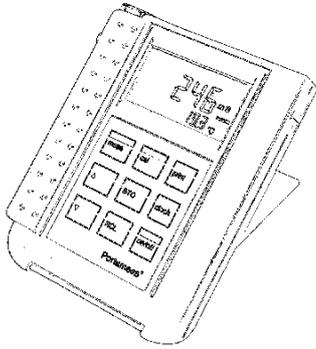


# Instruction Manual

Portamess® 913 Cond  
Portamess® 913 X Cond



ProMinent®



60983

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We reserve the right to make technical changes.

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TA-193.204-PME01 280901

Software version: 1.x

## Safety Precautions

### Be sure to read and follow these instructions !



The Portamess® 913 X Cond may only be opened to change the batteries outside hazardous areas. If repairs are necessary, the meter must be sent in to the factory.

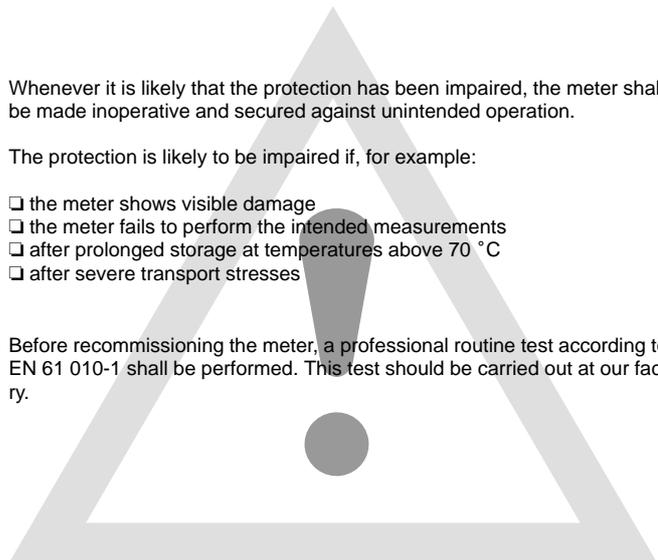
Never operate the remote interface or printer within hazardous areas.

Whenever it is likely that the protection has been impaired, the meter shall be made inoperative and secured against unintended operation.

The protection is likely to be impaired if, for example:

- the meter shows visible damage
- the meter fails to perform the intended measurements
- after prolonged storage at temperatures above 70 °C
- after severe transport stresses

Before recommissioning the meter, a professional routine test according to EN 61 010-1 shall be performed. This test should be carried out at our factory.



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## Information on this Instruction Manual

*ITALICS* are used for texts which appear in the Portamess<sup>®</sup> 913 (X) Cond display.

**Bold print** is used to represent the texts of keys, e.g. **cal**.



Display examples

or



Keys whose functions are explained are frequently shown in the left-hand column.

### Note



Notes provide important information which should always be observed when using the meter.

### Warning



Warning means that the instructions given must always be followed for your own safety. Failure to follow these instructions may result in injuries.

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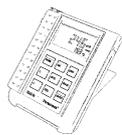
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# 1 The Model 913 (X) Cond

## Package contents

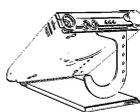


Please check the completeness of the shipment after un-packing.

The package should include:

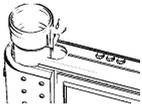
- Portamess® 913 (X) Cond incl. batteries and sensor container
- LF 204 sensor
- Carrying strap
- Instruction manual
- Short instructions in German, English and French
- Interface cable with adapter for printer and PC
- Paraly® SW 105 transfer software
- Field case

## Short description of meter



- The Portamess® 913 (X) Cond measures conductivity, salinity, TDS and temperature in industry, the environment, food processing and waste-water treatment.
- Operation of the Portamess® 913 X Cond is also permitted in Zone 1 hazardous areas.
- The meter meets the EMC requirements of 89-336-EEC and the recommendations as per NAMUR NE 21.
- The meter is IP 66 protected to EN 60 529 (jet water from all directions).





❑ Temperature compensation is automatic with an NTC 30 k $\Omega$  or a Pt 1000 temperature probe (automatic recognition during power-on). When using sensors without a temperature probe, the temperature can be manually specified.

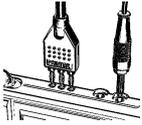
❑ Calibration can be carried out by directly entering the cell constants, by calibrating with calibration solutions KCl 0.01 mol/l or 0.1 mol/l or with any other buffer solutions.



❑ The datalogger records up to 100 measured values with the temperature, date and time. Recording takes place either manually, interval or event-controlled.

❑ To minimize battery consumption, the meter switches off after either one or twelve hours when it is not operated.

❑ Only three AA batteries are required for uninterrupted operation for approx. 1,000 hours.



❑ With the Paraly SW 105 software, the meter can be completely remote-controlled from a PC. All measured values and parameters can be read out and easily processed further (e.g. with Microsoft Excel).

❑ Measured values and meter records can also be output directly to a printer via the serial interface.

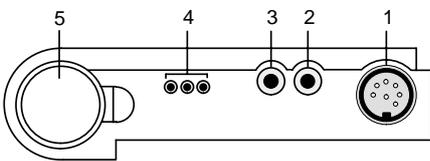
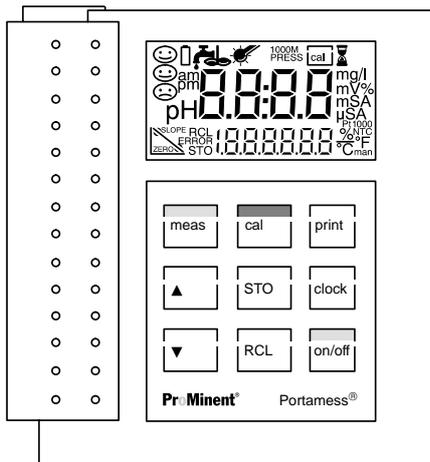
**Warning**



**Never** use the remote interface in hazardous areas!

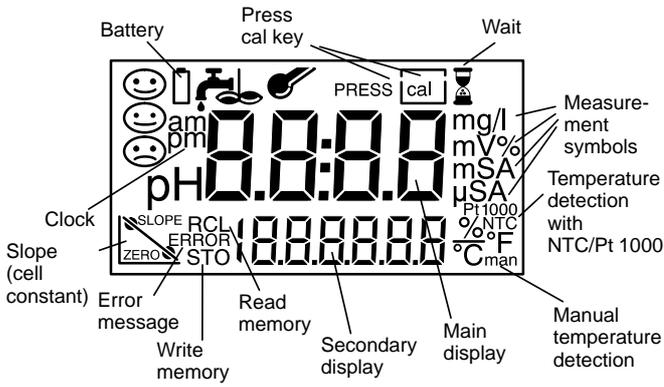
## 2 Operation

### Meter design



- 1 Sensor connection
- 2, 3 Separate temperature probe connection
- 4 PC/printer interface connection
- 5 Sensor container, removable

## Display



## Keypad



Pressing **on/off** switches the meter on or off. After switching on, the meter automatically carries out a self-test and adjusts itself to the connected temperature probe.



Pressing **meas** returns the meter to the measuring mode from any function. Pressing **meas** in the measuring mode displays the following parameters:  
*Cond* measuring mode: temperature compensation  
*tdS* measuring mode: TDS factor

### Note



The meter can also be switched on with **meas**. However, in this case only a short test is conducted without determination of the temperature probe. The meter assumes that the last temperature probe determined is used.



Pressing **cal** starts calibration.



With ▲ and ▼ you can select and change parameters and select a mode.



Pressing **clock** switches the meter into the clock mode. All measurement processes are cancelled and the battery consumption is reduced to a minimum.



Pressing **STO** records the measured value in the display and stores it in the data memory.



Pressing **RCL** displays stored measured values.



Pressing **print** outputs the currently measured value to a printer or PC.



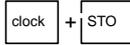
Pressing **RCL** and then **print** prints out the data memory.



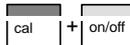
Pressing **cal** and then **print** prints out the meter record.



Pressing **STO** and then **clock** switches the meter into the datalogger mode.



Pressing **clock** and **STO** simultaneously activates the mode for setting the date and time.



Pressing **cal** and **on/off** simultaneously when the meter is switched off, activates the configuration menu.

## Note



When pressing two keys simultaneously, make sure that the key shown at the left is pressed first.

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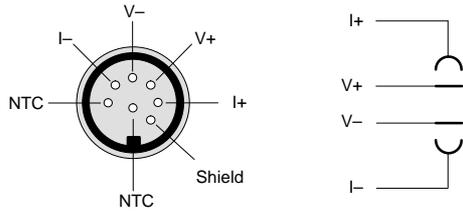
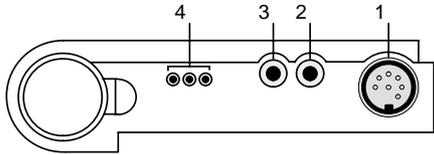
## Connection and start-up

**Connecting sensor** The following sensor from the line of accessories can be connected to the meter.

LF 204                      4-electrode sensor with integrated  
NTC 30 k $\Omega$  temperature probe

**Connection assignment**      **Connection** ..... **Socket**

Sensor ..... 1  
Separate temperature probe ..... 2, 3  
Interface ..... 4



If no temperature probe is used for measurement, the meter operates with the manually set temperature and *man* appears in the display.

**Note**  When using a sensor with integrated temperature probe, do not connect an external temperature probe.

- Note**  If the meter is connected to a PC and is used to take measurements in a grounded liquid, measuring errors may result.
- Note**  Prior to first use, the cell constant, temperature compensation and time and date must be checked and set, if required. The cell constant is printed on the sensor head and listed in the sensor specifications (also see Pg. 29).
- Note**  The calibration and configuration data and the contents of the data memory remain permanently stored both with the meter switched off and with the batteries removed (battery replacement).
-  Pressing **on/off** switches the meter into the measuring mode. When switched on, the meter determines the connected temperature probe and conducts a self-test:
- Simultaneous appearance of all display segments
  - Display of the model number
  - Display of the software version
- Note**  For recognition of the temperature probe, the conductivity sensor must be connected to the meter before power-on. The temperature probe is only recognized during the power-on procedure after pressing **on/off**.
- Note**  The meter can also be switched on with **meas**. However, in this case only a short test is conducted without determination of the temperature probe. The meter assumes that the last temperature probe determined is used.
- Note**  The LF 204 sensor has an integrated NTC temperature probe.

---

## Configuration

The following basic settings can be changed in the configuration:

- Function *Cond* (conductivity), *SAL* (salinity) or *tdS* (Total Dissolved Solids or evaporation residue)
- Calibration by entering the cell constants (*AutCal Off*) or calibration with calibration solution (*AutCal On*)
- Automatic meter switch-off after  
1 hour or 12 hours
- Interface  
Printer output On/Off, baud rate
- Temperature display  
°C or °F
- Date and time format  
24 hours and day, month, year or  
12 hours (a.m./p.m.) and month, day, year



To activate the configuration, hold down **cal** with the meter switched off and then press **on/off**.

# Conf

The menu items of the configuration menu are worked through in sequence. Use ▲ and ▼ to change the setting of the respective menu item. **STO** saves the parameters and switches to the next menu item.



Pressing **meas** exits the configuration menu at any time. The value last displayed and possibly changed will then not be saved.

### Function

Select the measuring function *Cond* (conductivity), *SAL* (salinity) or *tdS* (Total Dissolved Solids or evaporation residue).

### Automatic or manual calibration

Select whether you wish to adapt the sensor by directly entering the cell constants or by calibrating with a calibration solution and automatic drift check. (Default setting: Direct entry of the cell constant (*AutCAL OFF*))

OFF  
AutCAL

Direct entry of the cell constants (*AutCal OFF*) from 0.010 cm<sup>-1</sup> to 199.9 cm<sup>-1</sup>. (Default setting 0.475 cm<sup>-1</sup>)

On  
AutCAL

Automatic calibration (*AutCAL On*) with 0.1 molar KCl solution, 0.01 molar KCl solution or entry of the temperature-compensated conductivity of another known calibration solution.

**Automatic meter switch-off**

To protect the batteries, the meter switches off automatically when not operated for a longer time.

1 h  
AutOFF

Switch-off after one hour or after twelve hours. (Default setting: 1 hour). In the interface mode or when the datalogger is active, the meter is not switched off.

**Interface**

On  
Print

If the meter is controlled with a PC and interface conflicts occur when the print key is pressed, the print function should be deactivated (*Print OFF*). (Default setting: Print On, 4,800 baud)

4800  
BAUD

The transmission speed can be set to 600, 1,200, 2,400, 4,800 or 9,600 baud. The transmission speed must correspond to that set in the printer or PC. The data format and protocol are permanently set to 7 bit, one stop bit, even parity and XON/XOFF protocol (NAMUR NE 28).

**Temperature display**

°C  
TEMP

The temperature can be displayed either in °C or °F. (Default setting: °C)

---

**Date and time format** You can choose between the display format 24 hours and day.month.year and the format 12 hours a.m./p.m. and month.day.year.

**24:00** (Default setting: 24 hours and day.month.year)  
DATE

## Calibration

With calibration the Portames® 913 (X) Cond is adjusted to the cell constant of the sensor.  
It is generally sufficient to enter the cell constant specified by the sensor manufacturer in the meter.

### General information on calibration

<b>Calibration solutions</b>	Solutions for calibration of conductivity measuring devices are unbuffered systems. Care should be taken to use fresh conductivity standards and to avoid contamination of the conductivity standard by water droplets adhering to the conductivity sensor.
<b>Clean sensors</b>	Before calibration, make sure that the conductivity sensor is clean. Residues should be rinsed off with distilled water. Afterwards, the sensor should be wiped dry and rinsed with the calibration solution to be used.
<b>Cell constant</b>	The cell constant is determined by the size and geometric arrangement of the measuring electrodes. It is the characteristic parameter of conductivity sensors. The cell constant changes very little over time. The prerequisite is clean electrode surfaces without insulating deposits. Regular calibration is therefore generally not necessary.
<b>4-electrode sensors</b>	With 4-electrode sensors the principle of separate current/voltage electrodes results in virtually no measuring errors even in the case of partial soiling of the measuring electrodes. However, electrodes completely soiled with insulating coatings cause the measurement to fail.
<b>LF 204 sensor</b>	For the LF 204 conductivity sensor, the cell constant is specified with a tolerance of 1.5 %. This cell constant is entered and stored in the calibration mode ( <i>AutCAL OFF</i> ). An additional calibration with calibration solutions is not necessary.

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**Calibration by direct entry of the cell constant (*AutCAL OFF*)**

LF 204 sensor:  $c = 0.475 \text{ cm}^{-1}$



Press **cal** to activate calibration. The cell constant determined or set during the last calibration is displayed. Pressing **meas** exits calibration again.



Set the cell constant of the sensor used with ▲ and ▼ and confirm with **cal**. Then the meter switches back into the measuring mode.

Calibration with 0.1 or 0.01 molar KCl solution (AutCAL On)

**Note**  Impurities must always be prevented from getting into the calibration solutions.



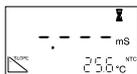
Pressing **cal** activates calibration. Calibration can be exited again with **meas**. Then the cell constant of the last calibration is displayed briefly.



Select the calibration solution used (CALSoL). A 0.1 and a 0.01 molar KCl solution are available to choose from. Confirm the corresponding solution with **cal**.

Immerse the clean and dry sensor in the calibration solution (also see "Clean sensors", Pg. 11).

Press **cal** to start calibration. If calibration is not desired, cancel the process with **meas**.



During calibration the lower line indicates the temperature. The automatic drift check checks the stability of conductivity and temperature. The hour glass flashes.



When the measured values are stable, the temperature-compensated table value of the KCl solution is displayed. The measured conductivity value flashes.

Confirm with **cal**.



The determined cell constant is displayed for a few seconds. Then the meter switches back into the measuring mode.

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## Calibration with any calibration solution (AutCAL ON)

**Note**  Impurities must always be prevented from getting into the calibration solutions.



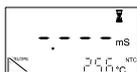
Pressing **cal** activates calibration.  
Calibration can be exited again with **meas**. Then the cell constant of the last calibration is displayed briefly.



First confirm any of the 0.1 or 0.01 mol/l KCl solutions (CALSoL) with **cal**.

Immerse the clean and dry sensor in the calibration solution (also see "Clean sensors", Pg. 11).

Press **cal** to start calibration. If calibration is not desired, cancel the process with **meas**.



During calibration the lower line indicates the temperature. The automatic drift check checks the stability of conductivity and temperature. The hour glass flashes.



When the measured values are stable, the temperature-compensated table value of the KCl solution is displayed. The measured conductivity value flashes.

See the table of your calibration solution for the conductivity value which belongs to the displayed measuring temperature.

Set the temperature-compensated conductivity in the meter with ▲ and ▼, then confirm it with **cal**.



The determined cell constant is displayed for a few seconds. Then the meter switches back into the measuring mode.

## Measurement

**Measuring mode** With **meas** the measuring mode can be reached from all functions. In the measuring mode the main display indicates the measured variable and the secondary display the temperature.

**Note**  If the Portamess® 913 (X) Cond is connected to a PC and measurements are taken in a grounded liquid, measuring errors may result.

### Measuring the conductivity (Cond)



The main display indicates the measured conductivity, the secondary display the temperature.

**Temperature compensation** The instrument offers various temperature compensation methods. With **meas** and ▲ or ▼ the temperature compensation method can be selected and set:



(*tc OFF*) No temperature compensation



(*tc nLF*) Temperature compensation with non-linear characteristic to EN 27088 or DIN 38404.8 for natural water and ultrapure water (reference temperature 25 °C). In the secondary display *tc* also appears.



(*tc 0.01 – 9.99 %/°C*) Temperature compensation with linear characteristic and definable temperature coefficients (reference temperature 25 °C). In the secondary display *tc* also appears.

**Note**  When you have selected temperature compensation with linear characteristic, you can only exit this function or select the nonlinear function when the temperature coefficient has been set to 0.00.

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### Measuring the salinity (SAL)



The main display indicates the measured salinity in ‰ (g/kg), the secondary display the temperature.

### TDS determination (TDS)



The main display indicates the concentration of the dissolved solids contributing to the solution conductivity (TDS, comparable to the evaporation residue) in mg/l, the secondary display the temperature.

**TDS factor** Pressing **meas** and then ▲ or ▼ sets the TDS factor within the range 0.40 – 1.00.

**Note**  The TDS factor is dependent on the composition of the water to be tested and must be determined for each water type.

**Manual temperature specification** The display *man* signals that no temperature probe is connected. The meter operates with the manually specified temperature. The specified temperature can be edited with the ▲ and ▼ keys in the *Cond* measuring mode.

## Data memory

Up to one hundred measured values can be saved in the data memory together with the temperature, date and time. Storage is performed either manually or automatically using the datalogger. The currently measured value is stored.

### Writing memory

Press **STO**.  
The currently measured value is shown in the display.



Select any memory location with ▲ and ▼.  
Press **STO** to store the measured value in the selected memory location. After storing, the memory location number is automatically incremented and the meter returns to measuring mode.



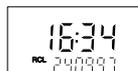
### Reading memory

Pressing **RCL** displays the last stored value.

Select any memory location using ▲ and ▼.



Pressing **RCL** switches between the measured value and the time/date of storage.  
In this way, for example, a value can be searched for which was stored at a certain time.



Pressing **meas** returns to the measuring mode.

### Clearing memory

To clear the entire data memory, press **STO** to enter the memory mode and then press **clock** to access the datalogger mode. Here select Clear (CLr) with ▲ or ▼.



By confirming this with **STO**, the entire data memory is cleared.



If you do not want to clear the memory, press **meas** to abort the procedure.

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## Datalogger

**Datalogger** The datalogger records up to 100 measured values together with temperature, time and date in the data memory. Recording is carried out either manually at the press of a button, interval or event-controlled. The datalogger always stores the currently measured value.

STO

clock

Press **STO** to access the memory mode and then **clock** to access the datalogger mode.

STO

Pressing **STO** confirms the selected mode. In the Continue and Start mode this also starts the datalogger. The current memory location is shown in the display. If "Clear" has been selected, all memory locations are cleared and the meter returns to measuring mode.

meas

Pressing **meas** ends the datalogger mode.

### Data logging modes

Cont  
LOGGER

After pressing **STO**, logging is continued after the memory location in which the last measured value was stored (continue). Press **meas** to end logging.

Clr  
LOGGER

After pressing **STO**, the entire data memory is cleared without starting the datalogger (clear).

Start  
LOGGER

After pressing **STO**, the entire data memory is cleared. Storage begins from memory location "00" (start). Press **meas** to end logging.

Setting the datalogger parameters

PAR  
LOGGER

In the parameter setting mode, you select whether data storage is to be interval, event-controlled or manual. Press **STO** to access the logging functions.

Int  
LOGGER

To select interval-controlled storage of measured values, press **STO** and set the interval in which the recording is to take place using ▲ and ▼. The interval range is between 5 seconds and 60 minutes. Default time (factory-set) is 2 minutes. After selecting your interval time, press **STO** to enter the value.

dIFF  
LOGGER

With event-controlled data storage, a measured value is not stored until it deviates from the last memory value by the preset differential value. Using the time also stored, you can determine when the value has changed. The differential value is entered in the subsequent parameter-setting step.

Note 

The differential value is always based on the currently set measured variable (conductivity, salinity or TDS). This means that if differential conductivity values are to be logged, the meter must be set to conductivity measurement prior to parameter setting and data logging.

Shot  
LOGGER

With manual data logging, the measured values are saved with **STO**.

STO

After selecting the above parameters, select "Continue" or "Start" using the ▲ and ▼ keys and then press **STO** to commence logging.

Note 

The datalogger is a ring memory, i.e. it does not stop after reaching the last memory location (99). Recording is automatically continued with memory location number 00. To avoid losing data by overwriting, download stored data and clear the logger before beginning a new set of data. Be aware of this when using interval-controlled data collection.

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## Clock mode



Pressing **clock** exits the measuring mode, or enters the clock mode with the meter switched off. The time and date are displayed.  
In this mode the battery consumption of the meter is reduced to a minimum.

**Setting clock** To set the clock or the date, the clock mode must be activated.



Press **clock** and **STO** simultaneously.

The time display flashes. Now the time can be set using ▲ and ▼.

Pressing **STO** again saves the displayed time. Now the date can be set.

Press **STO** again to save the date. Now the year can be set.  
Press **STO** to confirm the year. The meter returns to the clock mode.



Press **meas** to return to measuring mode.

## Serial interface

**Note**  If the meter is connected to a PC and measurements are taken in a grounded liquid, measuring errors may result.

With the remote interface, you can directly send data to a printer with serial port or set up a direct connection to a personal computer. Via the computer, the meter can be completely remote controlled and all data and parameters can be read. Using the printer (e.g. Lab Printer, Order No. 100 87 17), you can directly print measured values, the memory and records.

**Interface parameters** The RS 232 interface can be defined for all common baud rates. Setting is carried out in the Configuration menu

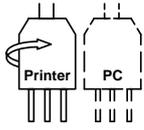
- Baud rate:           600 Bd
- 1,200 Bd
- 2,400 Bd
- 4,800 Bd (default setting)
- 9,600 Bd

The data format and protocol are permanently set to:

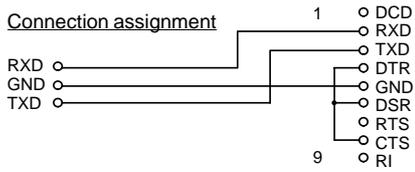
- 7 bits
- even parity
- one stop bit
- XON/XOFF protocol

**Note**  For the command set of the Portamess® 913 (X) Cond, refer to the online help of the Paraly SW 105 transfer software.

## Interface cable



Only one interface cable is required to operate with a printer or PC. By simply turning the plug around on the meter's interface port, the cable can be used to connect either printer or PC. The label facing the operator should match the output device being connected.



## Standard setting for Lab Printer

Configuration on meter	Parameter	Setting
	Baud rate	4800
	Printer	On

## Printing measured values and records

**Note**  Make sure that the printer function is activated in the configuration (*Print On*) and the set baud rate corresponds to that of the printer.

**Printing measured values**  
 Press **print** while in the measuring mode to print out the currently measured value. The measured value is printed out together with the temperature, date, time and a three-digit identification number. The identification number is reset when the meter is switched off.

**Printing memory**  
  Press **RCL** and then **print** to print out the logged data. All stored measured values are printed with temperature, date, time and memory location number.  
If you only want to print individual memory locations, press **RCL** first. Then select the desired memory location with **▲** or **▼** and confirm with **print**.

## Note



If the permissible measurement or temperature range has been exceeded during data logging or if the clock has not been set, the line on the print-out will be marked with "#". If temperature compensation was active during data logging, the line on the print-out will be marked with "!".

## Printing record

To print out the meter record, press **cal** and then **print**. The record print-out contains:



- a calibration record with the data of the last calibration
- the settings of the configuration menu
- a record of the last meter self-test

---

## 3 Troubleshooting and Maintenance

### Error messages

**Range limits exceeded** If a measured value lies outside the ranges accepted by the meter, an error message appears and the measured-value display flashes.

**ERROR 1** The measurement range was exceeded.

Possible causes:

- Sensor defective
- Break in sensor cable
- Wrong sensor connected
- Wrong cell constant entered

**ERROR 3** The measured temperature is outside the ranges:

Conductivity -20 °C to +120 °C

nLF: 0 °C to 120 °C

Salinity: 0 °C to 30 °C

TDS: 10 °C to 40 °C

Possible causes:

- Temperature probe in sensor defective
- Short circuit in temperature probe
- Wrong temperature probe connected

**Note**  When changing the conductivity sensor, note that the temperature probe type (Pt 1000/NTC 30 kΩ) is only recognized when the meter is switched on with **on/off**.

**Calibration error messages** If errors occur during calibration, or if the determined sensor data are outside the valid range, an error message appears (ERROR 6, ERROR 11).

- ERROR 6** The cell constant lies outside the permissible range  $< 0.01 \text{ cm}^{-1}$  or  $> 199.9 \text{ cm}^{-1}$ .
- Possible causes:
- No sensor connected during calibration
  - Wrong calibration solution
  - Sensor not immersed far enough in calibration solution
- ERROR 11** The calibration was cancelled after approx. 2 minutes, because the drift was too large. This message only appears briefly during calibration.
- Possible causes:
- Sensor defective or dirty
  - Sensor cable insufficiently shielded or defective
  - Strong electric fields influence the measurement
  - Major temperature fluctuation of the calibration solution
  - Calibration solution unstable
  - Conductive connection between potential to ground, PC, meter and measuring medium
- ERROR 14** If the clock has not been set, e.g. after battery replacement, this error message is displayed. To clear the message, set the clock (see Pg. 20).

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**ERROR 15** If errors occur during transmission via the RS 232 interface, this error message appears. To eliminate the error message, switch the meter off and then on again. Should the error message occur again, check the settings in the Configuration menu.

Possible causes:

- Wrong transmission rate (baud rate) set (see Pg. 9)
- Error during transmission
- Wrong data format (see Pg. 21) e.g. parity bit

**ERROR 18** If the meter determines an error during the self-test, an error message appears.

Possible causes:

- Configuration or calibration data are defective. Completely reconfigure and recalibrate the meter.

**ERROR 19** Error in the factory settings or system memory. "FAIL" appears in the display.

FAIL

Possible causes:

- EPROM or RAM defective
- Error in meter factory settings

**Note**  This error message should normally not occur, as the data are protected from loss with multiple safety functions. Should this error message nevertheless appear, no remedy is available. The meter must be repaired and recalibrated at the factory.

## Maintenance

### Changing batteries



When the battery symbol appears in the display, the batteries need replacement. However, the meter can still be used for a few days. If the battery voltage continues to drop, the meter will switch itself off. (Since battery consumption is higher when the remote interface is used, the battery symbol is displayed earlier.)



Never change the batteries within a hazardous area. Use only alkaline AA (or LR 6) cells. Make sure that the meter is carefully closed again and the protective cover with the rating plate is properly mounted on the meter after changing the batteries.

To replace the batteries, you need 3 alkaline AA cells and a screwdriver (either straight-blade or Phillips).

- Close the protective cover and remove the sensor container.
- Lift the hook, unscrew the four screws on the back of the meter and remove the lid.
- Remove the old batteries from the battery holder.
- Insert the new batteries in the specified direction.
- Make sure the protective cover is in the notches provided and the rubber seal is correctly seated, especially near the sensor socket.
- Remount the lid and secure it with the screws. Be sure to tighten the screws thoroughly.
- Remount the sensor container.

### Note



When changing the batteries, all calibration and configuration data and the memory contents are retained. The time and date must be reset. The current memory location number of the data memory is set to 00.

---

**Note**

After battery replacement recording will also be continued with memory location 00 when the meter is in the datalogger mode "Continue". If you have stored measured values before battery replacement and you do not want to overwrite them, set the first memory location to be written with **RCL** and ▲ or ▼ before restarting the datalogger.

**Warning**

If you want to store the meter for a longer time, the batteries must always be removed beforehand. Leaky batteries may damage the meter.

**Cleaning the meter**

To remove dust and dirt, the external surfaces of the meter may be cleaned with water, and also with a mild household cleaner if necessary.

**Warning**

Beware of electrostatic charging when using the meter in hazardous areas!  
For example, never wipe the meter with a dry cloth.

## Appendix

### Accessories

	<b>Ref. No.</b>
Printer	1008717
Printer paper (5 rolls)	1008718
Printer ribbon (5 pieces)	1008719
Sensor container 5 pieces (for leak-proof storage of the sensors)	1008716
<b>Sensor</b> LF 204 4-electrode cell	1008723
Material: epoxy/graphite	
Cell constant $0.475 \text{ cm}^{-1}$	
Range: $0.1 \mu\text{S/cm} - 500 \text{ mS/cm}$	

**Note**  For calibrating the 4-electrode cell, you can use the conductivity standard by Merck, Merck Order No.: 1203, for example. (KCl solution 0.01 mol/l, retraceable to RSM by NIST)

## Specifications for Portamess® 913 (X) Cond

Ranges	Conductivity: 0.1 $\mu\text{S/cm}$ to 1,000 $\text{mS/cm}$ ( $c > 0.8 \text{ cm}^{-1}$ ) 0.1 $\mu\text{S/cm}$ to 500 $\text{mS/cm}$ ( $c = 0.2$ to $0.8 \text{ cm}^{-1}$ ) 0.01 $\mu\text{S/cm}$ to 199.9 $\mu\text{S/cm}$ ( $c < 0.2 \text{ cm}^{-1}$ ) Temperature: $-20.0$ to $+120.0 \text{ }^\circ\text{C}$ / $-4$ to $+248 \text{ }^\circ\text{F}$ nLF: 0 to $+120 \text{ }^\circ\text{C}$ Salinity: 0.0 to 45.0 $\text{g/kg}$ (0 to $30^\circ\text{C}$ ) TDS: 0 to 1,999 $\text{mg/l}$ (10 to $40^\circ\text{C}$ )
Display	LCD 35 x 67 mm, character height 15 mm
Measurement cycle	Approx. 2 sec
Measurement error ( $\pm 1$ count)	Conductivity: $< 0.5 \%$ of measured value <sup>1)</sup> Temperature: $< 0.3 \text{ K}$
Input 1 (Sensor)	Multi-contact for 2 and 4-electrode sensors with integrated temperature probe
Input 2 (Temperature)	4 mm sockets for separate Pt 1000 / NTC (30 $\text{k}\Omega$ ) temperature probe
Permissible cell constant	0.010 to $199.9 \text{ cm}^{-1}$ (adjustable)
Sensor standardization	Direct entry of the cell constant, Automatic determination of the cell constant with KCl solution 0.01 mol/l or 0.1 mol/l, Sensor standardization with any known solutions
Meter self-test	During switch-on routine, segment test, memory test, display of model number and software version
Temperature measurement	Pt 1000 / NTC 30 $\text{k}\Omega$ (automatic recognition during switch-on) or manual temperature entry
Temperature compensation	Linear characteristic: 0.01 to 9.99 $\%/^\circ\text{C}$ nLF (non-linear characteristic for ultrapure water and natural water to EN 27088 (DIN 38404.8))
Data memory	100 memory locations: conductivity, salinity or TDS, with temperature, date and time
Datalogger	Manual, interval-controlled or event-controlled <sup>*)</sup>

\*) configurable      1) For conductivities  $> 500 \text{ mS/cm}$   $< 1\%$  meas. value

Remote interface	Serial RS 232 interface, bidirectional, asynchronous, baud rate user-defined (600 to 9,600 baud), can be used as either printer or computer interface
Data retention	Configuration/calibration data and factory settings >10 years
Automatic switch-off	After either 1 or 12 hours <sup>*)</sup> , ineffective during interface or datalogger operation
Emitted interference	EN 61 326 Class B
Immunity to ESD	EN 61 326, EN 61 326/A1, NAMUR NE 21
Explosion protection (only 913 X Cond)	EEx ia IIC T6
Ambient temperature	Operation: -10 to +55 °C Transport and storage: -20 to +70 °C
Power supply	3 AA (or LR 6) batteries, alkaline-manganese
Operating time	Approx. 1,000 h <sup>2)</sup> , clock operation > 2 years
Enclosure	Material: PA, type of protection: IP 66, with integrated sensor container
Dimensions	133 x 160 x 30 mm (W x H x D)
Weight	Approx. 560 g with batteries

### Specifications for Lab Printer

Printer type	Matrix printer
Interface	Serial RS 232 interface
Paper	Normal paper, width 57.5 mm (2.25 inches)
Data transfer	Baud rate: 4,800 baud, data bits: 7, stop bits: 1, parity: even
Power supply	230 Vac ± 10 %
Dimensions	197 x 73 x 153 mm (W x H x D)
Weight	Approx. 1.2 kg incl. plug-in mains adapter

\*) configurable

2) Due to storage, the service life of the included battery may be shorter.





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## Glossary

<b>Automatic switch-off (AutOFF)</b>	To protect the batteries, the meter switches off automatically when not operated for a longer period. Switch-off can take place after either one hour or twelve hours. When the datalogger is active, the meter is not switched off.
<b>cal</b>	Key for activating calibration.
<b>Calibration</b>	Adjustment of the conductivity meter to the cell constant of the sensor used.
<b>Calibration solution</b>	Solution with exactly defined conductivity for calibrating a conductivity meter.
<b>Datalogger</b>	The datalogger records up to 100 measured values together with the temperature, date and time in the data memory. Recording takes place either interval or event-controlled (measured-value difference) or manually at the push of a button.
<b>Data memory</b>	Up to 100 measured values can be stored in the data memory together with the temperature, time and date.
<b>Evaporation residue</b>	See TDS.
<b>GLP</b>	Good Laboratory Practice: Rules for conducting and documenting measurements in the laboratory.
<b>meas</b>	Pressing this key returns to the measuring mode from all other levels. In the measuring mode <i>Cond</i> the set temperature compensation is displayed by pressing <b>meas</b> , in the TDS mode the TDS factor.
<b>NAMUR</b>	German committee for measurement and control standards in the chemical industry

<b>nLF</b>	Non-linear temperature compensation for ultrapure water with NaCl traces and for natural water to EN 27088 (DIN 38404.8), reference temperature = 25 °C.
<b>Response time</b>	Time from the start of a calibration step to the stabilization of the measured value.
<b>Salinity</b>	The salinity indicates the salt content, particularly of sea waters as a cumulative parameter. It is specified in g/kg (‰).
<b>TDS</b>	Total Dissolved Solids, corresponds to the concentration of the dissolved solids contributing to the conductivity – comparable to the evaporation residue.

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