

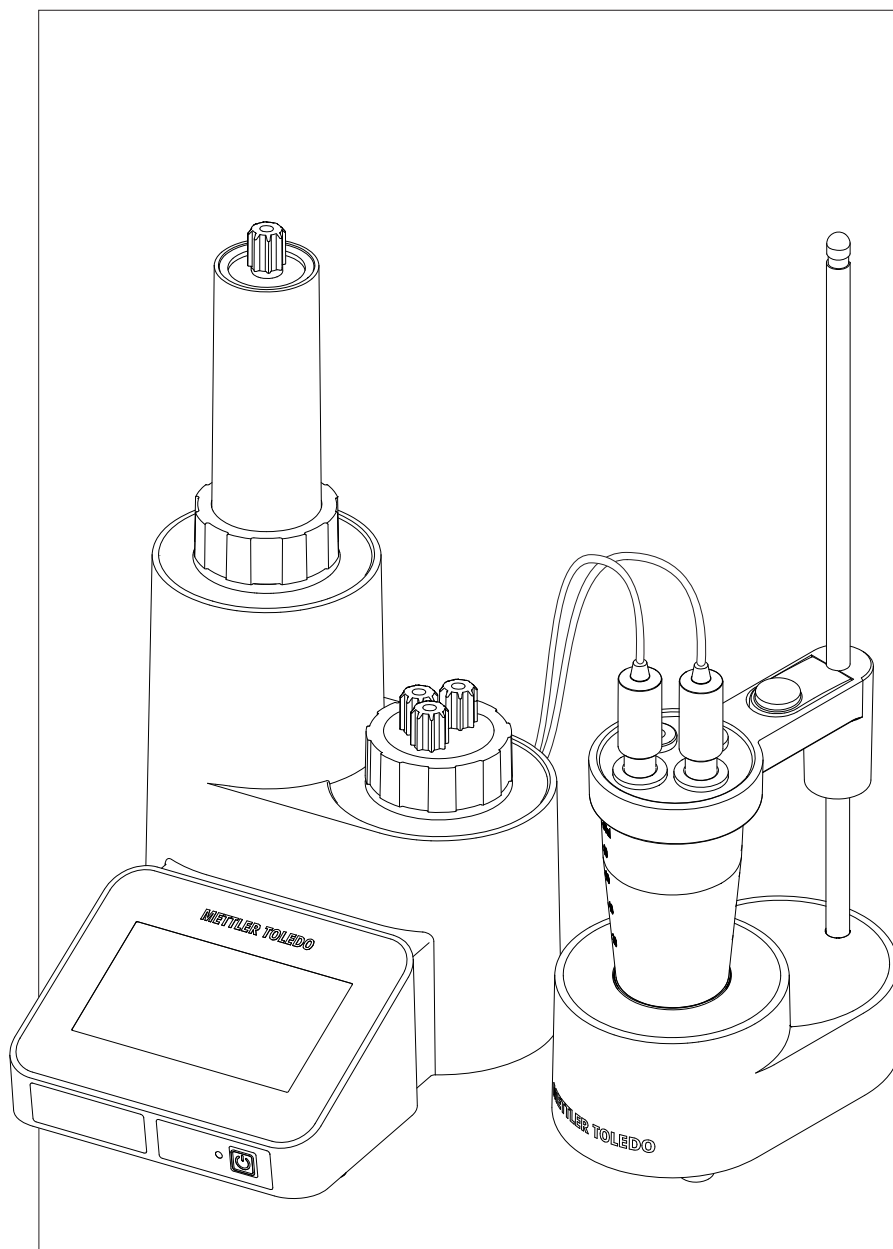


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1 Introduction

The Sodium Analyzer has been especially designed for simplicity in the determination of sodium in food product using the standard addition technique. Just add your sample and ionic strength adjustment (ISA) solution then start your measurement. No calibration of the system is needed. Save operator time with reduced efforts in sample preparation and calibration.

Increase productivity with fast measurements of your samples. The Sodium Analyzer is modern with a small footprint for use in a wide variety of sodium determination applications. The instrument has been developed primarily for the use in Food and Beverage Labs. The Sodium Analyzer perfectly combines simple, easy-to-understand operation with high precision and reliability. Thanks to the App-oriented user interface and the built-in know-how, operation could not be any simpler or more intuitive. The Sodium Analyzer can be controlled by touch screen and all measured data can be stored in the PC Software EasyDirect.

All main functions can be started directly from the home screen on the touch screen via Longclick™ on the corresponding App, which makes routine use extremely simple. The integrated, proven algorithm specifically designed for Na⁺ determination delivers highly accurate and repeatable results and is dedicated to determining directly the harmful sodium in Food and Beverage products.

Find out more and visit us on:

www.mt.com/SodiumAnalyzer

About this document

The instructions in this document refer to instruments running firmware version 2.0.0 or higher.

For third party licenses and open source attribution files, see the following link:

► www.mt.com/licenses

If you have any additional questions, contact your authorized METTLER TOLEDO service representative or dealer.

► www.mt.com/contact

Conventions and symbols

Note

For useful information about the product.



Refers to an external document.

Elements of instructions

- Prerequisites
- 1 Steps
- 2 ...
 - ⇒ Intermediate results
 - ⇒ Results

2 Safety information

- These Operating Instructions contain a description of the instrument and its use. They are printed and delivered with the instrument.
- Keep the Operating Instructions for future reference.
- Include the Operating Instructions if you transfer the instrument to other parties.

Only use the instrument according to the Operating Instructions. If you do not use the instrument according to the Operating Instructions or if it is modified, the safety of the instrument may be impaired and Mettler-Toledo GmbH assumes no liability.



The Operating Instructions are available online.

► www.mt.com/library

2.1 Definitions of signal words and warning symbols

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

Signal words

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

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

Warning symbols



Electric shock

2.2 Product specific safety notes

Intended use

This instrument is intended to be used by trained staff. The instrument is suitable for the processing of reagents and solvents.

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

Responsibilities of the instrument owner

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

METTLER TOLEDO assumes that the instrument owner trains users to safely use the instrument in their workplace and deal with potential hazards. METTLER TOLEDO assumes that the instrument owner provides the necessary protective gear.



 WARNING

Danger of death or serious injury due to electric shock!

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

- 1 Only use the METTLER TOLEDO power supply cable and AC adapter designed for your instrument.
- 2 Connect the power cable to a grounded power outlet.
- 3 Keep all electrical cables and connections away from liquids and moisture.
- 4 Check the cables and the power plug for damage and replace damaged cables and power plugs.



NOTICE

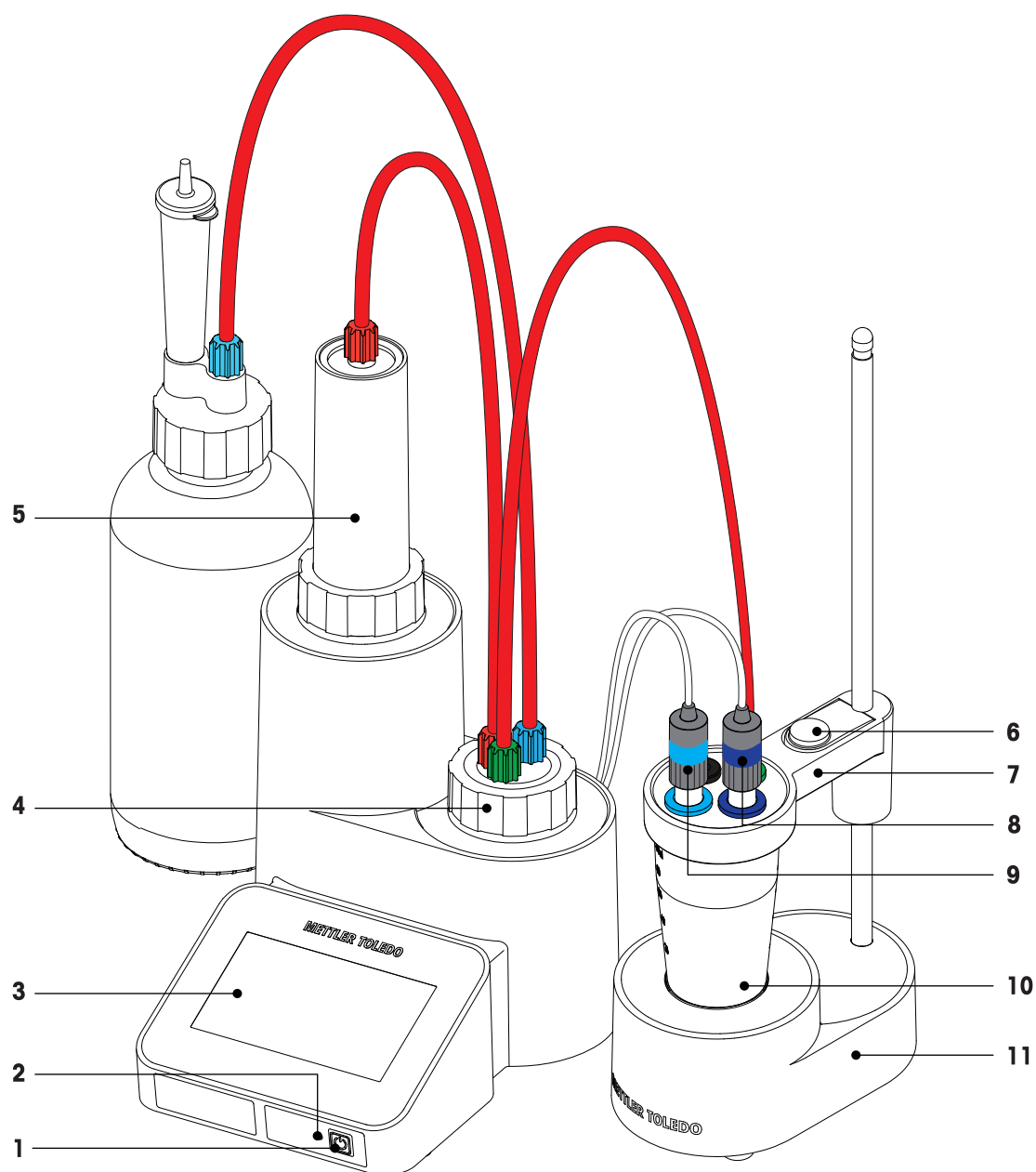
Risk of damage to the instrument due to the use of unsuitable parts!

Using unsuitable parts with the instrument can damage the instrument or cause it to malfunction.

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

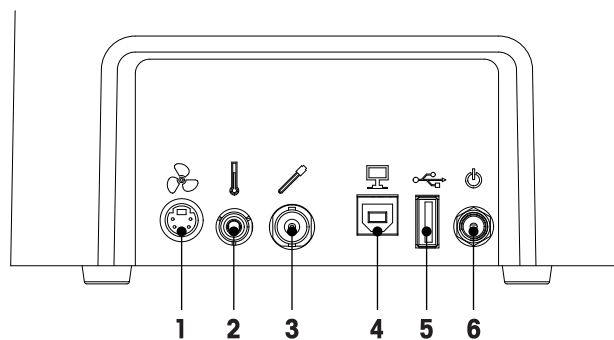
3 Design and Function

3.1 Overview



1	Power button	2	Status LED
3	Touch screen	4	Valve
5	Burette	6	Release button
7	Analyzer head Na	8	DX222-Na (Na-ISE sensor)
9	DX205-SC (Reference sensor)	10	Beaker
11	Stirrer (EasyStir)		

3.2 Rear panel

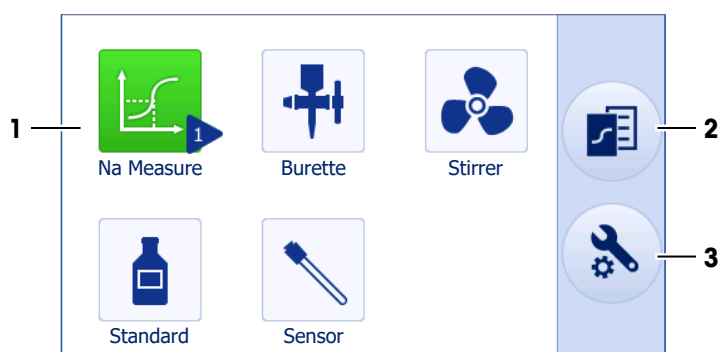


1	Socket for stirrer (Mini-DIN)	2	Socket for temperature sensor (RCA - Cinch)
3	Socket for sensors	4	USB B interface for PC connection (EasyDirect PC Software)
5	USB A interface for printer and balance	6	DC socket for power supply

3.3 User interface

3.3.1 Home screen

The home screen is the main screen and appears after startup of the instrument. Tap and hold any of the home screen apps (except Standard) to start the last analysis without further navigation (LongClick™).



1 Functional Apps: Apps for various functions.	2 Results: Select this menu item to display the results of the previous analysis.
3 Setup & Tools: Select this menu item to make changes to the system settings and to perform diagnostics.	

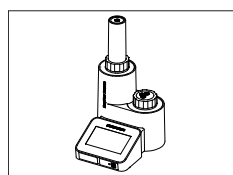
3.3.2 Icons and buttons

	Tap this menu item to return to the home screen.		Tap this menu item to go back to the previous screen.
	Tap this menu item to start an action.		Tap this menu item to stop a running action.
	Tap the arrows to page through parameter sets.		Tap the help icon to change to help mode. Then tap any of the parameters to get a specific help description.
	Tap this icon to accept and close any entry screen.		Tap this icon to reject and close any entry screen.
	Tap this icon to print parameters or results.		
	Tap this icon on a parameter screen to change the parameter set. Parameter set with number two is active in this example.		Indicates which analysis will be started when you tap and hold an app (LongClick™). Parameter set with number two is active in this example.

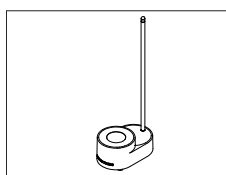
4 Putting into operation

Before getting started, make sure you have received all parts listed in the section scope of delivery.

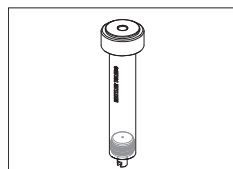
4.1 Scope of Delivery



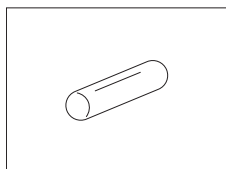
Sodium Analyzer



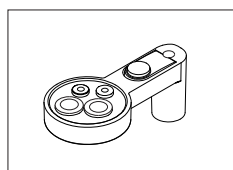
EasyStir



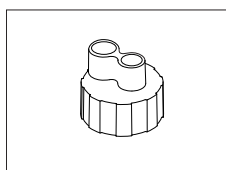
Burette 10 mL



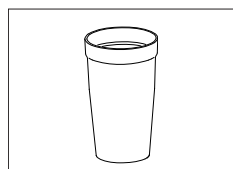
Magnetic stirrer bar



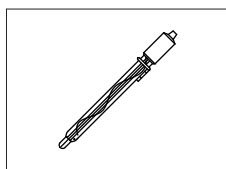
Analyzer head Na



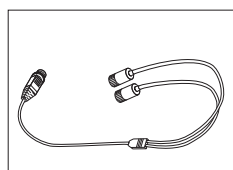
Bottle head incl. flat seal



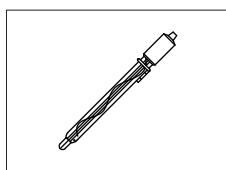
Beaker PP (100 mL,
10 pcs.)



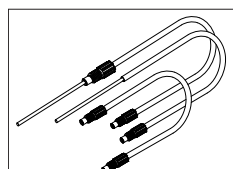
DX222-Na (Na-ISE sensor)



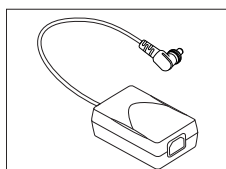
Cable reference sensor Na



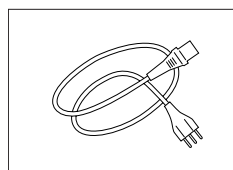
DX205-SC (Reference
sensor)



Tubing set instrument



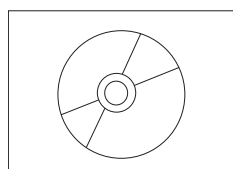
AC adapter



Country specific power cable



Application brochure



EasyDirect Titration Trial
Version

4.2 Position the instrument

The instrument has been developed for indoor operation in a well-ventilated area.

The following site requirements apply:

- Ambient conditions within the limits specified in the technical data
- No powerful vibrations
- No direct sunlight

- No corrosive gas atmosphere
- No explosive atmosphere
- No powerful electric or magnetic fields

Procedure

- 1 Place the instrument on a level surface.
- 2 Make sure that the distance between the instrument and any wall is at least 6 cm.

4.3 Connect the instrument to the power supply

The instrument is supplied with an AC adapter. The AC adapter is suitable for all line voltages in the range of 100...240 V AC, 50 / 60 Hz.



WARNING

Danger of death or serious injury due to electric shock!

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

- 1 Only use the METTLER TOLEDO power supply cable and AC adapter designed for your instrument.
- 2 Connect the power cable to a grounded power outlet.
- 3 Keep all electrical cables and connections away from liquids and moisture.
- 4 Check the cables and the power plug for damage and replace damaged cables and power plugs.



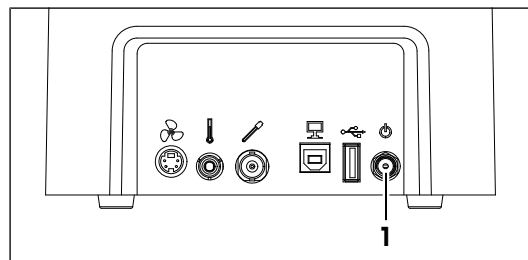
NOTICE

Danger of damage to the AC adapter due to overheating!

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

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

- 1 Install the cables in such a way that they cannot be damaged or interfere with operation.
- 2 Insert the plug of the power cable into the socket of the AC adapter.
- 3 Insert the plug of the AC adapter into the socket (1) on the rear panel.
- 4 Tighten the knurled nut to secure the plug.
- 5 Insert the plug of the power cable into a grounded power outlet that is easily accessible.



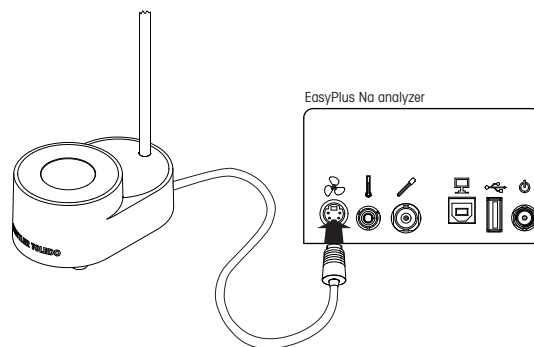
4.4 Disconnect the instrument from the power supply

- The instrument is shut down.
- 1 Pull the plug of the power cable out of the power outlet.
 - 2 Pull the plug of the AC adapter out of the socket on the rear panel.

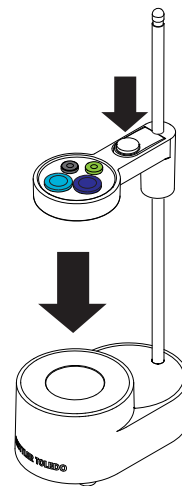
4.5 Install the EasyStir

This stirrer is powered by the instrument and will automatically be switched on/off according to the settings.

- 1 Connect EasyStir to the instrument stirrer socket, observing the arrow on the connector (arrow must be topside).

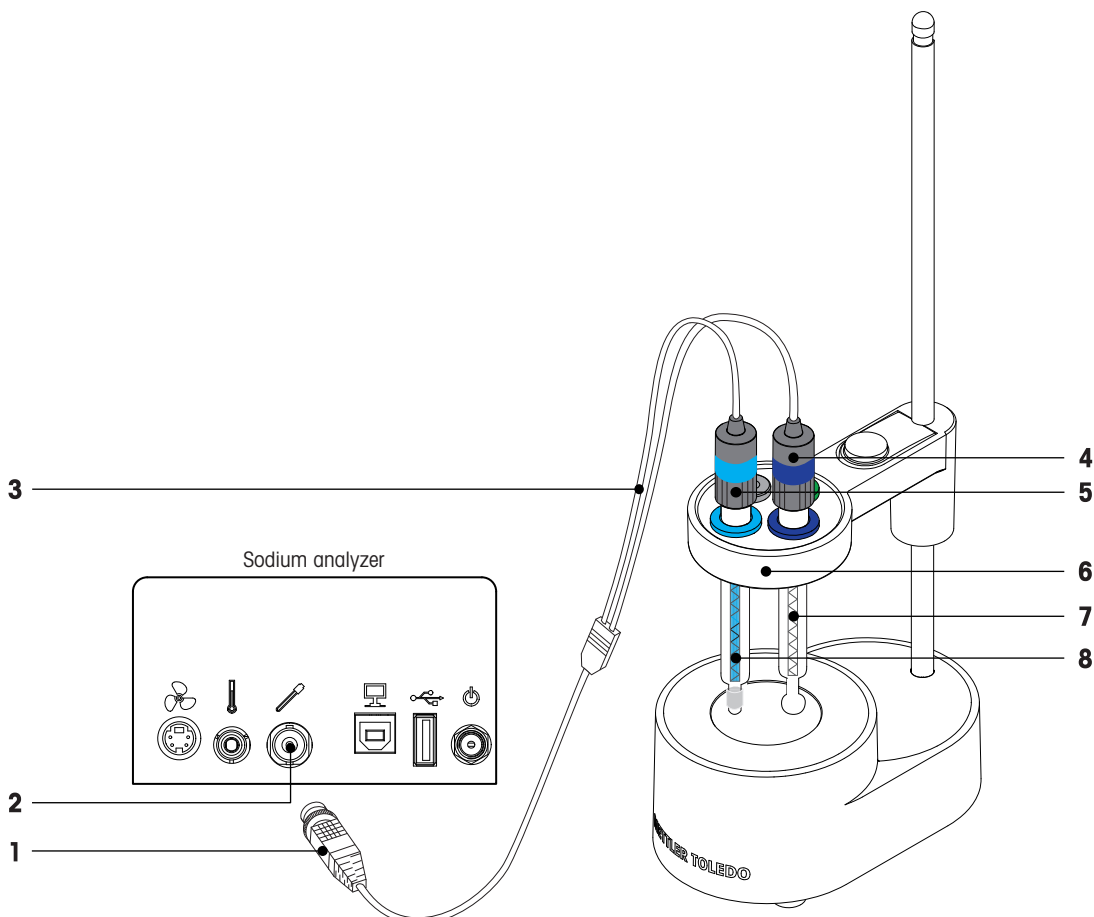


- 2 Push the release button to install the analyzer head on stirrer rod.



4.6 Install sensors

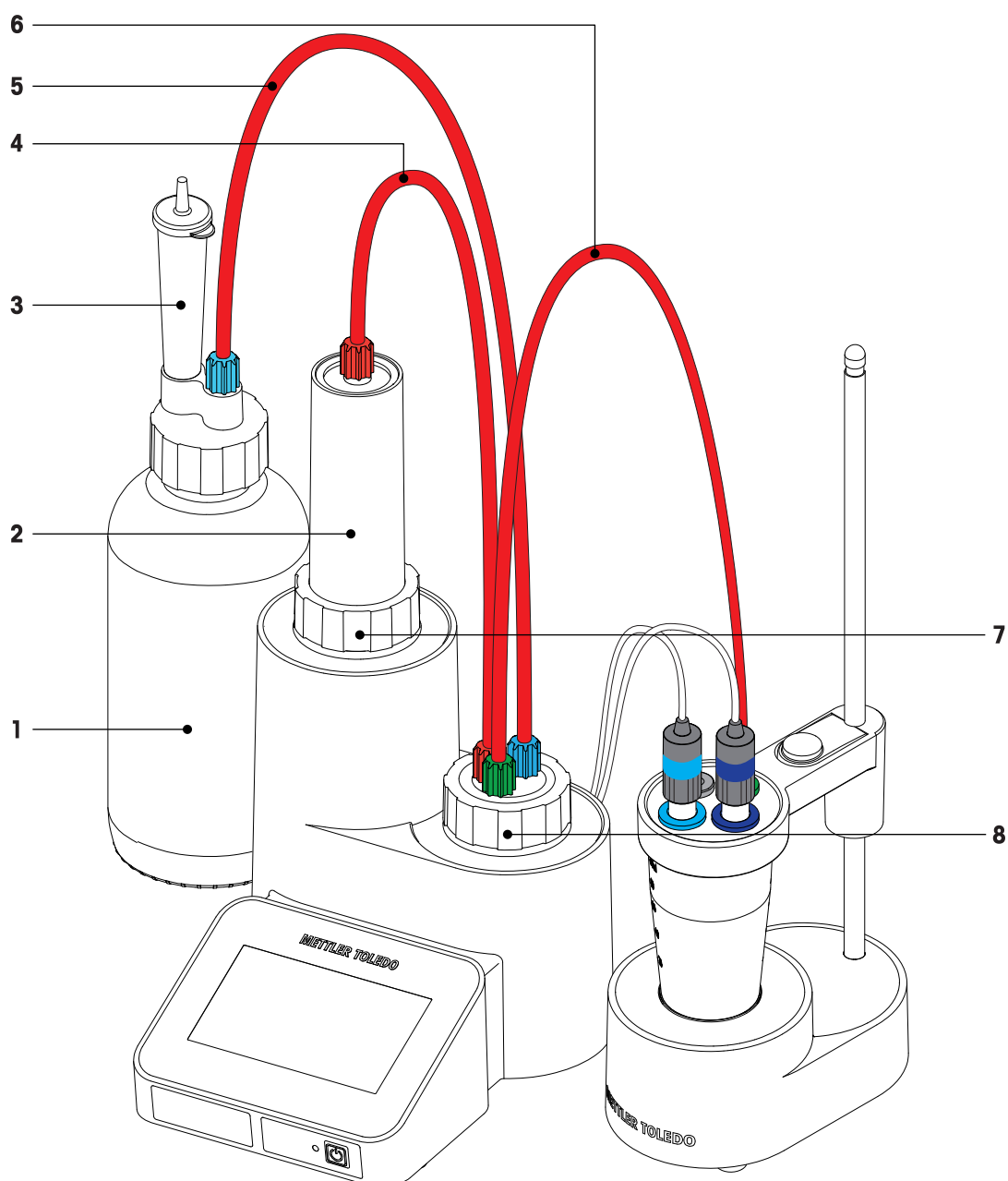
The Easy Na works with two sensors, a reference sensor (DX205-SC) and a Na-ISE sensor (DX222-Na). Both sensors need to be installed and connected to the instrument as follows:



1	BNC plug	2	Socket for adapter cable for sensors
3	Reference sensor	4	Plug for Na-ISE sensor (dark blue-colored)
5	Plug for Reference sensor (cyan-colored)	6	Analyzer head Na
7	DX222-Na (Na-ISE sensor)	8	DX205-SC (Reference sensor)

- 1 Insert Reference sensor into the cyan-colored rubber ring of the Analyzer head Na.
- 2 Insert Na-ISE sensor into the dark blue-colored rubber ring of the Analyzer head Na.
- 3 Connect the cyan-colored plug to the Reference sensor.
- 4 Secure the plug by firmly tightening the knurled nut.
- 5 Connect the dark blue-colored plug to the Na-ISE sensor.
- 6 Secure the plug by firmly tightening the knurled nut.
- 7 Connect the BNC plug to the socket for adapter cable for sensors, observing the nuts on the BNC plug.
- 8 Secure the BNC plug by turning the knurled nut a 1/4 turn.

4.7 Install the tubing



1	Standard bottle	2	Burette
3	Drying tube	4	Burette-valve tube

5	Suction tube for standard	6	Titration tube
7	Cap nut of the burette	8	Cap nut of the valve

- 1 Screw the cap nut of the valve (8) on tightly.
- 2 Screw the cap nut of the burette (7) on tightly.
- 3 Connect suction tube for standard (5) to the standard bottle (1) and the cyan-colored valve inlet.
- 4 Connect burette-valve tube (4) to the burette (2) and the red-colored valve inlet.
- 5 Connect titration tube (6) to the green-colored valve outlet and the green-colored rubber ring on the Analyzer head Na.
- 6 Ensure that all tubes are firmly connected and all cap nuts tightened.

4.8 Install printer & balance

Printers and balances can be connected to the USB interface found on the back of the instrument. Printers and balances are recognized automatically when connected. They can be used immediately by the instrument without any special settings.

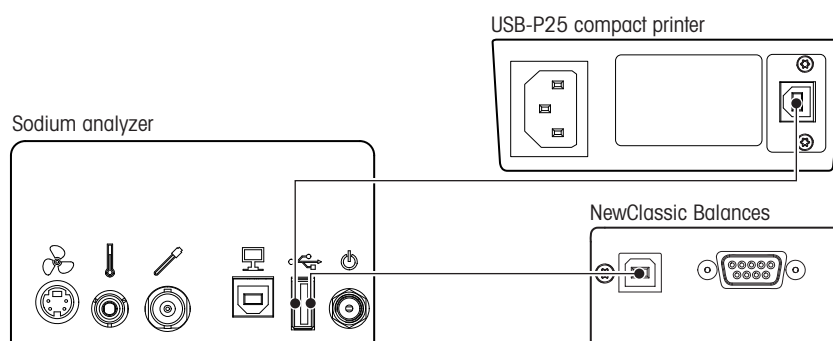
Supported devices

Manufacturer	Type	Model
METTLER TOLEDO	Balance	MS-S, MS-TS*, ML-T*, ME-T*
METTLER TOLEDO	Printer	USB-P25

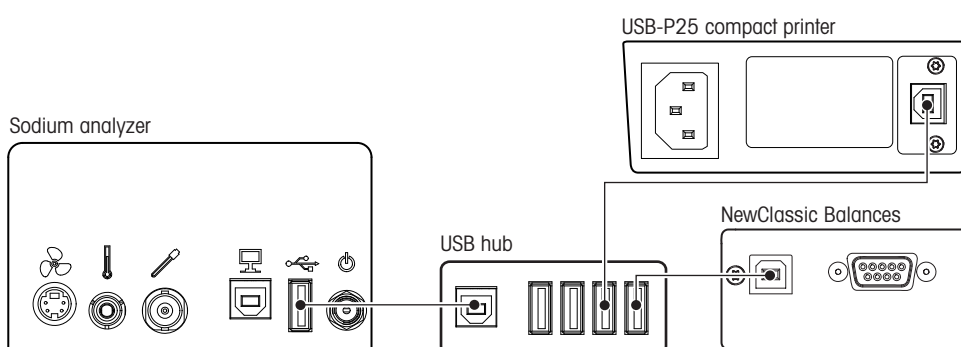
* Only for instrument firmware version 1.2.1 or higher.

A standard USB-hub can be used if more than one device is to be connected to the USB port of the instrument.

Connecting printer or balance:



Connecting printer and balance, using a hub:



5 Setup & Tools



Navigation: **Setup & Tools**

Select this menu item on the home screen to make changes to the system settings and to perform diagnostics.

5.1 Settings



Navigation: **Setup & Tools > Settings**

On tab **Settings** you can define general settings such as date-/time format, temperature unit or blank value.

On tab **System information** you will find general information about the instrument's hardware and software.

5.2 Language



Navigation: **Setup & Tools > Language**

Defines the user interface language.

5.3 Diagnostics



Navigation: **Setup & Tools > Diagnostics**

Performs diagnostics for the peripheral devices and the printer.

Available functions



Peripheral check

A connection test of the available peripheral devices is performed.



Printer check

A test printout is generated on the connected printer.



Sensor input

The sensor input function allows to measure the sensor input values in the basic units (mV, °C).

The measurement will automatically stop after the duration which was specified by the user.

This function may help in instrument verification procedures where the basic measurement values are required.

5.4 Toolbox



Navigation: **Setup & Tools > Toolbox**

This screen contains different tools for maintaining the firmware, adjusting the screen or performing a factory reset.

Available functions



Factory reset

This function will reset all data and settings of the instrument.



FW Update

This function will update the firmware of the instrument. The following firmware can be updated:

- **FW instrument:** This is the application firmware.
- **FW mainboard:** This is the firmware of the micro-controller.



Adjust screen

This function will start the touch screen adjustment.

Adjustment of the touch screen is necessary when your touch screen responds inaccurately e.g. after a firmware update has been performed.

6 Functional Apps on homescreen

6.1 Na Measure



Na Measure

Select this menu item to define analysis parameters and to start a measurement

Parameters

Only the most important parameters are listed here. To obtain additional information on all other parameters, you may refer to the online help by clicking [?] on the instrument.

Parameter	Description	Values
Potential diff. dE	Defines the targeted potential difference for each standard addition. Standard will be added until the potential difference is reached. Please make sure that (dE) x (No. of additions) is between 30 and 60 mV. Please refer the application notes to obtain a suggestion on the optimum values for your sample.	1.0 - 60.0
Analysis type	Selects the type of the analysis. For most applications Direct can be used. If your sample preparation contaminates your solution with Na ⁺ (e.g. acid hydrolysis), determine the blank value first and use Blank compensated afterwards to obtain more accurate results.	Direct Blank determination Blank compensated
Control	Definition of internally fixed parameters for the value acquisition.	Normal Fast Cautious User defined
Sampling	Select this option to choose the way the sample is prepared for the analysis. Direct Preparation of the sample directly in the beaker. Note: For solid samples, the sample volume is not taken into account ($V_{\text{solvent}} = V_{\text{water}} + V_{\text{ISA}}$). This sample preparation type is therefore recommended for solid samples which do not dissolve in the solvent. Liquid samples are assumed to be soluble in the solvent and, therefore, the sample volume is taken into account ($V_{\text{solvent}} = V_{\text{water}} + V_{\text{ISA}} + V_{\text{sample}}$). Aliquot incl. ISA Select "Aliquot incl. ISA" if you create a dilution solution with your sample, water and ISA. Take a known amount (aliquot) out of your dilution solution and put it in the analysis beaker. Aliquot excl. ISA Select "Aliquot excl. ISA" if you create a dilution solution with your sample and water (without ISA!). Take a known amount (aliquot) out of your dilution solution and put it in the analysis beaker. Then add the ISA directly to the beaker.	Direct Aliquot incl. ISA Aliquot excl. ISA
Multiple determination	This option will calculate the mean value and standard deviation (relative and absolute) in the samples. Maximum number of samples: 5.	Yes No
Printout	None No report is printed at the end of the analysis. Short A summary is printed at the end of the analysis. Long A full report is printed at the end of the analysis.	None Short Long

Export	Defines if a report is exported to a USB flash drive and the format of the exported report. None: no report is exported. PDF report: a report formatted as PDF file is exported. CSV report: a report formatted as CSV file is exported.	None PDF report CSV report
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6.2 Burette



Burette

Select this menu item to rinse the burette or to dispense a defined quantity of standard. Change the burette size according to the actual installed burette.

Properties

Parameter	Description	Values
Burette size	Select the size of burette you are using. The standard size of the burette is 10 mL. The adaption of a 20 ml burette is also possible.	10 mL 20 mL

Actions

Parameter	Description	Values
Rinse	Define the rinse cycles of the burette. A maximum of 3 rinse cycles is normally sufficient.	1 - 20
Dispense	Define the dispensing volume of the burette.	0.1 - 100.0

6.3 Stirrer



Stirrer

Select this menu item to switch the stirrer on or off at a definable stirring speed.

Parameter	Description	Values
Stir speed	Select the required stirrer speed.	Low Medium High Maximum

6.4 Standard



Standard

Select this menu item to define the standard properties. It is possible to define 3 standards (**S1**, **S2**, **S3**).

Parameters

Parameter	Description	Values
Standard type	The normally used standard is Na ⁺ (Sodium). Defining a user-specific standard name is also possible.	Sodium User defined
Actual concentration	Enter the Actual concentration of Na ⁺ of the used standard.	0.01 - 400'000.00

6.5 Sensor



Sensor

Select this menu item to view the sensor properties and to start a sensor conditioning. In the two tabs **Properties** | **Conditioning** you will find the sensor properties and the parameters to execute a sensor conditioning. If no temperature sensor is defined for the conditioning, the system settings are taken into account for temperature compensation (Global temperature).

Properties

Parameter	Description	Values
Sensor	Name of the measuring half-cell.	-
Reference sensor	Name of the reference electrode.	-
Temperature sensor	Define whether you are working with a temperature sensor or not. Please note that temperature sensor must be activated if the temperature sensor is connected.	On Off
Cond. Date/Time	Shows the date and time of the last sensor conditioning.	-
Cond. result	Shows the status of the last sensor conditioning.	-

Sensor conditioning

We recommend that daily sensor conditioning is performed before starting measurements.

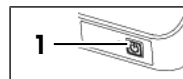
See also

 Performing sensor conditioning ► Page 20

7 Operation of the instrument

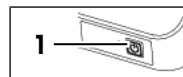
7.1 Start up the instrument

- The instrument is connected to the power supply.
- Press the power button  (1).
 - ⇒ The status LED starts blinking and the welcome window opens.
 - ⇒ The instrument starts up and detects connected devices.
 - ⇒ The instrument is ready for use when the status LED stops blinking.



7.2 Shut down the instrument

- Press the power button  (1).
 - ⇒ The status LED starts blinking and the instrument stops running tasks and shuts down.
 - ⇒ When the status LED and the screen are dark, the instrument is shut down.
- ⇒ The control circuit for the power button is energized. The rest of the instrument is not energized.



Shut down the instrument in emergency situations

- Pull the plug of the power cable out of the power outlet.

7.3 Preparing standards

Recommended ISA solution 1 M

- Wear protective gear as required by the safety data sheet of the chemicals you use and the safety rules of your workplace.
 - Prepare the solutions in a fume hood or a well-ventilated room.
 - ISA (Ionic strength adjuster) solution is added to the preconditioning solution, to the standard sodium solution as well as to the sample solution.
 - The final ISA-concentration in the analysis beaker should be 0.5 M ISA.
- 1 Prepare a 1'000 mL volumetric flask filled with approximately 120 mL deionized H₂O.
 - 2 Add 724 mL 0.5 M HCl and agitate to mix.
 - 3 Add 140 mL concentrated diisopropylamine (DIPA, 99.5 %).
 - 4 Fill deionized H₂O up to the 1'000 mL volumetric mark. The DIPA will dissolve slowly under intensive agitation.

Note

- The ratio of standard or sample to ISA should be 1:1.

Standard sodium solution with 0.5 M ISA

The standard solution 2'000 ppm Na Std. with 0.5 mol/L DIPA is prepared as follows:

- Wear protective gear as required by the safety data sheet of the chemicals you use and the safety rules of your workplace.
- 1 Use 5.084000 g NaCl for 1 L of solution.
 - 2 Dissolve the solution in a volumetric flask using 400 mL deionized H₂O + 500 mL 1 M ISA (see above).
 - 3 Fill with deionized H₂O up to the volumetric mark 1000 mL.

The standard solution 5'000 ppm Na Std within 0.5 mol/L DIPA is prepared as follows:

- 1 Use 12.71000 g NaCl for 1 L solution.
- 2 Dissolve the solution in a volumetric flask using 400 mL deionized H₂O + 500 mL 1 M ISA (see above).
- 3 Fill with deionized H₂O up to the volumetric mark 1000 mL.

Note

- The ratio of standard or sample to ISA should be 1:1.

Electrolyte for the reference sensor

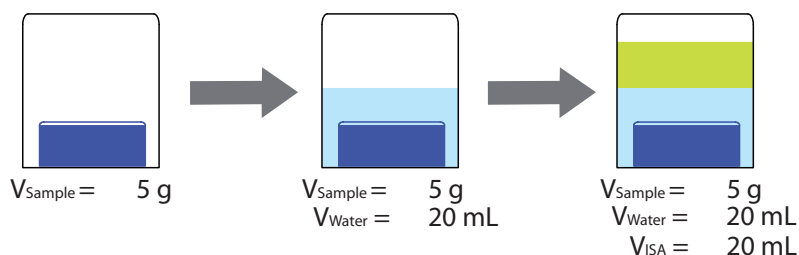
- Wear protective gear as required by the safety data sheet of the chemicals you use and the safety rules of your workplace.
- Use 0.5 M ISA solution.

7.4 Sample preparation

You can prepare samples in different ways. The used values in the descriptions are only for example.

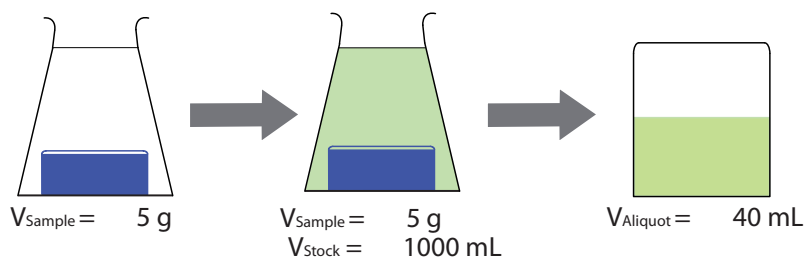
Analysis type Direct:

- 1 Add 5 g (solid sample) or 10 mL (liquid sample) into the analysis beaker.
- 2 Add 20 mL of water.
- 3 Add 20 mL of 1 M ISA.



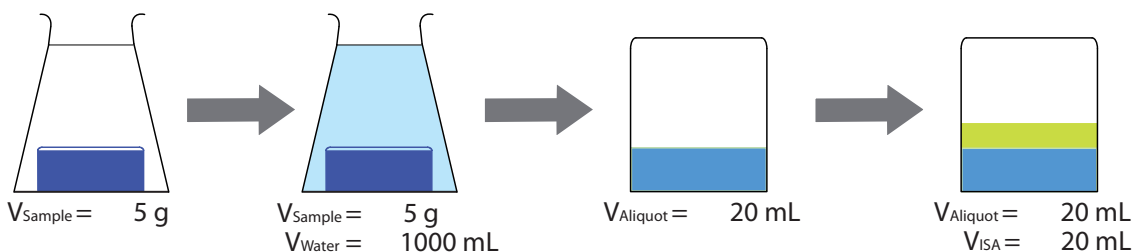
Analysis type Aliquot incl. ISA:

- 1 Add 5 g (solid sample) or 10 mL (liquid sample) into a volumetric flask.
- 2 Fill up to the volumetric mark e.g. 1000 mL with 0.5 M ISA.
- 3 Take out 40 mL aliquot and fill in the analysis beaker.



Analysis type Aliquot excl. ISA:

- 1 Add 5 g (solid sample) or 10 mL (liquid sample) into a 1000 mL volumetric vessel.
- 2 Fill up with water exactly to the volumetric mark of 1000 mL.
- 3 Take out 20 mL aliquot and fill in the analysis beaker.
- 4 Add 20 mL of 1 M ISA.



Note

- Detailed information about specific applications can be found in our application brochure which is part of the delivery.

7.5 Performing sensor conditioning



NOTICE

Danger of damage to the sensor due to drying out!

The sensor will be damaged if it is allowed to dry out.

- Make sure that the sensor is kept in a suitable liquid at all times.

Before starting your daily measurements, the sensors have to be conditioned. The sensor conditioning is a preconditioning with an internal test to check that the sensor values are stable. The instrument measures the voltage and verifies that the value is stable over a minimum time of 60 s (The maximum deviation of the measured values is 0.1 mV). Sensor conditioning will stop automatically when the sensors are ready to use. If the sensor values are not stable, sensor conditioning will stop automatically after 30 min with the result = failed.

Procedure

- Wear protective gear as required by the safety data sheet of the chemicals you use and the safety rules of your workplace.
- 1 Remove the Reference sensor from the Analyzer head Na.
- 2 Check by hand that the diaphragm moves smoothly. Rinse diaphragm with distilled water.
- 3 Open the rubber cap of the filling aperture and fill up the Reference sensor with electrolyte solution (0.5 M DIPA-HCL-ISA).
 - ⇒ The rubber cap must be open during sensor conditioning and measurements!
- 4 Put the Reference sensor back into the Analyzer head Na.
- 5 Put the Reference sensor into a beaker with Na⁺ solution (including ISA).
 - ⇒ Make sure the diaphragm is fully immersed into the conditioning solution.
- 6 Make sure the Na-ISE sensor is immersed into the conditioning solution.
- 7 Tap [▶] to start sensor conditioning.
 - ⇒ Sensor conditioning will normally take about max. 5 min and stops automatically.
 - ⇒ Tap [⏻] at any time to stop sensor conditioning.
 - ⇒ A timeout will be set automatically after 30 min (result = failed).
- ⇒ **Result = Passed**, the sensors are ready for use (Threshold = 0.1 mV).
- ⇒ **Result = Failed**, please check the sleeve diaphragm and the electrolyte level of the reference sensor. Make sure no air bubbles are inside the electrolyte of the reference sensor. Check the cable connections and repeat sensor conditioning.

7.6 Performing an analysis

Preparation

- 1 Check that the settings for the burette size correspond to the burette used for the analysis.
- 2 Check that the settings for the standard correspond to the standard used for the analysis.
- 3 Check that the settings for the sensor correspond to the sensor used for the analysis.
- 4 Check that the rubber cap of the filling aperture of the sensor is open.
- 5 **Note:** Air bubbles in the burette or the tubes can affect the results.
Rinse the burette and tubes with the function **Burette > Rinse** until no more air bubbles are present in the tube connections.

7.6.1 Single determination

- The sample is prepared and added to the beaker.
 - The magnetic stirrer bar is placed in the beaker.
 - All parameters for the method are checked and defined. **Multiple determination = No.**
- 1 Place the beaker on the center of the stirrer unit.
 - ⇒ Verify that the magnetic stirrer bar is turning correctly.

- 2 On the home screen, tap and hold [] to start the analysis.
 - ⇒ You will be prompted if any parameters are required by the analysis.
- 3 Follow the instructions on the screen. With the progress of the measurement, the displayed curve is automatically rescaled so that the entire measurement is visible.
 - ⇒ The result screen is displayed.

Note

- Tap [] to stop the measurement for early data transfer. The actual results will be shown in the menu **Results**
- Tap [] to stop the measurement without storing data.
- If an error occurs, measurement will stop immediately.

7.6.2 Multiple determination

- The sample is prepared and added to the beaker.
 - The magnetic stirrer bar is placed in the beakers.
 - All parameters for the method are checked and defined. **Multiple determination = Yes.**
- 1 Place the beaker on the center of the stirrer unit.
 - ⇒ Verify that the magnetic stirrer bar is turning correctly.
 - 2 On the home screen, tap and hold [] to start the analysis.
 - ⇒ You will be prompted if any parameters are required by the analysis.
 - 3 Follow the instructions on the screen. With the progress of the measurement, the displayed curve is automatically rescaled so that the entire measurement is visible.
 - ⇒ When the first analysis is finished, the result screen is displayed with the two options **Last sample Overview**.
 - 4 Prepare the next sample and place the beaker on the stirrer.
 - 5 Tap [] to start the next analysis and follow the instructions on the screen.
 - ⇒ Repeat these steps for a maximum of 5 samples.
 - 6 To end the series before the maximum of 5 samples is reached, tap []
 - ⇒ The result screen is displayed with the options **Last sample Overview**. The results of the last sample and the overview including the statistical data for the sample series are displayed.

Note

- Tap [] to stop the measurement for early data transfer. The current results will be shown in the menu **Results**
- Tap [] to stop the measurement without storing data. Accumulated data will automatically be excluded from the statistics.
- If an error occurs, measurement will stop immediately and accumulated data will also automatically be excluded from the statistics.

7.7 Results

Results of a single determination

Content	(R1) 126.08 ppm	Na Measure M1
Content	(R2) 0.126 g/L	
Sample size	23 mL	
Volume	3.258 mL	
Number of additions	3 Fixed	
Slope	55.7 mV/log(c)	
Coeff. of determ. (R ²)	0.998	
Date/Time	01/10/2018 14:00	
		

1/2

All available results for the sample are shown.

Content (R1)	Entered value in Calculation 1
Content (R2)	Entered value in Calculation 2
Sample size	Entered value in Sample size (mL) Only for Sampling = Aliquot incl. ISA/Aliquot excl. ISA : The sample size is the amount of sample in the dilution volume.
Sample size in aliquot	Only for Sampling = Aliquot incl. ISA/Aliquot excl. ISA : The sample size aliquot is the amount of the sample which is currently in the measuring beaker.
Volume	Total volume of the standard added to the sample.
Number of additions	Number of additions performed. Fixed Terminated according to additions in method Manual Manually terminated additions [✓]
Slope	When measuring sodium ions, the slope factor at 298 K (25°C) has a value of 59.16 mV. This is termed the Ideal Slope Factor and means that for each tenfold change in Sodium concentration, an ideal measuring system will sense a mV change of 59.16. The measurement of slope factor gives an indication of the performance of the sensor.
Coeff. of determ. (R²)	R ² denotes the strength of the relationship between the concentration (logarithmic) and the mV signal and indicates how well data points fit the linear regression. R ² represents the percent of the data that is the closest to the line of best fit. For example, if R ² = 0.950, this means that 95% of the total variation in y can be explained by the linear relationship between x and y.
Date/Time	Date and time of the displayed analysis-results.

Results of a multiple determination

No.	R1 [%]	R2 [ppm]		Na Measure
1	9.98	1.829	✓	
2	9.99	1.832	✓	
3	10.02	1.842	✗	
4	10.01	1.839	✓	
1 — AVG [%] 9.98			ASD [%] 0.511	RSD [%] 0.2

The results of the individual samples are displayed as well as the statistics (Average, absolute and relative standard deviation). By tapping on the individual sample, all available results for the respective sample are shown. If two calculations are defined in the method type, tap on the bottom bar (1) to get all statistics listed.



Tap this icon to exclude a result from the statistics.



Tap this icon to include a result, which was previously excluded. Results of stopped or erroneous analyses are excluded automatically.

8 Maintenance

In this chapter, you find descriptions of the maintenance tasks you can perform yourself. Any other maintenance tasks need to be performed by a service technician that has been qualified by METTLER TOLEDO. If you experience problems with your instrument, contact your authorized METTLER TOLEDO dealer or service representative.

METTLER TOLEDO recommends that preventive maintenance is done at least once a year through your authorized METTLER TOLEDO dealer or service representative.

► www.mt.com/contact

8.1 Maintenance schedule

If the standard operating procedures of your company require other maintenance intervals, use the intervals listed in the standard operating procedures.

Frequency	Task	Link
Daily	If you work with aggressive chemicals, empty the burette at the end of the work day.	[Empty tubes, valve and burette ► Page 24]

8.2 Clean the instrument



NOTICE

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

Inappropriate cleaning agents can damage the housing or other parts of the instrument. If liquids enter the housing they can damage the instrument.

- 1 Make sure the cleaning agent is compatible with the material of the part you want to clean.
- 2 Make sure that no liquid enters the interior of the instrument.

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

► www.mt.com/contact

8.2.1 Clean the housing



NOTICE

Danger of damage to the instrument due to inappropriate cleaning agents

The housing is made of Polypropylene (PP GF30) and can be damaged by certain acids and organic solvents, such as toluene, xylene, and methyl ethyl ketone (MEK).

- Use only water and a mild detergent to clean the housing.

METTLER TOLEDO recommends the following cleaning agents:

- Water
- Water with a mild detergent

Procedure

- The instrument is shut down.
- Wipe the housing with a cloth moistened with the cleaning agent.

8.2.2 Rinse tubes, valve and burette

- Wear protective gear as required by the safety data sheet of the chemicals you use and the safety rules of your workplace.
- 1 Remove the green tube from the beaker and place it in a waste container.
 - 2 Unscrew the blue tube from the bottle and place it in an empty container.
 - 3 To empty the tubes, run the function **Burette > Rinse** until all tubes are empty.

- 4 Place the blue tube in a bottle with deionized water.
- 5 Run the function **Burette > Rinse** until the tubes are rinsed.
- 6 Place the blue tube in a bottle with 99.5% ethanol.
- 7 Run the function **Burette > Rinse** until the tubes are rinsed.
- 8 Place the blue tube in an empty bottle.
- 9 To empty the tubes, run the function **Burette > Rinse** until all tubes are empty.
- 10 Dispose of the waste as required by the safety data sheet of the chemicals you use and the rules of your workplace.

8.2.3 Empty tubes, valve and burette

Empty tubes, valve and burette with the burette function

- 1 Remove the green tube from the beaker and place it in a waste container.
- 2 Unscrew the blue tube from the bottle and place it in an empty container.
- 3 To empty the tubes, run the function **Burette > Rinse** until all tubes are empty.
- 4 Disassemble and empty the burette.

Empty tubes and burette manually

- The instrument is disconnected from the power supply.
- 1 Place a waste container next to the instrument.
 - 2 Unscrew the blue tube from the bottle and place it in an empty container.
 - 3 Unscrew the blue tube from the valve and empty it into the waste container.
 - 4 Clean the connectors of the blue tube with a tissue.
 - 5 Pull the green tube from the beaker and place it in the waste container.
 - 6 Unscrew the green tube from the valve and empty it into the waste container.
 - 7 Clean the connector and the other end of the green tube with a tissue.
 - 8 Unscrew the red tube from the burette and place it in the waste container.
 - 9 Unscrew the red tube from the valve and empty it into the waste container.
 - 10 Clean the connectors of the red tube with a tissue.
 - 11 Disassemble and empty the burette.
 - 12 Dispose of the waste as required by the safety data sheet of the chemicals you use and the rules of your workplace.

See also

- 📖 Disassemble the burette ► Page 25
- 📖 Assemble the burette ► Page 26

8.2.4 Clean the burette



NOTICE

Danger of damage to the O-rings due to reinserting the piston!

Reinserting the piston into the glass cylinder will damage the O-rings.

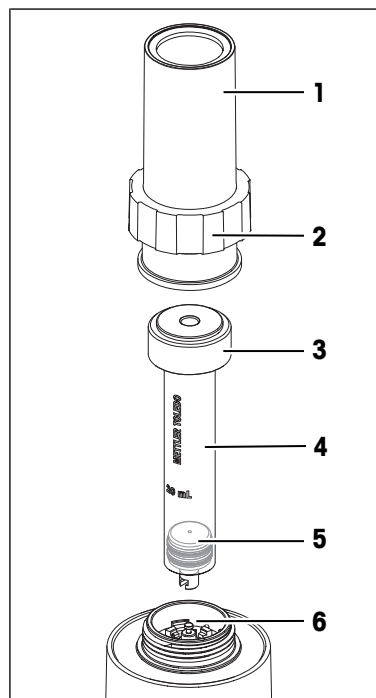
- Do not pull the piston out of the glass cylinder.

8.2.4.1 Disassemble the burette

- The burette, valve and tubes are rinsed and emptied.
 - The instrument is disconnected from the power supply.
- 1 Disconnect the red tube from the top of the burette cap (3) and clean the connections with a tissue.
 - 2 Disconnect the cap nut (2).
 - 3 Lift off the burette cover (1) including the cap nut (2).
 - 4 Carefully lift the glass cylinder (4), until you are able to slide the burette from the piston rod (6).
 - 5 Remove the burette cap (3) and empty the burette into a waste bottle.
 - 6 Replace the burette if the piston leaks, if the glass cylinder is badly scored at the edge or if crystals have formed between the seals of the piston.

See also

- 📖 Rinse tubes, valve and burette ► Page 23
- 📖 Empty tubes, valve and burette ► Page 24



8.2.4.2 Clean the burette parts



NOTICE

Danger of damage to the burette due to wrong cleaning methods

Parts of the burette can be damaged if you use the wrong cleaning agents or cleaning methods.

- 1 Never place O-rings in organic solvents.
- 2 Never attempt to remove any crystals in the cylinder by scratching with a hard object.
- 3 Never put the parts in a drying oven with a temperature higher than 40 °C.

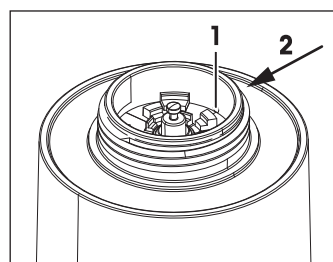
The frequency of cleaning depends on the frequency of usage and the chemicals used. You should clean the burette, valve and tubes when bubbles form in the burette or the tubes or if you see deposits in the burette or the tubes.

Procedure

- 1 Depending on the contamination caused by the chemicals, rinse cylinder, valve and tubes first with deionized water and then with high quality ethanol.
- 2 Remove crystals with pipe cleaners or Q tips™.
- 3 Dry the parts with oil-free compressed air.

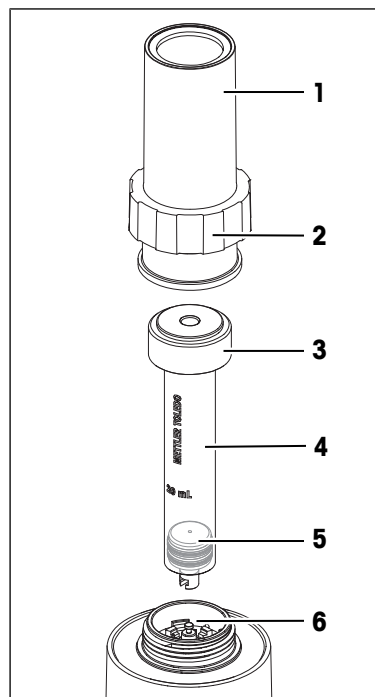
8.2.4.3 Clean the burette compartment

- The instrument is disconnected from the power supply.
- 1 If there is liquid in the burette compartment, absorb the liquid with an absorbent material like a Q-tip™.
 - 2 Push a thin rod from the rear of the instrument (2) into the outlet (1) of the burette compartment.
 - 3 Pull the thin rod out of the outlet.
 - 4 If the thin rod has pushed dirt into the valve compartment, take the dirt out with tweezers.



8.2.4.4 Assemble the burette

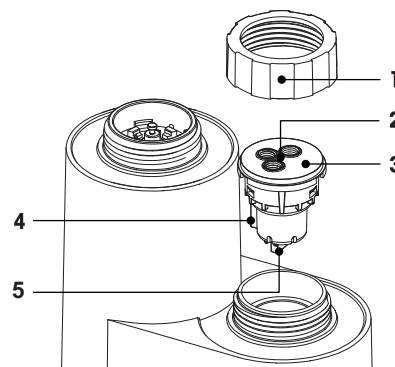
- The instrument is disconnected from the power supply.
- 1 Place the burette cap (3) onto the glass cylinder (4).
- 2 Slide the glass cylinder (4) onto the piston rod (6).
- 3 Carefully press the glass cylinder (4) down until it touches the housing of the instrument.
- 4 Place the burette cover (1) over the glass cylinder.
- 5 Place the cap nut (2) over the burette cover (1).
- 6 Screw the cap nut (2) onto the housing of the instrument and tighten it.
- 7 Screw one of the connectors of the red tube into the burette cap (3) and tighten it.
- 8 Screw the other connector of the red tube into the red opening of the valve and tighten it.
- 9 Make sure that all tubes are firmly connected and all cap nuts tightened.



8.2.5 Clean the valve

8.2.5.1 Remove the valve

- The burette, valve and tubes are rinsed and emptied.
- The instrument is disconnected from the power supply.
- 1 Unscrew all tube connectors (2) from the valve and clean the tube connectors with a tissue.
- 2 Check that all tube connectors are removed.
- 3 Unscrew the cap nut (1) holding the valve.
- 4 Remove the valve (3).
- ⇒ The valve can now be replaced or cleaned.



See also

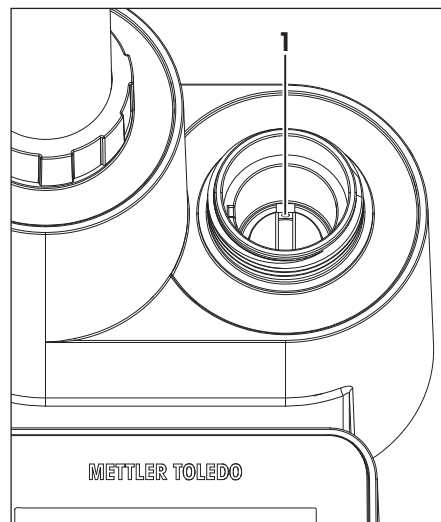
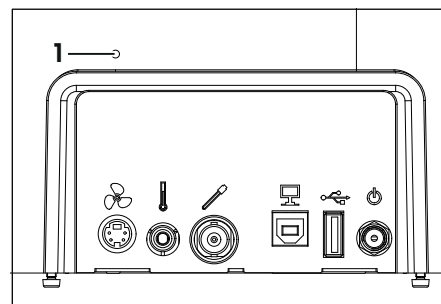
- ▢ Rinse tubes, valve and burette ► Page 23
- ▢ Empty tubes, valve and burette ► Page 24

8.2.5.2 Clean the valve

- 1 Place the valve for 30 minutes, or until the residue is dissolved, in deionized water or in ethanol.
- 2 Take the valve out and leave it to air-dry.

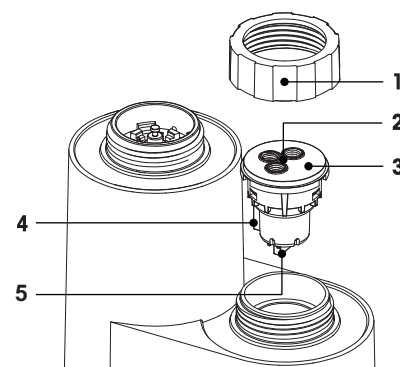
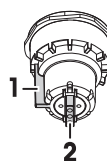
8.2.5.3 Clean outlet of valve compartment

- The instrument is disconnected from the power supply.
 - The valve has been removed.
- 1 If there is liquid in the valve compartment, absorb the liquid with an absorbent material like a Q-tip™.
 - 2 Push a thin rod from the rear of the instrument into the outlet (1) of the valve compartment.
 - 3 Check that the end of the thin rod reaches the opening of the outlet (1) in the valve compartment.
 - 4 Pull the thin rod out of the outlet.
 - 5 If the thin rod has pushed dirt into the valve compartment, take the dirt out with tweezers.



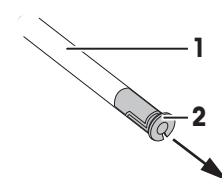
8.2.5.4 Install the valve

- 1 Make sure that the guide (1) is perpendicular to the driver bar (2).
- 2 Orient the valve so the guide (4) points toward the burette.
- 3 Insert the valve (3).
- 4 Screw the cap nut (1) on the instrument and tighten it.

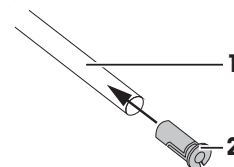


8.3 Replace the siphon tip

- 1 Place a waste bottle next to the instrument.
- 2 Pull the green tube from the beaker and place it in a waste container.
- 3 Unscrew the green tube from the valve and empty the tube into the waste container.
- 4 Pull the siphon tip (2) with tweezers out of the tip of the green tube (1).



- 5 Push a new siphon tip (2) into the tip of the green tube (1).

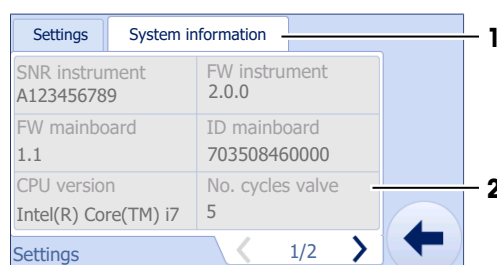


8.4 Replace the valve

The instrument permanently counts the cycles of the valve. When the life time of 5000 cycles is reached, a message box opens.

Check the number of valve cycles

- 1 Go to > > > **Settings**.
- 2 Tap **System information** (1).
 - ⇒ The current number of valve cycles is displayed in **No. cycles valve** (2).



Replace the valve

- 1 Remove the valve. **See** [Remove the valve ► Page 26].
- 2 Clean the outlet of the valve compartment. **See** [Clean outlet of valve compartment ► Page 27].
- 3 Install the new valve. **See** [Install the valve ► Page 27].

Reset the number of valve cycles

- 1 Go to > > > **Settings**.
 - 2 Tap **System information** (1).
 - 3 Go to page 2.
 - 4 Tap **Reset cycles valve** (2).
- ⇒ The number of valve cycles is set to 0.



8.5 Transport the instrument

- The burette, valve and tubes are rinsed and emptied.
 - The instrument is disconnected from the power supply.
- 1 Remove all tube connectors from burette and valve.
 - 2 Remove all cable connections from the instrument.
 - 3 Remove the burette.
- ⇒ The instrument is ready to be transported.

8.6 Dispose of the instrument

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

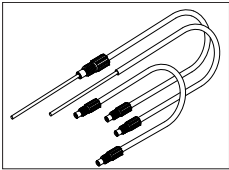
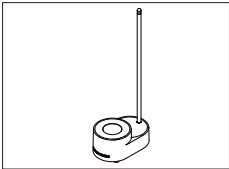
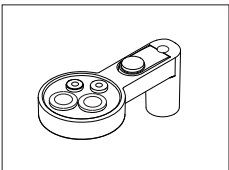
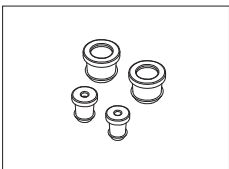
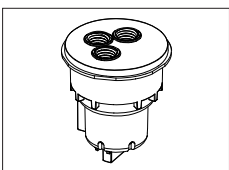
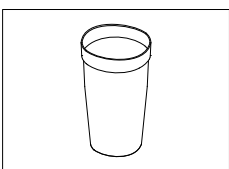
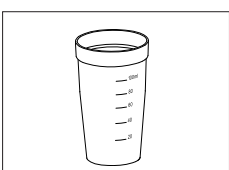
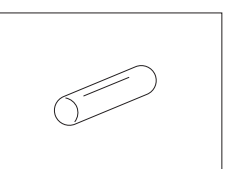
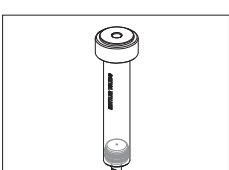
Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment. If you have any questions, please contact the responsible authority or the distributor from which you purchased this device. Should this device be passed on to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

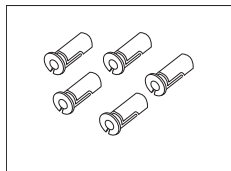


9 Troubleshooting

Problem	Cause	Measure
The valve is leaking.	The grey cap nut or the tube connections are not enough tightened.	Tighten the grey cap nut of the valve and the tube connections.
	The siphon tip of the green tube is clogged.	Replace the siphon tip of the green tube.
	Some of the tubes are clogged.	Rinse the tubes.
		If the tubes are still clogged, replace the tubes.
The burette is leaking.	The valve is clogged	Clean the valve.
		If the valve still leaks, replace the valve.
	The O-rings of the burette cap are damaged.	Replace the O-ring.
	The O-rings of the piston are damaged.	Replace the O-ring.

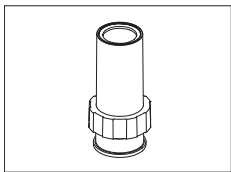
10 Accessories

	Description	Order number
	Tubing set instrument	30065464
	EasyStir GT	30065467
	Analyzer Head Na	30079612
	Insert set Analyzer head Na	30079618
	Valve	30042860
	Glass beakers 100 mL 20 pcs.	101446
	Beakers PP (120 pcs.) 100 mL, polypropylene, standard	51109388
	Stirrer Bar EPx	30060027
	Burette 10 mL Burette 20 mL	30043900 30043901



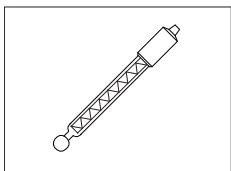
Siphon tips (5 pcs.)

23240



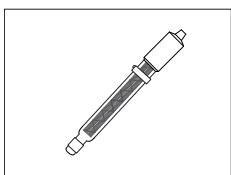
Burette cover set

30057633



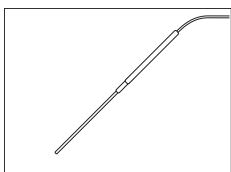
DX222-Na

30079616



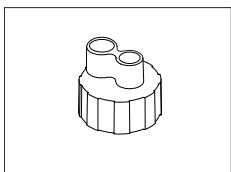
DX205-SC

30066675



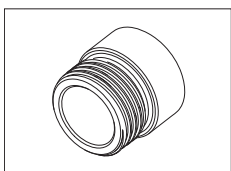
Temperature probe NTC 30K

51300164



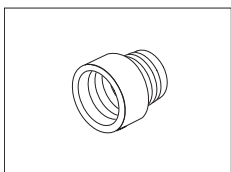
Bottle Head incl. flat seal

30060023



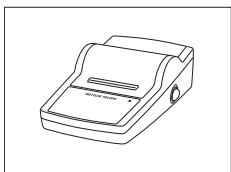
Bottle adapter
Merck, Germany
Fisher, USA

23774
23787



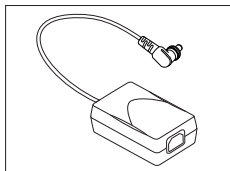
Bottle adaptor China (D34) incl. flat seal
Bottle adaptor China (D28.5) incl. flat seal
Bottle adaptor India incl. flat seal

30079456
30060026
30060024



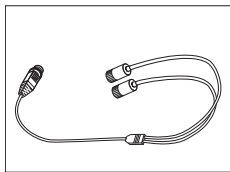
Lab equip access. data writer USB-P25/01

11124301



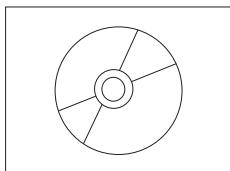
AC/DC power adapter

51105795



Cable Reference sensor Na

30079614



EasyDirect Titration Trial Version

30096988

11 Technical Data

Characteristic		Value
Power rating instrument	Input voltage	24 V DC
	Input current	0.5 A
Power rating AC adapter	Line voltage	100 - 240 V $\pm$ 10 %
	Input frequency	50 - 60 Hz
	Input current	0.8 A
	Output voltage	24 V DC
	Output current	1.25 A
Dimensions	Width	170 mm
	Depth	220 mm
	Height	350 mm
Weight	Instrument	1850 g
Touch screen	Technology	Full-coverage touch screen
	Size	4.3 inch
	Resolution	480 x 272 pixel, color
Materials	Housing	PP GF30
	Metal parts	Stainless steel
	Touch screen cover	Polyester
Ambient conditions	Ambient temperature	5...40 °C
	Relative humidity	Max. 80 % (non condensing) at 31 °C, linearly descending to 50 % at 40 °C
	Altitude	$\leq$ 2000 m above sea level
	Use	For indoor use only
	Overvoltage category	II
	Pollution degree	2

Connections

Characteristic		Value
USB type A	Data rate	USB 2.0, full / low speed
USB type B	Data rate	USB 2.0, full / low speed
Stirrer output	Voltage	0...9 V DC
	Socket	4-pin Mini-DIN
Sensor mV Input	Measuring range	$\pm$ 2000 mV
	Socket	BNC
Temperature Input	Sensor type	NTC 30 K Ω at 25 °C
	Measuring range	-5...105 °C
	Socket	Cinch (RCA)

Directives and standards

The instrument complies with the directives and standards that are listed on the declaration of conformity.

EasyStir

Characteristic		Value
Stirrer motor	Motor type	24 V DC
	Voltage	0...9 V DC
	Cable connection	4-pin Mini-DIN
Materials	Housing	PP GF30
	Metal parts	Stainless steel
Weight		550 g

To protect your product's future:

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

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www.mt.com/SodiumAnalyzer

For more information

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Im Langacher 44
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www.mt.com/contact

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