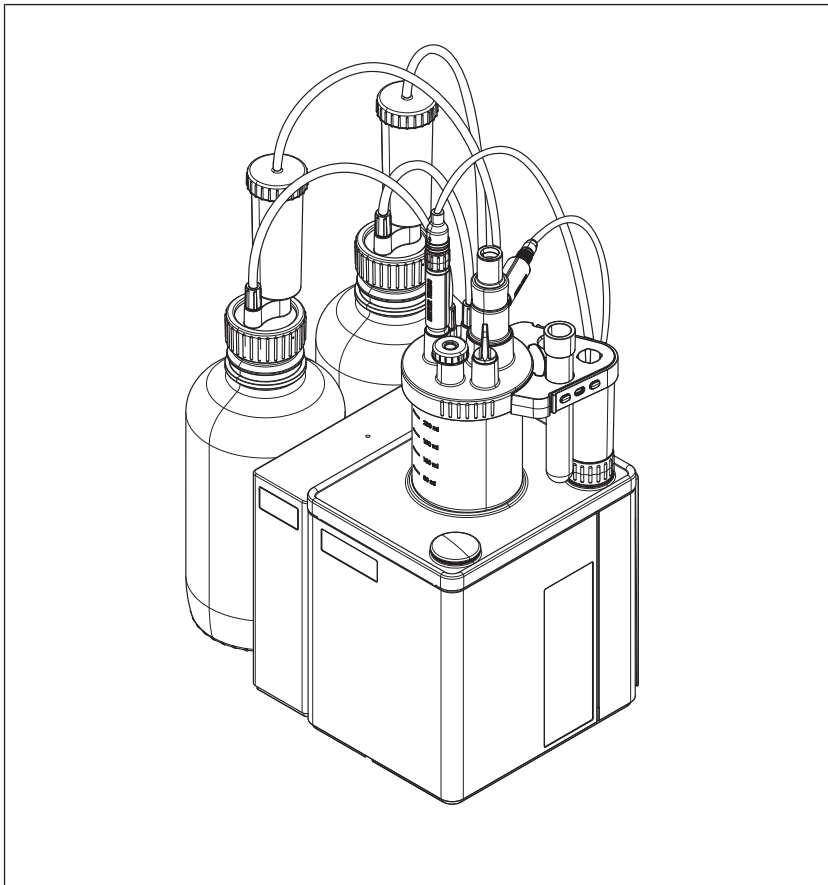


Advanced Titrator

EVA C1/EVA C3



METTLER TOLEDO

Table of Contents

1	Introduction	3
1.1	Further documents and information	3
1.2	Explanation of conventions and symbols	3
1.3	Compliance information	3
2	Safety information	4
2.1	Definitions of signal words and warning symbols	4
2.2	Product-specific safety notes	5
3	Design and function	6
3.1	Titration overview	6
3.1.1	Front view	6
3.1.2	Rear panel	6
3.1.3	Terminal	7
3.1.4	Status light	8
3.2	Home screen and menu structure	8
3.2.1	Home screen	8
3.2.2	First level menus	9
3.2.3	Menu structure	10
4	Installation	12
4.1	Scope of delivery	12
4.2	Download the Reference Manual	13
4.3	Unpack the titration	14
4.4	Position the titration	14
4.5	Connect, adjust and disconnect the terminal	14
4.5.1	Connect the terminal	14
4.5.2	Adjust the angle of the terminal	14
4.5.3	Disconnect the terminal	15
4.6	Install a system with automated solvent exchange	15
4.6.1	Overview of the setup	15
4.6.2	Overview of the actions	16
4.6.3	Install the solvent pump dPump KF	17
4.6.4	Prepare drying tubes	17
4.6.5	Install the titration arm	17
4.6.6	Assemble the Karl Fischer cell	18
4.6.7	Install the waste bottle and the solvent bottle	19
4.6.7.1	Install bottle adapters and drying tubes	19
4.6.7.2	Assemble the waste tube and the solvent tube	19
4.6.7.3	Connect the waste bottle	20
4.6.7.4	Connect the solvent bottle	20
4.6.8	Assemble the sample injection adapter	21
4.6.9	Install sample injection adapter and NS14 stopper	21
4.6.10	Install the sensor	22
4.6.11	Assemble the generator electrode	22
4.6.12	Install the generator electrode	23
4.7	Connect and disconnect the power supply	24
4.7.1	Connect the power supply	24
4.7.2	Disconnect the power supply	24
5	Operation	24
5.1	Start up and shut down the titration	24
5.1.1	Start up the titration	24
5.1.2	Shut down the titration	25

5.2	Example: determine water content of toluene	25
5.2.1	Overview	25
5.2.2	Configure the resources for the example	26
5.2.3	Fill the Karl Fischer cell with solvent	26
5.2.4	Determine the water content of toluene	27
5.2.4.1	Create the method	27
5.2.4.2	Create a shortcut	28
5.2.4.3	Perform the analysis	28
6	Maintenance	29
6.1	Maintenance schedule	30
6.1.1	Titrator	30
6.1.2	Terminal	30
6.1.3	Solvent pump dPump KF	30
6.1.4	Generator electrode	31
6.2	Clean the titrator and accessories	31
6.2.1	Clean the housing	31
6.2.2	Empty and clean the Karl Fischer cell	32
6.2.2.1	Empty the Karl Fischer cell	32
6.2.2.2	Remove the generator electrode	32
6.2.2.3	Remove the sensor	33
6.2.2.4	Remove the NS14 stopper and sample injection adapter	33
6.2.2.5	Disconnect the solvent and waste tubes	33
6.2.2.6	Remove the Karl Fischer cell	34
6.2.2.7	Disassemble the Karl Fischer cell	34
6.2.2.8	Clean the parts	34
6.2.2.9	Reinstall the Karl Fischer cell	35
6.2.3	Clean the generator electrode	35
6.2.3.1	Clean the generator electrode without diaphragm	35
6.2.4	Clean the terminal	37
6.2.5	Clean the solvent pump dPump KF	37
6.3	Prepare the titrator for storage	37
6.4	Transport the titrator	38
7	Dispose of the titrator	38
8	Technical data	39
8.1	Titrator	39
8.2	Terminal	40

1 Introduction

Thank you for choosing a METTLER TOLEDO EVA titrator. The EVA coulometric Karl Fischer titrators are instruments for coulometric Karl Fischer titrations.

This document provides you with the information you need to get started with your titrator.

Information is provided for the following titrators:

- EVA C1
- EVA C3

This document applies to software version 2.0.0 or higher.

The screenshots show the user interface of an EVA C3 titrator without connection to the LabX computer software.

The software license is subject to the End User License Agreement EULA. See the following link for the license text:

▶ www.mt.com/EULA

1.1 Further documents and information



Read the Reference Manual of the titrator for a full description of the titrator and its functions. See [Download the Reference Manual ▶ Page 13]

For application notes and METTLER TOLEDO methods, see the following link:

▶ www.mt.com/analytical-application-library

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

1.2 Explanation of conventions and symbols



Refers to an external document.

Elements of instructions

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

- Prerequisites that must be fulfilled before the individual action steps can be executed.

1 Action step 1

⇒ Intermediate result

2 Action step 2

⇒ Result

1.3 Compliance information

The instrument complies with the directives and standards listed on the Declaration of Conformity.

▶ <https://www.mt.com/doc>

National approval documents, e.g., the FCC Supplier Declaration of Conformity, are available online and/or included in the packaging.

▶ www.mt.com/ComplianceSearch

Contact METTLER TOLEDO for questions about the country-specific compliance of your instrument.

▶ www.mt.com/contact

European Union

This product may contain SVHC candidate substances according to Article 33 of the EU regulation no. 1907/2006 (REACH). SVHC candidate substances are listed on the Declaration of Conformity (DoC).

► <https://www.mt.com/doc>

United States of America

This equipment has been tested and found to comply with the limits for a **Class B** digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Trademarks

Trademark	Trademark owner
IPP Everywhere™	IEEE Industry Standards and Technology Organization (ISTO)
AirPrint	Apple Inc.

2 Safety information

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

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

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



User Manual and Reference Manual are available online. See [Download the Reference Manual ► Page 13].

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



General hazard



Notice

2.2 Product-specific safety notes

Intended use

This instrument is designed to be used in laboratories by trained staff. The titrator is intended for the processing of reagents and solvents for coulometric Karl Fischer titrations. All processed reagents and solvents must be compatible with the materials they come into contact with.

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

Responsibilities of the instrument owner

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

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

Safety notes



WARNING

Death or serious injury due to electric shock

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

- 1 Only use the METTLER TOLEDO power cable and AC/DC 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 them if damaged.



NOTICE

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

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

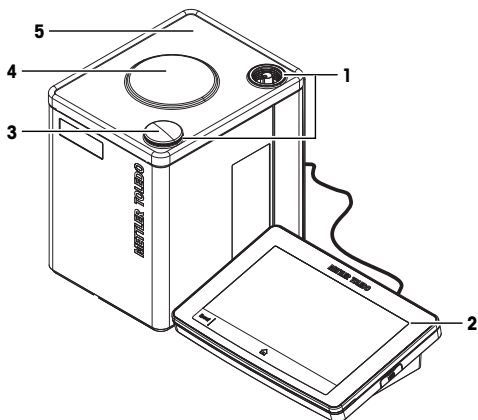
See also

 Technical data ▶ Page 39

3 Design and function

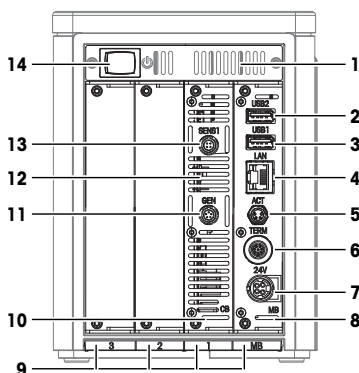
3.1 Titrator overview

3.1.1 Front view



No.	Name	Function
1	Mounting positions	Mounting positions for titration arm
2	Terminal	Controls the titrator and can be used to enter information
3	Mounting position cover	Cover for unused mounting position
4	Internal magnetic stirrer	To stir contents of the Karl Fischer cell
5	Titrator cover	Protects the surface of the titrator

3.1.2 Rear panel



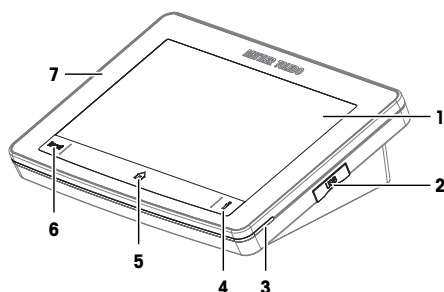
No.	Name	Function
1	Vents	Air outlet for cooling the titrator
2	USB2	USB-A socket to connect USB devices, for example, printers or barcode readers

No.	Name	Function
3	USB1	USB-A socket to connect USB devices, for example, printers or barcode readers
4	LAN	RJ45 socket to connect to a network
5	ACT	4-pin M8 socket to connect actor bus devices, for example, a solvent pump
6	TERM	8-pin M9 socket to connect the terminal
7	24V	4-pin power mini-DIN socket to connect the AC/DC adapter
8	Main board (MB)	Main board installed in board slot MB
9	Board slots 1, 2, 3, and MB	Slots for holding boards
10	Coulometer board (CB)	Coulometer board installed in board slot 1
11	GEN	5-pin socket to connect generator electrode
12	Vents	Air outlet for cooling the titrator
13	SENS1	4-pin socket to connect digital sensors
14	Power button	Push button to start up the titrator

See also

 Technical data ▶ Page 39

3.1.3 Terminal



No.	Name	Function
1	Touchscreen	Displays information and is used to enter information
2	USB	USB-C connection for data transfer
3	Status light	Provides information about the status of the titrator
4	Information button	Displays a QR code to access the Reference Manual
5	Home button	Opens the home screen
6	Reset button	Interrupts or ends all tasks that are currently running
7	Terminal cover	Protects the surface of the terminal

See also

 Technical data ▶ Page 39

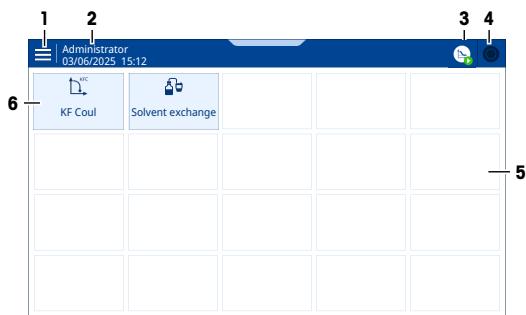
3.1.4 Status light

The status light provides information about the status of the titrator.

Status light	Titrator status
Steady, green light	The titrator is ready for operation.
Blinking, green light	Two states are possible: <ul style="list-style-type: none">The titrator is performing a task that requires no user interaction.The Karl Fischer cell is ready for a titration. The titrator is performing the KF Conditioning action to maintain this state.
Steady, yellow light	The titrator is waiting for the user to perform an action.
Blinking, yellow light	The Karl Fischer cell is not ready for a titration. The titrator is performing the KF Conditioning action to prepare the Karl Fischer cell for titration.
Steady, red light	The titrator has an error.

3.2 Home screen and menu structure



3.2.1 Home screen






No.	Name	Function
1	Menu	Opens the menu tree
2	User name	Shows, which user is logged in (only displayed if user management is activated)
3	Workplace button	<ul style="list-style-type: none">Icon shows that a task or an action is runningIcon shows the state of the task or the actionOpens the window of the task or of the action
4	Task area button	<ul style="list-style-type: none">Icon shows if a task is runningIcon shows the state of the taskOpens the task area
5	Shortcut area	Shows user-defined shortcuts
6	Shortcut button	<ul style="list-style-type: none">Tapping the button starts a task or an actionTapping and holding the button opens an editor to configure the task or the action

Explanation of the task area icon

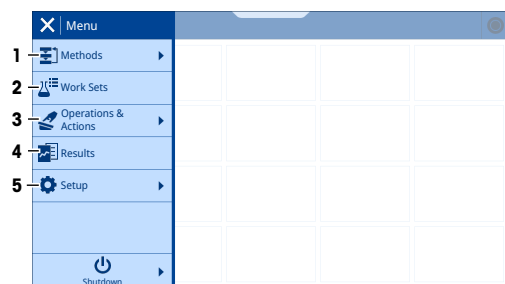
Icon	Description
	The task area is empty.

Icon	Description
	A task such as an analysis or an operation is running.
	A task such as an analysis is interrupted or is blocked.

Explanation of the workplace area icon

Icon	Description
	The KF Conditioning action is running in the background.
	A task such as an analysis or an operation is running.
	This icon stands for one of the following states: <ul style="list-style-type: none"> An analysis is running but the Karl Fischer cell is not ready for the titration to start. User interaction is needed for the analysis to continue.

3.2.2 First level menus



No.	Name	Function
1	Methods	<p>Access the following functions:</p> <ul style="list-style-type: none"> Create, edit or delete a method. Configure method-specific settings with the method editor. <p>Examples of method-specific settings:</p> <ul style="list-style-type: none"> Method name Results that are calculated and displayed during the analysis Control focus
2	Work Sets	<p>Access the following functions:</p> <ul style="list-style-type: none"> Create, edit or delete a work set. Configure settings for the analysis of a set of samples. <p>Examples of sample-specific settings:</p> <ul style="list-style-type: none"> Method used to analyze the samples Number of samples
3	Operations & Actions	<p>Configure and start operations and actions.</p> <p>Examples:</p> <ul style="list-style-type: none"> Exchange the solvent. KF Conditioning: a dry state of the Karl Fischer cell is established and maintained.

No.	Name	Function
4	Results	View and manage analysis results.
5	Setup	Configure settings that apply to the entire instrument and not to a specific method, action or operation. Examples: <ul style="list-style-type: none"> • Date and time • Standards • Sensors

3.2.3 Menu structure

Submenus of Methods



KF Coulometric



KF Coul External Extraction (EVA C3 only)



KF Coul Blank (EVA C3 only)



KF Coul Scan (EVA C3 only)

Submenus of Work Sets

This menu has no submenus.

Submenus of Operations & Actions



KF Conditioning



Solvent Exchange



Stirrer



Sample Changer (EVA C3 only)

Submenus of results Results

This menu has no submenus.

Submenus of Setup



Chemicals



Reagents



Standards



Values & Tables (EVA C3 only)

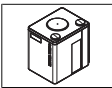
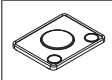
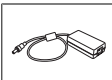
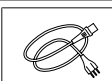

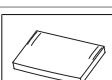

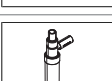






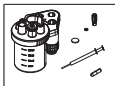




Blank Values (EVA C3 only)

 Hardware	 KF Cells
	 Generator Electrodes
	 Sensors
	 Pumps
	 Stirrers
	 Sample Changers (EVA C3 only)
	 Print & Export
 Peripherals	 Balance
	 SmartReader
	 Barcode Reader
	 USB Serial Devices
	 Task & Resources Behavior
 System Settings	 Instrument
	 Personal
	 User Management (only displayed if activated)
	 Network
	 LabX
	 Shortcuts
	 MT-Service
 Maintenance & Service	 Update Software
	 Import/Export
	 Reset to Factory Settings
	 Instrument Software History
	 Hardware Software Summary

4 Installation

4.1 Scope of delivery

Part	Order number	EVA C1 X	EVA C1 D	EVA C1
		EVA C3 X	EVA C3 D	Base EVA C3 Base
 EVA titrator	–	•	•	•
 Titrator cover	30869313	•	•	•
 Extern. Power Supply 120W (SP) AC/DC adapter	30298362	•	•	•
 Power cable (country specific)	–	•	•	•
 Terminal PSGT	–	•	•	•
 Terminal cover	30125377	•	•	•
 Terminal cable 68 cm	30003971	•	•	•
 Generator electrode without diaphragm	31028003	•	–	–
 Generator electrode with diaphragm	31028002	–	•	–
 Generator electrode cable 70 cm	30927803	•	•	•
 Sensor dSens M143 <ul style="list-style-type: none"> • Sensor dSens M143 • Protective sleeve • Protection cap • Quality certificate • User Manual 	30573200	•	•	•

Part	Order number	EVA C1 X EVA C3 X	EVA C1 D EVA C3 D	EVA C1 Base EVA C3 Base
 Cable dSens dVP4-T 70 cm	30635146	•	•	•
 Titration kit KFC <ul style="list-style-type: none"> • Adapter plate KFC GL80 • Adapter plate seal KF GL80 • Vessel KFC clear GL80 • Titration arm GL80 • Titration arm strap • Sample injection adapter NS14 • Septum set KF (5 pcs) • Stopper NS14 • Stopper set M9 (2 pcs) • Molecular sieve 250 g • Syringe 1 mL (2 pcs) • Injection needle 0.8 x 80 mm (2 pcs) • Magnetic stirrer bar 	30988520	•	•	•
 Solvent pump dPump KF <ul style="list-style-type: none"> • dPump KF • Cable ACT M8/F, M8/M, 20 cm • Glass bottle clear 1 L • Drying tube NS14 (2 pcs) • Bottle adapter M9 GL45 (2 pcs) • Flat seal GL45 (2 pcs) • Solvent tube (2 pcs) • Air tube 100 cm (2 pcs) 	30869285	•	•	–
 User Manual	–	•	•	•
 Declaration of conformity	–	•	•	•
 Test report	–	•	•	•

4.2 Download the Reference Manual

- 1 Go to the website www.mt.com/library.
- 2 Select the **Technical Documentation** tab.
- 3 Find the product type on the housing of the titrator and enter it into the search field.
- 4 Start the search.
- 5 Select the Reference Manual from the result list.

- 6 Select the link.
 - The Reference Manual is either opened or downloaded depending on the browser settings.
- 7 Check which software version is installed on your titrator.

▶ www.mt.com/contact

4.3 Unpack the titrator

- 1 Remove the titrator from the protective packaging.
- 2 Store the protective packaging for later transport over long distances.
- 3 Check that you have received all parts listed in the scope of delivery.
- 4 Inspect the parts visually for flaws or damage.
- 5 If parts are missing or damaged, report it to your authorized METTLER TOLEDO service representative or dealer.

▶ www.mt.com/contact

See also

🔗 Scope of delivery ▶ Page 12

4.4 Position the titrator

The titrator 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

See also

🔗 Technical data ▶ Page 39

4.5 Connect, adjust and disconnect the terminal



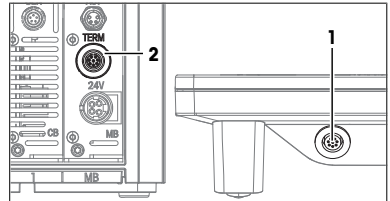
Read the User Manual of the terminal for more information about the terminal. See [Download the Reference Manual ▶ Page 13].

4.5.1 Connect the terminal

Titrators and terminals are designed as paired equipment. If multiple titrators and terminals are available, the matched pair of terminal and titrator must be connected.

Procedure

- The titrator is disconnected from the power supply.
- 1 Rotate one of the terminal-cable plugs until the arrow is on the upper side.
 - 2 Insert the plug into the **INST** socket (1) on the terminal and tighten the knurled nut.
 - 3 Rotate the other terminal-cable plug until the arrow is on the upper side.
 - 4 Insert the plug into the **TERM** socket (2) on the titrator and tighten the knurled nut.



4.5.2 Adjust the angle of the terminal

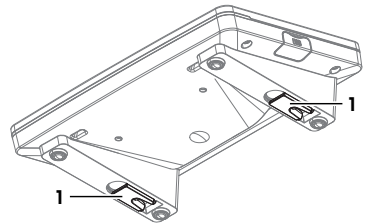
The angle of the terminal has two positions.

Preparations

- No task or action is running.

Procedure

- To increase the angle of the terminal, fold out the two feet (1).



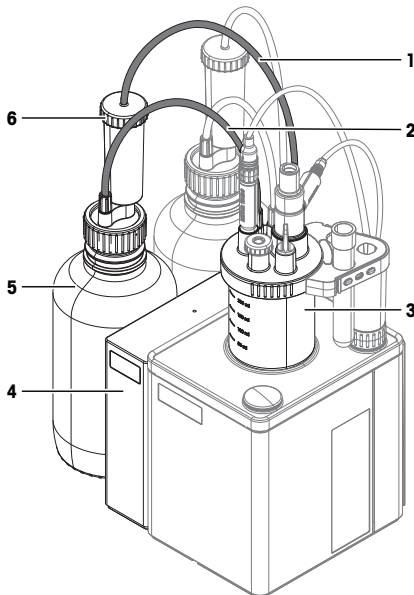
4.5.3 Disconnect the terminal

- The titrator is disconnected from the power supply.
- 1 Remove the terminal cable from the socket on the back of the terminal.
 - 2 Remove the terminal cable from the **TERM** socket on the rear panel of the titrator.

4.6 Install a system with automated solvent exchange

4.6.1 Overview of the setup

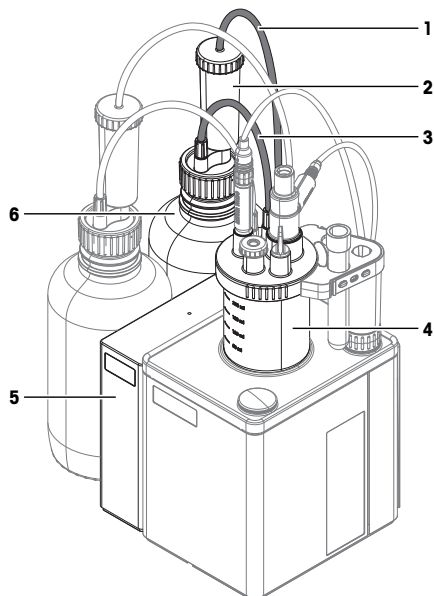
Solvent flow



No.	Name	Function
1	Air tube	Connects the solvent bottle to the solvent pump.

No.	Name	Function
2	Solvent tube	Connects the solvent bottle to the Karl Fischer cell.
3	Karl Fischer cell	Assembled reaction vessel for the Karl Fischer titration.
4	Solvent pump	Pumps air into the solvent bottle. Overpressure builds up in the solvent bottle and pushes solvent into the Karl Fischer cell.
5	Solvent bottle	Contains the solvent.
6	Drying tube	Removes moisture from the air that is pumped into the solvent bottle.

Waste flow



No.	Name	Function
1	Air tube	Connects the waste bottle to the solvent pump.
2	Drying tube	Removes moisture from the air that enters the waste bottle.
3	Waste tube	Connects the waste bottle to the Karl Fischer cell.
4	Karl Fischer cell	Assembled reaction vessel for the Karl Fischer titration.
5	Solvent pump	Aspirates air out of the waste bottle. Underpressure is created in the waste bottle and aspirates used solvent out of the Karl Fischer cell.
6	Waste bottle	Contains the waste.

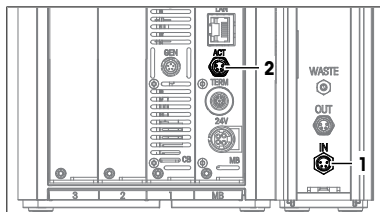
4.6.2 Overview of the actions

- 1 Install the solvent pump. See [Install the solvent pump dPump KF ▶ Page 17].
- 2 Prepare the drying tubes. See [Prepare drying tubes ▶ Page 17].
- 3 Install the titration arm. See [Install the titration arm ▶ Page 17].
- 4 Assemble the Karl Fischer cell. See [Assemble the Karl Fischer cell ▶ Page 18].
- 5 Install the waste bottle and solvent bottle. See [Install the waste bottle and the solvent bottle ▶ Page 19].

- 6 Install the sample injection adapter and NS14 stopper. See [Install sample injection adapter and NS14 stopper ▶ Page 21].
- 7 Install the sensor. See [Install the sensor ▶ Page 22].
- 8 Assemble the generator electrode. See [Assemble the generator electrode ▶ Page 22].
- 9 Install the generator electrode. See [Install the generator electrode ▶ Page 23].
- 10 Connect the power supply. See [Connect the power supply ▶ Page 24].

4.6.3 Install the solvent pump dPump KF

- The titrator is disconnected from the power supply.
 - The length of the ACT cable does not exceed 2.4 m.
- 1 Rotate the female plug of the ACT cable until the arrow is on the upper side.
 - 2 Insert the plug into the **IN** socket (1) on the pump.
 - 3 Tighten the knurled nut to secure the connection.
 - 4 Position the pump on the left side of the titrator.
 - 5 Push the pump against the titrator.
 - ➔ The internal magnets pull the pump into place.
 - 6 Rotate the male plug of the ACT cable until the arrow is on the upper side.
 - 7 Insert the plug into the **ACT** socket (2) on the titrator.
 - 8 Tighten the knurled nut to secure the connection.

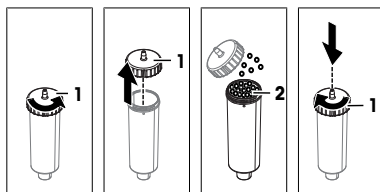


4.6.4 Prepare drying tubes

A drying tube can be used to remove moisture from the inside of a container. To remove moisture, the drying tube needs to be filled with desiccant.

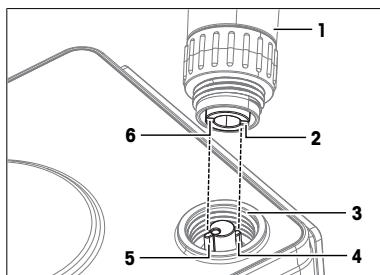
Fill the drying tube

- 1 Unscrew the lid (1) counterclockwise and lift the lid off the drying tube.
- 2 Fill the drying tube with desiccant (2).
- 3 Screw the lid (1) clockwise onto the drying tube and tighten it.

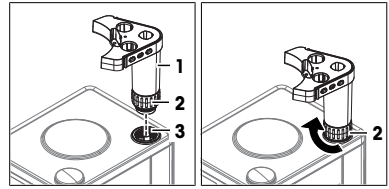


4.6.5 Install the titration arm

- 1 Pull the mounting position cover out of the rear mounting position (3).
- 2 Position the column (1) over the mounting position (3).
- 3 Align the long tab (5) with the long slot (6) and the short tab (4) with the short slot (2).



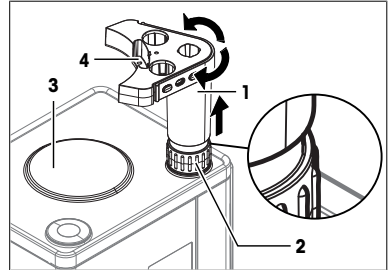
- 4 Gently lower the column (1) until the connector (2) slides down into the mounting position (3).
- 5 Tighten the connector (2) clockwise.



Swivel the titration arm

If the mounting slot for the Karl Fischer cell is not aligned with the internal magnetic stirrer, swivel the titration arm.

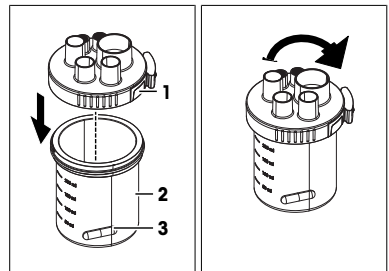
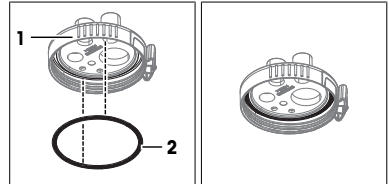
- 1 Gently pull the column (1) upward until there is a gap of a few millimeters between the connector (2) and column (1).
 - 2 Swivel the titration arm clockwise or counterclockwise to align the mounting slot (4) for the Karl Fischer cell with the internal magnetic stirrer (3).
- ➔ When the titration arm is properly aligned, the column (1) retracts down to the connector (2).



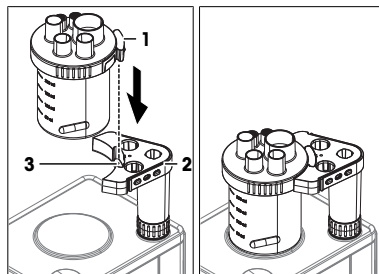
4.6.6 Assemble the Karl Fischer cell

- The titration arm is installed on the titrator.

- 1 Attach the adapter plate seal (2) to the bottom of the adapter plate (1).
- 2 Place the appropriate stir bar (3) into the vessel (2).
- 3 Place the adapter plate (1) on the vessel (2).
- 4 Turn the adapter plate clockwise and tighten it.



- 5 Stabilize the titration arm (2) with one hand.
- 6 Align the mounting tab (1) with the mounting slot (3) on the titration arm.
- 7 Push the mounting tab down completely into the mounting slot.



4.6.7 Install the waste bottle and the solvent bottle

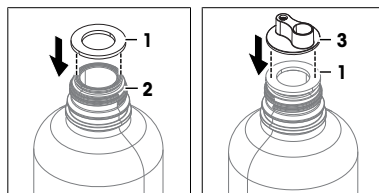
Overview of the actions

- 1 Install bottle adapters and drying tubes on the solvent bottle and on the waste bottle. See [Install bottle adapters and drying tubes ▶ Page 19].
- 2 Assemble the waste tube and the solvent tube. See [Assemble the waste tube and the solvent tube ▶ Page 19].
- 3 Connect the waste bottle. See [Connect the waste bottle ▶ Page 20].
- 4 Connect the solvent bottle. See [Connect the solvent bottle ▶ Page 20].

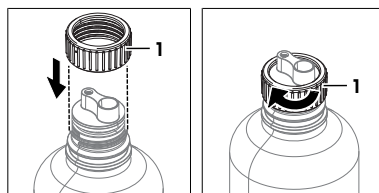
4.6.7.1 Install bottle adapters and drying tubes

- The drying tube is prepared.

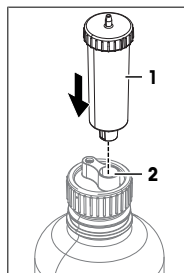
- 1 Place the flat seal (1) on the bottle (2).
- 2 Place the insert (3) on the flat seal (1).



- 3 Slide the threaded ring (1) over the insert and the flat seal.
- 4 Screw the threaded ring (1) clockwise onto the bottle and tighten it.



- 5 Insert the drying tube (1) into the mounting position (2).



4.6.7.2 Assemble the waste tube and the solvent tube

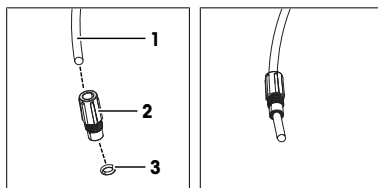
The solvent tube and the waste tube are identical tubes and are assembled in the same way.

Material

- 2 solvent tubes
- 4 M9 connectors
- 4 O-rings

Procedure

- 1 Slide one of the M9 connectors (2) over one end of a solvent tube (1).
- 2 Push one of the O-rings (3) over the end of the solvent tube.
- 3 Repeat the steps with the other end of the solvent tube.



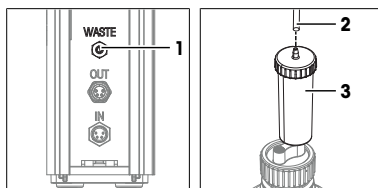
4.6.7.3 Connect the waste bottle

Material

- Air tube
- Waste tube: one of the assembled solvent tubes
- Assembled waste bottle

Connect the waste bottle to the solvent pump

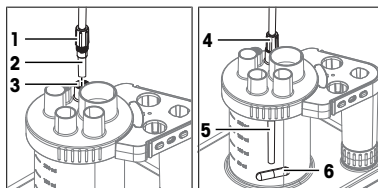
- 1 Push one end of the air tube over the **WASTE** fitting (1) on the pump.
- 2 Position the waste bottle behind the pump.
- 3 Make sure that there is no risk of knocking over the waste bottle.
- 4 Push the free end of the air tube (2) over the fitting on the drying tube (3).



Connect the waste tube to the Karl Fischer cell

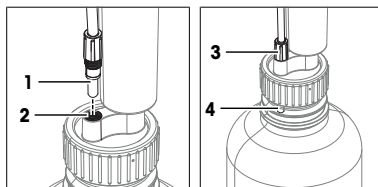
- The Karl Fischer cell is prepared.

- 1 Insert one end of the waste tube (2) into the M9 mounting position (3).
- 2 Screw the M9 connector (1) clockwise into the M9 mounting position (3) without tightening it.
- 3 Slide the tube tip (5) down to the bottom of the Karl Fischer cell, without interfering with the stir bar (6).
- 4 Tighten the M9 connector (4) clockwise.



Connect the waste tube to the waste bottle

- 1 Insert the free end of the waste tube (1) into the tube mounting position (2).
- 2 Screw the M9 connector (3) clockwise into the tube mounting position (2) without tightening it.
- 3 Slide the waste tube (4) down into the waste bottle until the end of the tube is visible just below the bottle adapter.
- 4 Tighten the M9 connector (3) clockwise.



4.6.7.4 Connect the solvent bottle

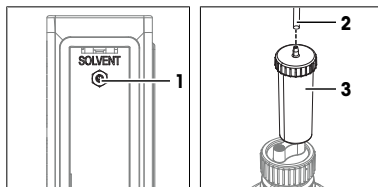
To avoid overflow, the liquid level in the solvent bottle must always be lower than the Karl Fischer cell adapter plate.

Material

- Air tube
- Solvent tube: one of the assembled solvent tubes
- Assembled solvent bottle

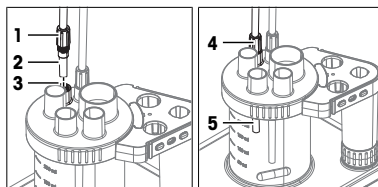
Connect the solvent bottle to the solvent pump

- 1 Push one end of the air tube over the **SOLVENT** fitting (1) on the pump.
- 2 Position the solvent bottle next to the pump.
- 3 Make sure that there is no risk of knocking over the solvent bottle.
- 4 Push the free end of the air tube (2) over the fitting on the drying tube (3).



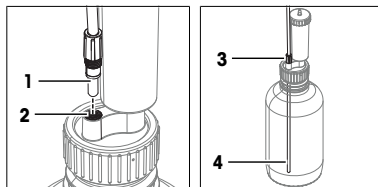
Connect the solvent tube to the Karl Fischer cell

- The Karl Fischer cell is prepared.
- 1 Insert one end of the solvent tube (2) into the M9 mounting position (3).
 - 2 Screw the M9 connector (1) clockwise into the M9 mounting position (3) without tightening it.
 - 3 Slide the solvent tube down into the Karl Fischer cell until the tube tip (5) is visible under the adapter plate.
 - 4 Tighten the M9 connector (4) clockwise.



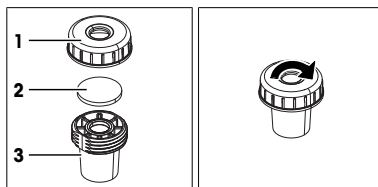
Connect the solvent tube to the solvent bottle

- 1 Insert the free end of the solvent tube (1) into the tube mounting position (2).
- 2 Screw the M9 connector (3) clockwise into the tube mounting position (2) without tightening it.
- 3 Slide the solvent tube (4) down until it touches the bottom of the solvent bottle.
- 4 Tighten the M9 connector (3) clockwise.



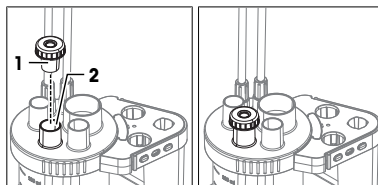
4.6.8 Assemble the sample injection adapter

- 1 Place a septum (2) in the center of the bottom of the sample injection adapter (3).
- 2 Place the top of the sample injection adapter (1) on the bottom (3).
- 3 Screw the top clockwise on the bottom and tighten it.

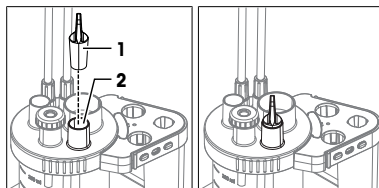


4.6.9 Install sample injection adapter and NS14 stopper

- 1 Insert the sample injection adapter (1) into the mounting position (2).
- 2 To tighten the connection, gently push the sample injection adapter down.

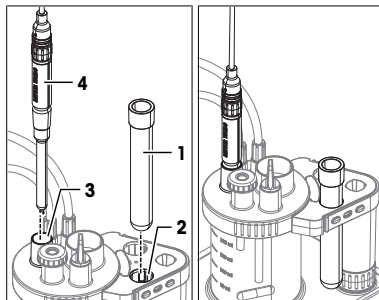


- 3 Insert the NS14 stopper (1) into the mounting position (2).
- 4 To tighten the connection, gently push the NS14 stopper down.



4.6.10 Install the sensor

- The titrator is disconnected from the power supply.
 - The sensor is assembled.
- 1 Align the red dot on the sensor cable plug with the red dot above the **SENS1** socket on the rear panel of the titrator.
 - 2 Insert the plug into the socket.
 - 3 Remove the sensor (4) from the protective sleeve (1).
 - 4 Insert the sensor (4) into the mounting position (3).
 - 5 To tighten the connection, gently push the sensor down.
 - 6 Insert the protective sleeve (1) into the holder (2).



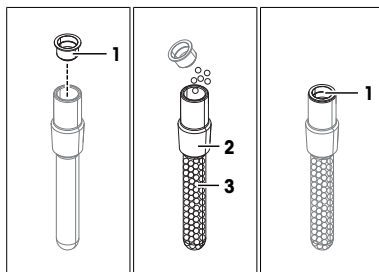
4.6.11 Assemble the generator electrode

Material

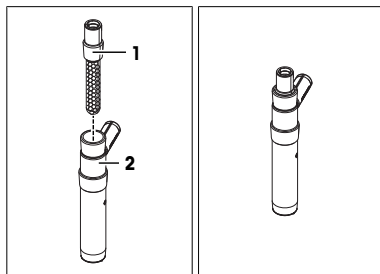
- Desiccant

Procedure

- 1 Remove the cap (1) from the drying tube.
- 2 Fill the drying tube with desiccant (3) up to the ground glass joint (2).
- 3 Replace the cap (1) on the drying tube.
- 4 Apply a thin film of silicon grease to the ground glass joint (2).



- 5 Insert the drying tube (1) into the shaft (2).



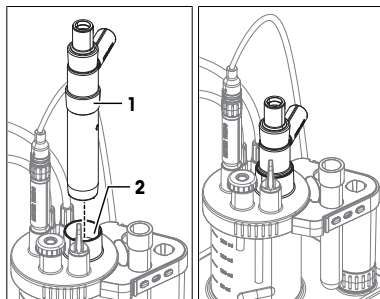
4.6.12 Install the generator electrode

Preparations

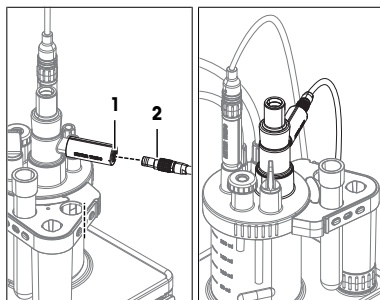
- The titrator is disconnected from the power supply.
- The generator electrode is assembled.

Procedure

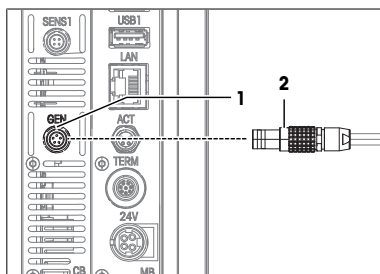
- 1 Remove the generator electrode from the holder and store the holder.
- 2 Insert the generator electrode (1) into the mounting position (2).
- 3 To tighten the connection, gently push the generator electrode down.



- 4 Align the red dot (2) on the generator electrode cable plug with the red dot (1) on the generator electrode socket.
- 5 Insert the plug into the generator electrode socket.



- 6 Align the red dot (2) on the generator electrode cable plug with the red dot (1) above the **GEN** socket on the rear panel of the titrator.
- 7 Insert the plug into the socket.



4.7 Connect and disconnect the power supply



NOTICE

Damage to the main instrument and accessories

- Connect the power supply to the titrator after the terminal and all accessories are installed.

4.7.1 Connect the power supply

The AC/DC adapter is suitable for all supply line voltages ranging from 100...240 V AC and 50–60 Hz.



WARNING

Death or serious injury due to electric shock

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

- 1 Only use the METTLER TOLEDO power cable and AC/DC 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 them if damaged.



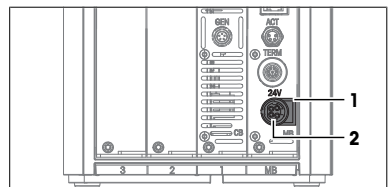
NOTICE

Damage to the AC/DC adapter due to overheating

An AC/DC adapter that does not have adequate air circulation around it, cannot cool sufficiently and overheats.

- Do not cover the AC/DC adapter.

- 1 Install the cables in such a way that they cannot be damaged or interfere with operation.
- 2 Position the AC/DC adapter so that the socket for the power cable is easily accessible.
- 3 Insert the plug of the power cable into the socket of the AC/DC adapter.
- 4 Rotate the plug of the AC/DC adapter until it is aligned with the marking (1) on the rear panel
- 5 Insert the plug into the **24V** socket (2).
- 6 Insert the plug of the power cable into a grounded power outlet that is easily accessible.



4.7.2 Disconnect the power supply

- The titrator is shut down.
 - 1 Pull the plug of the power cable out of the power outlet.
 - 2 Pull the AC adapter cable connector out of the **24V** socket at the back of the titrator.

5 Operation

5.1 Start up and shut down the titrator

5.1.1 Start up the titrator

During startup, the titrator detects connected devices. When the titrator detects a device, it opens a message with options for the configuration of the detected device. The available options depend on the detected device. The following list shows two common options:

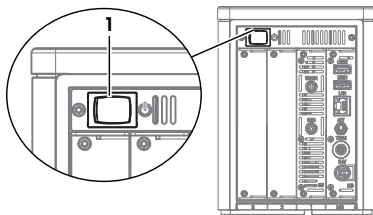
- Users can confirm the message and the titrator uses the device with default values. Users can change these default values later if they do not fit their needs.
- The titrator opens an editor so that users can edit the settings.



Read the Reference Manual for more information on how to configure connected devices. See [Download the Reference Manual ▶ Page 13].

Procedure

- The titrator is set up and connected to the power supply.
- 1 Press the power button (1).
 - ➔ The titrator starts up and detects connected devices.
 - ➔ When the titrator detects a device, a message opens.
 - 2 If you want to perform the example, confirm each message with **OK**.
- ➔ The home screen opens.



See also

- 🔗 Example: determine water content of toluene ▶ Page 25

5.1.2 Shut down the titrator

- The task area is empty or all tasks in the task area are interrupted.
 - No action is running
- 1 If user management is deactivated, go to > **Shutdown** > **Shut Down**.
 - 2 If user management is activated, go to > **Logout** > **Shut Down**.
 - ➔ The titrator discards unsaved changes and shuts down.
- ➔ The AC/DC adapter and the control circuit for the power button are energized. The rest of the titrator is no longer energized.

Shut down of the titrator in emergency situations

- Pull the plug of the power cable out of the AC/DC adapter.

5.2 Example: determine water content of toluene

This example shows how to determine the water content of toluene using a method of the **KF Coulometric** method type.

The description and the instructions are based on a setup for automated solvent exchange with a solvent pump as described in the installation chapter.

See also

- 🔗 Install a system with automated solvent exchange ▶ Page 15

5.2.1 Overview

For an analysis, the titrator executes a series of steps that might or might not require the interaction of users. At the end of the analysis, a result is available. To execute the analysis, the titrator needs a method and resources such as a sensor. The method defines the sequence of the steps that are performed during an analysis.

For this example you need:

- A method to determine the water content of samples.

Water content determination of toluene

A method of the **KF Coulometric** method type is used to determine the water content of samples.

Material

- Solvent: Karl Fischer reagent for coulometric water content determinations
- Sample: toluene

This example uses hazardous materials. Wear protective gear as required by the safety-data sheets of the chemicals you use and the safety rules of your workplace.

Dispose of the waste as required by the safety-data sheets of the chemicals you use and the rules of your workplace.

Overview of the actions

- 1 Configure the resources. See [Configure the resources for the example ▶ Page 26].
- 2 Fill the Karl Fischer cell with solvent. See [Fill the Karl Fischer cell with solvent ▶ Page 26].
- 3 Determine the water content of toluene. See [Determine the water content of toluene ▶ Page 27].

5.2.2 Configure the resources for the example

For this example, the following resources are needed:

- Sensor
- Pump
- Generator electrode without diaphragm
- Karl Fischer cell

The resources are automatically detected during startup. When a resource is detected, a message opens. If you confirmed these messages with **OK**, the resources shown in the following list are configured with the default values. For the example, you can use all resources with the default values.

- Sensor
- Pump
- Generator electrode without diaphragm



Read the Reference Manual for more information on how to configure resources. See [Download the Reference Manual ▶ Page 13].

5.2.3 Fill the Karl Fischer cell with solvent

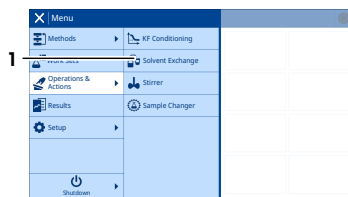
The **Solvent Exchange** operation automates filling of the Karl Fischer cell.

- Filling: fills the Karl Fischer cell with solvent.

Configure the Solvent Exchange operation and create a shortcut



- The Karl Fischer cell is connected to the solvent bottle and to the waste bottle.

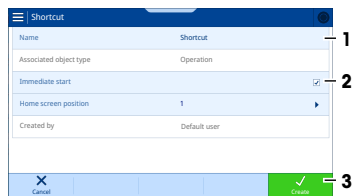
- 1 Go to **Operations & Actions > Solvent Exchange (1)**.



- 2 Deactivate **Drain (1)**.
- 3 Set **Fill duration** to 30 s (2).
- 4 Tap **Create Shortcut (3)**.

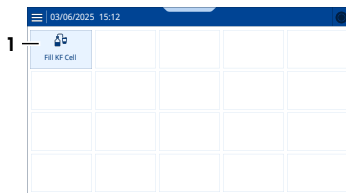


- 5 For **Name** (1), enter the name of the shortcut.
- 6 Activate **Immediate start** (2).
- 7 Tap  **Create** (3).
- 8 To open the home screen, tap .

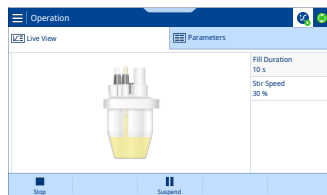



Fill the Karl Fischer cell

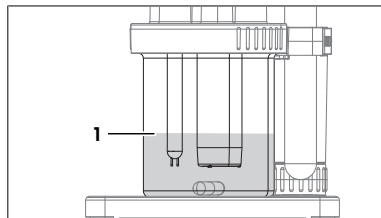
- 1 Tap the shortcut for the solvent exchange (1).



⇒ The pump pumps solvent into the Karl Fischer cell.






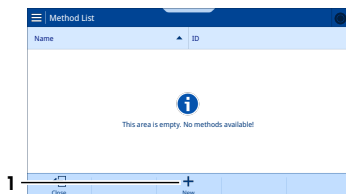
- 2 When the solvent reaches 100 mL (1), tap  **Stop**.
 - ⇒ The pump stops.
 - ⇒ The home screen opens.



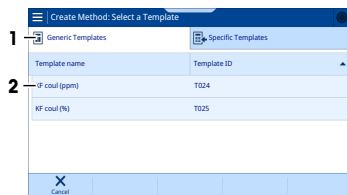
5.2.4 Determine the water content of toluene

5.2.4.1 Create the method

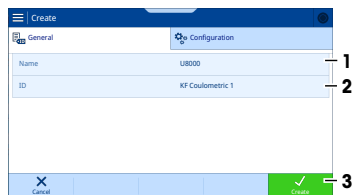
- 1 Go to  >  **Methods** >  **KF Coulometric**.
- 2 Tap  **New** (1).



- In the **Generic Templates** tab (1), select **KF coul (ppm) T024** (2).



- For **Name** (1), enter the required name.
- For **ID** (2), enter the required identifier.
- Tap **Create** (3).
 - The method is saved and listed with the name and the identifier.
- Tap **Create Task**.



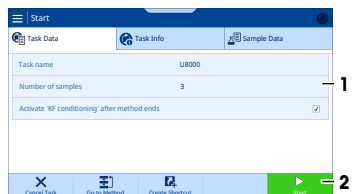
5.2.4.2 Create a shortcut

- Tap **Create Shortcut**.
- For **Name**, enter the name of the shortcut.
- Make sure **Immediate start** is not selected.
- Tap **Create**.
- To open the home screen, tap **Home**.
 - The home screen opens.

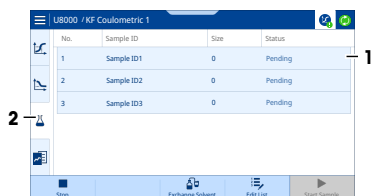
5.2.4.3 Perform the analysis

Prepare the sample entries

- Tap the shortcut for the task.
- For **Number of samples** (1), enter "3".
- Tap **Start** (2).
 - The titrator prepares the Karl Fischer cell for titration.



- Tap **Sample View**.
 - The sample view opens.
- Select the entry for the first sample (1).
- For **Sample ID**, enter the required identifier.
- Tap **Save**.
- Tap **Back**.
- Enter the **Sample ID** for the remaining samples.



Calculate sample weight

- Select the entry for the first sample.

2 Tap  **Size Calculation** (1).



3 For **Content** (1), enter "300".

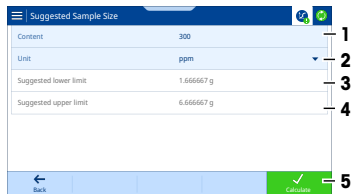
4 For **Unit** (2), select **ppm**.

5 Tap  **Calculate** (5).


⇒ The lower limit (3) and the upper limit (4) of the sample weight are calculated.

6 Write down the range of the calculated sample weight.

7 Return to the sample view.



Prepare the titration

1 Tap  (3) and check that the drift is stable (1).

2 Check that  **Start Sample** (2) is green.

3 Draw approximately 1 mL of the sample into the syringe.

4 Fill the rest of the syringe with air and shake the syringe a few times.

5 Empty the syringe into a suitable waste container.



Perform the titration

1 Draw the sample into the syringe.

2 Place the syringe on the balance.

3 Zero the balance.

4 On the titrator, tap  **Start Sample**.

5 Inject approximately 3 mL of the sample through the septum (1) into the Karl Fischer cell.

6 Backweigh the syringe and note the absolute value of the displayed weight.

7 In the **Sample size** window, enter the weight.

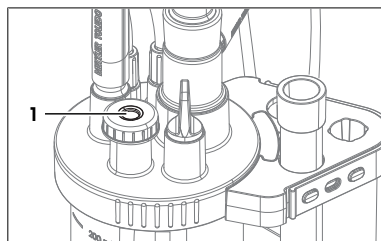
8 Tap .

⇒ When the titration is completed, the result is displayed.

9 Repeat the steps for the remaining samples.

10 When the last sample is analyzed, tap  **OK**.

⇒ The titrator starts **KF Conditioning** to maintain the dry state of the Karl Fischer cell.



6 Maintenance

In this chapter you find descriptions of the maintenance tasks you should perform on your instrument. Any other maintenance tasks need to be performed by a service technician who has been qualified by METTLER TOLEDO.

If you experience problems with your instrument, contact your authorized METTLER TOLEDO service representative or dealer.

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

► www.mt.com/contact

6.1 Maintenance schedule

Follow this maintenance schedule, unless otherwise required by the standard operating procedures of your company.

6.1.1 Titrator

Before each measurement series

Task	Link
1 Check if the desiccant in any of the drying tubes is saturated with moisture.	[Prepare drying tubes ► Page 17]
2 Replace desiccant that is saturated with moisture.	
1 Check the septum for holes.	[Install sample injection adapter and NS14 stopper ► Page 21]
2 Replace any septum with holes.	

Every month

Task	Link
Clean the housing and the titrator cover.	[Clean the housing ► Page 31]
Clean the Karl Fischer cell.	[Empty and clean the Karl Fischer cell ► Page 32]
Replace the desiccant in the drying tubes.	[Prepare drying tubes ► Page 17]

Before periods of inactivity

Task	Link
Clean the housing and the titrator cover.	[Clean the housing ► Page 31]
Clean the Karl Fischer cell.	[Empty and clean the Karl Fischer cell ► Page 32]

6.1.2 Terminal

Every month

Task	Link
Clean the terminal and the terminal cover.	[Clean the terminal ► Page 37]

Before periods of inactivity

Task	Link
Clean the terminal and the terminal cover.	[Clean the terminal ► Page 37]

6.1.3 Solvent pump dPump KF

Every month

Task	Link
Clean the housing.	[Clean the solvent pump dPump KF ► Page 37]

Before periods of inactivity

Task	Link
Clean the housing.	[Clean the solvent pump dPump KF ► Page 37]
Empty the solvent tube and the waste tube.	[Empty the Karl Fischer cell ► Page 32]

6.1.4 Generator electrode

Before each measurement series

Task	Link
1 Check if the desiccant in the drying tube is saturated with moisture.	[Assemble the generator electrode ▶ Page 22]
2 Replace desiccant that is saturated with moisture.	

Every month

Task	Link
Replace the desiccant in the drying tube.	[Assemble the generator electrode ▶ Page 22]

Before periods of inactivity

Task	Link
Clean the generator electrode and store it in the original packaging.	[Clean the generator electrode ▶ Page 35]

6.2 Clean the titrator and accessories



NOTICE

Damage to the titrator due to inappropriate cleaning methods

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

- 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 titrator.



NOTICE

Damage to electronic accessories due to inappropriate cleaning methods

Inappropriate cleaning agents can damage the housing or other parts of electronic accessories. If liquids enter the housing, they can damage an electronic accessory.

- 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 any electronic accessory.

Some of the recommended cleaning agents are hazardous materials. Wear protective gear as required by the safety-data sheets of the cleaning agents you use and the safety rules of your workplace.

Dispose of the waste as required by the safety-data sheets of the chemicals you use and the rules of your workplace.

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

▶ www.mt.com/contact

6.2.1 Clean the housing

METTLER TOLEDO recommends the following cleaning agents:

- Water with a mild detergent
- Ethanol

Procedure





- The titrator is shut down.
 - The titrator is disconnected from the power supply.
- 1 Remove the titrator cover.

- 2 Wipe the titrator cover with a cloth moistened with the cleaning agent.
- 3 Air-dry the titrator cover or dry it with a soft tissue.
- 4 Wipe the housing with a cloth moistened with the cleaning agent.
- 5 Air-dry the housing or dry it with a soft tissue.
- 6 Install the titrator cover.





6.2.2 Empty and clean the Karl Fischer cell

6.2.2.1 Empty the Karl Fischer cell

Empty the solvent tube

- The action **KF Conditioning** is not running.
- 1 On the solvent bottle, loosen the M9 connector counterclockwise.
 - 2 Pull the tube out of the solvent bottle until it is no longer immersed in the solvent.
 - 3 Tighten the M9 connector clockwise.
 - 4 Go to  >  **Operations & Actions** >  **Solvent Exchange**.
 - 5 Deactivate **Drain**.
 - 6 Activate **Fill**.
 - 7 Set **Fill duration** to 10 s.
 - 8 Tap  **Start**.
 - ➔ Air is pushed through the tube into the Karl Fischer cell.
 - ➔ The home screen opens.

Empty the Karl Fischer cell and the waste tube

- 1 Go to  >  **Operations & Actions** >  **Solvent Exchange**.
- 2 Activate **Drain**.
- 3 Deactivate **Fill**.
- 4 Set **Drain duration** to 60 s.
- 5 Tap  **Start**.
 - ➔ The solvent is drained from the Karl Fischer cell and the waste tube.
- ➔ The home screen opens.

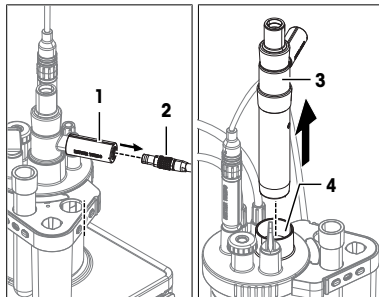
6.2.2.2 Remove the generator electrode

Preparations

- The titrator is shut down.
- The Karl Fischer cell, the solvent tube, and the waste tube are empty.
- The titrator is disconnected from the power supply.

Procedure

- 1 Disconnect the generator electrode cable (2) from the socket (1).
- 2 Lift the generator electrode (3) out of the mounting position (4).
- 3 Hold the generator electrode over a suitable waste container and rinse it with the cleaning agent.
- 4 Let the generator electrode air dry and then place it in the generator electrode holder.

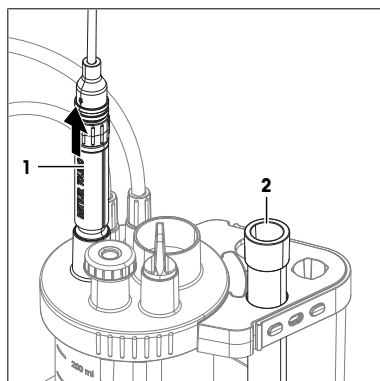


See also

🔗 Clean the generator electrode ▶ Page 35

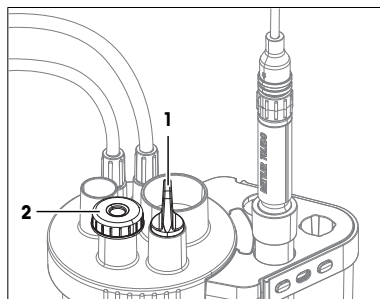
6.2.2.3 Remove the sensor

- 1 Pull the sensor (1) out of the adapter plate.
- 2 Hold the sensor over a suitable waste container and rinse it with the cleaning agent.
- 3 Insert the sensor into the protective sleeve (2).



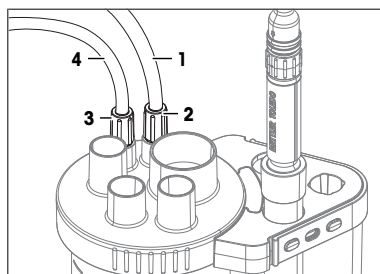
6.2.2.4 Remove the NS14 stopper and sample injection adapter

- 1 Pull the NS14 stopper (1) out of the adapter plate.
- 2 Pull the sample injection adapter (2) out of the adapter plate.



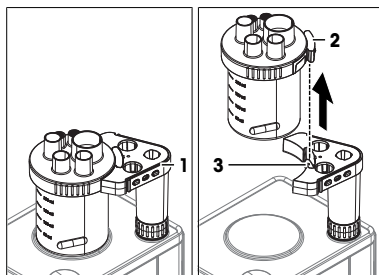
6.2.2.5 Disconnect the solvent and waste tubes

- 1 Unscrew the M9 connector (3) counterclockwise.
- 2 Lift the solvent tube (4) out of the Karl Fischer cell and slide the M9 connector (3) all the way back to the bottle adapter.
- 3 Unscrew the M9 connector (2) counterclockwise.
- 4 Lift the waste tube (1) out of the Karl Fischer cell and slide the M9 connector (2) all the way back to the bottle adapter.



6.2.2.6 Remove the Karl Fischer cell

- 1 Stabilize the titration arm (1) with one hand.
- 2 Pull the Karl Fischer cell up, lifting the mounting tab (2) out of the mounting slot (3).



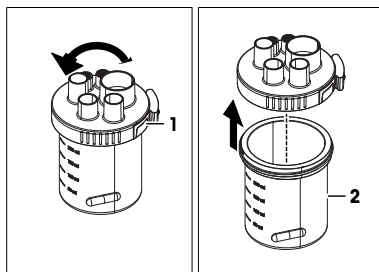
6.2.2.7 Disassemble the Karl Fischer cell

Material

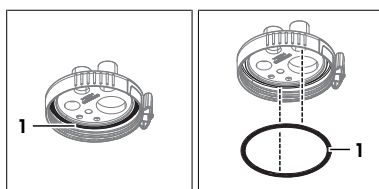
- Blunt, slim tool such as a small screwdriver

Remove the adapter plate

- 1 Turn the adapter plate (1) counterclockwise and remove it from the vessel (2).

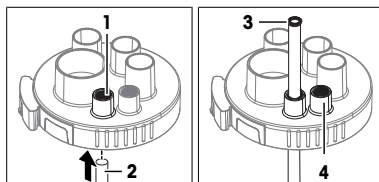


- 2 Remove the adapter plate seal (1) from the bottom of the adapter plate.



Remove the O-rings from the M9 mounting positions

- 1 Insert the blunt tool (2) from below into the M9 mounting position (1).
- 2 Push the O-ring (3) out of the M9 mounting position from below.
- 3 Repeat the steps with the other M9 mounting position (4).



6.2.2.8 Clean the parts

Any water that is adsorbed to an inner surface of the Karl Fischer cell is a cause for drift. To reduce this type of drift, clean the parts with water-free cleaning agents. If you use aqueous cleaning agents, dry the parts thoroughly before you reinstall the Karl Fischer cell.

METTLER TOLEDO recommends the following cleaning agents:

- Ethanol
- Methanol

Procedure

- 1 Wipe the vessel with a cloth moistened with the cleaning agent.
- 2 Rinse the adapter plate with the cleaning agents.
- 3 Air-dry the adapter plate and the vessel.

6.2.2.9 Reinstall the Karl Fischer cell

Preparations

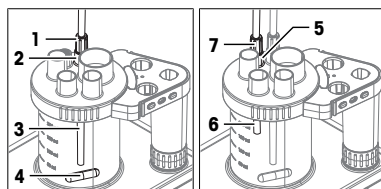
- The titrator is shut down.
- The titrator is disconnected from the power supply.
- The waste bottle is assembled.
- The solvent bottle is assembled.

Assemble the Karl Fischer cell

- Assemble the Karl Fischer cell. See [Assemble the Karl Fischer cell ▶ Page 18].

Connect the solvent bottle and the waste bottle

- 1 Insert the free end of the waste tube (3) into the M9 mounting position (2).
- 2 Slide the M9 connector (1) of the waste tube from the bottle adapter to the M9 mounting position (2).
- 3 Screw the M9 connector (1) clockwise into the M9 mounting position (2) without tightening it.
- 4 Slide the waste tube (3) down to the bottom of the Karl Fischer cell, without interfering with the stir bar (4).
- 5 Tighten the M9 connector (1) clockwise.
- 6 Insert the free end of the solvent tube (6) into the M9 mounting position (5).
- 7 Slide the M9 connector (7) of the solvent tube from the bottle adapter to the M9 mounting position (5) on the adapter plate.
- 8 Screw the M9 connector (7) clockwise into the M9 mounting position (5) without tightening it.
- 9 Slide the solvent tube down into the Karl Fischer cell until the tip of the tube (6) is visible but will remain above the level of liquid inside the vessel.
- 10 Tighten the M9 connector (5) clockwise.



Install sample injection adapter and NS14 stopper

- Install the sample injection adapter and NS14 stopper. See [Install sample injection adapter and NS14 stopper ▶ Page 21].

Install the sensor

- Install the sensor. See [Install the sensor ▶ Page 22].

Install the generator electrode

- Install the generator electrode. See [Install the generator electrode ▶ Page 23].

6.2.3 Clean the generator electrode

6.2.3.1 Clean the generator electrode without diaphragm

The generator electrode without diaphragm might need to be cleaned if conductivity is impeded.



NOTICE

Damage to the generator electrode due to inappropriate cleaning methods

Inappropriate cleaning agents or methods can damage the cathode or other parts of the generator electrode.

- 1 Do not touch or rub the mesh bottom of the generator electrode. Any pressure on the mesh might cause damage.
- 2 Do not touch the cathode wire inside the generator electrode housing.
- 3 Do not use water inside the electrode housing.





Material

- Suitable cleaning agent





Preparations

- A stir bar is in the Karl Fischer cell.











Replace solvent with cleaning agent

- 1 Go to  >  **Operations & Actions** >  **Solvent Exchange**.
- 2 Activate **Drain**.
- 3 Deactivate **Fill**.
- 4 Set **Drain duration** to 60 s.
- 5 Tap  **Start**.
 - ➔ The solvent is drained from the Karl Fischer cell and the waste tube.
- 6 Remove the sample injection adapter.
- 7 Manually add 100 mL of cleaning agent to the Karl Fischer cell through the sample injection adapter mounting position.
- 8 Reinstall the sample injection adapter.

Clean the generator electrode

- 1 Go to  >  **Operations & Actions** >  **Stirrer**.
- 2 Set **Speed** to 30 % and **Stir time** to ∞ s.
- 3 Tap  **Start**.
- 4 Allow the cleaning agent to stir approximately 2–3 hours until the generator electrode is visibly clean.
- 5 To stop the stirrer, press **Stop**.

Rinse with solvent

- 1 Go to  >  **Operations & Actions** >  **Solvent Exchange**.
- 2 Activate **Drain**.
- 3 Deactivate **Fill**.
- 4 Set **Drain duration** to 60 s.
- 5 Tap  **Start**.
 - ➔ The cleaning agent is drained from the Karl Fischer cell and the waste tube.
- 6 Go to  >  **Operations & Actions** >  **Solvent Exchange**.
- 7 Activate **Fill**.
- 8 Deactivate **Drain**.
- 9 Set **Fill duration** to 10 s.
 - ➔ The pump pumps solvent into the Karl Fischer cell.
- 10 Go to  >  **Operations & Actions** >  **Solvent Exchange**.
- 11 Activate **Drain**.
- 12 Deactivate **Fill**.

13 Set **Drain duration** to 60 s.

14 Tap  **Start**.

- ➔ The solvent is drained from the Karl Fischer cell and the waste tube.
- ➔ The generator electrode is clean and the Karl Fischer cell is ready for use.

See also

 Empty the Karl Fischer cell ▶ Page 32

6.2.4 Clean the terminal

METTLER TOLEDO recommends the following cleaning agents:

- Water with a mild detergent
- Ethanol

Procedure

- The titrator is shut down.
- 1 Remove the terminal cover.
- 2 Wipe the terminal cover with a cloth moistened with the cleaning agent.
- 3 Air-dry the terminal cover or dry it with a soft tissue.
- 4 Wipe the terminal with a cloth moistened with the cleaning agent.
- 5 Air-dry the terminal or dry it with a soft tissue.
- 6 Install the terminal cover.

6.2.5 Clean the solvent pump dPump KF

METTLER TOLEDO recommends the following cleaning agents:

- Water with a mild detergent
- Ethanol

Procedure

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

6.3 Prepare the titrator for storage

- 1 Empty the Karl Fischer cell.
- 2 Empty all tubes.
- 3 Shut down the titrator.
- 4 Disconnect the terminal.
- 5 Disconnect the titrator from the power supply.
- 6 Disconnect any accessories from the titrator.
- 7 Remove and clean the generator electrode.
- 8 Remove and clean the sensor.
- 9 Remove and clean the Karl Fischer cell.
- 10 Remove all cables.
- 11 Clean the titrator.
- 12 Store the titrator in a dry and clean place.

See also

- 🔗 Technical data ▶ Page 39
- 🔗 Empty and clean the Karl Fischer cell ▶ Page 32
- 🔗 Start up and shut down the titrator ▶ Page 24
- 🔗 Disconnect the terminal ▶ Page 15
- 🔗 Disconnect the power supply ▶ Page 24
- 🔗 Clean the titrator and accessories ▶ Page 31
- 🔗 Clean the generator electrode ▶ Page 35

6.4 Transport the titrator

If you have questions about transporting your titrator, contact your authorized METTLER TOLEDO service representative or dealer.

▶ www.mt.com/contact

Procedure

- 1 Empty the Karl Fischer cell.
- 2 Empty all tubes.
- 3 Shut down the titrator.
- 4 Disconnect the terminal.
- 5 Disconnect the titrator from the power supply.
- 6 Disconnect any accessories from the titrator.
- 7 Remove and clean the generator electrode.
- 8 Remove and clean the sensor.
- 9 Remove and clean the Karl Fischer cell.
- 10 Remove all cables.
- 11 Clean the titrator.
- 12 If you transport the titrator over long distances, use the original packaging.
- 13 Move the titrator to the new location.

See also

- 🔗 Technical data ▶ Page 39
- 🔗 Empty and clean the Karl Fischer cell ▶ Page 32
- 🔗 Start up and shut down the titrator ▶ Page 24
- 🔗 Disconnect the terminal ▶ Page 15
- 🔗 Disconnect the power supply ▶ Page 24
- 🔗 Clean the titrator and accessories ▶ Page 31
- 🔗 Clean the generator electrode ▶ Page 35

7 Dispose of the titrator

If you have questions about the disposal of your titrator, contact your authorized METTLER TOLEDO dealer or service representative.

▶ www.mt.com/contact

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



Please dispose of this equipment 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 equipment. Should this equipment be passed on to other parties, the content of this directive must also be passed on to the other party.

Procedure

- 1 Empty the Karl Fischer cell.
- 2 Empty all tubes.
- 3 Shut down the titrator.
- 4 Disconnect the terminal.
- 5 Disconnect the titrator from the power supply.
- 6 Disconnect any accessories from the titrator.
- 7 Remove and clean the generator electrode.
- 8 Remove and clean the sensor.
- 9 Remove and clean the Karl Fischer cell.
- 10 Remove all cables.
- 11 Clean the titrator.
- 12 Dispose of the titrator according to local laws and regulations.

See also

- Technical data ▶ Page 39
- Empty and clean the Karl Fischer cell ▶ Page 32
- Start up and shut down the titrator ▶ Page 24
- Disconnect the terminal ▶ Page 15
- Disconnect the power supply ▶ Page 24
- Clean the titrator and accessories ▶ Page 31
- Clean the generator electrode ▶ Page 35

8 Technical data



Read the Reference Manual for additional technical data. See [Download the Reference Manual ▶ Page 13].

8.1 Titrator

Power supply

Characteristic	Value	
Titration	Input rating	24 V DC, 5 A
	Socket	Power mini-DIN, 4-pin, female
AC/DC adapter	Input rating	100–240 V AC, 1.5 A
	Fluctuation of supply line voltage	±10 %
	Input frequency	50–60 Hz
	Output rating	24 V DC, 5 A, 120 W

Instrument

Characteristic		Value
Dimensions	Width	135 mm
	Depth	177 mm
	Height without titration arm	185 mm
Weight		2.8 kg
Material	Housing	PBT (polybutylene terephthalate), stainless steel (1.4301), chrome-plated ZnAl ₄ Cu ₁ , EPDM M-class (ethylene propylene diene monomer (M-class) rubber)
	Titration cover	PET (polyethylene terephthalate)
	Mounting position cover	PP (polypropylene)

Site requirements

Characteristic		Value
Ambient conditions	Ambient temperature	5...40 °C
	Recommended operational temperature ¹⁾	18...28 °C
	Relative humidity	Non-condensing, max. 80 % for temperatures up to 31 °C, decreasing linearly to 50 % at 40 °C
	Altitude	≤5000 m above sea level
	Use	Indoor
	Overvoltage category	II
	Pollution degree	2
Storage conditions	Temperature	-20...+70 °C, no ice formation
	Relative humidity	10...90 %, non-condensing

¹⁾ METTLER TOLEDO produces and tests the equipment with test tools that are certified for this temperature range. Usage outside the given range could lead to inferior performance.

8.2 Terminal

Characteristic		Value
Dimensions	Width	194 mm
	Depth	129 mm
	Height	51 mm
Weight		725 kg
Materials	Top housing	Chrome-plated ZnAl ₄ Cu ₁
	Lower housing	PBT (polybutylene terephthalate)
	Cover glass	Aluminosilicate glass
	USB-C socket cover	TPV (thermoplastic vulcanizate)
	Terminal cover	PET (polyethylene terephthalate)

To protect your product's future:

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

Please request full details about our attractive terms of service.

► www.mt.com/service

www.mt.com/EVA-titration

For more information

Mettler-Toledo GmbH

Im Langacher 44
8606 Greifensee, Switzerland
www.mt.com/contact

Subject to technical changes.
© 02/2025 METTLER TOLEDO. All rights reserved.
30988540A



30988540