OPERATING INSTRUCTIONS

FTMg

Thermal gas flow sensor

SICK
Sensor Intelligence.

Described product

FTMg

Industrial variant with firmware version V2.x

Ethernet variant with firmware version V4.x

Manufacturer

SICK AG
Erwin-Sick-Str. 1
79183 Waldkirch
Germany

Legal information

Original document

This document is an original document of SICK AG.

Contents

1 About this document

1.1 Information on the operating instructions

Read these operating instructions carefully before starting any work in order to familiarize yourself with the product and its functions.

The operating instructions are an integral part of the product and should remain accessible to the personnel at all times. When handing this product over to a third party, include these operating instructions.

These operating instructions do not provide information on the handling and safe operation of the machine or system in which the product is integrated. Information on this can be found in the operating instructions for the machine or system.

1.2 Further information

You can find the product page with further information via the SICK Product ID: pid.sick.com/{P/N}/{S/N}
(see "Product identification via the SICK product ID", page 10).

The following information is available depending on the product:

- This document in all available language versions
- Data sheets
- Other publications
- CAD files and dimensional drawings
- Certificates (e.g., declaration of conformity)
- Software
- Accessories

1.3 Symbols and document conventions

Warnings and other notes

DANGER
Indicates a situation presenting imminent danger, which will lead to death or serious injuries if not prevented.

WARNING
Indicates a situation presenting possible danger, which may lead to death or serious injuries if not prevented.

CAUTION
Indicates a situation presenting possible danger, which may lead to moderate or minor injuries if not prevented.

NOTICE
Indicates a situation presenting possible danger, which may lead to property damage if not prevented.

NOTE
Highlights useful tips and recommendations as well as information for efficient and trouble-free operation.

Instructions to action

► The arrow denotes instructions to action.

1. The sequence of instructions is numbered.
2. Follow the order in which the numbered instructions are given.

✓ The tick denotes the results of an action.

2 Safety information

2.1 Intended use

The **FTMg** (**F**low **T**hermal **M**eter for **g**ases) measures the flow rate, pressure and temperature of compressed air and other defined technical inert gases and provides the following measurands:

- Mass
- Mass flow rate
- Volume
- Volume flow
- Energy
- Flow velocity
- Pressure
- Temperature

The product must only be used within the limits of the prescribed and specified technical specifications and operating conditions at all times, see "Features", page 52.

The measuring principle is based on the calorimetric principle.

The FTMg fulfills the requirements of EN 61326-2-3 for industrial environments.

Incorrect use, improper modification or manipulation of the product will invalidate any warranty from SICK; in addition, any responsibility and liability of SICK for damage and secondary damage caused by this is excluded.

2.2 Improper use

Impermissible use

- As a safety component as defined in the relevant applicable safety standards for machines, e.g. Machinery Directive.

Impermissible ambient conditions

- Outdoor areas
- Direct UV radiation (sunlight)
- Precipitation
- Inadequate protection against moisture and contamination
- Publicly accessible areas
- Explosion-hazardous area
- Corrosive environment

2.3 Pressure Equipment Directive (PED)

The FTMg has been assessed in accordance with the Pressure Equipment Directive and is approved for use in the gases mentioned in the technical data and the process pressure range specified there.

2.4 Limitation of liability

The manufacturer accepts no liability for damage caused by:

- Failure to observe the operating instructions
- Improper use
- Use by untrained personnel
- Unauthorized conversions
- Technical modifications
- Use of unauthorized spare parts, wear and tear parts, and accessories

The actual scope of delivery may differ from the features and illustrations shown here where special variants are involved, if optional extras have been ordered, or as a result of the latest technical changes.

2.5 Modifications and conversions

NOTICE
Modifications and conversions to the sensor and/or the installation may result in unforeseeable dangers.

Interfering with or modifying the sensor or SICK software will invalidate any warranty claims against SICK AG. This applies in particular when opening the housing, including during assembly and electrical installation.

Written approval must be obtained from the manufacturer before making any technical changes or additions to the sensor.

Accessories that do not have clearly specified sizes and compositions or that have not been checked by SICK AG may not be installed or connected.

2.6 Operational safety and specific hazards

Please observe the safety notes and the warnings listed here and in other sections of this product documentation to reduce the possibility of risks to health and avoid dangerous situations.

2.7 Repair

Repair work on the sensor may only be performed by qualified and authorized personnel from SICK AG. Interference with or modifications to the sensor on the part of the customer will invalidate any warranty claims against SICK AG.

2.8 Qualification of personnel

Any work on the product may only be carried out by personnel qualified and authorized to do so.

Qualified personnel are able to perform tasks assigned to them and can independently recognize and avoid any potential hazards. This requires, for example:

- technical training
- experience
- knowledge of the applicable regulations and standards

2.9 Cybersecurity

Overview

To protect against cybersecurity threats, the operator must have a comprehensive cybersecurity concept, which must be continuously monitored and maintained. A suitable concept consists of organizational, technical, procedural, electronic, and physical levels of defense and considers suitable measures for different types of risks. The measures implemented in this product can only support protection against cybersecurity threats if the product is used as part of such a concept.

You will find further information at www.sick.com/psirt, e.g.:

- General information on cybersecurity
- Contact option for reporting vulnerabilities
- Information on known vulnerabilities (security advisories)

3 Product description

3.1 Product identification via the SICK product ID

SICK product ID

The SICK product ID uniquely identifies the product. It also serves as the address of the web page with information on the product.

The SICK product ID comprises the host name pid.sick.com, the part number (P/N), and the serial number (S/N), each separated by a forward slash.

For many products, the SICK product ID is displayed as text and QR code on the type label and/or on the packaging.

Figure 1: SICK product ID

3.2 Type code

Information on the housing

Information for identifying the sensor (serial number, part number, and type code) and its electrical connection are printed on the type label on the housing.

Type code

FTMg	-	I	S	D15	A	X	X
1		2	3	4	5	6	7

Position	Description
1	Product group FTMg (flow sensors)
2	Variant I: IO-Link M12-5 A-coded E: Ethernet M12-8 X-coded
3	Application S: Standard (compressed air)
4	Nominal size D08: G 1/4 female thread DIN EN ISO 228-1 ø8,8 mm D15: G 1 /2 female thread DIN EN ISO 228-1 ø16,1 mm D20: G 3/4 female thread DIN EN ISO 228-1 ø21.7 mm D25: G 1 female thread DIN EN ISO 228-1 ø27.3 mm R40: R 1 1/2 male thread DIN EN 10226-1 ø41.1 mm N40: 1 1/2" NPT male thread ø41.1 mm R50: R 2 male thread DIN EN 10226-1 ø53.1 mm N50: 2" NPT male thread ø53.1 mm
5	Measuring channel A: Aluminum measurement channel S: Stainless steel pipe
6	Installation X: Stand Alone
7	Additional options C: With calibration certificate X: Without

3.3 Product features

Device view

The FTMg is available in two variants:

- Industrial variants
- Ethernet variant

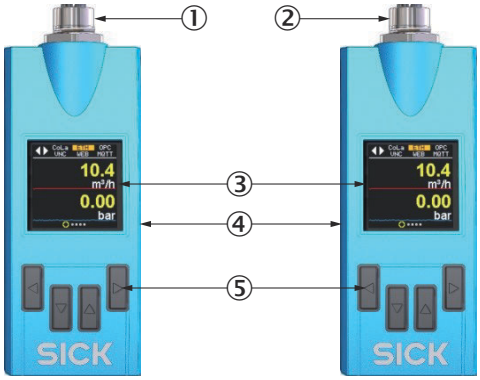


Figure 2: FTMg overview

① Industrial version, M12 x 1, 5-pin, A-coded
② Ethernet variant, M12 x 1, 8-pin, X-coded
③ Display
④ Housing
⑤ Operating buttons

FTMg display

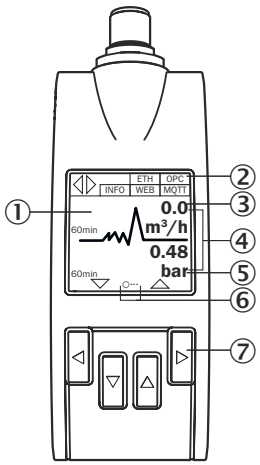


Figure 3: FTMg display and operation

① Measurement graph
② Status bar
③ Measured value
④ Contents
⑤ Display unit
⑥ Position in the menu
⑦ Arrow keys for navigation

Operating buttons

The sensor is operated using the display and the operating buttons.

NOTE

The industrial version can be parameterized via SICK SOPAS ET, among other things.

The Ethernet variant has its own web server and can be parameterized using an Internet browser, among other things.

For the Ethernet variant, the sensor can also be parameterized via OPC UA.

3.4 Product features and functions

Principle of operation

The FTMg uses the calorimetric measurement principle. The sensor measures the cooling effect of the medium flowing over the heated probe. The higher the flow speed of the medium, the higher the cooling effect of the heated probe.

In the industrial version, the sensor has three configurable outputs Qa, Q1 and Q2 for flow rate, pressure or temperature.

In addition, an IO-Link interface is available at the digital output (Q1).

In the Ethernet version, the sensor has an Ethernet interface with an OPC UA server and an MQTT client as well as an integrated web server. The sensor draws power via PoE.

NOTE

The individual sections may describe functions that are only available from certain subsequent firmware versions (V2.00, V3.00, ...).

Fields of application

The FTMg is mainly suited for:

- Measurement of compressed air as well as argon (Ar), carbon dioxide (CO_2), nitrogen (N_2)
- Controlling the energy consumption of compressed air on machines and in pressure distribution
- Flow, pressure and temperature monitoring in compressed air systems and pneumatic applications

4 Transport and storage

4.1 Transport

For your own safety, please read and observe the following notes:

NOTICE

Damage to the sensor due to improper transport!

- The device must be packaged for transport with protection against shock and damp.
- Recommendation: Use the original packaging as it provides the best protection.
- Transport should be performed by specialist staff only.
- The utmost care and attention is required at all times during unloading and transportation on company premises.
- Note the symbols on the packaging.
- Do not remove packaging until immediately before starting installation work.

4.2 Transport inspection

Immediately upon receipt in incoming goods, check the delivery for completeness and for any damage that may have occurred in transit. In the case of transit damage that is visible externally, proceed as follows:

- Do not accept the delivery or only do so conditionally.
- Note the extent of damage on the transport documents or on the transport company's delivery note.
- File a complaint.

NOTE

Complaints regarding defects should be filed as soon as these are detected. Damage claims are only valid before the applicable complaint deadlines.

4.3 Storage

Store the device under the following conditions:

- Recommendation: Use the original packaging.
- Do not store outdoors.
- Store in a dry area that is protected from dust.
- Do not store in an airtight container: this is so that any residual moisture present can escape.
- Do not expose to any aggressive substances.
- Protect from sunlight.
- Avoid mechanical shocks.
- Storage temperature: see "Technical data", page 52
- For storage periods of longer than 3 months, check the general condition of all components and packaging on a regular basis.

5 Mounting

5.1 Installation conditions

The sample gas line must be depressurized when installing/removing the sensor.

- Keep the mounting location easily accessible and free of vibrations.
- Ensure a minimum space of 150 mm to the FTMg.
- Observe the ambient temperature (see "Technical data", page 52).
- The measurement gas must correspond to purity class 3:4:4 or better, as per ISO 8573-1:2010.
- The measurement gas and the ambient air are not allowed to condense.
- Mount the FTMg downstream of the air dryer in the compressed-air network. If the dryer is missing, install the FTMg downstream of the condensate separator and install suitable filters.

NOTICE
Leakage through and around the appliance can pose a safety risk due to escaping gases.

5.2 Installation direction

Correct installation is relevant for the measuring accuracy of the FTMg.

The measuring medium must flow through the measuring channel in the direction of the arrow (preferred direction).

The sensor has been calibrated in the direction of the arrow and only displays accurate and reproducible measured values if the flow is in this direction.

NOTICE
Note that the sensor also shows measured values in the opposite direction. The measuring accuracy and repeatability are limited and not clearly predictable.

The sensor cannot distinguish between the flow directions. The summed quantities (mass, volume, energy) always count as positive both in the direction of the arrow and in the opposite direction.

For this reason, it is recommended that the sensor is mounted as close as possible to the consumer in order to avoid reverse flows.

It should also be noted:

- Place the FTMg as far away as possible from flow disturbances (e.g. different pipe diameters, curves, T-splitters, valves or pushers).
- Mount the FTMg upstream of valves or pushers.
- Observe the prescribed lengths of the inlet and outlet zones
- Select longer inlet zones for gases with lower densities.

Suitable flow conditioning pipes are available for the FTMg with nominal diameters DN08, DN15, DN20 and DN25, section 14.7.3.

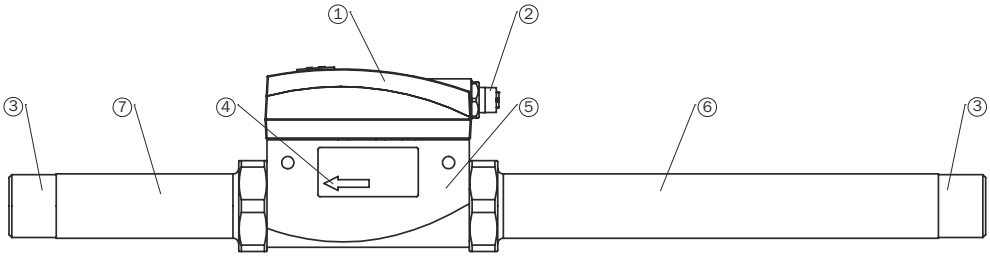


Figure 4: FTMg DN08, DN15, DN20, DN25 with inlet and outlet zone

① Sensor head
② Electrical connection (industrial or Ethernet version)
③ Process connection (R-type male thread or NPT-type male thread)
④ Flow direction
⑤ Measurement channel (DN08, DN15, DN20, DN25)
⑥ Inlet pipe
⑦ Outlet pipe

The FTMg with normal diameters DN40 and DN50 is supplied together with the measuring pipe.

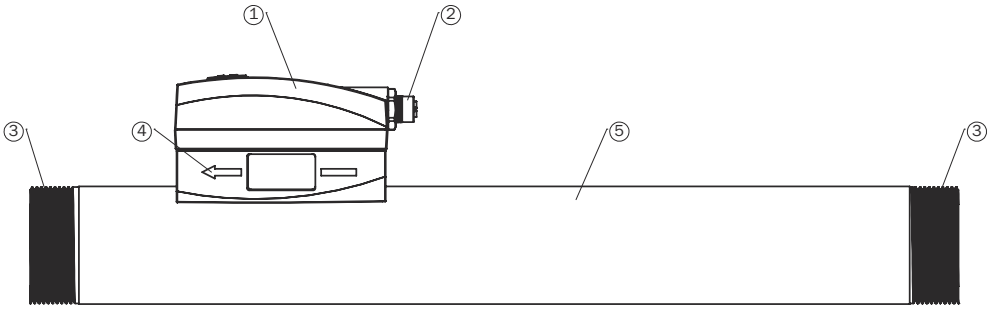


Figure 5: FTMg DN40, DN50 with measuring pipe

① Sensor head
② Electrical connection (industrial or Ethernet version)
③ Process connection (R-type male thread or NPT-type male thread)
④ Flow direction
⑤ Measuring pipe (DN40, DN50)

If flow disturbances are present, for example due to different pipe diameters, curves, T-splitters, valves or pushers, the following inlet and outlet zones must be adhered to.

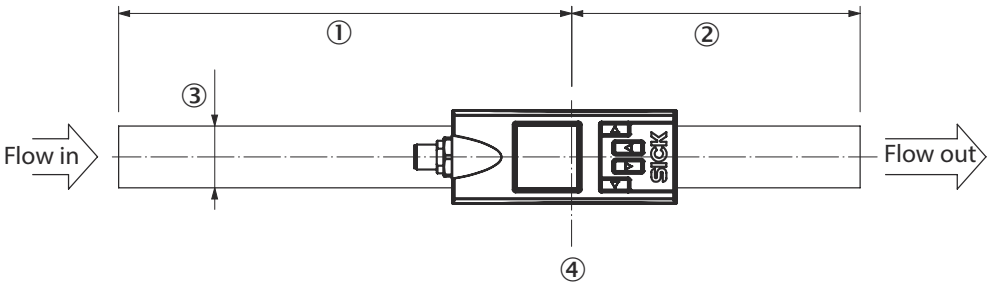
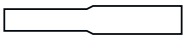
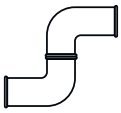
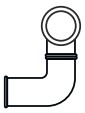
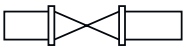


Figure 6: Inlet and outlet zones

① Inlet zone
② Outlet zone
③ Pipe diameter (DN)
④ Probe center axis

Table 1: Recommended inlet and outlet zones with sources of interference

	Type	(DN = pipe diameter) 3	
		Inlet zone ①	Outlet zone ②
	Constriction	10 x DN	3 x DN
	Expansion	25 x DN	3 x DN
	90° angle	25 x DN	5 x DN
	Two 90° angles on one level	25 x DN	5 x DN
	Two 90° angles on two levels, T-splitter	30 x DN	5 x DN
	Valve, pusher	50 x DN	5 x DN

The inlet and outlet zones shown are minimum requirements for reproducible measurements. The inlet zones can be reduced by additional installed flow conditioners. Flow conditioners create an additional pressure loss that can reduce the flow quantity.

NOTICE

Observe the specified minimum values to ensure reproducible measurements. If it is not possible to comply with the specified inlet zones, then considerable deviations to the measured values are to be expected. In order to be able to measure with the specified measuring accuracy, 100 x DN inlet conditions are recommended so that an optimum flow profile can form.

We recommend using SICK flow conditioning pipes (for the DN08, DN15, DN20, DN25 variants) directly in front of the sensor as they connect to the measuring channel without a shoulder.

6 Electrical installation

6.1 Safety

Notes on electrical installation

NOTICE

Device damage due to incorrect supply voltage.

An incorrect supply voltage can lead to damage to the device.

- Only operate the device using a protected low voltage and safe electrical insulation as per protection class III.

NOTICE

Equipment damage or unpredictable operation due to working with live parts.

Working with live parts may result in unpredictable operation.

- Only carry out wiring work when the power is off.
- Only connect and disconnect electrical connections when the power is off.

- The electrical installation must only be performed by electrically qualified personnel.
- Standard safety requirements must be observed when working on electrical systems!
- Only switch on the supply voltage for the device when the connection tasks have been completed and the wiring has been thoroughly checked.
- When using extension cables with open ends, ensure that bare wire ends do not come into contact with each other (risk of short-circuit when supply voltage is switched on!). Wires must be properly insulated from each other.
- Wire cross-sections in the supply cable from the user's power system must be designed in accordance with the applicable standards. Observe the following standards in Germany: DIN VDE 0100 (Part 430) and DIN VDE 0298 (Part 4) or DIN VDE 0891 (Part 1).
- Circuits connected to the device must be designed as SELV and PELV circuits (SELV = **Safety Extra Low Voltage**; PELV = Protected Extra Low Voltage).
- Protect the device with a separate fuse at the start of the supply circuit.

NOTE

Notes on layout of data cables

- To avoid interference, e.g., from switching power supplies, motors, clocked regulators and contactors, always use cables and layouts that are suitable for EMC.
- Do not lay cables over long distances in parallel with voltage supply cables and motor cables in cable ducts.

The IP65 and IP67 protection class for the device is only achieved under the following conditions:

- The cable attached to the M12 connection is screwed in place.
- If this is not done, the device does not fulfill any specified IP enclosure rating.

6.2 Electrical connection

- Only operate the FTMg via a power supply with safe separation from the mains (PELV according to DIN VDE 0100-410, IEC 60364-4-41, HD 60364.4.41, EN 60079-14). The electrical circuit must be volt-free (not grounded).
- Carefully mount the M12 plug connection to ensure the IP67 enclosure rating.

- Observe the pin assignment (see below).
- The flow sensor has three signal outputs that can be wired according to the pin assignment, see see "Technical data", page 52.
- Ethernet variant: The sensor is supplied directly via the Ethernet connection. Carefully mount the M12 plug connection to ensure the IP67 enclosure rating. Note the pin assignment (see "Pin assignment, M12 plug connector, 8-pin (Ethernet variant only)", page 18).

6.3 Electrical connection of the flow sensor

Screw M12 x 1 plug connection to the connection of the flow sensor. After switching on the supply voltage and the switch-on time has elapsed, the device is in run mode (normal operation) and display the current measured value.

6.4 Pin assignment, M12 plug connector, 5-pin (industrial version)

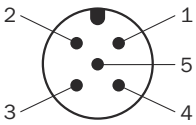


Figure 7: M12 x 1 plug connector, 5-pin

Contact	Labels	Wire color	Description
1	L+	Brown	Supply voltage
2	Q_A	White	Analog current output 4 ... 20 mA (scalable)
3	M	Blue	Ground, reference potential for current output
4	C/Q_1	Black	IO-Link communication or digital output 1: NO/NC programmable
5	Q_2	Gray	Digital output 2: NO/NC programmable or current output B 4 ... 20 mA, frequency or pulse output

6.5 Pin assignment, M12 plug connector, 8-pin (Ethernet variant only)

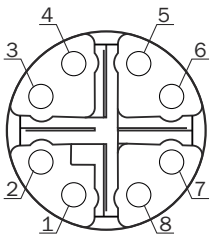


Figure 8: M12 x 1, 8-pin, X-coded

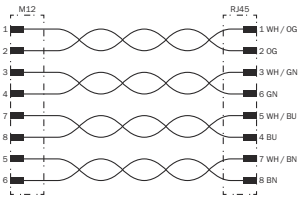


Figure 9: Connection diagram between M12 and RJ45

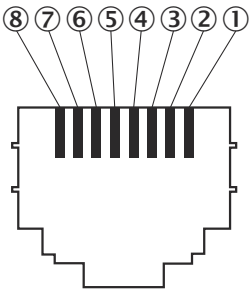


Figure 10: RJ45

Contact	RJ45	Color	Labels	10/100 Mbit
1	1	WH/OG	TX (+) + POE	TxData+
2	2	OG	TX (-) + POE	TxData -
3	3	WH/GN	RX (+) - POE	RxData+
4	6	GN	RX (-) - POE	RxData-
7	5	WH/BU	PoE+	

Contact	RJ45	Color	Labels	10/100 Mbit
8	4	BU	PoE+	
5	7	WH/BN	PoE-	
6	8	BN	PoE-	

7 Commissioning

7.1 Commissioning

1. Mount the sensor in accordance with the installation conditions, see "Installation conditions", page 14.
2. Apply the supply voltage or Ethernet connection (PoE).
3. The sensor performs a self-test and is then ready for operation. The factory-set measured value menu is displayed, see figure 3.

NOTE

If the appliance is operated at full load, the ambient temperature and process temperature are very high, parts and areas of the housing can become very hot. At very cold ambient temperatures and process temperatures, parts and areas of the housing can cool down considerably.

Intentional or unintentional prolonged contact (> 1 s) with unprotected areas of skin can lead to burns.

Protective gloves must be worn when installing the sensor.

In the event of problems during commissioning see "Troubleshooting", page 48.

8 Operation Industrial variant

Applies to all FTMg with the type code FTMg-Ixxxxxx.

The display shows the measured value menu with the default setting.

Press any arrow key for a long time (min. 2 seconds). Then select Q1 Menu, Q2 Menu or Qa Menu.

The recommended settings in the respective submenus are listed below from top to bottom, see "Industrial variants", page 59.

- The digital output can be set in the Q1 menu.
- In the Q2 menu, the output can be set as a digital output, pulse output, frequency output or analog output.
- The analog output can be set in the Qa menu.

Table 2: Explanation Abbreviations

SP1	**Switching point 1**
SP2	Switching point 2
HNO	Hysteresis function **normally open**
HNC	Hysteresis function **normally closed**
FNO	Window function **normally open**
FNC	Window function **normally closed**
U_V	Supply voltage
t	Time

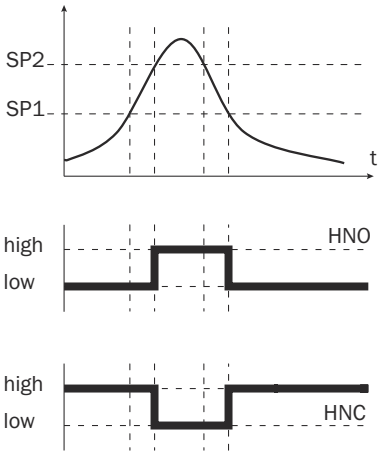
8.1 Q1 menu

This menu contains the settings for digital output 1.

Setting the hysteresis or window function

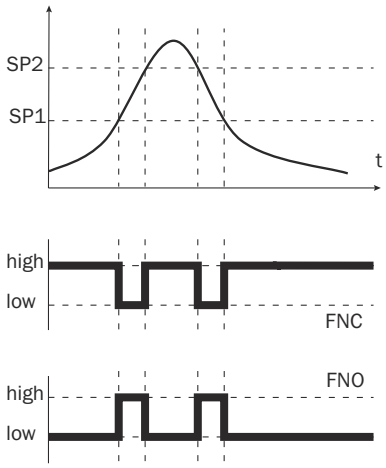
In the **Mode** menu, set the mode for hysteresis or window function with the associated measurand.

Flow



If the flow is fluctuating around the set value, the hysteresis keeps the output state of the outputs stable. If the flow rate increases, the output switches when the respective switching point (SP2) is reached; if the flow rate decreases again, the output only switches back when the switch-back point (SP1) is reached.

Flow



Window (example **Switch Window Volumetric Flow Rate**) allows a defined area to be monitored. If the flow is between SetPoint2 and SetPoint1, the output is active (normally open contact) or inactive (normally closed contact).
The error status of the measuring device is analogous to line break monitoring. In an error state, the measuring device assumes the safe state, i.e. the digital outputs become inactive.
For the downstream signal evaluation, this corresponds to a line interruption.

Setting the switching point

- Set the switching point in the **SetPoint1** submenu.

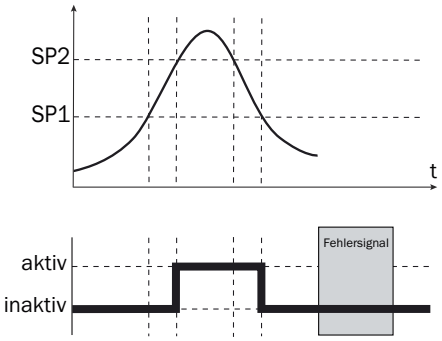
Set switch-back point/hysteresis and lower window limit

- Set the reset point/hysteresis and lower window limit in the **SetPoint2** submenu.

Setting the switching behavior of the normally open or normally closed contact

- Select the **Polarity** submenu. Choose between **normally closed** and **normally open**.

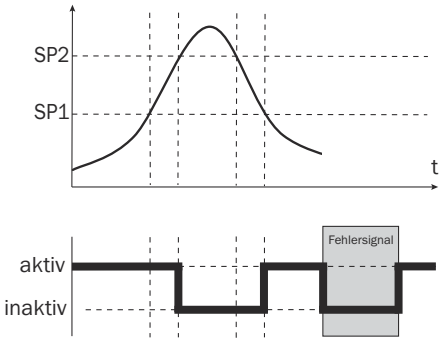
Flow



Digital output		PNP	NPN	DRV	Error status
Normally open/HNO	Active	U_v	0 V	U_v(PNP switched)	Deactivated
	Deacti-vated	0 V[1)]	U_V[2)]	0 V (NPN switched)	

1) Pulldown only.
2) Pullup only.

Flow



Digital output		PNP	NPN	DRV	Error status
Normally closed/HNC	Active	U_v	0 V	$_{UV}$(PNP switched)	Deactivated
	Deacti-vated	0 V[1)]	U_V[2)]	0 V (NPN switched)	

1) Pulldown only.
2) Pullup only.

Simulate digital output

- Select the **Simulate** submenu and select **active**, **inactive** or **normal** (measuring mode). This function can be used to simulate an active or inactive digital output. Select **normal** for standard operation.

Set PNP/NPN or DRV (push-pull)

- Select the **DriverType** submenu and set PNP/NPN or DRV (push-pull). IO-Link communication is available if PNP or push-pull has been selected.

8.2 Q2 menu

This menu contains the settings for digital output 2.

8.2.1 Set Q2 as digital output

Select the **Function** submenu. Activate the **Switch** function.

Setting the mode for hysteresis or window function

- In the **Mode** menu, set the mode for hysteresis or window function with the associated measurand.

Setting the switching point

- Set the switching point in the **SetPoint1** submenu.

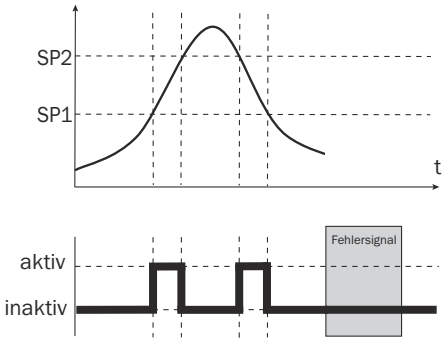
Set switch-back point/hysteresis and lower window limit

- Set the reset point/hysteresis and lower window limit in the **SetPoint2** submenu.

Setting the switching behavior of the normally open or normally closed contact

- Select the **Polarity** submenu and choose between **normally closed** and **normally open**.

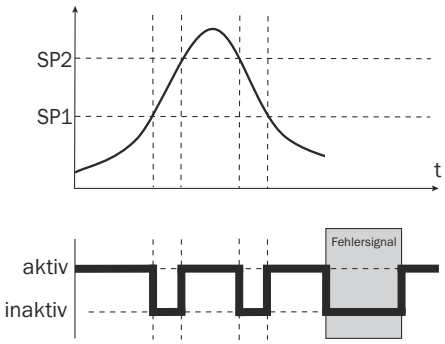
Flow



Digital output		PNP	NPN	DRV	Error status
Normally open/FNO	Active	U_v	0 V	$_{UV}$(PNP switched)	Deactivated
	Deacti-vated	0 V[1)]	U_V[2)]	0 V (NPN switched)	

1) Pulldown only.
2) Pullup only.

Flow



Digital output		PNP	NPN	DRV	Error status
Normally closed/FNC	Active	U_v	0 V	$_{UV}$(PNP switched)	Deactivated
	Deacti-vated	0 V[1)]	U_V[2)]	0 V (NPN switched)	

1) Pulldown only.
2) Pullup only.

Simulate digital output

Simulate digital output

- Select the **Simulate** submenu and select **active**, **inactive** or **normal** (measuring mode). This function can be used to simulate an active or inactive digital output. Select **normal** for standard operation.

Set PNP/NPN or DRV (push-pull)

- Select the **DriverType** submenu and set PNP/NPN or DRV (push-pull). IO-Link communication is available if PNP or push-pull has been selected.

8.2.2 Set Q2 as analog output

This menu contains the settings for the analog output.

Select **Analog** in the Q2 **function** menu and set accordingly.

Assigning the current output measurement parameters
- In the **Mode** submenu, assign the measurands such as flow rate, temperature or pressure to the current output.

Assigning the measuring range limit value
- Enter the upper range value in the **High** submenu (20 mA).

Assigning the lower limit of the measuring range
- In the **Low** submenu, enter the start of the measuring range (4 mA).

Setting the inversion of the current output
- In the **Polarity** submenu, set whether the current output should be inverted.

Setting the behavior of the current output in the event of an error on the device
- In the **Fail** submenu, set how the current output should behave in the event of an error.

Setting the predefined current value
- Set a predefined current value in the **Simulate** submenu.

8.2.3 Set Q2 as a frequency output

Select **Frequency** in the Q2 **function** menu and set accordingly.

Select process variable(VolumetricFlowRate)
- Set the process variable in the **Mode** submenu.

Defining the measuring range lower limit and limit value
- Under **MaxFreq** and **MinFreq** , the frequency can be specified in the range from 0... 10 kHz.

Overwriting the output using the simulation function
- Select the corresponding values under **SimFreq**.

Set PNP/NPN or DRV (push-pull)
- Select the **DriverType** submenu and set PNP/NPN or DRV (push-pull).

8.2.4 Set Q2 as the pulse output

Select **Pulse** in the Q2 **function** menu and set accordingly.

Selecting the process size
- Select Volume or Energy in the **Mode** submenu.

Specifying pulse valence
- Enter the pulse value under **Valency** and **Width**. If output of the pulse is not possible, the device outputs a warning message.

Set PNP/NPN or DRV (push-pull)
- Select the **DriverType** submenu and set PNP/NPN or DRV (push-pull).

8.3 Qa menu

This menu contains the settings of the analog output.

Assigning the current output measurement parameters
- In the **Mode** submenu, assign the measurands such as flow rate, temperature or pressure to the current output.

Assigning the measuring range limit value
- Enter the upper range value in the **High** submenu (20 mA).

Assigning the lower limit of the measuring range
- In the **Low** submenu, enter the start of the measuring range (4 mA).

Setting the inversion of the current output

- In the **Polarity** submenu, set whether the current output should be inverted.

Setting the behavior of the current output in the event of an error on the device

- In the **Fail** submenu, set how the current output should behave in the event of an error.

Setting the predefined current value

- Set a predefined current value in the **Simulate** submenu.

9 Operation Ethernet variant

The Ethernet variant applies to all FTMg with the type code FTMg-Exxxxxx with firmware version V4.x.

9.1 Ethernet configuration

The Ethernet settings can be made on the display or via the web server.

- When configured on the display, they are applied immediately.
- When parameterizing via the web server, execute the **Save Ethernet Settings...** function.

To operate the FTMg in a network, you must assign it a unique IP address. There are 2 options for this:

- Make a dynamic IP assignment via the DHCP client in the **DHCP Mode** submenu, see "DHCP client", page 27.
- Or assign a static IP address to the sensor, see "Static IP", page 27.

9.1.1 DHCP client

The prerequisite for dynamic IP assignment is that a DHCP server is available in the network.

The sensor sends a **DHCP request** during **PowerUp** and is assigned an IP address by a DHCP server in the network.

The sensor can be reached via IP address or host name. The hostname can be freely selected.

NOTE
The hostname must be unique on the network.

The automatically assigned IP address can be read on the display.

Parameter	Example	Function
Hostname	FTMg-<SerialNumber>	Unique identifier for the network node

9.1.2 Static IP

If there is no DHCP server in the network or a static IP is required, a static IP address can be assigned manually in the **IP Address** submenu.

The sensor can be reached via this IP address.

NOTE
The IP address must be unique on the network.

Parameter	Example	Function
IP address	192.168.0.10	Unique identifier for the network node
SubNetMask	255.255.255.0	All devices in the same network have the same subnet mask and a different IP address. All requests within the same network can be delivered directly
Gateway	192.168.0.1	The gateway establishes the connections to other networks. Requests outside your own network are sent to the gateway.

Parameter	Example	Function
DNS server	192.168.0.1	Domain name server: Required for name resolution at the SNTP server and MQTT broker, provided the servers were specified via domain name.

9.2 Web server

Every FTMg has an integrated web server that can be used to display the measurement data and configure settings directly in its own browser.

9.2.1 Web interface (user)

The sensor can be accessed via the web interface, e.g. to set parameters or visualize the process data.

- Open a web browser.
- In the address bar, enter the sensor IP address or the sensor hostname.
  - http://<sensor-ip> (for static IP or DHCP client)
  - Or http://<sensor-hostname> (when using DHCP client)

NOTE

If the default web server port 80 has been changed, the port must be explicitly specified in the URL.

- http://<sensor-ip>:<webserver-port> (for static IP or DHCP client)
- Or http://<sensor-hostname>:<webserver-port> (when using DHCP client)

9.2.2 Web server authorization

To see the full functionality of the web interface and to parameterize the device, it is necessary to log in.

- To do this, click on **Run** in the web interface. A login window opens. Select “Maintenance” as the username and enter the default password “airflowsensor”.

NOTE

After logging in for the first time, change the password and assign a secure password:

- The password must be at least 10 characters long and contain upper and lower case letters, numbers and special characters.
- Change the password in the web interface on the **web server**page **ChangePassword**.

The web server password can only be changed via the web server.

The password is not saved as plain text in the sensor, but can be reset to the original password “airflowsensor” via the sensor display.

NOTICE

Automatic change of the endpoints

The REST API endpoints under the path <sensor-ip>/api/* can change without notice and are therefore not suitable for automatic integration.

- The REST API interface (machine) see "REST API interface (machine)", page 28 use.

9.2.3 REST API interface (machine)

A REST API interface is available as a machine interface.

This is defined via an OpenAPI specification that was delivered with the sensor (http://<sensor-ip>/openapi.yaml).

The OpenAPI specification can be downloaded after logging in on the **web server**page **OpenAPI REST Interface Description**.

The OpenAPI specification can be visualized with an OpenAPI editor (e.g. https://editor.swagger.io/) can be visualized.

NOTE
The REST API interface is available to any user and does not require authorization.

The possible REST API endpoints can be found in the OpenAPI specification or in the web interface on the **web server** page.

NOTE
The endpoints profile/processdata/multiarray and profile/processdata/multiobject are influenced by the MQTT parameter MQTT/MQTT ProcessData Multi Update Interval.

9.2.4 Settings

The following web server settings can be made:

Parameter	Example	Function
Web server service	active/inactive	Switching the web server on and off **NOTICE** When the web server is switched off via the web interface, the connection to the web interface is disconnected. In this case, the web server can only be activated again via the sensor display
Web server port	80	Set web server port Default: 80

9.2.5 Firmware update

The sensor firmware can be updated via the web interface.

A firmware update file (ZIP format) is uploaded and checked via the web interface.

- If the check is successful, the update file is transmitted to the sensor.
- After the transmission, the sensor is restarted and the update is checked and then installed in the sensor. This process takes about 2 minutes.
- The sensor then restarts.

The configuration of the sensor is retained during the **firmware update**.

NOTICE
Possible damage to the device
.
The sensor may be damaged if the power supply is interrupted.

- Do not interrupt the power supply to the sensor during the update process.

9.2.6 Logger

Process data can be recorded via the web interface and downloaded as a .csv file.

The duration of the recording is limited and depends on the selected logging interval and the logger content. Depending on the setting, it can vary between 60 minutes and up to 7 days.

The logging interval can be set to 1 second, 2 seconds, 5 seconds, 10 seconds, 30 seconds and 60 seconds.

The last value per logging interval is always saved.

The longer the logging interval is selected, the longer the data can be recorded.

Either only the 2 process variables “Volume flow” and “Pressure” or all 8 process variables can be recorded as logger content.

If all 8 process variables are recorded simultaneously, the duration of the recording is shortened accordingly.

Recording can either be stopped manually (**Stop recording**) or is ended automatically when the memory is full.

The .csv file can be downloaded using the **Download Last Logfile** button.

NOTE
When the recording is restarted, the previous log file is overwritten.

9.3 Simple Network Time Protocol (SNTP)

9.3.1 Overview

The sensor has 2 internal times/timestamps:

- **localtime**: Milliseconds since the **PowerUp**
- **timestamp**: Milliseconds since 01.01.1970 (UnixTime)

The UnixTime can be synchronized with a time server in the network via SNTP(**Simple Network Time Protocol**).

The time data format is “Uint64” with a resolution of milliseconds.

9.3.2 Settings

The following SNTP settings can be configured:

Parameter	Example	Function
SNTP Client	active/inactive	Switching the integrated SNTP client on and off
SNTP server (IP or host name)	0.de.pool.ntp.org	IP address or hostname of a time server on the network

Localtime/timestamp is output/used for:

- HTTP REST API interface
- MQTT
- OPC UA
- Display
- Logger

NOTE
The UnixTime starts at 0 ms after PowerUp. This corresponds to 01.01.1970.

This means that UnixTime and LocalTime run synchronously until UnixTime is synchronized for the first time.

NOTE
The UnixTime is synchronized with the SNTP client every 60 minutes (if active).

NOTE
The UnixTime outputs the time in UTC+00.

9.3.3 Troubleshooting (SNTP)

Problem	Cause	Solution
Time is not synchronized	Wrong NTP server specified	Parameterize the correct NTP server
	NTP server specified via DNS, DNS not parameterized correctly	Parameterize the correct DNS or parameterize the NTP server via IP
	SNTP client deactivated	Activate the SNTP client
Time does not match the local time	The time is output as UTC+00	/

9.4 MQTT

9.4.1 Overview

Each FTMg contains an MQTT client via which it can connect to an MQTT broker.

The FTMg periodically sends(**publishes**) messages to the MQTT broker under a topic.

Each MQTT client can connect to the MQTT broker and**subscribe**to a topic.

The MQTT broker notifies all MQTT clients with an active **subscription** when a message has been sent.

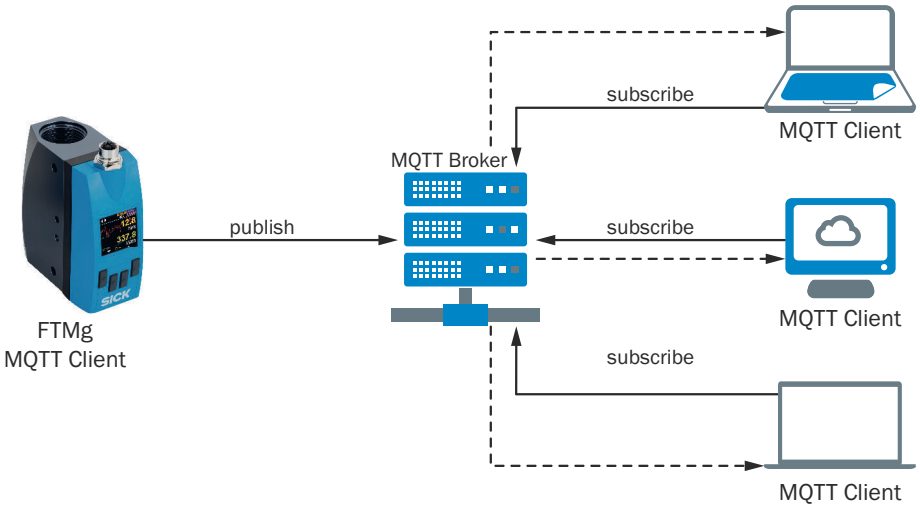


Figure 11: MQTT communication

9.4.2 Settings: MQTT broker

Make the following settings to establish the connection with the MQTT broker:

Parameter	Example	Function
MQTT service	active	• Active: MQTT client activated • Inactive: MQTT client deactivated
		NOTE | If MQTT is not used, the recommendation is to deactivate the service.

Parameter	Example	Function
MQTT broker	myMQTTBroker.company.com	Enter the IP or hostname of the MQTT broker
MQTT port	1883	Set the port of the MQTT broker. Default: 1883
MQTT-Broker Username		These settings are optional. Access to the MQTT broker can be provided with access data (username and password) here.
MQTT-Broker Password		**NOTE** | If no username and password have been assigned, then there is no authorization, i.e. there is no login to the MQTT broker.The password cannot be read via the web server. If a password has been assigned, *** is returned.Communication with the MQTT broker is unencrypted! The username and password can potentially be read.
MQTT QoS-Level QoS-	QoS-0	The Quality of Service level of the MQTT data transmission can be selected here: • QoS-0:**"At most once"** At level zero, delivery of the message is not guaranteed. There is no confirmation of receipt from the recipient. The message is also not saved and retransmitted by the sender. • QoS-1:**"At least once"** Level 1 guarantees that the message reaches the recipient at least once. The sender stores the message until it receives an acknowledgment of receipt from the recipient. A message may be sent or delivered multiple times. • QoS-2:**"Exactly once"** Level 2 guarantees that each message is only received once by the intended recipients. QoS-2 is the most secure and slowest Quality of Service class. The guarantee is provided by at least 2 request/response streams (a four-part handshake) between the sender and the receiver.
		NOTE | The different QoS levels generate different data traffic in the network, so that the network is more heavily loaded with higher QoS.
MQTT topic	FTMG_<Serno>	Under this topic, the MQTT client of the FTMg sends the selected data to the MQTT broker at the specified update interval.
		NOTE | Recommendation: Each sensor should have its own topic for differentiation.

9.4.3 Settings: Process data

The process data can be transmitted in a different process data format and update interval. The following settings are available:

Parameter	Example	Function
MQTT Process-Data Format	Single (1 element)	Here you can select in which process data format the data will be transmitted: • **Single** (1 element): The process data is transferred as a JSON object with one value per process parameter. • **MultiArray** (10 elements): The process data is provided as a JSON object with an array for each process parameter. • **MultiObject** (10 elements): The process data is provided as an array of JSON objects (with one value per process parameter). • **UserDefined** (Legacy v1 / v2): You can set which process data is sent. The unit and statistical values can also be sent.
		NOTE | By selecting a suitable process data format: • Can communication in the network be reduced(**MultiArray**, **MultiObject**, **UserDefined**). • Can data be transferred at a higher frequency (up to 10 ms for **MultiArray** and **MultiObject** with the parameter Update interval 100 ms with Δt = 10 ms). • Can compatibility with existing applications be ensured (**UserDefined**).
MQTT Update Interval	500 ms	The update interval for the MQTT ProcessData Format **Single** or **UserDefined** can be set here: • 100 ... 30,000 ms
MQTT Process-Data Multi Update Interval (t)	100 ms	The update interval for the MQTT ProcessData format **MultiArray** or **MultiObject** can be set here • 100 ms: Transmission of 10 elements every 100 ms with Δt = 10 ms 30 s: Transfer of 10 elements every 30 s with Δt = 3 s
Send Unit (complex) **Send Mass Flow Rate** **Send Flow Velocity** **Send Volumetric Flow Rate** **Send Volume** **Send Mass** **Send Energy** **Send Temperature** **Send Pressure** **Send Additional Information** **Send App Statistics (complex)**	Off/On	The process data to be sent as a JSON object can be selected here on a user-specific basis. This is only possible if the MQTT ProcessData Format **UserDefined** is selected.

9.4.4 MQTT-JSON Responses

Single
{
“massFlowRate”:0,
“flowVelocity”:0,
“volume”:0.015,
“volumetricFlowRate”:0,
“mass”:0.02,
“energy”:0,
“temperature”:39.4,
“pressure”:0,
“timestamp”:1656673414493,
“localtime”:70743946,
“deviceState”: “ok”
}

Further responses can be found in the OpenAPI specification (see "REST API interface (machine)", page 28) or the AsyncAPI specification (see "Settings: SubTopics", page 34).

9.4.5 Settings: SubTopics

In addition to the process parameters, subtopics such as the firmware version, signal status etc. can be sent as a JSON object.

Parameter	Example	Function
MQTT SubTopics	enabled	• Disabled: Deactivated - Subtopics can be deactivated to reduce the load on the network. • Enabled: Activated - When the subtopic is activated, in addition to the 8 process parameters, further information such as z. For example, the firmware version, signal status, etc. are sent.

SubTopics

The MQTT subtopics are documented in the AsyncAPI specification.

The specification can be loaded from the sensor at the URL http://<sensor-ip>/asyncapi.yaml or from the web interface on the **MQTT** page under **AsyncAPI MQTT Interface Description**.

For example, the editor **https://studio.asyncapi.com/** can be used as an editor.

Endpoint	Web server	MQTT broker	MQTT Retain	MQTT Publish Interval	Description
ProcessData UserDefined (Legacy v1 / v2)	-	<MQTT-Topic>	Configurable interval for cyclical output	Configurable see "Settings: Process data", page 32	-

Endpoint	Web server	MQTT broker	MQTT Retain	MQTT Publish Interval	Description
ProcessData Single	profile /process-data /single	<MQTT-Topic>	Configurable interval for cyclical output	Configurable see "Settings: Process data", page 32	Process data is provided as 1 object with 1 value per process parameter
ProcessData Descriptor	profile /processdata /desc	<MQTT-Topic&gt /processdata Desc	On connection, one-time output as a retained message ✓	On connection	Details of the process data (units and measuring ranges)
ProcessData MultiArray	profile /processdata /multiarray	<MQTT-Topic>	Configurable interval for cyclical output	Configurable see "Settings: Process data", page 32	Process data are provided as one object with one array for each process parameter
ProcessData MultiObject	profile /processdata /multiobject	<MQTT-Topic>	Configurable interval for cyclical output	Configurable see "Settings: Process data", page 32	Process data is provided as an array of objects (with a value for each process parameter)
Identification	profile /identification	<MQTT-Topic&gt /identification	On connection, one-time output as a retained message ✓	On connection	Sensor specific identification
DigitalNameplate	profile /digitalnameplate	<MQTT-Topic&gt /digitalNameplate	On connection, one-time output as a retained message ✓	On connection	Digital identifier of the device
Tags	profiles /tags	<MQTT-Topic>/ tags	When connected, one-time output as a retained message ✓	On connection	Tags for more detailed description
State	profile /state	<MQTT-Topic>/ state	Output every 5 minutes as a retained message ✓	Every 5 minutes	Complete device status including SignalQuality, monitoring services (SNTP client, web server, MQTT client, OPC UA Server) and Ethernet
Statistics	profile /statistics	<MQTT-Topic&gt /statistics	Output every 5 minutes as a retained message ✓	Every 5 minutes	Statistics on flow rate, flow velocity, volume flow, temperature and pressure since the last reset
Counter	profile /counter	<MQTT-Topic&gt /counter	Output every 5 minutes as a retained message ✓	Every 5 minutes	Summed quantities (volume, mass, energy) since last reset

Endpoint	Web server	MQTT broker	MQTT Retain	MQTT Publish Interval	Description
Events Info	profile /events/ info	<MQTT-Topic&gt /events/ info	On occurrence, one-time output as a retained message ✓	On occurrence	List of all pending messages
Events Warning	profile /events /warning	<MQTT. Topic&gt /events /warning	If it occurs, output once as a retained message ✓	On occurrence	List of all pending warnings
Events Error	profile /events/ error	<MQTTopic&gt /events/ error	If it occurs, output once as a retained message ✓	On occurrence	List of all pending errors
ProductID	/productid	/	/	/	Requests the Product ID (product identifier)

9.4.6 MQTT troubleshooting

For troubleshooting, check the states of MQTT State and **MQTT Detailed State** .

Problem	Cause	Solution
MQTT connection is not working	Wrong broker specified	Parameterize the correct broker (see section see "Settings: MQTT broker", page 31)
	MQTT broker specified via DNS, DNS not parameterized correctly	Parameterize correct DNS or parameterize NTP broker via IP (see section see "Settings: MQTT broker", page 31)
	Incorrect port specified	Set the correct MQTT port Default: 1883 (see section see "Settings: MQTT broker", page 31)
	Incorrect MQTT broker configuration	Enter the correct MQTT broker IP address or host name (see section see "Settings: MQTT broker", page 31)
	MQTT service deactivated	Activate MQTT service (see section see "Settings: MQTT broker", page 31)
Subtopics are not arriving	Subtopics are deactivated	Activate subtopics (see section see "Settings: SubTopics", page 34)
Process data are being transmitted too slowly	MQTT update interval is too high	Reduce MQTT update interval (see section see "Settings: Process data", page 32)

9.5 OPC UA

The OPC UA (**Open Platform Communications – Unified Architecture**) protocol is an open standard for horizontal communication from machine to machine and for vertical communication from the machine to the cloud. It is vendor and platform independent, thereby enabling easy integration.

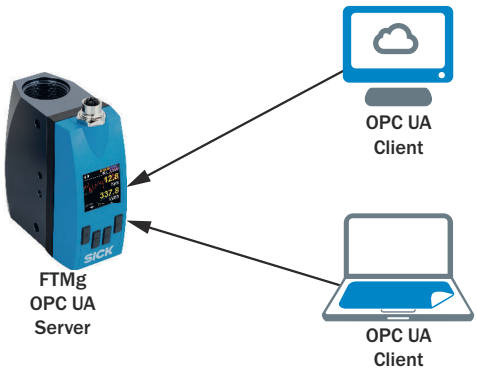


Figure 12: OPC UA communication

OPC UA works according to the server-client model, whereby each FTMg has an integrated OPC UA server. Up to 2 OPC UA clients can connect to it simultaneously.

The OPC UA server offers a service-oriented architecture (SoA).

The OPC UA client connects to the OPC UA server. It does not require a special device description file from the server, but instead can autonomously navigate through the address space of the server (FTMg) and read the data made available by the server.

9.5.1 Sensor

All parameters described in the OpenAPI can also be accessed via the OPC UA **Address Space**.

The sensor has an integrated OPC UA server.

Properties	Quantity
Number of simultaneous connections	2
Max. number of **subscriptions**	4
Number of **monitored items** per **subscription**	20

9.5.2 Settings

The following settings can be configured:

Parameter	Example	Function
OPC UA Service	Active	**Inactive**: Deactivated **Active**: Activated
		NOTE If OPC UA is not used, the recommendation is to deactivate the service.
OPC UA Port	4840	Set OPC UA port: The default port for the OPC UA server in the FTMg is port 4840. Default: 4840

Parameter	Example	Function
OPC UA Username	-	These settings are optional. Access to the OPC UA server can be provided with access data (user name and password) here.
OPC UA Password	-	**NOTE** If no user name and password have been assigned, there is no authorization, i.e. there is no logon to the OPC UA server. The password cannot be read out via the web server. If a password has been assigned, *** is returned. Communication is unencrypted! The username and password can potentially be read.

Using the example of the UaExpert client from Unified Automation (https://www.unified-automation.com/) is used to show the steps that need to be taken to operate the sensor via OPC UA:

1. Press “Plus” to add a new server (FTMg).
2. Assign a configuration name (name is freely selectable).
3. In the **Add Server** screen, select the **Advanced** tab and enter the IP address of the FTMg with port (example: opc.tcp://<sensor-ip>:<OPCUA-port>).
4. Confirm entry via **OK** .
5. Click “Connect”.
6. The FTMg appears in the Servers area of the “Project” field.
7. The address space of the FTMg is displayed in the **Address Space** field.
8. The attributes can be read in the “Attributes” field.
9. The desired parameters can be dragged and dropped from the address space into the **Data Access View** field.

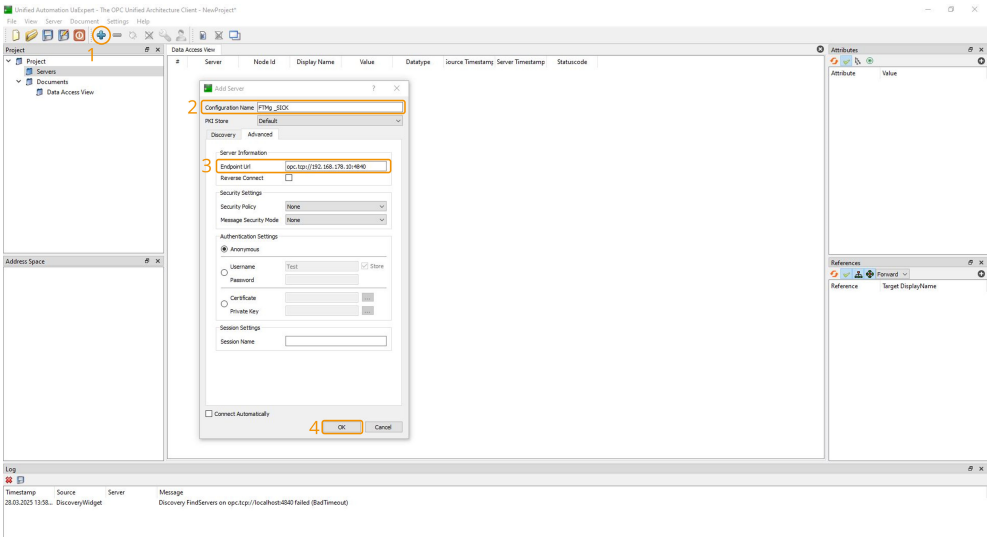


Figure 13: Example: Operation of the sensor via OPC UA with UaExpert client from Unified Automation, 1

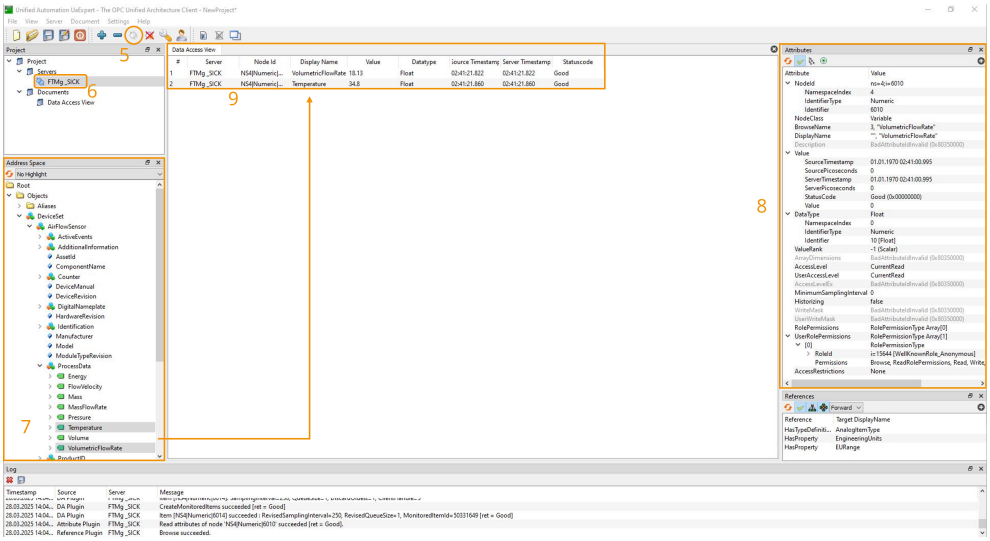


Figure 14: Example: Operation of the sensor via OPC UA with UaExpert client from Unified Automation, 2

9.5.3 OPC UA troubleshooting

Check the states of OPC UA State and OPC UA **Detailed State:**

Problem	Cause	Solution
OPC UA connection is not working	The OPC UA service is deactivated	Activate the OPC UA service
	Incorrect port specified	Set the OPC UA port: The default port for the OPC UA server in the FTMg is port 4840.
	Incorrect IP address specified	Enter the correct IP address of the sensor
	Username and password have been assigned	Enter user name and password
	There are already two OPC UA clients are already connected to the OPC UA server	Terminating the connection of an OPC UA client
No further **subscriptions** can be made	The number of **subscriptions** per connection has been exceeded	Delete unneeded **subscriptions**

10 Operation Industrial and Ethernet version

This section applies to all FTMg variants.

10.1 Display

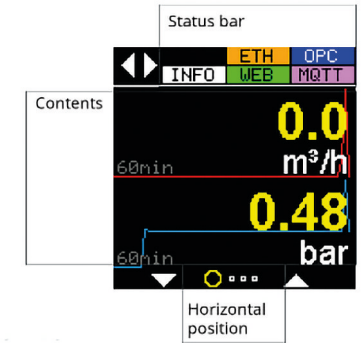


Figure 15: FTMg display

10.1.1 Status bar

The display has a status bar. This shows icons with three different statuses:

Table 3: Ethernet variant

Icon	Not present	Black background	Color background
Info	No information message active	/	Information message active See display page 3 for description
Warn/Err	No warning/error message active	/	Warning/error message active See display page 3 for description
Eth	/	No Ethernet link available	Ethernet link available
Web	Web server deactivated	Web server activated	Web server with active connections
MQTT	MQTT deactivated	MQTT client not connected	MQTT client successfully connected to MQTT broker
OPC	OPC UA deactivated	OPC UA server activated	OPC UA server with active connections

Table 4: Industrial variants

Icon	Not present	Black background	Color background
Info	No information message active	/	Information message active See display page 3 for description
Warn/Err	No warning/error message active	/	Warning/error message active See display page 3 for description
Q1	/	/	Q1 active
IO-Link	IO-Link deactivated	/	IO-Link active
Q2 / a	/	/	Q2 / a active
Qa	/	/	Qa active

10.1.2 Display units

The units for the different measurands can be selected in the **Units** submenu:

Process variable	Units
MassFlowRate	**kg/h**, g/s, kg /min
FlowVelocity	**m/s**, fps
Volume	**m³**, L, ft³
VolumetricFlowRate	**m³/h**, m³/min, L/s, L/min, ft³/s, ft³/min
Mass	**kg**
Energy	**kWh**
Temperature	**°C**, °F
Pressure	**bar**, psi

NOTE
The change of units only affects the display and the web server. For MQTT and OPC UA, the measurands are always transmitted in their base units (marked in bold).

10.1.3 Display pages

The display has 4 different pages on a horizontal level.

The page on which the user is located is shown at the bottom of the display.

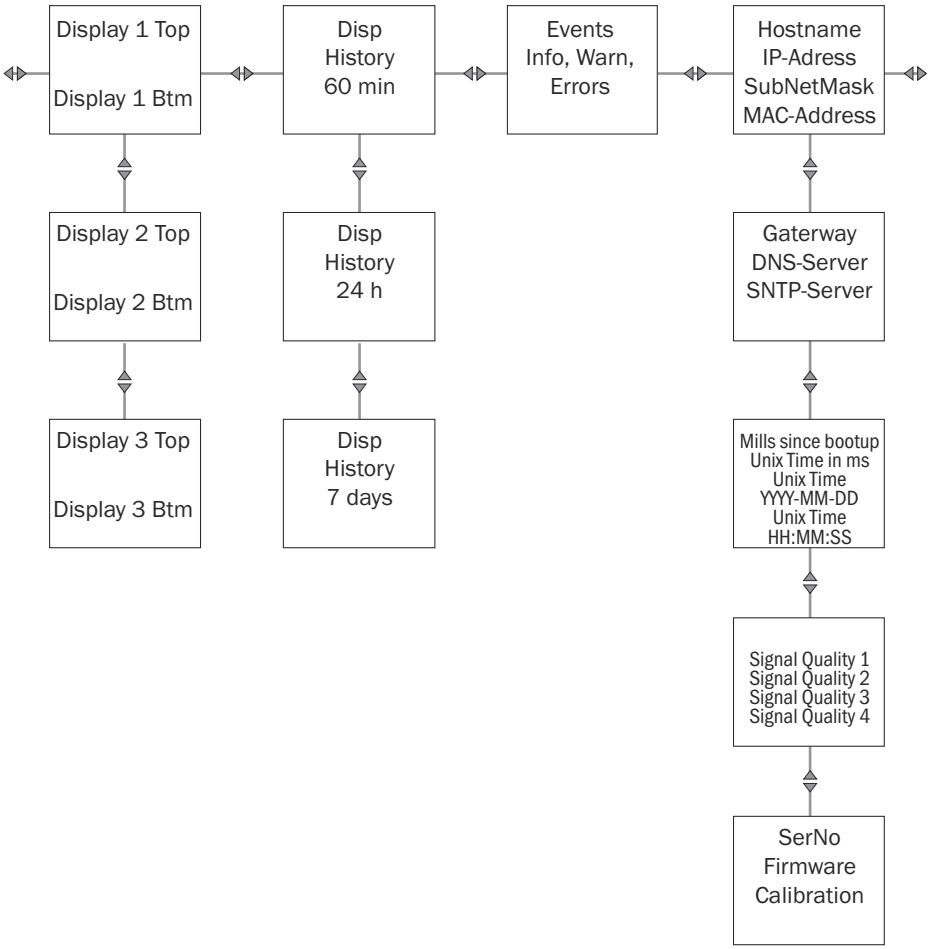


Figure 16: Display page (example for Ethernet variant)

1. Page: Display of the current measured values

Up to 6 different measured values can be displayed vertically (Disp1, Disp2, Disp3).

Which measured values are displayed at which position is freely configurable.

Example:

Table 5: Set “Screen 1.1” start screen

Set “Screen 1.1” start screen
• Select the measured value to be displayed in the **Pages** Disp1Top submenu (top half of the screen). • Select the parameter to be displayed in the **Pages** Disp1Btm submenu (bottom half of the screen).

2. Page: Display of the history of a measured value

- The different time periods (60 minutes, 24 hours, 7 days) are displayed vertically.
- Select the measured value to be displayed in the **DispHistory** submenu.

3rd Page:

Display of current information, warning and error messages.

4. Page:

Further information, e.g. signal quality, IP address, firmware version, etc.

10.1.4 Other display configurations

Optimizing readability

- In the **Rotation** submenu, set the display to 0°, 90°, 180° or 270° to ensure optimum readability.

Time until screensaver is activated

- Set the activation time of the screen saver in the **ScreenSaver** submenu.

Time until display is switched off

- In the **AutoOff** submenu, set the time for switching off the display to ensure a longer display life.

Brightness in %

- Set the brightness in % in the **Brightness** submenu.

4-digit pin assigned for operating and tamper protection

- Assign a 4-digit pin in the **Display Pin** submenu.

10.2 Simulation

Simulating flow

- In the **Flow** submenu, the flow rate can be simulated in % in predefined steps.

Simulating temperature

- In the **Temperature** submenu, a temperature value can be simulated in % (-20 ... +60 °C) in predefined steps.

Simulating pressure

- In the **Pressure** submenu, a pressure value can be simulated in % (0 ... 16 bar) in predefined steps.

10.3 Measure

10.3.1 Setting the medium

Select “Medium” in the **Flow** submenu. Set the medium as air, argon (Ar), carbon dioxide (CO_2) or nitrogen (N_2) or helium (He).

The product is currently not compatible with helium, this is a purely conceptual setting.

NOTE

The FTMg is calibrated with compressed air at the following reference conditions:

Condition	Parameter	Values
Media conditions	Air	ISO 8573-1:2010 [3:4:4] or better
	Static pressure	7 ± 0.2 bar (abs.)
	Temperature of medium	22 ± 3 °C
	Straight inlet zone	250xDN
	Customer-parameterizable average filter	10 seconds
Ambient conditions	Ambient temperature	+15 ... +25 °C
	Ambient pressure	1013 mbar
Measured value via digital interface	-	-

For the other gases, adjustment curves are stored in the sensor.

10.3.2 Setting the reference standard

Select **RefCond** in the **Flow** submenu.

Set reference standard such as ISO2533, ISO1217, DIN1945-1, DIN1343, IOS6358, ISO8778 or application-specific (**UserDefined**):

Standard	Pressure bar (abs.)	Temperature °C	Temperature K	Note
DIN 1343	1.01325	0	273.15	-
DIN 1945-1	1	20	293.15	For air only
ISO 1217	1	20	293.15	For air only
ISO 2533	1.01325	15	288.15	For air only
ISO 6358	1	20	293.15	For air only
ISO 8778	1	20	293.15	For air only
User-defined	Set an application-specific reference pressure	Set an application-specific temperature	-	-

- To set an application-specific reference pressure in the **Flow**submenu, select **RefPress**.
- To set an application-specific reference temperature, select **RefTemp** in the **Flow** submenu.

10.3.3 Flow configuration

Setting the zero point offset

- In the **Flow** submenu, select **0-FlowOff**. Set zero offset. The zero point offset is needed if the sensor displays a value at zero flow. The value can be corrected to zero using the zero offset.

Setting the leak flow volume suppression

- In the **Flow** submenu, select **0-FlowCut**. Set creep suppression. The volume flow is suppressed to the value 0 m^3/h when the value set is undershot.

Set mean value filter to filter (smooth) measured values on the display and at the output

- In the **Flow**submenu, select **Filter** to filter all flow measurement values on the display and at the output with predefined time elements.

10.3.4 Pressure configuration

Set offset/zero offset

- In the **Pressure**submenu, select **Offset** to set the offset/zero offset.

Set mean value filter to filter (smooth) measured values on the display and at the output

- In the **Pressure**submenu, select **Filter** to filter measured values on the display and at the output with predefined time units.

10.3.5 Temperature configuration

Setting the average filter to filter (smooth) measured values on the display and at the output

- In the **Temperature**submenu, select **Filter** to filter measured values on the display and at the output with predefined time units.

10.3.6 Signal quality

The sensor calculates various signal quality parameters that simplify the evaluation of the installation situation and the sensor status.

The **SigQua1**, **SigQua2**, **SigQua3** and **SigQua4** can be read out in the **Sigquality** submenu. **SigQua3** and **SigQua4** are currently only placeholders and are always set to 100%.

Table 6: Signal quality

	Signal quality 1	Signal quality 2
Meaning	Indicator for the quality of measurement	Indicator for the robustness of the measurement with regard to electromagnetic radiation
Value range	Value range: 0% ... 100% Good signal: > 90%	Value range: 0% ... 100% Good signal: > 70%
Exceptions	Can display < 100% for a short time in very dynamic processes with large temperature or flow rate fluctuations	
Recognizing problems	If the value is permanently < 90%, this may indicate that the process is subject to excessive temperature fluctuations or that the probe is dirty	If the value is permanently < 70%, this may indicate that there is too much interference due to the proximity to electromagnetic interference sources
Measures	Do not place the sensor too close to valves, as expansion cooling can limit the measurement accuracy. Check the probe for contamination	Do not place the sensor near sources of electromagnetic interference (electric motors, transformers)

10.4 History

The FTMg records all process variables from the last 7 days in a cascaded memory.

Older data is aggregated and stored in a long-term memory at a lower resolution.

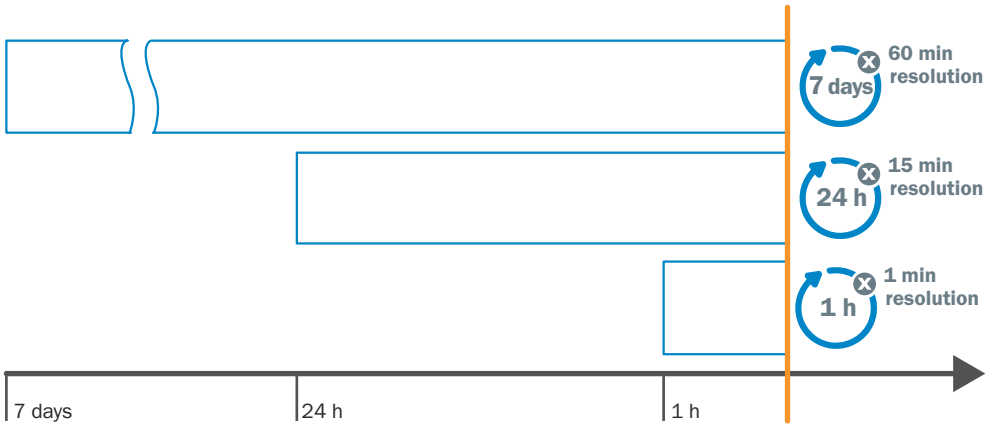


Figure 17: Memory of the FTMg

In the **History** submenu, the graph of the measured values for the last 60 minutes, the last 24 hours or the last 7 days can be displayed.

NOTE
The memory can be read out via the display, the web server and OPC UA.

NOTE
The memory cannot be reset.

10.5 Statistics

In the **Statistics** submenu, the maximum, minimum and average values of the mass and volume flow as well as the flow rate, temperature and pressure can be displayed since the last reset.

The FTMg saves the elapsed time since the statistics values were last reset. This can be called up in the **LastReset** menu item.

In the **Reset** menu item, the statistical values can be reset manually to “0”.

With the Ethernet version, it is also possible to reset the statistics values automatically.

In the **Auto Reset** menu item, you can set the statistics values to be reset automatically either after a certain time (10 seconds, 30 seconds, 1 min, 10 min, 30 min, 1 h, 6 h, 12 h, 24 h) or after an event (**HTTP Read** or **MQTT Publish**).

NOTE
The statistics values:
- Are stored permanently in flash.
- Can only be reset together.
- Can be accessed via the display, the web server, MQTT and OPC UA.

10.6 Counter

In the **Counter** submenu, the three integrated process variables mass, volume and energy can be displayed since the last reset.

The FTMg saves the elapsed time since the **counter**was last reset. This can be called up in the **LastReset** menu item.

The counter can be manually reset to “0” in the **Reset** menu item.

For the Ethernet variant, there is also the option to perform an automatic reset of the **Counter**.

In the **Auto Reset** menu item, you can set the counter to be reset automatically either after a certain time (10 s, 30 s, 1 min, 10 min, 30 min, 1 h, 6 h, 12 h, 24 h) or after an event (HTTP Read or MQTT Publish).

NOTE
The 3 integrated process variables mass, volume and energy can only be reset together.

NOTE
The counter value is stored in the flash memory at regular 15-minute intervals and is therefore permanently retained. When the device is restarted, the last available value from the flash memory is used as the starting point.

10.7 System

Service login
- Perform service login for authorized users in the **Service** submenu.

Resetting to factory settings
- Reset to factory setting (delivery status) in the **FactReset** submenu.

Serial number (read only)
- Display the serial number in the **SerialNumber** submenu.

FWVersion (read only)
- Display the firmware version in the **FWVersion** submenu.

BLVersion (read only)
- Display the bootload version in the **BLVersion** submenu.

HWVersion (read only)
- Display the hardware version in the **HWVersion** submenu.

10.8 Tags

The following tags are available in the industrial and Ethernet versions:

Device tag
- Set the device tag in the **DevTag** submenu. The device tag is assigned to the sensor.

Application tag
- Set the application tag in the **AppTag** submenu. The application tag is assigned to the application/measuring point and is taken into account during data retention.

The following tags are only available in the Ethernet version:

Accessories tag
- Set the accessories tag in the **Accessories** submenu.

Location tag
- In the **Location** submenu Location tag.

Machine tag
- Set the machine tag in the **Machine** tag submenu.

Group tag
- Set the group tag in the **Group** submenu.

Edge tag
- Set the Edge Edge tag in the **Edge** submenu.

Geohash tag

- Set the geohash tag in the **Geohash** submenu.

Service tag

- Set the service day in the **Service** submenu.

User def tag

- Set user-specific tags in the **User Def 1/2/3** submenu.

11 Troubleshooting

Error messages are shown on the display if the relevant error status is caused by a specific condition.

There are three classifications: Info, Warning and Error.

If the sensor goes into the error state (safe state), then:

- All non-integrated process variables except pressure are set to 0.
- If the process variable pressure is set to 888 bar. This makes it clear that the pressure value is currently unknown (888 bar = unrealistic pressure value) and is intended to prevent the pipe, which may still be under pressure, from being opened.
- If an ERROR symbol appears in the status line on the display.
- The active events (Info/Warning/Failures) can be read out on the display on the third page. This will indicate the cause of the error state.

In the following table all error messages are listed with their relevant error level indicated.

Message	Classification	Description
Memory Invalid	Error	The memory of the sensor is damaged. Contact support.
No MQTT Connection	Warning	No connection to the MQTT broker possible.
Simulation active	Info	Simulation active (output signal or process size)
Q1/2 Overtemp	Warning	Driver for digital output Q1 / Q2 overloaded.
Q1 Shortcut	Warning	Short-circuit on Q1
Q2 Shortcut	Warning	Short-circuit on Q2
Q2 / a: Overload	Warning	Q2 / a: Electric current does not flow. • Cable not connected? • Load too high impedance?
Q2 / a OverTemp	Warning	Q2 / a: Overtemperature of the output driver • Ideal: Load of 500 Ohm • Ambient temperature too high?
Q2 PulseConfig	Warning	Implausible configuration of the Q2 pulse output
Qa Overload	Warning	See **Q2 / a: Overload**
Qa OverTemp	Warning	See **Q2 / a: OverTemp**
Flow low Info	Info	Info: MBE - 5%
Flow high Info/Warning	Info/Warning	Info: Standard MBE + 5% Warning: Extended MBE + 5%
Pressure low	Warning	Pressure outside the measuring range
Pressure high	Warning	Pressure outside the measuring range
Temperature low	Warning	Temperature outside the measuring range
Temperature high	Warning	Temperature outside the measuring range
Pressure low/high Error	Error	Process pressure outside the permissible pressure range
Temperature low/high Error	Error	Temperature of the process medium outside the permissible temperature range

Message	Classification	Description
Energy Counter off - Air only	Info	Medium! = Air = > Formula for energy counter only stored for air, therefore no function
Q1 Config out of range	Info	Switching points parameterized outside measuring range
Q2 Config out of Range	Info	Switching points parameterized outside measuring range
Qa Config out of range	Info	Current output parameterized outside the measuring range
Invalid Medium + RefCond	Warning	The selected reference conditions are not permissible in combination with the medium
Supply voltage too low/high!	Warning	Industrial version only: Power supply outside the specification
Internal Temperature too low/ high!	Warning	Internal temperature too high. Check ambient conditions.

12 Repair

12.1 Maintenance

The FTMg is maintenance-free. Check the screw connections and plug connections at regular intervals.

12.2 Return

Clean removed devices before returning them in order to protect our employees and the environment from dangers posed by residue from measured materials. Faulty devices can only be examined when accompanied by a completed return form. Such a declaration includes all materials that have come into contact with the appliance, including those used for testing, operation or cleaning. The return form is available at our Internet address (www.sick.com).

13 Disposal

Dispose of appliance components and packaging materials in accordance with the relevant country-specific waste treatment and disposal regulations of the delivery area.

14 Technical data

14.1 Features

Measurement principle	Calorimetric (flow rate, temperature) Piezoresistive (pressure)
Medium	Pressure (air quality ISO 8573-1:2010 [3:4:4]) Argon, nitrogen, carbon dioxide
Measurands	Ground, mass flow, volume, volume flow, energy, flow speed, pressure, temperature
Measuring pipe nominal diameter	DN08, DN15, DN20, DN25, DN40, DN50
Process temperature	-20 °C ... + 60 °C
Process pressure	0 bar ... 16 bar
Communication interface	IO-Link V1.1 COM3/230K4 baud (industrial version only) OPC UA, MQTT, web server (Ethernet variant only)
Temperature measurement	✓
Pressure measurement	✓
Display	128 x 128 pixel OLED display rotatable by adjustment (90° rotation) and 4 buttons

14.2 Performance

Measuring range[1]	**Standard measuring range**: 0.5 m/s ... 100 m/s DN08: 1.5 l/min ... 301.6 l/min DN15: 5.3 l/min ... 1060.3 l/min DN20: 9.4 l/min ... 1,884.9 l/min DN25: 14.7 l/min ... 2,945.2 l/min DN40: 37.7 l/min ... 7,539.8 l/min DN50: 58.9 l/min ... 11,780.9 l/min **Extended measuring range:** 100 m/s ... 150 m/s DN08: 301.6 l/min ... 452.4 l/min DN15: 1,060.3 l/min ... 1,590.4 l/min DN20: 1,884.9 l/min ... 2,827.4 l/min DN25: 2,945.2 l/min ... 4,417.9 l/min DN40: 7,539.8 l/min ... 11,309.7 l/min DN50: 11,780.9 l/min ... 17,671.5 l/min
Measuring accuracy (flow rate)[2]	**Standard measuring range DN08, DN15, DN20, DN25:** ± (3% of the measured value + 0.3% of the full scale value (extended measuring range)) **Extended measuring range DN08, DN15, DN20, DN25:** ± (8% of the measured value + 1% of the full scale value (extended measuring range)) **Standard measuring range DN40, DN50:** ± (6% of the measured value + 0.6% of the full scale value (extended measuring range)) **Extended measuring range DN40, DN50:** ± (8% of measured value + 0.8% of the measuring range limit (extended measuring range)
Repeat accuracy (flow rate)[2]	± 1.5% of the measured value

Response time	< 0.3 s
Measuring accuracy (temperature)[3]	± 2 °C
Repeatability (temperature)[3]	± 0.5 °C
Measuring accuracy (pressure)[4]	± 1.5% of the measuring range end value (in the range 10 °C ... 30 °C)
Non-linearity (pressure)[4]	± 0.5% of the measuring range (including temperature drift)
Repeat accuracy (pressure)[4]	± 0.2% of the measuring range
MTTF	> 100 years

1) Reference conditions according to DIN 1343: atmospheric pressure 1.01325 bar abs compressed air temperature 0 °C
2) Reference conditions during measurement:
Media conditions: Air according to ISO 8573-1:2010 [3:4:4] or better; Static pressure = 7 ± 0.2 bar (abs.); Medium temperature 22 ± 3 °C; Straight inlet section > 250xDN; Customer parameterizable mean value filter: 10 seconds
Ambient conditions: Ambient temperature 15 ... 25 °C; Ambient pressure: 1013 mbar
Measured value via digital interface
Warm-up time of the sensor 30 min
Horizontal orientation of the flow direction, flow through the measuring channel in the direction of the arrow (see labeling of the measuring channel), alignment of the sensor so that the flow is from left to right when looking at the display.
3) If flow rate ≥ 10% of the measuring range end value (standard measuring range)
4) Evaluation according to DIN EN 61298-2 best fit straight line

14.3 Electrical connection values industrial version

Supply voltage U_B[1]	17 V DC ... 30 V DC
Power consumption	< 4.5 W at 24 V DC without output load
Power-up time	≤ 10 s
Protection class	III
Connection type	M12 plug x 1.5 - pole, A-coded
Output signals	1x analog output 4 mA ... 20 mA 1x digital/analog output (PNP, NPN, push-pull, 4 mA ... 20 mA/switchable), frequency/pulse output 1 x digital output (PNP, NPN, push-pull switchable), IO-Link
Output load of analog output	4 mA ... 20 mA, max. 500 Ohm
Lower signal level of analog output	3.5 mA ... 3.8 mA
Upper signal level of analog output	20.5 mA ... 21.5 mA
Inaccuracy of analog output	QA pin 2: < 0.5% full-range (20 mA) Q2 pin 5: < 0.5% full-range (20 mA)
Digital output	≤ 100 mA
Signal voltage HIGH	> Uv - 2 V
Signal voltage LOW	≤ 2 V
Inductive load	< 1 H
Capacitive load	< 100 nF (2.5 nF, IO-Link mode)

1) All connections are reverse polarity and overload protected. Q1 and Q2 are short-circuit protected. Use an energy-limited circuit for the voltage supply as per UL61010-1 3. Outp.

14.4 Electrical connection values Ethernet variant

Power consumption	< 5 W

Power-up time	≤ 10 s
Protection class	III
Connection type	1 x M12 round connector, 8-pin, X-coded
Output signal	OPC UA, MQTT, integrated web server
Standard communication	IEEE802.3 Clause 25 (100BaseTx); 100 Mbit/sec
Standard supply	Power over Ethernet according to IEEE802.3af
Performance class	Class 0; according to IEEE802.3af Powered Device < 13 W
Power supply unit	Mode A and Mode B

14.5 Mechanics/Materials

Process connection	DN08: G1/4 (according to DIN EN ISO 228-1) DN15: G1/2 (according to DIN EN ISO 228-1) DN20: G3/4 (according to DIN EN ISO 228-1) DN25: G1 (according to DIN EN ISO 228-1) DN40: R 1 1/2 (according to DIN EN 10226-1) or 1 1/2" NPT DN50: R 2 (according to DIN EN 10226-1) or 2" NPT
Materials in contact with the media	Probe: Stainless steel 1.4305, PA6 Seal: FKM (Viton®) Measurement channel DN08, DN15, DN20, DN25: aluminum Measuring pipe DN40, DN50: Stainless steel 1.4301
Housing material	PC+ABS, PA66+PA6I GF50, PC, TPE, stainless steel 1.4301
Enclosure rating[1)]	IP65 / IP67 (according to IEC 60529)
Weight	DN08: approx. 750 g DN15: approx. 805 g DN20: approx. 755 g DN25: approx. 685 g DN40: approx. 2.3 kg DN50: approx. 2.8 kg

1) Not UL tested

14.6 Ambient conditions

Ambient temperature, operation[1)]	-20 °C ... +60 °C
Ambient temperature, storage	-40 °C ... +85 °C

1) In accordance with UL approval: pollution degree 3 (UL61010-1: 2012-05); humidity: 80% at temperatures up to 31 °C; installation altitude: max. 3,000 m above sea level.

14.7 Dimensional drawings

All dimensions in mm [inch]

14.7.1 FTMg DN08, DN15, DN20, DN25

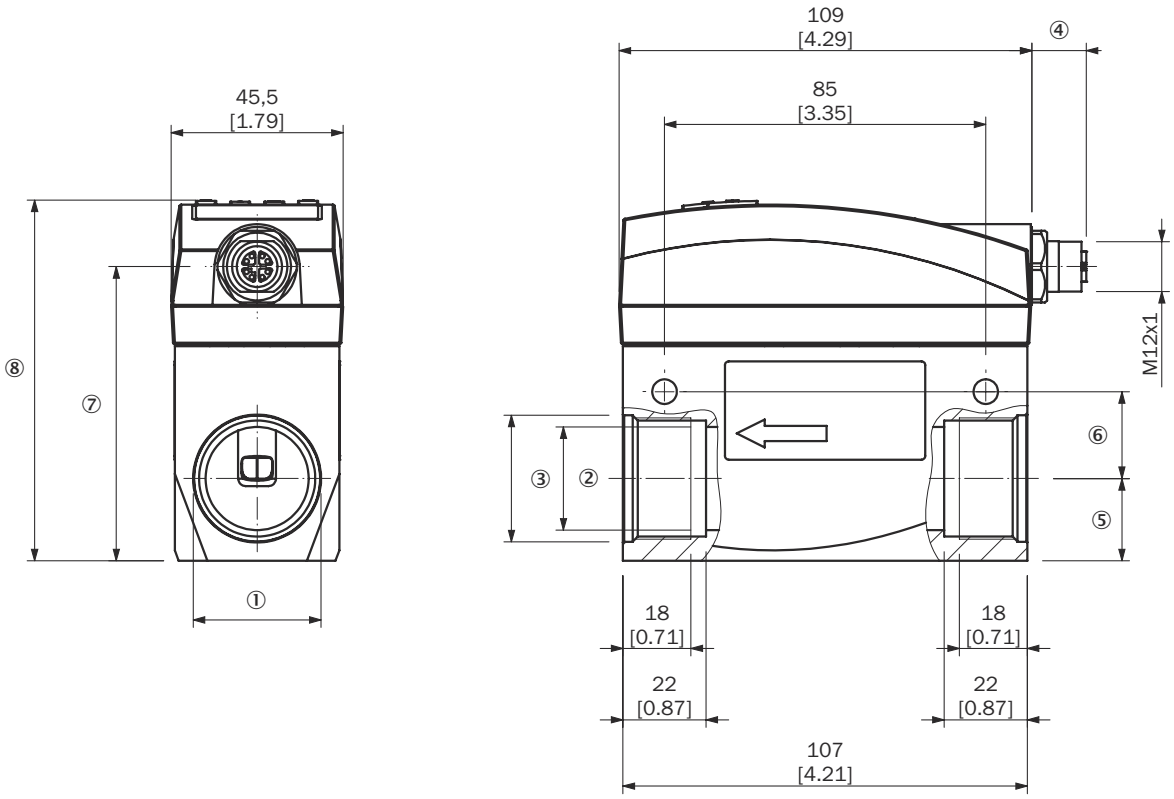


Figure 18: FTMg DN08, DN15, DN20, DN25

Table 7: FTMg DN08, DN15, DN20, DN25

Type	DN	①	②	③	④	⑤	⑥	⑦	⑧
FTMG-ISD08AXX	08	G 1/4	Ø 8.8 [Ø 0.35]	Ø13.5 [Ø 0.53]	8.5 [0.73]	17.5 [0.69]	20.3 [0.80]	70.9 [2.79]	88.5 [3.17]
FTMG-ESD08AXX	08	G 1/4	Ø 8.8 [Ø 0.35]	Ø13.5 [Ø 0.53]	13.4 [0.53]	17.5 [0.69]	20.3 [0.80]	70.9 [2.79]	88.5 [3.17]
FTMG-ISD08AXC	08	G 1/4	Ø 8.8 [Ø 0.35]	Ø13.5 [Ø 0.53]	18.5 [0.73]	17.5 [0.69]	20.3 [0.80]	70.9 [2.79]	88.5 [3.17]
FTMG-ESD08AXC	08	G 1/4	Ø 8.8 [Ø 0.35]	Ø13.5 [Ø 0.53]	13.4 [0.5]	17.5 [0.69]	20.3 [0.80]	70.9 [2.79]	88.5 [3.17]
FTMG-ISD15AXX	15	G 1/2	Ø 16.1 [Ø 0.63]	Ø 20.0 [Ø 0.79]	18.5 [0.73]	21.8 [0.86]	23.0 [0.91]	77.9 [3.06]	95.5 [3.75]
FTMG-ESD15AXX	15	G 1/2	Ø 16.1 [Ø 0.63]	Ø 20.0 [Ø 0.79]	13.4 [0.53]	21.8 [0.86]	23.0 [0.91]	77.9 [3.06]	95.5 [3.75]
FTMG-ISD15AXC	15	G 1/2	Ø 16.1 [Ø 0.63]	Ø 20.0 [Ø 0.79]	18.5 [0.73]	21.8 [0.86]	23.0 [0.91]	77.9 [3.06]	95.5 [3.75]
FTMG-ESD15AXC	15	G 1/2	Ø 16.1 [Ø 0.63]	Ø 20.0 [Ø 0.79]	13.4 [0.53]	21.8 [0.86]	23.0 [0.91]	77.9 [3.06]	95.5 [3.75]
FTMG-ISD20AXX	20	G 3/4	Ø 21.7 [Ø 0.85]	Ø 27.5 [Ø 1.08]	18.5 [0.73]	21.8 [0.86]	23.0 [0.91]	77.9 [3.06]	95.5 [3.75]
FTMG-ESD20AXX	20	G 3/4	Ø 21.7 [Ø 0.85]	Ø 27.5 [Ø 1.08]	13.4 [0.53]	21.8 [0.86]	23.0 [0.91]	77.9 [3.06]	95.5 [3.75]
FTMG-ISD20AXC	20	G 3/4	Ø 21.7 [Ø 0.85]	Ø 27.5 [Ø 1.08]	18.5 [0.73]	21.8 [0.86]	23.0 [0.91]	77.9 [3.06]	95.5 [3.75]

Type	DN	①	②	③	④	⑤	⑥	⑦	⑧
FTMG-ISD20AXC	20	G 3/4	Ø 21.7 [Ø 0.85]	Ø 27.5 [Ø 1.08]	13.4 [0.53]	21.8 [0.86]	23.0 [0.91]	77.9 [3.06]	95.5 [3.75]
FTMG-ISD25AXX	25	G 1	Ø 27.3 [Ø 1.07]	Ø 33.5 [Ø 1.32]	18.5 [0.73]	21.8 [0.86]	23.0 [0.91]	77.9 [3.06]	95.5 [3.75]
FTMG-ESD25AXX	25	G 1	Ø 27.3 [Ø 1.07]	Ø 33.5 [Ø 1.32]	13.4 [0.53]	21.8 [0.86]	23.0 [0.91]	77.9 [3.06]	95.5 [3.75]
FTMG-ISD25AXC	25	G 1	Ø 27.3 [Ø 1.07]	Ø 33.5 [Ø 1.32]	18.5 [0.73]	21.8 [0.86]	23.0 [0.91]	77.9 [3.06]	95.5 [3.75]
FTMG-ESD25AXC	25	G 1	Ø 27.3 [Ø 1.07]	Ø 33.5 [Ø 1.32]	13.4 [0.53]	21.8 [0.86]	23.0 [0.91]	77.9 [3.06]	95.5 [3.75]

14.7.2 FTMg DN40, DN50

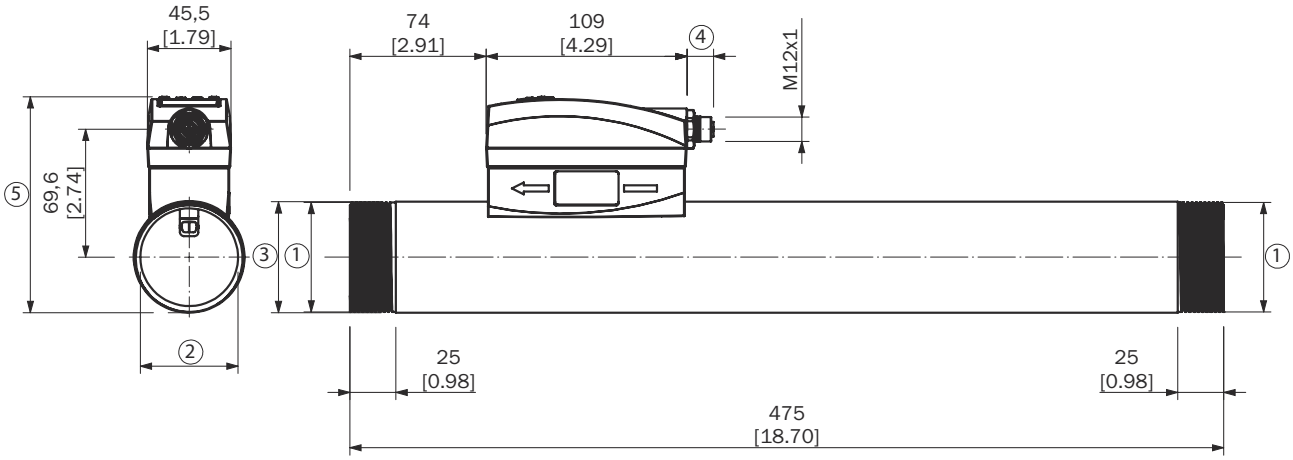


Figure 19: FTMg DN40, DN50

Type	DN	①	②	③	④	⑤
FTMG-ISR40SXX	40	R 1 1/2	Ø 41.1 [Ø 1.62]	Ø 48.3 [Ø 1.90]	18.5 [0.73]	105.1 [4.14]
FTMG-ESR40SXX	40	R 1 1/2	Ø 41.1 [Ø 1.62]	Ø 48.3 [Ø 1.90]	13.4 [0.53]	105.1 [4.14]
FTMG-ISN40SXX	40	1 1/2" NPT	Ø 41.1 [Ø 1.62]	Ø 48.3 [Ø 1.90]	18.5 [0.73]	105.1 [4.14]
FTMG-ESN40SXX	40	1 1/2" NPT	Ø 41.1 [Ø 1.62]	Ø 48.3 [Ø 1.90]	13.4 [0.53]	105.1 [4.14]
FTMG-ISR50SXX	50	R 2	Ø 54.1 [Ø 2.13]	Ø 60.3 [Ø 2.37]	18.5 [0.73]	117.1 [4.61]
FTMG-ESR50SXX	50	R 2	Ø 54.1 [Ø 2.13]	Ø 60.3 [Ø 2.37]	13.4 [0.53]	117.1 [4.61]
FTMG-ISN50SXX	50	2" NPT	Ø 54.1 [Ø 2.13]	Ø 60.3 [Ø 2.37]	18.5 [0.73]	117.1 [4.61]
FTMG-ESN50SXX	50	2" NPT	Ø 54.1 [Ø 2.13]	Ø 60.3 [Ø 2.37]	13.4 [0.53]	117.1 [4.61]

14.7.3 Accessories for inlet and outlet zones, FTMg DN08, DN15, DN20, DN25

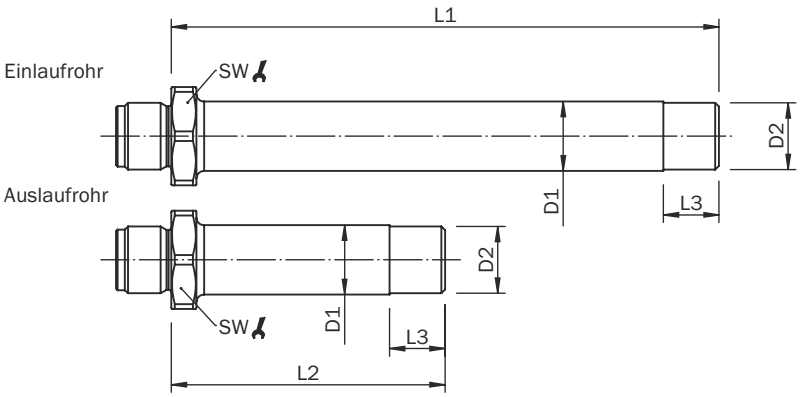


Figure 20: Accessories for flow conditioning pipes DN08, DN15, DN20, DN25

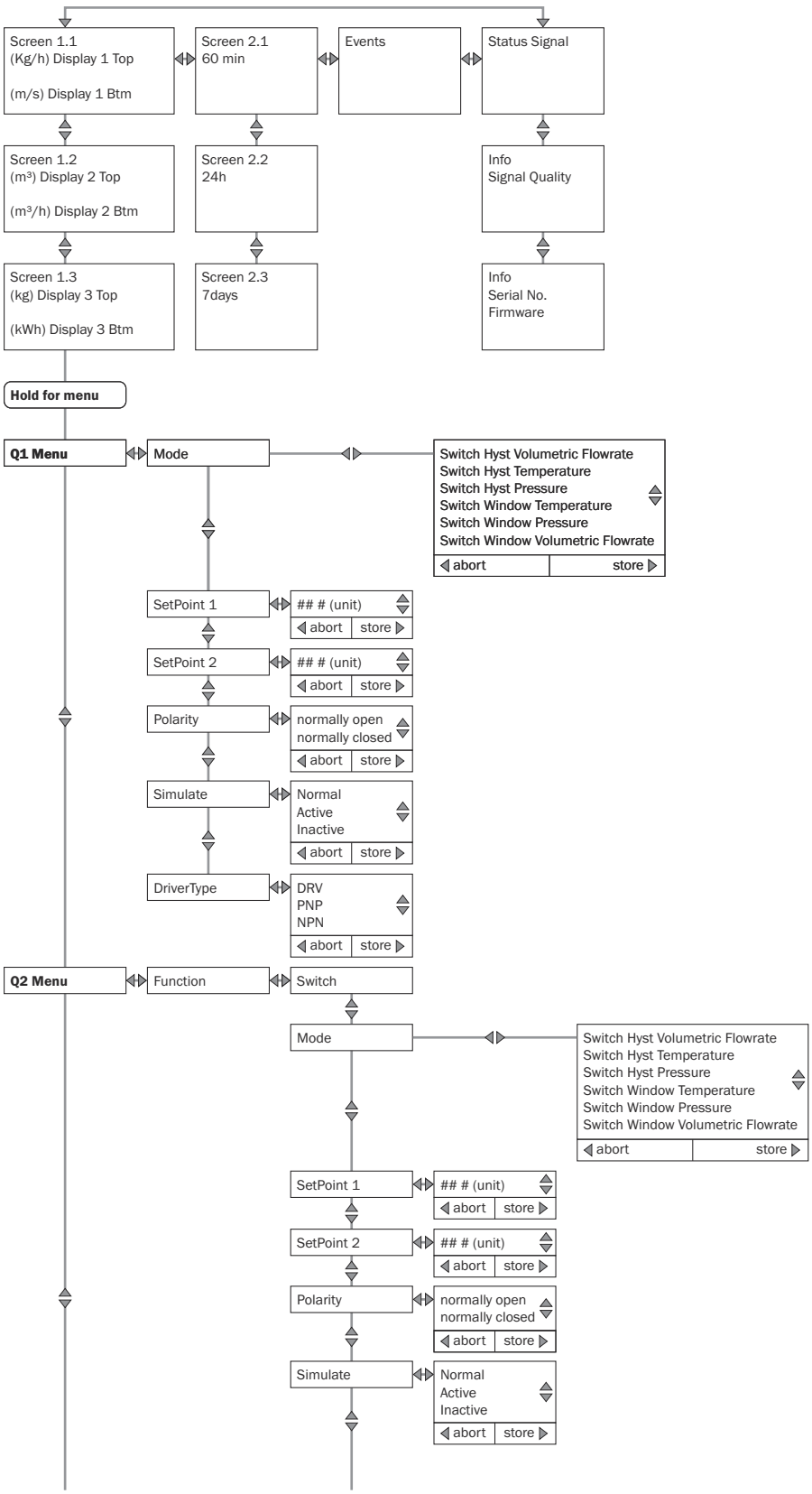
Type	L1	L2	L3	D1	D2	Width across flats
BEF-EL-R14D08-FTMG	110.0 [4.33]	44.0 [1.73]	19.5 [0.77]	Ø 14.0 [Ø 0.55]	R 1/4	24
BEF-EL-N14D08-FTMG	110.0 [4.33]	44.0 [1.73]	13.2 [0.52]	Ø 14.0 [Ø 0.55]	1/4" NPT	24
BEF-EL-R12D15-FTMG	161.0 [6.34]	80.5 [3.17]	20.0 [0.79]	Ø 22.2 [Ø 0.87]	R 1/2	32
BEF-EL-N12D15-FTMG	161.0 [6.34]	80.5 [3.17]	24.1 [0.95]	Ø 22.2 [Ø 0.87]	1/2" NPT	32
BEF-EL-R34D20-FTMG	217.0 [8.54]	108.5 [4.27]	20.0 [0.79]	Ø 27.5 [Ø 1.08]	R 3/4	39
BEF-EL-N34D20-FTMG	217.0 [8.54]	108.5 [4.27]	24.1 [0.95]	Ø 27.5 [Ø 1.08]	3/4" NPT	39
BEF-EL-R10D25-FTMG	273.0 [10.75]	136.5 [5.37]	20.0 [0.79]	Ø 34.0 [Ø 1.34]	R 1	48
BEF-EL-N10D25-FTMG	273.0 [10.75]	136.5 [5.37]	24.1 [0.95]	Ø 34.0 [Ø 1.34]	1" NPT	48

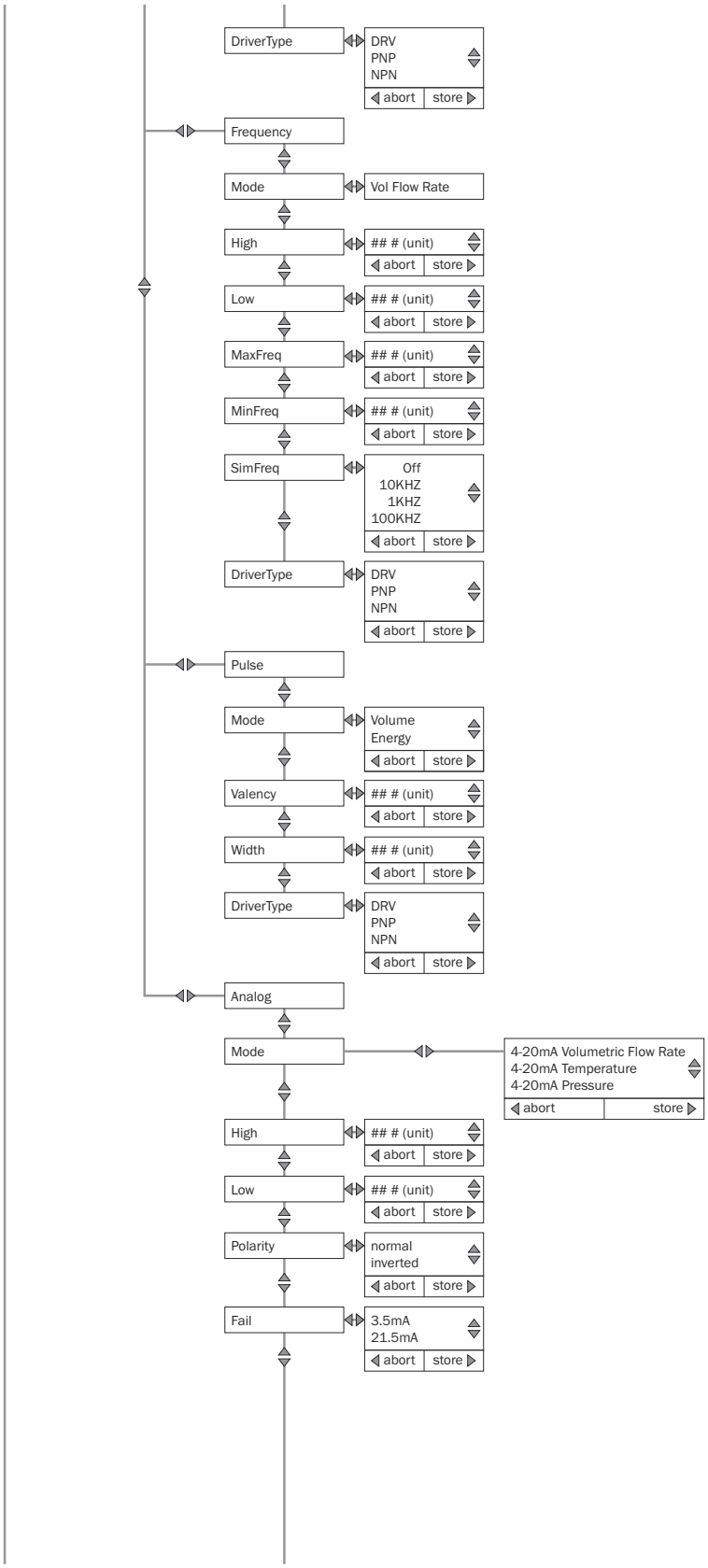
15 Accessories

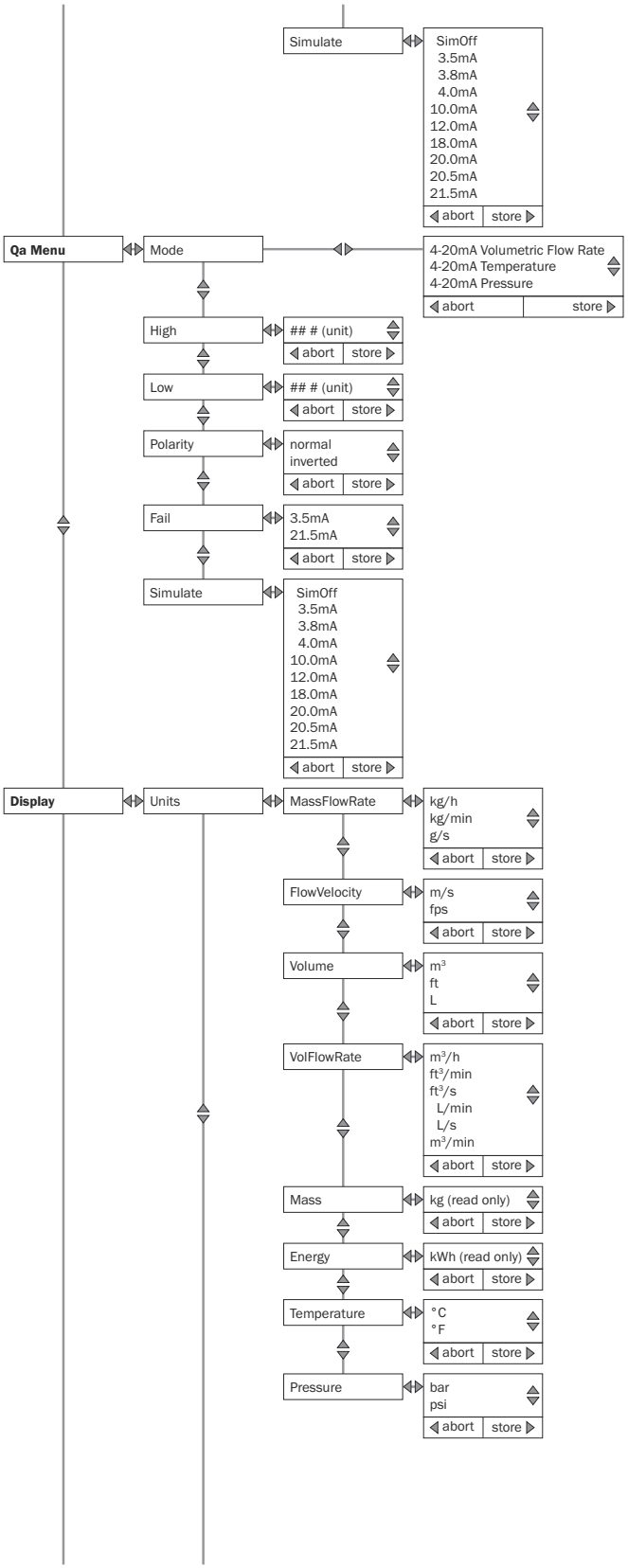
You can find accessories online at www.sick.com/FTMg.

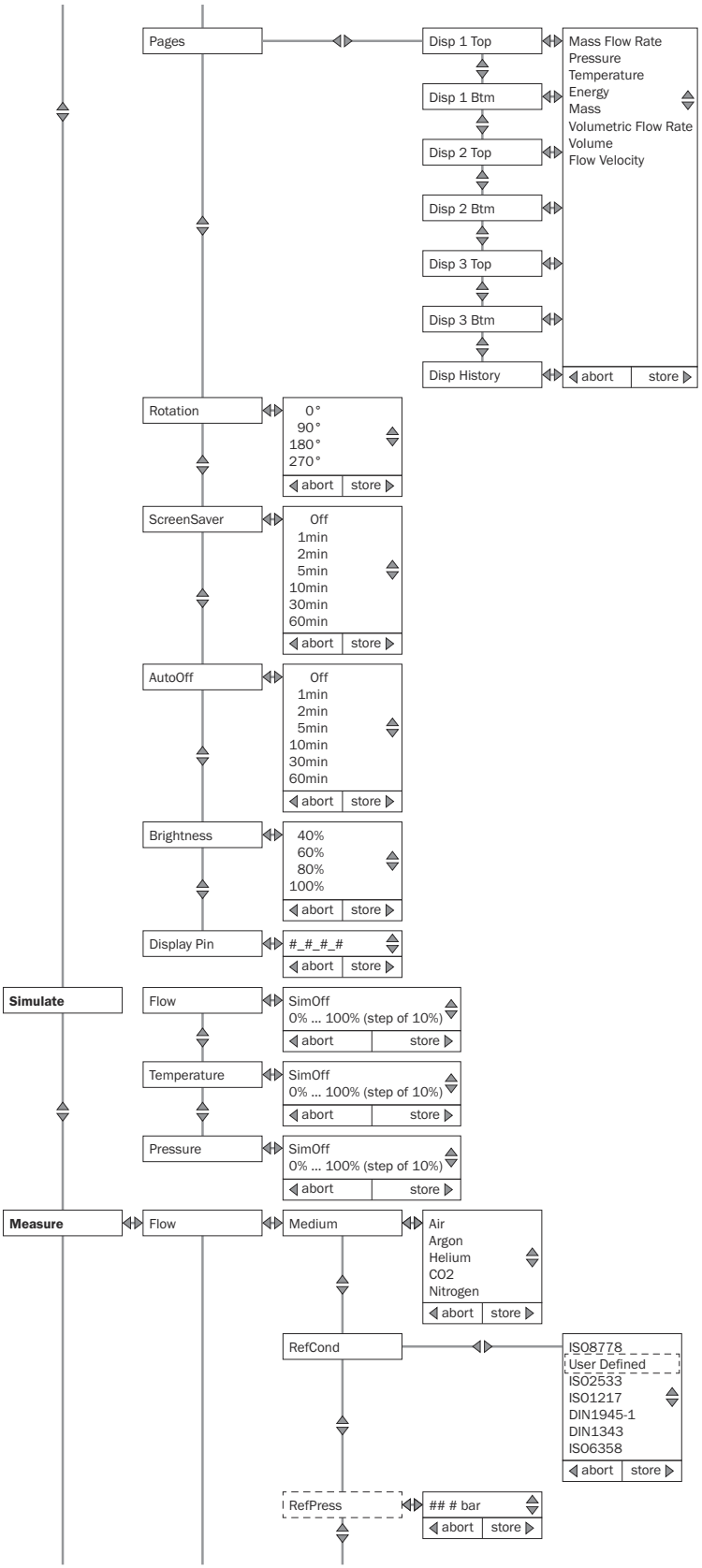
16 Menu overview

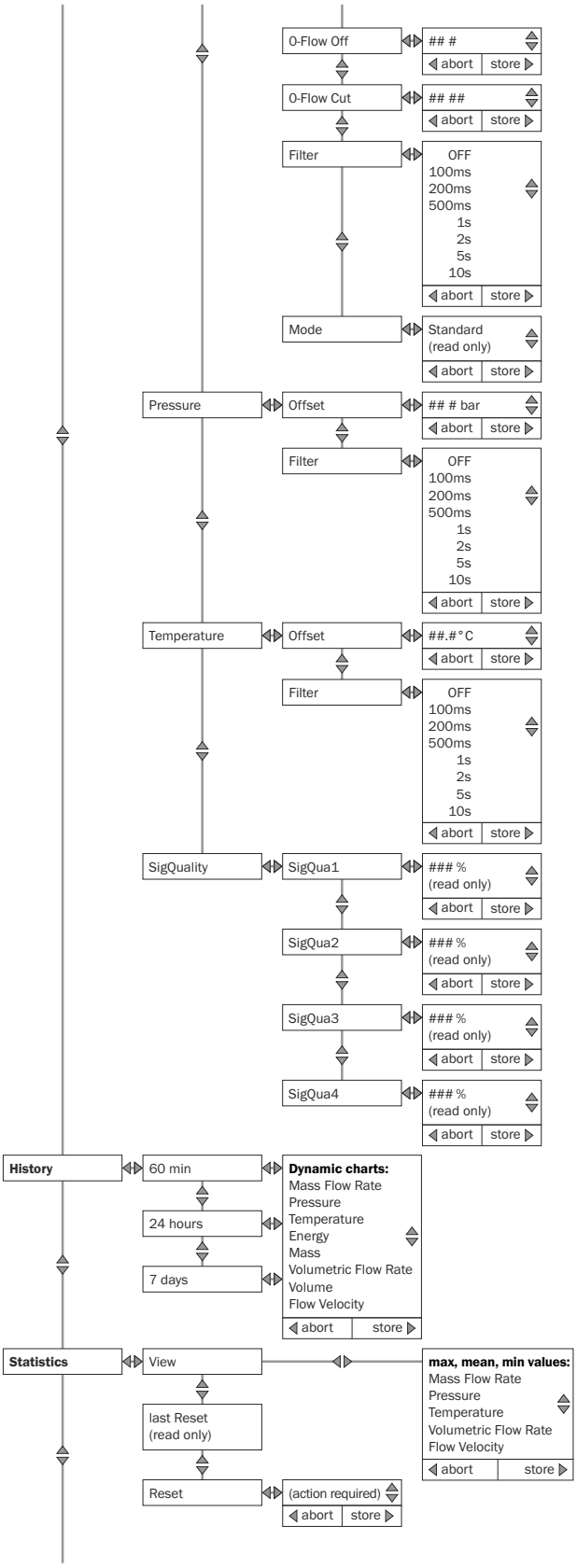
16.1 Industrial variants

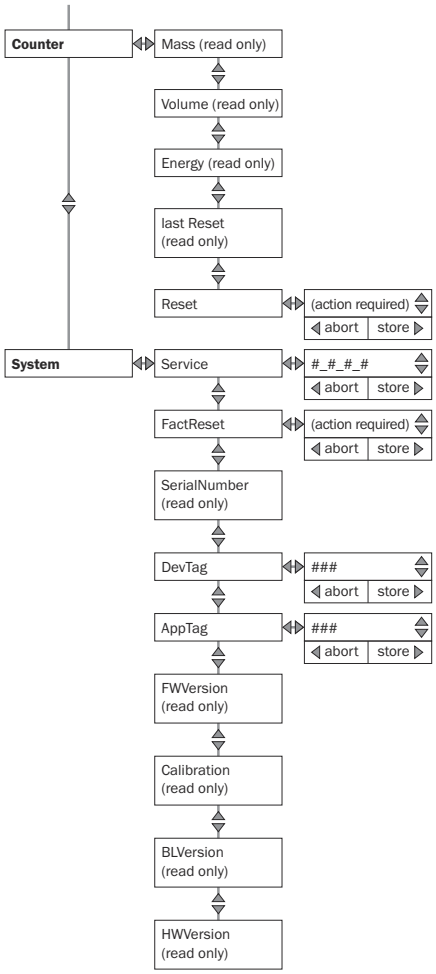



DriverType
DRV
PNP
NPN
abort
store
Frequency
Mode
Vol Flow Rate
High
(unit)
Low
MaxFreq
MinFreq
SimFreq
Off
10KHZ
1KHZ
100KHZ
DriverType
Pulse
Mode
Volume
Energy
Valency
Width
DriverType
Analog
Mode
4-20mA Volumetric Flow Rate
4-20mA Temperature
4-20mA Pressure
High
Low
Polarity
normal
inverted
Fail
3.5mA
21.5mA

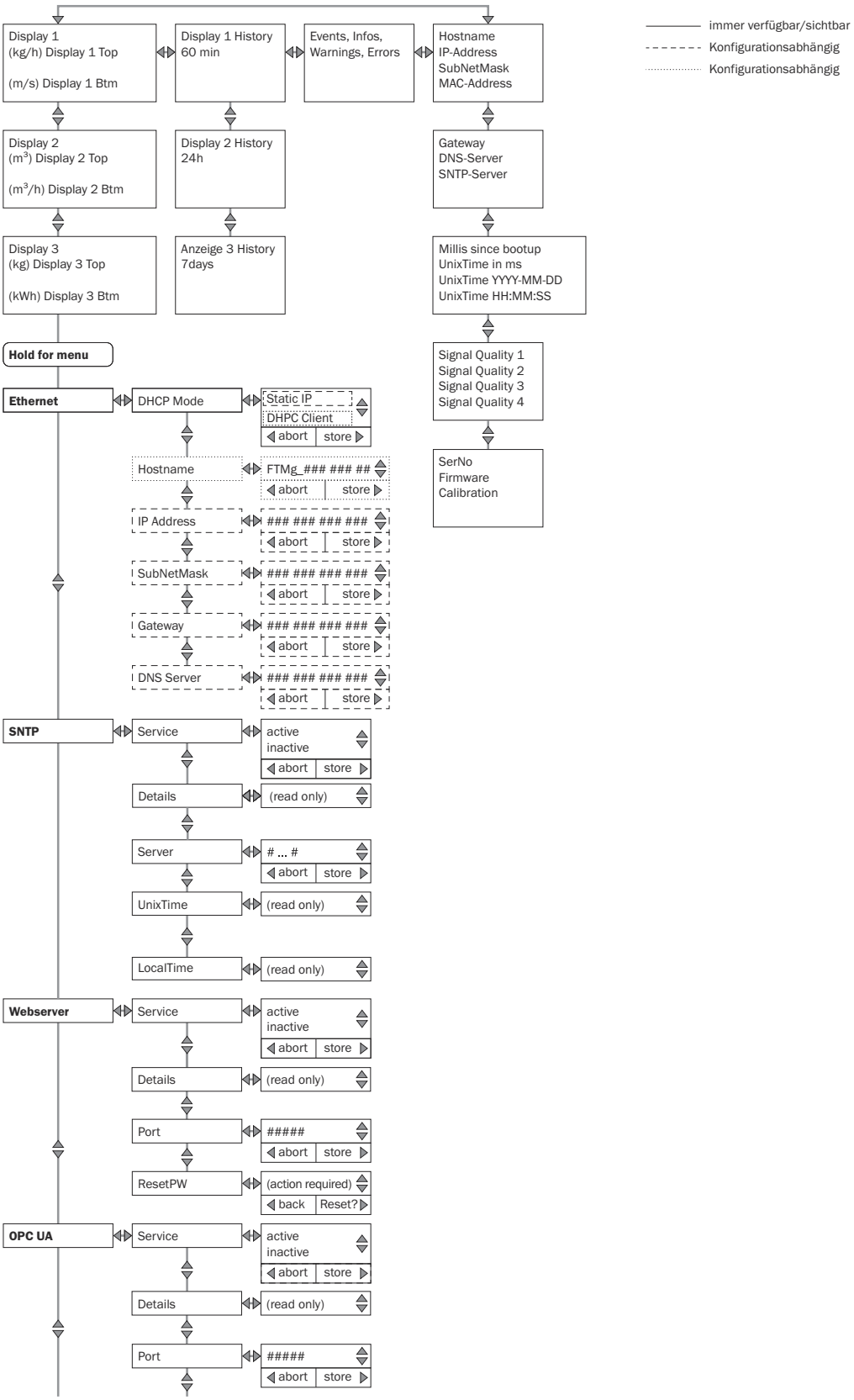

Simulate
SimOff
3.5mA
3.8mA
4.0mA
10.0mA
12.0mA
18.0mA
20.0mA
20.5mA
21.5mA
abort
store
Qa Menu
Mode
4-20mA Volumetric Flow Rate
4-20mA Temperature
4-20mA Pressure
abort
store
High
(unit)
abort
store
Low
(unit)
abort
store
Polarity
normal
inverted
abort
store
Fail
3.5mA
21.5mA
abort
store
Simulate
SimOff
3.5mA
3.8mA
4.0mA
10.0mA
12.0mA
18.0mA
20.0mA
20.5mA
21.5mA
abort
store
Display
Units
MassFlowRate
kg/h
kg/min
g/s
abort
store
FlowVelocity
m/s
fps
abort
store
Volume
m³
ft
L
abort
store
VolFlowRate
m³/h
ft³/min
ft³/s
L/min
L/s
m³/min
abort
store
Mass
kg (read only)
abort
store
Energy
kWh (read only)
abort
store
Temperature
°C
°F
abort
store
Pressure
bar
psi
abort
store

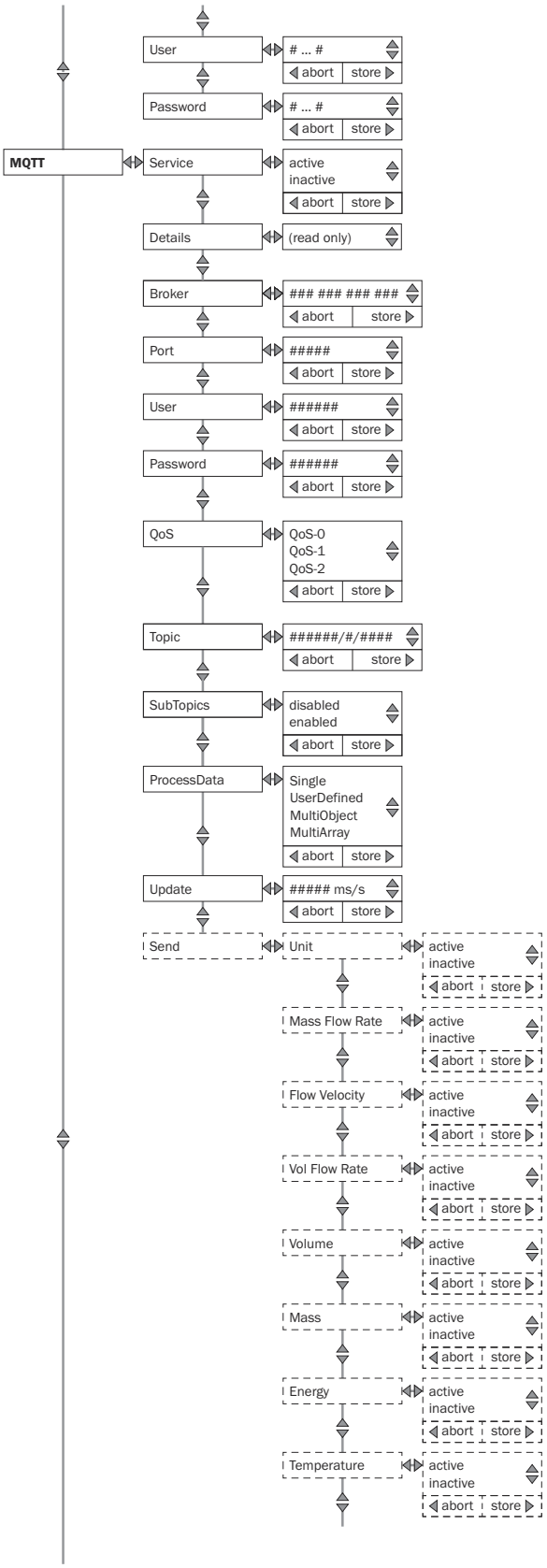

Pages
Disp 1 Top
Disp 1 Btm
Disp 2 Top
Disp 2 Btm
Disp 3 Top
Disp 3 Btm
Disp History
Mass Flow Rate
Pressure
Temperature
Energy
Mass
Volumetric Flow Rate
Volume
Flow Velocity
abort
store
Rotation
0°
90°
180°
270°
ScreenSaver
Off
1min
2min
5min
10min
30min
60min
AutoOff
Brightness
40%
60%
80%
100%
Display Pin
#_#_#_#
Simulate
Flow
SimOff
0% ... 100% (step of 10%)
Temperature
Pressure
Measure
Medium
Air
Argon
Helium
CO2
Nitrogen
RefCond
ISO8778
User Defined
ISO2533
ISO1217
DIN1945-1
DIN1343
ISO6358
RefPress
bar

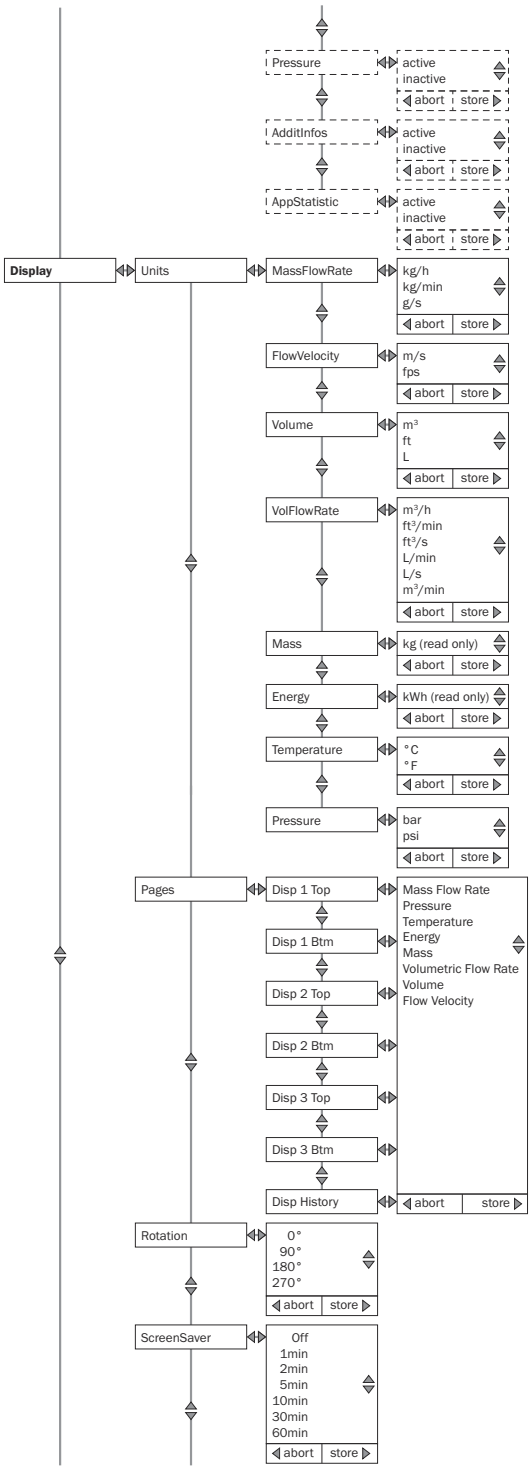

0-Flow Off
#
abort
store
0-Flow Cut
##
abort
store
Filter
OFF
100ms
200ms
500ms
1s
2s
5s
10s
abort
store
Mode
Standard
(read only)
abort
store
Pressure
Offset
bar
abort
store
Filter
OFF
100ms
200ms
500ms
1s
2s
5s
10s
abort
store
Temperature
Offset
##.#°C
abort
store
Filter
OFF
100ms
200ms
500ms
1s
2s
5s
10s
abort
store
SigQuality
SigQua1
%
(read only)
abort
store
SigQua2
%
(read only)
abort
store
SigQua3
%
(read only)
abort
store
SigQua4
%
(read only)
abort
store
History
60 min
24 hours
7 days
Dynamic charts:
Mass Flow Rate
Pressure
Temperature
Energy
Mass
Volumetric Flow Rate
Volume
Flow Velocity
abort
store
Statistics
View
last Reset
(read only)
Reset
max, mean, min values:
Mass Flow Rate
Pressure
Temperature
Volumetric Flow Rate
Flow Velocity
abort
store
(action required)
abort
store

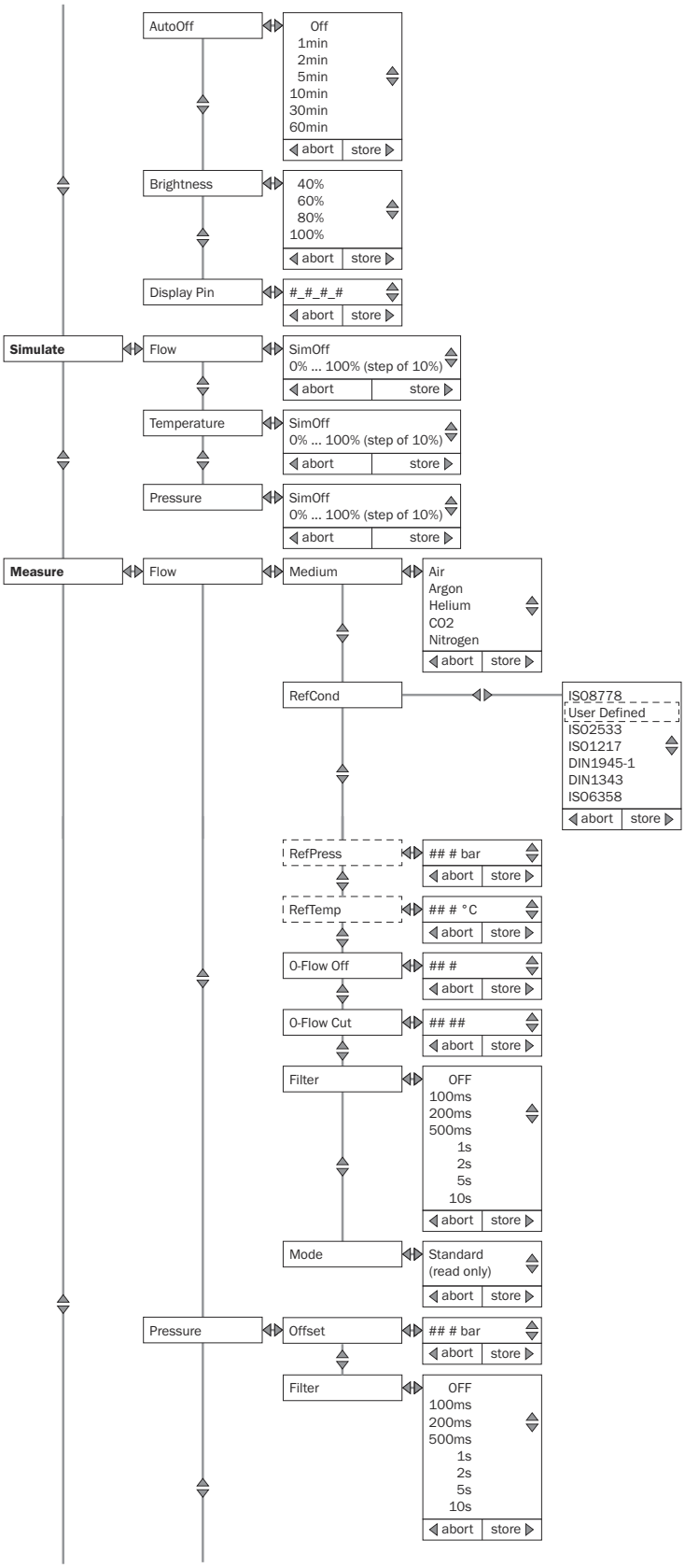

Counter
Mass (read only)
Volume (read only)
Energy (read only)
last Reset
(read only)
Reset
(action required)
abort
store
System
Service
#_#_#_#
abort
store
FactReset
(action required)
abort
store
SerialNumber
(read only)
DevTag
###
abort
store
AppTag
###
abort
store
FWVersion
(read only)
Calibration
(read only)
BLVersion
(read only)
HWVersion
(read only)

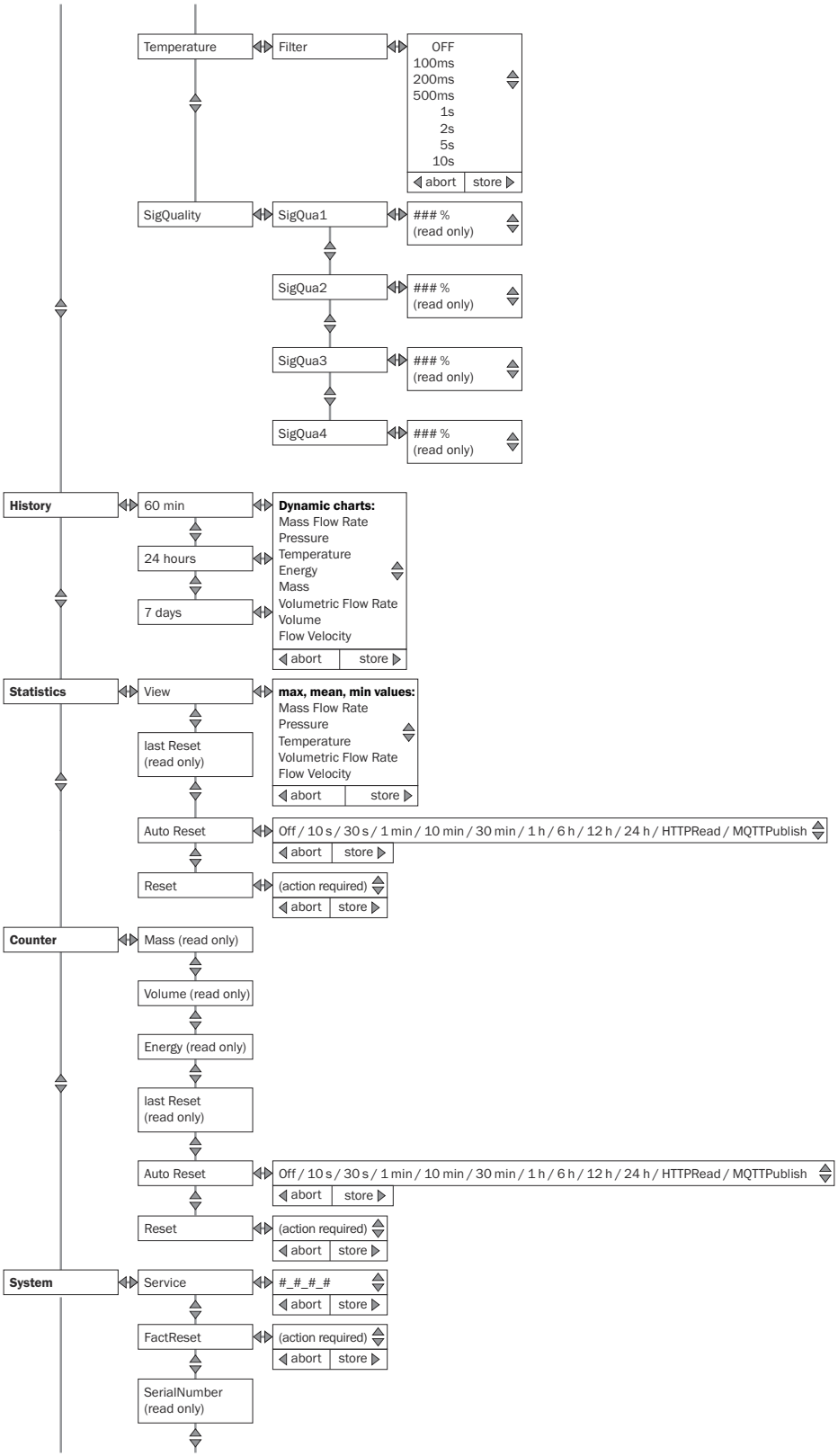
16.2 Ethernet variant

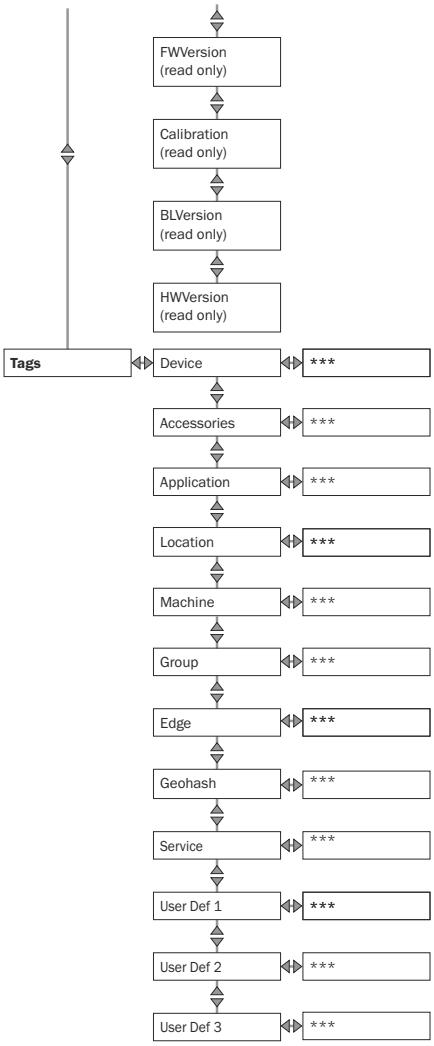



MQTT
User
...
abort
store
Password
...
abort
store
Service
active
inactive
abort
store
Details
(read only)
Broker
###
abort
store
Port
#####
abort
store
User
######
abort
store
Password
######
abort
store
QoS
QoS-0
QoS-1
QoS-2
abort
store
Topic
######/#/####
abort
store
SubTopics
disabled
enabled
abort
store
ProcessData
Single
UserDefined
MultiObject
MultiArray
abort
store
Update
ms/s
abort
store
Send
Unit
Mass Flow Rate
Flow Velocity
Vol Flow Rate
Volume
Mass
Energy
Temperature
active
inactive
abort
store


Pressure
active
inactive
abort
store
AdditInfos
active
inactive
abort
store
AppStatistic
active
inactive
abort
store
Display
Units
MassFlowRate
kg/h
kg/min
g/s
abort
store
FlowVelocity
m/s
fps
abort
store
Volume
m³
ft
L
abort
store
VolFlowRate
m³/h
ft³/min
ft³/s
L/min
L/s
m³/min
abort
store
Mass
kg (read only)
abort
store
Energy
kWh (read only)
abort
store
Temperature
°C
°F
abort
store
Pressure
bar
psi
abort
store
Pages
Disp 1 Top
Disp 1 Btm
Disp 2 Top
Disp 2 Btm
Disp 3 Top
Disp 3 Btm
Disp History
Mass Flow Rate
Pressure
Temperature
Energy
Mass
Volumetric Flow Rate
Volume
Flow Velocity
abort
store
Rotation
0°
90°
180°
270°
abort
store
ScreenSaver
Off
1min
2min
5min
10min
30min
60min
abort
store


AutoOff
Off
1min
2min
5min
10min
30min
60min
abort
store
Brightness
40%
60%
80%
100%
abort
store
Display Pin
#_#_#_#
abort
store
Simulate
Flow
SimOff
0% ... 100% (step of 10%)
abort
store
Temperature
SimOff
0% ... 100% (step of 10%)
abort
store
Pressure
SimOff
0% ... 100% (step of 10%)
abort
store
Measure
Flow
Medium
Air
Argon
Helium
CO2
Nitrogen
abort
store
RefCond
ISO8778
User Defined
ISO2533
ISO1217
DIN1945-1
DIN1343
ISO6358
abort
store
RefPress
bar
abort
store
RefTemp
°C
abort
store
0-Flow Off
#
abort
store
0-Flow Cut
##
abort
store
Filter
OFF
100ms
200ms
500ms
1s
2s
5s
10s
abort
store
Mode
Standard
(read only)
abort
store
Pressure
Offset
bar
abort
store
Filter
OFF
100ms
200ms
500ms
1s
2s
5s
10s
abort
store


Temperature
Filter
OFF
100ms
200ms
500ms
1s
2s
5s
10s
abort
store
SigQuality
SigQua1
%
(read only)
SigQua2
%
(read only)
SigQua3
%
(read only)
SigQua4
%
(read only)
History
60 min
24 hours
7 days
Dynamic charts:
Mass Flow Rate
Pressure
Temperature
Energy
Mass
Volumetric Flow Rate
Volume
Flow Velocity
abort
store
Statistics
View
last Reset
(read only)
max, mean, min values:
Mass Flow Rate
Pressure
Temperature
Volumetric Flow Rate
Flow Velocity
abort
store
Auto Reset
Off / 10 s / 30 s / 1 min / 10 min / 30 min / 1 h / 6 h / 12 h / 24 h / HTTPRead / MQTTPublish
abort
store
Reset
(action required)
abort
store
Counter
Mass (read only)
Volume (read only)
Energy (read only)
last Reset
(read only)
Auto Reset
Off / 10 s / 30 s / 1 min / 10 min / 30 min / 1 h / 6 h / 12 h / 24 h / HTTPRead / MQTTPublish
abort
store
Reset
(action required)
abort
store
System
Service
#_#_#_#
abort
store
FactReset
(action required)
abort
store
SerialNumber
(read only)


FWVersion
(read only)
Calibration
(read only)
BLVersion
(read only)
HWVersion
(read only)
Tags
Device
***
Accessories
***
Application
***
Location
***
Machine
***
Group
***
Edge
***
Geohash
***
Service
***
User Def 1
***
User Def 2
***
User Def 3
***

17 Annex

17.1 Conformities and certificates

You can obtain declarations of conformity, certificates, and the current operating instructions for the product at www.sick.com. To do so, enter the product part number in the search field (part number: see the entry in the “P/N” or “Ident. no.” field on the type label).

8024344.1RVW/2025-04-22/en

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E-Mail sick@sick.dk

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E-Mail info@sick.fr

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E-Mail support@sick.jp

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E-Mail mexico@sick.com

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E-Mail info@sick.se

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E-Mail contact@sick.ch

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E-Mail sales.gsg@sick.com

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