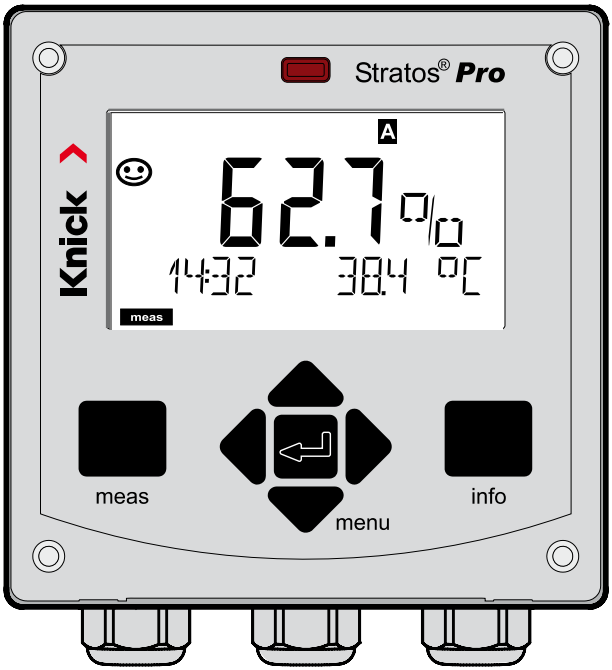
The Art of Measuring. Knick

User Manual
English

Stratos Pro A2.. Oxy
Oxygen Measurement



Latest Product Information: www.knick.de

About This Manual.

Return of products

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 de-contaminated/disinfected before shipment. In that case, please attach a corresponding certificate, for the health and safety of our service personnel.

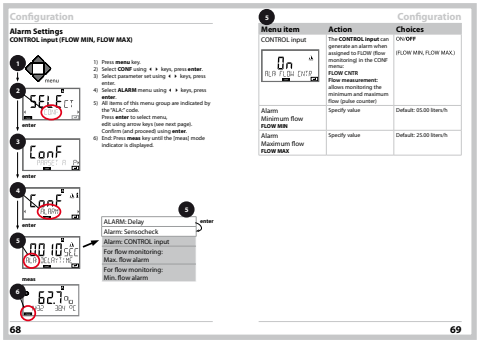
Disposal

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:

www.knick.de

Contents

Intended Use

Stratos Pro A2... OXY is a 2-wire device for dissolved oxygen and temperature measurement in biotechnology, pharmaceutical industry, as well as in the field of industry, environment, food processing and sewage treatment. Optionally, it can be used for measuring oxygen traces.

Enclosure and mounting possibilities

- The sturdy molded enclosure is rated IP 67/NEMA 4X for outdoor use. It is made of glass-reinforced PBT / PC and measures 148 mm x 148 mm x 117 mm (H x W x D).
  It is provided with knockouts to allow:
- wall mounting (with sealing plugs to seal the enclosure), see page 13
- post/pipe mounting (Ø 40 … 60 mm, ☐ 30 … 45 mm) see page 14
- panel mounting (138 mm x 138 mm cutout to DIN 43700), see page 15

Weather protector (accessory)

The weather protector, which is available as accessory, provides additional protection against direct weather exposure and mechanical damage, see page 14.

Connection of sensors, cable glands

For connecting the cables, the enclosure provides

- 3 knockouts for cable glands M20x1.5
- 2 knockouts for NPT 1/2" or rigid metallic conduit

For quasi-stationary installations with Memosens sensors, we recommend using the M12 device socket (accessory ZU 0822) instead of a cable gland – it allows simple replacement of the sensor cable without opening the device.

Sensors

The device has been designed for amperometric sensors, e.g. Knick SE 704 / SE 705 / SE 706 / SE 707 and for ISM sensors. (It can be easily retrofitted for Memosens sensors.)

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”, see page 25).

Color-coded user interface
The colored display backlighting signals different operating states (e.g. alarm: red, HOLD mode: orange, see page 26).

Diagnostics functions
“Sensocheck” and “Sensoface” monitor the sensor and provide clear information about its status, see page 112.

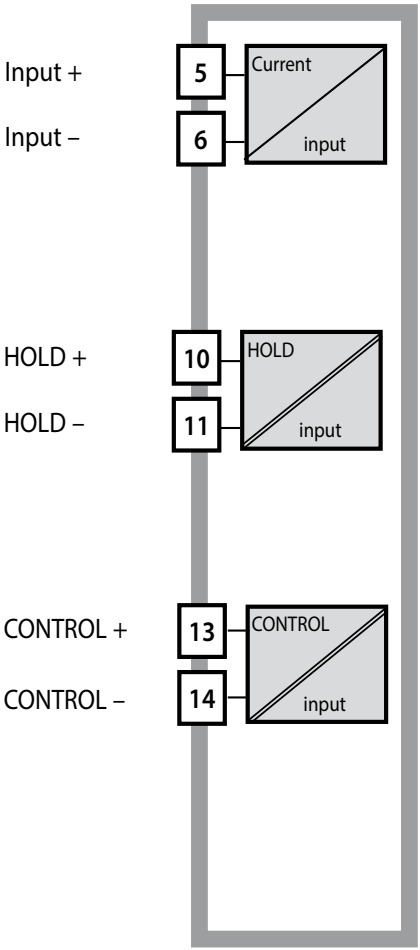
Data logger
The internal logbook (TAN SW-A002) can handle up to 100 entries – up to 200 with AuditTrail (TAN SW-A003), see page 93.

2 parameter sets A/B
The device provides two parameter sets which can be switched manually or via a control input for different process adaptations or different process conditions.
For overview of parameter sets (table for copy), see page 42.

Password protection
Password protection (passcodes) for granting access rights during operation can be configured, see page 97.

Correction
Here, you can adapt the device to the process conditions by means of salinity and pressure correction, either manually or via an external current input (optional, released by TAN), see page 64.

Control inputs



I input
The analog (0) 4 ... 20 mA current input can be used for external pressure compensation (TAN required).
See page 60.

HOLD
(floating digital control input)
The HOLD input can be used for external activation of the HOLD mode, see page 29.

CONTROL
(floating digital control input)
The CONTROL input can be used either for parameter set selection (A/B) or for flow monitoring, see page 62.

Signal outputs

The device provides two current outputs (for transmission of measured value and temperature, for example).

Options

Additional functions can be activated by entering a TAN (page 97).

Safety Information

Safety Information

Be sure to read and observe the following instructions!

The device has been manufactured using state of the art technology and it complies with applicable safety regulations.
When operating the device, certain conditions may nevertheless lead to danger for the operator or damage to the device.

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

CAUTION!

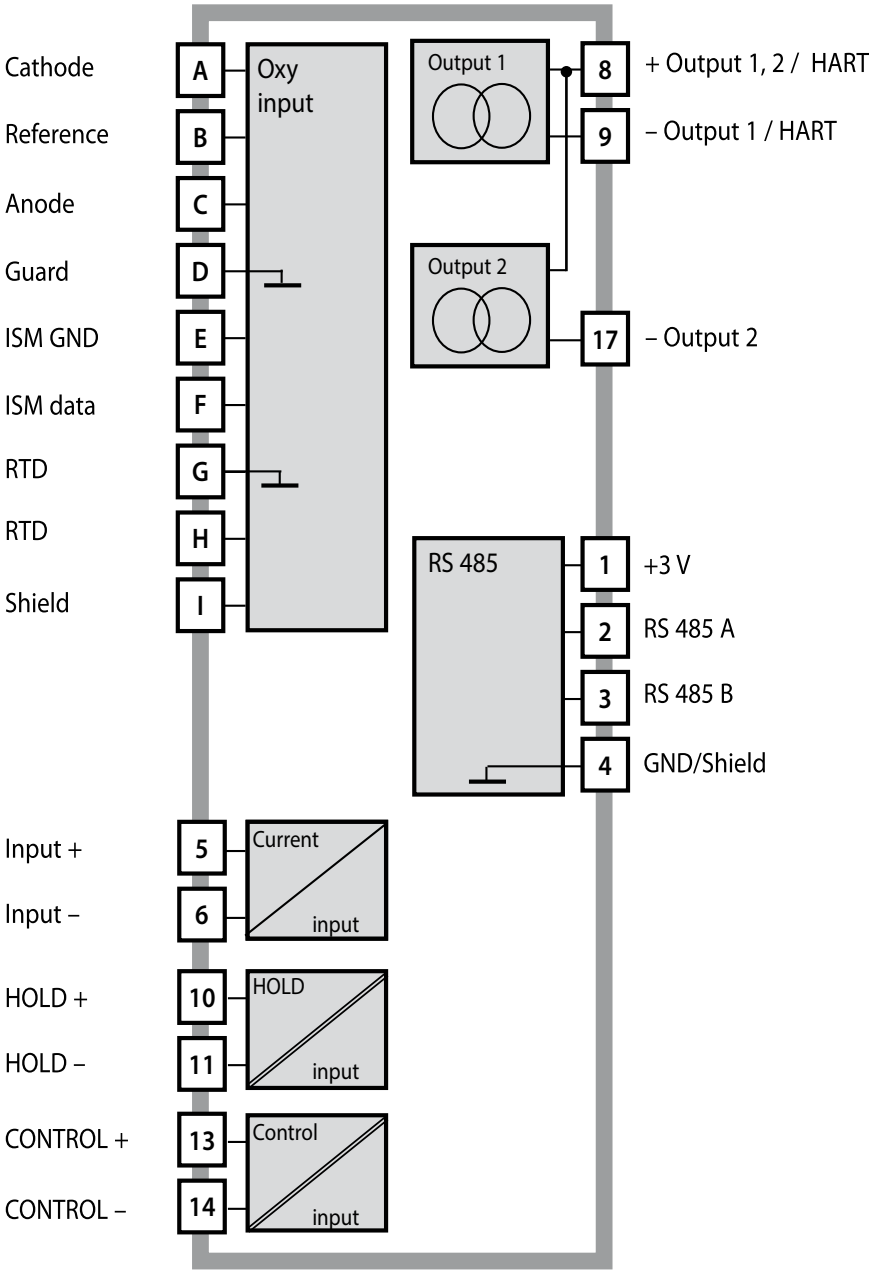
Commissioning must only be performed by trained personnel authorized by the operating company! Whenever it is likely that protection has been impaired, the device shall be made inoperative and secured against unintended operation.
The protection is likely to be impaired if, for example:

- the device shows visible damage
- the device fails to perform the intended measurements
- after prolonged storage at temperatures below –30 °C / –22 °F or above +70 °C / +158 °F
- after severe transport stresses

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

Note:
Before commissioning you must prove that the device may be connected with other equipment.

Overview of Stratos Pro A2... OXY



Assembly

Package Contents

Check the shipment for transport damage and completeness!

The package should contain:

- Front unit, rear unit, bag containing small parts
- Specific test report
- Documentation (cf p. 3)

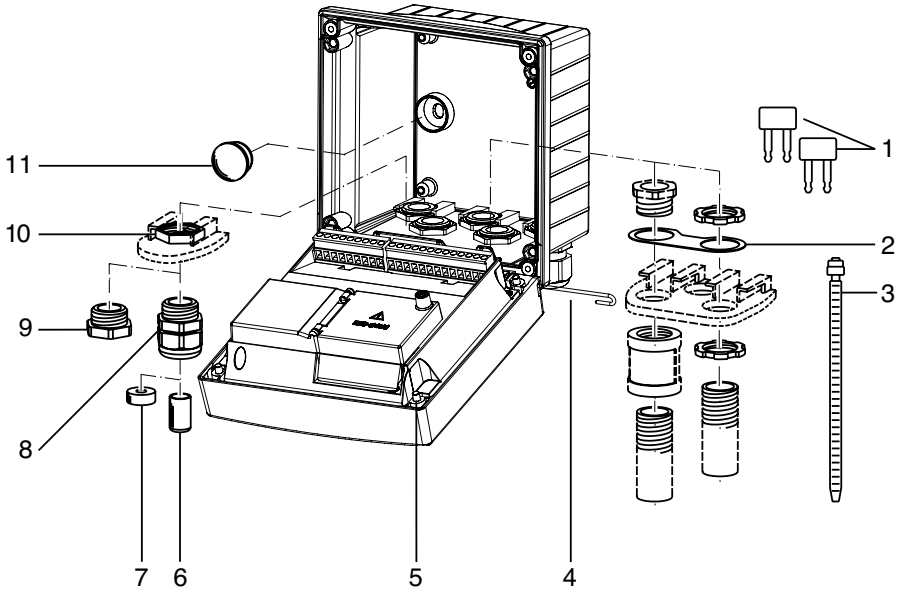
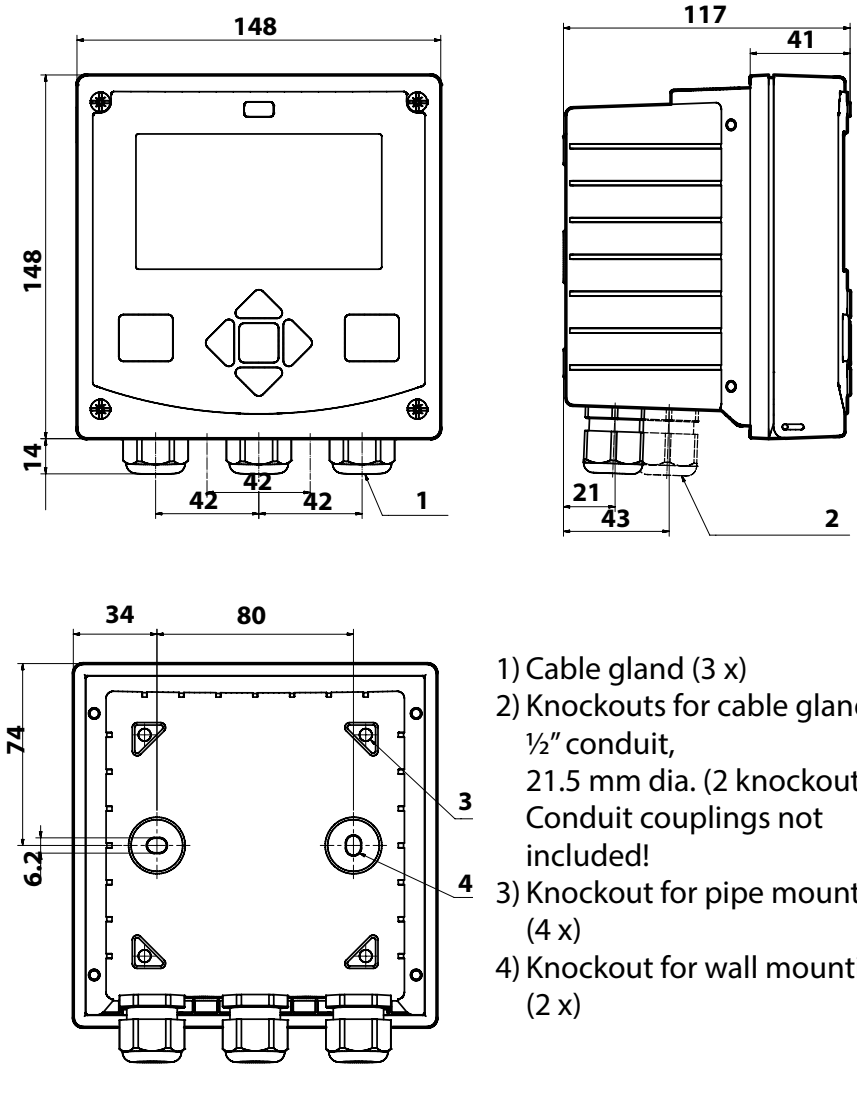


Fig.: Assembling the enclosure

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

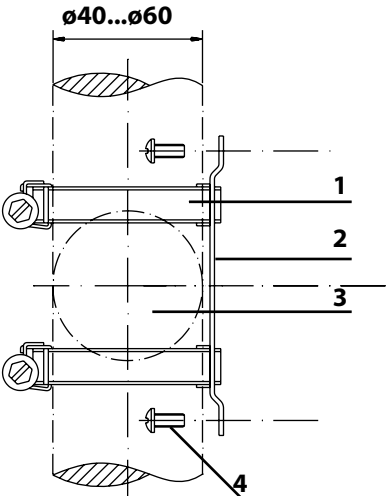
Mounting Plan, Dimensions



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

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

Pipe Mounting, Protective Hood



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

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

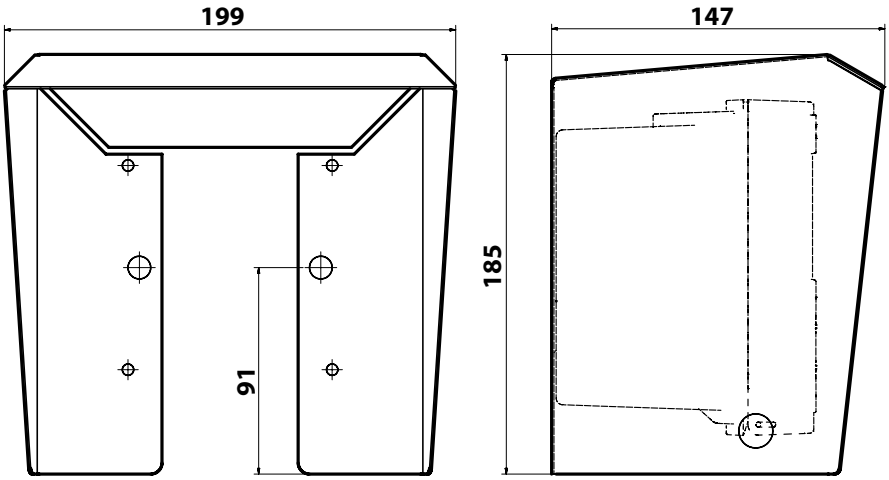
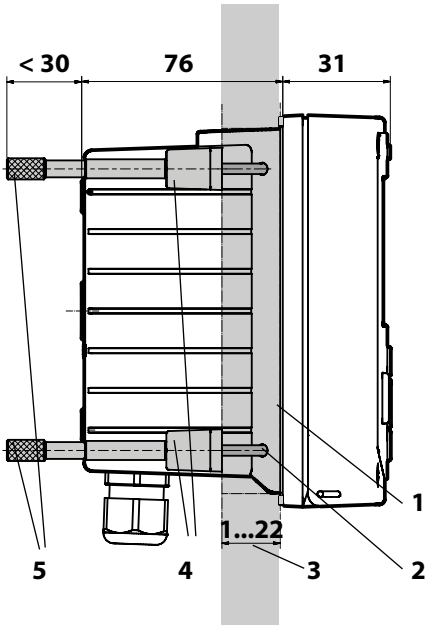


Fig.: Protective hood for wall and pipe mounting, accessory ZU 0737 (All dimensions in mm!)

Panel Mounting



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

Cutout
138 x 138 mm (DIN 43700)

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

Installation

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!
- The supplied current must be galvanically isolated. If not, connect an isolator module.
- All parameters must be set by a system administrator prior to commissioning!

Terminals:

suitable for single wires / flexible leads up to 2.5 mm² (AWG 14)

Rating Plates / Terminal Assignments

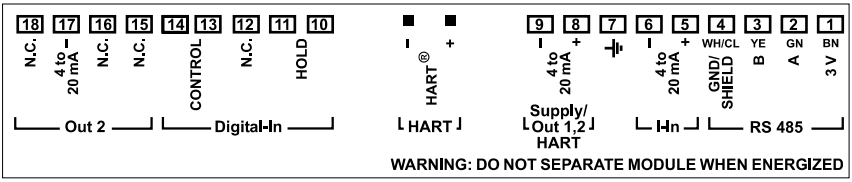


Fig.: Terminal assignments of Stratos Pro A2...

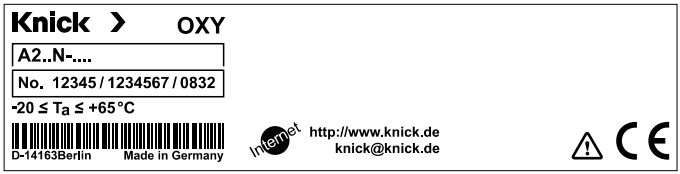
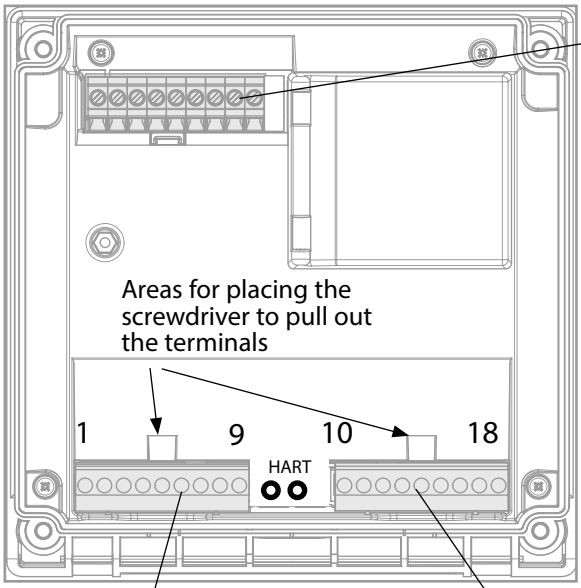


Fig.: Stratos Pro A2...N rating plate at outside bottom of front

Wiring of Stratos Pro A2... OXY



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

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

Sensor connection MK-OXY module	
A	cathode
B	reference
C	anode
D	guard
E	ISM DGND
F	ISM Data
G	RTD (GND)
H	RTD
I	shield

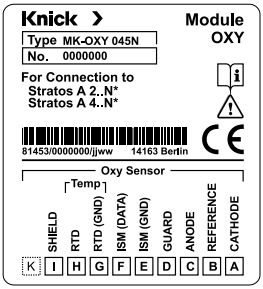


Fig.: MK-OXY module terminal assignments

Note:
When a Memosens sensor is to be connected to the RS-485 interface (terminals 1...4), you must remove the MK-OXY module.

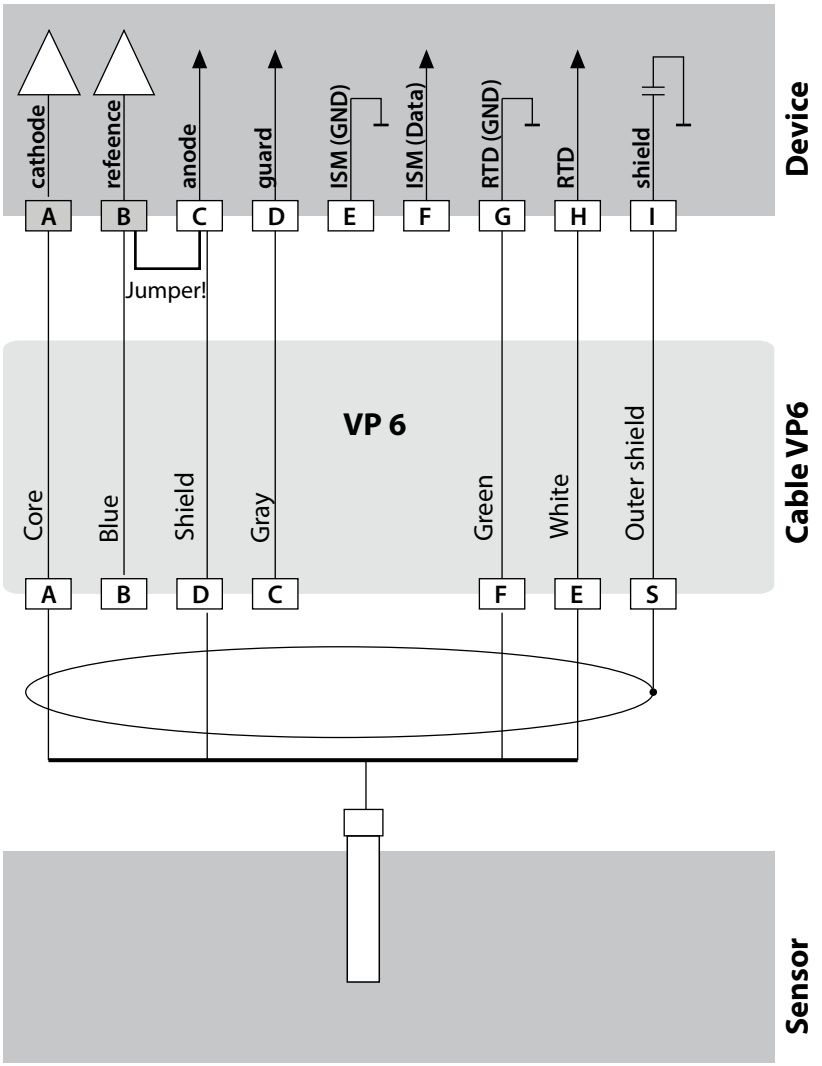
In addition:
2 HART pins
(between terminal row 1 and 2)

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

Wiring Examples

Example 1:

Measuring task: Oxygen STANDARD
Sensors (example): “10“ (e.g. SE 706, InPro 6800)
Cable (example): VP 6 ZU 0313 (Knick)

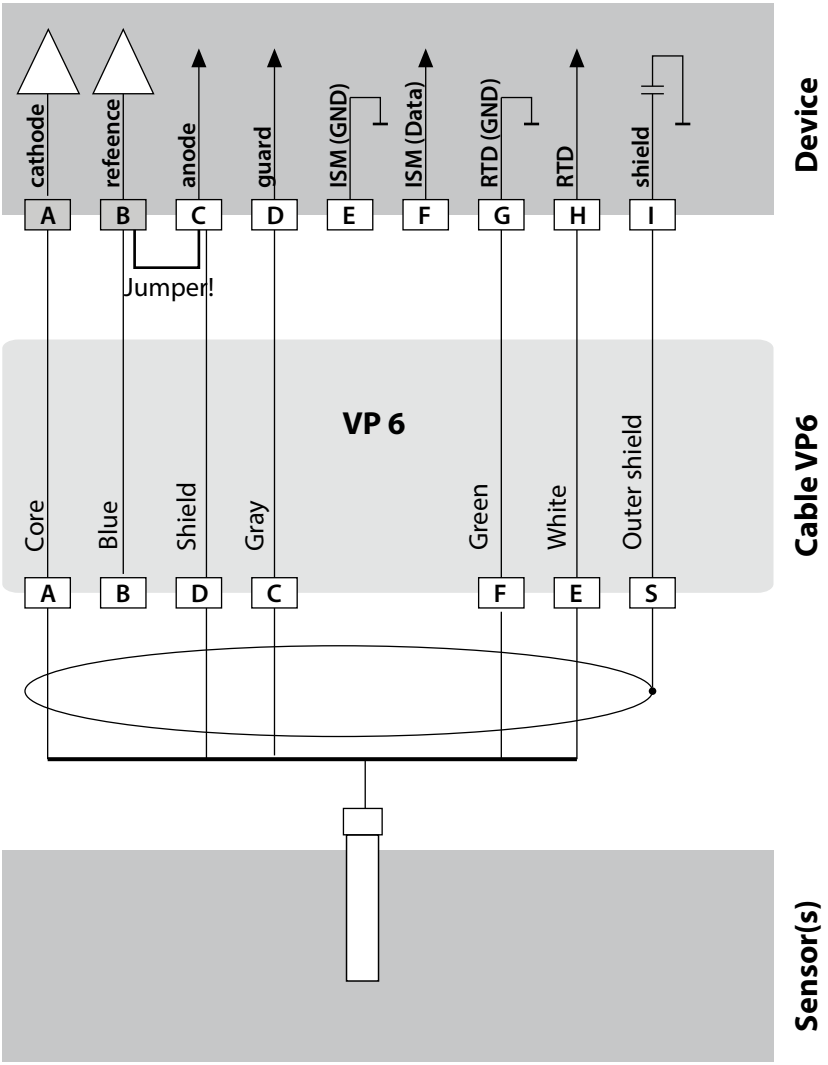


Example 2:

Measuring task: Oxygen TRACES (TAN required)

Sensors (example): "01" (e.g. SE 707, InPro 6900)

Cable (example): VP6 ZU 0313 (Knick)

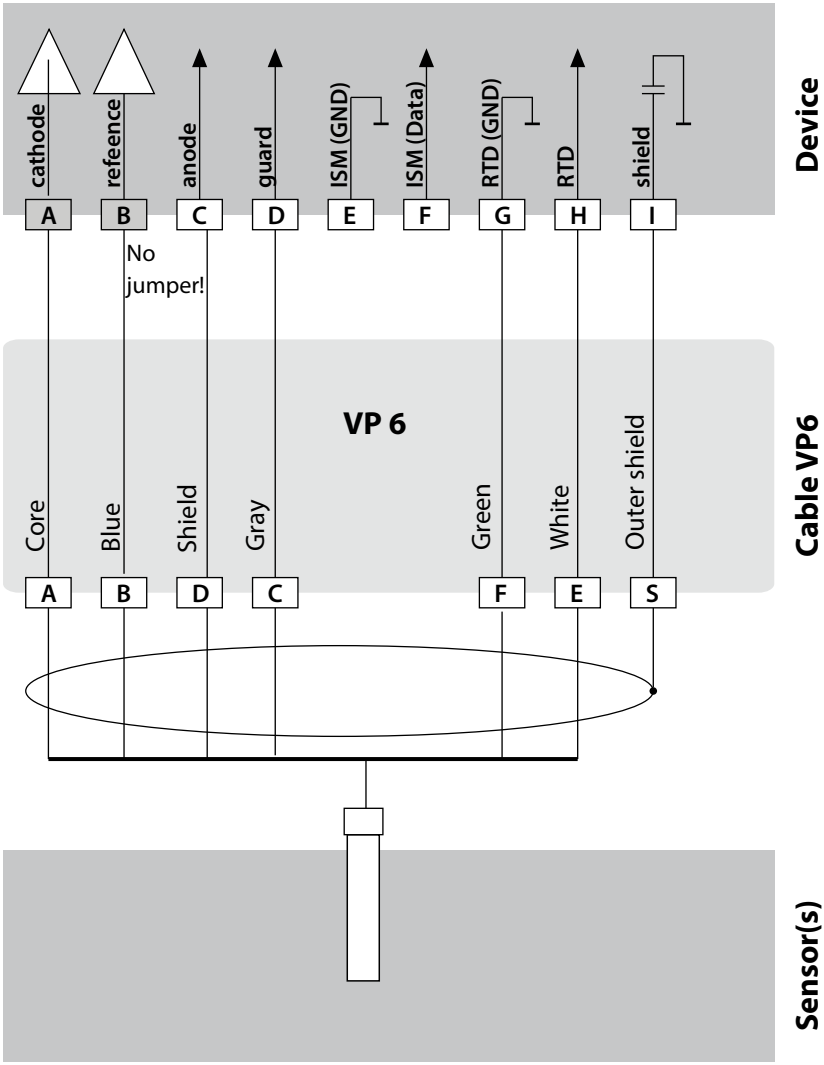


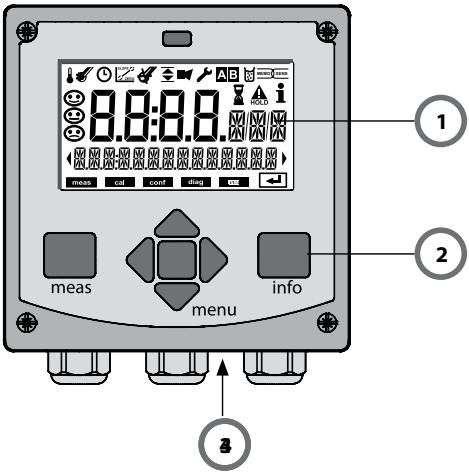
Example 3:

Measuring task: Oxygen SUBTRACES (TAN required)

Sensors (example): "001" (e.g. SE 708, InPro 6950)

Cable (example): VP6 ZU 0313 (Knick)

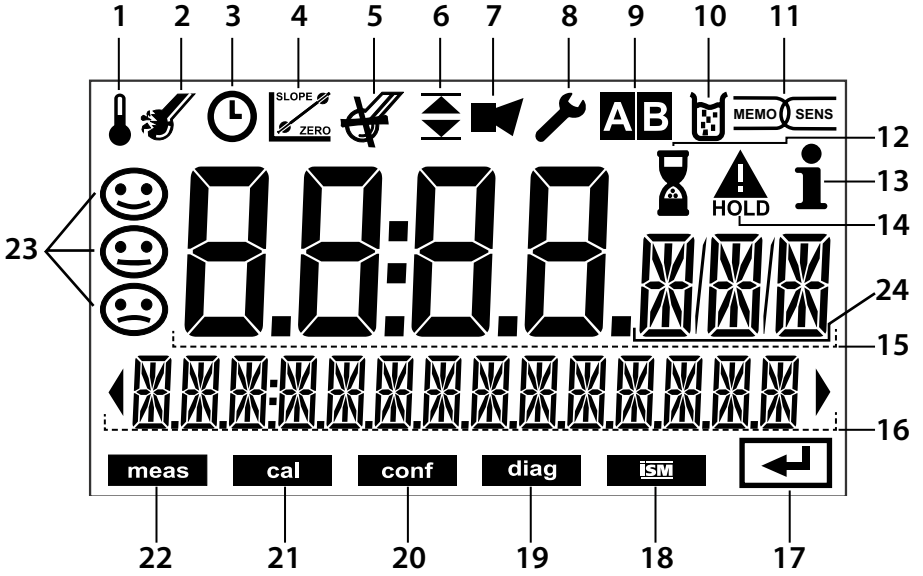




1 Display
2 Keypad
3 Rating plate (enclosure bottom)

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

Display

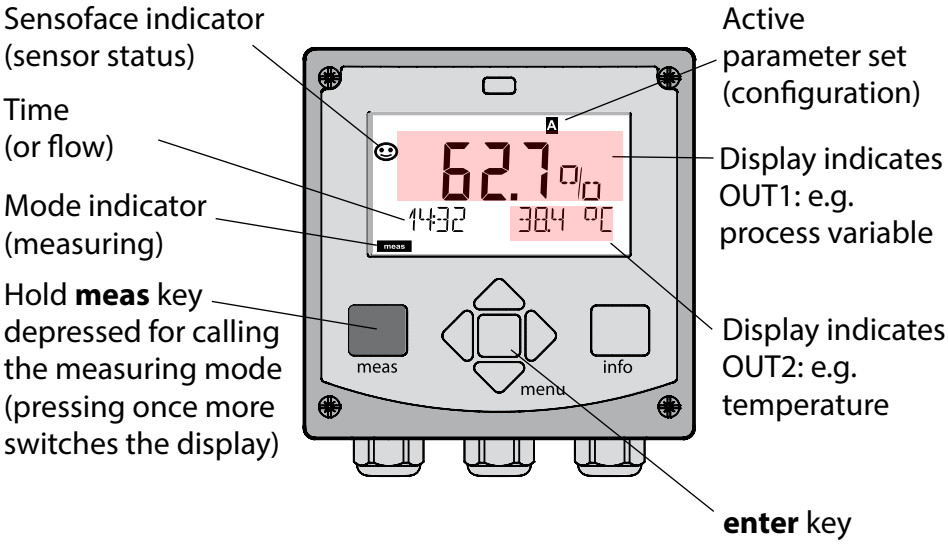


1 Temperature
2 Sensocheck
3 Interval/response time
4 Sensor data
5 Not used
6 Limit message:
Limit 1 ▼ or Limit 2 ▲
7 Alarm
8 Service
9 Parameter set
10 Calibration
11 Memosens sensor
12 Waiting time running
13 Info available
14 Hold mode active
15 Main display
16 Secondary display
17 Proceed using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

Signal Colors (Display Backlighting)

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

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



Depending on the configuration, one of the following displays can be set as standard display for the measuring mode (see page 25):

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

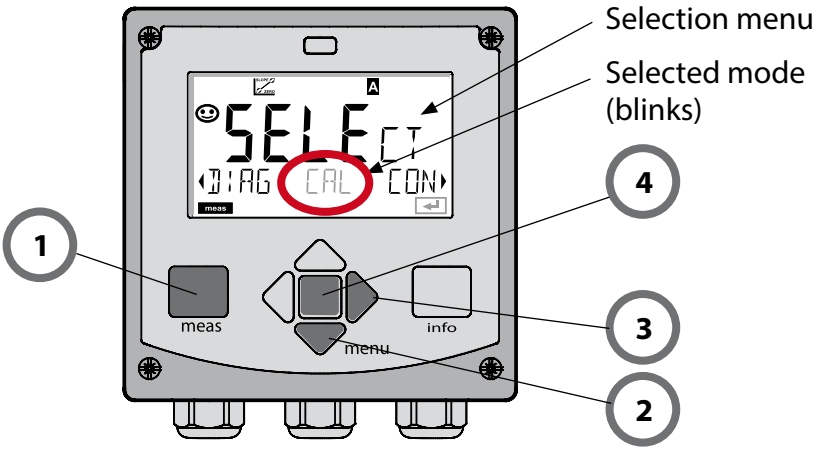
Note: By pressing the **meas** key in measuring mode you can view the displays for approx. 60 sec.

The device must be configured for the respective measurement task!

Selecting the Mode / Entering Values

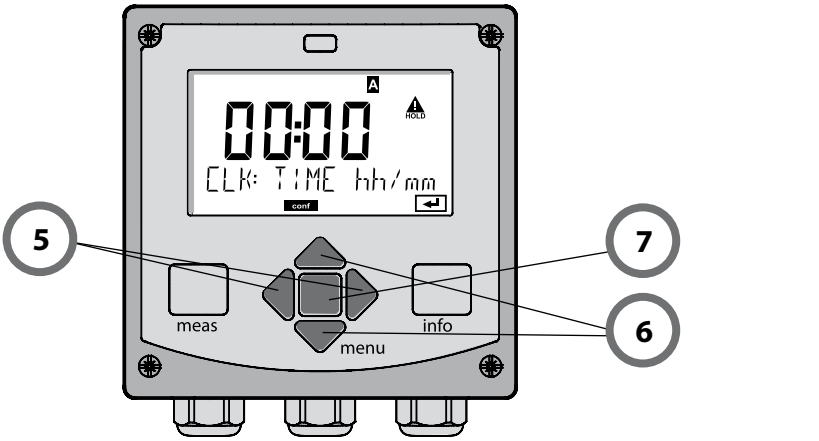
To select the operating mode:

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

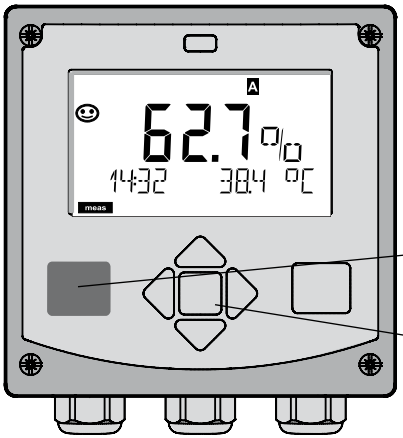


To enter a value:

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



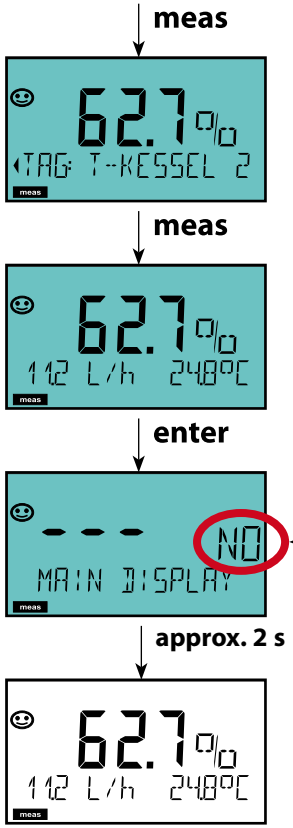
Display in Measuring Mode



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

meas key

enter key

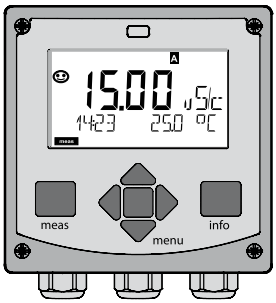


By pressing **meas** briefly you can step through further displays such as tag number (TAG) or flow (L/h). These displays are turquoise. After 60 sec they switch back to the main display.

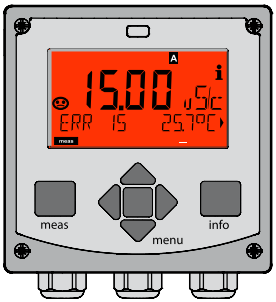
Press **enter** to select a display as MAIN DISPLAY – the secondary display shows "MAIN DISPLAY – NO". Use the **UP** / **DOWN** arrow keys to select "MAIN DISPLAY – YES" and confirm by pressing **enter**. The display color changes to white. This display is now shown in measuring mode.

Color-Coded User Interface

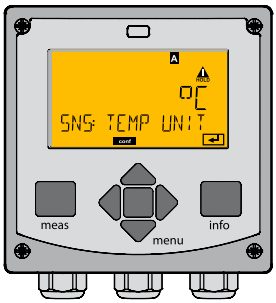
The color-coded user interface guarantees increased operating safety. Operating modes are clearly signaled.
The normal measuring mode is white. Information text appears on a green screen and the diagnostic menu appears on turquoise.
The orange HOLD mode (e.g. during calibration) is quickly visible as is the magenta screen which indicates asset management messages for predictive diagnostics – such as maintenance request, pre-alarm and sensor wear.
The alarm status has a particularly noticeable red display color and is also signaled by flashing display values. Invalid inputs or false pass-codes cause the entire display to blink red so that operating errors are noticeably reduced.



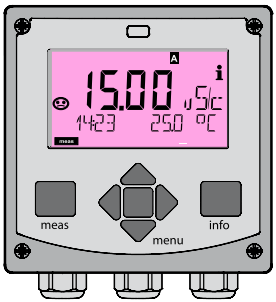
White:
Measuring mode



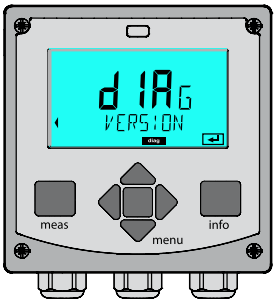
Red blinking:
Alarm, errors



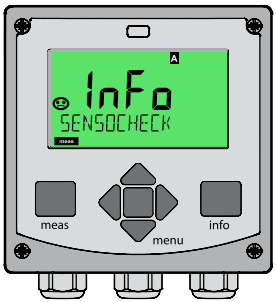
Orange:
HOLD mode



Magenta:
Maintenance request



Turquoise:
Diagnostics



Green:
Information texts

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

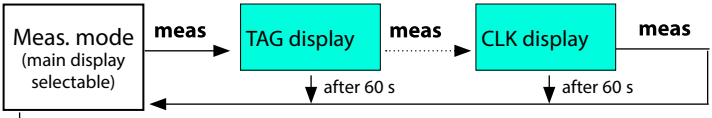
HOLD
Manual activation of HOLD mode, e.g. for replacing a digital sensor. The signal outputs adopt a defined state.

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

Configuration
The analyzer must be configured for the respective measurement task. In the "Configuration" mode you select the connected sensor, the measuring range to be transmitted, and the conditions for warning and alarm messages. During configuration the device is in HOLD mode.
Configuration mode is automatically exited 20 minutes after the last keystroke. The device returns to measuring mode.

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

Menu Structure of Modes and Functions



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

DIAG	CALDATA	Display of calibration data
	SENSOR	Display of sensor data
	SELFTEST	Self test: RAM, ROM, EEPROM, module
	LOGBOOK	Logbook: 100 events with date and time
	MONITOR	Display of direct, uncorrected sensor signals
	VERSION	Display of software version, model designation, serial number
HOLD		Manual activation of HOLD mode, e.g. for sensor replacement. The signal outputs behave as configured (e.g. last measured value, 21 mA)
CAL	CAL_WTR/AIR	Calibration in water/air (as configured)
	CAL_ZERO	Zero calibration
	P_CAL	Product calibration
	CAL_RTD	Adjustment of temperature probe
CONF	PARSET A	Configuring parameter set A
	PARSET B	Configuring parameter set B
SERVICE (Access via code, factory setting: 5555)	MONITOR	Display of measured values for validation (simulators)
	SENSOR	Reset wear counter
	OUT1	Current source, output 1
	OUT2	Current source, output 2
	CODES	Specifying access codes for operating modes
	DEFAULT	Reset to factory setting
	OPTION	Enabling an option via TAN

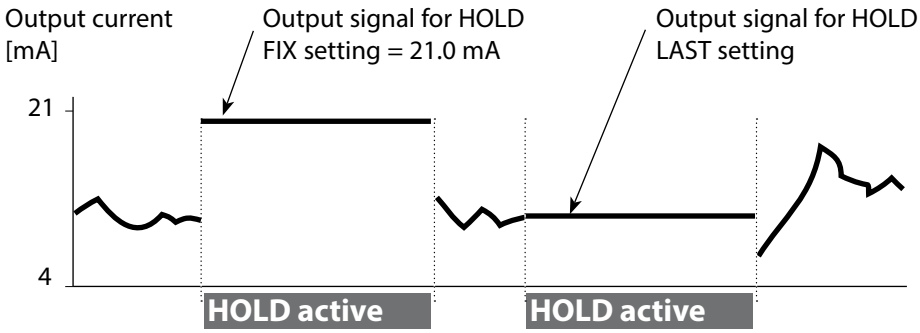
The HOLD mode is a safety state during configuration and calibration. Output current is frozen (LAST) or set to a fixed value (FIX).
The HOLD mode is indicated by orange display backlighting.

HOLD mode, display icon:

Output signal response

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

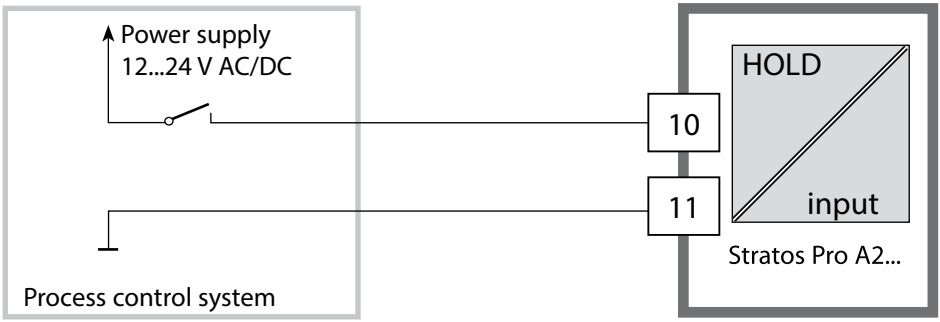
Output signal during HOLD:



Terminating the HOLD mode

The HOLD mode is ended by switching to measuring mode (hold **meas** key depressed). The display reads "Good Bye", after that, the HOLD mode is exited.
When the calibration mode is exited, a confirmation prompt ensures that the installation is ready for operation (e.g.: sensor reinstalled, located in process).

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



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

Manual activation of HOLD
The HOLD mode can be activated manually from the HOLD menu. This allows checking or replacing a sensor, for example, without provoking unintended reactions at the outputs.
Press **meas** key to return to selection menu.

Alarm

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

Error messages can also be signaled by a 22 mA output current (see Configuration).
2 sec after the failure event is corrected, the alarm status will be deleted.

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

Generating a message via the CONTROL input (min. flow / max. flow)

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

When preset to flow measurement

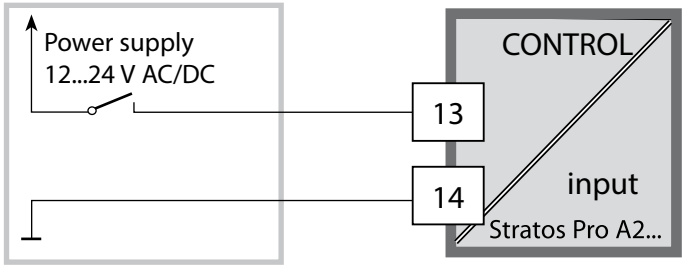
CONF/CNTR_IN/CONTROL = FLOW

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

CONF/ALA/FLOW CNTR = ON

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

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



Configuration

Menu Structure of Configuration

The device provides 2 parameter sets "A" and "B". By switching between the parameter sets you can adapt the device to different measurement situations, for example.
Parameter set "B" only permits setting of process-related parameters.
The configuration steps are assigned to different menu groups.
With the left/right arrow keys you can jump between the individual menu groups.
Each menu group contains menu items for setting the parameters.
Pressing **enter** opens a menu item. Use the arrow keys to edit a value.
Press **enter** to confirm/save the settings.
Return to measurement: Hold **meas** key depressed (> 2 s).

Select menu group	Menu group	Code	Display	Select menu item
	Sensor selection	SNS:		enter
		Menu item 1		enter
		⋮		enter
		Menu item ...		enter
	Current output 1	OT1:		
	Current output 2	OT2:		
	Compensation	COR:		
	Control input (parameter set or flow measurement)	IN:		
	Alarm mode	ALA:		
	Setting the clock	CLK:		
	Tag number	TAG:		

Parameter set A/B: configurable menu groups

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

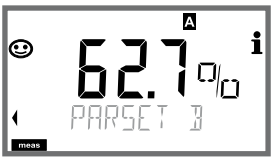
Menu group	Parameter set A	Parameter set B
SENSOR	Sensor selection	---
OUT1	Current output 1	Current output 1
OUT2	Current output 2	Current output 2
CORRECTION	Compensation	Compensation
CNTR_IN	Control input	---
ALARM	Alarm mode	Alarm mode
PARSET	Parameter set selection	---
CLOCK	Setting the clock	---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

External switchover of parameter sets A/B

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

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

Manual Switchover of Parameter Sets A/B

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

Configuration				Choices	Default
Sensor (SENSOR)					
SNS:	(Select text line)			STANDARD 10 Typ TRACES 01 Typ SUBTRACES 001 T. (requires "Traces" Option) ISM-DIGITAL MEMOSENS	STANDARD 10 Typ
	MEAS MODE			dO % dO mg/l dO ppm GAS %	dO %
	U-POL			-400...–1000 mV (0000...–1000 mV for traces)	-675 mV
	MEMBR. COMP.			00.50...03.00	01.00
	RTD TYPE			22 NTC 30 NTC	22 NTC
	TEMP UNIT			°C / °F	°C
	CAL MODE			CAL AIR CAL WTR	CAL AIR
	CAL TIMER			ON/OFF	OFF
	ON	CAL-CYCLE		0...9999 h	0168 h
	Memosens*	CIP COUNT		ON/OFF	OFF
		ON	CIP CYCLES	0...9999 CYC	0025 CYC
		SIP COUNT		ON/OFF	OFF
		ON	SIP CYCLES	0...9999 CYC	0025 CYC
		AUTOCLAVE		ON / OFF	OFF
		CHECK TAG/ GROUP		ON / OFF	OFF

* for digital sensors and Memosens only

Configuration			Choices	Default
Output 1 (OUT1, no trace measurement)				
OT1:	CHANNEL		OXY/TMP	OXY
	OXY dO %	BEGIN 4mA	000.0...600.0 %	000.0 %
		END 20 mA	0.000...600.0 %	600.0 %
	OXY dO mg/l	BEGIN 4mA	00.00...99.99 mg/l	
		END 20 mA	00.00...99.99 mg/l	
	OXY dO ppm	BEGIN 4mA	00.00...99.99 ppm	
		END 20 mA	00.00...99.99 ppm	
	OXY GAS %	BEGIN 4mA	00.00...99.99 %	
		END 20 mA	00.00...99.99 %	
	TMP °C	BEGIN 4mA	–20...150 °C	
		END 20 mA	–20...150 °C	
	TMP °F	BEGIN 4mA	–4...302 °F	
		END 20 mA	–4...302 °F	
	FILTERTIME		0...120 SEC	0000 SEC
	FAIL 22mA		ON/OFF	OFF
	FACE 22mA		ON/OFF	OFF
	HOLD MODE		LAST/FIX	LAST
	FIX	HOLD-FIX	4...22 mA	021.0 mA

Configuration			Choices	Default
Output 1 (OUT1) **Trace measurement, sensor type 01, TAN required**				
OT1:	CHANNEL		OXY/TMP	OXY
	OXY dO %	BEGIN 4mA	000.0...150.0 %	000.0 %
		END 20 mA	000.0...150.0 %	150.0 %
	OXY dO mg/l	BEGIN 4mA	0000 µg/l...20.00 mg/l	
		END 20 mA	0000 µg/l...20.00 mg/l	
	OXY dO ppm	BEGIN 4mA	0000 ppb...20.00 ppm	
		END 20 mA	0000 ppb...20.00 ppm	
	OXY GAS %	BEGIN 4mA	0000 ppm... 50.00 %	
		END 20 mA	0000 ppm... 50.00 %	
	TMP °C	BEGIN 4mA	–20...150 °C	
		END 20 mA	–20...150 °C	
	TMP °F	BEGIN 4mA	–4...302 °F	
		END 20 mA	–4...302 °F	
	FILTERTIME		0...120 SEC	0000 SEC
	FAIL 22mA		ON/OFF	OFF
	FACE 22mA		ON/OFF	OFF
	HOLD MODE		LAST/FIX	LAST
	FIX	HOLD-FIX	4...22 mA	021.0 mA

Configuration			Choices	Default
Output 1 (OUT1) **Trace measurement, sensor type 001, TAN required**				
OT1:	CHANNEL		OXY/TMP	OXY
	OXY dO %	BEGIN 4mA	000.0...150.0 %	000.0 %
		END 20 mA	000.0...150.0 %	150.0 %
	OXY dO mg/l	BEGIN 4mA	000.0 µg/l... 20.00 mg/l	
		END 20 mA	000.0 µg/l... 20.00 mg/l	
	OXY dO ppm	BEGIN 4mA	000.0 ppb... 20.00 ppm	
		END 20 mA	000.0 ppb... 20.00 ppm	
	OXY GAS %	BEGIN 4mA	0000 ppb...50 %	
		END 20 mA	0000 ppb...50 %	
	TMP °C	BEGIN 4mA	–20...150 °C	
		END 20 mA	–20...150 °C	
	TMP °F	BEGIN 4mA	–4...302 °F	
		END 20 mA	–4...302 °F	
	FILTERTIME		0...120 SEC	0000 SEC
	FAIL 22mA		ON/OFF	OFF
	FACE 22mA		ON/OFF	OFF
	HOLD MODE		LAST/FIX	LAST
	FIX	HOLD-FIX	4...22 mA	021.0 mA

Configuration				Choices	Default
Output 2 (OUT2)					
OT2:	CHANNEL			OXY/TMP	TMP
	... other steps like output 1				
Salinity or pressure compensation (CORRECTION)					
COR:	SALINITY			00.00...45.00 ppt	00.00 ppt
	PRESSURE UNIT			BAR/KPA/PSI	BAR
	PRESSURE			MAN/EXT *)	
	MAN	BAR		0.000...9.999 BAR	1.013 BAR
		KPA		000.0...999.9 KPA	
		PSI		000.0...145.0 PSI	
	EXT	I-Input		OFF/4(0)...20 mA	4...20 mA
		BAR	BEGIN 4mA (0 mA)	0.000...9.999 BAR	0.000 BAR
			END 20 mA	0.000...9.999 BAR	9.999 BAR
		KPA	BEGIN 4mA (0 mA)	000.0...999.9 KPA	
			END 20 mA	000.0...999.9 KPA	
		PSI	BEGIN 4mA (0 mA)	000.0...145.0 PSI	
			END 20 mA	000.0...145.0 PSI	
Control input (CNTR_IN)					
IN:	CONTROL			PARSET, FLOW	PARSET
	FLOW	FLOW ADJUST		12000 pulses/liter	0 ... 20000 pulses/liter
Alarm (ALARM)					
ALA:	DELAYTIME			0...600 SEC	0010 SEC
	SENSOCHECK			ON/OFF	OFF
	FLOW CNTR **)			ON/OFF	OFF
	ON	FLOW MIN **)		005.0 L/h	0 ... 99.9 L/h
		FLOW MAX**)		025.0 L/h	0 ... 99.9 L/h

*) only displayed if enabled
**) Hysteresis fixed at 5% of threshold value

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

Sensor Verification (TAG, GROUP)

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

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

A possibly existing TAG/GROUP will be overwritten.

Two complete parameter sets are stored in the EEPROM.
As delivered, the two sets are identical but can be edited.

Note:

Fill in your configuration data on the following pages or use them as original for copy.

Configuration (Template for Copy)

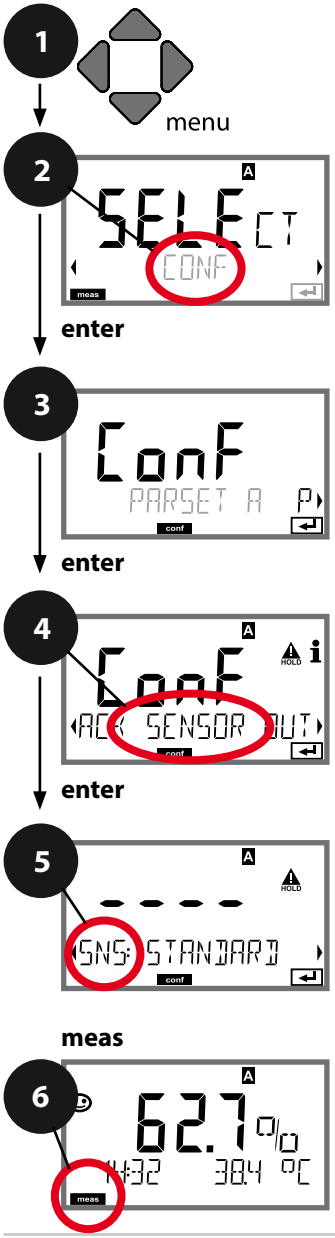
Parameter	Parameter set A	Parameter set B
SNS: Sensor type		--- *)
SNS: Measuring mode		--- *)
SNS: Voltage polarization		--- *)
SNS: MEMBR. COMP.		--- *)
SNS: RTD type		--- *)
SNS: Temperature unit		--- *)
SNS: Calibration mode		--- *)
SNS: Calibration timer		--- *)
SNS: Calibration cycle		--- *)
SNS: CIP counter		--- *)
SNS: SIP counter		--- *)
SNS: Autoclaving counter		--- *)
SNS: CHECK TAG		--- *)
SNS: CHECK GROUP		--- *)
OT1: Process variable		
OT1: Current start		
OT1: Current end		
OT1: Filter time		
OT1: FAIL 22 mA (error messages)		
OT1: FACE 22 mA (Sensoface messages)		
OT1: HOLD mode		
OT1: HOLD FIX current		
OT2: Process variable		
OT2: Current start		
OT2: Current end		
OT2: Filter time		
OT2: FAIL 22 mA (error messages)		
OT2: FACE 22 mA (Sensoface messages)		

Parameter	Parameter set A	Parameter set B
OT2: HOLD mode		
OT2: HOLD FIX current		
COR: Salinity (ppt)		
COR: Pressure unit (BAR, KPA, PSI)		
COR: Pressure (MAN/EXT)		
COR: Ext. current input (Option)		
IN: Parameter set A/B or flow		
IN: (Flow meter) Adjusting pulses/liter		
ALA: Delay		
ALA: Sensocheck on/off		
ALA: Flow control FLOW CNTR on/off		
ALA: Minimum flow (hysteresis fixed at 5 %)		
ALA: Maximum flow (hysteresis fixed at 5 %)		
PAR: Parameter set selection		--- *)
CLK: Time format		--- *)
CLK: Time hh/mm		--- *)
CLK: Day/month		--- *)
CLK: Year		--- *)
TAG: Measuring point (tag number)		
GROUP: Group of measuring points		

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

Sensor

Select: Measuring mode, sensor type analog/digital, polarization voltage, membrane compensation, temp probe type

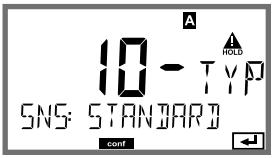
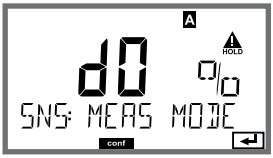
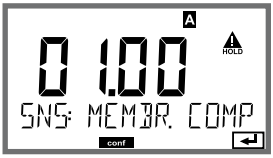
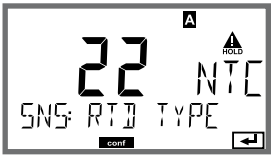


1) Press **menu** key.
2) Select **CONF** using ◂ ▸ keys, press **enter**.
3) Select parameter set using ◂ ▸, press **enter**.
4) Select **SENSOR** menu using ◂ ▸ keys, press **enter**.
5) All items of this menu group are indicated by the "SNS:" code.
   Press **enter** to select menu,
   edit using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

5

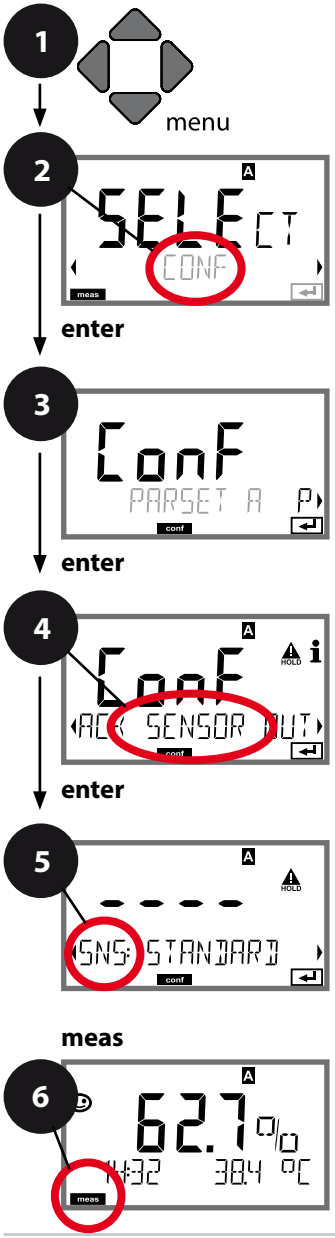
Select sensor type
Select measuring mode
Polarization voltage
Membrane compensation
Type of temp probe
Temperature unit
Calibration medium water/air
Calibration timer
CIP/SIP cycles
Autoclaving counter
CHECK TAG
CHECK GROUP

enter

Menu item	Action	Choices
Select sensor type analog/digital 	Select sensor type using ▲ ▼ keys. Press **enter** to confirm.	**STANDARD 10 Typ** TRACES 01 Typ SUBTRACES 001 Typ ISM MEMOSENS
Select measuring mode 	Select measuring mode using ▲ ▼ keys. DO: Measurement in liquids GAS: Measurement in gases Press **enter** to confirm.	**dO %,** dO mg/l dO ppm GAS %
Polarization voltage (not for Memosens) 	To be entered separately for measurement/calibration. For measuring in the trace range: U-POL MEAS = –500 mV Enter V_{pol} using ▲ ▼ ◀ ▶ keys. Press **enter** to confirm.	**-675 mV** -400...–1000 mV (0000...–1000 mV for trace measurement)
Membrane compensation 	(not for ISM/Memosens) Enter membrane compensation using ▲ ▼ ◀ ▶ keys. Press **enter** to confirm.	**01.00** 00.50...05.00
Type of temp probe 	(not for ISM/Memosens) Select type of temperature probe using ▲ ▼ keys. Press **enter** to confirm.	**22 NTC** 30 NTC

Sensor

Select: Temperature unit, medium: water/air, calibration timer

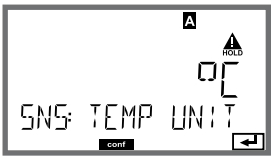
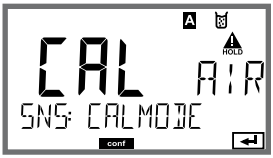
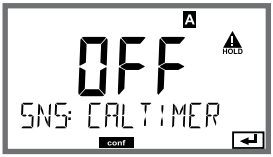
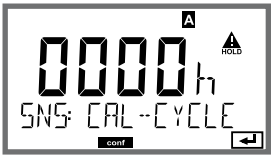


1) Press **menu** key.
2) Select **CONF** using ◂ ▸ keys, press **enter**.
3) Select parameter set using ◂ ▸, press **enter**.
4) Select **SENSOR** menu using ◂ ▸ keys, press **enter**.
5) All items of this menu group are indicated by the "SNS:" code.
   Press **enter** to select menu,
   edit using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

5

Select sensor type
Select measuring mode
Polarization voltage
Membrane compensation
Type of temp probe
Temperature unit
Calibration medium water/air
Calibration timer
CIP/SIP cycles
Autoclaving counter
CHECK TAG
CHECK GROUP

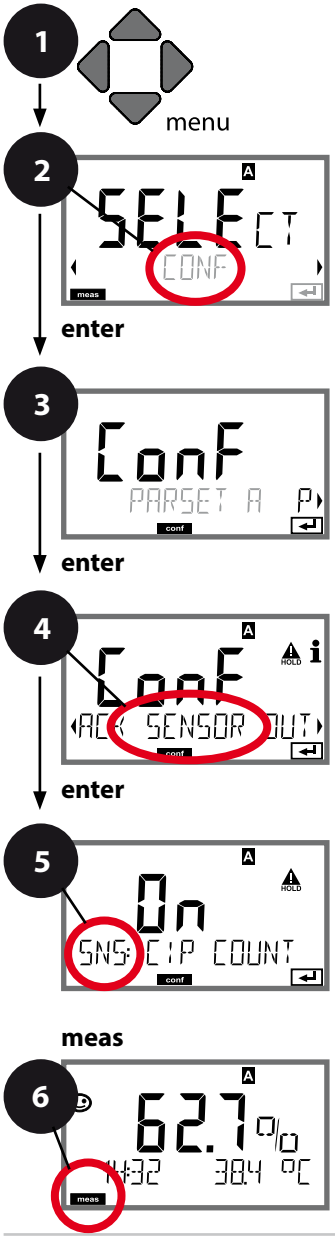
enter

Menu item	Action	Choices
Temperature unit 	Select temperature unit using ▲ ▼ keys. Press **enter** to confirm.	**°C** °F
Medium: 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.	**OFF** ON
(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 in the Configuration – Alarm menu, the expiration of the calibration interval is indicated by Sensoface (beaker icon and smiley).

The calibration timer settings apply to both parameter sets A and B. The time remaining until the next due calibration can be seen in the diagnostics menu (see "Diagnostics").

Sensor
Adjust: CIP cleaning cycles, SIP sterilization cycles

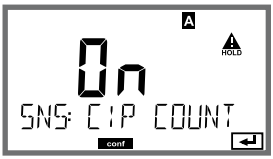
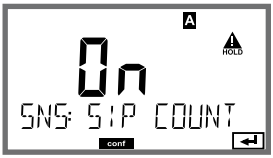


1) Press **menu** key.
2) Select **CONF** using ◂ ▸ keys, press **enter**.
3) Select parameter set using ◂ ▸, press **enter**.
4) Select **SENSOR** menu using ◂ ▸ keys, press **enter**.
5) All items of this menu group are indicated by the "SNS:" code.
   Press **enter** to select menu,
   edit with arrow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

5

Select sensor type
Select measuring mode
Polarization voltage
Membrane compensation
Type of temp probe
Temperature unit
Calibration medium water/air
Calibration timer
CIP cleaning cycle counter
CIP cleaning cycles
SIP sterilization cycle counter
SIP sterilization cycles
Autoclaving counter
CHECK TAG
CHECK GROUP

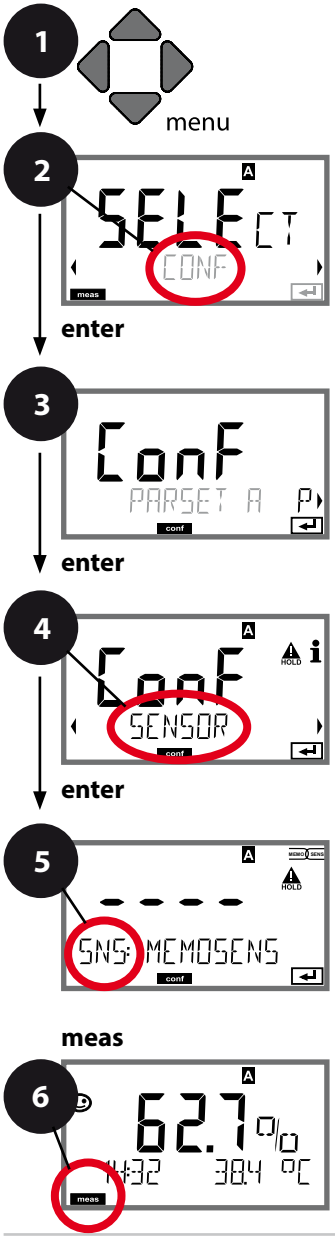
enter

Menu item	Action	Choices
CIP counter 	Adjust CIP counter using ▲ ▼ keys: OFF: No counter ON: Fixed cleaning cycle (adjust in the next step) Press **enter** to confirm.	**OFF**/ON
CIP cycles 	Only with CIP COUNT ON: Enter max. number of cleaning cycles using ▲ ▼ ◀ ▶ keys. Press **enter** to confirm.	0...9999 CYC (**0000 CYC**)
SIP counter 	Adjust SIP counter using ▲ ▼ keys: OFF: No counter ON: Max. sterilization cycles (adjust as for CIP counter) Press **enter** to confirm.	**OFF**/ON

Logging the cleaning and sterilization cycles with connected sensor helps measuring the load on the sensor.
Suitable for biochemical applications (process temp approx. 0 ... +50 °C / +32 ... +122 °F, CIP temp > +55 °C / +131 °F, SIP temp > +115 °C / +239 °F).

Note:
A CIP or SIP cycle is only entered into the logbook 2 hours after the start to ensure that the cycle is complete.
With Memosens, an entry is also made in the sensor.

Sensor
Adjust: Autoclaving counter



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

5

Select sensor type
Select measuring mode
Polarization voltage
Membrane compensation
Type of temp probe
Temperature unit
Calibration medium water/air
Calibration timer
CIP/SIP cycles
Autoclaving counter
CHECK TAG
CHECK GROUP

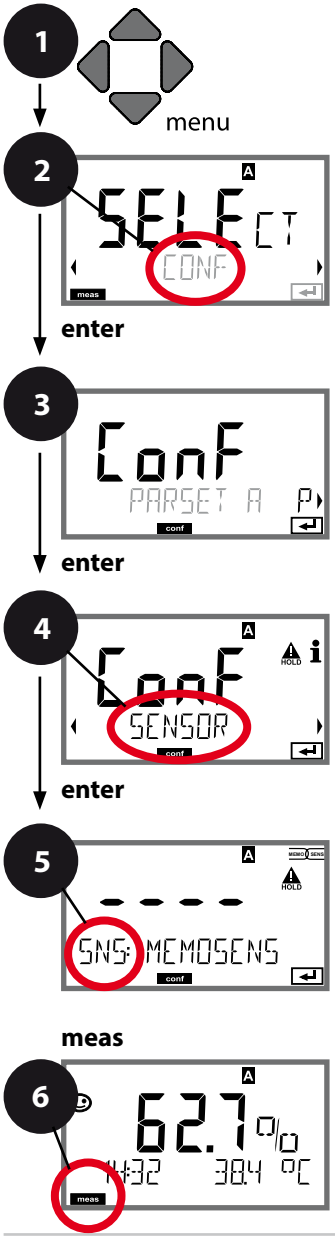
enter

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 on the transmitter. The transmitter displays "INCREMENT AUTOCLAVE CYCLE" as confirmation. You can configure the current outputs so that a Sensoface message generates a 22-mA error signal, see page 59.

Menu item	Action	Choices
Autoclaving counter 	Select using ▲ ▼ keys: 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 menu SENSOR/ AUTOCLAVE :		
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

Memosens Sensor
Sensor Verification (TAG, GROUP)



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

5

Select sensor type
Select measuring mode
Polarization voltage
Membrane compensation
Type of temp probe
Temperature unit
Calibration medium water/air
Calibration timer
CIP/SIP cycles
Autoclaving counter
CHECK TAG
CHECK GROUP

enter

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

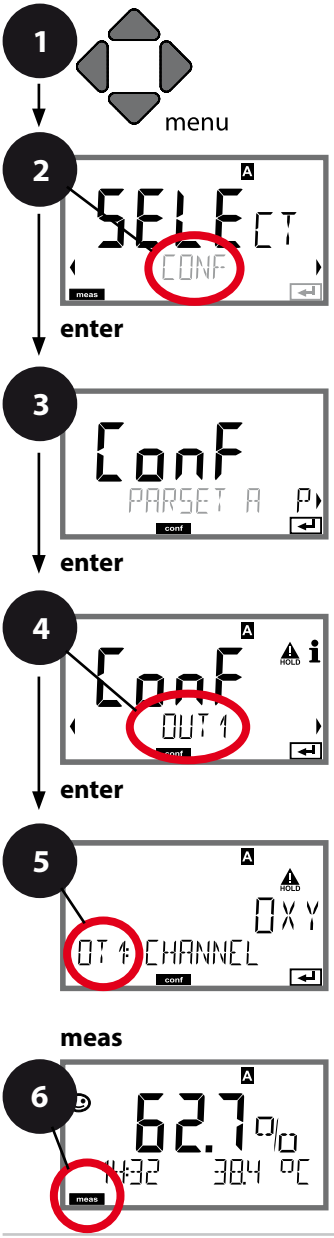
Sensor Verification (TAG, GROUP)

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

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

Current Output 1

Output current range, current start, current end

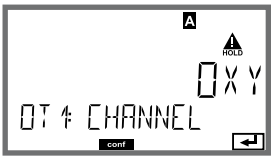


1) Press **menu** key.
2) Select **CONF** using ◂ ▸ keys, press **enter**.
3) Select parameter set using ◂ ▸ keys, press enter.
4) Select **OUT1** menu using ◂ ▸ keys, press **enter**.
5) All items of this menu group are indicated by the "OT1:" code.
   Press **enter** to select menu,
   edit using arrow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

5

Process variable
Current start
Current end
Time averaging filter
Output current for error message
Output current for Sensoface
Output current during HOLD
Output current for HOLD FIX

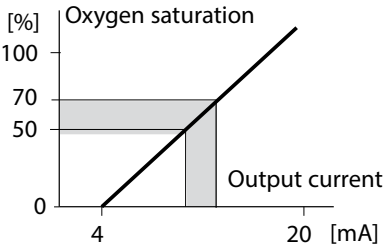
enter

Menu item	Action	Choices
Process variable 	Select using ▲ ▼ keys: OXY: Oxy value TMP: Temperature Press **enter** to confirm.	**OXY**/TMP
Current start, current end 	Modify digit using ▲ ▼ keys, select next digit using ◀ ▶ keys. Press **enter** to confirm.	000.0...0600% (OXY, Sensor 10) 0.000...0150% (OXY, Sensor 01, 001 and Traces option) –20...150 °C / –4...302 °F (TMP)

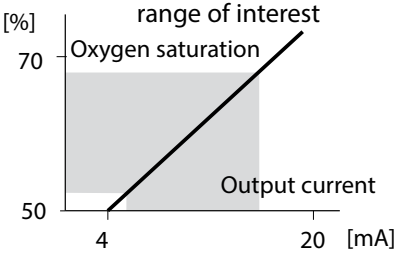
For **process variables comprising several decades**, decimal point and dimension can be shifted using the ◀ ▶ cursor keys.
Then, the desired number is entered using (up / down) and ◀ ▶.
For measurement in gases (GAS), this method is used to switch between ppm and % for volume concentration (10000 ppm = 1 %).

Assignment of measured values: current start and current end

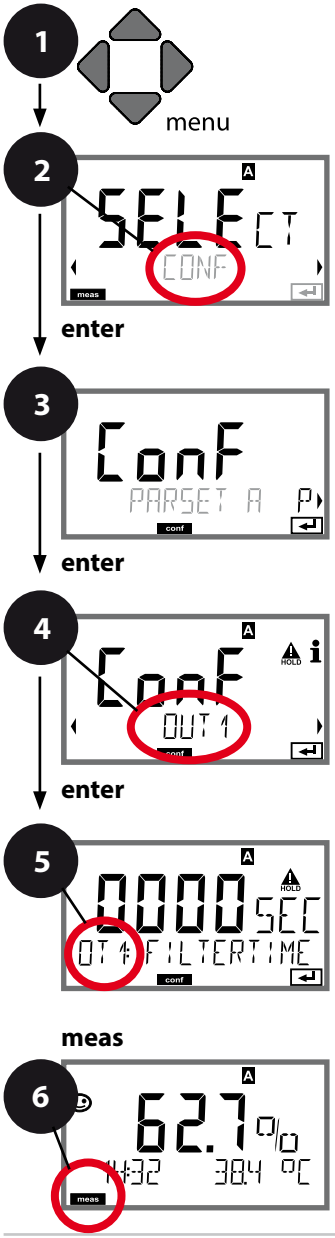
Example 1: Range 0...100%



Example 2: Range 50...70%
Advantage: Higher resolution in range of interest



Current Output 1
Adjusting the time interval of the output filter

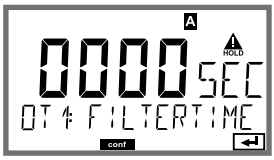


1) Press **menu** key.
2) Select **CONF** using ◂ ▸ keys, press **enter**.
3) Select parameter set using ◂ ▸ keys, press enter.
4) Select **OUT1** menu using ◂ ▸ keys, press **enter**.
5) All items of this menu group are indicated by the "OT1:" code.
   Press **enter** to select menu,
   edit using arrow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

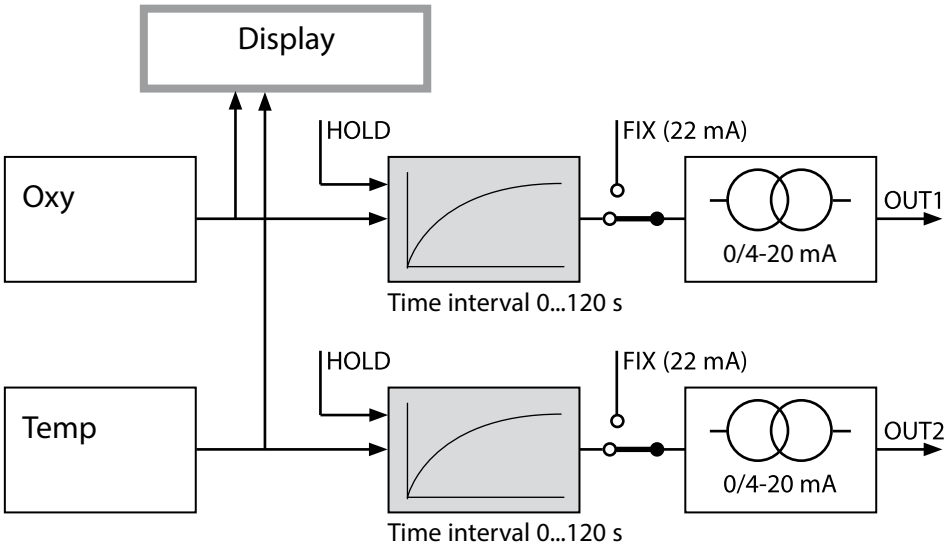
5

Process variable
Current start
Current end
Time averaging filter
Output current for error message
Output current for Sensoface
Output current during HOLD
Output current for HOLD FIX

enter

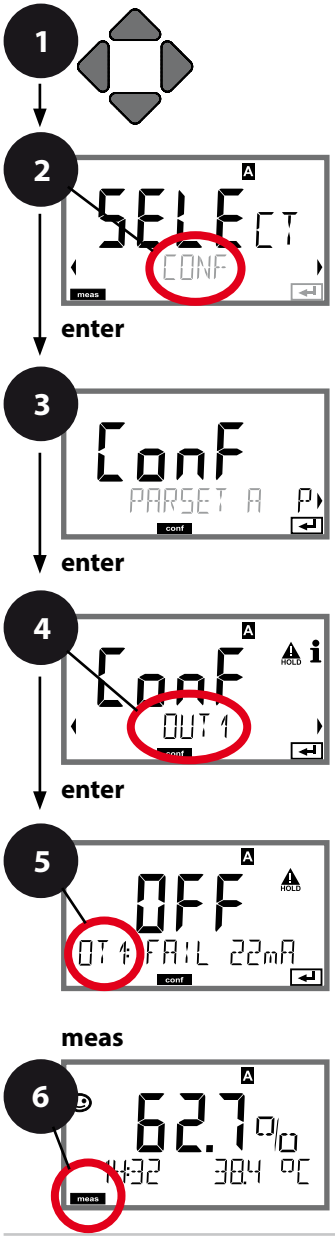
Menu item	Action	Choices
Time averaging filter 	Enter value using ▲ ▼ ◀ ▶ keys. Press **enter** to confirm.	0...120 SEC (**0000 SEC**)

Time averaging filter
To smoothen the current output, a low-pass filter with adjustable filter time constant can be switched on. When there is a jump at the input (100 %), the output level is at 63 % after the time interval has been reached. The time interval can be set from 0 to 120 sec. If the time interval is set to 0 sec, the current output directly follows the input.
Note:
The filter only acts on the current output, not on the display!
During HOLD the filter is not applied. This prevents a jump at the output.



Current Output 1

Output current for error message or Sensoface alert

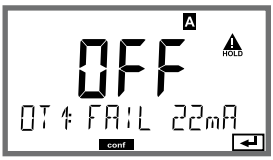


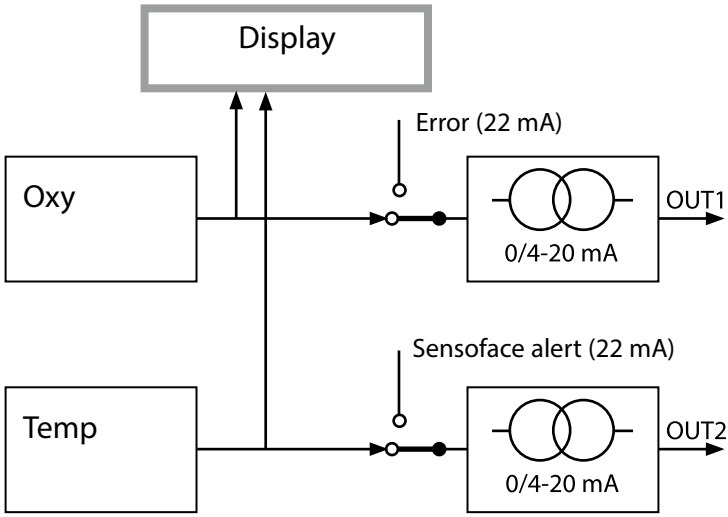
1) Press **menu** key.
2) Select **CONF** using ◂ ▸ keys, press **enter**.
3) Select parameter set using ◂ ▸, press **enter**.
4) Select **OUT1** menu using ◂ ▸ keys, press **enter**.
5) All items of this menu group are indicated by the "OT1:" code.
   Press **enter** to select menu,
   edit with arrow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

5

Process variable
Current start
Current end
Time averaging filter
Output current for error message
Output current for Sensoface
Output current during HOLD
Output current for HOLD FIX

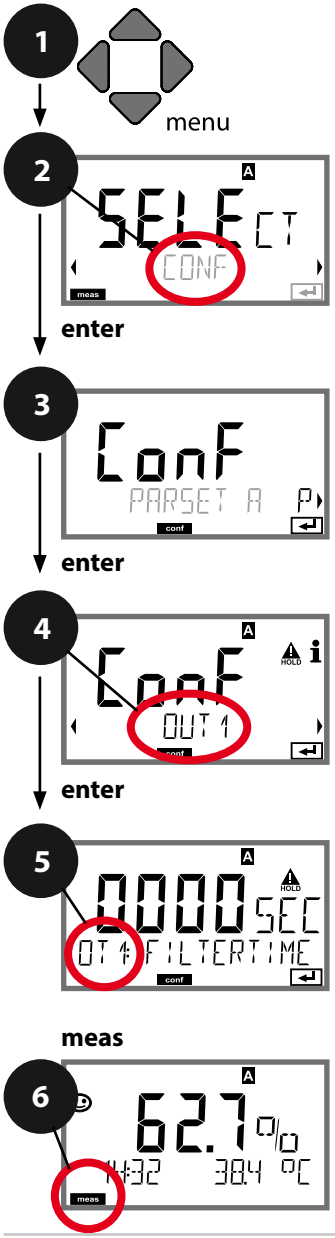
enter

Menu item	Action	Choices
Output current for error message (FAIL) 	In the case of an error (FAIL), the current output is set to 22 mA. Select ON or OFF using ▲ ▼ keys. Press **enter** to confirm.	ON/**OFF**
Output current for Sensoface (FACE) 	In the case of a Sensoface alert (FACE), the current output is set to 22 mA. Select ON or OFF using ▲ ▼ keys. Press **enter** to confirm.	ON/**OFF**



Error messages and Sensoface alerts can be set separately for both current outputs. This allows, for example, signaling error messages only over current output 1 and Sensoface alerts only over current output 2.

Current Output 1
Output current during HOLD

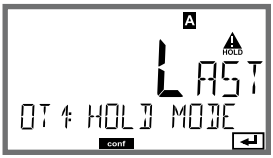


1) Press **menu** key.
2) Select **CONF** using ◂ ▸ keys, press **enter**.
3) Select parameter set using ◂ ▸ keys, press enter.
4) Select **OUT1** menu using ◂ ▸ keys, press **enter**.
5) All items of this menu group are indicated by the "OT1:" code.
   Press **enter** to select menu,
   edit using arrow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

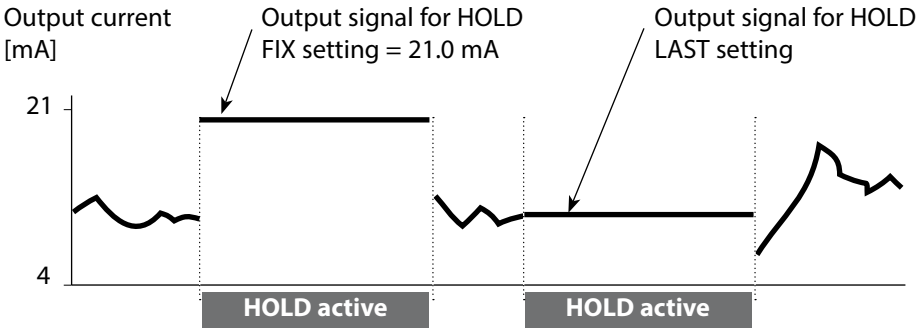
5

Process variable
Current start
Current end
Time averaging filter
Output current for error message
Output current for Sensoface
Output current during HOLD
Output current for HOLD FIX

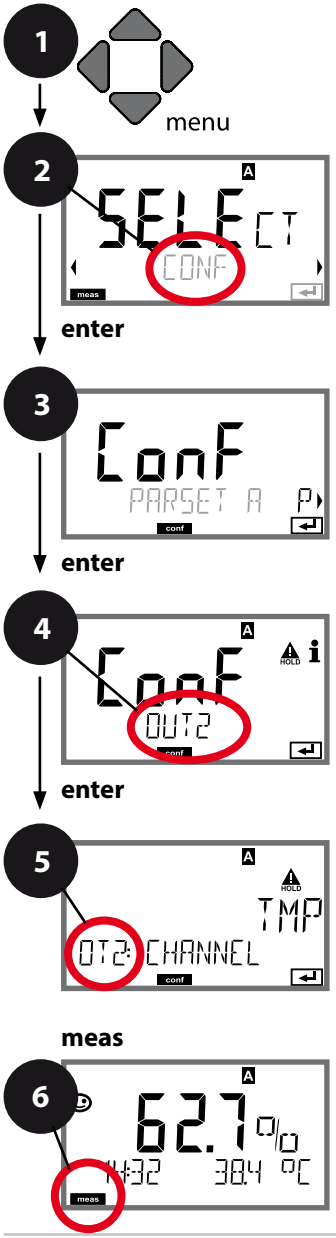
enter

Menu item	Action	Choices
Output current during HOLD 	LAST: During HOLD the last measured value is maintained at the output. FIX: During HOLD a value (to be entered) is maintained at the output. Select using ▲ ▼ Press **enter** to confirm.	**LAST**/FIX
Output current for HOLD FIX 	Only with FIX selected: Enter current which is to flow at the output during HOLD Enter value using ▲ ▼ ◀ ▶ keys. Press **enter** to confirm.	00.00...22.00 mA (**21.00 mA**)

Output signal during HOLD:



Current Output 2
Process variable. Current start. Current end ...

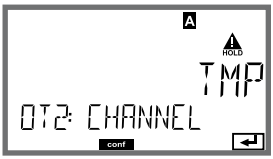


1) Press **menu** key.
2) Select **CONF** using ◂ ▸ keys, press **enter**.
3) Select parameter set using ◂ ▸ keys, press enter.
4) Select **OUT2** menu using ◂ ▸ keys, press **enter**.
5) All items of this menu group are indicated by the "OT2:" code.
   Press **enter** to select menu,
   edit using arrow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

5

Process variable
Current start
Current end
Time averaging filter
Output current for error message
Output current for Sensoface
Output current during HOLD
Output current for HOLD FIX

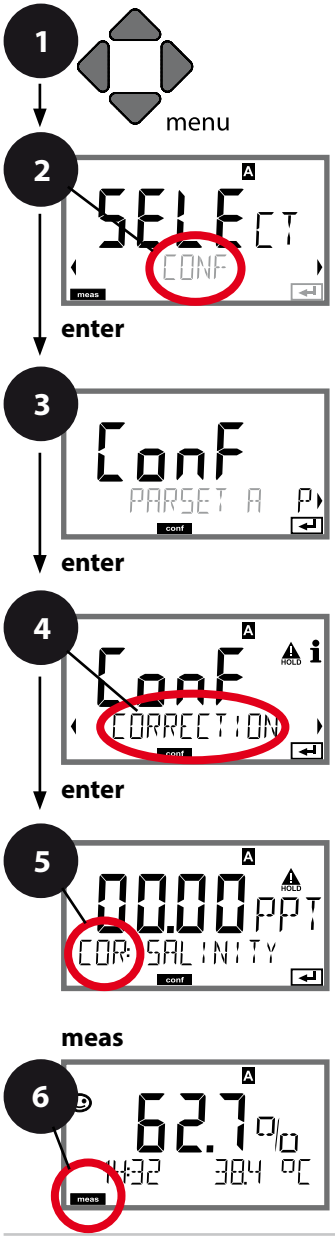
enter

Menu item	Action	Choices
Process variable 	Select using ▲ ▼ keys: OXY: Oxy value TMP: Temperature Press **enter** to confirm.	OXY/**TMP**
. . .		

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

Correction

Salinity correction, pressure correction, current input

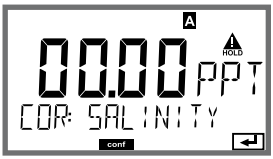
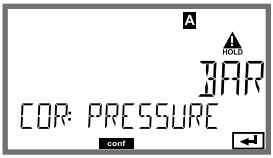
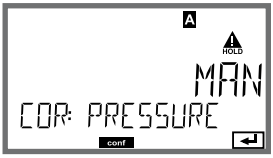
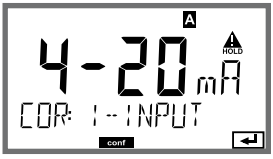


1) Press **menu** key.
2) Select **CONF** using ◂ ▸ keys, press **enter**.
3) Select parameter set using ◂ ▸ keys, press enter.
4) Select **CORRECTION** menu using ◂ ▸ keys, press **enter**.
5) All items of this menu group are indicated by the "COR:" code.
   Press **enter** to select menu,
   edit using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

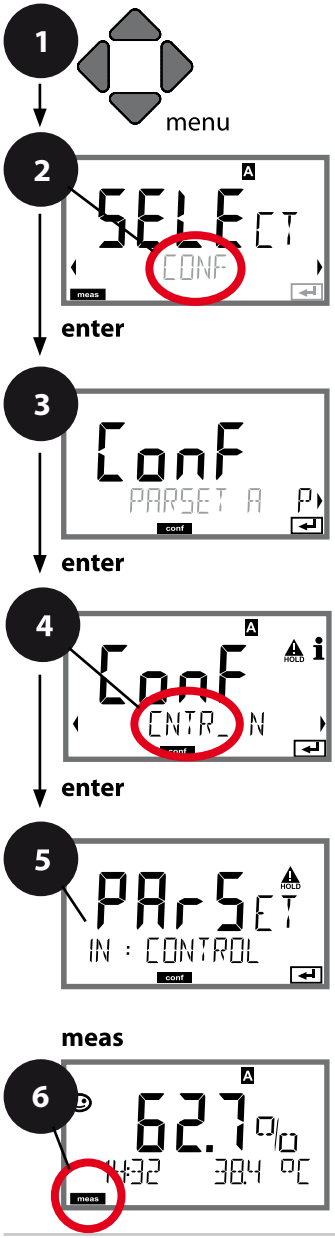
5

Salinity
Pressure unit
Pressure correction
Manual pressure input
Current input
Current range/Pressure range

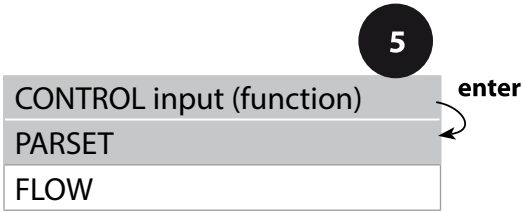
enter

Menu item	Action	Choices
Enter salinity 	Enter salinity of the process medium. Enter value using ▲ ▼ ◀ ▶ keys. Press **enter** to confirm.	00.00...45.00 ppt
Enter pressure unit 	Select desired pressure unit using ▲ ▼ keys. Press **enter** to confirm.	**Bar**/kPa/PSI
Enter pressure correction 	Select desired procedure for pressure correction using ▲ ▼ keys: MAN: Manual specification EXT: External pressure correction via current input Press **enter** to confirm.	**MAN** / EXT
(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**
Current input/ Pressure range 	With external pressure input, select current input 0/4 ... 20 mA and the pressure parameters for current start and end using ▲ ▼ ◀ ▶ keys.	0(4)...20 mA 0.000...9.999 Bar / 000.0...999.9 kPa / 000.0...999.9 PSI

CONTROL Input
Parameter set selection via external signal



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



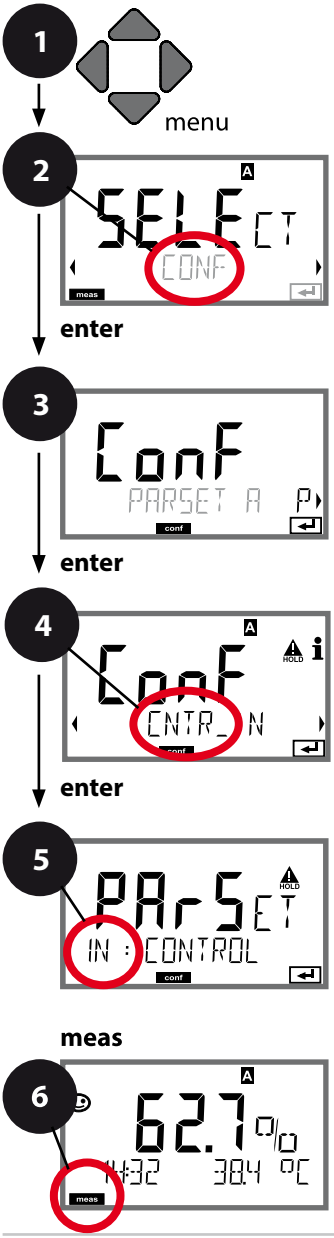
Menu item	Action	Choices
Select function of CONTROL input 	Select using ◀ ▶ keys. Press **enter** to confirm.	**PARSET FIX A /** MANUAL / CNTR INPUT (selecting parameter set A/B via signal at CONTROL input)

External switchover of parameter sets

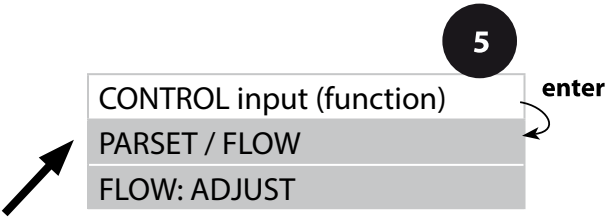
The parameter set A/B can be activated from outside by sending a signal to the CONTROL input (e.g. from the process control system).

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

CONTROL Input
Flow measurement



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



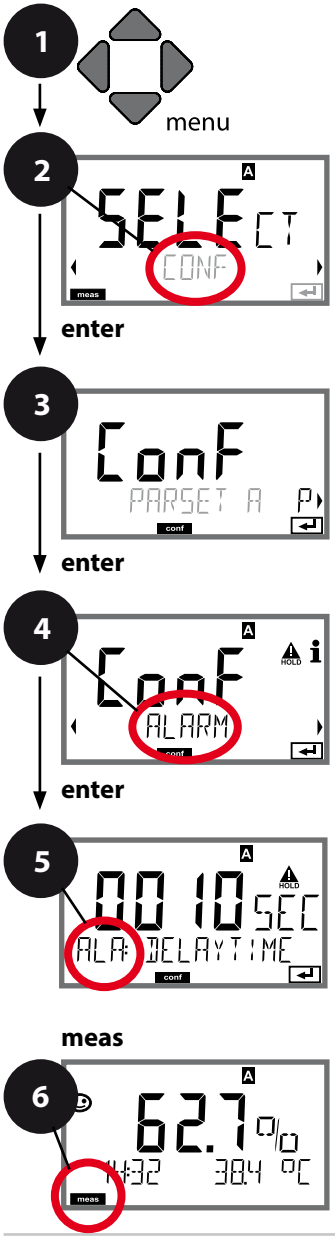
Menu item	Action	Choices
Select function of CONTROL input 	Select using ▲ ▼ keys. Press **enter** to confirm.	**PARSET** (selecting parameter set A/B via signal at CONTROL input)
		Flow (for connecting a pulse-output flow meter)
Adjust to flow meter: 	**With "Flow" selected**, you must adjust the device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

In the alarm menu you can configure flow monitoring. When you have set CONTROL to FLOW, you can specify 2 additional limit values for maximum and minimum flow.
If the measured value lies outside this range, an alarm message and a 22-mA error signal (if configured) will be generated.

Display
Flow measurement in measuring mode

Display
Flow measurement (sensor monitor)

Alarm Settings
Alarm delay, Sensocheck

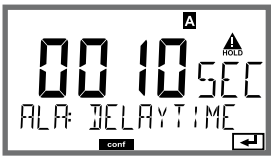
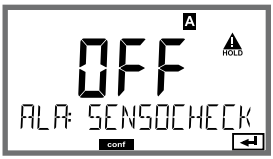


1) Press **menu** key.
2) Select **CONF** using ◂ ▸ keys, press **enter**.
3) Select parameter set using ◂ ▸ keys, press enter.
4) Select **ALARM** menu using ◂ ▸ keys, press **enter**.
5) All items of this menu group are indicated by the "ALA:" code.
   Press **enter** to select menu,
   edit using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

5

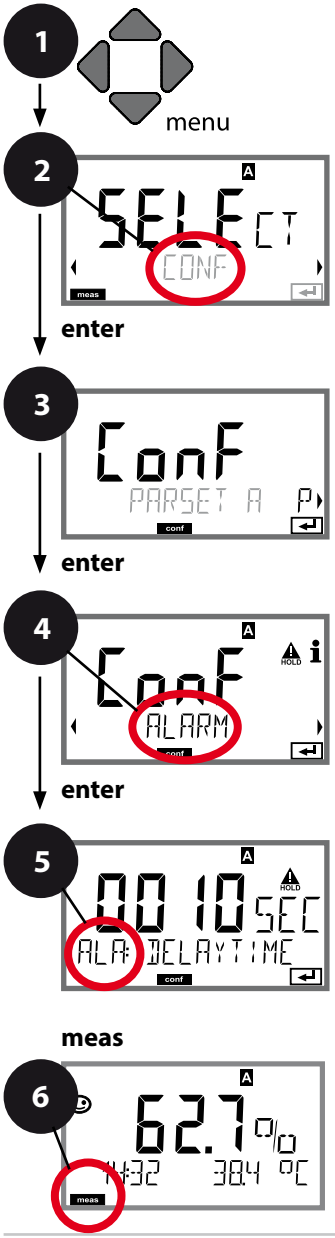
Delay
Sensocheck
Alarm: CONTROL input
For flow monitoring: Max. flow alarm
For flow monitoring: Min. flow alarm

enter

Menu item	Action	Choices
Alarm delay 	Enter alarm delay using ▲ ▼ ◀ ▶ keys. Press **enter** to confirm.	0...600 SEC (**010 SEC**)
Sensocheck 	Select Sensocheck (continuous monitoring of sensor membrane and lines). Select ON or OFF using ▲ ▼ keys. Press **enter** to confirm. (At the same time, Sensoface is activated. With OFF, Sensoface is also switched off.)	ON/**OFF**

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

Alarm Settings
CONTROL input (FLOW MIN, FLOW MAX)

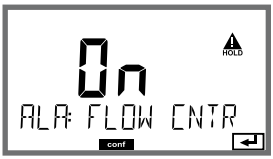


1) Press **menu** key.
2) Select **CONF** using ◂ ▸ keys, press **enter**.
3) Select parameter set using ◂ ▸ keys, press enter.
4) Select **ALARM** menu using ◂ ▸ keys, press **enter**.
5) All items of this menu group are indicated by the "ALA:" code.
   Press **enter** to select menu,
   edit using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

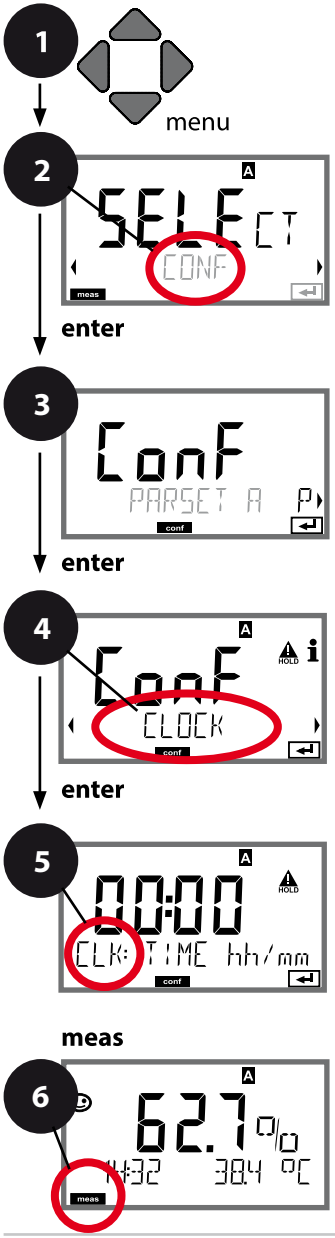
5

ALARM: Delay
Alarm: Sensocheck
Alarm: CONTROL input
For flow monitoring: Max. flow alarm
For flow monitoring: Min. flow alarm

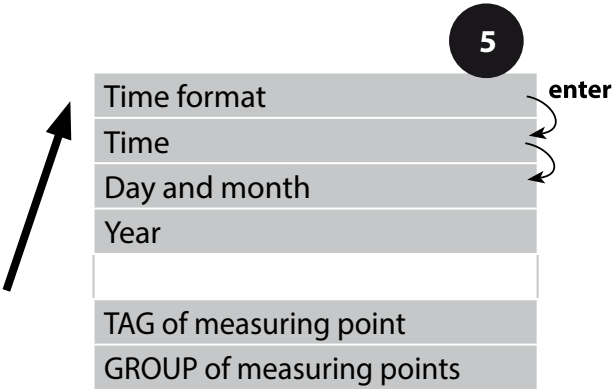
enter

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

Time and Date
Measuring Points (TAG/GROUP)



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



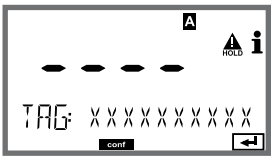
Time and Date

Control of the calibration and cleaning cycles is based on the time and date of the integrated real-time clock.
In measuring mode the time is shown in the lower display. When using digital sensors, the calibration data is written in the sensor head. In addition, the logbook entries (cf Diagnostics) are provided with a time stamp.

Note:
There is no automatic switchover from winter to summer time!
Be sure to manually adjust the time!

Sensor Verification (TAG, GROUP)

When Memosens sensors are calibrated in the lab, it is often useful and sometimes even mandatory that these sensors will be operated again at the same measuring points or at a defined group of measuring points. To ensure this, you can save the respective measuring point (TAG) or group of measuring points (GROUP) in the sensor. TAG and GROUP can be specified by the calibration tool or automatically entered by the transmitter. When connecting an MS sensor to the transmitter, it can be checked if the sensor contains the correct TAG or belongs to the correct GROUP. If not, a message will be generated, Sensoface gets "sad", and the display backlighting turns purple (magenta). The "sad" Sensoface icon can also be signaled by a 22 mA error current. Sensor verification can be switched on in the Configuration in two steps as TAG and GROUP if required.
When no measuring point or group of measuring points is saved in the sensor, e.g., when using a new sensor, Stratos enters its own TAG and GROUP. When sensor verification is switched off, Stratos always enters its own measuring point and group. A possibly existing TAG/GROUP will be overwritten.

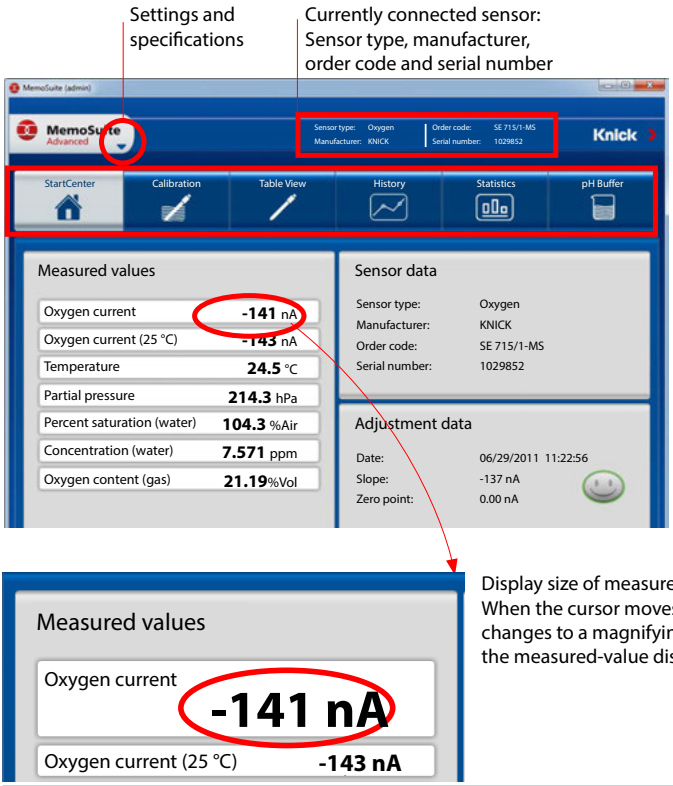
Menu item	Action	Choices
Measuring point (TAG) 	In the lower display line you can enter a designation for the measuring point (TAG) and for a group of measuring points (GROUP) if applicable. Up to 32 digits are possible. By pressing **meas** (repeatedly) in the measuring mode you can view the tag number.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

Digital Sensors

Stratos Pro can be operated with digital sensors. Due to the galvanic isolation of Memosens sensors, earth or ground potentials have no effect here. Therefore, a Solution Ground or measures for equipotential bonding are not required.
Digital sensors can be calibrated and maintained in the lab.
This considerably simplifies on-site maintenance.

Memosens Sensors: 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.



Calibration history of several sensors

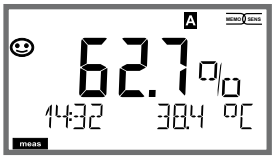
History: Load diagrams of the sensors

The comprehensive display options of the software allow drawing conclusions on the aging behavior of the sensors at one glance and making a reliable forecast for predictive maintenance.

The software is available as "Basic" (calibration function) or "Advanced" (with sensor database) version: www.knick.de

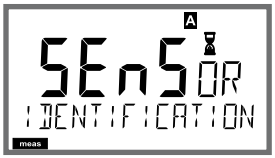
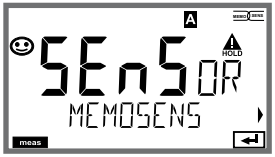
Memosens Sensors: Configuring the Device

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



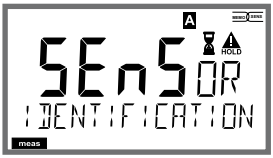
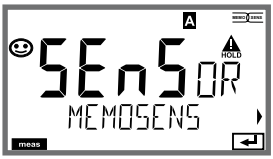
Otherwise, an error message is released. The **info** icon is displayed. You can display the error text in the bottom line using the ◀ ▶ keys.

Connecting a Digital Sensor

Step	Action/Display	Remark
Connect sensor		Before a digital sensor is connected, the error message “No sensor“ is displayed.
Wait until the sensor data are displayed.		The hourglass in the display blinks.
Check sensor data	 View sensor information using ◂ ▸ keys, press **enter** to confirm.	Display color changes to **green**. Sensoface is friendly when the sensor data are okay.
Go to measuring mode	Press **meas**, **info** or **enter**	After 60 sec the device automatically returns to measuring mode (time-out).

Replacing a Sensor

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

Step	Action/Display	Remark
Select HOLD mode	Press **menu** key to call the selection menu, select HOLD using the ◂ ▸ keys, press **enter** to confirm.	Now the device is in HOLD mode. The HOLD mode can also be activated externally via the HOLD input. During HOLD the output current is frozen at its last value or set to a fixed value.
Disconnect old sensor, connect new sensor.		Temporary messages are displayed during the replacement but neither output to the alarm contact nor entered in the logbook.
Wait until the sensor data are displayed.		
Check sensor data	 View sensor information using ◂ ▸ keys, press **enter** to confirm.	You can view the sensor manufacturer and type, serial number, and last calibration date.
Check measured values, then exit HOLD.	Hit **meas** key: Return to the selection menu. Hold **meas** key depressed: Device switches to measuring mode.	The sensor replacement is entered in the extended logbook.

Calibration

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 with aeration directly in the process medium (e.g. after sterilization).
In the field of biotechnology, for example, often saturation is measured and calibration is performed in the 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.
- If a 2-point calibration is prescribed, the zero calibration should be performed prior to slope calibration.

Common combination:
process variable / calibration medium

Process variable		Calibration	Default rel. humidity	Default cal pressure
Saturation (%)	SAT	Water	+100 %	Process pressure
Concentration (mg/l, ppm)	Conc	Air	50 %	1.013 bar

The calibration procedures for these two common applications are described on the following pages. Of course, other combinations of process variable and calibration medium are possible.

Selecting a Calibration Mode

Calibration is used to adapt the device to the individual sensor characteristics, namely zero 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_WTR / CAL_AIR	Calibration in air-saturated water / air (as configured)
CAL_ZERO	Zero calibration
P_CAL	Product calibration (calibration with sampling)
CAL-RTD	Temperature probe adjustment

Zero Calibration

The sensor models SE 704, SE 705, SE 706, SE 707 and InPro6000 have very low zero currents. Therefore, a zero calibration is only recommended for measurement of oxygen traces.

When a zero calibration is performed, the sensor should remain for at least 10 to 30 minutes in the calibration medium in order to obtain stable, non-drifting values.
During zero calibration, a drift check is not performed. Zero current of a properly functioning sensor is notably less than 0.5 % of air current.
The display (bottom: measured value, top: entered value) does not change until an input current is entered for the zero point.
When measuring in an oxygen-free medium, the displayed current can be taken directly.

Display	Action	Remark
	Select calibration, proceed by pressing **enter**	
	Ready for calibration. Hourglass blinks. Place sensor in oxygen-free medium	Display (3 sec) Now the device is in HOLD mode.
	Upper display line: Zero current. Press **enter** to save this value or correct using **arrow keys** and then save by pressing **enter**. Lower display line: Sensor current measured	
	Display of slope Display of new zero current. End calibration by pressing **enter** key, place sensor in process	Sensoface display
	The oxygen value is shown in the upper display line, "enter" blinks. Stop Hold by pressing **enter**.	New calibration: Select REPEAT, press **enter** key.
	Quit by pressing **enter**.	After end of calibration, the outputs remain in HOLD mode for a short time.

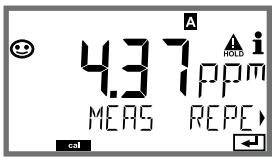
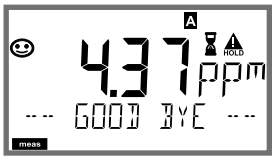
Product Calibration

Calibration with sampling

During product calibration the sensor remains in the process.
The measurement process is only interrupted briefly.

Procedure: During sampling the currently measured value is stored in the device. The device immediately returns to measuring mode.
The cal mode indicator blinks and reminds you that calibration has not been terminated. The reference value is measured on the site, e.g. using a portable DO meter in a bypass.
This value is then entered in the device. The new value for slope or zero is calculated from the stored value and the reference value. From the measured value, the device automatically recognizes whether a new slope or zero must be calculated (above approx. 5 % saturation: slope, below: zero).
If the sample is invalid, you can take over the measured value saved during sampling instead of the reference value. In that case the old calibration values remain stored. Afterwards, you can start a new product calibration. The following describes a product calibration with slope correction – a product calibration with zero correction is performed correspondingly.

Display	Action	Remark
	Select calibration, then product calibration P_CAL. Press **enter** to proceed.	
	Ready for calibration. Hourglass blinks.	Display (3 sec) Now the device is in HOLD mode.
	Take sample and save value. Press **enter** to proceed.	Now the sample can be measured. If the value is already available, press **info+enter** to proceed to step 2.

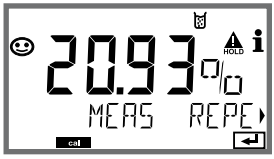
Display	Action	Remark
	The device returns to measuring mode.	From the blinking CAL mode indicator you see that product calibration has not been terminated.
	Product calibration **step 2:** When the sample value has been determined, open the product calibration once more	Display (3 sec) Now the device is in HOLD mode.
	The stored value is displayed (blinking) and can be overwritten with the lab value. Press **enter** to proceed.	
	Display of new slope and zero. Sensoface is active. Press **enter** to proceed.	Related to 25 °C and 1013 mbar
	Display of new oxy value. Sensoface is active. To end calibration: Select MEAS, then **enter**	Repeat calibration: Select REPEAT, then **enter**
	End of calibration	After end of calibration, the outputs remain in HOLD mode for a short time.

Slope Calibration (Medium: Water)

(air-saturated)

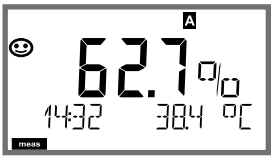
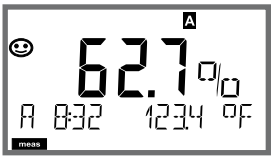
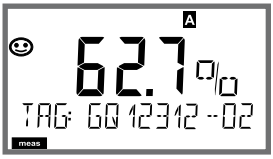
Display	Action	Remark
	Select calibration (SLOPE). Immerse sensor in cal medium, start by pressing **enter**	"CAL WATER" or "CAL AIR" is selected in the configuration.
	Enter cal pressure Press **enter** to proceed.	Default: **1.000 bar** Unit bar/kpa/PSI
	Drift check: Display of: Sensor current (nA) Response time (s) Temperature (°C/°F)	Device goes to HOLD mode. 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 end calibration: Select MEAS using ◂ ▸, then **enter**	To repeat calibration: Select REPEAT using ◂ ▸, then **enter**
	Place sensor in process. End of calibration	After end of calibration, the outputs remain in HOLD mode for a short time.

Slope Calibration (Medium: Air)

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: **1.000 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). Now the device is in HOLD mode: Reinstall the sensor and check whether the message is OK. MEAS ends calibration, REPEAT permits repetition.	After end of calibration, the outputs remain in HOLD mode for a short time.

Temp Probe Adjustment

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

Display	Remark
 or AM/PM and °F: 	From the configuration or calibration menus, you can switch the device to measuring mode by pressing the **meas** key. (Waiting time for signal stabilization approx. 8 sec). In the measuring mode the main display shows the configured process variable (Oxy [%] or temperature), the secondary display shows the time and the second configured process variable (Oxy [%] or temperature). The [meas] mode indicator lights and the active parameter set (A/B) is indicated.
By pressing the **meas** key you can step through the following displays. When no key has been pressed for 60 sec, the device returns to the MAIN DISPLAY.	
  	1) Selecting the parameter set (if set to "manual" in the configuration). Select the desired parameter set using the ◂ ▸ arrow keys (PARSET A or PARSET B blinks in the lower display line). Press **enter** to confirm. Further displays (each by pressing **meas**). 2) Display of tag number ("TAG") 3) Display of time and date 4) Display of output current(s)

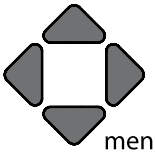
Diagnostics

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

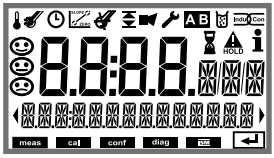
CALDATA	viewing the calibration data
SENSOR	viewing the sensor data
SELFTEST	starting a device self-test
LOGBOOK	viewing the logbook entries
MONITOR	displaying currently measured values
VERSION	displaying device type, software version, serial number

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

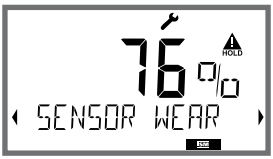
Note:
HOLD is not active during Diagnostics mode!

Action	Key	Remark
Activate Diagnostics	 menu	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
	**Displaying the calibration data** Select CALDATA using ◂ ▸, confirm by pressing **enter**. Use the ◂ ▸ keys to select the desired parameter from the bottom line of the display: (LAST_CAL ZERO SLOPE NEXT_CAL). The selected parameter is shown in the main display.
	
	
	
	Press **meas** to return to measurement.
	**Displaying the sensor data** For analog sensors, the type is displayed, for digital sensors, the manufacturer, type, serial number and last calibration date. In each case Sensoface is active. Display data using ◂ ▸ keys, press **enter** or **meas** to return.

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

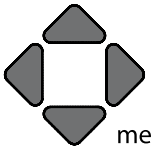
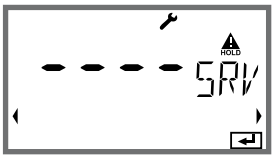
Display	Menu item
  	**Displaying the logbook entries** Select LOGBOOK using ◀ ▶, press **enter** to confirm. Using the ▲ ▼ keys, you can scroll backwards and forwards through the logbook (entries -00-...-99-), -00- being the last entry. If the display is set to date/time, you can search for a particular 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. Press **meas** to return to measurement.
	**Extended logbook / Audit Trail (via TAN)** Using the ▲ ▼ keys, you can scroll backwards and forwards through the extended logbook (entries -000-...-199-), -000- being the last entry. **Display: CFR** Audit Trail also records function activations (CAL CONFIG SERVICE), some Sensoface messages (cal timer, wear) and opening of the enclosure.

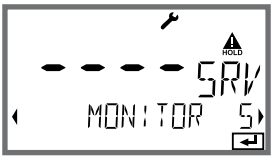
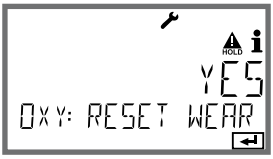
Display	Menu item
 Display example:    	**Displaying the currently measured values (sensor monitor)** Select MONITOR using ◀ ▶, press **enter** to confirm. Use the ◀ ▶ keys to select the desired parameter from the bottom line of the display: OXY, RTD, I-INPUT (for digital sensors in addition: OPERATION TIME SENSOR WEAR LIFETIME CIP SIP AUTOCLAVE). The selected parameter is shown in the main display. Press **meas** to return to measurement. Display of directly measured value (for validation, sensor can be immersed in a calibration solution, for example, or the device is checked by using a simulator) Display of remaining dynamic lifetime (for ISM sensors only) Display of sensor operating time (for digital sensors only) **Display of sensor wear** (Memosens only) When Sensocheck is activated, Sensoface will remind you to check the sensor and replace electrolyte and membrane. Info text: "Sensor wear - change membrane and electrolyte". After having carried out the servicing, reset the sensor wear counter in the Service menu.
	**Version** Display **of device type, software/hardware version** and **serial number** for all device components. Use the ▲ ▼ keys to switch between software and hardware version. Press **enter** to proceed to next device component.

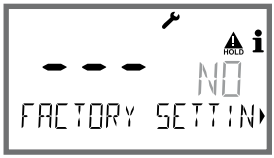
In the Service mode you can access the following menus:

MONITOR	displaying currently measured values
SENSOR	displaying the sensor data, with MEMOSENS also resetting the sensor wear counter after replacement of electrolyte/membrane, incrementing the autoclaving counter
OUT1	testing current output 1
OUT2	testing current output 2
CODES	assigning and editing passcodes
DEFAULT	resetting the device to factory settings
OPTION	enabling options via TAN

Note:
HOLD is active during Service mode!

Action	Key/Display	Remark
Activate Service		Press **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.
View		In service mode the following icons are displayed: • [diag] mode indicator • HOLD triangle • Service (wrench)
Exit	**meas**	Exit by pressing **meas**.

Menu item	Remark
	**Displaying currently measured values (sensor monitor) with HOLD mode activated:** Select MONITOR using ◂ ▸, press **enter** to confirm. Select variable in the bottom text line using ◂ ▸. The selected parameter is shown in the upper display line. As the device is in HOLD mode, you can perform validations using simulators without influencing the signal outputs. Return to Service menu: Hold **meas** depressed for longer than 2 sec. Press **meas** once more to return to measurement.
	**Sensor: Resetting the wear counter** When you have replaced the electrolyte or the membrane of the OXY sensor, you should reset the wear counter. Default setting is "NO". Select "YES" and press **enter** to reset the wear counter.
	**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".
	**Specifying the current at outputs 1 and 2:** Select OUT1 or OUT2 using the ◂ ▸ keys, press **enter** to confirm. Enter a valid current value for the respective output using ▲ ▼ ◂ ▸ keys. Press **enter** to confirm. For checking purposes, the actual output current is shown in the bottom right corner of the display. End by pressing **enter** or **meas**.

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

Operating States

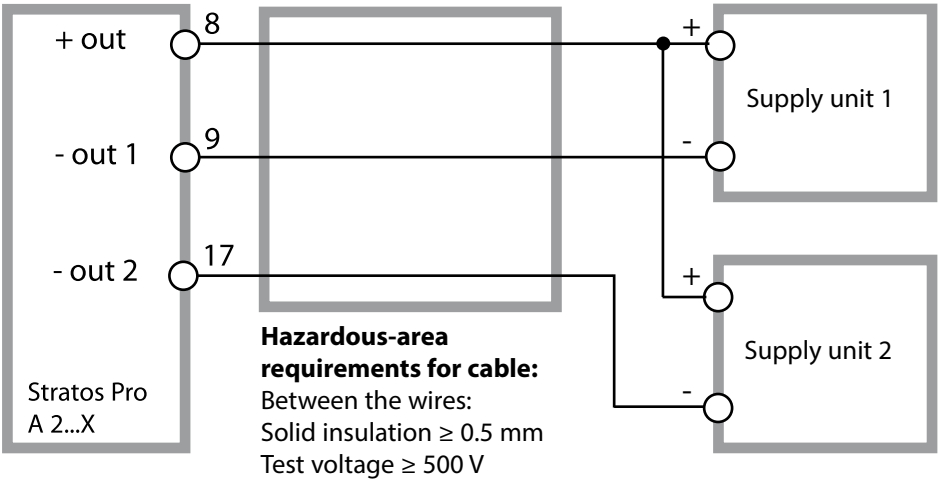
Operating status	OUT 1	OUT 2	Time out
Measuring			-
DIAG			60 s
CAL_ZERO Zero point			No
CAL_SLOPE Slope			No
P_CAL Product calibration S1			No
P_CAL Product calibration S2			No
CAL_RTD Temp adjustment			No
CONF_A ParSet A			20 min
CONF_B ParSet B			20 min
SERVICE MONITOR			20 min
SERVICE OUT 1			20 min
SERVICE OUT 2			20 min
SERVICE CODES			20 min
SERVICE DEFAULT			20 min
SERVICE OPTION			20 min
HOLD input			No

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

active manual

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

Connection to Supply Units



Product Line and Accessories

Order Code Stratos Pro A 2...

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

TAN options		
HART	SW-A001	(A)
Logbook	SW-A002	(B)
Extended logbook (Audit Trail)	SW-A003	(C)
Trace oxygen measurement	SW-A004	(D)
Current input + 2 digital inputs	SW-A005	(E)
ISM digital	SW-A006	(F)
Pfaudler	SW-A007	(G)

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

Standard	Sensors: SE 706, SE 707, InPro 6800, Oxyferm, Memosens	
Input range	Meas. current 0 ... 600 nA	Resolution 10 pA
Measurement error	< 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 / +14 ... +176 °F)	0.0 ... 600.0 %
	Concentration (–10 ... +80 °C / +14 ... +176 °F)	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	
Traces (TAN SW-A004)	Sensors: SE 706/707; InPro 6800/6900/6950; Oxyferm/Oxygold	
Input range I [1)]	Meas. current 0 ... 600 nA	Resolution 10 pA
Measurement error	< 0.5% meas. val. + 0.05 nA + 0.005 nA/K	
Input range II [1)]	Meas. current 0 ... 100000 nA	Resolution 166 pA
Measurement error	< 0.5% meas. val. + 0.8 nA + 0.008 nA/K	
Operating modes	GAS	Measurement in gases
	DO	Measurement in liquids
Ranges with standard sensors "10"		
	Saturation (–10 ... +80 °C / +14 ... +176 °F)	0.0 ... 600.0 %
	Concentration (–10 ... +80 °C / +14 ... +176 °F)	0.00 ... 99.99 mg/l
	(Dissolved oxygen)	0.00 ... 99.99 ppm
	Volume concentration in gas	0.00 ... 99.99 %vol
Ranges with trace sensors "01" (TAN SW-A004)	Saturation (–10 ... +80 °C / +14 ... +176 °F)	0.000 ... 150.0 %
	Concentration (–10 ... +80 °C / +14 ... +176 °F)	0000 ... 9999 µg/l / 10.00 ... 20.00 mg/l
	(Dissolved oxygen)	0000 ... 9999 ppb / 10.00 ... 20.00 ppm
	Volume concentration in gas	0000 ... 9999 ppm / 1.000 ... 50.00 %vol

Ranges with trace sensors "001"

(TAN SW-A004)	Saturation (–10 ... +80 °C / +14 ... +176 °F)	0.000 ... 150.0 %
	Concentration (–10 ... +80 °C / +14 ... +176 °F)	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 ppm / 1.000 ... 50.00 %vol
Polarization voltage	0 ... –1000 mV Default –675 mV (resolution < 5 mV)	
Permissible guard current	≤ 20 µA	
Input correction	Pressure correction *	0.000 ... 9.999 bar / 999.9 kPa / 145.0 PSI manually or through current input 0(4) ... 20 mA
	Salinity correction	0.0 ... 45.0 g/kg
Sensor standardization *		
Operating modes *	AIR Automatic calibration in air WTR Automatic calibration in air-saturated water Product calibration Zero calibration	
Calibration range Standard sensor "10"	Zero point Slope	± 2 nA 25 ... 130 nA (at +25°C/+77°F, 1013 mbar)
Calibration range Trace sensor "01"	Zero point Slope	± 2 nA 200...550 nA (at +25°C/+77°F, 1013 mbar)
Calibration range Trace sensor "001"	Zero point Slope	± 3 nA 2000...9000 nA (at 25°C/+77°F, 1013 mbar)
Calibration timer *	Interval 0000 ... 9,999 h	
Pressure correction *	Manual 0.000 ... 9.999 bar / 999.9 kPa / 145.0 PSI	
Sensocheck	Monitoring of membrane and electrolyte and the sensor wires for short circuits or open circuits (can be disabled)	
Delay	Approx. 30 s	
Sensoface	Provides information on the sensor condition Evaluation of zero/slope, response, calibration interval, wear, Sensocheck, can be disabled	

Temperature input	NTC 22 kΩ / NTC 30 kΩ *
	2-wire connection, adjustable
Measuring range	-20.0 ... +150.0 °C / -4 ... +302 °F
Adjustment range	10 K
Resolution	0.1 °C / 0.1 °F
Measurement error [2,3,4)]	< 0.5 K (< 1 K at > 100 °C)
ISM input	"One wire" interface for operation with ISM (digital sensors)
	(6 V / Ri= approx. 1.2 kΩ)

I input (TAN)	Current input 0/4 ... 20 mA / 50 Ω for external pressure compensation		
Start/end of scale	Configurable 0 ... 9.999 bar		
Characteristic	Linear		
Measurement error [1.3)]	< 1% current value + 0.1 mA		
HOLD input	Galvanically separated (optocoupler)		
Function	Switches device to HOLD mode		
Switching voltage	0 ... 2 V AC/DC	HOLD inactive	
	10 ... 30 V AC/DC	HOLD active	
CONTROL input	Galvanically separated (optocoupler)		
Function	Selecting parameter set A/B or flow measurement		
Parameter set A/B	Control input	0 ... 2 V AC/DC 10 ... 30 V AC/DC	Parameter set A Parameter set B
FLOW	Pulse input for flow measurement 0 ... 100 pulses/s		
Message	via 22 mA		
Display	00.0 … 99.9 l/h		
Output 1	Current loop, 4 ... 20 mA, floating, protected against inverse polarity HART communication (see further below for specifications)		
Supply voltage	14 ... 30 V		
Process variable *	Saturation, concentration, salinity or temperature		
Characteristic	Linear		
Overrange *	22 mA in the case of error messages		
Output filter *	PT_1 filter, time constant 0 ... 120 s		
Measurement error [1)]	< 0.25 % current value + 0.025 mA		
Start/end of scale *	Configurable within selected range		

Output 2	Current loop, 4 ... 20 mA, floating, protected against inverse polarity
Supply voltage	14 ... 30 V
Process variable *	Saturation, concentration, salinity or temperature
Characteristic	Linear
Overrange *	22 mA in the case of error messages
Output filter *	PT_1 filter, time constant 0 ... 120 s
Measurement error [1)]	< 0.25 % of current value + 0.05 mA
Start/end of scale *	Configurable within selected range
Real-time clock	Different time and date formats selectable
Power reserve	> 5 days
Display	LC display, 7-segment with icons
Main display	Character height approx. 22 mm, unit symbols approx. 14 mm
Secondary display	Character height approx. 10 mm
Text line	14 characters, 14 segments
Sensoface	3 status indicators (friendly, neutral, sad face)
Mode Indicators	meas, cal, conf, diag Further icons for configuration and messages
Alarm indication	Display blinks, red backlighting
Keypad	Keys: meas, menu, info, 4 cursor keys, enter
HART communication	HART version 6 Digital communication by FSK modulation of output current 1 Device identification, measured values, status and messages, parameter setting, calibration, records
FDA 21 CFR Part 11	Access control by editable passcodes Logbook entry and flag via HART Message and logbook entry when enclosure is opened

Diagnostics functions	
Calibration data	Calibration date, zero, slope
Device self-test	Display test, automatic memory test (RAM, FLASH, EEPROM)
Logbook	100 events with date and time
Extended logbook (TAN)	Audit Trail: 200 events with date and time
Service functions	
Sensor monitor	Display of direct sensor signals
Current source	Current specifiable for output 1 and 2 (04.00 ... 22.00 mA)
Passcodes	Assigning passcodes for menu access
Factory setting	Resetting all parameters to factory setting
TAN	Enabling optionally available additional functions
Explosion protection (A2**B/X)	See Control Drawing or www.knick.de
Data retention	Parameters, calibration data, logbook > 10 years (EEPROM)
EMC	EN 61326-1 (General Requirements)
Emitted interference	Class B (residential area)
Immunity to interference	Industry EN 61326-2-3
Nominal operating conditions	
Ambient temperature	–20 ... +65 °C / -4 ... +149 °F
Transport/Storage temperature	–30 ... +70 °C / -22 ... +158 °F
Relative humidity	10 ... 95% not condensing
Supply voltage	14 ... 30 V

Enclosure	Molded enclosure made of glass-reinforced PBT, PC
Mounting	Wall, pipe/post or panel mounting
Color	Gray, RAL 7001
Ingress protection	IP 67, NEMA 4X
Flammability	UL 94 V-0
Dimensions	148 mm x 148 mm
Control panel cutout	138 mm x 138 mm to DIN 43 700
Weight	Approx. 1200 g
Cable glands	3 knockouts for M20 x 1.5 cable glands 2 knockouts for NPT ½" or rigid metallic conduit
Connections	Terminals, conductor cross-section max. 2.5 mm^2

*) User-defined

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

2) ± 1 count

3) Plus sensor error

Error Handling

Alarm condition:

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

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

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

Parameter errors:

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

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

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

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

Calibration errors:

If errors occur during calibration,

- an error message will be displayed

Sensoface:

If the Sensoface becomes sad,

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

Error	Info text (is displayed in case of fault when the Info key is pressed)	Problem Possible causes
ERR 99	DEVICE FAILURE	**Error in factory settings** EEPROM or RAM defective This error message only occurs in the case of a total defect. The device must be repaired and recalibrated at the factory.
ERR 98	CONFIGURATION ERROR	**Error in configuration or calibration data** Memory error in device program Configuration or calibration data defective; completely reconfigure and recalibrate the device.
ERR 97	NO MODULE INSTALLED	**No module** Please have the module replaced in the factory.
ERR 96	WRONG MODULE	**Wrong module** Please have the module replaced in the factory.
ERR 95	SYSTEM ERROR	**System error** Restart required. If error still persists, send in the device for repair.
ERR 01	NO SENSOR	**O_2 sensor *** Sensor defective Sensor not connected Break in sensor cable
ERR 02	WRONG SENSOR	**Wrong sensor ***
ERR 04	SENSOR FAILURE	**Failure in sensor ***

Error	**Info text** (is displayed in case of fault when the Info key is pressed)	**Problem** **Possible causes**
ERR 05	CAL DATA	**Error in cal data ***
ERR 11	RANGE DO SATURATION	**Display range violation** SAT saturation CONC concentraton or GAS volume concentration
ERR 12	SENSOR CURRENT RANGE	**Measuring range of sensor exceeded**
ERR 13	TEMPERATURE RANGE	**Temperature range violation**
ERR 15	SENSOCHECK	**Sensocheck**
ERR 60	OUTPUT LOAD	**Load error**
ERR 61	OUTPUT 1 TOO LOW	**Output current 1** < 3.8 mA
ERR 62	OUTPUT 1 TOO HIGH	**Output current 1** > 20.5 mA
ERR 63	OUTPUT 2 TOO LOW	**Output current 2** < 3.8 mA
ERR 64	OUTPUT 2 TOO HIGH	**Output current 2** > 20.5 mA

* Memosens or ISM sensors

Error	Info text (is displayed in case of fault when the Info key is pressed)	Problem Possible causes
ERR 72	FLOW TOO LOW	Flow too low
ERR 73	FLOW TOO HIGH	Flow too high
ERR 105	INVALID SPAN I-INPUT	I-Input configuration error

Sensoface

(Sensocheck must have been activated during configuration.)

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

Sensocheck
Continuously monitors the sensor and its wiring.
Critical values make the Sensoface "sad" and the corresponding icon blinks:

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

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

Display	Problem	Status	
	Zero and slope	😐	Zero and slope of the sensor are still okay. The sensor should be replaced soon.
		☹	Zero and/or slope of the sensor have reached values which no longer ensure proper calibration. Replace sensor.
	Calibration timer	😐	Over 80 % of the calibration interval has already past.
		☹	The calibration interval has been exceeded.
	Sensor defect	☹	Check the sensor and its connections (see also Err 15, Error Messages).
	Response time	😐	Sensor response time has increased. The sensor should be replaced soon. To achieve an improvement, clean the sensor and check the electrolyte and membrane.
		☹	Sensor response time has significantly increased (> 600 s, calibration aborted after 720 s) Check electrolyte and membrane, replace sensor if required.

Display	Problem	Status	
	Sensor wear (for digital sensors only)		Wear is over 80%. Check electrolyte and membrane.
			Wear is at 100%. Check electrolyte and membrane, replace if required. **Note:** Reset the wear counter in the SERVICE - SENSOR menu when you have replaced the membrane or electrolyte.
AUTOCLAVE CYCLES OVERRUN		Maximally permitted number of autoclaving cycles has been reached. Replace sensor or increment autoclaving counter.	
SIP CYCLES OVERRUN		Maximally permitted number of sterilizing cycles has been reached. Replace sensor or increment SIP counter.	
CIP CYCLES OVERRUN		Maximally permitted number of cleaning cycles has been reached. Replace sensor or increment CIP counter.	

Conformity with FDA 21 CFR Part 11

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

Electronic Signature – Passcodes

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

Audit Trail

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

Extended logbook

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

Index

D

S

Trademarks

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

Passcodes

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

Mode of operation	Passcode
Service (SERVICE)	**5555**
Diagnostics (DIAG)	
HOLD mode	
Calibration (CAL)	
Configuration (CONF)	

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090822

Stratos Pro A2.. Oxy: Oxygen Measurement

TA-212.145-KNE04 20170831 Software version: 3.x