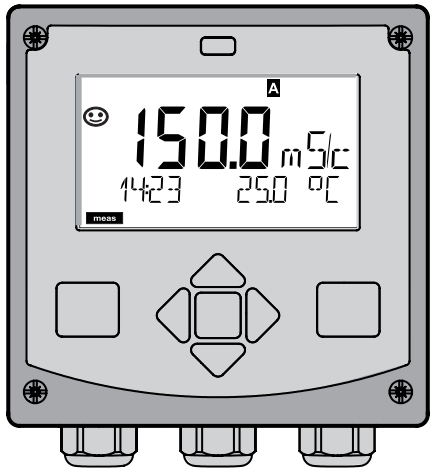
Stratos® Pro A2... COND

Instruction Manual



Latest Product Information:

www.knick.de

75284

Knick

Warranty

Warranty
Defects occurring within 3 years from delivery date shall be remedied free of charge at our plant (carriage and insurance paid by sender). Sensors, fittings, and accessories: 1 year.

Subject to change without notice.

Return of Products Under Warranty
Please contact our Service Team before returning a defective device. Ship the cleaned device to the address you have been given.
If the device has been in contact with process fluids, it must be decontaminated/disinfected before shipment. In that case, please attach a corresponding certificate, for the health and safety of our service personnel.

Disposal
Please observe the applicable local or national regulations concerning the disposal of "waste electrical and electronic equipment".

CD-ROM

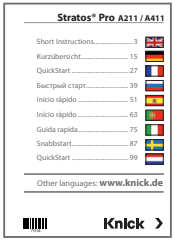
Complete documentation:

- Instruction manuals
- Safety instructions
- Short instructions

Safety Information

In official EU languages and others.

- ATEX / IECEX / FM / CSA
- EC Declarations of Conformity



Short Instructions

In German, English, French, Russian, Spanish, Portuguese, Swedish, and Dutch.
More languages on CD-ROM and on our website: www.knick.de

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

Specific Test Report

Contents

Contents

Intended Use

Stratos Pro A2... COND is used for measurement of electrical conductivity and temperature in liquids. Fields of application are: biotechnology, chemical industry, environment, food processing, water/waste-water treatment.
The sturdy molded enclosure can be fixed into a control panel or mounted on a wall or at a post. The protective hood, which is available as accessory, provides additional protection against direct weather exposure and mechanical damage.
The device has been designed for 2- and 4-electrode sensors, particularly for Models SE 600, SE 603, SE 604, SE 610, SE 620, SE 630 and for Memosens sensors.
Plain-text messages in a large, backlit display allow intuitive operation. The colored display backlighting signals alarm messages (red) or HOLD mode (orange).
The "Sensocheck" automatic monitoring of sensor and cables and the "Sensoface" function for clear indication of the sensor condition provide excellent diagnostics.
The internal logbook (TAN SW-A002) can handle up to 100 entries – up to 200 with AuditTrail (TAN SW-A003).
The device provides two parameter sets which can be switched manually or via a control input for different process adaptations or different process conditions (e.g. beer and CIP).
Password protection for granting access rights during operation can be configured.
Two floating, digital control inputs ("Hold" and "Control") are available for external control.
The device provides two current outputs (for transmission of measured value and temperature, for example).

Approvals for Measurement in Hazardous Locations:

Stratos Pro A201/A211N COND: General Safety.

Stratos Pro A201/A211X COND: Approved for operation in hazardous locations according to IECEx / ATEX / FM / CSA.

Safety Information

Safety information –
Be sure to read and observe the following instructions!
The device has been manufactured using state of the art technology and it complies with applicable safety regulations.
When operating the device, certain conditions may nevertheless lead to danger for the operator or damage to the device.

See also separate document:
- "Safety Instructions"
  (EC Declaration of Conformity, FM, CSA, ATEX (if applicable) Certificates)

⚠ CAUTION!

Commissioning must only be performed by trained personnel authorized by the operating company! Whenever it is likely that protection has been impaired, the device shall be made inoperative and secured against unintended operation.
The protection is likely to be impaired if, for example:
- the device shows visible damage
- the device fails to perform the intended measurements
- after prolonged storage at temperatures above 70°C
- after severe transport stresses

Before recommissioning the device, a professional routine test must be performed. This test must be carried out at the manufacturer's factory.

Please note:
Before commissioning it must be proved that the device may be connected with other equipment.

Information for Installation in Hazardous Locations (Stratos Pro A201/A211X COND)

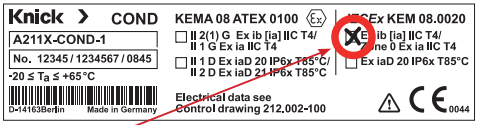
- Be sure to observe the stipulations of EN 60079-10 / EN 60079-14 or the corresponding local regulations during installation and commissioning. See also separate "Safety Instructions" document.

Approvals for application in hazardous locations (Stratos Pro A201/A211X COND)

- according to IECEx in Zone 0, 1, 20, 21
- according to ATEX in Zone 0, 1, 2 , 20, 21
- according to cCSAus in Class I Div 1, 2 / Zone 1
- according to FM in Class I, Div 1, 2 / Zone 1

Important Notice:
The operator must indicate the type of protection!

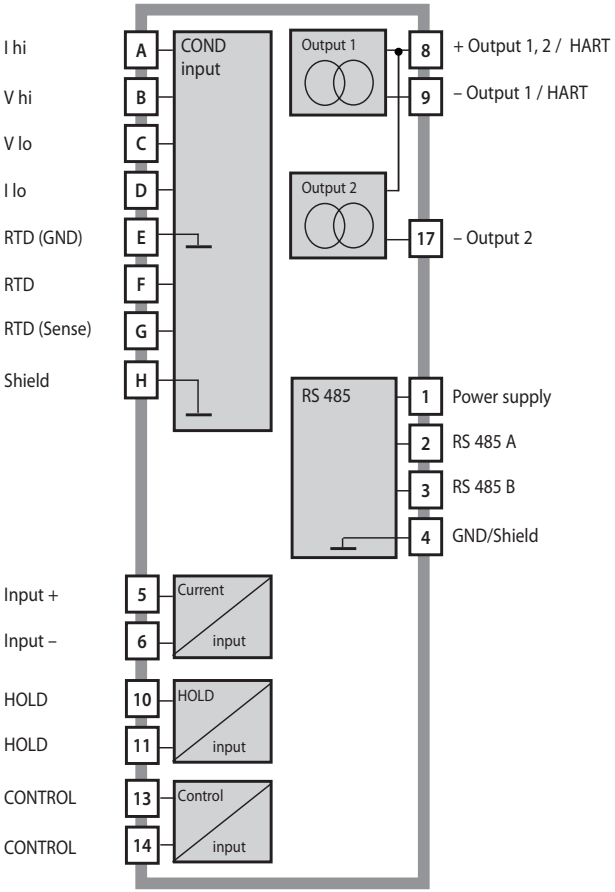
When the device provides different types of protection, the operator must specify the applied type of protection during installation.
To do so, use the checkboxes on the rating plate:



Stratos Pro A2...X rating plate at outside bottom of front with checkboxes for marking the respective application after installation

Terminals:
Screw terminal, suitable for single wires / flexible leads up to 2.5 mm^2 (AWG 14). Recommended torque for the terminal screws: 0.5 ... 0.6 Nm.

Overview of Stratos Pro A2... COND



Package Contents

Check the shipment for transport damage and completeness!

The package should contain:

- Front unit, rear unit, bag containing small parts
- Specific test report
- Documentation (cf Pg 3)
- CD-ROM

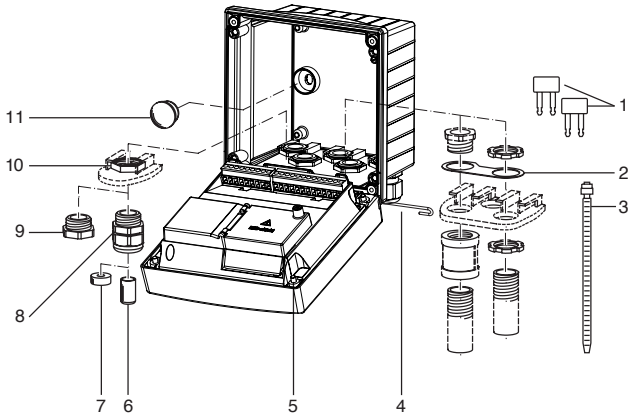
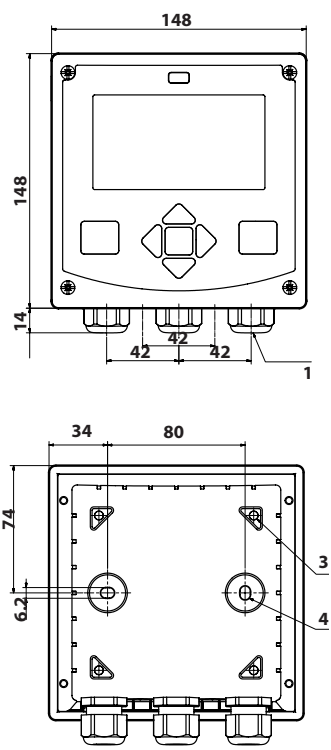


Fig.: Assembling the enclosure

1) Jumper (3 x)
2) Washer (1 x), for conduit mounting: Place washer between enclosure and nut
3) Cable tie (3 x)
4) Hinge pin (1 x), insertable from either side
5) Enclosure screw (4 x)
6) Sealing insert (1 x)
7) Rubber reducer (1 x)
8) Cable gland (3 x)
9) Filler plug (3 x)
10) Hexagon nut (5 x)
11) Sealing plug (2 x), for sealing in case of wall mounting

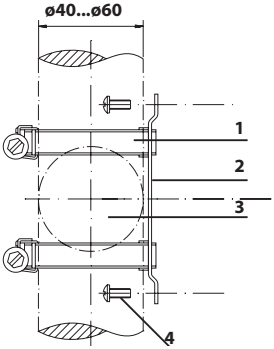
Mounting Plan, Dimensions



1) Cable gland (3 x)
2) Knockouts for cable gland or ½" conduit, 21.5 mm dia. (2 knockouts) Conduits not included!
3) Knockout for pipe mounting (4 x)
4) Knockout for wall mounting (2 x)

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.: ZU 0274 pipe-mount kit (All dimensions in mm!)

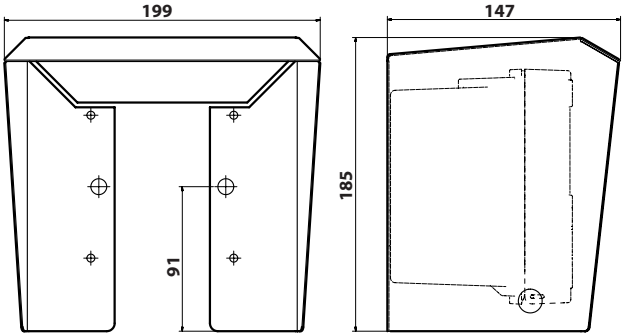
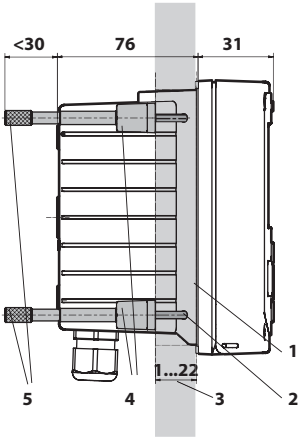


Fig.: ZU 0737 protective hood for wall and pipe mounting (All dimensions in mm!)

Panel Mounting



1) Circumferential sealing (1 x)
2) Screw (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.: ZU 0738 panel-mount kit (All dimensions in mm!)

Installation Instructions

- Installation of the device must be carried out by trained experts in accordance with this instruction manual and as per applicable local and national codes.
- Be sure to observe the technical specifications and input ratings during installation!
- Be sure not to notch the conductor when stripping the insulation!
- The supplied current must be galvanically isolated. If not, connect an isolator module.
- All parameters must be set by a system administrator prior to commissioning!

Terminals:

suitable for single wires / flexible leads up to 2.5 mm^2 (AWG 14)

Additional safety precautions have to be taken for applications in hazardous locations according to IECEx, ATEX, FM, CSA!
(See also separate "Safety Instructions" document.)

Rating Plates / Terminal Assignments

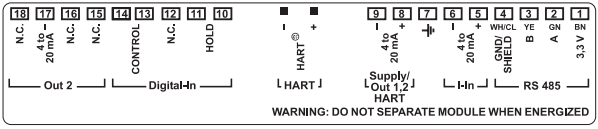


Fig.: Terminal assignments of Stratos Pro A2...

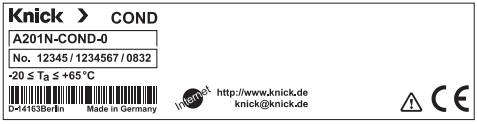


Fig.: Stratos Pro A2...N rating plate at outside bottom of front

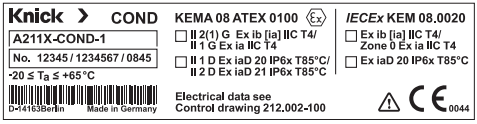


Fig.: Stratos Pro A2...X rating plate at outside bottom of front

Important Notice:
The operator must indicate the type of protection!
When the device provides different types of protection, the operator must specify the applied type of protection during installation.
To do so, use the checkboxes on the rating plate.
See also "Safety Information" chapter.

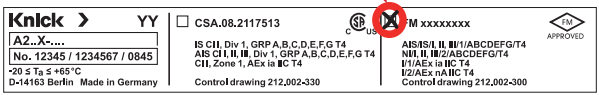
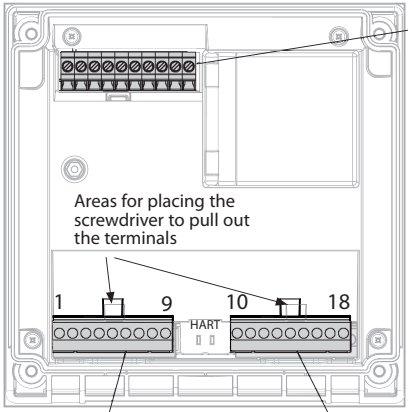


Fig.: Example of additional approval plate (cCSAus, FM)
The specifications refer to the respective device.

Wiring of Stratos Pro A201/A211 COND



Terminal row 1	
1	supply
2	RS 485 A
3	RS 485 B
4	GND/shield
5	+ input
6	– input
7	PA (equipot. bonding)
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)

Sensor connection MK-COND module	
A	I hi
B	V hi
C	V lo
D	I lo
E	RTD (GND)
F	RTD
G	RTD (Sense)
H	Shield

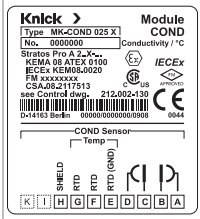


Fig.: MK-COND module terminal assignments

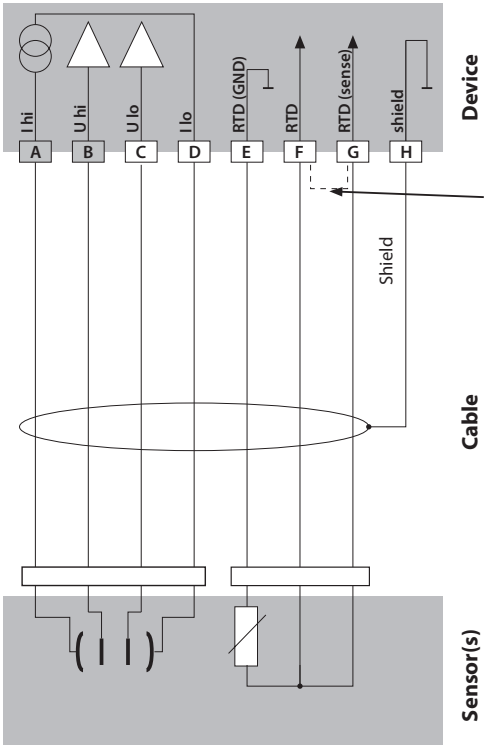
Fig.: Terminals, device opened, back of front unit

Wiring Examples

Example 1:

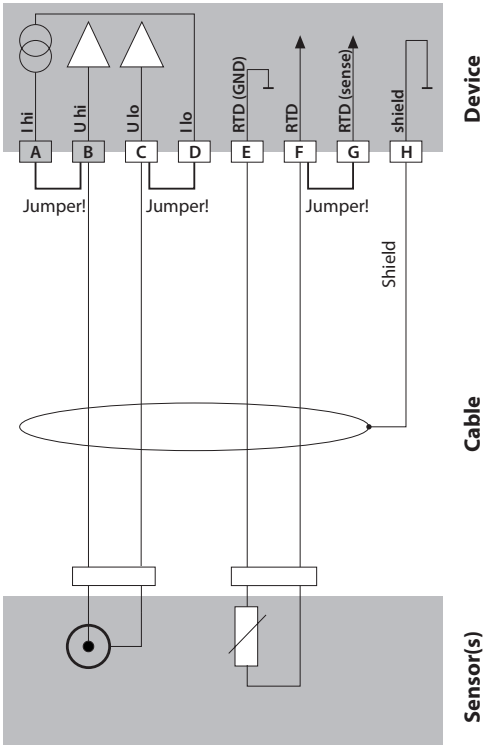
Measuring task: Conductivity, temperature

Sensors (principle): 4 electrodes



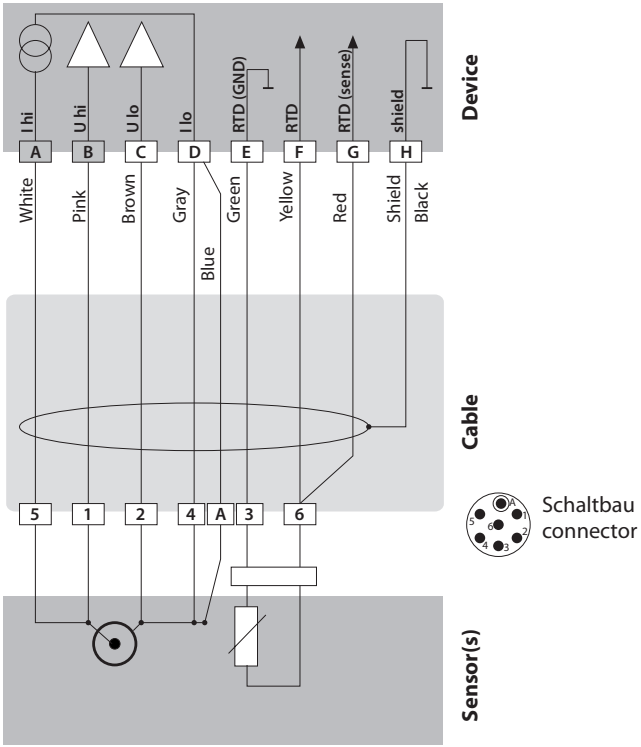
Example 2:

Measuring task: Conductivity, temperature
Sensors (principle): 2 electrodes, coaxial



Example 3:

Measuring task: Conductivity, temperature
Sensors (example): SE 604 (Knick)
Cable: Schaltbau cable

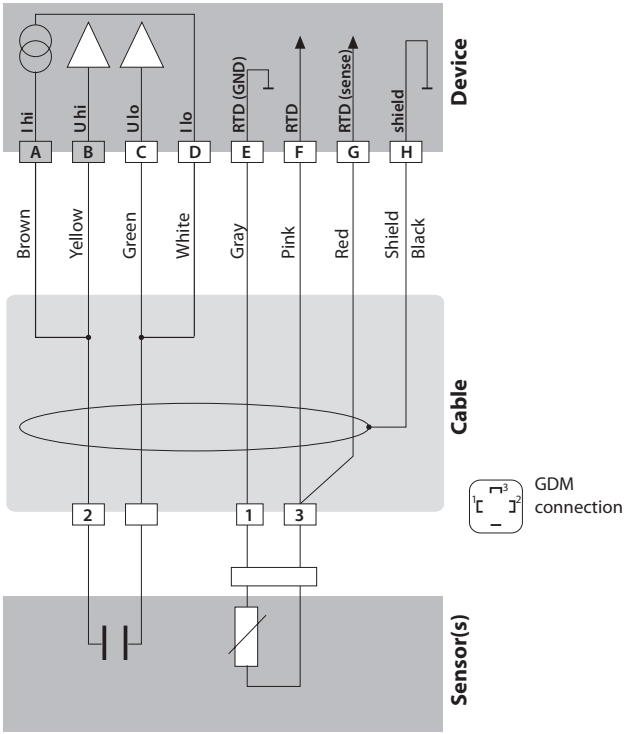


Example 4:

Measuring task: Conductivity, temperature

Sensors (example): SE 630 (Knick)

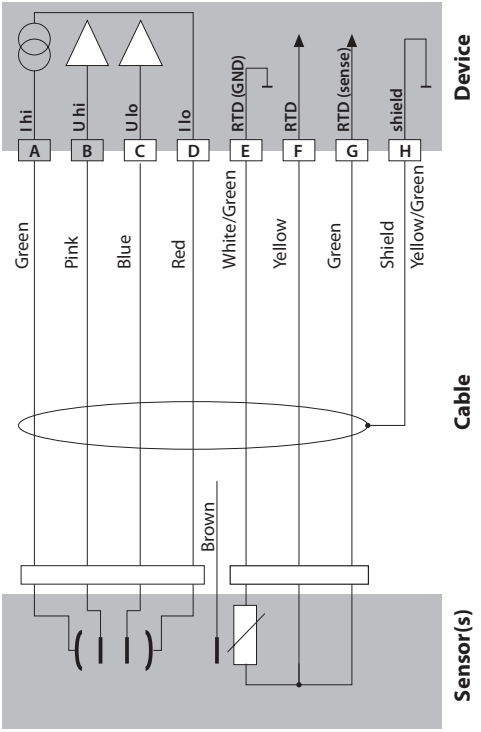
Connection via GDM connector



Example 5:

Measuring task: Conductivity, temperature

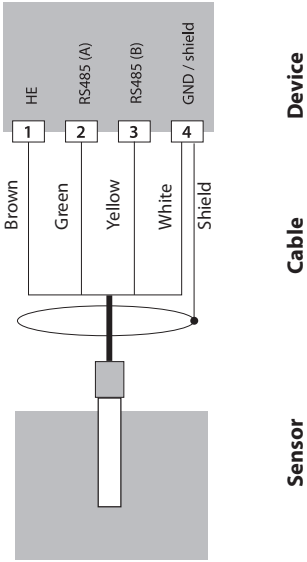
Sensors (example): SE 600 / SE 603 4-EL fringe-field sensor (Knick)



Example 6:

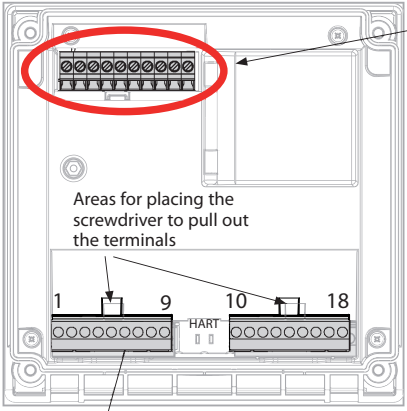
Measuring task: Conductivity, temperature

Sensor: Memosens



The Memosens sensor is 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). The connected Memosens sensor is automatically recognized during start-up of the transmitter.

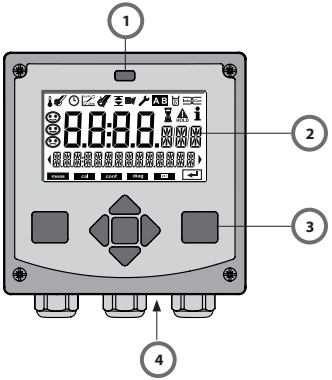
Connection of Memosens Sensor



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

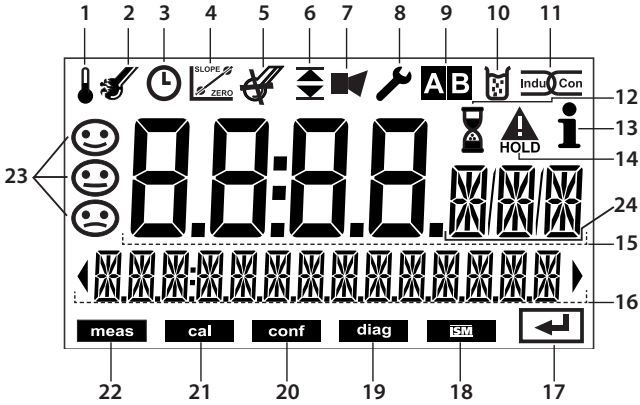
Connection of Memosens:		Wire color
1	Power supply	Brown
2	RS 485 A	Green
3	RS 485 B	Yellow
4	GND/shield	White, transparent shield

User Interface, Keypad



1 IrDA transmitter/receiver
2 Display
3 Keypad
4 Rating plate (bottom)

Key	Function
meas	• Return to last menu level • Directly to measuring mode (press > 2 s)
info	• Retrieve information • Show error messages
enter	• Configuration: Confirm entries, next configuration step • Calibration: Continue program flow • Measuring mode: Display output current
Arrow keys up / down	• Measuring mode: Call menu • Menu: Increase/decrease a numeral • Menu: Select
Arrow keys left / right	• Measuring mode: Call menu • Menu: Previous/next menu group • Number entry: Move between digits



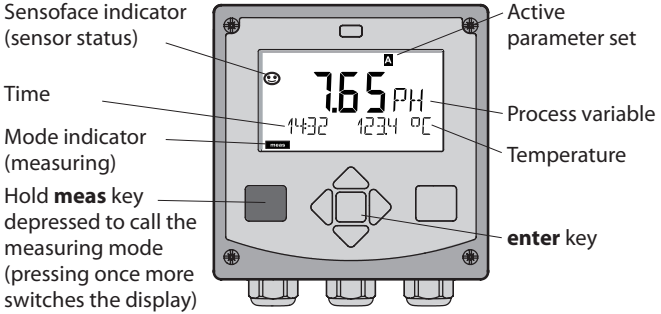
1 Temperature
2 Sensocheck
3 Interval/response time
4 Sensor data
5 Not used
6 Limit values
7 Alarm
8 Service
9 Parameter sets A/B
10 Calibration
11 Digital sensor
12 Waiting time running
13 Info available
14 HOLD mode active
15 Main display
16 Secondary display
17 Proceed with enter
18 Not used
19 Diagnostics
20 Configuration mode
21 Calibration mode
22 Measuring mode
23 Sensoface
24 Measurement symbol

Signal Colors (Display Backlighting)

Red	Alarm
Orange	HOLD mode (Calibration, Configuration, Service)
Turquoise	Diagnostics
Green	Info
Purple	Sensoface message

Measuring Mode

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



In measuring mode the display indicates:

- Measured value and time (24/12 h AM/PM) as well as temperature in °C or °F (formats selected during configuration)

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

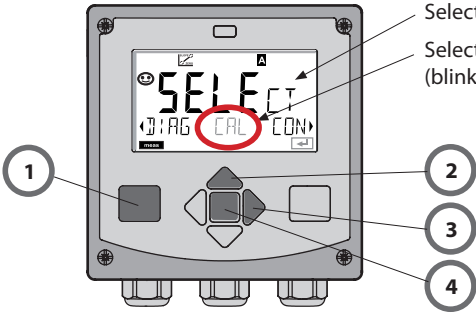
- Measured value and selection of parameter set A/B (if set to "Manual")
- Measured value and tag (point of measurement designation – entered during configuration)
- Time and date

Pressing the **enter** key shows the output currents. They are displayed as long as **enter** is held depressed, then the measured-value display will return after 3 sec.

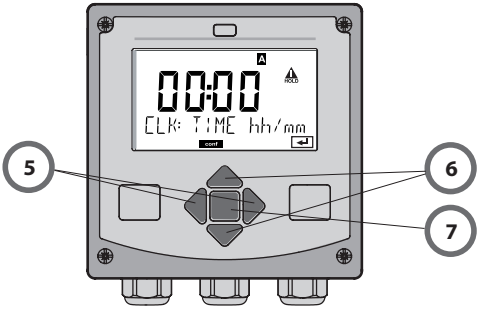
The device must be configured for the respective measurement task!

Selecting the Mode / Entering Values

To select the operating mode:
1) Hold **meas** key depressed (> 2 s) (directly to measuring mode)
2) Press any arrow 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**



Operating Modes

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 can store 100 events (00...99). They can be displayed directly on the device.
The logbook can be extended to 200 entries using a TAN (Option).

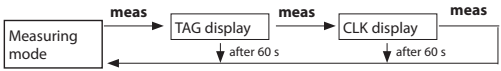
HOLD
Manual activation of HOLD mode, e.g. for servicing. The signal outputs adopt a defined state.

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 analyzer 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), IrDA operation, passcode assignment, reset to factory settings, enabling of options (TAN).

Menu Structure of Modes and Functions



Pressing any arrow key opens the selection menu.
Select the menu group using the left/right arrow keys.
Press **enter** to open a menu. Press **meas** to return.

DIAG

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

HOLD

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

CAL

CAL_SOL	Calibration with calibration solution
CAL_CELL	Calibration by entry of cell constant
P_CAL	Product calibration
CAL_RTD	Adjustment of temperature probe

CONF

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

SERVICE

(Access via code, factory setting: 5555)

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

HOLD Mode

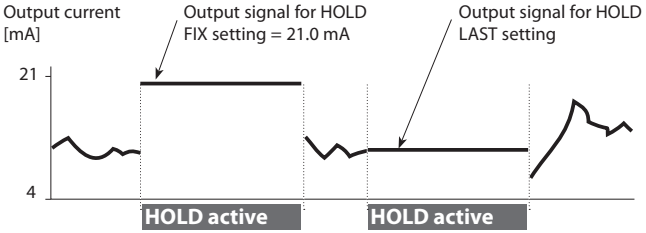
The HOLD mode is a safety state during configuration and calibration.
Output current is frozen (Last) or set to a fixed value (Fix).
The HOLD mode is indicated by orange display backlighting.

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.

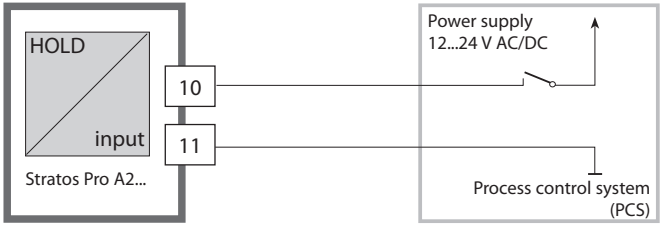
Output Signal During HOLD:



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).

External Activation of HOLD
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 can be activated manually from the HOLD menu.
This allows checking or replacing a sensor, for example, without provoking unintended reactions of outputs or contacts.
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.

Configuration

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.
Using ◂ and ▸, you can jump between the individual menu groups.
Each menu group contains menu items for setting the parameters.
Pressing **enter** opens a menu item.
The values are edited using ▴ and ▾.
Pressing **enter** confirms/stores the settings.
Return to measurement: Press **meas**.

Select menu group	Menu group	Code	Display	Select menu item
	Sensor selection	SNS:		enter
		Menu item 1		enter
		⋮		enter
		Menu item ...		enter
▸	Current output 1	OT1:		
▸	Current output 2	OT2:		
▸	Compensation	COR:		
▸	Alarm mode	ALA:		
▸	Setting the clock	CLK:		
▸	Tag number	TAG:		

Parameter Set A/B: Configurable Menu Groups

(Some parameters are identical in A and B. They are configured in parameter set A only.)

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
ALARM	Alarm mode	Alarm mode
PARSET	Parameter set selection	---
CLOCK	Setting the clock	---
TAG	Tag number	---

Parameter Set A/B
Manual selection

Display	Action	Remark
	To switch between parameter sets: Press **meas**	Manual selection of parameter sets must have been preset in CONFIG mode. Default setting is a fixed parameter set A. Wrong settings change the measurement properties!
	PARSET blinks in the lower line. Select parameter set using ◂ and ▸ keys	
	Select PARSET A / PARSET B	
	Confirm by pressing **enter** Cancel by pressing **meas**	

Configuration			Choices	Default
SENSOR				
SNS:			2-ELECTRODE 4-ELECTRODE MEMOSENS	2-ELECTRODE
	2-EL / 4-EL	CELLFACTOR [1]	00.0000 - 19.9999 c	01.0000 c
	MEAS MODE		Cond Conc % Sal ‰ USP µS/cm	COND
	Cond	MEAS RANGE [2]	x.xxx µS/cm xx.xx µS/cm xxx.x µS/cm xxxx µS/cm x.xxx mS/cm xx.xx mS/cm xxx.x mS/cm x.xxx S/m xx.xx S/m xx.xx MΩ	xxx.x mS/cm
	Conc	Solution	-01- (NaCl) -02- (HCl) -03- (NaOH) -04- (H_2SO_4) -05- (HNO_3)	-01- (NaCl)
	TEMP UNIT		°C / °F	°C
	TEMPERATURE		AUTO MAN EXT (only if enabled via TAN)	AUTO
	AUTO	RTD TYPE	100 PT 1000 PT 8.55 NTC 30 NTC	100 PT
	MAN	TEMPERATURE	–50...200 °C (–58...392 °F)	025.0 °C (077.0 °F)

Configuration			Choices	Default
SENSOR				
SNS:	CIP COUNT		ON/OFF	OFF
	SIP COUNT		ON/OFF	OFF
Output 1 (OUT1)				
OT1:	CHANNEL		COND/TMP	COND
	OUTPUT (with Cond only)		LIN / LOG	LIN
	LIN	BEGIN 4mA	xxxx	000.0 mS/cm
		END 20 mA	xxxx	100.0 mS/cm
	LOG	BEGIN 4mA	Decades	
		END 20 mA	Decades	
	TMP °C	BEGIN 4mA	–50...200 °C	
		END 20 mA	–50...200 °C	
	TMP °F	BEGIN 4mA	–58...392 °F	
		END 20 mA	–58...392 °F	
	FILTERTIME		0...120 SEC	0000 SEC
	22mA-FAIL		ON/OFF	OFF
	HOLD MODE		LAST/FIX	LAST
	FIX	HOLD-FIX	4...22 mA	021.0 mA

1) With Memosens, the cell constant is automatically loaded from the sensor. When switching from Memosens to 2-/4-electrode sensor, the cell constant is set to the default value 01.0000 c and then must be entered manually.
2) The range selection allows selecting the maximum resolution. If the upper limit of this range is exceeded, the device automatically switches to the next higher range.

Configuration			Choices	Default
Output 2 (OUT2)				
OT2:	CHANNEL		COND/TMP	TMP Begin: 0 °C End: 100 °C
	... other steps like output 1			
Temperature compensation (CORRECTION)				
COR:	TC SELECT		OFF LIN NLF NaCl HCL NH3	OFF
	LIN	TC LIQUID	00.00...19.99%/K	00.00%/K
	I-INPUT		0...20 mA/4...20 mA	4...20 mA
	°C	BEGIN 4 mA	–50...200 °C	000.0 °C
		END 20 mA	–50...200 °C	100.0 °C
	°F	BEGIN 4 mA	–58...392 °F	
		END 20 mA	–58...392 °F	
Alarm (ALARM)				
ALA:	DELAYTIME		0...600 SEC	0010 SEC
	SENSOCHECK		ON/OFF	OFF

Configuration			Choices	Default
Parameter set (PARSET)				
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)
Real-time clock (CLOCK)				
CLK:	FORMAT		24 h / 12 h	
	24 h	TIME hh/mm	00..23:00...59	
	12 h	TIME hh/mm	00...11:00...59 AM/PM:	
	DAY/MONTH		01...31/01...12	
	YEAR		2000...2099	
Tag number (TAG)				
TAG:	(Input in text line)			___

Default Settings of Parameter Sets

Two complete parameter sets are stored in the EEPROM.
As delivered, the two sets are identical but can be edited.
Please note:
Fill in your configuration data on the following pages or use them as original for copy.

Configuration (Original for Copy)

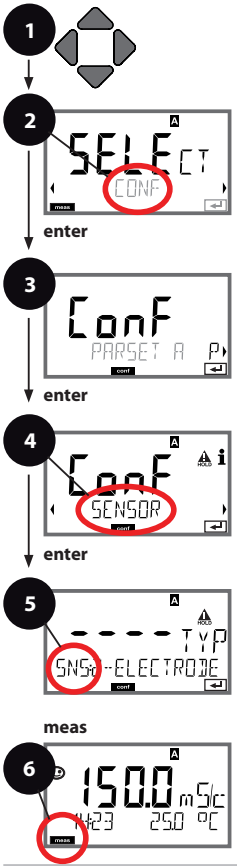
Parameter	Parameter set A	Parameter set B
SNS: Sensor type		--- *)
SNS: Cell constant		---
SNS: Measuring mode		---
SNS: Measuring range		---
SNS: Concentration determination		---
SNS: Temperature unit		---
SNS: Temp detection		---
SNS: Manual temp		---
SNS: RTD type		---
SNS: CIP counter		---
SNS: SIP counter		---
OT1: Process variable		
OT1: LIN/LOG output		
OT1: Current start		
OT1: Current end		
OT1: Filter time		
OT1: 22 mA error current		
OT1: HOLD mode		
OT1: HOLD-FIX current		

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

Parameter	Parameter set A	Parameter set B
OT2: Process variable		
OT2: LIN/LOG output		
OT2: Current start		
OT2: Current end		
OT2: Filter time		
OT2: 22 mA error current		
OT2: HOLD mode		
OT2: HOLD-FIX current		
COR: TC SELECT		
COR: Temp coefficient		
COR: Current range		
COR: Current start		
COR: Current end		
ALA: Delay		
ALA: Sensocheck on/off		
CLK: Time & Date		---*)
TAG: Tag number		---*)

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

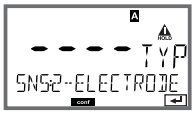
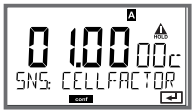
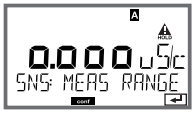
Sensor
Selecting the parameters



1 Press any arrow key.
2 Select **CONF** using ◂ ▸ keys, 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 with arrow keys (see next page).
Confirm (and proceed) with **enter**.
6 End: Press **meas** key until the [meas] mode indicator is displayed.

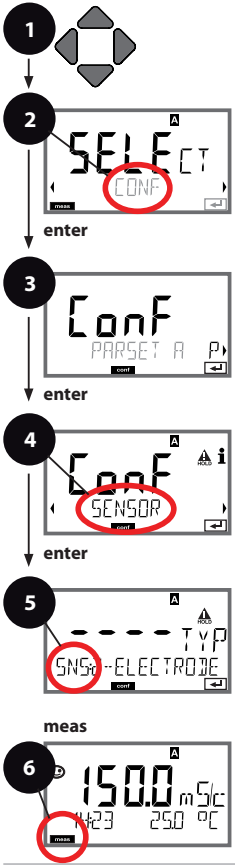
5

Select sensor type	enter
Enter cell constant	
Select measuring mode	
Select range	
Concentration determination	
Temperature unit	
Temperature detection	
Select type of temp probe	
Cleaning cycles	
Sterilization cycles	

Menu item	Action	Choices
Select sensor type 	Select sensor type using ▲ ▼ keys. Press **enter** to confirm.	**2-ELECTRODE** 4-ELECTRODE MEMOSENS
Enter cell constant 	Modify digit using ▲ ▼ keys, select next digit using ◀ ▶ keys. Press **enter** to confirm.	00.0000...19.9999 c **(01.0000 c)**
Select meas. mode 	Select desired measuring mode using ▲ ▼ keys. Press **enter** to confirm.	**Cond** Conc % Sal ‰ USP µS/cm
Select range 	**For cond measurement only** Select desired range using ▲ ▼ keys. Press **enter** to confirm.	x.xxx µS/cm, xx.xx µS/cm xxx.x µS/cm, xxxx µS/cm x.xxx mS/cm, xx.xx mS/cm **xxx.x mS/cm**, x.xxx S/m xx.xx S/m, xx.xx MΩ
Concentration determination 	**For conc measurement only** Select desired concentration solution using ▲ ▼ keys. Press **enter** to confirm.	**-01- (NaCl)** -02- (HCl) -03- (NaOH) -04- (H2SO4) -05- (HNO3)

Sensor

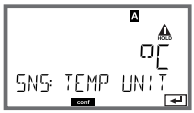
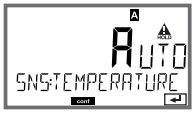
Select: Temperature unit, temperature detection, type of temp probe



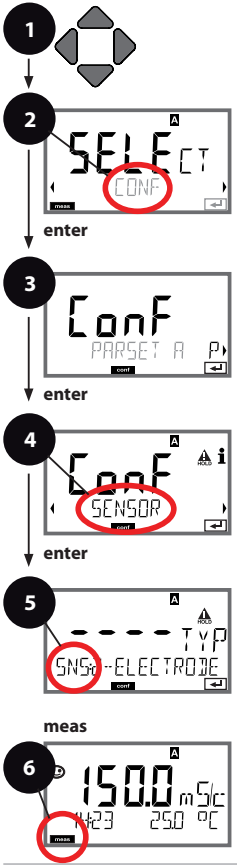
1 Press any arrow key.
2 Select **CONF** using ◂ ▸ keys, press **enter**.
3 Select parameter set using ◂ ▸ keys, press **enter**.
4 Select **SENSOR** menu using ◂ ▸ keys, press **enter**.
5 All items of this menu group are indicated by the "SNS:" code.
Press **enter** to select menu, edit with arrow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

5

Select sensor type	enter
Enter cell constant	
Select measuring mode	
Select range	
Concentration determination	
Temperature unit	
Temperature detection	
Select type of temp probe	
Cleaning cycles	
Sterilization cycles	

Menu item	Action	Choices
Temperature unit 	Select °C or °F using ▲ ▼ keys. Press **enter** to confirm.	**°C** / °F
Temp 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 **enter** to confirm.	**AUTO** MAN EXT
(Manual temperature) 	Modify digit using ▲ ▼ keys, select next digit using ◀ ▶ keys. Press **enter** to confirm.	–50...200 °C (–58...+392 °F)
Select type of temp probe  	(not for Memosens) Select type of temperature probe using ▲ ▼ keys. Press **enter** to confirm.	**100 PT** 1000 PT 30 NTC 8.55 NTC

Sensor
Adjust: Cleaning cycles, sterilization cycles

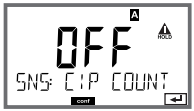


1 Press any arrow key.
2 Select **CONF** using ◂ ▸ keys, press **enter**.
3 Select parameter set using ◂ ▸ keys, press **enter**.
4 Select **SENSOR** menu using ◂ ▸ keys, press **enter**.
5 All items of this menu group are indicated by the "SNS:" code.
Press **enter** to select menu, edit with arrow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

5

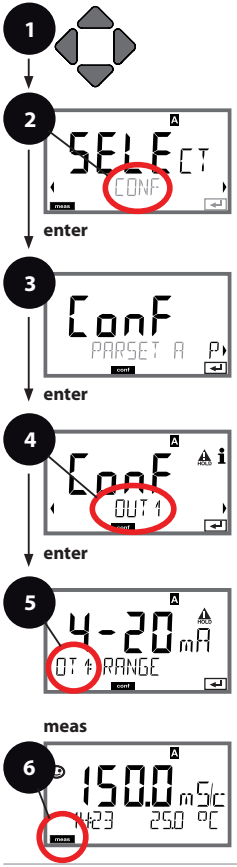
Select sensor type
Enter cell constant
Select measuring mode
Select range
Concentration determination
Temperature unit
Temperature detection
Select type of temp probe
Cleaning cycles
Sterilization cycles

enter

Menu item	Action	Choices
CIP / SIP		
Cleaning cycles On / Off 	Select ON or OFF using ▲ ▼ keys. Activates/deactivates logging in extended logbook Press **enter** to confirm.	ON/**OFF**
Sterilization cycles On / Off 	Select ON or OFF using ▲ ▼ keys. Activates/deactivates logging in extended logbook Press **enter** to confirm.	ON/**OFF**

Please note:
A CIP or SIP cycle is only entered into the logbook 2 hours after the start to ensure that the cycle is complete.

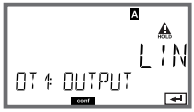
Current Output 1
Process variable, current start, current end



1 Press any arrow 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 with arrow keys (see next page).
Confirm (and proceed) with **enter**.
6 End: Press **meas** key until the [meas] mode indicator is displayed.

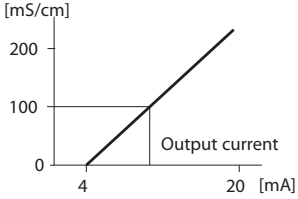
5

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

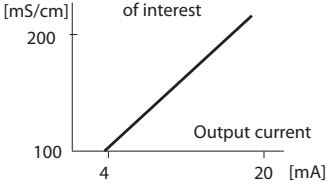
Menu item	Action	Choices
Process variable 	Select using ▲ ▼ keys: Cond: Conductivity TMP: Temperature Press **enter** to confirm.	**Cond**/TMP 
Select LIN/LOG 	Select using ▲ ▼ keys: LIN: Linear characteristic LOG: Logarithmic – See right column for selectable decades. Press **enter** to confirm.	Selectable decades with logarithmic setting (LOG): S/cm: 1.0 µS/cm, 10.0 µS/cm, 100.0 µS/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 ▲ ▼ keys, select next digit using ◀ ▶ keys. Press **enter** to confirm.	As selected for process variable/range If the adjusted range is exceeded, the device automatically switches to the next higher range (Autorange)
Current end 	Enter value using ▲ ▼ ◀ ▶ keys. Press **enter** to confirm.	As selected for 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

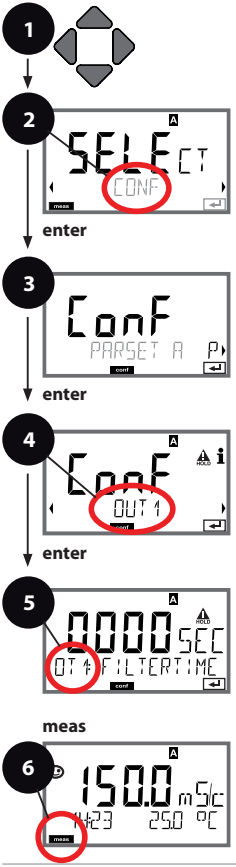
Example 1: Range 0...200 mS/cm



Example 2: Range 100...200 mS/cm
Advantage: Higher resolution in range of interest



Current Output 1
Adjust time interval of output filter



1 Press any arrow key.
2 Select **CONF** using ◂ ▸ keys, press **enter**.
3 Select parameter set using ◂ ▸ keys, 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 with arrow keys (see next page).
Confirm (and proceed) with **enter**.
6 End: Press **meas** key until the [meas] mode indicator is displayed.

5

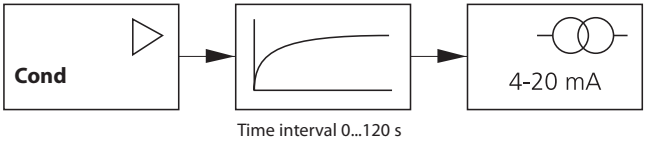
Process variable
LIN/LOG output
Current start
Current end
Time averaging filter
Output current during error message
Output current during HOLD
Output current for HOLD FIX

enter

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

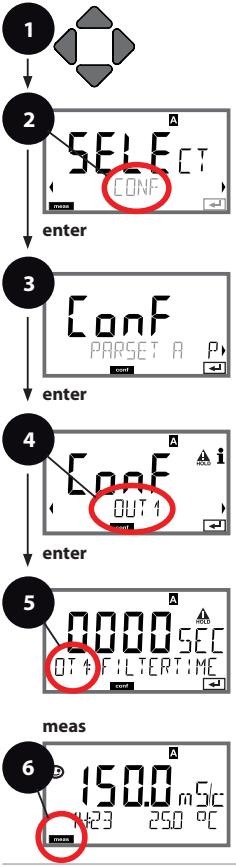
Time Averaging Filter (Attenuation)
To smoothen the current output, a low-pass filter with adjustable filter time constant can be switched on. When there is a jump at the input (100 %), the output level is at 63 % after the time interval has been reached.
The time interval can be set from 0 to 120 sec.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

Please note:
The filter only acts on the current output, not on the display!



Time interval 0...120 s

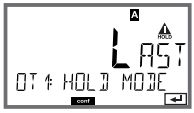
Current Output 1
Output current during Error and HOLD



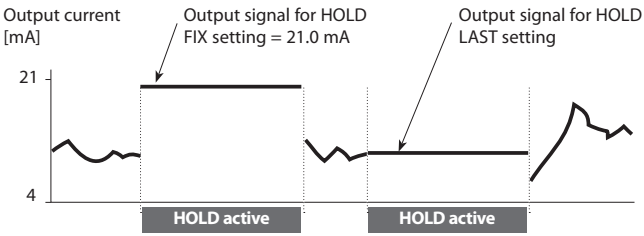
1 Press any arrow key.
2 Select **CONF** using ◂ ▸ keys, press **enter**.
3 Select parameter set using ◂ ▸ keys, press **enter**.
4 Select **OUT1** menu using ◂ ▸ keys, press **enter**.
5 All items of this menu group are indicated by the "OT1:" code.
Press **enter** to select menu, edit with arrow keys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

5

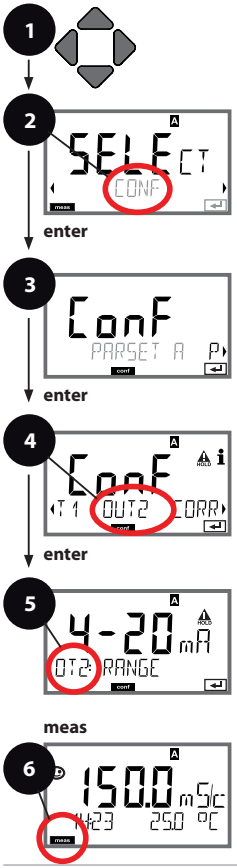
Process variable	enter
LIN/LOG output	
Current start	
Current end	
Time averaging filter	
Output current during error message	
Output current during HOLD	
Output current for HOLD FIX	

Menu item	Action	Choices
Output current during error message 	Select ON or OFF using ▲ ▼ keys. Press **enter** to confirm.	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 ▲ ▼ Press **enter** 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 ▲ ▼ ◀ ▶ keys. Press **enter** to confirm.	04.00...22.00 mA (**21.00 mA**)

Output Signal During HOLD:



Current Output 2
Output current range, process variable



1 Press any arrow key.
2 Select **CONF** using ◂ ▸ keys, press **enter**.
3 Select parameter set using ◂ ▸ keys, 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 with arrow keys (see next page). Confirm (and proceed) with **enter**.
6 End: Press **meas** key until the [meas] mode indicator is displayed.

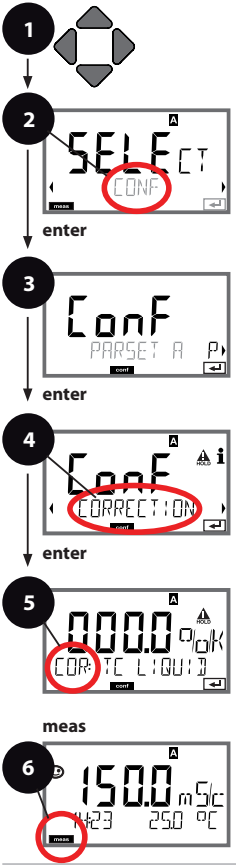
5

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

Menu item	Action	Choices
Process variable 	Select using ▲ ▼ keys: Cond: Conductivity TMP: Temperature Press **enter** to confirm.	Cond/**TMP** Begin: 0 °C End: 100°C
. . .		

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

Temperature Compensation
Selecting the compensation method



1 Press any arrow key.
2 Select **CONF** using ◂ ▸ keys, press **enter**.
3 Select parameter set using ◂ ▸ keys, 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 with arrow keys (see next page).
Confirm (and proceed) with **enter**.
6 End: Press **meas** key until the [meas] mode indicator is displayed.

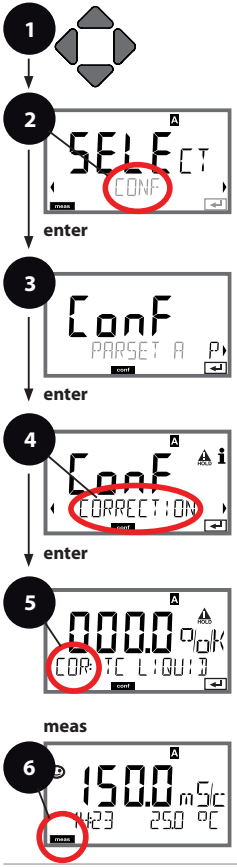
5

Temperature compensation	enter
Current input for external temperature measurement	
Current start	
Current end	

Menu item	Action	Choices
Temperature compensation	Select desired compensation using ▲ ▼ keys:	
	OFF: Temperature compensation switched off	
	LIN: Linear temperature compensation with entry of temperature coefficient	
	nLF: Temperature compensation for natural waters to EN 27888	
	NaCl: Temperature compensation for ultrapure water with NaCl traces	
	HCl: Temperature compensation for ultrapure water with HCl traces	
	NH3: Temperature compensation for ultrapure water with NH_3 traces Press **enter** to confirm.	

Temperature Compensation

TC process medium, current input for temp measurement



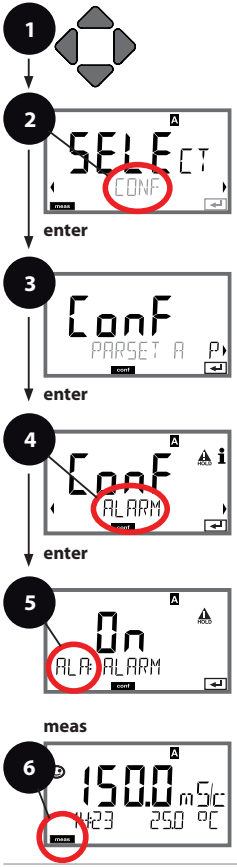
1 Press any arrow key.
2 Select **CONF** using ◂ ▸ keys, press **enter**.
3 Select parameter set using ◂ ▸ keys, press **enter**.
4 Select **CORRECTION** menu using ◂ ▸ keys, press **enter**.
5 All items of this menu group are indicated by the "COR:" code.
Press **enter** to select menu, edit with arrow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

5

Temperature compensation	enter
Current input for external temperature measurement	
Current start	
Current end	

Menu item	Action	Choices
Temp compensation, process medium 	With linear compensation only: Enter temperature compensation of the process medium. Enter value using ▲ ▼ ◀ ▶ keys. Press **enter** to confirm.	0...19.99 %/K
Current range 	Select desired range using ▲ ▼ keys. Press **enter** to confirm.	**4-20 mA** / 0-20 mA
Current start 	Modify digit using ▲ ▼, select next digit using ◀ ▶ keys. Press **enter** to confirm.	Input range: –50...200 °C / –58...392 °F
Current end 	Enter value using ▲ ▼ ◀ ▶ keys. Press **enter** to confirm.	Input range: –50...200 °C/ –58...392 °F

Alarm Settings
Delay, Sensocheck

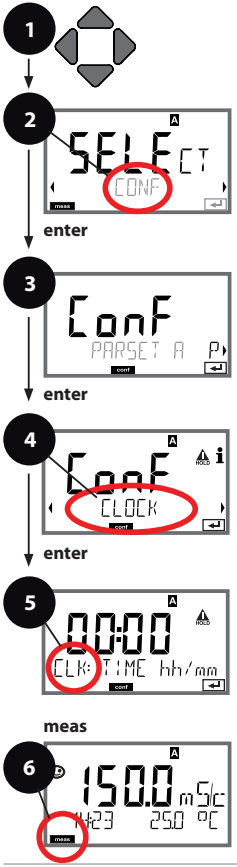


1 Press any arrow key.
2 Select **CONF** using ◂ ▸ keys, press **enter**.
3 Select parameter set using ◂ ▸ keys, press **enter**.
4 Select **ALARM** menu using ◂ ▸ keys, press **enter**.
5 All items of this menu group are indicated by the "ALA:" code.
Press **enter** to select menu, edit with arrow keys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

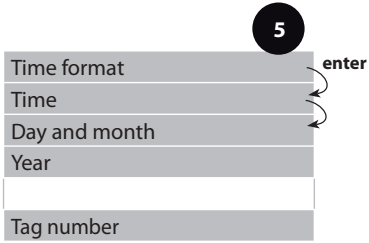
Menu item	Action	Choices
Delay 	Enter value using ▲ ▼ ◀ ▶ keys. Press **enter** to confirm.	0...600 SEC (**010 SEC**)
Sensocheck 	Select Sensocheck (continuous monitoring of sensor). Select ON or OFF using ▲ ▼ keys. Press **enter** to confirm.	ON/**OFF**

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 backlighting to red and the 22 mA signal (if configured).

Time and Date
Tag Number



1 Press any arrow key.
2 Select **CONF** using ◂ ▸ keys, press **enter**.
3 Select parameter set A using ◂ ▸ keys, press **enter**.
4 Press **enter**.
5 Select **CLOCK** or **TAG** using ◂ ▸ keys, press **enter**.
6 All items of this menu group are indicated by the "CLK:" or "TAG" code.
Press **enter** to select menu,
edit using arrow keys (see next page).
Confirm (and proceed) by pressing **enter**.
7 End: 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.

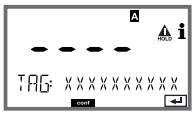
Please note:

- After prolonged power outage (> 5 days) the time display is replaced by dashes and cannot be used for processing.
  Enter the correct time.
- There is no automatic switchover from winter to summer time!
  Be sure to manually adjust the time!

Tag Number (" TAG")

You can enter a designation for the point of measurement (tag number) in the lower display line. Up to 32 digits are possible.
Pressing **meas** (repeatedly) in the measuring mode indicates the tag number.
Being part of the device configuration, the "TAG" can be read out via IrDA. A standardized tag number helps, for example, to correctly re-install a device after repair.

5

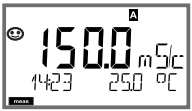
Menu item	Action	Choices
Tag number 	Select character using ▲ ▼ keys, select next digit using ◀ ▶ keys. Confirm with **enter**	A...Z, 0...9, – + < > ? / @ The first 10 characters are seen in the display without scrolling.

Digital Sensors

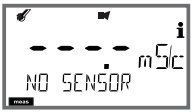
Operation

Stratos Pro can be operated with digital Memosens sensors.
The following display examples refer to a transmitter and a digital sensor (slight variations for other combinations).

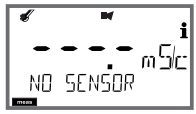
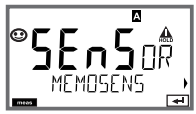
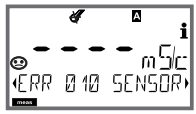
The sensor type is selected during **Configuration**.
The device only switches to measuring mode when the connected sensor corresponds to the type configured (Sensoface is friendly):



Otherwise, an error message is released. The **info** icon is displayed.
You can display the error text in the bottom line using the ◀ ▶ keys.
Sensoface is sad (see table of error messages and Sensoface in the Appendix):

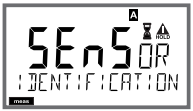


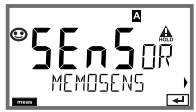
Connecting a Digital Sensor

Step	Action/Display	Remark
Connect sensor		Before a digital sensor is connected, the error message „No sensor" is displayed.
Wait until the sensor data are displayed.		The hourglass in the display blinks.
Check sensor data	 View sensor information using ◀ ▶ keys, press **enter** to confirm.	Display color changes to **green**. Sensoface is friendly when the sensor data are okay.
Go to measuring mode	Press **meas**, **info**, or **enter**	After 60 sec the device automatically returns to measuring mode (time-out).
Possible error messages		
Sensor defective. Replace sensor		When this error message appears, the sensor cannot be used. Sensoface is sad.

Sensor Replacement

A digital sensor should only be replaced during HOLD mode to prevent unintended reactions of the outputs or contacts. When you first want to calibrate the new sensor, it can also be replaced in calibration mode.

Step	Action/Display	Remark
Select HOLD mode	Press any key to call the selection menu, select HOLD using the ◂ ▸ keys, press **enter** to confirm.	Now the device is in HOLD mode. The HOLD mode can also be activated externally via the HOLD input. During HOLD the output current is frozen at its last value or set to a fixed value.
Disconnect and remove old sensor		
Install and connect new sensor.		Temporary messages which are activated during the replacement are indicated but not output to the alarm contact and not entered in the logbook.
Wait until the sensor data are displayed.		

Step	Action/Display	Remark
Check sensor data	 View sensor information using ◂ ▸ keys, press **enter** to confirm.	You can view the sensor type, serial number, and last calibration date.
Check measured values		
Exit HOLD	Hit **meas** key: Return to selection menu. Hold **meas** key depressed: Device switches to measuring mode	The sensor replacement is entered in the extended logbook.

Calibration

Please 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 constant with a known calibration solution
- Input of cell constant (e.g. for ultrapure-water sensors)
- Sampling (product calibration)
- Temperature probe adjustment

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 constant
P_CAL	Product calibration (calibration with sampling)
CAL_RTD	Temperature probe adjustment

Calibration with Calibration Solution

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

Display	Action	Remark
	Select Calibration. Press **enter** to proceed. Select CAL_SOL calibration method. Press **enter** 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 using the arrow keys (see table). Press **enter** to confirm.	Lower line: Display of cell constant and temperature
	The determined cell constant is displayed. The "hourglass" icon is blinking. Press **enter** to proceed.	

Display	Action	Remark
	Display of selected process variable (here: mS/cm). Now the device is in HOLD mode: Reinstall the sensor and check whether the message is OK. MEAS ends calibration, REPEAT permits repetition.	
	With MEAS selected: End calibration by pressing **enter**.	Display of conductivity and temperature, 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.

Please note:

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

Calibration by Entry of Cell Constant

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

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

Calibration by sampling – for product calibration, the uncompensated conductivity (µS/cm, 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, the sample temperature should correspond to the measured process temperature.
   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 constant.

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.

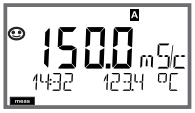
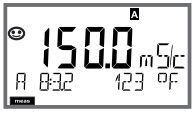
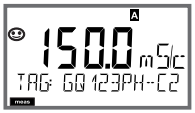
Display	Action	Remark
	Select Calibration. Press **enter** to proceed. Select P_CAL calibration method. Press **enter** to proceed.	
	Ready for calibration. Hourglass blinks.	Display (3 sec) Now the device is in HOLD mode.
	Take sample and save value. Press **enter** to proceed.	Now the sample can be 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.
	**Product calibration step 2:** 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 **enter** to proceed.	
	Display of new cell constant (based on 25°C). Sensoface is active. To end calibration: Select MEAS, then **enter**	To repeat calibration: Select REPEAT, then **enter**
	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.

Temp Probe Adjustment

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

Measurement

Display	Remark
 or AM/PM and °F: 	From the configuration or calibration menus, you can switch the device to measuring mode by pressing the **meas** key. In the measuring mode the main display shows the configured process variable (Cond or temperature), the secondary display 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. **Please note:** • After prolonged power outage (> 5 days) the time display is replaced by dashes and cannot be used for processing. Enter the correct time.
Pressing the **enter** key briefly shows the output currents. By pressing the **meas** key you can step through the following displays. When no key has been pressed for 60 sec, the device returns to the standard display.	
 	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 **enter** to confirm. Further displays (each with **meas**). 1) Display of tag number ("TAG") 2) Display of time and date

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).

Please note:
HOLD is not active during Diagnostics mode!

Action	Key	Remark
Activate Diagnostics		Press any arrow key to call the selection menu. (Display color changes to turquoise.) Select DIAG using ◂ ▸ keys, press **enter** to confirm.
Select diagnostics option		Use ◂ ▸ keys to select from: CALDATA SENSOR SELFTEST LOGBOOK MONITOR VERSION See next pages for further proceeding.
End	**meas**	End by pressing **meas**.

Menu item	Remark
 	**Display of calibration data** Select CALDATA using ◂ ▸, press **enter** 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. Press **meas** to return to measurement.

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.

Menu item	Remark
  	**Display of logbook entries.** Select LOGBOOK using ◀ ▶, press **enter** to confirm. By using the ▲ ▼ keys, you can scroll backwards and forwards through the logbook (entries -00-...-99-), -00- being the last entry. By using the ◀ ▶ keys, you can view a logbook entry. Press **meas** to return to measurement.
	**Extended logbook / Audit Trail (via TAN)** By using the ▲ ▼ keys, you can scroll backwards and forwards through the extended logbook (entries -000-...-199-), -000- being the last entry. **Display: CFR** Audit Trail also records function activations (CAL CONFIG SERVICE), some Sensoface messages, and opening of the enclosure.
 Display example: 	**Display of currently measured values (sensor monitor):** Select MONITOR using ◀ ▶, press **enter** 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)). The selected parameter is shown in the main display. Press **meas** to return to measurement.

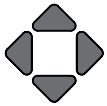
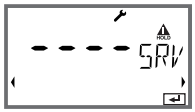
Display	Remark
	**Version** Here, you find the data you require for requesting a device-specific Option. Display of **device type, software/hardware version**, and **serial number** for all device components. Use the ▲ ▼ keys to switch between software and hardware version. Press **enter** to proceed to next device component.

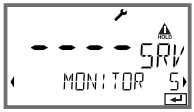
Service

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
IRDA	activating and communicating via the IrDA interface
CODES	assigning and editing passcodes
DEFAULT	resetting the device to factory settings
OPTION	enabling options via TAN.

Please note:
HOLD is active during Service mode!

Action	Key/Display	Remark
Activate Service		Press any arrow key to call the selection menu. Select SERVICE using ◀ ▶ keys, press **enter** to confirm.
Passcode		Enter passcode "5555" for service mode using the ▲ ▼ ◀ ▶ keys. Press **enter** to confirm.
Display		In service mode the following icons are displayed: • [diag] mode indicator • HOLD triangle • Service (wrench)
End	**meas**	End by pressing **meas**.

Menu item	Remark
 Display example: 	**Display of currently measured values (sensor monitor) with HOLD mode activated:** Select MONITOR using ◀ ▶, press **enter** to confirm. Select variable in the bottom text line using ◀ ▶. The selected parameter is shown in the main display. As the device is in HOLD mode, you can perform validations using simulators without influencing the signal outputs. Press **meas** to return to the service menu. Return to measurement: Press **meas** once more.
	**Specify current at outputs 1 and 2:** Select OUT1 or OUT2 using the ◀ ▶ keys, press **enter** to confirm. Enter a valid current value for the respective output using ▲ ▼ ◀ ▶ keys. Press **enter** to confirm. For checking purposes, the actual output current is shown in the bottom right corner of the display. End by pressing **enter** or **meas**.
	**IrDA communication:** Select IRDA using ◀ ▶, press **enter** to confirm.
HOLD 	When IrDA communication is active, the device remains in the HOLD mode for reasons of safety. Further operation is performed via IrDA. End communication by pressing **meas**. **Exception: Firmware update (must not be interrupted!)**

Menu item	Remark
	**Assigning passcodes:** In the "SERVICE - CODES" menu you can assign passcodes to DIAG, HOLD, CAL, CONF, and SERVICE modes (Service preset to 5555). **When you have lost the Service passcode**, 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.
	**Reset to factory settings:** In the "SERVICE - DEFAULT" menu you can reset the device to factory settings. **Caution!** After a reset to factory setting the device must be reconfigured completely, including the sensor parameters!
	**Option request:** Communicate the serial number and hardware/software version of your device to the manufacturer. These data can be viewed in the Diagnostics/Version menu. The "transaction number" (TAN) you will then receive is only valid for the device with the corresponding serial number. **Release of options:** Options come with a "transaction number" (TAN). This TAN must be entered and confirmed using **enter** to release the option.

According to the "USP" directive (U.S.Pharmacopeia), Section 645 "Water Conductivity" the conductivity of pharmaceutical waters can be monitored online. To do so, the conductivity is measured without temperature compensation and is compared with limit values (see table on next page).
The water is usable when the conductivity is below the USP limit. If the conductivity values are higher, further test steps must be performed according to the directive.
To increase safety, the USP limit value can be reduced in the device. To do so, a factor (%) is specified.

Configuring:

- **SNS** menu group:
  When "USP function" has been selected, the measuring range is fixed to 00.00.....99.99 µS/cm. Temperature compensation is switched off. Temperature is monitored.
  If the USP limit is exceeded, a 22 mA signal is output.

Temperature/Conductivity Table as per USP

Temp (°C)	Cond (µS/cm)	Temp (°C)	Cond (µS/cm)
0	0.6	55	2.1
5	0.8	60	2.2
10	0.9	65	2.4
15	1.0	70	2.5
20	1.1	75	2.7
25	1.3	80	2.7
30	1.4	85	2.7
35	1.5	90	2.7
40	1.7	95	2.9
45	1.8	100	3.1
50	1.9		

Operating status	OUT 1	OUT 2	Time out
Measuring			-
Diag			60 s
CAL_SOL Cal solution			No
CAL_CELL Cell constant			No
P_CAL Product cal S1			No
P_CAL Product cal S2			No
CAL_RTD Temp adjustment			No
CONF ParSet A			20 min
CONF ParSet B			20 min
HOLD input			No

Explanation: as configured (Last/Fix)

active

Product Line and Accessories

Order Code Stratos Pro A 2...

									TAN
Example	A	2	1	1	X	-	PH	-	1	
2-wire / 4-20 mA	A	2								B,C,E
Communication										
Without (HART retrofittable via TAN)			0							A
HART			1							
PROFIBUS PA			2							
Foundation Fieldbus FF			3							
Version number										
Version				1						
Approvals										
General Safety					N					
ATEX / IECEX Zone 2					B					
ATEX / IECEX / FM / CSA Zone 1 / Cl 1 Div 1					X					
Other approvals					Z					
Measuring channel										
Memosens pH / Redox	digital						MSPH			
Memosens Cond	digital						MSCOND			
Memosens Oxy	digital						MSOXY			
Dual COND (2x2-electrode sensors, analog)					N		CC			
pH / ORP value (ISM digital per TAN)	Measuring module						PH			F
Cond, 2-/4-electrode	Measuring module						COND			
Conductivity, electrodeless	Measuring module						CONDI			
Oxygen (ISM digital and traces per TAN)	Measuring module						OXY			D, F
Carbon dioxide (ISM digital per TAN)	Measuring module						CO2			
Options										
Without 2nd current output									0	
With 2nd current output									1	

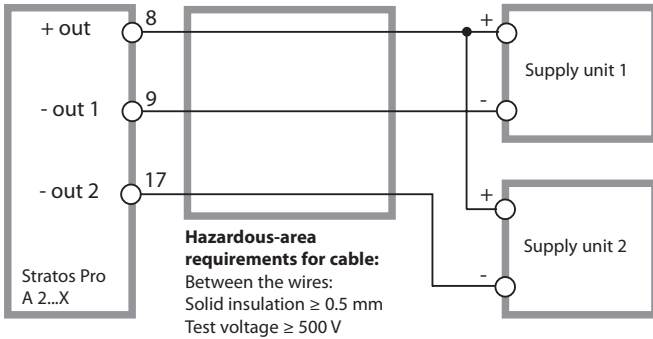
TAN options		
HART	SW-A001	(A)
Logbook	SW-A002	(B)
Extended logbook (Audit Trail)	SW-A003	(C)
Trace oxygen measurement	SW-A004	(D)
Current input + 2 digital inputs	SW-A005	(E)
ISM digital	SW-A006	(F)

Mounting accessories	
Pipe-mount kit	ZU 0274
Protective hood	ZU 0737
Panel-mount kit	ZU 0738

A201/A211X: Supply Units and Connection

Recommended Power Supply Units:	Order No.:
Repeater power supply, IS, 24 V AC/DC, output 0/4...20 mA	WG 20 A2
Repeater power supply, IS, 90...253 V AC, output 4...20 mA	WG 21 A7
Repeater power supply, IS, 90...253 V AC, HART, output 4...20 mA	WG 21 A7 Opt. 470
Repeater power supply, IS, 24 V AC/DC, output 4...20 mA	WG 21 A7 Opt. 336
Repeater power supply, IS, 24 V AC/DC, HART, output 4...20 mA	WG 21 A7 Opt. 336, 470
Repeater power supply, non-IS, 24 V DC, output 4...20 mA	IsoAmp PWR B 10116
Repeater power supply, non-IS, 24 V DC, HART, output 0/4...20 mA / 0...10 V	IsoAmp PWR A 20100

Connection to Supply Units



Specifications

COND input	Input for 2-/4-electrode sensors and Memosens sensors		
Effective ranges	2-EL sensors	0.2 µS · c … 200 mS · c	
	4-EL sensors	0.2 µS · c … 1000 mS · c	
	(Conductance limited to 3500 mS)		
Ranges	Conductivity	0.000 ... 9.999 µS/cm	
		00.00 ... 99.99 µS/cm	
		000.0 ... 999.9 µS/cm	
		0000 ... 9999 µS/cm	
		0.000 ... 9.999 mS/cm	
		00.00 ... 99.99 mS/cm	
		000.0 ... 999.9 mS/cm	
		0.000 ... 9.999 S/cm	
		00.00 ... 99.99 S/cm	
	Resistivity	00.00 … 99.99 MΩ · cm	
	Concentration	0.00 ... 9.99 %	
	Salinity	0.0 ... 45.0 ‰	(0 ... 35 °C)
	Response (T90)	Approx. 1 s	
Meas. error[1,2,3)]	< 1 % meas. val. + 0.4 µS · c		
Temp compensation [*)]	(OFF)	Without	
(reference temp 25°C)	(LIN)	Linear characteristic 00.00 ... 19.99 %/K	
	(NLF)	Natural waters to EN 27888	
	(NACL)	Ultrapure water with NaCl traces (0 ... 120 °C)	
	(HCL)	Ultrapure water with HCl traces (0 ... 120 °C)	
	(NH3)	Ultrapure water with NH_3 traces (0... 120 °C)	
Concentration determination	-01- NaCl	0.00 ... 9.99% by wt	(0 ... +60°C)
	-02- HCl	0.00 ... 9.99% by wt	(–20 ... +50 °C)
	-03- NaOH	0.00 ... 9.99% by wt	(0 ... +100 °C)
	-04- H_2SO_4	0.00 ... 9.99% by wt	(–17 ... +110 °C)
	-05- HNO_3	0.00 ... 9.99% by wt	(–17 ... +50 °C)

Sensor standardization	Input of cell constant with simultaneous display of selected process variable and temperature	
	Input of conductivity of calibration solution with simultaneous display of cell constant and temperature	
	Product calibration for conductivity	
	Temperature probe adjustment	
Permitted cell constant	00.0050 ... 19.9999 cm^{-1}	
Sensocheck	Polarization detection and monitoring of cable capacitance	
Delay	Approx. 30 s	
Sensoface	Provides information on the sensor condition	
Sensor monitor	Direct display of measured values from sensor for validation (resistance/temperature)	
USP function	Water monitoring in the pharmaceutical industry (USP) with additional limit value (%)	
	Output via HART or current output (22 mA)	
Temperature input *	Pt100/Pt1000/NTC 30 kΩ/NTC 8.55 kΩ (Betatherm)	
	3-wire connection, adjustable	
Measuring range	Pt 100/Pt 1000	–50 ... +200 °C / –58 ... +392 °F
	NTC 30 kΩ	–20 ... +150 °C / –4 ... +302 °F
	NTC 8.55 kΩ	–10 ... +130 °C / –4 ... +266 °F
Resolution	0.1 °C / 0.1 °F	
Meas. error[1,2,3)]	< 0.5 K (< 1 K for Pt 100; <1K for NTC >100°C)	
I input (TAN)	Current input 0/4 ... 20 mA / 50 Ω for external temperature signal	
Start/end of scale	Configurable –50 ... +200 °C / –58 ... +392 °F	
Characteristic	Linear	
Measurement error [1,3)]	< 1% current value + 0.1 mA	

HOLD input	Galvanically separated (OPTO coupler)	
Function	Switches device to HOLD mode	
Switching voltage	0 ... 2 V (AC/DC)	HOLD inactive
	10 ... 30 V (AC/DC)	HOLD active
CONTROL input	Galvanically separated (OPTO coupler)	
Function	Selecting parameter set A/B	
Switching voltage	0 ... 2 V (AC/DC)	Parameter set A
	10 ... 30 V (AC/DC)	Parameter set B
Output 1	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 or logarithmic	
Overrange *	22 mA in the case of error messages	
Output filter *	PT_1 filter, time constant 0 ... 120 s	
Measurement error [1)]	< 0.25% current value + 0.025 mA	
Start/end of scale *	Configurable within selected range	
Minimum span	LIN	5% of selected range
	LOG	1 decade
Output 2	Current loop, 4 ... 20 mA, floating, protected against inverse polarity	
Supply voltage	14 ... 30 V	
Process variable*	Conductivity, resistivity, concentration, salinity, or temperature	
Characteristic	Linear or logarithmic	
Overrange *	22 mA in the case of error messages	
Output filter *	PT_1 filter, time constant 0 ... 120 s	
Measurement error [1)]	< 0.25% current value + 0.05 mA	

Start/end of scale *	Configurable within selected range	
Minimum span	LIN	5% of selected range
	LOG	1 decade
Real-time clock	Different time and date formats selectable	
Power reserve	> 5 days	
Display	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	
Keypad	Keys: meas, info, 4 cursor keys, enter	
HART communication	HART version 6 Digital communication by FSK modulation of output current 1	
	Device identification, measured values, status and messages, parameter setting, calibration, records	
IrDA interface	Infrared interface for transmission of records and logbook, parameter setting, calibration, firmware update	
FDA 21 CFR Part 11	Access control by editable passcodes	
	Logbook entry and flag via HART in the case of configuration changes	
	Message and logbook entry when enclosure is opened	

Diagnostics functions		
Calibration data	Calibration date, cell constant	
Device self-test	Displaytest, automatic memory test (RAM, FLASH, EEPROM), module test	
Logbook	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 (00.00 ... 22.00 mA)	
IrDA	Activating the IrDA function	
Passcodes	Assigning passcodes for menu access	
Factory setting	Resetting all parameters to factory setting	
TAN	Enabling optionally available additional functions	
Data retention	Parameters, calibration data, logbook > 10 years (EEPROM)	
EMC	EN 61326-1 (General Requirements)	
Emitted interference	Class B (residential area)	
Immunity to interference	Industry EN 61326-2-3	
Explosion protection	Europe:	ATEX Zone 0, 1, 2, 20, 21
Stratos Pro A201X/A211X COND	USA:	FM Class I Div 1,2 / Zone 1 (pending)
	Canada:	$_{c}$CSA$_{us}$ Class I Div 1,2 / Zone 1
	International:	IECEx Zone 0, 1, 20, 21

Nominal operating conditions	
Ambient temperature	–20 ... +65 °C
Transport/Storage temperature	–20 ... +70 °C
Relative humidity	10 ... 95% not condensing
Supply voltage	14 ... 30 V
Enclosure	Molded enclosure made of PBT/PC, glass reinforced
Fastening	Wall, pipe/post, or panel mounting
Color	Gray, RAL 7001
Ingress protection	IP 67
Flammability	UL 94 V-0
Dimensions	148 mm x 148 mm
Control panel cutout	138 mm x 138 mm to DIN 43 700
Weight	Approx. 1200 g
Cable glands	3 knockouts for M20 x 1.5 cable glands 2 knockouts for NPT ½" or rigid metallic conduit
Connections	Terminals, conductor cross section max. 2.5 mm^2

* User-defined

1) Acc. to EN 60746, at nominal operating conditions

2) ± 1 count

3) Plus sensor error

Calibration Solutions

Potassium Chloride Solutions

(Conductivity in mS/cm)

Temperature	Concentration [1]		
[°C]	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)

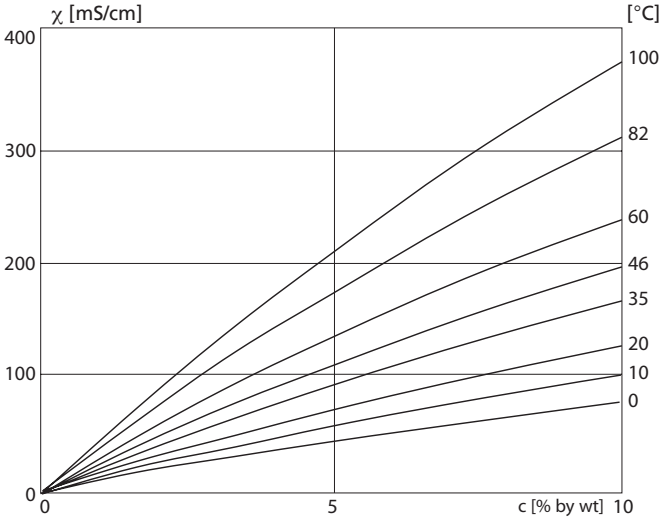
Temperature	Concentration		
[°C]	0.01 mol/l [1]	0,1 mol/l [1]	Saturated [2]
0	0.631	5.786	134.5
1	0.651	5.965	138.6
2	0.671	6.145	142.7
3	0.692	6.327	146.9
4	0.712	6.510	151.2
5	0.733	6.695	155.5
6	0.754	6.881	159.9
7	0.775	7.068	164.3
8	0.796	7.257	168.8
9	0.818	7.447	173.4
10	0.839	7.638	177.9
11	0.861	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

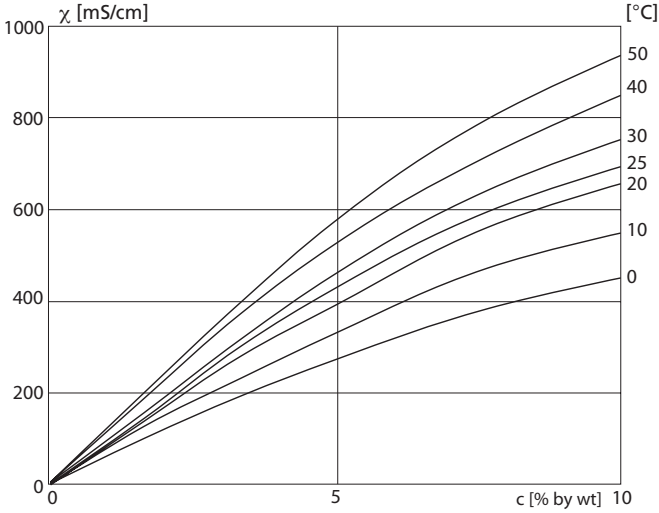
Concentration Curves

-01- Sodium chloride solution NaCl



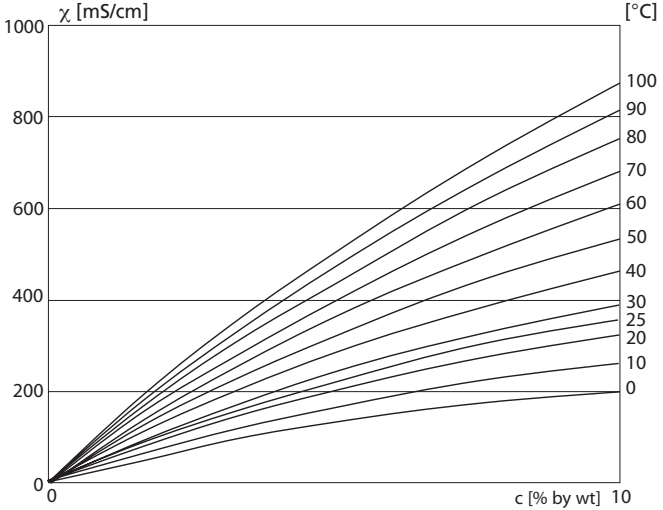
Conductivity versus substance concentration and process temperature for sodium chloride solution (NaCl)

-02- Hydrochloric acid HCl



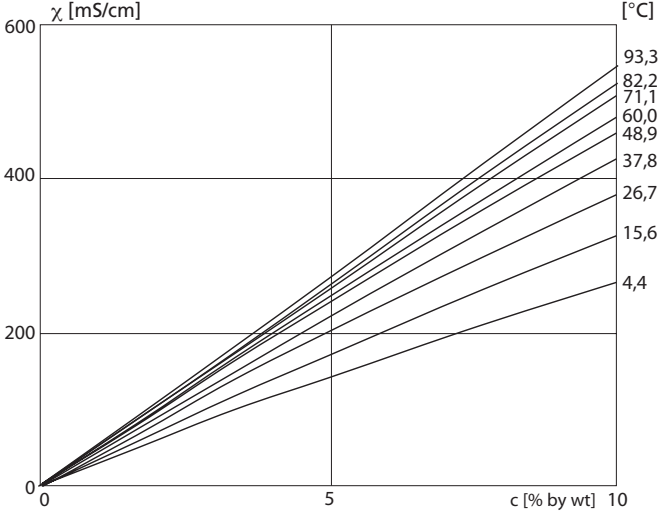
Conductivity versus substance concentration and process temperature for hydrochloric acid (HCl)
Source: Haase/Sauermann/Dücker; Z. phys. Chem. New Edition, Vol. 47 (1965)

-03- Sodium hydroxide solution NaOH



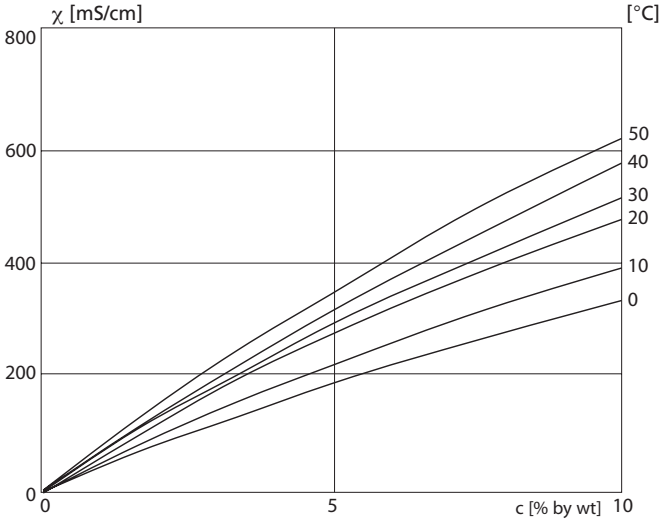
Conductivity versus substance concentration and process temperature for sodium hydroxide solution (NaOH)

-04- Sulfuric acid H_2SO_4



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 HNO_3



Conductivity versus substance concentration and process temperature for nitric acid ($HN0_3$)
Source: Haase/Sauermann/Dücker; Z. phys. Chem. New Edition, Vol. 47 (1965)

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 (IrDA, 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
- calibration will be restarted

Sensoface:

If the Sensoface becomes sad,

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

Error Messages

Error	**Info text** (is displayed in case of fault when the Info key is pressed)	**Problem** **Possible causes**
ERR 99	DEVICE FAILURE	**Error in factory settings** 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.
ERR 98	CONFIGURATION ERROR	**Error in configuration or calibration data** Memory error in device program Configuration or calibration data defective; completely reconfigure and recalibrate the device.
ERR 97	NO MODULE INSTALLED	**No module** Please have the module replaced in the factory.
ERR 96	WRONG MODULE	**Wrong module** Please have the module replaced in the factory.
ERR 95	SYSTEM ERROR	**System error** Restart required. If error still persists, send in the device for repair.
ERR 100	INVALID SPAN OUT1	Span Out1 configuration error
ERR 101	INVALID SPAN OUT2	Span Out2 configuration error
ERR 105	INVALID SPAN I-INPUT	I-Input configuration error

Error	**Info text** (is displayed in case of fault when the Info key is pressed)	**Problem Possible causes**
ERR 10	CONDUCTANCE TOO HIGH	**Measuring range of conductance exceeded** > 3500 mS/cm
ERR 11		**Display range violation**
	CONDUCTIVITY RANGE	Cond > 999.9 mS/cm > 99.99 S/m < 1 ohm * cm
	CONCENTRATION RANGE	Conc > 9.99 %
	SALINITY RANGE	SAL > 45.0 ‰
ERR 13	TEMPERATURE RANGE	**Temperature range violation**
ERR 15	SENSOCHECK	**Sensocheck**
ERR 60	OUTPUT LOAD	**Load error**
ERR 61	OUTPUT 1 TOO LOW	**Output current 1** < 0 (3.8) mA
ERR 62	OUTPUT 1 TOO HIGH	**Output current 1** > 20.5 mA
ERR 63	OUTPUT 2 TOO LOW	**Output current 2** < 0 (3.8) mA
ERR 64	OUTPUT 2 TOO HIGH	**Output current 2** > 20.5 mA

Sensoface

(Sensocheck must have been activated during configuration.)

The smiley in the display (Sensoface) alerts to sensor problems (defective sensor, sensor wear, defective cable, maintenance request). 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.

Sensocheck (not for Memosens)
Continuously monitors the sensor polarization and the sensor cable capacitance. Critical values make the Sensoface "sad" and the corresponding icon blinks:

The Sensocheck message is also output as error message Err 15.
The alarm contact is active, the display backlighting turns red, output current 1 is set to 22 mA (when configured correspondingly).
Sensocheck can be switched off during configuration (then Sensoface is also disabled).
Exception:
After a calibration a smiley is always displayed for confirmation.

Please 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.

Display	Problem	Status	
	Sensor defect		– Not for Memosens – Wrong or defective sensor, significant polarization of sensor, or excessive cable capacitance (see also error message Err 15).
	Temperature		Temperature outside range for TC, conc, sal

EC Declaration of Conformity

EG-Konformitätserklärung
EC Declaration of Conformity
Déclaration de Conformité CE

Knick
Elektronische Messgeräte
GmbH & Co. KG
Beuckestr. 22
D-14163 Berlin

Dokument-Nr. / Document No. / No. document	**EG80724A**
Wir, die / We, / Nous,	**Knick Elektronische Messgeräte GmbH & Co. KG** **Beuckestr. 22, D-14163 Berlin**
	erklären in alleiniger Verantwortung, daß dieses Produkt / diese Produkte, declare under our sole responsibility that the product / products, déclarons sous notre seule responsabilité que le produit / les produits,
Produktbezeichnung / Product identification / Désignation du produit	**Stratos® Pro Typen A20*N-*-*, A21*N-*-***

Aufbewahrung / Keeping / Garde en dépôt
Jürgen Cammin (KB)

auf welche(s) sich diese Erklärung bezieht, mit allen wesentlichen Anforderungen der folgenden Richtlinien des Rates übereinstimmen:
to which this declaration relates is/are in conformity with all essential requirements of the Council Directives relating to:
auquel/auxquels se réfère cette déclaration est/sont conforme(s) aux exigences essentielles de la Directives du Conseil relatives à: *)

Niederspannungs-Richtlinie / Low-voltage directive / Directive basse tension	**2006/95/EG**
Harmonisierte Normen / Harmonised Standards / Normes harmonisées	**DIN EN 61010-1 / VDE 0411 Teil 1: 2002-08**
EMV-Richtlinie / EMC directive / Directive CEM	**2004/108/EG**
Norm / Standard / Norme	**DIN EN 61326-1 / VDE 0843 Teil 20-1: 2006-10** **DIN EN 61326-2-3 / VDE 0843 Teil 20-2-3: 2007-05**

Jahr der Anbringung der CE-Kennzeichnung / Year in which the CE marking was affixed / L'année d'apposition du marquage CE: **2008**

*) Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten. Bei einer mit dem Hersteller nicht abgestimmten Änderung des Gerätes und/oder bei Nichtbeachtung der Sicherheitshinweise verliert diese Erklärung ihre Gültigkeit. /
The safety instructions contained in the documentation accompanying the product have to be observed. If the apparatus is modified without having obtained manufacturer's prior consent and/or the safety instructions are not followed, this declaration becomes void. /
Il est impératif de respecter les instructions de sécurité dans la documentation fournie avec le produit.. En cas de modification de l'appareil sans l'accord du fabricant et/ou en cas de non-respect des instructions de sécurité, cette déclaration perd sa vigueur.

Ausstellungsort, -datum / Place and date of issue / Lieu et date d'émission	**Berlin, 24.07.2008**

Knick Elektronische Messgeräte GmbH & Co. KG

ppa.
Wolfgang Fenchl
(Vice President Engineering, R&D)

ppa.
Bernhard Kusig
(Vice President Marketing/Sales)

EG-Konformitätserklärung
EC Declaration of Conformity
Déclaration de Conformité CE

Knick
Elektronische Messgeräte
GmbH & Co. KG
Beuckestr. 22
D-14163 Berlin

Dokument-Nr. / Document No. / No. document	**EG80724B**
Wir, die / We, / Nous,	**Knick Elektronische Messgeräte GmbH & Co. KG** **Beuckestr. 22, D-14163 Berlin**
	erklären in alleiniger Verantwortung, daß dieses Produkt / diese Produkte, declare under our sole responsibility that the product / products, déclarons sous notre seule responsabilité que le produit / les produits,
Produktbezeichnung / Product identification / Désignation du produit	**Stratos® Pro Typen A21*X-*-***

Aufbewahrung / Keeping / Garde en dépôt:
Jürgen Cammin (KB)

auf welche(s) sich diese Erklärung bezieht, mit allen wesentlichen Anforderungen der folgenden Richtlinien des Rates übereinstimmen:
to which this declaration relates is/are in conformity with all essential requirements of the Council Directives relating to:
auquel/auxquels se réfère cette déclaration est/sont conforme(s) aux exigences essentielles de la Directives du Conseil relatives à: *)

ATEX 100 Richtlinie / ATEX 100 directive / Directive ATEX 100	**94/9/EG**
Harmonisierte Normen / Harmonised Standards / Normes harmonisées	**EN 60079-0: 2006** **EN 60079-11: 2007** **EN 60079-26: 2007** **EN 61241-0: 2006** **EN 61241-11: 2006**

EG-Baumusterprüfbescheinigung / EC Type Examination Certificate / Attestation d'examen CE de type
KEMA Quality B.V.,
NL-6812 AR Arnhem, ExNB-No. 0344
KEMA 08 ATEX 0100

Kennzeichnung / Designation / Marquage
CE 0044 Ex II 2(1) G Ex ib [ia] IIC T4 oder/or/ou
II 1 G Ex ia IIC T4 oder/or/ou
II 1 D Ex iaD 20 IP6x T85 °C oder/or/ou
II 2 D Ex iaD 21 IP6x T85 °C

Niederspannungs-Richtlinie / Low-voltage directive / Directive basse tension	**2006/95/EG**
Harmonisierte Normen / Harmonised Standards / Normes harmonisées	**DIN EN 61010-1 / VDE 0411 Teil 1: 2002-08**

Jahr der Anbringung der CE-Kennzeichnung / Year in which the CE marking was affixed / L'année d'apposition du marquage CE: **2008**

EMV-Richtlinie / EMC directive / Directive CEM	**2004/108/EG**
Norm / Standard / Norme	**DIN EN 61326-1 / VDE 0843 Teil 20-1: 2006-10** **DIN EN 61326-2-3 / VDE 0843 Teil 20-2-3: 2007-05**

*) Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten. Bei einer mit dem Hersteller nicht abgestimmten Änderung des Gerätes und/oder bei Nichtbeachtung der Sicherheitshinweise verliert diese Erklärung ihre Gültigkeit. /
The safety instructions contained in the documentation accompanying the product have to be observed. If the apparatus is modified without having obtained manufacturer's prior consent and/or the safety instructions are not followed, this declaration becomes void. /
Il est impératif de respecter les instructions de sécurité dans la documentation fournie avec le produit.. En cas de modification de l'appareil sans l'accord du fabricant et/ou en cas de non-respect des instructions de sécurité, cette déclaration perd sa vigueur.

Ausstellungsort, -datum / Place and date of issue / Lieu et date d'émission	**Berlin, 24.07.2008**

Knick Elektronische Messgeräte GmbH & Co. KG

ppa.
Wolfgang Feucht
(Vice President Engineering, R&D)

ppa.
Bernhard Kusig
(Vice President Marketing/Sales)

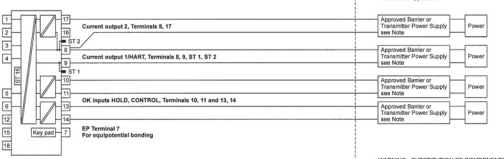
2-Wire Transmitter Stratos® Pro Type A20.X... or A21.X...
(intrinsically safe apparatus)

Hazardous Classified Area

Unclassified Area

IECEx IECEx KEM 08.0020
Ex ib [ia] IIC T4 or Zone 0 Ex ia IIC T4 or
Ex iaD 20 IP6x T85 °C

ATEX KEMA 08 ATEX 0100
II 2(1) G Ex ib [ia] IIC T4 or II 1 G Ex ia IIC T4 or
II 1 D Ex iaD 20 IP6x T85 °C or II 2 D Ex iaD 21 IP6x T85 °C



WARNING - SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY

Notes

1. Control equipment connected to the associated apparatus must not use or generate more than 250 V.
2. At the time of installation mark the selected type of protection on the equipment marking.

	In type of protection intrinsic safety Ex ia IIC only for connection to intrinsically safe circuits, with the following maximum values										
	Ui, Vmax (V)	Ii, Imax (mA)	Pi, Pmax (mW)	Ci (nF)	Li (µH)						
Current output 1 / HART (Terminals 8, 9, ST1, ST2)	30	100	800	5.3	2.5						
Current output 2 (Terminals 8, 17)	30	100	800	5.3	2.5						
Current input (Terminals 5, 6)	30	100	800	12	0						
OK input HOLD (Terminals 10, 11)	30	100	1000	0	0						
OK input CONTROL (Terminals 13, 14)	30	100	1000	0	0						
	In type of protection intrinsic safety, with the following maximum values										
				Ex ia IIC		Ex ia IIB		Ex ia IIA			
	Uo, Voc (V)	Io, Isc (mA)	Po (mW)	Co, Ca (µF)	Lo, La (mH)	Co, Ca (µF)	Lo, La (mH)	Co, Ca (µF)	Lo, La (mH)		
InduCon interface (Terminals 1, 2, 3, 4)	5	124	155	83.2	2	1000	8.5	1000	16		Linear characteristic
MK interface	only for connection to a measuring module MK-... belonging to Stratos® Pro Type A... system										
EP (Terminal 7)	For equipotential bonding										

Simultaneous connection of a measuring module MK-... and an InduCon measuring system is not permitted.

Safe galvanic isolation up to 60 V

Verteilen: FUL (Dx)	Zul. Abweichungen für Maße ohne Toleranzangabe	Maßstab
		Maßbezug

	Datum	Name	Benennung
Bearb.	29.05.2008	Kem	Stratos® Pro A20.X...
Gepr. (KDN)			Control drawing A21.X...
Freigabe			

Schutzvermerk nach DIN 34/ISO beachten.

Knick

Zeichnungsnummer	Blatt
212.002-100	1
	1 Bl.

Nr	Änderungen	Datum	Bearb.	FG, KDN	Elektronische Messgeräte GmbH & Co. KG

Hazardous Classified Area
Measuring Module Type MK-Cond
belonging to
Stratos® Pro Type A2..X... or
A2..B...

IECEx, ATEX control drawing 212.002-100

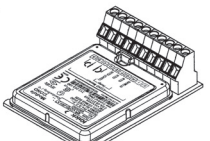
FM control drawing 212.002-300

CSA control drawing 212.002-330

MK interface	In type of protection Intrinsic safety, only for connection to Stratos® Pro A2..X... or A2..B...								
	In type of protection Intrinsic safety, with the following maximum values								
				Class I GRP A,B Ex ia IIC	Class I GRP C Ex ia IIB		Class I GRP D Class II GRP E,F,G Class III Ex ia IIA		
	Uo, Voc (V)	Io, Isc (mA)	Po (mW)	Co, Ca (µF)	Lo, La (mH)	Co, Ca (µF)	Lo, La (mH)	Co, Ca (µF)	Lo, La (mH)
Conductivity Measuring Loop (Terminals A, B, C, D, H)	5	36	45	100	25	1000	100	1000	210	Linear characteristic
Temperature Measuring Loop (Terminals E, F, G)	5	27	34	100	50	1000	200	1000	400	Linear characteristic
Conductivity/Temperature Measuring Loop (Terminals A, B, C, D, E, F, G, H)	5	63	79	100	8	1000	30	1000	70	Linear characteristic

The measuring circuits are galvanically connected

MK interface
ST 1
Only to connect to
Stratos® Pro A2..X... or
A2..B...



WARNING - SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY
WARNING - SUBSTITUTION OF COMPONENTS MAY IMPAIR THE SUITABILITY FOR DIV 2 / ZONE 2

Notes

IECEx, ATEX, FM, CSA

1. When installed in Stratos® Pro Type A2..X, Intrinsically Safe Equipment connecting to A, B, C, D, E, F, G, H must be IECEx or ATEX or FM or CSA Approved or be a simple Apparatus.
2. Simple Apparatus is defined as a device that does not generates more than 1.5 V, 0.1 A, or 25 mW.

FM

3. The Intrinsic Safety Entity concept allows the interconnection of FM Approved intrinsically safe devices with entity parameters not specifically examined in combination as a systems when:
   Ui or Vmax or Vt ≥ Voc, Is or Isc or It ≤ Imax, Pi ≤ Pt, Ca or Ca ≥ Σ C + Σ Cable
   For inductance use either La or Lo ≥ Σ Li + Σ Lcable or La/Ra ≤ (La/Ra or Lo/Ro) and Li/Ri ≤ (La/Ra or Lo/Ro)
4. Installation should be in accordance with ANSI/ISA RP12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code® (ANSI/NFPA 70).
5. No revisions to drawing without prior FM Approvals authorisation.

CSA

6. Installation must be in accordance with Canadian Electrical Code for Hazardous Locations

Verteiler: Pos. Dx1	Zul. Abweichungen für Maße ohne Toleranzangabe	Maßstab
		Halbzeug
	Datum / Name	Benennung: Module MK-COND Control drawing
	Bearb. 13.02.2009 dam	
	Gepr. 9080	
	Freigabe:	
	Schutzvermerk nach DIN 34 beachten.	Zeichnungsnummer: 212.002-130
	Knick Elektronische Messgeräte GmbH & Co. KG	Blatt 1 / 1 Bl.
Nr. Änderungen Datum Bearb.		

2-Wire Transmitter Stratos® Pro Type A20.X... or A21.X...
(intrinsically safe apparatus)

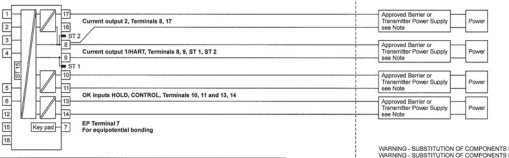
IS Class I, II, III, Division 1, Groups A, B, C, D, E, F, G, T4, Ta = 65 °C; Entity; Type 4X
NI Class I, II, III, Division 2, Groups A, B, C, D, E, F, G, T4, Ta = 65 °C; Type 4X
AIS, Class I, II, III, Division 1, Groups A, B, C, D, E, F, G
Class I, Zone 1, AEx ia IIC T4, Ta = 65 °C; Entity; Type 4X
Class I, Zone 2, AEx nA IIC T4, Ta = 65 °C; Type 4X
-20 °C ≤ Ta ≤ +65 °C

2-Wire Transmitter Stratos® Pro Type A20.B... or A21.B...
(non-incendive apparatus)

NI Class I, II, III, Division 2, Groups A, B, C, D, E, F, G, T4, Ta = 65 °C; Type 4X
Class I, Zone 2, AEx nA IIC T4, Ta = 65 °C; Type 4X
-20 °C ≤ Ta ≤ +65 °C

Hazardous Classified Area

Unclassified Area



	In type of protection intrinsic safety only for connection to intrinsically safe circuits, with the following maximum values									
	U_i, V_{max} (V)	I_i, I_{max} (mA)	P_i, P_{max} (mW)	Ci (nF)	Li (µH)					
Current output 1 / HART (Terminals 8, 9, ST1, ST2)	30	100	800	5.3	2.5					
Current output 2 (Terminals 8, 17)	30	100	800	5.3	2.5					
Current input (Terminals 5, 6)	30	100	800	12	0					
OK input HOLD (Terminals 10, 11)	30	100	1000	0	0					
OK input CONTROL (Terminals 13, 14)	30	100	1000	0	0					
	In type of protection intrinsic safety, with the following maximum values									
				Class I GRP A,B GRP IIC		Class I GRP C GRP IIB			Class I GRP D Class II GRP E,F,G Class III GRP IIIA	
	U_o, V_{DC} (V)	I_o, I_{SC} (mA)	P_O (mW)	Co, Ca (µF)	Lo, La (mH)	Co, Ca (µF)	Lo, La (mH)	Co, Ca (µF)	Lo, La (mH)	
RS 485 (InduCon/Memosens) (Terminals 1, 2, 3, 4)	5	124	155	83.2	2	1000	8.5	1000	16	Linear characteristic
MK interface	only for connection to a measuring module MK-..., belonging to Stratos® Pro Type A... system									
EP (Terminal 7)	For equipotential bonding									

Simultaneous connection of a measuring module MK-... and an InduCon measuring system is not permitted.

IS Safe galvanic isolation up to 60 V

Associated Apparatus

1. The Intrinsic Safety Entity concept allows the interconnection of FM-Approved intrinsically safe devices with entity parameters not specifically examined in combination as a systems when:
   U_o or $V_t \leq V_{max}$, I_o or $I_t \leq I_{max}$, $P_o \leq P_i$, C_a or $C_o \geq \Sigma C_i + \Sigma C_{cable}$
   For inductance use either L_a or $L_o \geq \Sigma L_i + \Sigma L_{cable}$ or $L_a/R_a \leq (L_i/R_i$ and $L_i/R_i \leq (L_a/R_a$ or $L_o/R_o)$
2. Installation should be in accordance with ANSI/ISA RP12.06.01, "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the National Electrical Code®(ANSI/NFPA 70).
3. No revisions to drawing without prior FM Approvals authorisation.
4. Stratos® Pro Type A2..X: Intrinsically Safe Equipment connecting to 1 to 17 must be FM Approved or be a simple Apparatus.
5. Associated apparatus must be FMRC Approved and must be used in an FMRC Approved configuration. The Control drawing for the associated apparatus must be followed when installing this equipment.
6. Control equipment connected to the associated apparatus must not use or generate more than 250 V.
7. Do not disconnect equipment unless power has been switched of or the area is known to be non hazardous.

Verteiler: FUL (2x)	Zul. Abweichungen für Maße ohne Toleranzangabe	Maßstab	
		Halbzeug	
	Datum / Name	Benennung	Stratos® Pro A2..X... FM Control dwg. A2..B...
	Bearb. 26.10.2018 / dam		
	Gepr. (KON)		
	Freigabe		
	Schutzvermerk nach DIN/EN beachtet.	Zeichnungsnummer	Blatt
	Knick Elektronische Messgeräte GmbH & Co. KG	212.002-300	1 / 1 Bl.

Nr	Änderungen	Datum	Bearb.	FGL	KON

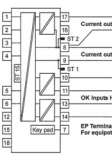
2-Wire Transmitter Stratos® Pro Type A20.X... or A21.X...
(intrinsically safe apparatus)
IS Class I, Division 1, Groups A, B, C, D, E, F, G T4, Ta = 65 °C, Entity
AIS Class I, II, III, Division 1, GRP A, B, C, D, E, F, G T4, Ta = 65 °C
Class I, Zone 1, AEx ia IIC T4, Ta = 65 °C, Entity
-20 °C ≤ Ta ≤ +65 °C

2-Wire Transmitter Stratos® Pro Type A20.B... or A21.B...
(non-incendive apparatus)

cCSAus Certificate number CSA.08.2117513

Hazardous Classified Area

Unclassified Area



Associated Apparatus

- Approved Barrier or Transmitter Power Supply see Note → Power
- Approved Barrier or Transmitter Power Supply see Note → Power
- Approved Barrier or Transmitter Power Supply see Note → Power
- Approved Barrier or Transmitter Power Supply see Note → Power

WARNING - SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY
WARNING - SUBSTITUTION OF COMPONENTS MAY IMPAIR THE SUITABILITY FOR DIV 2 / ZONE 2

Notes
1. Installation must be in accordance with Canadian Electric Code for Hazardous Locations.
2. Stratos® Pro Type A2..X: Intrinsically Safe Equipment connecting to 1 to 17 must be CSA Approved or be a simple Apparatus (a device which will neither generate not store more than 1.2 V, 0.1 A, 25 mW or 20 mJ).
3. Control equipment connected to the associated apparatus must not use or generate more than 250 V.
4. Do not disconnect equipment unless power has been switched of or the area is known to be non hazardous.

In type of protection intrinsic safety
only for connection to intrinsically safe circuits, with the following maximum values

	Ui, Vmax (V)	Ii, Imax (mA)	Pi, Pmax (mW)	Ci (nF)	Li (µH)				
Current output 1 / HART (Terminals 8, 9, ST1, ST2)	30	100	800	5.3	2.5				
Current output 2 (Terminals 8, 17)	30	100	800	5.3	2.5				
Current input (Terminals 5, 6)	30	100	800	12	0				
OK input HOLD (Terminals 10, 11)	30	100	1000	0	0				
OK input CONTROL (Terminals 13, 14)	30	100	1000	0	0				

In type of protection intrinsic safety, with the following maximum values

				Class I GRP A,B Class II GRP E,F,G		Class I GRP C GRP BB		Class I GRP D Class II GRP E,F,G Class III GRP 8A		
	Uo, Voc (V)	Io, Isc (mA)	Po (mW)	Co, Ca (µF)	Lo, La (mH)	Co, Ca (µF)	Lo, La (mH)	Co, Ca (µF)	Lo, La (mH)	
RS 485 (InduCon/Memosens) (Terminals 1, 2, 3, 4)	5	124	155	83.2	2	1000	8.5	1000	16	Linear characteristic
MK interface	only for connection to a measuring module MK-... belonging to Stratos® Pro Type A... system									
EP (Terminal 7)	For equipotential bonding									

Simultaneous connection of a measuring module MK-... and an InduCon measuring system is not permitted.

IS Safe galvanic isolation up to 60 V

Verteiler: FUL IZvI

Zul. Abweichungen FÜr Maße ohne Toleranzangabe

Maßstab

Maßzweig

	Datum	Name
Bearb.	2x.10.2009	dam
Gepr.	9096	
Freigabe	21.10.09	

Benennung: Stratos® Pro A2..X... CSA Control dwg. A2..B...

Schutzvermerk nach DIN 34 beachten.

Knick

Änderungen | Datum | Bearb. | Ritz | Knick Elektronische Messgeräte GmbH & Co. KG

Zeichnungsnummer: 212.002-330

Blatt: 1 von 1 Bl.

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 US 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

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

Trademarks

The following names are registered trademarks. For practical reasons they are shown without trademark symbol in this manual.
Stratos®
Sensocheck®
Sensoface®
Calimatic®
GainCheck®
InPro® is a registered trademark of Mettler-Toledo.
Memosens® is a registered trademark of Endress+Hauser Conducta GmbH and Knick Elektronische Messgeräte GmbH & Co. KG.
HART® is a registered trademark of the HART Communication Foundation.

Passcodes

In the SERVICE – CODES menu you can assign passcodes to protect the access to certain functions.

Operating mode	Passcode
Service (SERVICE)	**5555**
Diagnostics (DIAG)	
HOLD mode	
Calibration (CAL)	
Configuration (CONF)	

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knick@knick.de

TA-212.125-KNE01 20090406 Software version: 1.x