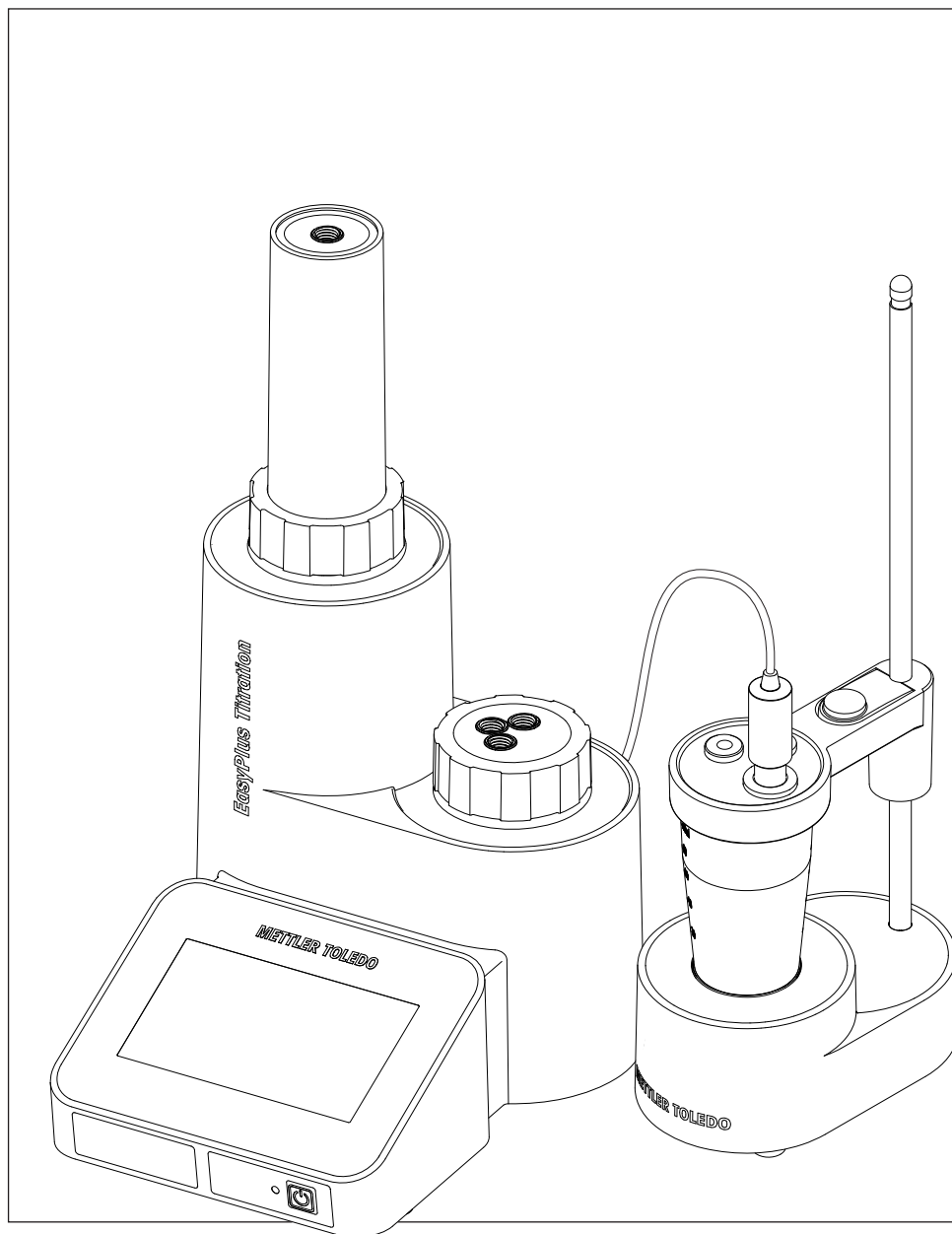


EasyPlus™ Titration

Easy pH / Easy Ox / Easy Cl / Easy Pro



METTLER TOLEDO

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1 Introduction

The EasyPlus™ titrator is especially designed for routine applications and is simply operated due to the Apps oriented user interface. The simple and intuitive navigation speaks your language and 14 others. The setup and installation process is supported by the EasySetup tutorial on the instrument, meaning that the titrator is up and running in the shortest possible time.

Titration for your Samples

The instruments in METTLER TOLEDO's EasyPlus™ Titration line are modern with a small footprint for use in a wide variety of basic applications. The instrument is primarily developed for the use in quality control labs and for educational purposes.

The EasyPlus titrators perfectly combine simple, easy-to-understand operation with a high precision and reliability. Thanks to the App oriented user interface and the built-in know-how (iTitrate™ intelligence), operation could not be any simpler or intuitive.

The EasyPlus titrators 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 EasySetup guides you step by step through the installation menu and the help tool on the instrument explains all parameters. Installation, setup and operation of the instrument could not be any simpler.

Take advantage of our internet based service and support. Videos, FAQ's and a multitude of applications are just a click away. Visit us on:

www.mt.com/easyplustitration

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 dealer or service representative.

► 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

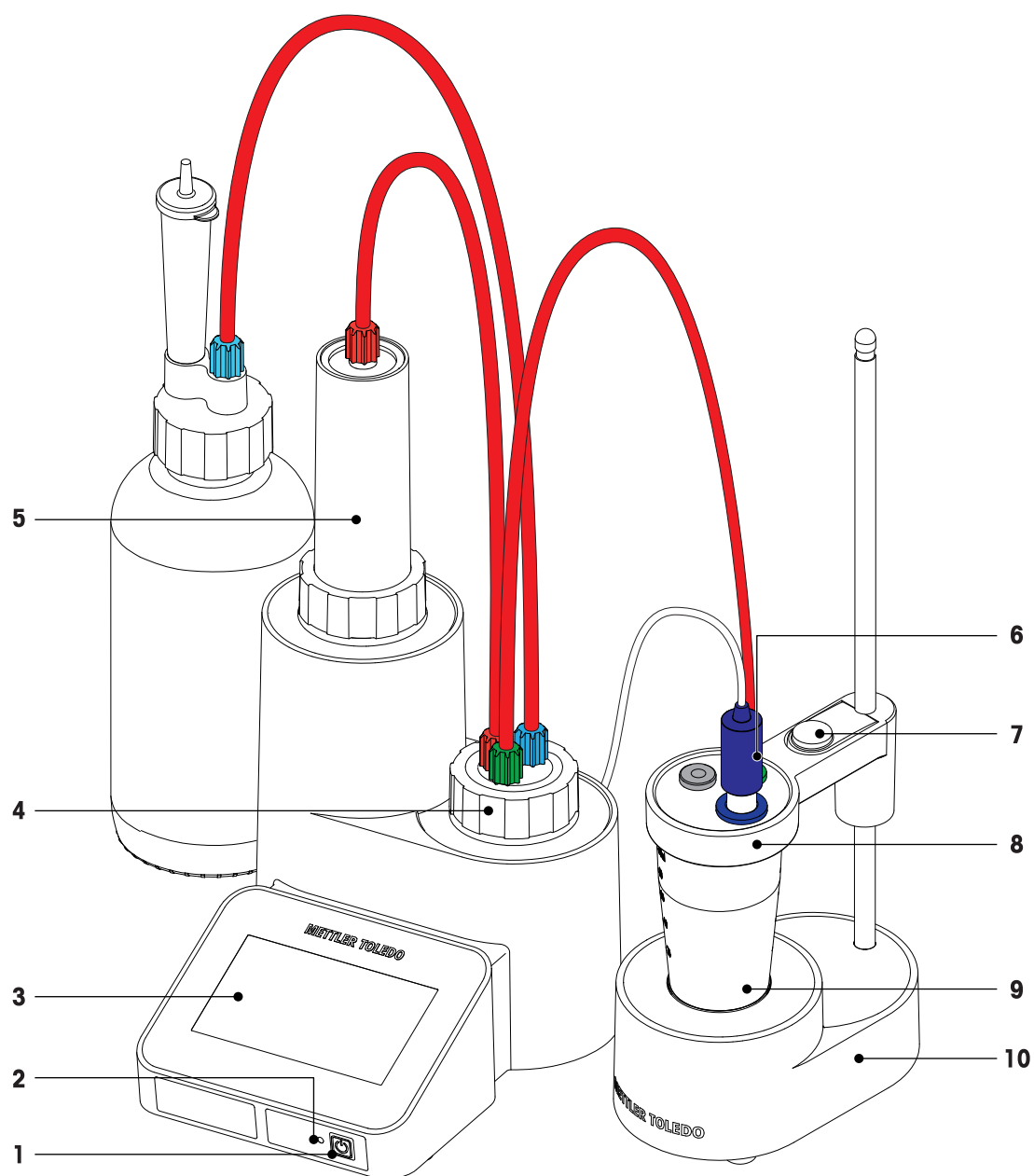
Risk of damage to the instrument due to the use of unsuitable parts!

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.

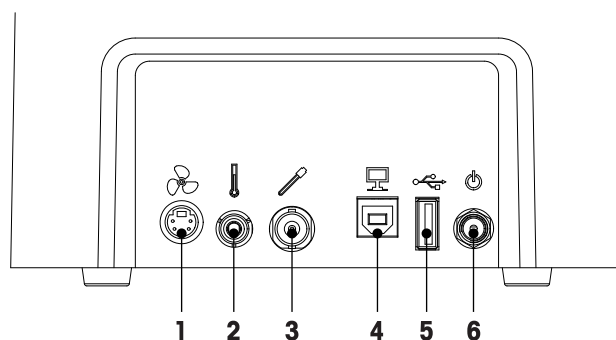
3 Design and Function

3.1 Overview



1	Power button	2	Status LED
3	Touch screen	4	Valve
5	Burette	6	Sensor
7	Release button	8	Titration head GT
9	Titration beaker	10	Stirrer (EasyStir GT)

3.2 Rear panel

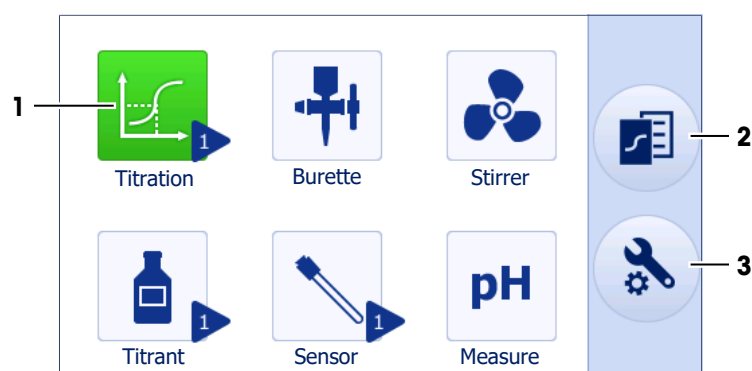


1	Socket for stirrer (Mini-DIN)	2	Socket for temperature sensor (RCA - Cinch)
3	Socket for measuring sensor (BNC)	4	USB B interface for PC connection (EasyDirect PC Software)
5	USB A interface for printer and balance	6	DC socket for power supply

3.3 User Interface

3.3.1 Home

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



1	Apps for various functions	2	Select this menu item to display the results of the last analysis.
3	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. ¹⁾



Indicates which analysis will be started when you tap and hold an app (LongClick™). Parameter set with number two is active in this example. ¹⁾

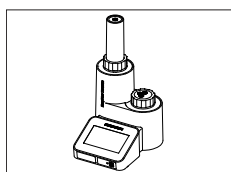
1) For instrument type Easy Pro only.

4 Putting into Operation

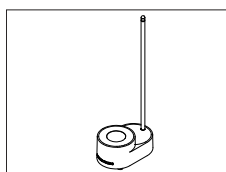
Before getting started, make sure you have received all parts listed in the section scope of delivery.

4.1 Scope of Delivery

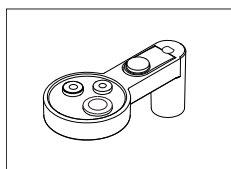
Check the completeness of the delivery. The following accessories are part of the standard equipment of your new instrument:



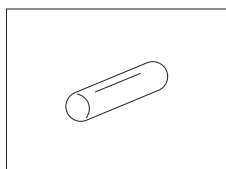
EasyPlus titrator incl. 20 mL burette



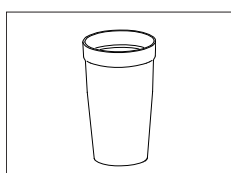
EasyStir GT



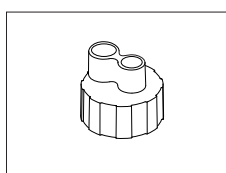
Titration head GT



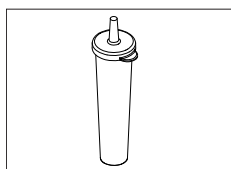
Magnetic stirrer bar



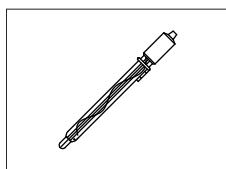
Beaker PP (100 mL, 10 pcs.)



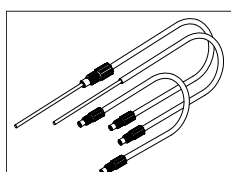
Bottle head incl. flat seal



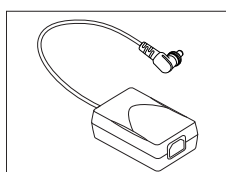
Drying tube



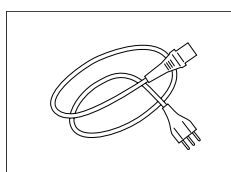
Measuring sensor



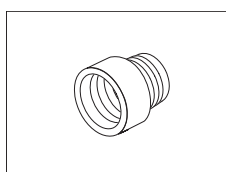
Tubing set instrument



AC/DC power adapter



Country specific power cable



Bottle adapter incl. flat seal
(For China only)

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.



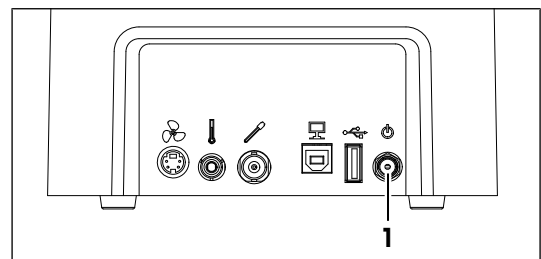
NOTICE

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.



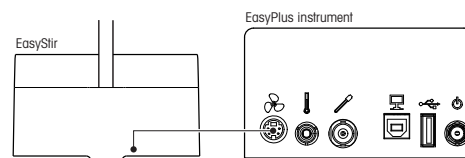
4.4 Disconnect the instrument from the power supply

- 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.

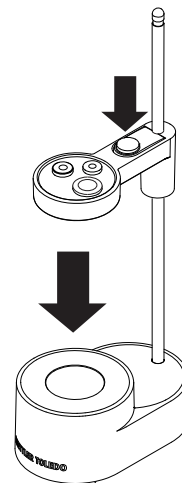
4.5 Install the EasyStir

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

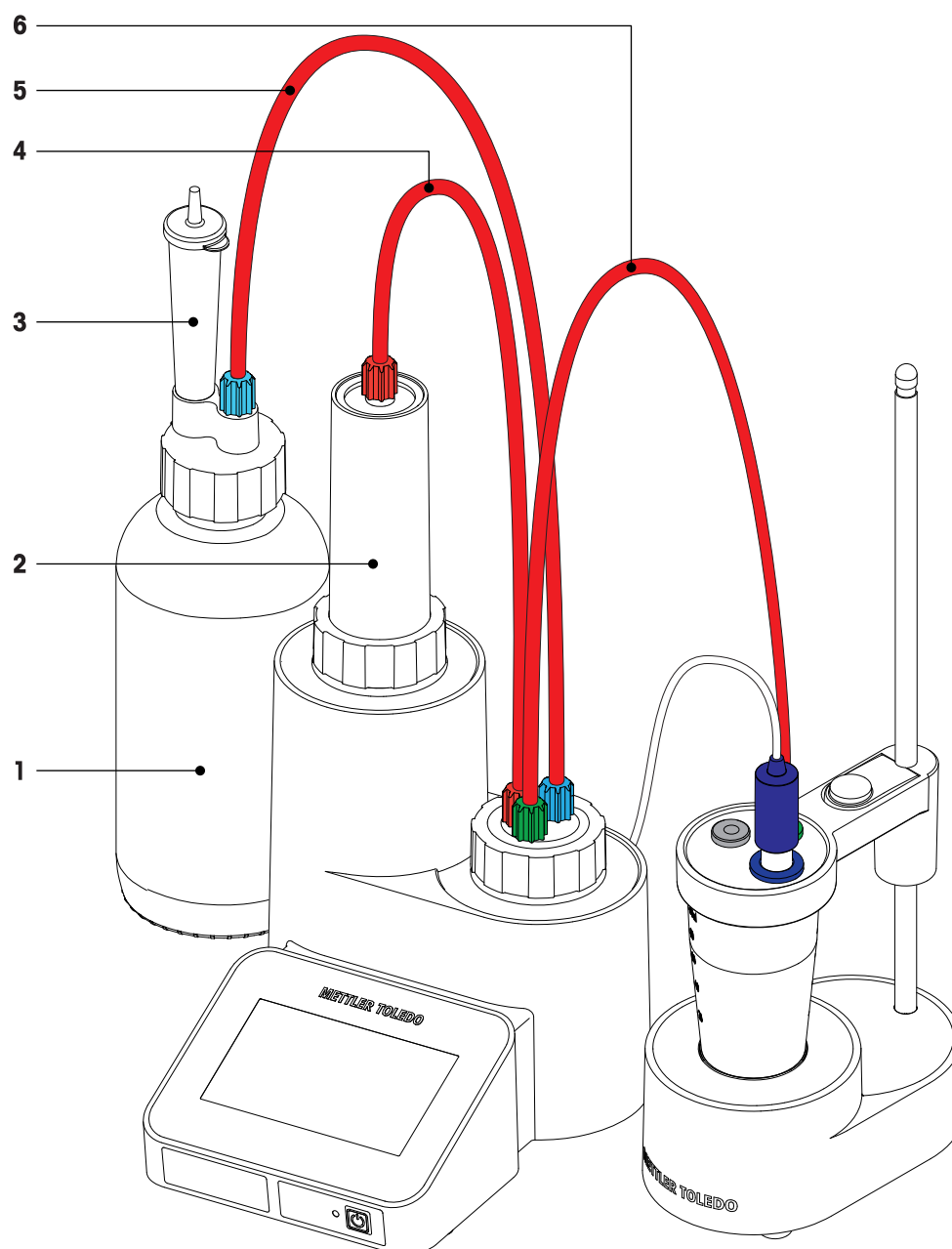
- 1 Connect EasyStir to the instrument stirrer socket, observing the arrow on the connector.



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



4.6 Install the tubing



1	Titrant bottle	2	Burette
3	Drying tube	4	Burette-valve tube
5	Titrant tube	6	Titration tube

- 1 Connect the titrant tube (5) to the titrant bottle (1) and the cyan-colored valve inlet.
- 2 Connect the burette-valve tube (4) to the burette (2) and the red-colored valve inlet.
- 3 Connect the titration tube (6) to the green-colored valve outlet and the green-colored rubber ring on the titration head.
- 4 Ensure that all tubes are firmly connected and all cap nuts tightened.

4.7 Install printer and balance

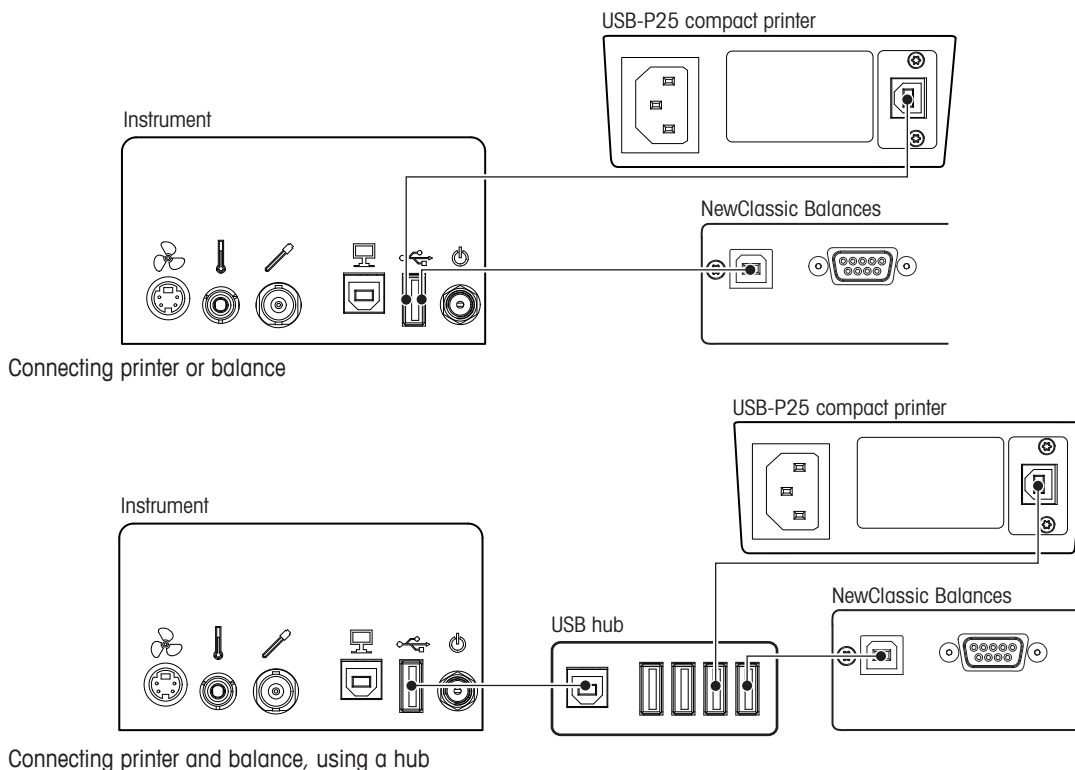
Printers and balances can be connected to the USB interface on the back side of the titrator. Printers and balances are recognized automatically when connecting. They can immediately be used by the instrument without any special settings.

Supported devices

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

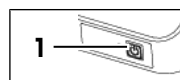
* Only for instrument firmware version 1.2.1 or higher.

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



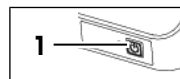
4.8 Start up the instrument

- The instrument is connected to the power supply.
- 1 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.
 - ⇒ If you start the instrument the first time, the tutorial opens.
- 2 If needed, follow the instructions in the tutorial to configure the instrument.



4.9 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.

5 Setup and 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**

Enter or display general system settings on this screen like **Date/Time**, **Blank value**, **No. cycles valve** and **SNR instrument**.

5.2 Language



Navigation: **Setup & Tools > Language**

Defines the user interface language.

5.3 VPac

Mettler-Toledo offers an unique performance verification service* with the ready to use traceable VPac™ standard kits. It is a simple and convenient method to get an independent, reliable verification of your system's performance. It is a standard operating procedure which covers the whole system while minimizing operator handling errors. This enables the on-line support team to help solve your titration problems.

► www.mt.com/easyplustitration-vpac

A performance test is recommended in the following situations:

- You are setting up an instrument.
- You are changing components of the titration system like the burette.
- You are switching the titrant or electrode.
- Periodic check every 6 months.

(*) The systems performance is verified according to the general system suitability tests requirements defined by Mettler-Toledo.

This service is provided for the EasyPlus™ Titration types: Easy CI, Easy pH, Easy Pro

Get the ready to use standard solutions appropriate for your type of titration and simply run three analyses. The preprogrammed method automatically calculates the results which can be submitted on the Mettler-Toledo webpage with your EasyPlus™ Titration registration to receive an unbiased performance verification statement rating your titration's accuracy.



Navigation: **Setup & Tools > VPac**

Execute a performance verification for the instrument including the titrant and the sensor, using a VPac standard kit.

This function is available for the following titration types:

- Acid/Base aqueous: **Easy pH, Easy Pro**
- Precipitation: **Easy CI, Easy Pro**



Tap the help icon to change to help mode. Then tap any of the parameters to get a specific help description. To exit the help mode, tap the help icon again.



If a printer is connected, this icon is displayed on the parameter screen. Tap the icon to print the parameters.

Performance verification

- Wear protective gear as required by the safety data sheet of the chemicals you use and the safety rules of your workplace.
 - It is recommended to perform a titrant determination, before a performance verification using a VPac is executed.
 - Clean a stirrer bar which will be used for the procedure.
- 1 In **Standard kit**, select the corresponding VPac to be used for the performance verification.

- 2 Insert a stirrer bar into the first sample vessel (A) from the VPac and attach it to the titration head.
- 3 Tap  to start the first determination.
 - ⇒ When the first determination is finished, the result screen is displayed.
- 4 Release the sample vessel and remove the stirrer bar from the sample vessel.
- 5 Insert the cleaned stirrer bar into the second sample vessel (B) from the VPac and attach it to the titration head.
- 6 Tap  to start the second determination.
 - ⇒ When the second determination is finished, the result screen is displayed.
- 7 Release the sample vessel and remove the stirrer bar from the sample vessel.
- 8 Insert the cleaned stirrer bar into the third sample vessel (C) from the VPac and attach it to the titration head.
- 9 Tap  to start the third determination.
- 10 Dispose of the waste as required by the safety data sheet of the chemicals you use and the rules of your workplace.
 - ⇒ When the third determination is finished, the result screen is displayed. The result screen is displayed with the options **Last sample|Overview**. You find the results of the last sample and the overview which includes statistics data for the current series of samples.

The Performance Verification webpage

Please follow this link:

► www.mt.com/easyplustitration-vpac

- Use a web browser and navigate to link provided to enter the results of the three VPac standard kit analyses you ran on your EasyPlus™ Titrator. Click [**Run VPac Verification**].
- Please log in with your existing profile or register using your instrument's serial number.
- On the page [**Run Performance Verification**] proceed as follows:
 - 1 Enter the kit number stated on the VPac standard kit vessels or on the smaller side of the VPac standard kit box. It has the format ####-####-####. Use TAB key or click in the next field. The detail information about your kit will be shown on the page.
 - 2 Enter the three results shown in the mmol column of your titrator result screen. You may submit the form with two results only, but you will not be able to receive a certificate with statistical information.
 - 3 Enter the operator name and set the date you had performed the analyses. Default is the current date.
 - 4 To customize the certificate showing the company information and instrument serial number enter your details or unselect the respective check box.
The company information from your profile is filled in by default, the profile is not changed by editing it on the performance verification form.
 - 5 Click [**Submit**] to submit the results. You will be directed to a new page from where you can download a customized PDF document.

There are three possible outcomes

Conformity certificate	Three results have been submitted and are within the limits set.
Conformity confirmation	Results are within limits, but only two results were submitted or the VPac™ standard kit already expired.
Non-conformity declaration	The results are outside the limits. We help you to solve the problem.

5.4 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 check

The sensor check will measure the buffer and compare the measured value with the target value entered by the user. The limits are fixed internally.

This option is only available for pH sensors with the following titrator types: **Easy pH, Easy Pro**



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.

5.5 Toolbox



Navigation: **Setup & Tools > Toolbox**

This screen contains different tools for maintaining the firmware and the option to restart the installation tutorial.

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



EasySetup Tutorial

The tutorial will show you how to install the titrator and guide you through a first analysis.



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 was performed.

6 Home Screen Functions

6.1 Titration



Titration

Select this menu item to define titration parameters and to start a titration.

6.1.1 Set up methods

- 1 Tap [**Titration**] to open the titration parameters.
 - 2 On the parameter screens, check and define all the parameters.
- ⇒ Tap [] to directly start the analysis.



Tap the help icon to change to help mode. Then tap any of the parameters to get a specific help description. To exit the help mode, tap the help icon again.



If a printer is connected, this icon is displayed on the parameter screen. Tap the icon to print the parameters.

Important method parameters

Parameter	Description	Values
Titration type	The available options are depending on the application and instrument model. Direct Determination of the concentration of the sample. Blank determination The blank determination will determine the consumption in [mmol] when titrating the solvent. Blank compensated This titration type will take the stored blank value into account, when calculating the result of an analysis. Back In a back titration, the concentration of an analyte is determined by reacting it with a known amount of excess reagent. The excess reagent is then titrated with a titrant. The concentration of the analyte in the original solution is then related to the amount of titrant consumed. The amount of excess reagent titrated with the titrant is entered as back value. In Back value, enter the amount of excess reagent which is titrated with the titrant.	Direct Blank determination Blank compensated Back
EP/EQP	EP The titrant is added until the endpoint (EP) is found. EQP The titrant is added until the equivalence point (EQP) is found.	EP EQP

Control	Normal Select this option to achieve a high accuracy with an average analysis duration. Fast Select this option if your analysis requires a high titrant consumption. This will set the priority on the analysis duration and may lead to a lower accuracy. Cautious Select this option to set the priority on a high accuracy. The analysis duration may be prolonged with this setting. Very cautious Select this option if you expect a steep titration curve. User defined Definition of a specific user defined control parameter set. An additional parameter set (Control settings) is displayed.	Normal Fast Cautious Very cautious User defined
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

6.1.2 Perform 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 titrant correspond to the titrant used for the analysis.
- 3 Check that the settings for the sensor correspond to the sensor used for the analysis.
- 4 **Note:** Air bubbles in the burette or the tubes can affect the results.
Rinse the burette and tubes with the function **Burette** until no more air bubbles are present in the tube connections.

Single determination

- The sample is prepared and added to the titration beaker.
 - All parameters for the method are checked and defined.
- 1 Place the titration beaker on the stirrer.
 - 2 On the home screen, tap and hold [**Titration**] to start the titration.
⇒ You will be prompted, if any parameters are required by the analysis.
 - 3 Follow the instructions on the screen. With the progress of the titration, the displayed curve is automatically rescaled so that an entire titration is visible.
- ⇒ The result screen is displayed.

Note

- Before a second fill of the burette, a message is displayed giving the option to refill.
- A maximum of 10 fills of the burette is possible. After 10 fills the titration will be stopped automatically. The volume dosed during predisense is not included here.

Multiple determination

- All parameters for the method are checked and defined. **Multiple determination** is selected.
- 1 Prepare the first sample and place the titration beaker on the stirrer.
- 2 On the home screen, tap and hold [**Titration**] to start the titration.
 - ⇒ You will be prompted, if any parameters are required by the analysis.
- 3 Follow the instructions on the screen. With the progress of the titration, the displayed curve is automatically rescaled so that an entire titration is visible.
 - ⇒ When the first analysis is finished, the result screen is displayed with the two options **Last sample** and **Overview**.
- 4 Prepare the next sample and place the titration 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** and **Overview**. The results of the last sample and the overview including the statistical data for the sample series are displayed.

Note

- Sample data of analysis stopped with [⏏] or by an error will automatically be excluded from the statistics.

6.2 Burette



Burette

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

6.3 Stirrer



Stirrer

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

6.4 Titrant



Titrant

Select this menu item to define the titrant properties and to start a titrant determination. For an accurate analysis, it is recommended to determine the concentration of the titrant by performing a titrant determination.

In the two tabs **Properties** and **Determination** you will find the titrant properties and the parameters to execute a titrant determination. For a titrant determination, similar parameters are used as for a titration.

A titrant determination should be performed as multiple determination.



Tap the help icon to change to help mode. Then tap any of the parameters to get a specific help description. To exit the help mode, tap the help icon again.



If a printer is connected, this icon is displayed on the parameter screen. Tap the icon to print the parameters.

Important parameters

Parameter	Description	Values
Titrant	Choose a predefined name from the list or choose User defined to enter a name.	Predefined names User defined
Nominal concentration	Enter here the nominal concentration in [mol/L] of the titrant being used.	0.001 ... 100

Titer	The titer of a titrimetric solution is the quotient of the actual concentration (Actual concentration) and the expected concentration (Nominal concentration). Titer = Actual concentration / Nominal concentration The titer can either be entered manually or determined automatically.	0.0001 ... 10.0000
Actual concentration	The Actual concentration can either be determined automatically or for a manual entry of the titer value it will be calculated. For an automated determination, tap [Properties Determination] to change to the parameters.	0.0010 ... 100.0000
Determination mode	Indicates if the titer has been entered manually or has been determined automatically.	Automatic Manual input

See also

 Set up methods ► Page 17

6.5 Sensor



Sensor

Select this menu item to define or view the sensor properties and to start a sensor calibration.

In the two tabs **Properties**|**Calibration** you will find the sensor properties and the parameters to execute a sensor calibration. If no temperature sensor is defined for the calibration, the system settings are taken into account for temperature compensation (**Global temperature**).

A sensor calibration is only available for pH sensors with the following titrator types: **Easy pH**, **Easy Pro**



Tap the help icon to change to help mode. Then tap any of the parameters to get a specific help description. To exit the help mode, tap the help icon again.



If a printer is connected, this icon is displayed on the parameter screen. Tap the icon to print the parameters.

Important parameters

Parameter	Description	Values
Sensor	Select a sensor type according to the measurement type.	pH aqueous pH non-aqueous Redox IPol.
Unit	Select the unit to be used for the measurement. Displayed if Sensor = pH aqueous or pH non-aqueous .	mV pH
Temperature sensor	Defines if a temperature sensor is used for the temperature capture. Displayed if Sensor = pH aqueous or pH non-aqueous .	On Off
Zero point	Information on the zero point of the sensor, determined by a sensor calibration [pH]. The sensor zero point (pH value at E = 0 mV) is a calibration parameter. Displayed if Sensor = pH aqueous or pH non-aqueous .	0.00 ... 14.00
Slope	Information on the slope of the sensor, determined by a sensor calibration [mV/pH]. The slope is a calibration parameter. Displayed if Sensor = pH aqueous or pH non-aqueous .	-100.00 ... +100.00
Current	Defines the polarization current of the measuring sensor [µA]. The current may need to be changed depending on the application type. Displayed if Sensor = Redox IPol .	0.1 ... 5.0

Important parameters for sensor calibration

Parameter	Description	Values
Buffer list	Select the buffer list with which the pH sensor will be calibrated.	MT-EU MT-US GBT/ T 27501 User defined
Buffer 1 / Buffer 2	If Temperature sensor = Off . Enter the pH value for each buffer. If Temperature sensor = On . Enter the temperature specific pH values of up to 6 different temperatures for each buffer.	0.01 ... 14.00

See also

 Set up methods ▶ Page 17

 Settings ▶ Page 14

6.6 Measure



Measure

Select this menu item to start a pH measurement.

The measurement starts after the time defined in **Prestir duration**, and ends automatically when the signal of the measuring sensor is stable. To accept the readings before the endpoint is found automatically, tap [✓].

Stability criterion: The signal of the measuring sensor input may not change by more than 0.1 mV in 6 seconds.

This option is only available for pH sensors with the following titrator types: **Easy pH, Easy Pro**



Tap the help icon to change to help mode. Then tap any of the parameters to get a specific help description. To exit the help mode, tap the help icon again.



If a printer is connected, this icon is displayed on the parameter screen. Tap the icon to print the parameters.

7 Results



Results

Select this menu item to display the results of a determination. The result of the last sample or of the last multiple determination is displayed.

Results of a single determination

Content (R)	9.980 %	Titration M1
Consumption EP (VEP)	1.829 mL	
Sample size	3.1 g	
Date/Time	01/10/2018 12:00	

All available results for the sample are shown.



Tap this icon to print the shown results.



Tap this menu item to return to the home screen.

Results of a multiple determination

No.	R [%]	VEP [mL]		Titration
1	9.980	1.829		
2	9.990	1.832		
3	10.020	1.842		
4	10.010	1.839		
AVG [%]				
9.990				
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.



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 titrations are excluded automatically.



Tap this icon to print the shown results.



Tap this menu item to return to the home screen.

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.

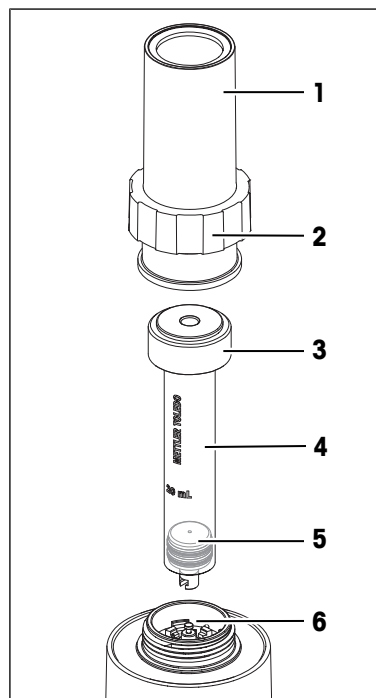
- Do not pull the piston out of the glass cylinder.

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.

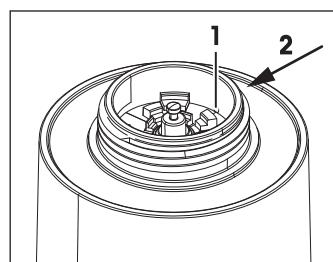
The frequency of cleaning depends on the frequency of usage and the chemicals used. You should clean the burette, valve and tubes when bubbles form in the burette or the tubes or if you see deposits in the burette or the tubes.

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.

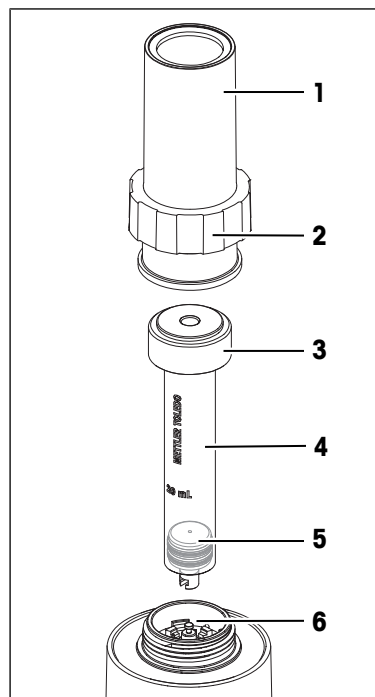
8.2.4.3 Clean the burette compartment

- 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

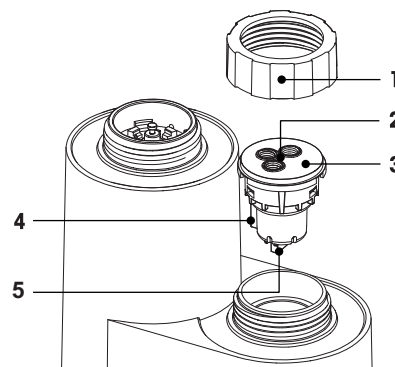
- The instrument is disconnected from the power supply.
- 1 Place the burette cap (3) onto the glass cylinder (4).
- 2 Slide the glass cylinder (4) onto the piston rod (6).
- 3 Carefully press the glass cylinder (4) down until it touches the housing of the instrument.
- 4 Place the burette cover (1) 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

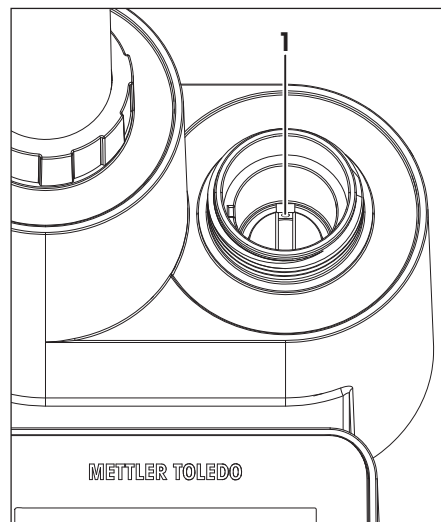
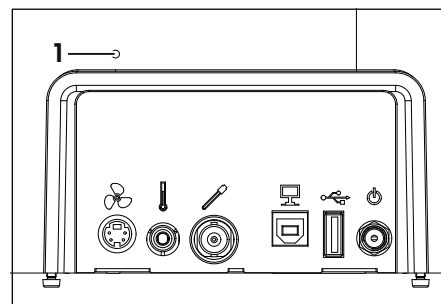
- 📖 Rinse tubes, valve and burette ► Page 23
- 📖 Empty tubes, valve and burette ► Page 24

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.

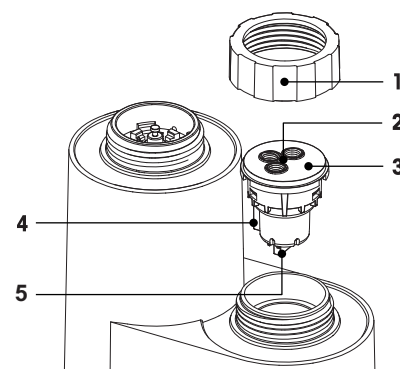
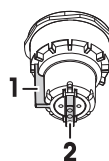
8.2.5.3 Clean outlet of valve compartment

- 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.



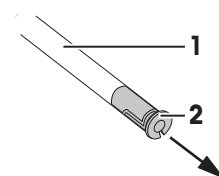
8.2.5.4 Install the valve

- 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.

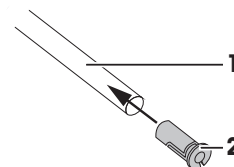


8.3 Replace the siphon tip

- 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).

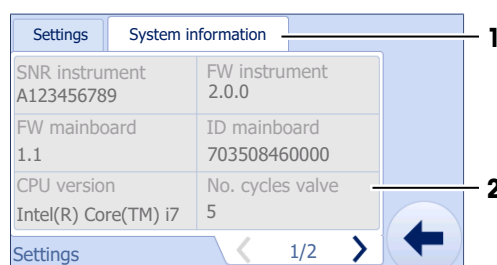


8.4 Replace the valve

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.

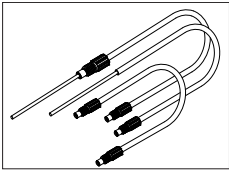
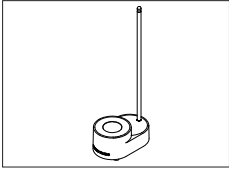
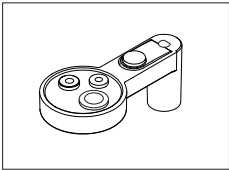
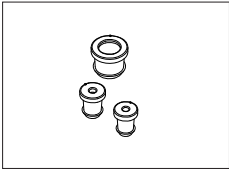
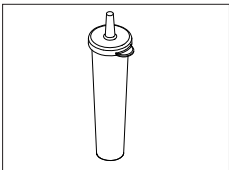
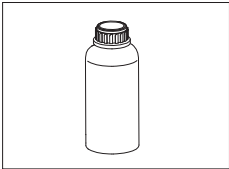
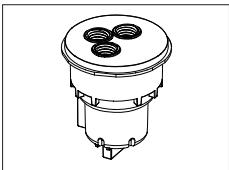
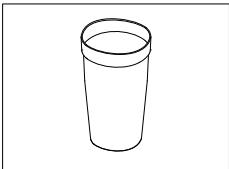
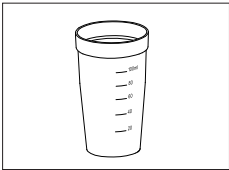
Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment. If you have any questions, please contact the responsible authority or the distributor from which you purchased this device. Should this device be passed on to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

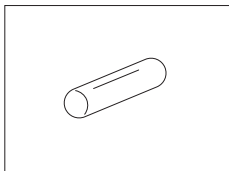


9 Troubleshooting

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.

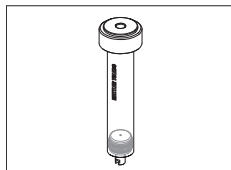
10 Accessories

	Description	Order number
	Tubing set instrument	30065464
	EasyStir GT	30065467
	Titration head GT	30041102
	Insert set titration head GT	30057635
	EasyPlus drying tube	30044701
	Molecular sieve 250 g	71478
	Valve	30042860
	Glass beakers 100 mL 20 pcs.	101446
	Beakers PP (120 pcs.) 100 mL, polypropylene, standard	51109388



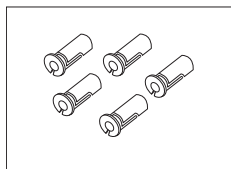
Stirrer Bar EPx

30060027



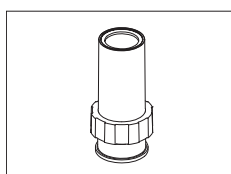
Burette 10 mL
Burette 20 mL
Burette 50 mL

30043900
30043901
30043902



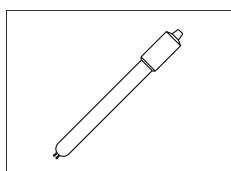
Siphon tips (5 pcs.)

23240



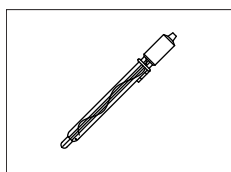
Burette cover set

30057633



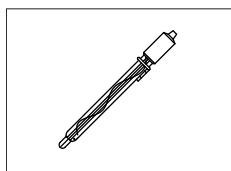
EM43-BNC: Sensor KF/Redox Ipol

30043105



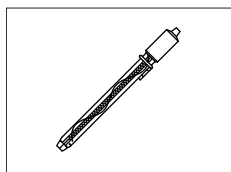
EG11-BNC: Sensor pH aqueous

30043103



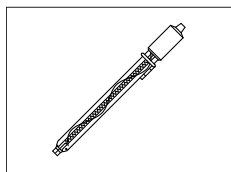
EG13-BNC: Sensor pH non-aqueous

30043104



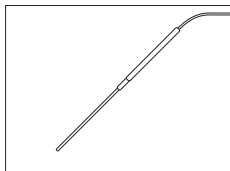
EM40-BNC: Sensor Redox mV

30043106



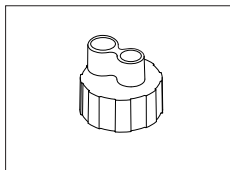
EM45-BNC: Sensor Precipitation mV

30043107



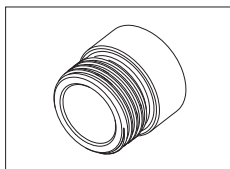
Temperature probe NTC 30K

51300164



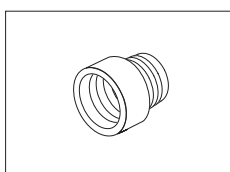
Bottle Head incl. flat seal

30060023



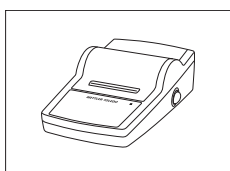
Bottle adapter
Merck, Germany
Fisher, USA

23774
23787



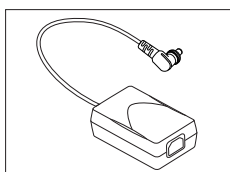
Bottle adaptor China (D34) incl. flat seal
Bottle adaptor China (D28.5) incl. flat seal
Bottle adaptor India incl. flat seal

30079456
30060026
30060024



Lab equip access. data writer USB-P25/01

11124301



AC/DC power adapter

51105795

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
Polarized Sensor Ipol	Current source	0...50 μ A
	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

Characteristic		Value
Materials	Housing	PP GF30
	Metal parts	Stainless steel
Weight		550 g

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Glossary

Endpoint titration (EP)

The endpoint mode represents the classical titration procedure: the titrant is added until the end of the reaction is observed, e.g., by a color change of an indicator. With an automatic titrator, the sample is titrated until a predefined value is reached, e.g. pH = 8.2.

Equivalence point titration (EQP)

The equivalence point is the point at which the analyte and the reagent are present in exactly the same concentration. In most cases it is virtually identical to the inflection point of the titration curve, e.g. titration curves obtained from acid/base titrations. The inflection point of the curve is defined by the corresponding pH or potential (mV) value and titrant consumption (mL). The equivalence point is calculated from the consumption of titrant of known concentration. The product of concentration and the titrant consumption gives the amount of substance which has reacted with the sample. In an autotitrator the measured points are evaluated according to specific mathematical procedures which lead to an evaluated titration curve. The equivalence point is then calculated from this evaluated curve.

Titer

The determination of the effective concentration, generally called titer determination is through titration of a substance of exactly known concentration. Whenever possible, primary standards are used.

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