

The Art of Measuring.

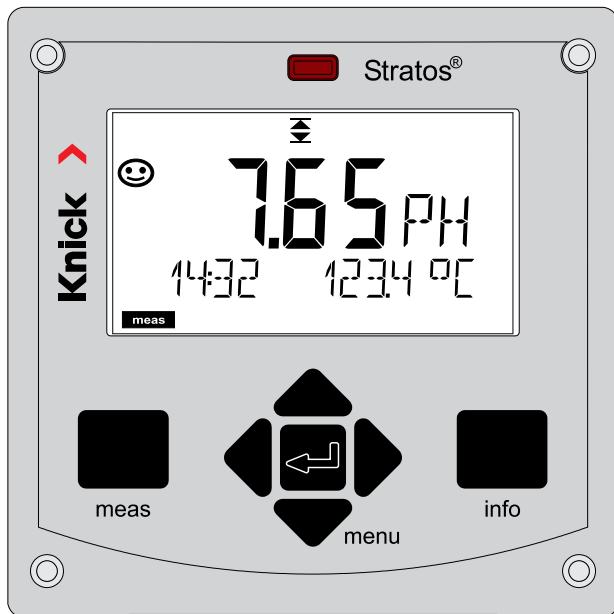
Knick 

User Manual
English

PROFIBUS DP/PA

Stratos® Evo A451N

Stratos® Pro A221(N/X)



Basics	7
Introduction.....	9
Intended Use of Stratos Pro A221(N/X)	9
Intended Use of Stratos Evo A451N.....	10
Stratos Pro A221(N/X): Typical Application	12
Stratos Evo A451N: Typical Application.....	13
Overview	14
Package Contents.....	14
Changing the Measuring Function.....	16
Inserting a Module.....	16
pH, Oxy Modules	17
Conductivity Modules	18
Dual-Conductivity Module	19
Digital Sensors: Memosens.....	20
Connecting a Memosens Sensor	21
Memosens Cable CA/MS-.....	22
Terminal Plate and Rating Plates	23
A221(N/X) Signal Assignments	25
A451N Signal Assignments.....	26
Commissioning	27
Changing the Measuring Function	27
Selecting the Measuring Function.....	27
Measuring Mode	28
Operation	28
Keypad	29
Display.....	30
Display in Measuring Mode.....	31
Color-Coded User Interface	32
Operating Modes	33
Selecting the Operating Mode.....	34
Entering Values.....	35
Alarm Messages	36
Overview of Menus.....	37
Connecting a Memosens Sensor.....	38
Replacing a Memosens Sensor.....	39
Configuration.....	40
Overview of pH Configuration	40
pH Configuration (Template for Copy).....	42
Overview of Cond Configuration	62
Cond Configuration (Template for Copy)	64

Overview of CondI Configuration	74
CondI Configuration (Template for Copy).....	76
Configuring an Oxygen Sensor	86
Oxy Configuration (Template for Copy)	88
Device Type: Cond-Cond	104
Cond-Cond Configuration	108
CC Configuration (Template for Copy)	110
Configuring the CONTROL Input	112
Configuring the Alarm.....	114
Configuring the Time/Date.....	116
Calibration	118
Zero Adjustment.....	120
pH: Automatic Calibration.....	122
pH: Manual Calibration.....	124
pH: Premeasured Sensors.....	126
Slope: Converting % to mV.....	127
ORP (Redox) Calibration.....	128
Product Calibration.....	130
Oxy: Calibration	132
Slope Calibration in Air.....	134
Slope Calibration in Water.....	135
LDO Calibration.....	137
LDO Slope Calibration in Air.....	138
LDO Slope Calibration in Water.....	140
LDO Zero Calibration in N ₂	142
LDO Offset Correction	143
Conductivity: Calibration.....	144
Calibration with Calibration Solution	145
Inductive Conductivity: Calibration.....	146
Calibration by Input of Cell Factor	147
Zero Calibration	148
Measurement.....	149
Diagnostics	150
Service	155
Error Messages.....	158
pH Error Messages	158
Cond Error Messages	160
CondI Error Messages	162
Oxy Error Messages	164
Cond-Cond Error Messages	168

Sensocheck and Sensoface.....	170
PROFIBUS PA Product Range.....	171
PROFIBUS DP Product Range	172
PROFIBUS	173
Introduction	173
Typical Configuration.....	175
PROFIBUS PA Terminal Assignments	176
PROFIBUS DP Terminal Assignments	177
Schematic Diagram of Block Types for PROFIBUS PA	178
Schematic Diagram of Block Types for PROFIBUS DP	179
The Block Model	180
Physical Block (PB).....	181
Transducer Block (TB)	181
Function Block (FB).....	182
Overview of Software	188
Diagnostics	189
MEAS MODE (Measurement Mode).....	190
Condensed Status	192
Classic Status	194
Synoptic Table of DIAGNOSIS_EXTENSION.....	196
Commissioning on the PROFIBUS	200
Configuration Data	206
Cyclic Data Communication	207
Physical Block Parameters	208
AI Function Block Parameters	210
AO Function Block Parameters	213
DI Function Block Parameters	215
DO Function Block Parameters.....	217
Bus Parameters of Standard Transducer Block (TB)	218
Bus Parameters of Manufacturer-Specific Transducer Block (TB)	220
Product Calibration.....	250
PROFIBUS Certificate Stratos Pro A221(N/X)	251
PROFIBUS Certificate Stratos Evo A451N.....	252
Installation	253
Changing the Measuring Function	254
Inserting a Module.....	254
pH Module	255
pH Wiring Examples	256
Oxy Module	263
Oxy Wiring Examples	264

Optical Sensor Wiring Example	267
Cond Module	268
Cond Wiring Examples	269
CondI Module	276
Cable Preparation SE 655 / SE 656	277
CondI Wiring Examples	278
Dual-Conductivity Module	283
Cond-Cond Wiring Examples	284
Digital Sensors: Memosens	287
Connecting a Memosens Sensor	290
Specifications	291
Appendix	303
Buffer Tables	303
-U1- Specifiable Buffer Set	313
Calibration Solutions	316
Concentration Measurement	318
Concentration Curves	319
Index	324

Registered Trademarks

The following names are registered trademarks. For practical reasons they are shown without trademark symbol in this manual.

- CaliMat®
- Calimatic®
- Memosens®
- MemoSuite®
- Sensocheck®
- Sensoface®
- Stratos®

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

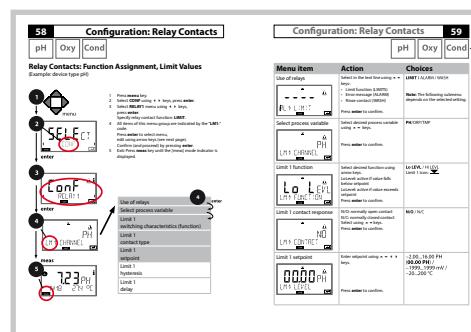
Please observe the applicable local or national regulations concerning the disposal of "waste electrical and electronic equipment".

About This Manual:

This manual is intended as a reference guide to your device –

You don't have to read the book from front to back.

Take a look at the **Table of Contents** or the **Index** to find the function you are interested in. Each topic is explained on a double-page spread with step-by-step instructions on how to configure the desired function. Clearly legible page numbers and headlines help you to quickly find the information:



Left page:

How do I get to the function

Right page:
Which settings are provided for this function

Safety Instructions

In official EU languages and others

Quickstart Guides

Installation and first steps:

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

Specific Test Report**Electronic Documentation**

Manuals + Software

Ex Devices:

Control Drawings**EU Declarations of Conformity**

Up-to date documentation available on our website:



Intended Use of Stratos Pro A221(N/X)

Stratos Pro A221(N/X) is a 2-wire analyzer with digital communication via PROFIBUS PA. The analyzer has an input for digital Memosens sensors.

Interchangeable measuring modules enable operation with analog sensors.

Power is supplied via the PROFIBUS.

The **Stratos Pro A221X** is suitable for use in hazardous areas.

The sturdy molded enclosure can be fixed into a control panel or mounted on a wall or at a post. The protective hood is optionally available to provide additional protection against direct weather exposure and mechanical damage.

You can select one of the following measuring functions:

- pH value
- ORP
- Conductivity, 2-/4-electrode sensors
- Conductivity, toroidal sensors
- Oxygen

Possible fields of application are:

- Biotechnology
- Chemical industry
- Pharmaceutical industry
- Environmental engineering
- Food technology
- Power station engineering
- Water/wastewater

Intended Use of Stratos Evo A451N

Stratos Evo A451N is a 4-wire analyzer with digital communication via PROFIBUS DP. The analyzer has an input for digital Memosens sensors. Interchangeable measuring modules enable operation with analog sensors. Current is provided through a universal power supply 80 ... 230 V AC, 45 ... 65 Hz / 24 ... 60 V DC. Two bus-controlled, floating relay contacts are available at the output for free configuration. The analyzer also provides power supply and allows signal processing for additional transmitters, e.g., for flow monitoring.

The sturdy molded enclosure can be fixed into a control panel or mounted on a wall or at a post. The protective hood is optionally available to provide additional protection against direct weather exposure and mechanical damage.

You can select one of the following measuring functions:

- pH value
- ORP
- Conductivity, 2-/4-electrode sensors
- Conductivity, toroidal sensors
- Oxygen
- Oxygen, optical

Possible fields of application are:

- Biotechnology
- Chemical industry
- Pharmaceutical industry
- Environmental engineering
- Food technology
- Power station engineering
- Water/wastewater

Display

Plain-text messages in a large, backlit LC display allow intuitive operation. You can specify which values are to be displayed in standard measuring mode ("Main Display").

Color-coded user interface

The colored display backlighting signals different operating states (eg, alarm: red).

Diagnostics functions

Diagnostics functions are provided by the "Sensocheck" automatic monitoring of glass and reference electrode and the "Sensoface" function for clear indication of the sensor condition.

Data Logger

The logbook (Audit Trail) can handle up to 100 entries.

Password protection

Password protection (passcode) for granting access rights during operation can be configured.

Automatic calibration with Calimatic

You can choose from the most commonly used pH buffer solutions.

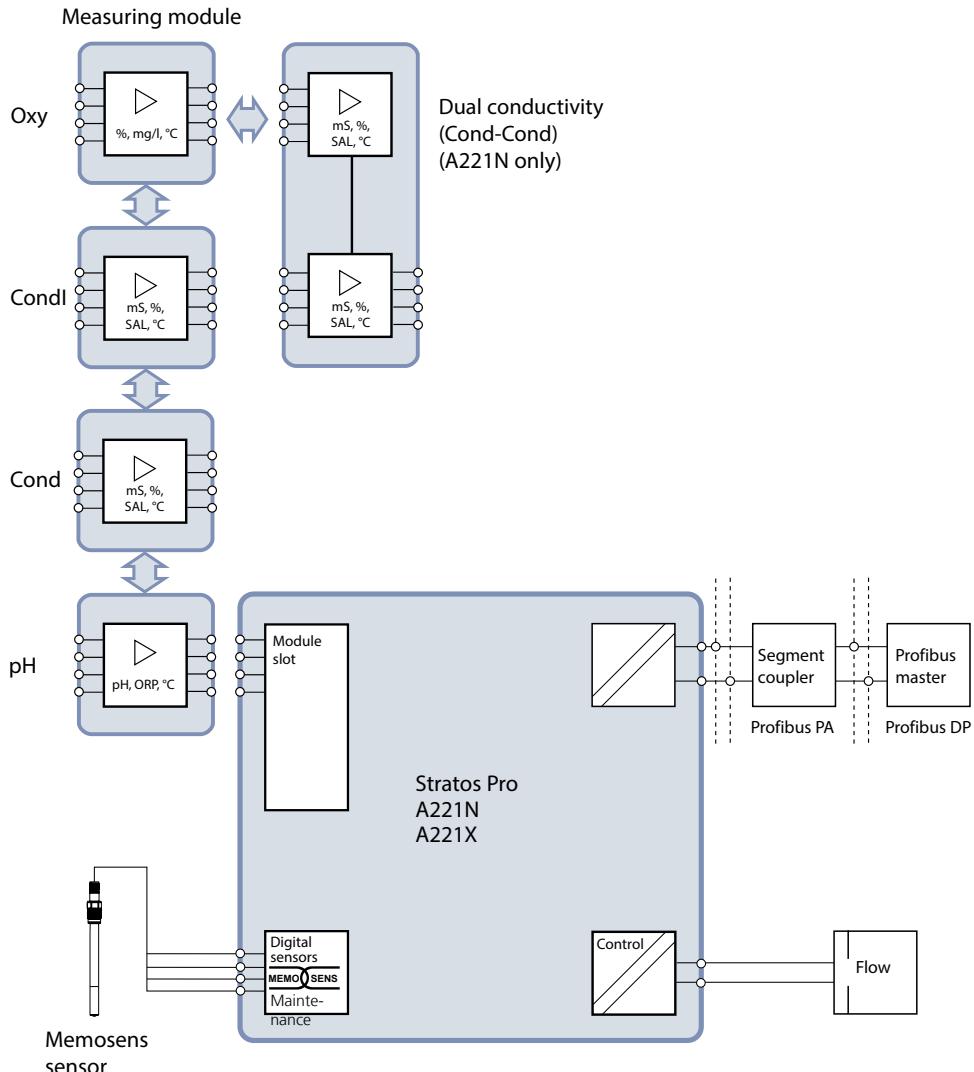
In addition, you can enter an individual pH buffer set.

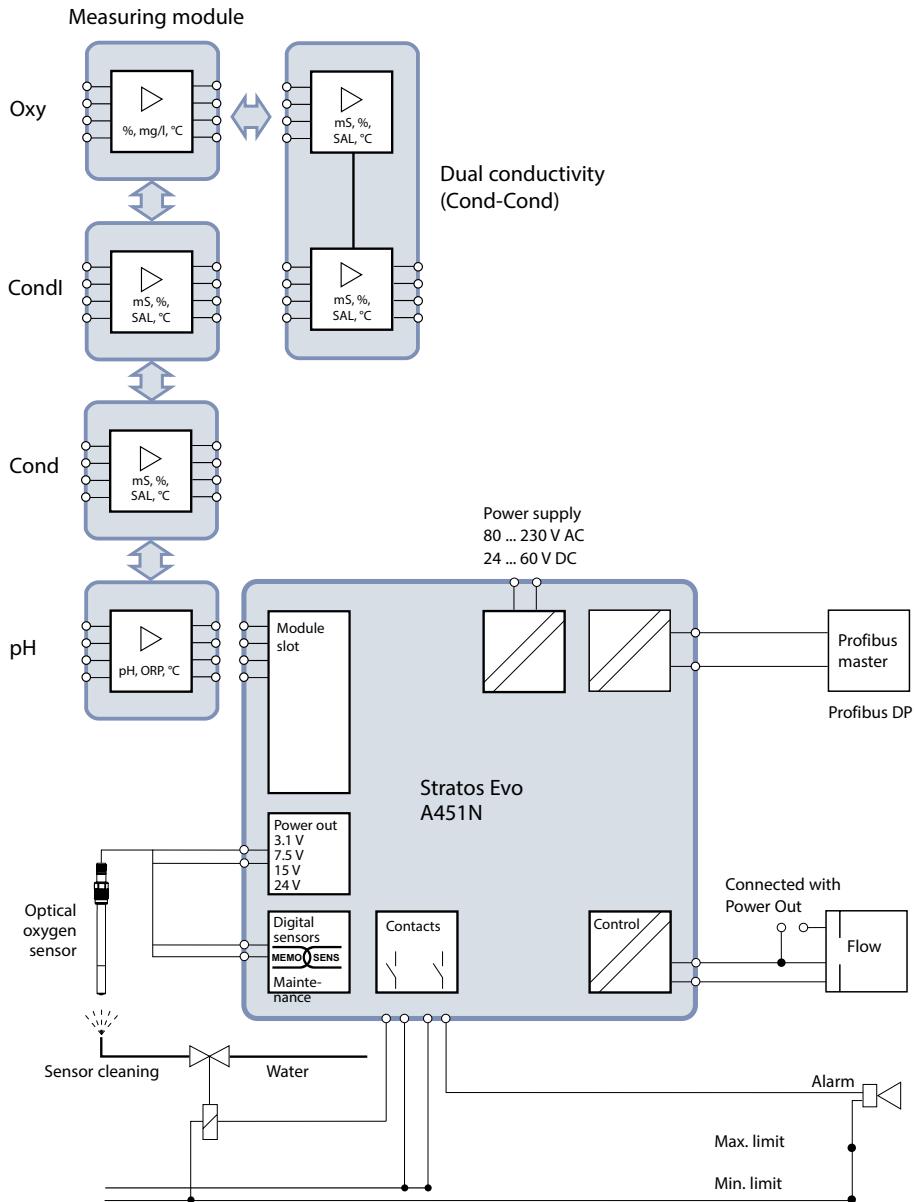
Door contact

When the enclosure is opened, a reed contacts opens, which automatically generates a logbook entry.

Control

Input for flow monitoring (floating, digital control input).





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

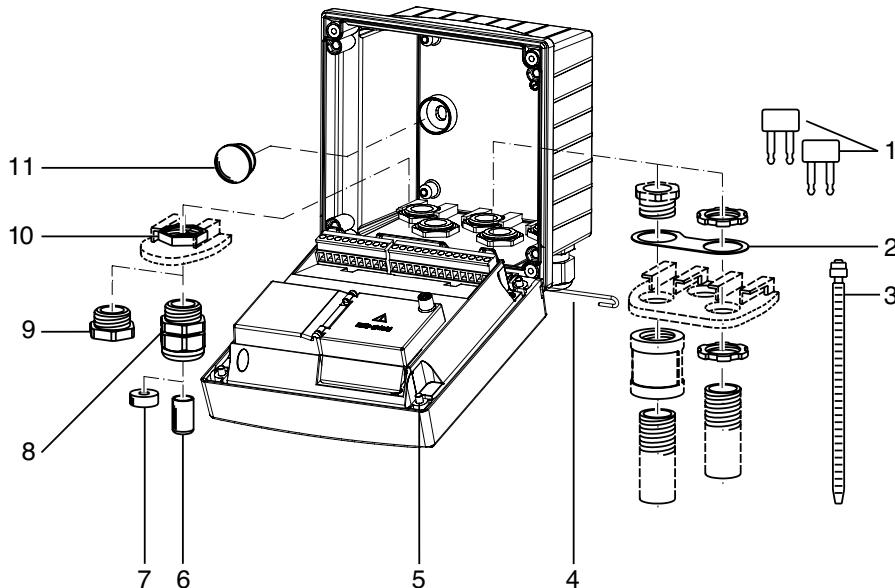
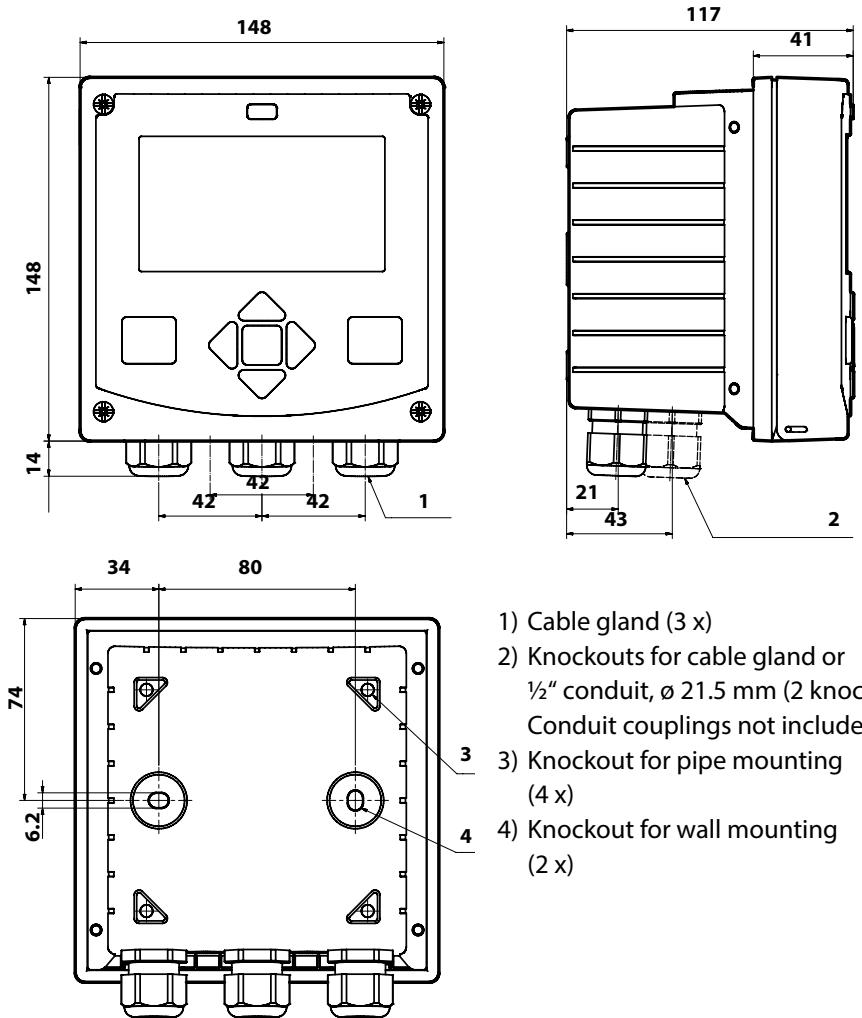


Fig.: Assembling the enclosure

- 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 M20x1.5 (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



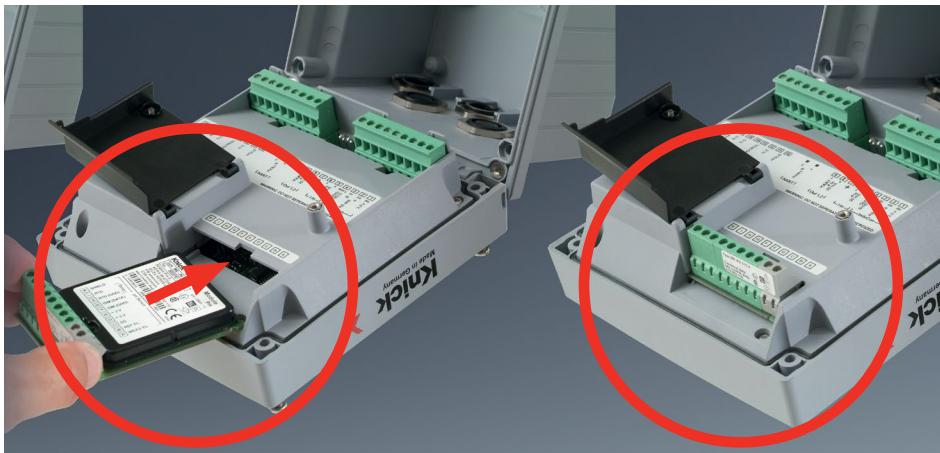
All dimensions in mm

Mounting Accessories

Pipe-mount kit, accessory ZU 0274

Protective hood for wall and pipe mounting, accessory ZU 0737

Panel-mount kit, accessory ZU 0738

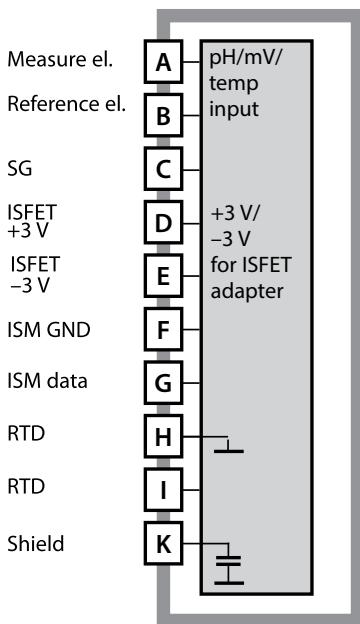


**Measuring modules for connection of analog sensors:
pH, oxygen (Oxy), conductivity (Cond, CondI, Cond-Cond)**

Measuring modules for the connection of analog sensors are simply inserted into the module slot.

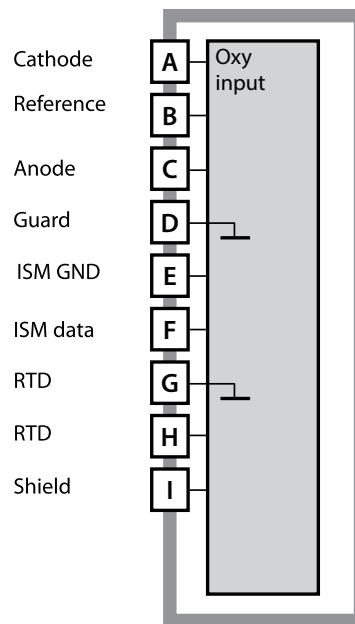
Changing the Measuring Function

When you replace the measuring module, you must select the corresponding measuring function in the "Service" menu.



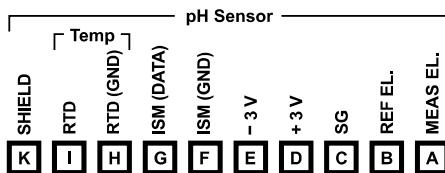
Module for pH measurement

Order code MK-PH015N / MK-PH015X
For wiring examples, see page 256.



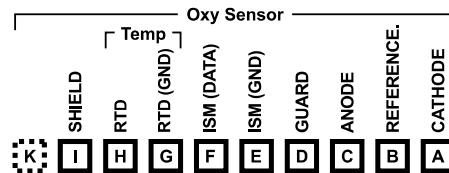
Module for oxygen measurement

Order code MK-OXY045N / MK-OXY045X
For wiring examples, see page 264.



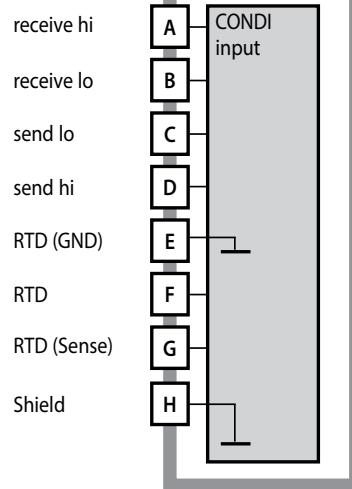
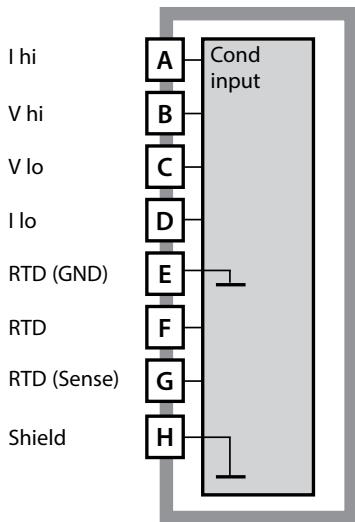
Terminal plate of pH module

The terminals are suitable for single or stranded wires up to 2.5 mm² (AWG 14).



Terminal plate of oxygen module

The terminals are suitable for single or stranded wires up to 2.5 mm² (AWG 14).

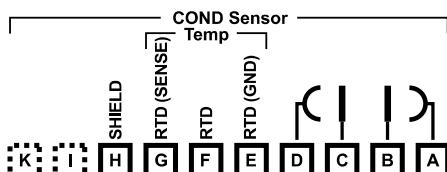


Module for contacting conductivity measurement (COND)

Order code MK-COND025N / MK-COND025X
For wiring examples, see page 269.

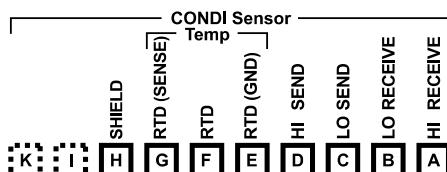
Module for inductive conductivity measurement (CONDI)

Order code MK-CONDI035N / MK-CONDI035X
For wiring examples, see page 278.



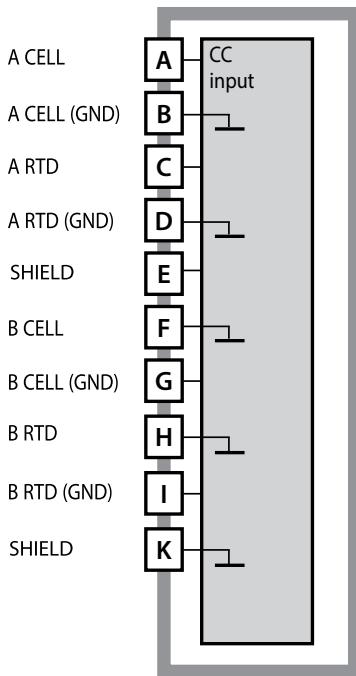
Terminal plate of COND module

The terminals are suitable for single or stranded wires up to 2.5 mm² (AWG 14).



Terminal plate of CONDI module

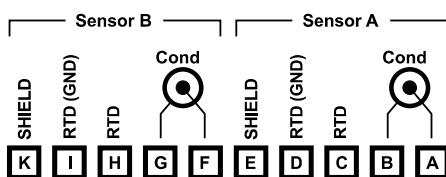
The terminals are suitable for single or stranded wires up to 2.5 mm² (AWG 14).



Dual-conductivity module (COND-COND)

Order code MK-CC065N

For wiring examples, see page 284.



Terminal plate

Dual conductivity measurement

The terminals are suitable for single or stranded wires up to 2.5 mm^2 (AWG 14).

Changing the Measuring Function

In the "Service" menu you can select another measuring function at any time.

Calibration and Maintenance in the Lab

The "MemoSuite" software allows calibrating Memosens sensors under reproducible conditions at a PC in the lab. The sensor parameters are registered in a database. Documenting and archiving meet the demands of FDA CFR 21 Part 11. Detailed reports can be output as csv export for Excel. MemoSuite is available as accessory and comes in the versions "Basic" and "Advanced": www.knick.de.

Settings and Specifications

Connected sensor: Sensor type, manufacturer, order code and serial number

Function selection:
The selected function is highlighted.

Measured values

pH value	7.09 pH
pH voltage	49.2 mV
Temperature	25.1 °C

Sensor data

Sensor type:	pH (glass)
Manufacturer:	KNICK
Order code:	SE 533X/1-NMSN
Serial number:	1030550
Measuring point:	Change
Tag number:	Change

Adjustment data

Date:	6/27/2011 20:09:12
Slope:	58.5 mV/pH
Zero point:	7.06 pH

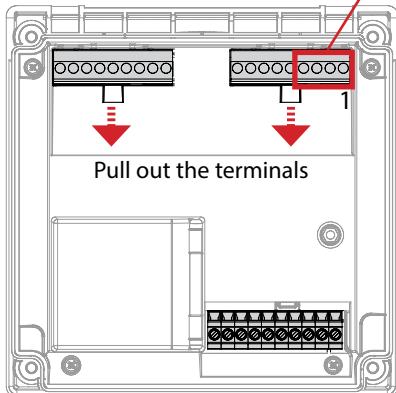
Connected sensor: Sensor type, manufacturer, order code and serial number, measuring point and tag number

Last adjustment

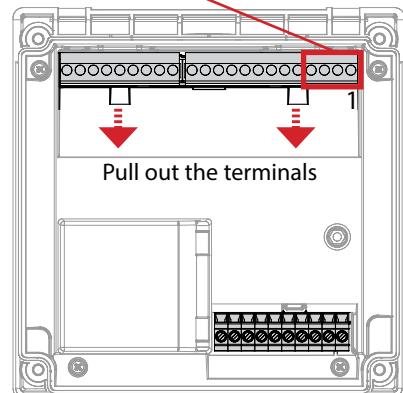
You can magnify a measured-value display at a click of the mouse.

Terminals for Memosens

1	Brown	+3V
2	Green	RS 485 A
3	Yellow	RS 485 B
4	White	GND
	Transparent	Shield



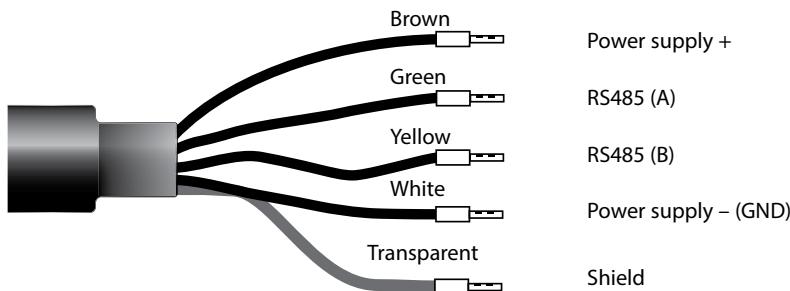
Stratos Pro A221N / A221X



Stratos Evo A451N

NOTICE: Remove the measuring module!

Memosens Cable



Connecting cable for non-contact inductive digital transmission of measured signals (Memosens).

By providing perfect galvanic isolation between sensor and analyzer/transmitter, the Memosens cable prevents measurement interferences. Any effects of humidity and corrosion are prevented.

Specifications

Material	TPE
Cable diameter	6.3 mm
Length	up to 100 m
Process temperature	-20 °C ... 135 °C
Ingress protection	IP 68

Order Codes

	Cable type	Cable length	Order code
Memosens	Ferrules	3 m	CA/MS-003NAA
		5 m	CA/MS-005NAA
		10 m	CA/MS-010NAA
		20 m	CA/MS-020NAA
Memosens Ex*	M12 plug, 8-pin	3 m	CA/MS-003NCA
		5 m	CA/MS-005NCA
	Ferrules	3 m	CA/MS-003XAA
		5 m	CA/MS-005XAA
		10 m	CA/MS-010XAA
		20 m	CA/MS-020XAA
	M12 plug, 8-pin	3 m	CA/MS-003XCA
		5 m	CA/MS-005XCA

Other cable lengths or cable types are available on request.

* Ex-certified ATEX II 1G Ex ia IIC T3/T4/T6 Ga

A221N Terminal Assignments

The terminals are suitable for single or stranded wires up to 2.5 mm² (AWG 14).



A221N Rating Plate

Knick >

A221N

No. 87829/0000000 / 1443

-20 ≤ Ta ≤ +65 °C



14163 Berlin

Made in Germany



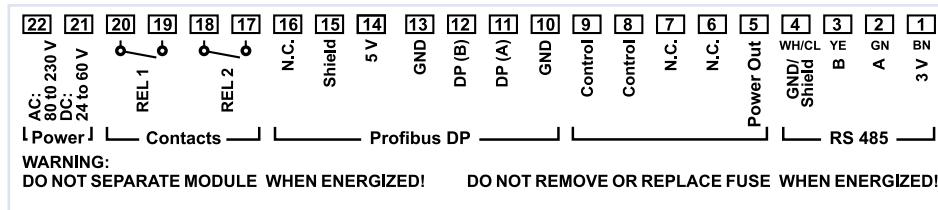
Conductor Cross-Sections

With a tightening torque of 0.5 to 0.6 Nm, the following conductor cross-sections are permitted:

Connection	Cross-section
Conductor cross-section rigid/flexible	0.2 ... 2.5 mm ²
Conductor cross-section flexible with ferrule without plastic sleeve	0.25 ... 2.5 mm ²
Conductor cross-section flexible with ferrule with plastic sleeve	0.2 ... 1.5 mm ²

A451N Terminal Assignments

The terminals are suitable for single or stranded wires up to 2.5 mm² (AWG 14).



A451N Rating Plate

Knick >

A451N

No. 87756 / 0000000 / 1409

-20 ≤ T_a ≤ +55°C



14163 Berlin

Made in Germany

Power

80 (-15%) to 230 (+10%) V AC,
45 to 65 Hz, < 15 VA

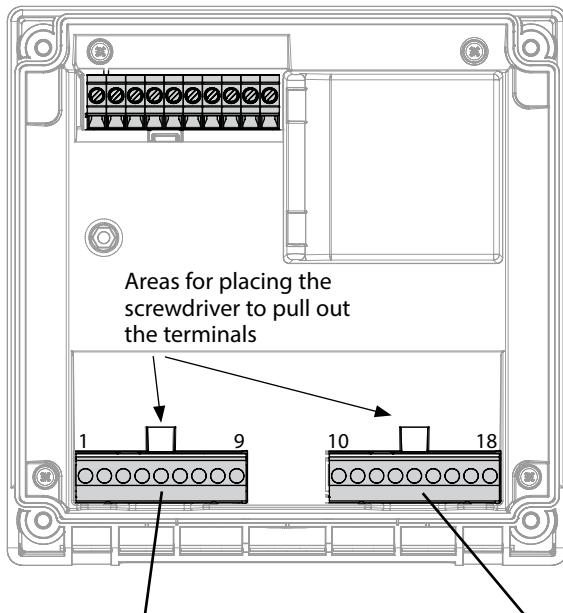
24 (-15%) to 60 (+10%) V DC,
--- 10 W



Conductor Cross-Sections

With a tightening torque of 0.5 to 0.6 Nm, the following conductor cross-sections are permitted:

Connection	Cross-section
Conductor cross-section rigid/flexible	0.2 ... 2.5 mm ²
Conductor cross-section flexible with ferrule without plastic sleeve	0.25 ... 2.5 mm ²
Conductor cross-section flexible with ferrule with plastic sleeve	0.2 ... 1.5 mm ²

**Terminal row 1**

1	+3V	Memosens
2	RS 485 A	
3	RS 485 B	
4	GND/Shield	
5	n. c.	
6	n. c.	
7	Equipot. bonding	
8	Control	
9	Control	

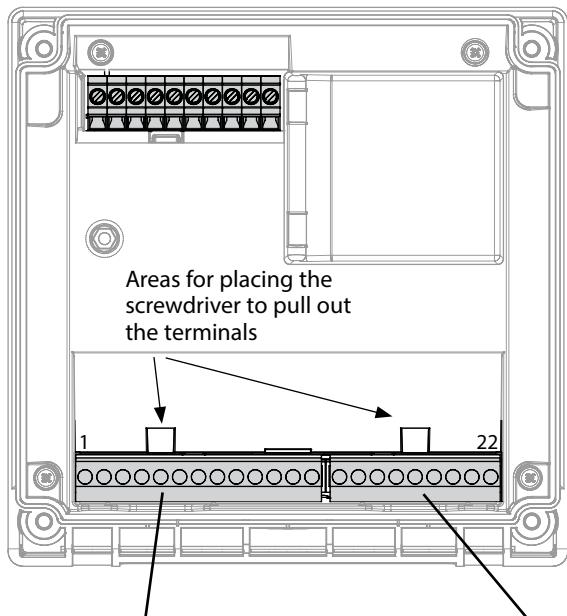
Terminal row 2

10	PA (IEC 61158-2)	PROFI-BUS PA
11	PA (IEC 61158-2)	
12	Shield	
13	n. c.	
14	n. c.	
15	n. c.	
16	n. c.	
17	n. c.	
18	n. c.	

Connecting the Memosens Sensor

Connect the Memosens sensor to the RS-485 interface of the device. Then select the measuring function. (When you change to another sensor type, you can change the measuring function in the "Service" menu.)

When you have selected the sensor type in the Configuration menu, the device will read the calibration data from the sensor and use them for calculating the measured value.

**Terminal row 2**

10	GND
11	DP RS 485 A
12	DP RS 485 B
13	DP Shield
14	5 V BUS
15	shield
16	n. c.
17	Relay 2
18	Relay 2
19	Relay 1
20	Relay 1
21	Power
22	Power

PROFIBUS DP

Terminal row 1

1	+3V	Memosens
2	RS 485 A	
3	RS 485 B	
4	GND/Shield	
5	Power Out	
6	n. c.	
7	n. c.	
8	Control	
9	Control	

Figure:
Terminals, device opened,
back of front unit

Commissioning

Upon initial start-up, the analyzer automatically recognizes a connected module and adjusts the software correspondingly. When you replace the measuring module, you must select the corresponding measuring function in the "Service" menu.

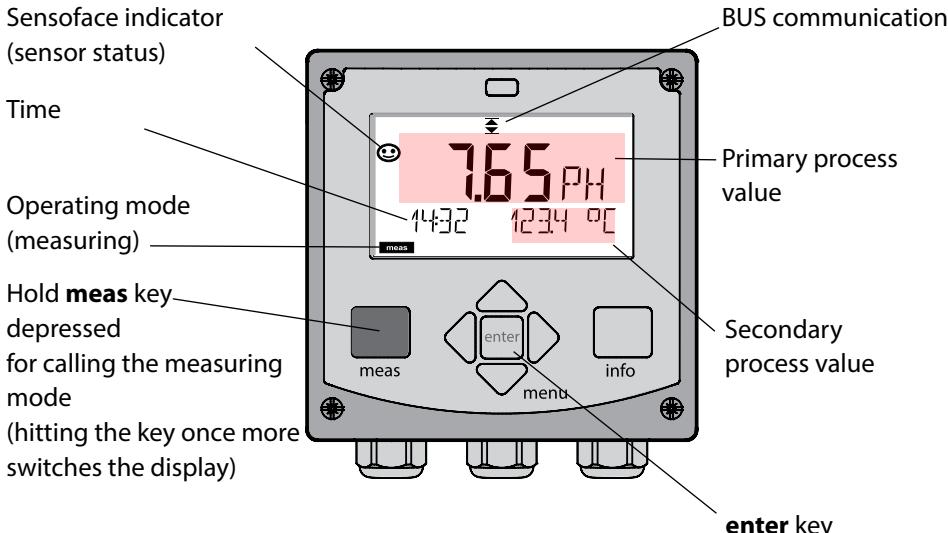
Changing the Measuring Function

In the "Service" menu you can select another measuring function at any time.

Measuring Mode

Prerequisite: A Memosens sensor is connected or a measuring module is installed with a corresponding conventional sensor connected.

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



Depending on the configuration, one of the following displays can be set as standard display for the measuring mode:

- Measured value, time and temperature (default setting)
- Measured value
- Time and date

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



NOTICE:

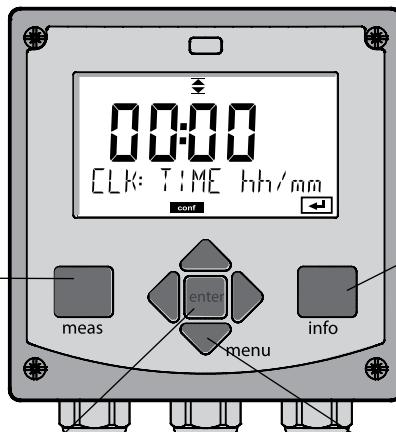
You must configure the analyzer for the respective measurement task.

Up / Down arrows

- Menu:
Increase/decrease a numeral
- Menu: Selection

meas

- Return to last menu level
- Directly to measuring mode (press > 2 s)
- Measuring mode: other display



enter

- Configuration: Confirm entries, next configuration step
- Calibration: Continue program flow

Left / Right arrows

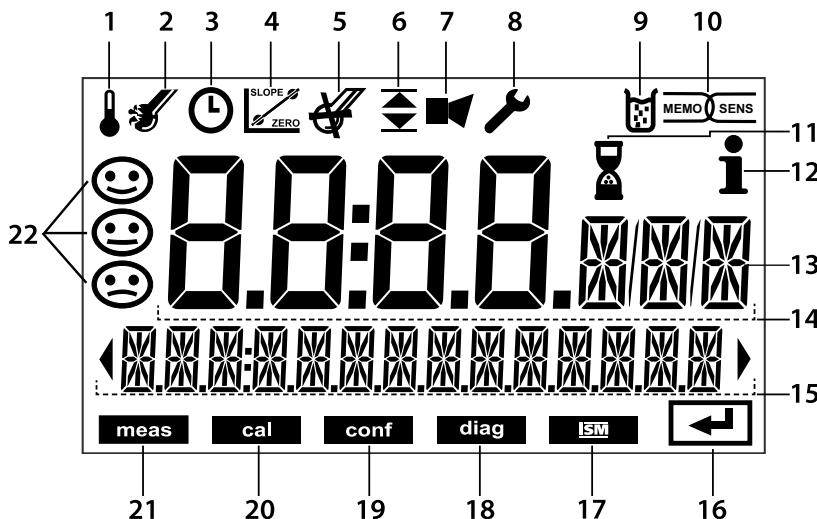
- Menu:
Previous/next menu group
- Number entry:
Move between digits

info

- Retrieve information
- Show error messages

menu

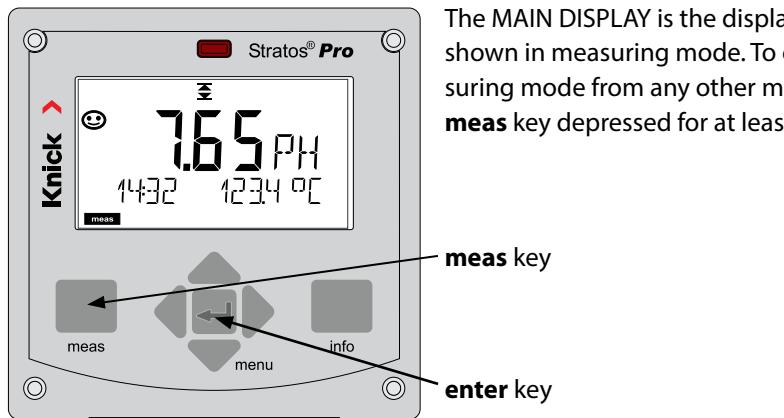
- Measuring mode: Call menu



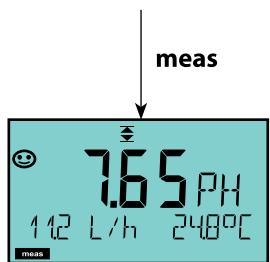
- | | |
|--------------------------|--------------------------|
| 1 Temperature | 12 Info available |
| 2 Sensocheck | 13 Unit symbols |
| 3 Interval/response time | 14 Primary process value |
| 4 Sensor data | 15 Secondary display |
| 5 Sensocheck | 16 Proceed using enter |
| 6 BUS communication | 17 ISM sensor |
| 7 Alarm | 18 Diagnostics |
| 8 Service | 19 Configuration mode |
| 9 Cal timer expired | 20 Calibration mode |
| 10 Digital sensor | 21 Measuring mode |
| 11 Waiting time running | 22 Sensoface |

Signal Colors (Display Backlighting)

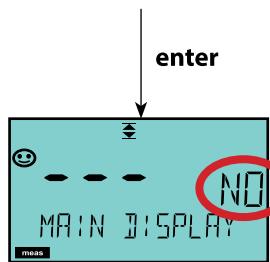
Red	Alarm (in case of fault: display values blink)
Red blinking	Input error: illegal value or wrong passcode
Yellow	Configuration, Calibration, Service
Turquoise	Diagnostics
Green	Info
Magenta	Sensoface message



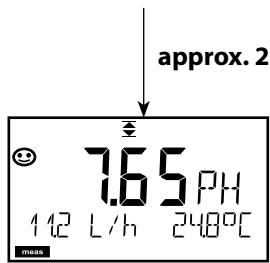
The MAIN DISPLAY is the display which is shown in measuring mode. To call the measuring mode from any other mode, hold the **meas** key depressed for at least 2 sec.



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



Press **enter** to select a display as MAIN DISPLAY.



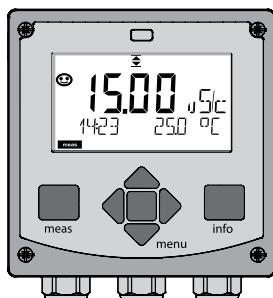
The secondary display shows "MAIN DISPLAY – NO". Use the **UP / DOWN** arrows to select "MAIN DISPLAY – YES" and confirm by pressing **enter**. The display color changes to white. This display is now shown in measuring mode.

The color-coded user interface guarantees increased operating safety.

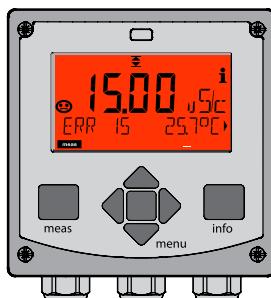
Operating modes are clearly signaled.

The normal measuring mode is white. Information text appears on a green screen and the diagnostic menu appears on turquoise. The yellow screen for configuration, calibration and service is quickly visible as is the magenta screen which indicates asset management messages for predictive diagnostics – such as maintenance request, pre-alarm and sensor wear.

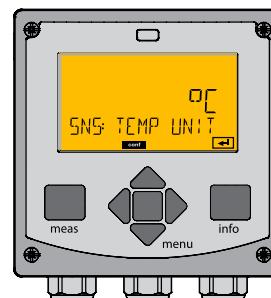
The alarm status has a particularly noticeable red display color and is also signaled by flashing display values. Invalid inputs or false passcodes cause the entire display to blink red so that operating errors are significantly reduced.



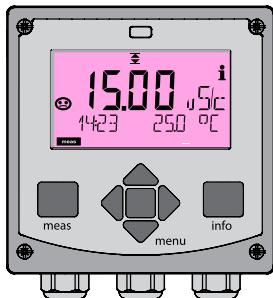
White:
Measuring mode



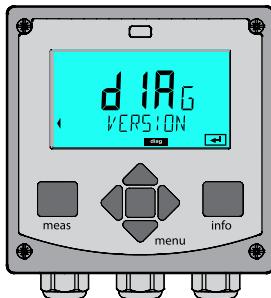
Red blinking:
Alarm, error



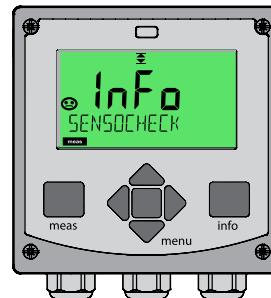
Yellow:
Configuration,
Calibration, Service



Magenta:
Maintenance request



Turquoise:
Diagnostics



Green:
Information texts

Diagnostics (DIAG)

Display of calibration data, display of sensor data, sensor monitor, 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.

Calibration (CAL)

Every sensor has typical characteristic values, which change in the course of the operating time. 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. Calibration must be repeated at regular intervals. The time between the calibration cycles depends on the load on the sensor.

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

Configuration (CONF)

You must configure the analyzer for the respective measurement task. In the "Configuration" mode you select the adjusted measuring function, the connected sensor, the measuring range to be transmitted, and the conditions for warning and alarm messages.

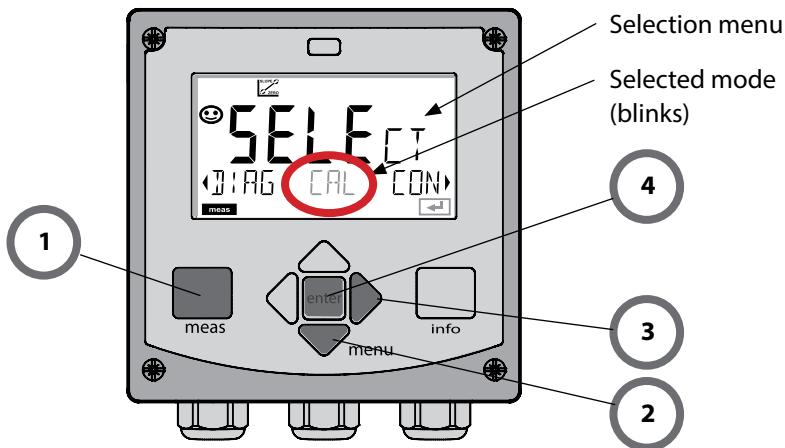
**Configuration mode is automatically exited 20 minutes after the last keystroke.
The device returns to measuring mode.**

Service (SERVICE)

Assigning passcodes, selecting the device type (pH/oxy/conductivity), resetting to factory settings.

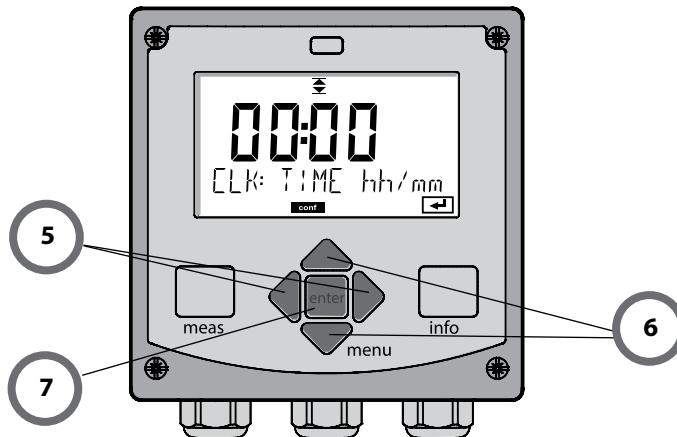
To select the operating mode:

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



To enter a value:

- 1) Select numeral: left / right arrow
- 2) Change numeral: up / down arrow
- 3) Confirm entry by pressing **enter**



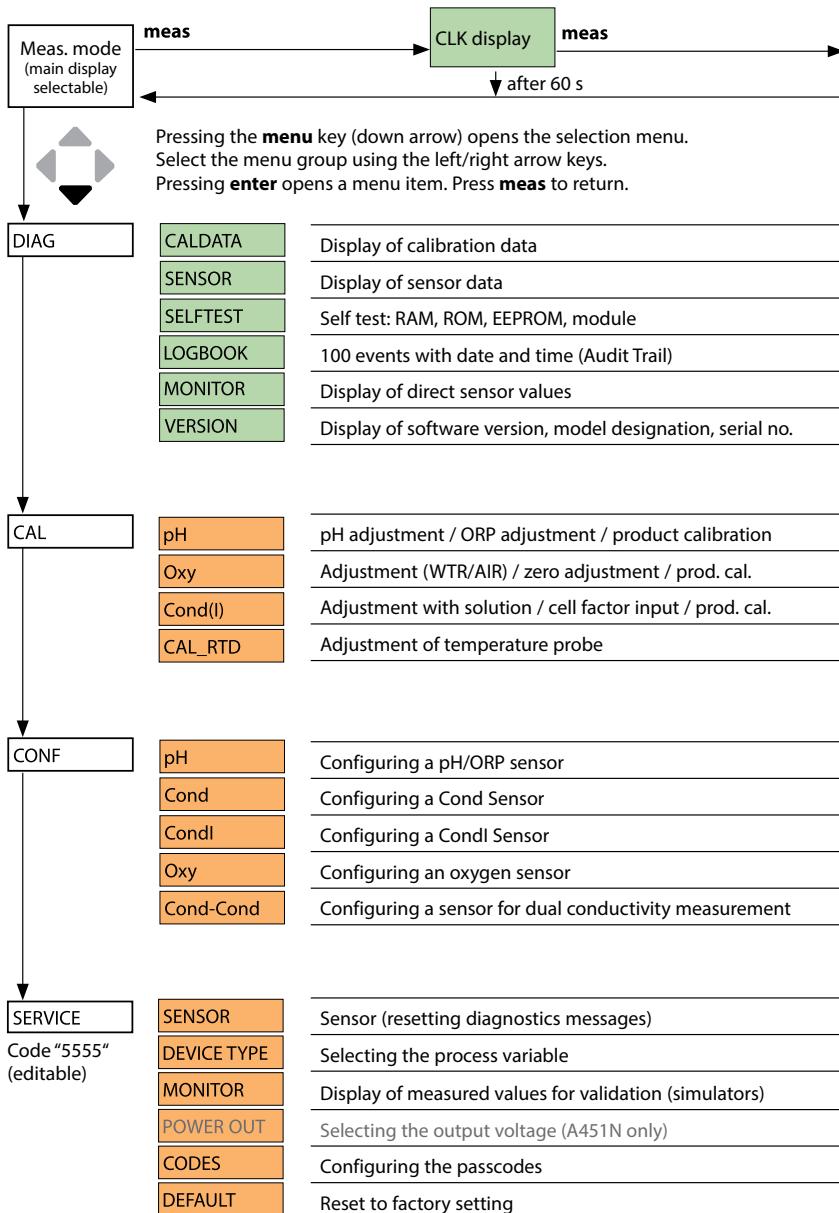
Alarm

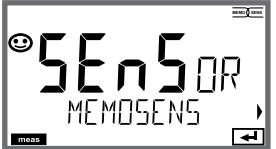
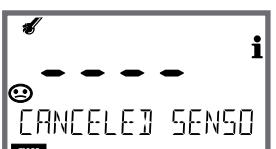
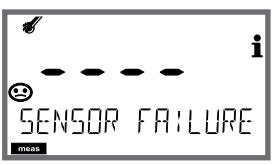
When an error has occurred, **Err** is displayed immediately.

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.

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



Step	Action/Display	Remark
Connect sensor.		Before a Memosens 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.	 <p data-bbox="381 828 657 933">View sensor information using ◀ ▶ keys, confirm using enter.</p>	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 (timeout).
Possible error message		
Sensor worn out. Replace sensor.		When this error message appears, the sensor cannot be used any more. Sensoface is sad.
Sensor defective. Replace sensor.		When this error message appears, the sensor cannot be used. Sensoface is sad.

Step	Action/Display	Remark
Disconnect and remove old sensor.		
Install and connect new sensor.		Temporary messages which are activated during the replacement are indicated but not entered in the logbook.
Wait until the sensor data are displayed.		
Check sensor data.	View sensor information using ◀ ▶ keys, confirm using enter .	You can view the sensor manufacturer and type, serial number and last calibration date.
Check measured values.		

pH

pH Configuration		Choices	DEFAULT in bold
BUS:	ADDRESS	0000 ... 0126	
SNS:		STANDARD ISFET MEMOSENS PFAUDLER ISM	
	MEAS MODE	pH mV ORP	
	RTD TYPE (STANDARD, ISFET, PFAUDLER)	100 PT 1000 PT 30 NTC 8.55 NTC BALCO	
	TEMP UNIT	°C °F	
	TEMP MEAS	AUTO MAN BUS	
MAN		-50 ... 250 °C (025.0 °C) -58 ... 482 °F (077.0 °F)	
	TEMP CAL	AUTO MAN BUS	
MAN		-50 ... 250 °C (025.0 °C) -58 ... 482 °F (077.0 °F)	
	NOM ZERO ¹⁾	0.00 ... 14.00 PH (7.00 PH)	
	NOM SLOPE ¹⁾	30.0 ... 60.0 mV (059.2 mV)	
	PH_ISO ¹⁾	0.00 ... 14.00 PH (07.00 PH)	
	CALMODE	AUTO MAN DAT	
AUTO	BUFFER SET	-01- MT -02- KNC -03- CIB -04- NST -05- STD -06- HCH -07- WTW -08- HMT -09- RGC -10- DIN -U1- USR	
	CAL TIMER ²⁾	OFF FIX AdAPT	
FIX	AdAPT	CAL-CYCLE ²⁾ xxxx h (0168 h)	
	ACT ³⁾	OFF AUTO MAN	
MAN		ACT CYCLE ³⁾ 0 ... 2000 DAY (0007 DAY)	
	TTM ³⁾	OFF AUTO MAN)	
MAN		TTM CYCLE ³⁾ 0 ... 2000 DAY (0030 DAY)	

Overview of pH Configuration

41

pH

pH Configuration		Choices	DEFAULT in bold
SNS:	CIP COUNT	ON OFF	
	ON CIP CYCLES ³⁾	0 ... 9999 CYC (0000 CYC)	
	SIP COUNT	ON OFF	
	ON SIP CYCLES ³⁾	0 ... 9999 CYC (0000 CYC)	
	AUTOCLAVE ³⁾	ON OFF	
	ON AC CYCLES ³⁾	xxxx CYC (0000 CYC)	
COR:	TC SELECT	OFF LIN PURE WTR USER TAB	
	LIN TC LIQUID	-19.99 ... +19.99 %/K (00.00 %/K)	
	USER TAB EDIT TABLE	NO YES	
	YES	0 ... 100 °C in 5 °C steps	
IN:	FLOW ADJUST	0 ... 20 000 l/L (12 000 l/L)	
ALA:	ALARM DELAY	0 ... 600 SEC (010 SEC)	
	SENSOCHECK	ON OFF	
	HOLD	OFF LAST	
CLK:	CLK FORMAT	24h 12h	
	CLK TIME	hh:mm hh.mm (A/M) (00.00)	
	CLK DAY/MONTH	dd.mm (01.01.)	
	CLK YEAR	yyyy (2014)	

¹⁾ with PFAUDLER sensors only

²⁾ omitted for ISM sensors

³⁾ with ISM sensors only

pH

Parameter		Default	User setting
BUS:	Address	126	
	Sensor type	STANDARD	
	Measuring mode	pH	
	Type of temp probe	1000 PT	
	Temperature unit	°C	
	Measurement temp	AUTO	
	Measurement temp, manual	25.0 °C (77.0 °F)	
	Calibration temp	AUTO	
	Calibration temp, manual	25.0 °C (77.0 °F)	
	Zero point ¹⁾	7.00 pH	
	Slope ¹⁾	59.2 mV	
	PH ISO ¹⁾	7.00 pH	
	Calibration mode	AUTO	
SNS:	Buffer set	-02- KNC (Knick)	
	Calibration timer ²⁾	OFF	
	Calibration cycle	168 h	
	Adaptive cal timer (ACT) ³⁾	OFF	
	Calibration cycle (ACT) ³⁾	30 DAY	
	Adaptive maintenance timer (TTM) ³⁾	OFF	
	Maintenance cycle (TTM) ³⁾	365 DAY	
	CIP counter	OFF	
	CIP cycles	0000 CYC	
	SIP counter	OFF	
	SIP cycles	0000 CYC	
	Autoclaving counter ³⁾	OFF	
	Autoclaving cycles ³⁾	0000 CYC	

Parameter	Default	User setting
COR:	Temperature compensation	OFF
	Temperature compensation, LINEAR	00.00%/K
	Temperature compensation, USER	NO
IN:	Flow meter (pulses/liter)	12 000 l/L
ALA:	Delay	10 s
	Sensocheck	OFF
	HOLD mode	LAST
CLK:	Time format	24h
	Time hh/mm	00.00
	Day/Month	01.01.
	Year	2014

¹⁾ with PFAUDLER sensors only

²⁾ omitted for ISM sensors

³⁾ with ISM sensors only

pH



Device Type: pH

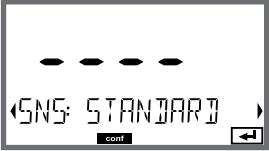
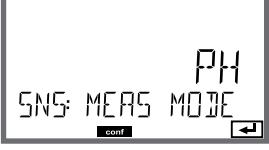
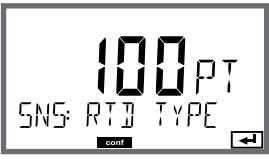
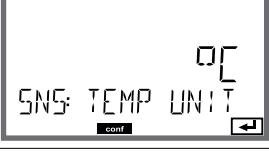
Connected modules are automatically recognized. In the SERVICE menu you can change the device type. Afterwards, you must select the corresponding calibration mode in the CONF menu.

- 1 Press **menu** key.
- 2 Select **CONF** using **◀ ▶**, press **enter**.
- 3 Enter PROFIBUS address (0000 ... 0126) using **▲ ▼ ▲ ▼**, press **enter**.
The next menu item appears.
Use the arrow keys **▲ ▼** for selection (see right-hand page).
Confirm (and proceed) by pressing **enter**.
- 4 Exit: Press **meas** until the [meas] mode indicator is displayed.

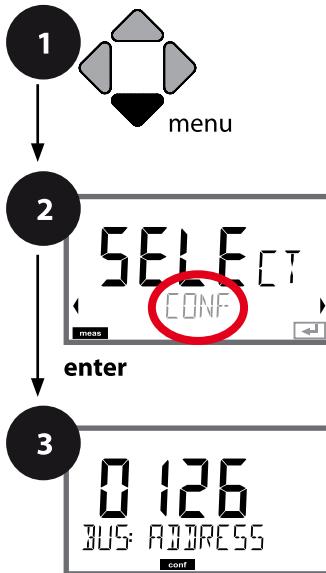
3

PROFIBUS address
Sensor type
Measuring mode
Type of temp probe
Temperature unit
Temp detection during measurement
Temp detection during calibration
Calibration mode
Calibration timer
Adaptive calibration timer
Adaptive maintenance timer
Cleaning cycles CIP
Sterilization cycles SIP
Autoclaving counter
Temperature compensation

3

Menu item	Action	Choices
PROFIBUS address	Adjust value using ▲ ▼ keys, select next digit using ◀ ▶ keys. Press enter to confirm.	0000 ... 0126
		
Sensor type	Select sensor type using ▲ ▼ keys. Press enter to confirm.	STANDARD ISFET MEMOSENS PFAUDLER ISM
		
Measuring mode	Select measuring mode using ▲ ▼ keys. Press enter to confirm.	pH mV ORP
		
Type of temp probe	(not for digital sensors) Select type of temperature probe using ▲ ▼ keys. Press enter to confirm.	100 PT 1000 PT 30 NTC 8.55 NTC BALCO
		
Temperature unit	Select °C or °F using ▲ ▼ keys. Press enter to confirm.	°C °F
		

pH

Sensor, Temp Detection during Calibration, Calibration Mode

- 1 Press **menu** key.
- 2 Select **CONF** using **◀ ▶**, press **enter**.
- 3 Enter PROFIBUS address (0000 ... 0126) using **▲ ▼ ▲ ▼**, press **enter**.
The next menu item appears.
Use the arrow keys **▲ ▼** for selection (see right-hand page).
Confirm (and proceed) by pressing **enter**.
- 4 Exit: Press **meas** key until the [meas] mode indicator is displayed.

3

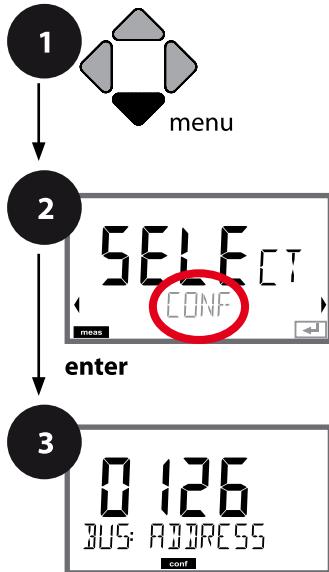
PROFIBUS address
Sensor type
Measuring mode
Type of temp probe
Temperature unit
Temp detection during measurement
Temp detection during calibration
Calibration mode
Calibration timer
Adaptive calibration timer
Adaptive maintenance timer
Cleaning cycles CIP
Sterilization cycles SIP
Autoclaving counter
Temperature compensation



3

Menu item	Action	Choices
Temperature detection during measurement	Select mode using ▲ ▼ keys: AUTO: Measured by sensor MAN: direct input of temperature, no measurement (see next step) BUS: Value from AO block Press enter to confirm.	AUTO MAN BUS
(Manual temperature)	Adjust value using ▲ ▼ keys, select next digit using ◀ ▶ keys. Press enter to confirm.	-50 ... 250 °C (25.0 °C) (-58 ... 482 °F) (77.0 °F)
Temp detection during calibration	AUTO: Measured by sensor MAN: direct input of temperature, no measurement (see next step) BUS: Value from AO block Press enter to confirm.	AUTO MAN BUS
(Manual temperature)	See above	
Calibration mode	Select CALMODE using ▲ ▼ keys: AUTO: Calibration with Calimatic buffer set recognition MAN: Manual entry of buffer solutions DAT: Input of adjustment data of premeasured sensors Press enter to confirm.	AUTO MAN DAT
(AUTO: Buffer set)	Select buffer set using ▲ ▼ keys (see buffer tables for nominal values) Press enter to confirm.	-00...-10-, -U1- (see Appendix) Pressing the info key displays the manufacturer and nominal values in the lower line.

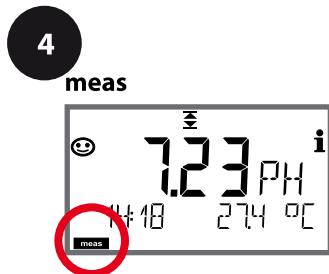
pH

Sensor, Calibration Timer, Calibration Cycle

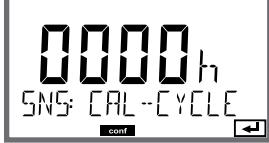
- 1 Press **menu** key.
- 2 Select **CONF** using **◀ ▶**, press **enter**.
- 3 Enter PROFIBUS address (0000 ... 0126) using **▲ ▼ ▲ ▼**, press **enter**.
The next menu item appears.
Use the arrow keys **▲ ▼** for selection (see right-hand page).
Confirm (and proceed) by pressing **enter**.
- 4 Exit: Press **meas** key until the [meas] mode indicator is displayed.

3

PROFIBUS address
Sensor type
Measuring mode
Type of temp probe
Temperature unit
Temp detection during measurement
Temp detection during calibration
Calibration mode
Calibration timer
Adaptive calibration timer
Adaptive maintenance timer
Cleaning cycles CIP
Sterilization cycles SIP
Autoclaving counter
Temperature compensation



3

Menu item	Action	Choices
Calibration Timer 	Adjust CALTIMER using ▲ ▼ : OFF: No timer FIX: Fixed cal cycle (adjust in the next step) AdAPT: Maximum cal cycle (adjust in the next step) Press enter to confirm.	OFF FIX AdAPT With ADAPT, the calibration cycle is automatically reduced depending on the sensor load (high temperatures and pH values) and for digital sensors also depending on the sensor wear
Calibration cycle 	Only with FIX/ADAPT: Adjust value using ▲ ▼ keys, select next digit using ◀ ▶ keys. Press enter to confirm.	0 ... 9999

Note for the calibration timer:

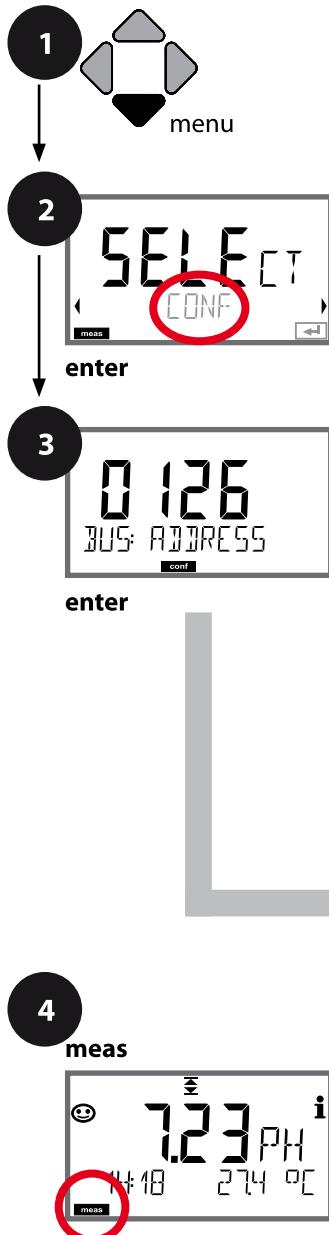
When Sensocheck has been activated, the Sensoface indicator reminds you when the calibration interval is about to expire:

Display	Status
 + 	Over 80 % of the calibration interval has already passed.
 + 	The calibration interval has been exceeded.

The time remaining until the next due calibration can be seen in the diagnostics menu (see Diagnostics chapter, from page 150 onwards).

pH

ISM Sensor, Adaptive Cal Timer (ACT)



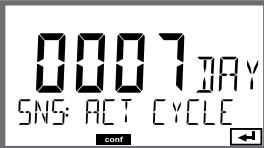
3	PROFIBUS address
	Sensor type
	Measuring mode
	Type of temp probe
	Temperature unit
	Temp detection during measurement
	Temp detection during calibration
	Calibration mode
	Calibration timer
	Adaptive calibration timer
	Adaptive maintenance timer
	Cleaning cycles CIP
	Sterilization cycles SIP
	Autoclaving counter
	Temperature compensation

Adaptive Cal Timer (ACT)

By issuing a Sensoface message, the adaptive calibration timer reminds you to calibrate the sensor. After expiration of the interval, Sensoface is getting "sad". Pressing the **info** key shows the text "OUT OF CAL TIME CALIBRATE SENSOR" which reminds you that a calibration is due. The ACT interval is either read automatically from the sensor settings or can be specified manually (max. 9999 days). Stressing influences (temperature, measurement in extreme ranges) shorten the timer interval.

The adaptive cal timer is reset after each calibration.

3

Menu item	Action	Choices
Adaptive cal timer (ACT)  	Select using ▲ ▼: OFF: No timer AUTO: The interval stored in the ISM sensor is used. MAN: The interval is specified manually (0 ... 9999 days). Default ACT CYCLE = 7 days Confirm by pressing enter	OFF AUTO MAN

pH

ISM Sensor, Adaptive Maintenance Timer (TTM)



- 1 Press **menu**.
- 2 Select **CONF** using **◀ ▶**, press **enter**.
- 3 Enter PROFIBUS address (0000 ... 0126) using **▲ ▼ ▲ ▾**, press **enter**.
The next menu item appears.
Use the arrow keys **▲ ▼** for selection (see right-hand page).
Confirm (and proceed) by pressing **enter**.
- 4 Exit: Press **meas** key until the [meas] mode indicator is displayed.

3

PROFIBUS address
Sensor type
Measuring mode
Type of temp probe
Temperature unit
Temp detection during measurement
Temp detection during calibration
Calibration mode
Calibration timer
Adaptive calibration timer
Adaptive maintenance timer
Cleaning cycles CIP
Sterilization cycles SIP
Autoclaving counter
Temperature compensation

Adaptive Maintenance Timer (TTM, Time to Maintenance)

By issuing a Sensoface message, the adaptive maintenance timer reminds you to service the sensor. After expiration of the interval, Sensoface is getting "sad". Pressing the **info** key shows the text "OUT OF MAINTENANCE CLEAN SENSOR" which reminds you that a sensor maintenance is due. The TTM interval is either read automatically from the sensor settings or can be specified manually (max. 2000 days).

Stressing influences (temperature, measurement in extreme ranges) shorten the timer interval.

3

Menu item	Action	Choices
Adaptive maintenance timer (TTM)  	Select using ▲ ▼ keys: OFF: No timer AUTO: The interval stored in the ISM sensor is used. MAN: The interval is specified manually (0 ... 2000 days). Default TTM CYCLE = 30 days Confirm by pressing enter	OFF AUTO MAN
The adaptive maintenance timer can be reset in the SERVICE / SENSOR / TTM menu. Here, the interval is reset to its initial value.		
	To do so, select " TTM RESET = YES " and confirm by pressing enter .	NO YES

pH

Sensor, CIP / SIP Cycles

- 1 Press **menu**.
- 2 Select **CONF** using **◀ ▶**, press **enter**.
- 3 Enter PROFIBUS address (0000 ... 0126) using **▲ ▼ ▲ ▼**, press **enter**.
The next menu item appears.
Use the arrow keys **▲ ▼** for selection (see right-hand page).
Confirm (and proceed) by pressing **enter**.
- 4 Exit: Press **meas** key until the [meas] mode indicator is displayed.

3

PROFIBUS address
Sensor type
Measuring mode
Type of temp probe
Temperature unit
Temp detection during measurement
Temp detection during calibration
Calibration mode
Calibration timer
Adaptive calibration timer
Adaptive maintenance timer
Cleaning cycles CIP
Sterilization cycles SIP
Autoclaving counter
Temperature compensation

3

Menu item	Action	Choices
Cleaning cycles CIP 	Select ON or OFF using ▲▼ keys. When switched on, the cycles will be entered in the extended logbook but not counted. Press enter to confirm.	ON OFF
Sterilization cycles SIP 	Select ON or OFF using ▲▼ keys. When switched on, the cycles will be entered in the extended logbook but not counted. Press enter to confirm.	ON OFF

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

Suitable for biochemical applications (process temp approx. 0...50 °C, CIP temperature > 55 °C, SIP temperature > 115 °C).

pH

ISM Sensor, Autoclaving Counter



- 1 Press **menu**.
- 2 Select **CONF** using **◀ ▶**, press **enter**.
- 3 Enter PROFIBUS address (0000 ... 0126) using **▲ ▼ ▲ ▼**, press **enter**.
The next menu item appears.
Use the arrow keys **▲ ▼** for selection (see right-hand page).
Confirm (and proceed) by pressing **enter**.
- 4 Exit: Press **meas** key until the [meas] mode indicator is displayed.

3

PROFIBUS address
Sensor type
Measuring mode
Type of temp probe
Temperature unit
Temp detection during measurement
Temp detection during calibration
Calibration mode
Calibration timer
Adaptive calibration timer
Adaptive maintenance timer
Cleaning cycles CIP
Sterilization cycles SIP
Autoclaving counter
Temperature compensation

Autoclaving Counter

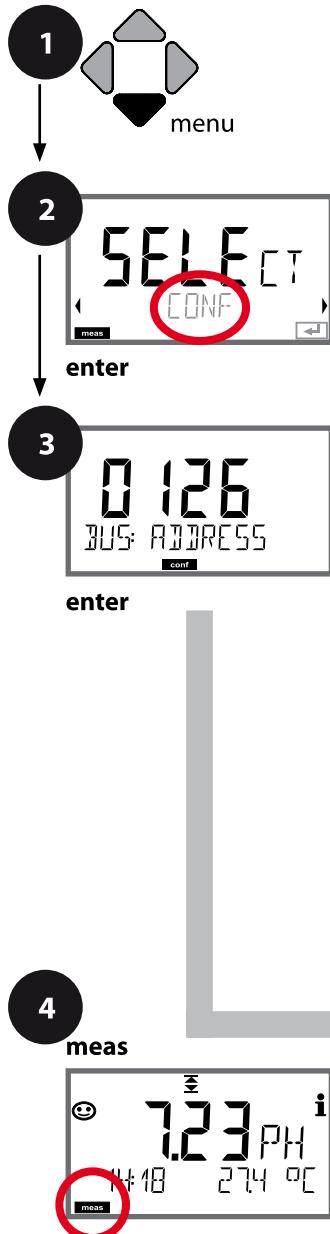
After reaching a specified limit value the autoclaving counter generates a Sensoface message. As soon as the counter has reached the specified value, Sensoface is getting "sad". Pressing the **info** key shows the text "AUTOCLAVE CYCLES OVERRUN" which reminds you that the maximum number of autoclaving cycles has been reached. After each autoclaving process, you must manually increment the autoclaving counter in the SENSOR service menu. The transmitter displays "INCREMENT AUTOCLAVE CYCLE" as confirmation.

3

Menu item	Action	Choices
Autoclaving counter	Select using ▲ ▼: OFF: No timer ON: The cycles are specified manually (0 ... 9999). Press enter to confirm.	OFF ON
With the autoclaving counter switched on, you must increment the count after each autoclaving process in the SERVICE/SENSOR/AUTOCLAVE menu:		
Incrementing the autoclaving counter (SERVICE menu)	After having completed an autoclaving process, open the SERVICE menu SENSOR / AUTOCLAVE to increment the autoclaving count. To do so, select " YES " and confirm by pressing enter .	NO / YES

pH

Temperature Compensation of Process Medium (pH)



PROFIBUS address
Sensor type
Measuring mode
Type of temp probe
Temperature unit
Temp detection during measurement
Temp detection during calibration
Calibration mode
Calibration timer
Adaptive calibration timer
Adaptive maintenance timer
Cleaning cycles CIP
Sterilization cycles SIP
Autoclaving counter
Temperature compensation

3

Menu item	Action	Choices
Temperature compensation of process medium	<p>For pH measurement only: Select temperature compensation of the process medium.</p> <p>OFF: No compensation LIN: Linear compensation PURE WTR: Ultrapure water USER TAB: User-defined table Select using ◀ ▶, press enter to confirm.</p>	OFF LIN PURE WTR USER TAB
Temperature compensation, linear	<p>Only with LIN: Enter the linear temperature compensation of the process medium.</p> <p>Enter value using ▲ ▼ ▲ ▼ keys. Press enter to confirm.</p>	-19.99...+19.99 %/K
Temperature compensation	<p>Only with USER TAB: 0 ... 100 °C in 5 °C steps</p>	NO YES

pH

Support of Pfaudler Sensors

or pH sensors with a zero point other than pH 7 and/or deviating slope,
e.g., pH sensors with a zero point at pH 4.6

You select a Pfaudler sensor in the pH configuration menu (see page 44).

For Pfaudler standard pH sensors, you can specify a nominal zero point and a nominal slope.

In addition, you can enter a pHiso value.

The additional entries appear in the CONFIGURATION / SENSOR menu:

SNS: NOM ZERO (0.00 ... 14.00 pH, default: 07.00 pH)

SNS: NOM SLOPE (30.0 ... 60.0 mV, default: 59.2 mV)

SNS: PH_ISO (0.00 ... 14.00 pH, default: 07.00 pH)

Prior to measurement, you must enter the values for nominal zero and slope and the isothermal intersection point pHiso as provided by the manufacturer and perform a calibration using suitable buffer solutions.

When you use a Memosens Pfaudler sensor, the data will be read from the sensor or will be set to standard values. Here, you do not have to make entries. The respective menu items will be suppressed.

The nominal ZERO/SLOPE values are required for the proper functioning of the sensor monitoring and calibration functions (Sensoface, Calimatic), they do not replace an adjustment (calibration)!

Typical values

Probe	Pfaudler enamel probes (Pfaudler specifications)	Probes with absolute pH measurement and Ag/AgCl reference system	Probes with abso- lute pH measure- ment and Ag/A (silver acetate) reference system	Differential pH probe
Nom. slope	55 mV/pH	55 mV/pH	55 mV/pH	55 mV/pH
Nom. zero	pH 8.65	pH 8.65	pH 1.35	pH 7 ... 12
pHiso	pH 1.35	pH 1.35	pH 1.35	pH 3.00

Note:

Please refer to the operating instructions of the respective sensor for more information on functioning, installation, calibration and configuration.

Cond

Cond Configuration		Choices	DEFAULT in bold
BUS:	ADDRESS		0000 ... 0126
SNS:	2-ELECTRODE 4-ELECTRODE MEMOSENS		
CELLFACTOR ¹⁾		00.0050 – 19.9999 c (01.0000c)	
MEAS MODE		Cond Conc % SAL %o USP µS/cm TDS	
Cond	DISPLAY UNIT	0.000 µS/cm 00.00 µS/cm 000.0 µS/cm 0000 µS/cm 0.000 mS/cm 00.00 mS/cm 000.0 mS/cm 0.000 S/cm 00.00 S/cm 00.00 MΩ	
		-01- (NaCl) -02- (HCl) -03- (NaOH) -04- (H2SO4) -05- (HNO3)	
		TEMP UNIT °C °F	
		TEMPERATURE AUTO MAN BUS	
		AUTO RTD TYPE ¹⁾ 100 PT 1000 PT 100 NI 8.55 NTC 30 NTC	
		MAN TEMPERATURE -50 ... 250 °C (025.0 °C) -58 ... 482 °F (077.0 °F)	
		CIP COUNT ON OFF	
		SIP COUNT ON OFF	
COR:	TC SELECT		OFF LIN nLF nACL HCL nH3 nAOH
	LIN	TC LIQUID 0 ... +19.99 %/K (00.00 %/K)	
	LIN	REF TEMP -20 ... 200 °C (25.0 °C) 4 ... 392 °F (077.0 °F)	
	TDS FACTOR ²⁾		0.0 ... 1.0 (1.0)
	USP FACTOR ³⁾		010.0 ... 100.0 % (100.0 %)
IN:	FLOW ADJUST		0 ... 20 000 l/L (12 000 l/L)

Cond Configuration		Choices	DEFAULT in bold
ALA:	ALARM DELAY	0 ... 600 SEC	(010 SEC)
	SENSOCHECK	ON OFF	
	HOLD	OFF LAST	
CLK:	CLK FORMAT	24h 12h	
	CLK TIME	hh:mm hh.mm (A/M)	(00.00)
	CLK DAY/MONTH	dd.mm	(01.01.)
	CLK YEAR	yyyy	(2014)

¹⁾ omitted for Memosens sensors

²⁾ only for MEAS MODE = TDS

³⁾ only for MEAS MODE = USP

Cond

Parameter		Default	User setting
BUS:	Address	126	
SNS:	Sensor type	2-ELECTRODE	
	Cell factor ¹⁾	01.0000 c	
	Measuring mode	Cond	
	Cond range	000.0 mS/cm	
	Concentration determination	-01- (NaCL)	
	Temperature unit	°C	
	Measurement temp	AUTO	
	Type of temp probe ¹⁾	1000 PT	
	Measurement temp, manual	25.0 °C (77.0 °F)	
	Calibration temp	AUTO	
COR:	Calibration temp, manual	25.0 °C (77.0 °F)	
	CIP counter	OFF	
	SIP counter	OFF	
	Temperature compensation	OFF	
	Temperature compensation, LINEAR	00.00%/K	
IN:	Reference temperature, LINEAR	25.0 °C (77.0 °F)	
	TDS factor ²⁾	1.0	
	USP factor ³⁾	100.0 %	
ALA:	Flow meter (pulses/liter)	12 000 l/L	
ALA:	Delay	10 s	
	Sensocheck	OFF	
	HOLD mode	LAST	
CLK:	Time format	24h	
	Time hh/mm	00.00	
	Day/Month	01.01.	
	Year	2014	

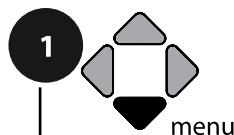
¹⁾ omitted for Memosens sensors

²⁾ for MEAS MODE = TDS

³⁾ for MEAS MODE = USP

Cond

Cond



Device Type: Cond

Connected modules are automatically recognized. In the SERVICE menu you can change the device type. Afterwards, you must select the corresponding calibration mode in the CONF menu.

- 1 Press **menu**.
- 2 Select **CONF** using **◀ ▶**, press **enter**.
- 3 Enter PROFIBUS address (0000 ... 0126) using **▲ ▼ ▲ ▼**, press **enter**.
The next menu item appears.
Use the arrow keys **▲ ▼** for selection (see right-hand page).
Confirm (and proceed) by pressing **enter**.
- 4 Exit: Press **meas** key until the [meas] mode indicator is displayed.

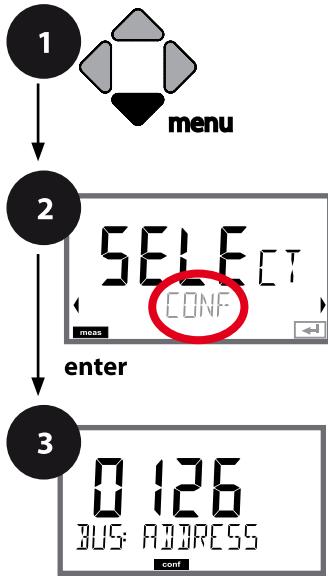
PROFIBUS address
Sensor type
Enter cell factor
Measuring mode
Cond range
Concentration determination Conc
Temperature unit
Temperature detection
Type of temp probe
Cleaning cycles CIP
Sterilization cycles SIP
Temperature compensation

3

Menu item	Action	Choices
PROFIBUS address	Adjust value using ▲ ▼ keys, select next digit using ◀ ▶ keys. Press enter to confirm.	0000 ... 0126
Sensor type	Select sensor type using ▲ ▼ keys. Press enter to confirm.	2-ELECTRODE 4-ELECTRODE MEMOSENS
Cell factor	Adjust value using ▲ ▼ keys, select next digit using ◀ ▶ keys. Press enter to confirm.	00.0050 ... 19.9999 c (01.0000 c)
Measuring mode	Select desired mode using ▲ ▼ keys. Press enter to confirm.	Cond Conc % Sal % USP µS/cm TDS
Cond range	For cond measurement only Select desired measuring 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- (H ₂ SO ₄) -05- (HNO ₃) -06- (H ₂ SO ₄) -07- (HCl) -08- (HNO ₃) -09- (H ₂ SO ₄) -10- (NaOH)

Cond

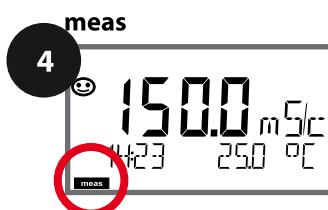
SENSOR, Temperature Unit, Temp Detection, Temperature Probe



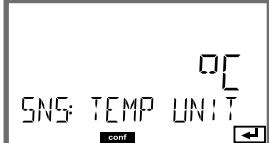
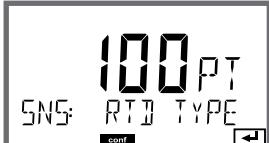
- 1 Press **menu**.
- 2 Select **CONF** using **◀ ▶**, press **enter**.
- 3 Enter PROFIBUS address (0000 ... 0126) using **▲ ▼ ▲ ▼**, press **enter**.
The next menu item appears.
Use the arrow keys **▲ ▼** for selection (see right-hand page).
Confirm (and proceed) by pressing **enter**.
- 4 Exit: Press **meas** key until the [meas] mode indicator is displayed.

3

PROFIBUS address
Sensor type
Enter cell factor
Measuring mode
Measuring range
Concentration determination
Temperature unit
Temperature detection
Type of temp probe
Cleaning cycles CIP
Sterilization cycles SIP
Temperature compensation

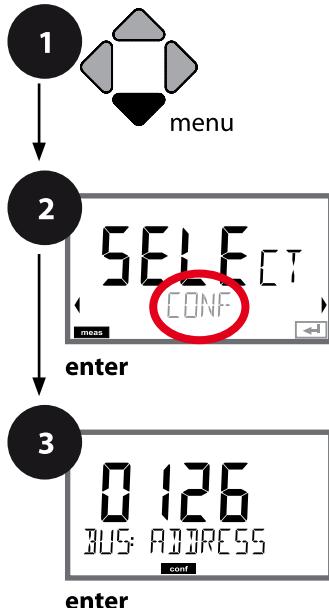


3

Menu item	Action	Choices
Temperature unit	Select °C or °F using ▲ ▼ keys. 	°C / °F
Temp detection	Select mode using ▲ ▼ keys: AUTO: Measured by sensor MAN: Direct input of temperature, no measurement (see next step) BUS: Value from AO block Press enter to confirm.	AUTO MAN BUS
Type of temp probe	(not for Memosens) Select type of temperature probe using ▲ ▼ keys.  	100 PT 1000 PT 100 Ni 8.55 NTC 30 NTC
(Manual temperature)	Modify value using ▲ ▼ keys, select next digit using ◀ ▶ keys. Press enter to confirm.	-50...250 °C (25.0 °C) (-58...482 °F) (77.0 °F)

Cond

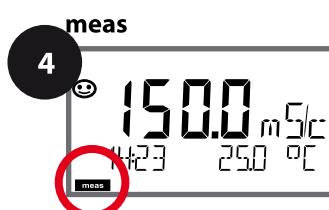
Sensor, CIP / SIP Cycles



- 1 Press **menu**.
- 2 Select **CONF** using **◀ ▶**, press **enter**.
- 3 Enter PROFIBUS address (0000 ... 0126) using **▲ ▼ ▲ ▼**, press **enter**.
The next menu item appears.
Use the arrow keys **▲ ▼** for selection (see right-hand page).
Confirm (and proceed) by pressing **enter**.
- 4 Exit: Press **meas** key until the [meas] mode indicator is displayed.

3

PROFIBUS address
Sensor type
Enter cell factor
Measuring mode
Measuring range
Concentration determination
Temperature unit
Temperature detection
Type of temp probe
Cleaning cycles CIP
Sterilization cycles SIP
Temperature compensation



3

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

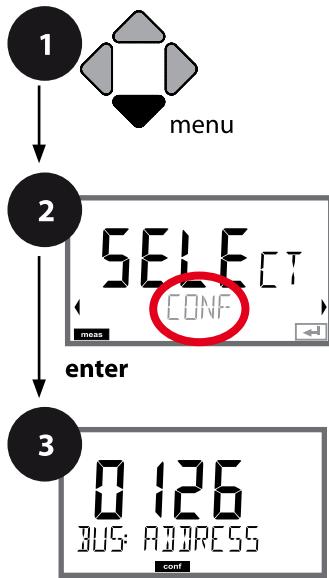
The cleaning and sterilization cycles are logged to measure the load on the sensor. Suitable for biochemical applications (process temp approx. 0...50 °C, CIP temperature > 55 °C, SIP temperature > 115 °C).

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.

Cond

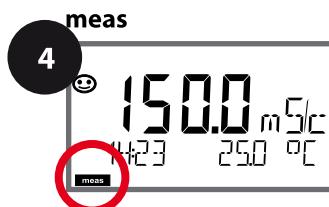
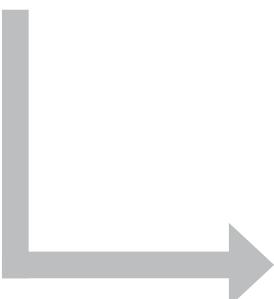
Temperature Compensation (Cond)



- 1 Press **menu**.
- 2 Select **CONF** using **◀ ▶**, press **enter**.
- 3 Enter PROFIBUS address (0000 ... 0126) using **▲ ▼ ▲ ▼**, press **enter**.
The next menu item appears.
Use the arrow keys **▲ ▼** for selection (see right-hand page).
Confirm (and proceed) by pressing **enter**.
- 4 Exit: Press **meas** key until the [meas] mode indicator is displayed.

3

PROFIBUS address
Sensor type
Enter cell factor
Measuring mode
Measuring range
Concentration determination
Temperature unit
Temperature detection
Type of temp probe
Cleaning cycles CIP
Sterilization cycles SIP
Temperature compensation



Cond

3

Menu item	Action	Choices
Temp compensation	Select desired compensation using Δ ∇ keys: OFF: Temperature compensation switched off	OFF LIN NLF nACL HCL nH3 nAOH
		
	LIN: Linear temperature compensation Select desired temperature coefficient and reference temperature using Δ ∇ keys.	TC LIQUID 00.00 ... +19.99 %/K REF TEMP -20 ... 200 °C (25.0 °C) 4 ... 392 °F (077.0 °F)
	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 Confirm by pressing enter	
	NaOH (without figure)	

Condl

Condl Configuration		Choices	DEFAULT in bold
BUS:	ADDRESS		0000 ... 0126
SNS:			SE 655 SE 656 SE 660 SE 670 SE 680 MEMOSENS OTHER
OTHER	RTD TYPE		100 PT 1000 PT 30 NTC
OTHER	CELLFACTOR		XX.XXx (01.980)
OTHER	TRANS RATIO		XXX.Xx (120.00)
MEAS MODE		Cond Conc % SAL %o TDS	
Cond	DISPLAY UNIT		0.000 mS/c *) 00.00 mS/c 000.0 mS/c 0000 mS/c 0.000 S/m 00.00 S/m
Conc	SOLUTION		-01- (NaCl) -02- (HCl) -03- (NaOH) -04- (H ₂ SO ₄) -05- (HNO ₃) -06- (H ₂ SO ₄) -07- (HCl) -08- (HNO ₃) -09- (H ₂ SO ₄) -10- (NaOH)
TEMP UNIT		°C °F	
TEMPERATURE		AUTO MAN BUS	
MAN	TEMPERATURE		-50 ... 250 °C (025.0 °C) -50 ... 482 °F (077.0 °F)
CIP COUNT		ON OFF	
SIP COUNT		ON OFF	
COR:	TC SELECT		OFF LIN nLF nACL HCL nH3 nAOH
LIN	TC LIQUID		0 ... +19.99 %/K (00,00 %/K)
LIN	REF TEMP		-20 ... 200 °C (25.0 °C) 4 ... 392 °F (077.0 °F)
TDS FACTOR ¹⁾		0.0 ... 1.0 (1.0)	
IN:	FLOW ADJUST		0 ... 20 000 l/L (12 000 l/L)

Condl

Condl Configuration		Choices	DEFAULT in bold
ALA:	ALARM DELAY	0 ... 600 SEC	(010 SEC)
	SENSOCHECK	ON OFF	
	HOLD	OFF LAST	
CLK:	CLK FORMAT	24h 12h	
	CLK TIME	hh:mm hh.mm (A/M)	(00.00)
	CLK DAY/MONTH	dd.mm	(01.01.)
	CLK YEAR	yyyy	(2014)

* 0.000 mS/cm range blocked for SE 660

¹⁾ for MEAS MODE = TDS

CondI

Parameter	Default	User setting
BUS: Address	126	
SNS:	Sensor type	SE 655
	Type of temp probe	1000 PT
	Cell factor	01.980 c
	Transfer ratio	120.00
	Measuring mode	Cond
	Cond range	000.0 mS/cm
	Concentration determination	-01- (NaCL)
	Temperature unit	°C
	Temperature	AUTO
	Manual temp	25.0 °C (77.0 °F)
	CIP counter	OFF
	SIP counter	OFF
COR:	Temperature compensation	OFF
	Temperature compensation, LINEAR	00.00%/K
	Reference temperature, LINEAR	25.0 °C (77.0 °F)
	TDS factor ¹⁾	1.0
IN:	Flow meter (pulses/liter)	12 000 l/L
ALA:	Delay	10 s
	Sensocheck	OFF
	HOLD mode	LAST
CLK:	Time format	24h
	Time hh/mm	00.00
	Day/Month	01.01.
	Year	2014

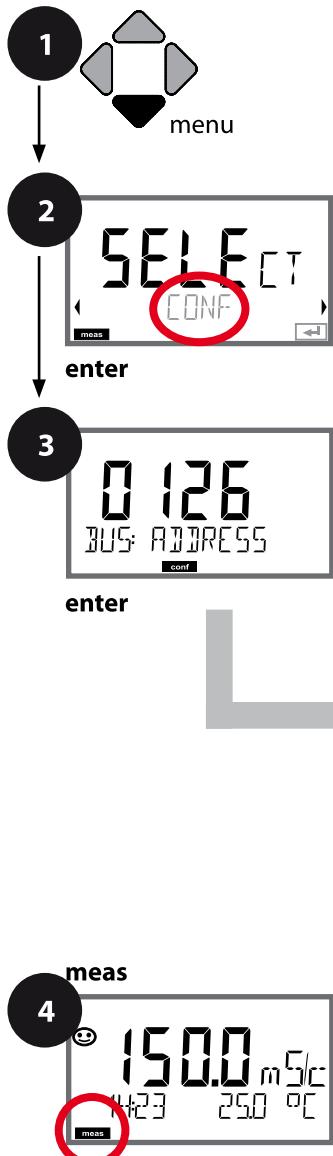
¹⁾ for MEAS MODE = TDS

CondI

CondI

Device Type: CondI

Connected modules are automatically recognized.
In the SERVICE menu you can change the device type.
Afterwards, you must select the corresponding calibration mode in the CONF menu.



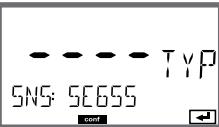
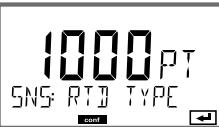
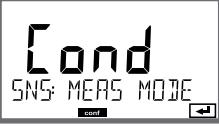
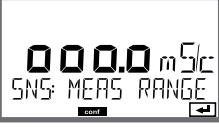
- 1 Press **menu**.
- 2 Select **CONF** using **◀ ▶**, press **enter**.
- 3 Enter PROFIBUS address (0000 ... 0126) using **▲ ▼ ▲ ▼**, press **enter**.
The next menu item appears.
Use the arrow keys **▲ ▼** for selection (see right-hand page).
Confirm (and proceed) by pressing **enter**.
- 4 Exit: Press **meas** key until the [meas] mode indicator is displayed.

3

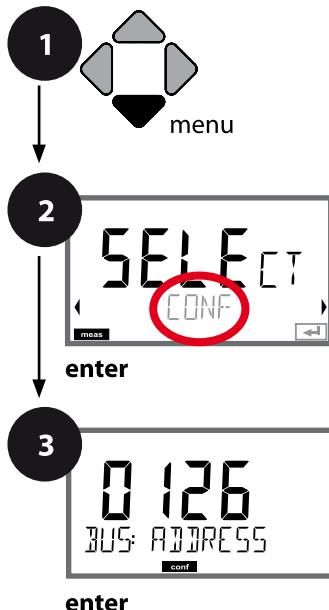
PROFIBUS address
Sensor type
Temperature probe
Cell factor
Transfer ratio
Measuring mode
Measuring range
Concentration determination
Temperature unit
Temperature detection
Cleaning cycles CIP
Sterilization cycles SIP
Temperature compensation

3

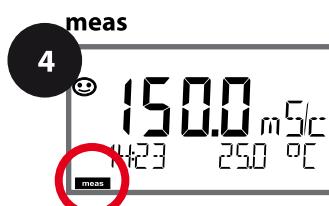
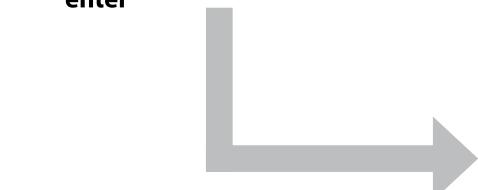
CondI

Menu item	Action	Choices
PROFIBUS Address 	Adjust value using ▲ ▼ keys, select next digit using ◀ ▶ keys. Press enter to confirm.	0000 ... 0126
Sensor type 	Select sensor type using ▲ ▼ keys. Press enter to confirm.	SE 655 SE 656 SE 660 SE 670 SE 680 MEMOSENS OTHER
Temperature probe 	Only with OTHER Select type of temperature probe using ▲ ▼ keys. Press enter to confirm.	1000 PT 100 PT 30 NTC
Cell factor 	Only with OTHER Enter cell factor using ▲ ▼ ◀ ▶ keys. Press enter to confirm.	01.980 XX.XXx
Transfer ratio 	Only with OTHER Enter transfer ratio using ▲ ▼ ◀ ▶ keys. Press enter to confirm.	120.00 XXX.Xx
Measuring mode 	Select desired mode using ▲ ▼ keys. Press enter to confirm.	Cond Conc % Sal % TDS
Measuring range 	For cond measurement only Select desired measuring range using ▲ ▼ keys. Press enter to confirm.	x.xxx mS/cm, xx.xx mS/cm xxx.x mS/cm , xxxx mS/m, x.xxx S/m, xx.xx S/m

CondI

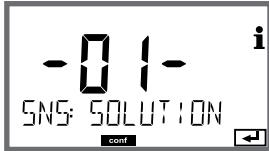
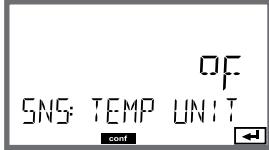
SENSOR, Concentration Determination, Temperature Unit

- 1 Press **menu**.
- 2 Select **CONF** using **◀ ▶**, press **enter**.
- 3 Enter PROFIBUS address (0000 ... 0126) using **▲ ▼ ▲ ▼**, press **enter**.
The next menu item appears.
Use the arrow keys **▲ ▼** for selection (see right-hand page).
Confirm (and proceed) by pressing **enter**.
- 4 Exit: Press **meas** key until the [meas] mode indicator is displayed.



PROFIBUS address
Sensor type
Temperature probe
Cell factor
Transfer ratio
Measuring mode
Measuring range
Concentration determination
Temperature unit
Temperature detection
Cleaning cycles CIP
Sterilization cycles SIP
Temperature compensation

3

Menu item	Action	Choices
Concentration determination	<p>For conc measurement only</p> <p>Select desired concentration solution using Δ ∇ keys (see appendix for ranges).</p> <p>Press enter to confirm.</p> 	-01- (NaCl) -02- (HCl) -03- (NaOH) -04- (H2SO4) -05- (HNO3) -06- (H2SO4) -07- (HCl) -08- (HNO3) -09- (H2SO4) -10- (NaOH)
Temperature unit	Select °C or °F using Δ ∇ keys.	°C / °F
	Press enter to confirm.	
Temp detection	<p>Select mode using Δ ∇ keys:</p> <p>AUTO: Measured by sensor MAN: Direct input of temperature, no measurement (see next step) BUS: Value from AO block</p> <p>Press enter to confirm.</p> 	AUTO MAN BUS
(Manual temperature)	<p>Modify value using Δ ∇ keys, select next digit using \blacktriangleleft \triangleright keys.</p> <p>Press enter to confirm.</p> 	-50...250 °C (25.0 °C) (-58...482 °F) (77.0 °F)

CondI

SENSOR, Cleaning Cycles, Sterilization Cycles



- 1 Press **menu**.
- 2 Select **CONF** using **◀ ▶**, press **enter**.
- 3 Enter PROFIBUS address (0000 ... 0126) using **▲ ▼ ▲ ▼**, press **enter**.
The next menu item appears.
Use the arrow keys **▲ ▼** for selection (see right-hand page).
Confirm (and proceed) by pressing **enter**.
- 4 Exit: Press **meas** key until the [meas] mode indicator is displayed.

3

PROFIBUS address
Sensor type
Temperature probe
Cell factor
Transfer ratio
Measuring mode
Measuring range
Concentration determination
Temperature unit
Temperature detection
Cleaning cycles CIP
Sterilization cycles SIP
Temperature compensation

3

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

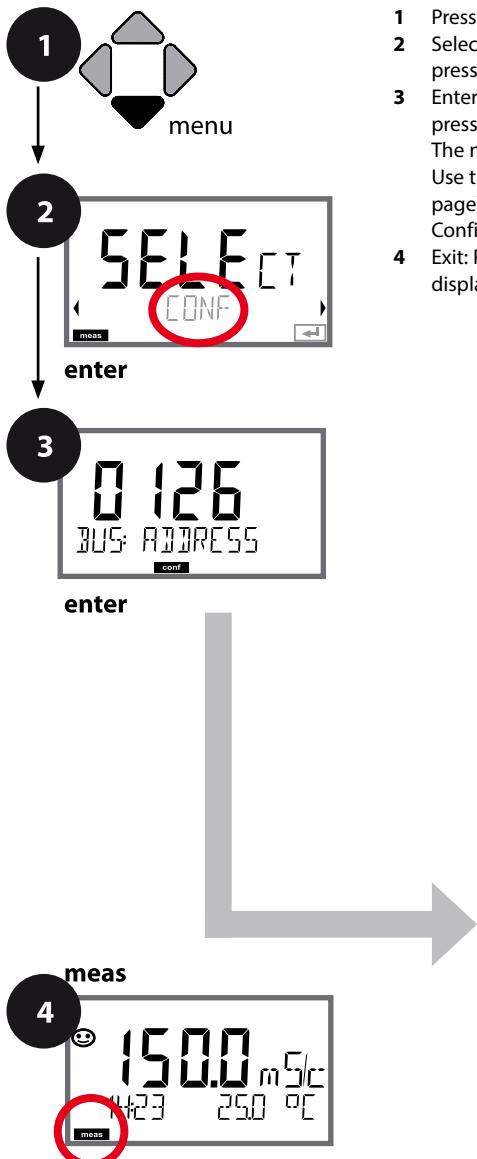
The cleaning and sterilization cycles are logged to measure the load on the sensor. Suitable for biochemical applications (process temp approx. 0...50 °C, CIP temperature > 55 °C, SIP temperature > 115 °C).

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.

CondI

Temperature Compensation (CondI)



PROFIBUS address
Sensor type
Temperature probe
Cell factor
Transfer ratio
Measuring mode
Measuring range
Concentration determination
Temperature unit
Temperature detection
Cleaning cycles CIP
Sterilization cycles SIP
Temperature compensation

3

Menu item	Action	Choices
Temp compensation	Select desired compensation using Δ ∇ keys: OFF: Temperature compensation switched off	OFF LIN NLF nACL HCL nH3 nAOH
		
	LIN: Linear temperature compensation Select desired temperature coefficient and reference temperature using Δ ∇ keys.	TC LIQUID 00.00 ... +19.99 %/K REF TEMP -20 ... 200 °C (25.0 °C) 4 ... 392 °F (077.0 °F)
	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 Confirm by pressing enter	
	NaOH (without figure)	

Oxy

Oxy Configuration			Choices	DEFAULT in bold		
BUS:	ADDRESS		0000 ... 0126			
SNS:	STANDARD TRACES SUBTRACES MEMOSENS ISM LDO SE 740 ^{*)}					
	MEAS MODE		dO % dO mg/l dO ppm GAS %			
	U-POL MEAS ¹⁾		0000 ... -1000 mV (-675 mV)			
	U-POL CAL ¹⁾		0000 ... -1000 mV (-675 mV)			
	MEMBR.COMP ^{1) 3)}		00.50 ... 03.00 (01.00)			
	RTD TYPE ^{1) 3)}		22 NTC 30 NTC			
	TEMP UNIT		°C °F			
	CALMODE ²⁾		CAL AIR CAL WTR			
	CAL TIMER ³⁾		ON OFF			
	ON	CAL CYCLE		0 ... 9999 h (0168 h)		
	ACT ⁴⁾		OFF AUTO MAN			
	MAN	ACT CYCLE ⁴⁾		0 ... 9999 DAY (0030 DAY)		
	TTM ⁴⁾		OFF AUTO MAN)			
	MAN	TTM CYCLE ⁴⁾		0 ... 2000 DAY (0365 DAY)		
	CIP COUNT		ON OFF			
	ON	CIP CYCLES ⁵⁾		0 ... 9999 CYC (0000 CYC)		
	SIP COUNT		ON OFF			
	ON	SIP CYCLES ⁶⁾		0 ... 9999 CYC (0000 CYC)		
	AUTOCLAVE ⁶⁾		ON OFF			
	ON	AC CYCLES ⁶⁾		0 ... 9999 CYC (0000 CYC)		
COR:	SALINITY			00.00 ... 45.00 ppt (00.00 ppt)		
	PRESSURE UNIT			BAR KPA PSI		
	PRESSURE			MAN BUS		
	MAN	BAR	PRESSURE	0.000 ... 9.999 BAR (1.013 BAR)		
	MAN	KPA	PRESSURE	000.0 ... 999.9 KPA (100 KPA)		
	MAN	PSI	PRESSURE	000.0 ... 145.0 PSI (14.5 PSI)		
IN:	FLOW ADJUST		0 ... 20 000 l/L	(12 000 l/L)		
ALA:	ALARM DELAY			0 ... 600 SEC (010 SEC)		
	SENSOCHECK			ON OFF		
	HOLD			OFF LAST		

Oxy Configuration		Choices	DEFAULT in bold
CLK:	CLK FORMAT	24h 12h	
	CLK TIME	hh:mm hh.mm (A/M)	(00.00)
	CLK DAY/MONTH	dd.mm	(01.01.)
	CLK YEAR	yyyy	(2014)

* Stratos Pro A451N only

¹⁾ omitted for Memosens and LDO SE 740

²⁾ omitted for MEAS MODE = GAS %

³⁾ omitted for ISM

⁴⁾ only for ISM

⁵⁾ only for ISM and LDO SE 740

⁶⁾ only for Memosens, ISM and LDO SE 740

Oxy

Parameter	Default	User setting
BUS: Address	126	
SNS:	Sensor type	STANDARD
	Measuring mode	dO %
	Polarization voltage, measurement ¹⁾	-675 mV
	Polarization voltage, calibration ¹⁾	-675 mV
	Membrane compensation ^{1) 3)}	01.00
	Type of temp probe ^{1) 3)}	22 NTC
	Temperature unit	°C
	Calibration mode ²⁾	CAL AIR
	Calibration timer ³⁾	OFF
	Calibration cycle	7 DAY
	Adaptive cal timer (ACT) ⁴⁾	OFF
	Calibration cycle (ACT) ⁴⁾	30 DAY
	Adaptive maintenance timer (TTM) ⁴⁾	OFF
	Maintenance cycle (TTM) ⁴⁾	365 DAY
	CIP counter	OFF
	CIP cycles ⁵⁾	0000 CYC
	SIP counter	OFF
	SIP cycles ⁶⁾	0000 CYC
	Autoclaving counter ⁶⁾	OFF
	Autoclaving cycles ⁶⁾	0000 CYC
COR:	Salinity	00.00 ppt
	Pressure unit	BAR
	Pressure measurement	MAN
	Manual pressure, BAR	1.013 bar
	Manual pressure, KPA	100 KPA
	Manual pressure, PSI	14.5 PSI

Parameter		Default	User setting
IN:	Flow meter (pulses/liter)	12 000 l/L	
ALA:	Delay	10 s	
	Sensocheck	OFF	
	HOLD mode	LAST	
CLK:	Time format	24h	
	Time hh/mm	00.00	
	Day/Month	01.01.	
	Year	2014	

¹⁾ omitted for Memosens and LDO SE 740

²⁾ omitted for MEAS MODE = GAS %

³⁾ omitted for ISM

⁴⁾ only for ISM

⁵⁾ only for ISM ad LDO SE 740

⁶⁾ only for Memosens, ISM and LDO SE 740

Oxy



Device Type: Oxy

Connected modules are automatically recognized. In the SERVICE menu you can change the device type. Afterwards, you must select the corresponding calibration mode in the CONF menu.

- 1 Press **menu**.
- 2 Select **CONF** using **◀ ▶**, press **enter**.
- 3 Enter PROFIBUS address (0000 ... 0126) using **▲ ▼ ▲ ▼**, press **enter**.
The next menu item appears.
Use the arrow keys **▲ ▼** for selection (see right-hand page).
Confirm (and proceed) by pressing **enter**.
- 4 Exit: Press **meas** key until the [meas] mode indicator is displayed.

PROFIBUS address
Sensor type
Measuring mode
Polarization voltage during meas/cal
Membrane compensation
Type of temp probe
Temperature unit
Calibration mode water/air
Calibration timer
Adaptive calibration timer
Adaptive maintenance timer
Cleaning cycles CIP
Sterilization cycles SIP
Autoclaving counter
Salinity
Pressure unit
Pressure correction

3

Menu item	Action	Choices
PROFIBUS address	Adjust value using Δ ∇ keys, select next digit using \blacktriangleleft \blacktriangleright keys. Press enter to confirm.	0000 ... 0126
Sensor type	Select sensor type using Δ ∇ keys. Press enter to confirm.	STANDARD TRACES SUBTRACES MEMOSENS ISM LDO SE 740 (A451N only)
Measuring mode	Select measuring mode using Δ ∇ keys. dO: Measurement in liquids GAS: Measurement in gases Press enter to confirm.	dO %, dO mg/l dO ppm GAS %
Polarization voltage	To be entered separately for measurement and calibration. When measuring low oxygen concentrations (traces) U-POL MEAS = -500 mV Enter V_{pol} using arrow keys. Press enter to confirm.	-675 mV 0000 ... -1000 mV not for Memosens, ISM and LDO SE 740
Membrane compensation	Enter membrane compensation using Δ ∇ \blacktriangleleft \blacktriangleright keys. Press enter to confirm.	01.00 00.50 ... 03.00 not for Memosens, ISM and LDO SE 740
Type of temp probe	Select type of temperature probe using Δ ∇ keys. Press enter to confirm.	22 NTC 30 NTC not for Memosens, ISM and LDO SE 740

Oxy

SENSOR, Temperature Unit, Medium: Water/Air, Calibration Timer

3

PROFIBUS address
Sensor type
Measuring mode
Polarization voltage during meas/cal
Membrane compensation
Type of temp probe
Temperature unit
Calibration mode air/water
Calibration timer
Adaptive calibration timer
Adaptive maintenance timer
Cleaning cycles CIP
Sterilization cycles SIP
Autoclaving counter
Salinity
Pressure unit
Pressure correction

3

Menu item	Action	Choices
Temperature unit	Select temperature unit using ▲ ▼ keys. Press enter to confirm.	°C °F
Calibration mode air/water	Select calibration medium using ▲ ▼ keys. AIR: Air as cal medium WTR: Air-saturated water as cal medium Press enter to confirm.	CAL_AIR CAL_WTR
Calibration timer	Select/deselect calibration timer using ▲ ▼ keys Press enter to confirm.	ON OFF
(ON: Calibration cycle)	Enter calibration cycle in hours using ▲ ▼ ← → keys Press enter to confirm.	0 ... 9999 h 0168 h

Note for the calibration timer:

When Sensocheck has been activated, the Sensoface indicator reminds you when the calibration interval is about to expire (beaker icon and smiley). The time remaining until the next due calibration can be seen in the diagnostics menu (see Diagnostics chapter, from page 150 onwards).

Oxy

ISM Sensor, Adaptive Cal Timer (ACT)

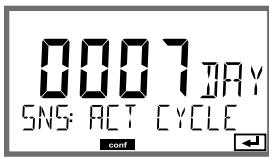
3	PROFIBUS address
	Sensor type
	Measuring mode
	Polarization voltage during meas/cal
	Membrane compensation
	Type of temp probe
	Temperature unit
	Calibration mode air/water
	Calibration timer
	Adaptive calibration timer
	Adaptive maintenance timer
	Cleaning cycles CIP
	Sterilization cycles SIP
	Autoclaving counter
	Salinity
	Pressure unit
	Pressure correction

Adaptive Cal Timer (ACT)

By issuing a Sensoface message, the adaptive calibration timer reminds you to calibrate the sensor. After expiration of the interval, Sensoface is getting "sad". Pressing the **info** key shows the text "OUT OF CAL TIME CALIBRATE SENSOR" which reminds you that a calibration is due. The ACT interval is either read automatically from the sensor settings or can be specified manually (max. 2000 days). Stressing influences (temperature, measurement in extreme ranges) shorten the timer interval.

The adaptive cal timer is reset after each calibration.

3

Menu item	Action	Choices
Adaptive cal timer (ACT)  	Select using ▲ ▼ : OFF: No timer AUTO: The interval stored in the ISM sensor is used. MAN: The interval is specified manually (0 ... 2000 days). Default ACT CYCLE: 30 days Press enter to confirm.	OFF AUTO MAN

Oxy

ISM Sensor, Adaptive Maintenance Timer (TTM)

3	PROFIBUS address
	Sensor type
	Measuring mode
	Polarization voltage during meas/cal
	Membrane compensation
	Type of temp probe
	Temperature unit
	Calibration mode air/water
	Calibration timer
	Adaptive calibration timer
	Adaptive maintenance timer
	Cleaning cycles CIP
	Sterilization cycles SIP
	Autoclaving counter
	Salinity
	Pressure unit
	Pressure correction

Adaptive Maintenance Timer (TTM, Time to Maintenance)

By issuing a Sensoface message, the adaptive maintenance timer reminds you to service the sensor. After expiration of the interval, Sensoface is getting "sad". Pressing the **info** key shows the text "OUT OF MAINTENANCE CHECK ELECTROLYTE AND MEMBRANE" which reminds you that a sensor maintenance is due. The TTM interval is either read automatically from the sensor settings or can be specified manually (max. 2000 days). Stressing influences (temperature, measurement in extreme ranges) shorten the timer interval.

3

Menu item	Action	Choices
Adaptive maintenance timer (TTM)	<p>Select using arrow keys: AUTO: The interval stored in the ISM sensor is used.</p>  <p>MAN: The interval is specified manually (0 ... 2000 days). Default TTM CYCLE: 365 days</p> <p>Press enter to confirm.</p> 	OFF AUTO MAN

The adaptive maintenance timer can be reset in the SERVICE / SENSOR / TTM menu. Here, the interval is reset to its initial value.

	<p>To do so, select "TTM RESET = YES" and confirm by pressing enter.</p>	NO / YES
---	--	-----------------

Oxy

Sensor, CIP Cleaning Cycles, SIP Sterilization Cycles

3	PROFIBUS address
	Sensor type
	Measuring mode
	Polarization voltage during meas/cal
	Membrane compensation
	Type of temp probe
	Temperature unit
	Calibration mode air/water
	Calibration timer
	Adaptive calibration timer
	Adaptive maintenance timer
	Cleaning cycles CIP
	Sterilization cycles SIP
	Autoclaving counter
	Salinity
	Pressure unit
	Pressure correction

3

Menu item	Action	Choices
CIP counter	Adjust CIP counter using ▲ ▼ : OFF: No counter ON: Fixed cleaning cycle (adjust in the next step) Press enter to confirm.	ON OFF
CIP cycles	Only with CIP COUNT ON: Enter max. number of cleaning cycles using ▲ ▼ ◀ ▶ keys Press enter to confirm.	0000 ... 9999 CYC
SIP counter	Adjust SIP counter using ▲ ▼ : OFF: No counter ON: Max. sterilization cycles (adjust as for CIP counter) Press enter to confirm.	ON OFF

The cleaning and sterilization cycles are counted to measure the load on the sensor.
 Suitable for biochemical applications (process temp approx. 0...50 °C,
 CIP temperature > 55 °C, SIP temperature > 115 °C).

100

Oxy Configuration

Oxy

ISM Sensor, Autoclaving Counter



3	PROFIBUS address
	Sensor type
	Measuring mode
	Polarization voltage during meas/cal
	Membrane compensation
	Type of temp probe
	Temperature unit
	Calibration mode air/water
	Calibration timer
	Adaptive calibration timer
	Adaptive maintenance timer
	Cleaning cycles CIP
	Sterilization cycles SIP
	Autoclaving counter
	Salinity
	Pressure unit
	Pressure correction

Autoclaving Counter

After reaching a specified limit value the autoclaving counter generates a Sensoface message. As soon as the counter has reached the specified value, Sensoface is getting "sad". Pressing the **info** key shows the text "AUTOCLAVE CYCLES OVERRUN" which reminds you that the maximum number of autoclaving cycles has been reached. After each autoclaving process, you must manually increment the autoclaving counter in the SENSOR service menu. The transmitter displays "INCREMENT AUTOCLAVE CYCLE" as confirmation.

3

Menu item	Action	Choices
Autoclaving counter  	Select using arrow keys: OFF: No counter ON: The cycles are specified manually (0000 ... 9999). Press enter to confirm.	ON OFF For ISM only

With the autoclaving counter switched on, you must increment the count after each autoclaving process:

Incrementing the autoclaving counter (SERVICE menu) 	After having completed an autoclaving process, open the SERVICE menu SENSOR / AUTOCLAVE to increment the autoclaving count. To do so, select " YES " and confirm by pressing enter .	NO YES
---	---	------------------

Oxy

Correction (Oxy), Salinity Correction, Pressure Correction

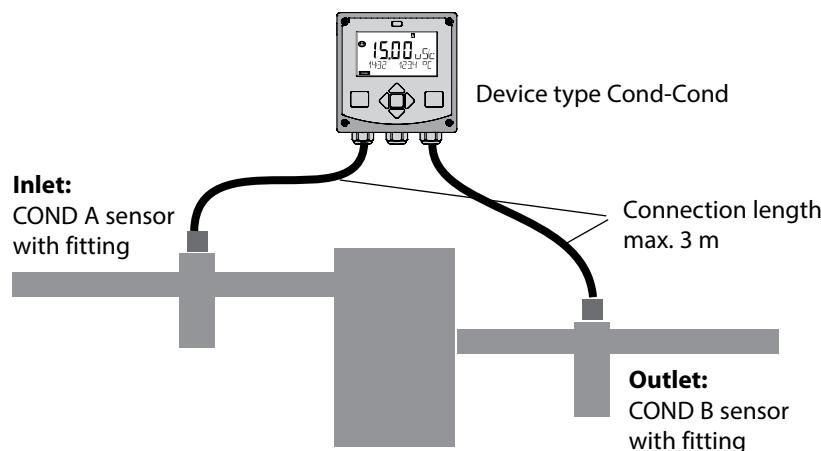
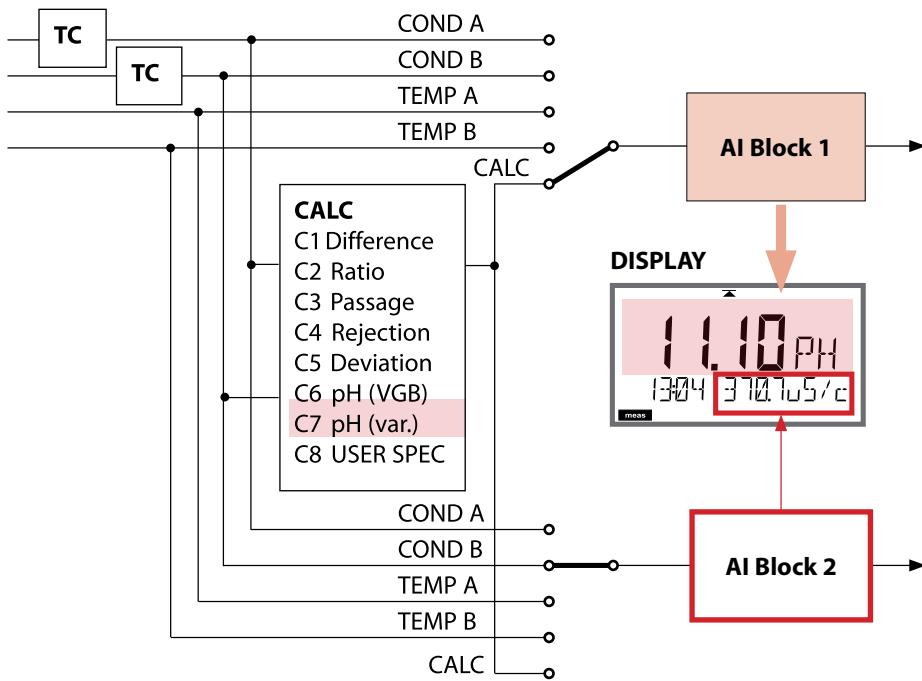
3

PROFIBUS address
Sensor type
Measuring mode
Polarization voltage during meas/cal
Membrane compensation
Type of temp probe
Temperature unit
Calibration mode air/water
Calibration timer
Adaptive calibration timer
Adaptive maintenance timer
Cleaning cycles CIP
Sterilization cycles SIP
Autoclaving counter
Salinity
Pressure unit
Pressure correction

3

Menu item	Action	Choices
Salinity	Adjust salinity correction using ▲ ▼. Press enter to confirm.	00.00 ppt xx.xx ppt
Pressure unit	Select pressure unit using ▲ ▼. Press enter to confirm.	BAR KPA PSI
Pressure correction	Select using ▲ ▼ keys: MAN: Manual input BUS: Value from AO block Press enter to confirm.	MAN BUS
Manual pressure input	Enter value using ▲ ▼ ▶ ▶ keys. Press enter to confirm.	Input range: 0.000 ... 9.999 BAR 000.0 ... 999.9 KPA 000.0 ... 145.0 PSI 1.013 BAR 100 KPA 14.5 PSI

CC

Sensors A and B – Arrangement**Channel Selection and Display Assignment**

Calculations (CALC)

CONF	Calculation	Formula
-C1-	Difference	COND A – COND B
-C2-	Ratio	COND A / COND B
-C3-	Passage	COND B / COND A * 100
-C4-	Rejection	(COND A – COND B) / COND A * 100
-C5-	Deviation	(COND B – COND A) / COND A * 100
-C6-	pH value acc. to VGB Alkalizing agent: NaOH	11+log ((COND A – COND B /3)/243)
-C7-	Variable pH value, factors specifiable (see also page 107)	11+log ((COND A – COND B /F1)/F2) F1, F2 specifiable
-C8-	USER SPEC* (DAC) PARAMETER W, A, B specifiable	

*) Input of user-specific parameters possible

CC

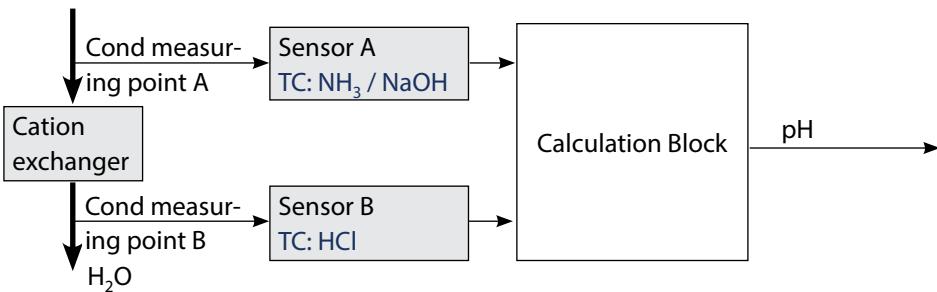
Calculating the pH Value by Means of Dual Conductivity Measurement

When monitoring boiler feedwater in power plants, dual conductivity measurement can be used to calculate the pH value. For that purpose, the boiler feedwater conductance is measured before and after the cation exchanger. This commonly used method of indirect pH value measurement does not require much maintenance and has the following advantage:

Normal pH measurement in ultrapure water is very critical. Boiler feedwater does not contain many ions. This requires the use of a special electrode, which must be calibrated constantly and the service life of which is generally rather short.

Function

Two sensors are used to measure the conductivity before and after the cation exchanger. The pH value is inferred from these two conductivity values.



Extract from VGB-S-006-00-2012-09-DE (Translation):

Calculated pH Value

To obtain a correct pH measurement, a great number of conditions must be observed. In practice, the pH value of the power plant feedwater is therefore calculated from the specific conductivity and the cation conductivity using the method described below.

When only one single alkalizing agent is used, such as ammonia, sodium hydroxide or lithium hydroxide, the pH in the range of 7.5 to 10.5 can be calculated as follows:

$$\text{pH}_{\text{NH}_3} = \log\left(\frac{x_v - 1/3 x_h}{273}\right) + 11$$

$$\text{pH}_{\text{NaOH}} = \log\left(\frac{x_v - 1/3 x_h}{243}\right) + 11$$

$$\text{pH}_{\text{LiOH}} = \log\left(\frac{x_v - 1/3 x_h}{228}\right) + 11$$

x_v = Conductivity

x_h = Cation conductivity

The conductivity values used for calculating the pH must be temperature compensated.

This calculation method is basically applicable. With increasing cation conductivity values, however, a decreasing accuracy must be tolerated.

(Translation of extract from VGB-S-006-00-2012-09-DE, pages 62, 63)

CC

Configuration		Choices DEFAULT in bold
BUS:	ADDRESS	0000 ... 0126
SENSOR A		
S_A:	CELLFACTOR (A)¹⁾	0.0050 ... 1.9999 (0.0290)
	TC SELECT (A)	OFF LIN nLF nACL HCL nH3 nAOH
	LIN	TC LIQUID (A) 00.00 ... +19.99 %/K (00.00 %/K)
	LIN	REF TEMP (A) -20 ... 200 °C (25.0 °C) 4 ... 392 °F (077.0 °F)
SENSOR B		
S_B:	CELLFACTOR (B)¹⁾	0.0050 ... 1.9999 (0.0290)
	TC SELECT (B)	OFF LIN nLF nACL HCL nH3 nAOH
	LIN	TC LIQUID (B) 00.00 ... +19.99 %/K (00.00 %/K)
	LIN	REF TEMP (B) -20 ... 200 °C (25.0 °C) 4 ... 392 °F (077.0 °F)
MEAS MODE		
MES:	MEAS RANGE²⁾ Setting applies to both channels, A and B	0.000 µS/cm 00.00 µS/cm 000.0 µS/cm 0000 µS/cm 00.00 MΩ
	TEMP UNIT	°C °F
	CALCULATION	ON OFF
	ON	-C1- DIFFERENCE -C2- RATIO -C3- PASSAGE -C4- REJECTION -C5- DEVIATION -C6- PH VGB -C7- PH VARIABLE -C8- USER SPEC
-C6-	PH VGB	nAOH LiOH nH3
-C7-	COEFFICIENT	00.00 ... 99.99 (11.00)
-C7-	FACTOR 1	01.00 ... 10.00 (03.00)
-C7-	FACTOR 2	0100 ... 0500 (0243)
-C8-	PARAMETER W	xxxx E-3 (1000 E-3)
-C8-	PARAMETER A	xxx.x E-3 (000.0 E-3)
-C8-	PARAMETER B	xxxx E-4 (000.0 E-4)

Configuration	Choices	DEFAULT in bold
IN: FLOW ADJUST	0 ... 20 000 l/L	(12 000 l/L)
ALA: ALARM DELAY	0 ... 600 SEC	(010 SEC)
SENSOCHECK	ON OFF	
HOLD	OFF LAST	
CLK: CLK FORMAT	24h 12h	
CLK TIME	hh:mm hh.mm (A/M)	(00.00)
CLK DAY/MONTH	dd.mm	(01.01.)
CLK YEAR	yyyy	(2014)

- 1) The cell factor can be modified by an entry in the configuration menu or by calibration (one storage position). This means, a cell factor determined by calibration is taken over by pressing **enter** during configuration. It remains unchanged until a new value is entered.
- 2) For conductivity ($\mu\text{S}/\text{cm}$), the range selection determines the max. resolution. If the selected range is exceeded, the device automatically switches to the next higher range until the max. measurement limit is reached ($9999 \mu\text{S}/\text{cm}$). This applies to display values and current outputs. The current outputs are adjusted using a floating-point editor which allows settings over several decades. The initial range of the editor is the selected range:

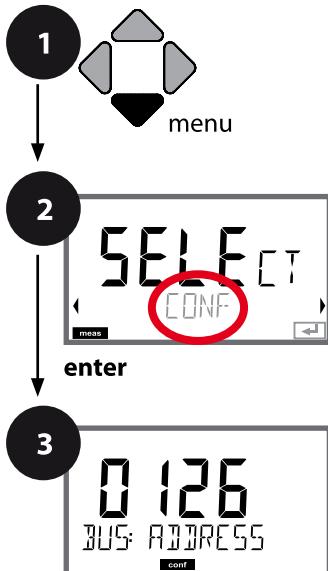
Selected resolution	Displayed range (or floating-point editor)			
	x.xxx $\mu\text{S}/\text{cm}$	xx.xx $\mu\text{S}/\text{cm}$	x.xxx $\mu\text{S}/\text{cm}$	xxxx $\mu\text{S}/\text{cm}$
x.xxx $\mu\text{S}/\text{cm}$				
xx.xx $\mu\text{S}/\text{cm}$				
xxx.x $\mu\text{S}/\text{cm}$				
xxxx $\mu\text{S}/\text{cm}$				

CC

Parameter	Default	User settings
BUS: Address	126	
S_A:	Cell factor A	0.0290
	Temperature compensation A	OFF
	Temperature compensation, LINEAR	00.00%/K
	Reference temperature, LINEAR	25.0 °C (77.0 °F)
S_B:	Cell factor B	0.0290
	Temperature compensation B	OFF
	Temperature compensation, LINEAR	00.00%/K
	Reference temperature, LINEAR	25.0 °C (77.0 °F)
MES:	Measuring range	00.00 µS/cm
	Temperature unit	°C
	Calculation	OFF
	CALCULATION ON	-C1- DIFFERENCE
	-C6- PH VGB	nAOH
	-C7- COEFFICIENT	11.00
	-C7- FACTOR 1	03.00
	-C7- FACTOR 2	0243
	-C8- PARAMETER W	1000 E-3
	-C8- PARAMETER A	000.0 E-3
IN:	-C8- PARAMETER B	000.0 E-4
	Flow meter (pulses/liter)	12 000 l/L
ALA:	Delay	10 s
	Sensocheck	OFF
	HOLD mode	LAST
CLK:	Time format	24h
	Time hh/mm	00.00
	Day/Month	01.01.
	Year	2014

CC

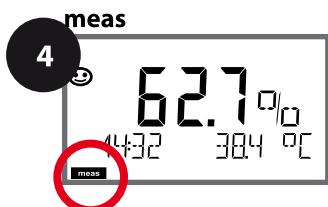
Flow Measurement



- 1 Press **menu**.
- 2 Select **CONF** using **◀ ▶**, press **enter**.
- 3 Enter PROFIBUS address (0000 ... 0126) using **▲ ▼ ▲ ▼**, press **enter**.
The next menu item appears.
Use the arrow keys **▲ ▼** for selection (see right-hand page).
Confirm (and proceed) by pressing **enter**.
- 4 Exit: Press **meas** key until the [meas] mode indicator is displayed.

3

PROFIBUS address
...
Flow measurement
Alarm delay
Sensocheck
HOLD
Time and date



3

Menu item	Action	Choices
PROFIBUS address	Adjust value using ▲ ▼ keys, select next digit using ◀ ▶ keys. Press enter to confirm.	0000 ... 0126
Adjust to flow meter:	You must adjust the device to the flow meter used. Enter value using ▲ ▼ keys, confirm by pressing enter .	0 ... 20,000 pulses/liter 0 ... 12,000 pulses/liter

Display

Flow measurement in measuring mode

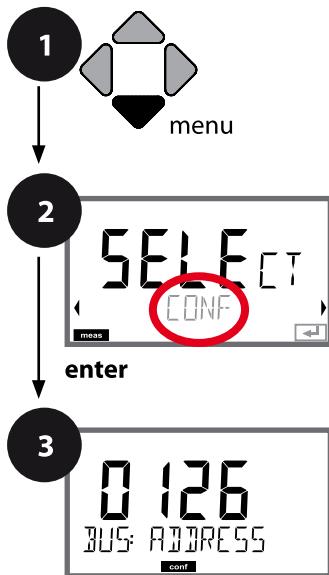
**Display**

Flow measurement (sensor monitor)



Note: The response speed may be reduced because the values are averaged.

Alarm, Alarm Delay, Sensocheck



3

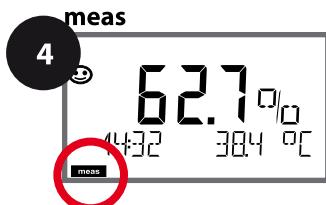
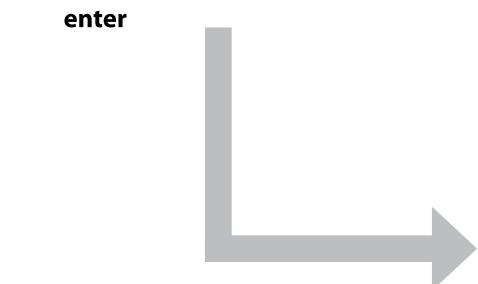
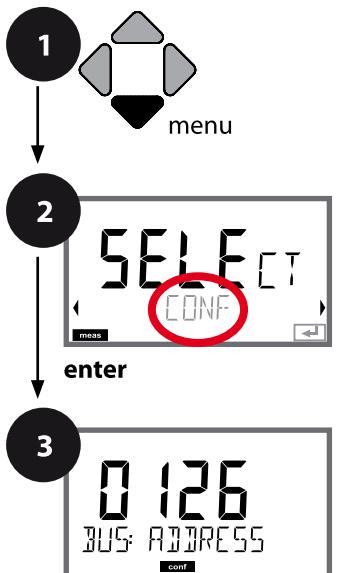
PROFIBUS address
...
Flow measurement
Alarm delay
Sensocheck
HOLD
Time and date



3

Menu item	Action	Choices
Alarm delay	<p>Enter alarm delay using ▲ ▼ keys. Press enter to confirm.</p> <p>The alarm delay time delays the color change of the display backlighting to red.</p>	0 ... 600 SEC (010 SEC)
Sensocheck	<p>Select Sensocheck (continuous monitoring of sensor membrane and lines).</p> <p>Select ON or OFF using ▲ ▼ keys.</p> <p>Press enter to confirm.</p> <p>(At the same time, Sensoface is activated. With OFF, Sensoface is also switched off.)</p>	ON OFF
HOLD	<p>Status of measured value during calibration</p> <p>OFF: Measured value and status are updated as usual.</p> <p>LAST: Measured value and status remain at their last value (Last Usable Value).</p>	OFF LAST

Setting the Time and Date



PROFIBUS address
...
Flow measurement
Alarm delay
Sensocheck
HOLD
Time and date

3

Menu item	Action	Choices
Time format	Select time format using ▲ ▼ keys. Press enter to confirm.	24h 12h
Time	Enter time using ▲ ▼ ▲ ▼ keys. Press enter to confirm.	hh:mm hh.mm (A/M) 00.00
Day and month	Enter day and month using ▲ ▼ ▲ ▼ keys. Press enter to confirm.	dd.mm 01.01.
Year	Enter year using ▲ ▼ ▲ ▼ keys. Press enter to confirm.	yyyy 2014

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.
In that case, enter the correct time and the correct date.
- There is no automatic switchover from winter to summer time!
Be sure to manually adjust the time!

pH**Please note:**

- All calibration procedures must be performed by trained personnel. Incorrectly set parameters may go unnoticed, but change the measuring properties.
- The response time of the sensor and temperature probe is considerably reduced when the sensor is first moved about in the buffer solution and then held still.

The device can only operate properly when the buffer solutions used correspond to the configured set. Other buffer solutions, even those with the same nominal values, may demonstrate a different temperature response.

This leads to measurement errors.

When using ISFET sensors or sensors with a zero point other than pH 7, the nominal zero point must be adjusted each time a new sensor is connected.

This is important if you want to obtain reliable Sensoface messages. The Sensoface messages issued during all further calibrations are based on this basic calibration.

Calibration is used to adapt the device to the individual sensor characteristics, namely asymmetry potential and slope.

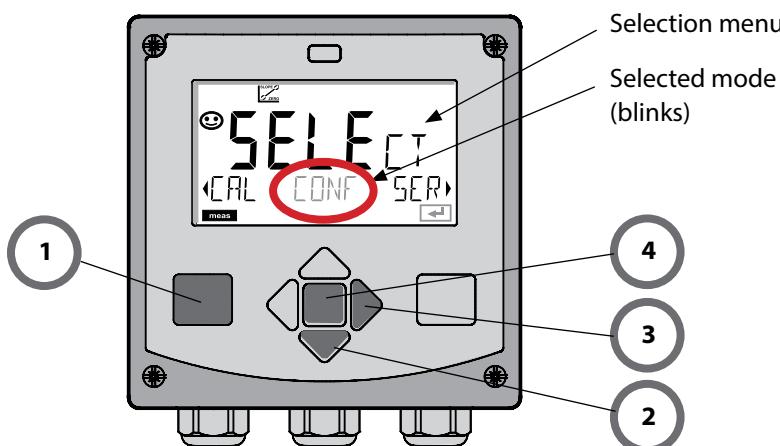
Access to calibration can be protected with a passcode (SERVICE menu).

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

CAL_PH	Depending on configuration setting: AUTO Automatic buffer recognition (Calimatic) MAN Manual buffer input DAT Input of premeasured electrode data
CAL_ORP	ORP calibration
P_CAL	Product calibration (calibration with sampling)
ISFET-ZERO	Zero adjustment. Required for ISFET sensors. Subsequently you can conduct either a one or a two-point calibration.
CAL_RTD	Temperature probe adjustment

To preset CAL_PH (CONF menu / configuration):

- 1) Hold **meas** key depressed (> 2 s) (measuring mode)
- 2) Press **menu** key: the selection menu appears
- 3) Select CONF mode using left / right arrow key
- 4) Select "SENSOR" – "CALMODE": AUTO, MAN, or DAT.
Press **enter** to confirm.



pH

This adjustment allows the use of ISFET sensors with differing nominal zero (pH only). The function is available when ISFET has been selected during configuration. Zero adjustment is disabled for any other sensors.

The adjustment is made using a zero buffer (pH 7.00).

Permitted range for buffer value: pH 6.5 ... 7.5. Temperature-corrected input.

Maximum zero offset: $\pm 200 \text{ mV}$

Display	Action	Remark
A digital display showing the letters 'CAL' in large font, followed by 'ISFET-ZERO' in smaller font. Below the display are two small buttons labeled 'cal' and 'exit'.	Select Calibration. Press enter to proceed.	
The same display as above, but the 'CAL' text is smaller and positioned above the 'ISFET-ZERO' text. An hourglass icon is visible above the text.	Ready for calibration. Hourglass blinks.	Display (3 sec)
The display shows '7.00' as the pH value, 'BUF' as the buffer type, '127mV' as the temperature, and '273°C' as the temperature. The 'cal' button is visible at the bottom.	Immerse sensor in a pH 7.00 buffer. Enter the temperature-corrected pH value in the range 6.50 to 7.50 using the arrow keys (see buffer table). Press enter to confirm.	If the zero offset of the sensor is too large ($> \pm 200 \text{ mV}$), a CAL ERR error message is generated. In that case the sensor cannot be calibrated.
The display shows '7.00' as the pH value, 'BUF' as the buffer type, '128mV' as the temperature, and '273°C' as the temperature. The 'cal' button is visible at the bottom. An hourglass icon is blinking above the text.	Stability check. The measured value [mV] is displayed. The "hourglass" icon is blinking.	Note: Stability check can be stopped (by pressing enter). However, this reduces calibration accuracy.

Display	Action	Remark
	<p>At the end of the adjustment procedure the zero offset [mV] of the sensor is displayed (based on 25 °C). Sensoface is active.</p> <p>Press enter to proceed.</p>	This is not the final calibration value of the sensor! Asymmetry potential and slope must be determined with a complete 2-point calibration.
	<p>Use the arrow keys to select:</p> <ul style="list-style-type: none"> • Repeat (repeat calibration) or • Measure <p>Press enter to confirm.</p>	
	<p>Place sensor in process.</p> <p>Press enter to exit zero calibration.</p>	

Note for Zero Adjustment:

After having adjusted the zero offset, be sure to calibrate the sensor following one of the procedures as described on the next pages.



pH

The AUTO calibration mode must have been preset during **configuration**.

Make sure that the buffer solutions used correspond to the configured buffer set.

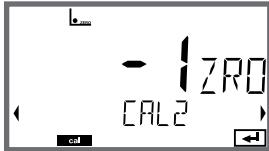
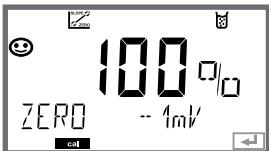
Other buffer solutions, even those with the same nominal values, may demonstrate a different temperature response. This leads to measurement errors.

Display	Action	Remark
	<p>Select Calibration. Press enter to proceed.</p>	
	<p>Ready for calibration. Hourglass blinks. Select calibration method: CAL_PH Press enter to proceed.</p>	Display (3 sec)
	<p>Remove the sensor, clean it, and immerse it in the first buffer solution (it does not matter which solution is taken first). Press enter to start.</p>	
	<p>Buffer recognition. While the "hourglass" icon is blinking, the sensor remains in the first buffer solution.</p>	<p>To reduce the sensor response time, first move it about in the buffer solution and then hold it still.</p>
	<p>Buffer recognition terminated, the nominal buffer value is displayed, then zero point and temperature.</p>	

Display	Action	Remark
	Stability check. The measured value [mV] is displayed, "CAL2" and "enter" are blinking. Calibration with the first buffer is terminated.	Note: Stability check can be stopped after 10 sec (by pressing enter). However, this reduces calibration accuracy. Display for 1-point cal:
	Remove the sensor from the first buffer solution and rinse it thoroughly. Use the arrow keys to select: <ul style="list-style-type: none"> • END (1-point cal) • CAL2 (2-point cal) • REPEAT Press enter to proceed.	 Sensoface is active. Exit by pressing enter
	2-point calibration: Immerse sensor in second buffer solution. Press enter to start.	The calibration process runs as for the first buffer.
	Retract sensor out of second buffer, rinse off, re-install. Press enter to proceed.	The slope and asymmetry potential of the sensor (based on 25 °C) are displayed.
	Use the arrow keys to select: <ul style="list-style-type: none"> • MEAS (exit) • REPEAT Press enter to proceed.	When 2-point cal is exited:

The MAN calibration mode and the type of temperature detection are selected during **configuration**. For calibration with manual buffer specification, you must enter the pH value of the buffer solution used in the device for the proper temperature. Any desired buffer solution can be used for calibration.

Display	Action	Remark
	Select Calibration. Press enter to proceed.	
	Ready for calibration. Hourglass blinks.	Display (3 sec)
	Remove the sensor and temperature probe, clean them, and immerse them in the first buffer solution. Press enter to start.	When manual input of temperature has been configured, the temp value in the display blinks and can be edited using the arrow keys.
	Enter the pH value of your buffer solution for the proper temperature. While the "hourglass" icon is blinking, the sensor and temperature probe remain in the buffer solution.	The response time of the sensor and temperature probe is considerably reduced when the sensor is first moved about in the buffer solution and then held still.

Display	Action	Remark
	<p>At the end of the stability check, the value will be saved and the asymmetry potential will be displayed. Calibration with the first buffer is terminated. Remove the sensor and temp probe from the first buffer solution and rinse them thoroughly.</p> <p>Use the arrow keys to select:</p> <ul style="list-style-type: none"> • END (1-point cal) • CAL2 (2-point cal) • REPEAT <p>Press enter to proceed.</p>	<p>Note:</p> <p>Stability check can be stopped after 10 sec (by pressing enter). However, this reduces calibration accuracy.</p> <p>Display for 1-point cal:</p> 
	2-point calibration: Immerse sensor and temperature probe in the second buffer solution. Enter pH value. Press enter to start.	The calibration process runs as for the first buffer.
	Rinse sensor and temperature probe and reinstall them. Press enter to proceed.	Display of slope and asymmetry potential of the sensor (based on 25 °C).
	<p>Use the arrow keys to select:</p> <ul style="list-style-type: none"> • MEAS (exit) • REPEAT <p>Press enter to proceed.</p>	When 2-point cal is exited:
		

The DAT calibration mode must have been preset during configuration.
 You can directly enter the values for slope and asymmetry potential of a sensor.
 The values must be known, eg, determined beforehand in the laboratory.

Display	Action	Remark
	Select Calibration. Press enter to proceed.	
	"Data Input" Ready for calibration. Hourglass blinks.	Display (3 sec)
	Enter asymmetry potential [mV]. Press enter to proceed.	
	Enter slope [%].	
	The device displays the new slope and asymmetry poten- tial (at 25 °C). Sensoface is active.	
	Use the arrow keys to select: <ul style="list-style-type: none"> • MEAS (exit) • REPEAT Press enter to proceed.	

Converting slope [%] to slope [mV] at 25 °C

%	mV
78	46.2
80	47.4
82	48.5
84	49.7
86	50.9
88	52.1
90	53.3
92	54.5
94	55.6
96	56.8
98	58.0
100	59.2
102	60.4

Converting asymmetry potential to sensor zero point

$$\text{ZERO} = 7 - \frac{V_{AS} [\text{mV}]}{S [\text{mV}]}$$

ZERO = Sensor zero

V_{AS} = Asymmetry potential

S = Slope

pH

The potential of a redox sensor is calibrated using a redox (ORP) buffer solution. In the course of that, the difference between the measured potential and the potential of the calibration solution is determined according to the following equation. During measurement this difference is added to the measured potential.

$$mV_{\text{ORP}} = mV_{\text{meas}} - \Delta mV$$

mV_{ORP} = displayed ORP

mV_{meas} = direct sensor potential

ΔmV = delta value, determined during calibration

The sensor potential can also be related to another reference system – eg, the standard hydrogen electrode. In that case the temperature-corrected potential (see table) of the reference electrode used must be entered during calibration.

During measurement, this value is then added to the ORP measured.

Please make sure that measurement and calibration temperature are the same since the temperature behavior of the reference electrode is not automatically taken into account.

Temperature Dependence of Commonly Used Reference Systems Measured Against SHE

Temperature [°C]	Ag/AgCl/KCl 1 mol/l [ΔmV]	Ag/AgCl/KCl 3 mol/l [ΔmV]	Thalamid [ΔmV]	Mercury sulfate [ΔmV]
0	249	224	-559	672
10	244	217	-564	664
20	240	211	-569	655
25	236	207	-571	651
30	233	203	-574	647
40	227	196	-580	639
50	221	188	-585	631
60	214	180	-592	623
70	207	172	-598	613
80	200	163	-605	603

Display	Action	Remark
A digital display showing 'CAL' at the top, followed by 'CAL_ORP' below it. There are four buttons at the bottom: 'cal' on the left, and arrows pointing up, down, and right on the right.	Select ORP calibration. Press enter to proceed.	
A digital display showing 'CAL' at the top, followed by 'ORP ADJUST' below it. There are four buttons at the bottom: 'cal' on the left, and arrows pointing up, down, and right on the right.	Remove the sensor and temperature probe, clean them, and immerse them in the redox buffer.	Display (3 sec)
A digital display showing '220 mV' in large digits, followed by 'SOLUTION 275°C' below it. There are four buttons at the bottom: 'cal' on the left, and arrows pointing up, down, and right on the right.	Enter setpoint value for redox buffer. Press enter to proceed.	
A digital display showing '213 mV' in large digits, followed by 'ORP--DELT A' below it. There are four buttons at the bottom: 'cal' on the left, and arrows pointing up, down, and right on the right.	The ORP delta value is displayed (based on 25 °C). Sensoface is active. Press enter to proceed.	
A digital display showing '223 mV' in large digits, followed by 'MEAS' below it. There are four buttons at the bottom: 'cal' on the left, and arrows pointing up, down, and right on the right.	To repeat calibration: Select REPEAT. To exit calibration: Select MEAS, then enter	

pH

Oxy

LDO

Cond

(Example: pH)

Calibration by sampling (one-point calibration).

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 must correspond to the measured process temperature.

During sampling the device saves the currently measured value and then returns to measuring mode. 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 asymmetry potential.

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.

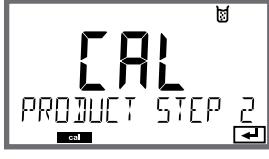
Display	Action	Remark
	Select product calibration: P_CAL Press enter to proceed.	If you have protected the calibration with a passcode (in the Service menu), the device will return to measuring mode when an invalid code is entered.
	Ready for calibration. Hourglass blinks. Press enter to proceed.	Display (3 sec)
	Take sample and save value. Press enter to proceed.	Now the sample can be measured in the lab.

pH

Oxy

LDO

Cond

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 (P_CAL).	Display (3 sec)
	The stored value is displayed (blinking) and can be overwritten with the measured sample value. Press enter to proceed.	
	Display of new asymmetry potential (based on 25 °C). Sensoface is active. To exit calibration: Select MEAS, then enter	To repeat calibration: Select REPEAT, then enter
End of calibration.		

Oxy

Calibration adapts the device to the individual sensor characteristics.

It is always recommended to calibrate in air.

Compared to water, air is a calibration medium which is easy to handle, stable, and thus safe. In the most cases, however, the sensor must be removed for a calibration in air.

When dealing with biotechnological processes which require sterile conditions, the sensor cannot be removed for calibration. Here, calibration must be performed directly in the process medium (eg, after sterilization and aeration).

In the field of biotechnology, for example, often saturation is measured and calibration is performed in the process medium for reasons of sterility.

For other applications where concentration is measured (water control etc.), calibration in air has proved to be useful.

Note

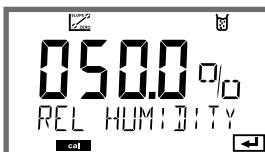
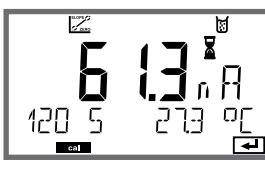
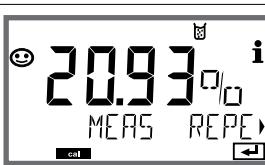
All calibration procedures must be performed by trained personnel. Incorrectly set parameters may go unnoticed, but change the measuring properties.

Common Combination: Process Variable / Calibration Mode

Measurement	Calibration	Application
Saturation	Water	Biotechnology; sensor cannot be removed for calibration (sterility)
Concentration	Air	Waters, open basins

On the following pages, the calibration procedure for a slope calibration in air is described. Of course, other combinations of process variable and calibration mode are possible.

Oxy

Display	Action	Remark
	Select calibration. Place sensor in air, press enter to start.	“Medium water” or “Medium air” is selected in the configuration.
	Enter relative humidity using arrow keys Press enter to proceed.	Default for relative humidity in air: rH = 50%
	Enter cal pressure using arrow keys . Press enter to proceed.	Default: 1.000 bar Unit: bar/kpa/PSI
	Drift check: Display of: sensor current (nA), response time (s), temperature (°C/F) Press enter to proceed.	The drift check can take some minutes.
	Display of calibration data (slope and zero). Press enter to proceed.	
	Display of selected process variable (here: %vol). MEAS exits calibration, REPEAT permits repetition.	

Display	Action	Remark
	Select calibration (SLOPE). Immerse sensor in cal medium, start with enter .	"Medium water" or "Medium air" is selected in the configuration.
	Enter cal pressure Press enter to proceed.	Default: 1.000 bar Unit: bar/kpa/PSI
	Drift check: Display of: sensor current (nA), response time (s), temperature (°C/F)	The drift check might take some time.
	Display of calibration data (slope and zero) and Sensoface Press enter to proceed.	Related to 25 °C and 1013 mbar
	Display of selected process value. To exit calibration: Select MEAS ◀ ▶ , then enter	To repeat calibration: Select REPEAT ◀ ▶ , then enter
	Place sensor in process. End of calibration	

136

LDO

(A451N only)

Calibrating/Adjusting the SE 740 Optical Oxygen Sensor

Every oxygen sensor has its individual slope (Stern-Volmer constant c_{VS}) and its individual zero point (phase angle). Both values are altered, for example, by aging.

For sufficiently high accuracy of oxygen measurement, the analyzer must be regularly adjusted for the sensor data (adjustment).

Calibration/Adjustment Methods

- Automatic calibration in water/air
- Zero calibration
- Product calibration (saturation/concentration/partial pressure)
- Offset correction

Recommendations for Calibration

It is always recommended to calibrate in air. Compared to water, air is a calibration medium which is easy to handle, stable, and thus safe. In the most cases, however, the sensor must be removed for a calibration in air. In certain processes the sensor cannot be removed for calibration. Here, calibration must be performed directly in the process medium (e.g. by means of a product calibration).

If there is a temperature difference between the calibration medium and the measured medium, you must keep the sensor in the respective medium for several minutes before and after calibration in order to achieve stable measured values. The type of calibration pressure detection is preset during parameter setting.

LDO

(A451N only)

Automatic Calibration in Air

The slope is corrected using the saturation value (100 %), similar to air saturation of water. Since this analogy only applies to water-vapor saturated air (100 % relative humidity) and often the calibration air is less humid, the relative humidity of the calibration air must also be specified. If you do not know the exact value of the relative humidity of the calibration air, you can take the following reference values for a sufficiently precise calibration:

- Ambient air: 50 % rel. humidity (average)
- Bottled gas (synthetic air): 0 % rel. humidity

NOTICE!

The sensor membrane must be dry. Be sure to keep temperature and pressure constant during calibration. If there is a temperature difference between calibration medium and measured medium, you must keep the sensor in the respective medium for several minutes before and after calibration.

Display	Action	Remark
	Select calibration. Place sensor in air, press enter to start. Device goes to HOLD mode.	"CAL WATER" or "CAL AIR" is selected in the configuration.
	Enter relative humidity using arrow keys . Press enter to proceed.	Default for relative humidity in air: RH = 50%
	Enter cal pressure using arrow keys . Press enter to proceed.	Default: 1.013 bar Unit: bar/kpa/PSI
	Drift check: Display of: partial pressure (hPa), response time (s), temperature (°C/F) Press enter to proceed.	The drift check can take some minutes.
	Display of calibration data Sensoface Stern-Volmer constant Press enter to proceed.	
	Display of selected process variable. Now the device is in HOLD mode: Reinstall the sensor and check whether the measurement is OK. MEAS exits calibration, REPEAT permits repetition.	After end of calibration, the outputs remain in HOLD mode for a short time.

LDO

(A451N only)

Automatic Calibration in Water

The slope is corrected using the saturation value (100 %) of water in equilibrium with air.

NOTICE!

The calibration medium must be in equilibrium with air. Oxygen exchange between water and air is very slow. Therefore, it takes a relatively long time until water is saturated with atmospheric oxygen. If there is a temperature difference between calibration medium and measured medium, you must keep the sensor in the respective medium for several minutes before and after calibration.

Display	Action	Remark
	Select calibration (SLOPE). Immerse sensor in cal medium, press enter to start.	"CAL WATER" or "CAL AIR" is selected in the configuration.
	Enter cal pressure Press enter to proceed.	Default: 1.013 bar Unit: bar/kpa/PSI
	Drift check: Display of: Partial pressure (hPa) Response time (s) Temperature (°C/°F) Press enter to proceed.	Device goes to HOLD mode. The drift check might take some time.
	Display of calibration data Sensoface Stern-Volmer constant Press enter to proceed.	Phase angle with O ₂ =0
	Display of selected process value. To exit calibration: Select MEAS ◀ ▶ , then enter	To repeat calibration: Select REPEAT ◀ ▶ , then enter
	Place sensor in process. End of calibration	After end of calibration, the outputs remain in HOLD mode for a short time.

LDO

(A451N only)

Zero Correction

For trace measurements below 500 ppb, the zero point should be calibrated. If you want to perform a zero correction, then you should keep the sensor in the calibration medium (eg, N₂ or sulfite solution) until the measured value has stabilized. This may well take several minutes. After that, you can start the calibration process.

Display	Action	Remark
	Select calibration. Place sensor in N ₂ , press enter to start. Device goes to HOLD mode.	"Zero Point" is selected in the configuration.
	Drift check: Display of: partial pressure (hPa), response time (s), temperature (°C/F) Press enter to proceed.	The drift check can take some minutes.
	Display of calibration data Sensoface Stern-Volmer constant Press enter to proceed.	Phase angle with O ₂ =0
	Display of selected process value. To exit calibration: Select MEAS ▲ ▼, then enter	To repeat calibration: Select REPEAT ▲ ▼, then enter
	Place sensor in process. End of calibration	After end of calibration, the outputs remain in HOLD mode for a short time.

(A451N only)

When measuring in the oxygen trace range, you can use the product calibration menu to adjust an offset. The offset can only be determined for measured values < 20 mbar. For higher values, the analyzer corrects the slope and adjusts the Stern-Volmer constant in the sensor.

The offset is stored in the device, not in the sensor. It may be max. 2 mbar (approx. 1 % sat or 0,055 ppm / 0.055 mg/l).

Display	Action	Remark
	Ready for calibration. Hourglass blinks. Press enter to proceed.	Display (3 sec)
	Press enter to save the measured value.	
	Press enter to proceed.	
	The stored value is displayed (blinking). Enter offset. Press enter to proceed.	You can adjust an offset (%) when the oxygen concentration is below 20 mbar (20 hPa).
	Display of calibration data, Sensoface and Stern-Volmer constant Press enter to proceed.	
	Display of measured OXY value. Sensoface is active. To exit 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.

Cond

Input of temperature-corrected value of calibration solution with simultaneous display of cell factor (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)
	Immerse sensor in cali- bration 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 factor and temperature
	Contacting conductivity measurement (COND) The determined cell factor is displayed. The “hourglass” icon is blinking. Proceed by pressing enter	
	Inductive conductivity measurement (COND) The determined cell factor and zero point are displayed. The “hourglass” icon is blinking. Proceed by pressing enter	

Display	Action	Remark
	Display of selected process variable (here: mS/cm). MEAS exits calibration, REPEAT permits repetition.	
	With MEAS selected: Press enter to exit calibration.	Display of conductivity and temperature, Sensorface is active. 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).
- Make sure that the temperature does not change during the calibration procedure.

CondI**Note:**

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

Calibration can be performed by:

- Determining the cell factor with a known calibration solution taking account of the temperature
- Input of cell factor
- Sampling (product calibration)
- Zero calibration in air or with calibration solution
- Temperature probe adjustment

**Note:**

When the sensor is installed in a pipe/tank at a distance less than 30 mm from the wall, you should perform the calibration either with the sensor installed by means of sampling (product calibration) or in a suitable calibration beaker with dimensions and material corresponding to the process conditions.

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 input of cell factor

P_CAL Product calibration (calibration with sampling)

CAL_ZERO Zero calibration

CAL_RTID Temperature probe adjustment

CondI

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

Display	Action	Remark
	Select Calibration. Press enter to proceed. Select CAL_CELL calibration method. Press enter to proceed.	
	Ready for calibration. Hourglass blinks.	Display (3 sec)
	Enter cell factor. Press enter to proceed.	The selected process variable and the tem- perature are displayed.
	The device shows the cal- culated cell factor and zero point (at 25 °C). Sensoface is active.	
	Use the arrow keys to select: <ul style="list-style-type: none">• MEAS (exit)• REPEAT Press enter to proceed.	

Please refer to the Specifications for the nominal cell factor.

When measuring in a restricted space, the individual cell factor must be determined.

Condl

Zero Calibration in Oxygen-Free Gas

Display	Action	Remark
	Select Calibration. Press enter to proceed. Select CAL_ZERO calibration method. Press enter to proceed.	
	Ready for calibration. Hourglass blinks.	Display (3 sec)
	Calibration in oxygen-free gas (e.g., nitrogen) Edit digits until the lower display indicates Zero Press enter to proceed.	
	The device shows the cell factor (at 25 °C) and the zero point. Sensoface is active.	
	Use the arrow keys to select: <ul style="list-style-type: none">MEAS (exit)REPEAT Press enter to proceed.	

Display	Remark
	From the configuration or calibration menus, you can switch the device to measuring mode by pressing the meas key. In the measuring mode the upper display line shows the configured process variable (pH, ORP [mV] or temperature), the lower display line shows the time and the second configured process variable (pH, ORP [mV] or temperature). The [meas] mode indicator lights.
or AM/PM and °F: 	Please note: <ul style="list-style-type: none">After prolonged power outage (> 5 days), the time display is replaced by dashes and cannot be used for processing. In that case, enter the correct time and the correct date.
	

By pressing the **meas** key you can step through the following displays.

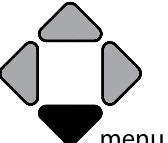
- 1) Primary process value
- 2) Secondary process value
- 3) Flow
- 4) Pressure (Oxy only)
- 5) Calculation (Cond-Cond only)
- 6) Measured value of sensor A (Cond-Cond only)
- 7) Measured value of sensor B (Cond-Cond only)
- 8) Time and Date

When no key has been pressed for 60 sec, the device returns to MAIN DISPLAY.

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).

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

Display	Menu item
 <p>d 1A 6 CAL DATA diag</p>	Displaying the calibration data (Example: pH) Select CALDATA using ◀ ▶ , confirm by pressing enter . Use the ◀ ▶ keys to select the desired parameter from the bottom line of the display: LAST_CAL, ISFET-ZERO, ZERO, SLOPE or NEXT_CAL. The selected parameter is shown in the upper display line.
 <p>27.09 07 LAST_CAL diag</p>	
 <p>23 mV CAL ZERO diag</p>	
 <p>95 % SLOPE diag</p>	
 <p>24 h NEXT_CAL diag</p>	Press meas to return to measurement.
 <p>SENSOR STANDARD diag</p>	Displaying the sensor data For analog sensors, the type is displayed (STANDARD / ISFET). For digital sensors, the manufacturer, type, serial number and last calibration date are displayed. In each case Sensoface is active.
 <p>SENSOR ISM meas</p>	Display data using ◀ ▶ keys, return by pressing enter or meas .

Display	Menu item
	<p>Device self-test (To abort, you can press meas.)</p> <ol style="list-style-type: none"> Display test: Display of all segments with changing background colors (white/green/red). Proceed by pressing enter
	<ol style="list-style-type: none"> RAM test: Hourglass blinks, then display of --PASS-- or --FAIL-- Proceed by pressing enter
	<ol style="list-style-type: none"> EEPROM test: Hourglass blinks, then display of --PASS-- or --FAIL-- Proceed by pressing enter
	<ol style="list-style-type: none"> FLASH test: Hourglass blinks, then display of --PASS-- or --FAIL-- Proceed by pressing enter
	<ol style="list-style-type: none"> Module test: Hourglass blinks, then display of --PASS-- or --FAIL-- Return to measuring mode by pressing enter or meas

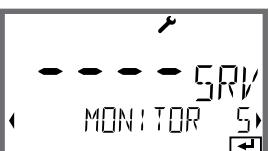
Display	Menu item
	Displaying the logbook entries Select LOGBOOK using ◀ ▶ , press enter to confirm. With the ▲ ▼ keys, you can scroll backwards and forwards through the Audit Trail log (entries 00 ... 99), 00 being the last entry.
	If the display is set to date/time, you can search for a particular date using the ▲ ▼ keys. Press ◀ ▶ to view the corresponding message text.
	If the display is set to the message text, you can search for a particular message using the ▲ ▼ keys. Press ◀ ▶ to display the date and time.
	In addition, function activations (CAL, CONFIG, SERVICE), some Sensoface messages (cal timer, wear), and opening of the enclosure (door contact) can be displayed. Press meas to return to measurement.

Display	Menu item
<p>Display example:</p>	<p>Sensor monitor: Displaying the currently measured values (example: pH)</p> <p>Select MONITOR using ◀ ▶, press enter to confirm.</p> <p>Use the ◀ ▶ keys to select the desired parameter from the bottom line of the display: mV_PH, mV_ORP, RTD, TEMP, R_GLASS, R_REF or FLOW.</p> <p>For digital sensors in addition: OPERATION TIME, SENSOR WEAR, LIFETIME, CIP, SIP and AUTOCLAVE.</p> <p>For ISM sensors in addition: ACT (adaptive calibration timer), TTM (adaptive maintenance timer), DLI (Dynamic Life Time Indicator). The selected parameter is shown in the upper display line.</p> <p>Press meas to return to measurement.</p>
	<p>Display of mV_pH (for validation, sensor can be immersed in a calibration solution, for example, or the device is checked by using a simulator)</p>
	<p>Display of remaining dynamic lifetime (only for digital sensors, however not for MEMOSENS)</p>
	<p>Display of sensor operating time (for digital sensors only)</p>
	<p>Version</p> <p>Display of device type, software/hardware version and serial number for all device components.</p> <p>Use the ▲ ▼ keys to switch between software and hardware version. Press enter to proceed to next device component.</p>

In the Service mode you can access the following menus:

SENSOR	Sensor (resetting diagnostics messages)
DEVICE TYPE	Selecting the process variable
MONITOR	Display of measured values for validation (simulators)
POWER-OUT	Selecting the output voltage (A451N only)
CODES	Configuring the passcodes
DEFAULT	Reset to factory setting

Action	Key/Display	Remark
Activate Service		Press menu 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		Service mode is indicated by the Service (wrench) icon.
Exit	meas	Exit by pressing meas .

Display	Menu item
SENSOR / TTM 	<p>Resetting the adaptive maintenance timer Here, the interval is reset to its initial value. To do so, select "TTM RESET = YES" and confirm by pressing enter.</p>
SENSOR / AUTOCLAVE 	<p>Incrementing the autoclaving counter After having completed an autoclaving process, you must increment the autoclaving count. To do so, select "YES" and confirm by pressing enter. The device confirms with "INCREMENT AUTOCLAVE CYCLE".</p>
DEVICE TYPE 	<p>Device type: Changing the measuring function, eg, after having replaced a Memosens sensor.</p>
MONITOR 	<p>Displaying the currently measured values (sensor monitor) Select MONITOR using ◀ ▶, press enter to confirm. Select the process variable in the bottom text line using ◀ ▶. The selected variable is shown in the main display.</p> <p>Hold meas depressed for longer than 2 sec to return to Service menu. Press meas once more to return to measurement.</p>

Display	Menu item
POWER OUT (A451N only) 	POWER OUT, adjusting the output voltage Here, you can select an output voltage of 3.1/12/15/24 V. When the SE 740 optical oxygen sensor has been selected, the output voltage will be automatically set to 15 V, regardless of the setting in the SERVICE menu.
CODES 	Assigning passcodes: In the "SERVICE - CODES" menu you can assign passcodes to DIAG, 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 and hardware version 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.
DEFAULT 	Reset to factory settings: In the "SERVICE - DEFAULT" menu you can reset the device to factory settings. NOTICE! After a reset to factory setting the device must be reconfigured completely, including the sensor parameters and the PROFIBUS settings.

pH

Error	Info text (is displayed in case of fault when the Info key is pressed)	Problem Possible causes
ERR 01	NO SENSOR	Sensor error Device type not assigned Defective sensor Sensor not connected Break in sensor cable
ERR 02	WRONG SENSOR	Wrong sensor
ERR 03	CANCELED SENSOR	Sensor devaluated
ERR 04	SENSOR FAILURE	Failure in sensor
ERR 05	CAL DATA	Error in cal data
ERR 10	ORP RANGE	ORP display range violation
ERR 11	PH RANGE	pH display range violation
ERR 12	MV RANGE	mV range
ERR 13	TEMPERATURE RANGE	Temperature range violation
ERR 15	SENSOCHECK GLASS-EL	Sensocheck glass
ERR 16	SENSOCHECK REF-EL	Sensocheck ref.
ERR 69	TEMP. OUTSIDE TABLE	Temperature value outside table

Error	Info text <i>(is displayed in case of fault when the Info key is pressed)</i>	Problem Possible causes
ERR 94	FB BLOCK ALARM	Alarm in function block: eg, actual mode and target mode do not match or AI limits are exceeded
ERR 95	SYSTEM ERROR	System error Restart required. If error still persists, send in the device for repair.
ERR 96	WRONG MODULE	Module does not correspond to measuring function Correct the setting in the SERVICE / DEVICE TYPE menu. Afterwards, configure and cali- brate the device.
ERR 97	NO MODULE INSTALLED	No module Module, inserting
ERR 98	CONFIGURATION ERROR	Error in configuration or calibration data Configuration or calibration data defective; completely reconfig- ure and recalibrate the device.
ERR 99	DEVICE FAILURE	Factory settings error
ERR 102	pH: FAILURE BUFFERSET -U1-	Parameter error Specifiable buffer set U1

Cond

Error	Info text (is displayed in case of fault when the Info key is pressed)	Problem Possible causes
ERR 01	NO SENSOR	Sensor error Device type not assigned Defective sensor Sensor not connected Break in sensor cable
ERR 02	WRONG SENSOR	Wrong sensor
ERR 03	CANCELED SENSOR	Sensor devaluated
ERR 04	SENSOR FAILURE	Failure in sensor
ERR 05	CAL DATA	Error in cal data
ERR 10	CONDUCTANCE TOO HIGH	Conductance range exceeded Conductance > +3500 mS
ERR 11	RANGE CONDUCTIVITY RANGE CONCENTRATION RANGE SALINITY LIMIT USP	Measuring range violation Conductivity > +999.9 mS/cm or > +99.99 S/m or < 1 MΩ cm Concentration > Table limit (see page 318 et seq.) Salinity > 45.0 ‰ Conductivity ≥ USP limit value
ERR 13	RANGE TEMPERATURE	Temperature range violation (see page 298)
ERR 15	SENSOCHECK	Sensocheck

Error	Info text (is displayed in case of fault when the Info key is pressed)	Problem Possible causes
ERR 94	FB BLOCK ALARM	Alarm in function block
ERR 95	SYSTEM ERROR	System error Restart required. If error still persists, send in the device for repair.
ERR 96	WRONG MODULE	Module does not correspond to measuring function Correct the setting in the SERVICE / DEVICE TYPE menu. Afterwards, configure and calibrate the device.
ERR 97	NO MODULE INSTALLED	No module Module, inserting
ERR 98	CONFIGURATION FAILURE	Error in configuration or calibration data Configuration or calibration data defective; completely reconfigure and recalibrate the device.
ERR 99	SYSTEM FAILURE	Factory settings error

CondI

Error	Info text (is displayed in case of fault when the Info key is pressed)	Problem Possible causes
ERR 01	NO SENSOR	Sensor error Device type not assigned Defective sensor Sensor not connected Break in sensor cable
ERR 02	WRONG SENSOR	Wrong sensor
ERR 03	CANCELED SENSOR	Sensor devaluated
ERR 04	SENSOR FAILURE	Failure in sensor
ERR 05	CAL DATA	Error in cal data
ERR 10	CONDUCTANCE TOO HIGH	Conductance range exceeded Conductance > +3500 mS
ERR 11	RANGE CONDUCTIVITY RANGE CONCENTRATION RANGE SALINITY	Measuring range violation Conductivity > +1999 mS/cm or > +99.99 S/m or < 1 MΩ cm Concentration > Table limit (see page 318 et seq.) Salinity > 45.0 ‰
ERR 13	RANGE TEMPERATURE	Temperature range violation (see page 298)
ERR 15	SENSOCHECK	Sensocheck
ERR 69	TEMP. OUTSIDE TABLE	Temperature value outside table

Error	Info text <i>(is displayed in case of fault when the Info key is pressed)</i>	Problem Possible causes
ERR 94	FB BLOCK ALARM	Alarm in function block
ERR 95	SYSTEM ERROR	System error Restart required. If error still persists, send in the device for repair.
ERR 96	WRONG MODULE	Module does not correspond to measuring function Correct the setting in the SERVICE / DEVICE TYPE menu. Afterwards, configure and calibrate the device.
ERR 97	NO MODULE INSTALLED	No module Module, inserting
ERR 98	CONFIGURATION FAILURE	Error in configuration or calibration data Configuration or calibration data defective; completely reconfigure and recalibrate the device.
ERR 99	SYSTEM FAILURE	Factory settings error

Oxy

Error	Info text (is displayed in case of fault when the Info key is pressed)	Problem Possible causes
ERR 01	NO SENSOR	Sensor error Device type not assigned Defective sensor Sensor not connected Break in sensor cable
ERR 02	WRONG SENSOR	Wrong sensor
ERR 03	CANCELED SENSOR	Sensor devaluated
ERR 04	SENSOR FAILURE	Failure in sensor
ERR 05	CAL DATA	Error in cal data
ERR 11	RANGE DO SATURATION RANGE DO CONCENTRATION RANGE GAS CONCENTRATION	Display range violation SAT saturation [%] or CONC concentraton or GAS volume concentration
ERR 12	RANGE SENSOR CURRENT	Sensor current exceeded
ERR 13	TEMPERATURE RANGE	Temperature range violation
ERR 14	OUT OF INTERNAL TABLE	Tables exceeded
ERR 15	SENSOCHECK	Sensocheck
ERR 17	OUT OF CAL TIME CALIBRATE OR CHANGE SENSOR	Cal timer expired (ACT for ISM)
ERR 18	SENSOR ZERO/SLOPE CALI- BRATE OR CHANGE SENSOR	Cal timer expired (ACT for ISM)

Error	Info text <i>(is displayed in case of fault when the Info key is pressed)</i>	Problem Possible causes
ERR 20	SENSOR DRIFT CALIBRATE OR CHANGE SENSOR	Sensor response
ERR 21	SENSOR WEAR CHECK ELECTROLYTE AND MEMBRANE	Memosens sensor wear
ERR 22	CIP-CYCLES OVERRUN	CIP cycles exceeded
ERR 23	SIP-CYCLES OVERRUN	SIP cycles exceeded
ERR 24	ZERO xx.xx nA	Zero
ERR 25	SLOPE xxxx nA	Slope
ERR 26	TMAX xxx.x °C	Max. temp (CIP/SIP)
ERR 27	OXY VALUE NOT VALID	LDO OXY measurement Off

Oxy

Error	Info text (is displayed in case of fault when the Info key is pressed)	Problem Possible causes
ERR 94	FB BLOCK ALARM	Alarm in function block
ERR 95	SYSTEM ERROR	System error Restart required. If error still persists, send in the device for repair.
ERR 96	WRONG MODULE	Module does not correspond to measuring function Correct the setting in the SERVICE / DEVICE TYPE menu. Afterwards, configure and calibrate the device.
ERR 97	NO MODULE INSTALLED	No module Module, inserting
ERR 98	CONFIGURATION FAILURE	Error in configuration or calibration data Configuration or calibration data defective; completely reconfigure and recalibrate the device.
ERR 99	SYSTEM FAILURE	Factory settings error
ERR 102	INVALID PARAMETER U-POL	Parameter error: polarization voltage
ERR 103	INVALID PARAMETER MEMBR. COMP	Parameter error: membrane correction

CC

Error	Info text (is displayed in case of fault when the Info key is pressed)	Problem Possible causes
ERR 01	NO SENSOR	Sensor error Device type not assigned Defective sensor Sensor not connected Break in sensor cable
ERR 02	WRONG SENSOR	Wrong sensor
ERR 03	CANCELED SENSOR	Sensor devaluated
ERR 04	SENSOR FAILURE	Failure in sensor
ERR 05	CAL DATA	Error in cal data
Channel A		
ERR 10	A CONDUCTANCE TOO HIGH	Conductance value out of range: > 250 mS
ERR 11	A RANGE CONDUCTANCE	Cond > 9999 µS/cm or < 0.1 kΩ cm
ERR 13	A CONDUCTANCE TOO HIGH	Temperature range violation
ERR 15	A SENSOCHECK	Sensocheck
Channel B		
ERR 40	B CONDUCTANCE TOO HIGH	Conductance value out of range: > 250 mS
ERR 41	B RANGE CONDUCTANCE	Cond > 9999 µS/cm or < 0.1 kΩ cm
ERR 43	B CONDUCTANCE TOO HIGH	Temperature range violation
ERR 45	B SENSOCHECK	Sensocheck
ERR 59	INVALID CALCULATION	Invalid calculations

Error	Info text (is displayed in case of fault when the Info key is pressed)	Problem Possible causes
ERR 94	FB BLOCK ALARM	Alarm in function block
ERR 95	SYSTEM ERROR	System error Restart required. If error still persists, send in the device for repair.
ERR 96	WRONG MODULE	Module does not correspond to measuring function Correct the setting in the SERVICE / DEVICE TYPE menu. Afterwards, configure and calibrate the device.
ERR 97	NO MODULE INSTALLED	No module Module, inserting
ERR 98	CONFIGURATION FAILURE	Error in configuration or calibration data Configuration or calibration data defective; completely reconfigure and recalibrate the device.
ERR 99	SYSTEM FAILURE	Factory settings error

Sensocheck

Sensocheck continuously monitors the sensor and its wiring. The Sensocheck message is also output as error message ERR 15. Measured value status changes to Bad. Sensocheck can be switched off in the configuration menu (then Sensoface is also disabled!).

Sensoface

The three Sensoface indicators provide information on required maintenance of the sensor. Additional icons refer to the error cause. Pressing the **info** key shows an information text.



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

Sensoface is automatically deactivated when Sensocheck has been switched off. Exception: After a calibration, a smiley is always displayed for confirmation.

Standard version	Order No.
Stratos Pro A221N (basic unit for measurement with digital sensors)	A221N
Interchangeable modules for measurement with analog sensors	
pH	MK-PH015N
Oxy	MK-OXY045N
Cond	MK-COND025N
Condl	MK-CONDI035N
CC	MK-CC065N
Version for hazardous areas	Order No.
Stratos Pro A221X (basic unit for measurement with digital sensors)	A221X
Interchangeable modules for measurement with analog sensors	
pH, Ex	MK-PH015X
Oxy, Ex	MK-OXY045X
Cond, Ex	MK-COND025X
Condl, Ex	MK-CONDI035X
Accessories	Order No.
Pipe-mount kit	ZU 0274
Panel-mount kit	ZU 0738
Protective hood	ZU 0737

Please contact us for further information or if you have any questions concerning our product range:

Knick Elektronische Messgeräte GmbH & Co. KG

Phone: +49 30 80191-0
Fax: +49 30 80191-200
Email: info@knick.de
Internet: www.knick.de

Standard version	Order No.
Stratos Evo A451N (basic unit for measurement with digital sensors)	A451N
Interchangeable modules for measurement with analog sensors	
pH	MK-PH015N
Oxy	MK-OXY045N
Cond	MK-COND025N
CondI	MK-CONDI035N
CC	MK-CC065N
Accessories	Order No.
Pipe-mount kit	ZU 0274
Panel-mount kit	ZU 0738
Protective hood	ZU 0737

Please contact us for further information or if you have any questions concerning our product range:

Knick Elektronische Messgeräte GmbH & Co. KG

Phone: +49 30 80191-0
Fax: +49 30 80191-200
Email: info@knick.de
Internet: www.knick.de

Introduction

PROFIBUS is a digital communication system that connects different field devices over a common cable and integrates them into a control system. In the long term, PROFIBUS will replace the 4–20 mA technology, which only supplies pure measured values.

Advantages of the PROFIBUS Technology are:

- easy and cost-saving cabling
- convenient operation over a central control station
- transmission, evaluation, and control of high amounts of data from field device to control station.
- devices installed in hazardous locations are configured and maintained from the control station

PROFIBUS is the leading open fieldbus system in Europe. Its application range covers manufacturing, process, and building automation. As open fieldbus standard to EN 50170 and IEC 61158, PROFIBUS ensures communication of different devices over one bus. The PROFIBUS User Organization (PNO) provides for further development and maintenance of the PROFIBUS technology. It combines the interests of users and manufacturers.

Variants and Basic Characteristics

PROFIBUS determines the technical and functional characteristics of a serial bus system. There are two different PROFIBUS variants:

- **PROFIBUS DP** (Decentralized Peripherals) is tailored for communication of automation systems and distributed peripherals. It operates according to the RS 485 standard with transmission rates up to 12 Mbits/s.
- **PROFIBUS PA** (Process Automation) is dedicated to the process industry. It permits connection of sensors and actuators to a common bus even in hazardous locations. PROFIBUS PA has a transfer rate of 31.25 kbits/s.

PROFIBUS distinguishes between two types of devices:

- **Master** devices control the data traffic on the bus. They send messages without external request.
- **Slave** devices are peripheral devices such as valves, drives, transmitters, and analyzers. They can react acyclically to servicing, configuration and diagnostic tasks of the master. The central controller cyclically reads the measurement data with status.

Device Certification

PROFIBUS PA/DP is an open bus standard which enables devices of different manufacturers to be integrated in one system. This is only feasible when all the devices exactly meet the specification. The devices are therefore certified by the PROFIBUS and PROFINET International (PI) organization.

Definitions for PROFIBUS PA

The bus protocol defines type and speed of the data exchange between master and slave devices and determines the transmission protocol of the respective PROFIBUS system.

PROFIBUS PA permits cyclic and acyclic services.

- **Cyclic services** are used for transmission of measurement data and actuating commands with status information.
- **Acylic services** are used for device configuration, maintenance and diagnostics during operation.

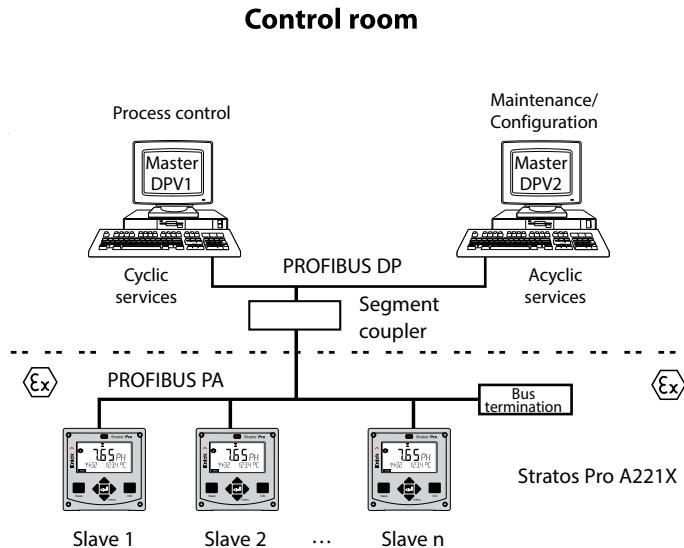
The device profile 3.02 defines the device class and typical functionalities with parameters, ranges, and limit values.

The FISCO model developed by the German PTB for hazardous locations permits connection of several devices to one common bus and defines permissible limits for device and cable parameters.

I&M Functions (Identification & Maintenance)

The Stratos PROFIBUS devices A221N/A221X and A451N support “Identification & Maintenance” functions. I&M functions specify how certain device-describing data shall be uniformly stored. Information on manufacturer, release number, order designation, etc allows for unambiguous device identification. In addition, you can retrieve information on projecting, commissioning, parameter setting, diagnostics, etc.

Typical Configuration



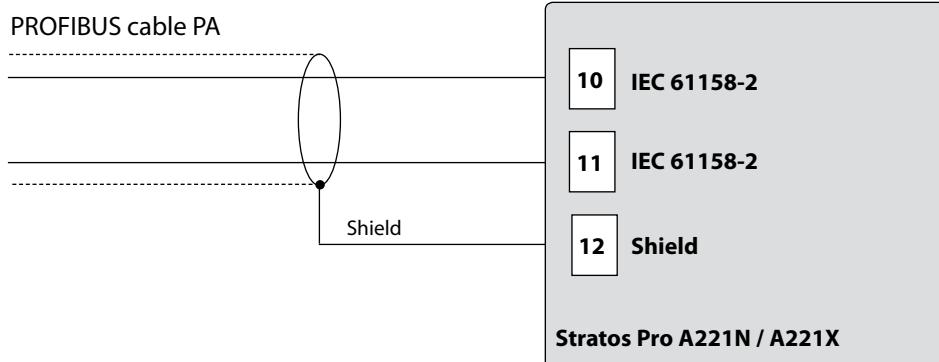
In hazardous locations the electrical connections to the PROFIBUS are made in accordance with FISCO.
(FISCO = Fieldbus Intrinsically Safe Concept, www.fieldbus.org)

Differences between PROFIBUS PA and PROFIBUS DP

	PROFIBUS PA	PROFIBUS DP
Max. data transfer rate	31.25 kbit/s	12 Mbit/s
Hazardous-area application	Yes	No
Power supply via BUS	Yes	No
Application	Production automation	Process automation
Transmission technology	MBP-IS*	RS-485

* Manchester Coded, Bus Powered-Intrinsically Safe

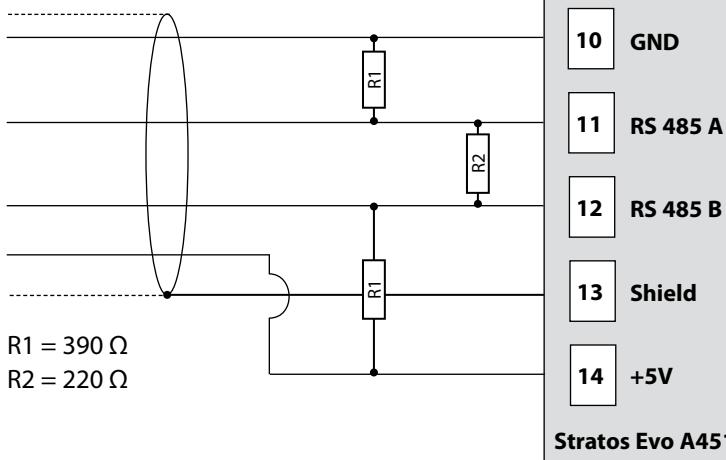
PROFIBUS PA Terminal Assignments



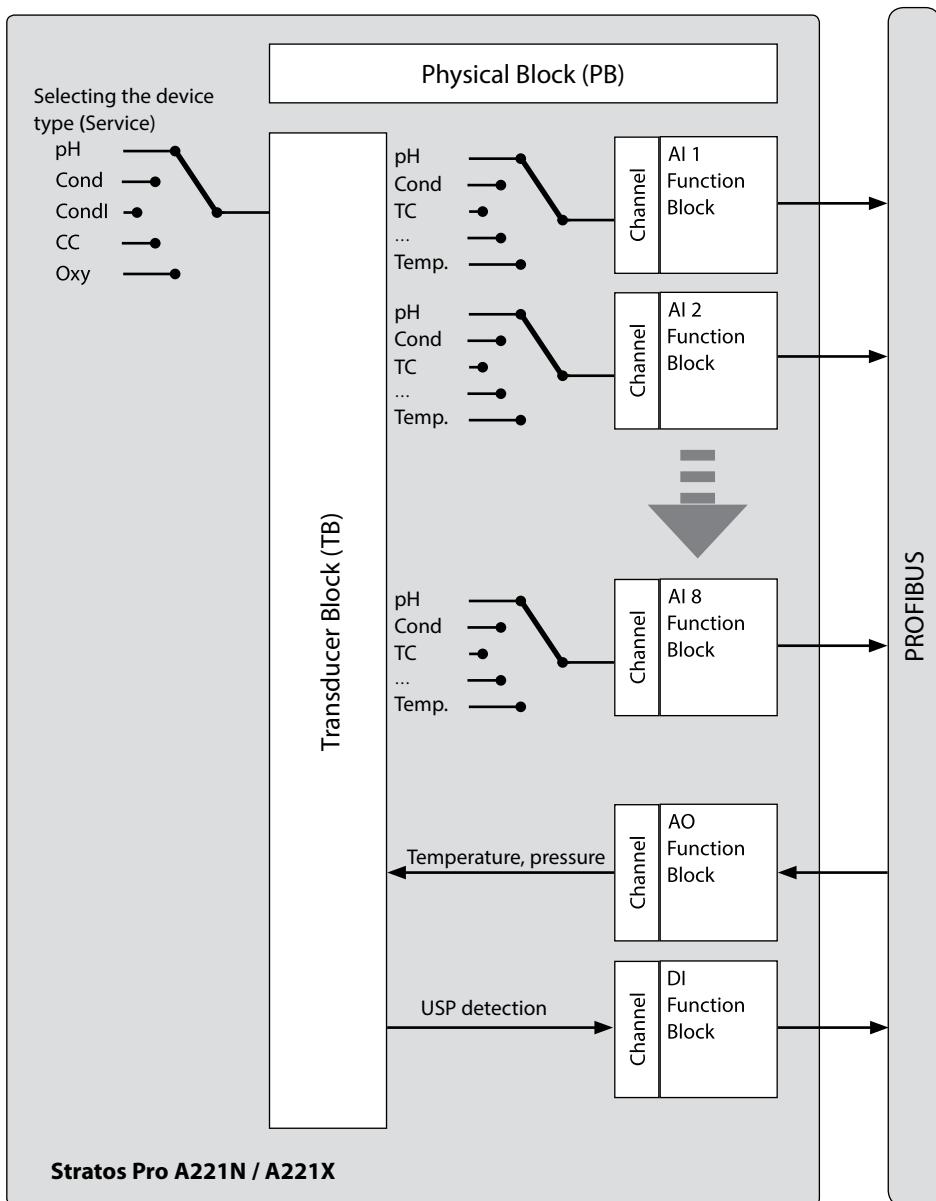
PROFIBUS DP Terminal Assignments

To ensure safe signal transmission, you must terminate the PROFIBUS cable on both ends of a PROFIBUS segment with a bus termination (combination of three resistors). Please note that the bus termination is not included with the Stratos Evo A451N.

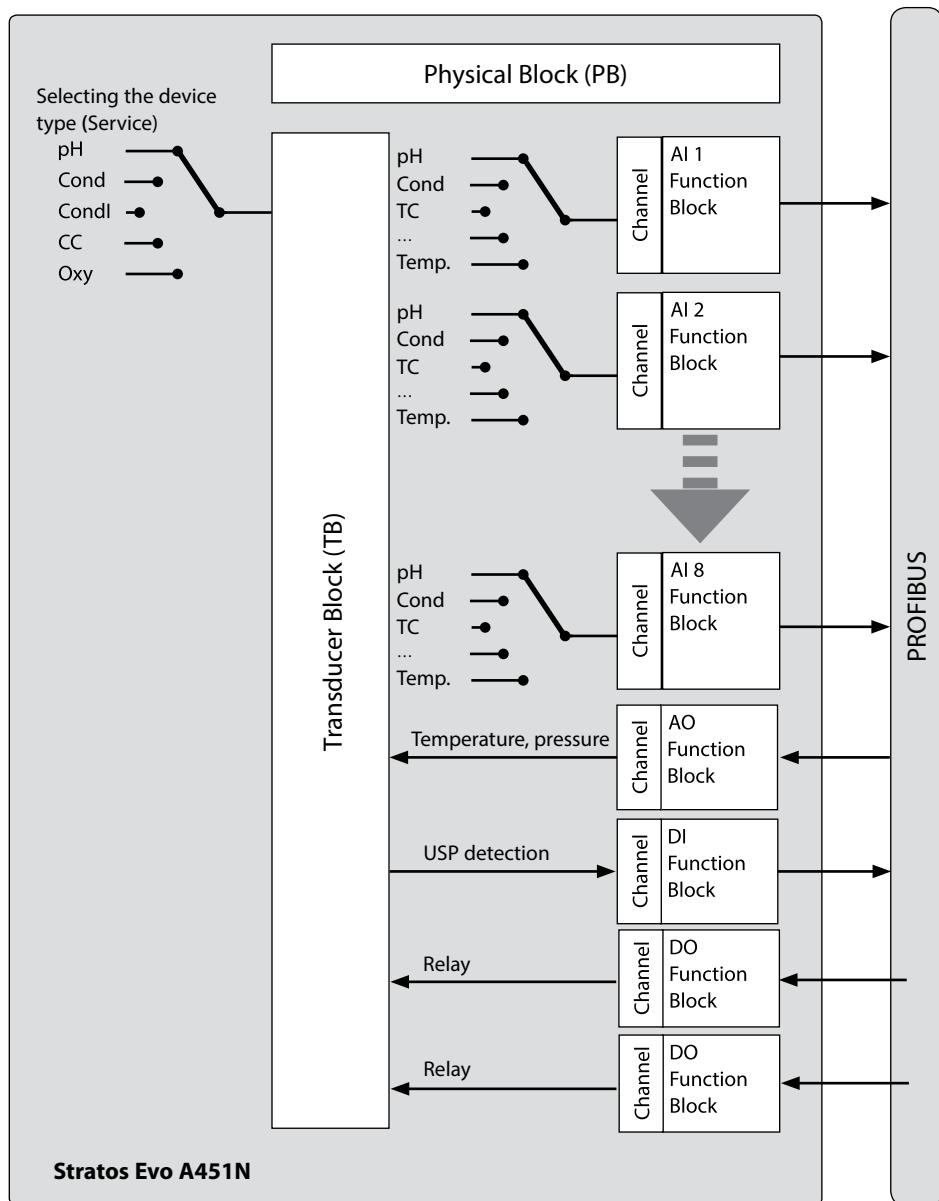
PROFIBUS cable DP



Schematic Diagram of Block Types for PROFIBUS PA



Schematic Diagram of Block Types for PROFIBUS DP



The Block Model

The device parameters in the PROFIBUS protocol are assigned to different block types according to their characteristics. The different block types contain parameter groups and their functions.

PROFIBUS devices structure their parameters and functions in block objects:

- The **Device Management** describes the block objects.
- A **Physical Block**
- One or more **Function Blocks**
- One or more **Transducer Blocks**

The **Stratos Pro A221N / A221X** consists of the following blocks:

- 1 x Physical Block
- 1 x Transducer Block (AITB)
- 10 Function Blocks, consisting of:
 - 8 x AI (Analog Input)
 - 1 x AO (Analog Output)
 - 1 x DI (Digital Input)

The **Stratos Evo A451N** consists of the following blocks:

- 1 x Physical Block
- 1 x Transducer Block (AITB)
- 12 Function Blocks, consisting of:
 - 8 x AI (Analog Input)
 - 1 x AO (Analog Output)
 - 1 x DI (Digital Input)
 - 2 x DO (Digital Output)

Physical Block (PB)

The resource block contains device-specific information, which clearly identifies a device, such as: Model designation, manufacturer's name, device type, software version, hardware version and serial number.

Resetting

With the FACTORY_RESET parameter, you can reset the device to the factory settings.

NOTICE: Data loss! Resets all configuration values to factory setting.

Transducer Block (TB)

The transducer block contains all device information, such as calibration data and sensor type. A device may have several transducer blocks, eg, for diagnostic, process variable or display. The sensor signal is first preprocessed in the transducer block.

From here, the measured value is sent to the Analog Input blocks where it can be further processed (limit values, scaling). The transducer block provides the following information and configuration options:

- Product calibration
- Parameter setting
- Logbook
- Sensor diagnostics

Signal processing

The process variables are assigned to specific channels and are connected to input function blocks (AI).

Key lock

With the DEVICE_LOCK parameter, you can set a key lock in the CAL, CONF, and SERVICE modes.

- UNLOCKED Device can be operated via keypad.
- LOCKED Key lock is active.

Function Block (FB)

Function blocks describe a device's tasks and functions, which are controlled by the transmission schedules.

The PROFIBUS specification has defined sets of standard function blocks which can be used to describe all basic functions, eg:

- Analog Output (AO)
- Digital Output (DO)
- Analog Input (AI)
- Digital Input (DI)

Analog Input (AI)

The AI function block is a universal interface for transmitting the process variable to the PROFIBUS. AI function blocks allow simulating the input and output of the function block. They are used for cyclic transmission of measured values.

Selecting the Process Variables and Units

The process variables of the Transducer Block are assigned to the function block via the **Channel** parameter. The corresponding measurement unit is selected in the **Unit** parameter or the **Units** sub-parameter.

AI Block pH

Parameter	Channel	Unit
pH value	90	pH = 1422
pH voltage	53	mV = 1243
ORP	54	mV = 1243
Glass impedance	55	$\Omega = 1281$
Reference impedance	56	$\Omega = 1281$
Temperature	57	$^{\circ}\text{C} = 1001 \mid ^{\circ}\text{F} = 1002$
Slope	60	% = 1342
Zero point	62	mV = 1243
Calibration timer	59	h = 1059
Wear	63	% = 1342
Flow	64	l/h = 1353

AI Block Oxy

Parameter	Channel	Unit
Saturation	90	% = 1342
Concentration	66	ppm = 1423 mg/l = 1558
Vol. concentration	68	Vol% = 1562
Partial pressure	69	mbar = 1138
Temperature	57	$^{\circ}\text{C} = 1001 \mid ^{\circ}\text{F} = 1002$
Slope	60	nA = 1213
Zero point	62	nA = 1213
Calibration timer	59	h = 1059
Wear	63	% = 1342
Flow	64	l/h = 1353

AI Block Cond		
Parameter	Channel	Unit
Conductivity	90	$\mu\text{S}/\text{cm} = 1552$
Temperature	57	$^{\circ}\text{C} = 1001 \mid ^{\circ}\text{F} = 1002$
Concentration	73	% = 1342
Salinity	75	g/kg = 1523
TDS	76	mg/l = 1558
Resistivity	72	$\text{M}\Omega * \text{cm} = 1555$
Cell factor	79	1/cm = 1524
Flow	64	l/h = 1353

AI Block Condl		
Parameter	Channel	Unit
Conductivity	90	$\mu\text{S}/\text{cm} = 1552$
Temperature	57	$^{\circ}\text{C} = 1001 \mid ^{\circ}\text{F} = 1002$
Concentration	73	% = 1342
Salinity	75	g/kg = 1523
TDS	76	mg/l = 1558
Cell factor	79	1/cm = 1524
Zero point	62	$\mu\text{S} = 1290$
Flow	64	l/h = 1353

AI Block CC (Dual Conductivity)		
Parameter	Channel	Unit
Conductivity A	70	$\mu\text{S}/\text{cm} = 1552$
Conductivity B	77	$\mu\text{S}/\text{cm} = 1552$
Temperature A	57	$^{\circ}\text{C} = 1001 \mid ^{\circ}\text{F} = 1002$
Temperature B	80	$^{\circ}\text{C} = 1001 \mid ^{\circ}\text{F} = 1002$
Cell factor A	79	$1/\text{cm} = 1524$
Cell factor B	62	$1/\text{cm} = 1524$
Flow	64	$\text{l/h} = 1353$
Calculation	78	without = 0
Resistivity A	72	$\text{M}\Omega \cdot \text{cm} = 1555$
Resistivity B	92	$\text{M}\Omega \cdot \text{cm} = 1555$

Analog Output (AO Block)

The AO function block sends the value specified by the PROFIBUS to the device. You can enter a temperature or pressure value, for example, which is then used by the device.

Channel	Module type	Text	Info	XD_SCALE
83	PH, COND, CONDI, OXY	Temperature		°C, °F
85	OXY	Pressure		mbar, hPa, psi

Digital Input (DI Block)

The digital input is used for USP detection (with Cond only, "good"/"bad" assessment of water quality).

Channel	Text
89	USP

Parameter OUT_D

Bit	Value	Meaning
0	1	USP limit exceeded
1	1	Reduced USP limit exceeded

Digital Outputs (DO Block, A451N only)

The two digital outputs are used for freely controlling the two relays.

Channel	Text
87	Relay 1
88	Relay 2

SP_D Parameter

Bit	Value	Meaning
0	0	Open relay
0	1	Closed relay

Overview of Software

Overview of Software for Stratos Pro A221 N / A221X

GSD	GSD file from CD-ROM or website
GSD A221 N / A221X	Manufacturer-specific: KNIC7535.GSD
	Profile-specific: PA139700.GSD
Device profile	PROFIBUS PA Profile 3.02
Address range	0 ... 126 (default = 126)
	0 ... 125 via PROFIBUS service set_slave_add
	0 ... 126 via local display
	0 ... 126 via RESET = 2712
Function blocks	1 x TB = Transducer Block
	1 x PB = Physical Block
	8 x AI = Analog Input Blocks
	1 x AO = Analog Output Block
	1 x DI = Digital Input Block

Overview of Software for Stratos Evo A451N

GSD	GSD file from CD-ROM or website
GSD A451N	Manufacturer-specific: KNIC7536.GSD
	Profile-specific: PA039700.GSD
Device profile	PROFIBUS PA Profile 3.02
Address range	0 ... 126 (default = 126)
	0 ... 125 via PROFIBUS service set_slave_add
	0 ... 126 via local display
	0 ... 126 via RESET = 2712
Function blocks	1 x TB = Transducer Block
	1 x PB = Physical Block
	8 x AI = Analog Input Blocks
	1 x AO = Analog Output Block
	2 x DO = Digital Output Block
	1 x DI = Digital Input Block

Diagnostics

The PROFIBUS DP supports comprehensive diagnostics options. A DP master can query the current diagnostics from the DP slave at any time. Alongside standard diagnostics, diagnostic telegrams can describe other device-specific diagnostics in the GSD. The DP slave can report in the data telegram at any time that current diagnostics are queued. It does this during cyclic data exchange by marking the data telegram as high priority.

Version 3.02 of the PROFIBUS profile has been extended by the **condensed status** and **diagnosis** parameters. Diagnostics are coded bitwise, which allows multiple events to be transmitted simultaneously. The GSD file contains text for each diagnostics bit to provide a text message for the control room.

Cyclic Data Transmission

Float Format

Byte n								Byte n+1							
Bit 7	Bit 6							Bit 7	Bit 6						
Sign	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	2^{-1}	2^{-2}	2^{-3}	2^{-4}	2^{-5}	2^{-6}	2^{-7}
Exponent								Mantissa							

Byte n+2								Byte n+3							
Bit 7	Bit 6							Bit 7	Bit 6						
2^{-8}	2^{-9}	2^{-10}	2^{-11}	2^{-12}	2^{-13}	2^{-14}	2^{-15}	2^{-16}	2^{-17}	2^{-18}	2^{-19}	2^{-20}	2^{-21}	2^{-22}	2^{-23}
Mantissa								Mantissa							

Example:

The COND_STATUS_DIAG parameter cannot be changed when cyclic data transmission is active.

MEAS MODE (Measurement Mode)

The MEAS MODE parameter specifies which process variables are available. The other channels also provide values. These, however, have no valid measured value status and therefore serve as information only. Depending on the configuration, the following process variables are available at the same time:

pH	
MEAS MODE	Process variables
pH	pH, ORP, temperature
mV	mV, temperature
ORP	ORP, temperature

Cond, CondI	
MEAS MODE	Process variables
Cond	Conductivity, temperature
USP	
Conc%	Conc%, conductivity, temperature
SAL	SAL, conductivity, temperature
TDS	TDS, conductivity, temperature

Oxy	
MEAS MODE	Process variables
DO%	Saturation, partial pressure, temperature
DO ppm	Concentration, partial pressure, temperature
DO mg/l	
GAS%	Gas concentration, partial pressure, temperature

CC (Dual Conductivity)	
MEAS MODE	Process variables
Conductivity	Conductivity 1, conductivity 2, temperature 1, temperature 2, calculation
Resistivity	Resistivity 1, resistivity 2

Condensed Status

For a better overview, the status of a PROFIBUS device is comprised in a condensed status. Here, all status messages are condensed to one message.

Quality		Quality substatus				Limits		
Gr	Gr	QS	QS	QS	QS	Qu	Qu	
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	
0	0							= bad
0	1							= uncertain
1	0							= good (Non Cascade)
1	1							= good (Cascade) - not supported

Status = bad

Quality		Quality substatus				Limits		
Gr	Gr	QS	QS	QS	QS	Qu	Qu	
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	
0	0	0	0	0	0	0	0	= non-specific
0	0	1	0	0	0	1	1	= passivated
0	0	1	0	0	1	x	x	= maintenance alarm, more diagnosis available
0	0	1	0	1	0	x	x	= process related, no maintenance
0	0	1	1	1	1	x	x	= function check / local override; value not usable

Status = uncertain

Quality		Quality substatus				Limits		
Gr	Gr	QS	QS	QS	QS	Qu	Qu	
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	
0	1	0	0	1	0	x	x	= substitute set
0	1	0	0	1	1	1	1	= initial value
0	1	1	0	1	0	x	x	= maintenance demanded
0	1	1	1	0	0	1	1	= simulated value, start
0	1	1	1	0	1	1	1	= simulated value, end
0	1	1	1	1	0	x	x	= process related, no maintenance

Status = good (Non Cascade)

Quality		Quality substatus				Limits		
Gr	Gr	QS	QS	QS	QS	Qu	Qu	
2 ⁷	2 ⁶	2 ⁵	2 ⁴	2 ³	2 ²	2 ¹	2 ⁰	
1	0	0	0	0	0	x	x	= ok
1	0	0	0	0	1	x	x	= update event
1	0	0	0	1	0	x	x	= advisory alarm
1	0	0	0	1	1	x	x	= critical alarm
1	0	1	0	0	0	x	x	= initiate fail safe (not provided by signal converter)
1	0	1	0	0	1	x	x	= maintenance required
1	0	1	0	1	0	x	x	= maintenance demanded
1	0	1	1	1	1	x	x	= function check

Status = Limits

Quality		Quality substatus				Limits		
Gr	Gr	QS	QS	QS	QS	Qu	Qu	
2 ⁷	2 ⁶	2 ⁵	2 ⁴	2 ³	2 ²	2 ¹	2 ⁰	
						0	0	= ok
						0	1	= low limited
						1	0	= high limited
						1	1	= constant

Bad: Value is not usable.

Uncertain: Value is still usable.

Good (Cascade): Value is usable.

Good (Non-Cascade): Value is usable.

Classic Status

Quality		Quality substatus				Limits		
Gr	Gr	QS	QS	QS	QS	Qu	Qu	
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	
0	0							= bad
0	1							= uncertain
1	0							= good (Non Cascade)
1	1							= good (Cascade) - not supported

Status = bad

Quality		Quality substatus				Limits		
Gr	Gr	QS	QS	QS	QS	Qu	Qu	
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	
0	0	0	0	0	0			= non-specific
0	0	0	0	0	1			= configuration error
0	0	0	0	1	0			= not connected
0	0	1	0	1	0			= device failure
0	0	1	1	1	1			= sensor failure
0	0	0	1	0	1			= no communication (last usable value)
0	0	0	1	1	0			= no communication (no usable value)
0	0	0	1	1	1			= out of service

Status = uncertain

Quality		Quality substatus				Limits		
Gr	Gr	QS	QS	QS	QS	Qu	Qu	
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	
0	1	0	0	0	0			= non-specific
0	1	0	0	0	1			= last usable value
0	1	0	0	1	0			= substitute-set
0	1	0	0	1	1			= initial value
0	1	0	1	0	0			= sensor conversion not accurate
0	1	0	1	0	1			= engineering unit violation (unit not in the valid set)
0	1	0	1	1	0			= sub-normal
0	1	0	1	1	1			= configuration error
0	1	1	0	0	0			= simulated value

Status = good (Non Cascade)

Quality		Quality substatus				Limits		
Gr	Gr	QS	QS	QS	QS	Qu	Qu	
2 ⁷	2 ⁶	2 ⁵	2 ⁴	2 ³	2 ²	2 ¹	2 ⁰	
1	0	0	0	0	0			= ok
1	0	0	0	0	1			= update event
1	0	0	0	1	0			= active advisory alarm
1	0	0	0	1	1			= active critical alarm
1	0	0	1	0	0			= unacknowledged update event
1	0	0	1	0	1			= unacknowledged advisory alarm
1	0	0	1	1	0			= unacknowledged critical alarm
1	0	1	0	0	0			= initial fail safe
1	0	1	0	0	1			= maintenance required

Status = Limits

Quality		Quality substatus				Limits		
Gr	Gr	QS	QS	QS	QS	Qu	Qu	
2 ⁷	2 ⁶	2 ⁵	2 ⁴	2 ³	2 ²	2 ¹	2 ⁰	
						0	0	= ok
						0	1	= low limited
						1	0	= high limited
						1	1	= constant

Bad: Value is not usable.

Uncertain: Value is still usable.

Good (Cascade): Value is usable.

Good (Non-Cascade): Value is usable.

Synoptic Table of DIAGNOSIS_EXTENSION

BIT	ERR	Condition Name
0		Reserved
1	ERR 23	Autoclaving counter exceeded
2	ERR 24	CIP cycles exceeded
3	ERR 25	SIP cycles exceeded
4	ERR 102	Parameter error: User Buffer -U1-
5		Reserved
6		Reserved
7		Reserved
8	ERR 22	Sensor wear (Memosens)
9	ERR 18	Maintenance counter exceeded
10	ERR 17	Calibration timer expired
11	ERR 21	Sensor response time exceeded (drift)
12		Calibration data bad
13	ERR 15, 16	Sensocheck (glass impedance, ref. impedance)
14		Reserved
15		Reserved
16	ERR 14	Temperature value outside table
17	ERR 13	Temperature range violation
18	ERR 10,11,12	Measuring range violation
19		Reserved
20		Calibration is active
21		Configuration is active
22		Service is active
23		Reserved
24	ERR 05	Calibration data error
25	ERR 03	Sensor devaluated
26	ERR 02, 96	Wrong module/sensor

	Measured Value Status, Condensed (PA)
	0xA8 Good-Maintenance demanded
	0xA8 Good-Maintenance demanded
	0x78 Uncertain-invalid process condition
	0x78 Uncertain-invalid process condition
	0x78 Uncertain-invalid process condition
	0xBC Good Function Check
	0xBC Good Function Check
	0xBC Good Function Check
	0x24 BAD-Maintenance alarm
	0x24 BAD-Maintenance alarm
	0x24 BAD-Maintenance alarm

Synoptic Table of DIAGNOSIS_EXTENSION

BIT	ERR	Condition Name
27	ERR 01, 96	No sensor/module
28	ERR 04	Defective sensor
29	ERR 98	Configuration data defective
30	ERR 99	Factory settings error
31	ERR 95	Failure of internal communication / System error

* depending on parameter setting

Note: Invalid values are set to 0 and have a bad status.

	Measured Value Status, Condensed (PA)
	0x24 BAD-Maintenance alarm

Commissioning on the PROFIBUS

Only when the Stratos is competently configured, can the PROFIBUS communication function correctly. Different configuration tools from different manufacturers are available (eg, SIMATIC PDM from Siemens). They can be used to configure the device and the PROFIBUS.

Please note: Be sure to observe the operating instructions and the menu guidance of the control system (DCS) or the configuration tool during installation and configuration via the control system.

Device Database File (GSD File)

The GSD file contains the description of the device parameters and allows the device to be integrated in the PROFIBUS system. The included CD-ROM contains the GSD file (KNIC7535.gsd / KNICK7536.gsd) and the DD (Device Description) folder which contains further files. These additional files (eg, *.bmp or *.dib) contain icons which represent the PROFIBUS device in the configuration system. For that purpose, you must first load the files into the configuration program.

These files can be obtained from:

- the included CD
- the website www.knick.de or www.profibus.com

Initial Start-Up

- 1) Supply the device with power.
- 2) Connect the device to PROFIBUS.
- 3) Specify PROFIBUS address (see page 201).
- 4) Perform default initialization if required (see page 201).
- 5) Select ident number (see page 201).
- 6) Load the GSD file to the corresponding directory of the configuration program.
- 7) Open configuration program.

Specifying the PROFIBUS Address

To specify the PROFIBUS address, proceed as follows:

- 1) Press **menu**.
 - 2) Select CONF using **◀ ▶**, press **enter** to confirm.
 - 3) Select ADDRESS and press **enter** to confirm.
 - 4) Enter the desired PROFIBUS address between 0000 and 0126 using **◀ ▶ ▲ ▼**,
press **enter** to confirm.
- The PROFIBUS address is assigned to the device.

Default Initialization

To perform a default initialization, proceed as follows:

- 1) Press **menu**.
- 2) Select SERVICE using **◀ ▶**, press **enter** to confirm.
- 3) Enter passcode (default: **5555**), press **enter** to confirm.
- 4) Select DEVICE TYPE using **◀ ▶**, press **enter** to confirm.
- 5) Select desired process variable using **◀ ▶**.

Default initialization will be performed according to the tables below.

Selecting the Valid ID Number

For communicating with a Class 1 Master, a PROFIBUS DP device must be assigned an ID (ident number) which describes the unambiguous correlation between device and GSD file. The IDENT_NUMBER_SELECTOR parameter allows selecting the ident number that was used at the beginning of the cyclic data transmission:

- a) Automation Adaption Mode (factory settings)
- b) Profile Specific Ident. Number (profile)
- c) Manufacturer Specific Ident. Number

You can select the ident number using a suitable configuration tool (eg, SIMATIC PDM). The ident numbers are issued by the PROFIBUS User Organization.

a) Automation Adaption Mode

Selected according to GSD file used.

b) Profile-Specific Ident Number (9700 HEX)

This setting provides limited functionality as specified in PA Profile 3.02.

pH		
Slot	Description	Type of block
1	Measured value 1	AI
2	Measured value 2	AI
3	Measured value 3	AI
4	Measured value 4	AI

Valid GSD modules:

AI-FB EMPTY_MODULE
 AI

You require the **PA039700.GSD** GSD file.

Stratos Pro A221 N / A221X Combinations

Ident no. selection	Ident no.	GSD file	Status
Automation adaption mode	7535 HEX	KNIC7535.GSD	Classic/Condensed
	9700 HEX	PA139700.GSD	Classic
Manufacturer-spec ident no.	7535 HEX	KNIC7535.GSD	Classic/Condensed
Profile-spec. ident no.	9700 HEX	PA139700.GSD	Classic

Stratos Evo A451N Combinations

Ident no. selection	Ident no.	GSD file	Status
Automation adaption mode	7536 HEX	KNIC7536.GSD	Classic/Condensed
	9700 HEX	PA039700.GSD	Classic
Manufacturer-spec ident no.	7536 HEX	KNIC7536.GSD	Classic/Condensed
Profile-spec. ident no.	9700 HEX	PA039700.GSD	Classic

c) Manufacturer Specific Ident. Number**(A221 N / A221X: 7535 HEX | A451N: 7536 HEX)**

This setting provides full functionality of the PROFIBUS device.

All function blocks are available for cyclic data traffic.

pH			
Slot	Description	Block	Default value
1	pH value	AI1	pH
2	Temperature	AI2	°C
3	pH voltage	AI3	mV
4	ORP value	AI4	mV
5	Glass impedance	AI5	Ω
6	Wear	AI6	%
7	Calibration timer	AI7	h
8	Flow	AI8	L/h
9	Temperature	AO	°C

Oxy			
Slot	Description	Block	Default value
1	Oxygen saturation	AI1	%
2	Temperature	AI2	°C
3	Concentration	AI3	%
4	Volume concentration	AI4	%vol
5	Partial pressure	AI5	mbar
6	Wear	AI6	%
7	Calibration timer	AI7	h
8	Flow	AI8	L/h
9	Pressure	AO	mbar

Valid GSD modules:

AI-FB EMPTY_MODULE

AI: Out

You require the **KNIC7535.GSD / KNIC7536.GSD** GSD file.

Cond			
Slot	Description	Block	Default value
1	Conductivity	AI1	µS/cm
2	Temperature	AI2	°C
3	Concentration	AI3	%
4	Salinity	AI4	g/kg
5	TDS	AI5	mg/l
6	Resistivity	AI6	MΩ*cm
7	Cell constant	AI7	1/cm
8	Flow	AI8	L/h
9	Temperature	AO	°C

CondI			
Slot	Description	Block	Default value
1	Conductivity	AI1	µS/cm
2	Temperature	AI2	°C
3	Concentration	AI3	%
4	Salinity	AI4	g/kg
5	TDS	AI5	mg/l
6	Zero point	AI6	1/cm
7	Cell constant	AI7	1/cm
8	Flow	AI8	L/h
9	Temperature	AO	°C

Cond-Cond			
Slot	Description	Block	Default value
1	Conductivity 1	AI1	µS/cm
2	Temperature 1	AI2	°C
3	Conductivity 2	AI3	µS/cm
4	Temperature 2	AI4	°C
5	Calculated value	AI5	
6	Cell constant 1	AI6	1/cm
7	Cell constant 2	AI7	1/cm
8	Flow	AI8	L/h

Configuration Data

The "Cyclic Data Communication" table shows the maximum configuration of the cyclic data telegram. The telegram can be adapted to the respective system requirements if you do not require all data. For projecting, proceed as follows:

- 1) Load the GSD file in the software of the automation system.
- 2) From the configuration software of the automation system, select those data which are required in the cyclic telegram.

From your projecting data, the configuration software of the automation system collects the configuration data which will be transferred from the process control to the field device. The configuration data (CHK_CFG) determine the contents of the cyclic data telegram.

The configuration data consist of twelve sections, each section being assigned to a Function Block. The content determines whether a Function Block takes part in the cyclic data traffic or not. The sequence of data in the cyclic Input/Output data telegram corresponds to the position of the respective Function Block in the configuration data.

Slot Model

Slot No.	Block	Usage
0	Physical Block (PB)	General data
1	AI 1	Measured value 1
2	AI 2	Measured value 2
3	AI 3	Measured value 3
4	AI 4	Measured value 4
5	AI 5	Measured value 5
6	AI 6	Measured value 6
7	AI 7	Measured value 7
8	AI 8	Measured value 8
9	AO	Analog output
10	DI	Sense Unical status
11	DO 1	Control of relay 1
12	DO 2	Control of relay 2
13	Transducer Block (TB)	

Cyclic Data Communication

Slot	Block	Configuration Data	Description	Input	Output
1	AI 1	0x00	Free Place	-	-
		0x42, 0x84, 0x08, 0x05 oder 0x94	Process Value 1	5 bytes	-
2	AI 2	0x00	Free Place	-	-
		0x42, 0x84, 0x08, 0x05 oder 0x94	Process Value 2	5 bytes	-
3	AI 3	0x00	Free Place	-	-
		0x42, 0x84, 0x08, 0x05 oder 0x94		5 bytes	-
4	AI 4	0x00	Free Place	-	-
		0x42, 0x84, 0x08, 0x05 oder 0x94	Process Value 4	5 bytes	-
5	AI 5	0x00	Free Place	-	-
		0x42, 0x84, 0x08, 0x05 oder 0x94	Process Value 5	5 bytes	-
6	AI 6	0x00	Free Place	-	-
		0x42, 0x84, 0x08, 0x05 oder 0x94	Process Value 6	5 bytes	-
7	AI 7	0x00	Free Place	-	-
		0x42, 0x84, 0x08, 0x05 oder 0x94	Process Value 7	5 bytes	-
8	AI 8	0x00	Free Place	-	-
		0x42, 0x84, 0x08, 0x05 oder 0x94	Process Value 8	5 bytes	-
9	AO	0x00	Free Place	-	-
		0xA4 oder 0x82, 0x84, 0x08, 0x05	Compensation Value	2 bytes	-
10	DI	0x00	Free Place	-	-
		0x91	USP Status	2 bytes	-
11	DO 1	0x00	Free Place	-	-
		0xA1	Relay 1	2 bytes	-
12	DO 2	0x00	Free Place	-	-
		0xA1	Relay 2	2 bytes	-

Physical Block Parameters

Index rel	Index abs	Parameter	Data Type	Size	Store	
0	16	BLOCK_OBJECT	DS-32	12	Record	
1	17	ST_REV	UNSIGNED16	2	Simple	
2	18	TAG_DESC	OCTET_STRING	32	Simple	
3	19	STRATEGY	UNSIGNED16	2	Simple	
4	20	ALERT_KEY	UNSIGNED8	1	Simple	
5	21	TARGET_MODE	UNSIGNED8	1	Simple	
6	22	MODE_BLK	DS_37	3	Record	
7	23	ALARM_SUM	DS_42	4	Record	
8	24	SOFTWARE_REVISION	VISIBLE_STRING	16	Simple	
9	25	HARDWARE_REVISION	VISIBLE_STRING	16	Simple	
10	26	DEVICE_MAN_ID	UNSIGNED16	1	Simple	
11	27	DEVICE_ID	VISIBLE_STRING	16	Simple	
12	28	DEVICE_SER_NUM	VISIBLE_STRING	16	Simple	
13	29	DIAGNOSIS	OCTET_STRING	4	Simple	
14	30	DIAGNOSIS_EXT	OCTET_STRING	6	Simple	
15	31	DIAGNOSIS_MASK	OCTET_STRING	4	Simple	
16	32	DIAGNOSIS_MASK_EXT	OCTET_STRING	6	Simple	
17	33	DEVICE_CERTIFICATION	VISIBLE_STRING	32	Simple	
18	34	WRITE_LOCKING	UNSIGNED16	2	Simple	
19	35	FACTORY_RESET	UNSIGNED16	2	Simple	
20	36	DESCRIPTOR	OCTET_STRING	32	Record	
21	37	DEVICE_MESSAGE	OCTET_STRING	32	Simple	
22	38	DEVICE_INSTAL_DATE	OCTET_STRING	16	Simple	
24	40	IDENT_NUMBER_SELECT	UNSIGNED8	1	Simple	
25	41	HW_WRITE_PROTECTION	UNSIGNED8	1	Simple	
26	42	FEATURE	DS_68	2	Record	
27	43	COND_STATUS_DIAG	UNSIGNED8	1	Simple	
28	44	DIAG_EVENT_SWITCH	DS_69	3	Record	

	Default Value	Access	Writable Range	Slot
		R		0
	0	SR		0
	"	SRW		0
	0	SRW		0
	0	SRW		0
	8	SRW		0
	8; 0x88; 8	DR		0
	0; 0; 0; 0	DR		0
		R		0
		R		0
		R		0
		R		0
		R		0
	0	DR		0
	0	DR		0
		R		0
		R		0
		R		0
		NRW		0
	0	SRW		0
	"	SRW		0
	"	SRW		0
	"	SRW		0
		SRW		0
	0	DR		0
		R		0
	1	SRW		0
	0, 0	SRW		0

AI Function Block Parameters

Index rel	Index abs	Parameter	Data Type	Size	Store	
0	16	BLOCK_OBJECT	DS-32	12	Record	
1	17	ST_REV	UNSIGNED16	2	Simple	
2	18	TAG_DESC	OCTET_STRING	32	Simple	
3	19	STRATEGY	UNSIGNED16	2	Simple	
4	20	ALERT_KEY	UNSIGNED8	1	Simple	
5	21	TARGET_MODE	UNSIGNED8	1	Simple	
6	22	MODE_BLK	DS_37	3	Record	
7	23	ALARM_SUM	DS_42	4	Record	
8	24	BATCH	DS_67	4	Record	
10	26	OUT	DS_101	2	Record	
11	27	PV_SCALE	FLOATING_POINT	2	Array	
12	28	OUT_SCALE	DS_36	4	Record	
13	29	LIN_TYPE	UNSIGNED8	1	Simple	
14	30	CHANNEL	UNSIGNED16	2	Simple	
16	32	PV_FTIME	FLOATING_POINT	1	Simple	
17	33	FSAFE_TYPE	UNSIGNED8	1	Simple	
18	34	FSAFE_VALUE	FLOATING_POINT	1	Simple	
19	35	ALARM_HYS	FLOATING_POINT	1	Simple	
21	37	HI_HI_LIM	FLOATING_POINT	1	Simple	
23	39	HI_LIM	FLOATING_POINT	1	Simple	
25	41	LO_LIM	FLOATING_POINT	1	Simple	
27	43	LO_LO_LIM	FLOATING_POINT	1	Simple	
30	46	HI_HI_ALM	DS_39	5	Record	
31	47	HI_ALM	DS_39	5	Record	
32	48	LO_ALM	DS_39	5	Record	
33	49	LO_LO_ALM	DS_39	5	Record	
34	50	SIMULATE	DS_50	3	Record	
35	51	OUT_UNIT_TEXT	OCTET_STRING	16	Simple	

	Default Value	Access	Writable Range	Slot
		R		1-8
	0	SR		1-8
	"	SRW		1-8
	0	SRW		1-8
	0	SRW		1-8
	8	SRW	Auto	1-8
	128; 152; 8	DR	OS, OS/MAN/AUTO, AUTO	1-8
	0; 0; 0; 0	DR		1-8
	0; 0; 0; 0	SRW		1-8
	0.0; 0x4F	NRWO	UNCERTAIN, INITIAL_VALUE; writable	1-8
	100.0; 0.0	SRW	0% to 100%	1-8
	100.0; 0.0; 1342; 0	SRW	0% to 100%	1-8
	0	SRW		1-8
	0	SRW		1-8
	0.0	SRW		1-8
	1	SRW		1-8
	0.0	SRW		1-8
	0.5	SRW	0.5% out of range	1-8
		SRW		1-8
		SRW		1-8
		SRW		1-8
	0; 0; 0; 0; 0.0	DR		1-8
	0; 0; 0; 0; 0.0	DR		1-8
	0; 0; 0; 0; 0.0	DR		1-8
	0; 0; 0; 0; 0.0	DR		1-8
	0; 0; 0;	SRW	disabled	1-8
	"	SRW		1-8

AO Function Block Parameters

Index rel	Index abs	Parameter	Data Type	Size	Store	
0	16	BLOCK_OBJECT	DS-32	12	Record	
1	17	ST_REV	UNSIGNED16	2	Simple	
2	18	TAG_DESC	OCTET_STRING	32	Simple	
3	19	STRATEGY	UNSIGNED16	2	Simple	
4	20	ALERT_KEY	UNSIGNED8	1	Simple	
5	21	TARGET_MODE	UNSIGNED8	1	Simple	
6	22	MODE_BLK	DS_37	3	Record	
7	23	ALARM_SUM	DS_42	4	Record	
8	24	BATCH	DS_67	4	Record	
9	25	SP	DS_101	2	Record	
11	27	PV_SCALE	DS_36	4	Record	
12	28	READBACK	DS_101	2	Record	
14	30	RCAS_IN	DS_101	2	Record	
21	37	IN_CHANNEL	UNSIGNED16	2	Simple	
22	38	OUT_CHANNEL	UNSIGNED16	2	Simple	
23	39	FSAVE_TIME	FLOATING_POINT	1	Simple	
24	40	FSAVE_TYPE	UNSIGNED8	1	Simple	
25	41	FSAVE_VALUE	FLOATING_POINT	1	Simple	
27	43	RCAS_OUT	DS_101	2	Record	
31	47	POS_D	DS_102	2	Record	
32	48	SETP_DEVIATION	FLOATING_POINT	1	Simple	
33	49	CHECK_BACK	OCTET_STRING	3	Simple	
34	50	CHECK_BACK_MASK	OCTET_STRING	3	Simple	
35	51	SIMULATE	DS_50	3	Record	
36	52	INCREASE_CLOSE	UNSIGNED8	1	Simple	
37	53	OUT	DS_101	2	Record	
38	54	OUT_SCALE	DS_36	4	Record	

	Default Value	Access	Writable Range	Slot
		R		9
	0	SR		9
	"	SRW		9
	0	SRW		9
	0	SRW		9
	0x08	SRW	Auto	9
	0x80;0x9A;0x08	DR	OS, OS/MAN/AUTO/RCAS, AUTO	9
	0; 0; 0; 0	DR		9
	0; 0; 0; 0	SRW		9
	0.0;0x18	DRWI	bad, no comm. no value	9
	100.0; 0.0; 1001; 0	SRW		9
	0.0; 0	DRO	bad, non-specific	9
	0.0;0x18	DRWI	bad, no comm. no value	9
	0	SRW		9
	0	SRW		9
	0.0	SRW		9
	2	SRW		9
	0.0	SRW		9
	0.0; 0	DRO	bad, non-specific	9
	0; 0	DRO	bad, non-specific	9
	0.0	DR		9
	0, 0, 0	DRO		9
	0x0D, 0x4C, 0x00	R		9
	0; 0.0; 0	SRW	disabled	9
	0	SRW		9
	0.0; 0	DRO	bad, non-specific	9
	100.0; 0.0; 1001; 0	SRW		9

DI Function Block Parameters

Index rel	Index abs	Parameter	Data Type	Size	Store	
0	16	BLOCK_OBJECT	DS-32	12	Record	
1	17	ST_REV	UNSIGNED16	2	Simple	
2	18	TAG_DESC	OCTET_STRING	32	Simple	
3	19	STRATEGY	UNSIGNED16	2	Simple	
4	20	ALERT_KEY	UNSIGNED8	1	Simple	
5	21	TARGET_MODE	UNSIGNED8	1	Simple	
6	22	MODE_BLK	DS_37	3	Record	
7	23	ALARM_SUM	DS_42	4	Record	
8	24	BATCH	DS_67	4	Record	
10	26	OUT_D	DS_102	2	Record	
14	30	CHANNEL	UNSIGNED16	2	Simple	
15	31	INVERT	UNSIGNED8	1	Simple	
20	36	FSAFE_TYPE	UNSIGNED8	1	Simple	
21	37	FSAVE_VALUE_D	UNSIGNED8	1	Simple	
24	40	SIMULATE	DS_51	3	Record	

	Default Value	Access	Writable Range	Slot
		R		10
	0	SR		10
	"	SRW		10
	0	SRW		10
	0	SRW		10
	8	SRW	Auto	10
	0x80; 0x98; 0x08	DR	OS, OS/MAN/AUTO, AUTO	10
	0; 0; 0; 0	DR		10
	0; 0; 0; 0	SRW		10
	0; 0x00	NRWO	bad, non-specific	10
	0	SRW		10
	0	SRW		10
	1	SRW		10
	0	SRW		10
	0; 0; 0	SRW	disabled	10

DO Function Block Parameters

Index rel	Index abs	Parameter	Data Type	Size	Store	
0	16	BLOCK_OBJECT	DS-32	12	Record	
1	17	ST_REV	UNSIGNED16	2	Simple	
2	18	TAG_DESC	OCTET_STRING	32	Simple	
3	19	STRATEGY	UNSIGNED16	2	Simple	
4	20	ALERT_KEY	UNSIGNED8	1	Simple	
5	21	TARGET_MODE	UNSIGNED8	1	Simple	
6	22	MODE_BLK	DS_37	3	Record	
7	23	ALARM_SUM	DS_42	4	Record	
8	24	BATCH	DS_67	4	Record	
9	25	SP_D	DS_102	2	Record	
10	26	OUT_D	DS_102	2	Record	
12	28	READBACK_D	DS_102	2	Record	
14	30	RCAS_IN_D	DS_102	2	Record	
17	33	CHANNEL	UNSIGNED16	2	Simple	
18	34	INVERT	UNSIGNED8	1	Simple	
19	35	FSAFE_TIME	FLOATING_POINT	1	Simple	
20	36	FSAFE_TYPE	UNSIGNED8	1	Simple	
21	37	FSAFE_VALUE_D	UNSIGNED8	1	Simple	
22	38	RCAS_OUT_D	DS_102	2	Record	
24	40	SIMULATE	DS_51	3	Record	
33	49	CHECK_BACK_D	OCTET_STRING	3	Simple	
34	50	CHECK_BACK_MASK	OCTET_STRING	3	Simple	

	Default Value	Access	Writable Range	Slot
		R		11-12
	0	SR		11-12
	"	SRW		11-12
	0	SRW		11-12
	0	SRW		11-12
	0x08	SRW	Auto	11-12
	0x80; 0x9A; 0x08	DR	OS, OS/MAN/AUTO/RCAS/LO, AUTO	11-12
	0; 0; 0; 0	DR		11-12
	0; 0; 0; 0	SRW		11-12
	0; 0x18	DRWI	bad, no communication (no usable value)	11-12
	0; 0x00	DRWO	bad, non-specific	11-12
	0; 0x00	DRO	bad, non-specific	11-12
	0; 0x18	DRWI	bad, no communication (no usable value)	11-12
	0	SRW		11-12
	0	SRW		11-12
	0.0	SRW		11-12
	2	SRW		11-12
	0	SRW		11-12
	0; 0x00	DRO	bad, non-specific	11-12
	0; 0; 0	SRW	disabled	11-12
	0, 0, 0	DRO		11-12
	0x0D, 0x4C, 0x00	R		11-12

Bus Parameters of Standard Transducer Block (TB)

Index rel	Index abs	Parameter	Description	
0	16	BLOCK_OBJECT	Block type	
1	17	ST_REV	Identification counter which is incremented with every change of configuration parameters	
2	18	TAG-DESC	Unambiguous TAG in the system, can be specified by the user	
3	19	STRATEGY	Can be used to identify grouping of blocks	
4	20	ALERT_KEY	Value can be written by the user for alarm handling	
5	21	TARGET_MODE	Target mode = Auto	
6	22	MODE_BLK	Configured block mode	
7	23	ALARM_SUM	Alarm status	
8	24	VALUE_AO	Value for analog output	
9	25	VALUE_DI	Value for digital input	
10	26	VALUE_DO	Value for digital output	

	Default Value	R/W	Bytes	Data Type	Range
	The revision value is incremented every time a static parameter in the block is changed.	R	2		
	Text		32		
	0		2		
	0		1		
	Available Modes: Automatic, Out Of Service (OOS), Manual		1 1 1 1		
			2		
	0		1		
	0		1		
	0	R	8		
	0		2		
	0		2		
		R/W	5	FLOAT_S	
		R/W	2	DISC_2	
		R/W	2	DISC_2	

Bus Parameters of Manufacturer-Specific Transducer Block (TB)

Index rel	Index abs	Parameter	Description
11	27	Meas Type	Select measuring mode
12	28	pH	Parameter: pH
		Sensortype	Select pH sensor type
		Meas Mode	Select measuring mode
		RTD Type	Select temperature sensor type
		Temperature Unit	Select temperature unit of display
		Temperature Meas	Select temperature detection during measurement
		Temperature Meas Manual Value	Enter temperature value (MAN)
		Temperature Calibration	Select temperature detection during calibration
		Temperature Cal Manual Value	Enter temperature value (MAN)
		Nominal Zero	Enter nominal zero for Pfaudler sensors
		Nominal Slope	Enter nominal slope for Pfaudler sensors
		pH Iso	Enter pHiso value for Pfaudler sensors
		Calibration Mode	Select calibration mode
		Buffer Set	Select buffer set (AUTO)
		Calibration Timer	Select calibration timer
		Calibration Cycle	Set calibration cycle
		ACT	Select adaptive cal timer (ISM only)
		ACT Cycle	Select adaptive cal cycle (ISM only)
		TTM	Select adaptive maintenance timer (ISM only)
		TTM Cycle	Select adaptive maintenance cycle (ISM only)
		CIP Count	Switch cleaning cycles on/off
		CIP Cycles	Enter cleaning cycles (ON)
		SIP Count	Enable/disable sterilization cycles
		SIP Cycles	Enter sterilization cycles (ON)
		Autoclave	Enable/disable autoclaving counter
		AC Cycles	Enter autoclaving cycle (ON)
		Tc Select	Select temperature compensation
		Tc Liquid	Enter value for linear temperature compensation (LIN)

	Default Value	R/W	Bytes	Data Type	Range
	0 = pH	R/W	1	U8	0-5
		R/W		Record	
	0 = Standard	R/W	1	U8	0-20
	0 = pH	R/W	1	U8	0-2
	0 = 100 PT	R/W	1	U8	0-8
	0 = °C	R/W	1	U8	0-1
	0 = Auto	R/W	1	U8	0-2
	0	R/W	4	Float	
	0 = Auto	R/W	1	U8	0-2
	0	R/W	4	Float	
	7.0	R/W	4	Float	0-14
	59.2	R/W	4	Float	30-60
	7.0	R/W	4	Float	0-14
	0 = Auto	R/W	1	U8	0-2
	0 = -02- Knick	R/W	1	U8	0-255
	0 = Off	R/W	1	U8	0-2
	168	R/W	4	Float	0-9999
	0 = Off	R/W	1	U8	0.2
	30	R/W	4	Float	0-2000
	0 = Off	R/W	1	U8	0-2
	365	R/W	4	Float	0-2000
	0 = Off	R/W	1	U8	0-1
	0	R/W	2	U16	0-9999
	0 = Off	R/W	1	U8	0-1
	0	R/W	2	U16	0-9999
	0 = Off	R/W	1	U8	0-1
	0	R/W	2	U16	0-9999
	0 = Off	R/W	1	U8	0-3
	0	R/W	4	Float	-19.99-19.99

Cond

Bus Parameters of Manufacturer-Specific Transducer Block (TB)

Index rel	Index abs	Parameter	Description
13	29	Conductivity	Parameter: conductivity
		Sensor Type	Select Cond sensor type
		Meas Mode	Select measuring mode
		Display Unit	Select measuring range
		Solution	Concentration determination
		RTD Type	Select temperature sensor type
		Temperature Unit	Select temperature unit of display
		Temperature	Select temperature detection during measurement
		Temperature Manual Value	Enter temperature value (MAN)
		CIP Count	Switch cleaning cycles on/off
		SIP Count	Enable/disable sterilization cycles
		Tc Select	Select temperature compensation
		Tc Liquid	Enter value for linear temperature compensation (LIN)
		Reference Temperature	Enter value for reference temperature (LIN)
		Tds Factor	Enter TDS factor (Meas Mode = TDS)
		Usp Factor	Enter USP factor (Meas Mode = USP)

	Default Value	R/W	Bytes	Data Type	Range
		R/W		Record	
	0 = 2-Electrode	R/W	1	U8	0-20
	0 = Cond	R/W	1	U8	0-2
	0 = 000.0 mS/cm	R/W	1	U8	0-8
	0 = -01- (NaCl)	R/W	1	U8	0-1
	0 = 100 PT	R/W	1	U8	0-2
	0 = °C	R/W	1	U8	
	0 = Auto	R/W	1	U8	0-2
	0	R/W	4	Float	
	0 = Off	R/W	1	U8	0-1
	0 = Off	R/W	1	U8	0-1
	0 = Off	R/W	1	U8	0-1
	0	R/W	4	Float	0-2
	0	R/W	4	Float	0-255
	0	R/W	4	Float	0-2
	0	R/W	4	Float	0-9999

CondI

Bus Parameters of Manufacturer-Specific Transducer Block (TB)

Index rel	Index abs	Parameter	Description
14	30	Toroidal Conductivity	Parameter: inductive conductivity
		Sensor Type	Select Cond sensor type
		Meas Mode	Select measuring mode
		Display Unit	Select measuring range
		Solution	Concentration determination
		RTD Type	Select temperature sensor type
		Temperature Unit	Select temperature unit of display
		Temperature	Select temperature detection during measurement
		Temperature Manual Value	Enter temperature value (MAN)
		CIP Count	Switch cleaning cycles on/off
		SIP Count	Enable/disable sterilization cycles
		Tc Select	Select temperature compensation
		Tc Liquid	Enter value for linear temperature compensation (LIN)
		Reference Temperature	Enter value for reference temperature (LIN)
		Tds Factor	Enter TDS factor (Meas Mode = TDS)

	Default Value	R/W	Bytes	Data Type	Range
		R/W		Record	
	0 = SE 655	R/W	1	U8	0-4
	0 = Cond	R/W	1	U8	0-2
	0 = 0.000 mS/cm	R/W	1	U8	0-5
	0 = -01- (NaCl)	R/W	1	U8	0-9
	0 = 100 PT	R/W	1	U8	0-5
	0 = °C	R/W	1	U8	0-1
	0 = Auto	R/W	1	U8	0-2
	0	R/W	4	Float	25.0
	0 = Off	R/W	1	U8	0-1
	0 = Off	R/W	1	U8	0-1
	0 = Off	R/W	1	U8	0-5
	0	R/W	4	Float	0-19.99
	0	R/W	4	Float	
	0	R/W	4	Float	

Bus Parameters of Manufacturer-Specific Transducer Block (TB)

Index rel	Index abs	Parameter	Description
15	31	Dissolved Oxygen	Parameter: Oxy
		Sensor Type	Sensor type selection
		Meas Mode	Select measuring mode
		Polarization Voltage Meas	Enter polarization voltage during meas
		Polarization Voltage Cal	Enter polarization voltage during cal
		Membrane Compensation	Enter membrane compensation
		RTD Type	Select type of temperature probe
		Temperature Unit	Select temperature unit of display
		Calibration Mode	Select calibration mode
		Calibration Timer	Enable/disable calibration timer
		Cal Cycle	Set calibration cycle (ON)
		ACT	Select adaptive cal timer (ISM only)
		ACT Cycle	Select adaptive cal cycle (ISM only)
		TTM	Select adaptive maintenance timer (ISM only)
		TTM Cycle	Select adaptive maintenance cycle (ISM only)
		CIP Count	Enable/disable cleaning cycles
		CIP Cycles	Enter cleaning cycles (ON)
		SIP Count	Enable/disable sterilization cycles
		SIP Cycles	Enter sterilization cycles (ON)
		Autoclave	Enable/disable autoclaving counter
		AC Cycles	Enter autoclaving cycle (ON)
		Salinity	Enter salinity correction
		Pressure Unit	Select pressure unit
		Pressure	Select pressure correction
		Pressure Manual Value	Enter pressure value (MAN)

	Default Value	R/W	Bytes	Data Type	Range
		R/W		Record	
	0 = Standard	R/W	1	U8	0-4
	0 = DO%	R/W	1	U8	0-2
	0	R/W	4	Float	
	0	R/W	4	Float	
	0	R/W	4	Float	
	4 = 22 NTC	R/W	1	U8	4-5
	0 = °C	R/W	1	U8	0-1
	0 = Cal air	R/W	1	U8	0-1
	0 = Off	R/W	1	U8	0-2
	168	R/W	4	Float	0-9999
	0 = Off	R/W	1	U8	0-2
	30	R/W	4	Float	0-9999
	0 = Off	R/W	1	U8	0-2
	365	R/W	4	Float	0-2000
	0 = Off	R/W	1	U8	0-1
	0	R/W	2	U16	0-9999
	0 = Off	R/W	1	U8	0-1
	0	R/W	2	U16	0-9999
	0 = Off	R/W	1	U8	0-1
	0	R/W	2	U16	0-9999
	0	R/W	4	Float	
	0 = BAR	R/W	1	U8	0-2
	0 = MAN	R/W	1	U8	0-1
	0	R/W	4	Float	

CC

Bus Parameters of Manufacturer-Specific Transducer Block (TB)

Index rel	Index abs	Parameter	Description
16	32	CC	Cond-Cond parameter
		Tc Select A	Select temperature compensation
		Tc Liquid A	Enter value for linear temperature compensation (LIN)
		Reference Temperature A	Enter value for reference temperature (LIN)
		Tc Select B	Select temperature compensation
		Tc Liquid B	Enter value for linear temperature compensation (LIN)
		Reference Temperature B	Enter value for reference temperature (LIN)
		Meas Range	Select measuring range
		Temp Unit	Select temperature unit of display
		Calculation	Switch calculation on/off
		Calculation Type	Select calculation type (ON)
		Factor 1	Enter factor 1 (-C7-)
		Factor 2	Enter factor 2 (-C7-)
		Parameter A	Enter factor 1 (-C8-)
		Parameter A	Enter factor 2 (-C8-)
		Parameter B	Enter factor 3 (-C8-)
24	33	Flow Adjust	Enter flow measurement (pulses/liter)
25	34	Alarm Delay	Enter alarm delay in seconds
26	35	Sensocheck	Enable/disable Sensocheck

	Default Value	R/W	Bytes	Data Type	Range
		R/W		Record	
	0 = Off	R/W	1	U8	0-6
	0	R/W	4	Float	0-19.99
	0	R/W	4	Float	
	0 = Off	R/W	1	U8	0-6
	0	R/W	4	Float	0-19.99
	0	R/W	4	Float	
	1 = 00.00 µS/cm	R/W	1	U8	22-25, 55
	0 = °C	R/W	1	U8	0-1
	0 = Off	R/W	1	U8	0-1
	0 = -C1- Difference	R/W	1	U8	0-7
	3	R/W	4	Float	
	243	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	12000	R/W	4	Float	0-20000
	10	R/W	4	Float	0-600
	1 = On	R/W	1	U8	0-1

Bus Parameters of Manufacturer-Specific Transducer Block (TB)

Index rel	Index abs	Parameter	Description
20	36	Clock	Parameter: clock
		Format	Select time format
		Minute	Enter minutes
		Hour	Enter hours
		am or pm	Select AM / PM
		Day	Enter day
		Month	Enter month
		Year	Enter year

	Default Value	R/W	Bytes	Data Type	Range
		R/W		Record	
	0 = 24 h	R/W	1	U8	0-1
	0	R/W	1	U8	0-59
	0	R/W	1	U8	0-24
	0 = am	R/W	1	U8	0-1
	1	R/W	1	U8	1-31
	1	R/W	1	U8	1-12
	2000	R/W	2	U16	2000-2099

pH

Bus Parameters of Manufacturer-Specific Transducer Block (TB)

Index rel	Index abs	Parameter	Description
21	37	pH Tc Liquid Table	Table for temperature compensation (TC_SELECT = user tab) Values from 0 °C to 100 °C in 5 °C steps
		0 °C	Enter value for 0 °C
		5 °C	Enter value for 5 °C
		10 °C	Enter value for 10 °C
		15 °C	Enter value for 15 °C
		20 °C	Enter value for 20 °C
		25 °C	Enter value for 25 °C
		30 °C	Enter value for 30 °C
		35 °C	Enter value for 35 °C
		40 °C	Enter value for 40 °C
		45 °C	Enter value for 45 °C
		50 °C	Enter value for 50 °C
		55 °C	Enter value for 55 °C
		60 °C	Enter value for 60 °C
		65 °C	Enter value for 65 °C
		70 °C	Enter value for 70 °C
		75 °C	Enter value for 75 °C
		80 °C	Enter value for 80 °C
		85 °C	Enter value for 85 °C
		90 °C	Enter value for 90 °C
		95 °C	Enter value for 95 °C

Note: Use a configuration tool such as **SIMATIC PDM** from Siemens for convenient data entry.

pH

Bus Parameters of Manufacturer-Specific Transducer Block (TB)

Index rel	Index abs	Parameter	Description
22	38	pH User Buffer 1	Table for 1st buffer solution (BUFFER = User buffer)
		Nominal Value	Enter nominal value (25 °C) for 1st pH buffer
		0 °C	Enter value for 1st pH buffer
		5 °C	Enter value for 1st pH buffer
		10 °C	Enter value for 1st pH buffer
		15 °C	Enter value for 1st pH buffer
		20 °C	Enter value for 1st pH buffer
		25 °C	Enter value for 1st pH buffer
		30 °C	Enter value for 1st pH buffer
		35 °C	Enter value for 1st pH buffer
		40 °C	Enter value for 1st pH buffer
		45 °C	Enter value for 1st pH buffer
		50 °C	Enter value for 1st pH buffer
		55 °C	Enter value for 1st pH buffer
		60 °C	Enter value for 1st pH buffer
		65 °C	Enter value for 1st pH buffer
		70 °C	Enter value for 1st pH buffer
		75 °C	Enter value for 1st pH buffer
		80 °C	Enter value for 1st pH buffer
		85 °C	Enter value for 1st pH buffer
		90 °C	Enter value for 1st pH buffer
		95 °C	Enter value for 1st pH buffer

pH

Bus Parameters of Manufacturer-Specific Transducer Block (TB)

Index rel	Index abs	Parameter	Description
23	39	pH User Buffer 2	Table for 2nd buffer solution (BUFFER = User buffer)
		Nominal Value	Enter nominal value (25 °C) for 2nd pH buffer
		0 °C	Enter value for 2nd pH buffer
		5 °C	Enter value for 2nd pH buffer
		10 °C	Enter value for 2nd pH buffer
		15 °C	Enter value for 2nd pH buffer
		20 °C	Enter value for 2nd pH buffer
		25 °C	Enter value for 2nd pH buffer
		30 °C	Enter value for 2nd pH buffer
		35 °C	Enter value for 2nd pH buffer
		40 °C	Enter value for 2nd pH buffer
		45 °C	Enter value for 2nd pH buffer
		50 °C	Enter value for 2nd pH buffer
		55 °C	Enter value for 2nd pH buffer
		60 °C	Enter value for 2nd pH buffer
		65 °C	Enter value for 2nd pH buffer
		70 °C	Enter value for 2nd pH buffer
		75 °C	Enter value for 2nd pH buffer
		80 °C	Enter value for 2nd pH buffer
		85 °C	Enter value for 2nd pH buffer
		90 °C	Enter value for 2nd pH buffer
		95 °C	Enter value for 2nd pH buffer
24	40	Sample Product	Start step 1 of product calibration.
25	41	Stored Value	Display value saved for product calibration – step 1.
26	42	Reference Value	Step 2 of product calibration: Enter value of sample.
27	43	Calibration Product Step	Progress of calibration
28	44	Calibration Result	Result of last calibration
29	45	Logbook Entry	Specify group index that is to be read
30	46	Logbook Binary Data	Raw data of logbook
31	47	Logbook Erase	Logbook entries are deleted

	Default Value	R/W	Bytes	Data Type	Range
				Record	
	1	R	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	0 = No operation	R/W	1	U8	
	0	R	4	Float	
	0	R/W	4	Float	
	0	R	1	U8	
	0 = Good	R/W	1	U8	
	0	R/W	1	U8	
		R	78	U8	
	0 = No Operation	R/W	1	U8	

Bus Parameters of Manufacturer-Specific Transducer Block (TB)

Index rel	Index abs	Parameter	Description
32	48	Sensor	Sensor data
		Sensor Serial No.	Serial number of digital sensor
		Sensor Order No.	Order number of digital sensor
		Tag	Tag number (TAG) of digital sensor
		Status	Mode indication
		Runtime	Operating time of digital sensor
		SIP Cycles	SIP cycles
		CIP Cycles	CIP cycles
		TTM	Adaptive maintenance timer
		DLI	Digital Lifetime Indicator
		ACT	Adaptive calibration timer
		Autoclave	Autoclaving
		Wear	Sensor wear for Memosens pH or Oxy sensors
		Smiley	Sensoface status
		Calibration Timer	Calibration timer
33	49	Sensor Request Binary	Query sensor information
34	50	Sensor Response Binary	Response data with sensor information
35	51	Slope	pH slope with read/write access
36	52	Zero	pH zero with read/write access
37	53	Isfet Offset	ISFET offset with read/write access (ISM only)
38	54	ORP Zero	ORP zero with read/write access
39	55	Slope	Oxygen slope with read/write access
40	56	Zero	Oxygen zero with read/write access
41	57	rH	Relative humidity during calibration [%]
42	58	Cellconstant	Enter cell factor
43	59	Cellfactor	Enter cell factor
44	60	Install	Enter installation factor
45	61	Zero	Enter zero point
46	62	Trans Ratio	Enter transfer ratio
47	63	Cellfactor A	Enter cell factor for sensor A (CC only)
48	64	Cellfactor B	Enter cell factor for sensor B (CC only)
49	65	Calibration Time	Last calibration (date)
50	66	Hold	Select measured value status during calibration, configuration and service

	Default Value	R/W	Bytes	Data Type	Range
				Record	
	0	R	16	Oct	
	0	R	18	Oct	
	0	R	32	Oct	
	0	R	2	U16	
	0	R	4	Float	
	0	R	2	U16	
	0	R	2	U16	
	0	R	4	Float	
	0	R	4	Float	
	0	R	4	Float	
	0	R	4	Float	
	0	R	2	U16	
	0	R	4	Float	
		R/W	20	Oct	
		R	32	Oct	
	59.2	R/W	4	Float	
	7.0	R/W	4	Float	
	0	R/W	4	Float	
	0	R/W	4	Float	
	60.0	R/W	4	Float	
	0	R/W	4	Float	
	100	R/W	4	Float	
	0.75	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
	0	R/W	4	Float	
	0	R/W	4	Float	
	1	R/W	4	Float	
	1	R/W	4	Float	
		R/W	19	Oct	
	0 = Off	R/W	1	U8	

Bus Parameters of Manufacturer-Specific Transducer Block (TB)

Index rel	Index abs	Parameter	Description
51	67	Version	Version
		Device Serial No	Serial number of device
		Device Software Version	Software version
		Device Hardware Version	Hardware version
		Meas Module Serial No.	Serial number of digital sensor
		Meas Module Software Version	Software serial number of digital sensor
		Meas Module Hardware Version	Hardware serial number of digital sensor

	Default Value	R/W	Bytes	Data Type	Range
		R		Record	
	0	R	4	U32	
	0	R	8	Oct	
	0	R	2	Oct	
	0	R	16	Oct	
	0	R	8	Oct	
	0	R	2	Oct	

Bus Parameters of Manufacturer-Specific Transducer Block (TB)

Index rel	Index abs	Parameter	Description
52	68	Value pH [pH]	pH value
		Value pH [pH]	pH value
		Status	pH status
53	69	Value mV [mV]	mV value
		Value mV [mV]	mV value
		Status	mV status
54	70	Value ORP [mV]	ORP value
		Value ORP [mV]	ORP value
		Status	ORP status
55	71	Value Glass Impedance [MOhm]	Glass impedance value
		Value Glass Impedance [MOhm]	Glass impedance value
		Status	Glass impedance status
56	72	Value Reference Impedance [kOhm]	Reference impedance value
		Value Reference Impedance [kOhm]	Reference impedance value
		Status	Reference impedance status
57	73	Value Temperature	Temperature value
		Value Temperature	Temperature value
		Status	Temperature status
58	74	Temperature Unit	Select temperature unit
59	75	Value Calibration Timer [h]	Cal timer value (not for ISM)
		Value Calibration Timer [h]	Cal timer value (not for ISM)
		Status	Cal timer status
60	76	Value Slope	Slope value
		Value Slope	Slope value
		Status	Slope status
61	77	Slope Unit	Select unit for slope
62	78	Value Zero	Zero point value
		Value Zero	Zero point value
		Status	Zero point status

	Default Value	R/W	Bytes	Data Type	Range
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
1001 = °C		R	2	U16	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
1342 = %		R	2	U16	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	

Bus Parameters of Manufacturer-Specific Transducer Block (TB)

Index rel	Index abs	Parameter	Description
63	79	Value Wear [%]	Sensor wear value (Memosens pH/Oxy sensors)
		Value Wear [%]	Sensor wear value (Memosens pH/Oxy sensors)
		Status	Sensor wear status (Memosens pH/Oxy sensors)
64	80	Value Flow [l/h]	Flow value
		Value Flow [l/h]	Flow value
		Status	Flow status
65	81	Value DO Saturation Air [%]	Air saturation value
		Value DO Saturation Air [%]	Air saturation value
		Status	Air saturation status
66	82	Value DO Concentration	Concentration value
		Value DO Concentration	Concentration value
		Status	Concentration status
67	83	DO Concentration Unit	Select unit for concentration
68	84	Value Gas Volume Concentration [Vol %]	Gas concentration value
		Value Gas Volume Concentration [Vol %]	Gas concentration value
		Status	Gas concentration status
69	85	Value Partial Pressure [mbar]	Partial pressure value
		Value Partial Pressure [mbar]	Partial pressure value
		Status	Partial pressure status
70	86	Value Conductivity	Conductivity value
		Value Conductivity	Conductivity value
		Status	Conductivity status
71	87	Conductivity Unit	Select unit for conductivity
72	88	Value Specific Resistance [MOhm*cm]	Resistivity value
		Value Specific Resistance [MOhm*cm]	Resistivity value
		Status	Resistivity status

	Default Value	R/W	Bytes	Data Type	Range
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
1423 = ppm		R	2	U16	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
1552 = μ S/cm		R	2	U16	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	

Bus Parameters of Manufacturer-Specific Transducer Block (TB)

Index rel	Index abs	Parameter	Description
73	89	Value Concentration [%]	Concentration value
		Value Concentration [%]	Concentration value
		Status	Concentration status
74	90	Value Conductance	Conductance value
		Value Conductance	Conductance value
		Status	Conductance status
75	91	Value Salinity [g/kg]	Salt content value
		Value Salinity [g/kg]	Salt content value
		Status	Salt content status
76	92	Value Tds [mg/l]	TDS value
		Value Tds [mg/l]	TDS value
		Status	TDS status
77	93	Value Conductivity 2 [$\mu\text{S}/\text{cm}$]	CC: 2nd conductivity value
		Value Conductivity 2 [$\mu\text{S}/\text{cm}$]	CC: 2nd conductivity value
		Status	CC: Status of 2nd conductivity value
78	94	Value Calculation	CC: Value calculated acc. to calculation type
		Value Calculation	CC: Value calculated acc. to calculation type
		Status	CC: CC: Status of value calculated acc. to calculation type
79	95	Value Cell [1/cm]	Cell factor value
		Value Cell [1/cm]	Cell factor value
		Status	Cell factor status
80	96	Value Temperature 2	CC: 2nd temperature value
		Value Temperature 2	CC: 2nd temperature value
		Status	CC: Status of 2nd temperature value
81	97	Temperature 2 Unit	CC: Select temperature unit
82	98	Unit	Unit used during product calibration

	Default Value	R/W	Bytes	Data Type	Range
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
1001 = °C		R	2	U16	
0		R	2	U16	

Bus Parameters of Manufacturer-Specific Transducer Block (TB)

Index rel	Index abs	Parameter	Description
83	99	AO Final Value Temperature	Analog output: last temperature value
		AO Final Value Temperature	Analog output: last temperature value
		Status	Analog output: last temperature value – Status
84	100	AO Feedback Value (not used)	Analog output: actual value
		AO Feedback Value (not used)	Analog output: actual value
		Status	Analog output: actual value – Status
85	101	AO Final Value Pressure	Analog output: final pressure value
		AO Final Value Pressure	Analog output: final pressure value
		Status	Analog output: final pressure value – Status
86	102	AO Feedback Value (not used)	Analog output: actual value
		Value	Analog output: actual value
		Status	Analog output: actual value – Status
87	103	DO Final Value 1	Digital output: final value 1
		Value	Digital output: final value 1
		Status	Status
88	104	DO Final Value 2	Digital output: final value 2
		Value	Digital output: final value 2
		Status	Status
89	105	DI Value USP	Digital input: USP value
		Value	USP value
		Status	Digital input: USP value – Status
90	106	Primary Value	Primary value
		Value	Primary value
		Status	Primary value – Status
91	107	Current Error	Current device error
92	108	Specific Resi.2 [MOhm*cm]	CC: Resistivity 2
		Status	Resistivity 2 – Status
		Value	Resistivity 2 – Value
93	109	Sensor Fix	Sensor data
		Sensor Serial No.	Serial number of digital sensor
		Sensor Order No.	Order number of digital sensor
		Tag	Tag number of digital sensor
		Manufacturer	Manufacturer of digital sensor
		Initial Operation	Date of initial operation

	Default Value	R/W	Bytes	Data Type	Range
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
		R		DS_102	
0		R	1	U8	
0		R	1	U8	
		R		DS_102	
0		R	1	U8	
0		R	1	U8	
		R		DS_102	
0		R	1	U8	
0		R	1	U8	
		R		DS_101	
0.0		R	4	Float	
0		R	1	U8	
0		R	1	U8	
		R		DS_101	
0		R	1	Float	
0.0		R	4	U8	
		R		Record	
		R	16	Oct	
		R	18	Oct	
		R	32	Oct	
		R	16	Oct	
		R	19	Oct	

Product Calibration

With three parameters, product calibration for pH, ORP, Cond, Condl, Oxy and Cond-Cond can be performed via PROFIBUS.

Typical pH Product Calibration via PROFIBUS

- 1) Set SAMPLE_PRODUCT parameter to Sample. The device saves the pH value of the sample. After the writing, the parameter is automatically reset to NOP.
- 2) Read out STORED_VALUE parameter. It contains the stored value.
- 3) Write lab value of the sample in the REFERENCE_VALUE parameter.
The STORED_VALUE parameter is reset to 0. Now the device is calibrated.

Note: When step 1 has been performed directly on the site on the device, the operation on the PROFIBUS as described in point 1 is omitted.

PROFIBUS Certificate Stratos Pro A221(N/X)



Certificate

PROFIBUS Nutzerorganisation e.V. grants to

**Knick Elektronische Messgeräte GmbH & Co. KG
Beuckestr. 22, 14163 Berlin, Germany**

the Certificate No: **Z01920** for the PROFIBUS device:

Model Name: **Stratos Pro PA A221(X)**
Revision: **1; SW/FW: 1.0.0/1.0.2; HW: 1.0**
GSD: **KNIC7535.GSD, File Version: July 2014
pa139700.GSD**

This certificate confirms that the product has successfully passed the certification tests with the following scope:

<input checked="" type="checkbox"/>	DP-V0	MS0_Set_Slave_Add
<input checked="" type="checkbox"/>	DP-V1	Prm_Block_Structure, MS2, I&M
<input checked="" type="checkbox"/>	Profile	PROFIBUS PA 3.0.2
<input checked="" type="checkbox"/>	Physical Layer	MBP

Test Report Number: **FZI0018**

Authorized Test Laboratory: **FZI Forschungszentrum Informatik, Karlsruhe, Germany**

The tests were executed in accordance with the following documents:

"Test Specifications for PROFIBUS DP Slaves, Version 3.0.9, September 2008" and
"Test Specifications for PROFIBUS PA Profile 3.0.2, Version 5.0.4, February 2010".

This certificate is granted according to the document:

"Framework for testing and certification of PROFIBUS and PROFINET products".

For all products that are placed in circulation by February 16, 2018 the certificate is valid for life.

Board of PROFIBUS Nutzerorganisation e. V.

(Official in Charge)



(Karsten Schneider)

(K.-P. Lindner)

PROFIBUS Certificate Stratos Evo A451N



Certificate

PROFIBUS Nutzerorganisation e.V. grants to

Knick Elektronische Messgeräte GmbH & Co. KG
Beuckestr. 22, 14163 Berlin, Germany

the Certificate No: **Z01919** for the PROFIBUS device:

Model Name: **Stratos Evo DP A451N**
Revision: **1; SW/FW: 1.0.0/1.0.2; HW: 1.0**
GSD: **KNIC7536.GSD, File Version: July 2014**
pa139700.GSD

This certificate confirms that the product has successfully passed the certification tests with the following scope:

<input checked="" type="checkbox"/>	DP-V0	MS0, Set_Slave_Add
<input checked="" type="checkbox"/>	DP-V1	Prm_Block_Structure, MS2, I&M
<input checked="" type="checkbox"/>	Profile	PROFIBUS PA 3.0.2
<input checked="" type="checkbox"/>	Physical Layer	RS485

Test Report Number: **FZI0017**

Authorized Test Laboratory: **FZI Forschungszentrum Informatik, Karlsruhe, Germany**

The tests were executed in accordance with the following documents:

"Test Specifications for PROFIBUS DP Slaves, Version 3.0.9, September 2008" and

"Test Specifications for PROFIBUS PA Profile 3.0.2, Version 5.0.4, February 2010".

This certificate is granted according to the document:

"Framework for testing and certification of PROFIBUS and PROFINET products".

For all products that are placed in circulation by February 16, 2018 the certificate is valid for life.

Board of PROFIBUS Nutzerorganisation e. V.

(Official in Charge)



A handwritten signature in blue ink, appearing to read 'Karsten Schneider'.

(Karsten Schneider)

(K.-P. Lindner)

A handwritten signature in blue ink, appearing to read 'Klaus-P. Lindner'.

Installation Instructions

- Installation of the device must be carried out by trained experts in accordance with this user 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!
- All parameters must be set by a system administrator prior to commissioning.

Terminals

With a tightening torque of 0.5 to 0.6 Nm, the following conductor cross-sections are permitted:

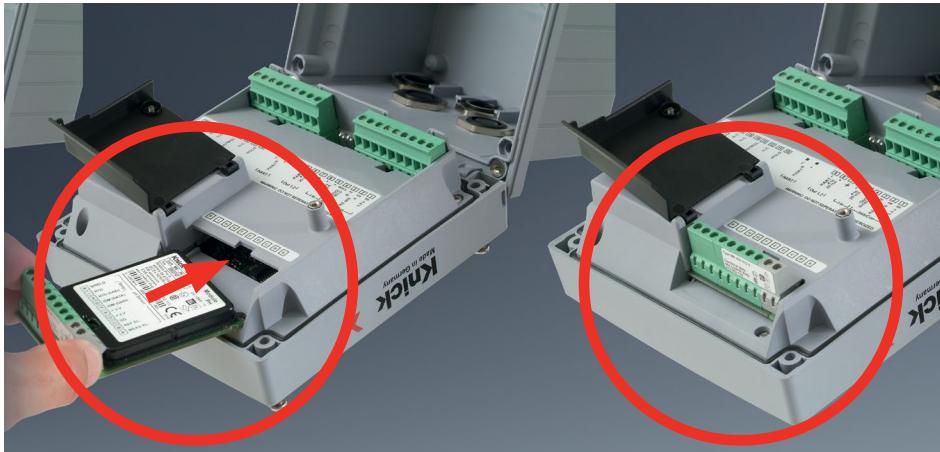
Connection	Cross-section
Conductor cross-section rigid/flexible	0.2 ... 2.5 mm ²
Conductor cross-section flexible with ferrule without plastic sleeve	0.25 ... 2.5 mm ²
Conductor cross-section flexible with ferrule with plastic sleeve	0.2 ... 1.5 mm ²



Application in Hazardous Locations (Stratos Pro A221X only)

When using the device in a hazardous location, observe the specifications of the Control Drawing.



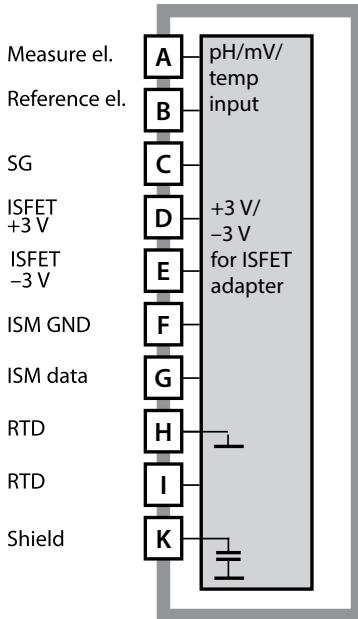


**Measuring modules for connection of analog sensors:
pH, oxygen (Oxy), conductivity (Cond, CondI, Cond-Cond)**

Measuring modules for the connection of analog sensors are simply inserted into the module slot.

Changing the Measuring Function

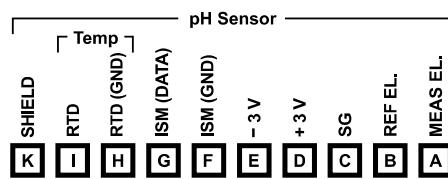
When you replace the measuring module, you must select the corresponding measuring function in the "Service" menu.



Module for pH Measurement

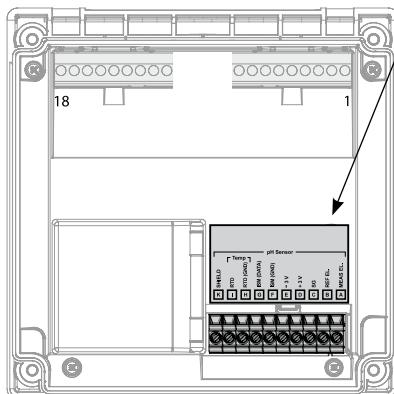
Order codes MK-PH015N / MK-PH015X

See the following pages for wiring examples.



Terminal Plate of pH Module

The terminals are suitable for single or stranded wires up to 2.5 mm² (AWG 14).



The measuring module comes with a self-adhesive label. Stick the label to the module slot on the device front. This way, you have the wiring "under control".

Example 1

Measuring task:

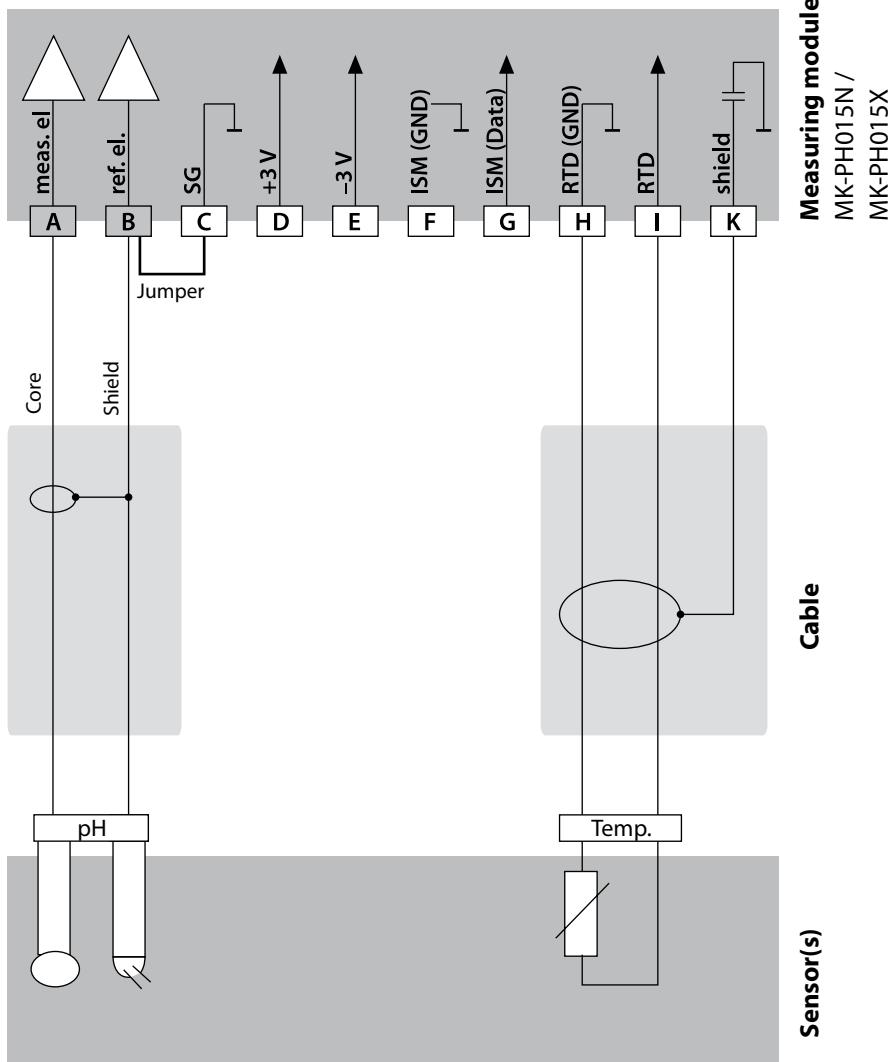
pH, temperature, glass impedance

Sensor:

pH sensor, eg, SE 555X/1-NS8N, cable: ZU 0318

Temperature detector:

separate



Example 2

Measuring task:

pH/ORP, temperature, glass impedance, ref. impedance

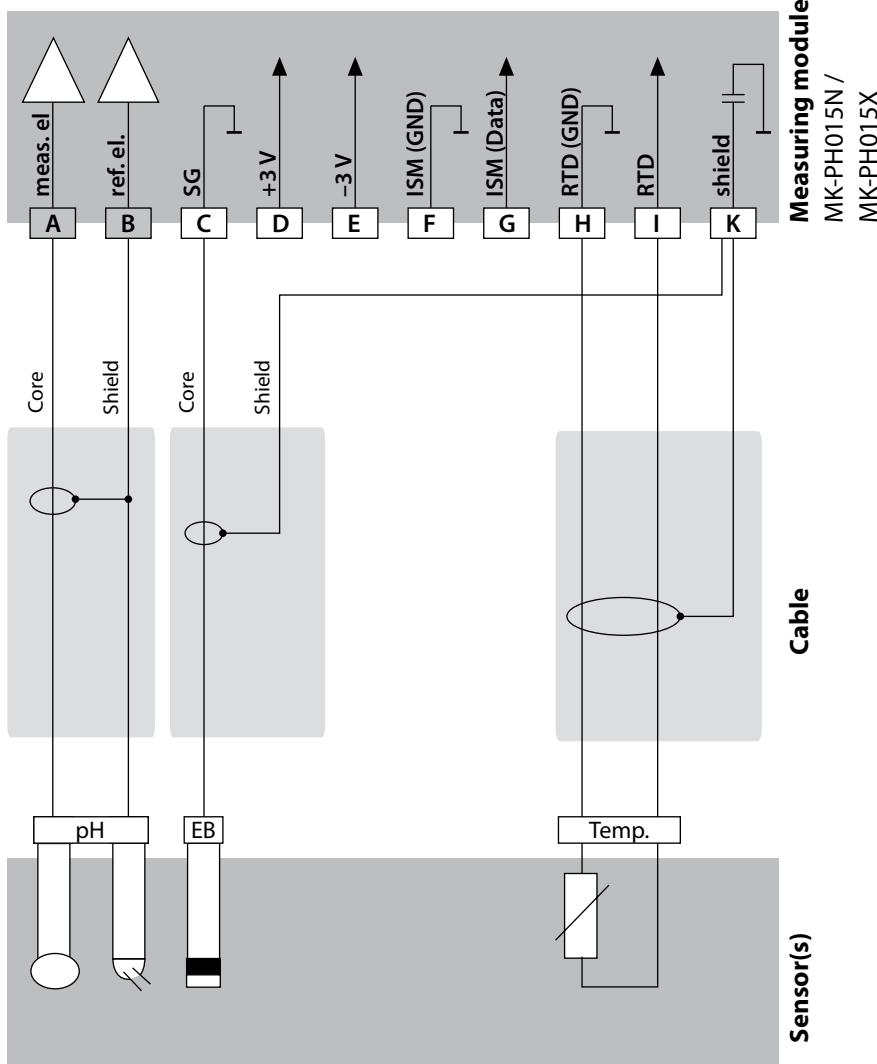
Sensor:

pH sensor, eg, SE 555X/1-NS8N, cable: ZU 0318

Temperature detector:

separate

Equipotential bonding electrode: ZU 0073



Example 3

Measuring task:

Sensor:

Cable:

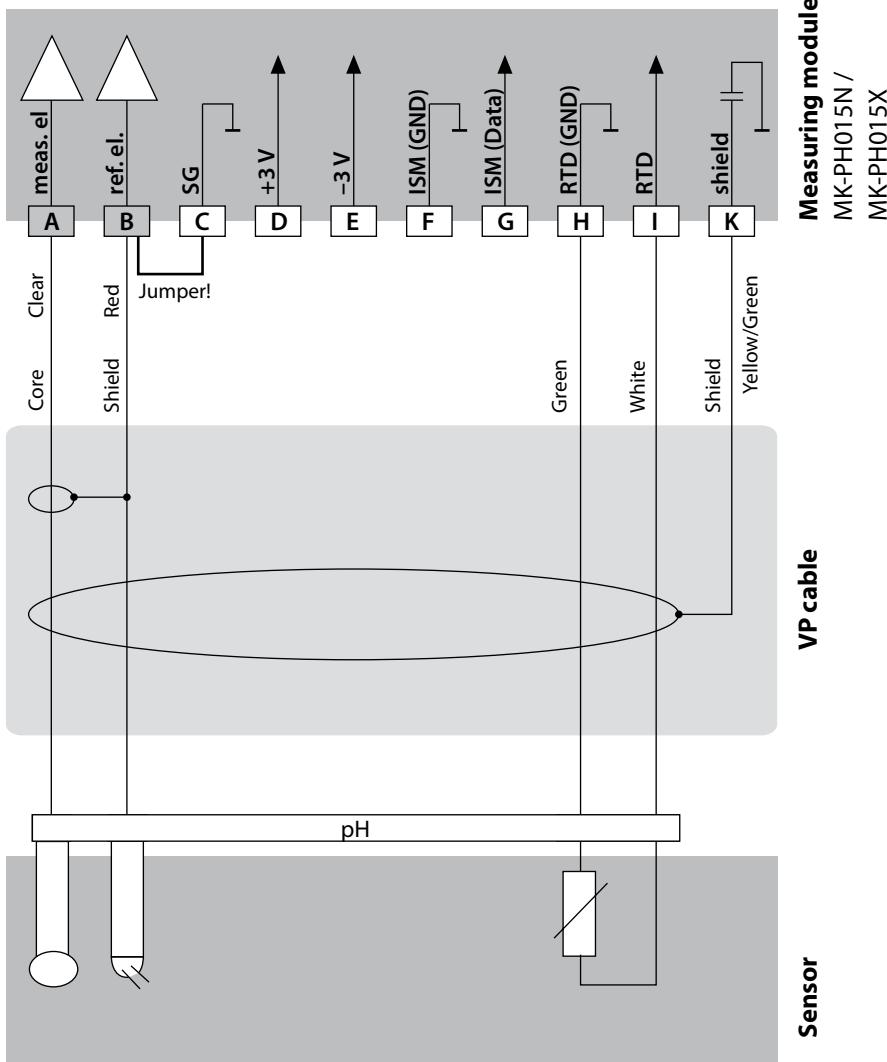
Temperature detector:

pH, temperature, glass impedance

pH sensor, eg, SE 554X/1-NVPN,

CA/VP6ST-003A (ZU 0313)

integrated



Example 4

Measuring task:

pH/ORP, temperature, glass impedance, ref. impedance

Sensor:

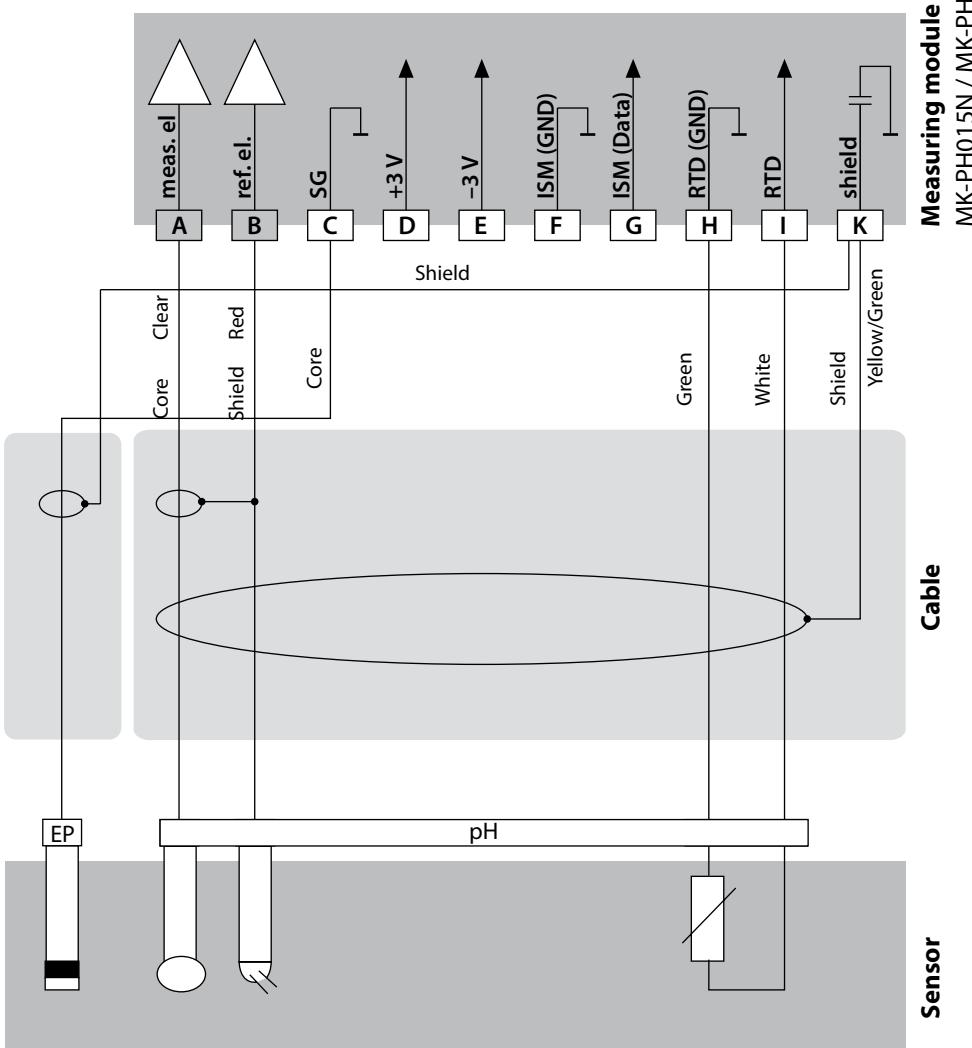
pH sensor, eg, SE 555X/1-NVPN, cable: ZU 0313

Temperature detector:

integrated

Equipotential bonding electrode:

ZU 0073



pH

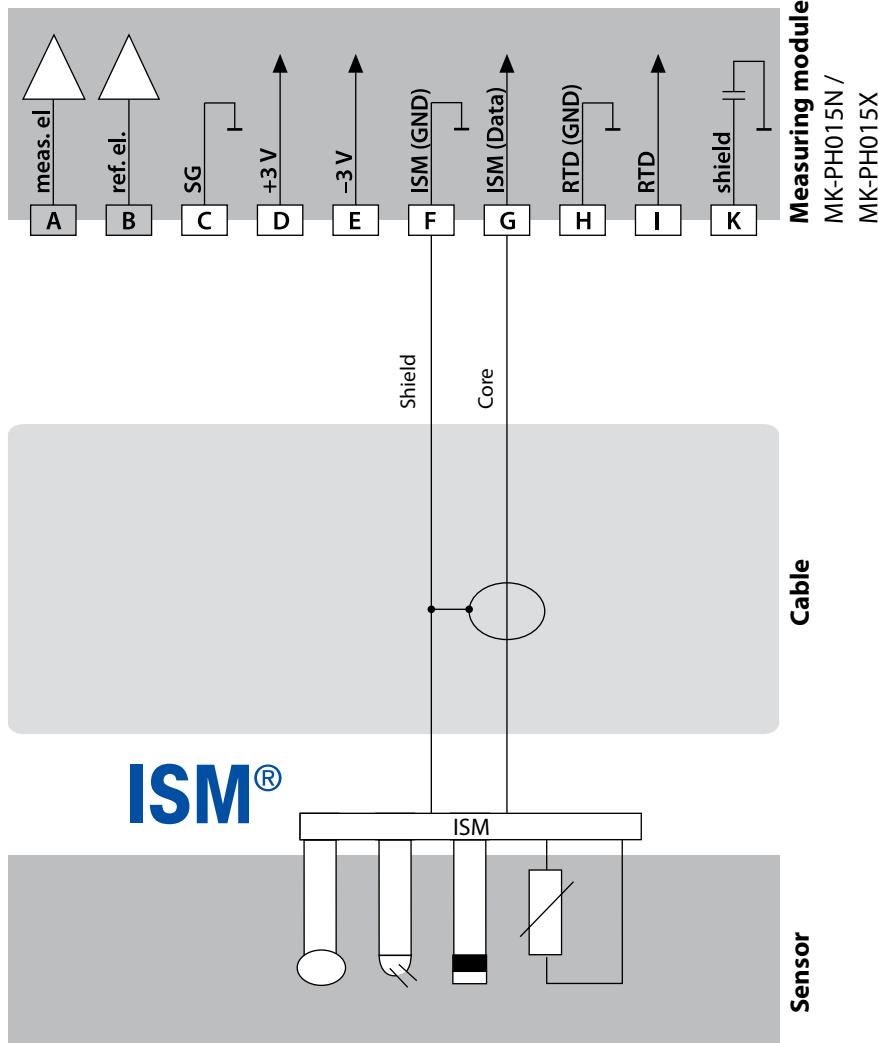
Example 5**NOTICE!** Do not connect an additional analog sensor!

Measuring task: pH/ORP, temperature, glass impedance, ref. impedance

Sensor: pH sensor, eg, ISM digital, cable: AK9

Temperature detector: integrated

Equipotential bonding electrode: integrated



Example 6

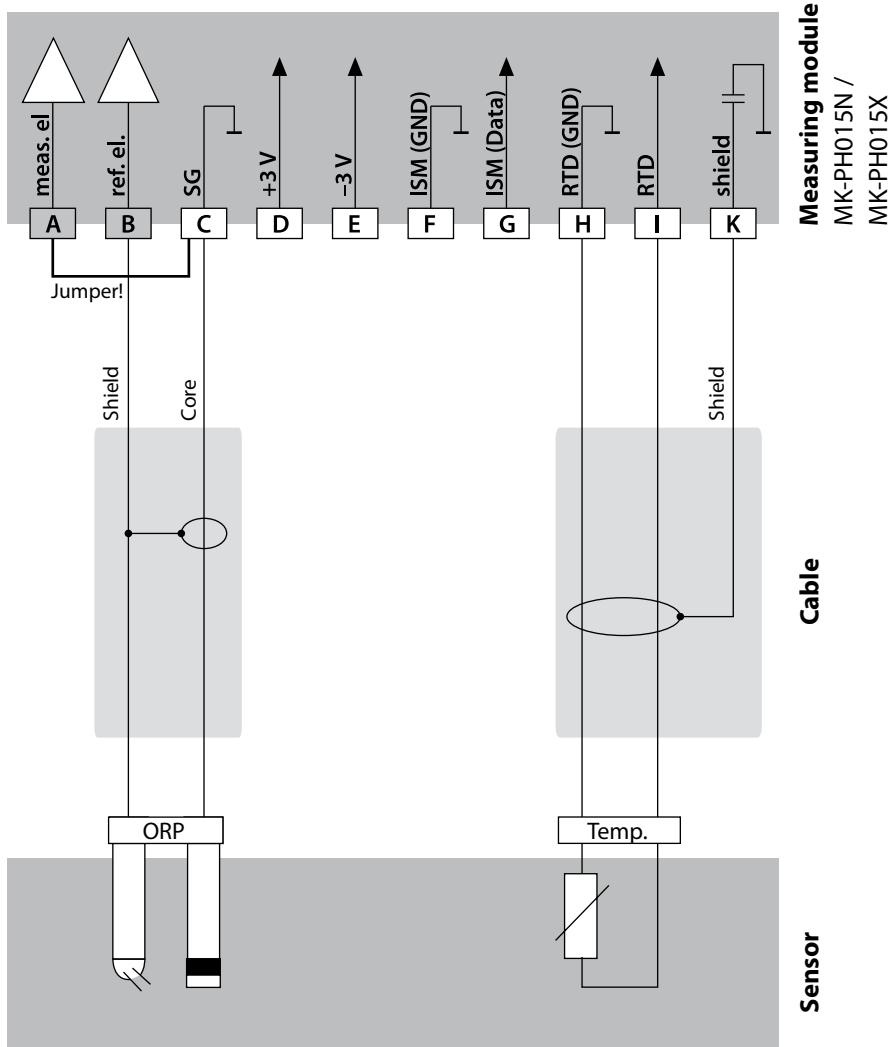
Please note: Switch off Sensocheck!

Measuring task:

ORP, temperature, ref. impedance

Sensor:

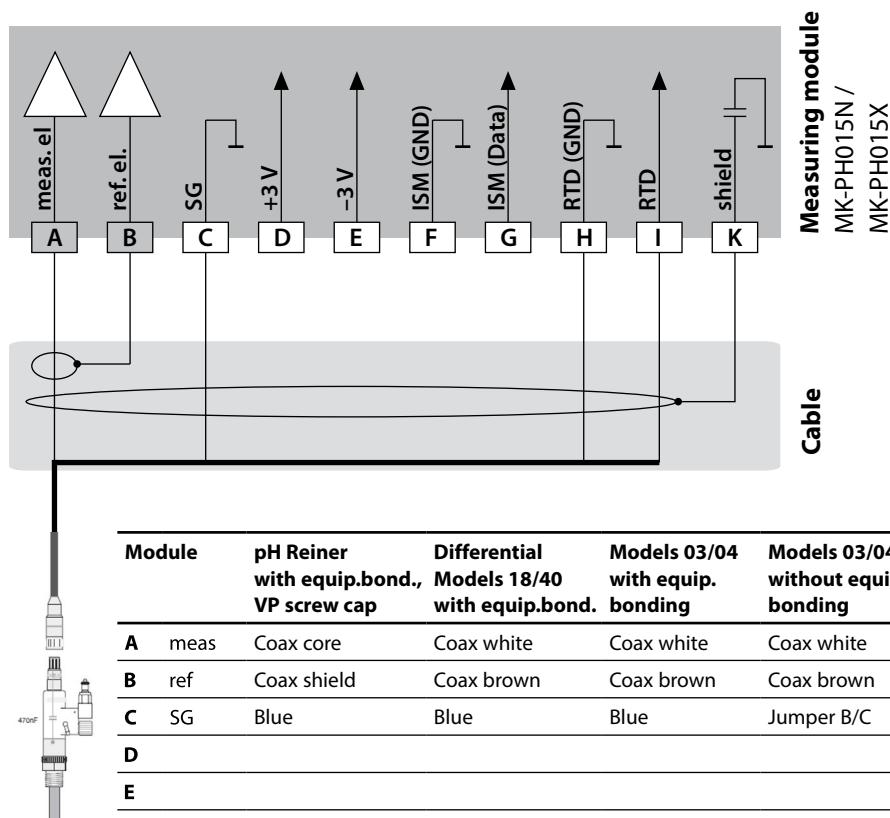
ORP sensor, eg, SE 564X/1-NS8N, cable: ZU 0318
separate



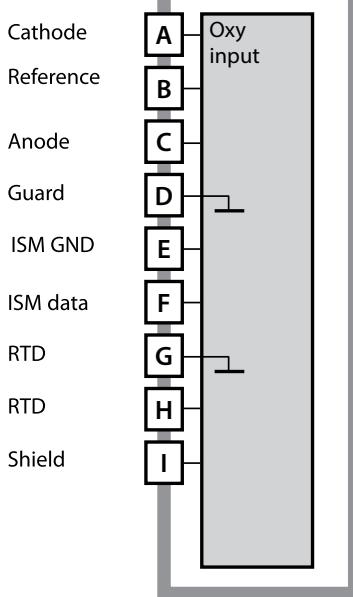
pH

Example 7

Connecting a Pfaudler probe



Module	pH Reiner with equip.bond., VP screw cap	Differential Models 18/40 with equip.bond.	Models 03/04 with equip. bonding	Models 03/04 without equip. bonding
A meas	Coax core	Coax white	Coax white	Coax white
B ref	Coax shield	Coax brown	Coax brown	Coax brown
C SG	Blue	Blue	Blue	Jumper B/C
D				
E				
F				
G				
H RTD (GND)	Green	Brown	Brown	Brown
I RTD	White	Green, Black	Green, Black	Green, Black
K Shield	Green/Yellow, Gray	Orange, Violet	Orange, Violet	Orange, Violet

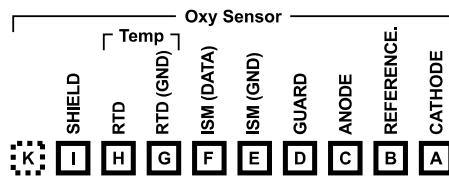


Module for Oxygen Measurement

Order codes:

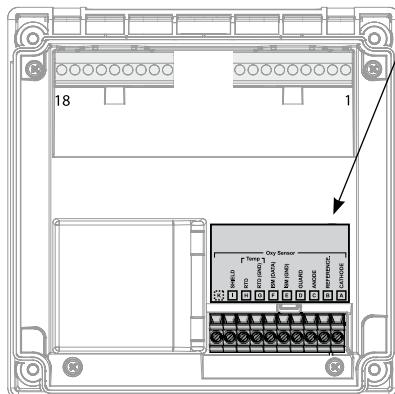
MK-OXY045N / MK-OXY045X

See the following pages for wiring examples.



Terminal Plate of Oxy Module

The terminals are suitable for single or stranded wires up to 2.5 mm² (AWG 14).



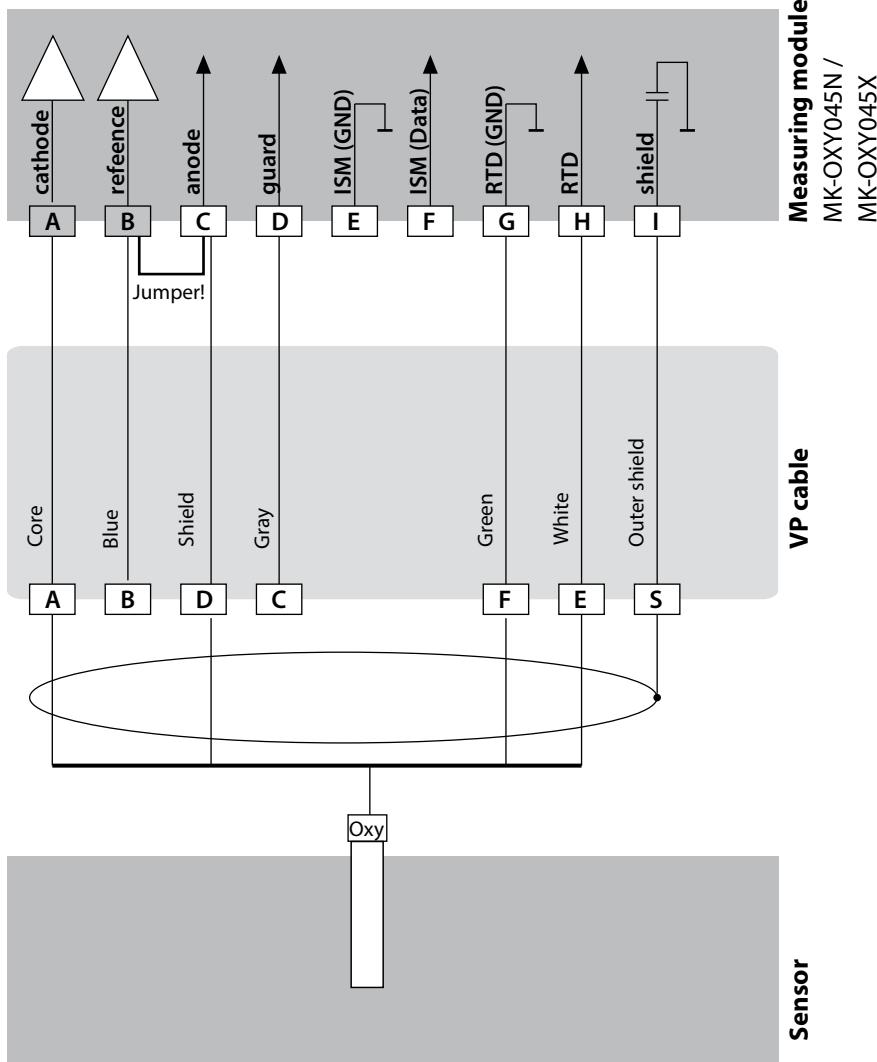
The measuring module comes with a self-adhesive label. Stick the label to the module slot on the device front. This way, you have the wiring "under control".

Oxy

Example 1

Measuring task: Oxygen STANDARD

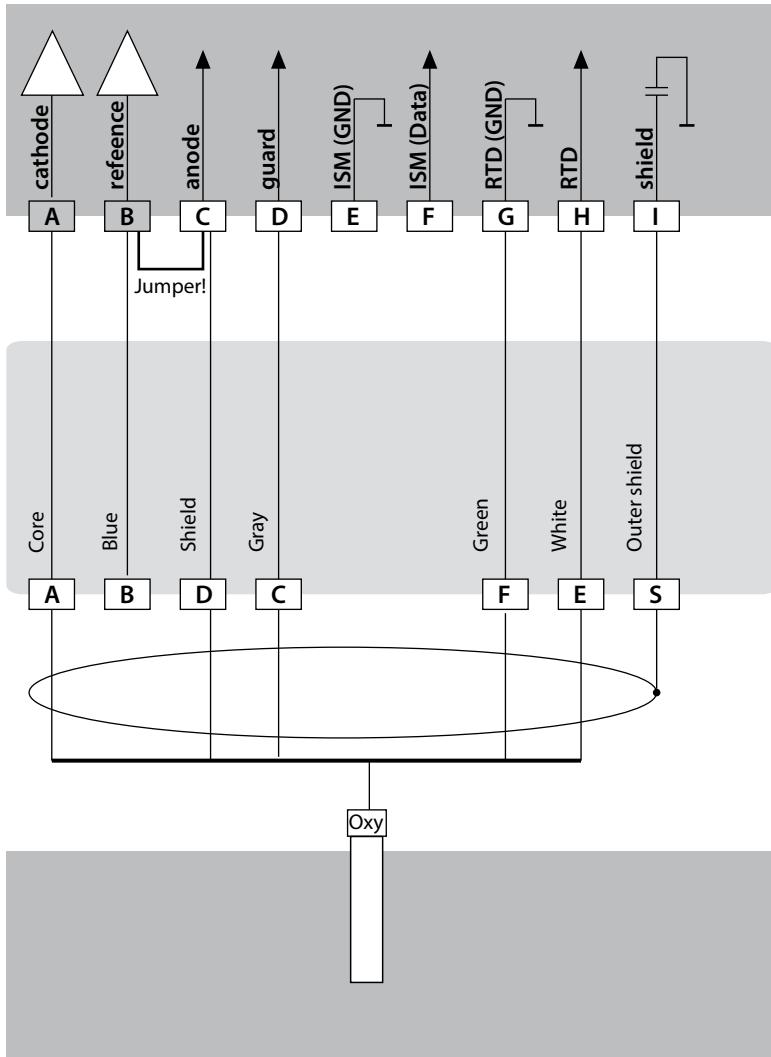
Sensor: "10" (eg, SE 706), cable: CA/VP6ST-003A (ZU 0313)



Example 2

Measuring task: Oxygen TRACES

Sensor: "01" (eg, SE 707), cable: CA/VP6ST-003A (ZU 0313)

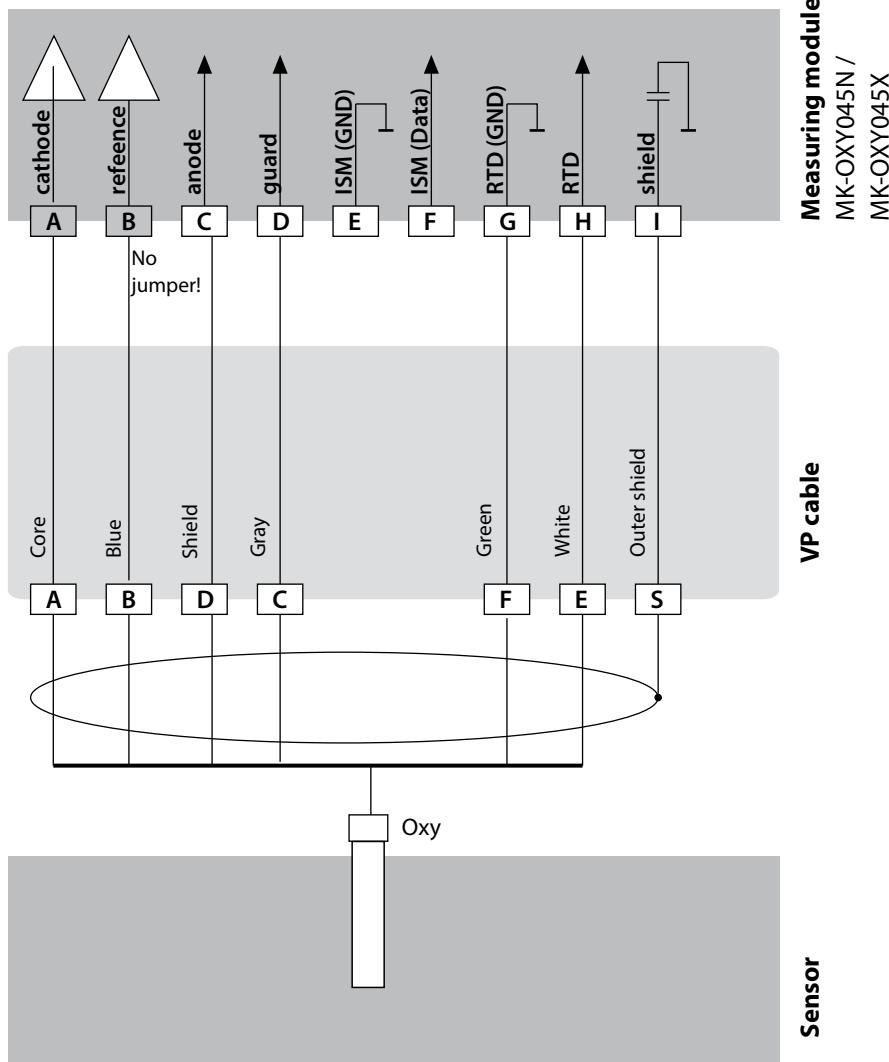


Oxy

Example 3

Measuring task: Oxygen SUBTRACES

Sensor: "001" (eg, SE 708), cable: CA/VP6ST-003A (ZU 0313)



Example 1

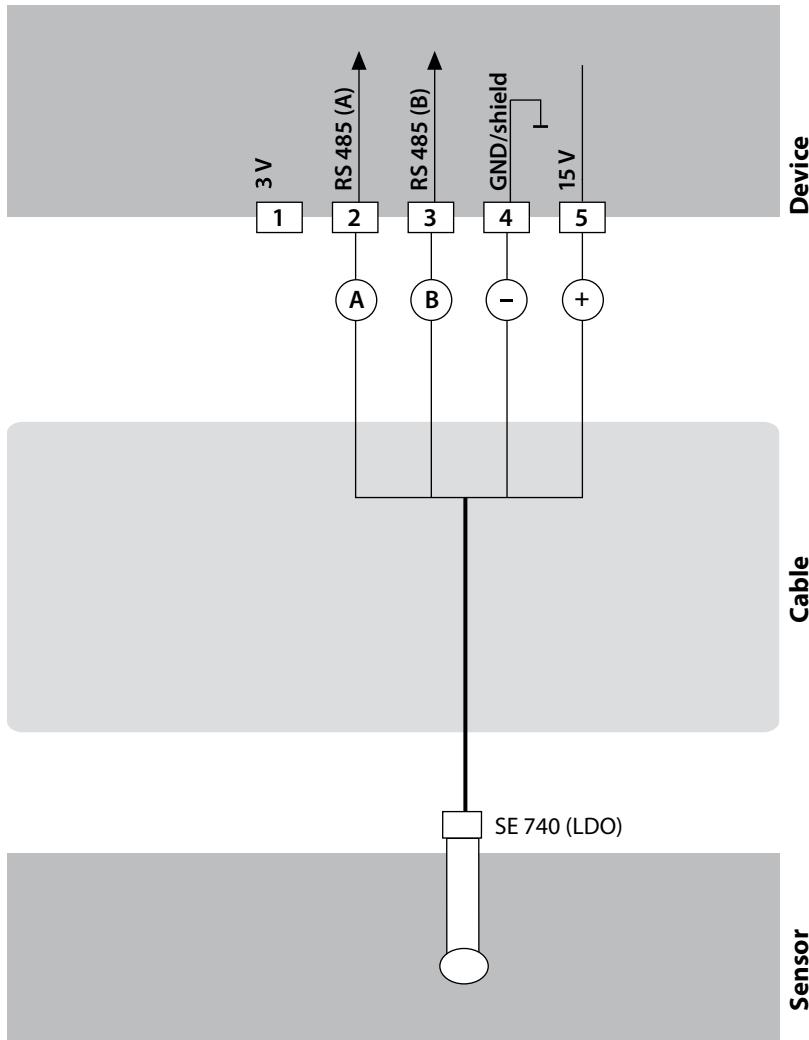
Measuring task:

Optical oxygen (LDO)

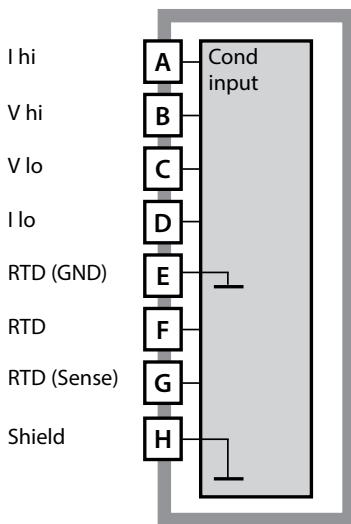
A451N only

Sensor:

SE 740, cable, eg, CA/M12-005N485



Cond

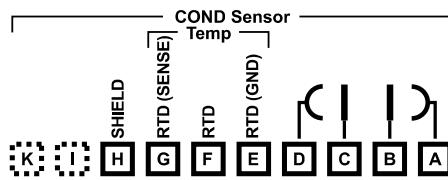


Module for Contacting Conductivity Measurement (Cond)

Order codes:

MK-COND025N / MK-COND025X

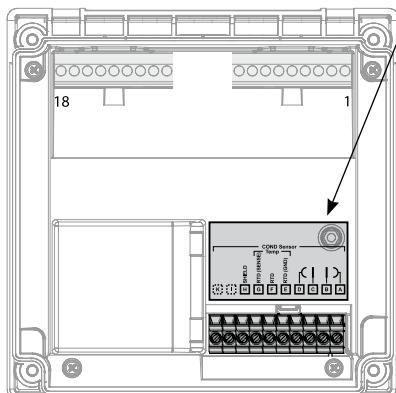
See the following pages for wiring examples.



Terminal Plate of Module for Cond Measurement

The terminals are suitable for single or stranded wires up to 2.5 mm^2 (AWG 14).

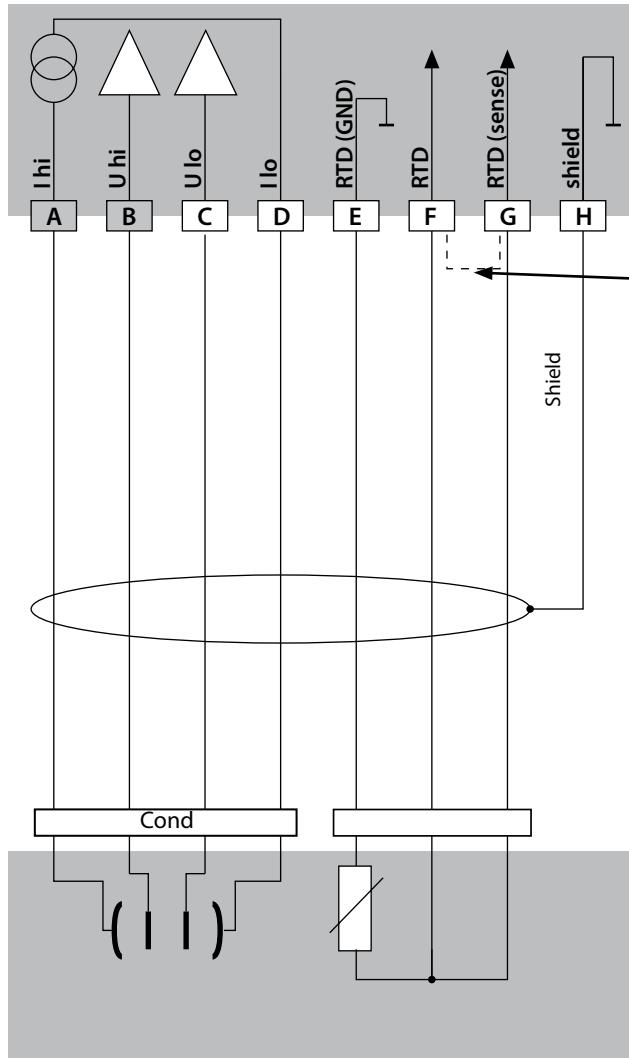
The measuring module comes with a self-adhesive label. Stick the label to the module slot on the device front. This way, you have the wiring "under control".



Example 1

Measuring task: Conductivity, temperature

Sensor: 4 electrodes



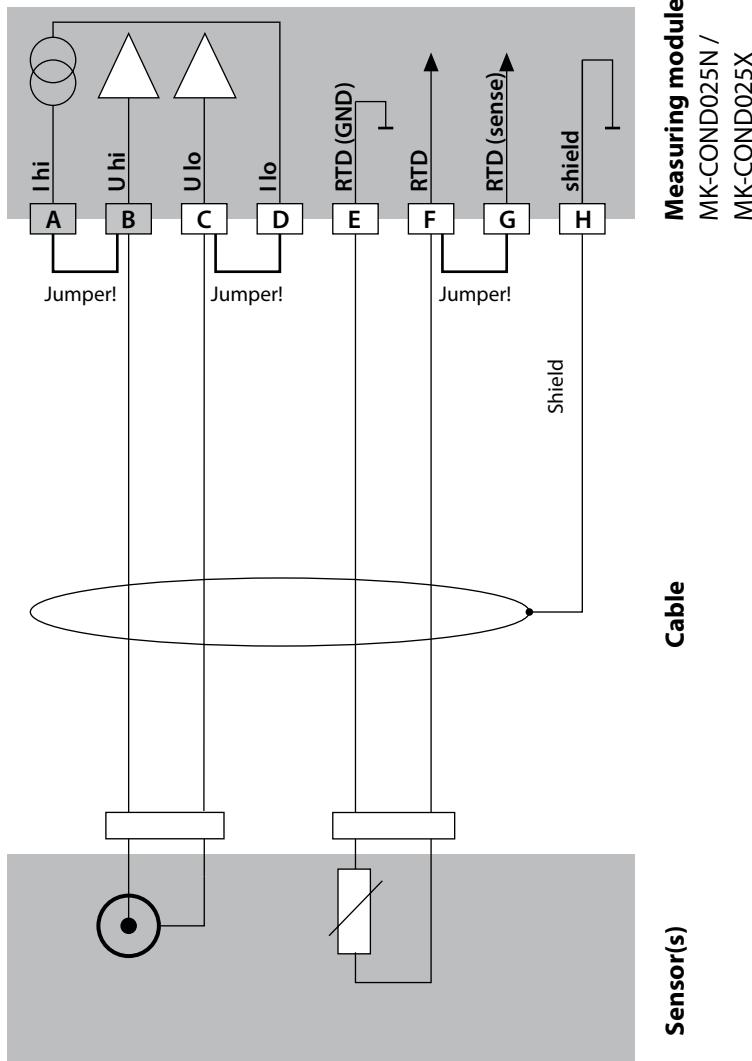
Measuring module
MK-COND025N /
MK-COND025X

Place jumper across F
and G when a 2-wire
temperature probe is
used!

Cond

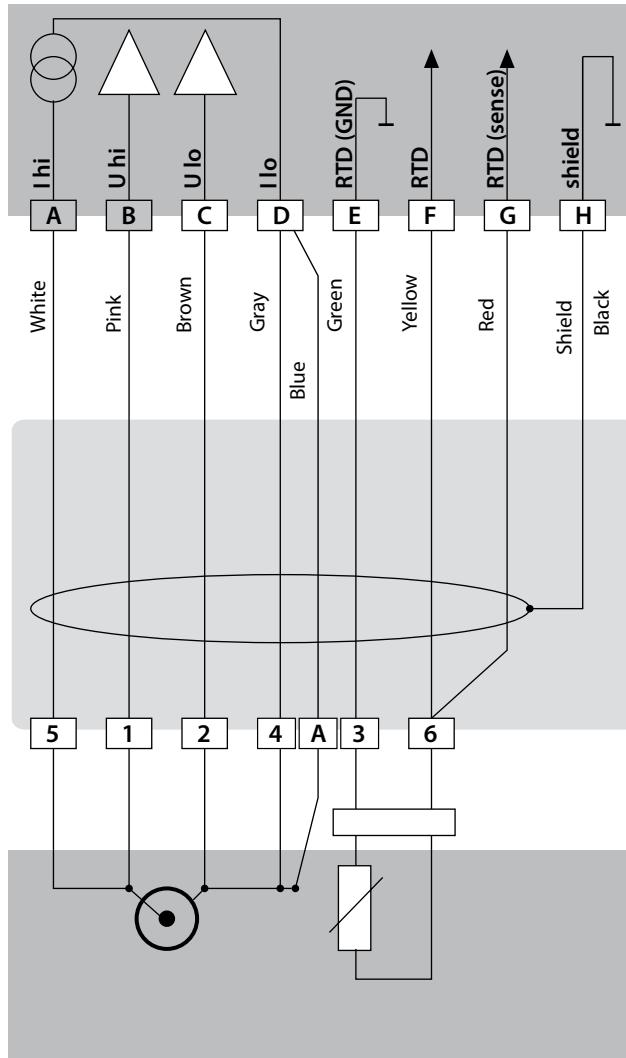
Example 2

Measuring task: Conductivity, temperature
Sensor: 2 electrodes, coaxial



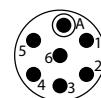
Example 3

Measuring task: Conductivity, temperature
Sensor: SE 604, cable: ZU 0645



Measuring module
MK-COND025N /
MK-COND025X

Cable



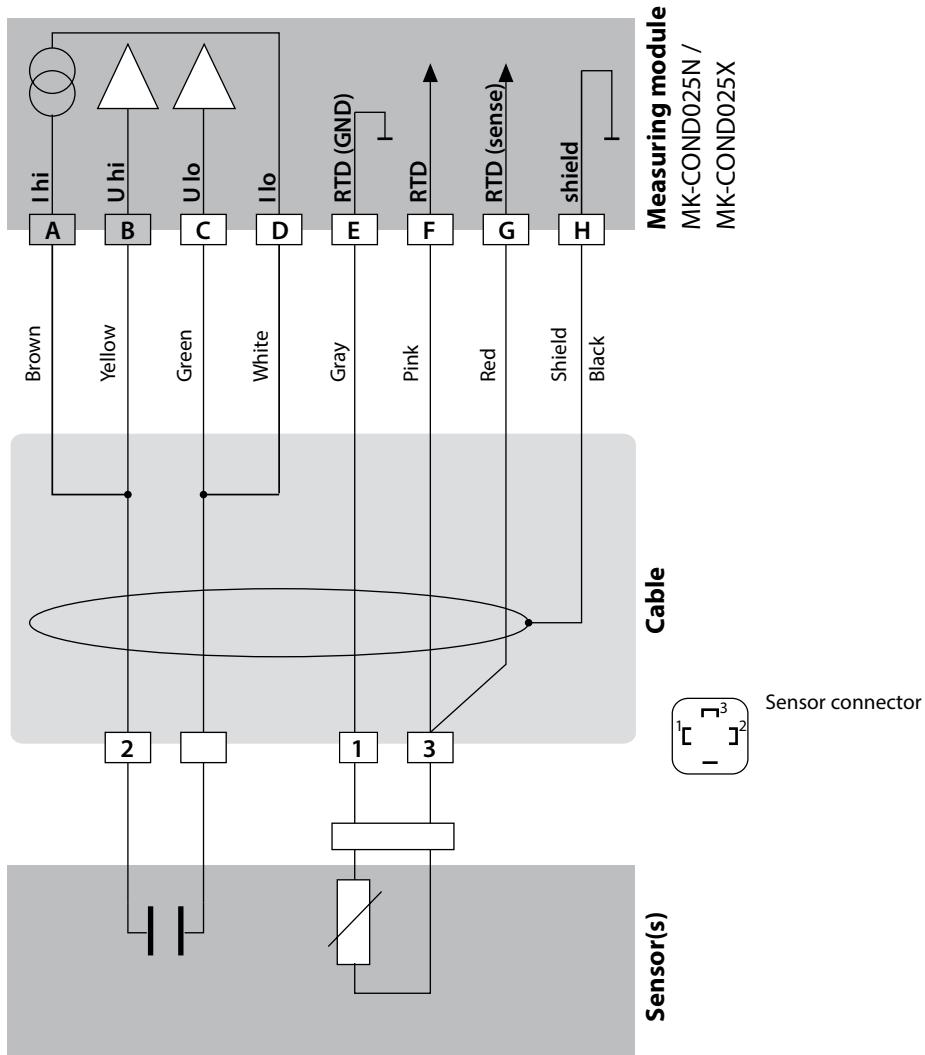
Sensor connector

Sensor(s)

Cond

Example 4

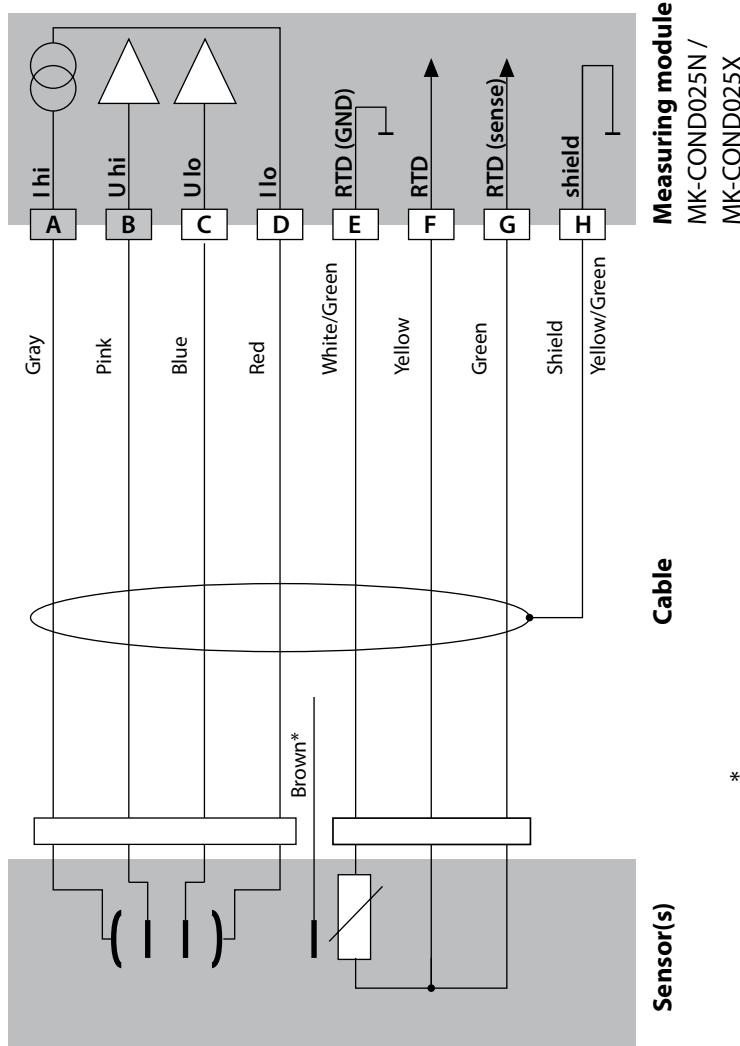
Measuring task: Conductivity, temperature
 Sensor: SE 630



Example 5

Measuring task: Conductivity, temperature

Sensor: SE 600 or SE 603 4-EL fringe-field sensor



Cond

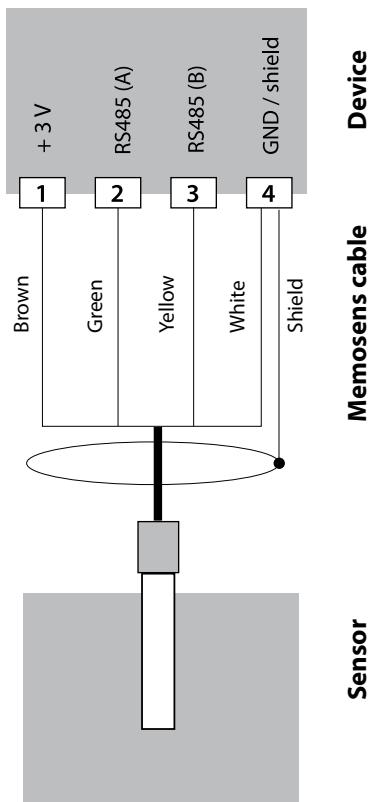
Example 6

Measuring task: Conductivity, temperature

Sensor: Memosens

NOTICE: Connection to RS-485 interface!

Remove the measuring module.

**Examples:**

SE 604(X)-MS

SE 605H-**

SE 615(X)MS

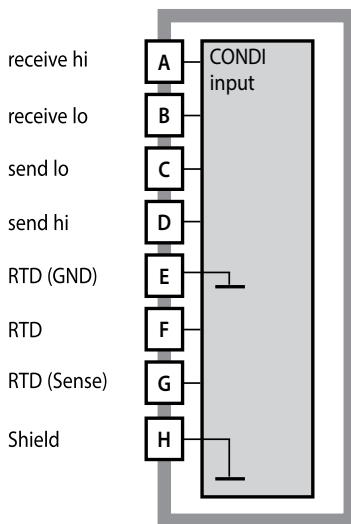
SE 630(X)MS

Connect the Memosens sensor to the RS-485 interface of the device.

275

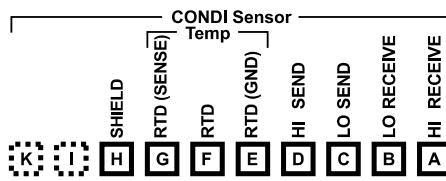
Cond

CondI

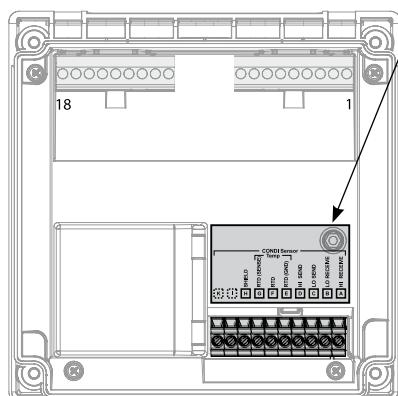
**Module for Inductive Conductivity****Measurement (CondI)**

Order codes: MK-CONDI035 N /
MK-CONDI035X

See the following pages for wiring
examples.

**Terminal Plate of CondI Module**

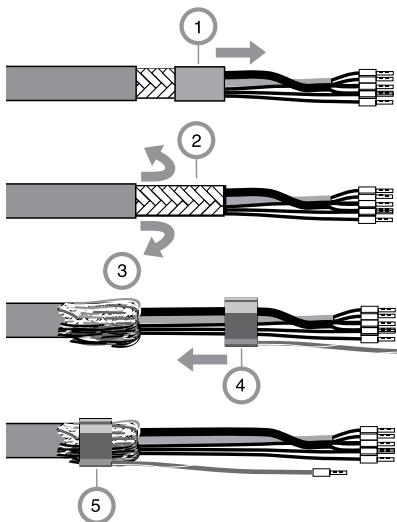
The terminals are suitable for single or stranded wires up to 2.5 mm^2 (AWG 14).



The measuring module comes with a self-adhesive label. Stick the label to the module slot on the device front. This way, you have the wiring "under control".

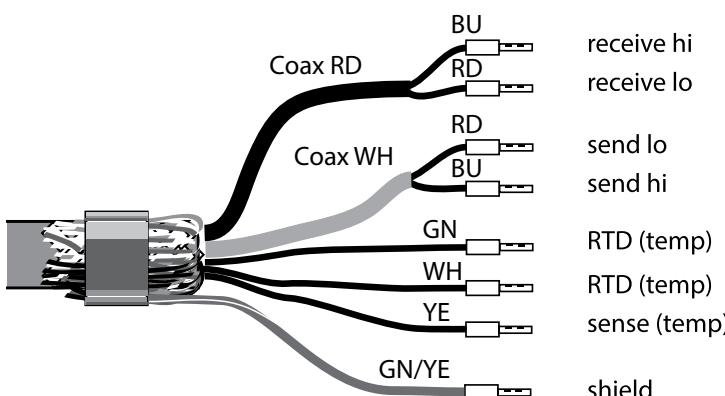
Preparing the Shield Connection

Pre-assembled special cable for SE 655 / SE 656 sensors



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

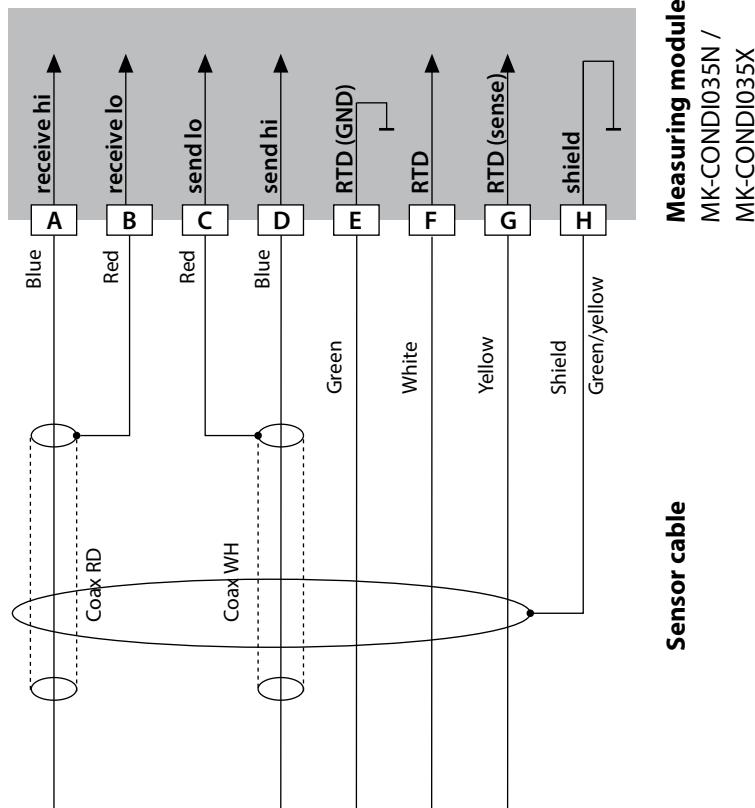
The pre-assembled special cable:



CondI

Example 1

Measuring task: Noncontacting conductivity, temperature
Sensor: SE 655 or SE 656

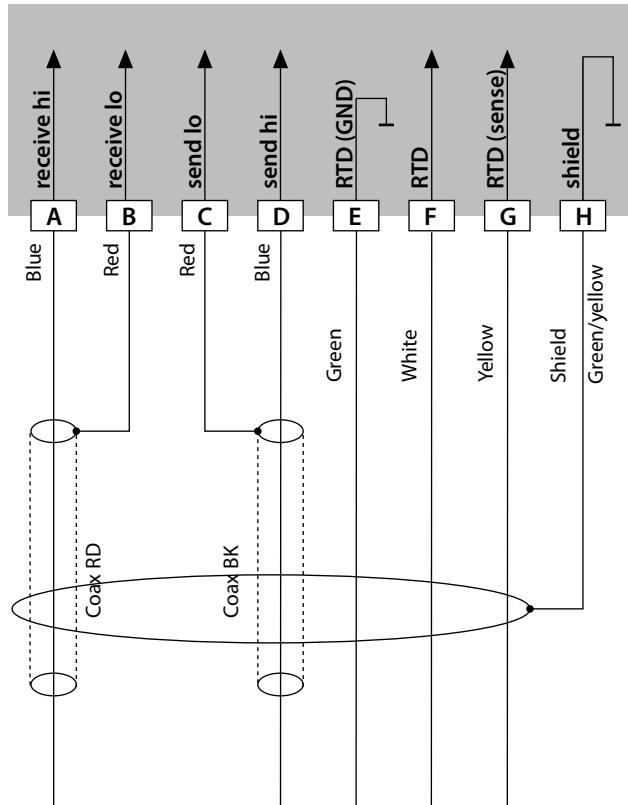


Sensor cable

Measuring module
MK-CONDI035N /
MK-CONDI035X

Example 2

Measuring task: Noncontacting conductivity, temperature
Sensor: SE 660

**Measuring module**

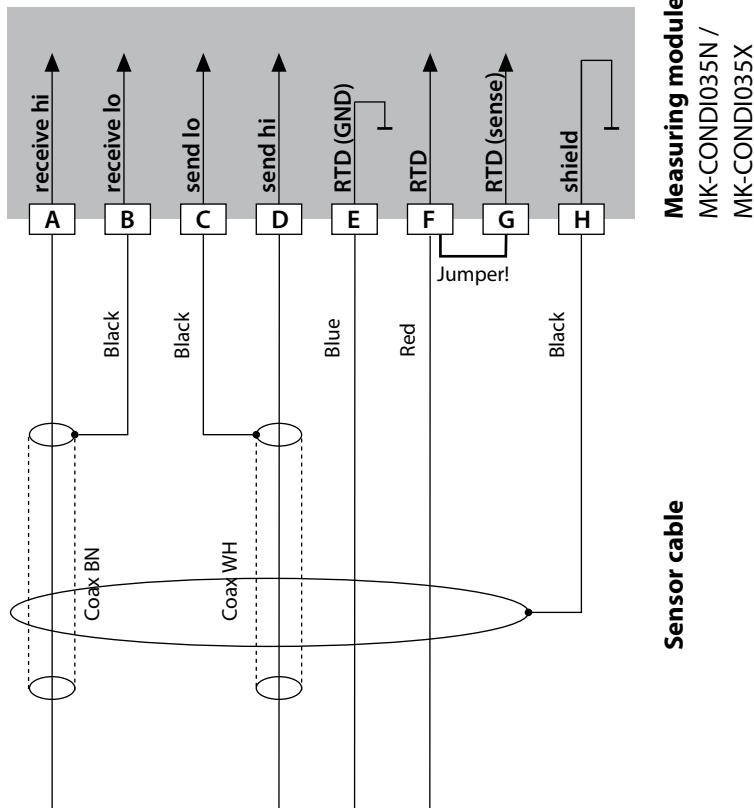
MK-CONDI035N /
MK-CONDI035X

Sensor cable

CondI

Example 3

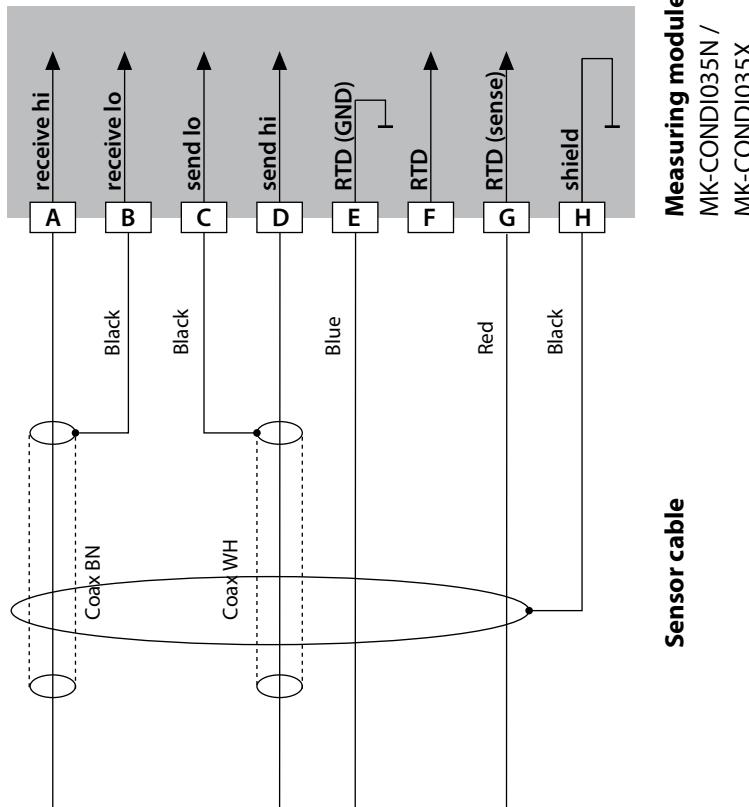
Measuring task: Noncontacting conductivity, temperature
 Sensor: Yokogawa ISC40 (Pt1000)

**Configuration settings for this sensor:**

SENSOR	Conductivity, temperature
Sensor:	OTHER
RTD TYPE	1000Pt
CELL FACTOR	1.88
TRANS RATIO	125

Example 4 for Stratos Pro A221N / A221X only

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



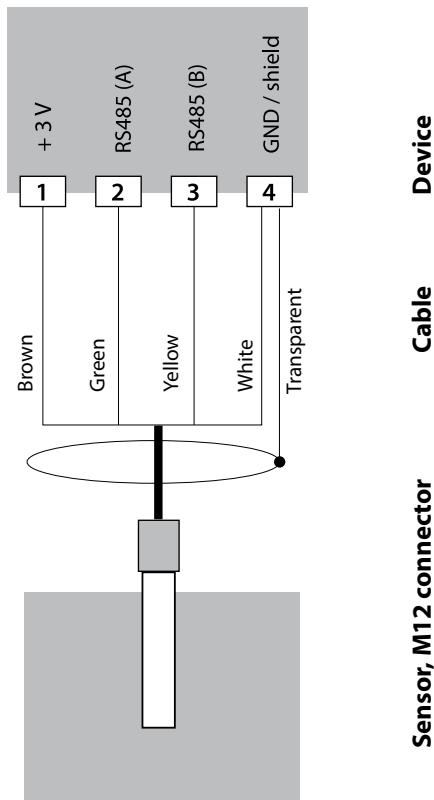
Configuration settings for this sensor:

SENSOR	Conductivity, temperature
Sensor:	OTHER
RTD TYPE	30 NTC
CELL FACTOR	approx. 1.7
TRANS RATIO	125

CondI

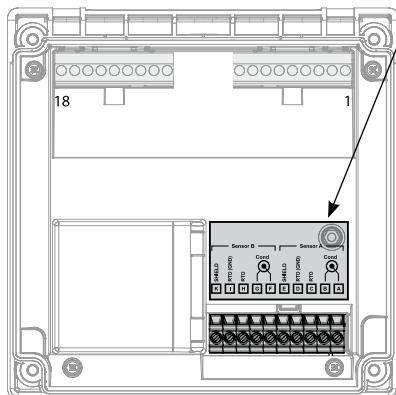
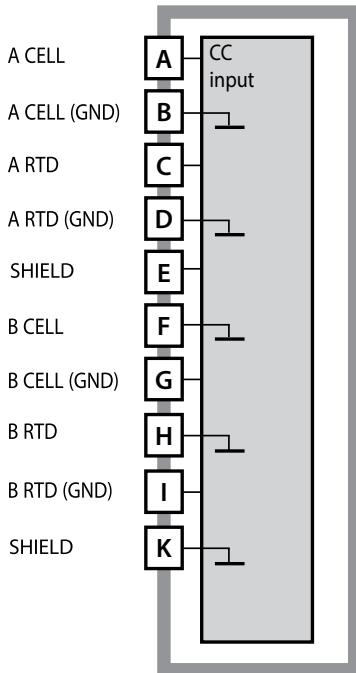
Example 5

Measuring task: Noncontacting conductivity, temperature
Sensor: SE 670/C1, SE 680/D1, SE 680N-C1N4U00M
Cable: CA/M12-005NA
NOTICE! Connection to RS-485 interface!
Remove the measuring module.



When the SE 670/C1 (SE 680/D1) sensor is selected in the Configuration menu, the default values are taken as calibration data. They can then be modified by calibration.

NOTICE: The calibration data of the SE 670/C1 (SE 680/D1) are saved in the analyzer and not in the sensor.

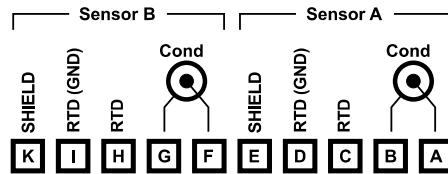


NOTICE! Do not use this module with
Stratos Pro A221X!

Dual-Conductivity Module

Order code MK-CC065N

See the following pages for wiring
examples.



Terminal Plate Dual Conductivity Measurement

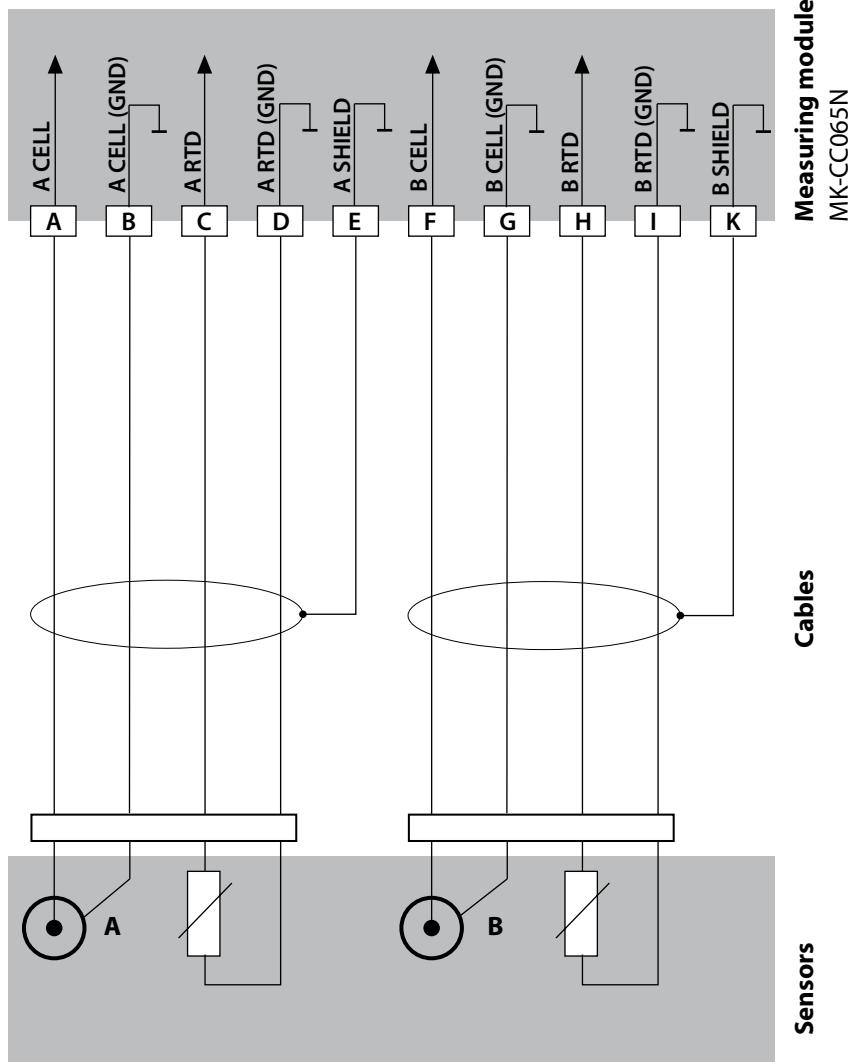
The terminals are suitable for single or
stranded wires up to 2.5 mm² (AWG 14).

The measuring module comes with a
self-adhesive label. Stick the label to
the module slot on the device front.
This way, you have the wiring "under
control".

CC

Example 1

Measuring task: Dual conductivity, temperature
Sensor: 2 coaxial sensors

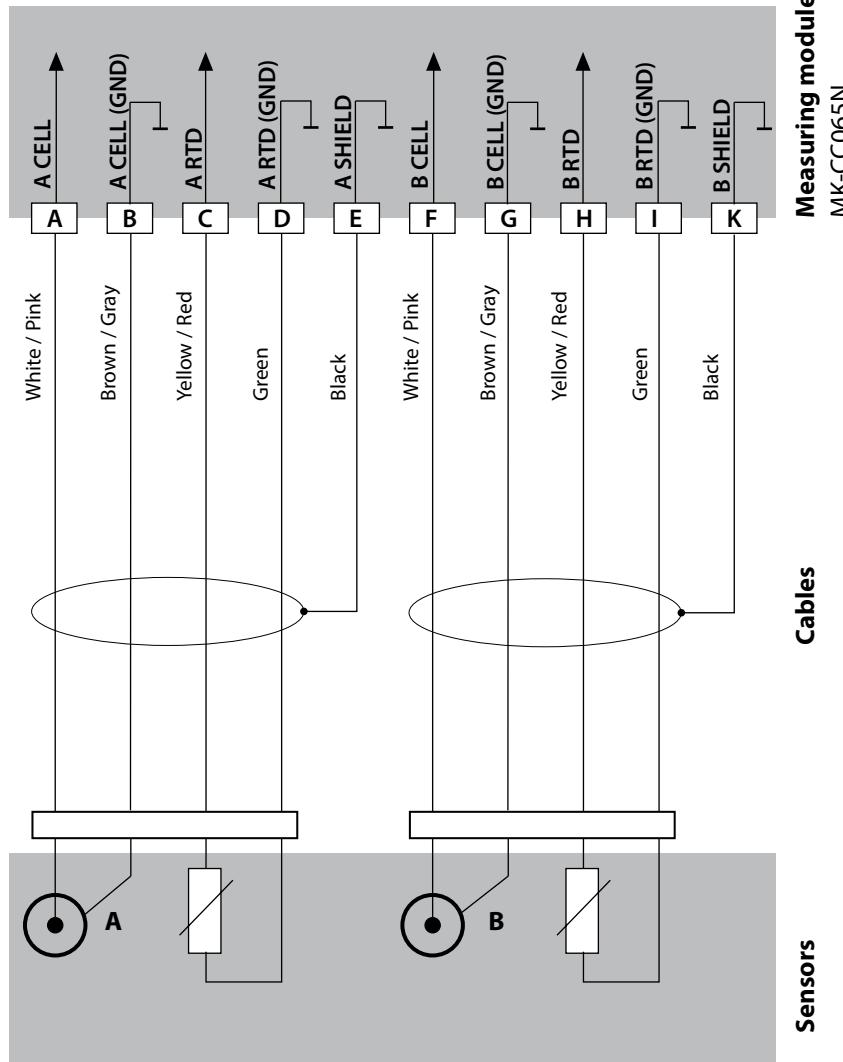


Example 2

Measuring task: Dual conductivity, temperature

Sensor: 2 x SE 604

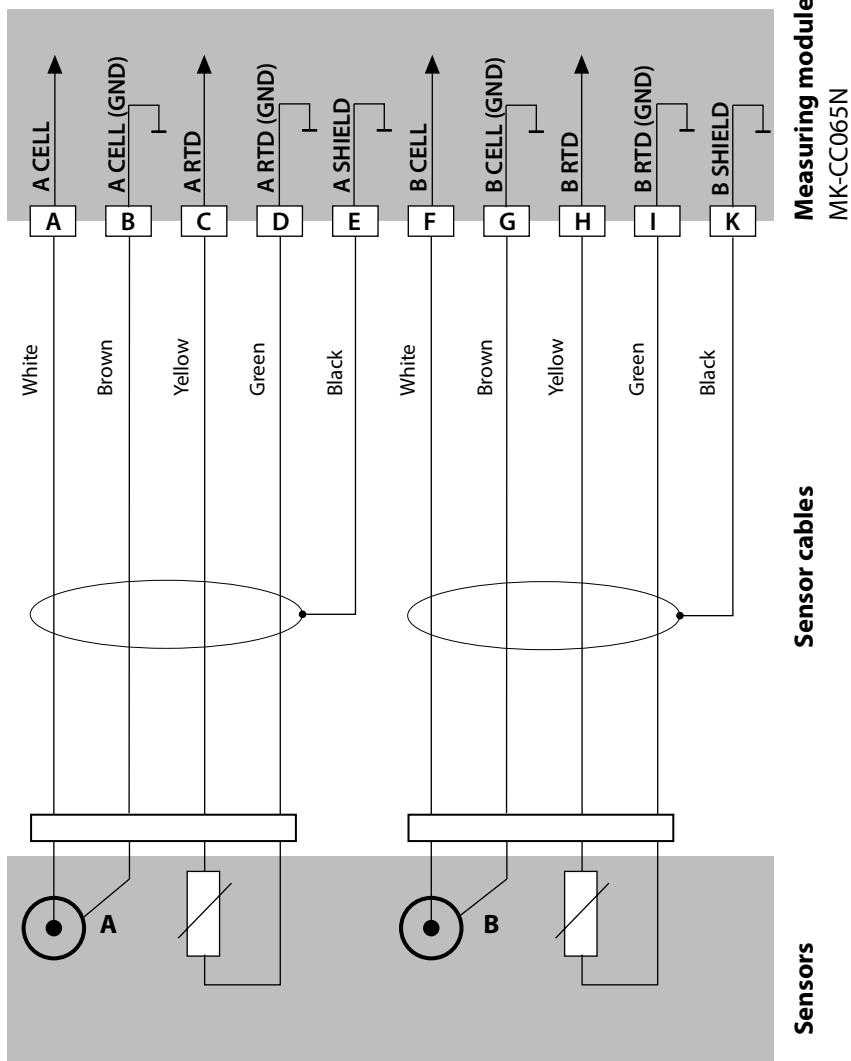
Cable: 2 x ZU 0645



CC

Example 3

Measuring task: Dual conductivity, temperature
 Sensor: 2 x SE 610



Changing the Measuring Function

In the "Service" menu you can select another measuring function at any time.

Calibration and Maintenance in the Lab

The "MemoSuite" software allows calibrating Memosens sensors under reproducible conditions at a PC in the lab. The sensor parameters are registered in a database. Documenting and archiving meet the demands of FDA CFR 21 Part 11. Detailed reports can be output as csv export for Excel. MemoSuite is available as accessory and comes in the versions "Basic" and "Advanced": www.knick.de.

Settings and Specifications

Connected sensor: Sensor type, manufacturer, order code and serial number

Function selection:
The selected function is highlighted.

Connected sensor: Sensor type, manufacturer, order code and serial number, measuring point and tag number

Last adjustment

You can magnify a measured-value display at a click of the mouse.

The screenshot shows the MemoSuite software window. At the top, there's a title bar with the application name and a dropdown menu. Below it is a navigation bar with tabs: StartCenter (highlighted with a red box), Calibration, TableView, History, Statistics, and pH Buffers. The main area is divided into three sections: 'Measured values' (pH value: 7.09 pH, pH voltage: 49.2 mV, Temperature: 25.1 °C), 'Sensor data' (Sensor type: pH (glass), Manufacturer: KNICK, Order code: SE 554X/1-NMSN, Serial number: 1030550, Measuring point: 0, Tag number: 0), and 'Adjustment data' (Date: 6/27/2011 20:09:12, Slope: 58.5 mV/pH, Zero point: 7.06 pH). A red circle highlights the '7.09 pH' value in the measured values section. A red arrow points from this circle to a callout box at the bottom left. Another red arrow points from the '7.09 pH' value to a magnifying glass icon in a callout box at the bottom right. A red box highlights the 'StartCenter' tab in the navigation bar. A red arrow points from this box to a callout box on the right side. A red box highlights the 'Sensor data' section in the main area. A red arrow points from this box to a callout box on the right side. A red box highlights the '7.09 pH' value again, with a red arrow pointing to a callout box at the bottom right.

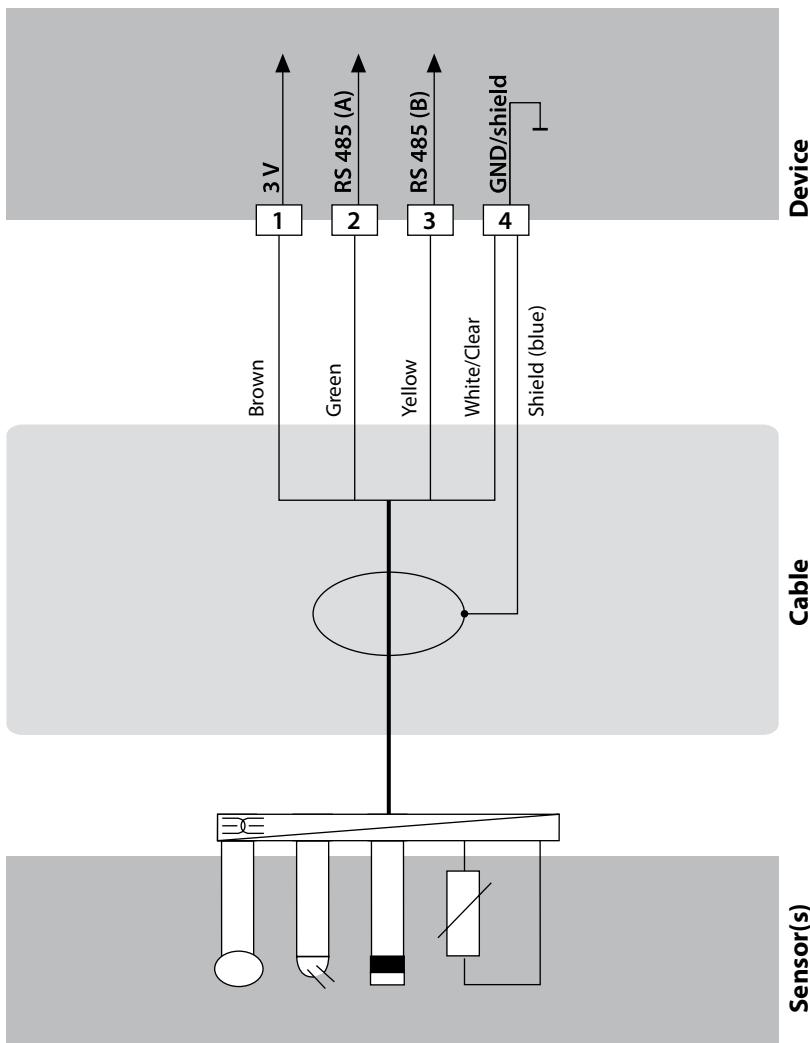
pH**Example 1**

Measuring task: pH/ORP, temp, glass impedance, ref. impedance

Sensors (example): SE 554N/1-AMSN, Memosens

Cable (example): CA/MS-003NAA

NOTICE: Remove the measuring module!



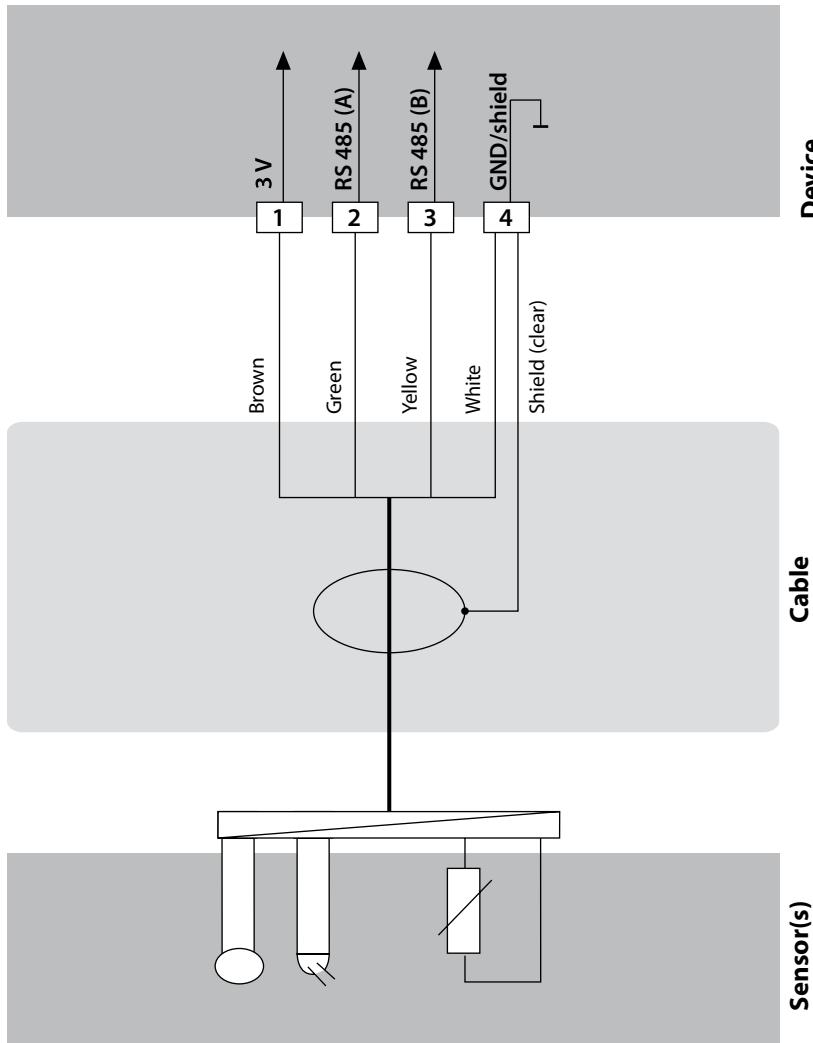
Example 2

Measuring task: pH, temp, glass impedance

Sensors (example): SE 555X/1-NMSN Memosens

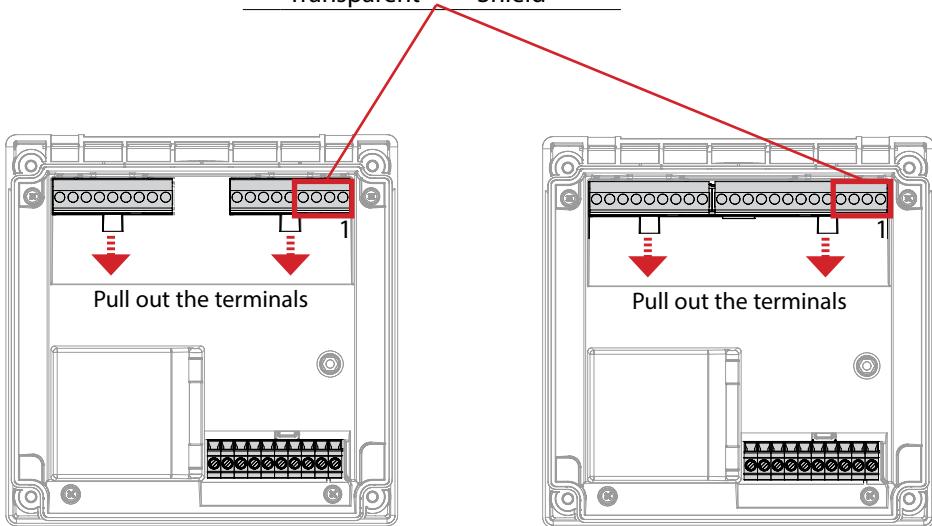
Cable (example): CA/MS-003XAA

NOTICE: Remove the measuring module!



Terminals for Memosens

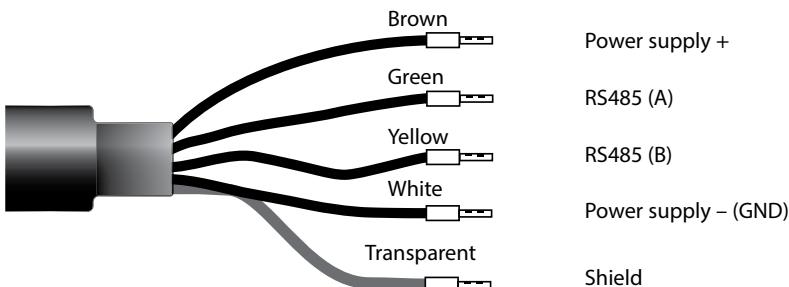
1	Brown	+3V
2	Green	RS 485 A
3	Yellow	RS 485 B
4	White	GND
	Transparent	Shield



Stratos Pro A221N / A221X

Stratos Evo A451N

NOTICE: Remove the measuring module!

Memosens Cable

Stratos Pro A221N / A221X

BUS communication	PROFIBUS PA (DP-V1)
Physical interface	To EN 61158-2 (IEC 61158-2), MBP-IS
Operating mode	Bus-powered with constant current consumption
Supply voltage	FISCO ≤ 17.5 V (trapezoidal or rectangular characteristic) Linear characteristic ≤ 26 V non-Ex ≤ 32 V
Current consumption	< 20 mA
Max. current in case of fault*	20.4 mA
Explosion protection	See Control Drawing or www.knick.de
Data retention	Parameters and calibration data > 10 years (EEPROM)
EMC	EN 61326
Emitted interference	Class B (residential area)
Immunity to interference	Industry
Nominal operating conditions	
Ambient temperature	-20 ... +65 °C for hazardous area, T4: -20 ... +65 °C for hazardous area, T6: -20 ... +50 °C
Transport/Storage temperature	-20 ... +70 °C
Relative humidity	10 ... 95% not condensing (assembly mounted in housing)
Bus connection	3 pluggable terminals Equipotential bonding
CONTROL input	Galvanically separated optocoupler)
Function	Flow measurement (FLOW)
FLOW	Pulse input for flow measurement 0 ... 100 pulses/s Display 00.0 ... 99.9 l/h
Real-time clock	Different time and date formats selectable
Power reserve	> 5 days
Adjustable via bus	
RoHS conformity	According to EU directive 2011/65/EU

* including current increase due to the integrated Fault Disconnection Electronic (FDE)

Stratos Evo A451N

BUS communication	PROFIBUS DP (DP-V1)
Physical interface	RS-485
Baud rate	9.6 kbits/s ... 1.5 Mbits/s
Power supply	80 V (-15%) ... 230 (+10%) V AC, approx. 15 VA, 45 ... 65 Hz 24 V (-15%) ... 60 (+10%) V DC, 10 W
Electrical safety	Overvoltage category II, protection class II Protection against electric shock by protective separation of all extra-low-voltage circuits against mains according to EN 61010-1
Data retention	Parameters and calibration data > 10 years (EEPROM)
EMC¹⁾	EN 61326
Emitted interference	Class A (industry)
Immunity to interference	Industry
Nominal operating conditions	
Ambient temperature	-20 ... +55 °C
Transport/Storage temperature	-20 ... +70 °C
Relative humidity	10 ... 95% not condensing (assembly mounted in housing)
Bus connection	3 pluggable terminals DP connection
REL1/REL2	Relay1 and Relay2 contacts, floating
Contact ratings	AC < 250 V / < 3 A / < 750 VA DC < 30 V / < 3 A / < 90 W
Contact response	The relays can be freely controlled via PROFIBUS. They are switched via the DO1 and DO2 function blocks.
Power Out	Software-adjustable voltage for supplying the sensor (SE 740)
Voltages	3.1 V / 12 V / 15 V / 24 V
Power	Max. 1 W
CONTROL input	Galvanically separated optocoupler)
Function	Flow measurement (FLOW)
FLOW	Pulse input for flow measurement 0 ... 100 pulses/s Display 00.0 ... 99.9 l/h
Real-time clock	Different time and date formats selectable
Power reserve	> 5 days
Adjustable via bus	

¹⁾ The Stratos Evo A451N is intended for use in an industrial environment. In residential, commercial and light industrial environments as well as in small businesses, the device can cause functional disturbances due to emitted interference. When the device is used outside industrial locations, the user is required to take adequate measures.

Display	Display LC display, 7-segment with icons
Primary display	Character height approx. 22 mm, unit symbols approx. 14 mm
Secondary display	Character height approx. 10 mm
Backlighting	Multi-color, may be switched off for temperature code T6
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	Red backlighting in case of alarm
Keypad	Keys: meas, info, 4 cursor keys, enter Material: EPDM
FDA 21 CFR Part 11	Access control by editable passcodes Logbook entry in the case of configuration changes Message and logbook entry when enclosure is opened
Diagnostics functions	
Calibration data	Calibration date, zero, slope, response time
Device self-test	Automatic memory test (RAM, FLASH, EEPROM)
Display test	Display of all segments
Logbook	Audit Trail: 100 events with date and time
Service functions	
Sensor monitor	Display of direct sensor signals
Device type	Specifying the device type
Housing	Molded enclosure made of PBT/PC, glass-reinforced
Mounting	Wall, pipe/post or panel mounting
Color	Gray, RAL 7001
Ingress protection	IP 67 / NEMA 4X outdoor (with pressure compensation)
Flammability	UL 94 V-0
Dimensions	148 mm x 148 mm
Control panel cutout	138 mm x 138 mm to DIN 43 700
Weight	1.2 kg (1.6 kg incl. accessories and packaging)
Cable glands	3 knockouts for M20 x 1.5 cable glands 2 knockouts for NPT ½ " or rigid metallic conduit
Connections	Terminals, tightening torque: 0.5 ... 0.6 Nm. Conductor cross-section rigid/flexible: 0.2 ... 2.5 mm ² Conductor cross-section flexible with ferrule without plastic sleeve: 0.25 ... 2.5 mm ² Conductor cross-section flexible with ferrule with plastic sleeve: 0.2 ... 1.5 mm ²

pH

pH/mV input	Input for pH or ORP (redox) sensors or ISFET		
Input	Glass electrode or ISFET		
Input	Reference electrode		
Input	ORP electrode (eg. platinum) or auxiliary electrode for impedance measurement		
Measuring range	-1500 ... +1500 mV		
Display range	pH value	-2.00 ... +16.00	
	ORP	-1999 ... +1999 mV	
Glass electrode input ⁴⁾	Input resistance	> 1 x 10 ¹² Ω	
	Input current	< 1 x 10 ⁻¹² A	
	Impedance range	0.5 ... 1000 MΩ (±20%)	
Reference electrode input ⁴⁾	Input resistance	> 1 x 10 ¹⁰ Ω	
	Input current	< 1 x 10 ⁻¹⁰ A	
	Impedance range	0.5 ... 200 kΩ (±20%)	
Measurement error ^{1,2,3)}	pH value	< 0.02	TC: 0.002 pH/K
	mV value	< 1 mV	TC: 0.1 mV/K
pH sensor standardization *	pH calibration		
Operating modes	AUTO	Calibration with Calimatic automatic buffer recognition	
	MAN	Manual calibration with entry of individual buffer values	
	DAT	Data entry of pre-measured electrodes	
	Product calibration		
Calimatic buffer sets *	-01- Mettler-Toledo	2.00/4.01/7.00/9.21	
	-02- Knick CaliMat	2.00/4.00/7.00/9.00/12.00	
	-03- Ciba (94)	2.06/4.00/7.00/10.00	
	-04- NIST technical	1.68/4.00/7.00/10.01/12.46	
	-05- NIST standard	1.679/4.006/6.865/9.180	
	-06- HACH	4.01/7.00/10.01	
	-07- WTW techn. buffers	2.00/4.01/7.00/10.00	
	-08- Hamilton	2.00/4.01/7.00/10.01/12.00	
	-09- Reagecon	2.00/4.00/7.00/9.00/12.00	
	-10- DIN 19267	1.09/4.65/6.79/9.23/12.75	
	-U1- USER	Specifiable buffer set with 2 buffer solutions	
Zero adjustment	±200 mV (ISFET only) (±750 mV with Memosens ISFET)		
Max. calibration range	Asymmetry potential	±60 mV (±750 mV for Memosens ISFET)	
	Slope	80 ... 103 % (47.5 ... 61 mV/pH) (possibly restricting notes from Sensoface)	

ORP sensor standardization *	ORP calibration (zero adjustment)
Max. calibration range	-700 ... +700 ΔmV
Temperature input	Pt100 / Pt1000 / NTC 30 kΩ * 2-wire connection, adjustable
Measuring range	Pt 100/Pt 1000 -20.0 ... +200.0 °C (-4 ... +392 °F) NTC 30 kΩ -20.0 ... +150.0 °C (-4 ... +302 °F) NTC 8.55 kΩ (Mitsubishi) -10.0 ... +130.0 °C (+14 ... +266 °F) Balco 3 kΩ -20.0 ... +130.0 °C (-4 ... +266 °F)
Adjustment range	10 K
Resolution	0.1 °C (0.1 °F)
Measurement error ^{1,2,3)}	< 0.5 K (< 1 K for Pt100; < 1 K for NTC 30 kΩ >100 °C)
TC of process medium	Linear -19.99 ... +19.99 %/K (reference temp. 25 °C) Table: 0 ... 95 °C, user-defined in 5-K steps
ISM input	"One wire" interface for operation with ISM (digital sensors) (6 V / Ri= approx. 1.2 kΩ)
Memosens interface	Memosens (terminals 1 ... 4)
Data In/Out	Asynchronous interface, RS 485, 9600/19200 Bd
Power supply	Terminal 1: +3.08 V/10 mA, Ri < 1 Ω, short-circuit-proof
Adaptive calibration timer*	Interval 0000 ... 9999 h (Pat. DE 101 41 408)
Diagnostics functions	
Calibration data	Calibration date, zero, slope, response time
Power output	for operating an ISFET adapter +3 V / 0.5 mA -3 V / 0.5 mA
Sensocheck	Automatic monitoring of glass and reference electrode (can be switched off)
Delay	Approx. 30 s
Sensoface	Provides information on the sensor condition (can be switched off)
Evaluation of	Zero/slope, calibration interval, Sensocheck, wear

* user-defined

- 1) to EN 60746-1, at nominal operating conditions
- 2) ± 1 count
- 3) plus sensor error
- 4) at room temperature

Oxy

Standard version	Sensors: SE 706, InPro 6800, Oxyferm	
Input range	Meas. current -600 ... +2 nA	Resolution 10 pA
Measurement error ^{1,2,3)}	< 0.5% meas. val. + 0.05 nA + 0.005 nA/K	
Operating modes	GAS	Measurement in gases
	DO	Measurement in liquids
Display ranges	Saturation (-10 ... +80 °C)	0.0 ... 600.0 %
	Concentration (-10 ... +80 °C)	0.00 ... 99.99 mg/l
	(Dissolved oxygen)	0.00 ... 99.99 ppm
	Volume concentration in gas	0.00 ... 99.99 %vol
Polarization voltage	-400 ... -1000 mV, default -675 mV (resolution < 5 mV)	
Permissible guard current	≤ 20 µA	
Trace measurement	Sensors: SE 706/707; InPro 6800/6900/6950; Oxyferm/Oxygold	
Input range I⁴⁾	Meas. current -600 ... +2 nA	Resolution 10 pA
Measurement error ^{1,2,3)}	< 0.5% meas. val. + 0.05 nA + 0.005 nA/K	
Input range II⁴⁾	Meas. current -10,000 ... +2 nA	Resolution 166 pA
Measurement error	< 0.5% meas. val. + 0.8 nA + 0.08 nA/K	
Operating modes	GAS	Measurement in gases
	DO	Measurement in liquids
Measuring ranges with standard sensors "10"		
	Saturation (-10 ... +80 °C)	0.0 ... 600.0 %
	Concentration (-10 ... +80 °C)	0.00 ... 99.99 mg/l
	(Dissolved oxygen)	0.00 ... 99.99 ppm
	Volume concentration in gas	0.00 ... 99.99 %vol
Measuring ranges with trace sensors "01"		
	Saturation (-10 ... +80 °C)	0.000 ... 150.0 %
	Concentration (-10 ... +80 °C)	0.000 ... 9999 µg/l / 10.00 ... 20.00 mg/l
	(Dissolved oxygen)	0.000 ... 9999 ppb / 10.00 ... 20.00 ppm
	Volume concentration in gas	0.000 ... 9999 ppb / 1.000 ... 50.00 %vol

Measuring ranges with "001" trace sensors (not supported by Memsosens sensors)

Saturation (-10 ... +80 °C)	0.000 ... 150.0 %
Concentration (-10 ... +80 °C)	000.0 ... 9999 µg/l / 10.00 ... 20.00 mg/l
(Dissolved oxygen)	000.0 ... 9999 ppb / 10.00 ... 20.00 ppm
Volume concentration in gas	000.0 ... 9999 ppb / 1.000 ... 50.00 %vol

Polarization voltage 0 ... -1000 mV, default -675 mV (resolution < 5 mV)

Permissible guard current ≤ 20 µA

Measurement using SE 740 (optical sensor) (Stratos Evo A451N only)

Measuring range 0 ... 300 % air saturation

Detection limit 0.01 %vol

Response t₉₈ < 30 s (at 25 °C, from air to nitrogen)

Temperature measurement -10 ... +130 °C (Above 85 °C the sensor delivers no measured value)

Input correction	Pressure correction *	0.000 ... 9.999 bar / 999.9 kPa / 145.0 PSI
	manually or through BUS AO Block	
	Salinity correction	0.0 ... 45.0 g/kg

Sensor standardization *

Operating modes * CAL_AIR Automatic calibration in air

CAL_WTR Automatic calibration in air-saturated water

P_CAL Product calibration

CAL_ZERO Zero calibration

Calibration range Zero point ±2 nA

Standard sensor "10" Slope 25 ... 130 nA (at 25°C, 1013 mbar)

Calibration range Zero point ±2 nA

Trace sensor "01" Slope 200 ... 550 nA (at 25°C, 1013 mbar)

Calibration range Zero point ±3 nA

Trace sensor "001" Slope 2000 ... 9000 nA (at 25°C, 1013 mbar)

Calibration timer * Interval 0000 ... 9999 h

Pressure correction * Manually 0.000 ... 9.999 bar / 999.9 kPa / 145.0 PSI

Memsosens interface Memsosens (terminals 1 ... 4)

Data In/Out Asynchronous interface, RS 485, 9600/19200 Bd

Power supply Terminal 1: +3.08 V/10 mA, Ri < 1 Ω, short-circuit-proof

* user-defined

1) to EN 60746-1, at nominal operating conditions

2) ± 1 count

3) plus sensor error

4) automatic range selection

Cond

Cond input	Input for 2-/4-electrode sensors or Memosens	
Measuring 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)	
Measuring 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/m 00.00 ... 99.99 S/m
	Resistivity	00.00 ... 99.99 MΩ · cm
	Concentration	0.00 ... 100 %
	Temperature	-20.0 ... +150.0 °C (-4.0 ... +302.0 °F)
	Salinity	0.0 ... 45.0 ‰ (0 ... 35 °C)
	Response (T_{90})	Approx. 1 s
Measurement error ^{1,2,3)}	< 1 % meas. val. + 0.4 µS • c	
Temp compensation *	OFF	Without
(Reference temp user defined)	LIN	Linear characteristic 00.00...19.99 %/K
(Reference temp 25 °C)	nLF	Natural waters to EN 27888
	nACL	NaCl from 0 (ultrapure water) to 26 % by wt (0...120°C)
	HCL	Ultrapure water with HCl traces (0...120°C)
	nH3	Ultrapure water with NH ₃ traces (0...120°C)
	nAOH	Ultrapure water with NaOH traces (0...120°C)
Concentration determination	-01- NaCl	0 – 26% by wt (0 °C) ... 0 – 28% by wt (100 °C)
	-02- HCl	0 – 18% by wt (-20 °C) ... 0 – 18% by wt (50 °C)
	-03- NaOH	0 – 13% by wt (0 °C) ... 0 – 24% by wt (100 °C)
	-04- H ₂ SO ₄	0 – 26% by wt (-17 °C) ... 0 – 37% by wt (110 °C)
	-05- HNO ₃	0 – 30% by wt (-20 °C) ... 0 – 30% by wt (50 °C)
	-06- H ₂ SO ₄	94 – 99% by wt (-17 °C) ... 89 – 99% by wt (115 °C)
	-07- HCl	22 – 39% by wt (-20 °C) ... 22 – 39% by wt (50 °C)
	-08- HNO ₃	35 – 96% by wt (-20 °C) ... 35 – 96% by wt (50 °C)
	-09- H ₂ SO ₄	28 – 88% by wt (-17 °C) ... 39 – 88% by wt (115 °C)
	-10- NaOH	15 – 50% by wt (0 °C) ... 35 – 50% by wt (100 °C)

Sensor standardization	Input of cell factor with simultaneous display of selected process variable and temperature Entry of conductivity of calibration solution with simultaneous display of cell factor and temperature Product calibration for conductivity Temperature probe adjustment (10 K)
Permissible cell factor	00.0050...19.9999 cm ⁻¹
Memosens interface	Memosens (terminals 1 ... 4)
Data In/Out	Asynchronous interface, RS 485, 9600/19200 Bd
Power supply	Terminal 1: +3.08 V/10 mA, Ri < 1 Ω, short-circuit-proof

-
- * user-defined
 - 1) to EN 60746-1, at nominal operating conditions
 - 2) ± 1 count
 - 3) plus sensor error

Condl

Condl input	Input for toroidal conductivity sensors: SE 655, SE 656, SE 660, SE 670, SE 680, SE 680(N/X)-C1N4U00M	
Measuring ranges	Conductivity	0.000 ... 1999 mS/cm
	Concentration	0.00 ... 100.0 % by wt
	Salinity	0.0 ... 45.0 ‰ (0 ... 35 °C)
Measuring ranges	Conductivity	0.000 ... 9.999 mS/cm (not with SE 660) 0.00 ... 99.99 mS/cm 000.0 ... 999.9 mS/cm 0000 ... 1999 mS/cm 0.000 ... 9.999 S/m 00.00 ... 99.99 S/m
	Concentration	0.00 ... 9.99 % / 10.0 ... 100.0 %
	Salinity	0.0 ... 45.0 ‰ (0 ... 35 °C)
	Response (T_{90})	Approx. 1 s
Measurement error^{1,2,3)}	< 1% meas. val. + 0.005 mS	
Temp compensation *	OFF	Without
(Reference temp user defined)	LIN	Linear characteristic 00.00...19.99 %/K
(Reference temp 25 °C)	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 NH3 traces (0...120°C)
	nAOH	Ultrapure water with NaOH traces (0...120°C)
Concentration determination	-01- NaCl	0 – 26% by wt (0 °C) ... 0 – 28% by wt (100 °C)
	-02- HCl	0 – 18% by wt (-20 °C) ... 0 – 18% by wt (50 °C)
	-03- NaOH	0 – 13% by wt (0 °C) ... 0 – 24% by wt (100 °C)
	-04- H ₂ SO ₄	0 – 26% by wt (-17 °C) ... 0 – 37% by wt (110 °C)
	-05- HNO ₃	0 – 30% by wt (-20 °C) ... 0 – 30% by wt (50 °C)
	-06- H ₂ SO ₄	94 – 99% by wt (-17 °C) ... 89 – 99% by wt (115 °C)
	-07- HCl	22 – 39% by wt (-20 °C) ... 22 – 39% by wt (50 °C)
	-08- HNO ₃	35 – 96% by wt (-20 °C) ... 35 – 96% by wt (50 °C)
	-09- H ₂ SO ₄	28 – 88% by wt (-17 °C) ... 39 – 88% by wt (115 °C)
	-10- NaOH	15 – 50% by wt (0 °C) ... 35 – 50% by wt (100 °C)

Sensor standardization	Input of cell factor with simultaneous display of selected process variable and temperature Entry of conductivity of calibration solution with simultaneous display of cell factor and temperature Product calibration for conductivity Zero adjustment Temperature probe adjustment (10 K)
Permissible cell factor	00.100...19.9999 cm ⁻¹
Permissible transfer ratio	010.0 ... 199.9
Permissible offset	± 0.5 mS
Permissible installation factor	0.100 ... 5.000
Sensocheck	Monitoring of primary and secondary coils and lines for open circuit and of primary coil and lines for short circuit
Delay	Approx. 30 s
Sensoface	Provides information on the sensor condition (zero point, Sensocheck)
Sensor monitor	Direct display of measured values from sensor for validation (resistance/temperature)
Temperature extrapolation	Extrapolation of the temperature using the TICK method in the case of a significant change (for standard sensors SE 670 / SE 680 only)
Memosens interface	Memosens (terminals 1 ... 4)
Data In/Out	Asynchronous interface, RS 485, 9600/19200 Bd
Power supply	Terminal 1: +3.08 V/10 mA, Ri < 1 Ω, short-circuit-proof

- * user-defined
- 1) to EN 60746-1, at nominal operating conditions
- 2) ± 1 count
- 3) plus sensor error

Cond inputs A/B	2 inputs for 2-el. sensors, via MK module only				
Measuring range	0 ... 30,000 $\mu\text{S} \cdot \text{c}$				
Display ranges	Conductivity	0.000 ... 9.999 $\mu\text{S}/\text{cm}$ 0.00 ... 99.99 $\mu\text{S}/\text{cm}$ 000.0 ... 999.9 $\mu\text{S}/\text{cm}$ 0000 ... 9999 $\mu\text{S}/\text{cm}$ 00.00 ... 99.99 M Ω cm			
	Response (T_{90})	Approx. 1 s			
Measurement error^{1,2,3)}	< 1 % meas. val. + 0.4 $\mu \cdot \text{c}$				
Memosens interface	Memosens (terminals 1 ... 4)				
Data In/Out	Asynchronous interface, RS 485, 9600/19200 Bd				
Power supply	Terminal 1: +3.08 V/10 mA, $R_i < 1 \Omega$, short-circuit-proof				
Temp compensation * (reference temp 25 °C)	OFF	Without			
	LIN	Linear characteristic 00.00...19.99 %/K			
	nLF	Natural waters to EN 27888			
	nACL	NaCl from 0 (ultrapure water) to 26 % by wt (0...120°C)			
	HCL	Ultrapure water with HCl traces (0...120°C)			
	nH3	Ultrapure water with NH3 traces (0...120°C)			
	nAOH	Ultrapure water with NaOH traces (0...120°C)			
Sensor standardization					
Channel A/B	Input of cell factor with simultaneous display of conductivity and temperature				
Permissible cell factor	0.0050...1.9999 cm ⁻¹				
Calculations (CALC)	-C1- Difference	A-B	[$\mu\text{S}/\text{cm}$]		
	-C2- Ratio	A/B	00.00 ... 19.99		
	-C3- Passage	B/A * 100	000.0 ... 199.9 %		
	-C4- Rejection	(A-B)/A * 100	-199.9 ... 199.9 %		
	-C5- Deviation	(B-A)/A * 100	-199.9 ... 199.9 %		
	-C6- pH value	acc. to VGB regulation	[pH]		
	-C7- pH value	variable, specifiable factors	[pH]		
	-C8- User spec	(DAC Degassed Acid Conductivity)	[$\mu\text{S}/\text{cm}$]		
Temperature input A/B *	Pt1000, 2-wire connection				
Measuring range	-50 ... +200 °C (-58 ... +392 °F)				
Resolution	0.1 °C (0.1 °F)				
Measurement error ^{1,2,3)}	0.5 K (1 K > 100 °C)				

* user-defined

1) to EN 60746-1, at nominal operating conditions

2) ± 1 count

3) plus sensor error

-01- Mettler-Toledo

(corresponds to former "Knick technical buffers")

Nominal values at 25 °C: 2.00 / 4.01 / 7.00 / 9.21

°C	pH			
0	2.03	4.01	7.12	9.52
5	2.02	4.01	7.09	9.45
10	2.01	4.00	7.06	9.38
15	2.00	4.00	7.04	9.32
20	2.00	4.00	7.02	9.26
25	2.00	4.01	7.00	9.21
30	1.99	4.01	6.99	9.16
35	1.99	4.02	6.98	9.11
40	1.98	4.03	6.97	9.06
45	1.98	4.04	6.97	9.03
50	1.98	4.06	6.97	8.99
55	1.98	4.08	6.98	8.96
60	1.98	4.10	6.98	8.93
65	1.99	4.13	6.99	8.90
70	1.99	4.16	7.00	8.88
75	2.00	4.19	7.02	8.85
80	2.00	4.22	7.04	8.83
85	2.00	4.26	7.06	8.81
90	2.00	4.30	7.09	8.79
95	2.00	4.35	7.12	8.77

pH**-02- Knick CaliMat**

(Values also apply to Merck-Titrisols, Riedel-de-Haen Fixanals.)

Nominal values at 20 °C: 2.00 / 4.00 / 7.00 / 9.00 / 12.00

°C	pH				
0	2.01	4.05	7.09	9.24	12.58
5	2.01	4.04	7.07	9.16	12.39
10	2.01	4.02	7.04	9.11	12.26
15	2.00	4.01	7.02	9.05	12.13
20	2.00	4.00	7.00	9.00	12.00
25	2.00	4.01	6.99	8.95	11.87
30	2.00	4.01	6.98	8.91	11.75
35	2.00	4.01	6.96	8.88	11.64
40	2.00	4.01	6.96	8.85	11.53
50	2.00	4.01	6.96	8.79	11.31
60	2.00	4.00	6.96	8.73	11.09
70	2.00	4.00	6.96	8.70	10.88
80	2.00	4.00	6.98	8.66	10.68
90	2.00	4.00	7.00	8.64	10.48

Knick CaliMat Buffer Solutions

pH value [20 °C]	Quantity	Order No.
2.00 ± 0.02	250 ml	CS-P0200/250
4.00 ± 0.02	250 ml	CS-P0400/250
4.00 ± 0.02	1000 ml	CS-P0400/1000
4.00 ± 0.02	3000 ml	CS-P0400/3000
7.00 ± 0.02	250 ml	CS-P0700/250
7.00 ± 0.02	1000 ml	CS-P0700/1000
7.00 ± 0.02	3000 ml	CS-P0700/3000
9.00 ± 0.02	250 ml	CS-P0900/250
9.00 ± 0.02	1000 ml	CS-P0900/1000
9.00 ± 0.02	3000 ml	CS-P0900/3000
12.00 ± 0.05	250 ml	CS-P1200/250

-03- Ciba (94) buffers

Nominal values: 2.06 / 4.00 / 7.00 / 10.00

°C	pH			
0	2.04	4.00	7.10	10.30
5	2.09	4.02	7.08	10.21
10	2.07	4.00	7.05	10.14
15	2.08	4.00	7.02	10.06
20	2.09	4.01	6.98	9.99
25	2.08	4.02	6.98	9.95
30	2.06	4.00	6.96	9.89
35	2.07	4.01	6.95	9.85
40	2.06	4.02	6.94	9.81
45	2.06	4.03	6.93	9.77
50	2.06	4.04	6.93	9.73
55	2.05	4.05	6.91	9.68
60	2.08	4.10	6.93	9.66
70	2.07	4.11	6.92	9.57
80	2.02	4.15	6.93	9.52
90	2.04	4.20	6.97	9.43

pH**-04- Technical buffers to NIST**

Nominal values at 25 °C: 1.68 / 4.00 / 7.00 / 10.01 / 12.46

°C	pH				
0	1.67	4.00	7.12	10.32	13.42
5	1.67	4.00	7.09	10.25	13.21
10	1.67	4.00	7.06	10.18	13.01
15	1.67	4.00	7.04	10.12	12.80
20	1.68	4.00	7.02	10.06	12.64
25	1.68	4.01	7.00	10.01	12.46
30	1.68	4.02	6.99	9.97	12.30
35	1.69	4.03	6.98	9.93	12.13
40	1.69	4.03	6.98	9.89	11.99
45	1.70	4.05	6.98	9.86	11.84
50	1.71	4.06	6.97	9.83	11.71
55	1.72	4.08	6.97		11.57
60	1.72	4.09	6.97		11.45
65	1.73	4.10	6.98		
70	1.74	4.13	6.99		
75	1.75	4.14	7.01		
80	1.77	4.16	7.03		
85	1.78	4.18	7.05		
90	1.79	4.21	7.08		
95	1.81	4.23	7.11		

-05- NIST standard buffers

NIST Standard (DIN 19266 : 2001)

Nominal values at 25 °C: 1.679 / 4.006 / 6.865 / 9.180

°C	pH			
0	1.666	4.010	6.984	9.464
5	1.668	4.004	6.950	9.392
10	1.670	4.001	6.922	9.331
15	1.672	4.001	6.900	9.277
20	1.676	4.003	6.880	9.228
25	1.680	4.008	6.865	9.184
30	1.685	4.015	6.853	9.144
35	1.688	4.021	6.844	9.102
40	1.697	4.036	6.837	9.076
45	1.704	4.049	6.834	9.046
50	1.712	4.064	6.833	9.018
55	1.715	4.075	6.834	8.985
60	1.723	4.091	6.836	8.962
70	1.743	4.126	6.845	8.921
80	1.766	4.164	6.859	8.885
90	1.792	4.205	6.877	8.850
95	1.806	4.227	6.886	8.833

Please note:

The actual pH values of the individual batches of the reference materials are documented in a certificate of an accredited laboratory. This certificate is supplied with the respective buffers. Only these pH(S) values shall be used as standard values for the secondary reference buffer materials. Correspondingly, this standard does not include a table with standard pH values for practical use. The table above only provides examples of pH(PS) values for orientation.

pH**-06- HACH buffers**Nominal values at 25 °C: 4.01 / 7.00 / 10.01 (± 0.02)

°C	pH		
0	4.00	7.11	10.30
5	4.00	7.08	10.23
10	4.00	7.05	10.17
15	4.00	7.03	10.11
20	4.00	7.01	10.05
25	4.01	7.00	10.01
30	4.01	6.98	9.96
35	4.02	6.97	9.92
40	4.03	6.97	9.88
45	4.05	6.96	9.85
50	4.06	6.96	9.82
55	4.07	6.96	9.79
60	4.09	6.96	9.76

-07- WTW techn. buffers

Nominal values at 25 °C: 2.00 / 4.01 / 7.00 / 10.00

°C	pH			
0	2.03	4.00	7.12	10.32
5	2.02	4.00	7.09	10.25
10	2.01	4.00	7.06	10.18
15	2.00	4.00	7.04	10.12
20	2.00	4.00	7.02	10.01
25	2.00	4.01	7.00	10.01
30	1.99	4.02	6.99	9.97
35	1.99	4.03	6.98	9.93
40	1.98	4.03	6.98	9.89
45	1.98	4.05	6.98	9.86
50	1.98	4.06	6.97	9.83
55	1.98	4.08	6.97	
60	1.98	4.09	6.97	
65	1.99	4.10	6.98	
70	2.00	4.13	6.99	
75	2.00	4.14	7.01	
80	2.00	4.16	7.03	
85	2.00	4.18	7.05	
90	2.00	4.21	7.08	
95	2.00	4.23	7.11	

pH**-08- Hamilton Duracal buffers**

Nominal values at 25 °C:

2.00 ±0.02 / 4.01 ±0.01 / 7.00 ±0.01 / 10.01 ±0.02 / 12.00 ±0.05

°C	pH				
0	1.99	4.01	7.12	10.23	12.58
5	1.99	4.01	7.09	10.19	12.46
10	2.00	4.00	7.06	10.15	12.34
15	2.00	4.00	7.04	10.11	12.23
20	2.00	4.00	7.02	10.06	12.11
25	2.00	4.01	7.00	10.01	12.00
30	1.99	4.01	6.99	9.97	11.90
35	1.98	4.02	6.98	9.92	11.80
40	1.98	4.03	6.97	9.86	11.70
45	1.97	4.04	6.97	9.83	11.60
50	1.97	4.05	6.97	9.79	11.51
55	1.98	4.06	6.98	9.75	11.42
60	1.98	4.08	6.98	9.72	11.33
65	1.98	4.10	6.99	9.69	11.24
70	1.99	4.12	7.00	9.66	11.15
75	1.99	4.14	7.02	9.63	11.06
80	2.00	4.16	7.04	9.59	10.98
85	2.00	4.18	7.06	9.56	10.90
90	2.00	4.21	7.09	9.52	10.82
95	2.00	4.24	7.12	9.48	10.74

-09- Reagecon buffers

Nominal values at 25 °C: 2.00 / 4.00 / 7.00 / 9.00 / 12.00

°C	pH				
0	2.01	4.01	7.07	9.18	12.54
5	2.01	4.01	7.07	9.18	12.54
10	2.01	4.00	7.07	9.18	12.54
15	2.01	4.00	7.04	9.12	12.36
20	2.01	4.00	7.02	9.06	12.17
25	2.00	4.00	7.00	9.00	12.00
30	1.99	4.01	6.99	8.95	11.81
35	2.00	4.02	6.98	8.90	11.63
40	2.01	4.03	6.97	8.86	11.47
45	2.01	4.04	6.97	8.83	11.39
50	2.00	4.05	6.96	8.79	11.30
55	2.00	4.07	6.96	8.77	11.13
60	2.00	4.08	6.96	8.74	10.95
65	2.00	4.10	6.99	8.70	
70	2.00	4.12	7.00	8.67	
75	2.00	4.14	7.02	8.64	
80	2.00	4.16	7.04	8.62	
85	2.00	4.18	7.06	8.60	
90	2.00	4.21	7.09	8.58	
95	2.00	4.24	7.12	8.56	

pH**-10-** DIN 19267 buffers

Nominal values at 25 °C: 1.09 / 4.65 / 6.79 / 9.23 / 12.75

°C	pH				
0	1.08	4.67	6.89	9.48	
5	1.08	4.67	6.87	9.43	
10	1.09	4.66	6.84	9.37	13.37
15	1.09	4.66	6.82	9.32	13.16
20	1.09	4.65	6.80	9.27	12.96
25	1.09	4.65	6.79	9.23	12.75
30	1.10	4.65	6.78	9.18	12.61
35	1.10	4.65	6.77	9.13	12.45
40	1.10	4.66	6.76	9.09	12.29
45	1.10	4.67	6.76	9.04	12.09
50	1.11	4.68	6.76	9.00	11.89
55	1.11	4.69	6.76	8.96	11.79
60	1.11	4.70	6.76	8.92	11.69
65	1.11	4.71	6.76	8.90	11.56
70	1.11	4.72	6.76	8.88	11.43
75	1.11	4.73	6.77	8.86	11.31
80	1.12	4.75	6.78	8.85	11.19
85	1.12	4.77	6.79	8.83	11.09
90	1.13	4.79	6.80	8.82	10.99

You can specify a buffer set with 2 buffer solutions in the temperature range of 0 ... 95 °C, step width: 5 °C.

To do so, select buffer set -U1- in the configuration menu.

As delivered, the Ingold technical buffer solutions pH 4.01 / 7.00 are stored as buffer set and can be edited.

Conditions for the Specifiable Buffer Set:

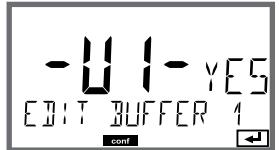
- All values must lie in the range pH 0 ... 14.
- Maximum difference between two adjacent pH values (5 °C step width) of the same buffer solution: pH 0.25
- The values of buffer solution 1 must be lower than those of buffer solution 2: The difference between values for identical temperatures must be greater than 2 pH units.

Faulty entries are indicated in measuring mode by the "FAIL BUFFERSET -U1-" message.

The 25 °C value is always used for buffer display during calibration.

Note: Use a configuration tool such as the SIMATIC PDM from Siemens for convenient data entry.

pH

Step	Action/Display	Remark
Select buffer set -U1- (CONFIG / SNS menu)		
Select buffer solution 1 for editing.	 Select "YES" using up/down key.	You are prompted for confirmation to prevent accidental changes of the settings.
Editing the values Buffer solution 1	 Edit: using arrow keys, press enter to confirm and proceed to next temperature value. 	Enter the values for the first buffer solution in 5°C steps. The difference to the next value must not exceed 0.25 pH unit.
Select buffer solution 2 for editing.		The difference between buffer solutions for identical temperatures must be greater than 2 pH units.

pH**Buffer set U1:**

Fill in your configuration data or use the table as original for copy.

Temperature [°C]	Buffer 1	Buffer 2
5		
10		
15		
20		
25		
30		
35		
40		
45		
50		
55		
60		
65		
70		
75		
80		
85		
90		
95		

Cond

Potassium Chloride Solutions

(Conductivity in mS/cm)

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

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

Sodium Chloride Solutions

(Conductivity in mS/cm)

Temperature [°C]	Concentration	0.01 mol/l 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

Cond

CondI

Measuring Ranges

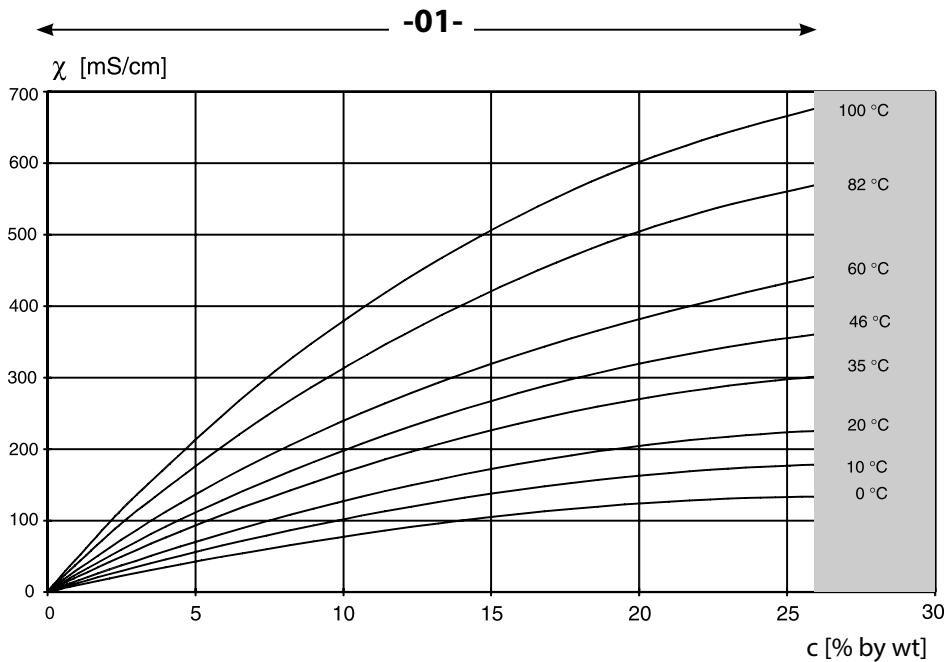
Substance	Concentration ranges		
NaCl Configuration	0-26% by wt (0 °C) 0-26% by wt (100 °C) -01-		
HCl Configuration	0-18% by wt (-20 °C) 0-18% by wt (50 °C) -02-	22-39% by wt (-20 °C) 22-39% by wt (50 °C) -07-	
NaOH Configuration	0-13% by wt (0 °C) 0-24% by wt (100 °C) -03-	15-50 % by wt (0 °C) 35-50% by wt (100 °C) -10-	
H_2SO_4 Configuration	0-26% by wt (-17 °C) 0-37% by wt (110 °C) -04-	28-77% by wt (-17 °C) 39-88% by wt (115 °C) -09-	94-99% by wt (-17 °C) 89-99% by wt (115 °C) -06-
HNO_3 Configuration	0-30% by wt (-20 °C) 0-30% by wt (50 °C) -05-	35-96% by wt (-20 °C) 35-96% by wt (50 °C) -08-	

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

Condl

Cond

-01- Sodium Chloride Solution NaCl

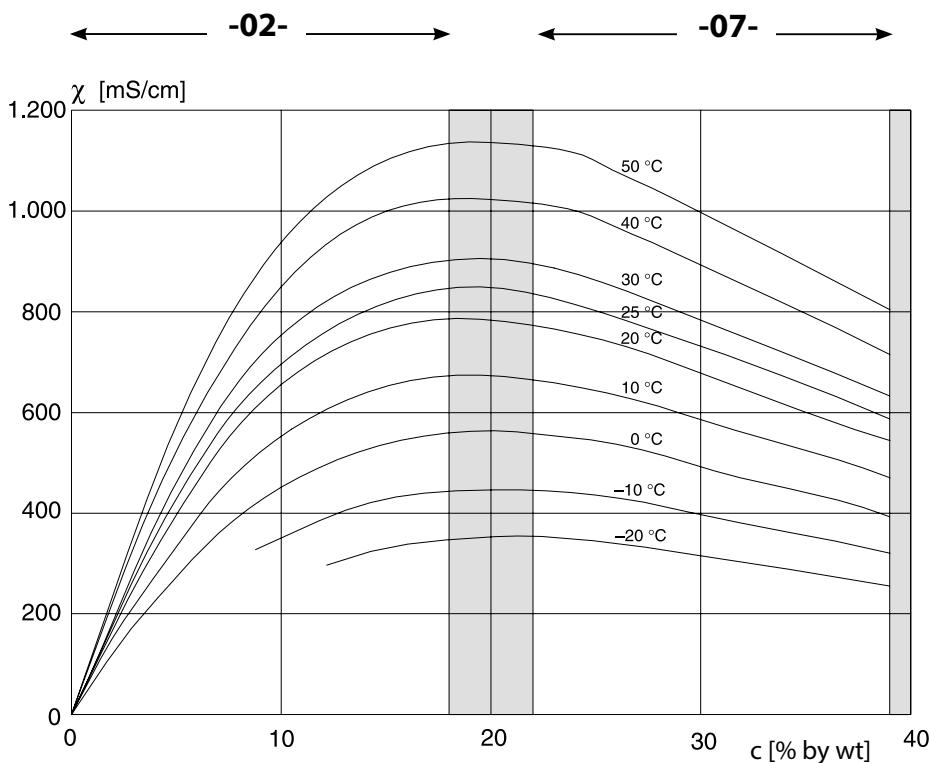


Concentration measurement not possible in this range.

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

Cond

CondI

-02- Hydrochloric Acid HCl**-07-**

Concentration measurement not possible in this range.

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

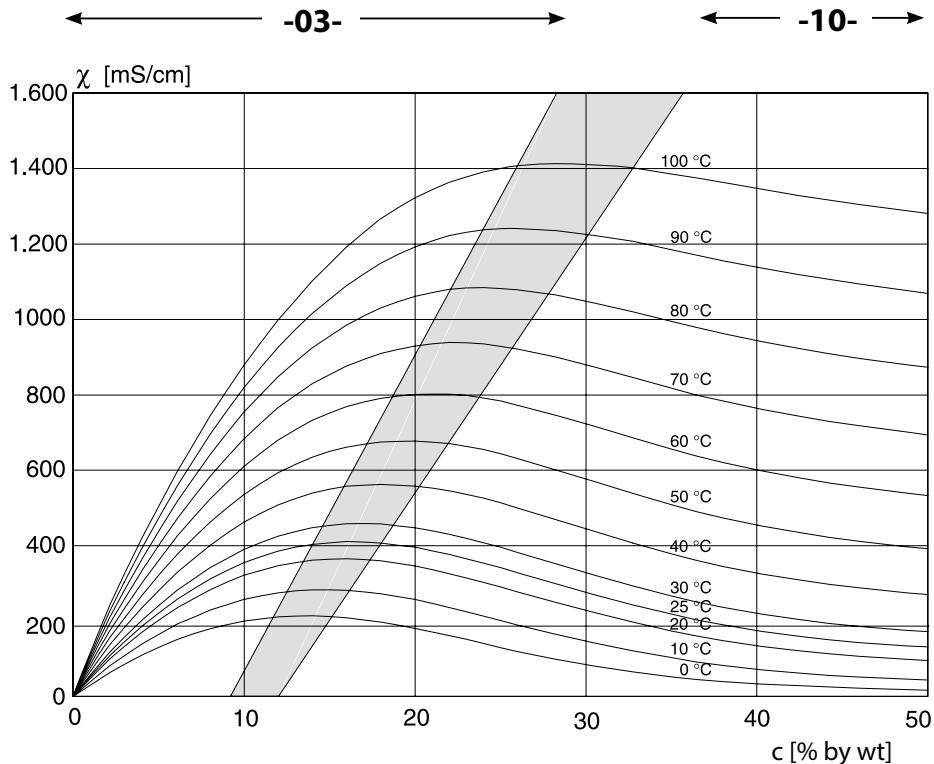
Source: Haase/Sauermann/Dücker; Z. phys. Chem. New Edition, Vol. 47 (1965)

Condl

Cond

-03- Sodium Hydroxide Solution NaOH

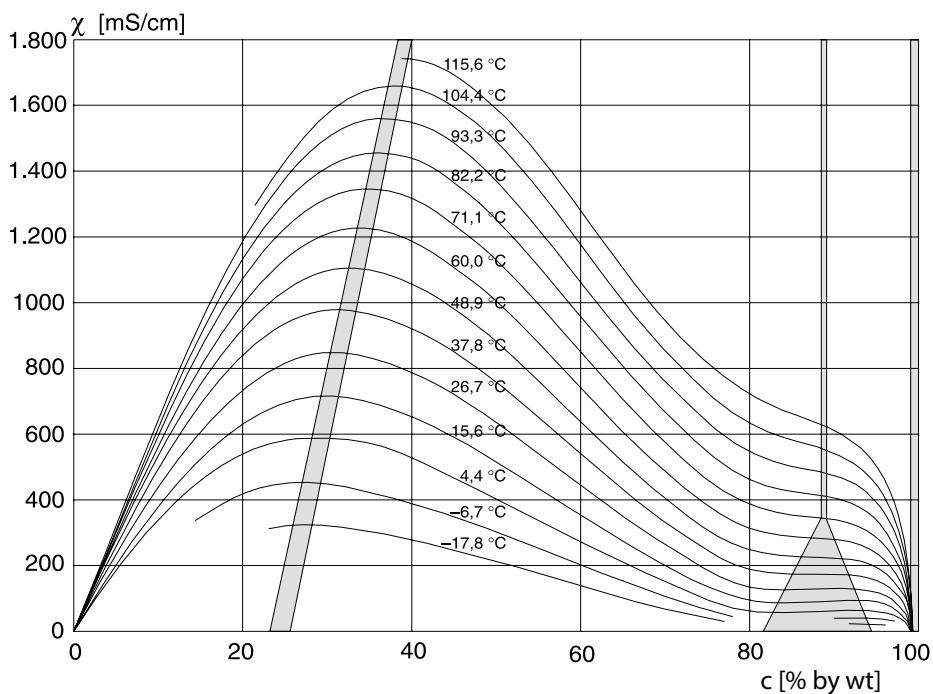
-10-



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

Cond

CondI

-04- Sulfuric Acid H₂SO₄**-06-****-09-****-04-****-09-****-06-**

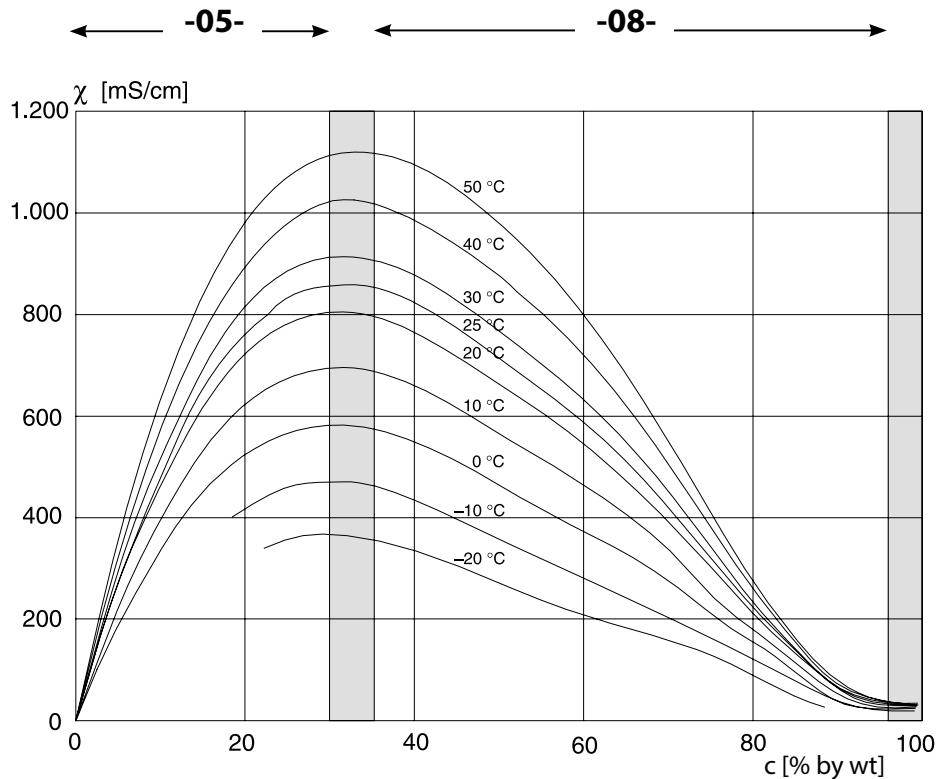
Concentration measurement not possible in this range.

Conductivity versus substance concentration and process temperature for sulfuric acid (H₂SO₄)

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

CondI

Cond

-05- Nitric Acid HNO₃**-08-**

Concentration measurement not possible in this range.

Conductivity versus substance concentration and process temperature for nitric acid (HNO₃)

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

A

Accessories 171, 172
ACT, adaptive cal timer (ISM), Oxy configuration 94
ACT, adaptive cal timer (ISM), pH configuration 50
Activate Sensocheck 115
Adaptive cal timer, ACT (ISM), Oxy configuration 94
Adaptive cal timer, ACT (ISM), pH configuration 50
Adaptive maintenance timer, TTM (ISM), Oxy configuration 96
Adaptive maintenance timer, TTM (ISM), pH configuration 52
AI Block Cond 184
AI Block Cond-Cond 185
AI Block Condl 184
AI Block Oxy 183
AI Block pH 183
AI Function Block, parameters 210
Alarm and HOLD messages 36
Alarm, delay 114
Alarm, description 36
Alarm, Sensocheck 115
Ambulance TAN if passcode is lost 157
Analog Input (AI) 182
Analog Output (AO) 186
AO Function Block, parameters 212
Application example 12, 13
Asymmetry potential to sensor zero point 127
Autoclaving counter, ISM sensor (Oxy) 100
Autoclaving counter, ISM sensor (pH) 56
Automatic calibration, pH 122

B

Backlighting 30
Block model 180
Buffer set selection 47
Buffer tables 303
Bus parameters of manufacturer-specific Transducer Block (TB) 220
Bus parameters of standard Transducer Block (TB) 218
Bus termination, PROFIBUS DP 177
Button functions 29

C

- Cable preparation SE 655 / SE 656 277
- Cables for Memosens 22
- Calculations (CALC), Cond-Cond device type 105
- Calibration 118
 - Calibration by input of cell factor 147
 - Calibration (Cond) 144
 - Calibration (CondI) 146
 - Calibration data, display 151
 - Calibration (LDO) 137
 - Calibration mode air/water, Oxy configuration 93
 - Calibration mode, configuring (pH) 47
 - Calibration (ORP) 128
 - Calibration (Oxy) 132
 - Calibration (pH) 119
 - Calibration (pH) by entering data from premeasured sensors 126
 - Calibration (pH), zero adjustment 121
 - Calibration solutions 316
 - Calibration, temp measurement, pH configuration 47
 - Calibration timer, Oxy configuration 93
 - Calibration timer, pH configuration 49
 - Calibration with calibration solution (Cond) 145
 - Calibration with calibration solution (CondI) 147
 - Calibration with sampling 130
 - CC wiring examples 284
 - Cell factor, Cond configuration 67
 - Cell factor, CondI configuration 79
 - Certification, PROFIBUS 174
 - Changing the measuring function 16
 - Channel selection and display assignment (Cond-Cond) 104
 - Ciba (94) buffers, buffer table 305
 - CIP (Cond configuration) 71
 - CIP (CondI configuration) 83
 - CIP (Oxy configuration) 99
 - CIP (pH configuration) 55
 - Cleaning cycles CIP, Cond configuration 71
 - Cleaning cycles CIP, CondI configuration 83
 - Cleaning cycles CIP, Oxy configuration 99
 - Cleaning cycles CIP, pH configuration 55
 - Colors in display 30
 - Commissioning on the PROFIBUS 200
 - Concentration curves 319
 - Concentration measurement, ranges 318
 - Concentration solution, configuration (Cond) 66

Concentration solution, configuration (CondI) 80
Cond, calibration 144
Cond, configuration 66
Condensed status, PROFIBUS 192
CondI, calibration 146
CondI, configuration 78
CondI, temperature compensation 84
CondI wiring examples 278
Cond modules, overview 18
Cond, temperature compensation 72
Conductivity calibration 144
Conductivity modules, overview 18
Conductor cross-sections 23
Cond wiring examples 269
Configuration, alarm 114
Configuration (Cond) 66
Configuration (Cond-Cond) 108
Configuration (CondI) 78
Configuration (CondI), overview 74
Configuration (Cond), overview 62
Configuration, CONTROL input 112
Configuration data, PROFIBUS 206
Configuration (Oxy) 90
Configuration (Oxy), overview 86
Configuration (pH) 44
Configuration (pH), overview 40
Connecting a conductivity sensor (examples) 269
Connecting a Memosens sensor 21
Connecting a Memosens sensor, menu 38
Connecting an oxygen sensor (examples) 264
Connecting a pH sensor (examples) 256
Connecting cable for Memosens 21, 22
Connection length for sensors, maximum (Cond-Cond) 104
Control buttons 29
Control Drawings 8
Correction (Oxy) 102
Cyclic data communication, table 207
Cyclic data transmission 189

D

- Data input (pH calibration) 126
- Data logger, description 11
- Data logger, viewing entries 153
- Date, display 149
- Date, setting 116
- Default initialization 201
- Device database file (GSD file) 200
- DEVICE_LOCK parameters 181
- Device self-test 152
- Device type Cond-Cond 104
- Device type Cond, configuration 66
- Device type Condl, configuration 78
- Device type, display 154
- Device type Oxy, configuration 90
- Device type pH, configuration 44
- Device type, selecting the measuring function 156
- Diagnostics, calibration data 151
- Diagnostics, device self-test 152
- Diagnostics, hardware and software version 154
- Diagnostics, logbook 153
- Diagnostics mode 150
- Diagnostics, sensor data 151
- Diagnostics, sensor monitor 154
- DI block 186
- DI Function Block, parameters 214
- Digital sensors, calibration and maintenance 20
- Digital sensors (Condl), select sensor type 91
- Digital sensors (Cond), select sensor type 67
- Digital sensors (Oxy), select sensor type 91
- Digital sensors (pH), select sensor type 45
- Dimensions 15
- DIN 19267 buffers, buffer table 312
- Display 30
- Display backlighting 32
- Displaying process parameters 149
- Displaying the calculation 149
- Display in measuring mode 31
- Display, selecting the main display 31
- Display test 152
- Disposal 7
- DO block 187
- Documentation 8
- DO Function Block, parameters 216

Door contact 11
Dual conductivity measurement 106

E

EEPROM test, device self-test 152
Enclosure components 14
Entering values 35
ERR (error codes) 158
Error messages 158
EU Declarations of Conformity 8

F

Factory setting 157
FISCO 175
FLASH test 152
Flow, display 149
Flow measurement 112
Function Block (FB) 182

H

HACH buffers, buffer table 308
Hamilton Duracal buffers, buffer table 310
HOLD mode, configuration 115
Housing, components 14

I

Icons 30
Ident number, selection 201
I&M functions 174
Info text 158
Initial start-up 200
Input ratings, interface 291
Inserting a module 16
Installation, terminal assignments 253
Intended use, A221(N/X) 9
Intended use, A451N 10
ISM sensors (Oxy), configure adaptive cal timer 94
ISM sensors (Oxy), configure adaptive maintenance timer 96
ISM sensors (Oxy), configure autoclaving counter 100
ISM sensors (pH), configure adaptive cal timer 50
ISM sensors (pH), configure adaptive maintenance timer 52
ISM sensors (pH), configure autoclaving counter 56

K

Key lock 181
Keypad 29
Knick CaliMat, buffer table 304

L

LDO calibration, notes 137
LDO offset correction 143
LDO, optical oxygen sensor 267
LDO slope calibration in air 138
LDO slope calibration in water 140
LDO zero calibration in N2 142
Linear temperature compensation (Cond) 73
Linear temperature compensation (pH) 59
Logbook 153

M

MAIN DISPLAY 31
Manual calibration with buffer entry 124
Meas mode, PROFIBUS 190
Measured values, viewing (sensor monitor) 154
Measuring function, changing 16
Measuring function (device type) 156
Measuring mode 28, 149
Measuring mode, configuration (Cond) 67, 79
Measuring mode, configuration (Oxy) 91
Measuring mode, configuration (pH) 45
Measuring mode for temperature detection 47
Measuring range, configuration (Cond) 67
Measuring range, configuration (CondI) 79
Measuring ranges, concentration 318
Membrane compensation, Oxy configuration 91
Memosens cable, connection 21
Memosens cable (specifications, order code) 22
Memosens, calibration and maintenance 20
Memosens CondI, select sensor type 79
Memosens Cond, select sensor type 67
Memosens Cond wiring examples 274
Memosens Oxy, select sensor type 91
Memosens pH, select sensor type 45
Memosens pH wiring examples 288
Memosens sensor (connection, terminal assignments) 21
Memosens sensor, replacement 39
MemoSuite software 20
Menu 37

Mettler-Toledo, buffer table 303
Module, inserting 16
Modules, overview 17
Modules, product range 171, 172
Module test 152
Mounting accessories 15
Mounting accessories, product range 171, 172
Mounting plan 15

N

NIST standard buffers, buffer table 307
NIST technical buffers, buffer table 306
NLF, temperature compensation for natural waters (Cond) 73
NLF, temperature compensation for natural waters (CondI) 85

O

Offset correction, LDO 143
Operating mode, selection 34
Operating modes, short description 33
Operation, general 28
Optical oxygen sensor, calibration 137
Optical sensor, wiring example 267
Order information 171, 172
ORP calibration 128
ORP mode selection 45
Output voltage, adjusting (POWER OUT) 157
Oxy, calibration 132
Oxy configuration 90
Oxygen, STANDARD (wiring example) 264
Oxygen, SUBTRACES (wiring example) 266
Oxygen, TRACES (wiring example) 265
Oxy module, overview 17
Oxy wiring examples 264

P

Package contents, complete 14
Package contents, documentation 8
Parameters of AI Function Block 210
Parameters of AO Function Block 212
Parameters of DI Function Block 214
Parameters of DO Function Block 216
Parameters of Physical Block 208
Passcode assignment 157
Passcode lost 157
Pfaudler sensors, connection 262

- Pfaudler sensors, description and specifications 60
 - Phase angle, LDO calibration 137
 - pH, automatic calibration 122
 - pH configuration 44, 90
 - pH, manual calibration 124
 - pH module, overview 17
 - pH, premeasured sensors 126
 - pH value calculation 106
 - pH wiring examples 256
 - Physical Block 181
 - Physical Block (PB), parameters 208
 - Point of measurement, arrangement (Cond-Cond) 104
 - Polarization voltage during meas/cal 91
 - Potassium chloride solutions, table 316
 - POWER OUT, adjusting the output voltage 157
 - Presetting pH calibration 119
 - Pressure correction (Oxy) 102
 - Pressure, display 149
 - Pressure unit, Oxy configuration 103
 - Primary process value, display 149
 - Product calibration 130
 - Product calibration, PROFIBUS 250
 - Product range DP A451N 172
 - Product range PA A221(N/X) 171
 - PROFIBUS address, Cond configuration 67
 - PROFIBUS address, Condl configuration 79
 - PROFIBUS address, Oxy configuration 91
 - PROFIBUS address, pH configuration 45
 - PROFIBUS cable 176
 - PROFIBUS, commissioning 200
 - PROFIBUS, diagnostics 189
 - PROFIBUS, introduction 173
 - PROFIBUS PA/DP, differences 175
 - PROFIBUS software, overview 188
 - PROFIBUS, specifying the address 201
- Q**
- Quickstart guides 8

R

RAM test 152
Rating plate, A221N 23
Rating plate, A451N 24
Reagecon buffers, buffer table 311
Redox calibration (ORP) 128
Redox measurement, configuration 45
Reset to factory settings 157
Return of products under warranty 7

S

Safety instructions 8
Salinity correction (Oxy) 102
Salinity, Oxy configuration 103
Schematic diagram of block types, PROFIBUS 178, 179
SE 740, optical oxygen sensor 267
Secondary process value, display 149
Sensocheck 170
Sensoface 170
Sensor data, display 151
Sensor monitor, displaying the currently measured values 154
Sensor monitor, Service mode 156
Sensor replacement 39
Sensor type selection (Cond) 67
Sensor type selection (Condl) 79
Sensor type selection (Oxy) 91
Sensor type selection (pH) 45
Serial number, display 154
Service, factory settings 157
Service, incrementing the autoclaving counter 156
Service mode 155
Service passcode lost 157
Service, passcodes 157
Service, resetting the TTM interval 156
Service, sensor monitor 156
Settings of U1 buffer set 315
Setting the passcodes 157
Signal assignments, A221(N/X) 25
Signal assignments, A451N 26
Signal colors 32
SIP (Cond configuration) 71
SIP (Condl configuration) 83
SIP (Oxy configuration) 99
SIP (pH configuration) 55
Slope calibration, LDO (in air) 138

Slope calibration, LDO (in water) 140
Slope calibration, Oxy (in air) 134
Slope calibration, Oxy (in water) 135
Slope calibration (Oxy), select calibration medium 93
Slope, converting % to mV 127
Slot model 206
Sodium chloride solutions, table 317
Software, overview 188
Software version, display 154
Specifiable buffer set 313
Specifications 291
Specifications, Memosens cable 22
Specific test report 8
Start-up, measuring function 27
Sterilization cycles SIP, Cond configuration 71
Sterilization cycles SIP, Condl configuration 83
Sterilization cycles SIP, Oxy configuration 99
Sterilization cycles SIP, pH configuration 55
Stern-Volmer constant, LDO calibration 137
Synoptic table of DIAGNOSIS_EXTENSION 196

T

Technical data 291
Temperature compensation (Cond) 72
Temperature compensation (Condl) 84
Temperature compensation (pH) 58
Temperature dependence of reference systems measured against SHE 128
Temperature measurement, Cond configuration 69
Temperature measurement, Condl configuration 81
Temperature measurement, pH configuration 46
Temperature probe, Cond configuration 69
Temperature probe, Condl configuration 79
Temperature probe, Oxy configuration 91
Temperature probe, pH configuration 45
Temperature unit, Cond configuration 69
Temperature unit, Condl configuration 80
Temperature unit, Oxy configuration 93
Temperature unit, pH configuration 45
Template for Cond-Cond configuration 110
Template for Cond configuration 64
Template for Condl configuration 76
Template for Oxy configuration 88
Template for pH configuration 42
Terminal assignments, PROFIBUS DP 177
Terminal assignments, PROFIBUS PA 176

Terminal compartment, A221(N/X) 25
Terminal compartment, A451N 26
Terminal plate, A221(N/X) 23
Terminal plate, A451N 24
Terminal plates of modules 17
Time and date, setting 116
Time/date, display 149
TRACES, measuring oxygen traces 265
Transducer Block (TB) 181
Transducer Block (TB), bus parameters 218
Transfer ratio, CondI configuration 79
TTM, adaptive maintenance timer (ISM), Oxy configuration 96
TTM, adaptive maintenance timer (ISM), pH configuration 52
Typical configuration, PROFIBUS 175

U

U1 specifiable buffer set 313

W

Wiring example, optical sensor (LDO) 267
Wiring examples, Memosens Cond 274
Wiring examples, Memosens pH 288
Wiring of conductivity sensors (examples) 269
Wiring of oxygen sensors (examples) 264
Wiring of pH sensors (examples) 256
WTW technical buffers, buffer table 309

Z

Zero adjustment for ISFET sensors 120
Zero calibration (CondI) 148
Zero calibration (LDO) 142

Knick
Elektronische Messgeräte GmbH & Co. KG

Beuckestraße 22
14163 Berlin
Germany

Phone: +49 30 80191-0
Fax: +49 30 80191-200
Web: www.knick.de
Email: info@knick.de



087889