Knick

User Manual

Portavo® 904(X) COND

Portable Meter

Read before installation.
Keep for future use.

www.knick.de

Repair

The meter cannot be repaired by users. For inquiries regarding repairs, please contact Knick Elektronische Messgeräte GmbH & Co. KG at 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

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

6 Package Contents

Check the shipment for transport damage and completeness.
The package of the Portavo 904(X) COND includes:

- Meter, incl. premounted quiver
- 4 batteries (AA)
- Carrying strap
- USB cable, 1.5 m
- Quickstart overview for attaching to the inside of the protective cover (German, English, French)
- Safety guide
- Quickstart guide in various languages
- Test report 2.2 according to EN 10204

For Portavo 904X COND Ex version:

- EU Declaration of Conformity
- Control drawing no. 209.009-110 (ATEX, IECEx, cFMus)

User manuals, certificates, the Paraly SW 112 PC software, and other product information can be downloaded from www.knick.de.

Intended Use

The Portavo 904(X) COND is a portable conductivity meter. With a plain text line on a high-contrast LCD, operation is largely intuitive. The device variant 904X COND is available for applications in hazardous locations up to Zone 0.

The meter stands out by the following features:

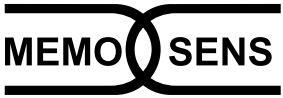
- Use of digital Memosens sensors
- A detachable quiver protects the sensor and prevents it from drying out. Furthermore, it can be used for calibration.
- The rugged housing is made of a high-performance polymer. It provides high impact resistance and dimensional stability even when exposed to extreme moisture.

- Scratch-proof clear glass display, perfectly readable even after years
- Very long operating times 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 (Li-ion battery not suited for Portavo 904X COND for application in hazardous locations)
- Data logger with 5000 values
- Micro USB port for communication with Paraly SW 112 PC software for data evaluation of digital sensors (Memosens)
- Sensoface icons provide single-glance information on the sensor condition (page 39)
- Real-time clock and indication of battery charging level
- At measuring temperatures from -20 to +100 °C the temperature detector can be automatically identified.

Value-Added Features

Memosens

The Portavo 904 can communicate with Memosens sensors. These digital sensors are automatically identified and the meter switches to the appropriate measurement method. When a Memosens sensor is connected to the meter, it is indicated by the logo shown on the right. Furthermore, Memosens allows the storage of calibration data, which will be available and can still be used when the sensor is connected to another Memosens-capable device.



Sensoface

Sensoface provides quick information on the sensor condition. The three "smiley" faces as shown on the right represent the sensor condition during measurement and after a calibration. When the condition deteriorates, an “INFO …” message provides additional information on the cause.

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. A label on the inner side of the cover explains the control functions and device messages.

Hook

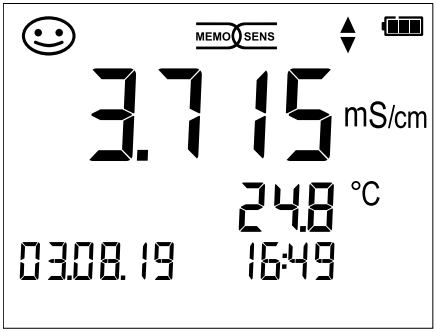
A fold-out hook on the back allows the meter to be suspended. This leaves your hands free for the actual measurement. The **nameplate** is located beneath the hook.

Protective Cover and Hook Combined

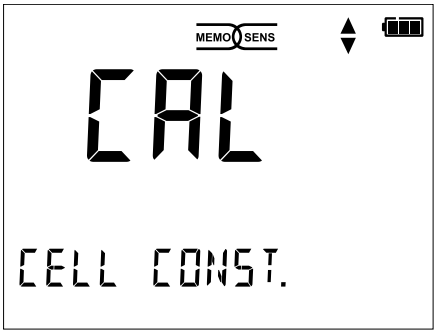
The two parts can be combined to form a benchtop stand, enabling convenient and fatigue-free work with the device at a laboratory table or desk.

Display

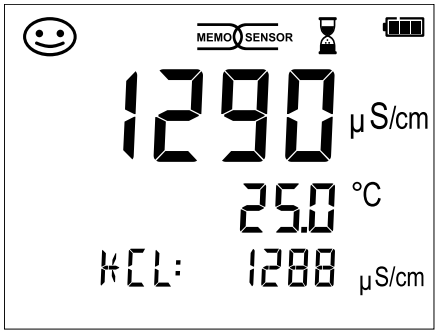
The meter has a three-line display for showing alphanumeric information such as measurement and calibration data, temperatures, and date/time. Additional information is provided by means of icons (Sensoface, battery icon, etc.).
Some typical displays are shown here.



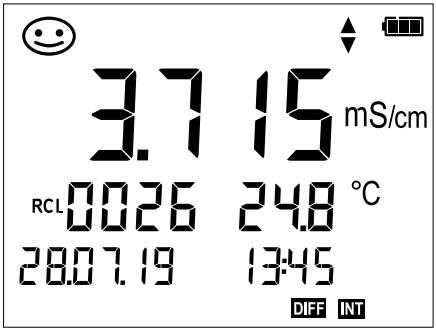
Measuring
(display of measured value and temperature)



Calibration
(Calibration by entry of cell constant)



Calibration
(with KCl solution)



Logger data
(display of measured value, memory location, temperature, date and time)

Clock
(display of hours and minutes, seconds and date)

Keypad

The keys of the membrane keypad have a noticeable pressure point.

They have the following functions:

on/off	Switches the meter on and displays the device and calibration data (see Commissioning)
meas	Switches the meter on / Activates measuring mode / Data logger, stopping
cal	Start calibration
set	Activates configuration / Confirms entries
clock	Displays time and date, allows setting the clock using **set**
RCL	View stored values
STO	Holds and saves a measured value, allows setting and starting of the logger by pressing **set** (page 24)
▲ ▼	When this icon is displayed, you can use the arrow keys for navigation.

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.

Note on Use in Hazardous Locations

⚠ WARNING! Impairment of explosion protection.

Only open the battery compartment of the Portavo 904X outside the hazardous location.

- The device cannot be repaired by users. For inquiries regarding repairs, please contact Knick Elektronische Messgeräte GmbH & Co. KG at www.knick.de.
- Never use the USB port within the hazardous location.

Inserting the Batteries

With four AA batteries, the Portavo has an operating time of over 1000 h.
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 (ZU 0925) suited to the battery compartment is available for the Portavo 904. Only this battery type can be charged directly from the USB port.

Note: Not available for the Portavo 904X (device variant for applications in hazardous locations).

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	Max. 10 operating hours remaining, measurement is still possible ***NOTICE!*** It is absolutely necessary to replace the batteries.

⚠ WARNING! Impairment of explosion protection.
When using the Portavo 904X (device variant for applications in hazardous locations) in a hazardous location, only the battery types listed below may be used. The batteries must be from the same manufacturer and of identical type and capacity. Never use new and used batteries together (see also Control Drawing 209.009-110).

Batteries for Application in Hazardous Locations

Batteries (4x each)	Temp. class	Ambient temperature range
Duracell MN1500 [1)]	T4	-10 °C ≤ Ta ≤ +40 °C
Energizer E91	T3	-10 °C ≤ Ta ≤ +50 °C
Power One 4106	T3	-10 °C ≤ Ta ≤ +50 °C
Panasonic Pro Power LR6	T3	-10 °C ≤ Ta ≤ +50 °C

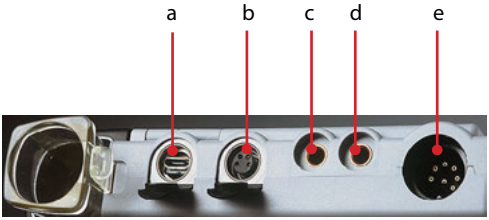
1) The Duracell Plus Power 4ct (EAN: 5000394017641) is an MN1500 battery.

Connecting a Sensor

The Portavo 904(X) COND provides several connections so that many types of sensors can be used for measurement (see illustration below).
Note that only **one** sensor may be connected to the meter at a time.
The meter automatically recognizes a connected Memosens sensor and switches accordingly. Memosens is signaled in the display.

Separate Temperature Probe

Note: Temperature measurement using a separate temperature probe is only possible when no Memosens sensor is connected.
After power-on, a separate temperature probe is automatically recognized. 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 sensors
c - Temperature probe GND
d - Temperature probe
e - 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** (M8, 4 pins for Memosens sensors).

⚠ WARNING! Impairment of explosion protection.
Never use digital Memosens sensors without Ex approval in a hazardous location. For these applications, you must use Memosens sensors with Ex approval. These sensors, as well as the hazardous-area cables, are marked by an orange-red ring.

Switching On the Meter

When you have connected the sensor, you can switch on the meter 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.

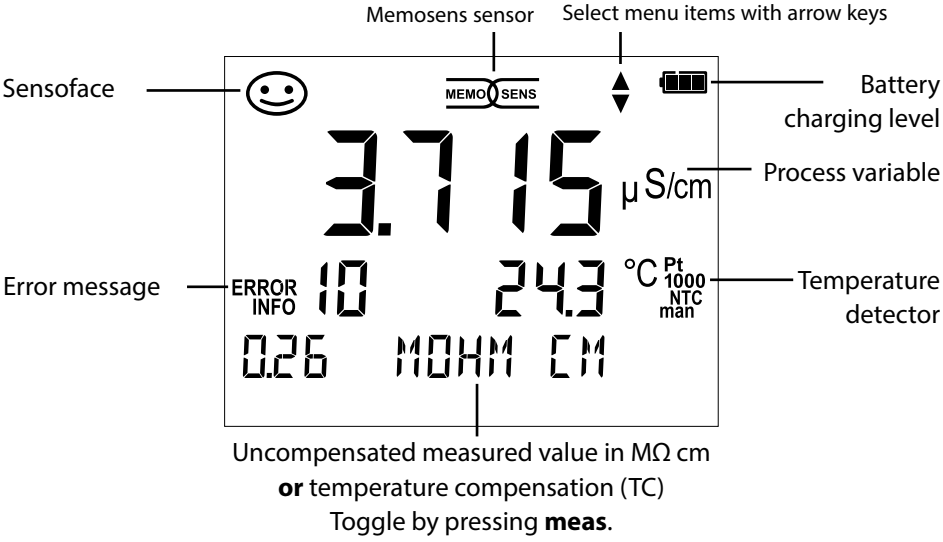
Memosens sensors:
After pressing the **on/off** key, the meter displays selected sensor information, incl. adjustment data, before it switches to measuring mode.

Alternating Use of Analog and Memosens 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.

Icons

Important information about the state of the device:



Press the **set** key to access configuration mode.
Prior to measurement, a configuration should be performed to match the connected sensor and the desired measurement performance. Furthermore, you can select the suitable calibration method. The following table gives you an overview. Factory settings are shown in **bold print**.

Measurement

↓ **set**

"SETUP" view

Select using arrow keys, confirm by pressing **set**.

DISPLAY 1	**Cond** | Conc % | SAL g/kg | TDS mg/l | °C
DISPLAY 2	**OFF** | Date + Time | Date | Time
MOHM cm	**OFF** | On
COND UNIT	**mS/cm** | S/m
TDS FACTOR	0.0 … **1.0** (if display = TDS)
TC*)	**OFF** | LINEAR | NAOH | NH3 | HCL | NACL | NLF (if display = Cond)
TC LINEAR	0.0 … 20.0 %/K | **2.1 %/K** (if TC = LINEAR)
REF TEMP	0 … 100 °C | **25.0 °C** (32 … 212 °F | **77 °F)** (if TC = LINEAR)
CONC TABLE	-01- ... -10- (if display = Conc %) For concentration determination, see page2145
▲ ▼ CAL (**set** ↔)	**CELL CONST.** | COND | 0.01 MOL KCL | 0.1 MOL KCL | INST. FACTOR**) | ZERO POINT***) | TEMP. OFFSET (Opt.)| FREE CAL
AUTO OFF	**OFF** | 12h | 6h | 1h | 0.1h
TEMP UNIT	**°C** | °F
TIME FORMAT	**24h** | 12h
DATE FORMAT	**DD.MM.YY** | MM.DD.YY
TAN TEMP CAL	Enter TAN to enable option (see page 34)
TAN SOP	
SETUP CODE	**OFF (0000)** | 0001 ... 9999 (with option 001 SOP only, see page 35)
CAL CODE	
LOGGER CODE	
DEFAULT	**NO** | YES (reset to factory settings) **Note**: All data logger entries will be deleted.

*) Temperature compensation **) With selected sensors
***) For inductive conductivity measurements only

▲ This icon prompts you to select a menu item using the arrow keys – the selec-
▼ tion is confirmed by pressing **set**.

CELL CONST Calibration

(Calibration by entry of cell constant)

The calibration method is selected in the configuration menu.

Measurement

↓ **cal**

CAL
CELL CONST.

The conductivity will be shown in the display and can be compared with a reference solution (temperature-corrected).

↓

Value blinks

Use ▲▼ to set the cell constant value.

↓ **cal**

Calibration is performed. Display: CELL CONSTANT.
The meter then automatically returns to measuring mode.

COND Calibration

(Calibration by entry of conductivity)

The calibration method is selected in the configuration menu.

Measurement

↓ **cal**

CAL
COND

Dip sensor in solution.

↓

Value blinks

Use ▲▼ to set the temperature-corrected conductivity value. **Note**: Here, the meter does not perform a temperature compensation!

↓ **cal**

Calibration is performed. Display: CELL CONSTANT.
The meter then automatically returns to measuring mode.

0.1 / 0.01 MOL KCL Calibration

(Automatic calibration with KCl solution)

The calibration method is selected in the configuration menu.

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 conductivity sensor, any separate temperature probe, and the calibration solution have the same temperature. Only this ensures that the cell constant is determined correctly.

Measurement	
↓ **cal**	
CAL 0.1/0.01 MOL KCL PRESS CAL	Dip sensor in KCl solution. The meter automatically compensates for the temperature deviation!
↓ **cal**	
Measured value Temperature Conductivity KCl Hourglass blinks	Calibration is performed.
↓	

Display: CELL CONSTANT.
The meter then automatically returns to measuring mode.

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

INST. FACTOR Calibration

(For inductive conductivity measurement only or with Memosens 4-electrode sensor with specification of installation factor)

Selected in the configuration menu.

Measurement

↓ **cal**

CAL
INST. FACTOR

In narrow installation conditions, the conductivity measurement is influenced by the sensor's distance to the wall and the wall material. This effect can be compensated for by the installation factor. The meter corrects the cell constant by multiplying it with the installation factor. The value of the installation factor depends on the diameter and the conductivity of the pipe as well as on the sensor's distance from the wall. If the distance from the wall is sufficient (> 15 mm (0.59"), DN 80 or larger), it is not necessary to consider the installation factor (1.00). If the distance from the wall is smaller, the installation factor increases (> 1) when the pipe is electrically insulating and decreases (< 1) when the pipe is electrically conductive. See the instructions in the sensor manufacturer's documentation.

↓ **cal**

Value blinks

Use ▲▼ to set the installation factor.

↓ **cal**

Calibration is performed.
Display: CELL CONSTANT, INST. FACTOR.
The meter then automatically returns to measuring mode.

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

ZERO POINT Calibration

(For inductive conductivity measurement only: calibrating the sensor zero point)

Selected in the configuration menu.

Measurement

↓ **cal**

CAL
ZERO POINT

Remove the sensor for calibration and place it in air – then start calibration.

↓ **cal**

The "hourglass" icon blinks until the zero point has been calculated:

Calibration is performed.

⧗

↓

Calibration is performed.
Display: CELL CONSTANT, ZERO POINT, INST. FACTOR.
The meter then automatically returns to measuring mode.

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

TEMP. OFFSET Calibration (option)

Temperature calibration (offset)

Selected in the configuration menu.

Measurement

↓ **cal**

CAL
TEMP. OFFSET

You can specify an offset for the temperature measured by the sensor.

After calibration has been activated, the following values are listed in the display:

- temperature setpoint
- temperature measured by sensor
- offset (display in K)

↓ **cal**

Temperature setpoint value blinks.

Use ▲▼ to set the temperature setpoint value.

↓ **cal**

Calibration is performed.
Display: TEMP. OFFSET.
The meter then automatically returns to measuring mode.

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

FREE CAL Calibration

(Free selection of calibration method)

FREE CAL calibration is selected in the configuration menu.

Measurement

↓ **cal**

CAL
CELL CONST. blinks

Use ▲▼ to select a calibration method (depending on the connected sensor: CELL CONST., COND, 0.01 MOL KCL, 0.1 MOL KCL, INST. FACTOR, ZERO POINT, TEMP. OFFSET).

↓ **cal**

Perform the selected calibration
as described on the previous pages.
The meter then automatically returns to measuring mode.

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

Keys for measurement

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.
5) By pressing the **STO** key, you can hold and save a measured value (see data logger, page 24).

Measurement can also be controlled using the Paraly SW 112 PC software.

Toggling Between Compensated and Uncompensated Measured Values

With temperature compensation (TC) activated, you can press the **meas** key during measurement to toggle between display of compensated and uncompensated values.

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:

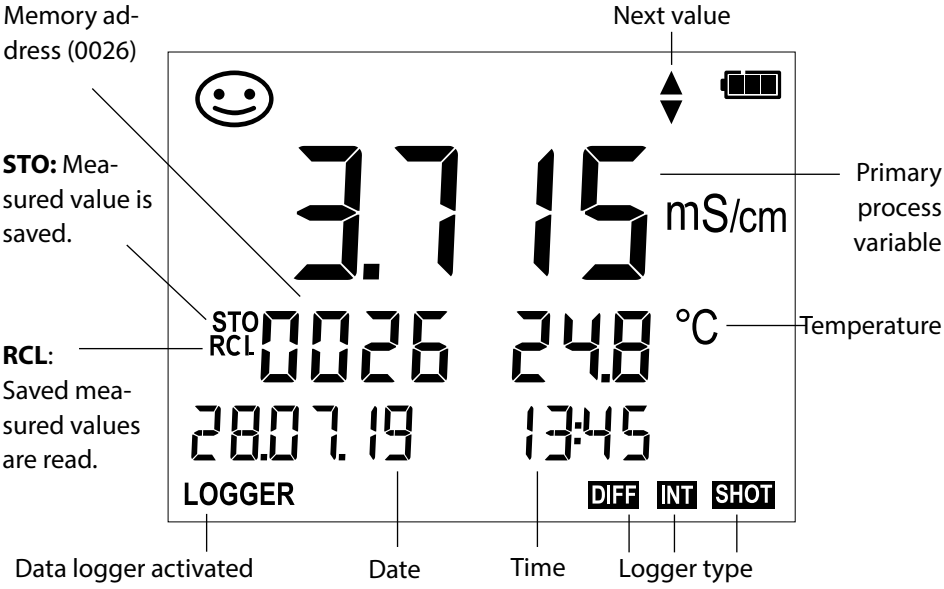
- DIFF (signal-controlled logging of measured variable and temperature)
- INT (time-controlled logging at a fixed interval)
- DIFF+INT (combined time- and signal-controlled logging)
- SHOT (manual logging by pressing the **STO** key)

The data logger records up to 5000 entries and saves them in a circular buffer. Already existing entries will be overwritten.
The following data are recorded: primary value, temperature, time stamp and device status.

Option 001 SOP can be used to set up an access lock for the data logger, which in the absence of an access code allows only logger data to be displayed (see page 34).

The Paraly SW 112 software allows convenient management of the data logger. It is always the currently selected process variable which is recorded. The "STO" icon and the memory address is displayed briefly to indicate that an entry is being saved.

Display: Icons Related to the Data Logger



Operating Modes of the Data Logger (Logger Type)

Manual Logging when Logger is Activated (SHOT)
In this mode, a measured value is recorded each time the **STO** key is pressed.

Measurement
Logger activated

↓ **STO**

The measured value is saved to the address of the last recorded value + 1.

Manual Logging when Logger is Deactivated

Measurement
Logger deactivated

↓ **STO**

Measured value is maintained
Proposed address blinks
(address of the last recorded value + 1)

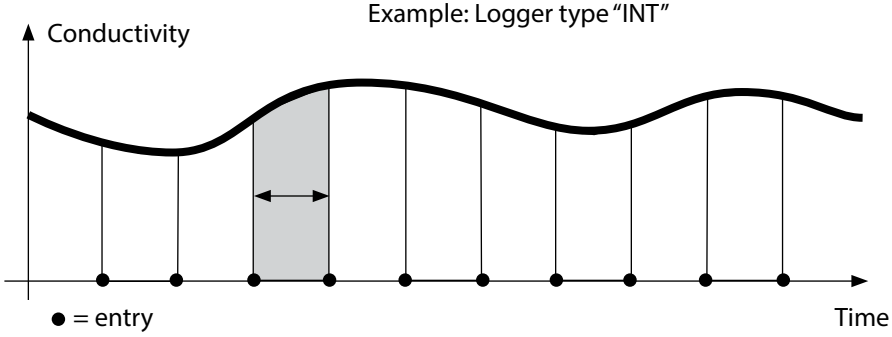
If desired: Select a start address using ▲▼.

↓ **STO**

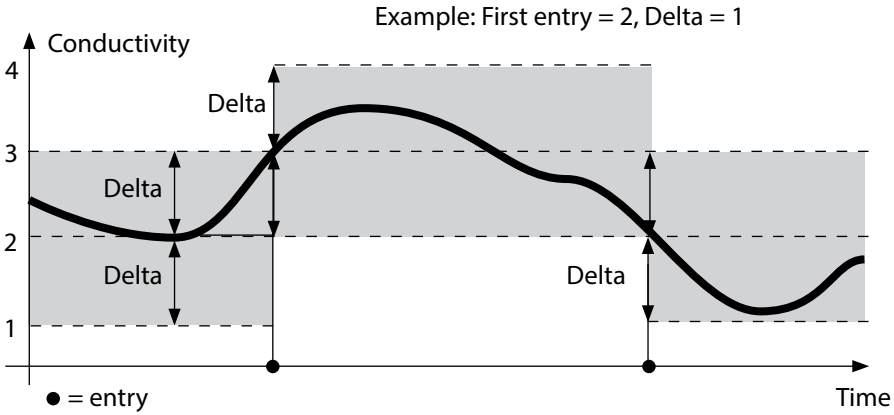
Measured value is saved to the desired address (e.g., for overwriting an incorrect measurement).

Interval (INT)
In this mode, the measured values are cyclically recorded.

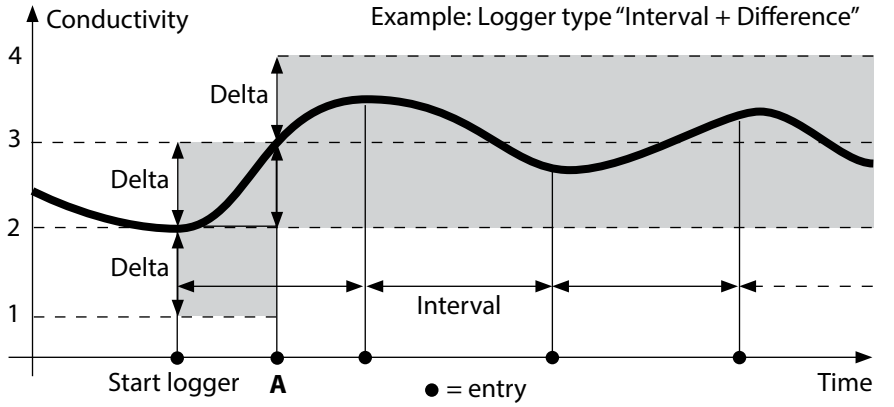
Example: Logger type "INT"



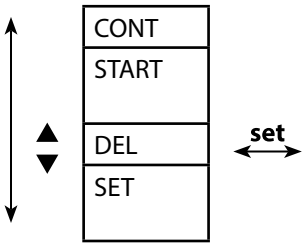
Difference (DIFF)
When the delta range (process variable and/or temperature) related to the last entry is exceeded, a new entry is created and the delta range is displaced upwards or downwards by the delta value. The first entry is automatically created when the data logger is started.



Difference + Interval Combined (DIFF+INT)
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.



Data Logger Menu



Configuring the Data Logger

Prerequisite: The data logger is stopped (press **meas**).

Measurement

↓ **STO**

Measured value is maintained

↓ **set**

Logger: CONT blinks

↓ ▼

Logger: START blinks

↓ ▼

Logger: DEL blinks

↓ ▼

Logger: SET blinks

↓ **set**

Logger: Current logger type blinks

Select desired logger type using ▲▼: DIFF, INT, DIFF+INT or SHOT.

↓ **set**

Select the appropriate parameters using ▲▼ and confirm each selection by pressing **set**. When configuration is finished, CONT blinks. You can start the data logger by selecting START or CONT (see page 29).

Configuring the Logger Type

Logger type	Select (default in bold print)	
DIFF [1)]	Delta cond	OFF | **1** … 9999 µS/cm OFF | **0.1** … 999.9 mS/m
	Delta Conc %	OFF | 0 … 10 % | **1 %**
	Delta SAL	OFF | **0.1** … 45.0 g/kg
	Delta TDS	OFF | **1** … 5000 mg/l
	Delta °C / °F	OFF | 0.1 … 50.0 °C | **1.0 °C** OFF | 0.1 …100.0 °F | **1.0 °F**
INT	Interval	h:mm:ss 0:00:01 … 9:59:59 | **0:01:00**
DIFF+INT	DIFF	See logger type DIFF
	INT	See logger type INT
SHOT	Currently selected process variable is saved.	

1) Process variables dependent on configuration, see page 16

Starting the Data Logger using CONT

Prerequisite: Data logger is configured. Every time the meter has been switched off, the data logger must be restarted (exception: SHOT).

Measurement

↓ **STO**

Measured value is maintained

↓ **set**

Logger: CONT blinks

↓ **set**

Address of the last recorded value + 1 blinks
(proposed start address)

If desired: Select a start address using ▲▼.

↓ **set**

The measured value is saved to the selected start address (exception: SHOT). "… FREE MEMORY" is displayed.
"LOGGER" and "active logger type" icons are displayed.

Starting the Data Logger using START

Prerequisite: Data logger is configured. All existing entries are deleted. The start address for saving the values is 0001. Every time the meter has been switched off, the data logger must be restarted (exception: SHOT).

Measurement

↓ **STO**

Measured value is maintained

↓ **set**

Logger: CONT blinks

↓ ▼

Logger: START blinks

↓ **set**

All entries will be deleted. "5000 FREE MEMORY" is displayed.
"LOGGER" and "active logger type" icons are displayed.

Displaying the Logger Data

Pressing the **RCL** key displays all stored values. The Paraly SW 112 PC software allows convenient management of the data logger.

Measurement

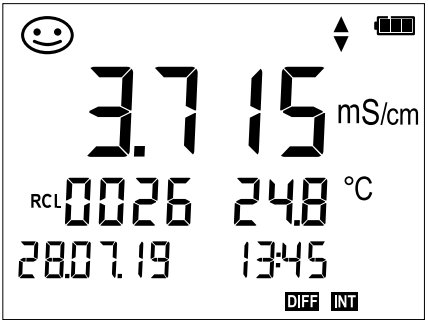
↓ **RCL**

The "RCL" icon and the last recorded value is displayed.

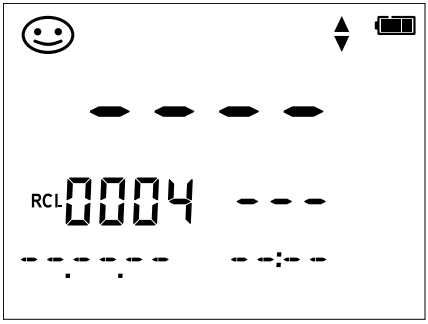
Use ▲▼ to select the desired address. Empty memory locations will also be displayed.

↓ **RCL** or **meas**

Return to measurement



Example:
Measured value stored at location 0026



Example:
Empty memory location 0004

Stopping the Data Logger

You can stop the data logger at any time by pressing the **meas** key.

Measurement, logger activated

↓ **meas**

Data logger is stopped. "LOGGER" and "active logger type" icons are no longer displayed. It is still possible to hold a measured value by pressing **STO** and send it to any desired address.

Clearing the Data Logger

Selecting "DEL" deletes all data records.

Measurement

↓ **STO**

Measured value is maintained

↓ **set**

Logger: CONT blinks

↓ ▼

Logger: START blinks

↓ ▼

Logger: DEL blinks
PRESS SET

↓ **set**

All stored data are deleted.
"0000 DELETED" is displayed.

Press the **clock** key to access the clock mode. Date and time will be displayed in the format as set in the configuration menu.
To set the clock, proceed as follows:

Display of time+date		
↓ **set**		
Hour display blinks SET HOUR	▲ ▼	Set value.
↓ **set**		
Minute display blinks SET MINUTE	▲ ▼	Set value.
↓ **set**		
Second display blinks and shows 00	**set**	Clock is started, the seconds count up.
↓ **set**		
Year display blinks SET YEAR	▲ ▼	Set value.
↓ **set**		
Month display blinks SET MONTH	▲ ▼	Set value.
↓ **set**		
Day display blinks SET DAY	▲ ▼	Set value.
↓ **set**		
Display of corrected time+date		

Option 001 SOP (Standard Operating Procedure)

Scope:

Sensor Verification
The Paraly SW 112 PC software allows a sensor to be assigned to the device.
See the Paraly SW 112 PC software user manual.

Setup / Cal / Logger Code
Access codes can be set on the meter or using the Paraly SW 112 PC software;
see page 35.
Configuration: SETUP CODE
Calibration: CAL CODE
Data logger: LOGGER CODE
Without entry of an access code, the data logger will only display logger data (**RCL**).

Temperature Calibration
(also separately available as Option 002 TEMP.CAL)

Option 002 TEMP.CAL (Temperature Calibration)

For Memosens sensors, you can perform a 1-point calibration of the internal temperature detector. See page 21 for a description.

Enabling Options / TAN Input

When you have bought an option, you receive a document with a code (TAN) for enabling this option on your device.
Press the **set** key to access the configuration mode.
Use the arrow keys to select the "TAN TEMP CAL" function, for example, where you can enter the TAN for enabling the option.

↓ **set**

TAN TEMP CAL	**set**	Press the **set** key.

↓ **set**

Enter the TAN code.

First digit blinks.	▲ ▼	Set value.

↓ **set**

Next digit blinks.	▲ ▼	Set value.

↓ **set**

...	▲ ▼	Set value, press **set** to save the TAN.

After correct input of the TAN, the device signals "PASS" – The option is now available.

Access Codes for CONF, CAL, and Data Logger

(with Option 001 SOP only)

Press the **set** key to access the configuration mode.
Use the arrow keys to select the "SETUP CODE" function and set an access code for configuration, "CAL CODE" to set an access code for calibration, and/or "LOGGER CODE" to set an access code for the data logger.

Important Note:
If you lose the SETUP access code, system access is locked.
See the next page for more information.

set

SETUP CODE	**set**	Press the **set** key.
set		
First digit blinks.	▲ ▼	Set value.
set		
Next digit blinks.	▲ ▼	Set value.
set		
...	▲ ▼	Set value, press **set** to save the configuration access code.

When accessing the configuration menu, you will be prompted to enter an access code.
If you want to set a code for access to calibration or the data logger, select "CAL CODE" or "LOGGER CODE" and proceed as described above.
Note: Functions are accessible to anyone with access code "0000".

Inputting the Rescue TAN

If you lose the SETUP access code, system access is locked.
The manufacturer can generate a rescue TAN (TAN RESCUE).
For this purpose, please have the serial number of the corresponding device to hand.
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.

The menu for input of the rescue TAN appears if the SETUP access code is incorrectly entered three times:

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

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

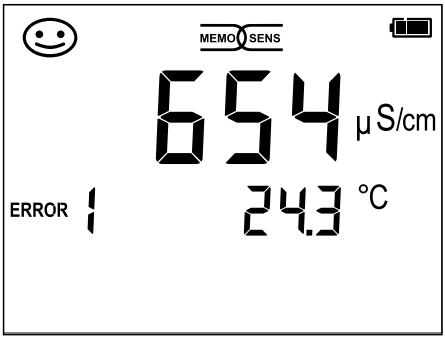
- Intuitive Windows user interface
- Easy configuration and management of several meters
- Display of device and sensor information
- Convenient management and evaluation of the data logger
- Export function for Microsoft Excel
- Print function
- Upgrade/downgrade of device firmware

Note: Prior to upgrading/downgrading the device firmware, Portavo is reset to its factory settings.
Make the following backups prior to upgrading or downgrading:

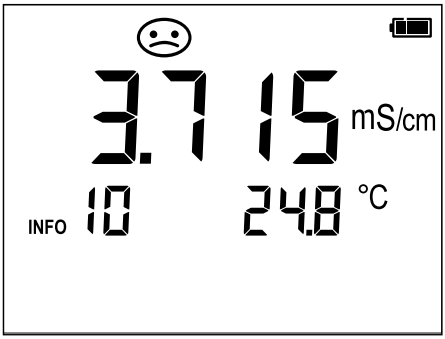
- Read out Portavo data logger.
- Save the Portavo device configuration in Paraly.

The Paraly SW 112 PC software, incl. a detailed user manual, can be downloaded from www.knick.de.

Error messages are indicated as "ERROR …" on the display. Information on the sensor condition is indicated by the "Sensoface" icon (friendly, neutral, sad) possibly accompanied by an info message ("INFO …").



Example of an error message:
ERROR 1 (value out of range)



Example of a "Sensoface" message:
INFO 10 (polarization)

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

The most important error messages and "Sensoface" info messages are shown on the inside of the protective cover. A complete list of messages and their meanings is provided in the following tables.

"Sensoface" Messages

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

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

The "neutral" and "sad" Sensoface icons are accompanied by an "INFO …" message to give a hint to the cause of deterioration.

Sensoface	Message	Cause
	INFO 6	Response time
	INFO 10	Polarization

Error Messages

The following error messages can be shown in the display.

Message	Cause	Remedy
 blinks	Battery empty	Replace batteries
ERROR 1	Value out of range	Check whether the measurement conditions correspond to the adjusted measuring range.
ERROR 3	Temperature value out of range	
ERROR 6	Cell constant too high/low	Enter nominal cell constant or calibrate the sensor using a known solution.
ERROR 11	Measured value unstable Drift too high	Leave the sensor in the liquid until the temperature is stable. If this does not help, replace the sensor.
ERROR 14	Time and date invalid	Set time and date
ERROR 18	Configuration invalid	Restart, reset to factory settings (Setup: DEFAULT YES), configure and calibrate. If this does not help, send in the device for repair.
ERROR 19	Factory settings error	Device defective, send it in.
ERROR 21	Sensor error (Memosens) or Sensor verification message	Connect an operational Memosens sensor. With sensor verification activated in Paraly SW 112, this error message indicates that an unassigned sensor was connected.

Accessories/Options

Item	Order No.
Robust field case (for meter, sensor, various small parts and user manual)	ZU0934
Li-ion battery (for Portavo 904 COND only)	ZU0925
Replacement quiver (5 units)	ZU0929
Adapter for process sensors with Ø 12 mm and PG 13.5 thread for use with quiver	ZU0939
Replacement KPG® tube for ZU6985 4-electrode sensor, incl. O-ring	ZU0180
Replacement flow cell for SE 202 2-electrode sensor	ZU0284
Adapter for connecting a conductivity sensor with 2 banana plugs	ZU0289
Adapter for connecting the ZU6985 4-electrode sensor	ZU0290
Base stand for mounting up to 3 sensors, with base plate made of stainless steel	ZU6953
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 toroidal conductivity sensors with Memosens protocol, 4-pin M12 coupling; 4-pin M8 connector	CA/M12-001M8-L
Measuring cable for connecting 2-/4-electrode sensors with VP connector	ZU1120

Temperature Detectors	Order No.
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. When a Memosens sensor is not connected, the Portavo can be used as a temperature meter.

TAN Options	Order No.
SOP (Standard Operating Procedure): 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

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

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, (0.001 mol/l KCl)	500 ml	CS-C147K/500
1413 µS/cm, (0.01 mol/l KCl)	500 ml	CS-C1413K/500
12.88 mS/cm, (0.1 mol/l KCl)	500 ml	CS-C12880K/500
Solutions for Preparation		
For preparation of 1000 ml 0.1 mol/l NaCl solution (12.88 mS/cm)	1 ampoule	ZU 6945

Conductivity input, analog	Multi-contact for 2-/4-electrode sensors with integrated temperature detector	
Measuring ranges	SE 202 sensor:	0.01 … 200 µS/cm
	SE 204 sensor:	0.05 … 500 mS/cm
	2-electrode sensors:	0.1 µS * c … 200 mS * c [4]
	4-electrode sensors:	0.1 µS * c … 1000 mS * c [4]
Measurement error[1,2,3]	< 0.5 % meas.val. + 0.4 µS * c [4]	
Measuring cycle	Approx. 1 s	
Display resolution [1] (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)
Temperature compensation	OFF Linear 0 … 20 %/K, reference temperature adjustable nLF: 0 ... 120 °C / 32 ... 248 °F NaCl HCl (ultrapure water with traces) NH_3 (ultrapure water with traces) NaOH (ultrapure water with traces)	
Concentration determination	See page 45	
Temperature input	Multi-contact for sensors with integrated temperature detector or 2x Ø 4 mm for separate temperature detector	
Measuring ranges	NTC30 temperature detector	-20 ... 120 °C / -4 ... 248 °F
	Pt1000 temperature detector	-40 ... 250 °C / -40 ... 482 °F
Measuring cycle	Approx. 1 s	
Measurement error[1,2,3]	< 0.2 K (Tamb = 23 °C / 73.4 °F); TC < 25 ppm/K	
Sensor adjustment		
Operating modes *	CELL CONST.	Enter cell constant
	COND	Entry of calibration solution conductivity
	0.1 / 0.01 MOL KCL	Automatic determination of cell constant with KCl solution
	INST. FACTOR [5]	Entry of installation factor
	ZERO POINT [5]	Zero calibration
	FREE CAL	Free selection of calibration method
Permissible cell constant	0.005 … 200.0 cm^{-1} (adjustable)	

*) User-defined
1) at rated operating conditions
2) ± 1 digit
3) Plus sensor error
4) c = cell constant
5) for inductive conductivity measurement

Conductivity input, Memosens	M8 socket, 4-pin, for Memosens laboratory cable	
Measuring range	SE 615/1-MS sensor:	10 µS/cm … 20 mS/cm
	For other sensors, see the sensor documentation.	
Measuring cycle	Approx. 1 s	
Display resolution [1] (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)
	Temperature	-50 … 250 °C / -58 ... 482 °F
Temperature compensation	OFF Linear 0 … 20 %/K, reference temperature adjustable nLF: 0 ... 120 °C / 32 ... 248 °F NaCl HCl (ultrapure water with traces) NH_3 (ultrapure water with traces) NaOH (ultrapure water with traces)	
Concentration determination	See page 45	
Sensor adjustment		
Operating modes *	CELL CONST.	Enter cell constant
	COND	Entry of calibration solution conductivity
	0.1 / 0.01 MOL KCL	Automatic determination of cell constant with KCl solution
	INST. FACTOR [2]	Entry of installation factor
	ZERO POINT [2]	Zero calibration
	TEMP. OFFSET (TAN option)	Software option SW-P002 for temperature probe adjustment in the Memosens sensor (offset correction)
	FREE CAL	Free selection of calibration method

*) User-defined
1) Ranges dependent on Memosens sensor
2) for inductive conductivity measurement

Connections	1 x DIN socket, 8 pins for analog sensors 2 x 4-mm socket for separate temperature detector 1x M8 socket, 4 pins, for Memosens lab cable 1 x micro USB-B for data transmission to PC **Portavo 904X:** Be sure to observe the safety instructions when using the USB port.	
Display	LCD STN 7-segment display with 3 lines and icons	
Sensoface	Status display (friendly, neutral, sad)	
Status indicators	For battery condition, logger	
Notices	Hourglass	
Keypad	[on/off], [cal], [meas], [set], [▲], [▼], [STO], [RCL], [clock]	
Data logger	With up to 5000 memory locations	
Recording	Manual, interval- or event-controlled	
Communication	USB 2.0	
Profile	HID, driverless installation	
Usage	Data exchange and configuration via Paraly SW 112 PC software	
Concentration determination	-01- NaCl	0 – 26 wt% (0 °C / 32 °F) ... 0 – 28 wt% (100 °C / 212 °F)
	-02- HCl	0 – 18 wt% (–20 °C / –4 °F) ... 0 – 18 wt% (50 °C / 122 °F)
	-03- NaOH	0 – 13 wt% (0 °C / 32 °F) ... 0 – 24 wt% (100 °C / 212 °F)
	-04- H_2SO_4	0 – 26 wt% (–17 °C /–1.4 °F) ... 0 – 37 wt% (110 °C / 230 °F)
	-05- HNO_3	0 – 30 wt% (–20 °C / –4 °F) ... 0 – 30 wt% (50 °C / 122 °F)
	-06- H_2SO_4	94 – 99 wt% (–17 °C/–1.4 °F) ... 89 – 99 wt% (115 °C / 239 °F)
	-07- HCl	22 – 39 wt% (–20 °C / –4 °F) ... 22 – 39 wt% (50 °C / 122 °F)
	-08- HNO_3	35 – 96 wt% (–20 °C / –4 °F) ... 35 – 96 wt% (50 °C / 122 °F)
	-09- H_2SO_4	28 – 88 wt% (–17 °C /–1.4 °F) ... 39 – 88 wt% (115 °C / 239 °F)
	-10- NaOH	15 – 50 wt% (0 °C / 32 °F) ... 35 – 50 wt% (100 °C / 212 °F)

Diagnostic functions	
Sensor data (Memosens only)	Manufacturer, sensor type, serial number, operating time
Calibration data	Calibration date; 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 Transmitters)
Explosion protection (Portavo 904X)	See control drawing for entity parameters.
RoHS conformity	According to directive 2011/65/EU
Power supply	
Portavo 904	Batteries: 4x AA alkaline or 4x NiMH (rechargeable) or 1x Li-ion battery, USB chargeable
Portavo 904X	4x AA batteries For battery types, see Control Drawing No. 209,009-110
Operating time	Approx. 1000 h (alkaline)
Rated operating conditions	
Ambient temperature	-10 °C … +55 °C
Ambient temperature 904X	-10 °C ≤ Ta ≤ +40 °C T4 Duracell MN1500 -10 °C ≤ Ta ≤ +50 °C T3 Energizer E91 -10 °C ≤ Ta ≤ +50 °C T3 Power One 4106 -10 °C ≤ Ta ≤ +50 °C T3 Panasonic Pro Power LR6
Transport/ Storage temperature	-25 °C … +70 °C
Relative humidity	0 … 95 %, short-term condensing allowed
Housing	
Material	PA12 GF30 (silver gray RAL 7001) + TPE (black)
Protection	IP66/67 with pressure compensation
Dimensions	approx. 132 x 156 x 30 mm
Weight	Approx. 500 g

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Version: 3
This document was last updated on March 31, 2021
The latest documents are available for download on our website
under the corresponding product description.

098203 TA-209.4CD-KNEN03