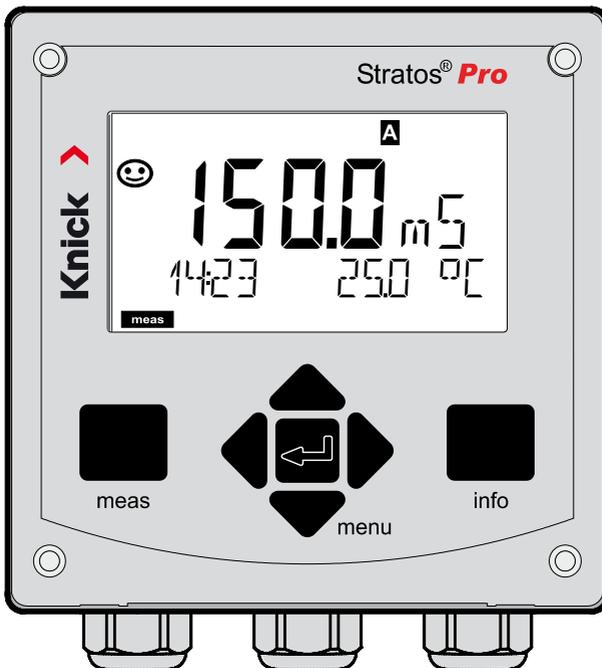


# Stratos Pro A201 CONDI

Conductivity Measurement  
with Toroidal Sensors



Read before installation.  
Keep for future use.

# Supplemental Directives

---

Read this document and retain it for future reference. Before assembling, installing, operating, or maintaining the product, ensure that you fully understand the instructions and risks. Observe all safety instructions. Failure to follow the instructions in this document may result in serious injury and/or property damage.

This document is subject to change without notice.

These supplemental directives explain how safety information is laid out in this document and what content it covers.

## Safety Chapter

This document's Safety chapter is designed to give the reader a basic understanding of safety. It illustrates general hazards and gives strategies on how to avoid them.

## Safety Guide

The external Safety Guide is designed to give the reader a basic understanding of safety. It illustrates general hazards and suggests strategies on how to avoid them.

## Warnings

This document uses the following warnings to indicate hazardous situations:

Symbol	Category	Meaning	Remark
	WARNING	Designates a situation that can lead to death or serious (irreversible) injury.	The warnings contain information on how to avoid the hazard.
	CAUTION	Designates a situation that can lead to slight or moderate (reversible) injury.	
None	NOTICE	Designates a situation that can lead to property or environmental damage.	

## Additional Safety Information

Stratos Safety Guide

## **Safety Guide**

In official EU languages and others

## **Quickstart Guides**

Installation and first steps:

- Operation
- Menu structure
- Calibration
- Error messages and recommended actions

## **Test Report 2.2 According to EN 10204**

## **Electronic Documentation**

[www.knick-international.com](http://www.knick-international.com):

Manuals + software

Ex devices:

## **Control Drawings**

## **EU Declaration of Conformity**

# Table of Contents

---

<b>Supplemental Directives</b> .....	2
<b>Documents Supplied</b> .....	3
<b>Safety</b> .....	7
Intended Use .....	7
<b>Introduction</b> .....	9
<b>Overview of Stratos Pro A201CONDI</b> .....	12
<b>Assembly</b> .....	13
Package Contents .....	13
Mounting Plan, Dimensions .....	14
Pipe Mounting, Protective Hood.....	15
Panel Mounting .....	16
<b>Electrical Installation</b> .....	17
Rating Plates / Terminal Assignments.....	18
Wiring of Stratos Pro A201CONDI.....	19
Cable Preparation SE655 / SE656.....	20
Wiring Example: SE655 / SE656 .....	21
Wiring Example: SE660 .....	22
Wiring Example: Yokogawa ISC40.....	23
Wiring Example: Yokogawa IC40S.....	24
Wiring Example: SE670, SE680 .....	25
Connecting an SE670 / SE680 Sensor .....	26
<b>User Interface, Keypad</b> .....	27
<b>Display</b> .....	28
Signal Colors (Display Backlighting) .....	28
Measuring Mode .....	29
Selecting the Mode / Entering Values.....	30
<b>Display in Measuring Mode</b> .....	31
<b>Color-Coded User Interface</b> .....	32
<b>Operating Modes</b> .....	33
Menu Structure of Modes and Functions .....	34
HOLD Mode .....	35
Alarm .....	36
Alarm and HOLD Messages.....	37

<b>Configuration</b> .....	<b>39</b>
Menu Structure of Configuration.....	39
Parameter Set Selection .....	41
Configuration (Original for Copy) .....	46
Sensor.....	48
Sensor Verification (TAG, GROUP) .....	56
Current Output 1 .....	58
Current Output 2.....	68
Temperature Compensation.....	70
CONTROL Input (TAN SW-A005).....	74
Alarm Settings.....	76
Time and Date.....	80
Measuring Points (TAG/GROUP) .....	82
Display Backlighting .....	82
<b>Calibration</b> .....	<b>85</b>
Selecting a Calibration Mode .....	85
Calibration with Calibration Solution.....	86
Calibration by Input of a Cell Factor .....	88
Calibration by Input of an Installation Factor.....	89
Product Calibration .....	90
Zero Calibration in Air / with Calibration Solution .....	92
Temp Probe Adjustment .....	93
<b>Measurement</b> .....	<b>94</b>
<b>Diagnostics</b> .....	<b>95</b>
<b>Service</b> .....	<b>100</b>
<b>Operating States</b> .....	<b>103</b>
<b>Maintenance and Repair</b> .....	<b>105</b>
<b>A201B/X: Supply Units and Connection</b> .....	<b>106</b>
<b>Product Line and Accessories</b> .....	<b>107</b>
<b>Specifications</b> .....	<b>108</b>
<b>Calibration Solutions</b> .....	<b>114</b>
<b>Concentration Measurement</b> .....	<b>116</b>
Concentration Curves.....	117

# Table of Contents

---

<b>Error Handling</b> .....	<b>122</b>
<b>Error Messages</b> .....	<b>123</b>
<b>Decommissioning</b> .....	<b>126</b>
Disposal .....	126
Returns.....	126
<b>Sensoface</b> .....	<b>127</b>
<b>HART: Typical Applications</b> .....	<b>129</b>
<b>FDA 21 CFR Part 11</b> .....	<b>130</b>
Electronic Signature – Passcodes.....	130
Audit Trail.....	130
<b>Index</b> .....	<b>131</b>

## **Always Read and Observe the Safety Instructions!**

The device is constructed in accordance with the latest technology and generally accepted safety rules and regulations.

Under certain circumstances, however, usage may pose risks to users or cause damage to the device.

Commissioning must be carried out by specialist personnel authorized by the operating company. If safe operation is not possible, the device must not be switched on or, if it is already on, must be switched off properly and secured against unintended operation.

Reasons to assume safe operation is not possible:

- the device shows visible damage
- failure to perform the intended function
- prolonged storage at temperature of below -30 °C/-22 °F or above 70 °C/158 °F
- severe transport stresses

Before recommissioning the device, a professional routine test must be performed. This test should be carried out by the manufacturer at its factory.

## **Intended Use**

Stratos Pro A201CONDI is a 2-wire device for measurement of electrical conductivity and temperature in liquids using toroidal (electrodeless) sensors. Fields of application are: biotechnology, chemical industry, environment, food processing, water/wastewater treatment.

Stratos Pro A201X and the separately approved Ex sensor may be operated in Zone 0 / Division 1.

Stratos Pro A201B and the separately approved Ex sensor may be operated in Zone 2.

The defined rated operating conditions must be observed when using this product. They can be found in the Specifications chapter of this User Manual; see page 108.

# Safety

---

## **Function Check Mode (HOLD Function)**

After activating configuration, calibration, or service, Stratos Pro enters function check mode (HOLD).

The current outputs respond in accordance with the configuration.

Operations must not be carried out while Stratos Pro is in function check (HOLD) mode, as the system may behave unexpectedly and put users at risk.

## **Control Drawings**

If installing in hazardous locations, observe the information provided on the included Control Drawings.

## **Devices Not Intended for Use in Hazardous Locations**

Devices identified with an N in their product name must not be used in hazardous locations.

## **Configuration**

Replacing components may affect intrinsic safety. The modules are not intended to be replaced on devices in the Stratos Pro A201 product line.

## Housing and Mounting Options

- The sturdy molded enclosure is designed for IP66/IP67 / TYPE 4X Outdoor protection, is made of PBT glass fiber reinforced PC, and has the following dimensions: H 148 mm, W 148 mm, T 117 mm. Knockouts in the housing enable
- wall mounting (with sealing plugs to seal the housing)  
see page 14
- pipe mounting (Ø 40 ... 60 mm, □ 30 ... 45 mm)  
see page 15
- panel mounting (cutout 138 mm x 138 mm acc. to DIN 43700)  
see page 16

## Protective Hood (Accessory)

The protective hood, which is available as accessory, provides additional protection against direct weather exposure and mechanical damage; see page 15.

## Connection of Sensors, Cable Glands

For connecting the cables, the enclosure provides

- 3 knockouts for M20x1.5 cable glands
- 2 knockouts for ½" conduit

For quasi-stationary installations with Memosens sensors, we recommend using the M12 socket accessory (ZU0822) instead of a cable gland – which allows simple replacement of the sensor cable without opening the device.

## Sensors

The device has been designed for toroidal conductivity sensors, in particular for Models SE 655/656, SE 660, SE 670 and SE 680.

## **Display**

Plain-text messages on a large, backlit LC display enable intuitive operation. You can specify which values are to be displayed in standard measuring mode (“Main Display,” see page 31).

## **Color-Coded User Interface**

The colored display backlighting indicates different operating states (e.g., alarm: red, HOLD mode: orange; see page 32). The display backlighting can be switched off; see page 82.

## **Diagnostic Functions**

“Sensocheck” automatically monitors sensor and cables; and the “Sensoface” function clearly indicates the sensor condition; see page 127.

## **Data Logger**

The internal logbook (TAN SW-A002) can handle up to 100 entries – up to 200 with AuditTrail (TAN SW-A003); see page 98.

## **Two Parameter Sets A, B**

The device provides two parameter sets that can be switched manually or via a control input for different process connections or different process conditions.

For an overview of parameter sets (original for copy), see page 46.

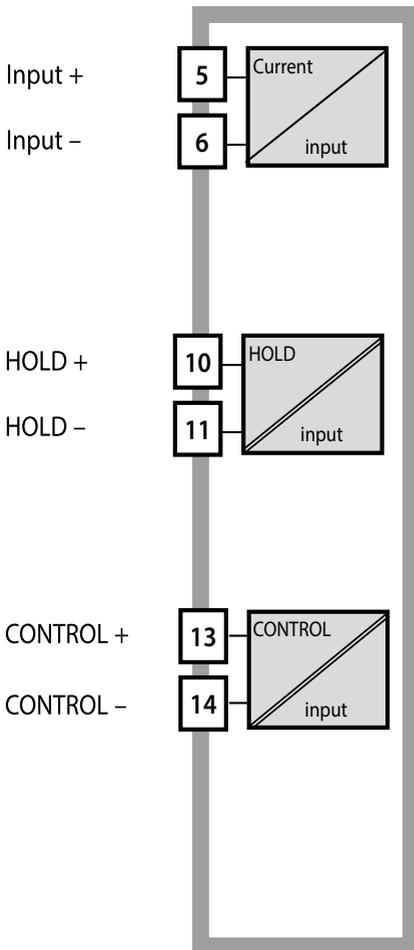
## **Password Protection**

Password protection (passcodes) for granting access rights during operation can be configured; see page 102.

## **TC process medium: Selecting the compensation method**

The following temperature compensation methods are provided: linear (by entering a temperature coefficient), natural waters (nLF), ultrapure water with traces of NaCl, HCl, NH<sub>3</sub>, NaOH, see page 70.

## Control Inputs (TAN SW-A005)



### I input

The analog (0) 4 ... 20 mA current input can be used for external temperature compensation; see page 70.

### HOLD

(Floating digital control input)  
The HOLD input can be used for external activation of HOLD mode; see page 35.

### CONTROL

(Floating digital control input)  
The CONTROL input can be used either for parameter set selection (A/B) or for flow monitoring; see page 74.

## Signal Outputs

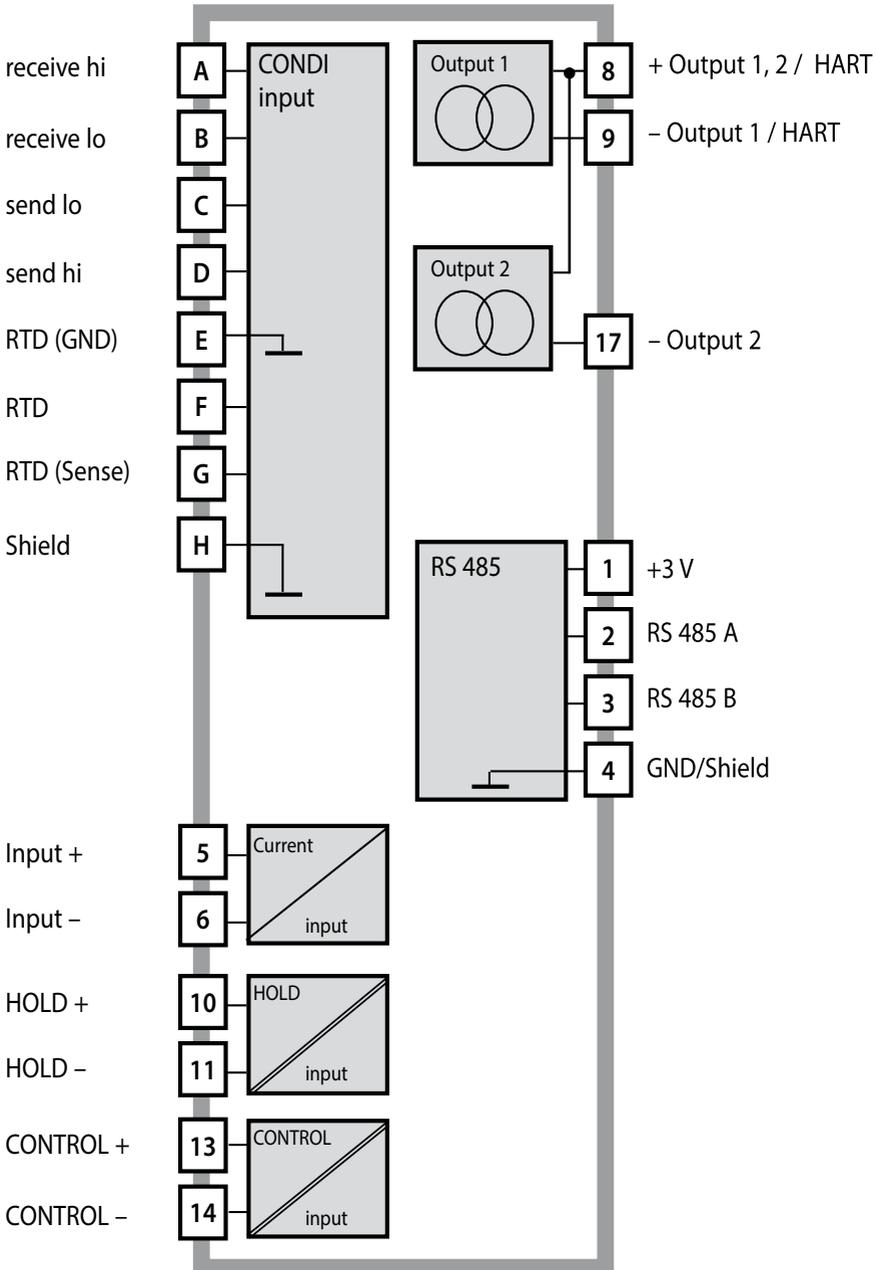
The device provides two current outputs (for transmission of measured value and temperature, for example). The output curve is adjustable (linear, bilinear or logarithmic), see page 60.

## Options

Additional functions can be enabled by entering a TAN (p. 102).

# Overview

## Overview of Stratos Pro A201CONDI



## Package Contents

**Note:** Check all components for damage upon receipt.  
Do not use damaged parts.

**The package should contain:**

- Front unit, rear unit, bag containing small parts
- Specific test report
- Documentation (see page 3)

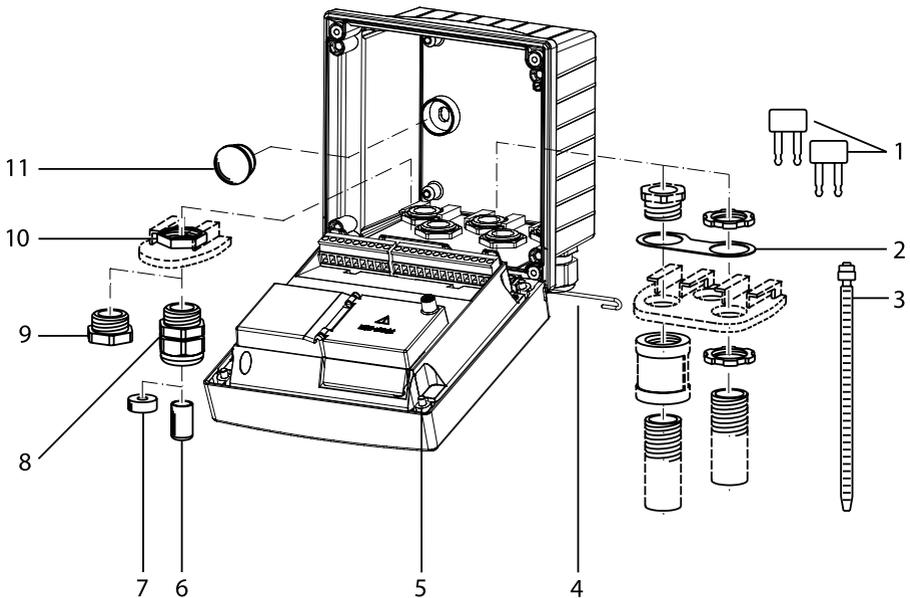


Fig.: Assembling the enclosure

- |  |   |
|--|---|
| 1) Insertable jumper (3x)  | 6) Blanking plug (2x, non-Ex only)                                  |
| 2) Plate (1x), for conduit mounting: Plate between housing and nut | 7) Reduction sealing insert (1x)                                    |
| 3) Cable tie (3x)  | 8) Cable gland (3x)   |
| 4) Hinge pin (1x), insertable from either side                     | 9) Blanking cap (2x)  |
| 5) Enclosure screw (4x)  | 10) Hex nut (5x)  |
|  | 11) Plastic sealing plug (2x), for sealing in case of wall mounting |

## Mounting Plan, Dimensions

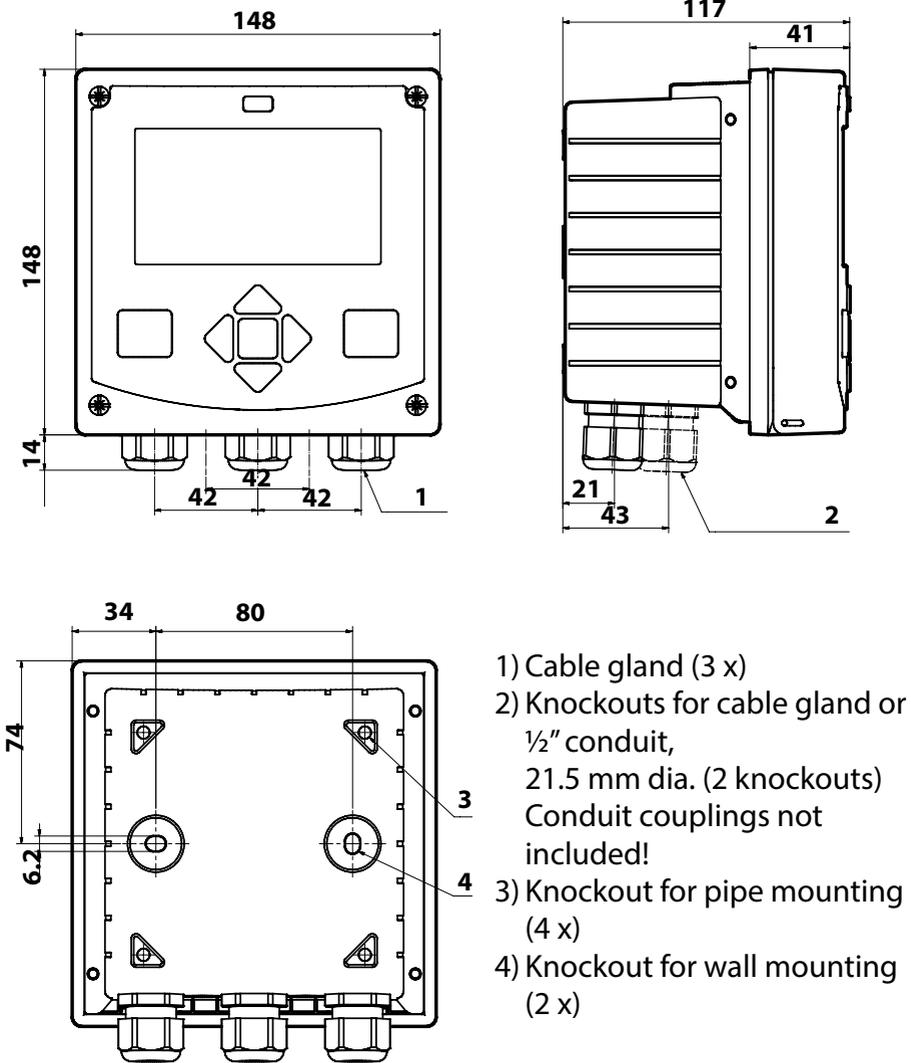
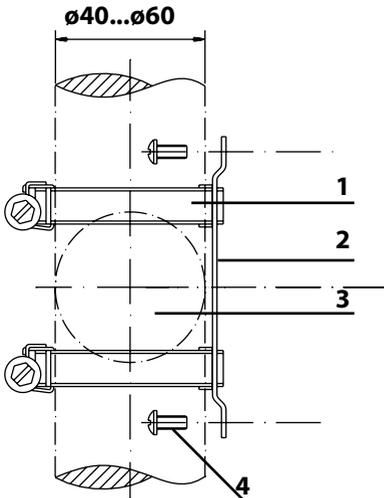


Fig.: Mounting plan (All dimensions in mm!)

## Pipe Mounting, Protective Hood



- 1) Hose clamp with worm gear drive to DIN 3017 (2 x)
- 2) Pipe-mount plate (1 x)
- 3) For vertical or horizontal posts or pipes
- 4) Self-tapping screw (4 x)

Fig.: Pipe-mount kit, accessory ZU 0274 (All dimensions in mm!)

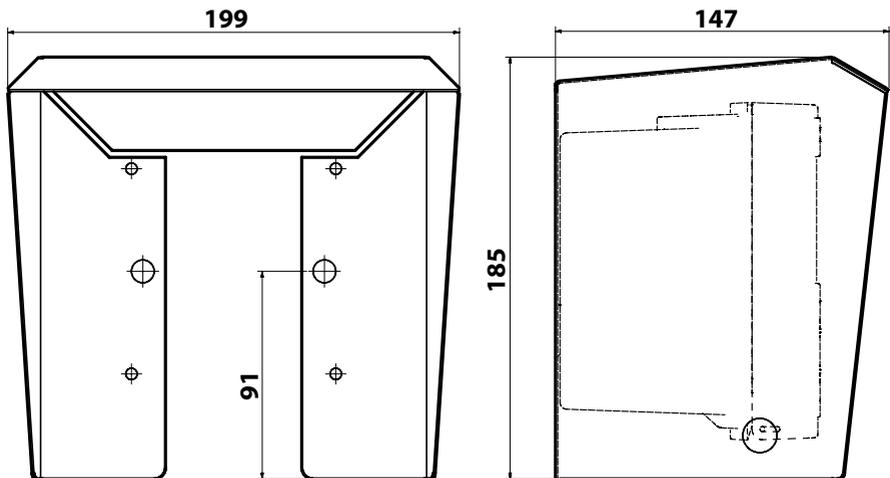
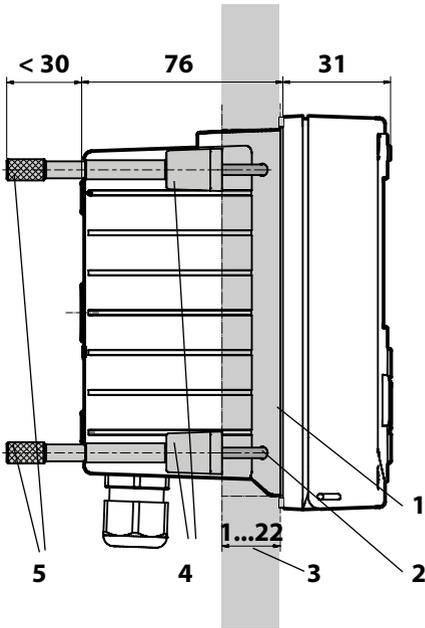


Fig.: Protective hood for wall and pipe mounting, accessory ZU 0737 (All dimensions in mm!)

## Panel Mounting



- 1) Circumferential sealing (1 x)
- 2) Screws (4 x)
- 3) Position of control panel
- 4) Span piece (4 x)
- 5) Threaded sleeve (4 x)

Cutout  
138 x 138 mm (DIN 43700)

Fig.: Panel-mount kit, accessory ZU 0738 (All dimensions in mm!)

# Electrical Installation

Before commencing with the installation, make sure that all lines to be connected are de-energized.

Observe the safety instructions; see page 7.

## Cable Glands

In a hazardous location, only cable glands with suitable approvals may be used. The installation instructions of the manufacturer must be observed.

Cable glands	5 cable glands M20 x 1.5 A/F 24 mm WISKA type ESKE/1 M20
Clamping ranges	Standard sealing insert: 7 ... 13 mm Reduction sealing insert: 4 ... 8 mm Multiple sealing insert: 5.85 ... 6.5 mm
Tensile strain	Not permitted; Only suitable for "fixed installation"

**⚠ CAUTION!** Risk of losing the specified ingress protection.

Fasten the cable glands and screw together the housing correctly.

Observe the permissible cable diameters and tightening torques.

Only use original accessories and spare parts.

**NOTICE!** Strip the insulation from the wires using a suitable tool to prevent damage. For stripping length, see Specifications.

- 1) Wire the current outputs. Deactivate unused current outputs in the parameter settings or use jumpers.
- 2) Wire the inputs as necessary.
- 3) Connect the sensor.
- 4) Check whether all connections are correctly wired.
- 5) Close the housing and successively tighten the enclosure screws in a diagonal pattern.

## Rating Plates / Terminal Assignments

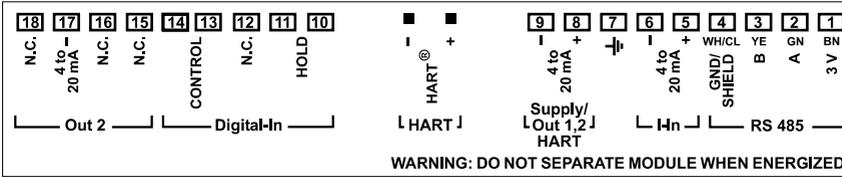


Fig.: Terminal assignments of Stratos Pro A201

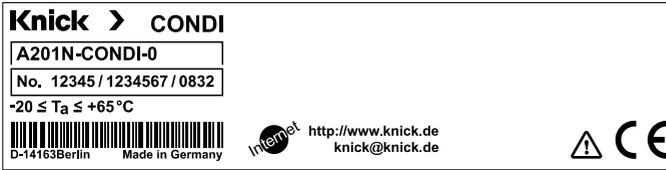
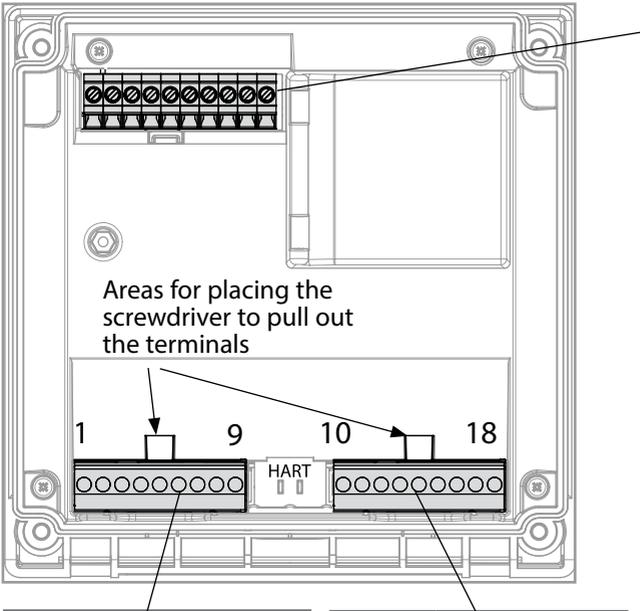


Fig.: Stratos Pro A201N rating plate at outside bottom of front (illustrative example)

## Wiring of Stratos Pro A201CONDI



### Sensor connection MK-CONDI module

A	receive hi
B	receive lo
C	send lo
D	send hi
E	RTD (GND)
F	RTD
G	RTD (Sense)
H	Shield

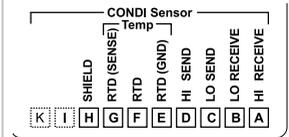


Fig.: MK-CONDI module terminal assignments

### Terminal row 1

1	+3 V
2	RS 485 A
3	RS 485 B
4	GND/shield
5	+ input
6	- input
7	PA
8	+ out 1,2/HART
9	- out1/HART

### Terminal row 2

10	hold
11	hold
12	n.c.
13	contr.
14	contr.
15	n.c.
16	n.c.
17	- out 2
18	n.c.

In addition:

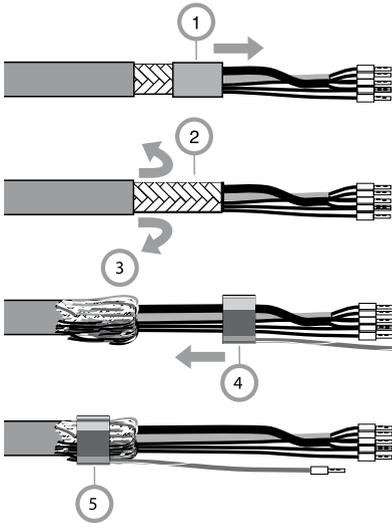
2 HART pins (between terminal row 1 and 2)

Fig.: Terminals, device opened, back of front unit

# Cable Preparation SE655 / SE656

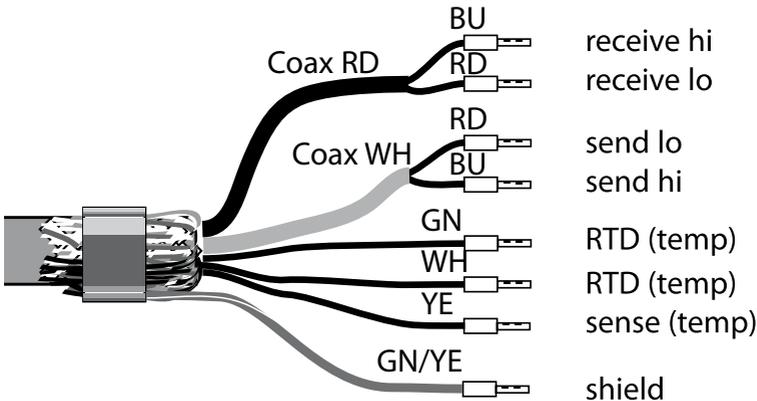
## Preparing the shield connection

Pre-assembled special cable for SE655 / SE656 sensors



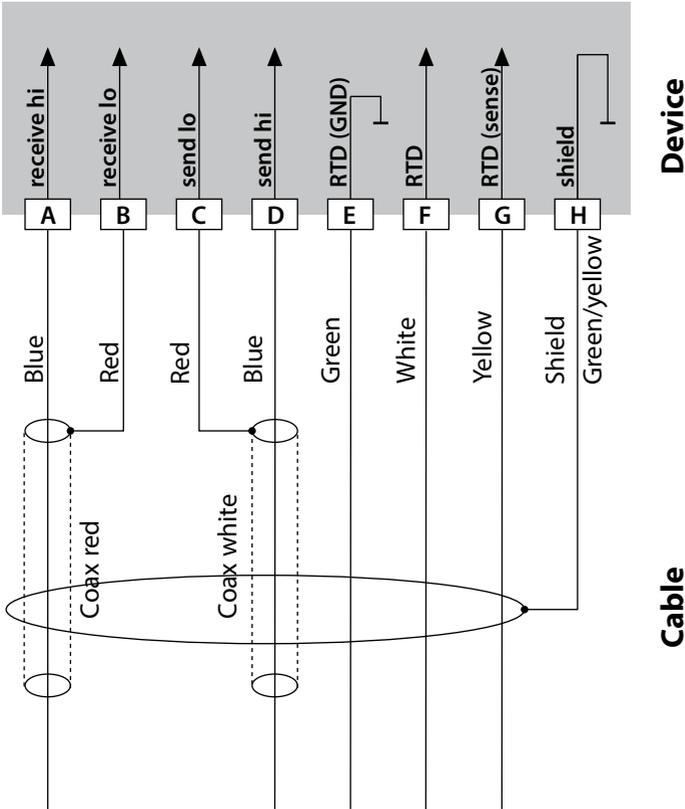
- Insert the special cable through the cable entry into the terminal compartment.
- Remove the already separated part of the cable insulation (1).
- Turn the shielding mesh (2) over the cable insulation (3).
- Then shift the crimp ring (4) over the shielding mesh and tighten it using a pincer (5)

## The pre-assembled special cable:



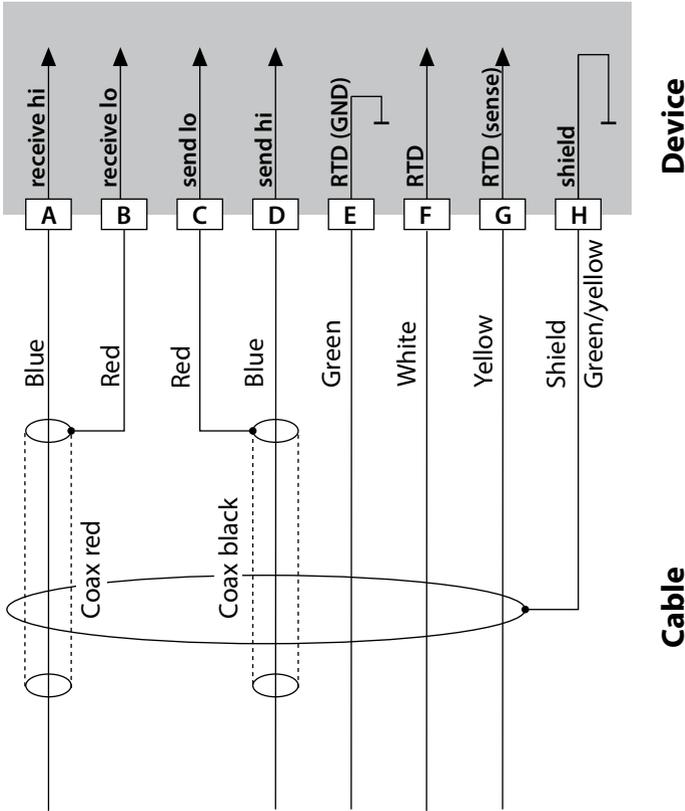
# Wiring Example: SE655 / SE656

Measuring task: Conductivity, temperature  
Sensors: SE655/SE656 sensor  
Connecting the pre-assembled cable



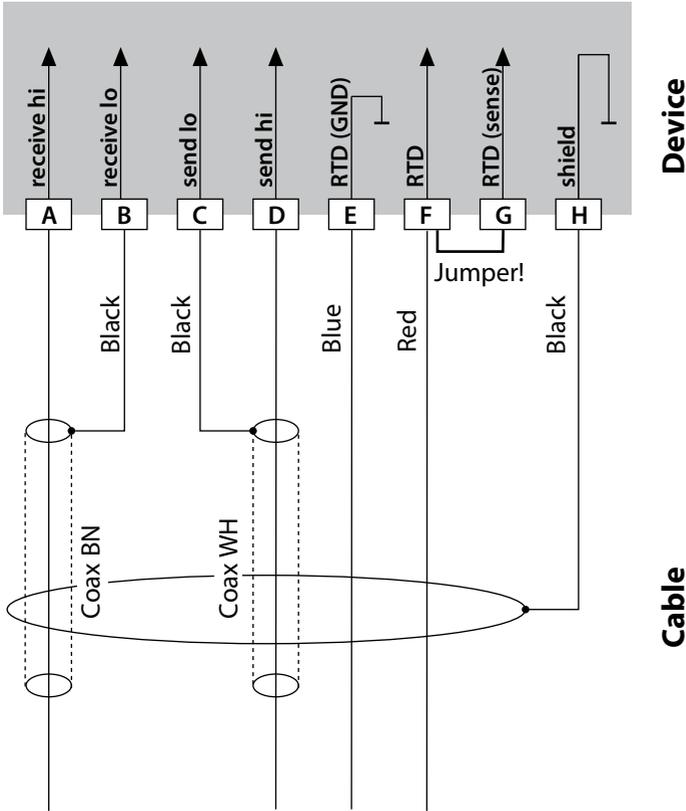
# Wiring Example: SE660

Measuring task: Conductivity, temperature  
Sensor: SE660 sensor



# Wiring Example: Yokogawa ISC40

Measuring task: Conductivity, temperature  
Sensor: Yokogawa ISC40 (Pt 1000)

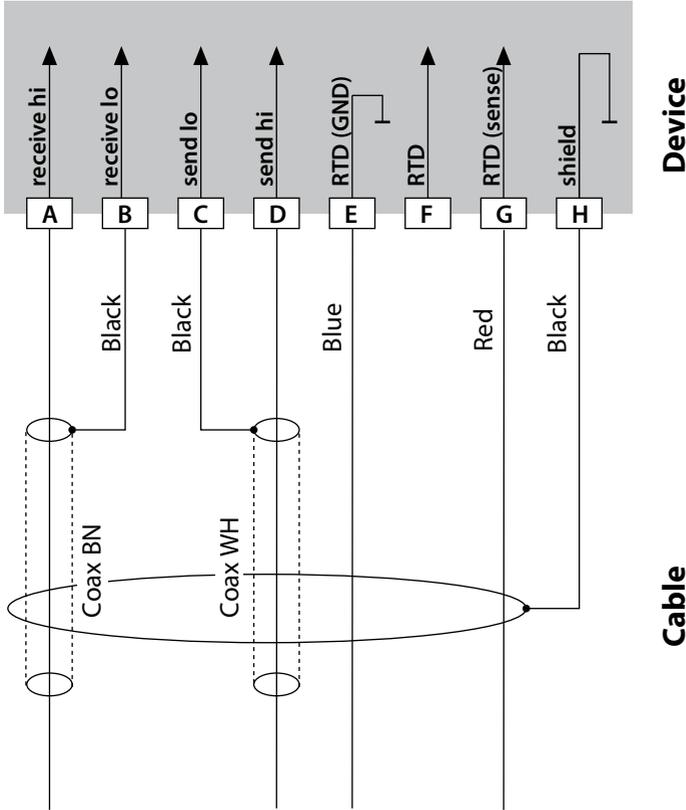


## Configuration settings for this sensor:

SENSOR	OTHER
RTD TYPE	1000Pt
CELL FACTOR	1.88
TRANS RATIO	125

# Wiring Example: Yokogawa IC40S

Measuring task: Conductivity, temperature  
Sensor: Yokogawa IC40S (NTC 30k)



## Configuration settings for this sensor:

SENSOR	OTHER
RTD TYPE	30 NTC
CELL FACTOR	Approx. 1.7
TRANS RATIO	125

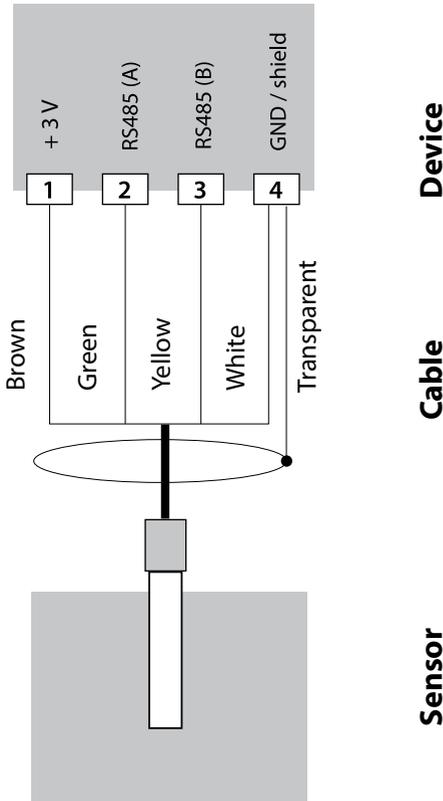
# Wiring Example: SE670, SE680

Measuring task: Conductivity, temperature

Sensor: SE670

**NOTICE!** Connection to RS-485 interface.

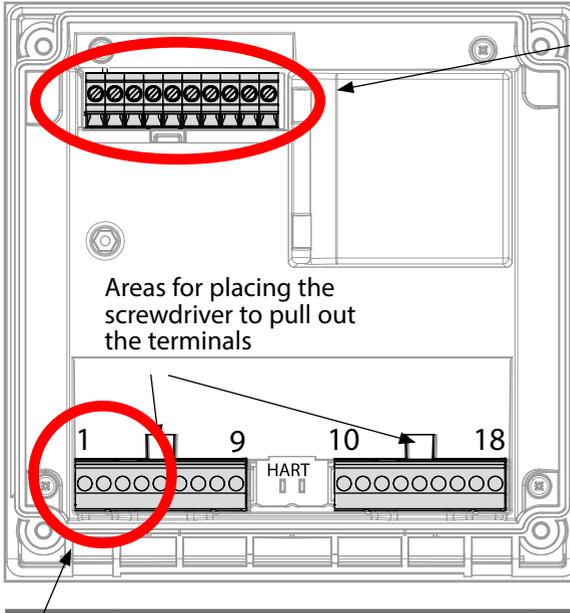
Remove the measuring module.



The SE670 / SE680 sensors are connected to the RS-485 interface of the device – for an A2... Series (2-wire) device, the measuring module slot must be empty. Therefore, first remove the measuring module from the slot (see next page). When the sensor model SE670 / SE680 is selected in the Configuration menu, the default values are taken as calibration data. They can then be modified by calibration.

All calibration data of the SE680-M sensor with Memosens protocol are stored in the sensor.

## Connecting an SE670 / SE680 Sensor



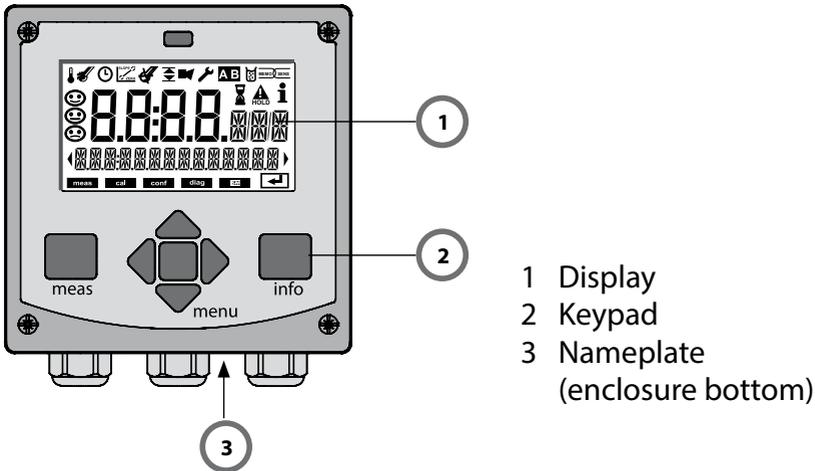
### **NOTICE!**

The slot for the MK-CONDI module must be empty – be sure to remove the module!

### Connection of SE670 / SE680: Wire color

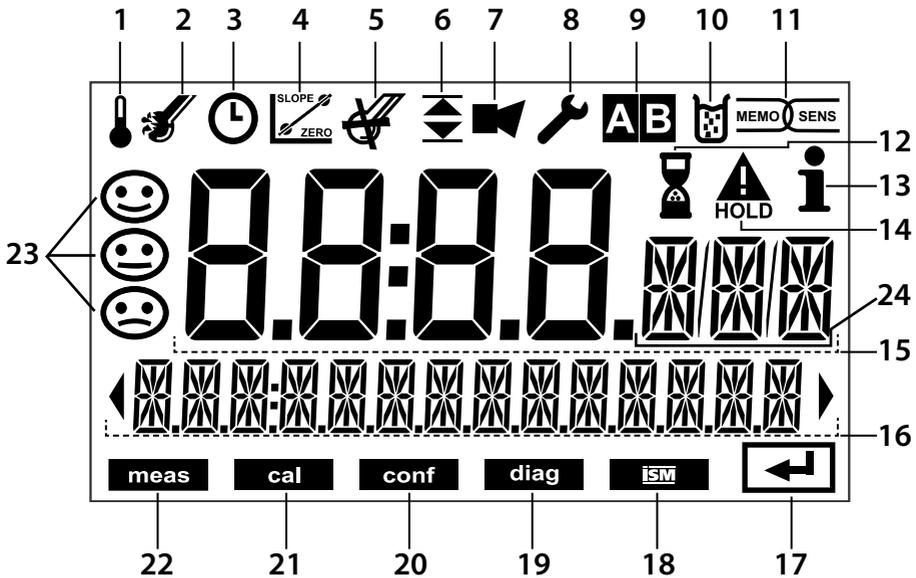
1	+3 V	Brown
2	RS 485 A	Green
3	RS 485 B	Yellow
4	GND/shield	White, transparent shield

# User Interface, Keypad



Key	Function
<b>meas</b>	<ul style="list-style-type: none"><li>• Return to last menu level</li><li>• Directly to measuring mode (press &gt; 2 s)</li><li>• Measuring mode: other display</li></ul>
<b>info</b>	<ul style="list-style-type: none"><li>• Retrieve information</li><li>• Show error messages</li></ul>
<b>enter</b>	<ul style="list-style-type: none"><li>• Configuration: Confirm entries, next configuration step</li><li>• Calibration: Continue program flow</li></ul>
<b>menu</b>	<ul style="list-style-type: none"><li>• Measuring mode: Call menu</li></ul>
<b>Arrow keys up / down</b>	<ul style="list-style-type: none"><li>• Menu: Increase/decrease a numeral</li><li>• Menu: Selection</li></ul>
<b>Arrow keys left / right</b>	<ul style="list-style-type: none"><li>• Previous/next menu group</li><li>• Number entry: Move between digits</li></ul>

# Display



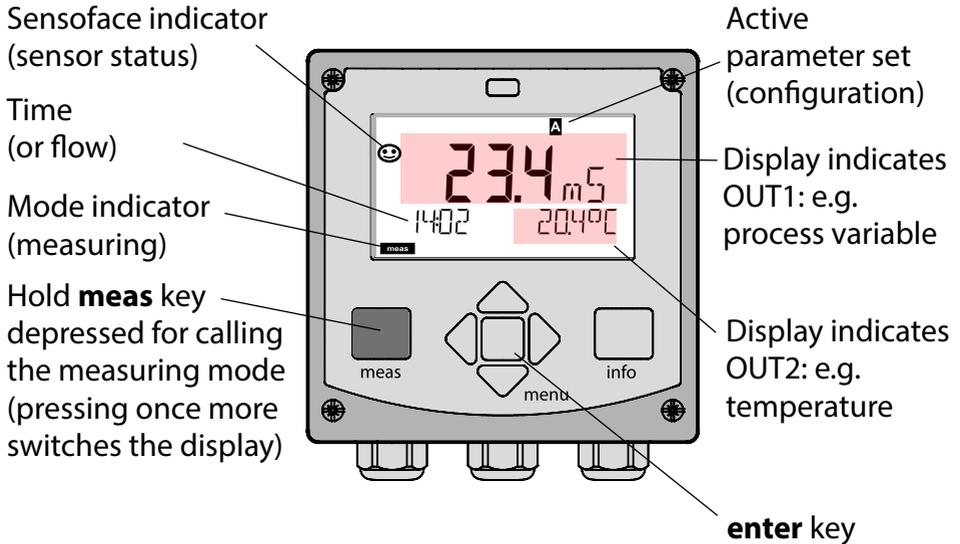
- |    |  |    |                     |
|----|--|----|---------------------|
| 1  | Temperature  | 13 | Info available      |
| 2  | Sensocheck   | 14 | Hold mode active    |
| 3  | Interval/response time   | 15 | Main display        |
| 4  | Sensor data  | 16 | Secondary display   |
| 5  | Not used   | 17 | Proceed using enter |
| 6  | Limit message:<br>Limit 1  or Limit 2  | 18 | Not used            |
| 7  | Alarm  | 19 | Diagnostics         |
| 8  | Service  | 20 | Configuration mode  |
| 9  | Parameter set  | 21 | Calibration mode    |
| 10 | Calibration  | 22 | Measuring mode      |
| 11 | Memosens   | 23 | Sensoface           |
| 12 | Waiting time running   | 24 | Unit symbols        |

## Signal Colors (Display Backlighting)

- |              |   |
|--------------|---|
| Red          | Alarm (in case of fault: display values blink)  |
| Red blinking | Input error: illegal value or wrong passcode    |
| Orange       | HOLD mode (Calibration, Configuration, Service) |
| Turquoise    | Diagnostics                                     |
| Green        | Info  |
| Magenta      | Sensoface message                               |

# Measuring Mode

After the operating voltage has been connected, the analyzer automatically goes to "Measuring" mode. To call the measuring mode from another operating mode (e.g. Diagnostics, Service): Hold **meas** key depressed (> 2 s).



Depending on the configuration, one of the following displays can be set as standard display for the measuring mode (see page 31):

- Measured value, time and temperature (default setting)
- Measured value and selection of parameter set A/B or flow
- Measured value and measuring point ("TAG")
- Time and date

**Note:** By pressing the **meas** key in measuring mode you can view the displays for approx. 60 sec.

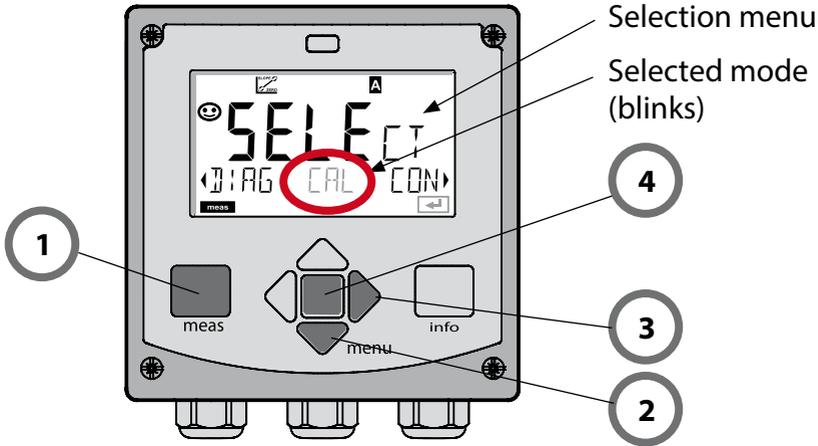


The device must be configured for the respective measurement task, see page 39.

# Selecting the Mode / Entering Values

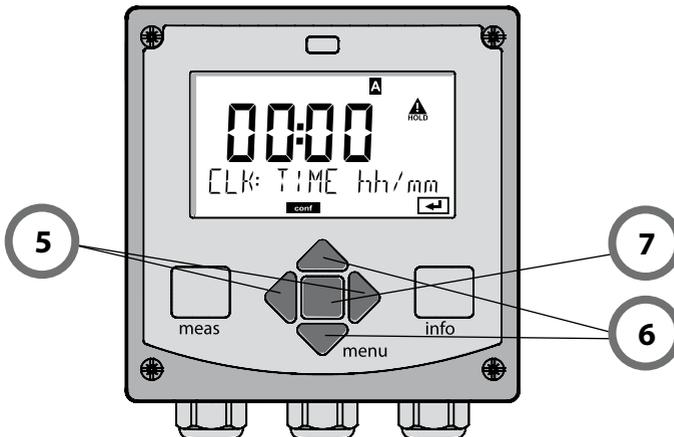
## To select the operating mode:

- 1) Hold **meas** key depressed (> 2 s) (directly to measuring mode)
- 2) Press **menu** key: the selection menu appears
- 3) Select operating mode using left / right arrow key
- 4) Press **enter** to confirm the selected mode

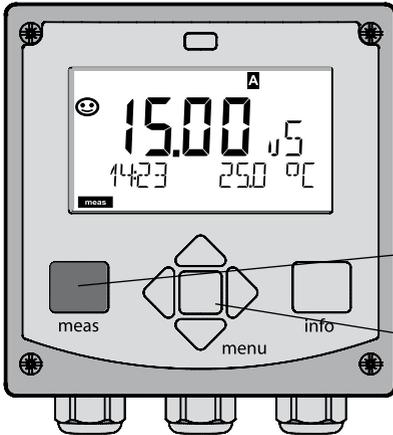


## To enter a value:

- 5) Select numeral: left / right arrow key
- 6) Change numeral: up / down arrow key
- 7) Confirm entry by pressing **enter**



# Display in Measuring Mode



The MAIN DISPLAY is the display which is shown in measuring mode. To call the measuring mode from any other mode, hold the **meas** key depressed for at least 2 sec.

**meas** key

**enter** key

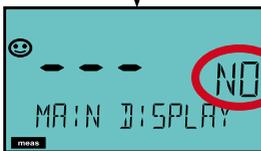
**meas**



**meas**



**enter**



**approx. 2 s**



By pressing **meas** briefly you can step through further displays such as tag number (TAG) or flow (L/h). These displays are turquoise. After 60 sec they switch back to the main display.

Press **enter** to select a display as MAIN DISPLAY – the secondary display shows “MAIN DISPLAY – NO”. Use the **UP / DOWN** arrow keys to select “MAIN DISPLAY – YES” and confirm by pressing **enter**. The display color changes to white. This display is now shown in measuring mode.

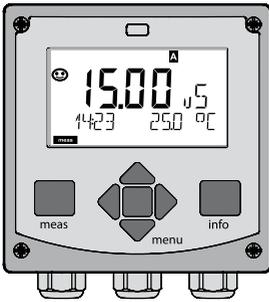
# Color-Coded User Interface

The color-coded user interface\* guarantees increased operating safety. Operating modes are clearly signaled.

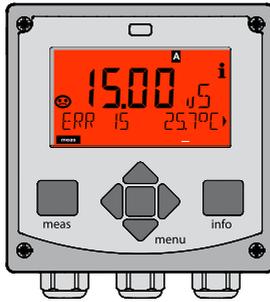
The normal measuring mode is white. Information text appears on a green screen and the diagnostic menu appears on turquoise.

The orange HOLD mode (e.g. during calibration) is quickly visible as is the magenta screen which indicates asset management messages for predictive diagnostics – such as maintenance request, pre-alarm and sensor wear.

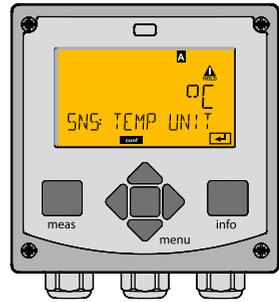
The alarm status has a particularly noticeable red display color and is also signaled by flashing display values. Invalid inputs or false pass-codes cause the entire display to blink red so that operating errors are noticeably reduced.



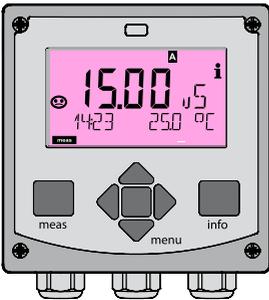
White:  
Measuring mode



Red blinking:  
Alarm, errors



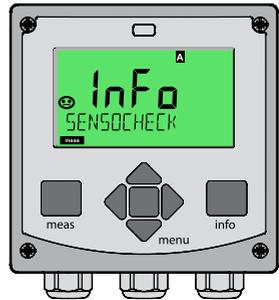
Orange:  
HOLD mode



Magenta:  
Maintenance request



Turquoise:  
Diagnostics



Green:  
Information texts

## **Diagnostics**

Display of calibration data, display of sensor data, performing a device self-test, viewing the logbook entries, display of hardware/software versions of the individual components. The logbook (TAN SW-A002) can store 100 events (00...99). They can be displayed directly on the device. With AuditTrail (TAN SW-A003), the logbook can be extended to 200 entries.

## **HOLD**

Manual activation of HOLD mode, e.g. for servicing. The signal outputs adopt a defined state.

## **Calibration**

Every sensor has typical characteristic values. Calibration is required to supply a correct measured value. The device checks which value the sensor delivers when measuring in a known solution. When there is a deviation, the device can be "adjusted". In that case, the device displays the "actual" value and internally corrects the measurement error of the sensor. During calibration the device is in HOLD mode.

**During calibration the device remains in the HOLD mode until it is stopped by the operator.**

## **Configuration**

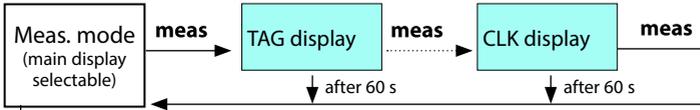
The analyzer must be configured for the respective measurement task. In the "Configuration" mode you select the connected sensor, the measuring range to be transmitted, and the conditions for warning and alarm messages. During configuration the device is in HOLD mode.

**Configuration mode is automatically exited 20 minutes after the last keystroke. The device returns to measuring mode.**

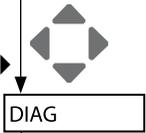
## **Service**

Maintenance functions (current source), passcode assignment, reset to factory settings, enabling of options (TAN).

# Menu Structure of Modes and Functions



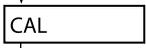
Pressing the **menu** key (down arrow) opens the selection menu. Select the menu group using the left/right arrow keys. Pressing **enter** opens a menu item. Press **meas** to return.



CALDATA	Display of calibration data
SENSOR	Display of sensor data
SELFTTEST	Self test: RAM, ROM, EEPROM, module
LOGBOOK	Logbook: 100 events with date and time
MONITOR	Display of direct, uncorrected sensor signals
VERSION	Display of software version, model designation, serial number



Manual activation of HOLD mode, e.g. for sensor replacement. The signal outputs behave as configured (e.g. last measured value, 21 mA)



CAL_SOL	Calibration with calibration solution
CAL_CELL	Calibration by input of cell factor
CAL_ZERO	Zero calibration
P_CAL	Product calibration
CAL_RTD	Adjustment of temperature probe



PARSET A	Configuring parameter set A
PARSET B	Configuring parameter set B



(Access via code, factory setting: 5555)

MONITOR	Display of measured values for validation (simulators)
OUT1	Current source, output 1
OUT2	Current source, output 2
CODES	Specifying access codes for operating modes
DEFAULT	Reset to factory setting
OPTION	Enabling an option via TAN

The HOLD mode is a safety state during configuration and calibration. Output current is frozen (LAST) or set to a fixed value (FIX). The HOLD mode is indicated by orange display backlighting.

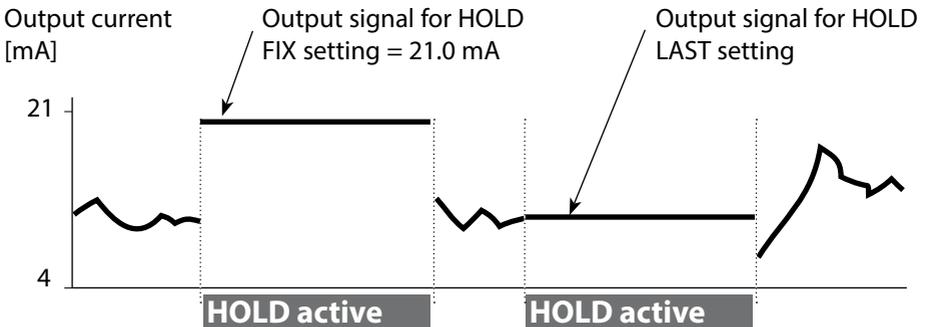
**HOLD mode**, display icon:



## Output signal response

- **LAST:** The output current is frozen at its last value. Recommended for short configuration procedures. The process should not change decisively during configuration. Changes are not noticed with this setting!
- **FIX:** The output current is set to a value that is noticeably different from the process value to signal the control system that the device is being worked at.

## Output signal during HOLD:



## Terminating the HOLD mode

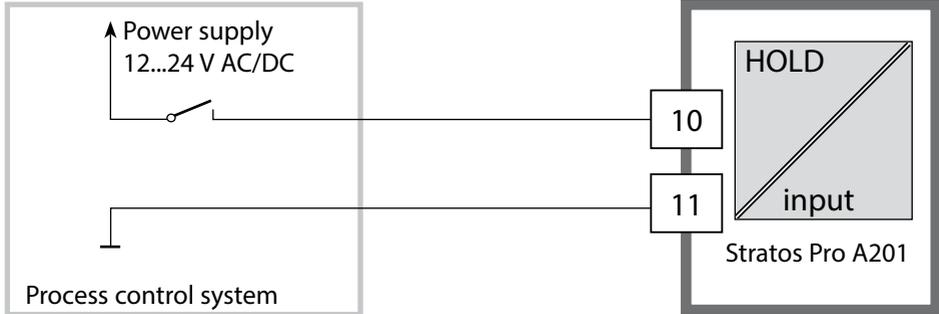
The HOLD mode is ended by switching to measuring mode (hold **meas** key depressed). The display reads “Good Bye”, after that, the HOLD mode is exited.

When the calibration mode is exited, a confirmation prompt ensures that the installation is ready for operation (e.g.: sensor reinstalled, located in process).

# Alarm

## External activation of HOLD (SW-A005)

The HOLD mode can be activated from outside by sending a signal to the HOLD input (e.g. from the process control system).



HOLD inactive	0...2 V AC/DC
HOLD active	10...30 V AC/DC

## Manual activation of HOLD

The HOLD mode can be activated manually from the HOLD menu. This allows checking or replacing a sensor, for example, without provoking unintended reactions at the outputs.

Press **meas** key to return to selection menu.

## Alarm

When an error has occurred, **Err xx** is displayed immediately. Only after expiry of a user-defined delay time will the alarm be registered and entered in the logbook.

During an alarm the display blinks, the display backlighting turns **red**.

Error messages can also be signaled by a 22 mA output current (see Configuration).

2 sec after the failure event is corrected, the alarm status will be deleted.

# Alarm and HOLD Messages

Message	Released by	Cause
Alarm (22 mA)	Sensocheck	Polarization / Cable
	Error Messages	Flow (CONTROL input) ERR 10: Conductance > 3500 mS
HOLD (Last/Fix)	HOLD	HOLD via menu or input
	CONF	Configuration
	CAL	Calibration
	SERVICE	Service

## Generating a message via the CONTROL input (TAN SW-A005) (min. flow / max. flow)

The CONTROL input can be used for parameter set selection or for flow measurement (pulse principle), depending on its assignment in the "Configuration" menu.

When preset to flow measurement

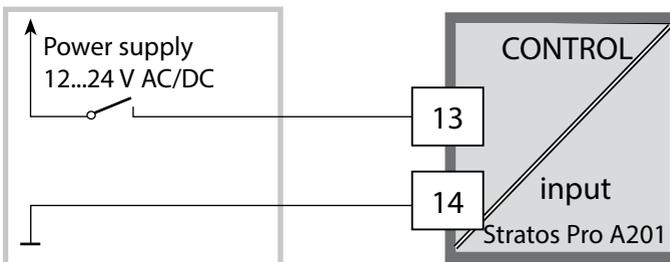
**CONF/CNTR\_IN/CONTROL = FLOW**

an alarm can be generated when the measured flow exceeds a specified range:

**CONF/ALA/FLOW CNTR = ON**

**CONF/ALA/FLOW min** (specify value, default: 5 liters/h)

**CONF/ALA/FLOW max** (specify value, default: 25 liters/h)



---

**⚠ CAUTION!** Incorrect parameter settings or adjustments can result in incorrect outputs. Stratos Pro must therefore be commissioned by a system specialist, all its parameters must be set, and it must be fully adjusted. For detailed information on parameter setting and adjustment, see the user manual

## Menu Structure of Configuration

The device provides 2 parameter sets "A" and "B". By switching between the parameter sets you can adapt the device to different measurement situations, for example. Parameter set "B" only permits setting of process-related parameters.

The configuration steps are assigned to different menu groups.

With the left/right arrow keys you can jump between the individual menu groups.

Each menu group contains menu items for setting the parameters.

Pressing **enter** opens a menu item. Use the arrow keys to edit a value.

Press **enter** to confirm/save the settings.

Return to measurement: Hold **meas** key depressed (> 2 s).

Select menu group	Menu group	Code	Display	Select menu item
	Sensor selection	SNS:		
		Menu item 1		
		:		
		Menu item ...		
▶	Current output 1	OT1:		
▶	Current output 2	OT2:		
▶	Compensation	COR:		
	...	...		
▶	Display backlighting	DSP:		◀

# Configuration

---

## Parameter Set A/B: Configurable Menu Groups

Menu group	Parameter set A	Parameter set B
SENSOR	Sensor selection	---
OUT1	Current output 1	Current output 1
OUT2	Current output 2	Current output 2
CORRECTION	Compensation	Compensation
CNTR_IN	Control input	---
ALARM	Alarm mode	Alarm mode
PARSET	Parameter set selection	---
CLOCK	Setting the clock	---
TAG	TAG of measuring point	TAG of measuring point
GROUP	GROUP of measuring points	GROUP of measuring points
DISPLAY	Display backlighting	---

## Parameter Set Selection

**Note:** Manual selection of parameter sets must have been preset in the CONFIG > PARSET menu. Default setting is a fixed parameter set A. Wrong settings change the measurement properties!

### Manual switchover of parameter sets A/B

Display	Action
	To switch between parameter sets: Press <b>meas.</b>
	PARSET blinks in the lower line. Select parameter set using ◀ and ▶ keys
	Press <b>enter</b> to confirm. Cancel by pressing <b>meas.</b>

### External switchover of parameter sets A/B (TAN SW-A005)

You can switch between parameter sets A and B by applying a signal to the CONTROL input (parameter setting: CONTR-IN > PARSET).



Parameter set A active	0...2 V AC/DC
Parameter set B active	10...30 V AC/DC

# Configuration

Configuration		Choices	Default
<b>Sensor (SENSOR)</b>			
SNS:		SE 655, SE 656 SE 660, SE 670, SE680-K, SE680-M MEMOSENS OTHER	SE 655
OTHER	RTD TYPE	100PT / 1000PT / 30 NTC	1000PT
	CELL FACTOR	XX.XXx	01.980
	TRANS RATIO	XXX.Xx	120.0
MEAS MODE		Cond Conc % Sal ‰	Cond
Cond	MEAS RANGE	xxx.x µS/cm x.xxx mS/cm xx.xx mS/cm xxx.x mS/cm x.xxx S/m xx.xx S/m	x.xxx mS/cm
Conc	Solution	-01- (NaCl) -02- (HCl) -03- (NaOH) -04- (H2SO4) -05- (HNO3) -06- (H2SO4) -07- (HCl) -08- (HNO3) -09- (H2SO4) -10- (NaOH) -U1-	-01- (NaCl)
TEMP UNIT		°C / °F	°C
TEMPERATURE		AUTO, MAN, EXT (EXT. only with TAN option SW-A005)	AUTO
MAN	TEMPERATURE	-50 ... 250 °C (-58 ... 482 °F)	025.0 °C (077.0 °F)

Configuration		Choices	Default	
<b>Sensor (SENSOR)</b>				
SNS:	CIP COUNT	ON/OFF	OFF	
		ON	0 ... 9999 CYCLES	
	SIP COUNT	ON/OFF	OFF	
		ON	0 ... 9999 CYCLES	
CHECK TAG	ON/OFF	OFF		
CHECK GROUP	ON/OFF	OFF		
<b>Output 1 (OUT1)</b>				
OT1:	Channel		Cond/TMP	Cond
	Output		LIN / BiLIN / LOG	LIN
	LIN	BEGIN 4 mA	xxxx	000.0 mS/cm
		END 20 mA	xxxx	100.0 mS/cm
	BiLIN	BEGIN 4 mA		
		END 20 mA		
		CORNER X	Input range: selected CHANNEL Vertex X : BEGIN ≤ CORNER X ≤ END (rising) BEGIN ≥ CORNER X ≥ END (falling)	
		CORNER Y	Input range: selected CHANNEL Default: 12 mA Vertex Y: (0) 4 mA ≤ CORNER Y ≤ 20 mA	
	LOG	BEGIN 4 mA	Decades	
		END 20 mA	Decades	
	TMP °C	BEGIN 4 mA	-50...250 °C	
		END 20 mA	-50...250 °C	
	TMP °F	BEGIN 4 mA	-58...482 °F	
		END 20 mA	-58...482 °F	
	FILTERTIME		0...120 SEC	0000 SEC
	22 mA FAIL		ON/OFF	OFF
22 mA FACE		ON/OFF	OFF	
HOLD MODE		LAST/FIX	LAST	
FIX	HOLD-FIX	04.00...22.00 mA	021.0 mA	

# Configuration

Configuration		Choices	Default
<b>Output 2 (OUT2)</b>			
OT2:	CHANNEL	Cond/TMP	TMP
	... other steps like output 1		
<b>Temperature compensation (CORRECTION)</b>			
COR:	TC SELECT	OFF Compensation for ultrapure water: NaCl, HCL, NH3	OFF
LIN	TC LIQUID	00.00 ...19.99%/K	00.00%/K
	REF TEMP	000.0 ... 199.9 °C	025.0 °C
TEMP EXT *)		ON/OFF	OFF
ON	I-INPUT	0–20 mA / 4–20 mA	4...20 mA
	°C	BEGIN 4 mA	–50...250 °C
		END 20 mA	–50...250 °C
	°F	BEGIN 4 mA	–58...482 °F
END 20 mA		–58...482 °F	
<b>Control input (CNTR_IN)</b>			
IN:	CONTROL	Parameter-set switchover (PARSET) or flow measurement (FLOW)	PARSET
FLOW	FLOW ADJUST	12000 pulses/liter	0 ... 20000 pulses/liter
<b>Alarm (ALARM)</b>			
ALA:	DELAYTIME	0...600 SEC	0010 SEC
	SENSOCHECK	ON/OFF	OFF
	TEMP CHECK	ON/OFF	OFF
	FLOW CNTR **)	ON/OFF	OFF
ON	FLOW MIN ***)	0 ... 99.9 L/h	005.0 L/h
	FLOW MAX ***)	0 ... 99.9 L/h	025.0 L/h

\*) With TAN option SW-A005 and SENSOR "TEMP EXT" selected

\*\*) These menu items appear only if selected.

\*\*\*) Hysteresis fixed at 5% of threshold value

Configuration		Choices	Default
<b>Parameter set (PARSET)</b>			
PAR:	Select fixed parameter set (A) or switch between A/B via control input or manually in measuring mode	PARSET FIX / CNTR INPUT / MANUAL	PARSET FIX (fixed parameter set A)
<b>Real-time clock (CLOCK)</b>			
CLK:	FORMAT	24 h / 12 h	24 h
	24 h	TIME hh/mm	00..23:00...59
	12 h	TIME hh/mm	00 ... 12:59 AM / 01 ... 11:59 PM
	DAY/MONTH		01...31/01...12
	YEAR		2000...2099
<b>Measuring points (TAG / GROUP)</b>			
TAG:	(Input in text line)	A...Z, 0...9, - + < > ? / @	
GROUP:	(Input in text line)	0000...9999	0000
<b>Display backlighting (DISPLAY)</b>			
DSP:	BACKLIGHT	On, Off	On

## Monitoring the sensor lines for breakage

The sensor lines are monitored for breakage when the temperature is used for calculating the conductivity or concentration. If the sensor or line is broken, an alarm will be generated (output current FIX or 22 mA, depending on the configuration).

If you want to output a conductivity value that is independent of the measured temperature (uncompensated), you can monitor the sensor lines for breakage by setting "TEMP CHECK" to "ON" in the ALARM menu.

# Configuration (Original for Copy)

Parameter	Parameter set A	Parameter set B
SNS: Sensor type		--- *)
SNS: RTD type		---
SNS: Cell factor		---
SNS: Transfer ratio		---
SNS: Measuring mode		---
SNS: Measuring range		---
SNS: Concentration determination		---
SNS: Temperature unit		---
SNS: Temp detection		---
SNS: Manual temp		---
SNS: CIP counter		---
SNS: SIP counter		---
SNS: CHECK TAG		
SNS: CHECK GROUP		
OT1: Process variable		
OT1: Lin/bilin/log output		
OT1: Current start		
OT1: Current end		
OT1: Vertex X (bilinear curve only)		
OT1: Vertex Y (bilinear curve only)		
OT1: Filter time		
OT1: FAIL 22 mA (error messages)		
OT1: FACE 22 mA (Sensoface messages)		
OT1: HOLD mode		
OT1: HOLD FIX current		
OT2: Process variable		
OT2: Lin/bilin/log output		
OT2: Current start		
OT2: Current end		

# Configuration (Original for Copy)

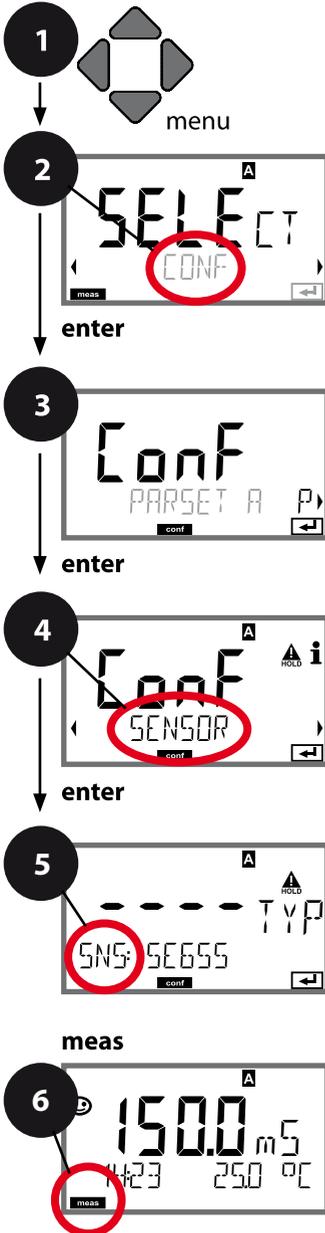
Parameter	Parameter set A	Parameter set B
OT2: Vertex X (bilinear curve only)		
OT2: Vertex Y (bilinear curve only)		
OT2: Filter time		
OT2: FAIL 22 mA (error messages)		
OT2: FACE 22 mA (Sensoface messages)		
OT2: HOLD mode		
OT2: HOLD FIX current		
COR: TC SELECT		
COR: Temp coefficient		
COR: Reference temperature		
COR: Current range		
COR: Current start		
COR: Current end		
IN: Parameter set A/B or flow		
IN: (Flow meter) Adjusting pulses/liter		
ALA: Delay		
ALA: Sensocheck on/off		
ALA: Tempcheck on/off		
ALA: Flow control FLOW CNTR on/off		
ALA: Minimum flow (hysteresis fixed at 5 %)		
ALA: Maximum flow (hysteresis fixed at 5 %)		
PAR: Parameter set selection		---*)
CLK: Time format		---
TAG: Measuring point (tag number)		
GROUP: Group of measuring points		
DISPLAY: Display backlighting		---

\*) These parameters cannot be adjusted in parameter set B, the values are the same as in parameter set A.

# Configuration

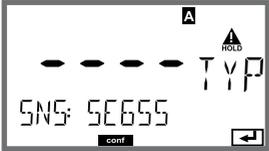
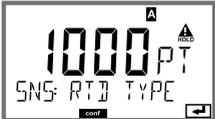
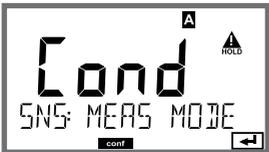
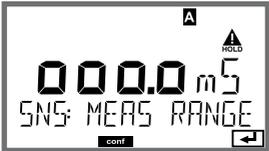
## Sensor

Select: Sensor type, temperature probe, cell factor, transfer ratio, measuring mode, range



- 1) Press **menu** key.
- 2) Select **CONF** using ◀ ▶ , press **enter**.
- 3) Select parameter set using ◀ ▶ keys, press **enter**.
- 4) Select **SENSOR** menu using ◀ ▶ keys, press **enter**.
- 5) All items of this menu group are indicated by the "SNS:" code. Press **enter** to select menu, edit using arrow keys (see next page). Confirm (and proceed) by pressing **enter**.
- 6) Exit: Press **meas** key until the [meas] mode indicator is displayed.

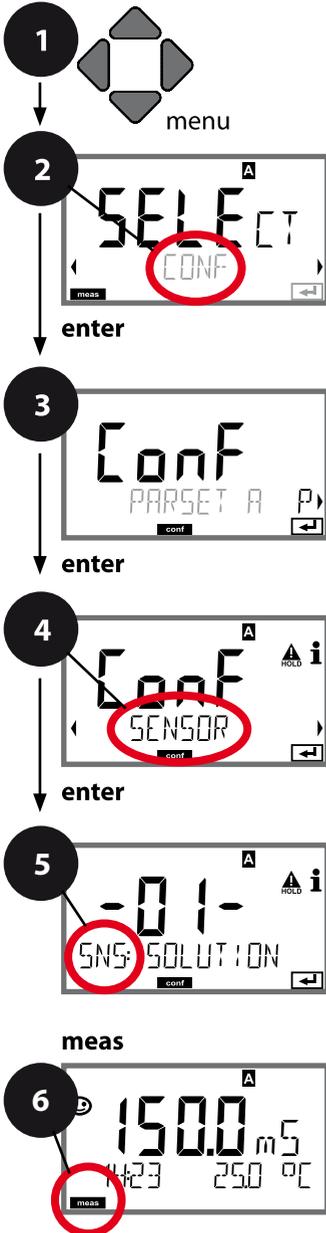
<b>5</b>	Sensor type	enter
	Temperature probe	enter
	Cell factor	enter
	Transfer ratio	
	Measuring mode	
	Measuring range	
	Concentration determination	
	Temperature unit	
	Temperature detection	
	Cleaning cycles	
	Sterilization cycles	
	CHECK TAG	
	CHECK GROUP	

Menu item	Action	Choices
Sensor type 	Select sensor type using ▲ ▼ keys.  Press <b>enter</b> to confirm.	<b>SE 655</b> SE 656, SE 660 SE 670, SE 680-K, SE 680-M, MEMOSENS, OTHER
Temperature probe 	<b>Only with OTHER:</b> Select type of temperature probe using ▲ ▼ keys. Press <b>enter</b> to confirm.	<b>1000PT</b> 100PT 30 NTC
Cell factor 	Enter cell factor using ▲ ▼ ◀ ▶ keys. Press <b>enter</b> to confirm.	<b>01.980</b> XX.XXX
Transfer ratio 	Enter transfer ratio using ▲ ▼ ◀ ▶ keys. Press <b>enter</b> to confirm.	<b>120.00</b> XXX.XX
Measuring mode 	Select desired measuring mode using ▲ ▼ keys.  Press <b>enter</b> to confirm.	<b>Cond</b> Conc % Sal %
Measuring range 	<b>For cond measurement only</b>  Select desired range using ▲ ▼ keys.  Press <b>enter</b> to confirm.	<b>x.xxx mS/cm</b> , xx.xx mS/cm xxx.x mS/cm, x.xxx S/m xx.xx S/m

# Configuration

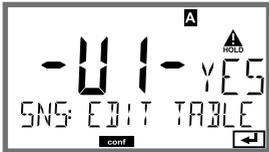
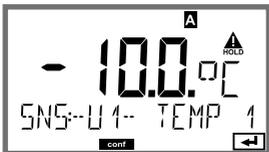
## Sensor

### Select: Concentration determination



- 1) Press **menu** key.
- 2) Select **CONF** using ◀ ▶ keys, press **enter**.
- 3) Select parameter set using ◀ ▶, press **enter**.
- 4) Select **SENSOR** menu using ◀ ▶ keys, press **enter**.
- 5) All items of this menu group are indicated by the "SNS:" code.  
Press **enter** to select menu, edit using arrow keys (see next page). Confirm (and proceed) using **enter**.
- 6) Exit: Press **meas** key until the [meas] mode indicator is displayed.

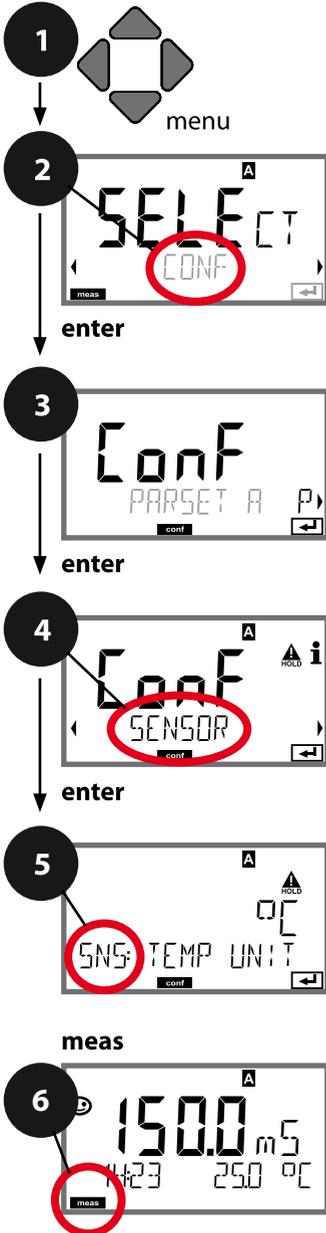
Sensor type	5
Temperature probe	enter
Cell factor	enter
Transfer ratio	
Measuring mode	
Measuring range	
Concentration determination	
Temperature unit	
Temperature detection	
Cleaning cycles	
Sterilization cycles	
CHECK TAG	
CHECK GROUP	

Menu item	Action	Choices
Concentration determination	<p><b>For conc measurement only</b></p> <p>Select desired concentration solution using ▲ ▼ .</p> <p>Press <b>enter</b> to confirm.</p>	<p><b>-01- (NaCl)</b>, -02- (HCl),            -03- (NaOH), -04- (H<sub>2</sub>SO<sub>4</sub>),            -05- (HNO<sub>3</sub>), -06- (H<sub>2</sub>SO<sub>4</sub>),            -07- (HCl), -08- (HNO<sub>3</sub>),            -09- (H<sub>2</sub>SO<sub>4</sub>), -10- (NaOH),            -U1-</p>
<p><b>-U1-: Specifying a Concentration Solution for Conductivity Measurement</b></p> <p>To specify a custom solution, 5 concentration values are entered in a matrix together with 5 temperature values 1 ... 5. First enter the 5 temperature values, then the corresponding conductivity values for each of the concentrations 1 ... 5. These solutions are then available as "U1" in addition to the default standard solutions.</p>		
	<p>Press <b>enter</b> to confirm</p>	
	<p>Use the arrow keys ▲ ▼ ◀ ▶ to enter temperature values 1 ... 5.</p> <p>Press <b>enter</b> to confirm.</p>	<p>Input range:            -50...250 °C /            -58...482 °F</p>
	<p>Use the arrow keys ▲ ▼ ◀ ▶ to enter concentration value 1.</p> <p>Press <b>enter</b> to confirm.</p>	
	<p>For concentration value 1:            Use the arrow keys ▲ ▼ ◀ ▶ to enter conductivity values for temperatures 1 ... 5.</p> <p>Press <b>enter</b> to confirm.</p>	

# Configuration

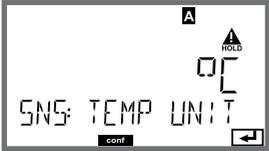
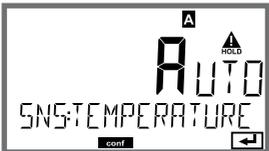
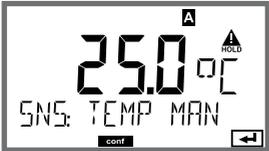
## Sensor

### Select: Temperature unit, temperature detection



- 1) Press **menu** key.
- 2) Select **CONF** using ◀ ▶ keys, press **enter**.
- 3) Select parameter set using ◀ ▶, press **enter**.
- 4) Select **SENSOR** menu using ◀ ▶ keys, press **enter**.
- 5) All items of this menu group are indicated by the "SNS:" code.  
Press **enter** to select menu, edit using arrow keys (see next page). Confirm (and proceed) using **enter**.
- 6) Exit: Press **meas** key until the [meas] mode indicator is displayed.

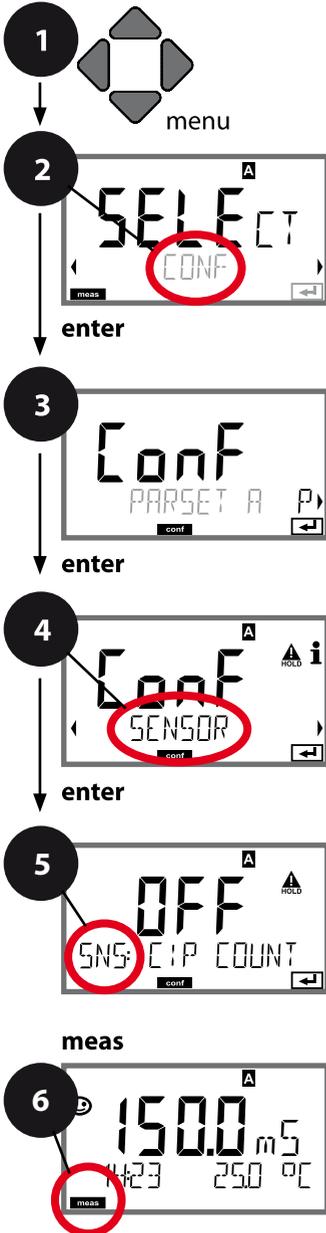
Sensor type	5	enter
Temperature probe		↻
Cell factor		↻
Transfer ratio		
Measuring mode		
Measuring range		
Concentration determination		
Temperature unit		
Temperature detection		
Cleaning cycles		
Sterilization cycles		
CHECK TAG		
CHECK GROUP		

Menu item	Action	Choices
Temperature unit 	Select °C or °F using ▲ ▼ keys.  Press <b>enter</b> to confirm.	°C / °F
Temperature detection 	Select mode using ▲ ▼ : AUTO: Measured by sensor MAN: Direct input of temperature, no measurement (see next step) EXT: Temperature specified via current input (only if TAN E enabled) Press <b>enter</b> to confirm.	<b>AUTO</b> <b>MAN</b> <b>EXT</b>
(Manual temperature) 	Modify digit using ▲ ▼ keys, select next digit using ◀ ▶ keys. Press <b>enter</b> to confirm.	-50...250 °C (-58...+482 °F)

# Configuration

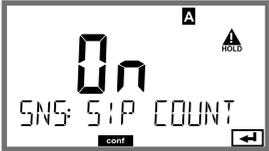
## Sensor

### Adjust: Cleaning cycles, sterilization cycles



- 1) Press **menu** key.
- 2) Select **CONF** using ◀ ▶ keys, press **enter**.
- 3) Select parameter set using ◀ ▶, press **enter**.
- 4) Select **SENSOR** menu using ◀ ▶ keys, press **enter**.
- 5) All items of this menu group are indicated by the "SNS:" code.  
Press **enter** to select menu, edit using arrow keys (see next page). Confirm (and proceed) using **enter**.
- 6) Exit: Press **meas** key until the [meas] mode indicator is displayed.

Select sensor type	5	enter
Select temp probe		enter
Select cell factor		enter
Select transfer ratio		
Select measuring mode		
Select range		
Concentration determination		
Temperature unit		
Temperature detection		
Cleaning cycles		
Sterilization cycles		
CHECK TAG		
CHECK GROUP		

Menu item	Action	Choices
<b>CIP / SIP</b>		
Cleaning cycles 	Select ON or OFF using ▲ ▼ keys. Activates/deactivates logging in extended logbook (TAN SW-A003). Press <b>enter</b> to confirm.	ON/OFF
Sterilization cycles 	Select ON or OFF using ▲ ▼ keys. Activates/deactivates logging in extended logbook (TAN SW-A003). Press <b>enter</b> to confirm.	ON/OFF

Logging the cleaning and sterilization cycles with connected sensor helps measuring the load on the sensor.

Suitable for biochemical applications (process temp approx.

0 ... +50 °C / +32 ... +122 °F, CIP temp > +55 °C / +131 °F,

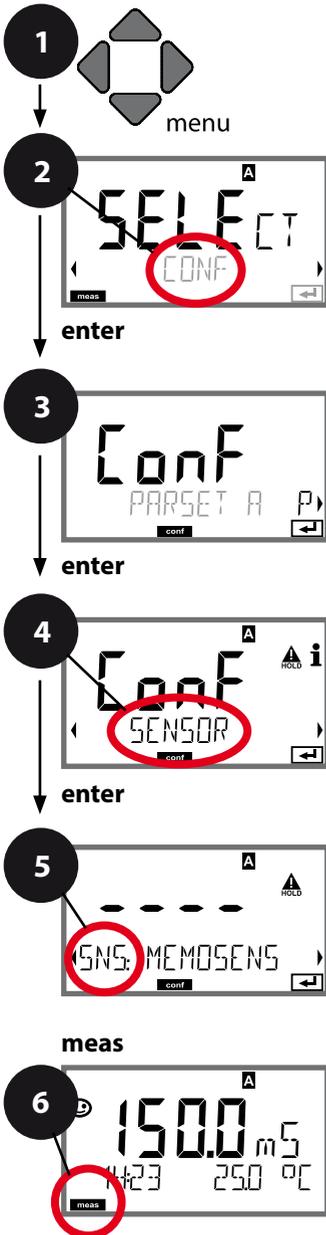
SIP temp > +115 °C / +239 °F).

**Note:**

A CIP or SIP cycle is only entered into the extended logbook (TAN SW-A003) 2 hours after the start to ensure that the cycle is complete. With Memosens (e.g., SE680-M), an entry is also made in the sensor.

# Configuration

## Memosens Sensor Sensor Verification (TAG, GROUP)



- 1) Press **menu** key.
- 2) Select **CONF** using ◀ ▶, press **enter**.
- 3) Select parameter set using ◀ ▶ keys, press **enter**.
- 4) Select **SENSOR** menu using ◀ ▶ keys, press **enter**.
- 5) All items of this menu group are indicated by the "SNS:" code.  
Press **enter** to select menu, edit using arrow keys (see next page). Confirm (and proceed) by pressing **enter**.
- 6) Exit: Press **meas** key until the [meas] mode indicator is displayed.

	5
Select sensor type	enter
Select temp probe	enter
Select cell factor	enter
Select transfer ratio	
Select measuring mode	
Select range	
Concentration determination	
Temperature unit	
Temperature detection	
Cleaning cycles	
Sterilization cycles	
CHECK TAG	
CHECK GROUP	

Menu item	Action	Choices
<p>TAG</p> 	<p>Select ON or OFF using ▲ ▼ keys. Press <b>enter</b> to confirm.</p> <p>When switched on, the entry for "TAG" in the Memosens sensor is compared to the entry in the analyzer. If the entries differ, a message will be generated.</p>	<p>ON/OFF</p>
<p>GROUP</p> 	<p>Select ON or OFF using ▲ ▼ keys. Press <b>enter</b> to confirm.</p> <p>Function as described above</p>	<p>ON/OFF</p>

## Sensor Verification (TAG, GROUP)

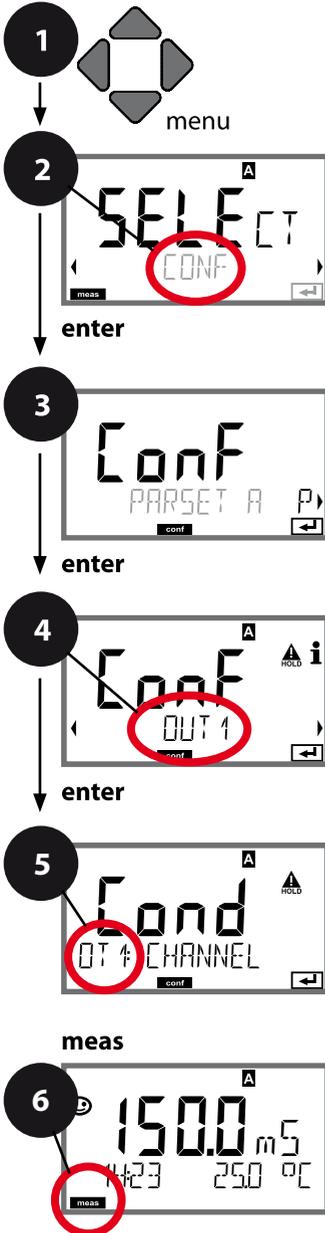
When Memosens sensors are calibrated in the lab, it is often useful and sometimes even mandatory that these sensors will be operated again at the same measuring points or at a defined group of measuring points. To ensure this, you can save the respective measuring point (TAG) or group of measuring points (GROUP) in the sensor. TAG and GROUP can be specified by the calibration tool or automatically entered by the transmitter. When connecting an MS sensor to the transmitter, it can be checked if the sensor contains the correct TAG or belongs to the correct GROUP. If not, a message will be generated, Sensoface gets "sad", and the display backlighting turns magenta (purple). The "sad" Sensoface icon can also be signaled by a 22 mA error current. Sensor verification can be switched on in the Configuration in two steps as TAG and GROUP if required.

When no measuring point or group of measuring points is saved in the sensor, e.g., when using a new sensor, Stratos enters its own TAG and GROUP. When sensor verification is switched off, Stratos always enters its own measuring point and group. A possibly existing TAG/GROUP will be overwritten.

# Configuration

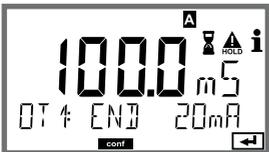
## Current Output 1

Output current range. Linear/Logarithmic. Current start.



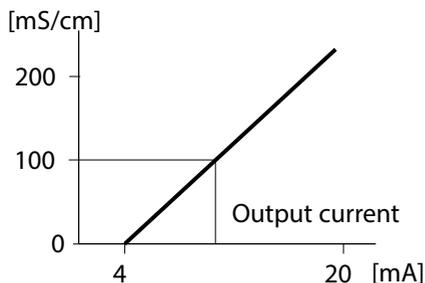
- 1) Press **menu** key.
- 2) Select **CONF** using ◀ ▶ keys, press **enter**.
- 3) Select parameter set using ◀ ▶, press **enter**.
- 4) Select **OUT1** menu using ◀ ▶ keys, press **enter**.
- 5) All items of this menu group are indicated by the "OT1:" code.  
Press **enter** to select menu, edit using arrow keys (see next page). Confirm (and proceed) using **enter**.
- 6) Exit: Press **meas** key until the [meas] mode indicator is displayed.

Process variable	enter
LIN/biLIN/LOG output	enter
Current start	
Current end	
Time averaging filter	
Output current for error message	
Output current for Sensoface	
Output current during HOLD	
Output current for HOLD FIX	

Menu item	Action	Remark
Process variable 	Select using $\blacktriangle$ $\blacktriangledown$ keys: Cond: Conductivity TMP: Temperature Press <b>enter</b> to confirm. Then select characteristic (LIN/biLIN/LOG).	Selectable decades with <b>logarithmic setting (LOG)</b> : S/cm: 0.001 mS/cm, 0.01 mS/cm, 0.1 mS/cm, 1.0 mS/cm, 10.0 mS/ cm, 100.0 mS/cm, 1000 mS/cm S/M: 0.001 S/m, 0.01 S/m, 0.1 S/m, 1.0 S/m, 10.0 S/m, 100 S/m
Current start 	Modify digit using $\blacktriangle$ $\blacktriangledown$ keys, select next digit using $\blacktriangleleft$ $\blacktriangleright$ keys. Press <b>enter</b> to confirm.	Entered value applies to selected process variable/ range If the adjusted range is exceeded, the device automatically switches to the next higher range (Autorange)
Current end 	Enter value using $\blacktriangle$ $\blacktriangledown$ $\blacktriangleleft$ $\blacktriangleright$ keys.  Press <b>enter</b> to confirm.	Entered value applies to selected process variable/ range If the adjusted range is exceeded, the device automatically switches to the next higher range (Autorange)

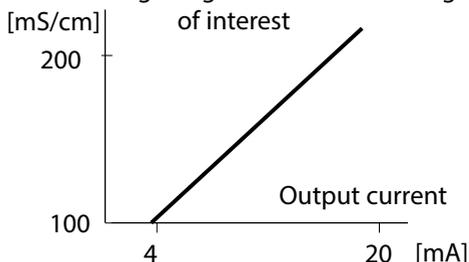
### Assignment of measured values: Current start and current end

Example 1: Range 0...200 mS/cm



Example 2: Range 100...200 mS/cm

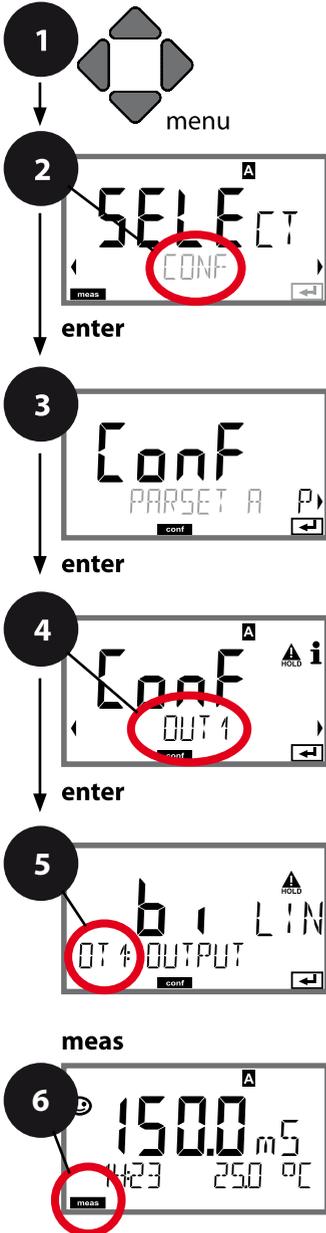
Advantage: Higher resolution in range  
of interest



# Configuration

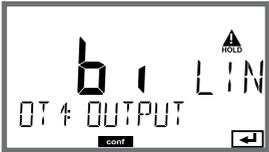
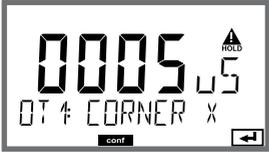
## Current Output 1

### Output current curve, bilinear



- 1) Press **menu** key.
- 2) Select **CONF** using **◀ ▶** keys, press **enter**.
- 3) Select parameter set using **◀ ▶**, press **enter**.
- 4) Select **OUT1** menu using **◀ ▶** keys, press **enter**.
- 5) All items of this menu group are indicated by the "OT1:" code.  
Press **enter** to select menu, edit using arrow keys (see next page). Confirm (and proceed) using **enter**.
- 6) Exit: Press **meas** key until the [meas] mode indicator is displayed.

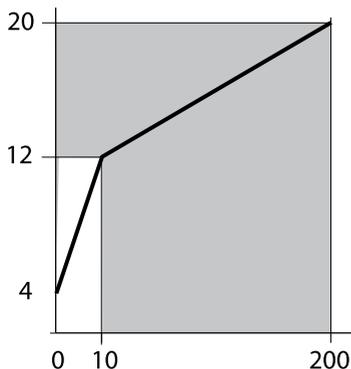
Process variable
LIN/biLIN/LOG output
Current start
Current end
Bilinear: Vertex X
Bilinear: Vertex Y
Time averaging filter
Output current for error message
Output current for Sensoface
Output current during HOLD
Output current for HOLD FIX

Menu item	Action	Choices
Output current curve 	Select using $\blacktriangle$ $\blacktriangledown$ keys. Press <b>enter</b> to confirm.	<b>LIN</b> Linear characteristic biLIN Bilinear curve LOG Logarithmic curve
Current start and current end 	Enter value using $\blacktriangle$ $\blacktriangledown$ $\blacktriangleleft$ $\blacktriangleright$ keys.  Press <b>enter</b> to confirm.	Entered value applies to selected process variable/range If the adjusted range is exceeded, the device automatically switches to the next higher range (Autorange)
Bilinear curve: Vertex X/Y 	Enter value using $\blacktriangle$ $\blacktriangledown$ $\blacktriangleleft$ $\blacktriangleright$ keys.  Press <b>enter</b> to confirm.	Entered value applies to selected vertex of bilinear curve "Corner X" (process variable) and "Corner Y" (output current) – see figure below.

### Vertex of bilinear curve

Output current

[mA]



Example:

Current range 4 ... 20 mA,

Current start: 0  $\mu\text{S/cm}$

Current end: 200  $\mu\text{S/cm}$

Vertex:

"CORNER X": 10  $\mu\text{S/cm}$  (process variable)

"CORNER Y": 12 mA (output current)

Result: The output current change in the range 0 ... 10  $\mu\text{S/cm}$  is much greater than in the range 10 ... 200  $\mu\text{S/cm}$ .

Process variable  
[ $\mu\text{S/cm}$ ]

# Logarithmic Curve

---

Nonlinear output current characteristic: allows measurements over several decades, e.g. measuring very low values with a high resolution and high values with a low resolution.

Parameters required: Start and end value

### Possible start and end values

The start value must be at least one decade lower than the end value.

Start value and end value must be specified in the same units (either in  $\mu\text{S}/\text{cm}$  or in  $\text{S}/\text{m}$ , see listing):

0.001 mS/cm	0.001 S/m
0.01 mS/cm	0.01 S/m
0.1 mS/cm	0.1 S/m
	1.0 S/m
	10.0 S/m
	100 S/m

### The start value

is the next decade value below the lowest measured value.

### The end value

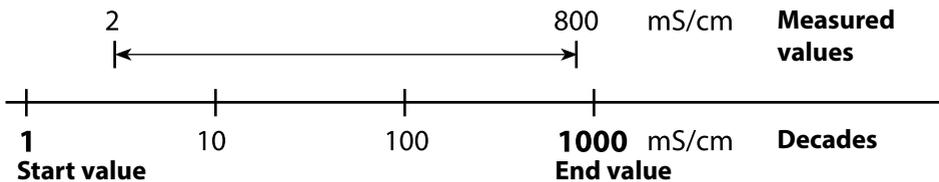
is the next decade value above the highest measured value.

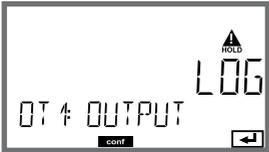
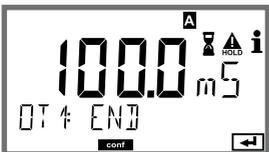
The number of decades results from:

$$\text{Number of decades} = \log(\text{end value}) - \log(\text{start value})$$

The output current value is defined as follows:

$$\text{Output current} = 16 \text{ mA} * \frac{\log(\text{measured value}) - \log(\text{start value})}{\text{Number of decades}} + 4 \text{ mA}$$



Menu item	Action	Choices
Logarithmic curve of output current  	Select using ▲ ▼ keys. Press <b>enter</b> to confirm.	<b>LOG</b> Logarithmic curve  biLIN Bilinear curve  LIN Linear characteristic
Start value  	Enter value using ▲ ▼ ◀ ▶ keys.  Press <b>enter</b> to confirm.	Start value of logarithmic output curve
End value  	Enter value using ▲ ▼ ◀ ▶ keys.  Press <b>enter</b> to confirm.	End value of logarithmic output curve

### Possible start and end values for the logarithmic curve

S/cm:

0.001 mS/cm, 0.01 mS/cm, 0.1 mS/cm

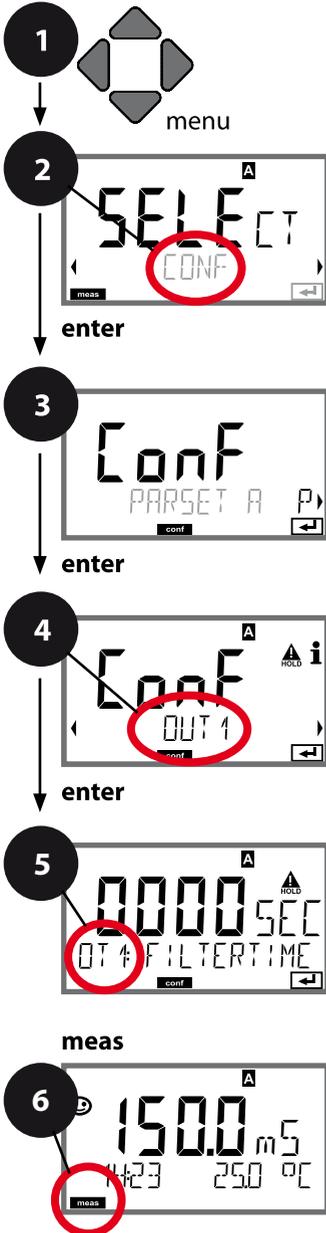
S/m:

0.001 S/m, 0.01 S/m, 0.1 S/m, 1.0 S/m, 10.0 S/m, 100 S/m

# Configuration

## Current Output 1

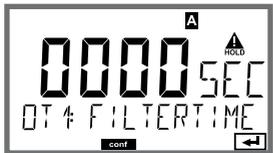
### Adjusting the time interval of the output filter



- 1) Press **menu** key.
- 2) Select **CONF** using ◀ ▶ keys, press **enter**.
- 3) Select parameter set using ◀ ▶, press **enter**.
- 4) Select **OUT1** menu using ◀ ▶ keys, press **enter**.
- 5) All items of this menu group are indicated by the "OT1:" code.  
Press **enter** to select menu, edit using arrow keys (see next page). Confirm (and proceed) using **enter**.
- 6) Exit: Press **meas** key until the [meas] mode indicator is displayed.

Process variable	enter
LIN/biLIN/LOG output	enter
Current start	
Current end	
Time averaging filter	
Output current for error message	
Output current for Sensoface	
Output current during HOLD	
Output current for HOLD FIX	

Menu item	Action	Choices
Time averaging filter	Enter value using ▲ ▼ ◀ ▶ keys.  Press <b>enter</b> to confirm.	0...120 SEC (0000 SEC)



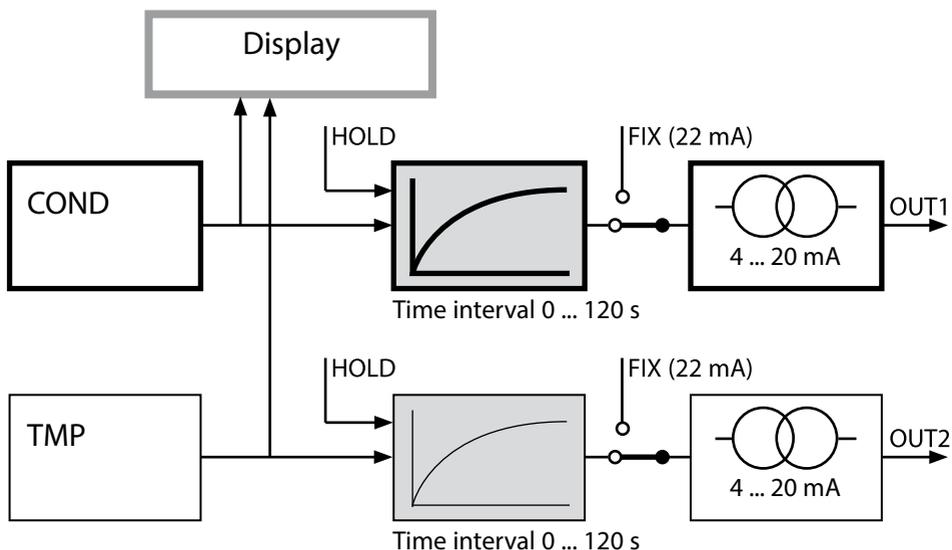
### Time averaging filter

To smoothen the current output, a low-pass filter with adjustable filter time constant can be switched on. When there is a jump at the input (100 %), the output level is at 63 % after the time interval has been reached. The time interval can be set from 0 to 120 sec. If the time interval is set to 0 sec, the current output directly follows the input.

#### Note:

The filter only acts on the current output, not on the display or the limit value!

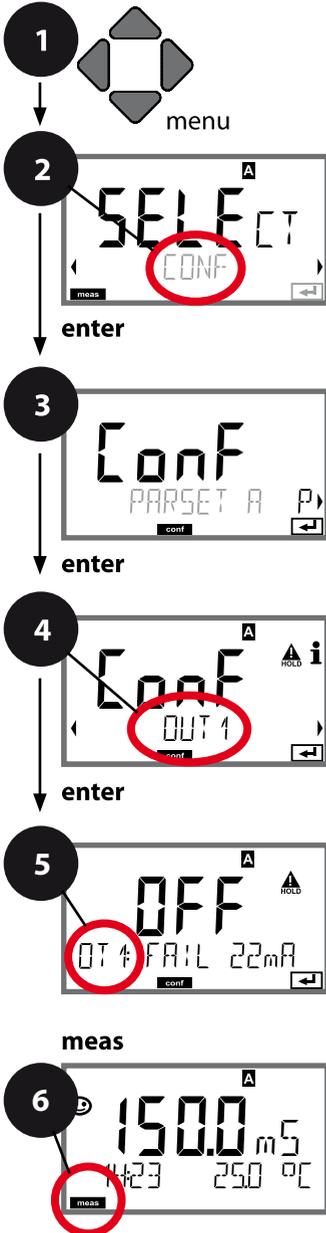
During HOLD the filter is not applied. This prevents a jump at the output.



# Configuration

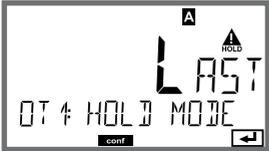
## Current Output 1

### Output current during Error and HOLD

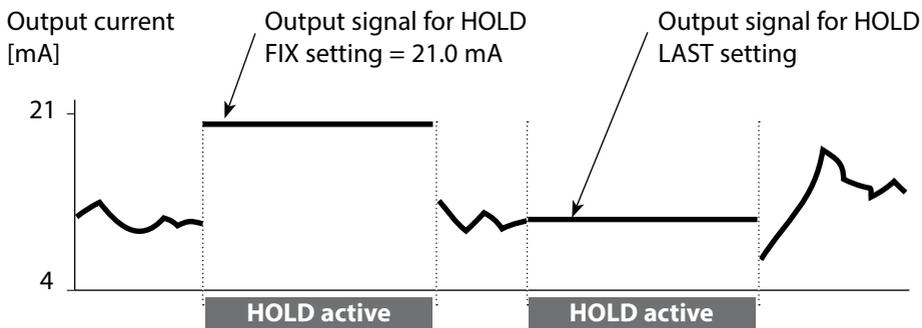


- 1) Press **menu** key.
- 2) Select **CONF** using ◀ ▶ keys, press **enter**.
- 3) Select parameter set using ◀ ▶, press **enter**.
- 4) Select **OUT1** menu using ◀ ▶ keys, press **enter**.
- 5) All items of this menu group are indicated by the "OT1:" code.  
Press **enter** to select menu, edit using arrow keys (see next page). Confirm (and proceed) using **enter**.
- 6) Exit: Press **meas** key until the [meas] mode indicator is displayed.

	<b>5</b>
Process variable	enter
LIN/biLIN/LOG output	enter
Current start	
Current end	
Time averaging filter	
Output current for error message	
Output current for Sensoface	
Output current during HOLD	
Output current for HOLD FIX	

Menu item	Action	Choices
Output current during error message	Select ON (22 mA for error message) or OFF using $\blacktriangle$ $\blacktriangledown$ keys. Press <b>enter</b> to confirm.	ON/OFF
		
Output current during Sensoface messages <b>OT1: FACE 22 mA</b>	Select ON or OFF using $\blacktriangle$ $\blacktriangledown$ keys. Confirm by pressing <b>enter</b>	ON/OFF
Output current during HOLD	LAST: During HOLD the last measured value is maintained at the output. FIX: During HOLD a value (to be entered) is maintained at the output. Select using $\blacktriangle$ $\blacktriangledown$ keys. Press <b>enter</b> to confirm.	LAST/FIX
		
Output current for HOLD FIX	Only with FIX selected: Enter current which is to flow at the output during HOLD. Enter value using $\blacktriangle$ $\blacktriangledown$ $\blacktriangleleft$ $\blacktriangleright$ keys. Press <b>enter</b> to confirm.	04.00...22.00 mA <b>(21.00 mA)</b>
		

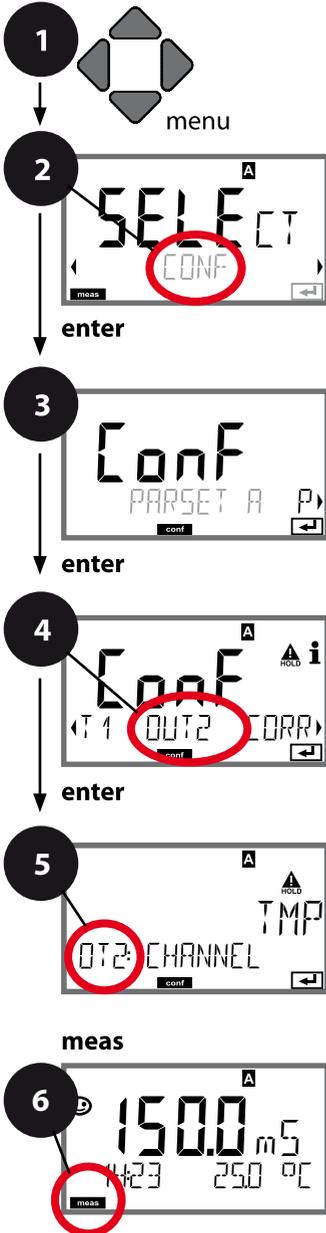
### Output signal during HOLD:



# Configuration

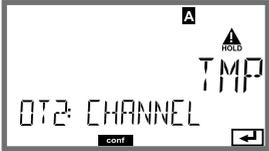
## Current Output 2

### Output current range. Process variable . . .



- 1) Press **menu** key.
- 2) Select **CONF** using ◀ ▶ keys, press **enter**.
- 3) Select parameter set using ◀ ▶, press **enter**.
- 4) Select **OUT2** menu using ◀ ▶ keys, press **enter**.
- 5) All items of this menu group are indicated by the "OT2:" code.  
Press **enter** to select menu, edit using arrow keys (see next page). Confirm (and proceed) using **enter**.
- 6) Exit: Press **meas** key until the [meas] mode indicator is displayed.

Process variable	enter
LIN/biLIN/LOG output	↻
Current start	↻
Current end	
Bilinear: Vertex X	
Bilinear: Vertex Y	
Time averaging filter	
Output current for error message	
Output current for Sensoface	
Output current during HOLD	
Output current for HOLD FIX	

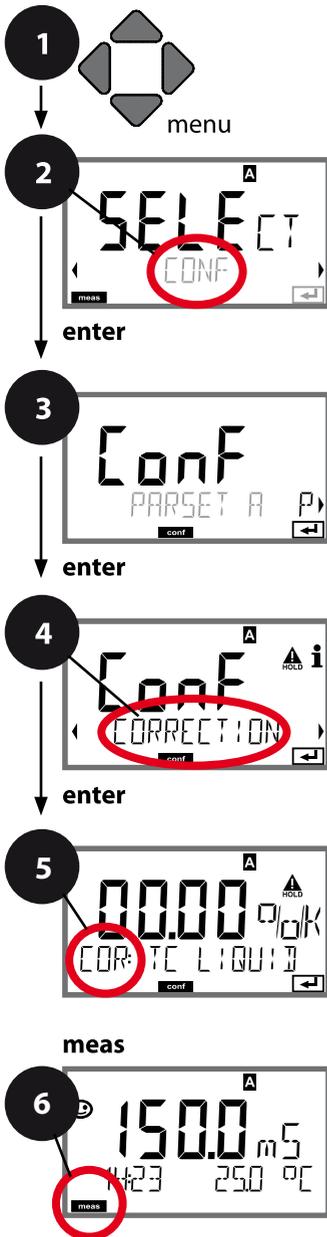
Menu item	Action	Choices
Process variable 	Select using ▲ ▼ keys: Cond: Conductivity TMP: Temperature  Press <b>enter</b> to confirm.	Cond/ <b>TMP</b> Begin: 0 °C End: 100°C
<ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> </ul>		

**All the following adjustments are made as for current output 1 (see there)!**

# Configuration

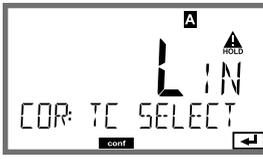
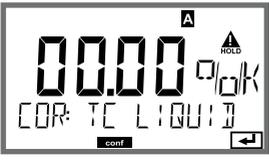
## Temperature Compensation

### Selecting the compensation method. TC process medium.



- 1) Press **menu** key.
- 2) Select **CONF** using ◀ ▶ keys, press **enter**.
- 3) Select parameter set using ◀ ▶, press **enter**.
- 4) Select **CORRECTION** menu using ◀ ▶ keys, press **enter**.
- 5) All items of this menu group are indicated by the "COR:" code.  
Press **enter** to select menu, edit using arrow keys (see next page). Confirm (and proceed) using **enter**.
- 6) Exit: Press **meas** key until the [meas] mode indicator is displayed.

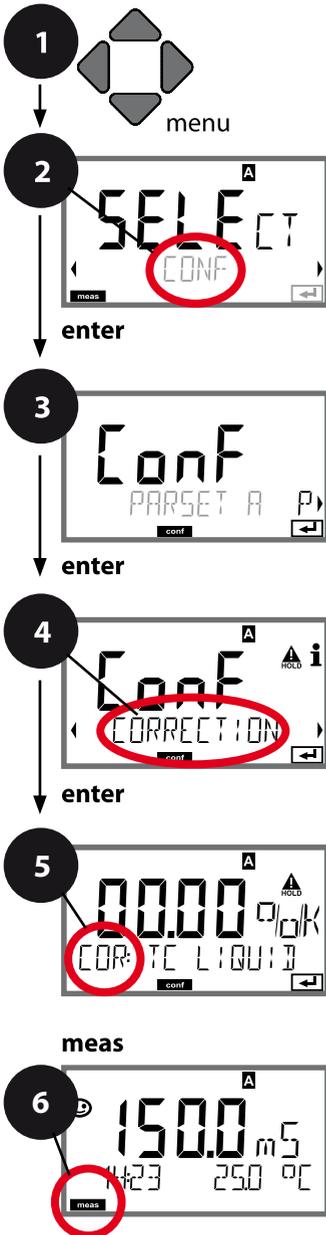
5	Temperature compensation	enter
	Temperature compensation, process medium	enter
	Enter reference temperature	enter
	Current input, external temp measurement	
	Current start	
	Current end	

Menu item	Action	Choices
Temperature compensation	<p>Select desired compensation using <math>\blacktriangle</math> <math>\blacktriangledown</math> keys:</p> <p><b>OFF:</b> Temp compensation</p> <p><b>LIN:</b> Linear temperature compensation with entry of temperature coefficient</p> <p><b>nLF:</b> Temperature compensation for natural waters to EN 27888</p> <p><b>NaCl:</b> Ultrapure water with NaCl traces (0 ... +120 °C / +32 ... +248 °F)</p> <p><b>HCl:</b> Ultrapure water with HCl traces (0 ... +120 °C / +32 ... +248 °F)</p> <p><b>NH3:</b> Ultrapure water with NH<sub>3</sub> traces (0 ... +120 °C / +32 ... +248 °F)</p> <p><b>NaOH:</b> Ultrapure water with NaOH traces (0 ... +120 °C / +32 ... +248 °F)</p> <p>Press <b>enter</b> to confirm.</p>	  
<p>Temperature compensation of process medium</p>  <p>Enter reference temperature</p> 	<p><b>With linear compensation only:</b></p> <p>Step 1: Enter temperature compensation of the process medium.</p> <p>Step 2: Enter reference temperature. Enter value using <math>\blacktriangle</math> <math>\blacktriangledown</math> <math>\blacktriangleleft</math> <math>\blacktriangleright</math> keys. Press <b>enter</b> to confirm.</p> <p>Permissible range 0 ... 199.9 °C</p>	<p>00.00...19.99 %/K</p>

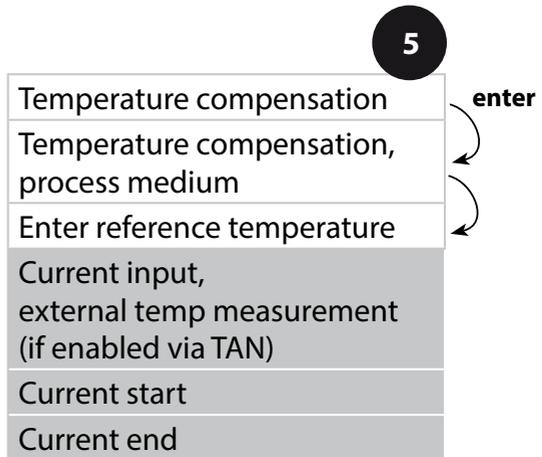
# Configuration

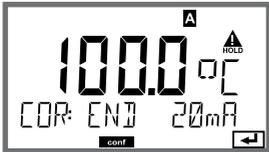
## Temperature Compensation

### Current input for temp measurement.



- 1) Press **menu** key.
- 2) Select **CONF** using ◀ ▶ keys, press **enter**.
- 3) Select parameter set using ◀ ▶, press **enter**.
- 4) Select **CORRECTION** menu using ◀ ▶ keys, press **enter**.
- 5) All items of this menu group are indicated by the "COR:" code.  
Press **enter** to select menu, edit using arrow keys (see next page). Confirm (and proceed) using **enter**.
- 6) Exit: Press **meas** key until the [meas] mode indicator is displayed.

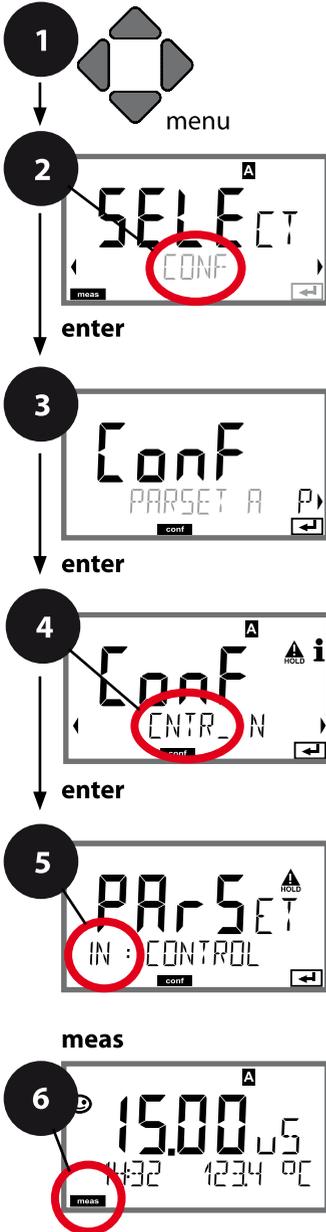


Menu item	Action	Choices
With external temp measurement (current input enabled / TAN):		
Current range	Select desired range using $\blacktriangle$ $\blacktriangledown$ keys.  Press <b>enter</b> to confirm.	<b>4-20 mA</b> / 0-20 mA
		
Current start	Modify digit using $\blacktriangle$ $\blacktriangledown$ keys, select next digit using $\blacktriangleleft$ $\blacktriangleright$ keys.  Press <b>enter</b> to confirm.	Input range: -50...250 °C / -58...482 °F
		
Current end	Enter value using $\blacktriangle$ $\blacktriangledown$ $\blacktriangleleft$ $\blacktriangleright$ keys.  Press <b>enter</b> to confirm.	Input range: -50...250 °C / -58...482 °F
		

# Configuration

## CONTROL Input (TAN SW-A005)

### Parameter set selection via external signal or flow measurement



- 1) Press **menu** key.
- 2) Select **CONF** using ◀ ▶ keys, press **enter**.
- 3) Select parameter set using ◀ ▶, press **enter**.
- 4) Select **CNTR\_IN** menu using ◀ ▶ keys, press **enter**.
- 5) All items of this menu group are indicated by the "IN:" code.  
Press **enter** to select menu, edit using arrow keys (see next page). Confirm (and proceed) using **enter**.
- 6) Exit: Press **meas** key until the [meas] mode indicator is displayed.

5

CONTROL input (function)	enter
PARSET / FLOW	
FLOW: ADJUST	

Menu item	Action	Choices
Select function of CONTROL input  	Select using ▲ ▼ keys. Press <b>enter</b> to confirm.	<b>PARSET</b> (selecting parameter set A/B via signal at CONTROL input)
		Flow (for connecting a pulse-output flow meter)
Adjust to flow meter:  	<b>With "Flow" selected,</b> you must adjust the device to the flow meter used. Enter value using arrow keys. Press <b>enter</b> to confirm.	<b>12000 pulses/liter</b>

In the alarm menu you can configure flow monitoring. When you have set CONTROL to FLOW, you can specify 2 additional limit values for maximum and minimum flow.

If the measured value lies outside this range, an alarm message and a 22-mA error signal (if configured) will be generated.

### Display

Flow measurement in measuring mode



### Display

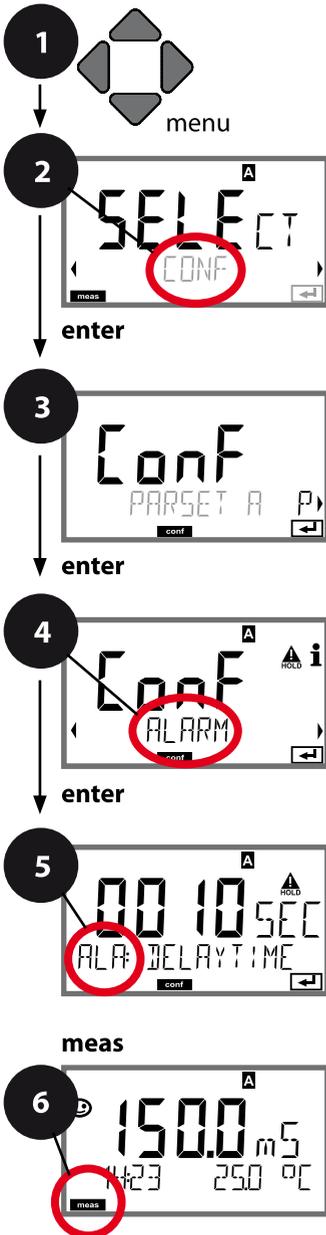
Flow measurement (sensor monitor)



# Configuration

## Alarm Settings

Delay. Sensocheck. Tempcheck.



- 1) Press **menu** key.
- 2) Select **CONF** using ◀ ▶ keys, press **enter**.
- 3) Select parameter set using ◀ ▶, press **enter**.
- 4) Select **ALARM** menu using ◀ ▶ keys, press **enter**.
- 5) All items of this menu group are indicated by the "ALA:" code.  
Press **enter** to select menu, edit using arrow keys (see next page). Confirm (and proceed) using **enter**.
- 6) Exit: Press **meas** key until the [meas] mode indicator is displayed.

Delay	5
Sensocheck	
Tempcheck	
CONTROL input	
For flow monitoring: Max. flow alarm	
For flow monitoring: Min. flow alarm	

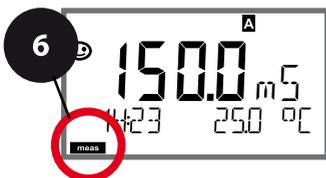
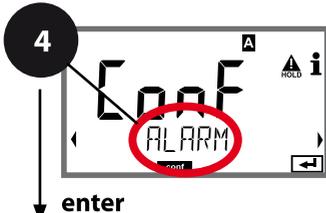
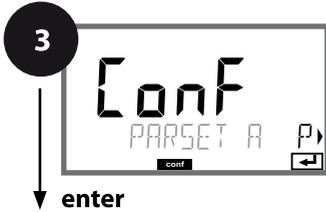
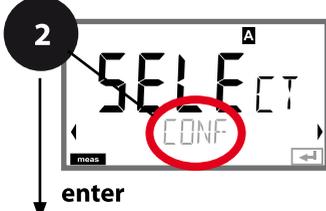
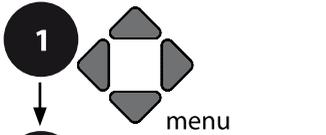
Menu item	Action	Choices
Delay 	Enter value using ▲ ▼ ◀ ▶ keys. Press <b>enter</b> to confirm.	0...600 SEC <b>(010 SEC)</b>
Sensocheck 	Select Sensocheck (continuous monitoring of sensor). Select ON or OFF using ▲ ▼ keys. Press <b>enter</b> to confirm (At the same time, Sensoface is activated. With OFF, Sensoface is also switched off.)	<b>ON/OFF</b>
Tempcheck (see page 45)	To monitor the tem- perature probe with TC OFF selected: Select Tempcheck ON using ▲ ▼ keys. Press <b>enter</b> to confirm. Now, the temperature probe will be monitored.	<b>ON/OFF</b>

Error messages can be signaled by a 22 mA output current (see Error Messages and Configuration of Output 1/Output 2). **The alarm delay time** delays the color change of the display back-lighting to red and the 22 mA signal (if configured).

# Configuration

## Alarm Settings

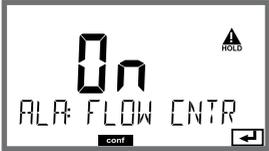
### CONTROL input (TAN SW-A005)



- 1) Press **menu** key.
- 2) Select **CONF** using ◀ ▶ keys, press **enter**.
- 3) Select parameter set using ◀ ▶, press **enter**.
- 4) Select **ALARM** menu using ◀ ▶ keys, press **enter**.
- 5) All items of this menu group are indicated by the "ALA:" code.  
Press **enter** to select menu, edit using arrow keys (see next page). Confirm (and proceed) using **enter**.
- 6) Exit: Press **meas** key until the [meas] mode indicator is displayed.

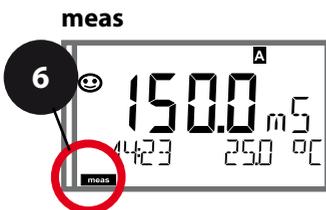
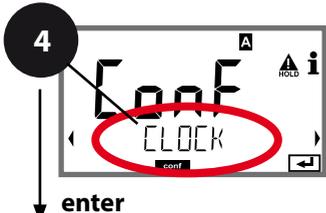
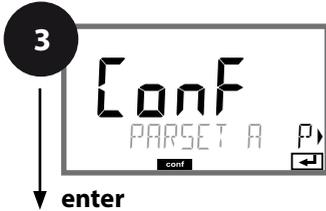
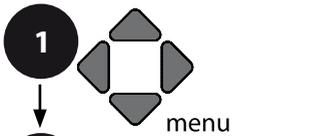
5

Delay	enter
Sensocheck	
Tempcheck	
CONTROL input	
For flow monitoring: Max. flow alarm	
For flow monitoring: Min. flow alarm	

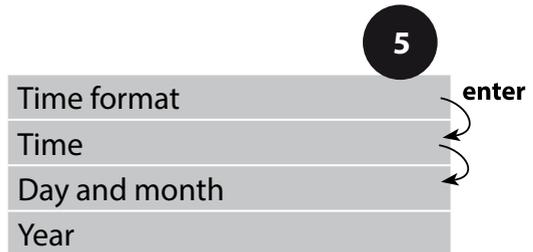
Menu item	Action	Choices
CONTROL input 	The <b>CONTROL input</b> can generate an alarm when assigned to FLOW (flow monitoring) in the CONF menu: <b>FLOW CNTR</b> <b>Flow measurement:</b> allows monitoring the minimum and maximum flow (pulse counter)	<b>ON/OFF</b>  (FLOW MIN, FLOW MAX.)
Alarm Minimum flow <b>FLOW MIN</b>	Specify value	Default: 05.00 liters/h
Alarm Maximum flow <b>FLOW MIN</b>	Specify value	Default: 25.00 liters/h

# Configuration

## Time and Date



- 1) Press **menu** key.
- 2) Select **CONF** using ◀ ▶, press **enter**.
- 3) Select parameter set A using ◀ ▶ keys, press **enter**.
- 4) Select **CLOCK** using ◀ ▶ keys, press **enter**.
- 5) All items of this menu group are indicated by the "CLK:" code.  
Press **enter** to select menu, edit using arrow keys (see next page). Confirm (and proceed) by pressing **enter**.
- 6) Exit: Press **meas** key until the [meas] mode indicator is displayed.



## **Time and Date**

Control of the calibration and cleaning cycles is based on the time and date of the integrated real-time clock.

In measuring mode the time is shown in the lower display. When using digital sensors, the calibration data is written in the sensor head. In addition, the logbook entries (cf Diagnostics) are provided with a time stamp.

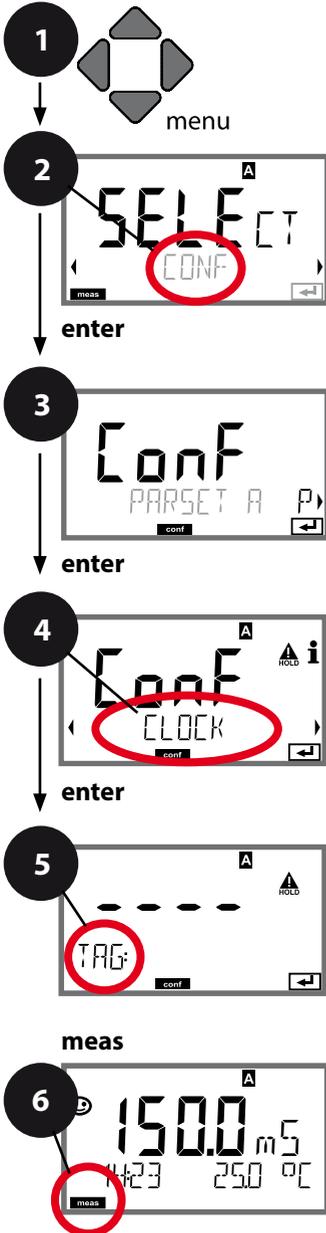
### **Note:**

There is no automatic switchover from winter to summer time!

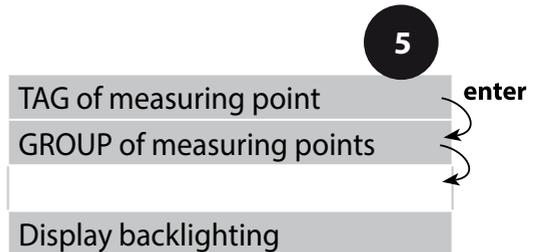
Be sure to manually adjust the time!

# Configuration

## Measuring Points (TAG/GROUP) Display Backlighting



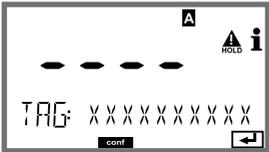
- 1) Press **menu** key.
- 2) Select **CONF** using ◀ ▶, press **enter**.
- 3) Select parameter set A using ◀ ▶ keys, press **enter**.
- 4) Select **TAG** or **DISPLAY** using ◀ ▶ keys, press **enter**.
- 5) All items of this menu group are indicated by the "TAG:" or "DSP" code. Press **enter** to select menu, edit using arrow keys (see next page). Confirm (and proceed) by pressing **enter**.
- 6) Exit: Press **meas** key until the [meas] mode indicator is displayed.



## Sensor Verification (TAG, GROUP)

When Memosens sensors are calibrated in the lab, it is often useful and sometimes even mandatory that these sensors will be operated again at the same measuring points or at a defined group of measuring points. To ensure this, you can save the respective measuring point (TAG) or group of measuring points (GROUP) in the sensor. TAG and GROUP can be specified by the calibration tool or automatically entered by the transmitter. When connecting an MS sensor to the transmitter, it can be checked if the sensor contains the correct TAG or belongs to the correct GROUP. If not, a message will be generated, Sensoface gets "sad", and the display backlighting turns purple (magenta). The "sad" Sensoface icon can also be signaled by a 22 mA error current. Sensor verification can be switched on in the Configuration in two steps as TAG and GROUP if required.

When no measuring point or group of measuring points is saved in the sensor, e.g., when using a new sensor, Stratos enters its own TAG and GROUP. When sensor verification is switched off, Stratos always enters its own measuring point and group. A possibly existing TAG/GROUP will be overwritten.

Menu item	Action	Choices
<p>Measuring point (TAG)</p> 	<p>In the lower display line you can enter a designation for the measuring point (TAG) and for a group of measuring points (GROUP) if applicable. Up to 32 digits are possible. Select character using ▲ ▼ keys, select next digit using ◀ ▶ keys. Press <b>enter</b> to confirm. By pressing <b>meas</b> (repeatedly) in the measuring mode you can view the tag number.</p>	<p>A...Z, 0...9, - + &lt; &gt; / @</p> <p>The first 10 characters are seen in the display without scrolling.</p>

## Switch Off the Display Backlighting

The display backlighting can be switched off in the DISPLAY menu.

**Note:** If the display backlighting is off, color signaling of error events is not possible.

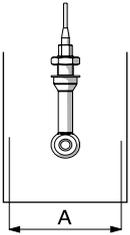
---

**Note:**

- All calibration procedures must be performed by trained personnel. Incorrectly set parameters may go unnoticed, but change the measuring properties.

Calibration can be performed by:

- Determining the cell factor with a known calibration solution taking account of the temperature
- Input of cell factor (e.g. for ultrapure-water sensors)
- Entering an installation factor<sup>\*)</sup>
- Sampling (product calibration)
- Zero calibration in air or with calibration solution
- Temperature probe adjustment

**Note:**

If measurements are performed in fittings with  $A < 110$  mm, be sure to choose a calibration beaker with the same cross-section and of the same material (metal/plastic)!

## Selecting a Calibration Mode

Calibration adapts the device to the individual sensor characteristics. Access to calibration can be protected with a passcode (SERVICE menu).

First, you open the calibration menu and select the calibration mode:

CAL_SOL	Calibration with calibration solution
CAL_CELL	Calibration by entry of cell factor
CAL_INSTALL	Calibration by entry of an installation factor <sup>*)</sup>
P_CAL	Product calibration (calibration with sampling)
CAL_ZERO	Zero calibration
CAL_RTD	Temperature probe adjustment

<sup>\*)</sup> with Memosens sensors only

# Calibration

## Calibration with Calibration Solution

Input of temperature-corrected value of calibration solution with simultaneous display of cell factor.

Be sure to use known calibration solutions and the respective temperature-corrected conductivity values (see calibration solution tables in the appendix). During the calibration procedure the temperature must be kept constant.

### Note:

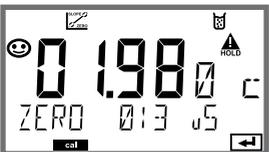
When using an ARF 210/215 flow-through fitting, you should use the included calibration beakers (identical dimensions and materials) for calibration to prevent calibration errors.

Display	Action	Remark
	Select Calibration. Press <b>enter</b> to proceed. Select CAL_SOL calibration method. Press <b>enter</b> to proceed.	
	Ready for calibration. Hourglass blinks.	Display (3 sec) Now the device is in HOLD mode.
	Immerse sensor in calibration solution. Enter the temperature- corrected value of the calibration solution us- ing the arrow keys (see table in the appendix). Press <b>enter</b> to confirm.	Lower line: display of cell factor and temperature

Display	Action	Remark
 <p>The display shows a large '0' followed by '198'. Below it, 'ZERO' and '0.13 uS' are visible. There are several icons: a smiley face, a battery level indicator, a 'HOLD' icon, and a 'CAL' icon at the bottom.</p>	<p>The cell factor and zero point are displayed. The “hourglass” icon is blinking.</p>	
 <p>The display shows '1265' followed by 'mS'. Below it, 'MEAS' and 'REPE' are visible. There are several icons: a smiley face, a battery level indicator, a 'HOLD' icon, and a 'CAL' icon at the bottom.</p>	<p>Use the arrow keys to select:</p> <ul style="list-style-type: none"> <li>• Repeat (repeat calibration) or</li> <li>• Measuring.</li> </ul> <p>Press <b>enter</b> to confirm.</p>	
 <p>The display shows '1265' followed by 'mS'. Below it, 'GOOD BYE' is visible. There are several icons: a smiley face, a battery level indicator, a 'HOLD' icon, and a 'MEAS' icon at the bottom.</p>	<p>With MEAS selected: End calibration by pressing <b>enter</b>.</p>	<p>Display of measured variable, Sensoface is active. After end of calibration, the outputs remain in HOLD mode for a short time. After display of GOOD BYE, the device automatically returns to measuring mode.</p>

## Calibration by Input of a Cell Factor

You can directly enter the value for the cell factor of a sensor. This value must be known, e.g. determined beforehand in the laboratory. The selected process variable and the temperature are displayed. This method is suitable for all process variables.

Display	Action	Remark
	Select Calibration. Press <b>enter</b> to proceed. Select CAL_CELL calibration method. Press <b>enter</b> to proceed.	
	Ready for calibration. Hourglass blinks.	Display (3 sec) Now the device is in HOLD mode.
	Enter cell factor. Press <b>enter</b> to proceed.	The selected process variable and the temperature are displayed.
	The device shows the calculated cell factor and zero point (at 25 °C). Sensoface is active.	
	<b>Use the arrow keys to select:</b> • MEAS (exit) • REPEAT Press <b>enter</b> to proceed.	Exit: HOLD is deactivated after a short time.

Please refer to the sensor specifications for the nominal cell factor. When measuring in a restricted space, the individual cell factor must be determined.

## Calibration by Input of an Installation Factor

When using a Memosens sensor in a tight space, the installation factor is entered.

Display	Action	Remark
	<p>Select Calibration. Press <b>enter</b> to proceed. Select CAL_INSTALL calibration method. Press <b>enter</b> to proceed.</p>	
	<p>Ready for calibration. Hourglass blinks.</p>	<p>Display (3 sec) Now the device is in HOLD mode.</p>
	<p>Enter installation factor. Press <b>enter</b> to proceed.</p>	<p>The selected pro- cess variable and the temperature are displayed.</p>
	<p><b>Use the arrow keys to select:</b></p> <ul style="list-style-type: none"> <li>• MEAS (end)</li> <li>• REPEAT</li> </ul> <p>Press <b>enter</b> to proceed.</p>	<p>End: HOLD is deactivated after a short time.</p>

# Calibration

## Product Calibration

(Calibration by sampling)

For product calibration, the uncompensated conductivity (mS/cm, S/m) is used. During product calibration the sensor remains in the process. The measurement process is only interrupted briefly.

### Procedure:

- 1) The sample is measured in the lab or directly on the site using a portable meter. To ensure an exact calibration, sample temperature and process temperature should be the same.  
During sampling the device saves the currently measured value and then returns to measuring mode. Then, the "calibration" mode indicator blinks.
- 2) In the second step you enter the measured sample value in the device. From the difference between the stored measured value and entered sample value, the device calculates the new cell factor.  
If the sample is invalid, you can take over the value stored during sampling. In that case the old calibration values are stored.  
Afterwards, you can start a new product calibration.

Display	Action	Remark
	Select Calibration. Press <b>enter</b> to proceed. Select P_CAL calibration method. Press <b>enter</b> to proceed.	
	Ready for calibration. Hourglass blinks.	Display (3 sec) Now the device is in HOLD mode.
	Take sample and save value. Press <b>enter</b> to proceed.	Now the sample can be measured in the lab.

Display	Action	Remark
	The device returns to measuring mode.	From the blinking CAL mode indicator you see that product calibration has not been terminated.
	<b>Product calibration step 2:</b> When the sample value has been determined, open the product calibration once more	Display (3 sec) Now the device is in HOLD mode.
	The stored value is displayed (blinking) and can be overwritten with the lab value. Press <b>enter</b> to proceed.	
	Display of new cell factor and zero point (based on 25°C). Sensoface is active. Press <b>enter</b> .	To repeat calibration: Select REPEAT, then <b>enter</b>
	To end calibration: Select MEAS, then <b>enter</b>	
	After calibration is ended, the device will switch to measuring mode.	After end of calibration, the outputs remain in HOLD mode for a short time.

# Calibration

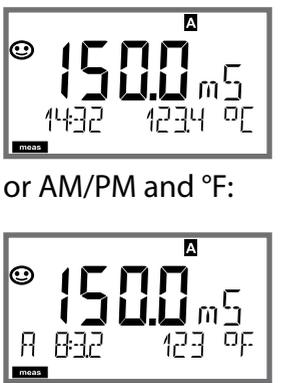
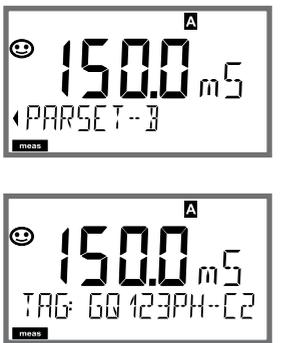
## Zero Calibration in Air / with Calibration Solution

Display	Action	Remark
	Select Calibration. Press <b>enter</b> to proceed. Select CAL_ZERO calibration method. Press <b>enter</b> to proceed.	
	Ready for calibration. Hourglass blinks.	Display (3 sec) Now the device is in HOLD mode.
	<b>Calibration in air</b> Edit digits until the lower display indicates Zero Calibration in air (AIR-SET) for SE680-M and Memosens sensors: Press <b>enter</b> to start AIR-SET. When zero point and cell factor are displayed, press <b>enter</b> to confirm. <b>Calibration with solution</b> Edit digits until the lower display indicates the solution value. Press <b>enter</b> to proceed.	
	The device shows the cell factor (at 25 °C) and the zero point. Sensoface is active.	
	<b>Use the arrow keys to select:</b> <ul style="list-style-type: none"> <li>• MEAS (exit)</li> <li>• REPEAT</li> </ul> Press <b>enter</b> to proceed.	Exit: HOLD is deactivated after a short time.

## Temp Probe Adjustment

Display	Action	Remark
	<p>Select Calibration. Press <b>enter</b> to proceed. Select CAL_RTD calibration method. Press <b>enter</b> to proceed.</p>	<p>Wrong settings change the measurement properties!</p>
	<p>Measure the tempera- ture of the process medium using an external thermometer.</p>	<p>Display (3 sec) Now the device is in HOLD mode.</p>
	<p>Enter the measured temperature value. Maximum difference: 10 K. Press <b>enter</b> to proceed.</p>	<p>Display of actual temperature (un- compensated) in the lower display.</p>
	<p>The corrected tempera- ture value is displayed. Sensoface is active. To end calibration: Select MEAS, then <b>enter</b> To repeat calibration: Select REPEAT, then <b>enter</b></p>	<p>After end of calibra- tion, the outputs re- main in HOLD mode for a short time.</p>
	<p>After calibration is ended, the device will switch to measuring mode.</p>	

# Measurement

Display	Remark
 <p>or AM/PM and °F:</p>	<p>From the configuration or calibration menus, you can switch the device to measuring mode by pressing the <b>meas</b> key. In the measuring mode the upper display line shows the configured process variable (Cond or temperature), the lower display line shows the time and the second configured process variable (Cond or temperature). The [meas] mode indicator lights and the active parameter set (A/B) is indicated. A/B is not displayed with parameter set "Fix A".</p>
<p>By pressing the <b>meas</b> key you can step through the following displays. When no key has been pressed for 60 sec, the device returns to the standard display.</p>	
	<p>1) Selecting the parameter set (if set to "manual" in the configuration). Select the desired parameter set using the ◀ ▶ arrow keys (PARSET A or PARSET B blinks in the lower display line). Press <b>enter</b> to confirm.</p> <p>Further displays (each with <b>meas</b>).</p>
	<p>2) Display of measuring point ("TAG")            3) Display of time and date            4) Display of output current(s)</p>

# Diagnostics

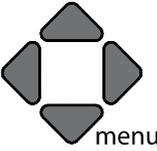
In the Diagnostics mode you can access the following menus without interrupting the measurement:

CALDATA	viewing the calibration data
SENSOR	viewing the sensor data
SELFTEST	starting a device self-test
LOGBOOK	viewing the logbook entries
MONITOR	displaying currently measured values
VERSION	displaying device type, software version, serial number

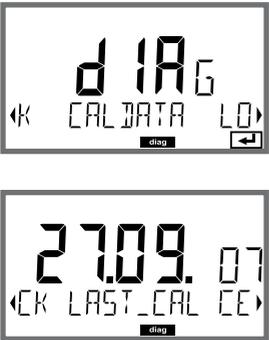
Access to diagnostics can be protected with a passcode (SERVICE menu).

## Note:

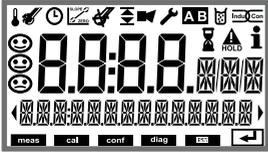
HOLD is not active during Diagnostics mode!

Action	Key	Remark
Activate Diagnostics		Press <b>menu</b> key to call the selection menu. (Display color changes to turquoise.) Select DIAG using ◀ ▶ keys, press <b>enter</b> to confirm.
Select diagnostics option		Use ◀ ▶ keys to select from: CALDATA SENSOR SELFTEST LOGBOOK MONITOR VERSION See next pages for further proceeding.
Exit	<b>meas</b>	Exit by pressing <b>meas</b> .

# Diagnostics

Display	Menu item
	<p><b>Displaying the calibration data</b></p> <p>Select CALDATA using ◀ ▶, press <b>enter</b> to confirm. Use the ◀ ▶ keys to select the desired parameter from the bottom line of the display (LAST_CAL CELLFACTOR ZERO). The selected parameter is shown in the main display.</p> <p>Press <b>meas</b> to return to measurement.</p>

## Display



## Menu item

### Device self-test

(To abort, you can press **meas.**)

- 1) **Display test:** Display of all segments with changing background colors white/green/red. Press **enter** to proceed.
  
- 2) **RAM test:** Hourglass blinks, then display of --PASS-- or --FAIL--  
Press **enter** to proceed.
  
- 3) **EEPROM test:** Hourglass blinks, then display of --PASS-- or --FAIL--  
Press **enter** to proceed.
  
- 4) **FLASH test:** Hourglass blinks, then display of --PASS-- or --FAIL--  
Press **enter** to proceed.
  
- 5) **Module test:** Hourglass blinks, then display of --PASS-- or --FAIL--  
Press **enter** or **meas** to return to measuring mode.

# Diagnostics

Display	Menu item
	<p><b>Displaying the logbook entries (TAN SW-A002)</b>            Select LOGBOOK using ◀ ▶, press <b>enter</b> to confirm.</p> <p>By using the ▲ ▼ keys, you can scroll backwards and forwards through the logbook (entries -00-...-99-), -00- being the last entry.</p> <p>If the display is set to date/time, you can search for a particular date using the ▲ ▼ keys.            Press ◀ ▶ to view the corresponding message text.</p> <p>If the display is set to the message text, you can search for a particular message using the ▲ ▼ keys.            Press ◀ ▶ to display the date and time.</p> <p>Press <b>meas</b> to return to measurement.</p>
	<p><b>Extended logbook / Audit Trail (TAN SW-A003)</b>            By using the ▲ ▼ keys, you can scroll backwards and forwards through the extended logbook (entries -000-...-199-), -000- being the last entry.  <b>Display: CFR</b>            Audit Trail also records function activations (CAL CONFIG SERVICE), some Sensoface messages, and opening of the enclosure.</p>
	<p><b>Displaying the currently measured values (sensor monitor)</b>            Select MONITOR using ◀ ▶, press <b>enter</b> to confirm.            Use the ◀ ▶ keys to select the desired parameter from the bottom line of the display (R_COND G_COND RTD TEMP I-INPUT (Option) OPERATION TIME CIP SIP).            The selected parameter is shown in the main display.</p> <p>Press <b>meas</b> to return to measurement.</p>
	
	
<p>Display example:</p> 	

**Display****Menu item****Version**

Here, you find the data you require for requesting a device-specific Option.

Display of **device type**, **software/hardware version**, and **serial number** for all device components.

Use the ▲ ▼ keys to switch between software and hardware version. Press **enter** to proceed to next device component.

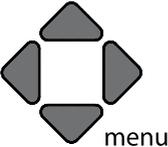
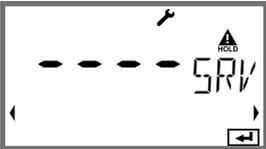
# Service

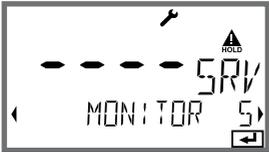
In the Service mode you can access the following menus:

MONITOR	Displaying currently measured values.
OUT1	Testing current output 1.
OUT2	Testing current output 2. (Only if equipped with 2nd current output.)
CODES	Assigning and editing passcodes.
DEFAULT	Resetting the device to factory settings.
OPTION	Enabling options via TAN.

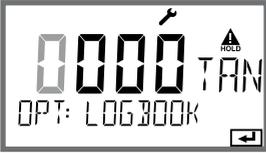
**Note:**

HOLD is active during Service mode!

Action	Key/Display	Remark
Activate Service		Press <b>menu</b> key to call the selection menu. Select SERVICE using ◀ ▶ keys, press <b>enter</b> to confirm.
Passcode		Enter passcode "5555" for service mode using the ▲ ▼ ◀ ▶ keys. Press <b>enter</b> to confirm.
Display		In Service mode the following icons are displayed: <ul style="list-style-type: none"> <li>• [diag] mode indicator</li> <li>• HOLD triangle</li> <li>• Service (wrench)</li> </ul>
Exit	<b>meas</b>	Exit by pressing <b>meas</b> .

Menu item	Remark
	<p><b>Displaying currently measured values (sensor monitor) with HOLD mode activated:</b>  Select MONITOR using ◀ ▶, press <b>enter</b> to confirm.  Select variable in the bottom text line using ◀ ▶.</p> <p>The selected parameter is shown in the upper display line.  As the device is in HOLD mode, you can perform validations using simulators without influencing the signal outputs.</p> <p>Return to Service menu:  Hold <b>meas</b> depressed for longer than 2 sec.  Press <b>meas</b> once more to return to measurement.</p>
	<p><b>Specifying the current at outputs 1 and 2:</b>  Select OUT1 or OUT2 using the ◀ ▶ keys, press <b>enter</b> to confirm.  Enter a valid current value for the respective output using ▲ ▼ ◀ ▶ keys.  Press <b>enter</b> to confirm.</p> <p>For checking purposes, the actual output current is shown in the bottom right corner of the display.  End by pressing <b>enter</b> or <b>meas</b>.</p> <p>OUT2:  Only if equipped with 2nd current output.</p>

# Service

Menu item	Remark
	<p><b>Assigning passcodes:</b> In the "SERVICE - CODES" menu you can assign passcodes to DIAG, HOLD, CAL, CONF and SERVICE modes (Service preset to 5555).</p> <p><b>When you have lost the Service passcode,</b> you have to request an "Ambulance TAN" from the manufacturer specifying the serial number of your device. To enter the "Ambulance TAN", call the Service function and enter passcode 7321. After correct input of the ambulance TAN the device signals "PASS" for 4 sec and resets the Service passcode to 5555.</p>
	<p><b>Reset to factory settings:</b> In the "SERVICE - DEFAULT" menu you can reset the device to factory settings.</p> <p><b>NOTICE</b> After a reset to factory setting the device must be reconfigured completely, including the sensor parameters!</p>
	<p><b>Option request:</b> Communicate the serial number and hardware/software version of your device to the manufacturer. These data can be viewed in the Diagnostics/Version menu.</p> <p>The "transaction number" (TAN) you will then receive is only valid for the device with the corresponding serial number.</p> <p><b>Releasing an option:</b> Options come with a "transaction number" (TAN). To release the option, enter this TAN and confirm by pressing <b>enter</b>.</p>

# Operating States

Operating status	OUT 1	OUT 2	Time out
Measuring			-
Diag			60 s
CAL_SOL Calibration solution			No
CAL_CELL Cell factor			No
P_CAL Product cal S1			No
P_CAL Product cal S2			No
CAL_ZERO Zero cal			No
CAL_RTD Temp adjustment			No
CONF ParSet A			20 min
CONF ParSet B			20 min
SERVICE MONITOR			20 min
SERVICE OUT 1			20 min
SERVICE OUT 2			20 min
SERVICE IRDA			20 min
SERVICE CODES			20 min

# Operating States

---

Operating status	OUT 1	OUT 2	Time out
SERVICE DEFAULT			20 min
SERVICE OPTION			20 min
HOLD input			No

Explanation:  as configured (Last/Fix or Last/Off)

 active  manual

## **Maintenance**

Stratos Pro does not require maintenance.

If maintenance work (e.g., sensor replacement) has to be performed at the measuring point, you must activate the function check (HOLD) mode on the device as follows:

- Opening the Calibration menu
- Opening the Service menu
- Opening the Configuration menu

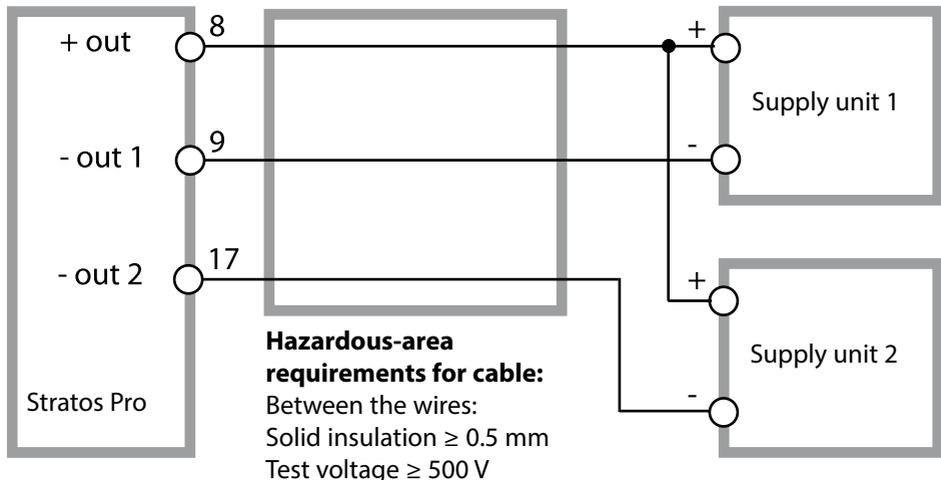
## **Repair**

The Stratos Pro and the measuring modules cannot be repaired by the user. To request a repair, please contact Knick Elektronische Messgeräte GmbH & Co. KG by visiting [www.knick.de](http://www.knick.de).

# A201B/X: Supply Units and Connection

Recommended Power Supply Units	Order No.
Stratos Pro A201X, Zone 1:	
Repeater power supply, Ex, 90...253 V AC, output 4...20 mA	WG 21 A7
Repeater power supply, Ex, 90...253 V AC, HART, output 4...20 mA	WG 21 A7 Opt. 470
Repeater power supply, Ex, 24 V AC/DC, output 4...20 mA	WG 21 A7 Opt. 336
Repeater power supply, Ex, 24 V AC/DC, HART, output 4...20 mA	WG 21 A7 Opt. 336, 470
Stratos Pro A201B, Zone 2:	
Repeater power supply, non-Ex, 24 V DC, output 4...20 mA	IsoAmp PWR B 10116
Repeater power supply, non-Ex, 24 V DC, HART, output 0/4...20 mA / 0...10 V	IsoAmp PWR A 20100

## Connection to Supply Units



# Product Line and Accessories

## Order Code Stratos Pro A201

										TAN
<b>Example</b>	A	2	0	1	X	-	CONDI	-	1	
2-wire / 4-20 mA	A	2								B,C,E
<b>Communication</b>										
Without (HART retrofittable via TAN)			0							A
<b>Version number</b>										
Version				1						
<b>Approvals</b>										
General Safety										N
ATEX / IECEx Zone 2										B
ATEX / IECEx / FM Zone 1 / CI 1 Div 1										X
<b>Measuring channel</b>										
Memosens pH / Redox	digital						MSPH			G
Memosens Cond	digital						MSCOND			
Memosens Condi	digital						MSCONDI			
Memosens Oxy	digital						MSOXY			
Dual COND (2x2-electrode sensors, analog)					N		CC			
pH / ORP value (ISM digital per TAN)	Measuring module						PH			F, G
Cond, 2-/4-electrode	Measuring module						COND			
Conductivity, electrodeless	Measuring module						CONDI			
Oxygen (ISM digital and traces per TAN)	Measuring module						OXY			D, F
<b>Options</b>										
Without 2nd current output									0	
With 2nd current output									1	
<b>TAN options</b>										
HART							SW-A001			(A)
Logbook							SW-A002			(B)
Extended logbook (Audit Trail)							SW-A003			(C)
Trace oxygen measurement							SW-A004			(D)
Current input + 2 digital inputs							SW-A005			(E)
ISM digital							SW-A006			(F)
Pfandler							SW-A007			(G)
<b>Mounting accessories</b>										
Pipe-mount kit							ZU 0274			
Protective hood							ZU 0737			
Panel-mount kit							ZU 0738			

# Specifications

<b>CONDI input</b>	Input for toroidal conductivity sensors SE655, SE656, SE660, SE670, SE680-K, SE680-M, MEMOSENS		
<b>Measuring range</b>	Conductivity	0.000 ... 1999 mS/cm	
	Concentration	0.00 ... 100.0 wt%	
	Salinity	0.0 ... 45.0 % (0 ... 35 °C / 32 ... 95 °F)	
<b>Display ranges</b>	Conductivity	0.000 ... 9.999 mS/cm (not with SE 660 / SE 670 / SE 680)	
		00.00 ... 99.99 mS/cm	
		000.0 ... 999.9 mS/cm	
		0000 ... 1999 mS/cm	
		0.000 ... 9.999 S/cm	
		00.00 ... 99.99 S/cm	
	Concentration	0.00 ... 9.99 % / 10.0 ... 100.0 %	
	Salinity	0.0 ... 45.0 % (0 ... +35 °C / +32 ... +93 °F)	
	Response time (T90)	Approx. 1 s	
<b>Measurement error<sup>1,2,3)</sup></b>	< 1% meas. val. + 0.005 mS		
<b>Temp compensation *</b>	(OFF)	Without	
	(LIN)	Linear characteristic 00.00 ... 19.99%/K (reference temp user-defined)	
	(NLF)	Natural waters to EN 27888 (reference temp 25 °C)	
	(NACL)	Ultrapure water with NaCl traces (0 ... 120 °C / 32 ... 248 °F), reference temp 25 °C / 77 °F	
	(HCL)	Ultrapure water with HCl traces (0 ... 120 °C / 32 ... 248 °F), reference temp 25 °C / 77 °F	
	(NH3)	Ultrapure water with NH3 traces (0 ... 120 °C / 32 ... 248 °F), reference temp 25 °C / 77 °F	
	(NaOH)	Ultrapure water with NaOH traces (0 ... 120 °C / 32 ... 248 °F), reference temp 25 °C / 77 °F	
<b>Concentration determination</b>	-01- NaCl	0 – 26 wt% (0 °C / 32 °F)	... 0 – 28 wt% (100 °C / 212 °F)
	-02- HCl	0 – 18 wt% (-20 °C / -4 °F)	... 0 – 18 wt% (50 °C / 122 °F)
	-03- NaOH	0 – 13 wt% (0 °C / 32 °F)	... 0 – 24 wt% (100 °C / 212 °F)
	-04- H <sub>2</sub> SO <sub>4</sub>	0 – 26 wt% (-17 °C / 1.4 °F)	... 0 – 37 wt% (110 °C / 230 °F)
	-05- HNO <sub>3</sub>	0 – 30 wt% (-20 °C / -4 °F)	... 0 – 30 wt% (50 °C / 122 °F)

<b>Concentration determination (continued)</b>	-06- H <sub>2</sub> SO <sub>4</sub>	94 – 99 wt% (-17 °C / 1.4 °F)	... 89 – 99 wt% (115 °C / 239 °F)
	-07- HCl	22 – 39 wt% (-20 °C / -4°F)	... 22 – 39 wt% (50 °C / 122 °F)
	-08- HNO <sub>3</sub>	35 – 96 wt% (-20 °C / -4 °F)	... 35 – 96 wt% (50 °C / 122 °F)
	-09- H <sub>2</sub> SO <sub>4</sub>	28 – 88 wt% (-17 °C / 1.4 °F)	... 39 – 88 wt% (115 °C / 239 °F)
	-10- NaOH	15 – 50 wt% (0 °C / 32 °F)	... 35 – 50 wt% (100 °C / 212 °F)
-U1-	Specifiable concentration table		

<b>Sensor standardization</b>	Input of cell factor with simultaneous display of selected process variable and temperature Input of calibration solution conductivity with simultaneous display of cell factor Input of an installation factor Product calibration for conductivity Zero adjustment Temperature probe adjustment		
Permissible cell factor	00.100 ... 19.9999 cm <sup>-1</sup>		
Permissible transfer ratio	010.0 ... 199.99 cm		
Permissible zero offset	± 0.5 mS		
<b>Sensocheck</b>	Monitoring of primary and secondary coils and lines for open circuit and of primary coil and lines for short circuit		
Delay	Approx. 30 s		
<b>Sensoface</b>	Provides information on the sensor condition (zero point, Sensocheck)		
<b>Sensor monitor</b>	Direct display of measured values from sensor for validation (resistance/temperature)		
<b>Temperature input *</b>	Pt100/Pt1000/NTC 30 kΩ 3-wire connection, adjustable		
Measuring range	Pt 100/Pt 1000	-50 ... 250 °C / -58 ... 482 °F	
	NTC 30 kΩ	-20 ... 150 °C / -4 ... 302 °F	
Resolution	0.1 °C / 0.1 °F		
Measurement error <sup>1,2,3)</sup>	< 0.5 K (< 1 K for Pt100; < 1 K for NTC > 100 °C / 212 °F)		
<b>Calibration data</b>	Calibration date, cell factor, zero point, installation factor		

# Specifications

<b>I input (TAN)</b>	Current input 0/4 ... 20 mA / 50 Ω for external temperature signal		
Start/end of scale	Configurable -50 ... 250 °C / -58 ... 482 °F		
Characteristic	Linear		
Measurement error <sup>1,3)</sup>	< 1% current value + 0.1 mA		
<b>HOLD input</b>	Galvanically separated (optocoupler)		
Function	Switches device to HOLD mode		
Switching voltage	0 ... 2 V AC/DC	HOLD inactive	
	10 ... 30 V AC/DC	HOLD active	
<b>CONTROL input</b>	Galvanically separated (optocoupler)		
Function	Selecting parameter set A/B or flow measurement		
Parameter set A/B	Control input	0 ... 2 V AC/DC 10 ... 30 V AC/DC	Parameter set A Parameter set B
FLOW	Pulse input for flow measurement 0 ... 100 pulses/s		
Message	via 22 mA		
Display	00.0 ... 99.9 l/h		
<b>Output 1</b>	Current loop, 4 ... 20 mA, floating, protected against inverse polarity HART communication (see further below for specifications)		
Supply voltage	14 ... 30 V		
Process variable *	Conductivity, resistivity, concentration, salinity, or temperature		
Characteristic	Linear, bilinear or logarithmic		
Overrange *	22 mA in the case of error messages		
Output filter *	PT <sub>1</sub> filter, time constant 0 ... 120 s		
Measurement error <sup>1)</sup>	< 0.25 % current value + 0.025 mA		
Start/end of scale *	Configurable within selected range		
Bilinear: Vertex X/Y *	Configurable within selected range		

## Output 2

For version with 2nd current output only

Current loop, 4 ... 20 mA, floating, reverse polarity protected

Supply voltage	14 ... 30 V
Process variable *	Conductivity, resistivity, concentration, salinity, or temperature
Characteristic	Linear, bilinear or logarithmic
Overrange *	22 mA in the case of error messages
Output filter *	PT <sub>1</sub> filter, time constant 0 ... 120 s
Measurement error <sup>1)</sup>	< 0.25 % of current value + 0.05 mA
Start/end of scale *	Configurable within selected range
Bilinear: Vertex X/Y *	Configurable within selected range
<b>Real-time clock</b>	Different time and date formats selectable
Power reserve	> 5 days
<b>Display</b>	LC display, 7-segment with icons
Main display	Character height approx. 22 mm, unit symbols approx. 14 mm
Secondary display	Character height approx. 10 mm
Text line	14 characters, 14 segments
Sensoface	3 status indicators (friendly, neutral, sad face)
Mode Indicators	meas, cal, conf, diag Further icons for configuration and messages
Alarm indication	Display blinks, red backlighting
<b>Keypad</b>	Keys: meas, menu, info, 4 cursor keys, enter
<b>HART communication (TAN)</b>	HART version 6 Digital communication by FSK modulation of output current 1 Device identification, measured values, status and messages, parameter setting, calibration, records
<b>FDA 21 CFR Part 11</b>	Access control by editable passcodes Logbook entry and flag via HART Message and logbook entry when enclosure is opened

# Specifications

---

## Diagnostic functions

Calibration data	Calibration date, sensor parameters
Device self-test	Display test, automatic memory test (RAM, FLASH, EEPROM), module test
Logbook (TAN)	100 events with date and time
Extended logbook (TAN)	Audit Trail: 200 events with date and time

## Service functions

Sensor monitor	Display of direct sensor signals
Current source	Current specifiable for output 1 and 2 (04.00 ... 22.00 mA)
Passcodes	Assigning passcodes for menu access
Factory setting	Resetting all parameters to factory setting
TAN	Enabling optionally available additional functions

<b>Data retention</b>	Parameters, calibration data, logbook > 10 years (EEPROM)
-----------------------	---

## Housing

	Molded enclosure, glass fiber reinforced Front unit material: PBT Rear unit material: PC
Mounting	Wall, pipe/post or panel mounting
Color	Gray RAL 7001
Ingress protection	IP66/IP67/TYP E 4X outdoor (with pressure compensation) when the device is closed
Flammability	UL 94 V-0 for external parts
Dimensions	148 mm x 148 mm
Control panel cutout	138 mm x 138 mm acc. to DIN 43 700
Weight	approx. 1200 kg (1.6 kg incl. accessories and packaging)
Cable glands	5 knockouts for M20 x 1.5 cable glands 2 of 5 knockouts for NPT ½" or rigid metallic conduit

## Terminals

Screw terminals	for single or stranded wires 0.2... 2.5 mm <sup>2</sup>
Tightening torque	0.5 ... 0.6 Nm

## Wiring

Stripping length	Max. 7 mm
Temperature resistance	> 75 °C / 167 °F

## Rated operating conditions

Climatic class	3K5 according to EN 60721-3-3
Location class	C1 according to EN 60654-1
Ambient temperature	-20 ... 65 °C / -4 ... 149 °F
Relative humidity	5 ... 95 %
Supply voltage	14 ... 30 V

## Transport and storage

Transport / storage temperature	-30 ... 70 °C / -22 ... 158 °F
---------------------------------	--------------------------------

## EMC

Emitted interference	Class A (industrial applications) <sup>4)</sup>
Immunity to interference	Industrial applications

\*) User-defined

2) ± 1 count

1) At rated operating conditions

3) Plus sensor error

# Calibration Solutions

---

## Potassium Chloride Solutions

(Conductivity in mS/cm)

Temperature [°C]	Concentration <sup>1</sup>		
	0.01 mol/l	0.1 mol/l	1 mol/l
0	0.776	7.15	65.41
5	0.896	8.22	74.14
10	1.020	9.33	83.19
15	1.147	10.48	92.52
16	1.173	10.72	94.41
17	1.199	10.95	96.31
18	1.225	11.19	98.22
19	1.251	11.43	100.14
20	1.278	11.67	102.07
21	1.305	11.91	104.00
22	1.332	12.15	105.94
23	1.359	12.39	107.89
24	1.386	12.64	109.84
25	1.413	12.88	111.80
26	1.441	13.13	113.77
27	1.468	13.37	115.74
28	1.496	13.62	
29	1.524	13.87	
30	1.552	14.12	
31	1.581	14.37	
32	1.609	14.62	
33	1.638	14.88	
34	1.667	15.13	
35	1.696	15.39	
36		15.64	

---

1) Data source: K. H. Hellwege (Editor), H. Landolt, R. Börnstein: Zahlenwerte und Funktionen ..., volume 2, part. volume 6

## Sodium Chloride Solutions

(Conductivity in mS/cm)

Temperature [°C]	Concentration		
	0.01 mol/l <sup>1)</sup>	0,1 mol/l <sup>1)</sup>	Saturated <sup>2)</sup>
0	0.631	5.786	134.5
1	0.651	5.965	138.6
2	0.671	6.145	142.7
3	0.692	6.327	146.9
4	0.712	6.510	151.2
5	0.733	6.695	155.5
6	0.754	6.881	159.9
7	0.775	7.068	164.3
8	0.796	7.257	168.8
9	0.818	7.447	173.4
10	0.839	7.638	177.9
11	0.861	7.831	182.6
12	0.883	8.025	187.2
13	0.905	8.221	191.9
14	0.927	8.418	196.7
15	0.950	8.617	201.5
16	0.972	8.816	206.3
17	0.995	9.018	211.2
18	1.018	9.221	216.1
19	1.041	9.425	221.0
20	1.064	9.631	226.0
21	1.087	9.838	231.0
22	1.111	10.047	236.1
23	1.135	10.258	241.1
24	1.159	10.469	246.2
25	1.183	10.683	251.3
26	1.207	10.898	256.5
27	1.232	11.114	261.6
28	1.256	11.332	266.9
29	1.281	11.552	272.1
30	1.306	11.773	277.4
31	1.331	11.995	282.7
32	1.357	12.220	288.0
33	1.382	12.445	293.3
34	1.408	12.673	298.7
35	1.434	12.902	304.1
36	1.460	13.132	309.5

1) Data source: Test solutions calculated according to DIN IEC 746-3

2) Data source: K. H. Hellwege (Editor), H. Landolt, R. Börnstein: Zahlenwerte und Funktionen ..., volume 2, part. volume 6

# Concentration Measurement

## Ranges

Substance	Concentration ranges		
NaCl	0-26 wt% (0 °C / +32 °F) 0-26 wt% (+100 °C / +212 °F)		
Configuration	<b>-01-</b>		
HCl	0-18 wt% (-20 °C / -4 °F) 0-18 wt% (+50 °C / +122 °F)	22-39 wt% (-20 °C / -4 °F) 22-39 wt% (+50 °C / +122 °F)	
Configuration	<b>-02-</b>	<b>-07-</b>	
NaOH	0-13 wt% (0 °C / +32 °F) 0-24 wt% (+100 °C / +212 °F)	15-50 wt% (0 °C / +32 °F) 35-50 wt% (+100 °C / +212 °F)	
Configuration	<b>-03-</b>	<b>-10-</b>	
H <sub>2</sub> SO <sub>4</sub>	0-26 wt% (-17 °C/-1.4 °F) 0-37 wt% (+110 °C/+230 °F)	28-77 wt% (-17 °C/-1.4 °F) 39-88 wt% (+115 °C/+239 °F)	94-99 wt% (-17 °C/-1.4 °F) 89-99 wt% (+115 °C/+239 °F)
Configuration	<b>-04-</b>	<b>-09-</b>	<b>-06-</b>
HNO <sub>3</sub>	0-30 wt% (-20 °C / -4 °F) 0-30 wt% (+50 °C / +122 °F)	35-96 wt% (-20 °C / -4 °F) 35-96 wt% (+50 °C / +122 °F)	
Configuration	<b>-05-</b>	<b>-08-</b>	

For the solutions listed above, the device can determine the substance concentration from the measured conductivity and temperature values in % by wt. The measurement error is made up of the sum of measurements errors during conductivity and temperature measurement and the accuracy of the concentration curves stored in the device. We recommend to calibrate the device together with the sensor, e.g. directly to concentration using the CAL\_CELL method. For exact temperature measurement, you should perform a temperature probe adjustment. For measuring processes with rapid temperature changes, a separate temperature probe with fast response should be used.

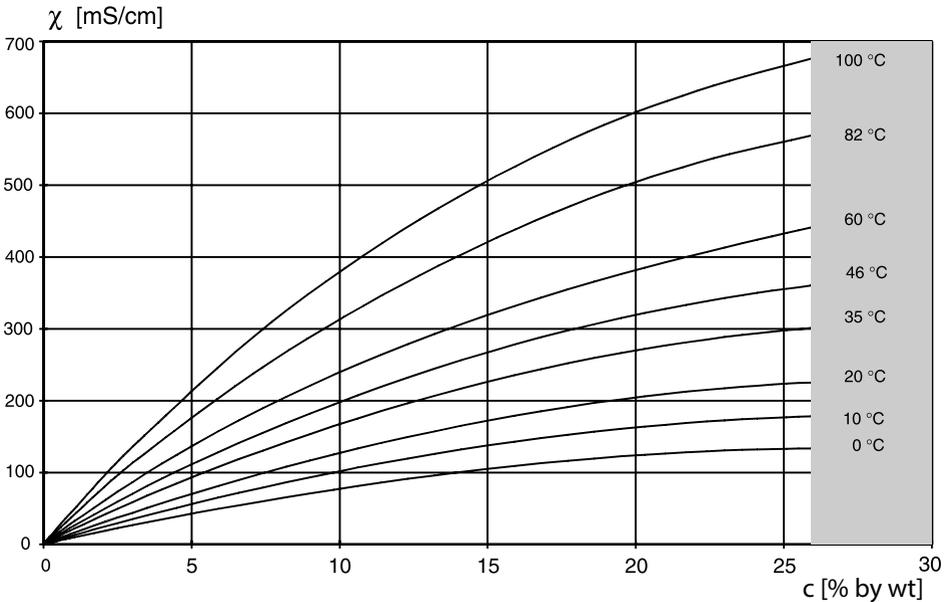
When measuring processes such as dilution or intensification of CIP solutions (Clean-In-Place), it is helpful to switch between the parameter sets for measuring the process medium and for measuring the CIP solution.

For specification of a concentration solution for conductivity measurement, see page 51.

# Concentration Curves

## -01- Sodium chloride solution NaCl

← -01- →



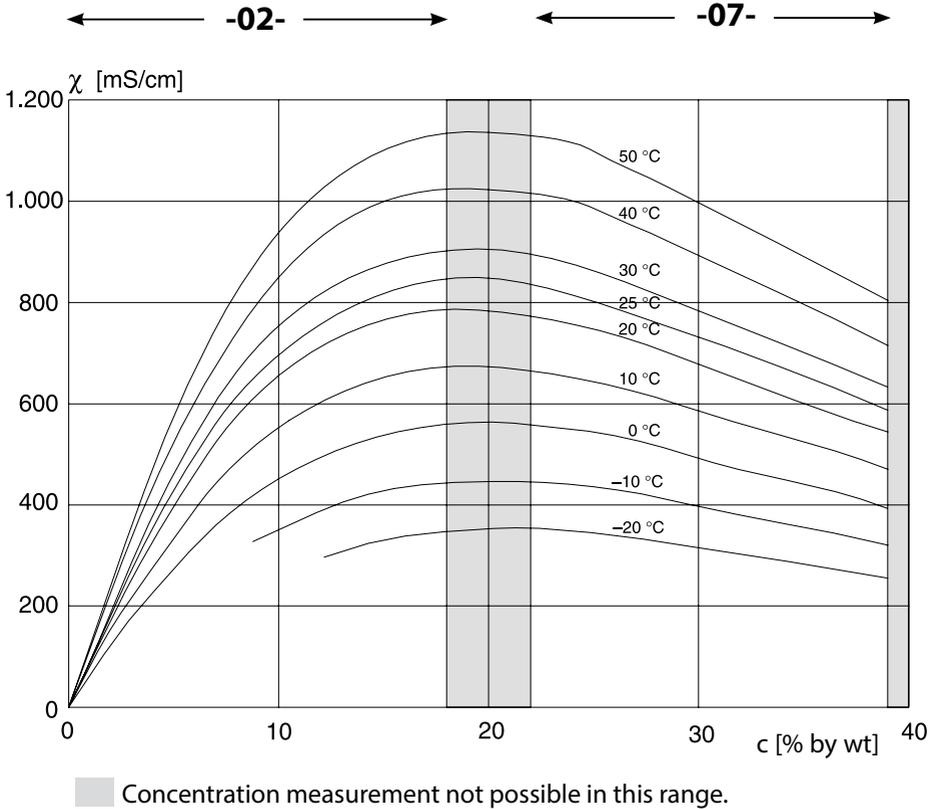
■ Concentration measurement not possible in this range.

Conductivity versus substance concentration and process temperature for sodium chloride solution (NaCl)

# Concentration Curves

## -02- Hydrochloric acid HCl

-07-



Conductivity versus substance concentration and process temperature for hydrochloric acid (HCl)

Source: Haase/Sauermann/Dücker; Z. phys. Chem. New Edition, Vol. 47 (1965)

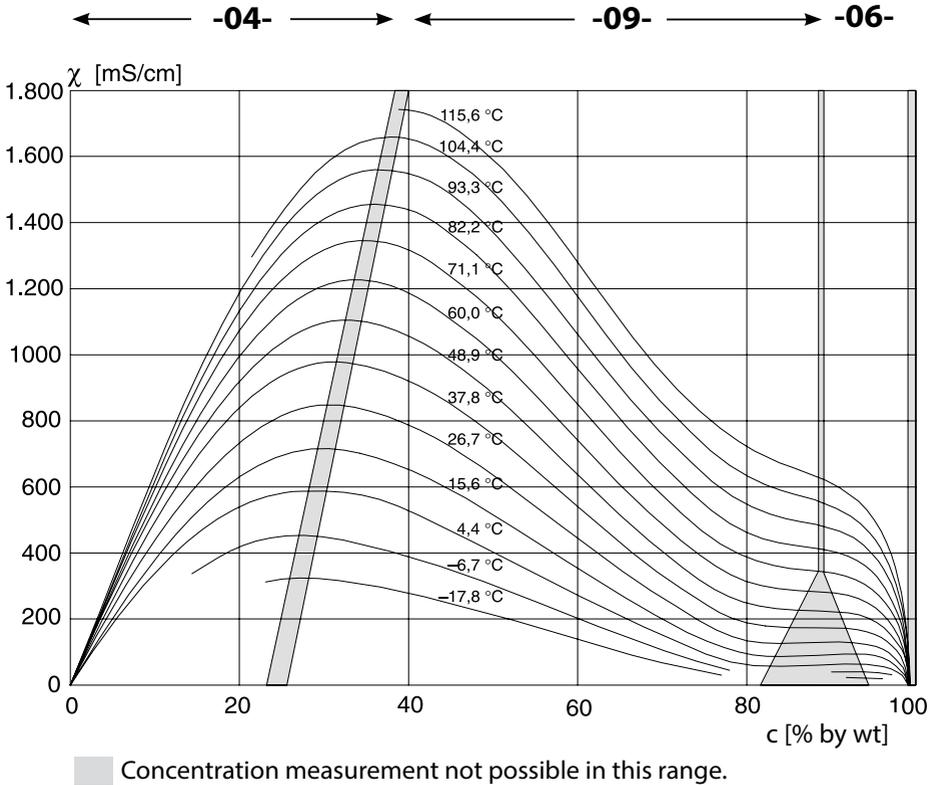


# Concentration Curves

-04- Sulfuric acid  $H_2SO_4$

-06-

-09-

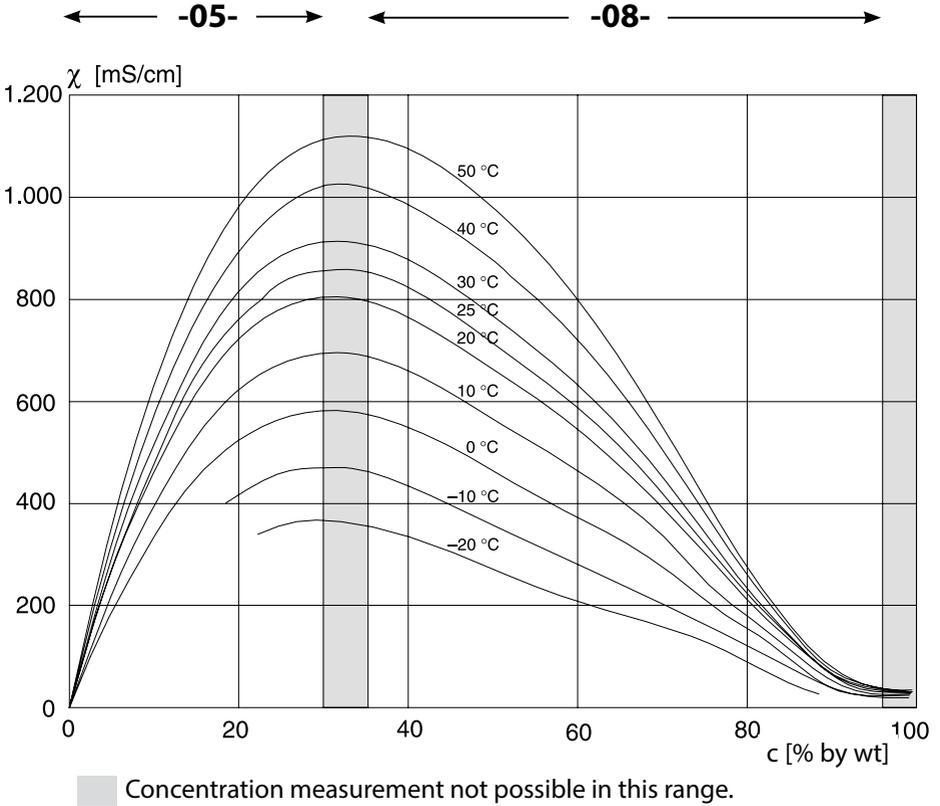


Conductivity versus substance concentration and process temperature for sulfuric acid ( $H_2SO_4$ )

Source: Darling; Journal of Chemical and Engineering Data; Vol.9 No.3, July 1964

-05- Nitric acid  $\text{HNO}_3$

-08-



Conductivity versus substance concentration and process temperature for nitric acid ( $\text{HNO}_3$ )

Source: Haase/Sauermann/Dücker; Z. phys. Chem. New Edition, Vol. 47 (1965)

# Error Handling

---

## Alarm condition:

- The display backlighting turns **red**
- The alarm icon  is displayed
- The complete measured-value display blinks
- **"ERR xxx"** is displayed in the lower menu line

Press the [**info**] key to view a short error text:

- The error text appears in the lower menu line
- The main display reads **"InFo"**.

## Parameter errors:

Configuration data such as current range, limit values, etc are checked during the input.

If they are out of range,

- **"ERR xxx"** is displayed for 3 sec,
- the display backlighting flashes red,
- the respective maximum or minimum value is shown,
- input must be repeated.

If a faulty parameter arrives through the interface (HART),

- an error message will be displayed: **"ERR 100...199"**
- the faulty parameter can be localized by pressing the [**info**] key

## Calibration errors:

If errors occur during calibration,

- an error message will be displayed

## Sensoface:

If the Sensoface becomes sad,

- the display backlighting will turn magenta (purple)
- the cause can be seen by pressing the **info** key
- the calibration data can be seen in the Diagnostics menu

# Error Messages

<b>Error</b>	<b>Info text</b> (is displayed in case of fault when the Info key is pressed)	<b>Problem</b> <b>Possible causes</b>
<b>ERR 99</b>	DEVICE FAILURE	<b>Error in factory settings</b> EEPROM or RAM defective This error message only occurs in the case of a total defect. The device must be repaired and recalibrated at the factory.
<b>ERR 98</b>	CONFIGURATION ERROR	<b>Error in configuration or calibration data</b> Memory error in device program Configuration or calibration data defective; completely reconfigure and recalibrate the device.
<b>ERR 97</b>	NO MODULE INSTALLED	<b>No module</b> Please have the module replaced at the factory.
<b>ERR 96</b>	WRONG MODULE	<b>Wrong module</b> Please have the module replaced at the factory.
<b>ERR 95</b>	SYSTEM ERROR	<b>System error</b> Restart required. If error still persists, send in the device for repair.

# Error Messages

Error	Info text (is displayed in case of fault when the Info key is pressed)	Problem Possible causes
ERR 10	CONDUCTANCE TOO HIGH	<b>Measuring range of conductance exceeded</b> > 3500 mS
ERR 11	CONDUCTIVITY RANGE  CONCENTRATION RANGE  SALINITY RANGE	<b>Display range limits exceeded</b>  Cond > 1999 mS/cm > 99.99 S/m  Conc > 99.9 %  SAL > 45.0 ‰
ERR 13	TEMPERATURE RANGE	<b>Temperature range limits exceeded</b>  Connect the sensor, check the sensor cable and replace if necessary, check the sensor connection, adjust the parameter settings.
ERR 15	SENSOCHECK	<b>Sensocheck</b>
ERR 60	OUTPUT LOAD	<b>Load error</b> Check the current loop, deactivate unused current outputs.
ERR 61	OUTPUT 1 TOO LOW	<b>Output current 1</b> < 0 (3.8) mA
ERR 62	OUTPUT 1 TOO HIGH	<b>Output current 1</b> > 20.5 mA
ERR 63	OUTPUT 2 TOO LOW	<b>Output current 2</b> < 0 (3.8) mA
ERR 64	OUTPUT 2 TOO HIGH	<b>Output current 2</b> > 20.5 mA
ERR 69	TEMP. OUTSIDE TABLE	Temperature value outside table (e.g., for concentration or TC)

<b>Error</b>	<b>Info text</b> (is displayed in case of fault when the Info key is pressed)	<b>Problem</b> <b>Possible causes</b>
<b>ERR 72</b>	FLOW TOO LOW	Flow too low
<b>ERR 73</b>	FLOW TOO HIGH	Flow too high
<b>ERR 100</b>	INVALID SPAN OUT1	<b>Span Out1 configuration error</b> Selected span too small
<b>ERR 101</b>	INVALID SPAN OUT2	<b>Span Out2 configuration error</b> Selected span too small
<b>ERR 105</b>	INVALID SPAN I-INPUT	<b>Configuration error</b> Current input
<b>ERR 108</b>	OUT1 INVALID CORNER X/Y	Bilinear characteristic: Invalid vertex point
<b>ERR 109</b>	OUT2 INVALID CORNER X/Y	

# Decommissioning

---

## **Disposal**

Local codes and regulations must be observed when disposing of the product.

## **Returns**

If required, send the product in a clean condition and securely packed to your local contact. See [www.knick.de](http://www.knick.de).

(Sensochek must have been activated during configuration.)



The smiley in the display (Sensoface) alerts to sensor problems (defective sensor, defective cable, maintenance required). The permitted calibration ranges and the conditions for a friendly, neutral, or sad Sensoface are summarized in the following table. Additional icons refer to the error cause.

## Sensochek

Continuously monitors the sensor and leads for short circuits or open circuits. Critical values make the Sensoface “sad” and the corresponding icon blinks:



The Sensochek message is also output as error message Err 15.

The display backlighting turns red, output current 1 is set to 22 mA (when configured correspondingly).

Sensochek can be switched off during configuration (then Sensoface is also disabled).

### Exception:

After a calibration a smiley is always displayed for confirmation.

### Note:

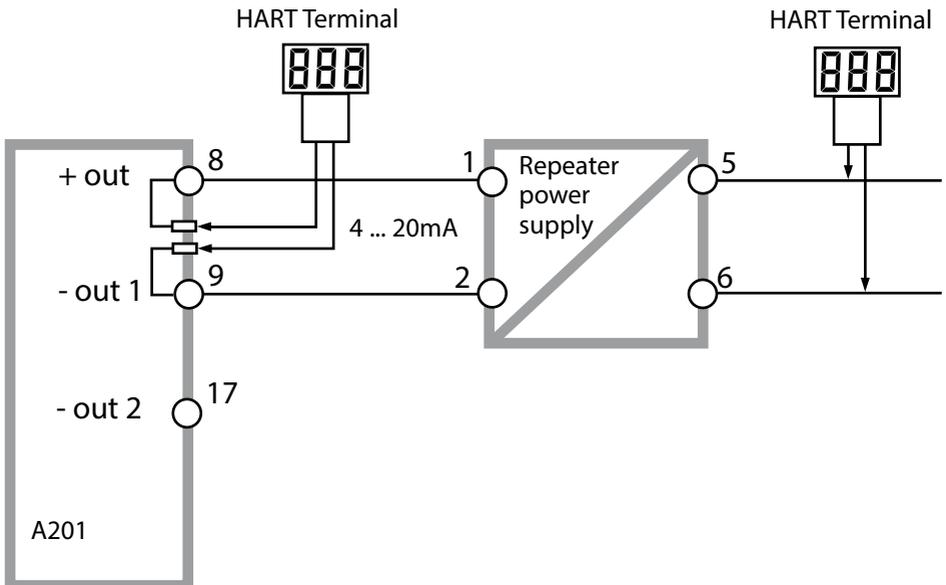
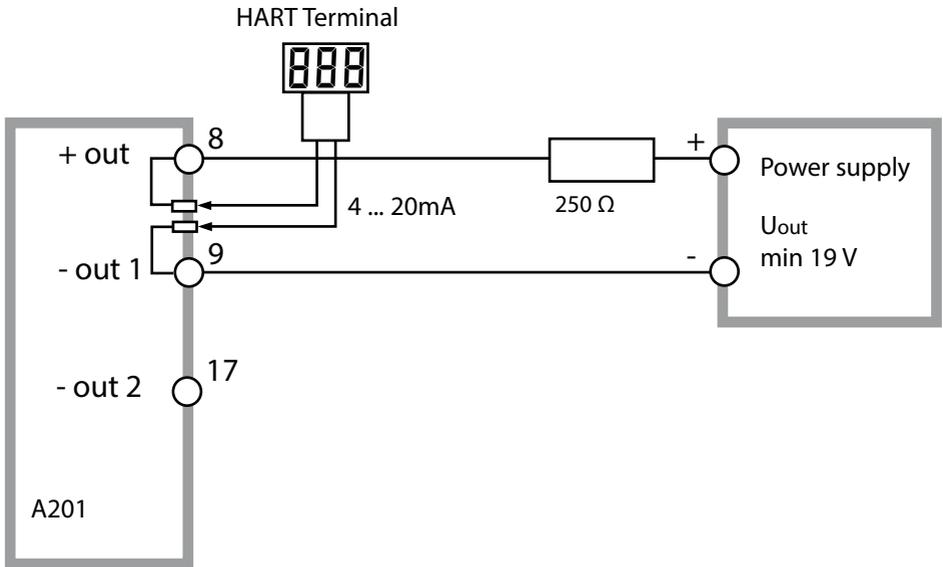
The worsening of a Sensoface criterion leads to the devaluation of the Sensoface indicator (Smiley becomes “sad”). An improvement of the Sensoface indicator can only take place after calibration or removal of the sensor defect.

# Sensoface

Display	Problem	Status	
	Sensor defect		Wrong or defective sensor or excessive cable capacitance (see also error message Err 15).
	Temperature		Temperature outside range for TC, conc, sal

# HART: Typical Applications

(SW-A001)



# FDA 21 CFR Part 11

---

## **Conformity with FDA 21 CFR Part 11**

In their directive “Title 21 Code of Federal Regulations, 21 CFR Part 11, Electronic Records; Electronic Signatures” the American health agency FDA (Food and Drug Administration) regulates the production and processing of electronic documents for pharmaceutical development and production. This results in requirements for measuring devices used for corresponding applications. The following features ensure that the measuring devices of this Series meet the demands of FDA 21 CFR Part 11:

### **Electronic Signature – Passcodes**

Access to the device functions is regulated and limited by individually adjustable codes – “Passcodes” (see SERVICE). This prevents unauthorized modification of device settings or manipulation of the measurement results. Appropriate use of these passcodes makes them suitable as electronic signature.

### **Audit Trail**

Every (manual) change of device settings can be automatically documented. Each change is tagged with a “Configuration Change Flag”, which can be interrogated and documented using HART communication. Altered device settings or parameters can also be retrieved and documented using HART communication.

### **Extended logbook (TAN SW-A003)**

Audit Trail also records function activations (CAL, CONFIG, SERVICE), some Sensoface messages (cal timer, wear, SIP, CIP) and opening of the enclosure.

## A

Access code assignment 102  
Accessories 107  
Activating an option 102  
AIR-SET calibration 92  
Alarm 36  
Alarm and HOLD messages 37  
Alarm settings 76  
Ambulance TAN 102  
Assembly 13  
Audit Trail 130  
Audit Trail, diagnostics 98  
Autorange 59

## B

Backlighting 28  
Block diagram 12

## C

Cable glands 17  
Cable preparation SE655/SE656 20  
Calibration 85  
Calibration by entry of cell factor 88  
Calibration data, display 96  
Calibration errors 122  
Calibration, general 33  
Calibration mode 85  
Calibration solutions 114  
Calibration with calibration solution 86  
Calibration with installation factor 89  
CIP / SIP 55  
Commissioning 7  
Concentration curves: hydrochloric acid HCl 118  
Concentration curves: nitric acid HNO<sub>3</sub> 121  
Concentration curves: sodium chloride solution NaCl 117  
Concentration curves: sodium hydroxide solution NaOH 119  
Concentration curves: sulfuric acid H<sub>2</sub>SO<sub>4</sub> 120  
Concentration measurement, custom concentration solution 51  
Concentration ranges 116

- Concentration solution, selection 50
- Configuration, alarm 76
- Configuration, CONTROL input 74
- Configuration, current output 1 58
- Configuration, current output 2 68
- Configuration, display backlighting 82
- Configuration, flow measurement 74
- Configuration, general 33
- Configuration, measuring point 82
- Configuration, menu groups 40
- Configuration, menu structure 39
- Configuration, output current during Error and HOLD 66
- Configuration, overview 42
- Configuration, Sensocheck 76
- Configuration, sensor 48
- Configuration, sensor verification (TAG, GROUP) 56
- Configuration, temperature compensation 70
- Configuration, time and date 80
- Configuration, time averaging filter 64
- Connection to supply units 106
- CONTROL, alarm settings 78
- CONTROL, configuring the input 74
- Control drawings 3
- CONTROL input 37
- Control inputs 11
- Current start / end 59

## **D**

- Data logger, explanation 10
- Date and time (configuration) 80
- Date and time (usage) 81
- Date, display 94
- Declaration of Conformity 3
- Decommissioning 126
- Device self-test 97
- Device type, display 99
- Diagnostics, calibration data 96
- Diagnostics, device self-test 97
- Diagnostics, general 33

Diagnostics, logbook 98  
Diagnostics mode 95  
Diagnostics, sensor monitor 98  
Diagnostics, version 99  
Dimensions 14  
Display 28  
Display backlighting 28  
Display data in Diagnostics mode 95  
Display test 97  
Disposal 126  
Documentation: package contents 3

## **E**

EEPROM test 97  
Electrical installation 17  
Electronic Signature 130  
Enabling an option 102  
Enclosure 14  
Enclosure components 13  
Entering values 30  
Error codes 123  
Error handling 122  
Error messages 123  
EU Declaration of Conformity 3  
Extended logbook, Audit Trail 130  
Extended logbook, diagnostics 98

## **F**

FDA 21 CFR Part 11 130  
FLASH test 97  
FLOW 75  
Flow measurement, configuration 74

## **G**

GROUP (measuring points) 83

## H

- HART, typical applications 129
- HOLD, configuring the output signal 67
- HOLD mode, description 35
- HOLD mode, exit 35
- HOLD mode, external activation 36
- HOLD mode, manual activation 36
- HOLD mode, output signal 35

## I

- Info text 123
- Installation, notices 17
- Intended use 7

## K

- Keypad 27

## L

- Logarithmic curve 62
- Logbook, diagnostics 98

## M

- Maintenance 105
- Manual switchover of parameter sets A/B 41
- Measured values, display 98
- Measurement method, selection 48
- Measuring mode 94
- Measuring mode, overview 29
- Measuring points (TAG/GROUP) 83
- Menu structure 34
- Menu structure of configuration 39
- Message via CONTROL input 37
- Module test 97
- Monitoring the sensor lines for breakage 45
- Monitoring the temperature probe 77
- Mounting options 9
- Mounting plan 14

## **O**

- Operating modes 33
- Operating mode, selection 30
- Operating states 103
- Option request 102
- Option request: Conditions 99
- Options, overview 107
- Order code 107
- Output current, display 94
- Output current range 68
- Output current, specify value 101
- Output filter 64
- Output signal during HOLD 35
- Output signal during HOLD, configuration 67
- Overview, device properties 9

## **P**

- Package contents 13
- Package contents: documentation 3
- Panel mounting 16
- Parameter error 122
- Parameter set A/B 40
- Parameter set A/B, display 94
- Parameter set A/B, individual settings 46
- Parameter set A/B, introduction 10
- Parameter set selection 41
- Parameter set selection via external signal 74
- Pipe mounting 15
- Power supply units 106
- Product calibration 90
- Product line 107
- Protective hood 15

## **Q**

- Quickstart guides 3

## R

RAM test 97  
Rated operating conditions 113  
Rating plates 18  
Repair 105  
Reset to factory settings 102  
Returns 126

## S

Safety 7  
Safety guide 3  
SE670/680 sensor, connection via RS-485 26  
Selection menu 30  
Sensocheck, configuration 76  
Sensocheck, description 127  
Sensoface, description 127  
Sensoface, troubleshooting 122  
Sensor connection, assignments 19  
Sensor connection, examples 21  
Sensor monitor, diagnostics 98  
Sensor monitor (Service) 101  
Sensor type selection 48  
Sensor verification (TAG, GROUP) 57  
Serial number, display 99  
Service 100  
Service, factory setting 102  
Service, general 33  
Service, output current, specify value 101  
Service, passcode assignment 102  
Service passcode lost 102  
Service, sensor monitor 101  
Setting the passcodes 102  
Signal colors 28, 32  
Signal lines 19  
Signal outputs 11  
Software version, display 99  
Specifications 108  
Supplemental directives 2  
Supply units 106

**T**

Tag number, display 94  
TAG (point of measurement) 83  
TAN input 102  
TAN options, activation 102  
TAN options, overview 107  
Technical data 108  
Tempcheck 76  
Temperature compensation 70, 71  
Temperature probe adjustment 93  
Temperature probe, monitoring 77  
Temperature probe, selection 48  
Temperature unit 52  
Terminal assignments 18  
Test report 2.2 3  
Time and date (configuration) 80  
Time and date (usage) 81  
Time averaging filter 65  
Time, display 94  
Transaction number (TAN) 102

**U**

User interface 27

**W**

Weather protector 15  
Wiring 19  
Wiring examples: SE655/SE656 21  
Wiring examples: SE660 22  
Wiring examples: SE670/SE680 (via RS-485) 25  
Wiring examples: Yokogawa IC40S 24  
Wiring examples: Yokogawa ISC40 23  
Wiring, power supply units 106

**Z**

Zero calibration 92



**Knick**  
**Elektronische Messgeräte**  
**GmbH & Co. KG**

**Headquarters**

Beuckestraße 22 • 14163 Berlin

Germany

Phone: +49 30 80191-0

Fax: +49 30 80191-200

info@knick.de

www.knick.de

**Local Contacts**

www.knick-international.com

Translation of the original instructions

Copyright 2022 • Subject to change

Version: 4 • This document was published on February 18, 2022.

The latest documents are available for download on our website under the corresponding product description.



099485

TA-212.135-KNEN04