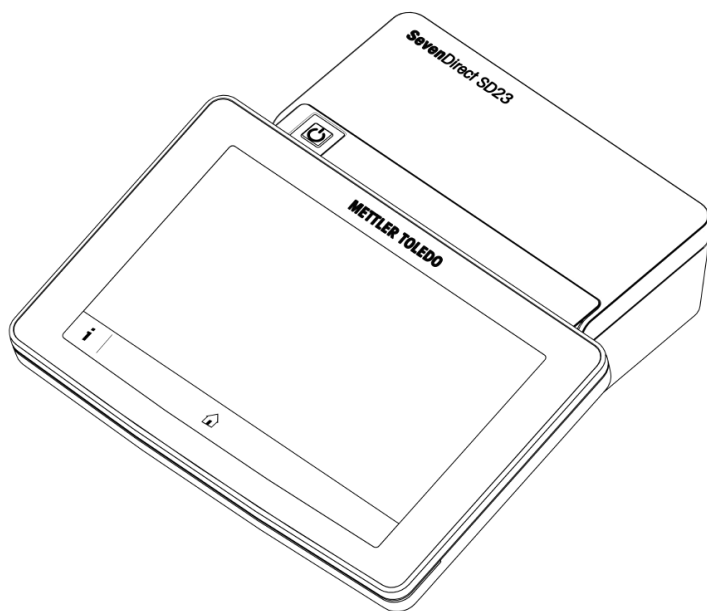




METTLER TOLEDO

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1 Introduction

The SevenDirect is an intuitive, easy-to-operate benchtop meter for parameters such as pH, redox potential, conductivity and ion concentrations (depending on instrument version). It is designed for robustness in typical laboratory settings and supports the recording and transfer of important measurement data.

Conventions and symbols



Refers to an external document.

Note

For useful information about the product.

Elements of instructions

Instructions always contain action steps and can contain prerequisites, intermediate results and results. If an instruction contains more than one action step, the action steps are numbered.

- Prerequisites that must be fulfilled before the individual action steps can be executed.
- 1 Action step 1
 - ⇒ Intermediate result
- 2 Action step 2
 - ⇒ Result

2 Safety Information

Two documents named "User Manual" and "Reference Manual" are available for this instrument.

- The User Manual is printed and delivered with the instrument.
- The electronic Reference Manual contains a full description of the instrument and its use.
- Keep both documents for future reference.
- Include both documents if you transfer the instrument to other parties.

Only use the instrument according to the User Manual and the Reference Manual. If you do not use the instrument according to these documents or if the instrument is modified, the safety of the instrument may be impaired and Mettler-Toledo GmbH assumes no liability.



User Manual and Reference Manual are available online.

► www.mt.com/library



The FCC Supplier Declaration of Conformity is available online.

► <http://www.mt.com/ComplianceSearch>

2.1 Definitions of signal words and warning symbols

Safety notes contain important information on safety issues. Ignoring the safety notes may lead to personal injury, damage to the instrument, malfunctions and false results. Safety notes are marked with the following signal words and warning symbols:

Signal words

WARNING

A hazardous situation with medium risk, possibly resulting in death or severe injury if not avoided.

NOTICE

A hazardous situation with low risk, resulting in damage to the instrument, other material damage, malfunctions and erroneous results, or loss of data.

Warning symbols



Electrical shock

2.2 Product specific safety notes

Intended use

This instrument is designed to be used by trained staff. The SevenDirect™ SD23 pH/Conductivity Meter is intended for measuring pH, redox potential and electrical conductivity.

Any other type of use and operation beyond the limits of use stated by Mettler-Toledo GmbH without consent from Mettler-Toledo GmbH is considered as not intended.

Responsibilities of the instrument owner

The instrument owner is the person holding the legal title to the instrument and who uses the instrument or authorizes any person to use it, or the person who is deemed by law to be the operator of the instrument. The instrument owner is responsible for the safety of all users of the instrument and third parties.

Mettler-Toledo GmbH assumes that the instrument owner trains users to safely use the instrument in their workplace and deal with potential hazards. Mettler-Toledo GmbH assumes that the instrument owner provides the necessary protective gear.

Safety notes



WARNING

Death or serious injury due to electric shock

Contact with parts that carry a live current can lead to death or injury.

- 1 Only use the METTLER TOLEDO AC/DC adapter designed for your instrument.
- 2 Keep all electrical cables and connections away from liquids and moisture.
- 3 Check the cables and the plugs for damage and replace damaged cables and plugs.



NOTICE

Damage to the instrument or malfunction due to the use of unsuitable parts

- Only use parts from METTLER TOLEDO that are intended to be used with your instrument.

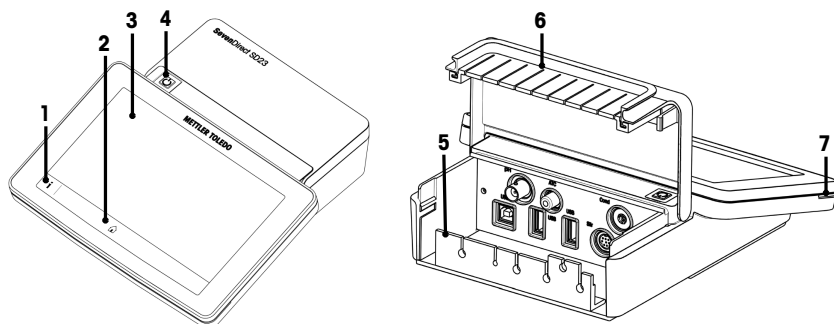
FCC Rules

This device complies with Part 15 of the FCC Rules and Radio Interference Requirements of the Canadian Department of Communications. Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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.

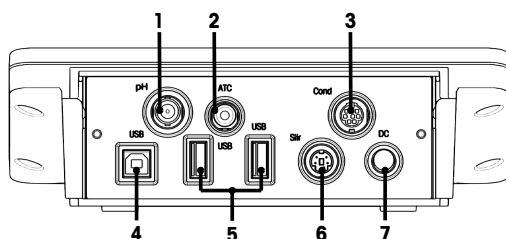
3 Design and Function

3.1 Overview



#	Description	Function
1	On screen help	To display help information for the current screen.
2	Home	To return from any menu level to Home screen .
3	Touch screen	Displays information and operates the meter.
4	Power switch	Switches the meter on/off. - Press to switch on. - Press and hold for 3 seconds to switch off.
5	Connector protection rubber	The removable dust rubber protects the meter from dust and the grooves are used for cable guidance.
6	Connector protection cover	- Closed to prevent dust from entering the meter. - Open to access rear panel connections.
7	Status light	Indicates whether the meter is: - ready for use: green - in use: blinking green - user intervention required: yellow - blocked: red

3.2 Rear panel connections



1	BNC socket for mV/pH signal input	2	RCA socket for temperature signal input
3	Mini-DIN socket for conductivity signal input	4	USB-B interface
5	USB-A interface (USB-Stick, printer, barcode reader)	6	Mini DIN socket for EasyMix
7	DC power supply socket		

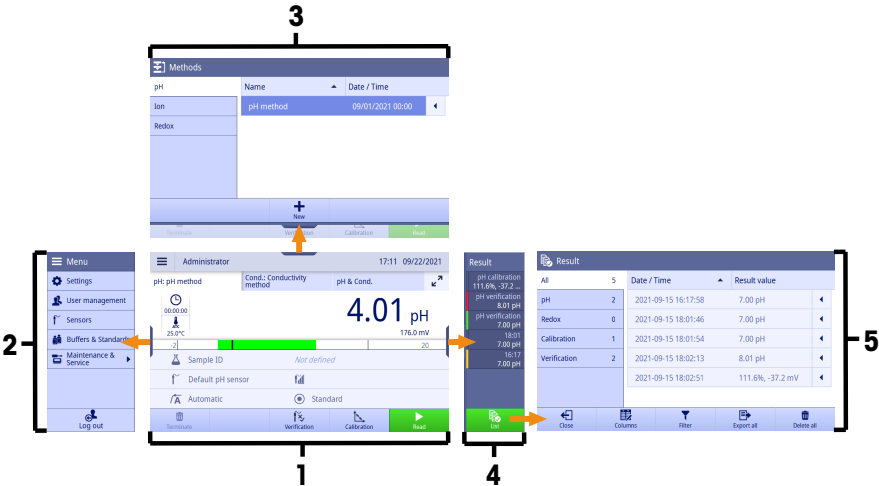
Note For best performance, use USB memory stick with FAT16 or FAT32 file system.

3.3 User interface

Note The screen shots in this manual are examples and can differ from the screen on your meter.

3.3.1 Main sections at a glance

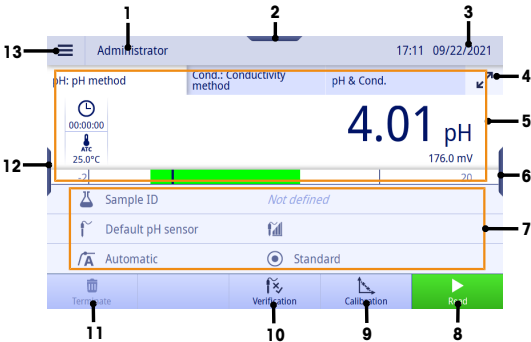
The **Home screen** (1) is the central navigation point where all the menus and settings can be found. The **Menu** (2), **Methods** (3) and **Results fly-in** (4) open when using the handles along the sides of the main screen. The **Result** (5) opens when tapping **List** from (4).



See also

Home screen ▶ Page 6

3.3.2 Home screen

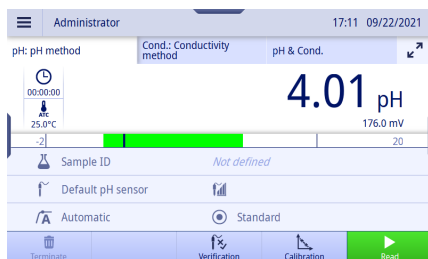


#	Description	Function
1	User name	Displays the name of the current user.
2	Methods handle	Enters into Methods to view and edit methods.
3	Date and time	Displays the current date and time. The format is set in Menu > Settings > General .

#	Description	Function
4	Activate / deactivate uFocus™ mode	Switches modes for the display representation. Details see [Display representation ► Page 7].
5	Measurement reading area	Displays the results of the current measurement, calibration or verification.
6	Results handle	Enters into Results fly-in to see the list of the latest 7 results.
7	Method information area	Displays the information about the sample, sensor and method.
8	Read	Starts measurements and confirms measurement results.
9	Calibration	Reviews sensor status, changes sensor and starts calibrations.
10	Verification	Reviews sensor status, changes sensor and starts verifications.
11	Terminate	Terminates the measurement, calibration or verification.
12	Menu handle	Enters into Menu to maintain settings, user management, sensors, buffers & standards and maintenance & service.
13	Menu button	

3.3.2.1 Display representation

There are two modes available for the display representation: the full-information screen with all the information displayed, and the measurement close-up screen uFocus™, where the method information area is hidden and the measurement information is shown in large font. To toggle between these views, touch Activate / deactivate uFocus™ mode button  before, during or after a measurement.



Standard view



uFocus™ view



#	Description	Function
1	Method ID	Tap on the different tabs to switch between the measurement modes. • 'pH': can perform pH measurement, pH sensor calibration and pH sensor verification • 'Cond.': can perform conductivity measurement, conductivity sensor calibration and conductivity sensor verification • 'pH & Cond.': can perform simultaneous pH and conductivity measurements • 'Redox': can perform redox measurement and redox sensor verification • 'Redox & Cond.': can perform simultaneous redox and conductivity measurements
2	Duration	• : displays the duration of the measurement. • : displays the number of data points which are already recorded. Only if Methods > Measure > Interval reading is active, you can tap to switch between these 2 modes.
3	Temperature	Displays the temperature. Tap to perform a temperature check while the meter is in idle state. • : gets the temperature value from the sample automatically. • : taps to change the temperature value used for the current measurement only.
4	Endpoint type	Displays the information of the endpoint type. If a user belonging to the Administrator user group is logged in, you can tap to enter the active method to adjust settings for the endpoint type and the stability criterion. - Endpoint type, defined in Methods > Measure > Endpoint type. –  Automatic: stops the measurement automatically when the signal is stable. –  Manual: manually stops the measurement by tapping Manual endpoint. –  Timed: stops the measurement after the predefined time. - Stability Criterion (pH only), defined in Methods > Measure > Stability criteria. Details see Stability criteria. –  Strict –  Standard –  Fast

#	Description	Function
5	Sensor name	Displays the information of the selected sensor. Tap to change to another sensor if no sensor is defined in the method and no ISM sensor is connected. - pH electrode condition  Slope: 95-105% / Offset: $\pm(0-20)$ mV (Electrode is in good condition)  Slope: 94-90% / Offset: $\pm(20-35)$ mV (Electrode needs cleaning)  Slope: 89-85% / Offset: $\pm(>35)$ mV (Electrode is defective or too old) - Inform about whether a calibration is due based on: Methods > Calibration > Calibration reminder Menu > Settings > Analysis settings > Calibration expiry action - Inform about whether a verification is due based on: Methods > Verification > Verification reminder Menu > Settings > Analysis settings > Verification expiry action
6	Sample ID	Displays the information of the sample ID. Tap to set the sample ID manually.
7	Range indicator	Only visible for pH measurement mode. The green area shows the range covered by the current calibration. The bold vertical line will move to indicate the current measured value. If Methods > Measure > Limits of the measurement are defined, the limits are also indicated on the bar, marked as vertical lines.
8	Reading	Displays the measurement value and used measurement unit. - pH: raw value 'mV' with unit 'pH', 'mV' - Conductivity: raw value 'Ω' with unit: - For Conductivity mode: $\mu\text{S/cm}$, mS/cm, S/m, $\mu\text{S/m}$, mS/m - For TDS mode: ppt (‰), mg/L, ppm, g/L - For Salinity: psu, ppt - For Resistivity: $\text{M}\Omega\cdot\text{cm}$, $\text{k}\Omega\cdot\text{cm}$, $\Omega\cdot\text{cm}$ - Redox: raw value 'mV' with unit 'mV', 'Rel.mV'

3.3.3 How to operate the touch screen

The meter is operated by using a finger tapping on the touch screen.



NOTICE

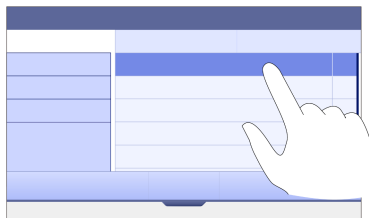
Danger of damaging the touch screen with pointed or sharp objects!

Pressing on the touch screen with pointed or sharp objects may be damaged it.

- Operate the touch screen by applying gentle pressure with the pad of your finger.

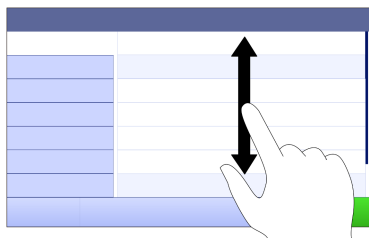
3.3.3.1 Selecting or activating an item

- Tap the item or function to be selected or activated.



3.3.3.2 Scrolling up and down

- 1 Place the finger on the screen.
- 2 Move the list or content up and down.

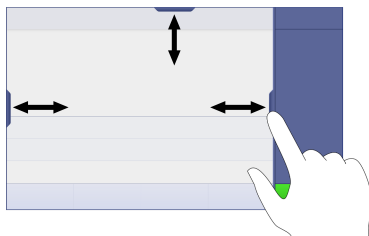


3.3.3.3 Accessing specific menus

The handles are placed along the sides of **Home screen**. Use the handles to access specific menus.

To use the handles, proceed as follows:

- Place the finger on the handle and slide the function window out or in.
- or -
- Swipe across the measurement reading area away from the handle of the menu which you want to open or close.
- or -
- Tap the handle symbol to open or close the function window.



3.3.3.4 Secondary functions for list items

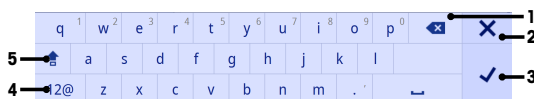
To access the secondary functions, proceed as follows:

- Place the finger on the triangle symbol ◀ and slide to the left to display the secondary functions.
- or -
- Swipe left across a list item to display its secondary functions and swipe right across to hide its secondary functions.
- or -
- Tap ◀ to display or hide the secondary functions.



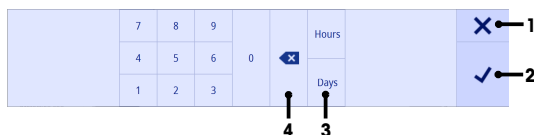
3.3.3.5 Entering characters and numbers

The instrument has different keyboard layouts of the alphanumeric input field which can be selected in **Menu > Settings > User settings > Language**. The following image is an example of the English keyboard.



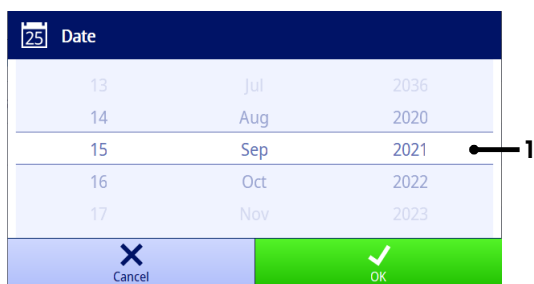
#	Description	Function
1	Backspace	Deletes the character left of the current cursor position. The cursor can be positioned by using the touch screen.
2	Discard	Closes the keyboard dialog and discards the input.
3	Confirm	Confirms the entered information.
4	Numbers and special characters	Switches to the keyboards for special characters and numbers.
5	Shift	Switches between lower or upper case letters. Double tap can engage caps lock.

3.3.3.6 Entering numbers and unit



#	Description	Function
1	Discard	Closes the keyboard dialog and discards the input.
2	Confirm	Confirms the entered data.
3	Unit	Lists optional units. Tap to switch the unit. Only displayed if the unit can be changed.
4	Backspace	Deletes the number left of the current cursor position. The cursor can be positioned by using the touch screen.

3.3.3.7 Changing date and time



The display field (1) shows the defined date or time. Scroll to move the list up/down to change the display field.

Note the format of date and time can be defined in **Menu > Settings > General**.

4 Putting into Operation

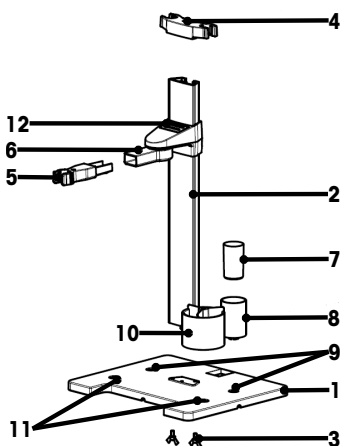
4.1 Scope of delivery

Unpack the instrument and check the scope of delivery. Keep the calibration certificate in a safe place. SevenDirect™ is delivered with:

- AC adapter
- Electrode arm EasyPlace complete
- Protective cover
- EU Declaration of conformity
- Test report
- User Manual (print version)

4.2 Mounting EasyPlace

- 1 Attach the base plate (1) to the pole (2) by tightening the Screws (3) by hand.
- 2 Put the Top Cover Pole (4) on the pole.
- 3 Insert the Sensor Holder (5) into the electrode arm (6).
- 4 Put the Parking Beaker Insert (7) into the Parking Beaker (8).
- 5 Put the Parking Beaker to the dedicated storage position (9).
- 6 Put the Sachet Holder (10) to the dedicated position (11), which is used to hold the buffers/standards.
- 7 Press the button (12) and slide up and down to adjust the height.
- 8 Rotate the electrode arm to adjust the sensor position.



4.3 Installing power supply



WARNING

Death or serious injury due to electric shock

Contact with parts that carry a live current can lead to death or injury.

- 1 Only use the METTLER TOLEDO AC/DC adapter designed for your instrument.
- 2 Keep all electrical cables and connections away from liquids and moisture.
- 3 Check the cables and the plugs for damage and replace damaged cables and plugs.



NOTICE

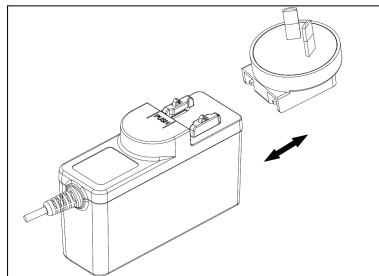
Danger of damage to the AC adapter due to overheating!

If the AC adapter is covered or in a container, it is not sufficiently cooled and overheats.

- 1 Do not cover the AC adapter.
- 2 Do not put the AC adapter in a container.

The instrument is operated using an AC adapter. The AC adapter is suitable for all supply line voltages ranging from 100...240 V AC $\pm 10\%$ and 50-60 Hz.

- 1 Insert the correct connector plug into the AC adapter until it is completely inserted.
 - 2 Connect the cable of the AC adapter with the DC socket of the instrument.
 - 3 Install the cables in such a way that they cannot be damaged or interfere with operation.
 - 4 Insert the plug of the AC/DC adapter into a power outlet that is easily accessible.
- ➔ To remove the connector plug, push the release button and withdraw the connector plug.



4.4 Switching the instrument on and off

Switching the instrument on

- 1 Press the power switch.
 - ➔ The StatusLight turns on.
 - 2 Wait for 1 - 2 seconds, the screen lights up and displays the startup image.
 - 3 The instrument is initialized. The instrument will be ready for operation in about 25 seconds.
- ➔ Login screen appears.

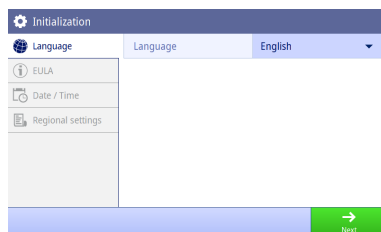
Switching the instrument off

- 1 Press the power switch for 3 seconds.
 - 2 The instrument stops running tasks and shuts down. This process will take some time.
- ➔ The screen turns off.

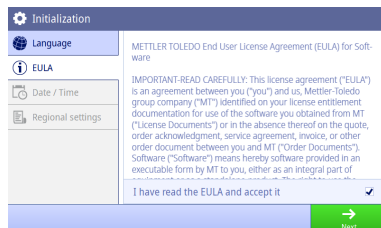
4.5 First Startup Wizard

At first startup of the instrument or after a factory reset, a First Startup Wizard guides you through the major settings of the instrument.

- 1 Select a Language from the language list.
 - ➔ The user interface switches to the language selected immediately.
- 2 Tap **Next**.



- 3 Scroll down to read the EULA and make it active.
- 4 Tap **Next**.



- 5 Set the date format, date and time one by one.
- 6 Tap **Next**.

Initialization		
Language	Date	01/01/2021
EULA	Date format	MM/DD/YYYY
Date / Time	Time	00:00
Regional settings		
...		Next

- 7 Select the temperature unit and default buffers.
- 8 Touch **Finish**.

Initialization		
Language	Temperature unit	°C
EULA	Default buffers	4.01-7.00-9.21
Date / Time		
Regional settings		
...		Finish

⇒ Get into Login screen.

- 9 Tap the default user account without password to get into **Home screen**.

If you want to change settings made during the startup wizard, they are all available in the settings menu.

Login	
17:56 09/15/2021	Administrator
Finish	

4.6 Connecting sensors

When connecting a sensor, make sure that the plugs are properly inserted. If you are using a sensor with a built-in temperature probe or a separate temperature probe, connect the second cable to the ATC socket.

Example

- Connect a pH sensor to the BNC plug and if a temperature sensor, ISM or both are integrated, connect the RCA (Cinch) plug to the ATC input.
- Or -
- Connect a conductivity probe to the conductivity input, a temperature probe is always built in and does not need to be connected separately.

ISM® sensor

When connecting an ISM® sensor to the meter, the **ISM** icon **ISM** appears on the display and the sensor name of the sensor chip is registered and appears on the display.

The calibration history, the initial data and the maximum temperature can be reviewed in the data memory.

Note We strongly recommend you to switch off the meter when disconnecting an ISM sensor. In doing so, you make sure that the sensor is not removed while the instrument is reading data from or writing data to the ISM-chip of the sensor.

5 Starting Analysis

5.1 Selecting a method

Before starting the analysis, you must first select a method. You can select a predefined or user-defined method directly from the method lists.

To select a method, proceed as follows:

- 1 Use the top handle to access into **Methods** menu.
 - 2 Select a measurement mode from the side tab on the left.
 - 3 Tap the method you want to start.
- ⇒ The measurement mode and method name is shown on **Home screen**.

5.2 Selecting a sensor

If the parameter in **Methods > Configuration > Sensor** is defined as 'Any' and no **ISM** sensor is connected, you can change a sensor on **Home screen** before starting an analysis.

To select a sensor, proceed as follows:

- 1 Tap the sensor name on **Home screen**.
 - or -
 - Tap **Calibration > Change sensor**.
 - or -
 - Tap **Verification > Change sensor**.

⇒ The names of all available sensors are listed.
- 2 Tap the sensor you want to select.

⇒ The last calibration date of the sensor and the required buffers/standards are displayed.
- 3 Tap **Close** to go back to **Home screen**.
 - or -
 - Tap **Start calibration** to start the calibration.
 - or -
 - Tap **Start verification** to start the verification.

5.3 Starting a calibration

The meter allows you to perform pH calibrations with up to 5 points and conductivity calibrations with up to 2 points. The successful calibration data will be stored into the active sensor data.

Note

- The use of a temperature sensor or electrode with a built-in temperature sensor is recommended.
- If you use  (Manual) mode, you should enter the correct temperature value for each measurement and keep all buffers/standards and sample solutions at the set temperature.
- To ensure the most accurate readings, you should perform calibrations regularly.

Running Direct Calibration

- Ensure that the appropriate buffers/standards have been selected.
- 1 Select an appropriate method according to [Selecting a method ▶ Page 14].
 - 2 Select a sensor if necessary according to [Selecting a sensor ▶ Page 15].
 - 3 Tap **Calibration**.
 - 4 Tap **Start calibration**.
 - 5 Enter the lot number if **Methods > Calibration > Check buffer lot number** is checked and confirm with **OK**.

⇒ The sensor name, the endpoint type and buffers/standards points are displayed.
 - 6 Place the sensor in a calibration buffer/standard.
 - 7 Tap **Read**.

⇒ The font of the measurement values turns to light blue.
 - 8 The measurement stops when the endpoint criterion is fulfilled. See [Endpoint criterion ▶ Page 17].

⇒  appears in front of the passed calibration point.
 - 9 Rinse the sensor with deionized water and place the sensor in the next calibration buffer/standard.
 - 10 Tap **Read**.

⇒ The font of the measurement values turns to light blue.
 - 11 The measurement stops when the endpoint criterion is fulfilled. See [Endpoint criterion ▶ Page 17].

- ➡ ✓ appears in front of the passed calibration point.
- 12 Rinse the sensor with deionized water and repeat the steps with all buffers/standards.
 - ➡ A window pops up with calibration data.
- 13 Tap **OK (Adjust)** to save the result.
 - or -
 - Tap **Reject** to reject the calibration and return to **Home screen**.

Finalize a Calibration in Advance

If **Home screen > Menu > Settings > Analysis settings > Finalize pH calibration at any point** is active, a button **Calculate** will display for the multi-point pH calibration. You can tap it to finalize the calibration in advance.

To finalize the calibration in advance, proceed as follows:

- **Analysis settings** is active.
 - The calibration is a multi-point pH calibration.
 - At least one calibration point of a multi-point calibration is passed.
- 1 Tap **Calculate**.
 - 2 Tap **OK (Adjust)** to save the result.
 - or -
 - Tap **Reject** to reject the calibration and return to **Home screen**.

The meter will do calibrations in the user-defined order in the active method. If one calibration point fails, you should redo this calibration point and cannot skip it.

However, if **Auto buffer recognition** of a pH method is active, the meter will automatically recognize the closest calibration point.

5.4 Starting a verification

The latest verification data will be stored into the data of the active sensor.

- Ensure that the appropriate buffers/standards have been selected.
- 1 Select an appropriate method according to [Selecting a method ▶ Page 14].
 - 2 Select a sensor if necessary according to [Selecting a sensor ▶ Page 15].
 - 3 Tap **Verification**.
 - 4 Tap **Start verification**.
 - 5 Enter the lot number if **Methods > Verification > Check buffer lot number** is active and confirm with **OK**.
 - ➡ The verification point, sensor name, sensor status and the endpoint type are displayed.
 - 6 Tap **Read**.
 - 7 The measurement stops when the endpoint criterion is fulfilled. See [Endpoint criterion ▶ Page 17].
 - ➡ A window pops up with verification data.
 - 8 Tap **OK**.

5.5 Starting a measurement

- 1 Select an appropriate method according to [Selecting a method ▶ Page 14].
- 2 Select a sensor if necessary according to [Selecting a sensor ▶ Page 15].
- 3 Tap Sample ID to enter the Sample ID if necessary.
- 4 Place the sensor in the sample.
- 5 Tap **Read**.
- 6 The measurement stops when the endpoint criterion is fulfilled. See [Endpoint criterion ▶ Page 17].
- 7 Tap **Confirm** if **Menu > Settings > Analysis settings > Confirm end of analysis** is active.

5.6 Interrupting analysis

Ongoing analyses can be interrupted anytime.

To interrupt an analysis, proceed as follows:

- 1 Tap **Terminate**.
- 2 Confirm with **OK** to go back to **Home screen**.
- or -
Tap **Cancel** to continue the analysis.

5.7 Endpoint criterion

The measurement will stop based on the setting in **Methods > Measure > Endpoint type**.

If **Endpoint type** is defined as:

- **Automatic:** The measurement will stop automatically, based on the programmed stability criteria.
- **Manual:** The measurement will only stop when you tap **Manual endpoint**.
- **Timed:** The measurement will stop after the defined time in **Methods > Measure > Endpoint time**.

If **Home screen > Menu > Settings > Analysis settings > Allow taking of manual endpoint** is active, you can also stop the measurement manually by tapping **Manual endpoint** during the measurement, whatever the **Endpoint type** is defined for.

5.8 Measurement status

Measurement Reading

Measurement limit	In progress		Endpoint reached	
	Within limit	Out of limit	Within limit	Out of limit
Inactive	font: light blue		font: white	
	background: white		background: dark blue	background: light blue
Active	font: light blue	font: red	font: white	
	background: white		background: green	background: red

Temperature Reading

Temperature limit	In progress		Endpoint reached	
	Within limit	Out of limit	Within limit	Out of limit
Inactive	font: light blue		font: white	
	background: white		background: dark blue	background: light blue
Active	font: light blue	font: red	font: white	
	background: white		background: green	background: red

5.9 Dual channel operation

Administrator

16:39 09/16/2021

pH: pH method

Cond.: Conductivity method

pH & Cond.

00:00:00

pH

mV

00:00:00

μS/cm

Ω

Sample ID

Not defined

Default pH sensor

Default conductivity...

Automatic

Standard

Automatic

Standard

Terminate

Read

With the thorough galvanic isolation of the electronics layout, it is possible to simultaneously measure with both measurement channels in the very same sample beaker, without interfering the measurements.

The dual channel mode will use the settings from the respective measurement settings. Measurements can be started by pressing **Read**. However, calibrations and verifications need to be carried out in single channel mode.

You can switch between measurements in single channel mode or in dual channel mode by tapping the method name on **Home screen**.

If **Menu > Settings > Analysis settings > Allow taking of manual endpoint** is active, both channels will stop sampling and refreshing immediately when tapping **Manual endpoint**. If inactive, **Manual endpoint** is applied only for the channel which is set manual endpoint in the activate method which means that the channel will wait for automatic endpoint if **Methods > Measure > Endpoint type** is **Automatic**.

Each channel will save a separate result after this channel is end pointed.

6 Maintenance and Care

Do not open the housing of the instrument; it does not contain any parts that can be maintained, repaired or replaced by the user. If you experience problems with your instrument, contact your authorized METTLER TOLEDO dealer or service representative.

► www.mt.com/contact

6.1 Cleaning the Instrument



NOTICE

Danger of damage to the instrument due to inappropriate cleaning agents!

The housing is made of acrylonitrile butadiene styrene/polycarbonate (ABS/PC). This material is sensitive to some organic solvents, such as toluene, xylene and methyl ethyl ketone (MEK). If liquids enter the housing they can damage the instrument.

- 1 Use only water and a mild detergent to clean the housing.
- 2 Wipe off any spills immediately.

- The instrument is turned off and disconnected from the electrical outlet.
- Clean the housing of the instrument using a cloth dampened with water and a mild detergent.

If you have questions about the compatibility of cleaning agents, contact your authorized METTLER TOLEDO dealer or service representative.

► www.mt.com/contact

6.2 Maintenance of electrodes

The instrument monitors the condition of the attached pH electrodes.



Slope: 95-105%
and offset: $\pm$ (0-20) mV
Electrode is in good condition



Slope: 90-94%
or offset: $\pm$ (20-35) mV
Electrode needs cleaning



Slope: 85-89%
or offset: $\pm$ (>35) mV
Electrode is defective or too old

When cleaning, always follow the instructions in the manual of the electrodes used. Make sure the pH electrode is always kept filled with the appropriate filling solution. For maximum accuracy, any filling solution that may have "crept" and encrusted the outside of the electrode should be removed with deionized water. Always store the electrode according to the manufacturer's instructions and do not allow it to dry out.

If the electrode slope falls rapidly, or if the response becomes sluggish, the following procedures may help. Try one of the following, depending on your sample.

Problem	Action
Fat or oil build-up	Either rinse the membrane with soap solution or acetone/ethanol or shortly soak the tip of the electrode in warm water. When rinsed with organic solvent, place the membrane overnight in 0.1 mol/L HCl.
pH electrode membrane has dried out	Soak the tip of the electrode overnight in 0.1 mol/L HCl. If this procedure has no effect, soak the tip of the electrode for a few minutes in reactivation solution for pH electrodes.
Protein build-up in the diaphragm of a pH electrode	Remove deposits by soaking the electrode in an HCl/pepsin solution for few hours or overnight.
Silver sulfide contamination of pH electrode	Remove deposits by soaking the electrode in a thiourea solution.

Run a new calibration after treatment.

Note

- Cleaning and filling solutions should be handled with the same care as that given to toxic or corrosive substances.
- The condition of the pH electrode can also be checked, using the provided METTLER TOLEDO method Sensor Test.

6.3 Transporting the instrument

Note the following instructions when transporting the instrument to a new location:

- Transport the instrument with care to avoid damage! The instrument may be damaged if not transported correctly.
- Unplug the instrument and remove all connected cables.
- Remove the electrode arm.
- To avoid damage to the instrument when transporting it over long distances, please use the original packaging.
- If the original packaging is no longer available, choose packaging that will ensure safe handling.

6.4 Disposal

In conformance with the European Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.

Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment. If you have any questions, please contact the responsible authority or the distributor from which you purchased this device. Should this device be passed on to other parties, the content of this regulation must also be related.



7 Technical Data

General

Screen	Color TFT	
Interfaces	USB-A	USB-Stick (FAT12/FAT16/FAT32)/ Printer/barcode reader
	USB-B	Computer

Ambient conditions	Ambient temperature	5...40 °C
	Relative humidity	5...80% (non-condensing)
	Overvoltage category	Class II
	Pollution degree	2
	Range of application	For indoor use only
	Maximum operating altitude	Up to 5000 m
Standards for safety and EMC	See Declaration of Conformity	
Dimensions	Width	195 mm
	Depth	205 mm
	Height	65 mm
	Weight	850 g
Power rating instrument	Input voltage	12 V $\equiv$
	Maximum power consumption	15 W
Power rating AC adapter	Line voltage	100 - 240 V $\sim \pm 10$ %
	Input frequency	50/60 Hz
	Input current	0.5 A
	Output voltage	12 V $\equiv$
	Output current	1.5 A
Materials	Housing	ABS/PC reinforced
	Window	Glass

pH measurement

Measurement range	pH	-2.000...20.000
	mV	-2000.0...2000.0
	Temperature	-30.0...130.0 °C
Resolution	pH	0.1/0.01/0.001
	mV	1/0.1
	Temperature	0.1 °C
Accuracy	pH	± 0.002
	mV	± 0.1 (-500.0...500.0 mV) ± 0.2 (< -500.0 mV or > 500.0 mV)
	Temperature	± 0.1 °C (0.0...100.0 °C) ± 0.3 °C (< 0.0 °C or > 100.0 °C)
Isopotential point	pH 7.00	
pH input	BNC, impedance $> 3 \cdot 10^{12} \Omega$	
Temperature input	RCA (Cinch) NTC 30k Ω or PT1000	
Calibration (pH)	Calibration points	1...5
	Predefined buffer groups	11
	User-defined buffer groups	10
	Automatic buffer recognition	Yes
	Calibration methods	Linear, segmented

Conductivity measurement

Measurement range	Conductivity	0.000 µS/cm...2000 mS/cm
	TDS	0.00 mg/L...1000 g/L
	Salinity	0.00...80.00 psu 0.00...80.00 ppt
	Resistivity	0.00...100.0 MΩ·cm
	Temperature	-30...130 °C
Resolution	Conductivity	0.1/0.01/0.001* (µS/cm, mS/cm) 0.1/0.01/0.001/0.0001* (µS/m, mS/m, S/m)
	TDS	0.1/0.01/0.001 (mg/L, ppm)* 0.1/0.01/0.001/0.0001 (g/L, ppt)*
	Salinity	0.1/0.01
	Resistivity	0.1/0.01/0.001 (Ω·cm, kΩ·cm)* 0.1/0.01 (MΩ·cm)
	Conductivity Temperature	0.1 °C
Accuracy	Conductivity	±0.5% of measured value
	TDS	±0.5% of measured value
	Salinity	±0.5% of measured value
	Resistivity	±0.5% of measured value
	Temperature	± 0.1 °C (0.0...100.0 °C) ± 0.3 °C (< 0.0 °C or > 100.0 °C)
Input	Mini-DIN	
Calibration	Calibration points	1...2
	Predefined conductivity standards	4
	User-defined conductivity standards	10
	Manual cell constant entry	Yes

* For this parameter, resolution is automatically adjusted based on the measured value. A maximum of 6 digits is displayed.

Redox measurement

Measurement range	mV	-2000.0...2000.0 mV
	rel.mV	-2000.0...2000.0
	Temperature	-30...130 °C
Resolution	mV	1/0.1
	rel.mV	1/0.1
	Temperature	0.1 °C
Accuracy	mV	± 0.1 (-500...500 mV) ± 0.2 (< -500 mV or > 500 mV)
	Temperature	± 0.1 °C (0.0...100.0 °C) ± 0.3 °C (< 0.0 °C or > 100.0 °C)
mV input	BNC, impedance > 3 · 10 ¹² Ω	

Temperature input	RCA (Cinch) NTC 30kΩ or PT1000	
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To protect your product's future:

METTLER TOLEDO Service assures the quality, measuring accuracy and preservation of value of this product for years to come.

Please request full details about our attractive terms of service.

www.mt.com/pHLab

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Subject to technical changes.
© Mettler-Toledo GmbH 11/2021
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