The Art of Measuring. Knick

User Manual
English

Portavo® 907 MULTI

Latest Product Information: www.knick.de

Return of Products Under Warranty

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

Disposal

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

Registered Trademarks

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

- CaliMat®
- Calimatic®
- Memosens®
- Paraly®
- Portavo®
- Sensocheck®
- Sensoface®

Table of Contents

6 Package Contents

Check the shipment for transport damage and completeness.
The package of the Portavo 907 MULTI includes:

	Portavo 907 MULTI
Meter incl. 4 batteries (AA) and premounted quiver	✓
Carrying strap	✓
USB cable, 1.5 m	✓
Safety instructions	✓
Quickstart instructions in various languages	✓
Specific test report	✓

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
available on our website:

www.knick.de

8 Overview of the Portavo 907

The Portavo 907 MULTI is a portable multi-parameter meter for use with Memosens sensors or the Model SE 340 optical oxygen sensor. The meter automatically recognizes the connected sensor and accordingly selects the corresponding process variable. By simply replacing the sensor, the meter can be used for measuring **conductivity**, **pH/ORP** or **oxygen (also optical)**. Operation is simple and intuitive, supported by detailed information and help texts.

The meter stands out by the following features:

- Use of digital Memosens sensors or the Model SE 340 optical oxygen sensor
- A detachable quiver protects the sensor and prevents it from drying out. Furthermore, it can be used for calibration.
- The rugged housing is made of a high-performance polymer. It provides high impact resistance and dimensional stability even when exposed to extreme moisture.
- Scratch-proof clear glass display, perfectly readable even after years
- Long operating time with one set of batteries (4 x AA) or use of a Li-ion battery for reliable operation even at high or very low operating temperatures
- Data logger with 10,000 values
- Micro USB port for communication with Paraly SW 112 software for data evaluation of digital sensors (Memosens)
- Sensoface icons provide single-glance information on the sensor condition
- Real-time clock and indication of battery charging level
- Automatic compensation of ambient pressure for oxygen measurement
- At measuring temperatures from -20 to +100 °C / -4 to +212 °F, the temperature detector can be automatically identified.

Value-Added Features

Memosens

The Portavo 907 can communicate with Memosens sensors. These digital sensors are automatically identified and the meter switches to the appropriate measurement method. When a Memosens sensor is connected to the meter, it is indicated by the logo shown on the right. Furthermore, Memosens allows the storage of calibration data, which will be available and can still be used when the sensor is connected to another Memosens-capable device.

Sensoface

Sensoface provides quick information on the sensor condition. The three "smiley" faces as shown on the right represent the sensor condition during measurement and after a calibration. When the condition deteriorates, a status message gives a hint to the cause.

Calimatic (pH)

Calimatic is a very convenient method for pH calibration with automatic buffer recognition. You only have to select the buffer set with the buffers used. The buffers can then be used in any order.

Digital optical oxygen measurement (907 MULTI OXY only)

Digital optical oxygen measurement reduces maintenance effort and simplifies handling.

Protective Cover

The front of the meter is protected by a cover, which can be completely flipped over and secured to the back for operation.

Hook

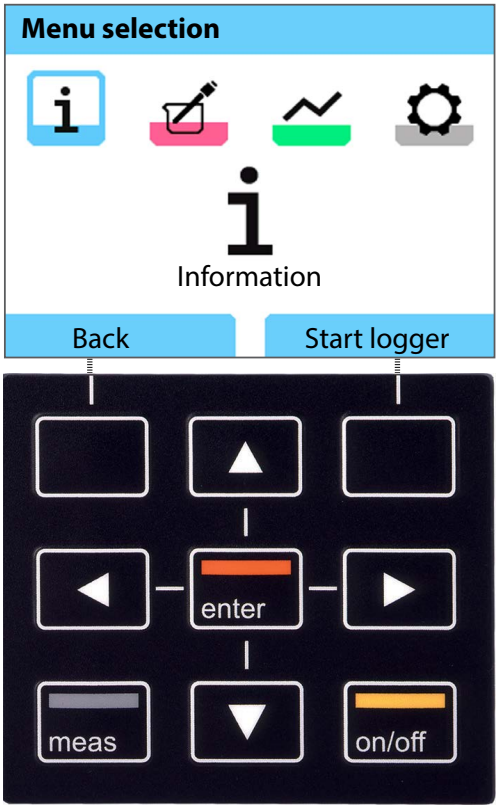
A fold-out hook on the back allows suspending the meter. This leaves your hands free for the actual measurement. The **rating plate** is located beneath the hook.

Protective Cover and Hook Combined

Cover and hook can be joined together to form a benchtop stand allowing comfortable and fatigue-free working at a lab bench or desk.

Display and Keypad

Display and keypad correspond directly via softkeys.



Menu icons


Information


Calibration


Data logger


Configuration

Softkeys	Function is shown in the display above the key
Arrow keys	Selecting / Adjusting entries
enter	Confirming an adjustment
on/off	Switching on / off
meas	Switching on / Immediate access of meas. mode / Toggling the display / Displaying time and date

Check the shipment for transport damage and completeness (see Package Contents).

NOTICE!

Do not operate the device when one of the following conditions applies:

- the device shows visible damage
- the device fails to perform the intended function
- prolonged storage at temperatures above +70 °C / +158 °F
- severe transport stresses

In this case, a professional routine test must be performed.
This test should be carried out at our factory.

Inserting the Batteries

With four AA batteries, the Portavo has an operating time of up to 500 h when operated in logger mode (see page 40). Open the battery compartment on the rear of the device. Be sure to observe the correct polarity when inserting the batteries (see markings in the battery chamber). Close the battery compartment cover and screw it handtight.

A special lithium-ion battery (ZU 0925) suited to the battery compartment is available for the Portavo 907. Only this battery type can be charged directly from the USB port.

A battery icon in the display indicates the battery power level:

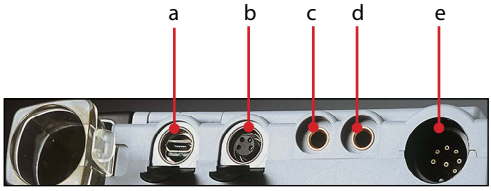
	Icon fully filled	Batteries at full capacity
	Icon partially filled	Battery capacity is sufficient
	Icon empty	Battery capacity not sufficient; calibration is possible, no logging
	Icon blinks	Only a few operating hours remaining, measurement is still possible **NOTICE!** It is absolutely necessary to replace the batteries.

Connecting a Sensor

The Portavo 907 MULTI provides a special socket for connecting conventional sensors for the respective process parameter. Alternatively, you can connect a Memosens sensor for pH, conductivity or oxygen measurement. The Model SE 340 optical oxygen sensor can also be connected. The meter automatically recognizes a connected Memosens sensor and accordingly selects the corresponding process variable. Memosens is signaled in the display.
Note that only **one** sensor may be connected to the meter at a time.

Separate temperature probe

After power-on, a separate temperature probe is automatically recognized.
When you want to replace the temperature probe, you must switch off the meter and then switch it on again.



Connections

a - Micro USB port
b - M8, 4 pins, for Memosens lab cable
c - Temperature probe GND
d - Temperature probe
e - Depending on the device variant:
Portavo 907 MULTI PH: pH socket acc. to DIN 19 262 for analog sensors
Portavo 907 MULTI COND: DIN socket, 8 pins, for analog sensors
Portavo 907 MULTI OXY: M12, 8 pins, for Memosens sensors or SE 340 sensor (optical oxygen)

Memosens sensors have a **cable coupling** which allows convenient replacement of sensors while the cable remains connected to the meter. The connecting cable is connected to socket **b** (Memosens lab cable) or **e** (flexible connecting cable – for Portavo 907 MULTI OXY only!).

Switching On the Meter

You can use **meas** or **on/off** to switch the meter on:

Analog sensors:

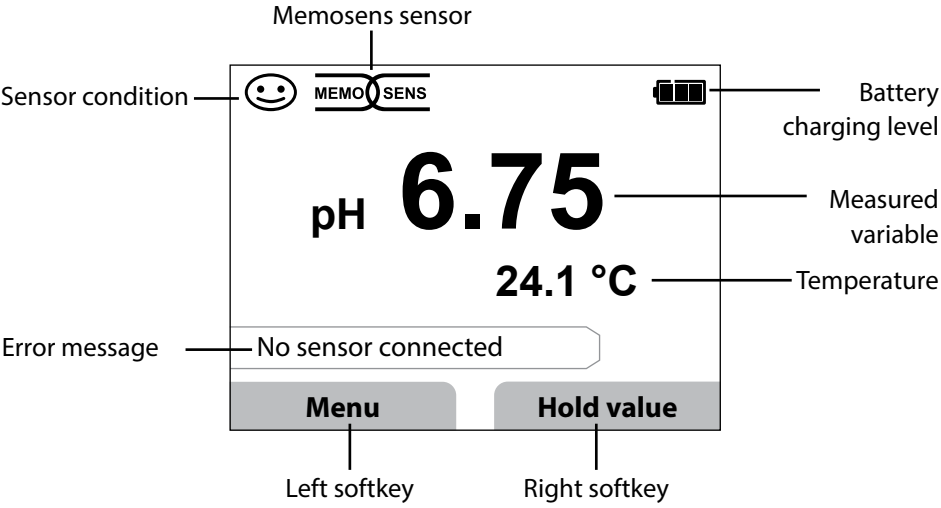
- When you press **meas** or **on/off**, the meter immediately switches to measuring mode.

Memosens sensors:

- When you press **meas** or **on/off**, the meter displays selected sensor data before it switches to measuring mode.

Icons

Important information about the state of the device:



1) In measuring mode, press the **Menu** softkey.
2) Select "Information" and confirm by pressing **enter**.
3) Select the desired submenu and confirm by pressing **enter**.
   The different submenus are described below.

Calibration Record

Shows the data of the last calibration performed on the currently connected sensor.

Sensor Information (Digital Sensors only)

Shows the data of the currently connected sensor. When MemoLog has been activated (in the Configuration menu), you can save the sensor data in the device by pressing the **Save** softkey. The following table shows the sensor information depending on the respective sensor:

	pH/ pH/ORP**	Cond	Oxy	ISFET	ORP	Optical Oxy
Manufacturer	x	x	x	x	x	x
Ref. No.	x	x	x	x	x	x
Sensor serial no.	x	x	x	x	x	x
Membrane serial no.						x
TAG	x	x	x	x	x	
SW version	x	x	x	x	x	x
HW version	x	x	x	x	x	
Calibration*	x	x	x	x	x	x
Zero point	x		x			x
Slope	x		x	x		x
ORP calibration* **	x					
Correction					x	
Nom. cell constant		x				
Temp. offset	x	x	x		x	
Sensor operating time	x	x	x	x	x	x
Membrane operating time						x
Wear	x		x	x		
SIP	x	x	x	x	x	
CIP	x**	x				
Autoclaving	x**					
Cell constant		x				
Operating point				x		

* latest calibration ** for pH/ORP combo sensor only

pH | Oxy

Sensor Diagram (pH and Oxy only)

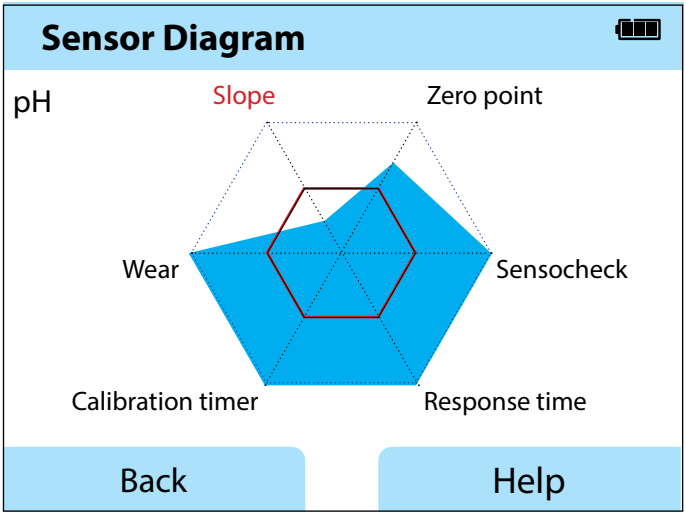
Provide single-glance information on the following parameters of the connected sensor:

- Slope
- Zero point (operating point for Memosens ISFET)
- Sensocheck (pH) or leakage current (ISFET and Oxy)
- Response time
- Calibration timer
- Wear (Memosens)

Parameters which cannot be checked are shown as inactive (gray) and are set to 100% (e.g. Sensocheck for analog sensors).

The parameter values should lie between the outer (100%) and inner (50%) hexagon. When a value enters the inner hexagon (<50%), the corresponding caption text flashes red (see example).

Example: Sensor diagram of a digital pH sensor (Memosens)



Sensor Monitor

Shows the raw values available fom the connected sensor:

pH, analog	mV, temperature, temperature detector, temp. resistance
pH, digital, glass	mV, temperature, glass impedance
pH, digital, ISFET	mV, leakage current, temperature
pH, ORP	mV, temperature
Cond, analog	Resistance, conductance, temperature, temperature detector, temperature resistance
Cond, digital	Resistance, conductance, temperature
Oxy, digital	Sensor current, leakage current, polarization voltage, partial pressure, air pressure, temperature
Oxy, digital, optical	Partial pressure, temperature

Messages

Shows all active error and status messages as well as supplementary help texts.

MemoLog (Memosens only)

Displays the individual calibration records stored in the device. You have the possibility to delete individual entries or all entries. The following parameters are displayed:

- Sensor type
- Serial no.
- TAG
- Calibration date
- Zero point
- Slope
- Cell constant (Cond sensor)
- Operating point (ISFET sensor)

Background: The device provides a calibration data logger, which must be activated in the configuration menu. With "MemoLog" activated, up to 100 calibration records can be directly saved to the device. After every calibration, the complete Memosens data will be recorded. Convenient management of the calibration data is possible using the MemoSuite or Paraly SW 112 software.
MemoLog is not suitable for SE 340 (optical oxygen sensor).

pH | ORP | Oxy | Cond

Device Info

Shows the following device information:

- Model name
- Serial number
- Software version
- Hardware version
- Air pressure
- Battery

Device Test

A device self-test is automatically run in the background at regular intervals.
It checks the memory modules listed below. A green checkmark shows that the test was successful.

- FLASH program memory
- FLASH data memory
- FLASH parameter memory
- RAM (working memory)

Display test

1) Select "Display test" and press **enter**.
2) The display lights up red, green, blue and then white.
3) Press any key to stop the test.

Keypad test

1) Select "Keypad test" and press **enter**.
2) Press all nine keys one after the other.
   A green checkmark shows that a key functions properly.
3) Press any key to stop the test.

pH Configuration

1) In measuring mode, press the **Menu** softkey.
2) Select "Configuration" and confirm by pressing **enter**.
3) Make the desired adjustments.

The following table gives you an overview.
Factory settings are shown in **bold print**.

"pH Configuration" menu selection – part 1

Language		**Deutsch** | English | Español | Italiano | Français | Português |
Auto-off		**Off** | 5 min | 10 min | 30 min | 60 min
Temperature		**°C** | °F
Right softkey		Logger Start/Stop | **Hold value**
+ pH sensor*		
	Display format	**0.00 pH** | 0.000 pH
	Wear	**On** | Off
+ Calibration*		
	Cal timer	**Off** | On
	Interval	On: 00 … 99 days
	Cal mode	**Calimatic** | Manual | Data entry
	Cal points	**Auto** | 1-point | 2-point | 3-point
	Buffer set	Mettler-Toledo 2.00/4.01/7.00/9.21
		Knick CaliMat 2.00/4.00/7.00/9.00/12.00
		Ciba 2.06/4.00/7.00/10.00
		NIST technical 1.68/4.00/7.00/10.01/12.46
		NIST standard 1.679/4.006/6.865/9.180
		Hach 4.01/7.00/10.01/12.00
		WTW 2.00/4.01/7.00/10.00
		Hamilton 2.00/4.01/7.00/10.01/12.00
		Reagecon 2.00/4.00/7.00/9.00/12.00
		DIN 19267 1.09/4.65/6.79/9.23/12.75
		Metrohm 4:00/7.00/9.00
		User buffer 1**
	MemoLog	**Off** | On
	TAG	**Off** | On

* "+" indicates that submenus can be opened by pressing **enter**.

** Parameter can be configured using Paraly SW 112 software.

pH

"pH Configuration" menu selection – part 2

+ Time/Date*		
	Time format	**24 h** | 12 h
	Date format	**dd.mm.yyyy** | yyyy-mm-dd | dd/mm/yyyy | mm/dd/yyyy
	Time	hh:mm:ss
	Date	Date format as configured
+ Display*		
	Appearance	**Modern** | Retro
	Lighting	**Permanent** | 60 min | 30 min | 10 min | 5 min | 1 min | 30 sec
	Brightness	**Bright** | Standard | Dim
+ Data logger*		
	Meas.point	- -
	Note	- -
	Recording	**Non-circular** | Circular
	Logger type	Shot
		Interval 00.00.01…12:59:59 | **00:02:00**
		Difference – 1st difference: **On** | Off
		Difference – Delta pH: pH 0.0…16.0 | **pH 1.0**
		Difference – Delta mV: 0 … 2000 mV | 1 mV
		Difference – 2nd diff.: On | **Off**
		Difference – Delta °C: 0…99.9 °C | **1.0 °C**
		Difference – Delta °F: 0…450 °F | **1.0 °F**
		Intv+Diff – Interval: See logger type: Interval
		Intv+Diff – Difference: See logger type: Difference
		Limit value – Interval: Basis/Event 00.00.01…12:59:59 **00:01:00/00:00:01**
		Limit value – Limit values: Min/Max, corresponding to permissible range (see Specifications)
+ Options		001 SOP 002 Temp.cal — Add-on function, enabled via TAN
Factory setting		Yes | **No** **Note:** Reset to factory settings will also erase all logger data!

enter

* "+" indicates that submenus can be opened by pressing **enter**.

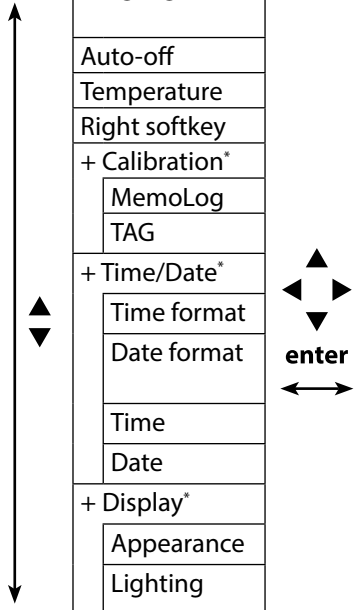
ORP Configuration

1) In measuring mode, press the **Menu** softkey.
2) Select "Configuration" and confirm by pressing **enter**.
3) Make the desired adjustments.

The following table gives you an overview.
Factory settings are shown in **bold print**.

"ORP Configuration" menu selection – part 1

Language		**Deutsch** | English | Español | Italiano | Français | Português |
Auto-off		**Off** | 5 min | 10 min | 30 min | 60 min
Temperature		**°C** | °F
Right softkey		Logger Start/Stop | **Hold value**
+ Calibration*		
	MemoLog	**Off** | On
	TAG	**Off** | On
+ Time/Date*		
	Time format	**24 h** | 12 h
	Date format	**dd.mm.yyyy** | yyyy-mm-dd | dd/mm/yyyy | mm/dd/yyyy
	Time	hh:mm:ss
	Date	Date format as configured
+ Display*		
	Appearance	**Modern** | Retro
	Lighting	**Permanent** | 60 min | 30 min | 10 min | 5 min | 1 min | 30 sec
	Brightness	**Bright** | Standard | Dim



* "+" indicates that submenus can be opened by pressing **enter**.

ORP

"ORP Configuration" menu selection – part 2

+ Data logger*				
	Meas.point	- -		
	Note	- -		
	Recording	**Non-circular** | Circular		
	Logger type	Shot		
		Interval	00.00.01…12:59:59 | **00:02:00**	
		Difference	1st difference	**On** | Off
			Delta pH	pH 0.0…16.0 | **pH 1.0**
			Delta mV	0 … 2000 mV | 1 mV
			2nd diff.	On | **Off**
			Delta °C	0…99.9 °C | **1.0 °C**
			Delta °F	0…450 °F | **1.0 °F**
		Intv+Diff	Interval	See logger type: Interval
			Difference	See logger type: Difference
		Limit value	Interval	Basis/Event 00.00.01…12:59:59 **00:01:00/00:00:01**
			Limit values	Min/Max, corresponding to permissible range (see Specifications)
+ Options		001 SOP 002 Temp.cal		Add-on function, enabled via TAN
Factory setting		Yes | **No** **Note:** Reset to factory settings will also erase all logger data!		

enter

* "+" indicates that submenus can be opened by pressing **enter**.

Conductivity Configuration

1) In measuring mode, press the **Menu** softkey.
2) Select "Configuration" and confirm by pressing **enter**.
3) Make the desired adjustments.

The following table gives you an overview.
Factory settings are shown in **bold print**.

"Conductivity Configuration" menu selection – part 1

Language	**Deutsch** | English | Español | Italiano | Français | Português |
Auto-off	**Off** | 5 min | 10 min | 30 min | 60 min
Temperature	**°C** | °F
Right softkey	Logger Start/Stop | **Hold value**
+ Cond sensor*	
Conductivity	**S/cm** | S/m
Range selection	**Auto** | o.ooo µS/cm | oo.oo µS/cm | ooo.o µS/cm | oooo µS/cm | oo.oo mS/cm | ooo.o mS/cm | oooo mS/cm
Calculation	**Off** | MΩ cm | TC | SAL | TDS | % by wt
TC comp.	TC: **Linear** | NLF | NaCl | HCl | NH3 | NaOH
TC of solution	TC: 0 … 20.0 %/K | **2.1 %/K**
Ref. temp	TC: 0 … 100.0 °C | **25 °C** 32 … 212 °F | **77 °F**
TDS factor	TDS: 0 …9.99 | **1.00**
Solution	% by wt: **NaCl** | HCl | NaOH | H2SO4 | HNO3

enter

* "+" indicates that submenus can be opened by pressing **enter**.

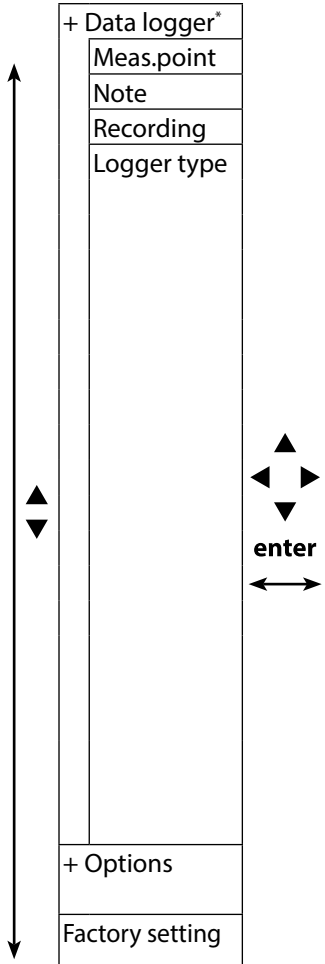
Cond

"Conductivity Configuration" menu selection – part 2

+ Calibration*		
Cal mode		**Contacting (conductive) conductivity sensors:** Auto | Entry of solution | **Cell constant**
		Toroidal (inductive) conductivity sensors: Auto | Entry of solution | **Cell factor** | Installation factor | Zero point
Cal solution		**NaCl 0.01 mol/l** | NaCl 0.1 mol/l | NaCl sat. | KCl 0.01 mol/l | KCl 0.1 mol/l | KCl 1 mol/l
MemoLog	▲	**Off** | On
TAG	◀ ▶	**Off** | On
+ Time/Date*	▼	
Time format	enter	**24 h** | 12 h
Date format	⟷	**dd.mm.yyyy** | yyyy-mm-dd | dd/mm/yyyy | mm/dd/yyyy
Time		hh:mm:ss
Date		Date format as configured
+ Display*		
Appearance		**Modern** | Retro
Lighting		**Permanent** | 60 min | 30 min | 10 min | 5 min | 1 min | 30 sec
Brightness		**Bright** | Standard | Dim

* "+" indicates that submenus can be opened by pressing **enter**.

"Conductivity Configuration" menu selection – part 3



+ Data logger*			
Meas.point		- -	
Note		- -	
Recording		**Non-circular** | Circular	
Logger type		Shot	
		Interval 1…12:59:59 | **00:02:00**	
	Difference	1st difference	**On** | Off
		Delta cond	0 … 2000 mS/cm | **1.0 µS/cm**
		Delta conc	0 … 9.99 % | **1.0 %**
		Delta MΩcm	0 … 9.999 MΩcm | **1 MΩcm**
		Delta salinity	0 … 45.0 g/kg | **1.0 g/kg**
		Delta TDS	0 … 2000.0 mg/l | **1 mg/l**
		2nd diff.	On | **Off**
		Delta °C	0…99.9 °C | **1.0 °C**
		Delta °F	0…450 °F | **1.0 °F**
	Intv+Diff	Interval	See logger type: Interval
		Difference	See logger type: Difference
	Limit value	Interval	Basis/Event 00.00.01…12:59:59 **00:01:00/00:00:01**
		Limit values	Min/Max, corresponding to permissible range (see Specifications)
+ Options		001 SOP 002 Temp.cal	Add-on function, enabled via TAN
Factory setting		Yes | **No** **Note:** Reset to factory settings will also erase all logger data!	

* "+" indicates that submenus can be opened by pressing **enter**.

Oxy

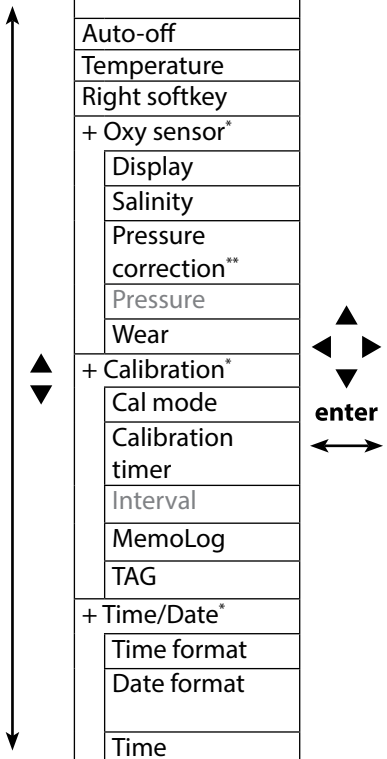
Oxygen Configuration

1) In measuring mode, press the **Menu** softkey.
2) Select "Configuration" and confirm by pressing **enter**.
3) Make the desired adjustments.

The following table gives you an overview.
Factory settings are shown in **bold print**.

"Oxygen Configuration" menu selection – part 1

Language	**Deutsch** | English | Español | Italiano | Français | Português |
Auto-off	**Off** | 5 min | 10 min | 30 min | 60 min
Temperature	**°C** | °F
Right softkey	Logger Start/Stop | **Hold value**
+ Oxy sensor*	
Display	**Saturation** | Concentration | Partial pressure
Salinity	**0** … 45.0 g/kg
Pressure correction**	**Air pressure**| Manual
Pressure	Manual: 0 … 9999 mbar | **1013 mbar**
Wear	**On** | Off
+ Calibration*	
Cal mode	**In air** | Zero point | Data entry
Calibration timer	**Off** | On
Interval	On: 0 … 99 days
MemoLog	**Off** | On
TAG	**Off** | On
+ Time/Date*	
Time format	**24 h** | 12 h
Date format	**dd.mm.yyyy** | yyyy-mm-dd | dd/mm/yyyy | mm/dd/yyyy
Time	hh:mm:ss
Date	Date format as configured



* "+" indicates that submenus can be opened by pressing **enter**.
** The device provides an internal barometer.

"Oxygen Configuration" menu selection – part 2

+ Display*			
	Appearance		**Modern** | Retro
	Lighting		**Permanent** | 60 min | 30 min | 10 min | 5 min | 1 min | 30 sec
	Brightness		**Bright** | Standard | Dim
+ Data logger*			
	Meas.point		- -
	Note		- -
	Right softkey		Logger Start/Stop | **Hold value**
	Recording		**Non-circular** | Circular
	Logger type		Shot
		Interval	00.00.01…12:59:59 | **00:02:00**
		Difference	1st difference: **On** | Off
			Delta saturation: 0 … 200 %Air | **1% Air**
			Delta conc: 0 … 20 mg/l | **1 mg/l**
			Delta mbar: 0 … 999.99 mbar **1 mbar**
			2nd diff.: On | **Off**
			Delta °C: 0…99.9 °C | **1.0 °C**
			Delta °F: 0…450 °F | **1.0 °F**
		Intv+Diff	Interval: See logger type: Interval
			Difference: See logger type: Difference
		Limit value	Interval: Basis/Event 00.00.01…12:59:59 **00:01:00/00:00:01**
			Limit values: Min/Max, corresponding to permissible range (see Specifications)
+ Options			001 SOP 002 Temp.cal: Add-on function, enabled via TAN
Factory setting			Yes | **No** **Note:** Reset to factory settings will also erase all logger data!

enter

* "+" indicates that submenus can be opened by pressing **enter**.

pH

pH Calibration

1) In measuring mode, press the **Menu** softkey.
2) Select "Calibration" and confirm by pressing **enter**.
3) Select the desired "Calibration mode" and confirm by pressing **enter**.
4) The "TAG" menu allows the sensor TAG to be edited.
   To do so, set "TAG" to **On** in the configuration menu
   (default setting: **Off**).
5) Perform the selected calibration as described on the following pages.
   Follow the instructions on the display.

Note: Calibration is not possible when the device is connected via USB with the Paraly SW 112 software.

Calimatic Calibration

(Automatic calibration with specification of the buffer solution used)

1) Select the number of calibration points and the buffer set as shown in the table below and press the **Start** softkey.

Cal points	**Auto** | 1-point | 2-point | 3-point	
Buffer set	Mettler-Toledo	2.00/4.01/7.00/9.21
	Knick CaliMat	2.00/4.00/7.00/9.00/12.00
	Ciba	2.06/4.00/7.00/10.00
	NIST technical	1.68/4.00/7.00/10.01/12.46
	NIST standard	1.679/4.006/6.865/9.180
	Hach	4.01/7.00/10.01/12.00
	WTW	2.00/4.01/7.00/10.00
	Hamilton	2.00/4.01/7.00/10.01/12.00
	Reagecon	2.00/4.00/7.00/9.00/12.00
	DIN 19267	1.09/4.65/6.79/9.23/12.75
	Metrohm	4.00/7.00/9.00
	User buffer 1	configurable via Paraly SW 112 software

2) Immerse the sensor in the **1st**/2nd/3rd buffer solution and press **Continue** (repeat this step for each calibration point).
3) Finally, the calibration data will be displayed.
   You can **Apply** or **Discard** these values.

Note: To abort calibration, you can press **meas** at any time.

pH

Manual Calibration

(Calibration with manual specification of the number of calibration points and the buffer solution)

1) Select the number of calibration points and press the **Start** softkey.
2) Adjust the temperature-corrected value (see buffer table) for the **1st**/2nd/3rd buffer solution and press **Continue** (repeat this step for each calibration point).
   Note: When using sensors without temperature detector, you should adjust the temperature manually before starting calibration (see page 36).
3) Finally, the calibration data will be displayed.
   You can **Apply** or **Discard** these values.

Data Entry Calibration

(Calibration by entering known sensor values)

1) Press the **Start** softkey.
2) Enter the known sensor values for zero and slope.
3) Finally, you can **Apply** these values or **Cancel** the calibration.

pH ORP

Calibrating a pH/ORP Combo Sensor

The pH/ORP combo sensor can be calibrated as a pH sensor and/or as an ORP sensor.

pH Calibration
Follow the instructions given for pH calibration, page 28.

ORP Calibration
Follow the instructions given for ORP calibration, page 30.

Note: To abort calibration, you can press **meas** at any time.

ORP

ORP Calibration

1) In measuring mode, press the **Menu** softkey.
2) Select "Calibration" and confirm by pressing **enter**.
3) Select the desired "Calibration mode" and confirm by pressing **enter**.
4) The "TAG" menu allows the sensor TAG to be edited.
   To do so, set "TAG" to **On** in the configuration menu (default setting: **Off**).
5) Enter the temperature-corrected setpoint of the calibration solution.
6) Immerse the sensor in the calibration solution and wait until the measured value is stable.
7) **Apply** or **Discard** the ORP setpoint.

Note: Calibration is not possible when the device is connected via USB with the Paraly SW 112 software.

Note: To abort calibration, you can press **meas** at any time.

ISFET Calibration

1) In measuring mode, press the **Menu** softkey.
2) Select "Calibration" and confirm by pressing **enter**.
3) Select the desired "Calibration mode" and confirm by pressing **enter**.
4) The "TAG" menu allows the sensor TAG to be edited.
   To do so, set "TAG" to **On** in the configuration menu (default setting: **Off**).
5) Perform the selected calibration as described on the following pages.
   Follow the instructions on the display.

Note: Calibration is not possible when the device is connected via USB with the Paraly SW 112 software.

Calibrating the ISFET Zero (Operating Point)

1) Select the "ISFET zero" calibration mode for setting the operating point for the first sensor calibration.

Calibration mode	**Calimatic**
	Manual
	Data entry
	ISFET zero (operating point)

2) Press the **Start** softkey.
3) Adjust the buffer value if required: default pH 7.00
4) Press the **Start** softkey.
5) Finally, you can **Apply** or **Discard** the calibration value for the operating point.
   When you apply the calibration value, the operating point will be stored in the device, but not in the sensor!
   Keep the sensor connected to the Portavo while performing the next calibration step. The operating point will be taken into account for the following calibration.

Calimatic/Manual/Data Entry Calibration

Follow the instructions given for pH calibration, page 28.
If you disconnect the sensor before performing the calibration (e.g., Calimatic), you must set the operating point again as described above.

Note: To abort calibration, you can press **meas** at any time.

Cond

Conductivity Calibration

1) In measuring mode, press the **Menu** softkey.
2) Select "Calibration" and confirm by pressing **enter**.
3) Select the desired "Calibration mode" and confirm by pressing **enter**.
4) The "TAG" menu allows the sensor TAG to be edited.
   To do so, set "TAG" to **On** in the configuration menu (default setting: **Off**).
5) Perform the selected calibration as described on the following pages.
   Follow the instructions on the display.

Note: Calibration is not possible when the device is connected via USB with the Paraly SW 112 software.

Auto Calibration

(Automatic calibration with specification of the calibration solution used)

NOTICE!

- Make sure that the values of the calibration solutions used correspond exactly to those specified in this manual.
  If not, the resulting cell constant will be incorrect.
- When calibrating in a liquid, make sure that the sensor, the separate temperature probe (if present) and the calibration solution have the same temperature.
  Only this ensures that the cell constant is determined correctly.

1) Select the calibration solution:
   - **NaCl 0.01 mol/l**
   - NaCl 0.1 mol/l
   - NaCl sat.
   - KCl 0.01 mol/l
   - KCl 0.1 mol/l
   - KCl 1 mol/l
2) Press the **Start** softkey.
3) Immerse the sensor in the solution and press **Continue**.
4) Finally, the calibration data record will be displayed.
   You can **Apply** or **Discard** these values.

Note: To abort calibration, you can press **meas** at any time.

"Entry of Solution" Calibration

(Calibration by entering the conductivity with display of the cell constant)

1) Press the **Start** softkey.
2) Immerse the sensor in the solution.
3) Enter the temperature-corrected conductivity value and press **enter**.
4) Finally, you can **Apply** these values or **Cancel** the calibration.

Cell Constant / Cell Factor Calibration

(Calibration by entering the cell constant (cell factor) with display of the conductivity)

1) Press the **Start** softkey.
2) Immerse the sensor in the solution.
3) Modify the value of the cell factor (cell constant) until the temperature-corrected conductivity value is reached. Then press **enter**.
4) Finally, you can **Apply** these values or **Cancel** the calibration.

Contacting conductivity sensor (conductive)	**Cell constant**
SE 202	0.100/cm ± 2 %
SE 204	0.475/cm ± 1,5 %
ZU 6985	1.19/cm ± 1 %
SE 215 MS	1.00/cm ± 2 %
Toroidal conductivity sensor (inductive)	**Cell factor**
SE 680 MS	6.4/cm

Installation Factor Calibration

1) Make sure that the sensor is in normal mounting position in the medium.
2) Press the **Start** softkey.
3) Modify the installation factor until the correct conductivity value is displayed (reference measurement). Then press **enter**.
4) Finally, you can **Apply** these values or **Cancel** the calibration.

Zero Calibration

1) Make sure that the sensor is outside the medium (in air).
2) Press the **Start** softkey.
3) Finally, you can **Apply** these values or **Cancel** the calibration.

Note: To abort calibration, you can press **meas** at any time.

Oxy

Oxygen Calibration

1) In measuring mode, press the **Menu** softkey.
2) Select "Calibration" and confirm by pressing **enter**.
3) Select the desired "Calibration mode" and confirm by pressing **enter**.
4) Select "Membrane module replacement" if you wish to save a change of membrane or electrolyte in the connected sensor. The digital, optical oxygen sensor automatically recognizes when its membrane module has been replaced.
5) The "TAG" menu allows the sensor TAG to be edited.
   To do so, set "TAG" to **On** in the configuration menu (default setting: **Off**).
6) Perform the selected calibration as described on the following pages.
   Follow the instructions on the display.

Note: Calibration is not possible when the device is connected via USB with the Paraly SW 112 software.

Calibration in Air

(Calibrating the slope in air)

1) Place sensor in air and wait for a stable measured value.
2) Press the **Start** softkey.
3) Adjust the correct value for "Relative humidity". Then press **Continue**.
   Calibration will be performed.
4) Finally, you can **Apply** or **Discard** these values.

Note: To abort calibration, you can press **meas** at any time.

Zero Calibration

(Zero calibration with oxygen-free medium, e.g., nitrogen 5.0)

1) Place sensor in oxygen-free medium and wait for a stable measured value.
2) Press the **Start** softkey. Calibration will be performed.
3) Finally, you can **Apply** these values or **Cancel** the calibration.

Data Entry Calibration

(Calibration by entering known sensor values)

1) Press the **Start** softkey.
2) Adjust the known sensor values for zero and slope.
3) Finally, you can **Apply** these values or **Cancel** the calibration.

Note: To abort calibration, you can press **meas** at any time.

pH | ORP | Oxy | Cond

Once you have completed all preparations, you can start with the actual measurement.

1) Connect the desired sensor to the meter. Some sensors require a special preparation. Please proceed according to the operating instructions for the sensor.
2) Switch the meter on using the **on/off** or **meas** key.
3) Depending on the measurement method and the sensor used, immerse the sensing part of the sensor in the medium to be measured.
4) Watch the display and wait for the reading to stabilize.

Note: Measurement can also be controlled via the Paraly SW 112 software.

Switching the Measured Value Display

During measurement, you can toggle between display of primary / secondary measured values and clock by pressing **meas**.

Adjusting the Temperature

When you connect a sensor without temperature detector, you can manually adjust the temperature for measurement or calibration:

1) Press **meas** to access measuring mode.
   The adjusted temperature will be displayed.
2) Set the desired temperature value using the ❮ or ❯ arrow.
   Holding the key depressed changes the temperature value at high speed.

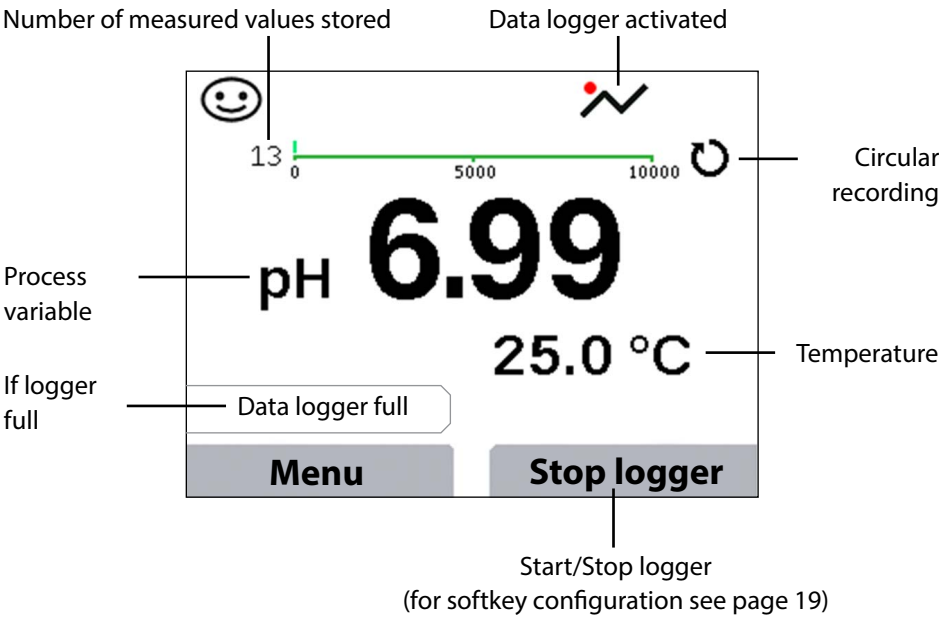
The Data Logger

The meter provides a data logger. **Prior to use**, it must be configured and then activated. You can choose from the following logger types:

- Shot (manual logging by pressing the **Save value** softkey)
- Interval (time-controlled logging at a fixed interval)
- Difference (signal-controlled logging of measured variable and temperature)
- Intv+Diff (combined time- and signal-controlled logging)
- Limit value (combined time- and threshold-controlled logging)

The data logger records up to 10 000 entries, which can be assigned to different points of measurement (TAGs) and notes. The following data will be recorded: meas. point, note, sensor ID, serial number of sensor (Memosens), primary value, temperature, time stamp, device status.
It is always the currently selected process variable which is recorded.

Display: Icons related to the data logger



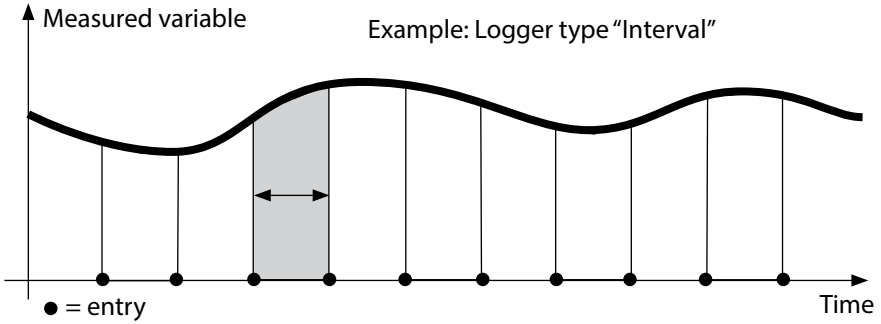
Operating Modes of the Data Logger (Logger Type)

Shot

In this mode, a measured value is recorded when the **Save value** softkey is pressed. In the measuring mode (**meas**), it is always possible to hold a value and then save it.

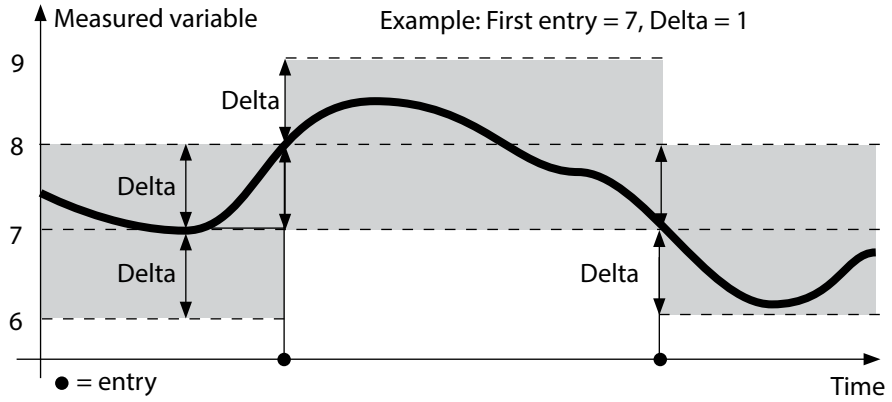
Interval (time-controlled)

In the "Interval" mode, the data are cyclically recorded.



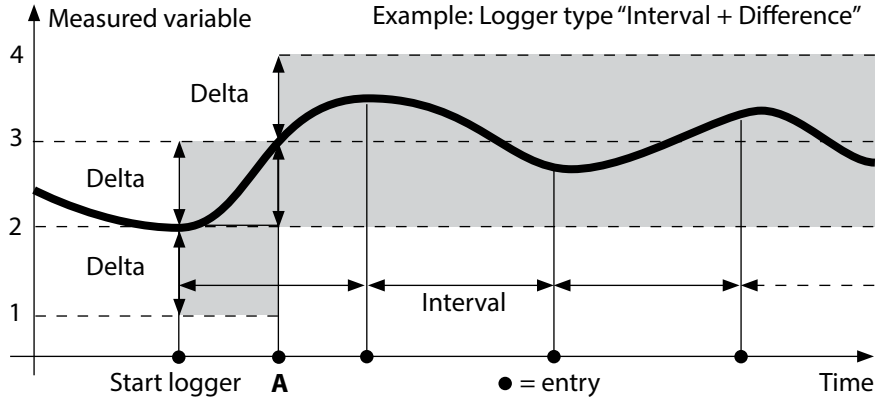
Difference

When the delta range (process variable and/or temperature) related to the last entry is exceeded, a new entry is created and the delta range is displaced upwards or downwards by the delta value. The first entry is automatically created when the data logger is started.



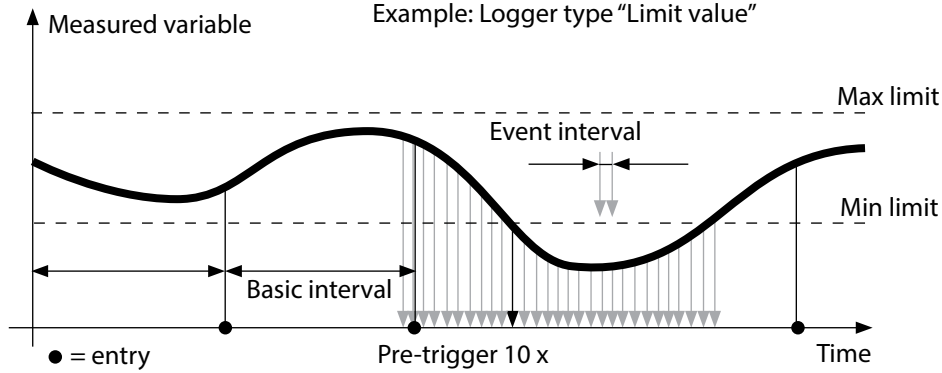
Interval and difference (combined)

When the delta range related to the last DIFF entry is exceeded, a new entry is created (example: entry **A**) and the delta range is displaced upwards or downwards by the delta value. As long as the measured value remains within the delta range, logging is performed at the preset interval. The first DIFF entry is automatically created when the data logger is started.



Limit value (combined)

When one of the two limit values (Min/Max) is exceeded, the data are logged as defined by the "event interval". Additionally, the last ten measured values before an event are recorded (pre-trigger). As long as the measured value remains within the limits, logging is performed at the preset "basic interval".



pH | ORP | Oxy | Cond

Configuring the Data Logger

Prerequisite: Data logger is stopped.

The "Data logger" menu shows the number of occupied entries as well as the number of free entries. Configuration can also be done in the "Configuration" menu under "Data logger".

1. Press **Menu** softkey.
2. Select "Data logger" and confirm by pressing **enter**.
3. Select "Configure data logger" and confirm by pressing **enter**.
4. Configure data logger as required (see table).
5. When you have completed the configuration, you can start the data logger!

Increasing the Battery Life

To increase the battery life for logger operation, the time for the display lighting selected in the configuration should be as short as possible.

Note: When the selected time has expired, display and backlighting switch off automatically. They can be switched on again by pressing any key.

Configuring the data logger (default in bold print)			
Meas.point	**Without**		
Note	**Without**		
Recording	**Non-circular**		
	Circular		
Logger type	Shot		
	Interval	Interval	00:00:01…12:59:59 | **00:02:00**
	Difference	1st difference	**On** Off
		Delta pH	pH 0.0…16.0 | **pH 1.0**
		Delta mV	0 … 2000 mV | **1 mV**
		Delta cond	0 … 2000 mS/cm | **1.0 µS/cm**
		Delta conc	0 … 9.99 % by wt | **1%**
		Delta MΩcm	0 … 9.999 MΩcm | **1.0 MΩcm**
		Delta salinity	0.00 … 45.0 g/kg | **1.0 g/kg**
		Delta TDS	0.00 … 2000.0 mg/l | **1 mg/l**
		Delta saturation	0 … 200% Air | **1% Air**
		Delta conc	0 … 20.0 mg/l | **1 mg/l**
		Delta mbar	0 … 1000 mbar | **1 mbar**
		2nd difference	On **Off**
		Delta °C	0…99.9 °C | **1.0 °C**
		Delta °F	0…450 °F | **1.0 °F**
	Intv+Diff	Interval	see logger type: interval
		Difference	see logger type: difference
	Limit value	Interval	Basis 00.00.01…12:59:59 | **00:01:00**
			Event **00.00.01**…12:59:59
		Limit values	Min/Max corresponding to permissible range (see Specifications)

pH | ORP | Oxy | Cond

Starting/Stopping the Data Logger

With the data logger activated, automatic switch-off is disabled.
Every time the meter has been switched off, the data logger must be restarted.
Depending on the assignment of the right softkey (see "Configuration", page 19), you can start/stop the data logger as follows:

Right softkey	
Start/Stop logger	1. Press right softkey **Start logger / Stop logger**.
Hold value	2. Press **Menu** softkey. 3. Select "Data logger" using the arrows and confirm by pressing **enter**. 4. Press **Start** or **Stop** softkey, resp.

Viewing the Logger Data

In the "Data logger" menu you can view the recorded entries either individually or as curve characteristic (see examples).
You can also use the Paraly SW 112 software for managing the data logger.

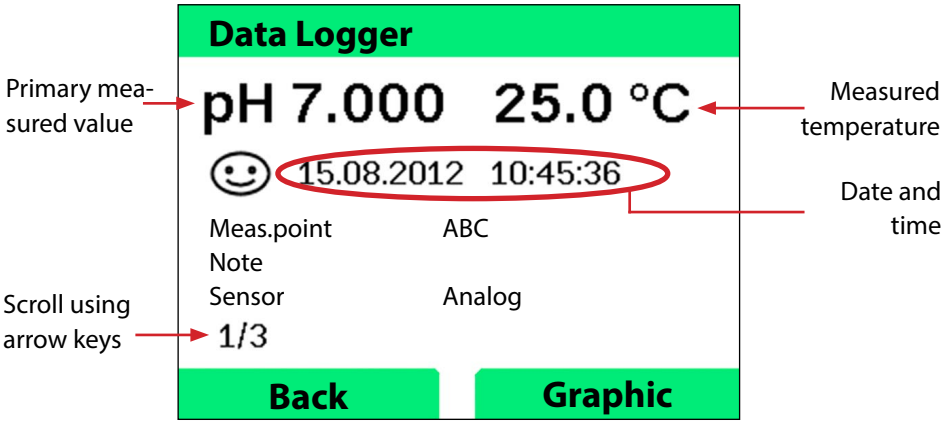
1. Press **Menu** softkey.
2. Select "Data logger" using the arrows and confirm by pressing **enter**.
3. Select "View logger data" using the arrows and confirm by pressing **enter**.
4. Select filter ("Meas.point" or "Time + Meas.point" or "All values").
5. Select the parameter correspondng to the sensor.
6. Press **Menu** softkey.
7. Select the desired entries using the arrow (see example 1).
8. For display as curve characteristic, press **Graphic** softkey.
   You can use the arrows to navigate between entries (see example 2).

Deleting the Logger Data

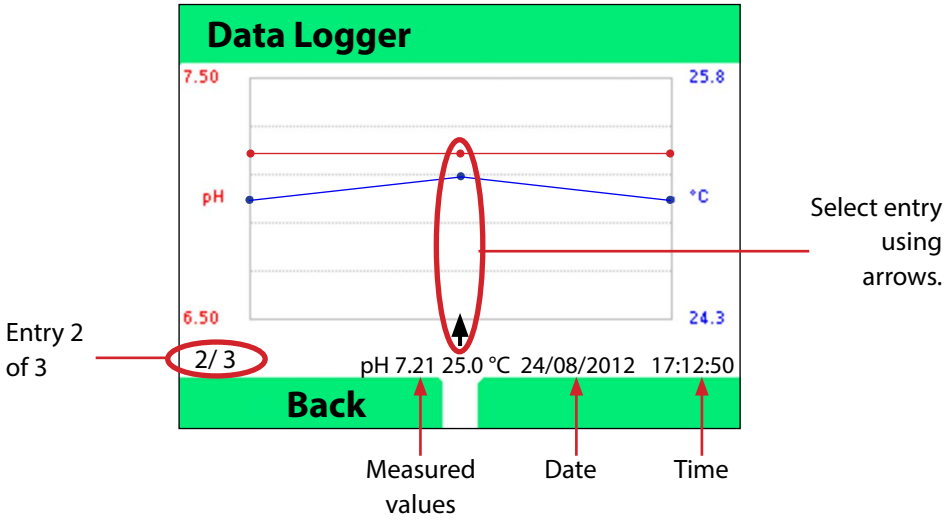
To delete the recorded entries, proceed as follows:

1. Press **Menu** softkey.
2. Select "Data logger" using the arrows and confirm by pressing **enter**.
3. Select "Delete logger data" using the arrows and confirm by pressing **enter**.
4. Select deletion mode: "Complete", "Data", "Meas.point" or "Filter"
   (you can filter for measuring point, parameter or time).
5. Press **Delete** softkey. The data are deleted according to the configuration.
6. Press **Back** softkey to return to menu selection.

Example 1: Viewing the logger data



Example 2: Curve characteristic



pH | ORP | Oxy | Cond

Paraly SW 112 Software

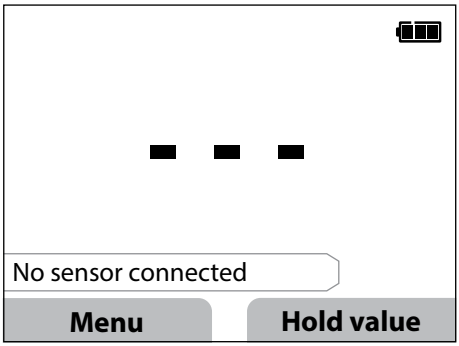
The Paraly SW 112 software supplements the Portavo series. It allows convenient management of the data that have been acquired by the meters as well as simple and clear configuration of the meters. Paraly SW 112 starts automatically when the Portavo USB port is connected to the computer.

The Paraly SW 112 software stands out by the following features:

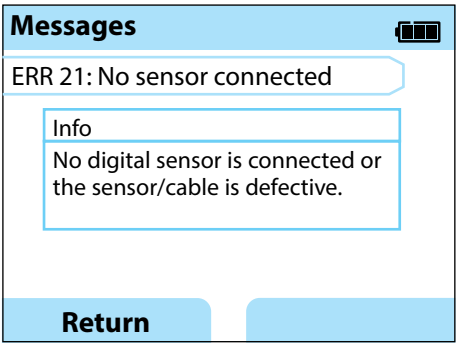
- Intuitive Windows user interface
- Easy configuration and management of several meters
- Display of device and sensor information
- Configuration of individual buffer sets (pH)
- Convenient management and evaluation of the data logger
- Export function for Microsoft Excel
- Print function
- Updating the device software

Note: A detailed user manual for the Paraly SW 112 software can be found on the included data carrier.

Error and status messages appear as plain text on the display. By pressing **enter** and **Help**, more detailed help texts can be displayed. Information on the sensor condition is indicated by the "Sensoface" icon (friendly, neutral, sad) possibly accompanied by an info text.



Example of an error message: Press **enter** and **Help** to access the help text.



Help text for error 21

Sensoface (the "smiley" icon) provides information on the sensor condition (maintenance request). Measurement can still be performed. After a calibration, the corresponding Sensoface icon (friendly, neutral, sad) is shown together with the calibration data. Otherwise, Sensoface is only visible in measuring mode.

pH | ORP | Oxy | Cond

"Sensoface" Messages

The "Sensoface" icon provides information on the sensor condition:

Sensoface	Meaning
	Sensor is okay
	Calibrate the sensor soon
	Calibrate or replace the sensor

Info and Help Texts

When an error or status message appears on the screen, proceed as follows to view the corresponding info or help text:

1) Press **enter**.
2) Press the **Help** softkey.
3) The help text will be displayed. In most cases, you can remedy the cause of the error by yourself. Please refer to the following table for possible remedies.

Info	Message
Info 01	Cal timer expired
Info 02	Sensor wear
Info 03	Bad glass impedance
Info 05	Zero/Slope
Info 06	Response time too long
Info 07	Operating point (ISFET)
Info 08	Leakage current (ISFET)
Info 09	ORP offset
Info 10	Polarization

Error Messages

Error	Message	Remedy
blinks	Replace the batteries	Replace the batteries.
ERR 1	Primary variable range	Check whether the measurement conditions correspond to the adjusted measuring range.
ERR 2	ORP range	
ERR 3	Temperature range	
ERR 4	Zero point	Thoroughly rinse the sensor and recalibrate. If this does not help, replace the sensor.
ERR 5	Slope	
ERR 6	Cell constant too high/ too low	Enter nominal cell constant or calibrate the sensor using a known solution.
ERR 7	Air pressure range	Check if the opening for the pressure sensor located on the back of the device is blocked.
ERR 8	Identical buffers!	Use a buffer solution with a different nominal value before starting the next calibration step.
ERR 10	Buffers interchanged!	Repeat calibration.
ERR 11	Unstable value (Drift too high)	Leave the sensor in the liquid until the measured value is stable. If this does not help, replace the sensor.
ERR 14	Time and date invalid	Set the date and time.
ERR 18	System error	Restart, reset to factory settings, configure and calibrate. If the error occurs again, contact the Service.
ERR 19	Factory settings error	Data error, measurement with analog sensors no longer possible. Contact the Service team.
ERR 21	No sensor connected	Connect operational Memosens sensor.
ERR 25	Buffer distance	Re-enter the buffer table (Paraly SW 112).
ERR 30	Data logger full	Clear the logger completely or partially.
ERR 31	MemoLog full	Clear the MemoLog completely or partially.

pH | ORP | Oxy | Cond

Option 001 SOP

The option meets specific requirements of the pharmaceutical and biotechnological industries.

SOP Cal

Here, you specify which buffers are to be used in which sequence.
You can combine buffer solutions from different buffer sets. Please note that the minimum distance allowed between two buffer solutions is Δ 2 pH.

User Management (Access Control)

You can create up to 4 users with different access rights for configuration or calibration.

Sensor Verification

To make sure that only selected sensors can be operated on the meter, you can evaluate the sensor type and/or the "TAG" and "Group" data stored in the sensor. The sensor will only be accepted if the data stored in the sensor corresponds to the data stored in the meter.

Temperature Adjustment

For Memosens sensors, you can perform a 1-point calibration of the internal temperature detector.

Option 002 Temp.Cal

(included in Option 001 SOP)

Temperature Adjustment

For Memosens sensors, you can perform a 1-point calibration of the internal temperature detector.

Enabling the Option 001 SOP

1) In measuring mode, press the **Menu** softkey.
2) Select "Configuration" and confirm by pressing **enter**.
3) Select Option "001 SOP" and enter your activation code.

Adapt SOP Cal

Here, you specify which buffers are to be used in which sequence.
You can combine buffer solutions from different buffer sets. Please note that the minimum distance allowed between two buffer solutions is Δ 2 pH.
The "Configuration - Calibration" menu is extended as follows:

+ Calibration	
Cal mode	Calimatic | Manual | Data entry | **SOP cal**
Adapt SOP cal	
Cal points	1-point | 2-point | 3-point
Buffer 1	
Buffer set	Mettler-Toledo 2.00/4.01/7.00/9.21 **Knick CaliMat** 2.00/4.00/7.00/9.00/12.00 Ciba 2.06/4.00/7.00/10.00 NIST technical 1.68/4.00/7.00/10.01/12.46 NIST standard 1.679/4.006/6.865/9.180 Hach 4.01/7.00/10.01/12.00 WTW 2.00/4.01/7.00/10.00 Hamilton 2.00/4.01/7.00/10.01/12.00 Reagecon 2.00/4.00/7.00/9.00/12.00 DIN 19267 1.09/4.65/6.79/9.23/12.75 Metrohm 4.00/7.00/9.00 User buffer 1
Buffer	Select a buffer from the selected set
Buffer 2	Select buffer set 2 and buffer (see buffer 1)
Buffer 3	Select buffer set 3 and buffer (see buffer 1)
Verification	**Off** | On
Delta pH	**pH 0.05** (Enter maximum permitted deviation from verification buffer; exceeding this value generates an error message)
Verification buffer	Select buffer set and buffer (see buffer 1)

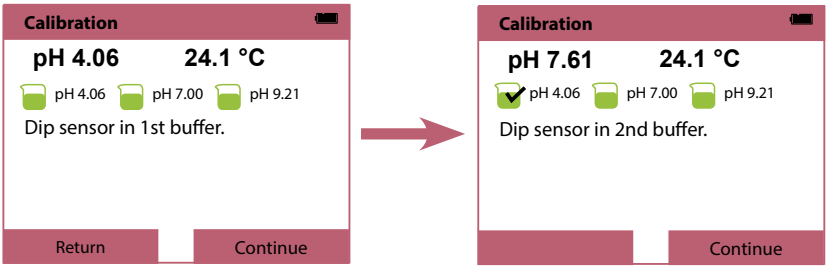
pH

Selecting SOP Calibration

1) In measuring mode, press the **Menu** softkey.
2) Select "Calibration" and confirm by pressing **enter**.
3) Select the "SOP cal" calibration mode and confirm by pressing **enter**.

Performing an SOP Calibration

The sequence of buffers to be used is displayed as specified in the configuration. After each calibration step, the identified buffer is marked off in the display. The next operation procedure is displayed. Perform the calibration following the instructions given in the display.



First calibration step completed

Note: Calibration is not possible when the device is connected via USB with the Paraly SW 112 software.

User Management (Access Control)

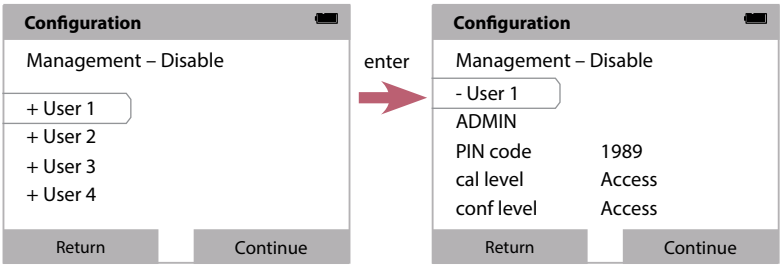
You can create up to 4 users with different access rights for configuration or calibration.

Enabling the User Management

1) In measuring mode, press the **Menu** softkey.
2) Select "Configuration" and confirm by pressing **enter**.
3) Select "User management" / "Management – Enable".
4) Select
   User = ADMIN
   PIN code = 1989 (factory setting)
5) Press **enter**.
6) To create more users / assign more PIN codes: Press **Continue** softkey.

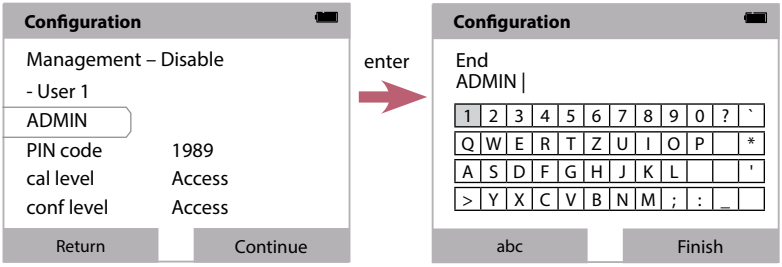
Creating a User / Changing the PIN Code

1. Select a user (e.g., "User 1", default: ADMIN, PIN code 1989):



You can allow or block access to configuration or calibration for each user.

2. Select ADMIN to open the editor for entering the user name:



NOTICE!

If you lose the PIN code for the ADMIN user, the system access will be blocked. The manufacturer can generate a rescue PIN code.

pH | ORP | Oxy | Cond

How to Enter the Rescue PIN Code

1) In measuring mode, press the **Menu** softkey.
2) Select "Configuration" using the cursor keys.
3) Press the ❑ and ◘ keys simultaneously.
4) Set User to "ADMIN".
5) Select "PIN code" and enter the rescue PIN code.
   Confirm by pressing **enter**.
6) Press the **Continue** softkey.

Sensor Verification

To make sure that only selected sensors can be operated on the meter, you can evaluate the following data stored in the sensor:
- Model (sensor model)
- TAG (e.g., point of measurement)
- Group (e.g., facility)

With Option 001 enabled, the "Configuration" menu is extended as follows:

- Sensor verification	
Check model	**Off** | Info | Reject
Check TAG	**Off** | Info | Reject
Check group	**Off** | Info | Reject

You can select the following options:

Off	No verification.
Info	When a wrong sensor is connected, an error message will be displayed. Nevertheless, you can continue working with the sensor.
Reject	Here you specify values with which the sensor will be rejected.

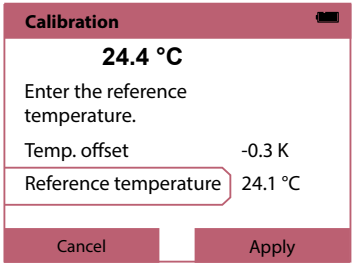
Enabling the Option 002 Temp.Cal (included in Option 001 SOP)

1) In measuring mode, press the **Menu** softkey.
2) Select "Configuration" and confirm by pressing **enter**.
3) Select Option "002 Temp.cal" and enter your activation code.

Selecting Temperature Calibration

1) In measuring mode, press the **Menu** softkey.
2) Select "Calibration" and confirm by pressing **enter**.
3) Select the "Temperature" calibration mode and confirm by pressing **enter**.

For Memosens sensors, you can perform a 1-point calibration of the internal temperature detector. To do so, enter the reference temperature and confirm the temperature adjustment by pressing the **Apply** softkey:



Option 003 Multi-Channel

This option enables simultaneous operation of two Memosens sensors or, depending on the model, one Memosens sensor and one analog pH/ORP or conductivity sensor. The sensors can be separately configured and calibrated.
The data logger records the measured values from both sensors at the same time.

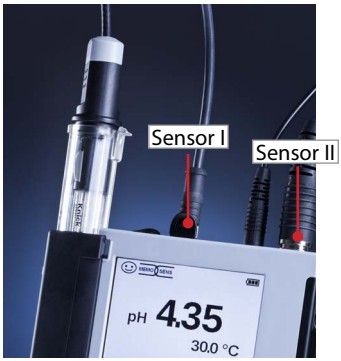
Enable Option

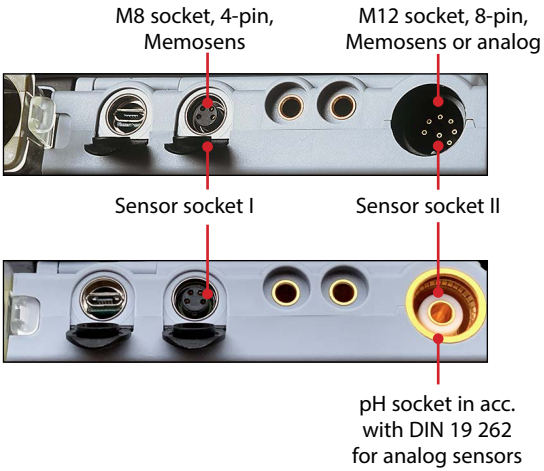
1) From within measuring mode, press the **Menu** softkey.
2) Select "Configuration" and press **enter** to confirm.
3) Select the option "003 Multi-Channel" and enter the activation code.

The option is now enabled. To disable it, see p. 58.
An activation code is not required to re-enable the option.

Sensor Connection

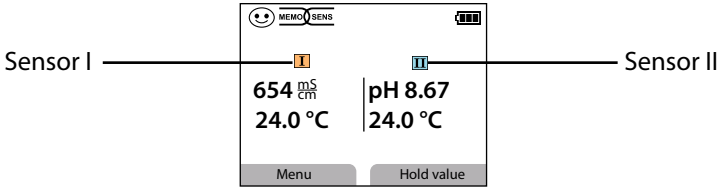
Connect the Memosens sensors or, depending on the model, one Memosens sensor and one analog pH/ORP or conductivity sensor.
See the chapter "Connecting a Sensor", p. 13.



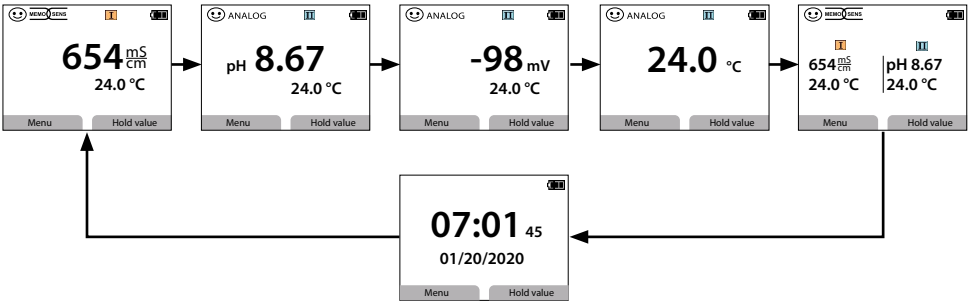


The Memosens sensors are connected to sensor sockets I and II, or one Memosens sensor is connected to sensor socket I and the analog sensor is connected to sensor socket II.

The measuring device identifies the sensors.
The measured values from the connected sensors are displayed.



Press the **meas** key repeatedly to display all recorded values from both sensors in succession (see example below).



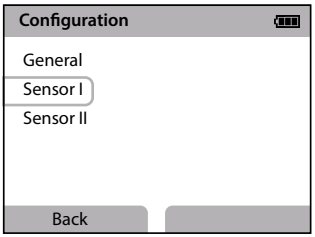
Note: If option 001 SOP is enabled and users have been set up, a valid user PIN must be entered during configuration and calibration. See the chapter "Creating a User", p. 51.

pH | ORP | Oxy | Cond

Configuration

For selection of the configuration function, see p. 19.

Go to "General" to configure your device settings.
Then select a sensor.



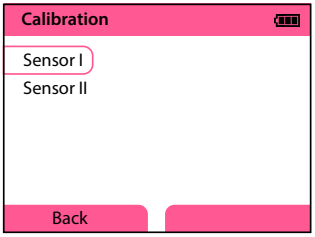
After selecting sensors, carry out the configuration applicable to the sensor's process variable.
For configuration, see p. 19ff

Repeat these steps for the second sensor.
You can select your sensors in any order.

Calibration

For selection of the calibration function, see p. 28.

A sensor must be selected after selecting the calibration function.



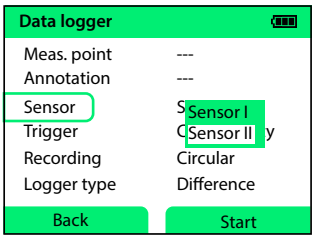
After selecting sensors, carry out the calibration applicable to the sensor's process variable.
For calibration, see p. 28ff

Repeat these steps for the other sensor.
You can select your sensors in any order.

Data Logger

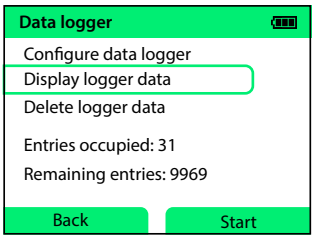
For selection of the data logger function and configuration, see p. 40ff

After selecting "Configure Data Logger", a sensor must be selected. The data logger functions for this sensor are defined in multi-channel mode. These settings define the data logger's recording functions for both sensors.



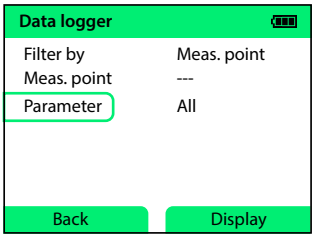
Example: Sensor II is selected. The data logger's settings are made on the basis of sensor II. Different parameters are available depending on the sensor type.

The choice of trigger defines the recording's process variable. The "Difference" and "Limit" logger types use this process variable to control the recording.

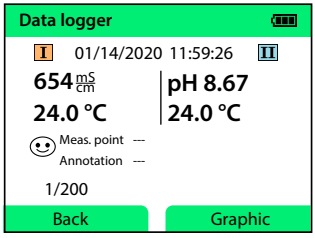


Press "Back" to return to the data logger menu and display the logger data.

Select "Display logger data".



Select the process variable for display.

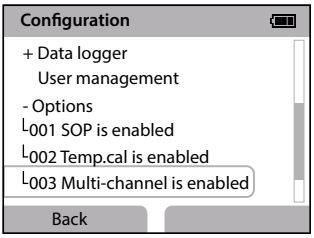


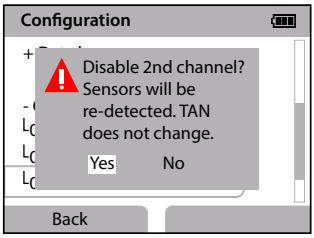
The measured values are displayed. Use the arrow keys ◀ ▶ to show the data logger's entries in succession.

To display a curve (graph), a process variable **must** be selected in "Parameter". See the information on p. 42.

Disable Option 003

1) From within measuring mode, press the **Menu** softkey.
2) Select "Configuration" and press **enter** to confirm.
3) Select the option "003 Multi-Channel" and press **enter**.
4) Confirm the prompt "Disable 2nd Channel?" with "**Yes**".





pH | ORP

pH Sensors

Analog pH Sensors	**Order No.**
pH/Pt1000 sensor (plastic body, length 120 mm)	SE 101 N
pH/Pt1000 sensor (plastic body, length 110 mm)	SE 102 N
pH puncture sensor (plastic body, length 65/25 mm)	SE 104 N

Digital pH Sensors	**Order No.**
pH/temp sensor (plastic body, length 120 mm)	SE 101 NMS
pH/temp sensor (glass body, length 110 mm)	SE 102 NMS

You can also connect other Memosens sensors for pH or ORP as well as the SE 5xx Series Memosens pH/ORP combo sensors.

Temperature Detectors	**Ref. No.**
Pt1000 temperature detector	ZU 6959
Pt1000 temperature detector with tilted tip	ZU 0156

Memosens sensors have a **cable coupling**, which allows convenient replacement of sensors while the cable remains connected to the meter.

Knick CaliMat (pH) Buffer Solutions

Ready-to-use quality pH buffer solutions

pH Value (20 °C)	Quantity	Order No.
2.00 ± 0.02	250 ml	CS-P0200/250
4.00 ± 0.02	250 ml	CS-P0400/250
	1000 ml	CS-P0400/1000
	3000 ml	CS-P0400/3000
7.00 ± 0.02	250 ml	CS-P0700/250
	1000 ml	CS-P0700/1000
	3000 ml	CS-P0700/3000
9.00 ± 0.02	250 ml	CS-P0900/250
	1000 ml	CS-P0900/1000
	3000 ml	CS-P0900/3000
12.00 ± 0.05	250 ml	CS-P1200/250
Buffer Sets		
Set 4.00	3 x 250 ml	CS-PSET4
Set 7.00	3 x 250 ml	CS-PSET7
Set 9.00	3 x 250 ml	CS-PSET9
Set 4.00, 7.00, 9.00	250 ml each	CS-PSET479

Accessories for pH, ORP

Item	Order No.
Robust field case (for meter, sensor, various small parts and user manual)	ZU 0934
Adapter for BNC pH sensors to DIN socket	ZU 1190
Replacement quiver (5 units)	ZU 0929
Flexible Memosens lab cable, M8 4-pin	CA/MS-001XFA-L
Flexible connecting cable for Memosens sensors, M12 8-pin	CA/MS-001XDA-L
Li-ion battery	ZU 0925

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Cond

Conductivity Sensors

Analog Conductivity Sensors	**Order No.**
2-electrode sensor, 120 mm, NTC 30k	SE 202
4-electrode sensor, 120 mm, NTC 30k	SE 204
4-electrode sensor with glass body (connection via ZU 0290 adapter)	ZU 6985

Digital Conductivity Sensors	
2-electrode sensor with graphite electrode and polysulfone body, 120 mm, NTC 30k	SE 615/1-MS

You can also connect other Memosens sensors of the SE 6xx Series.

Temperature Detectors	
Pt1000 temperature detector	ZU 6959
Pt1000 temperature detector with tilted tip	ZU 0156

Memosens sensors have a **cable coupling**, which allows convenient replacement of sensors while the cable remains connected to the meter.

Conductivity Standards

for determining a cell constant

Ready-to-Use Solutions	Quantity	Order No.
15 µS/cm, (0.0001 mol/l KCl)	300 ml	ZU 0350
147 µS/cm, (0.001 mol/l KCl)	500 ml	ZU 0702
1413 µS/cm, (0.01 mol/l KCl)	250 ml	ZU 0349
12.88 mS/cm, (0.1 mol/l KCl)	250 ml	ZU 0348
Solutions for Preparation		
For preparation of 1000 ml 0.1 mol/l NaCl solution (12.88 mS/cm)	1 ampoule	ZU 6945

Accessories for Conductivity

Item	Order No.
Robust field case (for meter, sensor, various small parts and user manual)	ZU 0934
Replacement quiver (5 units)	ZU 0929
Flexible Memosens lab cable, M8 4-pin	CA/MS-001XFA-L
Flexible connecting cable for Memosens sensors, M12 8-pin	CA/MS-001XDA-L
Flexible connecting cable for SE 680 sensor, M12 4-pin, M8 4-pin	CA/M12-001M8-L
Li-ion battery	ZU 0925
KPG® tube for ZU 6985 4-electrode sensor, incl. O-ring	ZU 0180
Replacement flow cell for SE 202 2-electrode sensor	ZU 0284
Adapter for connecting a conductivity sensor with 2 banana plugs to the Portavo 907 MULTI COND	ZU 0289
Adapter for connecting the ZU 6985 4-electrode sensor to the Portavo 907 MULTI COND	ZU 0290

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Oxy

Oxygen Sensors

Digital Oxygen Sensors	Order No.
Optical oxygen sensor	SE 340
Amperometric oxygen sensor (Memosens)	SE 715/1-MS

You can also connect other amperometric oxygen sensors (Memosens) of the SE 7xx Series.

Temperature Detectors	
Pt1000 temperature detector	ZU 6959
Pt1000 temperature detector with tilted tip	ZU 0156

Accessories for Oxygen

Item	Order No.
Robust field case (for meter, sensor, various small parts and user manual)	ZU 0934
Replacement quiver (5 units)	ZU 0929
Flexible Memosens lab cable, M8 4-pin	CA/MS-001XFA-L
Flexible connecting cable for Memosens sensors, M12 8-pin	CA/MS-001XDA-L
Li-ion battery	ZU 0925
O_2 membrane kit (4x membrane module, O-ring set, 25 ml electrolyte)	ZU 0564
O_2 electrolyte	ZU 0565

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pH | ORP | Oxy | Cond

Connections	2x socket, 4 mm dia., for separate temp. detector 1 x M8 socket, 4 pins, for Memosens lab cable 1x micro USB-B for data transmission to PC 1 x socket depending on device version: Portavo 907 MULTI PH: pH socket acc. to DIN 19 262 Portavo 907 MULTI COND: Multi-contact for 2-/4-el. sensors Portavo 907 MULTI OXY: M12, 8 pins, for Memosens sensors or SE 340 sensor (optical oxygen)	
Air pressure measurement	700 … 1100 hPa	
User interface	Straightforward menu navigation with graphic icons and detailed operating instructions in plain text	
Languages	German, English, French, Spanish, Italian, Portuguese, Russian	
Sensoface	Status indication (friendly, neutral, sad)	
Status indicators	For battery power level, logger	
Graphic display	QVGA TFT display with white backlighting	
Keypad	[on/off], [meas], [enter], [◀], [▶], [▲], [▼], 2 context-sensitive softkeys	
Data logger	10 000 memory locations	
Recording	Manual, interval- or event-controlled, with management of tag numbers and notes	
Cal data logger MemoLog (Memosens only)	Up to 100 Memosens calibration records can be saved	
	Recording	Directly retrievable via MemoSuite or Paraly SW 112 (USB)
	Viewable on the display	Manufacturer, sensor type, serial no., zero, slope, calibration date
Temperature input	2 x 4 mm dia. for integrated or separate temperature detector	
Measuring ranges	NTC30 temperature detector	–20 … 120 °C / –4 … 248 °F
	Pt1000 temperature detector	–40 … 250 °C / –40 … 482 °F
Measuring cycle	Approx. 1 s	
Measurement error[1,2,3)]	< 0.2 K (Tamb = 23 °C / 73.4 °F); TC < 25 ppm/K	

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

pH ORP Oxy Cond

Communication	USB 2.0
Profile	HID, driverless installation
Usage	Data exchange and configuration via Paraly SW 112 software
Diagnostics functions	
Sensor data (Memosens only)	Manufacturer, sensor type, serial number, wear, operating time, remaining lifetime, max. temperature, adaptive calibration timer, calibration and adjustment data, SIP, CIP and autoclaving counter
Calibration data	Calibration date; pH/Oxy: zero, slope; Cond: cell constant
Device self-test	Automatic memory test (FLASH, EEPROM, RAM)
Device data	Device type, software version, hardware version
Data retention	Parameters, calibration data > 10 years
EMC	EN 61326-1 (General Requirements)
Emitted interference	Class B (residential environment)
Immunity to interference	Industrial environment
	EN 61326-2-3 (Particular Requirements for Transmitters)
RoHS conformity	According to directive 2011/65/EU
Power supply	4 x AA alkaline batteries or 1x Li-ion battery, USB chargeable
Nominal operating conditions	
Ambient temperature	-10 … 55 °C / 14 … 131 °F
Transport/ Storage temperature	-25 … 70 °C / -13 … 158 °F
Relative humidity	0 … 95 %, short-term condensing allowed
Housing	
Material	PA12 GF30 (silver gray RAL 7001) + TPE (black)
Protection	IP66/67 with pressure compensation
Dimensions	Approx. 132 x 156 x 30 mm / 5.2 x 6.14 x 1.18 inches
Weight	Approx. 500 g / 1.10 lbs

pH | ORP

Analog pH/mV input	pH socket, DIN 19 262 (13/4 mm)		
pH range	-2 … 16		
Decimal places *)	2 or 3		
	Input resistance	1 x 10^{12} Ω	(0 … 35 °C)
	Input current	1 x 10^{-12} A	(at RT, doubles every 10 K)
Measuring cycle	Approx. 1 s		
Measurement error[1,2,3)]	< 0.01 pH, TC < 0.001 pH/K		
mV range	-1300 … 1300 mV		
Measuring cycle	Approx. 1 s		
Measurement error[1,2,3)]	< 0.1 % meas. val. + 0.3 mV, TC < 0.03 mV/K		
Memosens pH input (also ISFET)	M8 socket, 4 pins, for Memosens lab cable or M12 socket for Memosens sensors (Portavo 907 MULTI OXY only)		
Display ranges [4)]	pH	-2.00 … 16.00	
	mV	-1999 … 1999 mV	
	Temperature	-50 … 250 °C / -58 … 482 °F	
Sensor standardization *	pH calibration		
Operating modes *	Calimatic	Calibration with automatic buffer recognition	
	Manual	Manual calibration with entry of individual buffer values	
	Data entry	Data entry of zero and slope	
Calimatic buffer sets *	-01- Mettler-Toledo	2.00/4.01/7.00/9.21	
	-02- Knick CaliMat	2.00/4.00/7.00/9.00/12.00	
	-03- Ciba (94)	2.06/4.00/7.00/10.00	
	-04- NIST technical	1.68/4.00/7.00/10.01/12.46	
	-05- NIST standard	1.679/4.006/6.865/9.180	
	-06- HACH	4.01/7.00/10.01/12.00	
	-07- WTW techn. buffers	2.00/4.01/7.00/10.00	
	-08- Hamilton	2.00/4.01/7.00/10.01/12.00	
	-09- Reagecon	2.00/4.00/7.00/9.00/12.00	
	-10- DIN 19267	1.09/4.65/6.79/9.23/12.75	
	-11- Metrohm	4.00/7.00/9.00	
	-U1- (User)	loadable via Paraly SW 112	
Permissible calibration range	Zero point	6 ... 8 pH	
	With ISFET: Operating point (asymmetry)	-750 … 750 mV	
	Slope	Approx. 74 … 104 %	
	(possibly restricting notes from Sensoface)		
Calibration timer *	Interval 1 … 99 days, can be switched off		
Sensoface	Provides information on the sensor condition		
Evaluation of	zero/slope, response, calibration interval		

* user-defined
1) according to EN 60746-1, at nominal operating conditions
2) ± 1 count
3) plus sensor error
4) ranges depending on Memosens sensor

ORP

Memosens input ORP	M8 socket, 4 pins, for Memosens lab cable or M12 socket for Memosens sensors (Portavo 907 MULTI OXY only)	
Display ranges [4]	mV	-1999 … 1999 mV
	Temperature	-50 … 250 °C / -58 … 482 °F
Sensor standardization *	ORP calibration (zero adjustment)	
Permissible calibration range	ΔmV (offset)	-700 … 700 mV

* user-defined
4) Ranges depending on Memosens sensor

Conductivity input, analog	Multi-contact for 2-/4-electrode sensors with integrated temp detector	
Measuring ranges	SE 202 sensor	0.01 … 200 µS/cm
	SE 204 sensor	0.05 ... 500 mS/cm
	2-electrode sensors	0.1 µS * c … 200 mS * c [4]
	4-electrode sensors	0.1 µS * c … 1000 mS * c [4]
Permissible cell constant	0.005 … 200.0 cm^{-1} (adjustable)	
Measurement error[1,2,3]	< 0.5 % meas.val. + 0.4 µS * c [4]	
Conductivity input, Memosens	M8 socket, 4 pins, for Memosens lab cable or M12 socket for Memosens sensors (Portavo 907 MULTI OXY only)	
Measuring range	SE 615/1-MS sensor	10 µS/cm … 20 mS/cm
Conductivity inputs		
Measuring cycle	Approx. 1 s	
Temperature compensation	Linear 0 … 20 %/K, reference temperature adjustable nLF: 0 ... 120 °C / 32 ... 248 °F NaCl (ultrapure water with traces) HCl (ultrapure water with traces) NH_3 (ultrapure water with traces) NaOH (ultrapure water with traces)	
Display resolution (autoranging)	Conductivity	0.001 µS/cm (c < 0.05 cm^{-1}) 0.01 µS/cm (c = 0.05 … 0.2 cm^{-1}) 0.1 µS/cm (c > 0.2 cm^{-1})
	Resistivity	00.00 … 99.99 MΩ cm
	Salinity	0.0 … 45.0 g/kg (0 … 30 °C / 32 … 86 °F)
	TDS	0 … 1999 mg/l (10 … 40 °C / 50 … 104 °F)
	Concentration	0.00 ... 100 % by wt
Concentration determination	NaCl	0 – 26 wt% (0 °C / 32 °F) ... 0 – 28 wt% (100 °C / 212 °F)
	HCl	0 – 18 wt% (–20 °C / –4 °F) ... 0 – 18 wt% (50 °C / 122 °F)
	NaOH	0 – 13 wt% (0 °C / 32 °F) ... 0 – 24 wt% (100 °C / 212 °F)
	H_2SO_4	0 – 26 wt% (–17 °C /–1.4 °F) ... 0 – 37 wt% (110 °C / 230 °F)
	HNO_3	0 – 30 wt% (–20 °C / –4 °F) ... 0 – 30 wt% (50 °C / 122 °F)
	H_2SO_4	94 – 99 wt% (–17 °C /–1.4 °F) ... 89 – 99 wt% (115 °C / 239 °F)
	HCl	22 – 39 wt% (–20 °C / –4 °F) ... 22 – 39 wt% (50 °C / 122 °F)
	HNO_3	35 – 96 wt% (–20 °C / –4 °F) ... 35 – 96 wt% (50 °C / 122 °F)
	H_2SO_4	28 – 88 wt% (–17 °C /–1.4 °F) ... 39 – 88 wt% (115 °C / 239 °F)
	NaOH	15 – 50 wt% (0 °C / 32 °F) ... 35 – 50 wt% (100 °C / 212 °F)
Sensor standardization	Cell constant	Input of cell constant with simultaneous display of conductivity value and temperature
	Input of solution	Input of conductivity of the calibration solution with simultaneous display of cell constant and temperature
	Auto	Automatic determination of the cell constant with KCl solution or NaCl solution

1) acc. to EN 60746-1, at nominal operating conditions
2) ± 1 count
3) plus sensor error
4) c = cell constant

Oxy

Memosens input, amperometric oxygen	M8 socket, 4 pins, for Memosens lab cable or M12 socket for Memosens sensors (Portavo 907 MULTI OXY only)	
Display ranges [4]	Saturation	0.000 … 200.0 %
	Concentration	000 µg/l … 20.00 mg/l
	Partial pressure	0.0 … 1000 mbar
Temperature meas. range [4]	–20 … 150 °C / –4 … 302 °F	
Sensor standardization	Automatic calibration in air (100 % RH) Zero calibration	
Storage	in quiver with moistening sponge	

Input optical oxygen	M12 socket for SE 340 sensor or Memosens sensors	
OXY meas. ranges at 20 °C / 68 °F	Saturation	0.000 … 200.0 %
	Concentration	000 µg/l … 20.00 mg/l
	Partial pressure	0.0 … 1000 mbar
Response time	t90 < 30 s t99 < 60 s	
Measurement error[1,2,3]	Zero signal < 0.1 % full saturation	
Temperature meas. range [4]	0 … 50 °C / 32 … 122 °F	
Measurement error[1,2,3]	Temperature ± 0.2 K	
Sensor standardization	Automatic calibration in air Zero calibration	
Max. overpressure	2.5 bar	
Immersion depth	Min. 60 mm Max. 25 m	
Storage	in quiver with moistening sponge	

1) according to EN 60746-1, at nominal operating conditions
2) ± 1 count
3) plus sensor error
4) ranges depending on Memosens sensor

D

P

T

U

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