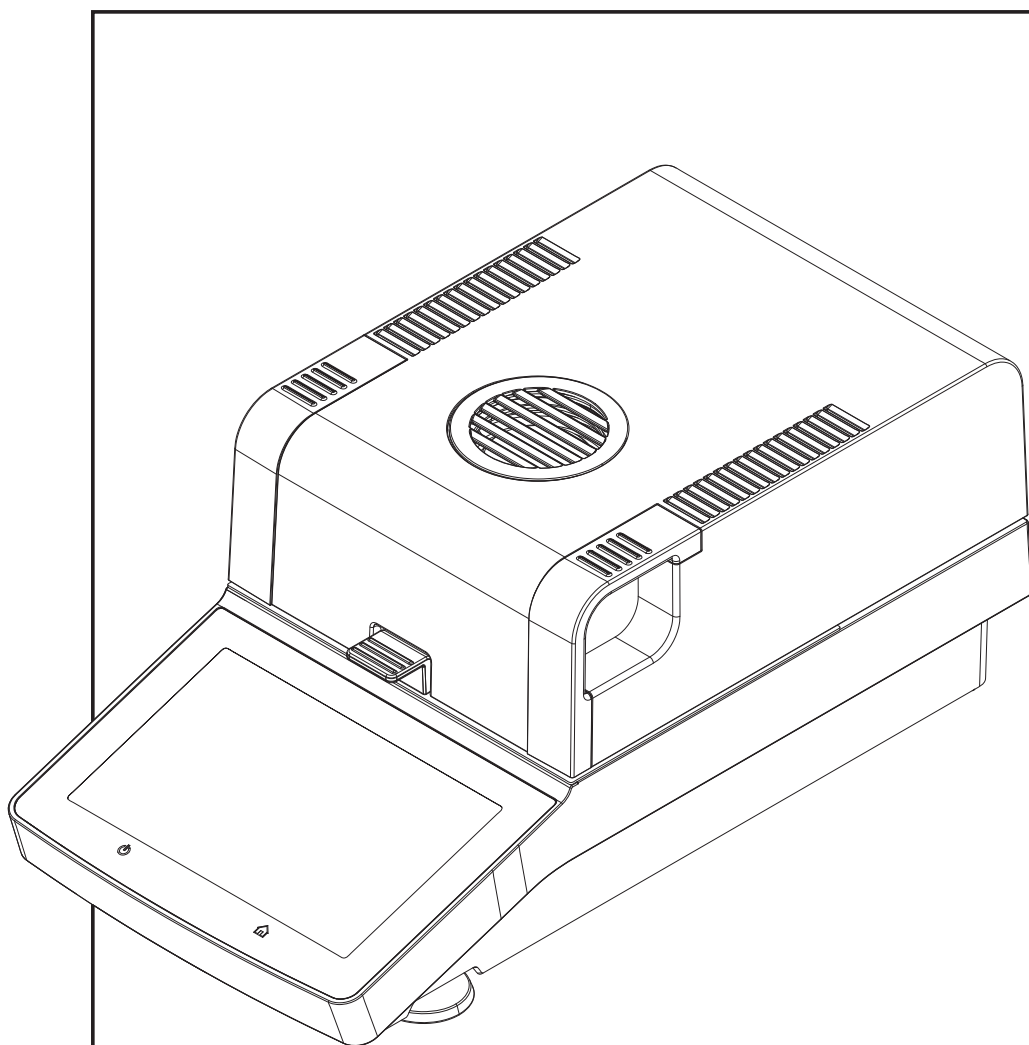


Moisture Analyzer

HC103



METTLER TOLEDO

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1 Introduction

Thank you for purchasing a Halogen Moisture Analyzer from METTLER TOLEDO.

Your Moisture Analyzer is fast and reliable. It offers a high level of operating convenience and useful functions to facilitate determination of the moisture content of your samples.

Behind your instrument stands METTLER TOLEDO, a leading manufacturer of not only balances and scales for the lab and production, but also analytical measuring instruments. A customer service network covering the entire globe with well trained personnel is your service at all times, whether you are choosing accessories or require guidance for a specific application to ensure optimum utilization of your instrument.

Your Halogen Moisture Analyzer is used for determining the moisture content of almost any substance. The instrument works on the thermogravimetric principle. At the start of the measurement the Moisture Analyzer determines the weight of the sample, the sample is then quickly heated by the integral halogen heating module and the moisture vaporizes. During the drying process the instrument continually measures the weight of the sample and displays the reduction in moisture. Once drying has been completed, the moisture or solids content of your sample is displayed as the final result.

Of decisive importance in practice is the rate of heating and even heating of the surface of the sample. In comparison with conventional infrared heating or the drying oven method, for example, the halogen heating module of your instrument needs a shorter time to reach its maximum heating power. It also allows use of high temperatures, an additional factor in shortening the drying time. Uniform heating of the sample material ensures good repeatability of the drying results and makes it possible to use a smaller amount of sample.

The Moisture Analyzer conforms with all common standards and directives. It supports stipulations, work techniques and result records as demanded by all international quality assurance systems, e.g. GLP (Good Laboratory Practice), GMP (Good Manufacturing Practice). The instrument has a CE declaration of conformity and METTLER TOLEDO as the manufacturer has been awarded ISO 9001 and ISO 14001 certification. This provides you with the assurance that your capital investment is protected in the long term by a high product quality and a comprehensive service package (repairs, maintenance, servicing, adjustment service).

Finding More Information

► www.mt.com/moisture

Software version

These operating instructions are based on the initially installed firmware (software) version V1.10.

1.1 Conventions and Symbols Used in these Operating Instructions

Key and button designations are indicated by a picture or text in square brackets (e.g. **[Save]**).

These symbols indicate an instruction:

- prerequisites
- 1 steps
- 2 ...
- ⇒ results

2 Safety Information

2.1 Definition of Signal Warnings and Symbols

Safety notes are marked with signal words and warning symbols. These show safety issues and warnings. Ignoring the safety notes may lead to personal injury, damage to the instrument, malfunctions and false results.

Signal Words

WARNING	for a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.
CAUTION	for a hazardous situation with low risk, resulting in damage to the device or the property or in loss of data, or minor or medium injuries if not avoided.
NOTICE	(no symbol) for important information about the product.
Note	(no symbol) for useful information about the product.

Warning Symbols

	General hazard		Electrical shock
	Hot surface		Inflammable or explosive substance
	Toxic substance		Acid / Corrosion

2.2 Product Specific Safety Notes

General Safety Information

Your instrument corresponds to the state of the art technology and complies with all recognized safety rules, however, certain hazards may arise in extraneous circumstances. Do not open the housing of the instrument: It does not contain any parts which can be maintained, repaired or replaced by the user. If you ever have problems with your instrument, contact your authorized METTLER TOLEDO dealer or service representative.

Always operate and use your instrument only in accordance with the instructions contained in this document. The instructions for setting up your new instrument must be strictly observed.

If the instrument is not used according to the Operating Instructions, protection of the instrument may be impaired and METTLER TOLEDO assumes no liability.

Intended Use

Your Moisture Analyzer is used for determining the humidity in samples. Use the instrument exclusively for this purposes. Any other type of use and operation beyond the limits of technical specifications without written consent from Mettler-Toledo GmbH is 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.



It is not permitted to use the instrument in explosive atmosphere of gases, steam, fog, dust and flammable dust (hazardous environments).

Staff Safety

The Moisture Analyzer may be operated only by trained personnel who are familiar with the properties of the samples used and with the handling of the instrument.

These printed document must be read and understood before using the instrument. These printed document must be retained for future reference.

The instrument must not be altered or modified in any way. Only use METTLER TOLEDO original spare parts and accessories.

Protective Clothing

It is advisable to wear protective clothing in the laboratory when working with the instrument.



A lab coat should be worn.



A suitable eye protection such as goggles should be worn.



Use appropriate gloves when handling chemicals or hazardous substances, checking their integrity before use.

Safety Notes



WARNING

Risk of electric shock

Your instrument is supplied with a 3-pin power cable with an equipment grounding conductor. Only extension cables which meet this relevant standards and also have an equipment grounding conductor may be used. Intentional disconnection of the equipment grounding conductor is prohibited.



CAUTION

The Halogen Moisture Analyzer works with heat!

- 1 Ensure sufficient free space around the instrument to avoid heat accumulation and overheating (approx. 1 m free space above the heating module).
- 2 The vent over the sample must never be covered, plugged, taped over or tampered with in any other way.
- 3 Do not place any combustible materials on, under or next to the instrument since the area around the heating module may be hot.
- 4 Exercise caution when removing the sample. The sample itself, the sample chamber, the draft shield and any sample vessels used may still be very hot.
- 5 During operation, you should never open the heating module itself as the ring-shaped heating reflector or its protective glass can reach 400 °C! If you have to open the heating module e.g. for maintenance, disconnect the instrument from the power supply and wait until the heating module has cooled down completely.
- 6 No modifications must be made within the heating module. It is particularly dangerous to bend any components or remove them or to make any other changes.

Certain samples require special care!

With certain types of samples, there is a possibility of danger to personnel or damage of property. Please note that the user always has the responsibility and liability for damage caused by use of any types of samples!



CAUTION

Fire or Explosion

- Flammable or explosive substances.
 - Substances containing solvents.
 - Substances which evolve flammable or explosive gases or vapors when heated.
- 1 In cases of doubt, perform a careful risk analysis.
 - 2 Work at a drying temperature that is low enough to prevent the formation of flames or an explosion.
 - 3 Wear protective goggles.
 - 4 Work with small amounts of sample.
 - 5 **Never leave the instrument unattended!**



WARNING

Substances which contain toxic or caustic components

Toxic gases produced during drying could cause irritations (eyes, Skin, breathing), illness or death.

- Such substances may be dried only in a fume cupboard.



CAUTION

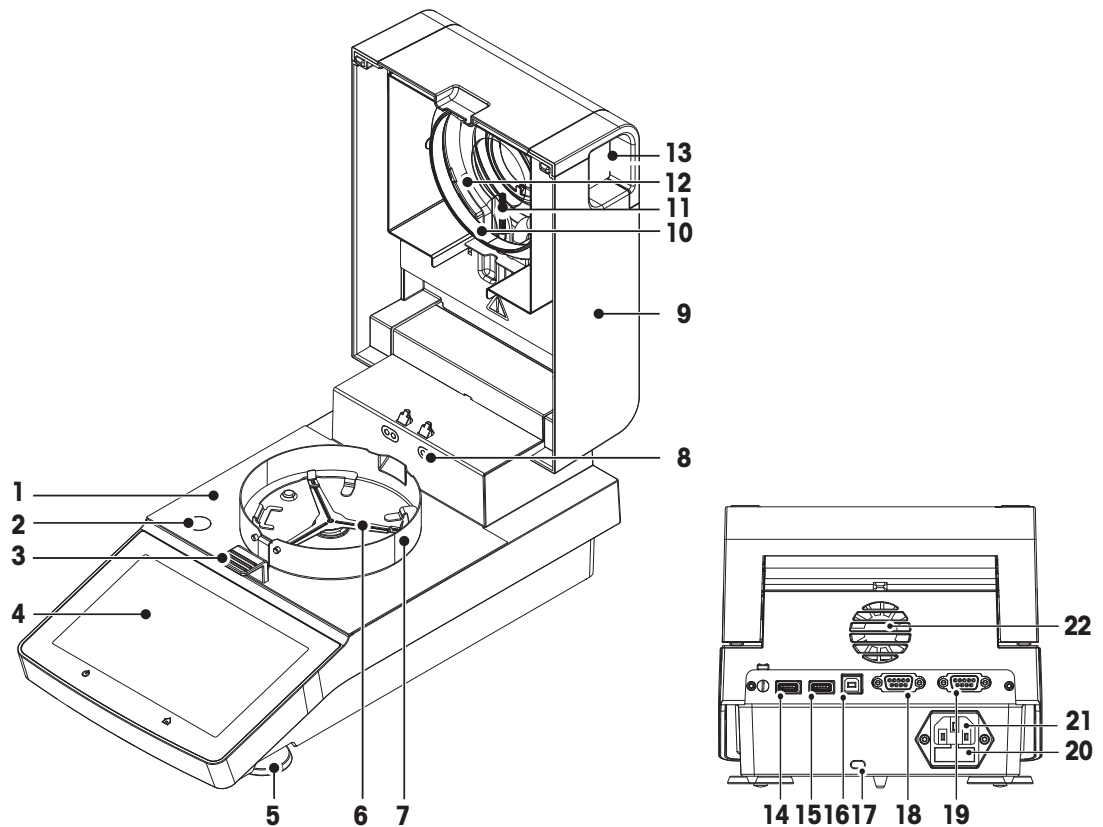
Corrosion

Substances which evolve corrosive vapors when heated (e.g. acids).

- Work with small amounts of samples as the vapor can condense on cooler housing parts and cause corrosion.

3 Design and Function

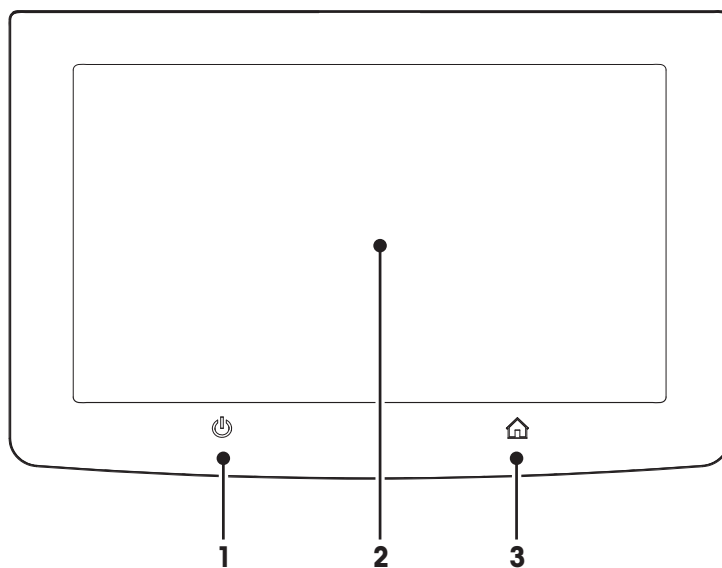
3.1 Overview





Legend

- | | |
|--|---|
| 1 Sample chamber | 2 Level indicator |
| 3 Sample pan handler | 4 WVGA color display (touch screen) |
| 5 Leveling screw | 6 Sample pan holder |
| 7 Draft shield element | 8 Contacts for optional temperature adjustment kit |
| 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 RS232C (for optional RHT sensor only) | 20 Power line fuse |
| 21 Power line socket | 22 Fan |

3.1.1 Operation Keys



Legend operation keys

1		To switch on or off (standby operation) the instrument. Note Do not disconnect the instrument from the power supply except if you will not be using the instrument for an extended period.
2		The touch screen area
3		Home To return to the user home screen.

3.2 User Interface

The colored touch screen is a touch-sensitive WVGA display. The touch screen not only displays information, it also allows you to enter commands by touching certain areas on its surface. You can choose the information displayed on the screen, change settings or perform certain operations on the instrument.

Buttons on the Touch Screen

Buttons are software elements on the touch screen (Soft keys).



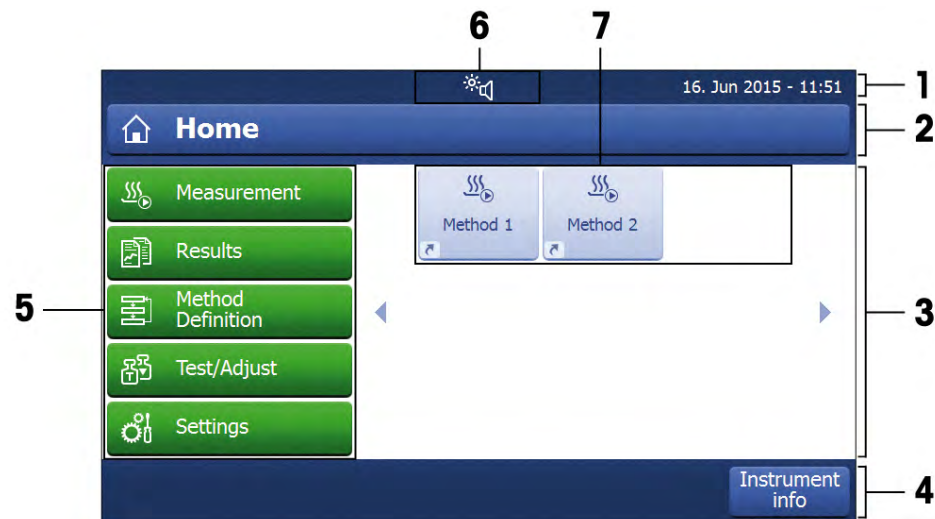
CAUTION

Do not touch the touch screen with pointed or sharp objects!

This may damage the touch screen.

3.2.1 User Home Screen

The user home screen always appears after startup or login of the instrument. The user home screen is the central screen where every application can be started. Returning to the user home screen is possible by pressing the button [Home] or by tapping [Home] in the action bar of the current process.







	Name	Explanation
1	Status bar	The status bar shows status icons, date and time.
2	Title bar	The title bar shows elements for the user's orientation and information.
3	Content area	The content area is the main working area for menus and applications.
4	Action bar	The action bar shows buttons for available actions in the current dialog (e. g. Back , ->0/T<- , Print , Save , Delete , OK).
5	Main menu	In the main menu, the submenus Measurement , Results , Method Definition , Test/Adjust or Settings can be chosen.
6	Status icons	Icons that show the status of the device. [Status Messages ▶ 71].
7	User shortcuts	User-specific shortcuts for frequently used methods. Shortcuts are saved in the user profile.

3.2.2 Input Dialogs

3.2.2.1 Entering Text and Numbers

The keyboard dialog allows you to enter characters including letters, numbers and a variety of special characters.



	Name	Explanation
1	Input field	Shows the characters that have been entered.
2	Explanation field	Shows additional information.
3	Specialized tabs	To switch the keyboard mode for entering letters, numbers or special characters.
	Shift-Lock	To enter lower and upper case letters.
	Delete	Delete last character.
	Cursor left	To move the cursor to the left.
	Cursor right	To move the cursor to the right.

Note

It is also possible to place cursor directly in input field by tapping the respective position.

3.2.2.2 Changing Date and Time

This dialog (Picker view) allows you to set the date and time by picking from the built-in calendar/clock.



	Name	Explanation
1	Pick button	Increment
2	Explanation field	Current value
3	Pick button	Decrement
	Back	To exit the dialog without saving.
	Set date	To confirm the entered date.

3.2.3 Lists and Tables

Simple list view



	Name	Explanation
1	Content area	
2	Content title	
3	Scroll bar	Use the scroller to scroll up and down

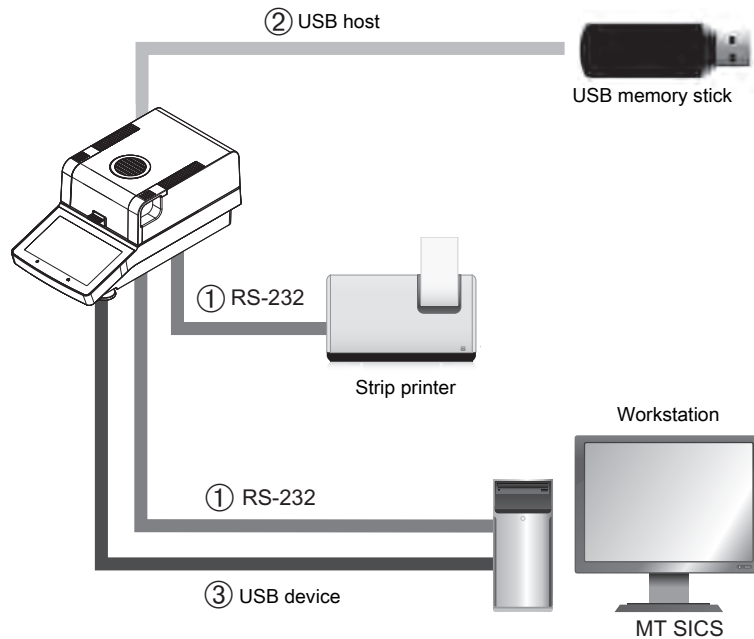
3.2.4 Work Screen

The work screen is used for performing main tasks e.g. measurements.



	Name	Explanation
1	Name field	Name of current method
2	Shortcut button	Adding/editing a shortcut to the home screen for this method
3	Value panel	Displays the current measured values of the work process
4	Graphics panel	E.g. graphical illustrations of the drying curves, instructions for the user for performing tasks, and weighing-in aid
5	Parameter panel	Displays the parameters of the current work process. A detailed overview of the method parameters appears after tapping the parameter panel.
6	Action buttons	Depending on the current context

3.3 Peripheral Devices



	Name	Explanation
1	RS232C connection	RS232C interface for connecting the instrument to a peripheral device (e.g. to a printer or a PC with a 9-pin male connection).
2	USB Host	USB interface for connecting a peripheral device to the instrument (e.g. a memory stick up to 32 GB. Type A socket).
3	USB Device	USB interface for connecting the instrument to a peripheral device (e.g. a PC). Type B socket.

Note

The USB host connection can only be used with specific devices. The following devices are officially supported:

- USB memory stick (for specific characteristics see list below)

Note for using USB memory stick

- USB memory sticks up to 32 GB are supported.
- Recommended formatting: FAT32 (NTFS not supported).
- Max. cluster size: 32 KB.
- Max. file size: 32 MB.
- Make sure that the stick is fully inserted.
- Make sure that the write protection is deactivated if present.

4 Installation and Putting into Operation

4.1 Scope of delivery

Open the package and check the completeness of the delivery. The following accessories are part of the standard equipment of your new Moisture Analyzer:

- 80 aluminum sample pans
- 1 Sample handler
- 1 Sample pan holder
- 1 Draft shield
- 1 Specimen sample (circular, absorbent glass fibre filter)
- 1 Power cable (country specific)
- 1 SmartCal sample
- 1 In use cover
- 1 Application brochure «Guide to Moisture Analysis»
- 1 Operating instructions or User Manual; printed or on CD-ROM, depending on country of use
- 1 CD ROM (Installation videos, Operating Instructions, User Manual, Moisture Guide, SOPs Routine Testing and further information)
- 1 Declaration of conformity
- 1 Voucher for elearning "Proper Moisture Determination"

Remove the packaging from the instrument. Check the instrument for transport damage. Immediately inform your METTLER TOLEDO representative if you have any complaints or parts are missing.

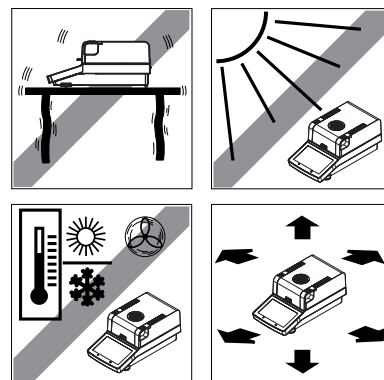
Note

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

4.2 Location

Your Moisture Analyzer is a precision instrument. An optimum location guarantees accuracy and dependability. Make sure that the following environmental conditions are met:

- Operate the instrument only indoors and at an altitude of less than 4000 m above sea level.
- Before switching on the instrument, allow all its parts to reach room temperature (+5 to 30°C). Make sure that the relative humidity is between 20% and 80% and non-condensing conditions are met.
- The power plug must be easily accessible.
- Firm, horizontal location as free from vibrations as possible.
- Avoid direct sunlight.
- No excessive temperature fluctuations.
- No powerful drafts.
- Surroundings as free from dust as possible.
- Sufficient clearance around the instrument to allow warm air to dissipate.
- Sufficient distance from heat-sensitive materials in the vicinity of the instrument.



4.3 Connecting the instrument



WARNING

Risk of electric shock

- 1 Use only the 3-pin power cable with equipment grounding conductor which was supplied with your instrument.
- 2 Only a 3-pin grounded outlet for connecting your instrument must be used.
- 3 Only extension cables which meet this relevant standards and also have an equipment grounding conductor may be used.
- 4 Intentional disconnection of the equipment grounding conductor is prohibited.

NOTICE

- Check if the voltage printed on the type plate corresponds to your local line voltage. If this is not the case, contact your METTLER TOLEDO sales representative or dealer. Do not connect the drying unit to the power supply.

Two different versions with country-specific power cable are available (110 V AC or 230 V AC).

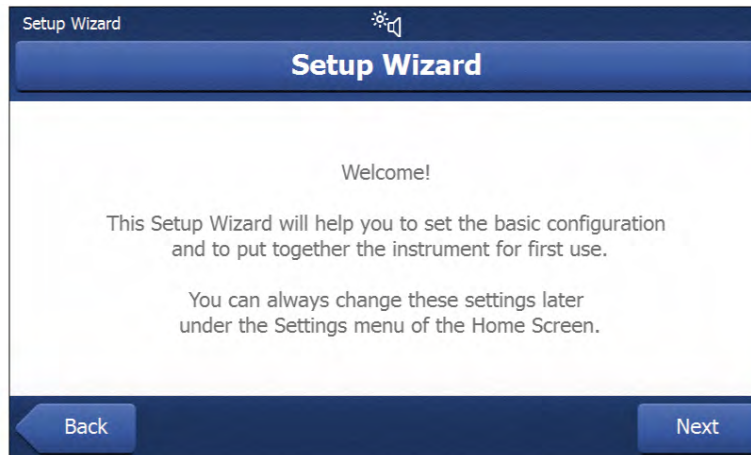
- The power plug must be always accessible.
 - Before operating, check all cables for damage.
 - Guide the cables so that they cannot become damaged or interfere with the measuring process.
 - Instrument is at the final location.
- 1 Connect the power cable to the power supply socket on the instrument.
 - 2 Connect the power cable to the power line outlet.

Switching on the instrument

- 1 Instrument is connected to the power supply.
 - 2 To switch on, press [⏻].
 - ⇒ Display appears.
- ⇒ Instrument is ready to use.

4.4 Setup Wizard

When you switch on your Moisture Analyzer for the first time, the **Setup Wizard** appears. The **Setup Wizard** is a step-by-step instruction, that helps to define the basic functions (**Language** and **Date format**) and to install the sample chamber of your device. The buttons in the action bar can be used for navigation.



Note

The application **Setup Wizard** appears automatically when the instrument was switched on for the first time (or when a factory reset was performed). It must be successfully finished. If it is not finished, the device is not operational and the function will reappear when the device is switched on the next time. After the application **Setup Wizard** is successfully finished, the settings can be changed via **Settings** of the user home screen.

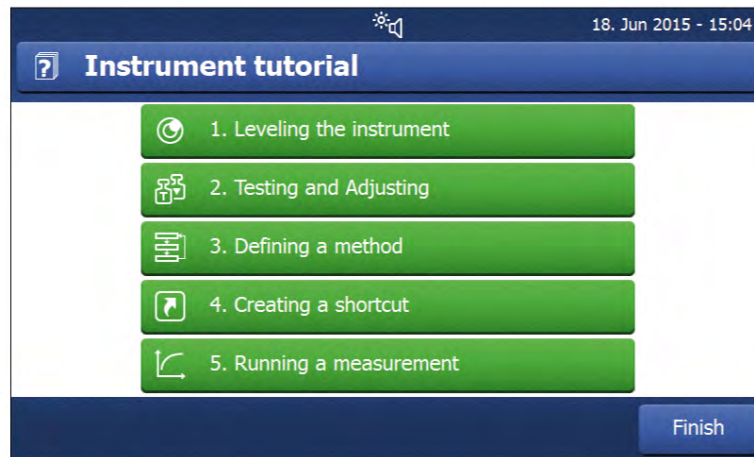
Note

The application **Instrument tutorial** starts automatically after the application **Setup Wizard** is successfully finished. This option can be skipped by inactivating the checkbox **Proceed to the Instrument Tutorial**.

4.5 Instrument Tutorial

The tutorial helps you, to define the basic functionalities of your Moisture Analyzer.

Navigation: User Home Screen > **Settings** > **Help and tutorials** > **Instrument tutorial**



The following sections can be defined with the help of a tutorial:

- **1. Leveling the instrument**
- **2. Testing and Adjusting**
- **3. Defining a method**
- **4. Creating a shortcut**
- **5. Running a measurement**

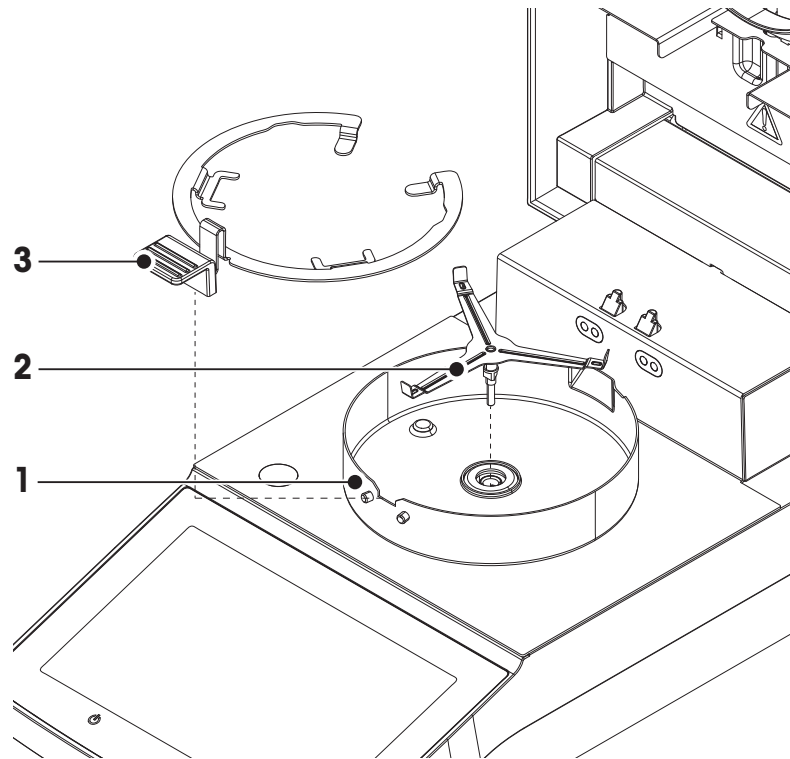
Note

The application **Instrument tutorial** can be started directly at the end of the application **Setup Wizard** or from the home user screen via the section **Settings / Help and tutorials**.

4.6 Setting up the sample chamber

Note

When putting into operation for the first time or if the instrument is disconnected from the power over a longer period, leave the instrument connected to the power supply for at least 5 hours to allow the built-in rechargeable battery to charge up! This battery ensures that the date and time are not lost when the instrument is disconnected from the power. This battery can not be replaced by the user. Please contact a METTLER TOLEDO representative.



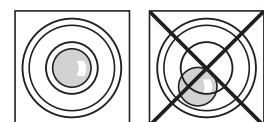
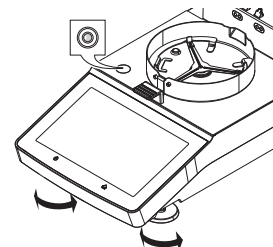
- Instrument is connected to the power supply.
- 1 Open the sample chamber.
- 2 Place the draft shield element (1) into the sample chamber.
 - ⇒ Make sure that the draft shield element is correctly positioned. The element must be locked with the screw heads on the bottom of the sample chamber.
- 3 Insert the sample pan holder (2) carefully.
 - ⇒ Make sure that the sample pan holder is correctly positioned. When one arm of the sample pan holder has a 90° angle to the display, the sample pan falls into position (see picture above).
- 4 Insert the sample pan handler (3).
- 5 Press [⏻] to start the instrument.

4.7 Leveling the Moisture Analyzer

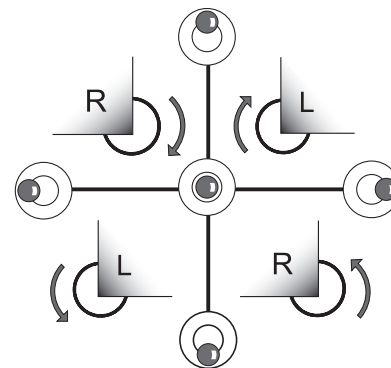
Exact horizontal positioning and stable installation are prerequisites for repeatable and accurate results. To compensate for small irregularities or inclinations ($\pm 2\%$) at the location, the instrument must be leveled.

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. 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 counter- clockwise
Air bubble at	"6 o'clock"	turn both feet counter- clockwise
Air bubble at	"9 o'clock"	turn left foot counter- clockwise, right foot clockwise



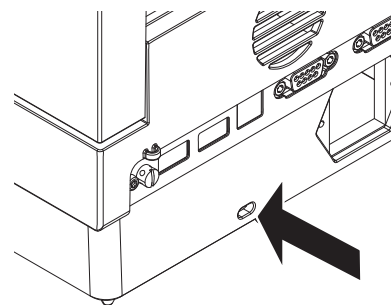
Note

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

The Moisture Analyzer can also be leveled by using the Tutorial **1. Leveling the instrument**. For more information **see** at section [Instrument Tutorial ► 18].

4.8 Anti-theft Device

For protection against theft, the Moisture Analyzer is fitted with a Kensington security slot for an anti-theft device. To find a suitable anti-theft cable **see** Accessories and Spare Parts.



4.9 Setting Date and Time

Navigation: Home > Settings > System 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**].

Note

For changing the format for date and time, **see** Regional Settings.

4.10 Adjustment

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. We recommend to do TESTS at regular intervals and adjust if necessary.

The following adjustment options are possible:

- Balance adjustment with external weight (accessory).
- Temperature adjustment with temperature adjustment kit (accessory).

For more information to perform these operations **see** Test/Adjust.

4.11 METTLER TOLEDO RHT sensor

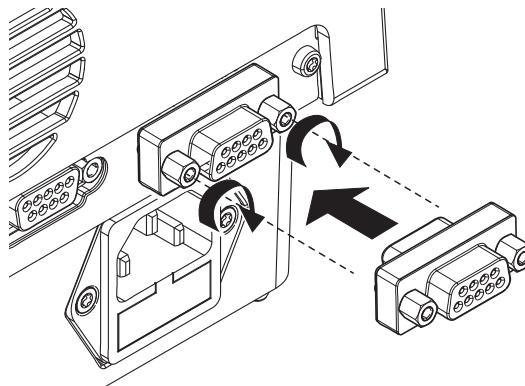
The RHT sensor from METTLER TOLEDO allows the automatic detection of relative humidity and temperature values for SmartCal tests.

Note

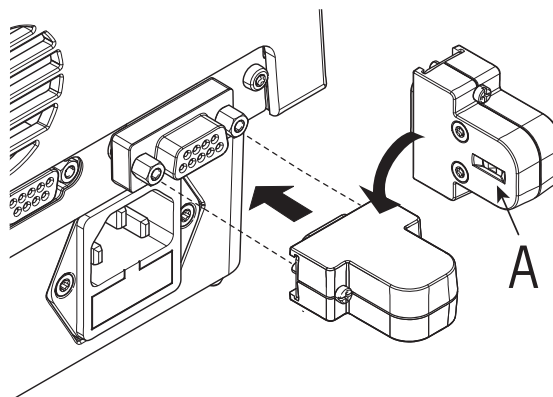
The RHT sensor is an optional accessory and must be ordered separately.

Installation

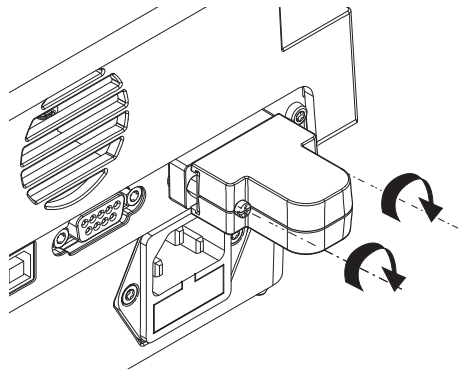
- 1 Connect the adapter to the drying unit.
- 2 Use the bolts to fix the adapter on the drying unit.



- 3 Take the sensor out of its packing.
- 4 Retain the packing for later use.
- 5 Connect the RHT sensor to the drying unit with sensor opening (A) facing down.



- 6 Tighten the two screws to secure the RHT sensor.



Note

Always use the right RS232 connection with the RHT sensor. The left RS232 connection is not configured for using the RHT sensor.

NOTICE

Please observe the following instructions to avoid wrong SmartCal measurements.

- Be sure that the sensor opening is clean.
- Do not touch the sensor opening with sharply pointed objects.
- After installing, RHT sensor must be acclimatized in working area for about one hour, before using.
- Exposure to acids, bases or volatile compounds (e.g. solvents) at high concentration or long exposure time must be avoided.
- The RHT sensor must be stored in the original, sealed anti-static bag.
- For storage temperature shall be in the range of 10°C...50°C and humidity at 20...60%rH.
- **We recommend to remove the RHT sensor after a SmartCal measurement and to store it in the original, sealed anti-static and bag.**
- Settings **see** Equipment.

Note

The RHT sensor determines the absolute humidity for SmartCal tests only. The sensor cannot be used to determine the ambient temperature and the relative humidity. Due to its compact construction, the RHT sensor housing is getting warm during operation. This has an effect on the measured temperature. Therefore, it is not possible to determine the precise ambient temperature with the RHT sensor.

Specification of RHT sensor (sensor chip only, without housing):

± 1 °C (within the range of 5 °C - 40 °C)

± 3% rH (within the range of: 20% - 80% rH)

5 Performing a Measurement

After you have successfully put your new Moisture Analyzer into operation for the first time, you can immediately perform your first measurement. In doing so, you will become familiar with the instrument. Use the supplied specimen sample (absorbent glass fiber filter) for your first measurement to determine the moisture content. During your first measurement the instrument operates with the factory settings.

Create a method

- 1 Tap **Method Definition**.
⇒ **Method Definition** menu appears.
- 2 To define a new method, tap [**New...**].
⇒ The keypad appears.
- 3 Enter a name for your first method e.g. **My first method**.
- 4 Confirm with [**OK**].
- 5 To store your new method with factory settings, tap [**Save**].
- 6 Tap [**Home**].
⇒ User home screen appears.

Note

The number of methods that can be created is limited to 20.

Select the method for measuring

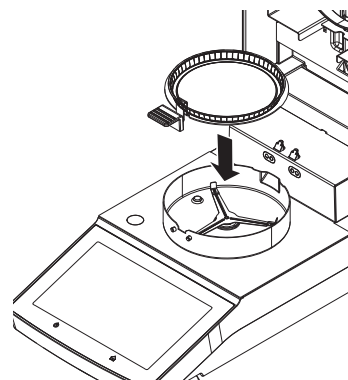
- 1 Tap [**Measurement**].
⇒ The methods list is displayed.
- 2 Tap **My first method**.
⇒ The work screen of the method **My first method** appears.
- 3 Open the sample chamber.

Placing sample pan

- The display now prompts you to load the empty sample pan and tare the balance.
- 1 Place the empty sample pan in the sample pan handler.
 - 2 Place the sample pan handler in the sample chamber. Ensure that the tongue of the pan handler fits exactly in the slot of the draft shield element. The sample pan must lie flat in the pan holder.

Note

We advise you to work with the sample pan handler at all times. The pan handler is ergonomic, automatic positioning, safe and provides protection against possible burns due to the hot sample pan.



Taring the balance

Note

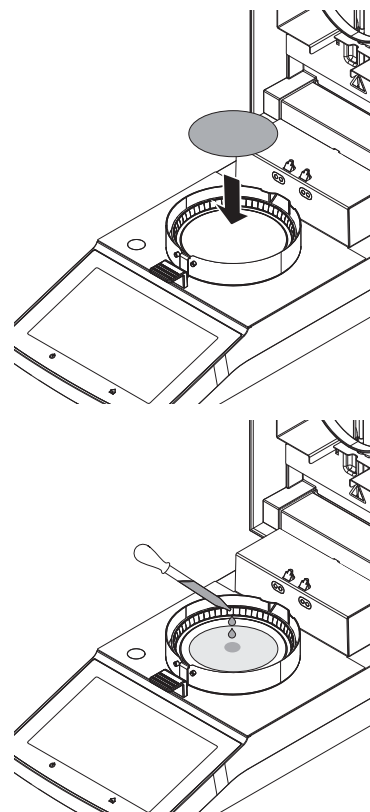
Before the sample pan is placed into the sample chamber, the left corner of the display must show **Open cover, place sample pan and tare**.

If the display shows **Add sample**, tap **[Cancel]** before placing the empty sample pan in the sample chamber.

- 1 Close the sample chamber.
⇒ The instrument tares the balance (**Starting mode: Automatic**).
- 2 After taring, open the sample chamber.

Start measuring

- 1 Place the specimen sample in the sample pan.
- 2 Wet the specimen sample with a few drops of water.
- 3 Close the sample chamber.
⇒ The drying process starts automatically.



Drying process

You can follow the measurement process on the display, **see** Work Screen.

- The drying process is continuously displayed graphically.
- The current temperature in the heating module is displayed as well as the elapsed drying time and the current drying value.
- The display shows the selected settings.
- Tap on **[Stop drying]**. The options **[Abort measurement and save data]**, **[Abort without saving]** or **[Cancel]** are available.
- Tap on **[Abort measurement and save data]** or **[Abort without saving]** to abort the process.
- Tap on **[Cancel]** to continue the process.

At the end of the drying process you can read the moisture content of your sample on the display.



CAUTION

Danger of burns

Sample, sample pan and other parts inside the sample chamber may still be hot.

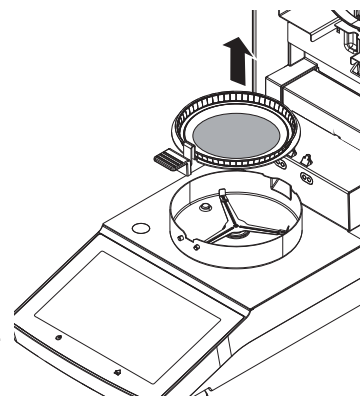
Remove Sample

- The drying process is completed.
- 1 Open the sample chamber.
- 2 Carefully remove the sample pan handler from the sample chamber.

Note

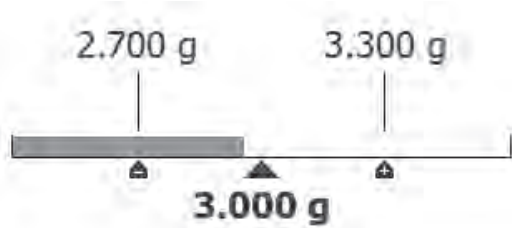
To remove the sample pan from the handler, lift the pan slightly from below and pull it out of the handler.

- 3
 - To perform a further measurement with the current method, tap **[Next Sample]**.
 - To perform a measurement with a new method, tap **[Methods]**.
 - To return to the home screen, press **[Home]**.



5.1 Work with Weighing-in Aid

The weighing-in aid can be defined for each method and facilitates weighing in of the sample to a target value. This is particularly necessary if you require all the samples of a method you wish to process to have same weight in order to improve the repeatability of the measurement results. In addition, the weighing-in aid can be set as active so that the drying process cannot be started if the weight of sample is outside the set tolerance. You are therefore compelled to weigh-in the correct quantity of sample. If all sample weighed are within tolerances then this will improve the repeatability. The weighing-in aid is available only if start weight has been activated. For further information see at section [Settings of Start Weight ► 59].



Icon	Function
	Lower weight limit (tolerance range)
	Target weight
	Upper weight limit (tolerance range)

5.2 Using Shortcuts

Navigation for managing shortcuts: **Home** > **Measurement** > **Method name** >

Shortcuts allow you to start methods directly from the home screen.

The following parameters can be defined:


Parameter	Explanation	Values
Shortcut name	Defines a name for the shortcut. It is recommended to choose a short name because only approx. 8 characters are displayed on the shortcut. Name should be unique and unambiguous.	any
Method name	Shows the name of the method. The name of the method is the target of the shortcut and can not be changed.	none

Defining a shortcut


- Menu **Measurement** is activated.
 - The method is selected.
- 1 Tap .
 - ⇒ Window **My shortcuts** appears.
 - 2 Tap **Add a shortcut to my home for this method....** (To abort, tap [X].)
 - ⇒ **New shortcut** appears.
 - 3 To enter a name for the shortcut if needed, tap **Shortcut name**.

Note
It is recommended to choose a short name because only approx. 8 characters are displayed on the shortcut. Name should be unique and unambiguous.
 - 4 Confirm with [OK].
 - 5 To store the setting, tap [Save].
 - ⇒ The shortcut is added to the home screen.
 - 6 To abort, tap [Cancel].

Editing a shortcut

- The method is selected.
- 1 Tap [].
 - ⇒ Window **My shortcuts** appears.
- 2 Tap **Edit this shortcut...** (To abort tap [**X**].)
 - ⇒ **Shortcut properties** appears.
- 3 To edit the name of the shortcut, tap **Shortcut name**.
- 4 Confirm with [**OK**].
- 5 To store the setting, tap [**Save**].
- 6 To abort, tap [**Cancel**].

Removing a shortcut

- The method is selected.
- 1 Tap [].
 - ⇒ Window **My shortcuts** appears.
- 2 Tap **Edit this shortcut...** (To abort, tap [**X**].)
 - ⇒ **Shortcut properties** appears.
- 3 To remove the shortcut, tap [**Remove**].
 - ⇒ A message window appears.
- 4 Confirm with [**Remove**]. (To abort, tap [**Cancel**].)
 - ⇒ The shortcut is removed from the home screen.

6 Settings

In this section you will find information how to define the general settings of your instrument.



6.1 User Preferences

6.1.1 Languages

Navigation: Home > Settings > User preferences > Languages

The following languages can be chosen:

Parameter	Explanation	Values
Display language	Defines user-specific display language.	English Deutsch Italiano Français Español Português Polski Magyar Český Русский 日本語 中文 한국어/조선말
Keyboard language	Defines user-specific layout of the Keypad.	English Deutsch Italiano Français Español Português Polski Magyar Český

6.1.2 Screen

Navigation: Home > Settings > User preferences > Screen

The following parameters can be defined:

Parameter	Explanation	Values
Brightness	Defines user-specific brightness of the display.	10...100 % (80 %)*
Color scheme	Defines user-specific display color scheme.	Blue* Green Orange Grey

* Factory setting

6.1.3 Sound

Navigation: Home > Settings > User preferences > Sound

The following parameters can be defined:

Parameter	Explanation	Values
Sound	Activate / deactivate of audible feedback and adjust the Volume . Audible feedback: <ul style="list-style-type: none"> when tapping a button. upon measurement completed. when an error message appears. 	OFF* ON 0...100 % (50 %)*

* Factory setting

6.1.4 Protection

Navigation: Home > Settings > User preferences > Protection

The following parameters can be defined:

Parameter	Explanation	Values
Protection of settings	With this function activated the settings are protected from accidentally changes through the operator.	ON OFF

Note

With the function **Protection of settings** activated, the following functions stay activated:

- **Measurement** (creating shortcuts and deleting shortcuts is inactive)
- **Results** (**Delete results** is inactive)
- **Tests**

6.2 System Settings

6.2.1 Regional Settings

Navigation: Home > Settings > System settings > Regional Settings

The following parameters can be defined:

Parameter	Explanation	Values
Date	Sets the date of the clock of the instrument.	Day Month Year
Time	Sets the clock time of the instrument.	Hours Minutes
Date format	Defines the date format. D = Day M = Month Y = Year	D. MMM YYYY* MMM D YYYY DD.MM.YYYY MM/DD/YYYY YYYY/MM/DD YYYY-MM-DD
Time format	Defines the time format. M = Minutes	24:MM* 12:MM 24.MM 12.MM

* Factory setting

Note

The date and time of the moisture analyzer is relevant. The date and time of a connected printer will be ignored.

6.2.2 Peripherals

Navigation: Home > Settings > System settings > Peripherals

In this menu item you can configure one printer and one host connection.

PCs

The **MT-SICS** host connection (remote client) is enabled by default and only usable with the METTLER TOLEDO specific protocol MT-SICS.

MT-SICS commands and functions can be transmitted via the RS232 interface (COM1 port) or the USB device interface (COM4 port). The use of the USB device interface requires the installation of an USB device driver on the PC, **see** [Installing USB Device Driver ► 86].

Commands and further information please refer to the Reference Manual **MT-SICS Interface Commands for Halogen Moisture Analyzers** downloadable from the internet.

► www.mt.com/moisture

Install Printers / PCs

No printer is installed by default. To install a printer:

- The printer is connected.

- 1 Tap [**New...**]
⇒ **Peripheral type** list appears.

- 2 Select device.

Note

Currently supported devices from METTLER TOLEDO with preset parameters:

- RS-P2X, see RS232 parameters
- RS-P4X, see RS232 parameters
- **RS-P5X Strip Printer**, see RS232 parameters

- 3 Change the parameters only if you have to. The parameters are predefined and any changes need advanced knowledge.

- 4 To store the settings, tap [**Save**].
- 5 To activate the interface, tap [**ON**].
 - ⇒ Status changes from **Disabled** to **Enabled**.

Note

- A printer or host connection can also be deleted.
- For strip printer settings **see** [Recommended Printer Settings (Strip printer) ► 85].
- For defining the printouts **see** Print and Export Management.
- Only one printer can be installed at a time.

RS232 parameters

The following parameters can be defined:

Parameter	Explanation	Values
Device Name	Defines a name for the device.	any
Device Port	Defines the device port. COM1 : RS232 / COM4 : USB Device (Driver required) Note It is possible to use an USB-to-Serial adapter. If such an adapter is connected, these devices are shown as e.g. SOU1 , SOU2 (SOU stands for serial over USB)	COM1* COM 4
Baudrate	Defines the speed of the data transmission (data transfer rate / Baud rate).	1200 2400 4800 9600* 19200 38400 57600 115200
DataBits	Defines the number of data bits.	7 8*
Parity	Defines the variant of parity bit.	None* Odd Even
StopBits	Defines the stop bits of the transmitted data.	1 StopBit* 2 StopBits
Flow Control	Defines the type of flow control (Handshake).	None Xon/Xoff*

* Factory setting

6.2.3 Touch Screen Adjustment

Navigation: Home > Settings > System settings > Touch screen adjustment

If the alignment of the touch-sensitive areas of the screen correspond not exactly with the position of the buttons e.g. after a software update was performed, then you can solve this error by executing this function.

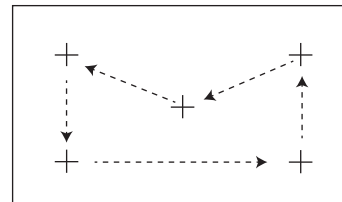


CAUTION

Do not touch the touch screen with pointed or sharp objects!

This may damage the touch screen.

- Menu **System settings** appears.
- 1 Choose **Touch screen adjustment** and tap [**Start**].
 - ⇒ Adjustment screen appears.
- 2 Touch and hold a touch screen stylus (resistive) on the center of the target until it moves to the next position on the screen.
- 3 Repeat this procedure until a message appears (**New calibration settings have been measured**).
- 4 Tap the screen to confirm or wait for 30 seconds for canceling (timeout).
 - ⇒ A message box appears.
- 5 To store the setting, tap [**OK**].



Note

- Tap the center of the target as accurately as possible otherwise the process has to be repeated several times.
- Make sure not to touch any other locations on the screen and the fix key areas while doing this adjustment.
- Make sure not to touch the screen with your hand.
- Keep accurate angle for your usage.
- The adjustment process cannot be aborted.

6.3 Applications Settings

6.3.1 Print and export management

6.3.1.1 Print management

Print management (Strip)

Navigation: Home > Settings > Application settings > Print and export management > Print management (Strip)

If a strip printer is connected and activated, results can be automatically printed out. The intermediate values are printed out in the pre-selected intervals and the final results are logged at the completion of the measurement. The printout contains information to the instrument, time, date as well as the method and results, depending of the protocol. The level of detail depends on the selected type of printout (short, standard) and the activated protocol items (settings or method), **see** Information on Printouts.

Note

- The print starts after the measurement has been completed.
- The definitions in this menu item are the default settings for the printouts. These parameters are displayed at every initialization of a Printout and can be modified again.
- The setting for printout language in this menu item has no impact on test or adjustment printouts.
- Not all languages are compatible with some printers, and also depending on the settings of the printer, **see** Recommended Printer Settings (Strip printer).
- For installing and defining a printer **see** [Peripherals ► 30].

The following parameters can be defined:

Parameter	Explanation	Values
Printout type	Selects a detailed printout or in a short form.	Standard* Short
Printout language	Defines the language for general printouts. Note No impact on test or adjustment printouts.	English Deutsch Italiano Français Español Português Polski Magyar Český
Print results automatically after measurement	Print results automatically after measurement if activated.	<input type="checkbox"/> (deactivated)* <input checked="" type="checkbox"/> (activated)
Include intermediate results to printout	Defines the time intervals at which interim results are transferred to the printer.	OFF* 10 s 30 s 1 min 2 min 10 min

* Factory setting

6.3.1.2 Export management

Navigation: Home > Settings > Application settings > Print and export management > Export management

If a USB flash drive is connected and activated, final results can be automatically exported. The export contains information to the instrument, time, date, method, result as well as the graphical curve.

Note

Only the formats .csv and .pdf can be exported on the USB flash drive.

The following parameters can be defined:

Parameter	Explanation	Values
File name prefix	Defines the name of the new data file. Date and time are automatically added by the system.	any
File type	Defines the type of the data file.	CSV* PDF
Printout language	Defines the language for general printouts. Note No impact on test or adjustment printouts.	English Deutsch Italiano Français Español Português Polski Magyar Český Русский 日本語 中文 한국어/조선말
Export management	Export results automatically after measurement if activated.	Selection: <input type="checkbox"/> * <input checked="" type="checkbox"/>
Export target	Defines the destination of data transfer.	Peripheral

Export target: Peripheral

Parameter	Explanation	Values
Location	Finds the location on the storage device.	Browse and select

* Factory setting

6.4 Quality Management

Navigation: Home > Settings > Quality management

In this menu you can define all settings related to the adjustment and Test of the instrument. Periodic adjustments or tests ensure accurate measurement results.

6.4.1 Test / Adjustment settings

Navigation: Home > Settings > Quality management > Test / Adjustment settings

This section describes all the menu options available for defining the parameters relating to the adjustment and testing of your instrument.

For performing test and adjustments **see** Test/Adjust.

6.4.1.1 Equipment

Navigation: Home > Settings > Quality management > Test / Adjustment settings > Equipment

This menu item defines the equipment which are required for the following tests:

- **Temperature Adjustment**
- **Temperature test**
- SmartCal test (optional)
- **Weight adjustment - external**
- **Weight test - external**

Note

For performing temperature adjustment or temperature test, you need the optional temperature adjustment kit, **see** Accessories and Spare Parts.

Test weight 1 and Test weight 2

The following parameters can be defined:

Parameter	Explanation	Values
Test weight name	Defines a name that is in an easily recognizable form as an alternative to the ID. A name should be unique and unambiguous.	any
Nominal weight	Is fixed and cannot be defined by the user.	100 g
Identification	Defines the identification (ID) of the weight. The ID of the weight is provided on the Weight Certificate. The ID may contain your company specific identification number. This ID is stored in the adjustment or test history and shows up on the printouts.	any

* Factory setting

Temperature Kit

The following parameters can be defined:

Parameter	Explanation	Values
Temperature kit name	Defines a name that is in an easily recognizable form as an alternative to the ID. A name should be unique and unambiguous.	any
Identification	Defines the identification (ID) of the Temperature kit. The ID is provided on the Certificate. The ID may contain your company specific identification number. This ID is stored in the adjustment or test history and shows up on the printouts.	any

External humidity sensor

The following parameters can be defined:

Parameter	Explanation	Values
Identification	Defines the identification (ID) of the RHT sensor. This ID is stored in the test history and shows up on the printouts.	any

For performing SmartCal tests, you can use the METTLER TOLEDO RHT sensor for the automatically setting of temperature and humidity values.

Note

Not applicable for certified RHT sensors

6.4.1.2 Test Settings

Navigation: Home > Settings > Quality management > Test / Adjustment settings > Test settings

Weight test external

The following parameters can be defined:

Parameter	Explanation	Values
Tolerance	Defines the measuring tolerance of the external weight.	0.0001 g - 0.1000 g (0.0010 g)*
Test weight	To choose a test weight.	Test weight 1 Test weight 2

* Factory setting

Temperature test

The following parameters can be defined:

Parameter	Explanation	Values
Temperature kit	Shows the name of the Temperature kit which was defined in the menu item Equipment .	none
Temperature 1	Enables or disables the lower test temperature.	OFF ON (100 °C)
Tolerance	Defines the tolerance of the test temperature.	1...5 °C (3 °C)*
Temperature 2	Enables or disables the upper test temperature.	OFF ON (160 °C)
Tolerance	Defines the tolerance of the test temperature.	1...5 °C (3 °C)*

* Factory setting

SmartCal test

The following parameters can be defined:

Parameter	Explanation	Values
Lot number input	Defines the type of input for the Lot number. The Lot number can be found on the product label. Free input: Input is not required Guided input: Input is required.	ON* OFF Free input Guided input *
Clear lot number after measurement	Enabled or disabled the function for clearing the Lot number after test measurement.	<input checked="" type="checkbox"/> (enabled) <input type="checkbox"/> (disabled)*
Temperature	Defines the test temperature. Note <ul style="list-style-type: none"> The setting of the temperature influences the setting of the control limits. If custom temperatur is set, the controll limits will be off. 	70 °C 100 °C* 130 °C 160 °C Custom temperature... 40 °C...230 °C (105 °C*)
Use cSmartCal	Sets the control limits to the correct values for using of cSmartCal. Note Enabling of cSmartCal affects only the protocol entry but has no effect to the values of the control limits, if custom temperature was set.	<input checked="" type="checkbox"/> (enabled) <input type="checkbox"/> (disabled)*
Control limits	Defines the control limits. The values of the control limits are in dependence of the temperature setting. The recommended values are automatically set. The values can also be changed. The recommended values are (lower - upper limits): 70 °C: 3.2-4.4 %MCN (cSmartCal: 3.3 - 4.3 %MCN) 100 °C: 5.2-6.4 %MCN (cSmartCal: 5.3 - 6.3 %MCN) 130 °C: 7.4-8.8 %MCN (cSmartCal: 7.5 - 8.7 %MCN) 160 °C: 9.9-11.7 %MCN (cSmartCal: 10.0 - 11.6 %MCN) Note Control limits are switched off if custom temperature was set.	values see explanation OFF

* Factory setting

6.4.1.3 Adjustment Settings

Navigation: Home > Settings > Quality management > Test / Adjustment settings > Adjustment settings

Weight adjustment external

The following parameters can be defined:

Parameter	Explanation	Values
Test weight	Selects the predefined Test weight . Test weight 1 / Test weight 2 = defined in the menu item Equipment	Test weight 1 Test weight 2

Temperature adjustment

The following parameters can be defined:

Parameter	Explanation	Values
Temperature kit	Shows the name of the Temperature kit which was defined in the menu item Equipment .	none

6.4.1.4 Print Settings

Navigation: Home > Settings > Quality management > Test / Adjustment settings > Print and output settings

This menu item allows you to set specific printer functions for test or adjustment printouts.

- The setting for printout language in this menu item has impact on test or adjustment printouts only. For setting the general printout language, **see** [Print management ► 33].
- Not all languages are compatible with any printer, and also depending on the settings of the printer, **see** Recommended Printer Settings (Strip printer).
- For installing and defining a printer, **see** [Print management ► 33].

The following parameters can be defined:

Parameter	Explanation	Values
Printout language	Defines the printout language for test or adjustment printouts.	English Deutsch Italiano Français Español Português Polski Magyar Český
Print results automatically after test/ adjustment	Activated or deactivated function.	<input checked="" type="checkbox"/> (enabled) <input type="checkbox"/> (disabled)*

* Factory setting

6.5 System and Data Management

Navigation: Home > Settings > System and data management

This menu item allows you to export or import settings and methods to or from an external USB storage device, as well as to restore the system.

Note for using USB memory stick

- USB memory sticks up to 32 GB are supported.
- Recommended formatting: FAT32 (NTFS not supported).
- Max. cluster size: 32 KB.
- Max. file size: 32 MB.
- Make sure that the stick is fully inserted.
- Make sure that the write protection is deactivated if present.

6.5.1 Export / Import

Navigation: Home > Settings > System and data management > Export / Import

This menu item allows you to export or import settings and methods to or from an external storage device. These data can be transferred to other instruments of the same type and can be useful to configure multiple instruments with the same specifications.

Note

- Software Version must be equal or higher.
- Data transfer from HX/HS models to HC models is limited. Features which are not supported by HC models cannot be imported, e.g. Step drying or high resolution.
- Export / import of methods can also be performed from the menu **Method Definition**.

Export settings and methods to external storage devices...

The following parameters can be defined:

Parameter	Explanation	Values
File name	Defines the name of the new data file.	any
Location	Finds the location on the storage device.	Browse and select
Export selection	Defines the data for export.	All* <input checked="" type="checkbox"/> User preferences <input checked="" type="checkbox"/> System, application and QM settings <input checked="" type="checkbox"/> Methods

* Factory setting

- An external storage device is connected e.g. memory stick.
- Settings are made.
- To start, tap [**Export**].
To abort, tap [**Cancel**].

Import settings and methods from external storage device...

The following parameters can be defined:

Parameter	Explanation	Values
Import from file	Defines the data to be imported.	Browse and select
Location	Shows the location of the import file.	—

Import selection	Defines the data for import.	All* <input checked="" type="checkbox"/> User preferences <input checked="" type="checkbox"/> System, application and QM settings <input checked="" type="checkbox"/> Methods
-------------------------	------------------------------	--

* Factory setting

- Import settings and methods from external storage devices – is selected.
- An external storage device is connected e.g. memory stick.

1 Tap **Browse and select**

⇒ **Import from file** appears.

2 Select Device and import file.

⇒ Full menu of Import settings and methods from external storage devices appears.

3 Tap Import selection and select the data for import if needed.

4 To start, tap Import button and follow the instructions in the message window.
To abort, tap [**Cancel**].

6.5.2 Back up / Restore

Navigation: Home > Settings > System and data management > Back up / Restore

This menu item allows you to create a recovery point of the system and to store them on an external storage device. We advise you to create a recovery point of the system regularly. So you are able to restore the system with all data in fault.

NOTICE

- After restoring, the system is in backup status. That means, that newer data such as settings, methods or results are lost.
- Restore is only possible on the same instrument as the back up was carried out.

Backup

The following parameters can be defined:

Parameter	Explanation	Values
File name	Defines the name of the new data file.	any
Location	Finds the location on the storage device.	Browse and select

Procedure:

- An external storage device is connected e.g. memory stick.
- **Back up your system on external storage device...** – is selected.

1 Define the name of the new data file.

2 Define the location on the storage device.

3 To confirm, tap [**OK**].

4 To start, tap [**Backup**].

To abort, tap [**Cancel**].

Restore

The following parameters can be defined:

Parameter	Explanation	Values
Restore from file	Finds the location on the storage device and selects the file for restoring.	Browse and select

Procedure:

- **Restore your system from selected back up...** – is selected.
- An external storage device is connected e.g. memory stick.
- 1 Tap **Restore from file... (Browse and select)**.
 - ⇒ Storage device appears.
- 2 Select the file for restoring.
- 3 To start, tap **[Restore]**.
To abort, tap **[Cancel]**.
 - ⇒ Confirmation window appears.
- 4 Confirm with **[Restore]**.
 - ⇒ The system will restore the data and then perform a restart. Wait until the system has completely started up again.

6.5.3 Export event logs

Navigation: Home > Settings > System and data management > Export event logs

This menu item allows you to export a log file (Zip format) with all relevant data to an external storage device. These data can be used for example, to support METTLER TOLEDO for troubleshooting.

The following parameters can be defined:

Parameter	Explanation	Values
File name	Defines the name of the new data file.	any
Export target	Defines the destination of data transfer.	Peripheral

Export target: Peripheral

Parameter	Explanation	Values
Location	Finds the location on the storage device.	Browse and select

* Factory setting

6.5.4 Reset

Navigation: Home > Settings > System and data management > Reset

This menu item allows you to reset the Instrument to factory settings. Date, time, weight and temperature adjustments/history are not affected. After the reset the application **Setup Wizard** appears.



CAUTION

Data loss after system reset.

After resetting, the instrument is in state of the current software version. All data such as settings, methods or results are lost.

- We recommend you to save first the appropriate data on an external storage device, **see** Export / Import and [Back up / Restore ► 39].

6.5.5 Update

Navigation: Home > Settings > System and data management > Update

Note

This function is not available with approved instruments. For update, contact your METTLER TOLEDO representative.

METTLER TOLEDO is continuously improving its instrument firmware (software) for the benefit of customers. So that the customer can benefit quickly and easily from further developments, METTLER TOLEDO makes the latest firmware versions available on the Internet. The firmware made available on the Internet has been developed and tested by Mettler-Toledo AG using processes that meet the guidelines of ISO 9001. Mettler-Toledo AG does not, however, accept liability for consequences that might arise from using the firmware.

Update procedure

- 1 Connect to the Internet.
- 2 Go to the site www.mt.com/moisture-software.
- 3 Choose language.
- 4 Download latest Firmware update instruction of HC103.
- 5 **Important:** Before updating read the downloadable supplementary sheet carefully. This document provides you with the relevant information for updating to the new firmware version.

7 Test/Adjust

This function offers you to adjust or test the integrated balance and the heating module.

7.1 Adjustments

Navigation: Home > Test/Adjust > Adjustments

In this menu item you can adjust the balance as well as the heating module of your instrument. For relevant settings **see** Test / Adjustment settings.

NOTICE

- To obtain accurate results, the balance must be adjusted at the point of use under measuring condition in order to match the gravitational acceleration at its location. The instrument must be connected to the power supply for approximately 60 minutes in order to reach operating temperature before adjusting. Adjusting is necessary:
 - before the instrument is used for the first time.
 - after a change of location.
- We advice you to wait at least 30 minutes after a drying operation (or previous heating module adjustment) before performing the adjustment.

7.1.1 Weight Adjustment - External

Navigation: Home > Test/Adjust > Adjustments > Weight adjustment - external

This function allows you to adjust the balance using an external weight. We recommend to use certified weights so that full traceability is guaranteed.


Perform this function as follows:

- Test weight and Adjustment settings are defined.
see Test / Adjustment settings

- 1 Have required test weight ready.
- 2 Tap the item **Weight adjustment - external**.
 - ⇒ The adjustment screen appears.
- 3 Clear sample pan holder and tap [**Start adjustment**].

Note

We recommend not to use a pan.

- ⇒ The required value flashes and prompts you to load the weight.
- 4 Load the required test weight in the center of sample pan holder.
 - ⇒ The balance indicates the adjustment process, "———" appears.
 - 5 When the display flashes "**000.00**" remove the test weight.
- ⇒ The balance is adjusted and ready to use for further measurements. The display shows the adjustment results. The results can be printed out by tapping [

Note

- After a timeout the error message appears **Weight out of range. The adjustment has been aborted** The adjustment was not executed.

- 1 Confirm with [**OK**].
- 2 Remove the test weight for unloading.
- 3 Repeat the adjustment.

Note

We recommend to close the sample chamber or to place the balance on a stable table.

7.1.2 Temperature Adjustment

Navigation: Home > Test/Adjust > Adjustments > Temperature adjustment

This function allows you to adjust the temperature control of the heating module. You need the optional Temperature Kit for performing this function, **see** Accessories and Spare Parts. To learn when an adjustment of the heating module is necessary, **see** [Notes on Adjustment of Balance and Heating Module ► 84]. We advise you to wait at least 30 minutes after a drying operation (or previous heating module adjustment) before performing the adjustment.

Note

- The duration of the temperature adjustment is 30 minutes. (15 minutes for each measuring temperature).
- The sample chamber must be less than 50 °C before a further adjustment or test can be done.
- It is also possible to perform a test first, and then to transform the test into an adjustment if required. Only possible for tests conducted with 2 temperatures, **see** Temperature Test.
- For temperature adjustment settings **see** Adjustment Settings.



CAUTION

Danger of burns

- Sample chamber may still be hot.
- Cool down instrument before setting up.

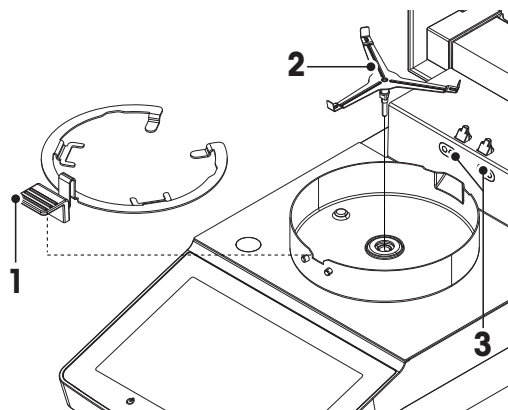
- Adjustment settings are defined, **see** Adjustment Settings.
- Tap menu item **Temperature adjustment**.
 - ⇒ Work screen **Temperature adjustment** appears.

Setting up Drying Unit

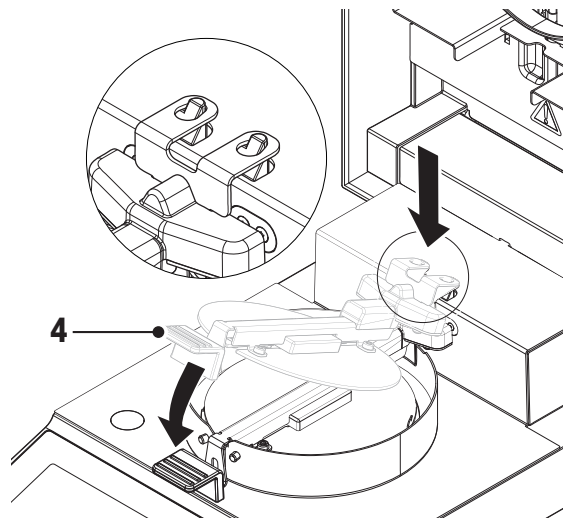
- Have required **Temperature kit** ready.
 - Instrument is on
 - Sample chamber is open.
 - Instrument is cooled down.
- 1 Remove sample pan handler (with pan) (1).
 - 2 Remove sample pan holder (2).
 - 3 Contact areas (3) should be clean. Clean them if needed.

Note

Do not remove draft shield.



- Insert **Temperature kit** (4).



Start adjustment

- Draft shield is installed.

CAUTION

Sample pan handler and sample pan holder must be removed.

- **Temperature kit** is inserted.

1 Close sample chamber

2 Tap [**Start adjustment**].

Note

The adjustment process takes 30 minutes.

⇒ The instrument starts the adjustment process. The screen shows the current temperature and the remaining time.

⇒ The instrument heats up to the target temperature 1 for determining the predefined lower temperature.

⇒ After 15 minutes, the instrument adjusts the lower temperature and continues with the process.

⇒ The instrument heats up to the target temperature 2 for determining the predefined upper temperature.

⇒ After 15 minutes, the instrument adjusts the upper temperature and concludes the adjustment.

3 • To print out the results, tap [🖨️].

• To return to the home screen, tap [🏠].

4 After cooling down, remove **Temperature kit** and set up drying unit for measurement.

See History and Setting up Drying Unit

Note

Your calibrated temperature adjustment kit can be re-calibrated. Please contact your local METTLER TOLEDO representative for more information.

7.2 Tests

Navigation: Home > Test/Adjust > Tests

In this menu item you can check several settings, such as the adjustment of the balance or the temperature of the heating module. For relevant settings **see** Test / Adjustment settings.

7.2.1 Weight test - external

Navigation: Home > Test/Adjust > Tests > Weight test - external

This function allows you to test the balance using an external weight. Perform this function as follows:

- Test weight and test settings are defined.

see Test / Adjustment settings

- 1 Have required test weight ready.
- 2 Open sample chamber.
- 3 Tap the item **Weight test - external**.
 - ⇒ The test screen appears.
- 4 Clear sample pan holder and tap [**Start test**].

Note


We recommend not to use a pan.

⇒ The required value flashes and prompts you to load the weight.

- 5 Load the required test weight.

⇒ The balance indicates the test process, "———" appears.

- 6 When the display flashes "**000.00**" remove the test weight.

⇒ When the test process is done, the display shows the test results and indicates whether the test is passed or failed according to defined tolerances. The results can be printed out by tapping [].

Timeout

- After a timeout of 75 seconds the error message appears **Weight out of range. The test has been aborted**. The test was not executed.

- 1 Confirm with [**OK**].
- 2 Repeat the test.

7.2.2 Temperature Test

Navigation: Home > Test/Adjust > Tests > Temperature test

This function allows you to test the temperature control of the heating module. You need the optional Temperature Kit for performing this function, **see** Accessories and Spare Parts. To learn when an test of the heating module is necessary, **see** [Notes on Adjustment of Balance and Heating Module ► 84]. We advise you to wait at least 30 minutes after a drying operation (or previous heating module adjustment) before performing a test.

Note

- The duration of the temperature test is 15 minutes for each measuring temperature.
- The sample chamber must be cooled down below 50 °C before a further adjustment or test can be done.
- It is possible to perform a test and then subsequently to transform the test into an adjustment if required. This is only possible for tests conducted with temperatures 1 and 2.
- Temperature test settings **see** Test Settings.

Setting up the Drying Unit for temperature test

Same procedure as for temperature adjustment, **see** Temperature Adjustment.



CAUTION

Danger of burns

- Sample chamber may still be hot.
- Cool down instrument before setting up.

Performing temperature test

- Test settings are defined, **see** Test Settings.
- Setting up the drying unit for temperature testing has been carried out.

1 Tap menu item **Temperature test**.

⇒ Work screen **Temperature test** appears.

2 Close sample chamber.

3 Tap [**Start test**].

Note

The testing process takes 15 minutes for each temperature (depending on the settings).

⇒ The instrument starts the testing process. The screen shows the current temperature and remaining time.

⇒ The instrument is heating up to the target temperature 1 for determining the predefined lower temperature.

⇒ After 15 minutes, the instrument displays and stores the measured lower temperature and continues with the process.


⇒ The instrument is heating up to the target temperature 2 for determining the predefined upper temperature.

⇒ After 15 minutes, the instrument displays and stores the measured upper temperature.

⇒ The test is done and indicates whether the test has passed or failed according to defined tolerances.

4 Decide if an adjustment is needed.

5 • To return to the menu **Tests**, tap [**Tests**].

• To print out the results, tap [].

• To display or print the results at any time, tap [History].

• To return to the home screen, press [].

6 After cooling down, remove temperature adjustment kit and set up drying unit for measurement, **see** Setting up Drying Unit.

7.2.3 SmartCal test

What is SmartCal™?

Proper operation of the Halogen Moisture Analyzer can be quickly verified with a SmartCal test. SmartCal is a granular test material with a defined moisture value after a specified time at a defined drying temperature.

SmartCal is available for four test temperatures. There are control limits for each test temperature. If the measured and normalized moisture value is within the control limits, the instrument has passed the functional test. If value is outside the control limits, there may be a problem with the instrument or the test conditions may not have been met.

Test temperatures and control limits

cSmartCal (certified) and SmartCal can be used for testing at any temperature between 70 °C and 230 °C. METTLER TOLEDO provides established control limits for testing at 70 °C, 100 °C, 130 °C and 160 °C.

Select the temperature closest to the drying temperature normally used.

Temperature	cSmartCal™	SmartCal™
70 °C	3.3 - 4.3 %MC _N	3.2 - 4.4 %MC _N
100 °C	5.3 - 6.3 %MC _N	5.2 - 6.4 %MC _N
130 °C	7.5 - 8.7 %MC _N	7.4 - 8.8 %MC _N
160 °C	10.0 - 11.6 %MC _N	9.9 - 11.7 %MC _N

MC_N = Normalized moisture content (Calculated value in consideration of temperature and humidity)

Note about using SmartCal

- Store SmartCal at room temperature.
- Do not open the blister pack before use.
- Shelf life: The expiry date is printed on the blister pack and on the stick (e.g. Exp08.2017).
- Disposal: Can be disposed of as normal waste. Observe local and national environmental regulations.

Additional information on using SmartCal, e.g. SmartCal user guide, **see**

► www.mt.com/smartcal

Performing SmartCal™ test

Navigation: Home > Test/Adjust > Tests > SmartCal test

The test is carried out in the same way as a measurement. The duration of the test is 10 minutes.

- The Instrument is acclimatized in working area, cooled and connected to AC power for at least one hour.
- The SmartCal package is acclimatized in working area.
- The expiration date of the Smart Cal sample has not been reached.
- The METTLER TOLEDO RHT sensor is properly installed and acclimatized in working area after installing for at least one hour. If no RHT sensor is available, room temperature and humidity must be enter manually, **see** Install METTLER TOLEDO RHT sensor .

Alternatively:

- you can use a certified RHT sensor from Testo, **see** note at the end of this Chapter.
- you can enter the temperature and humidity manually.

- Identification of the METTLER TOLEDO RHT sensor if needed, **see** Equipment.
- Test temperature and control limits are set, **see** Test Settings.

- 1 Tap **SmartCal test**.
- 2 Open sample chamber.
- 3 If no RHT sensor is used, enter current room temperature and humidity. Tap **[OK]**
- 4 Enter SmartCal lot number if needed. Tap **[OK]**
- 5 Place the sample pan handler with the aluminum sample pan in the instrument.
- 6 Close cover to tare the balance.

- 7 Remove a SmartCal stick from the blister pack, tear it open, and distribute the entire contents evenly over the sample pan. If necessary, carefully rotate and tilt the sample pan until it is fully and uniformly covered with granulate.
- 8 Close sample chamber.
 - ⇒ SmartCal test starts automatically.
- ⇒ The test is done and indicates whether the test has passed or failed. The display shows the normalized result.
 - **Passed:** Your instrument works properly and is ready for other measurements.
 - **Failed:** Your instrument works not properly. Action are required:
 - See What to Do if...
 - We recommend not to use this instrument further until the problem is resolved. In this case contact your METTLER TOLEDO representative.
- • To return to the menu **Tests**, tap [**Tests**].
- To print out the results, tap [].
- To display or print the results at any time, tap [**History**].
- To return to the home screen, press [].

Note

SmartCal tests do not supersede the recommended periodic weight or temperature tests.

Certified RHT sensors

The RHT sensor from METTLER TOLEDO is not available as a certified version. If an certified version is required, the following RHT models from testo are supported: testo 435-2, testo 435-4, testo 635-2, testo 735-2.

The Testo RHT sensor has to be connected on the USB port on the terminal. If both RHT sensors are connected, the testo RHT sensor has priority.

For more information about Testo, **see**

► <http://www.testo.com>

7.3 History

Navigation: Home > Test/Adjust > History

The instrument always records all test or adjustment operations that have been made and saves them in a memory which is specially protected against power failure (only the last adjustment or test is being displayed).

Note

Aborted adjustments or tests will not be saved.

Weight test history

Weight test external	
Calibration weight identification	
Nominal weight	g
Actual weight	g
Difference	g
Tolerance	g
Temperature	°C

Weight adjustments history

Weight adjustment external	
Calibration weight name	
Calibration weight identification	
Nominal weight	g

Weight adjustment external			
Temperature			°C

Temperature adjustment/test history			
Temperature adjustment		Temperature test	
Adjustment kit identification		Adjustment kit identification	
Temperature 1	target - actual	Temperature 1	target - actual
Temperature 2	target - actual	Temperature 2	target - actual
		Free temperature	target - actual
		Tolerances for each temperature	°C

SmartCal test history

SmartCal test	
User name	
SmartCal Identification	
Start weight	g
Total test time	minutes
Dry weight	%MCN
Test result	passed / failed
Date and time	
Leveling information	


CAUTION

The maximum number of SmartCal test results per SmartCal method is 12. When the history contains more than 12 test results, the oldest test results will be deleted automatically.

CAUTION

The SmartCal test results can not be deleted manually.

The SmartCal test results will be deleted after a factory reset.

The selected individual results can be printed out by tapping [].

8 Method Definition

Navigation: Home > Method definition

What is a method?

Methods simplify and accelerate your daily work. A method contains all settings for measuring the moisture content of a particular sample (substance). It can be recalled by tapping a measurement button or a shortcut and your instrument immediately operates with the corresponding settings.

The **optimal setting of parameters and the drying time** depends on the type and size of the sample and the desired accuracy of the measurement result. The exact parameters can only be determined experimentally, see at section How to Obtain Best Results.

Method definition

This function offers you to define new methods and to change, delete, export or import existing methods. It allows you to store up to 20 individual methods.

All parameters using in a drying method, can be defined under this menu item.

Note

- In most cases it is sufficient to set **Main measurement parameters**.
- You will find more information about defining methods in the delivered application brochure «Guide to Moisture Analysis» or **see** How to Obtain Best Results.

Prerequisite

The parameter menu appears only if a method already exists and is selected in the method definition dialog or create a new method.

Defining a new Method

Note

A method name can only exist once.

- **Method definition** is selected.

- 1 Tap [**New...**].
⇒ The keypad appears.
- 2 Enter a name for the new method. Name should be unique and unambiguous. 1 to 30 characters are possible (including spaces).
- 3 Confirm with [**OK**].
⇒ The parameter menu for the new method appears.
- 4 Set the desired parameters e.g. **Main measurement parameters**.
- 5 To store the method, tap [**Save**].

Editing an existing method

- **Method definition** is selected.

- 1 Tap the method in the list you want to edit.
⇒ The parameter menu for the selected method appears.
- 2 Edit the desired parameters e.g. **Main measurement parameters**.
- 3 To store the method, tap [**Save**].

Copying an existing method

- **Method definition** is selected.

- 1 Tap the method in the list you want to copy.
⇒ The parameter menu of the desired method appears.
- 2 Tap [**Save as...**].
⇒ The keypad appears.
- 3 Enter a new name for the copied method. Name should be unique and unambiguous. 1 to 30 characters are possible.
- 4 To store the method, tap [**Save**].

Removing an existing method

Note

All results of this method are also removed.

- **Method definition** is selected.

- 1 Tap the method in the list you want to remove.
⇒ The parameter menu of the desired method appears.
- 2 Tap [**Delete**].
⇒ A message box appears.
- 3 Confirm with [**Delete**].
⇒ The method and its shortcut are removed.

8.1 Main Measurement Parameters

Navigation: Home > Method Definition > Method name > Main measurement parameters

These parameters are relevant for measuring and must be determined for all samples. Most samples can be determined with these parameters.

The following parameters can be defined:

Parameter	Explanation	Values
Drying program	Defines the drying program which is best suited for the specific sample. (including temperature and switch-off criteria)	see Setting the Drying Program
Display mode	Defines the type of value for displaying and printing.	see Settings of Display Mode
Start weight	Defines a start weight so that the samples always have approximately the same weight .	see Settings of Start Weight

8.1.1 Settings of Drying Program

Navigation: Home > Method Definition > Method name > Main measurement parameters > Drying program

This function offers you different predefined drying programs for optimum matching of the drying characteristics to the sample used. Furthermore, the drying temperature and the switch-off criterion can be set.

Note

You will find more information about defining methods in the delivered application brochure «Guide to Moisture Analysis».

The following parameters can be defined:

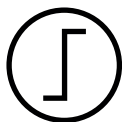
Parameter	Explanation	Values
Drying program	Defines the drying program which is best suited for the specific sample.	Standard* Rapid

* Factory setting

Further information:

- **Standard** drying **see** [Setting Standard drying ► 53]
- **Rapid** drying **see** [Setting Rapid drying ► 54]

8.1.1.1 Setting Standard drying



Standard drying

This drying program is set in the factory and is suitable for most samples. The sample is heated to the drying temperature.

Factory setting

Drying temperature = 105 °C, **Switch-off criterion** 3 = 1 mg / 50 s

The following parameters can be defined:

Parameter	Explanation	Values
Drying temperature	Defines the drying temperature.	40...230 °C (105 °C *)
Switch-off criterion	Defines the criterion when the instrument should end the drying.	1 (1 mg / 10 s) 2 (1 mg / 20 s) 3 (1 mg / 50 s)* 4 (1 mg / 90 s) 5 (1 mg / 140 s) Timed... Free (mg / s)... Free (% / s)...

* Factory setting

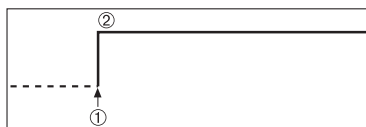
Setting the Drying Temperature

Navigation: Method Definition > Name of method > **Main measurement parameters > Drying temperature**

In this menu item you can set the final drying temperature.

Note

The admissible input range for the drying temperature is indicated.

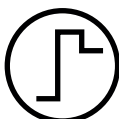


- 1 Start of drying
- 2 Final temperature

Setting Switch-off criterion

see Settings of Switch-off Criterion (SOC)

8.1.1.2 Setting Rapid drying



Rapid drying

This drying program is primarily suitable **for samples with a moisture content over 30%**. Following the start, the selected temperature is exceeded by 40% for 3 minutes (however, is possible up to maximum 230°C) to compensate for the cooling due to vaporization and accelerate the drying process. The drying temperature is then lowered to the set value and maintained.

Factory setting

Drying temperature = 105 °C, **Switch-off criterion** 3 = 1 mg / 50 s

The following parameters can be defined:

Parameter	Explanation	Values
Drying temperature	Defines the drying temperature.	40...230 °C (105 °C *)
Switch-off criterion	Defines the criterion when the instrument should end the drying.	1 (1 mg / 10 s) 2 (1 mg / 20 s) 3 (1 mg / 50 s)* 4 (1 mg / 90 s) 5 (1 mg / 140 s) Timed... Free (mg / s)... Free (% / s)...

* Factory setting

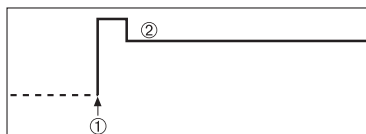
Setting the Drying Temperature

Navigation: Method Definition > Name of method > **Main measurement parameters > Drying temperature**

In this menu item you can set the final drying temperature.

Note

The admissible input range for the drying temperature is indicated.



- 1 Start of drying
- 2 Final temperature

Setting Switch-off criterion

see Settings of Switch-off Criterion (SOC)

8.1.1.3 Settings of Switch-off Criterion (SOC)

Navigation: Home > Method Definition > Method name > Main measurement parameters > Drying program

This function offers you different switch-off criteria. A switch-off criterion defines when the instrument should end the drying. Switch-off criteria ensure that measurements are finished in the same condition (weight loss per unit of time) every time, ensuring repeatable measurements.

Note

Accurate results require same start weights, **see** Settings of Start Weight.

The following parameters can be defined:

Parameter	Explanation	Values
Switch-off criterion	Defines the criterion when the instrument should end the drying.	1 (1 mg / 10 s) 2 (1 mg / 20 s) 3 (1 mg / 50 s)* 4 (1 mg / 90 s) 5 (1 mg / 140 s) Timed... Free (mg / s)... Free (% / s)...

* Factory setting

- Weight loss per unit of time (5 preprogrammed settings)
- Free switch-off criterion (2 different settings)
- Timed switch-off

Weight loss per unit of time

The switch-off defines in which drying condition, the measurement is completed. This switch-off is based on a weight loss per unit of time. As soon as the mean weight loss is less than a preset value during a specified time, the instrument considers drying as complete and automatically discontinues the measurement process.

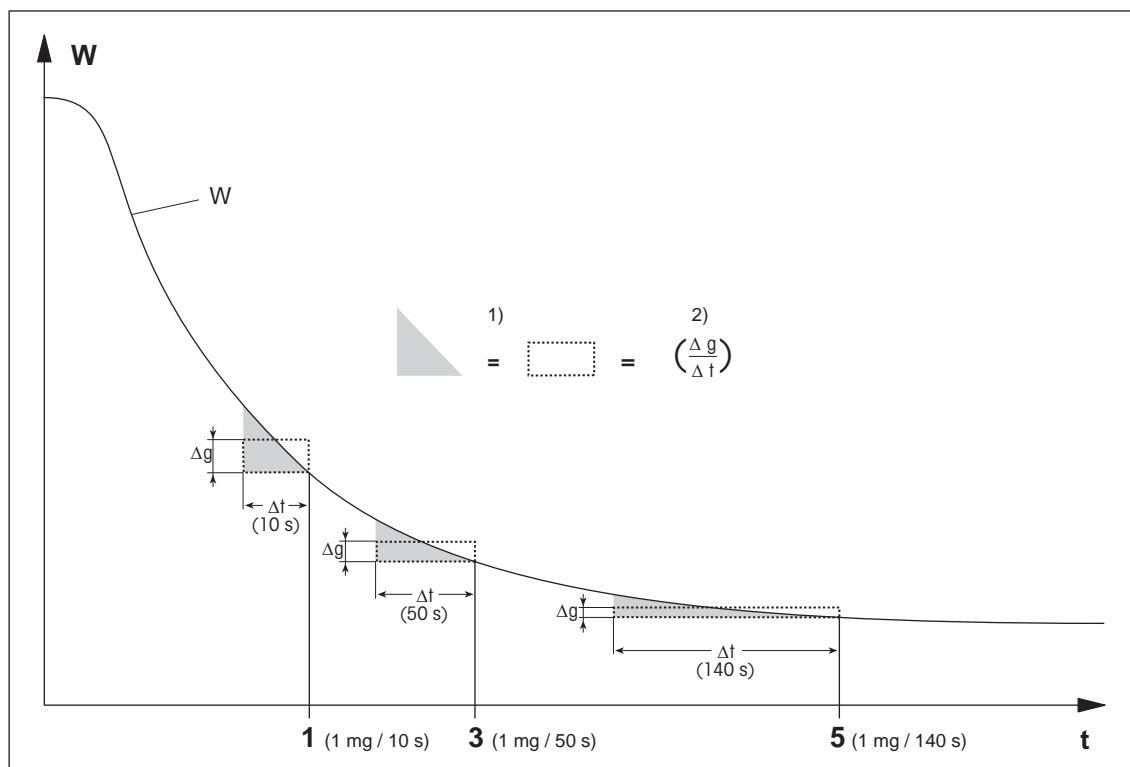
Note

The switch-off criterion is inactive during the first 30 sec.

The following 5 preprogrammed settings are available

Switch-off criterion	Δg	Δt	Description
1	1 mg	10 s	This setting is suitable for fast measurements to determine a trend.
2	1 mg	20 s	This setting is suitable for quick drying samples.
3	1 mg	50 s	This is the factory setting . It is suitable for most kind of samples.
4	1 mg	90 s	This setting is suitable for samples which dry moderately quickly or for samples with higher accuracy requirements.
5	1 mg	140 s	This setting is suitable for samples which dry very slowly (trapped moisture, skin formation) or for samples with very low moisture content e.g. plastics. Not suitable for very temperature sensitive samples.

The graph below exemplifies the mode of operation of the switch-off operation (not to scale).



t = time
 W = weight of sample
 1, 3, 5 = switch-off criteria shown as an example

1) = equal area
 2) = mean weight loss per unit of time

Free switch-off criterion

The free switch-off criterion is based on a user-defined mean weight loss per unit of time.

The following 2 settings are available:

- **Switch-off criterion > Free (mg / s)...** (weight loss per unit of time)
- **Switch-off criterion > Free (% / s)...** (weight loss in percent per unit of time)

Timed switch-off

With this switch-off criterion the measurement lasts until the pre-set drying time has elapsed. The display provides you with continuous information in the drying time.

8.1.2 Settings of Display Mode

Navigation: Home > Method Definition > Method name > Main measurement parameters > Display Mode

With this function you can select the desired type of result display. You also define what type of values are printed on the records.

The following parameters can be defined:

Parameter	Explanation	Values
Display Mode	Defines the type of value for displaying and printing.	%MC* %DC %AM %AD g -%MC

* Factory setting

Explanation of the Values:

- **%MC** – Moisture Content (calculated value)
- **%DC** – Dry Content (calculated value)
- **%AM** – ATRO Moisture Content (calculated value)
- **%AD** – ATRO Dry Content (Wet weight, calculated value)
- **g** – Weight in Grams
- **-%MC** – Moisture Content (negative value, calculated value)

Note

Calculated values are indicated with an asterisk in the display.

Detailed information:

%MC – Moisture Content

The moisture content of the sample is displayed (and printed out) as a percentage of the wet weight (WW = initial weight = 100 %). This is the **factory setting**.

During the measurement the value is constantly displayed in percent and as a graphical drying curve. The measured value is marked by "%MC" (Moisture Content, e.g. 11.35 %MC) also for the printed results.

$$MC = \frac{WW - DW}{WW} \cdot 100 \%$$

MC = Moisture Content [0...100 %]

WW = wet weight

DW = dry weight

%DC – Dry Content

The dry content of the sample is displayed (and printed out) as a percentage of the wet weight (WW = initial weight = 100 %).

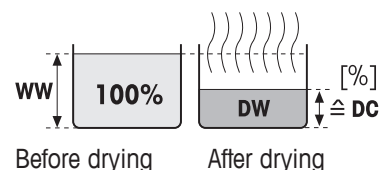
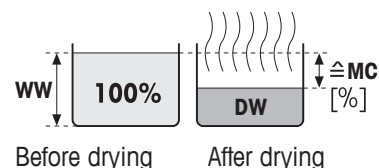
During the measurement the value is constantly displayed in percent and as a graphical drying curve. The measured value is marked by "%DC" (Dry Content, e.g. 88.65 %DC) also for the printed results.

$$DC = \frac{DW}{WW} \cdot 100 \%$$

DC = dry content [100...0 %]

WW = wet weight

DW = dry weight



%AM – ATRO Moisture Content ¹⁾

The moisture content of the sample is displayed (and printed out) as a percentage of the dry weight (DW = final weight = 100 %)

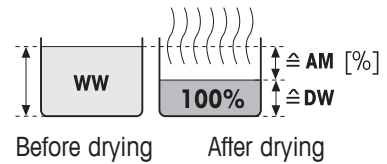
During the measurement the value is constantly displayed in percent and as a graphical drying curve. The measured value is marked by "%AM" (ATRO Moisture Content, e.g. 255.33 %AM) also for the printed results.

$$AM = \frac{WW - DW}{DW} \cdot 100 \%$$

AM = ATRO moisture content [0...1000 %]

WW = wet weight

DW = dry weight



%AD – ATRO Dry Content (Wet weight) ¹⁾

The wet weight of the sample is displayed (and printed out) as a percentage of the dry weight (DW = final weight = 100 %)

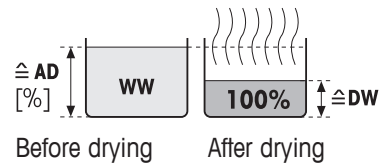
During the measurement the value is constantly displayed in percent and as a graphical drying curve. The measured value is marked by "%AD" (ATRO Dry Content, e.g. 312.56 %AD) also for the printed results..

$$AD = \frac{WW}{DW} \cdot 100 \%$$

AD = ATRO dry content [100...1000 %]

WW = wet weight

DW = dry weight



¹⁾ Comment on the ATRO display mode

If the current measured value in the ATRO display mode is greater or less than the predefined limit value (i.e. greater than 999.99 %AD or less than -999.99 %AM), the ATRO result values are limited to 999.99%.

g – Weight in Grams

The weight of the sample is displayed (and printed out) in grams. With this setting, the Moisture Analyzer is used as a precision balance.

During the measurement current weight is constantly displayed in grams.

-%MC – Moisture Content

The moisture content of the sample is displayed (and printed out) as a percentage of the wet weight (WW = initial weight = 100 %).

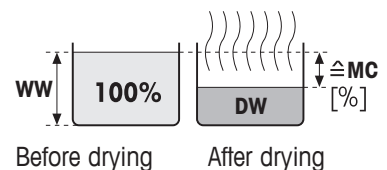
During the measurement the value is constantly displayed in percent and as a graphical drying curve. The measured value is marked by "-%MC" (Moisture Content, e.g. -11.35 -%MC) also for the printed results and shown as a negative value.

$$MC = - \frac{WW - DW}{WW} \cdot 100 \%$$

MC = Moisture Content [0...100 %]

WW = wet weight

DW = dry weight



8.1.3 Settings of Start Weight

Navigation: Home > Method Definition > Method name > Main measurement parameters > Start weight

The start weight affects both the duration of the measurement as well as the accuracy of the results. A small weight results in a shorter duration of the measurement but will decrease the accuracy of the result. With this function you can define a start weight so that the samples are approximately of equal weight thus improving the repeatability of the measurements. The weighing-in aid assists you in weighing-in the sample.

At most of the samples the target weight is in the range of 2–5 g. We recommend to cover the whole surface of the sample pan with a thin uniform layer of sample.

The following parameters can be defined:

Parameter	Explanation	Values
Start weight	Defines a start weight so that the samples always have approximately the same weight.	OFF* ON (0.5 g ... 101.090 g)
Weigh-in aid	Defines monitoring of target weight and tolerance (tolerance range: $\pm 10\%$). Passive = tolerance is displayed. Active = tolerance is monitored. If the startweight is out of tolerance, the measurement cannot be started.	Passive* Active

* Factory setting

8.2 Result and Value Handling

Navigation: Home > Method Definition > Method name > Result and value handling

8.2.1 Free Factor

Navigation: Home > Method Definition > Method name > Result and value handling > Free factor

This function allows you to multiply the result by a method-specific factor in the selected display mode. Furthermore, it allows you changing the result by an offset entry in the unit of the selected display mode. It is used to calculate a corrected final result (e.g. in order to compensate for systematic deviations from the reference result).

Note

- Free factor is not available in display mode "g" (weight).
- The calculation is carried out continuously during the measurement and displayed with the graphical drying curve.
- With free factor, the results are calculated and marked with an asterisk in the display.

The following parameters can be defined:

Parameter	Explanation	Values
Free factor	Defines the settings for free factor. OFF = no free factor applied.	OFF* ON
Factor	Defines the multiplication factor.	-10.000...+10.000 (1.000)*
Offset	Defines the offset value in the selected display mode.	-1000.000... +1000.000 (0.000)*
Format	Defines the number of decimal places of the calculated final results, for displaying and printing.	x x.x x.xx x.xxx*

* Factory setting

8.3 Workflow Handling

8.3.1 Starting Mode

Navigation: Home > Method Definition > Method name > Workflow handling > Starting mode

In this menu you can choose whether the sample chamber performs automatic or manual functions (e.g. tare, stop drying).

The following parameters can be defined:

Parameter	Explanation	Values
Starting mode	Defines how the sample chamber is operated.	Automatic* Manual

* Factory setting

Automatic

Your instrument is set in the factory to the automatic operating mode. This mode can be used for most kind of samples. When closing the sample chamber, the weight of the sample is recorded and the measurement is started.

Manual

We advise you to use the manual operating mode for samples which contain readily volatile substances. The initial weight (wet weight) important for the determination of the moisture content is recorded. In the manual operating mode you have time for further preparation of the sample (e.g. mixing with quartz sand or even distribution of the sample) while weight losses due to evaporation during the preparation time are measured from the outset. As soon as the sample is ready for drying, close the sample chamber. As soon as the sample chamber is closed, drying starts. In the manual operating mode you can open the sample chamber during a drying operation. In contrast to the automatic mode, drying will not be stopped but simply interrupted until the sample chamber is closed again.

8.4 General Method Properties

Navigation: Home > Method Definition > Method name > General method properties

8.4.1 Method name

Navigation: Home > Method Definition > Method name > General method properties > Method name

The following parameters can be defined:

Parameter	Explanation	Values
Method name	Renaming a method. Name should be unique and unambiguous.	any

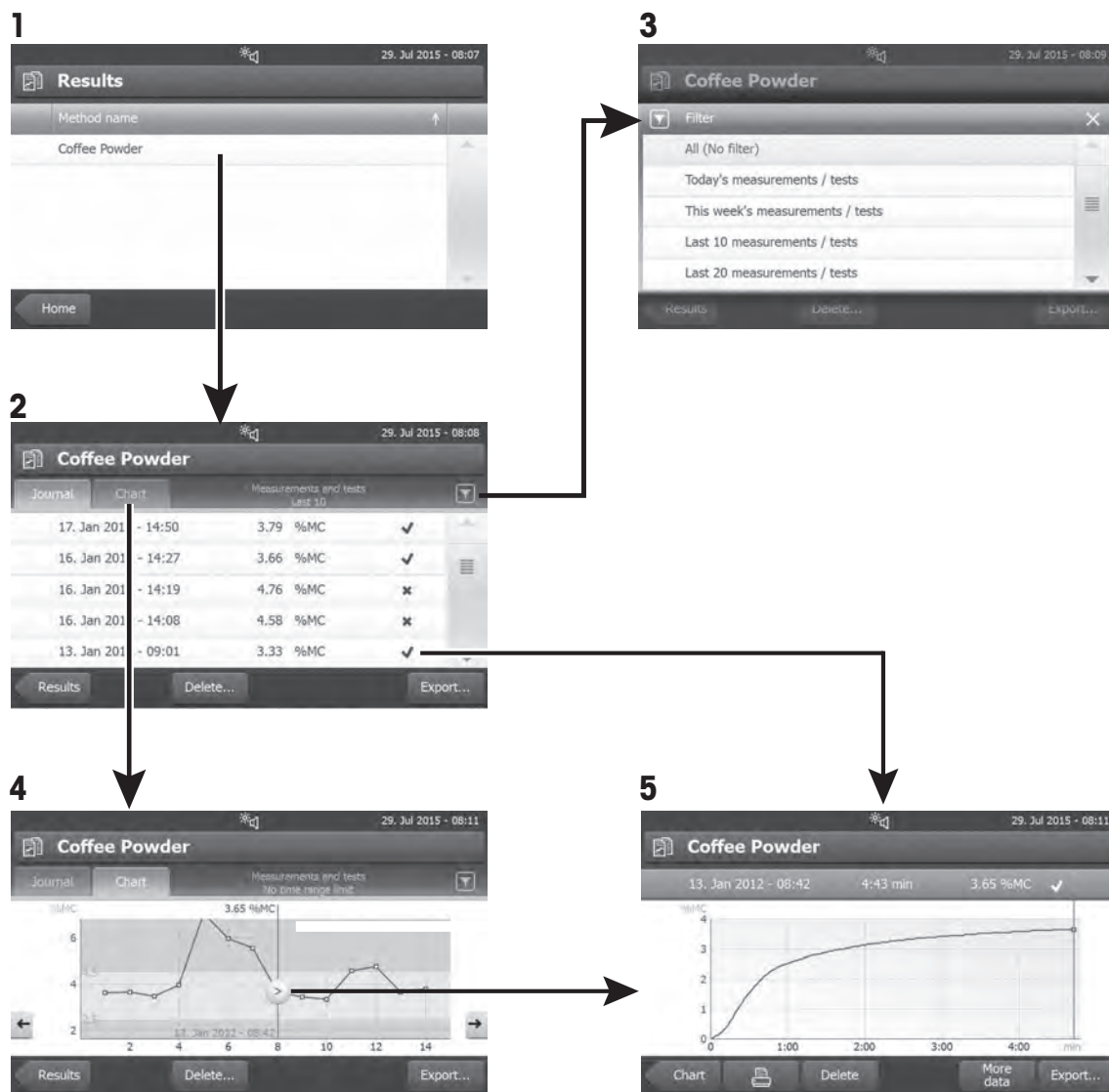
9 Results

The device can save a total of 100 measurement results. When there are more than 100 results, the oldest result will automatically be overwritten. Therefore we recommend to save the results frequently.

9.1 Graphical Evaluations of Measurement Results

Navigation: Home > Results

This function allows you to manage and evaluate measurement results.




1 Method list

- Tap the method you want to evaluate.
⇒ The journal view appears.

2 Journal view

The journal view allows you to start different graphical evaluations from a measurement series. You can perform the following functions:

- To start **filter function**, tap [].
 - ⇒ The filter menu appears.
- To start **chart view**, tap [**Chart**].
 - ⇒ The chart view of the series of measurement appears (4).
- To start **graphic view**, tap a measurement result.
 - ⇒ The graphic view appears (5).

3 Filter menu


The filter function allows you to evaluate the measurement series according to various criteria. You can select the following criteria:


- **All (No filter)**
 - **Today**
 - **This week**
 - **Date range (Begin - End)**
 - **Last 10 measurements / tests***
 - **Last 20 measurements / tests**
- Tap [**X**] to close filter menu.

* Factory setting

4 Chart view

This view allows you to display the results of a series of measurements depending on the filter settings.


The  marked measuring point is displayed with date, time, and the measurement result. You can perform following functions:

- To jump forward to the next measurement result, tap [->].
- To jump backwards to the previous measurement result, tap [<-]. Alternatively, tap directly on the desired measurement point.
- To recall the full measurement curve of the corresponding measurement, tap [].

5 Graphics view

With this function you can display a graphical view of the detailed results of a single measurement. You can perform the following functions:

Printing result

- To print the result, tap .

Exporting result

- To export the result, tap [**Export**].

See Exporting Results.

Deleting result

- To delete this measurement result, tap [**Delete**].

With the auto-delete functionality the oldest results will automatically be removed.

More data

- To display more measurement data, tap [**More data**]

With this function you can display a graphical view of the detailed results of a single measurement.

9.2 Exporting Results

Results can be exported to an external storage device e.g. a memory stick. Data in CSV format can be imported into e.g. MS Excel for further evaluations.

Note

Results cannot be imported in a Moisture Analyzer.

Sample procedure

- Result is activated.
 - An external storage device is connected e.g. memory stick.
- 1 To start, tap [**Export**]
⇒ **Export results** appears.
 - 2 Tap Export target > Peripheral
 - 3 Tap **Location** > **Browse and select**.
⇒ **Location** appears.
 - 4 Select location for file and confirm with [**OK**].
 - 5 Enter new file name, if needed.
 - 6 To start export, tap [**Export**].

9.2.1 Single Result Export

The following parameters can be defined:

Parameter	Explanation	Values
File name	Defines the name of the new data file.	any
File type	Defines the type of the data file.	CSV* PDF
Language	Defines the language for export files.	English Deutsch Italiano Français Español Português Polski Magyar Český Русский 日本語 中文 한국어/조선말
Export target	Defines the destination of data transfer.	Peripheral

* Factory setting

Peripheral

Parameter	Explanation	Values
Location	Finds the location on the storage device.	Browse and select

9.2.2 Multiple Result Export

- **Summary export**

The summary export contains method parameters and the end results per measurement. The intermediate values are not exported.

- **Multiple export**

- The multiple export contains method parameters, method data, intermediate values and end results per measurement.
- Each measurement is exported as a single file.

The following parameters can be defined:

Parameter	Explanation	Values
File name prefix	Defines the name of the new data file. Date and time are automatically added by the system.	any
Export selection	Custom selection of multiple results for the export from selected measurements. The selection can be made via the filter function.	Selection: <input type="checkbox"/> <input checked="" type="checkbox"/>
Export content	Defines the content of the multiple results export. Summary export (one file, no intermediate values): Results as summary report in one file. Multiple export (one file per measurement): Results with intermediate measurement values as separate files with the same layout as for the single result export.	Summary export Multiple export
File type	Defines the type of the data file.	CSV* PDF
Language	Defines the language for export files.	English Deutsch Italiano Français Español Português Polski Magyar Český Русский 日本語 中文 한국어/조선말
Export target	Defines the destination of data transfer.	Peripheral

Peripheral

Parameter	Explanation	Values
Location	Finds the location on the storage device.	Browse and select

* Factory setting

10 Maintenance



WARNING

Risk of electric shock

- The instrument must be disconnected from the power supply, before cleaning or other maintenance work to be performed.
- Use only the power cord from METTLER TOLEDO, if it needs replacing.

Note

- The thermal overload protection can not be reset by the user.
- The halogen lamp can not be replaced by the user.

In such cases, contact your METTLER TOLEDO representative.

10.1 Cleaning



CAUTION

Danger of burns

The interior parts of the heating module as well as the parts in the sample chamber could be very hot.

- Wait until the heating module has cooled down completely.

To obtain precise measurement results, we recommend you to clean the temperature sensor and the protective glass of the halogen lamp regularly. Please note the following directions for cleaning your instrument.

General

Your Moisture Analyzer is made from high quality, resistant materials and can therefore be cleaned with a commercially available, mild cleaning agent e.g. isopropanol.

Note

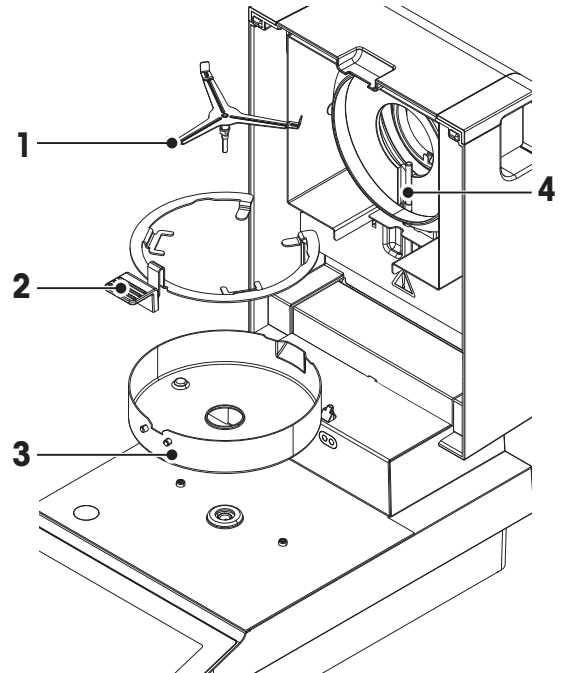
- Use a lint-free cloth for cleaning.
- Ensure that no liquids enters the interior of the instrument.
- **Heating Module**
Clean the exterior of the heating module with a mild cleaning agent although the housing is extremely rugged and resistant to solvents.
- **Display**
On no account use cleaning agents, which contain solvents or abrasive ingredients, as this can result in damage to the display.
- Never open the housing of the instrument – it contains no components, which can be cleaned, repaired or replaced by the user.

Note

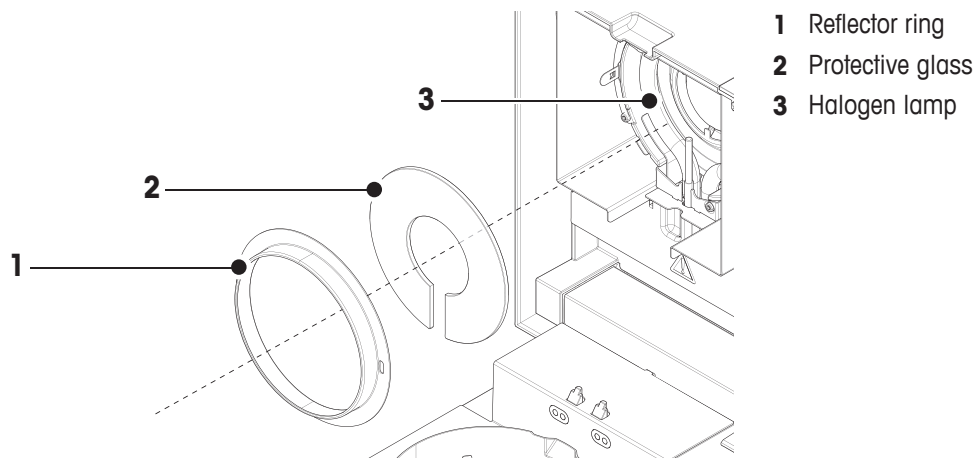
After the temperature sensor or the protective glass have been cleaned, we recommend adjusting the heating module using the temperature adjustment kit, **see** [Temperature Adjustment ► 43].

10.1.1 Cleaning the Sample Chamber

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



10.1.2 Cleaning the Heating Module



CAUTION

Avoid touching the round halogen lamp. If you have to remove any splashes, deposits, or spots of grease from the halogen lamp, it is advisable to use a weak organic solvent such as, for example ethanol. Ensure that the lamp is cool. **Do not remove the halogen lamp!**

CAUTION

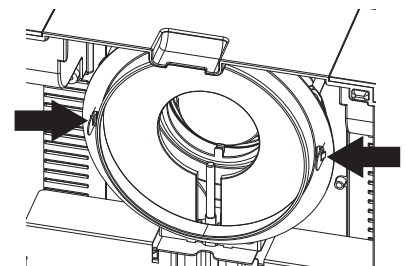
The protective glass is made of quartz glass. Always use gloves for touching the protective glass. Do not touch the protective glass with bare hands. For cleaning always use non-alkaline cleaning agents.

Removing reflector ring

- 1 To unlock the reflector ring push the clips towards each other.
- 2 Pull carefully out the reflector ring.

CAUTION

The protective glass is loose and may fall out when the reflector ring is removed.



Note

Do not touch the lamp with your fingers.

Removing protective glass

- Reflector ring is removed.
- Pull out the protective glass.

Reassembling after cleaning

Reassemble all parts in the opposite order.

- All parts are cleaned.
- 1 Insert the protective glass.

Note

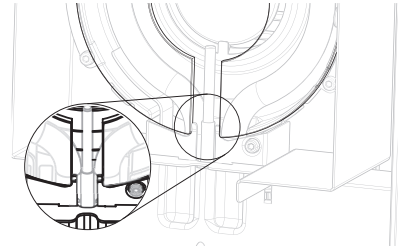
The outer edges of the protective glass must precisely be placed into the housing (see illustration).

- 2 Insert the reflector ring.

Note

Push the reflector ring until you hear a click sound and the reflector ring is locked.

- 3 Close the heating module.



10.1.3 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.

10.2 Dust Filter

If you use the Moisture Analyzer in a dusty environment with an dust filter, check the filter at regular intervals. Replacement Filters **see** Accessories and Spare Parts.

- Replace the filter, if needed.

10.3 Replacing Power Line Fuse



CAUTION

Safety risk or damage of the instrument

Do not use a fuse of a different type or rated value, or short out (bridge) the fuse, because this can put your safety at risk and damage the instrument!

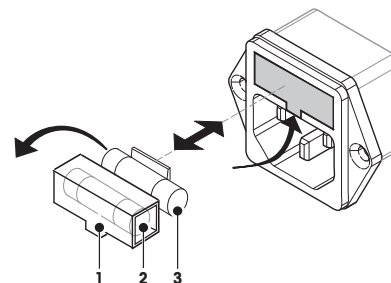
If the display of your terminal remains dark after switching on, in all probability the power line fuse of the drying unit is blown.

The power line fuse is located on the back of the drying unit. To change the fuse, proceed as follows:

- 1 Pull out the power cord.
- 2 Slide out the fuse holder (1) with a suitable tool such as a screwdriver.
- 3 Remove the fuse (3) and check its condition.
- 4 If the fuse is blown, replace the fuse with one of the same type and the same rated value (5 x 20 mm, T6.3H 250 V).

Note

A spare fuse is located in the holder (2).



Fuse **see** General Technical Data

10.4 Disposal

In conformance with the European Directive 2002/96/EC 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 (for private or professional use), the content of this regulation must also be related.

Thank you for your contribution to environmental protection.






11 Troubleshooting

Errors can occur during operation of your instrument. This section describes how you can rectify these errors.




11.1 Error Messages

Most error messages appear in plain text directly in the respective application, and usually accompanied by a text describing how to correct the error. Error messages of this type are self-explanatory and therefore are not mentioned below. The following error messages can appear instead of the weighing result.

Error Message	Cause	Rectification
Weight display		
	Overload – The weight on the pan exceeds the weighing capacity of the balance.	– Reduce the weight of the sample.
	Underload – Sample pan holder is missing.	– Insert sample pan holder. If needed, reboot the system by disconnecting and connecting to the mains.
	Weight display flashes / Out of zero range – When the instrument was switched on or upon zeroing, one or more limits were exceeded. The usual reason for this message to appear is when there is a weight on the weighing pan when the balance is switched on.	– Remove the weight.
Adjustment		
Unstable weight.	No stability during adjustment.	<ul style="list-style-type: none"> • Ensure ambient conditions and an optimum location. • Take care that no part of the sample or the sample pan touches the draft shield or the sample pan handler. • Ensure that the sample pan holder is correctly installed as well as not defect.
Weight out of range.	Either no weight , or the wrong weight , has been placed on the sample pan during adjustment. (This message is also displayed if you do not remove the weight when prompted to do so by the instrument.)	– Repeat the adjustment process and load the required adjustment weight.

11.2 Status Messages

Status messages are displayed by means of small icons in the status bar of the display. The status icons indicate the following:

	Cause	Rectification
	The battery in your instrument must be replaced. This battery ensures that the date and time are not lost when the instrument is disconnected from the power supply.	<ul style="list-style-type: none">– Contact your METTLER TOLEDO representative as soon as possible. ⇒ A service technician will change the battery.
	Your instrument is due for servicing.	<ul style="list-style-type: none">– Contact your METTLER TOLEDO representative as soon as possible to have a technician service your instrument.
	Quick Access icon is displayed continuously.	Quick setting of brightness and sound.

11.3 What to Do if...

Problem	Solution
Display remains dark after switching on	<ul style="list-style-type: none"> • Ensure that the instrument is connected to the power supply and the power is actually supplied. • Check the power line fuse of the drying unit and replace if necessary, see [Replacing Power Line Fuse ► 69]. • If the problem persists, contact a METTLER TOLEDO representative.
Keys and buttons do not respond	<ul style="list-style-type: none"> • Reboot the system by disconnecting and connecting to the mains. • If the problem persists, contact a METTLER TOLEDO representative.
USB peripheral device does not respond	<ul style="list-style-type: none"> • Reboot the system by disconnecting and connecting to the mains. • If an USB memory stick is being used, check if the USB memory stick has the correct format (see [System and Data Management ► 38]) • If the problem persists, contact a METTLER TOLEDO representative.
Printer that is connected does not print	<ul style="list-style-type: none"> • Ensure that the printer is properly connected to the terminal (do not connect the printer to the drying unit). • Ensure that the printer is on and enabled in the menu. See Peripherals • Check the printer settings. See Recommended Printer Settings (Strip printer).
Incorrect characters are printed	<ul style="list-style-type: none"> • Change the bit/parity setting of the printer and the instrument to 8/NO. • Check if both instruments have the same baud rate setting, see Peripherals. • Use the correct character sets, see Recommended Printer Settings (Strip printer).
Measurement takes too long	<ul style="list-style-type: none"> • You have selected an unsuitable switch-off criterion, see Settings of Switch-off Criterion (SOC). • An excessive amount of sample can also be the cause of slow drying, likewise samples which tend to form a skin which hinders vaporization. Perform a measurement at higher temperature. • Enlarge the surface of the sample, e.g. by crushing or grinding. • Use absorbent glass fiber filters for liquids. • If the sample is very temperature sensitive and decomposes, reduce the temperature. • If measuring is unstable, check correct positioning of pan, sample handler, sample, draft shield or sample holder.
Instrument does not heat after the start	<ul style="list-style-type: none"> • Halogen lamp is defective or the heating module is overheated and the thermal overload protection has switched off the heating. In this case, contact your METTLER TOLEDO representative.

Problem	Solution
Measurement results are not repeatable	<ul style="list-style-type: none"> • The value of the start weight is too small. • Support on which the instrument is standing is not sufficiently stable. Use a stable support. • Surroundings are very unstable (e.g. vibrations, air draft, humidity). Provide better environmental conditions. • Sample has more or less moisture between sampling and starting the drying process. • Sample is not evenly dispersed on the pan. • Start weight has not always the same value. • Samples are not homogeneous, i.e. they have different compositions. The more inhomogeneous a sample, the larger the amount of sample needed to obtain a repeatable result. • Selected drying time is too short for the "Timed switch-off" criterion. Extend the drying time or select a suitable switch-off criterion "Weight loss per unit of time". • Sample does not become completely dry (e.g. owing to skin formation). Dry the sample with the aid of glass fiber discs. • Selected temperature is too high and the sample has oxidized or decomposed. Lower the drying temperature. • Sample boils and the splashed drops continuously change the weight. Lower the drying temperature. • Granulation is not homogeneous or too large. • Insufficient heating power because the protective glass of the halogen lamp is dirty. Clean the protective glass, see Cleaning. • Temperature sensor is contaminated or faulty. Clean the temperature sensor, see Cleaning. • If the problem persists, contact a METTLER TOLEDO representative.
SmartCal test fails	<ul style="list-style-type: none"> • Ensure that the test prerequisites are met. • Ensure that entries of room temperature and humidity are correct (check RTHSensor) • Ensure that the sample pan is fully and uniformly covered with the test granulate. • Perform the temperature test, see Temperature test • Perform the weight test, see Tests • Repeat the test with new sample. • If the problem persists, contact a METTLER TOLEDO representative.

12 Technical Data

12.1 General data

Power Supply

110 V AC Version	100 V–120 V, 50/60 Hz, 4 A
230 V AC Version	220 V–240 V, 50/60 Hz, 2 A
Voltage fluctuations	-15%+10%
Power load	max. 450 W during drying process
Power line fuse	5 x 20 mm, T6.3H 250 V

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
Ambient temperature range	5 °C to 40 °C
Relative air humidity	10% to 80% at 31 °C, linearly decreasing to 50 % at 40 °C, noncondensing
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

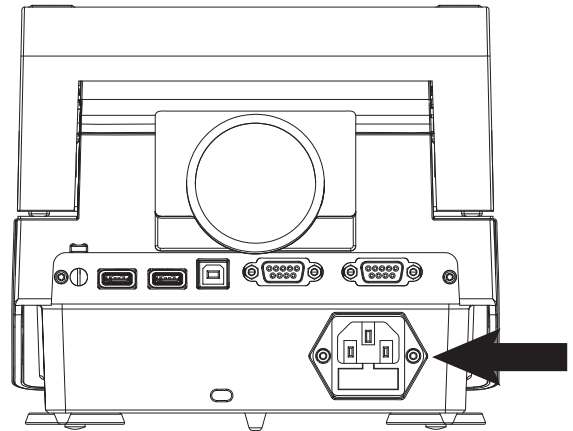
Housing	PBT, PBX45A (UL94-V0)
Inspection window grill	PPS, A504X90 (UL94-V0)
Protective glass	Quartz glass
Halogen lamp	Quartz glass
Reflector	Stainless steel, X2CrNiMo17-2 (1.4404)
Draft shield, interior bottom plate	Stainless steel, X2CrNiMo17-2 (1.4404)

12.1.1 Explanatory note to periodic inspections

In accordance with EU Directive 2001/95/EC

This instrument is provided with a 3-pin plug. The earth conductor is led into the instrument and connected to the bottom and the rear panel. The other accessible metal parts are not connected to the earth conductor. These parts are reinforced insulated and must not be connected to the earth conductor according to current European standards.

The earth connection must be checked on the metallic rear panel.



Further information about conformance of this instrument can be found in the Declaration of Conformity which is coming with the product or can be downloaded from the internet.

► <http://www.mt.com/moisture-hc103>

12.2 Model-specific data

Drying Unit

Heating Module	Halogen ring-shaped radiator
Temperature range	40–230 °C
Temperature step	1 °C
Temperature programs	standard, rapid

Balance

Maximum capacity	101 g
Readability	1 mg
Minimum sample weight	0.5 g
Weighing technology	Strain Gauge
Adjustment	External weight (100 g, accessory)

Moisture Content

Readability	0.01%
Repeatability (sd) with 2 g sample	0.10%
Repeatability (sd) with 10 g sample	0.015%

Interfaces

- 1 x RS232C (for METTLER TOLEDO RHT sensor only)
- 1 x RS232C (9-pin socket)
- 2 x USB Host (Type A socket), USB 1.1
Supported memory sticks up to 32 GB
- 1 x USB Device (Type B socket), USB 1.1

Data

Export data format of results	<ul style="list-style-type: none">• CSV (Comma-separated values)• PDF
-------------------------------	--

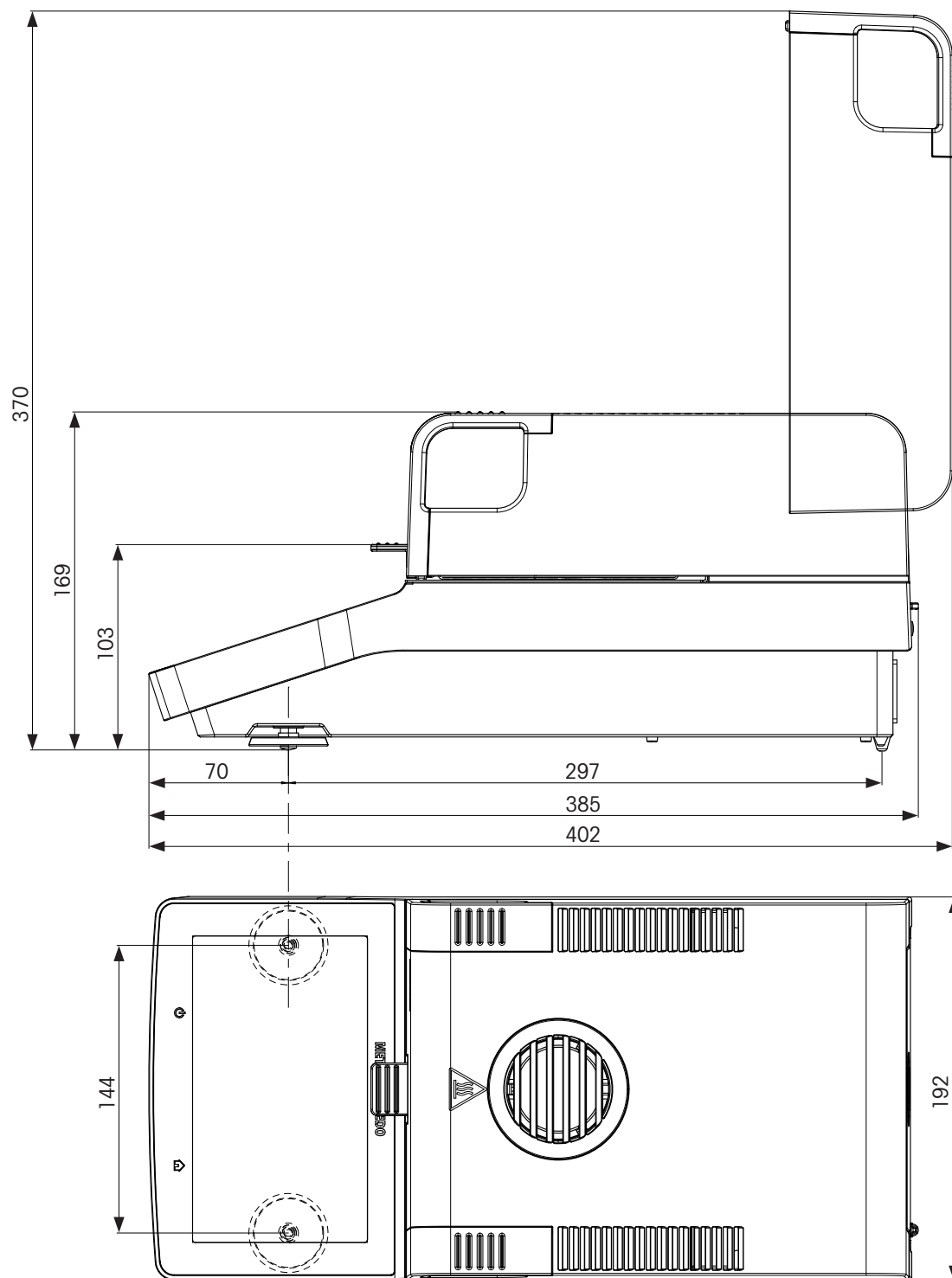
Hardware

Drying unit

Sample chamber opening/closing	manual
Leveling	2 leveling screws
Sample pan	Ø 90 mm
Maximum height of sample	15 mm
Thermal overload protection	Bimetallic-element switch in heating module
Dimensions (w x h x d)	192 x 169/370 x 385 See Dimensions
Weight, ready to measure	5.1 kg
Display	WVGA color display, resistive touch-sensitive

12.3 Dimensions

(all dimensions in mm)



12.4 Interfaces Specification

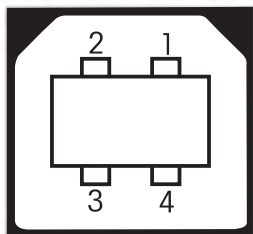
12.4.1 RS232C

Schematic	Item	Specification
	Interface type	Voltage interface according to EIA RS-232C/ DIN66020 CCITT V24/V.28)
	Max. cable length	15 m
	Signal level	Outputs: +5 V ... +15 V (RL = 3–7 kΩ) –5 V ... –15 V (RL = 3–7 kΩ) Inputs: +3 V ... +25 V –3 V ... –25 V
	Connector	Sub-D, 9-pole, female
	Operating mode	Full duplex
	Transmission mode	Bit-serial, asynchronous
	Transmission code	ASCII
	Baud rates	see setting options
	Bits/parity	see setting options
	Stop bits	see setting options
	Handshake	None, XON/XOFF, RTS/CTS (software selectable)

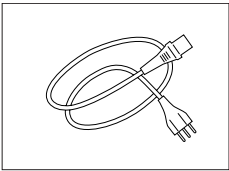
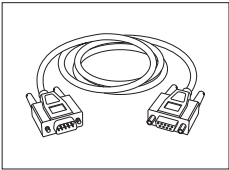
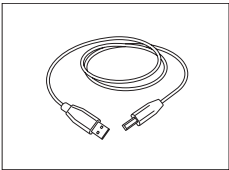
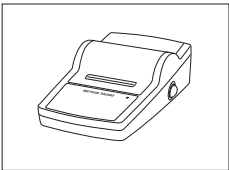
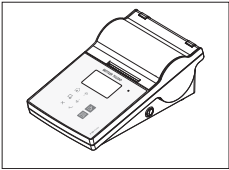
12.4.2 USB Host

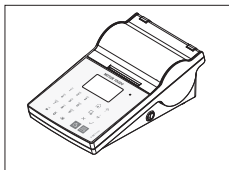
Schematic	Item	Specification
	Standard	In conformity with USB Specification Revision 1.0/1.1
	Speed	Full speed 12 Mbps (requires shielded cable)
	Power usage	Max. 500 mA
	Connector	Type A
	Pin assignment	1 VBUS (+5 V DC) 2 D- (Data -) 3 D+ (Data +) 4 GND (Ground)
	Shell	Shield

12.4.3 USB Device

Schematic	Item	Specification										
<div></div> <table><tr><td>1</td><td>VBUS (+5 VDC)</td></tr><tr><td>2</td><td>D- (Data -)</td></tr><tr><td>3</td><td>D+ (Data +)</td></tr><tr><td>4</td><td>GND (Ground)</td></tr><tr><td>Shield</td><td>Shield</td></tr></table>	1	VBUS (+5 VDC)	2	D- (Data -)	3	D+ (Data +)	4	GND (Ground)	Shield	Shield	Standard	In conformity with USB Specification Revision 1.1
	1	VBUS (+5 VDC)										
	2	D- (Data -)										
	3	D+ (Data +)										
	4	GND (Ground)										
	Shield	Shield										
Speed	Full speed 12 Mbps (requires shielded cable)											
Function	CDC (Communication Device Class) serial port emulation											
Power usage	Suspended device: Max 10 mA											
Connector	Type B											

13 Accessories and Spare Parts

	Description	Part No.
Power supplies		
	Country-specific 3-Pin power cable with grounding conductor.	
	Power cable AU	00088751
	Power cable BR	30015268
	Power cable CH	00087920
	Power cable CN	30047293
	Power cable DK	00087452
	Power cable EU	00087925
	Power cable GB	00089405
	Power cable IL	00225297
	Power cable IN	11600569
	Power cable IT	00087457
	Power cable JP	11107881
	Power cable TH, PE	11107880
	Power cable US	00088668
	Power cable ZA	00089728
Cables for RS232 interface		
	RS9 – RS9 (m/f): connection cable for PC, length = 1 m	11101051
Cables for USB interface		
	USB (A –B) connection cable for connection to PC, length = 1 m	12130716
Printers		
	RS-P25 printer with RS232 connection to instrument	11124300
	Paper roll (length: 20 m), set of 5 pcs	00072456
	Paper roll (length: 13 m), self-adhesive, set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
	P-56RUE thermal printer with RS232, USB and ethernet connections, simple printouts, date and time, label printing (limited).	30094673
	Paper roll, white (length: 27 m), set of 10 pcs	30094723
	Paper roll, white, self-adhesive (length: 13 m), set of 10 pcs	30094724
	Paper roll, white, self-adhesive labels (550 labels), set of 6 pcs	30094725



P-58RUE thermal printer with RS232, USB and ethernet connections, simple printouts, date and time, label printing, balance applications: statistics, formulation, totaling,

30094674

Paper roll, white (length: 27 m), set of 10 pcs

30094723

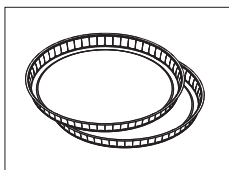
Paper roll, white, self-adhesive (length: 13 m), set of 10 pcs

30094724

Paper roll, white, self-adhesive labels (550 labels), set of 6 pcs

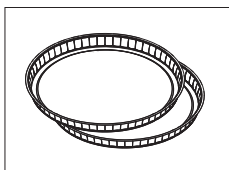
30094725

Sample Pans



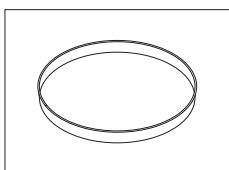
Aluminum sample pan, HA-D90, set of 80 pcs

00013865



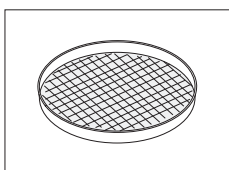
Professional aluminum sample pan, extra strong, set of 80 pcs

11113863



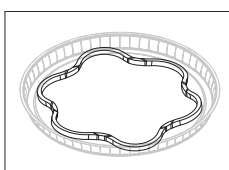
Stainless steel reusable sample pan 6 mm, DA-DR1, set of 3 pcs

00214462



Weighing pan for textiles HA-CAGE, 1 pcs

00214695



Down holder, prevents slipping of the sample during measurement, 1 pcs

00214758

Adjustment / Test Parts

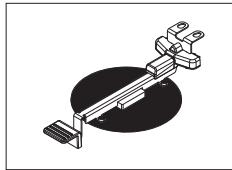


Certified adjustment weight, 100 g (F1)

11119531

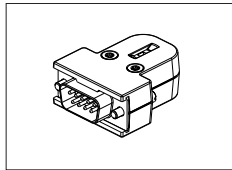


OIML / ASTM Weights (with calibration certificate) see www.mt.com/weights



Temperature adjustment kit HA-ETCC, certified

30020851



RHT sensor for detecting of humidity and temperature for SmartCal tests

30020850



SmartCal, Moisture Analyzer Reference Substance

cSmartCal, certified, 12 tests

30005793

cSmartCal, certified, 24 tests

30005791

SmartCal, 12 tests

30005792

SmartCal, 24 tests

30005790

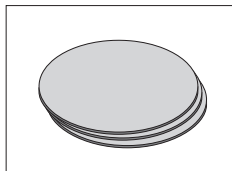
Anti-theft devices



Steel cable

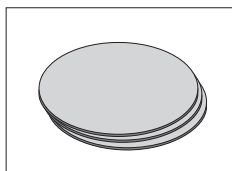
11600361

Miscellaneous



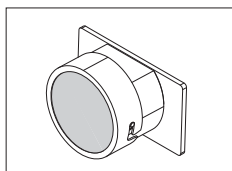
Glass fiber filter (for Liquids), set of 100 pcs

00214464



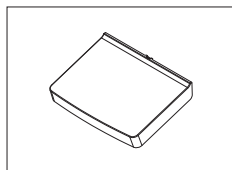
Dust filter, set of 50 pcs

11113883



HC dust filter housing

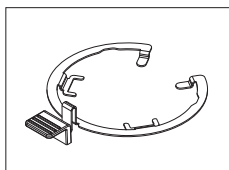
30216118



Protective cover for Display

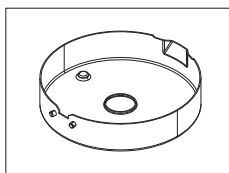
30216115

Spare Parts



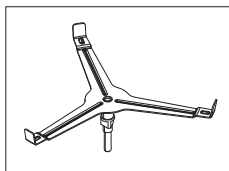
Sample pan handler

30216113



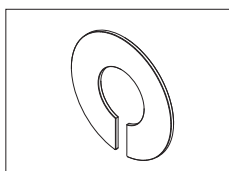
Draft shield

30216114



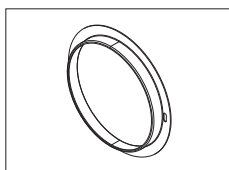
Sample pan holder

00214642



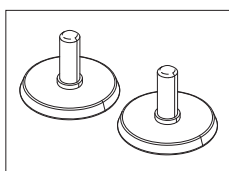
Protective glass

30216116



Reflector ring

30216117



Pair of feet adjustable

30104815

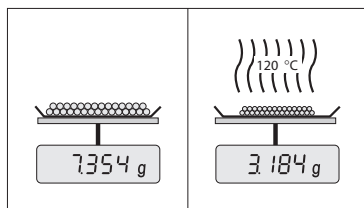
14 Appendix

14.1 How to Obtain Best Results

In this section you will find important information on how to obtain optimum results. You will discover which parameters influence the measurement process and how you can optimize the settings of your instrument to achieve the best measurement results.

14.1.1 Measurement Principle of Halogen Moisture Analyzer

Your instrument performs measurements based on the **thermogravimetric principle**, i.e. the moisture is determined from the weight loss of a sample dried by heating.



In principle, your instrument thus comprises two instruments: An analytical balance and a heating module. In contrast to other thermogravimetric methods (drying oven, infrared, microwave), the Halogen Moisture Analyzer operates with halogen heating technology. This ensures fast heating of the sample and thus guarantees rapid availability of the measurement results.

Irrespective of the measurement method, a correct preparation of the sample and the correct choice of the following measurement parameters improve the quality of the measurement result:

- Sample size
- Drying temperature
- Switch-off mode
- Drying time

NOTICE

Inappropriate setting of these parameters can cause the results to be incorrect or misleading. For this reason, check that the results for each type of sample are what might reasonably be expected.

You will find detailed information on the relationships between these parameters in the delivered application brochure «Guide to Moisture Analysis» or **see** Accessories and Spare Parts.

In practice not only the quality of the measurement results, but also the speed of the measurement process is important. Thanks to its drying principle (heat generated by a halogen radiator), the Halogen Moisture Analyzer is very fast. You can increase the speed even further through optimum setting of the instrument, e.g. using the **Drying program Rapid** for liquids.

The optimum drying temperature and the drying time are dependent on the nature and size of the sample and on the desired accuracy of the measurement results. These can be determined only by experiment.

14.1.2 Notes on Adjustment of Balance and Heating Module

The balance and the heating module in your drying unit can be adjusted using the appropriate accessories, **see** Accessories and Spare Parts. The heating module and the balance can also be tested (to check the adjustment). The user can define a test weight or the test temperature, together with permissible tolerances for this test. A test report can be printed out showing the test result has passed or failed.

A Moisture Analyzer is typically used in place of or in addition to the drying oven method. In an oven heat energy is transferred by the flow of air, which establishes an equilibrium between the sample temperature and the ambient temperature. This is not the case in a Moisture Analyzer. The actual sample temperature primarily depends on the specific absorption properties of the sample (dark samples absorb more heat), which can change during the measurement process. There can also be differences between the temperature at the surface of the sample and the temperature inside the sample. The heat output is therefore not dependent on the true sample temperature but instead is regulated by a temperature sensor underneath the halogen heating module.

For the reasons explained above, the sample temperature will be slightly different than the temperature shown on the instrument display. By regularly testing or adjusting the drying unit, you will ensure a consistent and reproducible heat output for the entire lifetime of your instrument.

Note

- METTLER TOLEDO offers an adjustment service – please contact your METTLER TOLEDO representative.
- We recommend to adjust the instrument exclusively under operating conditions.
- After the temperature sensor or the protective glass have been cleaned, we recommend adjusting the heating module using the temperature adjustment kit, **see** Accessories and Spare Parts. For the procedure for testing or adjusting the drying unit (balance/heating module), **see** Test/Adjust.

14.1.3 Optimum Sample Preparation

Preparation of the sample is decisive for the speed of the measurement process and the quality of the measurement results.

Note

Basic rules for the preparation of your sample:

The amount of sample you select should be as small as possible and only as large as necessary.

Excessive amounts of sample require more time for drying and thus prolong the measurement process. If the amount of sample is too small, the measurement result may possibly not be representative of the true moisture content. The following always holds: The greater the inhomogeneity of the sample, the larger the amount of sample needed to obtain a repeatable result.

Distribute the sample evenly over the sample pan

You thus increase the surface area of the sample and facilitate heat absorption. The base of the pan should be evenly covered.

With liquid, fat-containing, melting and highly reflecting samples, you should use the sample with the glass fiber filter available as optional equipment, **see** Accessories and Spare Parts. This also applies to samples which form a skin on their surface when heated. The glass fiber filter ensures even and rapid heat distribution and prevents the formation of a skin on the sample surface.

14.1.4 Further Information on Moisture Determination

You will find further information on the moisture determination, the importance of the parameters and the preparation of the samples in the delivered application brochure «Guide to Moisture Analysis» dealing with moisture determination, **see** Accessories and Spare Parts.

Useful tips and a variety of example methods (comparison between Halogen Moisture Analyzer results and the oven drying method) can be downloaded from:

- www.mt.com/moisture
- www.mt.com/moisture-methods
- www.moisture-guide.com

If you require information on specific applications, your METTLER TOLEDO Customer Service will be pleased to help you.

NOTICE

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.

14.2 Recommended Printer Settings (Strip printer)

English, German, French, Spanish, Italian, Polish, Czech, Hungarian

Printer			
Model	Char Set	Auto baudrate	Balance feature
RS-P25	IBM/DOS	Off	Disable
RS-P56	IBM/DOS ¹⁾	—	—

Instrument / Printer				
Model	Baudrate	Bit / Parity	Stop Bits	Handshake

Instrument / Printer				
RS-P25	9600	8/NO	1	Xon/Xoff
RS-P56	9600	8/NO	1	Xon/Xoff

Brazil Portuguese

Printer			
Model	Char Set	Auto baudrate	Balance feature
RS-P25	IBM/DOS	Off	Disable
RS-P56	— ²⁾	—	—

Instrument / Printer				
Model	Baudrate	Bit / Parity	Stop Bits	Handshake
RS-P25	9600	8/NO	1	Xon/Xoff
RS-P56	— ²⁾	— ²⁾	— ²⁾	— ²⁾

¹⁾ Printer settings not available.

²⁾ Required font for this language not available.

14.3 Installing USB Device Driver

For transmitting MT-SICS commands via USB Device interface, a driver needs installing on the connected PC. You can find the USB driver installer for download on the METTLER-TOLEDO website:

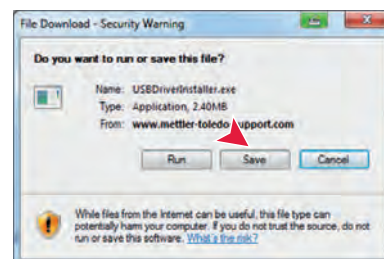
► www.mettler-toledo-support.com

Requirements

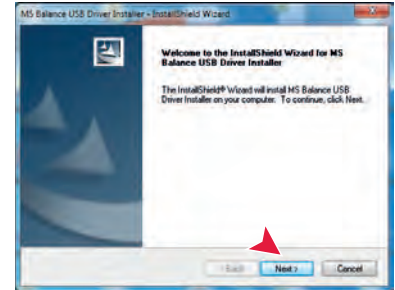
- PC with one of the Microsoft Windows® operating system 32-Bit & 64-Bit: Windows XP (SP3), Vista (SP2), Win 7 (SP1) or Win 8.
- Administrator rights for installing software.
- PC to instrument USB connection cable.

Installing USB Driver on the PC:

- 1 Connect to the Internet
- 2 Go to the site <http://www.mettler-toledo-support.com>.
- 3 Log in to the METTLER TOLEDO Balance Support Site (registration with the serial number of a METTLER TOLEDO instrument required).
- 4 Click **Customer Support**.
- 5 Click appropriate product folder e.g. HX204 or HS153.
- 6 Click **USB Driver**.
- 7 Click **USBDriverInstaller.exe**.
- 8 Click **Save** to download to your specified location.
- 9 Right-click on the downloaded install program: **USBDriverInstaller.exe** and select **Run as Administrator** from the menu.
- 10 If a safety warning appears, allow Windows to install.



- 11 Click **Next** and follow the installer's instructions.



Installing Instrument

- 1 Switch off moisture analyzer
- 2 Connect the moisture analyzer to the preferred USB Port on the PC.
- 3 Switch the moisture analyzer on.
- 4 Follow the instructions of the wizard and install the software automatically (recommended).



Note

The wizard appears again for each USB port, either on your PC or if another moisture analyzer is connected.

NOTICE

Do not click [Cancel] as for the connected USB port, it might not be possible anymore to perform the installation process.

14.4 Third Party License/Notice

This section contains Third Party Software Notices and/or Additional Terms and Conditions for licensed third party software components included within SOFTWARE PRODUCT.

This SOFTWARE PRODUCT is based in part on the work of:

- **Qwt project**
For user's guide **see** <http://qwt.sf.net>
For LGPL license V2.1 **see** <http://www.gnu.org/licenses/old-licenses/lgpl-2.1.html>
- **KompexSQLite**
For LGPL license V3 **see** <http://www.gnu.org/licenses/lgpl.txt>
- **Qt library 4.8**
For LGPL license V2.1 **see** <http://qt-project.org/doc/qt-4.7/lgpl.html>
For GPL license V3 **see** <http://qt-project.org/doc/qt-4.7/gpl.html>
- **decNumber**
For ICU license V3.68 **see** <http://source.icu-project.org/repos/icu/icu/trunk/license.html>
- **RapidXML**
For MIT license **see** <http://www.opensource.org/licenses/mit-license.php>

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Good Weighing Practice™

GWP® is the global weighing standard, ensuring consistent accuracy of weighing processes, applicable to all equipment from any manufacturer. It helps to:

- Choose the appropriate balance or scale
- Calibrate and operate your weighing equipment with security
- Comply with quality and compliance standards in laboratory and manufacturing

► www.mt.com/GWP

www.mt.com/moisture

For more information

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www.mt.com/contact

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