

FTMg

Thermal gas flow sensor

SICK
Sensor Intelligence.

en



Product described

FTMg

Manufacturer

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Original document

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1 About this document

1.1 About these operating instructions

These operating instructions provide important information on how to use sensors from SICK AG.

Prerequisites for safe work are:

- Compliance with all safety notes and handling instructions supplied
- Compliance with local work safety regulations and general safety regulations for sensor applications.

The operating instructions are intended to be used by qualified personnel and electrical specialists.

**Note:**

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

The instructions constitute an integral part of the product and are to be stored in the immediate vicinity of the device so they remain accessible to staff at all times. Should the device be passed on to a third party, these operating instructions should be handed over with it.

These operating instructions do not provide information on operating any system in which the sensor may be integrated. For information about this, refer to the operating instructions of the particular system.

1.2 Scope

These operating instructions explain how to incorporate a sensor into a customer system.

Step-by-step instructions are given for all required actions.

These instructions apply to all available device variants of the sensor. For more detailed information on identifying your device type, see “3.1.2 Type code”.

Available device variants are listed on the online product page:

➤ www.sick.com

A number of device variants are used as examples for commissioning, based on the default parameter settings for the relevant device.

In the following, the sensor is referred to in simplified form as FTMg (Flow Thermal Meter for Gases), except in cases where it is necessary to make a distinction between device variants due to different technical features or functions. In such cases, the complete type designation is used.

1.3 Explanation of symbols

Warnings and important information in this document are labeled with symbols. The warnings are introduced by signal words that indicate the extent of the danger. These warnings must be observed at all times and care must be taken to avoid accidents, personal injury, and material damage.

**HAZARD**

... indicates a situation of imminent danger, which will lead to a fatality or serious injuries if not prevented.



WARNING

... indicates a potentially dangerous situation, which may lead to a fatality or serious injuries if not prevented.



CAUTION

... indicates a potentially dangerous situation, which may lead to minor/slight injuries if not prevented.



IMPORTANT

... indicates a potentially harmful situation, which may lead to material damage if not prevented.



NOTE

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

1.4 Further information



NOTE

All the documentation available for the sensor can be found on the online product page at:

www.sick.com

The following information is available for download from this page:

- Model-specific online data sheets for device variants, containing technical data, dimensional drawings, and diagrams
 - EU declaration of conformity for the product family
 - Dimensional drawings and 3D CAD dimension models in various electronic formats
 - These operating instructions, available in English and German, and in other languages if necessary
 - Other publications related to the sensors described here (e.g., IO-Link)
 - Publications dealing with accessories
-

1.5 Customer service

If you require any technical information, our customer service department will be happy to help. To find your agency, see the final page of this document.



NOTE

Before calling, make a note of all sensor data such as type code, serial number, etc., to ensure faster processing.

2 Safety information

2.1 Intended use

The **FTMg** (**F**low **T**hermal **M**eter for **g**ases) measures the flow, pressure, and temperature and provides the following measured values:

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

The measurement principle is based on the calorimetric principle.

FTMg fulfils the requirements of EN 61326-2-3 for industrial applications.

2.2 Inappropriate use

FTMg is not a safety component as per the Machinery Directive (2006/42/EC). The sensor must not be used in explosion-hazardous locations. Do not open the housing of the FTMg.

Any use outside of the stated areas, in particular use outside of the technical specifications and the requirements for intended use, will be deemed to be incorrect use.

If the sensor is to be used under other conditions or in different environments, the manufacturer's service department may issue an operating license in consultation with the customer and in exceptional cases.

2.3 Limitation of liability

Applicable standards and regulations, the latest technological developments, and our many years of knowledge and experience have all been taken into account when assembling the data and information contained in these operating instructions. The manufacturer accepts no liability for damage caused by:

- Failing to observe the operating instructions
- Improper use
- Use by untrained personnel
- Unauthorized conversions
- Technical modifications
- Use of unauthorized spare parts, consumables, 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.

2.4 Modifications and conversions



IMPORTANT

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 to opening the housing, even as part of mounting and electrical installation work.

Before making technical modifications to or expanding the sensor, the prior written approval of the manufacturer must be obtained.

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.

2.5 Requirements for skilled persons and operating personnel



WARNING

Risk of injury due to insufficient training!

Improper handling of the sensor may result in considerable personal injury and material damage.

- All work must only ever be carried out by the stipulated persons.

The operating instructions state the following qualification requirements for the various areas of work:

- Instructed personnel have been briefed by the operating entity about the tasks assigned to them and about potential dangers arising from improper action.
- Skilled personnel have the specialist training, skills, and experience, as well as knowledge of the relevant regulations, to be able to perform tasks assigned to them and to detect and avoid any potential dangers independently.
- Electricians have the specialist training, skills, and experience, as well as knowledge of the relevant standards and provisions, to be able to carry out work on electrical systems and to detect and avoid any potential dangers independently. In Germany, electricians must meet the specifications of the BGV A3 Work Safety Regulations (e.g., Master Electrician). Other relevant regulations applicable in other countries must be observed.

The following qualifications are required for various activities:

Activities	Qualification
Mounting, maintenance	<ul style="list-style-type: none"> • Basic practical technical training • Knowledge of the current safety regulations in the workplace
Electrical installation, device replacement	<ul style="list-style-type: none"> • Practical electrical training • Knowledge of current electrical safety regulations • Knowledge of the operation and control of the devices in their particular application
Commissioning, configuration	<ul style="list-style-type: none"> • Basic knowledge of the control system used • Basic knowledge of the design and setup of the described connections and interfaces • Basic knowledge of data transmission

Activities	Qualification
Operation of the device for the specific application	<ul style="list-style-type: none"> • Knowledge of the operation and control of the devices in their particular application • Knowledge of the software and hardware environment for the particular application concerned

2.6 Operational safety and specific hazards

Please observe the safety notes and the warnings listed here and in other chapters of these operating instructions to reduce the possibility of risks to health and avoid dangerous situations.

2.7 General safety notes

- Read the operating instructions prior to commissioning.
- Observe national safety and work safety regulations.
 - These operating instructions are valid for devices from firmware version 1.00.
 - The FTMg is not a safety component under the EU Machinery Directive.
 - Wiring work and the opening and closing of electrical connections may only be carried out when the power is switched off.
 - The FTMg must be installed in the cable system as described in [“Mounting, maintenance”](#).

2.8 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.

3 Product description

3.1 Product identification

3.1.1 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.

3.1.2 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 D15: G1/2 ISO 228-1 ø16.1 D20: G3/4 ISO 228-1 ø21.7 D25: G1 ISO 228-1 ø27.3
5	Measuring channel A: Aluminum
6	Installation X: Stand alone
7	Additional options X: Without

3.2 Product characteristics

3.2.1 Device view

The FTMg is available in two versions:

- Industry version
- Ethernet version



Fig. 1: FTMg overview

- ① Industry version, M12 x 1, 5-pin, A-coded
- ② Ethernet version, M12 x 1, 8-pin, X-coded
- ③ Display
- ④ Housing
- ⑤ Operating pushbuttons

3.2.2 Operating buttons

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



Note:

The industry version can be parameterized via SICK SOPAS ET, among others.

The Ethernet version has its own web server and can also be parameterized with an Internet browser.

The sensor can also be parameterized via OPC UA.

3.3 Product features and functions

3.3.1 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 industry version, the sensor has three configurable outputs Qa, Q1, and Q2 for flow, pressure, or temperature.

The switching output (Q1) also features an IO-Link interface.

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

3.3.2 Fields of application

The FTMg is mainly suited for:

- Measuring compressed air as well as argon (Ar), helium (He), carbon dioxide (CO₂), nitrogen (N₂)
- Controlling the energy consumption of compressed air on machines and in pressure distribution
- Monitoring leaks in compressed air lines on machines
- Measuring inert gases when packaging foodstuffs

4 Transport and storage

4.1 Transport

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



IMPORTANT

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 Goods-in, 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: "14 Technical data"
- 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

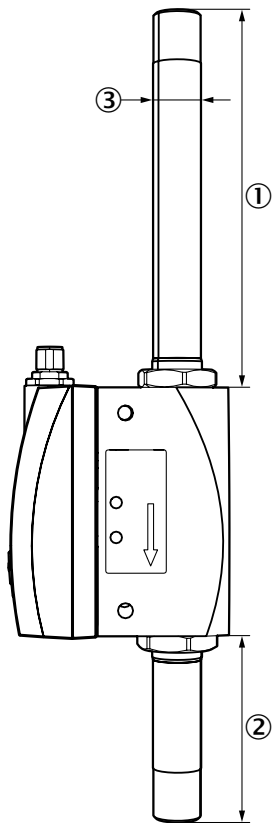
When mounting/removing the sensor, the measurement gas line must be depressurized.

- Keep the mounting location easily accessible and free of vibrations.
- Ensure a minimum space of 150 mm to the FTMg.
- Observe the ambient temperature (“14 Technical data”).
- 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.

5.2 Installation direction

Correct measurement is relevant for the measurement accuracy of the FTMg. Observe the flow direction of the measuring medium.

- Place the FTMg as far as possible away from flow disturbances (for example, different pipe diameters, curves, T-connectors, valves, or pushers). Mount the FTMg upstream of valves or pushers.
- Observe the prescribed length of the inlet and outlet zones (see accessories – inlet and outlet pipes).
- Select longer inlet zones for gases with lower densities.



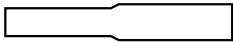

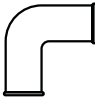
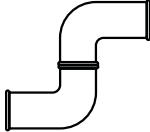
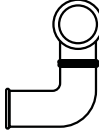
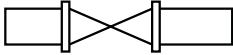
	Type	(DN = pipe diameter) ③	
		Inlet zone ①	Outlet zone ②
	Expansion	10 x DN	3 x DN
	Constriction	10 x DN	3 x DN
	90° angle	20 x DN	5 x DN
	Two 90° angles on one level	25 x DN	5 x DN
	Two 90° angles on one level, T-connector	30 x DN	5 x DN
	Valve, pusher	50 x DN	5 x DN

Fig. 2: Installation direction

The inlet zones can be reduced by additional installed flow conditioners. Flow conditioners create an additional pressure loss that can reduce the flow quantity.



IMPORTANT

Please note the specified minimum values: If it is not possible to comply with the specified inlet zones, then considerable deviations to the measured values are to be expected.

The SICK inlet and outlet pipes are recommended.

6 Electrical installation

6.1 Safety

6.1.1 Notes on electrical installation



IMPORTANT

Equipment damage due to incorrect supply voltage.

An incorrect supply voltage may result in damage to the equipment.

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



IMPORTANT

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 appropriately 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. In Germany, observe the following standards:
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.
-



Notes on layout of data cables

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

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

- The cable on the M12 connection has been screwed on.
- 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 "[14 Technical data](#)".
- Ethernet version: The sensor draws power directly via the Ethernet connection. Carefully mount the M12 plug connection to ensure the IP67 enclosure rating. Observe the pin assignment ("[6.2.1 Electrical connection of the flow sensor](#)").

6.2.1 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 time delay before availability has elapsed, the device is in run mode (normal operation) and display the current measured value.

6.2.2 Pin assignment, M12 plug connector, 5-pin (industry version)

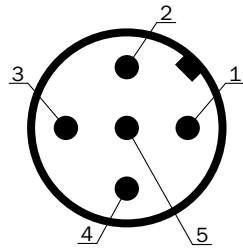
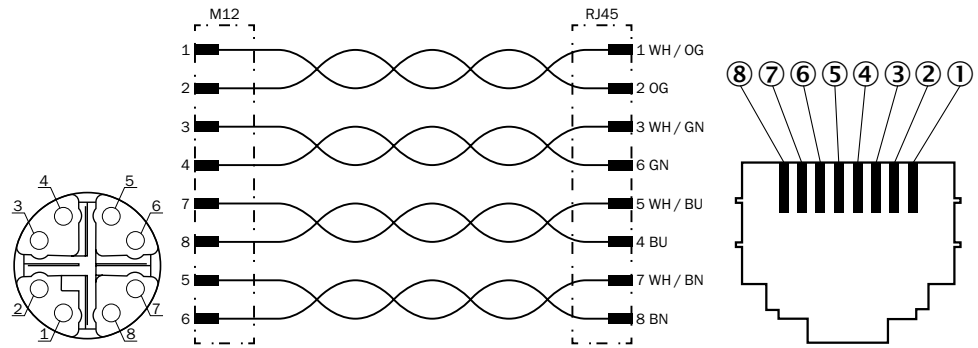


Fig. 3: M12 x 1 plug connector, 5-pin

Contact	Labeling	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 switching output 1: NO/NC programmable
5	Q ₂	Gray	Digital switching output 2: NO/NC programmable or switching output B 4 ... 20 mA, frequency or pulse output

6.2.3 Pin assignment, M12 plug connector, 8-pin (only Ethernet version)



M12 x 1, 8-pin, x-coded

Connection diagram between M12 and RJ45

RJ45

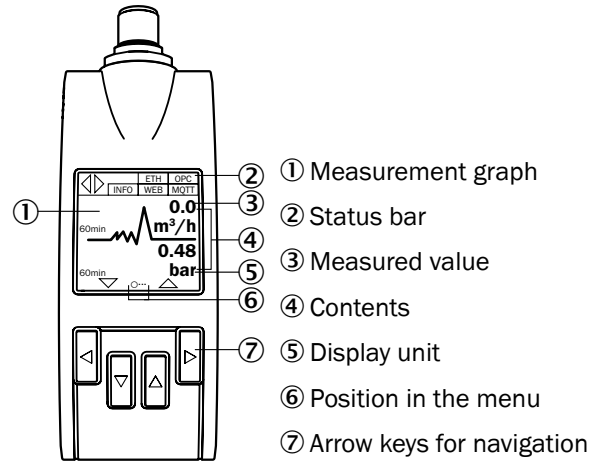
Contact	RJ45	Color	Labeling	10 / 100 MBit
1	1	WH / OG	TX (+) + POE	TxData +
2	2	OG	TX (-) + POE	TxData -
3	3	WH / GN	RX (+) - POE	RxData +
4	6	GN	RX (-) - POE	RxData -
7	5	WH / BU	PoE +	
8	4	BU	PoE +	
5	7	WH / BN	PoE -	
6	8	BN	PoE -	

7 Commissioning

7.1 Commissioning

1. Mount the sensor as appropriate to the installation conditions, “5 Mounting”.
2. Apply the supply voltage or create Ethernet connection (PoE).
3. The sensor performs a self-test and is then ready for operation. The factory-set measured value is displayed.

In the event of problems during commissioning, “11 Troubleshooting”.



8 Operating the industry version

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

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

Press and hold any arrow key (min. 2 seconds) and then select menu Q1, menu Q2, or menu Qa.

In the following, the recommended settings are listed in each submenu from top to bottom, “17.1 Industry version”.

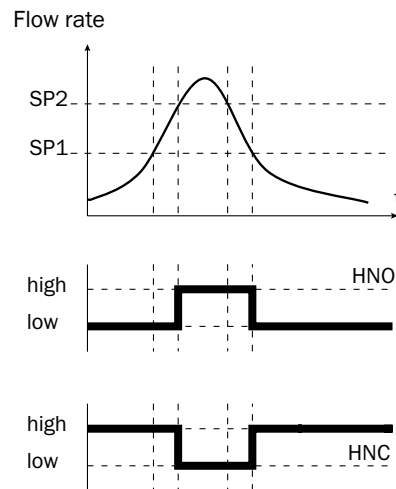
- The switching output can be set in the Q1 menu.
- In the Q2 menu, the output can be set as a switching output, pulse output, frequency output, or analog output.
- The analog output can be set in the Qa menu.

8.1 Q1 menu

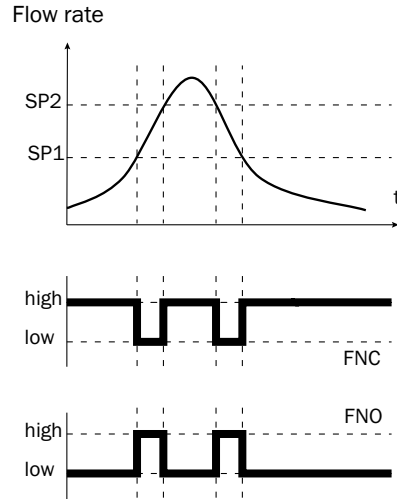
This menu contains the settings of digital output 1.

Setting the hysteresis or windows function

- In the “Mode” menu, set the mode for hysteresis or windows function with the accompanying measurand.



If the flow is fluctuating around the set value, the hysteresis keeps the output state of the outputs stable. When the flow is increasing, the output switches when the respective switching point (SP2) is reached; if the flow sinks again, the output switches back only after the reset switching point (SP1) has been reached.



Window (example Switch Window Volumetric Flow Rate) allows for the monitoring of a defined area. If the flow is between the SetPoint2 and SetPoint1, the output will be active (normally open) or inactive (normally closed).

The error status of the measuring device reflects the cable break monitoring. During an error status, the measuring device switches to a safe state; i.e. the switching outputs become inactive. As far as the downstream signal evaluation is concerned, this corresponds to a cable break.

Setting the switching point

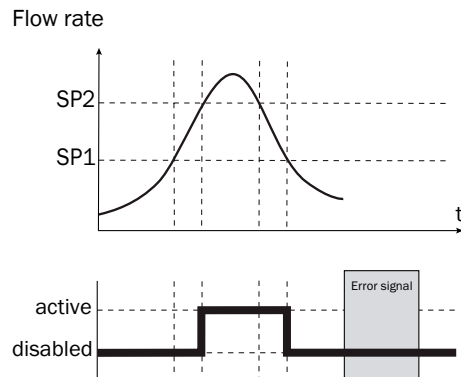
- Set the switching point in the “SetPoint1” submenu.

Setting the reset point / hysteresis or lower window limit

- Set the “SetPoint2” submenu reset point / hysteresis or lower window limit.

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

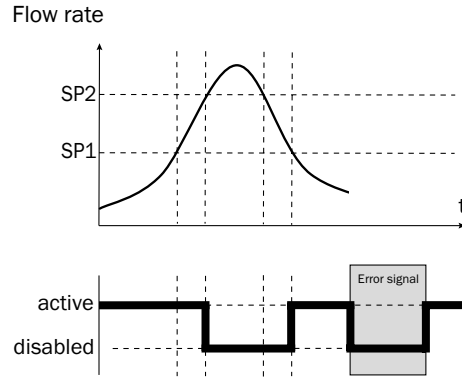
- Select the “Polarity” submenu and select between “normally closed” and “normally open”.



Switching output		PNP	NPN	DRV	Error status
Normally open / HNO	active	U_v	0 V	U_v (PNP switched)	disabled
	disabled	0 V ¹⁾	U_v ²⁾	0 V (NPN switched)	

¹⁾ Pulldown only

²⁾ Pullup only



Switching output		PNP	NPN	DRV	Error status
Normally closed / HNC	active	U_v	0 V	U_v (PNP switched)	disabled
	disabled	0 V ¹⁾	U_v ²⁾	0 V (NPN switched)	

¹⁾ Pulldown only

²⁾ Pullup only

Simulating the digital output

- Select the “Simulate” submenu and select “active”, “inactive”, or “normal” (measuring operation).

Setting the PNP / NPN or DRV (push-pull)

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

8.2 Q2 menu

This menu contains the settings of switching output 2.

8.2.1 Set Q2 as switching output

- Select the “Function” submenu and activate the “Switch” function.

Setting the mode for hysteresis or windows function

- In the “Mode” menu, set the mode for hysteresis or windows function with the accompanying measurand.

Setting the switching point

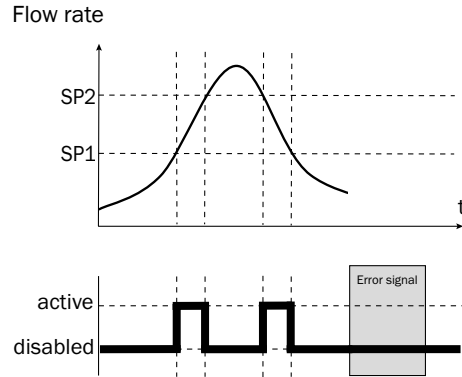
- Set the switching point in the “SetPoint1” submenu.

Setting the reset point / hysteresis or lower window limit

- Set the “SetPoint2” submenu reset point / hysteresis or lower window limit.

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

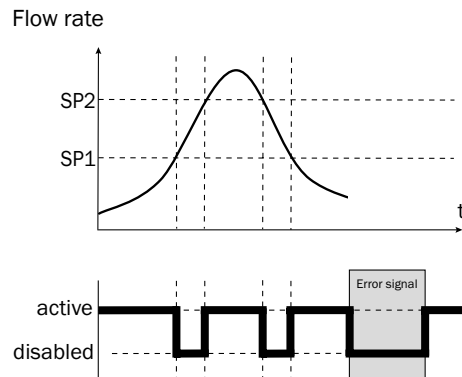
- Select the “Polarity” submenu and select between “normally closed” and “normally open”.



Switching output		PNP	NPN	DRV	Error status
Normally open/FNO	active	U_v	0 V	U_v (PNP switched)	disabled
	disabled	0 V ¹⁾	U_v ²⁾	0 V (NPN switched)	

¹⁾ Pulldown only

²⁾ Pullup only



Switching output		PNP	NPN	DRV	Error status
Normally closed/FNC	active	U_v	0 V	U_v (PNP switched)	disabled
	disabled	0 V ¹⁾	U_v ²⁾	0 V (NPN switched)	

¹⁾ Pulldown only

²⁾ Pullup only

Simulating the digital output

- Select the “Simulate” submenu and select between “active”, “inactive”, and “normal” (measuring operation).

Setting the PNP / NPN or DRV (push-pull)

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

8.2.2 Set Q2 as analog output

This menu contains the settings of 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 current output the measurand such as flow, temperature, or pressure.

Assigning the measuring range limit value

- In the "High" submenu, enter the measuring range limit value (20 mA).

Assigning the lower limit of the measuring range

- In the "Low" submenu, enter the lower limit 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 a fault on the device

- In the "Fail" submenu, set how the current output should behave in the event of a fault.

Setting the predefined current value

- In the "Simulate" submenu, set a predefined current value.

8.2.3 Set Q2 as a frequency output

- In the Q2 function menu, select "Frequency" and make the settings accordingly.

Selecting the process size (VolumetricFlowRate)

- In the "Mode" submenu, set the process size.

Defining the measuring range lower limit and limit value

- The frequency can be entered in the range 0 to 10 kHz under "MaxFreq" and "Min-Freq".

Overwriting the output using the simulation function

- Select the corresponding values under "Simfreq".

Setting the 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 the “Pulse” submenu and make the settings accordingly.

Selecting the process size

- Select volume or energy under “Mode”.

Specifying pulse valence

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

Setting the 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 current output the measurand such as flow, temperature, or pressure.

Assigning the measuring range limit value

- In the “High” submenu, enter the measuring range limit value (20 mA).

Assigning the lower limit of the measuring range

- In the “Low” submenu, enter the lower limit 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 a fault on the device

- In the “Fail” submenu, set how the current output should behave in the event of a fault.

Setting the predefined current value

- In the “Simulate” submenu, set a predefined current value.

9 Operating the Ethernet version

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

In the following, the recommended settings are listed in each submenu from top to bottom, “17.2 Ethernet version”

9.1 Ethernet

Assigning static or dynamic addresses

- In the “DHCP Mode” submenu, you can select static address allocation through parameterization or dynamic IP allocation.

Defining the names

- Enter the DHCP names (e.g. FTMg) in the “Name” submenu.

Setting the IP address

- The static IP address can be set in the “IP” submenu.

SubNetMask

- Set the SubNetMask in the “SubNetMask” submenu.

Gateway

- Set the gateway address in the “Gateway” submenu.

9.2 Web server

Switching the web interface on and off

- In the “State” submenu, the web server can be switched on and off (active/inactive). If the web server is not used, then the service should be deactivated.

Setting the port

- The web server port is selected in the “Port” submenu. The standard port for the HTTP service is port 80.

Resetting the user’s password

- Reset the web server password for the user “Maintenance” to the factory default. The default password (factory setting) is "airflowsensor".

9.3 OPC UA

Switching the web interface on and off

- In the “State” submenu, OPC UA can be switched on and off (active/inactive). If OPC UA is not used, the service should be deactivated.

Setting the port in “OPC UA”

- The OPC UA port is selected in the “Port” submenu. The standard port for the OPC UA server in FTMg is port 4840.

Setting usernames for “OPC UA”

- In the “User” submenu, enter the username for access to the internal OPC UA server.

Assigning a password for “OPC UA”

- Select the “Password” submenu and set the password. If no username or password are entered, then there is no access protection to the OPC UA server.

9.4 MQTT

Switching the web interface on and off

- In the “State” submenu, MQTT can be switched on and off (active/inactive). If MQTT is not used, then the service should be deactivated.

Broker

- Have the IP address of the MQTT broker displayed.

Setting the port

- Select the “Port” submenu to set the port of the MQTT broker.

Topic

- The MQTT client of the FTMg shows the selected data under topic in the update interval entered to the MQTT broker.

User

- In the “User” submenu, access to the MQTT broker can be entered with access data (optional).

Creating a broker password

- Select the “Password” submenu and enter the broker password. If no username or password are entered, then logging in to the MQTT broker does not occur.

Defining the update interval to the broker

- In the “MQTT” menu, select the “Update” submenu and enter the time interval in which the MQTT client in the sensor transmits the data to the MQTT broker.

QoS

- Display the QoS. Quality of Service level of the MQTT data transmission (At most once (0), At least once (1), Exactly once (2)).

Defining the MQTT message to the broker

- Select the “Send” submenu, go to the second submenu “Unit” and select between “Active” and “Inactive”.

10 Operating the industry and Ethernet versions

Applies to all FTMgs.

10.1 Display

Setting units

- Select “Units” submenu and in the second submenu select “MassFlowRate”, “FlowVelocity”, “Volume”, “VolFlowRate”, “Mass”, “Energy”, “Temperature” or “Pressure”.

Setting start screen display “Screen 1.1”

- In the “Pages” submenu Disp1Top (top half of the screen), select the parameters to be displayed.

Setting start screen display “Screen 1.1”

- In the “Pages” submenu Disp1Btm (bottom half of the screen), select the parameters to be displayed.

Setting the display “Screen 1.2”

- In the “Pages” submenu Disp2Top (top half of the screen), select the parameters to be displayed.

Setting the display “Screen 1.2”

- In the “Pages” submenu Disp2Btm (bottom half of the screen), select the parameters to be displayed.

Setting the display “Screen 1.3”

- In the “Pages” submenu Disp3Top (top half of the screen), select the parameters to be displayed.

Setting the display “Screen 1.3”

- In the “Pages” submenu Disp3Btm (bottom half of the screen), select the parameters to be displayed.

Display “Screen 2.1, 2.2. and 2.3”

- Select the display parameters in the “DispHistory” submenu.

Optimizing readability

- In the “Rotation” submenu, set display 0°, 90°, 180° or 270° to ensure optimal readability.

Time until screensaver is activated

- In the “Screensaver” submenu, set the activation time for the screensaver.

Time until display is switched off

- In the “AutoOff” submenu, set the time for switching off the display.

Brightness in %

- In the “Brightness” submenu, set the brightness as a percentage.

Assigning a 4-digit pin for operation and/or manipulation protection

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

10.2 Simulate

Simulating flow

- The flow rate in % can be simulated in predefined steps in the “Flow” submenu.

Simulating temperature

- A temperature value in % (-20 to 60 °C) can be simulated in predefined steps in the “Temperatures” submenu.

Simulating pressure

- A pressure value in % (0 to 16 bar) can be simulated in predefined steps in the “Pressure” submenu.

10.3 Measure

Setting measuring gas

- In the “Flow” submenu, select “Medium” and set the measuring gas such as air, argon, helium, carbon dioxide (CO₂) or nitrogen.

Setting the reference norm / reference standard

- In the “Flow” submenu, select “RefCond” and set reference norms / reference standards such as ISO2533, ISO1217, DIN1945-1, DIN1343, IOS6358, ISO8778 or user defined (UserDefined).

Setting the reference pressure for application-specific setting (UserDefined)

- In the “Flow” submenu, select “RefPress” and set the application-specific reference pressure.

Setting the reference temperature for application-specific setting (UserDefined)

- In the “Flow” submenu, select “RefTemp” and set the application-specific reference temperature.

Setting the zero point offset

- In the “Flow” submenu, select “0-FlowOff” and set the zero point offset.

Setting the leak flow volume suppression

- In the “Flow” submenu, select “0-FlowCut” and set the leak flow volume suppression. The volume flow is suppressed to the value 0 m³/h when the value set is undershot.

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

- In the “Flow” submenu, select “Filter” to filter all flow measured values to the display and at the output with predefined timing units.

Setting the offset / zero point offset

- In the “Pressure” submenu, select “Offset” to set the offset / zero point offset.

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

- In the “Pressure” submenu, select “Filter” to filter measured values to the display and at the output with the predefined timing units.

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

- In the “Temperature” submenu, select “Filter” to filter measured values to the display and at the output with the predefined timing units.

Selecting the signal quality

- In the "Sigquality" submenu, select between "SigQua1", "Sigqua2", "Sigqua3" and "SigQua4". All are set to 100%. Signal quality 1 is a metric for the robustness.

10.4 History

Display / graph of the measured values for the last 60 minutes

- In the “60 min” submenu, select the display / graph of the measured values for the last 60 minutes.

Display / graph of the measured values for the last 24 hours

- In the “24 hours” submenu, select the display / graph of the measured values for the last 24 hours.

Display / graph of the measured values for the last 7 days

- In the “7 days” submenu, select the display / graph of the measured values for the last 7 days.

10.5 Statistics

min./ average / max. values of the individual parameters after the last reset

- In the “View” submenu, you can display the min./ average / max. values of the individual parameters after the last reset.

Displaying the time of the last reset

- In the “LastReset” submenu, you can display the time elapsed since the last reset.

Resetting the statistic values to 0

- Reset the statistic values to “0” in the “Reset” submenu.

10.6 Counter

Displaying the counters

- Select the submenus “Mass”, “Volume”, “Energy” to display the counters.

Resetting the counters

- Select the “Reset” submenu to display the counters since the last reset.

10.7 System

Service login

- In the “Service” submenu, carry out the service login for authorized users.

Resetting to factory settings

- In the “FactReset” submenu, reset to the factory settings (defaults).

Serial number (read only)

- You can display the serial number in the “SerialNumber” submenu.

Setting the device tag

- Set the “DevTag” device tag in the submenu.

Setting the application tag

- Set the application tag in the “AppTag” submenu.

FWVersion (read only)

- You can display the firmware version in the “FWVersion” submenu.

BLVersion (read only)

- You can display the bootload version in the “BLVersion” submenu.

HWVersion (read only)

- You can display the hardware version in the “HWVersion” submenu.

11 Troubleshooting

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

There are three classifications: info, warning, and error.

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	About	Simulation active (output signal or process size)
Q1 / 2 Overtemp	Warning	Driver for switching output Q1 / Q2 overloaded.
Q1 Shortcut	Warning	Short-circuit on Q1
Q2 Shortcut	Warning	Short-circuit on Q2
Q2 / a Overload	Warning	Q2 / a: current not flowing. - Cable not connected? - Load impedance too high?
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	About	Info: MBE - 5%
Flow high Info/Warning	Info/Warning	Info: Standard ULR + 5% Warning: Extended MBE + 5%
Pressure low	Warning	
Pressure high	Warning	
Temperature low	Warning	
Temperature high	Info/Warning	
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
Energy Counter off - Air only	About	Medium != Air => Formula for energy counter only saved for air, therefore no function
Voltage low for Q1/2	About	
Voltage low for Q2 / a, Qa	About	
Voltage low for IO-Link	About	
Q1 Config out of Range	About	Switching points parameterized outside measuring range
Q2 Config out of Range	About	
Qa Config out of Range	About	
Invalid Medium + RefCond	Warning	

Message	Classification	Description
Supply Voltage too low/ high!	Warning	
Internal Temperature too low/ high!	Warning	

12 Repair

12.1 Maintenance

The FTMg is maintenance-free. Check the screws and plug connectors 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. This form includes information about all materials which have come into contact with the device, including those which were used for testing purposes, operation, or cleaning. The return form is available from our website (www.sick.com).

13 Disposal

Dispose of device components and packaging materials in compliance with applicable country-specific waste treatment and disposal regulations for the region of use.

14 Technical data

14.1 Features

Measurement principle	Calorimetric (flow, temperature) Piezoresistive (pressure)
Medium	Pressure (air quality ISO 8573-1:2010 [3:4:4]) Helium, argon, nitrogen, carbon dioxide
Nominal sizes	DN15, DN20, DN25
Process temperature	-20 °C ... +60 °C
Process pressure	0 bar ... 16 bar
Communication interface	IO-Link 1.1 COM3 (only industry version) Ethernet (only Ethernet version) - OPC UA, MQTT and web server
Temperature measurement	✓
Pressure measurement	✓
Display	128 x 128 pixels, adjustable rotary OLED display (90° rotations) and 4 pushbuttons

14.2 Performance

Measuring range	DN15: 5.3 ... 1,060.3 l/min DN20: 9.4 ... 1,884.9 l/min DN25: 14.7 ... 2,945.2 l/min (Standard measuring range according to ISO 8573-1:2010 [3:4:4]) DN15: 1,060.3 ... 1,590.4 l/min DN20: 1,884.9 ... 2,827.4 l/min DN25: 2,945.2 ... 4,417.9 l/min (Extended measuring range)
Minimum flow velocity¹⁾	0.5 m/s
Maximum flow velocity¹⁾	150 m/s
Accuracy of the sensor element ¹⁾	± 3% of the measured value + 0.3% of the measuring range limit value (standard measuring range as per ISO 8573-1:2010 [3:4:4]) ± 8% of the measured value + 1% of the measur- ing range limit value (extended measuring range)
Repeatability	± 1.5% of the measured value
Response time (T90)	< 0.3 s
Measurement accuracy – temperature	± 2 °C
Repeatability – temperature	± 0.5 °C
Pressure measurement:	
Measurement accuracy	≤ ± 1.5% of the measuring range (in the range 10 °C... 30 °C)
Non-linearity	≤ ± 0.5% of the measuring range. (including temperature drift)
Repeatability	≤ ± 0.2% of the measuring range (BFSL as per IEC 61298-2)

¹⁾ Reference conditions according to DIN 1343 atmospheric pressure 1.01325 bar abs,
compressed air temperature 0 °C

14.3 Electrical connection values – industry version

Supply voltage U_{v 1)}	17 ... 30 VDC
Power consumption	< 12 W (@ 24 VDC without output load)
Initialization time	≤ 10 s
Protection class	III
Connection type	M12 round male connector x 1, 5-pin (IO-Link version);
Output signal ³⁾	1 4...20 mA analog output (scalable) 1 PNP / NPN / push-pull transistor output 1 analog output (scalable or PNP / NPN / push-pull transistor output) (also configurable as pulse/frequency output)
Output load ³⁾	4 mA ... 20 mA, max. 500 Ohm, when U _v > 15 V
Lower signal level ³⁾	3.5 mA ... 3.8 mA
Upper signal level ³⁾	20.5 mA ... 21.5 mA
Digital output ³⁾	≤ 100 mA per output
Signal voltage HIGH ³⁾	> U _v - 2 V
Signal voltage LOW ³⁾	≤ 2 V
Inductive load ³⁾	< 1 H
Capacitive load ³⁾	< 100 nF (2.5 nF for IO-Link)

¹⁾ All connections have reverse polarity protection and are overcurrent protected. Switching outputs Q1, Q2 and Qa are short-circuit protected.

²⁾ Configuration of the digital output: PNP/NPN/push-pull.

³⁾ Only industry version.

14.4 Electrical connection values Ethernet version

Standard communication	IEEE802.3 Clause 25 (100BaseTx); 100 Mbit/sec.
standard supply	power over Ethernet according to IEEE802.3af
performance class	class 0; acc. IEEE802.3af Powered Device < 13 W
power supply mode	mode A and Mode B
Connection	M12x1 (female) 8 pin; X-coded
Power consumption	max. 5 W

14.5 Mechanics / materials

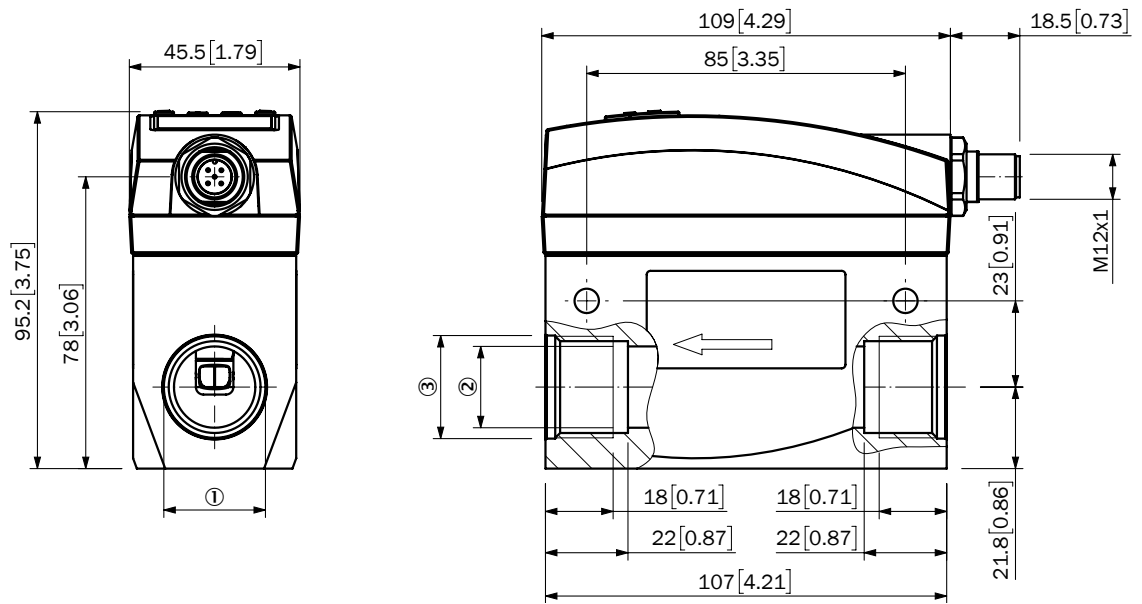
Process connection	G1/2, G3/4, G1 (according to DIN ISO 228-1)
Parts in contact with the media	Stainless steel 1.4305, PA6, Viton®, aluminum
Housing material	PC+ABS, PA66+PA6I GF50, PC, TPE, stainless steel 1.4301
Enclosure rating	IP65, IP67 according to EN 60529
Weight	G1/2 approx. 805 g G3/4 approx. 755 g G1 approx. 685 g

14.6 Ambient conditions

Ambient temperature, operation	-20 °C ... +60 °C
Ambient temperature, storage	-40 °C ... +85 °C
Maximum permissible relative humidity	≤ 90% RH, non-condensing

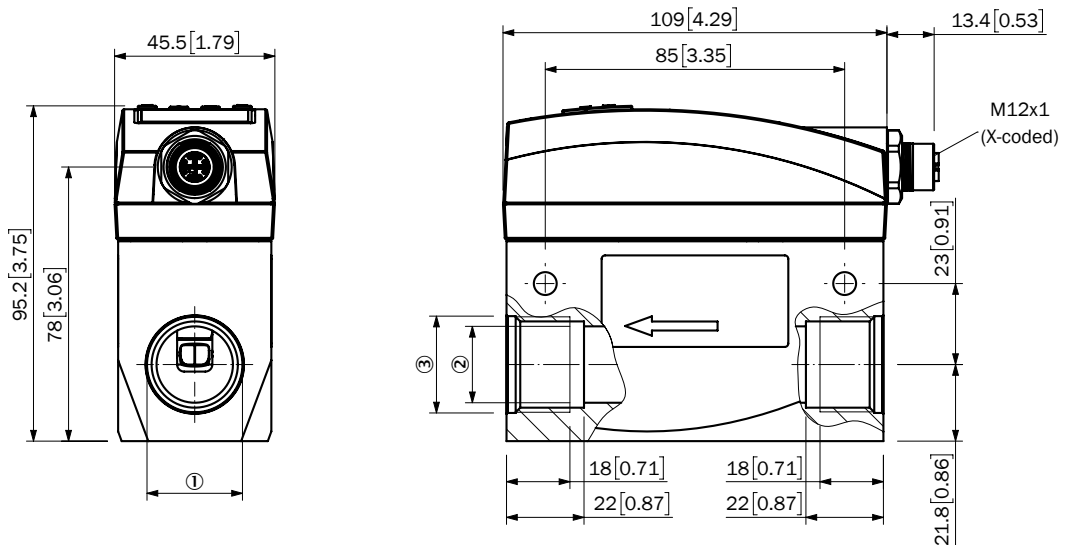
15 Dimensional drawings

15.1 Industry version



Type	DN	①	②	③
FTMG-ISD15AXX	15	G 1/2	Ø 16.1	Ø 22
FTMG-ISD20AXX	20	G 3/4	Ø 21.7	Ø 27.5
FTMG-ISD25AXX	25	G 1	Ø 27.3	Ø 33.5

15.2 Ethernet version



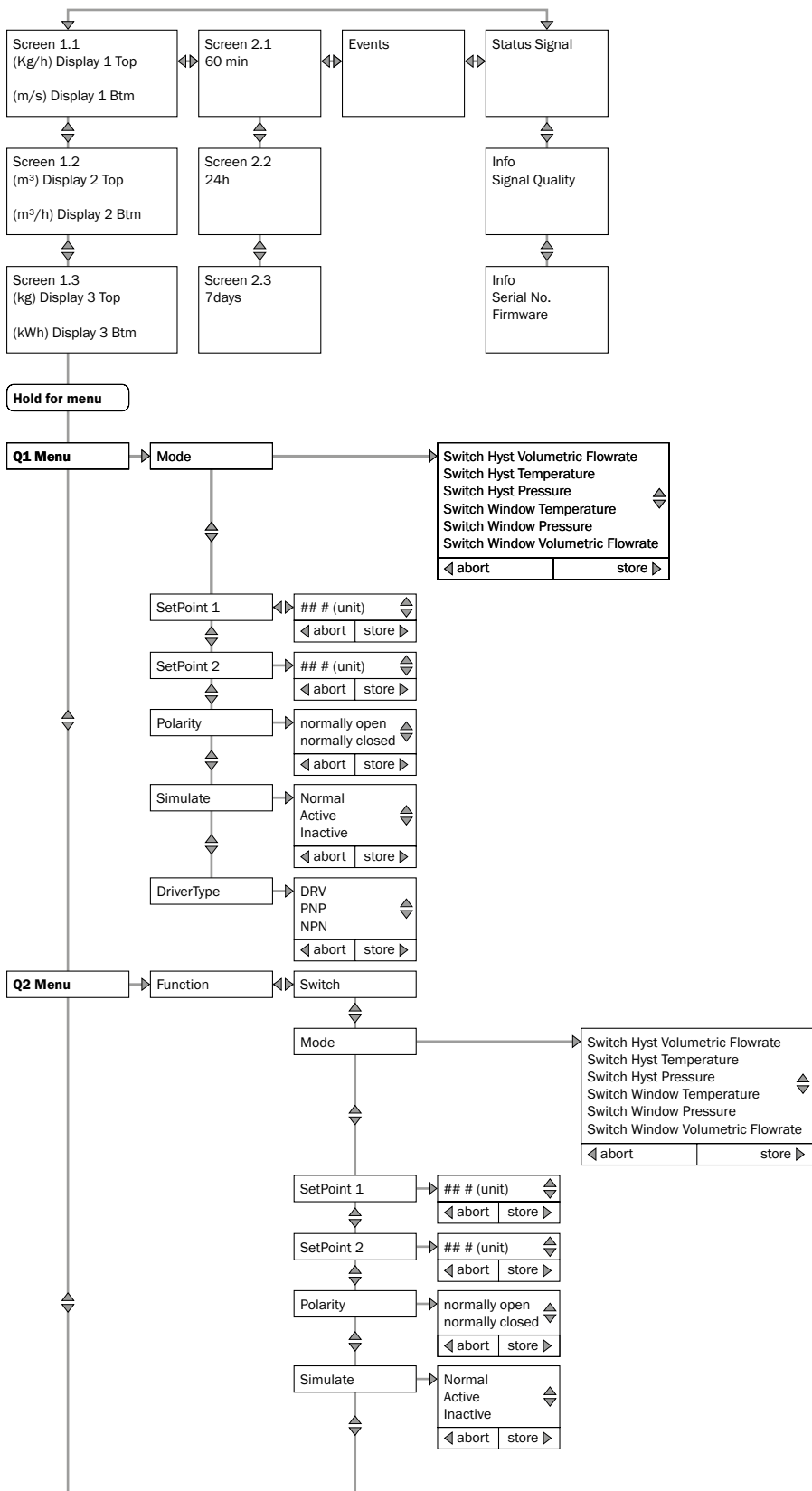
Type	DN	①	②	③
FTMG-ESD15AXX	15	G 1/2	Ø 16.1	Ø 22
FTMG-ESD20AXX	20	G 3/4	Ø 21.7	Ø 27.5
FTMG-ESD25AXX	25	G 1	Ø 27.3	Ø 33.5

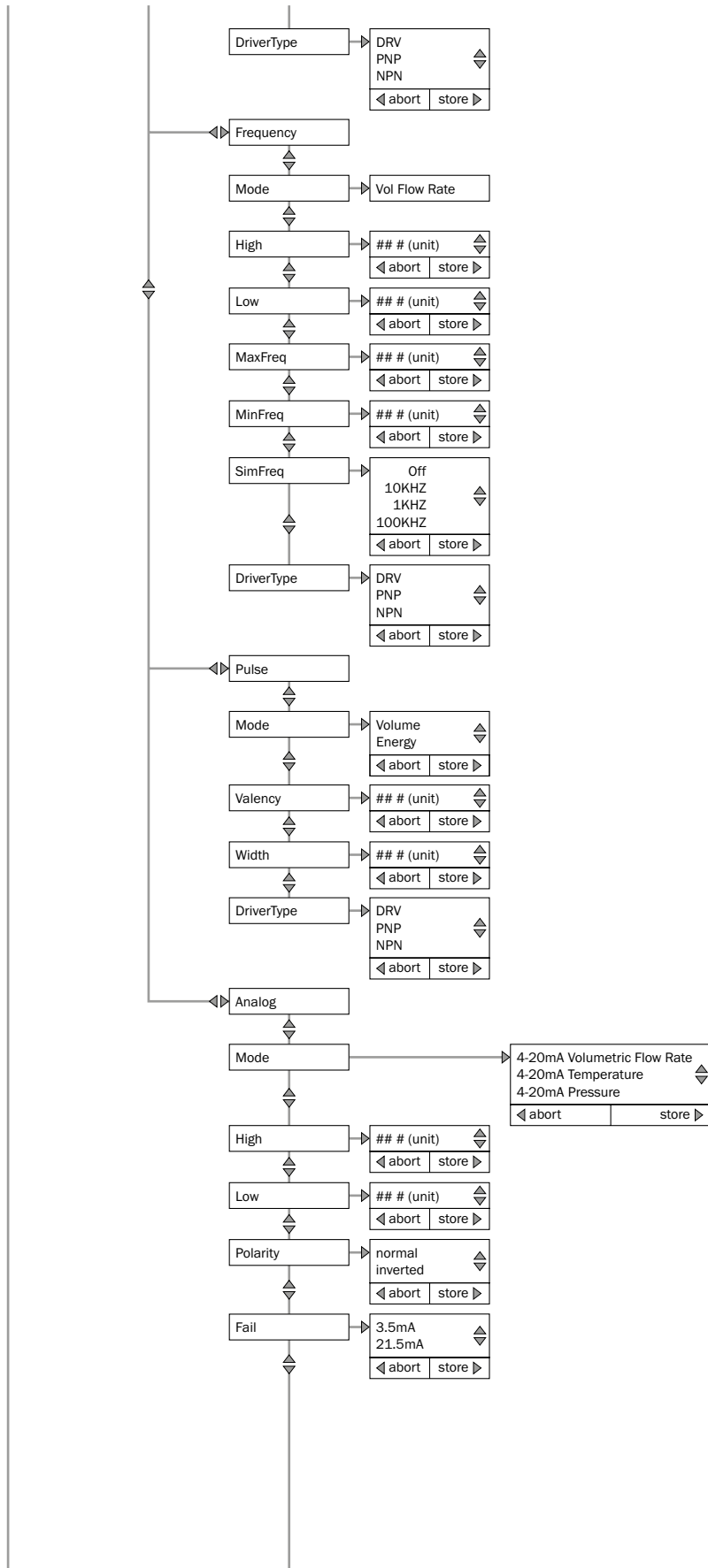
16 Accessories

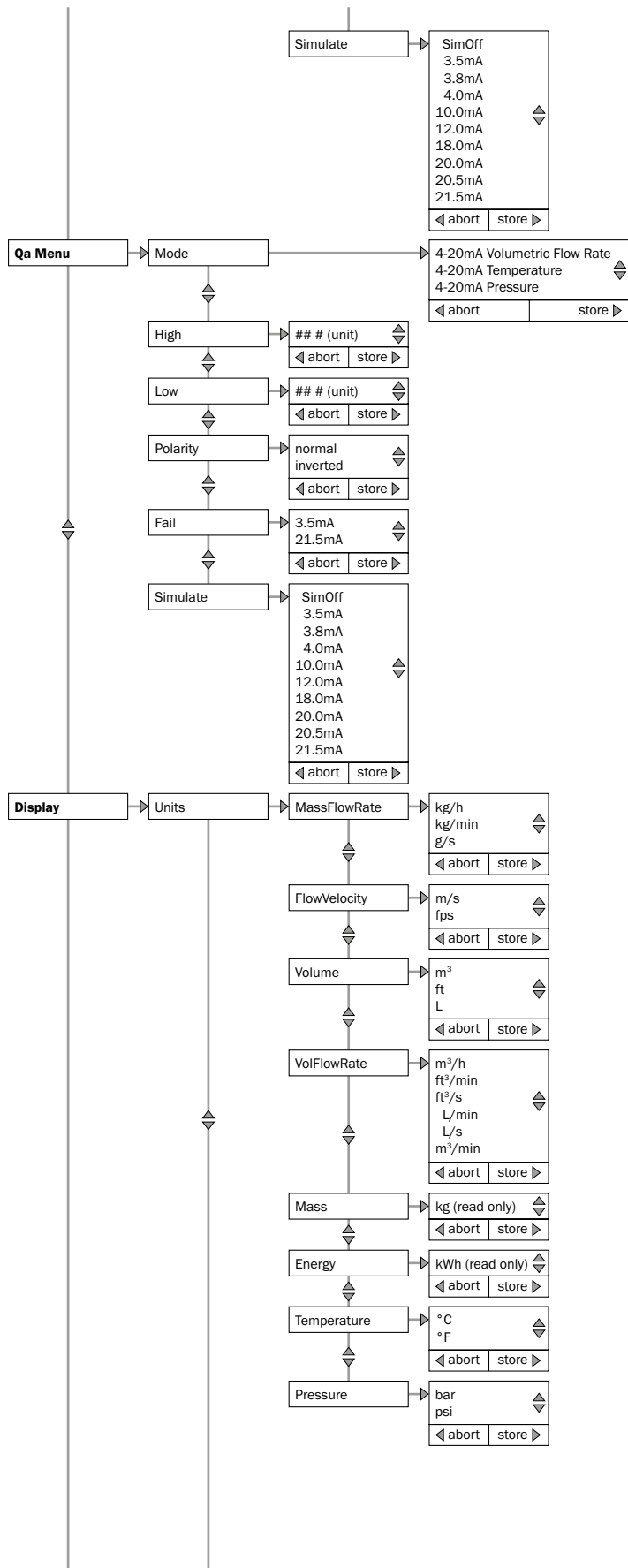
Accessories can be found online at www.sick.com

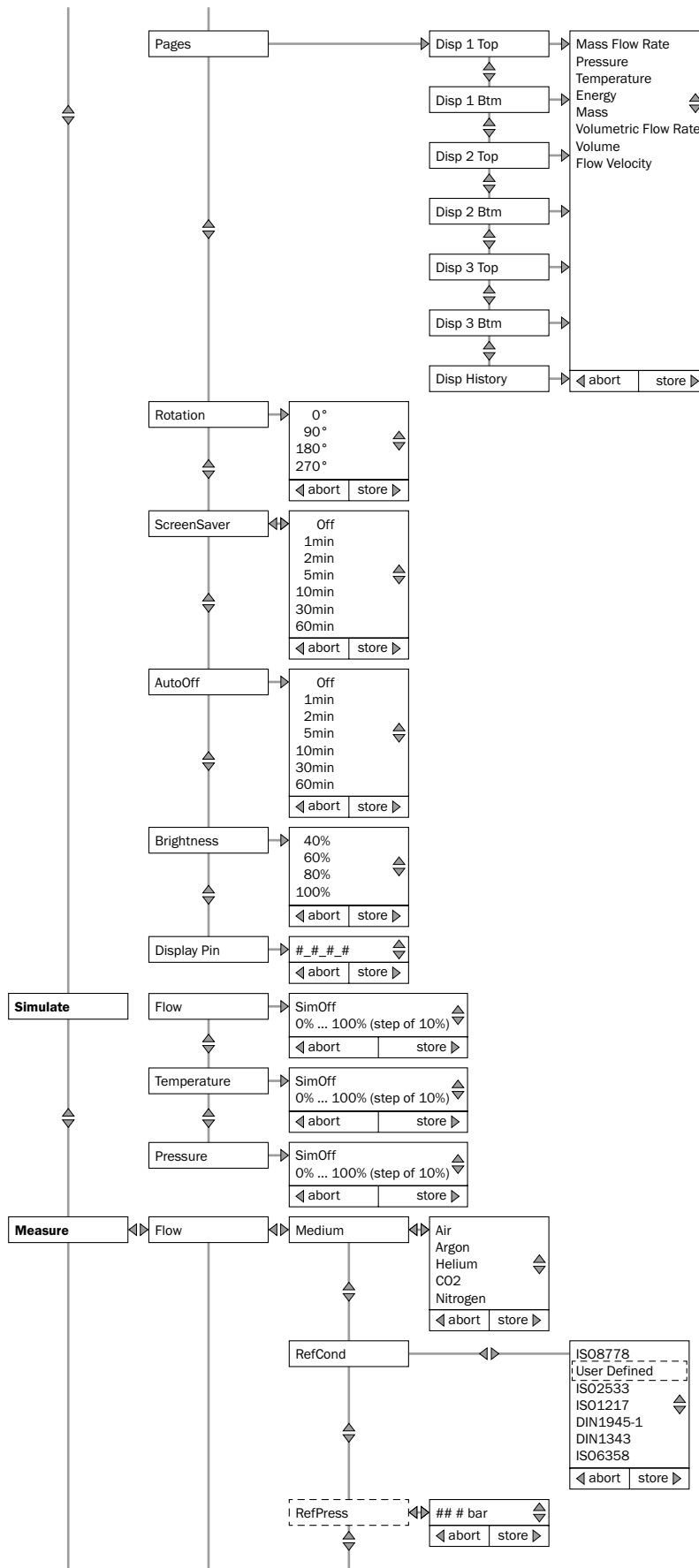
17 Menu overview

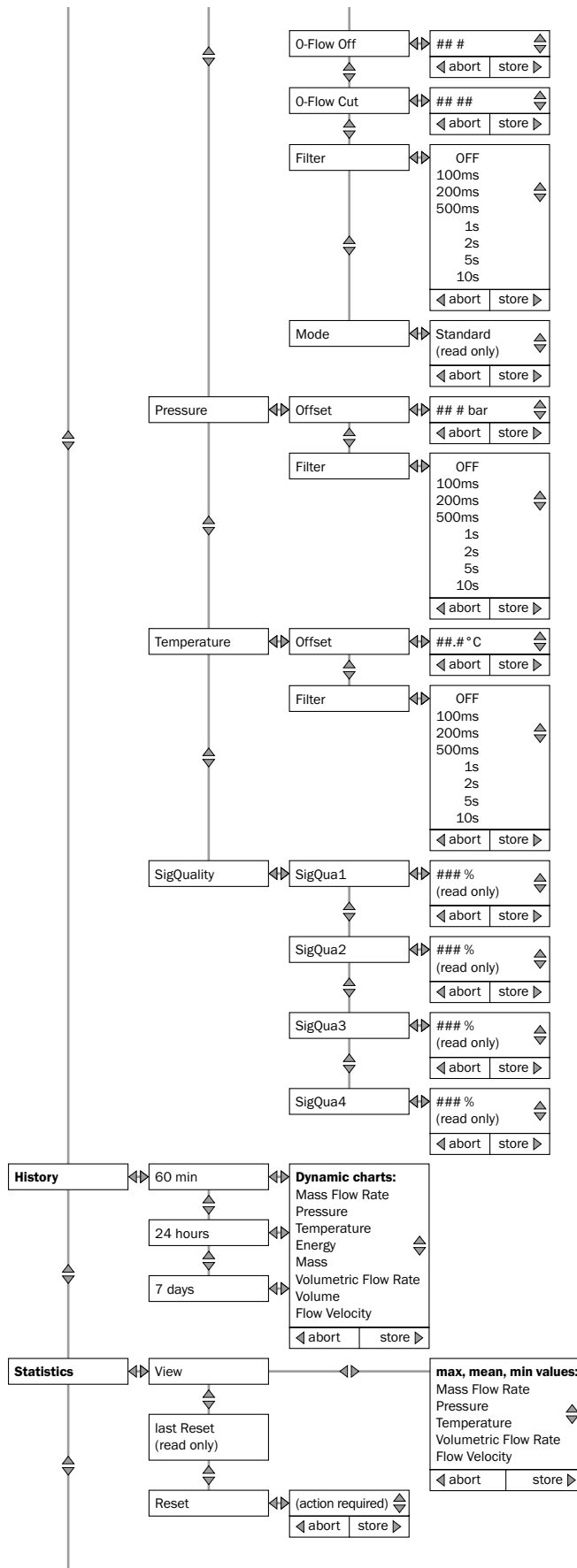
17.1 Industry version

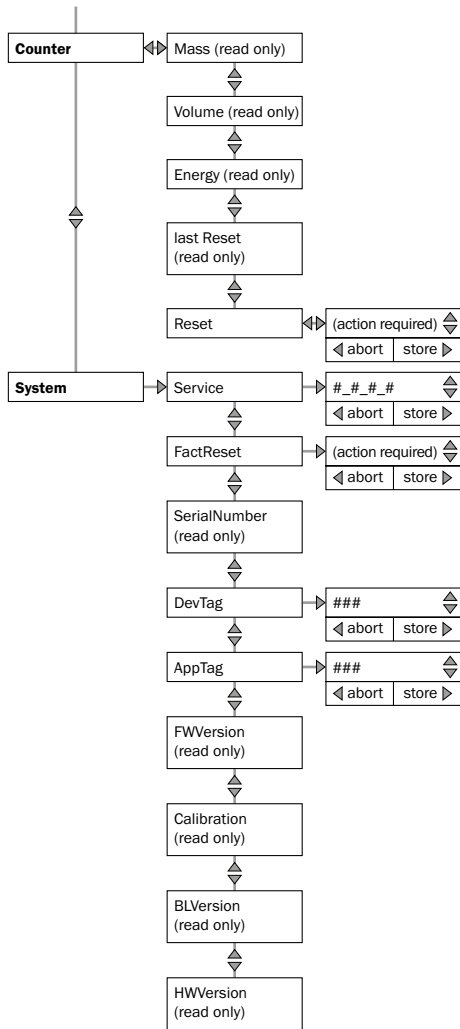




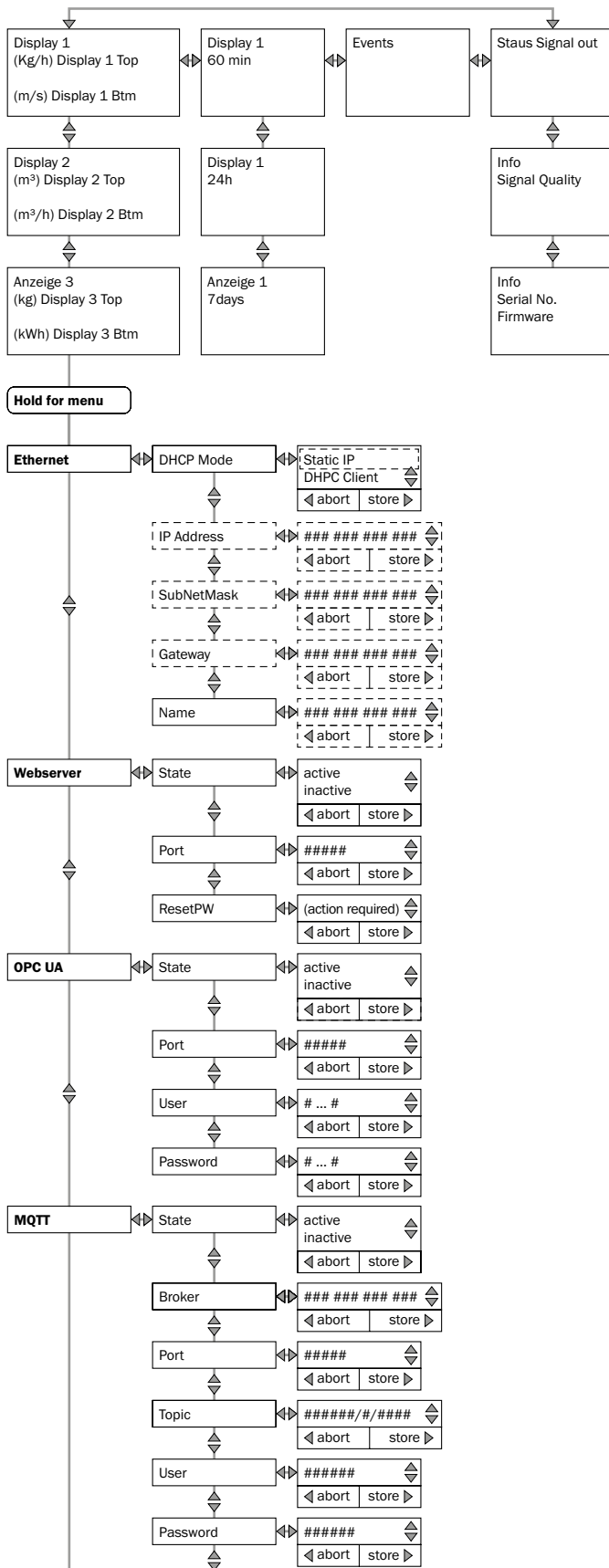


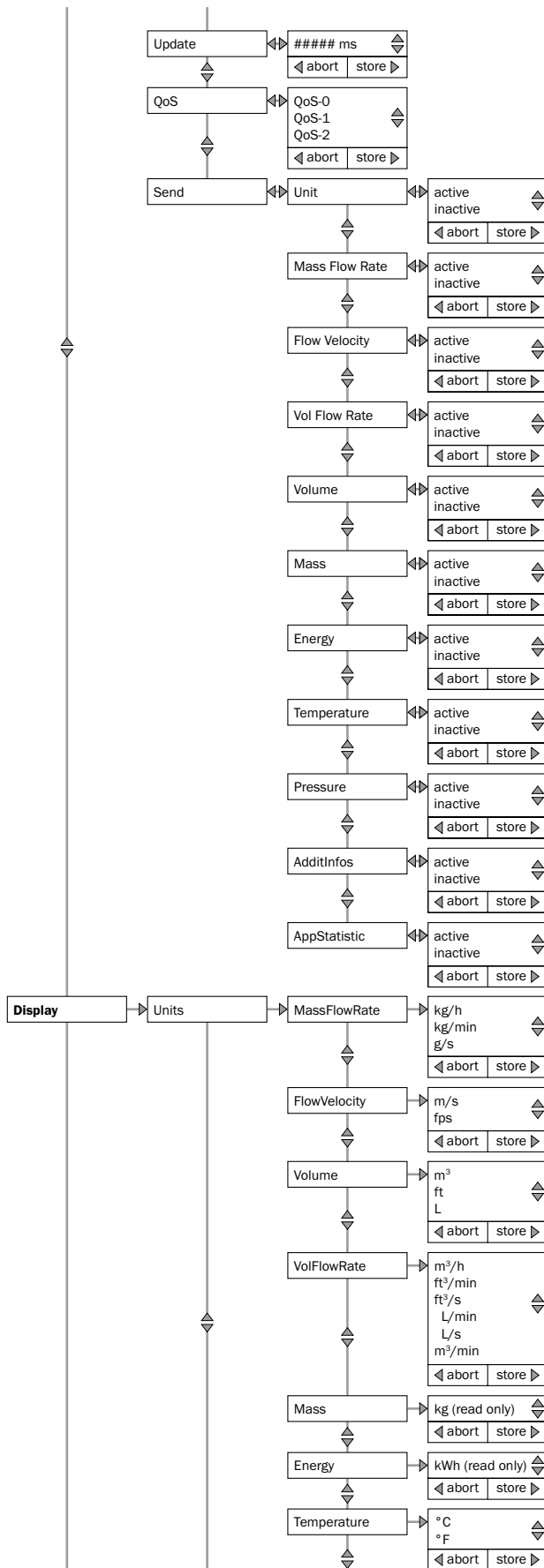


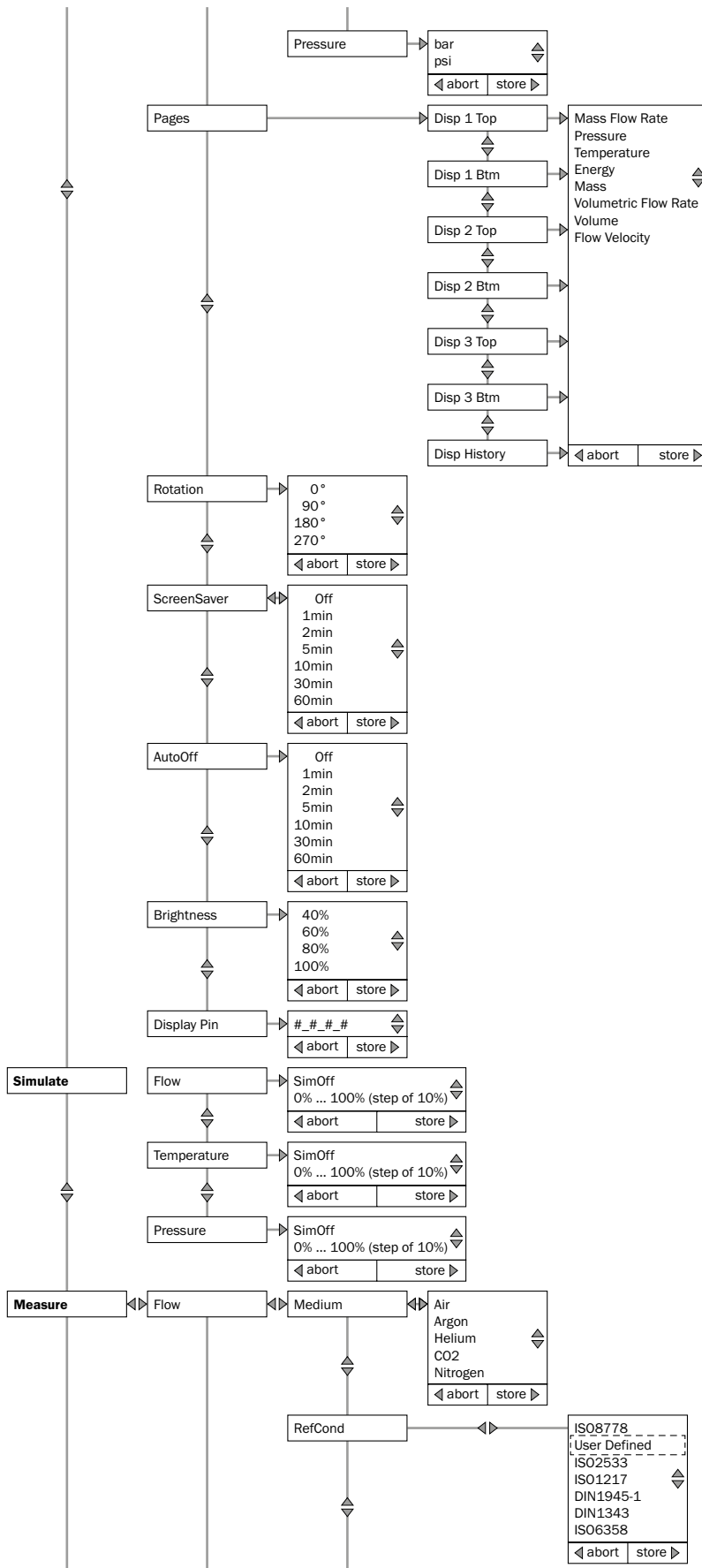


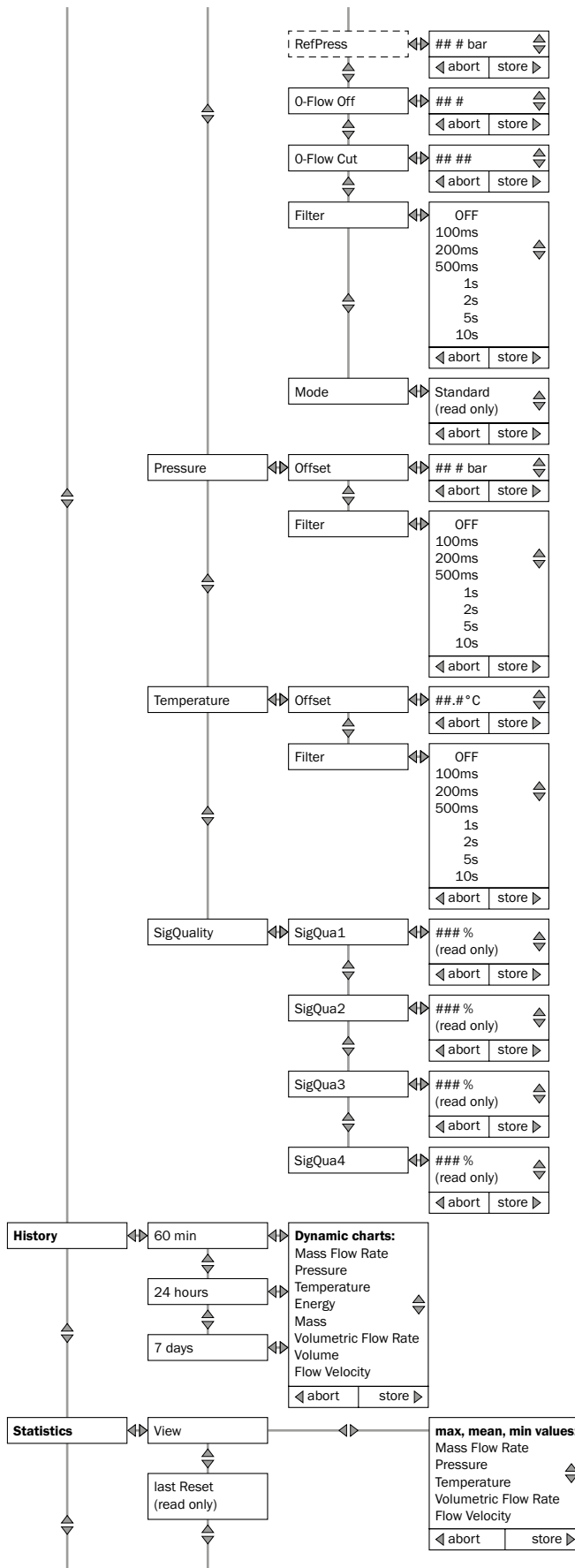


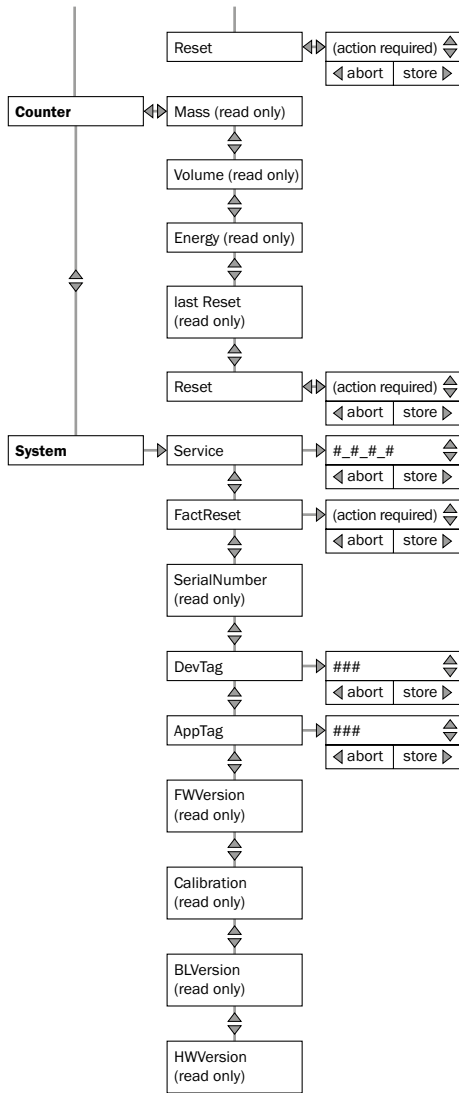
17.2 Ethernet version











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