

Type 8098 FLOWave

Flowmeter



QUICKSTART - English

Software version A.02.00.00 and higher

We reserve the right to make technical changes without notice.

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1 ABOUT THE QUICKSTART

The Quickstart includes main information and instructions for using the device.


The complete description of the product is in the Operating Instructions of the device.

Please keep this Quickstart in a safe place, accessible to all users and any new owners.

Important safety information.

Fully read the Quickstart. In particular, observe the safety recommendations and intended use.

- ▶ The Quickstart must be read and understood.

 The full Operating Instructions are available on the internet at www.burkert.com

1.1 Symbols used

DANGER

Warns against an imminent danger.

- ▶ Failure to observe this warning results in death or in serious injury.

WARNING

Warns against a potentially dangerous situation.

- ▶ Failure to observe this warning can result in serious injury or even death.


CAUTION


Warns against a possible risk.

- ▶ Failure to observe this warning can result in substantial or minor injuries.

NOTICE

Warns against material damage.

 Indicates additional information, advice or important recommendations.

 Refers to information contained in the Quickstart or in other documents.

- ▶ Indicates an instruction to be carried out to avoid a danger, a warning or a possible risk.

→ Indicates a procedure to be carried out.

A **highlighted term** is related to a menu or a menu item.

-  Indicates the result of a specific instruction.

1.2 Definition of the term device

The term "device" used in the Quickstart always refers to the Type 8098 flowmeter.

1.3 Definition of the term büS









The term "büS" used in the Quickstart refers to the industrial communication, developed by Bürkert, based on the CANopen protocol.

- For more information on büS, read the cabling guide available in English and German (Cabling_guide_for_büS_networks.pdf) at www.buerkert.com search for "Guide for planning büS networks".
- For more information on CANopen which is related to the device, refer to the Operating Instructions "CANopen Network configuration" at www.buerkert.com.

1.4 Validity of the Quickstart

The Quickstart is valid for the devices from software version A02.00.00.

To read out the version number of the device software, do the following:

- Go to the **CONFIGURATION** view.
-  **General settings**
-  Confirm to access the **Parameter** view.
-  Go to the **MAINTENANCE** view.
-  **Device information** -----> 
-  **Software version** -----> 
-  Go back to the parent menu.

2 INTENDED USE

Use of the device that does not comply with the instructions could present risks to people, nearby installations and the environment.

The Type 8098 flowmeter is intended to measure the flow rate of clean liquids, non emulsified (homogeneous liquids) and free of air bubbles and free of gas bubbles and free of solids, using the Surface Acoustic Wave (SAW) measurement principle.

- ▶ Use the device in compliance with the characteristics and the conditions of commissioning and use specified in the contractual documents and in the Operating Instructions.
- ▶ Protect the device against electromagnetic interference, ultraviolet rays and, when installed outdoors, against the effects of climatic conditions.
- ▶ Only operate a device in perfect working order.
- ▶ Properly transport, store, install and operate the device.
- ▶ Only use the device as intended.

3 BASIC SAFETY INFORMATION

This safety information does not take into account any contingencies or occurrences that may arise during installation, use and maintenance of the product.

The operating company is responsible for the respect of the local safety regulations, including staff safety.



Risk of injury due to electrical voltage.

- ▶ Before carrying out work on the system, disconnect the electrical power for all the conductors and isolate it.
- ▶ Observe all applicable accident protection and safety regulations for electrical equipment.

Risk of injury due to high pressure in the installation.

- ▶ Before any intervention in the installation, stop the circulation of fluid, cut off the pressure and drain the pipe.
- ▶ Before any intervention in the installation, make sure there is no pressure in the pipe.
- ▶ Observe the dependency between the fluid temperature and the fluid pressure for the fitting used.

If switched on for a prolonged time, risk of burns or fire due to hot device surfaces

- ▶ Do not touch with bare hands.
- ▶ Keep the device away from highly flammable substances and fluids.

Risk of burns due to high fluid temperatures.

- ▶ Do not touch with bare hands the parts of the device that are in contact with the fluid.
- ▶ Use safety gloves to handle the device.
- ▶ Before opening the pipe, stop the circulation of fluid and drain the pipe.
- ▶ Before opening the pipe, make sure the pipe is completely empty.

Risk of injury due to the nature of the fluid.

- ▶ Respect the prevailing regulations on accident prevention and safety relating to the use of dangerous fluids.



General dangerous situations

To avoid injury:

- ▶ Do not use the device in explosive atmospheres.
- ▶ Do not use the device in an environment incompatible with the materials it is made of.
- ▶ Do not use fluid that is incompatible with the materials the device is made of.
- ▶ Do not subject the device to mechanical loads.
- ▶ Do not make any modifications to the device.
- ▶ Prevent any unintentional power supply switch-on.
- ▶ Only qualified and skilled staff may carry out installation and maintenance work.
- ▶ Ensure a defined or controlled restarting of the process after a power supply interruption.
- ▶ Observe the general technical rules.



CAUTION

Risk of injury due to a heavy device.

A heavy device can fall down during transport or during installation and cause injuries.

- ▶ Transport, install and dismantle a heavy device with the help of another person.
- ▶ Use appropriate tools.

NOTICE

The device may be damaged by the measured fluid.

- ▶ Systematically check the chemical compatibility of the component materials of the device and the fluids likely to come into contact with the materials (for example: alcohols, strong or concentrated acids, aldehydes, alkaline compounds, esters, aliphatic compounds, ketones, halogenated aromatics or hydrocarbons, oxidants and chlorinated agents).

NOTICE

Elements/components sensitive to electrostatic discharges

- ▶ This device contains electronic components that are sensitive to electrostatic discharges. They may be damaged if they are touched by an electrostatically charged person or object. In the worst case scenario, these components are instantly destroyed or disabled as soon as they are activated.
- ▶ To minimise or even avoid any damage caused by an electrostatic discharge, take all the precautions described in standard EN 61340-5-1.
- ▶ Also make sure that you do not touch any of the live electrical components.

4 GENERAL INFORMATION

4.1 Manufacturer's address and international contacts

To contact the manufacturer of the device, use the following address:

Bürkert SAS

Rue du Giessen

BP 21

F-67220 TRIEMBACH-AU-VAL

You may also contact your local Bürkert sales office.

The addresses of our international sales offices are available on the internet at: www.burkert.com

4.2 Warranty conditions

The condition governing the legal warranty is the conforming use of the device in observance of the operating conditions specified in the Operating Instructions.

4.3 Information on the Internet

You can find the operating instructions and the technical data sheets for Type 8098 at: www.burkert.com

5 DESCRIPTION

5.1 Knowing the device

The Type 8098 flowmeter is made up of a Type SE98 transmitter and a Type S097 flow sensor.

The following pictures describe the main versions of the Type 8098 flowmeter:

- [Fig. 1](#) describes a device with 2 M20x1,5 cable glands in stainless steel (or in nickel plated brass) and 1 5-pin M12 male connector.
- [Fig. 2](#) describes the Ethernet version of the device, i.e. a device with 2 4-pin M12 female connectors and 1 5-pin M12 male connector.

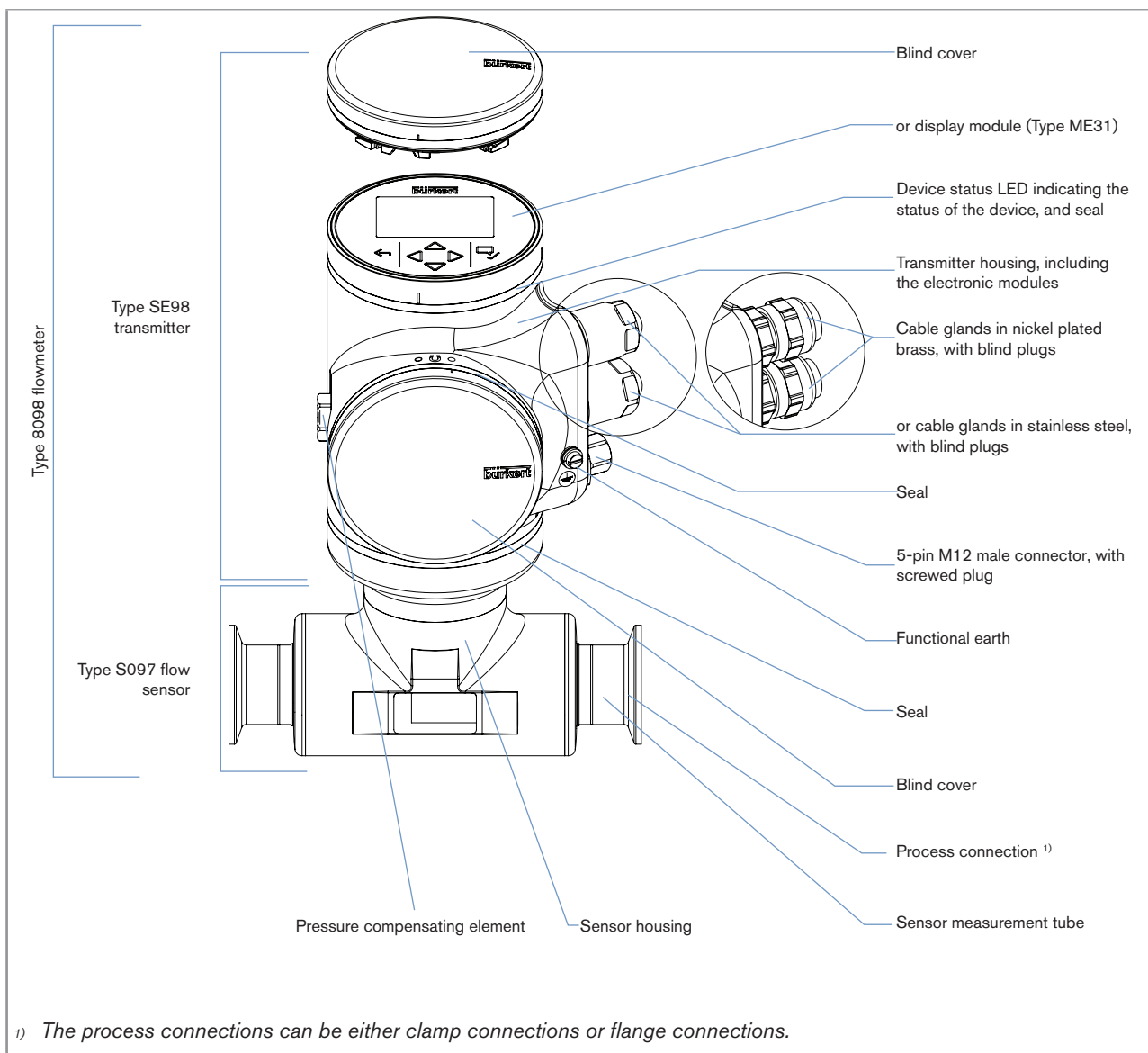


Fig. 1 : Description of the device with 2 M20x1,5 cable glands and 1 5-pin M12 male connector

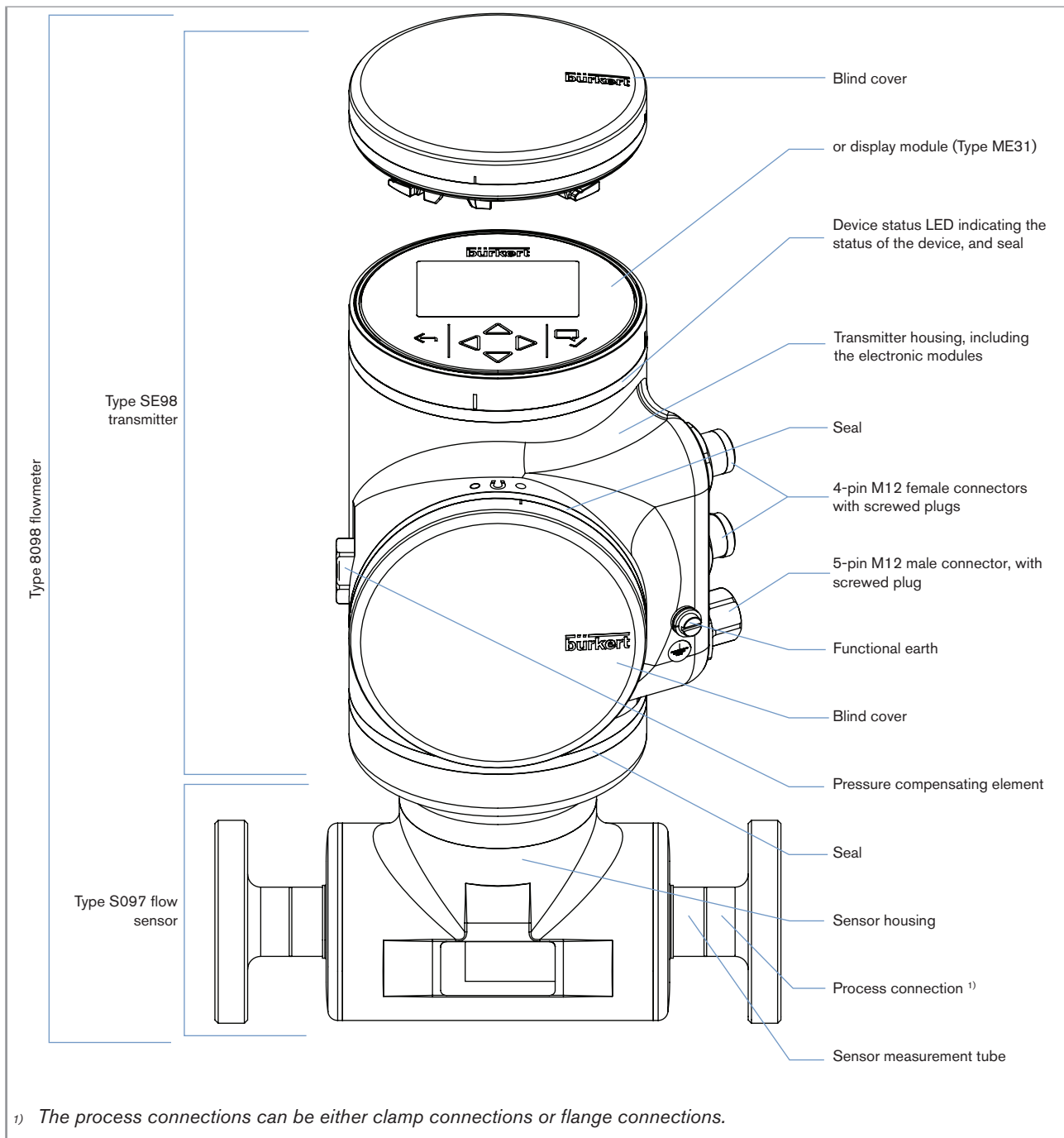


Fig. 2 : Description of an Ethernet version of the device, with 2 4-pin M12 female connectors and 1 5-pin M12 male connector

5.1.1 Wi-Fi module

The device can be equipped with a Wi-Fi module in place of or in addition to the display module. The Wi-Fi module has the Type number ME31, too. The Wi-Fi module has the same functional scope as the display module.

The Wi-Fi module is intended for use in Europe, the USA, and Canada.

The module can be integrated into an existing WLAN infrastructure. The wireless range is approximately 10 m.

The module provides a web server which can be accessed if the following requirements are met:

- Windows 7/8.1/10: IE11, Edge, Google Chrome, from version 53.
- Android with Google: Chrome, from version 53.
- Apple: Safari, from iOS 9.3.5.

5.1.2 Unlocking magnetic key

The device is delivered with a magnetic key to unlock the display module or the blind cover. See [Fig. 3](#).



Fig. 3 : *Unlocking magnetic key*

The device operates on a 4-wire system and needs a 12...35 V DC power supply.

The device has three outputs:

- 1 analogue output,
- 1 digital output,
- 1 output, which can be configured as an analogue output or as a digital output.

5.2 Marking with the MAC address

The marking with the MAC address can be seen by opening the front of the transmitter.

→ To open the front of the transmitter, see [chpt. 8.10](#).

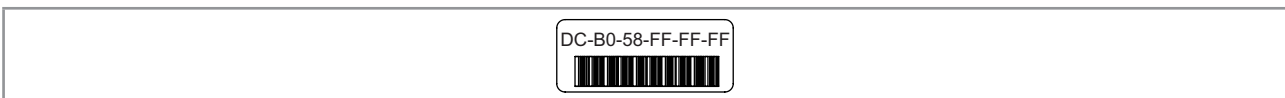


Fig. 4 : *Marking with the MAC address of the device (example)*

5.3 Rating plates

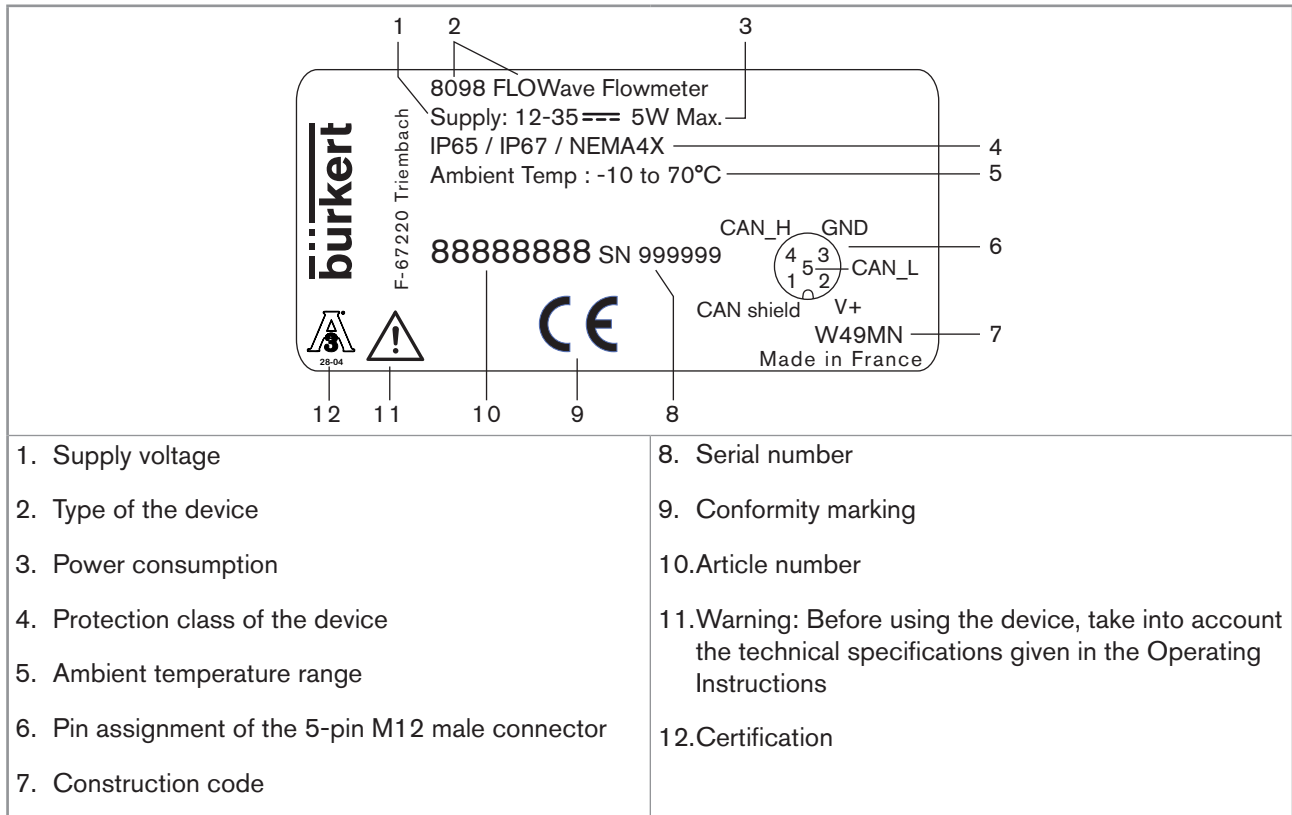


Fig. 5 : Rating plate of the Type 8098 flowmeter (example of a UL device)

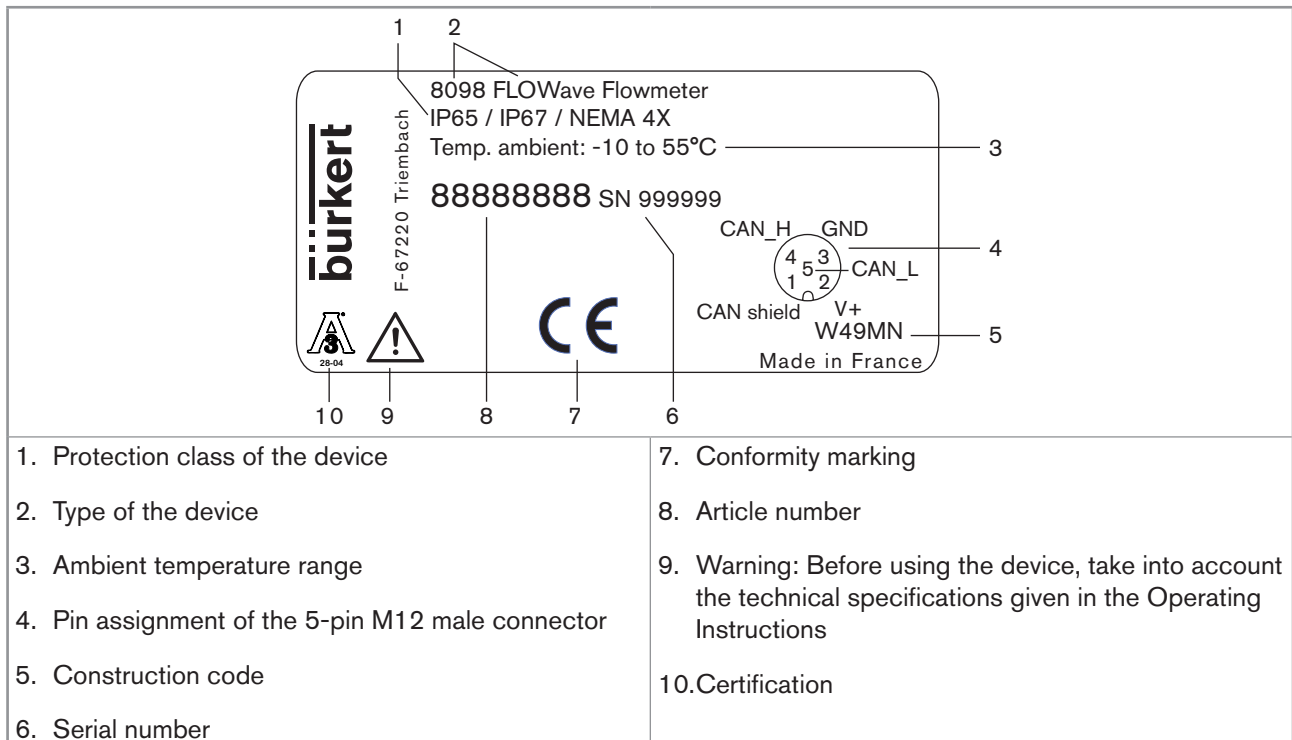
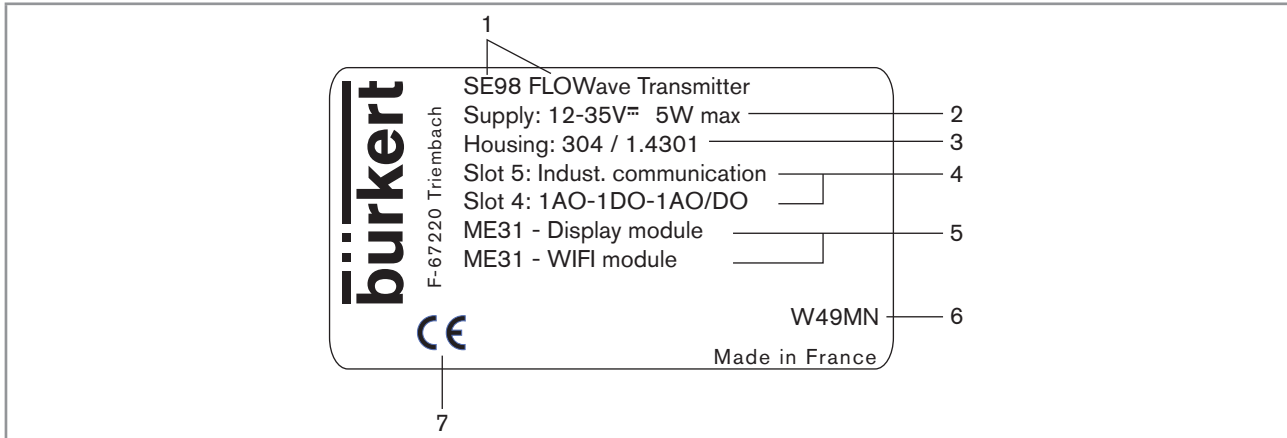
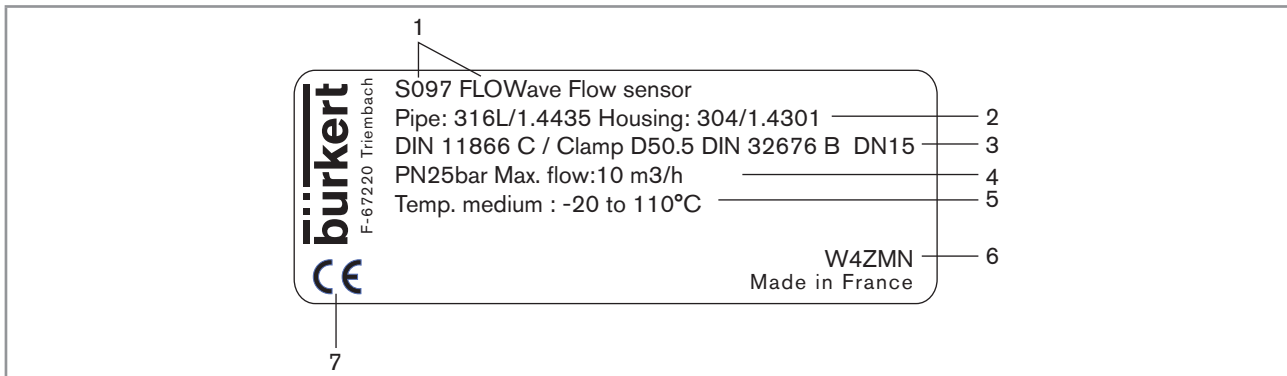


Fig. 6 : Rating plate of the Type 8098 flowmeter (example of a non-UL Ethernet device)



1. Type of the transmitter
2. Power supply and maximum power consumption
3. Housing material
4. Communication type and available outputs
5. Communication modules
6. Construction code
7. Conformity marking

Fig. 7 : Rating plate of the Type SE98 transmitter (example of an Ethernet device with display module and Wi-Fi module)



1. Type of the flow sensor
2. Material of the pipe and material of the housing
3. Standard the pipe conforms to; type of process connection, external diameter of the clamp and standard the process connection conforms to; DN of the measurement tube
4. Pressure class of the device and maximum flow rate
5. Fluid temperature range
6. Construction code
7. Conformity marking

Fig. 8 : Rating plate of the Type S097 flow sensor (example)

5.4 Description of the device status LED

Ex works, the LED that indicates the state of the device changes its colour and state based on the NAMUR NE 107 recommendation.

If several states exist simultaneously, the state with the highest priority is displayed. The priority is determined by the severity of the deviation from standard operation (red LED = failure, error or malfunction = highest priority).

Device status LED		Colour code (for a PLC)	Description	Meaning
Colour	Red	5	Failure, error, malfunction	Due to a malfunction of the device or its periphery, the measured values can be incorrect.
	Orange	4	Function check	Ongoing work on the device (for example, checking the correct behaviour of the outputs by simulating measurement values); the output signal is temporarily invalid (e.g. frozen).
	Yellow	3	Out of specification	The ambient conditions or process conditions for the device are outside the permitted ranges. Device internal diagnostics point to problems in the device or with the process properties.
	Blue	2	Maintenance required	The device continues to measure but a function is temporarily restricted. → Do the required maintenance operation.
	Green	1	Diagnostics active	No event has been generated. Status changes are shown in colour. Messages are listed and possibly transmitted via any connected fieldbus.
	White	0	Diagnostics inactive	Device is switched on. Status changes are not shown. Messages are neither listed nor transmitted via any connected fieldbus.
State	ON	-	Device is in operating state.	Device is in standard operation.
	Flashing rapidly	-	Identification	Serves as identification of a device in the büS network. The device was selected using the Bürkert Communicator software.

Table 1: Device status LED - colours and states in accordance with NAMUR NE 107, edition 2006-06-12

6 TECHNICAL DATA

6.1 Operating conditions

Ambient temperature	
▪ Device with 2 M20x1,5 cable glands and 1 5-pin M12 connector	▪ -10...+70 °C
▪ Device with 2 4-pin M12 female connectors and 1 5-pin M12 connector (Ethernet version)	▪ -10...+55 °C
Air humidity	< 85%, non condensing
Height above sea level	max. 2000 m
Operating conditions	Continuous operation
Equipment mobility	Fixed device
Use	Indoor and outdoor (Protect the device against electromagnetic interference, ultraviolet rays and, when installed outdoors, against the effects of climatic conditions)
Installation category	Category I according to UL/EN 61010-1
Degree of pollution	Degree 2 according to UL/EN 61010-1
Protection class according to IEC/EN 60529	IP65 ¹⁾ , IP67 ¹⁾ , if the device is wired and if the cable glands are tightened and the covers are screwed tight. Unused cable glands must be sealed with the stopper gaskets provided (mounted upon delivery of the device). An unused M12 connector must be protected by the screwed plug.
Protection class according to NEMA250 ¹⁾	4X, if the device is wired and if the cable glands are tightened and the covers are screwed tight. Unused cable glands must be sealed with the stopper gaskets provided (mounted at the delivery of the device). An unused M12 connector must be protected by the screwed plug.

¹⁾ not evaluated by UL

6.2 Conformity to standards and directives

The applied standards, which verify conformity with the EU Directives, can be found on the EU Type Examination Certificate and/or the EU Declaration of Conformity (if applicable).

6.3 Conformity to the Pressure Equipment Directive

→ Make sure the device materials are compatible with the fluid.

→ Make sure the pipe DN is adapted for the device.

The device conforms to Article 4, Paragraph 1 of the Pressure Equipment Directive 2014/68/EU under the following conditions:



- Device used on a pipe (PS = maximum admissible pressure; DN = nominal diameter of the pipe)

Type of fluid	Conditions
Fluid group 1, Article 4, Paragraph 1.c.i	DN ≤ 25
Fluid group 2, Article 4, Paragraph 1.c.i	DN ≤ 32 or PSxDN ≤ 1000
Fluid group 1, Article 4, Paragraph 1.c.ii	DN ≤ 25 or PSxDN ≤ 2000
Fluid group 2, Article 4, Paragraph 1.c.ii	DN ≤ 200 or PS ≤ 10 or PSxDN ≤ 5000

6.4 UL certification

The devices with variable key PU01 or PU02 are UL-certified devices and comply also with the following standards:

- UL 61010-1
- CAN/CSA-C22.2 n°61010-1

Identification on the device	Certification	Variable key
	UL recognized	PU01
 Measuring Equipment EXXXXXX	UL listed	PU02

6.5 EHEDG certification

- EL class I
- The following versions are EHEDG certified:

Process connections	Diameters
▪ Clamp ¹⁾ connections according to ASME BPE (DIN 32676 series C)	▪ 3/4", 1", 1 1/2", 2"
▪ Clamp connections according to DIN 11864-3 series C	▪ 3/4", 1", 1 1/2", 2"

Process connections	Diameters
▪ Flange connections according to DIN 11864-2 series C	▪ 3/4", 1", 1 1/2", 2"
▪ Clamp ¹⁾ connections according to DIN 32676 series B	▪ DN15 (except variants with a clamp diameter of 34.0 mm) DN25, DN40, DN50
▪ Clamp ¹⁾ connections according to DIN 32676 series A	▪ DN15, DN25, DN40, DN50
▪ Clamp connections according to DIN 11864-3 series A, DIN 11864-3 series B	▪ DN15, DN25, DN40, DN50
▪ Clamp ¹⁾ connections according to SMS 3017 / ISO 2852 for pipes according to SMS 3008	▪ DN25, DN40, DN50
▪ Flange connections according to DIN 11864-2 series A, DIN 11864-2 series B	▪ DN15, DN25, DN40, DN50

¹⁾ The EHEDG compliance is only valid if used in combination with EHEDG-compliant gaskets from Combifit International B.V.

→ To make sure you use EHEDG-compliant gaskets, refer to the "EHEDG Position Paper" available on the EHEDG website.



The manufacturer of the device does not supply any gaskets for the process connections.

6.6 Fluid data

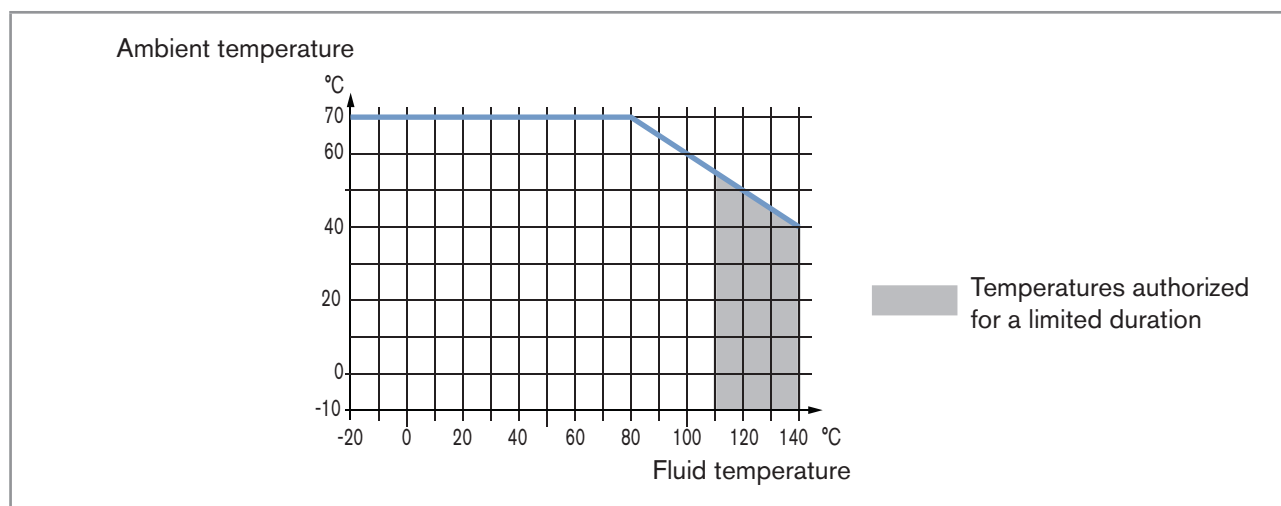


Fig. 9 : Dependency between the fluid temperature and the ambient temperature, device with 2 M20x1,5 cable glands and 1 5-pin M12 male connector

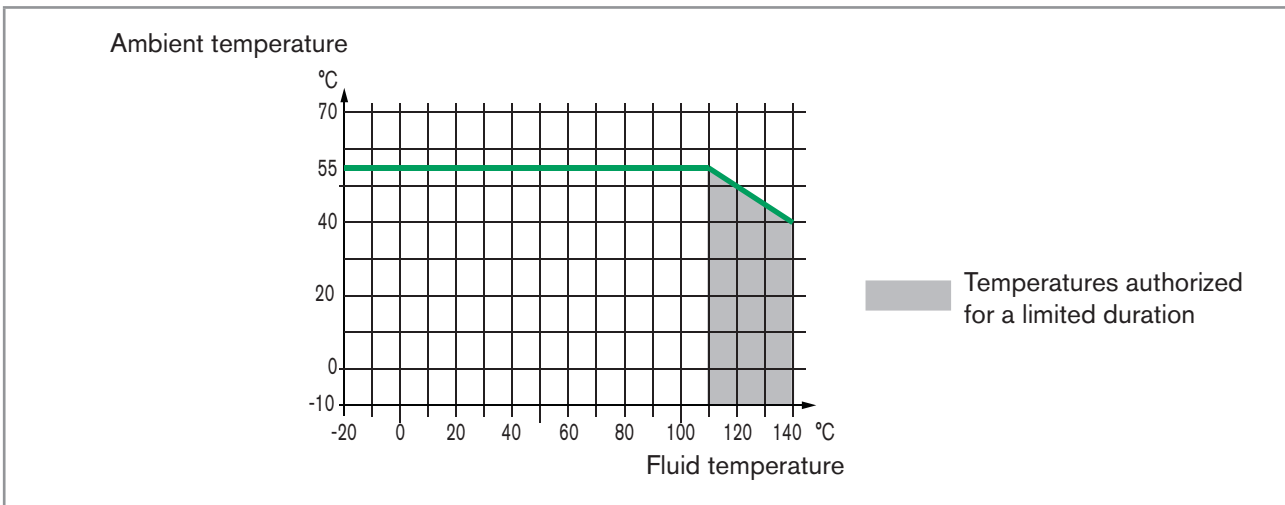


Fig. 10 : Dependency between the fluid temperature and the ambient temperature, device with 2 4-pin M12 female connectors and 1 5-pin M12 male connector (Ethernet version)

Fluid temperature	<p>-20...+110 °C, with clamp process connections. Up to 140 °C for maximum 60 minutes for a sterilisation process.</p> <p>Maximum temperature gradient: 10 °C/s [measured by the sensor integrated in the device]</p> <p>The maximum fluid temperature can be restricted by the ambient operating temperature. Depending on the version of your device, see Fig. 9 or Fig. 10</p>
Type of fluids	Non-dangerous liquids according to Article 4, Paragraph 1 of Directive 2014/68/EU

Size of the process connection	Type of process connection	Standards the process connections conform to	PN
DN15, DN25	clamp	<ul style="list-style-type: none"> ▪ DIN 11864-3 series A ▪ DIN 11864-3 series B ▪ DIN 32676 series A ▪ DIN 32676 series B 	PN25
	flange	<ul style="list-style-type: none"> ▪ DIN 11864-2 series A ▪ DIN 11864-2 series B 	PN25
DN25	clamp	SMS 3017 / ISO 2852 for pipes according to SMS 3008	PN25
3/4", 1", 1 1/2"	clamp	<ul style="list-style-type: none"> ▪ ASME BPE (DIN 32676 series C) ▪ DIN 11864-3 series C 	PN25
	flange	DIN 11864-2 series C	PN25

Size of the process connection	Type of process connection	Standards the process connections conform to	PN
DN40	clamp	<ul style="list-style-type: none"> ▪ DIN 11864-3 series B ▪ DIN 32676 series B 	PN16
		<ul style="list-style-type: none"> ▪ DIN 11864-3 series A ▪ DIN 32676 series A ▪ SMS 3017 / ISO 2852 for pipes according to SMS 3008 	PN25
	flange	DIN 11864-2 series B	PN16
		DIN 11864-2 series A	PN25
DN50	clamp	<ul style="list-style-type: none"> ▪ DIN 11864-3 series A ▪ DIN 11864-3 series B ▪ DIN 32676 series A ▪ DIN 32676 series B ▪ SMS 3017 / ISO 2852 for pipes according to SMS 3008 	PN16
	flange	<ul style="list-style-type: none"> ▪ DIN 11864-2 series A ▪ DIN 11864-2 series B 	PN16
2"	clamp	<ul style="list-style-type: none"> ▪ ASME BPE (DIN 32676 series C) ▪ DIN 11864-3 series C 	PN16
	flange	DIN 11864-2 series C	PN16

Table 2: Fluid pressure, depending on the pipe diameter, the type of process connections and the process connection standard

6.7 Measurement data

Flow rate measurement	
<ul style="list-style-type: none"> ▪ Measurement range 	<ul style="list-style-type: none"> ▪ 0...7 m³/h to 0...90 m³/h, depending on the DN of the sensor
<ul style="list-style-type: none"> ▪ Measurement deviation^{1) 2)} for a flow rate between 10% of the full scale and the full scale 	<ul style="list-style-type: none"> ▪ ±0.4% of the measured value
<ul style="list-style-type: none"> ▪ Measurement deviation^{1) 2)} for a flow rate between 1% of the full scale and 10% of the full scale 	<ul style="list-style-type: none"> ▪ < ±0.08% of the full scale
<ul style="list-style-type: none"> ▪ Repeatability²⁾ for a flow rate between 10% of the full scale and the full scale 	<ul style="list-style-type: none"> ▪ ±0.2% of the measured value
<ul style="list-style-type: none"> ▪ Repeatability²⁾ for a flow rate between 1% of the full scale and 10% of the full scale 	<ul style="list-style-type: none"> ▪ ±0.04% of the full scale
<ul style="list-style-type: none"> ▪ Refresh time 	<ul style="list-style-type: none"> ▪ Adjustable

Temperature measurement	
▪ Measurement range	▪ -20...+140 °C
▪ Measurement deviation ¹⁾ for temperatures up to 100 °C	▪ ±1 °C
▪ Measurement deviation ¹⁾ for temperatures between 100 °C and 140 °C	▪ ±1.5%
▪ Refresh time	▪ 1 s
Density factor measurement (optional feature)	
▪ Measurement range	▪ 0,8...1,3
▪ Resolution	▪ 0,00001
▪ Repeatability	▪ ±0.5% of the measured value
▪ Refresh time	▪ Adjustable
Acoustic transmission factor measurement (optional feature)	
▪ Measurement range	▪ 10...120%
▪ Resolution	▪ 0,01%
▪ Repeatability	▪ ±2% of the measured value
▪ Refresh time	▪ Adjustable

1) "Measurement bias" as defined in standard JCGM 200:2012.

2) Determined under the following reference conditions: fluid = water, free of gas bubbles and solids; water and ambient temperatures = 23 °C, refresh time of 190 ms, applying the minimum inlet (40xDN) and minimum outlet (1xDN) straight pipe lengths, appropriate pipe dimensions.

6.8 Electrical data

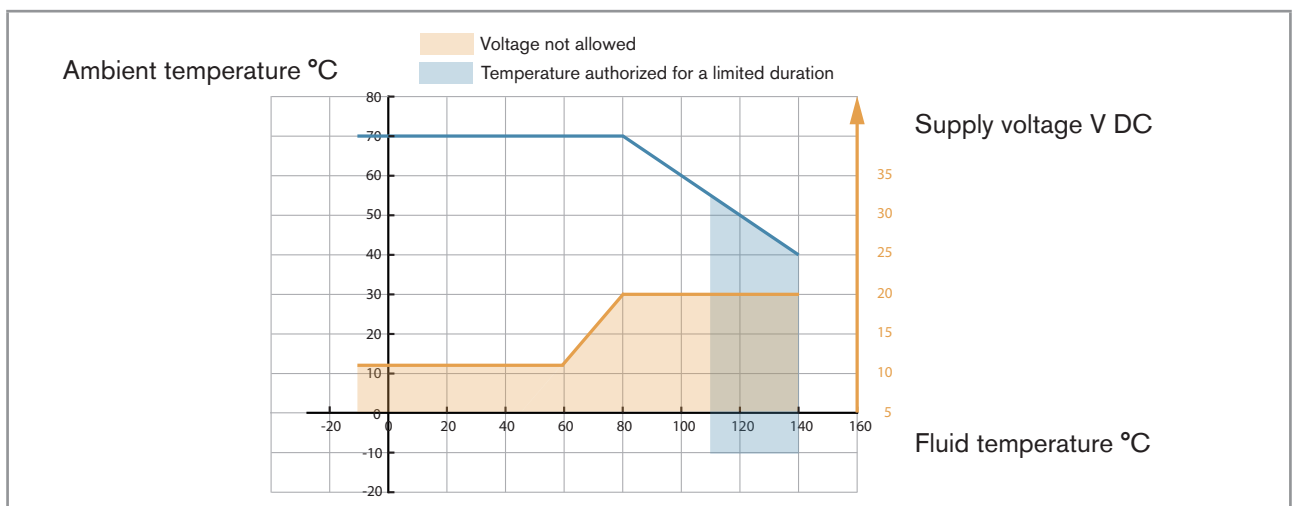


Fig. 11 : Minimum supply voltage depending on the ambient temperature and the fluid temperature, device with 2 M20x1,5 cable glands and 1 5-pin M12 male connector

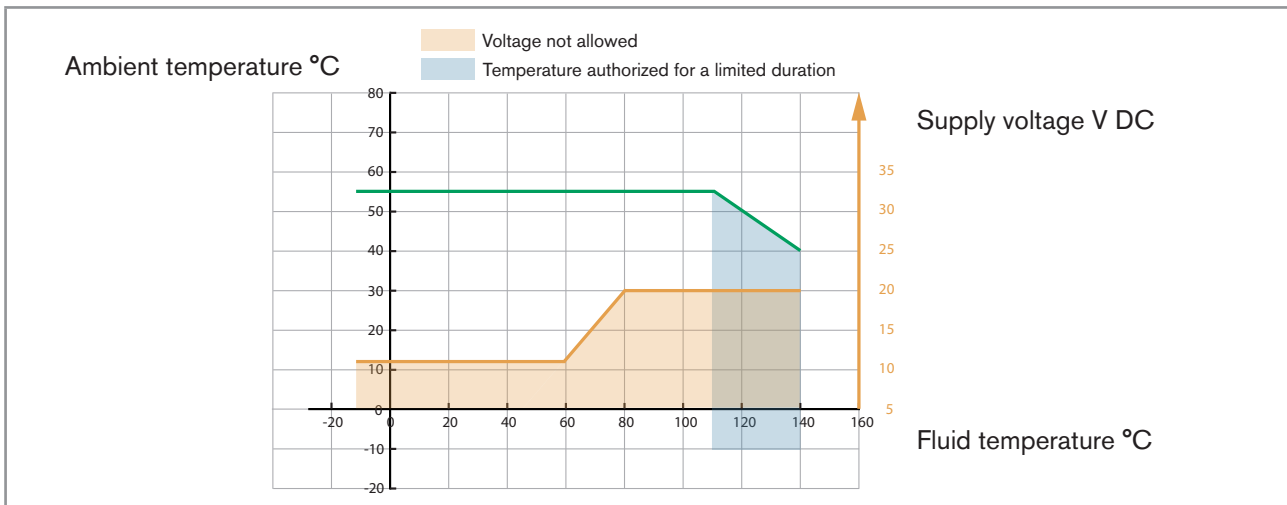


Fig. 12 : Minimum supply voltage depending on the ambient temperature and the fluid temperature, device with 2 4-pin M12 female connectors and 1 5-pin M12 male connector (Ethernet version)

Operating voltage	<ul style="list-style-type: none"> 12...35 V DC; the minimum voltage to be supplied depends on the fluid temperature and on the ambient operating temperature: depending on the version of your device, see Fig. 11 or Fig. 12 Current consumption: max. 2 A Filtered and regulated Oscillation rate: $\pm 10\%$ Connection to main supply: permanent (through external SELV (safety extra-low voltage) and through LPS (limited power source))
Specifications of the power source (not supplied)	<ul style="list-style-type: none"> Limited power source according to UL/EN 60950-1 standards or limited energy circuit according to UL/EN 61010-1, Paragraph 9.4
Power consumption (without the consumption of the outputs)	
<ul style="list-style-type: none"> Device with 2 M20x1,5 cable glands and 1 5-pin M12 connector 	<ul style="list-style-type: none"> ≤ 5 W
<ul style="list-style-type: none"> Device with 2 4-pin M12 female connectors and 1 5-pin M12 connector (Ethernet version) 	<ul style="list-style-type: none"> ≤ 8 W
Polarity reversal	Protected

Analogue output 1, also output 3 if configured as an analogue output	<ul style="list-style-type: none"> ▪ 4...20 mA current; 3.6 mA or 22 mA to indicate an error ▪ Uncertainty: ± 0.04 mA ▪ Resolution: 0.8 μA ▪ Open loop detection through diagnostics software function ▪ Any connection mode, in sink or source mode ▪ Galvanically isolated, passive ▪ Protected against polarity reversal ▪ Maximum loop impedance 1300 Ω at 35 V DC, 1000 Ω at 30 V DC, 700 Ω at 24 V DC, 450 Ω at 18 V DC
Digital output 2, also output 3 if configured as a digital output	<ul style="list-style-type: none"> ▪ Transistor ▪ Any connection mode, in NPN or PNP mode ▪ Pulse (by default), can be changed by the user ▪ 0...2000 Hz ▪ 5...35 V DC, max. 700 mA ▪ Galvanically isolated, passive ▪ Overload information through diagnostics software function ▪ Protected against overloads ▪ Protected against polarity reversals

6.9 Mechanical data

Dimensions and weight of the device: refer to the technical data sheet regarding Type 8098 available at www.buerkert.com

Table 3: *Materials in contact with ambient air*

Component	Material
Transmitter housing ¹⁾ , sensor housing	Stainless steel 304 / 1.4301, outer surface finish Ra < 1.6 μ m
Cable glands / Blind plugs (depending on the version of your device)	Stainless steel / PA6
	Nickel plated brass / Black polyoxymethylene (POM)
5 pin M12 male connector / Screwed plug (depending on the version of the device)	Stainless steel / Stainless steel
	Nickel plated brass / Nickel plated brass
4 pin M12 female connector / Screwed plug	Stainless steel / Stainless steel
Pressure compensating element	Stainless steel
External M4 screw for earth connection	Stainless steel A4
Display	Float glass, stainless steel 304 / 1.4301

Component	Material
Seals	VMQ silicone
Rating plate	Polyester

¹⁾ The housing may have slight machining marks due to the manufacturing process. These marks do not affect the operation of the device and are not a manufacturing defect.

Table 4: *Materials in contact with the fluid*

Component	Material
<ul style="list-style-type: none"> ▪ Sensor measurement tube ▪ Pipe connections 	Stainless steel 316L / DIN 1.4435 BN2

Table 5: *Available surface finish*

Component	Surface finish according to ISO 4288
Measurement tube (inner surface)	Ra < 0.8 µm or Ra < 0.4 µm
<ul style="list-style-type: none"> ▪ Measurement tube (outer surface) ▪ Housing 	Ra < 1,6 µm (excluding welding seams)

6.10 Specifications of the Ethernet Industrial communication

Table 6: Specifications of the industrial communication module

Network speed	10/100 mbps
Auto negotiation	Yes
Auto MDI/MDI-X	Yes
Switch function	Yes
Network diagnostics	Yes, via error telegram
MAC-ID	Individual identification number, stored in the module and on the outside of the device (see rating plate)
Device name Ethernet (factory setting)	FLOWave (name can be changed)

6.10.1 Modbus TCP protocol

TCP port	502
Protocol	Internet protocol, version 4 (IPv4)
Network topology	<ul style="list-style-type: none"> ▪ Tree ▪ Star ▪ Line (open daisy chain)
IP configuration	<ul style="list-style-type: none"> ▪ Static IP address ▪ Not supported: <ul style="list-style-type: none"> - BOOTP (Bootstrap Protocol) - DHCP (Dynamic Host Configuration Protocol)
Transmission speed	10 and 100 MBit/s
Data transport layer	EtherNet II, IEEE 802.3
Modbus function codes	1, 2, 3, 4, 15, 16, 23
Read/write register	Maximum 125 read registers and 123 write registers per telegram
Message mode	Server
Input (Target to Originator)	<ul style="list-style-type: none"> ▪ All diagnostics and errors information has the highest priority and can be read by a PLC (refer to the concerned protocol file available at www.burkert.com). ▪ PDO: value, status, unit ▪ Device and modules: status ▪ Functions: value, status

PDO = Process Data Object, Target = Server, Originator = Client.

6.10.2 PROFINET protocol

Product type	Compact field IO device
PROFINET IO specification	V2.3
Network topology	<ul style="list-style-type: none"> ▪ Tree ▪ Star ▪ Ring (closed daisy chain) ▪ Line (open daisy chain)
Network management	<ul style="list-style-type: none"> ▪ LLDP (Link Layer Discovery Protocol) ▪ SNMP V1 (Simple Network Management Protocol) ▪ MIB-II (Management Information Base) ▪ Physical device
Additional supported features	<ul style="list-style-type: none"> ▪ DCP (Discovery and Configuration Protocol) ▪ VLAN- and priority tagging ▪ Shared device ▪ RTC (Real Time Cyclic) protocol: Class 1 ▪ Not supported: <ul style="list-style-type: none"> - IRT (In Real Time)
Transmission speed	100 MBit/s full duplex
Data transport layer	EtherNet II, IEEE 802.3
Maximum supported conformance class	CC-B
Media Redundancy (for ring topology)	MRP client is supported
Minimum cycle time	10 ms
Input cyclic data (device to IO-controller or device to IO-supervisor)	<ul style="list-style-type: none"> ▪ All diagnostics and errors information has the highest priority and can be read by a PLC (refer to the concerned protocol file available at www.burkert.com). ▪ PDO: value, status, unit ▪ Device and modules: status ▪ Functions: value, status
Application Relations (AR)	The device can simultaneously process up to 2 IO-ARs, 1 Supervisor AR and 1 Supervisor DA AR.
GSDml file	Available at / Download from: www.burkert.com

PDO = Process Data Object

6.10.3 EtherNet/IP protocol

Protocol	Internet protocol, version 4 (IPv4)
Network topology	<ul style="list-style-type: none"> ▪ Tree ▪ Star ▪ DLR (Device Level Ring) for closed daisy chain ▪ Linear for open daisy chain

IP configuration	<ul style="list-style-type: none"> ▪ Static IP address ▪ BOOTP (Bootstrap Protocol) ▪ DHCP (Dynamic Host Configuration Protocol)
CIP reset services (Common Industrial Protocol)	Reset service (type 0 or type 1) of the Identity object
Transmission speed	10 and 100 MBit/s
Duplex modes	Half duplex, full duplex, auto-negotiation
Data transport layer	EtherNet II, IEEE 802.3
MDI modes (Medium Dependant Interface)	MDI, MDI-X, auto-MDI-X
Predefined standard objects	<ul style="list-style-type: none"> ▪ Identity (0x01) ▪ Message Router (0x02) ▪ Assembly (0x04) ▪ Connection Manager (0x06) ▪ DLR (0x47) ▪ QoS (0x48) ▪ TCP/IP Interface (0xF5) ▪ EtherNet Link (0xF6)
Additional supported features	<ul style="list-style-type: none"> ▪ ACD (Address Conflict Detection) ▪ Integrated switch
RPI (Requested Packet Interval)	<ul style="list-style-type: none"> ▪ minimum: 100 ms ▪ maximum: 9999 ms
Input (Consumer to Producer or Adapter to Scanner)	<ul style="list-style-type: none"> ▪ All diagnostics and errors information has the highest priority and can be read by a PLC (refer to the concerned protocol file available at www.burkert.com). ▪ PDO: value, status, unit ▪ Device and modules: status ▪ Functions: value, status
EDS file	Available at / Download from: www.burkert.com

PDO = Process Data Object, Consumer = Server, Producer = Client, Adapter = Server, Scanner = Client.

6.10.4 EtherCAT protocol



Industrial Ethernet interface X1, X2	<ul style="list-style-type: none"> ▪ X1: EtherCAT IN ▪ X2: EtherCAT OUT
Maximum number of cyclic input and output data	512 bytes in total
Maximum number of cyclic input data	1024 bytes
Maximum number of cyclic output data	1024 bytes
Acyclic communication (CoE)	<ul style="list-style-type: none"> ▪ SDO ▪ SDO master-slave ▪ SDO slave-slave (depends on master capacity)
Type	Complex slave
Fieldbus Memory Management Units (FMMUs)	8
Sync Managers	4
Transmission speed	100 Mbit/s
Data transport network	Ethernet II, IEEE 802.3

EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany

7 INSTALLATION IN THE PIPE

7.1 Safety instructions



DANGER

Risk of injury due to electrical voltage.

- ▶ Before carrying out work on the system, disconnect the electrical power for all the conductors and isolate it.
- ▶ Observe all applicable accident protection and safety regulations for electrical equipment.

Risk of injury due to high pressure in the installation.

- ▶ Before any intervention in the installation, stop the circulation of fluid, cut off the pressure and drain the pipe.
- ▶ Before any intervention in the installation, make sure there is no pressure in the pipe.
- ▶ Observe the dependency between the fluid temperature and the fluid pressure for the fitting used.

If switched on for a prolonged time, risk of burns or fire due to hot device surfaces

- ▶ Do not touch with bare hands.
- ▶ Keep the device away from highly flammable substances and fluids.

Risk of burns due to high fluid temperatures.

- ▶ Do not touch with bare hands the parts of the device that are in contact with the fluid.
- ▶ Use safety gloves to handle the device.
- ▶ Before opening the pipe, stop the circulation of fluid and drain the pipe.
- ▶ Before opening the pipe, make sure the pipe is completely empty.

Risk of injury due to the nature of the fluid.

- ▶ Respect the prevailing regulations on accident prevention and safety relating to the use of dangerous fluids.



WARNING

Risk of injury due to non-conforming installation.

- ▶ The electrical and fluid installations must only be carried out by qualified and authorized personnel with the appropriate tools.



WARNING

Risk of injury due to unintentional switch-on of the power supply or uncontrolled restart of the installation.

- ▶ Take appropriate measures to avoid unintentional activation of the installation.
- ▶ Guarantee a set or controlled process restart after carrying out any device intervention.

WARNING

Risk of injury if the fluid pressure/temperature dependency is not respected.

- ▶ Observe the fluid temperature-pressure dependency. Refer to chpt. [6.6 Fluid data](#).
- ▶ Observe Pressure Equipment Directive 2014/68/EU.

CAUTION

Risk of injury due to a heavy device.

A heavy device can fall down during transport or during installation and cause injuries.

- ▶ Transport, install and dismantle a heavy device with the help of another person.
- ▶ Use appropriate tools.

NOTICE

The device will be damaged if you use a tool to turn the blind cover or the display module.

- ▶ Do not use a tool to turn the blind cover or the display module.

7.2 Preparing the device before installation into the pipe

The device is delivered as described in chpt. [5.1](#).

Before installing the device into the pipe, you may:

- change the position of the transmitter on the sensor. Refer to chpt. [7.2.1](#).
- switch positions of the display module and the blind cover. Refer to chpt. [7.2.2](#).

7.2.1 Changing the position of the transmitter on the sensor



These instructions are valid for all the versions of the device.

The Type SE98 transmitter can have four positions on the Type S097 flow sensor. See [Fig. 13](#).

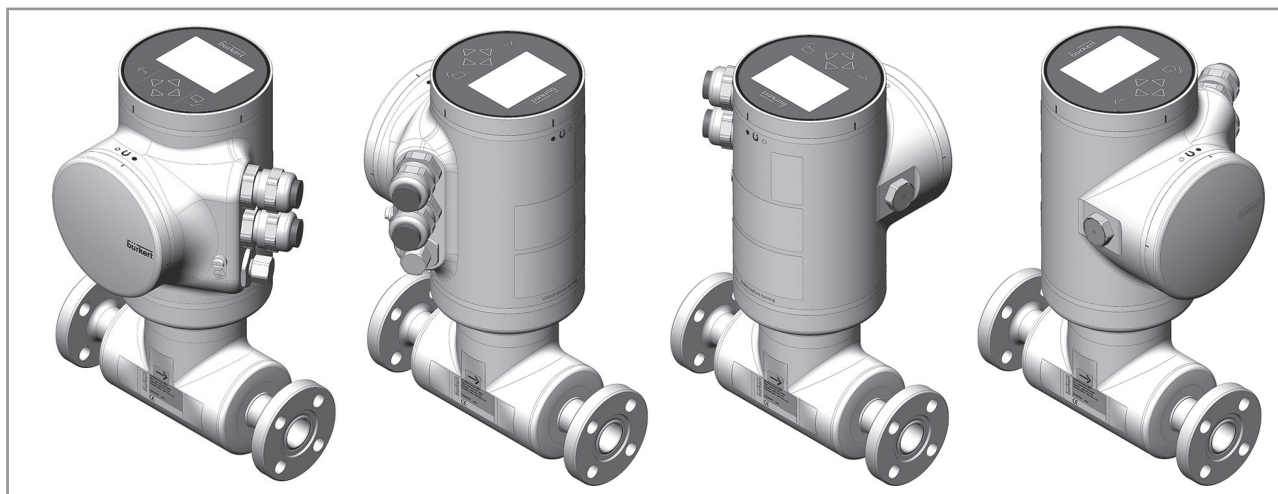
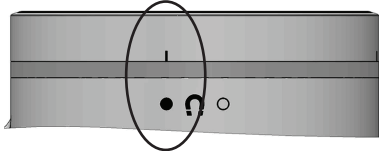



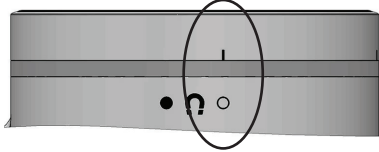

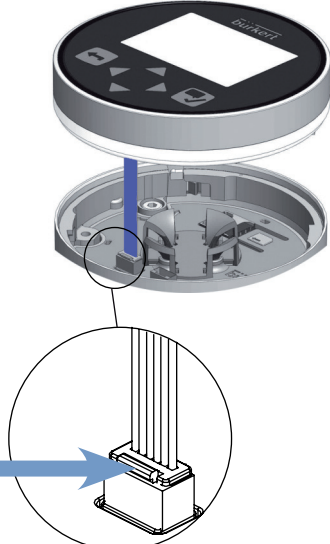
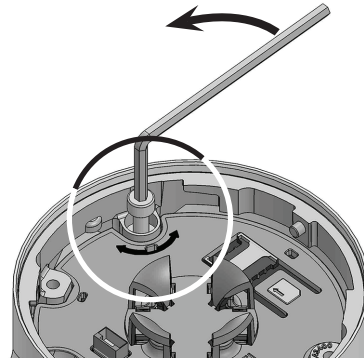


Fig. 13 : Possible positions of the transmitter SE98

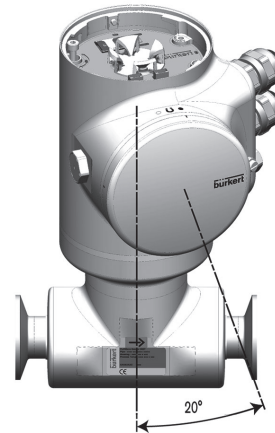
→ To change the position of the transmitter, do the following:


<p>For safety reasons and to comply with standard UL 61010-1, the blind cover and the display module are locked.</p> <p>→ Prepare the unlocking magnetic key, which is delivered with the device, to change the position of the transmitter.</p>	 <p>The blind cover or the display module is locked</p>
<p>1. Put the magnetic key on the  mark related to the display module. You should hear a soft click indicating that the display module is unlocked. Do not use a tool to turn the display module.</p>	
<p>2. While the magnetic key is on the  mark, turn the display module by hand only from the locked position to the unlocked position. If you cannot turn the display module by hand, contact Bürkert.</p>	 <p>The blind cover or the display module is unlocked</p>
<p> Carefully lift the display module because a cable connects the display module to the transmitter.</p> <p>4. Push the tab of the cable connector to disconnect the display module from the transmitter.</p> <p>5. Remove the display module and put it on a clean surface to protect the seal from dirt.</p>	 <p>Push the tab to unlock the cable connector</p>

6. Use a size 3 hexagonal key to loosen the screw that is marked with the arrow and that locks the transmitter to the flow sensor.



7. Hold the flow sensor with one hand and, with the other hand, turn the transmitter by about 20 degrees counterclockwise.

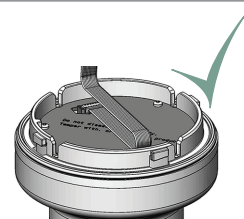


8.  Lift the transmitter carefully because a cable connects the transmitter to the flow sensor.

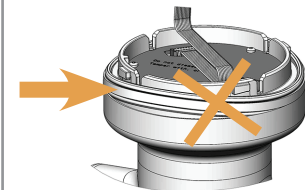


9. If the seal is damaged, replace it. Apply a layer of lithium soap grease to the new seal before you put it in place.

10. If the seal is not located in the groove, put it back in the groove.



Seal in the groove:
correct

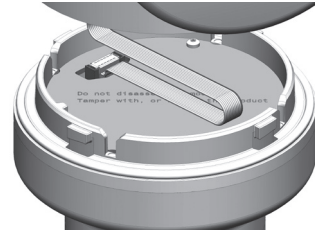


Seal not in the groove:
NOT correct

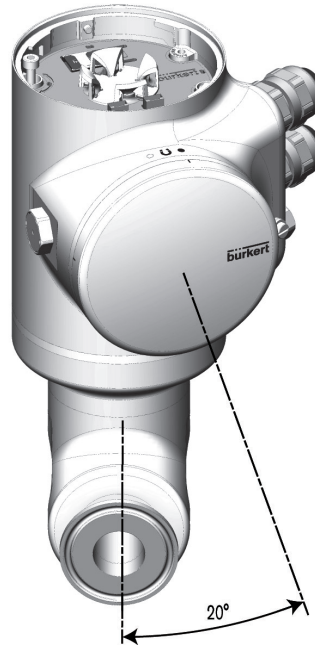
11. Turn the transmitter to the desired position.



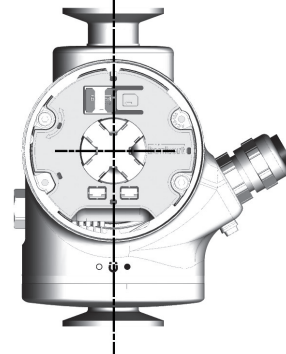
12. Fold the cable in a Z-shape and make sure the cable stays inside the transmitter.



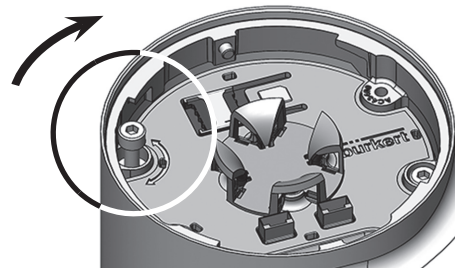
13. Turn the transmitter by about 20 degrees counterclockwise.



14. Screw the transmitter clockwise on the flow sensor until the blind cover is perfectly parallel or perpendicular to the axis of the pipe.



15. Fasten the screw with a size 3 hexagonal key to a tightening torque of 1.3 N·m ±0.5 N·m (0.9 ft·lbf ±0.4 ft·lbf)



<p>16. Connect the display module to the transmitter.</p> <p>17. Put the mark of the cover on the unlocked marking of the housing and screw the cover clockwise on the transmitter until the mark is on the locked position. You should hear a click.</p>	
---	--

7.2.2 Switching positions of the blind cover and the display module

CAUTION

Risk of injury due to a heavy device.

A heavy device can fall down during transport or during installation and cause injuries.

- ▶ Transport, install and dismantle a heavy device with the help of another person.
- ▶ Use appropriate tools.

These instructions are valid for all the versions of the device.

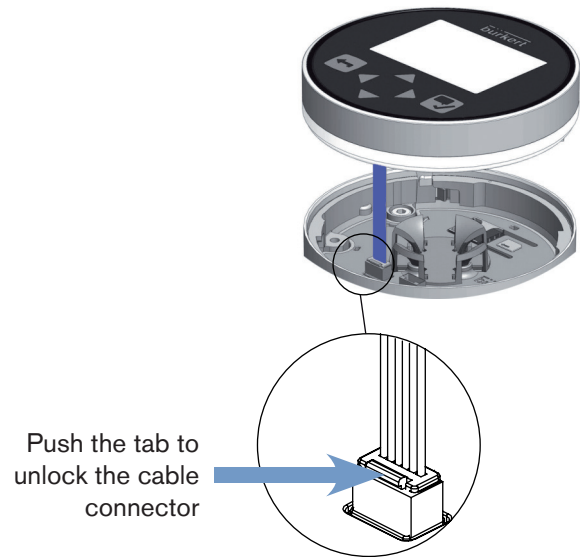
Upon delivery, a display module is screwed on the top and a blind cover is screwed on the housing side.


→ To switch positions of the display module and the blind cover, do the following:

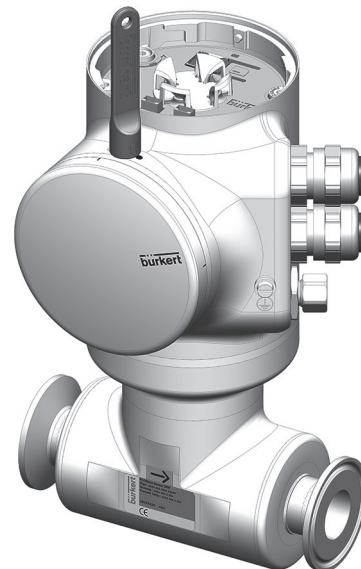
<p>For safety reasons and to comply with standard UL 61010-1, the blind cover and the display module are locked.</p> <p>→ Prepare the unlocking magnetic key, which is delivered with the device.</p>	<p>The blind cover or the display module is locked</p>
<p>1. Put the magnetic key on the mark related to the display module. You should hear a soft click indicating that the display module is unlocked. Do not use a tool to turn the display module.</p>	
<p>2. While the magnetic key is on the mark, turn the display module by hand only from the locked position to the unlocked position. If you cannot turn the display module by hand, contact Bürkert.</p>	<p>The display module is unlocked</p>

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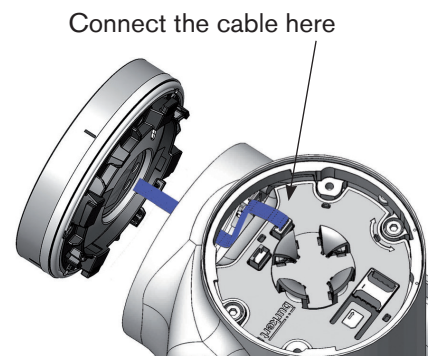
3. Carefully lift the display module because a cable connects the display module to the transmitter.
4. Push the tab of the cable connector to disconnect the display module from the transmitter.
5. Remove the display module and put it on a clean surface to protect the seal from dirt.



6. Put the magnetic key on the  mark related to the blind cover. You should hear a click indicating that the blind cover is unlocked. Do not use a tool to turn the blind cover.
7. Turn the blind cover by hand only to the unlocked position and remove it. If you cannot turn the blind cover by hand, contact Bürkert.



8. Put the cable of the display module through the front opening.
9. Connect the cable to the connector, as shown in the figure.
10. Put the mark of the display module on the unlocked marking of the housing and screw the cover clockwise on the transmitter until the mark is on the locked position.



<p>11. Put the mark of the blind cover on the unlocked marking of the top of the transmitter housing.</p>	
<p>12. Screw the blind cover clockwise on the transmitter until the mark is on the locked position. You should hear a click.</p>	<p>The blind cover is locked.</p>

7.3 Recommendations for the installation into the pipe

- Protect this device against electromagnetic interference, ultraviolet rays and, when installed outdoors, the effects of climatic conditions.
- Make sure the DN of the measurement tube is suited to the flow velocity: refer to the data sheet of the device, available at www.burkert.com.
- Choose a location with enough free space to put the magnetic key on the symbol at the rear side of the device.
- Install the device upstream a valve or any equipment that changes the pipe diameter or the pipe direction. If the recommendation cannot be complied with, install the device in the pipe in such a way that the straight downstream distances are satisfied depending on the design of the pipes, refer to standard ISO 9104:1991 and Fig. 14. If these recommendations cannot be complied with, contact Bürkert.

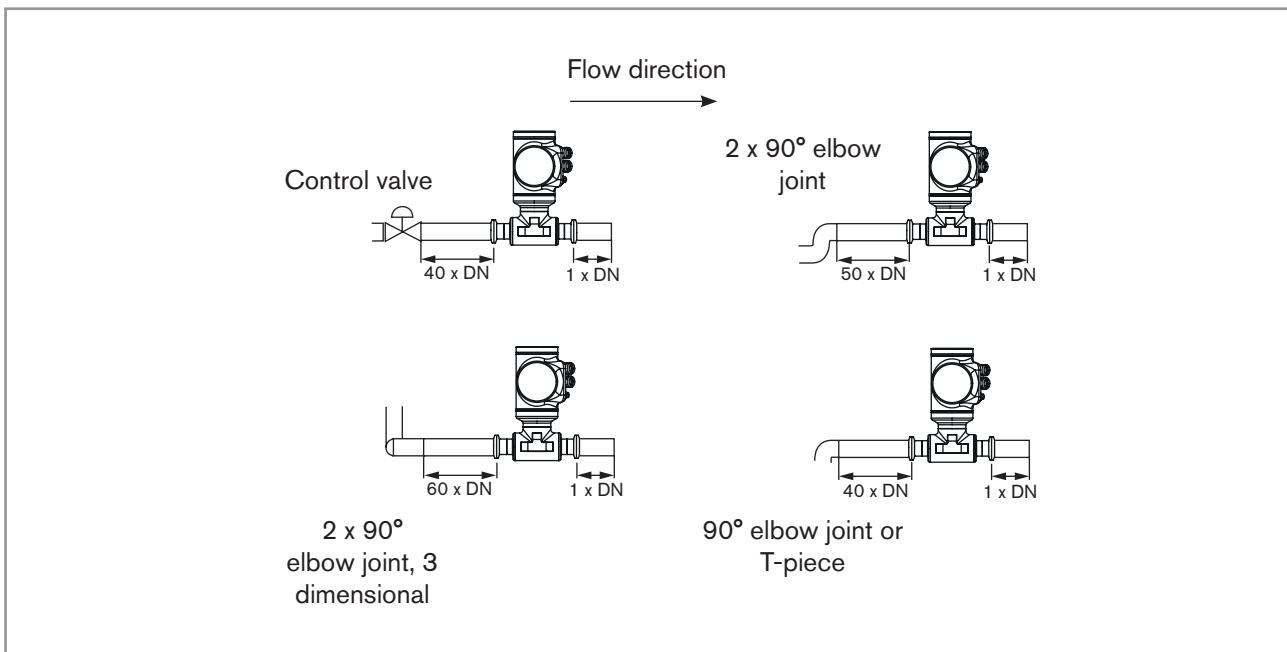


Fig. 14 : Upstream and downstream straight distances for special pipe designs

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→ To allow proper self-draining and to respect the 3A and EHEDG requirements, install the device into a pipe with a minimum angle against the horizontal. See [Table 7](#).

Table 7: Minimum angle against the horizontal for proper self-draining

Type of process connection	Standards the process connections conform to	Angle against the horizontal
clamp	<ul style="list-style-type: none"> ▪ DIN 32676 series A ▪ DIN 11864-3 series A ▪ SMS 3017 / ISO 2852 for pipes according to SMS 3008 	minimum 5°
flange	DIN 11864-2 series A	minimum 5°
clamp	<ul style="list-style-type: none"> ▪ ASME BPE (DIN 32676 series C) ▪ DIN 32676 series A ▪ DIN 11864-3 series B ▪ DIN 11864-3 series C 	minimum 3°
flange	<ul style="list-style-type: none"> ▪ DIN 11864-2 series B ▪ DIN 11864-2 series C 	minimum 3°

→ If the pipe is fitted with a thermal insulation, do not thermally insulate the measurement tube of the device to make sure that the temperature in the device is less than 70°. Refer to [Fig. 15](#) and, for the minimum supply voltage, to [chpt. 8.4](#).

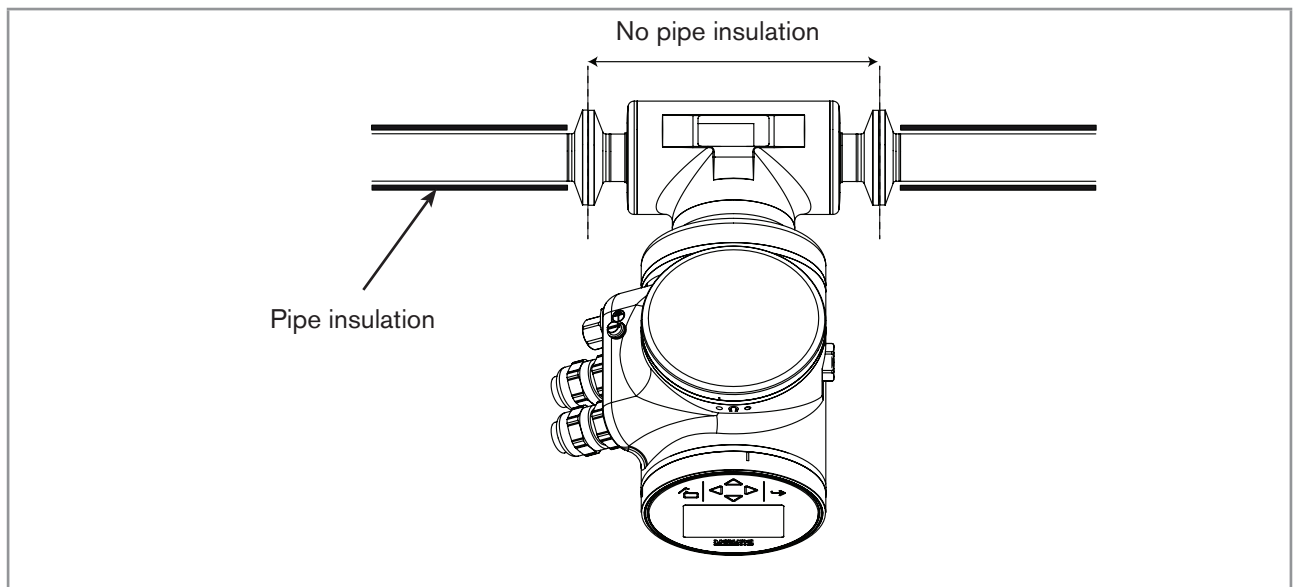


Fig. 15 : Thermal insulation of the pipe

- To make sure the internal temperature of the transmitter with cable glands does not exceed the authorized maximum value, install the device as recommended in [Fig. 16](#).
- To make sure the internal temperature of the transmitter does not exceed the authorized maximum value, install an Ethernet version of the device as recommended in [Fig. 17](#).

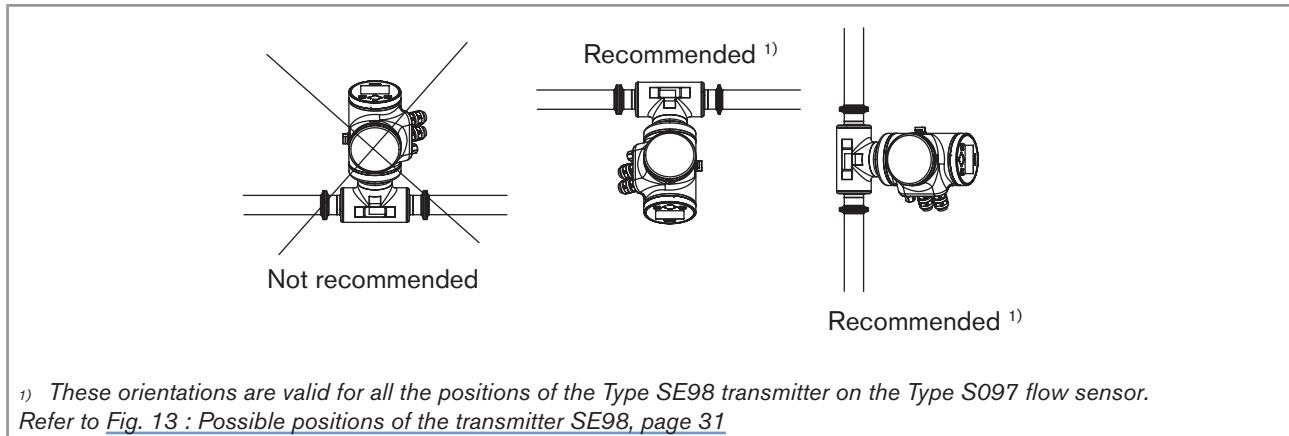


Fig. 16 : Orientation of a device with cable glands to avoid effects of high liquid temperatures

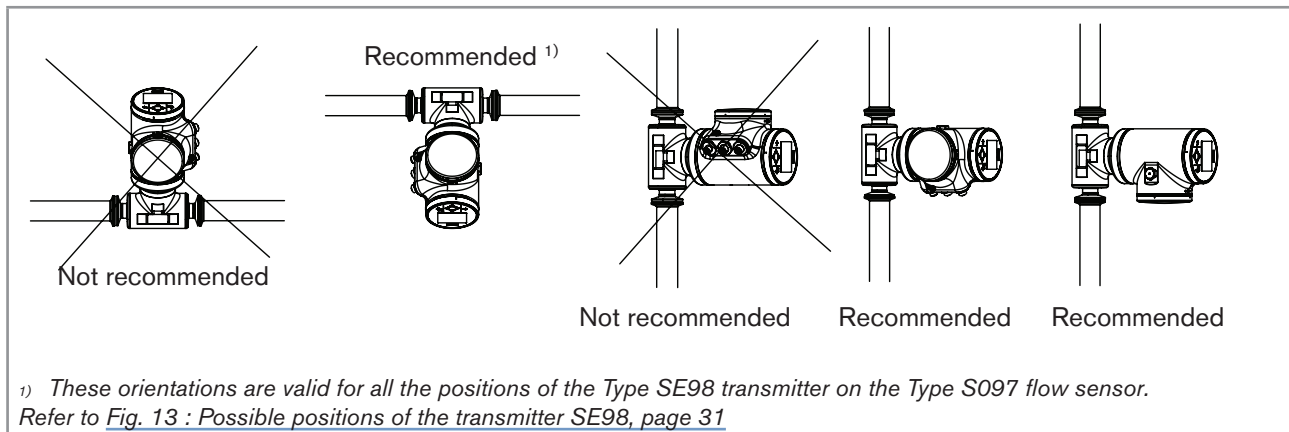


Fig. 17 : Orientation of an Ethernet version of the device to permit the heat dissipation

7.4 Installing the device into the pipe

CAUTION

Risk of injury due to a heavy device.

A heavy device can fall down during transport or during installation and cause injuries.

- ▶ Transport, install and dismantle a heavy device with the help of another person.
- ▶ Use appropriate tools.

7.4.1 Before installing the device into the pipe

- Prepare the device as described in chpt. [7.2](#).
- Follow the recommendations given in chpt. [7.3](#).

7.4.2 Installing a device with clamp connections

The manufacturer of the device does not supply any gaskets for the process connections.

- If the installation must be EHEDG-compliant and the device is fitted with clamp connections according to ASME BPE (DIN 32676 series C), DIN 32676 series A, DIN 32676 series B or SMS 3017 / ISO 2852 for pipes according to SMS 3008, use EHEDG-compliant gaskets from Combifit International B.V.
- To make sure you use EHEDG-compliant gaskets, refer to the "EHEDG Position Paper" available on the EHEDG website.
- The clamp connections according to DIN 11864-3 series A, B and C are hygienic connections. You can use any gaskets that are adapted to the process.
- Make sure the gaskets on the clamp connections are in good condition.
- Place gaskets adapted to the process (temperature, fluid type) in the grooves of the clamp connections.
- Attach the clamp connections to the pipe with clamp collars.

7.4.3 Installing a device with flange connections

- The flange connections according to DIN 11864-2 series A, B and C are hygienic connections. You can use any gaskets that are adapted to the process.
- Make sure the gaskets on the flange connections are in good condition.
- Place gaskets adapted to the process (temperature, fluid type) in the grooves of the flange connections.
- Use bolts with dimensions as given in the relevant flange standard and adapted to the process.
- Tighten the bolts to a torque as given in the relevant flange standard to fix the fitting to the pipe.

8 ELECTRICAL INSTALLATION

8.1 Safety instructions



DANGER

Risk of injury due to electrical voltage.

- ▶ Before carrying out work on the system, disconnect the electrical power for all the conductors and isolate it.
- ▶ Observe all applicable accident protection and safety regulations for electrical equipment.

Risk of injury due to high pressure in the installation.

- ▶ Before any intervention in the installation, stop the circulation of fluid, cut off the pressure and drain the pipe.
- ▶ Before any intervention in the installation, make sure there is no pressure in the pipe.
- ▶ Observe the dependency between the fluid temperature and the fluid pressure for the fitting used.

If switched on for a prolonged time, risk of burns or fire due to hot device surfaces

- ▶ Do not touch with bare hands.
- ▶ Keep the device away from highly flammable substances and fluids.

Risk of burns due to high fluid temperatures.

- ▶ Do not touch with bare hands the parts of the device that are in contact with the fluid.
- ▶ Use safety gloves to handle the device.
- ▶ Before opening the pipe, stop the circulation of fluid and drain the pipe.
- ▶ Before opening the pipe, make sure the pipe is completely empty.

Risk of injury due to the nature of the fluid.

- ▶ Respect the prevailing regulations on accident prevention and safety relating to the use of dangerous fluids.



WARNING

Risk of injury due to non-conforming installation.

- ▶ The electrical and fluid installations must only be carried out by qualified and authorized personnel with the appropriate tools.
- ▶ Fit a circuit breaker or a switch to the electrical installation of the building in which the device is installed.
- ▶ Install the circuit breaker or the switch in an easily accessible place.
- ▶ Identify the circuit breaker or the switch as the disconnecting component for the electrical power supply to the device.
- ▶ Install overload devices that are appropriate for electrical installation.
- ▶ Observe standard NF C 15-100 / IEC 60364.



WARNING

Risk of injury due to unintentional switch on of the power supply or uncontrolled restart of the installation.

- ▶ Take appropriate measures to avoid unintentional activation of the installation.
- ▶ Guarantee a set or controlled process restart after carrying out any device intervention.



CAUTION

Risk of injury due to a heavy device.

A heavy device can fall down during transport or during installation and cause injuries.

- ▶ Transport, install and dismantle a heavy device with the help of another person.
- ▶ Use appropriate tools.

NOTICE

The device will be damaged if you use a tool to turn the blind cover or the display module.

- ▶ Do not use a tool to turn the blind cover or the display module.

NOTICE

If you try to remove the nut from a stainless steel M20x1,5 cable gland, the device is no longer tight.

- ▶ Do not remove the nut of a stainless steel M20x1,5 cable gland. The nut of a stainless steel M20x1,5 cable gland cannot be removed.
- ▶ Turn the nut until the stop. If you turn beyond the stop, the cable gland unscrews from the device and the device is no longer tight.

NOTICE

If the screwed plug of a 5-pin M12 male connector is removed, the device is not tight.

- ▶ If the 5-pin M12 male connector is not used, do not remove the screwed plug.
- ▶ Screw the plug to the 5-pin M12 male connector to a torque of 2 N·m (1.47 lbf·ft).

NOTICE

If the screwed plug of a 4-pin M12 female connector is removed, the device is not tight.

- ▶ If the 4-pin M12 female connector is not used, do not remove the screwed plug.
- ▶ Screw the plug to the 4-pin M12 female connector to a torque of 1.3 N·m (0.96 lbf·ft).

NOTICE

The device with M20x1,5 cable glands is not tight if a cable gland is not used

- ▶ Make sure the unused M20x1,5 cable glands are sealed with the supplied plugs.
- ▶ When the blind plug is inserted, screw the cable-gland nut in stainless steel to a torque of 3 N·m (2.21 lbf·ft).
- ▶ When the blind plug is inserted, screw the cable-gland nut in nickel plated brass to a torque of 8 N·m (5.90 lbf·ft).



- Use a high quality electrical power supply, filtered and regulated.
- Do not install the cables near high voltage or high frequency cables; if this cannot be avoided, observe a minimum distance of 30 cm.



On a device with M20x1,5 cable glands, put only one cable in each cable gland.



To do the electrical installation of a device with 2 4-pin M12 female connectors (Ethernet version) that is connected to an Ethernet network, observe standard ISO / IEC 61918.

8.2 Specifications of the cable for the 5-pin M12 male connector

Use a 5-pin M12 female connector (not supplied) to connect the 5-pin M12 male connector, for example the M12 female connector with article number 917116.

If you use the M12 female connector with article number 917116, observe the specifications for the cable and conductors, given in [Table 8](#).

Table 8: Specifications of the cable and conductors for the M12 female connector with article number 917116

Specification	Recommended value
▪ Electromagnetic protection (EMC)	▪ Shielded
▪ Cross section of the conductors	▪ max. 0.75 mm ²
▪ Diameter of the cable	▪ 3...6.5 mm
▪ Maximum operating temperature	▪ min. 80 °C

8.3 Assembling and wiring the 5-pin M12 female connector (A-coding)

To assemble and wire the 5-pin M12 female connector with article number 917116, do the following:

	<p>→ Completely loosen the nut [1].</p> <p>→ Remove the rear part of the connector [2].</p>
	<p>→ Put the cable through the nut and the rear part of the connector.</p> <p>→ Strip 20 mm of the cable.</p> <p>→ Cut the central conductor so that its length is 11.5 mm.</p> <p>→ Expose 5.5 mm of the other conductors.</p> <p>→ Insert each conductor into the appropriate pin. Refer to chpt. 8.5.</p> <p>→ Pull the cable and tighten the connector nut.</p>

Fig. 18 : M12 multipin connector with article number 917116 (not provided)

→ Plug the 5-pin M12 female connector on the 5-pin M12 male connector of the device.

→ Tighten the M12 female connector with your hand.

8.4 Connecting the device to a power supply

The device is wired in the factory to be easily energized through the 5-pin M12 male connector.

→ Connect the device with 2 4-pin M12 female connectors (Ethernet version) to a 12...35 V DC power supply through the 5-pin M12 male connector; Refer to chpt. 8.5.



A device with 2 4-pin M12 female connectors (Ethernet version) must be energized through the 5-pin M12 male connector.

→ Connect the device with M20x1,5 cable glands to a 12...35 V DC power supply:

- either through the 5-pin M12 male connector, refer to chpt. 8.5.
- or through the M20x1,5 cable glands and the terminal strip located in the transmitter housing. Refer to chpt. 8.14 for the wiring procedure.

The minimum voltage to be supplied depends on the version of the device, on the fluid temperature and on the ambient operating temperature: see Fig. 19 and Fig. 20.

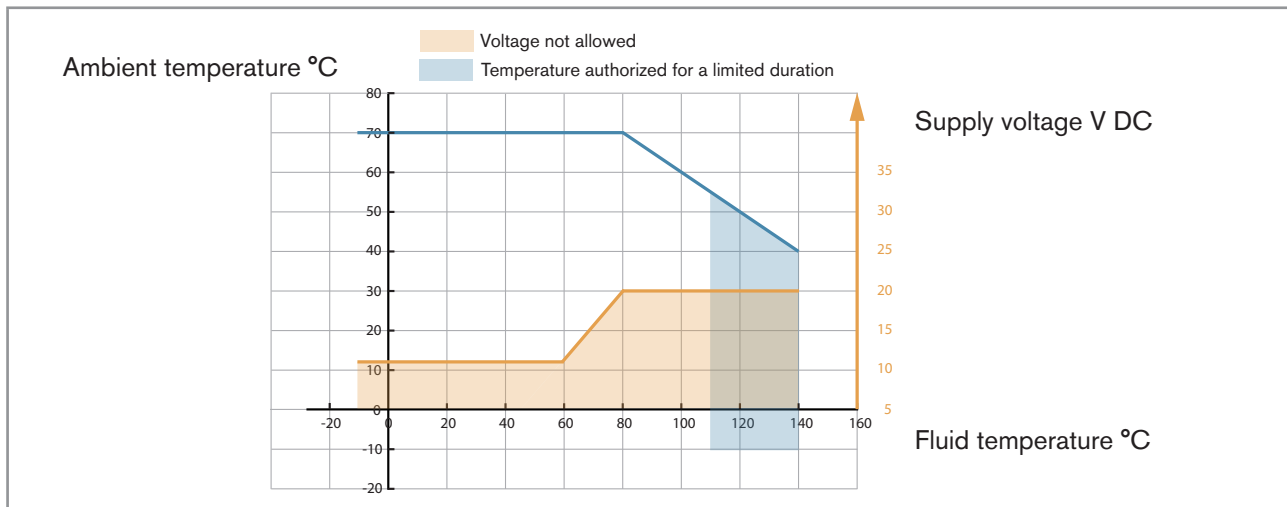


Fig. 19 : Minimum supply voltage depending on the ambient temperature and the fluid temperature, device with 2 M20x1,5 cable glands and 1 5-pin M12 male connector

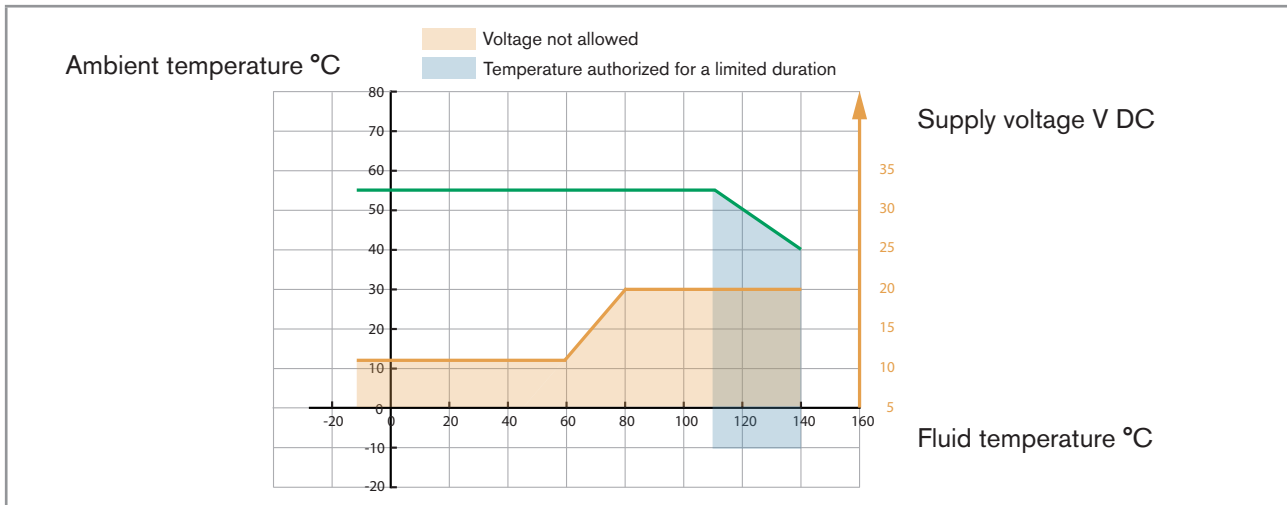


Fig. 20 : Minimum supply voltage depending on the ambient temperature and the fluid temperature, device with 2 4-pin M12 female connectors and 1 5-pin M12 male connector (Ethernet version)

8.5 Connecting the device to a bÜS / CANopen network

The 5-pin M12 male connector (A-coding) is used to connect the device:

- To a 12...35 V DC power supply and/or
- To the bÜS / CANopen network.



Risk of damage to the device if an M12 connector is unused.

- Put a protection cap on all the unused M12 connectors.



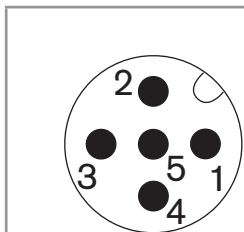
Malfunction of the internal and external communication if the 5-pin M12 male connector is not used.

- Make sure pins 4 and 5 are not in contact with each other and not in contact with the other pins.

→ If the device is connected to bÜS and at one end of bÜS, either install a 120 Ω termination resistor in the line or activate the device internal termination resistor: see chpt. 8.6.

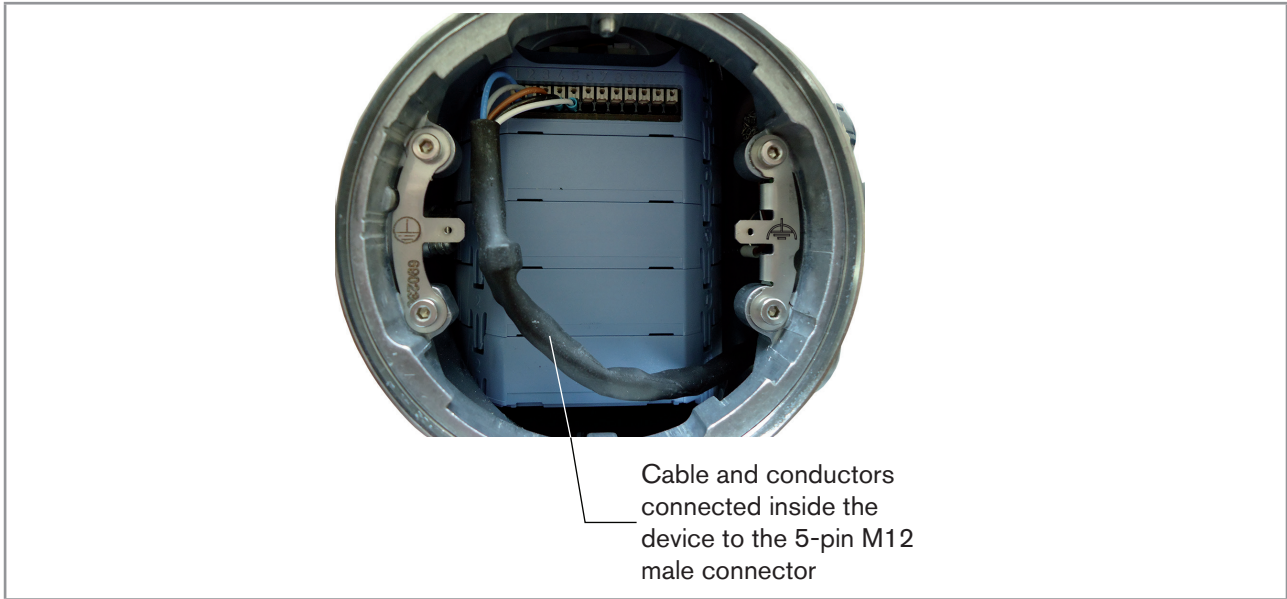


If a device with 2 4-pin M12 female connectors (Ethernet version) is connected to an Ethernet network, you must connect it to a bÜS / CANopen network for the configuration of the device with the software Bürkert Communicator.



- Pin 1: CAN shield
- Pin 2: 12...35 V DC
- Pin 3: GND
- Pin 4: CAN_H
- Pin 5: CAN_L

Fig. 21 : Pin assignment of the 5-pin M12 male connector



Cable and conductors connected inside the device to the 5-pin M12 male connector

Fig. 22 : Wiring ex works of the 12 push-in terminal strip to the 5-pin M12 male connector

8.6 Activating the device internal termination resistor (only büS network)

The device has an internal termination resistor that can be activated if the device is installed at one end of büS. If you activate the device internal termination resistor, do not install a termination resistor at the same end of büS.

To activate the device internal termination resistor, do the following:

- Go to the **CONFIGURATION** view.
- **General settings**
- Confirm to access the **Parameter** view.
- **büS**
- **Advanced**
- **Termination resistor**
- **On**
- Save.
- The internal termination resistor is activated.

8.7 Specifications of the cables for the M20x1,5 cable glands (only device with cable glands)

Table 9: Specifications of the cables for the M20x1.5 cable glands in nickel plated brass

Specification of the cables	Recommended value
Electromagnetic protection (EMC)	Shielded
Diameter	5...14 mm
Maximum operating temperature	min. 90 °C

Table 10: Specifications of the cables for the M20x1.5 cable glands in stainless steel

Specification of the cables	Recommended value
Electromagnetic protection (EMC)	Shielded
Diameter	6...12 mm
Maximum operating temperature	min. 100 °C

8.8 Specifications of the conductors for the 12 push-in terminal strip

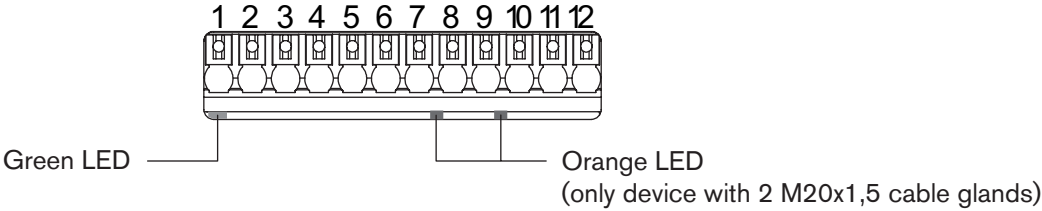
Table 11: Specifications of the conductors for the terminal strip

Specification of the conductors	Recommended value range
Cross section of a solid conductor H05(07) V-U	0,25...1,5 mm ²
Cross section of a stranded conductor H05(07) V-K, with a wire ferrule but without collar	0,25...1,5 mm ²
Cross section of a stranded conductor H05(07) V-K, with a wire ferrule with a plastic collar	0,25...0,75 mm ²
Cross section of other kinds of conductors	0,2...1,5 mm ² (AWG24... AWG16)

8.9 Terminal assignment of the 12 push-in terminal strip

The terminal strip located in the transmitter housing has 12 push-in terminals.

→ To access the 12 push-in terminal strip, open the front of the transmitter; See chpt. 8.10.



- Green LED:
 - flashes slowly if the operation of the device is correct.
 - flashes quickly if there is a communication problem with the measurement board.
- Orange LED lit if the related digital output is switched to ON (only device with 2 M20x1,5 cable glands)
- Terminal 1: GND (blue conductor, factory wired, internally connected to the 5-pin M12 male connector)
- Terminal 2: CAN_L (grey conductor, factory wired, internally connected to the 5-pin M12 male connector)
- Terminal 3: Shield (brown conductor, factory wired, internally connected to the 5-pin M12 male connector)
- Terminal 4: CAN_H (black conductor, factory wired, internally connected to the 5-pin M12 male connector)
- Terminal 5: 12...35 V DC (white conductor, factory wired, internally connected to the 5-pin M12 male connector)

! On a device with 2 4-pin M12 female connectors (Ethernet version), do not use terminals 6 to 12.

- Terminal 6: GND (for the connection of the power supply through the M20x1,5 cable glands)
- Terminal 7: negative output 3 (analogue output or digital output)
- Terminal 8: positive output 3 (analogue output or digital output)
- Terminal 9: negative output 2 (digital output)
- Terminal 10: positive output 2 (digital output)
- Terminal 11: negative output 1 (analogue output)
- Terminal 12: positive output 1 (analogue output)

Fig. 23 : Terminal assignment of the 12 push-in terminal strip located in the transmitter housing

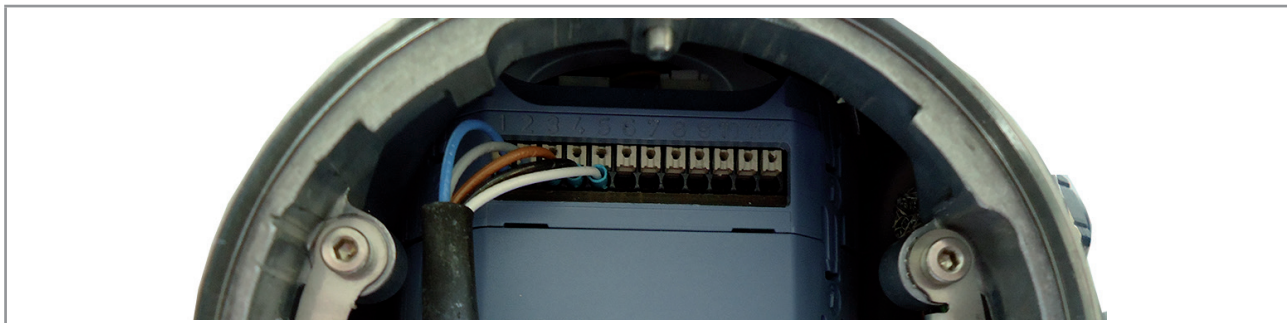


Fig. 24 : Wiring ex works of the 12 push-in terminal strip

→ If you need to disconnect a conductor, first push the terminal with a slot screwdriver 3.0 mm (any length) and a force of max. 40 N.

8.10 Opening the front of the transmitter

To open the front of the transmitter housing, remove either the blind cover or the display module.

Procedure to open the front of the transmitter if the blind cover is on the front of the device



<ol style="list-style-type: none"> 1. Put the magnetic key on the  mark related to the blind cover. You should hear a click indicating that the blind cover is unlocked. Do not use a tool to turn the blind cover. 2. Turn the blind cover by hand to the unlocked position and remove it. 	
--	--

Fig. 25 : Procedure to open the front of the transmitter if the blind cover is on the front of the device

Procedure to open the front of the transmitter if the display module is on the front of the device




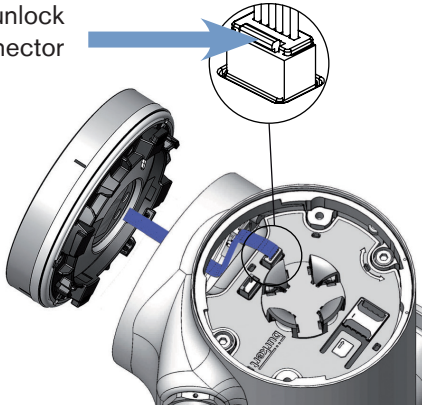
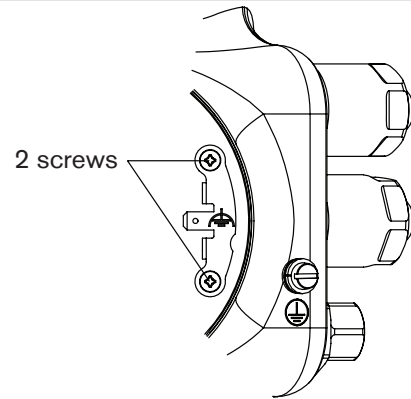
<ol style="list-style-type: none"> 1. Remove the blind cover from the top of the transmitter. 2. Put the magnetic key on the  mark related to the display module. You should hear a click indicating that the display module is unlocked. Do not use a tool to turn the display module. 3. Turn the display module by hand to the unlocked position. 	
<ol style="list-style-type: none"> 4.  Carefully pull the display module because a cable connects the display module to the transmitter. 5. Push the tab of the cable connector to disconnect the display module from the transmitter. 6. Remove the display module and put it on a clean surface to protect the seal from dirt. 	<p>Push the tab to unlock the cable connector</p> 

Fig. 26 : Procedure to open the front of the transmitter if the display module is on the front of the device

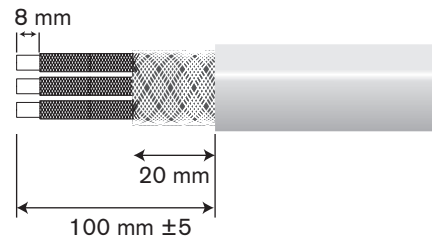
8.11 Wiring the device through the M20x1,5 cable glands in stainless steel (only device with cable glands)

! Put only one cable in each cable gland.

- Prepare cables that obey the specifications given in chpt. [8.7](#) and chpt. [8.8](#).
- To open the front of the transmitter, follow the instructions given in chpt. [8.10](#).
- 1. Use a size 10 hexagonal key to loosen the 2 screws of the functional earth plate.



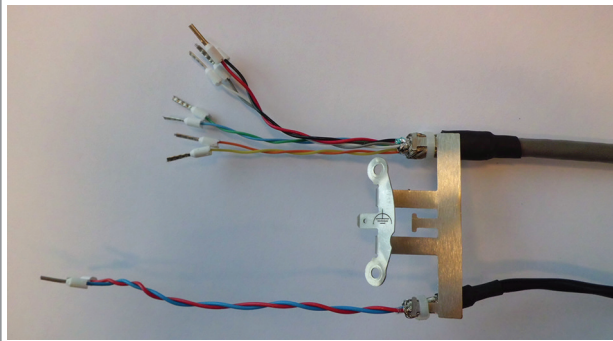
- 2. Strip 100 mm of the cable.
- 3. Reduce the shield to 20 mm.
- 4. Expose 8 mm of the conductors.



- 5. Loosen the nut of the cable gland.
- 6. Do not remove the nut of a stainless steel M20x1,5 cable gland. The nut of a stainless steel M20x1,5 cable gland cannot be removed.
- 7. Turn the nut until the stop. If you turn beyond the stop, the cable gland unscrews from the device and the device is no longer tight.
- 8. Remove the blind plug of the cable gland and store the blind plug in a safe and clean place.
- 9. Put the cable through the cable gland as shown in the figure.
- 10. Use a size 22 hexagonal key to tighten the cable gland to a torque of 5 N·m (3.7 ft·lbf).

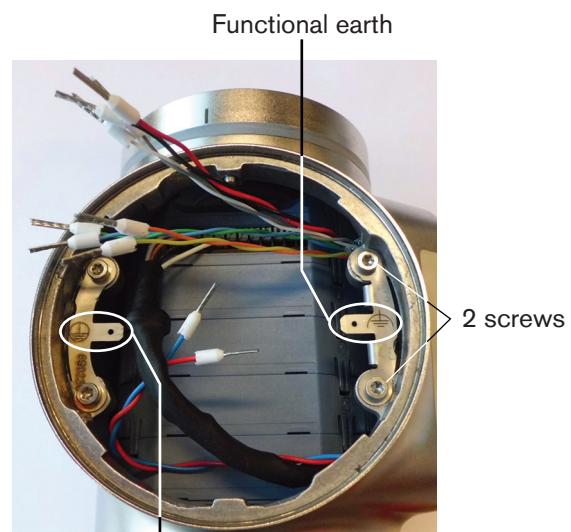


11. Attach each cable to the functional earth plate. The shield must be in contact with the functional earth plate.



12. Put the functional earth plate in its original place.

13. Use a size 10 hexagonal key to tighten the 2 screws of the functional earth plate to a torque of 0.2 N·m (0.15 ft·lbf).



IT IS NOT MANDATORY TO
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FUTURE USE

14. Put each conductor in the correct terminal of the terminal strip.

15. To connect the 12...35 V DC power supply through the cable glands, refer to chpt. [8.14](#).

16. To connect the outputs, refer to chpt. [8.15](#) and chpt. [8.16](#).

17. Connect the functional earth conductor. See chpt. [8.13](#).

18. If the display module is removed, connect it back.

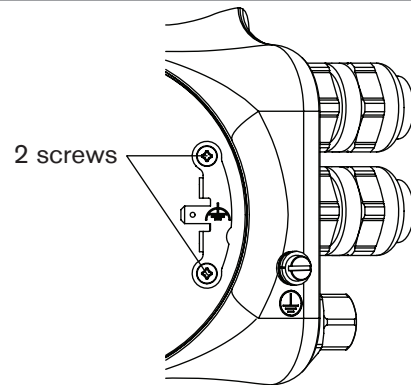
19. Close the front and the top of the transmitter housing.

Fig. 27 : Wiring the device through the M20x1,5 cable glands in stainless steel

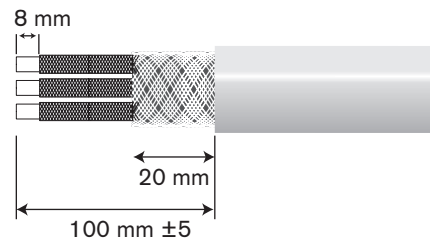
8.12 Wiring the device through the M20x1,5 cable glands in nickel plated brass (only device with cable glands)

! Put only one cable in each cable gland.

- Prepare cables that obey the specifications given in chpt. [8.7](#) and chpt. [8.8](#).
- To open the front of the transmitter, follow the instructions given in chpt. [8.10](#).
- 1. Use a size 10 hexagonal key to loosen the 2 screws of the functional earth plate.



- 2. Strip 100 mm of the cable.
- 3. Reduce the shield to 20 mm.
- 4. Expose 8 mm of the conductors.



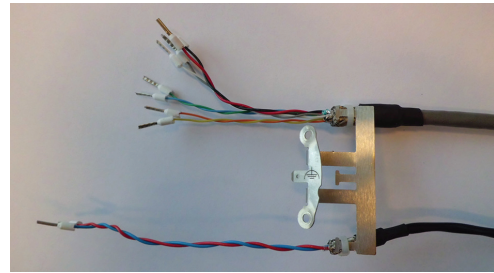
- 5. Loosen the nut of the cable gland.
- 6. Remove the blind plug of the cable gland and store the blind plug in a safe and clean place.
- 7. If the cable diameter is between 5 and 9 mm, put the cable through the cable gland as shown in the figure.
- 8. Use a size 24 hexagonal key to tighten the cable gland to a torque of 10 N·m (7.4 ft·lbf).



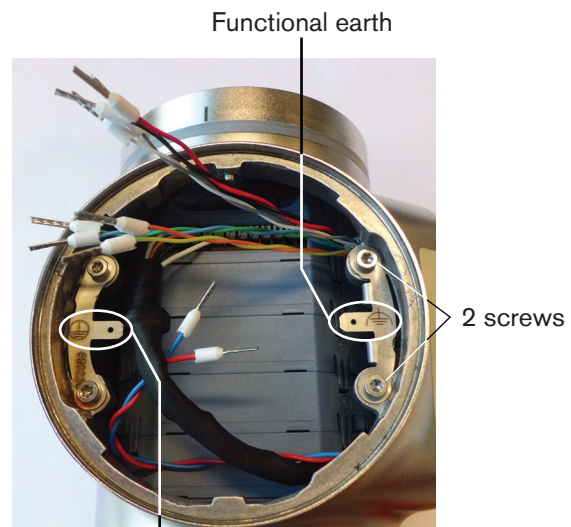
9. If the cable diameter is between 9 and 14 mm,
 → vertically put a screwdriver between the two seals,
 → lift the inner seal and remove it.
 → Put the cable through the cable gland.
 → Use a size 24 hexagonal key to tighten the cable gland to a torque of 10 N·m (7.4 ft·lbf).



10. Attach each cable to the functional earth plate. The shield must be in contact with the functional earth plate.



11. Put the functional earth plate in its original place.
 12. With an hexagonal key size 10, tighten the 2 screws of the functional earth plate to a torque of 0.2 N·m (0.15 ft·lbf).



IT IS NOT MANDATORY TO CONNECT THE DEVICE TO A PROTECTIVE EARTH - MEANT FOR FUTURE USE

13. Put each conductor in the correct terminal of the terminal strip.
14. To connect the 12...35 V DC power supply through the cable glands, refer to chpt. [8.14](#).
15. To connect the outputs, refer to chpt. [8.15](#) and chpt. [8.16](#).
16. Connect the functional earth conductor. See chpt. [8.13](#).
17. If the display module is removed, connect it back.
18. Close the front and the top of the transmitter housing.

Fig. 28 : Wiring the device through the M20x1,5 cable glands in nickel plated brass

8.13 Connecting the functional earth (device with 2 M20x1,5 cable glands)

→ For a proper function of device always connect the yellow/green functional earth conductor:

- either to the functional earth plate in the transmitter housing (see [Fig. 30](#) in chpt. [8.14](#)),
- or to the functional earth screw on the outer surface of the transmitter housing (see [Fig. 29](#)).

If you connect the conductor to the functional earth screw:

→ Use a ring cable lug for M4 screw.

→ Tighten the M4 screw to a torque between 1.8...2 N·m (1.3...1.4 ft·lbf).

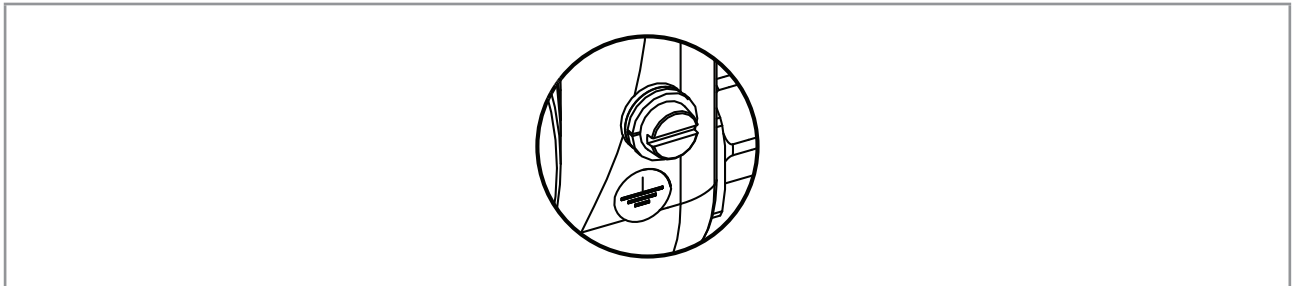


Fig. 29 : Functional earth screw on the outer surface of the device

8.14 Connecting the device to a 12...35 V DC power supply through the M20x1,5 cable glands (only device with cable glands)

1. Use a 3.0 mm slot screwdriver (any length) and a force of max. 40 N to push the terminal 5 and disconnect the white conductor. Do not cut the white conductor.
2. Insulate the white conductor.
3. Connect the power supply as shown in [Fig. 30](#).

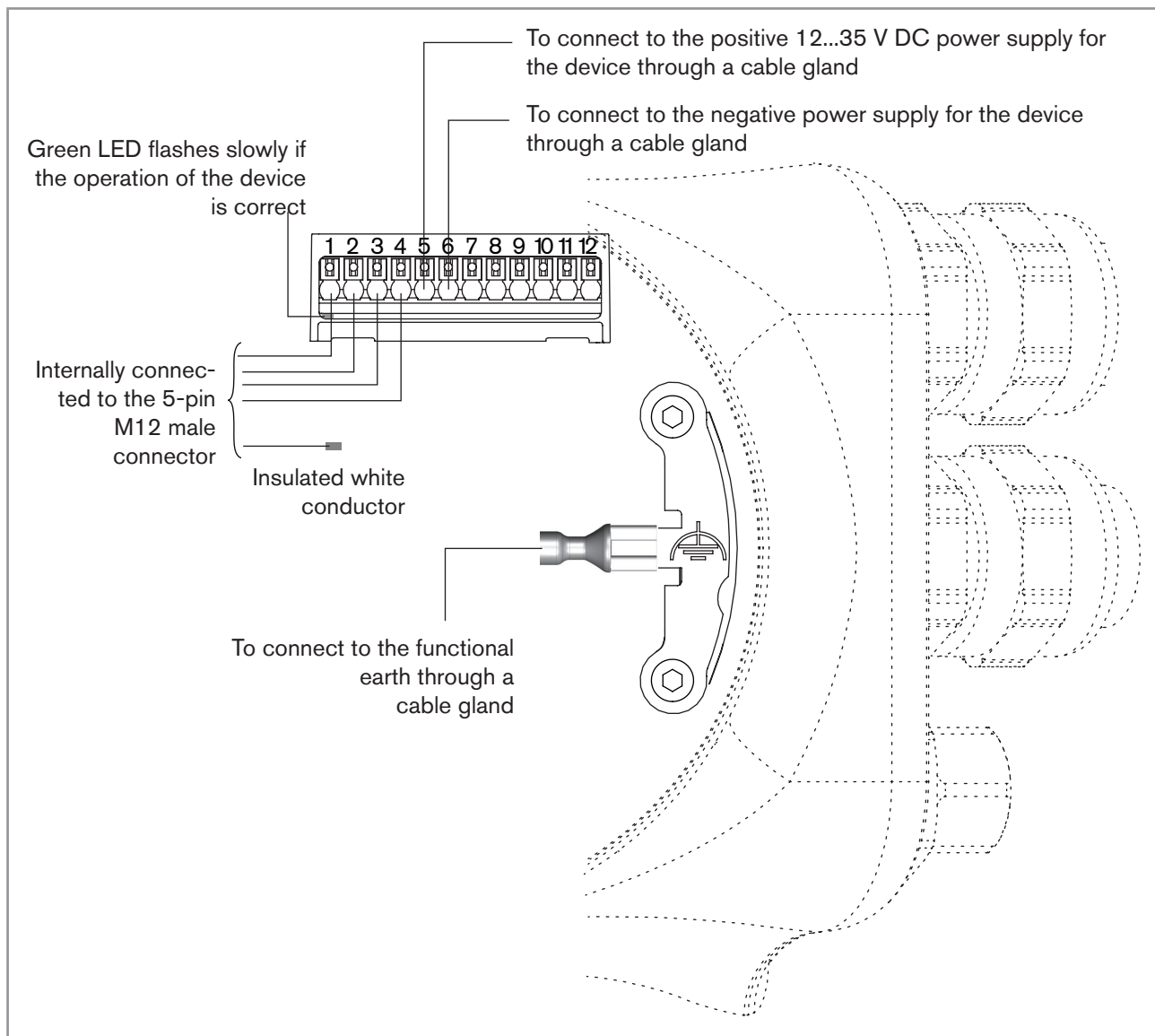


Fig. 30 : Connecting the 12...35 V DC power supply through the M20x1,5 cable glands

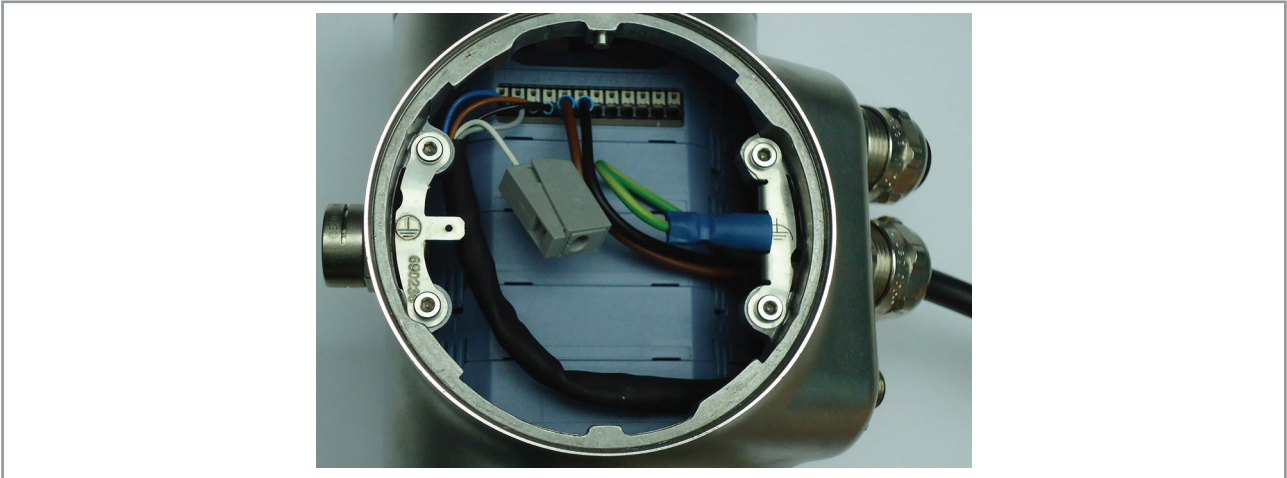


Fig. 31 : Device connected to a 12...35 V DC power supply through the M20x1,5 cable glands

8.15 Wiring output 1 (analogue) and output 3 configured as an analogue output (only device with cable glands)

NOTICE

Risk of short-circuit if the configuration of output 3 is wrong.

- ▶ Before wiring output 3 as an analogue output, make sure output 3 is configured as an analogue output in the Parameter menu of the outputs. See chpt. 9.10 Changing the type of output 3.

An analogue output can be wired either in sourcing mode or in sinking mode.

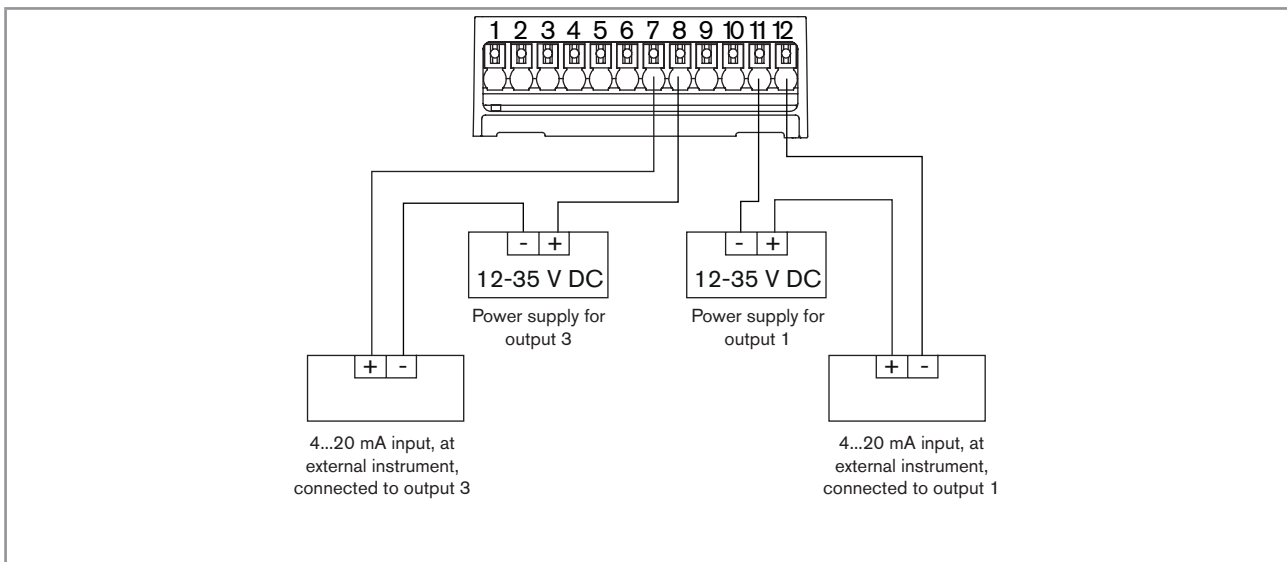


Fig. 32 : Wiring the analogue outputs

8.16 Wiring output 2 (digital) and output 3 configured as a digital output (only device with cable glands)

NOTICE

Risk of short-circuit if the configuration of output 3 is wrong.

- ▶ Before wiring output 3 as an analogue output, make sure output 3 is configured as an analogue output in the Parameter menu of the outputs. See [chpt. 9.10 Changing the type of output 3](#).

A digital output can be wired either in NPN mode or in PNP mode.

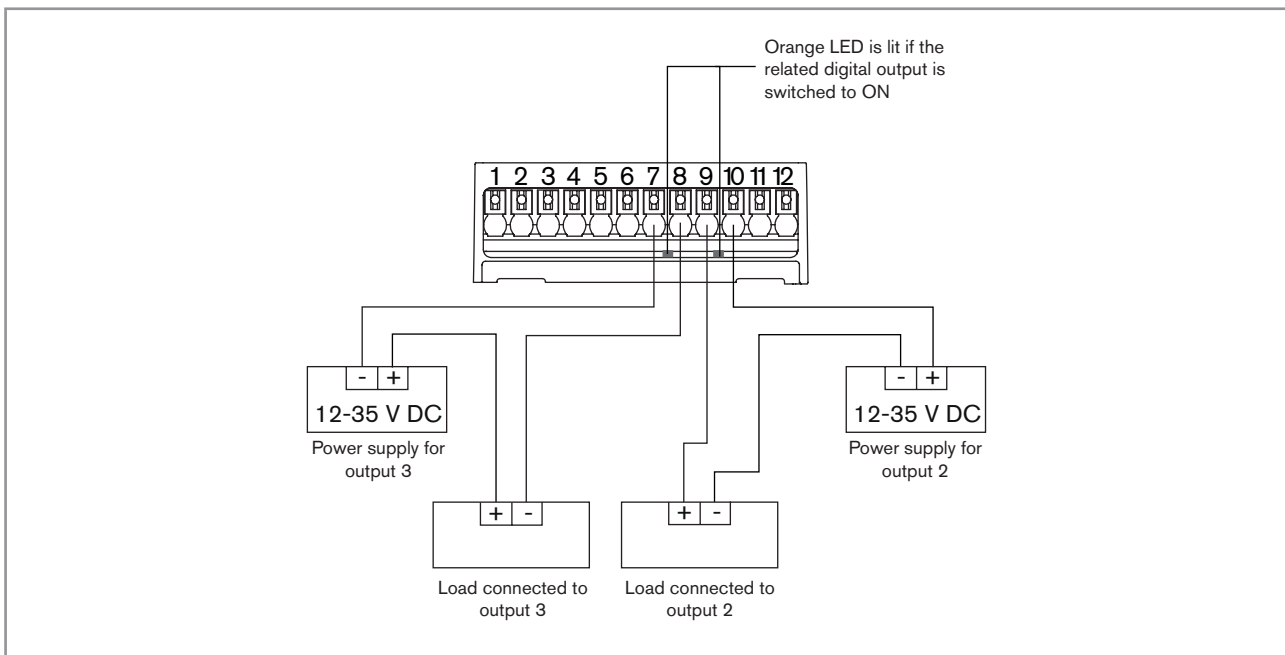


Fig. 33 : Wiring the digital outputs

8.17 Knowing the status of the Ethernet network (only device with 2 4-pin M12 female connectors - Ethernet version)

The status of the Ethernet network is indicated by LEDs. The LEDs are located on the industrial communication module in the transmitter housing.

→ To see the LEDs, open the front of the transmitter housing i.e. by removing either the blind cover or the display module; see chpt. 8.10.

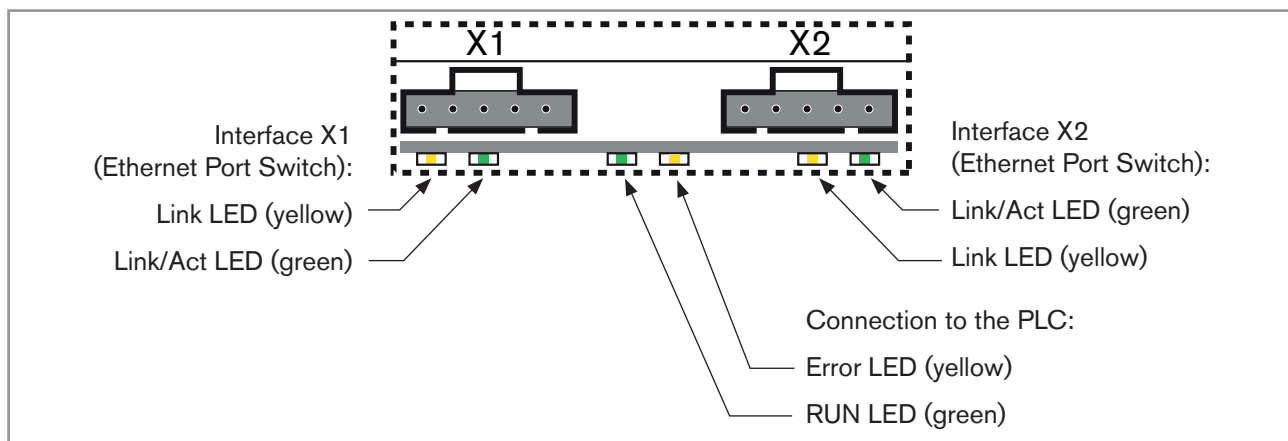


Fig. 34 : LEDs for status of the Ethernet network

Description of the LEDs:

LED status		Description / cause of error	Procedure
RUN LED (green)	ON	Connection active.	-
	OFF	Connection not active.	Check cables
Error LED (yellow)	ON	Connection not active.	Check cables
	OFF	Connection active.	-

Table 12: LED for status of the connection to the PLC

LED status		Description / cause of error	Procedure
Link/Act LED (green)	ON	Rapid flashing: connection to the higher-level protocol layer EtherNet/IP has been established. Data is being transmitted. Slow flashing: there is no connection to the protocol layer. This is usually the case for approx. 20 seconds following a restart.	
	OFF	No connection to the network available.	Check cables
Link LED (yellow)	ON	Connection to the network available.	-
	OFF	No connection to the network available.	Check cables

Table 13: LEDs for status of the interfaces X1 and X2 (for connection to an Ethernet network)

8.18 Specifications of the cables and conductors for the 4-pin M12 female connectors

Table 14: Specifications of the cables and conductors for the 4-pin M12 female connectors

Specification of the cables and conductors	Recommended value
Electromagnetic protection (EMC)	Shielded conductor with minimum STP
Minimum category	CAT-5
Maximum length	100 m
Maximum operating temperature	min. 90 °C

8.19 Connecting the device to an Ethernet network (only device with 2 4-pin M12 female connectors - Ethernet version)

The 2 4-pin M12 female connectors (D-coding) are used to connect the device to an Ethernet network.



Risk of damage to the device if any M12 connector is unused.

- Put a protection cap on all the unused M12 connectors.



If a device with 2 4-pin M12 female connectors (Ethernet version) is connected to an Ethernet network, you must connect it to a bus / CANopen network for the configuration of the device with the software Bürkert Communicator.

If a device is connected to an Ethernet network, the measured process values are transmitted via the Ethernet network.

Each 4-pin M12 female connector (D-coding) has the same pin assignment: See [Fig. 35](#).

	<ul style="list-style-type: none"> ▪ Pin 1: Transmit + ▪ Pin 2: Receive + ▪ Pin 3: Transmit - ▪ Pin 4: Receive -
--	--

Fig. 35 : Pin assignment of the 4-pin M12 female connector

→ Loosen the screwed plug of the 4-pin M12 female connector and store the screwed plug in a safe and clean place.

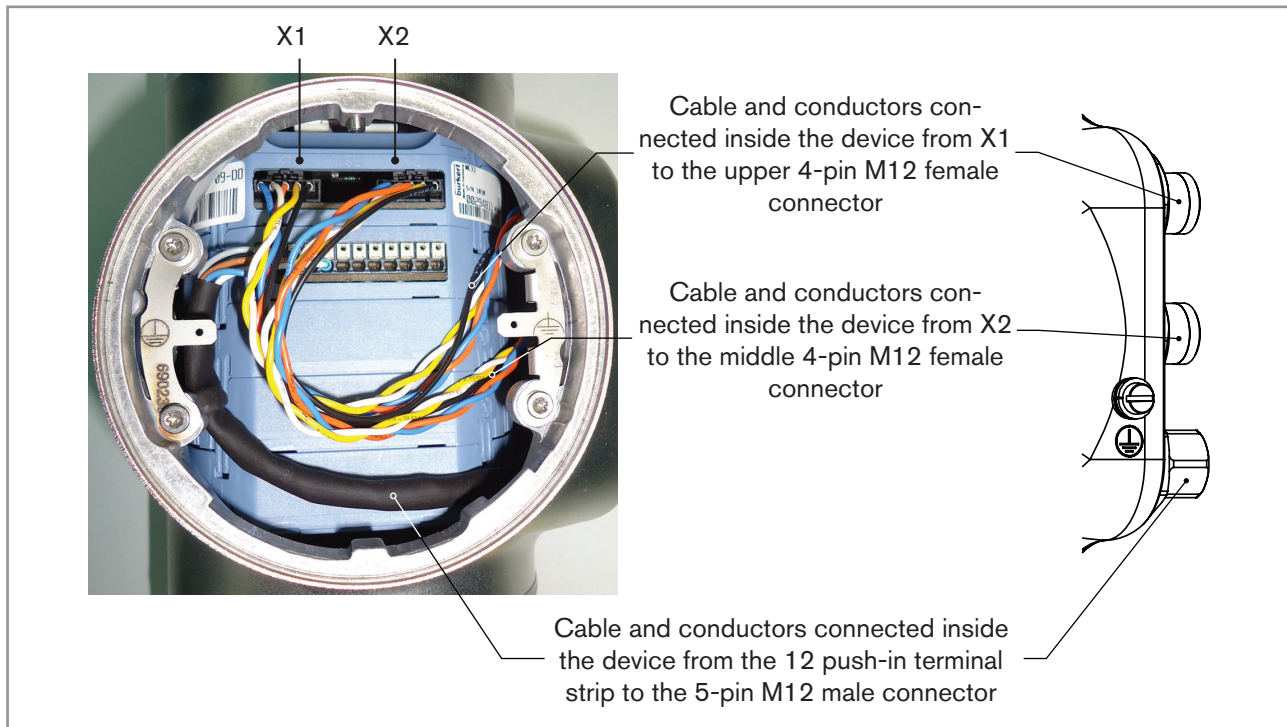


Fig. 36 : Wiring ex works of the device with 2 4-pin M12 female connectors (Ethernet version)

8.20 Connecting the functional earth (device with 2 4-pin M12 female connectors - Ethernet version)

For a proper function of device always connect the yellow/green functional earth conductor to the functional earth screw on the outer surface of the transmitter housing.

→ Use a ring cable lug for M4 screw.

→ Connect the functional earth conductor to the functional earth screw, see [Fig. 37](#).

→ Tighten the M4 screw to a torque between 1.8...2 N·m (1.3...1.4 ft·lbf).

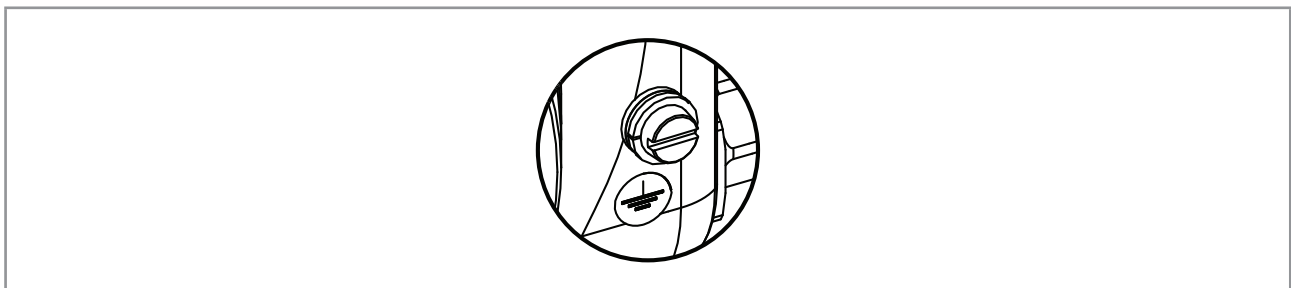


Fig. 37 : Functional earth screw on the outer surface of the device

9 HOW TO DO THE SETTINGS

9.1 Safety instructions



WARNING

Risk of injury due to non-conforming adjustment.

Non-conforming adjustment could lead to injury and damage the device and its surroundings.

- ▶ The operators in charge of adjustment must have read and understood the contents of the Operating Instructions.
- ▶ In particular, observe the safety recommendations and intended use.
- ▶ The device/installation must only be adjusted by suitably trained staff.

9.2 Available software to do the settings

The settings of the device can be done with:

- the Type ME31 display module. The device can be equipped with a display module or not.
- the Type 8920 Bürkert Communicator software, which must be installed on a PC.

The menu structure is the same in the display module and in the Bürkert Communicator software.

- To do the settings of the device with the Type ME31 display module, refer to the next chapters of the Quickstart and to the Operating Instructions.
- To use the Bürkert Communicator software, first prepare the necessary hardware and the software. Refer to chpt. 9.3. Then do the settings as described in the Operating Instructions.
- To use some specific functions that are only available with the Bürkert Communicator software, refer to the Type 8920 Operating Instructions, available on the internet at www.burkert.com
- To get detailed information on the software of the Type ME31 display module, refer to the related Operating Instructions, available on the internet at www.burkert.com

9.3 Preparing the Bürkert Communicator software

To do the settings with the Type 8920 Bürkert Communicator software, do the following steps:

1. Buy the USB-büS interface set with article number 772426.
2. Download the latest version of the Type 8920 Bürkert Communicator software from www.burkert.com
3. Install the Bürkert Communicator software on a PC. Obey the installation recommendations given in the USB-büS interface set. During installation, the büS stick must not be inserted at the PC.
4. Screw the termination resistance into the Y plug or activate the device internal termination resistor (see chpt. 8.6).
5. Screw the female M12 connector at the end of the delivered cable into the Y plug.
6. Insert the mini-USB of the cable into the delivered büS stick.
Do not insert the mini-USB of the cable into any equipment other than the büS stick.

7. Insert the appropriate power adapter into the AC/DC adapter.
8. Connect the cable of the AC/DC adapter to the related connector of the female M12 connector.

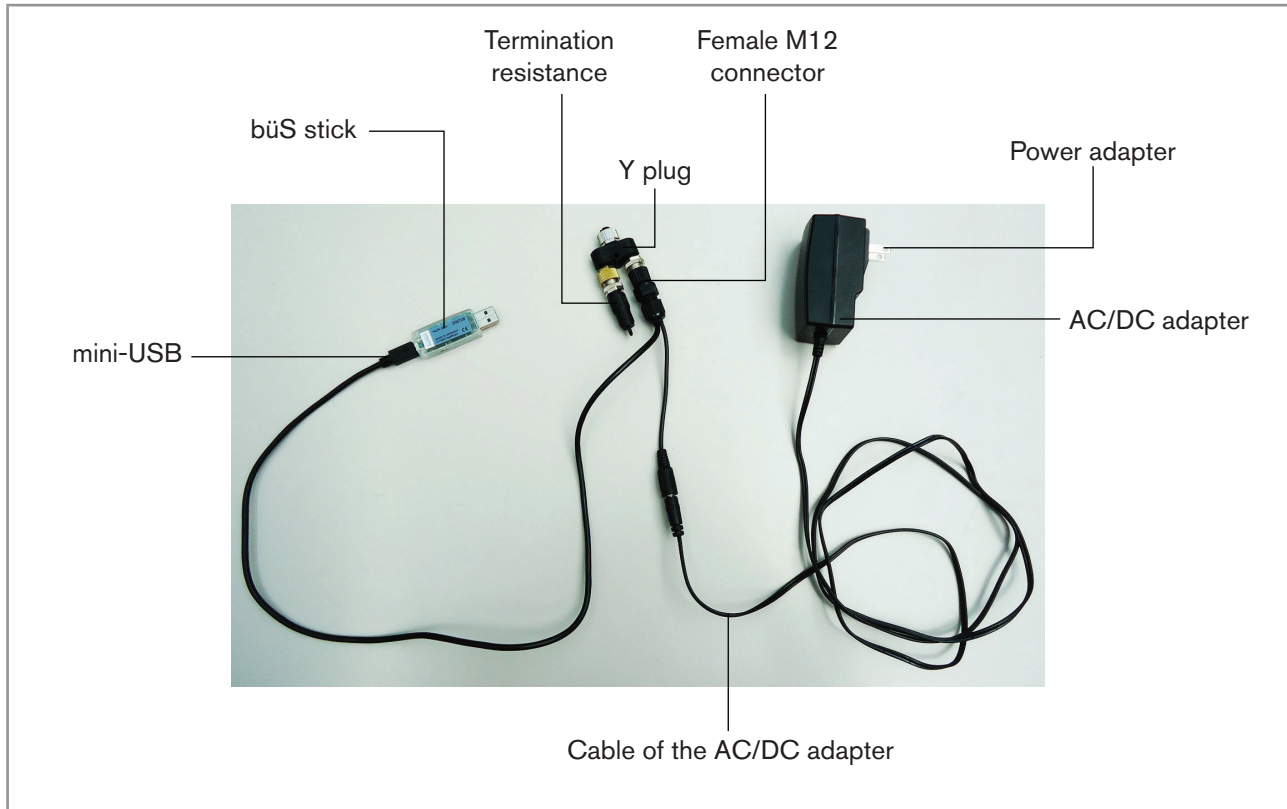



Fig. 38 : Assembled connection cables, plugs and bus stick

9. Screw the Y plug on the male M12 connector of the device.
10. Insert the bus stick into a USB port of the PC.
11. Wait until the Windows pilot of the bus stick has been completely installed on the PC.
12. Connect the AC/DC adapter to the power supply.
13. Start the Bürkert Communicator software.
14. Click on  in the Bürkert Communicator software to establish the communication between the Bürkert Communicator software and the device. A window opens.
15. Select **büs-Stick**.
16. Choose the port **Bürkert büS Stick**, click on **Finish** and wait until the device symbol appears in the list of devices.
17. In the list of devices, click on the symbol related to the device: the menu structure for the device is displayed.

9.4 Display module: description of the user interface



To get detailed information on the display software, refer to the Operating Instructions of the Type ME31 display software, available on the internet at www.burkert.com

The user interface is made up of a display and touch sensitive keys.

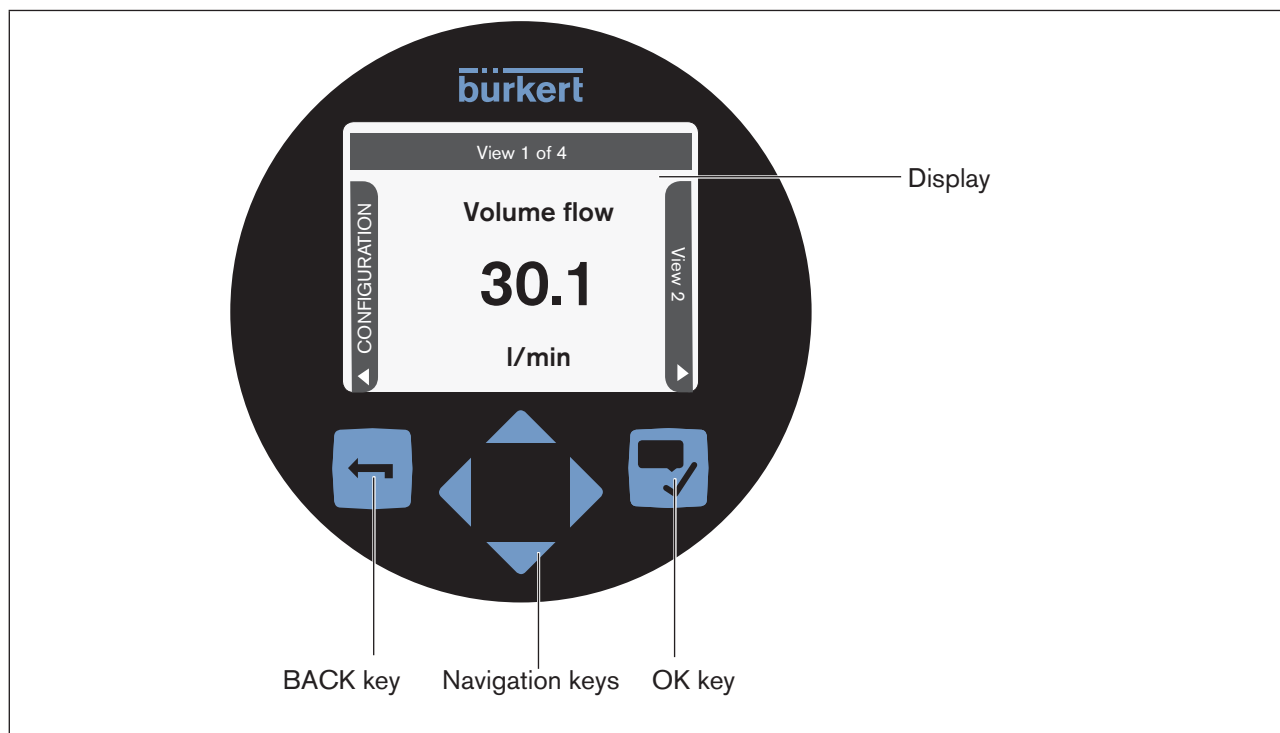


Fig. 39 : Overview of the user interface

9.4.1 Description of the display

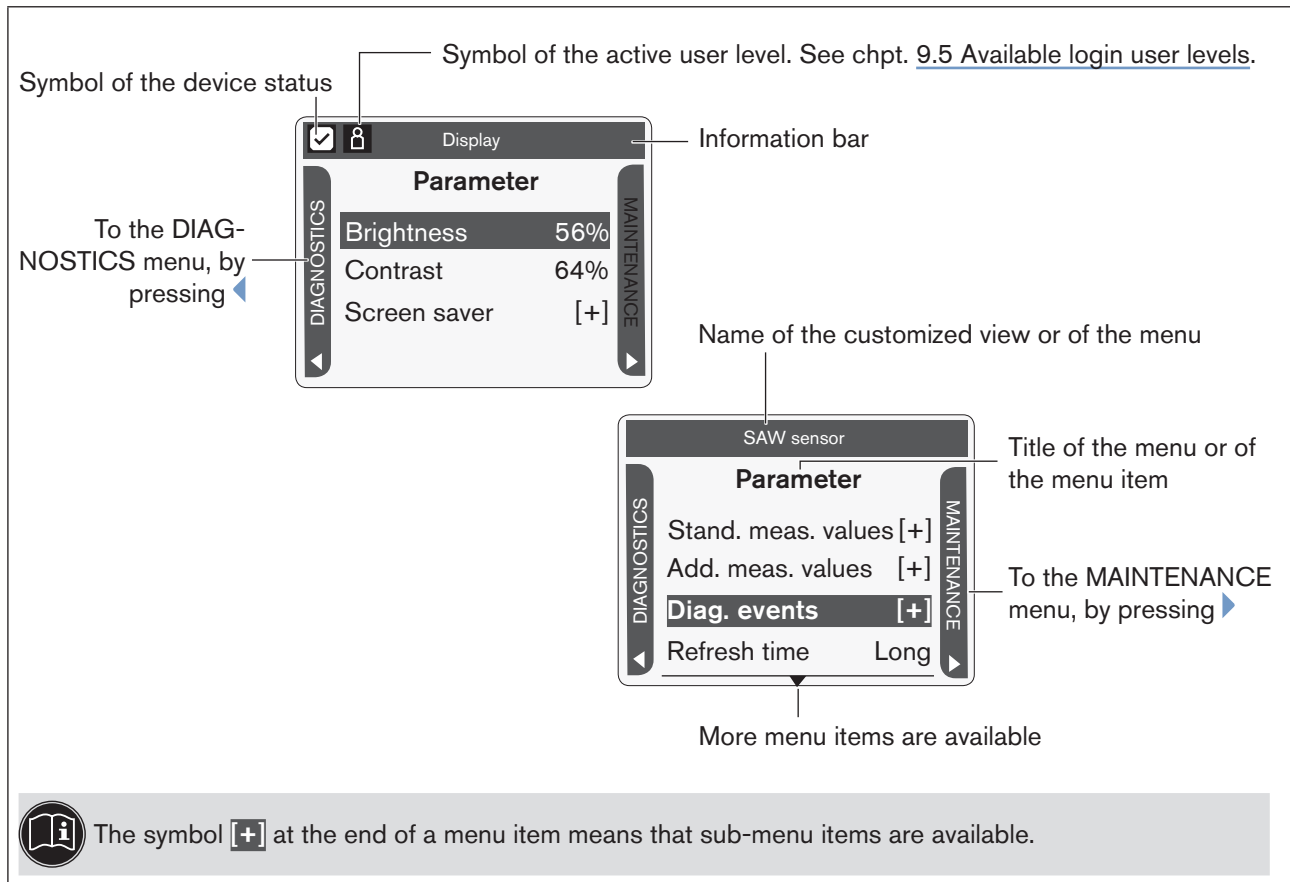


Fig. 40 : Description of the display (examples)

9.4.2 How to use the touch sensitive keys





 The **highlighted terms** are related to menus or menu items.

Table 15: How to use the keys

Key	Description
	<p>Short press: to go back to the parent menu or to the parent view. This key is called BACK in the display messages.</p> <p>If the user makes changes but does not save these, then a message is displayed asking if the changes should be saved.</p> <p>Long press: to go back to View 1</p>
	<p>If one or both keys are displayed:</p> <ul style="list-style-type: none"> ▪ To switch between views, from the left to the right and vice versa. Only possible between the views that can be customized and the CONFIGURATION view, and between the Diagnostics, Parameter and Maintenance views. ▪ To select the digit to the left or the digit to the right when you are asked to enter a value.
	<p>This key is called OK in the display messages.</p> <p>Short press:</p> <ul style="list-style-type: none"> ▪ To confirm a selection. ▪ To save a choice. ▪ To go to the next screen of the wizard. <p>Long press: to open the context menu</p>

9.4.3 Minimum and maximum values when entering a numerical value

When you are requested to enter or to change a numerical value, the minimum and maximum authorized values are always displayed.

9.5 Available login user levels

The following 4 login user levels are available to operate or adjust the device:

- the basic user level, which is the level with the least functions,
- the **Advanced User** user level,
- the **Installer** user level (default),
- the **Bürkert** user level.

By default, the device adjustment is not protected by passwords.

Table 16 shows the symbol displayed in the information bar, depending on the user level that is active on the device, and what can be done with each type of user level.






Symbol ¹⁾	User level	Description
No symbol	Basic user	<ul style="list-style-type: none"> No password is required. The menu items with the symbol  enable read-only access. Not all the menu items that are available with a higher user level are displayed.
	Advanced user	<ul style="list-style-type: none"> Password required, if the password protection is active. Default password is 005678. The menu items with the symbol  enable read-only access. Not all the menu items that are available with a higher user level are displayed.
	Installer	<ul style="list-style-type: none"> Password required, if the password protection is active. Default password is 001946. This level is active by default (and by default, password protection is switched off). All the available menu items can be adjusted.
	Bürkert	<ul style="list-style-type: none"> Password required, if the password protection is active. Only for Bürkert service.

Table 16: Possible login user levels

¹⁾ displayed in the information bar, only if the adjustment is protected through passwords.

→ If you have forgotten your passwords, you can restore the default passwords with the Type 8920 Bürkert Communicator software. Refer to the related Operating Instructions.

9.6 Default settings

You can find the default settings of the device in the CANopen supplement for the Type 8098 at www.burkert.com

→ Before making any changes to the settings, use the Bürkert Communicator software to print a pdf file with all the default settings of the device.

9.7 Menu structure

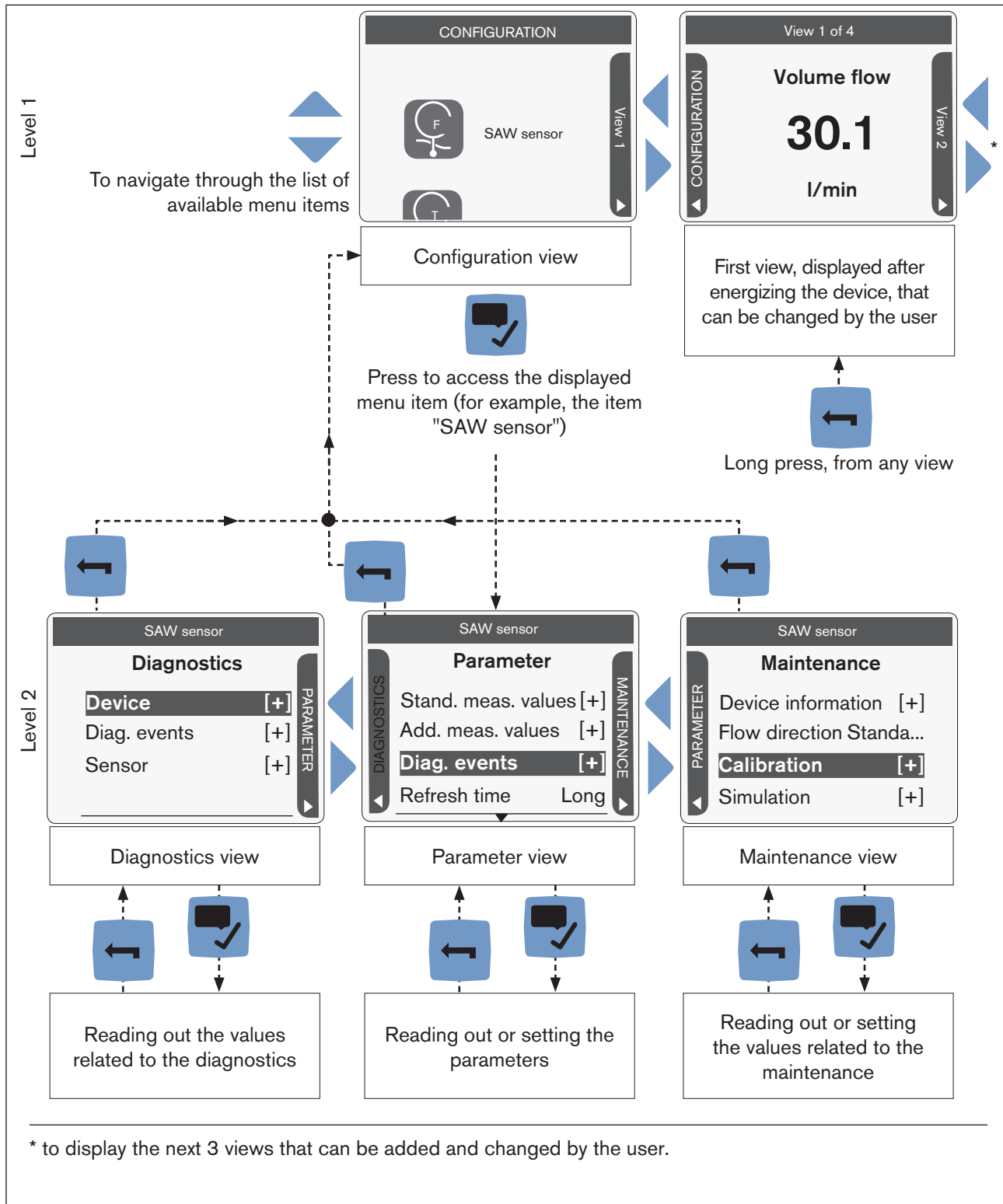



Fig. 41 : Menu structure of the FLOWWave

A context menu can be opened in any view: see chpt. 9.7.1.

9.7.1 Opening or closing the context menu in any view (display module only)

The user can open a context menu in any view. The content depends on the active view.

To open the context menu:

→ Press and hold .

✔ The context menu is open.

To close the context menu without leaving the active view:

→ Press .

✔ The context menu is closed.

Context menu content depending on the view:

View	Menu items of the context menu	
Views 1 to 4	Messages overview	To display the list of messages generated by the device. See chpt. 9.7.3 .
	Add new view Delete this view	To add a new view or to delete the displayed view.
	Change layout	To choose to display 1, 2 or 4 values or a trend of 1 or 2 values.
	Change title	To change the title of the displayed view.
	Change value Change unit	To change the value(s) or the units of the values displayed in the view.
	Fractional digits	Not available for trends. To choose whether a value of the view is displayed as a whole number or with one or more decimals.
	Change user level	To change the user level. See chpt. 9.7.4 or chpt. 9.7.5 .
	CONFIGURATION	Messages overview
Change user level		To change the user level.
Parameter Maintenance Diagnostics	Messages overview	To display the list of messages generated by the device.
	Where am I?	To display the access path to the displayed menu item. See chpt. 9.7.7 .
	Add shortcut Delete shortcut	To create or delete your own context menu items (see chpt. 9.7.2).
	Change user level	To change the user level.

View	Menu items of the context menu	
in a menu	Messages overview	To display the list of messages generated by the device.
	Save	To save the changes.
	Where am I?	To display the access path to the displayed menu item. Not available in the wizard.
	Add shortcut	To create or delete your own context menu items (see chpt. 9.7.2).
	Delete shortcut	
	Change user level	To change the user level.

Table 17: Context menu depending on the view

9.7.2 Adding your own context menu items (shortcuts, display module only)

If you are in the **Parameter**, **Maintenance** or **Diagnostics** view or in a menu, you can add up to 3 shortcuts to the context menu. These shortcuts then appear in every context menu and allow the user to jump directly to the selected view or menu item.

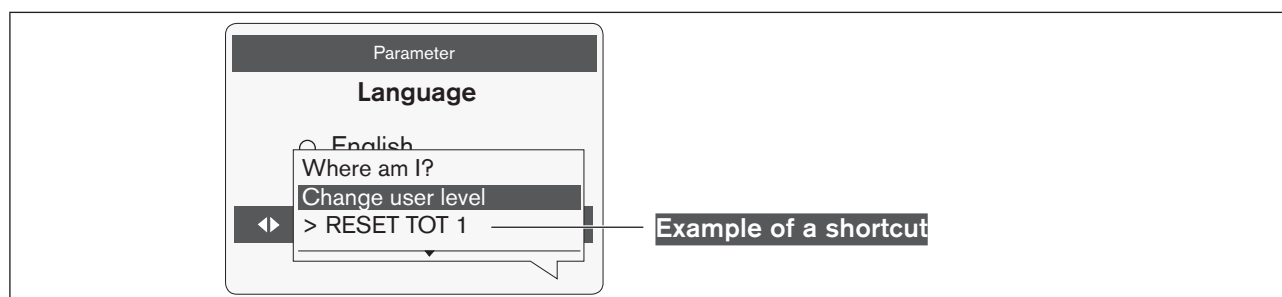


Fig. 42 : Shortcut example



To add a shortcut to the context menu:

→ Go to the view or menu for which a shortcut should be created.

→ Press and hold  to open the context menu.

→  **Add shortcut**

→ Enter a name for this shortcut: see chpt. 9.8.4 Entering a name.


→  **OK** to confirm the name entered. ----->  **Save**.

✔ The shortcut to this view or to this menu is added to the context menu.

To delete a shortcut from the context menu:

→ Press and hold  to open the context menu.

→ By using the shortcut to be deleted, go to the view or menu item.

→ Press and hold  to open the context menu.

→  **Delete shortcut** ----->  Confirm.


✓ The shortcut to this view or to this menu item is deleted from the context menu.

9.7.3 Reading out the messages generated by the device

The device generates messages to inform you, for example, that a problem has occurred or that a process value limit has been reached.

→ To read out the messages in the Bürkert Communicator software, refer to the Type 8920 Operating Instructions, available on the internet at www.burkert.com

Do the following to display the generated messages on the display module:

→  Long press, to open the context menu.

→  **Messages overview** ----->  Confirm.

✓ The generated messages are displayed. Some messages can be acknowledged.

9.7.4 Changing the login user level if the adjustment is not protected through passwords


By default:

- the **installer** user level is active on the device,
- the adjustment is not protected through passwords,
- the symbol related to the **installer** user level is not displayed in the information bar.

You can only change to the **Bürkert** user level.

→ To change the login user level in the Bürkert Communicator software, refer to the Type 8920 Operating Instructions, available on the internet at www.burkert.com

Do the following to change the login user level on the display module:

→  Long press, to open the context menu.

→  **Change user level** ----->  Confirm.

→  Choose the **Bürkert** user level ----->  Confirm.

→   Enter the password ----->  Confirm.

✓ The user level is changed.


→ To activate the adjustment protection through passwords, refer to the Type 8098 Operating Instructions.

9.7.5 Changing the login user level if the adjustment is protected through passwords



If the adjustment is protected through passwords, the symbol related to the active user level is displayed in the information bar.


→ To change the login user level in the Bürkert Communicator software, refer to the Type 8920 Operating Instructions, available on the internet at www.burkert.com

Do the following to change the login user level on the display module:

→  Long press, to open the context menu.

→  **Change user level** ----->  Confirm.

→  Choose **Logout** (not available if the basic user is logged in) ----->  Confirm.

→  Long press, to open the context menu.

→  **Change user level** ----->  Confirm.

→  Choose the user level ----->  Confirm.

→   Enter the password ----->  Confirm.

✓ The user level is changed. The related symbol is displayed in the information bar.

→ To deactivate the adjustment protection through passwords, refer to the Type 8098 Operating Instructions.


9.7.6 Logging out from the **Advanced user**, **Installer** or **Bürkert user level**

If the adjustment is protected through passwords:

- the symbol related to the active user level is displayed in the information bar.
- you are automatically logged out after the activation delay of the screen saver has elapsed.

→ To log out from the active user level in the Bürkert Communicator software, refer to the Type 8920 Operating Instructions, available on the internet at www.burkert.com

Do the following to log out from the **Advanced user**, the **Installer** or the **Bürkert** user level and to go to the basic user level:

→  Long press, to open the context menu.


→  **Change user level** ----->  Confirm.



→  Choose **Logout** ----->  Confirm.


✓ The basic user level is active.

9.7.7 Reading out the access path to a menu item (display module only)

If you are lost in the menu structure, you can display the access path.

→  Long press, to open the context menu.

→  **Where am I?** ----->  Confirm.

 Read out the access path to the displayed menu item.

9.8 How to navigate in the menus and to adjust values

9.8.1 Adjusting a percentage or selecting a value in a list

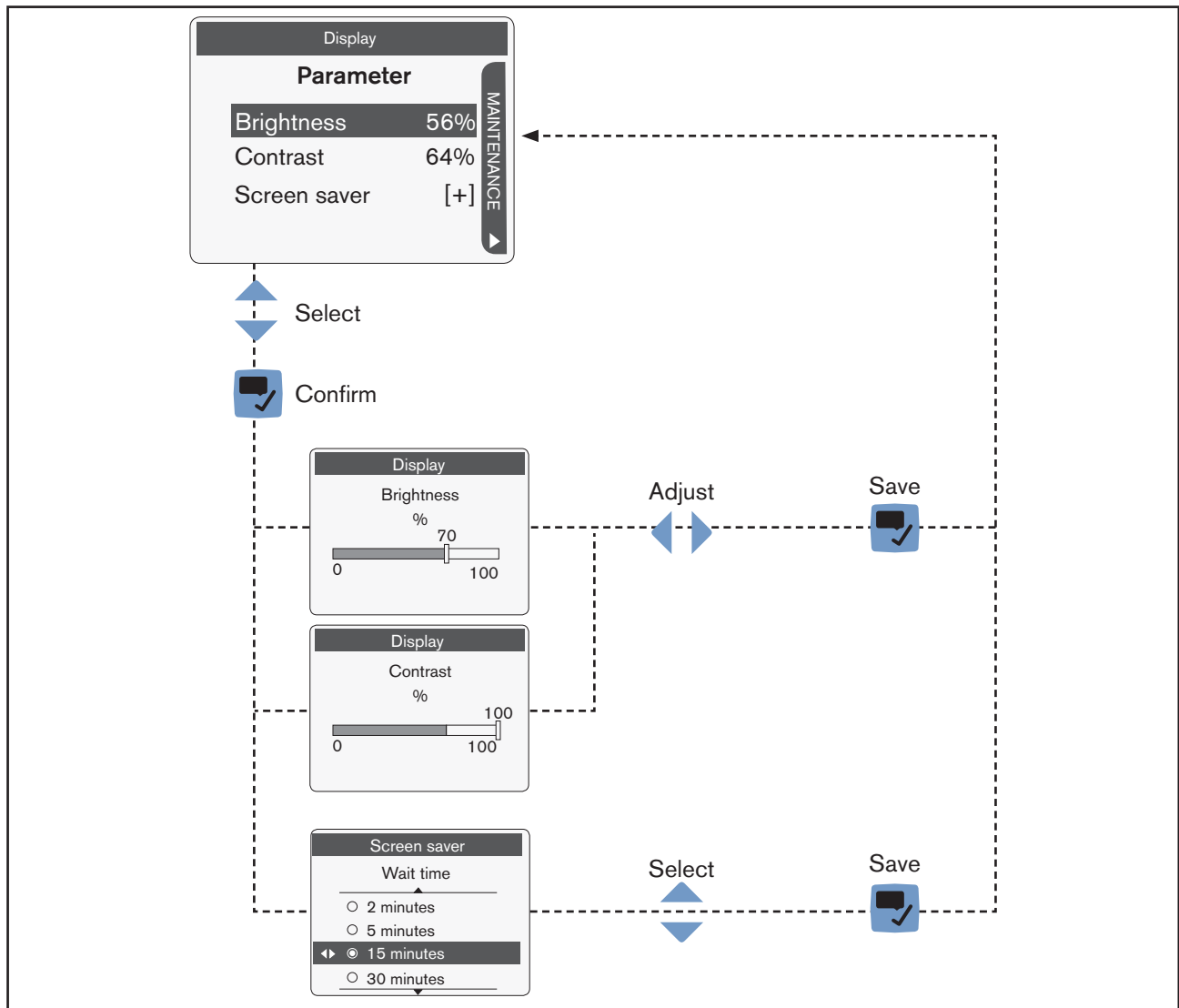
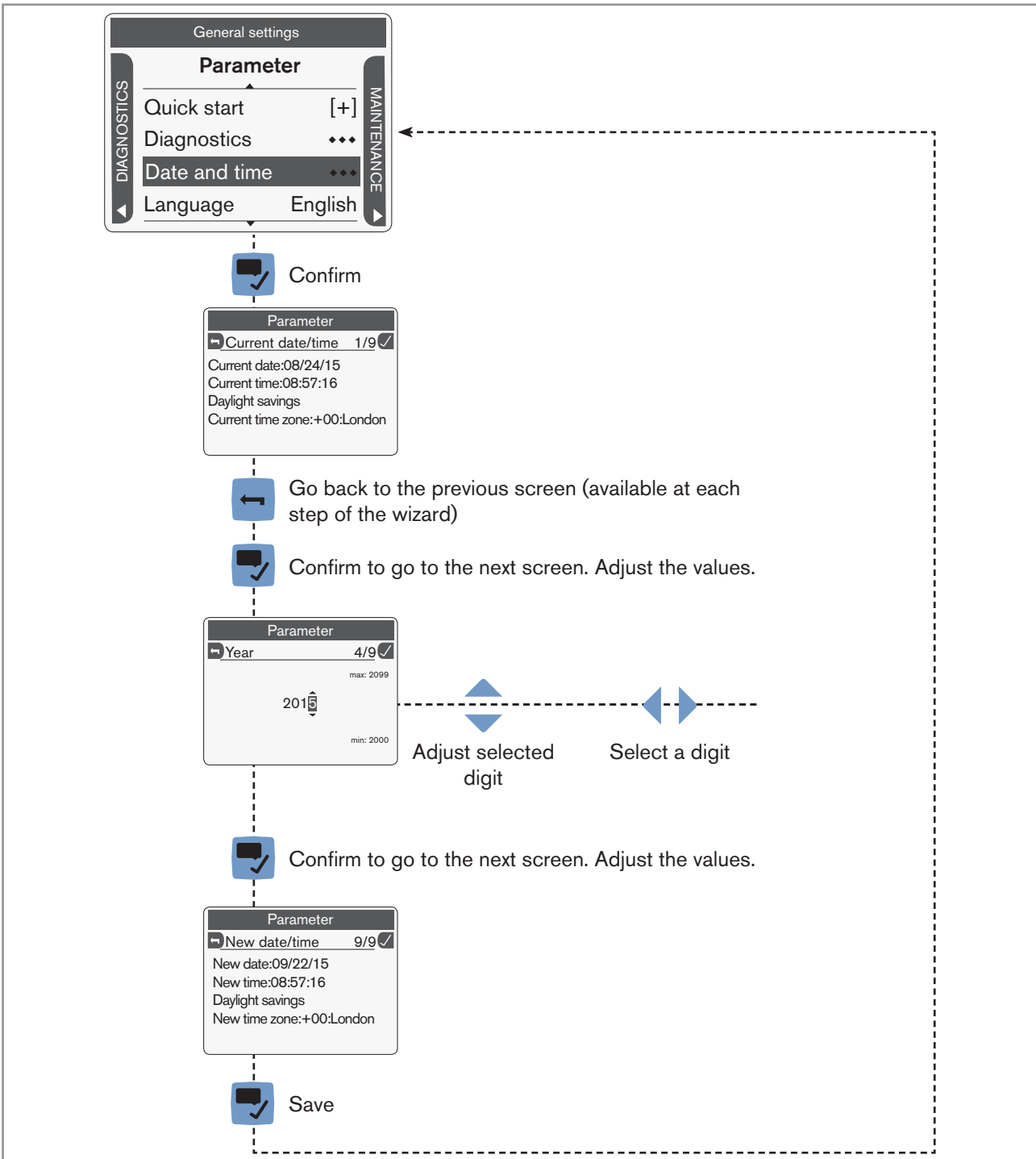


Fig. 43 : Adjusting a percentage or selecting a value in a list

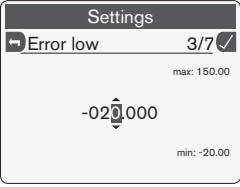
9.8.2 Navigating in a wizard and adjusting numbers



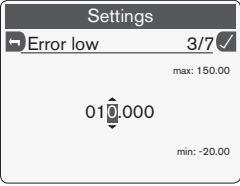
MAN 1000273179 EN Version: E Status: RL (released | freigegeben) printed: 28.02.2019

Fig. 44 : Navigating in a wizard and adjusting numbers

9.8.3 Setting negative or positive numbers



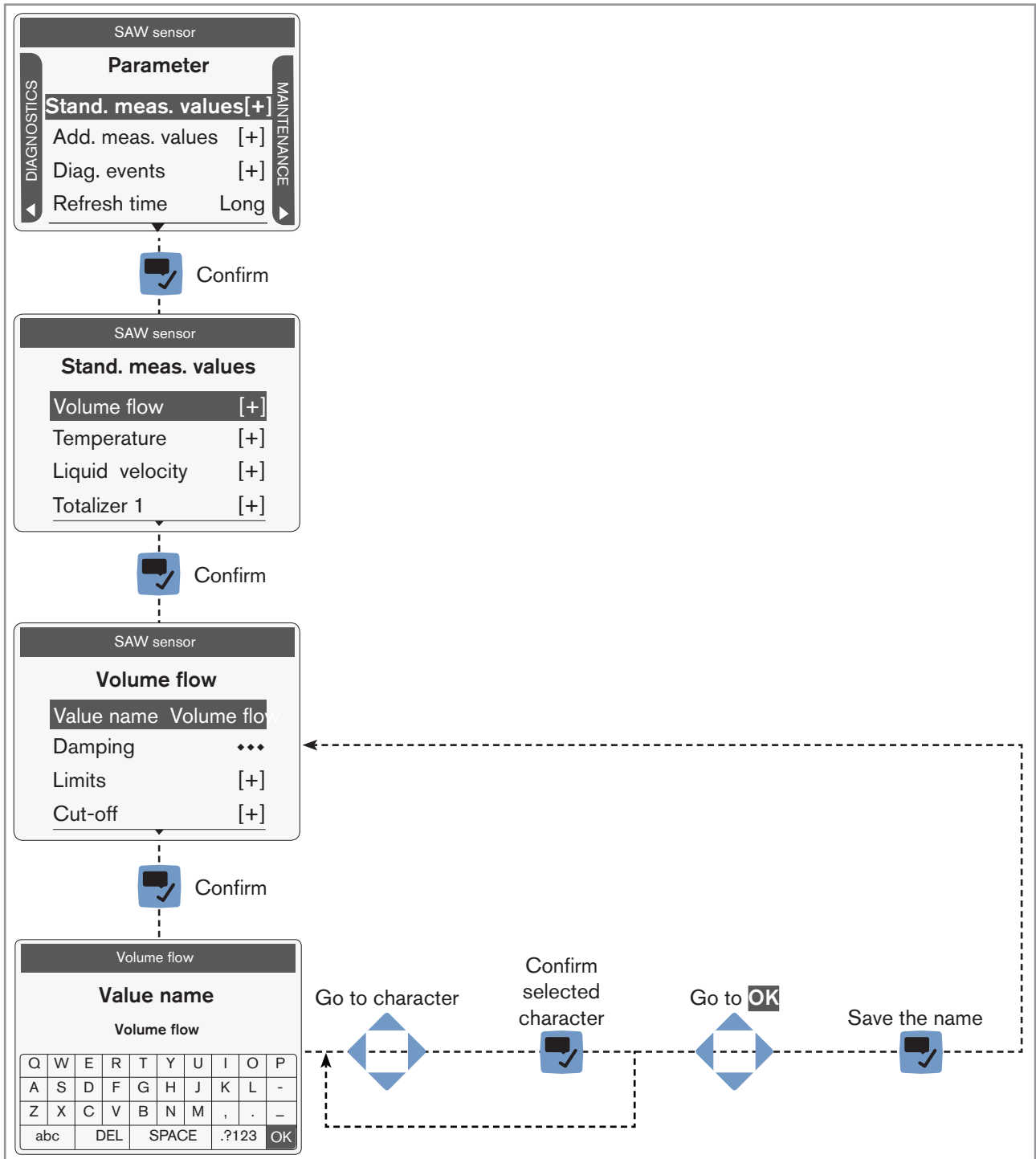
To set a positive number:
→ ▲ to increase the number until the positive value is reached.



To set a negative number:
→ ▼ to decrease the number until the negative value is reached.

Fig. 45 : Setting negative or positive numbers

9.8.4 Entering a name



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Fig. 46 : Entering a name

9.8.5 Activating or deactivating a feature

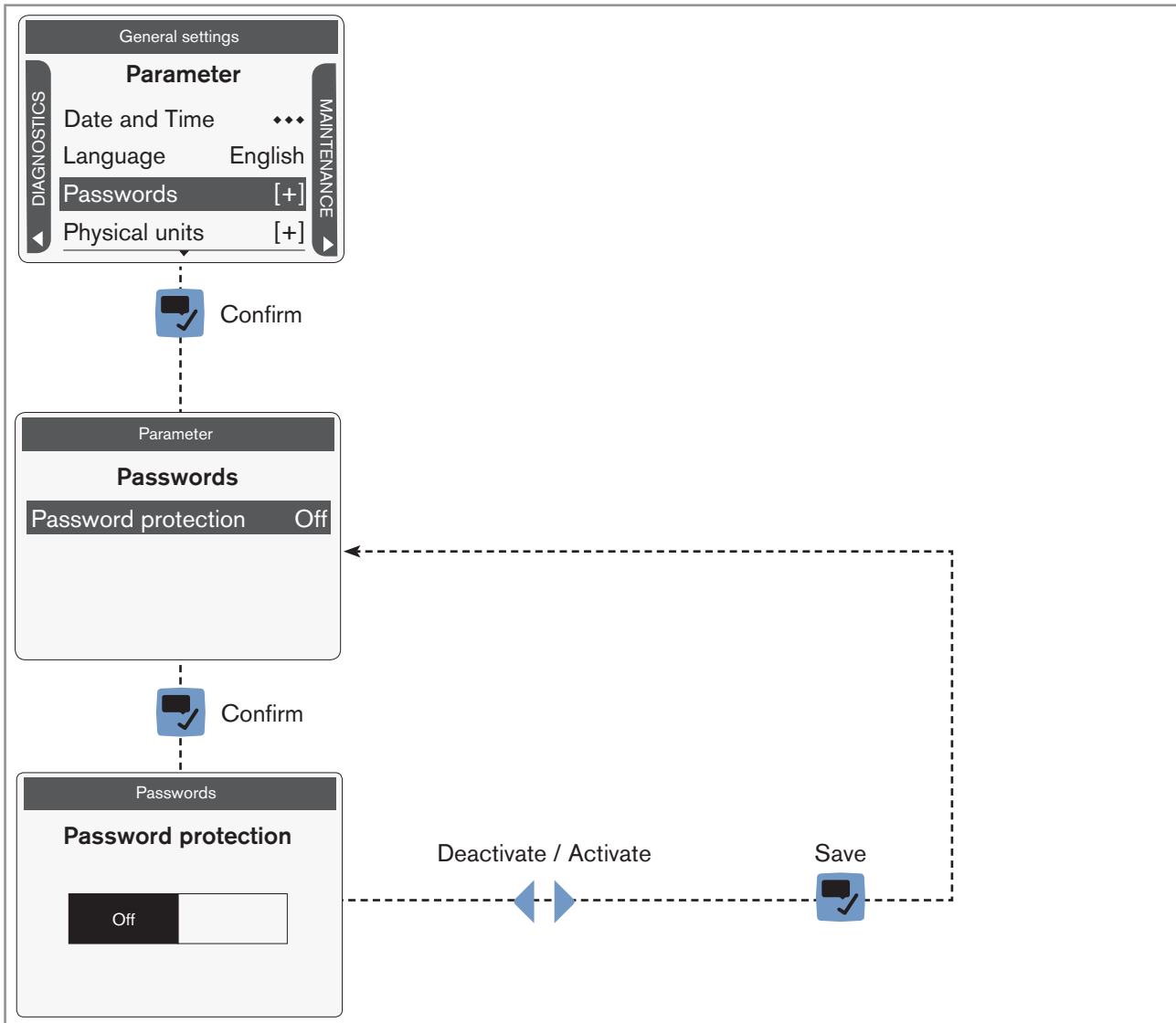























Fig. 47 : Activating or deactivating a feature

9.9 Doing the **Quick start** adjustments when energizing the device for the first time (display module only)

When the device is energized for the first time, the user is guided to make the following mandatory settings:

- choosing the display language,
- choosing the time zone,
- choosing whether daylight saving (summer time) is automatically taken into account or not,
- setting the date and time,
- choosing the unit system for all the measurements.

When the device has finished the uploading step, the first screen of the **Quick start** is displayed.

-  **Display**
-  Choose the display language ----->  Confirm. The current date and time settings are displayed in the chosen language.
-  Choose the time zone ----->  Confirm.
-  Choose whether daylight saving (summer time) is automatically taken into account (**On**) or not (**Off**) for the display of the time. ----->  Confirm.
-  Set the year ----->  Confirm.
-  Set the month ----->  Confirm.
-  Set the day ----->  Confirm.
-  Set the hours ----->  Confirm.
-  Set the minutes ----->  Confirm. The new date and time settings are displayed.
-  Choose the unit system for all the measurements ----->  Confirm.
-  Save the **Quick start** settings or  go back to the parent menu without saving the new settings.

9.10 Changing the type of output 3

NOTICE

Risk of short-circuit if the configuration of output 3 is wrong.

- ▶ Before wiring the output 3, make sure the output 3 is correctly configured.



The output parameters can be set with the **Installer** user level.




Even if the menu Outputs is available on an Ethernet version of the device, we recommend to not use the outputs.

By default, the output 3 is configured as an analogue output. It can be configured as a digital output.


To change the type of the output 3, do the following:

→ Go to the **CONFIGURATION** view.

→  **Outputs**

→  Confirm to access the **Parameter** view.

→  **Output 3 type** -----> .

→  Choose the type of the output 3.

→  Save.

 The configuration **and the name** of the output 3 are changed.

10 MAINTENANCE AND TROUBLESHOOTING

10.1 Safety instructions



Risk of injury due to electrical voltage.

- ▶ Before carrying out work on the system, disconnect the electrical power for all the conductors and isolate it.
- ▶ Observe all applicable accident protection and safety regulations for electrical equipment.

Risk of injury due to high pressure in the installation.

- ▶ Before any intervention in the installation, stop the circulation of fluid, cut off the pressure and drain the pipe.
- ▶ Before any intervention in the installation, make sure there is no pressure in the pipe.

If switched on for a prolonged time, risk of burns or fire due to hot device surfaces

- ▶ Do not touch with bare hands.
- ▶ Keep the device away from highly flammable substances and fluids.

Risk of burns due to high fluid temperatures.

- ▶ Do not touch with bare hands the parts of the device that are in contact with the fluid.
- ▶ Use safety gloves to handle the device.
- ▶ Before opening the pipe, stop the circulation of fluid and drain the pipe.
- ▶ Before opening the pipe, make sure the pipe is completely empty.

Risk of injury due to the nature of the fluid.

- ▶ Respect the prevailing regulations on accident prevention and safety relating to the use of dangerous fluids.



WARNING

Risk of injury due to non-conforming maintenance.

- ▶ Maintenance must only be carried out by qualified and skilled staff with the appropriate tools.
- ▶ Ensure that the restart of the installation is controlled after any interventions.



CAUTION

Risk of injury due to a heavy device.

A heavy device can fall down during transport or during installation and cause injuries.

- ▶ Transport, install and dismantle a heavy device with the help of another person.
- ▶ Use appropriate tools.

10.2 Information on returning the device to the manufacturer or to the reseller

- To return the device for calibration or any after sales service, use the original packaging.
- Send the device back to your local Bürkert sales office. The addresses of our international sales offices are available on the internet at www.burkert.com

10.3 Cleaning the outer surface of the device



- Always use a cleaning agent compatible with the materials from which the device is made.
- Pay special attention to the cable glands which are made of nickel plated brass.

The outer surface device can be cleaned with a cloth slightly dampened water or with a detergent compatible with the materials the device is made of.

Please feel free to contact your Bürkert supplier for any additional information.

10.4 Cleaning In Place (CIP) of the device

The measurement tube of the device can be cleaned in place in all the applications the device is used in.

- Do the cleaning in place procedure at appropriate intervals to prevent malfunctions or contamination.

NOTICE

The device and the seals used on the process connections can be damaged by the cleaning agents or the disinfecting agents.

- ▶ Use cleaning agents or disinfecting agents with a concentration that is compatible with the material the measurement tube is made of.
- ▶ Check the chemical compatibility of the cleaning agents or disinfecting agents with the materials of the seals used on the process connections.
- ▶ For more information on the chemical compatibility and the cleaning temperatures contact your local Bürkert sales office.
- ▶ Obey the cleaning in place procedure that is suited for your application.

Procedure for the cleaning in place of the device:

- Rinse the measurement tube with water of the best quality available in the factory (ideally, water for injection or purified water) under the following conditions:

- at a temperature between 50 °C and 75 °C,
- at a flow velocity between 1,5 m/s and 2,1 m/s,
- for a duration that is determined by your CIP recipe.

- Prepare one or two cleaning agents at concentrations and with chemical properties that have proven their effectiveness on the residues to be removed. Make sure the concentration of the cleaning agent does not damage stainless steel 316L.

- Let the cleaning agent circulate through the measurement tube under the following conditions:

- at a temperature between 50 °C and 75 °C,
- at a flow velocity between 1,5 m/s and 2,1 m/s,

- for a duration that is determined by your CIP recipe.
- Rinse the measurement tube with water of the best quality available in the factory (ideally, water for injection or purified water) under the same conditions as the first rinse.
- If needed, let a second cleaning agent circulate through the measurement tube, under the same conditions as the first cleaning agent, to neutralize any alkaline residues that remain.
- Do a final rinse of the measurement tube, under the same conditions as the first two rinses. Monitor the conductivity value of the final rinse to make sure all the cleaning agents have been removed.
- Blow air through the measurement tube to remove moisture and to ensure maintenance of a good passive layer.
- If needed, do a de-scaling by letting a solution made of water, nitric acid HNO_3 [15...20%] and hydrofluoric acid HF [2...5%] at a temperature between 20 °C and 60 °C circulate through the measurement tube for 5...30 minutes.
- After a de-scaling, or to prevent any corrosion effects after 1 or more (depending on the application) CIP-procedures, do a passivation by letting a solution made of water and nitric acid HNO_3 [3...5%] at a temperature between 70 °C and 80 °C circulate through the measurement tube for the same duration as the CIP-procedure. Then, rinse the measurement tube with water with the best quality available in the factory (ideally, water for injection or purified water) under the same conditions as the other rinses.
- Blow air through the measurement tube to remove moisture and to ensure creation of a uniform passive layer.

10.5 Sterilisation In Place (SIP) of the device

The measurement tube of the device can be sterilised in place in all the applications the device is used in.

- Do the sterilisation in place procedure using dry saturated steam at a temperature between 121 °C and 140 °C for max. 1 hour.

10.6 Troubleshooting when no message is displayed

Problem	The display is OFF
Possible cause	The device is not energized
What to do?	<ol style="list-style-type: none"> 1. Check the wiring. 2. Make sure that the voltage supply at the device terminals is 12...35 V DC. To read the actual value, refer to the Operating Instructions. 3. Check that the power supply source is working properly.

10.7 Troubleshooting when a message is displayed

→ If the message displayed on your device is not explained in the Operating Instructions, contact Bürkert.

If a message has been generated:

- a symbol is displayed in the information bar: see [Table 18](#).
- Ex works and if the status LED is not switched off, the device status LED changes its colour and state based on the NAMUR NE 107 recommendation: see [chpt. 5.4](#).
- The message is displayed in a list called **Messages overview**. The list can be accessed via the context menu. See [chpt. 9.7.3](#).





Symbol	Status	Description
	Failure, error or fault	<ul style="list-style-type: none"> ▪ Malfunction, ▪ or monitored values in the error range.
	Function check	Ongoing work on the device (for example, checking the correct behaviour of the outputs by simulating measurement values); the output signal is temporarily invalid (e.g. frozen).
	Out of specification	<p>The ambient conditions or process conditions for the device are outside the permitted ranges.</p> <p>Device internal diagnostics point to problems in the device or with the process properties.</p>
	Maintenance required	<p>The device is in controlled operation; however, the function is briefly restricted.</p> <p>→ Do the required maintenance operation.</p>

Table 18: Device status symbols


11 SPARE PARTS AND ACCESSORIES

CAUTION

Risk of injury and/or damage caused by the use of unsuitable parts.

Incorrect accessories and unsuitable replacement parts may cause injuries and damage the device and the surrounding area.

► Use only original accessories and original replacement parts from Bürkert.

Spare part or accessory		Article number
Unlocking magnetic key		690309
5 pin M12 female straight cable plug with plastic threaded locking ring, to be wired		917116
5 pin M12 female and 5 pin M12 male straight cable plugs, moulded at each end of a 1 m shielded cable		772 404
5 pin M12 female and 5 pin M12 male straight cable plugs, moulded at each end of a 3 m shielded cable		772 405
Female M12 connector with a 120 Ω termination resistor		772424
Y plug adapter for the male M12 connector		772420
USB-büS interface set		772426

12 PACKAGING, TRANSPORT



CAUTION

Risk of injury due to a heavy device.

A heavy device can fall down during transport or during installation and cause injuries.

- ▶ Transport, install and dismantle a heavy device with the help of another person.
- ▶ Use appropriate tools.

NOTICE

Damage due to transport

Transport may damage an insufficiently protected device.

- ▶ Transport the device in shock-resistant packaging and away from humidity and dirt.
- ▶ Do not expose the device to temperatures that may exceed the admissible storage temperature range.
- ▶ Protect the electrical interfaces using protective plugs.

13 STORAGE



CAUTION

Risk of injury due to a heavy device.

A heavy device can fall down during transport or during installation and cause injuries.

- ▶ Transport, install and dismantle a heavy device with the help of another person.
- ▶ Use appropriate tools.

NOTICE

Poor storage can damage the device.

- ▶ Store the device in a dry place away from dust.
- ▶ Storage temperature of the device: $-20\dots+70$ °C.

14 DISPOSAL OF THE DEVICE

NOTICE

Damage to the environment due to parts contaminated by the fluid.

- Dispose of the device and its packaging in an environmentally-friendly way.
- Comply with the regulations which concern the area of waste disposal.

