Knick

User Manual

Portavo® 907 MULTI

Portable Meter

Read before installation.
Keep for future use.

www.knick.de

Returns

Clean and securely package the product before returning it to Knick Elektronische Messgeräte GmbH & Co. KG.

If there has been contact with hazardous substances, the product must be decontaminated or disinfected prior to shipment. The consignment must always be accompanied by a corresponding return form to prevent service employees being exposed to potential hazards.

Further information can be found at www.knick.de.

Disposal

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

Table of Contents

Package Contents **5**

Overview of the Portavo 907 ..... **6**
Intended Use 6
Value-Added Features 7
Protective Cover 8
Hook 8
Display and Keypad 9
Inserting the Batteries 10

Commissioning **10**
Connecting a Sensor 11
Switching On the Meter 12
Icons 13

Information **14**
Calibration Record 14
Sensor Information (Digital Sensors Only) 14
Sensor Diagram (pH and Oxy Only) 15
Sensor Monitor 16
Messages 16
MemoLog (Memosens Only) 16
Device Info 17
Device Test 17

pH Configuration **18**

ORP Configuration **20**

Conductivity Configuration **22**

Oxygen Configuration **24**

pH Calibration **26**
Calimatic Calibration 26
Manual Calibration 27
Data Entry Calibration 27
pH/ORP Combo Sensor Calibration 27

ORP Calibration **28**

ISFET Calibration **29**

Conductivity Calibration **30**
Auto Calibration 30
"Entry of Solution" Calibration 31
Cell Constant / Cell Factor Calibration 31
Installation Factor Calibration 31
Zero Calibration 31

Oxygen Calibration **32**
Calibration in Air 32
Zero Calibration 33
Data Entry Calibration 33

Measurement **34**
Toggling the Measurement Display 34
Manually Adjusting the Temperature 34

Data Logger **35**
Operating Modes of the Data Logger (Logger Type) 36
Configuring the Data Logger 38
Increasing the Battery Life 38
Starting/Stopping the Data Logger 40
Viewing the Logger Data 40
Delete Logger Data 40

Paraly SW112 PC Software **42**

Error and Status Messages **43**
"Sensoface" Messages 43
Sensoface Criteria 44
Info and Help Texts 46
Error Messages 46

Options **48**
Option 001 SOP (Standard Operating Procedure) 48
Entering the Rescue PIN Code 53
Option 002 Temp.cal 56
Option 003 Multichannel 57

Product Line **62**
Accessories/Options 62
pH, ORP Accessories 64
Accessories for Conductivity 65
Accessories for Oxygen 66

Specifications **67**

Buffer Tables **73**

Index **84**

Package Contents

Check the shipment to ensure it is complete and undamaged.
The package of the Portavo 907 MULTI includes:

- Device, incl. premounted quiver
- 4 batteries (AA)
- Carrying strap
- USB cable, 1.5 m
- Safety Guide
- Quickstart Guide in various languages
- Test report 2.2 according to EN 10204

User Manuals, the Paraly SW112 PC software, and other product information can be downloaded from www.knick.de.

Intended Use

The Portavo 907 MULTI is a portable multiparameter meter for use with Memosens sensors or the SE340 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 SE340 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 (4x 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 SW112 PC 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 remains 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 further indication of 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 with SE340 (907 MULTI OXY only)

Digital optical oxygen measurement reduces maintenance and simplifies handling.

MemoView ZU1059

With the MemoView accessory, contactless querying of measuring points is possible when using Memosens without on-site display, e.g., MemoRail, or the Stratos Multi and Protos II 4400 transmitters. The measured values and sensor data are displayed on the Portavo.

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

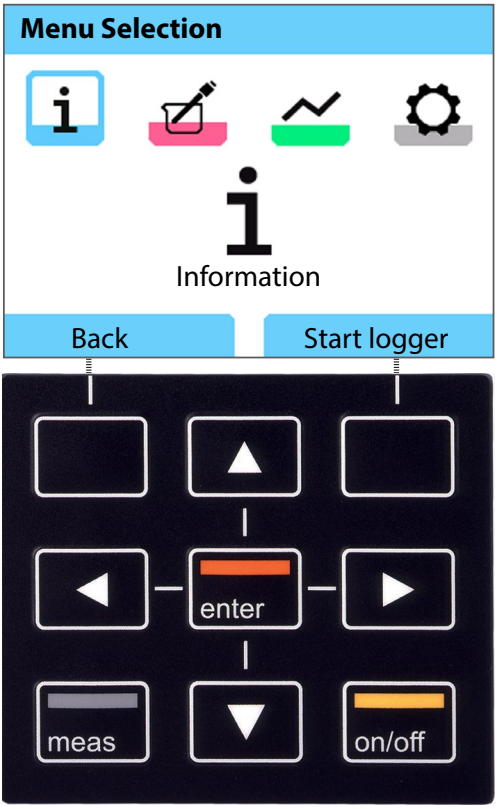
A fold-out hook on the back allows the meter to be suspended. This leaves your hands free for the actual measurement. The nameplate is located beneath the hook.

Protective Cover and Hook Combined

The two parts can be combined to form a benchtop stand, enabling convenient and fatigue-free work with the device at a laboratory table 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	Select / adjust entries
enter	Confirm an adjustment
on/off	Switch on / off
meas	Switch on / Go directly to measuring mode / Toggle the display / Display time and date

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

⚠ CAUTION!

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

- the device shows visible damage
- failure to perform the intended function
- prolonged storage at temperatures above 70 °C / 158 °F
- after 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 38). 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 fasten it finger tight.

A special lithium-ion battery (ZU0925) 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.

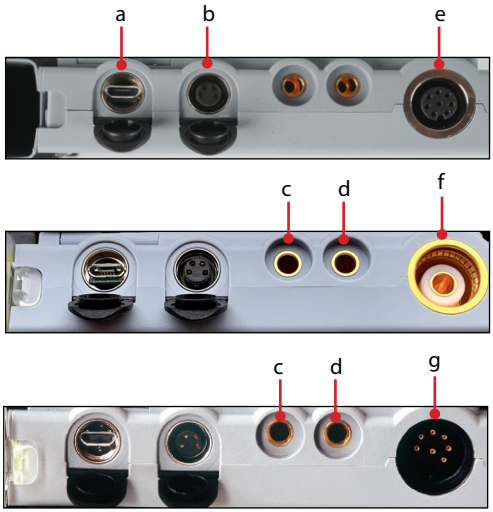
Connecting a Sensor

The Portavo 907 MULTI features 1 or 2 digital inputs for Memosens sensors or digital sensors such as the SE340 optical oxygen sensor. Depending on the version, the device also has a conventional interface for connecting analog pH/ORP or conductivity sensors. The meter automatically recognizes the connected sensor and accordingly selects the corresponding process variable. Memosens is signaled in the display.
In the basic configuration, note that only **one** sensor may be connected to the meter at a time.
Option 003 Multichannel enables simultaneous use of two sensors; see p. 57.

Separate Temperature Probe

For devices with analog sensor input only (see connections f and g): A separately connected temperature probe is automatically detected when the device is switched on. If 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 probes
Depending on the device variant:
e - Portavo 907 MULTI OXY and Multichannel MS: M12, 8 pins, for Memosens sensors or SE 340 sensor (optical oxygen)
f - Portavo 907 MULTI PH: pH socket according to DIN 19 262 for analog sensors
g - Portavo 907 MULTI COND: DIN socket, 8 pins, for analog sensors

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

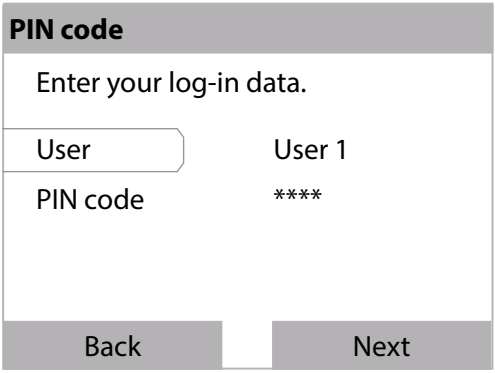
The meter can be switched on by pressing the **meas** or **on/off** key.
If you press **meas**, the meter immediately switches to measuring mode.

Analog sensors:
After pressing the **on/off** key, the meter displays selected adjustment data before it switches to measuring mode.
Memosens sensors:
After pressing the **on/off** key, the meter displays selected sensor information, incl. adjustment data, before it switches to measuring mode.

Alternating Use of Memosens and Analog Sensors
The meter initially starts in analog measuring mode.
If a Memosens sensor is connected and detected during operation, the meter switches to Memosens.
If the Memosens sensor is now removed, the meter remains in Memosens mode. If you want to resume measurements with an analog sensor, the meter needs to be restarted by pressing the **on/off** key. The Memosens cable may remain connected.

Login (Option 001 SOP)

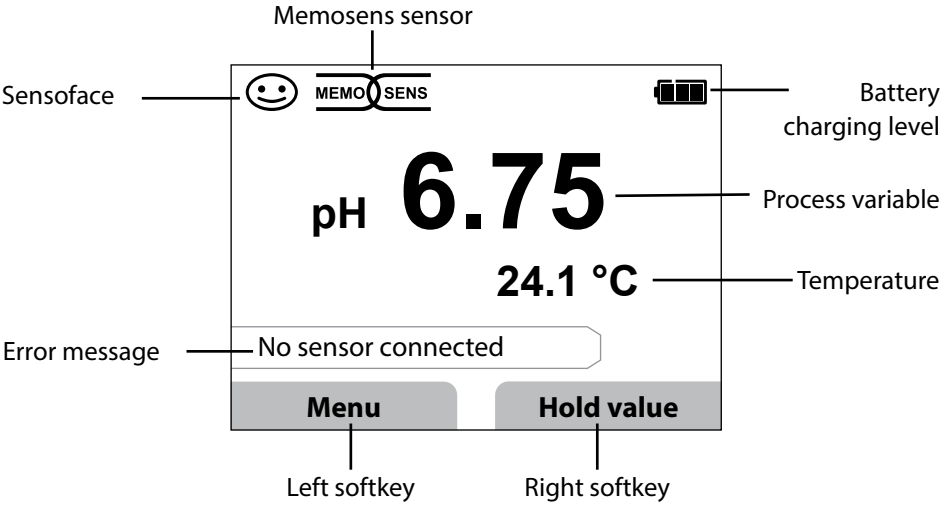
When using Option 001 SOP and with user management enabled, you will be prompted to enter your log-in data when the device starts; see p. 51:



Press **enter** to confirm your PIN code. Press the **Continue** softkey.

Icons

Important information about the state of the device:



pH ORP Oxy Cond

1) From within 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 for the different sensors:

	pH/ pH/ORP**	Cond	Oxy	ISFET	ORP	Optical Oxy
Manufacturer	x	x	x	x	x	x
Order 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)

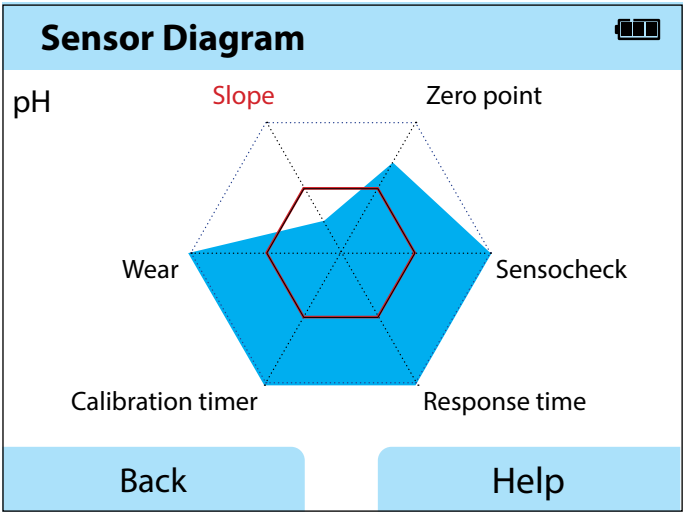
Provides single-glance information on the following parameters of the connected sensor:

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

Parameters that 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: Radar chart for a digital pH sensor (Memosens)



pH ORP Oxy Cond

Sensor Monitor

Shows the raw values available from the connected sensor:

pH analog	mV, temperature, temperature probe, temperature resistor
pH digital glass	mV, temperature, glass impedance
pH digital ISFET	mV, leakage current, temperature
pH ORP	mV, temperature
Cond analog	Resistance, conductance, temperature, temperature probe, temperature resistor
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; see p. 43.

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 SW112 software.
MemoLog is not suitable for SE340 (optical oxygen sensor).

Device Info

Shows the following device information:

- Name of station
- Serial number
- Language pack
- 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

pH Configuration

1) From within measuring mode, press the **Menu** softkey.
2) Select "Configuration" and press **enter** to confirm.
3) Adjust the settings as required.

The following table gives you an overview. Factory settings are shown in **bold print**. Further menu items appear when options are enabled. See "Options", p. 48.

Menu selection "pH configuration" – part 1

Language		**Deutsch** | English | Español | Italiano | Français | Português | 中文
Auto-off		**Off** | 5 min | 10 min | 30 min | 60 min
Temperature		**°C** | °F
Right softkey		Start/Stop logger | **Hold value**
+ pH sensor[1]		
	Display format	**0.00 pH** | 0.000 pH
	Wear	**On** | Off
	Count autoclaving cycle[2]	Yes | **No**
	Devaluate sensor[2]	Yes | **No**
+ Calibration[1]		
	Calibration timer	**Off** | On
	Monitoring	**Off** | On[3]
	Interval	00 … 99 days
	Calibration mode	**Calimatic** | Manual | Data entry | ORP[2] | ISFET zero[4]
	Cal points	**Auto** | 1-point | 2-point | 3-point

1) "+" indicates that sub-items can be brought up by pressing the **enter** key.
2) with pH/ORP combo sensor
3) If the calibration timer has expired, measured values are no longer displayed.
4) With ISFET sensor

Menu selection "pH configuration" – part 2

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[2]	
MemoLog	**Off** | On	
TAG	**Off** | On	
+ Time/Date[1]		
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	as per date format	
+ Display[1]		
Appearance	**Modern** | Retro	
Lighting	**Permanent** | 60 min | 30 min | 10 min | 5 min | 1 min | 30 sec	
Brightness	**Bright** | Standard | Dim	
+ Data logger[1] (for menu, see page 39)		
+ Options[1]	001 SOP 002 Temp.cal 003 Multichannel	Enter TAN to enable option (see page 48)
Factory setting	Yes | **No** **Note:** Resetting the device to its factory settings will delete all logger data.	

1) "+" indicates that sub-items can be brought up by pressing the **enter** key.
2) Parameter can be configured using the Paraly SW 112 software.

ORP

ORP Configuration

1) From within measuring mode, press the **Menu** softkey.
2) Select "Configuration" and press **enter** to confirm.
3) Adjust the settings as required.

The following table gives you an overview. Factory settings are shown in **bold print**. Further menu items appear when options are enabled. See "Options," p. 48.

Menu selection "ORP configuration" – part 1

Language	**Deutsch** | English | Español | Italiano | Français | Português | 中文
Auto-off	**Off** | 5 min | 10 min | 30 min | 60 min
Temperature	**°C** | °F
Right softkey	Start/Stop logger | **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	as per date format
+ Display*)	
Appearance	**Modern** | Retro
Lighting	**Permanent** | 60 min | 30 min | 10 min | 5 min | 1 min | 30 sec
Brightness	**Bright** | Standard | Dim

1) "+" indicates that sub-items can be brought up by pressing the **enter** key.

Menu selection "ORP configuration" – part 2

	+ Data logger[1)] (for menu, see page 39)			
	+ Options	enter	001 SOP 002 Temp.cal 003 Multichannel	Enter TAN to enable option (see page 48)
	Factory setting	enter	Yes | **No** **Note:** Resetting the device to its factory settings will delete all logger data.	

1) "+" indicates that sub-items can be brought up by pressing the **enter** key.

Cond

Conductivity Configuration

1) From within measuring mode, press the **Menu** softkey.
2) Select "Configuration" and press **enter** to confirm.
3) Adjust the settings as required.

The following table gives you an overview. Factory settings are shown in **bold print**. Further menu items appear when options are enabled. See "Options," p. 48.

Menu selection "Conductivity configuration" – part 1

Language		**Deutsch** | English | Español | Italiano | Français | Português | 中文
Auto-off		**Off** | 5 min | 10 min | 30 min | 60 min
Temperature		**°C** | °F
Right softkey		Start/Stop logger | **Hold value**
Conductivity		**S/cm** | S/m
+ Cond sensor[1)]		
	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

1) "+" indicates that sub-items can be brought up by pressing the **enter** key.

Menu selection "Conductivity configuration" – part 2

+ Calibration[1]		
	Calibration mode	**Contacting conductivity:** Auto | Entry of solution | **Cell constant**
		Inductive conductivity: Auto | Entry of solution | **Cell factor** | Installation factor | Zero point
	Calibration solution	Auto: **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[1]		
	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	as per date format
+ Display[1]		
	Appearance	**Modern** | Retro
	Lighting	**Permanent** | 60 min | 30 min | 10 min | 5 min | 1 min | 30 sec
	Brightness	**Bright** | Standard | Dim
+ Data logger[1] (for menu, see page 39)		
+ Options		001 SOP 002 Temp.cal 003 Multichannel Enter TAN to enable option (see page 48)
Factory setting		Yes | **No** **Note:** Resetting the device to its factory settings will delete all logger data.

enter

1) "+" indicates that sub-items can be brought up by pressing the **enter** key.

Oxy

Oxygen Configuration

1) From within measuring mode, press the **Menu** softkey.
2) Select "Configuration" and press **enter** to confirm.
3) Adjust the settings as required.

The following table gives you an overview. Factory settings are shown in **bold print**. Further menu items appear when options are enabled. See "Options," p. 48.

Menu selection "Oxygen configuration" – part 1

Language		**Deutsch** | English | Español | Italiano | Français | Português | 中文
Auto-off		**Off** | 5 min | 10 min | 30 min | 60 min
Temperature		**°C** | °F
Right softkey		Start/Stop logger | **Hold value**
+ Oxy sensor[1]		
	Medium	**Liquid** | Gas
	Relative humidity	Gas: 0.0 … **100.0 %**
	Display	**Saturation** | Concentration | Partial pressure
	Salinity	**0** … 45.0 g/kg
	Pressure corr.[2]	**Air pressure** | Manual
	Pressure	Manual: 0 … 9999 mbar | **1013 mbar**
	Wear	**On** | Off
+ Calibration[1]		
	Calibration mode	**In air** | Zero point | Data entry
	Calibration timer	**Off** | On
	Monitoring	**Off** | On[3]
	Interval	0 … 99 days
	MemoLog	**Off** | On
	TAG	**Off** | On

1) "+" indicates that sub-items can be brought up by pressing the **enter** key.
2) The device has an internal barometer.
3) If the calibration timer has expired, measured values are no longer displayed.

Menu selection "Oxygen configuration" – part 2

+ Time/Date[1)]		
	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	as per date format
+ Display[1)]		
	Appearance	**Modern** | Retro
	Lighting	**Permanent** | 60 min | 30 min | 10 min | 5 min | 1 min | 30 sec
	Brightness	**Bright** | Standard | Dim
+ Data logger[1)] (for menu, see page 39)		
+ Options		001 SOP 002 Temp.cal 003 Multichannel Enter TAN to enable option (see page 48)
Factory setting		Yes | **No** **Note:** Resetting the device to its factory settings will delete all logger data.

1) "+" indicates that sub-items can be brought up by pressing the **enter** key.

pH

pH Calibration

1) From within 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) Continue with the **Start** softkey.
5) The "TAG" menu allows the sensor TAG to be edited using the arrow keys and **enter**.
   To do so, set "TAG" to **On** in the Parameter Setting 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 SW112 PC 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.

Calibration 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 in Paraly SW 112 PC software

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

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

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 34).
3) On completion, 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) You can then **Apply** these values or **Cancel** the calibration.

Calibration Timer Monitoring

Activating calibration timer monitoring can help to improve the quality of the measurement (for configuration, see page 18). When the calibration timer has expired, no further measurements are possible. The measurement display is frozen and replaced by dashes, and not released until the sensor is calibrated again.

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

pH ORP

pH/ORP Combo Sensor Calibration

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, p. 26.

ORP Calibration
Follow the instructions given for ORP calibration, p. 28.

ORP Calibration

1) From within 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 using the arrow keys and **enter**. To do so, set "TAG" to **On** in the Parameter Setting 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 SW112 PC software.

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

ISFET Calibration

1) From within 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 using the arrow keys and **enter**. To do so, set "TAG" to **On** in the Parameter Setting 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 SW112 PC 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, p. 26
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) From within 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 using the arrow keys and **enter**. 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 SW112 PC software.

Auto Calibration

(Automatic calibration with specification of the calibration solution used)

Important notes:

- 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) On completion, 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) You can then **Apply** these values or **Cancel** the calibration.

Cell Constant / Cell Factor Calibration

(Calibration by entering the cell constant (cell factor) with display of 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**
SE202	0.100/cm ± 2 %
SE204	0.475/cm ± 1.5 %
ZU6985	1.19/cm ± 1 %
SE215 MS	1.00/cm ± 2 %
Toroidal Conductivity Sensor (Inductive)	**Cell Factor**
SE680 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) You can then **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) From within 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 replacement of the membrane body.
5) The "TAG" menu allows the sensor TAG to be edited using the arrow keys and **enter**. 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 SW112 PC 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) Set the correct value for "Relative humidity". Then press **Continue**. Calibration is performed.
4) On completion, 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 is performed.
3) You can then **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) You can then **Apply** these values or **Cancel** the calibration.

Calibration Timer Monitoring

Activating calibration timer monitoring can help to improve the quality of the measurement (for configuration, see page 24). When the calibration timer has expired, no further measurements are possible. The measurement display is frozen and replaced by dashes, and not released until the sensor is calibrated again.

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. Information on this can be found in the sensor's User Manual.
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 using the Paraly SW112 PC software.

Toggling the Measurement Display

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

Manually Adjusting the Temperature

When you connect an analog 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:

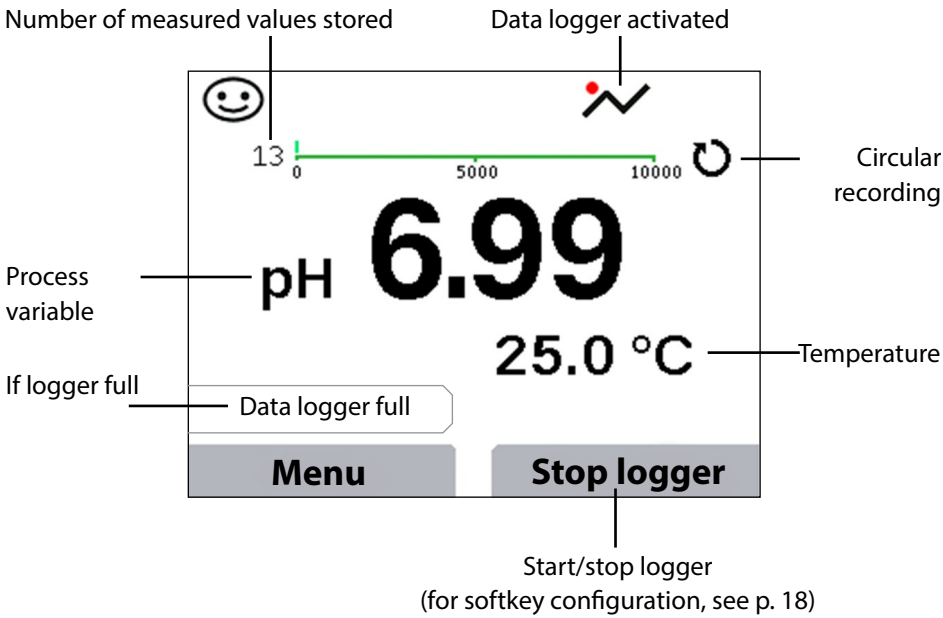
- Shot (manual logging by pressing the **Save value** softkey)
- Interval (time-controlled logging at a fixed interval)
- Difference (signal-controlled logging of measured variable and temperature)
- Intv+Diff (combined time- and signal-controlled logging)
- Limit value (combined time- and threshold-controlled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

The data logger records up to 10,000 entries, which can be assigned to different points of measurement (TAGs) and annotations. 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 that is recorded.

Option 001 SOP can be used to set up an access lock for the data logger, which in the absence of a PIN code allows only logger data to be displayed (see p. 48).

Display: Icons related to the data logger



pH ORP Oxy Cond

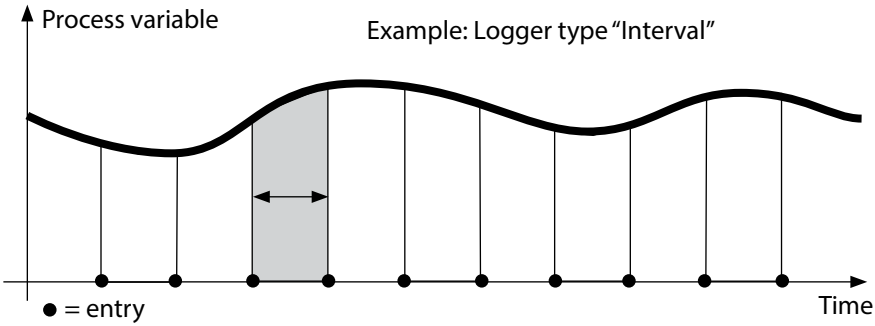
Operating Modes of the Data Logger (Logger Type)

Shot

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

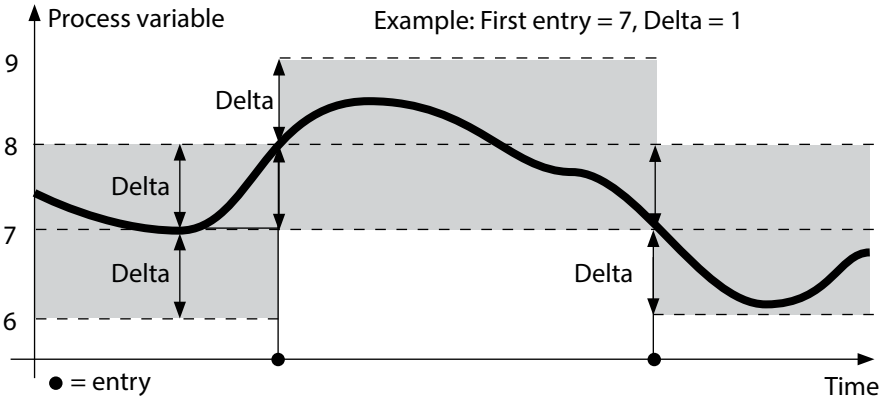
Interval (time-controlled)

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



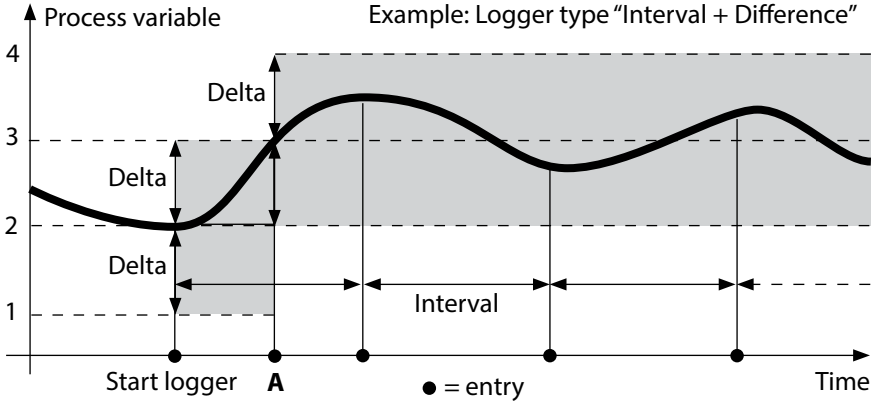
Difference

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.



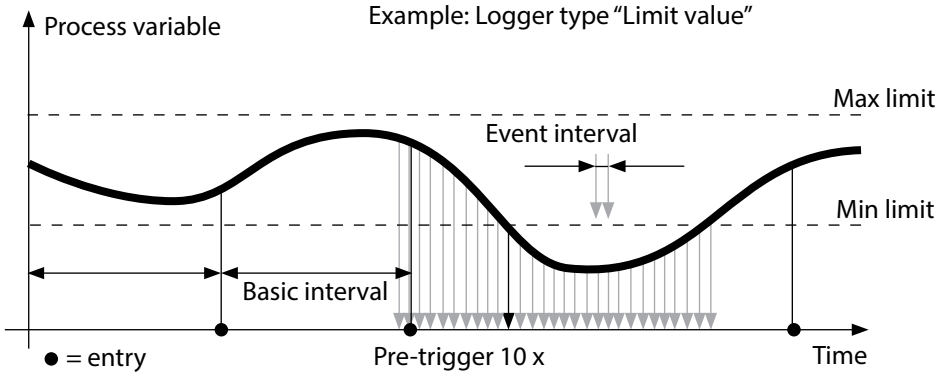
Interval and difference (combined)

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 is 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 by going to "Data logger" in the "Configuration" menu.

1. Press the **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.

pH ORP Oxy Cond

Configuring the data logger (default in bold print)			
Meas.point	**None**		
Note	**None**		
Record	**Non-circular**		
	Circular		
Logger type	Shot		
	Interval	Interval	00:00:01…12:59:59 | **00:02:00**
	Difference	1st difference*)	**On** Off
		Delta pH Delta mV	pH 0.0…16.0 | **pH 1.0** 0 … 2000 mV | **1 mV**
		Delta cond Delta conc Delta MΩcm Delta salinity Delta TDS	0 … 2000 mS/cm | **1,000 µS/cm** 0 … 9.99 % | **1.00 %** 0 … 9,999 MΩcm | **1,000 MΩcm** 0.0 … 45.0 g/kg | **1.0 g/kg** 0 … 5000 mg/l | **1 mg/l**
		Delta saturation Delta conc Delta % Delta mbar	0 … 200 %Air | **1 %Air** 0 … 20.0 mg/l | **1.0 mg/l** 0,001 … 9,999 % | **1,000 %** 0.0 … 999.99 mbar | **1.00 mbar**
		2nd difference	On **Off**
		Delta °C Delta °F	0…99.9 °C | **1.0 °C** 0…450.0 °F | **1.0 °F**
	Intv+Diff	Interval	see logger type: interval
		Difference	see logger type: difference
	Limit	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)

*) Process variables dependent on connected sensor and configuration, see page 18

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 18), you can start/stop the data logger as follows:

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

Viewing the Logger Data

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

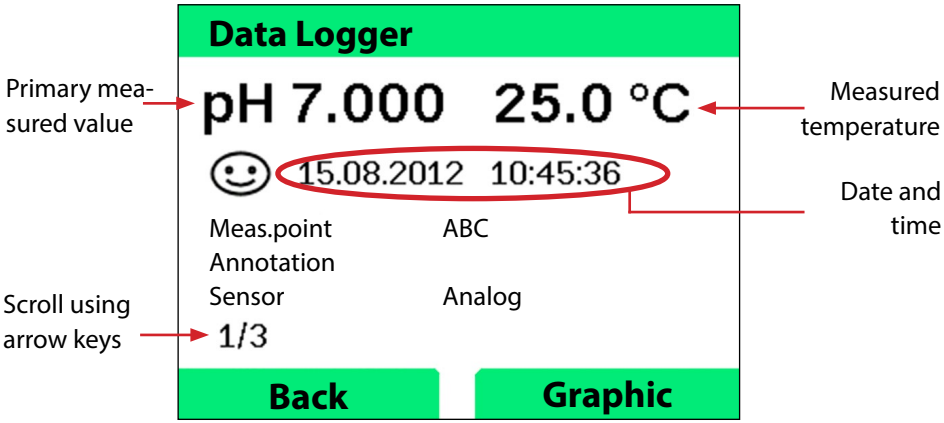
1. Press the **Menu** softkey.
2. Select "Data logger" using the arrows and confirm by pressing **enter**.
3. Select "View logger data" using the arrow keys and confirm by pressing **enter**.
4. Select filter ("Meas.point" or "Time + Meas.point" or "All values").
5. Select the parameter corresponding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

Delete Logger Data

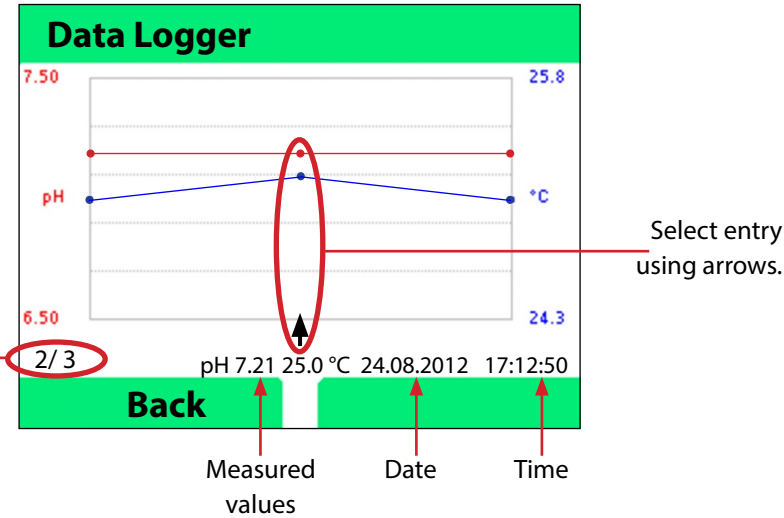
To delete the recorded entries, proceed as follows:

1. Press the **Menu** softkey.
2. Select "Data logger" using the arrows and confirm by pressing **enter**.
3. Select "Delete logger data" using the arrow keys 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 the **Delete** softkey. The data is deleted according to the configuration.
6. Press the **Back** softkey to return to menu selection.

Example 1: Viewing the logger data



Example 2: Curve characteristic



Paraly SW112 PC Software

pH | ORP | Oxy | Cond

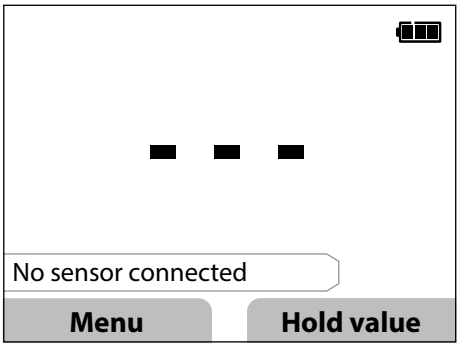
The Paraly SW112 PC software supplements the Portavo series. It allows convenient management of the data that has been acquired by the meters as well as simple and clear configuration of the meters. Paraly SW112 automatically connects to the Portavo as soon as the meter is connected to the computer's USB port.

The Paraly SW112 PC software stands out by the following features:

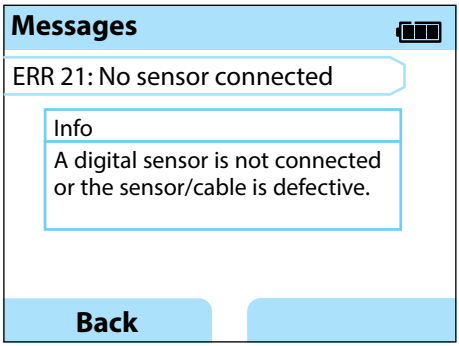
- Intuitive Windows user interface
- Easy configuration and management of several meters
- Display of device and sensor information
- Configuration of individual buffer sets
- Convenient management and evaluation of the data logger
- Export function for Microsoft Excel
- Print function
- Device firmware update

Note: The Paraly SW112 PC software, incl. a detailed User Manual, can be downloaded from www.knick.de.
To access the software's full range of functions, always make sure you are using the latest version.

Error and status messages appear as plain text on the display. More detailed help texts can be displayed by pressing **enter** and **Help**. Information on the sensor condition is indicated by the "Sensoface" icon (happy, neutral, sad), which may be 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" Messages

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

Sensoface	Meaning
☺	Sensor is OK
😐	Calibrate the sensor soon
☹	Calibrate or replace the sensor

Even with a sad Sensoface, the measuring device is still able to determine the process variable.
After a calibration, the corresponding Sensoface icon (happy, neutral, sad) is shown together with the calibration data.
Otherwise, Sensoface is only visible in measuring mode.

Cond

Sensoface Criteria

Conductivity (contacting)

Sensoface	Cell constant	
	Analog sensors	**Memosens**
☺	0.005 cm^{-1} … 19.9999 cm^{-1}	0.5x nom. cell constant … 2x nom. cell constant
☹	< 0.005 cm^{-1} or > 19.9999 cm^{-1}	< 0.5x nom. cell constant or > 2x nom. cell constant

Conductivity (inductive)

Sensoface	Cell factor		Zero point
	Analog sensors	**Memosens**	
☺	0.1 cm^{-1} … 19.9999 cm^{-1}	0.5x nom. cell factor … 2x nom. cell factor	-0.25 mS … 0.25 mS
☹	< 0.1 cm^{-1} or > 19.9999 cm^{-1}	< 0.5x nom. cell factor or > 2x nom. cell factor	< -0.25 mS or > 0.25 mS

Oxygen

Sensoface	Slope	
	Standard sensor (SE706...)	**Trace sensor (SE707...)**
☺	-110 nA ... -30 nA	-525 nA ... -225 nA
☹	< -110 nA or > -30 nA	< -525 nA or > -225 nA

Sensoface	Zero point	
	Standard sensor (SE706...)	**Trace sensor (SE707...)**
☺	-1 nA ... 1 nA	-1 nA ... 1 nA
☹	< -1 nA or > 1 nA	< -1 nA or > 1 nA

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

pH ORP Oxy Cond

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
Blinking	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.

Error	Message	Remedy
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 team.
ERR 19	Factory settings error	Data error, measurement with analog sensors no longer possible. Contact the Service team.
ERR 21	No sensor connected	Possible causes: Sensor defective/devaluated or no sensor connected: Connect an operational Memosens sensor. Two sensors connected in 1-channel mode: Select 2-channel mode.
ERR 25	Buffer difference	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 Redox Oxy Cond

Option 001 SOP (Standard Operating Procedure)

SOP Cal Calibration Method
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 units.
SOP calibration allows you to:

- select up to three calibration points and three buffer sets.
- add a verification buffer.
- specify a maximum deviation (0 ... 0.5 pH units) for the verification buffer as delta pH.

Configuration can also be carried out using the Paraly SW112 PC software.

User Management (Access Control)
Up to four users, each with their own access rights, can be created for configuration, calibration, and the data logger (see page 51).
An access lock for the data logger allows only logger data to be displayed in the absence of a PIN code.

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
(also separately available as Option 002 TEMP.CAL)
For Memosens sensors, you can perform a 1-point calibration of the internal temperature detector.

Option 002 Temp.cal is included in Option 001 SOP. See p. 56 for a description.

Enabling Option 001 SOP

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

Configuring SOP Cal

The "Configuration > Calibration" menu is extended as follows:

+ Calibration		
	Calibration 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)
	Check	**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)

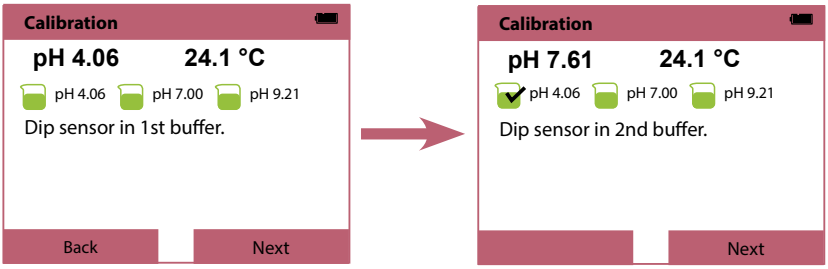
pH

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 SW112 software.

User Management (Access Control)

Up to four users, each with their own access rights, can be created for configuration, calibration, and the data logger.
Configuration can also be carried out using the Paraly SW112 PC software.

Enabling User Management

1) From within measuring mode, press the **Menu** softkey.
2) Select "Configuration" and press **enter** to confirm.
3) Select "User management" / "Management – Enable" (with Option 003 Multichannel enabled in "General").
4) Select
   User = ADMIN
   PIN code = 1989 (factory setting)
5) Press **enter**.
6) To create more users / assign more PIN codes: Press the **Continue** softkey, see next page.

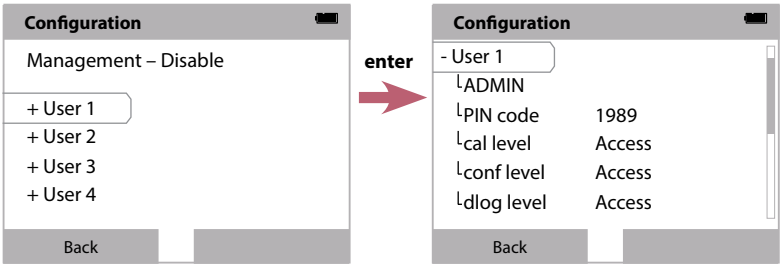
Note: User management settings made on the device also apply to the Paraly PC software. Access to the device via Paraly is then only possible following entry of the correct PIN code.

pH Redox Oxy Cond

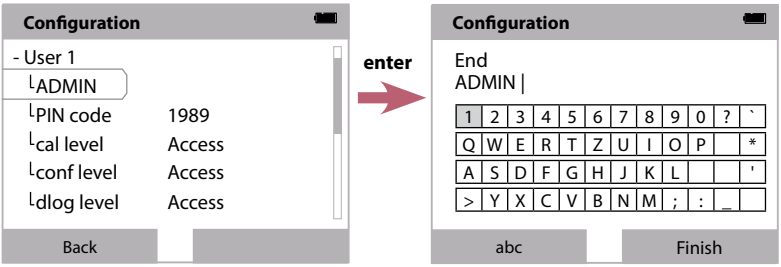
Setting Up Users / Changing the PIN Code

All users can be assigned a PIN code and provided or denied access to configuration, calibration, or the data logger.

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



2) Select ADMIN to open the editor an enter the user name:

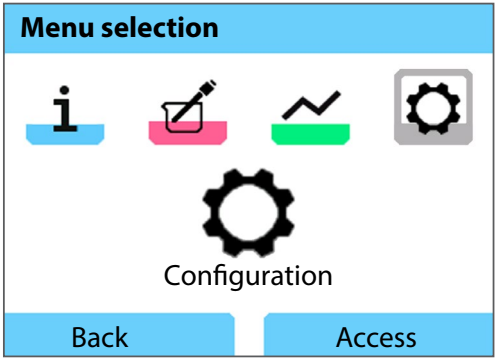


3) After making your settings, return to the menu selection.
4) Open User management with the **Access** softkey and select the user you require
   or
   Restart the device; see p. 54.

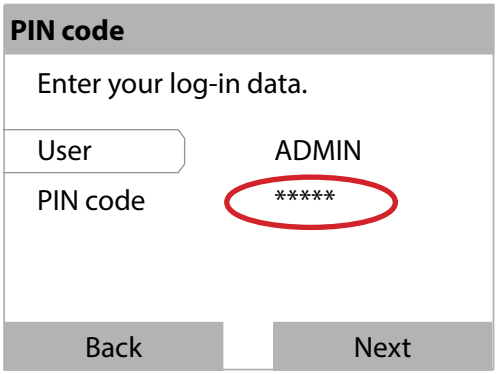
Important note: If you lose the PIN code for the ADMIN user, access to the system will be blocked. The manufacturer can generate a rescue PIN code. If you have any questions, please contact Knick Elektronische Messgeräte GmbH & Co. KG using the contact details provided on the last page of this document.

Entering the Rescue PIN Code

1) Go to Menu selection.
2) Select "Configuration" using the cursor keys.



3) Press the arrow keys ▼ and ▲ at the same time.
4) Set the user to "ADMIN".

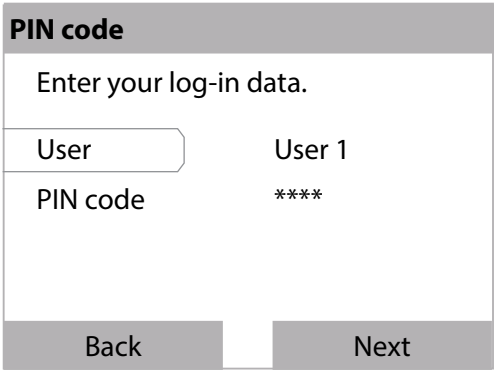


5) In "PIN code", enter the 5-digit rescue PIN code and confirm by pressing **enter**.
6) Press the **Continue** softkey.

pH Redox Oxy Cond

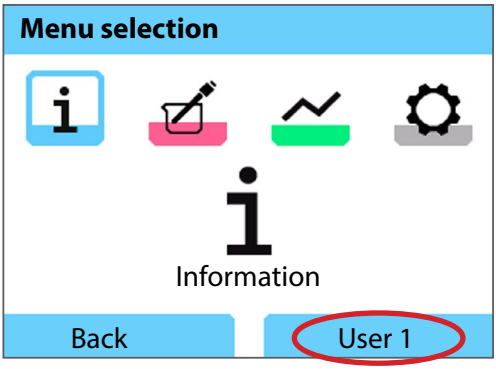
Login

When using Option 001 SOP and with user management enabled, you will be prompted to enter your log-in data when the device starts:



Enter the PIN code and press **enter** to confirm. Press the **Continue** softkey.

From Menu selection, you can directly access the "User management" menu.
Right softkey: **User 1...4** or, if no one is logged in: **Access**



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.

pH Redox Oxy Cond

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.

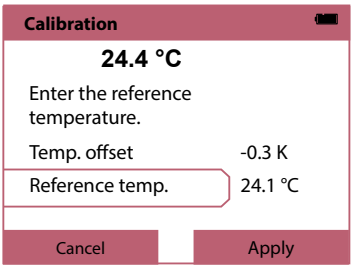
Enabling Option 002 Temp.cal

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

Selecting Temperature Calibration

1) From within 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 Multichannel

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.

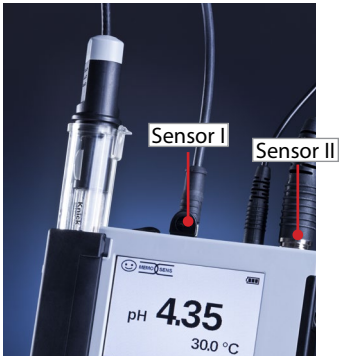
Enable Option

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

The option is now enabled. To disable it, see p. 61.
An activation code is not required to re-enable the option.

Sensor Connection

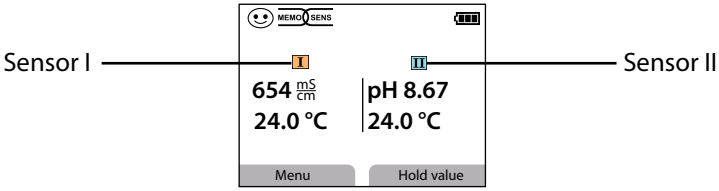
Connect the Memosens sensors or, depending on the model, one Memosens sensor and one analog pH/ORP or conductivity sensor.
See the chapter "Connecting a Sensor", p. 11.



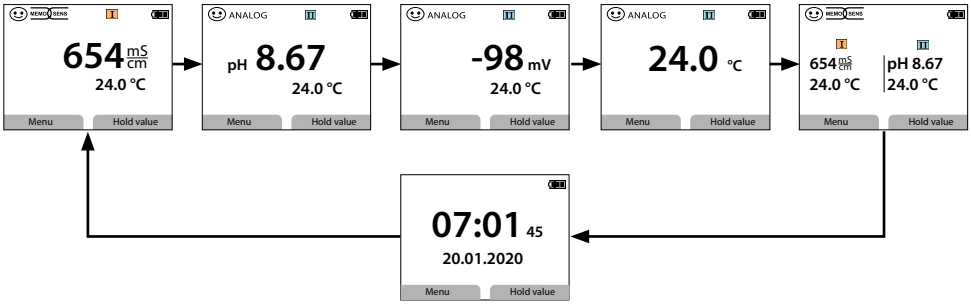
The Memosens sensors are connected to sensor sockets I and II, or one Memosens sensor is connected to sensor socket I and the analog sensor is connected to sensor socket II.

pH Redox Oxy Cond

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).

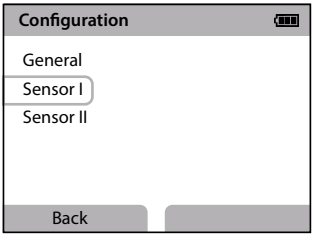


Note: If Option 001 SOP is activated and users have been set up, a valid user PIN must be entered during configuration and calibration, and when opening the data logger. See the chapter "Setting Up Users", p. 52.

Configuration

For selection of the configuration function, see p. 18.

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



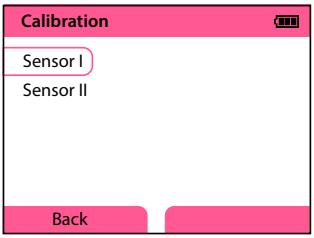
After selecting sensors, carry out the configuration applicable to the sensor's process variable.
For configuration, see p. 18ff.

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

Calibration

For selection of the calibration function, see p. 26.

A sensor must be selected after selecting the calibration function.



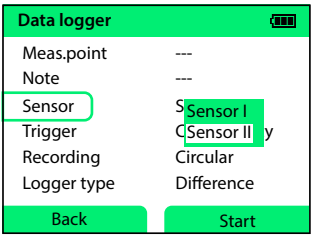
After selecting sensors, carry out the calibration applicable to the sensor's process variable.
For calibration, see p. 26ff.

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

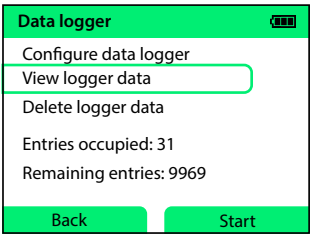
pH Redox Oxy Cond

Data Logger

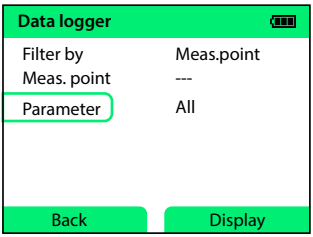
For selection of the data logger function and configuration, see p. 38ff.
After selecting "Configure data logger", a sensor must be selected. The data logger functions for this sensor are defined in multichannel mode. These settings define the data logger's recording functions for both sensors.



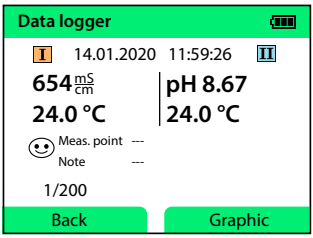
Example: Sensor II is selected. The data logger's settings are made on the basis of sensor II. Different parameters are available depending on the sensor type.
The choice of trigger defines the recording's process variable. The "Difference" and "Limit" logger types use this process variable to control the recording.



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



Select the process variable for display.

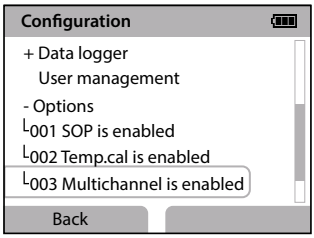


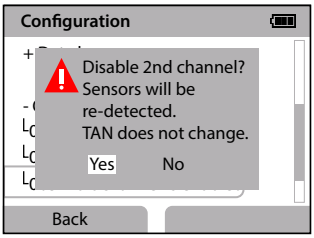
The measured values are displayed. Use the arrow keys ◀ ▶ to show the data logger's entries in succession.

To display a curve (graph), a process variable **must** be selected in "Parameter". See the information on p. 40.

Deactivate Option 003

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





pH Redox Oxy Cond

Accessories/Options

Accessories	Order No.
Robust field case (for meter, sensor, various small parts, and User Manual)	ZU0934
Li-ion battery	ZU0925
Replacement quiver (5 units)	ZU0929
Adapter for process sensors with Ø 12 mm and PG13.5 thread for use with quiver	ZU0939
Base stand for mounting up to 3 sensors with base plate made of stainless steel	ZU6953
MemoView incl. ZU1060 cable, with 2x M8 connectors	ZU1059
Measuring cable with M8 connector for sensors with Memosens connector	
Length 1.5 m / 4.92 ft	CA/MS-001XFA-L
Length 2.9 m / 9.51 ft	CA/MS-003XFA-L
Measuring cable for digital sensors with 4-pin M12 socket, 4-pin M8 connector	
Length 1.5 m / 4.92 ft	CA/MS-001XDA-L
Length 2.9 m / 9.51 ft	CA/MS-003XDA-L
Pt1000 temperature detector	ZU6959
Pt1000 temperature detector with angled connector	ZU0156

Note: When a Memosens sensor is connected, the temperature detector of the Memosens sensor is used.

TAN Options	Order No.
SOP cal calibration method[1]: user management, sensor verification, temperature detector adjustment in the Memosens sensor (offset correction)	SW-P001
Temperature detector adjustment in the Memosens sensor (offset correction)	SW-P002
Multichannel function	SW-P003

Paraly SW112 PC software for configuration and firmware updates:
Free download from www.knick.de

Please visit our website for more information on our product range: www.knick.de.

1) with pH only

pH ORP

pH, ORP Accessories

Item	Order No.
Adapter for BNC pH sensors to DIN socket	ZU1190
Inspection Certificate 3.1 for Portavo/Portamess pH	ZU0268/9nnpH

pH Sensors

Please visit our website for more information on our product range: www.knick.de.

Knick CaliMat (pH) Buffer Solutions

Ready-to-Use Quality pH Buffer Solutions

pH Value (20 °C/68 °F)	Quantity	Order No.
2.00	250 ml	CS-P0200/250
4.00	250 ml	CS-P0400/250
	1000 ml	CS-P0400/1000
	3000 ml	CS-P0400/3000
7.00	250 ml	CS-P0700/250
	1000 ml	CS-P0700/1000
	3000 ml	CS-P0700/3000
9.00	250 ml	CS-P0900/250
	1000 ml	CS-P0900/1000
	3000 ml	CS-P0900/3000
12.00	250 ml	CS-P1200/250
Buffer Solution Sets (20 °C/68 °F)		
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
KCl solution, 3 molar	250 ml	ZU0062

Accessories for Conductivity

Item	Order No.
Flexible connecting cable for SE680 sensor, M12 4-pin, M8 4-pin	CA/M12-001M8-L
Connecting cable for sensors of type 4USF/VP, VP 8-pin	ZU1120
KPG® tube for ZU6985 4-electrode sensor, incl. O-ring	ZU0180
Flow cell for sensors with Ø 12 mm and 15.3 mm	ZU1014
Adapter for connecting a conductivity sensor with 2 banana plugs to the Portavo 907 MULTI Cond socket	ZU0289
Adapter for connecting the ZU6985 4-electrode sensor to the Portavo 907 Multi Cond socket	ZU0290
Inspection Certificate 3.1 for Portavo/Portamess Cond	ZU0268/9nnCOND

Conductivity Sensors

Please visit our website for more information on our product range: www.knick.de.

Conductivity Standards

for determining a cell constant

Ready-to-Use Solutions	Quantity	Order No.
1.3 µS/cm, KCl	300 ml	ZU0701
15 µS/cm, KCl	500 ml	CS-C15K/500
147 µS/cm, KCl	500 ml	CS-C147K/500
1413 µS/cm, KCl	500 ml	CS-C1413K/500
12.88 µS/cm, KCl	500 ml	CS-C12880K/500
Solutions for Preparation		
NaCl concentrate, for preparing 1000 ml of a 0.1 mol/l saline solution for cell constant calibration	1 ampoule	ZU6945

Oxy

Accessories for Oxygen

Item	Order No.
Sensor protector that also serves as a calibration beaker for the SE340 optical oxygen sensor	ZU0911
Membrane cap with memory chip for the SE340 optical oxygen sensor	ZU0913
Flow cell for sensors with Ø 12 mm and 15.3 mm	ZU1014
O_2 electrolyte	ZU0565
Maintenance kit for SE715/1-MS (electrolyte, 3 membrane caps)	ZU0879
Adapter for process sensors with Ø 12 mm and PG 13.5 thread for use with quiver	ZU0939
Sensor protector for process sensors with Ø 12 mm and PG 13.5 thread	ZU1054
Sensor protector made of PVDF for process sensors with Ø 12 mm and PG 13.5 thread	ZU1121

Oxygen Sensors

Please visit our website for more information on our product range: www.knick.de.

pH ORP Oxy Cond

Connections	2x socket, 4 mm dia., for separate temp. detector 1x M8 socket, 4 pins, for Memosens lab cable 1x micro USB-B for data transmission to PC 1x 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-electrode sensors Portavo 907 MULTI OXY and Portavo 907 Multichannel MS: M12, 8-pin, for Memosens sensors or SE340 sensor (optical oxygen)
Air pressure measurement	700 … 1100 hPa
Device operation	Easy-to-use menu navigation with graphic symbols and detailed user hints in plain text
Languages	German, English, French, Spanish, Italian, Portuguese, Chinese
Sensoface	Status display (friendly, neutral, sad)
Status indicators	For battery condition, logger
Graphic display	QVGA TFT display with white backlighting
Keypad	[on/off], [meas], [enter], [◀], [▶], [▲], [▼], 2 context-sensitive softkeys
Data logger	Space for 10,000 entries
Recording	Manual, interval- or event-controlled with management of tag numbers and annotations
Cal data logger MemoLog (Memosens only)	Can save up to 100 Memosens calibration records Recording: Directly readable via MemoSuite or Paraly SW112 (USB) Can be shown on the display: Manufacturer, sensor type, serial no., zero point, slope, calibration date
Temperature input	2x socket Ø 4 mm for separate temperature detector (for devices with analog sensor input only)
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) at rated operating conditions
2) ± 1 digit
3) Plus sensor error

pH ORP Oxy Cond

Communication	USB 2.0
Profile	HID, driverless installation
Usage	Data transfer and configuration via the Paraly SW 112 software
Diagnostic 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 point, slope; Cond: Cell constant
Device self-test	Automatic memory test (FLASH, EEPROM, RAM)
Device data	Device type, software version, hardware version
Data retention	Parameter, calibration data > 10 years
EMC	EN 61326-1 (General requirements)
Emitted interference	Class B (residential)
Immunity to interference	Industrial applications
	EN 61326-2-3 (Particular requirements for transducers)
RoHS conformity	According to Directive 2011/65/EU
Power supply	4 x AA alkaline batteries or 1x Li-ion battery, USB chargeable
Rated operating conditions	
Ambient temperature	-10 … 55 °C / 14 … 131 °F
Transport/ Storage temperature	-25 … 70 °C / -13 … 158 °F
Relative humidity	0 … 95 %, brief condensation permissible
Housing	
Material	PA12 GF30 (silver gray RAL 7001) + TPE (black)
Ingress 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 measuring range	-2 … 16		
Decimal places *)	2 or 3		
	Input resistance	1×10^{12} Ω	(0 … 35 °C)
	Input current	1×10^{-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 measuring 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-pin, for Memosens laboratory cable		
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	
	ISFET Zero	Adjustment of ISFET sensor operating points	
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)		

*) User-defined
1) at rated operating conditions
2) ± 1 digit
3) Plus sensor error
4) Ranges dependent on Memosens sensor

pH ORP

Calibration timer[*)]	Interval 1 … 99 days, can be switched off	
Sensoface	Provides information on the condition of the sensor	
Evaluation of	Zero point/slope, response time, calibration interval	
Memosens input ORP	M8 socket, 4-pin, for Memosens laboratory cable	
Display ranges [4)]	mV	–1999 … 1999 mV
	Temperature	-50 … 250 °C / -58 … 482 °F
Sensor standardization *	ORP calibration (zero offset)	
Permissible calibration range	ΔmV (offset)	–700 … 700 mV

*) User-defined
4) Ranges dependent on Memosens sensor

Conductivity input, analog	Multi-contact for 2-/4-electrode sensors with integrated temperature detector	
Measuring ranges	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-pin, for Memosens laboratory cable	
Measuring range	SE615/1-MS sensor 10 µS/cm … 20 mS/cm	
Conductivity inputs		
Measuring cycle	Approx. 1 s	
Temperature compensation	Linear 0 … 20 %/K, adjustable reference temperature 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 … 5000 mg/l (10 … 40 °C / 50 … 104 °F)
	Concentration	0.00 … 100 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 adjustment	Cell constant	Input of cell constant with simultaneous display of conductivity value and temperature
	Solution input	Input of calibration solution conductivity with simultaneous display of cell constant and temperature
	Auto	Automatic determination of cell constant with KCl or NaCl solution

1) at rated operating conditions
2) ± 1 digit
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	
Display ranges [4]	Saturation	0.000 … 200.0 %
	Concentration	000 µg/l … 20.00 mg/l
	Partial pressure	0.0 … 1000 mbar
	Volume concentration in gas	0.00 … 99.99 vol%
Temperature meas. range [4]	-20 … 150 °C / -4 … 302 °F	
Sensor adjustment	Automatic calibration in air (100 % rel. hum.)	
	Zero calibration	
Storage	In quiver with moisture sponge	

Input for optical oxygen	M12 socket, 8-pin	
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
	Volume concentration in gas	0.00 … 99.99 vol%
Response time	t90 < 30 s	
	t99 < 60 s	
Measurement error[1,2,3]	Zero signal < 0.1 % of final saturation value	
Temperature meas. range [4]	0 … 50 °C / 32 … 122 °F	
Measurement error[1,2,3]	Temperature ± 0.2 K	
Sensor adjustment	Automatic calibration in air	
	Zero calibration	
Storage	In quiver with moisture sponge	

1) at rated operating conditions
2) ± 1 digit
3) Plus sensor error
4) Ranges dependent on Memosens sensor

Buffer Table, Mettler-Toledo

Nominal values in bold.

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

pH

Buffer Table, Knick CaliMat

Nominal values in bold.

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

Buffer Table, Ciba

Nominal values: 2.06 4.00 7.00 10.00

°C	pH			
0	2.04	4.00	7.10	10.30
5	2.09	4.02	7.08	10.21
10	2.07	4.00	7.05	10.14
15	2.08	4.00	7.02	10.06
20	2.09	4.01	6.98	9.99
25	2.08	4.02	6.98	9.95
30	2.06	4.00	6.96	9.89
35	2.06	4.01	6.95	9.85
40	2.07	4.02	6.94	9.81
45	2.06	4.03	6.93	9.77
50	2.06	4.04	6.93	9.73
55	2.05	4.05	6.91	9.68
60	2.08	4.10	6.93	9.66
65	2.07 [1)]	4.10 [1)]	6.92 [1)]	9.61 [1)]
70	2.07	4.11	6.92	9.57
75	2.04 [1)]	4.13 [1)]	6.92 [1)]	9.54 [1)]
80	2.02	4.15	6.93	9.52
85	2.03 [1)]	4.17 [1)]	6.95 [1)]	9.47 [1)]
90	2.04	4.20	6.97	9.43
95	2.05 [1)]	4.22 [1)]	6.99 [1)]	9.38 [1)]

1) extrapolated

pH

Buffer Table, NIST Technical Buffers

Nominal values in bold.

°C	pH				
0	1.67	4.00	7.115	10.32	13.42
5	1.67	4.00	7.085	10.25	13.21
10	1.67	4.00	7.06	10.18	13.01
15	1.67	4.00	7.04	10.12	12.80
20	1.675	4.00	7.015	10.06	12.64
25	**1.68**	**4.005**	**7.00**	**10.01**	**12.46**
30	1.68	4.015	6.985	9.97	12.30
35	1.69	4.025	6.98	9.93	12.13
40	1.69	4.03	6.975	9.89	11.99
45	1.70	4.045	6.975	9.86	11.84
50	1.705	4.06	6.97	9.83	11.71
55	1.715	4.075	6.97	9.83 [1)]	11.57
60	1.72	4.085	6.97	9.83 [1)]	11.45
65	1.73	4.10	6.98	9.83 [1)]	11.45 [1)]
70	1.74	4.13	6.99	9.83 [1)]	11.45 [1)]
75	1.75	4.14	7.01	9.83 [1)]	11.45 [1)]
80	1.765	4.16	7.03	9.83 [1)]	11.45 [1)]
85	1.78	4.18	7.05	9.83 [1)]	11.45 [1)]
90	1.79	4.21	7.08	9.83 [1)]	11.45 [1)]
95	1.805	4.23	7.11	9.83 [1)]	11.45 [1)]

1) values added

Buffer Table, NIST Standard (DIN 19266: 2015-05)
Nominal values in bold.

°C	pH				
0	1.666	4.000	6.984	9.464	
5	1.668	3.998	6.951	9.395	13.207
10	1.670	3.997	6.923	9.332	13.003
15	1.672	3.998	6.900	9.276	12.810
20	1.675	4.000	6.881	9.225	12.627
25	**1.679**	**4.005**	**6.865**	**9.180**	**12.454**
30	1.683	4.011	6.853	9.139	12.289
35	1.688	4.018	6.844	9.102	12.133
37		4.022	6.841	9.088	
38	1.691				12.043
40	1.694	4.027	6.838	9.068	11.984
45					11.841
50	1.707	4.050	6.833	9.011	11.705
55	1.715	4.075	6.834	8.985	11.574
60	1.723	4.091	6.836	8.962	11.449
70	1.743	4.126	6.845	8.921	
80	1.766	4.164	6.859	8.885	
90	1.792	4.205	6.877	8.850	
95	1.806	4.227	6.886	8.833	

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

pH

Buffer Table, HACH

Nominal values: 4.01 7.00 10.01 (± 0.02 at 25 °C)

°C	pH		
0	4.00	7.118	10.30
5	4.00	7.087	10.23
10	4.00	7.059	10.17
15	4.00	7.036	10.11
20	4.00	7.016	10.05
25	4.01	7.00	10.00
30	4.01	6.987	9.96
35	4.02	6.977	9.92
40	4.03	6.97	9.88
45	4.05	6.965	9.85
50	4.06	6.964	9.82
55	4.07	6.965	9.79
60	4.09	6.968	9.76
65	4.10	6.98	9.71
70	4.12	7.00	9.66
75	4.14	7.02	9.63
80	4.16	7.04	9.59
85	4.18	7.06	9.56
90	4.21	7.09	9.52
95	4.24	7.12	9.48

Buffer Table, WTW

Nominal values in bold.

°C	pH			
0	2.03	4.01	7.12	10.65
5	2.02	4.01	7.09	10.52
10	2.01	4.00	7.06	10.39
15	2.00	4.00	7.04	10.26
20	2.00	4.00	7.02	10.13
25	**2.00**	**4.01**	**7.00**	**10.00**
30	1.99	4.01	6.99	9.87
35	1.99	4.02	6.98	9.74
40	1.98	4.03	6.97	9.61
45	1.98	4.04	6.97	9.48
50	1.98	4.06	6.97	9.35
55	1.98	4.08	6.98	
60	1.98	4.10	6.98	
65	1.99	4.13	6.99	
70	2.00	4.16	7.00	
75	2.00	4.19	7.02	
80	2.00	4.22	7.04	
85	2.00	4.26	7.06	
90	2.00	4.30	7.09	
95	2.00	4.35	7.12	

pH

Buffer Table, Hamilton

Nominal values in bold.

°C	pH				
0	1.99	4.01	7.12	10.19	12.46
5	1.99	4.01	7.09	10.19	12.46
10	2.00	4.00	7.06	10.15	12.34
15	2.00	4.00	7.04	10.11	12.23
20	2.00	4.00	7.02	10.06	12.11
25	**2.00**	**4.01**	**7.00**	**10.01**	**12.00**
30	1.99	4.01	6.99	9.97	11.90
35	1.98	4.02	6.98	9.92	11.80
40	1.98	4.03	6.97	9.86	11.70
45	1.97	4.04	6.97	9.83	11.60
50	1.97	4.06	6.97	9.79	11.51
55	1.97	4.08	6.98	9.77	11.51
60	1.97	4.10	6.98	9.75	11.51
65	1.97	4.13	6.99	9.74	11.51
70	1.97	4.16	7.00	9.73	11.51
75	1.97	4.19	7.02	9.73	11.51
80	1.97	4.22	7.04	9.73	11.51
85	1.97	4.26	7.06	9.74	11.51
90	1.97	4.30	7.09	9.75	11.51
95	1.97	4.35	7.09	9.75	11.51

Buffer Table, Reagecon

Nominal values in bold.

°C	pH				
0	2.01 [1)]	4.01 [1)]	7.07 [1)]	9.18 [1)]	12.54 [1)]
5	2.01 [1)]	4.01 [1)]	7.07 [1)]	9.18 [1)]	12.54 [1)]
10	2.01	4.00	7.07	9.18	12.54
15	2.01	4.00	7.04	9.12	12.36
20	2.01	4.00	7.02	9.06	12.17
25	**2.00**	**4.00**	**7.00**	**9.00**	**12.00**
30	1.99	4.01	6.99	8.95	11.81
35	2.00	4.02	6.98	8.90	11.63
40	2.01	4.03	6.97	8.86	11.47
45	2.01	4.04	6.97	8.83	11.39
50	2.00	4.05	6.96	8.79	11.30
55	2.00	4.07	6.96	8.77	11.13
60	2.00	4.08	6.96	8.74	10.95
65	2.00 [1)]	4.10 [1)]	6.99 [1)]	8.70 [1)])	10.95 [1)]
70	2.00 [1)]	4.12 [1)])	7.00 [1)]	8.67 [1)]	10.95 [1)]
75	2.00 [1)]	4.14 [1)]	7.02 [1)]	8.64 [1)]	10.95 [1)]
80	2.00 [1)]	4.16 [1)]	7.04 [1)]	8.62 [1)]	10.95 [1)]
85	2.00 [1)]	4.18 [1)]	7.06 [1)]	8.60 [1)]	10.95 [1)]
90	2.00 [1)]	4.21 [1)]	7.09 [1)]	8.58 [1)]	10.95 [1)]
95	2.00 [1)]	4.24 [1)]	7.12 [1)]	8.56 [1)]	10.95 [1)]

1) values added

pH

Buffer Table, DIN 19267

Nominal values in bold.

°C	pH				
0	1.08	4.67	6.89	9.48	13.95 [1)]
5	1.08	4.67	6.87	9.43	13.63 [1)]
10	1.09	4.66	6.84	9.37	13.37
15	1.09	4.66	6.82	9.32	13.16
20	1.09	4.65	6.80	9.27	12.96
25	**1.09**	**4.65**	**6.79**	**9.23**	**12.75**
30	1.10	4.65	6.78	9.18	12.61
35	1.10	4.65	6.77	9.13	12.45
40	1.10	4.66	6.76	9.09	12.29
45	1.10	4.67	6.76	9.04	12.09
50	1.11	4.68	6.76	9.00	11.89
55	1.11	4.69	6.76	8.96	11.79
60	1.11	4.70	6.76	8.92	11.69
65	1.11	4.71	6.76	8.90	11.56
70	1.11	4.72	6.76	8.88	11.43
75	1.11	4.73	6.77	8.86	11.31
80	1.12	4.75	6.78	8.85	11.19
85	1.12	4.77	6.79	8.83	11.09
90	1.13	4.79	6.80	8.82	10.99
95	1.13 [1)]	4.82 [1)]	6.81 [1)]	8.81 [1)]	10.89 [1)]

1) extrapolated

Buffer Table, Metrohm

Nominal values in bold.

°C	pH		
0	3.99	7.11	9.27
5	3.99	7.08	9.18
10	3.99	7.06	9.13
15	3.99	7.04	9.08
20	3.99	7.02	9.04
25	**4.00**	**7.00**	**9.00**
30	4.00	6.99	8.96
35	4.01	6.98	8.93
40	4.02	6.98	8.90
45	4.03	6.97	8.87
50	4.04	6.97	8.84
55	4.06	6.97	8.81
60	4.07	6.97	8.79
65	4.09	6.98	8.76
70	4.11	6.98	8.74
75	4.13	6.99	8.73
80	4.15	7.00	8.71
85	4.18	7.00	8.70
90	4.20	7.01	8.68
95	4.23	7.02	8.67

A
AA batteries 10
Access control (Option 001 SOP) 51
Accessories for conductivity 65
Accessories for oxygen 66
Accessories for pH, ORP 64
Accessories, general 62
Arrow keys 9
Auto, conductivity calibration 30
Automatic calibration (conductivity) 30
Automatic calibration (pH) 26

B
Basic interval (limit value logger type) 37
Battery capacity 10
Battery compartment 10
Battery icon 10
Battery life, increasing 38
Battery replacement 10
Benchtop stand 8
Buffer set (pH configuration) 19
Buffer sets 64
Buffer sets, configuring (pH) 42
Buffer tables 73

C
Calculation (conductivity configuration) 22
Calibration (Cond), auto 30
Calibration (Cond), cell constant 31
Calibration (Cond), entry of solution 31
Calibration, conductivity 30
Calibration in air (Oxy) 32
Calibration, ISFET 29
Calibration mode 29
Calibration of multichannel operation (option) 59
Calibration (Oxy), data input 33
Calibration, oxygen 32

Calibration (Oxy), zero point 33
Calibration (pH), Calimatic 26
Calibration (pH), data input 27
Calibration (pH), manual 27
Calibration, pH/ORP combo sensor 28
Calibration points (pH) 26
Calibration record 14
Calibration, Temp.cal (option) 56
Calibration timer monitoring (Oxy) 33
Calibration timer monitoring (pH) 27
Calibration, zero point (operating point), ISFET 29
CaliMat buffer solutions 64
Calimatic calibration 26
Calimatic (pH) 7
Cal SOP (Option 001) 48
Cell constant, conductivity calibration 31
Charge level of batteries 10
CIP (sensor information) 14
Clearing the logger 40
Combo sensor, pH/ORP, calibration 28
Conductivity calibration 30
Conductivity configuration 22
Conductivity setup 22
Conductivity, specifications 71
Conductivity standards, product line 65
Configuration of multichannel operation (option) 59
Configure data logger 38
Connecting cable for Memosens 11
Connecting the sensors, Option 003 Multichannel 57
Connections 11
Connection, USB (battery) 10
Creating a user (Option 001 SOP) 52
Curve characteristic (data logger) 41

D
Data input, Oxy calibration 33
Data input, pH calibration 27
Data logger configuration 38
Data logger icons 35
Data logger, operating modes 36
Data Logger, Option 003 Multichannel 60
Data logger, starting 40
Data logger, stopping 40
Data of the meter 67
Delete logger data 40
Delta range (data logger) 36
Device info (Information menu) 17
Device properties 6
Device self-test 17
Device test (Information menu) 17
Difference (logger type) 36
Digital optical oxygen measurement 7
Display 9
Display icons 13
Display test 17
Disposal 2

E
Electrolyte, Oxy calibration 32
Enable option 49
Entry of solution, conductivity calibration 31
ERROR (error messages) 46
Error messages, overview 46
Event interval (limit value logger type) 37

F
Features 6
Field case (accessory) 62

H
Help texts 46
Hook 8

I
Icons, device status 13
Icons for data logger 35
Icons, menus 9
In air, Oxy calibration 32
Increasing the battery life 38
Individual buffer sets (pH) 42
Information (menu) 14
Info texts 46
Inserting the batteries 10
Installation factor, calibration 31
Intended use 6
Interfaces 11
Interval and difference (logger type) 37
Interval (logger type) 36
Introduction 6
ISFET calibration 29

K
Keypad 9
Keypad test 17
Knick CaliMat buffer solutions 64

L
Li-ion battery (accessory) 62
Limit value (logger type) 37
Lithium-ion battery (commissioning) 10
Logger type “Difference” 36
Logger type “Interval” 36
Logger type “Interval and difference” 37
Logger type “Limit value” 37
Logger type “Shot” 36
Login (Option 001 SOP) 54
Loss of PIN code 52

M
Manual calibration (pH) 27
Manual temperature adjustment 34
meas, switch-on 12
Measurement 34
Measurement display, Option 003 multichannel 58
Measuring cable for Memosens sensors 62
Membrane 32
Membrane body replacement 32
Membrane operating time (optical oxygen) 14
Membrane serial no. (optical oxygen) 14
MemoLog (Memosens only) 16
Memosens cable (accessory) 62
Memosens connecting cable 11
Memosens (digital sensors) 7
Memosens sensors, connection 11
MemoView ZU1059 7
Menu icons 9
Messages (Information menu) 16
Micro USB port 11
Multichannel operation, Option 003 57

N
Nameplate 8
Note (data logger) 39

O
on/off, switch-on 12
Operating modes of data logger 36
Optical oxygen measurement 7
Option 001 SOP 48
Option 002 Temp.cal 56
Option 003 Multichannel 57
Options, description 48
Options, order codes 63
ORP calibration 28
ORP configuration 20
ORP setup 20

Overview 6
Overview of error messages 46
Overview of status messages 43
Oxygen calibration (Oxy) 32
Oxygen configuration 24
Oxygen setup 24
Oxygen, specifications 72

P

Package contents 5
Paraly SW112 PC software 42
Paraly SW112 (software) 42
Paraly SW112 software 42
Passcode, loss 52
pH buffer solutions 64
pH calibration 26
pH configuration 18
pH/ORP sensor, calibration 28
pH setup 18
pH, specifications 69
PIN code, changing (Option 001 SOP) 52
PIN code, loss 52
Power-on 12
Pressure corr. (Oxy configuration) 24
Pre-trigger (limit value logger type) 37
Product features 6
Product line 62
Product presentation 6
Protective cover 8

R

Real-time clock 6
Rechargeable battery, Li-ion 10
Replacement quiver 62
Replacing the electrolyte (Oxy) 32
Replacing the membrane (Oxy) 32
Rescue PIN code, entry 53
Rescue PIN code, request 52
Returns 2

S

Safety instructions 5
Saving a membrane module replacement (Oxy) 32
Sensoface criteria 44
Sensoface messages 43
Sensor connection 11
Sensor connection, Option 003 Multichannel 57
Sensor diagram 15
Sensor information 14
Sensor monitor 16
Sensor operating time (sensor information) 14
Sensor selection, Option 003 Multichannel 59
Sensor serial no. (sensor information) 14
Sensor verification, Option 001 SOP 55
Sensor without temperature detector 34
Setting up users 52
Shot (logger type) 36
SIP (sensor information) 14
Slope, oxy calibration 32
Softkey 9
SOP calibration (Option 001) 50
Specifications 67
Starting the data logger 40
Status messages, overview 43
Stopping the data logger 40
Suspending the meter 8
Switching on the meter 12
Symbols in display 13

T

Table of error messages 46
Table of info texts 43
TAG entry (Cond) 30
TAG entry (ISFET) 29
TAG entry (ORP) 28
TAG entry (Oxy) 32
TAG entry (pH) 26
TAN options, description 48

TAN options, order codes 63
Temp.cal (option) 56
Temperature detectors (accessory) 62
Temperature probe connection 11
Toggling the measurement display 34

U

USB port (battery) 10
USB port, micro 11
User management (Option 001 SOP) 51

V

Value-added features 7
Viewing the logger data 40

Z

Zero calibration (Cond) 31
Zero calibration (ISFET) 29
Zero calibration (Oxy) 33

Knick
Elektronische Messgeräte
GmbH & Co. KG

Headquarters
Beuckestraße 22 • 14163 Berlin
Germany
Phone: +49 30 80191-0
Fax: +49 30 80191-200
info@knick.de
www.knick.de

Local Contacts
www.knick-international.com

Copyright 2022 • Subject to change
Version: 5
This document was published on January 28, 2022
The latest documents are available for download on our website
under the corresponding product description.

098222 TA-209.7MU-KNEN05