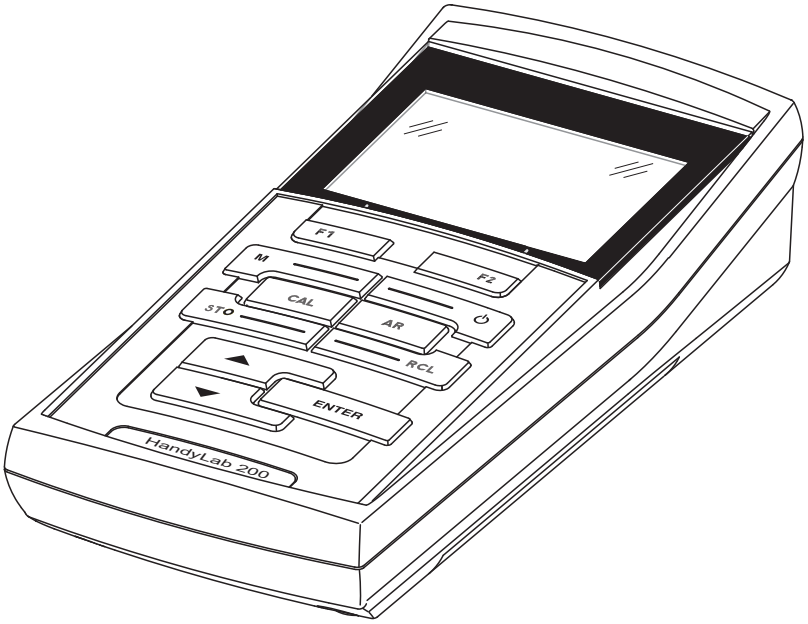
OPERATING MANUAL

ba77063e03 01/2018



HandyLab 200

CONDUCTIVITY METER

SI Analytics

a xylem brand

For the most recent version of the manual, please visit www.si-analytics.com.

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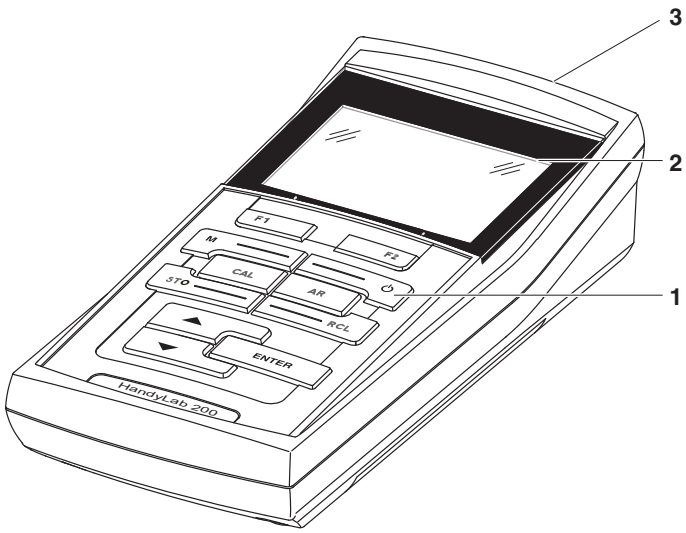
1 Overview

The HandyLab 200 compact precision conductivity meter enables you to perform conductivity measurements quickly and reliably.

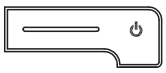
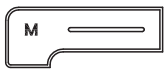
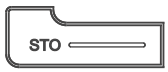
The HandyLab 200 provides the maximum degree of operating comfort, reliability and measuring certainty for all applications.
The proven procedures for determining or adjusting the cell constant support your work with the conductivity meter.



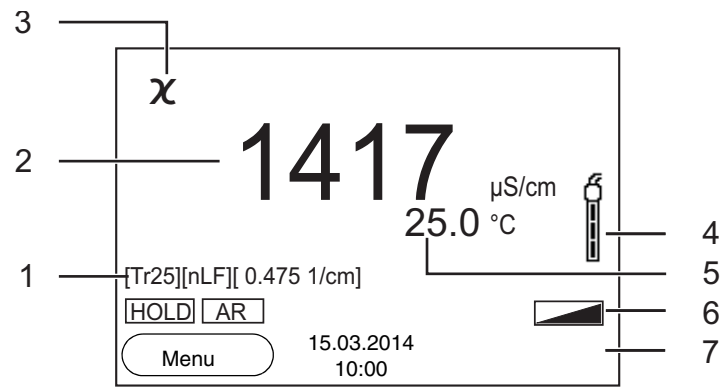
1 Keypad
2 Display
3 Connectors

1.1 Keypad

In this operating manual, keys are indicated by brackets <..> .
The key symbol (e.g. **<ENTER>**) generally indicates a short keystroke (under 2 sec) in this operating manual. A long keystroke (approx. 2 sec) is indicated by the underscore behind the key symbol (e.g. **<ENTER__>**).

	**<F1>:** **<F1__>:** **<F2>:**	Softkey providing situation dependent functions, e.g.: **<F1>**/[Menu]: Opens the menu for measurement settings **<F1__>**/[Menu]: Opens the menu for system settings
	**<On/Off>:**	Switches the meter on or off
	**<M>**:	Selects the measured parameter
	**<CAL>**: **<CAL__>**:	Calls up the calibration procedure Displays the calibration data
	**<STO>**:	Saves a measured value manually
	**<RCL>**:	Displays the manually stored measured values
	**<▲>**:	Increments values, scrolls
	**<▼>**:	Decrements values, scrolls
	**<ENTER>**: **<ENTER__>**:	Opens the menu for measurement settings / confirms entries Opens the menu for system settings
	**<AR>**	Freezes the measured value (HOLD function) Switches the AutoRead measurement on or off

1.2 Display

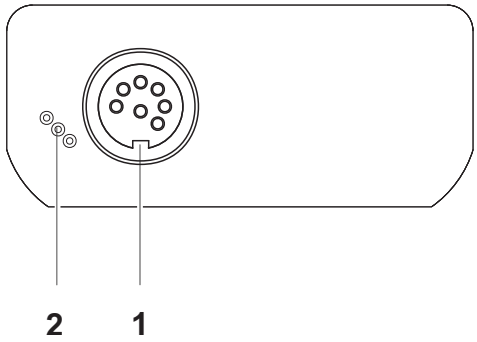


1 Status information
2 Measured value (with unit)
3 Measured parameter
4 Sensor symbol (calibration evaluation, calibration interval)
5 Measured temperature (with unit)
6 Status line
7 Softkeys and date + time

Function display indicators

Error	An error occurred during calibration
AR	Stability control (AutoRead) is active
HOLD	Measured value is frozen (**<AR>** key)
	Batteries are almost empty

1.3 Connectors



1 Conductivity measuring cell
2 Service interface

Caution
Only connect measuring cells to the meter that cannot return any voltages or currents that are not allowed (> SELV and > current circuit with current limiting).
Almost all customary measuring cells fulfill these conditions.

2 Safety

This operating manual contains basic instructions that you must follow during the commissioning, operation and maintenance of the meter. Consequently, all responsible personnel must read this operating manual before working with the meter.
The operating manual must always be available within the vicinity of the meter.

Target group

The meter was developed for work in the field and in the laboratory. Thus, we assume that, as a result of their professional training and experience, the operators will know the necessary safety precautions to take when handling chemicals.

Safety instructions

Safety instructions in this operating manual are indicated by the warning symbol (triangle) in the left column. The signal word (e.g. "Caution") indicates the level of danger:

Warning
indicates instructions that must be followed precisely in order to avoid possibly great dangers to personnel.

Caution
indicates instructions that must be followed precisely in order to avoid the possibility of slight injuries or damage to the instrument or the environment.

Further notes

Note
indicates notes that draw your attention to special features.

Note
indicates cross-references to other documents, e.g. operating manuals.

2.1 Authorized use

Authorized use of the meter consists exclusively of the measurement of conductivity, resistivity, salinity, TDS (total dissolved solids) and temperature in a laboratory or field environment.
The technical specifications as given in chapter 7 TECHNICAL DATA must be observed. Only the operation and running of the meter according to the instructions given in this operating manual is authorized.
Any other use is considered **unauthorized**.

2.2 General safety instructions

This meter is constructed and tested in compliance with the IEC 1010 safety regulations for electronic measuring instruments.
It left the factory in a safe and secure technical condition.

Function and operational safety

The smooth functioning and operational safety of the meter can only be guaranteed if the generally applicable safety measures and the specific safety instructions in this operating manual are followed during operation.

The smooth functioning and operational safety of the meter can only be guaranteed under the environmental conditions that are specified in chapter 7 TECHNICAL DATA.

If the meter was transported from a cold environment to a warm environment, the formation of condensate can lead to the faulty functioning of the meter. In this event, wait until the temperature of the meter reaches room temperature before putting the meter back into operation.

Caution
The meter is only allowed to be opened by authorized personnel.

Safe operation

If safe operation is no longer possible, the meter must be taken out of service and secured against inadvertent operation!
Safe operation is no longer possible if the meter:

- has been damaged in transport
- has been stored under adverse conditions for a lengthy period of time
- is visibly damaged
- no longer operates as described in this manual.

If you are in any doubt, please contact the supplier of the meter.

Obligations of the purchaser

The purchaser of this meter must ensure that the following laws and guidelines are observed when using dangerous substances:

- EEC directives for protective labor legislation
- National protective labor legislation
- Safety regulations
- Safety datasheets of the chemical manufacturers.

Caution
In addition to the safety instructions mentioned here, also follow the safety instructions of the sensors used.

3 Commissioning

3.1 Scope of delivery

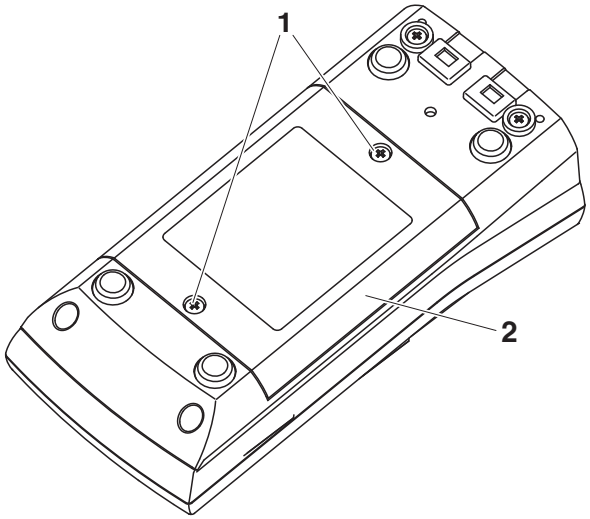
- Conductivity meter HandyLab 200
- 4 batteries 1.5 V Mignon type AA
- Short instructions
- CD-ROM with
  - detailed operating manual

3.2 Initial commissioning

Perform the following activities:

- Insert the supplied batteries
- Switching on the meter
- Set the date and time

3.2.1 Inserting the batteries



1	Unscrew the screws (1) on the underside of the meter.
2	Open the battery compartment (2) on the underside of the meter.

Caution
Make sure that the poles of the batteries are positioned correctly. The ± signs on the batteries must correspond to the ± signs in the battery compartment.

Note
Alternatively, you can also use Ni-MH rechargeable batteries (type Mignon AA). In order to charge the batteries, an external charging device is required.

3	Place four batteries (type Mignon AA) in the battery compartment.
4	Close the battery compartment.

3.2.2 Switching on the meter

1	Press the **<On/Off>** key. The meter performs a self-test. The display shows the manufacturer's logo while the self-test is being performed. Subsequently, the meter switches to the measuring mode (measured value display).

Note
The meter has an energy saving feature to avoid unnecessary battery depletion.
The energy saving feature switches off the meter if no key is pressed during the adjusted interval. (How to set the switch-off interval, see section 4.3.1).

3.2.3 Setting the date and time

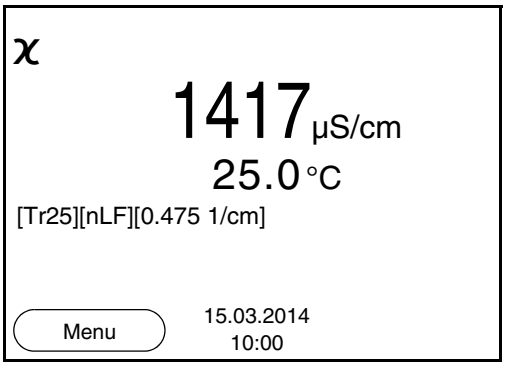
1	See section 4.2.4

4 Operation

4.1 Switching on the meter

Switching on

Press the **<On/Off>** key.
The meter performs a self-test.
The display shows the manufacturer's logo while the self-test is being performed.
The measured value display appears.



Switching off

Press the **<On/Off>** key.

Automatic switch-off function

The instrument has an automatic switch-off function in order to save the batteries (see section 4.3.1). The automatic switch-off function switches off the meter if no key is pressed for an adjustable period.

Display illumination

The meter automatically switches off the display illumination if no key is pressed for 30 seconds. The illumination is switched on with the next keystroke again.

You can also generally switch the display illumination on or off (see section 4.3.1).

4.2 General operating principles

This section contains basic information on the operation of the HandyLab 200.

Operating elements, display

An overview of the operating elements and the display is given in section 1.1 and section 1.2.

Operating modes, navigation

An overview of the operating modes and navigation of the HandyLab 200 is given in section 4.2.1 and section 4.2.2.

4.2.1 Operating modes

The instrument has the following operating modes:

- Measuring
  The measurement data of the connected sensor are shown in the measured value display
- Calibration
  The course of a calibration with calibration information, functions and settings is displayed
- Storing in memory
  The meter stores the measurement data manually
- Setting
  The system menu or a sensor menu with submenus, settings and functions is displayed

4.2.2 Navigation

Measured value display

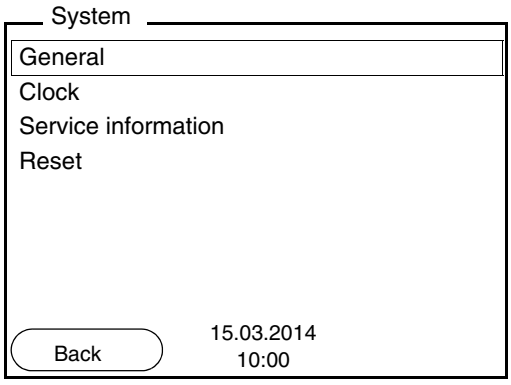
In the measured value display, you can

- open the menu for calibration and measurement settings with **<F1>** (short keystroke)
- Open the *Storage & config* menu with the sensor-independent settings with **<F1__>** (long keystroke, approx. 2 s).
- Change the display in the measurement window by pressing **<M>** (e.g. conductivity –> resistivity –> –> –>).

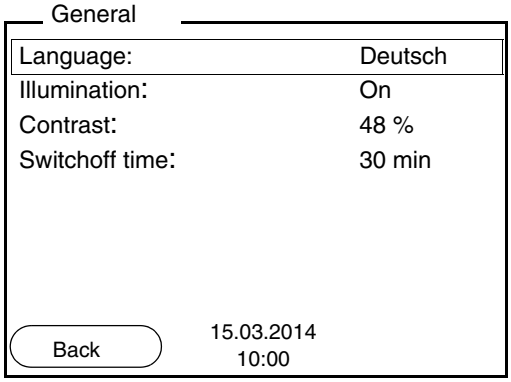
Menus and dialogs

The menus for settings and dialogs in procedures contain further sub-elements. The selection is made with the **<▲><▼>** keys. The current selection is displayed with a frame.

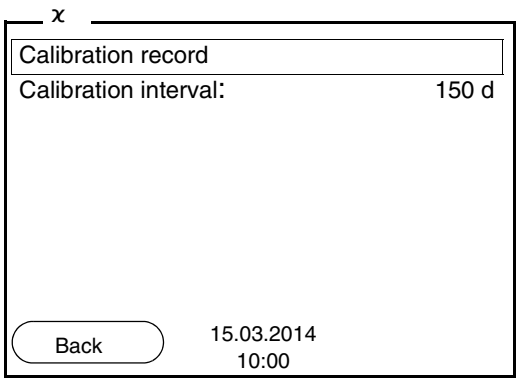
- Submenus
  The name of the submenu is displayed at the upper edge of the frame. Submenus are opened by confirming with **<ENTER>**. Example:



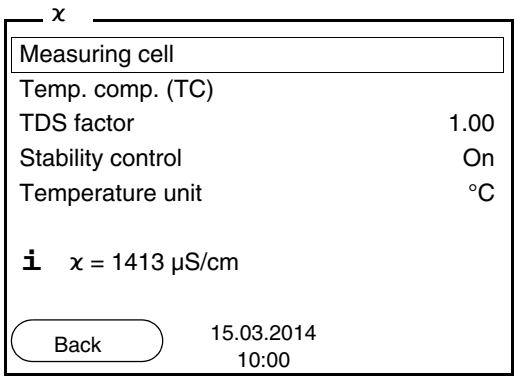
- Settings
  Settings are indicated by a colon. The current setting is displayed on the right-hand side. The setting mode is opened with **<ENTER>**. Subsequently, the setting can be changed with **<▲><▼>** and **<ENTER>**. Example:



- Functions
  Functions are designated by the name of the function. They are immediately carried out by confirming with **<ENTER>**.
  Example: Display the *Calibration record* function.



Messages Information is marked by the **i** symbol. It cannot be selected. Example:

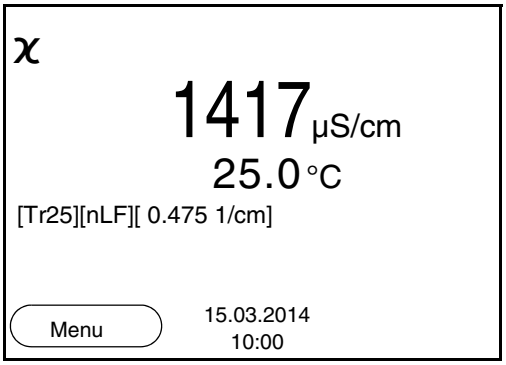


Note
The principles of navigation are explained in the two following sections by reference of examples:

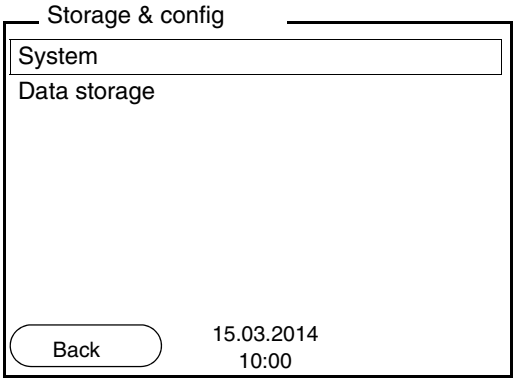
- Setting the language (section 4.2.3)
- Setting the date and time (see section 4.2.4).

4.2.3 Navigation example 1:Setting the language

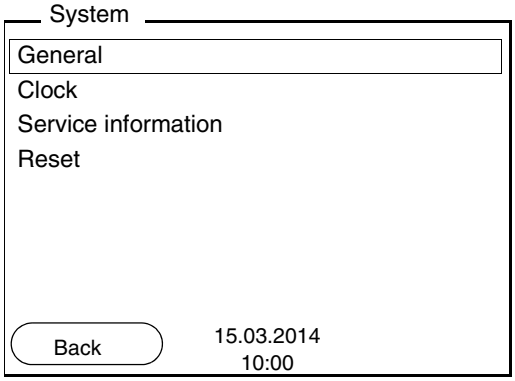
1	Press the **<On/Off>** key. The measured value display appears. The instrument is in the measuring mode.



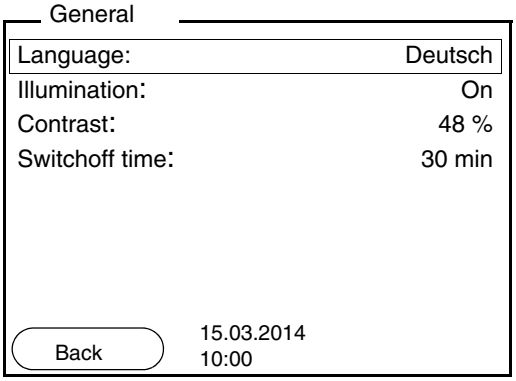
2	Using **<F1__>**/[Menu], open the *Storage & config* menu. The instrument is in the setting mode.



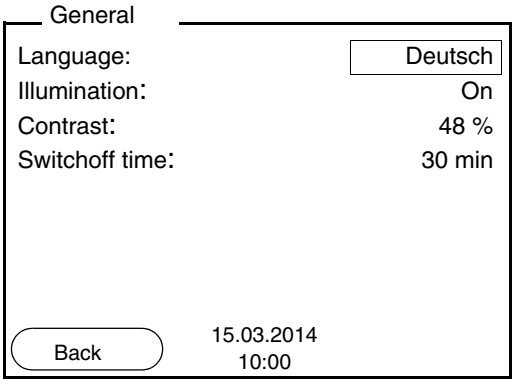
3	Select the *System* submenu with **<▲><▼>**. The current selection is displayed with a frame.
4	Open the *System* submenu with **<ENTER>**.



5	Select the *General* submenu with **<▲><▼>**. The current selection is displayed with a frame.
6	Open the *General* submenu with **<ENTER>**.



7	Open the setting mode for the *Language* with **<ENTER>**.



8	Select the required language with **<▲><▼>**.
9	Confirm the setting with **<ENTER>**. The meter switches to the measuring mode. The selected language is active.

4.2.4 Example 2 on navigation: Setting the date and time

The meter has a clock with a date function. The date and time are indicated in the status line of the measured value display.
When storing measured values and calibrating, the current date and time are automatically stored as well.

The correct setting of the date and time and date format is important for the following functions and displays:

- Current date and time
- Calibration date
- Identification of stored measured values.

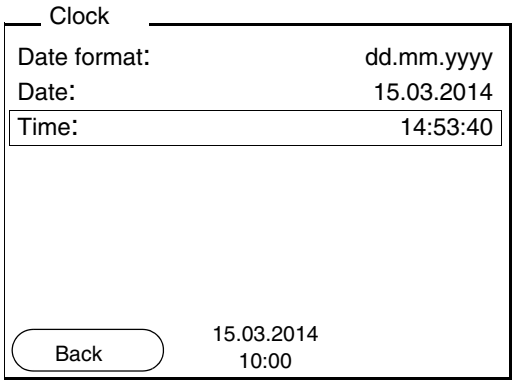
Therefore, check the time at regular intervals.

Note
The date and time are reset to default after a fall of the supply voltage (empty batteries).

Setting the date, time and date format

The date format can be switched from the display of day, month, year (*dd.mm.yyyy*) to the display of month, day, year (*mm/dd/yyyy* or *mm.dd.yyyy*).

1	In the measured value display: Using **<F1__>**/*[Menu]*, open the *Storage & config* menu. The instrument is in the setting mode.
2	Select and confirm the *System* / *Clock* menu with **<▲><▼>** and **<ENTER>**. The setting menu for the date and time opens up.
3	Select and confirm the *Time* menu with **<▲><▼>** and **<ENTER>**. The hours are highlighted.



4	Change and confirm the setting with **<▲><▼>** and **<ENTER>**. The minutes are highlighted.
5	Change and confirm the setting with **<▲><▼>** and **<ENTER>**. The seconds are highlighted.
6	Change and confirm the setting with **<▲><▼>** and **<ENTER>**. The time is set.
7	If necessary, set the *Date* and *Date format*. The setting is made similarly to that of the time.
8	To make further settings, switch to the next higher menu level with [Back]**<F1>**. or Switch to the measured value display with **<M>**. The instrument is in the measuring mode.

4.3 Sensor-independent settings

The *Storage & config* menu comprises the following settings:

- *System* (see section 4.3.1).
- *Data storage* (see section 4.3.2)

4.3.1 *System*

Overview

The following sensor-independent meter characteristics can be adjusted in the *Storage & config*/*System* menu:

- Menu language
- Illumination
- Display contrast
- Interval of the automatic switch-off function
- Clock and date function
- Reset of all sensor-independent system settings to the default condition

Settings

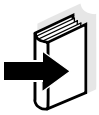
To open the *Storage & config* menu, press the **<F1__>**[Menu] key in the measured value display. After completing the settings, switch to the measured value display with **<M>**.

Menu item	Setting	Explanation
System / *General* / *Language*	*Deutsch* *English* (more)	Selects the menu language
System / *General* / *Illumination*	*Auto* *On* *Off*	Switches the display illumination on/off
System / *General* / *Contrast*	0 ... 100 %	Changes the display contrast
System / *General* / *Switchoff time*	10 min ... 24 h	Adjusts the switch-off time
System / *Clock*	*Time* *Datum* *Date format*	Settings of time and date. For details, see section 4.2.4

Menu item	Setting	Explanation
System / *Service information*		Hardware version and software version of the meter are displayed.
System / *Reset*	-	Resets the system settings to the default values. For details, see section 4.6.2

4.3.2 *Data storage*

This menu contains all functions to display, edit and erase stored measured values.



Note
Detailed information on the memory functions of the HandyLab 200 is given in section 4.5.

4.3.3 Automatic *Stability control*

The function, automatic *Stability control* (AutoRead) continually checks the stability of the measurement signal. The stability has a considerable impact on the reproducibility of measured values.

You can activate or switch off the automatic *Stability control* function (see section 4.4.4).

The measured parameter flashes on the display

- as soon as the measured value is outside the stability range
- when you switch over between the measured parameters with **<M>**.
- when the automatic *Stability control* is switched off.

4.4 Conductivity

4.4.1 General information

You can measure the following parameters:

- Conductivity
- Specific resistance
- Salinity
- Total dissolved solids (TDS)

Temperature measurement

The conductivity measuring cells LF413T, LF313T and LF213T have an integrated temperature sensor.

Preparatory activities

Perform the following preparatory activities when you want to measure:

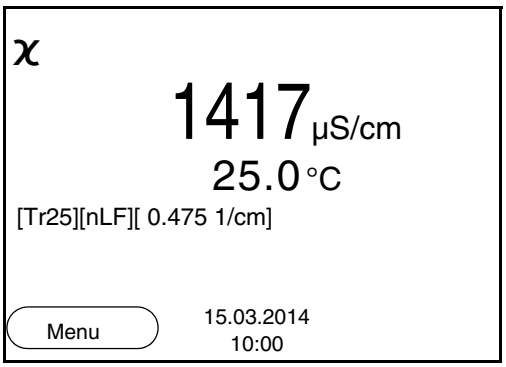
1	Connect a conductivity measuring cell to the measuring instrument. The conductivity measuring screen is displayed.
2	Check whether the *Measuring cell* and cell constant settings are suitable for the connected conductivity measuring cell. If necessary, correct the settings.

Note
The selection of the measuring cell and the setting of the cell constant is done in the measurement settings menu for conductivity (see section 4.4.4). The cell constant to be set must either be taken from the operating manual of the measuring cell or is printed on the measuring cell.

4.4.2 Measuring

You can carry out conductivity measurements as follows:

1	Perform the preparatory activities according to section 4.4.1.
2	Immerse the conductivity measuring cell in the test sample.



Selecting the displayed measured parameter

You can switch between the following displays with **<M>**:

- Conductivity [µS/cm] / [mS/cm]
- Resistivity [Ω·cm] / [kΩ·cm] / [MΩ·cm]
- Salinity SaL [ ]
- Total dissolved solids TDS [mg/l] / [g/l]

The factor to calculate the total dissolved solids is set to 1.00 in the factory. You can adjust this factor to meet your requirements in the range 0.40 ... 1.00. The factor is set in the *Measurement* menu for the parameter, TDS.

Stability control (AutoRead)

The stability control function (AutoRead) continually checks the stability of the measurement signal. The stability has a considerable impact on the reproducibility of measured values.

The measured parameter flashes on the display

- as soon as the measured value is outside the stability range
- when the automatic *Stability control* is switched off.

You can start the *Stability control* manually at any time, irrespective of the setting for automatic *Stability control* (see page 23) in the *Measurement* menu.

1	Freeze the measured value with **<AR>**. The [HOLD] status indicator is displayed. The HOLD function is active.

2	Using **<ENTER>**, activate the *Stability control* function manually. The [AR] status indicator appears while the measured value is assessed as not stable. A progress bar is displayed and the display of the measured parameter flashes. The [HOLD][AR] status indicator appears as soon as a stable measured value is recognized.

Note
You can prematurely terminate the *Stability control* function manually with **<ENTER>** at any time. If the *Stability control* function is prematurely terminated, the current measurement data are output to the interface without the AutoRead info.

3	Using **<ENTER>**, start a further measurement with stability control. or Release the frozen measured value again with **<AR>** or **<M>**. The [AR] status display disappears. The display switches back to the previous indication.

Criteria for a stable measured value

The *Stability control* function checks whether the measured values are stable within the monitored time interval.

Measured parameter	Time interval	Stability in the time interval
Conductivity χ	10 seconds	Δ : better than 1.0% of measured value
Temperature	15 seconds	Δ : better than 0.5 °C

The minimum duration until a measured value is assessed as stable is the monitored time interval. The actual duration is mostly longer.

4.4.3 Temperature compensation

The calculation of the temperature compensation is based on the preset reference temperature, 20 °C or 25 °C. It appears on the display as *Tr20* or *Tr25*.

You can select one of the following temperature compensation methods:

- **Nonlinear temperature compensation** (***nLF***) according to EN 27 888
- **Linear temperature compensation *(Lin)*** with adjustable coefficients in the range of 0.000 ... 10.000 %/K
- No temperature compensation (off)

Note
The reference temperature and temperature compensation are set in the *Measurement* menu for the parameter, conductivity (see section 4.4.4).

Application tips

Select the following temperature compensations given in the table according to the respective test sample:

Test sample	Temperature compensation	Display indicator
Natural water (ground water, surface water, drinking water)	*nLF* according to EN 27 888	*nLF*
Ultrapure water	*nLF* according to EN 27 888	*nLF*
Other aqueous solutions	*Lin* Set linear temperature coefficient 0.000 ... 10.000 %/K	*Lin*
Salinity (seawater)	Automatic *nLF* according to IOT (International Oceanographic Tables)	*Sal*, *nLF*

4.4.4 Settings for conductivity measuring cells

Overview

The following settings are possible for conductivity measuring cells:

- Calibration record (display)
- Calibration interval
- Measuring cell/cell constant
- Reference temperature
- Temperature compensation
- TDS factor
- Unit of the temperature
- Automatic Stability control

Settings

The settings are made in the *Measurement* menu for the measured parameter, conductivity. To open the settings, display the required parameter in the measured value display and press the **<F1>**/[menu] or **<ENTER>** key. After completing the settings, switch to the measured value display with **<M>**.

Menu item	Possible setting	Explanation
Calibration / *Calibration record*	-	Displays the calibration record of the last calibration.
Calibration / *Calibration data storage*	-	Displays the last calibration records.
Calibration / *Calibration interval*	1 ... 999 d	*Calibration interval* for the measuring cell (in days). The meter reminds you to calibrate regularly by the flashing sensor symbol in the measuring screen.
Measurement / *Measuring cell* / *Type*		*Measuring cell* used
	Cal	Measuring cells the cell constant of which is determined by calibration in the KCL control standard solution. Calibration ranges: 0.450 to 0.500 cm^{-1} and 0.800 to 0.880 cm^{-1} The currently valid cell constant is displayed in the status line.
	LF313T	Measuring cell LF313T, nominal cell constant 0.100 cm^{-1}. The cell constant can be adjusted in the range from 0.090 to 0.110 cm^{-1}.
	LF213T	Measuring cell LF213T, nominal cell constant 0.010 cm^{-1}. The cell constant is permanently set.

Menu item	Possible setting	Explanation
	man	Any measuring cells with freely adjustable cell constants.
Measurement / *Measuring cell* / *Cell const. man*	0.250 ... 25.000 cm^{-1}	Display and setting option of the cell constant of any measuring cells (*man*).
Measurement / *Measuring cell* / *Cell const.* LF313T	0.090 to 0.110 cm^{-1}	Display and setting options for the cell constant of the measuring cell LF313T.
Measurement / *Temp. comp. (TC)* / *Method*	*nLF* *Lin* *Off*	Procedure for temperature compensation (see section 4.4.3). This setting is only available for the measured parameters, χ and ρ.
Measurement / *Temp. comp. (TC)* / *Linear coeff.*	0,000 ... 3,000 %/K	Coefficient of the linear temperature compensation. This setting is only available when the linear temperature compensation is set.
Measurement / *Temp. comp. (TC)* / *Reference temp.*	20 °C 25 °C	Reference temperature This setting is only available for the measured parameters, χ and ρ.
Measurement / *TDS factor*	0.40 ... 1.00	Factor for TDS value
Measurement / *Stability control*	*On* / *Off*	Switches on or off the automatic stability control during measurement (see section 4.3.3)
Measurement / *Temperature unit*	°C °F	Temperature unit, degrees Celsius or degrees Fahrenheit. All temperature values are displayed with the selected unit.
Reset	-	Resets all sensor settings to the delivery condition (see section 4.6.1).

4.4.5 Determining the cell constant (calibration in control standard)

Why determine the cell constant?

Aging slightly changes the cell constant, e.g. due to coatings. As a result, an inexact measured value is displayed. The original characteristics of the cell can often be restored by cleaning the cell. Calibration determines the current value of the cell constant and stores this value in the meter.
Thus, you should calibrate at regular intervals (we recommend: every 6 months).

Procedure

You can determine the actual cell constant of the conductivity measuring cell by calibrating with the control standard in the following ranges:

- 0.450 ... 0.500 cm^{-1}
  (e.g. LF413T, nominal cell constant 0.475 cm^{-1})
- 0.800 ... 0.880 cm^{-1}
  (e.g. conductivity measuring cells with a nominal cell constant of 0.840 cm^{-1})

The cell constant is determined in the control standard, 0.01 mol/l KCl. Cell constants outside the ranges quoted above cannot be calibrated.

In the default condition, the calibrated cell constant of the meter is set to 0.475 cm^{-1} (conductivity sensor LF413T).

Stability control (AutoRead)

In calibration, the Stability control function (AutoRead) is automatically activated.

Display calibration data

You can have the data of the last calibration displayed (see section 4.4.6).

Calibration evaluation

After calibration, the meter automatically evaluates the current status of the calibration. The evaluation appears on the display and in the calibration record.

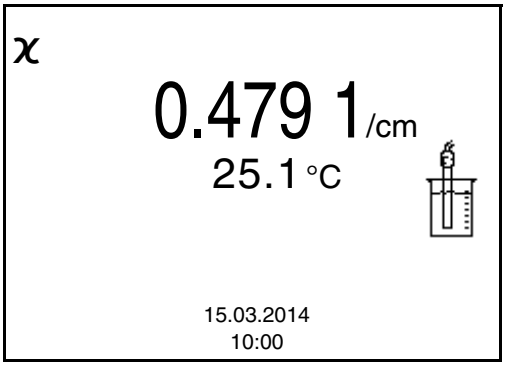
Display	Calibration record	Cell constant [cm^{-1}]
	+++	within the ranges 0.450 ... 0.500 cm^{-1} or 0.800 ... 0.880 cm^{-1}

Display	Calibration record	Cell constant [cm^{-1}]
Error	*Error*	outside the ranges 0.450 ... 0.500 cm^{-1} or 0.800 ... 0.880 cm^{-1}
Eliminate the error according to chapter 6 WHAT TO DO IF...		

Determining the cell constant

For this calibration procedure, the *Measuring cell* setting must be set to cal in the *Measurement* menu. Proceed as follows to determine the cell constant:

1	Connect a conductivity measuring cell to the measuring instrument.
2	In the measured value display, select the conductivity parameter with **<M>**.
3	Start the calibration with **<CAL>**. The cell constant that was calibrated last is displayed.



4	Immerse the conductivity measuring cell in the control standard solution, 0.01 mol/l KCl.
5	Start the measurement with **<ENTER>**. The [AR] status indicator is displayed. The measured parameter flashes.
6	Wait for the end of the AutoRead measurement or accept the calibration value with **<ENTER>**. The calibration record is displayed.
7	Using **<F1>**/*[Continue]* or **<ENTER>**, switch to the measured value display.

4.4.6 Displaying calibration records

Displaying the calibration record

The calibration record of the last calibration is to be found under the menu item, *Calibration* / *Calibration record*. To open it in the measured value display, press the **<CAL__>** key.

4.5 Data memory

You can transmit measured values (datasets) to the data memory:

- Manual memory (see section 4.5.1)

Measurement dataset

A complete dataset consists of:

- ID number
- Date/time
- Measured value of the connected sensor
- Measured temperature value of the connected sensor
- AutoRead info: *AR* appears with the measured value if the AutoRead criterion was met while storing (stable measured value). Otherwise, the *AR* display is missing.
- Calibration evaluation: +++, ++, +, -, or no evaluation

Memory locations

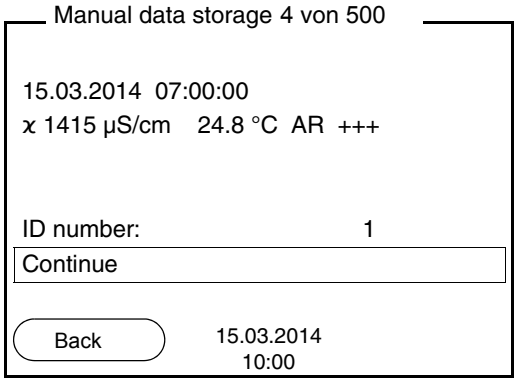
The HandyLab 200 meter has a measurement data memory.

Data memory	Maximum number of datasets
Manual data storage	500

4.5.1 Manual storage

You can store a measurement dataset to the data memory as follows.

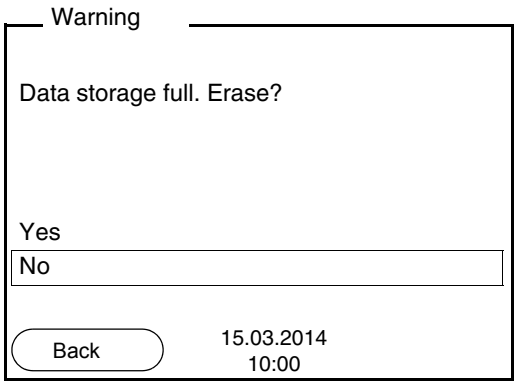
1	Press the **<STO>** key shortly. The menu for manual data storage appears.



2	If necessary, change and confirm the ID number (1 ... 10000) with **<▲><▼>** and **<ENTER>**. The dataset is stored. The meter switches to the measured value display.

If the memory is full

The following window appears if all 500 storage locations are occupied:



You have the following options:

- To erase the entire memory, confirm *Yes*.
- To cancel the storing process and switch to the measured value display, confirm *No*.

4.5.2 Displaying and editing the measurement data memory

The contents of the manual measurement data memory can be shown on the display.

The measurement data memory has a function to erase the entire contents.

Editing the data memory

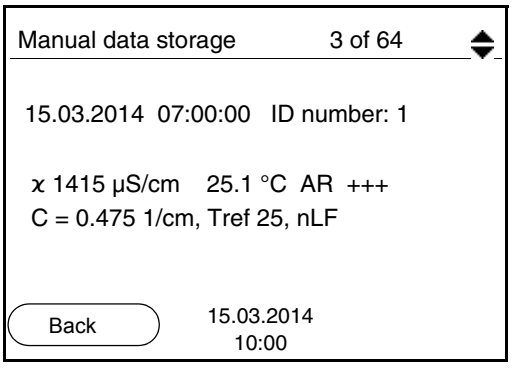
The memory is edited in the menu, *Storage & config*/ *Data storage*. To open the *Storage & config* menu, press the **<F1__>**/[Menu] key in the

measured value display.Open the manual memory directly with the **<RCL>** key.

Settings

Menu item	Setting/function	Explanation
Data storage / *Manual data storage* / *Display*	-	Displays all measurement datasets page by page. Further options: ● Scroll through the datasets with **<▲><▼>**. ● Quit the display with **<F1>**/*[Back]*.
Data storage / *Manual data storage* / *Erase*	-	Erases the entire manual measurement data memory. Note: All calibration data remain stored when this action is performed.

Display presentation of a dataset



Quitting the display

To quit the display of stored measurement datasets, you have the following options:

- Switch directly to the measured value display with **<M>**.
- Quit the display and move to the next higher menu level with **<F1>**/*[Back]*.

4.5.3 Erasing the measurement data memory

How to erase the measurement data memory is described in section

4.5.2 DISPLAYING AND EDITING THE MEASUREMENT DATA MEMORY.

4.6 Reset

You can reset (initialize) all sensor settings and sensor-independent settings separately from each other.

4.6.1 Resetting the measurement settings

Note
The calibration data are reset to the default settings together with the measuring parameters. Recalibrate after performing a reset.

The following settings for conductivity measurements are reset to the default settings with the *Reset* function:

Setting	Default settings
Cal. interval	150 d
Measured parameter	κ
Cell constant (c)	calibrated: 0.475 cm^{-1} adjusted: 0.475 cm^{-1} calibrated: cm^{-1} adjusted:
Temperature compensation	nLF
Reference temperature	25 °C
Temperature coefficient (TC) of the linear temperature compensation	2.000 %/K
TDS factor	1.00
Stability control	On
Temperature unit	°C

The sensor settings are reset under the *Reset* menu item in the menu for calibration and measurement settings. To open the settings, activate the relevant measuring window in the measured value display and press the **<F1>**/[Menu] key shortly.

4.6.2 Resetting the system settings

The following system settings can be reset to the default status:

Setting	Default settings
Language	English
Beep	On
Contrast	50 %
Illumination	Auto
Switchoff time	1 h

The system settings are reset in the menu, *Storage & config* / *System* / *Reset*. To open the *Storage & config* menu, press the **<F1__>**/[Menu] key in the measured value display.

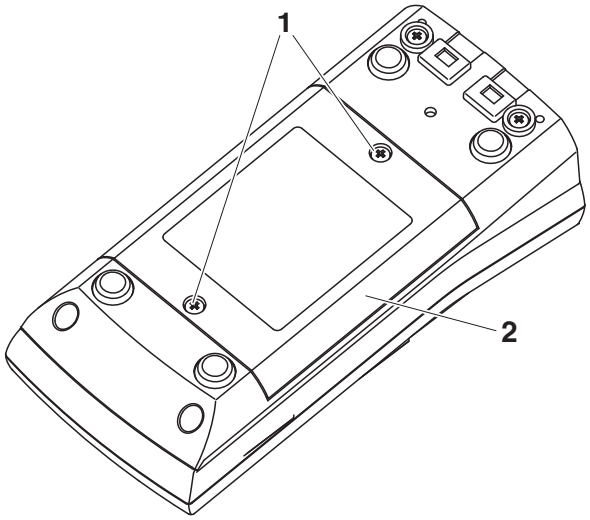
5 Maintenance, cleaning, disposal

5.1 Maintenance

The only maintenance activity required is replacing the batteries.

Note
See the relevant operating manuals of the measuring cells for instructions on maintenance.

5.1.1 Replacing the batteries



1	Unscrew the screws (1) on the underside of the meter.
2	Open the battery compartment (2) on the underside of the meter.
3	Remove the batteries from the battery compartment.

Caution
Make sure that the poles of the batteries are positioned correctly. The ± signs on the batteries must correspond to the ± signs in the battery compartment.

Note
Alternatively, you can also use Ni-MH rechargeable batteries (type Mignon AA). In order to charge the batteries, an external charging device is required.

4	Place four batteries (type Mignon AA) in the battery compartment.
5	Close the battery compartment.

5.2 Cleaning

Occasionally wipe the outside of the measuring instrument with a damp, lint-free cloth. Disinfect the housing with isopropanol as required.

Caution
The housing is made of synthetic material (ABS). Thus, avoid contact with acetone or similar detergents that contain solvents. Remove any splashes immediately.

5.3 Packing

This meter is sent out in a protective transport packing.
We recommend: Keep the packing material. The original packing protects the meter against damage during transport.

5.4 Disposal

Note
This meter contains batteries. Batteries that have been removed may only be disposed of at a recycling facility set up for this purpose or via the retail outlet.
It is illegal to dispose of it in household refuse.

6 What to do if...

Error message *OFL, UFL*

Cause	Remedy
– Measured value outside the measuring range	– Use suitable measuring cell

Error message, *Error*

Cause	Remedy
– Measuring cell contaminated	– Clean cell and replace it if necessary
– Calibration solution not suitable	– Check the calibration solutions
– Measuring cell not connected	– Connect the measuring cell

Sensor symbol flashes

Cause	Remedy
– Cleaning interval expired	– Recalibrate the measuring system

Display

Cause	Remedy
– Batteries almost empty	– Replace the batteries (see section 5.1 MAINTENANCE)

Meter does not react to keystroke

Cause	Remedy
– Operating condition undefined or EMC load unallowed	– Processor reset: Press the **<ENTER>** and **<On/Off>** key simultaneously

You want to know which software version is in the meter

Cause	Remedy
– E.g., a question by the service department	– Switch on the meter. Open the menu, **<F1__>**[Menu] / *Storage & config* / *System* / *Service information*. The instrument data are displayed.

7 Technical data

7.1 General data

Dimensions	Approx. 180 x 80 x 55 mm	
Weight	Approx. 0.4 kg	
Mechanical structure	Type of protection	IP 67
Electrical safety	Protective class	III
Test certificates	CE	

Ambient conditions	Storage	- 25 °C ... + 65 °C
	Operation	-10 °C ... + 55 °C
	Admissible relative humidity	Yearly mean: < 75 % 30 days/year: 95 % Other days: 85 %

Power supply	Batteries	4 x 1.5 V alkali-manganese batteries, type AA
	Rechargeable batteries	4 x 1.2 V NiMH rechargeable batteries, type AA (no charging function)
	Operational life	Up to 800 h without / 100 h with illumination

Guidelines and norms used	EMC	EC directive 2004/108/EC EN 61326-1 EN 61000-3-2 EN 61000-3-3 FCC Class A
	Meter safety	EC directive 2006/95/EC EN 61010-1
	IP protection class	EN 60529

7.2 Measuring ranges, resolution, accuracy

Measuring ranges, resolution (depending on the sensor)

Variable	Measuring range	Resolution
$\varkappa$[µS/cm]	0.000 ... 1.999* 0.00 ... 19.99** 0.0 ... 199.9 200 ... 1999	0.001 0.01 0.1 1

χ [mS/cm]	2.00 ... 19.99 20.0 ... 199.9 200 ... 1000	0.01 0.1 1
ρ (Resistivity) [Ohm*cm]	1.000 ... 1.999 2.00 ... 19.99 20.0 ... 199.9 200 ... 1999	0.001 0.01 0.1 1
ρ (Resistivity) [kOhm*cm]	2.00 ... 19.99 20.0 ... 199.9 200 ... 1999	0.01 0.1 1
ρ (Resistivity) [MOhm*cm]	2.00 ... 19.99** 20.0 ... 199.9*	0.01 0.1
SAL	0.0 ... 70.0 according to the IOT table	0.1
TDS	0 ... 1999 mg/l 2.00 ... 19.99 g/l 20.0 ... 199.9 g/l	1 0.01 0.1
T [°C]	-5.0 ... +105.0	0.1
T [°F]	+23.0 ... +221.0	0.1

** only possible with cells of the cell constant, 0.010 cm^{-1}*
*** only possible with cells of the cell constant, 0.010 cm^{-1} or 0.090 ... 0.110 cm^{-1}*

Cell constants

Cell constant C	Values
To be calibrated	0.450 ... 0.500 cm^{-1} 0.800 ... 0.880 cm^{-1}
Adjustable	0.010 cm^{-1} (fixed) 0.090 ... 0.110 cm^{-1} 0.250 ... 25.000 cm^{-1}

Reference temperature

Reference temperature	Values
Adjustable	20 °C (Tref20) 25 °C (Tref25)

Accuracy (± 1 digit)

Parameter	Accuracy	Temperature of the test sample
χ and ρ / temperature compensation		
None (Off)	± 0.5 %	

Nonlinear (nLF)	± 0.5 %	0 °C ... + 35 °C according to EN 27 888
	± 0.5 %	+ 35 °C ... + 50 °C enhanced nLF function
Linear (lin)	± 0.5 %	+ 10 °C ... + 75 °C

***SAL** / range*

0.0 ... 42.0	± 0.1	+ 5 °C ... + 25 °C
	± 0.2	+ 25 °C ... + 30 °C

TDS [mg/l]

	± 0.5 %	

T [°C] / temperature sensor

NTC 30	± 0.2	
PT 1000	± 0.3	

Note
The accuracy values specified here apply exclusively to the meter. The accuracy of the measuring cell has also to be taken into account.

8 Lists

This chapter provides additional information and orientation aids.

Specialist terms The glossary briefly explains the meaning of the specialist terms. However, terms that should already be familiar to the target group are not described here.

Index The index will help you to find the topics that you are looking for.

Glossary

Adjusting To manipulate a measuring system so that the relevant value (e.g. the displayed value) differs as little as possible from the correct value or a value that is regarded as correct, or that the difference remains within the tolerance.

AutoRange Name of the automatic selection of the measuring range.

Calibration Comparing the value from a measuring system (e.g. the displayed value) to the correct value or a value that is regarded as correct. Often, this expression is also used when the measuring system is adjusted at the same time (see adjusting).

Cell constant, k Characteristic quantity of a conductivity measuring cell, depending on the geometry.

Conductivity Short form of the expression, specific electrical conductivity.
It corresponds to the reciprocal value of the resistivity.
It is a measured value of the ability of a substance to conduct an electric current. In water analysis, the electrical conductivity is a dimension for the ionized substances in a solution.

Measured parameter The measured parameter is the physical dimension determined by measuring, e.g. pH, conductivity or D.O. concentration.

Measured value The measured value is the special value of a measured parameter to be determined. It is given as a combination of the numerical value and unit (e. g. 3 m; 0.5 s; 5.2 A; 373.15 K).

Molality Molality is the quantity (in Mol) of a dissolved substance in 1000 g solvent.

Reference temperature
Fixed temperature value to compare temperature-dependent measured values. For conductivity measurements, the measured value is converted to a conductivity value at a reference temperature of 20 °C or 25 °C.

Reset
Restoring the original condition of all settings of a measuring system.

Resistance
Short name for the specific electrolytic resistance. It corresponds to the reciprocal value of the electrical conductivity.

Resolution
Smallest difference between two measured values that can be displayed by a meter.

Salinity
The absolute salinity S_A of seawater corresponds to the relationship of the mass of dissolved salts to the mass of the solution (in g/Kg). In practice, this dimension cannot be measured directly. Therefore, the practical salinity according to IOT is used for oceanographic monitoring. It is determined by measuring the electrical conductivity.

Salt content
General designation for the quantity of salt dissolved in water.

Stability control
Function to control the measured value stability.

Standard solution
The standard solution is a solution where the measured value is known by definition. It is used to calibrate a measuring system.

Temperature coefficient
Value of the slope α of a linear temperature function.

$$\text{Re}_{T_{Ref}} = \text{Re}_{Meas} * \frac{1}{1 + \alpha * (T - T_{Ref})}$$

Temperature compensation
Name of a function that considers the temperature influence on the measurement and converts it accordingly. Depending on the measured parameter to be determined, the temperature compensation functions in different ways. For conductimetric measurements, the measured value is converted to a defined reference temperature. For potentiometric measurements, the slope value is adjusted to the temperature of the test sample but the measured value is not converted.

Temperature function
Name of a mathematical function expressing the temperature behavior of a test sample, a sensor or part of a sensor.

Test sample
Designation of the test sample ready to be measured. Normally, a test sample is made by processing the original sample. The test sample and original sample are identical if the test sample was not processed.

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Xylem |ˈzīləm|

1) The tissue in plants that brings water upward from the roots;
2) a leading global water technology company.

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services settings. Xylem also provides a leading portfolio of smart metering, network technologies and advanced analytics solutions for water, electric and gas utilities. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise with a strong focus on developing comprehensive, sustainable solutions.

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