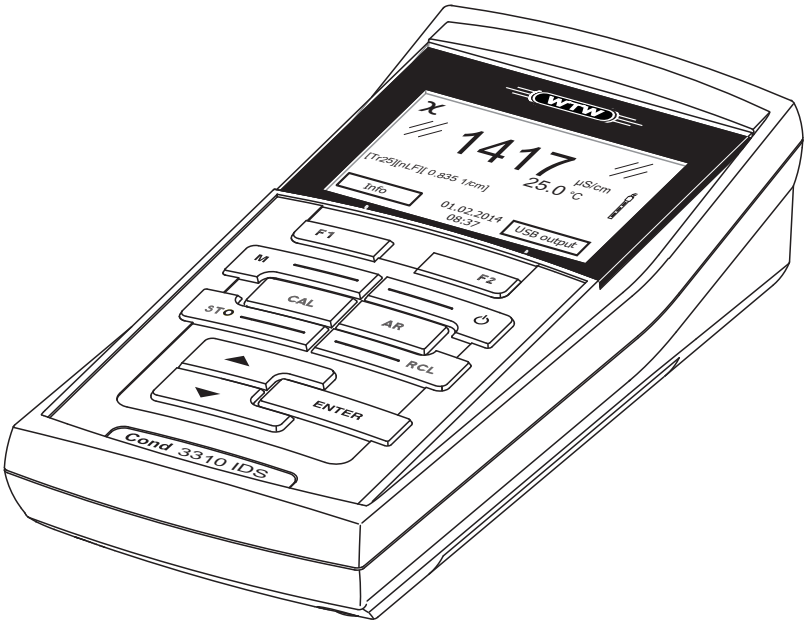
OPERATING MANUAL

ba75944e02 10/2014



Cond 3310 IDS

DIGITAL METER FOR DIGITAL IDS-CONDUCTIVITY SENSORS

WTW
a xylem brand

The latest version of the present operating manual is available on the Internet under www.WTW.com.

Cond 3310 IDS - Contents

1 Overview

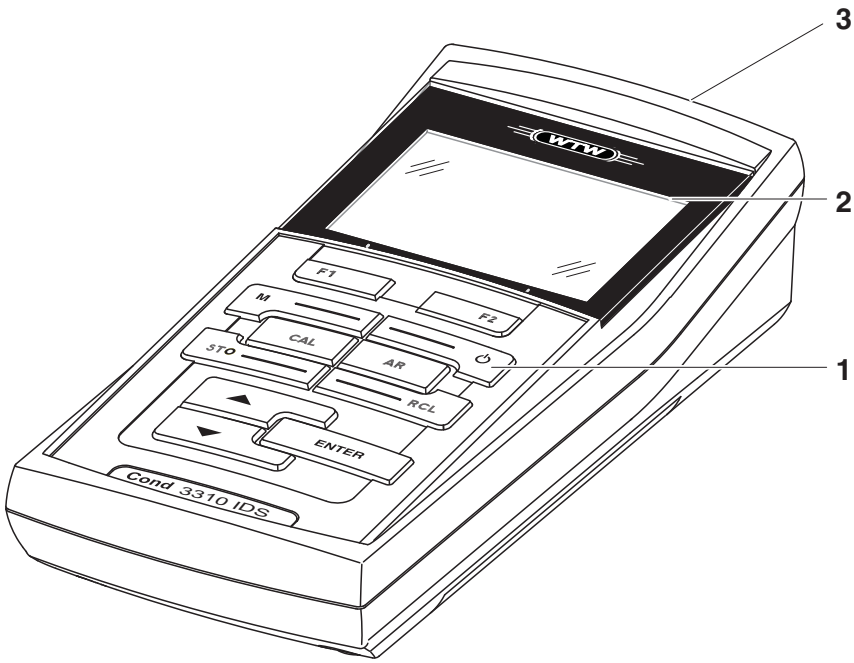
1.1 Cond 3310 IDS meter

The Cond 3310 IDS compact digital precision meter enables you to perform conductivity measurements quickly and reliably.

The Cond 3310 IDS provides the maximum degree of operating comfort, reliability and measuring certainty for all applications.

The Cond 3310 IDS supports you in your work with the following functions:

- Automatic sensor recognition
- Electronic access control
- Data transmission via the USB interface (USB-B).



1 Keypad
2 Display
3 Connectors

1.2 Sensors

A measuring system ready to measure consists of the Cond 3310 IDS meter and a suitable sensor.

Suitable sensors are WTW IDS conductivity sensors.

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

1.2.1 IDS sensors

IDS sensors

- support the automatic sensor recognition
- show only the settings relevant to the specific sensor in the setting menu
- process signals in the sensor digitally so that precise and interference-free measurements are enabled even with long cables
- facilitate to assign a sensor to a measured parameter with differently colored couplings
- have quick-lock couplings with which to fix the sensors to the meter.

Sensor data from IDS sensors

IDS sensors transmit the following sensor data to the meter:

- SENSOR ID
  - Sensor name
  - Sensor series number
- Calibration data
  - Calibration date
  - Calibration characteristics
  - Calibration interval
  - Cell constant (IDS conductivity sensors only)
  - Calibration history of the last 10 calibrations
- Measurement settings (IDS conductivity sensors only)
  - The set measured parameter
  - The set reference temperature
  - The set temperature coefficient
  - The set TDS factor

The calibration data are updated in the IDS sensor after each calibration procedure. A message is displayed while the data are being updated in the sensor.

Note
In the measured value display, you can display the sensor name and series number of the selected sensor with the [Info] softkey. You can then display all further sensor data stored in the sensor with the [More] softkey.

1.2.2 Automatic sensor recognition

The automatic sensor recognition for IDS sensors allows

- to operate an IDS sensor with different meters without recalibrating
- to assign measurement data to an IDS sensor
  - Measurement datasets are always stored and output with the sensor name and sensor series number.

- to assign calibration data to an IDS sensor
  - Calibration data and calibration history are always stored and output with the sensor name and sensor series number.
- to hide menus automatically that do not concern this sensor

To be able to use the automatic sensor recognition, a meter that supports the automatic sensor recognition (e.g. Cond 3310 IDS) and a digital IDS sensor are required.

In digital IDS sensors, sensor data are stored that clearly identify the sensor. The sensor data are automatically taken over by the meter.

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 11 TECHNICAL DATA, page 49).

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 11 TECHNICAL DATA, page 49).

3 Commissioning

3.1 Scope of delivery

- Meter Cond 3310 IDS
- 4 batteries 1.5 V Mignon type AA
- USB cable (A plug on mini B plug)
- Short instructions
- CD-ROM with
  - USB drivers
  - detailed operating manual
  - Software MultiLab Importer

3.2 Power supply

The Cond 3310 IDS is supplied with power in the following ways:

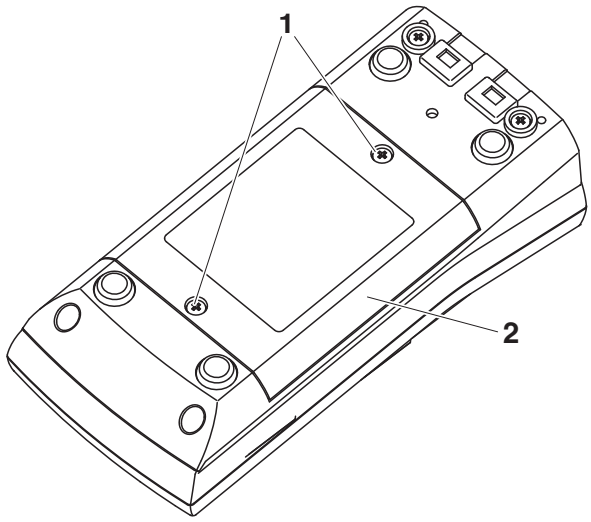
- Battery operation (4 batteries, 1.5 V Mignon type AA)
- USB operation via a connected USB-B cable

3.3 Initial commissioning

Perform the following activities:

- Insert the supplied batteries
- Switch on the meter (see section 4.2 SWITCHING ON THE METER, page 17)
- Set the date and time (see section 4.4.5 EXAMPLE 2 ON NAVIGATION: SETTING THE DATE AND TIME, page 22)

3.3.1 Inserting the batteries



1 Screws
2 Battery compartment

1. Open the battery compartment (1) 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.

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.

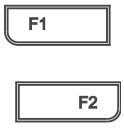
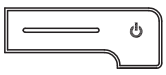
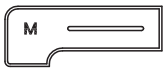
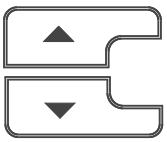
2. Place four batteries (type Mignon AA) in the battery compartment.
3. Close the battery compartment (1).
4. Set the date and time
(see section 4.4.5 EXAMPLE 2 ON NAVIGATION: SETTING THE DATE AND TIME, page 22).

4 Operation

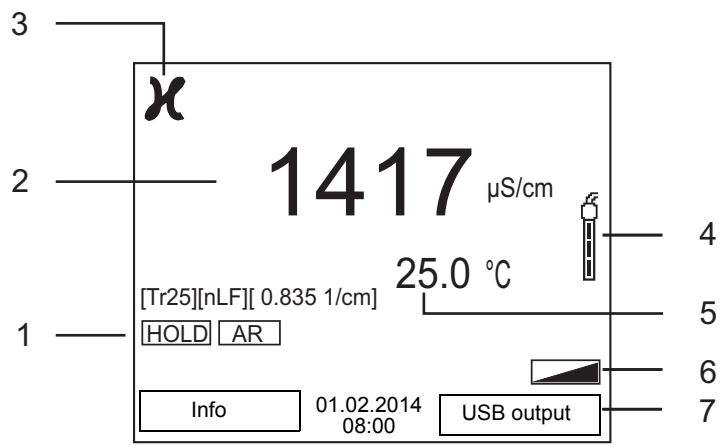
4.1 General operating principles

4.1.1 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>**: **<F2__>**:	Softkeys providing situation dependent functions, e.g.: **<F1>**/[*Info*]: View information on a sensor
	**<On/Off>**:	Switches the meter on or off
	**<M>**:	Selects the measured parameter / Quits the settings
	**<CAL>**: **<CAL_>**:	Calls up the calibration procedure Displays the calibration data
	**<STO>**: **<STO_>**:	Saves a measured value manually Opens the menu for the automatic save function
	**<RCL>**: **<RCL_>**:	Displays the manually stored measured values Displays the automatically stored measured values
	**<▲><▼>**: **<▲__><▼__>:**	Menu control, navigation Increments, decrements values Increments, decrements values continuously
	**<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

4.1.2 Display

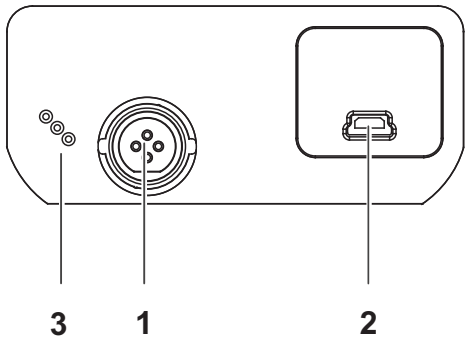


1 Status information (sensor)
2 Measured value
3 Measured parameter
4 Sensor symbol (calibration evaluation, calibration interval)
5 Measured temperature (with unit)
6 Status information (meter)
7 Softkeys and date + time

4.1.3 Status information (meter)

AR	Stability control (AutoRead) is active
HOLD	Measured value is frozen (**<AR>** key)
	Batteries are almost empty
	Data are automatically output to the USB-B interface at intervals

4.1.4 Connectors

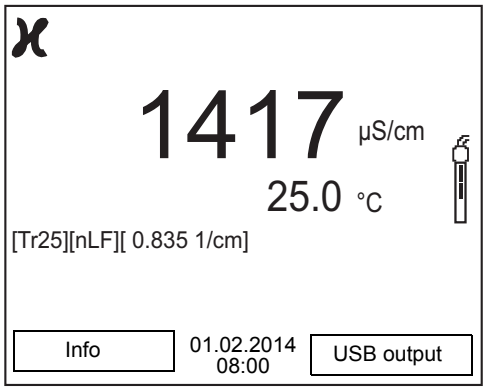


1 Digital sensors (Conductivity)
2 USB B (device) interface
3 Service interface

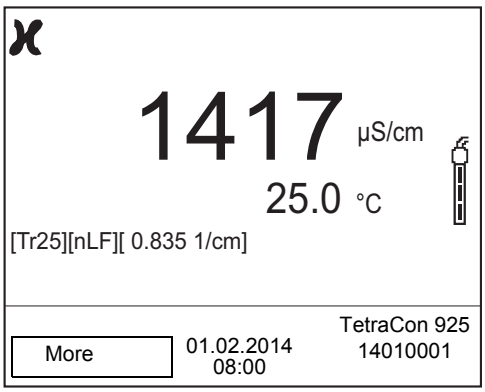
CAUTION
Only connect sensors to the meter that cannot return any voltages or currents that are not allowed (> SELV and > current circuit with current limiting).
WTW IDS sensors and IDS adapters meet these requirements.

4.1.5 Sensor info

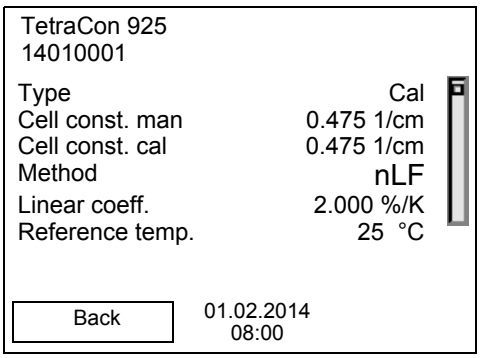
You can display the current sensor data and sensor settings of a connected sensor at any time. The sensor data are available in the measured value display with the **<F1>**/[*Info*] softkey.



1. In the measured value display:
   Display the sensor data (sensor name, series number) with [**<F1>***Info*].

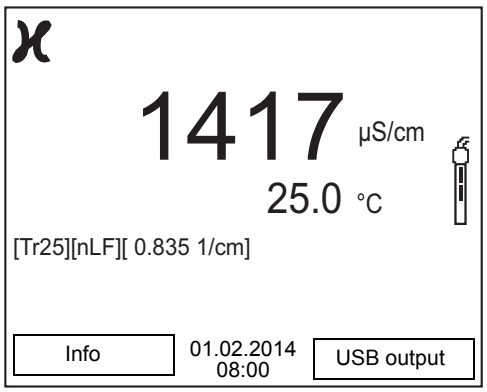


2. Display further sensor data (settings) with **<F1>**/[*More*].



4.2 Switching on the meter

1. Switch the meter on 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 the printer off with **<On/Off>**.

4.4 Navigation

4.4.1 Operating modes

Operating mode	Explanation
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 measuring data automatically or manually
Transmitting data	The meter transmits measuring data and calibration records to a USB-B interface automatically or manually.
Setting	The system menu or a sensor menu with submenus, settings and functions is displayed

4.4.2 Measured value display

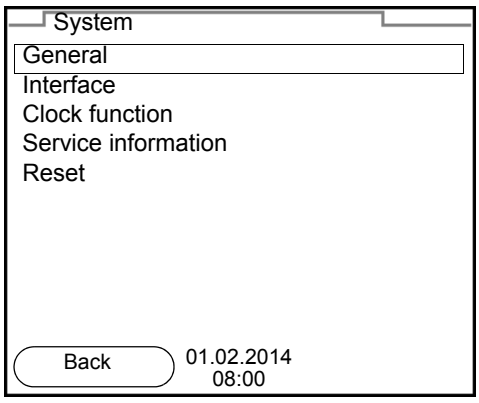
In the measured value display, you can

- open the menu for calibration and measurement settings with **<ENTER>** (short keystroke)
- **<ENTER_>** open the *Storage & config* menu with the sensor-independent settings by pressing **<ENTER>** (long keystroke, approx. 2 s).
- change the display in the selected measuring screen (e. g. pH <-> mV) by pressing **<M>**.
- change the display in the measurement window by pressing **<M>** (e.g. conductivity -> resistivity -> -> ->).

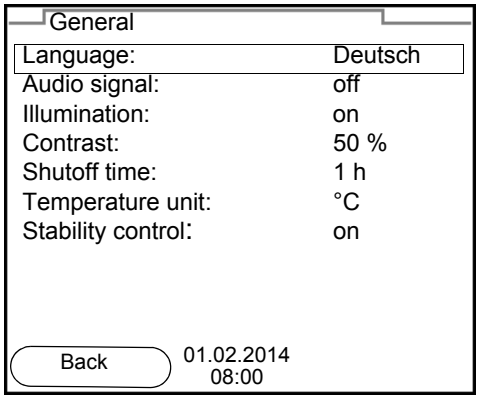
4.4.3 Menus and dialogs

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

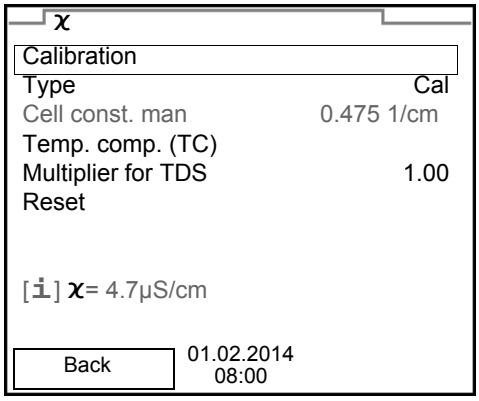
- Submenus
  The name of the submenu is displayed at the upper edge of the frame. Submenus are opened by confirming with **<ENTER>**. Example:



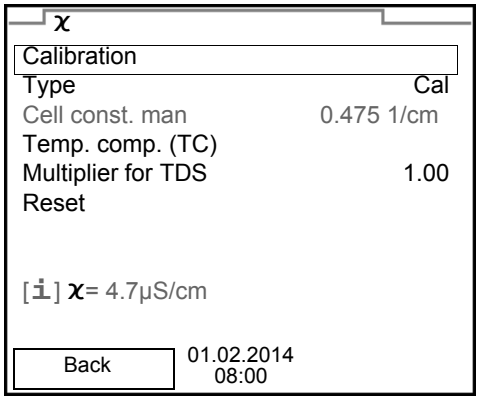
- Settings
  Settings are indicated by a colon. The current setting is displayed on the right-hand side. The setting mode is opened with **<ENTER>**. Subsequently, the setting can be changed with **<▲><▼>** and **<ENTER>**. Example:



- 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.

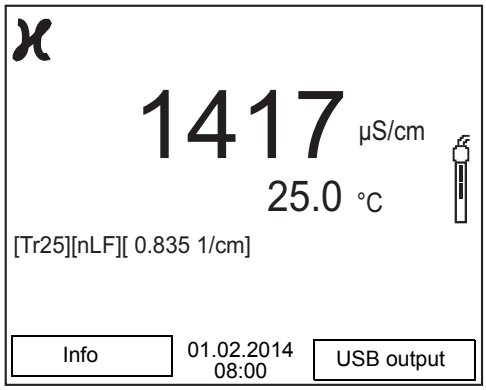


- Messages
  Information is marked by the [**i**] symbol. It cannot be selected. Example:

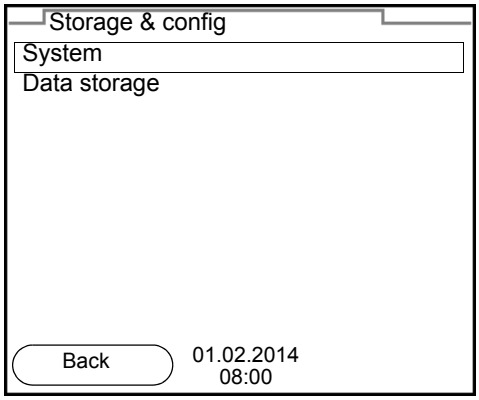


4.4.4 Navigation example 1:Setting the language

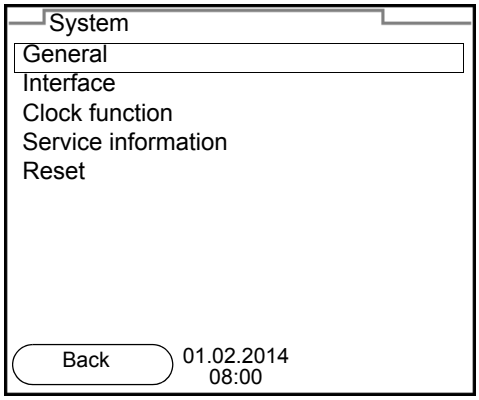
1. Press the **<On/Off>** key.
   The measured value display appears.
   The instrument is in the measuring mode.



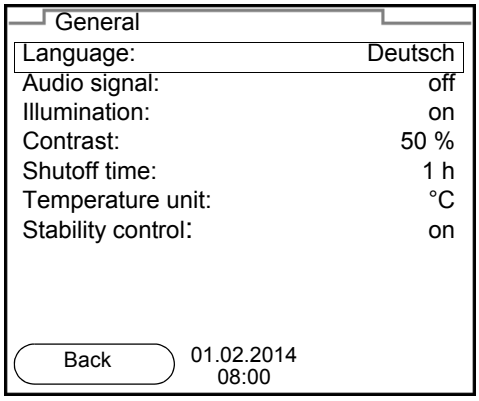
2. Using **<ENTER_>**, open the *Storage & config* menu.
   The instrument is in the setting mode.



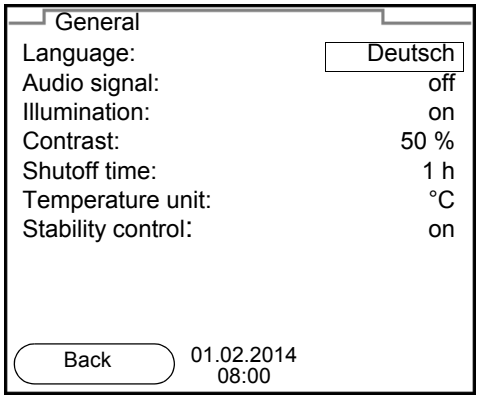
3. Select the *System* submenu with **<▲><▼>**.
   The current selection is displayed with a frame.
4. Open the *System* submenu with **<ENTER>**.



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.

4.4.5 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.

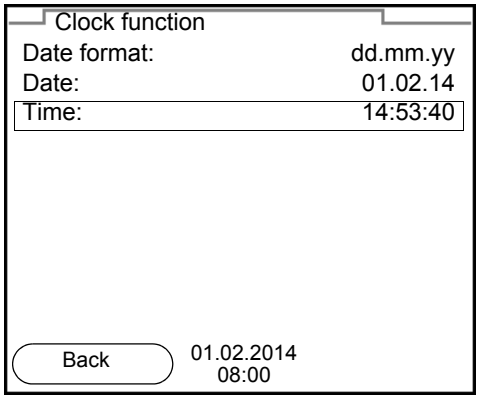
Therefore, check the time at regular intervals.

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.yy*) to the display of month, day, year (*mm/dd/yy* or *mm.dd.yy*).

1. In the measured value display:
   Using **<ENTER_>**, open the *Storage & config* menu.
   The instrument is in the setting mode.
2. Select and confirm the *System* / *Clock function* 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.

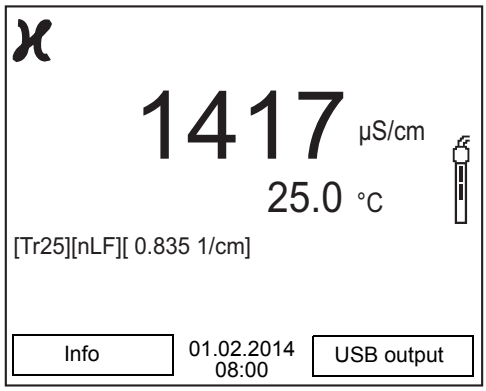
5 Conductivity

5.1 Measuring

5.1.1 Measuring the conductivity

NOTE
When connecting a grounded PC/printer, measurements cannot be performed in grounded media as the values would be incorrect. The USB interface is not galvanically isolated.

1. Connect the conductivity sensor to the meter.
   The conductivity measuring window is displayed.
   The measuring cell and cell constant for the connected IDS conductivity sensor are automatically taken over.
2. If necessary, press **<M>** to select the measured parameter χ.
3. Immerse the conductivity sensor 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 [ ] (≙ psu)
- Total dissolved solids TDS [mg/l] / [g/l]

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

Stability control (AutoRead) & HOLD function

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 set-

ting for automatic *Stability control* (see section 6.2.3 AUTOMATIC STABILITY CONTROL, page 33) in the *System* menu.

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

You can terminate the *Stability control* function and the HOLD function with **<AR>** or **<M>** at any time.

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. The progress bar disappears and the display of the measured parameter stops flashing.
   The current measurement data are output to the interface. Measurement data meeting the stability control criterion are marked by AR.

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	$\Delta\ \chi$: 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.

5.1.2 Measuring the temperature

For reproducible conductivity measurements, it is essential to measure the

temperature of the test sample.

IDS sensors measure the temperature with a temperature sensor integrated in the IDS sensor.

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

The reference temperature and temperature compensation are set in the menu for the parameter, conductivity (see section 6.1.1 SETTINGS FOR IDS CONDUCTIVITY SENSORS, page 30).

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*
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*

5.3 Calibration

5.3.1 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 meter.
Thus, you should calibrate at regular intervals.

5.3.2 When to calibrate?

- After connecting a sensor
- Routinely within the framework of the company quality assurance
- When the cleaning interval has expired

5.3.3 Determining the cell constant (calibration in control standard)

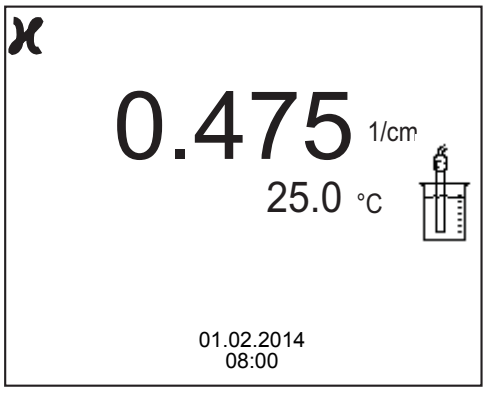
You can determine the actual cell constant of the IDS conductivity sensor by calibrating with the control standard in the following range:
0.450 ... 0.500 cm^{-1} (e.g. TetraCon 925, nominal cell constant 0.475 cm^{-1})

The cell constant is determined in the control standard, 0.01 mol/l KCl.

In the default condition, the calibrated cell constant of the IDS sensor is set to 0.475 cm^{-1} (IDS conductivity sensor TetraCon 925).

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

1. Connect the conductivity sensor to the meter.
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 sensor in the control standard solution, 0.01 mol/l KCl.
5. Start the measurement with **<ENTER>**.
   The measured value is checked for stability (stability control).
   The [AR] status indicator is displayed. The measured parameter flashes.
6. Wait for the end of the measurement with stability control ([HOLD][AR]) status indicator or
   take over the calibrated value with **<ENTER>**.
   The calibration record is displayed and output to the interface.
7. Switch to the measured value display with **<ENTER>**.

5.3.4 Calibration data

The calibration record is automatically transmitted to the interface after calibrating.

The calibration data can be displayed and then output to the interface.

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.

The calibration records of the last 10 calibrations are to be found in the menu, *Calibration* / *Calibration data storage* / *Display*. To open the *Calibration* menu, press the **<ENTER>** key in the measured value display.

Menu item	Setting/ function	Explanation
Calibration / *Calibration data storage* / *Display*	-	Displays the calibration records. Further options: ● Scroll through the calibration records with **<▲><▼>**. ● Output the displayed calibration record to the interface with **<F2>**/*[USB-Ausgabe]*. ● Output all calibration records to the interface with **<F2__>***[USB-Ausgabe]*. ● Quit the display with **<F1>**/ [Zurück] or **<ENTER>**. ● Switch directly to the measured value display with **<M>**.
Calibration / *Calibration data storage* / *Output to RS232/USB*	-	Outputs the calibration data memory to the interface

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 range 0.450 ... 0.500 cm^{-1}

Display	Calibration record	Cell constant [cm^{-1}]
Error	*Error*	Outside the range 0.450 ... 0.500 cm^{-1}
Error elimination (see section 14 WHAT TO DO IF..., page 88)		

Calibration record (USB output)

```
CALIBRATION Cond
01.02.2014 07:43:33

TetraCon 925
Ser. no. 09250033
Cell constant 0.476 1/cm       25.0 °C
Sensor                        +++
```

6 Settings

6.1 Cond measurement settings

6.1.1 Settings for IDS conductivity sensors

Settings

The settings are made in the menu for the measured parameter, conductivity. To open the settings, display the required measured parameter in the measured value display and press the **<ENTER>** key. After completing the settings, switch to the measured value display with **<M>**.
The possible settings are individually displayed for each sensor. Below the setting menu is displayed for two IDS sensors (TetraCon 925, LR 925/01).

Default settings are printed in **bold**.

Setting menuTetraCon 925

Menu item	Possible setting	Explanation
Calibration / *Calibration record*	-	Displays the calibration record of the last calibration.
Calibration / *Calibration data storage* / *Display*	-	Displays the last calibration records (max. 10)
Calibration / *Calibration data storage* / *Output to RS232/USB*	-	Outputs the calibration data memory to the interface
Calibration / *Calibration interval*	*1 ...* ***150*** *... 999 d*	*Calibration interval* for the IDS conductivity sensor (in days). The meter reminds you to calibrate regularly by the flashing sensor symbol in the measuring screen.
Type		Used measuring cell
	Cal	Measuring cells whose cell constant is determined by calibration in the KCL control standard solution. Calibration range: 0.450 ... 0.500 cm^{-1} The currently valid cell constant is displayed in the status line.
	man	Freely (manually) adjustable cell constant in the range 0.450 ... 0.500 $cm^{-1.}$

Menu item	Possible setting	Explanation
Cell const. man	*0.450 ...* ***0.475*** *...* *0.500 cm^{-1}*	Display and setting options for the manually adjustable cell constant. This menu item is only available when *Type man* is set.
Temp. comp. (TC) / Method	***nLF*** *Lin* *off*	Procedure for temperature compensation (see section 5.2 TEMPERATURE COMPENSATION, page 26). This setting is only available for the measured parameters, conductivity (χ) and resistivity (ρ).
Temp. comp. (TC) / Linear coeff.	*0.000 ...* ***2.000*** *...* *3.000 %/K*	Coefficient of the linear temperature compensation. This menu item is only available when the linear temperature compensation is set.
Temp. comp. (TC) / Reference temp.	*20 °C* ***25 °C***	Reference temperature This setting is only available for the measured parameters, conductivity (χ) and resistivity (ρ).
Multiplier for TDS	*0,40 ...* ***1,00***	Multiplier for TDS value
Reset	-	Resets all sensor settings to the delivery condition (see section 6.3.1 RESETTING THE MEASUREMENT SETTINGS, page 35).

Setting menu LR 925/01

Menu item	Possible setting	Explanation
Cell constant	*0.090 ...* ***0.100*** *...* *0.110 cm^{-1}*	Display and setting options for the cell constant
Temp. comp. (TC) / Method	***nLF*** *Lin* *off*	Procedure for temperature compensation (see section 5.2 TEMPERATURE COMPENSATION, page 26). This setting is only available for the measured parameters, conductivity (χ) and resistivity (ρ).
Temp. comp. (TC) / Linear coeff.	*0.000 ...* ***2.000*** *...* *3.000 %/K*	Coefficient of the linear temperature compensation. This menu item is only available when the linear temperature compensation is set.

Menu item	Possible setting	Explanation
Temp. comp. (TC) / Reference temp.	*20 °C* ***25 °C***	Reference temperature This setting is only available for the measured parameters, conductivity (χ) and resistivity (ρ).
Multiplier for TDS	*0,40 ...* ***1,00***	Multiplier for TDS value
Reset	-	Resets all sensor settings to the delivery condition (see section 6.3.1 RESETTING THE MEASUREMENT SETTINGS, page 35).

6.2 Sensor-independent settings

6.2.1 *System*

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

Default settings are printed in **bold**.

Menu item	Possible setting	Explanation
System / General / Language	*Deutsch* ***English*** (more)	Selects the menu language
System / General / Audio signal	***on*** *off*	Switches on/off the beep on keystroke
System / General / Illumination	***Auto*** *on* *off*	Switches the display illumination on/off
System / General / Contrast	*0 ...* ***50*** *... 100 %*	Changes the display contrast
System / General / Shutoff time	*10 min ...* ***1h*** *...* *24 h*	Adjusts the switch-off time
System / General / Temperature unit	***°C*** *°F*	Temperature unit, degrees Celsius or degrees Fahrenheit. All temperature values are displayed with the selected unit.
System / General / Stability control	***on*** *off*	Switches on or off the automatic stability control during measurement (see section 6.2.3 AUTOMATIC STABILITY CONTROL, page 33)
System / Interface / Baud rate	*1200, 2400,* ***4800****, 9600,* *19200*	Baud rate of the USB Device interface

Menu item	Possible setting	Explanation
System / *Interface* / *Output format*	***ASCII*** *CSV*	Output format for data transmission For details, see section 8 TRANSMITTING DATA (USB INTERFACE), page 43
System / *Interface* / *Decimal separator*	***Dot (xx.x)*** *Comma (xx,x)*	Decimal separator
System / *Interface* / *Output header*		Output of a header for *Output format*: *CSV*
System / *Clock function*	*Date format* *Datum* *Time*	Settings of time and date. For details, see section 4.4.5 EXAMPLE 2 ON NAVIGATION: SETTING THE DATE AND TIME, page 22
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 6.3.2 RESETTING THE SYSTEM SETTINGS, page 35

6.2.2 *Data storage*

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

Detailed information on the memory functions of the Cond 3310 IDS are given in section 7 DATA MEMORY, page 37.

6.2.3 Automatic *Stability control*

The automatic *Stability control* (AutoRead) function continuously 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 6.2 SENSOR-INDEPENDENT SETTINGS, page 32).

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.

6.2.4 Automatic switch-off function

The instrument has an automatic switch-off function in order to save the batteries (see section 6.2.1 SYSTEM, page 32). The automatic switchoff function switches off the meter if no key is pressed for an adjustable period.

The automatic switchoff function is not active

- if a USB-B cable is connected
- if the *Automatic data storage* function is active, or with *automatic data transmission*

6.2.5 Display illumination

The meter automatically switches off the display illumination if no key is pressed for 20 seconds.

The illumination is switched on with the next keystroke again.

You can also generally switch on the display illumination (see section 6.2.1 SYSTEM, page 32).

6.3 Reset

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

6.3.1 Resetting the measurement settings

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

Conductivity

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

Setting	Default settings
Calibration interval	150 d
Measured parameter	χ
Cell constant (c)	Depending on the connected measuring cell: 0.475 cm^{-1} (calibrated) 0.475 cm^{-1} (adjusted) 0.100 cm^{-1}
Temperature compensation	nLF
Reference temperature	25 °C
Temperature coefficient (TC) of the linear temperature compensation	2.000 %/K
TDS multiplier	1,00

The sensor settings are reset under the *Reset* menu item in the menu for calibration and measurement settings. To open the settings, display the required measured parameter in the measured value display and press the **<ENTER>** key.

6.3.2 Resetting the system settings

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

Setting	Default settings
Language	English
Audio signal	on
Baud rate	4800 Baud
Output format	ASCII

Setting	Default settings
Decimal separator	.
Contrast	50 %
Illumination	Auto
Shutoff time	1 h
Temperature unit	°C
Stability control	on

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

7 Data memory

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

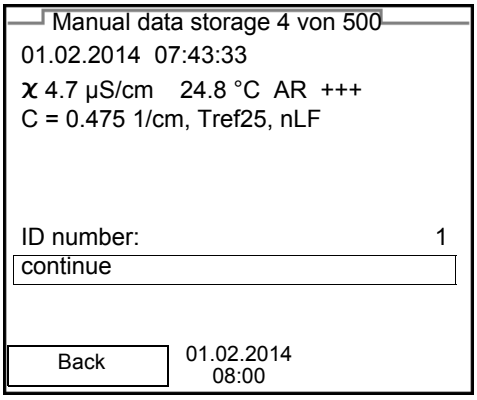
- Manual data storage (see section 7.1 MANUAL STORAGE, page 37)
- Automatic data storage at intervals (see section 7.2 AUTOMATIC DATA STORAGE AT INTERVALS, page 38)

Each data storage process transmits the current dataset to the interface at the same time.

7.1 Manual storage

You can store a measurement dataset to the data memory as follows. The dataset is at the same time output to the interface:

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

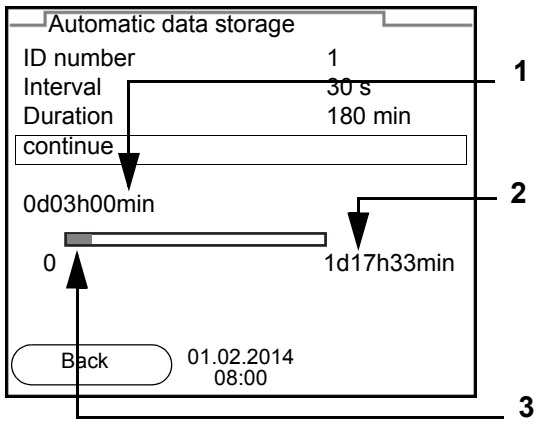
When all memory locations are occupied, it is not possible to continue storing. Then you can e.g. store the data from the memory to a PC (see section 7.3.1 EDITING THE MEASUREMENT DATA MEMORY, page 40) and subsequently erase the data memory (see section 7.3.2 ERASING THE MEASUREMENT DATA MEMORY, page 41).

7.2 Automatic data storage at intervals

The storage interval (*Interval*) determines the time interval between automatic data storage processes. Each data storage process transmits the current dataset to the interface at the same time.

Configuring the automatic storage function

1. Press the **<STO_>** key.
   The menu for automatic data storage appears.



1 Specified entire storage duration
2 Max. available storage duration
3 Graphical display of the memory usage

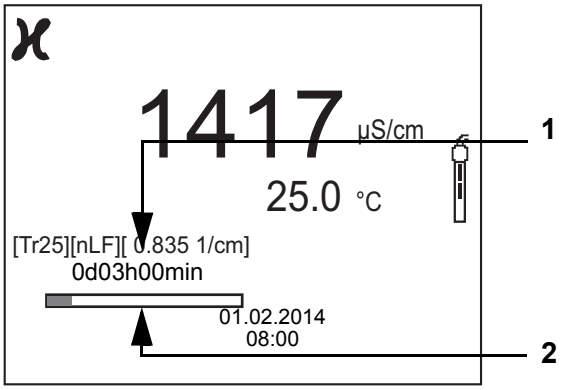
Settings

You can configure the automatic data storage function with the following settings:

Menu item	Possible setting	Explanation
ID number	*1 ... 10000*	ID number for the dataset series.
Interval	*1 s, 5 s, 10 s, 30 s, 1 min, 5 min, 10 min, 15 min, 30 min, 60 min*	Storage interval. The lower limit of the storage interval can be restricted by the number of free memory locations. The upper limit is restricted by the storage duration.
Duration	*1 min ... x min*	Storage duration. Specifies after which time the automatic data storage should be terminated. The lower limit of the storage duration is restricted by the storage interval. The upper limit is restricted by the number of free memory locations.

Starting the automatic storage function

To start the automatic storage function, select *continue* with **<▲><▼>** and confirm with **<ENTER>**. The meter switches to the measured value display.



1 Remaining storage duration
2 Graphical display of the storage duration

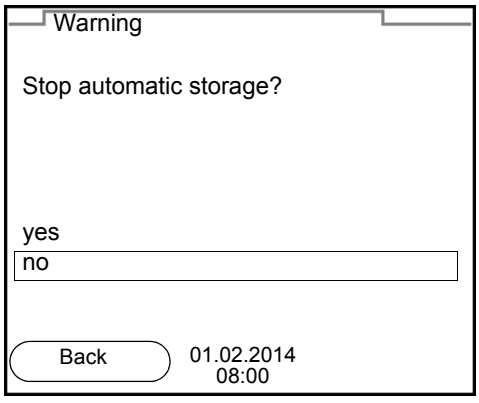
The active automatic data storage function can be recognized by the progress bar in the status line. The progress bar indicates the remaining storage duration.

If the automatic data storage function is activated *only the following keys are active:* **<M>**, **<STO_>** and **<On/Off>**. The other keys and the automatic switch-off function are deactivated.

Terminating the automatic storage function prematurely

Proceed as follows to switch off the automatic data storage function before the adjusted storage duration has expired:

1. Press the **<STO_>** key.
   The following window appears.



2. Using **<▲><▼>**, select *yes* and confirm with **<ENTER>**.
   The meter switches to the measured value display.
   The automatic data storage function is terminated.

7.3 Measurement data memory

7.3.1 Editing the measurement data memory

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

Each of the measurement data memories 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 **<ENTER_>** key in the measured value display.

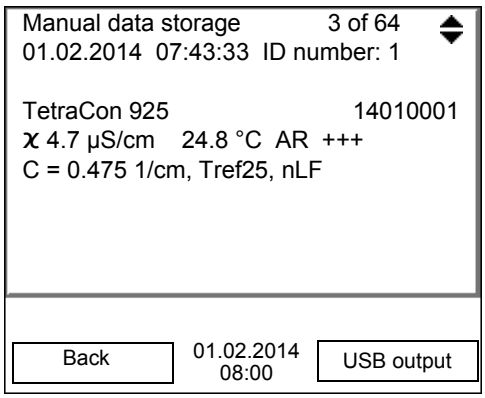
Open the manual or automatic memory directly with the **<RCL>** or **<RCL_>** key.

The settings are explained here using the manual data memory as an example. The same settings and functions are available for the automatic data memory.

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 **<▲><▼>**. ● Output the displayed dataset to the interface with **<F2>**/[*USB output*]. ● Quit the display with **<F1>**/ [*Back*].
Data storage / *Manual data storage* / *Output to RS232/ USB*	-	Outputs all stored measurement data to the interface.
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



Representation of a dataset (USB output)

```
01.02.2014 07:43:33
Cond 3310 IDS
Ser. no. 1135001

ID number 2

TetraCon 925
Ser. no. 1125001
Cond 4.7 µS/cm    24.8 °C  AR  +++
C = 0.475 1/cm, Tref25, nLF
_____________________________________

01.02.2014 07:43:53
Cond 3310 IDS
Ser. no. 1135001

ID number 2

TetraCon 925
Ser. no. 1125001
Cond 4.7 µS/cm    24.8 °C  AR  +++
C = 0.475 1/cm, Tref25, nLF
_____________________________________

etc...
```

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*].

7.3.2 Erasing the measurement data memory

Erasing the measurement data memory (see section 7.3.1 EDITING THE MEASUREMENT DATA MEMORY, page 40).

7.3.3 Measurement dataset

A complete dataset consists of:

- Date/time
- Meter name, series number
- Sensor name, series number
- ID number
- 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)

7.3.4 Storage locations

The Cond 3310 IDS meter has two measurement data memories. The measured values recorded either manually or automatic are stored separately in individual measurement data memories.

Memory	Maximum number of datasets
Manual data storage	500
Automatic data storage	4500

8 Transmitting data (USB interface)

8.1 Outputting current measurement data

1. Output the current measurement data to the USB-B interface with **<F2>**[*USB output*].

8.2 Transmitting data (to a PC)

The meter has a USB-B interface (*USB Device*) e.g. to connect a PC.

Via the USB-B interface (*USB Device*) you can store data to a PC or printer and update the meter software.

8.3 Connecting the PC / USB-B interface (*USB Device*)

Connect the Cond 3310 IDS to the PC via the USB-B interface.

Installation of the USB driver on the PC

System requirements of the PC for installation of the USB driver:

- PC with at least one free USB connection and CD-ROM drive
- Windows 2000, Windows XP, Windows Vista or Windows 7.

1. Insert the supplied installation CD in the CD drive of your PC.
2. Install the driver from the CD.
   Follow the Windows installation instructions as necessary.
3. Connect the Cond 3310 IDS to the PC via the USB-B interface.
   The meter is listed as a virtual COM interface among the connections in the Windows instrument manager.
4. Set the same transmission data at the connected instrument (PC):
   - Baud rate: to be selected in the range 1200 ... 19200
   - Handshake: RTS/CTS
   - Set at the PC only:
     – Parity: none
     – Data bits: 8
     – Stop bits: 2

8.4 Options for data storage to a PC

Via the USB-B interface you can store data to a PC. The following table shows which data are transmitted to the interface in which way:

Data	Control	Operation / description
Current measured values of all connected sensors	Manual	● With **<F2>**/[*USB output*]. ● Simultaneously with every manual data storage process (see section 7.1 MANUAL STORAGE, page 37).
	Automatic, at intervals	● With **<F2__>**/[*USB output*]. Then you can set the transmission interval. ● Simultaneously with every automatic data storage process (see section 7.2 AUTOMATIC DATA STORAGE AT INTERVALS, page 38).
Stored measured values	Manual	● Displayed dataset with **<F2>**[*USB output*] after calling up from the memory. ● All datasets with the *Output to RS232/ USB* function. (see section 7.3.1 EDITING THE MEASUREMENT DATA MEMORY, page 40).
Calibration records	Manual	● Calibration record with **<F2>**/[*USB output*] (ssection 5.3.4 CALIBRATION DATA, page 28).
	Automatic	● At the end of a calibration procedure.

The following rule applies: With the exception of the menus, shortly pressing the **<F2>**/[*USB output*] key generally outputs the display contents to the interface (displayed measured values, measuring datasets, calibration records).

8.5 MultiLab Importer

With the aid of the MultiLab Importer software, you can record and evaluate measurement data with a PC.

More detailed information can be found in the MultiLab Importer operating manual.

9 Maintenance, cleaning, disposal

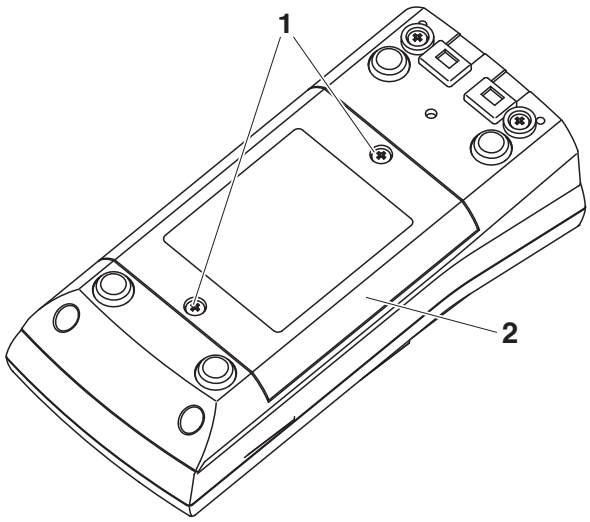
9.1 Maintenance

9.1.1 General maintenance activities

The only maintenance activity required is replacing the batteries.

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

9.1.2 Replacing the batteries



1 Screws
2 Battery compartment

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

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.

4. Place four batteries (type Mignon AA) in the battery compartment.
5. Close the battery compartment (2) and tighten the screws (1).
6. Set the date and time
(see section 4.4.5 EXAMPLE 2 ON NAVIGATION: SETTING THE DATE AND TIME, page 22).

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.

9.2 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.

9.3 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.

9.4 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.

10 What to do if...

10.1 Conductivity

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

Error message *OFL, UFL*

The measured value is outside the measuring range.

Cause	Remedy
– Measured value outside the measuring range	– Use suitable IDS conductivity sensor

Error message, *Error*

Cause	Remedy
– Sensor contaminated	– Clean the sensor and replace it if necessary
– Calibration solution not suitable	– Check the calibration solutions

10.2 General information

Sensor symbol flashes

Cause	Remedy
– Calibration interval expired	– Recalibrate the measuring system

Display

Cause	Remedy
– Batteries almost empty	– Replace the batteries (see section 9.1 MAINTENANCE, page 45)

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 or IDS sensor	Cause	Remedy
	– E.g., a question by the service department	– Switch on the meter. – Open the menu, **<ENTER_>** / *Storage & config* / *System* / *Service information*. The instrument data are displayed. or – Connect the sensor. Press softkey [**<F1>***Info***<F1>**] / [*More*] The sensor data are displayed (see section 4.1.5 SENSOR INFO, page 16)

11 Technical data

11.1 Measuring ranges, resolution, accuracy

The data are given in the documentation of your sensor.

11.2 General data

Dimensions	Cond 3310 IDS:	Approx. 180 x 80 x 55 mm
Weight	Cond 3310 IDS:	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	+5 °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
	Operational life	Approx. 200 h*

* The operational life is shorter is the display illumination is switched on permanently

USB interface (device)	Type	USB 1.1 USB-B (Device), PC
	Baud rate	Adjustable: 1200, 2400, 4800, 9600, 19200 Baud
	Data bits	8
	Stop bits	2
	Parity	None
	Handshake	RTS/CTS
	Cable length	Max. 3 m
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 UL 61010-1 CAN/CSA-C22.2#61010-1
IP protection class	EN 60529

12 Firmware update

12.1 Firmware update for the meter Cond 3310 IDS

You can find available firmware update files for your meter on the Internet. With the "Firmware Update " program and a PC you can update the firmware of the Cond 3310 IDS to the newest version.

For the update you have to connect the meter to a PC.

For the update via the USB-B interface, the following is required:

- a free USB interface (virtual COM port) on the PC
- the driver for the USB interface (on the enclosed CD-ROM)
- the USB cable (included in the scope of delivery of the Cond 3310 IDS).

1. Install the downloaded firmware update on a PC.
   An update folder is created in the Windows start menu.
   If an update folder already exists for the meter (or meter type), the new data are displayed there.
2. In the windows start menu, open the update folder and start the firmware update program for the meter
3. Using the USB interface cable, connect the Cond 3310 IDS to a USB interface (virtual COM port) of the PC.
4. Switch on the Cond 3310 IDS.
5. In the firmware update program, start the update process with OK.
6. Follow the instructions of the firmware update program.
   During the programming process, a corresponding message and a progress bar (in %) are displayed.
   The programming process takes up to 5 minutes. A terminatory message is displayed after a successful programming process. The firmware update is completed.
7. Disconnect the Cond 3310 IDS from the PC.
   The Cond 3310 IDS is ready for operation again.

After switching the meter off and on you can check whether the meter has taken over the new software version (see YOU WANT TO KNOW WHICH SOFTWARE VERSION IS IN THE METER OR IDS SENSOR, PAGE 48).

12.2 Firmware-Update for IDS Sensors

With the "Firmware Update" program and a PC you can update the firmware of an IDS sensor to the newest version.
You can find available firmware update files for your IDS sensor on the Internet.

For updating, connect the IDS sensor to the Cond 3310 IDS, and the Cond 3310 IDS to a PC.

For the update via the USB-B interface, the following is required:

- a free USB interface (virtual COM port) on the PC
- the driver for the USB interface (on the enclosed CD-ROM)
- the USB cable (included in the scope of delivery of the Cond 3310 IDS).

1. Install the downloaded firmware update on a PC.
   An update folder is created in the Windows start menu.
   If an update folder already exists for the sensor (or sensor type), the new data are displayed there.
2. In the windows start menu, open the update folder and start the firmware update program for the IDS sensor
3. Connect the IDS sensor to the Cond 3310 IDS meter.
4. Using the USB interface cable, connect the Cond 3310 IDS to a USB interface (virtual COM port) of the PC.
5. Switch on the Cond 3310 IDS.
6. In the firmware update program, start the update process with OK.
7. Follow the instructions of the firmware update program.
   During the programming process, a corresponding message and a progress bar (in %) are displayed.
   The programming process takes up to 5 minutes. A terminatory message is displayed after a successful programming process. The firmware update is completed.
8. Disconnect the Cond 3310 IDS from the PC.
   Meter and sensor are ready for operation again.

After switching the meter off and on you can check whether the sensor has taken over the new software version (see YOU WANT TO KNOW WHICH SOFTWARE VERSION IS IN THE METER OR IDS SENSOR, PAGE 48).

13 Glossary

Conductivity

Conductivity (ϰ)
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.

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 α of a linear temperature function.

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

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.

Resistivity (ρ)
Short name for the specific electrolytic resistivity. It corresponds to the reciprocal value of the electrical conductivity.

Cell constant (c)
Characteristic quantity of a conductivity measuring cell, depending on the geometry.

General information

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

AutoRange
Name of the automatic selection of the measuring range.

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.

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.
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.
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.
Reset	Restoring the original condition of all settings of a measuring system.
Stability control (AutoRead)	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 function	Name of a mathematical function expressing the temperature behavior of a test sample, a sensor or part of a sensor.

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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 12,500 people unified in a common purpose: creating innovative solutions to meet our world's water needs. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. We move, treat, analyze, and return water to the environment, and we help people use water efficiently, in their homes, buildings, factories and farms. 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, backed by a legacy of innovation.

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

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