Operating Instructions
FLOWSIC550

Flow Meter

Endress+Hauser
People for Process Automation

Described product
Product name: FLOWSIC550

Manufacturer
Endress+Hauser SICK GmbH+Co. KG
Bergener Ring 27
01458 Ottendorf-Okrilla
Germany

Legal information

Original document
This document is an original document of Endress+Hauser SICK GmbH+Co. KG.

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Contents

1 About this document

1.1 Function of this document

These Operating Instructions describe:

- Device components
- Installation
- Operation
- Maintenance work required for reliable operation
- Decommissioning

They contain the main safety information for safe operation of the FLOWSIC550.

1.2 Scope of application

These Operating Instructions are only applicable for the measuring device described in the product identification.

1.3 Further information

- Technical Bulletin: Modbus
- Technical Bulletin: Calibration
- Technical Bulletin: Associated Equipment
- Technical Bulletin: Encoder

1.4 Symbols and document conventions

1.4.1 Warning symbols

Table 1: Warning symbols

Symbol	Significance
	Hazard (general)
	Hazard by electrical voltage
	Hazard by explosive substances/mixtures
	Hazard by oxidizing substances
	Hazard by toxic substances
	Hazard by unhealthy substances
	Hazard by high temperature or hot surfaces
	Hazard for environment/nature/organisms

1.4.2 Warning levels and signal words

DANGER:
Risk or hazardous situation which *will* result in severe personal injury or death.

WARNING:
Risk or hazardous situation which *could* result in severe personal injury or death.

CAUTION:
Hazard or unsafe practice which *could* result in less severe or minor injuries.

NOTICE:
Hazard which *could* result in property damage.

Note:
Hints

1.4.3 Information symbols

Symbol	Significance
	Important technical information for this product
	Important information for electrical or electronic functions
	Information on product characteristics related to protection against explosions (general)

2 For your safety

2.1 Basic safety information

- Read and observe these Operating Instructions.
- Observe all safety instructions.
- If anything is not clear: Please contact the manufacturer.

Retention of documents

- These Operating Instructions must be kept available for reference.
- These Operating Instructions must be passed on to new owners.

Correct use

- Only use the measuring device as described in these Operating Instructions.
  The manufacturer bears no responsibility for any other use.
- Do not carry out any work or repairs on the measuring device not described in this manual.
- Do not remove, add or change any components in or on the measuring device unless such changes are officially allowed and specified by the manufacturer.
  Otherwise
  - The measuring device can become dangerous.
  - The measuring device can lose function.
  - The approval for use in lines pressurized above 50 kPa (0.5 bar) is no longer valid.

Special local conditions

- Follow all local laws, regulations and company-internal operating directives applicable at the installation location.

2.2 Warning information on device

WARNING: Danger identification on device
The following symbol draws attention to important dangers directly on the device:

- Consult the Operating Instructions in all cases where the symbol is attached to the device or shown on the display.

2.3 Intended use

The FLOWSIC550 serves for measuring the gas volume, volume flow rate and gas velocity of natural gas in pipelines.

The FLOWSIC550 with optional volume conversion serves for measuring the gas volume and converting the gas volume measured to base conditions as well as registering data on totalizer levels, maximums and other data.

2.4 Operation in potentially explosive atmospheres

The FLOWSIC550 is designed for use in potentially explosive atmospheres according to the respective device version:.

EX

Note:

- ATEX: II 2(1) G Ex ia [ia Ga] T4 IIB Gb
- IECEx: Ex ia [ia Ga] T4 IIB Gb
- NEC/CEC (US/CA):
  Class I Division 1, Groups C, D T4
  Ex ia [ia Ga] IIB T4 Gb
  Class I, Zone 1 AEx ia [ia Ga] IIB T4 Gb

Specific conditions of use (denoted by X after the certificate number)

1 Only three supply operation modes are allowed:
  – External power
  – External power plus one battery pack (as backup)
  – Two battery packs without external power (a battery pack serves as a backup)
  The use of all power inputs simultaneously is not allowed. Only Endress+Hauser Part No. 2064018 as a battery pack is allowed.

2 The equipment pressure sensor and ultrasonic transducers that are mounted in the meter body contain piezo-electric devices. The equipment installation shall ensure that these devices are suitably protected from impact.

3 The ultrasonic transducers that are mounted in the meter body are manufactured from titanium. The equipment installation shall ensure that these devices are suitably protected from impact or friction.

4 The adhesive type labels that are fitted to the flow meter may generate an ignition-capable level of electrostatic discharge under certain conditions. The user shall ensure that the equipment is not installed in a location where it may be subjected to external conditions which might cause a build-up of electrostatic charges on these non-conducting surfaces. Additionally, cleaning of the equipment should be done only with a damp cloth.

5 The flow meter is considered not capable of passing a 500V r.m.s. a.c. dielectric strength test according to Clause 6.3.13 of IEC 60079-11:2011, EN 60079-11:2012, CAN/CSA-C22.2 No. 60079-11:14, ANSI/UL 60079-11 6th Edition between the intrinsically safe circuits that are associated with the Ext. Power and the Service / Wireless M12 Connector connections, and its enclosure. This shall be taken into account in any equipment installation. The circuits associated with external connections RS485-1, RS485-2, DO0, DO1 and DO2 are isolated from the equipment enclosure, and are considered capable of passing a 500V r.m.s. a.c. dielectric strength test according to Clause 6.3.13 of IEC 60079-11:2011, CAN/CSA-C22.2 No. 60079-11:14, ANSI/UL 60079-11 6th Edition.

6 The flow meter is considered not capable of passing a 500V r.m.s. a.c. dielectric strength test according to Clause 6.3.13 of IEC 60079-11:2011, EN 60079-11:2012, CAN/CSA-C22.2 No. 60079-11:14, ANSI/UL 60079-11 6th Edition between the intrinsically safe circuits that are associated with the M8 connectors to which the pressure and/or tem-

perature transmitters are connected, and its enclosure. This shall be taken into account in any equipment installation. When considering this cognisance shall also be taken of Condition 7b).

7 Conditions associated with the digital temperature transmitter type EDT 87:
a) The capacity of free metal parts is C=24pF. This must be taken into account during installing the equipment.
b) The equipment does not meet the requirements of Clause 6.3 of IEC 60079-11:2011, EN 60079-11:2012, CAN/CSA-C22.2 No. 60079-11:14, ANSI/UL 60079-11 6th Edition, this must be taken into account during installing the equipment.

8 Conditions associated with the Digital temperature transmitter type EDT 96:
a) Under certain extreme circumstances, the plastic enclosure may store ignition-capable level of electrostatic charge. Therefore, the device shall not be installed in a location where the external conditions conducive to the build-up of electrostatic charge. The equipment shall only be cleaned with a damp cloth.

2.5 Restrictions of use

- Refer to the type plate for the configuration of your measuring device.
- Check the measuring device is suitably equipped for your application (e.g. gas conditions)
- The measuring device is suitable for use in pressurized lines within the combination of maximum allowable Temperature and pressure specified on the type plate.
- For use at temperatures below the maximum allowable temperature, the maximum allowable pressure can be increased within the values as following:

Class 300 (ASME B16.5)	Up to 48.7 bar(g) for -40 °C ... +70 °C, 51.1 bar at 38°C
	Up to 706 psi(g) for -40°F ... +158°F, 741 psi(g) at 100.4°F
Class 600 (ASME B16.5)	Up to 97.4 bar(g) for -40 °C ... +70°C, 102.1 bar at 38°C
	Up to 1412 psi(g) for -40°F ... +158 °F, 1480 psi(g) at 100.4 °F
PN40	Up to 40 bar(g) for -40 °C ... +70 °C
	Up to 580 psi(g) for -40 °F ... +158 °F
PN63	Up to 63 bar(g) for -40 °C ... +70 °C
	Up to 913 psi(g) for -40 °F ... +158 °F

- Pressure ratings for temperatures between 38 °C (100°F) and maximum allowable temperature can be determined through interpolation.
- It is the user's responsibility to ensure these maximum allowable values are not exceeded during operation.

NOTICE:
The device has been tested for electromagnetic compatibility in industrial environments according to IEC 61326-1. Additional measures may be required for use in electromagnetic environments with higher interference levels.

2.6 Responsibility of user

The measuring device may only be operated by skilled persons who, knowledgeable of relevant regulations, and able to assess potential hazards related to its operation.

Skilled persons are persons according to DIN VDE 0105, DIN VDE 1000-10 or IEC 60050-826 or directly comparable standards.

NOTICE:
Skilled persons must have exact knowledge on hazards arising from operation, e.g. through hot, toxic, explosive gases or gases under pressure, gas-liquid mixtures or other media as well as adequate knowledge of the measuring system gained through training.

2.7 Information on cybersecurity threats

Protection against cybersecurity threats requires a comprehensive cybersecurity concept that must be continuously reviewed and maintained. A suitable concept consists of organizational, technical, procedural, electronic and physical levels of defense and takes into account appropriate measures for the different types of risk. The measures implemented in this product can only support protection against cybersecurity threats if the product is used as part of such a concept.

Visit www.endress.com/cybersecurity for more information, such as:

- General information on cybersecurity
- Contact option for reporting vulnerabilities
- Information on known vulnerabilities (Security Advisories)

3 Product description

3.1 Product identification

Product name:	FLOWSIC550
Manufacturer:	Endress+Hauser SICK GmbH+Co. KG Bergener Ring 27 01485 Ottendorf-Okrilla Germany

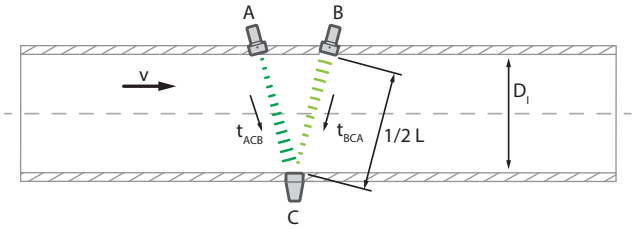
The type plates are located on the the signal processing unit and the meter body.

▶ For a detailed view of the type plates, see “Type plates”, page 60.

3.2 Measuring principle

3.2.1 Gas flow meter

The FLOWSIC550 works according to the principle of ultrasonic transit time difference measurement.



A + B = Ultrasonic transducers
C = Reflector
v = Gas velocity
L = Measuring path
α = Angle of inclination in °
t_{ACB} = Sound transit time in flow direction
t_{BCA} = Sound transit time against flow direction
D_I = Pipe inner diameter
Q = Volume flow

Fig. 1: Functional principle

Measured signal transit times t_{ACB} and t_{BCA} are defined by the current sound and gas velocity. Gas velocity v is determined from the difference between the signal transit times. Therefore changes in the sound velocity caused by pressure or temperature fluctuations do not affect the calculated gas velocity with this measurement method.

The FLOWSIC550 calculates the volume flow rate internally from the gas velocity and the diameter of the measuring section of the gas flow meter.

$$Q = \frac{\pi}{4} D_I^2 \cdot \frac{L}{2\cos\alpha} \cdot \frac{t_{BA} - t_{AB}}{t_{AB} \cdot t_{BA}}$$

3.2.2 Volume conversion (optional)

The integrated volume conversion converts the measured gas volume from measurement conditions to base conditions.

Calculation according to EN 12405:

$$V_b = C \cdot V_m$$

V_b = Volume at base conditions
C = Conversion factor
V_m = Volume at measurement conditions

$$C = \frac{p}{p_b} \cdot \frac{T_b}{T} \cdot \frac{Z_b}{Z}$$

p = Gas pressure at measurement conditions
p_b = Pressure at base conditions
T = Gas temperature at measurement conditions
T_b = Temperature at base conditions
Z_b = Compression factor at base conditions
Z = Compression factor at measurement conditions

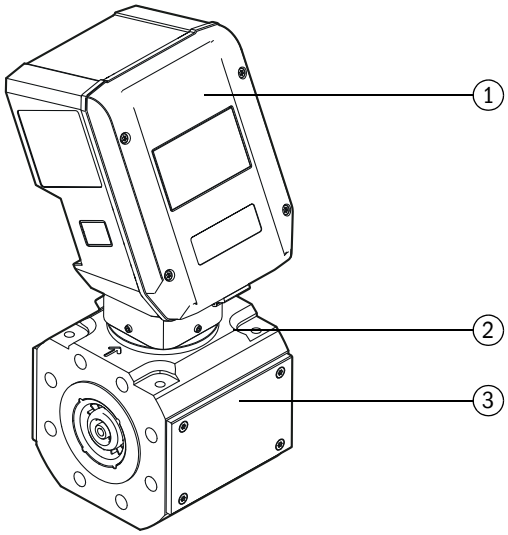
The measurement conditions are either determined with pressure and temperature sensors or entered as fixed value.

The following short forms are used in this document for better readability:
- Volume at base conditions = base volume
- Volume at flowing conditions = measurement volume

3.3 System components

The FLOWSIC550 measuring system comprises:

- the meter body with a straight pipe section with ultrasonic measuring paths and an integrated flow conditioner,
- the signal processing unit (SPU) measurement and interface electronic,
- optional pressure and temperature sensors for the volume conversion device option.



1 Signal processing unit (SPU)
2 Meter body
3 Cover for ultrasonic transducers

Fig. 2: FLOWSIC550 components

3.3.1 Meter body

The meter body is available in various flange standards and fitting lengths to connect the gas flow meter to the system pipeline. Depending on the version, the adapter is designed for assembly on line flanges CL300 or CL600 in accordance with ASME B16.5 or PN40 or PN63 in accordance with EN 1092-1.

An internal flow conditioner rectifies the gas flow in the gas flow meter so that flow profile disturbances caused by pipe bends in the inlet or outlet sections or components projecting into the pipe (e.g. a thermowell) are negligible on measuring results.

For the required inlet and outlet sections, see “Installation configurations”, page 29.

3.3.2 Ultrasonic transducers

Ultrasonic transducers optimally tuned to system requirements are fitted on the measuring device. The high quality of the transducer design provides the basis for accurate and highly stable transit time measurement of the ultrasonic signals.

3.3.3 Signal processing unit (SPU)

The signal processing unit (SPU) contains all the electrical and electronic components for controlling the ultrasonic transducers. It generates transmission signals and analyzes the received signals to calculate the measuring values. The SPU also contains several interfaces for communication with a PC or standardized process control system.

The SPU is fitted with:

- Control unit
- Electrical interfaces
- Batteries
- Display

3.4 Operating software FLOWgate™

3.4.1 Overview

The FLOWgate™ operating software allows user-friendly access to operating actions and measured values of the device.

Software functions

- Measured values overview
- Diagnosis data
- Logbook and archive management
- Commissioning
- Parameter modification
- Session browser

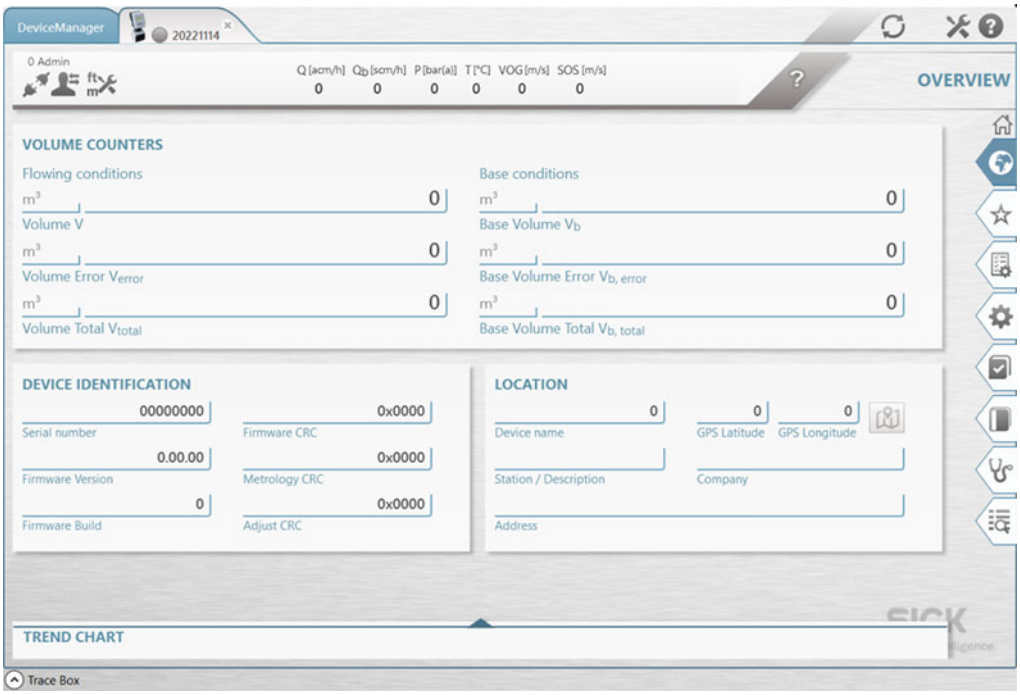


Fig. 3: FLOWgate™ operating software (example overview page)

3.4.2 System requirements

- Microsoft Windows 7/8/10
- Min. 1 GHz CPU
- Min. 512 MB RAM
- About 100 MB free disk capacity (without .NET framework)
- USB or serial interface
- Recommended minimum screen resolution: 1024 x 768 pixels, optimum screen resolution 1368 x 768 pixels
- Microsoft .NET framework 4.6

3.5 Interfaces

3.5.1 Overview

Table 2: Interfaces FLOWSIC550

Interface	Configurable as	Output options
DO_0	Pulse	• Volume a.c. (undisturbed) • Volume a.c. (total) • Volume s.c. (undisturbed) • Volume s.c. (total)
	Status	• Measured value valid • Warning • Error
	Encoder	• Standard Ecoder • Elster Encoder
	Inactive	
DO_1	Pulse	• Volume a.c. (undisturbed) • Volume a.c. (total) • Volume s.c. (undisturbed) • Volume s.c. (total)
	Status	• Measured value valid • Warning • Error
	Inactive	
DO_2	Pulse	• Volume a.c. (undisturbed) • Volume a.c. (total) • Volume s.c. (undisturbed) • Volume s.c. (total)
	Status	• Measured value valid • Warning • Error
	Inactive	
RS485_1	Modbus RTU	
	Modbus ASCII	
	ISO 17089-1	
	Not connected	
RS485_2	Modbus RTU	
	Modbus ASCII	
	ISO 17089-1	
	Not connected	

3.5.2 Digital outputs

Pulse and status outputs

FLOWSIC550 has three digital outputs. The digital outputs are electrically isolated.

DO_1 and DO_2 can be operated as NAMUR or Open Collector.

FLOWSIC550 has two pulse transmitters that can be used for up to two independent pulse outputs. Both pulse transmitters have a maximum frequency of 2kHz. A frequency of maximum 10 Hz should be used for battery operation.

All digital outputs can be individually parameterized for the output of status information or for pulse output. The digital outputs are updated synchronously once per second.

Encoder

Alternatively, NAMUR switching output DO_0 can be configured so that the totalizer level of the totalizer V_m, the meter state and a meter identification are output via asynchronous serial communication. This allows the connection of volume converters with a suitable input for encoder totalizers.

NOTICE:
With encoder communication, it must be ensured that the transmitted digit count or totalizer resolution can be processed by the connected volume converter.
A parameter modification can be carried out on the FLOWSIC550 with the FLOWgate™ operating software when the parameter locking switch is open.

3.5.3 Serial data interface

FLOWSIC550 has two RS485 interfaces designed as externally powered RS485 and requires an external intrinsically safe power supply for operation.

3.5.4 Service interface

A wired adapter M12/USB (accessory) can be used to connect to the meter with the FLOWgate™ operating software. The interface can be used to read out data and parameter settings, to configure the FLOWSIC550.

3.6 Totalizers

3.6.1 Device status and totalizers used

The gas flow meter displays the totalizer standard volume under undisturbed conditions. If malfunction occurs, the totalizer is stopped.

3.6.2 Reverse flow

The FLOWSIC550 is designed as unidirectional and has a configurable zero-flow cutoff. The zero-flow cutoff can be specified when ordering and will be preconfigured accordingly.

The totalizers are stopped during reverse flow and this volume is counted in a separate buffer totalizer. When normal operation resumes, the buffer totalizer is first computed with the flow rate.

The totalizers are first incremented again after the reverse flow volume has passed through. During reverse flow, the meter first switches to warning when the preconfigured buffer volume has been exceeded. A warning message is output on the device.

The zero-flow cutoff (measuring threshold for low flow rate) and the buffer volume (limit value for reverse flow volume) can be adjusted.

3.7 Data processing in FLOWSIC550

3.7.1 Logbooks

Event logbook

Maximum number of entries: 1000

All events are recorded in the event logbook with timestamp, totalizer level, user ID of the active user, the event code and additional information if necessary.

When the Event logbook is full, the FLOWSIC550 changes to device status "Malfunction", error E-3001 is displayed. A warning can be generated when a parameterized level is reached, warning W-2001 is displayed.

The event logbook can only be reset when the parameter locking switch is open.

Parameter logbook

Maximum number of entries: 200

All parameter changes are recorded with timestamp, user ID of the active user, totalizer level, old and new parameter value and register number.

The oldest entries are overwritten when the Parameter logbook is full.

Metrology logbook

Maximum number of entries: 50

Selected custody-relevant parameters can be changed when the parameter locking switch is closed. All changes to the selected custody-relevant parameters are recorded with timestamp, totalizer level, user ID of the active user, old and new parameter value and register number.

When the Metrology logbook is full, custody-relevant parameters can be modified only after the parameter locking switch has been opened. The device changes to device status "Warning", warning W-2002 is displayed.

The metrological logbook can be deactivated when the parameter locking switch is closed

Parameter changes to the following parameters are entered in the Metrology logbook as long as entries are possible:

- Meter factor
- Ambient pressure
- Warning limit for pressure and temperature
- Warning limit for the flow rate
- Default and fixed values for pressure and temperature
- Deactivation of the metrological logbook
- Heating value and fixed value for compressibility

Gas parameter logbook

Maximum number of entries: 150

All parameter changes of the gas composition for the volume conversion withtimestamp, user logged on, totalizer level, old and new parameter values and register number The oldest entries are overwritten when the Gas composition logbook is full.

The Gas composition logbook can only be cleared when the parameter locking switch is open.

Table 3: Gas composition parameters for volume conversion

Parameter	Description
Relative density	Relation between gas density and air density under reference conditions
Reference density	Gas reference density under reference conditions
Heating value	Gas heating (under reference conditions)
Carbon dioxide (CO_2)	CO_2 proportion in gas
Hydrogen H_2	H_2 proportion in gas
Nitrogen N_2	N_2 proportion in gas
Methane CH_4	Methane proportion in gas
Ethane C_2H_6	Ethane proportion in gas
Propane	Propane proportion in gas
Water H_20	Water vapor proportion in gas
Hydrogen sulfide H_2S	Hydrogen sulfide proportion in gas
Carbon monoxide CO	Carbon monoxide proportion in gas
Oxygen O_2	Oxygen proportion in gas
i-butane	i-butane proportion in gas
n-butane	n-butane proportion in gas
i-pentane	i-pentane proportion in gas
n-pentane	n-pentane proportion in gas
n-hexane	Hexane proportion in gas
n-heptane	Heptane proportion in gas
n-octane	Octane proportion in gas
n-nonane	Nonane proportion in gas
n-decane	Decane proportion in gas
Helium	Helium proportion in gas
Argon	Argon proportion in gas

3.7.2 Archives

The integrated data registration stores totalizer levels, maximums and other data in the following archives:

Measuring period archive

Maximum number of entries: 6000

Totalizers and data saved after the measuring period elapses (standard = 60 min). The measuring period can be adjusted.

The recording period can configured in the range of 3 minutes to 60 minutes.

By default, the oldest entries are overwritten when the measuring period archive is full.

Daily archive

Maximum number of entries: 600

Totalizers and data are saved at the defined gas hour time (standard = 06:00)

By default, the oldest entries are overwritten when the daily archive is full.

Monthly archive

Maximum number of entries: 25

Totalizers and data are saved at the defined gas day time (standard = 1st day of month)

By default, the oldest entries are overwritten when the monthly archive is full.

Diagnostics archive

Maximum number of entries: 6000

Diagnostic data is saved in the diagnostic archive at cyclical intervals. The storage period can be configured in the range can configured in the range of 15 minutes to 6 hours.

By default, the oldest entries are overwritten when the diagnostics archive is full.

3.7.3 Protection of parameters from undesired changes

User identification and authentification

Users must identify themselves with a user ID and a user password as protection against manipulation attempts. An access level which allows access to certain settings and commands is assigned to every user level.

Configuration mode

General protection of all (configuration) parameters from undesired changes.

Configuration mode can be activated only from access level “Authorized user”.

Parameter locking switch

The parameter locking switch is a hardware switch in the device and is normally located underneath a calibration seal. The parameter locking switch serves for protection against unauthorized parameter changes. Certain parameters that are protected with the parameter locking switch can also be changed when the parameter locking switch is closed. These changes are possible only when free entries exist in the metrology logbook.

Interface write protection

The interface write protection can be activated separately for each interface and becomes effective when the parameter locking switch is closed. If the interface write protection is activated, all write accesses are rejected regardless of login or configuration mode. Exceptions are user login/logout, reading out signals and reading out logbooks and archives.

3.8 Sealing

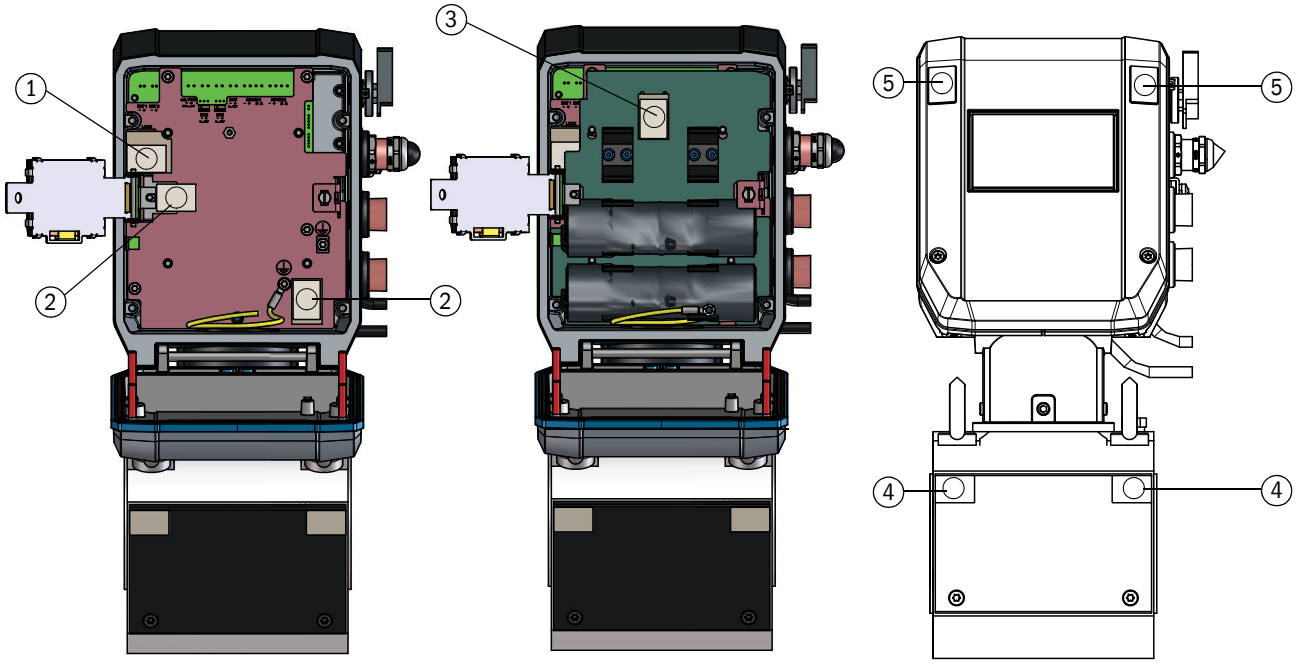
The flow meter has sealing points at the parameter locking switch (1), the shielding sheet (2), the transducer covers (4) and at the terminal compartment (3).

The sealing of the transducer covers is realized by at least two sticker seals per cover.

During commissioning, the terminal compartment must be sealed according to national regulations. The sealing is realized by a sticker seal on the mounting screw for the battery holder which serves as a terminal compartment cover.

By attaching a sticker seal bearing his own symbol, the operator of the meter can optionally secure the display cover (5) against tampering. The seal shall be placed in about equal parts on the cover and the meter housing.

The seal on the display cover must be opened in the event of a battery exchange.



1 Parameter locking switch
2 Electronics cover plate/shielding sheet
3 Terminal compartment cover
4 Transducer cover
5 Display cover

Fig. 4: Sealing positions

External pressure and temperature sensors

During commissioning, the connection of the external pressure and temperature sensors must be sealed according to national regulations.

The sealing is realized by means of capstan head screws, a tight stretched wire, and a wire seal.

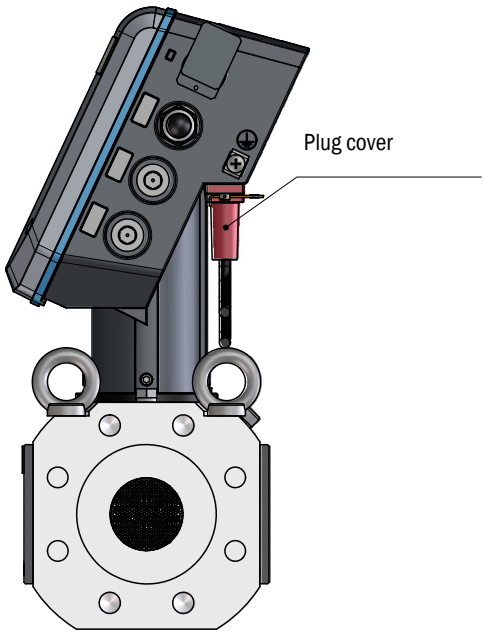


Fig. 5: Tamper protection, plug cover for the external pressure and temperature sensors

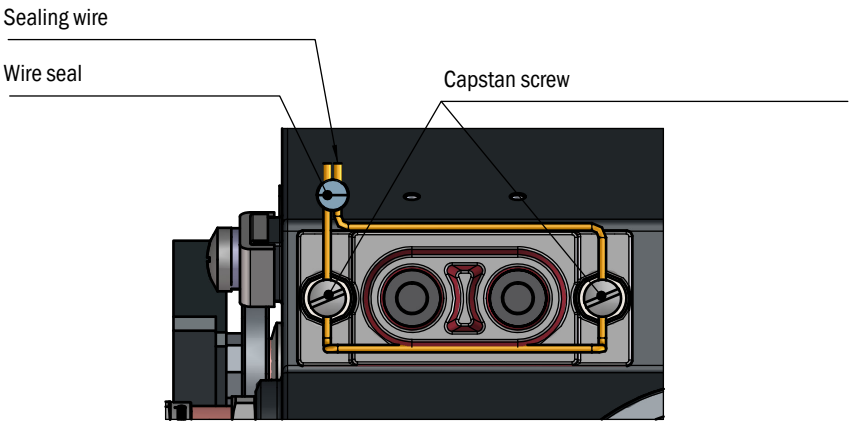


Fig. 6: Sealing – Detailed view from below

3.9 Volume conversion (option)

The FLOWSIC550 gas flow meter with volume conversion captures the gas volume under measurement conditions and converts it to a volume under base conditions.

Gas volume conversion runs as PTZ volume conversion. Measurement conditions are recorded with the pressure and temperature sensors or entered as fixed values.

By default, measured values recording and subsequent calculation of the conversion factor are performed every 30 seconds. The update interval can be adjusted.

Depending on the configuration, the compressibility factor (K-factor) is determined with one of the following calculation methods or can be entered as a fixed value.

- Fixed value
- SGERG88
- AGA 8 Gross method 1
- AGA 8 Gross method 2
- AGA8-DC92
- AGA NX-19
- AGA NX-19 mod.
- AGA NX-19 mod. GOST
- GERG91 mod.

FLOWSIC550 checks the permissible entry limits of the parameters for the selected calculation method. If one of the entry values is outside the limit values, the FLOWSIC550 switches to malfunction state and uses the fixed value of the compressibility factor for calculation of the basis volume.

A relative pressure sensor EDT23 or the functionally compatible successor model EDT96 and a temperature sensor EDT34 or the functionally compatible successor model EDT87 measure current measurement conditions and transfer the sensor type, measured value as well as the sensor status via a digital interface.

The FLOWSIC550 reads the valid measuring range automatically and, periodically, the current status and measured value.

A sensor is only activated for measurement when the configured serial number matches the serial number transferred for the sensor.

If no sensor is detected or a sensor is not functioning correctly, the FLOWSIC550 automatically uses the stored default value (= fixed value) of the state variable.

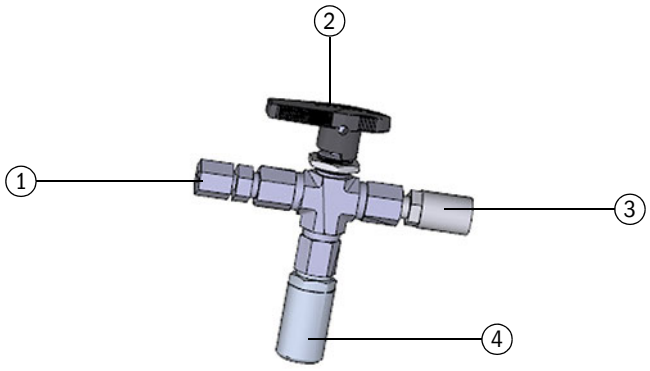
In this case, the FLOWSIC550 switches to malfunction state and, using the default value, stores the volume under base conditions calculated for pressure or temperature in the error volume counter.

If not specified otherwise, the FLOWSIC550 is supplied with the following standard settings:

Unit system	SI	Imperial
T unit	°C	° F
P unit	bar	psi
Symbols according to	EN 12405	API
Calculation method	SGERG88	AGA 8 Gross method 1
Reference conditions for density and heating value	(T1/T2/p2) 25 °C/0 °C/1.01325 bar (a)	(T1/T2/p2) 60 °F/60 °F/14.7300 psi (a)
Basic pressure	1.01325 bar (a)	14.7300 psi (a)
Basic temperature	0 °C	60 °F

The FLOWSIC550 with volume conversion and external sensors is used at measuring ports where a test/calibration of the pressure or temperature sensor in the system may be required.

It is recommended to install a three-way test valve that separates the pressure sensor from the measurement pressure and provides a test connection to test the pressure sensor.



1 Pipe screw fitting 1/4“ NPT on pipe D06
or pipe screw fitting 1/4“ NPT on pipe 1/4“
2 Hand lever
3 Test connection (Minimess coupling)
4 Pressure sensor, connection thread G 1/4“

Fig. 7: Three-way test valve with p-sensor and Minimess coupling

4 Transport and storage

4.1 Transport

During all transport and storage work, ensure:

- The measuring device is always well secured.
- Measures to prevent mechanical damage have been taken.
- Ambient conditions are within specified limits, see “Technical data”, page 52.

WARNING: Hazard due to heavy loads
When transporting the measuring device, there is a risk of crushing and impact due to the high weight.
- The measuring device may only be transported by competent persons.
- Only use lifting gear and equipment (e.g. lifting straps) suitable for the weight to be lifted.
- The lifting lugs are designed for transporting the meter only. Do not lift or transport the measuring device with additional loads using these lugs.
- Never attach lifting gear to the signal processing unit and avoid contact between these parts and the lifting gear.

Lifting requirements

If a lifting angle of 45 ° cannot be ensured due to construction of the FLOWSIC550 a suitable traverse hoist must be used for lifting.

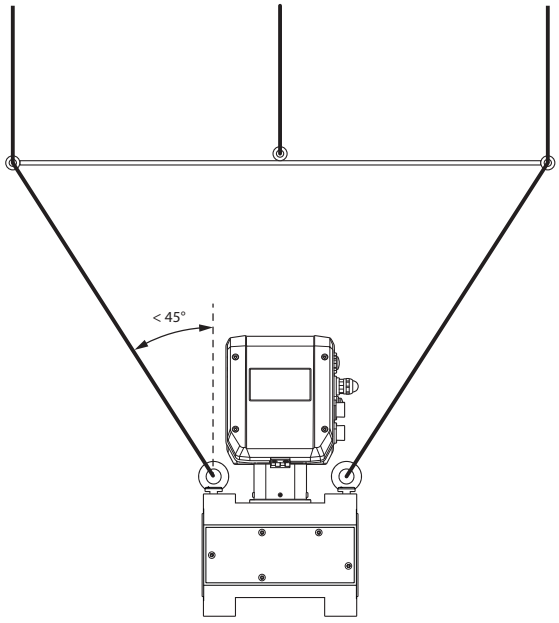


Fig. 8: Lifting requirements

4.2 Storage

- Ensure that storage conditions are within specified limits, see “Technical data”, page 52.

5 Project planning

5.1 Preparing the measuring point

- Select a suitable installation location.
- Ensure adequate assembly clearances.

5.2 Choosing flanges, gaskets and other components

NOTICE:
For flange connections only use pipeline flanges, bolts, nuts and gaskets suitable for the maximum operating pressure, maximum operating temperature as well as ambient and operating conditions (external and internal corrosion).

Mounting material is available from Endress+Hauser.

Table 4: Mounting material

Part No.	Description
2130423	Mounting kit for FLOWSIC550 meter installation 2", flange type ANSI300/ANSI600
2130428	Mounting kit for FLOWSIC550 meter installation 3", flange type ANSI300/ANSI600
2136593	Mounting kit for FLOWSIC550 meter installation 4", flange type ANSI600
2136594	Mounting kit for FLOWSIC550 meter installation 4", flange type ANSI300
2136595	Mounting kit for FLOWSIC550 meter installation 6", flange type ANSI600
2136596	Mounting kit for FLOWSIC550 meter installation 6", flange type ANSI300
2133645	Mounting kit for FLOWSIC550 meter installation DN50, flange type PN40
2133648	Mounting kit for FLOWSIC550 meter installation DN80, flange type PN40
2133721	Mounting kit for FLOWSIC550 meter installation DN50, flange type PN63
2133720	Mounting kit for FLOWSIC550 meter installation DN80, flange type PN63
2143418	Mounting kit for FLOWSIC550 meter installation DN100, flange type PN63
2143419	Mounting kit for FLOWSIC550 meter installation DN100, flange type PN40
2143420	Mounting kit for FLOWSIC550 meter installation DN150, flange type PN63
2143421	Mounting kit for FLOWSIC550 meter installation DN150, flange type PN40
2075562	Adapter for connecting the EDT96 pressure sensor, NPT 1/4“ - G 1/4“, stainless steel

6 Mounting

6.1 Safety

WARNING: Hazards during installation work
- ▶ Do not carry out any welding work on lines with meters fitted.
- ▶ Comply exactly with mandatory and approved methods.
- ▶ Observe and comply with regulations of the plant operator.
- ▶ Meticulously check completed work. Ensure leak tightness and strength.

Otherwise hazards are possible and safe operation is not ensured.

WARNING: Hazards through the gas in the system

The following conditions can increase the risk:
- Toxic gas or gas dangerous to health
- Explosive gas
- High gas pressure

- ▶ Only carry out installation, maintenance and repair work when the system is non-pressurized.

WARNING:
- ▶ Observe applicable valid regulations, general standards and guidelines.
- ▶ Observe local safety regulations, operating instructions and special regulations.
- ▶ Observe the safety information in this document.
- ▶ Persons carrying out installation work must be familiar with the directives and standards applicable for pipeline construction and have the corresponding qualifications.

NOTICE: VCI corrosion protection

Remove the protective foam inside the meter body before mounting the device. Otherwise, the device may be damaged and the measuring characteristics could be impaired.

6.2 Scope of Delivery

The measuring device is delivered preassembled in sturdy packaging.

- ▶ Inspect for transport damage when unpacking the device.
- ▶ Document any damage found and report this to the manufacturer.

NOTICE:

Do not put the measuring device into operation if you notice any damage!

Scope of delivery

- ▶ Check the scope of delivery for completeness.

The standard scope of delivery comprises:

- Measuring device (meter body and SPU, already fitted)
- Mounting material

6.3 Installation configurations

Inlet and outlet piping

Depending on predisturbance:

- Mild: 3D straight inlet/2D straight outlet
- Severe: 5D straight inlet/2D straight outlet

At a distance up to 5DN upstream to the flow meter, the following elements must not occur:

- a valve which is not always fully open during operation
- a pressure regulator

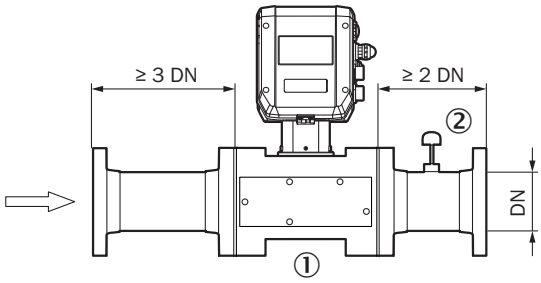


Fig. 9: Installation requirements

Temperature sensor

The temperature sensor must be be installed in the customer's pipeline downstream of the measuring point.

The temperature sensor shall not be disposed more than 5 DN downstream of the gas flow meter.

The serial number can be changed; parameter locking switch must be opened for this (seal must be broken). Access rights: Authorized user

6.4 Fitting the FLOWSIC550 in the pipeline

The measuring device can be installed horizontally or vertically.

Installation location

Fit the device in an easily accessible and protected position. Carry out all assembly work on-site. The following must be taken into account:

- Maintain the ambient temperature range in accordance with the technical data under consideration of possible radiant heat (shield when necessary).
- Protect the device against direct sunlight and atmospheric conditions.
- Select an installation location free from vibrations when possible and stabilize vibrations when necessary.
- Provide sufficient clearance for cables and opening the front panel.
- Select an installation location free of chemical influence

Installation in pipeline

NOTICE: Observe the gas flow direction
Install the device so that the flow conditioner is at the gas inlet.

1 Select suitable bolts.
2 Position the measuring device in the desired location in the pipeline. Lay the pipelines without tension to the device to be installed!
3 Insert and align the gaskets. The gaskets must not project into the area through which the gas flows and must be centered on the sealing surface.
4 Apply lubricant to the bolts.
5 First screw the bolts by hand into the meter body to the stop.
6 Check the thread length in the meter body is fully utilized.
7 Then install the washers and nuts, and tighten them by hand.
8 Check whether the thread length of the nut is fully utilized. If necessary, use a different bolt length.
9 Check correct positioning of flange gaskets. The gaskets must not project into the area through which the gas flows and must be centered on the sealing surface.
10 Tighten nuts evenly and crosswise in small steps until the specified tightening torque is reached. Make sure the flange sits free of tension.
11 Slowly increase the pressure in the pipeline.
Gradient: Max. 1 MPa/min (10 bar/min)
12 Carry out a leak tightness check on the pipeline (in accordance with the pipeline operating company's specifications).

6.5 Signal processing unit alignment

1 The signal processing unit can be rotated rotated a maximum of ±180°.
2 Loosen the four screws on the SPU neck.
Required tool: Torx screwdriver (T25)
3 Turn the meter body to the desired position.

NOTICE:
Always make sure that the SPU is not rotated more than ±180°. Otherwise, the cables will be damaged.

4 Retighten the four screws on the SPU neck that were previously loosened (3 Nm (2.2 lbf ft)).

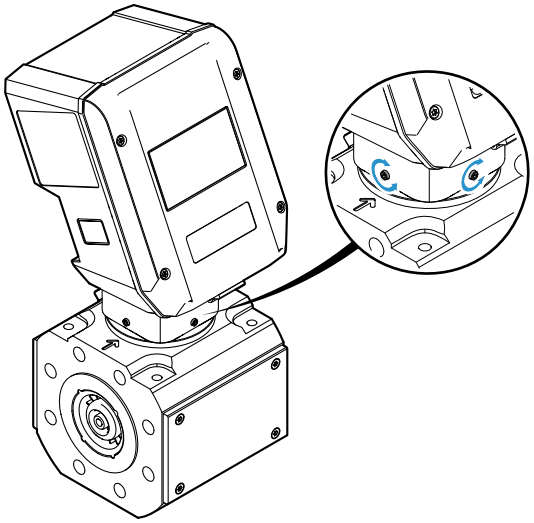


Fig. 10: Screws on the SPU neck

7 Electrical installation

7.1 Safety

All assembly work previously described must be completed (as far as applicable) before-starting installation work.

WARNING: Electrical hazard
Incorrect cabling can cause device malfunctions, failure of the measurement system or serious injuries.
- ▶ Observe the relevant safety regulations as well as the safety notices in during all installation work, see “For your safety”, page 8.
- ▶ Take suitable protection measures against possible local hazards or hazards arising from the equipment.
- ▶ All work may only be carried out when the device is disconnected from the power supply.

Requirements for use in potentially explosive atmospheres

The FLOWSIC550 is designed for use in potentially explosive atmospheres according to the respective device version, see “Technical data”, page 52

WARNING: Risk of ignition through impacts or friction
The ultrasonic transducers are manufactured from titanium. In rare cases, ignition sources due to impact or friction sparks could occur.
The user shall ensure that the ultrasonic transducers are suitably protected against danger from impact or friction

7.2 Opening and closing the electronics cover

Opening the electronics cover

1 Loosen the 4 screws on the electronics cover.
2 Open the electronics cover.

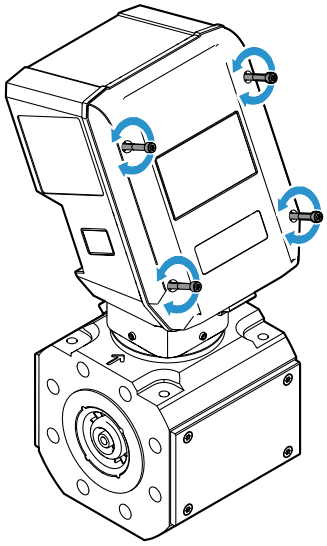


Fig. 11: Screws on the electronics cover

Closing the electronics cover

1 Close the electronics cover.
2 Retighten the four screws on the SPU cover that were previously loosened (3.5 Nm (2.58 lbf ft)).

7.3 Removing and inserting the battery carrier

1 Loosen the screw on the display holder by hand.
2 Fold the display to the side.
3 To remove the battery carrier, slide the carrier upwards and then remove it.

To reinsert the battery carrier, place the carrier on the screws with the larger holes. Then slide it downwards. Fold the display forwards again and screw the display holder in place.

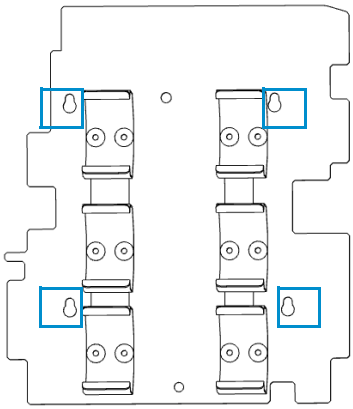
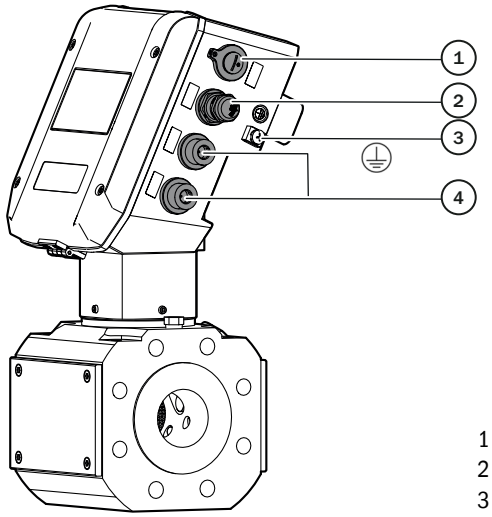


Fig. 12: Battery carrier

7.4 Electrical connections

Electrical connections



1 M12 plug (service interface)
2 Cable gland (NPT 1/2“ or M20)
3 Exterior ground terminal
4 Cable entries (NPT 1/2“ or M20)

Fig. 13: Electrical connections

Devices with ANSI flanges are provided with NPT 1/2“ cable glands and entries, devices with PN flanges are provided with M20 cable glands and entries.

Terminal assignment

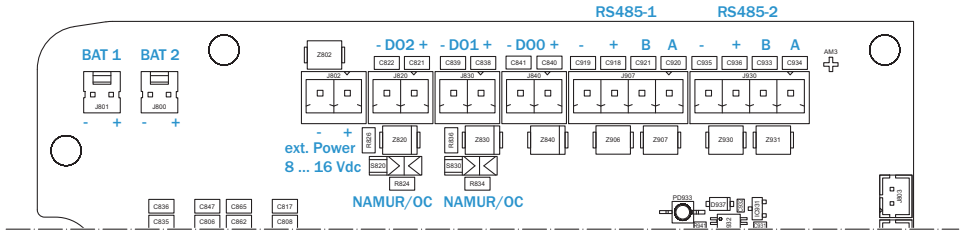


Fig. 14: Terminal assignment FLOWSIC550

Terminal connectors are included in scope of delivery.

Operating parameters

Input/output	Function/signal	Operating parameters
BAT1 “+”	Battery power supply	Battery Pack Article number: 2064018
BAT1 “-”		
BAT2 “+”	Battery power supply	Battery Pack Article number: 2064018
BAT2 “-”		
Ext. Power	External power supply	8 ... 16 V DC
DO0 “+”	Digital output DO0 “+“	NAMUR, electrically isolated Maximun rated voltage 16 VDC Ion = 3.6 mA @ 8.2V 1KΩ Ioff = 0.75 mA @ 8.2V 1KΩ
DO0 “–“	Digital output DO0 “-“	
DO1 “+”	Digital output DO1 “+“	Passive, electrically isolated, configurable as: OC (Open Collector): U = 3 VDC...16 VDC I_{MAX} = 20 mA R_{ON} < 10 Ω (U_{Drop} < 1.5V) R_{OFF} >1 MΩ or NAMUR: Maximum rated voltage 16 VDC I_{on} = 3.6 mA @ 8.2V 1KΩ I_{off} = 0.75 mA @ 8.2V 1KΩ
DO1 “-”	Digital output DO1 “-“	
DO2 “+”	Digital output DO2 “+“	
DO2 “-”	Digital output DO2 “-“	
⏚	Grounding	

Safety data of power supply

NOTICE:

Only three operation modes are allowed:

- External power
- External power plus one battery pack (as backup)
- Two battery packs without external power

The use of all power inputs simultaneously is not allowed.

Terminal/ Connector	Function	Ui [V]	Ii [mA]	Pi [mW]	Ci [nF]	Li [µH]
Ext. Power	External power supply	20	666	930	0	2.64

Safety data of Inputs and outputs

Termi-nal	Function	active					passive				
		Uo [V]	Io [mA]	Po [mW]	Co [µF]	Lo [mH]	Ui [V]	Ii [mA]	Pi [mW]	Ci [µF]	Li [mH]
Interfaces for interconnection with auxiliary equipment											
D00	Digital output 0 optical isolated	—	—	—	—	—	20	—	1100	0.024	0
D01	Digital output 1	—	—	—	—	—	20	—	1100	0.024	0
D02	Digital output 2	—	—	—	—	—	20	—	1100	0.024	0
RS485 -1	RS485 Data interface, external [Ex ia] power supply required	—	—	—	—	—	15	—	1100	IIA / D: 2.5 IIB /C, D: 1.5 IIC / A, B, C, D: 0.25	—
RS485 -2	RS485 Data interface, external [Ex ia] power supply required	—	—	—	—	—	15	—	1100	IIA / D: 2.5 IIB / C, D: 1.5 IIC / A, B, C, D: 0.25	—
Interface for interconnection with auxiliary service equipment											
M12 connector	Service/Wireless Dongle	8.2	410	688	IIA / D: 1000 µF IIB / C, D: 81 µF IIC / A, B, C, D: 7.6 µF	0.165	n/a	n/a	n/a	n/a	n/a

7.4.1 Cable specifications

WARNING: Electrical hazard

- The cables and wires must be permanently installed. The plant operator must provide adequate strain relief.
- Cables must have a permitted operating temperature of min. 70 °C (158 °F).

NOTICE: Requirements on cables and installation

- Pay attention to the requirements in EN 60079-14 when selecting the cables and during installation!
- Further legal requirements must be observed for use in explosive atmospheres.
- Only copper wires may be used.

Cables

- Protect cables especially endangered by thermal, mechanical or chemical stress, e.g. by laying in protective tubes.
- Cables must be flame-retardant according to DIN VDE 0472 Part 804. The fire behavior according to B / IEC 60332-1 must be approved.
- The existing air and creepage paths according to EN 60079-7 or EN 60079-15 may not be reduced by cable connections in the terminal box.
- Protect the wire ends with connector sleeves against fraying.
- Connect unused wires to ground or safeguard so that a short circuit with other conductive parts is excluded.
- Carry out potential equalization in accordance with EN 60079-14.

RS485

Supply voltage: 5 ... 10 VDC

Recommended cable cross section: 0.25 ... 1.5 mm^2, twisted pair, shielded

Maximum cable length: 500 m total length

Digital outputs

Recommended cable cross section: 0.25 ... 1.5 mm^2

Pressure and temperature sensor

Maximum cable length: 3 m

7.5 Battery operation

WARNING: Hazard through wrong spare parts
- ▶ Only the exchangeable battery packs from Endress+Hauser with Part No. 2064018 may be used for the power supply of the device.
- ▶ Do not use damaged batteries; they must be disposed of correctly!

The battery packs are already inserted in the device.

Connect the batteries to the BAT1 and BAT2 terminals.

Service life of battery packs

Under typical operating conditions, the expected total service life of both battery packs is 5 years.

There is no switchover from one battery to the other when one battery is empty. Both batteries are used at the same time.

Battery life may vary depending on the I/O configuration:

- In battery operation, preferably use DO_1 and DO_2 (LF + status or 2 times LF).
- Configure status outputs so that they are inactive during normal operation.
- If DO_0 is active, the power consumption of the device is significantly increased. In battery operation, DO_0 may only be used for status "Warning" and "Error".

The FLOWSIC550 needs more power:

- when the display is used frequently,
- when the wireless interface is used frequently,
- when the serial data interface is used frequently.

The capacity of the batteries is reduced in unfavorable climatic conditions, for example when the temperatures are significantly higher or lower than 25 °C (77 ° F).

7.6 Installing the pressure and temperature sensor

Pressure sensor

NOTICE:

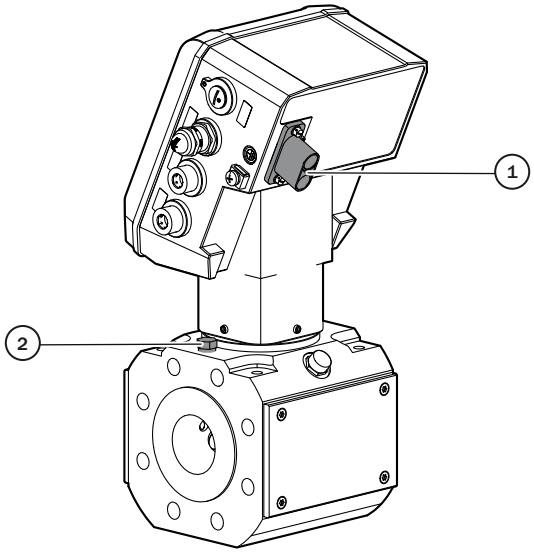
- The pressure measuring port to be used for measurement is marked "P_M".
- The thread on the meter body is damaged when a wrong thread type is screwed in. When the meter body has an NPT 1/4" thread, screw in the adapter from NPT 1/4" to G1/4" (Part No. 2075562) before using the accessory parts available from Endress+Hauser.

NOTICE:

Ensure sufficient clearance to the wall or other components at the rear measuring port when installing the sensor.

Temperature sensor

The temperature sensor must be installed in the customer's pipeline downstream of the measuring point.



1 M8 connectors for connection of pressure and temperature sensor
2 Pressure measuring port "P_M"

Fig. 15: Connecting the pressure and the temperature sensor

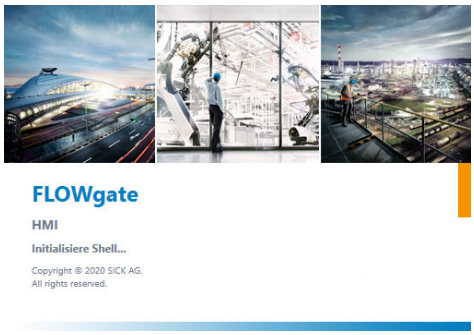
8 Commissioning

8.1 Important information

All activities described in “Mounting” and “Electrical installation” must be completed before commissioning.

8.2 Commissioning with the FLOWgate™ operating software

8.2.1 Auxiliary means and accessories required

FLOWgate™ is available on the Endress+Hauser website. 	The current FLOWgate™ version is available via www.endress.com
Service adapter (M12/USB)	Included in scope of delivery

8.3 Connecting to the device

1 Install the FLOWgate™ operating software.
2 Connect the service adapter to the service interface (M12 connector) and to the USB interface of your computer.

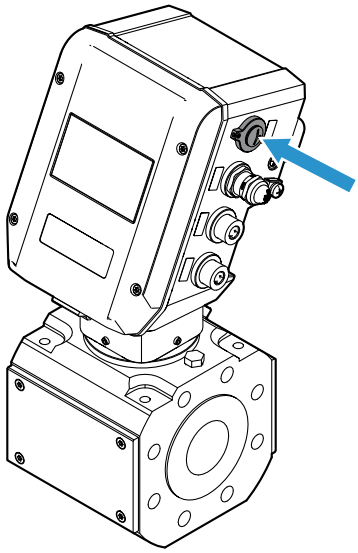


Fig. 16: Service interface

3 Press the push button to activate the service interface.

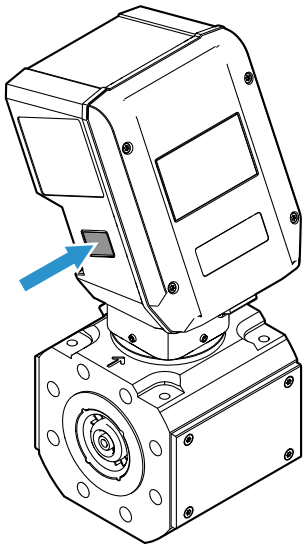
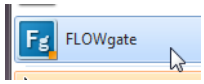


Fig. 17: Push button

Note:
The display and the service interface have a timeout and switch off after approx. 5 minutes (default setting) when no button has been pressed and no data transmission takes place.

4 Click on the icon to start FLOWgate™:



5 In FLOWgate™ click on icon “Scan” and scan for the device:

Default configuration of the service interface:
Protocol type: MODBUS-RTU
Baud rate: 38400
Protocol bits: 8N1

6 When the device has been found, click on “Connect”.
After successful login the Overview page is displayed.

8.3.1 Field setup wizard

8.3.1.1 *Identification*

Device serials

▶ Check the device serial numbers: Compare the entries against the type plate.

Device data

▶ Check the device serial numbers: Compare the entries against the type plate.

Device information

▶ Enter a device name: The device name is freely selectable.

Location

The GPS coordinates of the gas flow meter can also be entered as an option.

This allows showing the location of the gas flow meter on Google maps.

8.3.1.2 *System/user*

Device date and time

Enter the date and time or synchronize with the PC.

Device units

The units are set at the factory as ordered.

Check the settings and adapt if necessary.

User management

NOTICE:
Endress+Hauser recommends changing the initial password provided for the administrator for security reasons.

Please refer to the delivery documentation for the device-specific administrator password.
Otherwise the standard password for the Administrator is valid: 3333

Further users can be created here:

▶ Enter a user name.
▶ Specify a password. The password must comprise 4 digits.
▶ Activate the associated checkbox.
Up to three users and authorized users can be created.

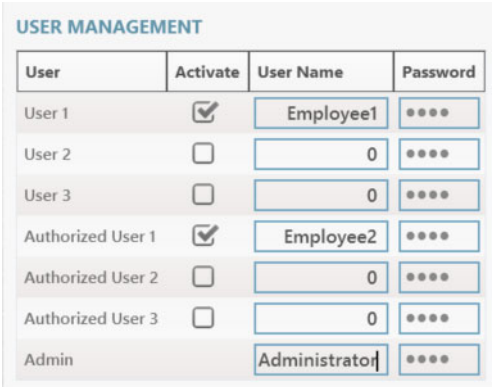


Fig. 18: Example: New users

Power management

- ▶ Select the power management configuration:
  - “Battery powered”
    Self-sufficient power configuration: 2 internal longlife battery packs
  - “Line powered with battery”
    External power supply and one internal battery pack
  - “Line powered”
    External power supply

8.3.1.3 *Warnings*

Warning limits

The standard limits for natural gas applications are set at the factory.

Configure the warning limits as desired for you application.

User warnings activation

The warnings signalled by the device can be individually activated or deactivated. Activate single warnings as desired.

8.3.1.4 *Archive/Logbooks*

Logbooks

- ▶ Select the counter which is used for logbook entries.
- ▶ Configure the Event logbook:
  - Stopping: A warning is output when the logbook is full.
  - Rolling: The oldest entries are overwritten when the logbook is full.
- ▶ Activate or deactivate the Metrology logbook

Data archive settings

- ▶ The interval for the Diagnostic archive is set at the factory; defaul: 60 minutes

8.3.1.5 *I/O Configuration*

In the I/O configuration step, the parameters can be set for the interfaces available in accordance with the ordered configuration.

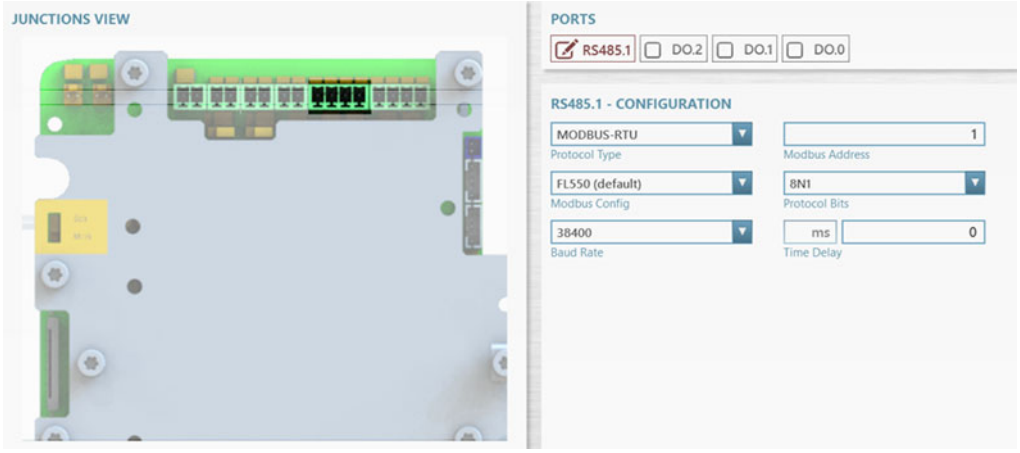


Fig. 19: Interface configuration

8.3.1.6 *EVC (Electronic Volume Converter)*

Only available for device option volume conversion

- ▶ Determine the reference values.
- ▶ Enter the specifications for gas characteristics.
- ▶ Select the algorithm and parameters for calculating the compressibility factor.
- ▶ Enter fixed values.

8.3.1.7 *Finalize*

Finalize

- ▶ If desired, reset the counters and clear the logbooks and the archive.

Generate reports

- ▶ Endress+Hauser recommends creating a parameter report and archiving the report with the delivery documentation.

8.3.2 Function check after commissioning

Check the device status.

Table 5: Signaling the device status in FLOWgate™

Status	Description
	Normal operation, neither warnings nor errors exist
	Device status warning: At least one warning is pending in the device, the measured value is still valid.
	Device status error: At least one error is pending in the device, the measured value is invalid.

Click on the symbol in the Status bar when warnings or errors exist.

The current Status overview opens and shows details and information on how to proceed.

9 Operation

9.1 Operating using the display

▶ Press the push button to switch the display on.

Note:
The display and the serviceinterface have a timeout and switch off after approx. 5 minutes (default setting) when no button has been pressed and no data transmission takes place.

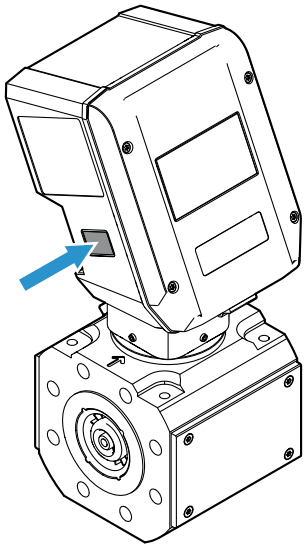


Fig. 20: Push button

Display elements

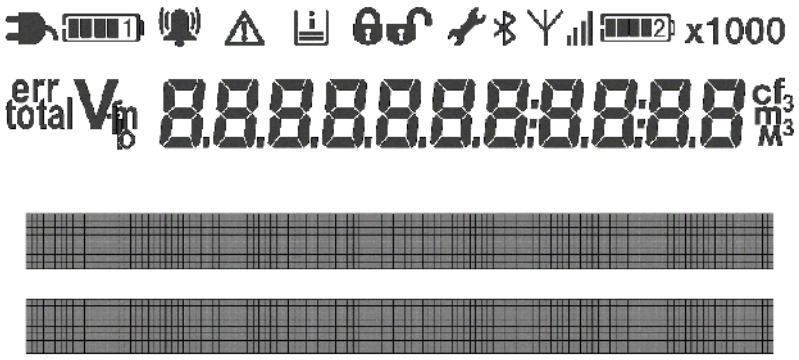


Fig. 21: Operating and display elements

Display test

Perform a display test by pressing the push button for 10 seconds.

9.2 Display in the symbol bar

Note:
If a value is measured under error conditions, the value is shown blinking on the display.

Symbol	Significance	Description
	External power supply	Displayed when the device is configured with external power supply.
	Meter Battery	Displayed when the device is configured for battery operation
	Device status: Malfunction	Blinking if the device has an error, the measured value is invalid.
	Device status: Warning	Blinking if device has a warning, the measured value is still valid.
	Registered events	Events have occurred since the last event summary reset.
	Parameter locking switch closed	Metrologically relevant parameters are protected against changing; modifications are registered in the Metrology logbook
	Parameter locking switch open	Metrologically relevant parameters can be changed; the modifications are not saved in the Metrology logbook.
	Configuration mode	Configuration mode is active, parameters can be changed.
x1000	Multiplier counter reading	Multiplier for the displayed counter reading.

9.3 Battery fill level display

The battery symbol changes as the battery is discharged.

Symbol	Description
	Battery fill level ≥ 75%
	Battery fill level ≥ 50%
	Battery fill level ≥ 25%
	Battery fill level ≥ 10%, the last segment of the battery symbol starts to blink when the battery fill level drops below 10%.

10 Maintenance

10.1 Maintenance work

WARNING: Ignition hazard
- To prevent ignition of flammable or combustible atmosphere, disconnect power (power supply and/or battery pack(s)) before servicing.

NOTICE:
Contact Endress+Hauser if any maintenance work should become necessary.

10.2 Cleaning

NOTICE: Cleaning information
- Only clean the device with a damp cloth.
- Do not use solvents for cleaning.
- Only use materials for cleaning which do not damage the surface of the device.

NOTICE: Cleaning procedure
A cleaning procedure for the inside of the flow meter is described in the Service Manual, which is provided after training.
The actions described in this document may only be carried out if they are compliant with the national metrological rules and guidelines.

10.3 Information on handling lithium batteries

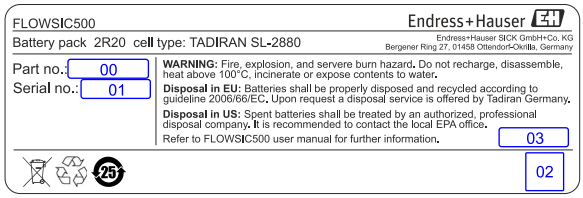
WARNING: Hazard through wrong spare parts
- Only the exchangeable battery packs from Endress+Hauser with Part No. 2064018 may be used for the power supply of the device.
- Do not use damaged batteries; they must be disposed of correctly!

WARNING: Transporting battery packs by air freight
- Comply with the national regulations when transporting used battery packs by air freight!

The battery packs are marked with important information concerning storage and disposal.

Table 6: Marking

Symbol	Significance
	Do not dispose with household trash.
	Recycling



Variable	Description
00	Part No.
01	Serial No.
02 DMC-Code	→ 00 + 01
03	Date

Fig. 22: Identification of battery packs

10.3.1 Information on storage and transport

- Prevent a short circuit of the battery terminals:
  - Store and transport the batteries in their original packaging
  - or tape the battery terminals.
- Store cool (under 21 °C (70 °F)), dry and without major temperature fluctuations.
- Protect against permanent sunlight.
- Do not store near the heating.

10.3.2 Disposal information

In the EU

- Dispose of lithium batteries in accordance with the Battery Directive 2006/66/EU.
- In Germany, you can hand in the batteries at your local recycling center. Alternatively, the battery manufacturer Tadiran Germany offers a return service on request.
  Contact data:
  Phone: +49 (0)6042/954-122
  Fax: +49 (0)6042/954-190
  www.tadiranbatteries.de

In the USA

- Batteries have to be disposed of by an authorized waste disposal company.
  Identification of lithium batteries:
  - Proper shipping name: Waste lithium batteries
  - UN number: 3090
  - Label requirements: MISCELLANEOUS, HAZARDOUS WASTE
  - Disposal code: D003
- If anything is unclear, contact the local office of the Environmental Protection Agency (EPA).

In other countries

Please observe national regulations for the disposal of lithium batteries.

11 Troubleshooting

11.1 Status messages

- Active errors or warnings are shown flashing in the LC display. Current errors or warnings can be retrieved under “Device status” /“Current events” with error code.
- Detailed information on the status messages is available via the FLOWgate™ operating software in the Diagnostics menu via the “Status Diagnostics” tile.

- ▶ Contact Endress+Hauser Customer Service for any malfunctions you cannot clear yourself.
- ▶ To help Customer Service to understand malfunctions that have occurred, the FLOWgate™ operating software provides the option to create a diagnostics file that can be sent to Customer Service.

11.1.1 Warnings and error messages

Table 7: Warning messages

Message	Logbook	Description
W-2001	Event	The Event logbook is almost full.
W-2002	Event	The Metrology logbook is full. Custody relevant parameters can only be modified after the parameter locking switch has been opened.
W-2003	Event	More pulses than permissible on the pulse output
W-2004	Event	More pulses than permissible on the pulse output 2
W-2005	Event	External power supply failure.
W-2006	Event	Battery fill level is low
W-2007	Event	Diagnostic limit exceeded
W-2008	Event	Flow rate measurement is in status “Warning”.
W-2009	Event	The measured flow rate is lower than the set warning limit.
W-2010	Event	The measured flow rate is higher than the set warning limit.
W-2011	Event	Limit reverse flow totalizer

Table 8: Error messages

Message	Logbook	Description
E-3001	Event	The Event logbook is full.
E-3002	Event	Check sum of totalizers is invalid.
E-3003	Event	Check sum of firmware is invalid.
E-3004	Event	Parameter is invalid.
E-3005	Event	Check sum of logbooks/archives is invalid.
E-3006	Event	Date/time invalid
E-3007	Event	Calibration mode active
E-3008	Event	System test active
E-3009	Event	Error in flow measurement
E-3010	Event	Error in volume conversion
E-3011	Event	Error in pressure measurement
E-3012	Event	Error in temperature measurement

Message	Logbook	Description
E-3013	Event	Pressure is lower than the permissible customer limit
E-3014	Event	Pressure is higher than the permissible customer limit
E-3015	Event	Temperature is lower than the permissible customer limit
E-3016	Event	Temperature is higher than the permissible customer limit

11.1.2 Information messages

Table 9: Information messages

Message	Logbook	Description
I-1001	Event	Event logbook has been reset.
I-1002	Event	Parameter logbook has been reset.
I-1003	Event	Metrology logbook has been reset.
I-1004	Event	Diagnostic archive has been reset.
I-1005	Event	Data archive 1 has been reset.
I-1006	Event	Data archive 2 has been reset.
I-1007	Event	Event memory has been reset
I-1008	Event	Date/time has been set
I-1009	Event	Totalizer has been set
I-1010	Event	Totalizers have been reset
I-1011	Event	Error volume totalizers have been reset
I-1012	Event	Reverse flow volume totalizer has been reset
I-1013	Event	Parameter has been reset
I-1014	Parame-ter	Parameter has been changed
I-1015	Metrology	Metrologically relevant parameters changed with closed parameter locking switch
I-1016	Event	Firmware has been changed
I-1017	Event	Battery has been replaced
I-1018	Event	Device has been started/shut down
I-1019	-	Unacknowledged logbook entries
I-1020	Event	Configuration mode has been activated
I-1021	Event	Parameter locking switch has been opened

11.2 Starting a diagnostic session

1 Click the icon in the tool bar to start a diagnostic session.
2 Select the desired data collection time.
It is recommended to select a minimum data collection time of 5 minutes and to load the logbooks and data archives
3 Click “Start” to start recording.
The following message with the current storage location of the data collection is shown after successful creation of the diagnostic session.

Fig. 23: Diagnostic recording completed

4 Click “OK” to confirm the message.
– Click “Save as” to select a storage location for the diagnostic recording.
– Click “E-mail” to send the file per e-mail. The file is appended to an e-mail when an e-mail client is available.
– Click “Close” to leave the file at the standard storage location.

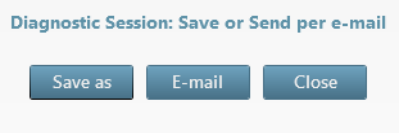


Fig. 24: Save the diagnostic session

The diagnostic sessions are saved as files with the ending .sfgsession. The files are saved by default under:
C:\Users\Public\Documents\SICK\FLOWgate
The name of the storage folder consists of device type and serial number of the device.

12 Decommissioning

12.1 Safety information on decommissioning

Ensure that all safety instructions are observed:

- see “For your safety”, page 8
- see “Mounting”, page 28
- see “Electrical installation”, page 32

12.2 Return delivery

12.2.1 Contact

Contact your local Endress+Hauser representative for assistance.

12.2.2 Clearance certificate

A clearcance certificate will be provided by your local Endress+Hauser representative, if necessary.

12.2.3 Packaging

Make sure, the measuring device cannot be damaged during transport.

13 Technical data

13.1 Dimensional drawings

Dimensions FLOWSIC550

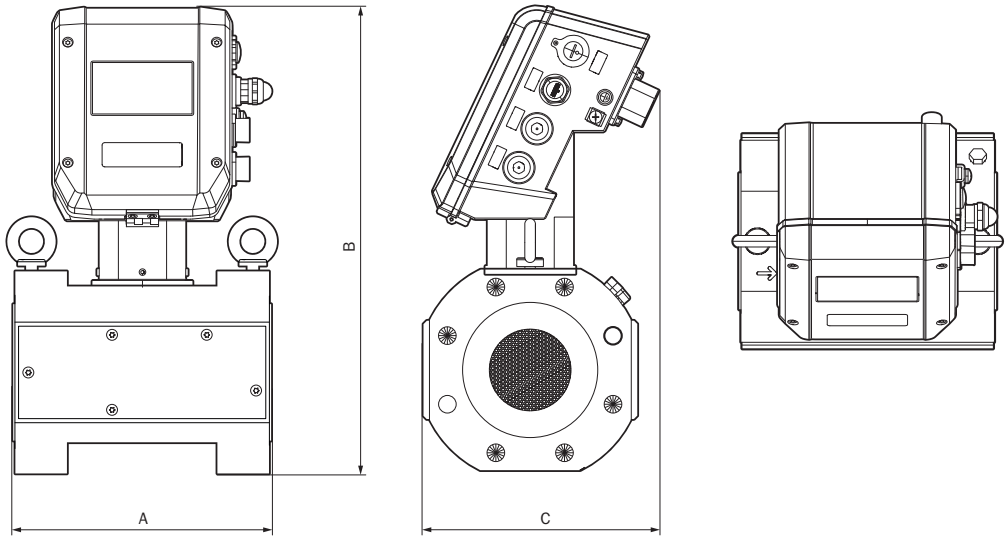


Table 10: Dimensions in mm [in]

Nominal size	A	B	C
DN50/2"	150 [5.9]	425 [16.73]	220 [8.66]
DN80/3"	240 [9.45]	425 [16.73]	220 [8.66]
DN100/4"	300 [11.81]	500 [19.69]	250 [9.84]
DN150/6"	450 [17.72]	560 [22.05]	300 [11.81]

13.2 Technical data

Table 11: Technical data FLOWSIC550

Measuring parameters			
Measured values	Volume a.c., volume flow a.c., gas velocity In addition, for integrated volume correction: volume s.c., volume flow s.c.		
Number of measuring paths	2		
Nominal pipe size	DN50/2", DN80/3", upcoming: DN100/4", DN150/6"		
Measurement principle	Ultrasonic transit time difference measurement		
Measuring medium	Natural gas (dry, odorized), air		
Measuring ranges	Size	p_{min}	Q_{min} ... Q_{max}
	DN50/ 2"	0.8 bar (a)	2.5 m^3/h ... 160 m^3/h
		12 psi (a)	88 cfh ... 5650 cfh
	DN80/ 3"	0.8 bar (a)	4 m^3/h ... 400 m^3/h
		12 psi (a)	141 cfh ... 14 125 cfh
	DN100/4"	3 bar (a)	22 m^3/h ... 650 m^3/h
		44 psi (a)	777 cfh ... 22 955 cfh
		10 bar (a)	6.5 m^3/h ... 650 m^3/h
		145 psi (a)	229 cfh ... 22 955 cfh
	DN150/6"	3 bar (a)	53 m^3/h ... 1600 m^3/h
		44 psi (a)	1872 cfh ... 56 503 cfh
		10 bar (a)	16 m^3/h ... 1600 m^3/h
		145 psi (a)	565 cfh ... 56 503 cfh
	Pressure ranges valid for natural gas, meter operation possible at ambient pressure for air		
Repeatability	≤ 0.1%		
Accuracy	Accuracy class 1; maximum allowed error limits Q_{min} up to 0.1 Q_{max}: ≤ ± 2% 0.1 Q_{max} up to Q_{max}: ≤ ± 1%		
	Accuracy class 1; typical error limits Q_{min} up to Q_{max}: ≤ ± 1%		
	After high pressure flow calibration: ± 0.2% at test pressure, otherwise ± 0.5%		
Min. piping requirements	Depending on predisturbance: • Mild: 3D straight inlet/2D straight outlet • Severe: 5D straight inlet/2D straight outlet		
Material	Meter body: low-temperature carbon steel SPU: cast aluminum		
Approvals			
Ex	ATEX	II 2(1) G Ex ia [ia Ga] T4 IIB Gb	
	IECEx	Ex ia [ia Ga] T4 IIB Gb	
	NEC/CEC (US/CA)	Class I Division 1, Groups C, D T4 Ex ia [ia Ga] IIB T4 Gb Class I, Zone 1 AEx ia [ia Ga] IIB T4 Gb	

Enclosure rating	IP66, Type 3R
Dimensions and weight	
Dimensions	See dimensional drawings
Weight	DN50/2": 26 kg (57 lbs) DN80/3": 46 kg (101 lbs) DN100/4": 87 kg (192 lbs) DN150/6": 207 kg (456 lbs)
Ambient conditions	
Ambient temperature	-40 °C...+70 °C (-40 °F...+158 °F)
Storage temperature	-40 °C...+70 °C (-40 °F...+158 °F)
Ambient pressure	80 kPa (0.8 bar) .... 110 kPa (1.1 bar)
Ambient humidity	≤ 95 % relative humidity; non-condensing
Installation	Horizontally or vertically
Installation location	Indoor, outdoor
Measuring conditions	
Operating pressure	ANSI300 (ASME B16.5): up to 48.7 bar(g) for -40 °C ... +70 °C, 51.1 bar at 38°C up to 706 psi(g) for -40°F ... +158°F, 741 psi(g) at 100.4°F
	ANSI600 (ASME B16.5): up to 97.4 bar(g) for -40 °C ... +70°C, 102.1 bar at 38°C up to 1412 psi(g) for -40°F ... +158 °F, 1480 psi(g) at 100.4 °F
	PN40 (EN 1092-1): up to 40 bar(g) for -40 °C ... +70°C up to 580 psi(g) for -40 °F ... +158 °F
	PN63 (EN 1092-1): up to 63 bar(g) for -40 °C ... +70°C up to 913 psi(g) for -40 °F ... +158 °F,
Gas temperature	-40 °C ... +70 °C (-40 °F...+158 °F)
Electrical connections	
Power supply	8...16 V DC, max. 50 mA
Power consumption	< 1 W
Outputs and interfaces	
Serial	2 x RS485 Data protocol: Modbus RTU, Modbus ASCII, ISO 17089-1
Digital outputs	2x Pulse and Status (HF with f_{max} = 2kHz, LF with f_{max} = 10 Hz), Encoder
Display	LCD: Measured variables, system information, warnings, maintenance requests, alarms

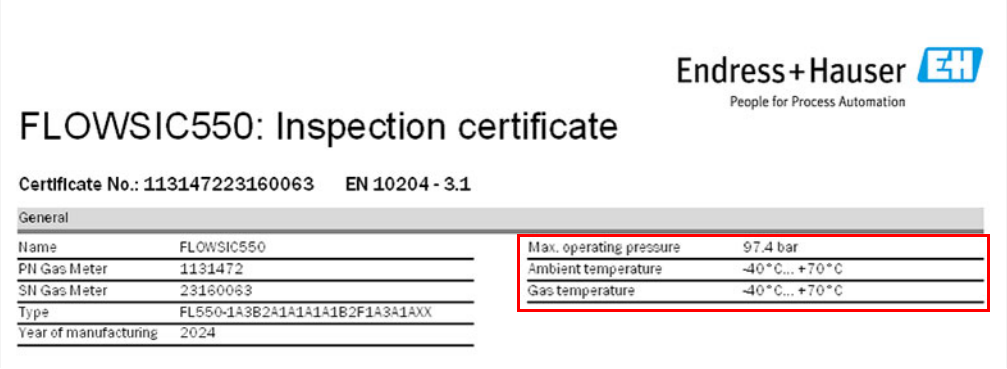
Battery	
Battery type	Battery pack 2R20 → 6050492 Tadiran SL-2880
Battery chemistry	Lithium thionyl chloride cell → Li/SOCl2

Table 12: Technical Data (additional for device option volume conversion)

Volume conversion		
Accuracy	Accuracy class 0.5 Maximum allowed error limit of conversion factor C: ≤ ±0.5% (at reference conditions)	
Conversion method	PTZ	
Calculation methods	• Fixed value • SGERG88, • AGA 8 Gross method 1 • AGA 8 Gross method 2 • AGA NX-19	• AGA NX-19 mod. • AGA NX-19 mod. GOST • GERG91 mod. • AGA8-92DC (AGA-8 detail)
Pressure sensor		
Measuring ranges	Absolute pressure sensors	
	0.8 … 20.0 bar (a)	
	7 … 35 bar (a)	
	14 … 70 bar (a)	
	25 … 130 bar (a)	
	Relative pressure sensors	
	0 … 70 bar (g) (0 … 1015 psi(g))	
	0 … 103.46 bar(g) (0 … 1500 psi(g)	
Temperature sensor		
Measuring ranges	-40 °C...+70 °C (-40 °F...+158 °F)	

13.3 Design pressure and design temperature

Please refer to the supplied acceptance test certificate (EN 10204 - 3.1) and the type plate on the meter body for the actual values for the design pressure and design temperature for your specific device.



Endress+Hauser
People for Process Automation

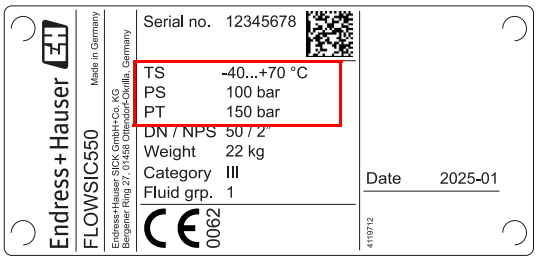
FLOWSIC550: Inspection certificate

Certificate No.: 113147223160063 EN 10204 - 3.1

General

Name	FLOWSIC550	Max. operating pressure	97.4 bar
PN Gas Meter	1131472	Ambient temperature	-40°C... +70°C
SN Gas Meter	23160063	Gas temperature	-40°C... +70°C
Type	FL550-1A3B2A1A1A1A1B2F1A3A1AXX		
Year of manufacturing	2024		

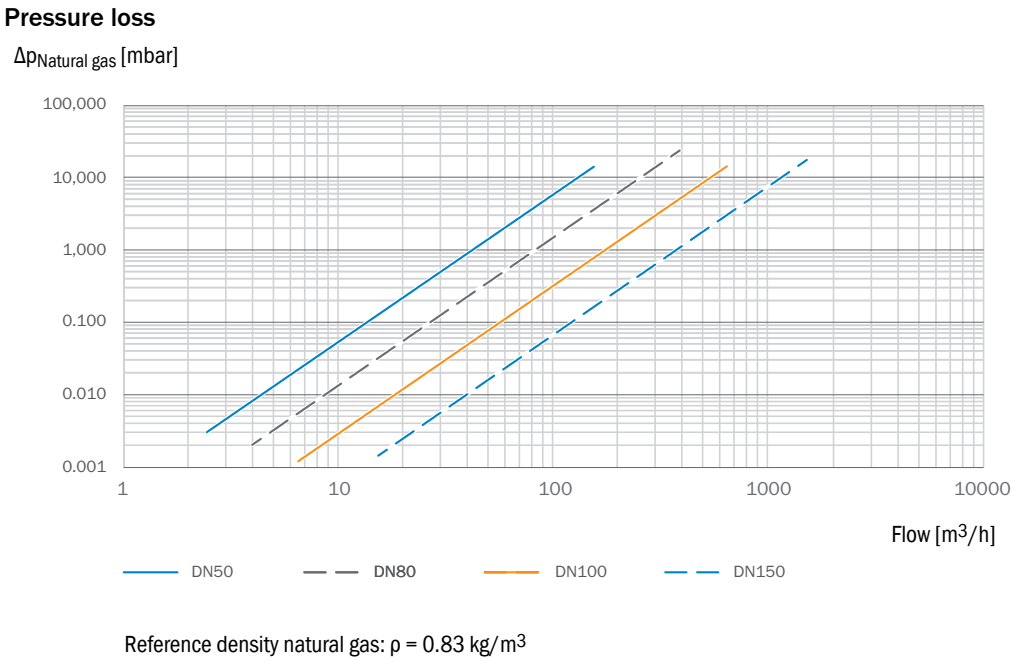
Fig. 25: Example acceptance test certificate (EN10204 – 3.1)



TS Minimum/Maximum design temperature
PS Maximum design pressure
PT Test pressure

Fig. 26: Meter body type plate (example)

13.4 Application ranges



Reference density natural gas: ρ = 0.83 kg/m³

Fig. 27: Typical pressure loss caused by FLOWSIC550

13.5 Volume conversion: input variables and limit values of the algorithms

13.5.1 SGERG88

Parameter	Normal range	Expanded range	Unit
Heating value	30..45	20..48	MJ/m³
Relative density	0.55..0.8	0.55..0.9	-
Mole fraction CO2	0..0.2	0..0.3	mol/mol
Mole fraction H2	0..0.1	0..0.1	mol/mol
Pressure	0..120	0..120	bar(a)
Temperature	-10..65	-10..65	°C

13.5.2 AGA 8 Gross method 1 und 2

Parameter	AGA Gross 1	AGA Gross 2	Unit
Heating value	18.7..45.1	-	MJ/m³
Relative density	0.554..0.87	0.554..0.87	-
Mole fraction CO2	0..0.3	0..0.3	mol/mol
Mole fraction N2	-	0..0.5	mol/mol
Mole fraction H2	0..0.1	0..0.1	mol/mol
Pressure	0..120	0..120	bar(a)
Temperature	-8..62	-8..62	°C

13.5.3 AGA NX-19 und NX-19 mod.

Parameter	NX19	NX19mod	NX19-mod.BR.korr.3H	Unit
Heating value	-	31.8..39.8	39.8..46.2	MJ/m³
Relative density	0.554..1.0	0.554..0.75	0.554..0.691	-
Mole fraction CO2	0..0.15	0..0.15	0.025	mol/mol
Mole fraction N2	0..0.15	0..0.15	0.07	mol/mol
Pressure	0..344.74	0..137.9	0..80	bar(a)
Temperature	-40..115.56	-40..115.6	0..30	°C

13.5.4 AGA NX-19 mod. GOST

Parameter	NX19mod-GOST	Unit
Reference density	0.66..1.0	kg/m³
Mole fraction CO2	0..0.15	mol/mol
Mole fraction N2	0..0.2	mol/mol
Pressure	0..120	bar(a)
Temperature	-23.15..66.85	°C

13.5.5 GERG91 mod.

Parameter	Normal range	Expanded range	Unit
Reference density	0.66..1.05	0.66..1.05	kg/m³
Mole fraction CO2	0..0.2	0..0.2	mol/mol
Mole fraction N2	0..0.2	0..0.2	mol/mol

Parameter	Normal range	Expanded range	Unit
Pressure	0..75	0..120	bar(a)
Temperature	-23.15..76.85	-23.15..76.85	°C

13.5.6 AGA8-92DC (AGA-8 Detail)

Parameter	Normal range	Expanded range	Unit
Mole fraction Methane	0.45 - 1.0	0 - 1	mol/mol
Mole fraction N2	0 - 0.5	0 - 1	mol/mol
Mole fraction CO2	0 - 0.3	0 - 1	mol/mol
Mole fraction Ethane	0 - 0.1	0 - 1	mol/mol
Mole fraction Propane	0 - 0.04	0 - 0.12	mol/mol
Mole fraction Water	0 - 0.0005	0 - dew point[4]	mol/mol
Mole fraction HydrogenSulphide	0 - 0.0002	0 - 1	mol/mol
Mole fraction H2	0 - 0.1	0 - 1	mol/mol
Mole fraction CarbonMonoxide	0 - 0.03	0 - 0.03	mol/mol
Mole fraction Oxygen	-	0 - 0.21	mol/mol
Mole fraction i-Butane	0 - 0.01[1]	0 - 0.06[1]	mol/mol
Mole fraction n-Butane	0 - 0.01[1]	0 - 0.06[1]	mol/mol
Mole fraction i-Pentane	0 - 0.003[2]	0 - 0.04[2]	mol/mol
Mole fraction n-Pentane	0 - 0.003[2]	0 - 0.04[2]	mol/mol
Mole fraction n-Hexane	0 - 0.002[3]	0 - dew point[3][4]	mol/mol
Mole fraction n-Heptane	0 - 0.002[3]	0 - dew point[3][4]	mol/mol
Mole fraction n-Octane	0 - 0.002[3]	0 - dew point[3][4]	mol/mol
Mole fraction n-Nonane	0 - 0.002[3]	0 - dew point[3][4]	mol/mol
Mole fraction n-Decane	0 - 0.002[3]	0 - dew point[3][4]	mol/mol
Mole fraction Helium	0 - 0.002	0 - 0.03	mol/mol
Mole fraction Argon	-	0 - 0.01	mol/mol
Pressure	0 - 1379	0 - 1379	bar(a)
Temperature	-129 - 204	-129 - 204	°C

[1] The sum of all butane fractions must not exceed the specified limit.
[2] The sum of all pentane fractions must not exceed the specified limit.
[3] The sum of all hydrocarbon fractions ≥ Hexane must not exceed the specified limit.
[4] The algorithm is only valid up to the dew point. Before applying the algorithm,make sure that the gas is completely in the gas phase (below dew point).

14 Annex

14.1 Type plates

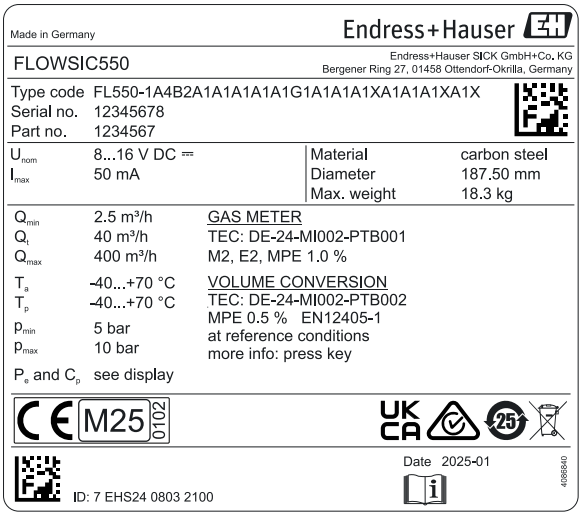


Fig. 28: Main type plate (example)

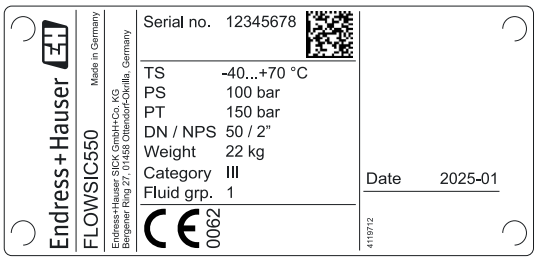


Fig. 29: Meter body type plate (example)

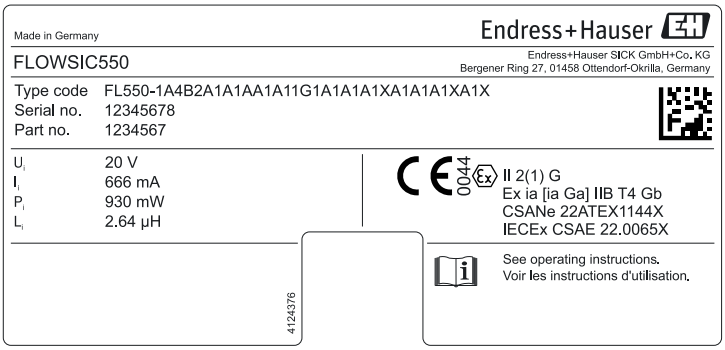


Fig. 30: ATEX/IECEx typle plate (example)

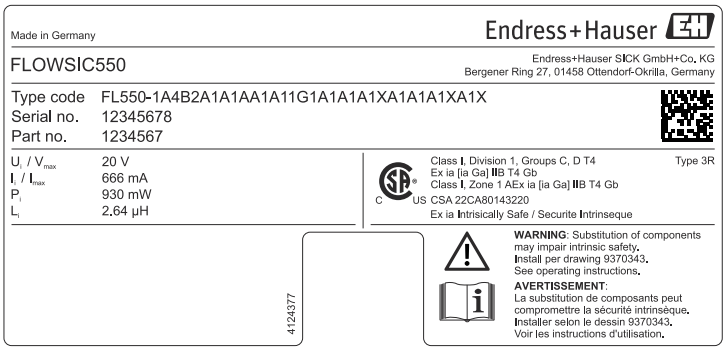


Fig. 31: CSA type plate (example)

14.2 Conformities

14.2.1 CE certificate

The FLOWSIC550 has been developed, manufactured and tested in accordance with the following EU Directives:

- Pressure Equipment Directive 2014/68/EU
- ATEX Directive 2014/34/EU
- EMC Directive 2014/30/EU
- Measuring Instrument Directive 2014/32/EU

Conformity with the above Directives has been determined and the CE label attached to the device.

14.2.2 Standards compatibility

The FLOWSIC550 conforms to the following standards or recommendations:

- OIML R137-1&2, 2012
  Gas Meters - Part 1: Metrological And Technical Requirements; Part 2: Metrological Controls And Performance Tests
- EN 61326-1:2006
  Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements (IEC 61326-1:2005)
- IEC 61326:2005
  Electrical equipment for measurement, control and laboratory use – EMC requirements
- EN 12405-1+A2:2010-10
  Gas meters - Conversion devices - Part 1: Volume conversion

ATEX/UKEx

- EN IEC 60079-0:2018, EN 60079-0:2012/A11:2013, EN 60079-11:2012
  Explosive atmospheres - Part 0: Equipment - General requirements; Part 11: Equipment protection by intrinsic safety "i"

IECEx

- IEC 60079-0: 2011, IEC 60079-0:2017 (Edition 7)
  Explosive atmospheres - Part 0: Equipment - General requirements
- IEC 60079-11: 2011+Cor.: 2012 (6.Edition)
  Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i“

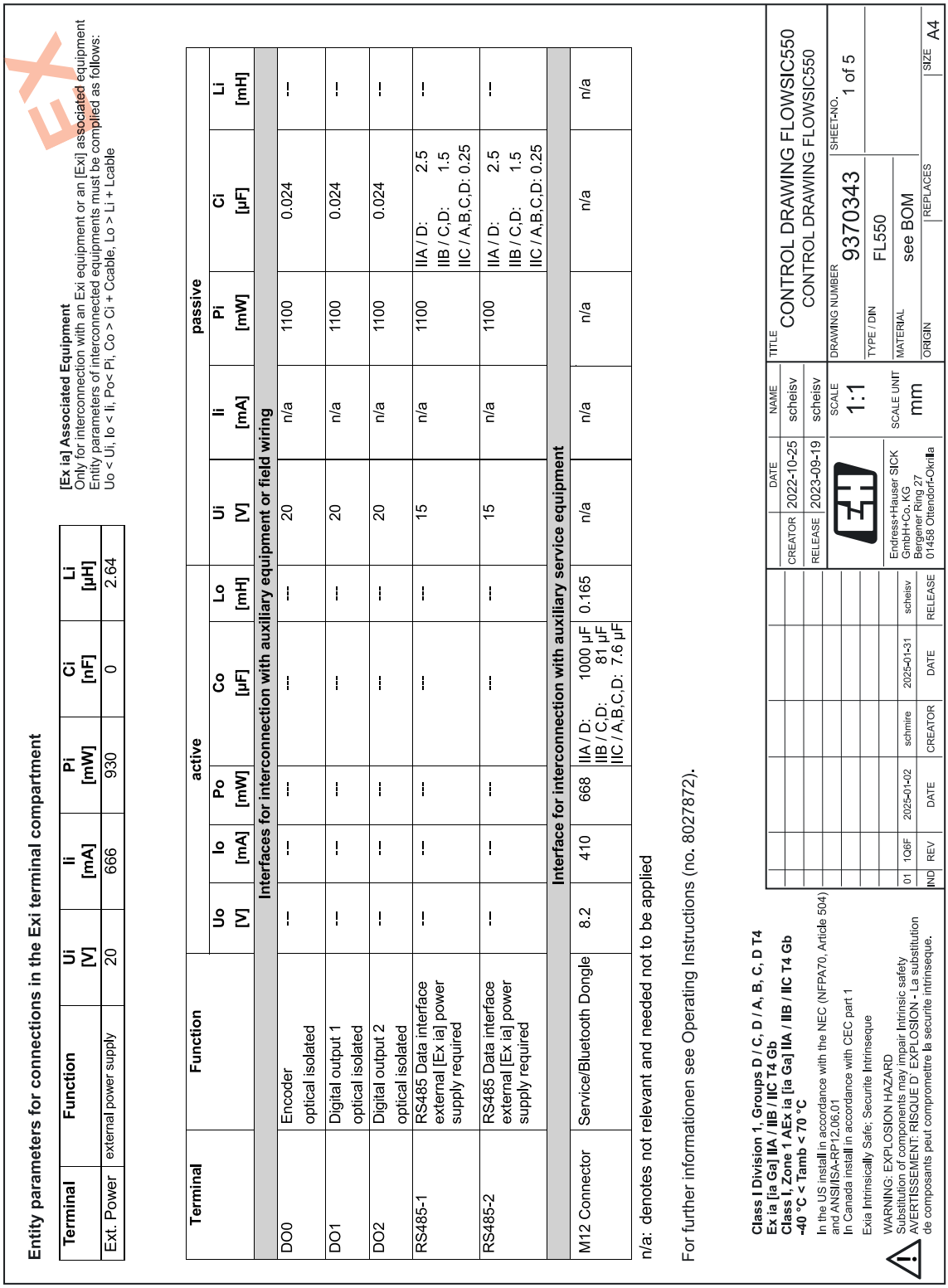
CSAus

- ANSI/UL 60079-0 Ed. 7
  Standard for Explosive Atmospheres - Part 0: Equipment - General Requirements
- ANSI/UL 60079-11 Ed. 6
  Explosive Atmospheres - Part 11: Equipment Protection by Intrinsic Safety 'i'
- UL 61010-1 3rd Edition (2012)
  Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements
- ANSI/IEC 60529:04 (R2011)
  Degrees of Protection Provided by Enclosures (IP Code)
- UL 50E (2015)
  Enclosures for Electrical Equipment, environmental considerations
- ANSI/UL 913 Ed. 8
  Standard for Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, III, Division 1, Hazardous (Classified) Locations

cCSA

- CSA C22.2 No. 60079-0:19
  Explosive atmospheres - Part 0: Equipment - General requirements
- CSA C22.2 No. 60079-11:14
  Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
- CSA C22.2 No. 61010-1-12
  Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements
- CSA C22.2 No. 60529:16
- Degrees of protection provided by enclosures (IP Code)
- CSA C22.2 No. 94.2-15
  Enclosures for electrical equipment, environmental considerations

14.3 Control drawing



Entity parameters for connections in the Exi terminal compartment

Terminal	Function	Ui [V]	Ii [mA]	Pi [mW]	Ci [nF]	Li [µH]
Ext. Power	external power supply	20	666	930	0	2.64

[Ex ia] Associated Equipment
Only for interconnection with an Exi equipment or an [Exi] associated equipment
Entity parameters of interconnected equipments must be complied as follows:
Uo < Ui, Io < Ii, Po< Pi, Co > Ci + Ccable, Lo > Li + Lcable

Terminal	Function	active						passive				
		Uo [V]	Io [mA]	Po [mW]	Pi [mW]	Co [µF]	Lo [mH]	Ui [V]	Ii [mA]	Pi [mW]	Ci [µF]	Li [mH]
Interfaces for interconnection with auxiliary equipment or field wiring												
DO0	Encoder optical isolated	---	---	---	---	---	---	20	n/a	1100	0.024	---
DO1	Digital output 1 optical isolated	---	---	---	---	---	---	20	n/a	1100	0.024	---
DO2	Digital output 2 optical isolated	---	---	---	---	---	---	20	n/a	1100	0.024	---
RS485-1	RS485 Data interface external [Ex ia] power supply required	---	---	---	---	---	---	15	n/a	1100	IIA / D: 2.5 IIB / C,D: 1.5 IIC / A,B,C,D: 0.25	---
RS485-2	RS485 Data interface external [Ex ia] power supply required	---	---	---	---	---	---	15	n/a	1100	IIA / D: 2.5 IIB / C,D: 1.5 IIC / A,B,C,D: 0.25	---
Interface for interconnection with auxiliary service equipment												
M12 Connector	Service/Bluetooth Dongle	8.2	410	668	IIA / D: 1000 µF IIB / C,D: 81 µF IIC / A,B,C,D: 7.6 µF		0.165	n/a	n/a	n/a	n/a	n/a

n/a: denotes not relevant and needed not to be applied

For further informationen see Operating Instructions (no. 8027872).

Class I Division 1, Groups D / C, D / A, B, C, D T4
Ex ia [ia Ga] IIA / IIB / IIC T4 Gb
Class I, Zone 1 AEx ia [ia Ga] IIA / IIB / IIC T4 Gb
-40 °C < Tamb < 70 °C

In the US install in accordance with the NEC (NFPA70, Article 504) and ANSI/ISA-RP12.06.01
In Canada install in accordance with CEC part 1
Exia Intrinsically Safe; Securite Intrinseque

WARNING: EXPLOSION HAZARD
Substitution of components may impair Intrinsic safety
AVERTISSEMENT: RISQUE D' EXPLOSION - La substitution de composants peut compromettre la securite intrinseque.

IND	REV	DATE	CREATOR	DATE	RELEASE
01	1Q6F	2025-01-02	schmire	2025-01-31	scheisv

CREATOR 2022-10-25 scheisv
RELEASE 2023-09-19 scheisv

Endress+Hauser SICK GmbH+Co. KG
Barsinghausen Plant
Berggener Ring 27
01458 Ottendorf-Okrilla

SCALE 1:1
SCALE UNIT mm

TITLE CONTROL DRAWING FLOWSIC550
CONTROL DRAWING FLOWSIC550
DRAWING NUMBER 9370343
SHEET-NO. 1 of 5
TYPE / DIN FL550
MATERIAL see BOM
ORIGIN
REPLACES
SIZE A4

Fig. 32: Control drawing 9370343 (page 1/5)

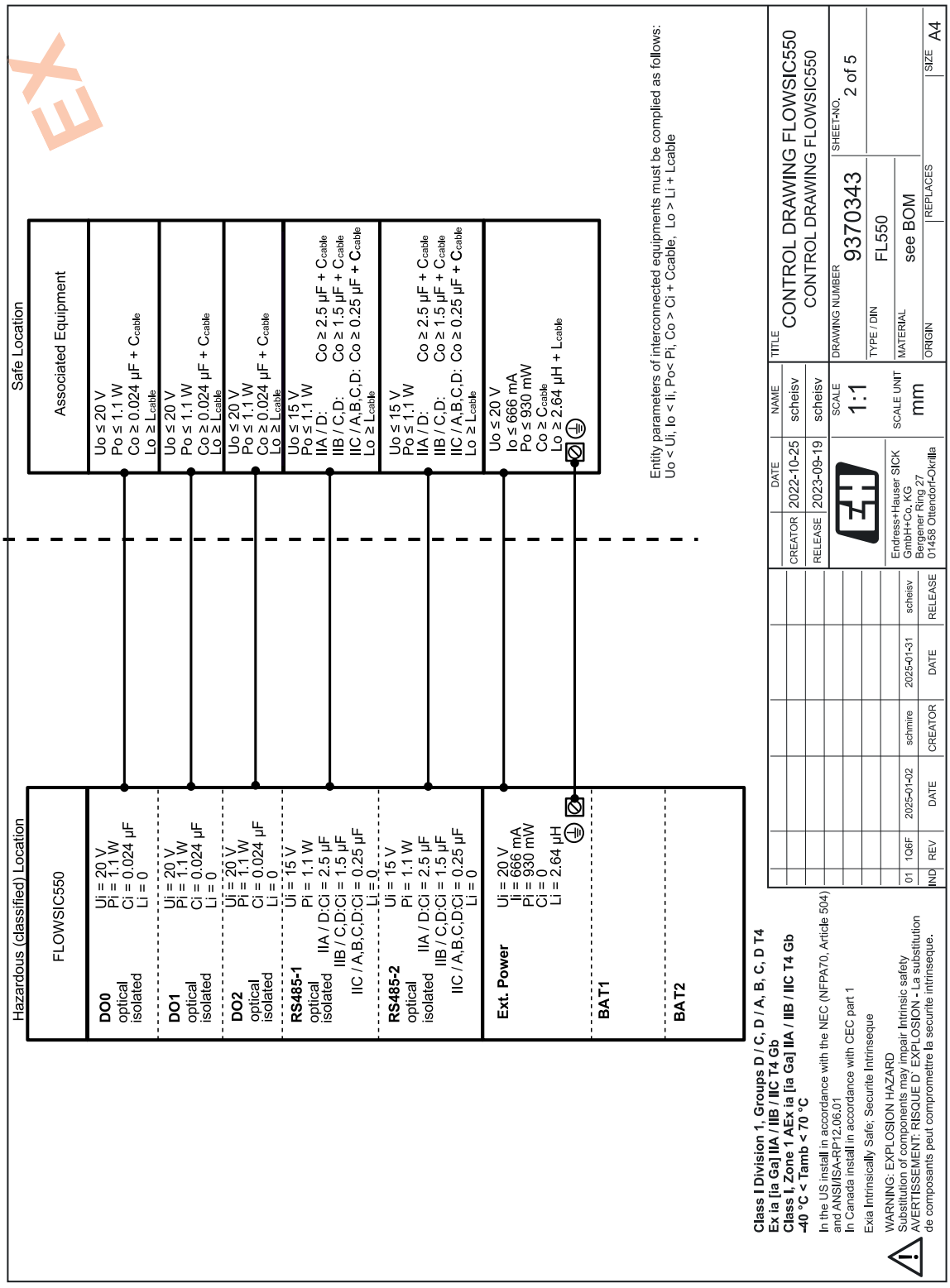


Fig. 33: Control drawing 9370343 (page 2/5)

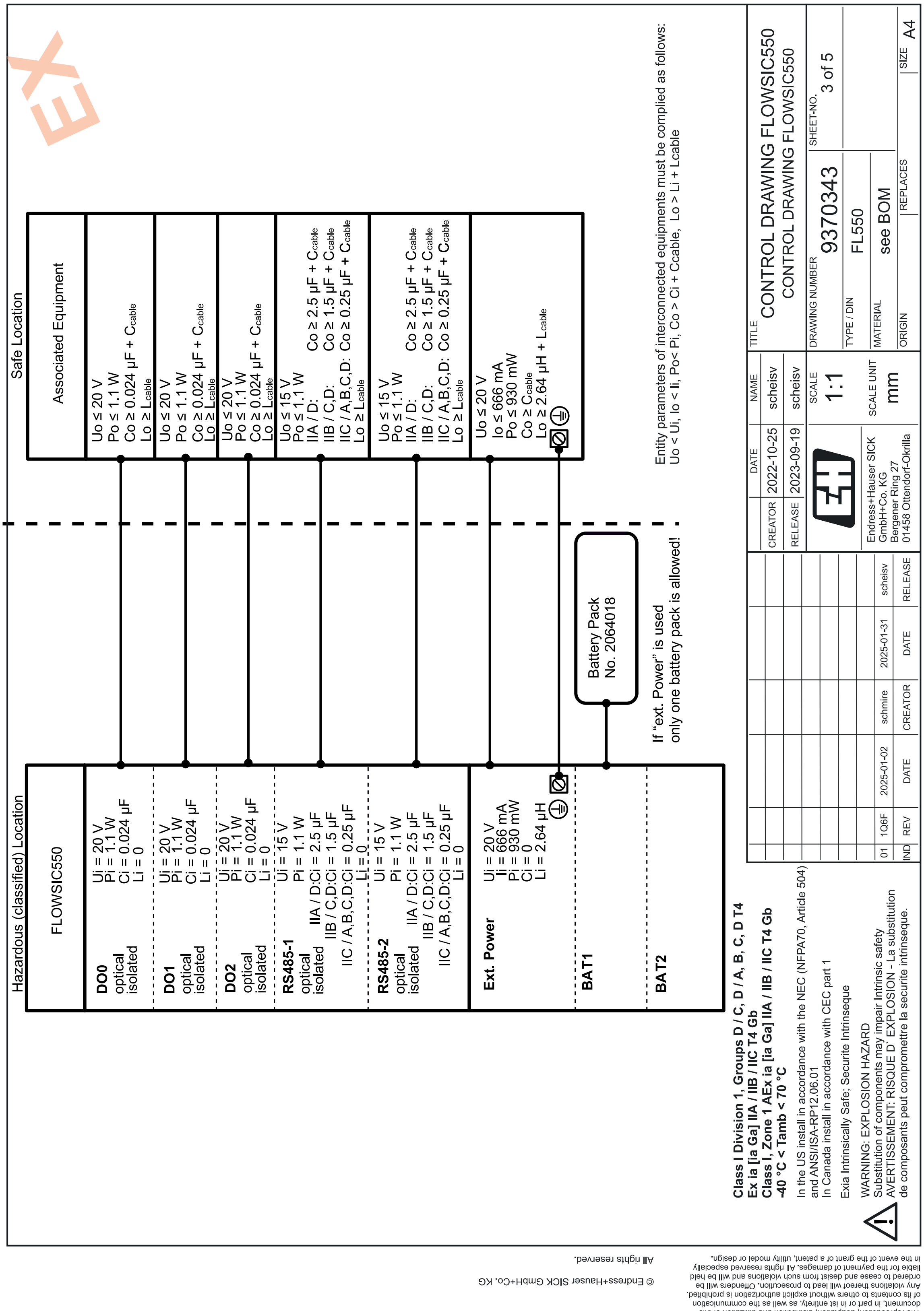


Fig. 34: Control drawing 9370343 (page 3/5)

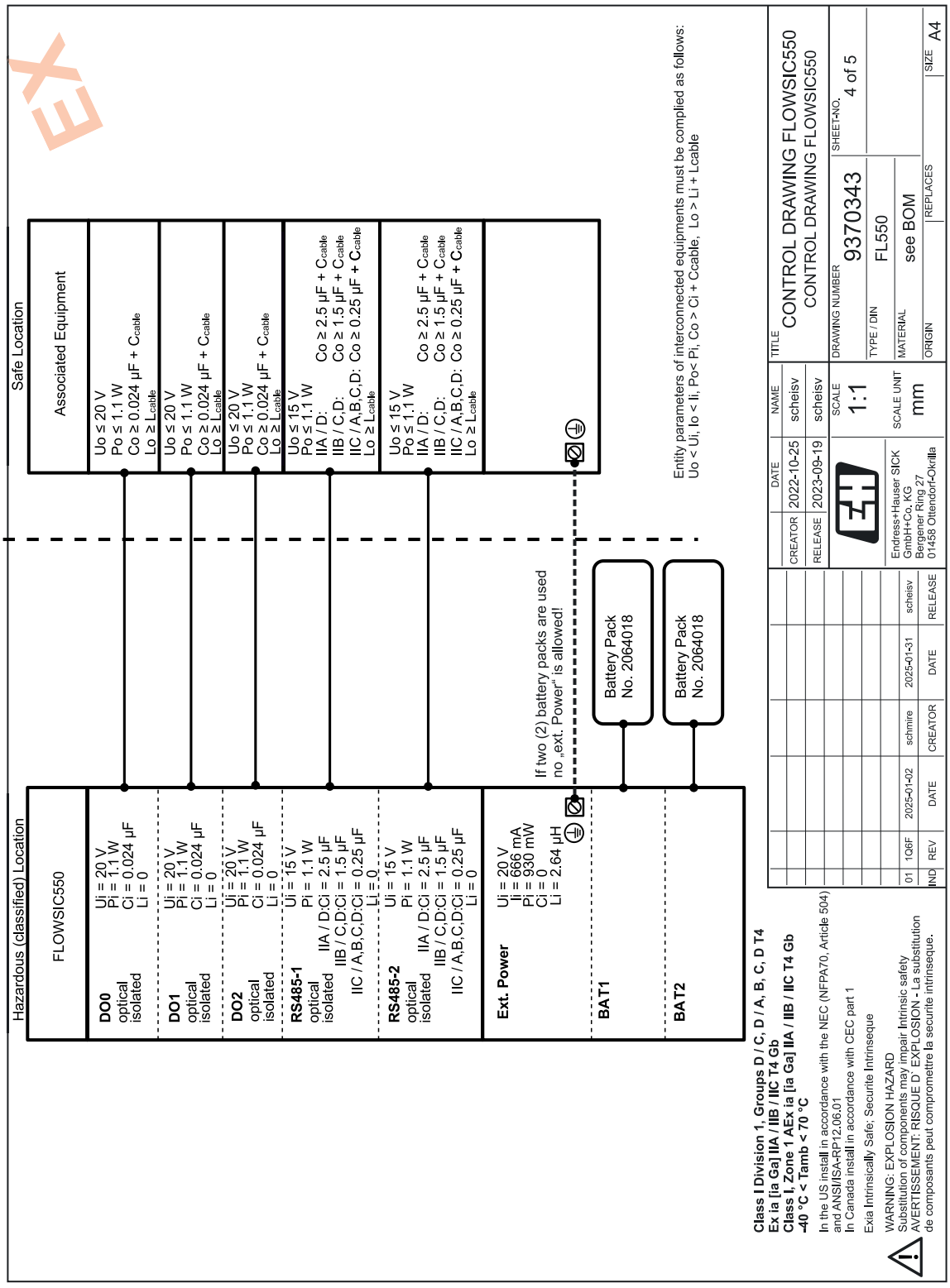


Fig. 35: Control drawing 9370343 (page 4/5)

Additional Installation Requirements

1.) The flowmeter is considered not capable of passing a 500V r.m.s. a.c. dielectric strength test according to Clause 6.3.13 of UL 60079-11 (2013) between the intrinsically safe circuits that are associated with the Ext. Power, the Service / Bluetooth M12 Connector connections, and its enclosure. This shall be taken into account in any equipment installation. The circuits associated with external connections DO0, DO1, DO2 RS485-1, RS485-2 are isolated from the equipment enclosure, and are considered capable of passing a 500V r.m.s. a.c. dielectric strength test according to Clause 6.3.13 of UL 60079-11 (2013).

2.) The flowmeter is considered not capable of passing a 500V r.m.s. a.c. dielectric strength test according to Clause 6.3.13 of UL 60079-11 (2013) between the intrinsically safe circuits that are associated with the M8 connectors to which the pressure and/or temperature transmitters are connected, and its enclosure. This shall be taken into account in any equipment installation. When considering this cognisance shall also be taken of note 3.) below.

3.) The Digital temperature transmitter type EDT 87 does not meet the requirements of Clause 6.3 of UL 60079-11 (2013), this must be taken into account during installing the equipment.

4.) The equipment pressure sensor and ultrasonic transducers that are mounted in the Meterbody contain piezo-electric devices. The equipment installation shall ensure that these devices are suitably protected from impact.

Class I Division 1, Groups C, D T4
Ex ia [ia Ga] IIA/IIB/IIC T4 Gb
Class I, Zone 1 AEx ia [ia Ga] IIA/IIB/IIC T4 Gb
-40 °C < Tamb < 70 °C

In the US install in accordance with the NEC (NFPA70, Article 504) and ANSI/ISA-RP12.06.01
In Canada install in accordance with CEC part 1

Exia Intrinsically Safe; Securite Intrinseque

WARNING: EXPLOSION HAZARD
Substitution of components may impair Intrinsic safety
AVERTISSEMENT: RISQUE D`EXPLOSION - La substitution de composants peut compromettre la securite intrinseque.

01	1Q6F	2025-01-02	schmire	2025-01-31	scheisv
IND	REV	DATE	CREATOR	DATE	RELEASE

	DATE	NAME
CREATOR	2022-10-25	scheisv
RELEASE	2023-09-19	scheisv
Endress+Hauser SICK GmbH+Co. KG Bergener Ring 27 01458 Ottendorf-Okrilla	SCALE 1:1	SCALE UNIT mm

TITLE	CONTROL DRAWING FLOWSIC550 CONTROL DRAWING FLOWSIC550
DRAWING NUMBER	9370343
SHEET-NO.	4 of 5
TYPE / DIN	FL550
MATERIAL	see BOM
ORIGIN	
REPLACES	
SIZE	A4

Fig. 36: Control drawing 9370343 (page 5/5)

14.4 Type code

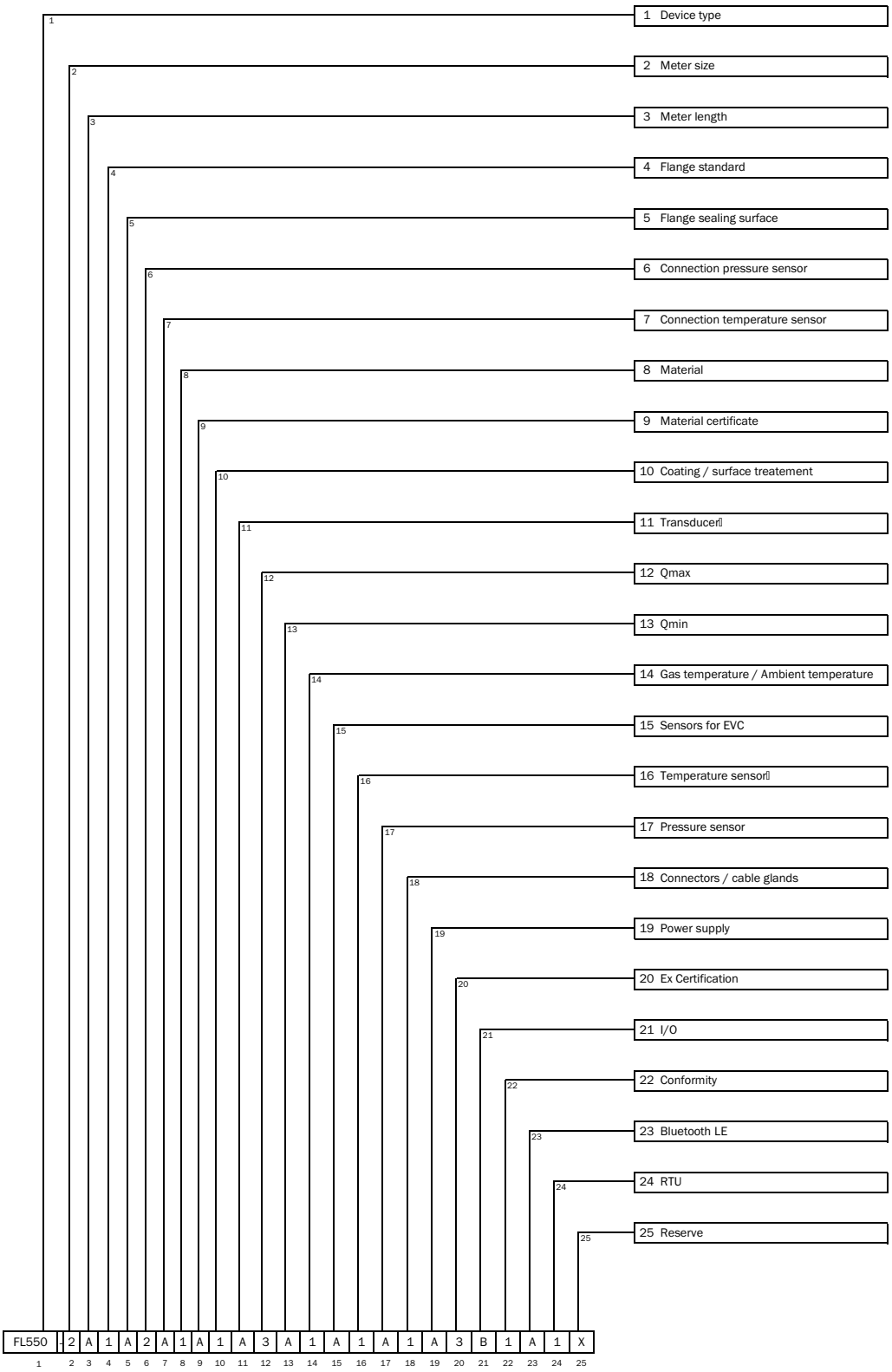


Fig. 37: Type code

1	**Device type**	
	FL550	FLOWSIC550
2	**Meter size**	
	1	DN50 | 2"
	2	DN80 | 3"
	3	DN100 | 4"
	4	DN150 | 6""
3	**Meter length**	
	A	50 mm [5.9]
	B	171 mm [9.45]
	C	241 mm [11.81]
	D	300 mm [17.72]
4	**Flange standard**	
	1	PN40 (EN 1092-1)
	2	PN63 (EN 1092-1)
	3	ANSI300 (ASME B16.5)
	4	ANSI600 (ASME B16.5)
5	**Flange sealing surface**	
	A	Type B, Form B1 (DIN EN 1092-1)
	B	Raised faced, stock finished
6	**Connection pressure sensor**	
	2	1x plug NPT 1/4"
7	**Connection temperature sensor**	
	X	w/o
8	**Material**	
	1	LTCS
9	**Material certificate**	
	A	3.1
10	**Coating / surface treatement**	
	1	Company Standard
11	**Transducer**	
	A	Type 1 - H210
12	**Qmax**	
	3	650 m^3/h [22 955 cfh]
	4	1600 m^3/h [56 503 cfh]
	5	160 m^3/h [5 650 cfh]
	6	400 m^3/h [14 125 cfh]
13	**Qmin**	
	A	2,5 m^3/h [88 cfh]
	C	6,5 m^3/h [229 cfh]
	D	4 m^3/h [141 cfh]
	E	16 m^3/h [565 cfh]
	F	22 m^3/h [777 cfh]
	G	53 m^3/h [1 872 cfh]

14	**Gas temperature /ambient temperature**	
	1	-40...+70 °C [-40... +158 °F]
15	**Sensors for EVC**	
	A	w/o
	B	p/T-Sensors external
16	**Temperature Sensor**	
	1	w/o
	2	
17	**Pressure Sensor**	
	A	w/o
	B	absolut 0,8 ... 20 bar
	C	absolut 7,0 ... 35 bar
	D	absolut 14 ... 70 bar
	E	absolut 25 ... 130 bar
	F	relative 0 ... 70 bar [0... 1015 psi]
	G	relative 0 ... 104 bar [0... 1500 psi]
18	**Connectors /cable glands**	
	1	3x NPT 1/2"
	2	3x M20x1.5
19	**Power supply**	
	A	autarkic with battery pack (5Y)
	B	external with backup (3 months)
20	**Ex Certification**	
	2	ATEX / IECEx / UKEx Zone 1, Group IIB
	3	cCSAus Cl.I Div1
21	**I/O**	
	A	Standard 3x DO, 2x RS485
22	**Conformity**	
	1	PED
	2	PED, MID
23	**Bluetooth LE**	
	A	w/o
24	**RTU**	
	1	w/o
25	**Reserve**	
	X	Reserve

Fig. 38: Type code (example)

8029793/AE00/V1-1/2025-02

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