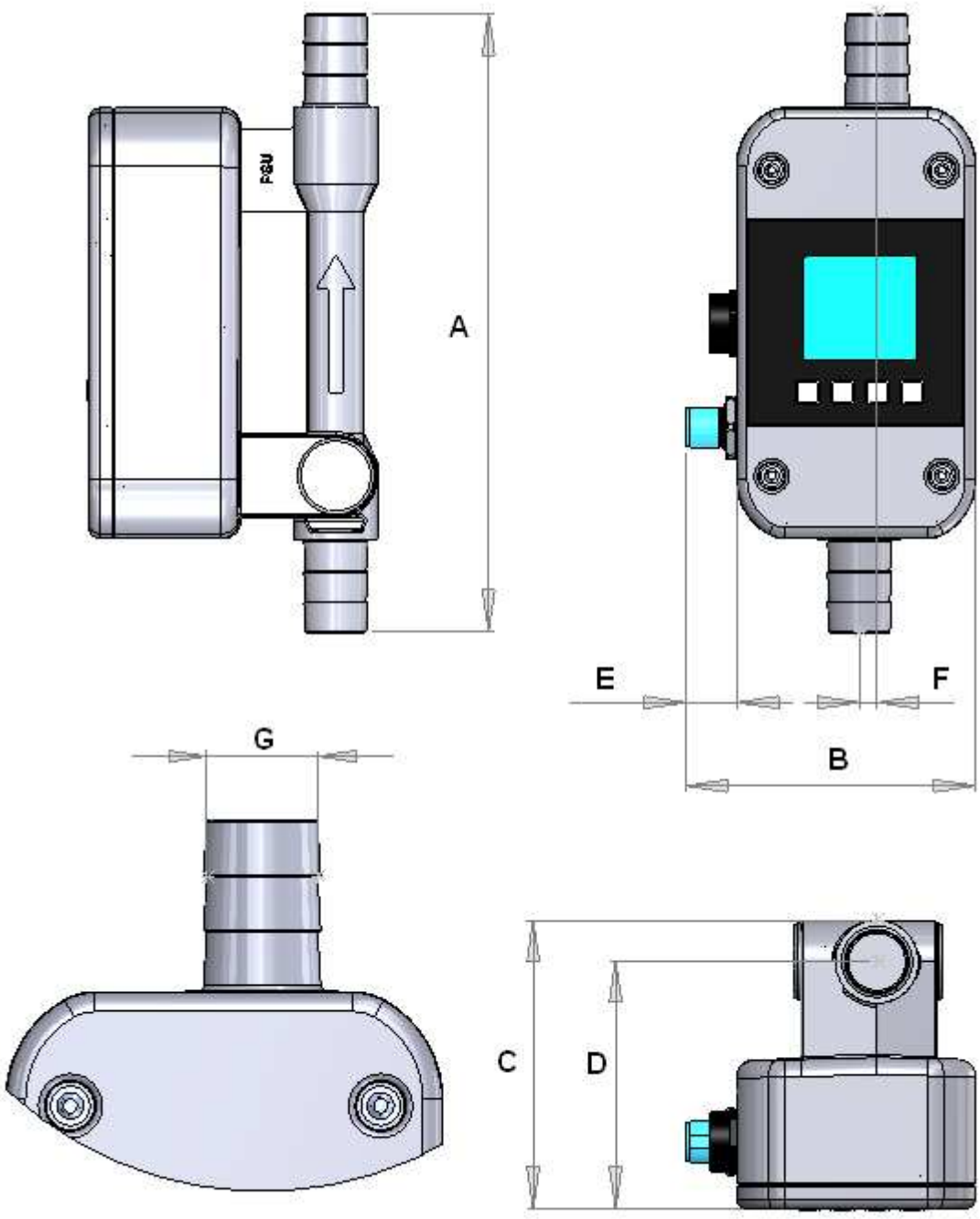
5.1 Dimensions and weight



Nominal diameter	Connection	Lengths A [mm]	Widths B [mm]	Height C [mm]	Height axis D [mm]	Plug E [mm]	Parting line F [mm]	Weight [g]
DN10	½ G,NPT	147,0	84,0	83,0	70,5	15,0	5,0	332
DN15	¾ G,NPT	147,0	84,0	84,5	71,1	15,0	5,0	344
DN20	1 G,NPT	160,0	84,0	94,2	77,6	15,0	5,0	414
DN25	1 ¼ G,NPT	168,0	84,0	98,5	77,6	15,0	5,0	454



Nominal diameter	Connection	Lengths A [mm]	Widths B [mm]	Height C [mm]	Height axis D [mm]	Plug E [mm]	Parting line F [mm]	Weight [g]
DN10	11864-Clamp	147,0	84,0	83,0	70,5	15,0	5,0	339
DN15	11864-Clamp	147,0	84,0	84,5	71,1	15,0	5,0	347
DN20	11864-Clamp	160,0	84,0	94,2	77,6	15,0	5,0	429
DN25	11864-Clamp	168,0	84,0	98,5	77,6	15,0	5,0	469



Zoom on nozzle

Nominal diameter	Connection	Lengths A [mm]	Widths B [mm]	Height C [mm]	Axis height D [mm]	Plug E [mm]	Parting line F [mm]	Nozzle G [mm]	Weight [g]
DN10	Tube	160,0	84,0	83,0	70,5	15,0	5,0	12,0	332
DN15	Tube	178,0	84,0	84,5	71,1	15,0	5,0	18,0	344
DN20	Tube	197,0	84,0	94,2	77,6	15,0	5,0	24,0	414

5.2 Technical specifications

Housing

Nominal diameters	DN10, DN15, DN20, DN25
Connection	inch thread G, inch threat NPT, clamp connection DIN1864-3
Medium temperature	0...+80℃
Protection class	IP 67
Pressure nominal	PN 10 for DN10 and DN15 PN 6 for DN20 and DN25
Material	all parts in contact with medium made of PSU (Polysulfone) Electronics housing made of PSU (Polysulfone)

Electronics

Power supply	18...30V DC
Power input	at 24V DC = 3,6W
Connection	Plug 5 pins, option plug 8 pins
Ambient temperature	0....+60℃
Storage temperature	0....+70℃
Current output	0/4...20 mA Lower- and upper limit adjustable, Ground connected to supply ground Error Signal according to NAMUR NE43
Digital output O1 /2	via transistor npn- and pnp-logic max. 30V/100mA output voltage according to DIN 19240: ≤5V means LOW ≥12V means HIGH Short cut resistant Frequency 0....10kHz
Data interface	Data interface for parameterize
Measuring deviation	± 1% v.M ± 3mm/s Reference conditions (VDE/VDI 2642)
Measuring range	0,3 – 21 l/min for DN10 0,9 – 36 l/min for DN15 3,5 – 60 l/min for DN20 5,0 – 240 l/min for DN25
Repeatability	0,5%

The measuring system Flowmax 44i complies with the EMC requirements EN 50081 parts 1/2 as well as EN 50082 parts 1/2. It is in conformity with the requirements of the EC directives and has the CE label.

Digital output

General

All outputs switch over to high resistance when the supply is smaller than 18V. When overload or short circuit is detected the digital outputs were switched off after 100µs for 2s. When time is up the outputs gets applied again.

Empty pipe output

	Empty pipe	Device filled
NPN opener	High resistatnt	0V
NPN shutter	0V	High resistatnt
PNP opener	Hochohmig	24V
PNP shutter	24V	High resistatnt

Pulse output

	Empty pipe	Filled, no flow	Filled, flow
NPN opener	0V	0V	0V Pulse
NPN shutter	0V	0V	0V Pulse
PNP opener	Hish resistant	Hish resistant	24V Pulse
PNP shutter	Hish resistant	Hish resistant	24V Pulse

Lower limit output

	Below lower limit	Between the limits	Above upper limit
NPN opener	High resistant	High resistant	0V
NPN shutter	0V	0V	High resistant
PNP opener	High resistant	High resistant	24V
PNP shutter	24V	24V	High resistant

Higher limit output

	Below lower limit	Between the limits	Above upper limit
NPN opener	0V	High resistant	High resistant
NPN shutter	Hochohmig	0V	0V
PNP opener	24V	High resistant	High resistant
PNP shutter	High resistant	24V	24V

Dosing output

	Startup of device	While dosing	Before/after dosing
NPN opener	High resistant	High resistant	0V
NPN shutter	High resistant	0V	High resistant
PNP opener	High resistant	High resistant	24V
PNP shutter	High resistant	24V	High resistant

When using the dosing function the output should not be configured as opener!

After restart and till the end of a dosing process the valve would be open.

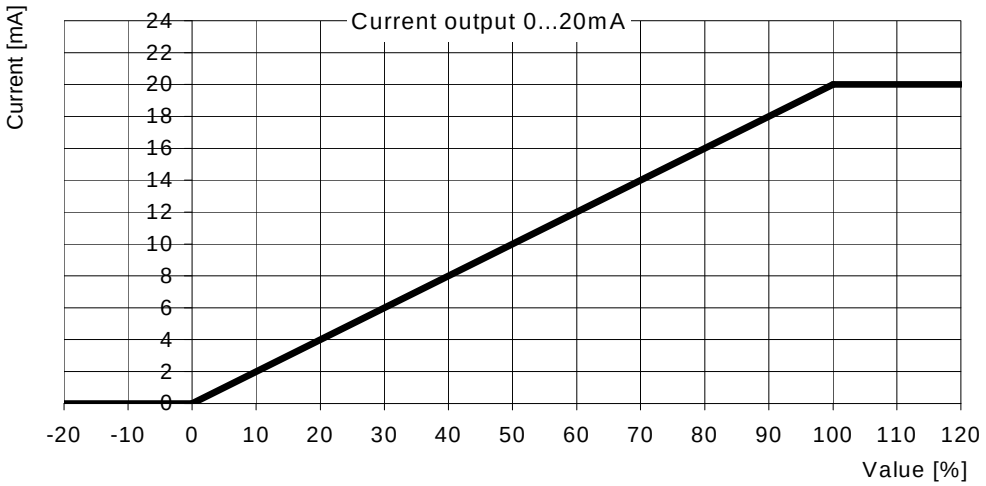
Digital input

When configuration of the input is changed a device restart is required.

Characteristic curve analog output

0 - 20mA

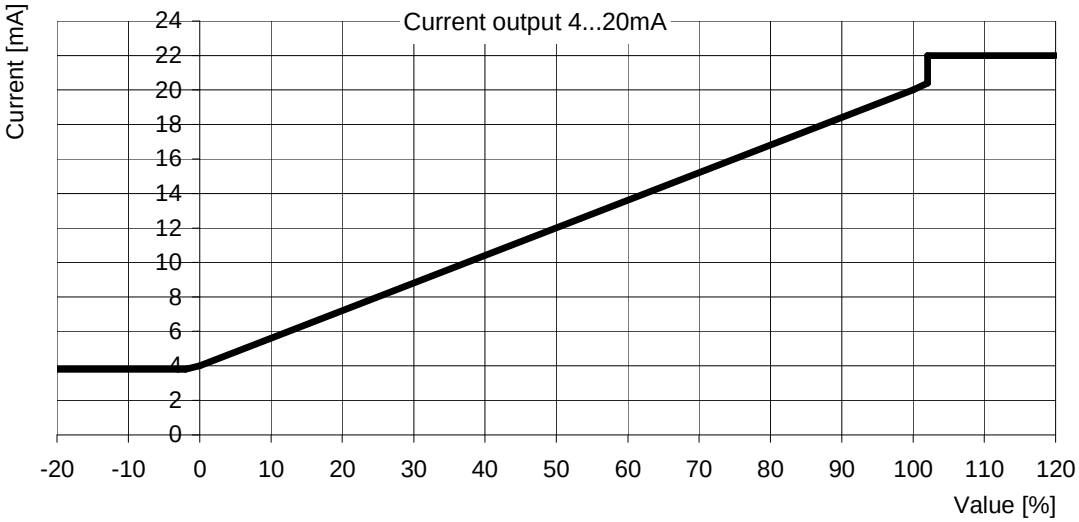
For the following graphic "min Range" is used for 0% and "max Range" is used for 100%.



Value	Current [mA]
Smaller 0%	0
0% (min Range)	0
Between 0% und 100%	Linear interpolation from 0 to 20 mA
100% (max Range)	20
Bigger 100%	20

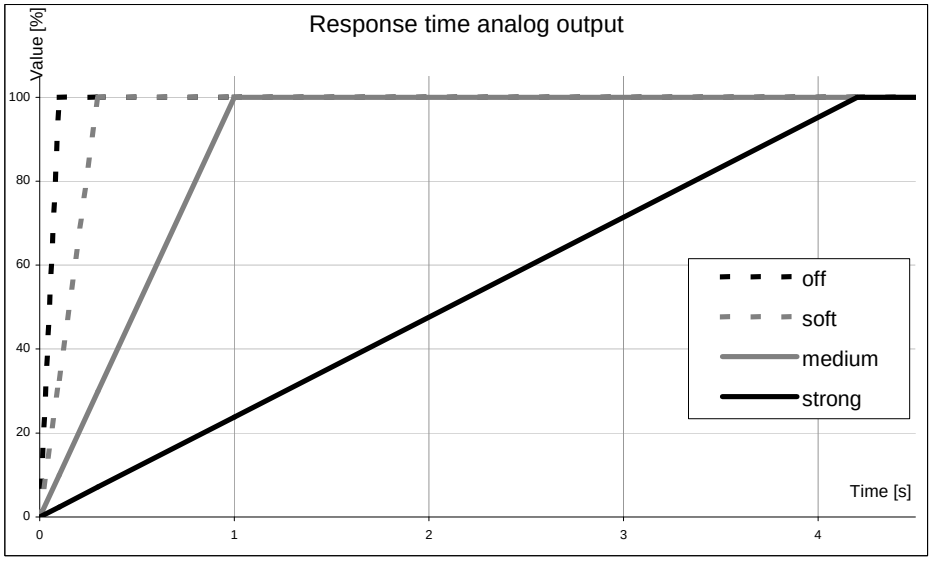
4 - 20mA

For the following graphic "min Range" is used for 0% and "max Range" is used for 100%.



Value	Current [mA]
Empty pipe	2
Smaller -1,2%	3,8
Between	Linear interpolation from 3,8 to 4mA
0% (min Range)	4
Between 0% und 100%	Linear interpolation from 4 to 20mA
100% (max Range)	20
Between 100% und 102,5%	Linear interpolation from 20 to 20,4mA
Bigger 102,5%	22

Filter options for analog output



Filter	100%
off	0,1s
soft	0,3s
medium	1s
strong	4,2s

6. Accessories

Flowview 100i
Evaluation and management unit for up to 10 ultrasonic volume flow meters Flowmax 44i. Flowview 100i is based on a compact SPS-control with integrated touch screen.
Ordercode 908765

Flowmax connection socket
To supply and connect Flowmax 44i to an external control unit.
Ordercode 507321 (Socket 5 pins)
Ordercode XXXXX (Socket 8 pins)

USB-to-RS485-Converter Sonic
Interface converter from USB to RS485 with spring terminal connection for quick-connection of Flowmax 44i and **FlowSoft / part 1**, PC software for configuration of ultrasonic volume flow meter Flowmax 44i
Ordercode 908726

7. Shipment

Basically the device Flowmax 44i is delivered without additional material like connection socket or cable. We recommend to order a connection socket (Ordercode 507321) to supply the measuring device.

Note!

8. Order code

The available functions of a Flowmax 44i device are defined by the ordered version. The order code gives important information about: connection, functions, diameter, material and user display. The combination of the described information is defined by the following figure.

MIB GmbH
Messtechnik und Industrieberatung
Am Krebsbach 2
D-79241 Ihringen
Tel. 0049 / (0)7668 / 90 98 9-0
Fax 0049 / (0)7668 / 90 98 9-99
E-Mail: zentrale@mib-gmbh.com
Internet: http://www.flowmax.de/

MIB GmbH
Messtechnik & Industrieberatung