Moisture Analyzer

HC103

METTLER TOLEDO

Table of Contents

1 Introduction

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

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

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).

This document is based on the software version V 2.10.

EULA

The software in this product is licensed under the METTLER TOLEDO End User License Agreement (EULA) for Software. ► www.mt.com/EULA

When using this product you agree to the terms of the EULA.

1.1 Further documents and information

► www.mt.com/moisture

This document is available in other languages online.

► www.mt.com/HC103-RM

Instructions for cleaning a balance: "8 Steps to a Clean Balance"

► www.mt.com/lab-cleaning-guide

Search for moisture software ► www.mt.com/moisture-software

Search for documents ► www.mt.com/library

For further questions, please contact your authorized METTLER TOLEDO dealer or service representative.

► www.mt.com/contact

1.2 Explanation of conventions and symbols used

Conventions and symbols

Key and button designations are indicated by a picture or bold text (e.g. **Save**).

📝 **Note** For useful information about the product.

Refers to an external document.

Elements of instructions

In this manual, step-by-step instructions are presented as follows. The action steps are numbered and can contain prerequisites, intermediate results and results, as shown in the example. Sequences with less than two steps are not numbered.

- Prerequisites that must be fulfilled before the individual steps can be executed.
1 Step 1
   ➡ Intermediate result
2 Step 2
➡ Result

1.3 Compliance information

European Union

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

United States of America

This equipment has been tested and found to comply with the limits for a **Class A** digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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

The FCC Supplier Declaration of Conformity is available online.

▶ http://www.mt.com/ComplianceSearch

2 Safety Information

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

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

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

2.1 Definition of signal words and warnings symbols

Safety notes contain important information on safety issues. Ignoring the safety notes may lead to personal injury, damage to the instrument, malfunctions and false results. Safety notes are marked with the following signal words and warning symbols:

Signal words

DANGER	A hazardous situation with high risk, resulting in death or severe injury if not avoided.
WARNING	A hazardous situation with medium risk, possibly resulting in death or severe injury if not avoided.
CAUTION	A hazardous situation with low risk, resulting in minor or moderate injury if not avoided.
NOTICE	A hazardous situation with low risk, resulting in damage to the instrument, other material damage, malfunctions and erroneous results, or loss of data.

Warning symbols

General hazard: read the User Manual or the Reference Manual for information about the hazards and the resulting measures.

Hot surface

Notice

2.2 Product-specific safety notes

Intended use

This instrument is designed to be used by trained staff. The instrument is intended for determining the weight loss during drying of samples.

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

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

Responsibilities of the instrument owner

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

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

Personal protective equipment

Insulated gloves

Lab coat

Goggles

Safety notes

⚠ **WARNING**

Death or serious injury due to electric shock

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

1 Check that the voltage printed on the instrument is the same as your local power supply voltage. If this is not the case, under no circumstances connect the instrument to the power supply, but contact a METTLER TOLEDO representative.

2 Only use the three-core power cable with equipment grounding conductor supplied by METTLER TOLEDO to connect your instrument.

3 Only connect it to a three-pin power socket with earthing contact.

4 Only use standardized extension cables with equipment grounding conductor for operating the instrument.

5 Make sure that the power plug is accessible at all times.

6 Arrange the cables so that they cannot be damaged or interfere with the operation.

7 Keep all electrical cables and connections away from liquids.

⚠ **WARNING**

Injury or death due to toxic or corrosive substances

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

1 When using chemicals and solvents, comply with the instructions of the manufacturer and the general laboratory safety rules.

2 Set up the instrument in a well-ventilated location.

3 When using dry substances that form toxic gases, place the instrument in a fume hood.

⚠ **WARNING**

Death or serious injuries due to flammable solvents

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

1 Keep flammable solvents away from the instrument.

2 When using chemicals and solvents, comply with the instructions of the manufacturer and the general laboratory safety rules.

⚠ CAUTION

Burns due to hot surfaces

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

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

NOTICE

Damage to the instrument due to corrosive substances and vapors

Corrosive substances and corrosive vapors can damage the instrument.

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

NOTICE

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

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

3 Design and Function

3.1 Overview

3.1.1 Overview

3.1.1.1 Drying unit
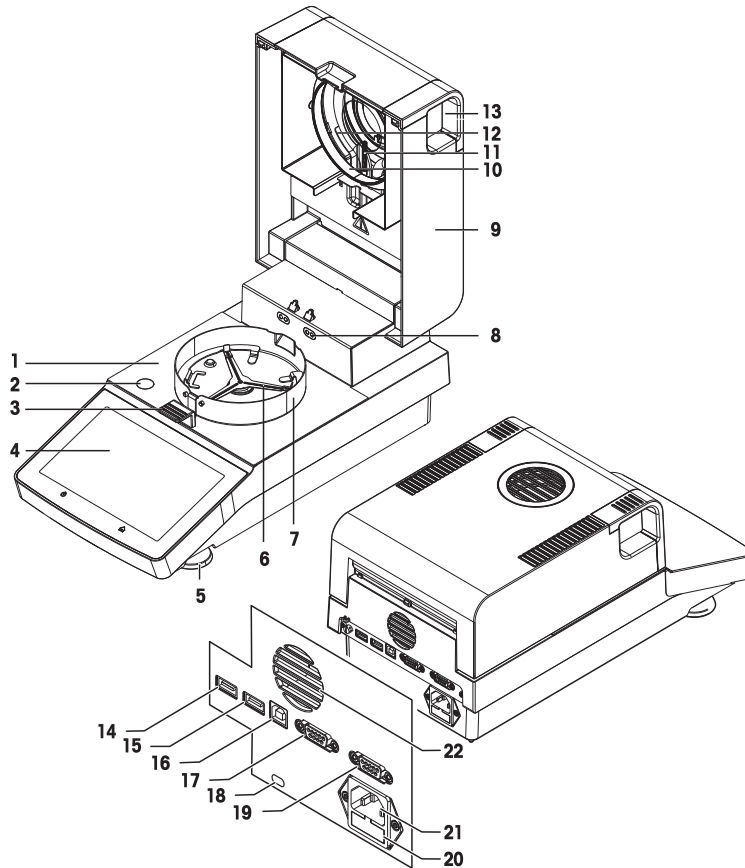
Legend

1	Sample chamber	**2**	Level indicator
3	Sample pan handler	**4**	Touch screen
5	Leveling screw	**6**	Sample pan holder
7	Draft shield element	**8**	Contacts for temperature adjustment kit (optional)
9	Heating module (with thermal overload protection)	**10**	Reflector ring
11	Temperature sensor	**12**	Protective glass
13	Handles for opening the sample chamber	**14**	USB Host 1
15	USB Host 2	**16**	USB Device
17	RS232C	**18**	Kensington slot for anti-theft purposes
19	RS232C (for production only)	**20**	Power line fuse
21	Power supply socket	**22**	Fan

3.1.2 Overview type plate

Drying unit type plate

The type plate of the drying unit is located on the side of the drying unit and contains the following information:
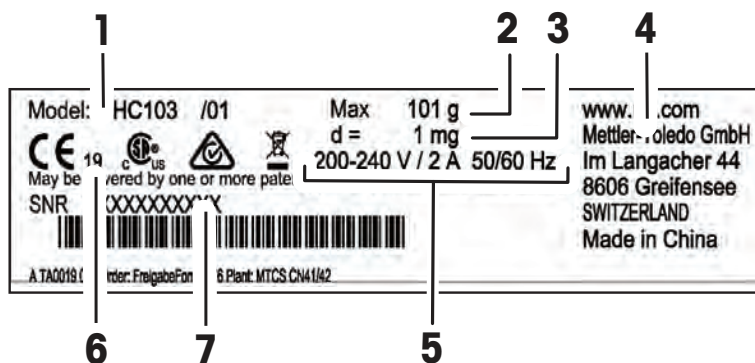
1	Model designation	**2**	Readability
3	Maximum capacity	**4**	Manufacturer
5	Power supply	**6**	Year of manufacture
7	Serial number (SNR)		

3.2 Function description

METTLER TOLEDO Moisture Analyzers work 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 absorption of the emitted infrared radiation. During the drying process the instrument continually measures the weight of the sample and displays the weight reduction, up to the final result.
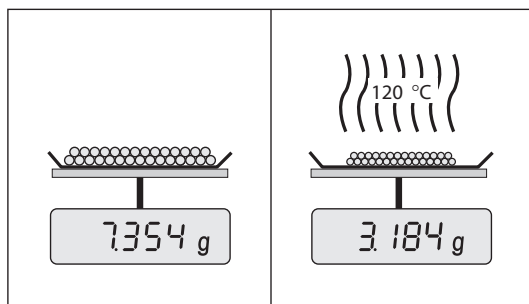
With halogen heating technology, maximum heating power is quickly reached and allows use of high temperatures. Uniform heating of the sample material ensures repeatability of the drying results and makes it possible to use small amounts of sample.

The METTLER TOLEDO Moisture portfolio comprises a range of moisture analyzers that differ from each other in both hardware and software.

The following features are available for the HC103 model:

- Robust and compact design, ideal for limited laboratory space.
- Intuitive operation thanks to a large touchscreen and easy to navigate user interface. **See** [User interface ▸ Page 20]
- Quick and easy cleaning. **See** [Cleaning ▸ Page 74]
- Quick access to methods and results with shortcuts on the home screen. **See** [Working with shortcuts ▸ Page 44]
- Easy reporting. **See** [Exporting results ▸ Page 48]
- ID management. **See** [Identifications management ▸ Page 63]
- Setup wizard and instrument tutorial. **See** [Setup wizard ▸ Page 13] and [Help and tutorials ▸ Page 73]

4 Installation and Putting into Operation

4.1 Selecting the location

Requirements of the location

| Place indoors on stable table | Ensure sufficient spacing | Level the instrument | Provide adequate lighting |

| Avoid direct sunlight | Avoid vibrations | Avoid strong drafts | Avoid temperature fluctuations |
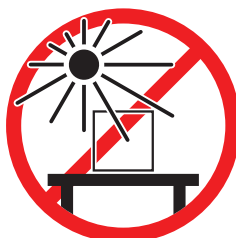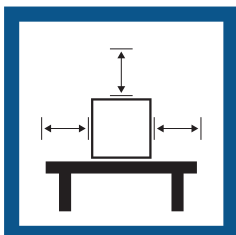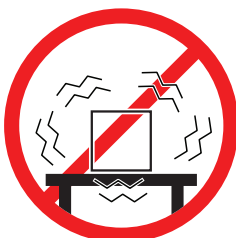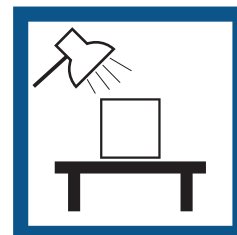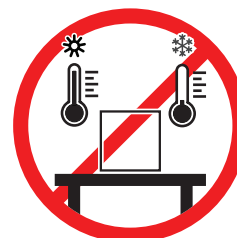
Sufficient distance for Moisture Analyzers: > 15 cm next to the instrument, > 1 m above the heating module.

4.2 Unpacking

📝 **Note**

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

After receiving the instrument, proceed as follows:

1 Open the package and remove drying unit and the accessories.

2 Remove the packaging from the instrument.

3 Check the Moisture Analyzer for transport damage and complete scope of delivery.

4 In the event of damage or missing accessories, immediately inform a METTLER TOLEDO representative.

4.3 Scope of delivery

Moisture Analyzer	Documentation	Accessories
• 1 Drying unit with terminal	• 1 User Manual	• 80 aluminium sample pans
• 1 Draft shield	• 1 Application brochure «Guide to Moisture Analysis»	• 3 Specimen samples (glass fibre filter)
• 1 Power cable	• EU-countries: 1 CE declaration of conformity	• 1 SmartCal sampler
• 1 Sample handler		
• 1 Sample pan holder		

4.4 Connecting the instrument

> ⚠ **WARNING**
>
> **Death or serious injury due to electric shock**
>
> Contact with parts that carry a live current can lead to injury and death. If the instrument cannot be shut down in an emergency situation, people can be injured and the instrument can be damaged.
>
> 1 Check that the voltage printed on the instrument is the same as your local power supply voltage. If this is not the case, under no circumstances connect the instrument to the power supply, but contact a METTLER TOLEDO representative.
> 2 Only use the three-core power cable with equipment grounding conductor supplied by METTLER TOLEDO to connect your instrument.
> 3 Only connect it to a three-pin power socket with earthing contact.
> 4 Only use standardized extension cables with equipment grounding conductor for operating the instrument.
> 5 Make sure that the power plug is accessible at all times.
> 6 Arrange the cables so that they cannot be damaged or interfere with the operation.
> 7 Keep all electrical cables and connections away from liquids.

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

110 V AC or 230 V AC

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

See also

📄 Drying unit ▶ Page 10

4.5 Setup wizard

When you switch on your Moisture Analyzer for the first time or when a factory reset was performed, 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.

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.

Setup Wizard

Setup Wizard

Welcome!

This Setup Wizard will help you to set the basic configuration
and to put together the instrument for first use.

You can always change these settings later
under the Settings menu of the Home Screen.

Back   Next
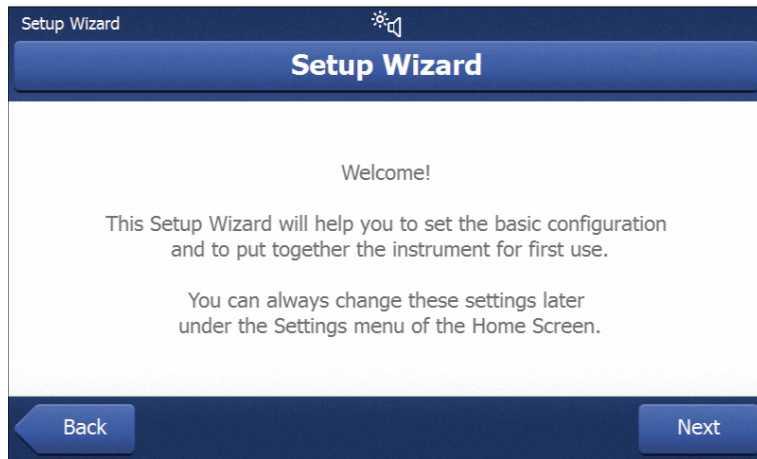
📝 **Note**

The application **Instrument tutorial** starts automatically after the application **Setup Wizard** has succesfully finished. This option can be skipped by inactivating the checkbox **Proceed to the Instrument Tutorial**. If you want to redo the application **Instrument tutorial**, it can be found in the section **Settings**.

4.6 Setting up the instrument

- Instrument is connected to the power supply.
1 Open the sample chamber.
2 Place the draft shield element. Place the notches onto the screw heads on the bottom of the sample chamber.
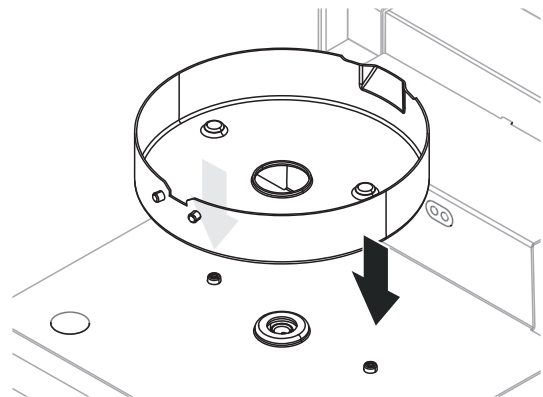
3 Carefully insert the sample pan holder. Make sure that the sample pan holder is correctly positioned and falls into position (see picture).
4 Insert the sample pan handler.
5 Press [⏻] to start the instrument.
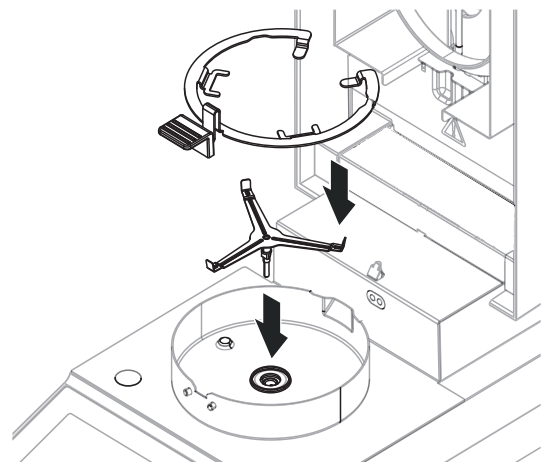
4.7 Leveling the instrument

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

Note

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

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

Note

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

To level it, proceed as follows:
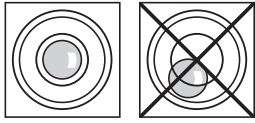
1   Position your Moisture Analyzer at the selected location.
2   Turn the two leveling feet until the air bubble is in the center of the level indicator.
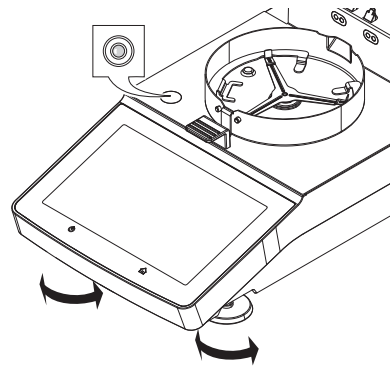
Air bubble at 12 o'clock:		turn both feet clockwise.	
Air bubble at 3 o'clock:		turn left foot clockwise, right foot counter-clockwise.	
Air bubble at 6 o'clock:		turn both feet counterclockwise.	
Air bubble at 9 o'clock:		turn left foot counterclockwise, right foot clockwise.	

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 ▸ Page 87].
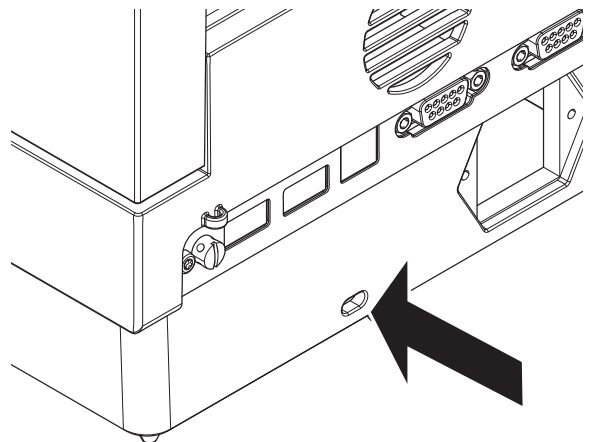
4.9 Setting date and time

Navigation: Home > **Settings** > **Instrument settings** > **Regional Settings**

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

Set the current date

■ **Regional Settings** is selected.

1 Tap **Date**.

2 Set day, month and year.

3 Confirm with **Set date**.

Set the current time

■ **Regional Settings** is selected.

1 Tap **Time**.

2 Set hours and minutes.

3 Confirm with **Set time**.

4.10 Adjusting after setup

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

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

The following adjustment options are possible:

- Balance adjustment with external weight
- Temperature adjustment with temperature kit
- To verify the overall performance of the Moisture Analyzer after the aforementioned adjustments, perform a SmartCal test.

For more information to perform these operations **see** [Test/Adjust ▶ Page 50].

4.11 Transporting, packing and storing

4.11.1 Transporting the Moisture Analyzer

Transporting the Moisture Analyzer over short distances

1 Switch off the instrument and unplug all interface cables.

2 Hold the instrument with both hands as shown.

3 Carefully lift the instrument and carry it in horizontal position to the new location.
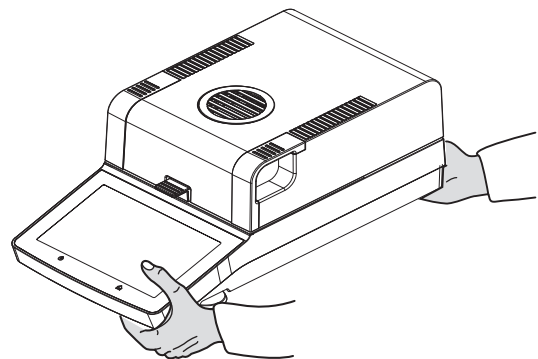
Transporting the Moisture Analyzer over long distances

For transporting the Moisture Analyzer over long distances, always use the original packaging or the designated transport case (**see** "Accessories").

4.11.2 Putting into operation after transport

Putting into operation after transport:

1 Connect the instrument to the power supply.

2 Check the level status. Level the Moisture Analyzer if necessary.

3 METTLER TOLEDO recommends to perform weight and temperature tests and, if necessary, adjustments after transporting the Moisture Analyzer.

➡ The Moisture Analyzer has been put into operation and is ready to use.

See also

▤ Connecting the instrument ▸ Page 13

▤ Test/Adjust ▸ Page 50

4.11.3 Packing and storing

Packaging

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

Storing

Store the Moisture Analyzer under following conditions:

* Indoor and in the original packaging.

* According to the environmental condition, see "Technical data".

▤ **Note**

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

4.12 Installing USB device driver

To transmit commands via USB device interface, a USB driver program has to be installed on the instrument and PC. The driver program is automatically installed during setup of the instrument. However, in case of an installation error, the software can be downloaded online and installed manually.

Find the download link on:

▶ www.mt.com/labweighing-software-download

Requirements

* PC with one of the following Microsoft Windows® 32-bit/64-bit operating systems: Win 7 (SP1), Win 8 or Win 10.

* USB cable to connect the instrument to the PC.

Downloading and installing the USB driver

1 Open the download portal (see above) on your PC.

2 Download the driver software and extract the .zip file.

3 Right-click on the extracted .exe installation program and select **Run as Administrator**.

4 If a safety warning appears, allow windows to perform the installation.

5 Click **Next** and follow the installer's instructions.

Connecting the instrument to the PC

1 Connect the moisture analyzer to the preferred USB port on the PC.

2 Follow the instructions on the PC and install the software automatically (recommended).

3 Check that the instrument is listed as a device (COM Port) on your PC.

4 Set USB interface in the peripheral settings of the instrument.

5 Operating Elements and Interfaces

5.1 Overview operation keys

⏻	⌂
ON/OFF	Home
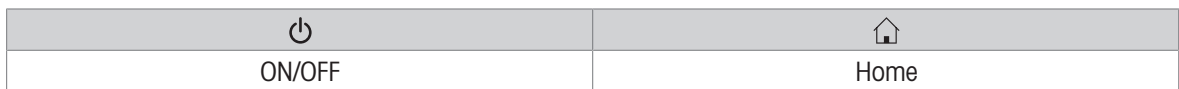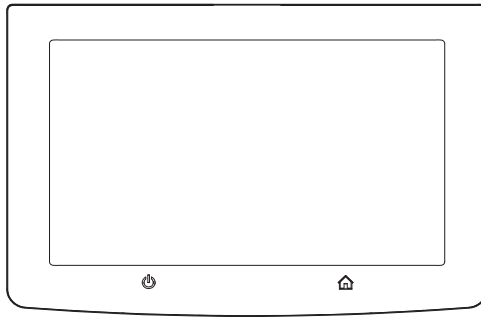
5.2 Electrical interfaces
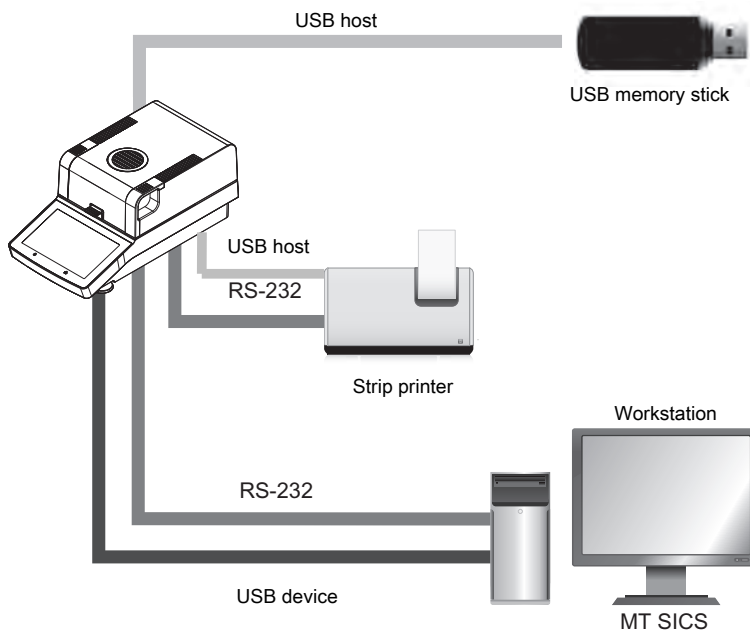
📝 Note

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)
- A bar code reader can be connected to the USB port. With a connected bar code reader, bar codes can be added in a keyboard dialog.

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 Operation

6.1 Operation orientation

The Moisture Analyzer is mainly operated via the touchscreen and keys of the terminal.

Before a measurement can be made, a method must first be defined. Methods define the parameters of a measurement, such as the temperature to which the sample is heated or the criterion after which the measurement is finalized. The optimum parameters differ from sample to sample. The instrument and METTLER TOLEDO support you in finding a suitable method for your sample.

Once a method has been defined, the actual measurement can be started: The sample is placed in the sample chamber and prepared. Then the heating module is closed and the sample is heated. Depending on the sample and the method, the measurement can take from a few minutes to a few hours.

When the measurement is finished, the end result is shown on the terminal screen. The result of the measurement can also be exported or printed.

The Moisture Analyzer can be used immediately for another measurement.

6.2 User interface

6.2.1 Operation keys

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

6.2.2 Screen navigation

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

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

NOTICE

Damage to the touch screen due to pointed or sharp objects

− Operate the touch screen with your fingers.

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

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

Selecting a button or an icon

− Tap on it.

Scrolling

− Drag the button in the scroll bar up or down.

− Or tap ▲ or ▼

6.2.3 Basic elements on the touch screen

The graphical user interface consists of the following basic elements.

	Name	Explanation
1	Status message icons	Show information about the instrument status. The quick access icon (for settings of brightness and sound) is displayed continuously. **See** Status Message Icons
2	Status bar	Shows the user name, status icons as well as date and time.
3	Title bar	Shows title of the current screen, contains special functions. **See** [Title bar icons ▶ Page 21].
4	Content area	Main working area of the menus and the applications. Shows content depending on application or performed action. May also show graphic illustrations such as the curve diagram of a data set (e.g. drying curve).
5	Action bar	Contains action buttons which are required and available in the current dialog. **See** [Action bar buttons ▶ Page 21].

6.2.4 Icons and buttons

6.2.4.1 Title bar icons

The title bar icons only appear when they are active. The icons which appear in the title bar, are listed with their function below:

Parameter	Description
⤴	Create a shortcut and add it to your user home screen. Edit or remove an existing shortcut **see** Using Shortcuts.

6.2.4.2 Action bar buttons

The action bar contains action buttons for triggering any of the actions which are required and available in the current dialog (e.g. **Back**, **->0/T<-**, **Print**, **Save**, **Delete**, **OK**). There are up to six action buttons available for a work step.

6.2.4.3 Status message icons

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

Icon	Status description	Diagnostic	Remedy
🔧	Service is due.	–	Contact your METTLER TOLEDO support representative.

Icon	Status description	Diagnostic	Remedy
☀🔊	Quick Access icon (displayed continuously)	Quick setting of brightness and sound.	-
🖥	**EasyDirect Moisture** connection icon	Indicates the connection of the device to **EasyDirect Moisture**.	-

6.2.5 Home screen

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

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

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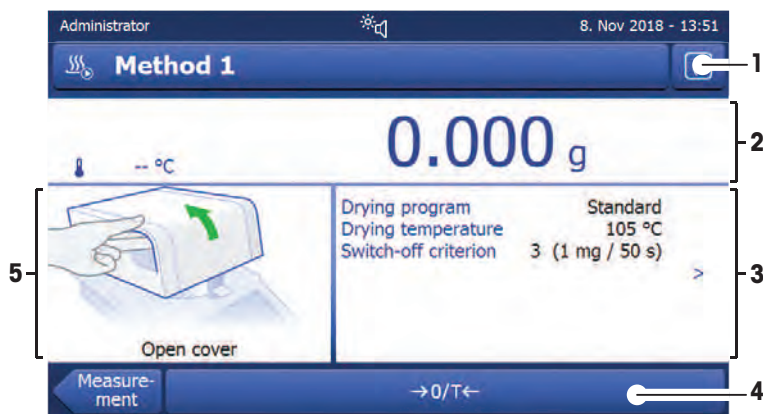
	Name	Explanation
1	**Shortcut button**	Adding/editing a shortcut to the current method (to the home screen).
2	**Value panel**	Current measured (or predicted) values of the work process.
3	**Parameter panel**	Parameters of the current work process. A detailed overview of the method parameters appears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

6.2.7 Input dialogs

6.2.7.1 Entering characters and numbers

The keyboard dialog allows you to enter characters including letters, numbers and a variety of special characters. The country-specific layout of the keyboard is in accordance with the selected language, **see** Regional Settings.
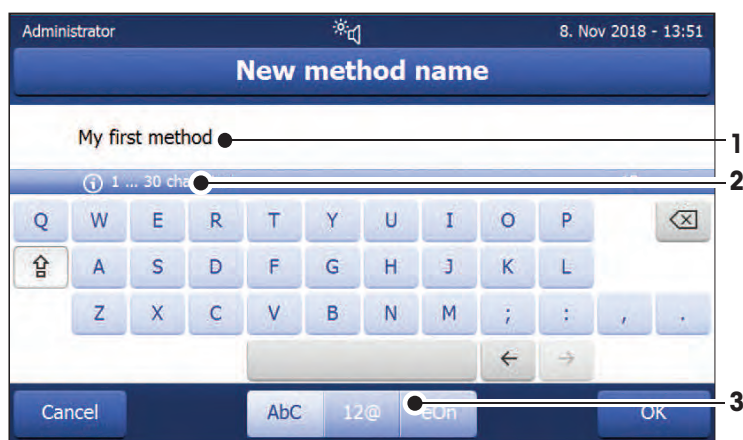
	Name	Explanation
1	Input field	Shows the data that has been entered.
2	Explanation field	Indicates the maximum number of characters allowed.
3	Shift	Switches the keyboard between standard and special characters.

– Confirm with [**OK**] (To exit keyboard tap [**Cancel**]).

	Function
⇧	Shifts between lower and upper case letters
⌫	Deletes last character
←	Cursor left
→	Cursor right

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

6.2.7.2 Entering numerical values

The numerical keypad dialog allows you to enter numerical values.

	Name	Explanation
1	Switch	If a switch appears, located on the left side in the title bar; it must be switched on for the entry of a value: O = **OFF**, I = **ON**
2	Input field	Shows the data that has been entered.
3	Explanation field	The valid input range is indicated.
⌫	Delete button	Deletes last character.
←	Cursor left	Jumps one character to the left.
→	Cursor right	Jumps one character to the right.

– Confirm with [**OK**].
To exit keypad, tap [**Cancel**].

6.2.7.3 Changing date and time

This dialog (Picker view) allows you to set the date and time by picking from the built-in calendar/clock.
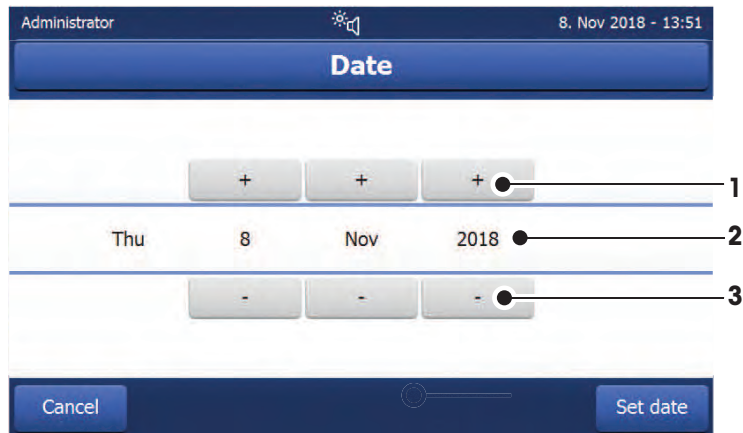
	Name	Explanation
1	Pick button	Increases the value
2	Explanation field	Shows the current value
3	Pick button	Reduces the value

− Confirm with [**Set date**]. (To exit without changing, tap [**Cancel**].)

6.2.8 Lists and tables

Simple list view

Basic elements of a simple list including a content title. If necessary, the content area can be scrolled vertically.

	Name	Explanation
1	Content title	Shows the subject of the current content
2	Content area	Shows the relevant content
3	Arrow icon	[↓] Shows the list in ascending order.
		[↑] Shows the list in descending order.
4	Scrollbar	[▲] Scroll up
5		Scroller
6		[▼] Scroll down

Further types of lists

Accordion panels are opened or closed by tapping [⌃].
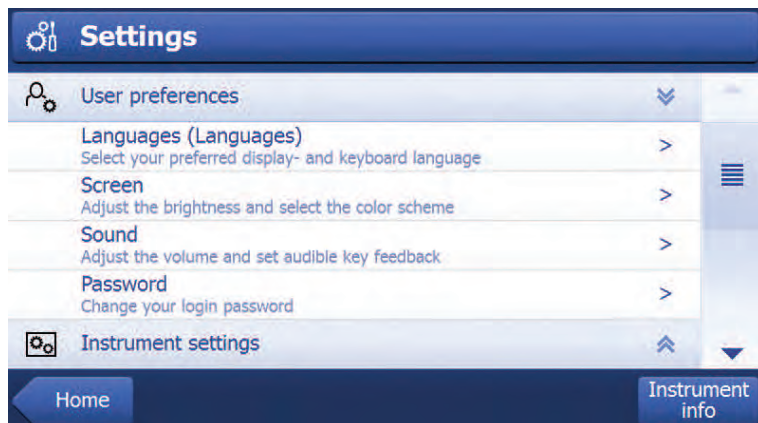
Closable panels are opened or closed by tapping [▶].
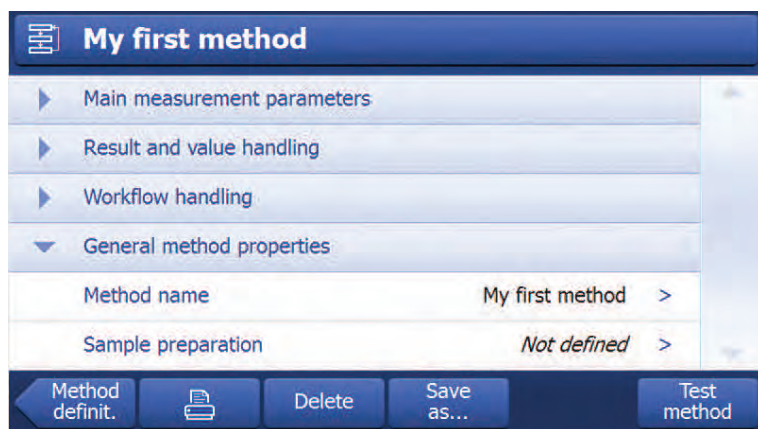
6.3 Performing a simple measurement

To check the function of the instrument and to become familiar with the process, METTLER TOLEDO recommends carrying out a simple example measurement, e.g. using a glass fibre filter to measure the moisture content of water. During this first measurement, the instrument works with factory default settings.

- ■ The instrument is connected to the power supply.
- – To switch on, press ⏻.
1 Tap **Method Definition**.
   - ➡ **Method Definition** menu appears.
2 To define a new method, tap **New…**.
3 To define a new method manually, tap **Define method manually**.
   - ➡ The keypad appears.
4 Enter a name for your first method e.g. **My first method**.
5 Confirm with **OK**.
6 To store your new method with factory settings, tap **Save**.
7 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 the accessories

▪ The display now prompts you to load the predefined accessories and tare the balance.

1 Place the empty accessories 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 accessories.

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 tarring, open the sample chamber.

📝 **Note**

In this example, the glass fiber filter is part of the sample for the sake of simplicity. In routine liquid measurements, the glass fiber filter is not part of the sample and must be tared together with the sample pan.

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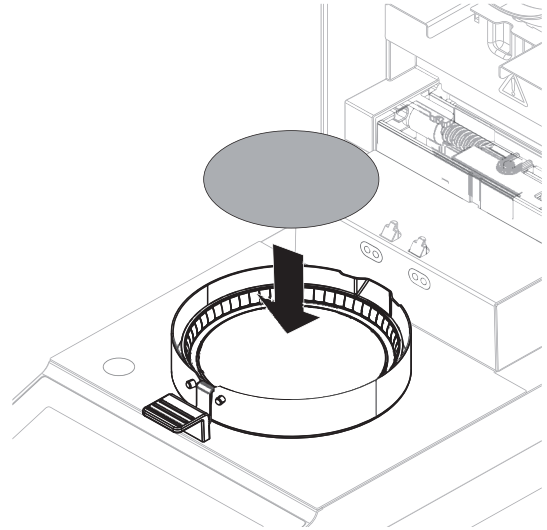
2   Wet the specimen sample with a few drops of water.
3   Close the sample chamber.
    ➡ The drying process starts automatically.

Drying process
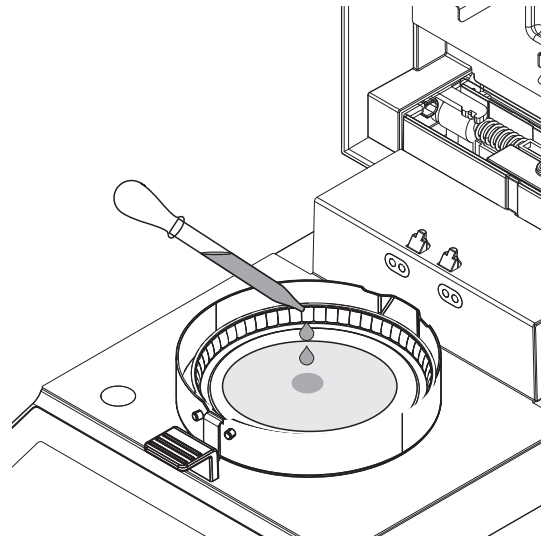
You can follow the measurement process on the display.

- 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** or **Cancel** are available.
- Tap on **Abort measurement and save data** 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**

Burns due to hot surfaces!

Parts of the instrument can reach temperatures that cause injuries if touched.
Sample, sample pan and other parts inside the sample chamber may still be hot.

−   Do not touch the place marked with the warning symbol.

- 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 ⌂.
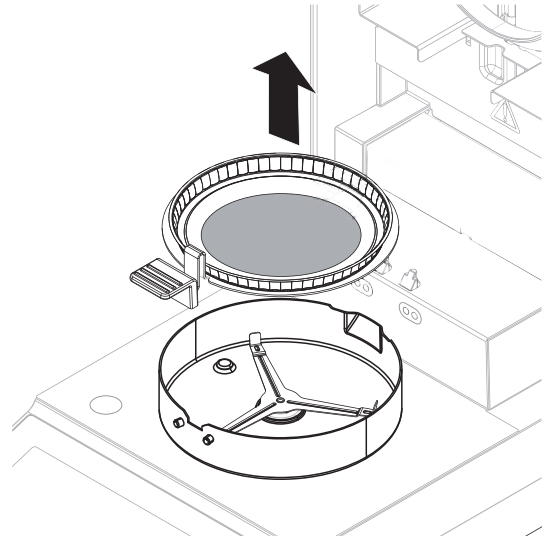
7 Software Description

7.1 Method definition

Navigation: Home > Method definition

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

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

Resources on methods and method definition:

▶ www.mt.com/moisture-guide

▶ www.mt.com/moisture-methods

7.1.1 Method parameters

7.1.1.1 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.

The following parameters can be defined:

Menu item	Explanation	Further Information
Drying program	Defines the drying program which is best suited for the specific sample. (including temperature and switch-off criteria)	**see** [Drying program ▶ Page 30]
Display mode	Defines the type of value for displaying and printing.	**see** [Display mode ▶ Page 34]
Start weight	Defines a start weight so that the samples always have approximately the same weight .	**see** [Start weight ▶ Page 35]

7.1.1.1.1 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	Description	Values
Drying program	Defines the drying program which is best suited for the specific sample.	Standard* | Rapid

* Factory setting

Further information:

- **Standard** drying **see** [Standard drying ▶ Page 31]
- **Rapid** drying **see** [Rapid drying ▶ Page 31]

Types of drying programs

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	Description	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 [Switch-off criterion (SOC) ▸ Page 32]

Rapid drying
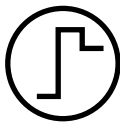
Rapid drying

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 (the maximum heating temperature is 230 °C) to compensate for the cooling due to vaporization and to 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	Description	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 [Switch-off criterion (SOC) ▸ Page 32]

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** [Start weight ▸ Page 35].

The following parameters can be defined:

Parameter	Description	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 that 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	Δ g	Δ t	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).
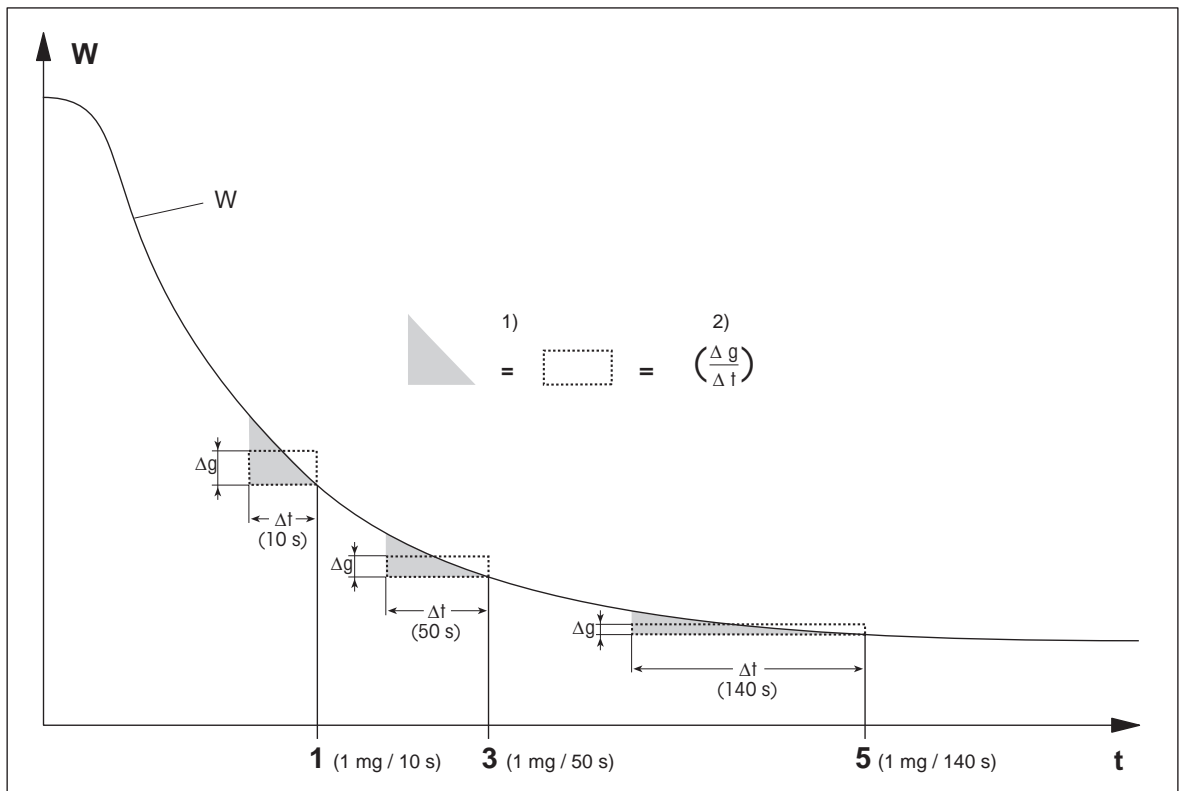
t	=	time
W	=	weight of sample
1, 3, 5	=	switch-off criteria shown as an example

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.

7.1.1.1.2 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	Description	Values
Display mode	Defines the type of value for displaying and printing.	%MC* I %DC I %AM I %AD I g I −%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.

Before drying   After drying

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

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.

Before drying   After drying

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

DC = dry content [100…0%]
WW = wet weight
DW = dry weight
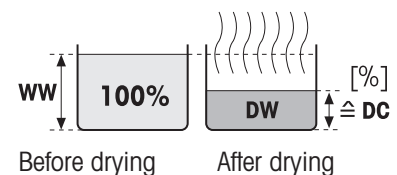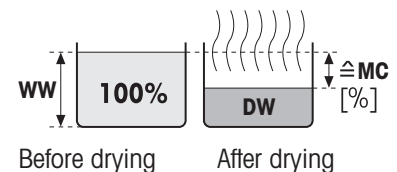
%AM – ATRO Moisture Content [1]

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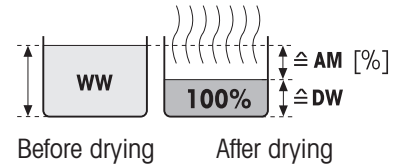
$$AM = \frac{WW - DW}{DW} \cdot 100\ \%$$

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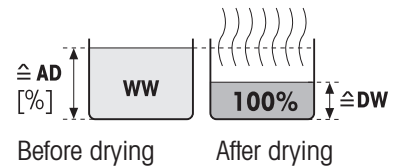
$$AD = \frac{WW}{DW} \cdot 100\ \%$$

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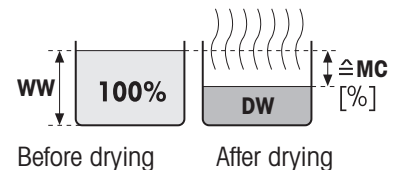
$$MC = - \frac{WW - DW}{WW} \cdot 100\ \%$$

MC = Moisture Content [0…100%]
WW = wet weight
DW = dry weight

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

* Factory setting

7.1.1.2 Result and value handling

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

The following parameters can be defined:

Menu item	Explanation	Further Information
Free factor	Defines a method-specific multiplication factor to calculate a corrected final result.	**see** [Free factor ▶ Page 36]

7.1.1.2.1 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	Description	Values
Free factor	Defines the settings for free factor. **OFF** = no free factor applied.	OFF* I 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 I x.x I x .xx I x.xxx*

* Factory setting

7.1.1.3 Workflow handling

7.1.1.3.1 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	Description	Values
Starting mode	Defines how the sample chamber is operated.	Automatic* I 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.

7.1.1.3.2 Accessories

For a method, certain accessories can be specified that must be used for the measurements. During the measurement, these accessories are then requested on the work screen.

The following parameters can be defined:

Parameter	Description	Values
Accessories	Defines the main accessory (pan) in which the sample is prepared.	Sample pan* I HA-Cage
Additional accessories (only available if the sample pan is the main accessory: • Glass fibre filter • Second glass fibre filter • Downholder	Defines additional accessories to be used with the sample pan.	☐ (deactivated)* I ☑ (activated)

* Factory setting

7.1.1.4 General method properties

7.1.1.4.1 Method name

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

The following parameters can be defined:

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

7.1.1.4.2 Sample preparation

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

If a method is created with the method wizard (**see** [Creating a method with the Method Wizard ▶ Page 38]), the wizard automatically fills the **Sample preparation** field with the recommended preparation steps. The recommended preparation can be edited by tapping **Sample preparation**, but the number of characters in the text is limited to 100.

The sample preparation recommendation is not visible in the workflow during routine measurements.

The following parameters can be defined:

Parameter	Description	Values
Sample preparation	Specifies the sample preparation for a method recommended by the Method Wizard.	any

7.1.2 Creating a method

Prerequisite

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

Main menu	Submenu	Further information
Main measurement parameters	**Drying program** (including temperature and switch-off criteria)	**see** Settings of Drying Program
	Display mode	**see** Settings of Display Mode
	Start weight	**see** Settings of Start Weight
Result and value handling	**Control limits**	**see** Control limits
	Resolution	**see** Resolution
	Free factor	**see** [Free factor ▶ Page 36]
	QuickPredict	**see** QuickPredict
Workflow handling	**Starting mode**	**see** Starting Mode
	Accessories	**see** [Accessories ▶ Page 37]
General method properties	**Method name**	**see** [Method name ▶ Page 38]
	Sample preparation	**see** [Sample preparation ▶ Page 38]

7.1.2.1 Creating a method with the Method Wizard

Introduction

The Method Wizard is a feature that offers assistance in developing a suitable moisture method for specific samples. Based on the characteristics of your sample as well as a test of the drying temperature and switch-off criterion, the Method Wizard is able to formulate a suitable method for your sample.

The Method Wizard guides you through the development of your moisture method in three simple steps:

1. **Questionnaire**: proposal of method parameters based on sample characteristics.
2. **Temperature assistant**: determination of drying temperature.

3. **Test measurement**: verification of temperature and selection of appropriate switch-off criterion

After each step of the Method Wizard you can decide whether to accept the current method settings or to complete another step of the wizard. For steps 2 and 3, a reference moisture content value is needed.

Creating a new method with the Method Wizard

- Reference value (for Steps 2 and 3) is available.
- **Method definition** is selected.

1 Tap [**New...**].

2 Tap **Define using Method Wizard**.
   → The Method Wizard disclaimer text appears.

3 Read the disclaimer text and confirm by tapping [**Next**].
   → The keypad appears.

4 Enter a name for the new method. The name should be unique and unambiguous. 1 to 30 characters are possible (including spaces).

5 Confirm with [**OK**].
   → A short introduction appears.

6 Read the instruction and tap **Next**.
   → The **Method Wizard** starts.

7 **Step 1 (Questionnaire):** Follow through the questions by tapping the answers and then tapping [**Next**].
   → After all questions are answered, you are proposed a method and asked if you want to adopt this method or continue with the next step.

8 • To continue, tap **Continue with temperature assistant (recommended)**.
   • To leave the wizard, tap **Accept method parameters and exit wizard**.

9 Confirm by tapping [**Next**].

10 **Step 2 (Temperature assistant):** Follow the instructions of the wizard to determine a suitable drying temperature. For questions about the temperature assistant, **see** Temperature assistant. This step may require several iterations.
   → After successful testing, you are proposed a drying temperature and asked if you want to complete the next step or adopt the current method.

11 • To continue, tap **Continue with test measurement (recommended)**.
   • To exit the wizard, tap **Accept method parameters and exit wizard**.

12 Tap [**Next**].

13 **Step 3 (Test measurement):** Follow the instructions of the wizard to select an appropriate switch-off criterion. For questions about the test measurement, **see** Test measurement.
   → After successful testing, you are recommended a switch-off criterion and are asked if you want to adopt it or perform another test.

14 • To adopt the method, tap the desired switch-off criterion.
   • To reject the proposed switch-off criterion and perform another test at a different drying temperature, tap **Start over again using a different drying temperature**.

15 Confirm by tapping [**Next**].

16 To store the method, tap [**Finish**].
   → The method settings appear. The new parameters are already filled in.

17 **NOTICE: Data loss:** To definitively store your method settings, tap [**Save**] before you exit the method settings. Otherwise all data is lost.
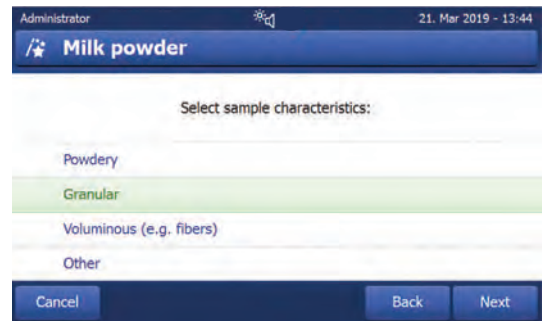
7.1.2.2 Creating a method manually

- ■ **Method definition** is selected.

1 Tap [**New...**].

2 Tap **Define method manually**.

   ⇒ The keypad appears.

3 Enter a name for the new method. The name should be unique (a method name can only exist once) and unambiguous. 1 to 30 characters are possible (including spaces).

4 Confirm with [**OK**].

   ⇒ The parameter menu for the new method appears.

5 Set the desired parameters e.g. **Main measurement parameters**.

6 To store the method, tap [**Save**].

7.1.2.3 Creating a method by consulting the method library

The online METTLER TOLEDO moisture method library offers a wide range of tested and validated methods for different industries and substances. Optimize your moisture analysis with the help of our moisture expertise and profit from a wealth of know-how and widespread support.

Find the moisture library under:

▶ www.mt.com/moisture-methods

Downloading a method from the method library

- ■ PC with internet connection is available.

- ■ Storage device (e.g. USB Stick) with at least 500 MB memory space is available.

1 Open the method library (see above) on your PC.

2 Click **Moisture Applications**.

3 Fill out the form according to the instructions to find a moisture method for your sample.

4 Click the method you wish to download.

   ⇒ The access form opens.

5 Fill out the form and click **Download** to download the method file.

6 Transfer the file onto your storage device.

Importing the method to the istrument

- ■ **Method Definition** is opened.

1 Connect your storage device to the instrument.

2 Tap [**Import**].

   ⇒ **Import methods** screen opens.

3 Tap [**Import from file**].

   ⇒ The list of connected hard drives opens.

4 Tap the device and location where your method file is stored and select your file.

5 Confirm by tapping **Import**.

⇒ Your new method is imported and is now ready for routine measurements in the method list.

7.1.3 Editing a method

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. The 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 (incl. results of previous versions) as well as corresponding shortcuts 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 desired method is removed.

7.2 Measurement

Navigation: Home > **Measurement**

Introduction

Before a measurement can be performed, a method first needs to be defined. To define a suitable method for your sample, **see** [Method definition ▸ Page 30].

The instrument guides you through the steps during a measurement and displays results in real time. Nevertheless, please note the instructions in this manual, especially at the beginning of your work with the Moisture Analyzer, as a correct execution of the work steps and the handling of the samples can have a great influence on the results.

7.2.1 Performing a measurement

Before performing a measurement, a method has first to be defined. To find a suitable method for your sample, **see** Method Definition.

- ■ The instrument must be connected to the power supply for approximately 60 minutes in order to reach operating conditions.

- – To switch on the Instrument, press ⏻.

Selecting a method

1   Tap on **Measurement**.

   ➡ The methods list is displayed.

2   Select the method to determine your sample.

   ➡ The work screen of the method appears.

3   Open the sample chamber.

Placing the accessories

- The display now prompts you to load the predefined accessories and tare the balance.
1 Place the empty accessories 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 accessories.

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 tarring, open the sample chamber.

- After taring, the display prompts you to add the sample to the sample pan.
1 Add the sample to the sample pan. If you have defined a start weight, weigh the sample using the weighing-in aid.
2 Close the sample chamber.
3 Tap **Start drying**.
   ➡ The drying process starts.
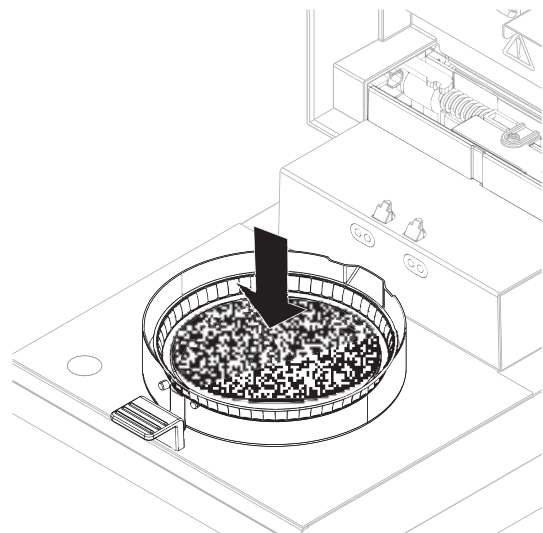
Drying process

The measurement process can be followed on the display.

- 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.
- The drying process can be aborted by tapping on **Stop drying**.

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

📝 **Note**

The maximal drying time is 480 minutes (8 hours).

Removing sample

> ⚠ **CAUTION**
>
> **Burns due to hot surfaces!**
> Parts of the instrument can reach temperatures that cause injuries if touched.
> Sample, sample pan and other parts inside the sample chamber may still be hot.
> – Do not touch the place marked with the warning symbol.

- ■ The drying process is completed.
- ■ Open the sample chamber.
1 Carefully remove the sample pan handler from the sample chamber.
2 • To perform a further measurement with the current method, tap **Next Sample**.
 • To perform a measurement with a new method, tap **Measurement**.
 • To return to the home screen, press ⌂.
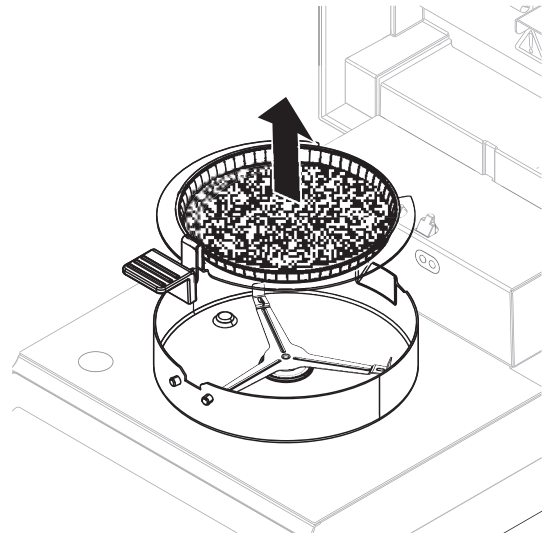
Stop drying

When you stop the measuring process by tapping [**Stop drying**], you can choose between two options:

- **Abort measurement and save data**
 Already sampled data are stored and an entry will be made in the results. The result is marked as aborted.
- **Cancel**
 The process will be continued.

Adding a comment

At the end of a measurement you can add a comment to the result of the measurement. This comment is stored in the measurement result and can be printed. A comment can only be entered before leaving the current measurement.

1 To create a comment, tap **Note**.
 ➡ The keyboard dialog appears.

2 Enter a comment.

3 Confirm with **OK**.

7.2.2 Optimum sample preparation

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

Basic rules for the preparation of samples:

- The amount of sample you select should be as small as possible but as large as necessary.
- The more inhomogeneous the sample substance, the larger the amount of sample needed to obtain a repeatable result.
- Distribute the sample evenly over the sample pan. This increases the surface area of the sample and facilitates heat absorption.
- With liquid, fat-containing, melting, highly reflecting samples or samples which form a skin on their surface when heated, use the sample with the glass fiber filter available as optional equipment, **see** Accessories and Spare Parts.

7.2.3 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** [Settings of Start Weight ▶ Page 36].
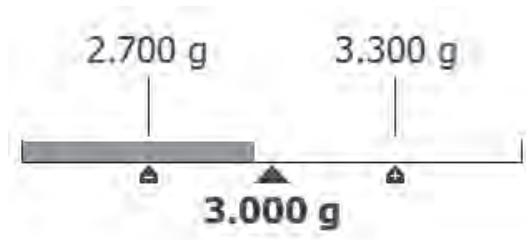
Icon	Function
➖	Lower weight limit (tolerance range)
▲	Target weight
➕	Upper weight limit (tolerance range)

7.2.4 Working with shortcuts

Navigation: Home > **Measurement** > **Method name** > 🔗

With shortcuts, methods can directly be started from the home screen. Shortcuts are being created for important methods that are often used.

Create a shortcut

1 Tap on **Measurement**.

⇒ The list of the defined methods appears.

2 Tap on **Edit shortcuts...** that can be found in the action bar.

3 Tap on the method from the list for which you want to create the shortcut.

⇒ The window **Shortcut name** appears.

4 Enter a shortcut name.

📝 **Note**

The shortcut name has a maximum length of 30 characters. Two lines with about 16-20 characters of the shortcut name are being shown in the shortcut on the home screen. The space button can be used to break the line. We recommend to use not more than 10 characters per line.

5 Tap on **OK**.

6 Tap on **Save**.

➡ The new shortcut appears on the home screen.

Editing a shortcut

1 Tap on **Measurement**.

   ➡ The list of the defined methods appears.

2 Tap on **Edit shortcuts…**.

3 Tap on the defined method from the list for which you want to edit the shortcut.

4 Define the shortcut name.

5 Tap on **OK**.

6 Tap on **Save**.

➡ The shortcut has been edited.

Removing a shortcut

1 Tap on **Measurement**.

   ➡ The list of the defined methods appears.

2 Tap on **Edit shortcuts…**.

3 Disable the shortcut that should be removed from the home screen.

4 Tap on **Save**.

➡ The shortcut is removed from the home screen.

7.3 Results

Navigation: Home > 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 safe the results frequently.

7.3.1 Graphical evaluations of measurement results

Navigation: Home > Results

This function allows you to manage and evaluate measurement results.

Method list
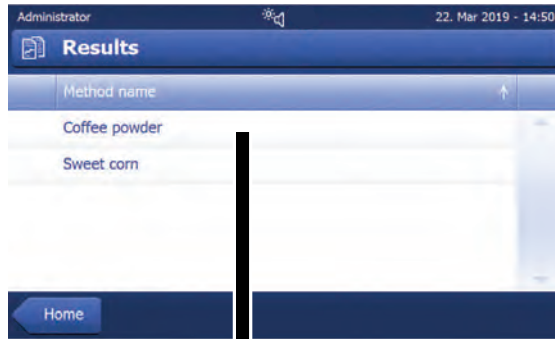
Journal view
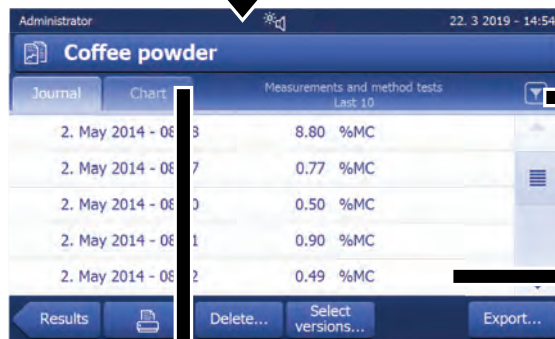
Filter menu
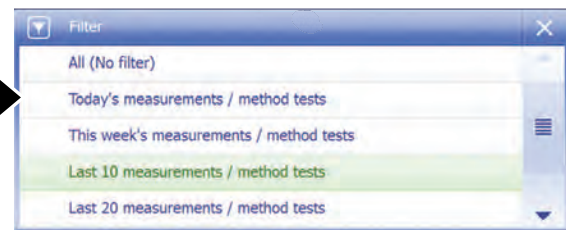
Chart view
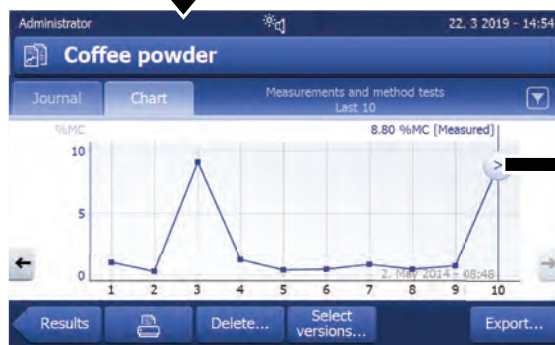
Graphic view
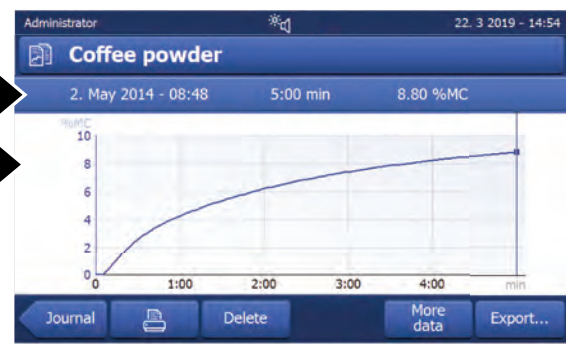
1 Method list

– 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's measurements**
- **This week's measurements**
- **Last 10 measurements***
- **Last 20 measurements**
- **Advanced filters**

* Factory setting

− Tap **X** to close filter menu.

Advanced filters

The menu **Advanced filters** offers you a number of additional filter criteria.

The following settings can be defined:

Parameter	Description	Values
Time range	With the option **Date range** the results are being filtered by date. Begin and end date must be defined. With the option **Last measurements** the last measurements and method tests that have been performed can be shown. The number must be between 1 and 100.	No time range limit l Date range l Last measurements

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**.

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.

7.3.2 Method versioning

Navigation: Home > **Results**

Every method has a method versioning function that works in the background. Whenever the settings of a method are changed, the versioning function automatically generates a new version of the method. This has also an effect on the results: Every measurement overtakes the current version of the method.

Measurement and method test results can be filtered based on the method version as follows:

1 Open the menu **Results**.

2 Select a method.

⇒ A journal with the results of the performed measurements and method tests appears. If there are results in several versions, the button **Select versions…** appears in the action bar.

3 Tap **Select versions…**.

⇒ The dialogue **Method versions** appears.

4 Select the versions you want to filter.

5 Tap **Save** to confirm the selected versions.

⇒ The system returns to the result list. The results based on the selected versions appear on the list, the other results are being grayed out.

📝 **Note**

The results filtered by the method version can be exported or printed. If the results are being exported as PDF or being printed, the results of the different versions are being listed based on their version.

7.3.3 Exporting results

7.3.3.1 Exporting results to a storage device

Navigation: Home > **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**.

7.3.3.2 Exporting results with EasyDirect Moisture

With **EasyDirect Moisture**, measurement and routine testing results are collected in a database. Results can be viewed, exported and also routine tests can be scheduled. The PC software must be installed on an external PC and the device must be connected to that PC with a USB cable or RS232 cable.

Before the function **EasyDirect Moisture** can be used, the following settings must be defined on the instrument:

Defining EasyDirect Moisture as peripheral device

Navigation: Settings > **Instrument settings** > **Peripherals**.

■   **Peripherals** is opened.

■   No printer is installed as a peripheral. Uninstall printer if necessary.

1   Tap [**New…**].

   → The list of possible peripherals appears.

2   Select [**EasyDirect Moisture**].

   → The parameters for EasyDirect Moisture appear.

3   Under **Device interface**, select the desired interface for the EasyDirect Moisture connection:
   • For a RS232-interface, select **RS232**.
   • For a USB-interface, select **USB**.

4   Set the rest of the settings.

5   To save the settings, tap [**Save**].

→ The option **EasyDirect Moisture** has been defined as peripheral device on the instrument.

See also

▤   Peripherals ▸ Page 61

7.3.3.3 Export settings

7.3.3.3.1 Single result export settings

The following parameters can be defined:

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

* Factory setting

Peripheral

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

7.3.3.3.2 Multiple result export settings

- **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	Description	Values
File name prefix	Defines the name of the new data file.	any
Export selection	Custom selection of multiple results for the export from selected measurements. The selection can be made via the filter function.	Selection: ☐ | ☑
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	Description	Values
Location	Finds the location on the storage device.	Browse and select

* Factory setting

7.4 Test/Adjust

Navigation: Home > Test/Adjust

Introduction

For optimum precision and repeatable results of the Moisture Analyzer, the function of the instrument should be tested on a regular basis and, if necessary, adjusted. The frequency of testing and adjusting depends on the use and location of the instrument.

Main menu	Submenu	Further information
Adjustments	**Weight adjustment - internal**	**see** Weight Adjustment - Internal
	Weight adjustment - external	**see** Weight Adjustment - External
	Temperature adjustment	**see** Temperature Adjustment

Tests	Weight test - internal	**see** Weight test - internal
	Weight test - external	**see** Weight test - external
	Weight test - Repeatability external	**see** Weight test - Repeatability external
	Temperature test	**see** Temperature test
	SmartCal x1 test	**see** [SmartCal test ▶ Page 53]
History	Weight test history	**see** History
	Weight adjustment history	
	Temperature adjustment history	
	Temperature test history	
	SmartCal x1 test history	

7.4.1 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 ▶ Page 66].

Introduction

Routine tests are performed to ensure accurate results. Therefore the tests should be performed in fixed, regular intervals depending on your Quality Management system and the results should be documented in a traceable way.

Based on your process requirements, METTLER TOLEDO can help you to define the routine tests to be performed. For further information, contact your local METTLER TOLEDO representative.

7.4.1.1 Temperature test

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

Target of the test

The temperature test checks if the temperature sensor is working correctly and if it delivers correct results. Using the temperature kit, the difference of the measured temperature at the kit (target temperature 1) and the sensor (target temperature 2) is used to calculate the precision of the sensor.

It is possible to start a test and subsequently transform it into an adjustment, if required.

Equipment

- Temperature kit.

⚠ **CAUTION**

Burns due to hot surfaces!

Parts of the instrument can reach temperatures that cause injuries if touched.

1　Let the instrument cool down before setting up.

2　Hold the temperature kit by its handle only.

Installing the temperature kit

- Instrument is cooled down to < 50 °C.
- Instrument is switched on.
- Sample chamber is open.
1 Remove sample pan handler (with pan) (1).
2 Remove sample pan holder (2).
3 Clean the contact areas (3) if needed.
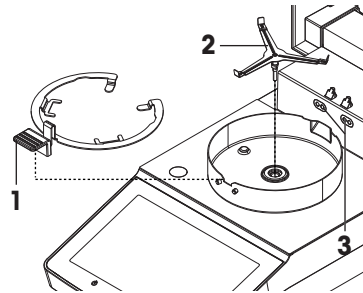
4 Insert **Temperature kit** (4).
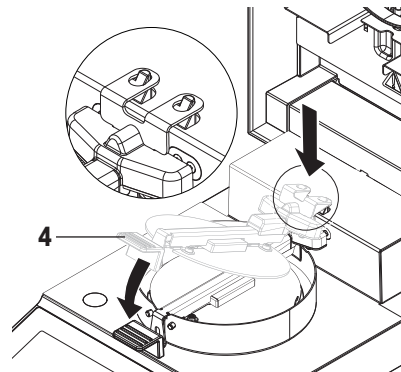
Testing procedure

- Test settings are defined, **see** Test Settings.
- Temperature kit is installed.
1 Tap **Temperature test**.
   ➡ Work screen **Temperature test** appears.
2 Close the sample chamber.
3 Tap [**Start test**].
   ➡ The testing process starts: The instrument first heats up to target temperature 1 (lower) for 15 minutes, then, for another 15 minutes, heats further up to target temperature 2 (higher). The screen shows the target temperature values (**Target**), measured at the sensor, and the actual temperature (**Actual**), measured at the temperature kit.
   ➡ The instrument indicates whether the test has passed or failed according to defined tolerances.
4 If an adjustment is needed, decide if you want to perform it now, **see** Temperature adjustment.
5 • To return to the menu **Tests**, tap [**Tests**].
   • To print the results, tap [🖶].
   • To display or print the results at any time, tap [**History**].
   • To return to the home screen, press [🏠].
6 Let the instrument cool down before removing the temperature kit.

See also

- 📄 Accessories and Spare Parts ▶ Page 87
- 📄 Test settings ▶ Page 67
- 📄 Temperature adjustment ▶ Page 56
- 📄 Accessories ▶ Page 87

7.4.1.2 Weight test - external

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

Target of the test

The external weight test determines if the integrated balance and the weight value display are working correctly by placing a test weight. The test ensures correct and precise results.

Equipment

- Test weights. To guarantee full traceability, METTLER TOLEDO recommends to use certified weights.

Testing procedure

- Test weight and test settings are defined.

1 Open sample chamber.

2 Tap the item **Weight test - external**.

   → The test screen appears.

3 Clear sample pan holder and tap **Start test**.

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

4 Load the required test weight.

   → The balance indicates the test process, ————— appears.

5 When the display flashes **000.00** remove the test weight.

→ The display shows the test results and indicates whether the test has passed or failed according to defined tolerances.

To print the results, tap [🖨].

Timeout

- In case of a timeout of over 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.

See also

📄 Accessories ▶ Page 87

7.4.1.3 SmartCal test

Target of the test

A SmartCal test is a quick and integral test of the instrument functions. SmartCal™ is a granular test substance whose moisture content value, when heated at a specific temperature for a specific time, is precisely defined. By performing a measurement with SmartCal™ and comparing the results to the control limits, it can be tested if both the integrated balance as well as the temperature sensor work well together and if the instrument functions correctly.

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

There are four SmartCal tests with four pre-defined temperatures and two additional tests where temperature and control limits can be defined by the customer.

Equipment

- SmartCal™ Moisture Analyzer Test Substance.
- For best results and easy handling, use a RHT sensor.

  If no RHT sensor is available, the room temperature and relative humidity must be entered manually.

Certified testo RHT sensors are supported.

Certified RHT sensors

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 to the USB port on the terminal.

For more information about Testo, **see**

▶ http://www.testo.com

Rules for handling SmartCal™

- Store SmartCal™ at room temperature.
- Remove SmartCal™-stick from the blister pack right before use.
- Do not use damaged or expired sticks (the expiry date is printed on the blister pack and on the stick (e.g. Exp08.2021).
- After a SmartCal™ test, the test substance can be disposed of as normal waste.

Additional information about SmartCal™ can be found under:

www.mt.com/smartcal

Testing procedure

The test is carried out in the same way as a measurement.

📝 Note

Every SmartCal test has a maximum number of 30 test results. If there are more than 30 results for one test, the oldest results will automatically be deleted.

- The instrument has been connected to the power supply for at least 60 minutes in order to reach operating conditions.
- If available, a RHT sensor is connected.
- The SmartCal package is acclimatized.
- Test temperature and control limits are set.
- The sample chamber is open.

1 Tap [**SmartCal x1 test**].
   → The method list is shown on display.
2 Select a method from the list.
   → The work screen appears.
3 If the test is performed without RHT sensor, tap [**Enter room temperature and humidity**], enter current room temperature and humidity and confirm with [**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 Tap [**->0/T<-**] to tare the balance.
7 Remove a SmartCal™ stick from the blister pack, open it 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 Start the test immediately by tapping [**Start drying**].
   → The SmartCal test procedure starts.
   → When the test is finished, the instrument indicates whether the test has passed or failed. The display shows the normalized result. If the SmartCal result has failed, **see** [Measures after failed test ▶ Page 55].
9 • To return to the menu **Tests**, tap [**Tests**].
   • To print the results, tap [🖨].
   • To display or print the results at any time, tap [**History**].
   • To return to the home screen, press [🏠].

See also

7.4.1.4 Measures after failed test

In case of a failed test, take the following measures:

1 Repeat the test and ensure that all steps have been carried out correctly.

2 If the failure persists, perform an according adjustment.
   • If a weight test has failed, perform a weight adjustment.
   • If a temperature test has failed, perform a temperature adjustment.
   • If a SmartCal test has failed, perform a weight adjustment first, then perform another SmartCal test and, if the failure persists, perform a temperature adjustment.

3 If the failure persists, **see** Malfunctions when operating the instrument.

4 If the failure persists, contact your METTLER TOLEDO service representative.

7.4.2 Adjustments

Navigation: Home > **Test/Adjust** > **Adjustments**

Introduction

To guarantee correct results and high performance of the instrument, it is necessary to adjust its functions:

• After setting up the balance for the first time.

• After a change of location.

• If a test indicates that an adjustment is due.

Test the instrument exclusively under operating conditions.

METTLER TOLEDO offers an adjustment service – please contact your METTLER TOLEDO representative.

See also

7.4.2.1 Weight adjustment - external

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

Target of the adjustment

In an external weight adjustment, the integrated balance is adjusted by placing a predefined weight as a reference for the instrument to re-calibrate itself.
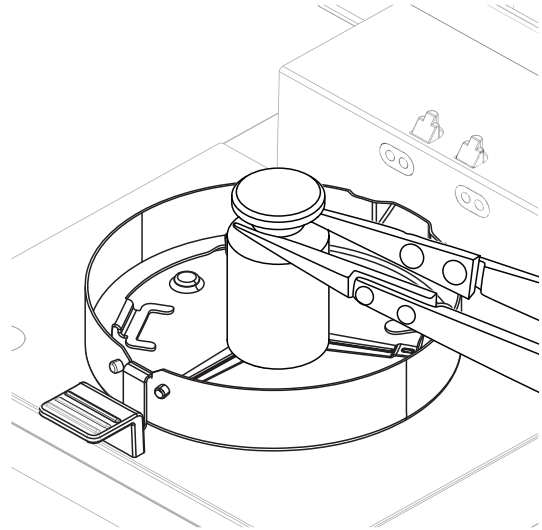
Equipment

• Test weights. To guarantee full traceability, METTLER TOLEDO recommends to use certified weights.

Testing procedure

■ Test weight and test settings are defined.

1 Open sample chamber.

2 Tap the item **Weight test - external**.

⇒ The test screen appears.

3 Clear sample pan holder and tap **Start test**.

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

4 Load the required test weight.

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

5 When the display flashes **000.00** remove the test weight.

⇒ The display shows the test results and indicates whether the test has passed or failed according to defined tolerances.

To print the results, tap [🖶].

Timeout

- In case of a timeout of over 75 seconds, the error message appears **Weight out of range. Adjustment aborted**. The test was not executed.

1 Confirm with [**OK**].

2 Repeat the adjustment.

See also

📄 Accessories ▶ Page 87

7.4.2.2 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 ▶ Page 87]. To learn when an adjustment of the heating module is necessary, **see** Notes on adjustment of balance and heating module. 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 ▶ Page 51].
- For temperature adjustment settings **see** [Adjustment settings ▶ Page 69].

⚠ **CAUTION**

Burns due to hot surfaces!

Parts of the instrument can reach temperatures that cause injuries if touched.

1 Let the instrument cool down before setting up.

2 Hold the temperature kit by its handle only.

- Adjustment settings are defined.

− Tap menu item **Temperature adjustment**.

⇒ Work screen **Temperature adjustment** appears.

Installing the temperature kit

- ■ Instrument is cooled down to < 50 °C.
- ■ Instrument is switched on.
- ■ Sample chamber is open.

1 Remove sample pan handler (with pan) (1).
2 Remove sample pan holder (2).
3 Clean the contact areas (3) if needed.
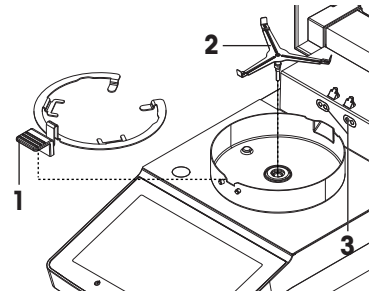
4 Insert **Temperature kit** (4).
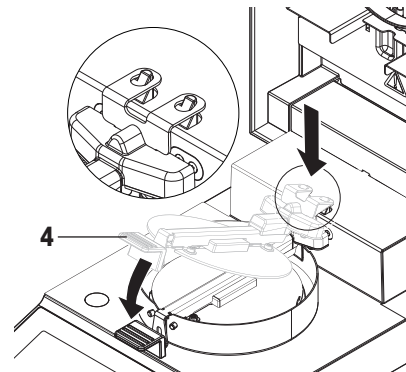
Start adjustment

- ■ Draft shield element is installed.
- ■ Sample pan handler and sample pan holder is removed.
- ■ **Temperature kit** is inserted.

1 Close sample chamber.
2 Tap [**Start adjustment**].
   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 ▸ Page 58] and [Setting up the instrument ▸ Page 14].

Note

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

7.4.3 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.

When the History is selected, a list appears with the history selection as follows:

- **Weight test history**
- **Weight adjustment history**
- **Temperature test history**

- **Temperature adjustment history**
- **SmartCal x1 test history**

The following information is displayed:

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
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 x1 test history

Following parameters are available for each SmartCal method.

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	

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

7.5 Settings

Navigation: Home > Settings

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

Main menu	Submenu	Further information
User preferences	**Languages**	**see** [Languages ▸ Page 59]
	Screen	**see** [Screen ▸ Page 60]
	Sound	**see** [Sound ▸ Page 60]
	Protection	**see** [Protection ▸ Page 60]
Instrument settings	**Regional Settings**	**see** [Regional settings ▸ Page 61]
	Peripherals	**see** [Peripherals ▸ Page 61]
	Touch screen adjustment	**see** [Touch screen adjustment ▸ Page 63]
Application settings	**Identifications management**	**see** Identifications management
	Print and export management	**see** [Print and export management ▸ Page 64]
Quality management	**Test / Adjustment settings**	**see** [Test / adjustment settings ▸ Page 66]
System and data management	**Export / Import**	**see** Export / import
	Back up / Restore	**see** [Back up / Restore ▸ Page 71]
	Export event logs	**see** [Export event logs ▸ Page 72]
	Reset	**see** Reset
	Update	**see** Update
Help and tutorials	**Instrument tutorial**	**see** Instrument tutorial

7.5.1 User preferences

Navigation: Home > Settings > User preferences

7.5.1.1 Languages

Navigation: Home > Settings > User preferences > Languages

The following languages can be chosen:

Parameter	Description	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

7.5.1.2 Screen

Navigation: Home > **Settings** > **User preferences** > **Screen**

The following parameters can be defined:

Parameter	Description	Values
Brightness: x1 %	Defines user-specific brightness of the display.	10...100 % (80 %)*
Color scheme	Defines user-specific display color scheme.	Blue* | Green | Orange | Grey

* Factory setting

7.5.1.3 Sound

Navigation: Home > **Settings** > **User preferences** > **Sound**

The following parameters can be defined:

Parameter	Description	Values
Sound	Activate / deactivate of audible feedback and adjust the **Volume: x1 %**. Audible feedback: • when tapping a button. • upon measurement completed. • when an error message appears.	OFF* | ON | 0...100 % (50 %)*

* Factory setting

7.5.1.4 Protection

Navigation: Home > **Settings** > **User preferences** > **Protection**

The following parameters can be defined:

Parameter	Description	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** (edit shortcuts and deleting shortcuts is inactive)
• **Results** (**Delete results** is inactive)

- **Tests**

7.5.2 Instrument settings

Navigation: Home > **Settings** > **Instrument settings**

7.5.2.1 Regional settings

Navigation: Home > **Settings** > **Instrument settings** > **Regional Settings**

The following parameters can be defined:

Parameter	Description	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
Daylight saving time	Activates or deactivates the daylight saving time.	OFF* | ON

* Factory setting

Daylight saving time

Define the following parameters:

Parameter	Description	Values
Offset	Defines the offset relevant for the daylight saving time.	30…120 min (60 min)*
Start	Defines the point in time from which daylight saving time is active.	Time | Day of the week | Week of the month | Month
End	Defines the point in time from which daylight saving time is deactivated.	Time | Day of the week | Week of the month | Month

Note

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

7.5.2.2 Peripherals

Navigation: Home > **Settings** > **Instrument settings** > **Peripherals**

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

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. The use of the USB device interface requires the installation of an USB device driver on the PC, **see** [Installing USB device driver ▸ Page 17].

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

Installing Printers / Computers

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

▪ The printer is connected.

▪ The printer is powered on.

1 Tap **New…**.

   ➡ **Peripheral type** list appears.

2 Select device.

   📄 **Note**

   Currently supported devices from METTLER TOLEDO with preset parameters:

   • **P-2x Strip Printer**

   • **P-4x Strip Printer**

   • **P-5x Strip Printer**

   • **EasyDirect Moisture**

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).
- For defining the printouts **see** [Print and export management ▶ Page 64].
- Only one printer can be installed. To install another printer, you have to delete the old printer first.
- If EasyDirect Moisture is connected, the icon 🖶 can be used to perform a manual transfer.

Parameters

The following parameters can be defined:

Parameter	Description	Values
Device Name	Defines a name for the device.	any
Device interface	Defines the device interface.	RS232* I USB
Device Port	Defines the device port. **COM1**: RS232 / **SOU**: 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* I SOU
Baudrate	Defines the speed of the data transmission (data transfer rate / Baud rate).	1200 I 2400 I 4800 I 9600* I 19200 I 38400 I 57600 I 115200
DataBits	Defines the number of data bits.	7 I 8*
Parity	Defines the variant of parity bit.	None* I Odd I Even
StopBits	Defines the stop bits of the transmitted data.	1 StopBit* I 2 StopBits
Flow Control	Defines the type of flow control (Handshake).	None I Xon/Xoff*

* Factory setting

USB devices

Connecting USB strip printers

Strip printers connected over USB or with USB adapters need the following settings:

- **Device interface**: RS232C
- **Device Port**: SOUx
- **Baudrate**: 19200

📝 **Note**

- A bar code reader can be connected to the USB port. With a connected bar code reader, bar codes can be added in a keyboard dialog.
- If the printer is not powered on when adding it to the peripherals, the device port SOUx might not be visible.

7.5.2.3 Touch screen adjustment

Navigation: Home > **Settings** > **Instrument 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.

> **NOTICE**
>
> **Damage to the touch screen due to pointed or sharp objects**
> − Operate the touch screen with your fingers.

- Menu **Instrument settings** is opened.
1 Choose **Touch screen adjustment** and tap **Start**.
   ➡ Adjustment screen with a target circle appears.
2 Tap the center of the target until it moves to the next position on the screen. Tap the center of the target as accurately as possible and make sure not to touch any other locations on the screen and the fix key areas.
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**.
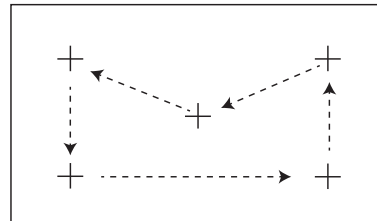
7.5.3 Applications settings

Navigation: Home > **Settings** > **Application settings**

7.5.3.1 Identifications management

Navigation: Home > **Settings** > **Application settings** > **Identifications management**

Identifications (ID) contain descriptive text for individual measurements, which enables samples to be easily allocated to specific tasks or customers. This feature allows you to define identifications in order to comment measurements, such as company id, id badge, id sample. In the ID panel on the work screen, the values (comments) can be entered or changed before measurement, **see** [Work screen ▶ Page 23]. IDs have an impact on all measurements, regardless of methods. The IDs are included on printouts or can be exported to a PC.

Main menu	Submenu	Further information
Identifications usage	**Identifications input**	**see** below
	Clear input after measurement	
Identifications (x1)	no submenu	

The following parameters can be defined:

Parameter	Description	Values
Identifications input	Defines the method for entering comments. **ON** = activates ID panel on work screen. **Free input** = the IDs appear after tapping on the ID panel (work screen) for entries or changes of values (comments). **Guided input** = each ID is displayed individually in order of definition (ID1 to ID10) before measurement, to make entries or changes of values (comments).	OFF* I ON I Free input I Guided input
Clear input after measurement	Defines the ID whose value (comment) is deleted after measurement.	OFF* I ON I ID selection: ☐ I ☑ I
Identifications (x1)	Defines general identifications in order to comment measurements. + = New identifications (max. 10 IDs, 1…20 characters) - = Remove identifications (selectable)	- I +* I any

* Factory setting

7.5.3.2 Print and export management

7.5.3.2.1 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).

📝 **Note**

- 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 ▸ Page 61].

The following parameters can be defined:

Parameter	Description	Values
Printout type	Selects a detailed printout or in a short form.	Standard* I Short I Custom 1 I Custom 2

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.	☐ (deactivated)* | ☑ (activated)
Include inter-mediate results to printout	Defines the time intervals at which intermediate results are trans-ferred to the printer.	OFF* | 10 s | 30 s | 1 min | 2 min | 10 min

* Factory setting

Customized printouts

With the options **Custom 1** and **Custom 2** the information that appear on the printout can be selected individually. The information that appear on the printout can be defined in the sub-option **Printout content**.

The following information for **Printout content** can be enabled/disabled or defined:

Parameter	Description	Values
Head	METTLER TOLEDO | Halogen Moisture Analyzer | Blank line	
S/N instrument and software	Type | SNR (Drying unit) | SNR (Terminal) | SW(Drying Unit) | SW(Terminal) | Blank line	
Adjustment info	Weight Adjustment | Temperature Adjustment | Blank line	
Method parameters	Method Name | Drying Prog | Drying Temp | Switch Off | Display mode | Start Weight | Start Weight Tol | Weigh-in aid | Start Mode | Free factor | Blank line	
ID's	ID's | Blank line	
Measurement	Start weight | Intermediate results | Total time | Dry Weight | Moisture Content | Factor | Offset | Measured Result | Measurement status | Note | Blank line	
Signature 1	☐ (deactivated)* | ☑ (activated)	
Signature 2	☐ (deactivated)* | ☑ (activated)	

📝 **Note**

The information **Date / Time** and the end result are always activated and appear at the end of the printout.

The settings for the option **Intermediate results** are still set but do only appear on short and standard printout.

7.5.3.2.2 Recommended printer settings (strip printer)

Printer

Model	Char Set	Auto baudrate	Balance feature
P-2x	IBM/DOS	Off	Disable
P-52RUE	IBM/DOS [1] ___ [2]	—	—
P-56RUE / P-58RUE	IBM/DOS [1] ___ [2]	—	—

Instrument printer

Model	Baudrate	Bit / Parity	Stop Bits	Handshake
P-2x	9600	8/NO	1	Xon/Xoff
P-56RUE / P-58RUE	9600 ___ 2)	8/NO ___ 2)	1 ___ 2)	Xon/Xoff ___ 2)
P-52RUE	9600 ___ 2)	8 / None ___ 2)	1 ___ 2)	XOn/XOff ___ 2)

1) Printer settings not available.

2) Value applicable for Brazilian Portugese.

7.5.3.2.3 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	Description	Values
File name prefix	Defines the name of the new data file.	any
File type	Defines the type of the data file.	CSV* I PDF
Printout language	Defines the language for general printouts. **Note** No impact on test or adjustment printouts.	English I Deutsch I Italiano I Français I Español I Português I Polski I Magyar I Český I Русский I 日本語 I 中文 I 한국어/조선말
Export management	Export results automatically after measurement if activated.	Selection: ☐* I ☑
Export target	Defines the destination of data transfer.	Peripheral

Export target: Peripheral

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

* Factory setting

7.5.4 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.

7.5.4.1 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 ▶ Page 50].

7.5.4.1.1 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 ▶ Page 87].

Test weight 1 and Test weight 2

The following parameters can be defined:

Parameter	Description	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	Defines the nominal weight value of the test weight. For adjustments, the weight must be at least 30 g.	0.1000 g ... 201 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	Description	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	Description	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 a testo RHT sensor for the automatical setting of temperature and humidity values.

7.5.4.1.2 Test settings

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

Weight test external

The following parameters can be defined:

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

* Factory setting

Temperature test

The following parameters can be defined:

Parameter	Description	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

📝 **Note**

There are 4 fixed SmartCal methods and 2 customizable SmartCal methods. All 6 methods are activated as default values but the methods can individually be enabled or disabled.

The following parameters can be defined:

Parameter	Description	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.	☑ (enabled) | ☐ (disabled)*
Use cSmartCal	Sets the control limits to the correct values for using of cSmartCal.	☑ (enabled) | ☐ (disabled)*
Temperature	Defines the test temperature. 📝 **Note** If temperature in customer SmartCal methods is set, the control limits will be reset to default (off).	70 °C | 100 °C | 130 °C | 160 °C | Custom temperature… 40 °C…230 °C (105 °C*)

| 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**
If temperature in customer SmartCal methods is set, the control limits will be reset to default (off). | values see explanation \| OFF |

* Factory setting

7.5.4.1.3 Adjustment settings

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

Weight adjustment external

The following parameters can be defined:

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

7.5.4.1.4 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 ▸ Page 64].
- 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 ▸ Page 64].

The following parameters can be defined:

Parameter	Description	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.	☑ (enabled) | ☐ (disabled)*

* Factory setting

7.5.5 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.

7.5.5.1 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.
- Data transfer between different Moisture Analyzer models (e.g. from HX204 to HS153 or HC103) is limited. Features that are not supported by a model and data resulting from these features cannot be imported.
- 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	Description	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. **Note** • **User management and user preferences** contains: User management settings, user preferences • **Instrument, application and QM settings** contains: Instrument settings, application settings, quality management settings	All* | ☑ User management and user preferences | ☑ Instrument, application and QM settings | ☑ Methods (x1)

* 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	Description	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* I ☑ User management and user preferences I ☑ Instrument, application and QM settings I ☑ Methods (x1)

* 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 device...** appears.
3 Tap **Import selection** and select the data for import if needed.
4 • To start, tap the **Import** button and follow the instructions in the message window.
   • To abort, tap [**Cancel**].

7.5.5.2 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.

Note

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

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

- **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.

7.5.5.3 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	Description	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	Description	Values
Location	Finds the location on the storage device.	Browse and select

* Factory setting

7.5.5.4 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.

! **NOTICE**

Data loss after system reset.

After resetting, the instrument is in factory default state. All data such as settings, methods or results is lost.

− Save the data on an external storage device before you reset the instrument, **see** [Export / Import ▸ Page 70] and [Back up / Restore ▸ Page 71]

The following parameters can be defined:

Parameter	Description	Values
Reset	Resets the instrument to factory settings.	none

7.5.5.5 Update

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

The Update menu item is only used during the software update process, **see** [Updating the software ▸ Page 77].

📝 **Note**

This function is not available on approved instruments.

7.5.6 Help and tutorials

Navigation: **Home** > **Settings** > **Help and tutorials** > **Instrument tutorial** > **Next**

The function **Instrument tutorial** automatically appeared when the function **Setup wizard** had been finished. The tutorial helps you, to define the basic functionalities of your Moisture Analyzer.

The application **Instrument tutorial** can be started directly at the end of the application **Setup wizard** or from the **Home** screen via the section **Settings**. The sections shown can be defined using the tutorial.

8 Maintenance

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

8.1 Maintenance tasks

Maintenance action	Recommended interval	Remarks
Cleaning	Depending on the degree of pollution or your internal regulations clean the instrument: • After every use • After change of sample	**see** chapter "Cleaning"
Performing routine tests (Weight test, temperature test, SmartCal test)	• After cleaning • After a software update	**see** chapter "Test"
Performing adjustments (weight adjustment, temperature adjustment)	• After changing the location • If a test indicates that an adjustment is needed	**see** chapter "Adjustments"
Replacing the dust filter (if used)	• Depending on the degree of pollution	**see** chapter "Replacing the dust filter"
Replacing the power line fuse	• If the fuse is blown	**see** chapter "Replacing the power line fuse"
Updating the software	• If recommended by METTLER TOLEDO	**see** chapter "Updating the software"

8.2 Cleaning

⚠ WARNING

Death or serious injury due to electric shock

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

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

⚠ CAUTION

Burns due to hot surfaces

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

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

> **NOTICE**
>
> **Damage to the instrument due to inappropriate cleaning agents**
>
> Inappropriate cleaning agents can damage the housing. If liquids enter the housing they can damage the instrument.
>
> 1   Make sure the cleaning agent is compatible with the material of the part you want to clean.
> 2   Make sure that no liquid enters the interior of the instrument. Do not spray any liquids and wipe off any spills immediately.
> 3   Use a lint-free cloth for cleaning.
> 4   Never open the housing of the instrument.

Protective equipment:

- Gloves
- Goggles

See also

- Temperature adjustment ▶ Page 56

8.2.1 Sample chamber

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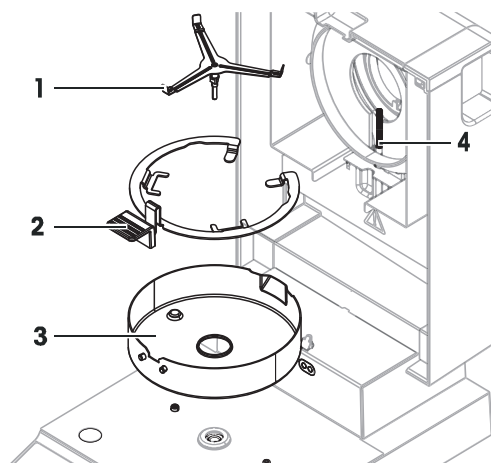
8.2.2 Heating module

> **⚠ CAUTION**
>
> **Burns due to hot surfaces**
>
> The round halogen lamp can reach temperatures that can cause injuries if touched.
>
> 1   Do not remove the halogen lamp.
> 2   Wait until the heating module has cooled down completely before cleaning.
> 3   Remove any splashes, deposits, or spots from the halogen lamp with a mild organic solvent such as ethanol.

Overview

1   Reflector ring
2   Protective glass
3   Halogen lamp

1   **2**   **3**
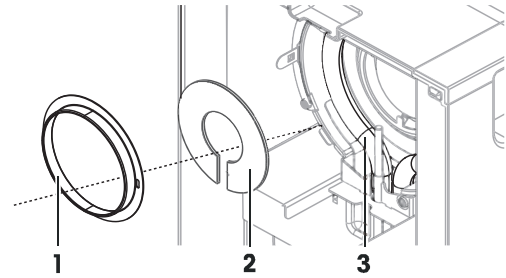
Removing reflector ring

📝 **Note**

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

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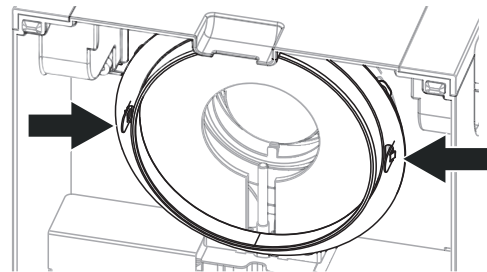
Removing protective glass

◾ Reflector ring is removed.
– Carefully pull out the protective glass.

Reassembling after cleaning

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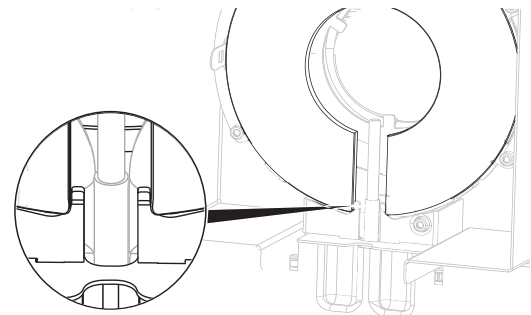
8.2.3 Fan grill

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

8.2.4 Putting into operation after cleaning

1   Reassemble the Moisture Analyzer.
2   Press ⏻ to switch on the Moisture Analyzer.
3   Warm up the Moisture Analyzer. Wait 1h for the acclimatization, before starting the tests.
4   Check the level status, level the Moisture Analyzer if necessary.

5   METTLER TOLEDO recommends to perform weight and temperature tests and, if necessary, adjustments after cleaning the Moisture Analyzer.
➡   The Moisture Analyzer has been put into operation and is ready to use.

8.3   Replacing the dust filter

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

1   Open the filter lid.
2   Replace the dust filter.
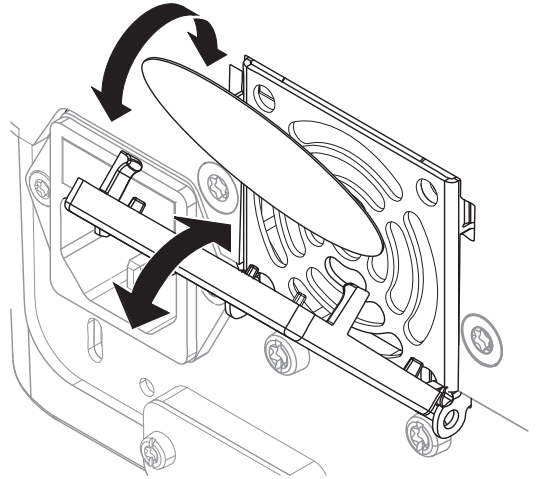
8.4   Replacing the power line fuse

⚠ **WARNING**

Danger of death or serious injury due to electric shock!
Risk of electrical shock or damage of the instrument when changing fuses.

1   Do not use a fuse of a different type or rated value.
2   The short-circuiting (bridging) of fuses is not allowed.

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

8.5   Updating the software

METTLER TOLEDO is constantly improving its instrument software to make the handling of its instruments more comfortable and smoother. The current software versions can be downloaded online and installed by the user to benefit from the improvements quickly and easily.

The firmware made available on the Internet has been developed and tested by Mettler-Toledo GmbH using processes that meet the guidelines of ISO 9001. Mettler-Toledo GmbH does not, however, accept liability for consequences that might arise from using the firmware.

!	**NOTICE**
	Data loss during software update.
	During the update of the software, data such as settings, methods or results can be lost. This is also the case if the update fails.
	— Before starting a software update, create a backup file of the current system on an external storage device.

Search for software

Update procedure

- Backup of the current data is created, **see** [Back up / Restore ▶ Page 71]
- Recent software update is downloaded and stored on an external device, e.g., USB stick or SD card.
- Administrator rights are active.
1 Insert device with software for update into its respective port.
2 Wait until the external device is recognized by the instrument.
3 Select **Home** > **Settings** > **System and data management** > **Update**. If **Update** is not visible check if administrator rights are active. If you have an approved version, contact your support representative.
    ➡ **Update** screen appears.
4 Select the device on which the software is stored.
5 Confirm with [**Update**] and wait until the software update is completely finished. Do not remove the device before the instrument has completely restarted.
    ➡ The instrument reboots.
    ➡ A message appears: **Operating system is up to date. Update instrument software?**…
6 Confirm with [**Update**].
7 Wait until the system returns to the home screen.

Software downgrade

It is not recommended to downgrade the software. However, in case of a setup that requires a software downgrade in order to work, please observe the following safety instructions.

!	**NOTICE**
	Data loss during software downgrade
	During a downgrade of the software all device data such as drying methods, results, SmartCal history, and settings will be removed.
	— Only let a service technician perform a software downgrade.

9 Troubleshooting

Possible errors with their cause and remedy are described in the following chapter. If there are errors that cannot be corrected through these instructions, contact METTLER TOLEDO.

9.1 Error messages

Error message	Possible cause	Diagnostic	Remedy
Underload	Underload - the sample pan holder is missing.	Check.	Insert the sample pan holder. If needed, reboot the system by disconnecting and reconnecting the power supply.
Overload	Overload - the weight on the sample pan exceeds the weighing capacity of the balance.	–	Reduce the weight of the sample.
Blinking zeros 0.0000	The balance is out of the zero range. When the instrument was switched on or upon zeroing, one or more limits were exceeded. The usual reason for this is when there is a weight on the weighing pan when the balance is switched on.	Check if a weight is on the sample pan.	Remove the weight and retry.
"Unhandled exception caught in main thread."	Startup problem on terminal.	–	Download and install the appropriate software. See [Updating the software ▶ Page 77].
"Sensor connection lost!"	More than 5000 measurements have been stored on the memory.	With software V2.11 and earlier, this caused the sensor to lose connection.	Update the software to V2.12 or later, **see** [Updating the software ▶ Page 77]

9.2 Error symptoms

Error symptom	Possible cause	Diagnostic	Remedy
Moisture analyzer cannot be switched on.	• The power supply cable is not connected. • No power supply voltage in the mains.	Check.	Connect the power supply cables or reestablish the mains supply voltage.
	Faulty fuse.	Check.	Replace the fuse. The fuse is located on the back of the instrument besides the power plug (find a spare fuse there).
Keys and buttons on the terminal do not function.	Software bug.	–	Restart the software by disconnecting and reconnecting the power plug.
Weight out of range. During adjustment.	Either no weight piece or the wrong weight piece has been placed on the	Check if the correct weight piece is placed.	Use the correct weight piece and retry.

Error symptom	Possible cause	Diagnostic	Remedy
	sample pan for adjustment. This message is also displayed if you do not remove the weight piece when you are prompted.		
Drift The measuring values on the display slowly drift up/down.	The air current which cools the Load cell is blocked (filter, grating). The rising temperature influences the measurement.	Check (find the air filter and the grating at the backside of the moisture analyzer).	Replace filter (if available) and clean ventilation grating.
Unstable weight indication. The measuring values do not stabilize but go up/down.	The sample pan holder is not placed properly .	Check.	Make sure the sample pan holder is correctly placed.
			Some parts are touching the sample pan.
			Volatile sample substance (weight of the sample changes quickly).
The measurement takes too long.	An unsuitable switch-off criterion was set.	–	Choose a suitable switch-off criterion.
	Sample substance tends to form a skin, when heated.	–	If you use samples which tend to form a skin that hinders evaporation, perform the measurement at a higher temperature.
	An excessive amount of sample cause slow drying.	–	Enlarge the surface of the sample substance, e.g by crushing or grinding.
	Liquids take longer to dry.	–	For sample liquids, use absorbent glass fibre filters.
			Use absorbent glass filter for liquids.
			Enlarge the surface of the sample, e.g. by crushing or grinding.
Measurement results are not repeatable.	Unstable environment/location of the instrument.	–	Choose a suitable location, **see** [Selecting the location ▶ Page 12].
			The drying time is too short for the "Timed switch-off" criterion.
	The sample substance boils and the splashed drops continuously change the weight.	–	Lower the drying temperature.
			The samples are not comparable.
	The granulation of the sample is not homogenous or too large.	–	Use samples with a homogenous granulation.

Error symptom	Possible cause	Diagnostic	Remedy
	Insufficient heating power because the protective glass of the halogen radiator is dirty.	Check if the protective glass is dirty.	• Clean the protective glass, **see** [Cleaning ▶ Page 74].
	The temperature sensor is contaminated/dirty.	Check if the temperature sensor is dirty.	Clean the temperature sensor, **see** [Cleaning ▶ Page 74].
	The sample substance does not become completely dry due to uneven distribution in the sample pan.	–	Evenly spread the sample substance in the pan and retry.
The difference between target and actual temperature is out of tolerance. When using the temperature adjustment kit.	The temperature adjustment kit is not adjusted or defective.	–	• Try another temperature adjustment kit. • Adjust the temperature adjustment kit (contact your METTLER TOLEDO service representative)
The adjustment temperature is lower than expected (e.g. 90°C instead of 100°C).	The draft shield is not installed.	Check.	Install the draft shield.
The SmartCal test failed.	The test prerequisites are not met correctly.	–	Make sure to meet the test prerequisites, **see** [SmartCal test ▶ Page 53].
	The entered room temperature and/or the relative humidity are set wrong.	Check if the values are set correctly.	Enter the correct values and retry.
			The test substance does not become completely dry due to uneven distribution in the sample pan.
	The test substance does not become completely dry due to uneven distribution in the sample pan.	–	Evenly spread the test substance in the pan and retry.
	The instrument is out of adjustments.	–	Perform: 1. Temperature test, **see** Temperature test. 2. Weight tests, **see** Tests 3. Repeat the SmartCal test with a new test substance.

10 Technical Data

10.1 General data

Power supply

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

Protection and standards

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

Environmental conditions

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

Materials

Drying Unit

Housing	PBT, PBX45A (UL 94 V-0)
Inspection window grill	PPS, A504X90 (U L94 V-0)
Protective glass	Quartz glass
Halogen lamp	Quartz glass
Reflector bracket	PPS A504X90 (UL 94 V-0)
Draft shield, interior bottom plate	Stainless steel, X2CrNiMo17-12-2 (1.4404)

10.2 Model-specific data

Drying unit

Heating module	Halogen ring-shaped radiator
Temperature range	40–230 °C
Temperature step	1 °C
Temperature programs	standard, rapid
Drying time	480 minutes

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 × RS232C (for production only)
- 1 × RS232C (9-pin socket)
- 2 × USB Host (Type A socket), USB 1.1
  Supported memory sticks up to 32 GB
- 1 × USB Device (Type B socket), USB 1.1

Data

Export data format of results	• 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	25 mm
Thermal overload protection	Bimetallic-element switch in heating module
Dimensions (w × h × d)	192 × 169/370 × 385
Weight, ready to measure	5.1 kg
Display	WVGA color display, resistive touch-sensitive

10.3 Dimensions

(all dimensions in mm)
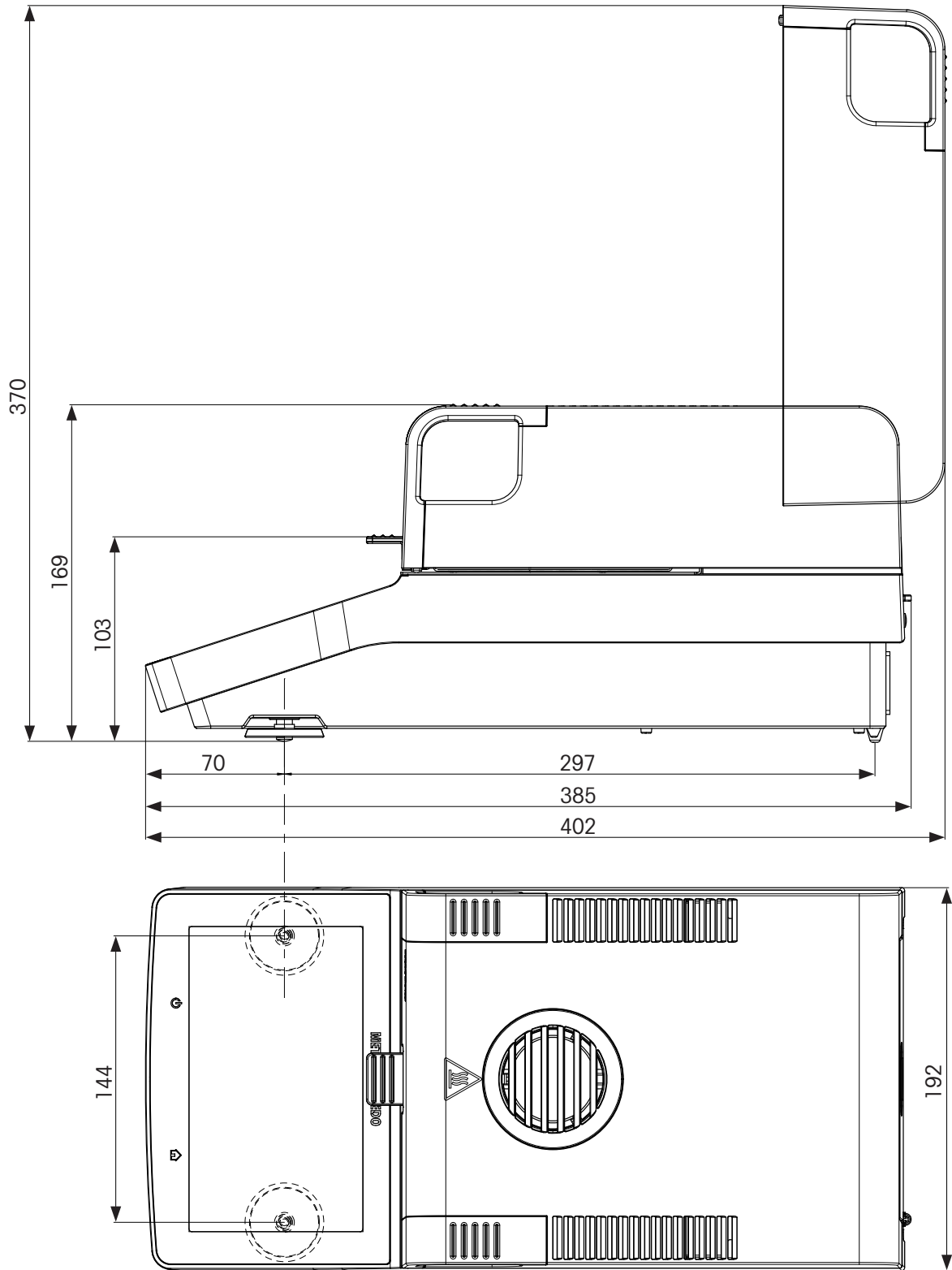
10.4 Interfaces specification
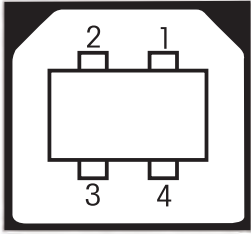
10.4.1 RS232C

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)

10.4.2 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

10.4.3 USB device

Schematic	Item	Specification
	Standard	In conformity with USB specifications revision 2.0
	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

1	VBUS (+5 VDC)
2	D– (Data –)
3	D+ (Data +)
4	GND (Ground)
Shield	Shield

11 Accessories and Spare Parts

11.1 Accessories

	Description	Order no.
Sample Handling		
	Aluminum sample pans, set of 80 pcs	00013865
	Glass fiber filter (for Liquids), set of 100 pcs	00214464
	Extra strong aluminum sample pans, set of 80 pcs	11113863
	Reusable steel sample pans, height 6 mm, set of 3 pcs	00214462
	Textile cage for bulky samples (HA-cage), 1 pcs	00214695
	Down holder, prevents slipping of the sample during measurement,1 pcs	00214758
Quality Management		
	Certified adjustment weight, 100 g (F1)	30406400
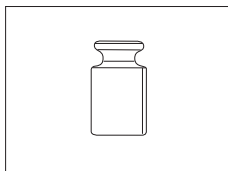
OIML / ASTM weights (with calibration certificate) see **www.mt.com/weights**
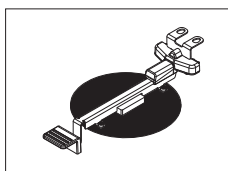
Certified temperature kit   30020851

SmartCal Moisture Analyzer Test Substance

cSmartCal, certified, 12 tests	30005793
cSmartCal, certified, 24 tests	30005791
SmartCal, 12 tests	30005792
SmartCal, 24 tests	30005790
StarterPac cSmartCal	30005918
StarterPac SmartCal	30005917

Printers

RS-P25/01 (EMEA) printer with RS232C 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

USB-P25/01 (EMEA) printer with USB connection to instrument   11124301

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-52RUE dot matrix printer RS232C, USB and Ethernet connections, simple print-outs   30237290

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 RS232C, USB and Ethernet connections, simple print-outs, date and time   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

	P-58RUE thermal printer with RS232C, USB and Ethernet connections, simple print-outs, date and time, label printing, balance applications, e.g., 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
	Dimension of the label 56×18 mm	

Anti-theft devices

	Anti-theft cable with lock	11600361

Cables for RS232C interfaces
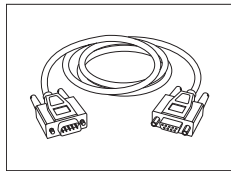
	RS9 – RS9 (m/f): connection cable for PC, length = 1 m	11101051

Barcode readers

	Corded USB barcode reader	30417466

Cables for USB interface

	USB (A –B) connection cable, length = 1 m	30241476

Miscellaneous
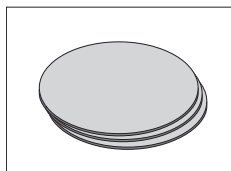
	Dust filter, set of 50 pcs	11113883
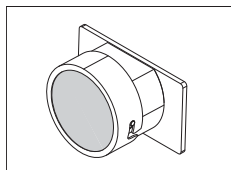
	HC dust filter housing	30216118
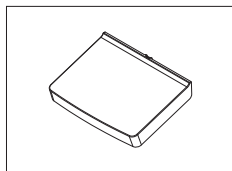
	Protective cover for Display	30216115

Software
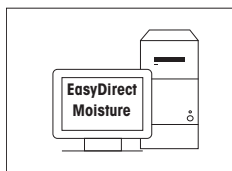
	EasyDirect Moisture (simple data collection)	30522676

11.2 Spare parts
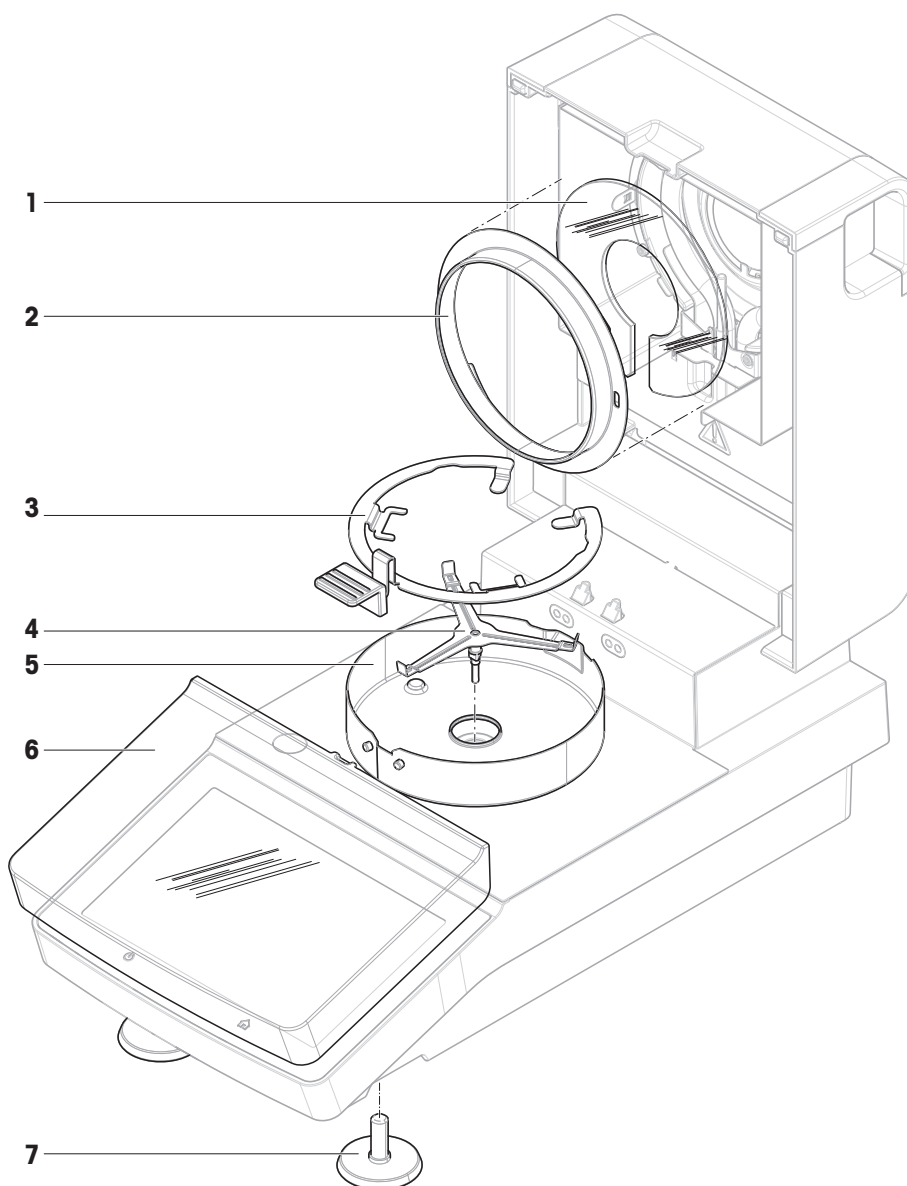
	Order no.	Designation	Remarks
1	30216116	Protective glass	–

	Order no.	Designation	Remarks
2	30216117	Reflector ring	–
3	30216113	Sample pan handler	–
4	214642	Sample pan holder	–
5	30216114	Draft shield	–
6	30216115	Protective cover display	–
7	30104835	Pair of leveling feet	–

12 Disposal

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

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

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For more information

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