

METTLER TOLEDO

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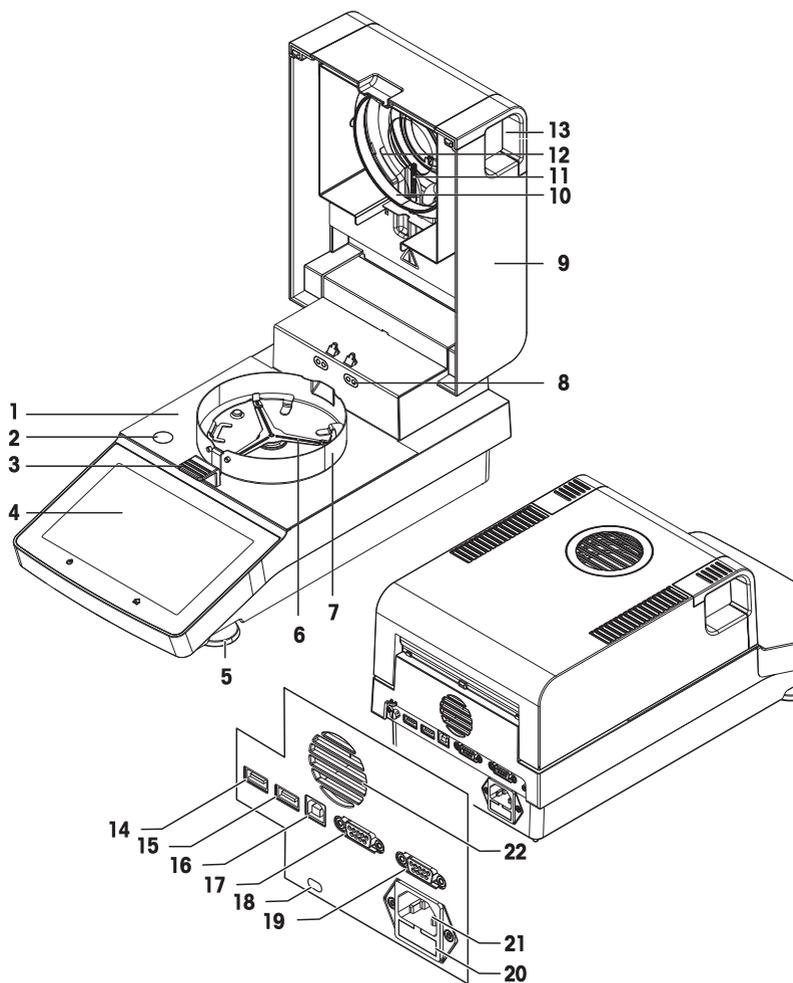


This User Manual is a brief instruction that provides information to handle with the first steps of the instrument in a safe and efficient manner. Personnel must have carefully read and understood this manual before performing any tasks.

For full information, always consult the Reference Manual (RM).

► www.mt.com/HC103-RM

Overview drying unit



Legend

- | | | | |
|----|---|----|--|
| 1 | Sample chamber | 2 | Level indicator |
| 3 | Sample pan handler | 4 | Touch screen |
| 5 | Leveling screw | 6 | Sample pan holder |
| 7 | Draft shield element | 8 | Contacts for temperature adjustment kit (optional) |
| 9 | Heating module (with thermal overload protection) | 10 | Reflector ring |
| 11 | Temperature sensor | 12 | Protective glass |
| 13 | Handles for opening the sample chamber | 14 | USB Host 1 |
| 15 | USB Host 2 | 16 | USB Device |
| 17 | Kensington slot for anti-theft purposes | 18 | RS232C |

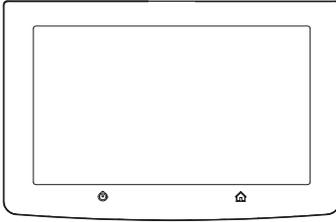
19 RHT sensor port (optional)

21 Power supply socket

20 Power line fuse

22 Fan

Overview operation keys



Legend key functions

	
ON/OFF	Home

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1 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.

1.1 Further applicable documents



This User Manual is a brief instruction that provides information to handle with the first steps of the instrument in a safe and efficient manner. Personnel must have carefully read and understood this manual before performing any tasks.

For full information, always consult and download the Reference Manual (RM).

► www.mt.com/HC103-RM

Search for software

► <http://www.mt.com/moisture-software>

1.2 Definition of signal warnings and 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.
- CAUTION** A hazardous situation with low risk, resulting in minor or moderate 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: read the User Manual or the Reference Manual for information about the hazards and the resulting measures.



Hot surface



Notice

1.3 Product specific safety information

Intended use

This instrument is designed to be used by trained staff. The instrument is intended for determining the humidity in samples.

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.

Moisture determination applications must be optimized and validated by the user according to local regulations. Application-specific data provided by METTLER TOLEDO is intended for guidance only.

Staff qualification

Incorrect use of the instrument or the chemicals used in the analysis can lead to death or injury. The following experience is needed for operating the instrument.

- Knowledge and experience in working with toxic and caustic substances.
- Knowledge and experience in working with standard laboratory equipment.
- Knowledge and experience in working in accordance with general lab safety rules.

Responsibilities of the instrument owner

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

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

Personal protective equipment



Insulated gloves



Lab coat



Goggles

Safety notes



WARNING

Death or serious injury due to electric shock

Contact with parts that carry a live current can lead to injury and death. If the instrument cannot be shut down in an emergency situation, people can be injured and the instrument can be damaged.

- 1 Check that the voltage printed on the instrument is the same as your local power supply voltage. If this is not the case, under no circumstances connect the instrument to the power supply, but contact a METTLER TOLEDO representative.
- 2 Only use the three-core power cable with equipment grounding conductor supplied by METTLER TOLEDO to connect your instrument.
- 3 Only connect it to a three-pin power socket with earthing contact.
- 4 Only use standardized extension cables with equipment grounding conductor for operating the instrument.
- 5 Make sure that the power plug is accessible at all times.
- 6 Arrange the cables so that they cannot be damaged or interfere with the operation.
- 7 Keep all electrical cables and connections away from liquids.



WARNING

Injury or death due to toxic or corrosive substances

Heating up toxic or corrosive substances, e.g., acids, can result in toxic or corrosive vapors that can cause injuries if they come in contact with the skin or the eyes or if they are inhaled.

- 1 When using chemicals and solvents, comply with the instructions of the manufacturer and the general laboratory safety rules.
- 2 Set up the instrument in a well-ventilated location.
- 3 When using dry substances that form toxic gases, place the instrument in a fume hood.



WARNING

Death or serious injuries due to flammable solvents

Flammable solvents in the vicinity of the instrument can ignite and lead to fire and explosions.

- 1 Keep flammable solvents away from the instrument.
- 2 When using chemicals and solvents, comply with the instructions of the manufacturer and the general laboratory safety rules.



CAUTION

Burns due to hot surfaces

During operation, parts of the instrument can reach temperatures that can cause burns if touched.

- 1 Do not touch the area marked with the warning symbol.
- 2 Ensure sufficient free space around the instrument to avoid heat accumulation and overheating (approx. 1 m free space above the heating module).
- 3 Never cover, tape or clog the vent over the sample chamber. Do not tamper with the vent in any other way.
- 4 Exercise caution when removing a sample. The sample itself, the sample chamber, the draft shield and the sample pan may be very hot.
- 5 Do not open the heating module during operation. Always let it cool down completely before opening.
- 6 Do not modify the heating module in any way.



NOTICE

Damage to the instrument due to corrosive substances and vapors

Corrosive substances and corrosive vapors can damage the instrument.

- 1 When using chemicals and solvents, comply with the instructions of the manufacturer and the general laboratory safety rules.
- 2 Ensure that the instrument parts touching your sample substance can not get altered by it.
- 3 Wipe off any condensation of corrosive vapours after an operation.
- 4 Work with small samples.



NOTICE

Damage to the instrument due to the use of unsuitable parts

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

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

2 Design and Function

2.1 Information on Standards

2.2 Operation Keys

Key	Designation	Description
	ON/OFF	Switches the Moisture Analyzer on / into standby mode (to switch it off completely, it has to be unplugged from the power supply).
	Home	Directly returns to the home screen from any other menu level.

2.3 Screen navigation

The colored touch screen is a touch-sensitive WVGA monitor. It displays information and allows you to enter commands by touching certain areas on its surface: You can choose the information displayed on the screen, change terminal settings or perform certain operations on the instrument.

Only those elements which are available for the current dialog appear on the display.



NOTICE

Damage to the touch screen due to pointed or sharp objects

- Operate the touch screen with your fingers.

Note

The sensitivity of the touch screen is set to a default value. The sensitivity of the touch screen can be defined with the function **Touch screen adjustment** in the section **Settings**.

The surface navigation of the touch screen works in the same way as on most common touch screens:

Selecting a button or an icon

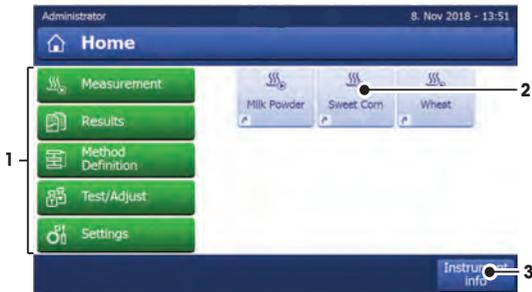
- Tap on it.

Scrolling

- Drag the button in the scroll bar up or down.
- Or tap ▲ or ▼

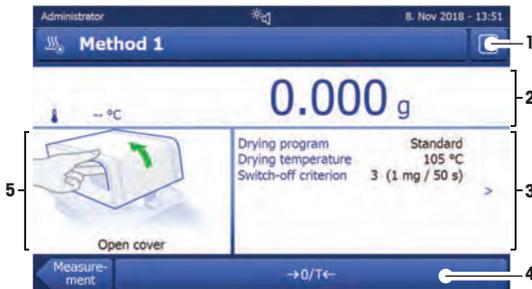
2.4 Home screen

The user **Home** screen is the main screen and appears after startup or login of the instrument. All screens of the user interface can be accessed from the home screen. Returning to the **Home** screen is possible from all other screens of the user interface by pressing the [**Home**] key or tapping the [**Home**] button.



	Name	Explanation
1	Main Menu	<p>Measurement Start measurement. Prerequisite: Method is defined and all necessary settings are made.</p> <p>Results Display, print and export results</p> <p>Method Definition Define, edit, test or delete a method</p> <p>Test/Adjust Adjust or test the integrated balance and the heating module.</p> <p>Settings Define instrument-, user-, and data-management settings. Find help and tutorials under this menu item.</p>
2	User shortcuts	Shows user-specific shortcuts for frequently used methods. Shortcuts are saved in the user profile.
3	Instrument info	Shows general info about the instrument and the software (e.g. serial number, software version).

2.5 Work screen



	Name	Explanation
1	Shortcut button	Adding/editing a shortcut to the current method (to the home screen).
2	Value panel	Current measured values of the work process.
3	Parameter panel	Parameters of the current work process. A detailed overview of the method parameters appears after tapping the parameter panel. Identifications (IDs) appear after tapping the ID panel for entering or editing values (comments). ID panel appears only if identification input is activated in the menu.
4	Action buttons	Action buttons which are required and available for the current dialog (e.g. Back , >0/T< , Print , Save , Delete , OK).
5	Graphics panel	Graphical illustrations, e.g. of the drying curves, instructions for the user for performing tasks, and weighing-in aid.

3 Installation and Putting into operation

3.1 Selecting the location

Requirements of the location

Place indoors on stable table

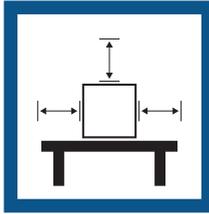
Ensure sufficient spacing

Level the instrument

Provide adequate lighting



Avoid direct sunlight



Avoid vibrations

Avoid strong drafts



Avoid temperature fluctuations



Sufficient distance for Moisture Analyzers: > 15 cm next to the instrument, > 1 m above the heating module.

3.2 Unpacking

Note

Store all parts of the packaging. This packaging guarantees the best possible protection for the transport of your instrument.

After receiving the instrument, proceed as follows:

- 1 Open the package and remove drying unit and the accessories.
- 2 Remove the packaging from the instrument.
- 3 Check the Moisture Analyzer for transport damage and complete scope of delivery.
- 4 In the event of damage or missing accessories, immediately inform a METTLER TOLEDO representative.

3.3 Scope of delivery

Moisture Analyzer	Documentation	Accessories
<ul style="list-style-type: none"> • 1 Drying unit with terminal • 1 Draft shield • 1 Power cable • 1 Sample handler • 1 Sample pan holder 	<ul style="list-style-type: none"> • 1 User Manual • 1 Application brochure «Guide to Moisture Analysis» • 1 Voucher for E-learning "Proper Moisture Determination" • EU-countries: 1 CE declaration of conformity 	<ul style="list-style-type: none"> • 80 aluminium sample pans • 3 Specimen samples (glass fibre filter) • 1 SmartCal sample

3.4 Connecting the instrument

Connecting the instrument



⚠ WARNING

Death or serious injury due to electric shock

Contact with parts that carry a live current can lead to injury and death. If the instrument cannot be shut down in an emergency situation, people can be injured and the instrument can be damaged.

- 1 Check that the voltage printed on the instrument is the same as your local power supply voltage. If this is not the case, under no circumstances connect the instrument to the power supply, but contact a METTLER TOLEDO representative.
- 2 Only use the three-core power cable with equipment grounding conductor supplied by METTLER TOLEDO to connect your instrument.
- 3 Only connect it to a three-pin power socket with earthing contact.
- 4 Only use standardized extension cables with equipment grounding conductor for operating the instrument.
- 5 Make sure that the power plug is accessible at all times.
- 6 Arrange the cables so that they cannot be damaged or interfere with the operation.
- 7 Keep all electrical cables and connections away from liquids.

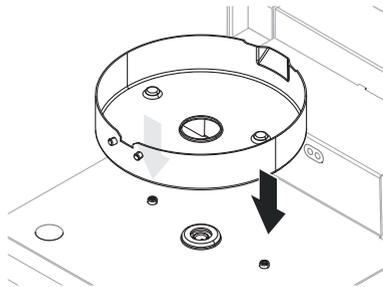
Two different versions of drying units with country-specific power cable are available:

110 V AC or 230 V AC

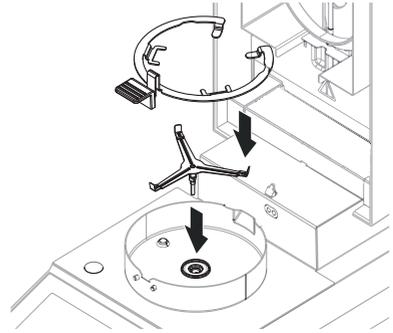
- Instrument is at the final location.
- 1 Connect the power cable to the power supply socket on the instrument.
 - 2 Connect the power cable to the power supply.

3.5 Setting up the instrument

- Instrument is connected to the power supply.
- 1 Open the sample chamber.
 - 2 Place the draft shield element. Place the notches onto the screw heads on the bottom of the sample chamber.



- 3 Carefully insert the sample pan holder. Make sure that the sample pan holder is correctly positioned and falls into position (see picture).
- 4 Insert the sample pan handler.
- 5 Press [⏻] to start the instrument.



3.6 Leveling the instrument

Exact horizontal positioning and stable installation are prerequisites for repeatable and accurate results. To compensate for small irregularities or inclinations ($\pm 2\%$) at the location, the instrument must be leveled.

 **Note**

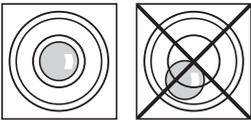
For leveling the drying unit use the function **Leveling guide** that can be found on **Settings > Help and tutorials > Instrument tutorial > 1. Leveling the instrument**.

For exact horizontal positioning, the device has a level indicator and two leveling feet. When the air bubble in the level indicator is exactly in the center, the instrument is standing perfectly horizontally.

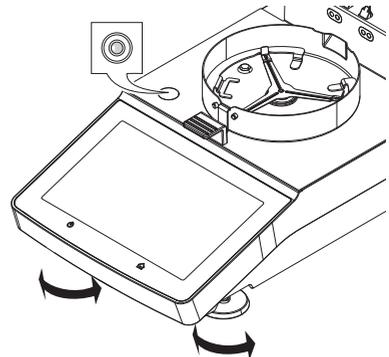
 **Note**

The drying unit should be re-leveled each time its location is changed.

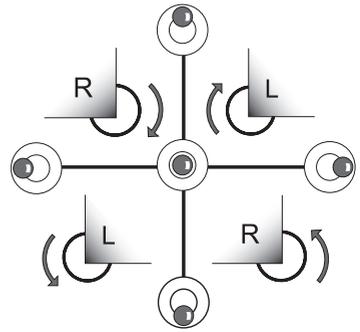
To level it, proceed as follows:



- 1 Position your Moisture Analyzer at the selected location.
- 2 Turn the two leveling feet until the air bubble is in the center of the level indicator.



- | | |
|---------------------------|--|
| Air bubble at 12 o'clock: | turn both feet clockwise. |
| Air bubble at 3 o'clock: | turn left foot clockwise, right foot counterclockwise. |
| Air bubble at 6 o'clock: | turn both feet counterclockwise. |
| Air bubble at 9 o'clock: | turn left foot counterclockwise, right foot clockwise. |



3.7 Setting date and time

Navigation: Home > Settings > Instrument settings > Regional Settings

When the instrument was switched into operation for the first time, date, time and language have been defined with the function **Setup Wizard**. These settings are retained even if the instrument is being disconnected from the power supply. The settings can also be changed manually as follows:

Set the current date

- **Regional Settings** is selected.
- 1 Tap **Date**.
- 2 Set day, month and year.
- 3 Confirm with **Set date**.

Set the current time

- **Regional Settings** is selected.
- 1 Tap **Time**.
- 2 Set hours and minutes.
- 3 Confirm with **Set time**.

3.8 Adjusting after setup

To obtain accurate measuring results, it is necessary to adjust the integrated balance as well as the heating module under working condition.

Adjusting is necessary before the instrument is used for the first time or after a change of location.

The following adjustment options are possible:

- Balance adjustment with external weight
- Temperature adjustment with temperature kit

For more information to perform these operations **see**

► www.mt.com/HC103-RM

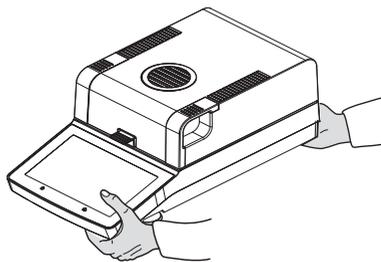
3.9 Transporting, packaging and storing

3.9.1 Transporting the Moisture Analyzer

Transporting the Moisture Analyzer over short distances

- 1 Switch off the instrument and unplug all interface cables.

- 2 Hold the instrument with both hands as shown.
- 3 Carefully lift the instrument and carry it in horizontal position to the new location.



Transporting the Moisture Analyzer over long distances

For transporting the Moisture Analyzer over long distances, always use the original packaging.

3.9.2 Putting into operation after transport

Putting into operation after transport:

- 1 Connect the instrument to the power supply.
 - 2 Check the level status. Level the Moisture Analyzer if necessary.
 - 3 METTLER TOLEDO recommends to perform weight and temperature tests and, if necessary, adjustments after transporting the Moisture Analyzer.
- ⇒ The Moisture Analyzer has been put into operation and is ready to use.

See also

 Connecting the instrument ▶ Page 9

3.9.3 Packaging and storing

Packaging

Store all parts of packaging in a safe place. The elements of the original packaging are developed specifically for the Moisture Analyzer and its components to ensure optimal protection during transportation or storing.

Storing

Store the Moisture Analyzer under following conditions:

- Indoor and in the original packaging.
- According to the environmental condition, **see** chapter "General data".

Note

When storing for longer than six months, the rechargeable battery may be down (date and time get lost).

4 Maintenance

To guarantee the functionality of the Moisture Analyzer and the accuracy of the results, a number of maintenance actions must be performed by the user.

4.1 Maintenance table

Maintenance action	Recommended interval	Remarks
Cleaning	Depending on the degree of pollution or your internal regulations clean the instrument: <ul style="list-style-type: none"> • After every use • After change of sample 	see chapter "Cleaning"
Performing routine tests (Weight test, temperature test, SmartCal test)	<ul style="list-style-type: none"> • After cleaning • After a software update 	see chapter "Test"

Maintenance action	Recommended interval	Remarks
Performing adjustments (weight adjustment, temperature adjustment)	<ul style="list-style-type: none"> After changing the location If a test indicates that an adjustment is needed 	see chapter "Adjustments"
Replacing the dust filter (if used)	<ul style="list-style-type: none"> Depending on the degree of pollution 	see chapter "Dust filter"



For full information, always consult and download the Reference Manual (RM).

4.2 Cleaning



WARNING

Death or serious injury due to electric shock

Contact with parts that carry a live current can lead to injury and death. If the instrument cannot be shut down in an emergency situation, people can be injured or the instrument can be damaged.

- Disconnect the instrument from the power supply before cleaning or performing other maintenance work.



CAUTION

Burns due to hot surfaces

The interior parts of the heating module as well as the parts in the sample chamber can reach temperatures that can cause injuries if touched.

- Wait until the heating module has cooled down completely before performing any maintenance task.



NOTICE

Damage to the instrument due to inappropriate cleaning agents

Inappropriate cleaning agents can damage the housing. If liquids enter the housing they can damage the instrument.

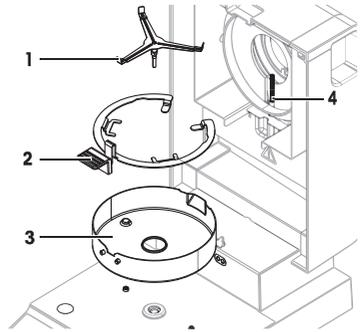
- 1 Make sure the cleaning agent is compatible with the material of the part you want to clean.
- 2 Make sure that no liquid enters the interior of the instrument. Do not spray any liquids and wipe off any spills immediately.
- 3 Use a lint-free cloth for cleaning.
- 4 Never open the housing of the instrument.

Protective equipment:

- Gloves
- Goggles

4.2.1 Sample chamber

- Sample chamber is open.
- 1 Remove the sample pan holder (1), the sample pan handler (2) and the draft shield element (3) for cleaning.
 - 2 Carefully remove any deposits from the black temperature sensor (4).



4.2.2 Heating module



CAUTION

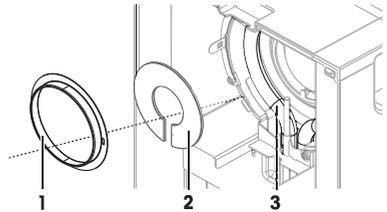
Burns due to hot surfaces

The round halogen lamp can reach temperatures that can cause injuries if touched.

- 1 Do not remove the halogen lamp.
- 2 Wait until the heating module has cooled down completely before cleaning.
- 3 Remove any splashes, deposits, or spots from the halogen lamp with a mild organic solvent such as ethanol.

Overview

- 1 Reflector ring
- 2 Protective glass
- 3 Halogen lamp

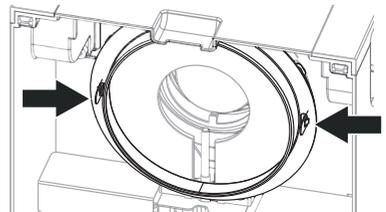


Removing reflector ring

Note

When the reflector ring is removed, the loose protective glass might fall out. Be careful when pulling out the reflector ring.

- 1 Sample chamber is open.
- 2 Unlock the reflector ring by pushing the anchoring clips on the side of the reflector ring inwards.
- 3 Carefully pull out the reflector ring.

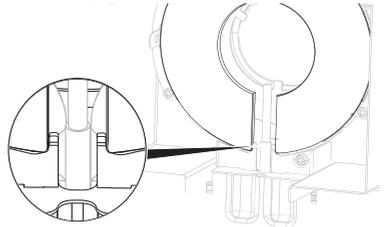


Removing protective glass

- Reflector ring is removed.
- Carefully pull out the protective glass.

Reassembling after cleaning

- All parts are cleaned.
- 1 Insert the protective glass.
 - 2 Set the protective glass into the housing and adjust the position until it sits correctly.
 - 3 Insert the reflector ring and push the anchoring clips into the designated openings.
 - 4 Close the heating module.



4.2.3 Fan grill

The air inlet of the fan is located at the rear of the instrument and its exterior should be cleaned from time to time to free it from any dust deposits.

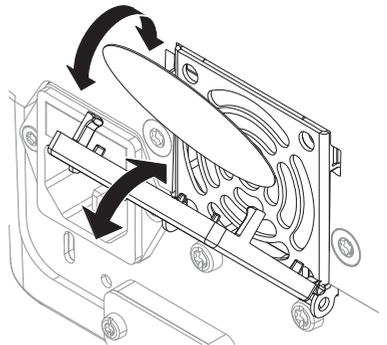
4.2.4 Putting into operation after cleaning

- 1 Reassemble the Moisture Analyzer.
 - 2 Press  to switch on the Moisture Analyzer.
 - 3 Warm up the Moisture Analyzer. Wait 1 h for the acclimatization, before starting the tests.
 - 4 Check the level status, level the Moisture Analyzer if necessary.
 - 5 METTLER TOLEDO recommends to perform weight and temperature tests and, if necessary, adjustments after cleaning the Moisture Analyzer.
- ⇒ The Moisture Analyzer has been put into operation and is ready to use.

4.3 Replacing the Dust filter

If you use a dust filter for your Moisture Analyzer, check the filter pollution at regular intervals. For replacement filters **see** Accessories and Spare Parts.

- 1 Open the filter lid.
- 2 Replace the dust filter.



5 Troubleshooting



For full information, always consult and download the Reference Manual (RM).

5.1 Malfunctions during initial application

Malfunction	Possible cause	Diagnostic	Remedy
Moisture analyzer cannot be switched on.	<ul style="list-style-type: none"> The power supply cable is not connected. No power supply voltage in the mains. 	Check.	Connect the power supply cables or reestablish the mains supply voltage.
	Faulty fuse.	Check.	Replace the fuse. The fuse is located on the back of the instrument besides the power plug (find a spare fuse there).
Keys and buttons on the terminal do not function.	Software bug.	–	Restart the software by disconnecting and reconnecting the power plug.
Unstable weight indication. The measuring values do not stabilize but go up/down.	The sample pan holder is not placed properly .	Check.	Make sure the sample pan holder is correctly placed.
			Some parts are touching the sample pan. Volatile sample substance (weight of the sample changes quickly).
The measurement takes too long.	An unsuitable switch-off criterion was set.	–	Choose a suitable switch-off criterion.
	Sample substance tends to form a skin, when heated.	–	If you use samples which tend to form a skin that hinders evaporation, perform the measurement at a higher temperature.
	An excessive amount of sample cause slow drying.	–	Enlarge the surface of the sample substance, e.g by crushing or grinding.
	Liquids take longer to dry.	–	For sample liquids, use absorbent glass fibre filters. Use absorbent glass filter for liquids. Enlarge the surface of the sample, e.g. by crushing or grinding.
Measurement results are not repeatable.	Unstable environment/ location of the instrument.	–	Choose a suitable location, see [Selecting the location ► Page 8].
			The drying time is too short for the "Timed switch-off" criterion.

Malfunction	Possible cause	Diagnostic	Remedy
Measurement results are not repeatable.	The sample substance boils and the splashed drops continuously change the weight.	–	Lower the drying temperature. The samples are not comparable.
	The granulation of the sample is not homogenous or too large.	–	Use samples with a homogenous granulation.
	Insufficient heating power because the protective glass of the halogen radiator is dirty.	Check if the protective glass is dirty.	<ul style="list-style-type: none"> Clean the protective glass, see [Cleaning ► Page 13].
	The temperature sensor is contaminated/dirty.	Check if the temperature sensor is dirty.	Clean the temperature sensor, see [Cleaning ► Page 13].
	The sample substance does not become completely dry due to uneven distribution in the sample pan.	–	Evenly spread the sample substance in the pan and retry.
The adjustment temperature is lower than expected (e.g. 90°C instead of 100°C).	The draft shield is not installed.	Check.	Install the draft shield.
The difference between target and actual temperature is out of tolerance. When using the temperature adjustment kit.	The temperature adjustment kit is not adjusted or defective.	–	<ul style="list-style-type: none"> Try another temperature adjustment kit. Adjust the temperature adjustment kit (contact your METTLER TOLEDO service representative)

6 Technical Data

6.1 General data

Power supply

110 V AC Version	100 V–120 V, 50/60 Hz, 4 A
230 V AC Version	200 V–240 V, 50/60 Hz, 2 A
Voltage fluctuations	-15%+10%
Power load	max. 450 W during drying process
Power line fuse	115 V: 5 × 20 mm, F6.3AL 250 V (6.3 A, fast-acting, low-breaking capacity) 230 V: 5 × 20 mm, F2.5AL 250 V (2.5 A, fast-acting, low-breaking capacity)

Protection and standards

Overvoltage category	II
Degree of pollution	2
Standards for safety and EMC	see Declaration of Conformity (part of standard equipment)
Range of application	for use in dry interior rooms

Environmental conditions

Height above sea level	up to 4000 m
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Ambient temperature range	Operation: +10 °C to 30 °C (operability guaranteed 5 °C to 40 °C)
Relative air humidity	max. 80% up to 31 °C, linearly decreasing to 50% at 40 °C 20% - 80% and non-condensing conditions
Warm-up time	At least 60 minutes after connecting the instrument to the power supply; when switched on from standby, the instrument is ready for operation immediately.

Materials

Drying Unit

Housing	Plastic, PBT, PBX45A (UL94-V0)
Inspection window grill	Plastic, PPS, A504X90 (UL94-V0)
Protective glass	Quartz glass
Halogen lamp	Quartz glass
Reflector bracket	Plastic, PPS A504X90 (UL94-V0)
Draft shield, interior bottom plate	Stainless steel, X2CrNiMo17-2 (1.4404)

7 Disposal

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

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



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Mettler-Toledo GmbH

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

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