

IONIC app

Manual

8.0101.8101EN / IONIC App version 1.0.x / 2026-08-20



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Technical Communication
Metrohm AG
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1 IONIC app – Overview

The IONIC help describes topics related to the structure and functions of the IONIC app. The following content can help to obtain a quick overview of the help, the user interface, the concepts, and the general content of the IONIC app.

IONIC help

IONIC help – Overview

User interface

- *IONIC app – User interface*
- *Touch screen – Operation*

Concepts

- *Titration – Process sequence*
- *Sample list concept*
- *Messages – Concept*

Other

- *Activating the software license*
- *Adding quick access*
- *Report templates – Directory*
- *File formats – Directory*

1.1 IONIC help – Overview



Read the present help carefully before putting the IONIC app into operation.

Observe information and warnings in the help to ensure the safe operation of the IONIC app.

A context-sensitive help is integrated in the IONIC app that provides information about the IONIC app and the functionalities it contains. Depending on which work area, subsection or section the help is opened, the available content is displayed in accordance with the respective area.

Apart from the context-sensitive content, the table of contents of the help can also be called up. All contents available in the help can be opened in the table of contents.

- *Structure*
- *Symbols and conventions*
- *Opening the context-sensitive help*
- *Opening the additional content of the help*
- *Closing the help*

2 Tap **Help**.

The matching content for the area is displayed.

Opening the additional contents of the help

Prerequisite:

- The context-sensitive help is open (*Additional information*).

1 Tap **Table of contents**.

The table of contents of the help is displayed.

2 If necessary, scroll down to the bottom and open the desired content by tapping (*Additional information*).

The selected content is displayed.

Closing the help

Prerequisite:

- The context-sensitive help is open (*Additional information*).

1 Tap in the title bar.

-  If additional content was opened in the context-sensitive help, e.g., by tapping links, then tap  to display the respective previous content. As soon as the originally opened content of the help is displayed again, the help will be closed by continuing to tap .
- Alternatively, tap a work area in the navigation bar to close the help.

1.4 Sample list concept

The **Sample lists** subsection is hierarchically divided into 3 levels.

The following graph shows an example for the possible structuring of a sample list:

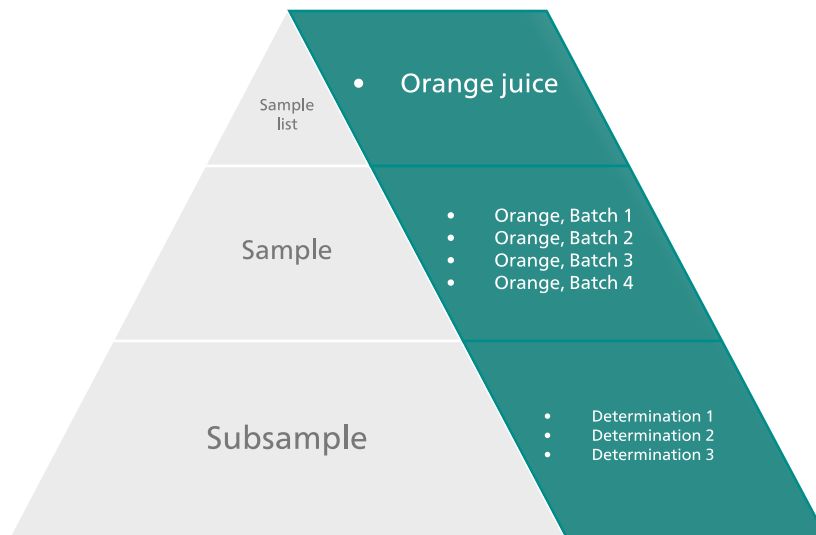


Figure 1 Sample list concept – Example

Level 1: Sample list

Multiple sample lists can be created that contain the associated samples and subsamples.

Figure 2 Level 1 – Sample list

A sample is the population of the material to be analyzed (*Additional information*).



Figure 3 Level 2 – Sample

Level 3: Subsample

A subsample is a subset of a sample ([Additional information](#)).

Multiple subsamples can be created within a sample. A method is assigned to each subsample so that the subsamples can be determined. Completed determinations can be signed on 2 levels ([Additional information](#)). In addition, the results and additional information can be displayed in the determination overview of the respective subsample and reprocessed if required ([Additional information](#)).

No.	Subsample	Method	Sample size	Position	Determinati	Status
1	Subsample 1	MEAS U	1.5 mg		2026-04-2	✓
2	Subsample 2	MEAS U	1.5 mg		2026-04-2	✓
3	Subsample 3	MEAS U	1.5 mg		2026-04-2	✓
4	Subsample 4	MEAS U	1.5 mg		2026-04-2	✓
5	Subsample 5	MEAS U	1.5 mg		2026-04-2	✓
6	Subsample 6	MEAS U	1.5 mg		2026-04-2	✓
7	Subsample 7	MEAS U	1.5 mg		2026-04-2	✓
8	Subsample 8	MEAS U	1.5 mg			✓
9	Subsample 9	MEAS U	1.5 mg			✓

02 Sample 2 0/10 ✓

03 Sample 3 0/10 ✓

Figure 4 Level 3 – Subsample

1.5 IONIC app – User interface

The IONIC app is divided into the following sections:

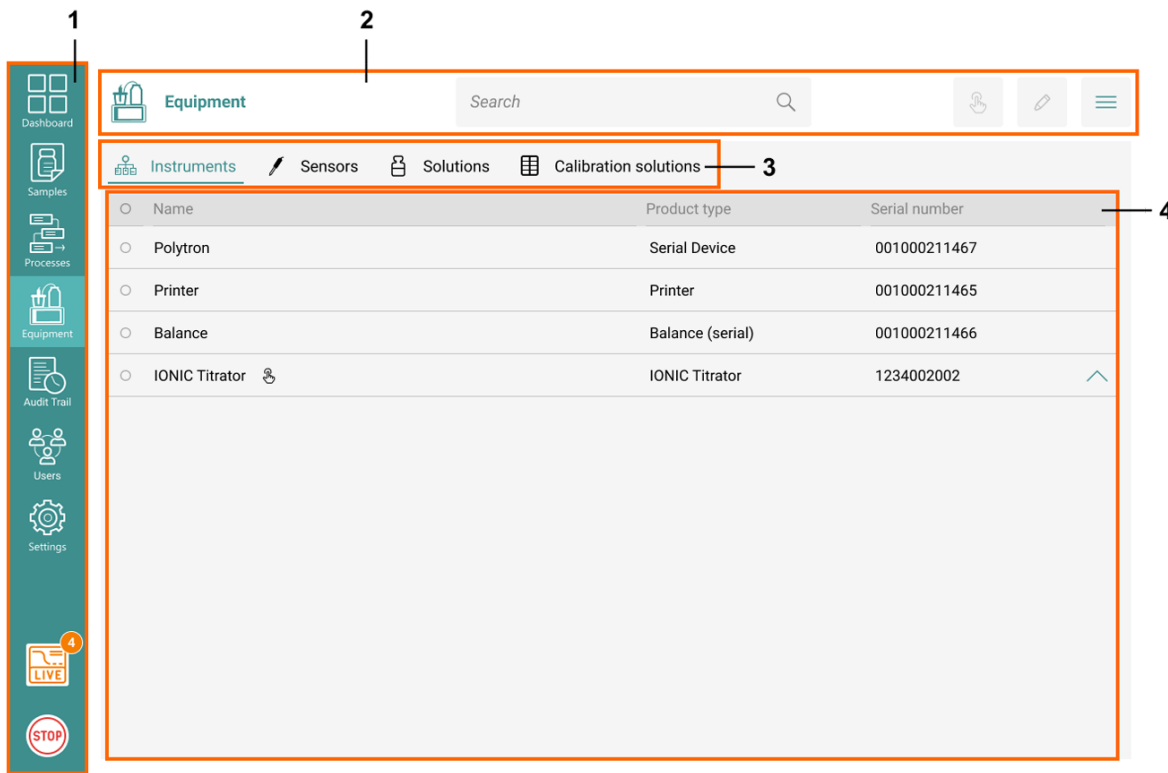


Figure 5 User interface – Example Equipment work area

1 Navigation bar <i>Additional information</i>	2 Title bar <i>Additional information</i>
3 Subsections <i>Additional information</i>	4 Overview list <i>Additional information</i>

i In the IONIC app, the active area is always highlighted in color (e.g., in the image of the **Equipment** work area and the **Instruments** subsection).

Navigation bar

Tap the **...** icon to expand the navigation bar.

The following work areas are displayed on the navigation bar:

i If the user management is used, then the work areas are displayed, depending on the assigned user group rights.



Title bar

The first level appears as soon as a work area is opened. In this case, the title bar contains the following objects:

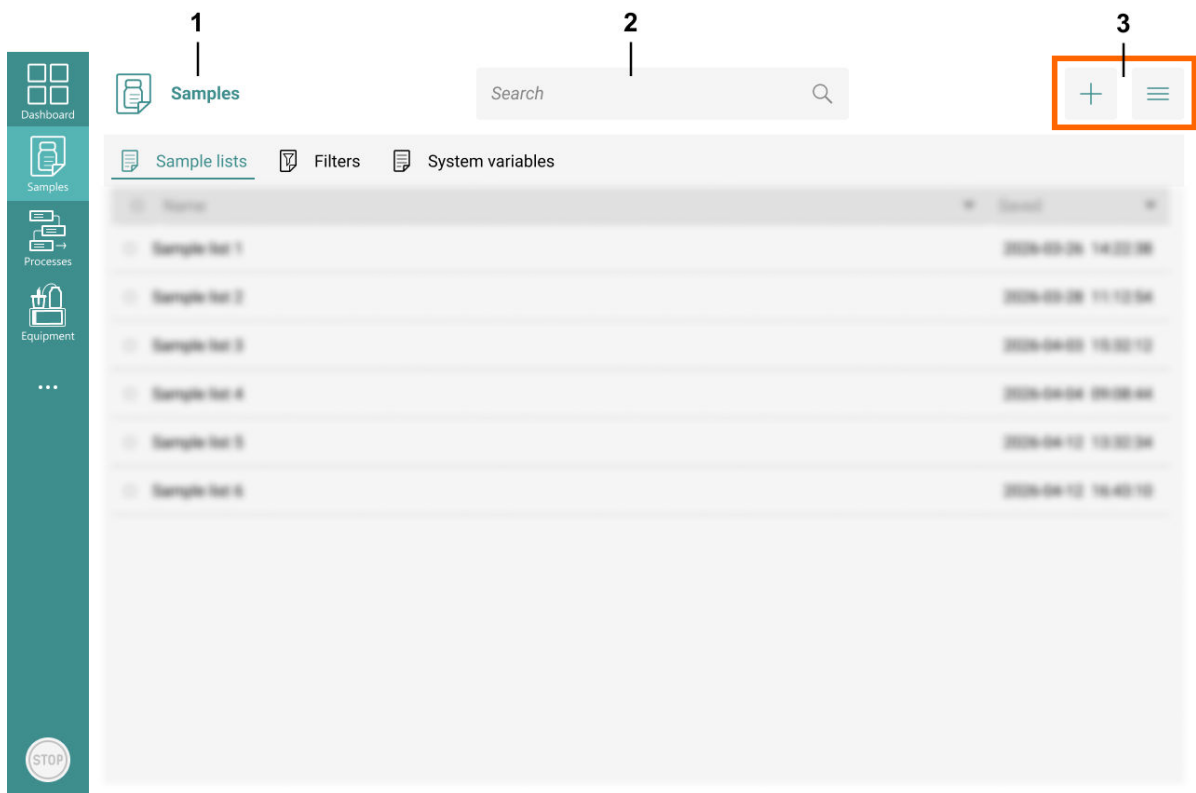


Figure 7 Title bar – Example Samples work area

- 1 Work area**
Name of the active work area.
- 2 Search bar**
Enter the keyword to search for an object in the active subsection.
- 3 Function icons**
Tap either to open a menu with functions or to open functions directly.
[Additional information](#)

The second level appears as soon as an object is opened in a subsection. The second level is not available for all subsections. On the second level, the title bar contains the following objects:



Figure 8 Title bar – Example open sample list

1 Back Tap to close the active area and return to the previous area.	2 Name Name of the opened object.
3 Function icons Tap either to open a menu with functions or to open functions directly. <i>Additional information</i>	

Function icons in the title bar

-  Only the icons that appear in the title bar of multiple subsections are listed here. Icons that affect individual subsections and sections are described in the respective overview.
- The function describes what happens as soon as the icon is tapped.

The following function icons can appear in the title bar:

Icon	Function
	Create a new object.

Icon	Function
	Open the menu with functions. The menu contains functions for the entire area. Tap Help in the menu to call up the IONIC help.

Subsections

- Only the icons that appear in multiple subsections and sections are listed here. Icons that affect individual subsections and sections are described in the respective overview.
- The function describes what happens as soon as the icon is tapped.

Icon	Function
	Expand the object.
	Collapse the object.
	Open the menu with additional functions. The menu contains functions for the respective section.
	The setting is deactivated. Tap to activate the setting.
	The setting is activated. Tap to deactivate the setting.
	Move the selected line upwards or downwards.
	Tap to add the function to the title bar (<i>Additional information</i>).
	A maximum of 5 functions can be added to the title bar as quick access.
	Tap to remove the function from the title bar (<i>Additional information</i>).
	Set the date and time.

Overview list

The manually created and predefined objects of the respective subsection are listed in overview lists.

The following function icons and functional elements can appear in the overview lists:

- Only the icons that appear in all overview lists are listed here. Icons that affect individual subsections and sections are described in the respective overview.
- The function describes what happens as soon as the icon is tapped.

Icon	Function
	Select the object. If the icon in the header is tapped, then all objects in the list are selected.  This does not apply to objects that are displayed on the second level in the overview list.
	Deselect the object. If the icon in the header is tapped, then all objects in the list are deselected.  This does not apply to objects that are displayed on the second level in the overview list.
	Filter the column in ascending or descending order. As soon as a column is sorted with this function,  in the respective column will change color: : The column is filtered in ascending order. : The column is filtered in descending order.
	Scroll the overview list upwards or downwards (<i>Additional information</i>).

Input fields

Input fields are present, for example, in the properties of objects. The input fields are displayed in different ways:

Display	Description
	Empty input field.
	Input field with entered content.
	Input field while the valid content is being entered.
	Input field with invalid content.
	Read-only input field.

1.6 Touch screen – Operation

The IONIC app is operated with a touch screen integrated in the instrument. Various gestures are required for the extensive operation of the touch screen.

- [Tapping](#)
- [Scrolling](#)
- [Moving](#)
- [Zooming](#)

Tapping

The **tap** gesture is used, for example, to open objects, select them or to operate the keyboard.

Tapping an object

- 1 Touch the touch screen briefly with your fingertip.



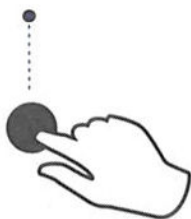
- 2 Lift your fingertip again.

Scrolling

The **Scroll** gesture is used, for example, to move up or down in an overview list.

Scrolling up or down

- 1 Touch the touch screen with your fingertip.
- 2 **Scroll down:** Move your fingertip upward on the touch screen.



Scroll up: Move your fingertip downward on the touch screen.



- 3** Lift your fingertip again.

If available, you can as an alternative touch the scroll bar on the right edge of the overview list with your fingertip and move it upward or downward on the touch screen.

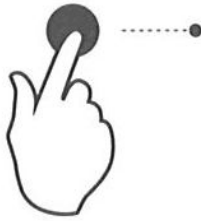
You can also scroll to the left or to the right in a list, for example.

Scrolling to the left or right

- 1 Touch the touch screen with your fingertip.
- 2 **Scrolling to the right:** Move your fingertip on the touch screen to the left.



Scrolling to the left: Move your finger tip on the touch screen to the right.



3 Lift your fingertip again.

Moving

The **Move gesture** is used, for example, to insert a command from the command library into a method via drag and drop or to move commands within a method. In addition, the gesture is used, for example, for moving sliders (e.g., for setting the stirring level, the brightness or the font size) and for activating the emergency stop.

Moving an object

i Depending on the use case, the object must already be selected by tapping it.

- 1** Touch the object with your fingertip.
- 2** Move your fingertip on the touch screen to the desired position.



3 Lift your fingertip again.

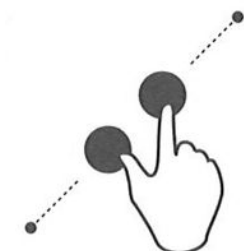
i Tap  to center the object.

Zooming

The **Zoom** gesture is used, for example, to enlarge (zoom out) or reduce (zoom in) an area in a curve or in a method.

Zooming in

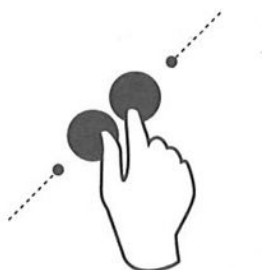
- 1 Touch the area to be enlarged with 2 fingertips close to one another.
- 2 Move your two fingertips apart on the touch screen.



- 3 Lift your fingertips again.
- 4 If the area is to be displayed even larger, then repeat the previous steps up to the desired zoom level.

Zooming out

- 1 Touch the area to be reduced with 2 fingertips stretched apart.
- 2 Move your two fingertips towards one another on the touch screen.



- 3 Lift your fingertips again.
- 4 If the area is to be displayed even smaller, repeat the previous steps up to the desired zoom level.

 Tap  to reset the zoom level to 100%.

1.7 Adding quick access

 The images show the procedure using an example from the **Favorites** section. The procedure applies to all areas in which the quick access function is available.

Video tutorial for adding quick access:



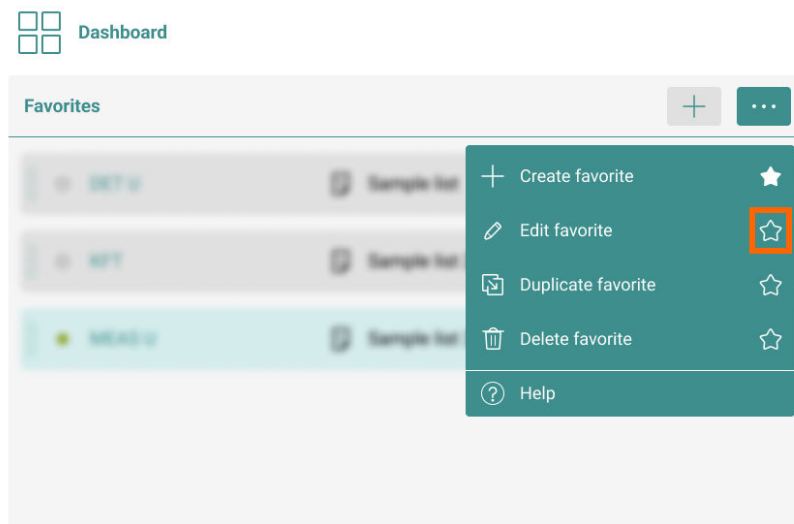
Adding quick access

Prerequisite:

- The required menu (•••) is open.

1 Adding quick access

Tap next to the desired function .



 A maximum of 4 functions can be added per menu as quick access.

[illegible][illegible][illegible]

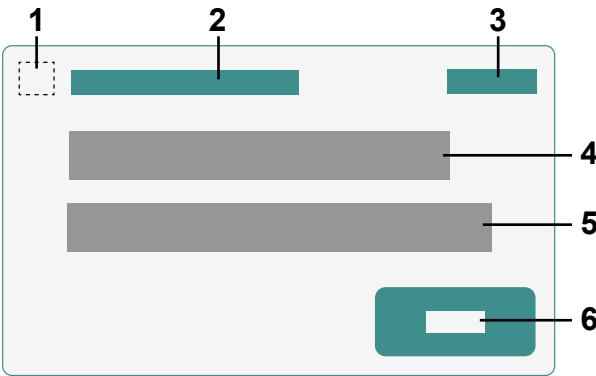


- | | |
|---|---|
| <p>1 Message icon
Displays the message icon for the <i>Information</i> or <i>Warning</i> message types.
Additional information</p> | <p>2 Message title
Title for the brief description of the message.</p> |
| <p>3 </p> <p>Close the message by tapping on it.</p> | <p>4 Description
Description of the information or warning.</p> |

Error messages and warning messages

Error messages and warning messages that require a user action appear in a central position on the screen and block the user interface until the button in the error message has been tapped. If the problem has not been solved, then the message will appear again for the same action.

Error messages and warning messages are structured as follows:



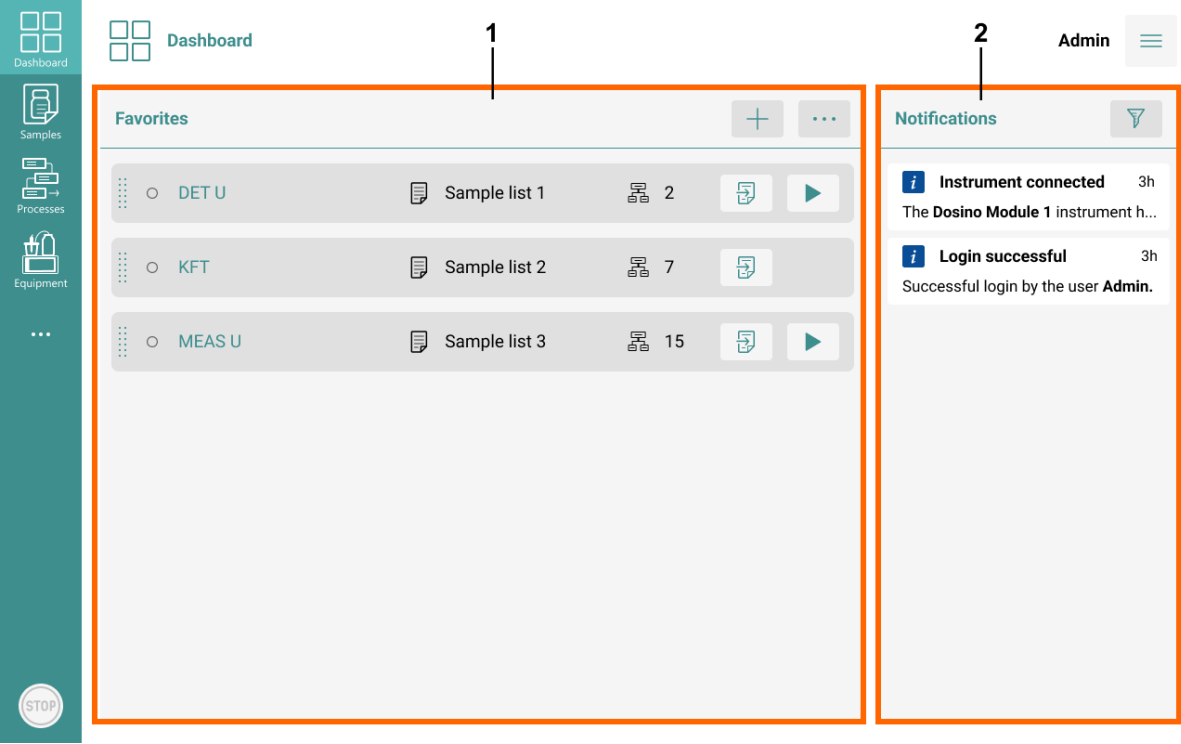
- | | |
|---|---|
| <p>1 Message icon
Displays the message icon for the <i>Error</i> or <i>Warning</i> message types.
Additional information</p> | <p>2 Message title
Title for the error description.</p> |
| <p>3 Message number
Identification number of the error message or the warning message.</p> | <p>4 Description of causes
Description of the error cause.</p> |
| <p>5 Troubleshooting
Supporting troubleshooting instructions.</p> | <p>6 Button
Button for closing the message.</p> |

For long messages, use the scroll bar on the right-hand message edge for navigating.

Areas (manual generation of reports)	Name	Description	Content
Samples ▶ Sample lists ▶ Subsample Samples ▶ Sample lists ▶ Determination overview	Equipment (determination)	Equipment used for the determination.	▪ Sample ▪ Subsample ▪ Method ▪ Subsample data ▪ Statistics settings ▪ Determination ▪ Instruments ▪ Functional units
Samples ▶ Sample lists ▶ Subsample Samples ▶ Sample lists ▶ Determination overview	Chronology (determination)	History overview of all actions relevant for the determination in chronological order.	▪ Sample ▪ Subsample ▪ Method ▪ Subsample data ▪ Statistics settings ▪ Determination ▪ Chronology
Processes ▶ Methods Samples ▶ Sample lists ▶ Subsample Samples ▶ Sample lists ▶ Determination overview	Parameters (method)	Parameters of the selected method.	▪ Method – General – Subsample data – Statistics settings ▪ Main – Command properties of the commands used ▪ Execute on stop – Command properties of the commands used ▪ Execute on error – Command properties of the commands used

2 Dashboard – Work area

The **Dashboard** work area is divided into the following sections:



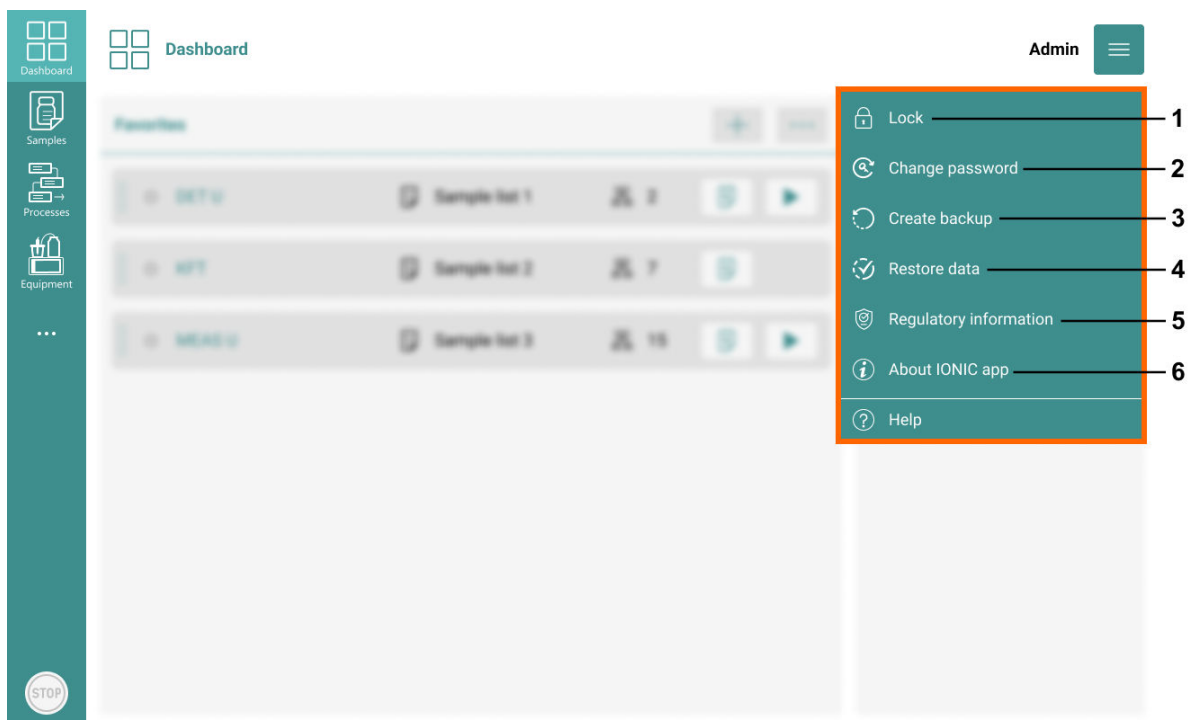
1 Favorites
Additional information

2 Notifications
Additional information

 If a user account is logged on, then the user name of the logged-on user account will be displayed in the title bar of the dashboard.

Functions

Tap on  to open a menu with the following functions:



1 Lock

Lock the IONIC app.

The function is available only if the toggle switch next to **User ID** or the toggle switch next to **ERES compliance** has been activated under **Settings ► Security ► Login and compliance** (*Additional information*).

Additional information

2 Change password

Change the password of the logged-in user account.

The function is available only if the toggle switches next to **User ID** and **Password** have been activated or if the toggle switch next to **ERES compliance** has been activated under **Settings ► Security ► Login and compliance** (*Additional information*).

Additional information

3 Create backup

Create a backup file for the system. The backup file contains the current database, the system configuration, and the data of all integrated functional units connected via the MDL connector.

The function is available only for user accounts with the necessary user group rights.

Additional information

4 Restore data

Restore the database and system configuration stored in the backup file.

The function is available only for user accounts with the necessary user group rights.

Additional information

5 Regulatory information

Display regulatory information and certifications for the instrument.

6 About IONIC app

View additional information about the IONIC app and the logged-on user account.

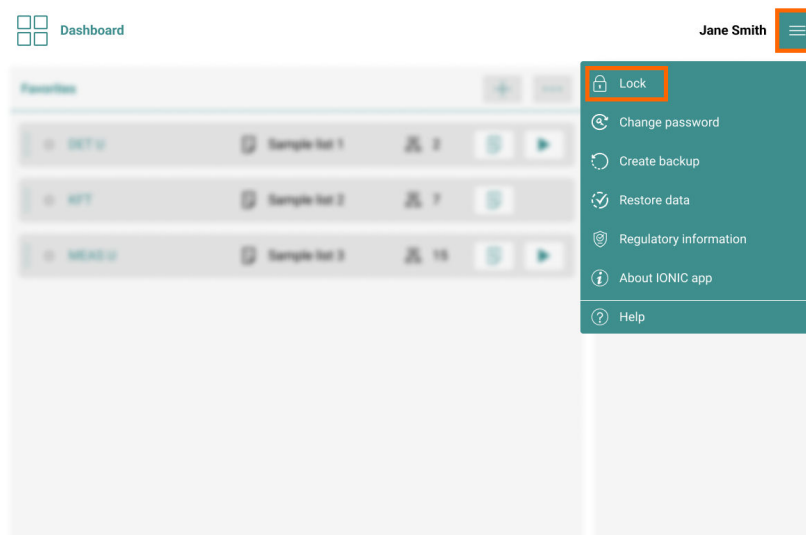
2.1 Locking/unlocking the IONIC app

A user-specific login to the system is possible and the IONIC app can be locked and thus protected against data changes if the toggle switch next to **User ID** or the toggle switch next to **ERES compliance** has been activated under **Settings ► Security ► Login and compliance** (*Additional information*).

- *Locking the IONIC app*
 - *Unlocking the IONIC app (same user account)*
 - *Unlocking the IONIC app (other user account)*
- If the **Automatic locking** is activated under **Settings ► Security ► System locking**, then the IONIC app will be locked automatically if user activity is absent within the defined Period, and the user must log in again with the corresponding access data (*Additional information*).
 - Running determinations are not interrupted by the locking of the IONIC app and are continued in the background.
 - The emergency stop can also be activated in the locked state for running determinations (*Additional information*). If the **Audit Trail** function is activated, then the activation of the emergency stop in the Audit Trail is recorded and assigned to the **System-User** user account.

Locking the IONIC app

- 1 Tap **Dashboard** and select **Lock** in the title bar  in the work area.



The IONIC app is locked and the user must log in again with the corresponding access data.

Unlocking the IONIC app (same user account)

1 Authenticating a user account

- In the **Unlock** dialog, tap the input field under **User ID** and enter the user ID of the user account.
- Tap the input field under **Password** and enter the password of the user account.

 The input field under **Password** is available only if the toggle switch next to **Password** or the toggle switch next to **ERES compliance** has been activated under **Settings ► Security ► Login and compliance** (*Additional information*).

2 Confirming a login

Tap **[Unlock]** and confirm the login data.

Unlocking the IONIC app (other user account)

Prerequisite:

- The user account has the same user group rights as the user account with which the IONIC app was locked.

 When logging in a different user account, observe the following:

- Unsaved changes made by the previously logged in user are discarded at the time of a new login.
- If the **Audit Trail** function is activated, then the change of user will be recorded in the Audit Trail. All changes up to the unlocking are assigned to the previously logged on user account. All changes made by the newly logged-in user account will be assigned to the newly logged-in user account after the change of user.

1 Authenticating a user account

Tap the **[Switch user]** button in the **Unlock** dialog.

2 Authenticating a user account

- In the **Login** dialog, tap the input field under **User ID** and enter the user ID of the user account.
- Tap the input field under **Password** and enter the password of the user account.

 The input field under **Password** is available only if the toggle switch next to **Password** or the toggle switch next to **ERES compliance** has been activated under **Settings ► Security ► Login and compliance** (*Additional information*).

3 Confirming a login

Tap **[Continue]** and confirm the login data.

The user account is logged on and can see the areas in the IONIC app and execute the functions that have been defined in the user group rights (*Additional information*).

2.2 Change password

If the toggle switches next to **User ID** and **Password** have been activated or if the toggle switch next to **ERES compliance** has been activated under **Settings ► Security ► Login and compliance**, then the password can be changed (*Additional information*).

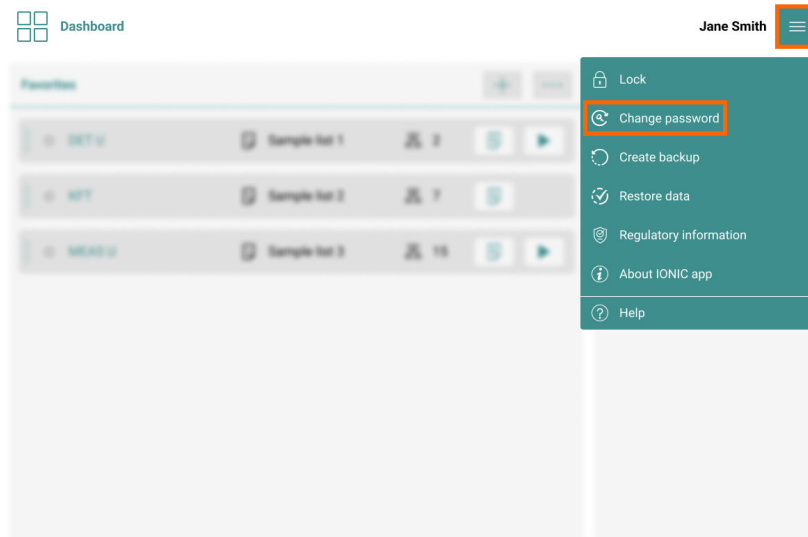
-  If the **Password expires** option is activated under **Settings ► Security ► Password policy**, then the user must change the password when logging into the IONIC app after the defined validity period has expired (*Additional information*).
- A reset of the password must be requested from the administrator.

Prerequisite:

- The user is logged on to the IONIC app.

1 Opening the password dialog

Tap **Dashboard** and select **Change password** in the title bar  in the work area.



2 Defining a new password

- In the **Defining a new password** dialog, tap the input field under **Old password** and enter the current password.
- Tap the input field under **New password** and enter a new password in accordance with the password requirements.
- Tap the input field under **Confirm password** and repeat the newly set password.

The password requirements are defined under **Settings** ► **Security** ► **Password policy** (*Additional information*).

 Securely document and store the assigned password securely (e.g., in a password manager or in another protected memory location).

3 Confirming a password

Tap **[Save]** and confirm the new password.

The user account is logged on with the new password.

2.3 Create backup

An encrypted backup file of the system is created when a backup is created. The backup file contains the current database, the system configuration, and the data of all integrated functional units connected via the MDL connector.

NOTICE

Loss of database

Metrohm AG does not have access to the database and **cannot** restore the database in the event of loss of backup file and/or password.

- Archive the backup file on a suitable and secure storage medium after its creation. The USB flash drive is not intended as a permanent storage medium for backup files.
- Securely document and store the assigned password securely (e.g., in a password manager or in another protected memory location).

Prerequisite:

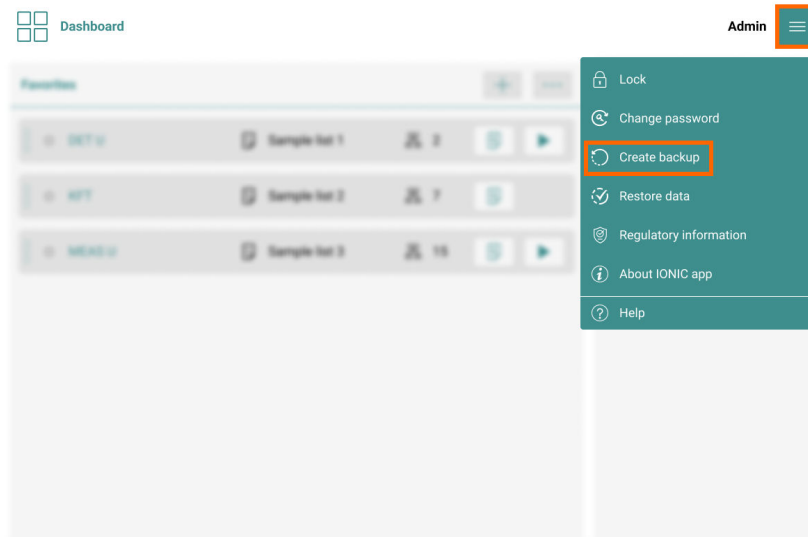
- The logged on user has the necessary user group rights ([Additional information](#)).

1 Plugging in a USB flash drive

Plug a USB flash drive into one of the USB connectors available on the IONIC main instrument and wait until the message **USB flash drive connected** appears.

2 Opening a backup dialog

Tap **Dashboard** and select **Create backup** in the title bar  in the work area.



3 Selecting a USB connector

Tap the selection list under **USB connector** and select the connector to which the desired USB flash drive is connected.

- The selection list is available only if at least one USB flash drive is connected.
- The **Assign automatically** function works only if exactly one USB flash drive is connected.

4 Defining a password (optional)

- Tap .
- Tap the input field under **Password** and **Confirm password** and enter a password for the additional encryption of the backup file.

-  The backup file is always encrypted. When the password is activated, then the data can be restored only with the password defined here ([Additional information](#)).

5 Creating a backup

Confirm the message with **[OK]**.

-  Tap **[Cancel]** to cancel the creation of the backup.

The backup file is checked and created. This procedure may take several minutes.

As soon as the **Backup successful** information message appears, the backup will be stored on the USB flash drive as an encrypted IONIC backup file (.iob).

 The backup file is saved to the USB flash drive in the **Backups** folder under the following file name: **InstrumentName_Time-Stamp**. Spaces are replaced with _.

During export, the time indications in the file properties are converted to Coordinated Universal Time (UTC±00:00). This time format may differ from the local time on the instrument.

2.4 Restore data

The user can restore only the database and the system configuration. Only the regional Metrohm Service representative can restore the data of all integrated functional units connected via the MDL connector.

Prerequisite:

- The data to be restored comes from an IONIC App version that is the same or older than the currently installed IONIC App version.
- The IONIC backup file (.job) is present in the **Backups** folder on the USB flash drive used.
- The logged on user has the necessary user group rights (*Additional information*).

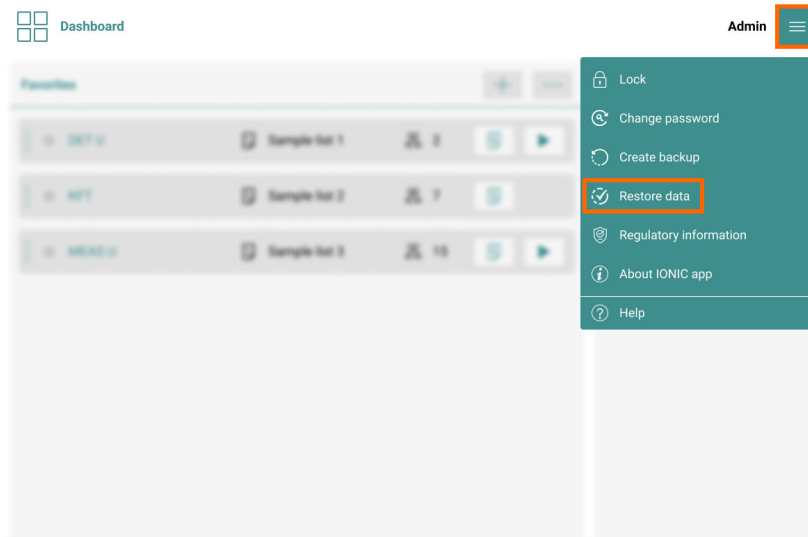
1 Plugging in a USB flash drive

Plug a USB flash drive into one of the USB connectors available on the IONIC main instrument and wait until the message **USB flash drive connected** appears.

 If multiple USB flash drives are plugged in, then the USB flash drive that was first recognized by the system will be used.

2 Opening the restore dialog

Tap **Dashboard** and select **Restore data** in the title bar in the work area.



3 Selecting a backup file

- Tap  to select the desired IONIC backup file (.iob).
- Tap **[Continue]**.

4 Entering a password

- If a password was defined when the backup was created, then tap the input field under **Password** and enter the password.
- Tap **[Continue]**.

5 Restoring data

- Confirm the message with **[Continue]**.
- Tap **[Restore]** in the following message to restore the data.

 Tap **[Cancel]** to cancel the restoration of the data.

The database and the system configuration are restored from the backup file and overwrite the existing database and system configuration. Depending on the database size, this procedure can take from several minutes to several hours.

- Only the data that is present in the backup file will be restored. If new data has been added since the backup was created, then the data will be lost when the data is restored.
- The IONIC main instrument must not be switched off or disconnected from the energy supply during the restoration.
- The USB flash drive must not be removed from the IONIC main instrument during the restoration.

Once the data has been restored, the IONIC main instrument will be restarted automatically. As soon as the IONIC main instrument is ready, the status display will light up **green**.

- Contact the regional Metrohm service representative to restore the data of all integrated functional units connected via the MDL connector.

2.5 Favorites – Overview

- [Definition](#)
- [Overview list](#)
- [Functions](#)
- [Editing window](#)
- [Icons](#)

Video tutorials for the **Favorites** section:



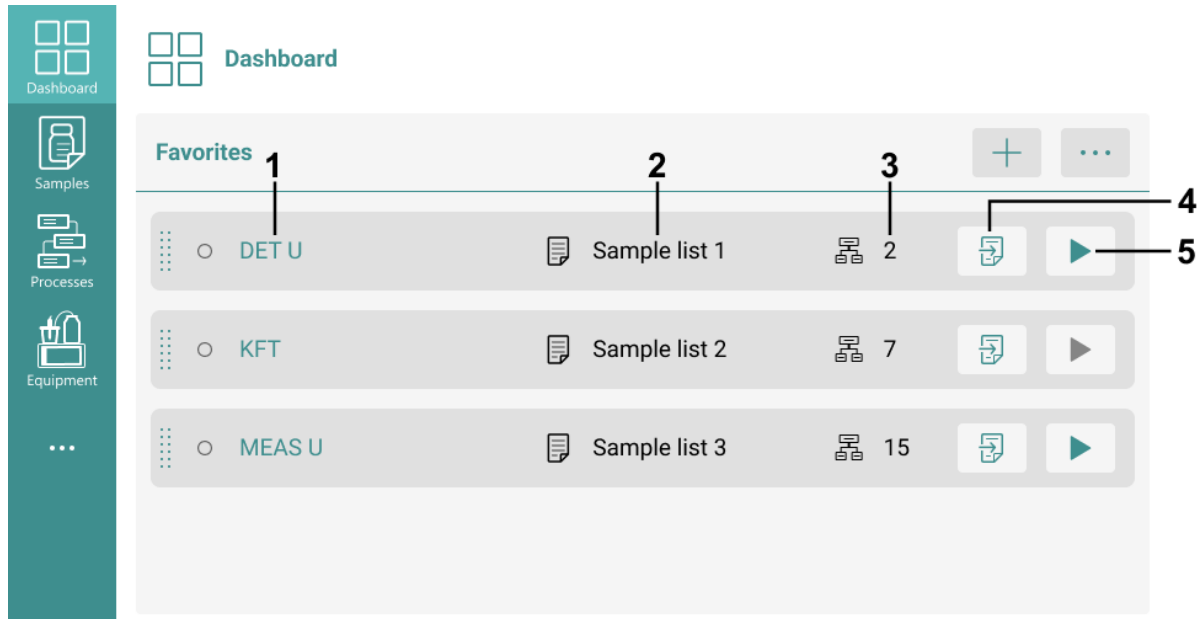
Definition

Templates for frequently used analyses can be defined or edited in the **Favorites** section.

With a favorite, a sample with the defined number of subsamples (a maximum of 24 in total) can be created in the selected sample list and the determinations can be set to pending. The subsamples can be analyzed with a maximum of 5 different methods.

Overview list

All created favorites are displayed in an overview list in the **Favorites** section. The following information is displayed in the overview list:



1 Name of favorite

The name of favorite is also the sample name of the sample created by the favorite.

2 Sample list name

Name of the sample list that is linked to the favorite and in which the defined sample is to be created.

3 Number of subsamples

Number of subsamples that are to be created within the sample.

4

The sample defined in the favorite is created in the linked sample list by tapping.

Additional information

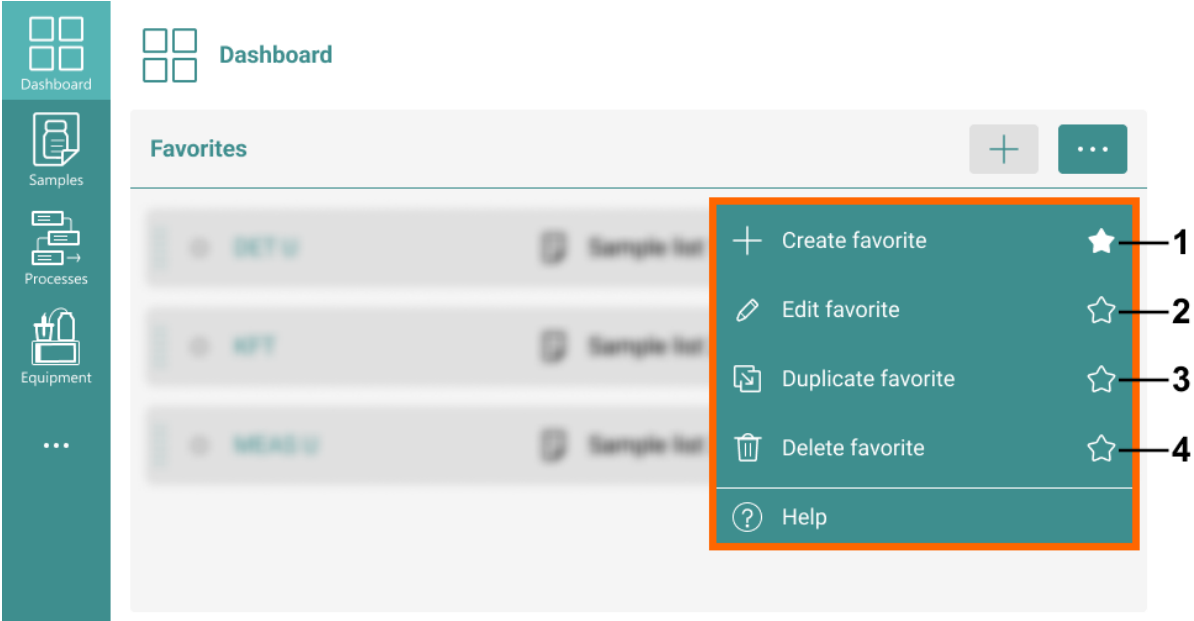
5

The sample defined in the favorite is created in the linked sample list by tapping. At the same time, the determinations of the subsamples created in the sample are set to pending.

Additional information

Functions

Tap on **...** to open a menu with the following functions:



1 Create favorite

A new favorite is created and can be defined in the editing window.

[Additional information](#)

2 Edit favorite

The editing window of the selected favorite is opened.

[Additional information](#)

3 Duplicate favorite

The selected favorite is copied and appears as a new favorite in the overview list.

[Additional information](#)

4 Delete favorite

The selected favorite is deleted.

[Additional information](#)

Editing window

The **Edit favorite** window opens by tapping the desired favorite. If a favorite is created, then the window is called **Create favorite**. In the help, both windows are named editing windows for the sake of simplicity.

The properties of the selected favorite can be edited in the editing window. The following settings can be configured:

Create favorite

Name of favorite — 1

Sample list — 2



Method and number of subsamples (max. 24) — 3

Method 1



 — 4

Method 2





Method 3





Method 4





+ Method

— 5

☐ Set to pending — 6

Cancel

Save

1 Name of favorite

Name of the favorite in the overview list that also corresponds to the name of the sample in the defined sample list.

The name of favorite may not exceed 32 characters.

2 Sample list

Selection list of the sample lists available in the **Samples** work area.

The favorite is linked to the sample list.

3 Method and number of subsamples (max. 24)

The selection list of the methods present in the **Processes** work area and the specification of the number of subsamples that are to be created in the sample with the defined method.

Regardless of the number of defined methods, a maximum of 24 subsamples can be created with a favorite.

4 ×

Remove the selected method from the favorite.

5 Method

Additional methods that are to be assigned to the defined subsamples can be selected by tapping on **[Method]**.

A maximum of 5 methods can be defined in total.

6 Set to pending

✓: The determinations can be set to pending directly from the **Favorites** section.

Icons

 The following icons are present in the **Favorites** section. Icons that affect the entire user interface can be found [here](#).

Icon	Function
	Tap to add the function as a bookmark to the title bar (Additional information).
	Tap to remove the function as a bookmark from the title bar (Additional information).

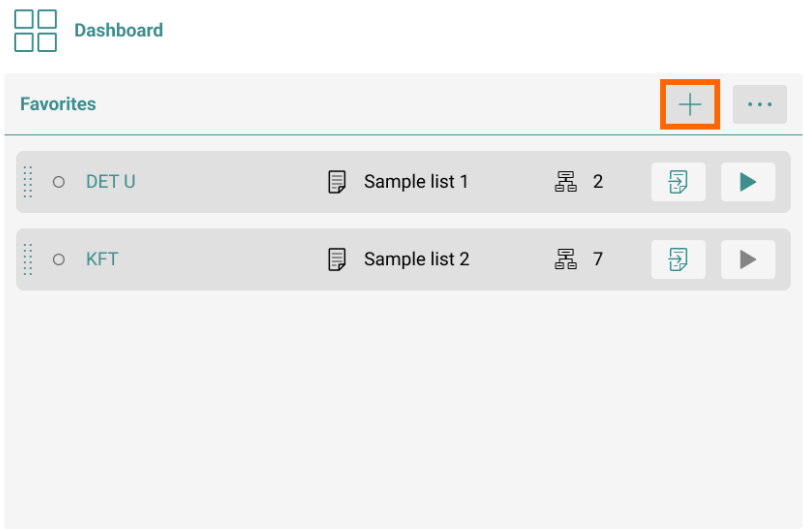
2.5.1 Create favorite

Video tutorial for creating favorites:



1 Creating a favorite

Under **Dashboard** ► **Favorites**, tap in the title bar .



The **Create favorite** window is opened automatically.

2 Entering the name of favorite

Tap the input field under **Name of favorite** and enter the desired name.

 The maximum character length is 32 characters.

Dashboard

Favorite

SET

WFT

Create favorite

Name of favorite

Sample list

Select

▼

Method and number of subsamples (max. 24)

Select

▼

1

+ Method

☐ Set to pending

Cancel

Save

3 Selecting a sample list

Tap the selection list under **Sample list** and select the sample list in which the sample is to be created.

 The required sample list can also be searched for by entering a text.

Create favorite

Name of favorite

MEAS

Sample list

Enter

- Sample list 1
- Sample list 2
- Sample list 3
- Sample list 4
- Sample list 5

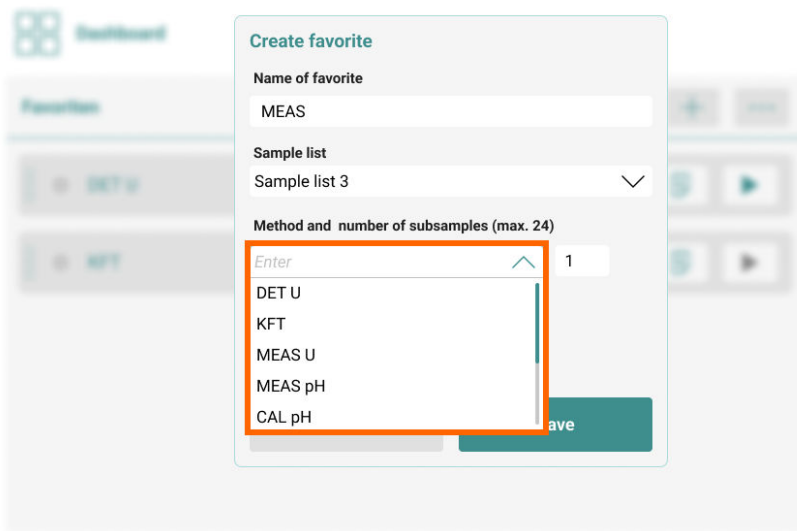
☐ Set to pending

Cancel Save

4 Selecting a method

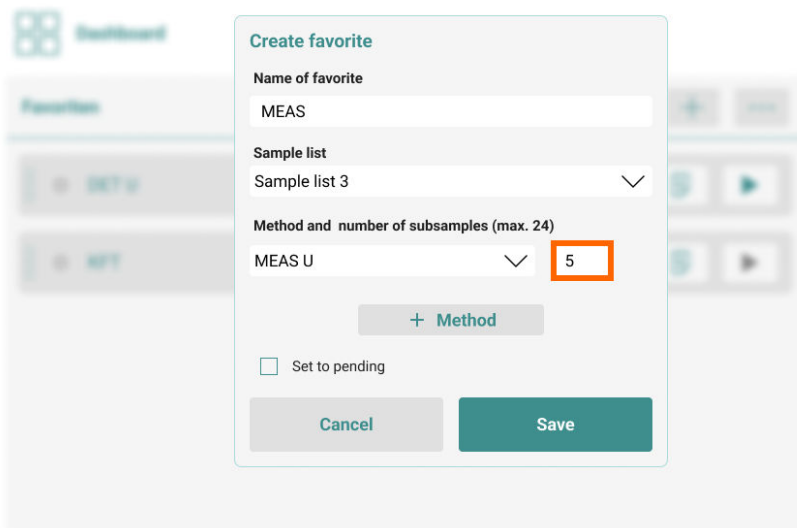
Tap the input field under **Method and number of subsamples** and select the method to be assigned to the subsamples to be created.

 The desired method can also be searched for by entering text.



5 Entering the number of subsamples

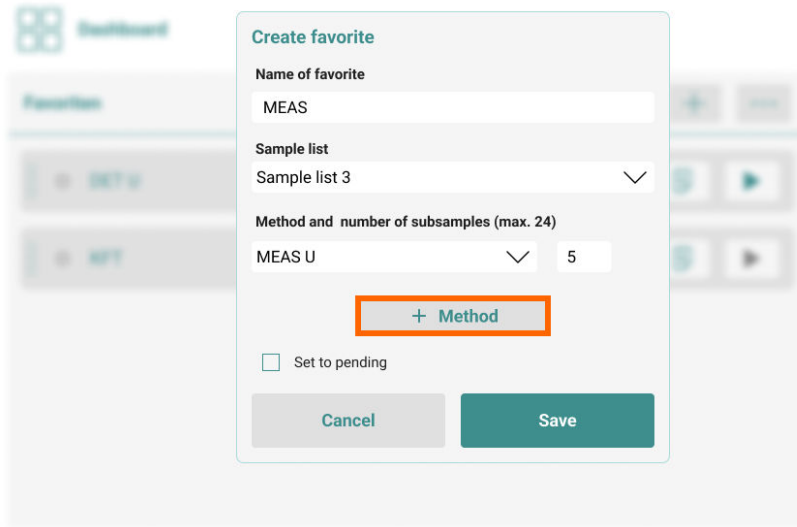
Tap the input field next to the method selection and enter the number of subsamples that are to be created in the sample with the assigned method.



6 Adding methods (optional)

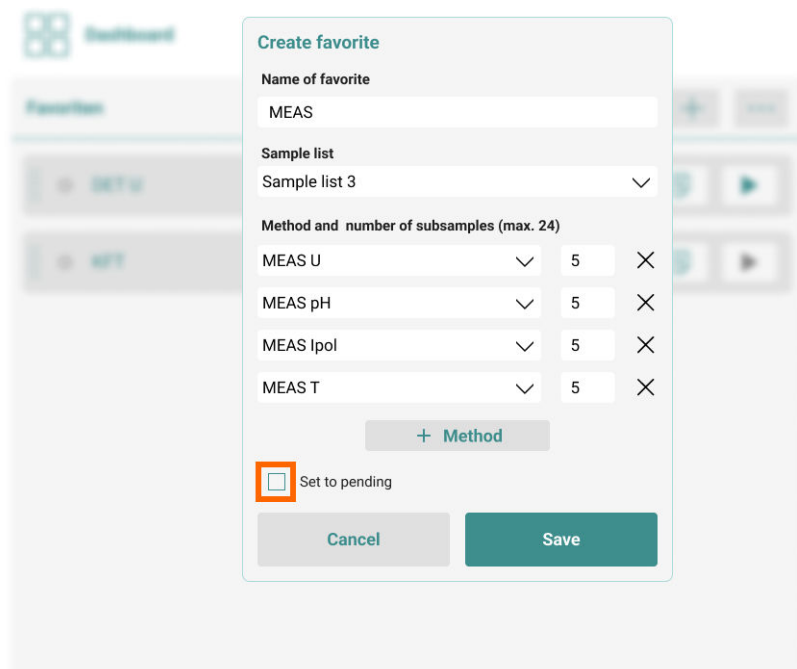
Tap **[Method]** and add more methods.

 A maximum of 5 methods can be selected.



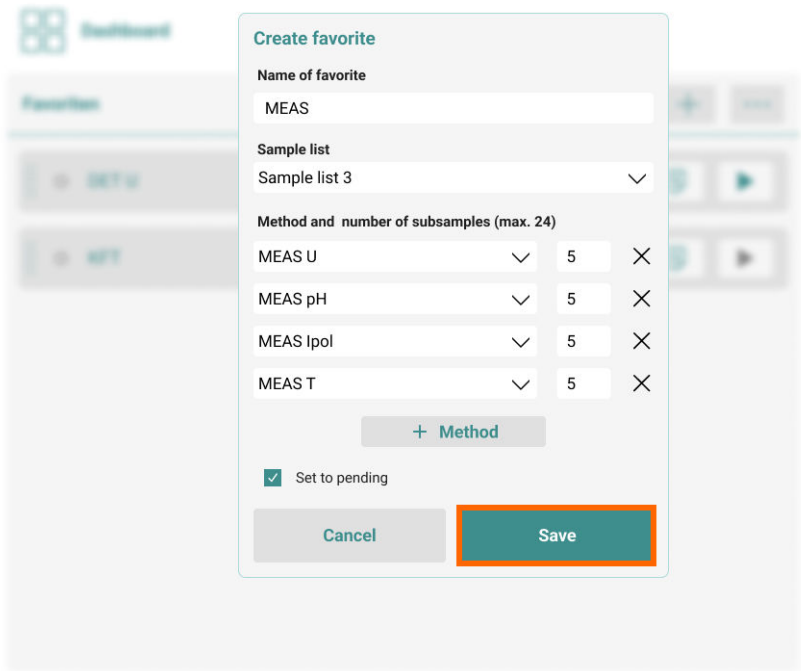
7 Activating the "Set to pending" option (optional)

Tap  to be able to set the determinations of the defined subsamples to pending directly in the **Favorites** subsection.



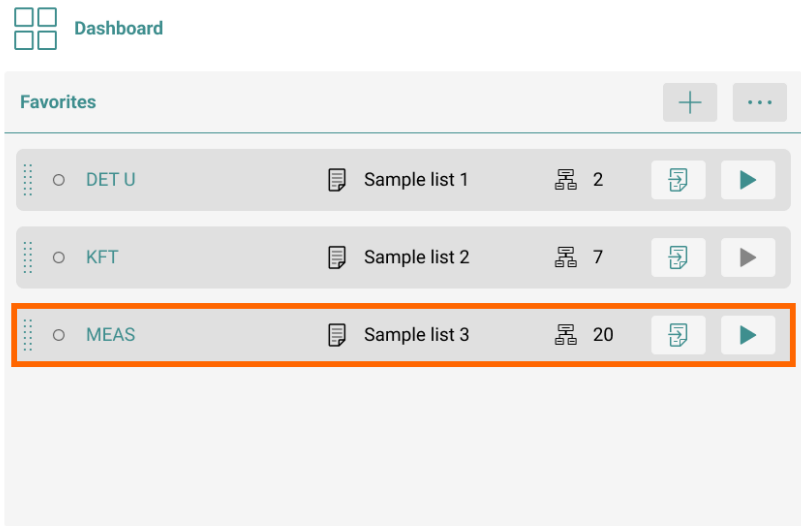
8 Saving a favorite

Tap **[Save]** to save the favorite.



 Tap **[Cancel]** to discard all changes.

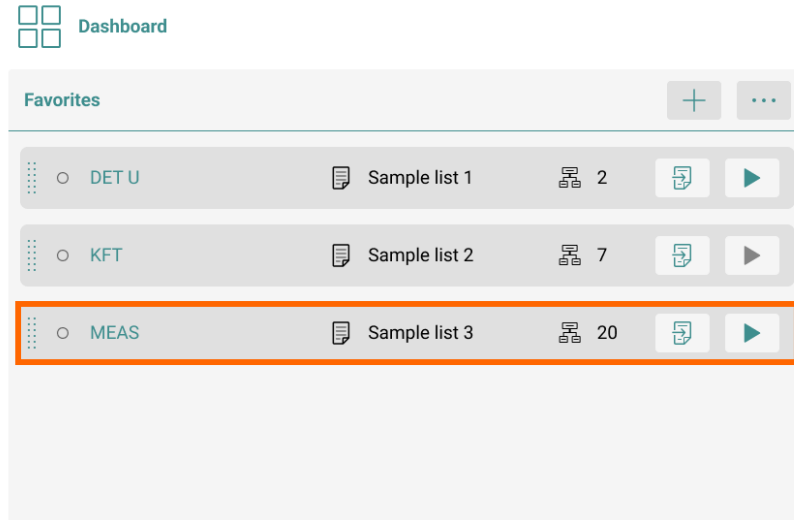
The created favorite appears in the overview list.



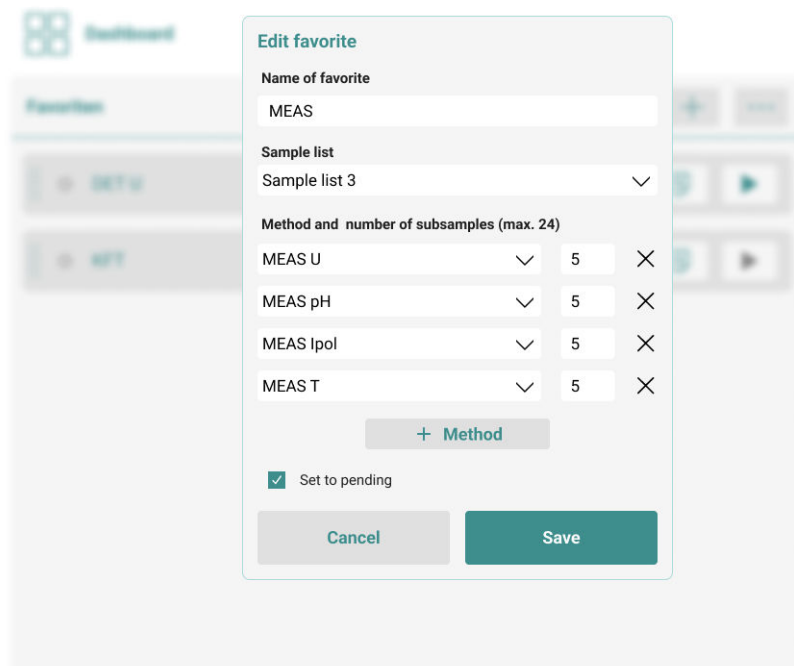
2.5.2 Edit favorite

1 Opening the editing window

Under **Dashboard** ► **Favorites**, tap on the desired favorite.



The editing window opens and the favorite can be edited (*Additional information*).

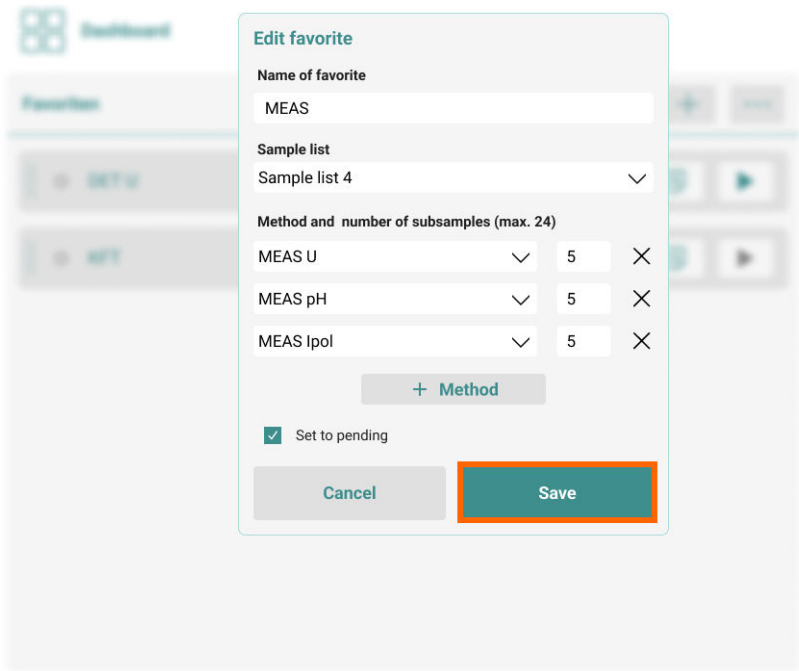


2 Editing a favorite

Edit the favorite as desired.

3 Saving a favorite

Tap **[Save]** to save the changes.

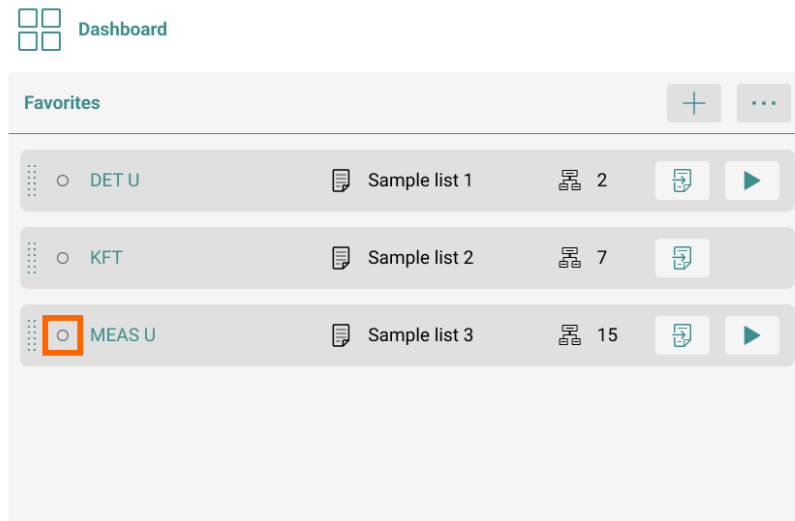


 Tap **[Cancel]** to discard all changes.

2.5.3 Duplicate favorite

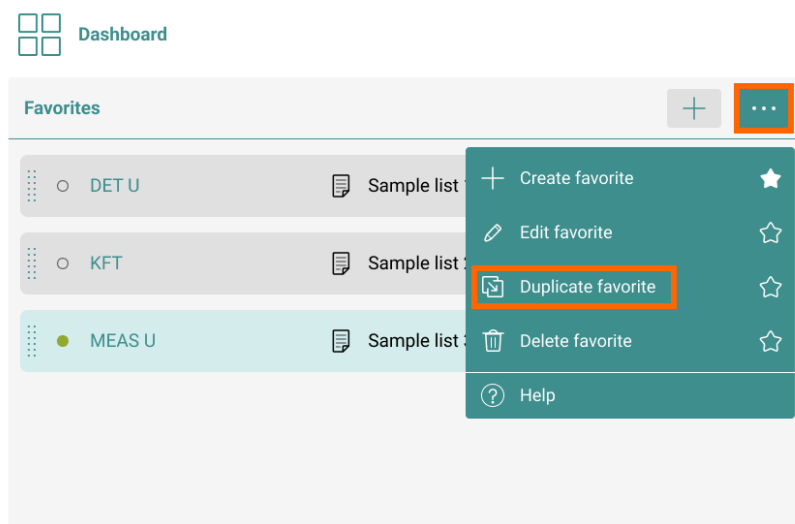
1 Selecting favorites

Select the desired favorites by tapping .

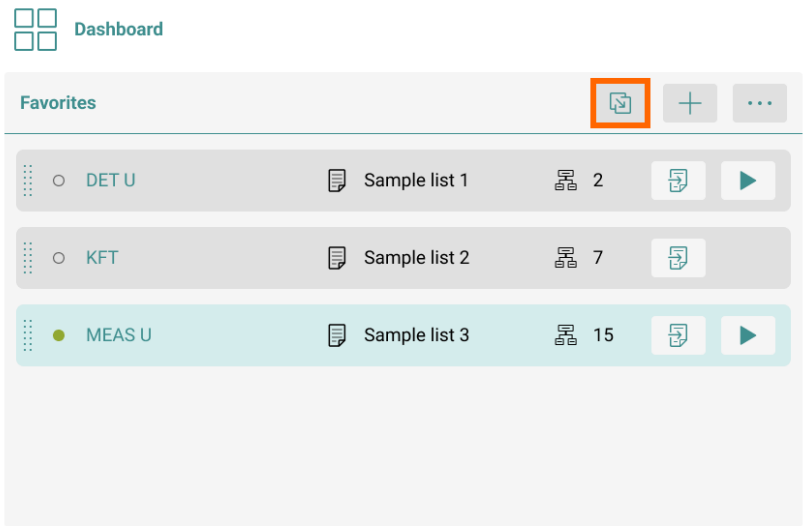


2 Duplicating favorites

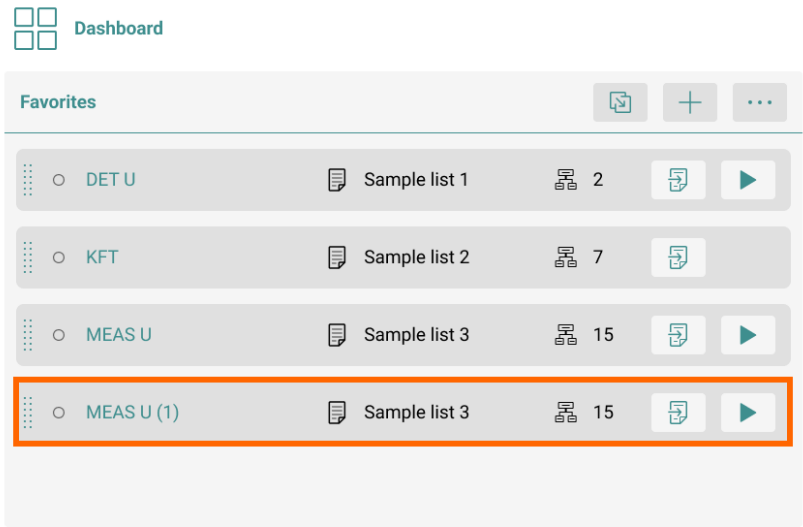
Tap **...** in the title bar and select **Duplicate favorite**.



As an alternative, tap  in the title bar if the function has been added as a bookmark (*Additional information*).



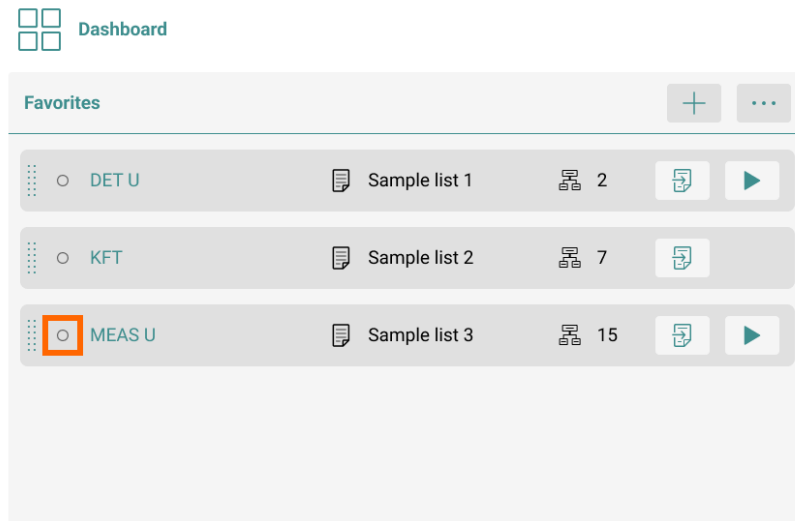
The selected favorites are duplicated and displayed in the overview list under the same name with ascending numbering.



2.5.4 Delete favorite

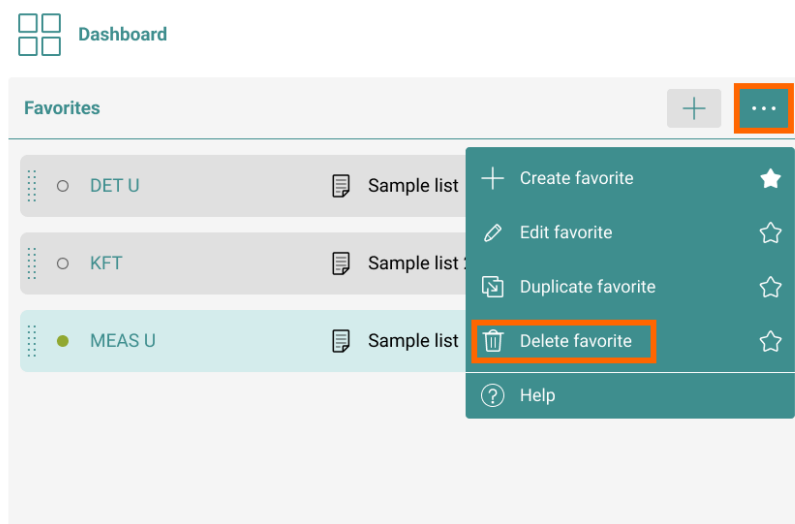
1 Selecting favorites

Select the desired favorites by tapping ☐.

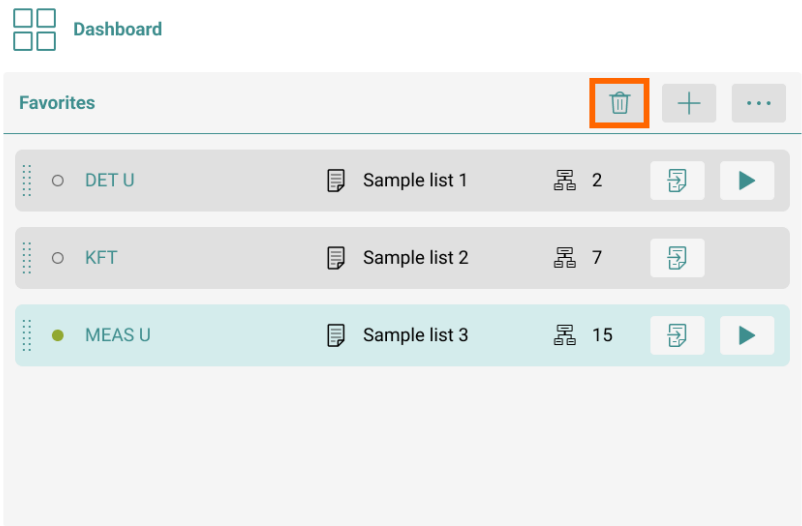


2 Deleting favorites

Tap **...** in the title bar and select **Delete favorite**.

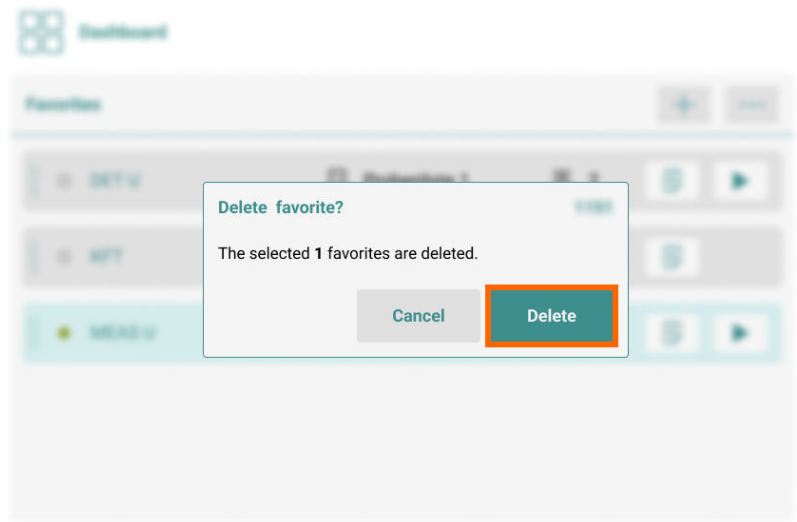


As an alternative, tap  in the title bar if the function has been added as a bookmark ([Additional information](#)).



3 Confirming the message

Confirm the message by tapping **[Delete]**.



 The action is canceled by tapping **[Cancel]**.

2.5.5 Creating a sample using favorites

Video tutorial:

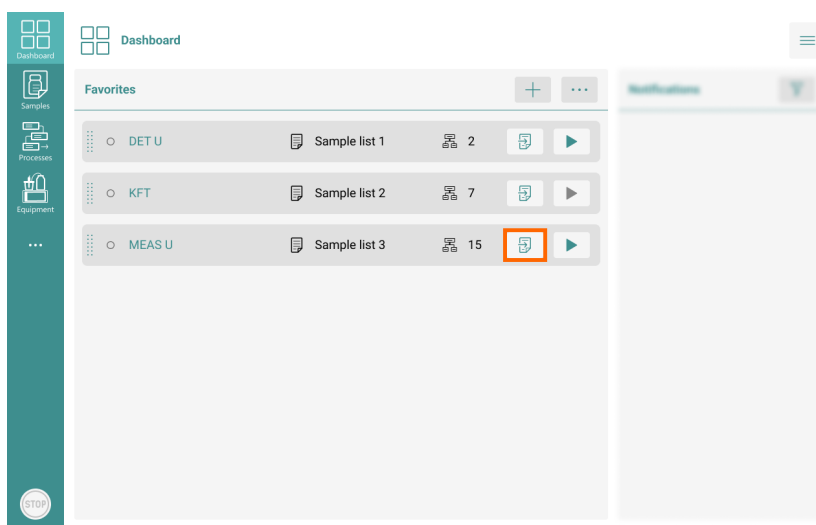


Prerequisite:

- The desired favorite has been created (*Additional information*).

1 Creating a sample

Tap in the line of the desired favorite .



The sample defined by the favorite is created in the selected sample list and the sample list is opened.

No.	Subsample	Method	Sample size	Determination start	Status
1	Subsample 1	MEAS U	1.5 mg		
2	Subsample 2	MEAS U	1.5 mg		
3	Subsample 3	MEAS U	1.5 mg		
4	Subsample 4	MEAS U	1.5 mg		
5	Subsample 5	MEAS U	1.5 mg		
6	Subsample 6	MEAS U	1.5 mg		
7	Subsample 7	MEAS U	1.5 mg		
8	Subsample 8	MEAS U	1.5 mg		
9	Subsample 9	MEAS U	1.5 mg		
10	Subsample 10	MEAS U	1.5 mg		
11	Subsample 11	MEAS U	1.5 mg		
12	Subsample 12	MEAS U	1.5 mg		
13	Subsample 13	MEAS U	1.5 mg		

2.6 Notifications – Overview

- [Definition](#)
- [Display](#)
- [Overview](#)
- [Icons](#)

Video tutorial on the **Notifications** section:



Definition

The last 100 messages since the start of the IONIC app are displayed in the **Notifications** section ([Additional information](#)).

Notifications are summaries of messages that describe information, warnings or errors in the IONIC app. The notifications can be expanded and collapsed, and filtered according to **All**, **Read**, and **Unread**.

Display

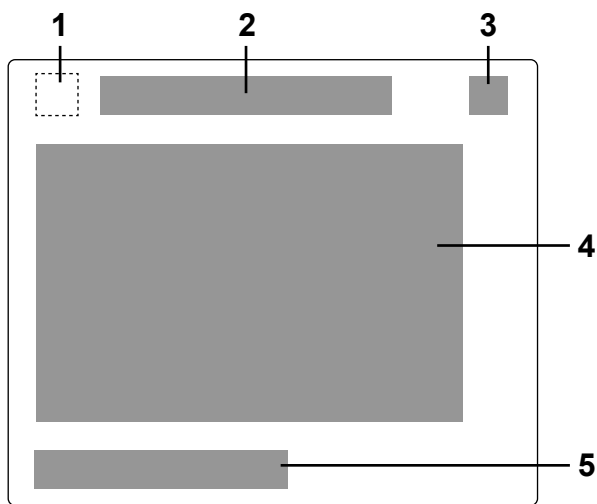
Depending on the status, notifications are displayed in the **Notifications** section as follows:

Status	Display
Unread	
Read	

Overview

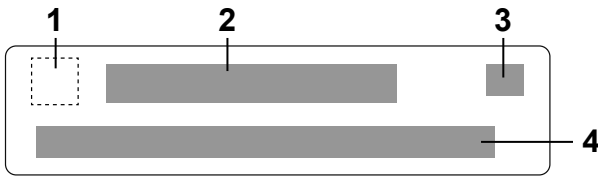
Notifications can be expanded and collapsed.

The following information is available when opened:



- | | |
|---|---|
| <p>1 Message icon
Displays the message icon for the respective message type.
<i>Additional information</i></p> <hr/> | <p>2 Message title
Title for the brief description of the message.</p> <hr/> |
| <p>3 
Collapse the notification by tapping.</p> <hr/> | <p>4 Description
Description of the message.</p> |

The following information is available when collapsed:



- | | |
|---|---|
| <p>1 Message icon
Displays the message icon for the respective message type.
<i>Additional information</i></p> | <p>2 Message title
Title for the brief description of the message.</p> |
| <p>3 Time
Time span that has elapsed since the appearance of the message (time format hours:minutes, e.g., 12h:50m).</p> | <p>4 Description
Abbreviated description of the message.</p> |

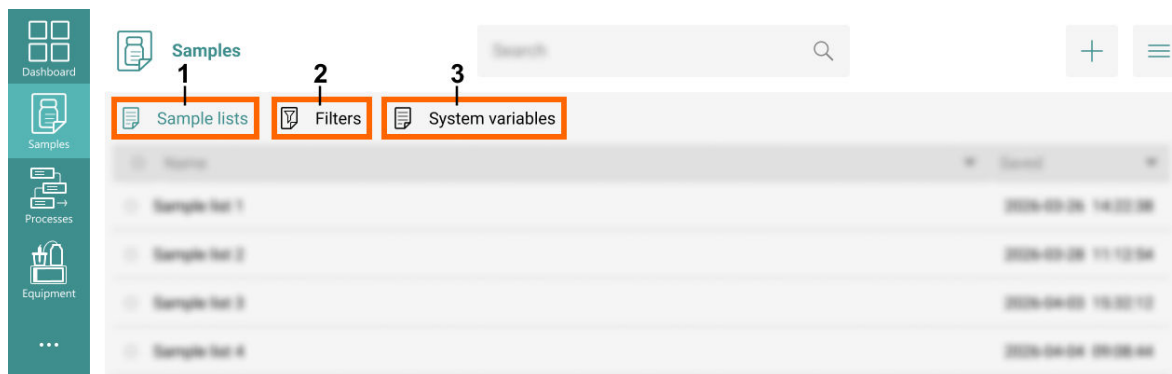
Icons

 The following icons are present in the **Notifications** section. Icons that affect the entire user interface can be found [here](#).

Icon	Function
	Filter the notifications. ▪ All: All notifications are displayed. ▪ Unread: Only the unread notifications are displayed. ▪ Read: Only the read notifications are displayed.

3 Samples – Work area

The **Samples** work area is divided into the following subsections:



1 Sample lists subsection

Additional information

2 Filters subsection

Additional information

3 System variables subsection

Additional information

3.1 Sample lists – Subsection

In the **Samples** work area, tap on **Sample lists** to open the **Sample lists** subsection.

Video tutorials for the **Sample lists** subsection:



Sample lists, samples and subsamples can be created and processed in the **Sample lists** subsection. In addition, determinations can be carried out and results can be displayed and reprocessed.

- *Sample lists – Overview*
- *Samples – Overview*
- *Subsamples – Overview*

3.1.1 Sample lists – Overview

- [Definition](#)
- [Overview list](#)
- [Functions](#)

Video tutorials for the **Sample lists** subsection:



Definition

A sample list contains samples that consist of subsamples to be analyzed. Information on the determination can be displayed and edited in the determination overview of the respective subsample ([Additional information](#)).

Overview list

All created sample lists are shown in an overview list in the **Sample lists** subsection. The following information is displayed in the overview list:

Dashboard	Samples	Search	+	≡
Samples	Sample lists	Filters	System variables	2
Processes	Name 1		Saved	
Equipment	Sample list 1		2026-03-26 14:22:38	
	Sample list 2		2026-03-28 11:12:54	
	Sample list 3		2026-04-03 15:32:12	
	Sample list 4		2026-04-04 09:08:44	
	Sample list 5		2026-04-12 13:32:34	

1 Name

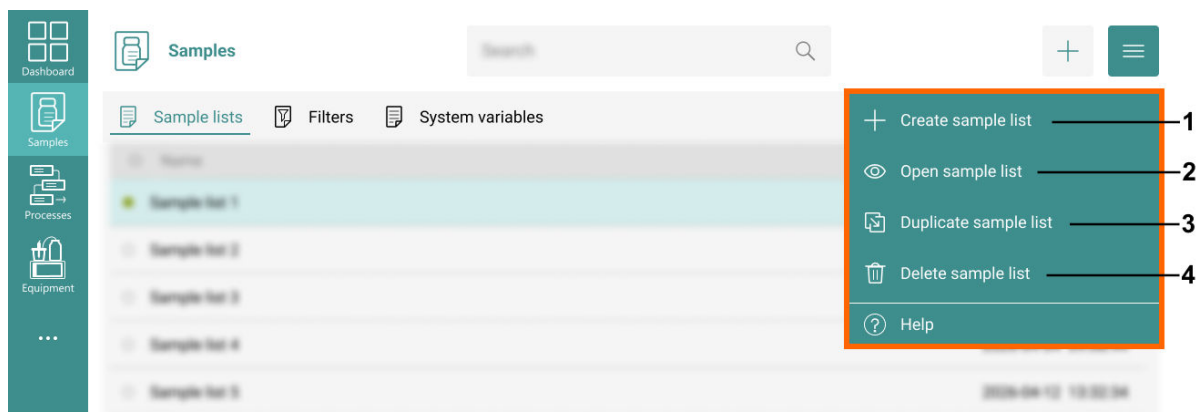
Name of the sample list. The name can be modified in the open sample list.

2 Saved

Time at which the sample list was last saved.

Functions

Tap on to open a menu with the following functions:



1 Create sample list

A new sample list is created in which samples and subsamples can be added and edited.

[Additional information](#)

2 Open sample list

The selected sample list is opened, in which samples and subsamples can be added and edited.

[Additional information](#)

3 Duplicate sample list

The selected sample list is displayed in the overview list under the same name and with an ascending index.

[Additional information](#)

4 Delete sample list

The selected sample list is deleted.

[Additional information](#)

3.1.1.1 Create sample list

Video tutorial for creating sample lists:

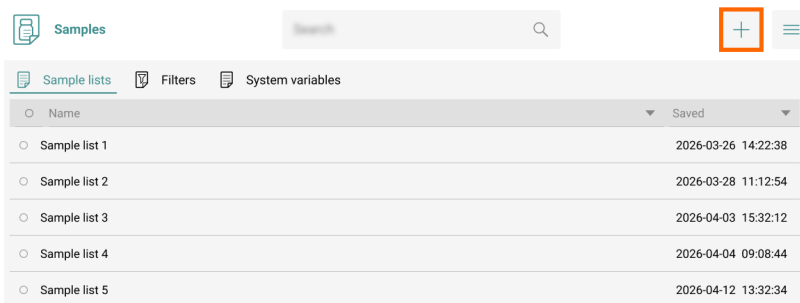


1. [Create sample list](#)
2. [Add sample](#)
3. [Add subsample](#)

 The maximum length of name fields is 32 characters.

1 Creating a sample list

Under **Samples** ► **Sample lists**, tap in the title bar .

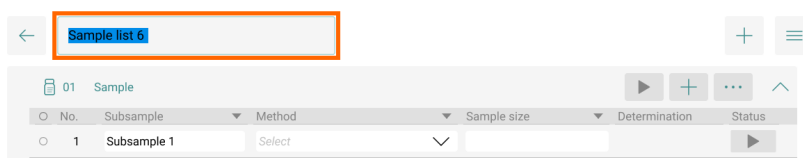


Name	Saved
Sample list 1	2026-03-26 14:22:38
Sample list 2	2026-03-28 11:12:54
Sample list 3	2026-04-03 15:32:12
Sample list 4	2026-04-04 09:08:44
Sample list 5	2026-04-12 13:32:34

A new sample list is created that contains a sample with a subsample by default.

2 Naming a sample list

- If necessary, use  to delete the preset sample list name in the title bar.



- Enter the desired name for the new sample list and confirm with .

←

Juice

+ ≡

📁 01 Sample

▶ + ⋮ ↗

○ No.	Subsample	Method	Sample size	Determination	Status
○ 1	Subsample 1	Select			▶



3 Naming a sample

- If necessary, use to delete the preset sample name.

←

Juice

+

☰

01

Sample

▶

+

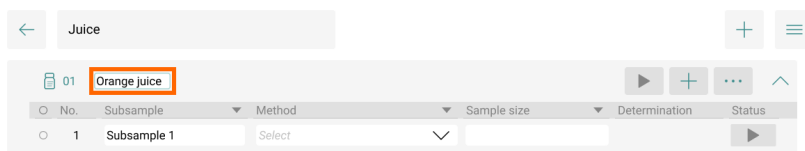
⋮

⌵

No.	Subsample	Method	Sample size	Determination	Status
1	Subsample 1	Select			▶



- Enter the desired name for the new sample and confirm with .



← Juice + ☰

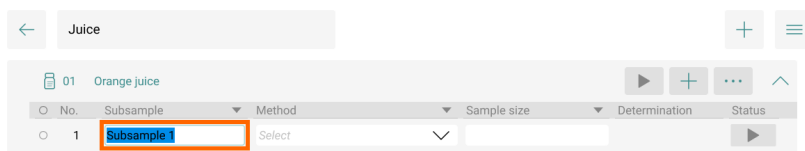
01 Orange juice ▶ + ⋮ ⏴

No.	Subsample	Method	Sample size	Determination	Status
1	Subsample 1	Select	▼		▶



4 Naming a subsample

- If necessary, delete the preset subsample name with .



← Juice + ☰

01 Orange juice ▶ + ⋮ ⏴

No.	Subsample	Method	Sample size	Determination	Status
1	Subsample	Select	▼		▶



- Enter the desired name for the new subsample and confirm with .

←

Juice

+
≡

01 Orange juice

▶

+

⋮

⌵

☐ No.	Subsample	Method	Sample size	Determination	Status
☐ 1	Orange 1	Select			▶



5 Selecting a method

 In order for subsample to be determined, a method must be assigned to it.

Under **Method**, open the selection list by tapping and select the desired method.

The screenshot shows the 'Orange juice' sample entry in the software. The 'Method' dropdown menu is open, displaying a list of options: 'Enter', 'Dynamic pH titration', 'Endpoint pH titration', 'Monotonic pH titration', 'Titer HCl', and 'pH calibration'. The 'Enter' option is currently selected and highlighted.

A maximum of 500 samples and 24 subsamples per sample can be added in a sample list.

Adding a sample

1 Adding a sample

Tap  in the title bar to add a new sample.

←

Juice

+

≡

01 Orange juice

▶ + ... ⤴

○ No.	Subsample	Method	Sample size	Determination	Status
○ 1	Orange 1	Dynamic pH titration			▶

A new sample is created that contains a subsample by default.

2 Naming a sample

- If necessary, use  to delete the preset sample name.
- Enter the desired name for the new sample and confirm with .

Adding a subsample

1 Adding a subsample

Tap  in the title bar of the sample to add a new subsample.

←

Juice

+

☰

01 Cherry juice

▶

+

⋮

↗

☐ No.	Subsample	Method	Sample size	Determination	Status
☐ 1	Cherry 1	Dynamic pH titration			▶

☐ 02 Orange juice

0/1

↘

2 Naming a subsample

- If necessary, delete the preset subsample name with .
- Enter the desired name for the new subsample and confirm with .

3 Selecting a method

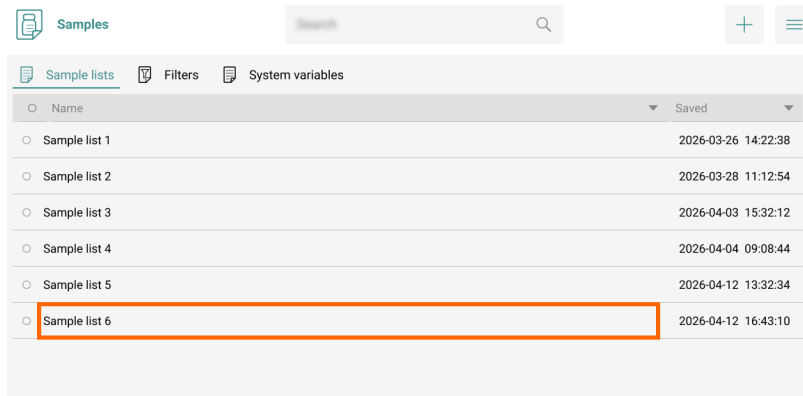
Under **Method**, open the selection list by tapping and select the desired method.

All entries are saved automatically.

3.1.1.2 Open sample list

1 Opening a sample list

Tap the name of the required sample list under **Samples** ► **Sample lists**.

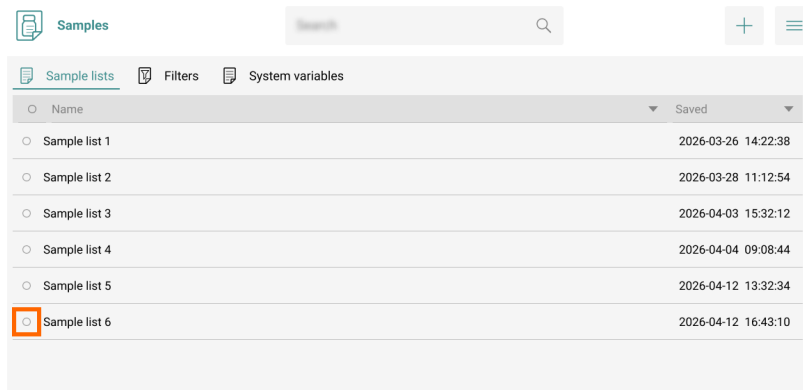


Samples ([Additional information](#)) and subsamples ([Additional information](#)) can be added, edited, and removed within the sample list.

3.1.1.3 Duplicate sample list

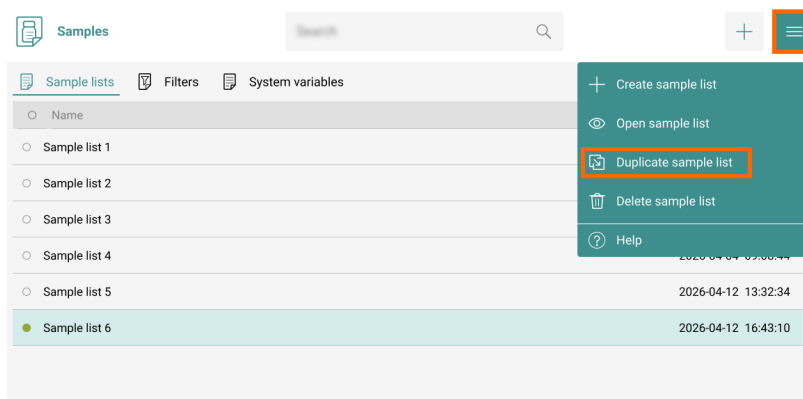
1 Selecting a sample list

Under **Samples** ► **Sample lists** tap  to select the desired sample list.

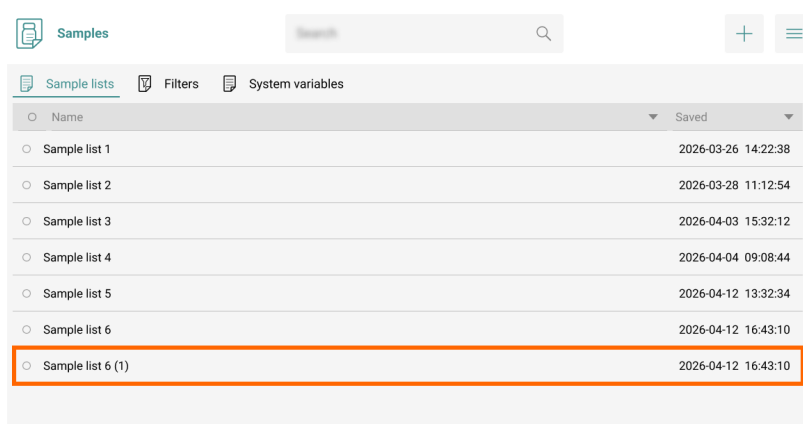


2 Duplicating a sample list

Tap  in the title bar and select **Duplicate sample list**.



The duplicated sample list is displayed in the overview list under the same name with an ascending index.

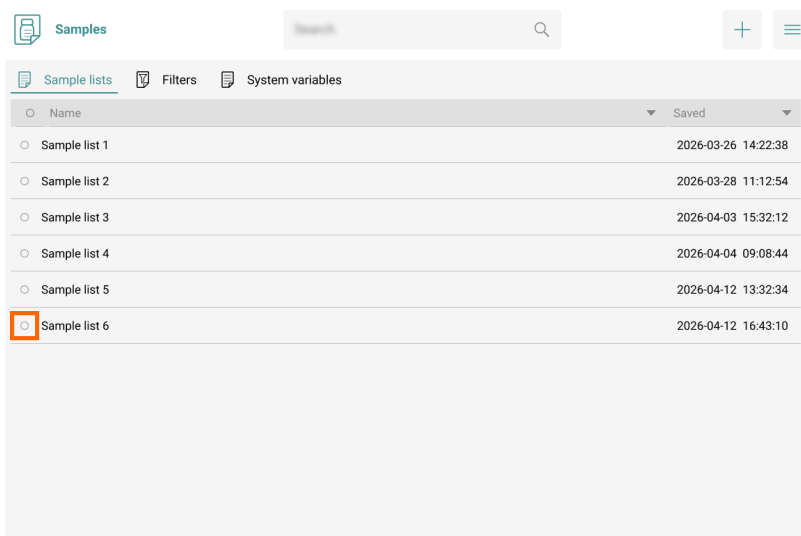


 The newly created sample list contains duplicates of the samples and subsamples from the original sample list in the unexecuted state.

3.1.1.4 Delete sample list

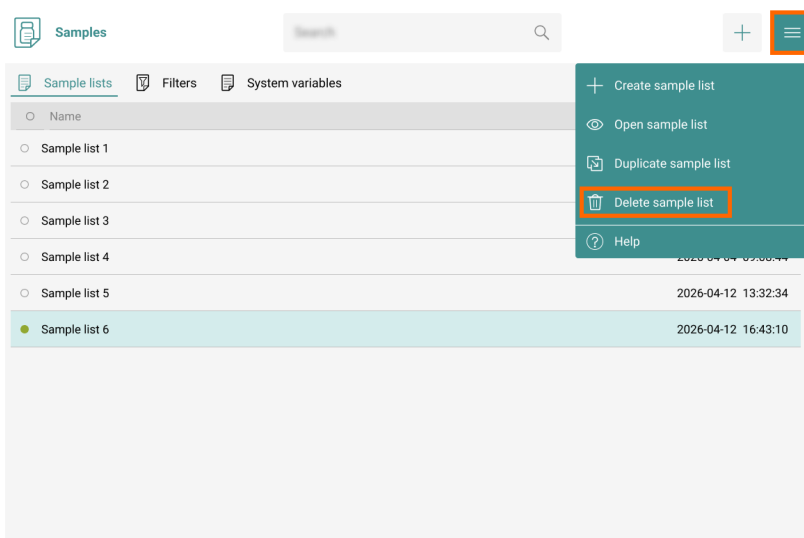
1 Selecting a sample list

Tap  to select the desired sample list under **Samples ► Sample lists**.



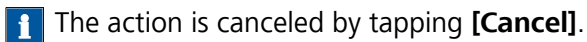
2 Deleting a sample list

Tap  in the title bar and select **Delete sample list**.



3 Confirming the message

Confirm the message with **Delete**.



1 Opening a sample list

 **Samples**

 **Sample lists**

 **Filters**

 **System variables**

 Name	 Saved
 Sample list 1	2026-03-26 14:22:38
 Sample list 2	2026-03-28 11:12:54
 Sample list 3	2026-04-03 15:32:12
 Sample list 4	2026-04-04 09:08:44
 Sample list 5	2026-04-12 13:32:34
 Sample list 6	2026-04-12 16:43:10

In the title bar, tap on the sample list name and delete it with .



3 Entering a new sample list name

Enter the desired name for the sample list and close the keyboard.

 The maximum character length is 32 characters.



3.1.2 Samples – Overview

- *Definition*
- *Sample list*
- *Functions*
- *Icons*

Video tutorials for the **Sample lists** subsection:



Definition

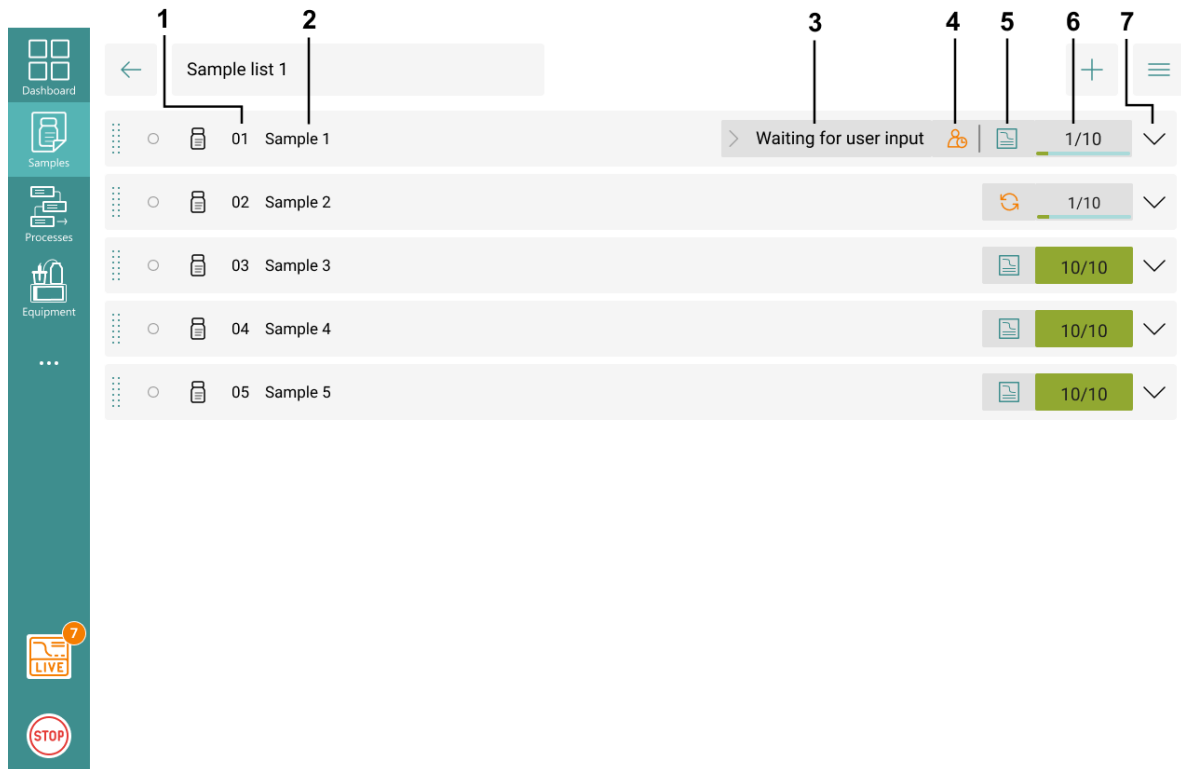
A sample is the population of the material to be analyzed and is also referred to in analytical chemistry as an analytical sample, material sample or test sample.

To analyze a sample in the laboratory, different analytical techniques are often used, or the analyses are repeated multiple times. To accomplish this, the sample is divided proportionally into several subsamples (aliquoted) ([Additional information](#)).

Based on the determination of a subsample, properties are analyzed that are either measured directly or determined indirectly with subsequent calculations. The analyzed subsample yields a single result for each calculation with activated statistics. The single results of all subsamples in the sample are combined and statistically evaluated in the **Sample overview** ([Additional information](#)).

Sample list

As soon as a sample list is opened, all of the samples it contains will be listed. The following information is displayed in the sample list:

**1 Sample number**

Index of the sample within the sample list.

2 Sample name

Name of the sample.

3 Information

This appears if additional information on the status is available. It can be shown with and hidden with .

4 Status

Status of the most recent determination within the sample.

This appears as soon as the status of a determination is available.

[Additional information](#)

5 Sample overview

Detail view of the sample.

This appears as soon as at least one determination has been completed. Tap to display the sample overview.

[Additional information](#)

6 Progress bar

Number of successfully completed determinations compared to the total number of subsamples within the sample.

[Additional information](#)

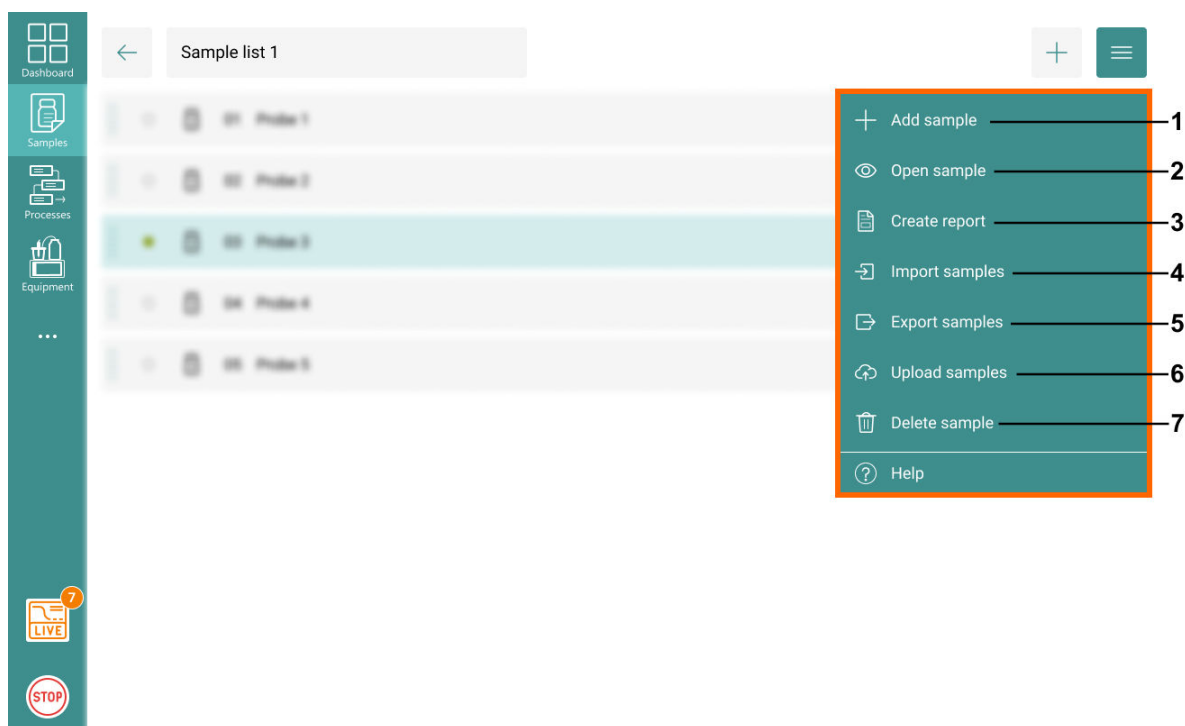
7

Tap to open the sample. All subsamples of this sample are listed.

[Additional information](#)

Functions

Tap on to open a menu with the following functions for the selected sample:

**1 Add sample**

A new sample is added to the sample list. Subsamples can be added and edited within the sample.

[Additional information](#)

3 Create report

Print out or save the desired report of the selected sample.

This function is available only if at least one determination within the sample has been completed.

[Additional information](#)

5 Export samples

The selected samples are exported with the associated subsamples.

This function is available only if at least one determination within the sample has been completed.

[Additional information](#)

7 Delete sample

The selected sample is permanently deleted.

[Additional information](#)

2 Open sample

The selected sample is opened.

[Additional information](#)

4 Import samples

The samples selected in the import window are imported with the associated subsamples.

[Additional information](#)

6 Upload samples

The selected samples are uploaded with the associated subsamples to the Metrohm Data Service.

This function is available only if at least one determination within the sample has been completed.

[Additional information](#)

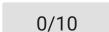
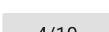
Icons

 The following icons are present in the opened sample lists. Icons that affect the entire user interface can be found [here](#).

Icon	Function
<	Show information on the status. This is displayed only if additional information on the status is available.
>	Hide information on the status. This is displayed only if additional information on the status is available.
	Open the Sample overview (<i>Additional information</i>).

Progress bar

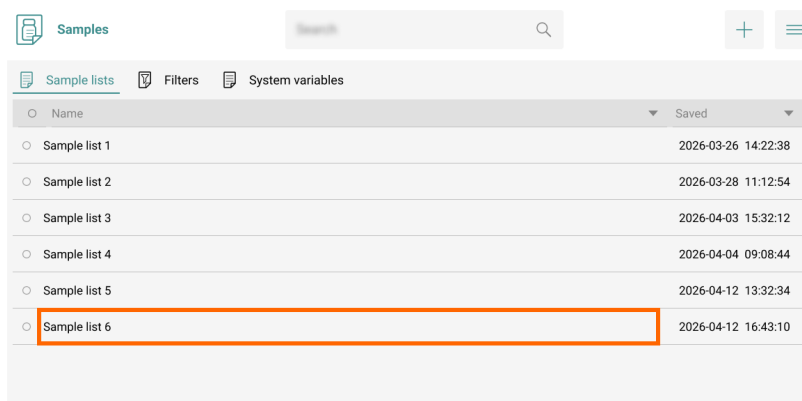
The following display levels are possible on the progress bar:

Icon	Function
	No subsamples within the sample have been successfully determined yet.
	X out of Y subsamples have been successfully determined.
	All subsamples have been successfully determined within the sample.

3.1.2.1 Add sample

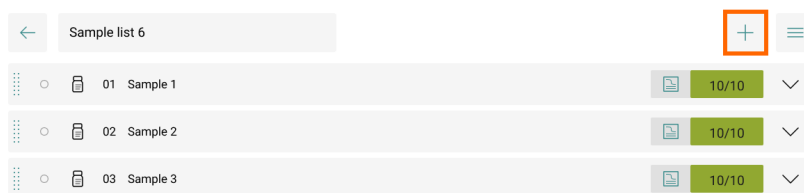
1 Opening a sample list

Tap the name of the desired sample list under **Samples** ► **Sample lists** (*Additional information*).



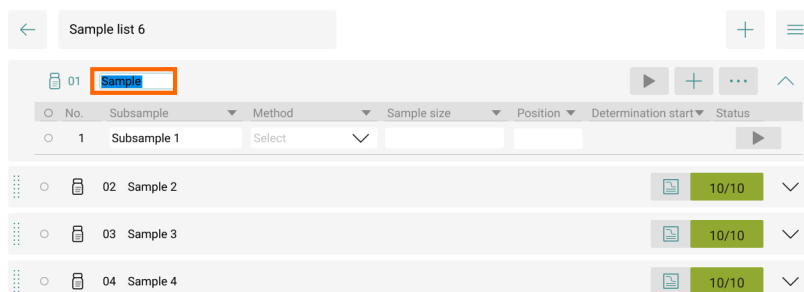
2 Adding a sample

Tap  in the title bar.



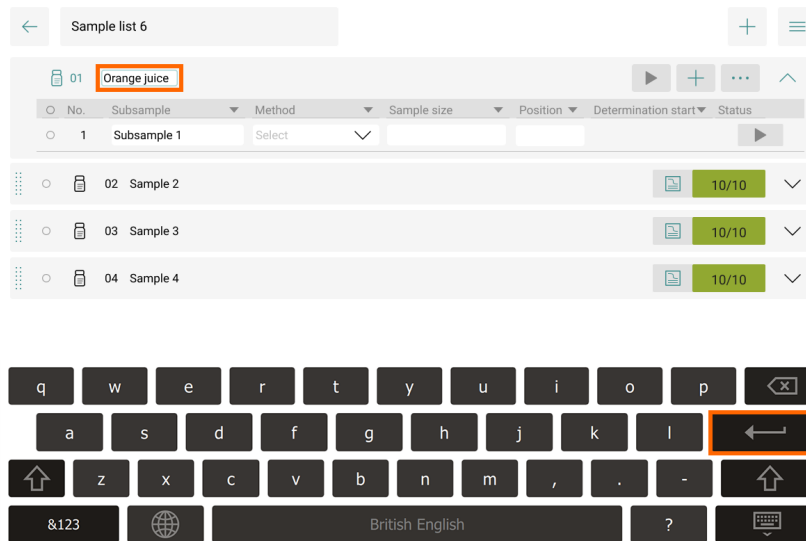
3 Naming a sample

- If necessary, use  to delete the preset sample name.



- Enter the desired name for the new sample and confirm with .

 The maximum character length is 32 characters.



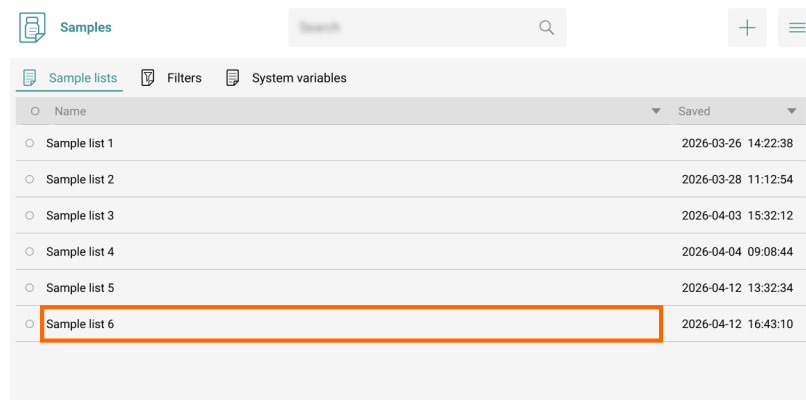
The automatically created subsample can be defined and additional subsamples can be added ([Additional information](#)).

 All entries are saved automatically.

3.1.2.2 Opening a sample

1 Opening a sample list

Tap the name of the desired sample list under **Samples** ► **Sample lists** (*Additional information*).



2 Opening a sample

Tap  to expand the desired sample.



Sample list 6		+	≡
01	Sample 1	10/10	▼
02	Sample 2	10/10	▼
03	Sample 3	10/10	▼

The sample has been expanded, and all subsamples within the sample are displayed.

Sample list 6

01

Sample 1

No.	Subsample	Method	Sample size	Position	Determination start	Status
1	Subsample 1	MEAS U	1.5 mg		2026-04-28 07:42:53	
2	Subsample 2	MEAS U	1.5 mg		2026-04-28 07:42:53	
3	Subsample 3	MEAS U	1.5 mg		2026-04-28 07:42:53	
4	Subsample 4	MEAS U	1.5 mg		2026-04-28 07:42:53	
5	Subsample 5	MEAS U	1.5 mg		2026-04-28 07:42:53	
6	Subsample 6	MEAS U	1.5 mg		2026-04-28 07:42:53	
7	Subsample 7	MEAS U	1.5 mg		2026-04-28 07:42:53	
8	Subsample 8	MEAS U	1.5 mg		2026-04-28 07:42:53	
9	Subsample 9	MEAS U	1.5 mg		2026-04-28 07:42:53	
10	Subsample 10	MEAS U	1.5 mg		2026-04-28 07:42:53	

02

Sample 2

10/10

03

Sample 3

10/10

3.1.2.3 Import samples

Prerequisite:

- At least one IONIC sample file (.ios) is available in the **Samples** folder on the USB flash drive used.
- The IONIC sample file to be imported is not yet in the database.

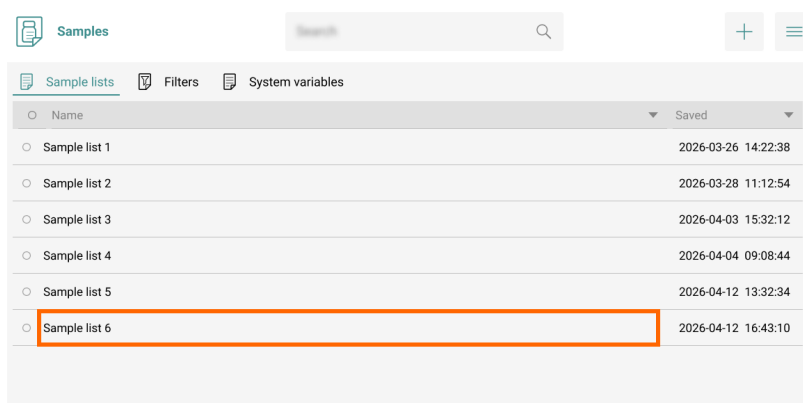
1 Plugging in a USB flash drive

Plug a USB flash drive into one of the USB connectors available on the IONIC main instrument and wait until the message **USB flash drive connected** appears.

 If multiple USB flash drives are plugged in, then the USB flash drive that was first recognized by the system will be used.

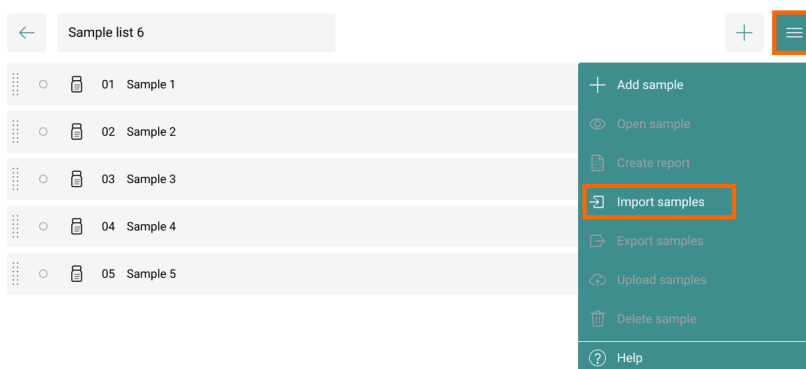
2 Opening a sample list

Tap the name of the desired sample list in which the sample is to be imported under **Samples ► Sample lists** (*Additional information*).



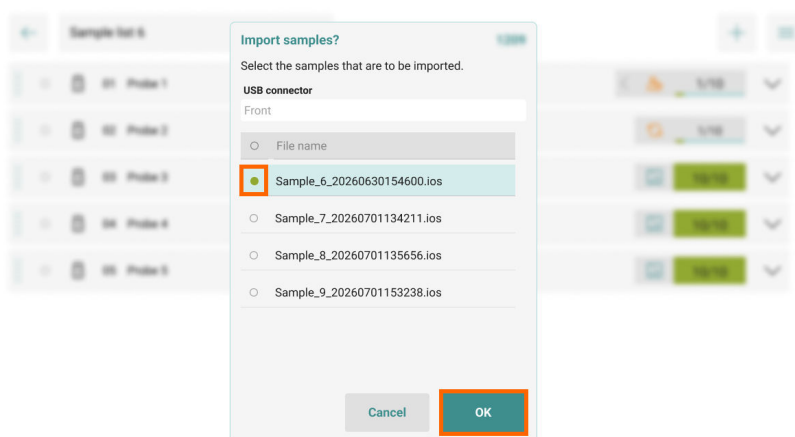
3 Opening the import dialog

Tap  in the title bar and select **Import samples**.



4 Selecting a sample file

Tap  to select the desired IONIC sample file (.ios).



The sample is imported into the open sample list with its associated subsamples.



3.1.2.4 Export samples

Prerequisite:

- At least one sample is available in the sample list.
- The determination of at least one subsample from the sample to be exported has been completed.

1 Plugging in a USB flash drive

Plug a USB flash drive into one of the USB connectors available on the IONIC main instrument and wait until the message **USB flash drive connected** appears.

2 Opening a sample list

Tap the name of the desired sample list under **Samples** ► **Sample lists** (*Additional information*).

 **Samples**

 Sample lists	 Filters	 System variables
☐ Name		☐ Saved
☐ Sample list 1		2026-03-26 14:22:38
☐ Sample list 2		2026-03-28 11:12:54
☐ Sample list 3		2026-04-03 15:32:12
☐ Sample list 4		2026-04-04 09:08:44
☐ Sample list 5		2026-04-12 13:32:34
☐ Sample list 6		2026-04-12 16:43:10

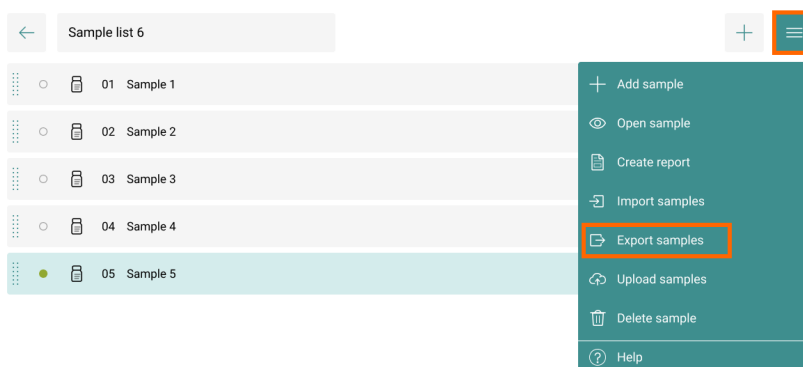
3 Selecting samples

Select the desired samples by tapping .



4 Opening the export dialog

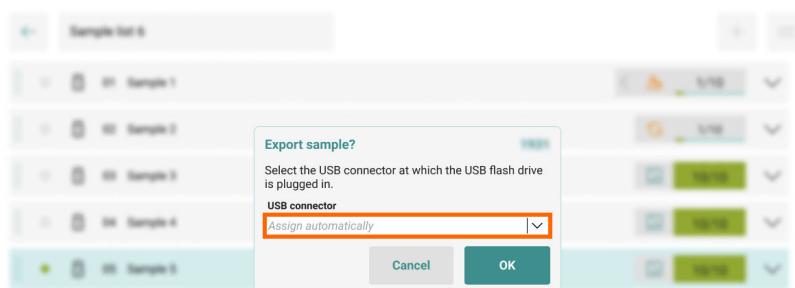
Tap  in the title bar and select **Export samples**.



5 Selecting a USB connector

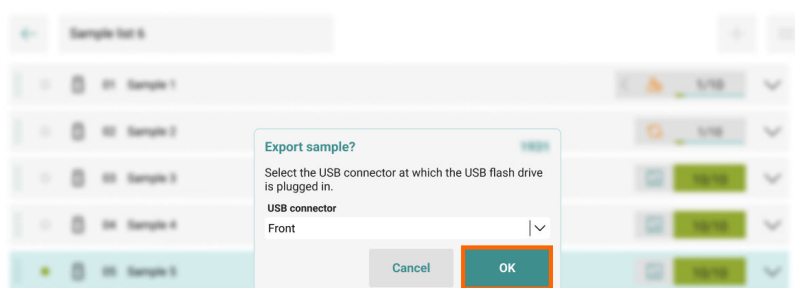
Tap the selection list under **USB connector** and select the connector to which the desired USB flash drive is connected.

- The selection list is available only if at least one USB flash drive is connected.
- The **Assign automatically** function works only if exactly one USB flash drive is connected.



6 Exporting a sample

Confirm the selection with **[OK]**.



If an error message appears, follow the instructions in the error message.

As soon as the **Sample exported** information message appears, the sample data will be saved with the associated subsample data to the USB flash drive as an IONIC sample file (.ios).

 The files are saved to the USB flash drive in the **Samples** folder with the following file name: **SampleName_TimeStamp**. Spaces are replaced with _.

During export, the time indications in the file properties are converted to Coordinated Universal Time (UTC±00:00). This time format may differ from the local time on the instrument.

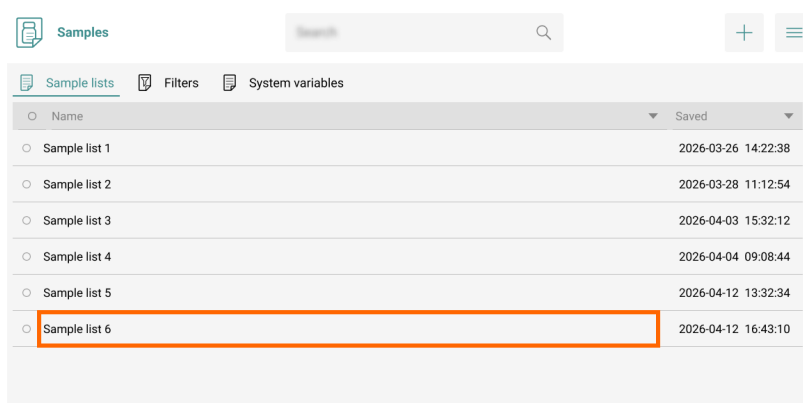
3.1.2.5 Upload samples

Prerequisite:

- At least one sample is available in the sample list.
- The determination of at least one subsample from the selected sample has been completed.
- The IONIC main instrument is logged onto Metrohm Data Service ([Additional information](#)).

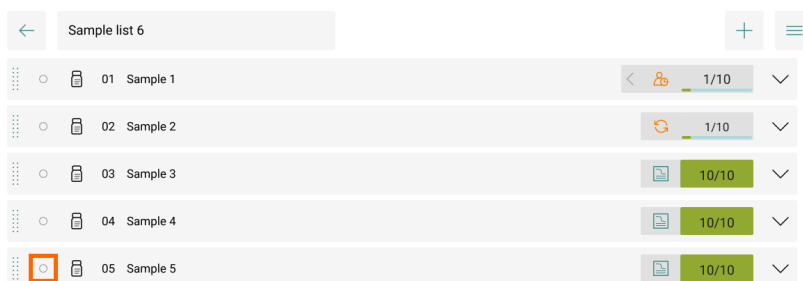
1 Opening a sample list

Tap the name of the desired sample list under **Samples ► Sample lists** ([Additional information](#)).



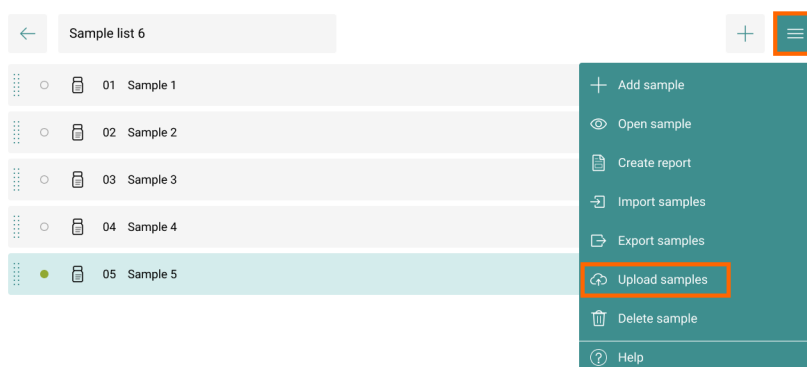
2 Selecting samples

Select the desired samples by tapping .



3 Uploading a sample

Tap  in the title bar and select **Upload samples**.



As soon as the **Sample Uploaded** information message appears, the sample data with the associated subsample data will be saved to the **Samples** area of Metrohm Data Service.

3.1.2.6 Create report

The following possibilities are available for generating reports in the IONIC app:

- *Automated generation of reports* with the **REPORT** command (*Additional information*)
- *Manual generation of reports* from the sample list
- *Manual generation of reports* from the sample overview
- *Manual generation of reports* from the sample
- *Manual generation of reports* from the determination overview
- *Manual generation of reports* from the **Methods** subsection

A report can either be saved in PDF format to a USB flash drive or printed out via a printer.

- If the report is to be saved as a PDF file to a USB flash drive, then the USB flash drive must be plugged into the USB connector on the front or on one of the USB connectors on the rear of the IONIC main instrument.
- If the report is to be printed out via a printer, then the matching printer must be defined in the **Equipment** work area and plugged into the IONIC main instrument (*Additional information*).

Video tutorial for generating reports:



Automated report with the REPORT command

1 Opening or creating a method

Under **Processes** ► **Methods**, open the desired method (*Additional information*) or create a new method (*Additional information*).

2 Adding a command

Insert the **REPORT** command from the **Command library** into the method (*Additional information*).



The **REPORT** command generates a report for the results or calibrations that were generated with commands of the same method.

3 Defining the parameters

Open the **Command properties** of the **REPORT** command and define the parameters as desired (*Additional information*).

4 Saving the method

Tap  in the title bar to save the method.

5 Creating a sample and a subsample

Create a new sample with at least one subsample (*Additional information*).

6 Assigning a method

Assign the method with the defined **REPORT** command to the desired subsample.

7 Setting a determination to pending

Set the determination of the subsample to pending (*Additional information*).

Once the **REPORT** command has been executed, the defined report will be saved to the selected USB flash drive or transmitted to the selected printer.

Manual generation of reports from the sample list

Prerequisite:

- At least one sample is available in the sample list.

- At least one subsample was determined in the selected sample.

1 Opening a sample list

Tap the name of the desired sample list under **Samples** ► **Sample lists** (*Additional information*).

2 Selecting a sample

Tap  to select the desired sample.

3 Opening a report dialog

Tap in the title bar and select **Create report**.

4 Defining a report

Define the report as desired (*Additional information*).

5 Generating a report

Tap **[OK]** to generate the defined report.

If an error message appears, then follow the instructions in the error message.

- **PDF file:** The report will be stored as a PDF file on the USB flash drive as soon as the **Report generated** information message appears.

 The files are saved to the USB flash drive under **Samples ► Reports** under the following file name: **SampleName_ReportTemplateName_TimeStamp**. Spaces are replaced with **_**.

During export, the time indications in the file properties are converted to Coordinated Universal Time (UTC±00:00). This time format may differ from the local time on the instrument.

- **Paper printout:** The report was sent to the selected printer as soon as the **Report generated** information message appeared.

Manual generation of reports from the sample overview

Prerequisite:

- At least one sample is available in the sample list.

- At least one subsample was determined in the selected sample.

1 Opening a sample overview

Tap  in the title bar of the desired sample in an open sample list under **Samples ▶ Sample lists** (*Additional information*).

2 Opening a report dialog

Tap  in the title bar and select **Create report**.

3 Defining a report

Define the report as desired (*Additional information*).

4 Generating a report

Tap **[OK]** to generate the defined report.

If an error message appears, then follow the instructions in the error message.

- **PDF file:** The report will be stored as a PDF file on the USB flash drive as soon as the **Report generated** information message appears.

 The files are saved to the USB flash drive under **Samples ▶ Reports** under the following file name: **SampleName_ReportTemplateName_TimeStamp**. Spaces are replaced with **_**.
During export, the time indications in the file properties are converted to Coordinated Universal Time (UTC±00:00). This time format may differ from the local time on the instrument.

- **Paper printout:** The report was sent to the selected printer as soon as the **Report generated** information message appeared.

Manual generation of reports from the sample

Prerequisite:

- The determination of the selected subsample is complete.

1 Opening a sample

Under **Samples ▶ Sample lists**, tap  to expand the desired sample in an open sample list (*Additional information*).

3 Defining a report

Define the report as desired (*Additional information*).

4 Generating a report

Tap **[OK]** to generate the defined report.

If an error message appears, then follow the instructions in the error message.

- **PDF file:** The report will be stored as a PDF file on the USB flash drive as soon as the **Report generated** information message appears.

 The files are saved to the USB flash drive under **Sam-
ples ► Reports** under the following file name: **Subsam-
pleName_ReportTemplateName_TimeStamp**. Spaces are
replaced with _.

During export, the time indications in the file properties are
converted to Coordinated Universal Time (UTC±00:00). This
time format may differ from the local time on the instrument.

- **Paper printout:** The report was sent to the selected printer as soon as the **Report
generated** information message appeared.

Manual generation of reports from the Methods subsection

1 Selecting a method

Tap  to select the desired method under **Processes ► Methods**.

2 Opening a report dialog

Tap  in the title bar and select **Create report**.

3 Defining a report

Define the report as desired (*Additional information*).

4 Generating a report

Tap **[OK]** to generate the defined report.

If an error message appears, then follow the instructions in the error message.

- **PDF file:** The report will be stored as a PDF file on the USB flash drive as soon as the **Report generated** information message appears.

 The files are saved to the USB flash drive under **Processes ► Reports** under the following file name: **MethodName_ReportTemplateName_TimeStamp**. Spaces are replaced with **_**.

During export, the time indications in the file properties are converted to Coordinated Universal Time (UTC±00:00). This time format may differ from the local time on the instrument.

- **Paper printout:** The report was sent to the selected printer as soon as the **Report generated** information message appeared.

Defining a report

1 Selecting the language to use

Tap the selection list under **Language** and select the language in which the report is to be output.

2 Selecting a report template

Tap the selection list under **Report** and select the desired report template (*Additional information*).

3 Selecting an output format

Tap the radio button next to the desired output format under **Output format**.

4 Selecting a USB connector (only if PDF file is selected)

Tap the selection list under **USB connector** and select the connector to which the desired USB flash drive is connected and to which the report is to be saved.

 The **Assign automatically** function works only if exactly one USB flash drive is connected.

5 Selecting a printer (only if Paper printout is selected)

Tap the selection list under **Printer** and select the printer that is connected to the IONIC main instrument and with which the report is to be printed out.

 The **Assign automatically** function works only if exactly one printer has been added to the equipment (*Additional information*).

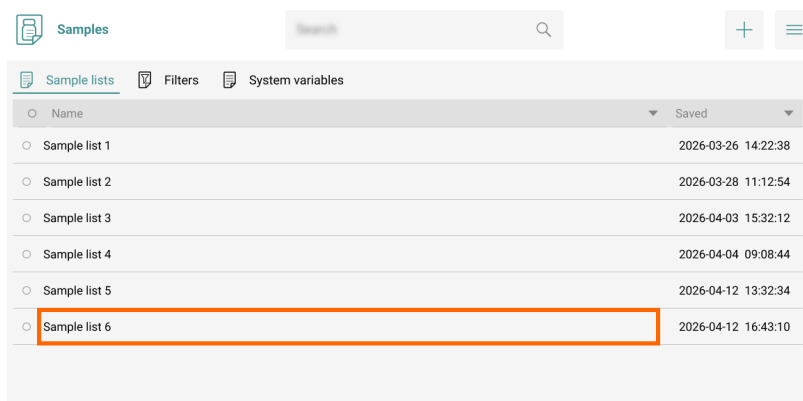
3.1.2.7 Delete sample

Prerequisite:

- No determination within the sample was set to pending.

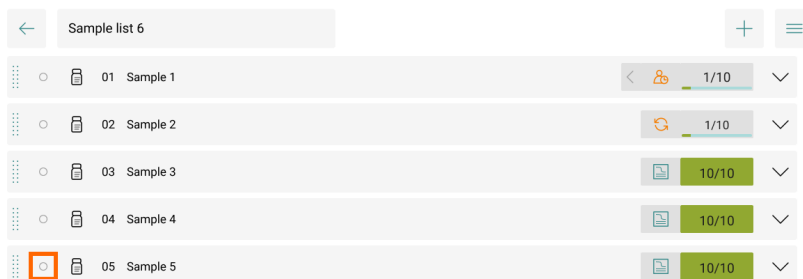
1 Opening a sample list

Tap the name of the desired sample list under **Samples** ► **Sample lists** (*Additional information*).



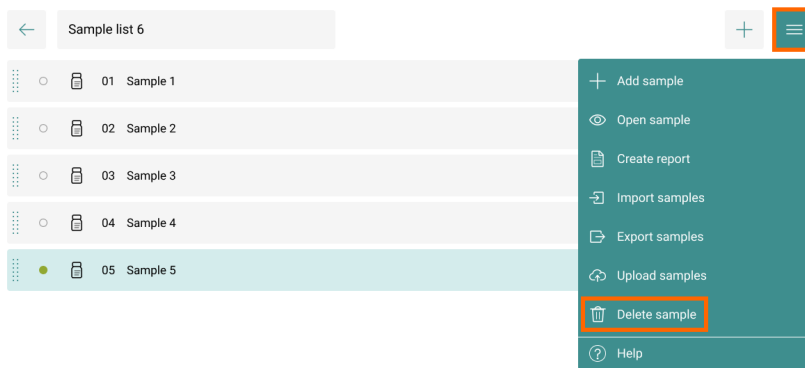
2 Selecting a sample

Tap  to select the desired sample.



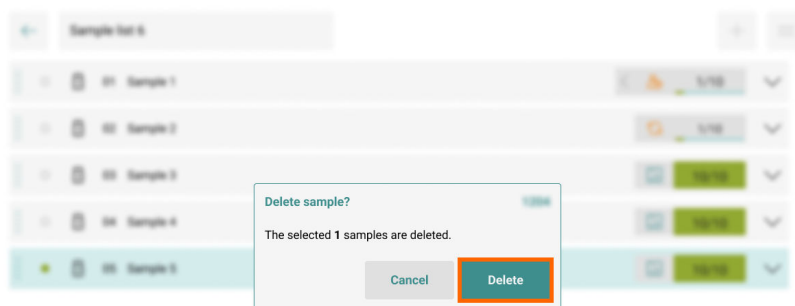
3 Deleting a sample

Tap  in the title bar and select **Delete sample**.



4 Confirming a message

Confirm the message by tapping **Delete**.



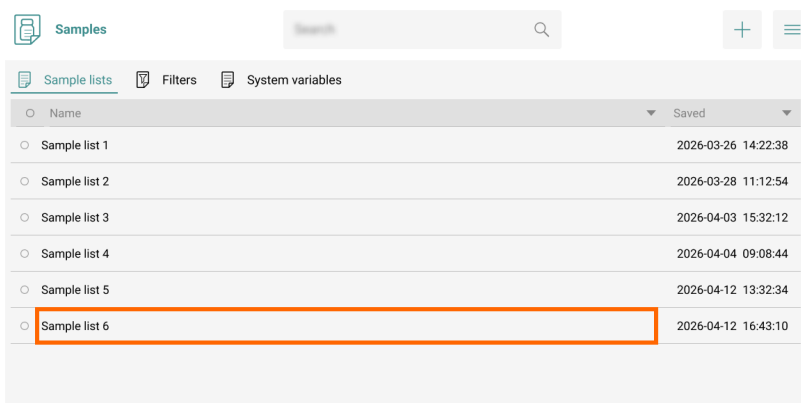
 The action is canceled by tapping **[Cancel]**.

The sample and all subsamples it contains are permanently deleted from the sample list.

3.1.2.8 Renaming a sample

1 Opening a sample list

Tap the name of the desired sample list under **Samples** ► **Sample lists** (*Additional information*).



Name	Saved
Sample list 1	2026-03-26 14:22:38
Sample list 2	2026-03-28 11:12:54
Sample list 3	2026-04-03 15:32:12
Sample list 4	2026-04-04 09:08:44
Sample list 5	2026-04-12 13:32:34
Sample list 6	2026-04-12 16:43:10

2 Opening a sample

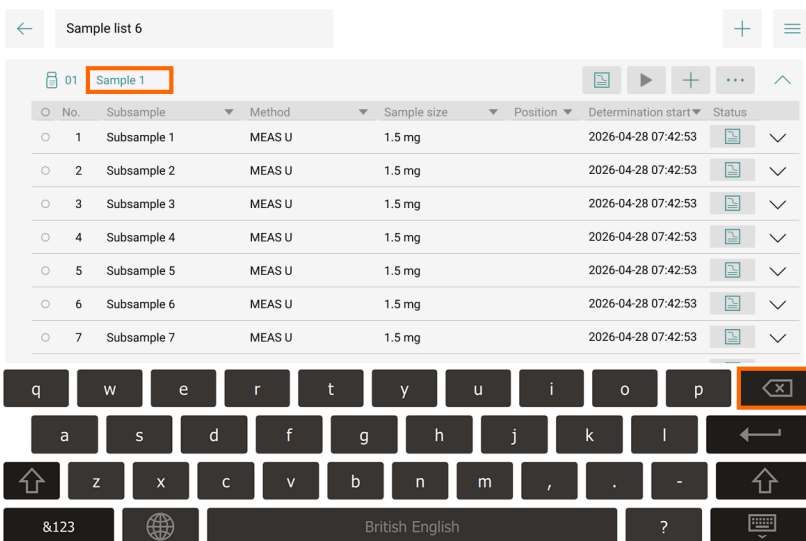
Tap  to expand the desired sample (*Additional information*).



No.	Sample	10/10	
01	Sample 1	10/10	
02	Sample 2	10/10	
03	Sample 3	10/10	

3 Deleting a sample name

In the title bar, tap on the sample name and tap  to delete it.

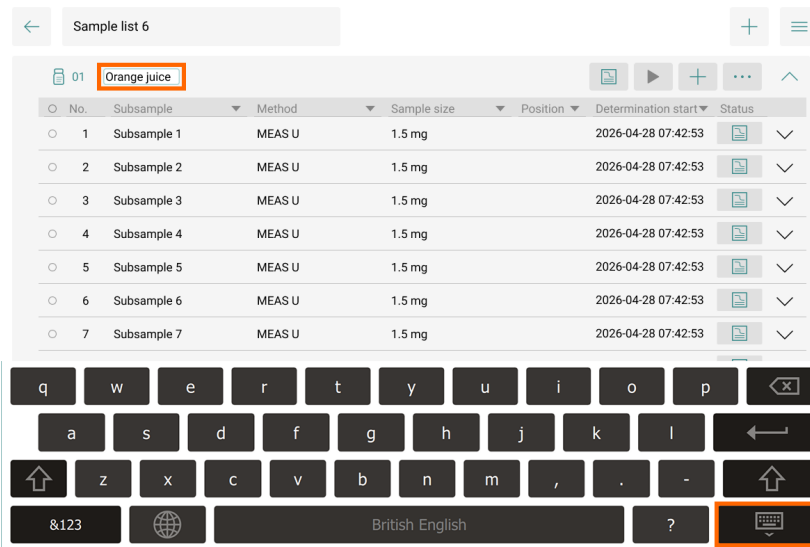


No.	Subsample	Method	Sample size	Position	Determination start	Status
1	Subsample 1	MEAS U	1.5 mg		2026-04-28 07:42:53	
2	Subsample 2	MEAS U	1.5 mg		2026-04-28 07:42:53	
3	Subsample 3	MEAS U	1.5 mg		2026-04-28 07:42:53	
4	Subsample 4	MEAS U	1.5 mg		2026-04-28 07:42:53	
5	Subsample 5	MEAS U	1.5 mg		2026-04-28 07:42:53	
6	Subsample 6	MEAS U	1.5 mg		2026-04-28 07:42:53	
7	Subsample 7	MEAS U	1.5 mg		2026-04-28 07:42:53	

4 Entering a new sample name

Enter the desired name for the sample and close the keyboard.

 The maximum character length is 32 characters.



3.1.2.9 Sample overview – Overview

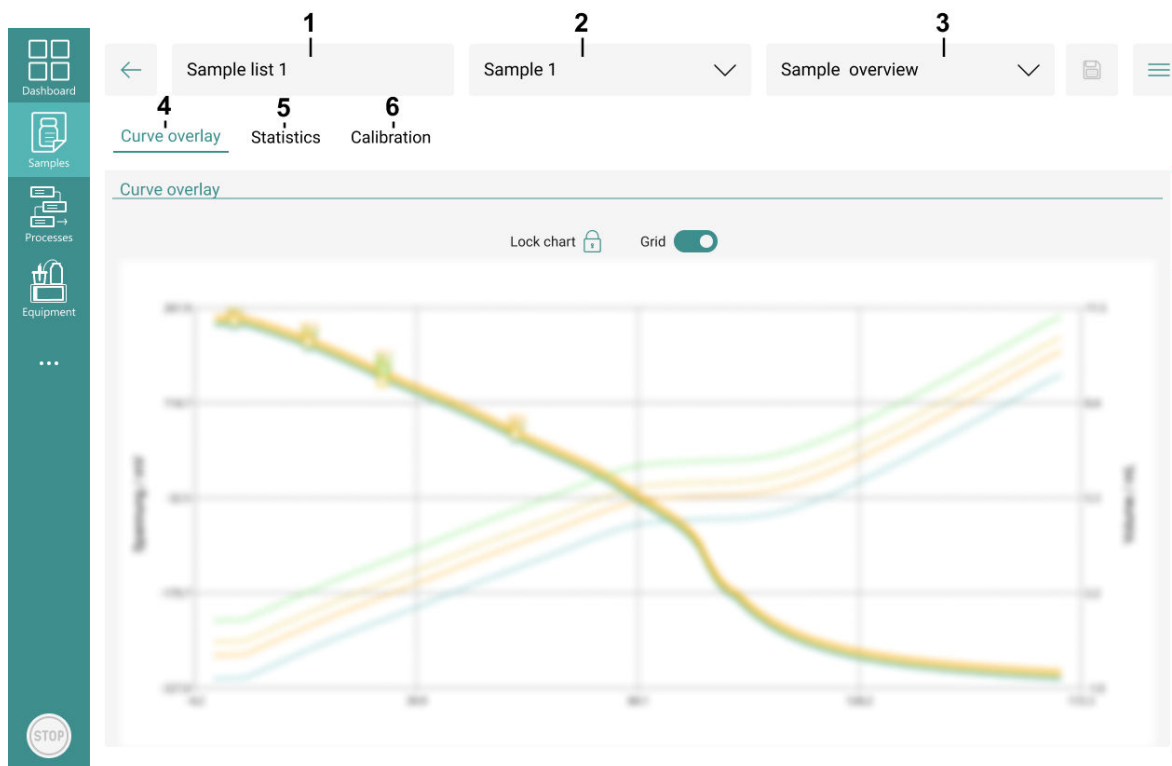
Tap  in the title bar of a sample to open the **Sample overview** (*Additional information*).

- Overview
- Curve overlay
- Statistics
- Calibration
- Icons

 The **Sample overview** is available only if at least one determination has been carried out within the sample.

Overview

The following information is displayed in the Sample overview:



1 Sample list

Name of the sample list that contains the sample.

2 Sample

Name of the current sample.

Tap  to select the Sample overview of another sample within the sample list.

3 Overview

Name of the sample overview.

Tap  to select the determination overview of a single subsample within the sample ([Additional information](#)).

4 Curve overlay

(see "Curve overlay", page 94)

5 Statistics

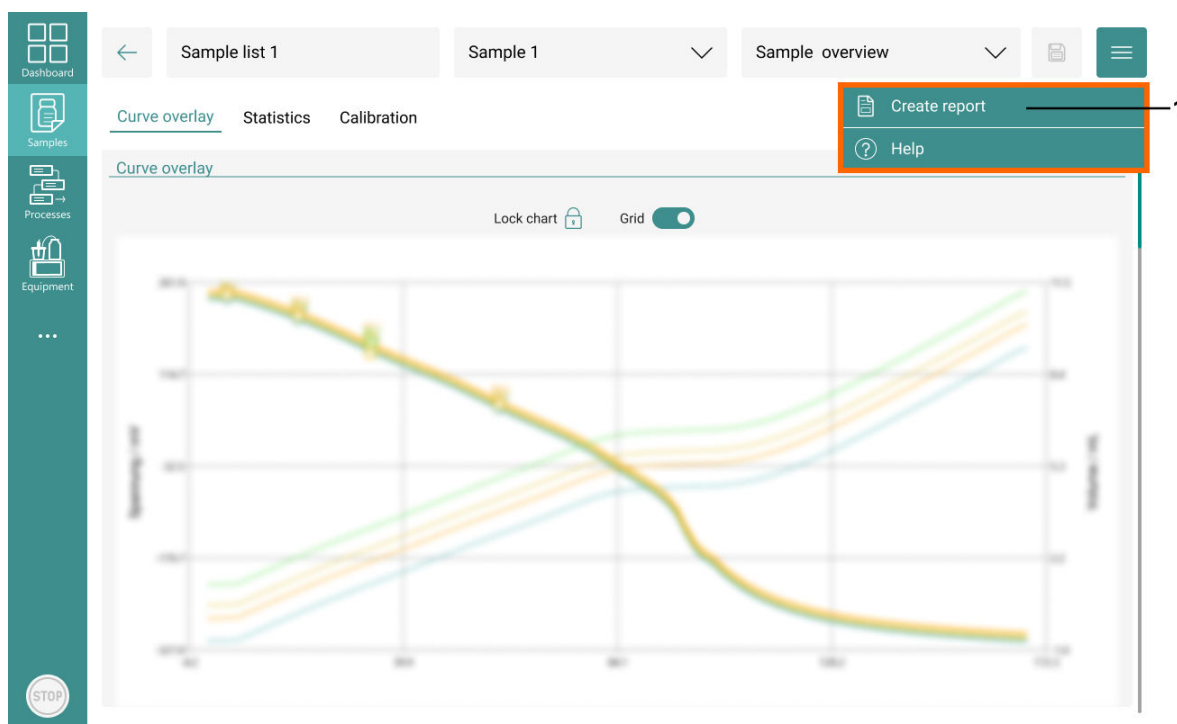
[Additional information](#)

6 Calibration

[Additional information](#)

Functions

Tap on  to open a menu with the following functions:



1 Create report

Print out or save the desired report of the selected sample overview.

[Additional information](#)

Curve overlay

In the curve overlay, all of the curves of the determinations that were carried out in the sample are displayed together in a chart. In addition, there is a legend in which individual determinations can be hidden from the chart and then shown again.

- In the curve overlay, only curves of the same titration type (only with titration commands) and the same measured quantity can be superimposed.
- The defined diagram axes of the first titration command, measurement command or calibration command to be performed are displayed in the curve overlay.

The following information is displayed in the chart:

Grid	Activate or deactivate the grid in the background of the curve.
Curve overlay	Displays the curves of all determinations within the sample in different colors.
x-axis	Display of the quantity defined in the command or in the reevaluation for the x-axis.

y-axis	Display of the quantity defined in the command or in the reevaluation for the y-axis.
y2-axis	Display of the quantity defined in the command or in the reevaluation for the y2-axis. If the display was deactivated in the command or in the reevaluation, then the y2-axis will not be displayed.

The following information is displayed in the **Legend**:

Visibility	: The curve of the determination is displayed in the Curve overlay. Tap to deactivate the visibility of the curve. : The curve of the determination is hidden from the Curve overlay. Tap to activate the visibility of the curve.
Color	Color of the respective curve in the Curve overlay.
Sample	Name of the sample in which the subsample was determined.
Subsample	Name of the subsample that was determined.
Command	Command name of the titration command, measuring command or calibration command, the results of which are shown as a curve.
Method	Method with which the subsample was determined.
Determination start	Date and time of the determination start.

Statistics

In the statistics, the results of calculations from multiple determinations that were performed within the sample are statistically evaluated. A calculation can be carried out with each **CALC** command and this yields the single result. A **CALC** command with activated statistics must be included in the method for a calculation (*Additional information*). A statistics entry in the sample overview is created for each **CALC** command with activated statistics.

-  Invalid results are not taken into account in the statistics and can neither be excluded nor included in the statistics entry.
- If a result becomes valid through reprocessing, then it will be taken into account again in the statistics entry.
- Results for which **Exact** was selected in the method properties of the Statistical sample type cannot be excluded from the statistics entry.

The determinations are statistically linked if the same method has been assigned to the subsamples affected. The assigned method must meet the following conditions:

- The method name must be identical.

- The method version must be identical.

The following information is displayed in the overview list of the **Statistics**:

#	Index of the statistics entry.
Name	Name of the CALC command that was defined in the method.
Mean value	Mean value of the results of all statistically related determinations.
Unit	Unit of the calculated results. The unit applies for the Mean value , s(abs) , Minimum , and Maximum columns.
s(abs)	Absolute standard deviation of the mean value of all statistically related determinations.
s(rel)	Relative standard deviation of the mean value of all statistically related determinations.
n	- If Unlimited is selected in the method properties of the Statistical sample type, then the current number of single results that have been taken into account in the statistics will be displayed under n. - If Exact is selected in the method properties of the Statistical sample type, then the current number of single results that have been taken into account in the statistics will be displayed under n in relation to the N sample set size defined in the method properties. - If Minimum is selected in the method properties of the Statistical sample type, then the current number of single results that have been taken into account in the statistics will be displayed under n in relation to the N sample set size defined in the method properties. As soon as the number of single results n exceeds the defined sample set size N, the sample set size N will increase together with the additional number of single results n. <i>Additional information</i> on the statistics settings in the method properties.
Minimum	The smallest value of all statistically related determinations.
Maximum	The largest value of all statistically related determinations.

 If the **CALC** command is calculated in a **LOOP** command, then multiple single results will be calculated within a determination. These single results are counted under **n**. All single results for a determination are displayed in an entry in the **Exclude/include** window.

Calibration

The **Calibration** section shows the **Calibration curves** with the associated calibration data as well as the **Calibration points** of each of the measured calibration buffers.

The following information is displayed in the chart:

Grid	Activate or deactivate the grid in the background of the curve.
Calibration curves	Display of the calibration curve including all of the measured calibration buffers.
x-axis	Display of the quantity defined in the command or in the reevaluation for the x-axis.
y-axis	Display of the quantity defined in the command or in the reevaluation for the y-axis.
y2-axis	Display of the quantity defined in the command or in the reevaluation for the y2-axis. If the display was deactivated in the command or in the reevaluation, then the y2-axis will not be displayed.
Slope	The relative slope calculated from the calibration in relation to the ideal Nernst slope.
pH(0)	The electrode zero point of the electrode used, calculated from the calibration.
Variance	Measured value variance of the series. The variance is a measure for the dispersion of the data.
Coefficient of determination	The coefficient of determination (R^2) as a quality criterion of linear regression. The coefficient of determination indicates how suitable the independent variables are for explaining the variance of the dependent variables.

Calibration points

In the **Calibration curves** section, swipe to the right or tap  to open the list with the calibration points. The following information is displayed in the list:

Subsample	Name of the subsample with which the calibration was carried out.
Buffer value	pH value of the measured calibration buffer.
Potential	Measured potential of the pH electrode at the respective calibration point.
Temperature	Temperature of the calibration buffer measured or defined in the CAL pH command (<i>Additional information</i>).
Duration	Duration of the measurement of the calibration buffer.

Icons

 The following icons are present in the sample overview. Icons that affect the entire user interface can be found [here](#).

Icon	Function
	Display the Calibration points .
	Display the Calibration curves .
	Display Calibration curves or Calibration points .
	Current view of Calibration curves or of Calibration points .
	The curves cannot be moved in the chart.
	The curves can be moved in the chart (<i>Additional information</i>).
	Reset the zoom level to 100% and center the curves.
	Open the Exclude/include window. In the Exclude/include window, subsamples with which the mean value and the other statistical data were calculated can be excluded from the statistics entry and then included once again.
	Tap the subsample to exclude it from the statistics.
	Tap the subsample to include it in the statistics once again.

3.1.3 Subsamples – Overview

- *Definition*
- *Overview list*
- *Functions*
- *Icons*

Video tutorials for the **Sample lists** subsection:



Definition

A subsample is a subset of a sample (*Additional information*).

At least one subsample must be created for each determination. Several subsamples from the same sample can be taken for multiple determinations.

The run of the determination of a subsample is defined in the IONIC app by a method that may contain multiple commands. ([Additional information](#)). Data required for performance of the determination can be entered individually for each subsample (e.g., sample size or user-defined subsample data). Which data is available as subsample data is defined in the **Method properties** definiert ([Additional information](#)).

Properties of a subsample are analyzed during the determination. The associated data is documented in the determination overview ([Additional information](#)).

Overview list

As soon as a sample is expanded in a sample list, the subsamples of this sample will be listed. The following information is displayed in the overview list:

No.	Subsample	Method	Sample size	Position	Determination start	Status
1	Subsample 1	MEAS U	1.5 mg		2026-04-28 07:42:53	✓
2	Subsample 2	MEAS U	1.5 mg		2026-04-28 07:42:53	✓
3	Subsample 3	MEAS U	1.5 mg		2026-04-28 07:42:53	✓
4	Subsample 4	MEAS U	1.5 mg		2026-04-28 07:42:53	✓
5	Subsample 5	MEAS U	1.5 mg		2026-04-28 07:42:53	✓
6	Subsample 6	MEAS U				▶
7	Subsample 7	MEAS U				▶

Subsample data

Sample volume 10 ml

02	MEAS pH					0/10
03	MEAS Ipol					0/10

1 No.

Index of the subsample within the sample.

2 Subsample

Name of the subsample.

3 Method

Method with which the subsample was determined or should be determined.

[Additional information](#)

4 Sample size

Sample amount that is to be analyzed.

The editability of the variable can be adapted in the **Method properties** ([Additional information](#)).

5 Position

Position of the sample beaker within the sample rack.

The position cannot be edited.

7 Status

Subsample status.

Additional information

6 Determination start

Date and time of the determination start.

This appears as soon as the determination has been set to pending.

8

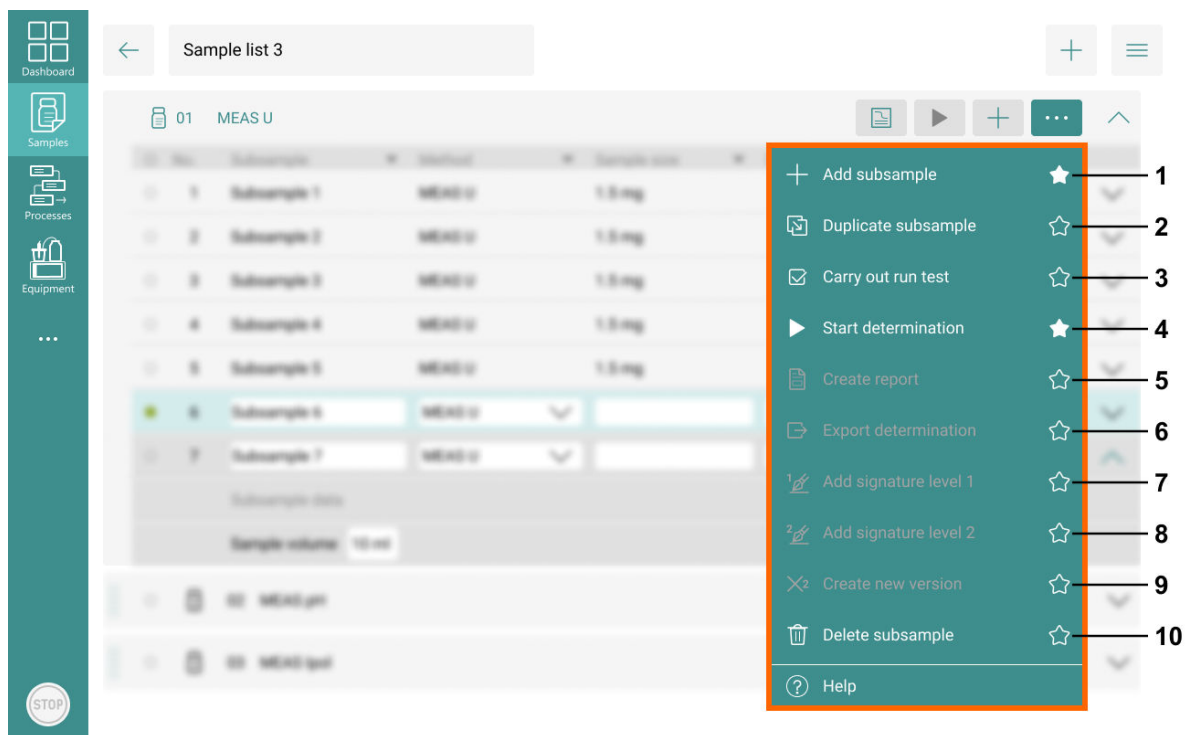


Tap to display user-defined subsample data and determination results. The results are available only for completed determinations.

Additional information

Functions

Tap on **...** to open a menu with the following functions:



1 Add a subsample

A new subsample is added to the overview list.

Additional information

2 Duplicate subsample

Individual and multiple subsamples can be duplicated. The selected subsamples are displayed in the overview list under the same name with ascending numbering.

Additional information

3 Carry out run test

A run test is performed for the selected subsample.

The function is available only for subsamples that have not been processed.

[Additional information](#)

5 Create report

Print out or save the desired report of the selected subsample.

The function is available only for completed determinations.

[Additional information](#)

7 Add signature level 1

The selected determination will be signed at level 1.

The function is available only with the **Electronic signature** license and works only for completed determinations.

[Additional information](#)

9 Create new version

A new, unsigned determination version is created.

This function is available only with the **Electronic signature** license and works only for completed determinations that have been signed at level 2.

[Additional information](#)

4 Start determination

The determination of the selected subsample is set to pending.

The function is available only for subsamples that have not been processed.

[Additional information](#)

6 Export determination

The selected determination is exported with the associated subsample data and determination data.

The function is available only for completed determinations.

[Additional information](#)

8 Add signature level 2

The selected determination will be signed at level 2.

This function is available only with the **Electronic signature** license and works only for completed determinations that have been signed at level 1.

[Additional information](#)

10 Delete subsample

The selected subsample is permanently deleted.

The function is available only for subsamples that have not been processed.

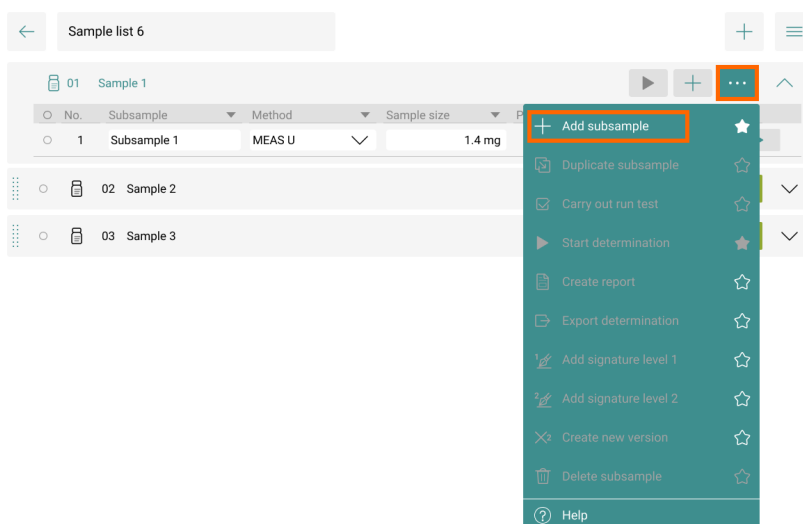
[Additional information](#)

Icons

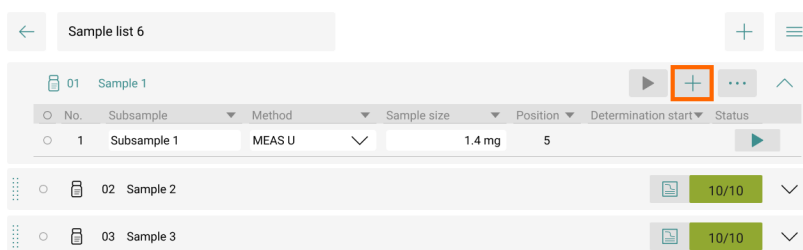
 The following icons are present in the opened samples. Icons that affect the entire user interface can be found [here](#).

Icon	Function
	Tap to add the function to the title bar (Additional information).
	Tap to remove the function from the title bar (Additional information).

Various status icons are displayed for the subsamples or for the determinations, respectively:



As an alternative, tap  in the title bar if the function has been added as a quick access ([Additional information](#)).



The subsample is duplicated under the same name with ascending numbering sequence.
Follow these steps if the subsample name and the method need to be adapted.

3 Renaming a subsample

- Tap the preset subsample name and delete it by tapping .

← Sample list 6
+
☰

01 Sample 1
▶ + ... ^

○	No.	Subsample	Method	Sample size	Position	Determination start	Status
○	1	Subsample 1	MEAS U	1.4 mg	5		▶
○	2	Subsample 2	MEAS U	1.4 mg	5		▶

02 Sample 2
10/10

03 Sample 3
10/10



- Enter the desired name for the subsample and confirm by tapping .

 The maximum character length is 32 characters.

←

Sample list 6

+

≡

01

Sample 1

▶

+

⋮

↗

○	No.	Subsample	Method	Sample size	Position	Determination start	Status
○	1	Subsample 1	MEAS U	1.4 mg	5		▶
○	2	Orange	MEAS U	1.4 mg	5		▶

02

Sample 2

📄

10/10

↕

03

Sample 3

📄

10/10

↕



4 Selecting a method

Open the selection list and select the desired method under **Method**.

Sample list 6

No.	Subsample	Method	Sample size	Position	Determination start	Status
1	Subsample 1	MEAS U	1.4 mg	5		
2	Orange	Enter	1.4 mg	5		
02	Sample 2					10/10
03	Sample 3					10/10

All entries are saved automatically.

3.1.3.2 Duplicate subsample

1 Opening a sample

Tap to expand the desired sample in an open sample list (*Additional information*).

2 Selecting subsamples

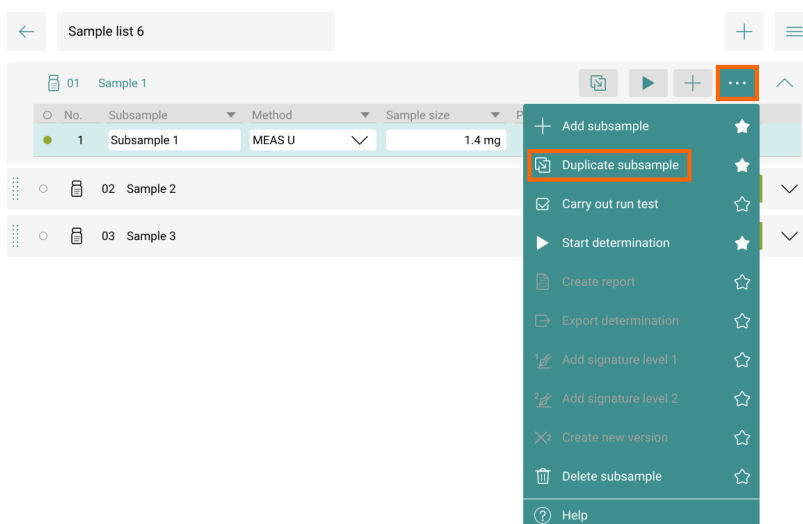
Select the desired subsamples by tapping .

Sample list 6

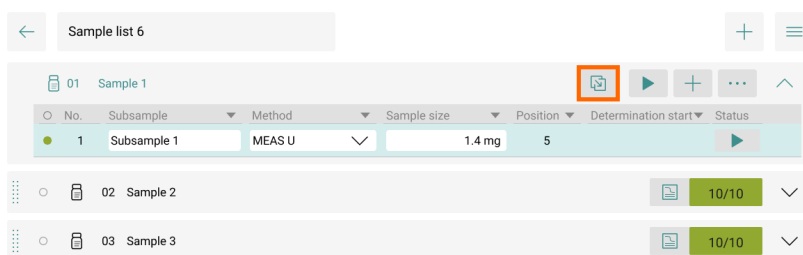
No.	Subsample	Method	Sample size	Position	Determination start	Status
	1	Subsample 1	MEAS U	1.4 mg	5	
02	Sample 2					10/10
03	Sample 3					10/10

3 Duplicating subsamples

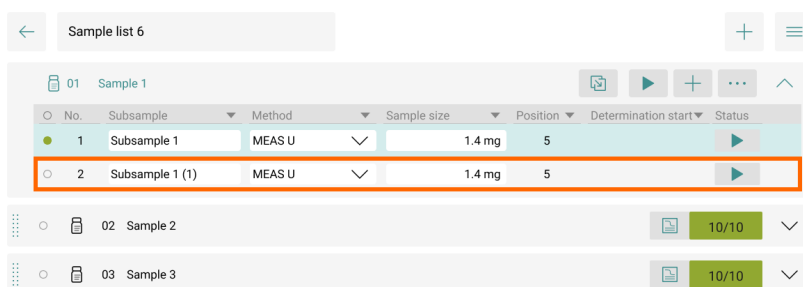
Tap in the title bar of the sample and select **Duplicate subsample**.



As an alternative, tap  in the title bar if the function has been added as a quick access ([Additional information](#)).



The duplicated subsamples are displayed under the same name with ascending numbering in the expanded sample.



3.1.3.3 Carry out run test

The following types of run test are available in the IONIC app:

- Manual run test ([Additional information](#))
- Automatic run test ([Additional information](#))

General

The following is checked with each run test:

- **User group rights**
 - The user must be assigned the respective user group rights to execute a determination ([Additional information](#)).
 - **Licenses**
 - The corresponding licenses must be activated ([Additional information](#)).
 - **Subsample**
 - The data types entered must correspond to the subsample data defined in the method properties and also be valid.
- 
 - If the subsample data has been changed, then the run test must be carried out once again.
 - Subsamples with invalid subsample data cannot be executed.
 - Numeric fields must not be left blank, but text fields may be left blank.
- **Method**
 - All commands used must have valid parameterization.
 - A functional unit must be assigned to all instrument-dependent commands.
 - When using the Measuring Interface Analog, a sensor type that matches the command must be assigned to all sensor-dependent commands.
 - **Equipment**
 - The digital sensor to be used must be connected or the analog sensor to be used must be installed in the equipment.
 - When the electrode check is activated, the polarizable metal electrode must be installed and connected in the equipment.
 - The piston buret to be used must be connected to the IONIC main instrument with the associated dosing drive.
 - The **Working life** (e. g., sensor, solution) and the **Validity period** (e. g., calibration, titer) of the assigned sensors and the connected solutions will be checked. During the automatic run test, depending on the setting in the equipment, an error message or warning message appears when the equipment has expired, or the determination is set to pending with an information message ([Additional information](#)).

 If the **Ask user** setting was selected in the properties of the sensor or of the solution, then the determination can continue during the automatic run test only if the user has been assigned the **Start determinations with expired equipment** user group right.

Manual run test

The manual run test checks all selected subsamples, one after another.

Performing a manual run test

Prerequisite:

- The subsample has the  status.

1 Opening a sample

Tap to expand the desired sample in an open sample list (*Additional information*).

2 Selecting subsamples

Select the desired subsamples by tapping .

Sample list 6

01 Sample 1

No.	Subsample	Method	Sample size	Position	Determination start	Status
0	Subsample 1	MEAS U	1.4 mg	5		
1	Subsample 2	MEAS U	1.4 mg	5		
3	Subsample 3	MEAS U	1.4 mg	5		
4	Subsample 4	MEAS U	1.4 mg	5		

02 Sample 2

03 Sample 3

To select all subsamples within a sample, tap  in the title bar of the sample.

←

Sample list 6

+

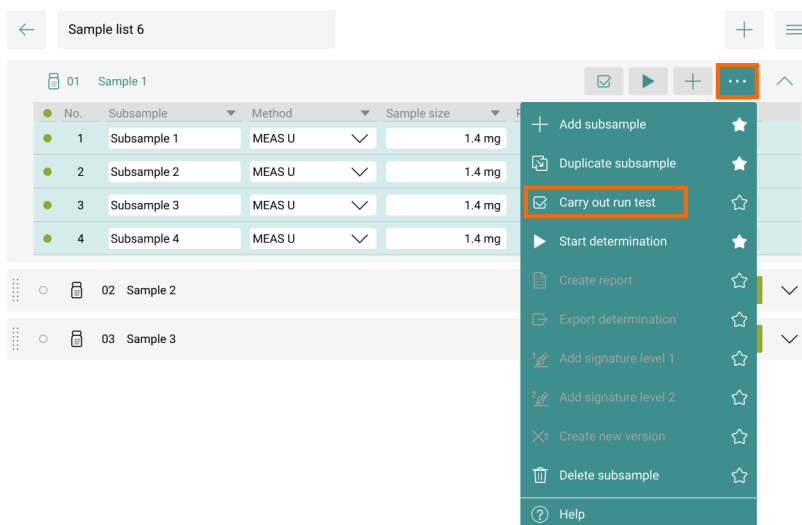
≡

01 Sample 1								☑	▶	+	⋮	↶
	No.	Subsample	Method	Sample size	Position	Determination start	Status					
☐	1	Subsample 1	MEAS U	1.4 mg	5							
☐	2	Subsample 2	MEAS U	1.4 mg	5							
☐	3	Subsample 3	MEAS U	1.4 mg	5							
☐	4	Subsample 4	MEAS U	1.4 mg	5							

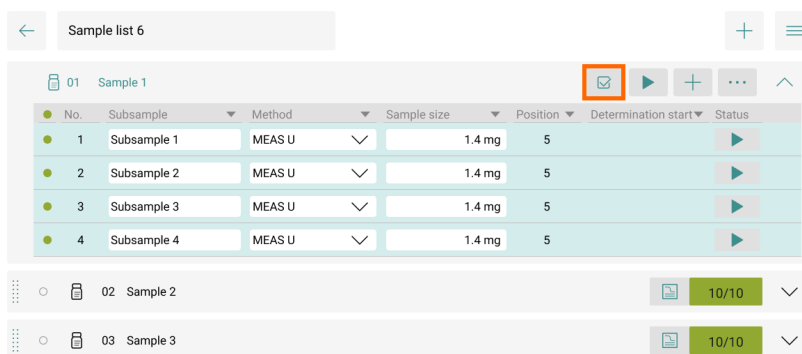
☐	02 Sample 2		10/10	↘
☐	03 Sample 3		10/10	↘

3 Starting a run test

Tap **...** in the title bar of the sample and select **Carry out run test**.



As an alternative, tap  in the title bar if the function has been added as a quick access ([Additional information](#)).



For the selected subsamples, a sequential check is performed to determine whether all determinations for the successful performance of the determination are met at the time the manual run test is performed.

If the run test is successful, then the system will not return a response.

If the run test is unsuccessful, then the user will be notified of any problems via messages.

Automatic run test

The automatic run test is triggered automatically as soon as a determination is set to pending, and it checks the subsample before the determination start.

 Only the selected subsample is checked in a single determination.

Carrying out an automatic run test

Prerequisite:

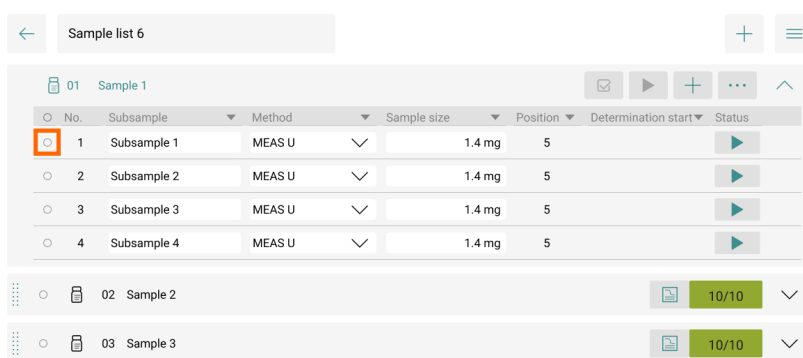
- The subsample has the  status.

1 Opening a sample

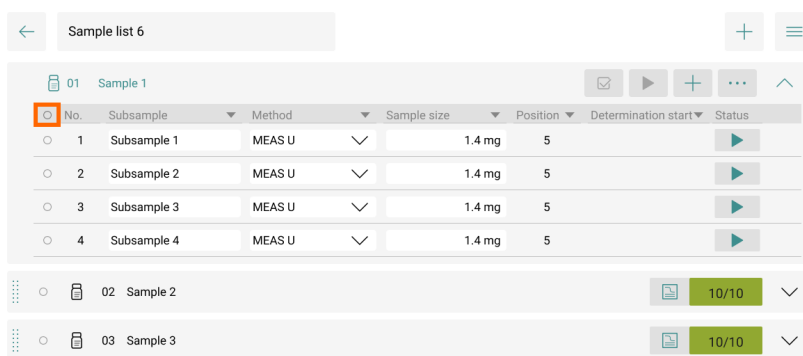
Tap  to expand the desired sample in an open sample list (*Additional information*).

2 Selecting subsamples

Select the desired subsamples by tapping .



To select all subsamples within a sample, tap in the title bar of the sample.



3 Setting the determination to pending

Tap in the title bar to set the determinations of the selected subsamples to pending.

No.	Subsample	Method	Sample size	Position	Determination start	Status
1	Subsample 1	MEAS U	1.4 mg	5		
2	Subsample 2	MEAS U	1.4 mg	5		
3	Subsample 3	MEAS U	1.4 mg	5		
4	Subsample 4	MEAS U	1.4 mg	5		

02 Sample 2 10/10

03 Sample 3 10/10

For the selected subsamples, a sequential check is performed to determine whether all conditions have been fulfilled for successfully executing the determination.

If the run test is successful, then the determination will be set to pending without feedback from the system and the next subsample will be checked.

If the run test is unsuccessful, then the user will be notified of any problems via messages and the next subsample will be checked.

3.1.3.4 Determination – Overview

A determination comprises the preparation, analysis, and evaluation of a subsample. Determinations are carried out and edited in the open sample list in the **Sample lists** subsection.

Video tutorials on how to perform determinations:



A determination can be set to pending for each subsample. While one determination is in progress, the other determinations are placed in a queue and displayed under **Live display ► Execution overview**. When the **Autostart** function is activated in the execution overview, the subsamples will be automatically selected from the queue as soon as the determination of the previous subsample is complete.

The determination of a subsample can be set to pending in the sample list and can be paused or stopped in the **Live display** work area. In addition, the determination can be tracked and edited in the **Live display** work area.

- *Starting the determination*
- *Pausing the determination*
- *Stopping the determination*
- *Live display – Overview*

3.1.3.4.1 Starting a determination

- *Determining a subsample via sample list*
- *Determining subsamples via favorites*

Video tutorials on how to perform determinations:



 A maximum of 50 subsamples can be set to pending.

Determining a subsample via sample list

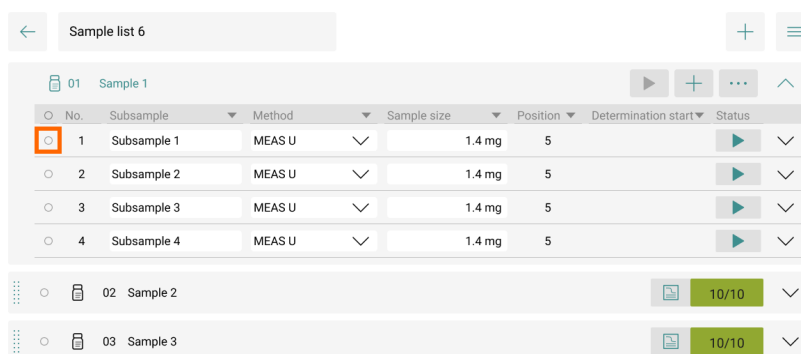
Prerequisite:

- The desired sample is open (*Additional information*).
- A method is assigned to each affected subsample.
- The subsample has the  status.

1 Selecting subsamples

 This step is necessary only if multiple determinations are to be set to pending at the same time.

Select the desired subsamples by tapping .



To select all subsamples within a sample, tap  in the title bar of the overview list.

←

Sample list 6

+

≡

01

Sample 1

▶

+

⋮

↗

🔍

No.

Subsample

Method

Sample size

Position

Determination start

Status

○

1

Subsample 1

MEAS U

1.4 mg

5

▶

▼

○

2

Subsample 2

MEAS U

1.4 mg

5

▶

▼

○

3

Subsample 3

MEAS U

1.4 mg

5

▶

▼

○

4

Subsample 4

MEAS U

1.4 mg

5

▶

▼

02

Sample 2

10/10

▼

03

Sample 3

10/10

▼

2 Setting the determination to pending

Single subsample: Tap  in the status column next to the desired subsample.

←

Sample list 6

+

≡

01

Sample 1

▶

+

⋮

^

☐	No.	Subsample	Method	Sample size	Position	Determination start	Status
☐	1	Subsample 1	MEAS U	1.4 mg	5		▶
☐	2	Subsample 2	MEAS U	1.4 mg	5		▶
☐	3	Subsample 3	MEAS U	1.4 mg	5		▶
☐	4	Subsample 4	MEAS U	1.4 mg	5		▶

⋮

☐

02

Sample 2

📄

10/10

▼

⋮

☐

03

Sample 3

📄

10/10

▼

Multiple subsamples: Tap  in the title bar of the sample.

Sample list 6

01

Sample 1

<

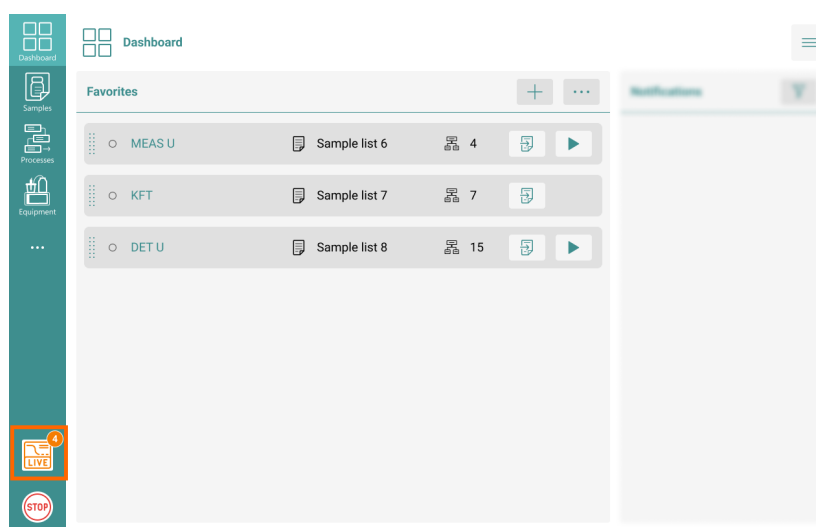
The determinations of the selected subsamples are set to pending. If no other determinations are being run, then the determination of the first subsample will be started. The other determinations are in the queue and are displayed in the execution overview ([Additional information](#)). As soon as the determination of the previous subsample is complete, the next pending subsample is determined if the **Autostart** function is activated.

The determinations of the subsamples available in the created sample are set to pending. If no other determinations are being run, then the determination of the first subsample will be started. The other determinations are in the queue and are displayed in the execution overview ([Additional information](#)). As soon as the determination of the previous subsample is complete, the next pending subsample is determined if the **Autostart** function is activated.

 Tapping  once again creates a new sample and new determinations will be set to pending.

2 Changing the work area

Tap the **Live display** work area in the navigation bar ([Additional information](#)).



The determination can be observed in the **Live display**.

3.1.3.4.2 Pausing a determination

Prerequisite:

- The **Live display** work area is open and a determination is run ([Additional information](#)).

1 Pausing a determination

Tap  in the title bar.



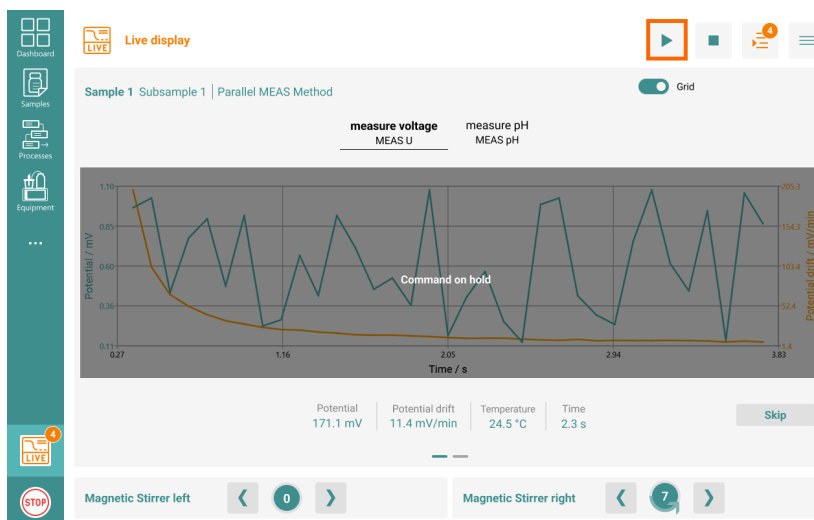
The determination of the subsample is paused.

 In the sample list, the  status appears in the status column of the affected subsample.

No.	Subsample	Method	Sample size	Position	Determination start	Status
01	Sample 1					
1	Subsample 1	Parallel MEAS Method	1.4 mg	5		
2	Subsample 2	Parallel MEAS Method	1.4 mg	5		
3	Subsample 3	Parallel MEAS Method	1.4 mg	5		
4	Subsample 4	Parallel MEAS Method	1.4 mg	5		
02	Sample 2					 10/10
03	Sample 3					 10/10

2 Continuing the determination

Tap  in the title bar.



The determination of the subsample is continued.

 In the sample list, the  status appears in the status column of the affected subsample.

Sample list 6

No.	Subsample	Method	Sample size	Position	Determination start	Status
01	Sample 1					
1	Subsample 1	Parallel MEAS Method	1.4 mg	5		
2	Subsample 2	Parallel MEAS Method	1.4 mg	5		
3	Subsample 3	Parallel MEAS Method	1.4 mg	5		
4	Subsample 4	Parallel MEAS Method	1.4 mg	5		
02	Sample 2					10/10
03	Sample 3					10/10

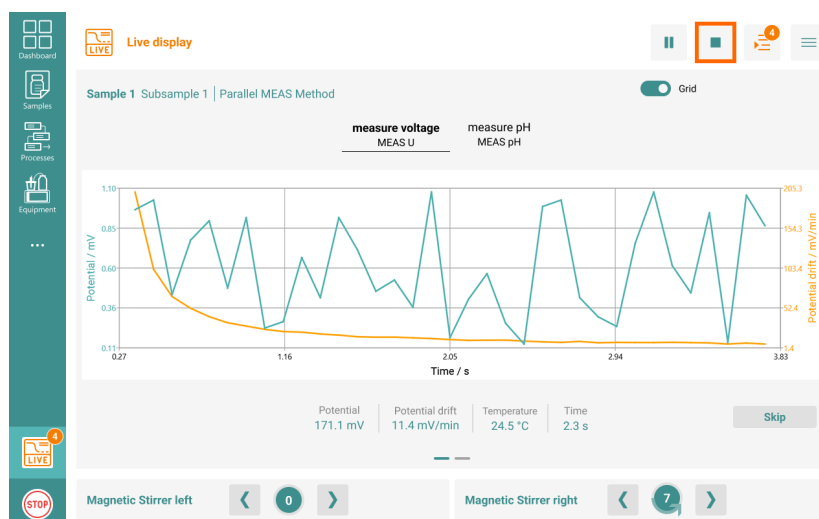
3.1.3.4.3 Stopping a determination

Prerequisite:

- The **Live display** work area is open and a determination is run ([Additional information](#)).

1 Stopping a determination

Tap  in the title bar.



The determination of the subsample is stopped and cannot be restarted. The **Autostart** function is deactivated for pending subsamples. In contrast to the emergency stop, all running functional units will not be automatically stopped. The **Execute on stop** run defined in the method is executed.

 In the sample list, the  status appears in the status column of the affected subsample. Tap  to open the determination overview with all determination data that was saved up to the stop time (*Additional information*).

No.	Subsample	Method	Sample size	Position	Determination start	Status
1	Subsample 1	Parallel MEAS Method	1.4 mg	5		
2	Subsample 2	Parallel MEAS Method	1.4 mg	5		
3	Subsample 3	Parallel MEAS Method	1.4 mg	5		
4	Subsample 4	Parallel MEAS Method	1.4 mg	5		
02	Sample 2				10/10	
03	Sample 3				10/10	

3.1.3.5 Create report

The following possibilities are available for generating reports in the IONIC app:

- *Automated generation of reports* with the **REPORT** command (*Additional information*)
- *Manual generation of reports* from the sample list
- *Manual generation of reports* from the sample overview
- *Manual generation of reports* from the sample
- *Manual generation of reports* from the determination overview
- *Manual generation of reports* from the **Methods** subsection

A report can either be saved in PDF format to a USB flash drive or printed out via a printer.

- If the report is to be saved as a PDF file to a USB flash drive, then the USB flash drive must be plugged into the USB connector on the front or on one of the USB connectors on the rear of the IONIC main instrument.
- If the report is to be printed out via a printer, then the matching printer must be defined in the **Equipment** work area and plugged into the IONIC main instrument (*Additional information*).

Video tutorial for generating reports:



Automated report with the REPORT command

1 Opening or creating a method

Under **Processes** ► **Methods**, open the desired method (*Additional information*) or create a new method (*Additional information*).

2 Adding a command

Insert the **REPORT** command from the **Command library** into the method (*Additional information*).

- The **REPORT** command generates a report for the results or calibrations that were generated with commands of the same method.



3 Defining the parameters

Open the **Command properties** of the **REPORT** command and define the parameters as desired (*Additional information*).

4 Saving the method

Tap in the title bar to save the method.

5 Creating a sample and a subsample

Create a new sample with at least one subsample (*Additional information*).

6 Assigning a method

Assign the method with the defined **REPORT** command to the desired subsample.

7 Setting a determination to pending

Set the determination of the subsample to pending (*Additional information*).

Once the **REPORT** command has been executed, the defined report will be saved to the selected USB flash drive or transmitted to the selected printer.

Manual generation of reports from the sample list

Prerequisite:

- At least one sample is available in the sample list.
- At least one subsample was determined in the selected sample.

1 Opening a sample list

Tap the name of the desired sample list under **Samples** ► **Sample lists** (*Additional information*).

2 Selecting a sample

Tap  to select the desired sample.

3 Opening a report dialog

Tap  in the title bar and select **Create report**.

4 Defining a report

Define the report as desired (*Additional information*).



5 Generating a report

Tap **[OK]** to generate the defined report.

If an error message appears, then follow the instructions in the error message.

- **PDF file:** The report will be stored as a PDF file on the USB flash drive as soon as the **Report generated** information message appears.

 The files are saved to the USB flash drive under **Sam-
ples ► Reports** under the following file name: **Sam-
pleName_ReportTemplateName_TimeStamp**. Spaces are
replaced with _.

During export, the time indications in the file properties are
converted to Coordinated Universal Time (UTC±00:00). This
time format may differ from the local time on the instrument.

- **Paper printout:** The report was sent to the selected printer as soon as the **Report
generated** information message appeared.

Manual generation of reports from the sample overview

Prerequisite:

- At least one sample is available in the sample list.
- At least one subsample was determined in the selected sample.

1 Opening a sample overview

Tap  in the title bar of the desired sample in an open sample list under **Sam-
ples ► Sample lists** (*Additional information*).

2 Opening a report dialog

Tap  in the title bar and select **Create report**.

3 Defining a report

Define the report as desired (*Additional information*).

4 Generating a report

Tap **[OK]** to generate the defined report.

If an error message appears, then follow the instructions in the error message.

- **PDF file:** The report will be stored as a PDF file on the USB flash drive as soon as the **Report generated** information message appears.



-  The files are saved to the USB flash drive under **Sam-
ples ► Reports** under the following file name: **Sam-
pleName_ReportTemplateName_TimeStamp**. Spaces are
replaced with `_`.
- During export, the time indications in the file properties are
converted to Coordinated Universal Time (UTC±00:00). This
time format may differ from the local time on the instrument.

- **Paper printout:** The report was sent to the selected printer as soon as the **Report generated** information message appeared.

Manual generation of reports from the sample

Prerequisite:

- The determination of the selected subsample is complete.

1 Opening a sample

Under **Samples** ► **Sample lists**, tap  to expand the desired sample in an open sample list (*Additional information*).

2 Selecting a subsample

Tap to select the desired subsample.

3 Opening a report dialog

Tap **...** in the title bar and select **Create report**.

4 Defining a report

Define the report as desired (*Additional information*).

5 Generating a report

Tap **[OK]** to generate the defined report.

If an error message appears, then follow the instructions in the error message.

- **PDF file:** The report will be stored as a PDF file on the USB flash drive as soon as the **Report generated** information message appears.

 The files are saved to the USB flash drive under **Samples ► Reports** under the following file name: **SubsampleName_ReportTemplateName_TimeStamp**. Spaces are replaced with _.

During export, the time indications in the file properties are converted to Coordinated Universal Time (UTC±00:00). This time format may differ from the local time on the instrument.

- **Paper printout:** The report was sent to the selected printer as soon as the **Report generated** information message appeared.

Manual generation of reports from the determination overview

Prerequisite:

- The determination of the selected subsample is complete.

1 Opening a determination overview

Under **Samples ► Sample lists**, tap , ,  or  in an open sample list in the status column of an expanded sample (*Additional information*).

2 Opening a report dialog

Tap  in the title bar and select **Create report**.

3 Defining a report

Define the report as desired (*Additional information*).

4 Generating a report

Tap **[OK]** to generate the defined report.

If an error message appears, then follow the instructions in the error message.

- **PDF file:** The report will be stored as a PDF file on the USB flash drive as soon as the **Report generated** information message appears.

 The files are saved to the USB flash drive under **Samples ► Reports** under the following file name: **SubsampleName_ReportTemplateName_TimeStamp**. Spaces are replaced with _.

During export, the time indications in the file properties are converted to Coordinated Universal Time (UTC±00:00). This time format may differ from the local time on the instrument.

- **Paper printout:** The report was sent to the selected printer as soon as the **Report generated** information message appeared.

Manual generation of reports from the Methods subsection

1 Selecting a method

Tap  to select the desired method under **Processes** ► **Methods**.

2 Opening a report dialog

Tap  in the title bar and select **Create report**.

3 Defining a report

Define the report as desired (*Additional information*).

4 Generating a report

Tap **[OK]** to generate the defined report.

If an error message appears, then follow the instructions in the error message.

- **PDF file:** The report will be stored as a PDF file on the USB flash drive as soon as the **Report generated** information message appears.

 The files are saved to the USB flash drive under **Processes ► Reports** under the following file name: **MethodName_ReportTemplateName_TimeStamp**. Spaces are replaced with **_**.

During export, the time indications in the file properties are converted to Coordinated Universal Time (UTC±00:00). This time format may differ from the local time on the instrument.

- **Paper printout:** The report was sent to the selected printer as soon as the **Report generated** information message appeared.

Defining a report

1 Selecting the language to use

Tap the selection list under **Language** and select the language in which the report is to be output.

2 Selecting a report template

Tap the selection list under **Report** and select the desired report template (*Additional information*).

3 Selecting an output format

Tap the radio button next to the desired output format under **Output format**.

4 Selecting a USB connector (only if PDF file is selected)

Tap the selection list under **USB connector** and select the connector to which the desired USB flash drive is connected and to which the report is to be saved.



The **Assign automatically** function works only if exactly one USB flash drive is connected.

5 Selecting a printer (only if Paper printout is selected)

Tap the selection list under **Printer** and select the printer that is connected to the IONIC main instrument and with which the report is to be printed out.



The **Assign automatically** function works only if exactly one printer has been added to the equipment (*Additional information*).

3.1.3.6 Export determination

There are 3 ways to export subsample data and determination data in the IONIC app:

- *Manual export from the sample*
- *Manual export from the determination overview*
- *Automated export with the EXPORT command*

Manual export from the sample**Prerequisite:**

- The determination of the selected subsample is complete.

1 Plugging in a USB flash drive

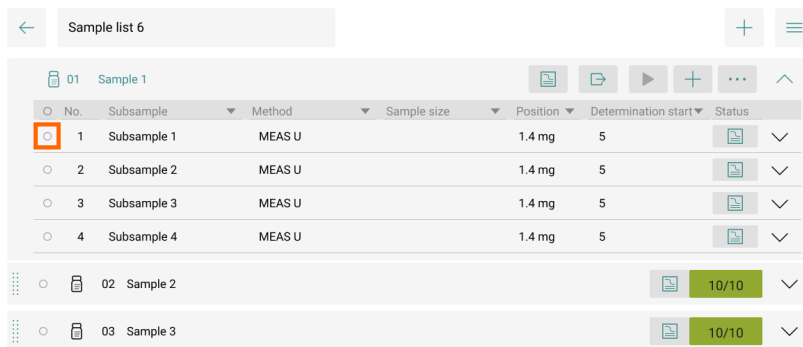
Plug a USB flash drive into one of the USB connectors available on the IONIC main instrument and wait until the message **USB flash drive connected** appears.

2 Opening a sample

Tap  to expand the desired sample in an open sample list (*Additional information*).

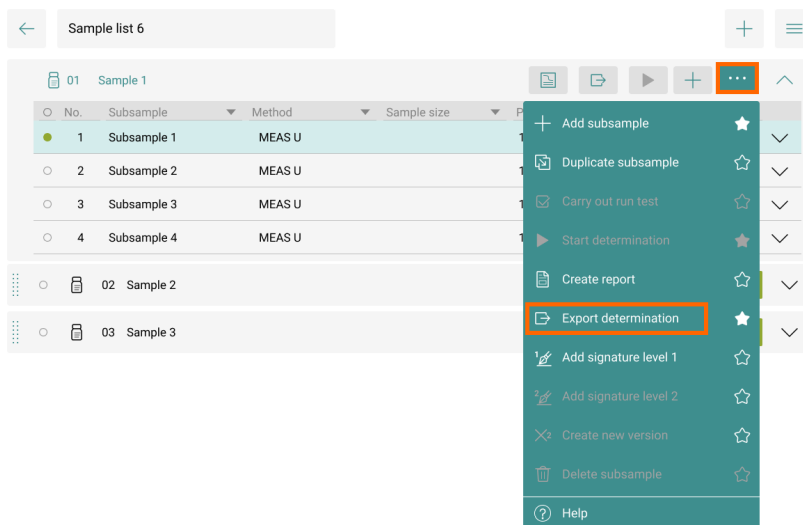
3 Selecting subsamples

Select the desired subsamples by tapping .

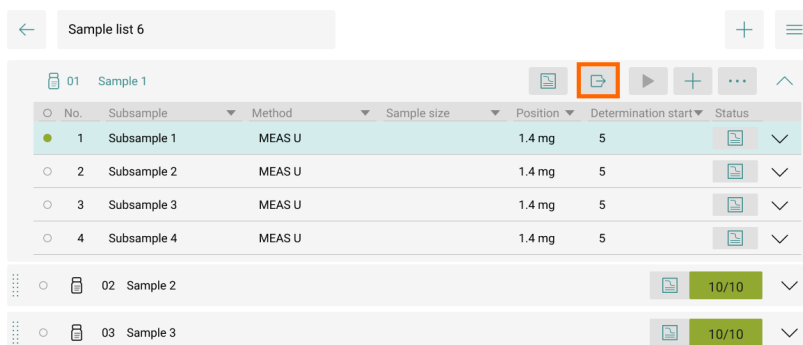


4 Opening the export dialog

Tap **...** in the title bar and select **Export determination**.



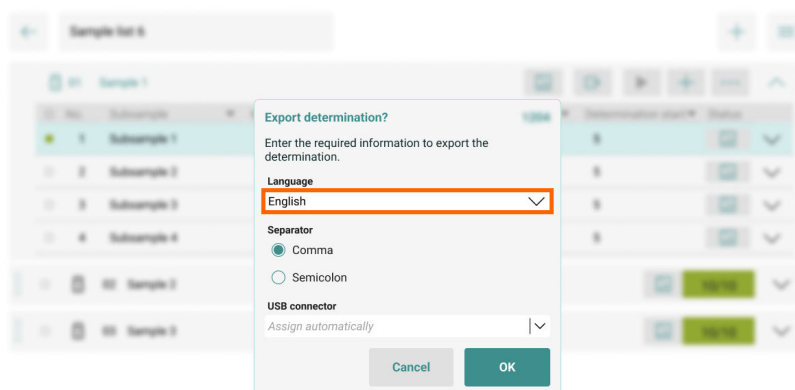
As an alternative, tap  in the title bar if the function has been added as a quick access ([Additional information](#)).



No.	Subsample	Method	Sample size	Position	Determination start	Status
01	Sample 1					
1	Subsample 1	MEAS U	1.4 mg	5		
2	Subsample 2	MEAS U	1.4 mg	5		
3	Subsample 3	MEAS U	1.4 mg	5		
4	Subsample 4	MEAS U	1.4 mg	5		
02	Sample 2					10/10
03	Sample 3					10/10

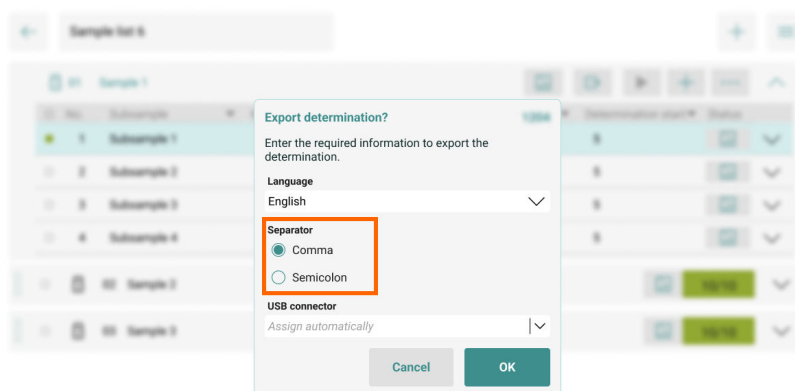
5 Selecting the language to use

Tap the selection list under **Language** and select the language in which the determination is to be exported.



6 Selecting a separator

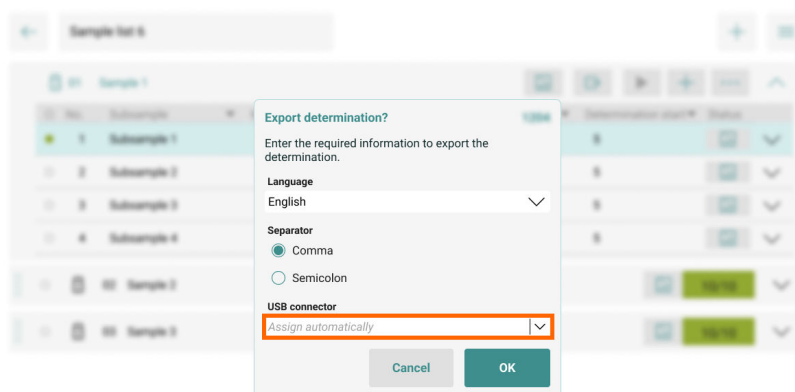
Tap ☐ under **Separator** to select whether a **Comma** or a **Semicolon** is to be used as a separator in the CSV file.



7 Selecting a USB connector

Tap the selection list under **USB connector** and select the connector to which the desired USB flash drive is connected.

- The selection list is available only if at least one USB flash drive is connected.
- The **Assign automatically** function works only if exactly one USB flash drive is connected.



8 Exporting a determination

Confirm the entries with **[OK]**.

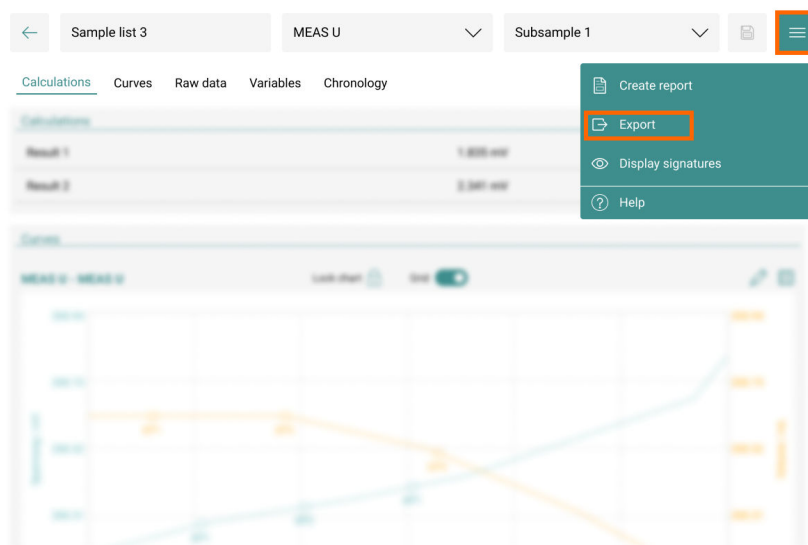
[illegible][illegible][illegible][illegible][illegible][illegible]

- Abstract**

[illegible][illegible][illegible][illegible]

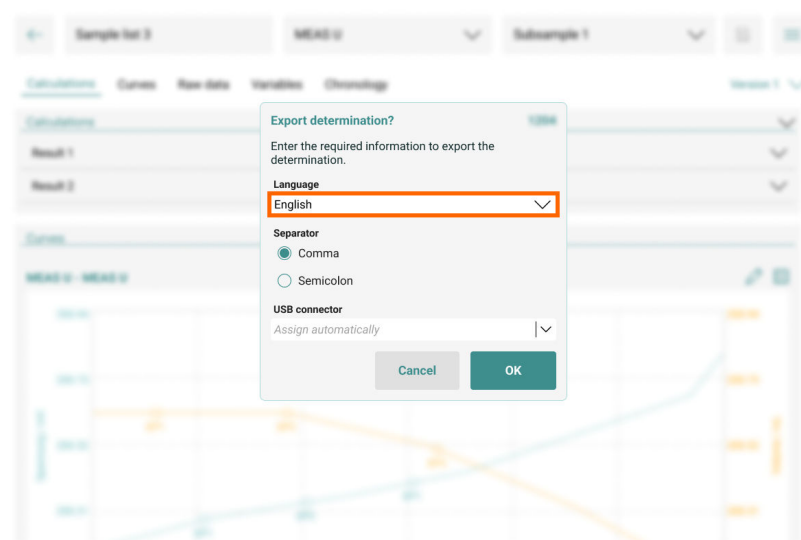
3 Opening the export dialog

Tap in the title bar and select **Export**.



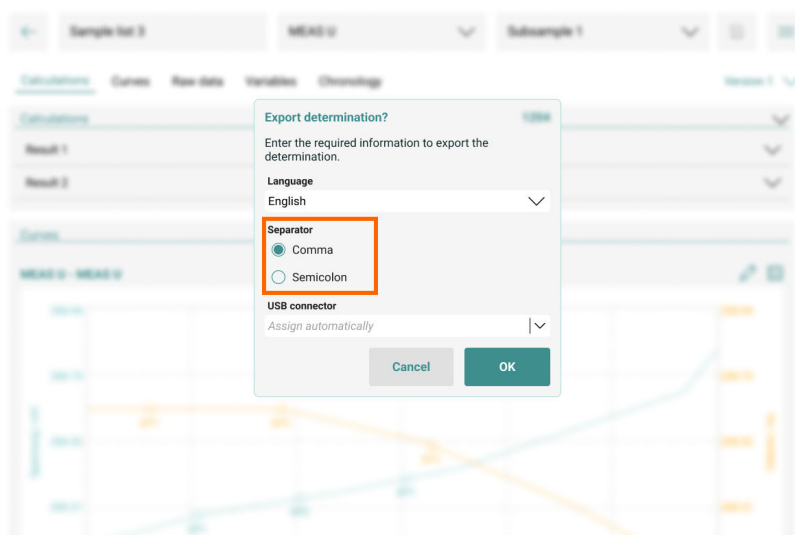
4 Selecting the language to use

Tap the selection list under **Language** and select the language in which the determination is to be exported.



5 Selecting a separator

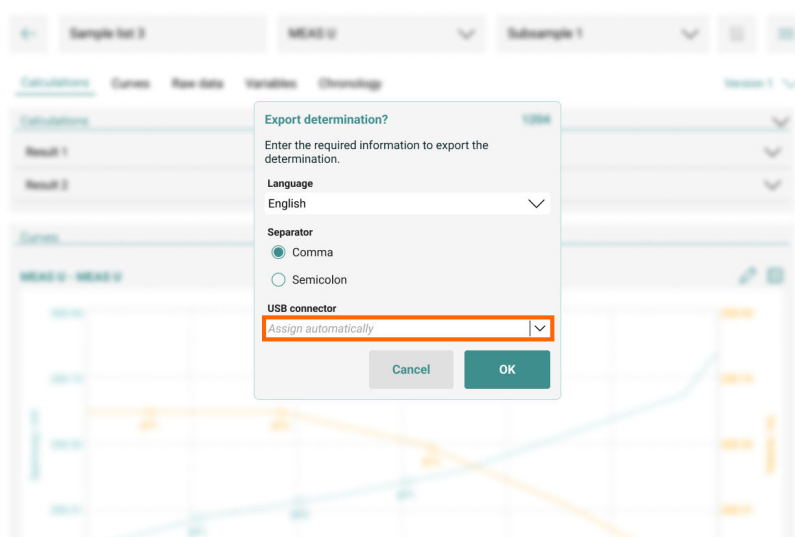
Tap  under **Separator** to select whether a **Comma** or a **Semicolon** is to be used as a separator in the CSV file.



6 Selecting a USB connector

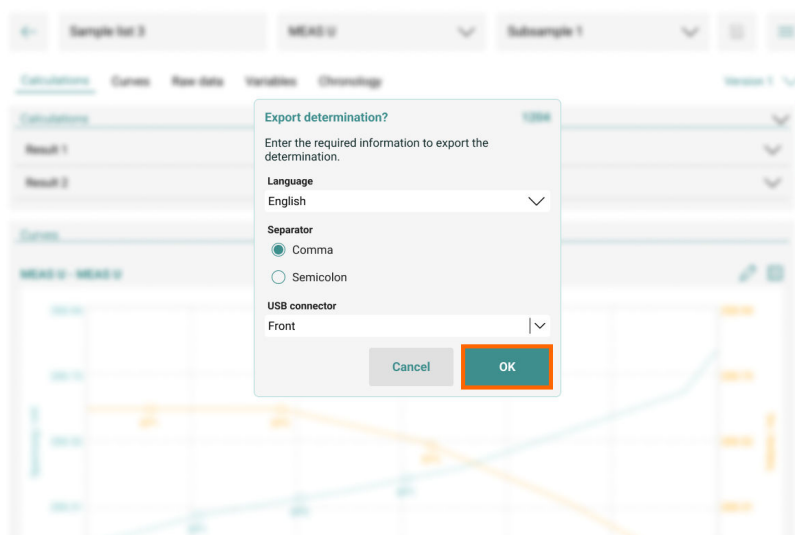
Tap the selection list under **USB connector** and select the connector to which the desired USB flash drive is connected.

- The selection list is available only if at least one USB flash drive is connected.
- The **Assign automatically** function works only if exactly one USB flash drive is connected.



7 Exporting a determination

Confirm the entries with **[OK]**.



If an error message appears, follow the instructions in the error message.

As soon as the **Determination exported** information message appears, all subsample data and determination data of the selected determination are stored as a CSV file (.csv) on the USB flash drive.

 The files are saved to the USB flash drive under **Sam-
ples ► Exports** with the following file name: **Subsample-
Name_TimeStamp**. Spaces are replaced with **_**.

During export, the time indications in the file properties are converted to Coordinated Universal Time (UTC±00:00). This time format may differ from the local time on the instrument.

Automated export with the EXPORT command

1 Plugging in a USB flash drive

Plug a USB flash drive into one of the USB connectors available on the IONIC main instrument and wait until the message **USB flash drive connected** appears.

2 Opening or creating a method

Under **Processes ► Methods**, open the desired method (*Additional information*) or create a new method (*Additional information*).

3 Adding a command

Add the **EXPORT** command from the **Command library** to the method (*Additional information*).

 In order to ensure that all relevant data is exported, the **EXPORT** command should be inserted at the end of the method.

4 Defining the parameters

Open the **Command properties** of the **EXPORT** command and define the parameters as desired ([Additional information](#)).

5 Saving the method

Tap  in the title bar to save the method.

6 Creating a sample and a subsample

- Open or create a sample list under **Samples ► Sample lists** ([Additional information](#)).
- Create a new sample with a subsample ([Additional information](#)).

7 Assigning the method

Under **Method**, open the selection list and assign the method with the defined **EXPORT** command ([Additional information](#)).

8 Setting the determination to pending

Set the determination of the subsample to pending ([Additional information](#)).

As soon as the **EXPORT** command is executed, the subsample data and determination data collected up to that point will be saved to the USB flash drive as a CSV file (.csv).

 The files are saved to the USB flash drive under **Samples ► Exports** with the following file name: **Subsample-Name_TimeStamp**. Spaces are replaced with _.

During export, the time indications in the file properties are converted to Coordinated Universal Time (UTC±00:00). This time format may differ from the local time on the instrument.

3.1.3.7 Delete subsample

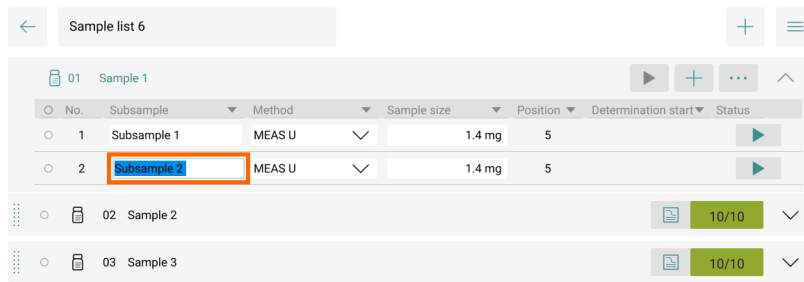
Prerequisite:



- The subsample has the status.

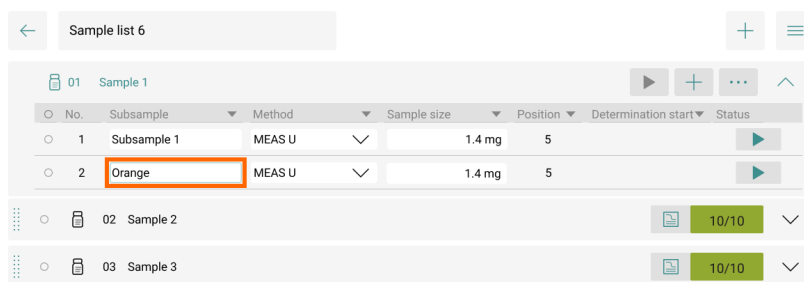
Tap to expand the desired sample in an open sample list (*Additional information*).

Tap the subsample name and delete it by tapping .



3 Entering a new subsample name

Enter the desired name for the subsample and confirm by tapping .



3.1.3.9 Signatures – Overview

- *Definition*
- *Additional information*

Definition

Signatures are available only with the activated **User management** and **Electronic signature** licenses. In addition, extended user management must be activated.

-  The user must have the necessary user group rights in order to be able to add signatures ([Additional information](#)).

Methods and subsamples can be signed on up to 2 levels in the IONIC app.

The following rules apply for the signatures:

General

- Every user can sign an object only once (regardless of the level).
- Only current determination versions and current method versions can be signed.
- When exporting and importing, all signatures are also exported or imported, respectively.

Level 1

- Objects signed at level 1 can be changed and deleted. As soon as an object signed at level 1 is changed and saved, a new, unsigned version of the determination or method will be created.
- Any number of users can sign an object at level 1.

Level 2

- Once an object has been signed at level 2, that object can no longer be changed or deleted. In order to change or delete the object, first a new, unsigned version must be created.
- Level 2 can be signed only if at least one user has signed the object at level 1.
- Only one signature can be added at level 2.
- As soon as a signature has been added at level 2, no further signatures can be added.

Additional information

Signatures can be added at level 1 and level 2 in the IONIC app. New, unsigned versions can also be created. In addition, the signatures can be displayed in the respective determination overview or in the respective method editor.

- [Adding a signature](#)
- [Creating a new version](#)
- [Displaying signatures](#)

3.1.3.9.1 Adding a signature

Methods and determinations can be signed at level 1 and at level 2 in the IONIC app ([Additional information](#)).

- [Adding level 1 signature](#)
- [Adding level 2 signature](#)

-  The images show how to add signatures for methods. This procedure also applies to adding signatures for determinations.

Adding signature level 1

Prerequisite:

- The user has the necessary user group rights (*Additional information*).
- The user has not yet signed the object.

1 Selecting an object

Tap  to select the desired object.

Processes

Search

Methods

☐	Name	Version	Saved	User name	Signature	...
☐	DET U	1	2026-03-26 14:22	John Smith	None	
☐	KFT Ipol	5	2026-04-05 13:01	John Smith	Level 1	▼
☒	MEAS U	2	2026-08-10 09:30	Charlie Wilson	None	▼
☐	CAL pH	3	2026-08-15 09:02	Charlie Wilson	Level 2	⌵
☐	CAL pH	2	2026-08-14 15:43	Charlie Wilson	Level 2	
☐	CAL pH	1	2026-08-14 08:15	Charlie Wilson	Level 2	

2 Opening a signature dialog

Tap (method) or (subsample) in the title bar and select **Add signature level 1**.

Processes

Search

Methods

Name	Version	Saved	User name
DET U	1	2026-03-26 14:22	John
KFT Ipol	5	2026-04-05 13:01	John
MEAS U	2	2026-08-10 09:30	Charles
CAL pH	3	2026-08-15 09:02	Charles
CAL pH	2	2026-08-14 15:43	Charles
CAL pH	1	2026-08-14 08:15	Charles

+

 Create method

🔍

 Open method

📄

 Duplicate method

🔄

 Restore version

📄

 Create report

📄

 Import method

📄

 Export method

🔄

 Upload method

📄

 Download method

📝

 Add signature level 1

📝

 Add signature level 2

🔄

 Create new version

🗑️

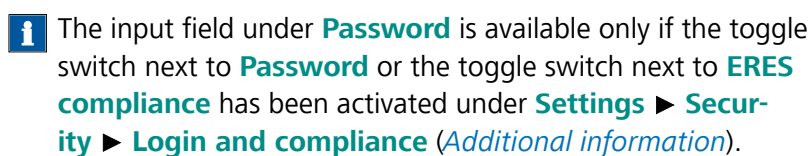
 Delete method

?

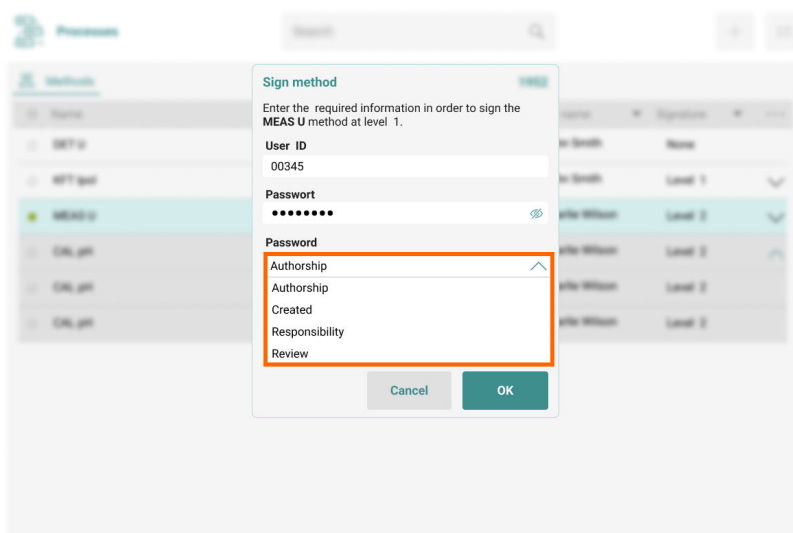
 Help

3 Authenticating a user account

- Tap the input field under **User ID** and enter the user ID of the user account.



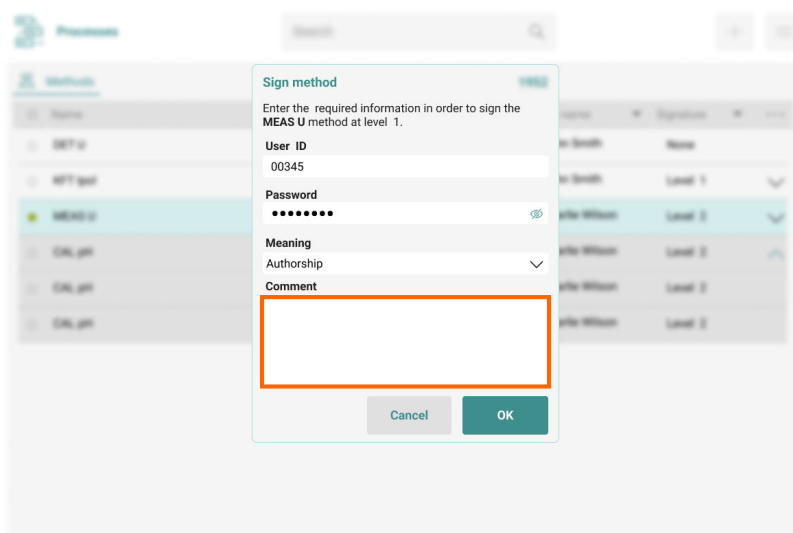
Tap the selection list under **Meaning** and select the meaning of the signature.



 The input field under **Meaning** is available only if the toggle switch next to **Meaning** has been activated under **Settings ► Security ► Electronic signatures** (*Additional information*) or if the toggle switch next to **ERES compliance** has been activated under **Settings ► Security ► Login and compliance** (*Additional information*).

5 Adding a comment

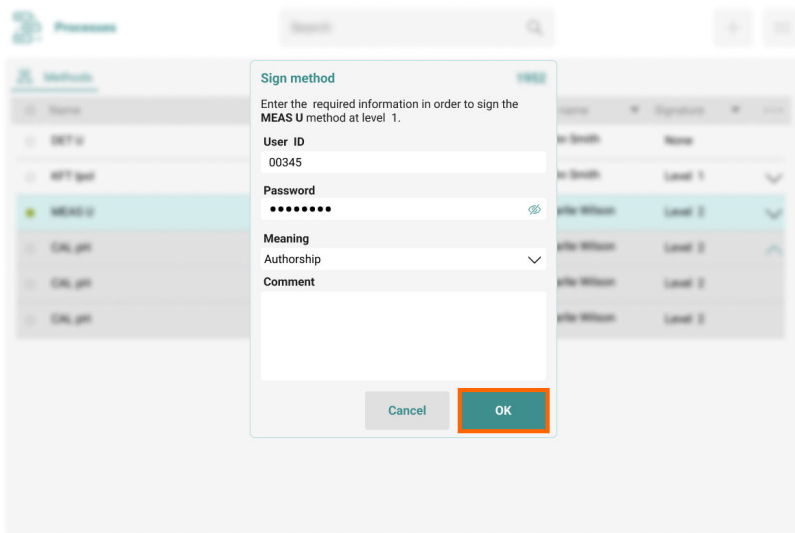
Tap the input field under **Comment** and add a comment.





6

Tap **[OK]** and confirm the signature.



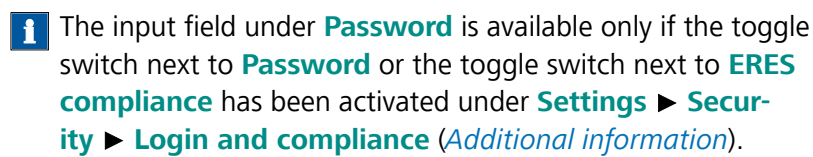
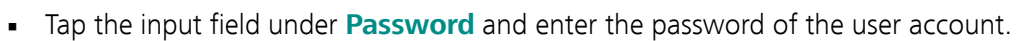
Adding signature level 2

Prerequisite:

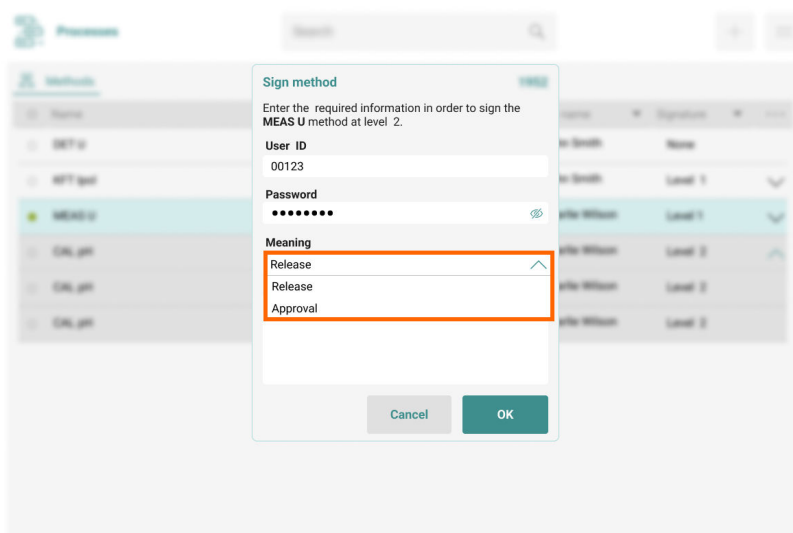
- The user has the necessary user group rights (*Additional information*).
- The object has been signed by at least one other user at level 1.

1

Tap  to select the desired object.



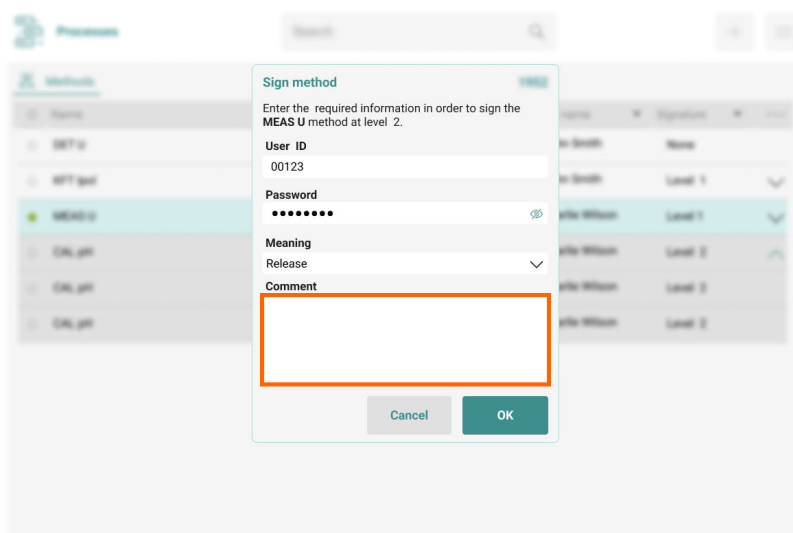
Tap the selection list under **Meaning** and select the importance of the signature.



 The input field under **Meaning** is available only if the toggle switch next to **Meaning** has been activated under **Settings ► Security ► Electronic signatures** (*Additional information*) or if the toggle switch next to **ERES compliance** has been activated under **Settings ► Security ► Login and compliance** (*Additional information*).

5 Adding a comment

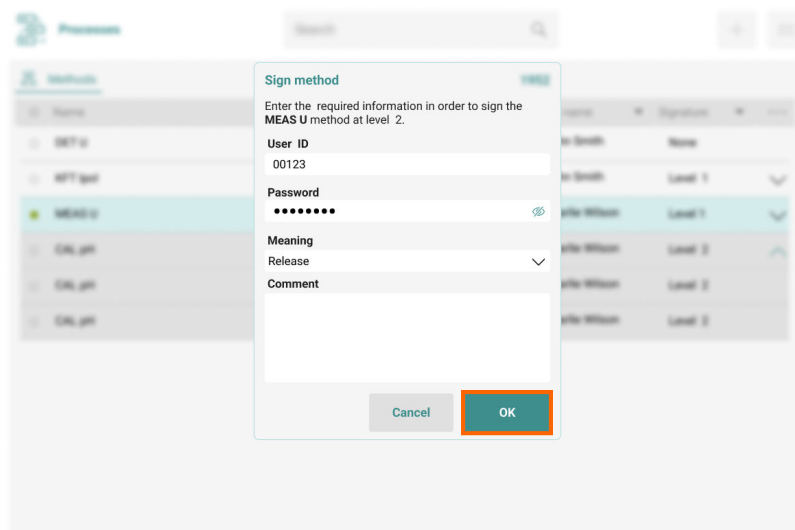
Tap the input field under **Comment** and add a comment.



 The input field under **Comment** is available only if the check box next to **Comment** has been activated under **Settings ► Security ► Electronic signatures** (*Additional information*).

6 Confirming a signature

Tap **[OK]** and confirm the signature.



3.1.3.9.2 Create new version

In order to create a new, unsigned version of an object signed at level 1, the object must first be modified and saved (*Additional information*). To create a new, unsigned version of an object signed at level 2, observe the following instructions.

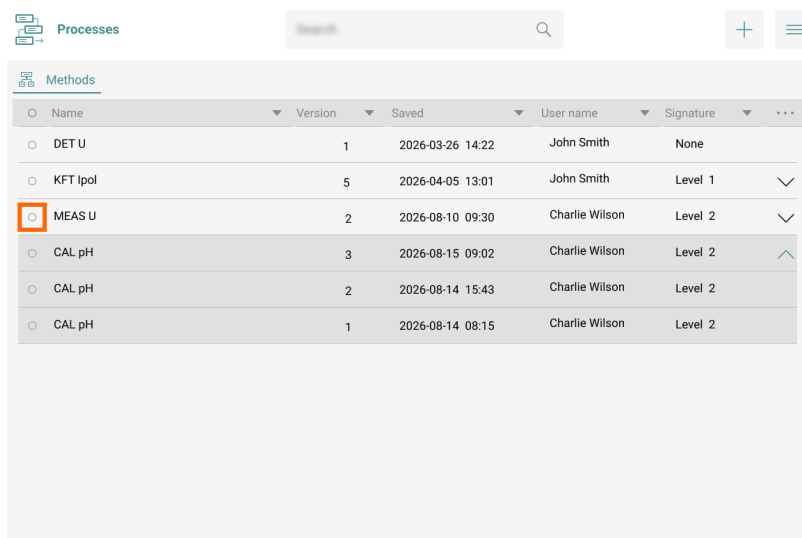
 The images show how to create a new version of a method. The procedure also applies to creating a new version for determinations.

Prerequisite:

- The user has the necessary user group rights (*Additional information*).
- The object is signed at level 2.

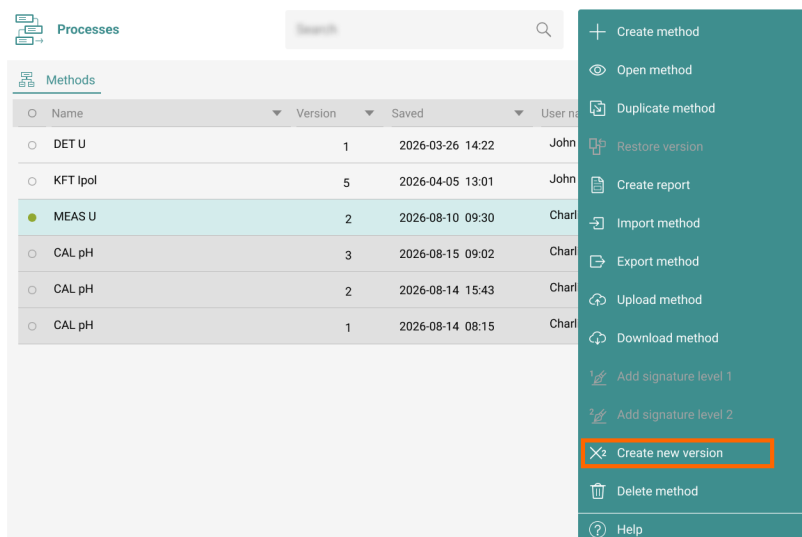
1 Selecting an object

Tap  to select the desired object.



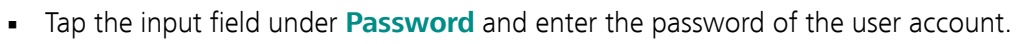
2 Opening a signature dialog

Tap (method) or (subsample) in the title bar and select **Create new version**.

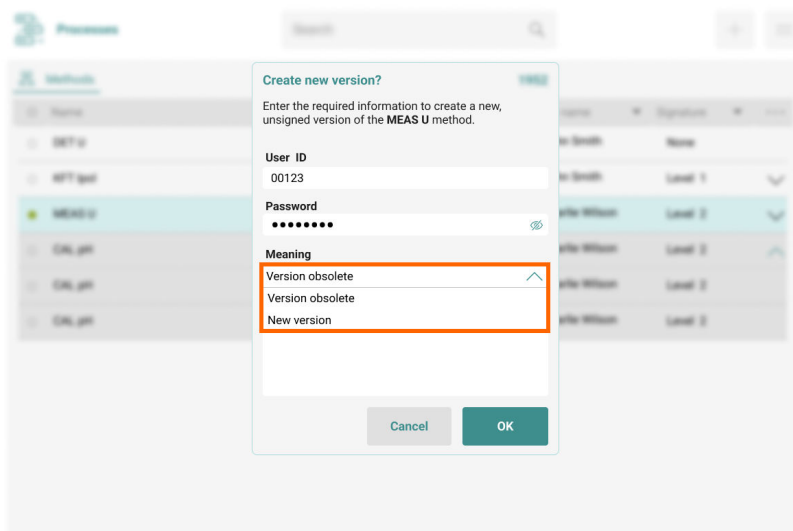


3 Authenticating a user account

- Tap the input field under **User ID** and enter the user ID of the user account.



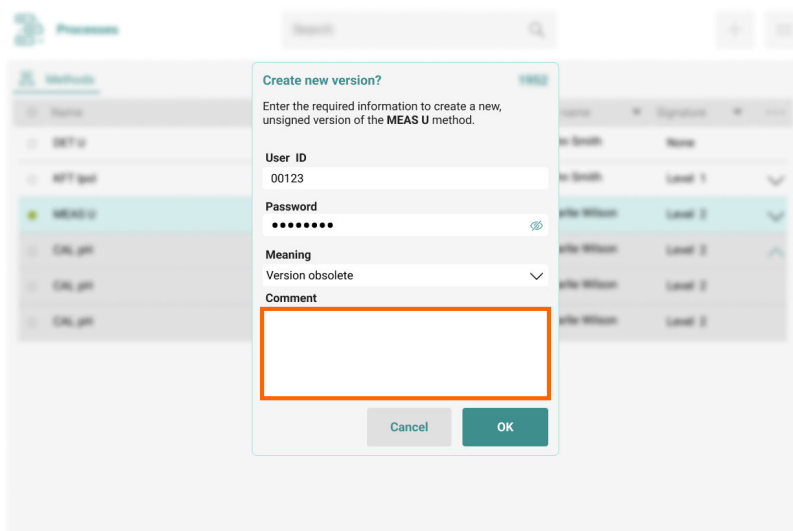
147



 The input field under **Meaning** is available only if the toggle switch next to **Meaning** has been activated under **Settings ► Security ► Electronic signatures** (*Additional information*) or if the toggle switch next to **ERES compliance** has been activated under **Settings ► Security ► Login and compliance** (*Additional information*).

5 Adding a comment

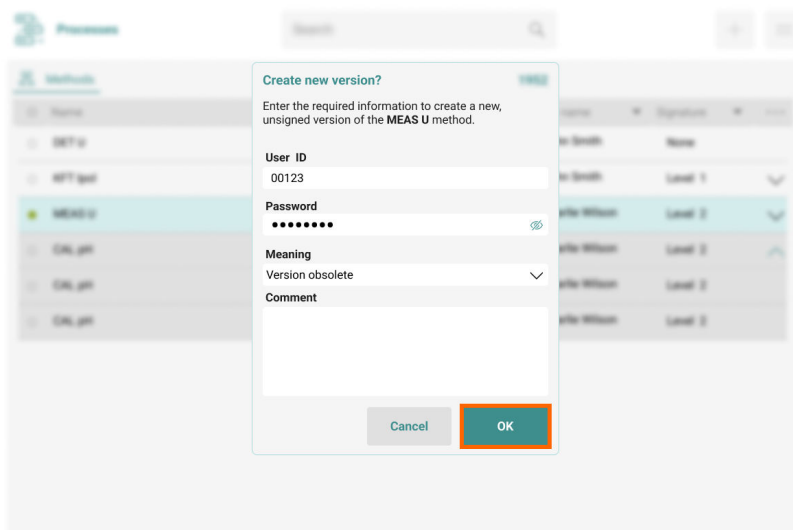
Tap the input field under **Comment** and add a comment.



 The input field under **Comment** is available only if the check box next to **Comment** has been activated under **Settings ► Security ► Electronic signatures** (*Additional information*).

6 Confirming a message

Tap **[OK]** and confirm the creation of a new version.



A new, unsigned version of the method or determination is created.

3.1.3.9.3 Display signatures

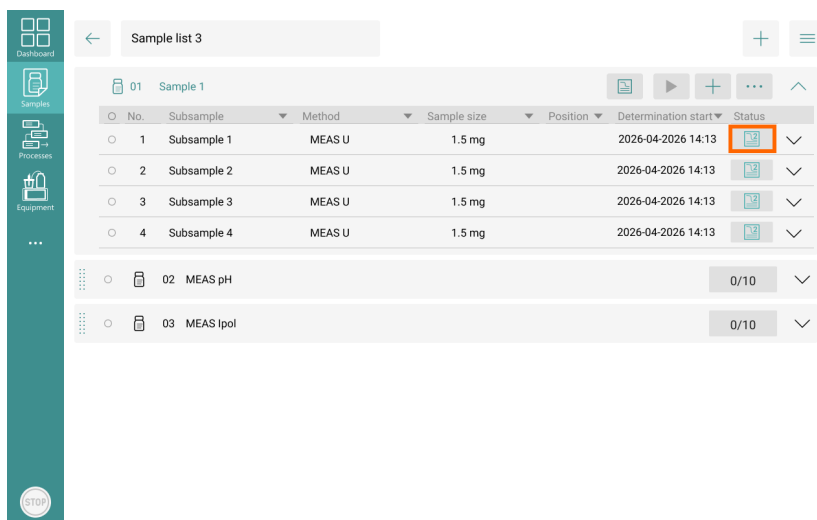
- *Displaying subsample signatures*
- *Displaying method signatures*

 The signatures can only be displayed and not edited.

Displaying subsample signatures

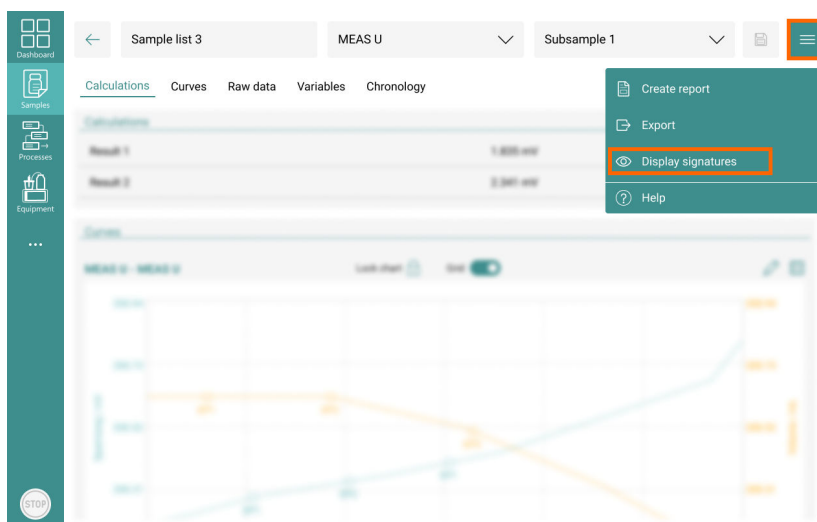
1 Opening the determination overview

Tap  or  in the status column of an expanded sample and open the determination overview (*Additional information*).



2 Opening subsample signatures

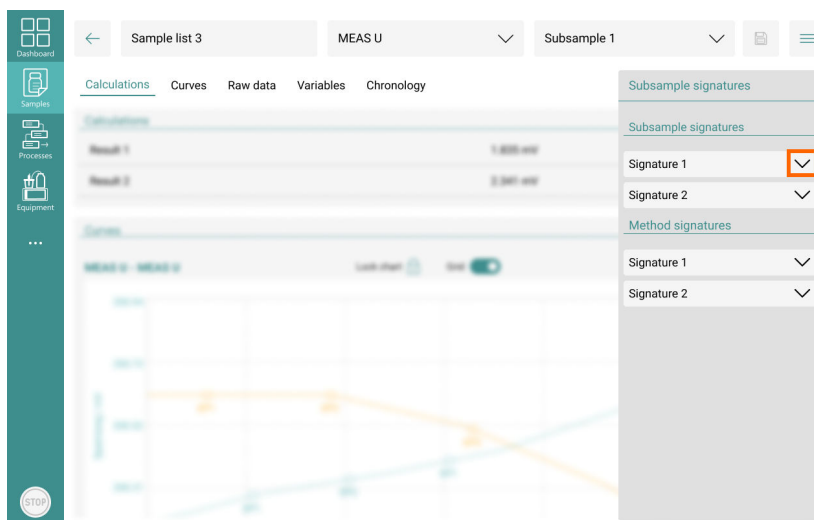
Tap  in the title bar and select **Display signatures**.



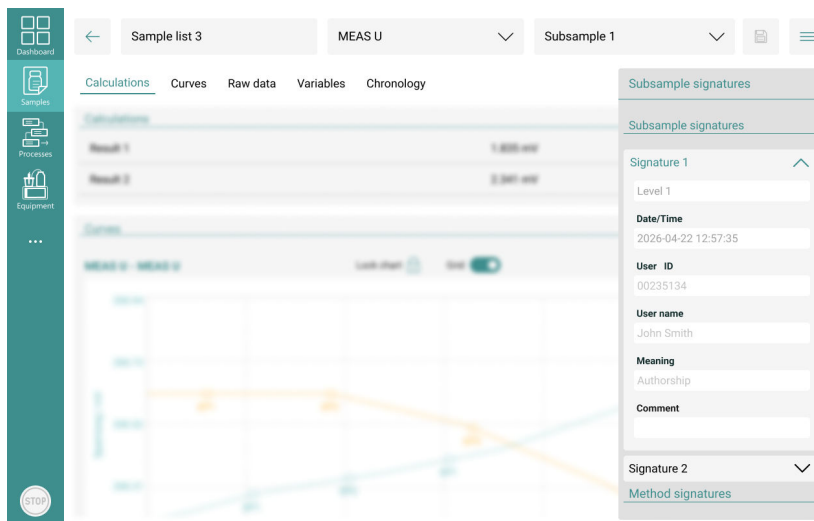
The signatures of the current determination version and the signatures of the method version that was used to determine the subsample are displayed.

3 Displaying signature details

Tap  in the **Subsample signatures** window next to the desired signature.



Information on the signature is displayed ([Additional information](#)).



Displaying method signatures

1 Opening the method editor

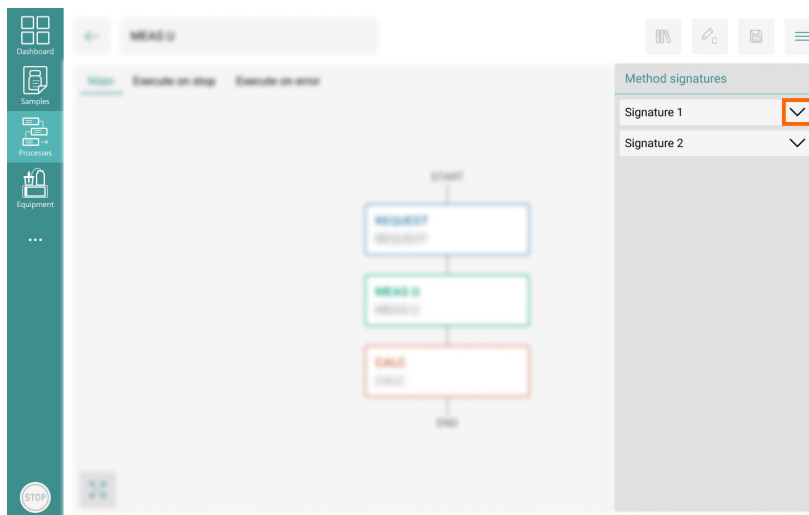
Tap the desired method and open the method editor ([Additional information](#)).



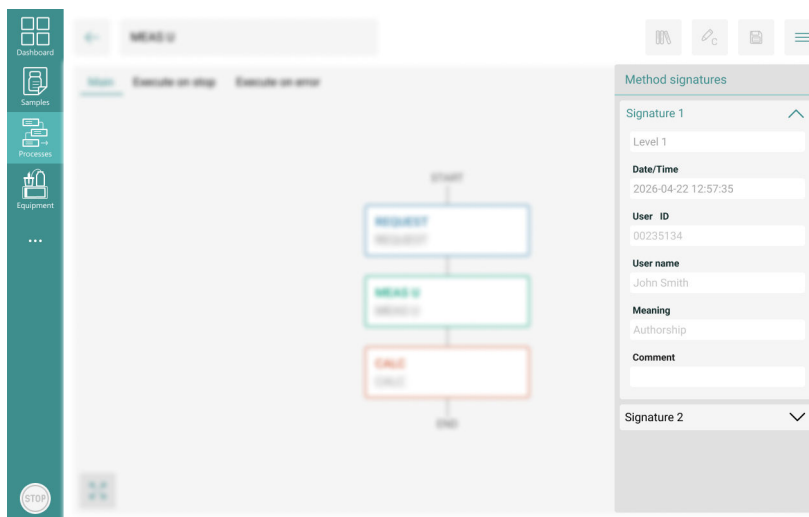
2



3

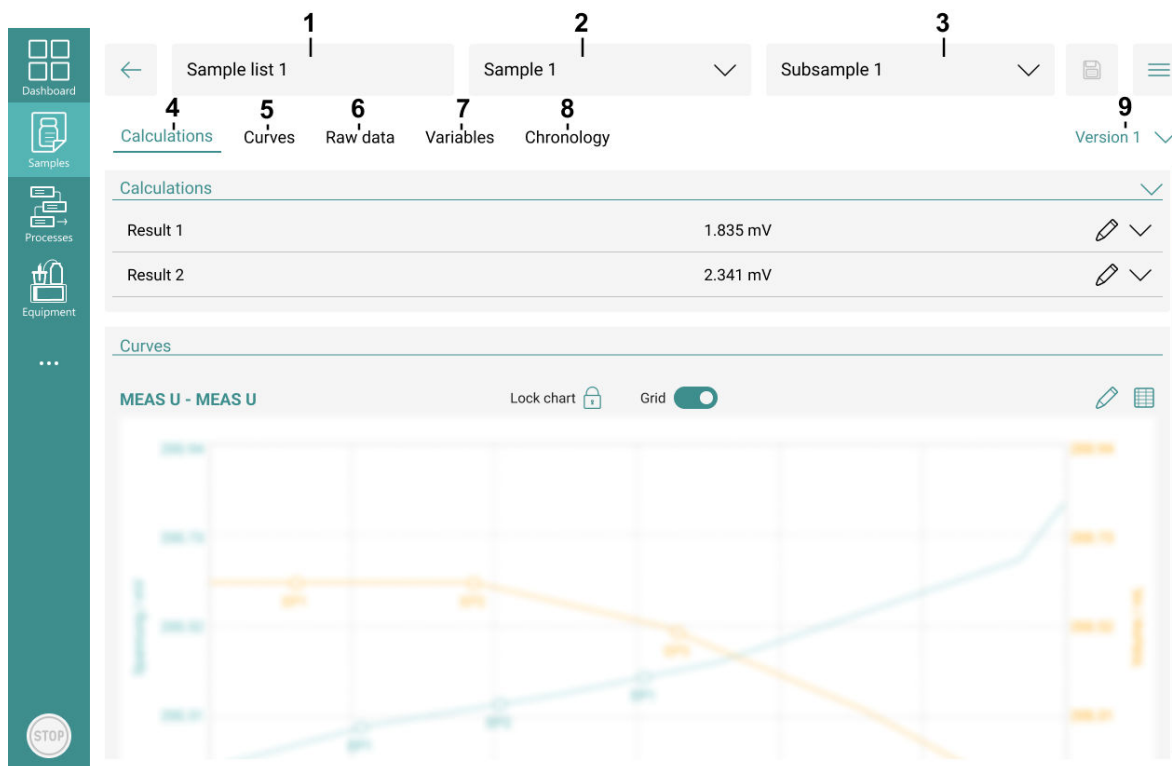


Information on the signature is displayed ([Additional information](#)).



As soon as a signature is expanded by tapping , the following information will appear:

Level	Level at which the signature was added.
Date/Time	Date and time when adding the signature.
User ID	User ID of the user account with which the signature was added.
User name	User name of the user account with which the signature was added.
Meaning	Selected importance of the signature.
Comment	Comment on the signature.

**1 Sample list**

Name of the sample list that contains the subsample.

2 Sample

Name of the sample that contains the subsample.

Tap  to select the Sample overview of another sample within the sample list.

3 Subsample

Name of the analyzed subsample.

Tap  to select the sample overview ([Additional information](#)) or the determination overview of another subsample.

4 Calculations

[Additional information](#)

5 Curves

[Additional information](#)

6 Raw data

[Additional information](#)

1 Create report

Print out or save the desired report of the selected determination.

[Additional information](#)

2 Export

Export the determination with the associated subsample data and determination data.

[Additional information](#)

3 Display signatures

Display information on the subsample signatures and method signatures at level 1 and at level 2.

[Additional information](#)

Calculations

The calculation results that were created by the **CALC** commands for the selected subsample are displayed in the **Calculations** section. If no **CALC** command is present in the assigned method, then the section will be empty.

The results of canceled subsamples are also displayed in the table.



- If the formula in a **CALC** command contains a variable with respect to a command that is repeated in a **LOOP** command prior to the calculation, then the **CALC** command will calculate only the result of the last run.
- If the formula in a **CALC** command contains a variable with respect to a command that is executed parallel to the **CALC** command, then the result will not necessarily be calculated with the end value of the variable.
- If a titer is recalculated, then the recalculated value will **not** be updated in the solution properties.

Tap  to expand the individual calculations. The following information is displayed in an expanded calculation:

Command name	Command name that was defined in the command properties of the CALC command.
Result	Numerical value of the calculated result.
Variables used	Variables used in the formula with the corresponding results.
Formula	Defined formula in the command properties or in the recalculation of the CALC command.

Curves

The curves recorded in the determination are displayed in a chart in the **Curves** section. The following information is displayed in the chart:

Command	Command name and command type.
Grid	Activate or deactivate the grid in the background of the curve.
Curve	Curve of the measured values recorded during the determination.
x-axis	Display of the quantity defined in the command or in the reevaluation for the x-axis.
y-axis	Display of the quantity defined in the command or in the reevaluation for the y-axis.
y2-axis	Display of the quantity defined in the command or in the reevaluation for the y2-axis. If the display was deactivated in the command or in the reevaluation, then the y2-axis will not be displayed.

Measuring point list

In the **Curves** section, swipe to the right or tap to open the measuring point list.

The measuring points with the associated values recorded during the determination are shown in the **Measuring point list**. The distance at which the measuring points are recorded can be defined in the command properties of titration commands in the **Measuring point distance** parameter and in the command properties of measuring commands in the **Time interval measuring point** parameter.

The following information is displayed in the measuring point list:

Table 1 Measuring point list – Overview

Command	Command name and command type.
#	Index of the measuring point list entry.
Measured quantities	Measured values for the measured quantities available in the command. Depending on the command, different measured quantities are displayed.

Table 2 Measuring point list – Measured quantities

Measured quantity	Description	Commands
Time	Time elapsed since the start of the titration or of the measurement up to the entry of the measuring point in the measuring point list. Unit: s	All titration commands and measuring commands
Volume	Measured volume at the respective measuring point. Unit: mL	All titration commands
pH value	Measured pH value at the respective measuring point. Unit: None	DET pH, MET pH, SET pH, MEAS pH
Potential	Measured potential at the respective measuring point. Unit: mV	DET U, MET U, SET U, MEAS U
Potential	Measured voltage at the respective measuring point. Unit: mV	DET Ipol, KFT Ipol, MET Ipol, SET Ipol, MEAS Ipol
Current	Measured current at the respective measuring point. Unit: μ A	DET Upol, KFT Upol, MET Upol, SET Upol, MEAS Upol
Volume drift	Calculated volume drift at the respective measuring point. Unit: μ L/min	KFT commands, SET commands

Measured quantity	Description	Commands
Potential drift	Calculated voltage drift at the respective measuring point. Unit: mV/min	MEAS pH, MEAS U, MEAS Ipol
Temperature drift	Calculated temperature drift at the respective measuring point. Unit: °C/min	MEAS T
Current drift	Calculated current drift at the respective measuring point. Unit: µA/min	MEAS Upol
Temperature	Measured temperature at the respective measuring point. Unit: °C	All titration commands and measuring commands
ERC	Calculated ERC value at the respective measuring point. Unit: None	DET commands
dpH	Measured value differential at the respective measuring point. Unit: None	MET pH
dU	Measured value differential at the respective measuring point. Unit: mV	MET U, MET Ipol
dI	Measured value differential at the respective measuring point. Unit: µA	MET Upol

Raw data

The measured values of the endpoints, the equivalence points, and the fixed points are displayed in the **Raw data** section. If none of these points is generated during a determination, then the section will be empty.

The following information is displayed in the raw data:

Table 3 Raw data – Overview

Command	Command name and command type.
Point	Index of the endpoint (EP), the equivalence point (EP) or the fixed point (FP).
Measured quantities	Measured values for the quantities available in the command at the respective point. Depending on the command, different quantities can be displayed.

Table 4 Raw data – Measured quantities

Measured quantity	Description	Commands
Time	Time elapsed since the start of the titration or of the measurement up to the entry of the measuring point in the measuring point list. Unit: s	All titration commands and measuring commands
Volume	Measured volume at the respective point. Unit: mL	All titration commands
pH value	Measured pH value at the respective point. Unit: None	DET pH, MET pH, SET pH, MEAS pH
Potential	Measured potential at the respective point. Unit: mV	DET U, MET U, SET U, MEAS U
Potential	Measured voltage at the respective point. Unit: mV	DET Ipol, KFT Ipol, MET Ipol, SET Ipol, MEAS Ipol
Current	Measured current at the respective point. Unit: μ A	DET Upol, KFT Upol, MET Upol, SET Upol, MEAS Upol
Volume drift	Calculated volume drift at the respective point. Unit: μ L/min	KFT commands, SET commands
Potential drift	Calculated voltage drift at the respective point. Unit: mV/min	MEAS pH, MEAS U, MEAS Ipol
Temperature drift	Calculated temperature drift at the respective point. Unit: $^{\circ}$ C/min	MEAS T
Current drift	Calculated current drift at the respective point. Unit: μ A/min	MEAS Upol
Temperature	Measured temperature at the respective point. Unit: $^{\circ}$ C	All titration commands and measuring commands
ERC	Calculated ERC value at the respective point. Unit: None	DET commands
dpH	Measured value differential at the respective point. Unit: None	MET pH

Object and action

Brief description of the executed action with the respective object.

Details

Additional information on the chronology entry.

Icons

 The following icons are present in the determination overview. Icons that affect the entire user interface can be found [here](#).

Icon	Function
	Calculations section: Open the Recalculation window (Additional information). Curves and Measuring point list sections: Open the Reevaluation window (Additional information). Variables section: Activate the editability of the variable (Additional information).
	Display the Measuring point list section.
	Display the Curves section.
	Display additional curve. Displayed only if multiple curves are available.
	Current view of the curve.
	Display the curve or the measuring point list.
	Current view of the curve or the measuring point list.
	The curves cannot be moved in the chart.
	The curves can be moved in the chart (Additional information).
	Reset the zoom level to 100% and center the curves.

3.1.3.10.1 Reprocessing calculations

-  A new determination version is created as soon as a calculation is recalculated.
- If determinations are statistically related, a new determination version will be created in all statistically connected determinations during recalculation.

Prerequisite:

- The determination overview of the desired determination is open (*Additional information*).
- The logged on user has the necessary user group rights (*Additional information*).

1 Opening a recalculation window

Tap  next to the desired calculation in the **Calculations** section.

The **Recalculation** window opens and the parameters available for the **CALC** command are displayed (*Additional information*).

2 Changing the parameters

Change the parameters as desired.

 The **Formula**, **Unit**, and **Decimal places** parameters can be reprocessed.

3 Saving changes

Tap in the title bar to save the changes.

The determination is recalculated and marked by  in the status column in the expanded sample.

 To discard the changes, tap  in the title bar. Tap **Discard** in the message.

3.1.3.10.2 Reevaluating curves

- A new determination version is created as soon as a curve is retroactively evaluated.
- If determinations are statistically related, a new determination version is created in all statistically connected determinations during reevaluation.
- If the reevaluation affects a calculation, then this calculation will be recalculated automatically.

Prerequisite:

- The determination overview of the desired determination is open (*Additional information*).

- The logged on user has the necessary user group rights ([Additional information](#)).

1 Selecting a curve

If multiple curves are present, then select the desired curve by scrolling or tapping  in the **Curves** section.

2 Opening a reevaluation window

Tap  .

The **Reevaluation** window opens and the parameters available for the respective command are displayed.

3 Changing the parameters

Change the parameters as desired.

 Depending on the command, different parameters are available and can be evaluated retroactively.

4 Saving changes

Tap  in the title bar to save the changes.

The determination is evaluated retroactively and marked by  in the status column in the expanded sample.

 To discard the changes, tap  in the title bar. Tap **Discard** in the message.

3.1.3.10.3 Reprocessing variables

- A new determination version is created as soon as a variable is reprocessed.
 - If determinations are statistically related, a new determination version is created in all statistically connected determinations during reprocessing.
 - Only **Subsample data** and **Equipment variables** can be reprocessed.
- Subsample data** can be reprocessed only if their editability has been activated in the **Method properties** (*Additional information*).
- If reprocessing affects a calculation, then this calculation will be recalculated automatically.

Prerequisite:

- The determination overview of the desired determination is open (*Additional information*).
- The variable can be reprocessed.
- The logged on user has the necessary user group rights (*Additional information*).

1 Activating the editing mode

In the **Variables**  section, tap next to the desired variable.

2 Editing a result

Enter the desired value and confirm by tapping .

3 Saving changes

Tap in the title bar to save the changes.

The determination is reprocessed and marked by  in the status column in the expanded sample.

-  To discard the changes, tap  in the title bar. Tap **Discard** in the message.

3.2 Filter – Subsection

Tap **Filter** to open the **Filter** subsection in the **Samples** work area.

Video tutorials for the **Filter** subsection:



Determinations and subsamples with predefined filter criteria can be displayed in filtered lists in the **Filter** subsection.

- [Filter – Overview](#)
- [Filtered list – Overview](#)

3.2.1 Filters – Overview

- [Definition](#)
- [Overview list](#)
- [Functions](#)

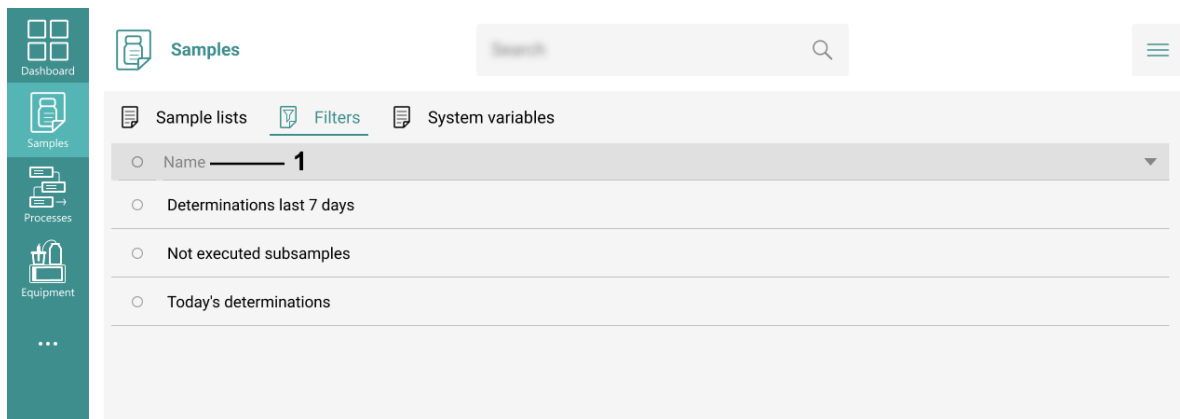
Definition

Filters are used to display only the determinations or subsamples that meet the defined filter criteria. The following predefined filters are available:

- **Determinations last 7 days:** All completed determinations within the last 7 days are displayed.
- **Not executed subsamples:** All subsamples that are not executed are displayed.
- **Today's determinations:** All determinations with the current date are displayed.

Overview list

All of the predefined filters are displayed in an overview list in the **Filters** subsection. The following information is displayed in the overview list:

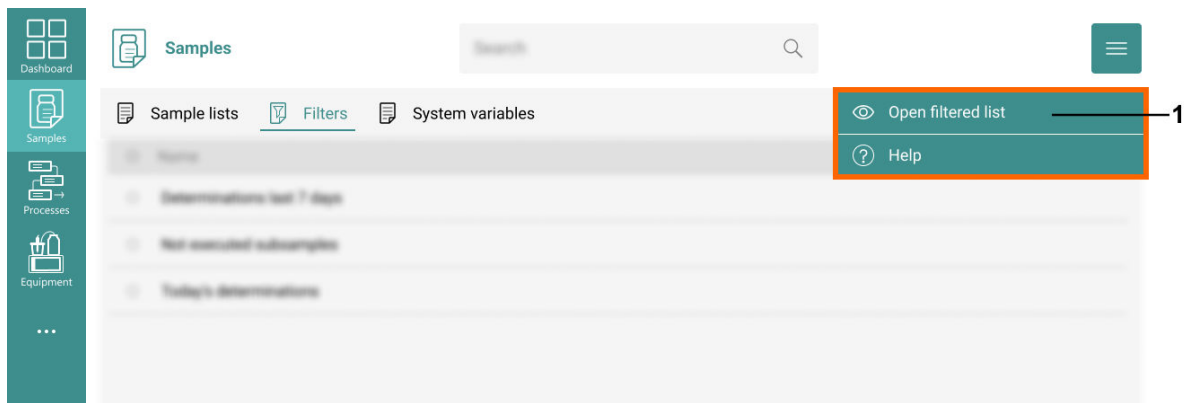


1 Name

Name of the predefined filter.

Functions

Tap on  to open a menu with the following functions:



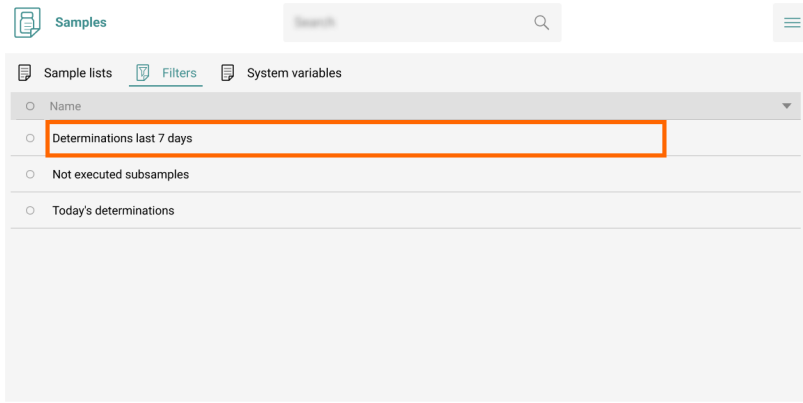
1 Open filtered list

The predefined filter is applied. Only the determinations or subsamples that correspond to the predefined filter criteria are displayed.

[Additional information](#)

3.2.1.1 Open filtered list

- 1 Tap the name of the desired filter under **Samples** ► **Filters**.



All determinations or subsamples that correspond to the defined filter criteria are displayed.

3.2.2 Filtered list – Overview

Tap a filter to open a filtered list in the **Filters** subsection.

- *Definition*
- *Overview list*
- *Functions*
- *Icons*

Definition

The filtered list is a dynamically compiled sample list. Within the filtered list, all determinations or subsamples within the database that correspond to the predefined filter criteria will be displayed.

Overview list

In a filtered list, all entries that correspond to the defined filter criteria are displayed in an overview list. The following information is displayed in the overview list:

1 Sample list	2 Sample	3 Subsample	4 Result	5 Status	6 Inf...ion	7 ...
Sample 1	Sample 1	Subsample 1	Result 1	Status 1	Information 1	
Sample 2	Sample 2	Subsample 2	Result 2	Status 2	Information 2	
Sample 3	Sample 3	Subsample 3	Result 3	Status 3	Information 3	
Sample 4	Sample 4	Subsample 4	Result 4	Status 4	Information 4	
Sample 5	Sample 5	Subsample 5	Result 5	Status 5	Information 5	
Sample 6	Sample 6	Subsample 6	Result 6	Status 6	Information 6	
Sample 7	Sample 7	Subsample 7	Result 7	Status 7	Information 7	
Sample 8	Sample 8	Subsample 8	Result 8	Status 8	Information 8	
Sample 9	Sample 9	Subsample 9	Result 9	Status 9	Information 9	
Sample 10	Sample 10	Subsample 10	Result 10	Status 10	Information 10	
Sample 11	Sample 11	Subsample 11	Result 11	Status 11	Information 11	
Sample 12	Sample 12	Subsample 12	Result 12	Status 12	Information 12	

1 Sample list

Name of the sample list that contains the sample and the subsample.

[Additional information](#)

3 Subsample

Name of the subsample.

[Additional information](#)

5 Status

Subsample status.

[Additional information](#)

7 Showing/hiding columns

Show or hide columns in the overview list.

The following columns can also be shown:

Method: Method by which the subsample is or was determined.

Sample size: Sample amount that will be or has been analyzed.

Determination start: Date and time of the determination start.

[Additional information](#)

2 Sample

Name of the sample that contains the subsample.

[Additional information](#)

4 Result

Available results after determination has been executed.

6 Information

Display all available information regarding the subsample or the determination.

Functions

Tap **...** in the overview list to open a menu with the following functions:



1

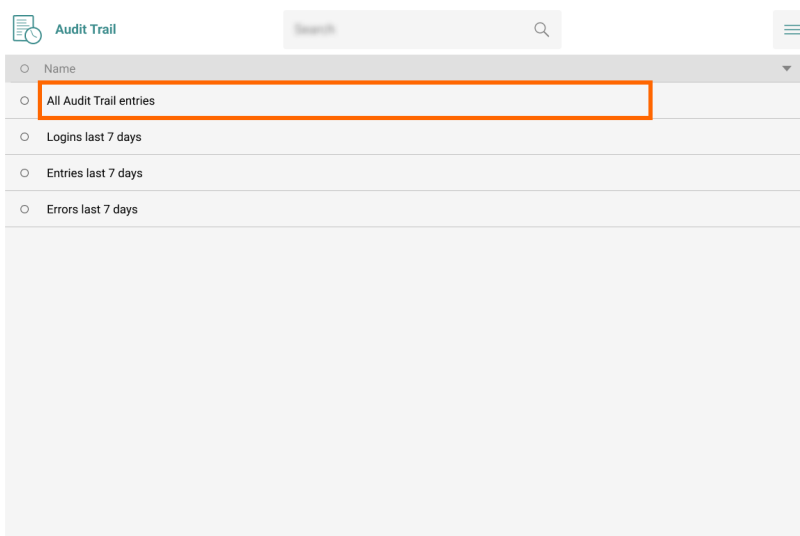
The filtered list is updated.

Additional information

Icons

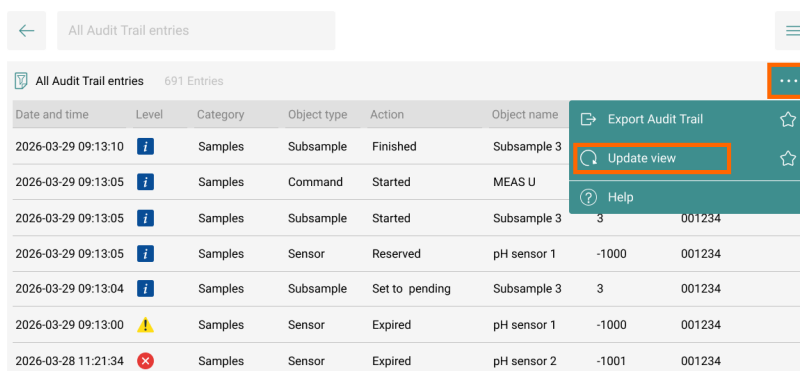
 The following icons are present in filtered lists. Icons that affect the entire user interface can be found [here](#).

Icon	Function
	Tap to add the function to the title bar (Additional information).
	A maximum of 5 functions can be added to the title bar as quick access.
	Tap to remove the function from the title bar (Additional information).
	Display all available determination results. The number in the icon indicates the number of available determination results.
	Display the information from all columns for the subsample or for the determination in a list.

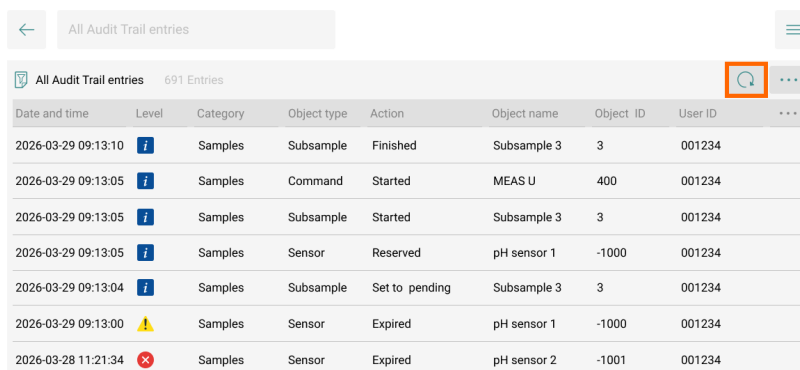


2 Updating the view

Tap **...** in the title bar and select **Update view**.



As an alternative, tap  in the title bar if the function has been added as a quick access (*Additional information*).



All entries added since the last update are displayed.



3.3 System variables – Subsection

Tap **System variables** to open the **System variables** subsection in the **Samples** work area.

- *Definition*
- *Overview list*
- *Functions*

Video tutorials for the **System variables** subsection:



Definition

In the **System variables** subsection, system variables can be defined that can then be used system-wide in different methods. For example, the result of a **CALC** command can be saved in a system variable.

 Once a system variable is renamed or deleted, this variable will no longer be available in commands and methods. A determination or a procedure that requires this system variable can therefore no longer be carried out correctly until this variable has been recreated as a system variable with the original name. As an alternative, the variable can be replaced within the corresponding commands and methods with another system variable.

Overview list

In the **System variables** subsection, all created system variables are displayed in an overview list.

The following information is displayed in the overview list:

Name	Type	Value	Unit	Saved	Edit
System 1	Number	42.3	nmol	2026-03-12 10:09:10	
System 2	Text	Text1		2026-03-12 10:15:01	

1 Name

Name of the system variable.

2 Type

Type of system variable (number or text).

3 Value

Numerical value or text content of the system variable.

4 Unit

Physical unit of the system variable.

5 Saved

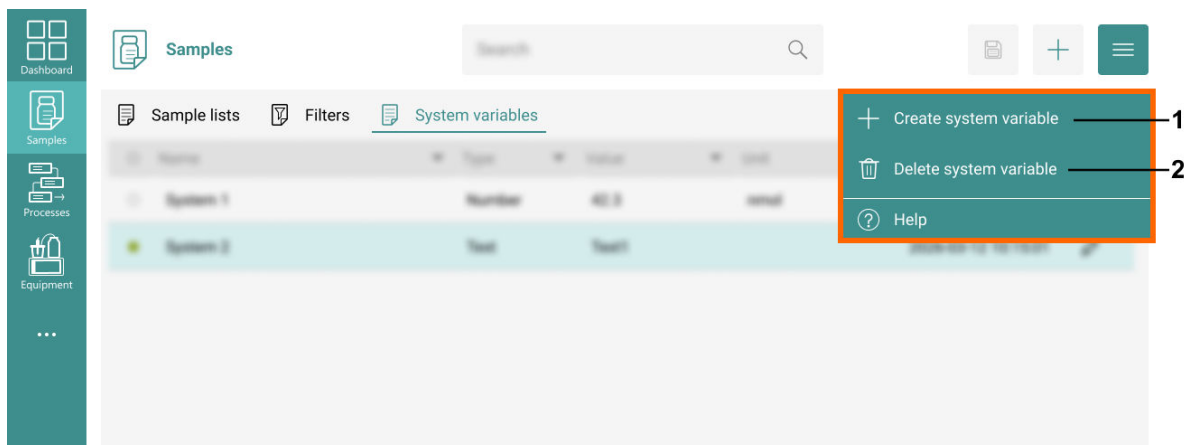
Time at which the system variable was last saved.

6 Edit

Activate or deactivate editing mode by tapping on .

Functions

Tap on to open a menu with the following functions:

**1 Create system variable**

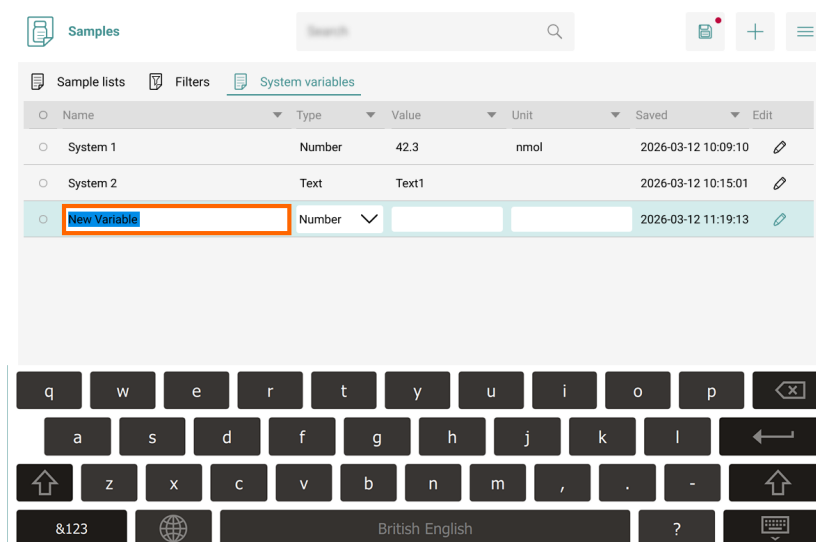
A new system variable is created and can be edited.

[Additional information](#)

2 Delete system variable

The selected system variable is deleted.

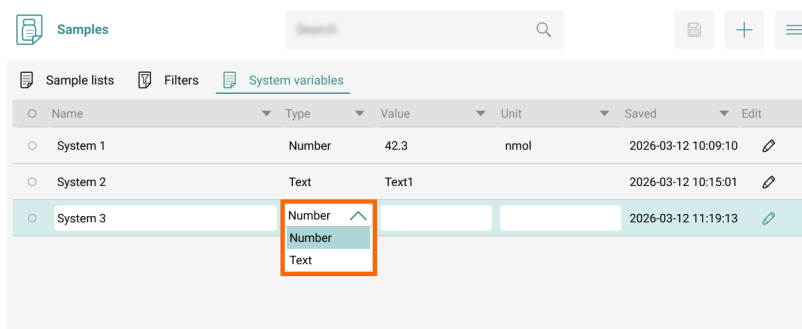
[Additional information](#)



 The maximum character length is 32 characters.

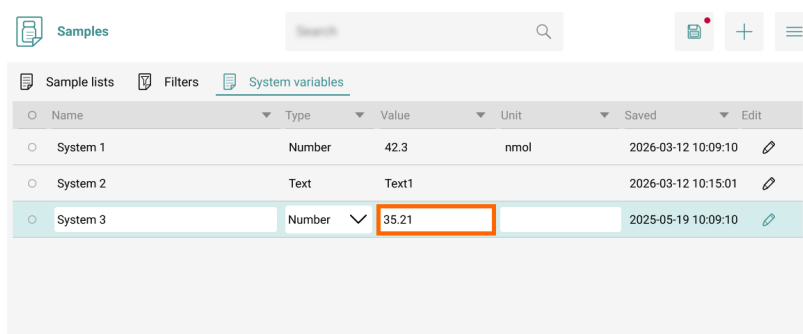
3 Selecting a type

Tap the selection list under **Type** and select **Number** or **Text**.



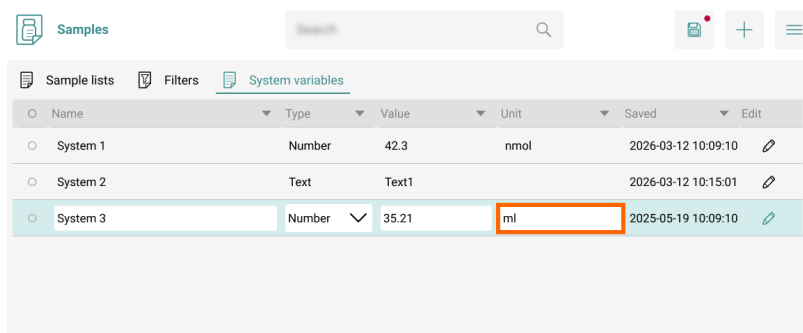
4 Entering a value

Tap the input field under **Value** and enter the numerical value or text content of the system variable.



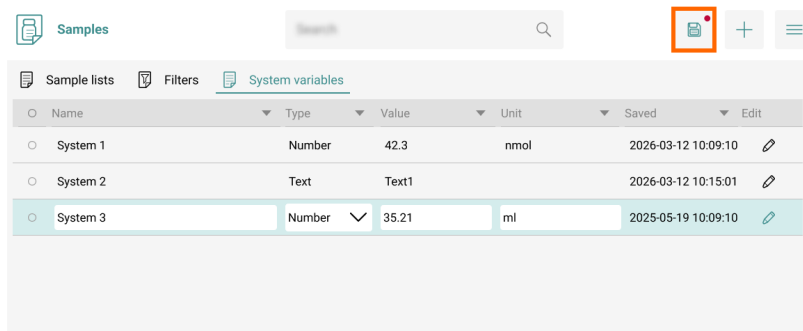
5 Entering a unit

Tap the input field under **Unit** and enter the physical unit of the system variable.



6 Saving a system variable

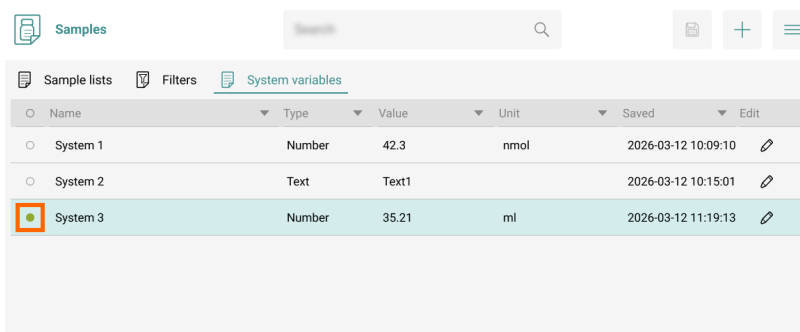
Tap  in the title bar to save the system variable.



3.3.2 Delete system variable

1 Selecting a system variable

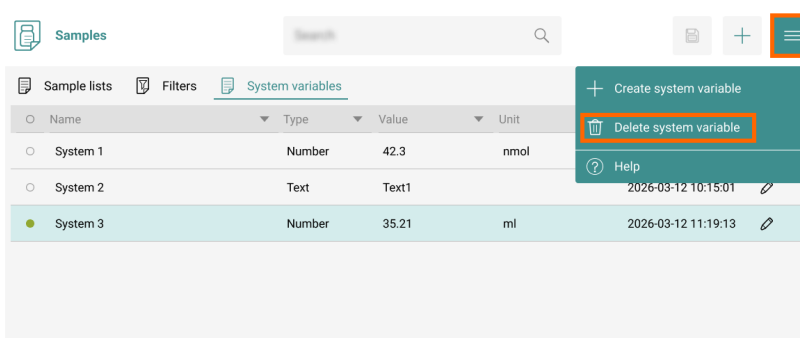
Select the desired system variable by tapping on  under **Samples ▶ System variables**.



Name	Type	Value	Unit	Saved	Edit
System 1	Number	42.3	nmol	2026-03-12 10:09:10	
System 2	Text	Text1		2026-03-12 10:15:01	
System 3	Number	35.21	ml	2026-03-12 11:19:13	

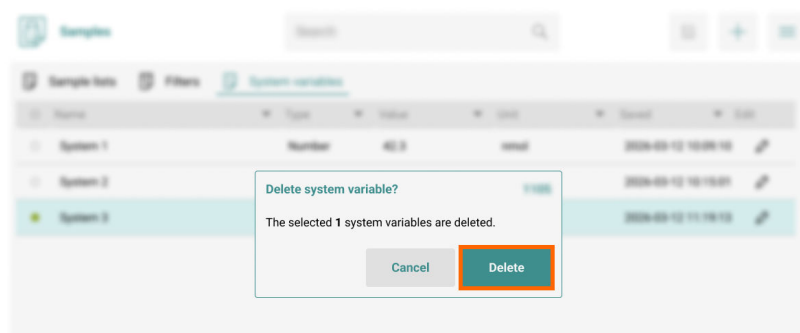
2 Deleting a system variable

Tap  in the title bar and select **Delete system variable**.



3 Confirming the message

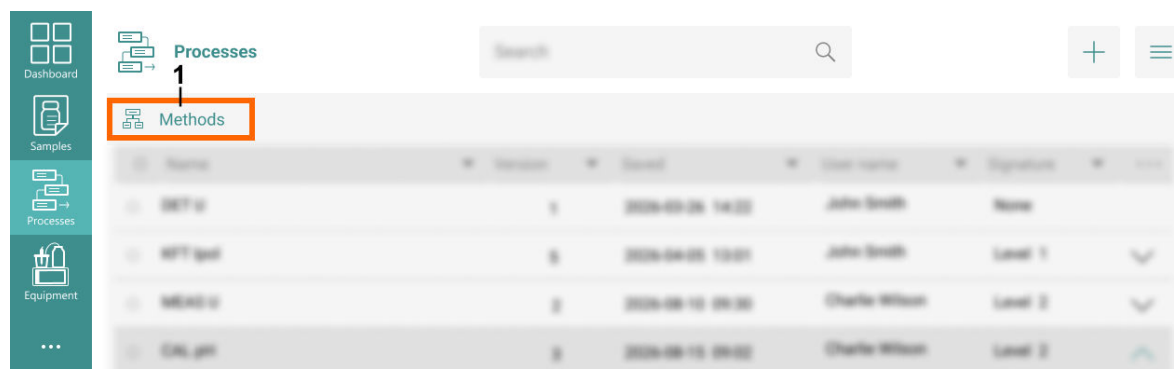
Confirm the message with **Delete**.



 If a system variable is deleted, then this variable will no longer be available in commands and methods. A determination or a procedure that requires this system variable can therefore no longer be carried out correctly until this variable has been recreated as a system variable with the original name. As an alternative, the variable can be replaced within the corresponding commands and methods with another system variable.

4 Processes – Work area

The **Processes** work area contains the following subsection:



1 Methods subsection

Additional information

4.1 Methods – Subsection

Tap the **Processes** work area to open the **Methods** subsection.

Video tutorials for the **Methods** subsection:



In the **Methods** subsection, methods can be created and edited in the method editor, and commands can be inserted from the Command library into the method. In addition, the Method properties and the Command properties can be edited. Calculations can be inserted into parameters in the Command properties with the Formula editor. In addition, methods can be exported and imported, and signed at level 1 and at level 2. The signatures can be displayed in the method editor.

- *Methods – Overview*
- *Method editor*
- *Formula editor*
- *Signatures*

4.1.1 Methods – Overview

- [Definition](#)
- [Overview list](#)
- [Functions](#)
- [Icons](#)

Video tutorials for the **Methods** subsection:



Definition

A method defines the work sequence for the analysis of subsamples and is a combination of commands that can be aligned sequentially and in parallel. Subsample data can be defined in a method (e.g., information such as sample size, sample position, etc.).

Method runs can be defined in the **Main**, **Execute on stop**, and **Execute on error** section in the method editor ([Additional information](#)).

The methods are created and managed under **Processes ► Methods**. The methods within a sample list are assigned directly to a subsample under **Samples ► Sample lists**.

 For a stable system performance, Metrohm recommends executing a maximum of 5 commands in parallel per method and limiting the number of measuring points generated to a maximum of 10,000.

Overview list

In the **Methods** subsection, all predefined methods are shown in an overview list along with the ones you have created yourself.

The following information is displayed in the overview list:

Dashboard

Samples

Processes

Equipment

...

Processes

Search

+

≡

Methods

1

2

3

4

5

Name	Version	Saved	User name	Signature	...
DET U	1	2026-03-26 14:22	John Smith	None	
KFT Ipol	5	2026-04-05 13:01	John Smith	Level 1	▼
MEAS U	2	2026-08-10 09:30	Charlie Wilson	Level 2	▼
CAL pH	3	2026-08-15 09:02	Charlie Wilson	Level 2	▲
CAL pH	2	2026-08-14 15:43	Charlie Wilson	Level 2	
CAL pH	1	2026-08-14 08:15	Charlie Wilson	Level 2	

1	Name
---	------

Name of the method. The name can be modified in the opened method.

2 Version

Version number of the method. A new version is created automatically each time the method is saved.

3 Saved

Time at which the method was last saved.

4 User name

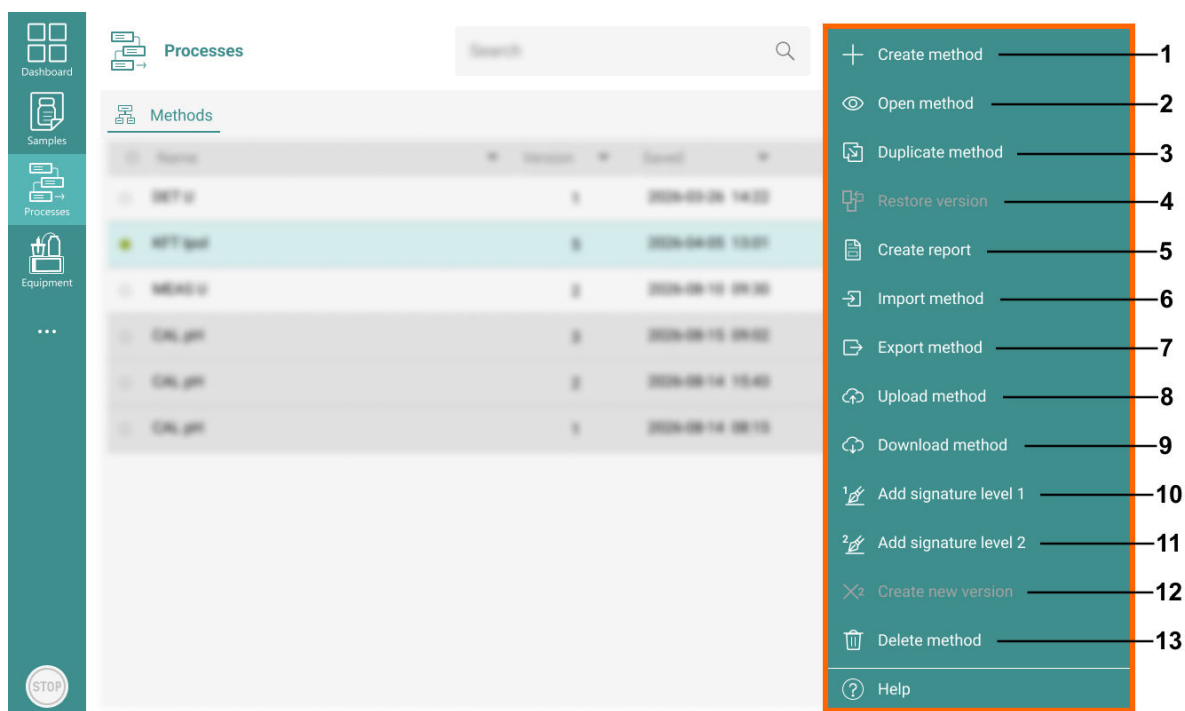
User name of the person who created the method version.

5 Signature

Indication whether and at which level the method was signed.

Functions

Tap on  to open a menu with the following functions:

**1 Create method**

A new method is created. Commands can be inserted and edited in the method in the open method editor.

[Additional information](#)

3 Duplicate method

Both individual and multiple methods can be duplicated. The selected methods are displayed in the overview list under the same name with ascending numbering.

5 Create report

Print out or save the desired report of the selected method.

[Additional information](#)

7 Export method

The selected method is exported.

[Additional information](#)

9 Download method

The method selected in the import window is downloaded from the Metrohm Data Service into the IONIC app.

2 Open method

The selected method is opened.

[Additional information](#)

4 Restore version

The selected method version is restored as the new, current method version.

[Additional information](#)

6 Import method

The method selected in the import window is imported.

[Additional information](#)

8 Upload method

The selected method is uploaded to the Metrohm Data Service.

[Additional information](#)

10 Add signature level 1

The selected method will be signed at level 1.

[Additional information](#)

11 Add signature level 2

The selected method will be signed at level 2.

Additional information

12 Create new version

A new, unsigned method version is created.

Additional information

13 Delete method

The selected method is permanently deleted.

Additional information

Icons

 The following icons are present in the overview list of methods. Icons that affect the entire user interface can be found [here](#).

Icon	Function
	Display method versions.

4.1.1.1 Create method

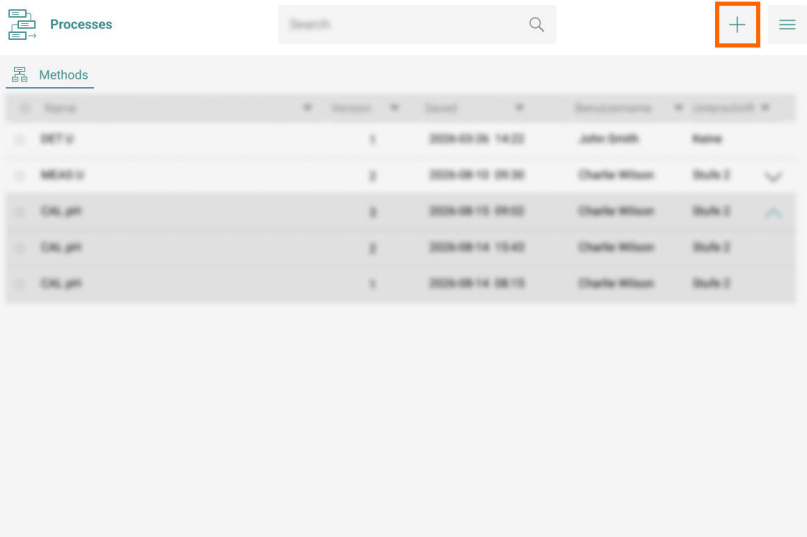
Video tutorial for creating methods:



 The maximum length of name fields is 32 characters.

1 Creating a method

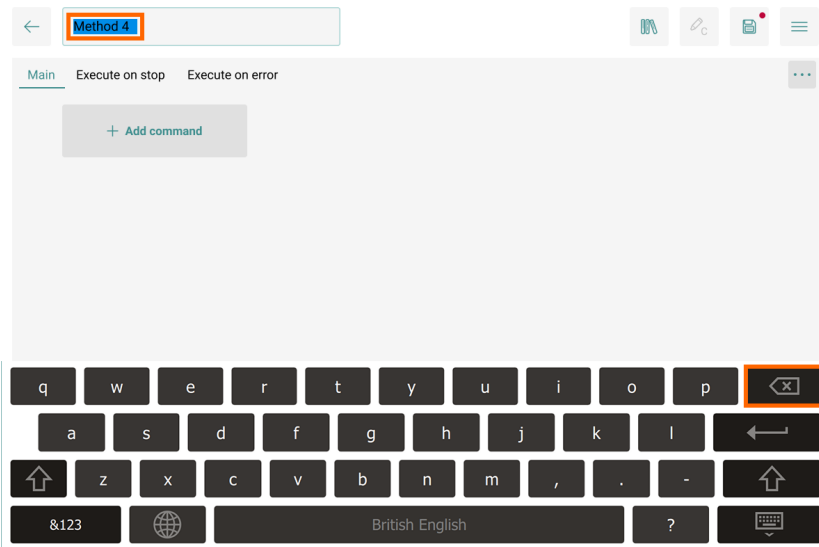
Tap  in the title bar under **Processes** ► **Methods**.



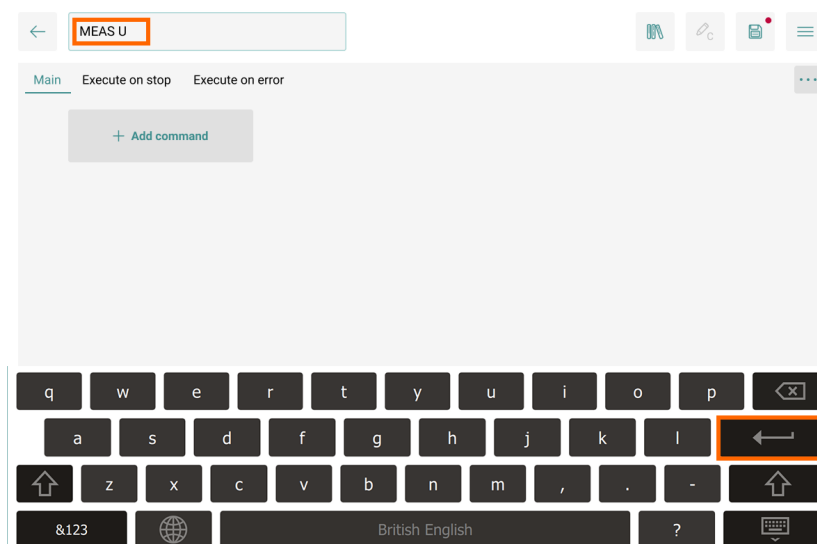
The method editor with the newly created method is opened ([Additional information](#)).

2 Naming the method

- In the title list, delete the default name with .

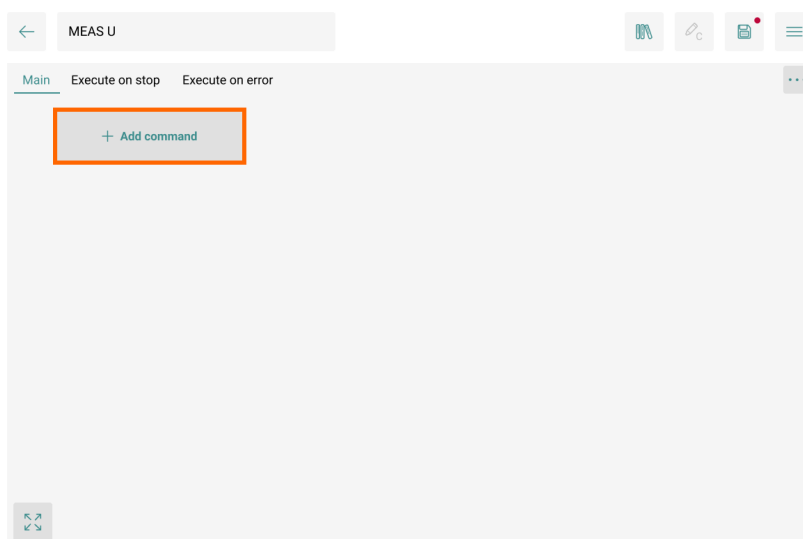


- Enter the desired name for the new method and confirm with .

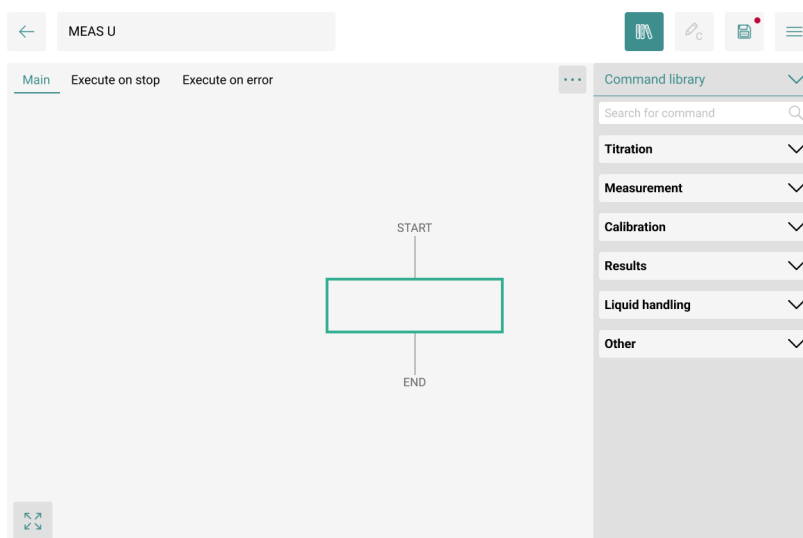


3 Adding commands

- Tap **[Add command]**.



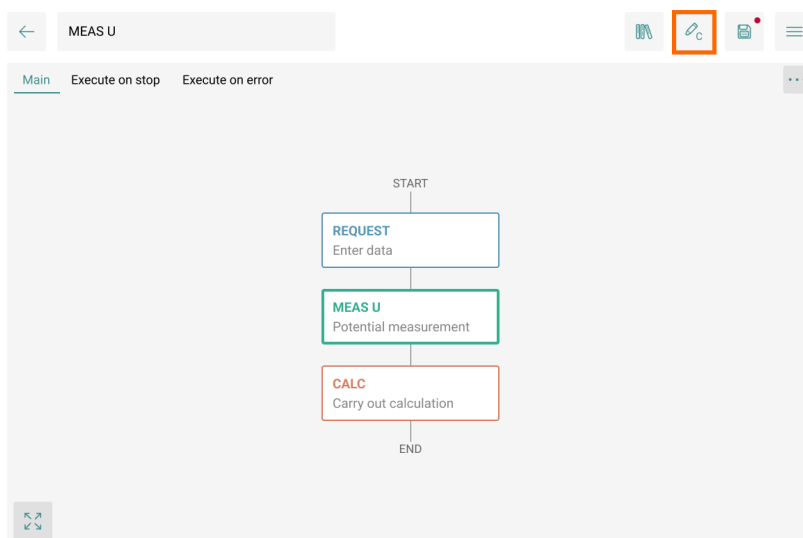
- In the **Command library**, select the desired command and insert it into the method (*Additional information*).



 Commands can be inserted either one below the other or side by side. Commands that are aligned one below the other are executed **sequentially**. Commands that are aligned side by side are executed in **parallel**.

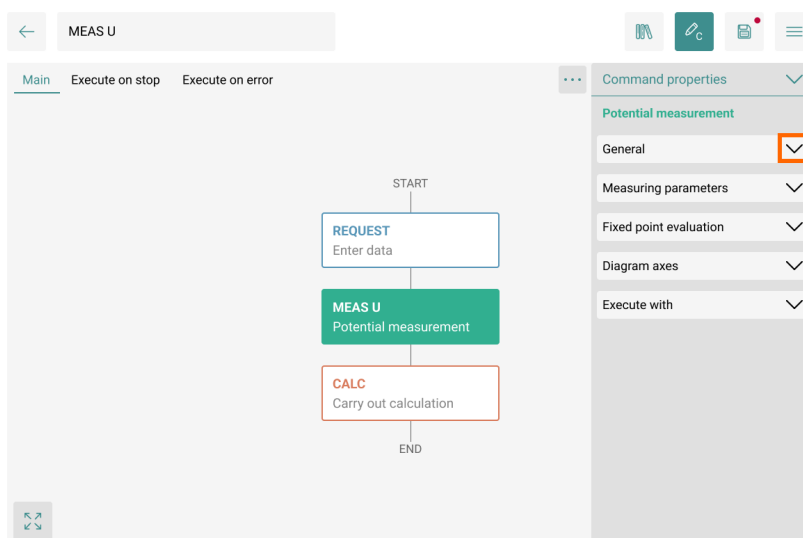
4 Opening the command properties

Select the desired command and tap  to open the **Command properties** ([Additional information](#)).

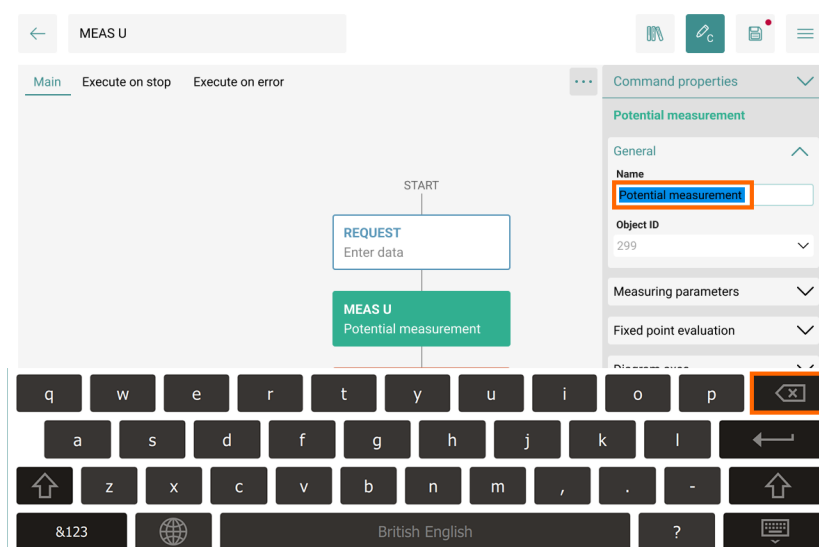


5 Naming or renaming a command

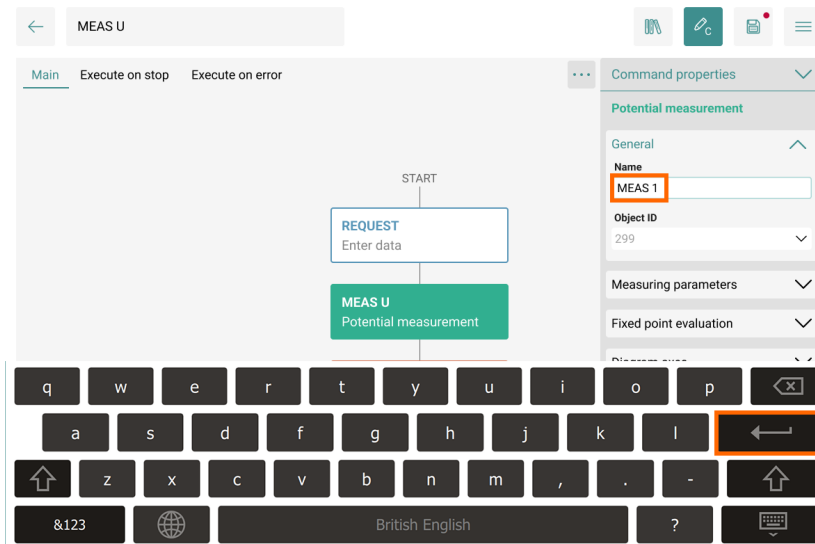
- Tap  next to **General**.



- Tap the input field under **Name** and delete the default name with .



- Enter a unique command name and confirm with .



6 Editing command parameters

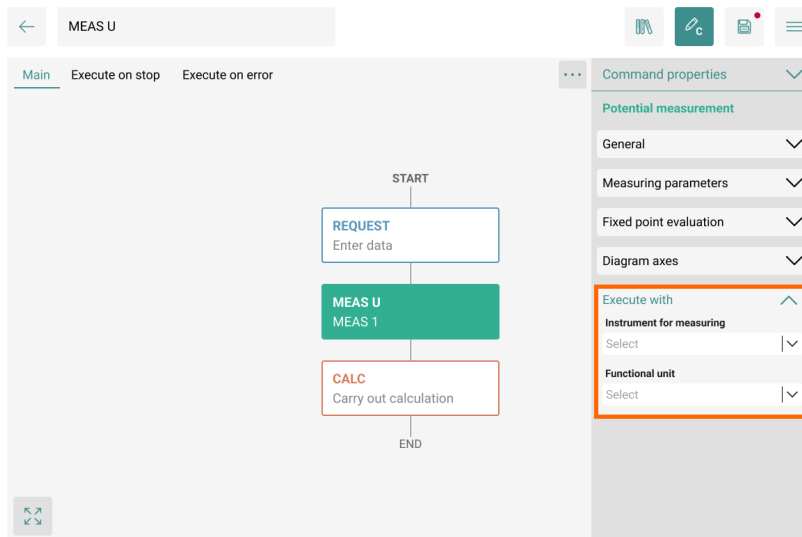
Tap  to open and edit each of the command parameters displayed in the **Command properties** by.

 Depending on the command, various properties are available, which are explained in greater detail in the **Help** in the properties of the respective command.

7 Assigning functional units

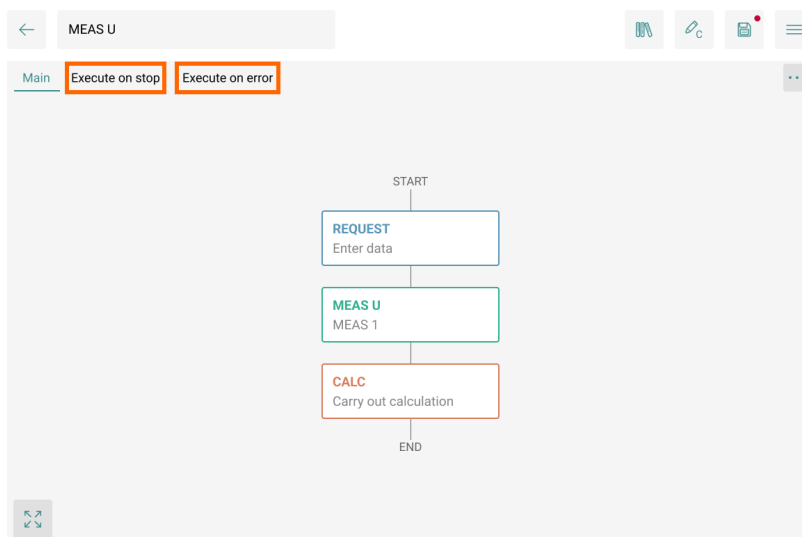
Depending on the command type, the **Execute with** section is available in the **Command properties**.

Open the **Execute with** section by tapping  and assign the desired functional units with which the command is to be executed.



8 Inserting optional runs (optional)

- Tap the **Execute on stop** (*Additional information*) or **Execute on error** (*Additional information*) section in the method editor.



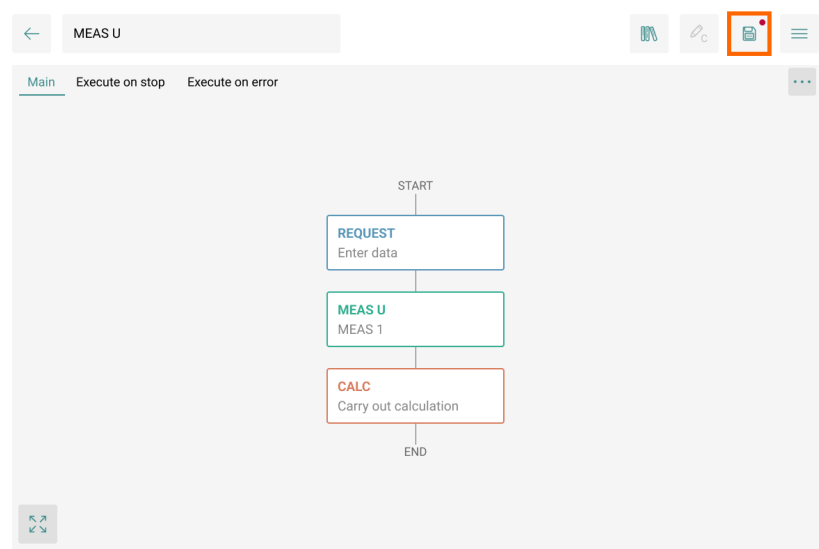
- Insert the required commands into the optional run (*Additional information*).

 An optional run can be inserted only in addition to the standard run.

9 Saving a method

Tap  in the title bar to save and validate the method.

If the validation is not successful, then messages in the IONIC app will provide notes for solving the problems.



The method information is automatically updated in the overview list under **Processes ► Methods**.

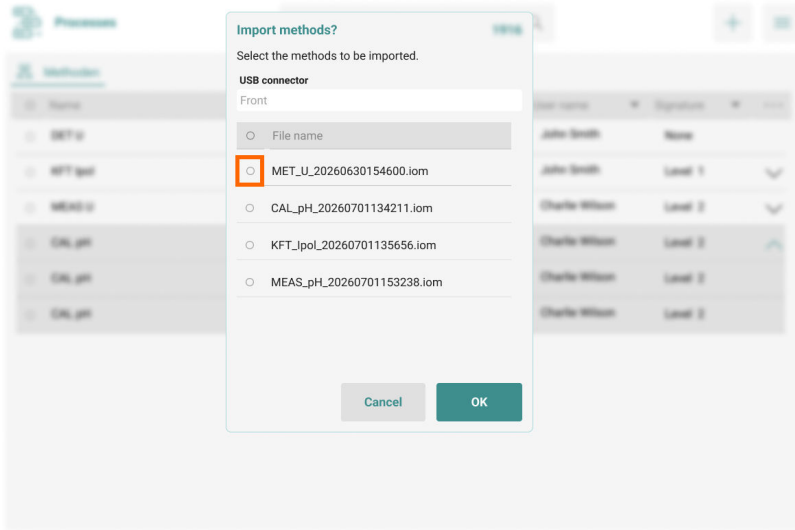
4.1.1.2 Open method

- 1 Tap the name of the desired method under **Processes ► Methods**.

The screenshot shows the 'Processes ► Methods' overview list. The list contains several rows of method information, including Name, Version, Saved, User name, and Signature. The 'DET U' method is highlighted with an orange border.

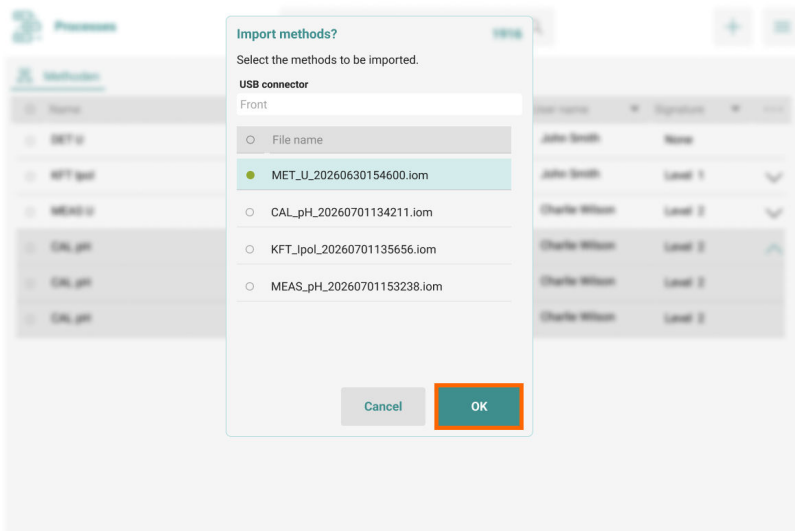
Name	Version	Saved	User name	Signature	...
DET U	1	2026-03-26 14:22	John Smith	None	
KFT Ipol	5	2026-04-05 13:01	John Smith	Level 1	▼
MEAS U	2	2026-08-10 09:30	Charlie Wilson	Level 2	▼
CAL pH	3	2026-08-15 09:02	Charlie Wilson	Level 2	▲
CAL pH	2	2026-08-14 15:43	Charlie Wilson	Level 2	
CAL pH	1	2026-08-14 08:15	Charlie Wilson	Level 2	

Method properties can be edited ([Additional information](#)) and commands can be added and edited ([Additional information](#)) within the method itself.

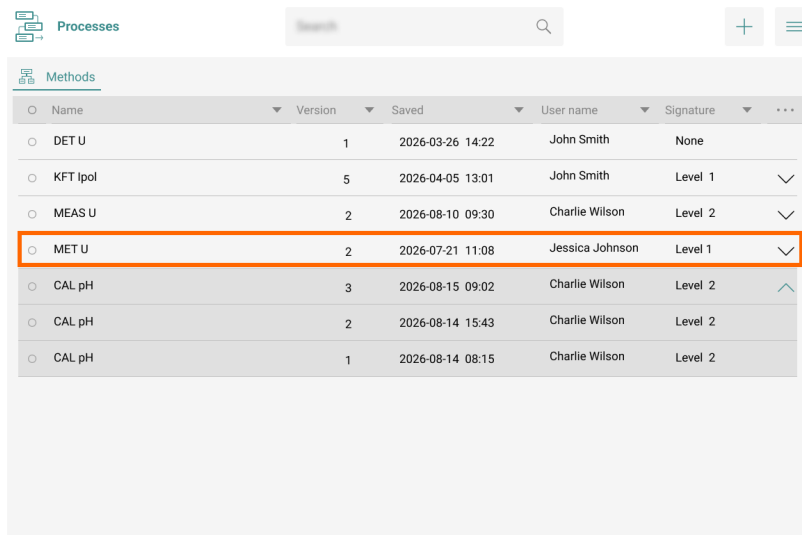


4

Confirm the selection with **[OK]**.



The method is imported into the overview list.



4.1.1.4 Export method

 Only current method versions can be exported.

Prerequisite:

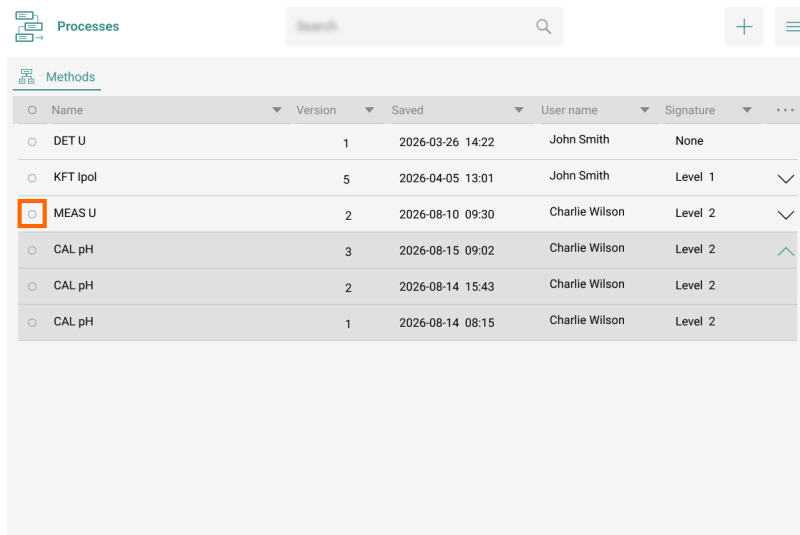
- At least one method is available in the overview list.

1 Plugging in a USB flash drive

Plug a USB flash drive into one of the USB connectors available on the IONIC main instrument and wait until the message **USB flash drive connected** appears.

2 Selecting a method

Select the desired method by tapping  under **Processes** ► **Methods**.

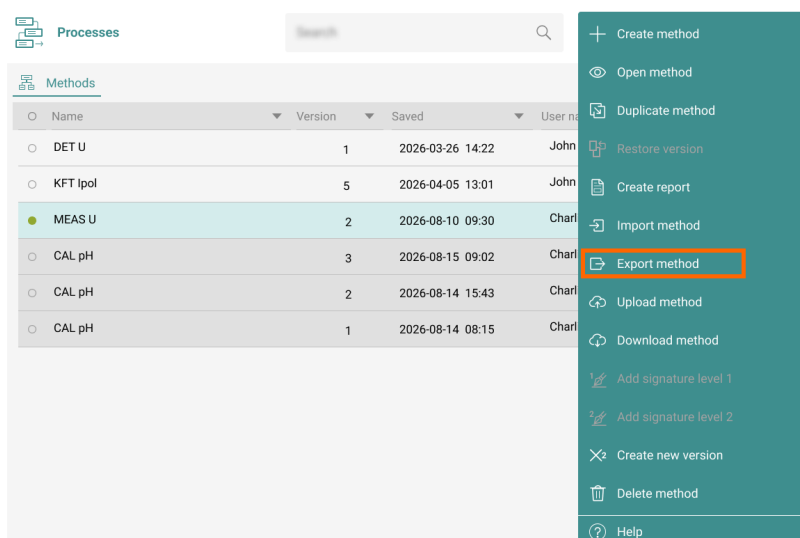


The screenshot shows the 'Processes' app interface. At the top, there's a 'Processes' header with a search bar and a menu icon. Below it, the 'Methods' section is active, displaying a table of methods. The 'MEAS U' method is highlighted with an orange box.

Name	Version	Saved	User name	Signature	...
DET U	1	2026-03-26 14:22	John Smith	None	
KFT Ipoh	5	2026-04-05 13:01	John Smith	Level 1	▼
MEAS U	2	2026-08-10 09:30	Charlie Wilson	Level 2	▼
CAL pH	3	2026-08-15 09:02	Charlie Wilson	Level 2	▲
CAL pH	2	2026-08-14 15:43	Charlie Wilson	Level 2	
CAL pH	1	2026-08-14 08:15	Charlie Wilson	Level 2	

3 Opening the export dialog

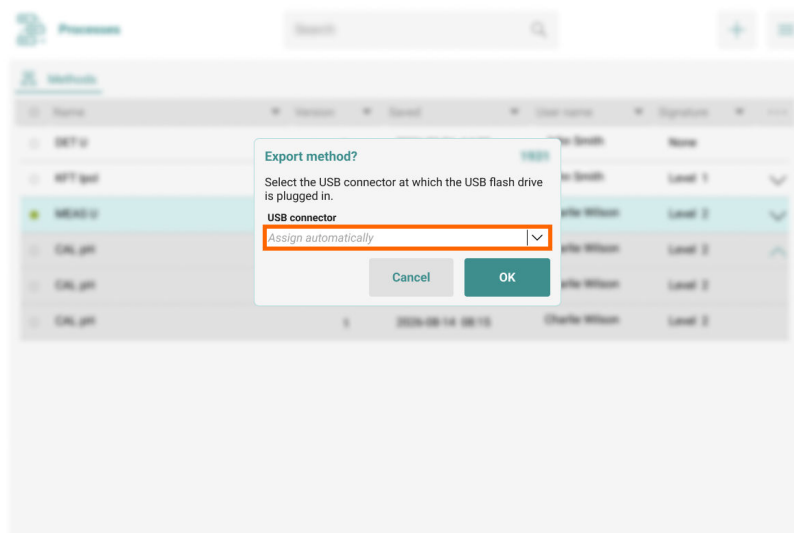
Tap  in the title bar and select **Export method**.



4 Selecting a USB connector

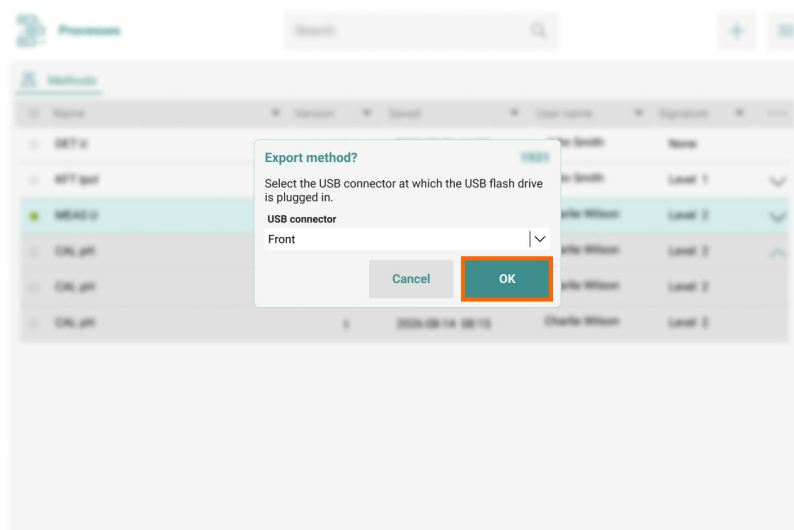
Tap the selection list under **USB connector** and select the connector to which the desired USB flash drive is connected.

- The selection list is available only if at least one USB flash drive is connected.
- The **Assign automatically** function works only if exactly one USB flash drive is connected.



5 Exporting a method

Confirm the selection with **[OK]**.



If an error message appears, follow the instructions in the error message.

As soon as the **Method exported** information messages appears, the method with its entire version history and all existing signatures will be saved to the USB flash drive as an IONIC method file (.iom).

During export, the time indications in the file properties are converted to Coordinated Universal Time (UTC±00:00). This time format may differ from the local time on the instrument.



**Processes**





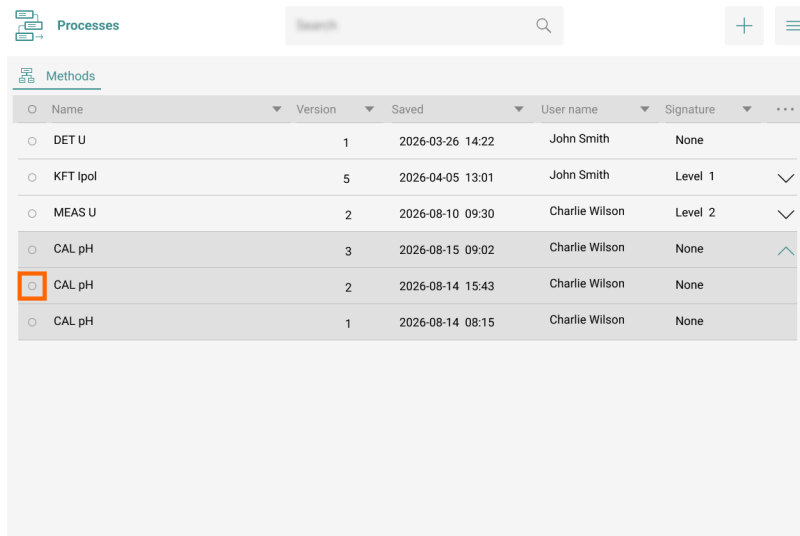


**Methods**

☐ Name	Version	Saved	User name	Signature	...
☐ DET U	1	2026-03-26 14:22	John Smith	None	
☐ KFT Ipol	5	2026-04-05 13:01	John Smith	Level 1	▼
☐ MEAS U	2	2026-08-10 09:30	Charlie Wilson	Level 2	▼
☐ CAL pH	3	2026-08-15 09:02	Charlie Wilson	None	▼

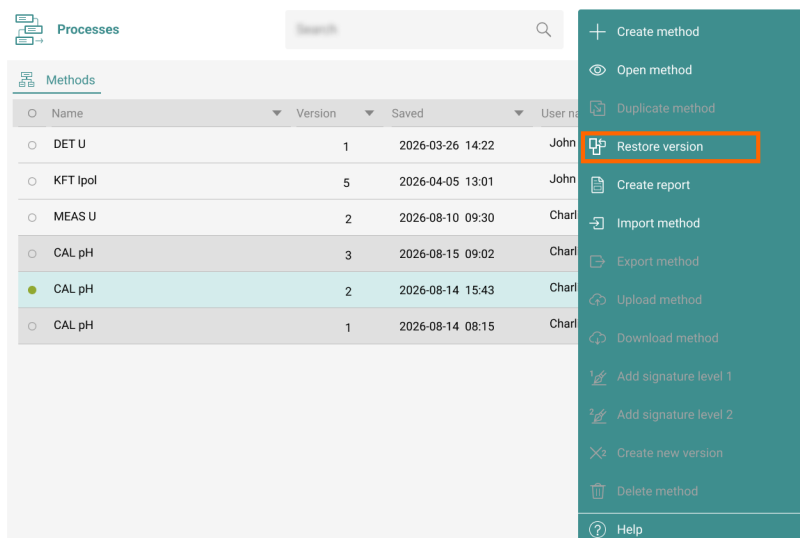
2 Selecting the method version

Select the desired older method version by tapping .



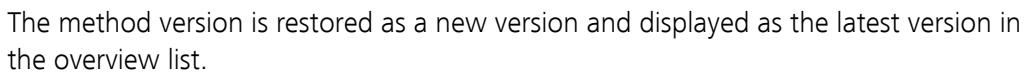
3 Opening the Restore window

Tap in the title bar and select **Restore version**.



4 Restoring a method version

Insert a comment in the message if necessary and confirm with **OK**.



Restoring a version in the method editor

1



Processes

Search

+

≡

Methods

Name	Version	Saved	User name	Signature	...
DET U	1	2026-03-26 14:22	John Smith	None	
KFT Ipol	5	2026-04-05 13:01	John Smith	Level 1	▼
MEAS U	2	2026-08-10 09:30	Charlie Wilson	Level 2	▼
CAL pH	3	2026-08-15 09:02	Charlie Wilson	None	▼

- 2

Opening the method version
Open the desired older method version ([Additional information](#)).

Processes

Search

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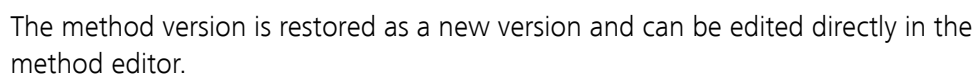
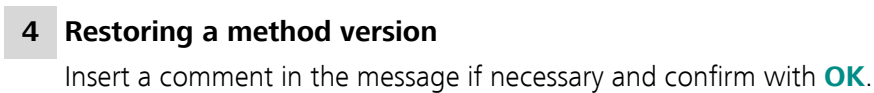
Methods

Name	Version	Saved	User name	Signature	...
DET U	1	2026-03-26 14:22	John Smith	None	
KFT Ipol	5	2026-04-05 13:01	John Smith	Level 1	▼
MEAS U	2	2026-08-10 09:30	Charlie Wilson	Level 2	▼
CAL pH	3	2026-08-15 09:02	Charlie Wilson	None	⌵
CAL pH	2	2026-08-14 15:43	Charlie Wilson	None	
CAL pH	1	2026-08-14 08:15	Charlie Wilson	None	

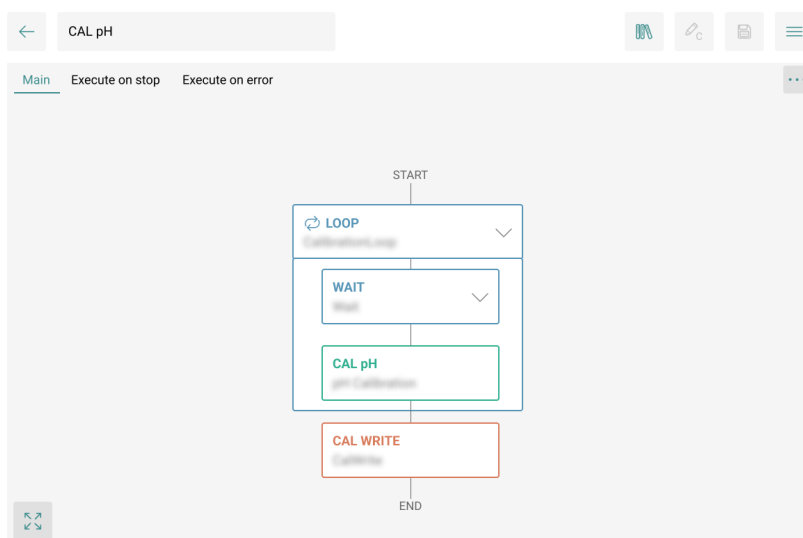
- 3

Opening the Restore window
In the method editor, tap in the title bar and select **Restore version**.





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4.1.1.6 Create report

The following possibilities are available for generating reports in the IONIC app:

- *Automated generation of reports* with the **REPORT** command (*Additional information*)
- *Manual generation of reports* from the sample list
- *Manual generation of reports* from the sample overview
- *Manual generation of reports* from the sample
- *Manual generation of reports* from the determination overview
- *Manual generation of reports* from the **Methods** subsection

A report can either be saved in PDF format to a USB flash drive or printed out via a printer.

- If the report is to be saved as a PDF file to a USB flash drive, then the USB flash drive must be plugged into the USB connector on the front or on one of the USB connectors on the rear of the IONIC main instrument.
- If the report is to be printed out via a printer, then the matching printer must be defined in the **Equipment** work area and plugged into the IONIC main instrument (*Additional information*).

Video tutorial for generating reports:



Automated report with the REPORT command

1 Opening or creating a method

Under **Processes** ► **Methods**, open the desired method (*Additional information*) or create a new method (*Additional information*).

2 Adding a command

Insert the **REPORT** command from the **Command library** into the method (*Additional information*).



The **REPORT** command generates a report for the results or calibrations that were generated with commands of the same method.

3 Defining the parameters

Open the **Command properties** of the **REPORT** command and define the parameters as desired (*Additional information*).

4 Saving the method

Tap  in the title bar to save the method.

5 Creating a sample and a subsample

Create a new sample with at least one subsample (*Additional information*).

6 Assigning a method

Assign the method with the defined **REPORT** command to the desired subsample.

7 Setting a determination to pending

Set the determination of the subsample to pending (*Additional information*).

Once the **REPORT** command has been executed, the defined report will be saved to the selected USB flash drive or transmitted to the selected printer.

Manual generation of reports from the sample list

Prerequisite:

- At least one sample is available in the sample list.

- At least one subsample was determined in the selected sample.

1 Opening a sample list

Tap the name of the desired sample list under **Samples** ► **Sample lists** (*Additional information*).

2 Selecting a sample

Tap  to select the desired sample.

3 Opening a report dialog

Tap  in the title bar and select **Create report**.

4 Defining a report

Define the report as desired (*Additional information*).

5 Generating a report

Tap **[OK]** to generate the defined report.

If an error message appears, then follow the instructions in the error message.

- **PDF file:** The report will be stored as a PDF file on the USB flash drive as soon as the **Report generated** information message appears.

 The files are saved to the USB flash drive under **Sam-
ples ► Reports** under the following file name: **Sam-
pleName_ReportTemplateName_TimeStamp**. Spaces are
replaced with `_`.

During export, the time indications in the file properties are converted to Coordinated Universal Time (UTC±00:00). This time format may differ from the local time on the instrument.

- **Paper printout:** The report was sent to the selected printer as soon as the **Report generated** information message appeared.

Manual generation of reports from the sample overview

Prerequisite:

- At least one sample is available in the sample list.

- At least one subsample was determined in the selected sample.

1 Opening a sample overview

Tap  in the title bar of the desired sample in an open sample list under **Samples ▶ Sample lists** (*Additional information*).

2 Opening a report dialog

Tap  in the title bar and select **Create report**.

3 Defining a report

Define the report as desired (*Additional information*).

4 Generating a report

Tap **[OK]** to generate the defined report.

If an error message appears, then follow the instructions in the error message.

- **PDF file:** The report will be stored as a PDF file on the USB flash drive as soon as the **Report generated** information message appears.

 The files are saved to the USB flash drive under **Samples ▶ Reports** under the following file name: **SampleName_ReportTemplateName_TimeStamp**. Spaces are replaced with **_**.
During export, the time indications in the file properties are converted to Coordinated Universal Time (UTC±00:00). This time format may differ from the local time on the instrument.

- **Paper printout:** The report was sent to the selected printer as soon as the **Report generated** information message appeared.

Manual generation of reports from the sample

Prerequisite:

- The determination of the selected subsample is complete.

1 Opening a sample

Under **Samples ▶ Sample lists**, tap  to expand the desired sample in an open sample list (*Additional information*).

3 Defining a report

Define the report as desired (*Additional information*).

4 Generating a report

Tap **[OK]** to generate the defined report.

If an error message appears, then follow the instructions in the error message.

- **PDF file:** The report will be stored as a PDF file on the USB flash drive as soon as the **Report generated** information message appears.

 The files are saved to the USB flash drive under **Samples ► Reports** under the following file name: **SubsampleName_ReportTemplateName_TimeStamp**. Spaces are replaced with **_**.
During export, the time indications in the file properties are converted to Coordinated Universal Time (UTC±00:00). This time format may differ from the local time on the instrument.

- **Paper printout:** The report was sent to the selected printer as soon as the **Report generated** information message appeared.

Manual generation of reports from the Methods subsection

1 Selecting a method

Tap  to select the desired method under **Processes ► Methods**.

2 Opening a report dialog

Tap  in the title bar and select **Create report**.

3 Defining a report

Define the report as desired (*Additional information*).

4 Generating a report

Tap **[OK]** to generate the defined report.

If an error message appears, then follow the instructions in the error message.

- **PDF file:** The report will be stored as a PDF file on the USB flash drive as soon as the **Report generated** information message appears.



 The files are saved to the USB flash drive under **Processes ► Reports** under the following file name: **MethodName_ReportTemplateName_TimeStamp**. Spaces are replaced with **_**.

During export, the time indications in the file properties are converted to Coordinated Universal Time (UTC±00:00). This time format may differ from the local time on the instrument.

- **Paper printout:** The report was sent to the selected printer as soon as the **Report generated** information message appeared.

Defining a report

1 Selecting the language to use

Tap the selection list under **Language** and select the language in which the report is to be output.

2 Selecting a report template

Tap the selection list under **Report** and select the desired report template (*Additional information*).

3 Selecting an output format

Tap the radio button next to the desired output format under **Output format**.

4 Selecting a USB connector (only if PDF file is selected)

Tap the selection list under **USB connector** and select the connector to which the desired USB flash drive is connected and to which the report is to be saved.

 The **Assign automatically** function works only if exactly one USB flash drive is connected.

5 Selecting a printer (only if Paper printout is selected)

Tap the selection list under **Printer** and select the printer that is connected to the IONIC main instrument and with which the report is to be printed out.

 The **Assign automatically** function works only if exactly one printer has been added to the equipment (*Additional information*).

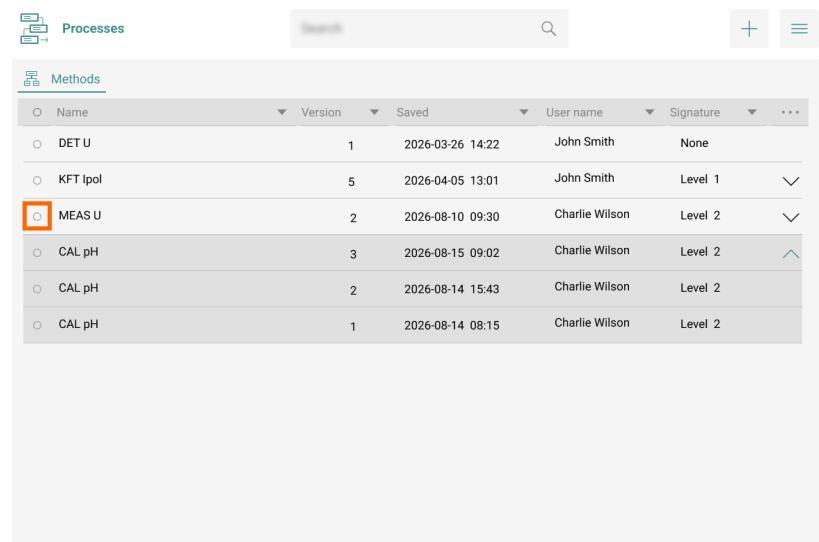
4.1.1.7 Upload method

Prerequisite:

- The IONIC main instrument is logged onto Metrohm Data Service ([Additional information](#)).

1 Selecting methods

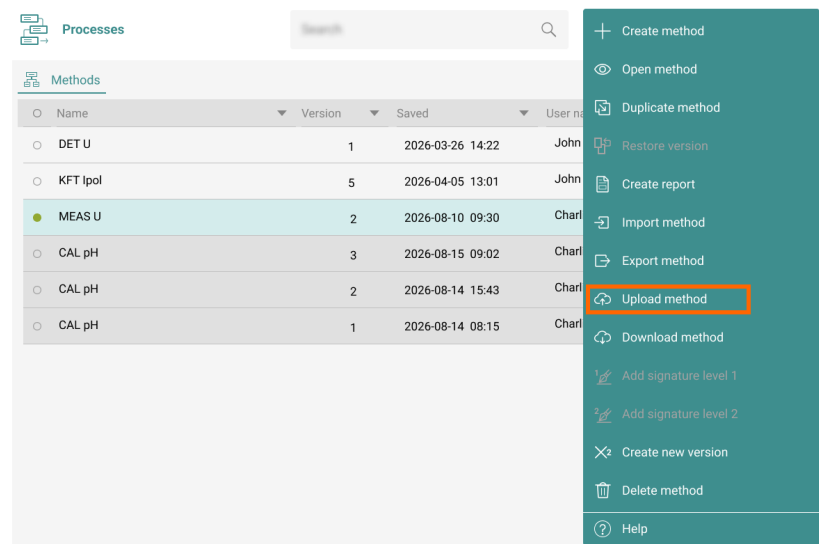
Select the desired methods by tapping  under **Processes** ► **Methods**.



☐	Name	Version	Saved	User name	Signature	...
☐	DET U	1	2026-03-26 14:22	John Smith	None	
☐	KFT Ipol	5	2026-04-05 13:01	John Smith	Level 1	▼
☒	MEAS U	2	2026-08-10 09:30	Charlie Wilson	Level 2	▼
☐	CAL pH	3	2026-08-15 09:02	Charlie Wilson	Level 2	▲
☐	CAL pH	2	2026-08-14 15:43	Charlie Wilson	Level 2	
☐	CAL pH	1	2026-08-14 08:15	Charlie Wilson	Level 2	

2 Uploading methods

Tap  in the title bar and select **Upload method**.



☐	Name	Version	Saved	User name
☐	DET U	1	2026-03-26 14:22	John
☐	KFT Ipol	5	2026-04-05 13:01	John
☒	MEAS U	2	2026-08-10 09:30	Charl
☐	CAL pH	3	2026-08-15 09:02	Charl
☐	CAL pH	2	2026-08-14 15:43	Charl
☐	CAL pH	1	2026-08-14 08:15	Charl

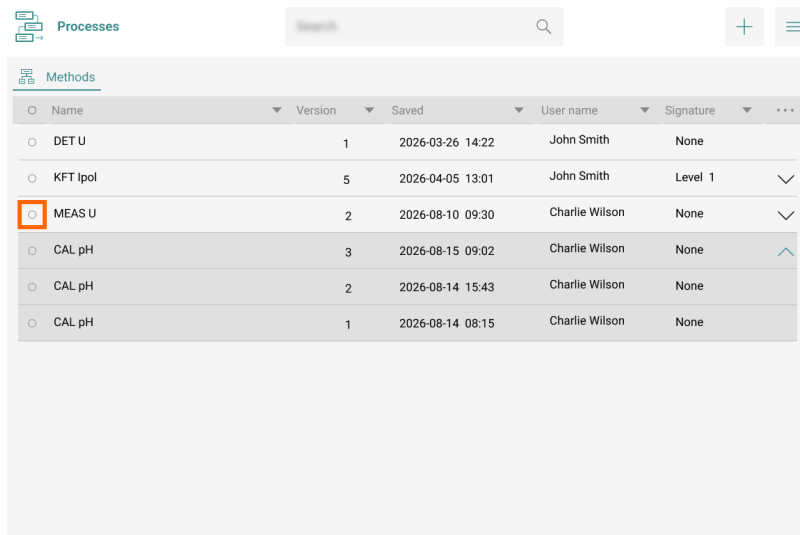
- + Create method
- 👁 Open method
- 📄 Duplicate method
- 🔄 Restore version
- 📄 Create report
- 📄 Import method
- 📄 Export method
- 📄 Upload method**
- 📄 Download method
- 📝 Add signature level 1
- 📝 Add signature level 2
- ✖ Create new version
- 🗑 Delete method
- 🔍 Help

As soon as the **Method uploaded** information message appears, the methods will be saved to the **Methods** area of Metrohm Data Service.

4.1.1.8 Delete method

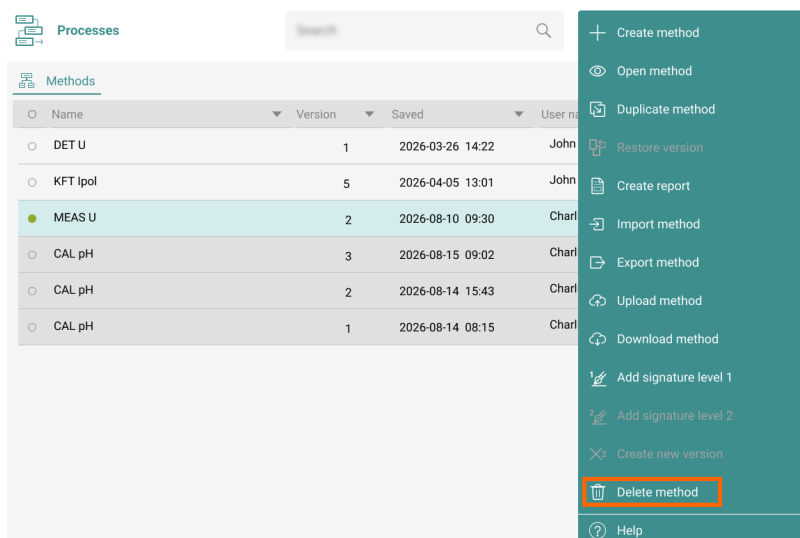
1 Selecting a method

Select the desired method by tapping  under **Processes** ► **Methods**.



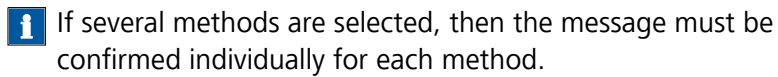
2 Deleting the method

Tap  in the title bar and select **Delete method**.



3 Confirming the message

Confirm the message with **Delete**.



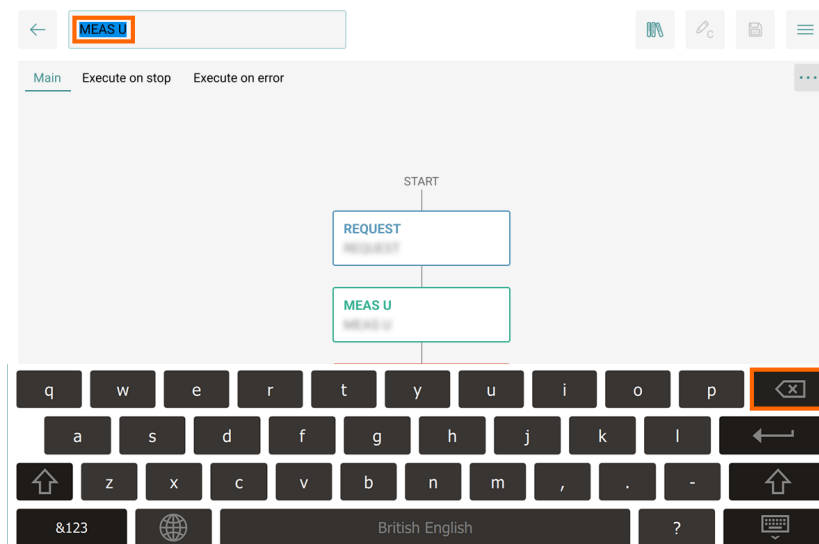
1 Opening a method

Processes

Search

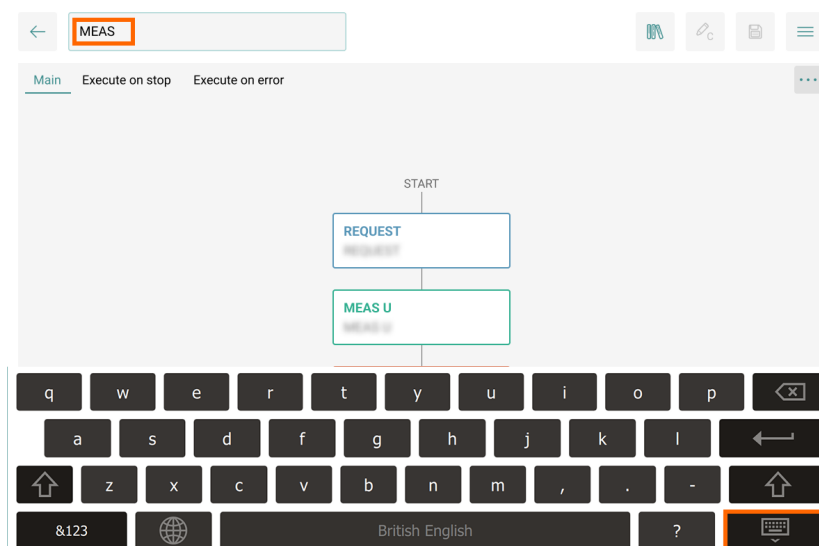
Name	Version	Saved	User name	Signature	...
DET U	1	2026-03-26 14:22	John Smith	None	
KFT Ipol	5	2026-04-05 13:01	John Smith	Level 1	
MEAS U	2	2026-08-10 09:30	Charlie Wilson	None	
CAL pH	3	2026-08-15 09:02	Charlie Wilson	None	
CAL pH	2	2026-08-14 15:43	Charlie Wilson	None	
CAL pH	1	2026-08-14 08:15	Charlie Wilson	None	

In the title bar, tap on the method name and delete it with .



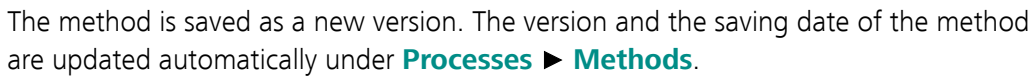
3 Entering a new method name

Enter the desired name for the method and close the keyboard.



4 Saving a method

Tap  in the title bar to save the changes.



- *Definition*
- *Additional information*

Signatures are available only with the activated **User management** and **Electronic signature** licenses. In addition, extended user management must be activated.

The following rules apply for the signatures:

- Every user can sign an object only once (regardless of the level).
- Only current determination versions and current method versions can be signed.
- When exporting and importing, all signatures are also exported or imported, respectively.

- Objects signed at level 1 can be changed and deleted. As soon as an object signed at level 1 is changed and saved, a new, unsigned version of the determination or method will be created.
- Any number of users can sign an object at level 1.

- Once an object has been signed at level 2, that object can no longer be changed or deleted. In order to change or delete the object, first a new, unsigned version must be created.

- Level 2 can be signed only if at least one user has signed the object at level 1.
- Only one signature can be added at level 2.
- As soon as a signature has been added at level 2, no further signatures can be added.

Additional information

Signatures can be added at level 1 and level 2 in the IONIC app. New, unsigned versions can also be created. In addition, the signatures can be displayed in the respective determination overview or in the respective method editor.

- *Adding a signature*
- *Creating a new version*
- *Displaying signatures*

4.1.1.10.1 Adding a signature

Methods and determinations can be signed at level 1 and at level 2 in the IONIC app ([Additional information](#)).

- Adding level 1 signature
- Adding level 2 signature

 The images show how to add signatures for methods. This procedure also applies to adding signatures for determinations.

Adding signature level 1

Prerequisite:

- The user has the necessary user group rights (*Additional information*).
- The user has not yet signed the object.

1 Selecting an object

Tap  to select the desired object.

Processes

Search

Methods

Name	Version	Saved	User name	Signature	...
DET U	1	2026-03-26 14:22	John Smith	None	
KFT Ipol	5	2026-04-05 13:01	John Smith	Level 1	▼
MEAS U	2	2026-08-10 09:30	Charlie Wilson	None	▼
CAL pH	3	2026-08-15 09:02	Charlie Wilson	Level 2	▲
CAL pH	2	2026-08-14 15:43	Charlie Wilson	Level 2	
CAL pH	1	2026-08-14 08:15	Charlie Wilson	Level 2	

2 Opening a signature dialog

Tap  (method) or  (subsample) in the title bar and select **Add signature level 1**.

Processes

Search

Methods

Name	Version	Saved	User name	Signature	...
DET U	1	2026-03-26 14:22	John Smith	None	
KFT Ipol	5	2026-04-05 13:01	John Smith	Level 1	▼
MEAS U	2	2026-08-10 09:30	Charlie Wilson	None	▼
CAL pH	3	2026-08-15 09:02	Charlie Wilson	Level 2	▲
CAL pH	2	2026-08-14 15:43	Charlie Wilson	Level 2	
CAL pH	1	2026-08-14 08:15	Charlie Wilson	Level 2	

+ Create method

👁 Open method

📄 Duplicate method

🔄 Restore version

📄 Create report

📄 Import method

📄 Export method

📄 Upload method

📄 Download method

 Add signature level 1

 Add signature level 2

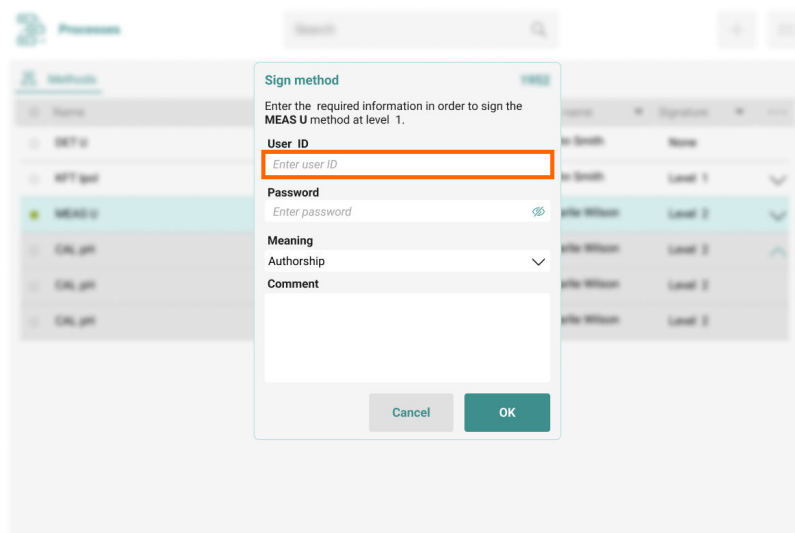
✖ Create new version

🗑 Delete method

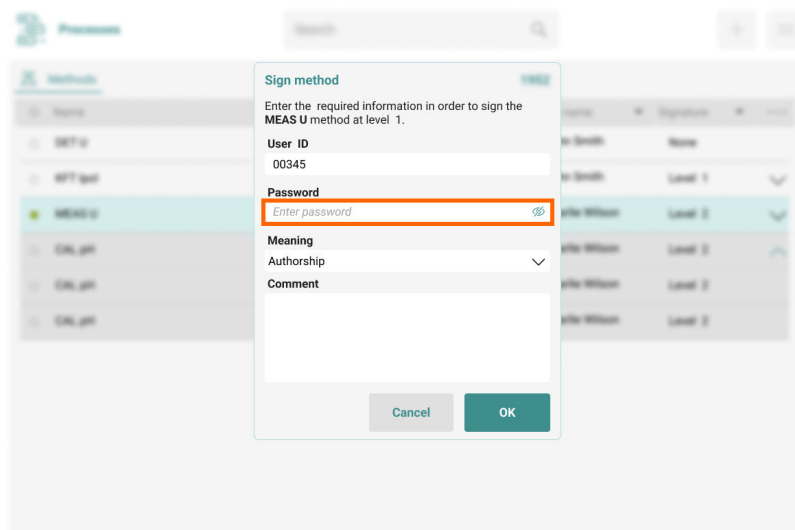
🔍 Help

3 Authenticating a user account

- Tap the input field under **User ID** and enter the user ID of the user account.



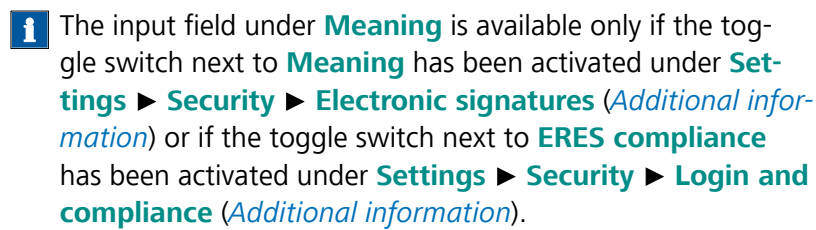
- Tap the input field under **Password** and enter the password of the user account.



 The input field under **Password** is available only if the toggle switch next to **Password** or the toggle switch next to **ERES compliance** has been activated under **Settings ► Security ► Login and compliance** (*Additional information*).

4 Selecting a meaning

Tap the selection list under **Meaning** and select the meaning of the signature.



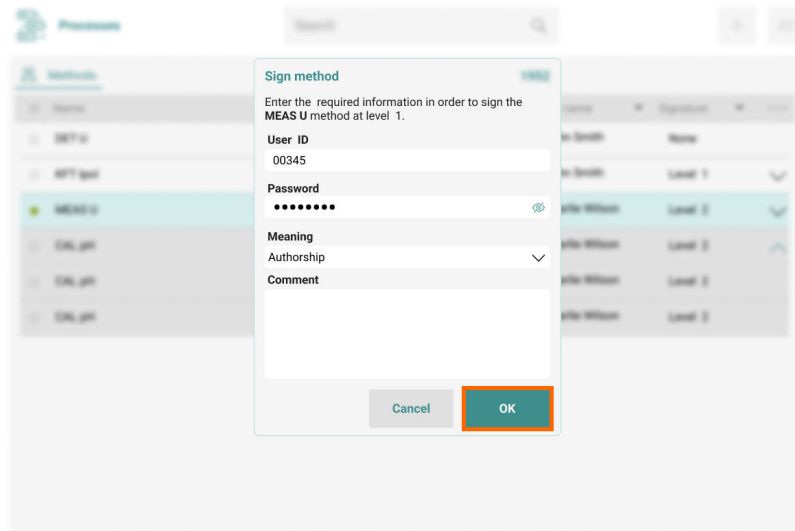
Tap the input field under **Comment** and add a comment.



 The input field under **Comment** is available only if the check box next to **Comment** has been activated under **Settings ► Security ► Electronic signatures** (*Additional information*).

6 Confirming a signature

Tap **[OK]** and confirm the signature.



Adding signature level 2

Prerequisite:

- The user has the necessary user group rights (*Additional information*).
- The object has been signed by at least one other user at level 1.

1 Selecting an object

Tap  to select the desired object.

Processes

Search

Methods

Name	Version	Saved	User name	Signature	...
DET U	1	2026-03-26 14:22	John Smith	None	
KFT Ipol	5	2026-04-05 13:01	John Smith	Level 1	▼
MEAS U	2	2026-08-10 09:30	Charlie Wilson	Level 1	▼
CAL pH	3	2026-08-15 09:02	Charlie Wilson	Level 2	▲
CAL pH	2	2026-08-14 15:43	Charlie Wilson	Level 2	
CAL pH	1	2026-08-14 08:15	Charlie Wilson	Level 2	

2 Opening a signature dialog

Tap  (method) or  (subsample) in the title bar and select **Add signature level 2**.

Processes

Search

Methods

Name	Version	Saved	User name	Signature	...
DET U	1	2026-03-26 14:22	John Smith	None	
KFT Ipol	5	2026-04-05 13:01	John Smith	Level 1	▼
MEAS U	2	2026-08-10 09:30	Charlie Wilson	Level 1	▼
CAL pH	3	2026-08-15 09:02	Charlie Wilson	Level 2	▲
CAL pH	2	2026-08-14 15:43	Charlie Wilson	Level 2	
CAL pH	1	2026-08-14 08:15	Charlie Wilson	Level 2	

+ Create method

👁 Open method

📄 Duplicate method

🔄 Restore version

📄 Create report

📄 Import method

📄 Export method

📄 Upload method

📄 Download method

1️⃣ Add signature level 1

2️⃣ Add signature level 2

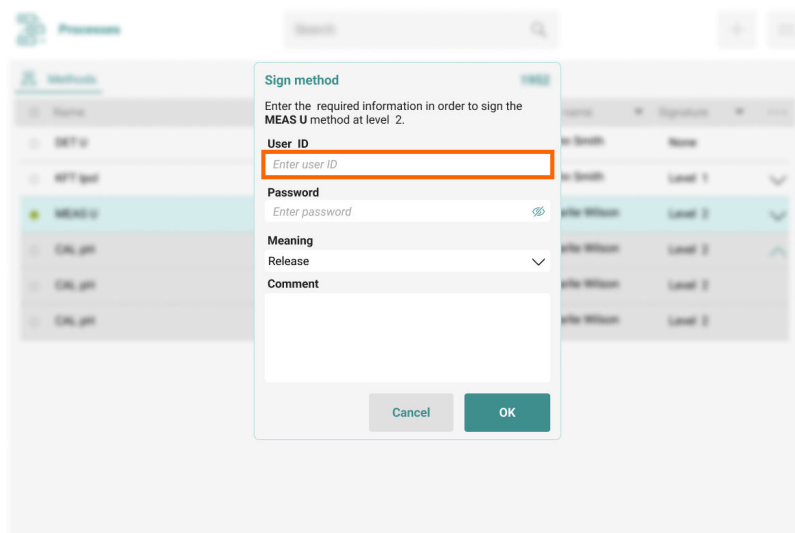
✖ Create new version

🗑 Delete method

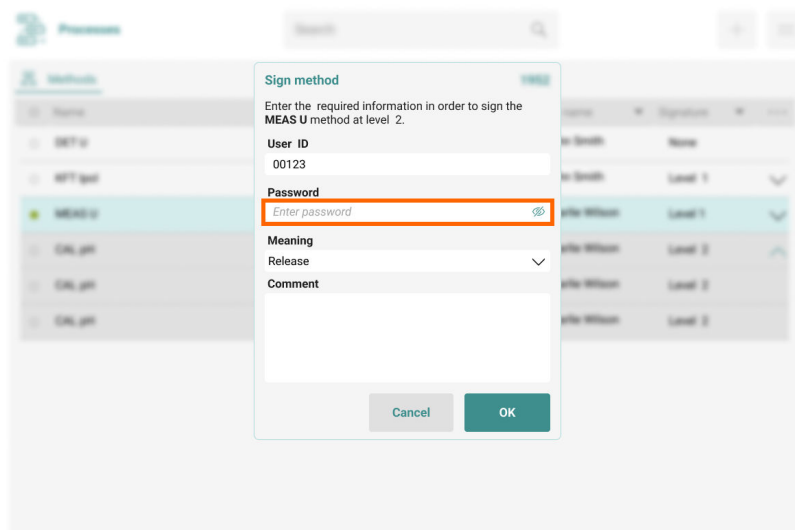
🔍 Help

3 Authenticating a user account

- Tap the input field under **User ID** and enter the user ID of the user account.



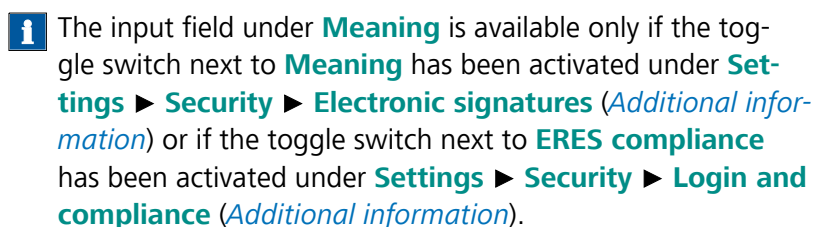
- Tap the input field under **Password** and enter the password of the user account.



 The input field under **Password** is available only if the toggle switch next to **Password** or the toggle switch next to **ERES compliance** has been activated under **Settings ► Security ► Login and compliance** (*Additional information*).

4 Selecting an importance

Tap the selection list under **Meaning** and select the importance of the signature.



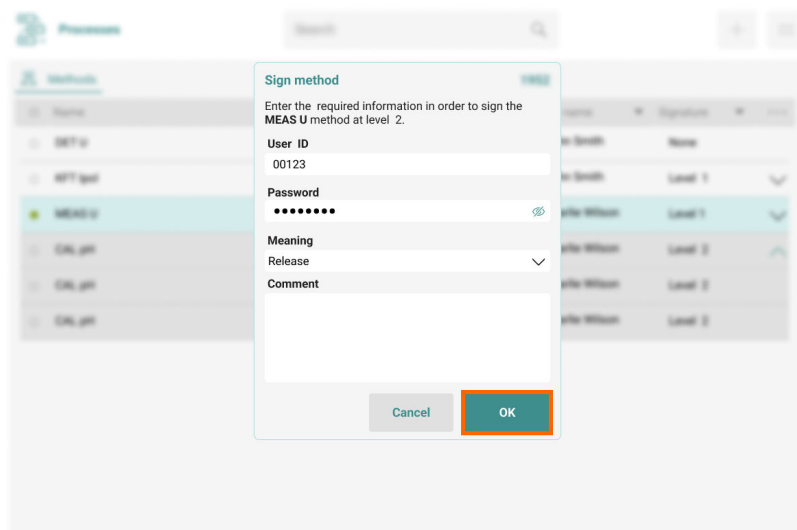
Tap the input field under **Comment** and add a comment.



 The input field under **Comment** is available only if the check box next to **Comment** has been activated under **Settings ► Security ► Electronic signatures** (*Additional information*).

6 Confirming a signature

Tap **[OK]** and confirm the signature.



4.1.1.10.2 Create new version

In order to create a new, unsigned version of an object signed at level 1, the object must first be modified and saved ([Additional information](#)). To create a new, unsigned version of an object signed at level 2, observe the following instructions.

 The images show how to create a new version of a method. The procedure also applies to creating a new version for determinations.

Prerequisite:

- The user has the necessary user group rights (*Additional information*).
- The object is signed at level 2.

1 Selecting an object

Tap  to select the desired object.

Processes

Search

Methods

Name	Version	Saved	User name	Signature	...
DET U	1	2026-03-26 14:22	John Smith	None	
KFT Ipol	5	2026-04-05 13:01	John Smith	Level 1	▼
MEAS U	2	2026-08-10 09:30	Charlie Wilson	Level 2	▼
CAL pH	3	2026-08-15 09:02	Charlie Wilson	Level 2	▲
CAL pH	2	2026-08-14 15:43	Charlie Wilson	Level 2	
CAL pH	1	2026-08-14 08:15	Charlie Wilson	Level 2	

2 Opening a signature dialog

Tap  (method) or  (subsample) in the title bar and select **Create new version**.

Processes

Search

Methods

Name	Version	Saved	User name	Signature	...
DET U	1	2026-03-26 14:22	John Smith	None	
KFT Ipol	5	2026-04-05 13:01	John Smith	Level 1	▼
MEAS U	2	2026-08-10 09:30	Charlie Wilson	Level 2	▼
CAL pH	3	2026-08-15 09:02	Charlie Wilson	Level 2	▲
CAL pH	2	2026-08-14 15:43	Charlie Wilson	Level 2	
CAL pH	1	2026-08-14 08:15	Charlie Wilson	Level 2	

+ Create method

👁 Open method

📄 Duplicate method

🔄 Restore version

📄 Create report

📄 Import method

📄 Export method

📄 Upload method

📄 Download method

1/2 Add signature level 1

2/2 Add signature level 2

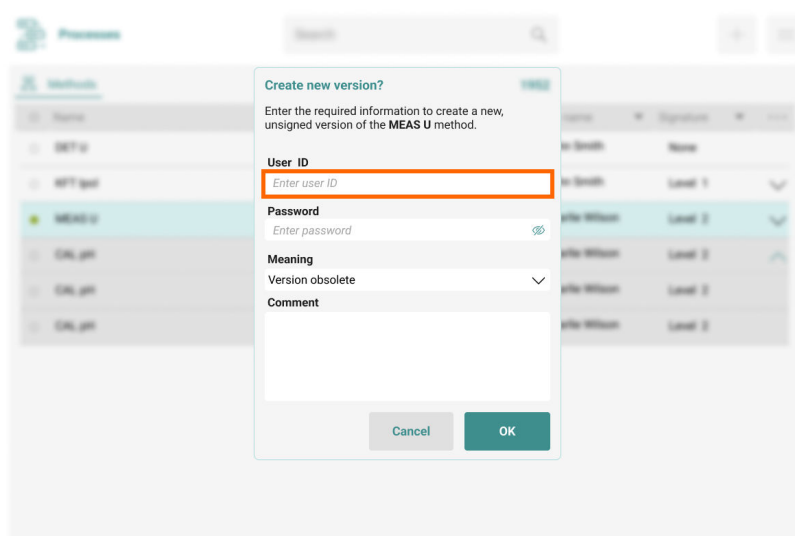
✕ Create new version

🗑 Delete method

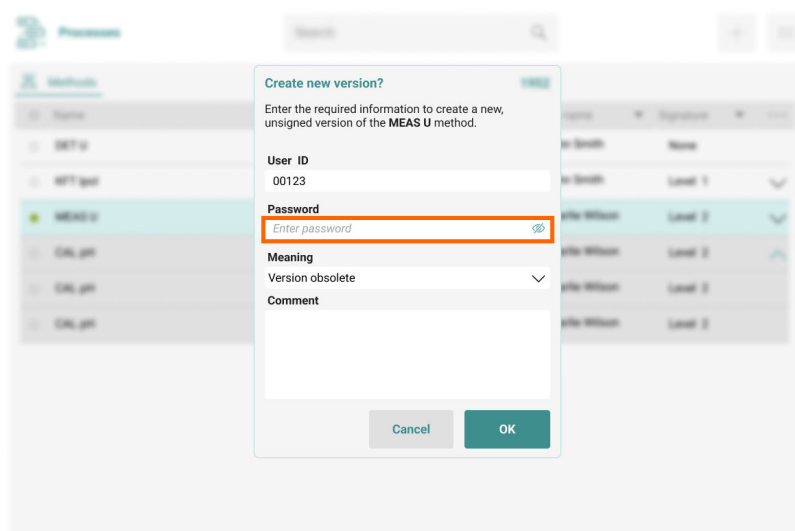
🔍 Help

3 Authenticating a user account

- Tap the input field under **User ID** and enter the user ID of the user account.

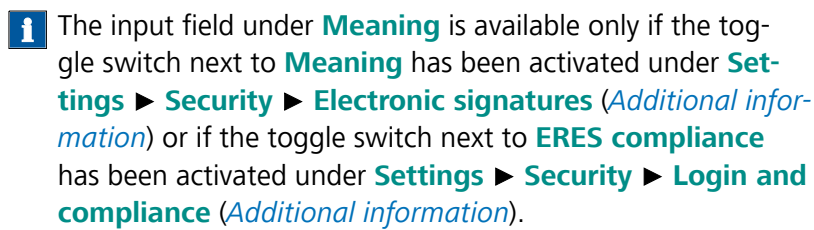


- Tap the input field under **Password** and enter the password of the user account.



4 Selecting an importance

Tap the selection list under **Meaning** and select the importance.



Tap the input field under **Comment** and add a comment.



 The input field under **Comment** is available only if the check box next to **Comment** has been activated under **Settings ► Security ► Electronic signatures** (*Additional information*).

6 Confirming a message

Tap **[OK]** and confirm the creation of a new version.

The screenshot shows a modal dialog box titled "Create new version?". The dialog contains the following fields and options:

- Enter the required information to create a new, unsigned version of the **MEAS U** method.**
- User ID:** A text input field containing "00123".
- Password:** A password input field with masked characters "••••••••" and a toggle icon.
- Meaning:** A dropdown menu with the selected option "Version obsolete".
- Comment:** A large text area for entering a comment.
- Buttons:** "Cancel" and "OK" buttons at the bottom right.

The background shows a blurred view of the "Methods" table, where the "MEAS U" method is highlighted.

A new, unsigned version of the method or determination is created.

4.1.1.10.3 Display signatures

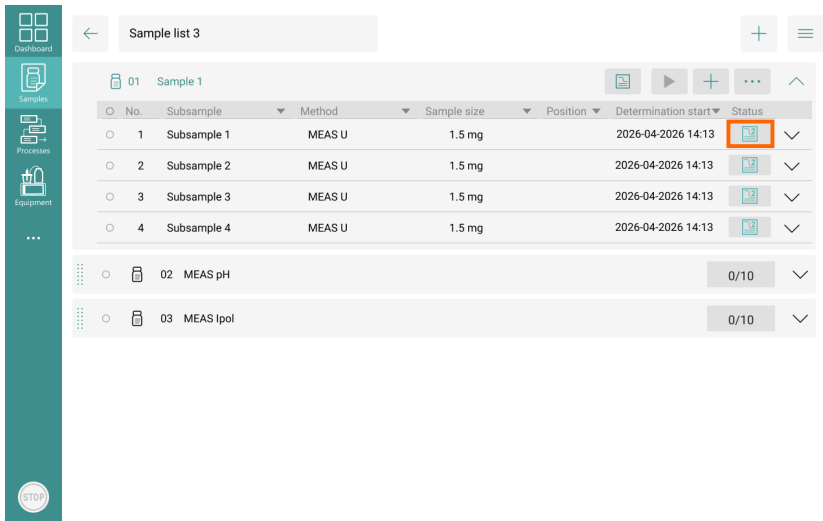
- *Displaying subsample signatures*
- *Displaying method signatures*

 The signatures can only be displayed and not edited.

Displaying subsample signatures

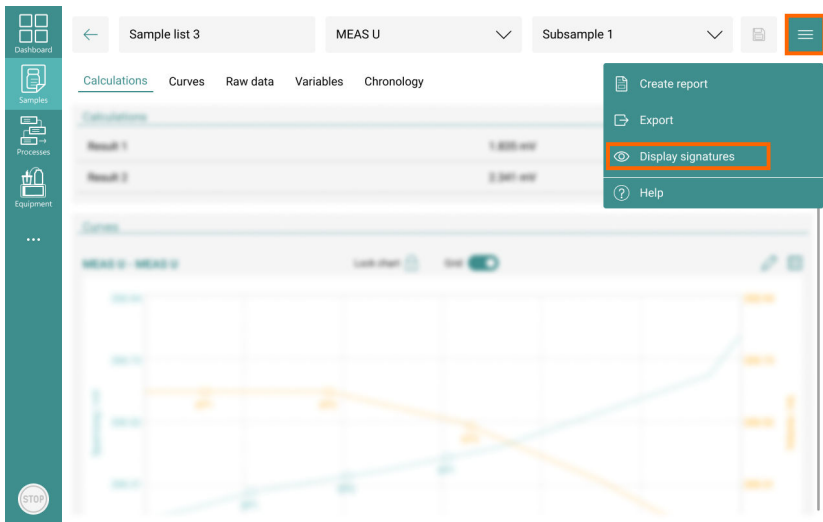
1 Opening the determination overview

Tap  or  in the status column of an expanded sample and open the determination overview (*Additional information*).



2 Opening subsample signatures

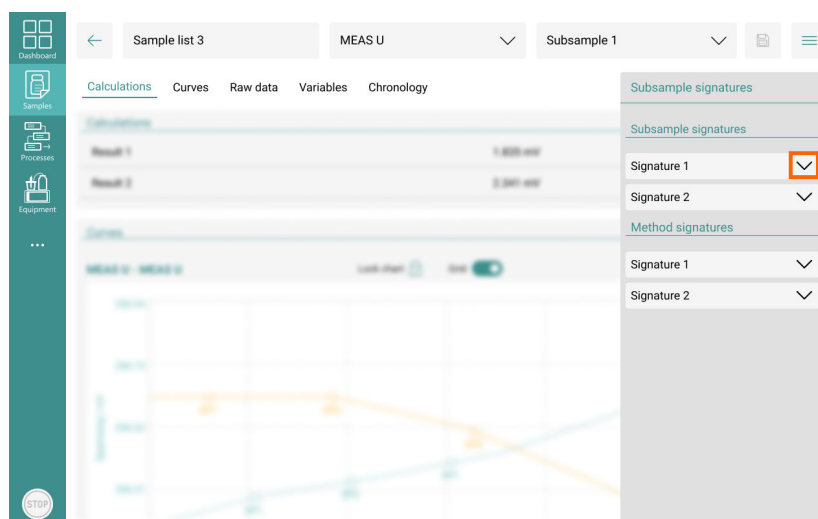
Tap  in the title bar and select **Display signatures**.



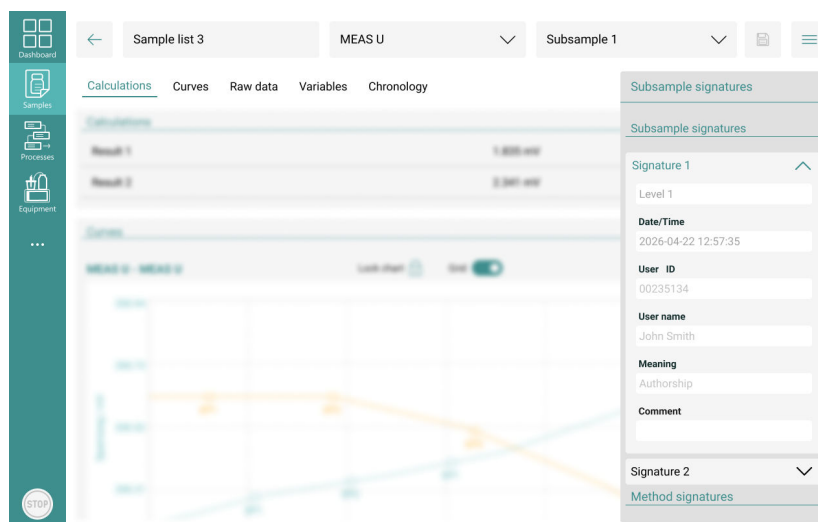
The signatures of the current determination version and the signatures of the method version that was used to determine the subsample are displayed.

3 Displaying signature details

Tap  in the **Subsample signatures** window next to the desired signature.



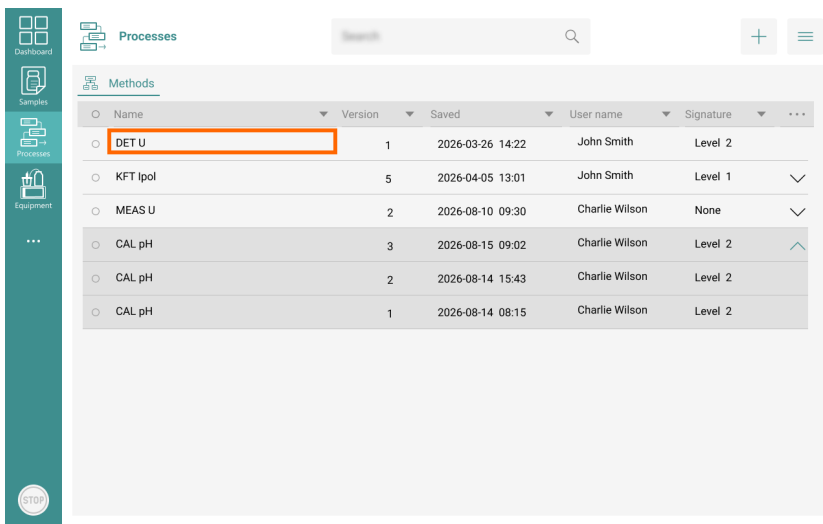
Information on the signature is displayed (*Additional information*).



Displaying method signatures

1 Opening the method editor

Tap the desired method and open the method editor ([Additional information](#)).

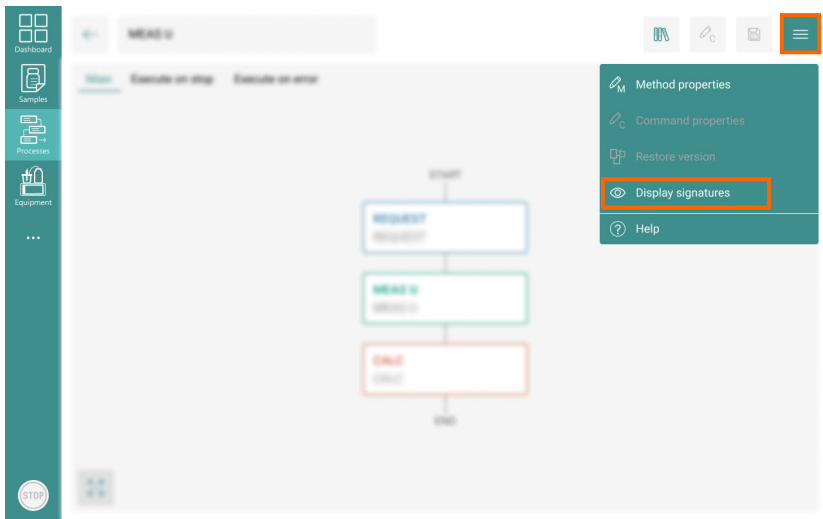


The screenshot shows the 'Processes' work area with a sidebar on the left containing icons for Dashboard, Samples, Processes, and Equipment. The main area displays a table of methods. The 'DET U' method is highlighted with an orange box.

Name	Version	Saved	User name	Signature	
DET U	1	2026-03-26 14:22	John Smith	Level 2	
KFT Ipol	5	2026-04-05 13:01	John Smith	Level 1	▼
MEAS U	2	2026-08-10 09:30	Charlie Wilson	None	▼
CAL pH	3	2026-08-15 09:02	Charlie Wilson	Level 2	▲
CAL pH	2	2026-08-14 15:43	Charlie Wilson	Level 2	
CAL pH	1	2026-08-14 08:15	Charlie Wilson	Level 2	

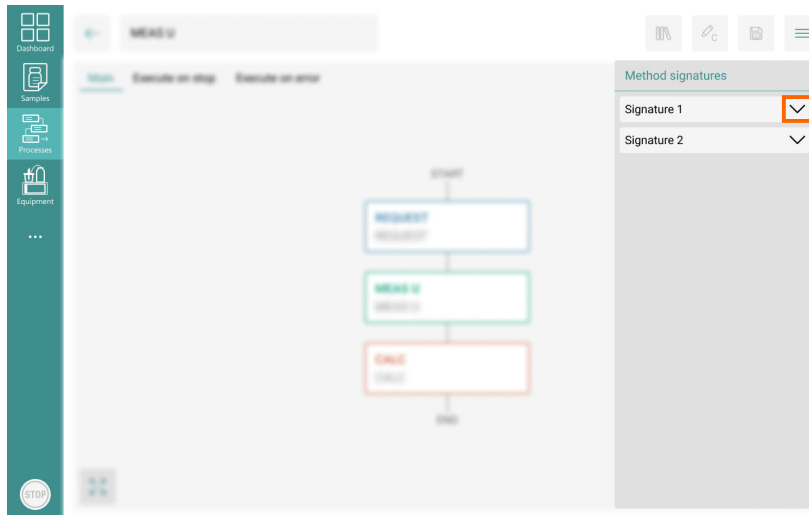
2 Opening method signatures

Tap  in the title bar and select **Display signatures**.

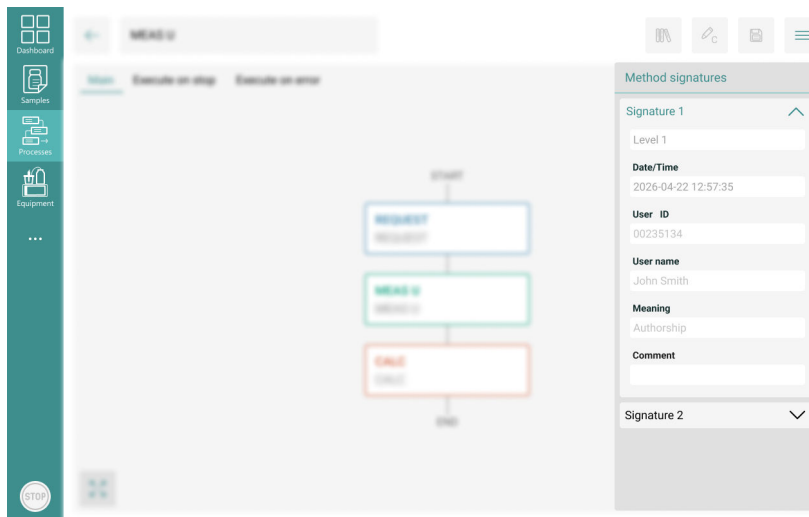


3 Displaying signature details

Tap  in the **Method signatures** window next to the desired signature.



Information on the signature is displayed (*Additional information*).



As soon as a signature is expanded by tapping , the following information will appear:

Level	Level at which the signature was added.
Date/Time	Date and time when adding the signature.
User ID	User ID of the user account with which the signature was added.
User name	User name of the user account with which the signature was added.
Meaning	Selected importance of the signature.
Comment	Comment on the signature.

4.1.2 Method editor – Overview

The method editor opens by tapping the method name under **Processes ► Methods**.

- [Definition](#)
- [Overview](#)
- [Functions](#)
- [Parameter selection list](#)

Video tutorials for the **Methods** subsection:



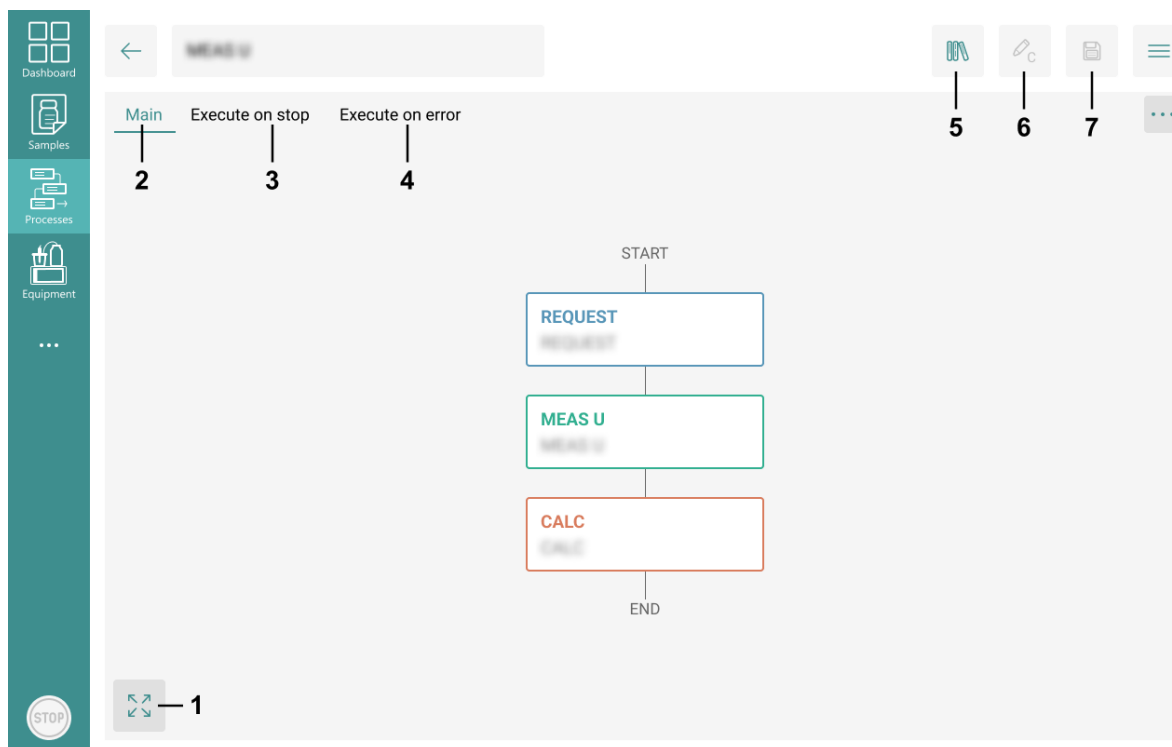
Definition

Commands from the **Command library** can be inserted into the method and moved in the method editor. In addition, the **Method properties** and **Command properties** can be viewed and edited. In addition, method sequences can be defined in the **Main**, **Execute on stop**, and **Execute on error** section.

If a predecessor is displayed in the version history, then it is read-only. This means that **Method properties** and **Command properties** can only be viewed and not edited. Similarly, no commands can be added to the method or deleted from the method.

Overview

The following editing options are available in the method editor:



1

Reset the zoom level to 100% and center the method.

3 Execute on stop (optional)

The run defined under **Execute on stop** is only carried out in case of a stop.

[Additional information](#)

5 Command library

The **Command library** with the list of all available commands is opened.

[Additional information](#)

7 Saving

All changes made are saved.

2 Main

The general method run is defined in the **Main** section.

4 Execute on error (optional)

The run defined under **Execute on error** is only carried out in case of an error.

[Additional information](#)

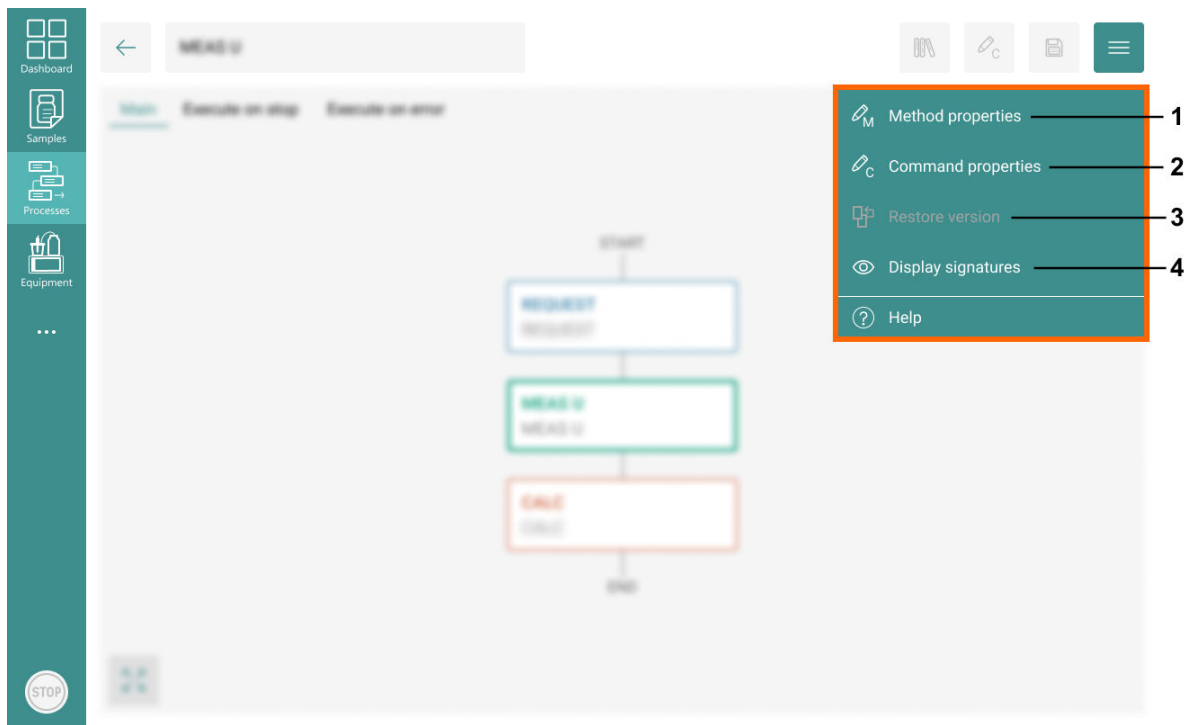
6 Command properties

The **Command properties** of the selected command are opened and can be edited.

[Additional information](#)

Functions

Tap on to open a menu with the following functions:



1 Method properties

The method properties are opened to display and edit the object ID, the subsample data, and the statistics settings of the currently selected method.

[Additional information](#)

2 Command properties

The command properties of the selected command are opened and can be edited.

[Additional information](#)

3 Restore version

The selected method version is restored as the new, current method.

[Additional information](#)

4 Display signatures

Display information on the method signatures at level 1 and at level 2.

[Additional information](#)

Tap ... to open a menu with the following functions:



1 Search command

All commands within the method are displayed in a list and can be searched for.

Additional information

2 Duplicate command

The duplicated command is inserted with the same name and with `*` as index under the original command with all command properties defined in the original command.

Additional information

3 Delete command

The selected command is removed from the method.

Additional information

Parameter selection list

A selection list with additional options to choose opens for certain parameters by tapping in the **Command properties**:

Options to choose	Function
Selection	The selection value can be used instead of the other values and is calculated automatically. Information on the selection for the respective parameters can be found in the command properties.
Formula	Opens the formula editor for entering formulas for calculating results or parameters (<i>Additional information</i>).

Options to choose	Function
Default value	Value that is defined by default for the parameter.
Enter value	The keyboard is opened so that a value can be entered manually.

 The options to choose can vary, depending on the parameter.

4.1.2.1 Command library – Overview

- [Definition](#)
- [Overview](#)

Video tutorials for the **Methods** subsection:



In a method, tap  to open the **Command library** window.

Definition

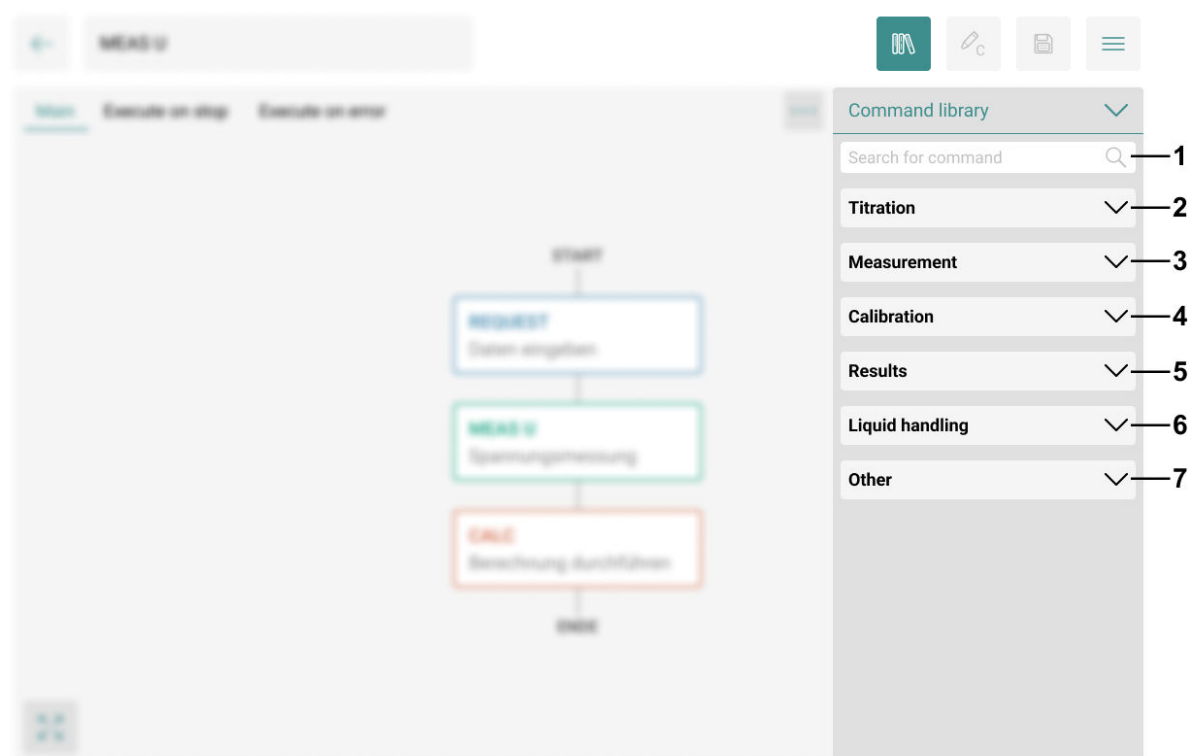
The **Command library** contains all the commands that can be added to a method. The individual commands are classified in command groups and sorted by color ([Additional information](#)).

Overview

The command groups are opened by tapping on  ([Additional information](#)).

 Depending on the activated licenses, different commands are displayed.

The **Command library** is structured as follows:

**1 Search field**

A command within the command library can be searched for by entering the command type in the search field.

2 Titration

[Additional information](#)

3 Measurement

[Additional information](#)

4 Calibration

[Additional information](#)

5 Results

[Additional information](#)

6 Liquid handling

[Additional information](#)

7 Other

[Additional information](#)

4.1.2.1.1 Titration commands – Overview

In a method, tap  to open the **Command library** window. Tap  next to **Titration** to open a list with the available titration commands.

The following titration commands can be inserted into the method:

- **DET** commands: **DET U**, **DET pH**, **DET Ipol**, **DET Upol** ([Additional information](#))
- **MET** commands: **MET U**, **MET pH**, **MET Ipol**, **MET Upol** ([Additional information](#))
- **SET** commands: **SET pH**, **SET U**, **SET Ipol**, **SET Upol** ([Additional information](#))
- **KFT** commands: **KFT Ipol** **KFT Upol** ([Additional information](#))
- **COND ON** ([additional information](#))
- **COND CHECK** ([additional information](#))
- **COND OFF** ([additional information](#))

The individual commands have **Command variables** that are generated in the process sequence and that can be used in formulas (*Additional information*).

4.1.2.1.1.1 DET – Overview

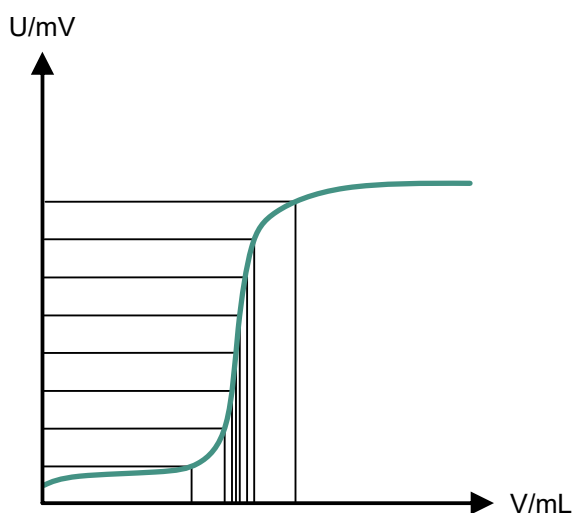
The following contents are available for the **DET** commands:

- *DET – Principle*
- *DET – Properties*
- *DET – Run*

4.1.2.1.1.1.1 DET – Principle

Measuring principle

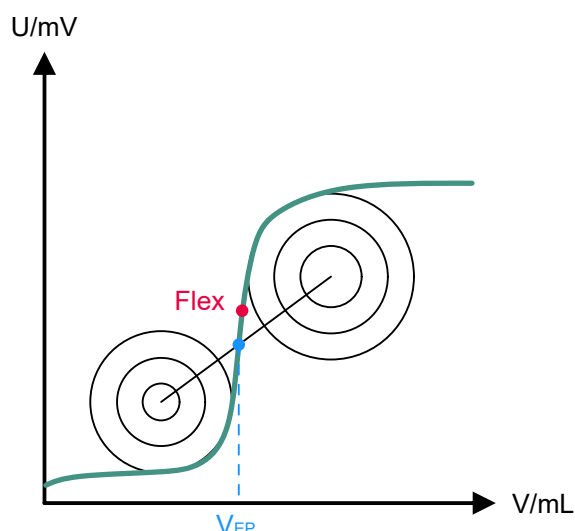
Titration with dynamic reagent addition is carried out with the **DET** command. The volume increments are added in such a way, depending on the slope of the curve, that each dosing leads to a constant measured value change. The volume increment for the next dosing is determined from the measured value changes of the previous dosings. The measured values are applied either drift-controlled (equilibrium titration) or after a defined waiting time.



i As the reagent dosing in **DET** depends on the measured data, the command parameters must be set so that the titration curve does not deviate too much from an s-shaped curve.

Potentiometric evaluation

The equivalence points **EP** are automatically localized similar to the Tubbs method and then automatically evaluated. With asymmetric titration curves, the volume value of the equivalence point **V_{EP}** is corrected by the inflection point **Flex** in the direction of the smaller circle of curvature.



The figure shows that the evaluation still requires measured values from the measuring point list even after the equivalence point. The set EP criterion is compared to the calculated **ERC** (**E**quivalence point **R**ecognition **C**riterion) for the recognition of the equivalence points found. The ERC is the first derivative of the titration curve combined with a mathematical function that is more sensitive for flat jumps than for steeper ones. Equivalence points where the ERC is smaller than the set EP criterion will not be recognized.

4.1.2.1.1.1.2 DET – Properties

The **DET** commands (**DET** = **D**ynamic **E**quivalence point **T**itration) are used to perform dynamic equivalence point titrations.

Depending on the measured quantity required, the following commands can be selected:

- **DET U**
Dynamic equivalence point titration with potentiometric voltage measurement (measured quantity: Potential U)
- **DET pH**
Dynamic equivalence point titration with potentiometric pH measurement (measured quantity: pH)
- **DET I_{pol}**
Dynamic equivalence point titration with voltametric measurement with selectable polarization current (measured quantity: Potential U)
- **DET U_{pol}**
Dynamic equivalence point titration with amperometric measurement with selectable polarization voltage (measured quantity: current I)

After selecting a **DET** command, tapping on  opens the **Command properties** window (*Additional information*).

The following parameters are available for the **DET** commands:

Start conditions

Measuring mode

Mode for the initial measured value adoption.

- **Drift-controlled:** The initial measured value is adopted by reaching one of the following criteria:
 - **Signal drift initial measured value**
 - **Maximum waiting time**
 - **Stop measured value**
- **Time-controlled** (Default value): The initial measured value is adopted by reaching one of the following criteria:
 - **Measurement duration**
 - **Stop measured value**

Signal drift initial measured value

The signal drift of the initial measured value is adopted as soon as the defined signal drift has been fallen short of.

(only if **Drift-controlled** is selected)

Only for **DET pH**, **DET U**, and **DET Ipol**:

Input range: 0.1–999.9

Unit: mV/min

Default value: 50.0

Only for **DET Upol**:

Input range: 0.10–99.99

Unit: µA/min

Default value: 50.00

Minimum waiting time

The signal drift of the initial measured value is not adopted until after the minimum waiting time has expired, even if the signal drift has already been fallen short of previously.

(only if **Drift-controlled** is selected)

Input range: 0–999,999

Unit: s

Default value: 0

Maximum waiting time

The signal drift of the initial measured value is applied no later than after the maximum waiting time has elapsed, even if the signal drift has not yet been reached.

(only if **Drift-controlled** is selected)

Input range: 0–999,999

Unit: s

Default value: 1

Measurement duration

The measurement is terminated as soon as the defined measurement duration is reached.

(only if **Time-controlled** is selected)

Input range: 0–999,999

Unit: s

Default value: 1

Start conditions	
Start volume (only if a value is entered under Start volume)	The titrant is added before the start of the titration until the start volume is reached. The following stop conditions are checked while dosing the start volume: ▪ Stop volume ▪ Stop time Input range: 0.00000–9'999.99000 Unit: mL Default value: 0.00000
Dosing rate start volume (only if a value is entered under Start volume)	Rate at which the start volume is dosed. If the Dosing rate start volume entered here is higher than the Maximum rate dosing port of the piston buret used that is defined under Equipment ► Instruments ► Properties ► Dosing port, then the Maximum rate dosing port defined there will be used. If Maximum is selected, then the Maximum rate dosing port from the Equipment work area will be used. In addition, a check is made during execution as to whether the defined dosing rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced. Input range: 0.01–300.00 Selection: Maximum (default value) (<i>Additional information</i>) Unit: mL/min
Start measured value (only for DET U , DET Ipol , and DET Upol)	The titrant is added before the start of the titration until the start measured value is reached. The following stop conditions are checked while dosing the titrant: ▪ Stop volume ▪ Stop time Selection: Off (default value) Only for DET U and DET Ipol: Input range: –2,000.0 to 2,000.0 Unit: mV Only for DET Upol: Input range: –200.00 to 200.00 Unit: µA Only for DET pH: Input range: –20.000 to 20.000 Unit: None

Start conditions

Dosing rate start measured value

(only if a value is entered under **Start measured value** or **Start measured value pH**)

Rate at which dosing takes place until the start measured value has been reached.

If the Dosing rate start measured value entered here is higher than the **Maximum rate dosing port** of the piston buret used that is defined under **Equipment ► Instruments ► Properties ► Dosing port**, then the **Maximum rate dosing port** defined there will be used.

If **Maximum** is selected, then the **Maximum rate dosing port** from the **Equipment** work area will be used.

In addition, a check is made during execution as to whether the defined dosing rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced.

Input range: 0.01–300.00

Selection: **Maximum** (*Additional information*)

Unit: mL/min

Default value: 5.00

Start slope

(only for **DET U**, **DET Ipol**, and **DET Upol**)

Start slope pH

(only for **DET pH**)

The titrant is added before the start of the titration until the start slope is reached.

The following stop conditions are checked while dosing the titrant:

- **Stop volume**
- **Stop time**

Selection: **Off** (default value)

Only for **DET U** and **DET Ipol**:

Input range: 0.0–999.9

Unit: mV/mL

Only for **DET Upol**:

Input range: 0.00–99.99

Unit: μ A/mL

Only for **DET pH**:

Input range: 0.000–9.999

Unit: 1/mL

Start conditions

Dosing rate start slope

(only if a value is entered under **Start slope** or **Start slope pH**)

Rate at which dosing takes place until the Start slope is reached.

If the Dosing rate start slope entered here is higher than the **Maximum rate dosing port** of the piston buret used that is defined under **Equipment ► Instruments ► Properties ► Dosing port**, then the **Maximum rate dosing port** defined there will be used.

If **Maximum** is selected, then the **Maximum rate dosing port** from the **Equipment** work area will be used.

In addition, a check is made during execution as to whether the defined dosing rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced.

Input range: 0.01–300.00

Selection: **Maximum** (*Additional information*)

Unit: mL/min

Default value: 5.00

Pause

Waiting time, e.g., for the measured value to stabilize after start or as reaction time after dosing a start volume. The pause begins as soon as all other start conditions have been processed.

Input range: 0–999,999

Unit: s

Default value: 0

Titration parameters

Titration rate

The titration rate can either be determined via 3 predefined parameter sets or the values for the parameters can be defined individually.

- **Slow:** Parameter set for titrations for which even the finest details are to be visible. This can, however, lead to an increase in noise, which may result in unwanted equivalence points.
- **Optimal** (default value): Optimized parameter set for standard titrations.
- **Fast:** Parameter set for not very critical titrations.
- **Enter values:** The values for the titration parameters must be defined individually. The default values of the predefined parameter set that was last selected are stored in the parameters.

If a predefined parameter set is selected for the titration rate, then the following parameters cannot be edited:

- Measuring mode
- Signal drift
- Minimum waiting time
- Maximum waiting time
- Measuring point distance
- Minimum volume increment
- Maximum volume increment
- Dosing rate

Titration parameters

Measuring mode

Mode for the measured value acceptance.

- **Drift-controlled** (default value): The measured value is adopted by achieving one of the following criteria:
 - **Signal drift**
 - **Maximum waiting time**
 - **Stop measured value**
- **Time-controlled**: The measured value is adopted by achieving one of the following criteria:
 - **Measurement duration**
 - **Stop measured value**



If a predefined parameter set is selected for the Titration rate, then the Measuring mode will be automatically set to **Drift-controlled**.

Signal drift

(only if **Drift-controlled** is selected)

The Signal drift is adopted as soon as it falls below the defined value during the minimum waiting time or at the latest after the maximum waiting time has expired.

Only for **DET pH**, **DET U**, and **DET Ipol**:

Input range: 0.1–999.9

Unit: mV/min

Only for **DET Upol**:

Input range: 0.10–99.99

Unit: µA/min

Minimum waiting time

(only if **Drift-controlled** is selected)

The Signal drift is not applied until after the minimum waiting time has expired at the earliest, even if the signal drift has already fallen below a defined value.

Input range: 0–999,999

Unit: s

Maximum waiting time

(only if **Drift-controlled** is selected)

The Signal drift is adopted at the latest after the maximum waiting time has expired. Even if the signal drift has not yet been reached or if the **Stop measured value** parameter is deactivated.

If the waiting time is not redefined, then a **Maximum waiting time** that is suitable for the Signal drift will be calculated automatically according to the following

$$\text{Waiting time} = \text{Floor} \left(5 + \frac{150}{\sqrt{\text{Drift} + 0.01}} \right)$$

formula:

Input range: 0–999,999

Unit: s

Measurement duration

(only if **Time-controlled** is selected)

The measurement is completed as soon as the defined Measurement duration is reached.

Input range: 0–999,999

Unit: s

Titration parameters

Measuring point distance

- The smaller the measuring point distance, the smaller the volume increments and the slower the titration. The curve then shows all the details, which, however, can lead to more noise and unwanted equivalence points. A small measuring point distance is particularly recommended for titrations with steep potential jumps (e.g., for strong acids or bases).
- The greater the selected measuring point distance, the larger the volume increments and the faster the titration. A large measuring point distance is particularly recommended for titrations with flat potential jumps (e.g., for weak acids or bases).
- A smaller value for the Measuring point distance can be advantageous when dosing with a piston buret with a smaller cylinder volume. At the same time, a smaller Signal drift and a higher EP criterion should be set.

 This parameter is identical to the **Measuring point density** parameter from previous Metrohm applications. The numerical values can therefore be applied from previous applications.

Input range: 0–9

Unit: None

Minimum volume increment

Minimum permissible volume increment that may be dosed at the start of the titration and in the event of steep potential jumps in the area of the equivalence point. Very small values (< 10 µL) should only be used if small titrant consumptions (e.g., EP volumes < 0.5 mL) are to be expected. Otherwise, unwanted equivalence points may appear.

Input range: 0.10–999.99

Unit: μL

Maximum volume increment

Maximum permitted volume increment that may be added per dosing step. The value for the maximum volume increment should not be less than 1/100 of the cylinder volume.

The maximum volume increment must be limited in the following cases:

- The titrant consumption is very low until the equivalence point is reached.
- The start volume is dosed until shortly before the equivalence point is reached.
- The change of direction in the jumping range is very abrupt, because otherwise it is easily possible for an excessively large volume to be dosed in the range of the equivalence point.

With **Unlimited**, the maximum possible volume increment will not be restricted.

 Similar values for the **Minimum volume increment** and **Maximum volume increment** parameters should be avoided. Monotonic equivalence point titration (MET) is more suitable in such cases.

Input range: 0.10–9,999.99

Selection: **Unlimited**

Unit: μL

Titration parameters

Dosing rate

Rate at which the volume increments are dosed.

If the dosing rate entered here is higher than the **Maximum rate dosing port** of the piston buret used that is defined under **Equipment ► Instruments ► Properties ► Dosing port**, then the **Maximum rate dosing port** defined there will be used.

If **Maximum** is selected, then the **Maximum rate dosing port** from the **Equipment** work area will be used.

In addition, a check is made during execution as to whether the defined dosing rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced.

Input range: 0.01–300.00

Selection: **Maximum** (default value) ([Additional information](#))

Unit: mL/min

Filling rate

Rate at which the cylinder is filled.

If the filling rate entered here is higher than the **Maximum rate** of the piston buret used that is defined under **Equipment ► Instruments ► Properties ► Fill port**, then the **Maximum rate** defined there will be used.

If **Maximum** is selected, then the **Maximum rate** from the **Equipment** work area will be used.

In addition, a check is made during execution as to whether the defined filling rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced.

If air bubbles occur during aspiration of the solution, then first check all the tubing connections. If a vacuum causes the air bubbles, then the air bubbles can be prevented by previously degassing the solution or by reducing the filling rate.

Input range: 0.01–300.00

Selection: **Maximum** (default value) ([Additional information](#))

Unit: mL/min

Temperature measuring mode

Type of temperature measurement.

The temperature of the solution can either be defined manually or measured continuously with a temperature sensor.

- **Automatic** (default value): If a temperature sensor is connected, then the temperature will be measured continuously. Otherwise, the temperature defined under **Temperature** will be used.
- **Continuous**: Because the temperature is measured continuously, a temperature sensor must be connected. If no temperature sensor is connected, then the command cannot be executed.
- **Manual**: The temperature defined under **Temperature** is adopted as the measuring temperature.

Stop conditions

Stop measured value

(only for **DET U**, **DET Ipol**, and **DET Upol**)

Stop measured value pH

(only for **DET pH**)

The titration is canceled as soon as it falls below or exceeds the defined measured value since the start of the titration. Exceeding or falling below the stop measured value is monitored on the basis of the titration direction which is defined using the stop measured value and the start measured value (or the initial measured value if the Start measured value is deactivated).

Off deactivates this stop condition.

Selection: **Off** (default value)

Only for **DET U** and **DET Ipol**:

Input range: -2,000.0 to 2,000.0

Unit: mV

Only for **DET Upol**:

Input range: -200.00 to 200.00

Unit: µA

Only for **DET pH**:

Input range: -20.000 to 20.000

Unit: None

Stop EP

The titration is aborted as soon as the defined number of equivalence points (EP) has been evaluated according to the EP criterion parameter.

Off deactivates this stop condition.

Input range: 1–9

Selection: **Off** (default value)

Volume after EP

(only if a value is entered under **Stop EP**)

As soon as the number of equivalence points defined under **Stop EP** has been evaluated, the **Volume after EP** is added to the volume of the last equivalence point. The titration is canceled after dosing this total volume (volume up to EP + volume after EP).

Because determination of the equivalence point will in any event require titration in excess of the equivalence point, the end volume will then be greater than the equivalence point volume that leads to the action being canceled, even if **Volume after EP** is 0 mL.



This parameter was deactivated in previous Metrohm applications with **Off**, which now corresponds to the setting "0 mL".

Input range: 0.00000–9'999.99000

Unit: mL

Default value: 0.00

Stop conditions

Stop time

The titration is canceled as soon as the defined time span has elapsed since the determination start (including start conditions).

Off deactivates this stop condition.

Input range: 0–999,999

Selection: **Off** (default value)

Unit: s

Potentiometric evaluation

Additional information

Fixed point evaluation

Additional information

Diagram axes

Quantities

Selection of the specified quantity to be shown in the curve display on the corresponding axis.

- Volume
- ERC
- Time
- Temperature

Only for **DET** pH:

- pH

Only for **DET U**:

- **Potential**

Only for **DET Ipol**:

- **Potential**

Only for **DET Upol**:

- **Current**

 The quantities are present for all axes and differ only in the default values.

x-axis

Selection of the specified quantity to be shown in the curve display on the x-axis.

Default value: **Volume**

y-axis

Selection of the specified quantity to be shown in the curve display on the first y-axis.

Default value:

Only for **DET** pH: pH

Only for **DET U: Potential**

Only for **DET Ipol: Potential**

Only for **DET Upol: Current**

Diagram axes

y2-axis	Optional display of a second y-axis in the curve display. The display of the y2-axis is deactivated by default.
y2-axis (only with activated y2-axis)	Selection of the specified quantity to be shown in the curve display on the second y-axis. Default value: ERC

Curve simulation**Curve selection**

Predefined curves can be created to simulate a possible determination run. The curve history is determined by the set parameters.

The following simulation curves can be selected:

- **None** (default value): The curve simulation is deactivated.
- **Hydrochloric acid**: Simulation curve of the titration of hydrochloric acid with caustic soda (titration curve with one equivalence point).
- **Citric acid**: Simulation curve of the titration of citric acid with caustic soda (titration curve with 3 equivalence points).



Before analyzing real samples, deactivate the curve simulation.

Execute with

In order for a **DET** command to be executed, the corresponding functional units need to be assigned to the command.

Additional information

4.1.2.1.1.1.3 DET – Run

The **DET** command is executed in 4 steps:

1 – Determining the initial measured value

The initial measured value (measured value before start of dosing) is determined according to the parameters in the parameter group **Start conditions**, either drift-controlled or after a maximum waiting time has elapsed.

2 – Processing the start conditions

If a **Start volume** was defined under **Start conditions**, then it will be dosed before the actual start of the titration.

The start conditions are checked in the following order: **Start volume** → **Start measured value (pH)** → **Start slope (pH)**

The defined **Pause** time is then observed.

3 – Carrying out the titration

The titration is carried out and evaluated according to the parameters defined under **Titration parameters** and **Potentiometric evaluation**.

- Fixed point evaluation

Optionally, up to 9 fixed points can be defined under **Fixed point evaluation** that are calculated from the measuring point list during the titration.

- **Diagram axes**

Different sizes can be selected for the **x-axis** and the **y-axis**. Optionally, a **y2-axis** can be displayed.

4 – Exiting the titration

The titration is completed as usual as soon as the first stop condition defined in **Stop conditions** is reached.

 A running titration can be canceled by a manual cancellation or with the emergency stop or in case of an error.

4.1.2.1.1.2 MET – Overview

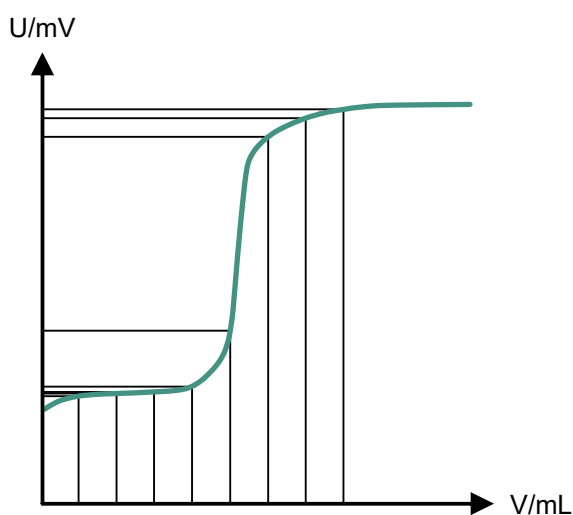
The following contents are available for the **MET** commands:

- *MET – Principle*
- *MET – Properties*
- *MET – Run*

4.1.2.1.1.2.1 MET – Principle

Measuring principle

Titration with reagent addition at constant volume increments are carried out with the **MET** command. The measured values are applied either drift-controlled (equilibrium titration) or after a defined waiting time.



 The **MET** command is suitable for titrations with relatively high signal fluctuations or sudden potential jump, as well as for slow titrations or electrodes which respond slowly.

Potentiometric evaluation

The equivalence points **EP** are automatically determined using a method based on the Fortuin method that has been adapted by Metrohm for numerical procedures (for details, see *METROHM Bulletin*, Vol. 2, No. 10, 1971). Here, a search is carried out for the largest measured value change Δ_n . The exact **EP** is determined by using an interpolation factor ρ that depends on the Δ values before and after Δ_n :

$$V_{EP} = V_0 + \rho \Delta V$$

V_{EP} = EP volume, V_0 = total volume dosed before Δ_n , ΔV = volume increment, ρ = interpolation factor according to Fortuin

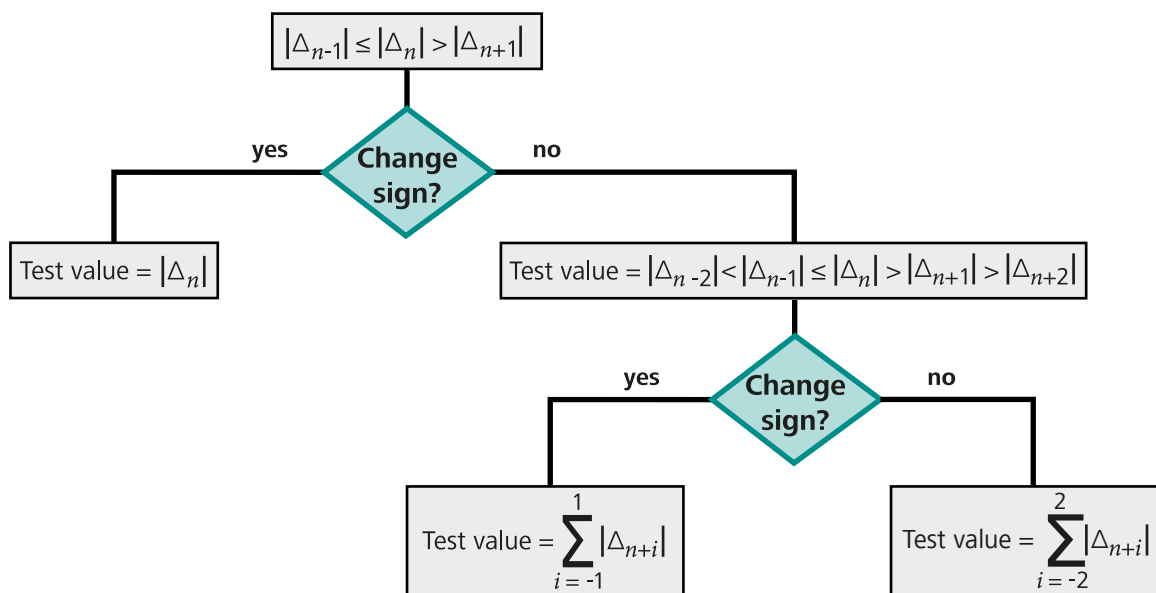
EP criterion in the MET commands

The EP criterion is a measure of the size of the jump in the titration curve. It is used to suppress the noise during the evaluation and to detect the relevant measurement jumps. In most applications, the default values are sufficient for this purpose.

The **ERC** (Equivalence point Recognition Criterion) found for each jump is compared with the value specified in the **EP criterion** parameter. Equivalence points (EPs) where the ERC is smaller than the set EP criterion will not be recognized.

The appropriate value for the EP criterion can be calculated using the measuring point list:

1. Search for the largest measured value change Δ_n .
2. Use the measured value changes before and after Δ_n to calculate a series:
 $|\Delta_{n-2}|, |\Delta_{n-1}|, |\Delta_n|, |\Delta_{n+1}|, |\Delta_{n+2}|$
3. Based on the following chart, decide how many Δ values are needed to calculate the value for the EP criterion:



1. If a recognized EP is to be excluded, then enter a value in the **EP criterion** or **EP criterion pH** parameter that is slightly higher than the calculated result.

2. If an unrecognized EP is to be taken into account, then enter a value in the **EP criterion** or **EP criterion pH** parameter that is slightly lower than the calculated result.

4.1.2.1.1.2.2 MET – Properties

The **MET** commands (**MET** = **M**onotonic **E**quivalence Point **T**itration) are used to perform monotonic equivalence point titrations.

Depending on the measured quantity required, the following commands can be selected:

- **MET U**
Monotonic equivalence point titration with potentiometric voltage measurement (measured quantity: Potential U)
- **MET pH**
Monotonic equivalence point titration with potentiometric pH measurement (measured quantity: pH)
- **MET I_{pol}**
Monotonic equivalence point titration with voltametric measurement with selectable polarization current (measured quantity: Potential U)
- **MET U_{pol}**
Monotonic equivalence point titration with amperometric measurement for selectable polarization voltage (measured quantity: Current I)

After selecting an **MET** command, tapping on  opens the **Command properties** window (*Additional information*).

The following parameters are available for the **MET** commands:

Start conditions	
Measuring mode	Mode for the initial measured value adoption. ▪ Drift-controlled: The initial measured value is adopted by reaching one of the following criteria: – Signal drift initial measured value – Maximum waiting time – Stop measured value ▪ Time-controlled (Default value): The initial measured value is adopted by reaching one of the following criteria: – Measurement duration – Stop measured value

Start conditions**Signal drift initial measured value**

(only if **Drift-controlled** is selected)

The signal drift of the initial measured value is adopted as soon as the defined signal drift has been fallen short of.

Only for **MET pH**, **MET U**, and **MET Ipol**:

Input range: 0.1–999.9

Unit: mV/min

Default value: 50.0

Only for **MET Upol**:

Input range: 0.10–99.99

Unit: µA/min

Default value: 50.00

Minimum waiting time

(only if **Drift-controlled** is selected)

The signal drift of the initial measured value is not adopted until after the minimum waiting time has expired, even if the signal drift has already been fallen short of previously.

Input range: 0–999,999

Unit: s

Default value: 0

Maximum waiting time

(only if **Drift-controlled** is selected)

The signal drift of the initial measured value is applied no later than after the maximum waiting time has elapsed, even if the signal drift has not yet been reached.

Input range: 0–999,999

Unit: s

Default value: 1

Measurement duration

(only if **Time-controlled** is selected)

The measurement is terminated as soon as the defined measurement duration is reached.

Input range: 0–999,999

Unit: s

Default value: 1

Start volume

The titrant is added before the start of the titration until the start volume is reached.

The following stop conditions are checked while dosing the start volume:

- **Stop volume**
- **Stop time**

Input range: 0.00000–9'999.99000

Unit: mL

Default value: 0.00000

Start conditions

Dosing rate start volume

(only if a value is entered under **Start volume**)

Rate at which the start volume is dosed.

If the Dosing rate start volume entered here is higher than the **Maximum rate dosing port** of the piston buret used that is defined under **Equipment ► Instruments ► Properties ► Dosing port**, then the **Maximum rate dosing port** defined there will be used.

If **Maximum** is selected, then the **Maximum rate dosing port** from the **Equipment** work area will be used.

In addition, a check is made during execution as to whether the defined dosing rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced.

Input range: 0.01–300.00

Selection: **Maximum** (default value) ([Additional information](#))

Unit: mL/min

Start measured value

(only for **MET U**, **MET Upol**, and **MET Upol**)

The titrant is added before the start of the titration until the start measured value is reached.

The following stop conditions are checked while dosing the titrant:

Start measured value
pH

(only for **MET pH**)

- Stop volume
- Stop time

Selection: **Off** (default value)

Only for **MET U** and **MET Ipol**:

Input range: -2,000.0 to 2,000.0

Unit: mV

Only for **MET Upol**:

Input range: -200.00 to 200.00

Unit: μA

Only for **MET** pH:

Input range: -20.000 to 20.000

Unit: None

Start conditions

Dosing rate start measured value

(only if a value is entered under **Start measured value** or **Start measured value pH**)

Rate at which dosing takes place until the start measured value has been reached.

If the Dosing rate start measured value entered here is higher than the **Maximum rate dosing port** of the piston buret used that is defined under **Equipment ► Instruments ► Properties ► Dosing port**, then the **Maximum rate dosing port** defined there will be used.

If **Maximum** is selected, then the **Maximum rate dosing port** from the **Equipment** work area will be used.

In addition, a check is made during execution as to whether the defined dosing rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced.

Input range: 0.01–300.00

Selection: **Maximum** (*Additional information*)

Unit: mL/min

Default value: 5.00

Start slope

(only for **MET U**, **MET Ipol**, and **MET Upol**)

Start slope pH

(only for **MET pH**)

The titrant is added before the start of the titration until the start slope is reached.

The following stop conditions are checked while dosing the titrant:

- **Stop volume**
- **Stop time**

Selection: **Off** (default value)

Only for **MET U** and **MET Ipol**:

Input range: 0.0–999.9

Unit: mV/mL

Only for **MET Upol**:

Input range: 0.00–99.99

Unit: μ A/mL

Only for **MET pH**:

Input range: 0.000–9.999

Unit: 1/mL

Start conditions

Dosing rate start slope

(only if a value is entered under **Start slope** or **Start slope pH**)

Rate at which dosing takes place until the start slope has been reached.

If the Dosing rate start slope entered here is higher than the **Maximum rate dosing port** of the piston buret used that is defined under **Equipment ► Instruments ► Properties ► Dosing port**, then the **Maximum rate dosing port** defined there will be used.

If **Maximum** is selected, then the **Maximum rate dosing port** from the **Equipment** work area will be used.

In addition, a check is made during execution as to whether the defined dosing rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced.

Input range: 0.01–300.00

Selection: **Maximum** (*Additional information*)

Unit: mL/min

Default value: 5.00

Pause

Waiting time, e.g., for the measured value to stabilize after start or as reaction time after dosing a start volume. The pause begins as soon as all other start conditions have been processed.

Input range: 0–999,999

Unit: s

Default value: 0

Titration parameters

Titration rate

The titration rate can either be determined via 3 predefined parameter sets or the values for the parameters can be defined individually.

- **Slow:** Parameter set for titrations for which even the finest details are to be visible. This can, however, lead to an increase in noise, which may result in unwanted equivalence points.
- **Optimal** (default value): Optimized parameter set for standard titrations.
- **Fast:** Parameter set for not very critical titrations.
- **Enter values:** The values for the titration parameters must be defined individually. The default values of the predefined parameter set that was last selected are stored in the parameters.

If a predefined parameter set is selected for the titration rate, then the following parameters cannot be edited:

- Measuring mode
- Signal drift
- Minimum waiting time
- Maximum waiting time
- Volume increment
- Dosing rate

Titration parameters

Measuring mode

Mode for the measured value acceptance.

- **Drift-controlled** (default value): The measured value is adopted by achieving one of the following criteria:
 - **Signal drift**
 - **Maximum waiting time**
 - **Stop measured value**
- **Time-controlled**: The measured value is adopted by achieving one of the following criteria:
 - **Measurement duration**
 - **Stop measured value**



If a predefined parameter set is selected for the titration rate, then the measuring mode will be automatically set to **Drift-controlled**.

Signal drift

(only if **Drift-controlled** is selected)

The signal drift is adopted as soon as it falls below the defined value during the minimum waiting time or at the latest after the maximum waiting time has expired.

Only for **MET pH**, **MET U**, and **MET Ipol**:

Input range: 0.1–999.9

Unit: mV/min

Only for **MET Upol**:

Input range: 0.10–99.99

Unit: µA/min

Minimum waiting time

(only if **Drift-controlled** is selected)

The signal drift will not be applied until after the minimum waiting time has expired at the earliest, even if the signal drift has already fallen below a defined value.

Input range: 0–999,999

Unit: s

Maximum waiting time

(only if **Drift-controlled** is selected)

The signal drift is adopted at the latest after the maximum waiting time has expired. Even if the signal drift has not yet been reached or if the **Stop measured value** parameter is deactivated.

If the waiting time is not redefined, then a **Maximum waiting time** that is suitable for the signal drift will be calculated automatically according to the following

$$\text{Waiting time} = \text{Floor} \left(5 + \frac{150}{\sqrt{\text{Drift} + 0.01}} \right)$$

formula:

Input range: 0–999,999

Unit: s

Measurement duration

(only if **Time-controlled** is selected)

The measurement is terminated as soon as the defined measurement duration is reached.

Input range: 0–999,999

Unit: s

Titration parameters

Volume increment

Volume dosed at each dosing step. Prerequisite for high accuracy requires using the appropriate volume increment. A good guide value for the volume increment is 0.1 mL. Metrohm recommends 20 dosing steps up to the equivalence point. With greater consumption, the titration time can be optimized using the start conditions. Smaller volume increments (< 0.1 mL) are required to determine blank values or to ensure accuracy with highly asymmetric curves. Larger volume increments are advisable for flatter curves.



The accuracy of the evaluation is not increased by using smaller increments, as the measured value change between 2 measuring points is of the same magnitude as the noise. This means that unwanted equivalence points may be generated.

Input range: 0.00001–9.99999

Unit: mL

Dosing rate

Rate at which the volume increments are dosed.

If the dosing rate entered here is higher than the **Maximum rate dosing port** of the piston buret used that is defined under **Equipment ► Instruments ► Properties ► Dosing port**, then the **Maximum rate dosing port** defined there will be used.

If **Maximum** is selected, then the **Maximum rate dosing port** from the **Equipment** work area will be used.

In addition, a check is made during execution as to whether the defined dosing rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced.

Input range: 0.01–300.00

Selection: **Maximum** (default value) ([Additional information](#))

Unit: mL/min

Titration parameters

Filling rate

Rate at which the cylinder is filled.

If the filling rate entered here is higher than the **Maximum rate** of the piston buret used that is defined under **Equipment ► Instruments ► Properties ► Fill port**, then the **Maximum rate** defined there will be used.

If **Maximum** is selected, then the **Maximum rate** from the **Equipment** work area will be used.

In addition, a check is made during execution as to whether the defined filling rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced.

If air bubbles occur during aspiration of the solution, then first check all the tubing connections. If a vacuum causes the air bubbles, then the air bubbles can be prevented by previously degassing the solution or by reducing the filling rate.

Input range: 0.01–300.00

Selection: **Maximum** (default value) (*Additional information*)

Unit: mL/min

Temperature measuring mode

Type of temperature measurement.

The temperature of the solution can either be defined manually or measured continuously with a temperature sensor.

- **Automatic** (default value): If a temperature sensor is connected, then the temperature will be measured continuously. Otherwise, the temperature defined under **Temperature** will be used.
- **Continuous**: Because the temperature is measured continuously, a temperature sensor must be connected. If no temperature sensor is connected, then the command cannot be executed.
- **Manual**: The temperature defined under **Temperature** is adopted as the measuring temperature.

Temperature

(only if **Automatic** or **Manual** is selected)

Defined temperature of the solution.

Input range: –20.0 to 150.0

Unit: °C

Default value: 25.0

Polarization current DC

(only for **MET Ipol**)

The Polarization current DC (Direct Current) is the current that is applied to the polarizable metal electrode (indicator electrode) during voltametric measurement.



Metrohm recommends observing increments of 0.50 µA.

Input range: –200.00 to 200.00

Unit: µA

Default value: 5.00

Titration parameters	
Polarization voltage DC (only for MET Upol)	The Polarization voltage DC (Direct Current) is the potential that is applied to the polarizable metal electrode (indicator electrode) during amperometric measurement.  Metrohm recommends maintaining increments of 25.0 mV. Input range: -2,000.0 to 2,000.0 Unit: mV Default value: 400.0
Electrode check (only for MET Ipol and MET Upol)	If the check box is activated, then the system checks within a few seconds whether an electrode is connected and whether a short circuit is present. The electrode check on the polarizable metal electrode (indicator electrode) is carried out during the transition from an inactive normal status to titration.
Stop conditions	
Stop volume	The titration is canceled as soon as the defined volume has been dosed during the time since the start of the titration (including start conditions). The volume must be adjusted to the size of the titration vessel to prevent it from overflowing. In addition, the stop volume should always be equal to or smaller than the cylinder volume of the piston buret used to avoid refilling during the titration. Off deactivates this stop condition. Input range: 0.00000–9'999.99000 Selection: Cylinder volume (default value), Off Unit: mL
Stop measured value (only for MET U , MET Ipol , and MET Upol)	The titration is canceled as soon as it falls below or exceeds the defined measured value since the start of the titration. Exceeding or falling below the stop measured value is monitored on the basis of the titration direction which is defined using the stop measured value and the start measured value (or the initial measured value if the Start measured value is deactivated). Off deactivates this stop condition. Selection: Off (default value) Only for MET U and MET Ipol: Input range: –2,000.0 to 2,000.0 Unit: mV Only for MET Upol: Input range: –200.00 to 200.00 Unit: µA Only for MET pH: Input range: –20.000 to 20.000 Unit: None
Stop measured value pH (only for MET pH)	The titration is canceled as soon as it falls below or exceeds the defined measured value since the start of the titration. Exceeding or falling below the stop measured value is monitored on the basis of the titration direction which is defined using the stop measured value and the start measured value (or the initial measured value if the Start measured value is deactivated). Off deactivates this stop condition. Selection: Off (default value) Only for MET U and MET Ipol: Input range: –2,000.0 to 2,000.0 Unit: mV Only for MET Upol: Input range: –200.00 to 200.00 Unit: µA Only for MET pH: Input range: –20.000 to 20.000 Unit: None

Stop conditions

Stop EP

The titration is aborted as soon as the defined number of equivalence points (EP) has been evaluated according to the **EP criterion** parameter.

Off deactivates this stop condition.

Input range: 1–9

Selection: **Off** (default value)

Volume after EP

(only if a value is entered under **Stop EP**)

As soon as the number of equivalence points defined under **Stop EP** has been evaluated, the **Volume after EP** is added to the volume of the last equivalence point. The titration is canceled after dosing this total volume (volume up to EP + volume after EP).

Because determination of the equivalence point will in any event require titration in excess of the equivalence point, the end volume will then be greater than the equivalence point volume that leads to the action being canceled, even if **Volume after EP** is 0 mL.



This parameter was deactivated in previous Metrohm applications with **Off**, which now corresponds to the setting "0 mL".

Input range: 0.00000–9'999.99000

Unit: mL

Default value: 0.00000

Stop time

The titration is canceled as soon as the defined time span has elapsed since the determination start (including start conditions).

Off deactivates this stop condition.

Input range: 0–999,999

Selection: **Off** (default value)

Unit: s

Potentiometric evaluation

Additional information

Fixed point evaluation

Additional information

Diagram axes

Quantities

Selection of the specified quantity to be shown in the curve display on the corresponding axis.

- **Volume**
- **Time**
- **Temperature**

Only for **MET pH**:

- **pH**
- **dpH**

Only for **MET U**:

- **Potential**
- **dU**

Only for **MET Ipol**:

- **Potential**
- **dU**

Only for **MET Upol**:

- **Current**
- **dI**

 The quantities are present for all axes and differ only in the default values.

x-axis	Selection of the specified quantity to be shown in the curve display on the x-axis. Default value: Volume
y-axis	Selection of the specified quantity to be shown in the curve display on the first y-axis. Default value: Only for MET pH: pH Only for MET U: Potential Only for MET Ipol: Potential Only for MET Upol: Current
y2-axis	Optional display of a second y-axis in the curve display. The display of the y2-axis is deactivated by default.
y2-axis (only with activated y2-axis)	Selection of the specified quantity to be shown in the curve display on the second y-axis. Default value: Only for MET pH: dpH Only for MET U and MET Ipol: dU Only for MET Upol: dI

Curve simulation

Curve selection

Predefined curves can be created to simulate a possible determination run. The curve history is determined by the set parameters.

The following simulation curves can be selected:

- **None** (default value): The curve simulation is deactivated.
- **Hydrochloric acid**: Simulation curve of the titration of hydrochloric acid with caustic soda (titration curve with one equivalence point).
- **Citric acid**: Simulation curve of the titration of citric acid with caustic soda (titration curve with 3 equivalence points).



Before analyzing real samples, deactivate the curve simulation.

Execute with

In order for an **MET** command to be executed, the corresponding functional units need to be assigned to the command.

Additional information

4.1.2.1.1.2.3 MET – Run

The **MET** command is executed in 4 steps:

1 – Determining the initial measured value

The initial measured value (measured value before start of pre-dosing) is determined according to the parameters in the parameter group **Start conditions**, either drift-controlled or after a maximum waiting time has elapsed.

2 – Processing the start conditions

If a **Start volume** was defined under **Start conditions**, then it will be dosed before the actual start of the titration.

The start conditions are checked in the following order: **Start volume** → **Start measured value (pH)** → **Start slope (pH)**

The defined **Pause** time is then observed.

3 – Carrying out the titration

The titration is carried out and evaluated according to the parameters defined under **Titration parameters** and **Potentiometric evaluation**.

▪ Fixed point evaluation

Optionally, up to 9 fixed points can be defined under **Fixed point evaluation** that are calculated from the measuring point list during the titration.

▪ Diagram axes

Different sizes can be selected for the **x-axis** and the **y-axis**. Optionally, a **y2-axis** can be displayed.

4 – Exiting the titration

The titration is completed as usual as soon as the first stop condition defined in **Stop conditions** is reached.

 A running titration can be canceled by a manual cancellation or with the emergency stop or in case of an error.

4.1.2.1.1.3 SET – Overview

The following contents are available for the SET commands:

- SET – Principle
- SET – Properties
- SET – Run

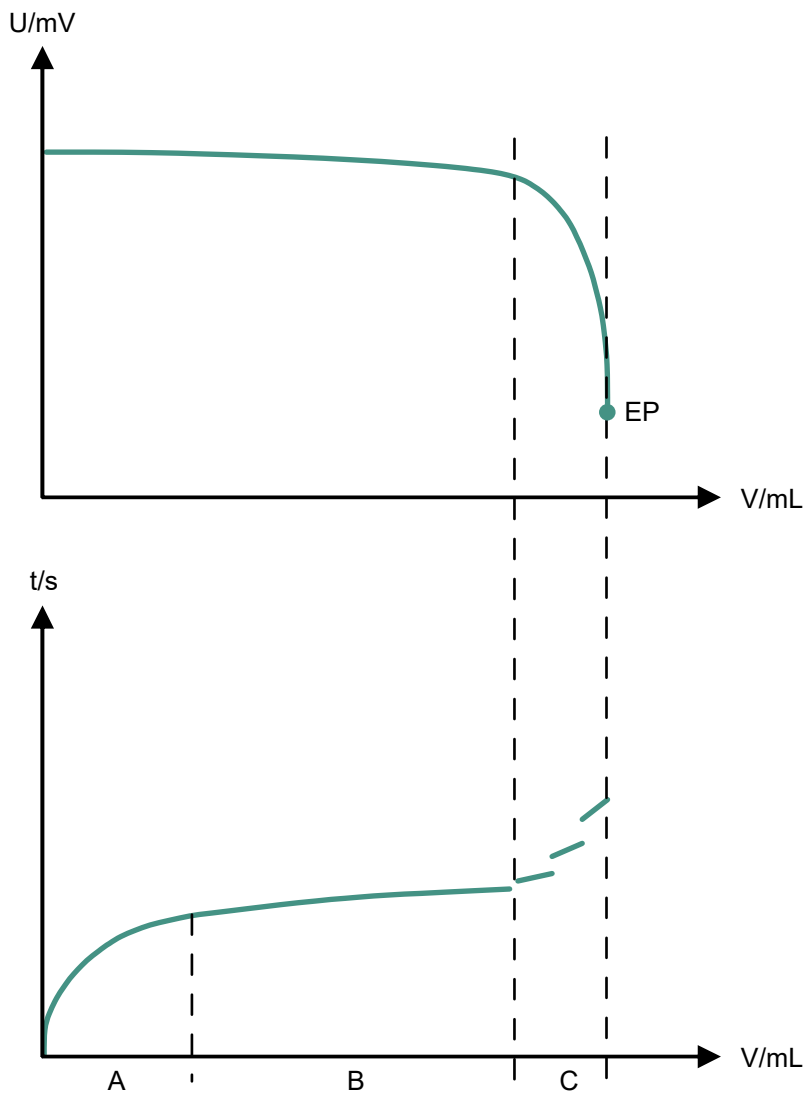
4.1.2.1.1.3.1 SET – Principle

Principle

The **SET** command is used to carry out titrations to a specified endpoint or to 2 specified endpoints. The titration is canceled at the endpoint, either drift-controlled or after a waiting time which can be defined. The volume that has been dosed up to the endpoint gives the calculable reagent consumption.

The reagent is added in 3 phases during the titration:

- **Initial dosing**
The dosing rate increases continuously during this phase. Initially, the dosing rate corresponds to the value of the **Minimum dosing rate** parameter. After that, the dosing rate is continuously increased until the value of the parameter **Maximum dosing rate** is reached.
- **Continuous dosing**
During this phase, dosing is continuous until the **Control range** is reached. The dosing rate corresponds to the value for **Maximum dosing rate**.
- **Control range**
The dosing rate is reduced as soon as the defined **Control range** is reached. The more the measured values approach the endpoint, the slower the dosing in the control range. Shortly before the endpoint is reached, only the value of the **Minimum dosing rate** parameter is dosed.



EP Endpoint

A Initial dosing

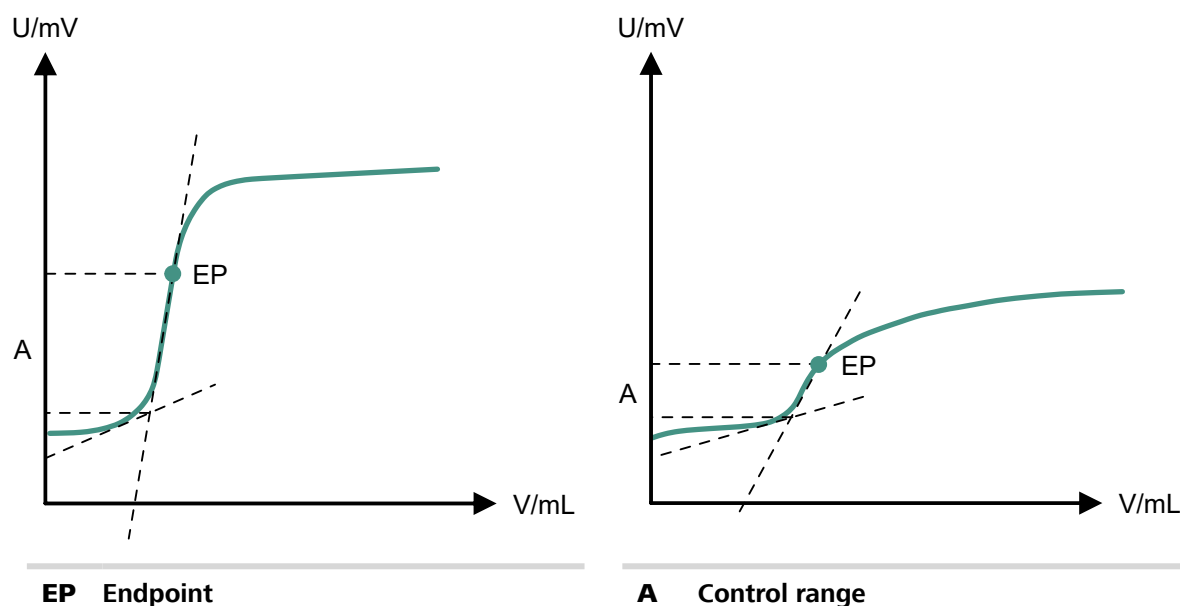
B Continuous dosing

C Control range

 This command can be used for rapid routine determinations where the endpoint does not change during a series or for titrations where an excess of reagent must be avoided.

Control range

Metrohm recommends setting a large control range for steep curves (example figure on the left) and a small control range for flatter curves (example figure on the right). A good approximation for the start of the control range is obtained at the intersection point of the tangents applied to the titration curve.



4.1.2.1.1.3.2 SET – Properties

Endpoint titrations can be carried out with the **SET** commands (**SET** = **S**et **E**ndpoint **T**itration).

Depending on the measured quantity required, the following commands can be selected:

- **SET U**
Endpoint titration with potentiometric voltage measurement (measured quantity: Potential U)
- **SET pH**
Endpoint titration with potentiometric pH measurement (measured quantity: pH)
- **SET Ipol**
Endpoint titration with voltametric voltage measurement with selectable polarization current (measured quantity: Potential U)
- **SET Upol**
Endpoint titration with amperometric measurement with selectable polarization voltage (measured quantity: current I)

After selecting a **SET** command, tapping on  opens the **Command properties** window (*Additional information*).

The following parameters are available for the **SET** commands:

Start conditions	
Measuring mode	Mode for the initial measured value adoption. ▪ Drift-controlled: The initial measured value is adopted by reaching one of the following criteria: – Signal drift initial measured value – Maximum waiting time ▪ Time-controlled (default value): The initial measured value is adopted by reaching the Measurement duration.

Start conditions

Signal drift initial measured value

(only if **Drift-controlled** is selected)

The signal drift of the initial measured value is adopted as soon as the defined signal drift has been fallen short of.

Only for **SET pH**, **SET U**, and **SET Ipol**:

Input range: 0.1–999.9

Unit: mV/min

Default value: 50.0

Only for **SET Upol**:

Input range: 0.01–99.99

Unit: µA/min

Default value: 50.00

Minimum waiting time

(only if **Drift-controlled** is selected)

The signal drift of the initial measured value is not adopted until after the minimum waiting time has expired, even if the signal drift has already been fallen short of previously.

Input range: 0–999,999

Unit: s

Default value: 0

Maximum waiting time

(only if **Drift-controlled** is selected)

The signal drift of the initial measured value is applied no later than after the maximum waiting time has elapsed, even if the signal drift has not yet been reached.

Input range: 0–999,999

Unit: s

Default value: 1

Measurement duration

(only if **Time-controlled** is selected)

The measurement is terminated as soon as the defined measurement duration is reached.

Input range: 0–999,999

Unit: s

Default value: 1

Start volume

Volume that is added before the start of the titration with the specified **Dosing rate start volume**.

The following stop conditions are checked while dosing the start volume:

- **Stop volume**
- **Stop time**

Input range: 0.00000–9'999.99000

Unit: mL

Default value: 0.00000

Start conditions

Dosing rate start volume

(only if a value is entered under **Start volume**)

Rate at which the start volume is dosed.

If the Dosing rate start volume entered here is higher than the **Maximum rate dosing port** of the piston buret used that is defined under **Equipment ► Instruments ► Properties ► Dosing port**, then the **Maximum rate dosing port** defined there will be used.

If **Maximum** is selected, then the **Maximum rate dosing port** from the **Equipment** work area will be used.

In addition, a check is made during execution as to whether the defined dosing rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced.

Input range: 0.01–300.00

Selection: **3 times the cylinder volume** (default value) (*Additional information*)

Unit: mL/min

Pause

Waiting time, e.g., for the measured value to stabilize after start or as reaction time after dosing a start volume. The pause begins as soon as all other start conditions have been processed.

Input range: 0–999,999

Unit: s

Default value: 0

Control parameters EP 1

Endpoint

(only for SET U, SET
Ipol, and SET Upol)

Measured value for the first endpoint.

Only for **SET U** and **SET Ipol**:

Input range: -2,000.0 to 2,000.0

Unit: mV

Default value: 0.0

Only for **SET Upol**:

Input range: -200.00 to 200.00

Unit: μA

Default value: 0.00

Only for **SET** pH:

Input range: -20.000 to 20.000

Unit: None

Default value: 0.000

Control parameters EP 1

Titration rate

The titration rate can either be determined via 3 predefined parameter sets or the values for the parameters can be defined individually.

- **Slow:** Parameter set for titrations for which even the finest details are to be visible. This can, however, lead to an increase in noise, which may result in unwanted endpoints.
- **Optimal** (default value): Optimized parameter set for standard titrations.
- **Fast:** Parameter set for not very critical titrations.
- **Enter values:** The values for the titration parameters must be defined individually. The default values of the predefined parameter set that was last selected are stored in the parameters.

If a predefined parameter set is selected for the titration rate, then the following parameters cannot be edited:

- **Control range** or **Control range pH**
- **Maximum dosing rate**
- **Minimum dosing rate**

Control range

(only for **SET U**, **SET Ipol**, and **SET Upol**)

Control range pH

(only for **SET pH**)

In the control range, the rate of the titrant dosing is controlled using the difference between the predefined endpoint and the current measured value. This means that titration to the endpoint is slower in the control range.

Outside the control range, the dosing rate is continuously increased until the maximum dosing rate is reached.

With **Unlimited**, the entire measuring range is considered as **Control range**.



The **Unlimited** setting is identical to the **Off** setting in previous Metrohm applications.

This parameter influences the accuracy with which the endpoint is reached. The larger the control range, the longer the titration will take, but the more accurately the endpoint will be approached.

The control range can be reduced if accuracy has a subordinated role and titration should be carried out faster.

Selection: **Unlimited**

Only for **SET U** and **SET Ipol**:

Input range: 0.1–2,000.0

Unit: mV

Only for **SET Upol**:

Input range: 0.01–200.00

Unit: µA

Only for **SET pH**:

Input range: 0.001–20.000

Unit: None

Control parameters EP 1

Maximum dosing rate	Maximum dosing rate of acceleration outside the control range. Depending on the measured value change, there is a possibility that the maximum dosing rate will never be reached. If the Maximum dosing rate entered here is higher than the Maximum rate dosing port of the piston buret used that is defined under Equipment ► Instruments ► Properties ► Dosing port, then the Maximum rate dosing port defined there will be used. If Maximum is selected, then the Maximum rate dosing port from the Equipment work area will be used. In addition, a check is made during execution as to whether the defined dosing rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced. Input range: 0.01–300.00 Selection: 3 times the cylinder volume <i>(Additional information)</i> Unit: mL/min
Minimum dosing rate	Rate at which dosing is carried out at the very beginning of the titration and in the control range at the end of the titration. The smaller this dosing rate, the slower the titration and the higher the accuracy. Input range: 0.01–9,999.99 Unit: µL/min
Stop criterion	Once the first endpoint has been reached, the procedure pauses after the final dosing while awaiting the selected stop criterion to be reached. After this, the endpoint is considered to have been reached. If a second endpoint is defined, then titration will continue until this endpoint is reached, otherwise the titration is ended. The following stop criteria can be selected: ▪ Stop drift (default value) ▪ Delay time ▪ Off: The titration is canceled only by the stop conditions. No endpoint data is saved as raw data.
Stop drift (only if Stop drift is selected)	The endpoint is applied once the first endpoint has been reached and the volume drift falls below the defined stop drift. If a second endpoint is defined, then titration will continue until this endpoint is reached, otherwise the titration is ended. Input range: 1–999 Unit: µL/min Default value: 20
Delay time (only if Delay time is selected)	The endpoint is applied once the first endpoint has been reached and the defined delay time has passed. If a second endpoint is defined, then titration will continue until this endpoint is reached, otherwise the titration is ended. Input range: 0–999 Unit: s Default value: 10

Control parameters EP 2

Endpoint

Measured value for the second endpoint.

(only for **SET U**, **SET Ipol**,
and **SET Upol**)

With **Off**, no further titration to EP 2 will be carried out.

Selection: **Off** (default value)

Endpoint pH

Only for **SET U** and **SET Ipol**:

(only for **SET pH**)

Input range: –2,000.0 to 2,000.0

Unit: mV

Only for **SET Upol**:

Input range: –200.00 to 200.00

Unit: µA

Only for **SET pH**:

Input range: –20.000 to 20.000

Unit: None

Titration rate

The titration rate can either be determined using 3 predefined parameter sets, or the values for the titration parameters can be defined individually.

- **Slow**: Parameter set for titrations for which even the finest details are to be visible. This can, however, lead to an increase in noise, which may result in unwanted endpoints.
- **Optimal** (default value): Optimized parameter set for standard titrations.
- **Fast**: Parameter set for not very critical titrations.
- **Enter values**: The values for the titration parameters must be defined individually. The default values of the predefined parameter set that was last selected are stored in the parameters.

If a predefined parameter set is selected for the titration rate, then the following parameters cannot be edited:

- **Control range** or **Control range pH**
- **Maximum dosing rate**
- **Minimum dosing rate**

Control parameters EP 2

Control range

(only for SET U, SET Ipol, and SET Upol)

In the control range, the rate of the titrant dosing is controlled using the difference between the predefined endpoint and the current measured value. This means that titration to the endpoint is slower in the control range.

Control range pH

(only for **SET pH**)

Outside the control range, the dosing rate is continuously increased until the maximum dosing rate is reached.

With **Unlimited**, the entire measuring range is considered as **Control range**.



The **Unlimited** setting is identical to the **Off** setting in previous Metrohm applications.

This parameter influences the accuracy with which the endpoint is reached. The larger the control range, the longer the titration will take, but the more accurately the endpoint will be approached.

The control range can be reduced if accuracy has a subordinated role and titration should be carried out faster.

Selection: **Unlimited**

Only for **SET U** and **SET Ipol**:

Input range: 0.1–2,000.0

Unit: mV

Only for **SET Upol**:

Input range: 0.01–200.00

Unit: μA

Only for **SET** pH:

Input range: 0.001–20.000

Unit: None

Maximum dosing rate

Maximum dosing rate of acceleration outside the control range. Depending on the measured value change, there is a possibility that the maximum dosing rate will never be reached.

If the Maximum dosing rate entered here is higher than the **Maximum rate dosing port** of the piston buret used that is defined under **Equipment ► Instruments ► Properties ► Dosing port**, then the **Maximum rate dosing port** defined there will be used.

If **Maximum** is selected, then the **Maximum rate dosing port** from the **Equipment** work area will be used.

In addition, a check is made during execution as to whether the defined dosing rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced.

Input range: 0.01–300.00

Selection: **3 times the cylinder volume** (*Additional information*)

Unit: mL/min

Control parameters EP 2

Minimum dosing rate	Rate at which dosing is carried out at the very beginning of the titration and in the control range at the end of the titration. The smaller this dosing rate, the slower the titration and the higher the accuracy. Input range: 0.01–9,999.99 Unit: $\mu\text{L}/\text{min}$
Stop criterion	Once the second endpoint has been reached, the procedure pauses after the final dosing while awaiting the selected stop criterion to be reached. After this, the endpoint is considered to have been reached and the titration is stopped. The following stop criteria can be selected: ▪ Stop drift (default value) ▪ Delay time ▪ Off: The titration is canceled only by the stop conditions. No endpoint data is saved as raw data.
Stop drift (only if Stop drift is selected)	Once the second endpoint has been reached and the volume drift falls below the defined Stop drift, the end point is applied and the titration is ended. Input range: 1–999 Unit: $\mu\text{L}/\text{min}$ Default value: 20
Delay time (only if Delay time is selected)	Once the second endpoint has been reached and the selected Delay time has passed, the endpoint is applied and the titration is ended. Input range: 0–999 Unit: s Default value: 10

Titration parameters

Titration direction	Selection of the titration direction. If only one endpoint has been defined, the following applies: ▪ Positive: In the direction of positive measured value change ▪ Negative: In the direction of negative measured value change ▪ Automatic (default value): The titration direction is calculated with the initial measured value and the set endpoint. If 2 endpoints have been set, then the titration direction has already been defined and the selected titration direction is ignored. Metrohm recommends specifying the titration direction. If the effective titration direction does not correspond to the one specified, then a message will be displayed indicating the specified titration direction.
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Titration parameters	
Extraction time	During the extraction time, no endpoint is recognized and the titration is not ended, even if the endpoint has already been reached and the stop criterion was already fulfilled earlier. The extraction time starts from the moment all start conditions have been processed.  The entry of an extraction time is advisable, e.g., for the titration of samples of low solubility. Input range: 0–999,999 Unit: s Default value: 0
Temperature measuring mode	Type of temperature measurement. The temperature of the solution can either be defined manually or measured continuously with a temperature sensor. ▪ Automatic (default value): If a temperature sensor is connected, then the temperature will be measured continuously. Otherwise, the temperature manually defined under Temperature will be used. ▪ Continuous: Since the temperature is to be measured continuously, a temperature sensor must be connected. If no temperature sensor is connected, then the command cannot be executed. ▪ Manual: The temperature defined under Temperature is adopted as the measuring temperature.
Temperature (only if Automatic or Manual is selected)	Defined temperature of the solution. Input range: –20.0 to 150.0 Unit: °C Default value: 25.0
Time interval measuring point	Time interval for entering a measuring point into the measuring point list. A measuring point is always entered at the end of the titration, even if the time interval is not observed. Input range: 0.1–999,999.9 Unit: s Default value: 2.0

Titration parameters

Polarization current DC

(only for **SET Ipol**)

The Polarization current DC (Direct Current) is the current that is applied to the indicator electrode (polarizable metal electrode) during voltametric measurement.

The **Endpoint** and **Control range** parameters may need to be adjusted when the polarization current is changed.



Metrohm recommends observing increments of 0.50 μA .

Input range: –200.00 to 200.00

Unit: μA

Default value: 5.00

Polarization voltage DC

(only for **SET Upol**)

The Polarization voltage DC (Direct Current) is the potential that is applied to the polarizable metal electrode (indicator electrode) during amperometric measurement.

The **Endpoint** and **Control range** parameters may need to be adjusted when the polarization voltage is changed.



Metrohm recommends maintaining increments of 25.0 mV.

Input range: –2,000.0 to 2,000.0

Unit: mV

Default value: 400.0

Electrode check

(only for **SET Ipol** and **SET Upol**)

If the check box is activated, then the system checks within a few seconds whether an electrode is connected and whether a short circuit is present.

The electrode check is carried out for indicator electrodes (polarizable electrodes) during the transition from an inactive normal status to the titration.

Filling rate

Rate at which the cylinder is filled.

If the filling rate entered here is higher than the **Maximum rate** of the piston buret used that is defined under **Equipment ► Instruments ► Properties ► Fill port**, then the **Maximum rate** defined there will be used.

If **Maximum** is selected, then the **Maximum rate** from the **Equipment** work area will be used.

In addition, a check is made during execution as to whether the defined filling rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced.

If air bubbles occur during aspiration of the solution, then first check all the tubing connections. If a vacuum causes the air bubbles, then the air bubbles can be prevented by previously degassing the solution or by reducing the filling rate.

Input range: 0.01–300.00

Selection: **Maximum** (default value) (*Additional information*)

Unit: mL/min

Stop conditions

Stop volume

The titration is canceled as soon as the defined volume has been dosed during the time since the start of the titration (including start conditions). The volume must be adjusted to the size of the titration cell to prevent any overflow.

In addition, the stop volume should always be equal to or smaller than the cylinder volume of the piston buret used to avoid refilling during the titration.

Off deactivates this stop condition.

Input range: 0.00000–9'999.99000

Selection: **Cylinder volume** (default value), **Off**

Unit: mL

Stop time

The titration is canceled as soon as the defined time has elapsed since the determination start (including start conditions).

Off deactivates this stop condition.

Input range: 0–999,999

Selection: **Off** (default value)

Unit: s

Fixed point evaluation

Additional information

Diagram axes

Quantities

Selection of the specified quantity to be shown in the curve display on the corresponding axis:

- Time
- Volume
- Drift
- Temperature

Only for **SET pH**:

- pH

Only for **SET U**:

- **Potential**

Only for **SET Ipol**:

- **Potential**

Only for **SET Upol**:

- **Current**

 The quantities are present for all axes and differ only in the default values.

x-axis

Selection of the specified quantity to be shown in the curve display on the x-axis.

Default value: **Time**

Diagram axes

y-axis	Selection of the specified quantity to be shown in the curve display on the first y-axis. Default value: Volume
y2-axis	Optional display of a second y-axis in the curve display. The display of the y2-axis is deactivated by default.
y2-axis (only with activated y2-axis)	Selection of the specified quantity to be shown in the curve display on the second y-axis. Default value: Only for SET pH: pH Only for SET U: Potential Only for SET Ipol: Potential Only for SET Upol: Current

Curve simulation

Curve selection	Predefined curves can be created to simulate a possible determination run. The curve history is determined by the set parameters. The following simulation curves can be selected: ▪ None (default value): The curve simulation is deactivated. ▪ Hydrochloric acid: Simulation curve of the titration of hydrochloric acid with caustic soda (titration curve with one equivalence point). ▪ Citric acid: Simulation curve of the titration of citric acid with caustic soda (titration curve with 3 equivalence points).
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Before analyzing real samples, deactivate the curve simulation.

Execute with

In order for a **SET** command to be executed, the corresponding functional units need to be assigned to the command.

Additional information

4.1.2.1.1.3.3 SET – Run

The **SET** command is executed in 4 steps:

1 – Determining the initial measured value

The initial measured value (measured value before start of pre-dosing) is determined according to the parameters in the parameter group **Start conditions**, either drift-controlled or after a maximum waiting time has elapsed.

2 – Processing the start conditions

If a **Start volume** was defined under **Start conditions**, then it will be dosed before the actual start of the titration. The defined **Pause** time is then observed.

First the **COND ON** command and then the **COND CHECK** command must be inserted in the method. The **COND ON** and **COND CHECK** commands used must be referenced in the command properties of the **KFT** command.

The criteria for determining when the titration cell is to be considered conditioned (i. e., ready for water content determination) are defined in the **KFT** command in the command properties (**Start drift**, **Stabilizing time**) (*Additional information*).

The transition from conditioning to titration is defined in the **KFT** command under **Titration start**.

After conditioning, the titration is carried out as defined in the titration command parameters.

Reconditioning

If the titration cell is to be conditioned further after completing the titration, then another a **COND ON** command must be inserted again in the process sequence after the **KFT** command. This ensures that the titration cell is further conditioned, even without a running determination.

Reconditioning can either be stopped in the manual control of the IONIC Titrator, or be stopped automatically by the system as soon as a new determination is started in which conditioning is to be performed using the same functional units. Alternatively, reconditioning can be stopped using the emergency stop.

The conditioning status is displayed in the manual control of the IONIC Titrator (e.g. **Conditioning OK** or **Conditioning not OK**) (*Additional information*).

4.1.2.1.1.4.2 Karl Fischer titration volumetric (KFT) – Principle

The Karl Fischer titration is a procedure for water content determination.

When an aqueous sample is titrated with iodine in the presence of sulfur dioxide in a buffered, alcoholic solution, then several reactions take place that can be summarized in the following sum equation:



According to the equation above, iodine (I_2) reacts quantitatively with water (H_2O).

This chemical equation serves as a basis for the water content determination.

Free as well as bound water can be determined using KF titration.

The water content determination is carried out quickly and quantitatively in water-free solvents.

The KF titration can either be drift-controlled after reaching the endpoint or ended after a definable delay time. The water content of the subsample is calculated from the volume consumption of the Karl Fischer titrant until the endpoint is reached.

When executing a volumetric Karl Fischer titration, an alcoholic solution of iodine, sulfur dioxide, and a base as buffer substance is used.

For the **KFT Ipol** command, the endpoint indication occurs voltametrically by applying a constant direct current to the polarizable metal electrode (double Pt electrode). This results in a potential difference at the double Pt electrode. The potential difference decreases drastically as soon as

even the slightest amounts of free iodine are present. This circumstance is used for detecting the endpoint of the titration.

For the **KFT Upol** command, the endpoint indication occurs amperometrically by applying a constant potential to the polarizable metal electrode (double Pt electrode). The flowing measuring current increases significantly as soon as even the slightest amounts of free iodine are present. This current increase is used to determine the endpoint of the titration.

Volumetry offers the option of introducing solid or pasty samples directly into the titration cell, provided that they are soluble in the KF reagent. To achieve this, the solution properties of the KF reagent can be adjusted to the sample using a multitude of suitable organic solvents. Since the volumetric KF reagents are not titration-stable, accurate results require regular titer determination of the titrant.

2 different types of KF reagents can be used:

- 1-component reagents

The titrant contains all the reactants required for the KF reaction. The most commonly used solvent is dry methanol.

Advantage: Greatest flexibility when selecting a sample-specific solvent. The required solvent is selected according to the characteristics regarding chemical properties and solubility of the subsample substance to be analyzed. Unlimited water capacity.

Disadvantage: Lacking titer stability, i.e., the titer continuously needs to be redetermined.

- 2-component reagents

They consist of the titrant (iodine dissolved in alcohol in an accurately defined concentration) and the optimally buffered solvent (an alcoholic solution containing sulfur dioxide and imidazole).

Advantage: Greater titer stability and high titration rate.

Disadvantage: Limited buffer capacity and limited sulfur dioxide content of the solvent.

Prerequisites for KF titration

- The titration cell must be leakproof. As little moisture as possible should penetrate the titration cell from the ambient air.
- The iodine must be able to be dosed accurately.
- No side reactions of the sample with the KF reagents may take place in the titration cell.

Control during volumetric KF titration

During titration, reagent dosing is controlled in such a way that the predefined endpoint is reached as quickly and precisely as possible.

The reagent volume dosed to the endpoint corresponds to the reagent consumption from which the water content of the sample can be calculated.

The volume steps and the rate of the reagent dosing are determined using the difference between the current measured value and the predefined endpoint. This means that titration is slower and that smaller volumes are added in the control range.

The reagent is added in 3 phases during the titration:

- **Initial dosing (A)**
As long as the **Control range** is not reached, the dosing rate is continually increased until the **Maximum dosing rate** is reached.
- **Continuous dosing (B)**
During this phase, dosing is carried out continuously at the maximum dosing rate until the **Control range** is reached.
- **Control range (C)**
The closer the measured value is to the endpoint (**EP**), the slower the dosing in the **Control range**. Shortly before the endpoint (**EP**) is reached, dosing is carried out only with the **Minimum volume increment** parameter.

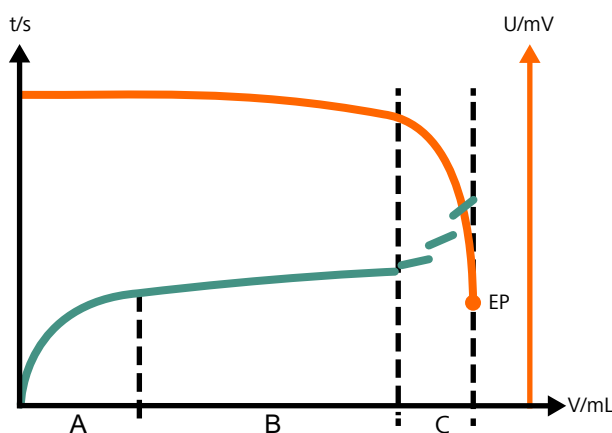


Figure 9 Control curve during a volumetric KF titration

A Initial dosing

B Continuous dosing

C Control range

EP Endpoint

4.1.2.1.1.4.3 KFT – Properties

Water content determinations can be carried out on the basis of an endpoint titration with the **KFT** commands (**KFT** = volumetric **K**arl **F**ischer **t**itration).

Depending on the measured quantity required, the following commands can be selected:

- **KFT Ipol**
Endpoint titration with voltametric measurement with selectable polarization current (measured quantity: Potential U)
- **KFT Upol**
Endpoint titration with amperometric measurement with selectable polarization voltage (measured quantity: current I)

After selecting a **KFT** command, tapping on  opens the **Command properties** window ([Additional information](#)).

 The **Conditioning parameters** are only effective if the Karl Fischer titration is carried out with conditioning. The commands **COND ON** and **COND CHECK** must be present in the process sequence before the **KFT** command for this purpose.

The following parameters are available for the **KFT** commands:

Conditioning parameters	
Conditioning	Optional execution of the titration with conditioning. The following parameters appear only when conditioning is activated.
Referenced COND ON command	Selection of the COND ON command to be referenced with which conditioning is started for endpoint titrations.
Referenced COND CHECK command	Selection of the COND CHECK command to be referenced with which conditioning is monitored according to the set conditioning parameters. When executing the COND CHECK command, the measured values, the drift stability, the conditioning status, and the curve are displayed in the Live display work area.
Start drift	The start drift corresponds to the threshold value that the volume drift needs to be below during the entire stabilization time so that the Conditioning OK status is reached. The threshold value must be adjusted to the titrant used and to the humidity conditions of the environment. Input range: 1–999 Unit: µL/min Default value: 20
Stabilizing time	The stabilizing time starts as soon as the volume drift falls below the start drift. If the volume drift has fallen below the start drift during the entire stabilizing time, then Conditioning OK status will be reached after the stabilizing time has expired. As soon as the volume drift once again exceeds the start drift during the stabilizing time, the stabilizing time will be re-initialized. Metrohm recommends setting a value of at least 3 s for the stabilizing time for the Recognition of sample addition function. If an extraction method with oven is used for the water content determination, then Metrohm recommends increasing the value to at least 10 s. Input range: 0–999 Unit: s Default value: 2

Conditioning parameters

Titration start

▪ Recognition of sample addition:

The start of the titration due to the detection of sample addition is suitable for samples that can be added quickly into the titration cell.

If the function is activated, then the **Threshold value** parameter will appear.

As soon as the defined threshold value is exceeded in the **Conditioning OK** status, the sample addition will be detected and the titration will be started automatically.

In order to obtain correct results when working with the detection of the sample addition, the following prerequisites must be fulfilled:

- The electrode and the tubing tip must be positioned correctly, as described in the *IONIC Titrator manual (8.1040.8101)* under *Equipping the volumetric Karl Fischer titration cell*.
- The sample in the KF titration cell must be well-mixed with the KF reagent. The stirring rate may need to be adjusted for this purpose.
- The stirring direction must be set counterclockwise.
- If the function is enabled, then the **Correction with volume drift** must not be set to **Automatic**.

▪ Acceptance by user (default value):

The titration of the respective subsample must be started manually in the **Live display** work area by tapping on **[Start]**.

Threshold value

(only if **Recognition of sample addition** is selected)

The volume drift must have exceeded the threshold value within approx. 0.4 s in order for the conditioning to stop automatically and for the process sequence to continue out of the **Conditioning OK** status due to the activated **Recognition of sample addition** function.

Input range: 1–9,999

Unit: µL/min

Default value: 800

Correction with volume drift

This parameter indicates how the correction of the endpoint volume is to be carried out using a volume drift. The use of the **Correction with volume drift** is displayed in the **Raw data**.

The following options are available for selection:

- **Off** (default value): No correction of the endpoint volume.
- **Automatic**: The correction volume is calculated from the volume drift at the end of conditioning and the titration duration. This option must **not** be used together with the **Recognition of sample addition** function.
- **Manual**: The correction volume is calculated from the **Volume drift** parameter and the titration duration.

Conditioning parameters	
Volume drift (only if Manual is selected)	Metrohm recommends determining the value of the volume drift in advance with a blind titration over several minutes with the equipment used.  The influx of humidity can cause a volume drift of up to 20 µL/min, even with leakproof titration cells. Input range: 0.0–99 Unit: µL/min Default value: 0
Conditioning stop volume	If the Conditioning stop volume is reached during conditioning, then the determination will be canceled with a message due to the highly likely probability that there is a problem. The Conditioning stop volume should be adjusted to the volume of the titration cell in order to prevent any overflow. As soon as the Cylinder volume option is selected, the cylinder volume stored in the Equipment work area will be automatically defined as Conditioning stop volume. Input range: 0.00000–9'999.99000 Selection: Cylinder volume (default value), Off Unit: mL
Conditioning stop time	If the Conditioning stop time is reached during conditioning, then the determination will be canceled with a message due to the highly likely probability that there is a problem. Input range: 0–999,999 Selection: Off (default value) Unit: s
Duration of meas. value recording	Time period of the measured value recording during conditioning. Entering the Duration of meas. value recording causes the respectively set time period in the past to be displayed and saved at the end of the conditioning in both the curve and the measuring point list. Input range: 0–600 Unit: s Default value: 60
Reconditioning	Optional execution of the titration with reconditioning.
Referenced COND ON command (only with activated Reconditioning)	Selection of the COND ON command to be referenced with which reconditioning is started for endpoint titrations. To use the COND ON command, the COND ON command must be added to the method after the titration command (<i>Additional information</i>).

Start conditions

Measuring mode	Mode for the initial measured value adoption. ▪ Drift-controlled: The initial measured value is adopted when one of the following criteria is reached: – Signal drift initial measured value – Maximum waiting time ▪ Time-controlled (default value): The initial measured value is adopted by reaching the Measurement duration.
Signal drift initial measured value (only if Drift-controlled is selected)	The signal drift of the initial measured value is adopted as soon as the defined signal drift has been fallen short of. Only for KFT Ipol: Input range: 0.1–999.9 Unit: mV/min Default value: 50.0 Only for KFT Upol: Input range: 0.01–99.99 Unit: µA/min Default value: 50.00
Minimum waiting time (only if Drift-controlled is selected)	The signal drift of the initial measured value is not adopted until after the minimum waiting time has expired, even if the signal drift has already been fallen short of previously. Input range: 0–999,999 Unit: s Default value: 0
Maximum waiting time (only if Drift-controlled is selected)	The signal drift of the initial measured value is applied no later than after the maximum waiting time has elapsed, even if the signal drift has not yet been reached. Input range: 0–999,999 Unit: s Default value: 1
Measurement duration (only if Time-controlled is selected)	The measurement is completed as soon as the defined time span has elapsed. Input range: 0–999,999 Unit: s Default value: 1

Start conditions

Start volume

Volume that is added before the start of the titration with the specified **Dosing rate start volume**.

The following stop conditions are checked while dosing the start volume:

- Stop volume
- Stop time

Input range: 0.00000–9'999.99000

Unit: mL

Default value: 0.00000

Dosing rate start volume

(only if a value is entered under **Start volume**)

Rate at which the start volume is dosed.

If the Dosing rate start volume entered here is higher than the **Maximum rate dosing port** of the piston buret used that is defined under **Equipment ► Instruments ► Properties ► Dosing port**, then the **Maximum rate dosing port** defined there will be used.

If **Maximum** is selected, then the **Maximum rate dosing port** from the **Equipment** work area will be used.

In addition, a check is made during execution as to whether the defined dosing rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced.

Input range: 0.01–300.00

Selection: **3 times the cylinder volume** (default value) (*Additional information*)

Unit: mL/min

Pause

Waiting time, e.g., for the measured value to stabilize after start or as reaction time after dosing a start volume. The pause begins as soon as all other start conditions have been processed.

Input range: 0–999,999

Unit: s

Default value: 0

Control parameters EP

Endpoint

Measured value for the endpoint.

Only for **KFT Ipol**:

Input range: -2,000.0 to 2,000.0

Unit: mV

Default value: 250.0

Only for **KFT Upol**:

Input range: -200.00 to 200.00

Unit: μA

Default value: 25.00

Control parameters EP

Titration rate

The titration rate can either be determined via 4 predefined parameter sets or the values for the parameters can be defined individually.

- **Slow:** Parameter set for titrations for which even the finest details are to be visible. This can, however, lead to an increase in noise, which may result in an unwanted endpoint.
- **Optimal 1-component reagents** (default value): Parameter set that has been optimized for the most common applications with 1-component reagents.
- **Optimal 2-component reagents:** Parameter set that has been optimized for the most common applications with 2-component reagents.
- **Fast:** Parameter set for not very critical titrations.
- **Enter values:** The values for the titration parameters must be defined individually. The default values of the predefined parameter set that was last selected are stored in the parameters.

If a predefined parameter set is selected for the titration rate, then the following parameters cannot be edited:

- **Control range**
- **Maximum dosing rate**
- **Minimum volume increment**



When using reagents with low methanol, Metrohm recommends using **Titration rate Optimal 2-component reagents** and entering a value of 20.00 μA in the **Polarization current DC** parameter.

Control parameters EP

Control range

The volume steps and the rate of the reagent dosing are controlled using the difference between the current measured value and the predefined endpoint. This means that titration is slower and that smaller volumes are added in the control range (influenced by **Minimum volume increment**).

Outside the control range, the dosing rate is continuously increased until the maximum dosing rate is reached.

With **Unlimited**, the entire measuring range is considered as the control range.

 The **Unlimited** setting is identical to the **Off** setting in previous Metrohm applications.

This parameter influences the accuracy with which the endpoint is reached. The larger the control range, the longer the titration will take, but the more accurately the endpoint will be approached.

The control range can be reduced if accuracy has a subordinated role and titration should be carried out faster.

Selection: **Unlimited**

Only for **KFT Ipol**:

Input range: 0.1–2,000.0

Unit: mV

Only for **KFT Upol**:

Input range: 0.01–200.00

Unit: μA

Maximum dosing rate

Maximum dosing rate of acceleration outside the control range. Depending on the measured value change, there is a possibility that the maximum dosing rate will never be reached.

If the dosing rate entered here is higher than the **Maximum rate dosing port** of the piston buret used that is defined under **Equipment ► Instruments ► Properties ► Dosing port**, then the **Maximum rate dosing port** defined there will be used.

If **Maximum** is selected, then the **Maximum rate dosing port** from the **Equipment** work area will be used.

In addition, a check is made during execution as to whether the defined dosing rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced.

Input range: 0.01–300.00

Selection: **3 times the cylinder volume** (*Additional information*)

Unit: mL/min

Control parameters EP

Minimum volume increment

Volume increment that is used for dosing at the beginning of the titration and in the control range at the end of the titration.

The smaller the selected increment, the slower the titration and the higher the accuracy.

Input range: 0.1–9.9

Unit: μL

Stop criterion

Once the specified endpoint has been reached, the procedure pauses after the final dosing while awaiting the selected stop criterion to be reached. The endpoint is applied and the titration is stopped. The following stop criteria can be selected:

- **Stop drift** (default value)
- **Relative stop drift**
- **Delay time**
- **Off**: The titration is canceled only by the stop conditions. No endpoint data is saved as raw data.

Stop drift

(only if **Stop drift** is selected)

Once the defined endpoint has been reached and the volume drift falls below the defined stop drift, the endpoint is applied and the titration is finished.

Input range: 1–999

Unit: $\mu\text{L}/\text{min}$

Default value: 20

Relative stop drift

(only if **Relative stop drift** is selected)

Once the defined endpoint has been reached and the volume drift is lower than the value from the sum of volume drift at the start of the titration and **Relative stop drift**, the endpoint is applied and the titration is finished.

Input range: 1–999

Unit: $\mu\text{L}/\text{min}$

Default value: 10

Delay time

(only if **Delay time** is selected)

Once the specified endpoint has been reached and the selected delay time has passed, the endpoint is applied and the titration is finished.

Input range: 0–999

Unit: s

Default value: 10

Titration parameters

Titration direction

Selection of the titration direction.

- **Positive** (default value for **KFT Upol**): In the direction of positive measured value change
- **Negative** (default value for **KFT Ipol**): In the direction of negative measured value change
- **Automatic**: The titration direction is calculated with the initial measured value and the set endpoint.

Metrohm recommends specifying the titration direction. If the effective titration direction does not correspond to the one specified, then a message will be displayed indicating the specified titration direction.

Extraction time

During the extraction time, no endpoint is recognized and the titration is not ended, even if the endpoint has already been reached and the stop criterion was already fulfilled earlier. The extraction time starts from the moment all start conditions have been processed.



It is advisable to enter an extraction time, e.g., for the titration of samples of low solubility or when performing an external extraction with KF oven.

Input range: 0–999,999

Unit: s

Default value: 0

Temperature measuring mode

Type of temperature measurement.

The temperature of the solution can either be defined manually or measured continuously with a temperature sensor.

- **Automatic** (default value): If a temperature sensor is connected, then the temperature will be measured continuously. Otherwise, the temperature manually defined under **Temperature** will be used.
- **Continuous**: Since the temperature is to be measured continuously, a temperature sensor must be connected. If no temperature sensor is connected, then the command cannot be executed.
- **Manual**: The temperature defined under **Temperature** is adopted as the measuring temperature.

Temperature

Defined temperature of the solution.

(only if **Automatic** or **Manual** is selected)

Input range: -20.0 to 150.0

Unit: °C

Default value: 25.0

Time interval measuring point

Time interval for entering a measuring point into the measuring point list. A measuring point is always entered at the end of the titration, even if the time interval is not observed.

Input range: 0.1–999,999.9

Unit: s

Default value: 2.0

Titration parameters

Polarization current DC

(only for **KFT Ipol**)

The Polarization current DC (Direct Current) is the current that is applied to the indicator electrode (polarizable metal electrode) during voltametric measurement.

The **Endpoint** and **Control range** parameters may need to be adjusted when the polarization current is changed.



Metrohm recommends observing increments of 0.50 μA .

Input range: -200.00 to 200.00

Unit: μA

Default value: 50.00

Polarization voltage DC

(only for **KFT Upol**)

The Polarization voltage DC (Direct Current) is the potential that is applied to the polarizable metal electrode (indicator electrode) during amperometric measurement.

The **Endpoint** and **Control range** parameters may need to be adjusted when the polarization voltage is changed.



Metrohm recommends maintaining increments of 25.0 mV.

Input range: -2,000.0 to 2,000.0

Unit: mV

Default value: 400.0

Electrode check

If the check box is activated, then the system checks within a few seconds whether an electrode is connected and whether a short circuit is present.

The electrode check on the indicator electrode (polarizable metal electrode) is carried out for the following titrations:

- For titrations with activated conditioning, only during the transition from inactive normal status to conditioning (i.e., only at the start of conditioning)
- For titrations without activated conditioning, during the transition from inactive normal status to titration

Titration parameters

Filling rate

Rate at which the cylinder is filled.

If the filling rate entered here is higher than the **Maximum rate** of the piston buret used that is defined under **Equipment ► Instruments ► Properties ► Fill port**, then the **Maximum rate** defined there will be used.

If **Maximum** is selected, then the **Maximum rate** from the **Equipment** work area will be used.

In addition, a check is made during execution as to whether the defined filling rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced.

If air bubbles occur during aspiration of the solution, then first check all the tubing connections. If a vacuum causes the air bubbles, then the air bubbles can be prevented by previously degassing the solution or by reducing the filling rate.

Input range: 0.01–300.00

Selection: **Maximum** (default value) ([Additional information](#))

Unit: mL/min

Stop conditions

Stop volume

The titration is canceled as soon as the defined volume has been dosed during the time since the start of the titration (including start conditions). The volume must be adjusted to the size of the titration cell to prevent any overflow.

In addition, the stop volume should always be smaller than the cylinder volume of the piston buret used, in order to avoid refilling during the titration.

Off deactivates this stop condition.

Input range: 0.00000–9'999.99000

Selection: **Cylinder volume** (default value), **Off**

Unit: mL

Stop time

The titration is canceled as soon as the defined time has elapsed since the determination start (including start conditions).

Off deactivates this stop condition.

Input range: 0–999,999

Selection: **Off** (default value)

Unit: s

Fixed point evaluation

Additional information

Diagram axes

Quantities	Selection of the specified quantity to be shown in the curve display on the corresponding axis: ▪ Time ▪ Volume ▪ Drift ▪ Temperature Only for KFT Ipol: ▪ Potential Only for KFT Upol: ▪ Current
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The quantities are present for all axes and differ only in the default values.

x-axis	Selection of the specified quantity to be shown in the curve display on the x-axis. Default value: Time
y-axis	Selection of the specified quantity to be shown in the curve display on the first y-axis. Default value: Volume
y2-axis	Optional display of a second y-axis in the curve display. The display of the y2-axis is deactivated by default.
y2-axis (only with activated y2-axis)	Selection of the specified quantity to be shown in the curve display on the second y-axis. Default value: Only for KFT Ipol: Potential Only for KFT Upol: Current

Curve simulation

Curve selection	Predefined curves can be created to simulate a possible determination run. The curve history is determined by the set parameters. The following simulation curves can be selected: ▪ None (default value): The curve simulation is deactivated. ▪ KFT with conditioning: Titration curve for KF methods with conditioning, i.e., with the COND ON and COND CHECK commands. The endpoint is reached at approx. 10% of the cylinder volume. ▪ KFT without conditioning: Titration curve for KF titration without conditioning. The endpoint is reached at approx. 50% of the cylinder volume.
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Before analyzing real samples, deactivate the curve simulation.

Execute with

In order for a **KFT** command to be executed, the corresponding functional units need to be assigned to the command.

Additional information

4.1.2.1.1.4.4 Karl Fischer titration volumetric (KFT) – Run

 The volumetric Karl Fischer titration (KFT) can be carried out with or without conditioning.

If conditioning is necessary, then the conditioning commands **COND ON** (Start conditioning) and **COND CHECK** (Monitor conditioning) must be inserted before the **KFT** command.

If reconditioning is necessary, then a **COND ON** command must be inserted into the method once again after the **KFT** command.

A standard method for volumetric Karl Fischer titration with conditioning looks as follows:

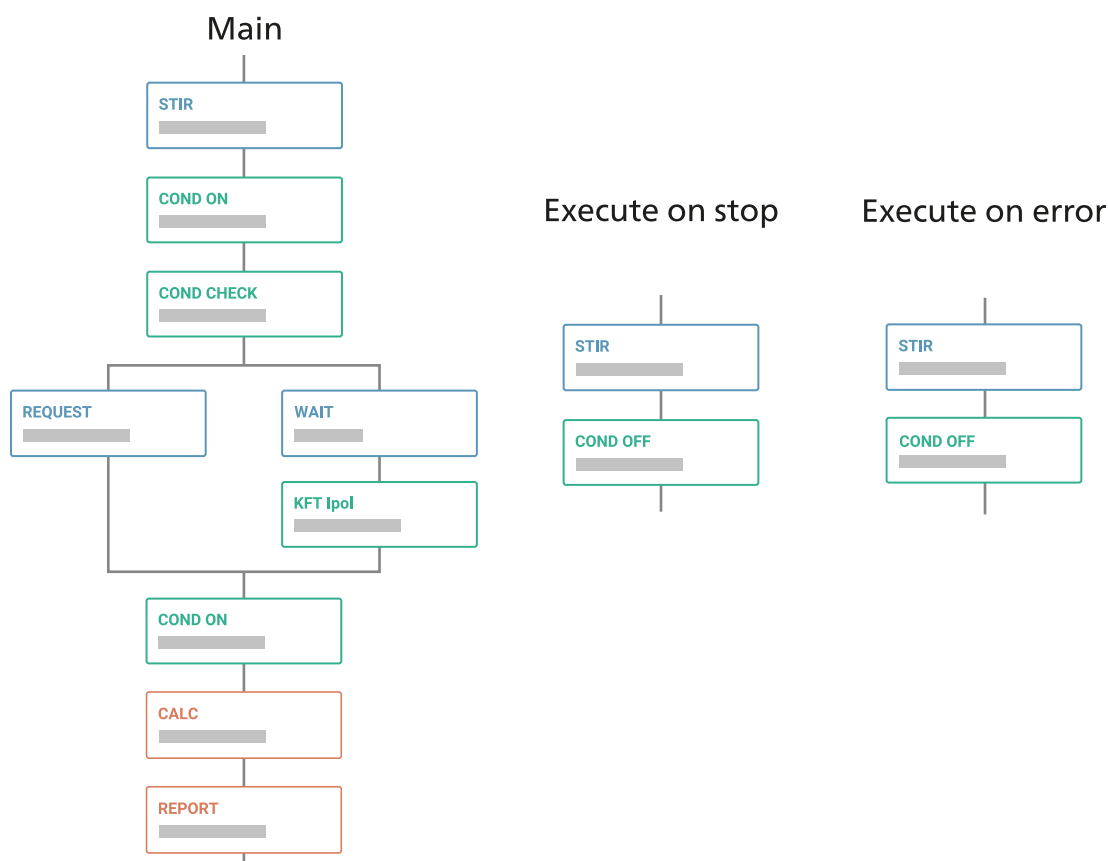


Figure 10 Example – KFT with voltametric measurement

The **KFT** command is executed in the following steps:

1 – Preconditioning

The work system can be conditioned by inserting a **COND ON** command and a **COND CHECK** command before the **KFT** command in the KF method.

The transition from conditioning to titration is defined in the **KFT** command under **Titration start**. If **Acceptance by user** was selected, then the titration can be started manually after conditioning in the **Live display** work area with the **[Start]** button. If **Recognition of sample addition** was selected, then the titration will be started automatically when a sample addition is recognized.

2 – Waiting for sample addition time

After the end of the conditioning and before the start of the titration, the sample addition time is awaited with the **WAIT** command.

3 – Determining the initial measured value

The initial measured value is adopted either drift-controlled or time-controlled. In the case of drift-controlled adoption, the measured value is adopted no earlier than after the minimum waiting time has expired and at the latest after the maximum waiting time has expired, even if the signal drift is higher than the defined **Signal drift initial measured value**.

This step is to be carried out to determine the titration direction.

4 – Pre-dosing: Dosing the start volume and waiting for a break

If a **Start volume** has been defined under **Start conditions**, then it is pre-dosed before the actual start of the titration. The defined **Pause** is then observed.

5 – Carrying out the titration with the set control parameters and titration parameters

The titration is carried out according to the parameters defined under **Control parameters EP** and **Titration parameters**.

- **Fixed point evaluation**

Optionally, up to 9 fixed points can be defined under **Fixed point evaluation** that are calculated from the measuring point list during the titration.

- **Diagram axes**

The quantities to be displayed can be selected for the **x-axis** and the **y-axis**. Optionally, a **y2-axis** can be displayed.

6 – Exiting the titration

The titration is completed regularly as soon as the endpoint defined under **Control parameters EP** and the defined **Stop criterion** are reached.

The conditions defined under **Stop conditions** are constantly monitored during the titration. By defining one or more stop conditions, the user makes sure that, e.g., the titration vessel does not overflow if the endpoint is not reached or if the stop criterion is never met. The titration is canceled if one of these conditions applies.



- A running titration can be canceled by a manual cancellation or with the emergency stop or in case of an error.

7 – Reconditioning

The titration system can be further conditioned after the end of the determination. To do this, an additional **COND ON** command must be inserted in the KF method after the **KFT** command.

The titration cell is thus still conditioned without the following subsample. Conditioning can be stopped manually in the manual control of the IONIC main instrument.

4.1.2.1.1.5 COND ON – Properties

The **COND ON** command starts conditioning in endpoint titrations. For commands that support conditioning, the conditioning parameters must be defined in the command properties in the **Conditioning parameters** section.

The functional units of the titration command that reference the **COND ON** command are used to execute the **COND ON** command.

The **COND ON** command must be followed by a **COND CHECK** command to monitor the conditioning and show its progress.

For reconditioning, an additional **COND ON** command must be added to the method after the titration command (*Additional information*).

-  The **COND ON** command **cannot** be paused and **cannot** be skipped during execution.
-  Additional information on the conditioning parameters can be found in the **Help** in the **Command properties** of the respective commands.

4.1.2.1.1.6 COND CHECK – Properties

Conditioning is monitored according to the parameters set in the titration command that references the **COND CHECK** command with **COND CHECK**.

The functional units of the titration command that reference the **COND CHECK** command are used to execute the **COND CHECK** command.

The **COND CHECK** command can be executed only if the conditioning was started earlier with a **COND ON** command.

-  The **COND CHECK** command **cannot** be skipped during execution.
-  Additional information can be found in the **Help** in the **Command properties** of the respective commands.

4.1.2.1.1.7 COND OFF – Properties

The **COND OFF** command stops the conditioning and deactivates the polarization of the electrode (e.g., in case of an error **Execute on error**).

The functional units of the referenced titration command are used to execute the **COND OFF** command.

 The **COND OFF** command **cannot** be paused and **cannot** be skipped during execution.

After selecting the **COND OFF** command, the **Command properties** window opens by tapping on  *(Additional information)*.

The following parameters are available for the **COND OFF** command:

Parameters

Referenced titration command	Selection of the titration command for which the COND OFF command is used.
-------------------------------------	---

 Additional information on the conditioning parameters can be found in the **Help** in the **Command properties** of the respective commands.

4.1.2.1.1.8 Execute with – Titration commands

 The **Assign automatically** function only works if exactly one suitable instrument or one suitable functional unit is available for the respective parameter.

General

The following parameters are valid for all titration commands.

Instrument for dosing	Selection of the control instrument that contains the dosing drive.
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- **Assign automatically**
- Name of the **IONIC Titrator**
- Name of the **OMNIS Dosing Module**

Functional unit	Selection of the dosing drive connected to the control instrument.
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- **Assign automatically**
- Name of the **Dosino Module**
- Name of the **Dosing Drive**

Dosing port	Selection of the dosing port which should be used for dosing.
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- **Dosing port 1** (default value)
- **Dosing port 2**

Sensor name INPUT 2 (only if Indication is selected or for activated Differential measurement)	Name of the analog sensor to be used at the measuring input INPUT 2 . The selection list depends on the selected command.
Temperature	Measuring input for a sensor that is to measure the temperature during the analysis. The measuring input Temperature is only used if the sensor connected to the measuring input Indication does not have an integrated temperature sensor.
Sensor name (only if Temperature is selected)	Name of the analog sensor to be used for temperature measurement. A sensor of the Temperature sensor type or a sensor of the pH electrode type with integrated temperature sensor can be selected.

Measured quantity potential U and current I

The following parameters are valid for the titration commands with the **Potential U(I(pol))** and **Current I(U(pol))** measured quantities (**DET Ipol**, **DET Upol**, **MET Ipol**, **MET Upol**, **SET Ipol**, **SET Upol**, **KFT Ipol**, **KFT Upol**).

Functional unit	Selection of the measuring interface to which the sensor required for the titration is connected. ▪ Assign automatically ▪ Name of the Measuring Interface Analog
Sensor name INPUT 1	Name of the analog sensor to be used at the measuring input INPUT 1 . A sensor of the Polarizable metal electrode type can be selected.
INPUT 2	Optional use of a second measuring input for temperature measurement. The INPUT 2 is deactivated by default.
Sensor name (only with activated INPUT 2)	Name of the analog sensor to be used at the measuring input INPUT 2 . A sensor of the Temperature sensor type or a sensor of the pH electrode type with integrated temperature sensor can be selected.

 If no sensor of the **Temperature sensor** type and no sensor with integrated temperature sensor is connected for the **INPUT 1** and **INPUT 2** measuring inputs, then the temperature must be entered manually in the command properties under **Titration parameters ► Temperature**. If the **Continuous** temperature measuring mode is selected and no temperature sensor is connected, then the determination is canceled with an error.

4.1.2.1.1.9 Titration commands – Command variables

The following variables are generated by the commands mentioned in the table in the process sequence and can be used in a formula under the designation '**Variable name.Command name**'.

The available variables can be found in the formula editor in the **Command variables** variable group ([Additional information](#)).

 The command variables with x have the following input range:
x = 1–9. x = 1 is entered in the formula editor as the default value.

Variable name	Definition	Commands
DI.EPx.Command name (Deltal.EPx.Command name)	Measured value differential at the x-th equivalent point. Unit: defined in the command variable Unit.MV.Command name	MET Upol
DI.FPx.Command name (Deltal.FPx.Command name)	Measured value differential at the x-th fixed point. Unit: - defined in the command variable Unit.MV.Command name - μA	MET Upol
DI.MPx.Command name (Deltal.MPx.Command name)	Measured value differential at the x-th measuring point in the measuring point list. Unit: defined in the command variable Unit.MV.Command name	MET Upol
DpH.EPx.Command name (DeltapH.EPx.Command name)	Measured value differential at the x-th equivalent point. Unit: defined in the command variable Unit.MV.Command name	MET pH
DpH.FPx.Command name (DeltapH.FPx.Command name)	Measured value differential at the x-th fixed point. Unit: - defined in the command variable Unit.MV.Command name - none	MET pH
DpH.MPx.Command name (DeltapH.MPx.Command name)	Measured value differential at the x-th measuring point in the measuring point list. Unit: defined in the command variable Unit.MV.Command name	MET pH

Variable name	Definition	Commands
DriV.Cond. <i>Command name</i> (DriftValue.Conditioning. <i>Command name</i>)	If the Recognition of sample addition function is activated, then this value corresponds to the volume drift before the sample addition. In all other cases, this value corresponds to the last amount drift from the COND CHECK command. If the Correction with volume drift Automatic parameter has been selected, then this volume drift is used for the correction calculation of the EP volume when working with Conditioning. Unit: µL/min	COND CHECK
DriV.DriCorr. <i>Command name</i> (DriftValue.DriftCorrection. <i>Command name</i>)	Volume drift that was used for correcting the EP volume. If the Correction with volume drift Automatic or Manual parameter was selected, then this volume drift is used for the correction calculation of the EP volume when working with conditioning. Unit: µL/min	KFT
DriV.EPx. <i>Command name</i> (DriftValue.EPx. <i>Command name</i>)	Volume drift at the x-th endpoint. Unit: µL/min	KFT, SET
DriV.Fin. <i>Command name</i> (DriftValue.Final. <i>Command name</i>)	Volume drift at the last measuring point in the measuring point list. Unit: µL/min	KFT, SET
DriV.FPx. <i>Command name</i> (DriftValue.FPx. <i>Command name</i>)	Volume drift at the x-th fixed point. Unit: µL/min	KFT, SET
DriV.MPx. <i>Command name</i> (DriftValue.MPx. <i>Command name</i>)	Volume drift at the x-th measuring point in the measuring point list. Unit: µL/min	COND CHECK, KFT, SET
DU.EPx. <i>Command name</i> (DeltaU.EPx. <i>Command name</i>)	Measured value differential at the x-th equivalent point. Unit: defined in the command variable Unit.MV.<i>Command name</i>	MET U, MET Ipol
DU.FPx. <i>Command name</i> (DeltaU.FPx. <i>Command name</i>)	Measured value differential at the x-th fixed point. Unit: - defined in the command variable Unit.MV.<i>Command name</i> - mV	MET U, MET Ipol

Variable name	Definition	Commands
DU.MPx.Command name (DeltaU.MPx.Command name)	Measured value differential at the x-th measuring point in the measuring point list. Unit: defined in the command variable Unit.MV.Command name	MET U, MET Ipol
Dur.Command name (Duration.Command name)	Total duration for the processing of the command. Unit: s	All titration commands
Dur.DriCorr.Command name (Duration.DriftCorrection.Command name)	Time period from the end of conditioning until the end of the titration. If the Correction with volume drift Automatic or Manual parameter has been selected, then this time period is used for the correction calculation of the EP volume when working with Conditioning . Note: In order for the command variable to be valid, the Conditioning parameter must be activated. Unit: s	KFT
ERC.EPx.Command name	Calculated ERC value for the x-th equivalence point.	DET, MET
ERC.FPx.Command name	Calculated ERC value for the x-th fixed point.	DET
ERC.MPx.Command name	Calculated ERC value for the x-th measuring point.	DET

Variable name	Definition	Commands
Fin.Command name (Finished.Command name)	The way in which the command was ended. ▪ NOT_FINISHED (21500): The command has not yet been ended. ▪ SUCCEEDED (21501): The command was ended normally. ▪ STOPPED (21502): The command was stopped by the user in the Live display work area or the emergency stop was activated. ▪ SKIPPED (21503): The command was skipped by the user in the Live display work area. ▪ CONFIRMED (21504): The user has confirmed the user action required by the command in the Live display work area (COND CHECK, REQUEST, WAIT). ▪ FAILED (21505): The command was canceled due to an error.  The variable is displayed as text in the determination overview. The respective numerical value (2150x) is used in calculations.	All titration commands
MV.EPx.Command name (MeasValue.EPx.Command name)	▪ Measured value at the x-th equivalence point (DET, MET). ▪ Measured value at the x-th endpoint (KFT, SET). Unit: defined in the command variable Unit.MV.Command name	DET, MET, KFT, SET
MV.Fin.Command name (Measvalue.Final.Command name)	Measured value at the last measuring point in the measuring point list. Unit: defined in the command variable Unit.MV.Command name	COND CHECK, DET, MET, KFT, SET
MV.FPx.Command name (MeasValue.FPx.Command name)	Measured value at the x-th fixed point. Unit: ▪ defined in the command variable Unit.MV.Command name (all valid commands) ▪ none (DET pH, MET pH, SET pH) ▪ mV (DET Ipol, DET U, MET Ipol, MET U, KFT Ipol, SET Ipol, SET U) ▪ μA (DET Upol, MET Upol, KFT Upol, SET Upol)	DET, MET, KFT, SET

Variable name	Definition	Commands
Time.FPx. <i>Command name</i>	Time stamp of the x-th fixed point. Unit: s	DET, MET, KFT, SET
Time.MPx. <i>Command name</i>	Time stamp of the x-th measuring point in the measuring point list. Unit: s	COND CHECK, DET, MET, KFT, SET
Time.SmplDetOff. <i>Command name</i> (Time.SampleDetectOffset. <i>Command name</i>)	Time that has elapsed since sample addition until it was recognized. Unit: s	COND CHECK
Unit.MV. <i>Command name</i> (Unit.MeasValue. <i>Command name</i>)	Unit of the measured value. Unit: ▪ none (DET pH, MET pH, SET pH) ▪ mV (COND CHECK, DET U, DET Ipol, MET U, MET Ipol, KFT Ipol, SET U, SET Ipol) ▪ μA (DET Upol, MET Upol, KFT Upol, SET Upol)	COND CHECK, DET, MET, KFT, SET
Vol.DriCorr. <i>Command name</i> (Volume.DriftCorrection. <i>Command name</i>)	Volume that was calculated for the drift-based correction of the EP volume. The correction volume is calculated by multiplying the volume drift with the time period between the end of conditioning and the end of the titration. If the Correction with volume drift, Automatic or Manual parameter has been selected, then this volume is used for the correction of the EP volume when working with conditioning.  In order for the command variable to be valid, the Conditioning parameter must be activated for the KFT command. Unit: mL	KFT
Vol.Cond. <i>Command name</i> (Volume.Conditioning. <i>Command name</i>)	Total dosed titrant volume for conditioning. If Recognition of sample addition is selected in the command properties of the KFT command, then this value is corrected with the volume Volume.SampleDetectOffset. <i>Command name</i> . Unit: mL	COND CHECK

Variable name	Definition	Commands
CalTemp.CurrSens. <i>Command name</i> (CalibrationTemperature.CurrentSensor. <i>Command name</i>)	Temperature at which the corresponding sensor was calibrated. Unit: °C	DET pH, MET pH, SET pH
Name.CurrSens. <i>Command name</i> (Name.CurrentSensor. <i>Command name</i>)	Name of the indicator electrode, i.e., the sensor that is used for measuring the required measured quantity.	DET, MET, KFT, SET
Slo.CurrSens. <i>Command name</i> (Slope.CurrentSensor. <i>Command name</i>)	Quotient from the slope of the pH electrode used and from the Nernst slope at the corresponding temperature. Unit: None (standardized to Nernst slope)	DET pH, MET pH, SET pH
ZerPt.CurrSens. <i>Command name</i> (ZeroPoint.CurrentSensor. <i>Command name</i>)	The electrode zero point pH(0) of the pH electrode used. pH(0) is the x-axis intercept of the calibration curve and corresponds to the pH value at 0 mV. Unit: None (standardized to Nernst slope)	DET pH, MET pH, SET pH

Table 7 Solution

Variable name	Definition	Commands
Conc.CurrSol. <i>Command name</i> (Concentration.CurrentSolution. <i>Command name</i>)	Concentration of the solution dosed with the piston buret. In the Properties of the solution used, the concentration corresponds to the Component 1 of the solution used. Unit: defined in the Unit.Conc.CurrSol. <i>Command name</i> variable	DET, MET, KFT, SET
Name.CurrSol. <i>Command name</i> (Name.CurrentSolution. <i>Command name</i>)	Name of the solution dosed with the piston buret.	DET, MET, KFT, SET
Titer.CurrSol. <i>Command name</i> (Titer.CurrentSolution. <i>Command name</i>)	Titer value of the solution dosed with the piston buret. Unit: defined in the Unit.Titer.CurrSol. <i>Command name</i> variable	DET, MET, KFT, SET
Unit.Conc.CurrSol. <i>Command name</i> (Unit.Concentration.CurrentSolution. <i>Command name</i>)	Concentration unit of the solution dosed with the piston buret. In the Properties of the solution used, the concentration corresponds to the Component 1 of the solution used.	DET, MET, KFT, SET

Variable name	Definition	Commands
Unit.Titer.CurrSol. <i>Command name</i>	Unit of the titer of the solution dosed with the piston buret.	DET, MET, KFT, SET
(Unit.Titer.CurrentSolution. <i>Command name</i>)		

4.1.2.1.2 Measuring commands – Overview

In a method, tap  to open the **Command library** window. Tap  next to **Measurement** to open a list with the available measuring commands.

The following measuring commands can be inserted in the method:

- **MEAS pH** (*additional information*)
- **MEAS U** (*additional information*)
- **MEAS T** (*additional information*)
- **MEAS Ipol** (*additional information*)
- **MEAS Upol** (*additional information*)

The individual commands have **Command variables** that are generated in the process sequence and that can be used in formulas (*Additional information*).

4.1.2.1.2.1 MEAS pH – Properties

The **MEAS pH** command is used to execute potentiometric pH measurements with pH electrodes.

After selecting the **MEAS pH** command, the **Command properties** window opens by tapping on  **c** (*Additional information*).

The following parameters are available for the **MEAS pH** command:

Measuring parameters	
Measuring mode	Mode for the measured value acceptance. ▪ Drift-controlled (default value): The drift-controlled measurement is ended by reaching one of the following criteria: – Signal drift – Maximum waiting time – Stop measured value pH ▪ Time-controlled: The time-controlled measurement is ended by reaching one of the following criteria: – Measurement duration – Stop measured value pH
Signal drift	The measured value is applied as soon as the defined signal drift is undercut. (only if Drift-controlled is selected) Input range: 0.1–999.9 Unit: mV/min Default value: 10.0

Measuring parameters

Minimum waiting time

(only if **Drift-controlled** is selected)

The measured value will not be applied until after the minimum waiting time has expired at the earliest, even if the signal drift has already fallen below a defined value.

Input range: 0–999,999

Unit: s

Default value: 0

Maximum waiting time

(only if **Drift-controlled** is selected)

The measured value is applied no later than after the maximum waiting time has expired, even if the signal drift has not yet been reached or if the **Stop measured value pH** parameter is deactivated.

Input range: 0–999,999

Unit: s

Default value: 52

Measurement duration

(only if **Time-controlled** is selected)

The measurement is terminated as soon as the defined measurement duration is reached.

Input range: 0–999,999

Unit: s

Default value: 120

Time interval measuring point

Time interval for entering a measuring point into the measuring point list. A measuring point is always entered at the end of the measurement, even if the time interval has not yet been reached.

Input range: 0.1–999,999.9

Unit: s

Default value: 2.0

Stop measured value pH

The measurement is canceled as soon as the defined measured value is reached.

The checking of the stop measured value is deactivated with **Off**.

Input range: –20.000 to 20.000

Selection: **Off** (default value)

Unit: None

Temperature measuring mode

Type of temperature measurement.

The temperature of the measuring solution can either be defined manually or measured continuously with a temperature sensor.

- **Automatic** (default value): If a temperature sensor is connected, then the temperature will be measured continuously. Otherwise, the manually defined **Temperature** is applied.
- **Continuous**: Since the temperature is to be measured continuously, a temperature sensor must be connected.
- **Manual**: The manually defined **Temperature** is applied as the measuring temperature.

Measuring parameters

Temperature	Temperature of the measuring solution.
(only for Automatic or Manual)	Input range: -20.0 to 150.0
	Unit: °C
	Default value: 25.0

Fixed point evaluation

Additional information

Diagram axes

Quantities	Selection of the specified quantity to be shown in the curve display on the corresponding axis.
	▪ Time ▪ pH ▪ Drift ▪ Temperature

 The quantities are present for all axes and differ only in the default values.

x-axis	Selection of the specified quantity to be shown in the curve display on the x-axis. Default value: Time
y-axis	Selection of the specified quantity to be shown in the curve display on the first y-axis. Default value: pH
y2-axis	Optional display of a second y-axis in the curve display. The display of the y2-axis is deactivated by default.
y2-axis (only with activated y2-axis)	Selection of the specified quantity to be shown in the curve display on the second y-axis. Default value: Drift

Execute with

In order for a **MEAS pH** command to be executed, the corresponding functional units need to be assigned to the command.

Additional information

4.1.2.1.2.2 MEAS U – Properties

The **MEAS U** command is used to execute potentiometric voltage measurements.

After selecting the **MEAS U** command, the **Command properties** window opens by tapping on  **C** (*Additional information*).

The following parameters are available for the **MEAS U** command:

Measuring parameters

Measuring mode

Mode for the measured value acceptance.

- **Drift-controlled** (default value): The drift-controlled measurement is ended by reaching one of the following criteria:
 - **Signal drift**
 - **Maximum waiting time**
 - **Stop measured value**
- **Time-controlled**: The time-controlled measurement is ended by reaching one of the following criteria:
 - **Measurement duration**
 - **Stop measured value**

Signal drift

The measured value is applied as soon as the defined signal drift is undercut.

(only if **Drift-controlled** is selected)

Input range: 0.1–999.9

Unit: mV/min

Default value: 10.0

Minimum waiting time

The measured value will not be applied until after the minimum waiting time has expired at the earliest, even if the signal drift has already fallen below a defined value.

(only if **Drift-controlled** is selected)

Input range: 0–999,999

Unit: s

Default value: 0

Maximum waiting time

The measured value is applied no later than after the maximum waiting time has expired, even if the signal drift has not yet been reached or if the **Stop measured value** parameter is deactivated.

(only if **Drift-controlled** is selected)

Input range: 0–999,999

Unit: s

Default value: 52

Measurement duration

The measurement is terminated as soon as the defined measurement duration is reached.

(only if **Time-controlled** is selected)

Input range: 0–999,999

Unit: s

Default value: 120

Time interval measuring point

Time interval for entering a measuring point into the measuring point list. A measuring point is always entered at the end of the measurement, even if the time interval has not yet been reached.

Input range: 0.1–999,999.9

Unit: s

Default value: 2.0

Measuring parameters	
Stop measured value	The measurement is canceled as soon as the defined measured value is reached. The checking of the stop measured value is deactivated with Off. Input range: -2,000.0 to 2,000.0 Selection: Off (default value) Unit: mV
Temperature measuring mode	Type of temperature measurement. The temperature of the measuring solution can either be defined manually or measured continuously with a temperature sensor. ▪ Automatic (default value): If a temperature sensor is connected, then the temperature will be measured continuously. Otherwise, the manually defined Temperature is applied. ▪ Continuous: Since the temperature is to be measured continuously, a temperature sensor must be connected. ▪ Manual: The manually defined Temperature is applied as the measuring temperature.
Temperature (only for Automatic or Manual)	Temperature of the measuring solution. Input range: -20.0 to 150.0 Unit: °C Default value: 25.0
Fixed point evaluation	
<i>Additional information</i>	
Diagram axes	
Quantities	Selection of the specified quantity to be shown in the curve display on the corresponding axis. ▪ Time ▪ Potential ▪ Drift ▪ Temperature  The quantities are present for all axes and differ only in the default values.
x-axis	Selection of the specified quantity to be shown in the curve display on the x-axis. Default value: Time
y-axis	Selection of the specified quantity to be shown in the curve display on the first y-axis. Default value: Potential
y2-axis	Optional display of a second y-axis in the curve display. The display of the y2-axis is deactivated by default.

Diagram axes

y2-axis (only with activated y2-axis)	Selection of the specified quantity to be shown in the curve display on the second y-axis. Default value: Drift
---	---

Execute with

In order for a **MEAS U** command to be executed, the corresponding functional units need to be assigned to the command.

[Additional information](#)

4.1.2.1.2.3 MEAS T – Properties

The **MEAS T** command is used to execute temperature measurements using temperature sensors or electrodes with built-in temperature sensors.

After selecting the **MEAS T** command, the **Command properties** window opens by tapping on  [\(Additional information\)](#).

The following parameters are available for the **MEAS T** command:

Measuring parameters

Measuring mode	Mode for the measured value acceptance. ▪ Drift-controlled (default value): The drift-controlled measurement is ended by reaching one of the following criteria: – Signal drift – Maximum waiting time – Stop measured value ▪ Time-controlled: The time-controlled measurement is ended by reaching one of the following criteria: – Measurement duration – Stop measured value
Signal drift (only if Drift-controlled is selected)	The measured value is applied as soon as the defined signal drift is undercut. Input range: 0.1–999.9 Unit: °C/min Default value: 0.5
Minimum waiting time (only if Drift-controlled is selected)	The measured value will not be applied until after the minimum waiting time has expired at the earliest, even if the signal drift has already fallen below a defined value. Input range: 0–999,999 Unit: s Default value: 0

Measuring parameters

Maximum waiting time

(only if **Drift-controlled** is selected)

The measured value is applied no later than after the maximum waiting time has expired, even if the signal drift has not yet been reached or if the **Stop measured value** parameter is deactivated.

Input range: 0–999,999

Unit: s

Default value: 215

Measurement duration

(only if **Time-controlled** is selected)

The measurement is terminated as soon as the defined measurement duration is reached.

Input range: 0–999,999

Unit: s

Default value: 120

Time interval measuring point

Time interval for entering a measuring point into the measuring point list. A measuring point is always entered at the end of the measurement, even if the time interval has not yet been reached.

Input range: 0.1–999,999.9

Unit: s

Default value: 2.0

Stop measured value

The measurement is canceled as soon as the defined measured value is reached.

The checking of the stop measured value is deactivated with **Off**.

Input range: -20.0 to 150.0

Selection: **Off** (default value)

Unit: °C

Fixed point evaluation

Additional information

Diagram axes

Quantities

Selection of the specified quantity to be shown in the curve display on the corresponding axis.

- Time
- Drift
- Temperature



The quantities are present for all axes and differ only in the default values.

x-axis

Selection of the specified quantity to be shown in the curve display on the x-axis.

Default value: **Time**

Diagram axes

y-axis	Selection of the specified quantity to be shown in the curve display on the first y-axis. Default value: Temperature
y2-axis	Optional display of a second y-axis in the curve display. The display of the y2-axis is deactivated by default.
y2-axis (only with activated y2-axis)	Selection of the specified quantity to be shown in the curve display on the second y-axis. Default value: Drift

Execute with

In order for a **MEAS T** command to be executed, the corresponding functional units need to be assigned to the command.

[Additional information](#)

4.1.2.1.2.4 MEAS Ipol – Properties

The **MEAS Ipol** command is used to execute voltametric measurements with selectable polarization current using polarizable metal electrodes.

After selecting the **MEAS Ipol** command, the **Command properties** window opens by tapping on  [\(Additional information\)](#).

The following parameters are available for the **MEAS Ipol** command:

Measuring parameters

Measuring mode	Mode for the measured value acceptance. ▪ Drift-controlled (default value): The drift-controlled measurement is ended by reaching one of the following criteria: – Signal drift – Maximum waiting time – Stop measured value ▪ Time-controlled: The time-controlled measurement is ended by reaching one of the following criteria: – Measurement duration – Stop measured value
Signal drift (only if Drift-controlled is selected)	The measured value is applied as soon as the defined signal drift is undercut. Input range: 0.1–999.9 Unit: mV/min Default value: 10.0
Minimum waiting time (only if Drift-controlled is selected)	The measured value will not be applied until after the minimum waiting time has expired at the earliest, even if the signal drift has already fallen below a defined value. Input range: 0–999,999 Unit: s Default value: 0

Measuring parameters

Polarization current DC The **Polarization current DC** (direct current) is the current that is applied to the polarizable metal electrode (indicator electrode) during voltametric measurement.

 Metrohm recommends compliance with 0.5 µA increments.

Input range: –200.00 to 200.00

Unit: µA

Default value: 5.00

Electrode check

If the check box is activated, then the system checks within a few seconds whether an electrode is connected and whether a short circuit is present.

Fixed point evaluation

Additional information

Diagram axes

Quantities Selection of the specified quantity to be shown in the curve display on the corresponding axis.

- **Time**
- **Potential**
- **Drift**
- **Temperature**

 The quantities are present for all axes and differ only in the default values.

x-axis Selection of the specified quantity to be shown in the curve display on the x-axis.
Default value: **Time**

y-axis Selection of the specified quantity to be shown in the curve display on the first y-axis.
Default value: **Potential**

y2-axis Optional display of a second y-axis in the curve display.
The display of the y2-axis is deactivated by default.

y2-axis Selection of the specified quantity to be shown in the curve display on the second y-axis.
(only with activated **y2-axis**)
Default value: **Drift**

Execute with

In order for a **MEAS Ipol** command to be executed, the corresponding functional units need to be assigned to the command.

Additional information

Measuring parameters

Time interval measuring point	Time interval for entering a measuring point into the measuring point list. A measuring point is always entered at the end of the measurement, even if the time interval has not yet been reached. Input range: 0.1–999,999.9 Unit: s Default value: 2.0
Stop measured value	The measurement is canceled as soon as the defined measured value is reached. The checking of the stop measured value is deactivated with Off. Input range: –200.00 to 200.00 Selection: Off (default value) Unit: μA
Temperature measuring mode	Type of temperature measurement. The temperature of the measuring solution can either be defined manually or measured continuously with a temperature sensor. ▪ Automatic (default value): If a temperature sensor is connected, then the temperature will be measured continuously. Otherwise, the manually defined Temperature is applied. ▪ Continuous: Since the temperature is to be measured continuously, a temperature sensor must be connected. ▪ Manual: The manually defined Temperature is applied as the measuring temperature.
Temperature (only for Automatic or Manual)	Temperature of the measuring solution. Input range: –20.0 to 150.0 Unit: °C Default value: 25.0
Polarization voltage DC	The Polarization voltage DC (Direct Current) is the voltage that is applied to the polarizable metal electrode (indicator electrode) during amperometric measurement.  Metrohm recommends compliance with 25 mV increments. Input range: –2,000.0 to 2,000.0 Unit: mV Default value: 400.0
Electrode check	If the check box is activated, then the system checks within a few seconds whether an electrode is connected and whether a short circuit is present.

Fixed point evaluation

Additional information

Diagram axes

Quantities

Selection of the specified quantity to be shown in the curve display on the corresponding axis.

- Time
- Current
- Drift
- Temperature

 The quantities are present for all axes and differ only in the default values.

x-axis	Selection of the specified quantity to be shown in the curve display on the x-axis. Default value: Time
y-axis	Selection of the specified quantity to be shown in the curve display on the first y-axis. Default value: Current
y2-axis	Optional display of a second y-axis in the curve display. The display of the y2-axis is deactivated by default.
y2-axis (only with activated y2-axis)	Selection of the specified quantity to be shown in the curve display on the second y-axis. Default value: Drift

Execute with

In order for a **MEAS Upol** command to be executed, the corresponding functional units need to be assigned to the command.

Additional information

4.1.2.1.2.6 Execute with – Measuring commands

 The **Assign automatically** function only works if exactly one suitable instrument or one suitable functional unit is available for the respective parameter.

General

The following parameters are valid for all measuring commands.

Parameters	Selection
Instrument for measuring	The control instrument that contains the measuring interface. ▪ Assign automatically ▪ Name of the IONIC Titrator

Measured quantities pH and potential U

The following parameters are valid for the measuring commands with the **pH** and **Potential U** measured quantities (**MEAS pH**, **MEAS U**).

Functional unit	Selection of the measuring interface to which the sensor required for the titration is connected. ▪ Assign automatically ▪ Name of the Measuring Interface Analog ▪ Name of the Measuring Interface Digital
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The following parameters are displayed only if the **Measuring Interface Analog** was selected under **Functional unit**.

Differential measurement	Differential measurement between the sensors at INPUT 1 and INPUT 2. ▪ Off (): The differential measurement is deactivated. The selection for INPUT 1 and INPUT 2 is displayed. ▪ On (): The differential measurement is activated. – Only for MEAS U: Sensors of the pH electrode, Metal electrode, and Other sensor types can be connected. – Only for MEAS pH: Sensors of the pH electrode type can be connected.
INPUT 1 and INPUT 2 (only if Differential measurement is deactivated)	▪ No sensor ▪ Indication ▪ Temperature The Indication measuring input and the Temperature measuring input can each be selected for either INPUT 1 or INPUT 2. If No sensor is selected for INPUT 1 and for INPUT 2, then the measurement is canceled with an error.
Indication	Measuring input for an indicator electrode. ▪ Only for MEAS U: A sensor of the pH electrode, Metal electrode or Other sensor type can be connected. ▪ Only for MEAS pH: A sensor of the pH electrode type can be connected.
Sensor name INPUT 1 (only if Indication is selected or for activated Differential measurement)	Name of the analog sensor to be used at the measuring input INPUT 1. The selection list depends on the selected command.
Sensor name INPUT 2 (only if Indication is selected or for activated Differential measurement)	Name of the analog sensor to be used at the measuring input INPUT 2. The selection list depends on the selected command.
Temperature	Measuring input for a sensor that is to measure the temperature during the analysis. The measuring input Temperature is only used if the sensor connected to the measuring input Indication does not have an integrated temperature sensor.

4.1.2.1.2.7 Measuring commands – Command variables

The following variables are generated by the commands mentioned in the table in the process sequence and can be used in a formula under the designation '**Variable name.Command name**'.

The available variables can be found in the formula editor in the **Command variables** variable group ([Additional information](#)).



The command variables with x have the following input range:
x = 1–9. x = 1 is entered in the formula editor as the default value.

Variable name	Definition	Commands
DriV.Fin.Command name (DriftValue.Final.Command name)	Potential drift at the last measuring point in the measuring point list. Unit: mV/min	MEAS pH, MEAS U
	Voltage drift at the last measuring point in the measuring point list. Unit: mV/min	MEAS Ipol
	Current drift at the last measuring point in the measuring point list. Unit: µA/min	MEAS Upol
	Temperature drift at the last measuring point in the measuring point list. Unit: °C/min	MEAS T
DriV.FPx.Command name (DriftValue.FPx.Command name)	Potential drift at the x-th fixed point. Unit: mV/min	MEAS pH, MEAS U
	Voltage drift at the x-th fixed point. Unit: mV/min	MEAS Ipol
	Current drift at the x-th fixed point. Unit: µA/min	MEAS Upol
	Temperature drift at the x-th fixed point. Unit: °C/min	MEAS T

Variable name	Definition	Commands
MV.FPx.Command name (MeasValue.FPx.Command name)	Measured value at the x-th fixed point. Unit: - defined in the command variable Unit.MV.Command name (all measuring commands) - none (MEAS pH) - mV (MEAS Ipol, MEAS U) - µA (MEAS Upol) °C (MEAS T)	All measuring commands
MV.MPx.Command name (MeasValue.MPx.Command name)	Measured value at the x-th measuring point in the measuring point list. Unit: defined in the command variable Unit.MV.Command name	All measuring commands
Stt.Command name (State.Command name)	Execution status of the command. NOT_STARTED (20100): The command has not yet been started. RUNNING (20101): The command is executed. FINISHED (20102): The command has been ended.  The variable is displayed as text in the determination overview. The respective numerical value (2010x) is used in calculations.	All measuring commands
Temp.Fin.Command name (Temperature.Final.Command name)	Temperature at the last measuring point in the measuring point list. Unit: °C	MEAS pH, MEAS U, MEAS Ipol, MEAS Upol
Temp.FPx.Command name (Temperature.FPx.Command name)	Temperature at the x-th fixed point. Unit: °C	MEAS pH, MEAS U, MEAS Ipol, MEAS Upol
Temp.MPx.Command name (Temperature.MPx.Command name)	Temperature at the x-th measuring point in the measuring point list. Unit: °C	MEAS pH, MEAS U, MEAS Ipol, MEAS Upol
Time.Fin.Command name (Time.Final.Command name)	Time stamp at the last measuring point in the measuring point list. Unit: s	All measuring commands
Time.FPx.Command name	Time stamp at the x-th fixed point. Unit: s	All measuring commands

Variable name	Definition	Commands
Time.MPx. <i>Command name</i>	Time stamp at the x-th measuring point in the measuring point list. Unit: s	All measuring commands
Unit.MV. <i>Command name</i> (Unit.MeasValue. <i>Command name</i>)	Unit of the measured value. Unit: ▪ none (MEAS pH) ▪ mV (MEAS U, MEAS Ipol) ▪ µA (MEAS Upol) ▪ °C (MEAS T)	All measuring commands

Equipment variables

Table 8 Sensor

Variable name	Definition	Commands
CalTemp.CurrSens. <i>Command name</i> (CalibrationTemperature.CurrentSensor. <i>Command name</i>)	Temperature at which the corresponding sensor was calibrated. Unit: °C	MEAS pH
Name.CurrSens. <i>Command name</i> (Name.CurrentSensor. <i>Command name</i>)	Name of the indicator electrode, i.e., the sensor that is used for measuring the required measured quantity.	All measuring commands
Slo.CurrSens. <i>Command name</i> (Slope.CurrentSensor. <i>Command name</i>)	Slope that was calculated during the calibration of the pH electrode used. Unit: None (standardized to Nernst slope)	MEAS pH
ZerPt.CurrSens. <i>Command name</i> (ZeroPoint.CurrentSensor. <i>Command name</i>)	The electrode zero point pH(0) of the pH electrode used. pH(0) is the x-axis intercept of the calibration curve and corresponds to the pH value at 0 mV. Unit: None (standardized to Nernst slope)	MEAS pH

4.1.2.1.3 Calibration commands – Overview

In a method, tap  to open the **Command library** window. Tap  next to **Calibration** to open the available calibration commands.

The following calibration commands can be inserted in the method:

- **CAL pH** (*additional information*)

The **CAL pH** command has **Command variables** which are generated in the process sequence and which can be used in formulas (*Additional information*).

4.1.2.1.3.1 CAL pH – Overview

The following contents are available for the CAL pH command:

- [CAL pH – Principle](#)
- [CAL pH – Properties](#)
- [CAL pH – Command variables](#)

4.1.2.1.3.1.1 CAL pH – Calibration principle

pH electrodes can be calibrated with the **CAL pH** command ([Additional information](#)). In order to do so, the command under **Command properties** ► **Execute with** must be assigned the **Instrument for measuring** and the **Functional unit**. If the functional unit is a Measuring Module Analog, then an analog electrode must be selected. If it is a Measuring Module Digital, then the electrode currently connected will be assigned automatically.

The electrode zero point pH(0) and the slope s are determined at the time of pH electrode calibration. The slope is temperature-dependent and is specified relative to the Nernst slope.

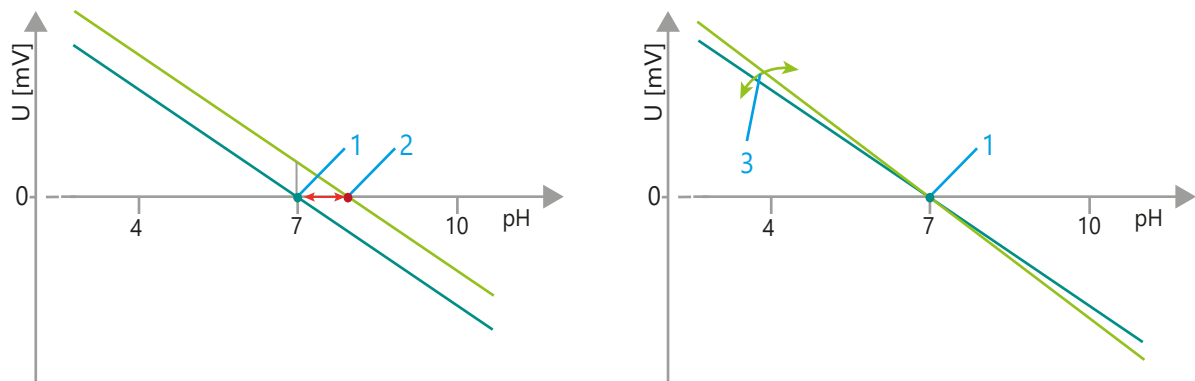


Figure 11 Deviation of the electrode zero point pH(0) and the slope s (green) from the ideal Nernst curve (blue)

1 pH(0) of the ideal calibration curve

The zero crossing is at pH 7 and corresponds to a potential $U = 0$ mV.

2 pH(0) of a real pH electrode

The zero crossing of a pH electrode is usually not precisely at pH 7. This deviation is determined by a calibration.

3 Slope

The slope of the pH electrode is specified relative to the Nernst slope.

$$\text{Relative slope} = s_{\text{measured}}/s_{\text{Nernst}}$$

The temperature and the pH value are related by the Nernst equation. This equation describes the ideal ratio between the measuring ion activity a_M in the solution and the measured potential between the reference electrode and the measuring electrode. The temperature directly influences the Nernst potential via the Nernst factor (= electrode slope).

$$U = U_0 - \frac{2.303 \times R \times T}{z \times F} \times \log a_M$$

Calibration temperature

The temperature can be measured either with a temperature sensor (Temperature measuring mode **Automatic** or **Continuous**) or entered with the Temperature measuring mode **Manual** as a number under **Temperature** in the **Command properties** of the **CAL pH** command.

The pH value of the calibration buffers is temperature-dependent. For accurate measurements, the temperature must be kept **constant** throughout all measurements necessary for calibration. The temperature measured with the first calibration buffer is considered the reference temperature for the entire calibration and is therefore defined as the calibration temperature. For each subsequent measurement, the temperature difference to the calibration temperature must not exceed 2 °C; otherwise the calibration will be canceled with an error.

Automatic calibration buffer detection

The following values are measured or determined for the individual calibration buffers:

- Temperature
- Potential

The calibration buffer is detected based on the defined buffer series and the two measured values.

With the buffer table, the pH value corresponding to the measured potential is then determined by linear interpolation between the 2 adjacent temperatures using the calibration temperature.

In order for calibration buffer detection to function correctly, the nominal values of the individual calibration buffers within the same buffer series must differ by at least one pH unit.

The electrode zero point $\text{pH}(0)$ and slope s are determined by linear regression of the value pairs (pH , potential) of the measured calibration buffers.

When calibrating with 2 or more calibration buffers, ensure that the first two calibration buffers are different. If this is not the case, then the determination will be canceled with an error. This restriction does not apply to any other calibration buffers.

The calibration data is saved in the command variables of the **CAL pH** command (*Additional information*).

 If the pH values entered in the buffer table have different numbers of decimal places, and if the calibration temperature lies between 2 such pH values, then the value is interpolated linearly and rounded to the smallest number of decimal places.

4.1.2.1.3.1.2 CAL pH – Properties

The **CAL pH** command is used to calibrate pH electrodes by potential measurements of solutions with a known pH value. Pre-defined, commercially available calibration buffers can be used as calibration buffers. The calibration data for the pH electrode is calculated automatically from the determined measured values.

After selecting the **CAL pH** command, the **Command properties** window opens by tapping on  *(Additional information)*.

The following parameters are available for the **CAL pH** command:

Calibration parameters	
Referenced CAL WRITE command	Selection of the CAL WRITE command to be referenced with which the calibration data is saved on the respective sensor.
Buffer series	Selection of the buffer series to be used for automatic calibration buffer detection during pH calibration.  The calibration buffers intended for this buffer series must be used for the selected buffer series. Default value: Metrohm
Signal drift	The measured value is applied as soon as the defined signal drift has been fallen short of. Input range: 0.1–999.9 Unit: mV/min Default value: 2.0
Minimum waiting time	The measured value will not be applied until after the minimum waiting time has expired at the earliest, even if the signal drift has already fallen below a defined value. Input range: 0–999,999 Unit: s Default value: 10
Maximum waiting time	The measured value is adopted after the maximum waiting time has expired at the latest, even if the signal drift has not yet been reached. Input range: 0–999,999 Unit: s Default value: 110
Time interval measuring point	Time interval for entering a measuring point into the measuring point list. A measuring point is always entered at the end of the measurement, even if the time interval has not yet been reached. Input range: 0.1–999,999.9 Unit: s Default value: 2.0

Calibration parameters

Temperature measuring mode

Type of temperature measurement.

The temperature of the solution can either be defined manually or measured continuously with a temperature sensor.

- **Automatic** (default value): If a temperature sensor is connected, then the temperature will be measured continuously. Otherwise, the temperature defined under **Temperature** will be used.
- **Continuous**: Because the temperature is measured continuously, a temperature sensor must be connected. If no temperature sensor is connected, then the command cannot be executed.
- **Manual**: The temperature defined under **Temperature** is adopted as the measuring temperature.

Temperature

Defined temperature of the measuring solution.

(only for **Automatic** or **Manual**)

Input range: -20.0 to 150.0

Unit: °C

Default value: 25.0

Diagram axes

Quantities

Selection of the specified quantity to be shown in the curve display on the corresponding axis.

- Time
- Potential
- Drift
- Temperature



 The quantities are present for all axes and differ only in the default values.

x-axis

Selection of the specified quantity to be shown in the curve display on the x-axis.

Default value: **Time**

y-axis

Selection of the specified quantity to be shown in the curve display on the first y-axis.

Default value: **Potential**

y2-axis

Optional display of a second y-axis in the curve display.

The display of the y2-axis is deactivated by default.

y2-axis

Selection of the specified quantity to be shown in the curve display on the second y-axis.

(only with activated **y2-axis**)

Default value: **Drift**

Execute with

In order for a **CAL pH** command to be executed, the corresponding functional units need to be assigned to the command.

Execute with**Instrument for measuring**

The control instrument that contains the measuring interface.

- **Assign automatically**
- Name of the **IONIC Titrator**

Functional unit

Selection of the measuring interface to which the sensor required for the titration is connected.

- Name of the **Measuring Interface Analog**
- Name of the **Measuring Interface Digital**

The following parameters are displayed only if the **Measuring Interface Analog** was selected under **Functional unit**.

Differential measurement

Differential measurement between the sensors at **INPUT 1** and **INPUT 2**.

- Off (): The differential measurement is deactivated. The selection for **INPUT 1** and **INPUT 2** is displayed.
- On (): The differential measurement is activated. Sensors of the **pH electrode** type can be connected.

INPUT 1 and INPUT 2

Selection of the measuring input.

(only if **Differential measurement** is deactivated)

- **No sensor**
- **Indication**
- **Temperature**

The **Indication** measuring input and the **Temperature** measuring input can each be selected for either **INPUT 1** or **INPUT 2**.

If **No sensor** is selected for **INPUT 1** and for **INPUT 2**, then the measurement is canceled with an error.

If no sensor of the **Temperature sensor** type and no sensor with integrated temperature sensor is connected for the measuring inputs, then the temperature must be entered manually in the command properties under **Calibration parameters ► Temperature**. If the **Continuous** temperature measuring mode is selected and no temperature sensor is connected, then the analysis is canceled with an error.

Indication

Measuring input for an indicator electrode.

A sensor of the **pH electrode** type can be connected.

Sensor name INPUT 1

Name of the analog sensor to be used at the measuring input **INPUT 1**.

(only if **Indication** is selected or for activated **Differential measurement**)

Sensor name INPUT 2

Name of the analog sensor to be used at the measuring input **INPUT 2**.

(only if **Indication** is selected or for activated **Differential measurement**)

Variable name	Definition
Fin.Command name (Finished.Command name)	The way in which the command was ended. ▪ NOT_FINISHED (21500): The command has not yet been ended. ▪ SUCCEEDED (21501): The command was ended normally. ▪ STOPPED (21502): The command was stopped by the user in the Live display work area or the emergency stop was activated. ▪ SKIPPED (21503): The command was skipped by the user in the Live display work area. ▪ CONFIRMED (21504): The user has confirmed the user action required by the command in the Live display work area (COND CHECK, REQUEST, WAIT). ▪ FAILED (21505): The command was canceled due to an error.  The variable is displayed as text in the determination overview. The respective numerical value (2150x) is used in calculations.
MV.Fin.Command name (Measvalue.Final.Command name)	Measured value at the last measuring point in the measuring point list. Unit: defined in the command variable Unit.MV.Command name
MV.MPx.Command name (MeasValue.MPx.Command name)	Measured value at the x-th measuring point in the measuring point list. Unit: defined in the command variable Unit.MV.Command name
NBf.Command name (NumberOfBuffers.Command name)	Number of calibration solutions required for the calibration.
Slo.RS.Command name (Slope.Result.Command name)	The relative slope calculated from the calibration in relation to the ideal Nernst slope. Value range: 0 (inconclusive)–1 (exact match) Unit: None
Sst.Command name (State.Command name)	Execution status of the command. ▪ NOT_STARTED (20100): The command has not yet been started. ▪ RUNNING (20101): The command is executed. ▪ FINISHED (20102): The command has been ended.  The variable is displayed as text in the determination overview. The respective numerical value (2010x) is used in calculations.
Temp.Fin.Command name (Temperature.Final.Command name)	Temperature at the last measuring point in the measuring point list. Unit: °C

Variable name	Definition
Temp.MPx. <i>Command name</i> (Temperature.MPx. <i>Command name</i>)	Temperature at the x-th measuring point in the measuring point list. Unit: °C
Time.Fin. <i>Command name</i> (Time.Final. <i>Command name</i>)	Time stamp at the last measuring point in the measuring point list. Unit: s
Time.MPx. <i>Command name</i>	Time stamp at the x-th measuring point in the measuring point list. Unit: s
Unit.MV. <i>Command name</i> (Unit.MeasValue. <i>Command name</i>)	Unit of the measured value. Unit: mV
UOff. <i>Command name</i> (UOffset. <i>Command name</i>)	Offset potential that was determined from the calibration curve at a pH value of 7.0. Unit: mV
Var. <i>Command name</i> (Variance. <i>Command name</i>)	Measured value variance of the series. The variance is a measure for the dispersion of the data.
ZerPt. <i>Command name</i> (ZeroPoint. <i>Command name</i>)	The electrode zero point pH(0) of the electrode used, calculated from the calibration. Unit: None

Equipment variables

Table 9 Sensor

Variable name	Definition
Name.CurrSens. <i>Command name</i> (Name.CurrentSensor. <i>Command name</i>)	Name of the indicator electrode, i.e., the sensor that is used for measuring the required measured quantity.

Table 10 Solution

Variable name	Definition
Name.CurrCalSol. <i>Command name</i> (Name.CurrentCalibrationSolution. <i>Command name</i>)	Name of the calibration solution used.
Value.CurrCalSol. <i>Command name</i> (Value.CurrentCalibrationSolution. <i>Command name</i>)	pH value of the most recently measured calibration buffer. At the time of the calibration, one potential and the temperature are measured and compared to the buffer data of the calibration solution that is stored in the program. The pH value is interpolated based on the temperature.

4.1.2.1.4 Result commands – Overview

In a method, tap  to open the **Command library** window. Tap  next to **Results** to open a list with the available result commands.

The following result commands can be inserted into the method:

- **CALC** (*additional information*)
- **REPORT** (*additional information*)
- **TITER WRITE** (*additional information*)
- **CAL WRITE** (*additional information*)
- **EXPORT** (*additional information*)

The individual commands have **Command variables** that are generated in the process sequence and that can be used in formulas (*Additional information*).

4.1.2.1.4.1 CALC – Properties

Results are calculated with the **CALC** command.

-  The **CALC** command **cannot** be paused and **cannot** be skipped during execution.
- Only one result can be calculated per **CALC** command. If multiple results are to be calculated, then several **CALC** commands must be added.

After selecting the **CALC** command, the **Command properties** window opens by tapping on  *(Additional information)*.

The following parameters are available for the **CALC** command:

Parameters	
Formula	Formula that is used for the result calculation. Tapping the input field opens the formula editor, with which the calculation formula can be defined and edited (<i>Additional information</i>).
Unit	Unit that is displayed together with the result. The selected unit has no influence on the calculation, but is used instead for displaying the result in the formula editor's result field and in reports. Selection: µL, °C  All other units can be entered with the keyboard.

4.1.2.1.4.2 REPORT – Properties

With the **REPORT** command, a report can be saved as PDF file to a USB flash drive or printed out via a printer.

- The **REPORT** command **cannot** be paused and **cannot** be skipped during execution.
- In order for all relevant data to be recorded in the report, the **REPORT** command should be inserted at the end of the method. Pay particular attention that the **CAL WRITE** command or the **TITER WRITE** command is carried out **before** the **REPORT** command. Otherwise the data is not included in the report.

After selecting the **REPORT** command, tap  to open the **Command properties** window (*Additional information*).

The following parameters are available for the **REPORT** command:

Parameters	
Report template	Report template that is to be output (<i>Additional information</i>). ▪ Calibration ▪ Results
Output language	Language in which the report is to be output.
Execute with	
	Selection of the format in which the report is to be output. ▪ PDF file: The report is saved to the USB flash drive selected under USB connector. ▪ Printer: The report is printed out with the printer selected under Printer.
USB connector (only if PDF file is selected)	Selection of the USB connector to which the USB flash drive is connected and to which the report is to be saved. ▪ Assign automatically ▪ Front ▪ Rear top ▪ Rear bottom  ▪ Only the USB connectors to which a USB flash drive is connected are displayed in the selection. ▪ The Assign automatically function works only if exactly one USB flash drive is connected.

Execute with

Printer

Selection of the printer with which the report is to be printed out.

(only if **Printer** is selected)

- **Assign automatically**
- Name of the printer that was added to the overview list under **Equipment ► Instruments**.

 The **Assign automatically** function works only if exactly one printer is available.

4.1.2.1.4.3 TITER WRITE – Overview

The following contents are available for the TITER WRITE command:

- *TITER WRITE – Properties*
- *Save as titer*

4.1.2.1.4.3.1 TITER WRITE – Properties

The result of a titer determination of a connected solution is saved to the properties of the bottle cap used with the **TITER WRITE** command. The titer is the correction factor that indicates the deviation of the actual concentration of a titrant from the nominal concentration. The titer is specific to the respective titrant and is determined from the mean values of all subsamples of a sample.

When the titer is saved, the following data is stored in the memory location:

- Sample ID
- Titer
- Titer unit
- Time of titer determination
- Date of titer determination
- Number of subsamples (only with enabled statistics calculation)
- Mean value of the titer (only with enabled statistics calculation)
- Standard deviation of the titer (only with enabled statistics calculation)

Depending on the combination of instruments used, the titer data is saved to the following memory locations:

- **Dosing Drive** with connected **Cylinder Unit**: The titer data is saved to the RFID tag of the bottle cap.
- **Dosino Module** with connected **807 Dosing Unit**: The titer data is saved to the memory chip of the **807 Dosing Unit**.

In order for a **TITER WRITE** command to be executed, a titration command (DET, MET, SET or KFT) must be present in the same method. This titration command must be assigned to one of the following functional units under **Command properties** ► **Execute with** ► **Functional unit**:

- **Dosing Drive**

▪ Dosino Module

The desired solution must be connected to this functional unit with the corresponding storage medium (memory chip or RFID tag).

For the data of the titer determination to be written correctly, the following conditions must be fulfilled in the run:

- In the method, first a titration command (DET, MET, SET or KFT) and then a **CALC** command must be executed.
- It is only after these commands have been completed that a **TITER WRITE** command can be executed for which the corresponding titration command and the **CALC** command are referenced in its parameters.
- The **TITER WRITE** command must be executed **prior** to the **REPORT** command if a report is to be created in the method. Otherwise, the data cannot be displayed in the report.

 The **TITER WRITE** command **cannot** be paused and **cannot** be skipped during execution.

Parameters

After selecting the **TITER WRITE** command, the **Command properties** window opens by tapping on  *(Additional information)*.

The following parameters are available for the **TITER WRITE** command:

Parameters	
Referenced titration command	Selection of the titration command that was executed for the titer determination. All titration commands that were executed in the same method before the TITER WRITE command can be selected. The name of the titration command has to be unique and must not be used multiple times in the method.
Referenced CALC command	Selection of the CALC command that generates the results of the titer determination. These include: ▪ Mean value ▪ Decimal places ▪ Standard deviation ▪ Number of subsamples ▪ Titer unit All CALC commands that were executed in the same method before the TITER WRITE command can be selected. The name of the desired CALC command must be unique and must not be used multiple times in the method. To write the mean value, the number of subsamples, and the standard deviation of the titer, the check box Statistics must be activated in the selected CALC command.

4.1.2.1.4.3.2 Saving titer

With a titration command (DET, MET, SET oder KFT), a **CALC** command, and a **TITER WRITE** command, the titer of a connected solution can be determined and the result can be saved in the **Titer data** of the corresponding connected solution (*Additional information*).

Saving the result of a titer determination

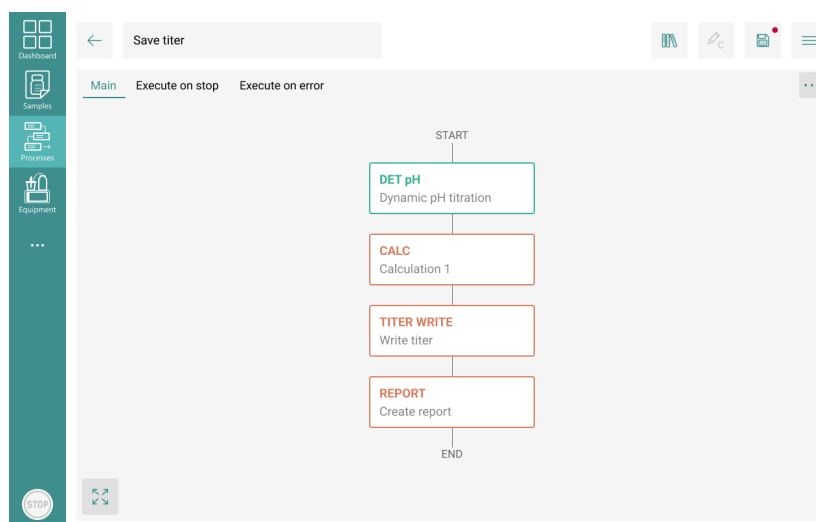
1 Creating a method

Under **Processes ► Methods**, create a new method (*Additional information*).

2 Adding commands

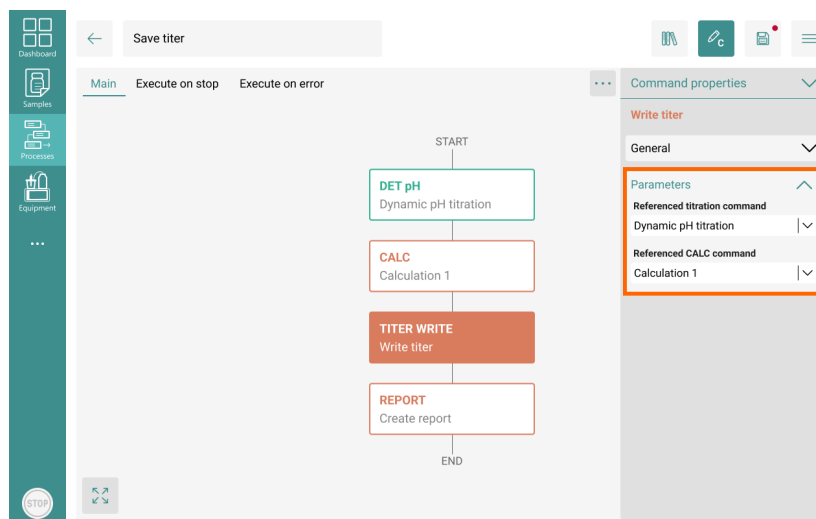
 The commands must be added in the following correct order.
Additional information on inserting commands into a method.

- Insert a titration command (DET, MET, SET or KFT) into the method and assign it a unique name.
- Insert a **CALC** command in the method and assign it a unique name.
To write the mean value, the number of subsamples, and the standard deviation of the titer, the **Statistics** check box must be activated in the **Command properties** of the **CALC** command.
- Insert a **TITER WRITE** command in the method.
- If a report is to be created in the method, then insert a **REPORT** command in the method.



3 Parameterizing the TITER WRITE command

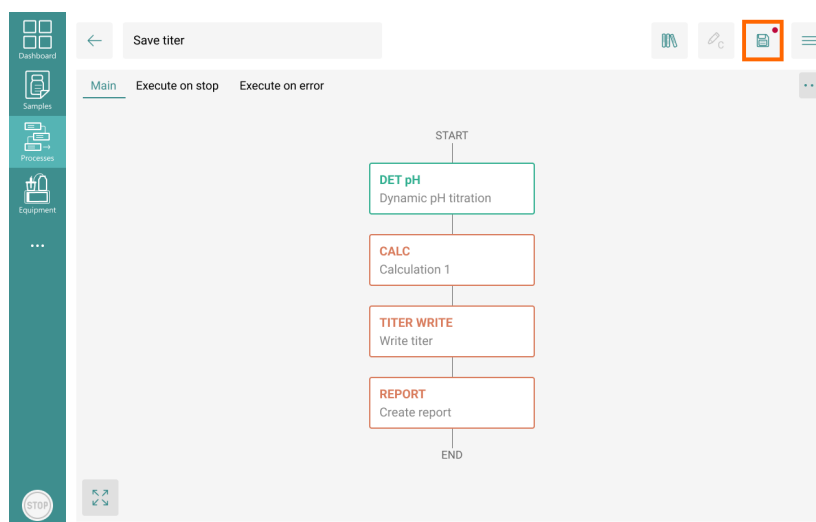
- Open the **Command properties** of the **TITER WRITE** command ([Additional information](#)).
- Open the **Parameters** section by tapping on ✓.
- Open the selection list under **Referenced titration command** by tapping on ✓ and select the desired titration command.
- Open the selection list under **Referenced CALC command** by tapping on ✓ and select the desired **CALC** command.



The **TITER WRITE** command is linked to the titration command and the **CALC** command.

4 Saving the method

Tap on  in the title bar to save the method.



- The **CAL WRITE** command must be executed prior to the **REPORT** command if a report is to be created in the method. Otherwise, the data cannot be displayed in the report.

 The **CAL WRITE** command **cannot** be paused and **cannot** be skipped during execution.

4.1.2.1.4.5 EXPORT – Properties

Determination data is exported as a CSV file with the **EXPORT** command.

 The **EXPORT** command **cannot** be paused and **cannot** be skipped during execution.

After selecting the **EXPORT** command, the **Command properties** window opens by tapping on  *(Additional information)*.

The following parameters are available for the **EXPORT** command:

Parameters	
Output language	Language in which the determination data is to be exported.
Format	Format in which the determination data is to be exported. ▪ CSV (default value)
Separator	Character to be used in the CSV file to separate the fields. ▪ Comma ▪ Semicolon (default value)
USB connector	Selection of the USB connector to which the USB flash drive is connected and to which the determination data is to be saved. ▪ Assign automatically ▪ Front ▪ Rear top ▪ Rear bottom  ▪ Only the USB connectors to which a USB flash drive is connected are displayed in the selection. ▪ The Assign automatically function works only if exactly one USB flash drive is connected.

4.1.2.1.4.6 Result commands – Command variables

The following variables are generated by the commands mentioned in the table in the process sequence and can be used in a formula under the designation '**Variable name.Command name**'.

The available variables can be found in the formula editor in the **Command variables** variable group (*Additional information*).

Variable name	Definition	Commands
SmplSetIdx. <i>Command name</i> (SampleSetIndex. <i>Command name</i>)	Index of the statistical sample used in the statistics.	CALC
SmplSetSizeCurr. <i>Command name</i> (SampleSetSizeCurrent. <i>Command name</i>)	Current number of subsamples that were taken into account in the statistics at the time of the determination.	CALC
SmplSetSizeTar. <i>Command name</i> (SampleSetSizeTarget. <i>Command name</i>)	The sample size defined in the method properties.	CALC
SD.Rs. <i>Command name</i> (StandardDeviation.Result. <i>Command name</i>)	Absolute standard deviation of the mean value of the results of all statistically related subsamples of the same method version at the time of determination.	CALC
Stt. <i>Command name</i> (State. <i>Command name</i>)	Execution status of the command. ▪ NOT_STARTED (20100): The command has not yet been started. ▪ RUNNING (20101): The command is executed. ▪ FINISHED (20102): The command has been ended.  The variable is displayed as text in the determination overview. The respective numerical value (2010x) is used in calculations.	All result commands
Sum.Rs. <i>Command name</i> (Sum.Result. <i>Command name</i>)	Sum of all results that were taken into account in the statistics at the time of the request.	CALC
SumOfSq.Rs. <i>Command name</i> (SumOfSquares.Result. <i>Command name</i>)	Sum of all squared deviations of the results taken into account in the statistics.	CALC

4.1.2.1.5 Liquid Handling commands – Overview

In a method, tap  to open the **Command library** window. Tap  next to **Liquid handling** to open a list with the available Liquid Handling commands.

The following Liquid Handling commands can be inserted in the method:

- **ADD** (*additional information*)
- **FILL** (*additional information*)
- **PREP** (*additional information*)

- **EMPTY** (*additional information*)
- **PISTON POS** (*additional information*)
- **PISTON END** (*additional information*)
- **VALVE POS** (*additional information*)

The individual commands have **Command variables** that are generated in the process sequence and that can be used in formulas (*Additional information*).

4.1.2.1.5.1 ADD – Properties

The **ADD** command can be used to dose a solution with a functional unit consisting of the dosing drive and piston buret.

After selecting the **ADD** command, the **Command properties** window opens by tapping on  **C** (*Additional information*).

The following parameters are available for the **ADD** command:

Parameters	
Dosing volume	Volume to be dosed. Input range: 0.00000–99'999.99000 Unit: mL Default value: 10.00000
Dosing rate	Rate at which the dosing volume is dosed. If the dosing rate entered here is higher than the Maximum rate dosing port of the piston buret used that is defined under Equipment ► Instruments ► Properties ► Dosing port, then the Maximum rate dosing port defined there will be used. If Maximum is selected, then the Maximum rate dosing port from the Equipment work area will be used. In addition, a check is made during execution as to whether the defined dosing rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced. Input range: 0.01–300.00 Selection: Maximum (default value) (<i>Additional information</i>) Unit: mL/min

Parameters

Filling rate

Rate at which the cylinder is filled.

If the filling rate entered here is higher than the **Maximum rate** of the piston buret used that is defined under **Equipment ► Instruments ► Properties ► Fill port**, then the **Maximum rate** defined there will be used.

If **Maximum** is selected, then the **Maximum rate** from the **Equipment** work area will be used.

In addition, a check is made during execution as to whether the defined filling rate exceeds the maximum permissible rate for the piston buret used. If this is the case, then the rate of the functional unit will be reduced.

If air bubbles occur during aspiration of the solution, then first check all the tubing connections. If a vacuum causes the air bubbles, then the air bubbles can be prevented by previously degassing the solution or by reducing the filling rate.

Input range: 0.01–300.00

Selection: **Maximum** (default value) ([Additional information](#))

Unit: mL/min

Execute with

Instrument for dosing

Selection of the control instrument that contains the dosing drive.

- **Assign automatically**
- Name of the **IONIC Titrator**
- Name of the **OMNIS Dosing Module**

Functional unit

Selection of the dosing drive connected to the control instrument.

- **Assign automatically**
- Name of the **Dosino Module**
- Name of the **Dosing Drive**

Dosing port

Selection of the dosing port through which the volume is to be dosed.

- **Dosing port 1** (default value): Port that is defined in the **Properties** of the piston buret as dosing port 1.
- **Dosing port 2**: Port that is defined in the **Properties** of the piston buret as dosing port 2.



The **Assign automatically** function only works if exactly one suitable instrument or one suitable functional unit is available for the respective parameter.

Parameters

Valve end position	Position on which the valve of the piston buret is located after dosing the solution. ▪ Fill port: The valve is positioned on the port that is defined as the fill port in the Equipment work area in the Properties of the piston buret. ▪ Exchange position (default value): The valve is positioned on the exchange position, i.e., on port 2.
---------------------------	---

Execute with

Instrument for dosing	Selection of the control instrument that contains the dosing drive. ▪ Assign automatically ▪ Name of the IONIC Titrator ▪ Name of the OMNIS Dosing Module
Functional unit	Selection of the dosing drive connected to the control instrument. ▪ Assign automatically ▪ Name of the Dosino Module ▪ Name of the Dosing Drive
Fill port	Selection of the fill port through which the cylinder is to be filled. ▪ Fill port (default value): Port that is defined as the fill port in the Properties of the piston buret. ▪ Special port: Port that is defined as a special port in the Properties of the piston buret.

 The **Assign automatically** function only works if exactly one suitable instrument or one suitable functional unit is available for the respective parameter.

4.1.2.1.5.3 PREP – Properties

The **PREP** command is used to rinse and then fill the cylinder and the tubings of the piston buret without air bubbles.

Metrohm recommends carrying out the **PREP** command or the **Preparing** (Manual control) function 1x per day for the piston burettes to be used.

 The **PREP** command **cannot** be paused and **cannot** be skipped during execution.

After selecting the **PREP** command, the **Command properties** window opens by tapping on

 *(Additional information)*.

The following parameters are available for the **PREP** command:

Execute with	
Instrument for dosing	Selection of the control instrument that contains the dosing drive. ▪ Assign automatically ▪ Name of the instrument for dosing
Functional unit	Selection of the dosing drive connected to the control instrument. ▪ Assign automatically ▪ Name of the Dosino Module ▪ Name of the Dosing Drive

4.1.2.1.5.4 EMPTY – Properties

The **EMPTY** command is used to empty the cylinder and the tubing of the piston buret.

 The **EMPTY** command **cannot** be paused and **cannot** be skipped during execution.

After selecting the **EMPTY** command, the **Command properties** window opens by tapping on  **C** (*Additional information*).

The following parameters are available for the **EMPTY** command:

Execute with	
Instrument for dosing	Selection of the control instrument that contains the dosing drive. ▪ Assign automatically ▪ Name of the IONIC Titrator ▪ Name of the OMNIS Dosing Module
Functional unit	Selection of the dosing drive connected to the control instrument. ▪ Assign automatically ▪ Name of the Dosino Module ▪ Name of the Dosing Drive

 The **Assign automatically** function only works if exactly one suitable instrument or one suitable functional unit is available for the respective parameter.

4.1.2.1.5.5 PISTON POS – Properties

The **PISTON POS** command is used to move the piston to the specified target position independently of the current position of the piston.

After selecting the **PISTON POS** command, the **Command properties** window opens by tapping on  *(Additional information)*.

The following parameters are available for the **PISTON POS** command:

Parameters

Target position

Position to which the piston is to be moved. The position depends on the functional unit.

Functional unit of the **Dosino Module** type:

- Position **0.00000**: If the 807 Dosing Unit is connected, then the piston of the Dosino Module is located at the top end of the working area of the cylinder. The cylinder is filled.
- Position **1.00000**: If the 807 Dosing Unit is connected, then the piston of the Dosino Module is located at the lower end of the working area of the cylinder. The cylinder is empty.

Functional unit of the **Dosing Drive** type:

- Position **0.00000**: If the cylinder unit OMNIS is connected, then the piston of the Dosing Drive is located at the top end of the working area of the cylinder. The cylinder is empty.
- Position **1.00000**: If the cylinder unit OMNIS is connected, then the piston of the Dosing Drive is located at the lower end of the working area of the cylinder. The cylinder is filled.

Input range: 0.00000–1.00000

Unit: None

Default value: 1.00000

Flow rate

Rate at which the piston is to be moved to the target position.

The flow rate must be reduced accordingly if viscous solutions are used or thinner tubing than the standard tubing is used.

 The maximum dosing rates and fill rates defined in the equipment are not taken into account with this command.

Input range: 0.0005–6.0000

Unit: 1/min

Default value: 6.0000

Execute with

Instrument for dosing	Selection of the control instrument that contains the dosing drive. ▪ Assign automatically ▪ Name of the instrument for dosing
Functional unit	Selection of the dosing drive connected to the control instrument. ▪ Assign automatically ▪ Name of the Dosino Module ▪ Name of the Dosing Drive
Dosing port	Selection of the dosing port through which the solution is to be dosed. ▪ Dosing port 1 (default value): Port that is defined in the Properties of the piston buret as dosing port 1. ▪ Dosing port 2: Port that is defined in the Properties of the piston buret as dosing port 2.

4.1.2.1.5.7 VALVE POS – Properties

The **VALVE POS** command is used for the port switching of the piston buret.



The **VALVE POS** command **cannot** be paused during execution.

After selecting the **VALVE POS** command, the **Command properties** window opens by tapping on *(Additional information)*.

The following parameters are available for the **VALVE POS** command:

Parameters

Target port	Port to which the valve disk opening is to be moved. ▪ Fill port (default value): Port that is defined as the fill port in the Properties of the piston buret. ▪ Dosing port 1: Port that is defined in the Properties of the piston buret as dosing port 1. ▪ Dosing port 2: Port that is defined in the Properties of the piston buret as dosing port 2. ▪ Special port: Port that is defined as a special port in the Properties of the piston buret. ▪ Port 1 ▪ Port 2 ▪ Port 3 ▪ Port 4
--------------------	---

Variable name	Definition	Commands
Fin. <i>Command name</i> (Finished. <i>Command name</i>)	The way in which the command was ended. ▪ NOT_FINISHED (21500): The command has not yet been ended. ▪ SUCCEEDED (21501): The command was ended normally. ▪ STOPPED (21502): The command was stopped by the user in the Live display work area or the emergency stop was activated. ▪ SKIPPED (21503): The command was skipped by the user in the Live display work area. ▪ CONFIRMED (21504): The user has confirmed the user action required by the command in the Live display work area (COND CHECK, REQUEST, WAIT). ▪ FAILED (21505): The command was canceled due to an error.  The variable is displayed as text in the determination overview. The respective numerical value (2150x) is used in calculations.	All Liquid Handling commands
Stt. <i>Command name</i> (State. <i>Command name</i>)	Execution status of the command. ▪ NOT_STARTED (20100): The command has not yet been started. ▪ RUNNING (20101): The command is executed. ▪ FINISHED (20102): The command has been ended.  The variable is displayed as text in the determination overview. The respective numerical value (2010x) is used in calculations.	All Liquid Handling commands
Vol.Fin. <i>Command name</i> (Volume.Final. <i>Command name</i>)	End volume after processing the command, i.e., total dosed volume at the end of the command. Unit: mL	ADD

Equipment variables

Table 11 Piston buret

Parameters

Stirring level Stirring level with which the stirring rate of the stirrer is set.
Input range: 1–15

Stirring direction Direction in which the stirrer rotates.

- **Counterclockwise**
- **Clockwise**

Execute with

Instrument Selection of the control instrument that contains the stirrer.

- **Assign automatically**
- Instrument name

Functional unit Selection of the stirrer connected to the control instrument or installed in the control instrument.

- **Assign automatically**
- **Magnetic Stirrer**
- **OMNIS Rod Stirrer**

4.1.2.1.6.2 WAIT – Properties

The **WAIT** command can be used to interrupt the process sequence for a defined time period or until the user has confirmed.

After selecting the **WAIT** command, the **Command properties** window opens by tapping on  *(Additional information)*.

The following parameters are available for the **WAIT** command:

Parameters

Wait mode

- **Wait for user action** (default value): Wait until the user taps the **[Confirm]** button in the **Live display** work area.
- **Predefined waiting time**: Wait until the time defined in the **Waiting time** parameter has expired.

Waiting time Waiting time after which the process sequence is continued.

(only if **Predefined waiting time** is selected)

 The predefined waiting time is stopped when a **WAIT** command is held. Once the **WAIT** command is continued, the waiting time will continue to run again.

Input range: 0.0–9,999

Unit: s

Default value: 1

4.1.2.1.6.4.1 IF – Concept

The **IF** command is used to execute a part of a method, depending on the condition defined in the **IF** command.

The command sequences can be defined sequentially and in parallel (*Additional information*). The command sequence ends as soon as the last command within the **IF** command has finished.

THEN and ELSE

The command sequence is defined under **THEN**, which is executed only if the condition defined in the **IF** is met. The **THEN** instruction is mandatory.

The command sequence is defined under **ELSE**, which is executed only if the condition defined in the **IF** is **not** met. The **ELSE** instruction is optional.

Hiding or displaying the command sequence

The command sequence defined in the **IF** command is closed by tapping on .

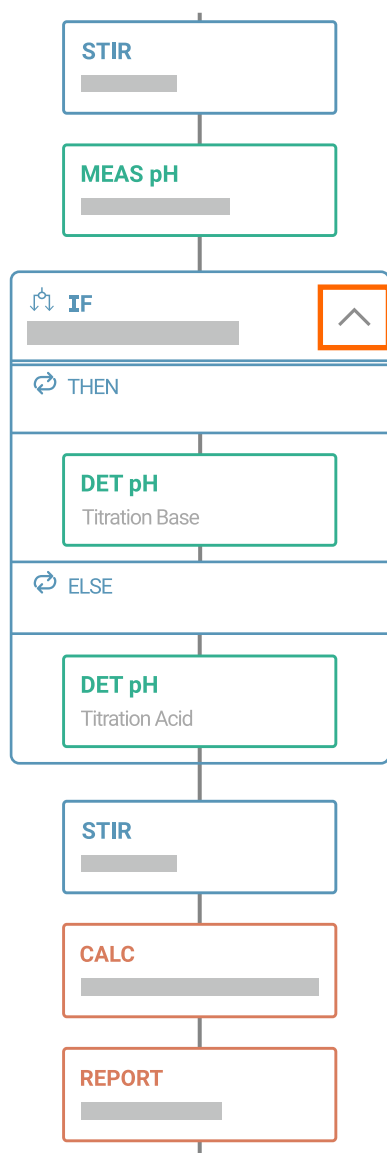
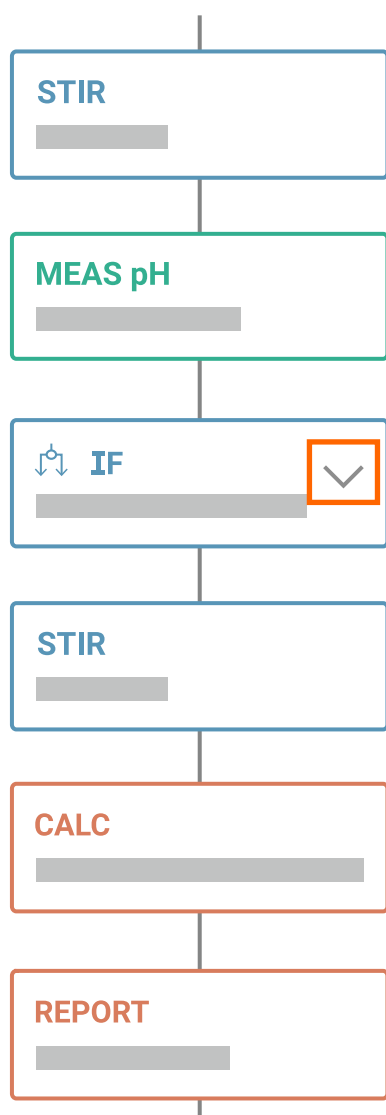


Figure 12 Example of sequential run

The command sequence defined in the **IF** command is opened by tapping on .



4.1.2.1.6.4.2 IF – Properties

The **IF** command is used to execute a part of a method, depending on the condition defined in the **IF** command.

 The **IF** command **cannot** be paused and **cannot** be skipped during execution.

After selecting the **IF** command, the **Command properties** window opens by tapping on  [\(Additional information\)](#).

The following parameters are available for the **IF** command:

Parameters

Condition

Condition for executing the command sequence in the **IF** command.

Tapping the input field opens the formula editor, in which the condition can be defined or edited (*Additional information*).

- If the condition is met, then the command sequence defined in the **IF** command under **THEN** will be executed. The method then continues to run as defined in the method editor.
- If the condition is not met, then the command sequence defined in the **IF** command under **ELSE** will be executed. The method then continues to run as defined in the method editor.

If an error occurs when calculating the condition, then the **IF** command will be skipped and the method will continue to run as defined in the method editor.

4.1.2.1.6.5 LOOP – Overview

The following contents are available for the LOOP command:

- *LOOP – Concept*
- *LOOP – Properties*

4.1.2.1.6.5.1 LOOP – Concept

The **LOOP** command can be used to define a command sequence that is to be carried out repeatedly.

The command sequences can be defined sequentially and in parallel ([Additional information](#)). The command sequence ends as soon as the last command within the **LOOP** command has finished.

Hiding or displaying the command sequence

The command sequence defined in the **LOOP** command is hidden by tapping on .

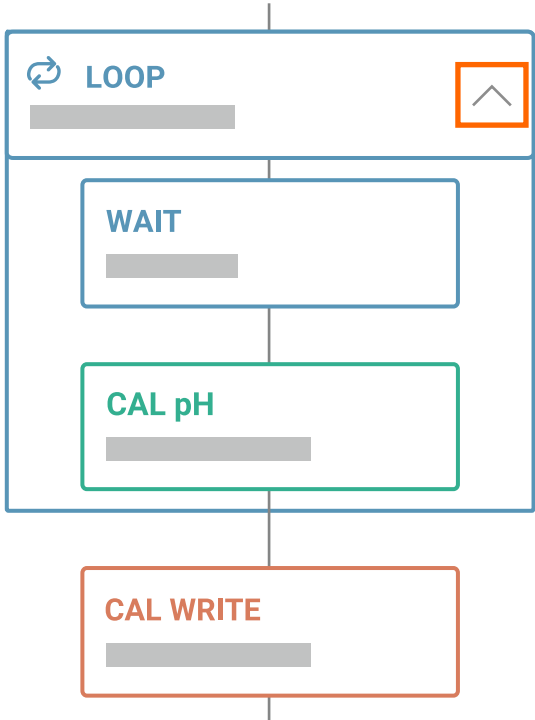
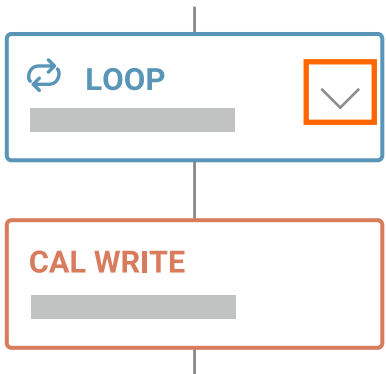


Figure 13 Example of sequential run

The command sequence defined in the **LOOP** command is displayed by tapping on .



4.1.2.1.6.5.2 LOOP – Properties

The **LOOP** command can be used to define a command sequence that is to be carried out repeatedly.

 The **LOOP** command **cannot** be paused and **cannot** be skipped during execution.

After selecting the **LOOP** command, the **Command properties** window opens by tapping on  *(Additional information)*.

The following parameters are available for the **LOOP** command:

Parameters	
Mode (only if Enter number is selected)	Exit condition that causes the command sequence to stop repeating. ▪ Enter number: The defined number of runs is checked at the beginning of each run. ▪ At the start of a run: The defined condition is checked at the beginning of each run. ▪ At the end of a run: The defined condition is checked at the end of each run so that the command sequence runs at least once.
Number of runs (only if Enter number is selected)	Number of runs for the command sequence defined in the LOOP command. The command sequence is ended as soon as the defined number of runs has been reached. Input range: 0–99
Condition (only if At the start of a run or At the end of a run is selected)	Condition for executing the command sequence. Tapping the input field opens the formula editor, in which the condition can be defined or edited (Additional information). The command sequence is repeated for as long as the condition is met. The command sequence ends as soon as the condition is no longer met.

 If a parameter is defined via a formula and an error occurs during the determination in the calculation, then the **LOOP** command will be skipped and the process sequence will be continued.

4.1.2.1.6.6 SEQUENCE – Concept

The **SEQUENCE** command is used to merge commands in a subordinate command sequence. This command sequence is executed completely before the next command is executed in the method.

The command sequences can be both sequential and parallel (*Additional information*). The command sequence ends as soon as the last command within the **SEQUENCE** command has finished.

 The **SEQUENCE** command **cannot** be paused and **cannot** be skipped during execution.

Hiding or displaying the command sequence

The command sequence defined in the **SEQUENCE** command is hidden by tapping on .

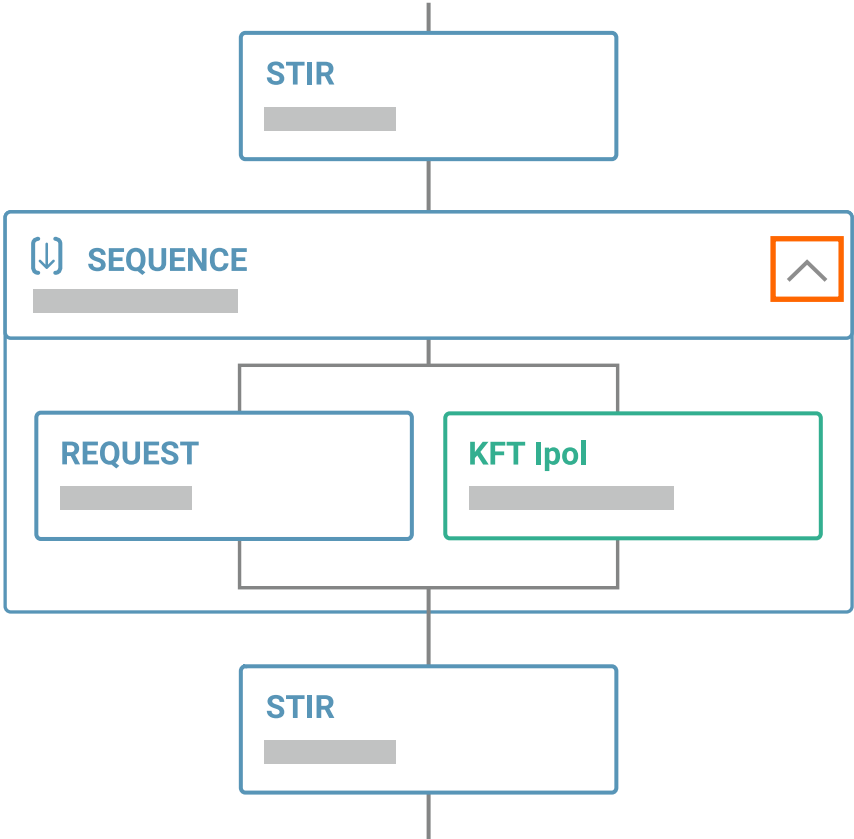


Figure 14 Example of parallel run

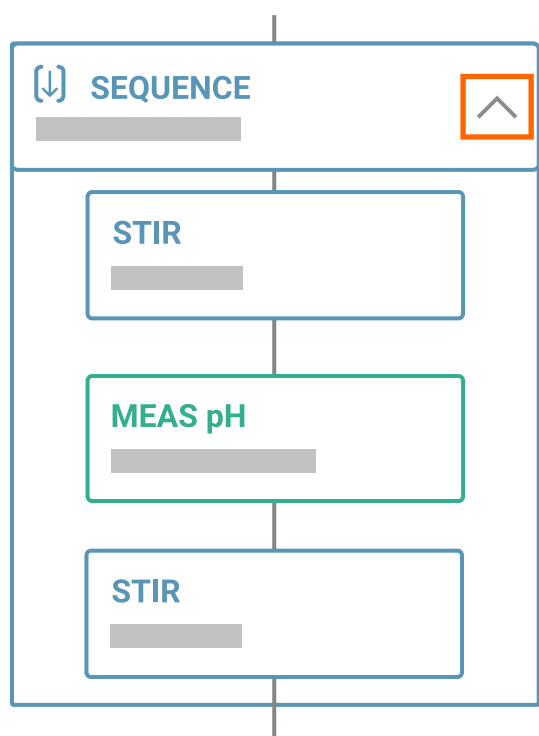


Figure 15 Example of sequential run

The command sequence defined in the **SEQUENCE** command is displayed by tapping on .



4.1.2.1.6.7 NOTIFY – Properties

The **NOTIFY** command, can be used to send notifications by e-mail through the IONIC app.

 The **NOTIFY** command **cannot** be paused and **cannot** be skipped during execution.

To be able to use the **NOTIFY** command, all of the notification settings must first be implemented under **Settings ► General ► E-mail notifications** and a connection to the e-mail server must be set up (*Additional information*).

The **NOTIFY** command can be used in combination with other commands (e.g., **IF** command) to dispatch an automatic notification when a particular event occurs.

 There is a risk of triggering many notifications when the **NOTIFY** command is used in combination with a **LOOP** command.

After selecting the **NOTIFY** command, the **Command properties** window opens by tapping on  *(Additional information)*.

The following parameters are available for the **NOTIFY** command:

Parameters	
Recipient	E-mail address of the notification recipient. The e-mail address must have the following format: name@example.com The maximum character length in the input field is 100 characters.
Subject	Subject line of the notification. If the field remains empty, then the notification is dispatched without a subject. The maximum character length in the input field is 100 characters.
Notification	Input field for the notification that is dispatched to the recipient as an e-mail when the command is executed. The maximum character length in the input field is 500 characters.  Variables and formulas can be entered with the keyboard if necessary. The following syntax options are available so that the value of the variable or formula is displayed in the e-mail: ▪ %{'Variable name'} ▪ \${'Variable name'} Example: The sample has an effective consumption of %{'Vol.EP1.Command name' – 'Blank.System'} mL.

4.1.2.1.6.8 READ/WRITE – Properties

The **READ/WRITE** command can be used to read data from an external instrument (READ) or to send data to an external instrument (WRITE) that is connected to the IONIC main instrument via USB/RS-232 Converter.

 The **READ/WRITE** command **cannot** be paused and **cannot** be skipped during execution.

After selecting the **READ/WRITE** command, the **Command properties** window opens by tapping on  *(Additional information)*.

Execute with**Instrument**

Selection of the Serial Device, which is connected to the IONIC main instrument via USB/RS-232 Converter.

- **Assign automatically**
- Name of the Serial Device which was added to the overview list under **Equipment ► Instruments**.

 The **Assign automatically** function works only if exactly one suitable instrument of the **Serial Device** type is available.

4.1.2.1.6.9 Additional commands – Command variables

The following variables are generated by the commands mentioned in the table in the process sequence and can be used in a formula under the designation '**Variable name.Command name**'.

The available variables can be found in the formula editor in the **Command variables** variables category ([Additional information](#)).

Variable name	Definition	Commands
Dur.Command name (Duration.Command name)	Total duration for the processing of the command. Unit: s	STIR, WAIT, REQUEST, LOOP, NOTIFY, READ/WRITE
Fin.Command name (Finished.Command name)	The way in which the command was ended. ▪ NOT_FINISHED (21500): The command has not yet been ended. ▪ SUCCEEDED (21501): The command was ended normally. ▪ STOPPED (21502): The command was stopped by the user in the Live display work area or the emergency stop was activated. ▪ SKIPPED (21503): The command was skipped by the user in the Live display work area. ▪ CONFIRMED (21504): The user has confirmed the user action required by the command in the Live display work area (COND CHECK, REQUEST, WAIT). ▪ FAILED (21505): The command was canceled due to an error.	STIR, WAIT, REQUEST, NOTIFY, READ/WRITE
 The variable is displayed as text in the determination overview. The respective numerical value (2150x) is used in calculations.		

Variable name	Definition	Commands
LpCnt. <i>Command name</i> (LoopCount. <i>Command name</i>)	Number of repeated run sequences of the LOOP command.	LOOP
Stt. <i>Command name</i> (State. <i>Command name</i>)	Execution status of the command. ▪ NOT_STARTED (20100): The command has not yet been started. ▪ RUNNING (20101): The command is executed. ▪ FINISHED (20102): The command has been ended.  The variable is displayed as text in the determination overview. The respective numerical value (2010x) is used in calculations.	STIR, WAIT, REQUEST, NOTIFY, READ/WRITE
RV. <i>Command name</i> (ReadValue. <i>Command name</i>)	Character string (unparsed) that is sent over the RS-232 interface by an external instrument. Unit: None	READ/WRITE

4.1.2.2 Method properties – Overview

- Definition
- Overview
- Subsample data
- Statistics settings

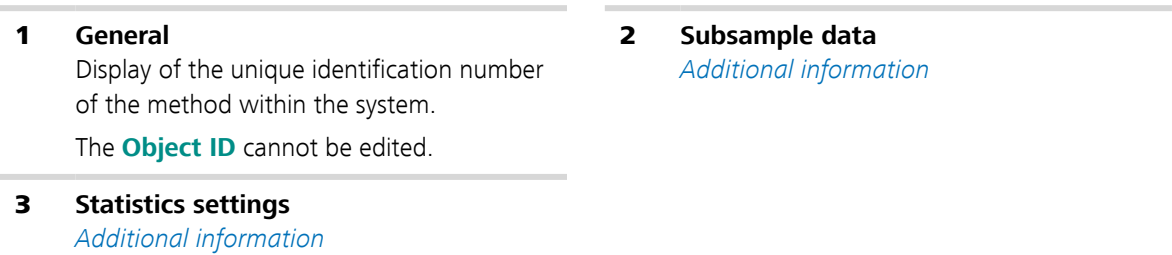
Tap **Method properties** to open the **Method properties** window in the open  menu in a method. Tap  to open the individual sections.

Definition

The general properties of the method can be viewed in the **Method properties**, and **Subsample data** and **Statistics settings** can be defined.

Overview

The following information is displayed in the **Method properties**:



Variable name	Name of the user-defined variable.
(only for user-defined subsample data)	The maximum character length in the input field is 32 characters. When a variable is added, the New variable name is stored by default.

Type (only for user-defined subsample data)	Type of variable. ▪ Integer: Number without decimal places. ▪ Real number (default value): Number with or without decimal places. ▪ Text
Minimum value (only for Integer and Real number)	Minimum possible value that can be entered for the variable in the sample list or in the request of the REQUEST command. Input range: -1,000'000.00000–1,000'000.00000 Default value: -1,000'000.00000
Maximum value (only for Integer and Real number)	Maximum possible value that can be entered for the variable in the sample list or in the request of the REQUEST command. Input range: -1,000'000.00000–1,000'000.00000 Default value: 1,000'000.00000
Default value	Value that is defined in the variable by default. Input range: -1,000'000.00000–1,000'000.00000 Default value: 1.00000
Unit (only for Integer and Real number)	Unit of the value that is stored in the variable.
Display in sample list	Optional display of the variable in the sample list.
Editable (only if Display in sample list is activated)	Optional editability of the variable in the sample list.
 (only for user-defined subsample data)	Tap  to permanently delete the user-defined variable.

 Values that are entered in the request of a **REQUEST** command overwrite the value of the variable in the sample list.

Statistics settings

The **Statistical sample type** can be defined in the statistics settings. The **N** sample set size for the statistics is defined with the Statistical sample type. The sample set size indicates the number of single results that is required for the statistics. Only calculations with valid results are counted

in the sample set size. A calculation can be carried out with each **CALC** command and this yields the single result.

 The statistics are displayed in the sample overview ([Additional information](#)).

Unlimited	All single results of the calculations of the affected CALC command are displayed in a statistics entry. In the sample overview, the N sample set size increases together with the number of single results.
Exact	Exactly the number of single results defined under N is required for the statistics. As soon as the number of single results corresponds to the defined N sample set size, no further determinations can be carried out that would generate additional results for this statistics entry.
Minimum	At a minimum, the number of single results defined under N is required for the statistics. As soon as the number of single results exceeds the defined N sample set size, the N sample set size in the sample overview increases together with the additional number of single results.
N (only for Exact and Minimum)	Exact or minimum number of required single results for the statistics. Input range: 1–20 Default value: 3

4.1.2.2.1 Creating a Subsample data

Video tutorial for creating subsample data:



- 1 Opening the method properties**
 Tap  and select **Method properties** in the title bar of the method editor.
- 2 Opening the user-defined subsample data**
 Tap  under **Subsample data ▶ User-defined**.



3 Creating a variable

Tap **[Create new]**.

4 Naming the variable

- Tap the default name under **Variable name** and delete with .
- Enter the desired name and confirm with .

5 Defining the parameters

Define the additional parameters as desired (*Additional information*).

6 Saving a method

Tap  in the title bar to save the changes.

If **Display in sample list** is activated, then the variable under **Samples ▶ Sample lists** will be displayed in an additional line in the subsample with the correspondingly assigned method. The additional line is opened by tapping  and the additional line is closed by tapping .

4.1.2.3 Command properties – Overview

In a method, the **Command properties** window opens after selecting the desired command by tapping  C. The individual sections open by tapping .

- *Definition*
- *Overview*
- *General*
- *Parameters*
- *Execute with*

Definition

The properties of the currently selected command can be viewed and edited in the **Command properties**. Depending on the command, various properties are available, which are explained in greater detail in the **Help** in the respective command properties.

Overview

The following information is displayed in the **Command properties** window:

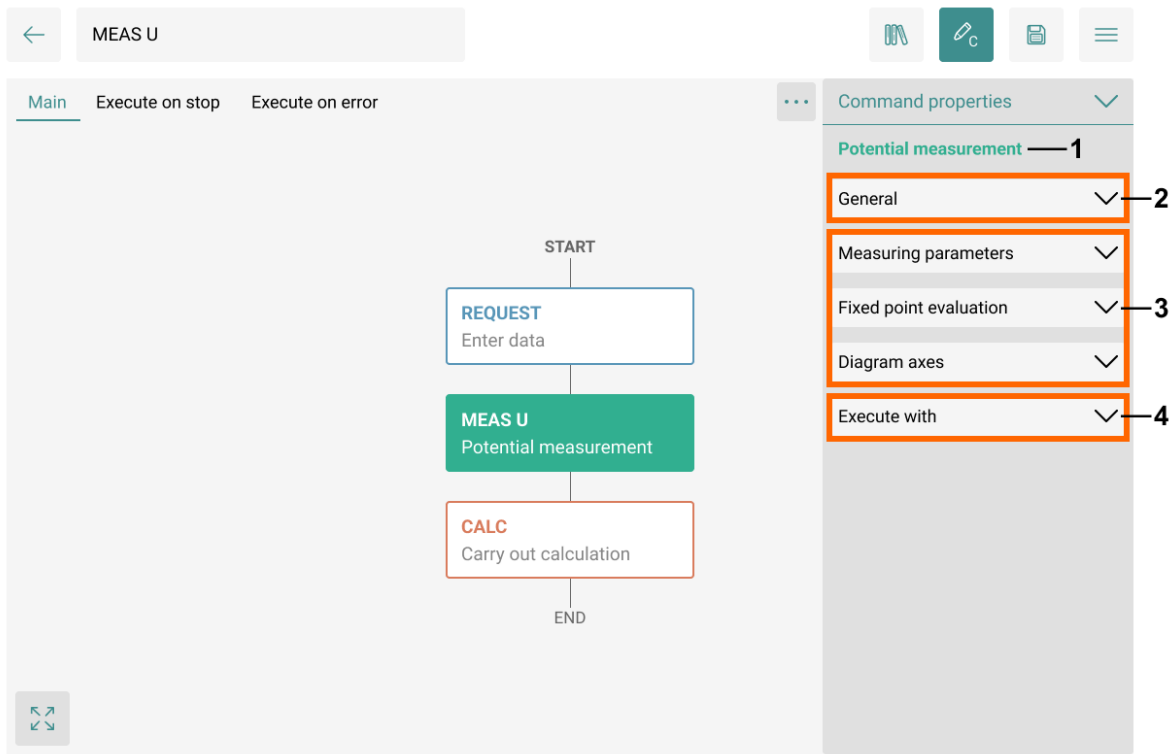


Figure 16 Example Command properties MEAS U

1 Command name Shows the defined command name.	2 General Visible with each command and contains Name and Object ID of the command. <i>Additional information</i>
3 Parameters Depending on the command, different parameters are available for individual adjustment. <i>Additional information</i>	4 Execute with Depending on the command, functional units can be assigned to the command. <i>Additional information</i>

General

Name	Unique name of the command. The maximum character length in the input field is 32 characters. In the event that a command is renamed afterwards, the references to this command (e.g., command variables) will be adjusted automatically within the method.  The references cannot be adjusted automatically under certain circumstances. In this case, a message appears while saving the method with notes on how to solve the problem.
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Object ID

Unique identification number of the command within the system.

The Object ID cannot be edited.

Parameters

Depending on the command, various parameters are available that can be individually adjusted. For certain commands (e.g., for dosing commands), the information under **Equipment ► Instruments** in the **Properties** of the functional unit must be observed.

 Additional information on the specific command parameters can be found in the **Help** in the respective command properties (*Additional information*).

Execute with

If the functional units contained in the equipment can be uniquely assigned to the individual commands, then this assignment will happen automatically. If multiple functional units of the same type are available with which the command can be executed, then the system cannot uniquely assign the functional unit. In such cases, the functional unit must be assigned to the command manually.

 Additional information on the **Execute with** section can be found in the **Help** in the respective command properties (*Additional information*).

4.1.2.3.1 Maximum rate – Calculation

The maximum rate (**Dosing rate** and **Filling rate**) for piston burets depends on the cylinder volume. The maximum rate is calculated with the following formula: $6 \times \text{cylinder volume} / \text{min}$.

Cylinder volume in mL	Maximum rate in mL/min
2	12.00
5	30.00
10	60.00
20	120.00
50	300.00

 If viscous solutions are dosed or if tubing is used that is thinner than standard tubing, then the rate needs to be reduced accordingly so that the dosing drive is not overloaded.

4.1.2.3.2 Evaluations – Overview

The following evaluations can be defined for certain commands in the **Command properties** or in the **Reevaluation**:

- Potentiometric evaluation for **DET** commands and **MET** commands (*Additional information*)
- Fixed point evaluation for titration commands and measuring commands (*Additional information*)

4.1.2.3.2.1 Potentiometric evaluation

The potentiometric evaluation can be defined in the **Command properties** and modified in the **Reevaluation** for **DET** commands and **MET** commands.

The potentiometric evaluation is carried out in 3 phases:

1. EP localization: Regardless of the parameters, all possible equivalence points are localized.
2. EP evaluation: The localized equivalence points are evaluated using the defined EP criterion.
3. EP recognition: Of the equivalence points evaluated, only those that correspond to the selected filter of the **EP recognition** are recognized.

Additional information on the principle of potentiometric evaluation for DET commands.

Additional information on the principle of potentiometric evaluation for MET commands.

Parameters

The following parameters can be defined for the **Command properties** in the **Potentiometric evaluation** of the **DET** commands and **MET** commands:

Type	Selection as to whether the potentiometric evaluation is to be carried out over the entire titration range (Regular) or only in defined segments of the titration curve (Window-based).
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Regular evaluation

If the option **Regular** has been selected under **Selection of the type**, then the following parameters can be defined:

EP criterion (only for DET, MET U, MET Ipol, and MET Upol) EP criterion pH (only for MET pH)	Threshold value for the evaluation of equivalence points. If the calculated ERC value (Equivalence point Recognition Criterion) is smaller than the defined threshold value, then the affected equivalence points will be discarded. The other equivalence points are valid and are considered to be evaluated. - Only for DET: Input range: 0–200 Unit: None Default value: 5 - Only for MET pH: Input range: 0.10–9.99 Unit: None Default value: 0.50 - Only for MET U and MET Ipol: Input range: 1–999 Unit: mV Default value: 30 - Only for MET Upol: Input range: 0.1–99.9 Unit: µA Default value: 2.0
EP recognition	Filter for the recognition of equivalence points for regular evaluation. All: All evaluated equivalence points are recognized. Greatest: Of the evaluated equivalence points, only the equivalence point with the largest ERC is recognized (i.e., in the steepest curve section). Last: Of the evaluated equivalence points, only the last is recognized. Off: The evaluation and recognition of equivalence points will be switched off.

Window-based evaluation

If the option **Window-based** has been selected under **Selection of the type**, then the following parameters can be defined:

Type of window evaluation

Selection on which axis the segments for the evaluation are to be defined.

- **Measured value window** (y-axis)
- **Volume window** (x-axis)

 The selection is valid for all defined windows.

Create new

A maximum of 9 windows can be defined by tapping on **[Create new]**.

A window can be deleted by tapping on .

 The previous window definitions are retained when the window type is switched.

The following parameters can be defined for each window:

- The areas of the individual windows must not overlap. This means that the lower limit of the next window to be defined must always be larger than the upper limit of the existing windows.
- A maximum of one equivalence point can be recognized per evaluation window. If an equivalence point is recognized in the window, then this equivalence point receives the index of the window as an EP index.

Lower limit

(only for **DET U**, **DET Ipol**, **DET Upol**, **MET U**, **MET Ipol**, and **MET Upol**)

The lower limit defines the first value within the window and thus belongs within the defined range.

The input range and the unit differ, depending on the **Type of window evaluation** and command.

Lower limit pH

(only for **DET pH** and **MET pH**)

- Only if **Measured value window** is selected:

- Only for **DET pH** and **MET pH**:
Input range: –20.000 to 20.000
Unit: None
Default value: –20.000
- Only for **DET U**, **DET Ipol**, **MET U**, and **MET Ipol**:
Input range: –2,000.0 to 2,000.0
Unit: mV
Default value: –2,000.0
- Only for **DET Upol** and **MET Upol**:
Input range: –200.00 to 200.00
Unit: µA
Default value: –200.00

- Only if **Volume window** is selected:
Input range: 0.00000–9'999.99000
Unit: mL
Default value: 0.00000
-

4.1.2.3.2.2 Fixed point evaluation

The Fixed point evaluation can be activated with the titration commands and measuring commands in the **Command properties** or in the **Reevaluation**.

A new fixed point can be created by tapping on **[Create new]**. Up to 9 fixed points can be defined.

A fixed point can be deleted again by tapping on .

Principle

With the fixed point evaluation, fixed points can be determined with the data from the measuring point list and they can then be used to calculate results, for example. A fixed point can be defined using one of the following 3 quantities:

- Measured value (pH value, potential, voltage, current or temperature)
- Volume (only for titration commands)
- Time

The measured values of the two other quantities (titration commands) or the respective other quantity (measuring commands) are calculated and are available as variables.

Parameters

The following parameters can be defined for each fixed point in the **Command properties** of the titration commands and measuring commands:

Fixed point evaluation	▪ : The titration should be carried out without Fixed point evaluation. ▪ : The titration should be carried out with Fixed point evaluation. The fixed points can be defined.
Create new	A new fixed point can be defined by tapping on [Create new] .

Quantity

Selection of the specified quantity for the fixed point evaluation from the measuring point list:

Only for **DET pH**, **MET pH**, **SET pH**, **MEAS pH**:

- **pH**
For the specified pH value, the values **Time**, **Temperature**, and **Volume** (for titration commands only) are interpolated from the measuring point list.
- **Time**
The values **pH**, **Temperature**, and **Volume** (only for titration commands) are interpolated from the measuring point list for the specified time.
- **Volume** (only for titration commands)
The values **pH**, **Time**, and **Temperature** are interpolated from the measuring point list for the specified volume.

Only for **DET U, MET U, SET U, MEAS U**:

- **Potential**
The values **Time**, **Temperature**, and **Volume** (only with titration commands) are interpolated from the measuring point list for the specified potential.
- **Time**
The values **Potential**, **Temperature**, and **Volume** (only for titration commands) are interpolated from the measuring point list for the specified time.
- **Volume** (only for titration commands)
The values **Potential**, **Time**, and **Temperature** are interpolated from the measuring point list for the specified volume.

Only for **DET Ipol**, **MET Ipol**, **SET Ipol**, **KFT Ipol**, **MEAS Ipol**:

- **Potential**
The values **Time**, **Temperature**, and **Volume** (only with titration commands) are interpolated from the measuring point list for the specified voltage.
- **Time**
The values **Potential**, **Temperature**, and **Volume** (only for titration commands) are interpolated from the measuring point list for the specified time.
- **Volume** (only for titration commands)
The values **Potential**, **Time**, and **Temperature** are interpolated from the measuring point list for the specified volume.

Only for **DET Upol**, **MET Upol**, **SET Upol**, **KFT Upol**, **MEAS Upol**:

- **Current**
The values **Time**, **Temperature**, and **Volume** (only with titration commands) are interpolated from the measuring point list for the specified current.
- **Time**
The values **Current**, **Temperature**, and **Volume** (only for titration commands) are interpolated from the measuring point list for the specified time.
- **Volume** (only for titration commands)
The values **Current**, **Time**, and **Temperature** are interpolated from the measuring point list for the specified volume.

Only for **MEAS T**:

- **Temperature**
The value **Time** is interpolated from the measuring point list for the specified temperature.
- **Time**
The values **Temperature** are interpolated from the measuring point list for the specified time.

Fixed point

Specified measured value for the fixed point evaluation.

Fixed point pH

Input range:

(only for **DET pH**, **MET pH**, **SET pH**, **MEAS pH**)

- **Time**: 0.0–999,999.9
- **Volume**: 0.00000–9'999.99000
- **Potential** and **Potential**: –2,000.0 to 2,000.0
- **pH**: –20.000 to 20.000
- **Current**: –200.0 to 200.00
- **Temperature**: –20.0 to 150.0

Unit:

- **Time**: s
- **Volume**: mL
- **Potential** and **Potential**: mV
- **pH**: none
- **Current**: µA
- **Temperature**: °C

Default value:

- **Time**: 0.0
- **Volume**: 0.00000
- **Potential** and **Potential**: 0.0
- **pH**: 0.000
- **Current**: 0.00
- **Temperature**: 25.0

4.1.2.4 Execute on error – Definition

In the method editor, a command sequence can optionally be defined in the **Execute on error** section in case the determination is canceled by an error. In the event of an error, the defined command sequence is executed before the determination cancellation. In this way, for example, running stirrers can be switched off in the event of an error.



If an error occurs when executing a command sequence of the **Execute on error** type or if the determination is stopped manually, then the command sequence will be canceled immediately.

4.1.2.5 Execute on stop – Definition

In the method editor, a command sequence can optionally be defined in the **Execute on stop** section in the event that the determination is stopped manually. In the case of a stop, the defined command sequence is executed before the determination stop. In the case of a stop, for example, serial instruments that are running can be switched off.



- If an error occurs during the execution of a command sequence of the **Execute on stop** type, then the **Execute on error** run will be executed.
- If the emergency stop is activated while executing a command sequence of the **Execute on stop** type, then the command sequence will be stopped.

4.1.2.6 Command – Definition

- *General*
- *Display*
- *Command variables*

General

Commands are modules for representing the analysis process in a method. Commands have the following properties:

- **Command type**
The command type defines the function of the command. For titration commands, measuring commands and calibration commands, the measured quantity in the command type is also named. The designation of the command type is language-neutral (i.e. the abbreviated designation is in English for all languages) and cannot be changed.
- **Name**
Each command has a freely definable command name that can be entered under **Processes ► Methods** in the **Command properties** window (*Additional information*).

 Most commands can be paused and skipped manually while executing methods. If this is not possible, this will be pointed out in the **Help** in the command properties of the respective command.

Display

Commands are displayed in two-line format. The first line contains the name of the command type (e.g., **DET pH**, **CALC**), the second line contains the freely definable command name.

The commands are classified into command groups and are highlighted in different colors accordingly.

- Standard: The command is not selected.
- Selected: The command has been tapped.
- Active: The command properties are open.

Command group	Display		
	Standard	Selected	Active
Titration Measurement Calibration			
Results			

Command group	Display		
Liquid handling			
Other			

Command variables

Each command has at least one command variable that is created in the process sequence and can be used under the 'Variable name.Command name' designation in a formula.

Additional information on the command variables:

- Command variables for titration commands ([Additional information](#))
- Command variables for measuring commands ([Additional information](#))
- Command variables for calibration commands ([Additional information](#))
- Command variables for result commands ([Additional information](#))
- Command variables for Liquid Handling commands ([Additional information](#))
- Command variables for additional commands ([Additional information](#))

4.1.2.6.1 Adding commands

Video tutorial for adding commands:



- [Add commands](#)
- [Add commands using drag and drop](#)
- [Add commands by tapping](#)



All commands can be moved within the method using drag and drop.

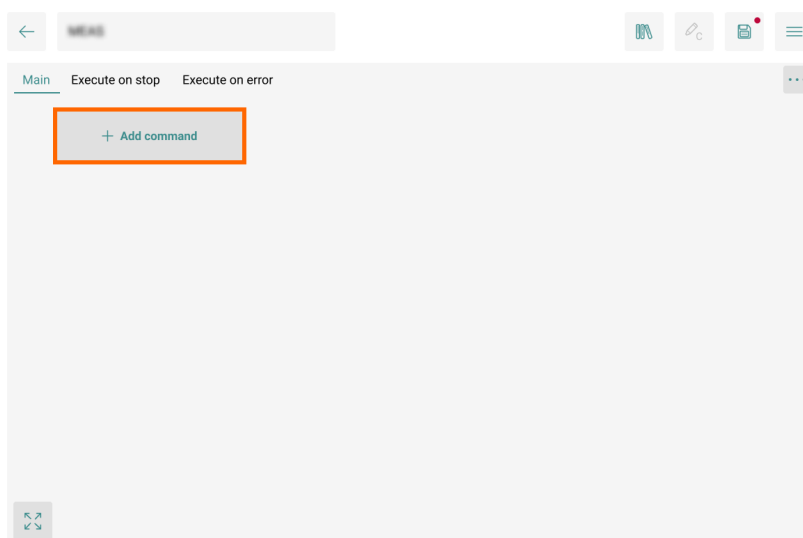
Adding commands

Prerequisite:

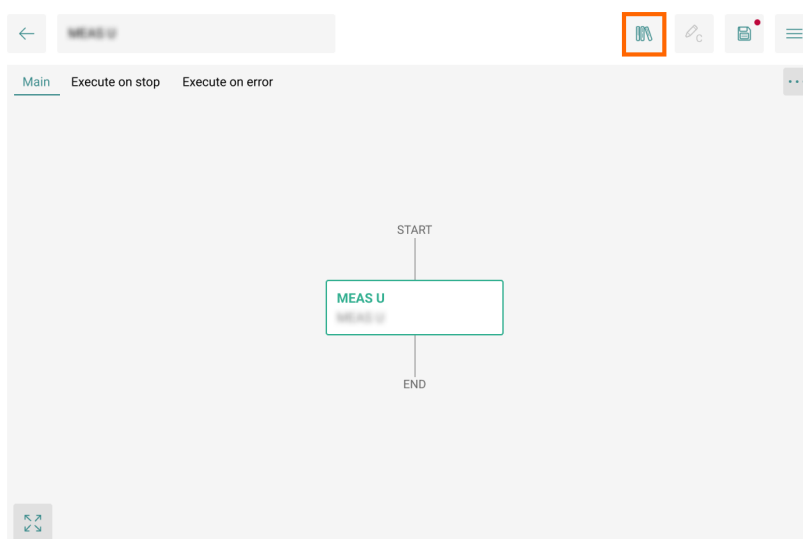
- The desired method is open ([Additional information](#)).

1 Opening the command library

Tap on **Add command** for an empty method.

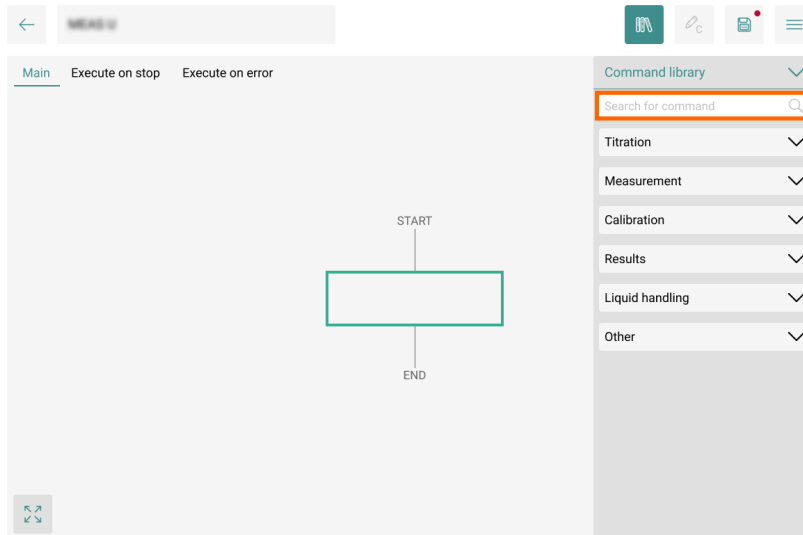


Tap on  for an existing method.

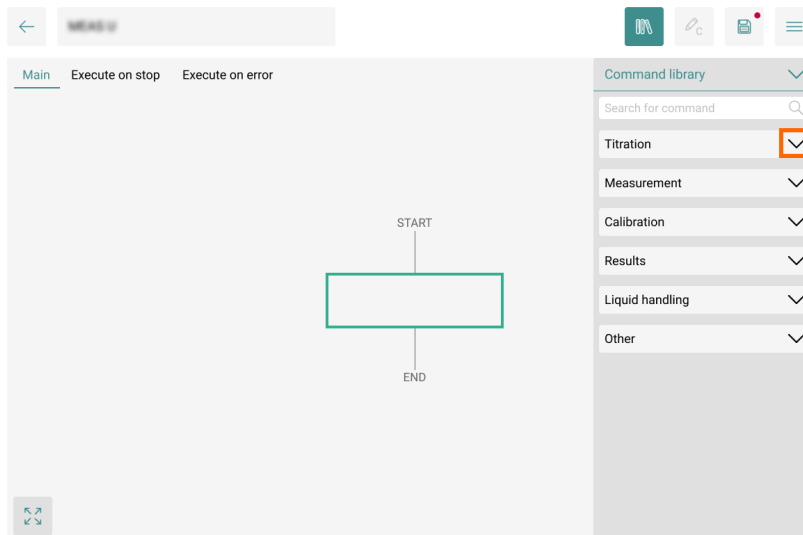


2 Displaying commands

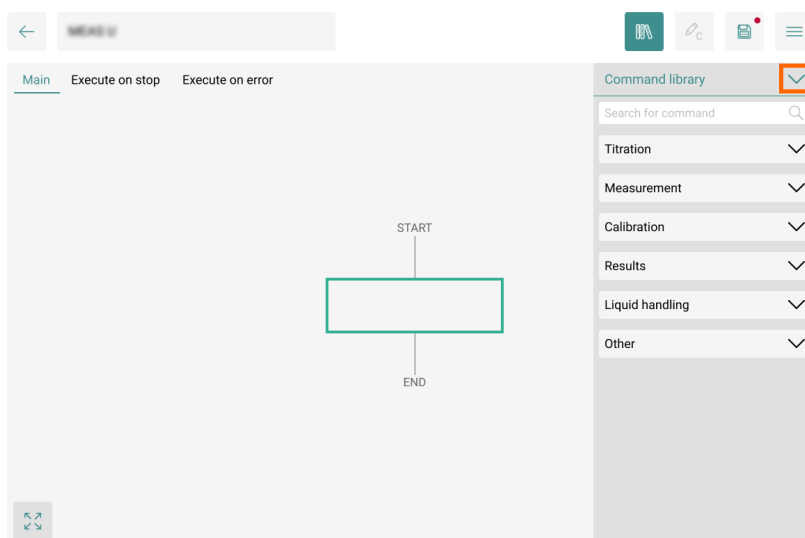
Tap the **Search command** field in the **Command library** window and enter the desired command type.



Alternatively, tap  next to the desired command group to display the command list in the command group.



Alternatively, tap  next to **Command library** to display the command list in all command groups.



3 Adding commands

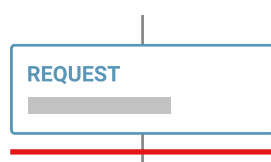
Insert the required commands individually into the method from the **Command library**, either by using drag and drop ([Additional information](#)) or by tapping ([Additional information](#)).

 Commands can be inserted either sequentially or in parallel.

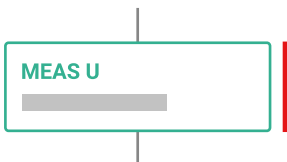
Adding commands with drag and drop

1 Positioning the command

To insert the new command **sequentially**, drag the command from the Command library and position it below or above the desired command so that a red horizontal line appears.



To insert the new command in **parallel**, drag the command from the Command library and position it to the right or left of the desired command so that a red vertical line appears.

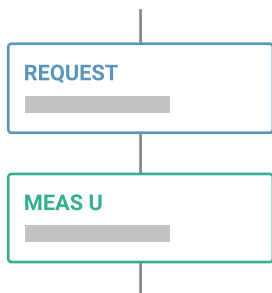


2 Inserting a command

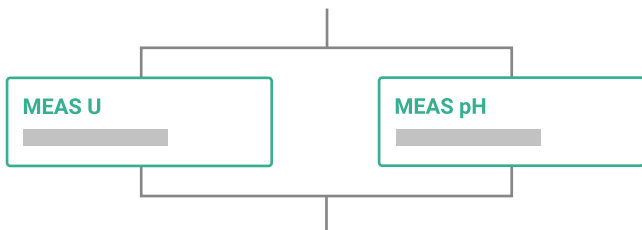
Release the command.

The command is inserted at the selected position.

Sequential:



Parallel:



Adding commands by tapping

1 Selecting a command

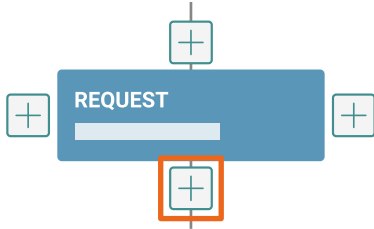
Tap to select the command in the method for which the new command is to be inserted in parallel or sequentially.

2 Opening the command library

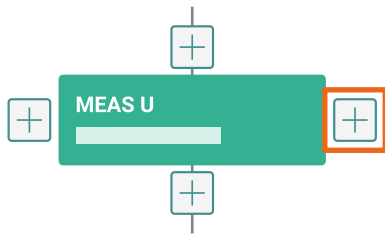
Open the **Command library** by tapping .

3 Defining a command position

- To execute a command **sequentially**, tap on the  symbol below or above the desired command.

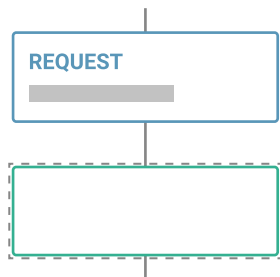


- To execute a command **in parallel**, tap the symbol  on the right or left of the desired command.

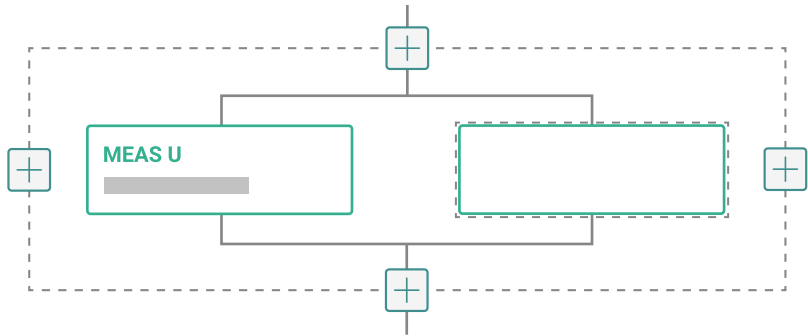


An empty box appears at the selected position.

Sequential:



Parallel:

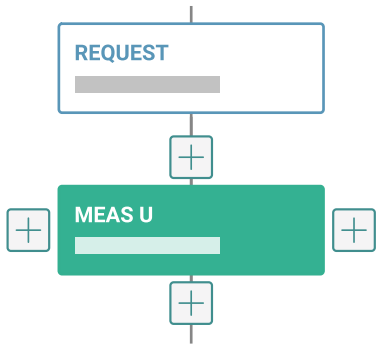


4 Inserting a command

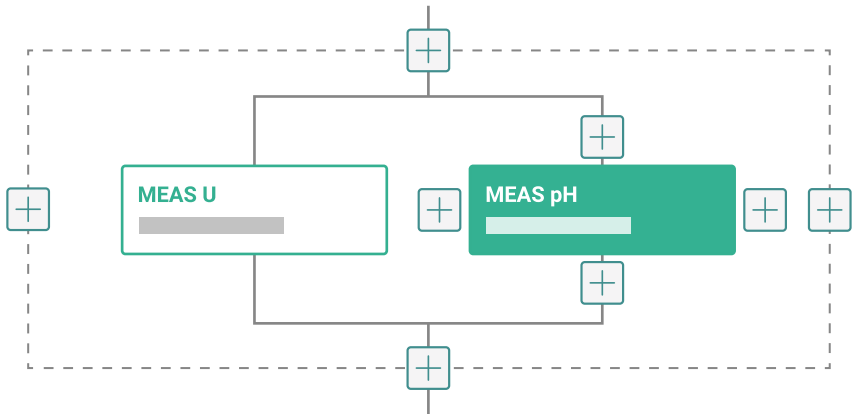
Search for and tap the desired command in the **Command library**.

The selected command appears in the box.

Sequential:



Parallel:



4.1.2.6.2 Search command

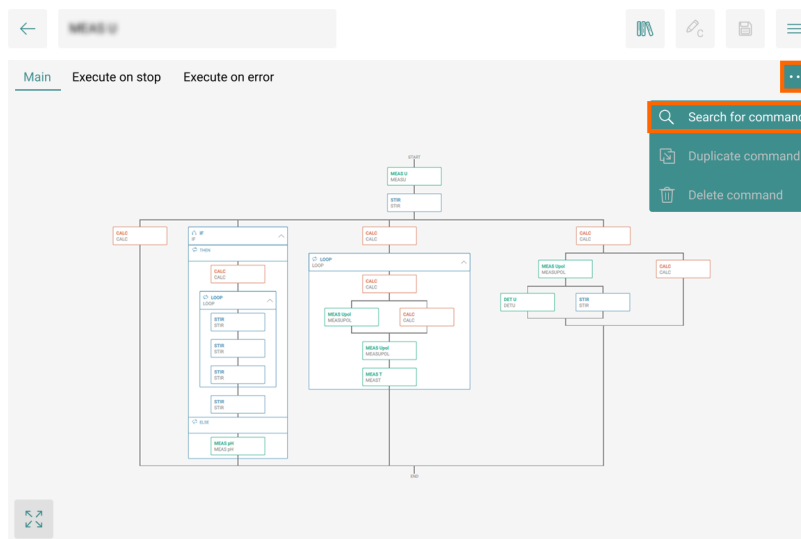
Searching for a command in a method

Prerequisite:

- The desired method is open (*Additional information*).
- No command is selected.

1 Opening the search mask

Tap **...** and select **Search command**.



All commands that are available in the method are displayed in the search mask.

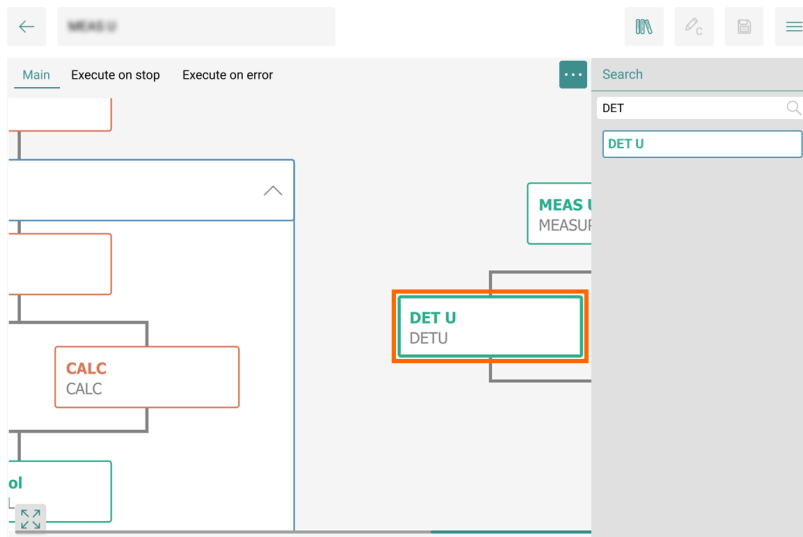
2 Entering the command name

Tap the **Search command** field and enter the command name searched for.



Tap the command you are searching for.





4.1.2.6.3 Duplicate command

Prerequisite:

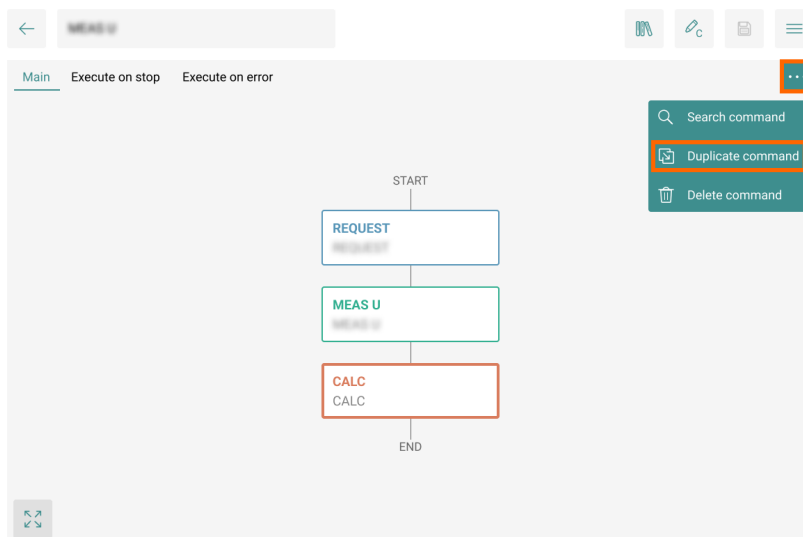
- The method is open (*Additional information*).

1 Selecting a command

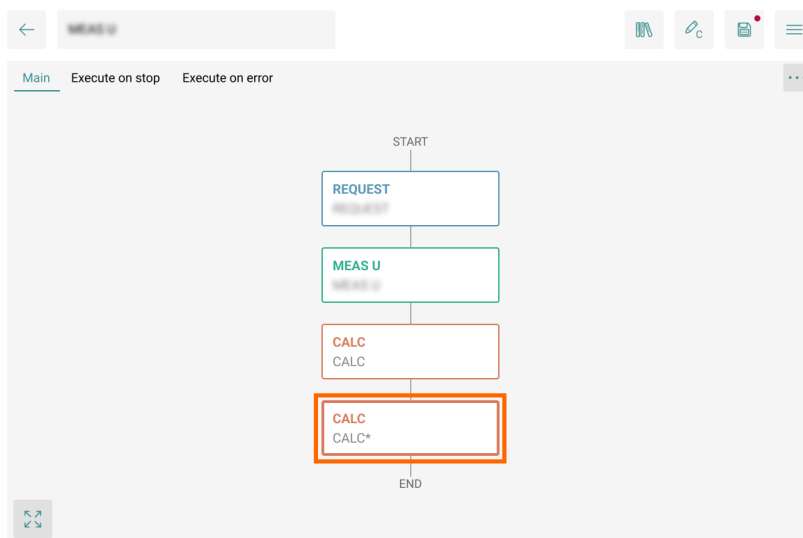
Select the command to be duplicated in the method by tapping on it.

2 Duplicating a command

Tap **...** and select **Duplicate command**.

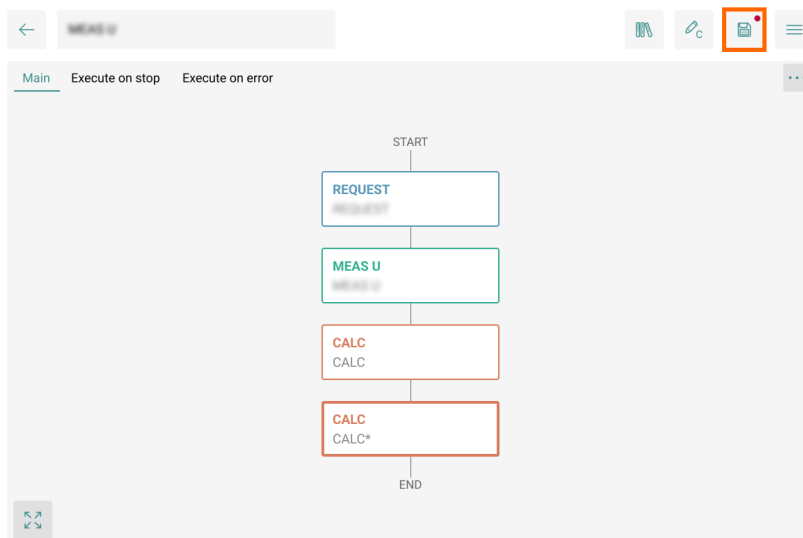


The duplicated command is inserted with the same command name and with * as index under the original command. The duplicated command contains all of the command properties defined in the original command.



3 Saving a method

Tap  in the title bar to save the changes.



4.1.2.6.4 Delete command

Video tutorial for deleting commands:



Prerequisite:

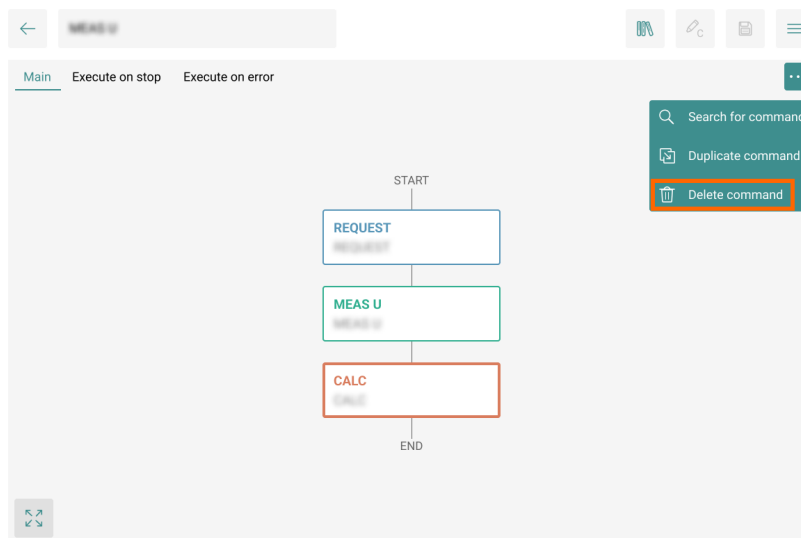
- The desired method is open (*Additional information*).

1 Selecting a command

Select the required command in the method by tapping on it.

2 Deleting a command

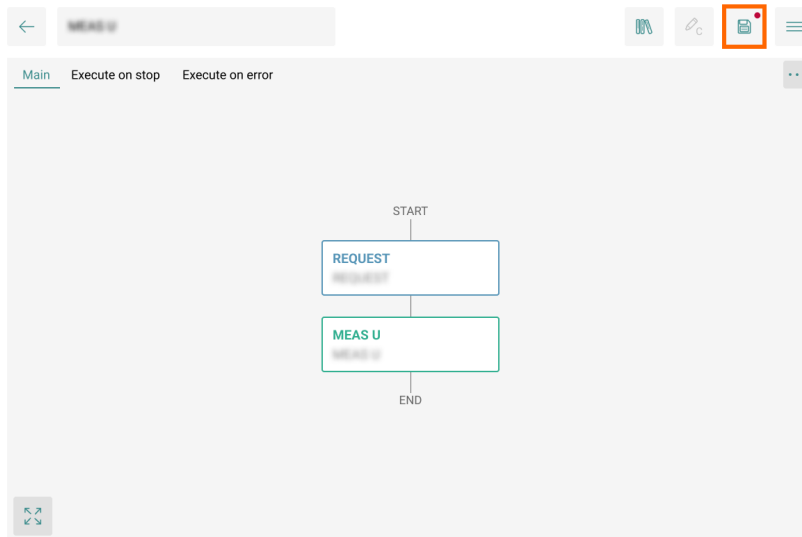
Tap **...** and select **Delete command**.



The selected command is deleted from the method.

3 Saving a method

Tap  in the title bar to save the changes.



4.1.3 Formula editor – Overview

Tap  to open a selection list for certain parameters in the **Command properties** (*Additional information*). Tap **Formula** to open the formula editor.

Tap the respective input field to open the formula editor for parameters into which a formula or a calculation must be entered in the formula editor.

- [Definition](#)
- [Overview](#)
- [Icons](#)

Video tutorial for entering formulas or calculations in the formula editor:

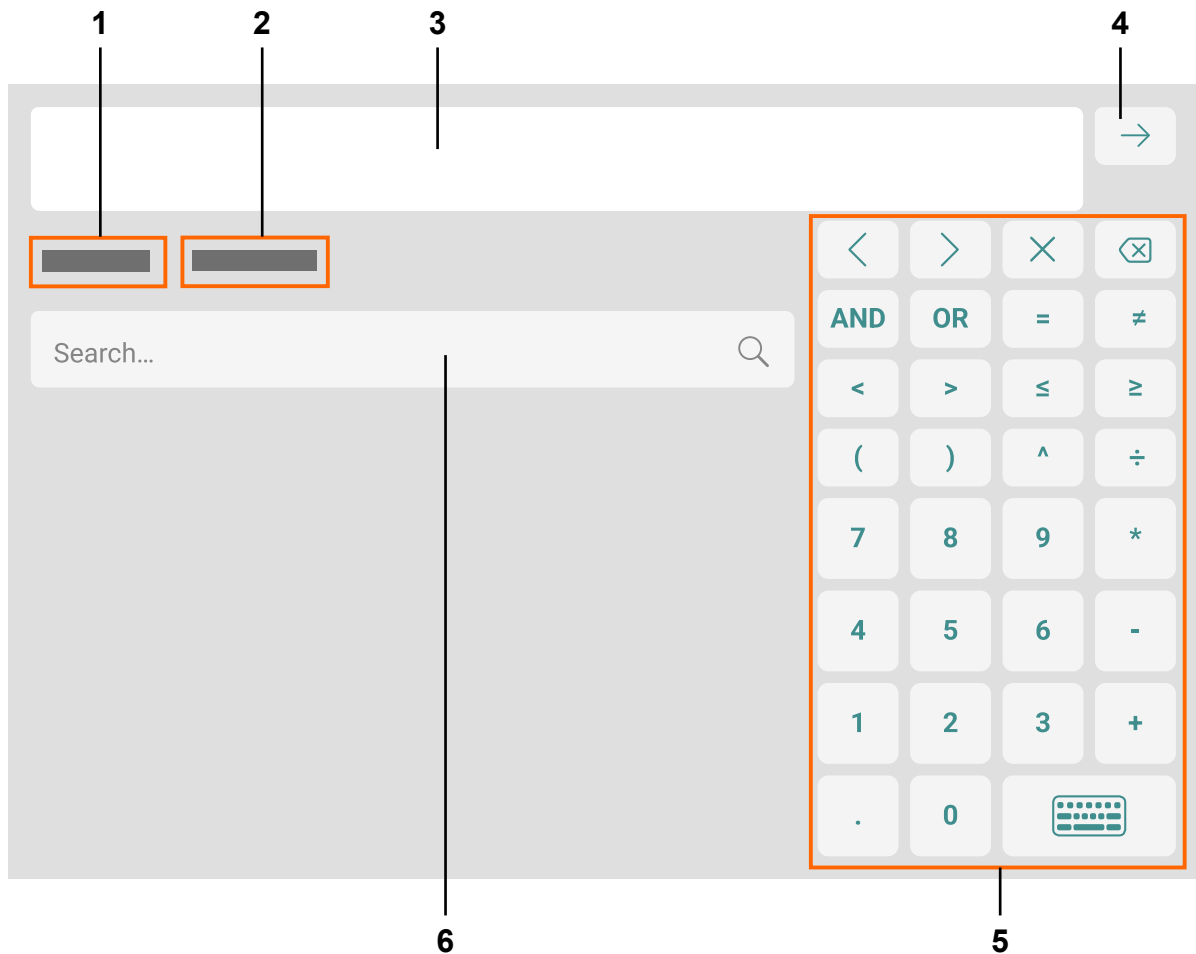


Definition

The formula editor serves as a support when entering formulas for result or parameter calculations. The formula editor is equipped with a syntax check that is triggered automatically when the formula is applied.

Overview

The formula editor is structured as follows:



1 Variables

List of the variables available for the formula. The variables can be divided up into variable groups in accordance with their function.

Additional information

2 Functions

List of the functions that can be used in the formula.

Additional information

3 Input field

Input field for the formula.

Additional information

4 →

Close the formula editor.

Note: A syntax check that is carried out automatically when the formula editor is closed. Once the syntax is correct, the formula editor can be closed.

5 Numerical keypad

Buttons for the input of numbers, operators, parentheses, and brackets.

Additional information

6 Search field

All of the variables and functions available in the formula editor can be searched for in the search field.

Icons

 The following icons are present in the formula editor. Icons that affect the entire user interface can be found [here](#).

Icon	Function
	Display additional information regarding the Variables or the Functions .
	Insert the variable or the function from the list into the input field.

4.1.3.1 Input field – Brief description

The formula can be entered in various ways in the input field of the formula editor. The following options are available for the entry:

Input via buttons

- Numerical keypad: Operators, parentheses, and numbers can be inserted into the formula by tapping the corresponding buttons on the numerical keypad ([Additional information](#)).
- Variables: In the **Variables** section, the available variable groups **Command variables**, **Sub-sample data**, and **System variables** can be opened by tapping on . In the **Command variables** variable group, the individual commands can be opened by tapping on . The individual variables can be inserted into the input field by tapping on .
- Functions: In the **Functions** section, the available functions are listed and can be inserted into the input field by tapping on .

Entry via keyboard

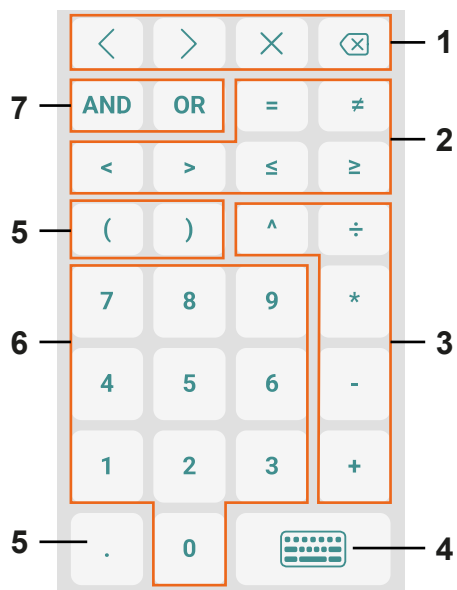
The keyboard opens by tapping on  in the numerical keypad ([Additional information](#)).

- **Numbers**
Numbers as well as mathematical functions can be entered directly via the keyboard.
- **Text**
Text must be enclosed in quotation marks " (e.g. "**my text**").
- **Variables**
Variables must be enclosed in apostrophes ' (e.g., '**Temperature.EP{x}.Command name**').

4.1.3.2 Numerical keypad – Overview

Various options are available with the numerical keypad to carry out calculations with operands or to compare operands. The operands can be entered either via the numerical keypad or as a variable.

The numerical keypad is structured as follows:



1 Edit keys

Additional information

2 Relational operators

Additional information

3 Arithmetic operators

Additional information

4 Keyboard

Show keyboard.

5 Punctuation marks

Additional information

6 Numbers

Edit keys

The edit keys are used to navigate the cursor in the input field or to remove the content.

<	Move the cursor one position to the left.
>	Move the cursor one position to the right.
X	Deletes the entire content in the input field.
ⓧ	Delete individual characters from the input field.

Relational operators

The relational operators are used to compare 2 operands.

=	The operands must have the same value.
≠	The operands must not have the same value.
<	The first operand must be less than the second operand.

>	The first operand must be greater than the second operand.
≤	The first operand must be less than or equal to the second operand.
≥	The first operand must be greater than or equal to the second operand.

 The operands can be entered either directly or as a variable and must be of the **Number** type.

Arithmetic operators

The arithmetic operators are used to perform calculations with operands.

^	Potentialiation
÷	Division
×	Multiplication
–	Subtraction
+	Addition

 The operands can be entered either directly or as a variable and must be of the **Number** type.

Punctuation marks

The punctuation marks can be used to form decimal numbers and to group operands with parentheses or brackets.

The parenthesis positioning influences the meaning of the calculation and the associated result.

(	Opening parentheses
)	Closing parentheses
.	Decimal separators

Logical operators

The logical operators are used to link 2 operands.

The entries are interpreted as follows:

- All numbers that are not 0 are interpreted as 1 (e.g., 5, 0.04, –8).
- Entries of the **Text** type are interpreted as 1 (e.g., "Hello", "0").
- The result type is always a number (1 = true, 0 = false).

AND	Both linked expressions must be fulfilled.
OR	At least one of the linked expressions must be fulfilled.

The following cases are possible:

Table 12 AND

Variable group	Variable type
Command variables	Variables that are generated by the individual commands in the process sequence. Syntax: '<i>Variable name.Command name</i>' The following variables are available for the respective command groups: ▪ Titration commands (Additional information) ▪ Measurement commands (Additional information) ▪ Calibration commands (Additional information) ▪ Result commands (Additional information) ▪ Liquid Handling commands (Additional information) ▪ Additional commands (Additional information)
Subsample data	Predefined variables and variables that were defined in the Method properties of the respective method as Subsample data. Syntax: '<i>Variable name.CurrentSubsample</i>' The <i>variable name</i> corresponds to the name that was defined for the Method properties in the subsample data. The following variables are available by default: ▪ Sample amount of the subsample 'Sample size.CurrentSubsample' ▪ Determination start of the subsample 'Date.Started.CurrentSubsample' ▪ Position of the sample beaker within the sample rack 'Position.CurrentSubsample' ▪ Name of the current method 'Name.Method.CurrentSubsample' ▪ Name of the user who created the method version. 'UserName.Method.CurrentSubsample' ▪ Subsample name 'Name.Subsample.CurrentSubsample' ▪ Name of the user who created the subsample. 'UserName.Subsample.CurrentSubsample' ▪ Sample name 'Name.Sample.CurrentSubsample' ▪ Name of the user who created the sample. 'UserName.Sample.CurrentSubsample' ▪ Sample list name 'Name.SampleList.CurrentSubsample' ▪ Name of the user who created the sample list. 'UserName.SampleList.CurrentSubsample'

Variable group	Variable type
Equipment variables	Variables that were generated by the individual commands in the process sequence. The variables are displayed only in the determination overview under Variables ► Equipment variables (<i>Additional information</i>). The selection and syntax vary according to their use: - Variables that are available for the functional units assigned in the commands. Syntax: 'Variable name.Command name' - Variables that are available for the sensors that are connected to the instruments. Syntax: 'Variable name.Sensor name' - Variables that are available for the solutions that are connected to the instruments. Syntax: 'Variable name.Solution name'
System variables	Variables that have been defined across methods. Syntax: 'Variable name.System' The <i>variable name</i> corresponds to the name that was defined for the system variable.

 When using variables, the respective data type must be observed (**number** or **text**).

For variables with index **x**, the desired number 1–9 must be entered for **x** (e.g., **"MV.EP3.Command name"** for the third endpoint). **x** = 1 is entered in the formula editor as default value.

4.1.3.5 Functions – Directory

The following functions are available in the formula editor:

Arithmetic

- **Abs** – Absolute value (*Additional information*)
- **Ceiling** – Rounding-up function (*Additional information*)
- **Div** – Integer division (*Additional information*)
- **Exp** – Exponential function (*Additional information*)
- **Floor** – Rounding-down function (*Additional information*)
- **Ln** – Natural logarithm (*Additional information*)
- **Log** – Decimal logarithm (*Additional information*)
- **Max** – Maximum (*Additional information*)
- **Min** – Minimum (*Additional information*)
- **Mod** – Remainder of a division (*Additional information*)
- **Power** – Power (*Additional information*)
- **Round** – Commercial rounding (*Additional information*)
- **Sqrt** – Square root (*Additional information*)
- **Truncate** – Shorten to integers (*Additional information*)

Type conversion

- **NumberToText** – Convert number to text ([Additional information](#))
- **TextToNumber** – Convert text to number ([Additional information](#))

Text

- **Concat** – Concatenating strings ([Additional information](#))
- **Subtext** – Substring of a character string ([Additional information](#))
- **TextPosition** – Position of a character in a character string ([Additional information](#))
- **Trim** – Remove empty spaces or character string ([Additional information](#))

Miscellaneous

- **Case** – Condition ([Additional information](#))
- **Error** – Error case ([Additional information](#))
- **Rand** – Generate random number ([Additional information](#))
- **Regex** – Regular expression ([Additional information](#))

4.1.3.5.1 Abs – Absolute value

Syntax

y = Abs(number)

Returns the absolute value of the entered number, i.e., the value of the number irrespective of its algebraic sign.

Argument

Number

The argument can be entered either via the numerical keypad as a number or as a variable of the **Number** type ([Additional information](#)).

If the argument does not match the expected data type, then the result of this operation will be returned as **Invalid**.

Examples

- $\text{Abs}(-55.3) = 55.3$
- $\text{Abs}(\text{'Temp.EP1.Command name'}) = \text{Value of the variable 'Temp.EP1.Command name' without algebraic sign}$

4.1.3.5.2 Case – Condition

Syntax

- **y = Case(Condition; Value_true; Value_false)**
If the **Condition** is true, then **Value_true** is returned. Otherwise **Value_false** is returned.
- **y = Case(Condition; Value_true; Value_false; Value_error)**
If the **Condition** is true, then **Value_true** is returned. Otherwise **Value_false** is returned. If an error occurs in the condition (result invalid), then **Value_error** will be returned.

If the argument does not match the expected data type, then the result of this operation will be returned as **Invalid**.

Examples

- Ceiling(2.9) = 3
- Ceiling(1.01) = 2
- Ceiling(3) = 3
- Ceiling(-1.1) = -1
- Ceiling(0) = 0

4.1.3.5.4 Concat – Concatenating character strings

Syntax

y = Concat(Text 1; Text 2;- ; Text X)

Connects the specified single text parts **Text1–Text X** to a new whole text.

Arguments

Text 1–Text X

The arguments can be entered either via the keyboard as text or as a variable of the **Text** or **Number** type.

- Text: Entry with quotation marks "*Example text*"
- Variable: Entry with apostrophes '*Variable name*'

If the arguments do not correspond to the expected data type, then the result of this operation will be returned as **Invalid**.

Examples

- Concat("Content: "; 'Mean.Calc1'; "±"; 'StdDev.Calc1'; "mg/L") = Content: 24.58 ± 0.76 mg/L
- Concat("The sample has been measured"; 'LoopCnt.Loop1'; "times.") = The sample has been measured 4 times.

4.1.3.5.5 Div – Integer division

Syntax

y = Div(Number 1; Number 2)

Returns the integer quotient from the dividend **Number 1** and the divisor **Number 2**.

Arguments

- **Number 1**
- **Number 2 ≠ 0**

The arguments can be entered either via the numerical keypad as a number or as a variable of the **Number** type ([Additional information](#)).

If the arguments do not correspond to the expected data type, then the result of this operation will be returned as **Invalid**.

Examples

- $\text{Div}(100; 25) = 4$
- $\text{Div}(\text{'Temp.EP1.Command name'}; 2) = \text{Result of the division of the value of the variable 'Temp.EP1.Command name' divided by 2}$

4.1.3.5.6 Error – Error case

Syntax

y = Error(Variable)

If the variable does **not** exist, then **1** is returned.

If the variable is present, **0** is returned.

Argument

Variable

The argument can be entered as a variable of the **Text** or **Number** type.

If the argument does not match the expected data type, then the result of this operation will be returned as **Invalid**.

Examples

- $\text{Error}(\text{'Vol.EP2.Command name'}) = 0$: The variable for the volume at the equivalence point 2 exists.
- $\text{Error}(\text{'MV.EP2.Command name'}) = 0$: The variable for the measured value at the equivalence point 2 exists.
- $\text{Error}(\text{'MV.EP3.Command name'}) = 1$: There is either no variable for the measured value or no equivalence point 3.

 As long as the variable is present in the system but has an invalid value or the result of the variable could not be calculated, the function returns the value **1**.

Example:

If the variable 'Vol.EP2.Command name' is present but gives an invalid result, then the function 1 will return: Error('Vol.EP2.Command name') = 1

4.1.3.5.7 Exp – Exponential function

Syntax

y = Exp(number)

Returns the value of the exponential function to base e.

A different notation is $y = e^{\text{Number}}$. Here, e is the Euler number ($e = 2.71828\dots$) and the entered number is the exponent.

Argument**Number (Exponent)**

The argument can be entered either via the numerical keypad as a number or as a variable of the **Number** type ([Additional information](#)).

If the argument does not match the expected data type, then the result of this operation will be returned as **Invalid**.

Examples

- $\text{Exp}(1.5) = 4.48169$
- $\text{Exp}(\text{'Temp.EP1.Command name'}) = \text{Power of the exponent (variable 'Temp.EP1.Command name') to base e}$

4.1.3.5.8 Floor – Rounding-down function**Syntax**

y = Floor(number)

Returns the nearest integer that is less than or equal to the entered number.

Argument**Number**

The argument can be entered either via the numerical keypad as a number or as a variable of the **Number** type ([Additional information](#)).

If the argument does not match the expected data type, then the result of this operation will be returned as **Invalid**.

Examples

- $\text{Floor}(2.9) = 2$
- $\text{Floor}(1.01) = 1$
- $\text{Floor}(3) = 3$
- $\text{Floor}(-1.1) = -2$
- $\text{Floor}(0) = 0$

4.1.3.5.9 Log – Logarithm**Syntax**

y = log(number; base)

Returns the value of the logarithm of the entered number for the entered base. If no base is entered, then the decimal logarithm (base 10) of the entered number will be returned.

A different notation is $y = \log_{\text{Base}}(\text{number})$.

Arguments

- **Base > 0 and $\neq 1$**
- **Number > 0**

The arguments can be entered either via the numerical keypad as a number or as a variable of the **Number** type (*Additional information*). The base must always be greater than 0 and not equal to 1. The number must always be greater than 0.

If the arguments do not correspond to the expected data type, then the result of this operation will be returned as **Invalid**.

Examples

- $\text{Log}(8; 2) = 3$
- $\text{Log}(10) = 1$
- $\text{Log}(\text{'Temp.EP1.Command name'}) = \text{decimal logarithm of the value of the variable 'Temp.EP1.Command name'}$

4.1.3.5.10 Ln – Natural logarithm

Syntax

$$y = \text{Ln}(\text{number})$$

Returns the value of the logarithm of the entered number to base e.

A different notation is $y = \log_e(\text{number})$. Here, e is the Euler number ($e = 2.71828\dots$).

Argument

Number > 0

The argument can be entered either via the numerical keypad as a number or as a variable of the **Number** type (*Additional information*). The number must always be greater than 0.

If the argument does not match the expected data type, then the result of this operation will be returned as **Invalid**.

Examples

- $\text{Ln}(3) = 1.09861$
- $\text{Ln}(\text{'Temp.EP1.Command name'})$ = Logarithm of the value of the variable 'Temp.EP1.Command name' to base e.
- $\text{Ln}(\text{"Text"})$ = Invalid, the argument corresponds to the **Text** data type.

4.1.3.5.11 Max – Maximum

Syntax

y = Max(Number 1; Number 2;-Number n)

Returns the numerically highest value of **Number 1– Number n**.

Arguments

Number

The arguments can be entered either via the numerical keypad as a number or as a variable of the **Number** type (*Additional information*).

If the arguments do not correspond to the expected data type, then the result of this operation will be returned as **Invalid**.

Example

- $\text{Max}(5; 2) = 5$
- $\text{Max}(4; 8; 11) = 11$
- $\text{Max}(\text{'Sample size.CurrentSubsample'}; 5) =$ returns the numerically highest value of the variable 'Sample size.CurrentSubsample' and 5.

4.1.3.5.12 Min – Minimum**Syntax**

y = Min(Number 1; Number 2;–Number n)

Returns the numerically smallest value of **Number 1–Number n**.

Arguments**Number**

The arguments can be entered either via the numerical keypad as a number or as a variable of the **Number** type ([Additional information](#)).

If the arguments do not correspond to the expected data type, then the result of this operation will be returned as **Invalid**.

Example

- $\text{Min}(5; 2) = 2$
- $\text{Min}(4; 8; 11) = 4$
- $\text{Min}(\text{'Sample size.CurrentSubsample'}; 5) =$ returns the numerically lowest value of the variable 'Sample size.CurrentSubsample' and 5.

4.1.3.5.13 Mod – Remainder of a division**Syntax**

y = Mod(Number 1; Number 2)

Returns the remainder of the division of **Number 1** (dividend) and **Number 2** (divisor).

Arguments

- **Number 1**
- **Number 2 $\neq 0$**

The arguments can be entered either via the numerical keypad as a number or as a variable of the **Number** type ([Additional information](#)).

If the arguments do not correspond to the expected data type, then the result of this operation will be returned as **Invalid**.

Examples

- $\text{Mod}(15; 4) = 3$
- $\text{Mod}(\text{'Temp.EP1.Command name'}; 7) =$ Remainder of the division of the value of the variable 'Temp.EP1.Command name' by 7
- $\text{Mod}(7; 0) = \text{Invalid}$, the divisor is 0.

Syntax 2**y = Rand() × a**

Returns a random number between 0 and a.

Syntax 3**y = Rand() × (b – a) + a**

Returns a random number between a and b.

Arguments**a** and **b**

The arguments can be entered either via the numerical keypad as a number or as a variable of the **Number** type ([Additional information](#)).

If the arguments do not correspond to the expected data type, then the result of this operation will be returned as **Invalid**.

Example

- Rand() = 0.76 (if 2 decimal places have been defined)
- Rand() × 50 = 37.9 (if 1 decimal place has been defined)
- Rand() × (6 – 4) + 4 = 5 (if no decimal place has been defined)

4.1.3.5.17 Regex – Regular expression**Syntax**

- **y = Regex(Variable; "Regular expression")**
Returns the fragment of the variable content that corresponds to the specifications of the regular expression.

Arguments

- **Variable**
The argument can be entered either via the keyboard as text or as a variable of the **Text** or **Number** type.
 - Text: Entry with quotation marks "Example text"
 - Variable: Entry with apostrophes 'Variable name'
- **Regular expression**
The argument has to correspond to a regular expression and must be written in quotation marks.

If the arguments do not correspond to the expected data type, then the result of this operation will be returned as **Invalid**.

Possible expressions

Regular expression	Description	Example
[abc]	OR function for individual characters	a or b or c

[a-z0-9]	A lowercase letter in the range [a; z] or a number in the range [0; 9]	m or 5
(hallo)	Substring	Character string contains "hallo"
^hallo	Beginning of string	"hallo" is at the beginning of the character string
hallo\$	End of string	"hallo" is at the end of the character string
.	Any character	a or 4 or - etc.
\.	Period	.
\d	Exactly one digit	1
\d+	One or more consecutive digits	1234567
\d{4}	Exactly 4 digits of a sequence	3143
\D	A character that must not be a digit	A or ! etc.
\w	The metacharacter \w stands for an alphanumeric character. Alphanumeric characters consist of the letters a–z and A–Z, the digits 0–9, and the underscore _.	a or 3
\W	The metacharacter \W stands for a non-alphanumeric character.	! or .
.*	Any character string	abcd or 41 or -\$=\$ etc.

Examples

- `Regex("12ABC34"; "[0-9]{2}") = 12`
- `Regex("pH 12.640"; "\d{2}.\d{2}") = 12.64`
- `Regex("ABCDEF"; "\d+") = Invalid; there is no digit in the argument.`

 The IONIC app uses the regular expressions from the Qt framework. Further information on regular expressions and application examples can be found at Regular-Expressions.info and Wikipedia - Regular Expression, for example.

4.1.3.5.18 Round – Commercial rounding

Syntax

- **y = Round(number 1; number 2)**

Returns the rounded value of the entered **Number 1**. **Number 2** indicates the number of decimal places to which rounding is done.



The number of decimal places set in this function refers only to rounding. A result is always output with the number of decimal places that was defined in the **Decimal places** parameter.

Arguments

Number

The arguments can be entered either via the numerical keypad as a number or as a variable of the **Number** type ([Additional information](#)).

If the arguments do not correspond to the expected data type, then the result of this operation will be returned as **Invalid**.

Rounding

IONIC uses commercial rounding (round half away from zero) in accordance with DIN1333, which meets the requirements for rounding in the European pharmacopoeia (Ph. Eur., Pharmacopoea Europaea) and in the United States Pharmacopeia (USP).

- If the last digit to be retained is followed by 0, 1, 2, 3, or 4, then it will be rounded down.
- If the last digit to be retained is followed by 5, 6, 7, 8, or 9, then it will be rounded up.

Examples

- $\text{Round}(-55.5259; 0) = -56$
- $\text{Round}(-55.5259; 2) = -55.53$
- $\text{Round}(55.5449; 2) = 55.54$
- $\text{Round}('MV.EP1.Command name'; 2) = \text{value of the variable 'MV.EP1.Command name' rounded to 2 decimal places.}$

4.1.3.5.19 Sqrt – Square root

Syntax

- **y = Sqrt(number)**

Returns the square root of the entered number.

Argument

Number ≥ 0

The argument can be entered either via the numerical keypad as a number or as a variable of the **Number** type ([Additional information](#)). The number must be greater than or equal to 0.

If the argument does not match the expected data type, then the result of this operation will be returned as **Invalid**.

Examples

- $\text{Sqrt}(16) = 4$
- $\text{Sqrt}(\text{'Temp.EP1.Command name'}) = \text{Square root of the value of the variable 'Temp.EP1.Command name'}$

4.1.3.5.20 Subtext – Substring of a character string

Syntax

y = Subtext(Text; Position; Character length)

Returns the part from the **Text** that starts at the specified **Position** and has the specified **Character length**.

Arguments

- **Text**

The argument can be specified either via the keyboard as text or as a variable of the **Text** type.

- Text: Entry with quotation marks "Example text"
- Variable: Entry with apostrophes 'Variable name'

If the argument does not match the expected data type, then the result of this operation will be returned as **Invalid**.

- **Position**

The numbering of the position starts at 1.

The argument can be entered either via the numerical keypad as a number or as a variable of the **Number** type (*Additional information*).

If the argument does not match the expected data type, then the result of this operation will be returned as **Invalid**.

- **Character length**

The argument can be entered either via the numerical keypad as a number or as a variable of the **Number** type (*Additional information*).

If the specified character length is longer than the length of the entered text, then **Invalid** will be returned as a result of this operation.

Examples

- Subtext("Citric acid"; 9; 5) = "acid"
- Subtext('Name.Subsample.CurrentSubsample'; 3; 5) = 5 characters of the variable 'Name.Subsample.CurrentSubsample' from position 3 up to and including position 7.
- Subtext("Citric acid"; 9; 6) = Invalid, only 5 characters are left from position 9 onwards.

4.1.3.5.21 TextPosition – Position of a character in a character string

Syntax

y = TextPosition(Text; character string)

Returns the position of the first occurrence of the **Character string** in the specified **Text**.

If the **Character string** is not contained in the **Text**, then **0** will be returned.

 Spaces are counted as characters.

Arguments

- **Text**
- **Character string**

The arguments can be entered either via the keyboard as text or as a variable of the **Text** type.

- Text: Entry with quotation marks *"Example text"*
- Variable: Entry with apostrophes *'Variable name'*

If the arguments do not correspond to the expected data type, then the result of this operation will be returned as **Invalid**.

Examples

- TextPosition("AAA BBB CCC"; "CCC") = 9, the character string "CCC" occurs in the text from position 9 onwards.
- TextPosition("Citric acid"; "acid") = 0, the character string "Acid" (capitalized) does not appear in the text.
- TextPosition("Citric acid"; "salt") = 0, the character string "salt" does not appear in the text.
- TextPosition("3362.14"; "6") = 3, the number "6" appears in the third position.
- TextPosition('Name.Subsample.CurrentSubsample'; "Acid") = Position at which the character string "Acid" appears in the value of the variable 'Name.Subsample.CurrentSubsample'. If the character string does not appear, then 0 is returned.

4.1.3.5.22 TextToNumber – Converting text to number

Syntax

y = TextToNumber(Text)

Returns the entered text as a number.

With this function, for example, character strings consisting of digits from external instruments can be used for the calculation.

Argument

Text

The argument can be entered either via the keyboard as text or as a variable of the **Text** type.

- Text: Entry with quotation marks *"Example text"*
- Variable: Entry with apostrophes *'Variable name'*

If the argument does not match the expected data type, then the result of this operation will be returned as **Invalid**.

Example

- `TextToNumber("-55") = -55`
- `TextToNumber("10") = 10`
- `TextToNumber("H2O") = Invalid`, the character string does not consist of digits.

4.1.3.5.23 Trim – Removing blank spaces or character string

Syntax

- **y = Trim(Text)**
Returns the **Text** without spaces before and after.
- **y = Trim(Text; character string)**
Returns the **Text** without the **character string** contained in the text.

Arguments

- Text
- Character string

The arguments can be entered either via the keyboard as text or as a variable of the **Text** type.

- Text: Entry with quotation marks "Example text"
- Variable: Entry with apostrophes 'Variable name'

If the arguments do not correspond to the expected data type, then the result of this operation will be returned as **Invalid**.

Examples

- `Trim(" Citric acid and hydrochloric acid ") = "Citric acid and hydrochloric acid"`
- `Trim("Citric acid"; "acid") = "Citric"`
- `Trim("Citric acid"; "salt") = "Citric acid"`
- `Trim('Name.Subsample.CurrentSubsample'; "acid") = Value of the variable 'Name.Subsample.CurrentSubsample' without the character string "acid"`

4.1.3.5.24 Truncate – Shortening to integers

Syntax

y = Truncate(number)

Returns the entered number truncated to an integer by eliminating the decimal places.

Argument

Number

The argument can be entered either via the numerical keypad as a number or as a variable of the **Number** type (*Additional information*).

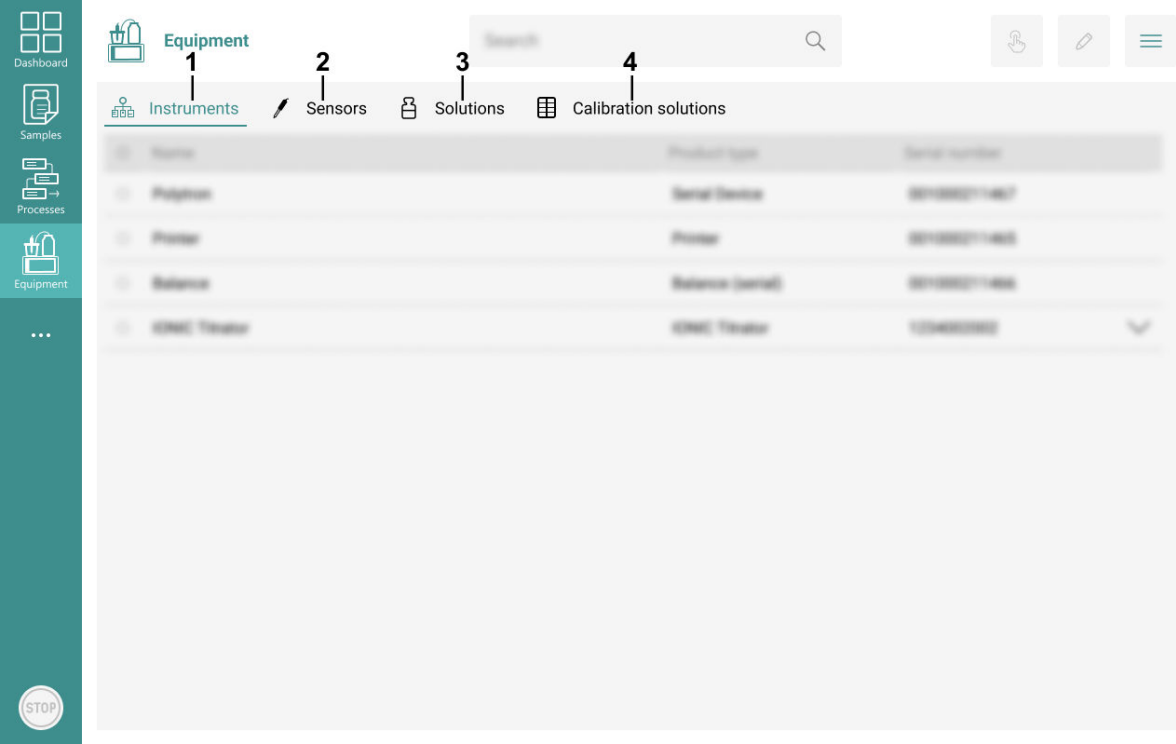
If the argument does not match the expected data type, then the result of this operation will be returned as **Invalid**.

Examples

- $\text{Truncate}(2.9) = 2$
- $\text{Truncate}(-2.9) = -2$
- $\text{Truncate}(0.23) = 0$
- $\text{Truncate}(\text{'Temp.EP1.Command name'}) = \text{Value of the variable 'Temp.EP1.Command name' as integer}$

5 Equipment – Work area

The **Equipment** work area is divided into the following subsections:



- 1

Instruments subsection
[Additional information](#)
- 2

Sensors subsection
[Additional information](#)
- 3

Solutions subsection
[Additional information](#)
- 4

Calibration solutions subsection
[Additional information](#)

5.1 Equipment – General overview

Instruments, sensors, solutions, and calibration solutions are available in the various subsections in the Equipment work area. In addition to Instruments, functional units and liquid handling components are also displayed in the Instruments subsection. The liquid handling components are displayed on the user interface on the same level as the functional units. The calibration solutions are not listed in the table for reasons of overview.

The general overview shows examples of which instruments, functional units, liquid handling components, sensors, and solutions are supported and how they are related to one another. The objects listed in the table are not present in the equipment by default.

 The names listed in the table are the product types.

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Equipment

Search

Instruments Sensors Solutions Calibration solutions

Name	Product type	Serial number
Polytron	Serial Device	001000211467
Printer	Printer	001000211465
Balance	Balance (serial)	001000211466
IONIC Titrator	IONIC Titrator	1234002002
807 Dosing Unit	807 Dosing Unit	0010000024408
Dosino Module	Dosino Module	123403103
Magnetic Stirrer left	Magnetic Stirrer	
Magnetic Stirrer right	Magnetic Stirrer	
Measuring Interface Digital	Measuring Interface Digital	001000006116
Rod Stirrer 1	OMNIS Rod Stirrer	123400803

Level 1

Level 2

Instruments

IONIC main instrument

The IONIC app is operated on the IONIC main instrument. The IONIC main instrument is automatically displayed in the overview list.

Instrument symbol	Product type	Description
	IONIC Titrator	This can be used for equivalence point titrations, end-point titrations, volumetric Karl Fischer titrations as well as concentration, pH value, potential, voltage, and temperature measurements. The IONIC app is operated on the IONIC Titrator .

Instruments

The following instruments can be connected to the IONIC main instrument via MDL interface and can only be used together with the IONIC main instrument.

The instruments are automatically added to the overview list as soon as they are connected to the IONIC main instrument and correctly recognized by the system.

Product type	Description
OMNIS Dosing Module	Can be used for dosing solutions. The OMNIS Dosing Module extends the titration system to include an additional dosing drive and, depending on the product version, a magnetic stirrer.

Other instruments

The following instruments can be connected to the IONIC main instrument via USB and can only be used together with the IONIC main instrument.

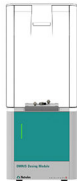
Instruments that are connected to the IONIC main instrument via USB must be added to the overview list manually with the corresponding product type.

Product type	Description
Balance	Balance that can be connected with a USB/RS-232 converter. The balance can be used for weighing in samples and for entering further sample data.
Printer	Printer that can be connected via USB connector. The printer can be used for printing reports.
Serial Device	Serial Device (e.g., homogenizer) that can be connected with a USB/RS-232 converter.

Functional units

The following functional units can be integrated in a instrument or can be connected to a instrument externally via the MDL interface.

The integrated functional units are automatically included in the overview list. The external functional units are included in the overview list as soon as they are connected to the IONIC main instrument and have been correctly recognized by the system.

Instrument symbol	Product type	Description
	Dosing Drive	Dosing drive that is part of a connected OMNIS Dosing Module. The Dosing Drive can be used together with the Cylinder Unit for dosing solutions.
	Dosino Module	Dosing drive that can be connected via MDL interface. The Dosino Module can be used together with the 807 Dosing Unit for dosing solutions.

Instrument symbol	Product type	Description
	Magnetic Stirrer (IONIC)	Right or left magnetic stirrer, which is part of the IONIC main instrument, depending on the product version. The Magnetic Stirrer can be used to stir samples and other liquids at different speeds and in different directions.
	Magnetic Stirrer (OMNIS)	Magnetic stirrer that is part of a connected OMNIS Dosing Module, depending on the product version. The Magnetic Stirrer can be used to stir samples and other liquids at different speeds and in different directions.
-	Measuring Interface Analog	Measuring interface for analog sensors that is part of the IONIC main instrument, depending on the product version. The following sensor types are available: ▪ Other sensor ▪ Metal electrode ▪ pH electrode ▪ Polarizable metal electrode ▪ Temperature sensor
-	Measuring Interface Digital	Measuring interface for digital sensors of the dTrode type, which is part of the IONIC main instrument, depending on the product version. The following sensor types are available: ▪ Metal electrode ▪ pH electrode
	OMNIS Rod Stirrer	Rod stirrer that can be connected via MDL interface. The OMNIS Rod Stirrer can be used to stir samples and other liquids at different speeds and in different directions.

Liquid handling components

The following liquid handling components are connected to a functional unit.

The **807 Dosing Unit** and **Cylinder Unit** liquid handling components are included in the overview list as soon as they are connected to the functional unit. The **OMNIS Liquid Adapter** liquid handling components is not included in the overview list.

Instrument symbol	Product type	Description
	807 Dosing Unit	Piston buret on which the Dosino Module is attached. Can be used for dosing solutions.
	Cylinder Unit	Piston buret that is attached to the Dosing Drive. Can be used for dosing solutions.
-	OMNIS Liquid Adapter	Quick-change coupling that is attached to bottles. Can be used for the transfer of liquid between the bottle and the Cylinder Unit. Solutions with the bottle cap multi-use or solutions with the bottle cap single-use can be connected with the OMNIS Liquid Adapter.

5.2.2 Instruments – Overview

- *Definition*
- *Overview list*
- *Functions*
- *Icons*

Definition

Instruments are used for performing analyses. An instrument consists of one or more functional units.

The IONIC app is operated on the IONIC main instrument (e.g., IONIC Titrator). All other instruments with the associated functional units can be connected to the IONIC main instrument via MDL interface (e.g., Dosino Module), USB/RS-232 Converter (e.g., homogenizer) or USB (e.g., printer).

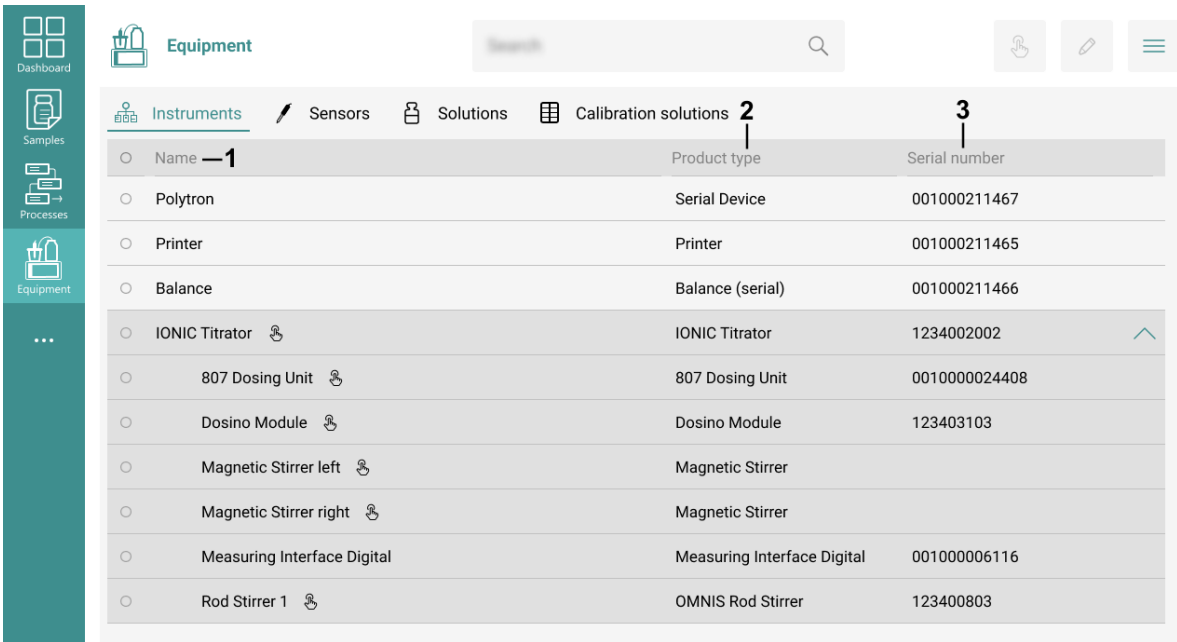
Overview list

All connected instruments, functional units, and liquid handling components are displayed in an overview list in the **Instruments** subsection.

Instruments that are connected to the IONIC main instrument via MDL interface are automatically added to the overview list. Instruments that are connected to the IONIC main instrument via USB must be added to the overview list manually with the corresponding product type.

 The designation *Instrument* refers to all objects in the **Instruments** subsection.

The following information is displayed in the overview list:



Name 1	Product type 2	Serial number 3
Polytron	Serial Device	001000211467
Printer	Printer	001000211465
Balance	Balance (serial)	001000211466
IONIC Titrator	IONIC Titrator	1234002002
807 Dosing Unit	807 Dosing Unit	0010000024408
Dosino Module	Dosino Module	123403103
Magnetic Stirrer left	Magnetic Stirrer	
Magnetic Stirrer right	Magnetic Stirrer	
Measuring Interface Digital	Measuring Interface Digital	001000006116
Rod Stirrer 1	OMNIS Rod Stirrer	123400803

1 Name

Name of the instrument. The name can be changed to the **Properties** of the instrument.

2 Product type

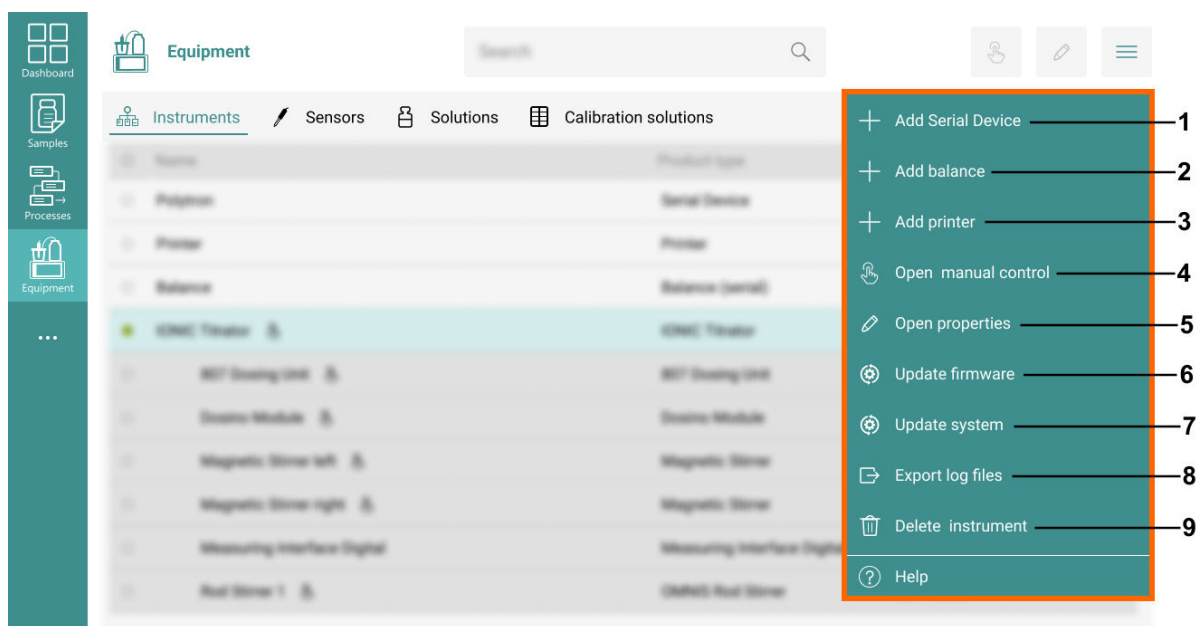
Technical designation of the instrument.
[Additional information](#)

3 Serial number

Serial number of the instrument.

Functions

Tap on  to open a menu with the following functions:

**1 Add Serial Device**

An instrument of the **Serial Device** product type is added to the overview list.

[Additional information](#)

3 Add printer

An instrument of the **Printer** product type is added to the overview list.

[Additional information](#)

5 Open properties

The **Properties** of the selected instrument are opened.

[Additional information](#)

7 Update system

The entire system of the IONIC main instrument is updated to the latest version.

[Additional information](#)

9 Delete instrument

The selected instrument is deleted.

[Additional information](#)

2 Add balance

An instrument of the **Balance (serial)** product type is added to the overview list.

[Additional information](#)

4 Open manual control

The **Manual control** of the selected instrument is opened.

[Additional information](#)

6 Update firmware

The firmware is updated to the latest version for all instruments that have outdated firmware and are connected to the IONIC main instrument via MDL interface.

[Additional information](#)

8 Export log files

All recorded information, warnings, and errors of the IONIC main instrument and of all connected instruments are exported as a ZIP file.

[Additional information](#)

Icons

 The following icons are present in the **Instruments** subsection.
Icons that affect the entire user interface can be found [here](#).

Icon	Function
	Open the Manual control section for the manual control of instruments and functional units (<i>Additional information</i>).
	Open the Properties window to display and edit the settings of the currently selected instrument.
	Display functional units and liquid handling components that are connected to the respective instrument.

Properties

In the properties, tap  to open a selection list with additional options to choose with certain settings:

Options to choose	Function
Default value	Value that is defined by default for the setting.
Enter value	The keyboard opens so that a value can be entered manually.

5.2.2.1 Add Serial Device

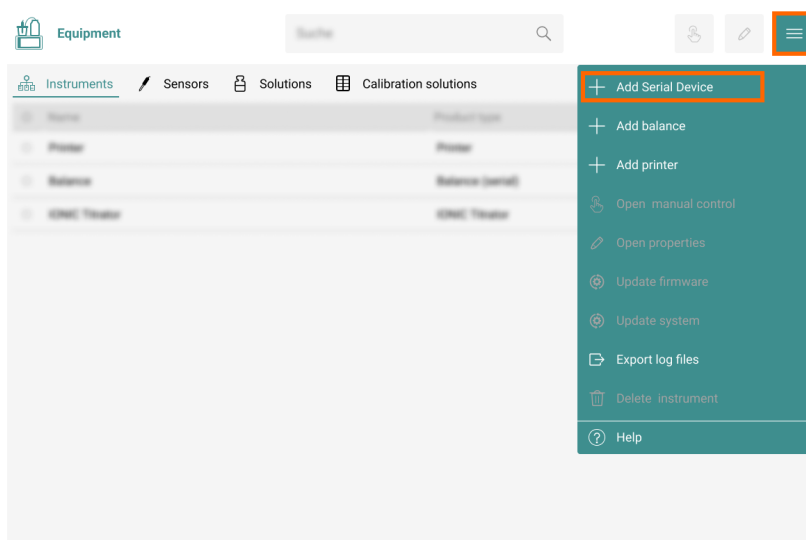
Video tutorial:



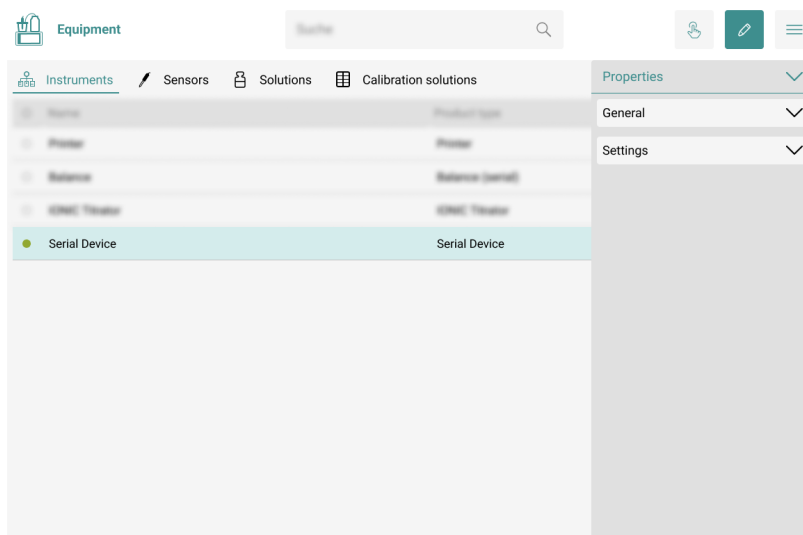
 When entering names, the maximum character length is 32 characters.

1 Adding Serial Device

Tap  in the title bar and select **Add Serial Device** under **Equipment ► Instruments**.

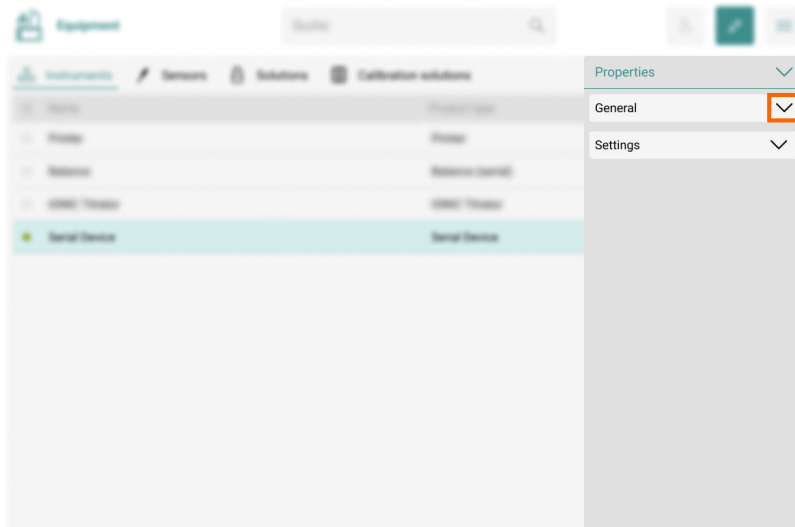


The instrument with the **Serial Device** product type appears in the overview list. The **Properties** window is opened automatically.

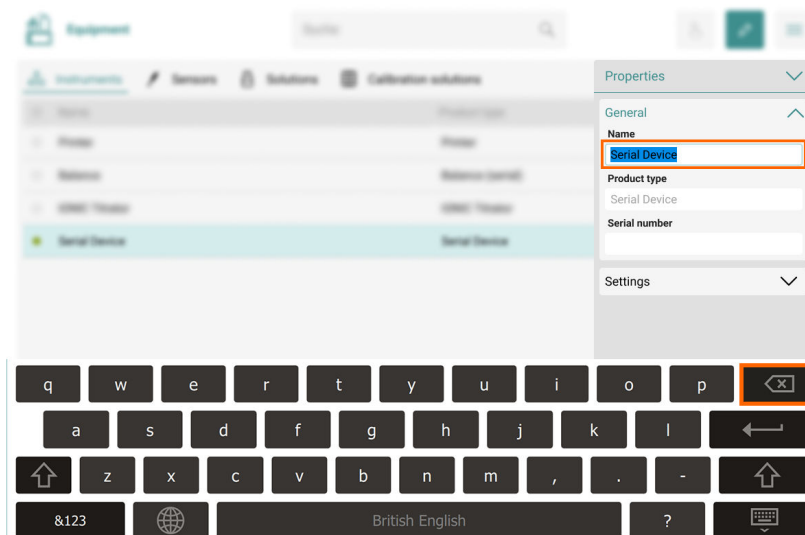


2 Naming or renaming Serial Device

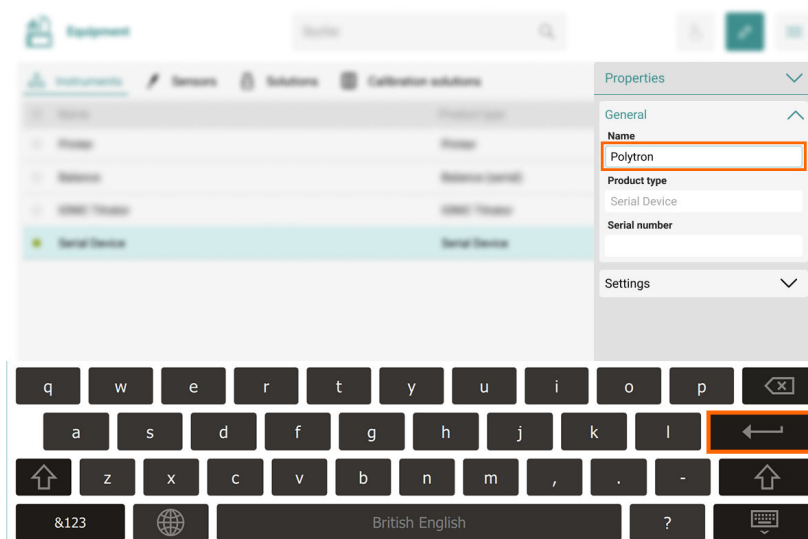
- Tap  next to **General**.



- Tap the input field under **Name** and delete the default name with .

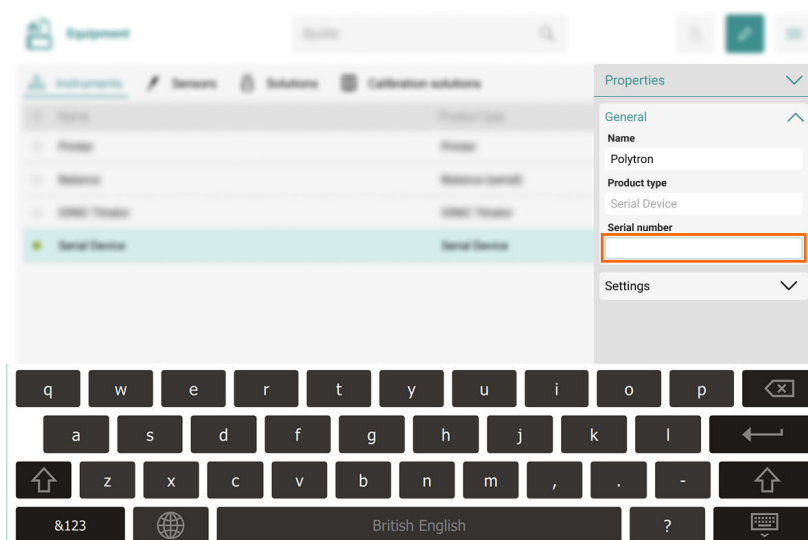


- Enter the desired instrument name and confirm with .

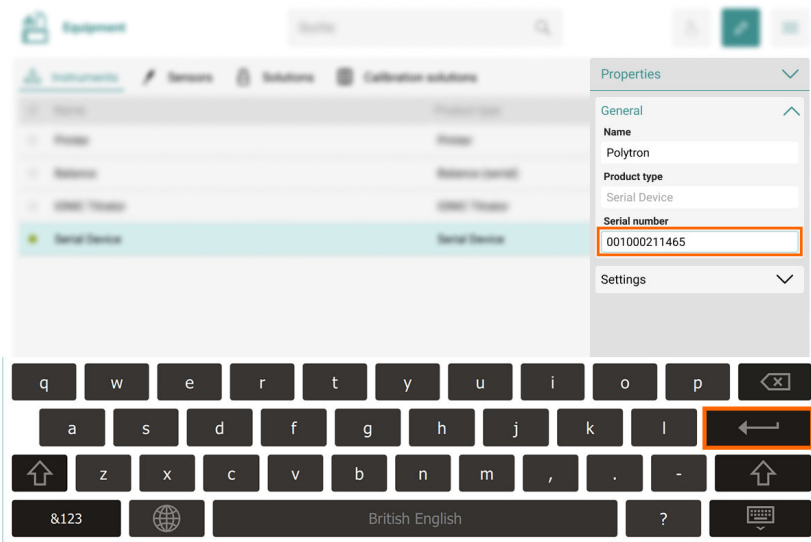


3 Entering the serial number

- Tap the input field under **Serial number**.

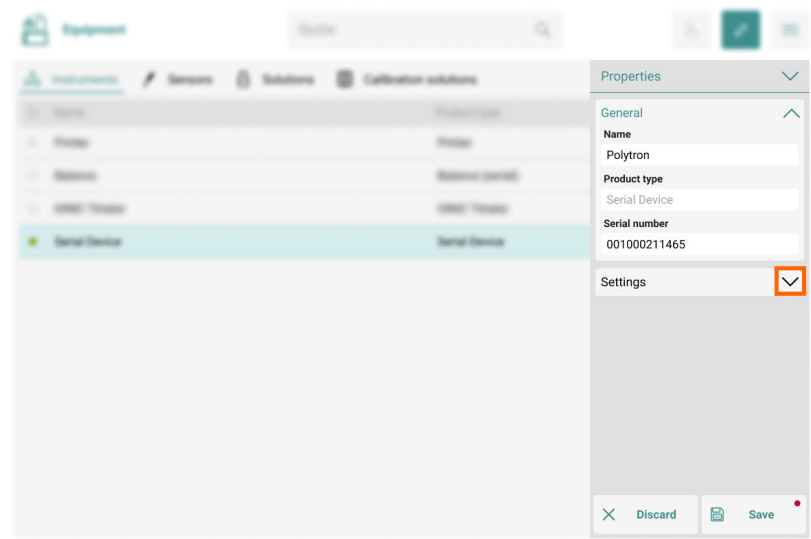


- Enter the serial number of the instrument and confirm with .



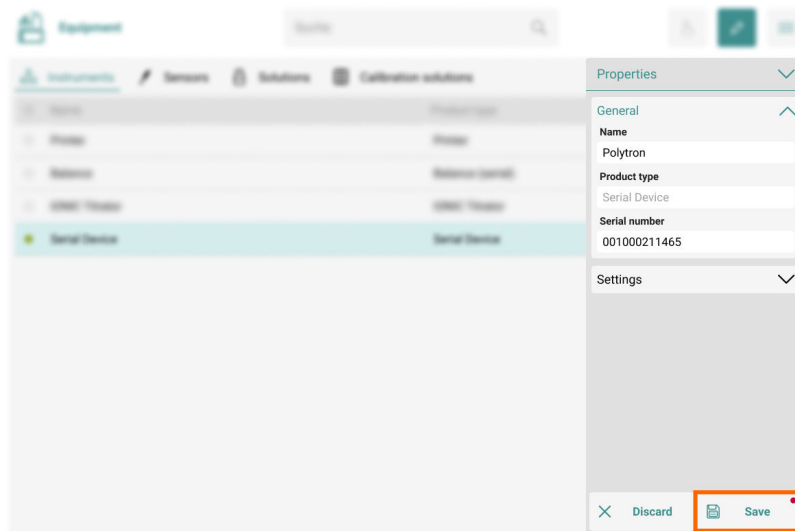
4 Editing settings

In addition, tap ✓ next to **Settings** and edit the required settings (*Additional information*).



5 Saving changes

Tap **[Save]** to save all changes.



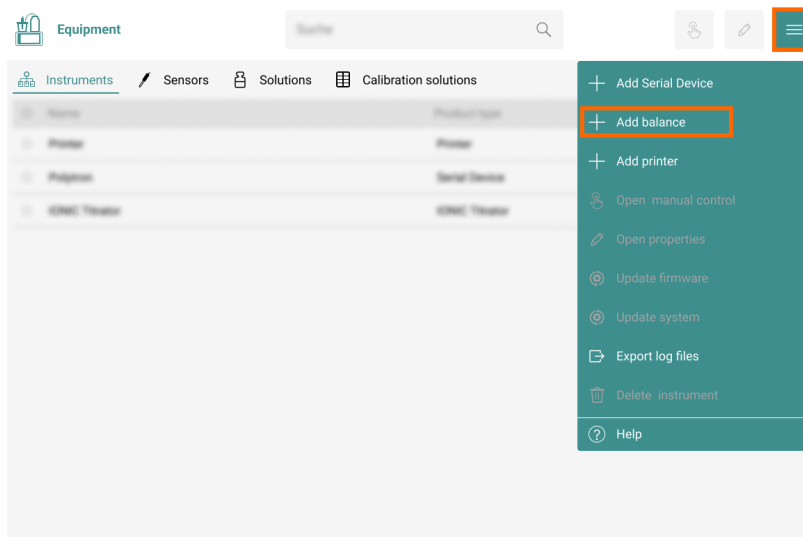
 Tap **[Discard]** to discard all changes.

5.2.2.2 Add balance

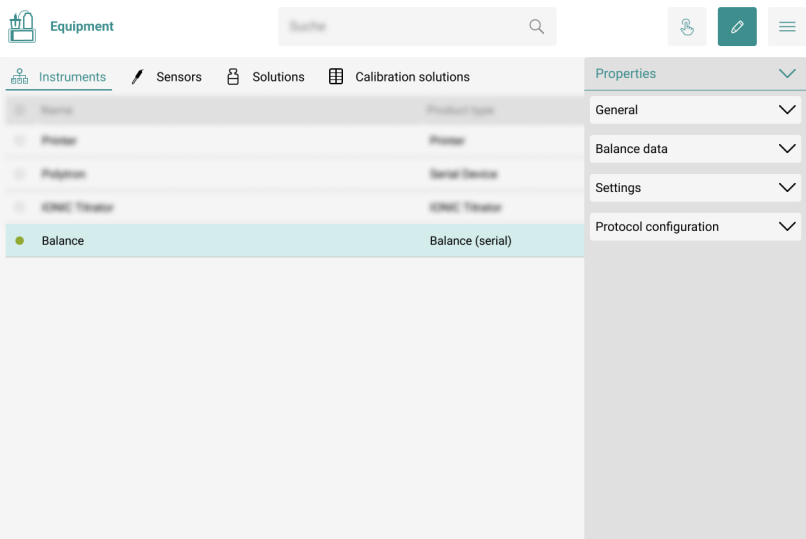
 The maximum length of name fields is 32 characters.

1 Adding a balance

Tap in the title bar and select **Add balance** under **Equipment** ► **Instruments**.

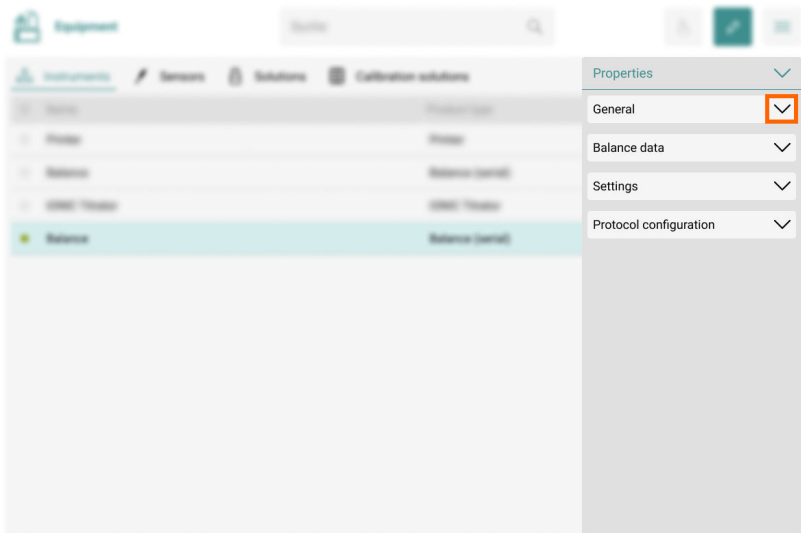


The balance with the **Balance (serial)** product type appears in the overview list. The **Properties** window is opened automatically.

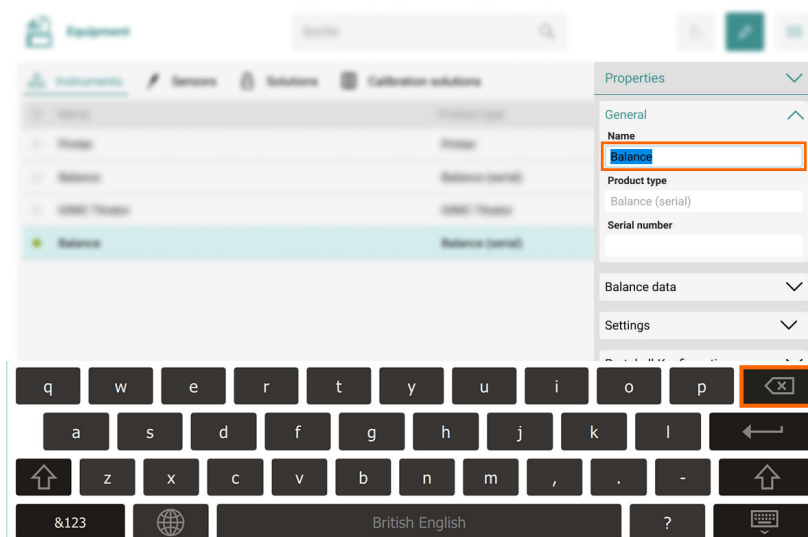


2 Naming or renaming a balance

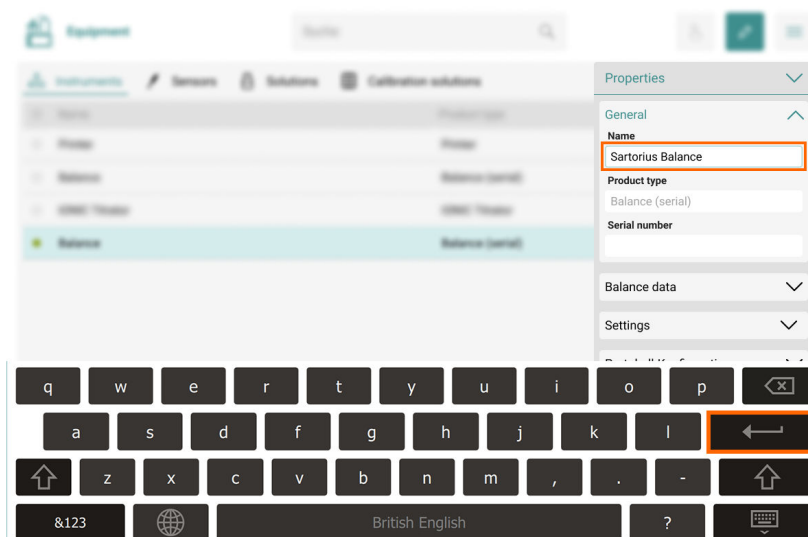
- Tap ✓ next to **General**.



- Tap the input field under **Name** and delete the default name with ✕.

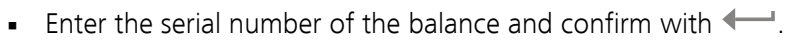


- Enter the desired balance name and confirm with .

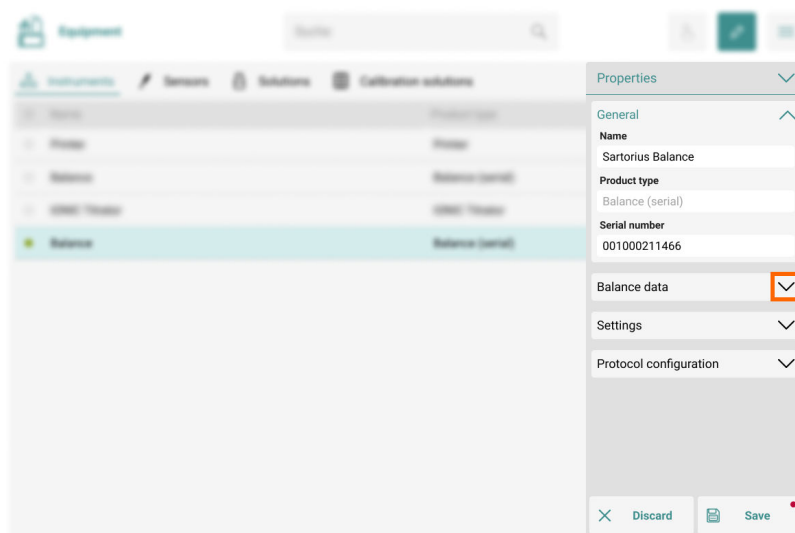


3 Entering a serial number

- Tap the input field under **Serial number**.

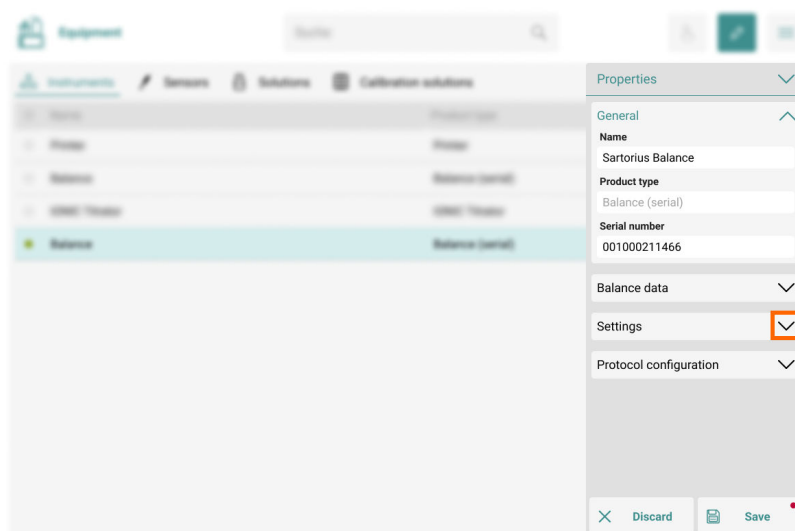


Tap next to **Balance data** and define the balance data (*Additional information*).



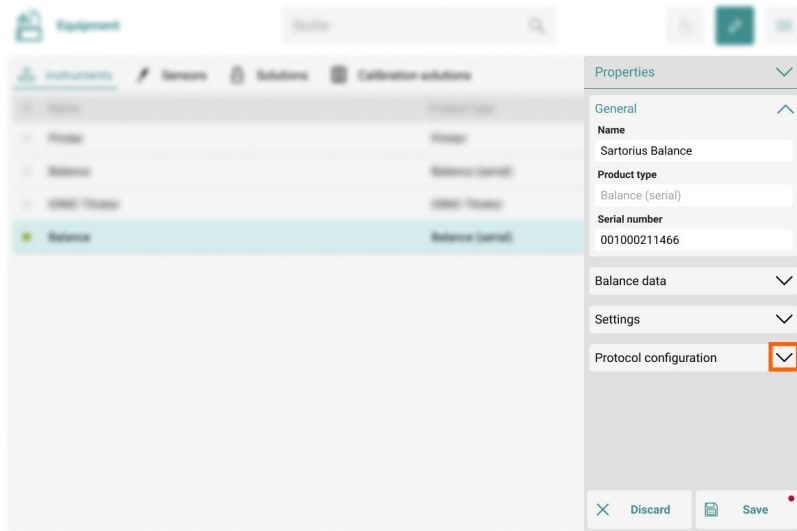
5 Editing settings

Tap next to **Settings** and edit the required settings (*Additional information*).



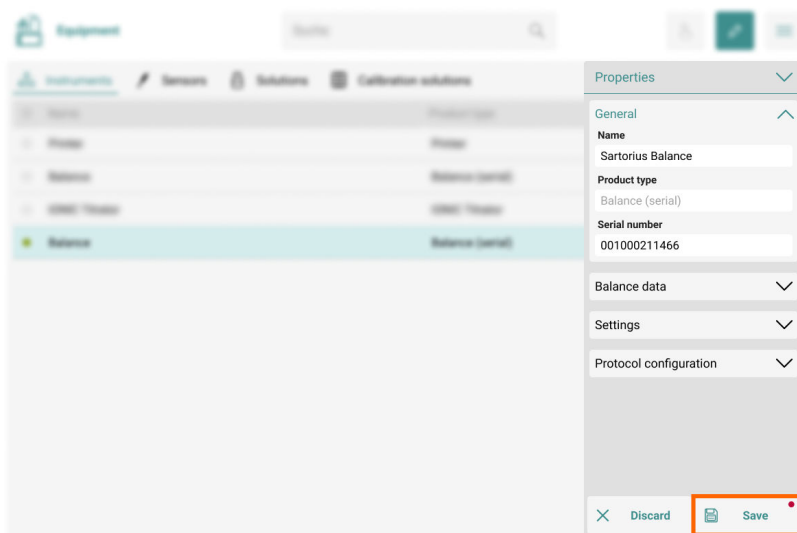
6 Editing a protocol configuration

Tap  next to **Protocol configuration** and define the protocol as desired (*Additional information*).



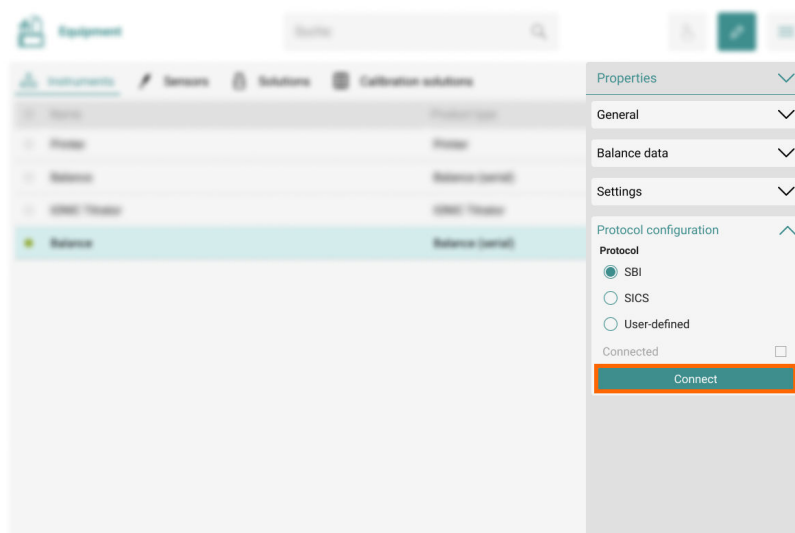
7

Tap **[Save]** to save all changes.



8

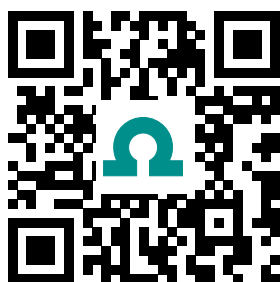
Tap the **[Connect]** button under **Protocol configuration** to connect the balance to the IONIC main instrument ([Additional information](#)).



The balance is connected to the IONIC main instrument. The properties cannot be edited until the balance is disconnected again.

5.2.2.3 Add printer

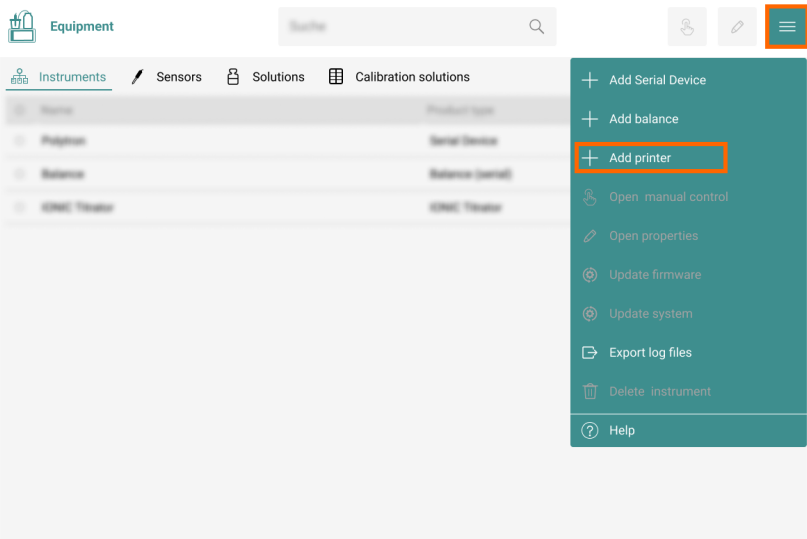
Video tutorial:



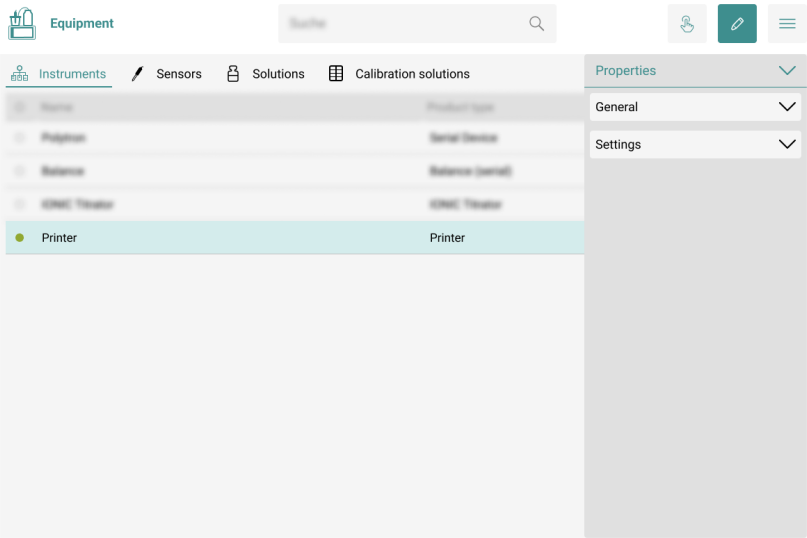
 When entering names, the maximum character length is 32 characters.

1 Adding printers

Tap  in the title bar and select **Add printer** under **Equipment** ► **Instruments**.

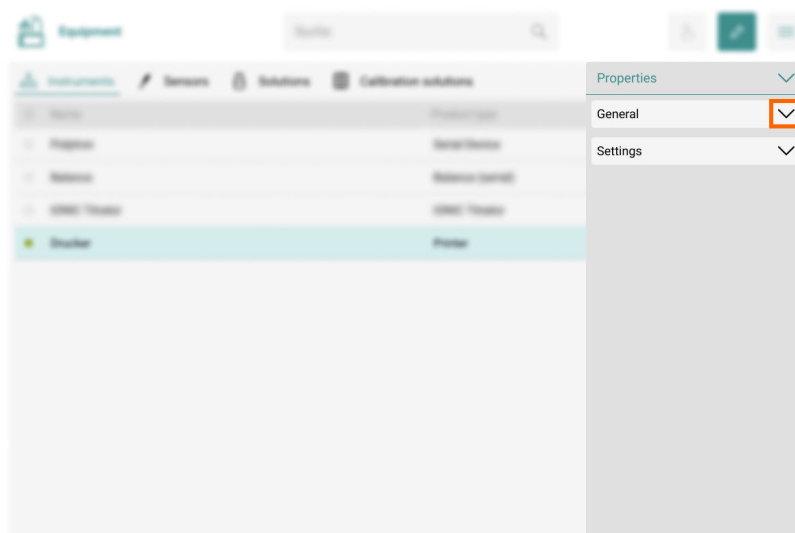


The printer with the **Printer** product type appears in the overview list. The **Properties** window is opened automatically.

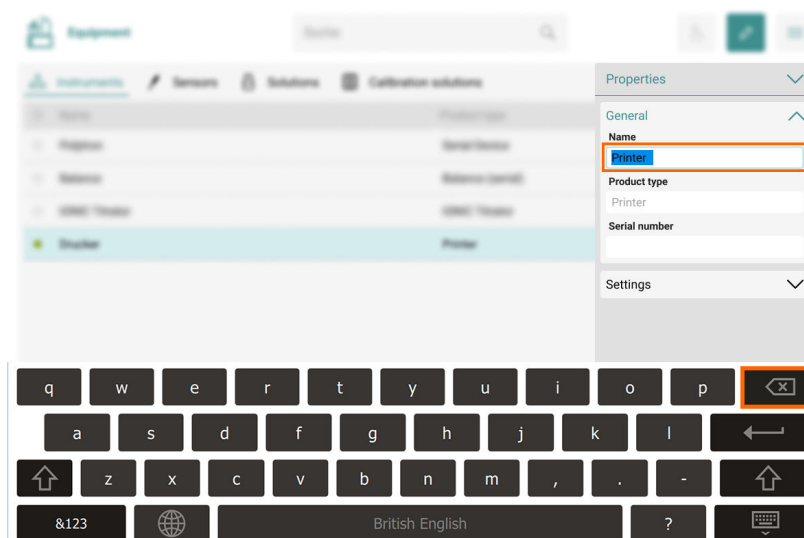


2 Naming or renaming printers

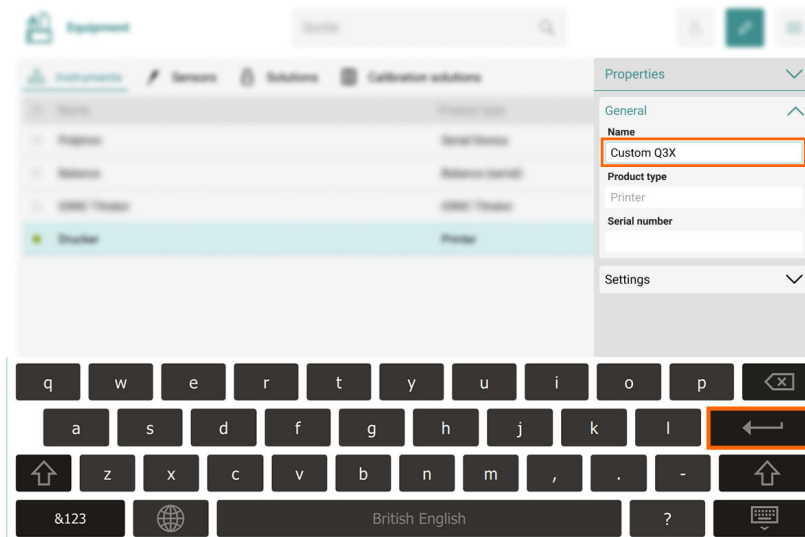
- Tap ✓ next to **General**.



- Tap the input field under **Name** and delete the default name with .

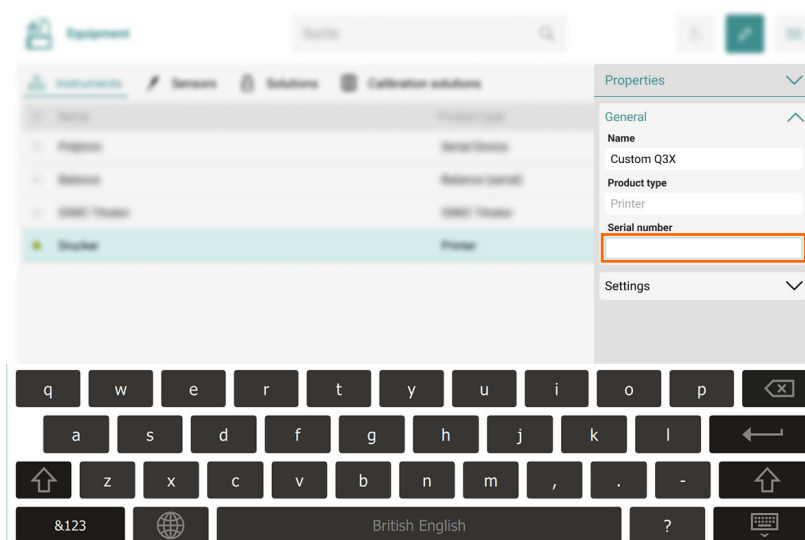


- Enter the desired printer name and confirm with .

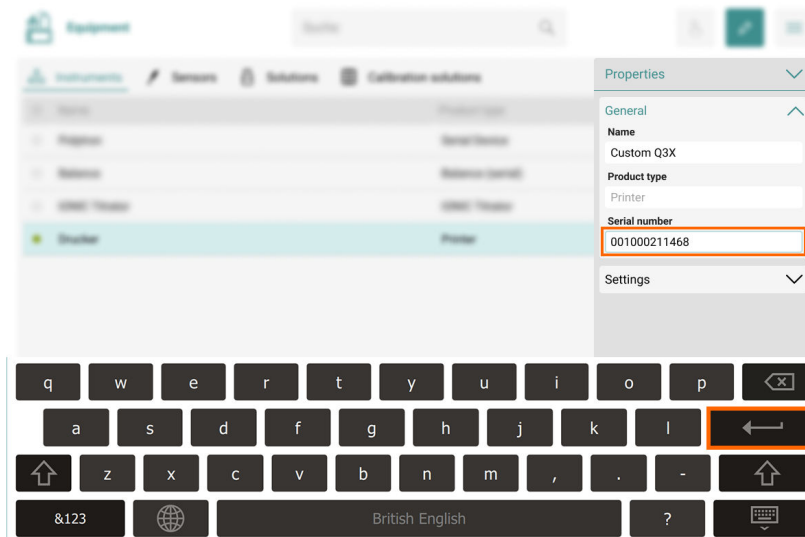


3 Entering the serial number

- Tap the input field under **Serial number**.

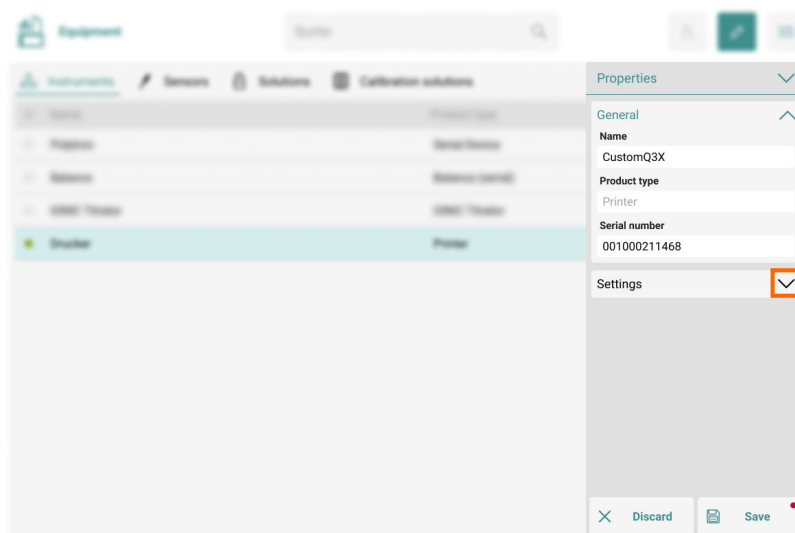


- Enter the serial number of the printer and confirm with .



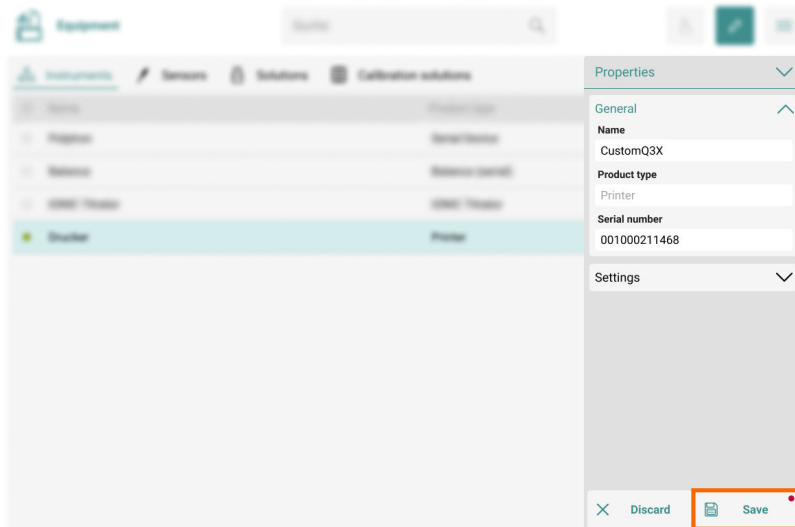
4 Editing settings

In addition, tap  next to **Settings** and edit the required settings (*Additional information*).



5 Saving changes

Tap **[Save]** to save all changes.



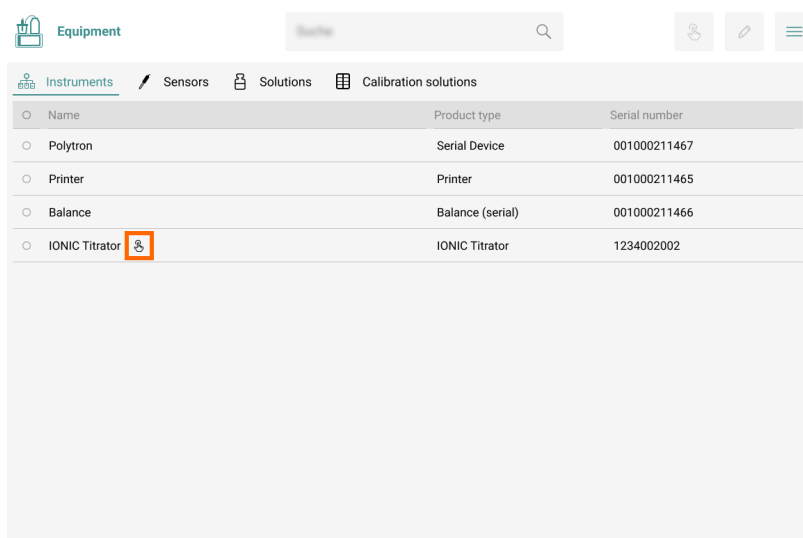
 Tap **[Discard]** to discard all changes.

5.2.2.4 Open manual control

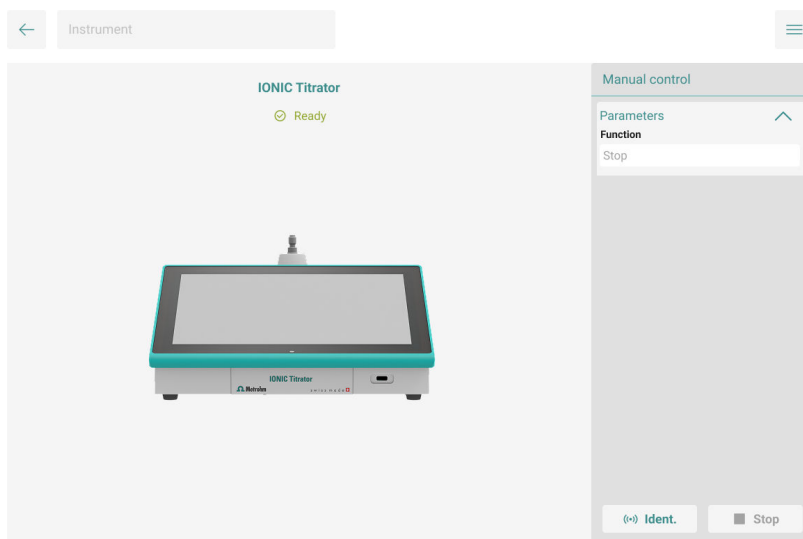
Video tutorial:



1 Tap  next to the desired instrument or the desired functional unit under **Equipment ► Instruments**.



The **Manual control** of the selected instrument or the selected functional unit is opened.



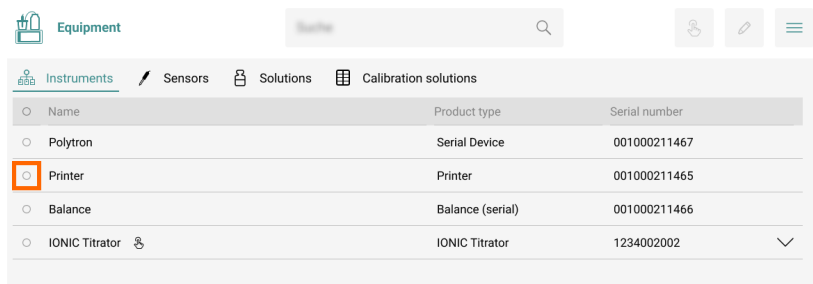
5.2.2.5 Open properties

 The images show an example from the **Instruments** subsection. The procedure applies for all subsections in the **Equipment** work area.

The properties can alternatively be opened by tapping in the **Sensors**, **Solutions**, and **Calibration solutions** subsections.

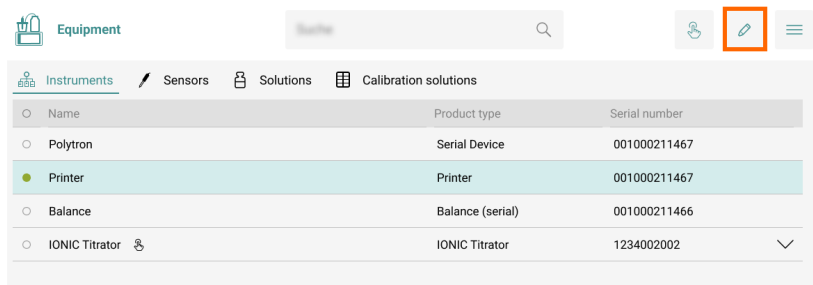
1 Selecting an object

Tap  to select the desired object under **Equipment** ► subsection.

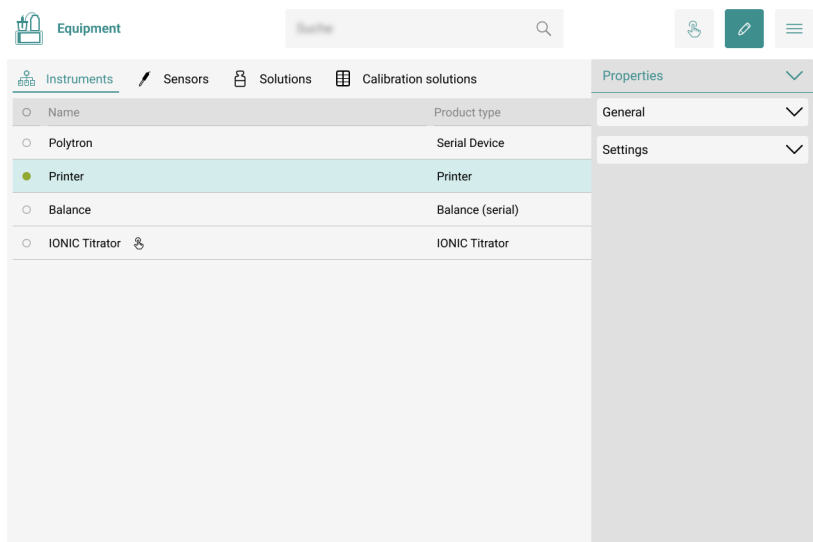


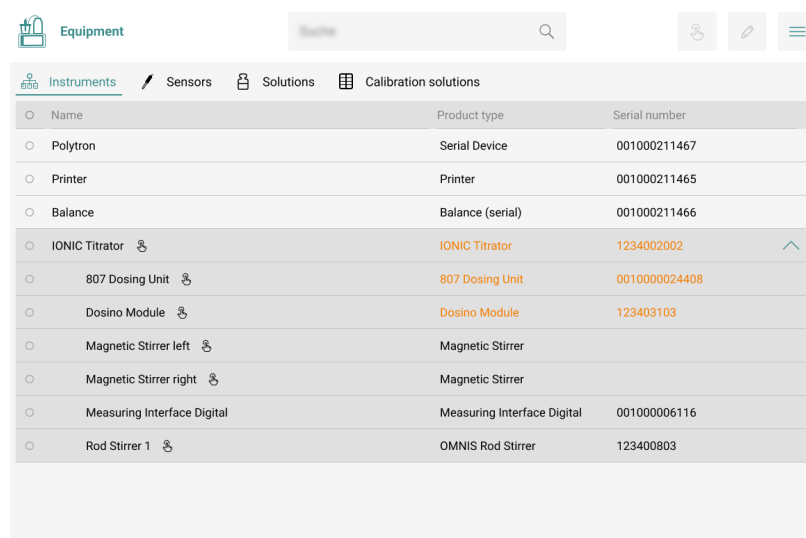
2 Opening the properties

Tap  in the title bar.



The **Properties** of the selected object are opened.





Name	Product type	Serial number
Polytron	Serial Device	001000211467
Printer	Printer	001000211465
Balance	Balance (serial)	001000211466
IONIC Titrator	IONIC Titrator	1234002002
807 Dosing Unit	807 Dosing Unit	0010000024408
Dosino Module	Dosino Module	123403103
Magnetic Stirrer left	Magnetic Stirrer	
Magnetic Stirrer right	Magnetic Stirrer	
Measuring Interface Digital	Measuring Interface Digital	001000006116
Rod Stirrer 1	OMNIS Rod Stirrer	123400803



CAUTION

Material damage caused by incomplete firmware update

The instrument on which a firmware update is canceled is in an undefined state and, thus, may be damaged.

- Do not shut down either the IONIC main instrument or the instruments connected via the MDL interface during the firmware update.
- Follow the instructions in the notes and messages displayed.

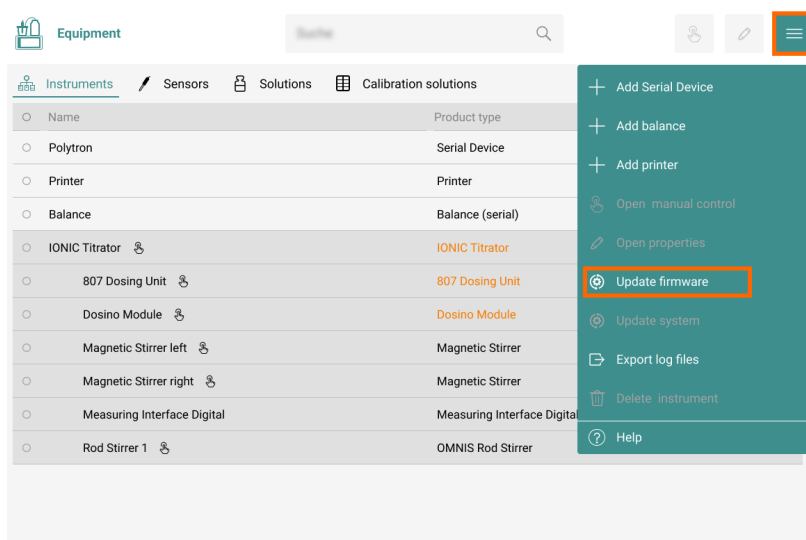
Updating firmware

Prerequisite:

- The system of the IONIC main instrument has been updated ([Additional information](#)).
- The instruments to be updated are connected to the IONIC main instrument via MDL interface.
- All instruments to be updated are switched on and visible in the overview list.
- The firmware of at least one connected instrument is outdated and highlighted in **orange** in the overview list.

1 Updating firmware

Tap  in the title bar and select **Update firmware** under **Equipment ► Instruments**.



A message appears and the firmware of the affected instruments is updated to the latest version. This procedure may take several minutes.

2 Completing a procedure

Wait until the firmware update is complete.

During the firmware update, the status LED of the instrument flashes **orange**.

The firmware update is completed as soon as the status display of the respective instrument lights up **green**. The instrument has been automatically restarted and is ready for operation.

5.2.2.8 Update system

The existing system of the IONIC main instrument can be updated to a newer version with the **Update system** function.

-  It is not possible to install an IONIC app version that is older than the currently installed starting version.
The database is also updated when the system is updated.

Updating a system

Prerequisite:

- The IONIC Titrator has been successfully licensed ([Additional information](#)).

1 Saving an IONIC app version

Contact the regional Metrohm service representative to receive the desired IONIC app version. Save the IONIC App version on a USB flash drive.

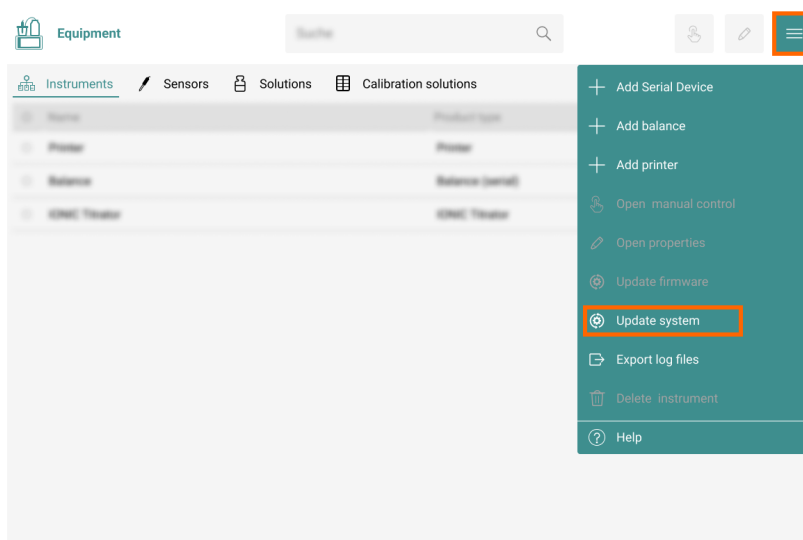
2 Plugging in a USB flash drive

Plug a USB flash drive into one of the USB connectors available on the IONIC main instrument and wait until the message **USB flash drive connected** appears.

-  If multiple USB flash drives are plugged in, then the USB flash drive that was first recognized by the system will be used.

3 Updating a system

Tap  in the title bar and select **Update system** under **Equipment** ► **Instruments**.



A message appears and the system of the IONIC main instrument is updated to the desired IONIC app version. This procedure may take several minutes.

- 
 - The IONIC main instrument must not be switched off or disconnected from the energy supply during the update.
 - The USB flash drive must not be removed from the IONIC main instrument during the update.

Once the system has been updated, the IONIC main instrument will be restarted automatically. As soon as the IONIC main instrument is ready, the status display will light up **green**.

4 Updating firmware

If instruments are displayed in **orange** in the overview list after the system update, then update the firmware of the respective instruments connected via MDL interface ([Additional information](#)).

5.2.2.9 Delete instrument

 The designation *Instrument* refers to all objects in the **Instruments** subsection.

Prerequisite:

- The instrument is disconnected from the IONIC main instrument.

1 Selecting the instrument

Tap  to select the desired instrument under **Equipment ► Instruments**.

Equipment

Search

Instruments

Sensors

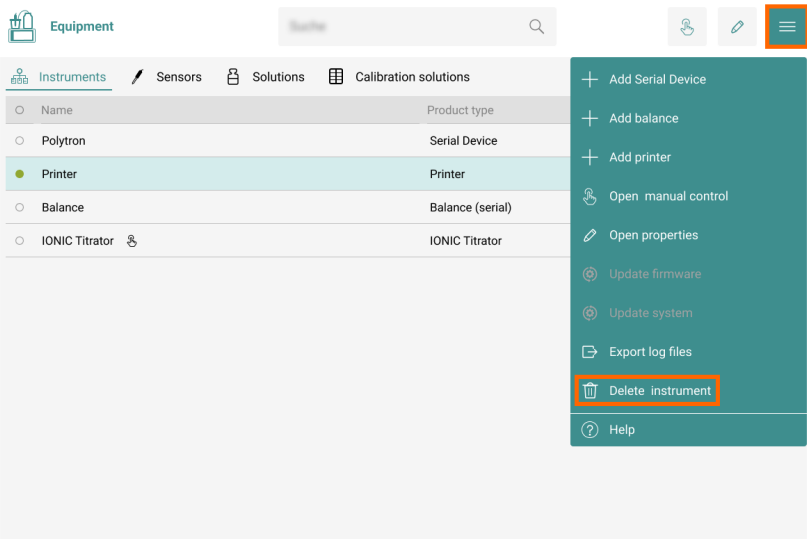
Solutions

Calibration solutions

☐	Name	Product type	Serial number
☐	Polytron	Serial Device	001000211467
☒	Printer	Printer	001000211465
☐	Balance	Balance (serial)	001000211466
☐	IONIC Titrator	IONIC Titrator	1234002002

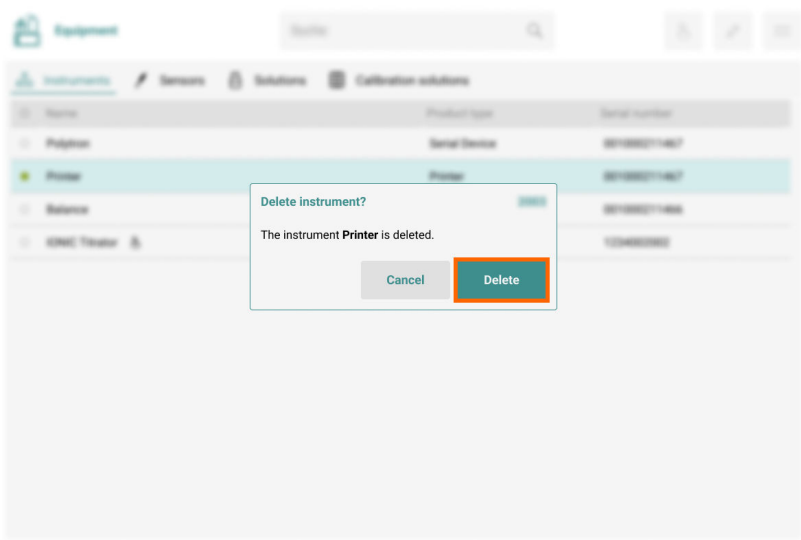
2 Deleting the instrument

Tap  in the title bar and select **Delete instrument**.



3 Confirming the message

Confirm the message with **Delete**.



 If multiple instruments are selected, then the message must be confirmed for each instrument.

5.2.3 Instrument properties – Overview

- [Overview](#)
- [General](#)
- [Settings](#)

 The designation *Instrument* refers to all objects in the **Instruments** subsection.

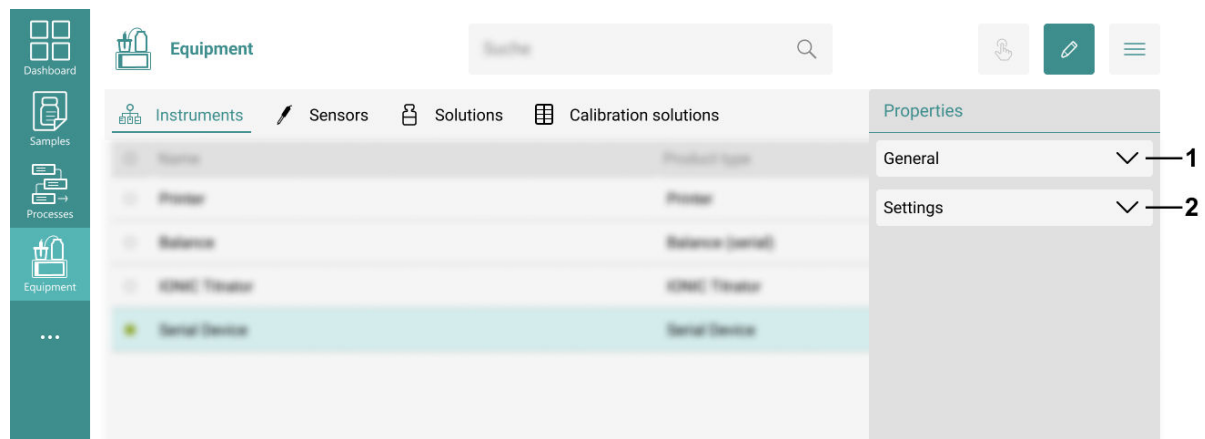
In the **Instruments** subsection, tap  to open the **Properties** window after selecting a instrument. The individual sections open by tapping .

Overview

The properties of the currently selected instrument can be viewed and edited in the **Properties** window. Depending on the instrument, various properties are available that are explained in more detail in the help in the properties of the respective instrument.

 Only the settings of the functional units of the **Magnetic Stirrer** and **OMNIS Rod Stirrer** types can be edited during a running determination. The settings of all other instruments, functional units or liquid handling components cannot be edited during a running determination.

The following information is displayed:



1 General

Visible with every instrument. The individual settings depend on the instrument selected.

Additional information

2 Settings

Depending on the instrument, different settings can be configured.

Additional information

General

 The configured settings must match the actual instrument settings.

The **General** section is available in the **Properties** of all instruments. The settings under **General** may vary, depending on the instrument.

Name	Name of the instrument. The maximum character length in the input field is 32 characters. When a instrument is added, the corresponding product type is defined as the name by default.
Product type	Product type of the instrument (Additional information). The product type cannot be edited.
Article number	Article number that uniquely identifies the instrument. The article number cannot be edited.
Serial number	Serial number of the instrument. Depending on the instrument, the serial number is automatically saved or must be entered manually.
Object ID	Unique identification number of the liquid handling component (e.g., piston buret) within the system. The Object ID cannot be edited.
Firmware version	Version number of the firmware installed on the instrument. The Firmware version cannot be edited.

Settings

Depending on the instrument, different settings are available that can be configured individually. Additional information on the specific settings can be found in the help in the respective instrument properties:

- Instruments ([Additional information](#))
- Functional units ([Additional information](#))
- Liquid handling components ([Additional information](#))

5.2.3.1 Instruments – Properties

Definition

Instruments are used for performing analyses. An instrument consists of one or more functional units.

The instruments are divided into *IONIC main instrument*, *Instruments*, and *Other instruments* in the instrument directory in the help and are displayed on the first level in the overview list ([Additional information](#)).

The IONIC app is operated on the *IONIC main instrument*. *Instruments* with the associated functional units are connected to the IONIC main instrument via MDL interface. *Other instruments* are connected to the IONIC main instrument with a USB/RS-232 Converter or via USB.

Settings

USB connector

Name of the USB interface on the IONIC main instrument to which the USB/RS-232 converter connected to the balance is connected.

The respective USB connector can be selected in the selection list as soon as a USB/RS-232 Converter is connected to the IONIC main instrument.

- **Front**
- **Rear top**
- **Rear bottom**

The respective USB connector can be selected in the selection list as soon as a USB/RS-232 Converter is connected to the IONIC main instrument.

- Front
- Rear top
- Rear bottom

Baud rate Speed of the characters that are transmitted per second.

- **300**
- **600**
- **1200**
- **2400**
- **4800**
- **9600** (default value)
- **19200**
- **38400**
- **57600**
- **115200**

- 300
- 600
- 1200
- 2400
- 4800
- 9600 (default value)
- 19200
- 38400
- 57600
- 115200

- 300
- 600
- 1200
- 2400
- 4800
- 9600 (default value)
- 19200
- 38400
- 57600
- 115200

Data bits	Number of bits for displaying a character during transmission. ▪ 7 ▪ 8 (default value)
------------------	--

- 7
- 8 (default value)

- 7
- 8 (default value)

Parity	Type of parity testing. ▪ None (default value) ▪ Even ▪ Odd
---------------	--

- **None** (default value)
- **Even**
- **Odd**

- **None** (default value)
- **Even**
- **Odd**

Stop bits	Number of stop bits. ▪ 1 (default value) ▪ 2
------------------	--

- 1 (default value)
- 2

- 1 (default value)
- 2

Handshake	Type of flow control. ▪ None (default value) ▪ HW ▪ SW
------------------	---

- **None** (default value)
- **HW**
- **SW**

- **None** (default value)
- **HW**
- **SW**

Protocol configuration

Weighing response pattern

(only if **User-defined** is selected)

Pattern which is looked for in the response of the balance to the weighing command that was sent. The pattern is defined using regular expressions (RegEx) ([Additional information](#)).

It is possible to work with named capturing groups in the regular expressions. In this way, certain components of the response (e.g., weight or unit) can be recorded in a targeted manner. After the definition of the capturing group, the corresponding RegEx expression must be entered.

3 capturing groups are relevant for the balance:

- (?<value>): Weight, e.g., as numerical value with decimal places: (?<value>\d+\.\d+)
- (?<unit>): Unit, e.g., for grams: (?<unit>[g])
- (?<sign>): Algebraic sign (optional), e.g., for a positive or negative weight: (?<sign>[+-]?)

Example of an entry for a positive or negative weight with decimal places in grams or milligrams: **(?<sign>[+-]?) []*(?<value>\d*\.\d+)[]*(?<unit>[g|mg])**

To ensure that only responses of the balance are taken into account, the entry can be written protocol-specific. Example for SICS: **[sS] [sS] []*(?<sign>[+-]?) []*(?<value>\d*\.\d+)[]*(?<unit>[g|mg])**

If the field is left empty, then the IONIC app will interpret the response.

Tare

(only if **User-defined** is selected)

Character string that is sent to the balance as a tare command via the RS-232 interface.

Connected

Connection status of the balance.

- ☐: The balance is not connected to the IONIC main instrument.
- ☒: The balance is connected to the IONIC main instrument.

The connection status cannot be edited.

Connect/Disconnect

The function is available only if the corresponding balance is connected to the IONIC main instrument.

- **Connect**: Tap **[Connect]** to connect the balance to the IONIC main instrument. The properties can no longer be edited afterwards.
- **Disconnect**: Tap **[Disconnect]** to disconnect the balance from the IONIC main instrument. The properties can be edited again afterwards.

To test the connection of the balance, apply weighing data directly in a sample list ([Additional information](#)).

5.2.3.1.1.1 Recording weighing data

If a balance is connected to the IONIC main instrument, then the weights of weighings can be applied directly into a sample list. A weight can be added to the subsample data by pressing the **[Print]** key on the balance or using a **REQUEST** command.

 The weighing unit can be defined in the method properties of the assigned method under **Subsample data ▶ Sample size ▶ Unit** (*Additional information*).

The following options for recording weighing data are available in the IONIC app:

- *Applying weighing data directly*
- *Applying weighing data with a REQUEST command*
- *Applying weighing data by weighing by difference*

Applying weighing data directly

Prerequisite:

- The balance is connected to the IONIC main instrument via the USB/RS-232 Converter.
- The balance is configured under **Equipment ► Instruments ► Properties** (*Additional information*).
- The **Sample size** input field can be edited in the selected subsample so that weighing data can be received (*Additional information*).

1 Selecting a sample size

Tap the input field subsample in the opened sample in the desired subsample under **Sample size**.

←

Sample list 6

+

☰

01 Sample 1

▶

+

⋮

↗

○	No.	Subsample	Method	Sample size	Position	Determination start	Status
○	1	Subsample 1	MEAS U		1		▶
○	2	Subsample 2	MEAS U		1		▶

⋮

02 Sample 2

0/1

▼

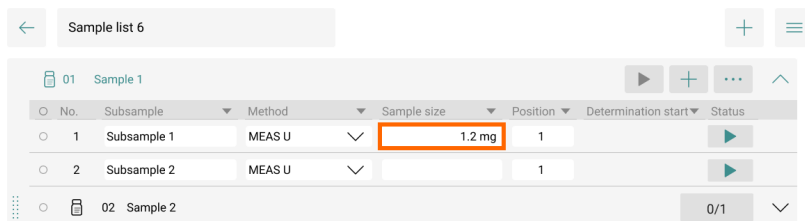
2 Weighing in a subsample

Weigh in the subsample at the balance.

3 Pressing Print key

On the balance, press the **[Print]** key.

The IONIC app receives the values of the balance and applies the weight in the **Sample size** input field of the selected subsample.



No.	Subsample	Method	Sample size	Position	Determination start	Status
1	Subsample 1	MEAS U	1.2 mg	1		
2	Subsample 2	MEAS U		1		

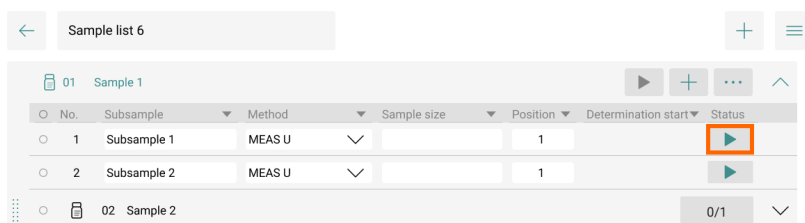
Applying weighing data with the REQUEST command

Prerequisite:

- The balance is connected to the IONIC main instrument via the USB/RS-232 Converter.
- The balance is configured under **Equipment ► Instruments ► Properties** (*Additional information*).
- The method selected in the subsample includes a **REQUEST** command with the activated **Sample size** variable (*Additional information*).
- The **Editable** field is activated in the selected method under **Method properties ► Subsample data ► Sample size** (*Additional information*).

1 Setting the determination to pending

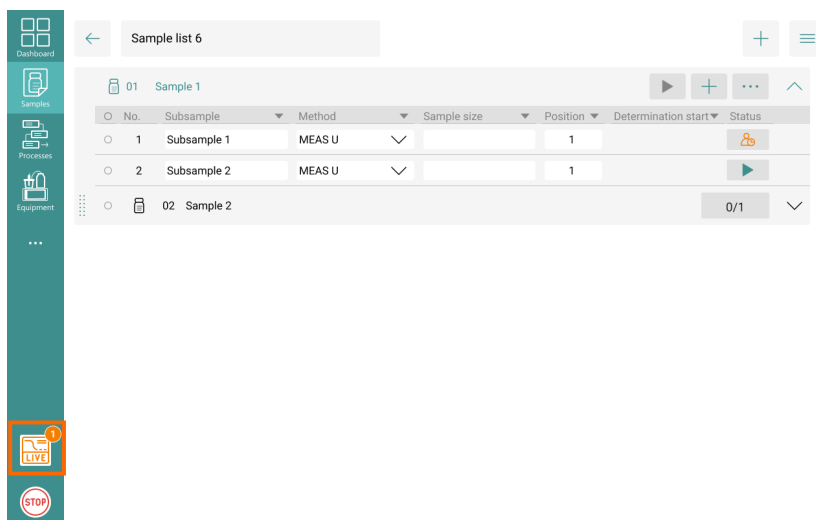
Set the determination of the desired subsample to pending.



No.	Subsample	Method	Sample size	Position	Determination start	Status
1	Subsample 1	MEAS U		1		
2	Subsample 2	MEAS U		1		

2 Changing the work area

Tap the **Live display** work area in the navigation bar.

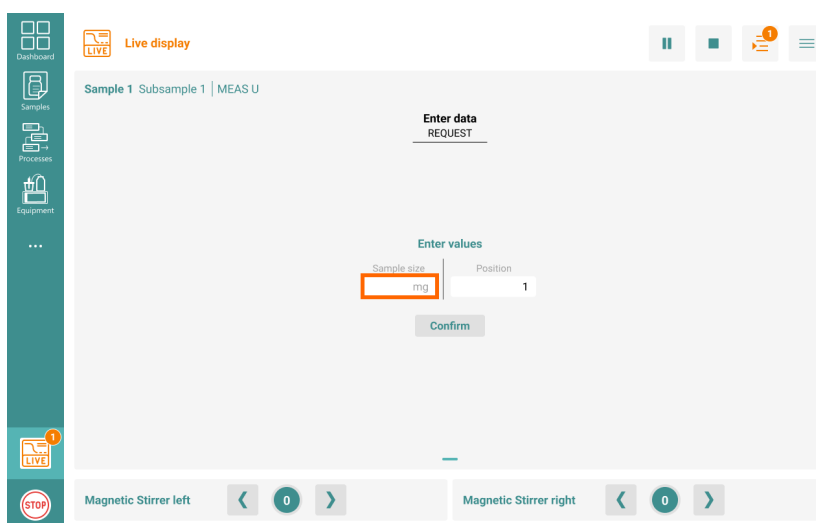


3 Weighing in a subsample

Weigh in the subsample at the balance.

4 Tapping the input field

Tap the input field under the **Sample size** variable in the request of the **REQUEST** command.

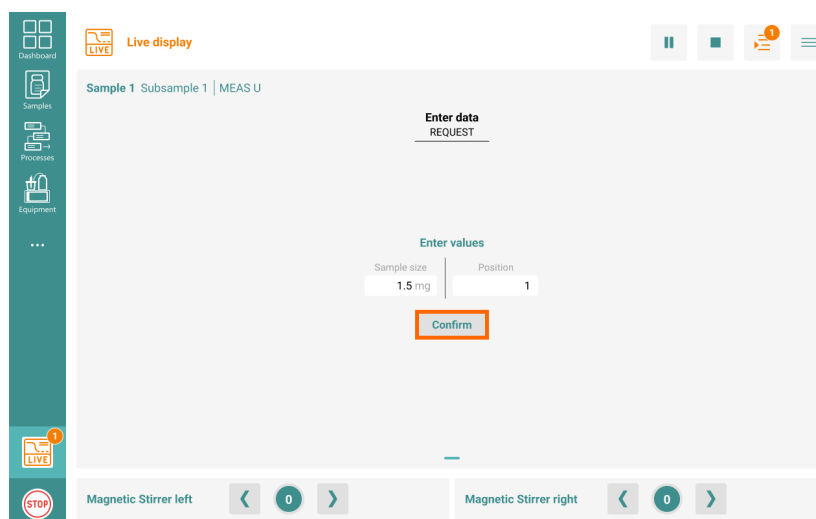


5 Pressing Print key

On the balance, press the **[Print]** key.

6 Applying values of the subsamples

As soon as the sample size has been successfully applied, tap **[Confirm]** in the request of the **REQUEST** command.



The values are adopted for the running subsample and the next command in the command sequence is executed.

Applying weighing data by weighing by difference

Prerequisite:

- The balance is connected to the IONIC main instrument via the USB/RS-232 Converter.
- The balance is configured under **Equipment ► Instruments ► Properties** (*Additional information*).
- The method selected in the subsample includes a **REQUEST** command with the activated **Sample size** variable (*Additional information*).
- The **Editable** field is activated in the selected method under **Method properties ► Subsample data ► Sample size** (*Additional information*).
- A determination is carried out that requires taring.

1 Displaying the REQUEST command

Display the **REQUEST** command in the **Live display** work area.

2 Weighing in a subsample

Weigh in the subsample at the balance.

3 Taring the balance

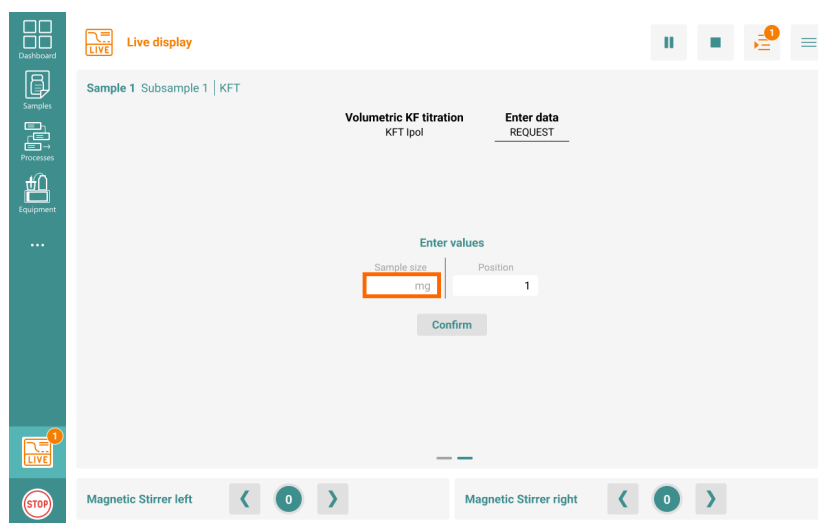
Tare the balance.

4 Adding a subsample

Add the subsample and place the weighing vessel back on the balance.

5 Tapping the input field

Tap the input field under the **Sample size** variable in the request of the **REQUEST** command.

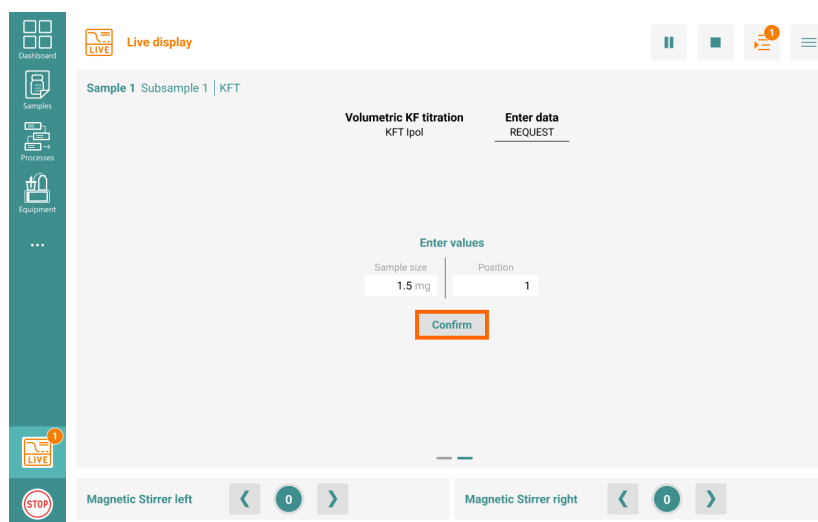


6 Pressing Print key

On the balance, press the **[Print]** key.

7 Applying values of the subsamples

As soon as the sample size has been successfully applied, tap **[Confirm]** in the request of the **REQUEST** command.



The values are adopted for the running subsample and the next command in the command sequence is executed.

5.2.3.1.2 Printer – Properties

Definition

Instruments with the **Printer** product type are connected locally to the IONIC main instrument via USB or connected to the IONIC main instrument via the network and can only be used together with the IONIC main instrument. A printer must be added manually to the overview list ([Additional information](#)).

-  Reports are sent to the printer as a PDF file in the original format. The direct printing of PDF files is supported by current PostScript-capable printers. Metrohm recommends testing the direct printing of PDF files before purchasing a printer or contacting the regional Metrohm service representative.

Properties

After the selection of a printer, tap  to open the **Properties** window. The individual sections open by tapping .

-  The configured settings must match the actual settings of the printer. The information can be found in the respective manual for the printer.

The following settings are available for printers:

General	
Additional information	
Settings	
Printer	Printer type with which the report is to be printed. ▪ Network printer: Printer that is connected to the IONIC main instrument via network. ▪ CUSTOM printer: Printer of the CUSTOM brand that is connected to the IONIC main instrument via USB. ▪ EPSON printer: Printer of the EPSON brand that is connected to the IONIC main instrument via USB. ▪ TX-900MH printer: TX-900MH impact printer that is connected to the IONIC main instrument via USB.
IP address (only if Network printer is selected)	IP address of the network printer used (see printer manual).

Settings

Cut off

(only if **CUSTOM printer** is selected)

If the check box is activated, then the CUSTOM printer will automatically cut off the printout after the completed printing process.

5.2.3.1.3 Serial Device – Properties

Definition

Instruments with the **Serial Device** product type are connected to the IONIC main instrument via USB/RS-232 Converter and can only be used together with the IONIC main instrument. A Serial Device must be added manually to the overview list ([Additional information](#)).

Properties

After the selection of a Serial Device, tap  to open the **Properties** window. The individual sections open by tapping .

 The configured settings must match the actual settings of the Serial Device. The information can be found in the respective manual for the Serial Device.

The following settings are available for a Serial Device:

General

Additional information

Settings

USB connector

Name of the USB interface on the IONIC main instrument to which the USB/RS-232 converter connected to the Serial Device is connected.

The respective port can be selected in the selection list as soon as a USB/RS-232 Converter is connected to the IONIC main instrument.

Baud rate

Speed of the characters that are transmitted per second.

- 1200
- 2400
- 4800
- 9600 (default value)
- 19200
- 38400
- 57600
- 115200

Settings

Data bits Number of bits for displaying a character during serial transmission.

- **5**
- **6**
- **7**
- **8** (default value)

Parity Type of parity testing.

- **None** (default value)
- **Even**
- **Odd**
- **Space**
- **Mark**

Stop bits Number of stop bits.

- **1** (default value)
- **1.5**
- **2**

Handshake Type of flow control.

- **None** (default value)
- **HW**
- **SW**

Terminator for send Terminator for sending in hexadecimal code.

- **CR**: Carriage Return = \0D
- **LF**: Line Feed = \0A
- **CR + LF** (default value): Carriage Return and Line Feed = \0D + \0A
- **No terminator**

Terminator for receive Terminator for receiving in hexadecimal code.

- **CR**: Carriage Return = \0D
- **LF**: Line Feed = \0A
- **CR + LF** (default value): Carriage Return and Line Feed = \0D + \0A
- **No terminator**

Connected Connection status of the Serial Device.

If the check box is enabled, the Serial Device is connected to the IONIC main instrument. If the check box is disabled, then the Serial Device is not connected to the IONIC main instrument.

The connection status cannot be edited.

Settings

Connect/Disconnect

The function is available only if the corresponding Serial Device is connected to the IONIC main instrument.

- **Connect:** Tap **[Connect]** to connect the Serial Device to the IONIC main instrument. The properties can no longer be edited afterwards.
- **Disconnect:** Tapping **[Disconnect]** disconnects the connection of the Serial Device from the IONIC main instrument. Afterwards, the properties can be edited again.

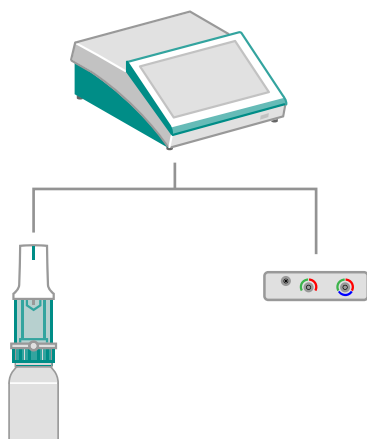
5.2.3.2 Functional units – Properties

Definition

A functional unit is a standalone component of a instrument that can be used to execute commands. Functional units are displayed on the second level in the overview list.

Example: IONIC Titrator with 2 functional units

- Dosino Module with connected 807 Dosing Unit
- Measuring Interface Analog (installed)



Properties

After selecting a functional unit, tapping  opens the window **Properties** in which the **General** section is displayed (*Additional information*). The properties to be edited open by tapping 

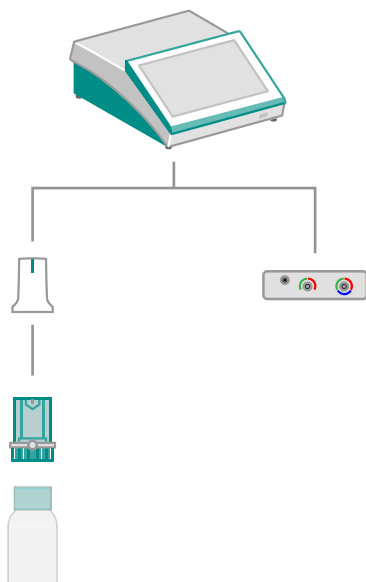
5.2.3.3 Liquid handling components – Properties

Definition

A liquid handling component is a flexible component that is used together with the associated functional unit for executing commands. Liquid handling components must be connected to a functional unit connected to the IONIC main instrument in order to be recognized by the system. The **807 Dosing Unit** and **Cylinder Unit** liquid handling components are displayed on the

second level in the overview list. The liquid handling component **OMNIS Liquid Adapter** is not displayed in the overview list.

Example: IONIC Titrator (instrument) with built-in Measuring Interface Analog (functional unit), connected Dosino Module (functional unit), and 807 Dosing Unit (liquid handling component)



Properties

 No properties are available for the **OMNIS Liquid Adapter**.

After selecting a liquid handling component, tapping  opens the **Properties** window in which the **General** section and, depending on the liquid handling component, additional settings are displayed (*Additional information*). The properties to be edited open by tapping .

Additional settings are available for the following product types in addition to the **General** section:

- **807 Dosing Unit** (*Additional information*)
- **Cylinder Unit** (*Additional information*)

5.2.3.3.1 807 Dosing Unit – Properties

Definition

The **Dosino Module** can be attached to the 807 Dosing Unit. The 807 Dosing Unit is included in the **Instruments** subsection in the overview list, as soon as it is connected to the attached Dosino Module on the **IONIC Titrator**.

The 807 Dosing Unit has a distributor with 5 ports, whereby the VENT port is used for purging:

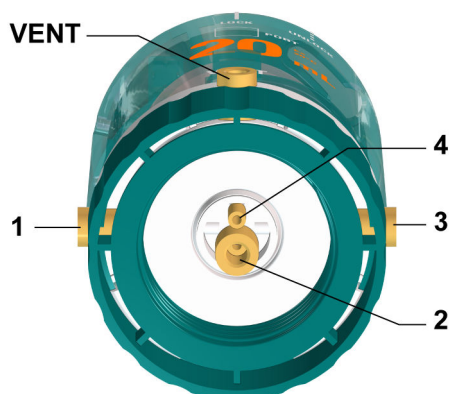


Figure 17 807 Dosing Unit – Ports

Properties

After the selection of the 807 Dosing Unit, the **Properties** window opens by tapping . The individual sections open by tapping .

The following settings are available for a 807 Dosing Unit:

General	
<i>Additional information</i>	
Fill port	
Fill port	Assigns the desired port as Fill port. ▪ Port 1 ▪ Port 2 (default value) ▪ Port 3 ▪ Port 4
Tubing length	Length of the tubing connected to the defined Fill port of the 807 Dosing Unit. If no tubing is connected, then 0 must be entered in order for the Fill port to be omitted when executing the Preparing function. Input range: 0.0–999.9 Unit: cm Default value: 40.0

Fill port

Tubing diameter Inner diameter of the tubing connected to the defined Fill port of the 807 Dosing Unit.

Input range: 0.0–9.9

Unit: mm

Default value: 2.0

Maximum rate

Maximum permissible rate with which the defined Fill port may be filled.

In addition, the instrument checks before filling whether the defined rate is greater than 6 times the cylinder volume per minute. If this is the case, then the rate will be reduced by the functional unit to the maximum permitted rate.

If air bubbles occur during aspiration of the solution, then first check all the tubing connections. If a vacuum causes the air bubbles, then the air bubbles can be prevented by previously degassing the solution or by reduction of the maximum rate.

Additional information

Input range: 0.01–300.00

Unit: mL/min

Default value: 300.0

Dosing port 1

Dosing port 1 Assigns the desired port as Dosing port 1.

- **Port 1** (standard port)
- **Port 2**
- **Port 3**
- **Port 4**

Tubing length

Length of the tubing connected to the defined Dosing port 1 of the 807 Dosing Unit.

If no tubing is connected, then 0 must be entered in order for the Dosing port 1 to be omitted when executing the **Preparing** function.

Input range: 0.0–999.9

Unit: cm

Default value: 40.0

Tubing diameter	Inner diameter of the tubing connected to the defined Dosing port 1 of the 807 Dosing Unit. Input range: 0.0–9.9 Unit: mm Default value: 2.0
Maximum rate	Maximum permissible rate with which the defined Dosing port 1 may be dosed. In addition, the instrument checks before dosing whether the defined rate is greater than 6 times the cylinder volume per minute. If this is the case, then the rate will be reduced by the functional unit to the maximum permitted rate. If air bubbles occur during dosing of the solution, then first check all the tubing connections. If a vacuum causes the air bubbles, then the air bubbles can be prevented by previously degassing the solution or by reduction of the maximum rate. <i>Additional information</i> Input range: 0.01–300.00 Unit: mL/min Default value: 300.0

Dosing port 2	Assigns the desired port as Dosing port 2. ▪ Port 1 ▪ Port 2 ▪ Port 3 (default value) ▪ Port 4
Tubing length	Length of the tubing connected to the defined Dosing port 2 of the 807 Dosing Unit. If no tubing is connected, then 0 must be entered in order for the Dosing port 2 to be omitted when executing the Preparing function. Input range: 0.0–999.9 Unit: cm Default value: 0.0

Dosing port 2

Tubing diameter Inner diameter of the tubing connected to the defined Dosing port 2 of the 807 Dosing Unit.

Input range: 0.0–9.9

Unit: mm

Default value: 2.0

Maximum rate Maximum permissible rate with which the defined Dosing port 2 may be dosed.

In addition, the instrument checks before dosing whether the defined rate is greater than 6 times the cylinder volume per minute. If this is the case, then the rate will be reduced by the functional unit to the maximum permitted rate.

If air bubbles occur during dosing of the solution, then first check all the tubing connections. If a vacuum causes the air bubbles, then the air bubbles can be prevented by previously degassing the solution or by reduction of the maximum rate.

Additional information

Input range: 0.01–300.00

Unit: mL/min

Default value: 300.0

Special port

Special port Assigns the desired port as Special port.

- **Port 1**
- **Port 2**
- **Port 3**
- **Port 4** (default value)

Tubing length Length of the tubing connected to the defined Special port of the 807 Dosing Unit.

If no tubing is connected, then 0 must be entered in order for the Special port to be omitted when executing the **Preparing** function.

Input range: 0.0–999.9

Unit: cm

Default value: 0.0

Cylinder	
Volume	Volume of the cylinder of the 807 Dosing Unit. The field cannot be edited.
Article number	Article number of the cylinder used. The field cannot be edited.
Serial number	Serial number of the cylinder used. The field cannot be edited.
Service	
Calibration result	Result of the last piston buret calibration.
Calibration date	Date of the last piston buret calibration carried out.

5.2.3.3.2 **Cylinder unit OMNIS – Properties**

Definition

The cylinder unit OMNIS (product type: **Cylinder Unit**) can be attached to the **Dosing Drive**. The cylinder unit OMNIS is included in the **Instruments** subsection in the overview list as soon as it is attached on the Dosing Drive installed in the **OMNIS Dosing Module** that is connected to the **IONIC Titrator**.

The cylinder unit OMNIS has a distributor with 4 ports:



Figure 18 *Cylinder unit OMNIS – Ports*

Properties

After the selection of the cylinder unit OMNIS, the **Properties** window opens by tapping on  .
The individual sections open by tapping  .

The following settings are available for a cylinder unit OMNIS:

General

Additional information

Fill port

Fill port

Assigns the desired port as Fill port.

- **Port 1**
- **Port 2** (default value)
- **Port 3**
- **Port 4**

Tubing length

Length of the tubing that is connected to the defined Fill port of the cylinder unit OMNIS.

If no tubing is connected, then 0 must be entered in order for the Fill port to be omitted when executing the **Preparing** function.

Input range: 0.0–999.9

Unit: cm

Default value: 40.0

Tubing diameter

Inner diameter of the tubing that is connected to the defined Fill port of the cylinder unit OMNIS.

Input range: 0.0–9.9

Unit: mm

Default value: 2.0

Maximum rate

Maximum permissible rate with which the defined Fill port may be dosed.

In addition, the instrument checks before filling whether the defined rate is greater than 6 times the cylinder volume per minute. If this is the case, then the rate will be reduced by the functional unit to the maximum permitted rate.

If air bubbles occur during aspiration of the solution, then first check all the tubing connections. If a vacuum causes the air bubbles, then the air bubbles can be prevented by previously degassing the solution or by reduction of the maximum rate.

Additional information

Input range: 0.01–300.00

Unit: mL/min

Default value: 300.0

Dosing port 1

Dosing port 1

Assigns the desired port as Dosing port 1.

- **Port 1** (default value)
- **Port 2**
- **Port 3**
- **Port 4**

Tubing length

Length of the tubing that is connected to the defined Dosing port 1 of the cylinder unit OMNIS.

If no tubing is connected, then 0 must be entered in order for the Dosing port 1 to be omitted when executing the **Preparing** function.

Input range: 0.0–999.9

Unit: cm

Default value: 40.0

Tubing diameter

Inner diameter of the tubing that is connected to the defined Dosing port 1 of the cylinder unit OMNIS.

Input range: 0.0–9.9

Unit: mm

Default value: 2.0

Maximum rate

Maximum permissible rate with which the defined Dosing port 1 may be dosed.

In addition, the instrument checks before dosing whether the defined rate is greater than 6 times the cylinder volume per minute. If this is the case, then the rate will be reduced by the functional unit to the maximum permitted rate.

If air bubbles occur during dosing of the solution, then first check all the tubing connections. If a vacuum causes the air bubbles, then the air bubbles can be prevented by previously degassing the solution or by reduction of the maximum rate.

Additional information

Input range: 0.01–300.00

Unit: mL/min

Default value: 300.0

Special port

Special port	Assigns the desired port as Special port. ▪ Port 1 ▪ Port 2 ▪ Port 3 ▪ Port 4 (default value)
Tubing length	Length of the tubing that is connected to the defined Special port of the cylinder unit OMNIS. If no tubing is connected, then 0 must be entered in order for the Special port to be omitted when executing the Preparing function. Input range: 0.0–999.9 Unit: cm Default value: 0.0
Tubing diameter	Inner diameter of the tubing that is connected to the defined Special port of the cylinder unit OMNIS. Input range: 0.0–9.9 Unit: mm Default value: 2.0
Maximum rate	Maximum permissible rate with which the defined Special port may be dosed. In addition, the instrument checks before filling or dosing whether the defined rate is greater than 6 times the cylinder volume per minute. If this is the case, then the rate will be reduced by the functional unit to the maximum permitted rate. If air bubbles occur during delivering the solution, then first check all the tubing connections. If a vacuum causes the air bubbles, then the air bubbles can be prevented by previously degassing the solution or by reduction of the maximum rate. <i>Additional information</i> Input range: 0.01–300.00 Unit: mL/min Default value: 300.0

Valve	
Valve disk rotation direction	Rotation direction of the valve disk to reach the desired target port. ▪ Ascending: The valve disk rotates to the target port in ascending port number order. ▪ Descending: The valve disk rotates to the target port in descending port number order. ▪ Automatic (default value): The valve disk rotates to the target port the shortest way. ▪ Do not rotate over: The valve disk must not rotate to the target port via the selected port.
Do not rotate over (only if Do not rotate over is selected)	Port via which the valve disk must not rotate during the rotation. In this way, contamination caused by dripping is avoided. ▪ Port 1 ▪ Port 2 ▪ Port 3 ▪ Port 4 (default value)
Cylinder	
Volume	Volume of the cylinder of the cylinder unit OMNIS. The field cannot be edited.
Article number	Article number of the cylinder used. The field cannot be edited.
Serial number	Serial number of the cylinder used. The field cannot be edited.
Service	
Calibration result	Result of the last piston buret calibration.
Calibration date	Date of the last piston buret calibration carried out.

5.2.4 Manual control – Overview

 The designation *Instrument* refers to all objects in the **Instruments** subsection.

- Overview
- Icons

Video tutorial:



Overview

The **Manual control** can be used to actuate an instrument directly. The following prerequisites must be met for this:

- The instrument is switched on.
- The instrument was recognized by the IONIC app.
- The instrument is not used in a running determination.

The following instruments can be actuated directly in the **Manual control** section:

- **807 Dosing Unit** (*Additional information*)
- **Cylinder Unit** (*additional information*)
- **Dosing Drive** (*additional information*)
- **Dosino Module** (*additional information*)
- **IONIC Titrator** (*additional information*)
- **Magnetic Stirrer** (*additional information*)
- **OMNIS Rod Stirrer** (*Additional information*)

Icons

 The following icons are present in the **Manual control** section.
Icons that affect the entire user interface can be found [here](#).

Icon	Function
	Start the selected function (<i>Additional information</i>).
	Stop the selected function (<i>Additional information</i>).
	Initialize the instrument (<i>Additional information</i>).
	Identify the instrument (<i>Additional information</i>).

Status

Various status icons are displayed for the instruments:

Status	Function
	The instrument is ready for operation.
Ready	
	The instrument is used.
Busy	
	The instrument is in the error state.
Error	

5.2.4.1 Identifying the instrument

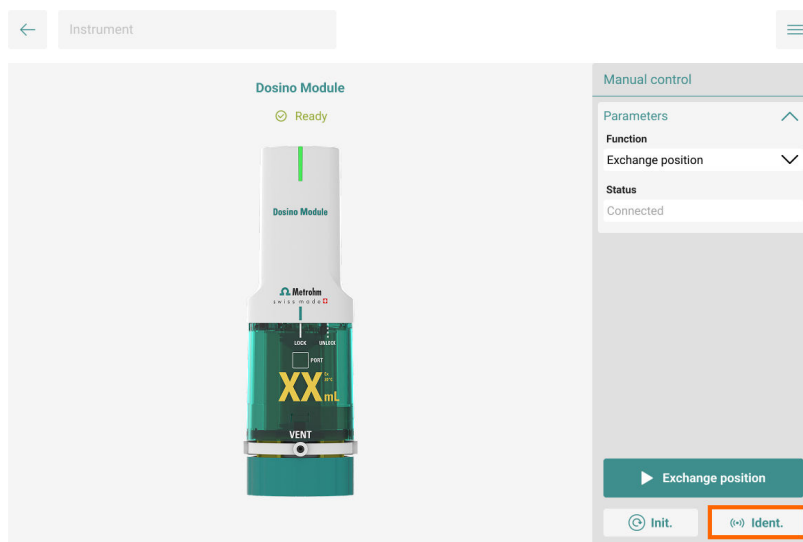
- The designation *Instrument* refers to all objects in the **Instruments** subsection.
- The **Ident.** function is not available for all instruments.

If multiple instruments of the same product type are connected to the IONIC main instrument, then the **Ident.** function can be used to identify the selected instrument.

Prerequisite:

- The affected instrument is connected to the IONIC main instrument.
- The **Manual control** of the affected instrument is open (*Additional information*).

1 Tap **[Ident.]**.



The status display on the affected instrument flashes orange for about 5 s and then lights up green again.

5.2.4.2 Initializing the instrument

Initialization is necessary in the following situations:

- The dosing drive (**Dosino Module** or **Dosing Drive**) has lost its stored initialization position (e.g., if the instrument was switched off during operation).
- The piston buret (**807 Dosing Unit** or **Cylinder Unit**) was blocked.

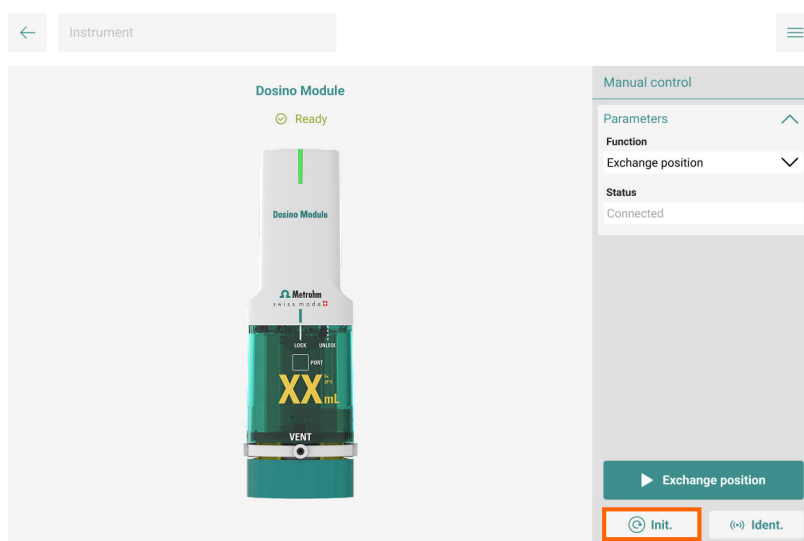


The dosing drive can be initialized with and without the piston buret.

Prerequisite:

- The dosing drive is connected to the IONIC main instrument.
- The **Manual control** of the dosing drive is open ([Additional information](#)).

1 Tap [Init.].



The push rod of the dosing drive is moved to the initialization position.

During initialization, the status display of the dosing drive flashes orange. Once the initialization is completed, the status display lights up green.

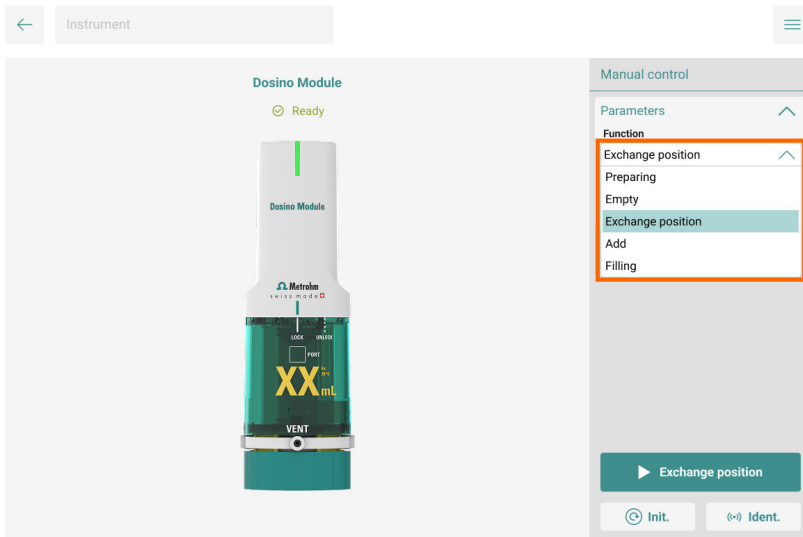
5.2.4.3 Starting the function

Prerequisite:

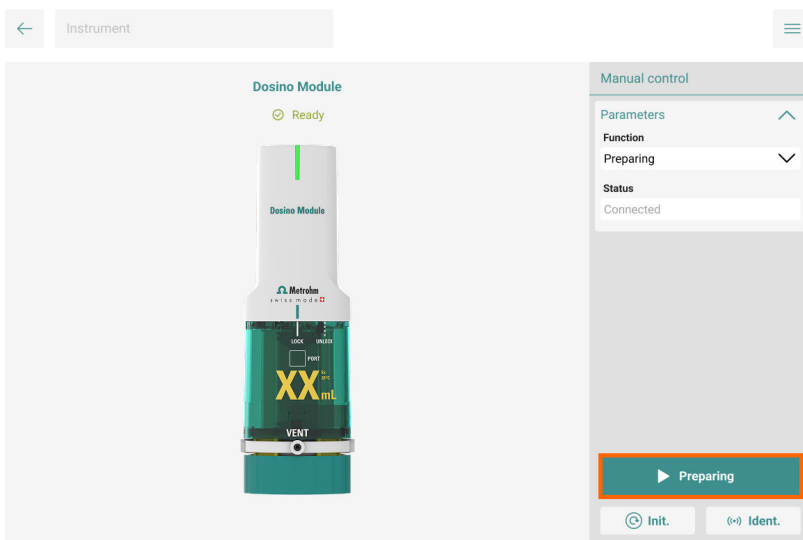
- The **Manual control** of the affected functional unit is open ([Additional information](#)).
- Functions can be selected in the manual control of the affected functional unit.

1 Selecting a function

Tap the selection list under **Function** and select the desired function.



2



If a message appears, then observe the message text and confirm the message by tapping **[Continue]**.

-

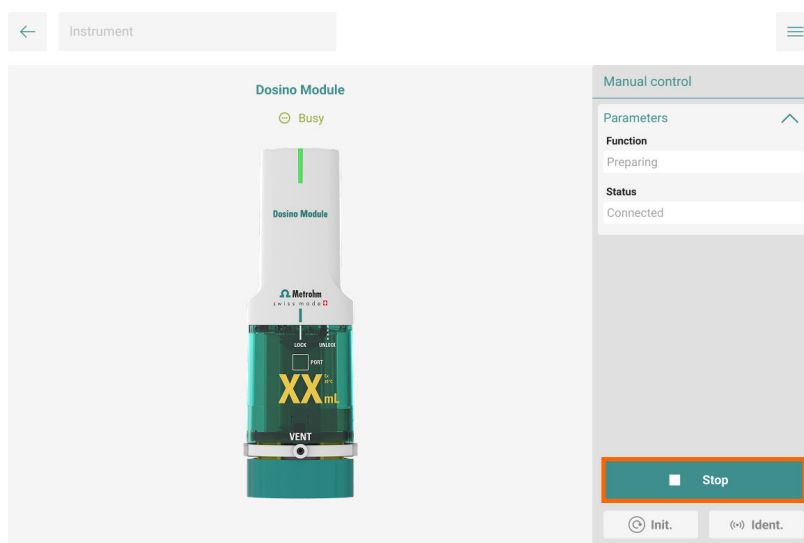
 Functions are not available for stirrers. Additional information on the stirrer control: (*see "Setting a stirring level and a stirring direction", chapter 9.1, page 649*)

5.2.4.4 Stopping the function

Prerequisite:

- The **Manual control** of the affected functional unit is open (*Additional information*).
- A function is executed.

1 Tap  **[Stop]** to stop the running function.



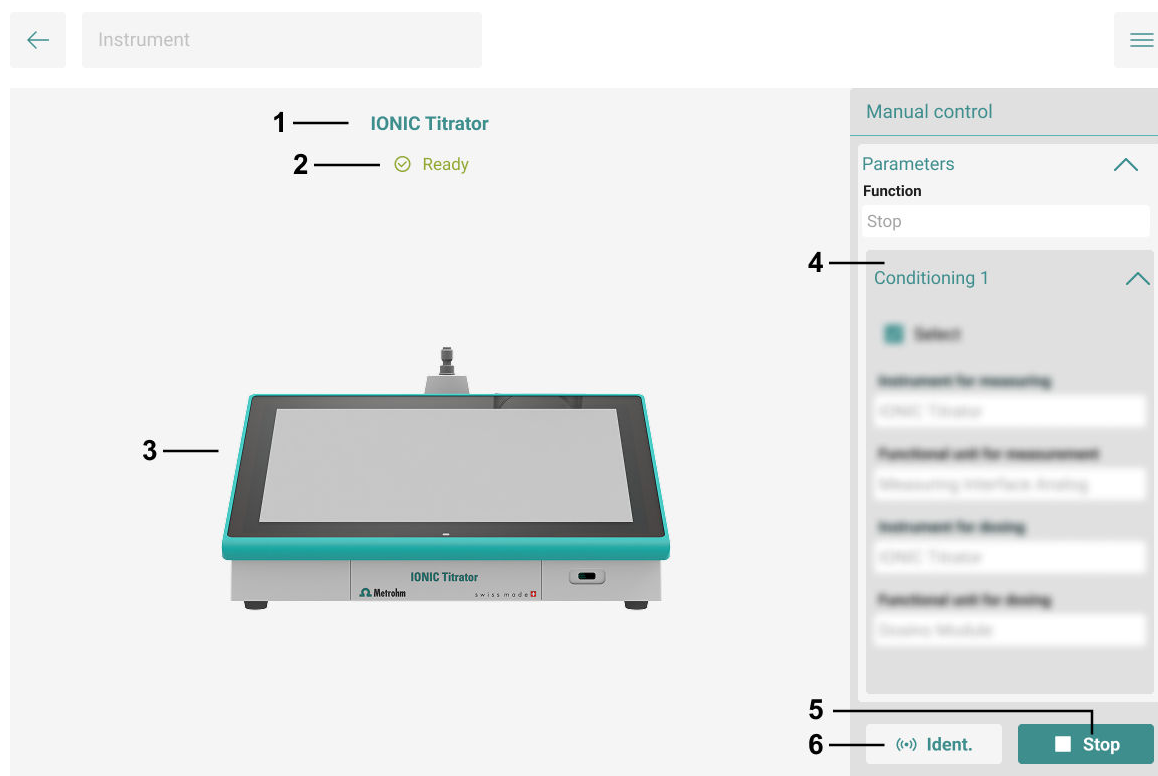
The function is canceled.

 Functions are not available for stirrers. Additional information on the stirrer control: (*see "Setting a stirring level and a stirring direction", chapter 9.1, page 649*)

5.2.4.5 IONIC Titrator – Manual control

Tap  next to the **IONIC Titrator** in the overview list to open the **Manual control** with the available information and functions.

Overview



- | | |
|---|---|
| 1 Name
Name of the IONIC Titrator. The name can be adjusted in the Properties of the IONIC Titrator. | 2 Status
Status of the IONIC Titrator.
Additional information |
| 3 Image
Image of the IONIC Titrator. | 4 Conditioning
Parameters for conditioning. Is displayed only when reconditioning is active.
Additional information |
| 5 Stop
Tap to stop the reconditioning.
The function is available for the selected conditioning only when reconditioning is active. | 6 Ident.
The status display on the IONIC Titrator flashes orange.
The function is available only if the instrument is not in Busy status.
Additional information |

Conditioning

If reconditioning has been activated for a **KFT** command, then the reconditioning process can be monitored in the **Manual control** section of the IONIC Titrator (*Additional information*).

- Depending on the instrument configuration, up to 2 conditioning processes can be tracked simultaneously in the manual control of the IONIC Titrator.
- Reconditioning can be stopped only if the functional units used are not being used for a running determination.
- Reconditioning is automatically stopped by the system as soon as a new determination is started that requires the same functional units.

The following parameters are available for each conditioning (max. 2):

Select	Tap ☐ to select Stop conditioning.
Instrument for measuring	Display of the control instrument that contains the measuring interface. ▪ Name of the IONIC Titrator
Functional unit for measurement	Display of the measuring interface to which the sensor required for conditioning is connected. ▪ Name of the Measuring Interface Analog
Instrument for dosing	Display of the control instrument that contains the dosing drive. ▪ Name of the IONIC Titrator ▪ Name of the OMNIS Dosing Module
Functional unit for dosing	Display of the dosing drive connected to the control instrument. ▪ Name of the Dosino Module ▪ Name of the Dosing Drive
Conditioning status	Display of the conditioning status (e.g., conditioning OK or conditioning not OK).

5.2.4.6 Dosing drive with piston buret – Manual control

A dosing drive can be directly actuated together with a piston buret in the **Manual control** section.

- 807 Dosing Unit with attached Dosino Module – Manual control ([Additional information](#))
- Solution exchange with the 807 Dosing Unit ([Additional information](#))
- Dosing Drive with attached cylinder unit OMNIS – Manual control ([Additional information](#))
- Solution exchange with the cylinder unit OMNIS ([Additional information](#))

5.2.4.6.1 Dosino Module/807 Dosing Unit – Manual control

A 807 Dosing Unit can be controlled directly with an attached Dosino Module in the **Manual control** section.

In the overview list, tap  next to the Liquid Handling component of the **807 Dosing Unit** type or next to the functional unit of the **Dosino Module** type to open the **Manual control** with the available information and functions.

- As soon as the Dosino Module is connected to the 807 Dosing Unit, the **Manual control** of 807 Dosing Unit and of the Dosino Module will be identical.
- If the functional unit is used in a running determination, then the **Manual control** of the 807 Dosing Unit or of the Dosino Module will not be available.

Overview



- 1 Name**
Name of the Dosino Module. The name can be adjusted in the **Properties** of the Dosino Module.

- ### 3 Image
- Image of the 807 Dosing Unit with the Dosino Module attached. If the 807 Dosing Unit is not connected, then only the Dosino Module will be displayed.

- ## 2 Status
- Status of the Dosino Module.
- Additional information*

- #### 4 Parameters

5 Start/Stop

The selected function is started (*Additional information*) or stopped (*Additional information*).

6 Ident.

The status display on the selected Dosino Module flashes orange.

The function is available only if the instrument is not in **Busy** status.

Additional information

7 Init.

The push rod of the Dosino Module is moved to the initialization position.

Additional information

Parameters

The following parameters are available for the 807 Dosing Unit with attached Dosino Module:

Function	Function that is to be executed. ▪ Preparing ▪ Empty ▪ Exchange position ▪ Add ▪ Filling <i>Additional information</i>
Status	Current status. ▪ Connected: The Dosino Module is placed on the 807 Dosing Unit. ▪ Disconnected: The Dosino Module is not placed on the 807 Dosing Unit.

Functions

Liquid may escape when some functions are performed. To avoid this, all tubing tips should be directed into a provided vessel.

Preparing

Metrohm recommends carrying out the **Preparing** function or the **PREP** command 1x per day for the piston burets to be used.

The function is used in the following situations:

- Removing air bubbles from the 807 Dosing Unit or the connected tubing.
- Put the system back into operation after an extended standstill.
- Change solutions (*Additional information*).

Empty

The function is used in the following situations:

- Emptying the 807 Dosing Unit used.
- Prepare the system for an extended standstill.
- Change solutions (*Additional information*).



Exchange position

The function is used in the following situations:

- Place the Dosino Module on the 807 Dosing Unit.
- Remove Dosino Module from the 807 Dosing Unit.

 Execute the **Exchange position** function before starting the **Empty** function. This ensures that there is no more liquid in the cylinder.

Add

The function is used to dose solution from the bottle and into a vessel via the 807 Dosing Unit.

Dosing volume	Volume to be dosed. Input range: 0.00000–99'999.99000 Unit: mL Default value: 0.00000
Dosing rate	Rate at which the solution is to be dosed. If Maximum is selected, then dosing will be at the maximum possible rate. The highest possible rate is defined in the properties of the 807 Dosing Unit in the Equipment work area (<i>Additional information</i>). In addition, a check is made during execution as to whether the defined dosing rate exceeds the maximum permissible rate for the 807 Dosing Unit used. If this is the case, then the rate of the functional unit will be reduced. Input range: 0.01–300.00 (depending on cylinder size) Selection: Maximum (default value) (<i>Additional information</i>) Unit: mL/min
Dosing port	Selection of the dosing port through which the volume is to be dosed. ▪ Dosing port 1 (default value): Port that is defined as dosing port 1 in the Properties of the 807 Dosing Unit. ▪ Dosing port 2: Port that is defined as dosing port 2 in the Properties of the 807 Dosing Unit.

Filling rate

Rate at which the cylinder is filled.

If **Maximum** is selected, then the cylinder is filled at the highest possible rate. The highest possible rate is defined in the properties of the 807 Dosing Unit in the **Equipment** work area ([Additional information](#)).

In addition, a check is made during execution as to whether the defined filling rate exceeds the maximum permissible rate for the 807 Dosing Unit used. If this is the case, then the rate of the functional unit will be reduced.

If air bubbles occur during aspiration of the solution, then first check all the tubing connections. If a vacuum causes the air bubbles, then the air bubbles can be prevented by previously degassing the solution or by reducing the filling rate.

Input range: 0.01–300.00 (depending on cylinder size)

Selection: **Maximum** (default value) ([Additional information](#))

Unit: mL/min

Filling

The function is used to fill the cylinder in the 807 Dosing Unit with the solution from the bottle.

Filling volume

Volume to which the cylinder is filled. If the cylinder is already partly filled, then only the difference in volume will be filled.

With **Maximum**, the cylinder is topped up to the maximum possible filling volume of the 807 Dosing Unit.

Input range: 0.10000–50.00000

Selection: **Maximum** (default value) ([Additional information](#))

Unit: mL

Filling rate

Rate at which the cylinder is filled.

If **Maximum** is selected, then the cylinder is filled at the highest possible rate. The highest possible rate is defined in the properties of the 807 Dosing Unit in the **Equipment** work area (*Additional information*).

In addition, a check is made during execution on the instrument to determine whether the defined fill rate exceeds the maximum permitted rate for the 807 Dosing Unit used. If this should be the case, then the instrument will reduce the rate.

If air bubbles occur during aspiration of the solution, then first check all the tubing connections. If a vacuum causes the air bubbles, then the air bubbles can be prevented by previously degassing the solution or by reducing the filling rate.

Input range: 0.01–300. 00 (depending on cylinder size)

Selection: **Maximum** (default value) ([Additional information](#))

Unit: mL/min

Fill port

Selection of the fill port through which the cylinder is to be filled.

- **Fill port** (default value): Port that is defined as the fill port in the **Properties** of the 807 Dosing Unit.
- **Special port**: Port that is defined as a special port in the **Properties** of the 807 Dosing Unit.

5.2.4.6.1.1 Dosino Module/807 Dosing Unit – Solution exchange

Prerequisite:

- The 807 Dosing Unit is connected to the IONIC main instrument with attached Dosino Module.
- The connected solution has the **Connected** status under **Equipment ► Solutions ► Properties ► Connector**.
- All connected tubing tips point into a vessel.

1 Opening manual control

Open the **Manual control** of the **Dosino Module** or the **807 Dosing Unit** (*Additional information*).

2 Emptying a cylinder

- Select the **Empty** function.
- Tap  to start the **Empty** function.
- Observe the message text and tap **[Continue]** to confirm the message.

The cylinder is emptied and filled with air.

3 Removing a used bottle

Unscrew the 807 Dosing Unit from the bottle used (*see 807 Dosing Unit manual*).

4 Connecting a bottle for rinsing

Screw the 807 Dosing Unit onto a bottle with solvent for rinsing (*see 807 Dosing Unit manual*).

5 Cylinder intermediate flushing

- Select the **Add** function and enter 3 times the cylinder volume under **Dosing volume**.
- Tap  to start the **Add** function.
- Observe the message text and tap **[Continue]** to confirm the message.

The cylinder is filled with the solvent for rinsing and thus undergoes intermediate rinsing.

6 Emptying a cylinder

- Select the **Empty** function.
- Tap  to start the **Empty** function.
- Observe the message text and tap **[Continue]** to confirm the message.

The cylinder is emptied and filled with air.

7 Connecting a bottle with another solution

Screw the 807 Dosing Unit onto the bottle with the other solution.

8 Filling a cylinder with a different solution

- Select the **Preparing** function.
- Tap  to start the **Preparing** function.
- Observe the message text and tap **[Continue]** to confirm the message.
- Start the **Preparing** function a second time.

The cylinder is filled with the other solution and can be used afterwards.

5.2.4.6.2 Dosing Drive/cylinder unit OMNIS – Manual control

A Dosing Drive can be controlled directly with an attached cylinder unit OMNIS in the **Manual control** section.

In the overview list, tap  next to the functional unit of the **Dosing Drive** type or next to the Liquid Handling component of the **Cylinder Unit** type to open the **Manual control** with the available information and functions.

- The **Manual control** of the Dosing Drive and the cylinder unit OMNIS will be identical as soon as the cylinder unit OMNIS is connected to the Dosing Drive.
- If the functional unit is used in a running determination, then the **Manual control** of the Dosing Drive or of the cylinder unit OMNIS is not available.

Overview

- | | |
|--|--|
| <p>1 Name</p> <p>Name of the Dosing Drive. The name can be adapted in the Properties.</p> | <p>2 Status</p> <p>Status of the Dosing Drive.</p> <p><i>Additional information</i></p> |
| <p>3 Image</p> <p>Image of the Dosing Drive with attached cylinder unit OMNIS with an OMNIS Dosing Module. If the cylinder unit OMNIS is not connected, then only the Dosing Drive will be displayed.</p> | <p>4 Parameters</p> <p><i>Additional information</i></p> |

5 Start/Stop

The selected function is started (*Additional information*) or stopped (*Additional information*).

6 Ident.

The status display of the OMNIS Dosing Module, which contains the selected Dosing Drive, flashes orange.

The function is available only if the instrument is not in **Busy** status.

Additional information

7 Init.

The push rod of the Dosing Drive is moved to the initialization position.

Additional information

Parameters

The following parameters are available for the Dosing Drive with cylinder unit OMNIS attached:

Function	Function that is to be executed. ▪ Preparing ▪ Empty ▪ Exchange position ▪ Add ▪ Filling <i>Additional information</i>
Status	Current status. ▪ Connected: The cylinder unit OMNIS is attached to the Dosing Drive. ▪ Disconnected: The cylinder unit OMNIS is not attached to the Dosing Drive.

Functions

Liquid may escape when some functions are performed. To avoid this, all tubing tips should be directed into a provided vessel.

Preparing

Metrohm recommends carrying out the **Preparing** function or the **PREP** command 1x per day for the piston burets to be used.

The function is used in the following situations:

- Remove air bubbles in the cylinder unit OMNIS or in the connected tubings.
- Put the system back into operation after an extended standstill.
- Change solutions (*Additional information*).

Empty

The function is used in the following situations:

- Emptying the cylinder unit OMNIS used.
- Prepare the system for an extended standstill.

- Change solutions (*Additional information*).

Exchange position

The function is used in the following situations:

- Attach the cylinder unit OMNIS to the Dosing Drive.
- Remove the cylinder unit OMNIS from the Dosing Drive.

 Carry out the **Empty** function before starting the **Exchange position** function. This ensures that there is no more liquid in the cylinder.

Add

The function is used to dose solution from the bottle and into a vessel via the cylinder unit OMNIS.

Dosing volume	Volume to be dosed. Input range: 0.00000–99'999.99000 Unit: mL Default value: 0.00000
Dosing rate	Rate at which the solution is to be dosed. If Maximum is selected, then dosing will be at the maximum possible rate. The highest possible rate is defined in the properties of the cylinder unit OMNIS in the Equipment work area (<i>Additional information</i>). In addition, a check is made during execution as to whether the defined dosing rate exceeds the maximum permissible rate for the cylinder unit OMNIS used. If this is the case, then the rate of the functional unit will be reduced. Input range: 0.01–300.00 (depending on cylinder size) Selection: Maximum (default value) (<i>Additional information</i>) Unit: mL/min
Dosing port	Selection of the dosing port through which the volume is to be dosed. ▪ Dosing port 1 (default value): Port that is defined as dosing port 1 in the Properties of the cylinder unit OMNIS. ▪ Dosing port 2: Port that is defined as dosing port 2 in the Properties of the cylinder unit OMNIS.

Filling rate

Rate at which the cylinder is filled.

If **Maximum** is selected, then the cylinder is filled at the highest possible rate. The highest possible rate is defined in the properties of the cylinder unit OMNIS in the **Equipment** work area (*Additional information*).

In addition, a check is made during execution as to whether the defined filling rate exceeds the maximum permissible rate for the cylinder unit OMNIS used. If this is the case, then the rate of the functional unit will be reduced.

If air bubbles occur during aspiration of the solution, then first check all the tubing connections. If a vacuum causes the air bubbles, then the air bubbles can be prevented by previously degassing the solution or by reducing the filling rate.

Input range: 0.01–300. 00 (depending on cylinder size)

Selection: **Maximum** (default value) ([Additional information](#))

Unit: mL/min

Filling

The function is used to fill the cylinder in the cylinder unit OMNIS with the solution from the bottle.

Filling volume

Volume to which the cylinder is filled. If the cylinder is already partly filled, then only the difference in volume will be filled.

With **Maximum**, the cylinder will be used to fill the maximum possible filling volume of the cylinder unit OMNIS.

Input range: 0.10000–50.00000

Selection: **Maximum** (default value) ([Additional information](#))

Unit: mL

3 Unlocking a used bottle

Unlock the OMNIS Liquid Adapter from the bottle cap of the bottle used (*see OMNIS Liquid Adapter manual*).

4 Locking a bottle for rinsing

Lock the OMNIS Liquid Adapter with the bottle cap onto a bottle with solvent for rinsing (*see OMNIS Liquid Adapter manual*).

5 Cylinder intermediate flushing

- Select the **Add** function and enter 3 times the cylinder volume under **Dosing volume**.
- Tap  to start the **Add** function.
- Observe the message text and tap **[Continue]** to confirm the message.

The cylinder is filled with the solvent for rinsing and thus undergoes intermediate rinsing.

6 Emptying a cylinder

- Select the **Empty** function.
- Tap  to start the **Empty** function.
- Observe the message text and tap **[Continue]** to confirm the message.

The cylinder is emptied.

7 Unlocking a bottle for rinsing

Unlock the OMNIS Liquid Adapter from the bottle cap of the bottle with solvent for rinsing.

8 Locking a bottle with another solution

Lock the OMNIS Liquid Adapter with the bottle cap on the bottle with the other solution.

9 Filling a cylinder with a different solution

- Select the **Preparing** function.
- Tap  to start the **Preparing** function.
- Observe the message text and tap **[Continue]** to confirm the message.
- Start the **Preparing** function a second time.

The cylinder is filled with the other solution and can be used afterwards.

5.2.4.8 OMNIS Rod Stirrer – Manual control

A OMNIS Rod Stirrer can be actuated directly in the **Manual control** section. When an OMNIS Rod Stirrer is used in a determination, the OMNIS Rod Stirrer can be operated manually, but it cannot be stopped.

Tapping  next to the functional unit of the **OMNIS Rod Stirrer** type in the overview list opens the **Manual control** with the available information and functions.

Overview

←

Instrument

☰

1 — OMNIS Rod Stirrer

2 —  Ready

3 — 

4 —

⏪

0

⏩

5 —

⏮ Ident.

Manual control

1

Name

Name of the OMNIS Rod Stirrer. The name can be adapted in the **Properties**.

3

Image

Image of the OMNIS Rod Stirrer.

5

Ident.

The status display on the selected OMNIS Rod Stirrer flashes orange.
[Additional information](#)

2

Status

Status of the OMNIS Rod Stirrer.
[Additional information](#)

4

Stirrer control

The stirring level and the stirring direction can be set manually.
[Additional information](#)

501

Product type	Description
dTrode	Product type for all digital sensors. Digital sensors can be connected to the IONIC main instrument via the Measuring Interface Digital. A memory chip is installed in the digital sensor on which all the sensor data is stored. The data read out of the memory chip is automatically displayed in the Properties window of the selected sensor. The following sensor types are available: ▪ Metal electrode ▪ pH electrode

Sensor type	Description
Other sensor	Sensor (not further specified) which supplies a potential in mV as the measuring signal (e.g., optical sensor).
Metal electrode	Electrode for potentiometric measurements with redox titrations and precipitation titrations.
pH electrode	Electrode for potentiometric pH measurements and acid-base titrations. pH electrodes are available with and without integrated temperature sensor.
Polarizable metal electrode	Electrode for non-reversible redox reactions or inhibited electrode reactions ((bi), voltametric or (bi)amperometric indication).
Temperature sensor	Sensor for temperature measurement.

5.3.2 Sensors – Overview

- [Definition](#)
- [Overview list](#)
- [Functions](#)
- [Icons](#)

Definition

A sensor is used for measuring physical or chemical properties. Depending on the functional unit, either digital or analog sensors can be used.

Depending on the product type, sensors can be connected to the IONIC main instrument via the connection sockets of the **Measuring Interface Digital** or **Measuring Interface Analog** functional unit.

Overview list

All available sensors are displayed in an overview list in the **Sensors** subsection. Digital sensors (**dTrode**) that are connected to the IONIC main instrument via the Measuring Interface Digital are

automatically added to the overview list. Analog sensors (**Analog Electrode**) that are connected to the IONIC main instrument via the Measuring Interface Analog must be added manually with the corresponding sensor type to the overview list.

The following information is displayed in the overview list:

Dashboard

Samples

Processes

Equipment

...

Equipment

Search

+

Instruments

Sensors

Solutions

Calibration solutions

3

4

Name — 1	Sensor type — 2	Serial number	Status
dTrode	pH electrode	001000491012	Connected
U sensor	Metal electrode	001000891032	
pol sensor	Polarizable metal electrode	004000581025	
temp sensor	Temperature sensor	006000356046	Disconnected
pH sensor	pH electrode	002000351009	

1 Name

Name of the sensor. The name can be adapted in the Properties of the sensor.

2 Sensor type

Category of the sensor.

Additional information

3 Serial number

Serial number of the sensor.

4 Status

Status of the sensor.

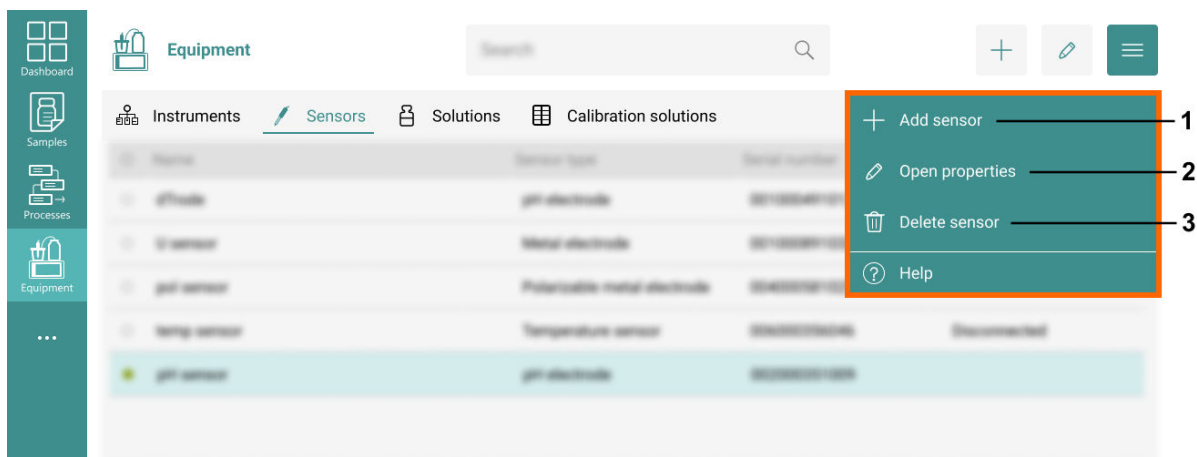
The status is available only for sensors of the **dTrobe** type.

Connected: The sensor is connected to the measuring interface.

Disconnected: The sensor is disconnected from the measuring interface.

Functions

Tap on  to open a menu with the following functions:



1 Add sensor

A selection window with the available analog sensor types opens. The required analog sensor can be added to the overview list.

[Additional information](#)

2 Open properties

The Properties of the selected sensor are opened.

[Additional information](#)

3 Delete sensor

The selected sensor is deleted.

The function is available for all analog sensors as well as for digital sensors with **Disconnected** status.

[Additional information](#)

Icons

 The following icons are present in the **Sensors** subsection.
Icons that affect the entire user interface can be found [here](#).

Icon	Function
	Open the Properties window to display and edit the settings of the currently selected sensor.

Properties

In the properties, tap  to open a selection list with various options to choose with certain settings:

Options to choose	Function
Default value	Value that is defined by default for the setting.
Enter value	The keyboard opens so that a value can be entered manually.

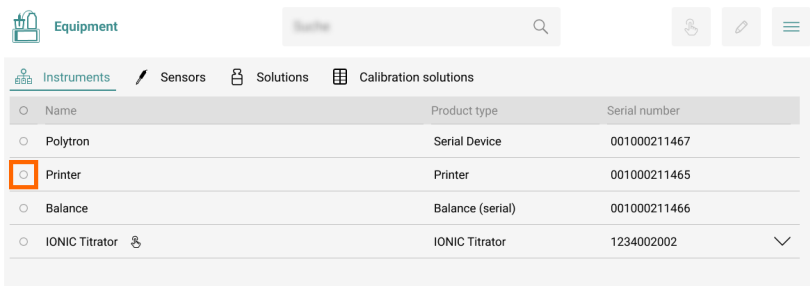
5.3.2.1 Open properties

 The images show an example from the **Instruments** subsection. The procedure applies for all subsections in the **Equipment** work area.

The properties can alternatively be opened by tapping in the **Sensors**, **Solutions**, and **Calibration solutions** subsections.

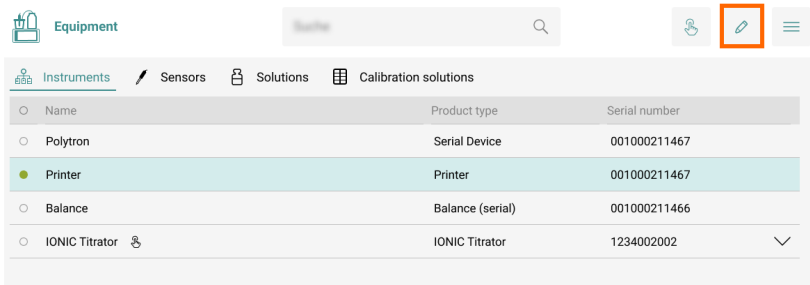
1 Selecting an object

Tap  to select the desired object under **Equipment ▶ subsection**.

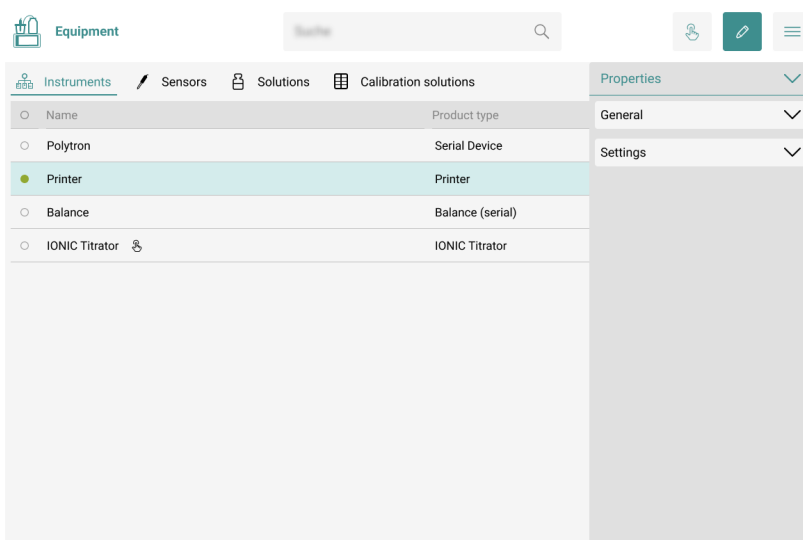


2 Opening the properties

Tap  in the title bar.



The **Properties** of the selected object are opened.

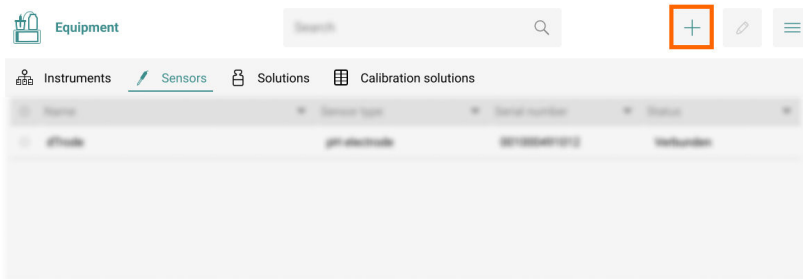


5.3.2.2 Adding a sensor

 The maximum length of name fields is 32 characters.

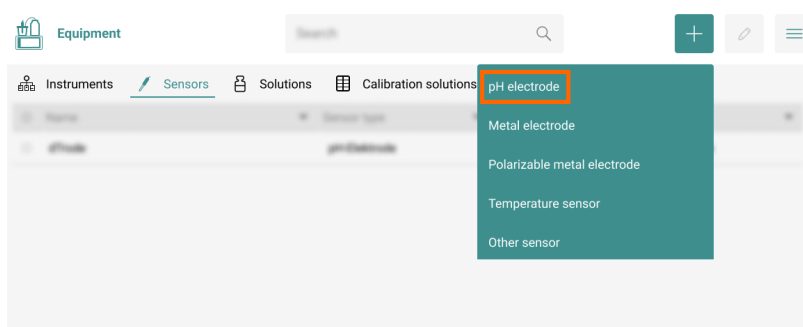
1 Adding a sensor

Under **Equipment** ► **Sensors**, tap in the title bar **+**.

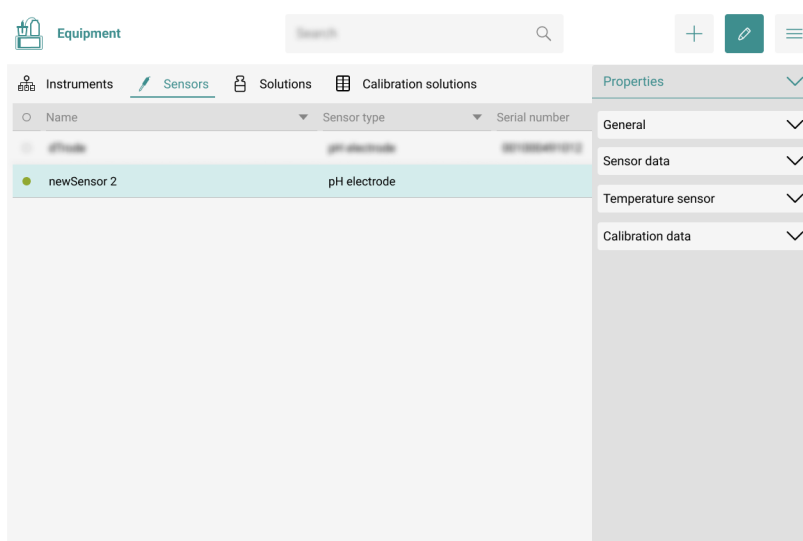


2 Selecting the sensor type

Select the desired sensor type.

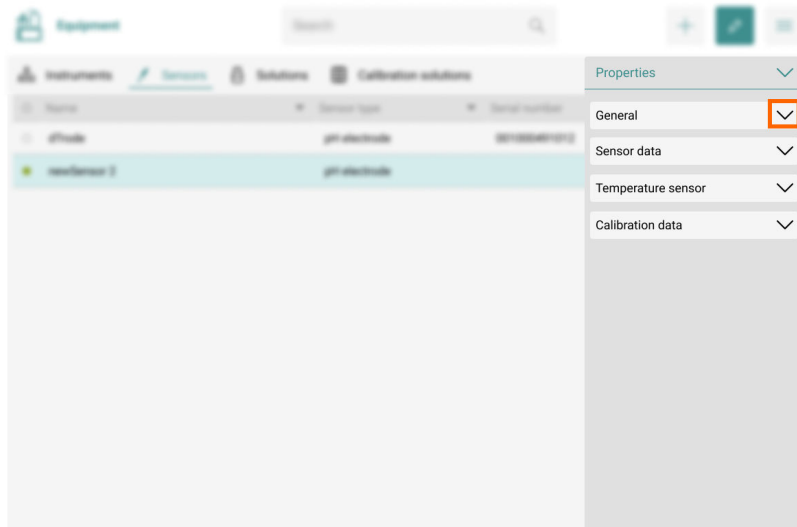


The selected sensor appears in the overview list. The **Properties** window is opened automatically.

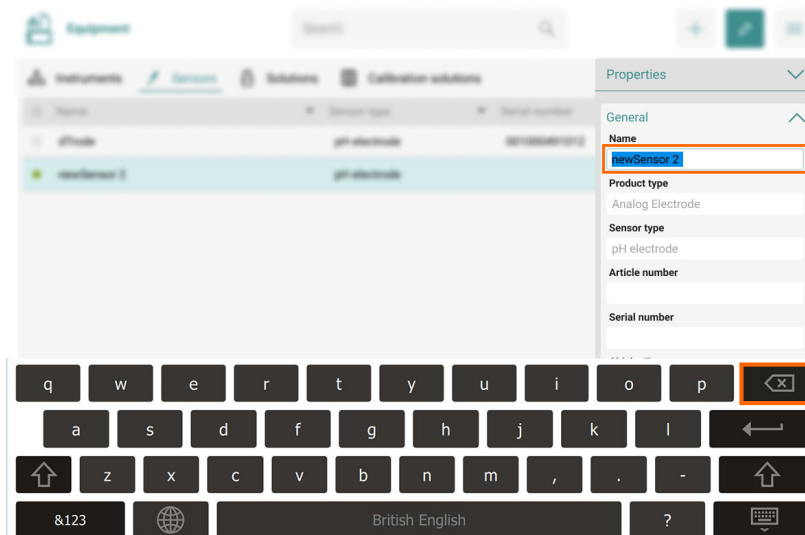


3 Name or rename sensor

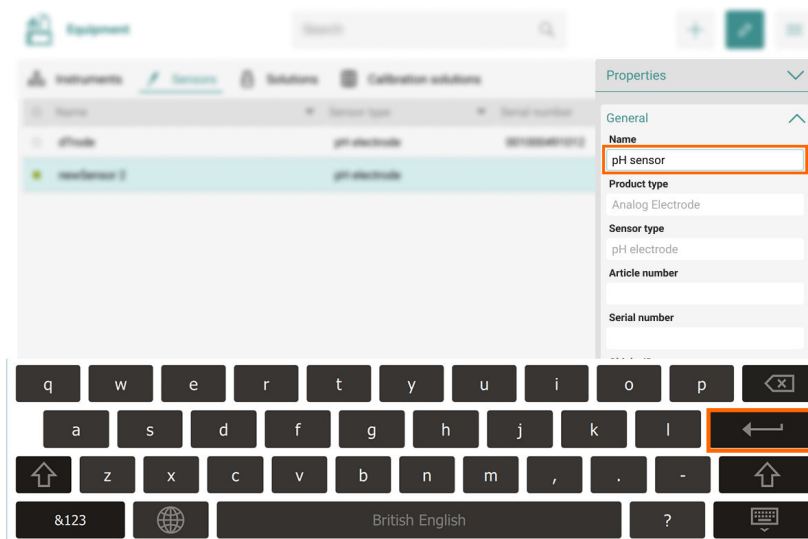
- Tap behind **General** .



- Tap the input field under **Name** and delete the default name with .



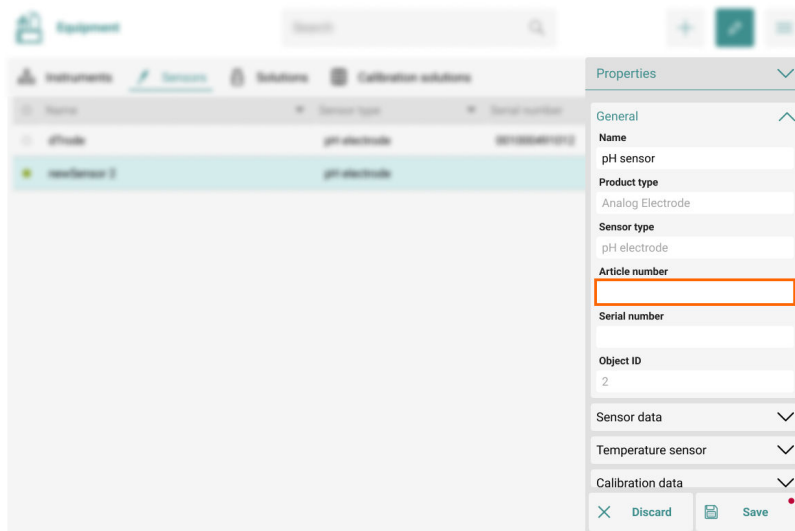
- Enter the desired sensor name and confirm with .



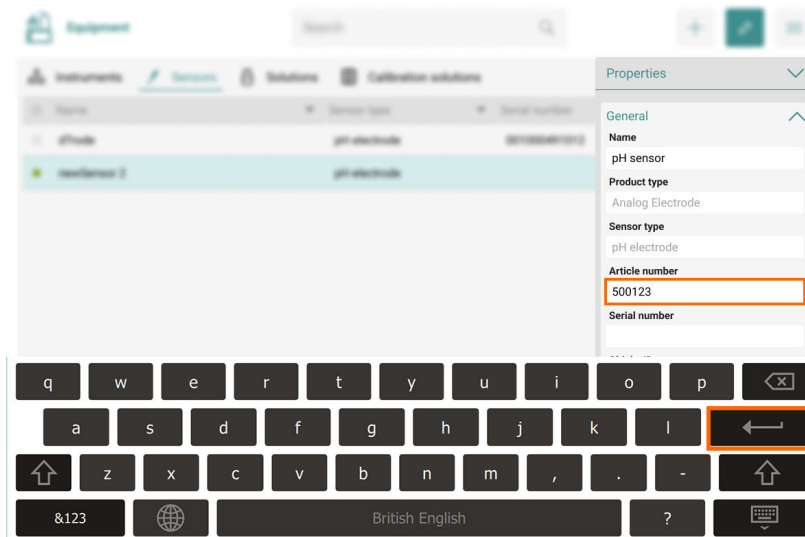
 The sensor name will be updated in the overview list only after being saved.

4 Entering the article number

- Tap the input field under **Article number**.

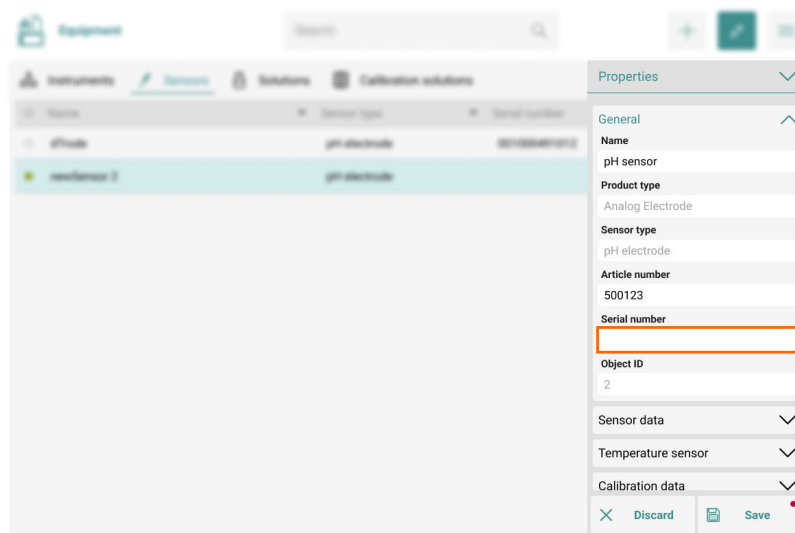


- Enter the article number of the sensor and confirm with .

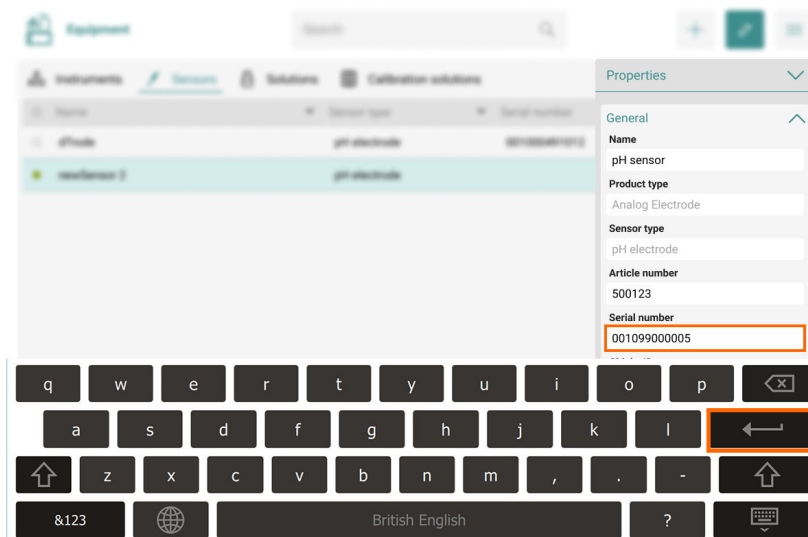


5

- Tap the input field under **Serial number**.



- Enter the serial number of the sensor and confirm with .



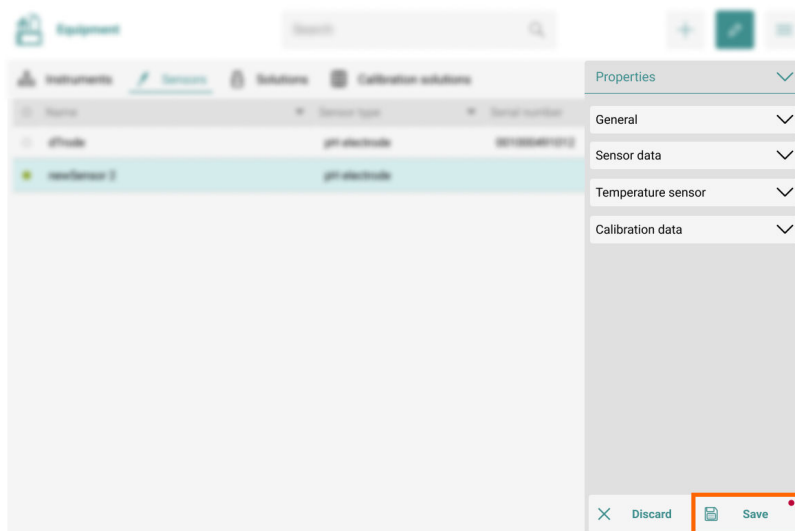
 The serial number will be updated in the overview list only after being saved.

6 Editing settings

Tap  next to the available sections and edit the required settings (*Additional information*).

7 Saving changes

Tap **[Save]** to save all changes in the **Properties**.



 Tap **[Discard]** to discard all changes.

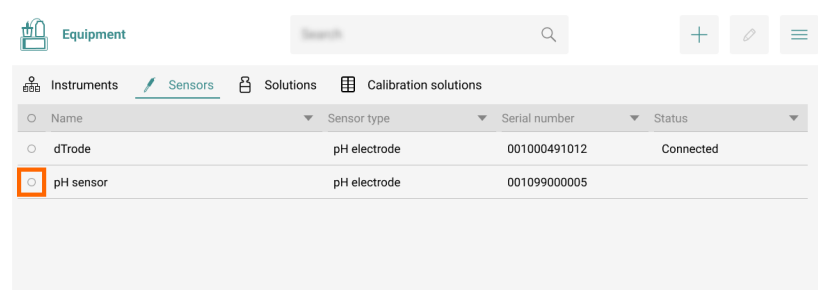
5.3.2.3 Deleting the sensor

Sensors of the **dTrode** type can be deleted only if they are disconnected from the Measuring Interface Digital. The data of the digital sensor is retained on the memory chip, even after it has been deleted.

If a sensor of the **Analog Electrode** type is deleted, then the data saved in the IONIC app will be deleted.

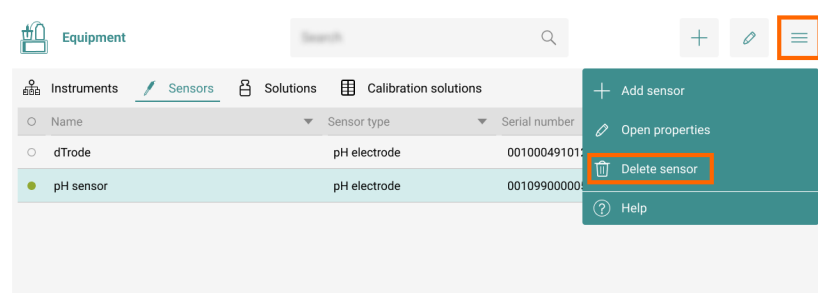
1 Selecting a sensor

Select the desired sensor by tapping  under **Equipment ► Sensors**.



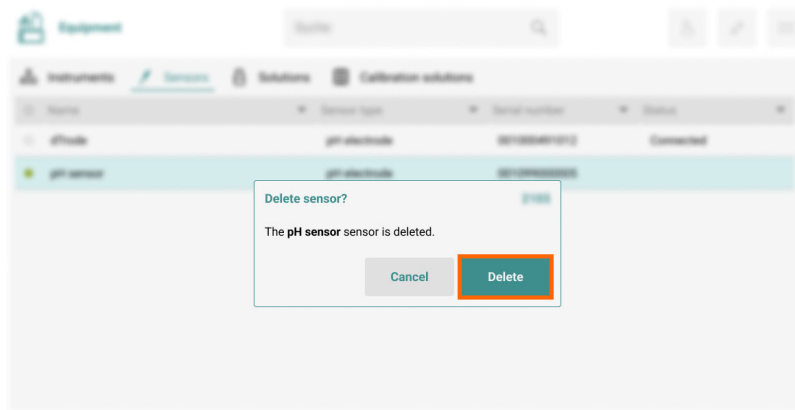
2 Deleting the sensor

Tap  in the title bar and select **Delete sensor**.



3 Confirming the message

Confirm the message with **[Delete]**.



 If multiple sensors are selected, then the message must be confirmed individually for each sensor.

5.3.3 Sensors – Properties

In the **Sensors** subsection, tap  to open the **Properties** window after selecting a sensor. The individual sections open by tapping .

- Overview
- Settings

Overview

The properties of the currently selected sensor can be viewed and edited in the **Properties** window.

 If a sensor is used in a running determination, then the sensor properties cannot be edited during the determination.

The following information is displayed:

The screenshot shows the 'Equipment' work area. The 'Sensors' tab is active, displaying a table of sensors. The 'Properties' panel on the right is open, showing five sections: 1. General, 2. Sensor data, 3. Temperature sensor, 4. Calibration data, and 5. Connector. Each section has a dropdown arrow and a corresponding number.

1 General[Additional information](#)**2 Sensor data**[Additional information](#)**3 Temperature sensor**[Additional information](#)**4 Calibration data**[Additional information](#)**5 Connector**[Additional information](#)

 The configured settings must match the actual settings of the sensor.

General

The **General** section is available in the **Properties** of all sensors.

Name

Name of the sensor.

The sensor name can be edited and may not exceed 32 characters.

When a sensor is added, the **newSensor** sensor name is saved, followed by an ascending index.

Product type

Product type of the sensor.

- **Analog Electrode**
- **dTrode**

The product type cannot be edited.

Sensor type

Specific sensor type.

- **Other sensor**
- **Metal electrode**
- **pH electrode**
- **Polarizable metal electrode**
- **Temperature sensor**

The sensor type cannot be edited.

Temperature sensor

The **Temperature sensor** section is available only for sensors of the **pH electrode** and **Temperature sensor** types.

Type of temperature sensor	Type of the built-in temperature sensor. ▪ Pt1000 ▪ None The type of the temperature sensor cannot be edited for digital sensors. For analog sensors, the type of the temperature sensor must be selected.
Temperature offset (only if Pt1000 is selected)	Value by which the measured temperature is to be corrected. Input range: –10.0 to 10.0 Unit: °C Default value: 0.0 (only for analog sensors)
Calibration data The Calibration data section is available only for sensors of the pH electrode type.	
Slope	Slope of the sensor. The slope can be determined either by a calibration or entered manually. Input range: –9.999 to 9.999 Unit: None Default value: 1.000 (only for analog sensors)
pH(0)	pH value at a voltage of 0 mV. The pH value can be determined either by a calibration or entered manually. Input range: –20.000 to 20.000 Unit: None Default value: 7.000 (only for analog sensors)
Calibration temperature	Temperature of the first calibration solution that was measured with a temperature sensor during the calibration or entered manually. Input range: –20.0 to 150.0 Unit: °C Default value: 25.0 (only for analog sensors)

Validity period (only with activated Monitoring)	Validity period of the calibration. Input range: 1–9,999 Unit: h Default value: 168 (only for analog sensors)
Expiry date (only with activated Monitoring)	Calibration expiry date. The expiry date is calculated using the calibration date and the validity period entered. The expiry date cannot be edited.
Action when expired	Selection of how the system should behave as soon as the validity period of the sensor has expired and a determination in which the expired sensor is used is set to pending. ▪ Ask user: The user is asked whether the determination should be set to pending despite the sensor that has expired. ▪ Cancel: An error message appears and the determination is canceled. ▪ Continue: An information message appears and the determination is nevertheless set to pending.
Sample ID	Object ID of the sample in which the calibration was carried out. If the calibration data has been adjusted manually, then the Sample ID is not available. The sample ID cannot be edited.
Comment	Optional comment on the calibration data with a maximum length of 100 characters.

Connector

The **Connector** section is available only for digital sensors.

Status	Current connection status. ▪ Connected: The sensor is connected to the measuring interface. ▪ Disconnected: The sensor is disconnected from the measuring interface.
Connected to (only for Status Connected)	Name of the measuring interface to which the sensor is connected.

5.3.4 Calibrating the pH electrode

pH electrodes can be calibrated with the **CAL pH** command. A **CAL pH** command and a **CAL WRITE** command must each be included in each calibration method.

The **CAL pH** command calibrates the pH electrode and the **CAL WRITE** command saves the calibration data of the pH electrode at the end of the calibration on the corresponding sensor (digital pH electrode) or in the corresponding sensor properties (analog pH electrode).

 The **CAL pH** command must be executed before the **CAL WRITE** command.

Additional information on the calibration principle.

Calibration with LOOP command

pH electrodes can be calibrated with a **LOOP** command using a calibration method. A calibration can be carried out within a sample with only one subsample. A new sample with a new subsample must be created to repeat the calibration.

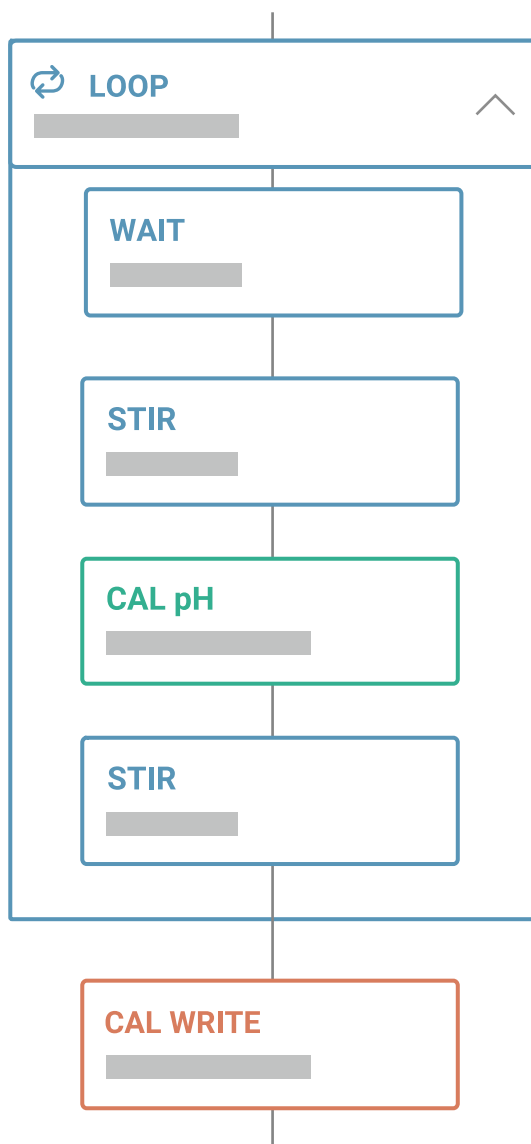
 Alternatively, a method template from the supplied USB flash drive can be imported into the IONIC app. If this method template is used, then the command properties must be adjusted according to the following instructions.

1 Creating a method

Under **Processes** ► **Methods**, create a new method (*Additional information*).

2 Adding commands

Add the commands to the method in the correct order as shown in the figure ([Additional information](#)).

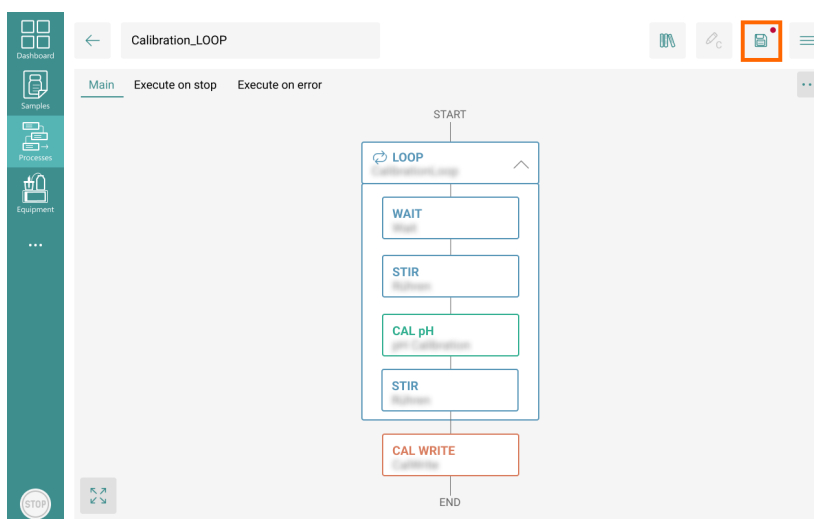


3 Parameterizing the LOOP command

- Open the **Command properties** of the **LOOP** command (*Additional information*).
- Select the **Enter number** option under **Parameters ► Mode**.
- Enter the number of calibration buffers with which the pH electrode is to be calibrated under **Parameters ► Number of runs**.

4 Parameterizing the WAIT command

- Open the **Command properties** of the **WAIT** command (*Additional information*).
- Select the **Wait for user action** option under **Parameters ► Wait mode**. This pauses the command sequence each time the loop run is paused so that the calibration buffer can be replaced.



9 Creating a sample and a subsample

- Open or create a sample list under **Samples** ► **Sample lists** ([Additional information](#)).
- Create a new sample with a subsample ([Additional information](#)).

10 Assigning the method

Open the selection list and select the defined calibration method under **Method**.

01 Sample			
No.	Subsample	Method	
1	Subsample 1	Calibration_LOOP	✓

Figure 20 Assigning the method – Example

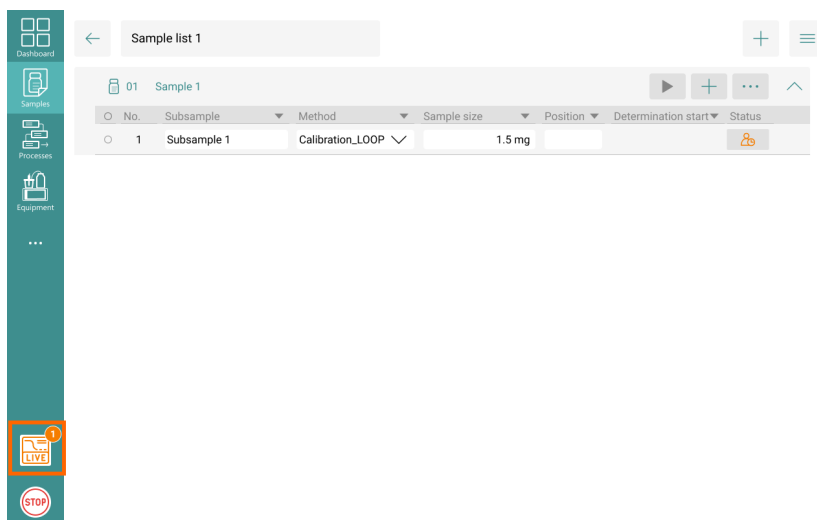
11 Setting the determination to pending

Tap  in the status column to set the determination of the subsample to pending ([Additional information](#)).

Sample list 1							
01 Sample 1							
No.	Subsample	Method	Sample size	Position	Determination start	Status	
1	Subsample 1	Calibration_LOOP	1.5 mg				

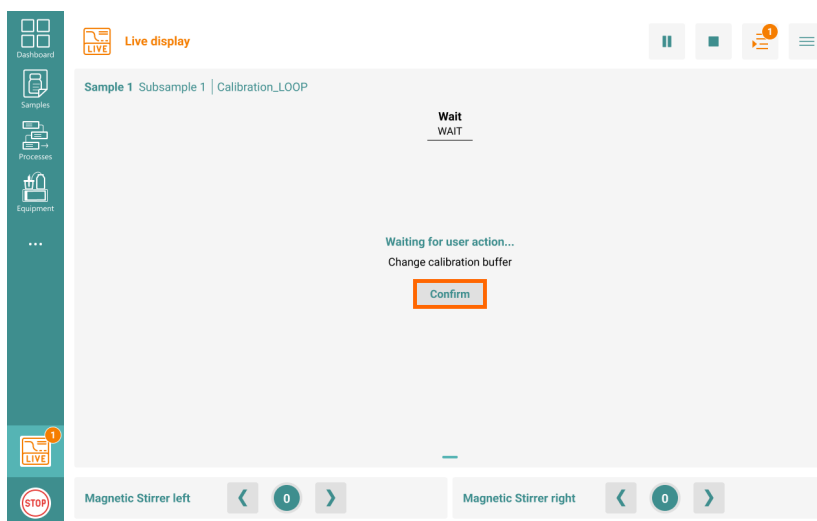
12 Changing the work area

Tap the **Live display** work area in the navigation bar.



13 Confirming the request

Once the desired calibration buffer is ready and the electrode is immersed, tap **[Confirm]** in the pop-up window of the **WAIT** command.



Once the calibration is finished with a calibration buffer, the **WAIT** command appears again to replace the calibration buffer, rinse the electrode, and immerse it in the calibration buffer. The procedure must be repeated, depending on the defined **Number of runs**.

5.4 Solutions – Subsection

Tap **Solutions** to open the **Solutions** subsection in the **Equipment** work area.

Video tutorials for the **Solutions** subsection:



The connected solutions and their properties are displayed in the **Solutions** subsection. The solution properties can be edited, depending on the product type.

- [Solution directory](#)
- [Solutions – Overview](#)
- [Solution properties](#)

5.4.1 Solutions – Directory

Solutions of the **Solution IDU** type are automatically added to the overview list as soon as they are connected to a 807 Dosing Unit connected to the IONIC main instrument.

Solutions of the **Solution Multi-Use** and **Solution Single-Use** types are automatically added to the overview list as soon as they are connected to a OMNIS Liquid Adapter connected to the IONIC main instrument.

Product type	Description
Solution IDU	Solution that can be connected to a 807 Dosing Unit with attached Dosino Module. The solution data is stored on the memory chip of the 807 Dosing Unit and is read out by the attached Dosino Module and transferred to the IONIC app. The read-out data is automatically displayed in the Properties window of the affected solution.
Solution Multi-Use	Solution that can be connected to a OMNIS Liquid Adapter with the bottle cap multi-use. The bottle cap multi-use can be used for multiple use with different solutions of the Solution Multi-Use type. The solution data is stored on the memory chip of the bottle cap and is read out from the connected OMNIS Liquid Adapter and transferred to the IONIC app. The read-out data is automatically displayed in the Properties window of the affected solution.

Product type	Description
Solution Single-Use	Solution that can be connected to a OMNIS Liquid Adapter with the bottle cap single-use. The bottle cap single-use is mounted on the 3S reagents from Merck/Sigma-Aldrich and cannot be removed from the solutions of the Solution Single-Use type without the memory chip becoming unusable. The solution data is stored on the memory chip of the bottle cap and is read out from the connected OMNIS Liquid Adapter and transferred to the IONIC app. The read-out data is automatically displayed in the Properties window of the affected solution.

5.4.2 Solutions – Overview

- *Definition*
- *Overview list*
- *Functions*
- *Icons*

Video tutorials for the **Solutions** subsection:



Definition

Solutions are reagents (e.g., titrants and auxiliary solutions) that are dosed with a piston buret with the dosing drive connected.

Solutions can be connected to the IONIC main instrument via the **807 Dosing Unit** or **OMNIS Liquid Adapter** liquid handling components, depending on the product type.

The solution of the **Solution IDU** type is used with the **807 Dosing Unit**. To be added to the overview list, the **Dosino Module** must be attached to the **807 Dosing Unit** and connected to the IONIC main instrument.

The solutions of the **Solution Multi-Use** and **Solution Single-Use** types are used with the **OMNIS Liquid Adapter**. To be added to the overview list, the **OMNIS Liquid Adapter** must be connected to the **OMNIS Dosing Module**. The **OMNIS Dosing Module** must be connected to the IONIC main instrument.

Overview list

All connected solutions are displayed in an overview list in the **Solutions** subsection. The following information is displayed in the overview list:

1	2	3	4	5	6
Name	Product type	Connected to	Titer determination	Titer expiry date	Solution expiry date
50mL HCL	Solution IDU	Dosino Module	2026-03-26 14:22	2035-03-25 14:22	2033-02-13 08:56
KF titrant 5 mg/mL	Solution Single-Use		2026-04-03 09:15	2035-04-02 09:15	2033-03-23 11:23
KF reagent	Solution Multi-Use		2026-04-15 10:46	2035-04-14 10:46	2033-03-29 15:37

1 Name

Name of the solution. The name can be adapted in the **Properties** of the solution.

2 Product type

Technical designation of the solution.

3 Connected to

Name of the dosing drive to which the piston buret with the solution is connected.

4 Date of titer determination

Date and time of the last titer determination that was carried out by the user.

5 Titer expiry date

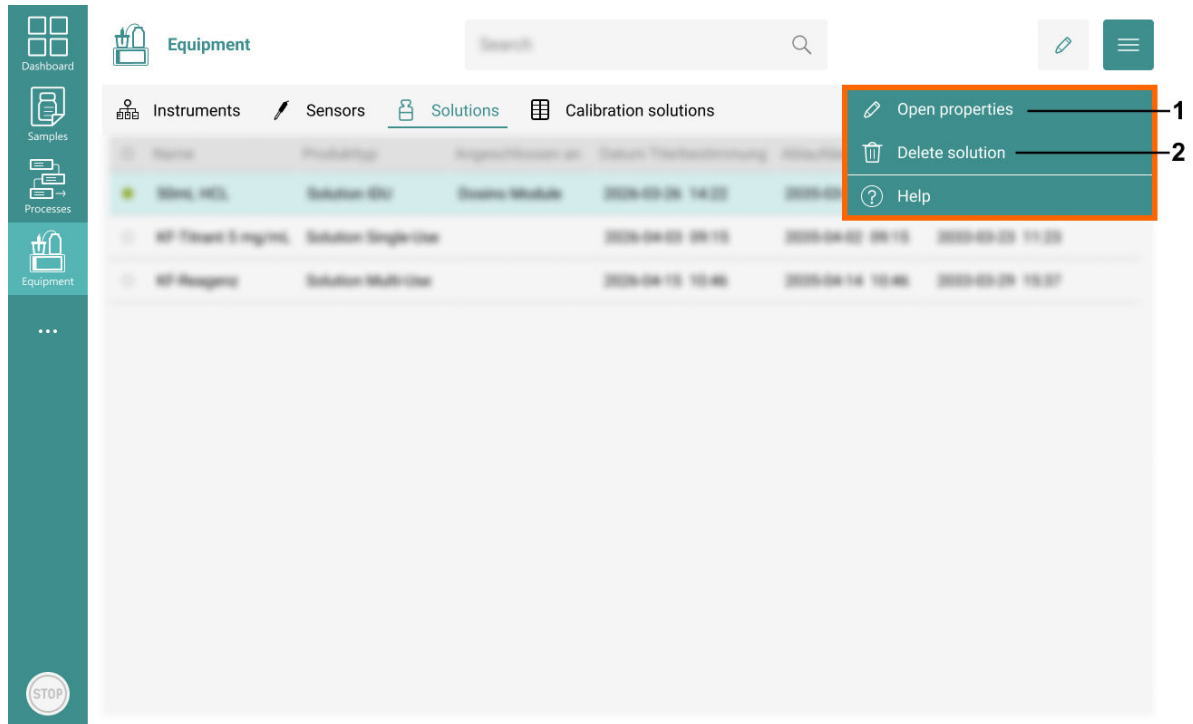
Expiry date of the titer, based on the date of the titer determination and the validity period entered. The expiry date of the titer can be set in the properties of the titer.

6 Solution expiry date

Expiry date of the solution, based on the opening date of the solution and the working life entered. The expiry date of the solution can be set in the properties of the solution.

Functions

Tap on to open a menu with the following functions:



1 Open properties

The **Properties** of the selected solution are opened.

Additional information

2 Delete solution

The selected solution is deleted. The function is available only if the solution is disconnected from the IONIC main instrument.

Additional information

Icons

 The following icons are present in the **Solutions** subsection. Icons that affect the entire user interface can be found [here](#).

Icon	Function
	Open the Properties window to display and edit the settings of the currently selected solution.

Properties

In the properties, tap  to open a selection list with various options to choose with certain settings:

Options to choose	Function
Default value	Value that is defined by default for the setting.
Enter value	The keyboard opens so that a value can be entered manually.

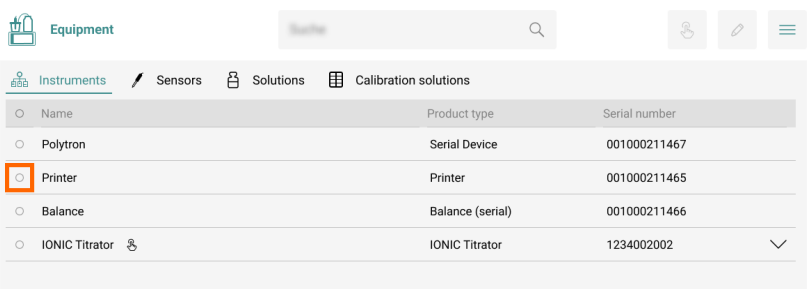
5.4.2.1 Open properties

 The images show an example from the **Instruments** subsection. The procedure applies for all subsections in the **Equipment** work area.

The properties can alternatively be opened by tapping in the **Sensors**, **Solutions**, and **Calibration solutions** subsections.

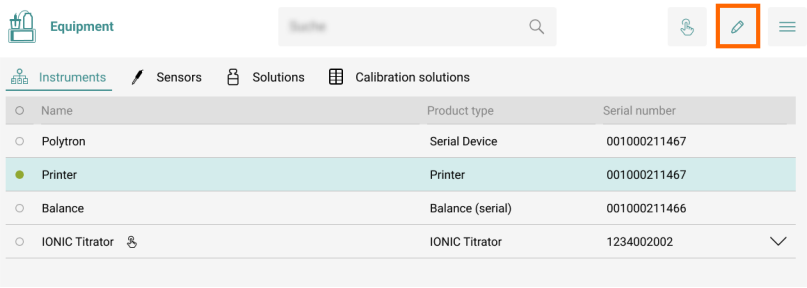
1 Selecting an object

Tap  to select the desired object under **Equipment ▶ subsection**.

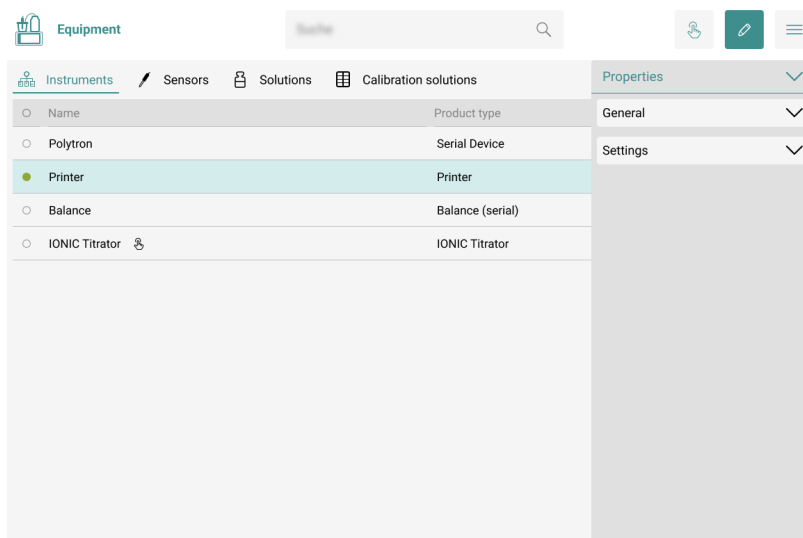


2 Opening the properties

Tap  in the title bar.



The **Properties** of the selected object are opened.



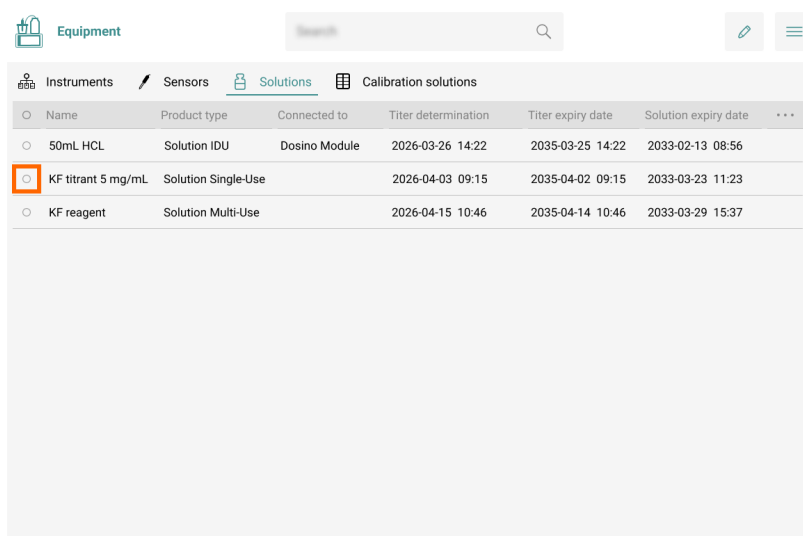
5.4.2.2 Delete solution

Prerequisite:

- The solution is separated from the 807 Dosing Unit or the OMNIS Liquid Adapter.

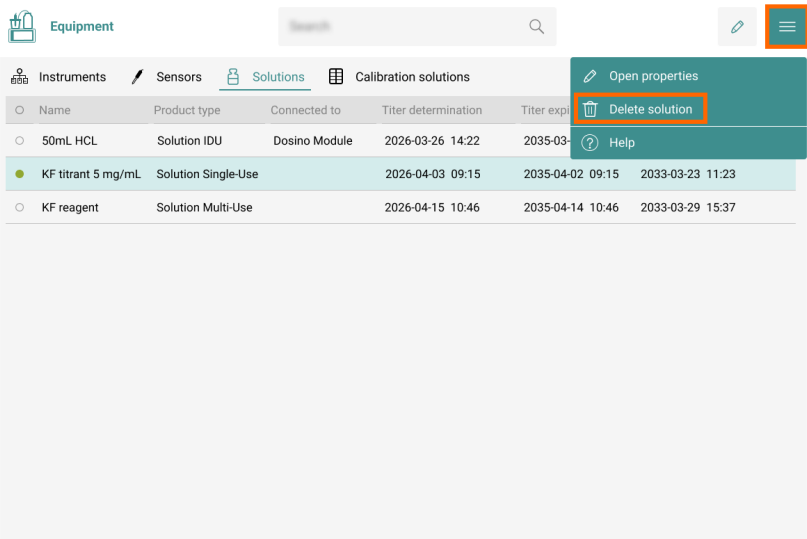
1 Selecting a solution

Tap  to select the desired solution under **Equipment ► Solutions**.



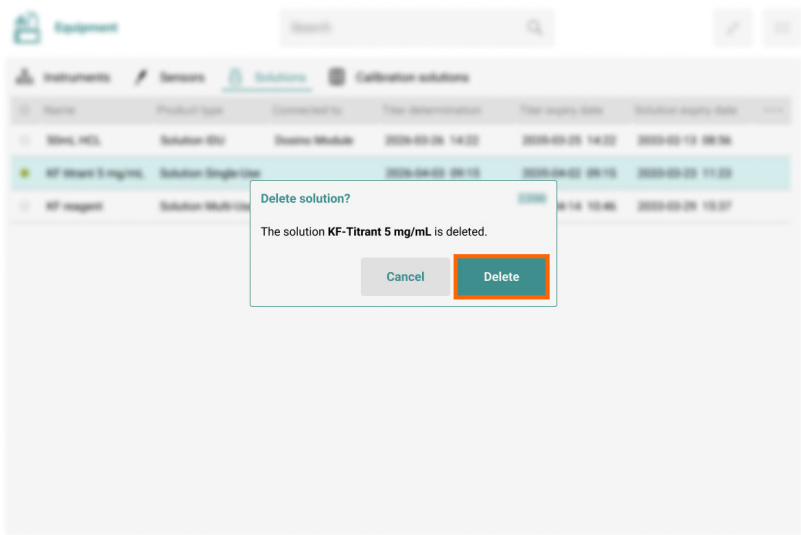
2 Deleting the solution

Tap  in the title bar and select **Delete solution**.



3 Confirming the message

Confirm the message with **Delete**.



 If multiple solutions are selected, then the message must be confirmed individually for each solution.

5.4.3 Solutions – Properties

In the **Solutions** subsection, tap  to open the **Properties** window after selecting a solution. The individual sections open by tapping .

- [Overview](#)
- [Settings](#)

Video tutorials for the **Solutions** subsection:



Overview

The properties of the currently selected solution are visible in the **Properties** window. All solution properties stored on the memory chip of the 807 Dosing Unit or on the memory chip of the bottle cap are automatically transferred to the IONIC app and cannot be edited. All settings that are not transferred via the memory chip can be edited.

- The solution properties can be edited only with connected solutions.
- If a solution is used in a running determination, then the properties of this solution cannot be edited during the entire determination run.

The following information is displayed:

Equipment

Search

Solutions

Name	Product type	Assigned/Issued on	Status	Validity
Blank, HCL	Solution IDU	2020-03-26 14:22	Active	2020-03-26
MP-Titerant 5 mg/ml	Solution Single-Use	2020-04-02 09:15	Active	2020-04-02
MP-Reserve	Solution Multi-Use	2020-04-15 10:46	Active	2020-04-14

Properties

- General (1)
- Solution data (2)
- Titer data (3)
- Components (4)
- Connector (5)

1 General*Additional information***2 Solution data***Additional information***3 Titer data***Additional information***4 Components***Additional information***5 Connector***Additional information***Settings****General****Name**

Name of the solution. The solution name can be edited and may not exceed 32 characters.

The solution name saved on the memory chip is stored as soon as the solution is first recognized by the IONIC app.

Product type

Product type of the solution.

- **Solution IDU**
- **Solution Multi-Use**
- **Solution Single-Use**

The product type cannot be edited.

Solution data	
Solution expiry date (manufacturer)	Expiry date of the solution in accordance with the manufacturer specification. For solutions of the Solution Single-Use type, the expiry date cannot be edited. For solutions of the Solution Multi-Use or Solution IDU types, the expiry date can be entered manually.
Solution opening date	Date on which the solution was first opened. For solutions of the Solution Single-Use type, the opening date cannot be edited. For solutions of the Solution Multi-Use or Solution IDU types, the opening date can be entered manually.
Monitoring	Activate or deactivate solution monitoring.
Working life (only with activated Monitoring)	Working life of the solution in days. Input range: 1–3,650 Unit: d
Solution expiry date (only with activated Monitoring)	Expiry date of the solution. The expiry date is calculated using the opening date of the solution and the working life entered.  If a determination with an expired solution is carried out, then the measurement results may be flawed. The expiry date cannot be edited.
Action when expired (only with activated Monitoring)	Selection of how the system should behave as soon as the working life of the solution has expired and a determination is set to pending, in which the expired solution is used. ▪ Ask user: The user is asked whether the determination should be set to pending despite the solution that has expired. ▪ Cancel: An error message appears and the determination is canceled. ▪ Continue: An information message appears and the determination is nevertheless set to pending.
Comment	Optional comment on the solution data with a maximum length of 250 characters.

Titer data

Sample ID

Object ID of the sample with which the titer determination was carried out.

If the **Titer** or **Unit** settings have been adjusted manually, then 0 will be saved for the Sample ID.

The sample ID cannot be edited.

Number of subsamples

Number of subsamples that were used for titer determination. If the titer is entered manually, then 0 is displayed for the number of subsamples.

The Number of subsamples cannot be edited.

Components

Component 1

The **Component 1** is already predefined. The last available **Component 1** cannot be deleted.

[Create new]

(only for **Solution IDU** and **Solution Multi-Use**)

Up to 9 new components can be defined by tapping **[Create new]**.

The components 2 to 10 can be deleted again by tapping .

Name

Name of the component.

Concentration

Concentration of the component.

Default value: 1.0

Concentration unit

Unit of the concentration of the solution.



If the manufacturer has saved the components on the memory chip of the bottle cap, then the components for solutions of the **Solution Single-Use** type are predefined and cannot be edited. If the manufacturer has not saved any components on the memory chip of the bottle cap, then the **Components** section for solutions of the **Solution Single-Use** type will not be displayed.

Connector

Status

Current connection status.

- **Connected:** The solution is connected to the associated liquid handling component and is recognized by the IONIC app.
- **Disconnected:** The solution is not connected to the associated liquid handling component.

Connector

- Connected to**
- **Solution IDU:** Name of the dosing drive with which the piston buret is connected to which the solution is connected.
 - **Solution Multi-Use** and **Solution Single-Use:** Name of the dosing drive on the OMNIS Dosing Module, to which the OMNIS Liquid Adapter is connected with the corresponding solution.

5.5 Calibration solutions – Subsection

In the **Equipment** work area, tap on **Calibration solutions** to open the **Calibration solutions** subsection.

Predefined, commercial buffer series are available in the **Calibration solutions** subsection. The properties of the buffer series can be displayed.

- Calibration solutions – Overview
- Calibration solutions – Properties

5.5.1 Calibration solutions – Overview

- *Definition*
- *Overview list*
- *Functions*
- *Icons*

Definition

The term **Calibration solutions** is used in the IONIC app as the generic term for buffer series. A buffer series consists of one or more calibration buffers that are required for the calibration of pH electrodes.

The following predefined, commercial buffer series with the corresponding calibration buffers can be used for the calibration.

- BAKER ANALYZED™
- Beckman
- DIN
- Fisher
- Hamilton DuraCal™
- Honeywell Fluka™
- Merck Certipur® 20 / Titrisol
- Merck Certipur® 25
- Merck Certipur® 25B
- Metrohm
- Mettler Toledo
- NIST
- Radiometer Analytical

Overview list

All buffer series are displayed in an overview list in the Calibration solutions subsection. The following information is displayed in the overview list:

Dashboard

Samples

Processes

Equipment

...

STOP

Equipment

InstrumentsSensorsSolutionsCalibration solutions

2

Name1	Product type
BAKER ANALYZED™	Buffer Series
Beckman	Buffer Series
DIN	Buffer Series
Fisher	Buffer Series
Hamilton DuraCal™	Buffer Series
Honeywell Fluka™	Buffer Series
Merck Certipur® 20 / Titrisol	Buffer Series
Merck Certipur® 25	Buffer Series
Merck Certipur® 25 B	Buffer Series
Metrohm	Buffer Series
Mettler Toledo	Buffer Series
NIST	Buffer Series

- 1

Name

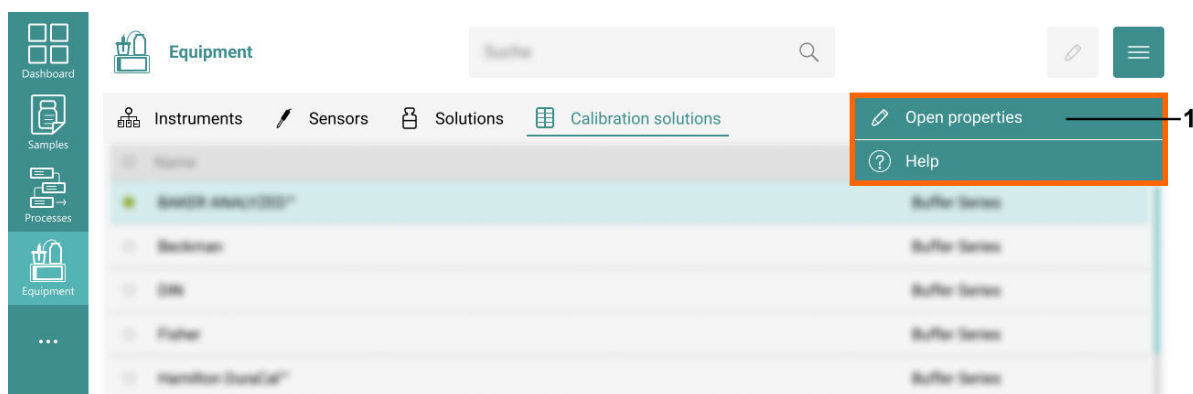
Name of the buffer series.
- 2

Product type

Designation of the calibration solution.

Functions

Tap on  to open a menu with the following functions:



1 Open properties

The **Properties** of the selected buffer series are opened.

Additional information

Icons

 The following icons are present in the **Calibration solutions** sub-section.

Icons that affect the entire user interface can be found [here](#).

Icon	Function
	Open the Properties window to display the properties of the currently selected buffer series.

5.5.1.1 Open properties

 The images show an example from the **Instruments** subsection. The procedure applies for all subsections in the **Equipment** work area.

The properties can alternatively be opened by tapping in the **Sensors**, **Solutions**, and **Calibration solutions** subsections.

1 Selecting an object

Tap  to select the desired object under **Equipment** ► **subsection**.

Equipment

Search

Instruments Sensors Solutions Calibration solutions

Name	Product type	Serial number
Polytron	Serial Device	001000211467
Printer	Printer	001000211465
Balance	Balance (serial)	001000211466
IONIC Titrator	IONIC Titrator	1234002002

2 Opening the properties

Tap  in the title bar.

Equipment

Search

Instruments Sensors Solutions Calibration solutions

Name	Product type	Serial number
Polytron	Serial Device	001000211467
Printer	Printer	001000211467
Balance	Balance (serial)	001000211466
IONIC Titrator	IONIC Titrator	1234002002

The **Properties** of the selected object are opened.

Equipment

Search

Instruments Sensors Solutions Calibration solutions

Name	Product type
Polytron	Serial Device
Printer	Printer
Balance	Balance (serial)
IONIC Titrator	IONIC Titrator

Properties

General

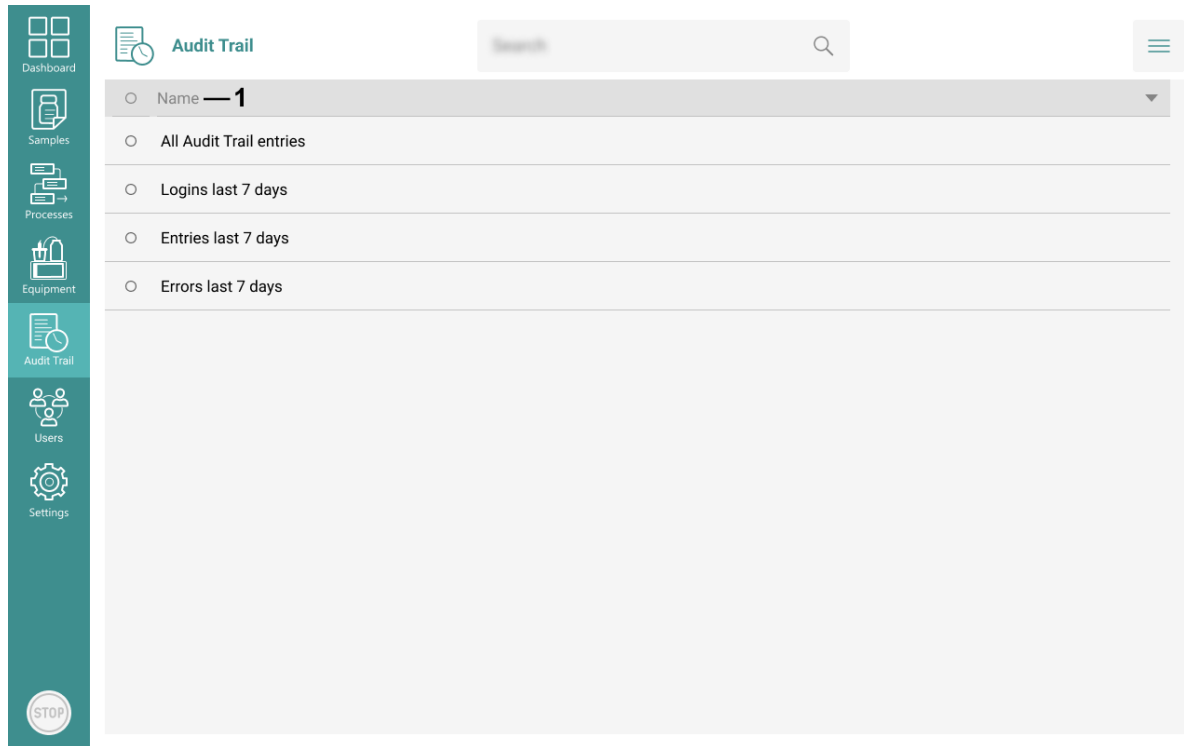
Settings

5.5.2 Calibration solutions – Properties

In the **Calibration solutions** subsection, tap  to open the **Properties** window after selecting a calibration solution. The individual sections open by tapping .

- Overview
- General
- Calibration buffer

Buffer table	Tabular representation of the dependency between temperature and pH value of the calibration buffer. The values in the buffer tables differ, depending on the buffer series.
Temperature	Temperature of the calibration buffer. Unit: °C
pH value	pH value of the calibration buffer at the respective temperature. Unit: None

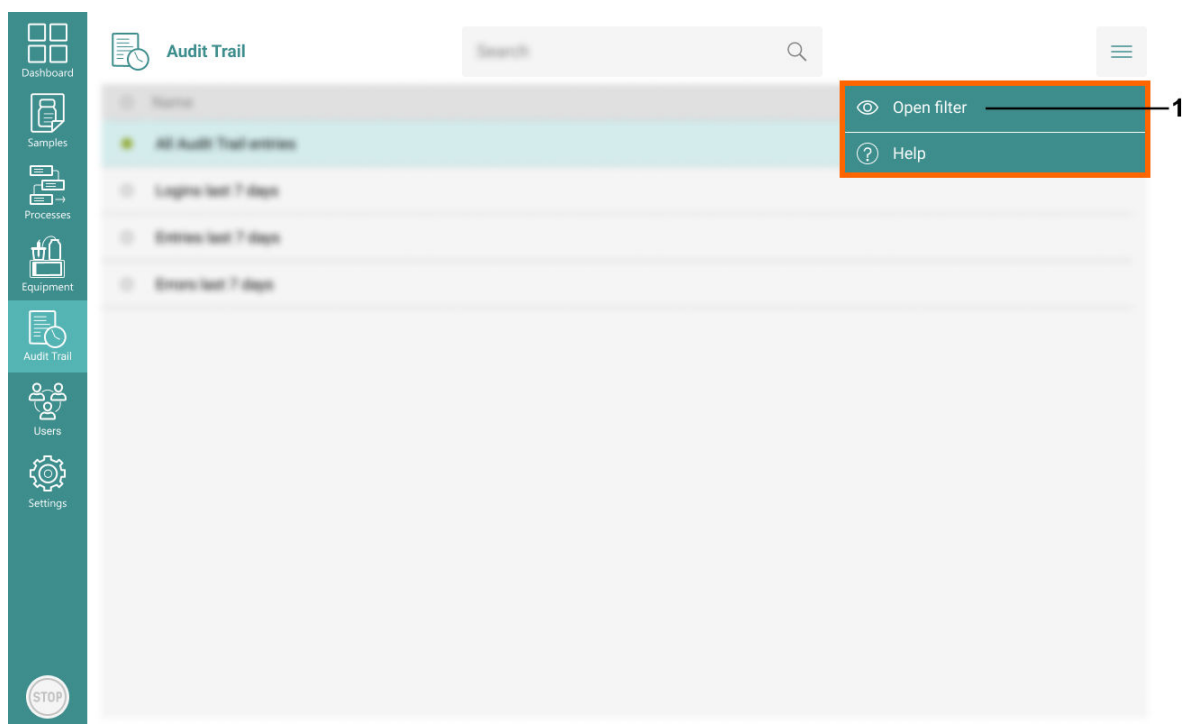


1 Name

Name of the predefined filter.

Functions

Tap on  to open a menu with the following functions:



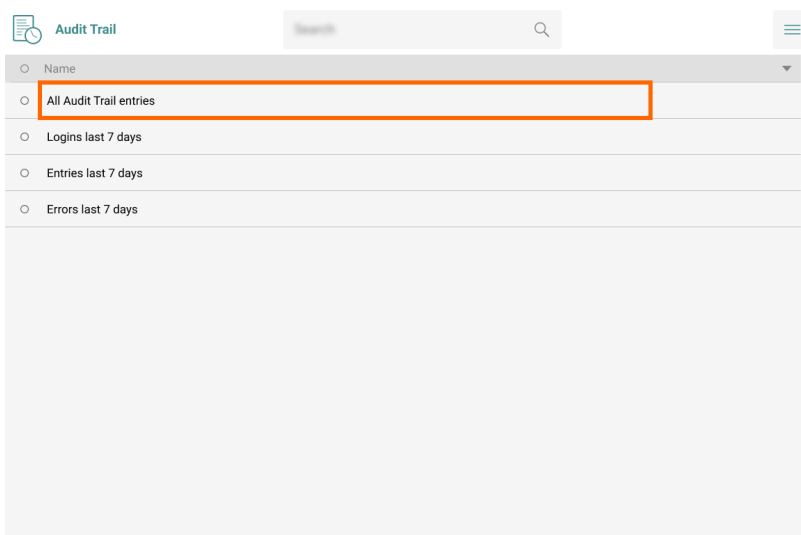
1 Open filter

The predefined filter is applied.

Additional information

6.1.1 Open filter

- 1 In the **Audit Trail** work area, tap on the name of the desired filter.



All Audit Trail entries that match the defined filter criteria are displayed ([Additional information](#)).

6.2 Audit Trail filter – Overview

- [Definition](#)
- [Overview list](#)
- [Functions](#)

Definition

Audit Trail entries are searched for and displayed in the predefined Audit Trail filters according to the predefined filter criteria. The overview list can optionally be extended to include the **Object name**, **Object ID**, and **User ID** columns. Tap an Audit Trail entry to display detailed information about the respective entry in the detail view ([Additional information](#)).

Overview list

Tap an Audit Trail filter to display all of the Audit Trail entries that correspond to the defined filter criteria in an overview list. The following information is displayed in the overview list:

Date and time	Level	Category	Object type	Action	Object name	Object ID	User ID
2026-03-29 09:13:10	i	Samples	Subsample	Finished	Subsample 3	3	001234
2026-03-29 09:13:05	i	Samples	Command	Started	MEAS U	400	001234
2026-03-29 09:13:05	i	Samples	Subsample	Started	Subsample 3	3	001234
2026-03-29 09:13:05	i	Samples	Sensor	Reserved	pH sensor 1	-1000	001234
2026-03-29 09:13:04	i	Samples	Subsample	Set to pending	Subsample 3	3	001234
2026-03-29 09:13:00	!	Samples	Sensor	Expired	pH sensor 1	-1000	001234
2026-03-28 11:21:34	x	Samples	Sensor	Expired	pH sensor 2	-1001	001234

Detail view	
Object ID	3
Message number	1234
Current language	Die Bestimmung der Subsample 3 wurde auf anstehend gestellt.
English	The determination of Subsample 3 was set to pending.

1 Date and time

Date and time of the action.

2 Level

Assignment of the action.

[Additional information](#)

3 Category

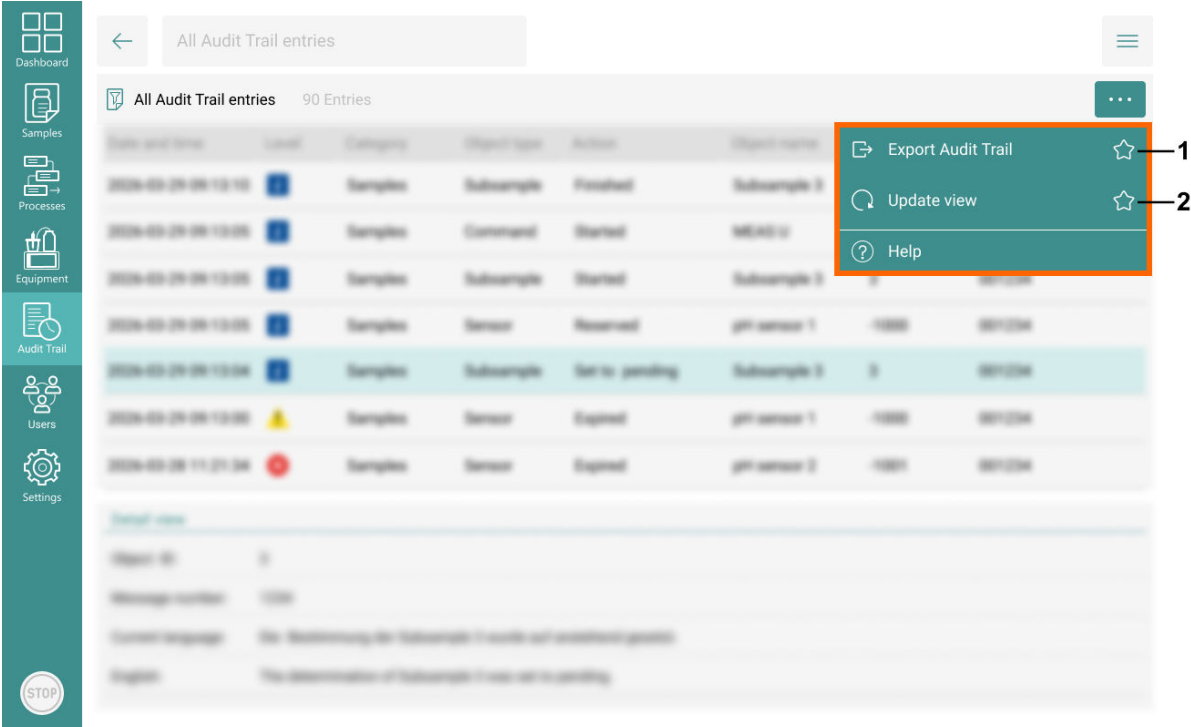
Category to which the respective action is assigned.

[Additional information](#)

4 Object type

Type of the object with which the action was carried out.

[Additional information](#)



- 1 Export Audit Trail**
Export all Audit Trail entries that match the defined filter criteria.
[Additional information](#)

- 2 Update view**
Update the list with the Audit Trail entries to the latest version.
[Additional information](#)

Icons

 The following icons are present in opened Audit Trail filters. Icons that affect the entire user interface can be found [here](#).

Icon	Function
	Tap to add the function to the title bar (Additional information).
	Tap to remove the function from the title bar (Additional information).

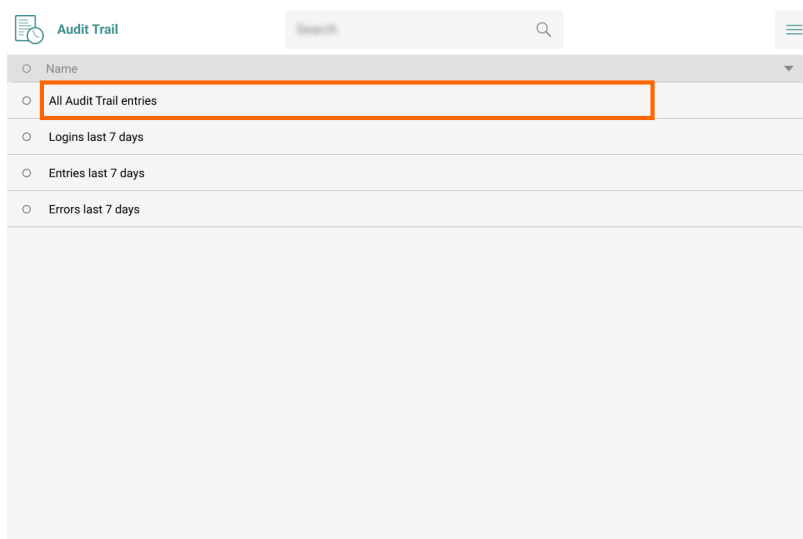
6.2.1 Export Audit Trail

1 Plugging in a USB flash drive

Plug a USB flash drive into one of the USB connectors available on the IONIC main instrument and wait until the message **USB flash drive connected** appears.

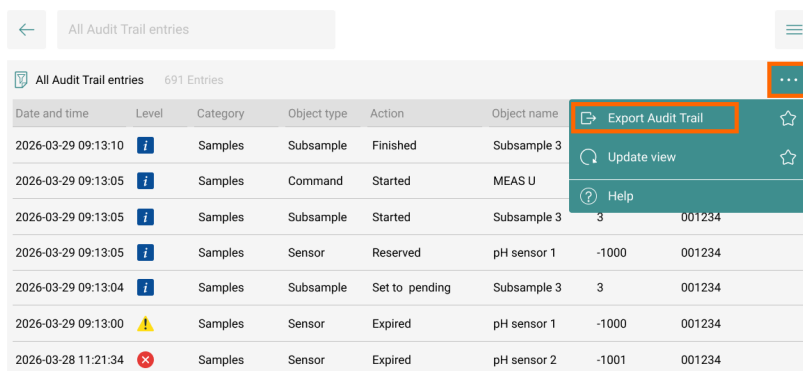
2 Opening the filter

In the **Audit Trail** work area, tap on the name of the desired filter.

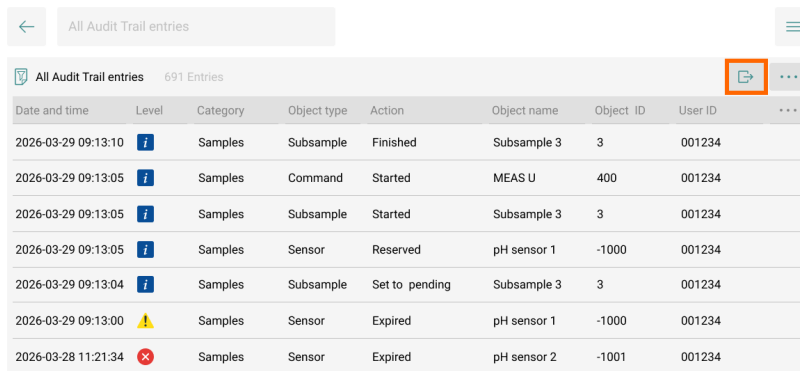


3 Opening the export dialog

Tap **...** in the title bar and select **Export Audit Trail**.



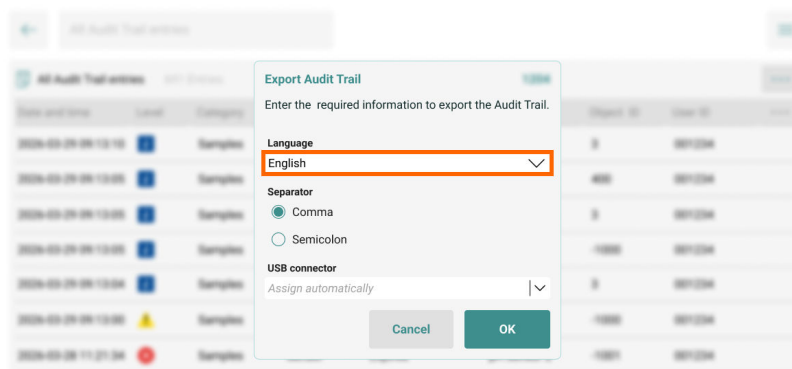
As an alternative, tap  in the title bar if the function has been added as a quick access ([Additional information](#)).



Date and time	Level	Category	Object type	Action	Object name	Object ID	User ID	...
2026-03-29 09:13:10		Samples	Subsample	Finished	Subsample 3	3	001234	
2026-03-29 09:13:05		Samples	Command	Started	MEAS U	400	001234	
2026-03-29 09:13:05		Samples	Subsample	Started	Subsample 3	3	001234	
2026-03-29 09:13:05		Samples	Sensor	Reserved	pH sensor 1	-1000	001234	
2026-03-29 09:13:04		Samples	Subsample	Set to pending	Subsample 3	3	001234	
2026-03-29 09:13:00		Samples	Sensor	Expired	pH sensor 1	-1000	001234	
2026-03-28 11:21:34		Samples	Sensor	Expired	pH sensor 2	-1001	001234	

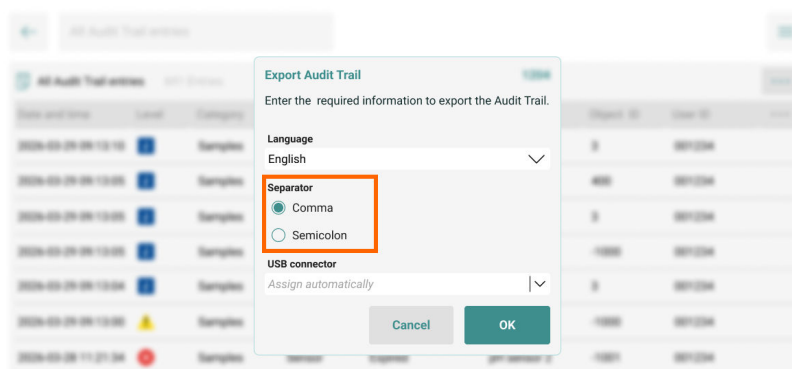
4 Selecting the language to use

Tap the selection list under **Language** and select the language in which the Audit Trail entries are to be exported.



5 Selecting a separator

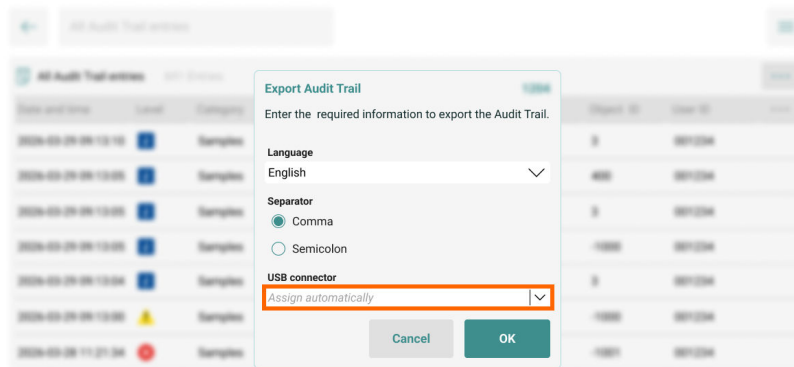
Tap under **Separator** to select whether a **Comma** or a **Semicolon** is to be used as a separator in the CSV file.



6 Selecting a USB connector

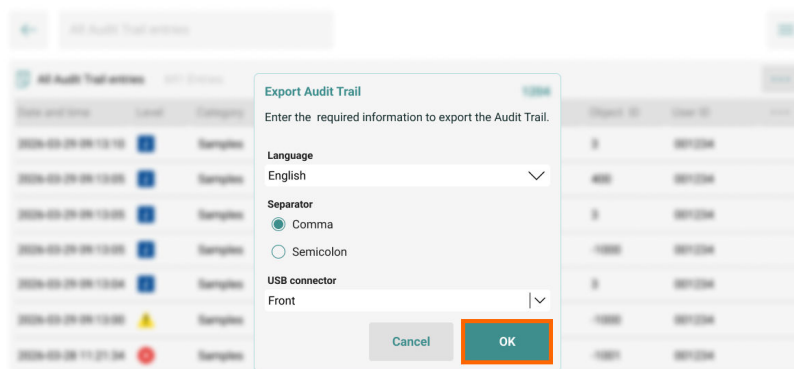
Tap the selection list under **USB connector** and select the connector to which the desired USB flash drive is connected.

- The selection list is available only if at least one USB flash drive is connected.
- The **Assign automatically** function works only if exactly one USB flash drive is connected.



7 Exporting Audit Trail entries

Confirm the entries with **[OK]**.



If an error message appears, follow the instructions in the error message.

As soon as the **AuditTrail exported** information message appears, all Audit Trail entries that correspond to the filter criteria of the selected Audit Trail filter will be saved to the USB flash drive as a CSV file (.csv).

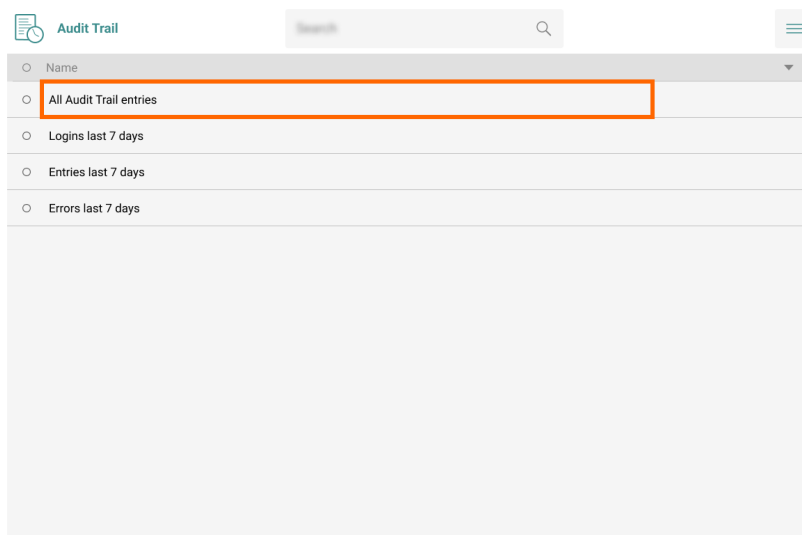
During export, the time indications in the file properties are converted to Coordinated Universal Time (UTC±00:00). This time format may differ from the local time on the instrument.

Update view

 The images show the procedure using an example from the **Audit Trail** work area. This procedure applies to all areas where the view can be updated.

1 Opening the filter

In the desired work area, tap on the name of the desired filter.



2 Updating the view

Tap **...** in the title bar and select **Update view**.



← All Audit Trail entries

All Audit Trail entries691 Entries

...

Export Audit Trail

Update view

Help

Date and time	Level	Category	Object type	Action	Object name		
2026-03-29 09:13:10	i	Samples	Subsample	Finished	Subsample 3		
2026-03-29 09:13:05	i	Samples	Command	Started	MEAS U		
2026-03-29 09:13:05	i	Samples	Subsample	Started	Subsample 3	3	001234
2026-03-29 09:13:05	i	Samples	Sensor	Reserved	pH sensor 1	-1000	001234
2026-03-29 09:13:04	i	Samples	Subsample	Set to pending	Subsample 3	3	001234
2026-03-29 09:13:00	!	Samples	Sensor	Expired	pH sensor 1	-1000	001234
2026-03-28 11:21:34	x	Samples	Sensor	Expired	pH sensor 2	-1001	001234

As an alternative, tap  in the title bar if the function has been added as a quick access (*Additional information*).

← All Audit Trail entries

All Audit Trail entries691 Entries

...

Date and time	Level	Category	Object type	Action	Object name	Object ID	User ID	...
2026-03-29 09:13:10	i	Samples	Subsample	Finished	Subsample 3	3	001234	
2026-03-29 09:13:05	i	Samples	Command	Started	MEAS U	400	001234	
2026-03-29 09:13:05	i	Samples	Subsample	Started	Subsample 3	3	001234	
2026-03-29 09:13:05	i	Samples	Sensor	Reserved	pH sensor 1	-1000	001234	
2026-03-29 09:13:04	i	Samples	Subsample	Set to pending	Subsample 3	3	001234	
2026-03-29 09:13:00	!	Samples	Sensor	Expired	pH sensor 1	-1000	001234	
2026-03-28 11:21:34	x	Samples	Sensor	Expired	pH sensor 2	-1001	001234	

All entries added since the last update are displayed.

6.2.3 Showing/hiding columns

Columns can be shown and hidden in overview lists, e.g., in filtered lists in the **Filters** subsection or in the **Audit Trail** work area.

Showing columns

- 1 Tap  in the overview list.
A menu with all of the available columns in the overview list is displayed.
- 2 Tap  to show the column in the overview list.
The selected columns are displayed in the overview list.

Hiding columns

- 1 Tap  in the overview list.



A menu with all of the available columns in the overview list is displayed.

- 2 Tap  to hide the column from the overview list.

The selected columns are no longer displayed in the overview list.

6.3 Audit Trail – Directory

In Audit Trail filters, information on the Audit Trail entries is displayed in both the overview list and the detail view. The following entries are possible:

Category

Category that the action is assigned to. The category corresponds to the work area, the subsection or the section from which the entry is retrieved. Depending on the action, Audit Trail entries may belong to the following categories:

- **Audit Trail**
- **Execution overview**
- **Authentication**
- **User management**
- **Dashboard**
- **Database**
- **Date and time**
- **Equipment**
- **Metrohm Data Service**
- **Processes**
- **Samples**
- **Security**
- **System**
- **Undefined**

Object type

Type of the object with which the action was carried out. Depending on the action, the following object types can be displayed for Audit Trail entries:

- **Command**
- **User group**
- **User account**
- **Setting**
- **Export**
- **Functional unit**
- **Instrument**
- **Calibration solution**
- **Piston buret**
- **Solution**
- **Method**
- **Connection**

- Sample
- Sample list
- Report
- Sensor
- System variable
- Subsample

The product type of the respective object is displayed under Product type in the detail view. The following product types can be displayed:

- **Analogue Electrode**
- **Dosing Drive**
- **Dosino Module**
- **Printer**
- **dTrobe**
- **IONIC Titrator**
- **Buffer Series**
- **Piston Buret**
- **Solution**
- **Magnetic Stirrer**
- **Measuring Interface Analogue**
- **Measuring Interface Digital**
- **Measuring Module Analogue**
- **Measuring Module Digital**
- **OMNIS Dosing Module**
- **OMNIS Rod Stirrer**
- **Serial Device**
- **Balance**

Action

Brief description of the action that was carried out. The following actions can be documented in the Audit Trail:

- Stop condition reached
- Canceled
- Expired
- Activated
- Held
- Set to pending
- Completed
- Ended with comments
- Deactivated
- Duplicated
- Removed
- Successful
- Created
- Failed
- Continued

- **Modified**
- **Deleted**
- **Locked**
- **Started**
- **Stopped**
- **Imported**
- **Manually adjusted**
- **Reprocessed**
- **Password modified**
- **Reactivated**
- **Reauthenticated**
- **Reserved**
- **Statistics modified**
- **Overloaded**
- **Skipped**
- **Signing failed**
- **Signed**
- **Signature revoked**
- **Waiting for user input**

Detail view

The following entries may be present in the detail view:

Expiry date	Expiry date of the object.
Expiry date (manufacturer)	Expiry date of the solution in accordance with the manufacturer specification.
Calibration expiry date	Expiry date of the electrode calibration.
Titer expiry date	Expiry date of the solution titer.
Old method ID	Method ID before the change.
Old method name	Method name before renaming.
Old value	Value prior to the change.
Opening date	Date on which the solution was first opened.
Reason for modification	Selected modification reason when saving an object.
Article number	Article number of the object.
Meaning	Meaning that was selected when signing.
Command name	Name of the command.
Command type	Type of the command.
User ID	Unambiguous designation of the user that is logged on to the IONIC app and is carrying out an action.

Minimum	Minimum valid value in the input range.
Name	Name of the object.
Name functional unit 1	Name of the functional unit 1 used.
Name functional unit 2	Name of the functional unit 2 used.
Name of instrument 1	Name of the instrument 1 used.
Name of instrument 2	Name of the instrument 2 used.
New method ID	New method ID assigned by the system after a change.
New method name	New name of the method.
New value	Changed value after the saving process.
Object ID	Unique identification number of the object within the system.
Object type	Type of the object with which the action was carried out.
Parameter name	Name of the parameter.
pH(0)	pH(0) of the pH electrode used.
Sample ID	Unique identification number of the sample in the system.
Sample list ID	Unique identification number of the sample list in the system.
Sample list name	Name of the sample list.
Sample name	Name of the sample.
Referenced command	Name of the referenced command.
Sensor type	Type of the sensor.
Serial number	Serial number of the object.
Serial no. functional unit 1	Serial number of the functional unit 1 used.
Serial no. functional unit 2	Serial number of the functional unit 2 used.
Serial number of piston buret	Serial number of the piston buret used.
Serial number of instrument 1	Serial number of the instrument 1 used.
Serial number of instrument 2	Serial number of the instrument 2 used.
Slope	Slope of the electrode used.
Subsample data	Name and value of the modified subsample data.
Subsample ID	Unique identification number of the subsample in the system.

Subsample name	Name of the subsample.
Titer	Titer of the solution used.
Type of temperature sensor	Type of the temperature sensor used.
Variance	Variance that arises during the regression analysis during the electrode calibration.
Value	Value of the parameter or of the object.

7 User management – Work area

A distinction is made between limited user management and extended user management in the **User management** work area.

Limited user management

The limited user management is available in the IONIC app without a license.

The subsections with the predefined user accounts and user groups are visible in the **User management** work area. The predefined **Administrator**, **Laboratory manager**, **Routine user**, and **Service engineer** user accounts are available with different user group rights in the **User accounts** subsection (*Additional information*). The password of the predefined user accounts can be reset by the administrator; no other settings can be edited (*Additional information*). The access data of the respective user account allows you to log into the IONIC app.

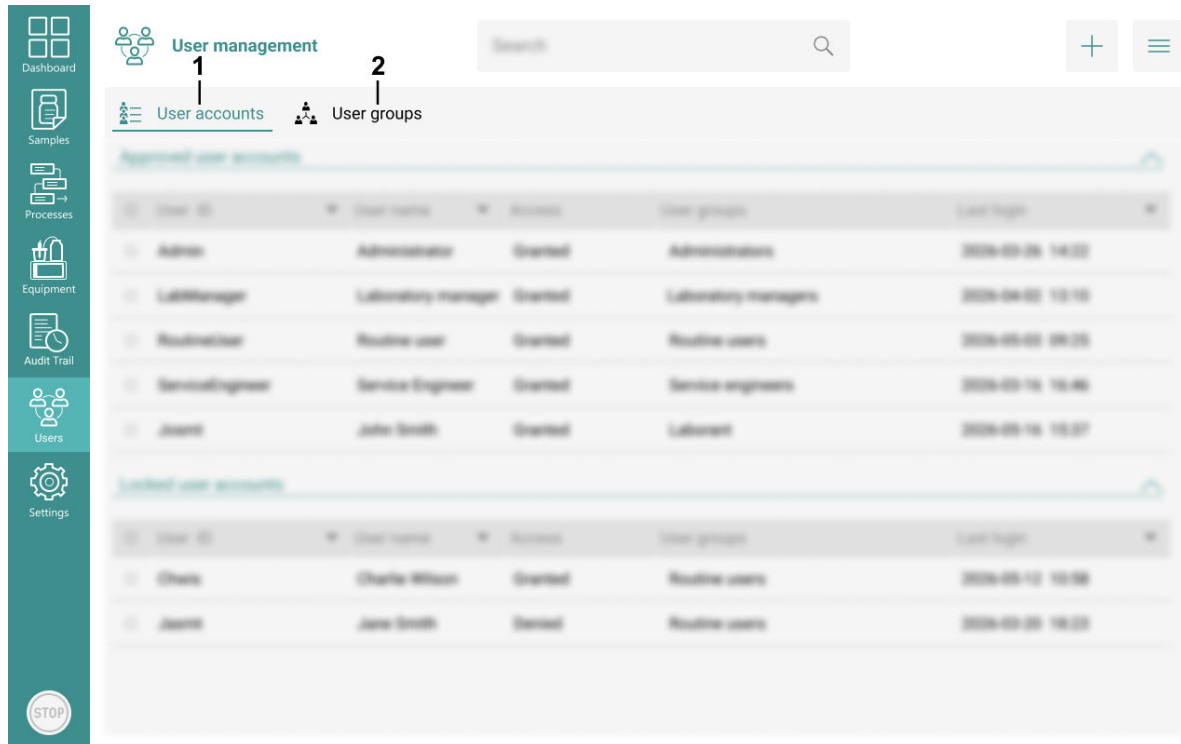
Extended user management

Extended user management is available in the IONIC app only with the **User management** license.

The subsections are visible in the **User management** work area and can be edited. The predefined user accounts and user groups are visible and can be edited. In addition, new user accounts and user groups can be created and defined.

Overview

The **User management** work area is divided into the following subsections:



1 User accounts subsection

Additional information

2 User groups subsection

Additional information

 In order for the different user accounts to be logged on and logged out in the system, the login must be activated with the **User ID** under **Settings ► Security ► Login and compliance** (*Additional information*).

7.1 Users – Directory

The following user accounts and user groups are predefined in the **User accounts** and **User groups** subsections:

 For predefined user accounts, only the password can be changed, otherwise the predefined user accounts cannot be edited. Predefined user groups cannot be edited.

User ID	User name	Assigned user group	Description
Admin	Administrator	Administrators	The Administrator user account is a member of the Administrators user group. All user group rights for the User management and Audit Trail work areas as well as system-relevant user group rights for the Dashboard, Equipment, and Settings work areas are assigned to the Administrators user group.
LabManager	Laboratory manager	Laboratory managers	The Laboratory manager user account is a member of the Laboratory managers user group. All user group rights for the Samples, Processes, and Equipment work areas as well as individual user group rights for the Dashboard and Settings work areas are assigned to the Laboratory managers user group.
RoutineUser	Routine user	Routine users	The Routine user user account is a member of the Routine users user group. Individual user group rights for the Dashboard, Samples, Processes, Equipment, and Settings work areas are assigned to the Routine users user group.
ServiceEngineer	Service engineer	Service engineers	The Service engineer user account is a member of the Service engineers user group. All user group rights for all work areas are assigned to the Service engineers user group. The Service engineer user account is intended for the regional Metrohm service representative.

7.2 User accounts – Subsection

Tap **User accounts** to open the **User accounts** subsection in the **User management** work area.

Limited user management: The predefined **Administrator**, **Laboratory manager**, **Routine user**, and **Service engineer** user accounts are visible in the **User accounts** subsection.

The limited user management is available without a license ([Additional information](#)).

Extended user management: User accounts can be created and the user properties can be edited in the **User accounts** subsection. User accounts can also be deactivated by the administrator.

Extended user management is available only with the **User management** license ([Additional information](#)).

- *User directory*
- *User accounts – Overview*
- *User properties – Overview*
- *User account login*

7.2.1 User accounts – Overview

- Definition
- Overview list
- Functions

Definition

User accounts can be managed by an administrator in the User properties section ([Additional information](#)).

 User accounts to which the **Administrators** user group is assigned are referred to as administrators.

The user accounts are divided into **Approved user accounts** and **Locked user accounts**.

- **Approved user accounts:**
 - User accounts that have been granted access by the administrator and whose users have logged onto the system within the maximum number of login attempts with the correct access data.
 - User accounts that were granted access by the administrator and whose users have not yet logged onto the system.
- **Locked user accounts:**
 - User accounts that have been granted access by the administrator and whose users exceeded the maximum number of login attempts by entering incorrect access data.
 - User accounts that have been deactivated by the administrator.

Overview list

Both the allowed and the locked user accounts are displayed in an overview list in the **User accounts** subsection. The following information is displayed in the overview list:

Dashboard

Samples

Processes

Equipment

Audit Trail

Users

Settings

STOP

User management

Search

+

≡

User accounts

User groups

Approved user accounts

2

3

4

5

1	2	3	4	5
User ID	User name	Access	User groups	Last login
☐ RoutineUser	Routine user	Granted	Routine users	2026-05-03 09:25:45
☐ LabManager	Laboratory manager	Granted	Laboratory managers	2026-04-02 13:10:10
☐ ServiceEngineer	Service Engineer	Granted	Service engineers	2026-03-16 16:46:53
☐ Admin	Administrator	Granted	Administrators	2026-03-26 14:22:08
☐ Josmt	John Smith	Granted	Routine users	2026-05-16 15:37:29

Locked user accounts

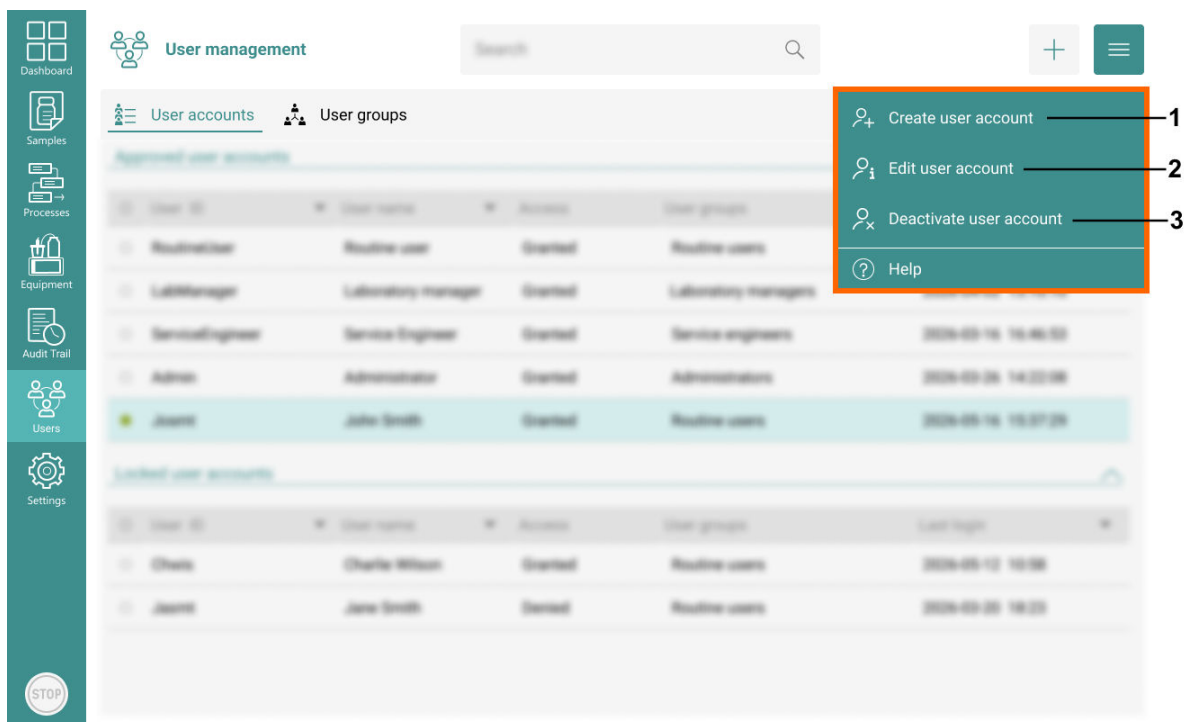
User ID	User name	Access	User groups	Last login
☐ Chwis	Charlie Wilson	Granted	Routine users	2026-05-12 10:58:13
☐ Jasmt	Jane Smith	Denied	Routine users	2026-03-20 18:23:34

1 User ID

Unambiguous designation of the user account.

2 User name

Name of the user.



1 Create user account

A new user account is created and the user properties can be configured.

[Additional information](#)

2 Edit user account

The user properties of the selected user account are opened and can be edited.

For predefined user accounts, only the password can be changed, otherwise the predefined user accounts cannot be edited.

[Additional information](#)

3 Deactivate user account

The selected user account is deactivated and moved to the **Locked user accounts** section.

[Additional information](#)

7.2.1.1 Create user account

Video tutorial for adding user accounts:



NOTICE

Loss of database

Metrohm AG has no access to the database and **cannot** export and restore the database if the administrator password is lost.

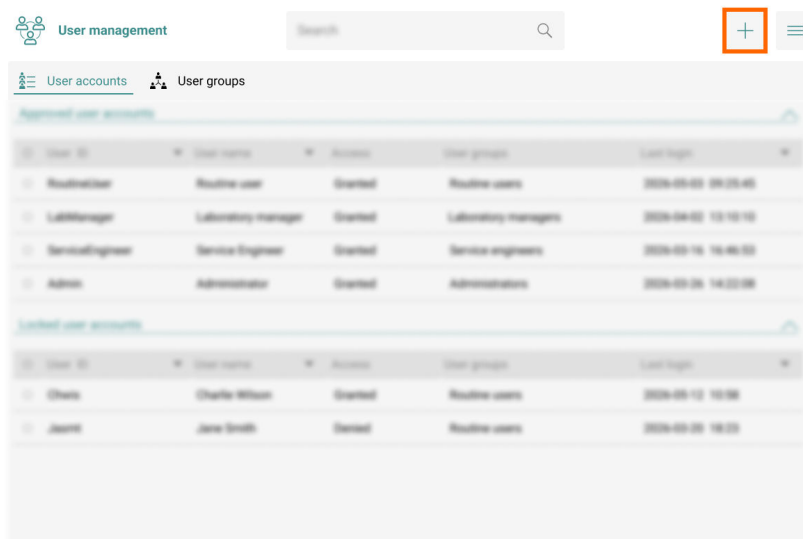
- At least one additional user account with administrator user group rights should be created when using the extended user management. If an administrator has forgotten his or her password, then another administrator will thus have access to the system and can reset the password.
- Document and store all assigned passwords securely (e.g., in a password manager or in another protected memory location).

Prerequisite:

- The license **User management** was activated for the use of extended user management.
- The logged on user has the necessary user group rights (*Additional information*).

1 Creating a user account

Tap  in the title bar under **User management** ► **User accounts**.



The user properties of the newly created user account are opened (*Additional information*).

2 Defining a user name

In the title bar, tap the **Enter user name** input field and enter the desired user name (e.g., first name and last name of the user).



3

Tap the input field under **User ID** and enter a system-wide unique designation of the user account (e.g., abbreviation or personnel number).

4 Defining a password

Tap the input field under **Password** and enter the desired start password in accordance with the password requirements. The password requirements are defined under **SettingsSecurity ► Password policy** (*Additional information*).

←

Jane Doe

User data

User ID

JaDo

Password

Enter password

The password must not exceed 32 characters.

Status of user account

Approved

E-mail address

Comment

✕

Discard

💾

Save

User groups

☐ Administrators

☐ Service engineers

☐ Laboratory managers

☐ Routine users

 The user account receives a start password assigned by the administrator for the first-time login, which the user must change after this initial login (*Additional information*).

5 Defining an e-mail address (optional)

Tap the input field under **E-mail address** and enter the e-mail address of the user.

←

Jane Doe

User data

User ID

JaDo

Password

●●●●●●



The password must not exceed 32 characters.

Status of user account

Approved

E-mail address

Comment

×

Discard



Save

User groups

☐ Administrators

☐ Service engineers

☐ Laboratory managers

☐ Routine users

6

Tap the input field under **Comment** and enter a comment.

←

Jane Doe

User data

User ID

JaDo

Password

●●●●●●●● 

The password must not exceed 32 characters.

Status of user account

Approved

E-mail address

jane.doe@metrohm.com

Comment

User groups

☐ Administrators

☐ Service engineers

☐ Laboratory managers

☐ Routine users

✕

Discard



Save

7

Tap  to assign the desired user group to the user account (*Additional information*).

←

Jane Doe

User data

User ID

JaDo

Password

●●●●●●●● 

The password must not exceed 32 characters.

Status of user account

Approved

E-mail address

jane.doe@metrohm.com

Comment

 Discard

 Save

User groups

☐ Administrators

☐ Service engineers

☐ Laboratory managers

☐ Routine users

8

Tap **[Save]** to save the inputs.

←

Jane Doe

User data

User ID

JaDo

Password

●●●●●●●● 

The password must not exceed 32 characters.

Status of user account

Approved

E-mail address

jane.doe@metrohm.com

Comment

✕ Discard

 Save

User groups

☐ Administrators

☐ Service engineers

☐ Laboratory managers

☒ Routine users

 Tap **[Discard]** to discard all changes.

The user account is created and appears in the overview list under **Approved user accounts**.

 **User management**

 **User accounts**

 **User groups**

Approved user accounts

User ID	User name	Access	User groups	Last login
RoutineUser	Routine user	Granted	Routine users	2026-05-03 09:25:45
LabManager	Laboratory manager	Granted	Laboratory managers	2026-04-02 13:10:10
ServiceEngineer	Service Engineer	Granted	Service engineers	2026-03-16 16:46:53
Admin	Administrator	Granted	Administrators	2026-03-26 14:22:08
JaDo	Jane Doe	Granted	Routine users	

Locked user accounts

User ID	User name	Access	User groups	Last login
Chwis	Charlie Wilson	Granted	Routine users	2026-05-12 10:58:13
Jasmt	Jane Smith	Denied	Routine users	2026-03-20 18:23:34

7.2.1.2 Edit user account

Editing a user account

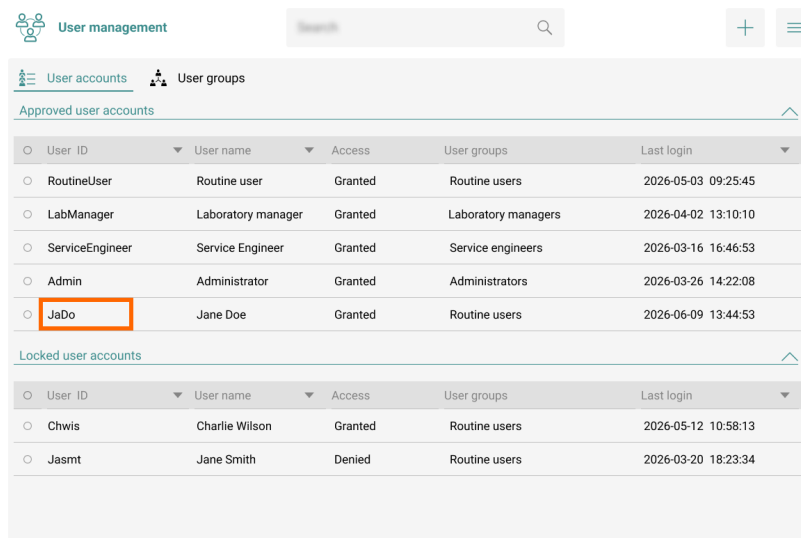
Prerequisite:

- The license **User management** was activated for the use of extended user management.

- The logged on user has the necessary user group rights ([Additional information](#)).

1 Opening user properties

Tap the **User ID** of the desired user account under **User management ► User accounts**.



The screenshot shows the 'User management' interface. At the top, there is a search bar and a '+ / menu' icon. Below the header, there are two tabs: 'User accounts' (selected) and 'User groups'. The 'Approved user accounts' section is expanded, showing a table with the following data:

User ID	User name	Access	User groups	Last login
RoutineUser	Routine user	Granted	Routine users	2026-05-03 09:25:45
LabManager	Laboratory manager	Granted	Laboratory managers	2026-04-02 13:10:10
ServiceEngineer	Service Engineer	Granted	Service engineers	2026-03-16 16:46:53
Admin	Administrator	Granted	Administrators	2026-03-26 14:22:08
JaDo	Jane Doe	Granted	Routine users	2026-06-09 13:44:53

Below this, the 'Locked user accounts' section is also expanded, showing a table with the following data:

User ID	User name	Access	User groups	Last login
Chwis	Charlie Wilson	Granted	Routine users	2026-05-12 10:58:13
Jasmt	Jane Smith	Denied	Routine users	2026-03-20 18:23:34

The User properties section opens ([Additional information](#)).

2 Editing a user account

Edit the user account as desired.

 For predefined user accounts, only the password can be changed, otherwise the predefined user accounts cannot be edited.

3 Saving a user account

Tap **[Save]** to save the changes.

 Tap **[Discard]** to discard all changes.

 At least one user account must be a member in the **Administrators** user group. The last user account in the user group **Administrators** cannot be deactivated.

Prerequisite:

- The license **User management** was activated for the use of extended user management.
- The logged on user has the necessary user group rights (*Additional information*).

1 Selecting a user account

Tap  to select the desired user account under **User management** ► **User accounts** ► **Approved user accounts**.

 **User management**

 **User accounts**

 **User groups**

Approved user accounts

User ID	User name	Access	User groups	Last login
☐ RoutineUser	Routine user	Granted	Routine users	2026-05-03 09:25:45
☐ LabManager	Laboratory manager	Granted	Laboratory managers	2026-04-02 13:10:10
☐ ServiceEngineer	Service Engineer	Granted	Service engineers	2026-03-16 16:46:53
☐ Admin	Administrator	Granted	Administrators	2026-03-26 14:22:08
☒ JaDo	Jane Doe	Granted	Routine users	2026-06-09 13:44:53

Locked user accounts

User ID	User name	Access	User groups	Last login
☐ Chwis	Charlie Wilson	Granted	Routine users	2026-05-12 10:58:13
☐ Jasmt	Jane Smith	Denied	Routine users	2026-03-20 18:23:34

2 Deactivating a user account

Tap  in the title bar and select **Deactivate user account**.

 If multiple user accounts are selected, then the **Deactivate user account** function is not available.

The screenshot shows the 'User management' interface. At the top, there's a search bar and a menu icon. Below, there are tabs for 'User accounts' and 'User groups'. The 'Approved user accounts' section contains a table with columns: User ID, User name, Access, User groups, and Last login. The table lists several users, including 'JaDo' (Jane Doe) who is highlighted in green. A dropdown menu is open for 'JaDo', showing options: 'Create user account', 'Edit user account', 'Deactivate user account' (highlighted with a red box), and 'Help'.

User ID	User name	Access	User groups	Last login
RoutineUser	Routine user	Granted	Routine users	
LabManager	Laboratory manager	Granted	Laboratory managers	
ServiceEngineer	Service Engineer	Granted	Service engineers	2026-03-16 16:46:53
Admin	Administrator	Granted	Administrators	2026-03-26 14:22:08
JaDo	Jane Doe	Granted	Routine users	2026-06-09 13:44:53

The user account is displayed in the overview list under **Locked user accounts** and receives the **Denied** status under **Access**.

The screenshot shows the 'User management' interface. The 'Locked user accounts' section contains a table with columns: User ID, User name, Access, User groups, and Last login. The table lists several users, including 'JaDo' (Jane Doe) who is highlighted with a red box. The 'Access' status for 'JaDo' is 'Denied'.

User ID	User name	Access	User groups	Last login
RoutineUser	Routine user	Granted	Routine users	2026-05-03 09:25:45
LabManager	Laboratory manager	Granted	Laboratory managers	2026-04-02 13:10:10
ServiceEngineer	Service Engineer	Granted	Service engineers	2026-03-16 16:46:53
Admin	Administrator	Granted	Administrators	2026-03-26 14:22:08
Chwis	Charlie Wilson	Granted	Routine users	2026-05-12 10:58:13
Jasmt	Jane Smith	Denied	Routine users	2026-03-20 18:23:34
JaDo	Jane Doe	Denied	Routine users	2026-06-09 13:44:53

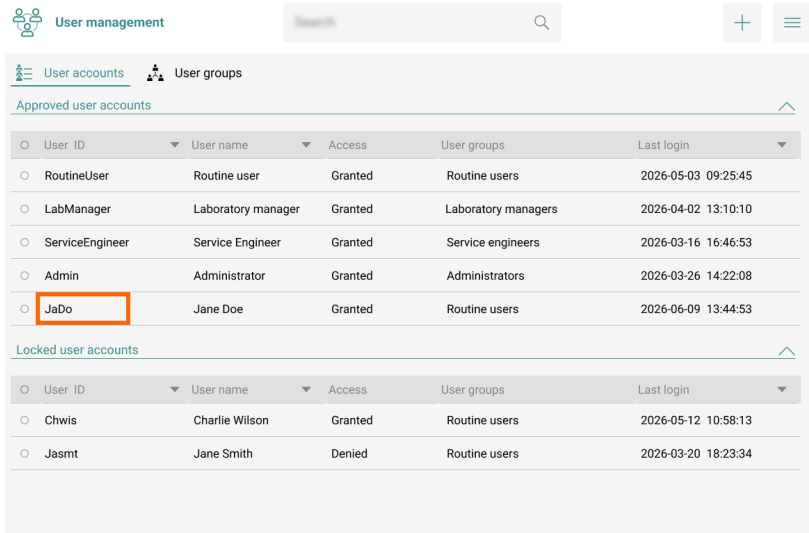
7.2.1.4 Renaming a user account

Prerequisite:

- The license **User management** was activated for the use of extended user management.
- The logged on user has the necessary user group rights ([Additional information](#)).

1 Opening user properties

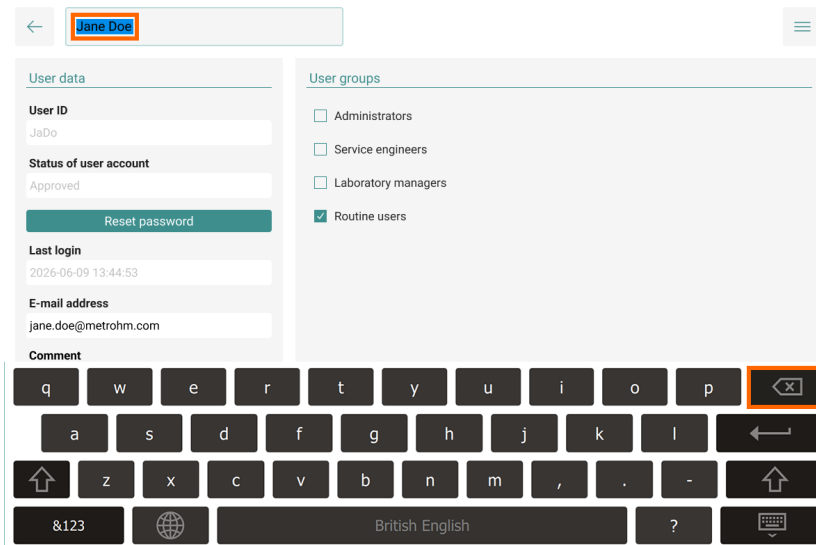
Tap the **User ID** of the desired user account under **User management** ► **User accounts**.



The User properties section opens (*Additional information*).

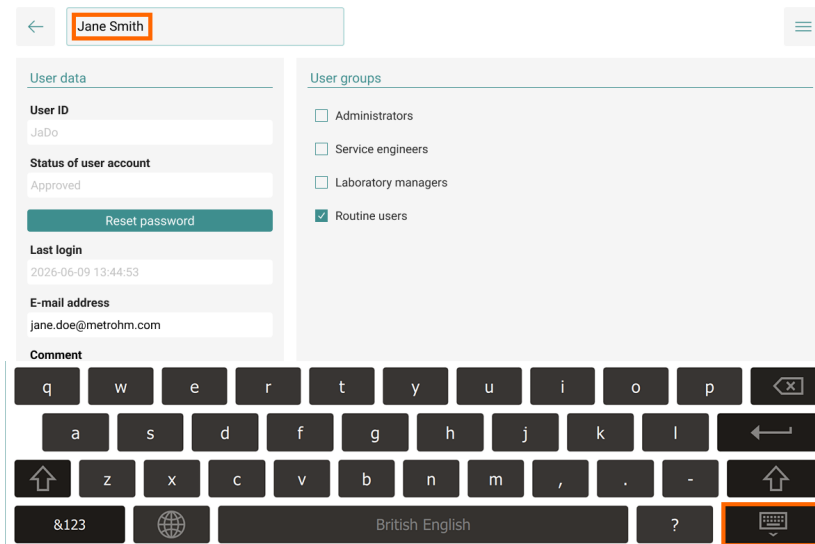
2 Deleting an old user name

In the title bar, tap on the user name and delete it with .



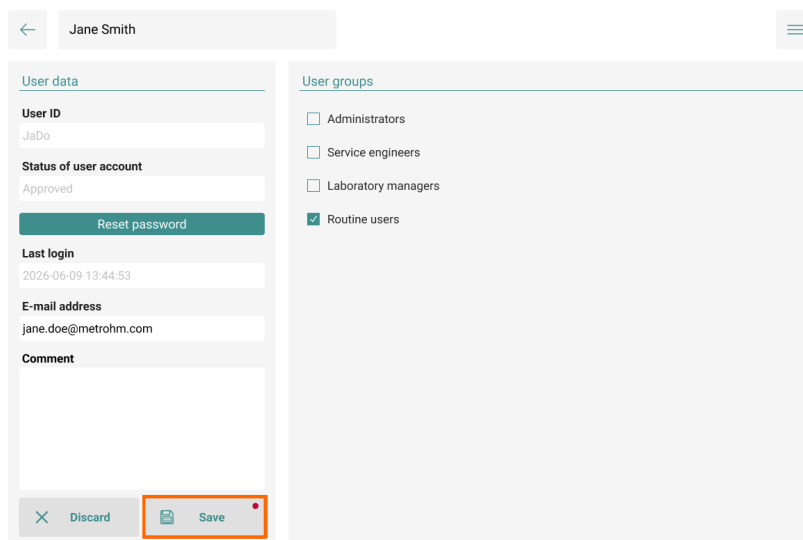
3 Entering a new user name

Enter the desired name for the user account and close the keyboard.



4 Saving a user account

Tap **[Save]** to save the user name.



 Tap **[Discard]** to discard all changes.

7.2.1.5 Logging in a user account

If the toggle switch next to **User ID** or the toggle switch next to **ERES compliance** has been activated under **Settings ► Security ► Login and compliance**, then the user must log into the system in order to use the IONIC app (*Additional information*).

- *First-time login*
- *User account login*

If the restricted user management is used ([Additional information](#)), then the user can log in to the IONIC app using the login data from one of the predefined user accounts.

If the extended user management is used ([Additional information](#)), then the user will receive a start password from the administrator for the first-time login. After the first-time login, the user can log in to the IONIC app as usual.

- If the **User account locking** is activated under **Settings ► Security ► Authentication**, then the user account will be locked as soon as the defined maximum number of failed attempts permitted is exceeded during login ([Additional information](#)).
- If the **Audit Trail** is activated under **Settings ► Security ► Electronic records**, then all login attempts will be recorded and listed in the Audit Trail of the IONIC app ([Additional information](#)).

First-time login

Prerequisite:

- The toggle switches next to **User ID** and **Password** are activated or the toggle switch next to **ERES compliance** is activated under **Settings ► Security ► Login and compliance** ([Additional information](#)).
- The administrator has created the user account and set a start password ([Additional information](#)).
- The user has not yet logged on to the IONIC app with the user account data.

- If the toggle switch next to **User ID** is activated and the toggle switch next to **Password** is deactivated under **Settings ► Security ► Login and compliance**, then the user can log in to the IONIC app without setting a new password and with only the input of the **User ID**.

1 Authenticating a user account

- In the **Login** dialog, tap the input field under **User ID** and enter the user ID of the user account.
- Tap the input field under **Password** and enter the start password of the user account.

2 Confirming a login

Tap **[Continue]** and confirm the login data.

3 Defining a new password

- In the **Defining a new password** dialog, tap the input field under **New password** and enter a new, individual password for the user account in accordance with the password requirements.
- Tap the input field under **Confirm password** and repeat the newly set password.

The password requirements are defined under **Settings** ► **Security** ► **Password policy** (*Additional information*).



Securely document and store the assigned password securely (e.g., in a password manager or in another protected memory location).

4 Confirming a password

Tap **[Save]** and set the new password.

The user account is logged on and the user can see the areas and execute the functions in the IONIC app that have been defined in the user group rights for the user account (*Additional information*).

Logging in a user account

Prerequisite:

- The user account is permitted and the user has already logged in to the IONIC app with the user account data.

1 Authenticating a user account

- In the **Login** dialog, tap the input field under **User ID** and enter the user ID of the user account.
- Tap the input field under **Password** and enter the password of the user account.



The input field under **Password** is available only if the toggle switch next to **Password** or the toggle switch next to **ERES compliance** has been activated under **Settings ► Security ► Login and compliance** (*Additional information*).

2 Confirming a login

Tap **[Continue]** and confirm the login data.

The user account is logged on and the user can see the areas in the IONIC app and execute the functions that have been defined in the user group rights (*[Additional information](#)*).

7.2.2 User properties – Overview

To open the User properties section, tap the **User ID** of a user account under **User management** ► **User accounts**.

- *Definition*
- *Overview*
- *Icons*

Definition

User data can be redefined or adjusted in the user properties. In addition, any number of user groups can be assigned to each user account.

 Only users with the necessary user group rights can edit the user properties (*Additional information*). Users who are allowed to create and edit user accounts are referred to as administrators.

Overview

The following information is displayed in the User properties section:

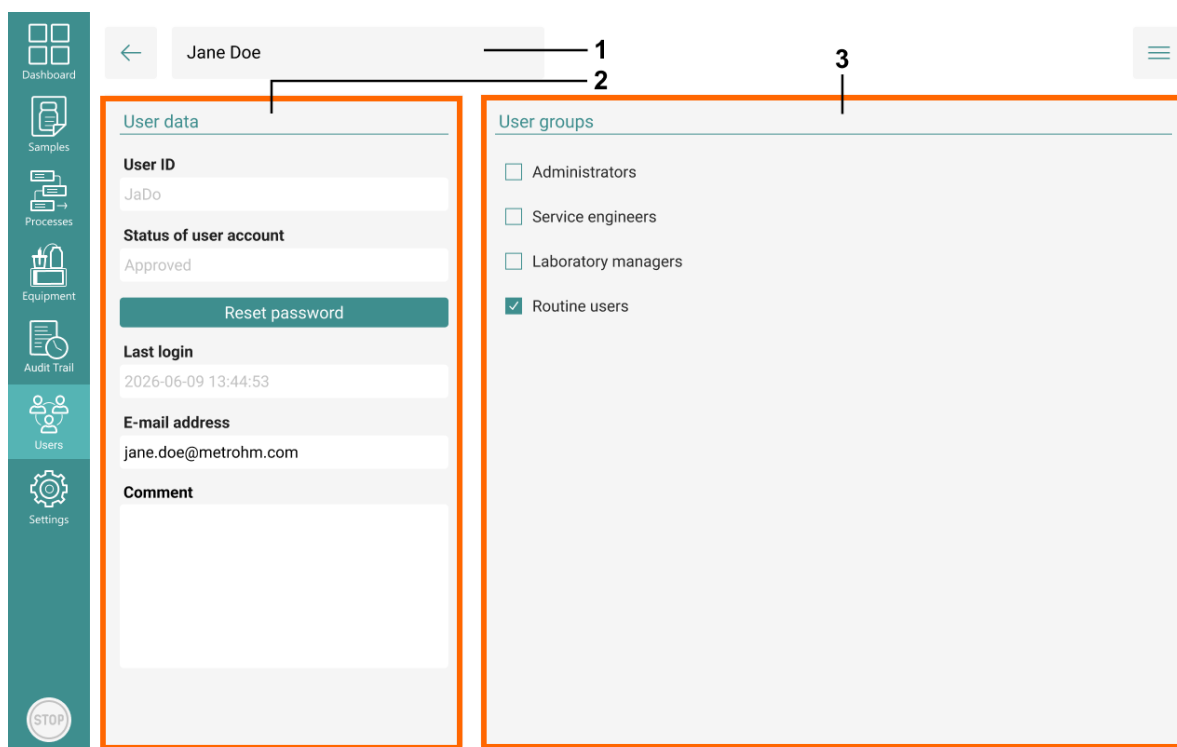


Figure 21 User properties example

1 User name

Name of the user with a maximum character length of 32 characters.

2 User data

Additional information

3 User groups

Additional information

User data

User ID

System-wide unambiguous designation for the user account (e.g., abbreviation or personnel number).

The user ID must be defined when creating a new user account. The user ID may be assigned only once system-wide and cannot be modified after it has been saved. The user ID is required for logging into the IONIC app.

Status	The status indicates whether a user account is allowed or locked (<i>Additional information</i>). ▪ Approved: The user account is displayed in the overview list under Approved user accounts. ▪ Locked: The user account is displayed in the overview list under Locked user accounts. For a newly created user account, the status is by definition Approved. The status cannot be edited.
Password (only for new user accounts)	For newly created user accounts, the administrator must define a start password according to the specifications defined under Settings ► Security ► Password policy. The user must change the start password at the time of the first-time login (<i>Additional information</i>).
Reset password (only for existing user accounts with Approved status)	A new password can be forced by tapping on [Reset password] by the administrator defining a new start password (<i>Additional information</i>). The function is available only for existing user accounts that have been granted access by the administrator and which have logged onto the system with the correct access data within the maximum number of login attempts.
Reauthenticate user account (only for existing user accounts with Locked status and Granted access)	Tapping on [Reauthenticate user account] enables the locked user account to be reauthenticated by defining a new start password (<i>Additional information</i>). The function is available only for existing user accounts that have been granted access by the administrator and which have exceeded the maximum permitted number of failed attempts at login by entering incorrect access data.
Reactivate user account (only for existing user accounts with Locked status and Denied access)	Tapping on [Reactivate user account] enables the locked user account to be regranted access and a new start password can be defined (<i>Additional information</i>). The function is available only for existing user accounts that have been deactivated by the administrator.
Last login (only for existing user accounts)	Date and time of the last login of the user account in the IONIC app.
E-mail address	E-mail address of the user.

Comment

Optional comment on the user account with a maximum length of 250 characters.

 Passwords can be defined only if the **User ID** and the check box next to **Password** are activated under **Settings ► Security ► Login and compliance** (*Additional information*).

User groups

At least one user group must be assigned to each user account that was either predefined or created in the **User groups** subsection (*Additional information*).

Icons

 The following icons are present in the user properties. Icons that affect the entire user interface can be found [here](#).

Icon	Function
	Display the password.
	Hide the password.

7.2.2.1 Reset password

 Resetting the password is necessary only if this has been requested by a user (e.g., in cases of forgotten passwords).

NOTICE

Loss of database

Metrohm AG has no access to the database and **cannot** export and restore the database if the administrator password is lost.

- At least one additional user account with administrator user group rights should be created when using the extended user management. If an administrator has forgotten his or her password, then another administrator will thus have access to the system and can reset the password.
- Document and store all assigned passwords securely (e.g., in a password manager or in another protected memory location).

Prerequisite:

- The **User ID** and the check box next to **Password** are activated under **Settings ► Security ► Login and compliance** (*Additional information*).

- ## 1 Opening user properties

**User management**



 **User accounts**

 **User groups**

Approved user accounts

User ID	User name	Access	User groups	Last login
 RoutineUser	Routine user	Granted	Routine users	2026-05-03 09:25:45
 LabManager	Laboratory manager	Granted	Laboratory managers	2026-04-02 13:10:10
 ServiceEngineer	Service Engineer	Granted	Service engineers	2026-03-16 16:46:53
 Admin	Administrator	Granted	Administrators	2026-03-26 14:22:08
 JaDo	Jane Doe	Granted	Routine users	2026-06-09 13:44:53

Locked user accounts

User ID	User name	Access	User groups	Last login
 Chwis	Charlie Wilson	Granted	Routine users	2026-05-12 10:58:13
 Jasmnt	Jane Smith	Denied	Routine users	2026-03-20 18:23:34

2 Resetting a password

←

Jane Doe

User data

User ID

JaDo

Status of user account

Approved

Reset password

Last login

2026-06-09 13:44:53

E-mail address

jane.doe@metrohm.com

Comment

User groups

☐ Administrators

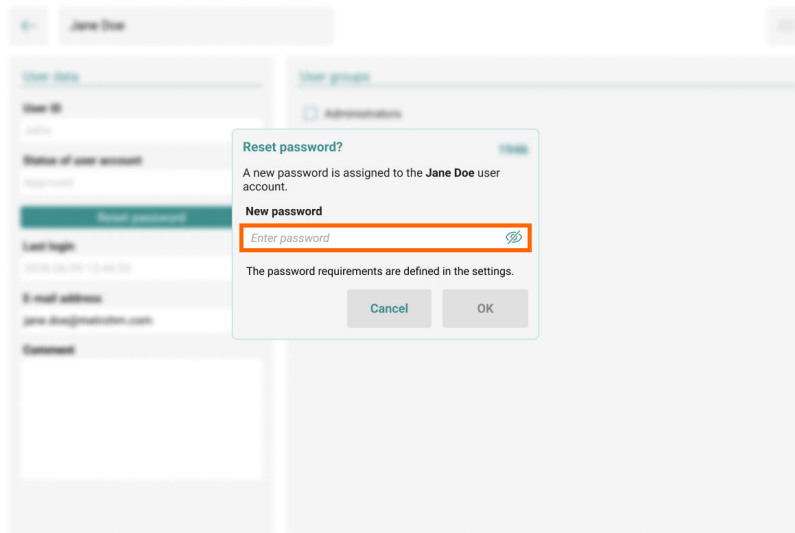
☐ Service engineers

☐ Laboratory managers

☒ Routine users

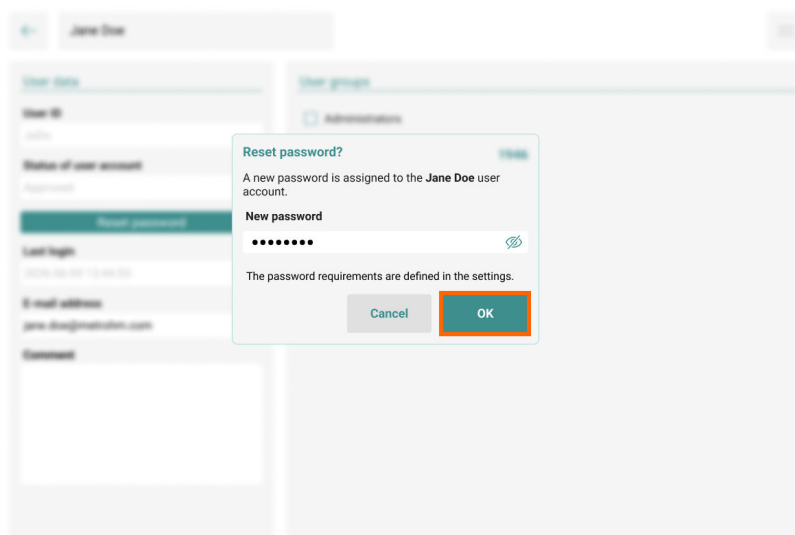
3 Entering a new password

Tap the input field under **New password** and define a new password in accordance with the password requirements. The password requirements are defined under **Settings ► Security ► Password policy** (*Additional information*).



4 Confirming a new password

Confirm the new password with **[OK]**.



All changes are saved automatically.

As soon as the affected user logs into the IONIC app with the newly set start password, that user will be requested to define a new, individual password (*Additional information*).

Prerequisite:

- ## 1 Opening user properties

User management

Search

+

≡

≡

User accounts

≡

User groups

Approved user accounts

User ID	User name	Access	User groups	Last login
☐ RoutineUser	Routine user	Granted	Routine users	2026-05-03 09:25:45
☐ LabManager	Laboratory manager	Granted	Laboratory managers	2026-04-02 13:10:10
☐ ServiceEngineer	Service Engineer	Granted	Service engineers	2026-03-16 16:46:53
☐ Admin	Administrator	Granted	Administrators	2026-03-26 14:22:08

Locked user accounts

User ID	User name	Access	User groups	Last login
☐ Chwis	Charlie Wilson	Granted	Routine users	2026-05-12 10:58:13
☐ Jasmt	Jane Smith	Denied	Routine users	2026-03-20 18:23:34
☐ JaDo	Jane Doe	Granted	Routine users	2026-06-09 13:44:53

2 Reauthenticating a user account

587

←

Jane Doe

User data

User ID

JaDo

Status of user account

Locked

Reauthenticate user account

Last login

2026-06-09 13:44:53

E-mail address

jane.doe@metrohm.com

Comment

User groups

☐ Administrators

☐ Service engineers

☐ Laboratory managers

☒ Routine users

3 Entering a new password

Tap the input field under **New password** and define a new password in accordance with the password requirements. The password requirements are defined under **SettingsSecurity ► Password policy** (*Additional information*).

A screenshot of a user management interface. In the background, a user profile for 'Jane Doe' is visible, showing fields for 'User status', 'User ID', 'Status of user account', 'Last login', 'E-mail address', and 'Comment'. A modal dialog is overlaid on the profile, titled 'Reauthenticate user account?' with a 'YES/NO' toggle. The dialog contains the text 'The password of the Jane Doe user account is reset.' followed by a section 'New password' with a text input field containing 'Enter password' and a password strength icon. Below the input field, it says 'The password requirements are defined in the settings.' At the bottom of the modal are 'Cancel' and 'OK' buttons.

4 Confirming a new password

Confirm the new password with **[OK]**.

All changes are saved automatically. The user account is displayed in the overview list under **Approved user accounts** and receives the **Granted** status under **Access**.

As soon as the affected user logs into the IONIC app with the newly set start password, that user will be requested to define a new, individual password (*Additional information*).

7.2.2.3 Reactivate user account

Prerequisite:

- The **User ID** and the check box next to **Password** are activated under **Settings ► Security ► Login and compliance** (*Additional information*).
- The user has the necessary user group rights (*Additional information*).

- The user account to be reactivated has been deactivated by the administrator.

1 Opening user properties

Tap the **User ID** of the desired user account under **User management** ► **User accounts** ► **Locked user accounts**.

 User management

User accounts					
Approved user accounts					
User ID	User name	Access	User groups	Last login	
☐ RoutineUser	Routine user	Granted	Routine users	2026-05-03 09:25:45	
☐ LabManager	Laboratory manager	Granted	Laboratory managers	2026-04-02 13:10:10	
☐ ServiceEngineer	Service Engineer	Granted	Service engineers	2026-03-16 16:46:53	
☐ Admin	Administrator	Granted	Administrators	2026-03-26 14:22:08	
Locked user accounts					
User ID	User name	Access	User groups	Last login	
☐ Chwis	Charlie Wilson	Granted	Routine users	2026-05-12 10:58:13	
☐ Jasmt	Jane Smith	Denied	Routine users	2026-03-20 18:23:34	
☐ JaDo	Jane Doe	Denied	Routine users	2026-06-09 13:44:53	

The User properties section opens (*Additional information*).

2 Reactivating a user account

Tap **[Reactivate user account]**.

←

Jane Doe

User data

User ID

JaDo

Status of user account

Locked

Reactivate user account

Last login

2026-06-09 13:44:53

E-mail address

jane.doe@metrohm.com

Comment

User groups

☐ Administrators

☐ Service engineers

☐ Laboratory managers

☒ Routine users

3

tingsSecurity ► **Password policy** (*Additional information*).

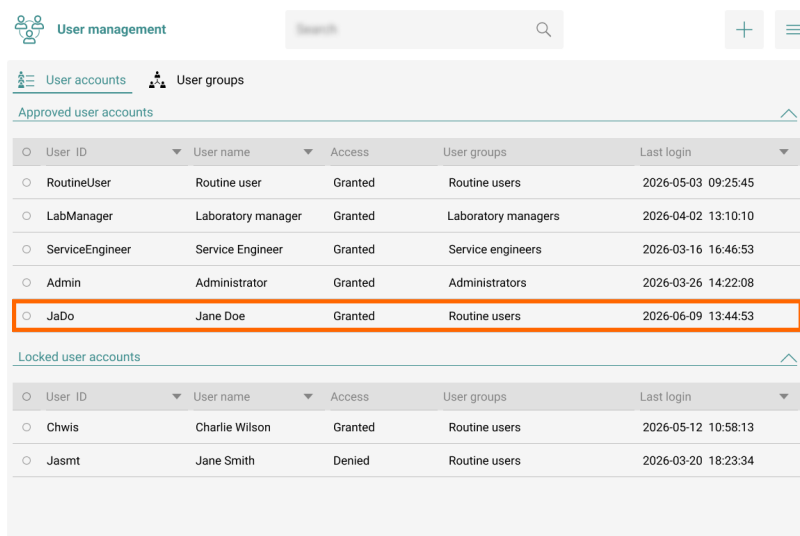
The screenshot shows a user management interface with a modal dialog box titled "Reactivate user account?". The dialog contains the following text: "Access is restored and the user account **Jane Doe** is reactivated.", "New password", "Enter password" (with a red border around the input field and a strength indicator icon), and "The password requirements are defined in the settings." At the bottom are "Cancel" and "OK" buttons. The background shows a sidebar with a "Users" tab and a list of users, including Jane Doe.

4

Confirm the new password with **[OK]**.

The screenshot shows a user management interface with a modal dialog box titled "Reactivate user account?". The dialog contains the text "Access is restored and the user account Jane Doe is reactivated." Below this is a section for "New password" with a masked password field (dots) and a strength indicator (a green checkmark icon). At the bottom of the dialog are two buttons: "Cancel" and "OK". The "OK" button is highlighted with a red rectangle. In the background, a user profile for "Jane Doe" is visible, showing fields for "User data", "User group" (Administrators), "Status of user account" (locked), "Last login" (2020-08-07 12:44:52), "E-mail address" (jane.doe@example.com), and "Comment".

All changes are saved automatically. The user account is displayed in the overview list under **Approved user accounts** and receives the **Granted** status under **Access**.



The screenshot shows the 'User management' interface. It has a search bar and a menu icon. Below the header, there are two tabs: 'User accounts' and 'User groups'. The 'User accounts' tab is active, showing a table of 'Approved user accounts'. The table has columns: User ID, User name, Access, User groups, and Last login. The user 'JaDo' is highlighted with a red border. Below this table, there is a section for 'Locked user accounts' with a table showing users 'Chwis' and 'Jasmt'.

User ID	User name	Access	User groups	Last login
RoutineUser	Routine user	Granted	Routine users	2026-05-03 09:25:45
LabManager	Laboratory manager	Granted	Laboratory managers	2026-04-02 13:10:10
ServiceEngineer	Service Engineer	Granted	Service engineers	2026-03-16 16:46:53
Admin	Administrator	Granted	Administrators	2026-03-26 14:22:08
JaDo	Jane Doe	Granted	Routine users	2026-06-09 13:44:53

User ID	User name	Access	User groups	Last login
Chwis	Charlie Wilson	Granted	Routine users	2026-05-12 10:58:13
Jasmt	Jane Smith	Denied	Routine users	2026-03-20 18:23:34

As soon as the affected user logs into the IONIC app with the newly set start password, that user will be requested to define a new, individual password ([Additional information](#)).

7.3 User groups – Subsection

Tap **User groups** to open the **User groups** subsection in the **User management** work area.

Limited user management: The predefined **Administrators**, **Laboratory managers**, **Routine users**, and **Service engineers** user groups are visible in the **User groups** subsection and cannot be edited.

The limited user management is available without a license ([Additional information](#)).

Extended user management: User groups can be created and the user group properties can be edited in the **User groups** subsection.

Extended user management is available only with the **User management** license ([Additional information](#)).

- [User directory](#)
- [User groups – Overview](#)
- [User group properties – Overview](#)
- [User group rights – Directory](#)

7.3.1 User groups – Overview

- [Definition](#)
- [Overview list](#)
- [Functions](#)

Definition

A user group is an organizational unit in which one or more user accounts can be grouped. This grouping is used for a hierarchical organization in which the properties of the user groups and thus the assigned user group rights are inherited by the assigned user accounts (*Additional information*).

The **Administrators**, **Laboratory managers**, **Routine users**, and **Service engineers** user groups are predefined in the **User groups** subsection (*Additional information*).

Overview list

All user groups are displayed in an overview list in the **User groups** subsection. The following information is displayed in the overview list:

User management

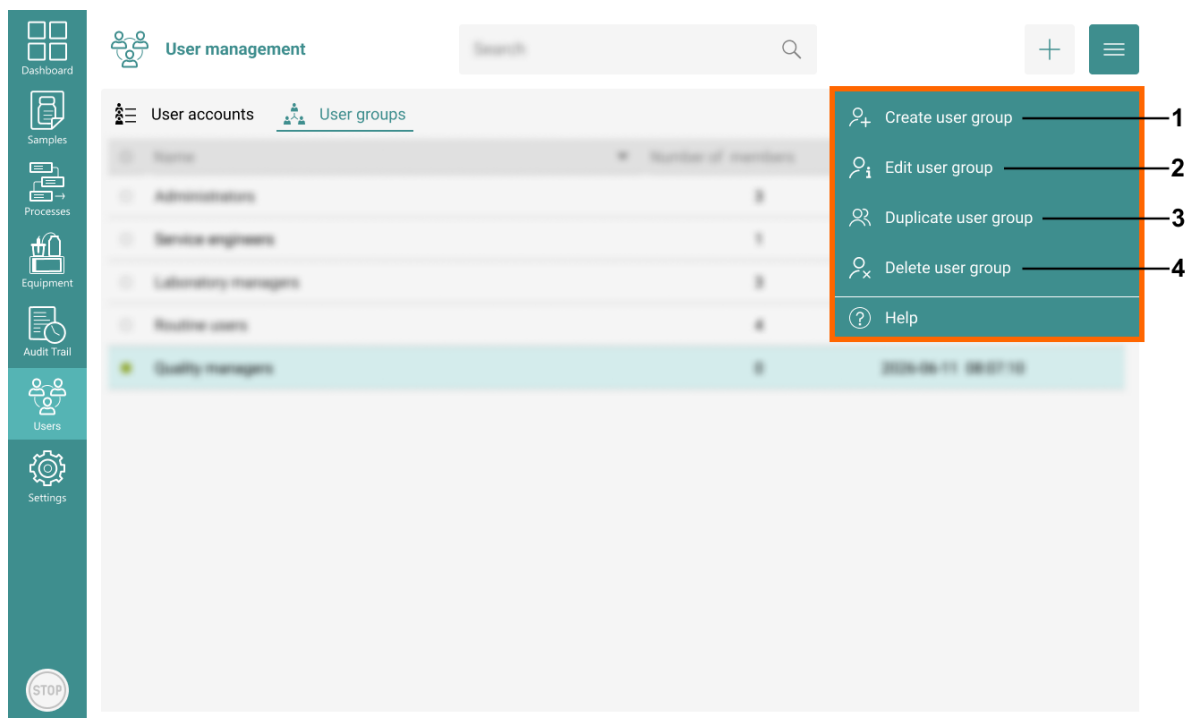
+
≡

User accounts	User groups
○ Name — 1	
○ Administrators	Number of members: 3 Creation date: 2026-03-26 14:22:38
○ Service engineers	Number of members: 1 Creation date: 2026-03-26 14:52:03
○ Laboratory managers	Number of members: 3 Creation date: 2026-03-26 14:35:04
○ Routine users	Number of members: 4 Creation date: 2026-03-26 14:46:14
○ Quality managers	Number of members: 0 Creation date: 2026-06-11 08:07:10

- | | |
|--|---|
| 1 Name
Name of user group. | 2 Number of members
Number of user accounts that are members of the user group. |
| 3 Date of creation
Date and time the user group was created. | |

Functions

Tap on  to open a menu with the following functions:



1 Create user group

A new user group is created and the user group properties can be configured.

[Additional information](#)

2 Edit user group

The properties of the selected user group are opened and can be edited. Predefined user groups cannot be edited.

[Additional information](#)

3 Duplicate user group

The new user group is displayed in the overview list under the same name as the selected user group with the addition **Copy of**.

[Additional information](#)

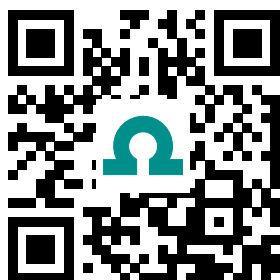
4 Delete user group

The selected user group is deleted. Predefined user groups cannot be deleted.

[Additional information](#)

7.3.1.1 Create user group

Video tutorial for creating user groups:



Prerequisite:

- The license **User management** was activated for the use of extended user management.

71 11

100

←

Enter user group name

User group data

Comment

User group rights

☐ Samples

☐ Dashboard

☐ Processes

☐ Equipment

☐ User management

☐ Audit Trail

☐ Settings

3 Entering a comment (optional)

Tap the input field under **Comment** and enter a comment.

←

Quality managers

User group data

Comment

User group rights

☐ Samples

☐ Dashboard

☐ Processes

☐ Equipment

☐ User management

☐ Audit Trail

☐ Settings

✕

Discard

💾

Save

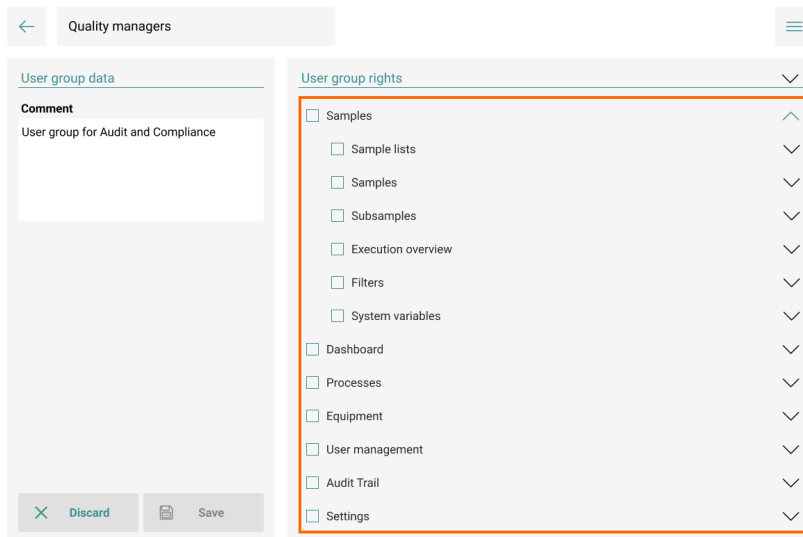
4 Displaying user group rights

Tap  next to the desired user group right to display the associated user group rights.

As an alternative, tap next to **User group rights** to display all user group rights.

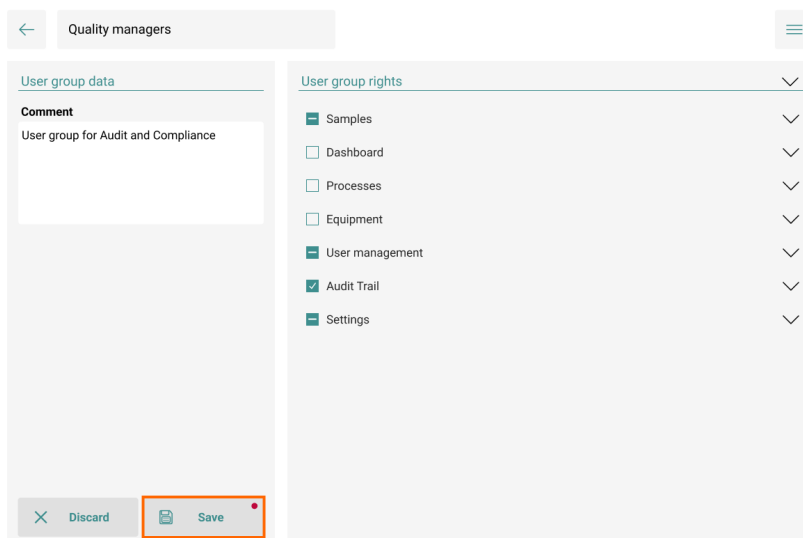
5 Assigning user group rights

5



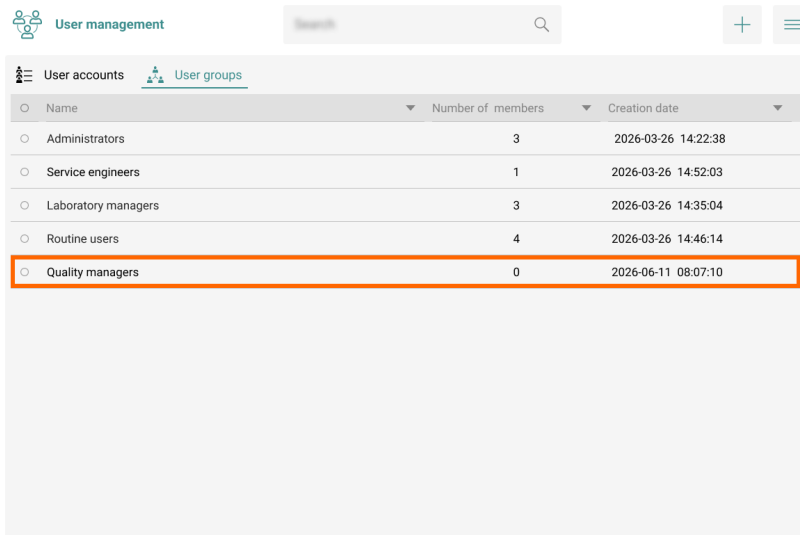
6 Saving a user group

Tap **[Save]** to save the inputs.



 Tap **[Discard]** to discard all changes.

The user group is created and appears in the overview list.



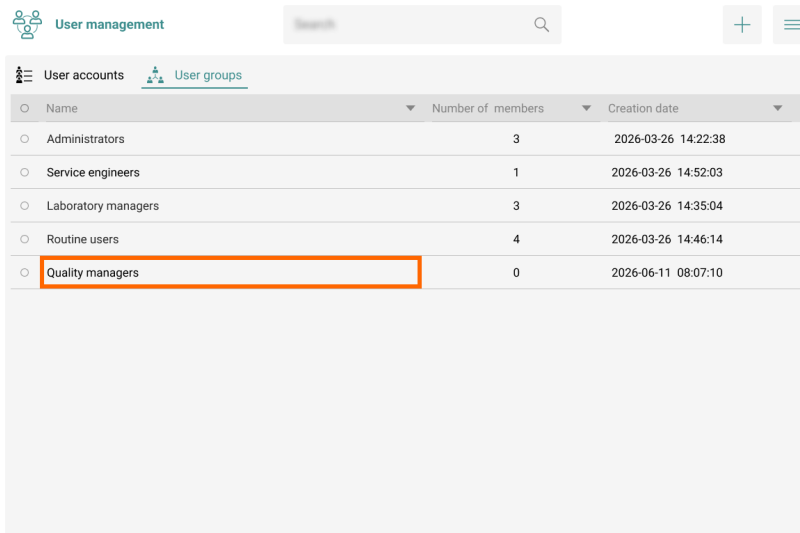
7.3.1.2 Edit user group

Prerequisite:

- The license **User management** was activated for the use of extended user management.
- The logged on user has the necessary user group rights (*Additional information*).

1 Opening user group properties

Tap the name of the desired user group under **User management** ► **User groups**.



The User group properties section opens (*Additional information*).

2 Editing user group properties

Edit the user group as desired.

 Predefined user groups cannot be edited.

←

Quality managers

User group data

Number of members

0

Creation date

2026-06-11 08:07:10

Comment

User group for Audit and Compliance

User group rights

☒

Samples

☐

Dashboard

☐

Processes

☒

Equipment

☒

User management

☒

Audit Trail

☒

Settings

3 Saving a user group

Tap **[Save]** to save the changes.

←

Quality managers

User group data

Number of members

0

Creation date

2026-06-11 08:07:10

Comment

User group for Audit and Compliance

✕

Discard

 Save

☰

User group rights

☒ Samples

☐ Dashboard

☒ Processes

☒ Equipment

☒ User management

☒ Audit Trail

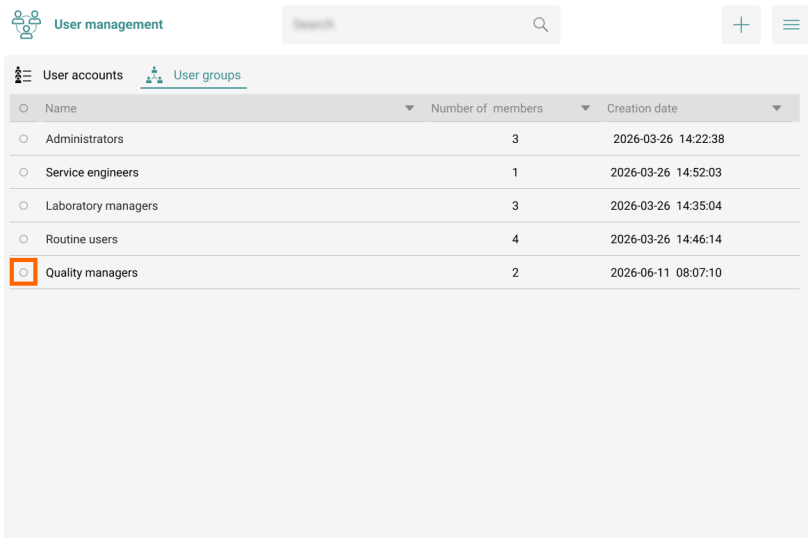
☒ Settings

 Tap **[Discard]** to discard all changes.

Prerequisite:

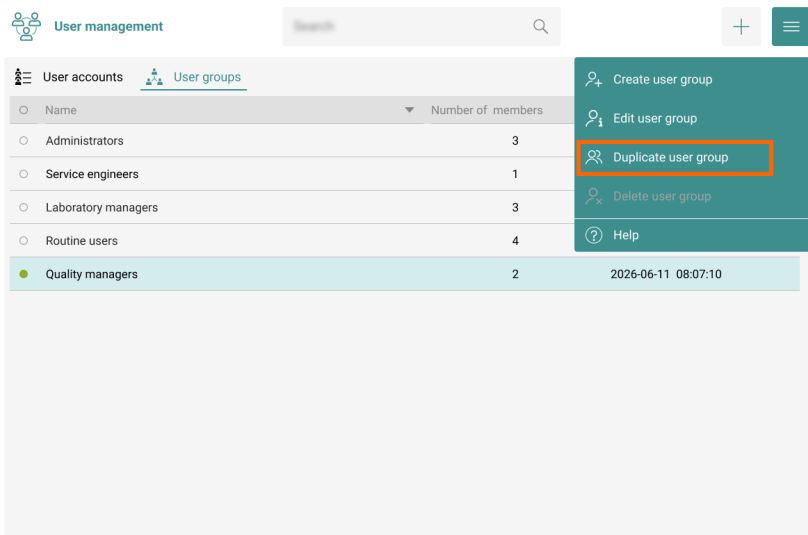
- ## 1 Selecting a user group

Select the desired user group by tapping on 



2 Duplicating a user group

Tap  in the title bar and select **Duplicate user group**.



The duplicated user group is displayed in the overview list under the same name with the addition **Copy of**.


User management


User accounts


User groups

☐	Name	Number of members	Creation date
☐	Administrators	3	2026-03-26 14:22:38
☐	Service engineers	1	2026-03-26 14:52:03
☐	Laboratory managers	3	2026-03-26 14:35:04
☐	Routine users	4	2026-03-26 14:46:14
☒	Quality managers	2	2026-06-11 08:07:10
☐	Quality managers (1)	0	2026-06-11 08:07:10

 The duplicated user group has the same user group rights as the original user group. The members of the original user group are **not** automatically assigned to the duplicated user group.

7.3.1.4 Delete user group

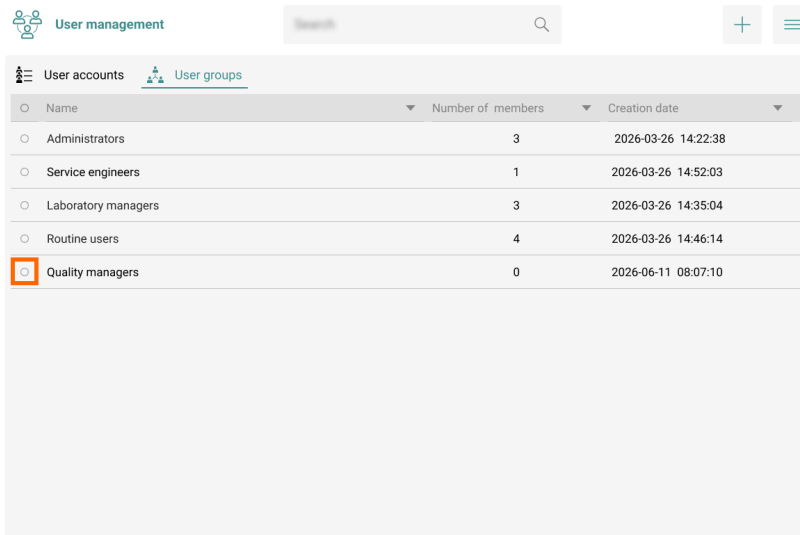
 Predefined user groups cannot be deleted. At least one user account must be a member in the **Administrators** user group. Therefore, this user group cannot be deleted.

Prerequisite:

- The license **User management** was activated for the use of extended user management.
- The logged on user has the necessary user group rights (*Additional information*).
- No user account is a member of the user group to be deleted.

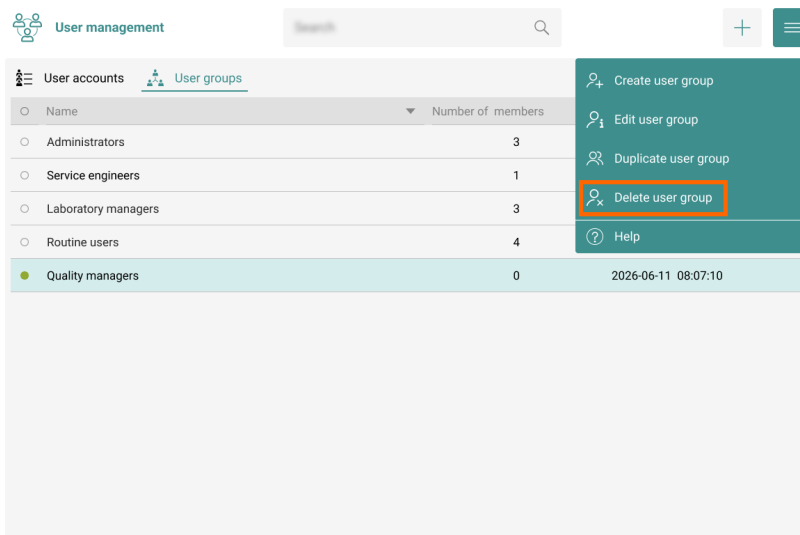
1 Selecting a user group

Select the desired user group by tapping on  under **User management ► User groups**.



2

Tap in the title bar and select **Delete user group**.



The user group is deleted and removed from the overview list.

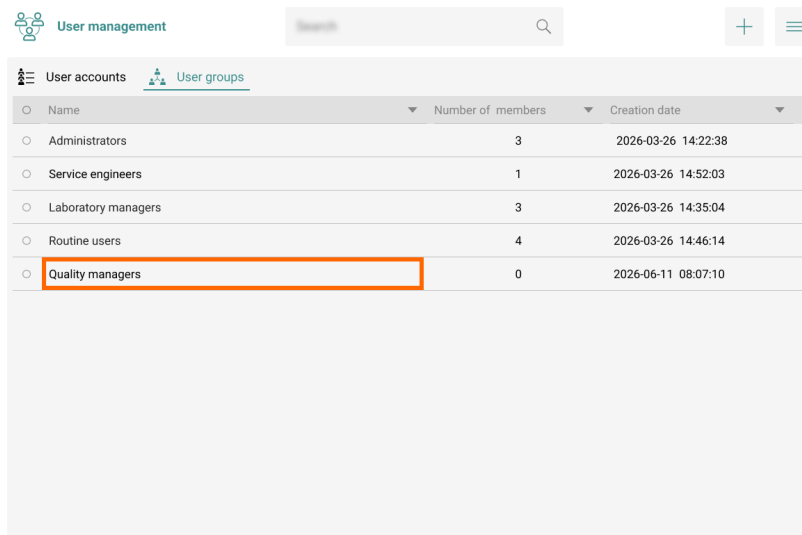
7.3.1.5 Renaming a user group

Prerequisite:

- The license **User management** was activated for the use of extended user management.
- The user has the necessary user group rights (*Additional information*).

1

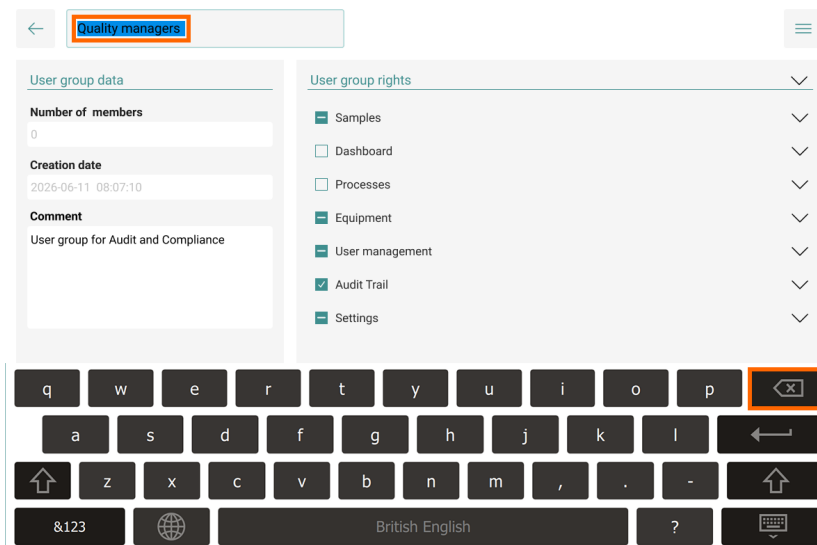
Tap the name of the desired user group under **User management** ► **User groups**.



The User group properties section opens (*Additional information*).

2 Deleting an old user group name

In the title bar, tap on the user group name and delete it with .



3 Entering a new user group name

Enter the desired name for the user group and close the keyboard.



4

Tap **[Save]** to save the user group name.



7.3.2 User group properties – Overview

To open the User group properties section, tap the user group name under **User management** ► **User groups**.

- *Definition*
- *Overview*
- *Icons*

Number of members (only for existing user groups)	Number of user accounts that belong to the user group. User accounts with both the Approved status and the Locked status are included in the count.
Creation date (only for existing user groups)	Date and time the user group was created.
Comment	Optional comment on the user group. The maximum comment length is 250 characters.

User group rights

Different user group rights can be assigned to the user group (*Additional information*).

Unless at least one user group right is assigned, the user has no rights to work in the IONIC app.

Icons

 The following icons are present in the user group properties. Icons that affect the entire user interface can be found [here](#).

Icon	Meaning
	The user group right is deactivated.
	The user group right is activated. All subordinate user group rights are enabled.
	At least one subordinate user group right is activated. Appears only if all of the subordinate user group rights are not activated. Displayed only for higher-level user group rights.

7.3.2.1 User group rights – Directory

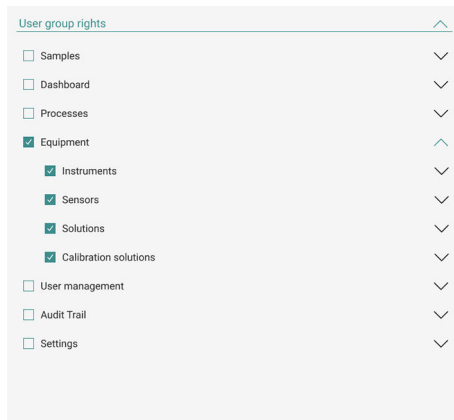
- *Definition*
- *Overview*

Definition

User group rights can be assigned to user groups in the user group properties. User group rights influence what logged-in users can see and edit in the IONIC app. The selected user group rights are valid for all user accounts to which the user group is assigned. A user account can be a member of multiple user groups.

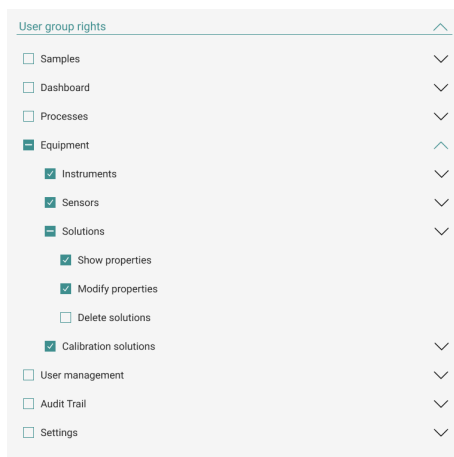
Tap  to activate or deactivate the user group right.

- All subordinate user group rights will be automatically activated as soon as a higher-level user group right is activated by tapping . The check box of the higher user group rights changes to .



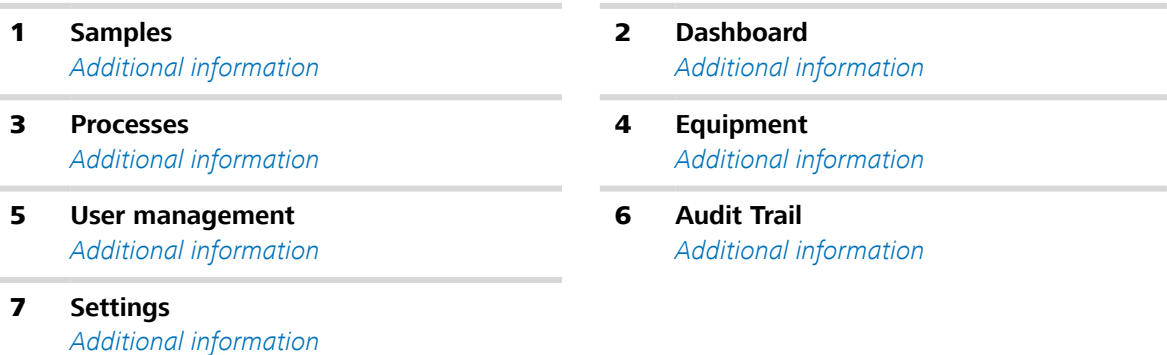
- As soon as at least one subordinate user group right is activated by tapping , the higher-level user group rights will also be automatically activated.

The check box of the higher-level user group rights changes to  if at least one subordinate user group right is deactivated.



- Certain user group rights can be used only if the corresponding work area is visible or if a higher-level user group right is also activated. User group rights that are dependent on one another are activated automatically.
- Certain user group rights are available only with additional licenses.
- Changed user group rights do not take effect until after a restart of the IONIC app.

The following information is displayed in the User group rights section:



The **Samples** user group right grants access to the **Samples** work area (*Additional information*).

- **Sample lists** section ([Additional information](#)): Provides access to functions that relate to sample lists ([Additional information](#)).
- **Samples** section ([Additional information](#)): Provides access to functions that affect samples ([Additional information](#)).

- **Subsamples** section ([Additional information](#)): Provides access to functions that relate to subsamples ([Additional information](#)).
- **Execution overview** section ([Additional information](#)): Provides access to functions in the **Execution overview** section ([Additional information](#)).
- **Filters** subsection ([Additional information](#)): Provides access to the **Filters** subsection ([Additional information](#)).
- **System variables** subsection ([Additional information](#)): Provides access to the **System variables** subsection ([Additional information](#)).

 If the higher-level **Samples** user group right is activated, then all subordinate user group rights will also be activated and the user account will have access to all functions in the **Samples** work area.

Sample lists	
User group right	Description
Display sample lists	Open and display sample lists.
Manage sample lists	▪ Create sample lists. ▪ Open and edit sample lists. ▪ Rename sample lists. ▪ Duplicate sample lists. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists
Delete sample lists	▪ Delete the sample lists with all the samples and subsamples contained therein. ▪ Delete selected samples and subsamples from a sample list. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists ▪ Display samples ▪ Delete samples/subsamples

Samples	
User group right	Description
Display samples	Open and display samples. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists

Samples	
User group right	Description
Manage samples	▪ Add samples to a sample list. ▪ Open and edit samples. ▪ Rename samples. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists ▪ Display samples
Delete samples/subsamples	Delete selected samples and subsamples from a sample list. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists ▪ Display samples
Import samples	Import samples into the sample list from an external source with the associated subsample data and determination data. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists
Export samples	Export the samples with the associated subsample data and determination data from the sample list as an IONIC sample file (.ios). If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists ▪ Display samples
Upload samples	Upload samples with the associated subsample data and determination data to the Metrohm Data Service. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists ▪ Display samples
Create reports	Generate reports that relate to the sample. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists ▪ Display samples ▪ Display sample overview

Samples	
User group right	Description
Display sample overview	Open and display the sample overview and the determination overview. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists
Modify sample overview	Open and edit the sample overview and the determination overview. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists ▪ Display samples ▪ Display sample overview ▪ Reprocess determinations
Subsamples	
User group right	Description
Manage subsamples	▪ Add subsamples to a sample list. ▪ Edit subsamples that have not yet been determined. ▪ Rename subsamples. ▪ Duplicate subsamples. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists ▪ Display samples
Start determinations with released methods	Start determinations of subsamples to which a released method is assigned.  Released methods are signed at level 2. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists ▪ Display samples ▪ Manage subsamples

Subsamples

User group right

Description

Start determinations with unreleased methods

Start the determinations.



Unreleased methods are not signed at level 2.

If the user group permission is activated, then the following user group rights will also be automatically activated:

- **Display sample lists**
- **Display samples**
- **Manage subsamples**

Start determinations with expired equipment

Start determinations even though the expiry date of objects in the **Equipment** work area that are used in the determination has been exceeded.

If the user group permission is activated, then the following user group rights will also be automatically activated:

- **Display sample lists**
- **Display samples**
- **Manage subsamples**

Skip running command

Tap the **[Skip]** button to skip a running command in the **Live display** work area during a determination.

If the user group permission is activated, then the following user group rights will also be automatically activated:

- **Display sample lists**
- **Display samples**

Reprocess determinations

- Reevaluate curves.
- Recalculate results.
- Modify the subsample data after the analysis. This may lead to the recalculation of results.
- Reprocess variables.

If the user group permission is activated, then the following user group rights will also be automatically activated:

- **Display sample lists**
- **Display samples**
- **Display sample overview**

Subsamples	
User group right	Description
Create reports	Generate reports that relate to the determination. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists ▪ Display samples ▪ Display sample overview
Export determinations	Export determinations with the associated subsample data and determination data from the sample list as a CSV file. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists ▪ Display samples ▪ Export samples ▪ Display sample overview
Sign determinations (only when the User management and Electronic signature licenses are available)	Sign determinations at level 1 and/or at level 2.
Add signatures on level 1 (only when the User management and Electronic signature licenses are available)	Sign determinations at level 1. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists ▪ Display samples ▪ Display sample overview
Add signatures on level 2 (only when the User management and Electronic signature licenses are available)	Sign determinations at level 2. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists ▪ Display samples ▪ Display sample overview

Subsamples	
User group right	Description
Create new versions (only when the User management and Electronic signature licenses are available)	Create a new, unsigned determination version. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display sample lists ▪ Display samples ▪ Display sample overview
Execution overview	
User group right	Description
Activate/deactivate autostart	Activate and deactivate the autostart function for pending determinations.
Arrange pending determinations manually	Manually change the sequence of the pending determinations.
Delete from list of pending determinations	Remove the pending determination from the execution overview queue. This will reset the subsample to the  status.
Filters	
User group right	Description
Display filters	Open and display the predefined filtered lists.
System variables	
User group right	Description
Display system variables	Display system variables.
Manage system variables	Create and edit system variables. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display system variables
Delete system variables	Delete system variables. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display system variables

Methods	
User group right	Description
Display methods	Open and display methods.
Manage methods	▪ Create methods. ▪ Open and edit methods. ▪ Rename methods. ▪ Duplicate methods. ▪ Edit method properties. ▪ Add commands. ▪ Reorder the commands. ▪ Edit command properties. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display methods
Delete methods	Delete methods. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display methods
Export methods	Export methods with the associated method versions as an IONIC method file (.iom). If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display methods
Import methods	Import methods from an external source with the associated method versions.
Restore versions	Restore older method versions as new, current method versions. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display methods

Methods	
User group right	Description
Create reports	Generate reports that relate to the method. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display methods
Upload methods	Upload methods with the associated method versions to the Metrohm Data Service. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display methods
Download methods	Download methods with the associated method versions into the IONIC app from the Metrohm Data Service. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display methods
Display signatures	Display method signatures at level 1 and level 2. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display methods
Sign methods (only when the User management and Electronic signature licenses are available)	Sign methods at level 1 and/or at level 2.
Add signatures on level 1 (only when the User management and Electronic signature licenses are available)	Sign methods at level 1. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display methods

Methods

User group right	Description
Add signatures on level 2 (only when the User management and Electronic signature licenses are available)	Sign methods at level 2. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display methods
Create new versions (only when the User management and Electronic signature licenses are available)	Create a new, unsigned method version. If the user group permission is activated, then the following user group rights will also be automatically activated: ▪ Display methods

Equipment

The **Equipment** user group right grants access to the **Equipment** work area (*Additional information*).

The subordinate user group rights can be assigned on a differentiated basis to manage the following subsections:

- **Instruments** subsection (*Additional information*): Provides access to the **Instruments** subsection (*Additional information*).
- **Sensors** subsection (*Additional information*): Provides access to the **Sensors** subsection (*Additional information*).
- **Solutions** subsection (*Additional information*): Provides access to the **Solutions** subsection (*Additional information*).
- **Calibration solutions** subsection (*Additional information*): Provides access to the **Calibration solutions** subsection (*Additional information*).

 If the **Equipment** user group right is activated, then all subordinate user group rights will also be activated and the user account will have access to all functions in the **Equipment** work area.

Instruments

User group right	Description
Add Serial Devices	Add instruments of the Serial Device type.
Add balances	Add instruments of the Balance (serial) type.

Calibration solutions	
User group right	Description
Show properties	Open and display the properties of calibration solutions.

The **User management** user group right grants access to the **User management** work area (*Additional information*).

- **User accounts** subsection (*Additional information*): Provides access to the **User accounts** subsection (*Additional information*).
- **User groups** subsection (*Additional information*): Provides access to the **User groups** subsection (*Additional information*).



Audit Trail

The **Audit Trail** user group right grants access to the **Audit Trail** work area ([Additional information](#)).

The subordinate user group rights can be assigned on a differentiated basis.

-

User group right	Description
Show Audit Trail	Display Audit Trail entries.
Export Audit Trail	Export Audit Trail entries that match the defined filter criteria as a CSV file.

Settings

The **Settings** user group right grants access to the **Settings** work area ([Additional information](#)).

The subordinate user group rights can be assigned on a differentiated basis to manage the following subsections:

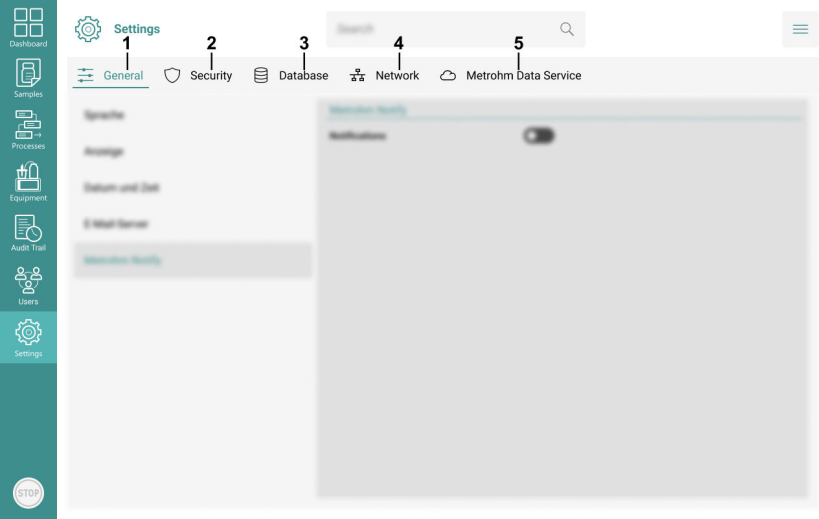
- **General** subsection (*Additional information*): Provides access to the **General** subsection (*Additional information*).
- **Security** subsection (*Additional information*): Provides access to the **Security** subsection and to the ERES compliance (*Additional information*).
- **Database** subsection (*Additional information*): Provides access to the **Database** subsection (*Additional information*).
- **Network** subsection (*Additional information*): Provides access to the **Network** subsection (*Additional information*).
- **Metrohm Data Service** subsection (*Additional information*): Provides access to the **Metrohm Data Service** subsection (*Additional information*).

-

General	
User group rights	Description
Manage language	Set the dialog language of the user interface.
Manage display	▪ Set the background color of the user interface. ▪ Set the brightness of the user interface. ▪ Set the font size of the user interface.
Manage date and time	▪ Define the date and time. ▪ Define the time server. ▪ Set the time zone.

8 Settings – Work area

The **Settings** work area is divided into the following subsections:



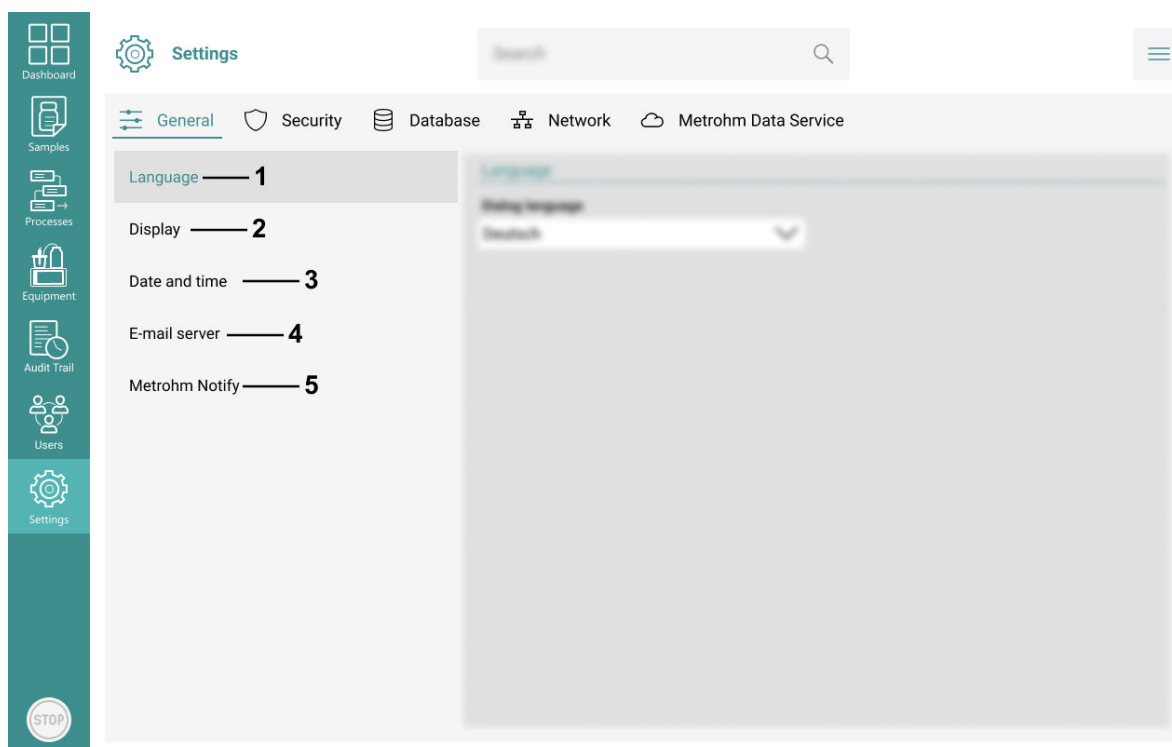
- | | |
|--|--|
| 1 General subsection
Additional information | 2 Security subsection
Additional information |
| 3 Database subsection
Additional information | 4 Network subsection
Additional information |
| 5 Metrohm Data Service subsection
Additional information | |

8.1 General – Subsection

Tap **General** to open the **General** subsection in the **Settings** work area.

Overview

The following sections are available in the **General** subsection:



1 Language

Selection of the language for the user interface.

Additional information

2 Display

Settings for the appearance of the user interface.

Additional information

3 Date and time

Date and time
Settings for the system time and the display of the date and time on the user interface.

Additional information

4 E-mail server

Settings to set up the connection with the e-mail server in order to use the **NOTIFY** command.

Additional information

5 Metrohm Notify

Settings to set up the connection with the Metrohm Notify app.

Additional information

 Changes in the settings are applied only by tapping **[Save]**. Tap **[Discard]** to discard the changes.

Language

The available languages in which the user interface will be displayed can be selected in the **Language** section under **Dialog language**. The name of the language is always displayed in the respective language.

Display

The following settings can be configured in the **Display** section:

Mode	Background color of the user interface. ▪ Dark ▪ Light
Brightness	The brightness of the user interface. ▪ The further the slider is moved to the right, the brighter the user interface will be displayed. ▪ The further the slider is moved to the left, the darker the user interface will be displayed.
Font size	Font size of the texts on the user interface. ▪ The further the slider is moved to the right, the larger the font size that will be displayed on the user interface. ▪ The further the slider is moved to the left, the smaller the font size that will be displayed on the user interface.

Date and time

The following settings can be configured in the **Date and time** section:

Synchronize date and time	 : The date and time are synchronized according to the time server.  : The date and time can be defined manually.
Time server	Server with which the date and the time are synchronized. Default value: 0.ch.pool.ntp.org
Current date and current time	Display of the current date and the current time (only with activated toggle switch under Synchronize date and time). Tap  to select the date and time manually (only with the toggle switch deactivated under Synchronize date and time).
Current time zone	Time zone that was selected manually under Time zones or automatically with the Time server .
Time zones	Table with the available time zones. All time zones from the IANA database along with the associated country and the UTC deviation are displayed in the table. Tap  to select the respective time zone.

E-mail server

The e-mail server can be set up in the **E-mail server** section to be able to use the **NOTIFY** command (*Additional information*). The following settings can be configured:

SMTP server	Host name of the SMTP server that is used for sending e-mails. The host name of the SMTP server may only contain ASCII characters a to z and A to Z, the numbers 0 to 9, and the hyphen-minus.
TCP port	Port of the SMTP server via which the data is transferred. Default value: 25
Sender	E-mail address of the sender under which the e-mail is sent. The e-mail address must have the following format: name@example.com
Test e-mail	Optional setting for sending a test e-mail to test the setup of the e-mail server.
Recipient (only with activated Test e-mail)	E-mail address of the recipient of the test e-mail. The e-mail address must have the following format: name@example.com
Send test e-mail (only with activated Test e-mail)	Tap [Send test e-mail] to send a test e-mail to the e-mail address of the defined recipient.

Metrohm Notify

The IONIC Titrator can be connected to the Metrohm Notify app in the **Metrohm Notify** section ([Additional information](#)). The following settings can be configured:

Notifications	 : All messages of the message types selected under Filtering according to urgency are displayed in the Metrohm Notify app.  : No messages are displayed in the Metrohm Notify app.
Channel ID	Identifier for the connection between the Metrohm Notify app and the IONIC Titrator. The identifier is visible under notify.metrohm.com or can be newly created there (Additional information).

Filtering according to urgency

Selection of the message types that are to be displayed in the Metrohm Notify app.

- **Starting with information:** All messages of the Error, Question, Warning, and Information message types are displayed in the Metrohm Notify app.
- **Starting with warning:** All messages of the Error, Question, and Warning message types are displayed in the Metrohm Notify app.
- **Starting with question:** All messages of the Error and Question message types are displayed in the Metrohm Notify app.
- **Starting with error:** All messages of the Error message type are displayed in the Metrohm Notify app.

8.1.1 Setting up Metrohm Notify

In order to connect the Metrohm Notify app to the IONIC Titrator, you must first create a channel ID using your myMetrohm user account.

- [Creating myMetrohm user account](#)
- [Creating a channel ID](#)
- [Setting up Metrohm Notify](#)

Creating a myMetrohm user account

1 Creating a user account

Tap **[Create Account]** under login.metrohm.com.

2 Completing registration

Follow the instructions and complete the registration.

Creating a channel ID

Prerequisite:

- The user has a myMetrohm user account.

1 Login

Log in under notify.metrohm.com.

2 Creating a channel (owner only)

Create and name a new channel under the **Channels** tab.

3 Adding a user (owner only)

- Enter the e-mail address of the desired user under the **User** tab.

- Assign the desired user role to the user:
 - **Owner:** The user has full rights for managing the channels, users, and use of the Metrohm Notify app.
 - **User:** The user has the rights to use the Metrohm Notify app.

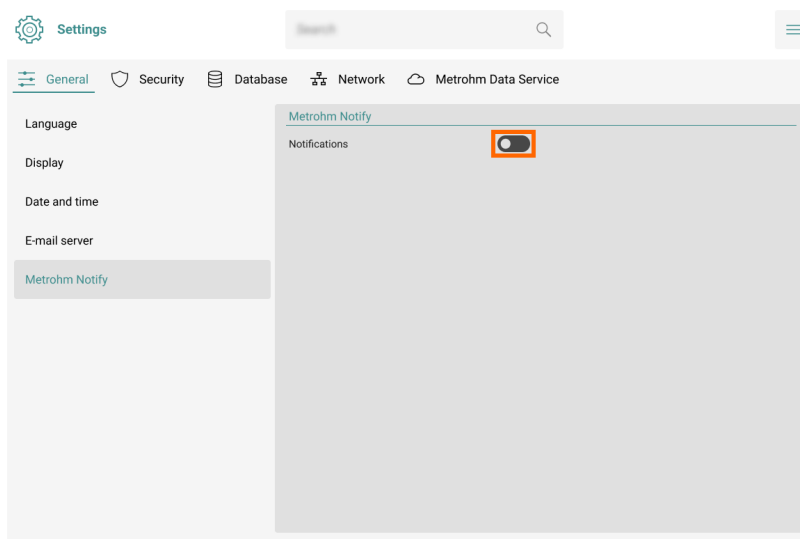
Setting up Metrohm Notify

Prerequisite:

- A channel has been created.

1 Activating notifications

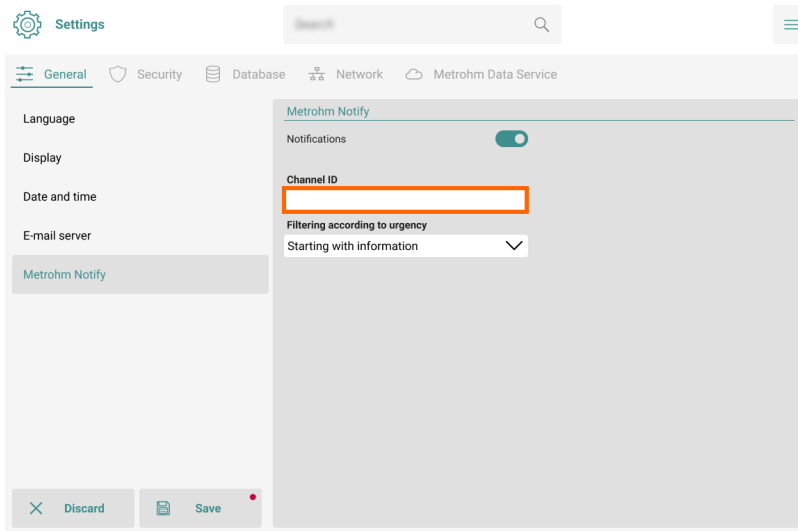
Activate the toggle switch next to **Notifications** in the IONIC app under **Settings** ► **General** ► **Metrohm Notify**.



2 Connecting Metrohm Notify

Tap the input field under **Channel ID** and enter the channel ID.

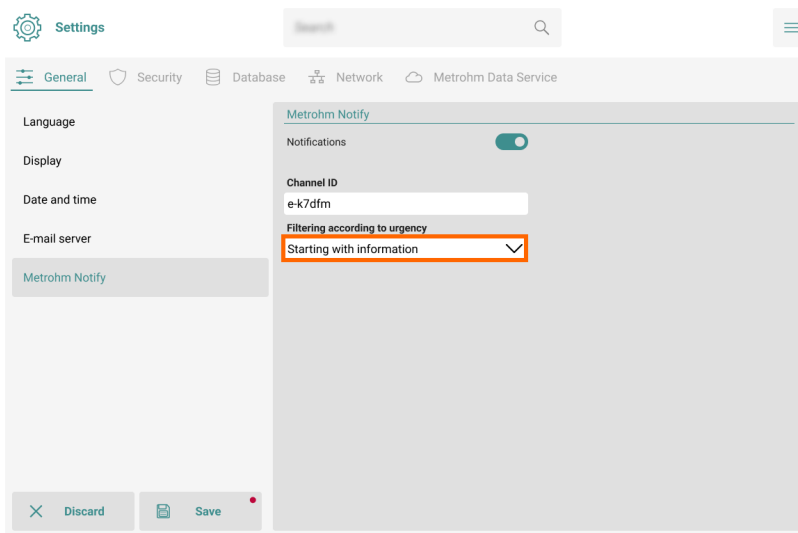
 The **Channel ID** corresponds to the identifier of the channel under notify.metrohm.com.



3 Setting the filter

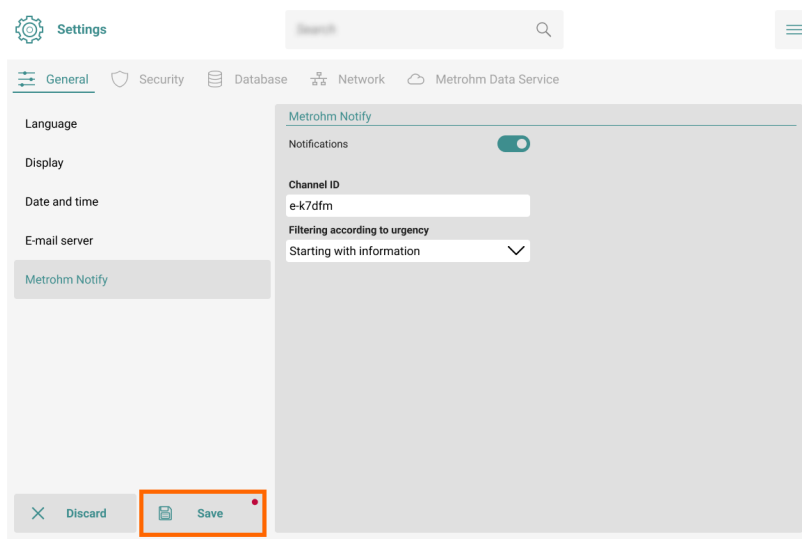
Tap the selection list under **Filtering according to urgency** and select which messages are to be displayed in the Metrohm Notify app.

- **Starting with information:** All messages of the Error, Question, Warning, and Information message types are displayed in the Metrohm Notify app.
- **Starting with warning:** All messages of the Error, Question, and Warning message types are displayed in the Metrohm Notify app.
- **Starting with question:** All messages of the Error and Question message types are displayed in the Metrohm Notify app.
- **Starting with error:** All messages of the Error message type are displayed in the Metrohm Notify app.



4 Saving the settings

Tap **[Save]** to save the changes.

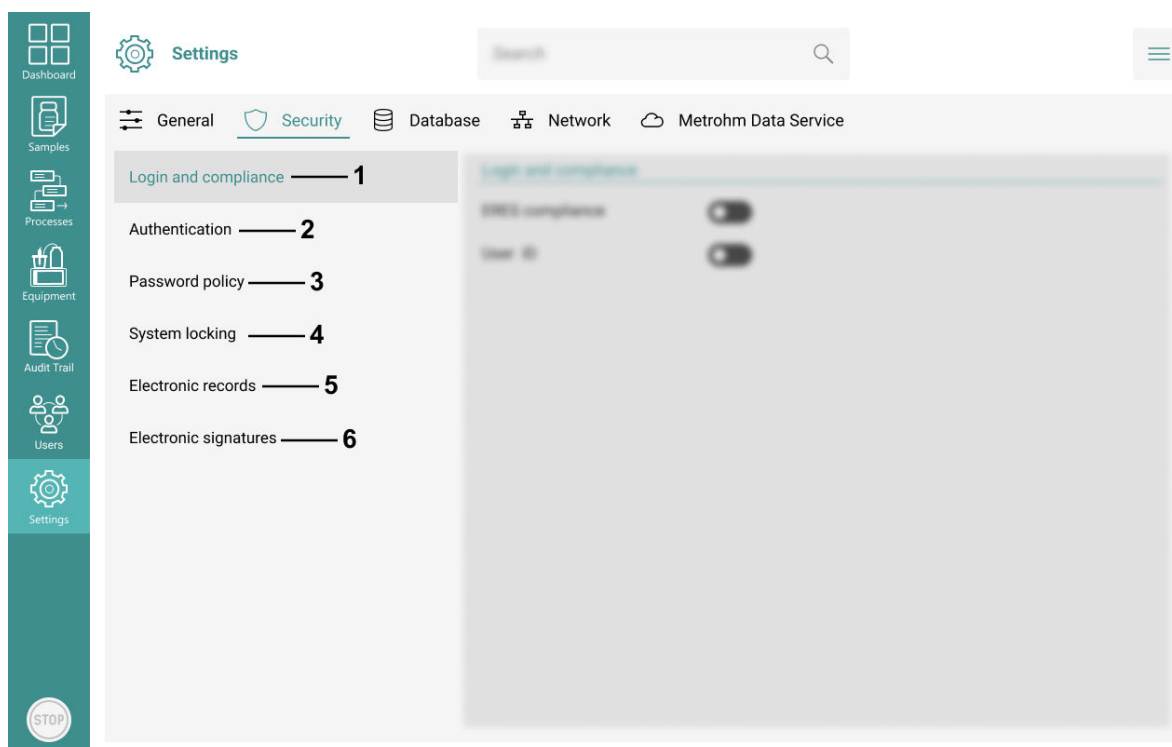


 Tap **[Discard]** to discard all changes.

8.2 Security – Subsection

Tap **Security** to open the **Security** subsection in the **Settings** work area.

The following sections are available in the **Security** subsection:



1 Login and compliance

Activate or deactivate ERES compliance and login with user ID and/or password.

[Additional information](#)

3 Password policy

Settings for the password requirements.

[Additional information](#)

5 Electronic records

Settings for recording user actions in the **Audit Trail** work area and for documenting changes.

[Additional information](#)

2 Authentication

Settings for user account locking.

[Additional information](#)

4 System locking

Settings for automatic locking of the IONIC app.

[Additional information](#)

6 Electronic signatures

Settings for the electronic signatures.

[Additional information](#)

- i** Changes in the settings are applied only by tapping **[Save]**. Tap **[Discard]** to discard the changes.
- Saved changes do not take effect until after a restart of the IONIC app.
- The security settings are effective only with the **User management** license.

Login and compliance

The following settings can be configured in the **Login and compliance** section:

User account locking	If User account locking is activated, then the user account will be locked as soon as the maximum permitted number of failed attempts to obtain authentication in the IONIC app has been exceeded. The user account must be reauthenticated by the administrator so that the user can define a new password the next time they log in (Additional information). If ERES compliance is activated, then the User account locking is automatically activated and cannot be deactivated.
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 Metrohm recommends activating this setting for security reasons.

Max. number of failed attempts	Maximum permitted number of failed attempts during authentication in the IONIC app.
(only with activated User account locking)	The Max. number of failed attempts is added together when logging into the IONIC app and when adding signatures. Input range: 2–9 Default value: 3

Password policy

The following settings can be configured in the **Password policy** section:

 The settings are effective only if the toggle switch next to **ERES compliance** or the toggle switches next to **User ID** and **Password** are activated under **Login and compliance**.

Minimum password length	Minimum required number of characters for the password. Input range: 1–64 Default value: 8
Special character	: The password must contain at least one of the following special characters: ~ ` ! @ # % ^ & * () - _ = + [] { } \ / ; : ' " < > ? , . Space
Lowercase	 : The password must contain at least one lowercase letter.
Uppercase	 : The password must contain at least one uppercase letter.
Digit	 : The password must contain at least one digit.

Password expires

✓: Once the defined validity period has expired, the user must change the password when logging into the IONIC app.

If **ERES compliance** is activated, then the setting is automatically activated and cannot be deactivated.

Validity period

Number of days after which the current password must be changed.

(only if **Password expires** is activated)

Input range: 1–999

Unit: d

Default value: 120

System locking

The following settings can be configured in the **System locking** section:

 The settings are effective only if the toggle switch next to **ERES compliance** or the toggle switch next to **User ID** is activated under **Login and compliance**.

Automatic locking

If the function is activated, then the IONIC app will be locked automatically within the defined Period because of the absence of user activity. Once the IONIC app has been automatically locked, the user must log in to the IONIC app once again with the corresponding access data ([Additional information](#)).

 Metrohm recommends activating this setting for security reasons.

Period

(only if **Automatic locking** is activated)

Number of minutes after which the IONIC app will be locked because of absence of user activity.

Input range: 1–60

Unit: min

Default value: 10

Electronic records

The following settings can be configured in the **Electronic records** section:

 The settings are available only with the **Audit Trail** license.

Audit Trail	✓: From the time of activation, entries and actions made in the IONIC app are recorded in the Audit Trail work area with a time stamp (<i>Additional information</i>). If ERES compliance is activated, then the Audit Trail is automatically activated and cannot be deactivated.
Change log	If Change log is activated, then a Reason for modification must be selected when saving changes to a method or to a determination. If ERES compliance is activated, then the Change log is automatically activated and cannot be deactivated.
Comment (only with activated Change log)	✓: When saving changes to a method or a determination, a Comment can also be entered in addition to Reason for modification.

Electronic signatures

The following settings can be configured in the **Electronic signatures** section:

 The settings are available only with the **Electronic signature** license.

Meaning	If Meaning is activated, then a Meaning must be selected when signing methods and determinations at level 1 and level 2. If ERES compliance is activated, then the Meaning is automatically activated and cannot be deactivated.
Comment (only with activated signature reason)	✓: When adding a signature, a Comment can be entered in addition to Meaning.

8.3 Database – Subsection

Tap **Database** to open the **Database** subsection in the **Settings** work area.

All data from the IONIC app, e.g., determinations, samples, Audit Trail or information on connected instruments are saved locally in the database.

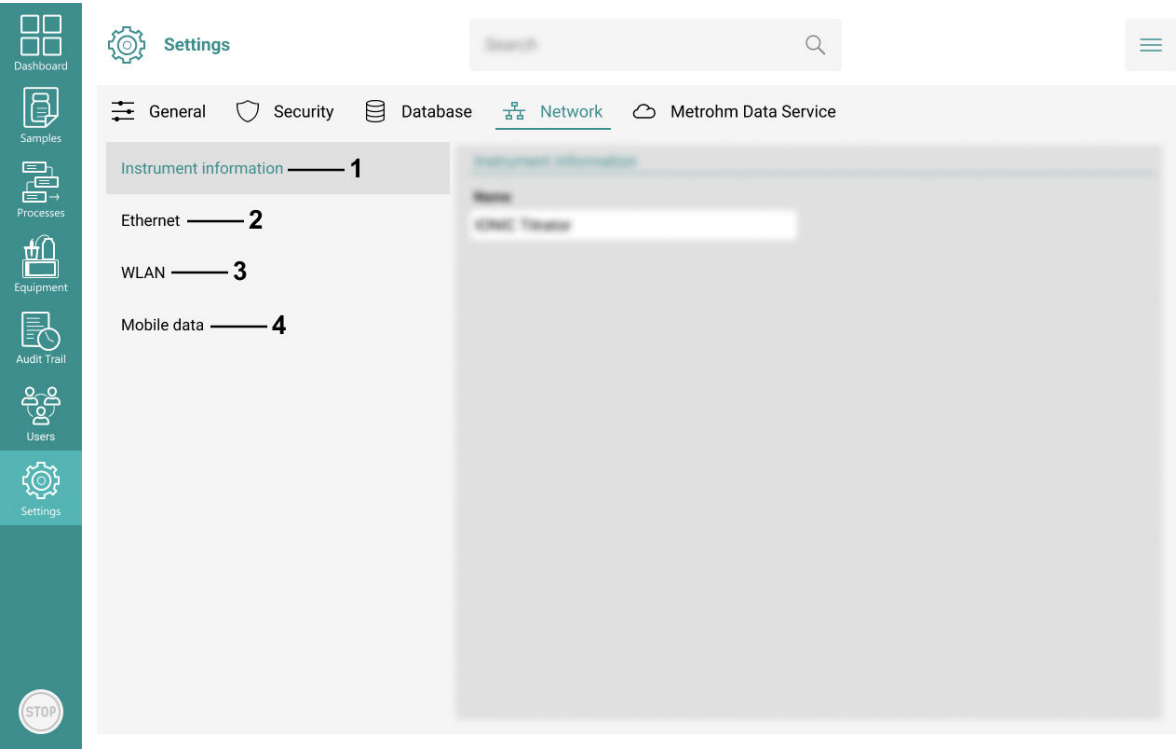
The following information is displayed in the **Database** subsection under **Capacity**:

Space used [MB]	Display of the currently used storage capacity in MB.
Space used [%]	Display of the currently used storage capacity in %.

8.4 Network – Subsection

Tap **Network** to open the **Network** subsection in the **Settings** work area.

The following sections are available in the **Network** subsection:



- 1

Instrument information
Name of the IONIC Titrator.
[Additional information](#)
- 2

Ethernet
Settings for a network connection via LAN.
[Additional information](#)
- 3

WLAN
Settings for a network connection via WLAN.
[Additional information](#)
- 4

Mobile data
Settings for a network connection via mobile data.
[Additional information](#)

 Changes in the settings are applied only by tapping **[Save]**. Tap **[Discard]** to discard the changes.

Instrument information

The following settings can be configured in the **Instrument information** section:

Name	Name of the IONIC Titrator.
-------------	-----------------------------

Ethernet

The following settings can be configured in the **Ethernet** section:

MAC address	Unique hardware address of the network adapter used. The MAC address cannot be edited.
DHCP	Activate or deactivate the Ethernet connection with DHCP. The network settings are retrieved automatically when the DHCP (Dynamic Host Configuration Protocol) is activated. The retrieved values cannot be edited.  If the DHCP is subsequently deactivated, then the automatically retrieved network settings will remain available and can be edited.
IP address	Unique address of the IONIC Titrator in the TCP/IP network. If DHCP is activated, then the IP address is assigned dynamically and cannot be edited. Otherwise, the IP address is static and can be edited manually.
Subnet mask	IP address of the subnet mask. The subnet mask is used to divide the IP address into a network part and a host part. If DHCP is activated, then the subnet mask cannot be edited.
Gateway	IP address of the default gateway. The gateway enables communication of the local network with other networks. If DHCP is activated, then the gateway cannot be edited.
Primary DNS server	IP address of the primary DNS server. The primary DNS server resolves network names into IP addresses. The primary DNS server cannot be edited while DHCP is activated.
Secondary DNS server	IP address of the secondary DNS server. The secondary DNS server is optional and will not be used unless the primary DNS server is not available. The secondary DNS server cannot be edited while DHCP is activated.
WLAN	
The following settings can be configured in the WLAN section:	
WLAN	Activate or deactivate the network connection via WLAN. The following settings are available only when WLAN is activated.

Password

Password of the WLAN network.

Enter the password of the selected WLAN network and confirm with **[Save]** to establish a WLAN connection.

Access points

Table with the available WLAN networks.

The name of the WLAN network as well as the associated signal strength and the classification of the security of the WLAN network are displayed in the table.

The respective WLAN network can be selected by tapping .

Mobile data

The following settings can be configured in the **Mobile data** section:

Mobile data

Activate or deactivate the network connection via mobile data.

The following settings are available only with activated mobile data.

IP address

Unique address of the IONIC Titrator in the TCP/IP network.

The IP address cannot be edited.

Subnet mask

IP address of the subnet mask.

The subnet mask is used to divide the IP address into a network part and a host part.

The subnet mask cannot be edited.

Gateway

IP address of the default gateway.

The gateway enables communication of the local network with other networks.

The gateway cannot be edited.

Primary DNS server

IP address of the primary DNS server.

The primary DNS server resolves network names into IP addresses.

The primary DNS server cannot be edited.

Secondary DNS server

IP address of the secondary DNS server.

The secondary DNS server is optional and will not be used unless the primary DNS server is not available.

The secondary DNS server cannot be edited.

Time remaining

(only if the QR code is displayed)

A QR code will appear for 5 min as soon as the IONIC Titrator needs to be newly registered the Metrohm Data Service. The remaining time indicates how long the QR code is still available.

Verification code

(only if the QR code is displayed)

Unique code that identifies the IONIC Titrator at the time of registration with the Metrohm Data Service. The Verification code must be confirmed after the correct input of the login data in the myMetrohm user account.



Conformity with FDA 21 CFR Part 11 and EudraLex, Volume 4, Annex 11 does **not** apply to the **Metrohm Data Service**.

8.5.1 Setting up and connecting the Metrohm Data Service

A myMetrohm user account must be available in order to use the IONIC App to register the IONIC Titrator with the Metrohm Data Service.

An organizational unit must be created with the first myMetrohm user account that sets up the Metrohm Data Service for a company. Afterwards, additional users can be invited to the created organizational unit.

Once a user account has been created with the associated organizational unit, the IONIC Titrator can be registered with the Metrohm Data Service with the IONIC app.

- [Creating a myMetrohm user account](#)
- [Register IONIC Titrator with the Metrohm Data Service](#)

Creating a myMetrohm user account

1 Creating a user account

Tap **[Create Account]** under login.metrohm.com.

2 Completing registration

Follow the instructions and complete the registration.

3 Creating an organizational unit (owner only)

Tap the **[Create Organization Unit]** button under the **Organization Unit** tab and enter a name for the desired organizational unit.

4 Adding a user (owner only)

- Enter the e-mail address of the desired user under the **Organization Unit Invitation** tab.

- Assign the desired user role to the user:
 - **Owner:** The user has all the rights for the management of the organizational unit, of the users, and of the use of the Metrohm Data Service.
 - **User Manager:** The user has all rights for the user management of the Metrohm Data Service.
 - **User:** The user has rights of use for the Metrohm Data Service.

5 Selecting a subscription (owner only)

Select the desired subscription under the tab **Subscription** tab. The first 2 years after activation are free of charge.

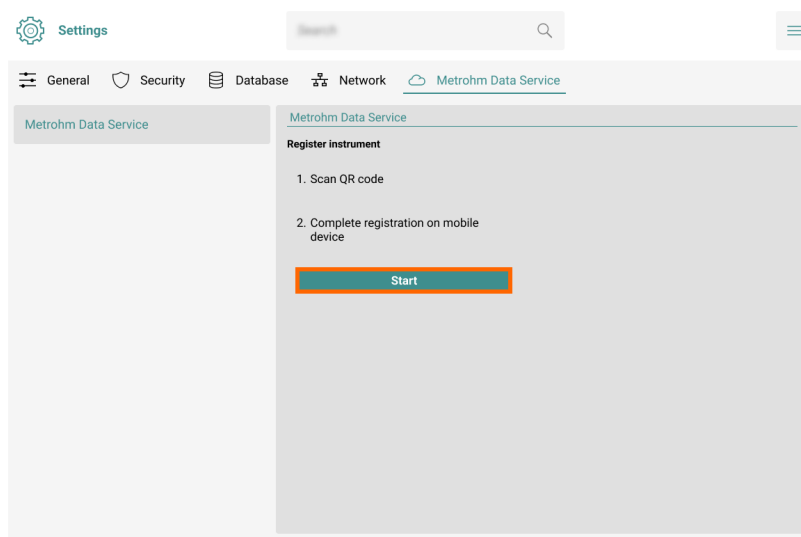
Registering an IONIC Titrator with the Metrohm Data Service

Prerequisite:

- The user has a myMetrohm user account and is assigned to an organizational unit.

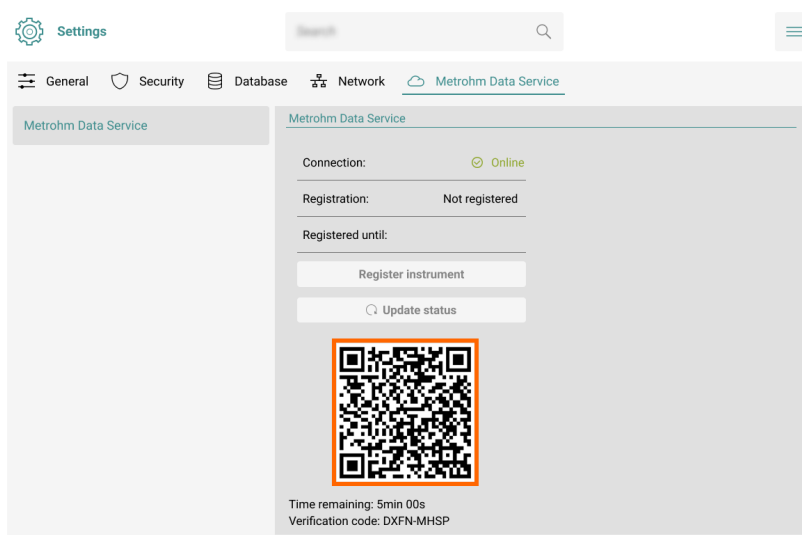
1 Starting the setup

Tap **[Start]** under **Settings** ► **Metrohm Data Service**.



2 Scanning a QR code

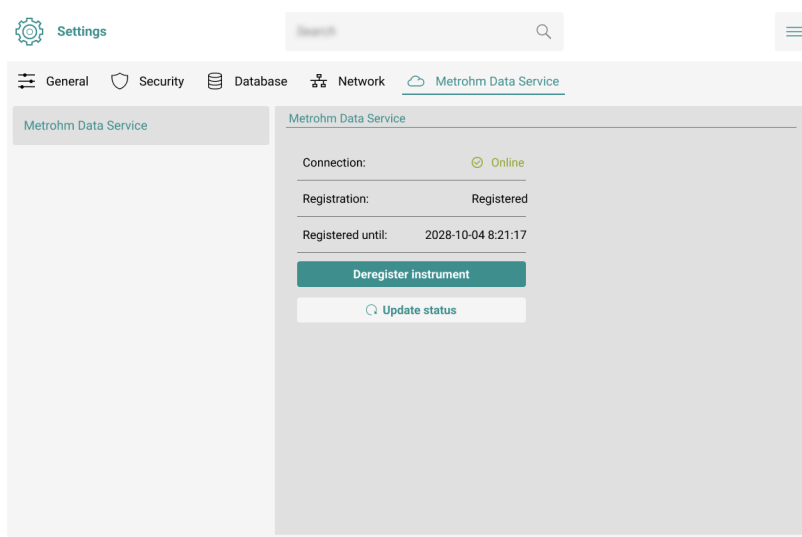
Scan the QR code with a mobile device.

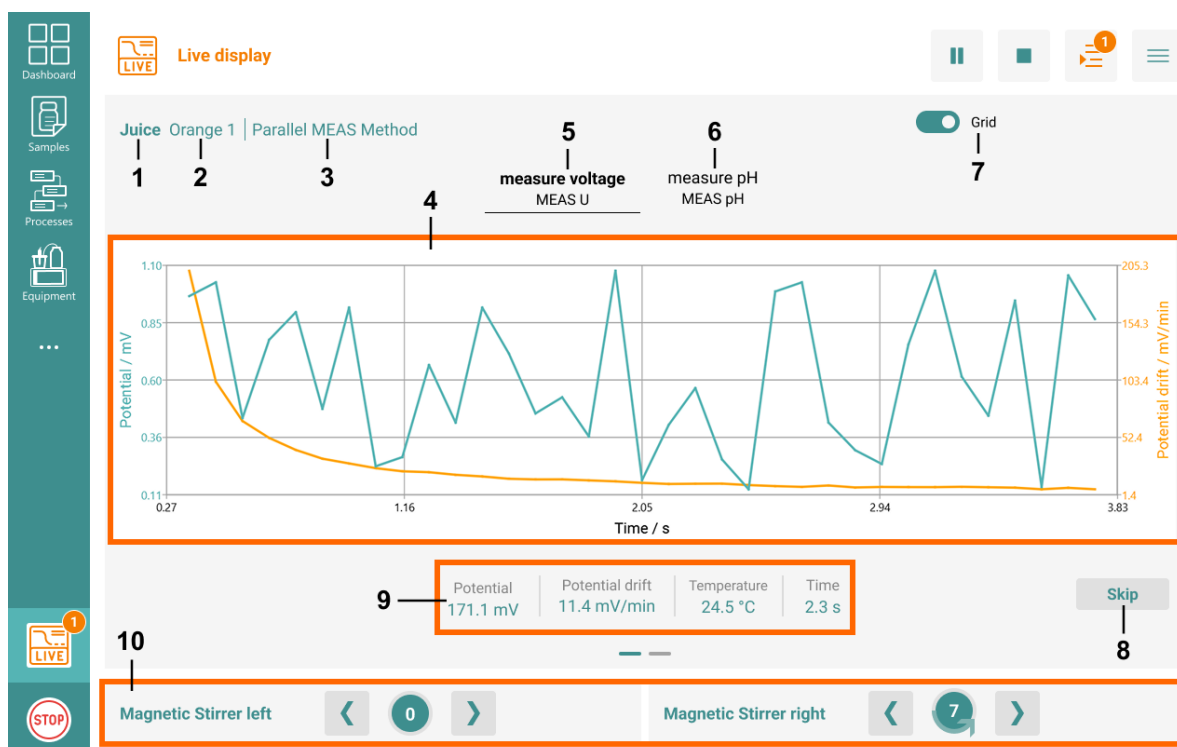


3 Connecting the Metrohm Data Service

Within the specified time on the mobile device, enter the login data of the myMetrohm user account and confirm the verification code ([Additional information](#)).

The IONIC Titrator is registered and the functions of the Metrohm Data Service can be used.



**1 Sample**

Name of the sample that contains the sub-sample to be determined.

3 Method

Name of the method with which the sub-sample is determined.

2 Subsample

Name of the subsample that is determined.

4 Curve

The measured values recorded are displayed in real time as a curve. The curve can be zoomed in and zoomed out. The different curves can also be displayed by scrolling to the left or right for parallel command sequences.

[Additional information](#)

5 Displayed command

Name of the command that is currently being executed. The live data of the command is displayed.

6 Parallel command (optional)

Name of the command that is executed in parallel. Only displayed if a command is executed in parallel.

9.1 Setting a stirring level and a stirring direction

The stirring level and the stirring direction of the built-in or connected stirrers can be set manually via the IONIC app.

1 to 15 stirring levels can be set. The rotation direction and the stirring level are displayed with an icon:

- Clockwise rotation direction (to the right) at stirring level 7 (example): 
- Rotation direction counterclockwise (to the left) at stirring level 7 (example): 
- [Setting the stirrer by tapping](#)
- [Setting the stirrer by moving](#)

Setting a stirrer by tapping

Prerequisite:

- The **Live display** work area or the manual control of a stirrer is open.

1 Setting a stirring level and a stirring direction

Depending on the desired rotation direction of the stirrer, tap  (clockwise rotation direction) or  (counterclockwise rotation direction) in the desired stirrer control repeatedly until the desired stirring level has been set.



The stirring level and the stirring direction are displayed using the icon.



Setting a stirrer by moving

Prerequisite:

- The **Live display** work area or the manual control of a stirrer is open.

1 Opening a slider

Tap  in the desired stirrer control.



2 Setting a stirring level and a stirring direction

Depending on the desired rotation direction of the stirrer, move  to the left or to the right until the desired stirring level is set.



The stirring level and the stirring direction are displayed using the icon.



 The slider of the stirrer control is automatically closed again after a few seconds.

9.2 Execution overview – Overview

As soon as a determination is running, the **Execution overview** section can be opened by tapping on  in the **Live display** work area.

- *Definition*
- *Overview list*
- *Icons*

Video tutorials for the **Execution overview** section:



Definition

The Execution overview contains **Running determinations** and **Pending determinations**. The currently executed determination is displayed in the **Running determinations** list. All determinations that have been set to pending but are not yet executed are displayed in the **Pending determinations** list.

Overview list

The running and pending determinations are displayed in an overview list in the **Execution overview** section. The following information is displayed in the overview list:

Execution overview

Running determinations

Sample list	Sample	Subsample	Method	Determination start	Sample size	Position	Action
Sample list 1	Sample 1	Subsample 1	MEAS U	2026-05-26 14:22:38	1.2 mg		

Pending determinations(6)

Sample list	Sample	Subsample	Method	Determination start	Sample size	Position	Action
Sample list 1	Sample 1	Subsample 2	MEAS U	2026-05-26 14:22:39	1.2 mg		X
Sample list 1	Sample 1	Subsample 3	MEAS U	2026-05-26 14:22:40	1.2 mg		X
Sample list 1	Sample 1	Subsample 4	MEAS U	2026-05-26 14:22:41	1.2 mg		X
Sample list 1	Sample 1	Subsample 5	MEAS U	2026-05-26 14:22:42	1.2 mg		X
Sample list 1	Sample 1	Subsample 6	MEAS U	2026-05-26 14:22:43	1.2 mg		X
Sample list 1	Sample 1	Subsample 7	MEAS U	2026-05-26 14:22:44	1.2 mg		X
Sample list 1	Sample 1	Subsample 8	MEAS U	2026-05-26 14:22:45	1.2 mg		X

1 Sample list

Name of the sample list that contains the subsample to be determined.

3 Subsample

Name of the subsample to be determined.

5 Determination start

Date and the time at which the determination was set to pending.

7 Position

Position of the sample beaker within the sample rack.

2 Sample

Name of the sample that contains the subsample to be determined.

4 Method

Name of the method with which the subsample is determined.

6 Sample size

Sample amount that is to be analyzed.

8 Action

Stop a running determination or remove a pending determination from the list.

[Additional information](#)

Functions

The following functions are available in the **Execution overview** section:

The menu opens by tapping on ...

1 Autostart

If the function is activated, then the next pending determination will be started automatically as soon as the running determination has been completed.

[Additional information](#)

2 Move up

The selected determination is moved upwards by one position.

[Additional information](#)

3 Move down

The selected determination is moved down by one position.

[Additional information](#)

4 Move to beginning

The selected determination is moved to the start of the list.

[Additional information](#)

5 Move to end

The selected determination is moved to the end of the list.

[Additional information](#)

6 Delete

The selected determinations are removed from the **Pending determinations** list. However, the data contained in the determination remains in the database and thus also in the sample lists.

[Additional information](#)

Icons

 The following icons are present in the **Execution overview** section. Icons that affect the entire user interface can be found [here](#).

Icon	Function
	Tap to add the function as a bookmark to the title bar (<i>Additional information</i>).
	Tap to remove the function as a bookmark from the title bar (<i>Additional information</i>).
	Stop the determination and remove it from the Running determinations list. The Autostart function is thereby automatically deactivated.
	Remove the determination from the Pending determinations list. However, the data contained in the determination remains in the database and thus also in the sample lists.

9.2.1 Activating and deactivating Autostart

Video tutorial for activating and deactivating the **Autostart** function:



Activating Autostart

- 1 Tap  under **Live display ▶ Execution overview ▶ Pending determinations** to activate the **Autostart** function.

The next pending determination will be started automatically as soon as the running determination has been completed.

Deactivating Autostart

- 1 Tap  under **Live data ▶ Execution overview ▶ Pending determinations** to deactivate the **Autostart** function.

The pending determinations will not be started automatically as soon as the running determination has been completed.



9.2.2 Reorganizing pending determinations

Video tutorial for reorganizing pending determinations:



Prerequisites:

- The **Execution overview** section is open (*Additional information*).
- At least one determination is available in the **Pending determinations** list.

1 Selecting a determination

Select the desired determination in the **Pending determinations** list by tapping on



2 Reorganizing a determination

Tap on . . . in the title bar and select the desired function for organizing the determination.

The selected determination is rearranged in accordance with the selected function in the list.

9.2.3 Deleting a pending determination

Prerequisites:

- The **Execution overview** section is open (*Additional information*).
- At least one determination is available in the **Pending determinations** list.

1 Selecting a determination

Select the desired determination in the **Pending determinations** list by tapping on



2 Deleting a determination

Tap **...** in the title bar and select **Delete**.

As an alternative, tap  in the title bar if the function has been added as a bookmark (*Additional information*).

The selected determination is removed from the **Pending determinations** list. The data contained in the determination remains in the database and thus also in the sample lists.

Confirm the message with **Delete**.

 The message does not appear when deleting via .

