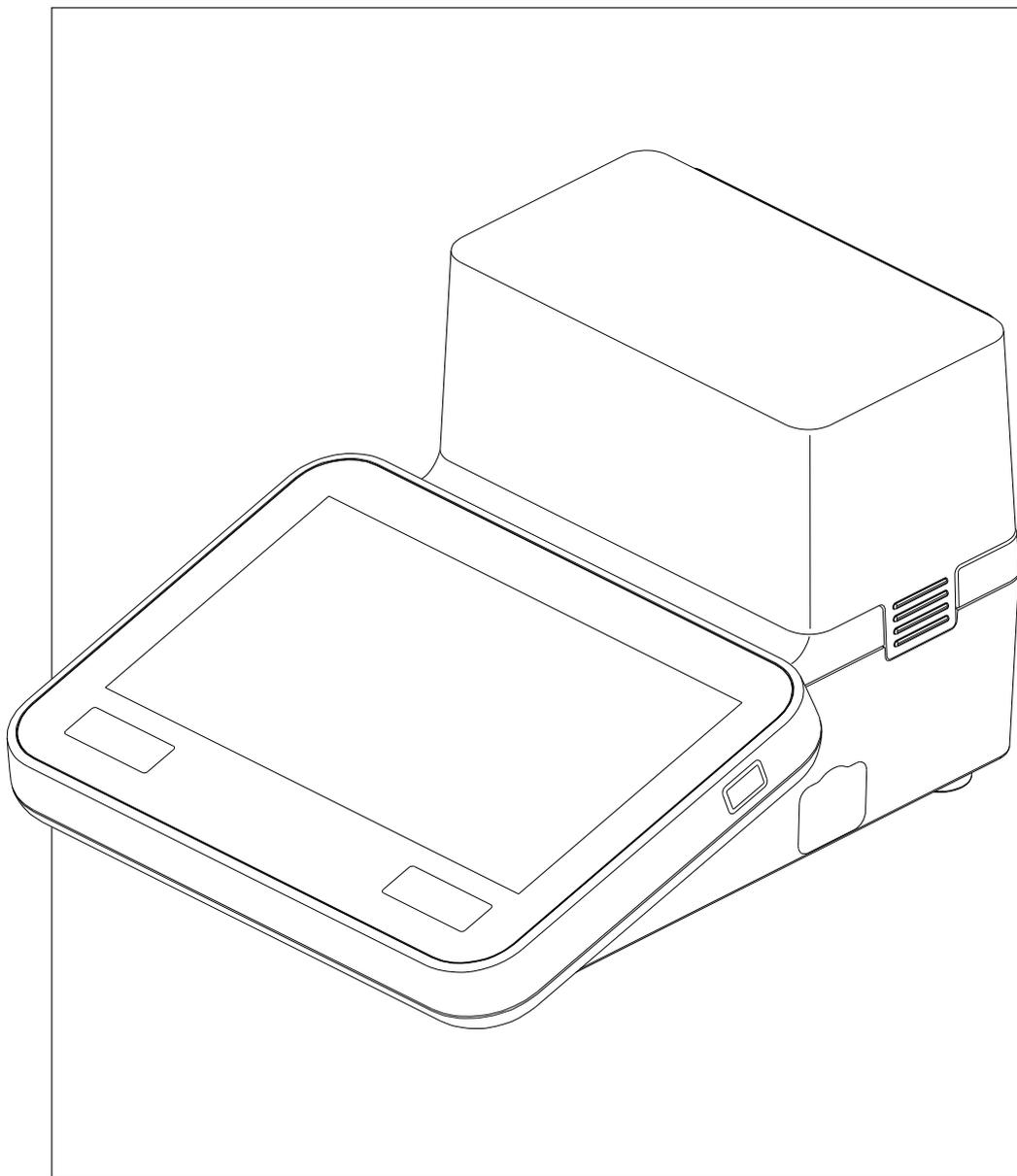


SevenExcellence™

pH/ORP/Ion/Conductivity/DO Meter



METTLER TOLEDO

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1 Introduction

Professional and Intuitive

The METTLER TOLEDO SevenExcellence™ is a modern, professional instrument suitable for use in a wide variety of application areas and segments. It can be used, for example, in quality control as well as in research and development and meets the most demanding requirements.

This flexible meter perfectly combines easy-to-understand operation with a high level of measurement accuracy and outstanding reliability. Thanks to the plug & play capability, the detection of external devices and ISM® sensors occurs automatically, in this way supporting the comfortable handling of SevenExcellence™.

Straightforward user guidance on the large color touch screen makes the operation particularly intuitive. User-definable shortcuts allow methods to be activated directly from the home screen with a single tap.

This operating instruction is a comprehensive overview of all functions of SevenExcellence™ and explains the necessary steps to use the instrument.

If you have any additional questions, METTLER TOLEDO is always available to assist you.

2 Safety Measures

Measures for your protection



Risk of explosion

- Never work in an environment subject to explosion hazards! The housing of the instrument is not gas tight (explosion hazard due to spark formation, corrosion caused by the ingress of gases).



Risk of corrosion

- When using chemicals and solvents, comply with the instructions of the producer and the general lab safety rules!

Measures for your operational safety



Caution

- Always operate and use the instrument in accordance with the instructions contained in this manual. The instructions for setting up your new instrument must be strictly observed.
- Do not open the instrument, it does not contain any parts which can be maintained, repaired, or replaced by the user.
- Have the meter serviced only by METTLER TOLEDO Service!
- Any spillage should be wiped off immediately! Some solvents might cause corrosion of the housing.
- Avoid the following environmental influences:
 - Powerful vibrations
 - Direct sunlight
 - Atmospheric humidity greater than 80%
 - Corrosive gas atmosphere
 - Temperatures below 5 °C and above 40 °C
 - Powerful electric or magnetic fields

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 Description of the SevenExcellence™

The SevenExcellence™ bench meters are based on precise electrochemical measuring technique. Modular expansion units, automatically recognized ISM® sensors and the plug & play function for external devices make SevenExcellence a comfortable instrument for reliable measurement.

For the optimal use of your SevenExcellence™ bench meters, the following devices can be connected:

- Modules

- METTLER TOLEDO pH/mV module
- METTLER TOLEDO pH/Ion module
- METTLER TOLEDO conductivity module
- METTLER TOLEDO DO/BOD module

Sensors

- Select from the wide range of METTLER TOLEDO electrodes, the electrode value box supports you to find the right tool. www.electrodes.net.
- ISM® sensors are detected automatically
- Temperature probes can be connected separately
- Rondolino sample changer allows fully automatic analysis of up to 9 samples. The optional PowerShower™ perfectly rinses contaminated electrodes.
- Computer for operation with LabX direct pH software
- Barcode reader for scanning sample data
- Logstraight™ fingerprint reader for user identification
- Compact printer (USB-P25), to print out results
- USB stick to store and transfer data
- LAN for printing with network printer
- Additional compact printers, including RS-P25, RS-P26, RS-P28

4 Description of Functions

4.1 Hard Key On/Off

The [On/Off] button is on the right side of the housing. With this button you can turn the power on or off.

4.2 Layout of the Terminal

The control panel of the terminal consists of an integrated touch screen and buttons, located below the touch-sensitive surface of the display. You can press the buttons any time regardless which dialog you currently use. There is only one exception, when the screens with text and number input fields are shown the access to the information screen is denied.

- [Home] brings you back to the **Home screen**.
- [Info] opens a screen with information to the instrument, attached modules and additional information concerning METTLER TOLEDO Service.

4.3 Operating the Touch Screen

The touch screen is automatically activated when the instrument is switched on.

To select a button or an input element in the dialog window, you simply touch the screen using a soft blunt object or the fingertip.

Note

Never touch the surface of the touch screen with pointed or sharp objects! This may damage the screen!

4.4 Home Screen

Home is the main screen that is displayed when you start up the instrument after you logged in. On the left-hand side of the screen you see five buttons that lead to the following dialog windows:

- [Methods]: The button leads you to the method editor, in which you can create and administer methods, see Methods (page 38).
- [Series]: In this dialog, you can create and manage series of individual samples, see Series (page 102).
- [Results]: Here you administer the results of your analyses, see Results (page 106).
- [Setup]: You can administer the following points here:
 - User-defined buffers and standards, see User-Defined Buffers and Standards (page 15)
 - The hardware and all resources used by the instrument, see Hardware (page 18)
 - User and global settings, see User Settings (page 24), Global Settings (page 26)
 - Tables, see Tables (page 33)
 - Maintenance and service of the instrument, see Maintenance & Service (page 36).
- [Sensors]: In this dialog, you can modify and manage sensors, see Sensors (page 105).

If modules are connected they are displayed at the top of the **Home screen**. The module type is displayed too and the module can be put into operation by tapping on the check box below the colored tag of the displayed module.

In addition, there is another feature that can be configured individually by each user (with the necessary authorization). Each user can store up to nine shortcuts on the center of the display. With these shortcuts, methods and series can be started directly from the home screen, see Shortcuts (page 13).

4.5 The User Interface

The graphical user interface consists of the following basic elements:

- The **Title bar** at the top of the display specifies the name of the current dialog.
- The **Navigation bar**, located below the title bar, specifies the path to the current dialog.

- In the top right-hand corner you see the button [**Tasks**], which signals the presence of ongoing processes, see Tasks (page 122).
- The button [**News**], located left from the button [**Tasks**], indicates important changes of the system like disconnected PnP devices, expiration of resources etc., see News (page 122).
- The **Scroll bar** on the right-hand side of the screen becomes visible if the content of the screen extends beyond the viewable area. If this occurs, use the arrows to scroll up or down and move the viewable area of the screen.
- Further **Buttons** are located at the bottom of the screen. The number and function of these buttons varies depending on the context of the current dialog.
- The Button **Log Out** allows users to log out of the instrument, change user levels, or lock the instrument with a personalized password.
- With the Button **User Data**, users can access an overview of the currently logged in user (e.g. Administrator), the user group/level (e.g. Administrator), and the time since the current user has been logged in.
- The Button **Read** allows users to initiate a direct measurement from the Home Screen, without the need to first set up a measurement method.

4.5.1 Entering Data in the User Interface

There are different types of input fields in the user interface. They allow you to enter data or select data from a list. To prevent incorrect settings some preselected data are shown as information and cannot be changed in the corresponding dialog.

The various types of input fields are characterized by an icon to the right:

Text and number input fields		In these fields text and numbers can be freely entered.
Number input fields		Numbers can be entered in these fields.
Drop-down lists		Selecting this field opens a drop-down list from which you can select an entry.
List fields		Selecting this field opens a new view with a menu list from which you can select an entry.
Formula fields		A freely definable formula can be entered in this field.
Info field		The values in deactivated input fields are displayed as information only and cannot be edited in the corresponding dialog.

Check Boxes

In addition to the input fields there are check boxes in order to select or activate certain functions. Check boxes affect the scope of the corresponding dialog. Input fields are visible or hidden depending on whether the check box is selected or not.

Sorting Lists

There are lists that can be sorted alphabetically or numerically by column in ascending or descending order. To do this, tap the parameter in the header row of the list to be sorted. A small arrow in the header row indicates whether the list is sorted in ascending (arrow up) or descending (arrow down) order. Use the arrow to change the order.

4.5.2 Shortcuts

Shortcuts allow you to start methods and series directly from the home screen. When creating a method or series, shortcuts can be added to the home screen using the button **[AddToHome]**.

Two types of shortcuts are supported.

Direct shortcuts from which you start the task immediately without warning (if you are authorized by the defined user settings) and shortcuts which take you to the corresponding **Start analysis** dialog from which you can start the task.

Authorized users can create specific shortcuts for the tasks they would like to conduct.

	Shortcuts (opens the Start analysis dialog)	Direct Shortcuts (task starts immediately, directly and without prior warning)
On methods	 A blue rounded rectangular button with a list icon, the text "Calib.", and a small square icon with a right-pointing arrow in the bottom-left corner.	 A blue rounded rectangular button with a list icon, a person icon, the text "CalibD", and a small square icon with a right-pointing arrow in the bottom-left corner.
On series	 A blue rounded rectangular button with a flask icon, the text "Series", and a small square icon with a right-pointing arrow in the bottom-left corner.	 A blue rounded rectangular button with a flask icon, a person icon, the text "Series", and a small square icon with a right-pointing arrow in the bottom-left corner.

Note

A maximum of nine shortcuts can be saved on the **Home screen**. As soon as this maximum is reached, **[AddToHome]** in the start dialog of methods and series will be deactivated. Deleting a shortcut will reactivate the **[AddToHome]** button. How to manage shortcuts, see Shortcuts (page 25).

5 Setup

Navigation: Home > Setup

This chapter provides you information on setting up the instrument according to your requirements.

The following summary shows the buttons available for the various setting options.

Buffers & Standards	Buffers & Standards
Hardware	Sensors
	Automation
	Peripherals
	Transfer
	Network settings
User settings	Language
	Screen
	Beep
	Shortcuts
	Keyboards
Global settings	System
	User management
	Analysis and resources behavior
	Physical properties
Tables	Tables
Maintenance & Service	MT-Service
	Import / Export
	Reset to factory settings
	Firmware
	Update

5.1 Buffers & Standards

This section describes how to manage buffers and standards. You can use predefined buffers and standards or you can create, edit or delete user-defined buffers and standards.

A maximum of 20 user-defined buffer sets and standard groups can be created with up to 20 temperature-dependent values per buffer or standard. A total of 13 buffer sets and standard groups for pH, ion and conductivity calibration are predefined.

The predefined pH buffer sets offer the option to create individual buffer sets based on a mixture of different commercial buffers.

Note

Before you perform a calibration, buffers or standards must be defined.

5.1.1 Predefined Buffers and Standards

The button [**Buffers & Standards**] opens the list of predefined buffer sets and standards. The predefined buffer sets and standards cannot be modified or deleted. The parameters of the following buffers and standards are stored, see in the Appendix Predefined Buffers & Standards (page 127).

Type	Name
pH	METTLER TOLEDO USA (Ref. 25 °C) METTLER TOLEDO Europe (Ref. 25 °C) MERCK (Ref. 20 °C) DIN(19266)/NIST (Ref. 25 °C) DIN(19267) (Ref. 25 °C) JJG119 (Chinese) (Ref. 25 °C) Technical (Ref. 25 °C) JIS Z 8802 (Japanese) (Ref. 25 °C)
Conductivity	International (Ref. 25 °C) Saturated NaCl (Ref. 25 °C) Chinese (Ref. 25 °C) Japanese (Ref. 20 °C)
Ion	METTLER TOLEDO ION (Ref. 25 °C)

- 1 Tap a buffer set or standard group.
 - ⇒ **Name of the buffer set or standard** is displayed with more detailed information about the stored values.
- 2 Tap a value.
 - ⇒ **Temp. related value** is displayed.
The parameters **Temperature** and **Value** are shown.

Note

This list has information character concerning the predefined buffers and standards. When user-defined buffers and standards are defined, they are shown in this list too.

5.1.2 User-Defined Buffers and Standards

The button **[Buffers & Standards]** leads to the list of the stored buffer sets and standard groups. When creating a user-defined buffer set or standard group you can make use of the already existing buffer sets and standard groups. In this way you can create new individual sets and groups with buffers and standards from different groups. User-defined buffers and standards will be added to the list of predefined buffers and standards.

Creating User-Defined Buffer Sets and Standard Group

Navigation: Home > Setup > Buffers & Standards > [New]

Parameter	Description	Value
Type	Defines the type of the buffer or standard for the calibration.	pH Ion Conductivity
Unit	For preparing a pH buffer group, pH as standard value is shown as information. For preparing an ion buffer group, select a unit. Displayed if Type = pH or Ion .	pH mmol/L mol/L mg/L ppm % pX
Use predefined buffers	Option to create a buffer group according to the stored buffer groups. Displayed if Type = pH .	Yes No

- 1 In **Type** select the type of the buffer or standard.
- 2 Give the buffer or standard group a meaningful name.
 - ⇒ A name **Calibration Standard** with consecutive number is entered automatically, it can be overwritten.
- 3 In **Reference temperature** enter a temperature.

- 4 If type **Ion** is selected, select a unit.
- or -
If type **pH** is selected and you want to assemble a buffer set from stored buffer sets, activate **Use predefined buffers**.
 - 5 Tap [**Save**].
- ⇒ Now you have created a user-defined buffer or standard group. The name of the user-defined buffer or standard group is displayed.

In the next step values need to be determined for:

- User-defined pH buffer groups based on predefined buffer sets
- User-defined pH buffer groups
- User-defined ion standards
- User-defined conductivity standards

Select Values for User-Defined pH Buffer Sets Based on Predefined Buffers

Navigation: Home > Setup > Buffers & Standards > [My group]

Parameter	Description	Value
Buffer group	Opens the list of predefined buffers and standards. Displayed if Use predefined buffers is activated.	-
pH value	Opens the list of predefined values. Displayed if Use predefined buffers is selected.	-
Reference temperature	Information on the defined reference temperature.	-

- 1 Tap the list field **pH value**.
⇒ **Select buffer / standard group** is displayed.
- 2 Select a value and confirm with [**OK**].
⇒ Name of the user-defined buffer or standard group is displayed. The value is set.
- 3 To enter additional values, tap [**New**] and repeat previous steps.
- 4 To finish and store entries tap [**Save**].

Select Values for User-Defined pH Buffer Sets

Navigation: Home > Setup > Buffers & Standards > [My group]

Parameter	Description	Value
Reference temperature	Information on the defined reference temperature.	-
pH value	Defines the pH value of the calibration standard to be used.	-

- 1 Enter a **pH value** and confirm with [**OK**].
⇒ Name of the user-defined buffer or standard group is displayed. The value is set.
- 2 To enter additional values, tap [**New**] and repeat previous step.
- 3 To finish and store entries tap [**Save**].

Select Values for User-Defined Ion Standards

Navigation: Home > Setup > Buffers & Standards > [My group]

Parameter	Description	Value
Reference temperature	Information on the defined reference temperature.	-
Standard value	Defines the value of the calibration standard to be used.	-

- 1 Enter a standard value and confirm with **[OK]**.
⇒ Name of the user-defined buffer or standard group is displayed. The value is set.
- 2 To enter additional values tap **[New]** and repeat previous step.
- 3 To finish and store entries tap **[Save]**.

Select Values for User-Defined Conductivity Standard Groups

Navigation: Home > Setup > Buffers & Standards > [My group]

Parameter	Description	Value
Unit	Defines the measurement unit for conductivity.	μS/cm mS/cm S/m μS/m mS/m
Reference temperature	Information on the defined reference temperature.	-
Conductivity	Defines the value for the calibration standard to be used in the unit selected in Unit .	-

- 1 In **Unit** select a type to which your calibration refers to.
- 2 Enter a conductivity value and confirm with **[OK]**.
⇒ Name of the user-defined buffer or standard group is displayed. The value is set.
- 3 To enter additional values tap **[New]** and repeat previous steps.
- 4 To finish and store entries tap **[Save]**.

Modify User-Defined Buffers and Standards

Navigation: Home > Setup > [Buffers & Standards]

- 1 Select the appropriate buffer set or standard group from the **Buffer / Standard group** dialog.
⇒ Name of the user-defined buffer or standard group is displayed.
- 2 Tap the value to be modified.
⇒ **Temperature value** is displayed.
- 3 Tap the temperature related value to be modified.
⇒ The value, depending on the selected buffer or standard is displayed.
- 4 Modify the value and confirm with **[OK]**.
- 5 Confirm with **[OK]**.
⇒ **Temp. related value** is displayed.
- 6 To modify additional values repeat previous steps.
- 7 To finish, tap **[Back]**.
⇒ Name of the user-defined buffer or standard group is displayed.
- 8 To store the entries tap **[Save]**.

Note

Values of user-defined buffer sets or standard groups created from predefined buffer sets or standard groups can not be modified.

Add User-Defined Buffers and Standards

Navigation: Home > Setup > [Buffers & Standards]

- 1 Select the appropriate buffer set or standard group.
⇒ Name of the user-defined buffer or standard group is displayed.
- 2 Tap **[New]**.

- 3 Enter a value and confirm with [**OK**].
- 4 Confirm with [**OK**].
- 5 To finish and store entries, tap [**Save**].

Delete User-Defined Buffers and Standards

Navigation: Home > Setup > [Buffers & Standards]

- 1 Select the appropriate buffer set or standard group.
 - ⇒ Name of the user-defined buffer or standard group is displayed.
- 2 Tap the value to be deleted.
 - ⇒ **Temp. related value** is displayed.
- 3 Tap [**Delete**].
- 4 To finish and store entries tap [**Save**].

Note

When a value of a buffer set or standard group is deleted, methods that refer to the deleted buffer set or standard group are no longer executable.

Delete User-Defined Buffer Sets and Standard Groups

Navigation: Home > Setup > [Buffers & Standards]

- 1 Select the appropriate buffer set or standard group.
 - ⇒ Name of the user-defined buffer or standard group is displayed.
- 2 Tap [**Info**] to open the parameters.
- 3 Tap [**Delete**].

Note

When buffer sets or standard groups are deleted, methods that refer to the deleted buffer sets or standard groups are no longer executable.

Modify the name of a User-Defined Buffer Set or Standard Group

Navigation: Home > Setup > [Buffers & Standards]

- 1 Select the appropriate buffer set or standard group.
 - ⇒ Name of the user-defined buffer or standard group is displayed.
- 2 Tap [**Info**] to open the parameters.
- 3 Overwrite the name for the user-defined buffer set or standard group.
- 4 To finish and store entries, tap [**Save**].

5.2 Hardware

This section describes how to configure the hardware components connected to the instrument, such as:

- **Sensors**
- **Automation**
- **Peripherals**
- **Transfer**
- **Network settings**

5.2.1 Sensors

Sensors for pH, redox, ISFET, conductivity, ion and temperature measurement can be connected to the instrument. One default sensor per sensor type is predefined.

Sensors can be added, modified and deleted. The usable life and life span of a sensor can be set and monitored (for redox and temperature sensors only the life span can be monitored). You can display or print out the calibration history.

Note

Digital ISM[®] sensors are detected automatically. The factory calibration will be transferred when ISM[®] sensors are used.

Navigation: Home > Setup > Hardware > [Sensors]

Parameter	Description	Value
Type	Information on the type of measurement.	-
Name	Information on the name of the sensor.	-
Serial number	Information on the serial number of the sensor.	-
Module	Module to which the sensor is attached. ISM [®] sensors are detected automatically. For ISM [®] sensors A-ISM , B-ISM or C-ISM is displayed. For non ISM sensors A , B or C is displayed. Displayed if a module is connected to the instrument and a sensor is connected to a module.	-

Adding Sensors

Navigation: Home > Setup > Hardware > Sensors > [New]

Parameter	Description	Value
Sensor type	Select a sensor type according to the measurement type.	pH Redox ISFET Conductivity DO Ion Temperature
Temperature signal	Select a type according to the specifications of the temperature sensor. Displayed if Sensor type = Temperature .	NTC30kOhm Pt1000
Sensor name	Define a name for the sensor.	-
Serial number	Each sensor has a serial number. The serial number of ISM [®] sensors are detected automatically.	-
Ion	The ion charge and molar mass values of predefined ions are stored in the instrument. Displayed if Sensor type = Ion .	Ag⁺ Ca²⁺ Cl⁻ CN⁻ Cu₂⁻ F⁻ I⁻ K⁺ Na⁺ NO₃⁻ Pb₂⁺ S₂ Other
Molar mass	Molar mass of an ion is calculated by adding the atomic weight of the individual atoms the ion is composed of. This parameter is needed for calculations of the units mol/L and mmol/L. Displayed if Ion = Other .	-
Ion charge	Ion charge of the ion to be detected. Displayed if Ion = Other .	-3 -2 -1 +1 +2 +3
Detection	Information about the detection mode of a DO sensor. Manually added sensors always have Polarographic detection. Displayed if Sensor type = DO. Displayed if = Sensor type = DO .	-
Cell constant	Conductivity measurement depends on the cell constant of the probe. The precise cell constant is noted in the certificate of the probe. Displayed if Sensor type = Conductivity .	-

Calibration mode	Information on calibration mode. Displayed if Sensor type = pH or ISFET or Ion .	-
Offset	Information on offset. Displayed if Sensor type = pH or ISFET or Ion .	-
Slope	Information on the slope. Displayed if Sensor type = pH or ISFET or Ion or DO .	-
Calibration procedure	Information on calibration procedure. Displayed if Sensor type = pH or ISFET or Conductivity or Ion or DO or Temperature .	-
Date / time of calibration	Information on date and time of calibration. Displayed if Sensor type = pH or ISFET or Conductivity or Ion or DO or Temperature .	-
Calibrated by	Information on user. Displayed if Sensor type = pH or ISFET or Conductivity or Ion or DO or Temperature .	-
Monitoring usable life	Specifies whether the usable life is to be monitored. Displayed if Sensor type = pH or ISFET or Conductivity or Ion or DO .	Yes No
Time period	Defines the period of time, when the next calibration must be performed. Displayed if Monitoring usable life is activated.	Days Hours
Usable life	Defines the number of days or hours up to next calibration. Displayed if Monitoring usable life is activated.	-
Expiry date	Information on the sensors lifetime, calculated from the predefined parameters. Displayed if Monitoring usable life is activated.	-
Monitoring life span	Based on your requirements a period of time for usable life can be defined. Not displayed for optical DO sensor because its sensor cap anyway has a limited life span of one year.	-
Initial operation	For documenting a period of life it is necessary to record the date of commissioning the sensor. Displayed if Monitoring life span is activated.	-
Life span	The period of time depending on your requirements in use of sensor. Displayed if Monitoring life span is activated.	-
Expiry date	Information on the end of the life span, calculated on base of the predefined parameters. Displayed if Monitoring life span is activated.	-

- 1 Select **Sensor type**. Different parameters and information are displayed depending on the sensor type.
 - ⇒ If **Temperature** is defined, select a unit in **Temperature signal**.
 - ⇒ If **Ion** is defined, select a predefined parameter or **Other** in **Ion type**.
 - ⇒ If **Other** is defined, enter a value in **Molar mass** and select a value in **Ion charge** of the sample to be analyzed.
 - ⇒ If **Conductivity** is selected, enter the value in **Cell constant** of your conductivity probe (found in the certificate of the probe). The unit is predefined.
- 2 Enter a sensor name. The name **Sensor** with consecutive number is entered automatically. The name in **Sensor name** is unique. If an already existing name is used, a warning will be displayed. Tap **[OK]** and change the name.
- 3 Enter the serial number.
- 4 To monitor the usable life of the sensor activate **Monitoring usable life**. Enter days or hours in **Time period** and **Usable life**. **Expiry date** is shown as information.

- 5 To monitor the life span of the sensor, activate **Monitoring life span**.
Enter the date and time in **Initial operation**. In **Life span**, enter the number of months until the sensor must be replaced. **Expiry date** is shown as information.
 - 6 To finish and store the entries tap [**Save**].
- ⇒ The sensor was added to the list.

Modifying Sensors

Navigation: Home > Setup > Hardware > [Sensors]

The parameters that can be modified are:

- **Sensor name**
- **Monitoring usable life**
- **Monitoring life span**
- **Cell constant** (conductivity only)

- 1 Tap the sensor to be modified.
⇒ **Parameters** is displayed.
- 2 Modify the required parameters.
- 3 To finish and store the entries tap [**Save**].

Note

- The type of the sensor cannot be modified
- A sensor that is currently in use cannot be modified.
- Changing the sensor name does not create a new sensor in the list.

Deleting Sensors

Navigation: Home > Setup > Hardware > [Sensors]

- 1 Tap the sensor to be deleted.
⇒ **Parameters** is displayed.
 - 2 Tap [**Delete**].
- ⇒ The sensor has been deleted without warning.

Note

- The last sensor of a type cannot be deleted.
- A sensor that is currently in use cannot be deleted.
- Predefined sensors cannot be deleted.

Show and Print Calibration History

Navigation: Home > Setup > Hardware > [Sensors]

- 1 Tap the required sensor.
⇒ **Parameters** is displayed.
 - 2 Tap [**Calibration history**] to display the history.
 - 3 To print the history, tap [**Print**].
- ⇒ The history is printed.

5.2.2 Automation

The automation unit that can be installed is:

- Rondolino

The instrument has automatic PnP (Plug & Play) identification. As soon as Rondolino is connected, the appropriate information is displayed.

Navigation: Home > Setup > Hardware > [Automation]

Parameter	Description	Value
Type	Shows the instrument type.	-
Status	Information if Rondolino is installed or not.	Installed Not installed

5.2.3 Peripherals

Navigation: Home > Setup > Hardware > [Peripherals]

In the dialog **Peripherals**, the following devices and settings can be configured:

- **USB stick**
- **Fingerprint reader**
- **Printer**
- **Barcode reader**
- **Stirrer**

The following chapter describes the management of the various peripherals which can be connected to the instrument. This includes the instruction how to add peripherals and how to change the parameters.

USB Stick

Navigation: Home > Setup > Hardware > Peripherals > [USB stick]

Commercially available USB sticks of USB Version 1.1 are supported. Two USB sockets are located on the right side of the instrument. As soon as the USB stick is connected, the instrument recognizes the peripheral device. The status field informs if the external memory is installed or not.

Fingerprint Reader

Connect the fingerprint reader to the USB output of the instrument. Two USB sockets are located on the right side of the instrument. Before the fingerprint reader can be used, the corresponding functions need to be configured, see Account Policies (page 30).

Navigation: Home > Setup > Hardware > Peripherals > [Fingerprint reader]

Parameter	Description	Value
Activate fingerprint reader	Activate the fingerprint reader.	Yes No
Status	Information that the peripheral device is installed. Displayed if check box Activate fingerprint reader is selected.	Installed Not installed

– To activate the fingerprint reader, select **Activate fingerprint reader**.

⇒ A status field is shown and informs that the peripheral device is connected.

Printer

The instrument supports different printers and a pdf writer to store the data on a USB stick. Connect the printer to the USB socket of the instrument. Two USB sockets are located on the right side of the instrument. Before the printer can be used, you have to activate the corresponding functions of the instrument.

Navigation: Home > Setup > Hardware > Peripherals > [Printer]

Parameter	Description	Value
Printer type	Several types of printers and pdf writers are offered to store or print data.	PDF Writer USB Compact Printer RS232 Compact Printer Network printer
Baud rate	Information on the baud rate for data transmission via the USB-RS232 interface. Displayed if RS232 Compact Printer is selected.	9600
Number of bits	Information on the number of data bits. Displayed if RS232 Compact Printer is selected.	8
Stop bits	Information on the stop bit for data transmission via the USB-RS232 interface. Displayed if RS232 Compact Printer is selected.	1
Parity	Information on the parity protocol. Displayed if RS232 Compact Printer is selected.	Even
Handshake	Information on the handshake used for data transmission. Displayed if RS232 Compact Printer is selected.	None
Type	Offers different types of command language for the connected network printer. Displayed if Network printer is selected.	HP PLC Epson ESC/P2
Network name	Enter the IP address of the printer. Displayed if Network printer is selected.	-
Port number	Enter the port number of the printer. Displayed if Network printer is selected.	-
Paper size	Defines the paper size suitable for the selected printer. Displayed if Network printer is selected.	A4 Letter
PDF storage location	Information on the data storage. Displayed if PDF Writer is selected.	USB stick

- 1 Select a type in **Printer type**
If **Network printer** is selected, enter the corresponding parameters.
- 2 To print out a test page, tap [**Test page**].
- 3 To finish and store the entries tap [**Save**].

Barcode Reader

Navigation: Home > Setup > Hardware > Peripherals > [Barcode reader]

Connect the barcode reader to a USB socket. Two USB sockets are located on the right side of the instrument. The PnP function of the instrument recognizes if a barcode reader is connected. The status field informs that a barcode reader is connected.

Stirrer

Connect the stirrer to the corresponding socket at the backside of the housing. The PnP function of the instrument recognizes if a stirrer is connected.

Navigation: Home > Setup > Hardware > Peripherals > [Stirrer]

Parameter	Description	Value
Status	Information if a stirrer is connected.	Installed Not installed
Stirrer type	Select a stirrer from different standard types or define individual parameters for a stirrer.	Magnetic stirrer Overhead stirrer User-defined stirrer
10%	Defines the minimum voltage for the defined stirrer.	-

100%	Defines the maximum voltage for the defined stirrer.	-
------	--	---

- 1 In **Stirrer type** select the type of stirrer to be used.
- 2 Enter a value for the minimum voltage for the current stirrer.
- 3 Enter a value for the maximum voltage for the current stirrer.
- 4 To check the settings of the stirring speed, tap [**Test**].
- 5 To finish and store the entries tap [**Save**].

Note

The stirrer type can only be selected, if a stirrer is connected to the instrument.

5.2.4 Transfer

The laboratory software LabX direct pH can be run in combination with the instrument. Only one PC can be connected to the instrument. Use the USB socket at the backside of the instrument to connect a PC via USB cable.

Navigation: Home > Setup > Hardware > [Transfer]

Parameter	Description	Value
Host status	Information if a host is connected or not.	Installed Not installed
Transfer to LabX direct	Enable the transfer to "LabX direct pH".	Yes No

- To transfer data to the "LabX direct pH" software of your computer, activate **Transfer to LabX direct**.

5.2.5 Network Settings

In this sub menu, the network settings are defined. Data transfer to the network printer is enabled.

Navigation: Home > Setup > Hardware > [Network settings]

Parameter	Description	Value
Type	Information on the type of network connection.	Ethernet
Obtain IP address automatically	If activated, the device automatically obtains an IP address.	Yes No
IP address	Defines the IP address of the instrument. Only if Obtain IP address automatically is not activated.	-
Subnet mask	Defines the subnet mask to link the subnet's IP address, to run the instrument on a local subnetwork. Only if Obtain IP address automatically is not activated.	-
Standard gateway	Defines the address of the standard gateway for communication between the various networks. Only if Obtain IP address automatically is not activated.	-

5.3 User Settings

Navigation: Home > Setup > [User settings]

The dialog **User settings** contains the settings that can be made specifically for each currently logged in user.

User settings include the following settings:

- **Language**
- **Beep** for signal tones
- **Shortcuts**
- **Keyboards** (alphanumeric and numeric)

5.3.1 Language

The language can be defined separately for the operation of the user interface as well as for the reports that are to be printed out.

Navigation: Home > Setup > User settings > [Language]

Parameter	Description	Value
Screen	Defines the language setting for user interface.	English French German Italian Spanish Portuguese Russian Chinese Japanese Korean
Report	Defines the language setting for printout.	English French German Italian Spanish Portuguese Russian

- 1 Select a language in **Screen**.
- 2 Select a language in **Report**.
- 3 To finish and store the entries tap [**Save**].

5.3.2 Screen

The screen can be adapted to individual needs. Activate the screen saver if it is desired and set the time period up to displaying.

Navigation: Home > Setup > User settings > [Screen]

Parameter	Description	Value
Primary color	Information on the color scheme of the user interface.	Blue
Brightness	Defines the brightness of the display.	50-100%
Screen saver	Activates the screen saver.	Yes No
Wait time	Time [min] before the screen saver becomes active. Displayed if Screen saver is activated.	1 ... 120

- 1 Select a percentage value for **Brightness**.
- 2 To use the screen saver, activate **Screen saver** and set a time for **Wait time**.
- 3 To finish and store the entries tap [**Save**].

5.3.3 Beep

A signal tone can be activated. With the push of a button, in case of error messages, stability of measurement results, additional news or if user interaction is required you hear a beep.

Navigation: Home > Setup > User settings > [Beep]

Parameter	Description	Value
Push of a button	Activates a beep with pushing a button.	Yes No
Error message	Activates a beep in case of error messages.	Yes No
Stability signal	Activates a beep in case of a stable measurement result.	Yes No
Generate news	Activates a beep in case of new news.	Yes No
User interaction required	Activates a beep when user interaction is required.	Yes No

- 1 To hear a signal in certain cases, activate the check boxes according to your requirements.
- 2 To finish and store the entries tap [**Save**].

5.3.4 Shortcuts

Navigation: Home > Setup > User settings > [Shortcuts]

Shortcuts can be created after the parameters for methods and series have been set, see [Creating Shortcuts for Methods](#) (page 100), [Creating Shortcuts for Series](#) (page 102). The administration of shortcuts takes place in the menu **Setup**. This chapter describes how to modify or delete shortcuts.

Modify Shortcuts

Navigation: Home > Setup > User settings > [Shortcuts]

- Select a method or series from the list.
- ⇒ **Shortcut parameters** is displayed.

Parameter	Description	Value
Type	If the shortcut refers to a series, Series as type is shown, if it refers to a method, Method as type is displayed as information.	-
Description	A meaningful name for the series or method can be entered and will be displayed on the home screen.	-
Series ID or Method ID	If the shortcut refers to a series the Series ID is show, if it refers to a method, the Method ID is shown.	-
Immediate start	If activated, the method or series starts can be started immediately.	Yes No
Homescreen position	Shows the position on the home screen. Nine positions are offered, they are numbered 1-9 from left to right in three rows.	-
Created by	Information about the administrator who created the shortcut.	-

- 1 To change the entry in **Description**, overwrite it.
- 2 To change the options for **Immediate start**, activate or deactivate the check box.
- 3 To change the position, tap the list field in **Homescreen position**.
Touching a free area in **Select location for shortcut** will assign the new home screen position.
- 4 To finish and store the entries tap [**Save**].

Delete Shortcuts

Navigation: Home > Setup > User settings > [Shortcuts]

- 1 Select the relevant shortcut from the list.
⇒ **Shortcut parameters** is displayed.
- 2 Tap [**Delete**].
- ⇒ The shortcut has been deleted without warning.

5.3.5 Keyboards

The layout for the alphanumeric and the numeric input fields can be set here.

Navigation: Home > Setup > User settings > [Keyboards]

Parameter	Description	Value
ABC keyboard	Defines the layout of the alphanumeric input field.	English French German
123 keyboard	Defines the layout of the numeric input field.	Calculator Phone

- 1 Select a layout for **ABC keyboard**.
- 2 Select a layout for **123 keyboard**.
- 3 To finish and store the entries tap [**Save**].

5.4 Global Settings

Navigation: Home > Setup > Global settings

In **Global settings**, you can make general instrument settings that apply to all users. The settings in this dialog can only be changed by users with the appropriate authorizations.

Global settings include settings for:

- **System**
- **User management:** Create user accounts and set assigning rights.
- **Analysis and resources behavior**
- **Physical properties** include **Temperature unit**.

5.4.1 System

Instrument identification, date and time format and current date and time can be set in this dialog.

Navigation: Home > Setup > Global settings > [System]

Parameter	Description	Value
Identification	Information on identification and software versions of the instrument.	-
Date/Time	Settings for date and time.	-

Identification

You can enter your own code to identify the instrument.

Navigation: Home > Setup > Global settings > System > [Identification]

Parameter	Description	Value
Instrument ID	Define the instrument identification.	-
Firmware version	Information on the firmware version of the instrument.	-
Instr. serial number	Information on the serial number of the instrument.	-
Module A	Information on the type of module currently plugged in.	pH/mV pH/Ion Conductivity DO/BOD
Module ID	Define the module identification of the module currently plugged in.	-
Module serial number	Information on the serial number of the module currently plugged in.	-
Module firmware version	Information on the firmware of the module currently plugged in.	-
Module B	Information on the type of module currently plugged in.	pH/mV pH/Ion Conductivity DO/BOD
Module ID	Define the module identification of the module currently plugged in.	-
Module serial number	Information on the serial number of the module currently plugged in.	-
Module firmware version	Information on the firmware of the module currently plugged in.	-
Module C	Information on the type of module currently plugged in.	pH/mV pH/Ion Conductivity DO/BOD
Module ID	Define the module identification of the module currently plugged in.	-
Module serial number	Information on the serial number of the module currently plugged in.	-

Module firmware version	Information on the firmware of the module currently plugged in.	-
--------------------------------	---	---

- 1 Enter the ID in **Instrument ID**.
- 2 To enter an ID for **Module ID**, connect a module to the instrument.
- 3 To finish and store the entries tap [**Save**].

Date/Time

You can enter a display format for date and time and set the current date and time.

Navigation: Home > Setup > Global settings > System > [Date/Time]

Parameter	Description	Value
Date format	Defines the format for displaying the date.	mm/dd/yyyy dd/mm/yyyy
Time format	Defines the format for displaying the time.	24h a.m./p.m.
Enable radio clock	Activate the radio clock for time synchronization.	Yes No
Channel	Define the channel for the reception. Only if Enable radio clock is activated.	Auto List of channels
Date/Time	Enter the current date and time. Only if Enable radio clock is not activated.	-
Time zone	Define the time zone of your location.	UTC+ UTC-
Daylight saving time	Activates to switch automatically to daylight saving time.	Yes No

- 1 Select a format in **Date format**.
- 2 Select a format in **Time format**.
- 3 To use the radio clock, activate **Enable radio clock**.
- or -
Tap list field [**Date/Time**], enter the current day and time and confirm with [**OK**].
- 4 Select your location in **Time zone**.
- 5 To switch automatically to daylight saving time, activate **Daylight saving time**.
- 6 To finish and store the entries tap [**Save**].

Note

The instrument is equipped with a radio clock. The radio clock will attempt to synchronize every 7 hours. To avoid interruption of measurements during synchronization of the radio clock, the synchronization will only occur when the instrument is switched off. For reduction of interference during synchronization of the radio clock it is recommended to disconnect the power supply overnight or during long periods of non-use.

5.4.2 User Management

Navigation: Home > Setup > Global settings > [User management]

In the dialog **User management** you can administer the settings for **User** and **Account policies**. A maximum of 30 different users can be defined, whereby only one can be logged in (1 user operation). User accounts can be deleted and edited. There is a default user with a predefined user name (user name: **Administrator**, user group: Administrator) that cannot be deleted.

5.4.2.1 User

In this dialog you have access to the list of users. You can enter user names and assign the users to a user group. The user groups have different user rights, see User Groups and User Rights (page 31). User accounts can be locked, edited or deleted.

User List

All registered users are listed in the user list. The user list gives a quick overview on the users and their assigned user groups.

Navigation: Home > Setup > Global settings > User management > [User]

Enter User and Assign User Rights

New user can be added at any time. A maximum of 30 user can be added to the list. If the maximum is reached, delete a user to create a new entry.

The number of parameters that are displayed depend on the settings in **Account policies**.

Navigation: Home > Setup > Global settings > User management > User > [New]

Parameter	Description	Value
User name	Defines the user name which uniquely identifies him to the system.	-
Full name	Defines the full name of the user.	-
User group	Assignment of the user to a user group. Depending on the user group, the user has various rights.	Administrator Expert Technician Operator
Reset password	If activated, the password for the user will be reset to 123456 . Displayed if Enforce password/fingerprint is activated.	Yes No
Lock user	If activated, the user will be locked and cannot access the instrument. Displayed if Enforce password/fingerprint is activated.	Yes No
Enforce password change	If activated, the entry of a new password will be enforced with the next login. Displayed if Enforce password/fingerprint is activated.	Yes No
Created by	Information on the administrator logged in at time of account creation.	-
Created on	Information on date and time of account creation.	-
Modified by	Information on the administrator logged in at time of account modification.	-
Modified on	Information on date and time of account modification.	-

- 1 Enter a user name in **User name**.
- 2 Enter the full name of the user in **Full name**.
- 3 Assign a group in **User group**.
- 4 To lock a user, activate **Lock user**.
- 5 To finish and store entries tap [**Save**].

Note

Reset password and **Enforce password change** are displayed when the option **Enforce password/fingerprint** is activated. No changes are possible in this submenu. To edit the settings, see Account Policies (page 30).

Edit User

Navigation: Home > Setup > Global settings > User management > [User]

The settings for access permissions and user data can be changed.

- 1 Select a user from the list **User**.
⇒ **User parameters** is displayed.
- 2 Edit the entries.
- 3 To finish and store entries tap [**Save**].

Delete User

Navigation: Home > Setup > Global settings > User management > [User]

User entries can be deleted.

- 1 Select a user from the list **User**.
⇒ **User parameters** is displayed.
- 2 Tap [**Delete**].
⇒ The user has been deleted without warning.

5.4.2.2 Account Policies

In the dialog **Account policies** you can set the options for password or fingerprint reader, also see Peripherals (page 22).

Navigation: Home > Setup > Global settings > User management > [Account policies]

Parameter	Description	Value
Enforce password/fingerprint	Activates to log in by entering a password or via the fingerprint reader.	Yes No
Min. password length	Defines the minimum length of the user passwords Displayed if Enforce password/fingerprint is activated.	-

- 1 To activate the login screen when turning on the instrument, activate **Enforce password/fingerprint**. In **Min. password length**, enter the number of digits required.
- 2 To finish and store the entries tap [**Save**].

5.4.2.3 User Management Settings and Registration Screen

Depending on the settings in **User** and **Account policies**, the following login options are available:

Enforce Password/Fingerprint is Deactivated

- If only one user is defined, the instrument starts directly with the home screen without showing the login screen.
- If several users are defined, the instrument starts with the login screen, the user can select an entry from the list. The input of a password is not required.

Enforce Password/Fingerprint is Deactivated, Fingerprint Reader is Connected and Activated

- If only one user is defined, the instrument starts directly with the home screen without showing the fingerprint logon screen.
- If several users are defined, the instrument starts with the fingerprint logon screen. The identification by fingerprint leads to the home screen. In case of problems with the fingerprint identification the user can change to the manual login screen and selects an entry from the list. The input of a password is not required.

Enforce Password/Fingerprint is Activated, Fingerprint Reader is not Activated

- If the user logs in for the first time or **Enforce password change** is deactivated, the instrument starts with the login screen, enter username and password.
- If the user logs in for the first time or **Enforce password change** is active, the instrument starts with the login screen, enter username and password. Change password screen is displayed, enter a new password, repeat the password and confirm with [**OK**].

Note

Login resets the parameter in **Enforce password change**.

Enforce Password/Fingerprint is Activated, Fingerprint Reader is Activated

- If **Enforce password change** is deactivated, the instrument starts with the fingerprint logon screen. The identification by fingerprint leads to the home screen. In case of problems with the fingerprint logon the user can change to the manual login screen to enter user name and password.
- If user logs in for the first time or **Enforce password change** is activated, the instrument starts with the fingerprint logon screen. The identification by fingerprint leads to the Change password screen, enter new password, repeat the password and confirm with [OK].
- If user logs in for the first time or **Enforce password change** is activated, the instrument starts with the fingerprint logon screen. The user changes to the password login and enters user name and password. Change password screen is displayed, enter a new password, repeat the password and confirm with [OK].

5.4.2.4 User Groups and User Rights

Every user is assigned to a user group. The following four user groups (with decreasing rights from top to down) are distinguished:

- **Administrator**
- **Expert**
- **Technician**
- **Operator**

The following table shows the user rights that are assigned to the corresponding user group:

User Group	User Right
Administrator	Reset to factory settings in Setup, Mainten. & Service .
	Update in Setup, Mainten. & Service .
	Import / Export in Setup, Mainten. & Service .
	User management in Setup, Global settings .
Expert	Creating Sensors in Setup .
	Modifying Sensors and Cell constant of conductivity sensors (manual calibration) in Setup .
	Deleting Sensors in Setup .
	Editing Methods and Series .
	Editing Buffers & Standards in Setup .
	Editing Hardware in Setup .
	Editing settings for System in Setup, Global settings .
	Editing User management in Setup, Global settings .
	Editing Physical properties in Setup, Global settings .
	Editing Analysis sequence settings in Setup, Global settings .
	Editing Actions when sensors expire in Setup, Global settings .
	Editing Tables in Setup .
	Modifying Language in Setup, User settings .
	Deleting Results .
Editing Setup, Mainten. & Service .	
Technician	Starting Methods/Series from the method or series editor.
	Changing Module settings .
	Editing Shortcuts in Setup User settings .

Operator	Starting analysis via [Shortcut]/[Direct Shortcut].
	Starting analysis via [Read] from the Home screen .
	Starting analysis via [Read] from the Module settings screen.
	Starting calibration via [Calibration] from the Module settings screen.
	Changing Sample-IDs.

5.4.3 Analysis and Resources Behavior

Navigation: Home > Setup > Global settings > [Analysis and resources behavior]

The following settings can be defined:

- **Analysis sequence settings**
- **Actions when sensors expire**

5.4.3.1 Analysis Sequence Settings

With these settings the instrument shows all required resources at the start of a method or series. Additionally you can specify whether the analysis ends automatically or manually.

Navigation: Home > Setup > Global settings > Analysis and resources behavior > [Analysis sequence settings]

Parameter	Description	Value
Show required resources at start	All resources that are required to perform the analysis are shown.	Yes No
Confirm end of analysis	The analysis will not end without confirmation.	Yes No

- 1 For information on the required resources at the start of an analysis, activate **Show required resources at start**.
- 2 To confirm the end of an analysis, activate **Confirm end of analysis**.
- 3 To finish and store the entries tap [**Save**].

5.4.3.2 Actions when Sensors Expire

With these settings you specify whether the instrument warns, warns and blocks or does not react, when usable life and life span expired.

Navigation: Home > Setup > Global settings > Analysis and resources behavior > [Actions when sensors expire]

Parameter	Description	Value
Usable life	Select the action when exceeding usable life.	Warn Warn and block None
Life span	Select the action when exceeding life span.	Warn Warn and block None

- 1 To be warned and/or blocked, when **Usable life** expires, activate **Usable life**.
- 2 To be warned and/or blocked, when **Life span** expires, activate **Life span**.
- 3 To finish and store the entries tap [**Save**].

5.4.4 Physical Properties

In **Physical properties** dialog you can define the parameters for **Temperature unit**.

Navigation: Home > Setup > Global settings > [Physical properties]

Parameter	Description	Value
Temperature unit	Defines the temperature unit applicable for all ranges of the instrument. All inputs or outputs are in the temperature unit selected here. The setting will be saved after a restart.	°C °F
Barometric pressure unit	Defines the air pressure unit applicable for dissolved oxygen measurements. All inputs or outputs are in the pressure unit selected here. The setting will be saved after a restart.	mbar hPa mmHg Atm

- Select a unit in **Temperature unit** and **Barometric pressure unit** and store the entries.

5.5 Tables

Navigation: Home > Setup > [Tables]

This instrument offers the comfort to enter data and calculate results, based on these data, see Formula Syntax (page 109) and Results (page 106). Tables can be used in calculations.

Tables are always assigned to an application. The list can be sorted according to the application.

There are two types of tables:

- **METTLER TOLEDO tables:**
These tables are included in the factory settings; they are listed and neither can be modified nor deleted.
- **User-defined tables:**
The layout of the table is a value table (x-y). It can be created, edited and deleted. User-defined tables are added to the list of METTLER TOLEDO tables.

5.5.1 METTLER TOLEDO Tables

Navigation: Home > Setup > [Tables]

In **Tables** you find a list of predefined buffer and standard tables. User-defined buffer and standard tables can be added.

The following buffer and standard tables with their temperature related values are available:

- METTLER TOLEDO Europe pH 2.00
- METTLER TOLEDO Europe pH 4.01
- METTLER TOLEDO Europe pH 7.00
- METTLER TOLEDO Europe pH 9.21
- METTLER TOLEDO Europe pH 11.00
- **Ultra pure water** (Ultra-pure water (USP/EP))
- **Purified water** (Purified water (EP))

For detailed information concerning the temperature related values:

- Tap a table from the list.

⇒ **Tables** is displayed and shows the selected pH value related to the temperature, starting at 5 °C to 50 °C in steps of 5 °C.

The conductivity values for ultra-pure water and purified water are displayed in $\mu\text{S}/\text{cm}$.

The table with the temperature related values of ultra-pure water contains all data between 0 °C and 100 °C in steps of 5 °C.

The table with the temperature related values of purified water contains all data between 0 °C and 100 °C in steps of 10 °C.

For more information about the conditions for the calculation of the values:

- Tap [**Parameter**].

⇒ **Parameters** is displayed and provides information on:

- **Name**
- **Input**
- **Output**
- **Fit type**
- **Comment**

For detailed information concerning the stored METTLER TOLEDO Tables, also see METTLER TOLEDO Tables (page 130).

5.5.2 User-Defined Tables

Navigation: Home > Setup > [Tables]

The following section describes how to create and administer a user-defined table, how to enter, modify and delete values and how to delete tables.

Note

A total of 10 user-defined tables can be created. If the limit is exceeded delete a table before you create a new one.

Creating Tables

Navigation: Home > Setup > Tables > [New]

Parameter	Description	Value
Name	Enter a name that uniquely identifies the table in the system. The name of the table can be entered in the method function Calculation > Formula .	-
Input	Defines the table heading for the input value.	-
Output	Defines the table heading for the output value.	-
Fit type	Information on the definition of the curve type for the calculation. Linear interpolation corresponds to a segmented curve.	-
Comment	Defines a short comment that will be displayed.	-

1 Enter a name in **Name**. The new table name must be unique.

2 Enter a table heading value for **Input**.

3 Enter a table heading value for **Output**.

4 Enter a comment in **Comment**.

5 Tap [**Save**].

⇒ **Table** is displayed.

Entering Values in Tables

– Tap [**New**].

⇒ **Values** is displayed.

Parameter	Description	Value
x	Defines the input value of the value pair.	-
y	Defines the output value of the value pair.	-

1 Enter value for **x**.

2 Enter value for **y**.

3 Confirm with [**OK**].

4 To enter additional values, tap [**New**] and repeat previous steps.

5 To finish and store the entries tap [**Save**].

Note

The maximum number of value entries per table is 25. If you enter by mistake identical values for **Input** and **Output**, a prompt informs that his value already exists.

Modifying Table Parameters

Navigation: Home > Setup > [Tables]

- 1 Select a table from **Tables**.
⇒ **Table** is displayed.
- 2 Tap [**Parameter**].
⇒ **Parameters** is displayed.
- 3 To Following parameters can be modified:
 - **Name**
 - **Input**
 - **Output**
 - **Comment**
- 4 To finish and store the entries tap [**Save**].

Modifying Values

Navigation: Home > Setup > [Tables]

- 1 Select a table from **Tables**.
⇒ **Table** is displayed.
- 2 Tap a value from the list.
⇒ **Values** is displayed.
- 3 To modify the value, overwrite it and confirm with [**OK**].
- 4 To modify additional values, repeat previous steps.
- 5 To finish and store the entries tap [**Save**].

Deleting Values

Navigation: Home > Setup > [Tables]

- 1 Select a table from **Tables**.
⇒ **Table** is displayed.
- 2 Tap the value on the list.
⇒ **Values** is displayed.
- 3 Tap [**Delete**].
- 4 To delete additional values, repeat previous steps.
- 5 To finish and store the entries tap [**Save**].
⇒ The values have been deleted.

Deleting Tables

Navigation: Home > Setup > [Tables]

- 1 Select a table from **Tables**.
⇒ **Table** is displayed.
- 2 Tap [**Parameter**].
⇒ **Parameters** is displayed.

3 Tap [**Delete**].

⇒ The table has been deleted.

Note

Calculations which refer to deleted tables can no longer be carried out.

5.6 Maintenance & Service

Navigation: Home > Setup > [Mainten. & Service]

The following functions are available:

- **MT-Service**
- **Import / Export**
- **Reset to factory settings**
- **Firmware**
- **Update**

5.6.1 MT Service

Navigation: Home > Setup > **Mainten. & Service** > [MT-Service]

In this dialog a list is shown with (max. 10 entries) METTLER TOLEDO maintenance information. Each entry contains information about the date of last maintenance and the executive service technician. The most recently performed maintenance appears at the bottom of the list.

Set Service Life

Navigation: Home > Setup > **Mainten. & Service** > **MT-Service** > [Settings]

Define the parameter for the service life to determine the date of the next maintenance interval. You can set a reminder to be informed on the upcoming maintenance. The following parameters can be set:

- **Service life:** Set the maintenance intervals (in days).
- **Reminder:** Activates whether a reminder informs about the days before the next maintenance takes place.
- **Days before expiration:** Define the number of days before the reminder informs about expiration of the maintenance interval.
The entered number of days must be smaller than the number of days you set for the service life (displayed if **Reminder** is activated).

5.6.2 Import/Export

Navigation: Home > Setup > **Mainten. & Service** > [Import / Export]

With the aid of this function you can either transfer data to or from USB sticks. Using a **Memory copy** is an easy way to transfer the settings from one instrument to another. Quickly you have installed two instruments with identical functions.

The following data can be imported or exported:

- **Methods**
- **Series**
- **Buffers & Standards**
- **Sensors**
- **Memory copy**
- **User management**
- **Log file**

Note

- The function **Import / Export** is only possible when a USB stick is connected and when no task is running.
 - All the saved results, analysis data, shortcuts and METTLER TOLEDO tables, METTLER TOLEDO methods as well as predefined buffer sets and standard groups are **not** contained in a memory copy.
 - When you import or export user management settings, the entire user management settings, with all users and their properties, will be imported or exported.
 - You need to have administrator rights to create and re-import a backup copy.
- 1 In **Action**, select **Import** or **Export**.
 - 2 Tap [**Data**] and select an item from the list.
 - 3 To transfer data tap [**Start**].

5.6.3 Reset to Factory Settings

Navigation: Home > Setup > Mainten. & Service > [**Reset to factory settings**]

You can reset all instrument settings to factory settings. A pop-up informs you that all existing data and settings will be deleted.

Note

If reset is performed all created data, amendments, settings, setup entries and results will be lost. Please create a **Memory copy** before you reset to factory settings.

- 1 Tap [**Reset to factory settings**].
 - ⇒ An information is displayed.
- 2 Tap [**Start**] to proceed.
 - ⇒ A second information is displayed.
- 3 Tap [**Continue**] to start the procedure.
 - ⇒ The instrument is shutting down and all the data will be deleted.

5.6.4 Firmware

Navigation: Home > Setup > Mainten. & Service > [**Firmware**]

The list shows all the firmware updates. The first entry on the list corresponds to initial operation.

All list entries show the following information:

- **Date:** The date of the installation.
- **FW Version:** The software version installed.
- **User name:** Name of technician.

5.6.5 Update

Navigation: Home > Setup > Mainten. & Service > [**Update**]

Firmware updates of the instrument and modules can be managed from this screen. Data can be transferred from USB stick.

Note

- You need administrator rights to implement a firmware update.
- METTLER TOLEDO provides additional information for updating instruments. These instructions will be part of the firmware update.

6 Methods

Navigation: Home > [Methods]

To perform a calibration, sensor test or measurement you can create methods. Methods can also be created for interval measurements or incremental ion measurements. A method is an analysis program and consists of a sequence of method functions. Method functions encompass the type of method, its configuration, the selection of expansion units, the definition of measurement criteria desired and ultimately the creation of a report for the measurements recorded. Parameters of method functions can be defined depending on the requirements of the method.

In addition to the option of creating user-defined methods, 21 METTLER TOLEDO methods have been pre-defined.

Types of METTLER TOLEDO Methods

The following METTLER TOLEDO methods with different objectives are available:

- **M001** for pH calibration
- **M002** for conductivity calibration
- **M003** for ion calibration
- **M004** for pH measurement
- **M005** for pH measurement of pure water according to USP/EP
- **M006** for conductivity measurement
- **M007** for conductivity measurement with α -coefficient determination
- **M008** for conductivity measurement of pure water according to USP/EP
- **M009** for conductivity ash measurement according to ICUMSA GS2/3-17
- **M010** for conductivity ash measurement according to ICUMSA GS1/3/4/7/8-13
- **M011** for conductivity of bioethanol
- **M012** for Rel.mV measurement with offset determination
- **M013** for incremental measurement with single standard addition
- **M014** for incremental measurement with multiple standard additions
- **M015** for incremental measurement with single sample addition
- **M016** for interval pH measurement
- **M017** for sensor test of pH sensor
- **M018** for DO calibration
- **M019** for DO measurement
- **M020** for biochemical oxygen demand (BOD) analysis
- **M021** for BOD check values (BCV) analysis

Types of Method Templates

The following templates for the various method types with different objectives are available and can be used to create user-defined methods:

- **Measure** for performing a measurement
- **Calibration** for performing a calibration
- **Interval** for performing an interval measurement
- **Incremental** for performing an incremental ion measurement
- **Sensor Test** for testing a pH electrode.
- **BOD Check Values** for performing a BOD of Check Values (BCV) measurement
- **BOD** for performing a BOD measurement

How to use METTLER TOLEDO methods and method templates, how to create methods, access them and apply them is described in the following chapters.

6.1 Using METTLER TOLEDO Methods

Navigation: Home > [Methods]

A wide range of standard calibration and measurement methods, used in daily laboratory practice, are covered by METTLER TOLEDO methods. This way the instrument allows the immediate use of methods to carry out calibrations and measurements or to create a series in combination with a METTLER TOLEDO method, also see Series (page 102).

Note

- Before you start a calibration or measurement using a METTLER TOLEDO method, connect a module to the instrument and connect a sensor to the module suitable to the method.
 - Add the sensor to the **Sensors** list, see Sensors (page 19).
 - Activate the check box of the module by tapping on it.
ISM® sensors are recognized automatically and enable to start the method immediately.
- 1 Tap the method desired in the list.
⇒ The method ID of the METTLER TOLEDO Method is displayed.
 - 2 Tap [**Start**].
⇒ **Start analysis** is displayed.
 - 3 If non ISM® sensors are used:
- Tap [**Sensors**] and select a sensor from the list. Tap [**Back**] and confirm with [**OK**].
 - 4 Tap [**Start**].
⇒ The calibration or measurement starts immediately.

6.2 Creating Methods

Various ways of generating a method are available to you in the instrument. Either you create a new method by changing the parameters of a delivered METTLER TOLEDO method and saving it under a new method ID or you select an appropriate method template from the list of proposals, modify it and save it under a new method ID. Lastly, you can also create a method by copying and saving an existing method.

A maximum number of 50 user-defined methods can be stored.

Note

- Sensors can be assigned any time before you start a method, see Sensors (page 19).
- If you start a method without sensor the instrument supports you with its module mapping capability to carry out the method with an available sensor.

6.2.1 Creating Methods as Copy of METTLER TOLEDO Methods

Navigation: Home > [Methods]

The easiest way to create a user-defined method, is using a METTLER TOLEDO method and changing the method ID.

- 1 Select a method with the default parameters that are nearest to the calibration or measurement you wish to carry out.
⇒ The method ID of the METTLER TOLEDO method is displayed.
- 2 Tap [**Title**].
- 3 Enter a new ID in **Method ID** and confirm with [**OK**].
- 4 Confirm with [**OK**].
⇒ A pop-up window opens with the information that the new method will be created as a copy of the pre-selected METTLER TOLEDO method.
- 5 Confirm with [**OK**].

- 6 Adjust further parameters according to your requirements.
 - **Title:** Individual title of the method that will be displayed on the list of methods.
 - **Configuration:** Selecting sensors and conditions for temperature capture.
 - **Sample:** Definition of sample IDs or in case of calibration, assortment of parameters concerning buffers and standards.
 - **Instruction:** Definition of conditions.
 - **Measure:** Settings of measurement parameters.
 - **Calculation R1:** Setting of result limits.
 - **Sensor evaluation:** Definition of calibration limits
 - **Report:** Instruction to print.
- 7 To finish and store the entries tap [**Save**].

6.2.2 Creating Methods Using Method Templates

Using method templates is another way to create a method. The parameters can be adjusted to your individual needs.

Navigation: Home > Methods > [New]

Type	ID	Title
MS	T0001	Measure
CAL	T0002	Calibration
INT	T0003	Interval
INC	T0004	Incremental
ST	T0005	Sensor Test
BCV	T0006	BOD Check Values
BOD	T0007	BOD

- Select a template.

The following chapters guide you through the creation of the different types of methods.

6.2.2.1 Creating Measurement Methods

Up to three measurement types can be defined in one method of the type measurement. The method functions will run sequentially from top to bottom. You can select the following functions to carry out the method.

- **Measurement type**
- **Sensor name**
- **Temperature capture**
- **Measurement type 2**
- **Measurement type 3**

Navigation: Home > Methods > New > [Measurement]

Parameter	Description	Value
Measurement type 1	Defines measurement type 1.	pH Ion Conductivity Dissolved Oxygen
Sensor name	Opens the sensor list, according to the sensor settings.	-
Temperature capture	Select the temperature captures mode.	Internal External Manual
Barometric pressure capture	Select the barometric pressure capture mode. Displayed in case of Measurement type 1 = Dissolved Oxygen	Automatic Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Temperature capture = External is selected.	-
Measurement type 2	Defines measurement type 2.	pH Ion Conductivity Dissolved Oxygen

Sensor name	Opens the sensor list, according to the sensor settings. Displayed if Measurement type 2 is selected.	-
Temperature capture	Different kinds of temperature captures can be selected. Displayed if Measurement type 2 is selected.	Internal External Manual
Barometric pressure capture	Select the barometric pressure capture mode. Displayed if Measurement type 2 = Dissolved Oxygen	Automatic Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Measurement type 2 is selected in combination with Temperature capture = External .	-
Measurement type 3	Defines measurement type 3. Displayed if Measurement type 2 is selected.	pH Ion Conductivity Dissolved Oxygen
Temperature capture	Different kinds of temperature captures can be selected. Displayed if Measurement type 3 is selected.	Internal External Manual
Barometric pressure capture	Select the barometric pressure capture mode. Displayed if Measurement type 3 = Dissolved Oxygen	Automatic Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Measurement type 3 is selected in combination with Temperature capture = External .	-

1 Select a type from **Measurement type**.

2 Select a sensor or choose **Empty**.

Note

Select a sensor if the method always runs with the same sensor. The method runs exclusively with this sensor. If you select **Empty**, you can connect any suitable sensor before you start a method.

3 Select **Temperature capture**.

If for **Temperature capture = External** is selected, select a sensor in **Temperature sensor**.

Note

Select a suitable sensor if the method always runs with the same temperature sensor. The method runs exclusively with this temperature sensor. If you select **Empty** you can connect any suitable sensor before you start a method.

4 Select **Barometric pressure capture**.

Choose between automatic (default) or manual pressure capture.

Only available if measurement type is **Dissolved Oxygen**

5 Tap [OK].

A (consecutive number): Measurement as method type is automatically displayed. The following method functions are displayed, whereby additional method functions can be inserted.

- **Title**
- **Configuration**
- **Sample**
- **Measure**
- **Report**

Note

- It is not necessary to select a sensor in this display.
- If it is desired, you can assign sensors and temperature sensors in the method function **Configuration**, which will be displayed in the following screen.

Title

This method function contains the following information:

- **Method type**
- **Method ID**
- **Title**
- **Author**
- Dates of creation and modification

– Tap **Title**.

⇒ **Title** is displayed.

Parameter	Description	Value
Method type	Information on type of measurement.	Measurement
Method ID	The method is uniquely identified in the system via the method ID. Once the method has been saved, the method ID cannot be changed. A change of the method ID results in the creation of a copy of the method. METTLER TOLEDO methods begin with "M" followed by numbers (M is reserved for METTLER TOLEDO methods).	-
Title	Defines the name of the method.	-
Author	Information on the author (logged in user) of this method.	-
Created on	Information on the date of creation.	-
Modified on	Information on the date of modification.	-
Modified by	Information on the author (logged in user) of modification.	-
Protect	Protects the method against deletion or modification by other users than the author (logged in user) or administrator.	Yes No
SOP	Activates a text to be displayed before the start of the analysis.	Yes No
SOP text	Defines the SOP text. Displayed if check box SOP is activated.	-

1 Enter an ID in **Method ID** and confirm with [**OK**].

Note

The method ID is unique. If an already existing ID is used, a warning will be displayed. Tap [**OK**] and change the ID.

⇒ The method is stored under this ID.

2 Enter a meaningful title to characterize the method and confirm with [**OK**].

3 To select **SOP**, scroll down and activate it.

⇒ A new entry field **SOP text** appears.

4 If desired, enter a text.

5 Confirm with [**OK**].

6 Tap [**Save**].

Now you have created a new method. This method already has predefined method functions. To change the method functions proceed as follows.

Configuration

This method function defines all hardware configurations and the parameters of all subsequent method functions.

– Tap **Configuration**.

⇒ **Configuration** is displayed.

Parameter	Description	Value
Measurement type 1	Information on the measurement type 1.	pH Ion Conductivity Dissolved Oxygen Redox

Sensor name	Opens the sensor list, according to the sensor settings.	-
Temperature capture	Select the temperature captures mode.	Internal External Manual
Barometric pressure capture	Select the barometric pressure capture mode. Displayed in case of Measurement type 1 = Dissolved Oxygen	Automatic Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Temperature capture = External is selected.	-
Measurement type 2	Information on measurement type 2. Displayed if Measurement type 2 is defined.	pH Ion Conductivity Dissolved Oxygen Redox
Sensor name	Opens the sensor list, according to the sensor settings. Displayed if Measurement type 2 is selected.	-
Temperature capture	Different kinds of temperature captures can be selected. Displayed if Measurement type 2 is selected.	Internal External Manual
Barometric pressure capture	Select the barometric pressure capture mode. Displayed if Measurement type 2 = Dissolved Oxygen	Automatic Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Measurement type 2 is selected in combination with Temperature capture = External .	-
Measurement type 3	Information on measurement type 3. Displayed if Measurement type 3 is defined.	pH Ion Conductivity Dissolved Oxygen Redox
Sensor name	Opens the sensor list, according to the sensor settings. Displayed if Measurement type 3 is selected.	-
Temperature capture	Different kinds of temperature captures can be selected. Displayed if Measurement type 3 is selected.	Internal External Manual
Barometric pressure capture	Select the barometric pressure capture mode. Displayed if Measurement type 3 = Dissolved Oxygen	Automatic Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Measurement type 3 is selected in combination with Temperature capture = External .	-
Overlapping temperature capture	When a minimum of two measurement types is defined, overlapping temperature capture can be used. Displayed if second Measurement type 2 is defined.	Yes No
Used temperature	Defines the measurement type, the temperature will be used from. Displayed if Overlapping temperature capture is activated.	Measurement type 1 Measurement type 2 Measurement type 3

1 Tap **Sensor name**.

⇒ **Select sensor** is displayed.

2 Select a sensor or choose **Empty**.

Note

Select a sensor if the method always runs with the same sensor. The method runs exclusively with this sensor. If you select **Empty**, you can connect any suitable sensor before you start a method.

3 Select **Temperature capture**.

If **Temperature capture = External** is selected, select a sensor.

Note

Select a suitable sensor if the method always runs with the same temperature sensor. The method runs exclusively with this temperature sensor. If you select **Empty** you can connect any suitable sensor before you start a method.

- 4 Select **Barometric pressure capture**.
Choose between automatic (default) or manual pressure capture.
Only available if measurement type is **Dissolved Oxygen**
- 5 If a second or third measurement type is defined, repeat previous steps
- 6 If you wish to select a measurement type **Used temperature** for all measurement types, activate **Overlapping temperature capture**.
- 7 Confirm with [**OK**].
- 8 Tap [**Save**].

Sample

In this method function you can enter the sample ID and an optional comment that will be displayed in the **Start analysis** screen.

- Tap **Sample**.
⇒ **Sample** is displayed.

Parameter	Description	Value
Sample ID	Defines the sample ID.	-
Salinity correction factor	Defines the sample's salinity. Displayed if Measurement type = Dissolved Oxygen in method function Configuration .	-
Barometric pressure	Defines the barometric air pressure. Displayed if Measurement type = Dissolved Oxygen and Automatic = Barometric pressure capture in method function Configuration	500.0 – 1100.0 mbar
Comment	Defines a short comment that will be displayed.	-

- 1 Enter sample ID and confirm with [**OK**].
- 2 If desired enter a comment and confirm with [**OK**].
- 3 Confirm with [**OK**].
- 4 Tap [**Save**].

Measure

In this method function the following parameters can be defined:

- **Decimal places**
 - **Endpoint type**
 - **Reference temperature**
 - **Stir**
 - other parameters
- Tap **Measure**.
⇒ **Measure** is displayed.

Parameter	Description	Value
Measurement type 1	Information on the measurement type 1.	pH Ion Conductivity Dissolved Oxygen Redox
Measurement type 2	Information on measurement type 2. Displayed if Measurement type 2 is defined.	pH Ion Conductivity Dissolved Oxygen Redox
Measurement type 3	Information on measurement type 3. Displayed if Measurement type 3 is defined.	pH Ion Conductivity Dissolved Oxygen Redox
Stir	Activates the stirrer.	Yes No

Stirring speed	Defines the stirring speed. Displayed if Stir is activated.	-
Condition	A logical condition can be defined. The method function is executed or not on the result (true or false) of the calculation.	-
Formula	Defines the formula taking reference to results, raw data and tables. Displayed if Condition is activated.	-

- 1 If desired, activate **Stir**.
- 2 Enter a value for **Stirring speed**.
- 3 If a logical condition for executing the method is to be formulated, activate **Condition**, and enter a formula, see Formula Syntax (page 109).
- 4 Confirm with [**OK**].
 - ⇒ The screen with the name of the method opens.

To define additional parameters for **Measurement type** note the instructions of the following paragraph.

- Tap **Measurement type 1**.

⇒ **Measure** is displayed.

Parameter	Description	Value
Sensor name	Information on the sensor name selected for the method, according to the measurement type Ion .	-
Conductivity mode	Defines the mode of the method. Displayed if Measurement type = Conductivity is selected.	Conductivity TDS Salinity Resistivity
Unit	The unit to be used for the measurement. The displayed units depend on the selected measurement types.	pH mV µS/cm mS/cm S/m µS/m mS/m ppm ppt (‰) mg/L g/L psu ppt MΩ.cm Ω.cm mV Rel.mV mmol/L mol/L ppm % pX mV
Temperature correction	Linear: For the most solutions a linear interrelationship consists between temperature and conductivity. Non-linear: Used for natural water (only for temperature between 0... 36°C). The conductivity is multiplied with a tabulated factor and then referenced to the reference temperature. Off: The conductivity value at the current temperature is displayed. Pure water: Used for Measurement type = Conductivity or Resistivity . A special type of temperature algorithm is used. Displayed if Measurement type = Conductivity, TDS or Resistivity is selected.	Linear Non-linear Off Pure water
α-coefficient	Defines the factor for the linear dependency. Displayed if Conductivity mode = Conductivity, TDS or Resistivity in combination with Temperature correction = Linear is selected.	-

Reference temperature	The conductivity of the sample is referenced to the selected temperature during measurement. If Measurement type = Conductivity or Resistivity in combination with Temperature correction = Pure water is selected a reference temperature of 25 °C is automatically set. Displayed if Measurement type = Conductivity, TDS or Resistivity in combination with Temperature correction = Linear is selected.	20°C 25°C
TDS factor	To calculate the TDS value, conductivity will be multiplied with this TDS factor. Displayed if Conductivity = TDS is selected.	-
Offset	Defines the offset [mV]. Displayed if Measurement type = Redox in combination with the unit in Rel.mV is selected.	-
Decimal places	Defines the number of digits for the displayed measurement result.	1 2 3
Endpoint type	Defines how the endpoint of the measurement is to be found.	Automatic Manual Timed
Endpoint criteria	The endpoint of the measurement is reached either after a predefined or user-defined period of time. pH/Redox Strict: Value varies less than 0.03 mV during the last 8 seconds or 0.1 mV for the last 20 seconds. Standard: Value varies less than 0.1 mV during the last 6 seconds. Fast: Value varies less than 0.6 mV during the last 4 seconds. Ion Strict: Value varies less than 0.03 mV during the last 8 seconds or 0.08 mV during the last 20 seconds. Standard: Value varies less than 0.08 mV during the last 8 seconds. Fast: Value varies less than 0.3 mV during the last 4 seconds. Conductivity Strict: Value varies less than 0.8% during the last 4 seconds. Standard: Value varies less than 0.6% during the last 6 seconds. Fast: Value varies less than 0.4% during the last 8 seconds. Dissolved oxygen Strict: Value varies less than 0.03 mg/L during the last 20 seconds. Standard: Value varies less than 0.08 mg/L during the last 20 seconds. Fast: Value varies less than 0.08 mg/L during the last 10 seconds. Displayed for all measurement types in combination with Endpoint type = Automatic .	Strict Standard Fast User-defined
Endpoint time	Period of time [s] until the endpoint of the measurement is reached. Displayed if Endpoint type = Timed .	-

dE	Defines the measured value interval. As soon as the change in the measured value over the time period dt is less than dE, the measured value will be acquired. This occurs within the defined time interval. Displayed in combination with Endpoint type Automatic and Endpoint criteria = User-defined .	-
dt	Defines the time component, in [sec] for dE/dt. dt>tmin and tmax>dt. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined .	-
tmin	Earliest possible time for the measured value acquisition, in [sec]. Displayed in combination with Endpoint type = Automatic and Endpoint criteria = User-defined .	-
tmax	Latest possible time for the measured value acquisition, in [sec]. Note The measurement ends after the time defined, even if the stability criteria of dE and dt are not fulfilled. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined .	-

- 1 Enter measurement parameters according to your requirements in **Measurement type 1**.
- 2 Confirm with [OK].
- 3 If **Measurement type 2** and optional **Measurement type 3** are defined, tap the measurement type and repeat previous steps.
- 4 Tap [Save].

Report

The details for creating a report, printing or exporting data can be set here.

Note

The method function **Report** is the only method function that can be deleted.

- Tap **Report**.
- ⇒ **Report** is displayed.

Parameter	Description	Value
Print	Defines if data will be printed to the connected printer.	Yes No
Print format	Summary: Covers all important data concerning date, time, user and all parameters according to the settings of the measurement type. User-defined: Additional include values and calculations based on the settings. Displayed if Print is selected.	Summary User-defined
Values & Calculations	Values and calculations of this particular method can be exported or printed. Displayed if Print format = User-defined is selected.	Yes No
Data	Data of this particular method can be exported or printed. Displayed if Print format = User-defined is selected.	Yes No
Info	Information of this particular method can be exported or printed. Displayed if Print format = User-defined is selected.	Yes No

- 1 If desired, activate **Print** and select a format.
 - ⇒ If you select **User-defined** you can define additional parameters:
 - **Values & Calculations**
 - **Data**
 - **Info**

- 2 Confirm with [**OK**].
- 3 Tap [**Save**].

Insert Method Functions

In addition to the predefined method functions you can insert additional method functions to expand the range of parameters for the method.

The following table shows the predefined method functions and the method functions that can be added.

Predefined Method Functions	Additional Method Functions
Title	< Instruction
Configuration	< Instruction
Sample	< Instruction < Wait/Stir < Sensor check
Measure	< Instruction < Measure < Calculation < Wait/Stir
Report	

- 1 Tap [**Insert**] and select the method function to be inserted.
- 2 Enter the parameters.
- 3 Confirm with [**OK**].
- 4 To insert additional method functions, repeat previous steps.
- 5 To finish and store entries, tap [**Save**].

Instruction

In this method function you can enter a text which will be displayed on the screen and you can set the conditions when the text will disappear. There are two possibilities either the text disappears after a predefined period of time or after confirmation.

Sensor check

This method function allows you to define special criteria for a sensor so that only sensors with a satisfying last calibration will be used. Calibration data can be checked and optionally the measurement can be interrupted if the sensor criteria are outside limits.

Measure

In method function **Measure**, you can determine the endpoint type, the resolution decimal and other parameters concerning the measurement. You can also define if stirring takes place. As soon as the method function ends, the stirring automatically stops.

Calculation

In this method function you can enter a calculation based on the results of your measurement. You can also set result limits and determine to interrupt the measurement when exceeding the limits, see Formula Syntax (page 109).

Wait/Stir

In this method function you can set a period of time for a pause before the next method function starts. You can define to stir **during** the waiting period.

Note

To start an analysis after all settings have been done, see Start Directly after Creating Methods/Series (page 119).

6.2.2.2 Creating Calibration Methods

In this method type, the number of buffers and standards to perform a calibration is defined. The method function repeats for the defined number of buffers/standards. The calibration data of the sensor is calculated automatically and will be transferred to the sensor setup.

Navigation: Home > Methods > New > [Calibration]

Parameter	Description	Value
Measurement type	Define the measurement type.	pH Ion Conductivity Dissolved Oxygen Redox
Sensor name	Opens the sensor list, according to the sensor settings.	-
Temperature capture	Select the temperature captures mode.	Internal External Manual
Barometric pressure capture	Select the barometric pressure capture mode. Displayed in case of Measurement type = Dissolved Oxygen	Automatic Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Temperature capture = External is selected.	-

1 Select a type from **Measurement type**.

2 Select a sensor or choose **Empty**.

Note

Select a sensor if the method always runs with the same sensor. The method runs exclusively with this sensor. If you select **Empty**, you can connect any suitable sensor before you start a method.

3 Select **Temperature capture**.

If for **Temperature capture = External** is selected, select a sensor in **Temperature sensor**.

Note

Select a suitable sensor if the method always runs with the same temperature sensor. The method runs exclusively with this temperature sensor. If you select **Empty** you can connect any suitable sensor before you start a method.

4 Select **Barometric pressure capture**.

Choose between automatic (default) or manual pressure capture.

Only available if measurement type is **Dissolved Oxygen**

5 Tap [OK].

A (consecutive number): Calibration as method ID is automatically displayed. The following method functions are displayed, whereby additional method functions can be inserted.

- **Title**
- **Configuration**
- **Sample (Calibration)**
- **Measure (Calibration)**
- **Report**

Note

- It is not necessary to select a sensor in this display.
- If it is desired, you can assign sensors and temperature sensors in the method function **Configuration**, which will be displayed in the following screen.

Title

This method function contains the following information.

- **Method type**
- **Method ID**
- **Title**
- **Author**
- Dates of creation and modification

You can protect the method against deletion or modification.

- Tap **Title**.

⇒ **Title** is displayed.

Parameter	Description	Value
Method type	Information on type of measurement.	Measurement
Method ID	The method is uniquely identified in the system via the method ID. Once the method has been saved, the method ID cannot be changed. A change of the method ID results in the creation of a copy of the method. METTLER TOLEDO methods begin with "M" followed by numbers (M is reserved for METTLER TOLEDO methods).	-
Title	Defines the name of the method.	-
Author	Information on the author (logged in user) of this method.	-
Created on	Information on the date of creation.	-
Modified on	Information on the date of modification.	-
Modified by	Information on the author (logged in user) of modification.	-
Protect	Protects the method against deletion or modification by other users than the author (logged in user) or administrator.	Yes No
SOP	Activates a text to be displayed before the start of the analysis.	Yes No
SOP text	Defines the SOP text. Displayed if check box SOP is activated.	-

- 1 Enter an ID in **Method ID** and confirm with [**OK**].

Note

The method ID is unique. If an already existing ID is used, a warning will be displayed. Tap [**OK**] and change the ID.

⇒ The method is stored under this ID.

- 2 Enter a meaningful title to characterize the method and confirm with [**OK**].
- 3 To select **SOP**, scroll down and activate it.
⇒ A new entry field **SOP text** appears.
- 4 If desired, enter a text.
- 5 Confirm with [**OK**].
- 6 Tap [**Save**].

Now you have created a new calibration method. This method already has predefined method functions. To change the method functions proceed as follows.

Configuration

This method function defines all hardware configurations and the parameters of all subsequent method functions.

- Tap **Configuration**.

⇒ **Configuration** is displayed.

Parameter	Description	Value
Measurement type	Information on the measurement type.	-
Sensor name	Opens the sensor list, according to the sensor settings.	-
Temperature capture	Select the temperature captures mode.	Internal External Manual
Barometric pressure capture	Select the barometric pressure capture mode. Displayed in case of Measurement type = Dissolved Oxygen	Automatic Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Temperature capture = External is selected.	-

- 1 Tap **Sensor name**.

⇒ **Select sensor** is displayed.

- 2 Select a sensor or choose **Empty**.

Note

Select a sensor if the method always runs with the same sensor. The method runs exclusively with this sensor. If you select **Empty**, you can connect any suitable sensor before you start a method.

- 3 Select **Temperature capture**.

If **Temperature capture = External** is selected, select a sensor.

Note

Select a suitable sensor if the method always runs with the same temperature sensor. The method runs exclusively with this temperature sensor. If you select **Empty** you can connect any suitable sensor before you start a method.

- 4 Select **Barometric pressure capture**.

Choose between automatic (default) or manual pressure capture.

Only available if measurement type is **Dissolved Oxygen**

- 5 If a second or third measurement type is defined, repeat previous steps

- 6 If you wish to select a measurement type **Used temperature** for all measurement types, activate **Overlapping temperature capture**.

- 7 Confirm with [**OK**].

- 8 Tap [**Save**].

Sample (Calibration)

In this method function buffer sets and standard groups and calibration modes can be defined.

Note

The parameters that are displayed depend on the preselected measurement type.

- Tap **Sample (Calibration)**.

⇒ **Sample** is displayed.

Parameter	Description	Value
Measurement type	Information on the measurement type.	-
Sensor name	Information on the sensor name selected for the method, according to the measurement type Ion ,.	-
Buffer group	Opens the list of predefined and user-defined buffer groups Displayed if Measurement type is pH .	-

Calibration standard group	Opens the list of predefined and user-defined standard groups. Displayed if Measurement type = Ion or Conductivity .	-
Unit	Information on the preselected unit. Displayed if Measurement type = Ion	-
Calibration mode	Algorithm on which the calibration is processed. Displayed if Measurement type = pH .	Linear Segmented
Number of buffers	Defines the number of buffers or standards for the calibration. Displayed if Measurement type = pH .	1 2 3 4 5
Automatic buffer recognition	Activates the automatic recognition of buffers. Displayed if Measurement type = pH .	Yes No
Buffer 1 - Buffer 5	Number of fields depends on the number of defined buffers. Up to 5 buffers are displayed with consecutive numbers. Each field opens the list of predefined and user defined buffer groups. Displayed if Measurement type = pH and Automatic buffer recognition is not activated.	-
Standard 1-5	Number of fields depends on the number of defined standards. Up to 5 standards are displayed with consecutive numbers. Each field opens the list of preselected standard groups. Displayed if Measurement type = Ion and Automatic buffer recognition is not activated.	-
Standard	Opens the values of the preselected calibration standard. Displayed if Measurement type = Conductivity .	-
Calibration points	Option to choose between different number of calibration points.	1 2
Calibration standard 1	Select the standard for the first calibration point. Displayed if Measurement type = Dissolved Oxygen .	Saturated air User defined
Standard concentration	Defines the concentration of the added sample.	-
Calibration standard 2	Defines the standard for the second calibration point. Cannot be edited. Displayed if Measurement type = Dissolved Oxygen and Calibration points = 2 .	Zero Point Standard
Salinity correction factor	Set a correction factor taking into account salinity levels in sample. Displayed if Measurement type = Dissolved Oxygen	-
Barometric pressure	Defines the barometric (atmospheric) pressure. Displayed if Barometric pressure capture = Manual is selected in method function Configuration	500.0 – 1100.0 mbar
Temperature	Defines the temperature for the measurement. Displayed if Temperature capture = Manual is selected.	-
Comment	Defines a short comment that will be displayed.	-

This table is necessary for the Dissolved Oxygen parameter.

Parameter	Description	Value
-----------	-------------	-------

- 1 Tap the list field **Buffer group** or **Calibration standard group**.
⇒ **Buffer / Standard group** is displayed.
- 2 Select a buffer or standard from the list.
- 3 If **Measurement type** pH or ion is selected, select a mode in **Calibration mode**.
- 4 Select the number of buffers you want to use from the list **Number of buffers**.
- or -
Select **Automatic buffer recognition**.

- 5 If **Number of buffers** is selected, select specific values for **Buffer**.
- or -
Select **Standard**.
- 6 If desired, enter a comment.
- 7 Confirm with [**OK**].
- 8 Tap [**Save**].

Measure (Calibration)

In this method function endpoint type and endpoint criteria are selected. You can also define whether stirring during calibration takes place or not.

- Tap **Measure (Calibration)**.
⇒ **Calibration** is displayed.

Parameter	Description	Value
Sensor name	Information on the sensor name selected for the method, according to the measurement type Ion ,.	-
Endpoint type	Defines how the endpoint of the measurement is to be found.	Automatic Manual Timed
Endpoint criteria	<p>The endpoint of the measurement is reached either after a predefined or user-defined period of time.</p> <p>pH/Redox Strict: Value varies less than 0.03 mV during the last 8 seconds or 0.1 mV for the last 20 seconds. Standard: Value varies less than 0.1 mV during the last 6 seconds. Fast: Value varies less than 0.6 mV during the last 4 seconds.</p> <p>Ion Strict: Value varies less than 0.03 mV during the last 8 seconds or 0.08 mV during the last 20 seconds. Standard: Value varies less than 0.08 mV during the last 8 seconds. Fast: Value varies less than 0.3 mV during the last 4 seconds.</p> <p>Conductivity Strict: Value varies less than 0.8% during the last 4 seconds. Standard: Value varies less than 0.6% during the last 6 seconds. Fast: Value varies less than 0.4% during the last 8 seconds.</p> <p>Dissolved oxygen Strict: Value varies less than 0.03 mg/L during the last 20 seconds. Standard: Value varies less than 0.08 mg/L during the last 20 seconds. Fast: Value varies less than 0.08 mg/L during the last 10 seconds.</p> <p>Displayed for all measurement types in combination with Endpoint type = Automatic.</p>	Strict Standard Fast User-defined
Endpoint time	Period of time [s] until the endpoint of the measurement is reached. Displayed if Endpoint type = Timed .	-

dE	Defines the measured value interval. As soon as the change in the measured value over the time period dt is less than dE, the measured value will be acquired. This occurs within the defined time interval. Displayed in combination with Endpoint type Automatic and Endpoint criteria = User-defined .	-
dt	Defines the time component, in [sec] for dE/dt. dt>tmin and tmax>dt. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined .	-
tmin	Earliest possible time for the measured value acquisition, in [sec]. Displayed in combination with Endpoint type = Automatic and Endpoint criteria = User-defined .	-
tmax	Latest possible time for the measured value acquisition, in [sec]. Note The measurement ends after the time defined, even if the stability criteria of dE and dt are not fulfilled. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined .	-
Stir	Activates the stirrer.	Yes No
Stirring speed	Defines the stirring speed. Displayed if Stir is activated.	-

- 1 Select **Endpoint type**.
For **Timed**, enter the time in **Endpoint time**.
- or -
For **Automatic**, select a criteria in **Endpoint criteria**.
- or -
For **User-defined**, enter parameters **dE**, **dt**, **tmin** and **tmax**.
- 2 If desired, activate **Stir**.
- 3 Enter a value for **Stirring speed**.
As soon as the method function ends, the stirring automatically stops.
- 4 Confirm with [**OK**].
- 5 To finish and store entries, tap [**Save**].

Report

The details for creating a report, printing or exporting data can be set here.

Note

The method function **Report** is the only method function that can be deleted.

- Tap **Report**.
⇒ **Report** is displayed.

Parameter	Description	Value
Print	Defines if data will be printed to the connected printer.	Yes No
Print format	Summary : Covers all important data concerning date, time, user and all parameters according to the settings of the measurement type. User-defined : Additional include values and calculations based on the settings. Displayed if Print is selected.	Summary User-defined
Values & Calculations	Values and calculations of this particular method can be exported or printed. Displayed if Print format = User-defined is selected.	Yes No

Data	Data of this particular method can be exported or printed. Displayed if Print format = User-defined is selected.	Yes No
Info	Information of this particular method can be exported or printed. Displayed if Print format = User-defined is selected.	Yes No

- 1 If desired, activate **Print** and select a format.
 - ⇒ If you select **User-defined** you can define additional parameters:
 - **Values & Calculations**
 - **Data**
 - **Info**
- 2 Confirm with [**OK**].
- 3 Tap [**Save**].

Insert Method Functions

In addition to the predefined method functions you can insert additional method functions to expand the range of parameters for the method.

The following table shows the predefined method functions and the method functions that can be added.

Predefined Method Functions	Additional Method Functions
Title	< Instruction
Configuration	< Instruction
Sample (Calibration)	< Instruction < Wait/Stir
Measure (Calibration)	< Instruction < Wait/Stir < Calibration analysis
Report	

- 1 Tap [**Insert**] and select the method function to be inserted.
- 2 Enter the parameters.
- 3 Confirm with [**OK**].
- 4 To insert additional method functions, repeat previous steps.
- 5 To finish and store entries, tap [**Save**].

Instruction

In this method function you can enter a text which will be displayed on the screen and you can set the conditions when the text will disappear. There are two possibilities either the text disappears after a predefined period of time or after confirmation.

Wait/Stir

In this method function you can set a period of time for a pause before the next method function starts. You can define to stir **during** the waiting period.

Calibration analysis

In this method function the limits for accepting a calibration can be entered. You can set the minimum and maximum slope for the calibration and the minimum and maximum offset. You can activate a check box to interrupt the performance if the parameters are outside limits.

Note

To start an analysis after all settings have been done, see Start Directly after Creating Methods/Series (page 119).

6.2.2.3 Creating Interval Methods

With this method you can create a table of measured values with defined intervals per measurement type. Up to six intervals are possible per method. Up to three measurement types per method can be defined.

Navigation: Home > Methods > New > [Interval]

Parameter	Description	Value
Measurement type 1	Defines measurement type 1.	pH Ion Conductivity Dissolved Oxygen
Sensor name	Opens the sensor list, according to the sensor settings.	-
Temperature capture	Select the temperature captures mode.	Internal External Manual
Barometric pressure capture	Select the barometric pressure capture mode. Displayed in case of Measurement type 1 = Dissolved Oxygen	Automatic Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Temperature capture = External is selected.	-
Measurement type 2	Defines measurement type 2.	pH Ion Conductivity Dissolved Oxygen
Sensor name	Opens the sensor list, according to the sensor settings. Displayed if Measurement type 2 is selected.	-
Temperature capture	Different kinds of temperature captures can be selected. Displayed if Measurement type 2 is selected.	Internal External Manual
Barometric pressure capture	Select the barometric pressure capture mode. Displayed if Measurement type 2 = Dissolved Oxygen	Automatic Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Measurement type 2 is selected in combination with Temperature capture = External .	-
Measurement type 3	Defines measurement type 3. Displayed if Measurement type 2 is selected.	pH Ion Conductivity Dissolved Oxygen
Sensor name	Opens the sensor list, according to the sensor settings. Displayed if Measurement type 3 is selected.	-
Temperature capture	Different kinds of temperature captures can be selected. Displayed if Measurement type 3 is selected.	Internal External Manual
Barometric pressure capture	Select the barometric pressure capture mode. Displayed if Measurement type 3 = Dissolved Oxygen	Automatic Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Measurement type 3 is selected in combination with Temperature capture = External .	-
Overlapping temperature capture	When a minimum of two measurement types is defined, overlapping temperature capture can be used. Displayed if second Measurement type 2 is defined.	Yes No
Used temperature	Defines the measurement type, the temperature will be used from. Displayed if Overlapping temperature capture is activated.	Measurement type 1 Measurement type 2 Measurement type 3

1 Select a type from **Measurement type**.

- 2 Select a sensor or choose **Empty**.

Note

Select a sensor if the method always runs with the same sensor. The method runs exclusively with this sensor. If you select **Empty**, you can connect any suitable sensor before you start a method.

- 3 Select **Temperature capture**.

If for **Temperature capture = External** is selected, select a sensor in **Temperature sensor**.

Note

Select a suitable sensor if the method always runs with the same temperature sensor. The method runs exclusively with this temperature sensor. If you select **Empty** you can connect any suitable sensor before you start a method.

- 4 Select **Barometric pressure capture**.

Choose between automatic (default) or manual pressure capture.

Only available if measurement type is **Dissolved Oxygen**

- 5 Tap [OK].

A (consecutive number): Measure (Interval) as method ID is automatically displayed. The following method functions are displayed, whereby additional method functions can be inserted.

- **Title**
- **Configuration**
- **Sample**
- **Measure (Interval)**
- **Report**

Note

- It is not necessary to select a sensor in this display.
- If it is desired, you can assign sensors and temperature sensors in the method function **Configuration**, which will be displayed in the following screen.

Title

This method function contains the following information:

- **Method type**
- **Method ID**
- **Title**
- **Author**
- Dates of creation and modification

You can protect your method against deletion or modification.

- Tap **Title**.

⇒ **Title** is displayed.

Parameter	Description	Value
Method type	Information on type of measurement.	Interval
Method ID	The method is uniquely identified in the system via the method ID. Once the method has been saved, the method ID cannot be changed. A change of the method ID results in the creation of a copy of the method. METTLER TOLEDO methods begin with "M" followed by numbers (M is reserved for METTLER TOLEDO methods).	-
Title	Defines the name of the method.	-
Author	Information on the author (logged in user) of this method.	-
Created on	Information on the date of creation.	-
Modified on	Information on the date of modification.	-

Modified by	Information on the author (logged in user) of modification.	-
Protect	Protects the method against deletion or modification by other users than the author (logged in user) or administrator.	Yes No
SOP	Activates a text to be displayed before the start of the analysis.	Yes No
SOP text	Defines the SOP text. Displayed if check box SOP is activated.	-

1 Enter an ID in **Method ID** and confirm with [OK].

Note

The method ID is unique. If an already existing ID is used, a warning will be displayed. Tap [OK] and change the ID.

⇒ The method is stored under this ID.

2 Enter a meaningful title to characterize the method and confirm with [OK].

3 To select **SOP**, scroll down and activate it.

⇒ A new entry field **SOP text** appears.

4 If desired, enter a text.

5 Confirm with [OK].

6 Tap [Save].

Now you have created an interval method. This method already has predefined method functions. To change the method functions proceed as follows:

Configuration

This method function defines all hardware configurations and the parameters of all subsequent method functions.

– Tap **Configuration**.

⇒ **Configuration** is displayed.

Parameter	Description	Value
Measurement type 1	Information on the measurement type 1.	pH Ion Conductivity Dissolved Oxygen Redox
Sensor name	Opens the sensor list, according to the sensor settings.	-
Temperature capture	Select the temperature captures mode.	Internal External Manual
Barometric pressure capture	Select the barometric pressure capture mode. Displayed in case of Measurement type 1 = Dissolved Oxygen	Automatic Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Temperature capture = External is selected.	-
Measurement type 2	Information on measurement type 2. Displayed if Measurement type 2 is defined.	pH Ion Conductivity Dissolved Oxygen Redox
Sensor name	Opens the sensor list, according to the sensor settings. Displayed if Measurement type 2 is selected.	-
Temperature capture	Different kinds of temperature captures can be selected. Displayed if Measurement type 2 is selected.	Internal External Manual
Barometric pressure capture	Select the barometric pressure capture mode. Displayed if Measurement type 2 = Dissolved Oxygen	Automatic Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Measurement type 2 is selected in combination with Temperature capture = External .	-

Measurement type 3	Information on measurement type 3. Displayed if Measurement type 3 is defined.	pH Ion Conductivity Dissolved Oxygen Redox
Sensor name	Opens the sensor list, according to the sensor settings. Displayed if Measurement type 3 is selected.	-
Temperature capture	Different kinds of temperature captures can be selected. Displayed if Measurement type 3 is selected.	Internal External Manual
Barometric pressure capture	Select the barometric pressure capture mode. Displayed if Measurement type 3 = Dissolved Oxygen	Automatic Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Measurement type 3 is selected in combination with Temperature capture = External .	-
Overlapping temperature capture	When a minimum of two measurement types is defined, overlapping temperature capture can be used. Displayed if second Measurement type 2 is defined.	Yes No
Used temperature	Defines the measurement type, the temperature will be used from. Displayed if Overlapping temperature capture is activated.	Measurement type 1 Measurement type 2 Measurement type 3

1 Tap **Sensor name**.

⇒ **Select sensor** is displayed.

2 Select a sensor or choose **Empty**.

Note

If the method always runs with the same sensor select a sensor. The method runs exclusively with this sensor. If you select **Empty** you can connect any suitable sensor before you start a method.

3 Select **Barometric pressure capture**. Choose between automatic (default) or manual pressure capture. Only available if measurement type is **Dissolved Oxygen**. Displayed if in case of measurement type = DO.

4 Select **Temperature capture**.

If **Temperature capture = External** is selected, select a sensor.

Note

If the method always runs with the same temperature sensor select a suitable sensor. The method runs exclusively with this temperature sensor. If you select **Empty** you can connect any suitable sensor before you start a method.

5 If a second or third measurement type is defined, repeat previous steps

6 If you wish to select a measurement type **Used temperature** for all measurement types, activate **Overlapping temperature capture**.

7 Confirm with [**OK**].

8 Tap [**Save**].

Sample

In this method function you can enter the Sample ID and optional a comment that will be displayed in the **Start analysis** screen.

– Tap **Sample**.

⇒ **Sample** is displayed.

Parameter	Description	Value
Sample ID	Defines the sample ID.	-
Salinity correction factor	Defines the sample's salinity. Displayed if Measurement type = Dissolved Oxygen in method function Configuration .	-

Barometric pressure	Defines the barometric air pressure. Displayed if Measurement type = Dissolved Oxygen and Barometric pressure capture = Manual in method function Configuration	500.0 – 1100.0 mbar
Comment	Defines a short comment that will be displayed.	-

- 1 Enter sample ID and confirm with [**OK**].
- 2 If desired enter a comment and confirm with [**OK**].
- 3 Confirm with [**OK**].
- 4 Tap [**Save**].

Measure (Interval)

In this method function the following parameters can be defined:

- **Decimal places**
- **Endpoint type**
- **Reference temperature**
- **Stir**
- other parameters

– Tap **Measure (Interval)**.

⇒ **Measure (Interval)** is displayed.

Parameter	Description	Value
Measurement type 1	Information on the measurement type 1.	pH Ion Conductivity Dissolved Oxygen Redox
Measurement type 2	Information on measurement type 2. Displayed if Measurement type 2 is defined.	pH Ion Conductivity Dissolved Oxygen Redox
Measurement type 3	Information on measurement type 3. Displayed if Measurement type 3 is defined.	pH Ion Conductivity Dissolved Oxygen Redox
Interval time	Time period between starting and storing measurement data (unit seconds is set).	-
Print after each interval	Activates printing out the result after each interval.	Yes No
Stir	Activates the stirrer.	Yes No
Stirring speed	Defines the stirring speed. Displayed if Stir is activated.	-
Condition	A logical condition can be defined. The method function is executed or not on the result (true or false) of the calculation.	-
Formula	Defines the formula taking reference to results, raw data and tables. Displayed if Condition is activated.	-

- 1 If desired, activate **Stir**.
- 2 Enter a value for **Stirring speed**.
- 3 If a logical condition for executing the method is to be formulated, activate **Condition**, and enter a formula, see Formula Syntax (page 109).
- 4 Confirm with [**OK**].
⇒ The screen with the name of the method opens.

To define additional parameters for **Measurement type** note the instructions of the following paragraph.

– Tap **Measurement type 1**.

⇒ **Measure (Interval)** is displayed.

Parameter	Description	Value
Sensor name	Information on the sensor name selected for the method, according to the measurement type Ion ,.	-
Conductivity mode	Defines the mode of the method. Displayed if Measurement type = Conductivity is selected.	Conductivity TDS Salinity Resistivity
Unit	The unit to be used for the measurement. The displayed units depend on the selected measurement types.	pH mV µS/cm mS/cm S/m µS/m mS/m ppm ppt (‰) mg/L g/L psu ppt MΩ.cm Ω.cm mV Rel.mV mmol/L mol/L ppm % pX mV
Temperature correction	Linear: For the most solutions a linear interrelationship consists between temperature and conductivity. Non-linear: Used for natural water (only for temperature between 0... 36°C). The conductivity is multiplied with a tabulated factor and then referenced to the reference temperature. Off: The conductivity value at the current temperature is displayed. Pure water: Used for Measurement type = Conductivity or Resistivity . A special type of temperature algorithm is used. Displayed if Measurement type = Conductivity, TDS or Resistivity is selected.	Linear Non-linear Off Pure water
α-coefficient	Defines the factor for the linear dependency. Displayed if Conductivity mode = Conductivity, TDS or Resistivity in combination with Temperature correction = Linear is selected.	-
Reference temperature	The conductivity of the sample is referenced to the selected temperature during measurement. If Measurement type = Conductivity or Resistivity in combination with Temperature correction = Pure water is selected a reference temperature of 25 °C is automatically set. Displayed if Measurement type = Conductivity, TDS or Resistivity in combination with Temperature correction = Linear is selected.	20°C 25°C
TDS factor	To calculate the TDS value, conductivity will be multiplied with this TDS factor. Displayed if Conductivity = TDS is selected.	-
Decimal places	Defines the number of digits for the displayed measurement result.	1 2 3
Endpoint type	Defines how the endpoint of the measurement is to be found.	Automatic Manual Timed

Endpoint criteria	<p>The endpoint of the measurement is reached either after a predefined or user-defined period of time.</p> <p>pH/Redox Strict: Value varies less than 0.03 mV during the last 8 seconds or 0.1 mV for the last 20 seconds. Standard: Value varies less than 0.1 mV during the last 6 seconds. Fast: Value varies less than 0.6 mV during the last 4 seconds.</p> <p>Ion Strict: Value varies less than 0.03 mV during the last 8 seconds or 0.08 mV during the last 20 seconds. Standard: Value varies less than 0.08 mV during the last 8 seconds. Fast: Value varies less than 0.3 mV during the last 4 seconds.</p> <p>Conductivity Strict: Value varies less than 0.8% during the last 4 seconds. Standard: Value varies less than 0.6% during the last 6 seconds. Fast: Value varies less than 0.4% during the last 8 seconds.</p> <p>Dissolved oxygen Strict: Value varies less than 0.03 mg/L during the last 20 seconds. Standard: Value varies less than 0.08 mg/L during the last 20 seconds. Fast: Value varies less than 0.08 mg/L during the last 10 seconds.</p> <p>Displayed for all measurement types in combination with Endpoint type = Automatic.</p>	Strict Standard Fast User-defined
Endpoint time	<p>Period of time [s] until the endpoint of the measurement is reached. Displayed if Endpoint type = Timed.</p>	-
dE	<p>Defines the measured value interval. As soon as the change in the measured value over the time period dt is less than dE, the measured value will be acquired. This occurs within the defined time interval. Displayed in combination with Endpoint type Automatic and Endpoint criteria = User-defined.</p>	-
dt	<p>Defines the time component, in [sec] for dE/dt. dt>tmin and tmax>dt. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined.</p>	-
tmin	<p>Earliest possible time for the measured value acquisition, in [sec]. Displayed in combination with Endpoint type = Automatic and Endpoint criteria = User-defined.</p>	-
tmax	<p>Latest possible time for the measured value acquisition, in [sec]. Note The measurement ends after the time defined, even if the stability criteria of dE and dt are not fulfilled. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined.</p>	-
Stir	Activates the stirrer.	Yes No

Stirring speed	Defines the stirring speed. Displayed if Stir is activated.	-
Threshold	Defines a value for the threshold to be monitored, with optionally finding an endpoint of the measurement upon exceeding the threshold. Displayed for all measurement types.	-
Lower threshold	Defines a value (unit is set, depends on unit for measurement type). Displayed if Threshold is activated.	-
Upper threshold	Displayed if check box Threshold is activated. Set a value (unit is set, depends on unit for measurement type).	-
Endpoint when threshold exceeded	Defines that the endpoint is reached when the threshold value is exceeded. Displayed if Threshold is activated.	Yes No
Print after each interval	Activates printing out the result after each interval.	Yes No
Condition	A logical condition can be defined. The method function is executed or not on the result (true or false) of the calculation.	-
Formula	Defines the formula taking reference to results, raw data and tables. Displayed if Condition is activated.	-

- 1 Enter measurement parameters according to your requirements in **Measurement type 1**.
- 2 Confirm with [OK].
- 3 If **Measurement type 2** and optional **Measurement type 3** are defined, tap the measurement type and repeat previous steps.
- 4 Tap [Save].

Report

The details for creating a report, printing or exporting data can be set here.

Note

The method function **Report** is the only method function that can be deleted.

- Tap **Report**.
⇒ **Report** is displayed.

Parameter	Description	Value
Print	Defines if data will be printed to the connected printer.	Yes No
Print format	Summary: Covers all important data concerning date, time, user and all parameters according to the settings of the measurement type. User-defined: Additional include values and calculations based on the settings. Displayed if Print is selected.	Summary User-defined
Values & Calculations	Values and calculations of this particular method can be exported or printed. Displayed if Print format = User-defined is selected.	Yes No
Data	Data of this particular method can be exported or printed. Displayed if Print format = User-defined is selected.	Yes No
Info	Information of this particular method can be exported or printed. Displayed if Print format = User-defined is selected.	Yes No

- 1 If desired, activate **Print** and select a format.

⇒ If you select **User-defined** you can define additional parameters:

- **Values & Calculations**
- **Data**
- **Info**

2 Confirm with [**OK**].

3 Tap [**Save**].

Insert Method Functions

In addition to the predefined method functions you can insert additional method functions to expand the range of parameters for the method.

The following table shows the predefined method functions and the method functions that can be added.

Predefined Method Functions	Additional Method Functions
Title	
	< Instruction
Configuration	
	< Instruction
Sample	
	< Instruction < Wait/Stir < Sensor check
Measure (Interval)	
	< Calculation < Instruction < Wait/Stir < Report < Measure
Report	

1 Tap [**Insert**] and select the method function to be inserted.

2 Enter the parameters.

3 Confirm with [**OK**].

4 To insert additional method functions, repeat previous steps.

5 To finish and store entries, tap [**Save**].

Instruction

In this method function you can enter a text which will be displayed on the screen and you can set the conditions when the text will disappear. There are two possibilities either the text disappears after a predefined period of time or after confirmation.

Sensor check

This method function allows you to define special criteria for a sensor so that only sensors with a satisfying last calibration will be used. Calibration data can be checked and optionally the measurement can be interrupted if the sensor criteria are outside limits.

Interval

In this method function the endpoint type, endpoint criteria and other important parameters are determined. You can also define the period of time for the interval measurements and whether stirring takes place during the measurement or not. As soon as the method function ends stirring automatically stops.

Calculation

In this method function you can enter a calculation based on the results of your measurement. You can also set result limits and determine to interrupt the measurement when exceeding the limits, see Formula Syntax (page 109).

Wait/Stir

In this method function you can set a period of time for a pause before the next method function starts. You can define to stir **during** the waiting period.

Note

To start an analysis after all settings have been done, see Start Directly after Creating Methods/Series (page 119).

6.2.2.4 Creating Incremental Methods

Template incremental is only for the measurement type Ion. Only one module can be used. The method function measurement repeats for the defined number of samples/standard additions all other method functions are not repeated. The concentration of the sample is calculated automatically.

Navigation: Home > Methods > New > [Incremental]

Parameter	Description	Value
Measurement type	Information on the measurement type.	-
Sensor name	Opens the sensor list, according to the sensor settings.	-
Temperature capture	Select the temperature captures mode.	Internal External Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Temperature capture = External is selected.	-

1 Select a type from **Measurement type**.

2 Select a sensor or choose **Empty**.

Note

Select a sensor if the method always runs with the same sensor. The method runs exclusively with this sensor. If you select **Empty**, you can connect any suitable sensor before you start a method.

3 Select **Temperature capture**.

If for **Temperature capture = External** is selected, select a sensor in **Temperature sensor**.

Note

Select a suitable sensor if the method always runs with the same temperature sensor. The method runs exclusively with this temperature sensor. If you select **Empty** you can connect any suitable sensor before you start a method.

4 Tap [**OK**].

1 Select a type from **Measurement type**.

2 Select a sensor or choose **Empty**.

Note

Select a sensor if the method always runs with the same sensor. The method runs exclusively with this sensor. If you select **Empty**, you can connect any suitable sensor before you start a method.

3 Select **Temperature capture**.

If for **Temperature capture = External** is selected, select a sensor in **Temperature sensor**.

Note

Select a suitable sensor if the method always runs with the same temperature sensor. The method runs exclusively with this temperature sensor. If you select **Empty** you can connect any suitable sensor before you start a method.

- 4 Select **Barometric pressure capture**.
Choose between automatic (default) or manual pressure capture.
Only available if measurement type is **Dissolved Oxygen**
- 5 Tap **[OK]**.

A (consecutive number): Incremental as **Method type** is automatically displayed. The following method functions are displayed, whereby additional method functions can be inserted.

- **Title**
- **Configuration**
- **Sample (Incremental)**
- **Measure (Incremental)**
- **Report**

Notes

- It is not necessary to select a sensor in this display.
- If it is desired, you can assign sensors and temperature sensors in the method function **Configuration**, which will be displayed in the following screen.

Title

This method function contains information about the **Method type**, **Method ID**, **Title**, **Author** und dates of creation and modification. You can protect your method against deletion or modification.

- Tap **Title**.
⇒ **Title** is displayed.

Parameter	Description	Value
Method type	Information on the type of method.	-
Method ID	The method is uniquely identified in the system via the method ID. Once the method has been saved, the method ID cannot be changed. A change of the method ID results in the creation of a copy of the method. METTLER TOLEDO methods begin with "M" followed by numbers (M is reserved for METTLER TOLEDO methods).	-
Title	Defines the name of the method.	-
Author	Information on the author (logged in user) of this method.	-
Created on	Information on the date of creation.	-
Modified on	Information on the date of modification.	-
Modified by	Information on the author (logged in user) of modification.	-
Protect	Protects the method against deletion or modification by other users than the author (logged in user) or administrator.	Yes No
SOP	Activates a text to be displayed before the start of the analysis.	Yes No
SOP text	Defines the SOP text. Displayed if check box SOP is activated.	-

- 1 Enter an ID in **Method ID** and confirm with **[OK]**.
Note
The method ID is unique. If an already existing ID is used, a warning will be displayed. Tap **[OK]** and change the ID.
⇒ The method is stored under this ID.
- 2 Enter a meaningful title to characterize the method and confirm with **[OK]**.
- 3 To select **SOP**, scroll down and activate it.
⇒ A new entry field **SOP text** appears.
- 4 If desired, enter a text.

5 Confirm with **[OK]**.

6 Tap **[Save]**.

Now you have created an incremental method. This method already has predefined method functions. To change the method functions proceed as follows:

Configuration

This method function defines all hardware configurations and the parameters of all subsequent method functions.

– Tap **Configuration**.

⇒ **Configuration** is displayed.

Parameter	Description	Value
Measurement type	Information on the measurement type.	-
Sensor name	Opens the sensor list, according to the sensor settings.	-
Temperature capture	Select the temperature captures mode.	Internal External Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Temperature capture = External is selected.	-

1 Tap **Sensor name**.

⇒ **Select sensor** is displayed.

2 Select a sensor or **Empty**.

Note

If the method always runs with the same sensor select a sensor. The method runs exclusively with this sensor. If you select **Empty** you can connect any suitable sensor before you start a method.

3 Select **Temperature capture**.

If **Temperature capture External** is selected, select a **Temperature sensor**.

Note

If the method always runs with the same temperature sensor select a suitable sensor. The method runs exclusively with this temperature sensor. If you select **Empty** you can connect any suitable sensor before you start a method.

4 Confirm with **[OK]**.

5 Tap **[Save]**.

Sample (Incremental)

In this method function you can define the basic parameters to perform a concentration determination. You can select the type of incremental measurement, enter the sample parameters and the concentration of the standard, the number of standard additions and the added volume.

– Tap **Sample (Incremental)**.

⇒ **Sample (Incremental)** is displayed.

Parameter	Description	Value
Sample ID	Defines the sample ID.	-
Measurement type	Information on the measurement type.	-
Incremental type	Select the incremental type.	Standard addition Standard subtraction Sample addition Sample subtraction
Sample volume	Defines the volume of the sample (mol is set). Displayed if Incremental type = Standard addition or Standard subtraction is selected.	-

Standard volume	Defines the volume of the standard (unit mL is set). Displayed if Incremental type = Sample addition or Sample subtraction is selected.	-
Standard unit	Defines the unit of the ion standard to be used.	mmol/L mol/L mg/L ppm % pX
Standard concentration	Defines the concentration of the added sample.	-
Ion ratio	Defines the ion ratio of the precipitated salts. Displayed if Incremental type = Standard subtraction or Sample subtraction is selected.	-
Number of standard additions	Defines the number of additions. Displayed if Incremental type = Standard addition is selected.	1 2 3 4 5
Added volume per addition	Defines the value for the volume to be added (unit mL is set).	-
Used slope	Defines the kind of slope to be detected.	From calibration Theoretical Enter known slope
Enter known slope	Defines the value of the known slope to be used (mV/pX is set). Displayed if Used slope Enter known slope is selected.	-
Comment	Defines a short comment that will be displayed.	-

- 1 Enter **Sample ID**.
Confirm with [OK].
- 2 Select **Incremental type** and define the following parameters.
 - **Sample volume**.
 - **Standard unit**.
 - **Standard concentration**.
If **Standard subtraction** or **Sample subtraction** is selected, in addition define the **Ion ratio**.
- 3 Enter the **Added volume per addition**.
- 4 Select the **Used slope**.
If **Enter known slope** is selected, enter the value.
- 5 If desired:
 - Enter a **Comment** and confirm with [OK].
- 6 Confirm with [OK].
- 7 Tap [Save].

Measure (Incremental)

In this method function the endpoint type, endpoint criteria and other important parameters are determined. You can also define whether stirring takes place during the measurement or not.

- Tap **Measure (Incremental)**.
⇒ **Measure (Incremental)** is displayed.

Parameter	Description	Value
Sensor name	Information on the sensor name selected for the method, according to the measurement type Ion .	-
Unit	Defines the unit for ion.	mmol/L mg/L ppm % pX
Decimal places	Defines the number of digits for the displayed measurement result.	1 2 3
Endpoint type	Defines how the endpoint of the measurement is to be found.	Automatic Manual Timed

Endpoint criteria	Defines the parameters for the endpoint criteria. Strict: Value varies less than 0.03 mV for the last 8 seconds or 0.08 mV for the last 20 seconds. Standard: Value varies less than 0.08 mV for the last 8 seconds. Fast: Value varies less than 0.3 mV for the last 4 seconds. User-defined: The relevant settings are displayed. Displayed if Endpoint type = Automatic is selected.	Strict Standard Fast User-defined
Endpoint time	Period of time [s] until the endpoint of the measurement is reached. Displayed if Endpoint type = Timed .	-
dE	Defines the measured value interval. As soon as the change in the measured value over the time period dt is less than dE, the measured value will be acquired. This occurs within the defined time interval. Displayed in combination with Endpoint type Automatic and Endpoint criteria = User-defined .	-
dt	Defines the time component, in [sec] for dE/dt. $dt > t_{min}$ and $t_{max} > dt$. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined .	-
tmin	Earliest possible time for the measured value acquisition, in [sec]. Displayed in combination with Endpoint type = Automatic and Endpoint criteria = User-defined .	-
tmax	Latest possible time for the measured value acquisition, in [sec]. Note The measurement ends after the time defined, even if the stability criteria of dE and dt are not fulfilled. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined .	-
Stir	Activates the stirrer.	Yes No
Stirring speed	Defines the stirring speed. Displayed if Stir is activated.	-
Condition	A logical condition can be defined. The method function is executed or not on the result (true or false) of the calculation.	-
Formula	Defines the formula taking reference to results, raw data and tables. Displayed if Condition is activated.	-

- 1 Select a **Unit**
- 2 Select the **Decimal places**.
- 3 Select **Endpoint type**.
If **Timed** is selected:
- Enter the **Endpoint time**.
If **Automatic** is selected:
- Select **Endpoint criteria**
If **User-defined** is selected:
- Enter parameters **dE**, **dt**, **tmin** and **tmax**.
- 4 If desired, activate **Stir**.
- Enter a value for the **Stirring speed**.
- 5 If a logical condition for executing the method is to be formulated, activate **Condition**
- Enter a **Formula**, see Formula Syntax (page 109).
- 6 Confirm with [**OK**].
⇒ You return to the screen with the name of the method.

7 Confirm with [OK].

8 Tap [Save].

Report

The details for creating a report, printing or exporting data can be set here.

Note

The method function **Report** is the only method function that can be deleted.

– Tap **Report**.

⇒ **Report** is displayed.

Parameter	Description	Value
Print	Defines if data will be printed to the connected printer.	Yes No
Print format	Summary: Covers all important data concerning date, time, user and all parameters according to the settings of the measurement type. User-defined: Additional include values and calculations based on the settings. Displayed if Print is selected.	Summary User-defined
Values & Calculations	Values and calculations of this particular method can be exported or printed. Displayed if Print format = User-defined is selected.	Yes No
Data	Data of this particular method can be exported or printed. Displayed if Print format = User-defined is selected.	Yes No
Info	Information of this particular method can be exported or printed. Displayed if Print format = User-defined is selected.	Yes No

1 If desired, activate **Print** and select a format.

⇒ If you select **User-defined** you can define additional parameters:

- **Values & Calculations**
- **Data**
- **Info**

2 Confirm with [OK].

3 Tap [Save].

Insert Method Functions

In addition to the predefined method functions you can insert additional method functions to expand the range of parameters for the method.

The following table shows the predefined method functions and the method functions that can be added.

Predefined Method Functions	Additional Method Functions
Title	
	< Instruction
Configuration	
	< Instruction
Sample (Incremental)	
	< Instruction < Wait/Stir < Sensor check
Measure (Incremental)	

	<ul style="list-style-type: none"> < Calculation < Instruction < Wait/Stir < Report
Report	

- 1 Tap [**Insert**] and select the method function to be inserted.
- 2 Enter the parameters.
- 3 Confirm with [**OK**].
- 4 To insert additional method functions, repeat previous steps.
- 5 To finish and store entries, tap [**Save**].

Instruction

In this method function you can enter a text which will be displayed on the screen and you can set the conditions when the text will disappear. There are two possibilities either the text disappears after a predefined period of time or after confirmation.

Sensor check

This method function allows you to define special criteria for a sensor so that only sensors with a satisfying last calibration will be used. Calibration data can be checked and optionally the measurement can be interrupted if the sensor criteria are outside limits.

Calculation

In this method function you can enter a calculation based on the results of your measurement. You can also set result limits and determine to interrupt the measurement when exceeding the limits, see Formula Syntax (page 109).

Wait/Stir

In this method function you can set a period of time for a pause before the next method function starts. You can define to stir **during** the waiting period.

Note

To start an analysis after all settings have been done, see Start Directly after Creating Methods/Series (page 119).

6.2.2.5 Creating Sensor Test Methods

This method type is related to method type calibration and gives information about the condition of the sensor. The sensor calibration data is not transferred to the sensor setup, it serves only informative purposes.

Navigation: Home > Methods > New > [**Sensor test**]

Parameter	Description	Value
Measurement type	Information on the measurement type.	pH
Sensor name	Opens the sensor list, according to the sensor settings.	-
Temperature capture	Select the temperature captures mode.	Internal External Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Temperature capture = External is selected.	-

- 1 Select a type from **Measurement type**.
- 2 Select a sensor or choose **Empty**.

Note

Select a sensor if the method always runs with the same sensor. The method runs exclusively with this sensor. If you select **Empty**, you can connect any suitable sensor before you start a method.

3 Select **Temperature capture**.

If for **Temperature capture = External** is selected, select a sensor in **Temperature sensor**.

Note

Select a suitable sensor if the method always runs with the same temperature sensor. The method runs exclusively with this temperature sensor. If you select **Empty** you can connect any suitable sensor before you start a method.

4 Tap **[OK]**.

A (consecutive number): Sensor test as **Method type** is automatically displayed. The following method functions are displayed, whereby additional method functions can be inserted.

- **Title**
- **Configuration**
- **Sample (Sensor test)**
- **Measure (Sensor test)**
- **Sensor evaluation**
- **Report**

Note

It is not necessary to select a sensor in this display. If it is desired, you can assign sensors and temperature sensors in the method function **Configuration**, which will be displayed in the following screen.

Title

This method function contains the following information:

- **Method type**
- **Method ID**
- **Title**
- **Author**
- Dates of creation and modification

You can protect your method against deletion or modification.

- Tap **Title**.

⇒ **Title** is displayed.

Parameter	Description	Value
Method type	Information on the type of method.	Sensor test
Method ID	The method is uniquely identified in the system via the method ID. Once the method has been saved, the method ID cannot be changed. A change of the method ID results in the creation of a copy of the method. METTLER TOLEDO methods begin with "M" followed by numbers (M is reserved for METTLER TOLEDO methods).	-
Title	Defines the name of the method.	-
Author	Information on the author (logged in user) of this method.	-
Created on	Information on the date of creation.	-
Modified on	Information on the date of modification.	-
Modified by	Information on the author (logged in user) of modification.	-
Protect	Protects the method against deletion or modification by other users than the author (logged in user) or administrator.	Yes No
SOP	Activates a text to be displayed before the start of the analysis.	Yes No
SOP text	Defines the SOP text. Displayed if check box SOP is activated.	-

- 1 Enter an ID in **Method ID** and confirm with **[OK]**.

Note

The method ID is unique. If an already existing ID is used, a warning will be displayed. Tap **[OK]** and change the ID.

⇒ The method is stored under this ID.

- 2 Enter a meaningful title to characterize the method and confirm with **[OK]**.
- 3 To select **SOP**, scroll down and activate it.
 - ⇒ A new entry field **SOP text** appears.
- 4 If desired, enter a text.
- 5 Confirm with **[OK]**.
- 6 Tap **[Save]**.

Now you have created a method sensor test. This method already has predefined method functions. To change the method functions proceed as follows:

Configuration

This method function defines all hardware configurations and the parameters of all subsequent method functions.

- Tap **Configuration**.
 - ⇒ **Configuration** is displayed.

Parameter	Description	Value
Measurement type	Information on the measurement type.	pH
Sensor name	Opens the sensor list, according to the sensor settings.	-
Temperature capture	Select the temperature captures mode.	Internal External Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Temperature capture = External is selected.	-

- 1 Tap **Sensor name**.
 - ⇒ **Select sensor** is displayed.
- 2 Select a sensor or choose **Empty**.

Note
If the method always runs with the same sensor select a sensor. The method runs exclusively with this sensor. If you select **Empty** you can connect any suitable sensor before you start a method.
- 3 Select **Temperature capture**.

If **Temperature capture = External** is selected, select a sensor.

Note
If the method always runs with the same temperature sensor select a suitable sensor. The method runs exclusively with this temperature sensor. If you select **Empty** you can connect any suitable sensor before you start a method.
- 4 Confirm with **[OK]**.
- 5 Tap **[Save]**.

Sample (Sensor test)

This method function gives an overview of the conditions used for the sensor test such as buffer sets and standard groups and drift.

- Tap **Sample (Sensor test)**.
 - ⇒ **Sample (Sensor test)** is displayed.

Parameter	Description	Value
Measurement type	Information on the measurement type.	pH
Sensor name	Opens the sensor list, according to the sensor settings.	-
Buffer group	Opens the list of predefined and user-defined buffer groups.	-
Calibration	Activates using sensor test in context with calibration.	Yes No
Calibration mode	Algorithm on which the calibration is processed. Displayed if Measurement type = pH .	Linear Segmented
Number of buffers	Defines the number of buffers or standards for the calibration. Displayed if Measurement type = pH .	1 2 3 4 5
Automatic buffer recognition	Activates the automatic recognition of buffers. Displayed if Measurement type = pH .	Yes No
Buffer 1 - Buffer 5	Number of fields depends on the number of defined buffers. Up to 5 buffers are displayed with consecutive numbers. Each field opens the list of predefined and user defined buffer groups. Displayed if Measurement type = pH and Automatic buffer recognition is not activated.	-
Temperature	Defines the temperature for the measurement. Displayed if Temperature capture = Manual is selected.	-
Drift test	Activate to start a drift test.	Yes No
Test measurements	Activates test measurements.	Yes No
No. of test measurements	Defines the number of measurements. Displayed if Test measurements is activated.	1 2 3 4 5
Test buffer 1 - Test buffer 5	Number of fields depends on the number of defined buffers. Up to 5 test buffers are displayed with consecutive numbers. Each field opens the list of predefined and user-defined buffer groups. Displayed if Test measurements is activated.	-
Comment	Defines a short comment that will be displayed.	-

- 1 Tap the list field **Buffer group** or **Calibration standard group**.
⇒ **Buffer / Standard group** is displayed.
- 2 Select a buffer or standard from the list.
- 3 If it is desired to perform a calibration within the sensor test with the selected buffers, activate **Calibration**.
- 4 Select a mode in **Calibration mode**.
- 5 Select the number of buffers you want to use from the list **Number of buffers**.
- or -
Select **Automatic buffer recognition**.
- 6 If **Number of buffers** is selected, select specific values for **Buffer**.
- or -
Select **Standard**.
- 7 If desired, activate **Drift test**.
- 8 If desired, activate **Test measurements**.
- Select number in **Test measurements**.
- Select **Test buffer 1** to maximum **Test buffer 5**.
- 9 Confirm with [**OK**].
- 10 Tap [**Save**].

Measure (Sensor test)

In this method function endpoint type and endpoint criteria are determined. You can also define whether stirring takes place during the measurement or not.

– Tap **Measure (Sensor test)**

⇒ **Measure (Sensor test)** is displayed.

Parameter	Description	Value
Sensor name	Information on the sensor name selected for the method, according to the measurement type Ion .	-
Endpoint type	Defines how the endpoint of the measurement is to be found.	Automatic Manual Timed
Endpoint criteria	Defines the parameters for the endpoint criteria. Strict: Value varies less than 0.03 mV during the last 8 seconds or 0.1 mV for the last 20 seconds. Standard: Value varies less than 0.1 mV during the last 6 seconds. Fast: Value varies less than 0.6 mV during the last 4 seconds. User-defined: The relevant settings are displayed. Displayed if Endpoint type = Automatic is selected.	Strict Standard Fast User-defined
Endpoint time	Period of time [s] until the endpoint of the measurement is reached. Displayed if Endpoint type = Timed .	-
dE	Defines the measured value interval. As soon as the change in the measured value over the time period dt is less than dE, the measured value will be acquired. This occurs within the defined time interval. Displayed in combination with Endpoint type Automatic and Endpoint criteria = User-defined .	-
dt	Defines the time component, in [sec] for dE/dt. dt>tmin and tmax>dt. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined .	-
tmin	Earliest possible time for the measured value acquisition, in [sec]. Displayed in combination with Endpoint type = Automatic and Endpoint criteria = User-defined .	-
tmax	Latest possible time for the measured value acquisition, in [sec]. Note The measurement ends after the time defined, even if the stability criteria of dE and dt are not fulfilled. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined .	-
Stir	Activates the stirrer.	Yes No
Stirring speed	Defines the stirring speed. Displayed if Stir is activated.	-

- 1 Select **Endpoint type**.
For **Timed**, enter the time in **Endpoint time**.
- or -
For **Automatic**, select a criteria in **Endpoint criteria**.
- or -
For **User-defined**, enter parameters **dE**, **dt**, **tmin** and **tmax**.
- 2 If desired, activate **Stir**.
- 3 Enter a value for **Stirring speed**.
As soon as the method function ends, the stirring automatically stops.

- 4 Confirm with [**OK**].
- 5 To finish and store entries, tap [**Save**].

Sensor evaluation

In this method function you can set calibration limits and test measurement limits for sensors in the method type sensor test.

- Tap **Sensor evaluation**.
⇒ **Sensor evaluation** is displayed.

Parameter	Description	Value
Sensor name	Information on the sensor name selected for the method, according to the measurement type Ion .	-
Calibration limits	Activates the parameters to set the limits.	Yes No
Min. slope	Define values for Min. slope (% is set). Displayed if Calibration limits is activated.	-
Max. slope	Define values for Max. slope (% is set). Displayed if Calibration limits is activated.	-
Min. offset	Define values for Min. offset (mV is set). Displayed if Calibration limits is activated.	-
Max. offset	Define values for Max. offset (mV is set). Displayed if Calibration limits is activated.	-
Max. drift	Define values for Max. drift (mV is set). Displayed if Calibration limits is activated.	-
Test meas. limits	Activate to set a tolerance value and to determine interruption of the method if the sensor is outside limits.	Yes No
Tolerance	Define values for Tolerance (pH is set). Displayed if Test meas. limits is activated.	-

1 If you want to set limits for calibration, activate **Calibration limits**. Define these parameters:

- **Min. slope**
- **Max. slope**
- **Min. offset**
- **Max. offset**
- **Max. drift**

2 To set limits for test measurement, activate **Test meas. limits** and enter a value for **Tolerance**.

Report

The details for creating a report, printing or exporting data can be set here.

Note

The method function **Report** is the only method function that can be deleted.

- Tap **Report**.
⇒ **Report** is displayed.

Parameter	Description	Value
Print	Defines if data will be printed to the connected printer.	Yes No
Print format	Summary: Covers all important data concerning date, time, user and all parameters according to the settings of the measurement type. User-defined: Additional include values and calculations based on the settings. Displayed if Print is selected.	Summary User-defined

Values & Calculations	Values and calculations of this particular method can be exported or printed. Displayed if Print format = User-defined is selected.	Yes No
Data	Data of this particular method can be exported or printed. Displayed if Print format = User-defined is selected.	Yes No
Info	Information of this particular method can be exported or printed. Displayed if Print format = User-defined is selected.	Yes No

- 1 If desired, activate **Print** and select a format.
 - ⇒ If you select **User-defined** you can define additional parameters:
 - **Values & Calculations**
 - **Data**
 - **Info**
- 2 Confirm with [**OK**].
- 3 Tap [**Save**].

Insert Method Functions

In addition to the predefined method functions you can insert additional method functions to expand the range of parameters for the method.

The following table shows the predefined method functions and the method functions that can be added.

Predefined Method Functions	Additional Method Functions
Title	< Instruction
Configuration	< Instruction
Sample (Sensor test)	< Instruction < Wait/Stir
Measure (Sensor test)	< Instruction < Wait/Stir < Report
Sensor evaluation	< Instruction < Wait/Stir < Report
Report	

- 1 Tap [**Insert**] and select the method function to be inserted.
- 2 Enter the parameters.
- 3 Confirm with [**OK**].
- 4 To insert additional method functions, repeat previous steps.
- 5 To finish and store entries, tap [**Save**].

Instruction

In this method function you can enter a text which will be displayed on the screen and you can set the conditions when the text will disappear. There are two possibilities either the text disappears after a predefined period of time or after confirmation.

Wait/Stir

In this method function you can set a period of time for a pause before the next method function starts. You can define to stir **during** the waiting period.

Note

To start an analysis after all settings have been done, see Start Directly after Creating Methods/Series (page 119).

6.2.2.6 Creating BCV Methods

Template BCV (BOD Check Values) is only for the measurement type Dissolved Oxygen. Only one module can be used. The method functions Measure (Blank), Measure (Seeded blank) and Measure (Standard) are repeated for the defined number of bottles in method types Blank (BOD), Seeded blank (BOD) and Standard (BOD); all other method functions are not repeated. A BCV method determines the BOD of different solutions needed for measurement correction or validation of the application. Every BCV method supports a BOD method; without relation to a BOD method it is useless. At BOD method start the relation between BCV and BOD method is built.

The same BCV method is used for the DO measurement before and after the incubation time of the check solutions. The measurement at start is called Base, the measurement afterwards (e.g. 5 days for BOD₅) is called Follow. With one base measurement several follow measurements can be done (e.g. after 5 days and after 10 days). It is needed to run the BCV method always before running the related BOD method.

Navigation: Home > Methods > New > [BCV]

Parameter	Description	Value
Measurement type	Define the measurement type.	Dissolved Oxygen
Sensor name	Opens the sensor list, according to the sensor settings.	-
Check value ID	Defines the ID for all check values.	-
Blank	Activates the measurement of a blank value, which is the BOD in the dilution water including inorganic nutrients.	Yes No
Seeded blank	Activates the measurement of a seeded blank value, which is the BOD of a solution including all ingredients except the sample.	Yes No
Standard	Activates the measurement of a standard value, which is the BOD of a solution with a well-defined BOD value (typically 2% glucose glutamine acid).	Yes No
Salinity correction	Activates salinity corrections of several solutions.	Yes No
Salinity of diluted water	Defines the salinity of the water used to dilute the samples. Displayed if check box Salinity correction is activated and any of the check boxes Blank , Seeded blank or Standard is activated.	0.0 - 70.0 ppt
Enter salinity of seed solution	Defines the salinity of the seed solution which is added to either the dilution water or the BOD bottle. Displayed if check box Salinity correction is activated and check box Seeded blank or Standard is activated.	0.0 – 70.0 ppt
Enter salinity of standard solution	Defines the salinity of the standard stock solution used to prepare the standards. Displayed if check boxes Salinity correction and Standard are activated.	0.0 - 70.0 ppt
Seed added	Defines to whether the seed is added to the bottle directly or to the dilution water first. If this selection is changed, all set volumes for sample, seed, and dilution water are reset to default values.	To bottle To dilution water

Seed dilution factor	Ratio of seed solution to dilution water. Displayed if Seed added = To dilution water is selected.	1.0 - 999.9
Blank correction	Activates the blank correction for BOD measurements.	Yes No
Bottle volume	Defines the volume of used BOD bottle. If this value is changed, all set volumes for sample, seed, and dilution water are adapted proportionally.	10.0 - 1000.0 mL
Temperature capture	Select the temperature captures mode.	Internal External Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Temperature capture = External is selected.	-
Barometric pressure capture	Select the barometric pressure capture mode.	Automatic Manual

- 1 Select a sensor or choose [**Empty**].

Note

Select a sensor if the method always runs with the same sensor. The method runs exclusively with this sensor. If you select [**Empty**], you can connect any suitable sensor before you start a method.

- 2 Enter a value in **Check value ID**.

Note

Difference prefixes are automatically added to this ID for different types of check values (blank, seeded blank, standard).

- 3 Enable or disable **Blank** BOD determination.

- 4 Enable or disable **Seeded blank** BOD determination.

- 5 Enable or disable **Standard** BOD determination.

- 6 Enable or disable **Salinity correction**.

If Salinity correction is enabled, the reading of dissolved oxygen in the samples is corrected in regards of the entered **Salinity of diluted water**, **Enter salinity of seed solution** and **Enter salinity of standard solution**.

- 7 With **Seed added** you define to where the solid seed or concentrated seed solution is added: to the BOD bottle directly or to the dilution water first, which is afterwards used to dilute the sample.

If **Seed added = To dilution water** is selected, define the **Seed dilution factor** as the ratio between seed solution and dilution water (e.g. 100 mL seed plus 900 mL dilution water gives a Seed dilution factor of 9).

- 8 Enable or disable the **Blank correction** for the BOD measurement.

When activated, the BOD of dilution water including the inorganic nutrients used to dilute the samples is determined to check the presence of oxidizable compounds in the dilution water. The result will be subtracted from the BOD of the sample. It often must be below 0.1 mg/L. In most countries (i.e USA) this value is only used for approval of the analysis. In a few countries (i.e. UK) it is used for correction of the samples like it is done with the Blank value.

- 9 Enter the **Bottle volume**.

- 10 Select **Temperature capture**.

If **Temperature capture = External** is selected, select a sensor in **Temperature sensor**.

Note

Select a suitable sensor if the method always runs with the same temperature sensor. The method runs exclusively with this temperature sensor. If you select **Empty** you can connect any suitable sensor before you start a method.

- 11 Select **Barometric pressure capture**.

If **Barometric pressure capture = Automatic** is selected, the value measured by the DO/BOD expansion unit is used. If **Barometric pressure capture = Manual** is selected, the value is entered in the Sample (BOD) method function.

- 12 Tap [**OK**].

A (consecutive number): BOD Check Values as **Method ID** is automatically displayed. The following method functions are displayed, whereby additional method functions can be inserted.

- **Title**
- **Configuration**
- **Blank (BOD)** only if Blank is activated in method function Configuration
- **Measure (Blank)** only if Blank is activated in method function Configuration
- **Seeded blank (BOD)** only if Seeded blank is activated in method function Configuration
- **Measure (Seeded blank)** only if Seeded blank is activated in method function Configuration
- **Standard (BOD)** only if Standard is activated in method function Configuration
- **Measure (Standard)** only if Standard is activated in method function Configuration
- **Report**

Notes

- It is not necessary to select a sensor in this display.
- If it is desired, you can assign sensors and temperature sensors in the method function **Configuration**, which will be displayed in the following screen.
- When activating or de-activating **Blank** in the method function **Configuration**, the two method functions **Blank (BOD)** and **Measure (Blank)** automatically appear or disappear.
- When activating or de-activating **Seeded blank** in the method function **Configuration**, the two method functions **Seeded blank (BOD)** and **Measure (Seeded blank)** automatically appear or disappear.
- When activating or de-activating **Standard** in the method function **Configuration**, the two method functions **Standard (BOD)** and **Measure (Standard)** automatically appear or disappear.

Title

This method function contains the following information:

- **Method type**
- **Method ID**
- **Title**
- **Author**
- Dates of creation and modification

– Tap **Title**.

⇒ **Title** is displayed.

Parameter	Description	Value
Method type	Information on type of measurement.	BOD Check Values
Method ID	The method is uniquely identified in the system via the method ID. Once the method has been saved, the method ID cannot be changed. A change of the method ID results in the creation of a copy of the method. METTLER TOLEDO methods begin with "M" followed by numbers (M is reserved for METTLER TOLEDO methods).	-
Title	Defines the name of the method.	-
Author	Information on the author (logged in user) of this method.	-
Created on	Information on the date of creation.	-
Modified on	Information on the date of modification.	-
Modified by	Information on the author (logged in user) of modification.	-
Protect	Protects the method against deletion or modification by other users than the author (logged in user) or administrator.	Yes No

SOP	Activates a text to be displayed before the start of the analysis.	Yes No
SOP text	Defines the SOP text. Displayed if check box SOP is activated.	-

- 1 Enter an ID in **Method ID** and confirm with **[OK]**.

Note

The method ID is unique. If an already existing ID is used, a warning will be displayed. Tap **[OK]** and change the ID.

⇒ The method is stored under this ID.

- 2 Enter a meaningful title to characterize the method and confirm with **[OK]**.

- 3 To select **SOP**, scroll down and activate it.

⇒ A new entry field **SOP text** appears.

- 4 If desired, enter a text.

- 5 Confirm with **[OK]**.

- 6 Tap **[Save]**.

Now you have created a new method. This method already has predefined method functions. To change the method functions proceed as follows.

Configuration

This method function defines all hardware configurations and the parameters of all subsequent method functions.

- Tap **Configuration**

⇒ **Configuration** is displayed.

Parameter	Description	Value
Measurement type	Information on the measurement type.	Dissolved Oxygen
Sensor name	Opens the sensor list, according to the sensor settings.	-
Check value ID	Defines the ID for all check values.	-
Blank	Activates the measurement of a blank value, which is the BOD in the dilution water including inorganic nutrients.	Yes No
Seeded blank	Activates the measurement of a seeded blank value, which is the BOD of a solution including all ingredients except the sample.	Yes No
Standard	Activates the measurement of a standard value, which is the BOD of a solution with a well-defined BOD value (typically 2% glucose glutamine acid).	Yes No
Salinity correction	Activates salinity corrections of several solutions.	Yes No
Salinity of diluted water	Defines the salinity of the water used to dilute the samples. Displayed if check box Salinity correction is activated and any of the check boxes Blank , Seeded blank or Standard is activated.	0.0 - 70.0 ppt
Enter salinity of seed solution	Defines the salinity of the seed solution which is added to either the dilution water or the BOD bottle. Displayed if check box Salinity correction is activated and check box Seeded blank or Standard is activated.	0.0 – 70.0 ppt
Enter salinity of standard solution	Defines the salinity of the standard stock solution used to prepare the standards. Displayed if check boxes Salinity correction and Standard are activated.	0.0 - 70.0 ppt

Seed added	Defines to whether the seed is added to the bottle directly or to the dilution water first. If this selection is changed, all set volumes for sample, seed, and dilution water are reset to default values.	To bottle To dilution water
Seed dilution factor	Ratio of seed solution to dilution water. Displayed if Seed added = To dilution water is selected.	1.0 - 999.9
Blank correction	Activates the blank correction for BOD measurements.	Yes No
Bottle volume	Defines the volume of used BOD bottle. If this value is changed, all set volumes for sample, seed, and dilution water are adapted proportionally.	10.0 - 1000.0 mL
Temperature capture	Select the temperature captures mode.	Internal External Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Temperature capture = External is selected.	-
Barometric pressure capture	Select the barometric pressure capture mode.	Automatic Manual

- 1 Select a sensor or choose [**Empty**].

Note

Select a sensor if the method always runs with the same sensor. The method runs exclusively with this sensor. If you select [**Empty**], you can connect any suitable sensor before you start a method.

- 2 Enter a value in **Check value ID**.

Note

Difference prefixes are automatically added to this ID for different types of check values (blank, seeded blank, standard).

- 3 Enable or disable **Blank** BOD determination.

- 4 Enable or disable **Seeded blank** BOD determination.

- 5 Enable or disable **Standard** BOD determination.

- 6 Enable or disable **Salinity correction**.

If Salinity correction is enabled, the reading of dissolved oxygen in the samples is corrected in regards of the entered **Salinity of diluted water**, **Enter salinity of seed solution** and **Enter salinity of standard solution**.

- 7 With **Seed added** you define to where the solid seed or concentrated seed solution is added: to the BOD bottle directly or to the dilution water first, which is afterwards used to dilute the sample.

If **Seed added = To dilution water** is selected, define the **Seed dilution factor** as the ratio between seed solution and dilution water (e.g. 100 mL seed plus 900 mL dilution water gives a Seed dilution factor of 9).

- 8 Enable or disable the **Blank correction** for the BOD measurement.

When activated, the BOD of dilution water including the inorganic nutrients used to dilute the samples is determined to check the presence of oxidizable compounds in the dilution water. The result will be subtracted from the BOD of the sample. It often must be below 0.1 mg/L. In most countries (i.e. USA) this value is only used for approval of the analysis. In a few countries (i.e. UK) it is used for correction of the samples like it is done with the Blank value.

- 9 Enter the **Bottle volume**.

- 10 Select **Temperature capture**.

If **Temperature capture = External** is selected, select a sensor in **Temperature sensor**.

Note

Select a suitable sensor if the method always runs with the same temperature sensor. The method runs exclusively with this temperature sensor. If you select **Empty** you can connect any suitable sensor before you start a method.

11 Select **Barometric pressure capture**.

If **Barometric pressure capture = Automatic** is selected, the value measured by the DO/BOD expansion unit is used. If **Barometric pressure capture = Manual** is selected, the value is entered in the Sample (BOD) method function.

12 Tap [OK].

Blank (BOD)

In this method function you can define the basic parameters to perform a BOD determination of a blank solution (dilution water including inorganic nutrients). You can define a comment and the number of bottles. In the bottle list you can enter the bottle ID and a comment.

– Tap **Blank (BOD)**.

⇒ **Blank (BOD)** is displayed.

Parameter	Description	Value
Blank ID	Information of the Blank ID entered in method function Configuration.	-
Comment	Defines a short comment that will be displayed.	-
Sample type	Information on the sample type.	Blank
Same bottles used for base and follow	Activates that DO is measured before (base) and after (follow) incubation time in the same bottles.	Yes No
Number of bottles (base)	Defines the number of bottles of this sample ID for base measurement (before incubation).	1 – 10
Number of bottles (follow)	Defines the number of bottles of this sample ID for follow measurement (after incubation). Displayed if check box Same bottles used for base and follow is de-activated.	1 – 10
Temperature	Defines the sample's temperature. Displayed if Temperature capture = Manual is selected in method function Configuration.	0 - 60 °C
Barometric pressure	Defines the barometric (atmospheric) pressure. Displayed if Barometric pressure capture = Manual is selected in method function Configuration	500.0 – 1100.0 mbar

1 Tap **Bottles**.

⇒ The list of **Bottle (base) settings** is displayed. It contains the following information:

- Bottle ID**
- Sample volume**
- Seed volume**
- Dilution volume**

2 Tap **Bottle (follow) settings** to display the corresponding list of bottles for the measurement after incubation time. Tap **Bottle (base) settings** to see again the list of bottles for the measurement before incubation time.

3 Tap any bottle list item.

⇒ **Bottle settings** is displayed.

Parameter	Description	Value
Blank ID	Information of the Blank ID entered in method function Configuration.	-
Bottle ID	Defines the bottle ID.	-
Comment	Defines a short comment that will be displayed.	-
Seed volume	Defines the seed volume in the bottle. The seed volume equals the bottle volume if Seed added = To dilution water in Configuration method function.	-

Dilution volume	Information on the dilution volume in the bottle. Value is calculated from other volumes above.	-
------------------------	---	---

- 1 If desired:
Enter a **Comment** and confirm with [**OK**].
- 2 Define if **Same bottles used for base and follow**.
If de-activated, a different number of bottles with different dilutions can be defined for DO measurement before and after incubation time.
- 3 Define the **Number of bottles**.
If same bottles are used for base and follow, then only one number of bottles must be defined. In the other case the number of bottles for base and follow measurement must be defined.
- 4 If Temperature capture and/or Barometric pressure capture was set to Manual, define the **Temperature** and/or the **Barometric pressure**.
Note
The values entered for **Temperature** and/or **Barometric pressure** can again be changed when starting the method.
- 5 Tab [**Bottles**].
- 6 Tab each line in the base bottles list to edit the bottle settings:
⇒ Enter **Bottle ID** and confirm with [**OK**].
⇒ If desired, enter a **Comment** and confirm with [**OK**].
⇒ Tab [**Back**].
- 7 Tab [**Bottle (follow) settings**].
- 8 Tab each line in the follow bottles list to edit the bottle setting:
⇒ Enter **Bottle ID** and confirm with [**OK**].
⇒ If desired, enter a **Comment** and confirm with [**OK**].
⇒ Tab [**Back**].
- 9 Confirm with [**OK**].
You return to the screen with the sample settings.
- 10 Tab [**Save**].

Measure (Blank)

In this method function you can define the measuring units and resolution as well as endpoint type and criteria for BOD determination in blank. You can also define whether stirring takes place during the measurement or not.

- Tap **Measure (Blank)**.
⇒ **Measure (Blank)** is displayed.

Parameter	Description	Value
Sensor name	Information on the sensor selected for this method.	-
DO unit	Defines the unit for single DO measurement.	mg/L ppm
BOD unit	Defines the unit for BOD result.	mg/L
DO resolution	Defines the number of digits for the displayed DO result.	1 2 3
BOD resolution	Defines the number of digits for the calculated BOD value.	1 2 3
Endpoint type	Defines how the endpoint of the measurement is to be found.	Automatic Manual Timed

Endpoint criteria	The endpoint of the measurement is reached either after a predefined or user-defined period of time. Strict: Value varies less than 0.03 mg/L during the last 20 seconds. Standard: Value varies less than 0.08 mg/L during the last 20 seconds. Fast: Value varies less than 0.08 mg/L during the last 10 seconds.	Strict Standard Fast User-defined
Endpoint time	Period of time [s] until the endpoint of the measurement is reached. Displayed if Endpoint type = Timed .	-
dE	Defines the measured value interval. As soon as the change in the measured value over the time period dt is less than dE, the measured value will be acquired. This occurs within the defined time interval. Displayed in combination with Endpoint type Automatic and Endpoint criteria = User-defined .	-
dt	Defines the time component, in [sec] for dE/dt. dt>tmin and tmax>dt. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined .	-
tmin	Earliest possible time for the measured value acquisition, in [sec]. Displayed in combination with Endpoint type = Automatic and Endpoint criteria = User-defined .	-
tmax	Latest possible time for the measured value acquisition, in [sec]. Note The measurement ends after the time defined, even if the stability criteria of dE and dt are not fulfilled. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined .	-
Stir	Activates the stirrer.	Yes No
Stirring speed	Defines the stirring speed. Displayed if Stir is activated.	-

- 1 Select a **DO unit**.
- 2 Select the **DO resolution**.
- 3 Select the **BOD resolution**.
- 4 Select **Endpoint type**.
 - ⇒ For **Timed**, enter the time in **Endpoint type**.
 - or
 - For **Automatic**, select a criteria in **Endpoint criteria**. For **Endpoint criteria = User-defined**, enter parameters **dE**, **dt**, **tmin** and **tmax**.
- 5 If desired, activate **Stir**.
 - ⇒ Select a value for the **Stirring speed**.
- 6 Confirm with [**OK**].
- 7 Tap [**Save**].

Seeded blank (BOD)

In this method function you can define the basic parameters to perform a BOD determination of a seeded blank solution (dilution water including all ingredients except the sample). You can define a comment and the number of bottles. In the bottle list you can enter the bottle ID and a comment.

- Tap **Seeded blank**.

⇒ **Seeded blank (BOD)** is displayed.

Parameter	Description	Value
Blank ID	Information of the Blank ID entered in method function Configuration.	-
Comment	Defines a short comment that will be displayed.	-
Sample type	Information on the sample type.	Blank
Same bottles used for base and follow	Activates that DO is measured before (base) and after (follow) incubation time in the same bottles.	Yes No
Number of bottles (base)	Defines the number of bottles of this sample ID for base measurement (before incubation).	1 – 10
Number of bottles (follow)	Defines the number of bottles of this sample ID for follow measurement (after incubation). Displayed if check box Same bottles used for base and follow is de-activated.	1 – 10
Temperature	Defines the temperature for the measurement. Displayed if Temperature capture = Manual is selected.	-
Barometric pressure	Defines the barometric (atmospheric) pressure. Displayed if Barometric pressure capture = Manual is selected in method function Configuration	500.0 – 1100.0 mbar

- 1 Tap **Bottles**.

⇒ The list of **Bottle (base) settings** is displayed. It contains the following information:

Bottle ID
Sample volume
Seed volume
Dilution volume

- 2 Tap **Bottle (follow) settings** to display the corresponding list of bottles for the measurement after incubation time. Tap **Bottles (base)** to see again the list of bottles for the measurement before incubation time.

- 3 Tap any bottle list item.

⇒ **Bottle settings** is displayed.

Parameter	Description	Value
Seeded blank ID	Information on given seeded blank ID.	-
Bottle ID	Defines the bottle ID.	-
Comment	Defines a short comment that will be displayed.	-
Seed volume	Defines the seed volume in the bottle. The seed volume equals the bottle volume if Seed added = To dilution water in Configuration method function.	-
Dilution volume	Information on the dilution volume in the bottle. Value is calculated from other volumes above.	-

- 1 If desired, enter a **Comment** and confirm with [**OK**].

- 2 Define if **Same bottles used for base and follow** is activated.
If de-activated, a different number of bottles with different dilutions can be defined for DO measurement before and after incubation time.

- 3 Define the **Number of bottles**.

If same bottles are used for base and follow, then only one number of bottles must be defined. In the other case the number of bottles for base and follow measurement must be defined.

- 4 If Temperature capture and/or Barometric pressure capture was set to Manual, define the **Temperature** and/or the **Barometric pressure**.
Note
The values entered for **Temperature** and/or **Barometric pressure** can again be changed when starting the method.
- 5 Tab [**Bottles**].
- 6 Tab each line in the base bottles list to edit the bottle settings.
⇒ Enter **Bottle ID** and confirm with [**OK**].
⇒ If desired, enter a **Comment** and confirm with [**OK**].
- 7 Define the **Seed volume** and confirm with [**OK**].
- 8 Tab [**Back**].
- 9 Tab [**Bottle (follow) settings**].
- 10 Tab each line in the follow bottles list to edit the bottle setting.
⇒ Enter **Bottle ID** and confirm with [**OK**].
⇒ If desired, enter a **Comment** and confirm with [**OK**].
⇒ Define the **Seed volume** and confirm with [**OK**].
Note
This value can only be changed if checkbox **Same bottles used for base and follow** is de-activated.
⇒ Tab [**Back**].
- 11 Confirm with [**OK**].
You return to the screen with the sample settings.
- 12 Confirm with [**OK**].
- 13 Tab [**Save**].

Measure (Seeded blank)

In this method function you can define the measuring units and resolution as well as endpoint type and criteria for BOD determination in seeded blank. You can also define whether stirring takes place during the measurement or not.

- Tap **Measure (Seeded blank)**.
⇒ **Measure (Seeded blank)** is displayed.

Parameter	Description	Value
DO unit	Defines the unit for single DO measurement.	mg/L ppm
BOD unit	Defines the unit for BOD result.	mg/L
DO resolution	Defines the number of digits for the displayed DO result.	1 2 3
BOD resolution	Defines the number of digits for the calculated BOD value.	1 2 3
Endpoint type	Defines how the endpoint of the measurement is to be found.	Automatic Manual Timed
Endpoint criteria	The endpoint of the measurement is reached either after a predefined or user-defined period of time. Strict: Value varies less than 0.03 mg/L during the last 20 seconds. Standard: Value varies less than 0.08 mg/L during the last 20 seconds. Fast: Value varies less than 0.08 mg/L during the last 10 seconds.	Strict Standard Fast User-defined
Endpoint time	Period of time [s] until the endpoint of the measurement is reached. Displayed if Endpoint type = Timed .	-

dE	Defines the measured value interval. As soon as the change in the measured value over the time period dt is less than dE, the measured value will be acquired. This occurs within the defined time interval. Displayed in combination with Endpoint type Automatic and Endpoint criteria = User-defined .	-
dt	Defines the time component, in [sec] for dE/dt. dt>tmin and tmax>dt. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined .	-
tmin	Earliest possible time for the measured value acquisition, in [sec]. Displayed in combination with Endpoint type = Automatic and Endpoint criteria = User-defined .	-
tmax	Latest possible time for the measured value acquisition, in [sec]. Note The measurement ends after the time defined, even if the stability criteria of dE and dt are not fulfilled. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined .	-
Stir	Activates the stirrer.	Yes No
Stirring speed	Defines the stirring speed. Displayed if Stir is activated.	-

- 1 Select a **DO unit**.
- 2 Select the **DO resolution**.
- 3 Select the **BOD resolution**.
- 4 Select **Endpoint type**.
For **Timed**, enter the time in **Endpoint time**.
or
For **Automatic**, select a criteria in **Endpoint criteria**. For **Endpoint criteria = User-defined**, enter parameters **dE**, **dt**, **tmin** and **tmax**.
- 5 If desired, activate **Stir**.
Select a value for the **Select stirring speed**.
- 6 Confirm with [**OK**].
- 7 Tap [**Save**].

Standard (BOD)

In this method function you can define the basic parameters to perform a BOD determination of a seeded blank solution (dilution water including all ingredients except the sample). You can define a comment and the number of bottles. In the bottle list you can enter the bottle ID and a comment.

- Tap **Standard (BOD)**.
⇒ **Standard (BOD)** is displayed.

Parameter	Description	Value
Blank ID	Information of the Blank ID entered in method function Configuration.	-
Comment	Defines a short comment that will be displayed.	-
Sample type	Information on the sample type.	Blank
Same bottles used for base and follow	Activates that DO is measured before (base) and after (follow) incubation time in the same bottles.	Yes No
Number of bottles (base)	Defines the number of bottles of this sample ID for base measurement (before incubation).	1 – 10

Number of bottles (follow)	Defines the number of bottles of this sample ID for follow measurement (after incubation). Displayed if check box Same bottles used for base and follow is de-activated.	1 – 10
Temperature	Defines the temperature for the measurement. Displayed if Temperature capture = Manual is selected.	-
Barometric pressure	Defines the barometric (atmospheric) pressure. Displayed if Barometric pressure capture = Manual is selected in method function Configuration	500.0 – 1100.0 mbar

1 Tap **Bottles**.

⇒ The list of **Bottle (base) settings** is displayed. It contains the following information:

- Bottle ID**
- Sample volume**
- Seed volume**
- Dilution volume**

2 Tap **Bottle (follow) settings** to display the corresponding list of bottles for the measurement after incubation time. Tab **Bottle (base) settings** to see again the list of bottles for the measurement before incubation time.

3 Tap any bottle list item.

⇒ **Bottle settings** is displayed.

Parameter	Description	Value
Standard ID	Information on given standard ID.	-
Bottle ID	Defines the bottle ID.	-
Comment	Defines a short comment that will be displayed.	-
Standard volume	Defines the standard volume in the bottle.	-
Seed volume	Defines the seed volume in the bottle. The seed volume equals the bottle volume if Seed added = To dilution water in Configuration method function.	-
Dilution volume	Information on the dilution volume in the bottle. Value is calculated from other volumes above.	-

1 If desired, enter a **Comment** and confirm with **[OK]**.

2 Define if **Same bottles used for base and follow** is activated.

If de-activated, a different number of bottles with different dilutions can be defined for DO measurement before and after incubation time.

3 Define the **Number of bottles**.

If same bottles are used for base and follow, then only one number of bottles must be defined. In the other case the number of bottles for base and follow measurement must be defined.

4 If Temperature capture and/or Barometric pressure capture was set to Manual, define the **Temperature** and/or the **Barometric pressure**.

Note

The values entered for **Temperature** and/or **Barometric pressure** can again be changed when starting the method.

5 Tab **[Bottles]**.

6 Tab each line in the base bottles list to edit the bottle settings:

⇒ Enter **Bottle ID** and confirm with **[OK]**.

⇒ If desired, enter a **Comment** and confirm with **[OK]**.

⇒ Define the **Standard volume** and confirm with **[OK]**.

⇒ Define the **Seed volume** and confirm with **[OK]**.

⇒ Tab **[Back]**.

- 7 Tab [**Bottle (follow) settings**].
- 8 Tab each line in the follow bottles list to edit the bottle setting:
 - ⇒ Enter **Bottle ID**.
 - ⇒ Confirm with [**OK**].
 - ⇒ f desired, enter a **Comment** and confirm with [**OK**].
 - ⇒ Define the **Standard volume** and confirm with [**OK**].
 - ⇒ Define the **Seed volume** and confirm with [**OK**].

Note

The values for **Standard volume** and **Seed volume** can only be changed if checkbox **Same bottles used for base and follow** is de-activated.

- ⇒ Tab [**Back**].
- 9 Confirm with [**OK**].
 - ⇒ You return to the screen with the sample settings.
 - 10 Confirm with [**OK**].
 - 11 Tab [**Save**].

Measure (Standard)

In this method function you can define the measuring units and resolution as well as endpoint type and criteria for BOD determination in the standard solution (solution with well-defined BOD value). You can also define whether stirring takes place during the measurement or not.

- Tap **Measure (Standard)**.
 - ⇒ **Measure (Standard)** is displayed.

Parameter	Description	Value
DO unit	Defines the unit for single DO measurement.	mg/L ppm
BOD unit	Defines the unit for BOD result.	mg/L
DO resolution	Defines the number of digits for the displayed DO result.	1 2 3
BOD resolution	Defines the number of digits for the calculated BOD value.	1 2 3
Endpoint type	Defines how the endpoint of the measurement is to be found.	Automatic Manual Timed
Endpoint criteria	The endpoint of the measurement is reached either after a pre-defined or user-defined period of time. Strict: Value varies less than 0.03 mg/L during the last 20 seconds. Standard: Value varies less than 0.08 mg/L during the last 20 seconds. Fast: Value varies less than 0.08 mg/L during the last 10 seconds.	Strict Standard Fast User-defined
Endpoint time	Period of time [s] until the endpoint of the measurement is reached. Displayed if Endpoint type = Timed .	-
dE	Defines the measured value interval. As soon as the change in the measured value over the time period dt is less than dE, the measured value will be acquired. This occurs within the defined time interval. Displayed in combination with Endpoint type Automatic and Endpoint criteria = User-defined .	-
dt	Defines the time component, in [sec] for dE/dt. dt>tmin and tmax>dt. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined .	-

tmin	Earliest possible time for the measured value acquisition, in [sec]. Displayed in combination with Endpoint type = Automatic and Endpoint criteria = User-defined .	-
tmax	Latest possible time for the measured value acquisition, in [sec]. Note The measurement ends after the time defined, even if the stability criteria of dE and dt are not fulfilled. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined .	-
Stir	Activates the stirrer.	Yes No
Stirring speed	Defines the stirring speed. Displayed if Stir is activated.	-

- 1 Select a **DO unit**.
- 2 Select the **DO resolution**.
- 3 Select the **BOD resolution**.
- 4 Select **Endpoint type**.
For **Timed**, enter the time in **Endpoint time**.
or
For **Automatic**, select a criteria in **Endpoint criteria**. For **Endpoint criteria = User-defined**, enter parameters **dE**, **dt**, **tmin** and **tmax**.
- 5 If desired, activate **Stir**.
Select a value for the **Select stirring speed**.
- 6 Confirm with [**OK**].
- 7 Tap [**Save**].

Report

The details for creating a report, printing or exporting data can be set here.

Note

The method function **Report** is the only method function that can be deleted.

- Tap **Report**.
⇒ **Report** is displayed.

Insert Method Functions

In addition to the predefined method functions you can insert additional method functions to expand the range of parameters for the method. The following table shows the predefined method functions and the method functions that can be added.

Predefined Method Functions	Additional Method Functions
Title	
	Instruction
Configuration	
	Instruction
Blank (BOD)	
	Instruction
	Wait/Stir
	Sensor check
Measure (Blank)	

Predefined Method Functions	Additional Method Functions
	Instruction Analysis (Blank) Calculation Wait/Stir
Seeded blank (BOD)	
	Instruction Wait/Stir Sensor check
Measure (Seeded blank)	
	Instruction Analysis (Seeded blank) Calculation Wait/Stir
Standard (BOD)	
	Instruction Wait/Stir Sensor check
Measure (Standard)	
	Instruction Analysis (BOD) Calculation Wait/Stir
Report	

Instruction

In this method function you can enter a text which will be displayed on the screen and you can set the conditions when the text will disappear. There are two possibilities either the text disappears after a predefined period of time or after confirmation.

Wait/Stir

In this method function you can set a period of time for a pause before the next method function starts. You can define to stir **during** the waiting period.

Calculation

In this method function you can enter a calculation based on the results of your measurement. You can also set result limits and determine to interrupt the measurement when exceeding the limits, see Formula Syntax (page 109).

Analysis (Blank), Analysis (Seeded blank), Analysis (Standard)

In these method functions different limiting parameters can be selected and modified in order to create related warnings, entries in the report, suspension of measurement or even interruption of measurement.

Notes

- To start an analysis after all settings have been done, see Start Directly after Creating Methods/Series (page 119).

6.2.2.7 Creating BOD methods

Template BOD (Biological Oxygen Demand) is only for the measurement type **Dissolved Oxygen**. Only one module can be used. The method function Measure (BOD) repeats for the defined number of bottles; all other method functions are not repeated. The BOD value of the sample is calculated automatically.

The same method is used for the DO measurement before and after the incubation time. The measurement at start is called Base, the measurement afterwards (e.g. 5 days for BOD₅) is called Follow. With one base measurement several follow measurements can be done (e.g. after 5 days and after 10 days).

Navigation: Home > Methods > New > [BOD]

Parameter	Description	Value
Method type	Information on type of measurement.	BOD
Method ID	The method is uniquely identified in the system via the method ID. Once the method has been saved, the method ID cannot be changed. A change of the method ID results in the creation of a copy of the method. METTLER TOLEDO methods begin with "M" followed by numbers (M is reserved for METTLER TOLEDO methods).	-
Title	Defines the name of the method.	-
Author	Information on the author (logged in user) of this method.	-
Created on	Information on the date of creation.	-
Modified on	Information on the date of modification.	-
Modified by	Information on the author (logged in user) of modification.	-
Protect	Protects the method against deletion or modification by other users than the author (logged in user) or administrator.	Yes No
SOP	Activates a text to be displayed before the start of the analysis.	Yes No
SOP text	Defines the SOP text. Displayed if check box SOP is activated.	-

- 1 Select a sensor or choose **Empty**.

Note

Select a sensor if the method always runs with the same sensor. The method runs exclusively with this sensor. If you select **Empty**, you can connect any suitable sensor before you start a method.

- 2 Enable or disable **Salinity correction**.
If Salinity correction is enabled, the reading of dissolved oxygen in the samples is corrected in regards of the entered **Enter salinity of seed solution**, **Salinity of diluted water** and **Salinity of undiluted sample**.
- 3 With **Seed added** you define to where the solid seed or concentrated seed solution is added: to the BOD bottle directly or to the dilution water first, which is afterwards used to dilute the sample. If **Seed added = To dilution water** is selected, define the **Seed dilution factor** as the ratio between seed solution and dilution water (e.g. 100 mL seed plus 900 mL dilution water gives a Seed dilution factor of 9).
- 4 Enable or disable the **Blank correction** for the BOD measurement.
When activated, the BOD of dilution water including the inorganic nutrients used to dilute the samples is determined to check the presence of oxidizable compounds in the dilution water. The result will be subtracted from the BOD of the sample. It often must be below 0.1 mg/L. In most countries (i.e USA) this value is only used for approval of the analysis. In a few countries (i.e. UK) it is used for correction of the samples like it is done with the Blank value
- 5 Enter the **Bottle volume**.
- 6 Select **Temperature capture**.

If **Temperature capture = External** is selected, select a sensor in **Temperature sensor**.

Note

Select a suitable sensor if the method always runs with the same temperature sensor. The method runs exclusively with this temperature sensor. If you select **Empty** you can connect any suitable sensor before you start a method.

7 Select **Barometric pressure capture**.

If **Barometric pressure capture = Automatic** is selected, the value measured by the DO/BOD expansion unit is used. If **Barometric pressure capture = Manual** is selected, the value is entered in the Sample (BOD) method function.

8 Tap **[OK]**.

A (consecutive number): BOD as **Method type** is automatically displayed. The following method functions are displayed, whereby additional method functions can be inserted.

- Title
- Configuration
- Sample (BOD)
- Measure (BOD)
- Report

Notes

- It is not necessary to select a sensor in this display.
- If it is desired, you can assign sensors and temperature sensors in the method function **Configuration**, which will be displayed in the following screen.

Title

This method function contains the following information:

- **Method type**
- **Method ID**
- **Title**
- **Author**
- Dates of creation and modification

Configuration

This method function defines all hardware configurations and the parameters of all subsequent method functions.

– Tap **Configuration**.

⇒ **Configuration** is displayed.

Parameter	Description	Value
Measurement type	Define the measurement type.	Dissolved Oxygen
Sensor name	Opens the sensor list, according to the sensor settings.	-
Salinity correction	Activates salinity corrections of several solutions.	Yes No
Enter salinity of seed solution	Defines the salinity of the seed solution which is added to either the dilution water or the BOD bottle. Displayed if check box Salinity correction is activated and check box Seeded blank or Standard is activated.	0.0 – 70.0 ppt
Salinity of diluted water	Defines the salinity of the water used to dilute the samples. Displayed if check box Salinity correction is activated and any of the check boxes Blank , Seeded blank or Standard is activated.	0.0 - 70.0 ppt
Salinity of undiluted sample	Defines the salinity of the sample before addition of seed or dilution water. Displayed if check box Salinity correction is activated.	0.0 - 70.0 ppt

Seed added	Defines to whether the seed is added to the bottle directly or to the dilution water first. If this selection is changed, all set volumes for sample, seed, and dilution water are reset to default values.	To bottle To dilution water
Seed dilution factor	Ratio of seed solution to dilution water. Displayed if Seed added = To dilution water is selected.	1.0 - 999.9
Blank correction	Activates the blank correction for BOD measurements.	Yes No
Bottle volume	Defines the volume of used BOD bottle. If this value is changed, all set volumes for sample, seed, and dilution water are adapted proportionally.	10.0 - 1000.0 mL
Temperature capture	Select the temperature captures mode.	Internal External Manual
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed if Temperature capture = External is selected.	-
Barometric pressure capture	Select the barometric pressure capture mode.	Automatic Manual

- 1 Select a sensor or choose **Empty**.

Note

Select a sensor if the method always runs with the same sensor. The method runs exclusively with this sensor. If you select **Empty**, you can connect any suitable sensor before you start a method.

- 2 Enable or disable **Salinity correction**.
If Salinity correction is enabled, the reading of dissolved oxygen in the samples is corrected in regards of the entered **Enter salinity of seed solution, Salinity of diluted water** and **Salinity of undiluted sample**.
- 3 With **Seed added** you define to where the solid seed or concentrated seed solution is added: to the BOD bottle directly or to the dilution water first, which is afterwards used to dilute the sample. If **Seed added = To dilution water** is selected, define the **Seed dilution factor** as the ratio between seed solution and dilution water (e.g. 100 mL seed plus 900 mL dilution water gives a Seed dilution factor of 9).
- 4 Enable or disable the **Blank correction** for the BOD measurement.
When activated, the BOD of dilution water including the inorganic nutrients used to dilute the samples is determined to check the presence of oxidizable compounds in the dilution water. The result will be subtracted from the BOD of the sample. It often must be below 0.1 mg/L. In most countries (i.e USA) this value is only used for approval of the analysis. In a few countries (i.e. UK) it is used for correction of the samples like it is done with the Blank value
- 5 Enter the **Bottle volume**.
- 6 Select **Temperature capture**.
If **Temperature capture = External** is selected, select a sensor in **Temperature sensor**.
Note
Select a suitable sensor if the method always runs with the same temperature sensor. The method runs exclusively with this temperature sensor. If you select **Empty** you can connect any suitable sensor before you start a method.
- 7 Select **Barometric pressure capture**.
If **Barometric pressure capture = Automatic** is selected, the value measured by the DO/BOD expansion unit is used. If **Barometric pressure capture = Manual** is selected, the value is entered in the Sample (BOD) method function.
- 8 Tap **[OK]**.

Sample (BOD)

In this method function you can define the basic parameters to perform a BOD determination. You can the sample ID, the number of bottles, a corresponding comment and the seed addition unit. In the bottle list the you can enter the bottle ID, the sample volume, the volume of seed addition and the salinity correction factor.

- Tap **Sample (BOD)**.

⇒ **Sample (BOD)** is displayed.

Parameter	Description	Value
Sample ID	Defines the sample ID.	-
Comment	Defines a short comment that will be displayed.	-
Sample type	Information on the sample type.	Sample
Number of bottles (base)	Defines the number of bottles of this sample ID for base measurement (before incubation).	1 – 10
Number of bottles (follow)	Defines the number of bottles of this sample ID for follow measurement (after incubation). Displayed if check box Same bottles used for base and follow is de-activated.	1 – 10
Temperature	Defines the sample's temperature. Displayed if Temperature capture = Manual is selected in method function Configuration.	0 - 60 °C
Barometric pressure	Defines the barometric (atmospheric) pressure. Displayed if Barometric pressure capture = Manual is selected in method function Configuration	500.0 – 1100.0 mbar

- 1 Tap **Bottles**.

⇒ The list of **Bottle (base) settings** is displayed. It contains the following information:

Bottle ID
Sample volume
Seed volume
Dilution volume

- 2 Tap **Bottle (follow) settings** to display the corresponding list of bottles for the measurement after incubation time. Tap **Bottle (base) settings** to see again the list of bottles for the measurement before incubation time.
- 3 Tap any bottle list item.

⇒ **Bottle settings** is displayed.

Parameter	Description	Value
Sample ID	Defines the sample ID.	-
Bottle ID	Defines the bottle ID.	-
Comment	Defines a short comment that will be displayed.	-
Sample volume	Defines the volume of sample in the bottle. Editable for base bottle. Editable for follow bottle only if checkbox Same bottles used for base and follow is de-activated.	-
Seed volume	Defines the seed volume in the bottle. Editable if checkbox Same bottles used for base and follow is de-activated and Seed added = To bottle is selected in method function Configuration.	-
Dilution volume	Information on the dilution volume in the bottle. Value is calculated from other volumes above.	-

- 1 Enter **Sample ID** and confirm with [OK].
- 2 If desired, enter a **Comment** and confirm with [OK].
- 3 Define if **Same bottles used for base and follow**.
If de-activated, a different number of bottles with different dilutions can be defined for DO measurement before and after incubation time.

- 4 Define the **Number of bottles**.
If same bottles are used for base and follow, then only one number of bottles must be defined. In the other case the number of bottles for base and follow measurement must be defined.
- 5 If Temperature capture and/or Barometric pressure capture was set to Manual, define the **Temperature** and/or the **Barometric pressure**.

Note

The values entered for **Temperature** and/or **Barometric pressure** can again be changed when starting the method.

- 6 Tab [**Bottles**].
- 7 Tab each line in the base bottles list to edit the bottle settings.
- 8 Enter **Bottle ID** and confirm with [**OK**].
- 9 If desired, enter a **Comment** and confirm with [**OK**].
- 10 Define **Sample volume** and **Seed volume**. Whether and which values can be edited depends on settings method function Configuration and Sample (BOD).
- 11 Confirm each value with [**OK**].
- 12 Tab [**Back**].
- 13 Tab [**Bottle (follow) settings**].
- 14 Tab each line in the follow bottles list to edit the bottle setting.
- 15 Enter **Bottle ID**.
Confirm with [**OK**].
- 16 Enter **Bottle ID** and confirm with [**OK**].
- 17 If desired, enter a **Comment** and confirm with [**OK**].
- 18 Define **Sample volume** and **Seed volume**. Whether and which values can be edited depends on settings method function Configuration and Sample (BOD).
- 19 Confirm each value with [**OK**].
- 20 Tab [**Back**].
- 21 Confirm with [**OK**].
⇒ You return to the screen with the sample settings.
- 22 Confirm with [**OK**].
- 23 Tab [**Save**].

Measure (BOD)

In this method function you can define the measuring units and resolution as well as endpoint type and criteria. You can also define whether stirring takes place during the measurement or not.

- Tap **Measure (BOD)**.
⇒ **Measure (BOD)** is displayed.

Parameter	Description	Value
Sensor name	Information on the sensor selected for this method.	-
DO unit	Defines the unit for single DO measurement.	mg/L ppm
BOD unit	Defines the unit for BOD result.	mg/L
DO resolution	Defines the number of digits for the displayed DO result.	1 2 3
BOD resolution	Defines the number of digits for the calculated BOD value.	1 2 3
Endpoint type	Defines how the endpoint of the measurement is to be found.	Automatic Manual Timed

Endpoint criteria	The endpoint of the measurement is reached either after a pre-defined or user-defined period of time. Strict: Value varies less than 0.03 mg/L during the last 20 seconds. Standard: Value varies less than 0.08 mg/L during the last 20 seconds. Fast: Value varies less than 0.08 mg/L during the last 10 seconds.	Strict Standard Fast User-defined
Endpoint time	Period of time [s] until the endpoint of the measurement is reached. Displayed if Endpoint type = Timed .	-
dE	Defines the measured value interval. As soon as the change in the measured value over the time period dt is less than dE, the measured value will be acquired. This occurs within the defined time interval. Displayed in combination with Endpoint type Automatic and Endpoint criteria = User-defined .	-
dt	Defines the time component, in [sec] for dE/dt. dt>tmin and tmax>dt. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined .	-
tmin	Earliest possible time for the measured value acquisition, in [sec]. Displayed in combination with Endpoint type = Automatic and Endpoint criteria = User-defined .	-
tmax	Latest possible time for the measured value acquisition, in [sec]. Note The measurement ends after the time defined, even if the stability criteria of dE and dt are not fulfilled. Displayed if Endpoint type = Automatic and Endpoint criteria = User-defined .	-
Stir	Activates the stirrer.	Yes No
Stirring speed	Defines the stirring speed. Displayed if Stir is activated.	-

- 1 Select a **DO unit**.
- 2 Select a **BOD unit**.
- 3 Select the **DO resolution**.
- 4 Select the **BOD resolution**.
- 5 Select **Endpoint type**.
For **Timed**, enter the time in **Endpoint time**.
or
For **Automatic**, select a criteria in **Endpoint criteria**. For **Endpoint criteria = User-defined**, enter parameters **dE, dt, tmin** and **tmax**.
- 6 If desired, activate **Stir**.
Select a value for the **Select stirring speed**.
- 7 Confirm with [**OK**].
- 8 Tap [**Save**].

Report

- 1 If desired, activate **Print** and select a format.

- ⇒ If you select **User-defined** you can define additional parameters:
 - **Values & Calculations**
 - **Data**
 - **Info**

2 Confirm with [**OK**].

3 Tap [**Save**].

Insert Method Functions

In addition to the predefined method functions you can insert additional method functions to expand the range of parameters for the method. The following table shows the predefined method functions and the method functions that can be added.

Predefined Method Functions	Additional Method Functions
Title	Instruction
Configuration	Instruction
Sample (BOD)	Instruction Wait/Stir Sensor check
Measure (BOD)	Instruction Analysis (BOD) Calculation Wait/Stir
Report	Instruction Analysis (BOD) Calculation Wait/Stir

Instruction

In this method function you can enter a text which will be displayed on the screen and you can set the conditions when the text will disappear. There are two possibilities either the text disappears after a predefined period of time or after confirmation.

Wait/Stir

In this method function you can set a period of time for a pause before the next method function starts. You can define to stir **during** the waiting period.

Calculation

In this method function you can enter a calculation based on the results of your measurement. You can also set result limits and determine to interrupt the measurement when exceeding the limits, see Formula Syntax (page 109).

Analysis (BOD)

In this method function different limiting parameters can be selected and modified in order to create related warnings, entries in the report, suspension of measurement or even interruption of measurement.

Notes

- To start an analysis after all settings have been done, see Start Directly after Creating Methods/Series (page 92).

6.2.3 Creating Method Copies

Navigation: Home > [Methods]

You can copy an existing method or METTLER TOLEDO method by changing the ID of the method in the method function **Title**. When the ID modification is confirmed a new method is created.

- 1 Select the method to be copied.
 - ⇒ Name of the method is displayed.
- 2 Tap **Title**.
- 3 Enter a new method ID.
- 4 Confirm with [OK].
 - ⇒ An information screen opens to inform you that you create a method as a copy of the selected method.
- 5 Confirm with [OK].

Note

The method ID is unique. If an already existing ID is used, a warning will be displayed. Tap [OK] and change the ID.

6.3 Creating Shortcuts for Methods

Navigation: Home > [Methods]

Shortcuts can be placed on the **Home screen** and constitute links to executable methods. Shortcuts can only be created from the **Start analysis** screen using the [AddToHome] button. The administration of shortcuts takes place in the setup menu, see Shortcuts (page 25). This chapter describes how a user can create shortcuts to start a method from the **Home screen**.

- 1 Select a method from the list.
 - ⇒ Name of the method is displayed with all parameters.
- 2 Tap [Start].
 - ⇒ **Start analysis** is displayed.
- 3 Tap [AddToHome].
 - ⇒ **Shortcut parameters** is displayed.
- 4 If desired, enter a meaningful **Description**, that will be displayed in the shortcut.
- 5 Select **Immediate start**, to create a direct shortcut.
- 6 Tap the list field **Homescreen position**.
 - ⇒ **Select location for shortcut** is displayed.
- 7 Select a free position.
- 8 Tap [Save]
 - ⇒ The shortcut is displayed on the selected position of the home screen.

Note

With direct shortcuts a series can be started immediately. Shortcuts lead to the **Start analysis** screen from where you can start the serial analysis.

6.4 Modifying Methods

Navigation: Home > [Methods]

If necessary define the parameters of a method according to your needs.

Note

METTLER TOLEDO methods cannot be modified. Changing the method ID will create a method copy, see Creating Method Copies (page 100).

- 1 Select the method to be modified.
 - 2 Select and edit the parameters to be modified.
 - 3 If desired, tap [**Insert**], select and enter additional parameters.
 - 4 Tap [**Save**].
- ⇒ The method is modified according to your requirements.

6.5 Deleting Methods

Navigation: Home > [**Methods**]

All created methods can be deleted.

- 1 Select the method you want to delete.
 - 2 Tap [**Delete method**].
⇒ An information screen opens to remind that components referring to the method will also be deleted.
 - 3 Tap [**Delete**].
- ⇒ The method has been deleted.

Note

- METTLER TOLEDO methods cannot be deleted.
- Shortcuts and series that refer to the method will also be deleted.

7 Series

Navigation: Home > [Series]

Defining and using series support you in performing identical analysis sequences for several samples. Serial measurement can be carried out with METTLER TOLEDO methods or with user-defined methods. Verify that a user-defined method is composed before you set the parameters for a series. Series can be defined in combination with the following method types.

- **Measurement**
- **Interval**

A maximum number of 9 samples per series can be defined, Rondolino can be used to run the series. A maximum of 60 series can be stored in the instrument. You can create shortcuts for series. Series can be created, modified and deleted.

7.1 Creating Series

Note

Verify that a method is defined suitable to the series you want to create.

Navigation: Home > Series > [New]

Parameter	Description	Value
Series ID	According to the headline of the screen, the Series ID is entered automatically starting with S and consecutive number.	-
Method ID	Opens the list of METTLER TOLEDO Methods and user-defined methods.	-
Method type	Information on type of measurement.	Measurement Interval
Number of samples	Defines the number of samples for the series.	-
Default sample ID	Defines an ID for the default sample.	-

- 1 Enter a series ID and confirm with [OK].

Note

If you enter the **Series ID** of an existing series, a pop-up window opens with the information that the series ID already exists!

Tap [Overwrite] to use the identical series ID for a new series.

- or -

Tap [Cancel] and change the series ID.

- 2 Select a method ID.
- 3 In **Number of samples**, select the number you want to use and confirm with [OK].
- 4 If desired, enter the ID in **Default sample ID**.
- 5 Tap [Save].

⇒ Now you have created a series. A dialog with the series ID as title of the newly created series is displayed.

Note

A maximum of 60 series can be stored at the instrument. If the maximum number of series is reached the [New] button is disabled. You have to delete minimum one series before you can create new series

7.2 Creating Shortcuts for Series

Navigation: Home > [Series]

Shortcuts can be placed on the **Home screen** and constitute links to executable series. Shortcuts can only be created from the **Start analysis** screen using the [AddToHome] button. The administration of shortcuts takes

place in the **Setup** menu, see Shortcuts (page 13). This chapter describes how a user can create shortcuts to start a series from the home screen.

- 1 Select a series from the list.
⇒ **Series ID** is displayed.
- 2 Tap [**Start**].
⇒ **Start analysis** is displayed.
- 3 Tap [**AddToHome**].
⇒ **Shortcut parameters** is displayed.
- 4 If desired, enter a meaningful **Description**, that will be displayed in the shortcut.
- 5 Select **Immediate start**, to create a direct shortcut.
- 6 Tap the list field **Homescreen position**.
⇒ **Select location for shortcut** is displayed.
- 7 Select a free position.
- 8 Tap [**Save**].
⇒ The shortcut is displayed on the selected position of the home screen.

Note

With direct shortcuts a series can be started immediately. Shortcuts lead to the **Start analysis** screen from where you can start the serial analysis.

7.3 Modifying Series

You can modify series by changing the sdample ID. You can insert or delete samples.

7.3.1 Change Single Sample ID

Navigation: Home > [**Series**]

- 1 Select a series.
⇒ **Series ID** is displayed.
- 2 Tap the sample to be modified.
⇒ **Series item** is displayed.
- 3 Change the sample ID and confirm with [**OK**].
- 4 Confirm with [**OK**].
- 5 To modify additional sample ID's, repeat previous steps.
- 6 To finish and store entries, tap [**Save**].

7.3.2 Insert Samples

Navigation: Home > [**Series**]

- 1 Select a series.
⇒ **Series ID** is displayed.
- 2 Tap [**Insert**].
⇒ Arrow-shaped **Insert** buttons are displayed.
- 3 Tap [**Insert**] at the position where you want to insert one or more samples.
⇒ **Series item** is displayed.
- 4 Enter a sample ID and confirm with [**OK**].

- 5 Enter the number to be inserted in **Number of samples** and confirm with [**OK**].
- 6 Confirm with [**OK**].
- 7 To finish and store entries, tap [**Save**].

Note

A maximum of 9 samples per series can be stored.

7.3.3 Delete Samples

Navigation: Home > [**Series**]

- 1 Select a series.
 - ⇒ **Series ID** is displayed.
- 2 Tap the sample to be deleted.
 - ⇒ **Series item** is displayed.
- 3 Tap [**Delete**].
 - ⇒ The sample has been deleted without confirmation or warning.
- 4 To delete additional samples, repeat previous steps.

7.4 Delete Series

Navigation: Home > [**Series**]

- 1 Tap the series to be deleted.
 - ⇒ **Series ID** is displayed.
- 2 Tap [**Delete**].
 - ⇒ An Information screen opens with the warning that shortcuts which refer to the series will also be deleted.
- 3 Tap [**Delete**].
 - ⇒ The series has been deleted.
- 4 To delete additional series, repeat previous steps.

8 Sensors

Navigation: Home > [Sensors]

Additional to the sensor management in the setup menu, SevenExcellence™ allows managing the sensors and sensor settings directly from the home screen.

8.1 Available Sensors

Navigation: Home > [Sensors]

[Sensors] leads you to the list of available sensors according to the sensor settings, see Sensors (page 19). You have a quick view over the defined sensors and the modules to which they are connected. Furthermore you have access to the calibration history.

8.2 Sensor Parameters

Navigation: Home > [Sensors]

To get detailed information concerning the sensor parameters, to change the sensor name and the conditions for usable life and life span, proceed as follows:

- 1 Select a sensor.
 - ⇒ **Parameters** is displayed with all information concerning sensor settings.
- 2 Define the parameters according to your requirements.
- 3 To finish and store the entries, tap [**Save**].

8.3 Calibration History

To get reliable and exact measurement values, check the calibration history before starting a measurement. Calibrate the sensor or replace it if necessary. You can print the calibration history for your documentation.

- 1 Tap [**Sensors**].
 - ⇒ **Sensors** is displayed.
- 2 Select a sensor.
 - ⇒ **Parameters** is displayed.
- 3 Tap **Calibration history**.
 - ⇒ **Calibration history** is displayed.
- 4 If desired, tap [**Print**].
 - ⇒ The calibration history is being printed.

9 Results

Navigation: Home > [Results]

Results on the **Home** screen opens the analysis list. The results of the most recent 250 analyses consisting of analysis status, analysis data, user-defined calculations, information on the analysis and statistical data of series are found. The performed analyses are listed in chronological order, with the newest analysis at the top of the list. If the maximum number of possible analysis entries is reached, the oldest entry will be deleted.

The analysis list as a whole can be deleted, single analysis can be deleted as well. You can print or transfer data of single entries if the corresponding printer settings are done, see Peripherals (page 22). Statistics are available only for series.

Note

Discontinued analyses are not included in the list, see Errors in the Analysis Sequences (page 120).

Opening the analysis list leads to the status view automatically. You can switch between the analysis list including data concerning the status of the measurements and the analysis list concerning the results of the measurements. Tapping the [Rx] button switches immediately to the result view. Return to the status view with **Status**.

9.1 Statuses of Measurements

Navigation: Home > [Results]

The status view of the analysis list is displayed and contains the following information:

- **Data**
- **Type**
- **Meth./Ser. ID**
- **Status**

The following designations characterize the type of measurement.

- DM: **Direct measurement**
- DC: **Direct calibration**
- MS: method type **Measurement**
- CAL: method type **Calibration**
- INC: method type **Incremental**
- INT: method type **Interval**
- S: **Series**
- ST: method type **Sensor Test**
- BCV: Method type BCV
- BOD: Method type BOD

Note

- For direct measurement and direct calibration no method ID is displayed.
- For Series a single entry is shown in the analysis list.

Executed analyses can have the following status:

- **OK**
Measurement proceeded flawlessly.
- **OK***
Corresponds to the status **OK** with one of the following restrictions:
Sensor has expired.
Limits were set and exceeded but **Interrupt outside limits** was disabled.
The task was not interrupted.

- **Error**
The user tapped [**Terminate**] and finished the measurement before the endpoint was reached.
The task was not interrupted.
- **Failed**
Limits were set and exceeded and **Interrupt outside limits** was enabled.
The task list was interrupted.

9.2 Results of Measurements

Navigation: Home > [Results] > [Rx]

The result view of the analysis list is displayed and contains the following information:

- **Data**
- **Type**
- **Sample**
- **Result (U)**

Note

- Listed series do not show **Result (U)** or **Sample** in this view.
- For additional information on the results of series, see Viewing and Printing single Analysis Data (page 108)

9.3 Statistics

[Results] includes statistical calculations based on the measurement results of series.

Navigation: Home > Results > [Statistics]

Statistics are displayed with the following parameters:

- **Results**, measurement results
- **Mean**, average of all measurement results
- **SD**, standard deviation of all measurement results
- **Min.** , **Max.**, minimum and maximum measurement result

9.4 Deleting Content of Analysis List

Navigation: Home > [Results]

You can delete the complete content of the analysis list.

Note

Single analysis cannot be deleted from the analysis list.

- Tap [**Delete all**].
- ⇒ The analysis list is emptied.

9.5 Deleting single Analysis

Navigation: Home > [Results]

Single analysis can be deleted.

- 1 Tap the relevant analysis on the analysis list.
⇒ **Series ID** or **Method ID** is displayed.
 - 2 Tap [**Delete**].
- ⇒ The analysis has been deleted, the entry is deleted from the analysis list.

9.6 Viewing and Printing single Analysis Data

Navigation: Home > [Results]

Single analysis data or series data can be viewed, printed or transferred to an USB stick.

Note

To print or transfer data to USB stick, verify that the necessary settings are done. See Peripherals (page 22).

Proceed as follows:

- 1 Tap the relevant analysis on the **Analysis list**.

⇒ The series ID or method ID is displayed.

The status view contains the following information:

- **Date**
- **Type**
- **Meth./Ser. ID**
- **Status**

The Results view contains the following information:

- **Date**
- **Type**
- **Sample**
- **Result (U)**

Note

You can switch any time from status view to Rx view, tapping the corresponding button. The display view has no influence on the display of the single analysis data.

- 2 Tap the relevant value.

⇒ Name of the method is displayed, the following buttons are shown:

- **Parameter**
- **Values & Calculations**, containing the parameters:
 - **Temperature** or **SD / #** (for BOD only)
 - **Limits**

Info, containing the parameters:

- **Status**
- **Method type**
- **Method ID**
- **Comment**
- **Sample ID**

Data, containing the parameters:

- **Measurement type**
- **Measurement type**
- **Sensor name**
- **Measurement unit**
- **Measurement value U1 [1]**
- **Elapsed days** (BOD only)

- 3 Tap **Values & Calculations**.

- or -

Info.

- or -

Data.

- 4 Tap [**Print**].

⇒ According to the printer settings the data are being transferred or printed.

10 Formula Syntax

The formula syntax enables you to formulate criteria and conditions to evaluate the results of your analysis.

Formulas can be entered under the method function Calculation or whenever the tickbox Condition is selected within the appropriate method function (e.g. Measure, Measure (Interval), Weight/Stir, etc.):

- **Measure**
- **Measure (Incremental)**
- **Measure (Interval)**
- **Calculation**
- **Wait/Stir**

10.1 Formula symbols

The following symbols are available under the measure function:

Symbol	Description
U	May be used for method function Measure , Measure (Incremental) , Calculation and Measure (Interval) . Analysis value at the time when the endpoint is taken, all value corrections are included. The unit depends on the settings in method function Measure , Measure (Interval) or Measure (Incremental) .
E	May be used for method function Measure and Measure (Interval) . Analysis value at the time when the endpoint is taken without value corrections. Units are mV for pH, ion and Redox and Ω for conductivity.
UST	May be used for method function Measure and Measure (Interval) . Analysis values at the start of an analysis, all value corrections are included. The unit depends on the settings in method function Measure or Measure (Interval) .
T	May be used for method function Measure , Measure (Incremental) and Measure (Interval) . Temperature at the time when the endpoint is taken.
t	May be used for method function Measure . Time period from the start of an analysis until the endpoint is taken. Unit is "s".
P	May be used for method function Measure and Measure (Interval) . Barometric pressure at the time when the endpoint is taken. Only available for the Dissolved Oxygen parameter

The following symbols for raw results are generally available:

Symbol	Description
E1-Ex	The number following the result refers to a specific measurement type in method function Configuration .
R1...Rx	Fix marker for all results.
TAB[Tablename()]	Fix marker to calculate tables. The value in round brackets is the input value 'x' of the table, and the completed and calculated fix marker is the output value 'y' of the table.

Square brackets listed in the above tables refer to table names and for indexing the method function **Measure** with a method (e.g. E1[1], E1[2]...).

The following symbols for raw results are available for BOD calculations:

Symbol	Description
U	Average BOD value generated after the follow measurement of the last bottle of a sample or check value is taken, including also seed or blank correction. The unit is always mg/L
EB	BOD value of a bottle generated after each follow measurement by subtracting base value and seeded blank or blank. The unit is always mg/L

E	DO value generated after a measurement has been end-pointed. Temperature, salinity and barometric pressure corrections included. The unit is always mg/L.
UST	DO values at the start of an analysis, temperature, salinity and barometric pressure corrections included. The unit is mg/L.
T	Temperature at the time when the endpoint is taken during the DO measurement.
t	Time period from the start of a DO measurement until the endpoint is taken. Unit is seconds.
P	Barometric pressure at the time when the endpoint is taken during the DO measurement.
e	Elapsed days. Time interval between endpoint of base and follow measurement. The unit is days. First bottle of base measurement to first bottle follow measurement.

The number following a one of the above listed raw results (U1 = Blank, U2 = seeded Blank, U3 = Standard) refers to a specific check value in MF_Configuration. The number in brackets following the result EB[1], EB[2] refers to the bottle numbers. The index 1 (E[1]1, E[2]1 ...) after the bracket indicates a base measurement, whereas the index 2 (E[1]2, E[2]2 ...) stands for a follow measurement.

The following mathematical operators are available:

Symbol	Description
+	Addition
-	Subtraction
*	Multiplication
/	Division

The following comparison operators are available:

Symbol	Description
>	Greater than
>=	Greater than or equal to
=	Numerical equality
<=	Less than or equal to
<	Less than
..<..<..	In the range of
<>	Not equal to

The following logical operators are available:

Symbol	Description
and	Conjunction
or	Disjunction
true/false	Condition

The following mathematical formulas are available:

Symbol	Description
lg()	Logarithm base 10
ln()	Logarithm base e
pw()	Exponentials base 10
ex()	Exponential base e
sq()	Square
sr()	Square root

10.2 Creating formulas

Raw results, symbols and mathematical formulas can either be entered directly or taken from the proposal list. If a value is selected from the proposal list, it will be entered at the cursor position.

10.3 Examples

10.3.1 Formula in Method Function Calculation

Second result of a single channel measurement

$R1 = U1[2]$, also possible: $R1 = U[2]$

First non-corrected result of third channel

$R1 = E3[1]$, also possible: $R1 = E3$

BOD value in second blank bottle (BCV method type)

$R1 = EB1[2]$

Barometric pressure of third bottle of seeded blank in follow step (BCV method type)

$R1 = P2[3]2$

Difference between initial and final reading of single channel measurement

$R1 = UST1[1]-U1[1]$, also possible: $R1 = UST-U$

Average temperature of channel 1 and 2 in first measurement

$R1 = (T1+T2)/2$

Total measuring time of two and three measurements of single channel measurement

$R1 = t[1]+t[2]$ $R2 = R1+t[3]$

Difference between average BOD value and BOD value in fifth sample bottle

$R1 = U-EB[5]$

Difference between measured and theoretical pH value at measured temperature in pH buffer

7.00 $R1 = U-TAB[Buffer\ pH\ 7.00(T)]$

Logarithm (base 10) of result

$R1 = lg(U)$

10.3.2 Formula in Conditions

Examples for formula in Conditions

Note

The corresponding method function is only executed if formula is true.

Third result is larger or equal to 100

$U[3] \geq 100$

Result R1 is between 1.0 and 1.2

$1.0 < R1 < 1.2$

First and second temperature are different

$T[1] \neq T[2]$, also possible: $TT[2] \neq 0$

Less than 7 days between base and follow measurement of BOD analysis

$e < 7$

11 Starting Analysis

An analysis can be started in various ways:

- Start by tapping [**Read**] on the **Home screen**
- Start by tapping [**Read**] from **Module settings**
- Start by tapping [**Calibrate**] from **Module settings**
- Start by tapping [**Shortcuts**] on the **Home screen**
- Start from the Methods/Series editor

The different options that are offered depend on the settings you have done before and on the kind of analysis. The following chapters show how to start:

- **Direct calibration**
- **Direct measurement**
- **Methods**
- **Series**

Note

Before you start an analysis or calibration, verify that a suitable module is connected and sensor data are stored in the instrument. ISM® sensors are recognized automatically. To do a quick check, tap [**Sensors**], a list of available sensors is shown. If the sensor you want to use is not listed, see Sensors (page 19).

11.1 Starting Direct Calibration

You can start a direct calibration from the module displayed on the home screen. Before you start a direct calibration you have to set the following parameters:

- **Sensor**
- **Temperature sensor** (optional)
- **General settings**
- **Calibration settings**

The following section guides you through this process.

- Tap the colored tag of the relevant module displayed on the top of the **Home screen**.
⇒ **Module settings** is displayed.

Parameter	Description	Value
Sensor name	Opens the sensor list, according to the sensor settings.	-
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed for pH/Ion , Conductivity , and DO/BOD module.	-
General settings	All parameters concerning endpoint and temperature for direct calibration and direct measurement.	-
Measurement settings	All parameters concerning the measurement and the result (only for direct measurement).	-
Calibration settings	All parameters concerning buffers or standards (only for direct calibration).	-

- 1 Tap list field **Sensor name**.
⇒ **Select sensor** is displayed.
- 2 Select a type.
- 3 To use an external temperature sensor, tap list field **Temperature sensor**.
⇒ **Select sensor** is displayed.
- 4 Select a type.

General settings

In **General settings** you set the conditions for **Endpoint type**, **Endpoint criteria** and **Temperature capture**. Additionally you can set whether the results of the calibration should be printed or not.

– Tap [**General settings**].

⇒ **General settings** is displayed.

Parameter	Description	Value
Measurement type	Information on the measurement type.	-
Endpoint type	Defines how the endpoint of the measurement is to be found.	Automatic Manual Timed
Endpoint criteria	<p>The endpoint of the measurement is reached either after a predefined or user-defined period of time.</p> <p>pH/Redox Strict: Value varies less than 0.03 mV during the last 8 seconds or 0.1 mV for the last 20 seconds. Standard: Value varies less than 0.1 mV during the last 6 seconds. Fast: Value varies less than 0.6 mV during the last 4 seconds.</p> <p>Ion Strict: Value varies less than 0.03 mV during the last 8 seconds or 0.08 mV during the last 20 seconds. Standard: Value varies less than 0.08 mV during the last 8 seconds. Fast: Value varies less than 0.3 mV during the last 4 seconds.</p> <p>Conductivity Strict: Value varies less than 0.8% during the last 4 seconds. Standard: Value varies less than 0.6% during the last 6 seconds. Fast: Value varies less than 0.4% during the last 8 seconds.</p> <p>Dissolved oxygen Strict: Value varies less than 0.03 mg/L during the last 20 seconds. Standard: Value varies less than 0.08 mg/L during the last 20 seconds. Fast: Value varies less than 0.08 mg/L during the last 10 seconds.</p> <p>Displayed for all measurement types in combination with Endpoint type = Automatic.</p>	Strict Standard Fast
Endpoint time	<p>Period of time [s] until the endpoint of the measurement is reached.</p> <p>Displayed if Endpoint type = Timed.</p>	-
Temperature capture	Select the temperature captures mode.	Internal External Manual
Temperature	<p>Defines the temperature for the measurement.</p> <p>Displayed if Temperature capture = Manual is selected.</p>	-
Barometric pressure capture	Select the Barometric pressure capture mode. Displayed in case of Measurement type = Dissolved Oxygen	Automatic Manual
Barometric pressure	Select the barometric pressure capture mode. Displayed in case of Measurement type = Dissolved Oxygen and Barometric pressure capture = Manual .	500.0 – 1100.0 mbar
Stir	Activates the stirrer.	Yes No

Stirring speed	Defines the stirring speed. Displayed if Stir is activated.	-
Print	Defines if data will be printed to the connected printer.	Yes No
Print format	Summary: Covers all important data concerning date, time, user and all parameters according to the settings of the measurement type. User-defined: Additional include values and calculations based on the settings. Displayed if Print is selected.	Summary User-defined

- 1 Select **Endpoint type**.
- 2 Select **Endpoint criteria**.
- 3 Select **Temperature capture**.
If **Manual** is selected, enter a value for **Temperature**.
- 4 If desired, activate check box **Print** and select a format in **Print format**.
- 5 Confirm with [**OK**].

Calibration settings

- Tap [**Calibration settings**].
⇒ **Calibration settings** is displayed.

Parameter	Description	Value
Measurement type	Information on the measurement type.	-
Buffer group	Opens the list of predefined and user-defined buffer groups Displayed if Measurement type is pH .	-
Calibration standard group	Opens the list of predefined and user-defined standard groups. Displayed if Measurement type = Ion or Conductivity .	-
Unit	Information on the preselected unit. Displayed if Measurement type = Ion	-
Calibration mode	Algorithm on which the calibration is processed. Displayed if Measurement type = pH .	Linear Segmented
Number of buffers	Defines the number of buffers or standards for the calibration. Displayed if Measurement type = pH .	1 2 3 4 5
Automatic buffer recognition	Activates the automatic recognition of buffers. Displayed if Measurement type = pH .	Yes No
Buffer 1 - Buffer 5	Number of fields depends on the number of defined buffers. Up to 5 buffers are displayed with consecutive numbers. Each field opens the list of predefined and user defined buffer groups. Displayed if Measurement type = pH and Automatic buffer recognition is not activated.	-
Standard 1-5	Number of fields depends on the number of defined standards. Up to 5 standards are displayed with consecutive numbers. Each field opens the list of preselected standard groups. Displayed if Measurement type = Ion and Automatic buffer recognition is not activated.	-
Standard	Opens the values of the preselected calibration standard. Displayed if Measurement type = Conductivity .	-
Calibration points	Option to choose between different number of calibration points.	1 2
Calibration standard 1	Select the standard for the first calibration point. Displayed if Measurement type = Dissolved Oxygen .	Saturated air User defined

Standard concentration	Defines concentration of first calibration standard in mg/L. Displayed if Measurement type = Dissolved Oxygen and Calibration standard 1 = User-defined	-
Calibration standard 2	Defines the standard for the second calibration point. Cannot be edited. Displayed if Measurement type = Dissolved Oxygen and Calibration points = 2 .	Zero Point Standard

- 1 Tap the list field **Buffer group** or **Calibration standard group**.

⇒ **Buffer / Standard group** is displayed.
- 2 Select a buffer or standard from the list.
- 3 If **Measurement type** pH or ion is selected, select a **Calibration mode**.
- 4 Select the number of buffers you want to use from the list **Number of buffers**.
- or -
Select **Automatic buffer recognition**.
- 5 If **Number of buffers** is selected, select specific values for **Buffer**.
- or -
Select **Standard**.
- 6 Confirm with [**OK**].
- 7 Tap [**Save**].
- 8 Immerse the sensor into the first buffer.
- 9 Tap [**Calibrate**].

Note

The calibration settings are saved even if you log out.

11.2 Starting Direct Measurement

A direct measurement can be started in two ways. You can start the analysis via the **Module settings** or directly from the **Home screen** via the button [**Read**].

11.2.1 Starting from Module Settings

You can start a direct measurement from the module displayed on the **Home screen**. Before you start a direct measurement you have to set the following parameters:

- Select a sensor
- Select a temperature sensor (optional)
- Adjust the **General settings**
- Adjust the **Measurement settings**

The following section guides you through this process.

- Tap the colored tag of the relevant module displayed on the top of the **Home screen**.
⇒ **Module settings** is displayed.

Parameter	Description	Value
Sensor name	Opens the sensor list, according to the sensor settings.	-
Temperature sensor	Opens the list of temperature sensors, according to the sensor settings. Displayed for pH/ion , Conductivity , and DO/BOD module.	-
General settings	All parameters concerning endpoint and temperature for direct calibration and direct measurement.	-

Measurement settings	All parameters concerning the measurement and the result (only for direct measurement).	-
Calibration settings	All parameters concerning buffers or standards (only for direct calibration).	-

- 1 Tap list field **Sensor name**.
⇒ **Select sensor** is displayed.
- 2 Select a type.
- 3 To use an external temperature sensor, tap list field **Temperature sensor**.
⇒ **Select sensor** is displayed.
- 4 Select a type.

General settings

- Tap **General settings**.
⇒ **General settings** is displayed.

Parameter	Description	Value
Measurement type	Information on the measurement type.	-
Endpoint type	Defines how the endpoint of the measurement is to be found.	Automatic Manual Timed
Endpoint criteria	<p>The endpoint of the measurement is reached either after a predefined or user-defined period of time.</p> <p>pH/Redox Strict: Value varies less than 0.03 mV during the last 8 seconds or 0.1 mV for the last 20 seconds. Standard: Value varies less than 0.1 mV during the last 6 seconds. Fast: Value varies less than 0.6 mV during the last 4 seconds.</p> <p>Ion Strict: Value varies less than 0.03 mV during the last 8 seconds or 0.08 mV during the last 20 seconds. Standard: Value varies less than 0.08 mV during the last 8 seconds. Fast: Value varies less than 0.3 mV during the last 4 seconds.</p> <p>Conductivity Strict: Value varies less than 0.8% during the last 4 seconds. Standard: Value varies less than 0.6% during the last 6 seconds. Fast: Value varies less than 0.4% during the last 8 seconds.</p> <p>Dissolved oxygen Strict: Value varies less than 0.03 mg/L during the last 20 seconds. Standard: Value varies less than 0.08 mg/L during the last 20 seconds. Fast: Value varies less than 0.08 mg/L during the last 10 seconds.</p> <p>Displayed for all measurement types in combination with Endpoint type = Automatic.</p>	Strict Standard Fast
Endpoint time	<p>Period of time [s] until the endpoint of the measurement is reached.</p> <p>Displayed if Endpoint type = Timed.</p>	-

Temperature capture	Select the temperature captures mode.	Internal External Manual
Temperature	Defines the temperature for the measurement. Displayed if Temperature capture = Manual is selected.	-
Barometric pressure capture	Select the Barometric pressure capture mode. Displayed in case of Measurement type = Dissolved Oxygen	Automatic Manual
Barometric pressure	Select the barometric pressure capture mode. Displayed in case of Measurement type = Dissolved Oxygen and Barometric pressure capture = Manual .	500.0 – 1100.0 mbar
Stir	Activates the stirrer.	Yes No
Stirring speed	Defines the stirring speed. Displayed if Stir is activated.	-
Print	Defines if data will be printed to the connected printer.	Yes No
Print format	Summary: Covers all important data concerning date, time, user and all parameters according to the settings of the measurement type. User-defined: Additional include values and calculations based on the settings. Displayed if Print is selected.	Summary User-defined

- 1 Select **Endpoint type**.
- 2 Select **Endpoint criteria**.
- 3 Select **Temperature capture**.
If **Manual** is selected, enter a value for the temperature.
- 4 If desired, activate **Print** and select a format.
- 5 Confirm with **OK**.

Measurement settings

- Tap **Measurement settings**.
⇒ **Measurement settings** is displayed.

Parameter	Description	Value
Measurement type	Information on the measurement type.	-
Sample ID	Defines the sample ID.	-
Auto sequential sample ID	Activates auto sequential sample ID.	Yes No
Conductivity mode	Defines the mode of the method. Displayed if Measurement type = Conductivity is selected.	Conductivity TDS Salinity Resistivity
Unit	The unit to be used for the measurement. The displayed units depend on the selected measurement types.	pH mV µS/cm mS/cm S/m µS/m mS/m ppm ppt (‰) mg/L g/L psu ppt MΩ.cm Ω.cm mV Rel.mV mmol/L mol/L ppm % pX mV
Offset	Defines the offset [mv]. Displayed if Measurement type = Redox in combination with the unit in Rel.mV is selected.	-

Temperature correction	<p>Linear: For the most solutions a linear interrelationship consists between temperature and conductivity.</p> <p>Non-linear: Used for natural water (only for temperature between 0... 36°C). The conductivity is multiplied with a tabulated factor and then referenced to the reference temperature.</p> <p>Off: The conductivity value at the current temperature is displayed.</p> <p>Pure water: Used for Measurement type = Conductivity or Resistivity. A special type of temperature algorithm is used.</p> <p>Displayed if Measurement type = Conductivity, TDS or Resistivity is selected.</p>	Linear Non-linear Off Pure water
α-coefficient	<p>Defines the factor for the linear dependency.</p> <p>Displayed if Conductivity mode = Conductivity, TDS or Resistivity in combination with Temperature correction = Linear is selected.</p>	-
Reference temperature	<p>The conductivity of the sample is referenced to the selected temperature during measurement.</p> <p>If Measurement type = Conductivity or Resistivity in combination with Temperature correction = Pure water is selected a reference temperature of 25 °C is automatically set.</p> <p>Displayed if Measurement type = Conductivity, TDS or Resistivity in combination with Temperature correction = Linear is selected.</p>	20°C 25°C
TDS factor	<p>To calculate the TDS value, conductivity will be multiplied with this TDS factor.</p> <p>Displayed if Conductivity = TDS is selected.</p>	-
Decimal places	<p>Defines the number of digits for the displayed measurement result.</p>	1 2 3
Interval	<p>Activates to define the interval.</p> <p>The measurement data will be stored after a defined time period.</p>	Yes No
Interval time	<p>Time period between starting and storing measurement data (unit seconds is set).</p>	-
Print after each interval	<p>Activates printing out the result after each interval.</p>	Yes No
Limits	<p>Activates to define the limits for the measurement.</p>	Yes No
Lower limit	<p>Defines a value for the deviation of the measured value downward.</p>	-
Upper limit	<p>Defines a value for the deviation of the measured value upward.</p>	-
Interrupt outside limits	<p>Activates to interrupt the measurement when exceeding the limits.</p>	Yes No

- 1 Enter a sample ID.
- 2 If desired, activate **Auto sequential sample ID**.
- 3 Select a unit.
- 4 Select the resolution decimals to be displayed.
- 5 Enter measurement parameters according to your measurement type and requirements.
- 6 If desired:
 - Activate **Interval** and enter a value for **Interval time**.
 - Activate **Limits** and enter values for **Lower limit** and **Upper limit**.
 - Activate **Interrupt outside limits**.
- 7 Confirm with [OK].
- 8 To finish and store entries, tap [Save].

9 Immerse the sensor into the sample.

10 Tap [**Read**].

11.2.2 Starting from Home Screen

A measurement can also be started directly from the home screen. In this case the last saved settings of the module are used for the measurement.

Note

Verify that the sensor according to the module settings is connected.

1 Activate the check box of the module.

2 Tap the colored tag of the module.

3 Immerse the sensor into the sample.

4 Tap [**Read**].

11.3 Starting Methods/Series

Methods and **Series** can be started in different ways.

- Start directly after creating a method or series.
- Start from the method an series list.
- Start from the **Home screen** via shortcut or direct shortcut.

11.3.1 Start Directly after Creating Methods/Series

When you have created a method or series and saved all settings you can immediately start the analysis.

1 Tap [**Start**].

⇒ The start analysis dialog is displayed.

2 Tap [**Start**].

11.3.2 Starting from Methods/Series List

You can start predefined and user-defined methods and series directly from the method or series lists.

1 Tap [**Methods**] or [**Series**].

⇒ **Methods** or **Series list** is shown.

2 Select the method or series you want to run.

3 Tap [**Start**].

⇒ **Start analysis** dialog is displayed.

4 Tap [**Start**].

11.3.3 Starting from Shortcut/Direct Shortcut

You can start methods and series via shortcuts and direct shortcuts displayed on the home screen.

1 Tap the shortcut on the home screen.

⇒ **Start analysis** is displayed.

2 Tap [**Start**].

Note

Tapping a direct shortcut triggers an immediate start of an analysis. The on-line display is shown forthwith.

11.4 Interrupting Analysis

Ongoing analyses can be interrupted in the on-line display via [**Terminate**]. To continue the task tap [**Resume**].

Note

Discontinued measurements are not included in results.

11.5 Errors in the Analysis Sequences

Analyses may show errors. Four types of errors can be identified during an analysis sequence:

- **Error**
- **Terminate Error**
- **Critical error**
- **Failed**

11.5.1 Malfunction Types: Error

Malfunctions of the **Error** type are:

- Interrupting the analysis.
- Disconnected USB stick when method function Report starts.
- Disconnected USB printer when method function Report starts

The malfunction **Error** triggers the following behavior:

- A message appears with information and hints on the error
- All remaining method functions will not be executed
- The processing of further tasks is interrupted
- The analysis with the status Error is listed in the analysis list, see Results (page 106).

11.5.2 Malfunction Types: Terminate Error

Malfunctions of the type **Terminate Error** are:

- Disconnected ISM[®] sensor
- Connecting ISM[®] sensor during measurement
- Disconnected temperature sensor

The malfunction **Terminate Error** triggers the following response:

- An information message for the relevant error appears
- The task is terminated immediately
- The processing of further tasks is interrupted
- No results are generated

11.5.3 Malfunction Types: Critical Error

Malfunctions of the type **Critical error** are:

- Disconnected module
- Connecting the module during measurement

The malfunction **Critical error** triggers the following response:

- A message appears with information on the error
- The task is terminated immediately
- The processing of further tasks is interrupted
- The instrument is shut down automatically to prevent further damage

- No results are generated
- After the restart of the instrument a popup is shown, indicating which critical error has occurred

11.5.4 Malfunction Types: Failed

Malfunctions of the type **Failed** are:

- Calibration analysis failed
- Method function **Sensor check** failed
- Method function **Calculation** failed

The malfunction **Failed** triggers the following response:

- A message appears with information on the error
- The task is terminated immediately
- The processing of further tasks is interrupted
- All remaining method functions will not be executed, except **Report**
- An entry is generated in **Results** with information according to the failure

12 News, Tasks and Online Display

If an analysis is started, the on-line display is shown. If a task is already running and a new analysis is started, the task list with the waiting tasks can be displayed. Tapping the [**News**] button provides information concerning the peripheral devices connected to the instrument.

12.1 News

In case of disconnected PnP resources, exceeded calibration limits etc. the [**News**] button opens a screen with additional information about these issues.

12.1.1 News Button

The [**News**] button is located in the top left-hand corner of the **Home screen**. The color of this button indicates if the list is empty (grey) or not (yellow).

Tap the [**News**] button to see the content of news. The list contains entries about connected and disconnected external devices, sensors with expired life span and if the radio clock synchronization process is finished. All information is listed in chronological order.

When a new device is added, the life span of a sensor exceeds or the radio clock finished synchronization, the [**News**] button flashes.

Note

The maximum number of news entries in the list is 30. If the capacity of the news list is fully exploited, the oldest message will be overwritten. If you switch the instrument off and on again, all old news will be cleared.

12.2 Tasks

Each calibration, measurement, method or series is a task. Tasks are always processed in sequence. Each task is listed in the task list and receives a number, based on the chronological order of its start.

For tasks, the following rules must be observed:

- It is allowed to start several identical measurements.
- Methods can also be started when a calibration or direct measurement is running. They will be queued.
- Starting a direct measurement in which more than one module is involved will be listed as one task in the task list.
- It is not possible to start several direct calibrations via [**Calibrate**].
- It is not possible to start several direct measurements via [**Read**].

Note

Direct calibration via [**Calibrate**] and direct measurement via [**Read**] can only be started when no other task is running. In case a task is running, [**Read**] and [**Calibrate**] are deactivated.

The task list offers the following options:

Show Online display	By tapping the list entry of the ongoing task, the online display is shown.
[Interrupt]	By tapping the button Interrupt , the processing of the tasks is interrupted. The ongoing task is carried out to completion.
[Resume]	By tapping Resume you can continue the processing of the task.
[Remove all]	This button is only visible, when the task list is interrupted and no tasks are running. By tapping this button all lined up tasks will be removed.
Move tasks	Tap a task. By changing the number, you can move the task.
Delete individual tasks	Tap a task. By tapping Remove the task is deleted from the list.

12.2.1 Tasks Button

[**Tasks**] is located in the top right-hand corner of the **Home screen**. It is activated, as soon as at least one task is lined up.

By tapping [**Tasks**] you switch to the **Online screen** or, if several tasks were started, the task list.

Status display of the [**Tasks**] button:

- **White:**
No task is lined up.
- **Yellow:**
A task is running right now.
- **Yellow/blue blinking:**
A task has been finished and is waiting for confirmation.
- **Orange:**
The task list is interrupted and no task is running.

12.3 Online Display

The on-line display shows the status and the readings of the ongoing analysis. The data are refreshed each 0.5 sec.

The **Title bar** at the top of the online screen shows:

- **Method ID:**
If you started a method: **Method type**
- **Meth./Ser. ID:**
If you started a series: **Method type**
- If you started a direct measurement: **Measurement:Direct**
- If you started a direct calibration: **Calibration:Direct**
- [**News**] for opening a screen including information about connected and disconnected devices and exceeded life span.
- [**Tasks**] for showing an ongoing task and to open a screen including the task list

The **Navigation bar**, located below the **Title bar**, shows the following information:

- The number of samples
- A rectangle with three dots.
Black dots symbolizes connected modules.
- A timer to show how long the method/series is running, including pause and waiting time.

The **Status bar**, located below the **Navigation bar**, shows the following information:

- Name of the method function that is running
- A timer to indicate how long the method function is running

A maximum of three **Data fields** can be shown. The number depends on the number of connected modules.

- If several modules are connected with the instrument a data field for each module is shown.
You can enlarge a data field by tapping on it.
The other fields are hidden now.
Tap it again and you return to the view with all data fields.
- If one module is connected you can switch between GLP view and normal view.

Note

Depending on the analysis different parameters are shown in the **Data field**, the commands on the button below the data field vary.

13 Technical Data

13.1 SevenExcellence™

Screen	Color TFT	
Interfaces	RS232, USB A, USB B, Ethernet	
Ambient conditions	Ambient temperature	5 °C to 40 °C
	Relative humidity	5% to 80% (non-condensing)
	Overvoltage category	Class II
	Pollution degree	2
	Range of application	For indoor use only
	Maximum operating altitude	Up to 2000 m
Dimensions	Width	235 mm
	Depth	188 mm
	Height	75 mm
Weight	Basic device	1120 g
	1 module	111 - 130 g
Power rating instrument	Input voltage	12 V \approx
	Power consumption	10 W
Power rating AC adapter	Line voltage	100 - 240 V $\sim \pm 10$ %
	Input frequency	50/60 Hz
	Input current	0.3 A
	Output voltage	12 V \approx
	Output current	0.84 A
Materials	Housing	ABS/PC
	Expansion units	ABS/PC
	Electrode arm	ABS/PC
	Touch panel	Tempered glass

13.2 pH/mV module

pH mode			
	pH	mV	Temperature °C
Measurement range	- 2.000 ... 20.000	\pm 2000.0	-30.0 ... 130.0
Resolution	0.001/0.01/0.1	0.1	0.1
Limits of error	\pm 0.002	\pm 0.1	\pm 0.1
Relative mV	-	yes	-
Temperature compensation	ATC	-30.0 °C ... 130.0 °C	
	MTC	-30.0 °C ... 130.0 °C	
ISFET mode			
	pH	Temperature °C	
Measurement range	0.000 ... 14.000	-30.0 ... 130.0	
Resolution	0.001/0.01/0.1 pH	0.1	
Limits of errors	\pm 0.05 pH	\pm 0.1	

13.3 Conductivity module

Measurement range	Conductivity	0.1 ... 999999 $\mu\text{S/cm}$
		0.001 ... 2000 mS/cm
		0.0001 ... 200 S/m
		0.0001 ... 200000 mS/m
		0.001 ... 999999 $\mu\text{S/m}$
	TDS	0.001 ... 1000 ppt, g/L
		0.001 ... 999 999 mg/L, ppm
	TDS Factor	0.40 ... 1.00
	Salinity	0.01 ... 80 psu, ppt
Resistivity	0.01 ... 100 $\text{M}\Omega\text{-cm}$	
	0.0001 ... 999 999 $\Omega\text{-cm}$	
Temperature	-30 °C ... 130 °C	
Temperature capture	ATC	-30 °C ... 130 °C
	MTC	-30 °C ... 130 °C
Resolution	Conductivity	0.001 ... 1 $\mu\text{S/cm}$, mS/cm , $\mu\text{S/m}$
		0.0001 ... 1 S/m , mS/m
	TDS	0.0001 ... 1 ppt, g/L
		0.001 ... 1 mg/L, ppm
	Salinity	0.01 ... 0.1 psu, ppt
	Resistivity	0.01 ... 1 $\text{M}\Omega\text{-cm}$
0.0001 ... 1 $\Omega\text{-cm}$		
Limits of errors	$\pm 0.5\%$ of measured value	
	$\pm 0.1\text{ °C}$ of measured temperature	

13.4 pH/Ion module

Ion mode			
Measurement range	0 ... 999 999 mg/L, ppm		
	0 ... 100 mol/L, %		
	0 ... 100 000 mmol/L		
	-2.000 ... 20.000 pX		
Resolution	0.001 ... 1 mg/L, ppm, mmol/L, pX		
	0.0001 ... 100 mol/L, %		
Limits of error	$\pm 0.5\%$ of measured value		
pH mode			
	pH	mV	Temperature °C
Measurement range	-2.000 ... 20.000	± 2000.0	-30.0 ... 130.0
Resolution	0.001/0.01/0.1	0.1	0.1
Limits of error	± 0.002	± 0.1	± 0.1
Relative mV	-	yes	-
Temperature compensation	ATC	-30.0 °C ... 130.0 °C	
	MTC	-30.0 °C ... 130.0 °C	

13.5 DO/BOD Module

Dissolved oxygen		
	Optical sensor (digital)	Polarographic sensor (analog)
Measuring range	0.000...50 mg/L (ppm)	0.000...99 mg/L (ppm)

Resolution	0.001/0.01/0.1	0.001/0.01/0.1
Limits of error	± 0.1 mg/L from 0...8	± 0.5%
	± 0.2 mg/L from 8...20	
	± 10% from 20...50	
Units	mg/L, ppm	mg/L, ppm
DO Saturation		
	Optical sensor (digital)	Polarographic sensor (analog)
Measuring range	0.0...500%	0.0...600%
Resolution	0.0001/0.001/0.01/0.1	0.0001/0.001/0.01/0.1
Pressure		
	Optical sensor (digital)	Polarographic sensor (analog)
Measuring range	500 to 1100 mbar	500 to 1100 mbar
Resolution	1	1
Limits of error	± 1 mbar	± 1 mbar
General		
	Optical sensor (digital)	Polarographic sensor (analog)
Calibration points	2	2
Sensor input	MiniLTW (IP67)	BNC
Pressure compensation	automatic / manual	automatic / manual
Pressure units	mbar, hPa, mmHg, Atm	mbar, hPa, mmHg, Atm

14 Appendix

14.1 Predefined Buffers & Standards

Buffer Sets

METTLER TOLEDO USA (Ref. 25°C)

Temperature °C	1.68	4.01	7.00	10.01
10	1.67	4.00	7.06	10.18
15	1.67	4.00	7.04	10.12
20	1.68	4.00	7.02	10.06
25	1.68	4.01	7.00	10.01
30	1.68	4.01	6.99	9.97
35	1.69	4.02	6.98	9.93
40	1.69	4.03	6.97	9.89
45	1.70	4.04	6.97	9.86
50	1.71	4.06	6.97	9.83

METTLER TOLEDO Europe (Ref. 25°C)

Temperature °C	2.00	4.01	7.00	9.21	11.00
5	2.02	4.01	7.09	9.45	11.72
10	2.01	4.00	7.06	9.38	11.54
15	2.00	4.00	7.04	9.32	11.36
20	2.00	4.00	7.02	9.26	11.18
25	2.00	4.01	7.00	9.21	11.00
30	1.99	4.01	6.99	9.16	10.82
35	1.99	4.02	6.98	9.11	10.64
40	1.98	4.03	6.97	9.06	10.46
45	1.98	4.04	6.97	9.03	10.28
50	1.98	4.06	6.97	8.99	10.10

MERCK (Ref. 20°C)

Temperature °C	2.00	4.00	7.00	9.00	12.00
5	2.01	4.04	7.07	9.16	12.41
10	2.01	4.02	7.05	9.11	12.26
15	2.00	4.01	7.02	9.05	12.10
20	2.00	4.00	7.00	9.00	12.00
25	2.00	4.01	6.98	8.95	11.88
30	2.00	4.01	6.98	8.91	11.72
35	2.00	4.01	6.96	8.88	11.67
40	2.00	4.01	6.95	8.85	11.54
45	2.00	4.01	6.95	8.82	11.44
50	2.00	4.00	6.95	8.79	11.33

DIN(19266)/NIST (Ref. 25°C)

Temperature °C	1.68	4.008	6.865	9.183	12.454
5	1.668	4.004	6.950	9.392	13.207
10	1.670	4.001	6.922	9.331	13.003
15	1.672	4.001	6.900	9.277	12.810
20	1.676	4.003	6.880	9.228	12.627
25	1.680	4.008	6.865	9.183	12.454

Temperature °C	1.68	4.008	6.865	9.183	12.454
30	1.685	4.015	6.853	9.144	12.289
35	1.691	4.026	6.845	9.110	12.133
40	1.697	4.036	6.837	9.076	11.984
45	1.704	4.049	6.834	9.046	11.841
50	1.712	4.064	6.833	9.018	11.705

DIN(19267) (Ref. 25°C)

Temperature °C	1.09	4.65	6.79	9.23	12.75
5	1.08	4.67	6.87	9.43	13.63
10	1.09	4.66	6.84	9.37	13.37
15	1.09	4.66	6.82	9.32	13.16
20	1.09	4.65	6.80	9.27	12.96
25	1.09	4.65	6.79	9.23	12.75
30	1.10	4.65	6.78	9.18	12.61
35	1.10	4.65	6.77	9.13	12.45
40	1.10	4.66	6.76	9.09	12.29
45	1.10	4.67	6.76	9.04	12.09
50	1.11	4.68	6.76	9.00	11.98

JJG119 (Ref. 25°C)

Temperature °C	1.680	4.003	6.864	9.182	12.460
5	1.669	3.999	6.949	9.391	13.210
10	1.671	3.996	6.921	9.330	13.011
15	1.673	3.996	6.898	9.276	12.820
20	1.676	3.998	6.879	9.226	12.637
25	1.680	4.003	6.864	9.182	12.460
30	1.684	4.010	6.852	9.142	12.292
35	1.688	4.019	6.844	9.105	12.130
40	1.694	4.029	6.838	9.072	11.975
45	1.700	4.042	6.834	9.042	11.828
50	1.706	4.055	6.833	9.015	11.697

Technical (Ref. 25°C)

Temperature °C	2.00	4.01	7.00	10.00
5	2.01	4.01	7.09	10.65
10	2.00	4.00	7.06	10.39
15	2.00	4.00	7.04	10.26
20	2.00	4.00	7.02	10.13
25	2.00	4.01	7.00	10.00
30	1.99	4.01	6.99	9.87
35	1.99	4.02	6.98	9.74
40	1.98	4.03	6.97	9.61
45	1.98	4.04	6.97	9.48
50	1.98	4.06	6.97	9.35

JIS Z 8802 (Ref. 25°C)

Temperature °C	1.679	4.008	6.865	9.180
5	1.668	3.999	6.951	9.395
10	1.670	3.998	6.923	9.332
15	1.672	3.999	6.900	9.276

Temperature °C	1.679	4.008	6.865	9.180
20	1.675	4.002	6.881	9.225
25	1.679	4.008	6.865	9.180
30	1.683	4.015	6.853	9.139
35	1.688	4.024	6.844	9.102
40	1.694	4.035	6.838	9.068
45	1.700	4.047	6.834	9.038
50	1.707	4.060	6.833	9.011

Standard Groups

International (Ref. 25°C)

Temperature °C	10 µS/cm	84 µS/cm	500 µS/cm	1413 µS/cm	12.88 mS/cm
5	6.13	53.02	315.3	896	8.22
10	7.10	60.34	359.6	1020	9.33
15	7.95	67.61	402.9	1147	10.48
20	8.97	75.80	451.5	1278	11.67
25	10.00	84.00	500.0	1413	12.88
35	12.14	100.92	602.5	1667	15.39

Chinese Standards (Ref. 25°C)

Temperature °C	146.5 µS/cm	1408 µS/cm	12.85 mS/cm	111.3 mS/cm
15	118.5	1141.4	10.455	92.12
20	126.7	1220	11.163	97.8
18	132.2	1273.7	11.644	101.7
25	146.5	1408.3	12.852	111.31
35	176.5	1687.6	15.353	131.1

Japanese Standards (Ref. 20°C)

Temperature °C	1330.00 µS/cm	133.00 µS/cm	26.6 µS/cm
0	771.40	77.14	15.428
5	911.05	91.11	18.221
10	1050.70	105.07	21.014
15	1190.35	119.04	23.807
20	1330.00	133.00	26.6
18	1469.65	146.97	29.393
25	1609.30	160.93	32.186
35	1748.95	174.90	34.979

Saturated NaCl (Ref. 25°C)

Temperature °C	Sat. NaCl
5	155.5
10	10 177.9
15	201.5
20	226.0
25	251.3
35	304.1

METTLER TOLEDO ION (Ref. 25°C)

Temperature °C	1000 mg/L	100 mg/L	10 mg/L	1 mg/L	0.1 mg/L
25	1000	100	10	1	0.1

14.2 METTLER TOLEDO Tables

METTLER TOLEDO Europe (Ref. 25°C)

Temperature °C	2.00	4.01	7.00	9.21	11.00
5	2.02	4.01	7.09	9.45	11.72
10	2.01	4.00	7.06	9.38	11.54
15	2.00	4.00	7.04	9.32	11.36
20	2.00	4.00	7.02	9.26	11.18
25	2.00	4.01	7.00	9.21	11.00
30	1.99	4.01	6.99	9.16	10.82
35	1.99	4.02	6.98	9.11	10.64
40	1.98	4.03	6.97	9.06	10.46
45	1.98	4.04	6.97	9.03	10.28
50	1.98	4.06	6.97	8.99	10.10

Ultra Pure Water (USP/EP)

°C	µS/cm	°C	µS/cm
5	0.6	55	1.9
10	0.8	60	2.1
15	0.9	65	2.2
20	1.0	70	2.4
25	1.1	75	2.5
30	1.3	80	2.7
35	1.4	85	2.7
40	1.5	90	2.7
45	1.7	95	2.9
50	1.8	100	3.1

Purified Water (EP)

°C	µS/cm	°C	µS/cm
5	2.4	60	8.1
10	3.6	70	9.1
20	4.3	75	9.7
25	5.1	80	9.7
30	5.4	90	9.7
40	6.5	100	10.2
50	7.1		

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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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