Cond 7110

CONDUCTIVITY METER

WTW

a **xylem** brand

Cond 7110 - Contents

1   Overview

1.1   Cond 7110 meter

The Cond 7110 compact digital precision meter enables you to perform conductivity measurements quickly and reliably.

The Cond 7110 provides the maximum degree of operating comfort, reliability and measuring certainty for all applications.

1 Keypad
2 Display
3 Socket field
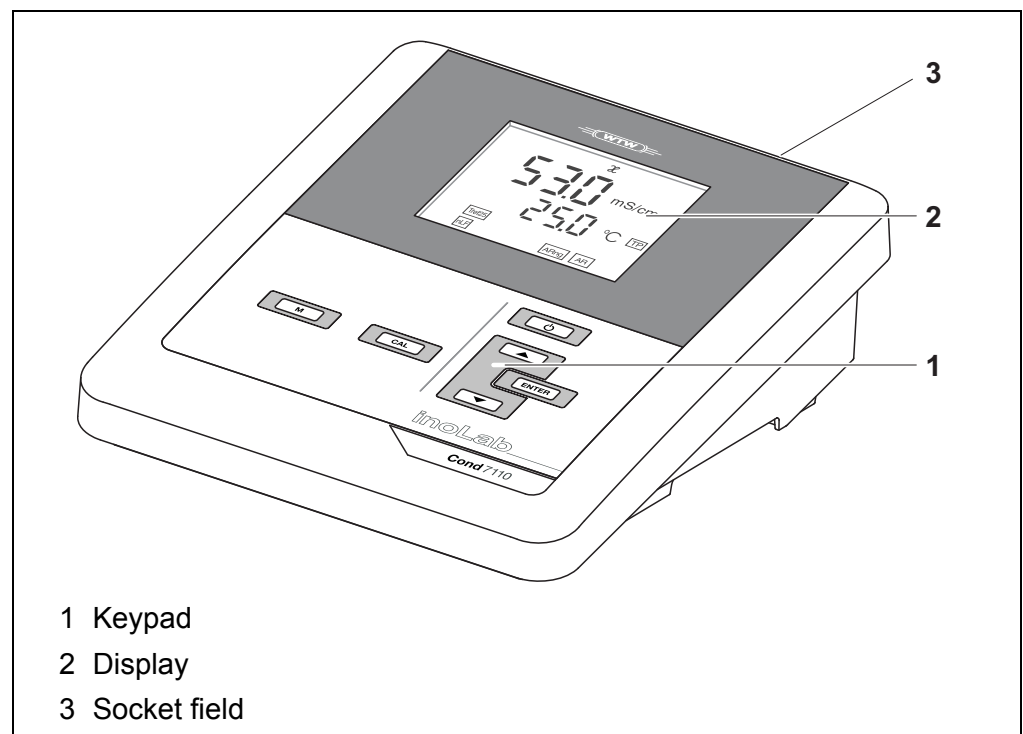
1.2   Sensors

A measuring system ready to measure consists of the Cond 7110 meter and a suitable sensor.

Suitable sensors are conductivity measuring cells.

Information on available sensors is given on the Internet and in the WTW catalog, "Laboratory and field instrumentation".

2   Safety

2.1   Safety information

2.1.1   Safety information in the operating manual

This operating manual provides important information on the safe operation of the meter. Read this operating manual thoroughly and make yourself familiar with the meter before putting it into operation or working with it. The operating manual must be kept in the vicinity of the meter so you can always find the information you need.

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

> **WARNING**
>
> **indicates a possibly dangerous situation that can lead to serious (irreversible) injury or death if the safety instruction is not followed.**

> **CAUTION**
>
> **indicates a possibly dangerous situation that can lead to slight (reversible) injury if the safety instruction is not followed.**

NOTE
indicates a possibly dangerous situation where goods might be damaged if the actions mentioned are not taken.

2.1.2   Safety signs on the meter

Note all labels, information signs and safety symbols on the meter and in the battery compartment. A warning symbol (triangle) without text refers to safety information in this operating manual.

2.1.3   Further documents providing safety information

The following documents provide additional information, which you should observe for your safety when working with the measuring system:

• Operating manuals of sensors and other accessories
• Safety datasheets of calibration or maintenance accessories (such as buffer solutions, electrolyte solutions, etc.)

2.2 Safe operation

2.2.1 Authorized use

This meter is authorized exclusively for conductivity measurements in the laboratory.

Only the operation and running of the meter according to the instructions and technical specifications given in this operating manual is authorized (see section 10 TECHNICAL DATA, page 34).

Any other use is considered unauthorized.

2.2.2 Requirements for safe operation

Note the following points for safe operation:

- The meter may only be operated according to the authorized use specified above.
- The meter may only be supplied with power by the energy sources mentioned in this operating manual.
- The meter may only be operated under the environmental conditions mentioned in this operating manual.
- The meter may only be opened if this is explicitly described in this operating manual (example: Inserting the batteries).

2.2.3 Unauthorized use

The meter must not be put into operation if:

- it is visibly damaged (e.g. after being transported)
- it was stored under adverse conditions for a lengthy period of time (storing conditions, see section 10 TECHNICAL DATA, page 34).

3 Commissioning

3.1 Scope of delivery

- Cond 7110 meter
- 4 batteries 1.5 V Mignon type AA
- Power pack
- Stand
- Stand holder
- Short instructions
- Detailed operating manual (4 languages)
- CD-ROM with detailed operating manual

3.2 Power supply

The Cond 7110 is supplied with power in the following ways:

- Mains operation with the supplied power pack.
- Battery operation (4 x alkaline manganese batteries, type AA)

3.3 Initial commissioning

Perform the following activities:

- Insert the supplied batteries
- Connect the power pack (mains operation)
- Mount the stand
- Switch on the meter
  (see section 4.2 SWITCHING ON THE METER, page 15)

3.3.1 Inserting the batteries

You can operate the meter either with normal batteries or with rechargeable batteries (Ni-MH).
In order to charge the batteries, an external charging device is required.

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

2
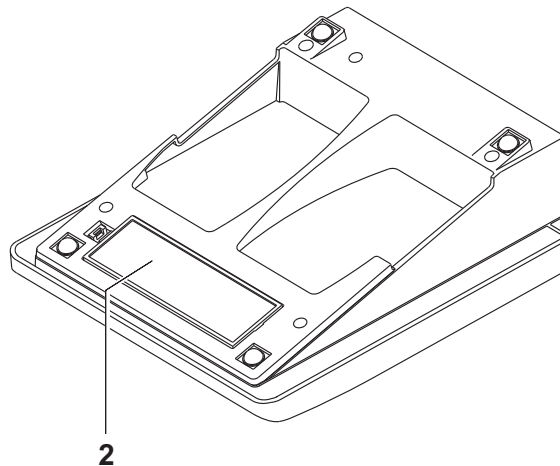
2.   Insert four batteries in the battery compartment.

> ⚠ **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.**

3.   Close the battery compartment tightly.

> ℹ When the batteries are nearly empty, the *[LoBat]* status indicator is displayed.

3.3.2   Connecting the power pack

> ⚠ **CAUTION**
>
> **The line voltage at the operating site must lie within the input voltage range of the original power pack (see section 10 TECHNICAL DATA, page 34).**

> ⚠ **CAUTION**
>
> **Use original power packs only (see section 10 TECHNICAL DATA, page 34).**

1.   Connect the plug of the power pack to the socket for the power pack on the Cond 7110.

2.   Connect the original power pack to an easily accessible power outlet.

3.3.3 Mounting the stand

The stand base can be mounted at the right side of the meter.
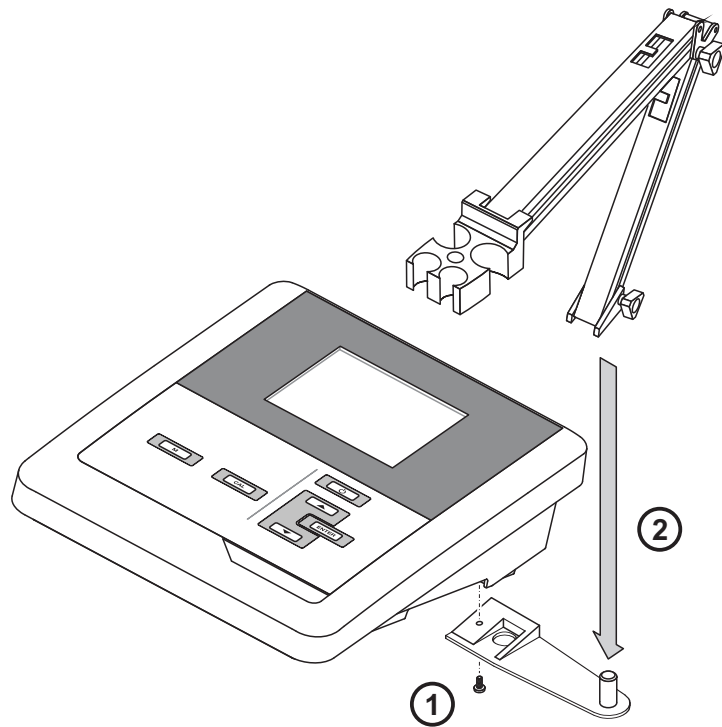
4 Operation

4.1 General operating principles

This section contains basic information on the operation of the Cond 7110.

4.1.1 Keypad

In this operating manual, keys are indicated by brackets <..> .

The key symbol (e.g. **<MENU/OK>**) 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. **<MENU/OK_>**).

Key	Symbol	Meaning
⏻	**<On/Off>** **<On/Off_>**	Switches the meter on or off Resets calibration data
M	**<MODE>** **<MODE_>**	Selects the measured parameter Opens the measurement settings
CAL	**<CAL>** **<CAL_>**	Calls up the calibration procedure Displays the calibration data
▲ ▼	**<▲><▼>** **<▲__><▼__>**	Increments, decrements values Increments, decrements values continuously
ENTER	**<MENU/OK>** **<MENU/OK_>**	Confirms entries Opens the menu for system settings

4.1.2   Display

1 Status information
2 Measured value (with unit)
3 Measured parameter
4 Sensor symbol (calibration evaluation, cleaning interval)
5 Measured temperature (with unit)
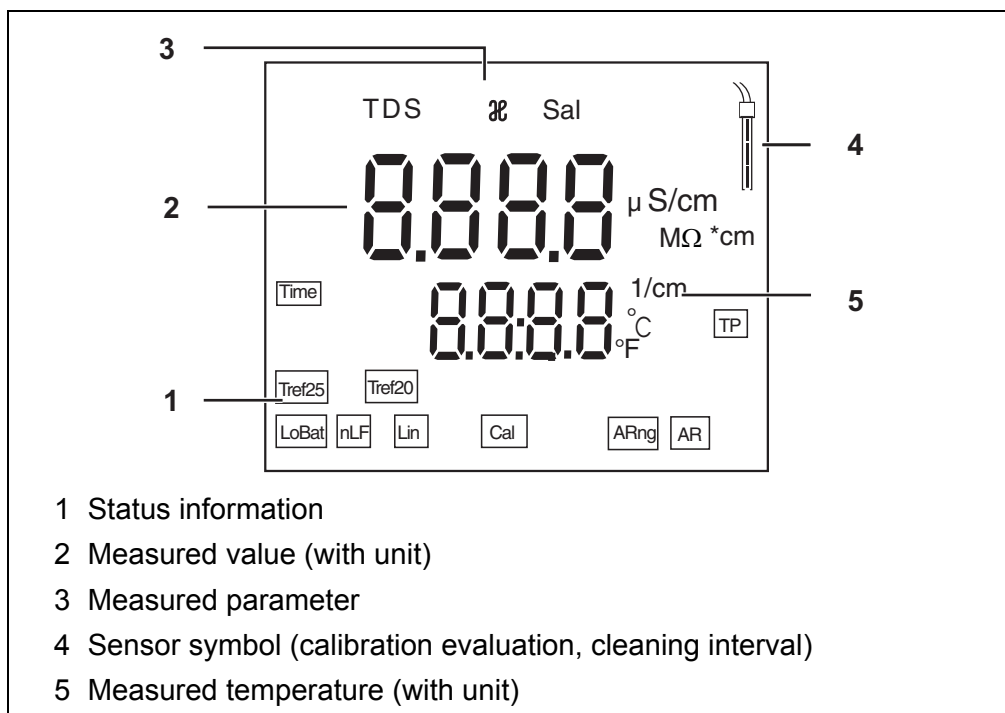
4.1.3   Status information

Display	Meaning
[AR]	Stability control (AutoRead) is active
[TP]	Temperature measurement active
[Time]	Setting of calibration interval
[ARng]	Automatic range switchover The meter always measures with the highest possible resolution.
[nLF], *[Lin]*	The temperature compensation is active • *[nLF]*: Nonlinear temperature compensation • *[Lin]*: Linear temperature compensation
[Tref20], *[Tref25]*	Reference temperature 20 °C or 25 °C
[Cal]	Calibration
[LoBat]	Batteries are almost empty

4.1.4   Socket field

1 Conductivity measuring cell
2 Power pack
3 Service interface
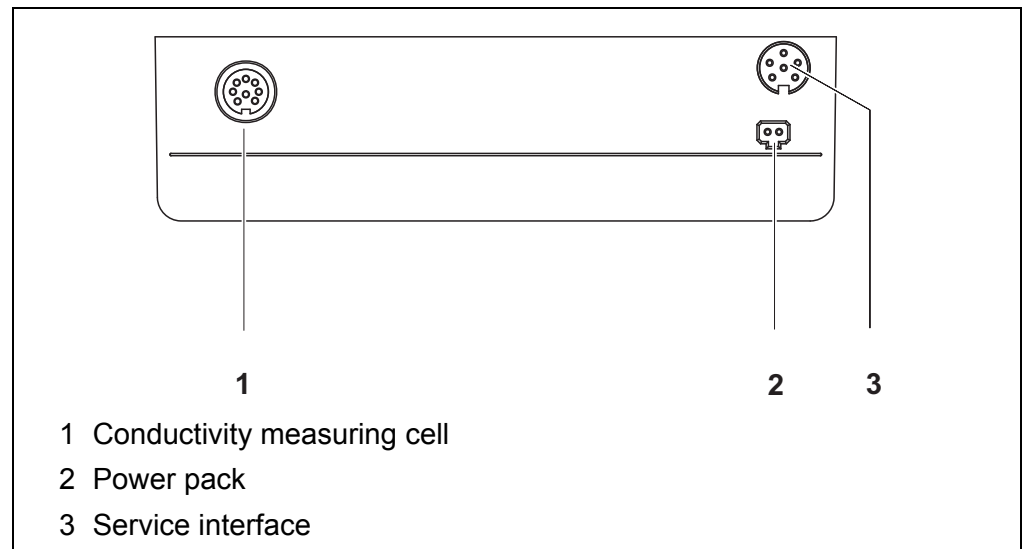
4.2   Switching on the meter

1.   Switch on the meter with **<On/Off>**.
       The meter performs a self-test.

2.   Connect the sensor.
       The meter is ready to measure.
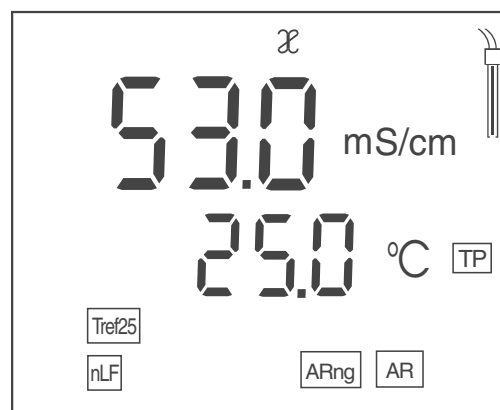
4.3   Switching off the meter

1.   Switch off the meter with **<On/Off>**.
       The meter is switched off.

When the meter is powered by the batteries, it switches itself off automatically after an adjustable interval to save the batteries (see section Automatic switch-off function, page 27).

4.4   Navigation

4.4.1   Operating modes

The meter has the following operating modes:

Operating mode	Description
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
Setting	A setting is displayed.

4.4.2   Measuring mode (measured value display)

The following functions are available in the measuring mode (measured value display):

*   To change the indication on the measuring screen (e.g. χ <-> Sal <-> TDS <-> Resistance), press **<MODE>**.
*   To open the measurement settings, press **<MODE_>** (long pressure).
*   To open the system settings, press **<ENTER__>** (long pressure).

4.4.3   Setting mode

The following functions are available in the setting mode:

*   To change the current setting, press **<▲><▼>**.
*   Confirm the setting with **<ENTER>**.
    The next setting is displayed.
    The settings are stored.

> **i**   When the last setting is confirmed, the setting menu is automatically quit.

*   Press **<MODE>** to exit the setting mode.

5   Conductivity

5.1   Measuring

5.1.1   Measuring the conductivity

> [i] To ensure the high measurement accuracy of the measuring system, measure with a current calibration or the correctly set cell constant (see section 5.2 CALIBRATION, page 19).

1.   Connect a conductivity measuring cell to the measuring instrument.
     The conductivity measuring screen is displayed.

2.   Adjust the temperature of the solutions and measure the current temperature if the measurement is made without a temperature sensor.

3.   Immerse the conductivity measuring cell in the test sample.
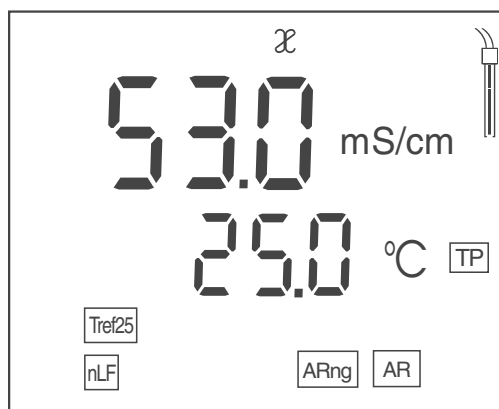
4.   When measuring without temperature sensor: Enter the temperature of the test sample with **<▲><▼>**.

5.   Wait for a stable measured value.
     The *[AR]* display indicator no longer flashes.

6.   If necessary, select the measured parameter with **<MODE>**.

     •   Conductivity [µS/cm] / [mS/cm]

     •   Salinity Sal

     •   Total dissolved solids TDS [mg/l]

          If necessary, set the TDS factor with **<▲><▼>** (see section 6.1.4 SETTING THE TDS FACTOR, page 26).

     •   Resistivity [MΩ · cm]

Stability control (AutoRead)

During the measuring procedure, the stability control function is automatically activated.

The stability control function (*AutoRead*) continually checks the stability of the measured values in the monitored time interval. The stability has a considerable impact on the reproducibility of measured values. The *[AR]* display indicator flashes until a stable value is measured.

Stability criteria (AutoRead)

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

5.1.2   Measuring the temperature

The temperature measurement is absolutely essential for a reproducible conductivity measurement.

You have the following options to measure the temperature:

- Automatic measurement of the temperature with the temperature sensor (NTC 30 or Pt 1000) integrated in the sensor.
- Manual determination and input of the temperature.

The measuring instrument recognizes whether a suitable sensor is connected and automatically switches on the temperature measurement.

Which type of temperature measurement is active is indicated by the temperature display and the *[TP]* status indicator:

Temperature sensor	Resolution of the temp. display	Status indicator	Temp. measurement
yes	0.1 °C	*[TP]*	Automatic with temperature sensor
-	1 °C	-	Manual

If you wish to measure (or calibrate) without temperature sensor, proceed as follows:

1.   Measure the current temperature of the test sample.

2.   Set the temperature value with <▲><▼>.

5.2   Calibration

5.2.1   Why calibrate?

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 instrument.

Thus, you should clean and calibrate at regular intervals (we recommend: every 6 months).

5.2.2   When to calibrate?

• When the cleaning interval has expired
• Routinely within the framework of the company quality assurance

5.2.3   Determining the cell constant (calibration in control standard)

This method can be used for measuring cells with cell constants in the following ranges:

• 0.450 ... 0.500 cm^{-1}
• 0.800 ... 0.880 cm^{-1}

A 0.01 mol/L KCl solution is used as control standard.

1.   Open the calibration menu with **<CAL>**.

2.   If necessary, select the calibration type (*Cal Cell*) with **<CAL>**.
        Cal Cell is displayed.

3.   Confirm the selection of (*Cal Cell*) with **<MENU/OK>** or **<CAL_>**.
        The cell constant of the last calibration is displayed.
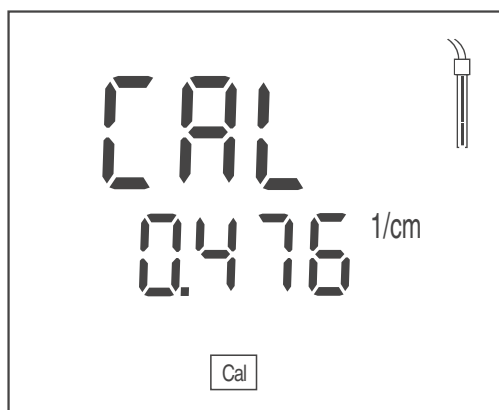
4. Immerse the measuring cell in the control standard solution (0.01 mol/l KCl).

5. When measuring without temperature sensor: Enter the temperature of the standard with **<▲><▼>**.

6. Start the measurement with **<MENU/OK>**.
   The measured value is checked for stability (stability control).
   The *[AR]* status display flashes.

7. Wait for the measurement with stability control to be completed or terminate the stability control with **<MENU/OK>**.
   The determined cell constant appears on the display.
   The meter automatically stores the cell constant.

8. Use **<MENU/OK>** to finish the calibration.
   The determined cell constant is used.

5.2.4   Using the last calibrated cell constant

This method can be used when a valid calibration is available (see section 5.2.3 DETERMINING THE CELL CONSTANT (CALIBRATION IN CONTROL STANDARD), page 19).

1. Open the calibration menu with **<CAL>**.

2. If necessary, select the calibration type (*Use Cell*) with **<CAL>**.
   Use Cell is displayed.
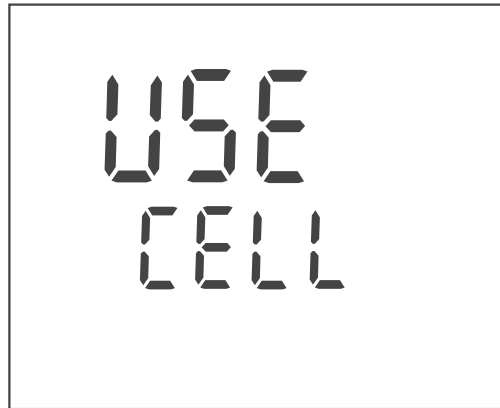
3. Confirm the selection of (*Use Cell*) with **<MENU/OK>** or **<CAL_>**.
   The cell constant of the last calibration is displayed.

4. If necessary, select the suitable cell constant with **<CAL>**.

5. Use **<MENU/OK>** to finish the calibration.
   The selected calibrated cell constant is used.

5.2.5 Setting the cell constant manually

This method can be used when the cell constant of the measuring cell is known (e.g. taken from the operating manual of the measuring cell, or from the labeling on the measuring cell).
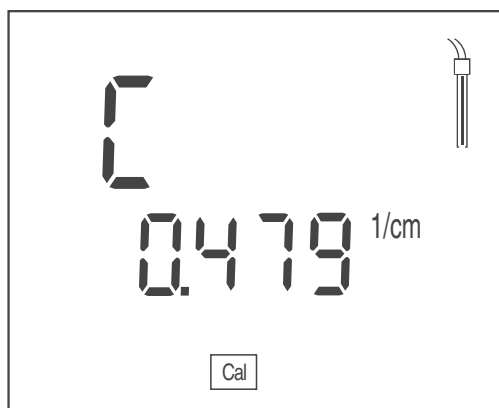
1. Open the calibration menu with **<CAL>**.

2. If necessary, select the calibration type (*Use Cell*) with **<CAL>**.
   Use Cell is displayed.
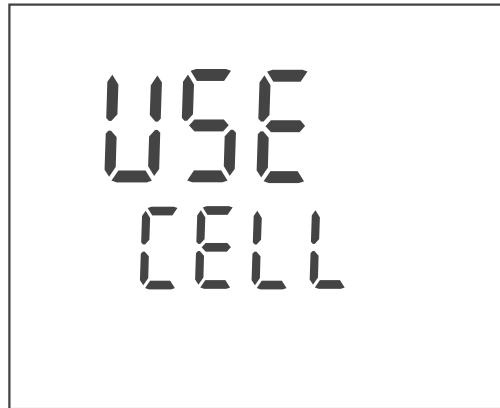
3.   Confirm the selection of (*Use Cell*) with **<MENU/OK>** or **<CAL_>**.
     The cell constant that was set last is displayed.
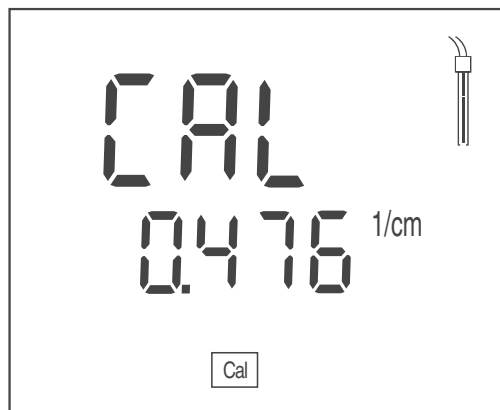
4.   Select a cell constant in a suitable range with **<CAL>**.

     •   Range 0.250 ... 2.500 cm-1

     •   Range 0.090 ... 0.110 cm-1

     •   Permanent, 0.010 cm^{-1}

5.   Set the exact cell constant within the range with **<▲><▼>** as necessary.

6.   Use **<MENU/OK>** to finish the calibration.
     The adjusted cell constant is used.

5.2.6   Calibration data

Displaying the calibration data

1.   Show the calibration data in the measured value display with **<CAL_>**.
     The calibrated cell constant is displayed.

Calibration evaluation (conductivity)

After calibration, the meter automatically evaluates the current status of the calibration.

The calibration evaluation is displayed as a sensor symbol.

Display	Cell constant [cm^{-1}]
	Within the range 0.450 ... 0.500 cm^{-1} or 0.800 ... 0.880 cm^{-1}
E3	Outside the range 0.450 ... 0.500 cm^{-1} or 0.800 ... 0.880 cm^{-1} Eliminate the error (see section 9 WHAT TO DO IF..., page 32)

The calibration evaluation on the display (sensor symbol) flashes when the set cleaning interval has expired and thus reminds you to regularly clean and calibrate the measuring cell (see section 6.1.2 CLEANING INTERVAL, page 25).

6 Settings

The meter has separate setting routines for the measurement settings and system settings.

6.1 Measurement settings (conductivity)

6.1.1 Changing the settings for conductivity measurements

1. Open the setting menu in the measured value display with **<MODE_>**. The first setting is displayed.

2. If necessary, indicate the required setting with **<ENTER>**.

3. To change the current setting, press **<▲><▼>**.

4. Confirm the setting with **<ENTER>**.
   The setting is stored.
   The next setting is displayed.

5. Change or confirm the other settings.

> When the last setting is confirmed, the setting menu is automatically quit.
>
> **or**
> Quit the setting menu with **<MODE>**.

List of settings for conductivity measurements

Default settings are printed in **bold**.

The settings appear in the following order:

Displayed (Confirm with <ENTER>)	Possible setting (Change with <▲><▼>)	Description
t25 /t20	**TRef25** Tref20	Reference temperature
Uni	**°C** °F	Temperature unit
Int.C	1 ... **180**... 999 d	Cleaning interval

6.1.2 Cleaning interval

The cleaning interval is set with the measurement settings (see section 6.1 MEASUREMENT SETTINGS (CONDUCTIVITY), page 24).

The calibration evaluation (sensor symbol) flashes when a valid calibration is available for a measuring cell and the set cleaning interval has expired.

The flashing calibration evaluation reminds you to clean and calibrate the measuring cell regularly (see section 5.2.3 DETERMINING THE CELL CONSTANT (CALIBRATION IN CONTROL STANDARD), page 19).

It is still possible to measure.

6.1.3 Selecting the temperature compensation

1. Open the calibration menu with **<CAL>**.

2. If necessary, select the *Use tC* setting with **<CAL>**.

3. Press **<MENU/OK>** or **<CAL_>** to confirm the selection of *Use tC*.
   The set temperature compensation is displayed.
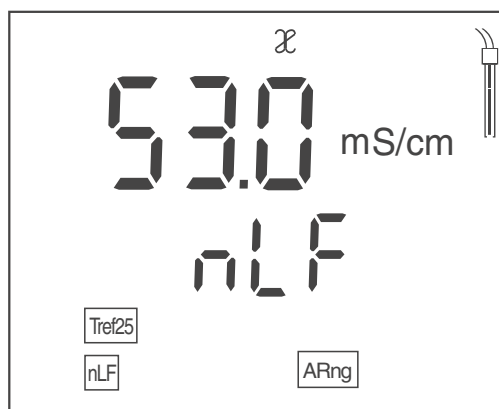
4. If necessary, change the setting of the temperature compensation with **<CAL>**.
   - **nLF**: Nonlinear temperature compensation
   - **Lin**: Linear temperature compensation
     If necessary, set the linear temperature coefficient with **<▲><▼>**.
   - **----**: No temperature compensation (temperature compensation switched off)

5. If necessary, quit the setting of the temperature compensation with **<MENU/OK>**.
   The set temperature compensation is used.

Temperature compensation

The calculation of the temperature compensation is based on the preset reference temperature, 20 °C [Tref20] or 25 °C [Tref25].

> The reference temperature is set in the menu for the parameter conductivity (see section 6.1 MEASUREMENT SETTINGS (CONDUCTIVITY), page 24).

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 of 0.000 ... 3.000 %/K
- **No temperature compensation** (---)

> The temperature compensation is set in the calibration menu (see section 6.1.3 SELECTING THE TEMPERATURE COMPENSATION, page 25).

Application tips

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

Test sample	Temperature compensation	Display
Natural water (ground water, surface water, drinking water)	*nLF* according to EN 27 888	*nLF*
Ultrapure water	*nLF* according to EN 27 888	*nLF*
Salinity (seawater)	Automatic *nLF* according to IOT (International Oceanographic Tables)	*Sal*, *nLF*

6.1.4   Setting the TDS factor

The factor to calculate the total dissolved solids is set to 1.00 in the delivery condition.

You can adjust this factor to meet your requirements in the range 0.40 ... 1.00.

1.   Select the measured parameter TDS with **<MODE>**.

2.   Set the TDS factor with **<▲><▼>**.

6.2   Sensor-independent settings

6.2.1   Changing the sensor-independent settings

1.   Open the menu for the sensor-independent settings with **<MENU/OK_>**.
      The first setting is displayed.

2.   To change the current setting, press **<▲><▼>**.

3.   Confirm the setting with **<ENTER>**.
      The settings are finished.
      The meter switches to the measuring mode.

List of sensor-independent settings

Default settings are printed in **bold**.

Displayed (Confirm with <ENTER>)	Possible setting (Change with <▲><▼>)	Description
t.Off	10, 20, 30, 40, 50 min, **1**, 2, 3, 4, 5, 10, 15, 20, 24 h	Switch-off interval (see section Automatic switch-off function, page 27)

6.2.2   Energy saving (battery operation)

Automatic switch-off function

The meter has an automatic switch-off function to avoid unnecessary power consumption during battery operation.

The energy saving feature switches off the meter during battery operation if no key is pressed during the adjusted interval.

The automatic switch-off function is not active when the power pack is connected.

The switch-off interval is set with the system settings (see section 6.2 SENSOR-INDEPENDENT SETTINGS, page 27).

7 Reset

You can erase the calibration values and reset (initialize) the measurement and system settings.

7.1 Erasing the calibration values

This function serves to erase the last determined cell constant.

1. Press **<On/Off_>** to open the menu to erase the calibration data.
   Ini.C is displayed.

2. Use **<▲><▼>** to display *no* or *YES*.

   • *YES*: Erase the calibration values.

   • *no*: Retain the calibration values.

3. Confirm with **<MENU/OK>.**
   The menu is finished. The meter switches to the measuring mode.

> The calibration values are erased. All other meter settings are retained.
> The meter subsequently uses the last manually set cell constant in the range 0.250 ... 2.500 cm^{-1}.
> The measuring system is not calibrated after a reset. Before measuring, make sure the meter uses the cell constant suitable for the measuring cell.

7.2 Resetting the measurement and system settings

1. Switch on the meter with **<On/Off>**.
   The display test appears briefly on the display.

2. During the display test, press **<MODE>** to open the menu for the reset of the meter settings.
   Init is displayed.

3. Use **<▲><▼>** to display *no* or *YES*.

   • *YES*: Resetting the meter settings.

   • *no*: Retain the meter settings.

4. Confirm with **<MENU/OK>.**
   The settings are reset. The menu is finished.
   The meter switches to the measuring mode.

The following settings are reset to the delivery condition (default):

- Measurement settings
- System settings
- Calibration data

The measuring system is possibly not calibrated after a reset. Before measuring, make sure the meter uses the cell constant suitable for the measuring cell.

Measurement and system settings that can be reset

Measurement settings	Default
Reference temperature (*Tref*)	t25
Unit of the measured temperature value (*Uni*)	°C
Calibration interval (*Int.C*)	180 d
Temperature compensation	nLF
Temperature coefficient of the linear temperature compensation	2.000 %/K
TDS factor	1.00
Manually set cell constant	0.475 cm^{-1}

System settings	Default
Switch-off interval (.*Off*)	1 h

8 Maintenance, cleaning, disposal

8.1 Maintenance

8.1.1 General maintenance activities

The only maintenance activity required is replacing the batteries.

	See the relevant operating manuals of the sensors for instructions on maintenance.

8.1.2 Replacing the batteries

	You can operate the meter either with normal batteries or with rechargeable batteries (Ni-MH). In order to charge the batteries, an external charging device is required.

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

2
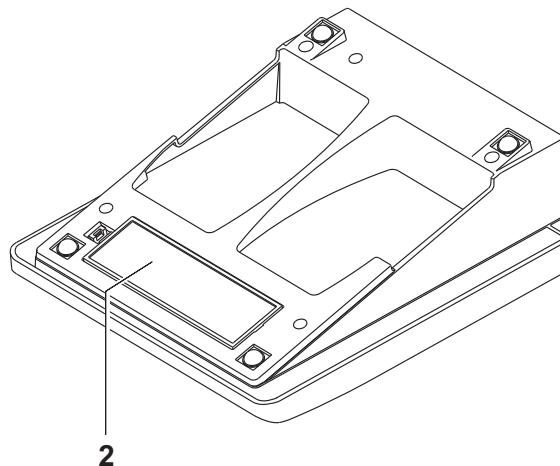
2.   Remove the old batteries.

3.   Place four batteries (type AA) in 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.

4.   Close the battery compartment tightly.

When the batteries are nearly empty, the *[LoBat]* status indicator is displayed.

Dispose of used batteries according to the local regulations of your country.
End users within the European Union are obligated to return used batteries (even ecologically compatible ones) to a collection point set up for recycling purposes.
Batteries are marked with the crossed-out waste container symbol. Therefore, they may not be disposed with the domestic waste.

8.2   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.**

8.3   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.

8.4   Disposal

At the end of its operational lifetime, the meter must be returned to the disposal or return system statutory in your country. If you have any questions, please contact your supplier.

9 What to do if...

9.1 Conductivity

> More information and instructions on cleaning and exchange of sensors are given in the documentation of your sensor.

9.1.1 Error message E3

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

9.1.2 Error message OFL, UFL

The measured value is outside the measuring range.

Cause	Remedy
• Measured value outside the measuring range	• Use suitable conductivity measuring cell

9.2 General information

9.2.1 *[LoBat]* Display

Cause	Remedy
Batteries almost empty	Replace the batteries (see section 3.3.1 INSERTING THE BATTERIES, page 10)

9.2.2 Instrument does not react to keystroke

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

9.2.3 Displaying the software version (meter)

Cause	Remedy
E. g., a question by the service department	• Switch on the meter. During the display test, display the software version with **<MENU/OK>**.

10 Technical data

10.1 Measuring ranges, resolution, accuracy

10.1.1 Measuring ranges, resolution

Parameter	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
$\varkappa$ [mS/cm]	2.00 ... 19.99 20.0 ... 199.9 200 ... 1000	0.01 0.1 1
Specific resis- tance [MOhm*cm]	1.000 ... 1.999 2.00 ... 19.99 20.0 ... 199.9 200 ... 1999	0.001 0.01 0.1 1
SAL	0.0 ... 70.0 according to the IOT table	0.1
TDS [mg/l]	0 ... 1999 Factor can be set between 0.40 and 1.00	1
T [°C]	- 25.0 ... + 125.0	0.1
T [°F]	- 13.0 ... + 257.0	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}

10.1.2   Cell constants

Cell constant	Values
Can be calibrated in the ranges	$0.800 \ldots 0.880 \text{ cm}^{-1}$ $0.450 \ldots 0.500 \text{ cm}^{-1}$
Adjustable	$0.250 \ldots 2.500 \text{ cm}^{-1}$ $0.090 \ldots 0.110 \text{ cm}^{-1}$ 0.010 cm^{-1} (permanent)

10.1.3   Reference temperature

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

10.1.4   Accuracy (± 1 digit)

Parameter	Accuracy	Temperature of the test sample
$\varkappa$ / Temperature compensation Nonlinear (nLF)	± 0.5 %	0 °C ... + 35 °C according to EN 27 888 + 35 °C ... + 50 °C enhanced nLF function
Linear (lin)	± 0.5 %	+ 10 °C ... + 75 °C
None (Off)	± 0.5 %	
SAL / range 0 ... 70.0	± 0.1 ± 0.2	+ 5 °C ... + 25 °C + 25 °C ... + 30 °C
TDS [mg/l] / range 1 ... 1999	± 0.5 %	
T [°C] / temperature sensor • NTC 30 • PT 1000	± 0.1 ± 0.1	

> The measuring ranges and accuracy values specified here apply exclusively to the meter. The accuracy of the measuring cells and calibration solutions has to be taken into account additionally.

10.2 General data

Dimensions	Approx. 230 x 190 x 80 mm
Weight	Approx. 1.0 kg
Mechanical structure	Type of protection IP 43
Electrical safety	Protective class III
Test certificates	CE

Ambient conditions	**Storing**: - 25 °C ... + 65 °C
	Operation: +5 °C ... + 55 °C With the power pack connected: +5 °C ... + 40 °C
	Allowable 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 **Operating time**: Approx. 1000 h (operating hours)
	Rechargeable batteries: 4 x 1.2 V NiMH rechargeable batteries, type AA (no charging function)
	Power pack: Ktec KSAC 0900110W1UV-1 Input: 100 ... 240 V ~ / 50 ... 60 Hz / 270 mA Output: 9 V = / 1.1 A Connection max. Overvoltage category II Primary plugs contained in the scope of delivery: Euro, US, UK and Australian.

Service inter-face	This interface can be used for service purposes only.

Applicable directives and standards	**EMC**: • EC directive 2004/108/EC • EN 61326-1 • EN 61000-3-2 • EN 61000-3-3 • FCC Class A
	Instrument safety: • EC directive 2006/95/EC • EN 61010-1
	IP type of protection: • EN 60529

FCC Class A Equipment Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

11   Glossary

11.1   Conductivity

Specialist term	Description
Cell constant, C	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.
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.
Resistance	Short name for the electrolytic resistivity. It corresponds to the reciprocal value of the electrical conductivity.
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.
Temperature coefficient	Value of the slope of a linear temperature function $$\mathcal{H}_{T_{Ref}} = \mathcal{H}_{Meas} * \frac{1}{1 + \alpha * (T - T_{Ref})}$$
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.

11.2   General information

Specialist term	Description
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).
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.
Potentiometry	Name of a measuring technique. The signal (depending on the measured parameter) of the electrode is the electrical potential. The electrical current remains constant.
Reset	Restoring the original condition of all settings of a measuring system.
Resolution	Smallest difference between two measured values that can be displayed by a meter.
Stability control (AutoRead)	Function to control the measured value stability.

Specialist term	Description
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 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.

12 Index

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.

For more information on how Xylem can help you, go to www.xylem.com.

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