

IONIC Titrator



2.1040.0xx0

Manual

8.1040.8101EN / v3 / 2026-08-05



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Technical Communication
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Table of contents

1	Overview	1
1.1	Product description	1
1.2	Product versions	1
1.3	About the documentation	2
1.4	Additional information	3
1.5	Displaying the accessories	3
2	Safety	4
2.1	Intended use	4
2.2	Responsibility of the operator	4
2.3	Requirements for operating personnel	5
2.4	Safety instructions	5
2.4.1	Danger from electrical potential	5
2.4.2	Danger from biological and chemical hazardous substances	6
2.4.3	Danger from highly flammable substances	6
2.4.4	Danger from leaking liquids	6
2.4.5	Danger during transport of the product	7
2.5	Design of warning messages	7
2.6	Meaning of warning signs	8
3	Functional description	9
3.1	IONIC Titrator – Overview	9
3.2	Titration system – Overview	12
3.2.1	Bottle holder – Overview	13
3.2.2	Bottle unit – Overview	14
3.2.3	Measuring Interface Analog – Overview	15
3.2.4	Measuring Interface Digital – Overview	16
3.3	Single-workplace titration system for volumetric Karl Fischer titrations – Overview	17
3.3.1	Volumetric Karl Fischer titration cell – Overview	18
3.4	Indicators and controls	20
3.5	System – Signals	21
4	Delivery and transport	22
4.1	Delivery	22
4.2	Packaging	22

5	Installation	23
5.1	Installation by Metrohm	23
5.2	Setup location	23
5.3	Installing the support stand	23
5.4	Mounting the electrode holder	25
5.5	Setting up the bottle holder	27
5.6	Equipping the bottle unit	29
5.7	Replacing the adsorber material	33
5.8	Setting up the single-workplace titration system for volumetric Karl Fischer titrations	37
5.8.1	Preparing the volumetric Karl Fischer titration cell	37
5.8.2	Equipping the volumetric Karl Fischer titration cell	38
5.8.3	Mounting the volumetric Karl Fischer titration cell	44
5.8.4	Preparing the volumetric Karl Fischer titration cell for reagent replacement	45
5.8.5	Mounting the homogenizer (optional)	49
5.9	Mounting the sensor	53
5.10	Connecting the power cord	56
6	Operation	58
6.1	Switching the instrument on and off	58
6.2	Removing the bottle unit	59
7	Maintenance	62
7.1	Cleaning the product surface	62
8	Troubleshooting	64
8.1	Forcing a shutdown	64
9	Disposal	65
10	Technical specifications	66
10.1	Ambient conditions	66
10.2	Energy supply	66
10.3	Measurements and weight	68
10.4	Housing	68
10.5	Connectors specifications	68
10.5.1	IONIC Titrator – Connectors specifications	68
10.5.2	Measuring Interface Analog – Connectors specifications	69
10.5.3	Measuring Interface Digital – Connector specifications	70

10.6	Display specifications	71
10.7	Operation specifications	71
10.8	Measurement specifications	71
10.9	Magnetic stirrer – Specifications	74
10.10	Wireless data transmission – Specifications	74

1 Overview

1.1 Product description

The IONIC Titrator is a compact titration system for volumetric titration. The IONIC Titrator combines in a single instrument the touch-sensitive color monitor, the titration unit, and the magnetic stirrer, depending on the product version. Thanks to its compact construction, the IONIC Titrator can be used as a stand-alone titrator.

Titration vessels can be placed on the top of the housing. 2 bottles can be safely placed with the optional bottle holder. The IONIC Titrator is used by default with an 807 Dosing Unit with the Dosino Module attached.

Solutions, sensors, methods, etc. can be managed in the internal memory. In addition to methods and determinations, a backup with all data and system settings can also be created. Data can be exported and imported to a USB flash drive via the USB connector, for example. In addition, a printer or an RS-232 instrument can be connected via a USB/RS-232 Converter.

The IONIC Titrator can also be connected to external instruments via a network connection. For the network connection, there is either the integrated Ethernet connector on the rear of the instrument or a wireless connection via WLAN or mobile communications. The network connection offers the following advantages:

- Print reports on a network printer.
- Send displayed messages as e-mails.
- Send notifications to a smartphone via app.

1.2 Product versions

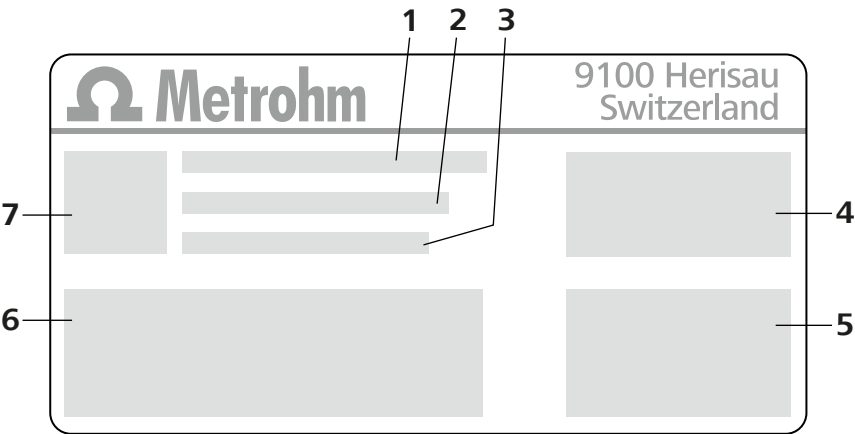
The product is available in the following versions:

Table 1 Product versions

Article number	Designation	Version feature
2.1040.0010	IONIC Titrator	without magnetic stirrer
2.1040.0020	IONIC Titrator	with 1 magnetic stirrer

Additional product versions are available on the [Metrohm website](#).

The article number and serial number for identification of the product can be found on the type label:



1	(01) = Article number in accordance with GS1 standard	2	(21) = Serial number
3	(240) = Metrohm article number	4	Certification
5	Technical specifications	6	Test mark
7	QR code		

1.3 About the documentation

Possible depictions in the documentation:

Depiction	Meaning
(5-12)	Cross-reference to figure legend (Figure number - <i>Element in the figure</i>)
1	Instruction step
Method	Parameters, menu items, tabs, and dialogs
File ► New	Menu path
[Continue]	Button or key
i	Supplementary information to the descriptive text
	Note In graphics, orange arrows or frames indicate the reference to the descriptive text. The relevant elements may also be colored orange.



Movement

In graphics, blue arrows indicate the movement direction. The elements to be moved may also be colored blue.

1.4 Additional information

Additional product information is available on the following pages:

- Metrohm website <https://www.metrohm.com> – Overview of product family, documents as PDF, details of accessories, and information on applications.
- IONIC help <https://go.metrohm.com/s/hjyKX> – Thematically filtered individual content, videos, information on the IONIC app.

1.5 Displaying the accessories

Up-to-date information on the scope of delivery and on optional accessories can be found on the Metrohm website.

1 Searching for a product on the website

- Go to <https://www.metrohm.com>.
- Click on .
- Enter the article number of the product into the search field and press **[Enter]**.
 - Article number: [Product versions, chapter 1.2, page 1](#)
- In the result list, click on the desired product.

Detailed information regarding the product is displayed.

2 Displaying the accessories

- Scroll down (accessories subject to availability):
 - Included parts
 - Optional parts

3 Downloading the accessories list (included and optional parts)

- Click on  to download the accessories list as a PDF.

 Metrohm recommends keeping the downloaded PDF for reference purposes.

2 Safety

2.1 Intended use

The IONIC Titrator is designed as a stationary analyzer for use in controlled lab environments. The main area of use is volumetric titrations in analytical laboratories. The product is suitable only for operation indoors and may not be used in potentially explosive or fire-hazard environments.

The IONIC Titrator may not be used for military purposes or for other otherwise non-permitted applications. Use in safety-critical environments is not intended. This applies in particular for sensitive applications in medicine, medical technology, nuclear technology, aviation, and aeronautics or in comparable areas in which malfunctions could lead to considerable personal injury, environmental damage or property damage.

2.2 Responsibility of the operator

The operator has the following responsibilities:

- Observe applicable national, regional, and local regulations.
- Instruct personnel in the safe handling of the product.
- Train personnel in the use of the product according to the user documentation (e.g., install, operate, clean, eliminate faults).
- Train personnel on basic occupational safety and accident prevention regulations.
- Provide personal protective equipment (e.g., protective glasses, gloves).
- Provide suitable tools and equipment for safe execution of work.

The product may be used only when its status is perfect. The following measures are required to ensure the safe operation of the product:

- Check the condition of the product before use.
- Remedy defects and malfunctions immediately.
- Maintain and clean the product regularly.

2.3 Requirements for operating personnel

Only qualified personnel may operate the product. Qualified personnel are persons who meet the following requirements:

- Basic regulations on occupational safety and accident prevention for chemical laboratories are known and complied with.
- Knowledge of handling hazardous chemicals is present. Personnel have the ability to recognize and avoid potential dangers.
- Knowledge regarding the application of fire prevention measures for laboratories is available.
- Safety-relevant information is communicated and understood. The personnel can operate the product safely.
- The user documentation has been read and understood. The personnel operate the product according to the instructions in the user documentation.

2.4 Safety instructions

2.4.1 Danger from electrical potential

Contact with electrical potential can cause serious injuries or death. To avoid danger from electrical potential, observe the following:

- Operate the product only if it is in perfect condition. The housing must also be intact.
- Use the product only with the coverings mounted. If covers are damaged or missing, disconnect the product from the energy supply and contact the regional Metrohm service representative.
- Protect live components (e.g., power supply unit, power cord, connection sockets) against moisture.
- Always have maintenance work and repairs on electrical components carried out by a regional Metrohm service representative.
- Disconnect the product from the energy supply immediately if at least one of the following cases occurs:
 - The housing is damaged or open.
 - Live parts are damaged.
 - Moisture penetrates.

 To disconnect the product from the energy supply, pull the power plug.

2.4.2 Danger from biological and chemical hazardous substances

Contact with biological hazardous substances may cause poisoning from toxins or infections from microorganisms. Contact with aggressive chemical substances may cause poisoning or chemical burns. To avoid danger from biological or chemical hazardous substances, observe the following:

- Label the product according to regulations if it is used for substances that have a potential for chemical hazards and are generally subject to the Hazardous Substances Ordinance.
- Wear personal protective equipment (e.g. protective glasses, gloves).
- Use exhaust equipment when working with vaporizing hazardous substances.
- Dispose of hazardous substances in accordance with regulations.
- Clean and disinfect contaminated surfaces.
- Only use detergents that do not cause any unwanted side reactions with the materials to be cleaned.
- Dispose of chemically contaminated materials (e.g. cleaning material) in accordance with regulations.
- Proceed as follows in case of a return shipment to Metrohm AG or a regional Metrohm representative:
 - Decontaminate the product or product component.
 - Remove the labeling for hazardous substances.
 - Create a declaration of decontamination and enclose it with the product.

2.4.3 Danger from highly flammable substances

Using highly flammable substances or gases may cause fires or explosions. To avoid danger from highly flammable substances, observe the following:

- Avoid ignition sources.
- Use protective grounding.
- Use exhaust equipment.

2.4.4 Danger from leaking liquids

Leaking liquids may cause injuries and may damage the product. To avoid danger from leaking liquids, observe the following:

- Check the product and its accessories for leakages and loose connections.
- Replace leaking components and connecting elements without delay.
- Only use stirring bars that are the right length for the vessel size.
- Tighten loose connecting elements.
- Do not loosen tubing connections under pressure.
- Do not remove aspiration tubing under pressure.
- Carefully pull the tubing ends out of the vessels.
- Carefully allow liquids from the tubing to drain into suitable vessels.
- Insert the tubing tips completely into the vessels.

- Remove and dispose of escaping liquids in accordance with regulations.
- If you suspect that liquid has penetrated the instrument, disconnect the instrument from the energy supply. Then have the instrument checked by a regional Metrohm service representative.

2.4.5 Danger during transport of the product

Chemical or biological substances may be spilled during the transport of the product. Parts of the product may fall down or may be damaged. There is a risk of injury from chemical or biological substances and pieces of broken glass. To ensure safe transport, observe the following:

- Remove loose parts (e.g. sample racks, sample vessels, bottles) before transport.
- Remove liquids.
- Lift and transport the product with both hands on the base plate.
- Lift and transport heavy products only according to instructions.

2.5 Design of warning messages

The present documentation uses warning messages as follows.

Structure

1. Severity of the danger (signal word)
2. Type and source of danger
3. Consequences of disregarding the danger
4. Measures for averting the danger

Hazard levels

Signal color and signal word designate the hazard level.



DANGER

Indicates an immediate danger. It will result in serious injuries or death if not avoided.



WARNING

Indicates a potential danger. Failure to avoid the danger may result in death or serious injury.



CAUTION

Indicates a potential danger. If not avoided, it may result in light or minor injuries.

NOTICE

Indicates a potentially damaging situation. If not avoided, the product or something in the surrounding area could be damaged.

2.6 Meaning of warning signs

Warning signs on the product or in the documentation indicate potential dangers or draw attention to certain behaviors in order to avoid accidents or damage.

Depending on the application purpose, the operating company attaches additional warning signs to the product. The corresponding instructions of the operator must be followed.

Table 2 Warning signs according to ISO 7010 (examples)

Warning signs / meaning		Warning signs / meaning	
	General warning sign		Warning of hot surface
	Warning of sharp object (cut/puncture)		Warning of hand injuries (crushing)
	Warning of electrical voltage		Warning of corrosive substances
	Warning of optical radiation		Warning of a laser beam
	Warning of flammable materials		Warning of biological hazard
	Warning of toxic materials		

3 Functional description

3.1 IONIC Titrator – Overview

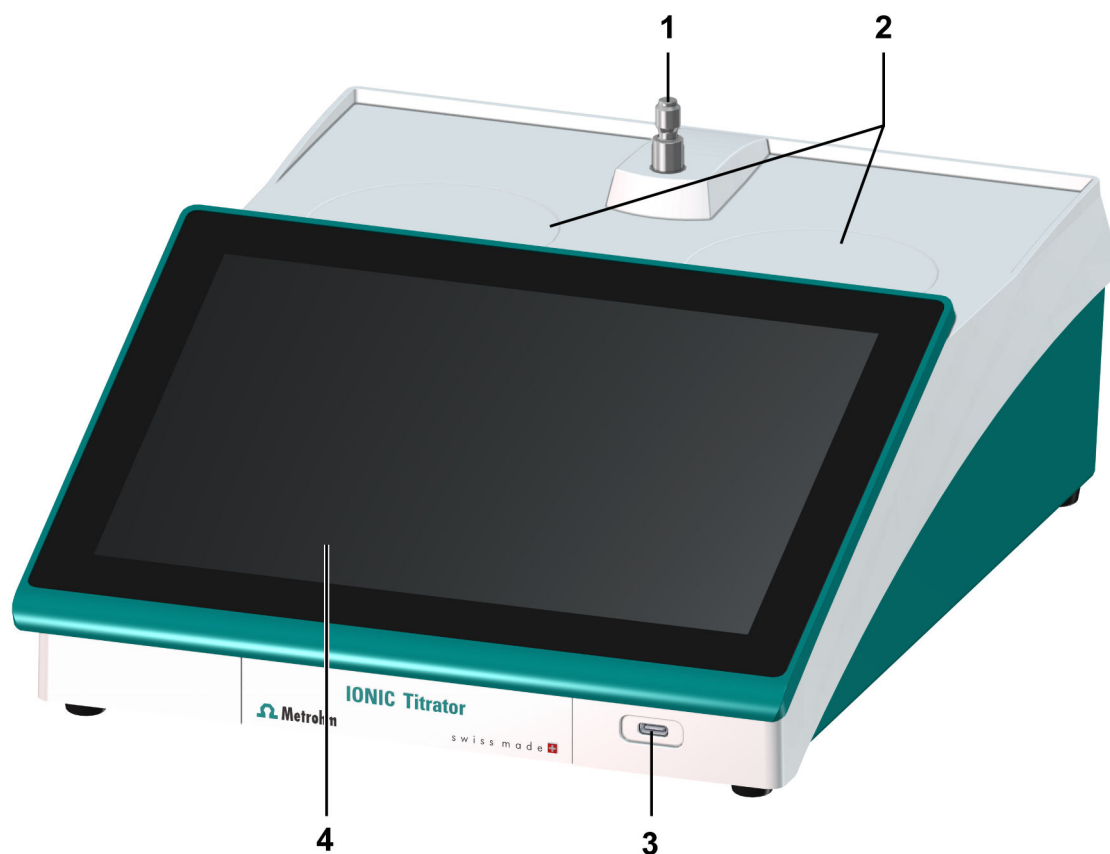


Figure 1 IONIC Titrator – Front

1 Stand attachment

2 Storage space

With built-in magnetic stirrer, (see ["Product versions", chapter 1.2, page 1](#)) depending on the product version.

3 USB-C connector

Connection socket for a USB flash drive.

4 Touch screen

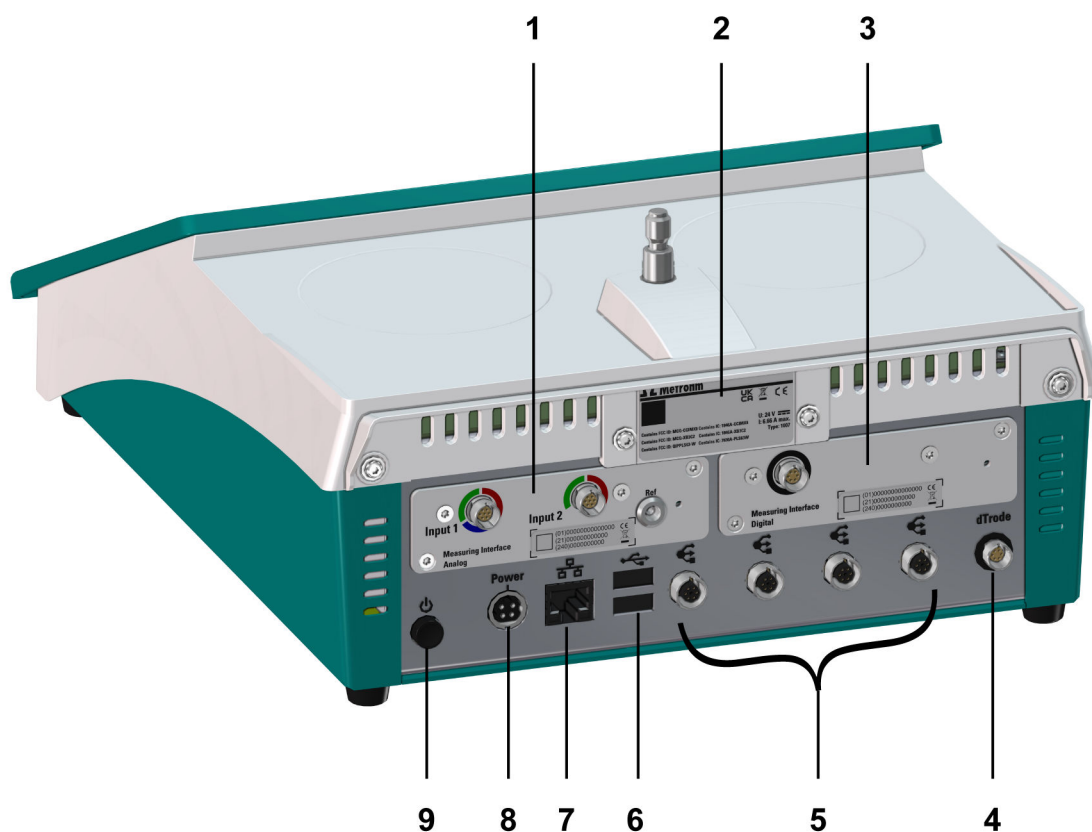


Figure 2 IONIC Titrator – Rear

1 Slot for a Measuring Interface
Can be retrofitted from accessories.
Example Measuring Interface Analog
(6.05803.100) ([see "Measuring Interface Analog – Overview", chapter 3.2.3, page 15](#)).

2 Type label

3 Slot for a Measuring Interface
Can be retrofitted from accessories.
Example Measuring Interface Digital
(6.05803.120) ([see "Measuring Interface Digital – Overview", chapter 3.2.4, page 16](#)).

4 dTrobe connector

5 MDL connectors
MDL = Metrohm Device Link. Connection sockets for external functional units.

6 USB connectors
Connection sockets for USB flash drives or external instruments.

7 LAN connector

LAN = Local Area Network. Connection socket for a connecting cable to the local network.

8 Power supply unit connector

Connection socket for power supply unit.

9 On/off switch**Function**

The IONIC Titrator is connected to the energy supply. All other modules of the titration system are installed in IONIC Titrator or connected to the IONIC Titrator via the MDL connectors.

The IONIC Titrator is equipped with the following functional units:

- Connectors to the energy supply and the Ethernet
- Interfaces for connecting additional modules
- Space for a maximum of 2 additional measuring interfaces:
 - The Measuring Interface Analog is used for connecting analog electrodes.
 - The Measuring Interface Digital is used for connecting digital electrodes (dTrodes).
- Touch screen as user interface
- Depending on the product version, 0, 1 or 2 built-in magnetic stirrers

The IONIC Titrator can be used as a stand-alone instrument with manual sample change.

3.2 Titration system – Overview

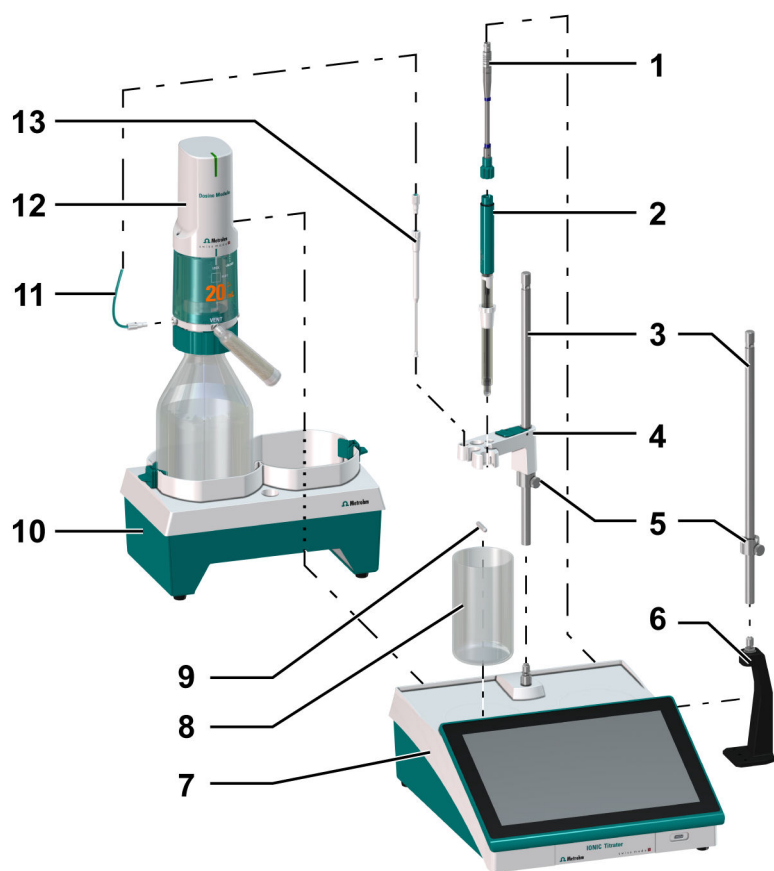


Figure 3 Single-workplace titration system

1	Electrode cable	2	Electrode
3	Support rod	4	Electrode holder
5	Clamping ring	6	Support stand
7	IONIC Titrator	8	Sample beaker
9	Stirring bar	10	Bottle holder (6.02061.010) <i>(see "Bottle holder – Overview", chapter 3.2.1, page 13)</i>
11	FEP tubing	12	Bottle unit Consisting of a bottle, an 807 Dosing Unit and a Dosino Module. <i>(see "Bottle unit – Overview", chapter 3.2.2, page 14)</i>
13	Antidiffusion tip		

i In this manual, the Dosino Module and the 807 Dosing Unit are described in use with the IONIC Titrator by default. Alternatively, the OMNIS Dosing Module and the cylinder unit OMNIS can also be used.

3.2.1 Bottle holder – Overview

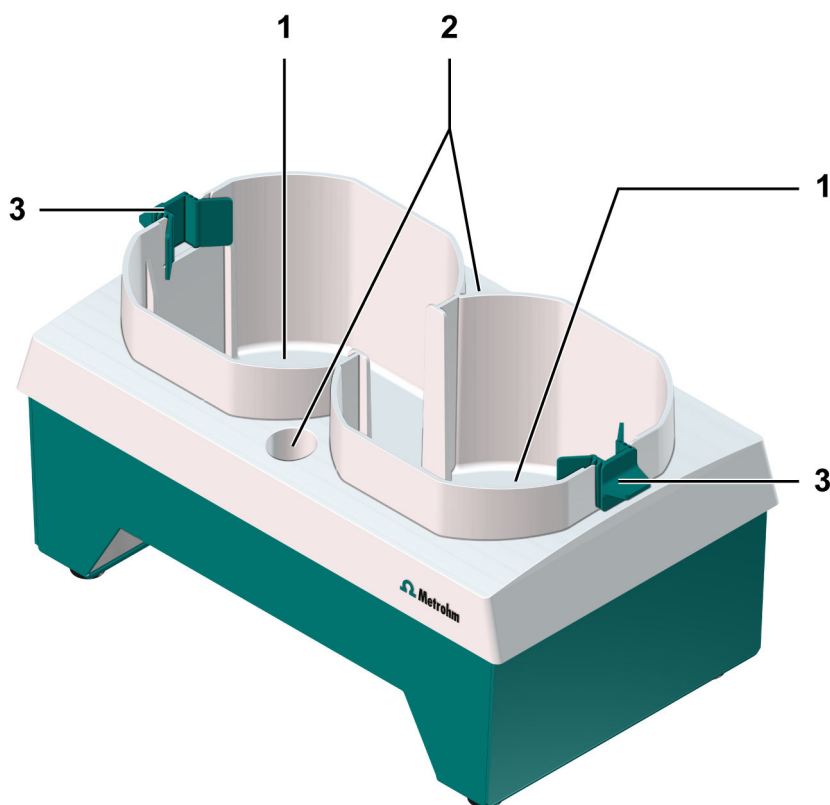


Figure 4 Bottle holder

1 Storage space

2 Electrode parking station

3 Holding clip

Function

The bottle holder is used for the safe storage of up to 2 bottles, which can be stabilized with holding clips if required. Electrodes and storage vessels of electrodes can be placed in the integrated electrode parking station. All cables coming from IONIC Titrator can be routed under the bottle holder.

3.2.2 Bottle unit – Overview

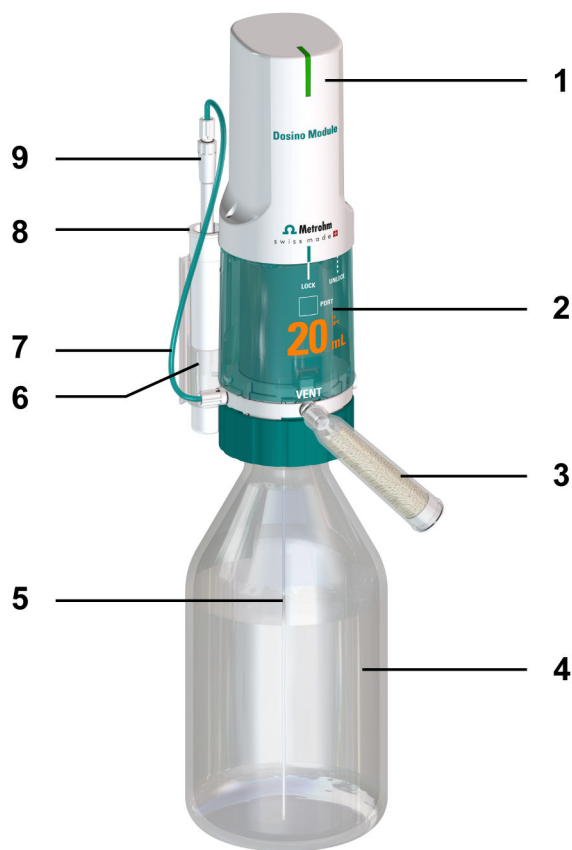


Figure 5 Bottle unit

1	Dosino Module (2.1042.00x0)	2	807 Dosing Unit (6.3032.xx0)
3	Adsorber tube (6.1619.000)	4	Bottle
5	Aspiration tubing (6.1829.010)	6	Storage vessel holder (6.2008.050)
7	FEP tubing (6.1805.100)	8	Storage vessel for tubing tips (6.2008.030)
9	Tubing tip (6.1543.200 or 6.1543.060)		

Function

The bottle unit contains the solutions that are required for the analysis.
The bottle unit in an IONIC system is comprised of the following elements:

- Bottle
- 807 Dosing Unit (see *Manual for 807 Dosing Unit (8.807.8002)*)
The 807 Dosing Unit fits on a bottle with GL 45 thread. Suitable adapters are available for bottles with other threads.

- Dosino Module (see *Manual for Dosino Module (8.1042.8101)*)
The Dosino Module fits on the 807 Dosing Unit with the cylinder sizes 2 mL, 5 mL, 10 mL, 20 mL or 50 mL.

3.2.3 Measuring Interface Analog – Overview

The Measuring Interface Analog has 2 measuring inputs for analog sensors.

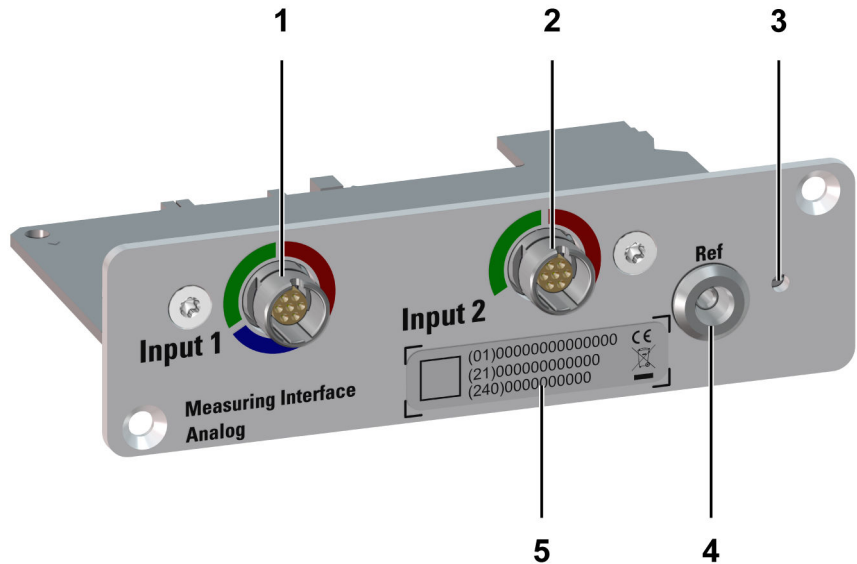


Figure 6 Measuring Interface Analog

1 INPUT 1 Connection socket for potentiometric sensors (green coding), temperature sensors (red coding), and polarizable metal electrodes (blue coding).	2 INPUT 2 Connection socket for potentiometric sensors (green coding) and temperature sensors (red coding).
3 Status display The status of the measuring input is displayed with the status display using different colors (see <i>"System – Signals", chapter 3.5, page 21</i>).	4 REF Connection socket for reference electrodes.
5 Measuring interface type label	

Function

The Measuring Interface Analog is used as an interface for analog sensors on an IONIC Titrator. Analog electrodes and analog reference electrodes can be connected into its connection sockets.

3.2.4 Measuring Interface Digital – Overview

The Measuring Interface Digital has a measuring input for a digital electrode (dTrode).

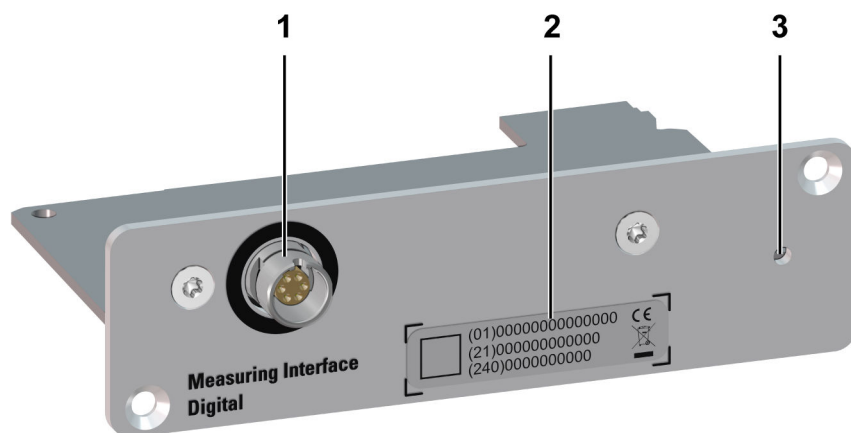


Figure 7 Measuring Interface Digital

1 Connection socket

Connection socket for dTodes (black coding).

2 Measuring interface type label

3 Status display

The status of the measuring input is displayed with the status display using different colors (*see "System – Signals", chapter 3.5, page 21*).

Function

The Measuring Interface Digital is used as an interface for digital electrodes on an IONIC Titrator. Digital electrodes (dTrodes) can be connected to its connection socket.

3.3 Single-workplace titration system for volumetric Karl Fischer titrations – Overview

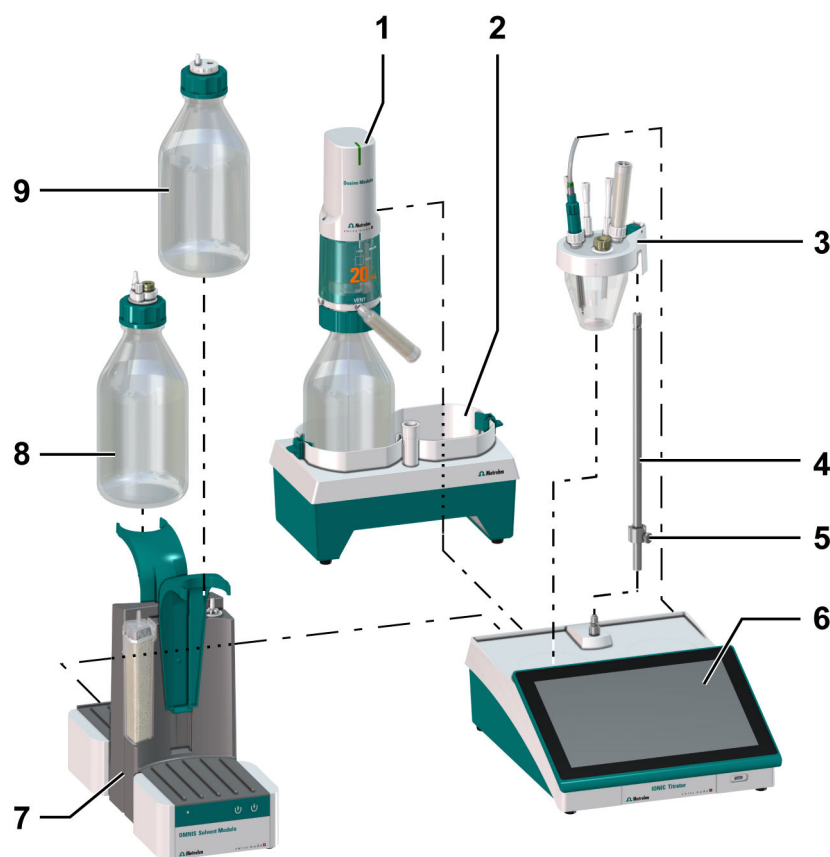


Figure 8 Single-workplace titration system for volumetric Karl Fischer titrations

1 Bottle unit

Consisting of a bottle, an 807 Dosing Unit and a Dosino Module.

Metrohm recommends the 10 mL cylinder for Karl Fischer titrations.

(see "Bottle unit – Overview", chapter 3.2.2, page 14)

2 Bottle holder (6.02061.010)

(see "Bottle holder – Overview", chapter 3.2.1, page 13)

3 Volumetric Karl Fischer titration cell with accessories

(see "Volumetric Karl Fischer titration cell – Overview", chapter 3.3.1, page 18)

4 Support rod

5 Clamping ring

6 IONIC Titrator

with built-in magnetic stirrer

- | | | | |
|----------|---|----------|---|
| 7 | OMNIS Solvent Module (2.1009.0010) | 8 | Waste bottle (Waste)
with overflow protection |
| 9 | Supply bottle (Solvent)
with Siphon Breaker | | |

3.3.1 Volumetric Karl Fischer titration cell – Overview

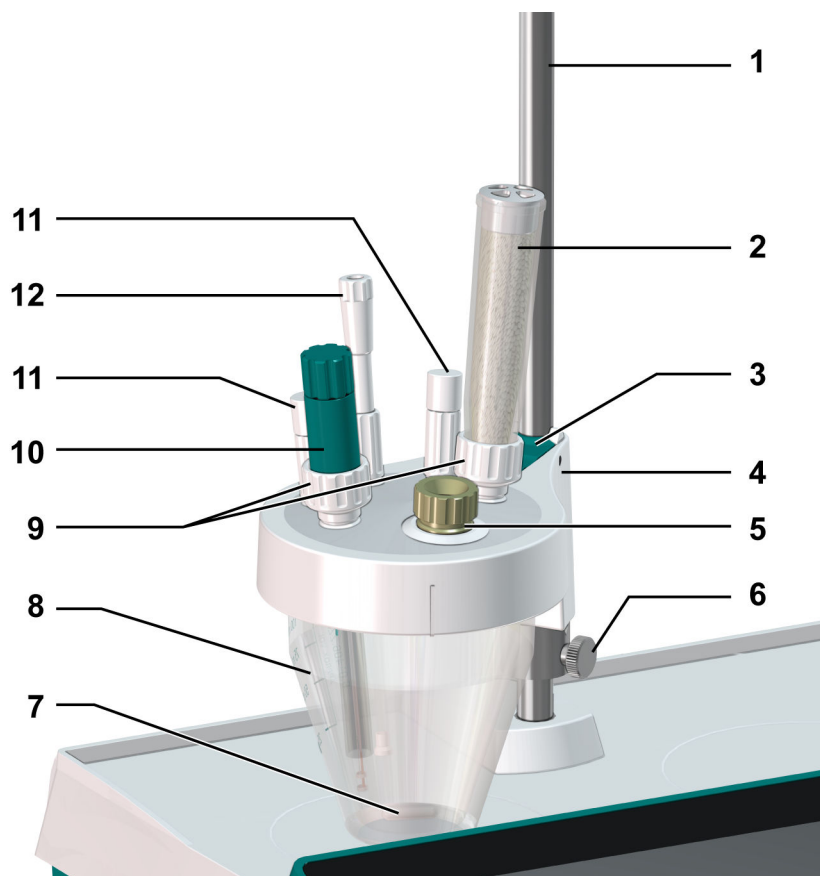


Figure 9 Volumetric Karl Fischer titration cell

- | | | | |
|----------|---|----------|--|
| 1 | Support rod (6.2016.050) | 2 | Adsorber tube (6.01406.010) |
| 3 | Locking lever
at titration vessel lid | 4 | Titration vessel lid (6.01405.010) |
| 5 | Septum stopper (6.02709.020)
Alternatives: Stopper (6.02709.010) or spoon for paste (6.02711.000) | 6 | Clamping ring (6.2013.010) |
| 7 | Stirring bar
16 mm (6.1903.020) or 25 mm (6.1903.030) | 8 | Titration vessel
20–90 mL (6.01406.220) or 50–150 mL (6.01406.250) |

9 M12 screw nipple (6.02709.030)	10 Electrode Double Pt electrode (6.0338.100) or double Pt ring electrode (6.00346.100)
11 M10 screw nipple with stopper (6.02709.010)	12 Antidiffusion tip (6.01543.120)

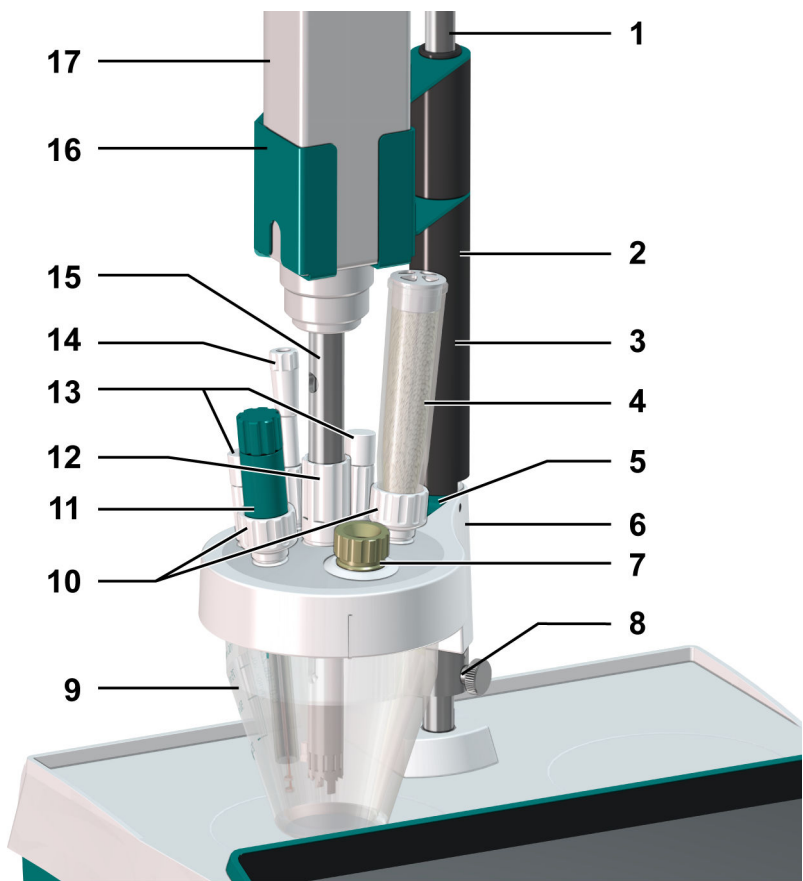


Figure 10 *Volumetric Karl Fischer titration cell with homogenizer*

1 Support rod (6.2016.050)	2 Spacer (35 mm)
3 Spacer (65 mm)	4 Adsorber tube (6.01406.010)
5 Locking lever at titration vessel lid	6 Titration vessel lid (6.01405.040) for the use with homogenizer
7 Septum stopper (6.02709.020) Alternatives: Stopper (6.02709.010) or spoon for paste (6.02711.000)	8 Clamping ring (6.2013.010)
9 Titration vessel 20–90 mL (6.01406.220) or 50–150 mL (6.01406.250)	10 M12 screw nipple (6.02709.030)

- | | |
|---|---|
| 11 Electrode
Double Pt electrode (6.0338.100) or double Pt ring electrode (6.00346.100) | 12 Guide sleeve (6.02709.050)
for fixing the homogenizer in the titration vessel lid in place |
| 13 M10 screw nipple with stopper (6.02709.010) | 14 Antidiffusion tip (6.01543.120) |
| 15 Dispersing aggregate
125 mm (6.9012.000) or 157 mm (6.9012.010) | 16 Holder for homogenizer (6.02008.010) |
| 17 Homogenizer (2.136.0100)
Polytron PT 1300 D | |

Function

The volumetric Karl Fischer titration cell (KF titration cell) is a closed vessel for water content determinations according to Karl Fischer, which is fastened to the support rod. The KF titration cell consists of a titration vessel (different versions possible) and a titration vessel lid (different versions possible, with and without homogenizer (Polytron PT 1300 D)).

Seepage of moisture into the KF titration cell is prevented with seals and with the adsorber tube, which is filled with molecular sieve (6.2811.000).

3.4 Indicators and controls

Indicators

The status of the IONIC Titrator is displayed in different colors and/or flashing patterns via the status display (see "System – Signals", chapter 3.5, page 21).

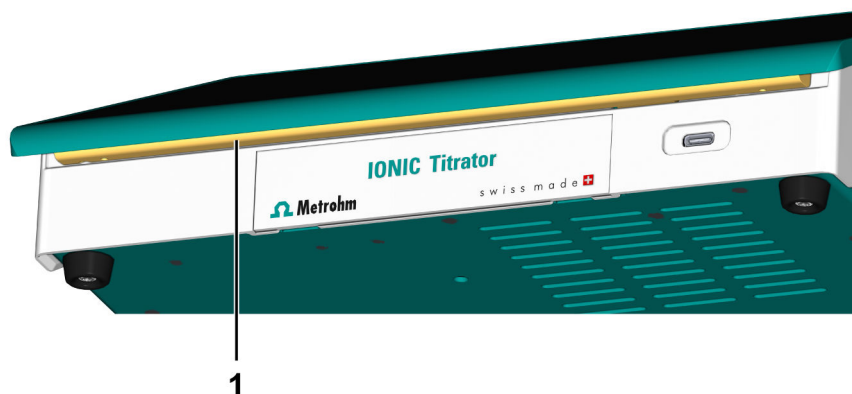


Figure 11 Status display

- ## 1 Status display

Controls

The on/off switch (2-9) can be used to switch the IONIC Titrator on and off.

Table 3 Behavior of the on/off switch

Pressure duration	Function
Press briefly (approx. 1 s)	Switch on the instrument.
Press and hold (approx. 4 s)	Switch off the instrument.
Very long pressing (approx. 34 s)	Force a shutdown.

3.5 System – Signals

System components with status displays show their operating status with colors and/or flashing patterns. The meaning of the colors and flashing patterns is explained in the following table.

Table 4 Signals

Visual signal		Meaning
	LED lights up yellow.	System start or initialization
	LED lights up green.	Ready for operation
	LED flashes green (slowly).	In operation
	LED flashes red (fast).	Malfunction or error

Some system components only use part of the explained flashing patterns.

4.1 Delivery

- Check the delivery against the delivery note to ensure completeness.
- Check the product for damage.
- If the delivery is incomplete or damaged, contact your regional Metrohm representative.

The product and accessories are supplied in protective special packaging. Keep this packaging to ensure safe transportation of the product. If a transport locking device is present, keep this as well for future reuse.

5 Installation

5.1 Installation by Metrohm

Installation and start-up of the system is always carried out by the regional Metrohm service representative.

5.2 Setup location

The product is suitable only for operation indoors and may not be used in potentially explosive or fire-hazard environments.

The following requirements apply to the setup location:

- The room is well-ventilated and protected against both direct sunlight and excessive temperature fluctuations.
- The setup space is stable and free of vibrations. The setup space must be suitable for the dimensions and weight of the components (see technical specifications).
- All cables and connectors are accessible during operation. The cables are safely installed (no tripping hazards).
- The workplace is ergonomically designed and ensures trouble-free operation of the product.

 Structural and ambient conditions could impair the signal strength and connection quality of the wireless connections.

5.3 Installing the support stand

Required accessories:

- Support stand (6.02001.000)
- 3 countersunk head screws
- Hex key (2 mm)

Prerequisite:

- The storage spaces of the IONIC Titrator are empty.
- No cables are connected to the IONIC Titrator.

- 1** Lift the IONIC Titrator on the right-hand side of the underside of the instrument and place it on the left side of the instrument.

- 4** Place the IONIC Titrator on the underside of the instrument once again.



5.4 Mounting the electrode holder

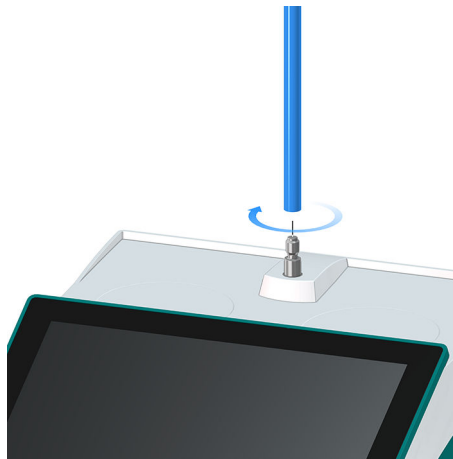
i The structure is identical for both stand attachments.

Required accessories:

- Support rod 30 cm (6.2016.050)
- Clamping ring 10 mm (6.2013.010)
- Electrode holder (6.02005.000)

1 Mounting the support rod

Screw the support rod onto the stand attachment.





- i** The clamping ring is used as the lower stop for the electrode holder. The clamping ring prevents the electrode holder with the mounted electrode from being lowered too far.

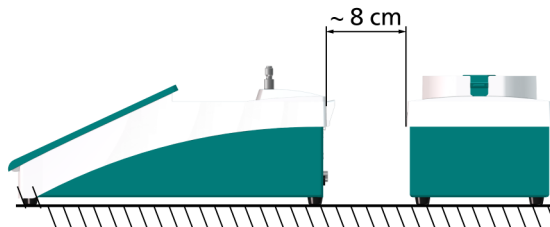
5.5 Setting up the bottle holder

Required accessories:

- Bottle holder (6.02061.010)

1 Setting up the bottle holder

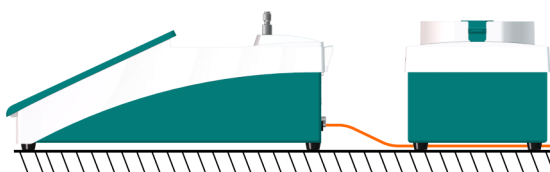
Place the bottle holder approx. 8 cm behind the IONIC Titrator on a stable surface.



2 Positioning the cable

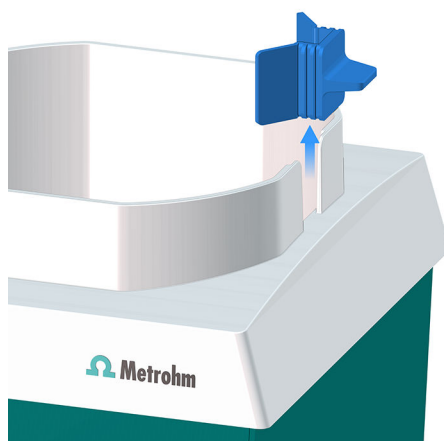
Place the desired cables under the bottle holder.

- i** The power cord, the network cable, and the MDL cable should be laid under the bottle holder.

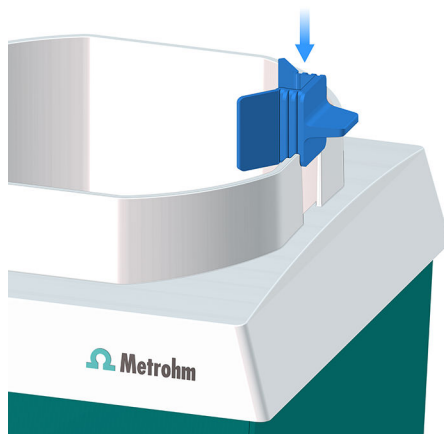


3 Adjusting the holding clips (optional)

- Remove the holding clips from the bottle holder.



- Slide the holding clips, which match the bottle size and have the desired recess, back into the bottle holder.



4 Positioning the bottles

Place the desired bottles in the bottle holder.



5 Positioning the electrodes

Place the required electrodes in the electrode parking station.



5.6 Equipping the bottle unit

The bottle unit is comprised of the following elements:

- Bottle
- 807 Dosing Unit
- Dosino Module

Various bottles with a GL 45 thread can be used. Amber glass bottles (6.1608.023), clear glass bottles (6.1608.030), or PE bottles (6.1608.040) with a capacity of one liter and a GL 45 thread are used as standard. Suitable adapters are available for bottles with other threads ([see "Displaying the accessories", chapter 1.5, page 3](#)).

Mounting the 807 Dosing Unit onto the bottle

Prerequisite:

- The storage vessel holder, the storage vessel for tubing tips, the adsorber tube, and the aspiration tubing are mounted on the 807 Dosing Unit (see *Manual for 807 Dosing Unit (8.807.8002)*).

Required accessories:

- 807 Dosing Unit (6.3032.xx0)
- Bottle with intact spout

 Do not use any mechanical means for mounting the 807 Dosing Unit.

- 1 Rotate the adsorber tube upward.
- 2 Hang the aspiration tubing into the filled bottle.
- 3 Use the fixing ring to screw the 807 Dosing Unit onto the bottle.

 The 807 Dosing Unit should still be easy to rotate by hand.



- 4** Rotate the adsorber tube back into a hanging position.



- 5 Mount the FEP tubing and the desired tubing tip (see *Manual for 807 Dosing Unit (8.807.8002)*).

Preparing for attachment

Required accessories:

- Dosino Module (2.1042.00x0)

- 1 Plug the connection cable of the Dosino Module to an MDL connector on the rear of the instrument of the IONIC Titrator.
- 2 Open the **Manual control** of the Dosino Module in the IONIC app under **Equipment**.
- 3 Start the **Exchange position** function.

 Additional information can be found in the [IONIC help](#).

Attaching the Dosino Module to the 807 Dosing Unit

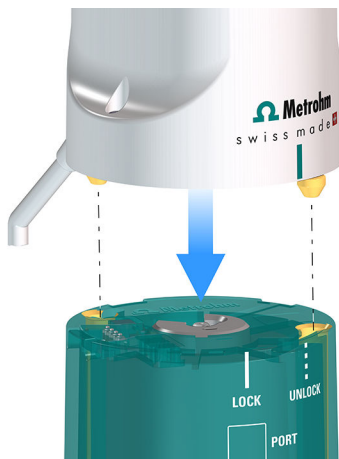
Prerequisite:

- The wedge on the drive disk is flush with the indent on the underside of the Dosino Module.
- The 2 triangles on the upper side of the 807 Dosing Unit are located exactly opposite one another.
- The piston stopper of the 807 Dosing Unit is flush with the upper edge of the housing.

 Additional information can be found in the *Manual for Dosino Module (8.1042.8101)*.

- 1 Insert the guide bolts of the Dosino Module into the openings of the 807 Dosing Unit provided for this purpose.

The green line marking of the Dosino Module must be flush with the dotted white line marking ("UNLOCK") of the 807 Dosing Unit.



- 2 Rotate the Dosino Module to the left until the green line marking of the Dosino Module is flush with the solid white line marking ("LOCK") of the 807 Dosing Unit.



- 3** Check the correct seating of the Dosino Module.



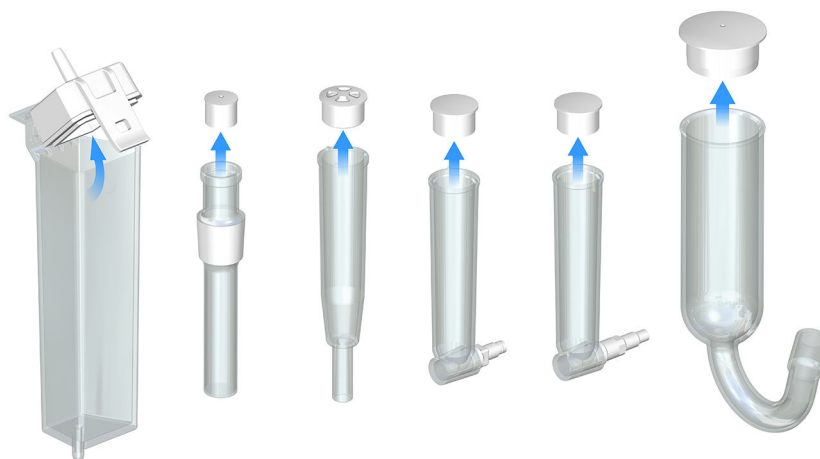
Table 5 Available adsorber cartridges or adsorber tubes

■■■■■■■ 33



Replacing the adsorber material

1 Removing the lid from the housing



- Adsorber cartridge: Unlatch and remove the lid including the seal from the housing.
- Adsorber tube: Remove the lid by pulling it out of the housing.

2 Removing the molecular sieve (if present)

- Remove the molecular sieve and regenerate for at least 24 hours in the drying oven at 300 °C. Place in a desiccator to cool down and then seal airtight in a glass bottle, see also [FAQ on Karl Fischer titration](#).

3 Filling the molecular sieve

- Adsorption cartridge: Place a base-covering cotton plug loosely into the housing at the bottom. Do not pack the wad of cotton too tightly, as sufficient gas flow must be possible. Use a molecular sieve to fill the housing to approx. 1 cm under the housing edge.
- Adsorber tube: Place a small cotton plug on the molecular sieve. Do not pack the wad of cotton too tightly, as sufficient gas flow must be possible.

5.8 Setting up the single-workplace titration system for volumetric Karl Fischer titrations

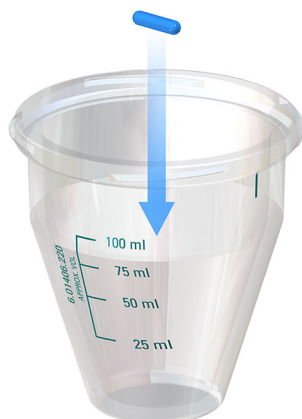
5.8.1 Preparing the volumetric Karl Fischer titration cell

Required accessories:

- Titration vessel: 20–90 mL (6.01406.220) or 50–150 mL (6.01406.250)
- Stirring bars: 16 mm (6.1903.020) or 25 mm (6.1903.030)
- Titration vessel lid: Without homogenizer (6.01405.010) or with homogenizer (6.01405.040)

- 1 Place a suitable stirring bar in the center of the titration vessel.

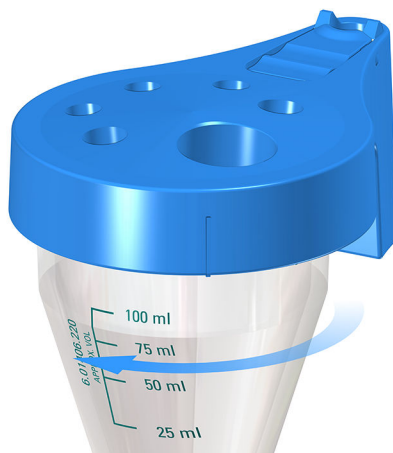
 This step applies only for use without homogenizer.



- 2 Place the titration vessel lid on the titration vessel in such a way that the marking rib on the titration vessel lid is flush with the marking rib on the titration vessel.



- 3 Hold the titration vessel firmly and rotate the titration vessel lid to the left up to the stop.



5.8.2 Equipping the volumetric Karl Fischer titration cell

Inserting the stopper and screw nipple

Required accessories:

- Septum stopper (6.02709.020), stopper (6.02709.010) or spoon for paste (6.02711.000)
- M10 screw nipple (6.02709.010)
- M12 screw nipple (6.02709.030)

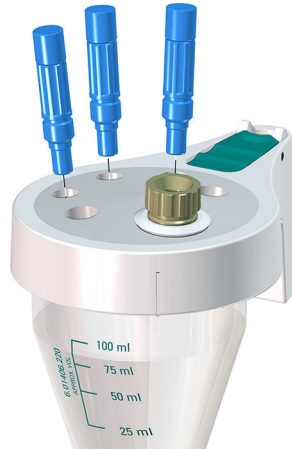
1 Inserting the septum stopper

Insert the septum stopper (with septum inserted) into the matching opening in the titration vessel lid.



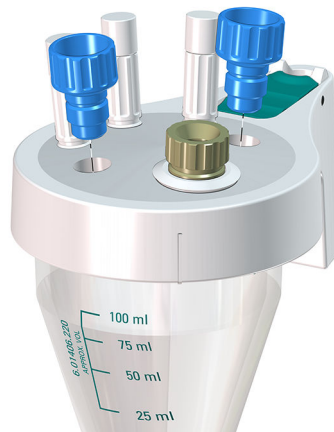
2 Inserting the M10 screw nipple

Insert the M10 screw nipples with the stoppers into the 3 matching openings in the titration vessel lid.



3 Inserting the M12 screw nipple

Insert the M12 screw nipples into the 2 matching openings in the titration vessel lid.



Mounting the antidiffusion tip

Required accessories:

- Antidiffusion tip (6.01543.120)

1 Removing the stoppers

Remove the stopper from the middle M10 screw nipple.



2 Inserting the antidiffusion tip

Insert the antidiffusion tip into the middle M10 screw nipple and position it just above the stirring bar without obstructing the stirrer bar.



3 Tightening the screw nipple

Tighten the screw nipple tightly.



Mounting the electrode

Required accessories:

- Double Pt electrode (6.0338.100) or double Pt ring electrode (6.00346.100)
- Electrode cable (6.02104.040)

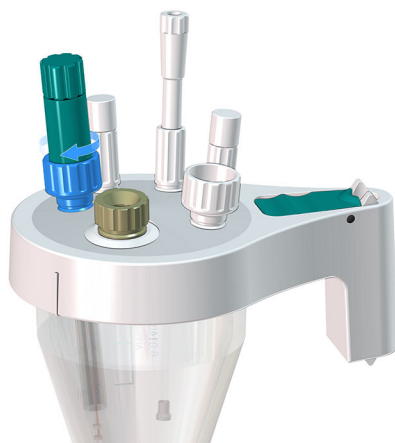
1 Inserting the electrode

Insert the double Pt electrode into the M12 screw nipple on the left and position it so that the electrode does not touch the stirring bar and the antidiffusion tip.



2 Tightening the screw nipple

Tighten the screw nipple tightly.



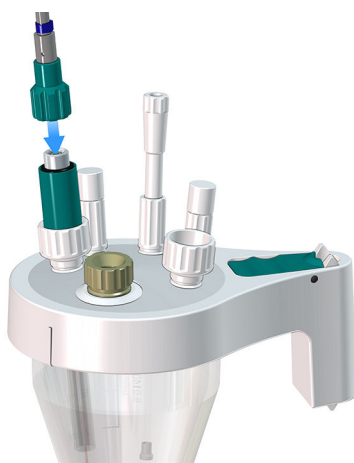
3 Unscrewing the screw cap

Unscrew the electrode screw cap.



4 Connecting the electrode cable

Screw an electrode cable with blue coding tightly onto the electrode.



Installing the adsorber tube

Prerequisite:

- The adsorber tube is filled with new molecular sieve (*see "Replacing the adsorber material", chapter 5.7, page 33*).

Required accessories:

- Adsorber tube (6.01406.010)

- 1 Insert the adsorber tube into the right-hand M12 screw nipple.



- 2 Tighten the screw nipple tightly.





- i** The clamping ring is used as the lower stop for the titration vessel lid. Thus, the clamping ring ensures that the Karl Fischer titration cell is always positioned at the same height and exactly in the center on the magnetic stirrer.

5.8.4 Preparing the volumetric Karl Fischer titration cell for reagent replacement

For a reagent replacement, the volumetric Karl Fischer titration cell must be additionally equipped and connected:

- Equip the volumetric Karl Fischer titration cell for reagent replacement (*see "Equipping the volumetric Karl Fischer titration cell for reagent replacement", page 45*)
- Connect the volumetric Karl Fischer titration cell for reagent replacement (*see "Connecting the volumetric Karl Fischer titration cell for reagent replacement", page 47*)

Equipping the volumetric Karl Fischer titration cell for reagent replacement

In addition to the antidiffusion tip, a dosing tip and an aspiration tip must also be mounted for reagent replacement.

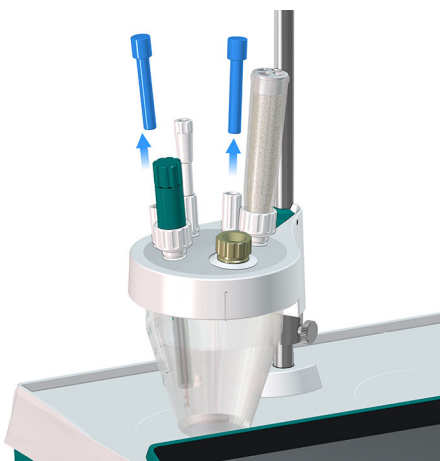
Mounting the tubing tips

Required accessories:

- Dosing tip (6.1543.110)
- Aspiration tip (6.01543.000)

1 Removing the stoppers

Remove the stoppers from the left and right M10 screw nipples.



2 Inserting the dosing tip

Insert the dosing tip into the left M10 screw nipple and position it just above the stirring bar without obstructing the stirrer bar.



3 Inserting the aspiration tip

Insert the aspiration tip into the right M10 screw nipple. The end of the aspiration tip should touch the vessel base for aspirating the solution without obstructing the stirring bar.

 The aspiration tip can, if needed, be pulled out of the solvent.



4 Tightening the screw nipple

Tighten the screw nipples tightly.



Connecting the volumetric Karl Fischer titration cell for reagent replacement

For reagent replacement, the volumetric Karl Fischer titration cell must be connected as follows:

 The structure is identical for both support rods.

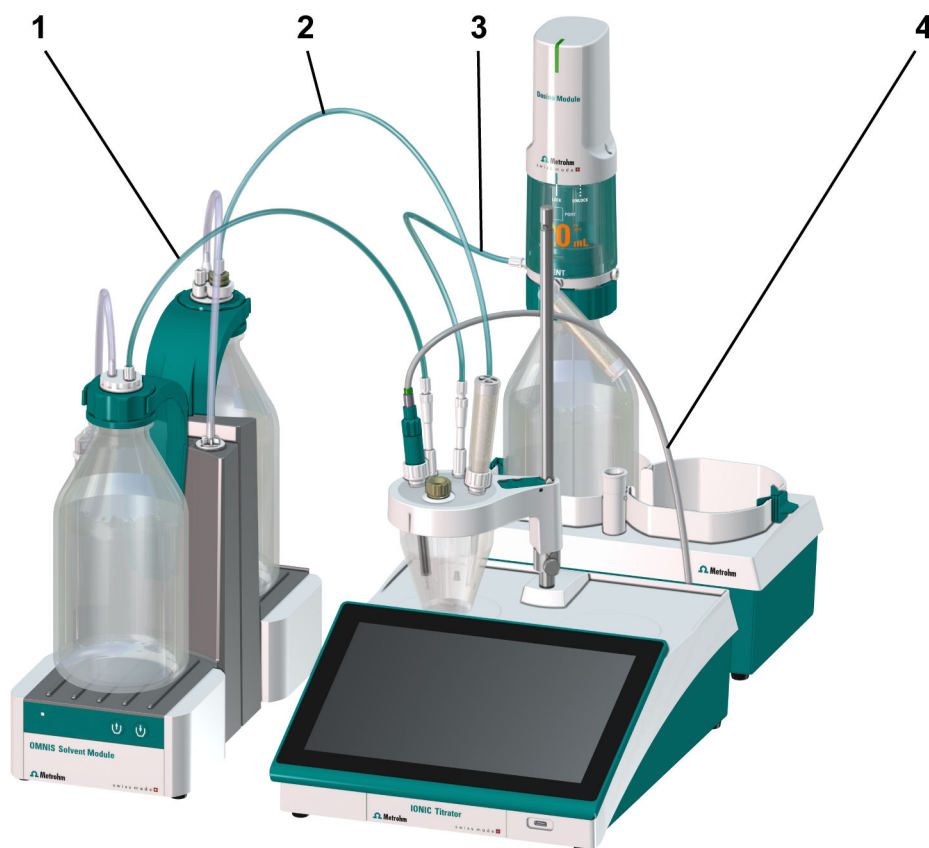


Figure 12 Connecting the Karl Fischer titration cell with an IONIC Titrator and the OMNIS Solvent Module

- | | | | |
|----------|--|----------|---|
| 1 | M8 PTFE tubing between dosing tip and supply bottle (Solvent) | 2 | M8 PTFE tubing between aspiration tip and waste bottle (Waste) |
| 3 | M6 FEP tubing between antidiffusion tip and dosing port 1 of the piston buret | 4 | Electrode cable for measuring input |

Prerequisite:

- The adsorber cartridge is filled with molecular sieve, sealed tightly and mounted to the OMNIS Solvent Module (*see "Replacing the adsorber material", chapter 5.7, page 33*).
- The Siphon Breaker on the supply bottle (Solvent) and the GL 45 bottle cap on the waste bottle (Waste) are fully equipped and connected to the OMNIS Solvent Module (*see Manual for OMNIS Solvent Module (8.1009.8002)*).
- The bottle unit is fully equipped (*see "Equipping the bottle unit", chapter 5.6, page 29*).

Required accessories:

- M6 FEP tubing (6.1805.100)

- M8 PTFE tubing (6.1805.200)

1 Connecting the antidiffusion tip with the piston buret

(12-3)

- Insert the FEP tubing into the M6 connector of the antidiffusion tip and screw it tight.
- Insert the other end of the FEP tubing into the dosing port 1 of the piston buret and screw it tight.

2 Connecting the dosing tip with the supply bottle

(12-1)

- Insert a PTFE tubing into the M8 connector of the dosing tip and screw it tight.
- Insert the other end of the PTFE tubing onto the M8 connector of the Siphon Breaker on the supply bottle (Solvent) and screw it tight.

3 Connecting the aspiration tip with the waste bottle

(12-2)

- Insert the other PTFE tubing into the M8 connector of the aspiration tip and screw it tight.
- Insert the other end of the PTFE tubing into the ground-joint stoppers of the waste bottle (Waste) and screw it tight.

4 Connecting the electrode

(12-4)

Plug in the plug of the electrode cable into the corresponding measuring input of the IONIC Titrator (*see "Plugging in the sensor cable", page 55*).

5.8.5 Mounting the homogenizer (optional)

-  Make sure that no stirring bar is placed in the titration vessel.

Prerequisite:

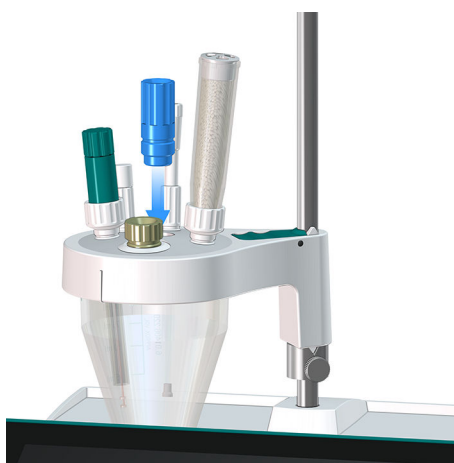
- The volumetric Karl Fischer titration cell is prepared (*see "Preparing the volumetric Karl Fischer titration cell", chapter 5.8.1, page 37*) and equipped (*see "Equipping the volumetric Karl Fischer titration cell", chapter 5.8.2, page 38*) with the titration vessel lid for the homogenizer.

- The volumetric Karl Fischer titration cell is attached to the IONIC Titrator (see *"Mounting the volumetric Karl Fischer titration cell"*, chapter 5.8.3, page 44).

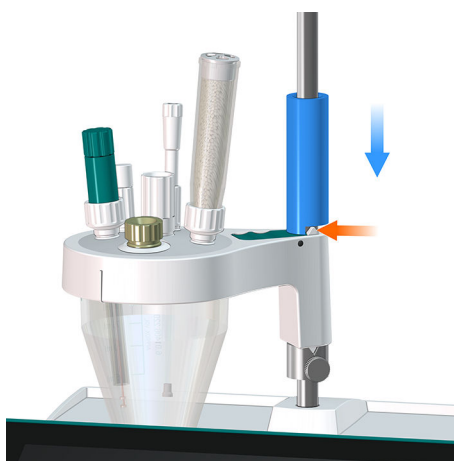
Required accessories:

- Spacer 65 cm
- Spacer 35 cm
- Dispersing aggregate: 125 mm (6.9012.000) or 157 mm (6.9012.010)
- Holder for homogenizer (6.02008.010)
- Guide sleeve (6.02709.050)
- Homogenizer (2.136.0100)

- 1 Insert the guide sleeve into the opening for the homogenizer in the titration vessel lid.



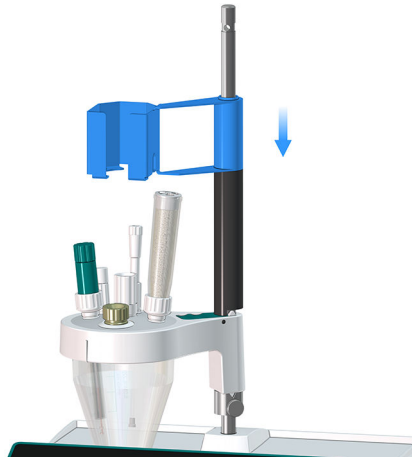
- 2 Push the spacer 65 cm with the indent facing downwards over the support rod in such a way that the wedge of the titration vessel lid fits into the indent on the spacer.



- 3** If you want to use the dispersing aggregate 157 mm, then also push the spacer 35 cm over the support rod.

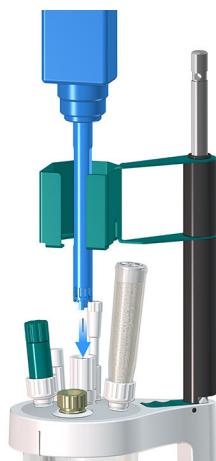


- 4** Push the holder for homogenizer over the support rod.

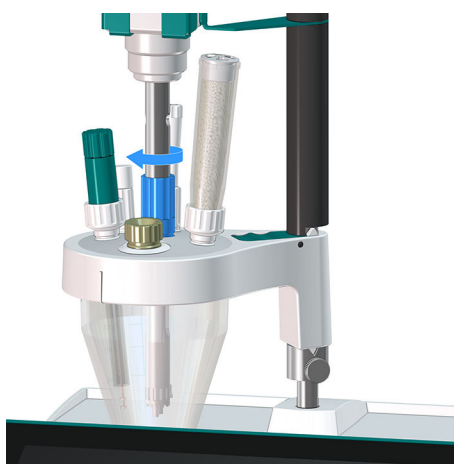


- 5** Push the homogenizer with the dispersing aggregate mounted into the holder and at the same time insert it into the guide sleeve in the titration vessel lid.

i If the dispersing aggregate cannot be inserted into the guide sleeve easily, then loosen the guide sleeve once again.



- 6** Tighten the guide sleeve tightly.



- 7 Connect the homogenizer handset to the control instrument of the homogenizer.
- 8 Connect the homogenizer with the RS-232 cable to the IONIC Titrator.

Hint:

Metrohm recommends the following use of the dispersing aggregates:

- **Dispersing aggregate 125 mm**
 - Applications with viscous samples.
 - Samples whose diameter is smaller than that of the aggregate.
 - Powders and salts that are difficult to dissolve.
- **Dispersing aggregate 157 mm**
 - Applications with solid samples.
 - Samples with a larger diameter than that of the aggregate.

5.9 Mounting the sensor



CAUTION

Risk of cuts from sharp edges

Cut injuries due to damaged glass parts and pieces of broken glass.

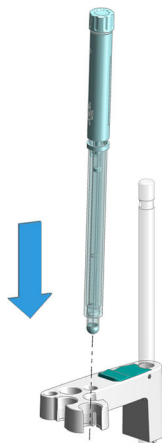
- Handle glass parts (e.g. electrodes, bottles) with care.
- Only use undamaged glass parts.
- Dispose of damaged glass parts immediately.



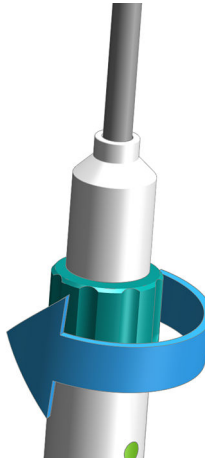
In the following example, a dTrobe is mounted. The procedure applies for all sensors.

Mounting the sensor

- 1 Insert the sensor from above into the front opening of the electrode holder.

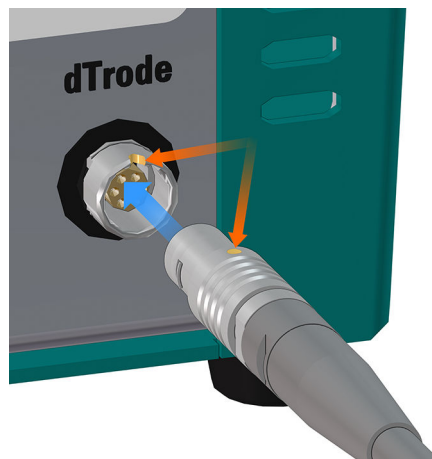


- 2 Slide the green upper sensor part downwards up to the stop until it is flush with the lower edge of the electrode holder.



Plugging in the sensor cable

- 1 Align the dot on the plug with the indent on the connection socket.
- 2 Plug in the plug of the sensor cable until it engages.
 -  If the plug cannot be inserted easily, rotate the plug to the right or left using light pressure until it latches in the socket.



5.10 Connecting the power cord



WARNING

Health hazards from electrical potential.

Severe injuries with possibly fatal consequences.

- Operate the product only if it is in perfect condition. The housing must also be intact.
- Only use the product with the covers fitted.
- Protect live components (e.g. power supply unit, power cord, connection sockets) against moisture.
- Always have maintenance work and repairs on electrical components carried out by a regional Metrohm service representative.

Required accessories:

- Power supply unit (6.02164.0120)



Use only this power supply unit. Other products are not permitted.

- Power cord:
 - Length: max. 2 m
 - Number of conductors: 3, with protective ground
 - Conductor cross-section: 3 × min. 1.0 mm² / 18 AWG
 - Coupling: IEC 60320, type C13, 10 A
 - Power plug: 6.2122.XX0 (according to customer requirement), min. 10 A



Figure 13 Rear of the instrument – Connecting the power supply unit

Connect the power supply unit to the **Power** connector and observe the alignment (see figure).

2 Connect the power cord to the power supply unit.

3 Connect the power plug to the power grid.

The instrument can now be switched on and off ([see "Switching the instrument on and off", chapter 6.1, page 58](#)).

6.2 Removing the bottle unit

Preparing the disassembly

- 1 Place the tubing tip in a container because reagent can be dosed out of the tubing tip during the **Empty** procedure.
- 2 Open the **Manual control** of the Dosino Module in the IONIC app.
- 3 Start the **Empty** function.
- 4 Start the **Exchange position** function.

Removing the Dosino Module

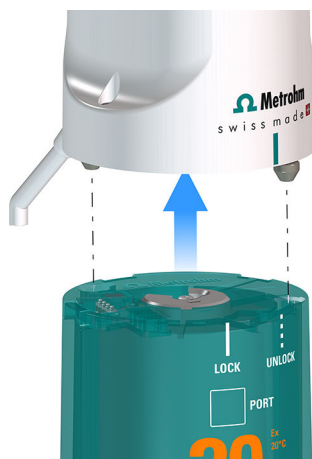
Prerequisite:

- The status display on the Dosino Module lights up constantly.
- The Dosino Module is in the exchange position (Port 2 is set).

- 1 Rotate the Dosino Module to the right until the green line marking of the Dosino Module is flush with the dotted white line marking ("UNLOCK") of the 807 Dosing Unit.



- 2 Lift the Dosino Module upwards.

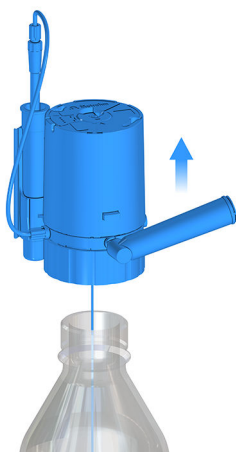


Removing the 807 Dosing Unit

- 1 Rotate the adsorber tube upward.
- 2 Unscrew the 807 Dosing Unit with the fixing ring from the bottle.



- 3** Remove the 807 Dosing Unit from the bottle.



- 4 Remove the adsorber tube, the tubings, the tubing tips, the storage vessel for tubing tips, and the storage vessel holder of the 807 Dosing Unit (see *Manual for 807 Dosing Unit (8.807.8002)*).

7 Maintenance

Perform maintenance work on the product at regular intervals to prevent functional disruptions and to ensure a long service life.

- Metrohm recommends having the products maintained by the regional Metrohm service representative as part of an annual service. Shorter maintenance intervals may be necessary if you frequently work with caustic and corrosive chemicals.
- Only perform maintenance work that is described in this instruction. Contact your regional Metrohm service representative for further maintenance work and repairs. The regional Metrohm service representative offers every form of technical advice for maintenance and service of all Metrohm products.
- Only use spare parts that meet the technical requirements of the manufacturer. Original spare parts always meet these requirements.

7.1 Cleaning the product surface

Regularly clean the product to prevent malfunctions and to ensure a long service life.

- Remove spilled chemicals immediately.
- Protect plug connections against contamination.



WARNING

Chemical hazardous substances

Contact with aggressive chemical substances may cause poisoning or chemical burns.

- Wear personal protective equipment (e.g. protective glasses, gloves).
- Use exhaust equipment when working with vaporizing hazardous substances.
- Clean contaminated surfaces.
- Only use detergents that do not cause any unwanted side reactions with the materials to be cleaned.
- Dispose of chemically contaminated materials (e.g. cleaning material) in accordance with regulations.



Severe injuries with possibly fatal consequences.

- Prerequisite:**

- ### Required accessories:

- 3** Clean the connectors with a dry cloth.

8 Troubleshooting

Messages on malfunctions and errors are displayed in the control software or in the embedded software (e.g. on the display of an instrument) and contain the following information:

- Descriptions of causes of malfunctions (e.g. jammed drive)
- Descriptions of problems with the control (e.g. missing or invalid parameter)
- Information on how to solve the problem

System components with status display elements also indicate malfunctions and errors with a red flashing LED.

Troubleshooting on the product is often only possible with the control software or the embedded software (e.g. initializing, moving to a defined position).

See also

System – Signals (chapter 3.5, page 21)

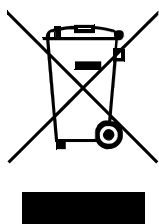
8.1 Forcing a shutdown

Prerequisite:

The IONIC Titrator cannot be switched off.

- 1 Press the on/off switch on the rear of the instrument (2-9) for approx 34 seconds.

9 Disposal



Properly dispose of chemicals and of the product to reduce negative effects on the environment and public health. Local authorities, waste disposal companies or dealers provide more detailed information on disposal. Observe the WEEE EU directive (WEEE = Waste Electrical and Electronic Equipment) for the proper disposal of waste electronic equipment within the European Union.

10 Technical specifications

Depending on the version, the IONIC Titrator has no magnetic stirrers, one magnetic stirrer or 2 magnetic stirrers. The Measuring Interface Analog or the Measuring Interface Digital may also be installed in the IONIC Titrator, depending on the version.

10.1 Ambient conditions

Nominal function range	+5 to +40 °C	at max. 80% relative humidity, non-condensing
Storage	+5 to +45 °C	at max. 80% relative humidity, non-condensing
Altitude / Pressure range	Max. 3,000 m.a.s.l. / min. 700 mbar	
Overvoltage category	II	
Pollution degree	2	

10.2 Energy supply

External power supply unit	6.02164.020	<i>from Metrohm accessories</i>
<i>Input</i>		
Nominal voltage range	100–240 VAC (± 10%)	
Frequency range	50–60 Hz (±3%)	
Current	max. 1.5 A	
<i>Output</i>		
Nominal voltage	24 V DC	
Current	max. 5 A	



Power output max. 120 W

Instrument

Input

Nominal voltage 24 V DC

Power consumption ≤ 30 W

max. 120 W

IONIC Titrator and Dosino Module

depending on the connected MDL instruments

Battery

Button cell

Nominal voltage 3 V

Type Lithium manganese dioxide

Size CR2032

cannot be replaced by the user

Protection

Internal fuse

2.0 ATH

cannot be replaced by the user

USB connectors

Nominal voltage 5 V DC ($\pm 5\%$)

Current

USB-A max. 500 mA

maximum output current per channel

USB-C max. 1.5 A

maximum output current

MDL connectors

Nominal voltage 24 V DC

Current max. 2 A

maximum output current per channel

10.3 Measurements and weight

Measurements

<i>Width</i>	265 mm	without support stand
	282 mm	with support stand
<i>Height</i>	142 mm	without support rods
	424 mm	with support rods
<i>Depth</i>	322 mm	
Weight	4.6 kg	without accessories and power supply unit

10.4 Housing

Materials

<i>Upper part</i>	PBT/PC	Polybutylene terephthalate/polycarbonate
<i>Back panel</i>	1.4301	Stainless steel, polished
<i>Base</i>	1.0330 (DC01+ZE25/25APC)	Steel, coated
<i>Cover glass</i>	Soda lime glass	chemically hardened
<i>Protective cover</i>	PET-A	
IP degree of protection	IP 20	

10.5 Connectors specifications

10.5.1 IONIC Titrator – Connectors specifications

Power

<i>Socket</i>	KPJX-4S-S	Round plug 4-pin
LAN	Local network	
<i>Type</i>	Gigabit Ethernet	
<i>Socket</i>	RJ-45	shielded
<i>Cable type</i>	min. F/FTP	shielded

LAN

LAN	Local network	
<i>Type</i>	Gigabit Ethernet	
<i>Socket</i>	RJ-45	shielded
<i>Cable type</i>	min. F/FTP	shielded

10.5.2 Measuring Interface Analog – Connectors specifications

INPUT 1

■■■■■■■ 69

<i>Temperature</i>	Temp.	Measuring input for temperature sensors of the Pt1000 or NTC type for automatic temperature compensation
<i>Polarizer</i>	Pol.	Measuring input for polarizable electrodes
INPUT 2		
<i>Socket</i>		Round plug 7-pin, size 0, 45°
<i>Potentiometric</i>	pH, ISE, Redox	Measuring input for potentiometric electrodes
<i>Temperature</i>	Temp.	Measuring input for temperature sensors of the Pt1000 or NTC type for automatic temperature compensation
REF		Reference potential
<i>Socket</i>	2 mm	
(INPUT 1 - INPUT 2)		Potentiometric differential measurement, with respect to REF

10.5.3 Measuring Interface Digital – Connector specifications

Measuring Interface Digital	6.05803.120	from Metrohm accessories
Socket		Round plug 6-pin, size 0, 60°
dTrobe		Connector for a digital electrode

10.6 Display specifications

Display

Type	TFT LCD	
Size	10.1 "	diagonal
Resolution	1280 × 800	pixels
Status display	LED	multi-colored

10.7 Operation specifications

Touch panels

Type	Multi-Touch	Capacitive
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Protective cover

6.02712.010 [from Metrohm accessories](#)

Resistance to chemicals	Ethanol, methanol, water
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Key

On/Off

10.8 Measurement specifications

Potentiometric

Measuring range	–2,400 to +2,400 mV –13 to +20 pH	
Resolution	1.56 µV 0.001 pH	
Measuring accuracy	±0.5 mV ±0.003 pH	in the measuring range –2,000 mV to +2,000 mV
Input resistance	≥ 1*10 ¹² Ω	
Offset current	≤ ±1*10 ^{–12} A	

Temperature

Pt1000

Measuring range	–150 to +250 °C	
Measuring resolution	approx. 0.002 °C	
Measuring accuracy	±0.4 °C	in the measuring range –20.0 to +150.0 °C

NTC 30 k Ω

$\approx 30\text{ k}\Omega$	$R(25\text{ }^{\circ}\text{C}) = 30,000\text{ }\Omega,$ $B25/100 = 3964$	
Measuring range	$-5\text{ to }+250\text{ }^{\circ}\text{C}$	
Measuring resolution	approx. $0.002\text{ }^{\circ}\text{C}$	
Measuring accuracy	$\pm 0.6\text{ }^{\circ}\text{C}$	in the measuring range $+10.0\text{ to }+40.0\text{ }^{\circ}\text{C}$

Polarizer

Ipol DC

Polarization current	−200.0 to +200.0 μA	adjustable in 0.5 μA steps
Measuring range	−2,400 to 2,400 mV	
Measuring resolution	0.1 mV	

Ipol AC

Polarization current	5, 10, 20, 30 μ A	Effective values
Measuring range	0 to +1,700 mV	Effective values
Measuring resolution	0.1 mV	
Frequency	10 Hz	

Upol DC

Polarization voltage	−2,000 to +2,000 mV	adjustable in 5 mV steps
Measuring range	−200.0 to +200.0 μA	
Measuring resolution	0.01 μA	

Potentiometric differential measurement

Measuring range	-2,400 to +2,400 mV
Measuring resolution	1.56 μ V



<i>Measuring accuracy</i>	$\pm 0.2\%$	of the measured value ± 0.5 mV in the measuring range $-2,000$ to $+2,000$ mV
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<i>Common-mode rejection</i>	≥ 60 dB
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Polarizer load*I_{pol}*

Load impedance at ± 10 μ A	max. 240 k Ω
Load impedance at ± 50 μ A	max. 48 k Ω
Load impedance at ± 100 μ A	max. 24 k Ω

U_{pol}

Load impedance at ± 300 mV	max. 1.5 k Ω
Load impedance at ± 600 mV	max. 3 k Ω
Load impedance at $\pm 1,000$ mV	max. 5 k Ω

Measuring accuracy

applies for all measuring ranges without sensor error, under reference conditions, measuring interval 100 ms

Reference conditions

<i>Relative humidity</i>	$\leq 60\%$
<i>Ambient temperature</i>	25 °C (± 3 °C)
<i>Instrument status</i>	

min. 30 minutes in operation

Memory

<i>Determinations</i>	$> 100,000$	depending on the type of samples
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<i>Range</i>	≤ 10 m	indoor with visual connection
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Mobile communications

<i>Technology</i>	LTE 4G	
<i>Category</i>	Cat-1	
<i>Frequency bands</i>		
Frequency Duplex procedure	1, 2, 3, 4, 5, 7, 8, 12, 13, 18, 19, 20, 26, 28, 66	dependent on national regulations
Time Duplex procedure	38, 40, 41	dependent on national regulations
<i>Data transmission rate</i>	max. 10/5 Mbps (downlink/uplink)	dependent on the configuration
<i>SIM card</i>	Nano-SIM (4FF)	cannot be replaced by the user

Antennas

<i>Number</i>	3	internal
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