Anton Paar

Reference Guide

Brabender Moisture Analyzer MT-CA

Find out more

www.anton-paar.com

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Address of the producer:
Anton Paar TorqueTec GmbH
Kulturstraße 49 – 51
D-47055 Duisburg / Germany
Tel: +49 203 77880
E-Mail: info.torquetec@anton-paar.com
Web: www.anton-paar.com

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Original instructions

Table of contents

1 Safety instructions

Read the documentation

- Read the documentation before using the product.
- Follow all hints and instructions in the documentation to ensure the correct use and safe functioning of the product.

1.1 General safety instructions

General

- The present manual is termed "Instruction Manual and Safety Information" (IMSI). It is designed as a quick guide providing you with the most important information regarding the safe installation and use of the product. Refer to the Reference Guide J03IB003 for a comprehensive description of the instrument. Download Anton Paar documents for free from the Anton Paar website: https://www.anton-paar.com
- Read this document and the documentation of the single instruments before using the measuring system.
- Follow all hints and instructions in the documentation to ensure the correct use and safe functioning of the product.
- The documentation is a part of the product. Keep it for the complete working life of the product and make it easily accessible to all persons involved with the product. If you receive any additions or revisions from Anton Paar, these must be treated as part of the documentation.

Liability

- This document does not claim to address all safety issues associated with the use of the product and samples. It is your responsibility to establish health and safety practices and to determine the applicability of regulatory limitations.
- Anton Paar only warrants the safe and proper functioning of the product if no modifications are made to mechanics, electronics, or software.
- Use the product only for the purpose described in the documentation. Anton Paar is not liable for damages caused by incorrect use of the product.
- The results delivered by the product depend on the correct function of the product and various other factors. We recommend that you have experts check the results (i.e., perform plausibility testing) before taking consequential actions based on the results.
- The proper function of the instrument's protective devices is only guaranteed when operated correctly within the specified scope of applications.

Cyber security

- The product must be installed in a physically restricted and access-controlled environment (e.g., non-public area, behind a firewall). Attacks requiring disassembly or hardware modification are out of scope.
- The user must use strong, unique passwords for each device and must keep them confidential, ensuring access is limited to authorized personnel only.
- The user must change or refresh passwords / PINs periodically.
- Security settings delivered by Anton Paar (e.g., authentication, PIN, encryption, logging) must remain enabled. Disabling or modifying them shifts responsibility and risk to the user and requires the customer to perform their own risk assessment.
- The user must configure the product in accordance with their company's recommended network and security policies.
- The user must regularly check for product updates and must install them (either independently or through Anton Paar processes).
- For software products, the customer must ensure proper access control to the host PC. The installer directory must be restricted to administrators.
- Security policies must ensure that users protect authenticators: keep them in their possession, do not share them, and report lost or compromised authenticators immediately. The user must not leave the product unlocked or unattended while authenticated.
- The product must operate only on a managed, regularly updated, and trusted operating system. It cannot protect against a compromised operating system.
- Only approved and conformant third-party components must be used. Secure implementation of connections to such components remains the responsibility of Anton Paar.
- The user must recognize that deviations from the Anton Paar-defined intended product use, environment, or documented security settings may introduce additional risks not covered by the provided security measures.

General precautions

- Observe and adhere to your national safety regulations regarding the handling of all substances associated with your measurements (e.g. use safety goggles, gloves, respiratory protection, etc.).
- Substances used must be labeled. The corresponding material safety data sheets must be observed and made available near the measuring setup.
- Samples and cleaning liquids that have been used in the measuring system are not suited for human consumption after use.

- Check the wetted parts of the product for chemical resistance to all samples and cleaning liquids.
- Take care that samples, cleaning liquids and gases are chemically compatible when they come into contact with each other. They must not react exothermally or produce hazardous substances.

Use of 30-mA RCDs

If local regulations prescribe the application of 30-mA RCDs to protect the socket circuits, consider the following points concerning selection of the RCDs.

Each Anton Paar device is tested as an individual consumer with the recommended RCDs and the real leakage current is documented.

Three-phase drive controls with variable speed:

- For operation of three-phase instruments with a three-phase frequency inverter, all-current sensitive RCDs type B must be used.
- Anton Paar recommends RCD type DFS4 B SK by Doepke (SK = special characteristic for increased tripping threshold up to 2 A in the pulse frequency range). A similar RCD with type designation RCCB2 is available from Messrs. EPA.
- Do not connect more than one instrument to each RCD. Otherwise, the respective leakage currents of combined instruments may sum up and trigger the RCD.

Single-phase instruments with variable-speed drive units:

- For the operation of single-phase instruments with frequency inverters, at least variable-current sensitive RCDs (type F) must be used, although all-current sensitive RCDs type B should be preferred. The recommendations given above apply here as well.
- If the recommendations concerning the type and model of the RCD and/or concerning operation of the device as an individual consumer cannot be met, please contact Anton Paar. The Anton Paar program comprises leakage current compensation devices and isolating transformers that can be installed in the power supply line.

Note that electrical safety tests in compliance with VDE 0701-0702 with a leakage current threshold value of 3.5 mA are not admitted for Anton Paar instruments.

Anton Paar instruments are subject to the EG machinery directive 2006/42/EG which requires conformity to EN 60204 1 (VDE 0113) for electric layout, equipment, and tests.

Chapter 18 (Tests) of the EN 60204 1 does not prescribe leakage current tests. However, chapter 8.2.8 of the machinery directive makes additional requirements on protective equipotential bonding for electric equipment with ground leakage currents of more than 10 mA AC or DC.

Installation

- Install products with a power plug so that you can easily separate them from the electrical supply (pull the power plug) at any time.
- The installation procedure shall only be carried out by authorized personnel who are familiar with the installation instructions.
- Never use the product outside the specified ambient conditions and specifications.
- Use only accessories, consumables, or spare parts supplied or approved by Anton Paar.
- Do not expose the product to direct sunlight for extended periods of time.

Using the product

- Ensure that all operators have been trained beforehand to use the product safely and correctly.
- Ensure that the product is sufficiently supervised during operation.
- In case of damage or malfunction, stop operating the product. Do not operate the product under conditions that could result in damage to goods or injuries or loss of life.
- If you suspect that spilled substances got into the product, disconnect the product from the electrical supply and have it checked for electrical safety by a service technician authorized by Anton Paar.
- If compressed gas from a gas bottle is used to operate the product, ensure that the operator is properly trained in the use of compressed gas bottles, and that all safety instructions of the gas bottle supplier are adhered to.

Operator’s skills

- All personnel involved in the operation and/or maintenance of the product must be qualified or properly instructed in its use.
- Operators must be able to read and understand the instructions within the manual.
- It is the owner's responsibility that all operators are sufficiently trained in the correct and safe use of the product.
- Operators must be able to judge dangerous situations and take the right measures to prevent accidents, injury and damage.
- Operators must have knowledge of the respective application field of the instrument and of its rules.

Precautions for flammable samples and cleaning agents

- Keep potential sources of ignition, like sparks or open flames, at a safe distance from the product.
- Store only the minimum required amount of sample, cleaning liquids, and other hazardous materials near the product.
- Place the product and all samples in a fume hood of adequate capacity.

– Do not spill sample/cleaning liquids or leave their containers uncovered. Immediately remove spilled sample/cleaning liquids.
– Ensure that the setup location is sufficiently ventilated. The environment of the product must be kept free from flammable gases and vapors.
– Provide fire-extinguishing equipment.

Precautions for processing dusty samples

– Flour or other fine dust dispersed in the air in a sufficiently high concentration can create a dangerous, highly explosive atmosphere. Even a small electric spark, e.g. due to operating an electrical switch, pulling a plug, electrostatic charge, friction, smoldering, glowing embers or hot surfaces can ignite the dust and cause a dust explosion involving the risk of serious injuries or death and the risk of damage to or destruction of adjacent devices or even the entire structure.
– When processing dusty products, smoking is absolutely prohibited in the workplace.
– Do not blow the device with compressed air after processing of dusty products.
– After processing of dusty products, remove adhering product residues with a damp cloth only.
– Thoroughly remove adhering product residues from the outer surfaces of the device, from adjacent devices and from the floor. Ensure to avoid turbulence as far as possible.

Operation in areas with risk of explosion

– The product is **not** explosion-proof and therefore must not be operated in areas with risk of explosion.

Service and repairs

– Service and repair procedures may be carried out only by authorized persons or by Anton Paar.

Disposal

– Concerning the disposal of the product, observe the legal requirements in your country. Contact your Anton Paar representative for further questions.

1.2 Conventions of safety messages and typography

Conventions for safety messages

The following conventions for safety messages are used in this document:

DANGER

Description of risk

Danger indicates a hazardous situation which, if not avoided, **will** result in death or serious injury.

WARNING

Description of risk

Warning indicates a hazardous situation which, if not avoided, **could** result in death or serious injury.

CAUTION

Description of risk

Caution indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Description of risk

Notice indicates a situation which, if not avoided, could result in damage to property.

TIP: *Tip gives extra information about the situation at hand.*

Typographical conventions

The following typographical conventions are used in this instruction manual:

Convention	Description
Names for physical buttons *Labels for tabs, buttons etc. in the software*	The names and labels are written in *italic*.
Menu Level 1 > Menu Level 2	Menu paths are written in *italic*. The menu levels are connected using a closing angle bracket.

1.3 Safety signs on the instrument

The following warning signs are attached or etched on the instrument.

CAUTION

Hot surface

This sign calls attention to the fact that the respective **surface can get very hot**. Do not touch this surface without adequate protective measures.

CAUTION

Danger of hand injuries

In areas marked with this sign there is the possibility of hand or finger injuries through moving parts. Keep a safe distance as long as parts of the product are still in motion.

Fig. 1: *Safety signs*

1 Safety sign - Hot surface

2 Safety sign - Danger of hand injuries

NOTICE

It is imperative that the warning signs remain clearly legible.

1.4 Protective devices

1.4.1 Cover hood above the positioning wheel

CAUTION

Risk of injury, entanglement hazard at the positioning wheel!

When the cover hood has been removed, there is the risk of injury and entanglement hazard at the rotating positioning wheel.

The cover hood prevents access to the rotating positioning wheel.

- Never dismantle the cover hood during operation!
- Operation of the device without the cover hood being mounted and fixed properly is not admitted!
- The cover hood may only be dismantled for cleaning and maintenance purposes by skilled personnel who has been informed about possible risks.
- Never work on the open positioning wheel with open long hair or with loose garments (tie, scarf, shawl or the like) or jewelry!

The cover hood on the top of the instrument prevents access to the rotating positioning wheel.

The cover hood is screwed to the instrument housing. It is a fixed guard, which can be removed only with tools.

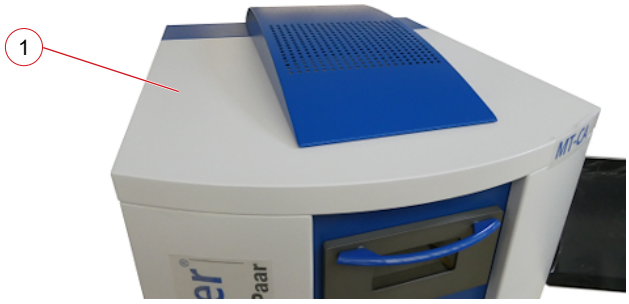


Fig. 2: *Cover hood above the positioning wheel*

1 Cover hood

1.5 Residual dangers

1.5.1 Risk of burns

WARNING

Risk of burns when touching the hot pans or when accessing the hot drying chamber, risk of property damage.

The inside of the drying chamber and the pans with the sample material may be very hot, even for a long time after switching off.

Risk of burns when touching the hot pans or the sample material or when accessing the hot drying chamber.

- Always wear suitable protective gloves when working on the instrument.
- Never put your bare hands into the drying chamber.
- Always ensure to keep a sufficient distance of unprotected parts of your body to the hot surfaces.
- Always use the crucible tongs for handling the pans.
- Deposit hot sample pans on a suitable, heat-resistant base only.
- Set up clear warning signs beside the hot pans in order to avoid unintentional touching by third persons.
- Guide/dispose hot product in appropriate, heat-resistant containers only.

1.5.2 Risk of injury on the turntable

CAUTION

Risk of injury on the turntable!

Risk of minor hand injuries on the pins of the turntable when accessing the drying chamber while the turntable is rotating.

- Always use suitable crucible tongs for inserting and removing the pans!
- Do not access the drying chamber with your bare hands!

1.5.3 Risk to human health by contact with materials

CAUTION

Risk of eye injuries or respiratory injuries, risk to human health.

Under certain circumstances gases, vapor or smoke can come out of the used or generated products. Getting in contact or breathing in such gases, vapors or smoke can lead to damage to your health.

- Always wear suitable protective gloves, respiratory protection (if required) and suitable safety goggles when working on the instrument.
- Always keep a sufficient distance of the respiratory organs to the measuring bowl and to the products used.

1.5.4 Danger by electricity

WARNING

Danger to life, risk of injury due to voltage leading parts!

In case of improper use of electric components, there is the risk of serious injuries or death by direct or indirect contact with live parts or connections!

- Work on electrical equipment is only to be carried out by authorized electricians!
- Do not run the machine with faulty electric connections or connections that are not ready for operation!
- Before connecting the instrument to the power supply, make sure that the line is equipped with a fault current circuit breaker (RCD), minimum type B [30 mA], and that the line voltage and frequency match the data on the name plate!
- Only connect the power plug to a correctly installed power outlet with protection contact (PE)!
- Avoid a tripping hazard when laying the power cable! Highlight any tripping positions!
- Keep access to the electric modules closed always. Access only by authorized personnel with the appropriate training and security briefing!
- Always pull the power plug before opening any access to the electric modules of the instrument!
- Always pull the power cable on the plug, never pull on the cable!
- Do not expose the power cable and the plug to humidity!

2 Overview

2.1 General description

The Moisture Analyzer MT-CA is an electronic moisture analyzer using the principle of drying in circulating air (drying chamber principle). The instrument determines the loss in weight of the sample material that results from drying. Due to the continuous air flow within the drying chamber, the drying process takes considerably less time than in a conventional drying chamber without ventilation.

The instrument enables individual and serial determination of the water and solvent content to the nearest 0.1 % of almost any organic and inorganic material (refer to table in the annex).

Apart from that, the instrument provides for software-aided recording of a drying curve (drying progress as a function of time) to determine the optimum drying time and temperature of a product.

As compared to other instruments and methods for moisture measurement (e.g. NIR, drying balances, dielectric instruments), the instrument offers the following advantages:

– The drying chamber method is the reference method. No special calibration is required for different samples
– The drying chamber ensures uniform temperature distribution, supporting consistent measurement results
– Up to 10 samples can be measured at a time with identical temperature, even if each sample requires a different drying time

The scope of delivery of the instrument comprises:

– Crucible pliers
– Software MetaBridge (installed in factory)

The following components need to be ordered separately:

– Pans (aluminum or V2A)
– Printer

2.2 Name plate of the instrument

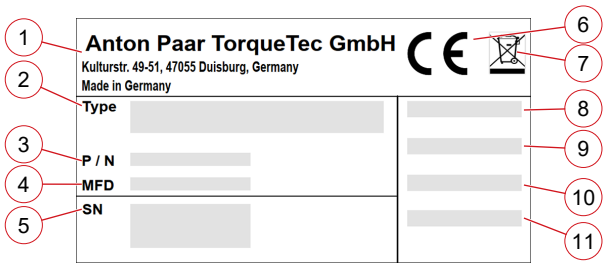


Fig. 3: *Name plate of the instrument*

1 Manufacturer's name and address
2 Instrument name
3 ID no./Electric drawing no.
4 Year of manufacture
5 Serial number
6 CE sign
7 Device must not be disposed of with household waste
8 Permissible line frequency
9 Admissible voltage
10 Rated current
11 Rated power

2.3 Designation of the instrument sides

Front side

The side of the instrument with the doors to the drying chamber and to the balance chamber is referred to as front side in the following.

Right side

The side with the ports (USB, HDMI, LAN) is referred to as right side in the following.

Left side

The side that is opposite to the right side is referred to as left side in the following.

2.4 Overview display

2.4.1 Front side, left side

On the front side of the instrument, there are the two doors to the drying chamber (upper door) and to the balance chamber (lower door) and, mounted laterally depending on the model, the touchscreen with the integrated MetaBridge software.

On the left side, there is an air supply grille in the front part for cooling the drying chamber and an air supply grille with fan in the rear part for cooling the electronics as in the below figure.

Fig. 4: *Front side and left side of the MT-CA*

1 Cover hood above the turntable
2 Door to the drying chamber
3 Air supply filter with fan for cooling the drying chamber
4 Air supply filter for cooling the electonics
5 Door to the balance chamber
6 Touchscreen (depending on the model)

2.4.2 Right side

Fig. 5: *Right side of the MT-CA*

1 *Bubble level*
2 *Key PC on/off*
3 *Air outlet grille with fan*
4 *LAN*
5 *4× USB 2.0*
6 *HDMI*
7 *Main power switch on/off and power cord socket*
8 *Equipotential bonding screw*

2.4.3 Drying chamber

The insulated drying chamber is located behind the upper door on the front side of the instrument.

In the drying chamber, there is a turntable for taking up to 10 samples at a time. The samples can be inserted at different times, even if other samples are already drying.

The turntable is controlled through the software. A position sensor recognizes the current turntable position and indicates it on the display or terminal.

The setpoint temperature in the drying chamber is set via the software and controlled by an RTD (Resistance Temperature Detector). The drying chamber is heated with a heating capacity of 1.1 kW.

A fan blows fresh air over the electric heating element into the drying chamber. The moist air is extracted through four vents. The constant exchange of the moist air makes the drying process faster than in a conventional drying oven without circulation.

TIP: *During calibration and during the entire measuring process, the door to the drying chamber must always be closed (except for inserting and taking out the samples).*

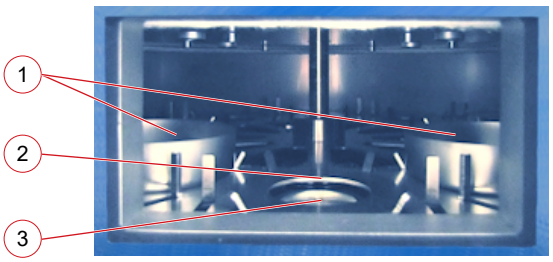


Fig. 6: *Drying chamber of the MT-CA with two pans on the turntable*

1 *Pan*
2 *Turntable*
3 *Pan carrier*

2.4.4 Balance chamber

The balance chamber with the precision balance is located behind the lower door on the front side of the device.

In the balance chamber, the sample is weighed before drying and is then placed in the drying chamber for drying.

After drying, the balance moves up fully automatically. The pan is placed automatically on the pan carrier and weighed.

TIP: *As the sample is re-weighed directly in the drying chamber, cooling down before re-weighing is not necessary.*

During re-weighing, the fan in the drying chamber is stopped automatically in order to avoid disturbances by circulating air during measurement. Additionally, the four vents for exhausting the moist air are closed during re-weighing.

TIP: *During calibration and during the entire measuring process, the door to the balance chamber must always be closed (except for inserting and taking out the samples).*

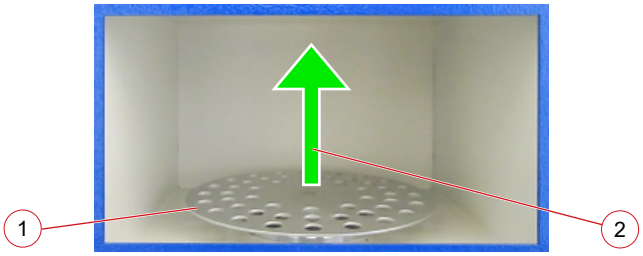


Fig. 7: *Balance chamber of the MT-CA*

1 *Balance*
2 *The balance moves up for re-weighing the sample*

2.5 Definitions

2.5.1 Pan carrier

During re-weighing, the pan carrier serves as balance plate. It penetrates through the bore of the turntable and is connected to the load cell.

During re-weighing, the balance moves upwards so that the pans in the drying chamber are carried by the pan carrier and can be weighed directly within the drying chamber.

2.5.2 Pan carrier weight

Weight of the pan carrier in the drying chamber.

During re-weighing of the sample, the pan carrier represents an additional weight which needs to be determined in regular time intervals because it may vary e.g. due to contamination.

2.6 Measuring Principle

The Moisture Analyzer MT-CA is an electronic moisture analyzer using the principle of drying in circulating air (drying chamber principle). The instrument determines the loss in weight of the sample material that results from drying. Due to the continuous air flow within the drying chamber, the drying process takes considerably less time than in a conventional drying chamber without ventilation.

The instrument enables individual and serial determination of the water and solvent content to the nearest 0.1 % of almost any organic and inorganic material refer to table in the annex.

Apart from that, the instrument provides for software-aided recording of a drying curve (drying progress as a function of time) to determine the optimum drying time, and temperature of a product.

As compared to other instruments and methods for moisture determination (e.g. NIR, drying balances, dielectric instruments), the instrument offers the following advantages:

- The drying chamber method is the reference method - there is no special calibration for different samples necessary
- Gentle and uniform drying ensures precise results
- Up to 10 samples can be measured at a time, even if each sample requires a different drying time

3 MetaBridge software

3.1 Starting/running down the internal PC or the software

3.1.1 Initial start-up

When starting the program for the first time, initial presetting's must be completed before the measurement program can begin.

TIP: *These settings can be changed later in the tile.*

Complete the initial setup steps outlined below:

1. Power on the device (if not already switched on).

   The internal PC will boot, and the *Welcome* and *MetaBridge* title windows will appear on the touchscreen or external terminal before the language selection window appears.
2. Select your language.

   The privacy statement window will appear.
3. Review the privacy statement and tap *Accept*.

   The date setting window will appear.
4. Set the current date and tap *Next.*

   The time setting window will appear.
5. Set the current time and tap *Next.*

   The country of operation window will appear.
6. Select the country of operation and tap *Next.*

TIP: *This setting determines your local service contact displayed in the tile.*

7. Create an administrator account, filling in all required fields, and tap *Finish*.

TIP: *The secret question and answer are necessary to recover your password if forgotten.*

8. Log in using your username and password.

   The main start screen will appear.
9. Configure additional settings (e.g., language) in the *Options* tile, if necessary.

3.1.2 Starting the internal PC

1. For starting the internal PC, power on the device.

   After a few seconds, the log-in window shows up where you can log in or create a new user account.

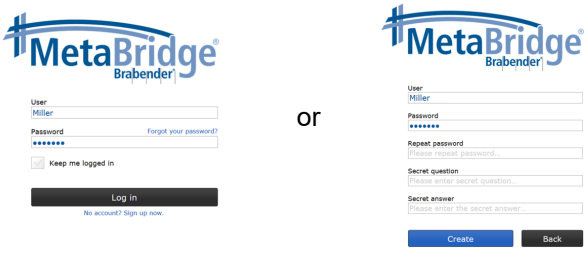


Fig. 8: *Log-in window and new user window*

3.1.3 Running down the internal PC

TIP: *Users who do not have administrator authorities can only run down the internal PC locally, that means directly on the touchscreen. In remote mode, only administrators can run down the internal PC.*

NOTICE

Risk of loss of data by running down the PC improperly!

Switching off the internal PC with the main power switch on the instrument may cause damage to or loss of data.

– Always run down the internal PC properly before switching off the instrument.
– Do not switch off the instrument as long as the internal PC is still running!

1. For running down the internal PC and the touchscreen, if any, tap the *User* tile.

   The following selection window pops up.

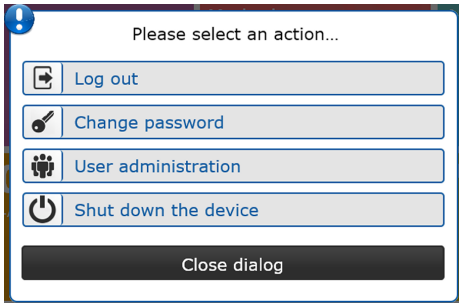


Fig. 9: *Selection of user functions*

TIP: *Users below the administrator level can see the button "Shut down the device" only in local operation. In remote mode, i.e. on external terminals, only administrators can see this button.*

2. Tap the button *Shut down the device* ⏻.

   A message window *The device is shutting down* pops up.

   After a few seconds, the internal PC is shut down and the touchscreen turns off.

Fig. 10: *Message "The device is shutting down"*

3.2 MetaBridge start screen

Upon log-in, the MetaBridge start screen appears as in the figure below.

TIP: *Generally, the start screen contains some device-specific tiles in the upper part (refer to Section 3.3 [▶ 14]) and some general tiles in the lower part (refer to Section 3.4 [▶ 16]). The arrangement of the tiles may vary depending on the terminal (PC, tablet, smartphone) and monitor size.*

The menus and functions of the individual tiles will be explained in detail in the following. They may, however, vary depending on the installed software modules and system configuration.

TIP: *The following software description assumes touchscreen operation ("tap"). However, the software can just as well be handled using a mouse.*

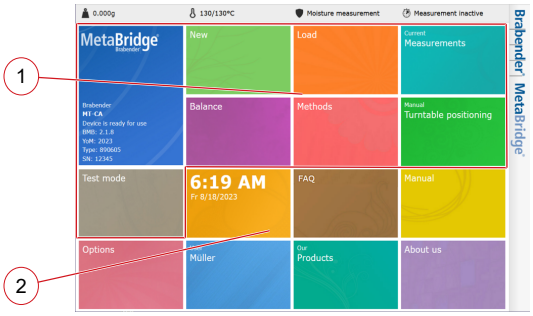


Fig. 11: *MetaBridge start screen for MT-CA*

1 Device-specific tiles
2 General tiles

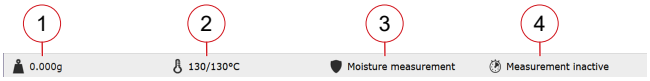
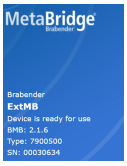


Fig. 12: *Header showing current test mode*

1 Sample weight in [g]
2 Drying temperature
3 Measurement type
4 Measurement status

3.3 Device-specific tiles

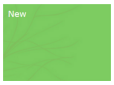
3.3.1 Tile "MetaBridge"



The *MetaBridge* tile shows the most important instrument data:

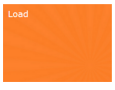
– User-defined name (factory setting: Brabender, editable under *Options* > *Device*)
– Instrument or software name
– **BMB:** MetaBridge version no.
– **YoM:** Year of Manufacture of the instrument
– **Type:** ID no. of the instrument/software
– **SN:** Serial no. of the instrument/software

3.3.2 Tile "New"



The tile *New* opens the parameter window for entering the parameters for a new test and for running and evaluating the new test.

3.3.3 Tile "Load"



The tile *Load* contains a list of all tests saved.

TIP: *In the field in the right top, you can search for a certain test or for tags (key words) defined before. Tapping the button behind the field allows searching for tests run on a certain date.*

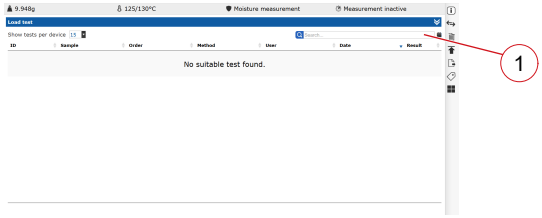


Fig. 13: *Window Load test*

1 Field "Search..."

1. Tap on a measurement in the list or import of a measurement.

   The parameters and results of the measurement are shown.

TIP: *Fields with the "Edit" button can still be edited in a loaded measurement.*

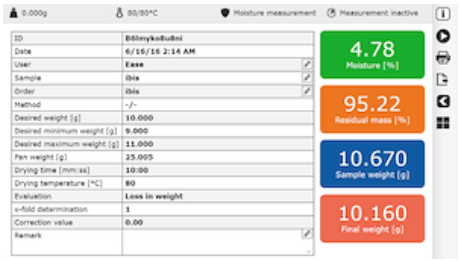


Fig. 14: *Display of a loaded measurement (single measurement)*

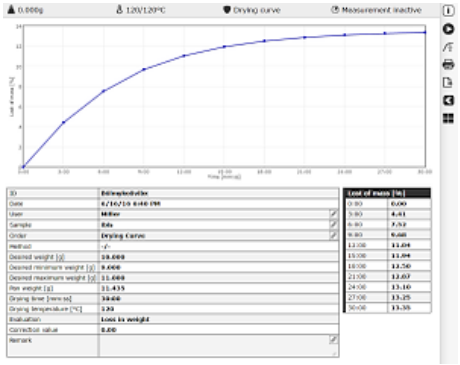


Fig. 15: *Display of a loaded measurement (drying curve)*

3.3.4 Tile "Current Measurements"

The tile *Current Measurements* shows an overview of the current measurements, listing also the measuring time remaining.

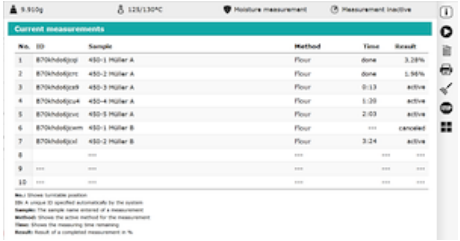
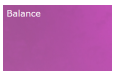


Fig. 16: *Current measurements*

3.3.5 Tile "Balance"



Tapping the tile *Balance* enables taring and calibration of the balance, determination of the pan carrier weight, and moving the balance up and down. Apart from that, this window shows the current weight on the balance.

TIP: *During a running measurement, the tile "Balance" is locked. As long as the weight is not stable, the unit behind the weight is hidden. It is shown when the weight on the balance is stable.*

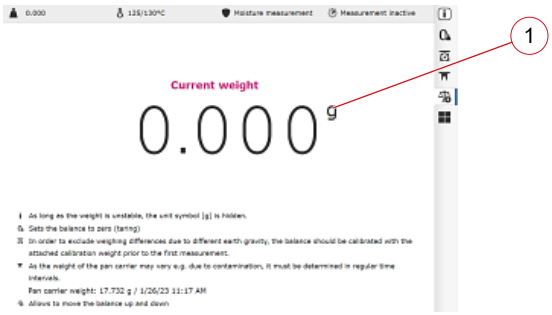


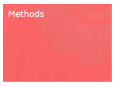
Fig. 17: *Window Balance*

1 Unit [g], only visible when weight is stable

The following procedures need to be performed in order:

1. Tare the balance (refer to Section 5.2.3 [▶ 21]).
2. Calibrate the balance (refer to Section 5.2.4 [▶ 21]).
3. Determine the pan carrier weight (refer to Section 5.2.5 [▶ 22]).

3.3.6 Tile "Methods"



A method comprises all data clearly defining the test conditions. An unlimited number of methods can be saved.

TIP: *It is possible to measure several samples using different methods simultaneously, if all these methods use the same drying temperature. Methods with different drying temperatures cannot be used simultaneously.*

When the instrument is delivered, some methods have been preset in factory that cannot be deleted.

Tapping the tile *Methods* opens the method window, showing the method currently active as in the figure below as an example.

TIP: *The buttons Rename method and Delete method on the right beside the entry field Method are inactive until at least one user-specific method has been defined.*

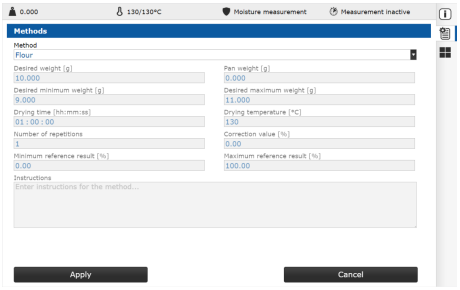
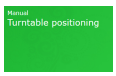


Fig. 18: *Window "Methods"*

3.3.7 Tile "Manual turntable positioning"



The tile *Manual turntable positioning* enables manual turntable positioning, e.g. for inserting or removing a pan.

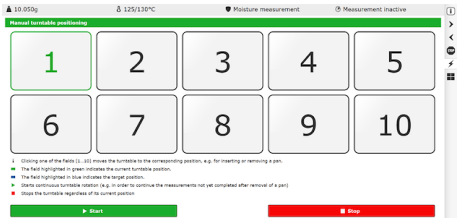
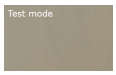


Fig. 19: *Window "Manual turntable positioning"*

3.3.8 Tile "Test mode"



The tile *Test mode* allows selection of the test mode.

– **Mode 1: Moisture test**

In the mode *moisture test*, single and multiple measurements of up to 10 samples can be run.

In single measurements, the moisture content of each individual sample is determined. In a multiple determination, an average moisture content of a certain type of sample is determined by measuring several identical samples.

– **Mode 2: Drying curve**

In the mode *drying curve*, the optimum drying time of a sample can be determined. For this purpose, 10 measuring points are distributed evenly over the entire measuring time.

TIP: *The drying time for a drying curve should be at least 60 min in order to make sure that the setpoint temperature in the drying chamber is reached and maintained again.*

1. To change the test mode, tap the tile *Test mode* and tap the desired field in the selection window.

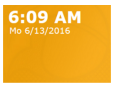
   The window *Test mode* is closed and the selected test mode is indicated in the header.

3.4 General tiles

3.4.1 Tile "Manual"

The tile *Manual* opens the instruction manual (PDF) of your device/software.

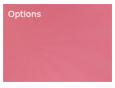
3.4.2 Tile "Time/date"



The *Time/date* tile shows the local time and date of the respective terminal.

TIP: *This tile just displays the local time and date; you cannot make any settings here. Time and date setting can be made on the "Options" tile.*

3.4.3 Tile "Options"



On the tile *Options*, you can make some general settings (time, language) as well as general settings concerning the device, test procedure, network and diagram configuration.

Fig. 20: *Tile "Options", window "General settings"*

3.4.3.1 General settings

Button *General settings*

Tapping the tile *Options* (or tapping the button *General settings* in any other window) opens the window *General settings* as in the figure above.

3.4.3.2 Diagram, axis, series, correlation settings

The buttons *Diagram settings*, *Axis settings*, *Series settings*, *Correlation settings* (if equipped), and *Measuring view* enable various settings concerning the diagram.

3.4.3.3 Export

The *Export* button opens a window for making several settings concerning the automatic export of the test and concerning the *Labfolder* Lims.

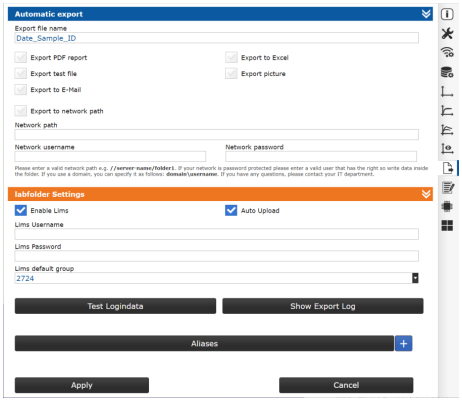


Fig. 21: *Window "Automatic export"*

In the entry field *Export file name*, you can define the composition of the file name of your export files. Tapping the entry field opens the following window. By means of the arrows, you can move the variables in this window.

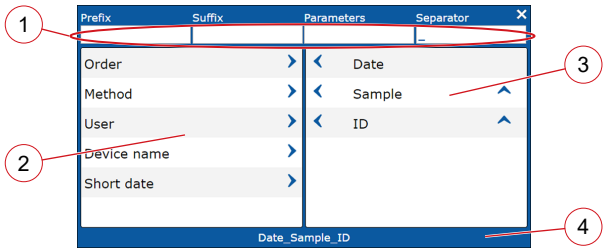


Fig. 22: *Export file name*

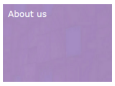
1 Manual entry fields
2 Available variables presently not used
3 Variables currently used
4 Representation of the current file name composition

3.4.4 Tile "Our Products"

The tile *Our Products* shows a survey of the Anton Paar Food or Chemical instruments (depending on the section your device belongs to).

Tapping a device opens a PDF file with a detailed description of the respective device and its applications.

3.4.5 Tile "About us"



This tile lists the contact data of the Anton Paar Customer Service and some basic device data needed when contacting the Anton Paar Customer Service.

4 Installation

4.1 Safety notes concerning mounting

CAUTION

Risk of injury, risk of property damage!

Improper mounting may cause danger of injury to the personnel and risk of damage to the instrument.

– All mounting work on the instrument may only be carried out with care by technically skilled personnel!

4.2 Pre-installation requirements

The intended place of operation must be in a closed room free of smoke, dust, or highly corrosive gases and vapors and not exposed to direct sunlight.

The intended base for mounting the instrument must be even and plane, clean, and strong enough to carry the instrument with all accessories and peripheral units.

Observe local regulations regarding workspace clearance (incl. maintenance work) and escape routes.

TIP: *Concerning power supply data, please refer to Appendix A [▸ 30].*

4.3 Arrival, transport and storage

4.3.1 Packaging

The instruments are packed professionally into wooden crates. Small parts and accessories are packed separately into cardboard boxes or bags contained in the crates. Additional equipment is packed either in the same crate as the instrument or in a separate one, depending on the scope of the order.

It is essential to observe the following labels on the outside of the crate(s):


This side up!


Fragile, handle with care!


Keep dry!

4.3.2 Unpacking the instrument

NOTICE

Risk of property damage!

By tilting or stacking the transport boxes, the instrument may be damaged.

- Do not tilt or stack the boxes!
- Transport and store the instrument and its accessories in their original packaging all times!
- Protect the box(es) from weather and outside influences!
- Use a forklift or pallet truck to transport the packed device!

1. Upon arrival of the instrument, inspect the shipping crate(s) for outside damage.
2. If any damage is detected, notify the transport guide and Anton Paar GmbH immediately.

NOTICE

Parts of the instrument may be damaged when opening the crate!

- When removing the lateral walls of the crate, take care of braces and supports within the crate as well as of bolt connections at the bottom of the crate, etc.!
- Carefully remove the lateral walls of the crate!

3. Unpack the instrument with care. Take particular care for small parts or accessories within the packing material.

   Leave cover hoods and protective films on the instrument until mounting or commissioning.
4. Inspect the packing material very carefully.
5. Dispose the packing material in an ecologically friendly way in compliance with the local regulations concerning disposal only after having found the scope of delivery to be complete.

4.3.3 Checking the scope of delivery

1. Upon arrival of the instrument at the place of destination, the owner shall promptly inspect the shipment and compare the contents with the shipping documents to verify completeness of the delivery.
2. The owner shall notify Anton Paar in writing without undue delay of any discrepancies, including missing equipment or spare parts.

TIP: *Timely inspection and written notice of any discrepancies shall be a condition precedent to any claim for free replacement of missing equipment or spare parts. Failure to provide such timely notice shall bar any claim for free replacement.*

4.3.4 Checking for and notification of damage

1. Immediately upon unpacking and checking of the scope of delivery, check the instrument as such for any signs of damage.
2. If damage is found, notify the transport guide immediately.
3. Provide a copy of the transport damage report to Anton Paar GmbH immediately. Also provide the place and time of the damage.

TIP: *If the ownership of the equipment was transferred to the buyer at the same time of or prior to transportation, the buyer is liable for all damages incurred during transportation. The buyer and receiver must observe the regulations of the insurance policy.*

TIP: *If necessary, the average adjuster appointed by the claim opponent must be given the opportunity to inspect the shipment/the instrument.*

WARNING

Risk of injury, risk of property damage by a defective instrument!

A defective instrument can result in unknown hazards for humans and instrument.

- Never mount or use a defective instrument!

4.3.5 Transport to the installation site, leveling

WARNING

Risk of severe injury due to inappropriate transportation of the instrument!

The instrument is extremely heavy. Risk of severe injury or death due to inappropriate transportation of the instrument.

- Always use an overhead crane, a lift truck or a fork lift for moving the instrument!
- Ensure to have a skilled person operate the lifting equipment!
- Ensure sufficient carrying capacity and safe operating condition of the lifting equipment!
- Fix ropes, chains, or belts so that they cannot slip off and the instrument cannot tip over!
- Do not stand underneath suspended loads!

1. Make sure to remove all covering hoods and protective films.
2. Mount suitable protective equipment for the lifting equipment used.
3. Dismantle any parts that might fall down during transportation.
4. Use the lifting equipment to move the unpacked instrument with extreme caution to the intended installation site.

5. Put a bubble level onto the instrument to check whether it is leveled exactly horizontally.
6. If this is not the case, slightly move the device or the mobile frame, if equipped, or compensate for depressions in the mounting surface by placing e.g. thin metal shims under the feet until the device is exactly horizontal.

WARNING

Risk of injury, risk of property damage and wrong measuring results by an instable instrument due to inaccurate leveling!

Inaccurate leveling involves the risk of injury and of property damage due to an instable instrument. Instability can also lead to poor performance or wrong measuring results.

Ensure that the instrument is leveled and stands firmly and safely!

7. Make sure the device stands firmly and safely.
8. Dismantle the protective transportation equipment.

4.3.6 Storage

NOTICE

Risk of property damage due to improper storage!

Storage in humid or aggressive environment may cause corrosion and, in extreme cases, pitting corrosion.

- Dismantle any separate modules from the instrument before storage.
- Clean and dry all surfaces of the machine thoroughly before storage.
- Cover the instrument with a cover hood or protective film in order to protect it against dust and humidity.
- Store the instrument and all parts thereof in dry and safe environment only.
- Put the instrument on a support that is at least 200 mm high, in order to protect the instrument from soil moisture.
- Arrange storage areas in a way that moisture can escape and periodical inspections are possible.
- Ensure that the device stands firmly and safely and is protected against rolling or slipping away and tipping (if equipped, lock the break).

Extreme temperature fluctuations or long exposure to direct sun may cause damage to the instrument or machine!

- Do not expose the instrument or parts thereof to extreme temperature fluctuations or direct sun!

4.4 Setting up the instrument

4.4.1 Leveling the instrument

CAUTION

Risk of severe injury due to inappropriate transportation of the instrument!

The instrument is heavy. Risk of severe injury due to inappropriate transportation of the instrument.

- Use a lift truck, a fork lift or at least two persons for moving the instrument!
- Ensure to have a skilled person operate the lifting equipment!
- Ensure sufficient carrying capacity and safe operating condition of the lifting equipment!
- Fix ropes, chains, or belts so that they cannot slip off and the instrument cannot tip over!
- Do not stand underneath suspended loads!
- Do not carry the instrument over long distances!

1. Lift the instrument with a suitable lifting device or with two or more persons, place the instrument onto a sturdy, vibration-free working surface.
2. Level the instrument exactly horizontally by means of the bubble level as in the figure below and the adjustable feet.
   If the device is not leveled exactly horizontally:

   Loosen the locknut of the respective foot screw with an open-jawed wrench.

   Screw in or out the four adjustable foot screws until the device is leveled exactly horizontally in every direction.

   Retighten the locknuts.
3. Make sure that the device stands firmly and safely.
4. Carefully remove the foamed plastic parts protecting the balance during shipment through the bottom door.

Fig. 23: *Front side of the instrument, lower part with bubble level*

1 Bubble level

4.4.2 Power supply connection

WARNING

Danger to life, risk of injury due to voltage leading parts!

In case of improper use of electric components, there is the risk of serious injuries or death by direct or indirect contact with live parts or connections!

- Work on electrical equipment is only to be carried out by authorized electricians!
- Do not run the machine with faulty electric connections or connections that are not ready for operation!
- Before connecting the instrument to the power supply, make sure that the line is equipped with a fault current circuit breaker (RCD), minimum type B [30 mA], and that the line voltage and frequency match the data on the name plate!
- Only connect the power plug to a correctly installed power outlet with protection contact (PE)!
- Avoid a tripping hazard when laying the power cable! Highlight any tripping positions!
- Keep access to the electric modules closed always. Access only by authorized personnel with the appropriate training and security briefing!
- Always pull the power plug before opening any access to the electric modules of the instrument!
- Always pull the power cable on the plug, never pull on the cable!
- Do not expose the power cable and the plug to humidity!

1. Make sure that the instrument has been switched off.
2. Connect the power plug of the power supply connection of the instrument to a protective earth contact (PE).
3. In order to prevent static charging or potential differences, a ground cable can be connected to the equipotential bonding screw as in the figure below. This is, however, not imperative.

TIP: *Refer to Appendix C.1.2 [▶ 32].*

Fig. 24: *Power supply connection*

1 Bubble level
2 Main power switch on/off
3 Power cord socket
4 Equipotential bonding screw

TIP: *Before taking the instrument into operation, make sure to read the instruction manual(s) and familiarize yourself with the functions of the software and all other system components!*

5 Start-up

5.1 Safety notes concerning start-up

CAUTION

Risk of injury, risk of property damage!

Improper start-up of the instrument involves the danger of injury to the personnel and the risk of damage to the instrument.

- Commissioning of the instrument may only be performed by qualified operating personnel!

5.2 Preparations prior to first measurement

5.2.1 Insert the pan carrier

For shipping, the pan carrier is attached separately to the scope of delivery. Before taking the instrument into operation, the pan carrier must be placed onto the supporting rod in the drying chamber.

TIP: *To insert the pan carrier, the turntable in the drying chamber must have reached a defined position.*

1. Turn on the MT-CA.
2. Turn on the internal PC.

   The turntable automatically runs to position number 1.
3. Tap the tile *Balance* in the MetaBridge software.

   The window *Balance* appears showing the current weight.

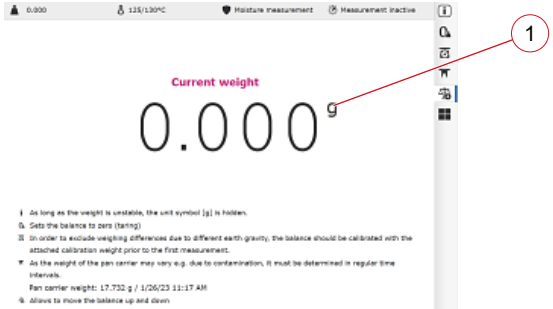


Fig. 25: *"Balance" window*

1 Unit [g], only visible when weight is stable

4. Tap *Balance up* in the action bar.

   The balance rises automatically.

TIP: *The individual positions of the turntable have a hole in the middle. When the balance moves up, the rod taking the pan carrier reaches into this hole as in the figure below.*

5. Open the upper door to the drying chamber.
6. Insert the pan carrier onto the support rod in the drying chamber.
7. Ensure that the pan carrier is level.

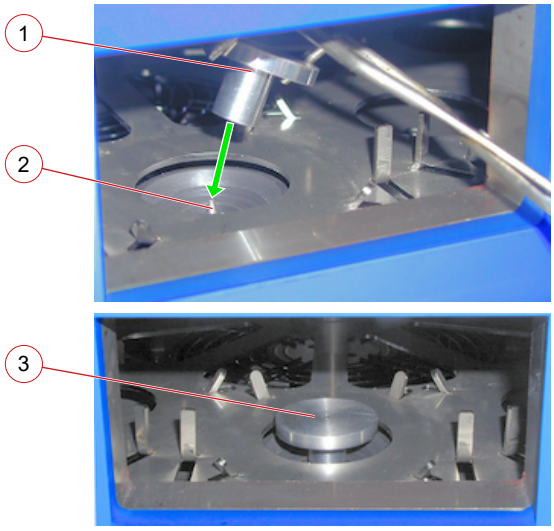


Fig. 26: *Inserting pan carrier*

1 Pan carrier
2 Supporting rod for pan carrier
3 Placed pan carrier

8. Tap *Balance down* in the action bar.

   The balance lowers.

5.2.2 Connect a printer

1. Connect a network printer via LAN or a stand-alone printer via USB.
2. Activate the option *Autoprint* on the *Options* tile to print the measurements automatically upon completion.

5.2.3 Tare the balance

TIP: *During taring, the doors to the balance chamber and to the drying chamber must be closed all the time.*

1. Make sure that the balance and the turntable are empty.
2. Make sure that the doors to the balance chamber and to the drying chamber are closed.
3. In the tile *Balance*, tap *Taring*.

   When taring is completed, the message reads *Balance taring completed*.

5.2.4 Calibrate the balance

In order to exclude weighing differences due to different earth gravity (depending on the geographical position of the place of application of the balance), the balance should be calibrated with the attached calibration weight **prior to the first measurement**.

TIP: *Because different components expand at different rates, calibration must always be done at the operating temperature to be used (depending on the method used), that means approx. 30 min after switching on, when the drying chamber has reached operating temperature.Only use the original Anton Paar calibration weight delivered with the instrument, otherwise calibration may fail!*

TIP: *During calibration, the doors to the balance chamber and to the drying chamber must be closed all the time.*

1. In the tile *Balance*, tap *Calibration*.

   A window appears, showing the setpoint temperature and the current actual temperature.

   When the set point temperature has been reached, you are requested to check the balance plate and to close the door to the balance chamber.

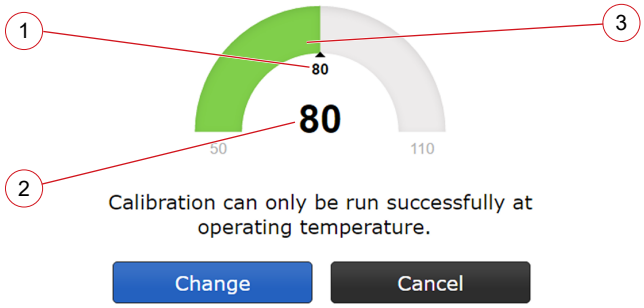


Fig. 27: *Calibration at operating temperature only*

1 Setpoint temperature
2 Current actual temperature
3 Actual temperature (blue: low, green: ok, red: high)

TIP: *If the actual temperature permanently deviates by only a few degrees from the setpoint temperature (e.g. due to a Pt-100 failure), the setpoint temperature can be adjusted correspondingly tapping the field .*

2. When the setpoint temperature has been reached, ensure the weighing plate and turntable are empty before calibration.
3. Make sure that the doors to the balance chamber and to the drying chamber are closed.
4. Tap *OK*.
5. Upon request, put the original calibration weight onto the balance plate.
6. Close the door to the balance chamber.

   The instrument calibrates the balance automatically.

5.2.5 Determine the pan carrier weight

During re-weighing, the balance moves upwards so that the sample pans in the drying room are carried by the sample pan carrier and can be weighed directly within the drying chamber. During re-weighing, the sample pan carrier represents an additional weight.

As the weight of the sample pan carrier may vary e.g. due to contamination, it needs to be determined **in regular time intervals**.

TIP: *For the determination of the pan carrier weight, the doors to the balance chamber and to the drying chamber must be closed all the time.*

1. In the tile *Balance*, tap *Define pan carrier weight* in the action bar.
2. Make sure that the balance plate and the turntable are empty and that the doors to the balance chamber and to the drying chamber are closed.
3. Tap *OK*.

   The sample pan carrier weight is determined automatically.

6 Setup and operation

6.1 Performing a measurement

6.1.1 Moisture measurement

1. Make sure to calibrate the balance prior to the first measurement (refer to Section 5.2.4 [▶ 21]).

General remarks

TIP: *For running moisture determinations (single and/or multiple measurements), "Mode 1: Moisture test" must have been activated on the tile "Test mode".*

Single and multiple measurements can be run at a time. For single measurements, the test parameters must be entered separately for each sample. If multiple determinations have been selected (under *Methods* > *Number of repetitions*, determination of the average moisture of several identical samples), the turntable automatically moves to the next position when the first sample has been inserted so that the next sample of the series can be inserted without needing to enter the test parameters anew.

6.1.1.1 Start-up and initialization

TIP: *The pan carrier weight may need to be determined and the balance may need to be calibrated before starting the measurement (refer to Section 5.2.5 [▶ 22] and Section 5.2.4 [▶ 21]).*

1. In the *Test Mode* tile, tap "*Mode 1: Moisture Test*" before proceeding.

   The header must indicate *Moisture measurement*. If not, set the correct mode in the tile *Test mode*.
2. Tap the tile *New*.

   The parameter window opens.
3. Enter the test parameters.
4. Tap the field *Start measurement*.
5. Wait until the drying temperature has been reached (window closes) or, if the actual temperature deviates by a few degrees only or tap *Ignore*.

   The turntable moves to a free position.

TIP: *The following steps differ depending upon whether pans with an undefined or defined weight are being used.*

6.1.1.2 Sample loading

Pans with undefined weight

Entry pan weight: *0.000*

1. Put the empty pan into the middle of the balance and close the door to the weighing chamber.

   The pan weight is determined and the balance with the pan is tared.

   The following window shows *0.000* and the tolerance range for the sample weight.

Fig. 28: *Window with pan weight 0.000 and tolerance range*

2. Fill in the sample into the pan inside of the instrument.

   This directly shows the given sample weight (10 g ±1 g tolerance).
3. Close the door to the weighing chamber.

   As soon as the weight is stable, it is shown in green and the unit symbol *g* appears behind the value

Fig. 29: *Stable sample weight*

Pans with defined weight

Entry preset pan weight, e.g. *11.500*

TIP: *You are requested immediately to fill the sample into the pan, there is no pan weight determination and balance taring.*

TIP: *The weight displayed (fixed pan weight) is negative because the pan is not yet on the balance.*

Fig. 30: *Fill sample into pan (fixed negative pan weight)*

1. Fill sample into pan.
2. Close the door to the weighing chamber.

   As soon as the weight is stable, it is shown in green and the unit symbol *g* appears behind the value.

6.1.1.3 Measurement

1. Tap > *OK* to confirm the weight.

   Upon confirmation with *OK*, you are requested to put the pan with the sample onto the turntable.

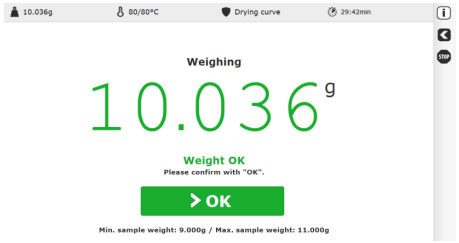


Fig. 31: *Stable sample weight*

TIP: *If a low or high sample weight is confirmed, the program asks whether the fact that the sample weight is out of the tolerance range is to be ignored.*

A confirmation of this window with OK may lead to faulty measuring results.

TIP: *Insertion of the pan with the sample onto the turntable and confirmation should be done as quickly as possible in order to avoid temperature fluctuations and to provide for reproducible results in case of repetitions.*

1. Take the pan with the sample out of the weighing chamber.
2. Close the door to the weighing chamber again.
3. Put the pan onto the front position of the turntable.
4. Close the door to the drying chamber immediately and confirm insertion of the pan with *OK*.

   The software recognizes the confirmation as starting point of the set drying time and starts the drying process.

   In case of multiple determinations, the turntable automatically moves to the next free position to allow insertion of the next sample of the series.
5. **Only for multiple determinations:** Insert all samples for the multiple determination as described before.

   Upon insertion of the (last) sample and confirmation with *OK*, the overview window opens automatically showing the status of the current measurements.

6.1.2 Drying curve

1. Make sure to calibrate the balance prior to the first measurement (refer to Section 5.2.4 [▶ 21]).

General remarks

TIP: *To run a drying curve, "Mode 2: Drying curve" must have been activated on the tile "Test mode".*

TIP: *A drying curve cannot run simultaneously with moisture determinations.*

TIP: *Only one drying curve can be recorded at a time.*

6.1.2.1 Start-up and initialization

1. Make sure that "*Mode 2: Drying curve*" has been enabled.

TIP: *The header of the main window must indicate Drying curve as in the figure below.*

1. Tap the tile *New*.

   The parameter window opens.
2. Enter the test parameters.

TIP: *The drying time must not be <10 min because otherwise, the time would be too short to distribute 10 measuring points over the drying time.*

3. Tap the field *Start measurement*.
4. Wait until the drying temperature has been reached (window closes) or, if the actual temperature deviates by a few degrees only or tap *Ignore*.

   The turntable moves to a free position.

TIP: *The following steps differ depending upon whether pans with an undefined or defined weight are being used.*

6.1.2.2 Sample loading

TIP: *If a low or high sample weight is confirmed, the program asks whether the fact that the sample weight is out of the tolerance range is to be ignored.*

A confirmation of this window with OK may lead to faulty measuring results.

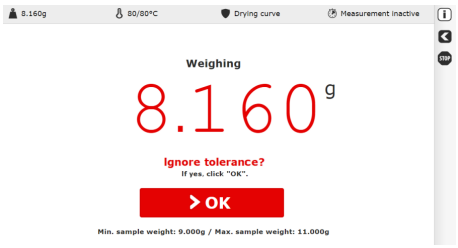


Fig. 32: *Ignore tolerance screen*

1. Upon confirmation with *OK*, you are requested to put the pan with the sample onto the turntable.

2. Take the pan with the sample out of the weighing chamber.
3. Close the door to the weighing chamber.
4. Put the pan onto the front position of the turntable.
5. Close the door to the drying chamber immediately.
6. Tap *Ok* to confirm insertion of the pan.

TIP: *Insertion of the pan with the sample onto the turntable and confirmation should be done as quickly as possible in order to avoid temperature fluctuations and to provide for reproducible results in case of repetitions.*

TIP: *During the entire drying curve process, the doors to the balance chamber and to the drying chamber must remain closed all the time, otherwise measurement errors are inevitable.*

6.1.2.3 Measurement

1. Upon insertion of the sample and confirmation with *OK*, the measuring window is shown automatically.

   The sample is weighed automatically on the individual drying points, and the results are shown in the measuring window.

TIP: *The button "Invert chart" changes the display from loss in weight to residual mass and vice versa.*

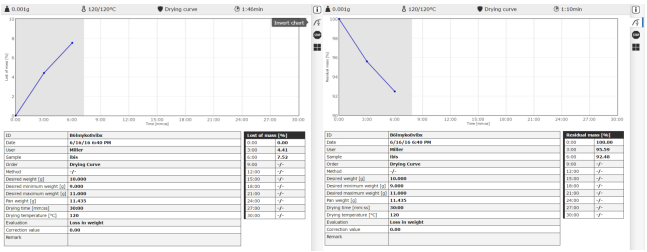


Fig. 33: *Measuring window drying curve (loss in weight) Measuring window drying curve (residual mass).*

If the option *Alarm at the end of the test* has been activated in the tile *Options*, an alarm will be given on each measuring point upon completion of the measurement in this point.

If the option *Autoprint* has been enabled, the drying curve will be printed automatically on the printer selected before. To start the next new measurement:

1. Tap *New measurement* in the action bar of the overview window.

   The parameter window opens again.

7 Upkeep and cleaning

TIP: *For cleaning, please also observe the corresponding chapters in the separate instruction manuals of all other instruments of the machine system.*

7.1 Safety notes concerning cleaning

WARNING

Danger to life, risk of injury due to voltage leading parts!

In case of improper use of electric components, there is the risk of serious injuries or death by direct or indirect contact with live parts or connections!

- Work on electrical equipment is only to be carried out by authorized electricians!
- Always pull the power plug or turn off the main power switch before opening access to electric modules!
- Never touch any modules inside the instrument as long as the instrument is switched on!
- As long as power supply to the instrument is on, functional checks of electric or electronic modules inside the instrument are only to be carried out visually and only by authorized electricians!

NOTICE

Risk of property damage, risk of faulty measurements due to unsuited cleaning tools or agents!

The use of unsuited cleaning agents or tools may cause damage to the instrument and implies the risk of faulty measurements.

- Only use soft, non-linting cloths and clear water for cleaning!
- Never use any sharp-edged or pointed tools or any other tools that might damage the surfaces of the instrument!
- Never use any scouring agents - they also cause damage to the surfaces of the instrument!
- When measuring **tobacco**, clean the instrument after each measurement, otherwise malfunction or failure of the device are inevitable!

Spots or contaminations on the underside of the positioning wheel or on the sensor surface or a choked or covered slot in the positioning wheel will cause malfunctions in turntable positioning.

- Thoroughly clean the underside of the positioning wheel, the sensor surface, and the drying chamber in regular, short time intervals!

7.2 Opening the MT-CA and dismantling the positioning wheel

TIP: *The required cleaning frequency depends on usage, sample type, and local hygiene regulations.*

1. Disconnect the power plug of the device from the power supply.
2. Unscrew the two screws on the front side under the instrument cover.

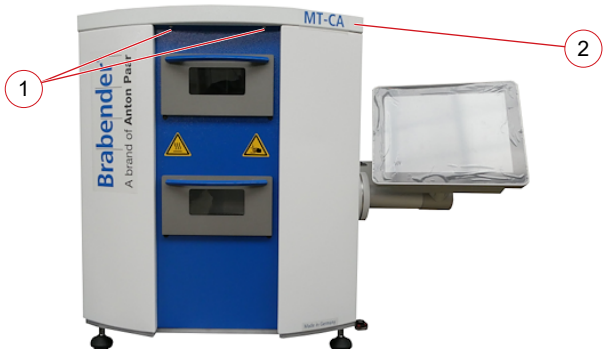


Fig. 34: *Fixing screws of the instrument cover*

1 Fixing screws
2 Instrument cover

NOTICE

Risk of tearing off the ground cable!

By opening the device improperly, ground cables inside the device can be torn off.

– Disconnect the ground cable(s) with care before opening the device completely!

3. Carefully pull the cover towards the front side.
4. Loosen the ground cable in the rear left corner as in the figure below.
5. Carefully lift off the cover completely.
6. Loosen the M4 grub screw on the circumference of the wheel hub in the middle of the positioning wheel.

NOTICE

Risk of damaging the instrument.

An unscrewed grub screw may fall into the device and may damage it upon restart.

– Just loosen the grub screw, do not unscrew it completely in order to prevent it from falling down into the device!

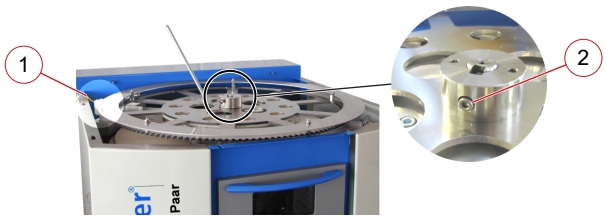


Fig. 35: *Ground cable, grub screw on the positioning wheel*

1 Ground cable
2 Grub screw

7. Lift off the positioning wheel.

TIP: *Hold the positioning wheel by the spokes, not on the circumference in order not to contaminate the slot in the positioning wheel.*

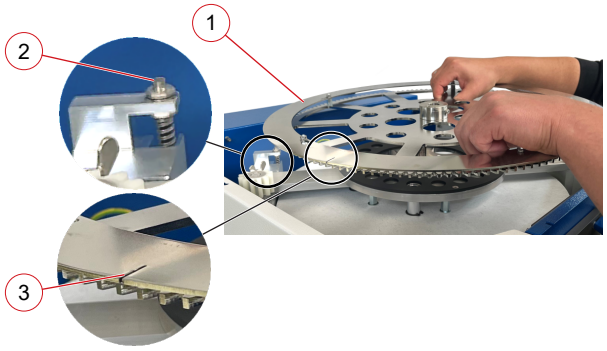


Fig. 36: *Dismantling the positioning wheel*

1 Positioninge wheel
2 Sensor
3 Slot in the positioning wheel

7.3 Cleaning the positioning wheel and sensor

TIP: *The required cleaning frequency depends on usage, sample type, and local hygiene regulations.*

1. Open the MT-CA and dismantle the positioning wheel, refer to Section 7.2 [▶ 24].
2. Clean the underside of the positioning wheel with a clean, non-linting cloth.
3. Make sure that the slot as in the figure above in the positioning wheel is open and free.
4. Carefully clean the sensor surface as in the figure above with a cotton-tip stick or with a clean cloth.
5. Remount the positioning wheel from the top onto the wheel hub.
6. Tighten the M4 grub screw on the circumference of the wheel hub.
7. Remount the cover and push it a little bit towards the rear side.
8. Fix the ground cable in the rear left corner on the cover.
9. Push the instrument cover all the way towards the rear and fix it with the two screws under the cover on the front side.

TIP: *If there are still problems with turntable positioning, please contact the Anton Paar customer service.*

7.4 Cleaning the drying chamber

If considerable amounts of sample have been scattered within the drying chamber, e.g. because a sample pan tipped over, the drying chamber must be cleaned.

1. Open the MT-CA and dismantle the positioning wheel, refer to Section 7.2 [▶ 24].
2. Check whether the underside of the positioning wheel is perfectly clean.

   If not, clean it with a non-linting cloth.

3. Make sure that the slot in the positioning wheel as in the figure above is open and free.
4. Check whether the sensor surface as in the figure above is perfectly clean.

   If not, clean it with a cotton-tip stick or with a clean cloth.

TIP: *For cleaning the positioning wheel and the sensor surface (refer to Section 7.3 [▸ 25]).*

1. Unscrew and remove the three thumb nuts on the traverse bar.

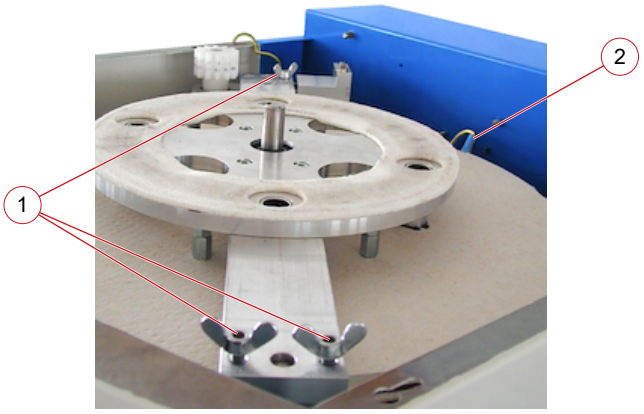


Fig. 37: *Thumb nuts on the traverse bar, ground cable*

1 Thumb nuts
2 Ground cable

2. Loosen the ground cable from the cover of the drying chamber as in the figure above.

NOTICE

Risk of damage to the turntable!

The turntable can be damaged when it is put down or warp due to wrong placement.

Precise mounting of the turntable assembly is essential for precise measuring results. Improper mounting of the turntable assembly can cause damage to the device and faulty measuring results.

– Lift off the turntable assembly and put it down with care on an even surface so that the turntable cannot warp.
– Any further disassembly of the turntable assembly is only allowed to be carried out by Anton Paar service technicians.

3. Lift off the entire turntable assembly and put it down carefully on an even surface.

Fig. 38: *Dismantling of the turntable assembly*

4. Clean the interior of the drying chamber with a non-linting cloth.

TIP: *Fine particles may be removed using a vacuum cleaner or by careful blowing with compressed air.*

5. Carefully remount the turntable assembly.
6. Fix the ground cable on the cover of the drying chamber.
7. Fix the traverse bar with the three thumb nuts.
8. Remount the positioning wheel from the top onto the wheel hub.
9. Tighten the M4 grub screw on the circumference of the wheel hub.
10. Remount the cover and push it a little bit towards the rear side.
11. Fix the ground cable in the rear left corner on the cover.
12. Push the cover all the way towards the rear.
13. Fix the cover with the two screws under the cover on the front side.

8 Maintenance and repair

NOTICE

Risk of property damage due to improper maintenance!

– Maintenance work on the Anton Paar instrument is only to be carried out by instructed personnel.

The required maintenance intervals may vary depending on the product to be processed and on the application environment of the instrument. For this reason, the maintenance intervals given below are to be understood as a guideline only.

It is within the responsibility of the owner of the instrument to define and install detailed maintenance intervals in accordance with the application environment, the laboratory class and the products processed.

8.1 Maintenance intervals

A preventive maintenance service carried out by an Anton Paar Certified Service Representative will ensure stable and compliant operation, reliable and accurate measuring results, and ongoing warranty support for your product.[1]

Under certain conditions, if you miss a maintenance service, your warranty is invalidated.[2]

The mandatory and recommended services for your specific product can be found in the following table:

Component	Action	Interval	Classification
MT-CA	Maintain	12 months	Mandatory
Filter fan	Check	Each month	Recommended
Filter mat	Check, clean	Each month With tobacco: After each usage	Recommended
Balance system	Check	12 months	Recommended
Temperature controller	Check	12 months	Recommended

8.2 Filter fan, filter mat

8.2.1 Checking the filter fan

Inside the instrument, there is a fan at the bottom for aerating the drying chamber and the electronics.

The filter fan on the right side of the instrument blows the warm air from the interior to the outside, drawing in fresh air from outside through the two air supply filters on the left side of the device.

NOTICE

Risk of property damage due to insufficient motor ventilation!

A contaminated filter mat may affect ventilation of the electrics and of the motor! Insufficient ventilation of the electrics and of the motor may cause overheating and, as a consequence, damage to the electrics and motor shut-off.

- Depending on the ambient conditions, check function of the fan(s) in regular time intervals, but not later than once per month!
- Clean the filter mat of the air supply ventilation grille at least once per month and replace it, if necessary!
- In case of a defective fan, immediately shut off the device and do not start it again!

Fig. 39: *Fans and ventilation grilles*

1 Air supply filter for the drying chamber
2 Air supply filter for the electronics
3 Air exhaust filter with fan

8.2.2 Checking the filter mat

1. Carefully lift off the ventilation grille.

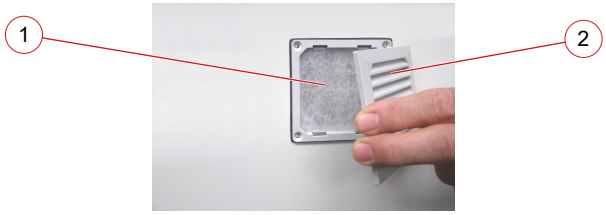


Fig. 40: *Lifting off the ventilation grille*

1 Filter mat
2 Ventilation grille

2. Remove the filter mat from the ventilation grille.
3. In case of normal contamination:
   - Carefully rinse the filter mat with clear water. If necessary, add some mild detergent.
   - Have the filter mat dry completely.

   In case of strong contamination:
   - Replace the filter mat.

[1] Please contact your Anton Paar representative to schedule preventive maintenance.

[2] For detailed information, please refer to general terms of delivery (GTD) on the Anton Paar website (https://www.anton-paar.com).

4. Visually check the fan(s) behind the ventilation grille for contamination.
5. In case of visible contamination, clean the fan(s) with a vacuum cleaner and a paintbrush.
6. Put the cleaned or new filter mat onto the ventilation grille.
7. Remount the ventilation grille.
8. Check the function of the fan(s) by means of a thin sheet of paper:
   – Hold the paper close to the air supply grille - the paper must be sucked towards the grille and must not fall down.

TIP: *If there is no air current, the respective fan may be defective. In this case, please contact the Anton Paar Service department.*

8.3 Checking the balance system

Check correct and precise functioning of the balance system including re-weighing in the drying chamber as described below:

NOTICE

The device must be at operating temperature for this check.

– For this check, at least one but up to ten pans can be positioned simultaneously at a time on all turntable positions.

1. Start a new measurement with the following parameters:

Parameter	Value [Unit]
Desired weight	10 [g]
Drying time	20 [min]
Drying temperature	130 [°C]

1. Weigh a piece of metal of approx. 10 g (e.g. a 10 g weight or a piece of 10 cents and one of 20 cents) as a sample.

NOTICE

The weight of this piece must not change during heating!

2. Put the pan with this piece of metal onto position number 1 of the turntable in the drying chamber.
3. Close the door of the drying chamber.
4. Dry the sample.
5. Start a new measurement with the same parameters as above.
6. Weigh another piece of metal of approx. 10 g as a sample.
7. When requested to put the sample onto the turntable, remove the piece of metal from the pan
8. Place the empty pan onto position number 2 of the turntable.
9. Close the door of the drying chamber.
10. Dry the sample.

    After drying, the following results must be displayed:

    Sample no. 1:
    0.0 % moisture ≙ loss in weight 0 g

    Sample no. 2:
    100.0 % moisture ≙ loss in weight 10 g

NOTICE

Deviation from these values must not exceed ± 0.1 %.

– In case of a deviation of more than ± 0.1 %, determine the pan carrier weight anew (refer to Section 5.2.5 [▶ 22]).

8.4 Checking the temperature controller

Check correct functioning of the temperature controller in the drying chamber as described below:

NOTICE

For checking the temperature controller, no measurement must be active.

1. Tap the tile *Methods* on the MetaBridge start screen.
2. Set the drying temperature to 130 °C.
3. Put a thermometer in each of the two pans used before.
4. Place the two pans opposite each other on the turntable.
5. Close the door to the drying chamber.
6. Tap the tile *Manual turntable positioning* on the MetaBridge start screen.

   The window *Manual turntable positioning* opens.
7. Tap the field *Start*. 

   The turntable starts rotating continuously.
8. Wait 60 minutes.
9. Tap the field *Stop*. 

   The turntable stops.
10. Take the thermometers out of the drying chamber.
11. Read the temperature indicated.

    The thermometer reading must not deviate by more than ± 1.5 °C from the preset drying temperature.

    In case of a deviation of more than ± 1.5 °C, please contact the Anton Paar service.

8.5 Repair performed by an authorized Anton Paar representative

In case your product needs repair, contact your local Anton Paar representative, who will take care of the necessary steps. If your product needs to be returned, request an RMA (Return Material Authorization Number). It must not be sent without the RMA and the filled “Safety Declaration for Instrument Repairs”. Please make sure it is cleaned before return.
Do not return products that are contaminated by radioactive materials, infectious agents or other substances that cause health hazards.

TIP: *Find the contact data of your local Anton Paar representative on the Anton Paar website (https://www.anton-paar.com) under “Contact”.*

9 Troubleshooting

This section lists some possible troubles that may occur during operation of the instrument and measures to be taken to eliminate these troubles.

WARNING

Risk of severe injury, risk of property damage!

When several persons work simultaneously on the device, the drive unit may be started unintentionally while another person is still working on the device and rotating parts are open.

Danger of serious injuries, entanglement hazard! Risk of damage to or destruction of the device by tools!

- Never have two or more persons work simultaneously on the device!
- Never work on the device with open long hair or with loose garments (tie, scarf, shawl or the like) or jewelry!

CAUTION

Risk of damage to health!

The use of substances hazardous to health for cleaning may cause health problems.

- The relevant hygiene guidelines for instruments handling food products must be observed.
- If applicable, personal protective equipment (PPE) must be used.

9.1 Balance unstable, no standstill

Possible cause:

- Lifting cone of the supporting rod is not centered in the pan carrier
- Contact between pan carrier and lifting cone
- Supporting rod of the pan carrier contaminated (friction)

Measures:

1. If applicable, cancel the running measurement.
2. Tap the tile *Balance* on the MetaBridge start screen.
3. Tap the button *Balance up* in the action bar.

   The balance moves up.
4. Open the door to the upper drying chamber.
5. Carefully lift the pan carrier off the supporting rod using the crucible pliers.

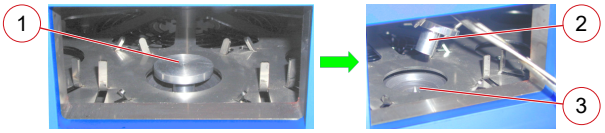


Fig. 41: *Lifting off the pan carrier*

1 Pan carrier in top position
2 Pan carrier, lifted
3 Supporting rod of the pan carrier

6. Check whether the balance gets stable now.

   If standstill is reached: Carefully place the pan carrier back onto the supporting rod so that it is horizontal and not tilted and check once more whether standstill is reached.

   If standstill is not reached: Please contact the Anton Paar service.

9.2 Error message: Unfortunately, there is a hardware problem. Please restart the device.

Possible cause:

- Positioning wheel and/or position sensor contaminated, slot in the positioning wheel is not recognized
- Other hardware problem

Measures:

1. If applicable, cancel the running measurement.
2. Run down the internal computer (refer to Section 3.1.3 [▶ 13]).
3. Unpower the instrument.
4. After one minute, power on the instrument again.
5. Press the key *PC ON/OFF* ⏻ to start the internal computer and the touchscreen, if equipped.

   The internal computer boots.

   After a short time, the log-in window appears.
6. Enter your log-in data.
7. If the error message still appears, clean the positioning wheel and the position sensor (refer to Section 7.4 [▶ 25]).
8. If the error message continues to appear even after cleaning, please contact the Anton Paar Service.

Appendix A Technical Data

Device		
Screen	284788, 284789	10.4-inch industrial touchscreen
	284790, 295260	Without touchscreen
Drying chamber	All devices	Drying chamber for up to 10 sample dishes made of either aluminum or stainless steel
Drying temperature	All devices	≤ 200 °C (≤ 392 °F)
Eletrical heating	All devices	1.1 kW
Temperature control	All devices	Built-in electronic temperature controller, RTD in the drying chamber
Air circulation	All devices	Ventilator
Sample weight	All devices	1 ≤ x ≤ 20 g, optional setting of a tolerance range
Balance	All devices	integrated electronic load cell
Measuring range	All devices	0.1 % to 99.9 % water content
Balance resolution	All devices	0.001 g
Reproducibility	All devices	± 0.002 g
Connections	All devices	4× USB 2.0, HDMI, LAN
Mains supply	284788, 284790	1× 230 V + N + PE, 50/60 Hz, 6.3 A
	284789, 295260	1× 115 V + N + PE, 50/60 Hz, 12 A
Dimensions (W × H × D)	284788, 284789	820 mm × 680 mm × 630 mm
	284790, 295260	540 mm × 680 mm × 630 mm
Weight	284788, 284789	~ 85 kg (187 lb)
	284790, 295260	~ 82 kg (181 lb)
Noise	All devices. The noise measurement was run under normal operating conditions over the entire speed range of the instrument. The measurement was carried out at a distance of 1 meter and a height of 1.6 meters. The measured equivalent continuous sound pressure level is L_{eq} < 70 dB(A).	
Environmental conditions (all devices)		
Transport classes (IEC 60721-3-2)	Climate	2K12
	Biological condition	2B1
	Chemical active substance	2C2
	Mechanical active substance	2S1
	Mechanical condition	2M5 / 2M6 - Profil: IEC 60068 or 60721-2-9
NOTICE: The maximum values for temperature and humidity given below **must not** occur simultaneously.		
Transport and storage	Ambient temperature | change	-20 °C (-4 °F) to +50 °C (+122 °F) | <10 K/h
	Humidity (non-condensing)	10 % to 90 % relative humidity
	Degree of pollution	3
Operation	Ambient temperature | change	+10 °C (+50 °F) to +35 °C (+95 °F) | <5 K/h
	Humidity (non-condensing)	35 % to 80 % relative humidity
	Degree of pollution	2
	Altitude (above sea level)	≤ 3000 m

Appendix B Declaration of conformity

Docusign Envelope ID: 4C23BE18-4473-4256-AA46-142D236C65F1

EC Declaration of Conformity

(original)

Anton Paar

The manufacturer **Anton Paar TorqueTec GmbH,** Kulturstraße 49-51, 47055 Duisburg, Germany – Europe, hereby declares that the machinery described below:

Description:	**MOISTURE ANALYZER MT-CA MAINS SUPPLY:1 x 230 V, 50/60 HZ + N + PE, 6.3 A, MOISTURE ANALYZER MT-CA MAINS SUPPLY: 1 x 115 V, 50/60 HZ + N + PE, 12 A, MOISTURE ANALYZER MT-CA WITHOUT SCREEN, 1 x 230 V, 50/60 HZ + N + PE, 6.3 A, MOISTURE ANALYZER MT-CA WITHOUT SCREEN, 1 x 115 V, 50/60 HZ + N + PE, 12 A**
Model:	**Brabender MT-CA**
Material number:	**284788, 284789, 284790, 295260**
Serial number:	.....

is in conformity with the relevant European Union harmonisation legislation. This declaration of conformity is issued under the sole responsibility of the manufacturer.

Machinery Directive (2006/42/EC, OJ L 157/24 of 9.6.2006)

Applied harmonised standards:

- EN ISO 12100:2010
- EN 60204-1:2018

Safety objectives of the Low Voltage Directive (2014/35/EU, OJ L 96/357 of 29.3.2014)

Electromagnetic Compatibility (2014/30/EU, OJ L 96/79 of 29.3.2014)

RoHS Directive (2011/65/EU, OJ L 174/88 of 1.7.2011)

This declaration relates exclusively to the machinery in the state in which it was placed on the market, and excludes components which are added and/or operations carried out subsequently by the final user.

The manufacturer compiles the technical file according to 2006/42/EC Annex II

Place and date of issue: Duisburg, 27.03.2025

Signed by: Jan Pardon 640B27BE994E4EF...

Jan Pardon
General Manager
Anton Paar TorqueTec

Signed by: Andreas Tauselt 12ACF34DDB074BD...

Andreas Tauselt
Head of Research & Development
Anton Paar TorqueTec

Appendix C Further appendices

Appendix C.1 USB problems, electric interferences

The close arrangement of electric instruments in an electrically disturbed environment may cause unspecified problems which require additional measures, e.g.

- USB problems
- electric interferences on the power supply connection

Observe the following points:

- The USB port of the PC must provide at least 400 mA.
- The line resistance of each of the individual wires of the USB cable including the protective shielding must not exceed 0.5 Ω.
- The max. distance with commercial USB cables is 5 m. For longer distances (L_{max} = 12 m), suitable industrial cables must be used.
- Do not use any USB extension cables!
- Do not lay USB cables in cable ducts together with power cables - this may cause intermittent signal interferences!

Appendix C.1.1 Recommendations for a USB PC

In case of USB problems (e.g. in case of poor signal integrity), plugging in a separate USB PCI or PCIe card may be useful.

Fig. 42: *Connection with a USB-PCI card*

1 USB-PCI card
2 To customer PC
3 Customer PC

In case of ground loop interferences, a USB isolator may be useful.

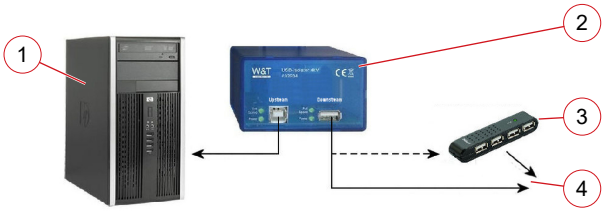


Fig. 43: *Connection with a USB isolator and an active USB hub, if required*

1 Customer PC
2 USB isolator
3 Active USB hub
4 To Brabender instrument

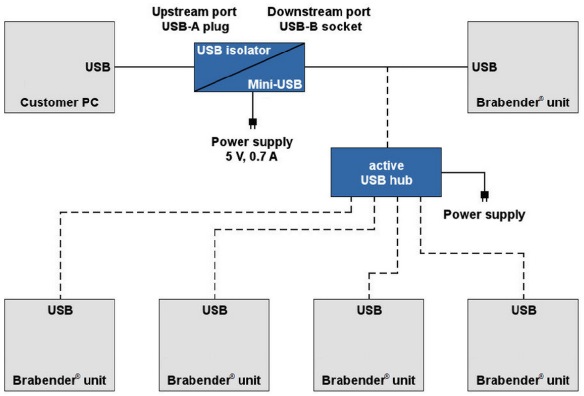


Fig. 44: *Connection with a USB isolator and an active USB hub, if required*

Appendix C.1.2 Potential equalization

Example no. 1

Potential equalization with separate ground cables (for separate wall outlets or separate distribution boxes)

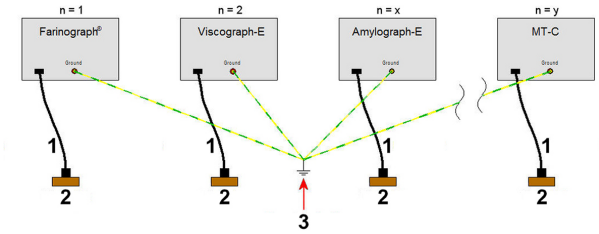


Fig. 45: *Potential equalization with separate ground cables*

Example no. 2

Potential equalization with separate ground cables (with a single, common power outlet extension)

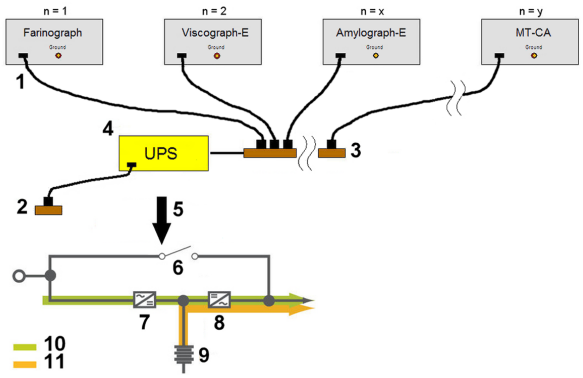


Fig. 46: *Potential equalization with common power outlet extension (Legend see Example no. 3)*

Example no. 3

Potential equalization with separate ground cables (for different voltages and separate wall outlets)

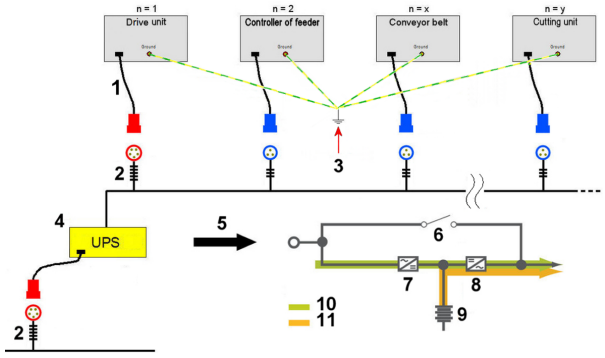


Fig. 47: *Potential equalization with separate ground cables*

1 *Power cord*
2 *Wall outlet*
3 *Connect ground cable for potential equalization*
4 *UPS: if required, for weak power supply grid*
5 *IMPORTANT: Use double-conversion UPS!*
6 *Internal static bypass*
7 *AC to DC rectifier*
8 *DC to AC inverter*
9 *Battery*
10 *Normal operation*
11 *Battery power*

Appendix C.2 List of buttons in the MetaBridge software

	About us Opens the tile "About us".
	Add reference curve Allows loading of a reference curve into the test or evaluation diagram or creation of a new reference curve from the loaded test.
	Add user Opens a window for adding a new user.
	Back to previous page Returns to the previous page.
	Back to start screen Returns to the start screen. – No active measurement: Turntable returns to start position. – During a running measurement: Turntable continues rotating.
	Balance up/down (with arrow up or down) Moves the balance up and down, respectively.
	Calibration Calibrates the balance.
	Change table columns Opens a window to adapt the table columns in the window to your individual needs.
	Define pan carrier weight Determines the pan carrier weight.
	Delete Deletes the selected test(s)/curve(s)/workflow.
	Description of button functions Shows a description of the button functions.
	Delete user Opens the list of users to delete one or several users.
	Export Opens the window *Automatic export* for making some settings concerning automatic export of the test.
	Feedback Direct contact with Anton Paar.
	General settings Opens the window *General settings* of the *Options* tile.
	Hardware settings Opens the window *Hardware settings.* **TIP:** *Visible for administrators only.*
	Invert chart Changes display from loss in weight to residual mass and vice versa.
	Import Opens the file selection dialog.
	Manual Link to the instruction manual of your device.
	Network settings Opens the window *Network settings*.
	New measurement Opens the parameter window in order to start a new test. **TIP:** *When loading a saved test, there is the button "Back" on this position instead.*

	**Our products** Shows the product range of the food sector.
	**Print** Opens a window for selecting a printer.
	**Remove finished measurements** Removes all measurements already completed from the list of current measurements.
	**Service** Opens a window for a software update or remote service meeting request.
	**Service settings** Opens the window *Service settings.* **TIP:** *Visible for administrators only.*
	**Show FAQ** Opens a list of frequently asked questions and the corresponding answers.
	**Stop measurement** Stops the running test before expiry of the measuring time.
	**Tag editor** Allows management or entry of tags (key words) that can be used to filter the test list.
	**Taring** Tares the balance (sets it to zero).
	**Temperature controller settings** Opens the window *Temperature controller settings.* **TIP:** *Visible for administrators only*.
	**User administration** Opens the *User administration* window.
	**User settings** Opens the window *User settings* to set user authorities.

Appendix C.3 Drying temperatures, times and sample weights

TIP: *"10 g / sand" means that 5 g of annealed see sand and 5 g of the sample material are applied. The result must be multiplied with 2.*

TIP: ** = Rapid method possible(10 g, 155 °C, 20 min)*

Material	Sample weight [g]		Temperature [°C]		Drying time [min]	
Artificial silk						
– Acetate cotton	5		125		30	
– Nylon (granular)	10		130		60	
– Rayon	10		130		60	
– Remigarn	10		130		60	
Barley, barley malt	10		130		60	
Bastard sugar	10		115		10	
Beef	10		110		120	
Beets	10		105		180	
Blood albumin	10		130		30	
Blood, raw	10	/ sand	120		10	
Bread	10		130		90	
Calcium phosphate	10		95		270	
Candy						
– Drops	5		115		20	
– Fondant	10	/ sand	115		20	
– Little fruit cakes	10	/ sand	115		30	
– Caramel candies	10		105		120	/ no constancy
– Chocolate filling	10	/ sand	115		50	
– Toffee	10	/ sand	130		70	/ no constancy
Carbide lime	10		120		60	
Casein	10		130		180	
Cellulose						
– Acetyl cellulose	5		130		20	
– Ground cellulose	5		130		60	
– Beech cellulose	5		130		15	
– Carboxylmethylcellulose	5		130		60	
– Cellulose	5		130		45	
– Rags half cellulose	5		130		60	
– Straw cellulose	10		130		80	
Cement	10		110		15	
Cheese						
– Butter cheese	10	/ sand	120		60	
– Camembert cheese	10	/ sand	120		90	
– Blue cheese	10	/ sand	120		70	
– Emmental cheese	10	/ sand	120		60	
– Peanut cheese	10	/ sand	130		20	
– Dutch cheese	10	/ sand	120		60	
– Herb cheese	10	/ sand	120		50	
– Limburg cheese	10	/ sand	120		90	

Material	Sample weight [g]		Temperature [°C]		Drying time [min]	
– Processed cheese	10	/ sand	120		40	
– Swiss chees	10	/ sand	120		60	
Chocolate	10		105		45	
Cimenite (adhesive)	10		80		20	
Citrated salt	10		130		30	
Clay	10		130		30	to 45
Cleaner (clean fix)	10		155		20	
Cocoa	10		105		40	
Cocoa butter	5		150		10	
Coffee, crude	10		120		120	
Coke	10		130		90	
Cork	10		90		60	
Corn	10		130		60	/ no constancy
Corn gluten, corn starch, corn germs, corn feed	10		130		60	
Cotton	5		130		15	
Curd	10	/ sand	110		60	
Dextrin	10		105		50	
Dextrose	10		105		60	
Diatomaceous earth (kieselguhr)	10		130		30	
Dough						
– Biscuit dough	5		130		60	
– Yeast dough	5		130		100	
– Cake dough	5		130		60	
– Pasta dough	5		130		100	
Eggs, wished	5		130		70	
Eurasit	10		130		100	
Extraction residues	10		130		50	
Fat						
– Butter	5		130		30	
– Oil emulsion	10		130		90	
– Vanishing creme (oily)	10		105		60	
Feedstuff						
– Roughage	5		130		50	
– Compound flour (feed flour)	10		105		240	/ no constancy
Fish						
– Bloater	5		130		300	
– Fish meal	10		110		120	
– Pickled herring	5		130		100	
Fly ash	10		130		10	
Fodder beet seed	5		120		60	
– Fruit						
– Apple pulp	5		105		60	

Material	Sample weight [g]		Temperature [°C]		Drying time [min]	
– Apple puree	5		105		60	
– Abricot jam	5		105		60	
– Abricot pulp	5		105		60	
– Strawberry jam	5		105		60	
– Strawberry pulp	5		105		60	
– Rose hip pulp	5		105		60	
– Currant-apple pulp	5		105		60	
– Currant pulp	5		105		60	
– Currant jam	5		105		30	
– Cherry pulp	5		105		30	
– Plum pulp	5		105		30	
– Plum jam	5		105		30	
– Dry plum pulp	5		105		30	
– Four fruit jam	5		105		80	
Garden soil	10		150		20	
Gelatin	10		130		120	/ no constancy
Grass seeds	5		120		60	
Gypsum	10		95		40	
Hemp	5		130		10	
Honey	10	/ sand	115		40	
Hops	5 5		105 115		180 80	convent. method rapid method
Inorganic salt	10		105		40	
Jute	10		105		120	
Leather	5		105		60	
Lignite	10		130		45	
Magnesium carbonate	10		150		30	
Malt coffee	10		105		120	
Malt extract	10		105		240	
Malt flour	10		105		60	
Mayonnaise	10	/ sand	105		60	
Meat bouillon cube	10		105		180	
Milk						
– Condensed milk	10	/ sand	105		20	
– Condensed milk (sugared)	10	/ sand	120		60	
– Condensed cream	10	/ sand	120		60	
– Whole milk	10	/ sand	120		60	
– Milk powder	10	/ sand	105		50	
– Buttermilk	10		105		50	
Mobasil mud	10		115		10	
Molasses	10		100		90	
Mushroom	10		120		60	

Material	Sample weight [g]		Temperature [°C]		Drying time [min]	
Mustard	10		130		30	
Mustard seed	10		130		90	
Natural fertilizer	10		130		70	
Nitramoncal (nitrogen fertilizer)	23.5		105		90	
Noodles						
– Wheat middlings (millfeed)	10		130		60	
– Egg noodles	10		130		60	
– Durum semolina	10		130		60	
– Macaroni	10		130		60	
Oat flakes	10		130		60	
Oats*	10		130		60	
Paints						
– Variocolors	10		150		50	
– Wallpaper paint	10		150		30	
Palm kernel grain (copra)	10		130		20	
Paper	10		130		30	
Paper board	10		130		30	
Paper glue	10		155		30	
Paper pulp	10		130		70	
Pastries						
– Biscuits	10		130		60	
– Ginger bread	10		130		40	
– Sweets	10		115		60	
– Rusk	5		130		20	
Peat	10		130		90	
Pectin	10	/ sand	105		30	
Phenol resin solution	10		130		120	
Phosphate, Kala Djerda	10		130		10	
Phosphate, M'Zaita	10		130		10	
Plexigum	10		90		30	
Pomace						
– Wet pomace	10		130		60	
– Dry pomace	5		105		80	
Popelin	5		120		20	
Potato flour	10		130		40	
Potatoes	10		130		90	
Powdered sugar	10		115		10	
Protein powder	10		120		20	
Pudding powder	10		130		40	
Rape	10		105		160	
Resin glue	10		155		30	
Rice (paddy)	10		130		100	

Material	Sample weight [g]		Temperature [°C]		Drying time [min]	
Rice (polished)	10		130		60	
Rice gluten	10		130		60	
Rubber	10		105		90	
Rubber regenerate	10		135		360	
Rye*	10		130		60	
Saltpeter	10		130		60	
Sausage						
– Liver sausage	10		130		30	
– Meat sausage	10	/ sand	130		30	
Sheep wool	10		105		100	
Silicic acid	5		130		30	
Soap and washing powder						
– Basic soap	5		130		60	
– Basic shaving soap	5		130		60	
– Curd soap	5		120		50	
– Soap flakes	5		120		20	
– Soap powder	5		120		60	
– Soft soap	5		150		60	
– Washing paste	5		130		90	
– Synthetic lather product	5		150		60	
– Soda	5		120		50	
Sodium alginate	5		130		60	
Soup (cubes)	10		105		180	
Soy grits	10		130		60	/ no constancy
Starch	10		130		30	
Sugar	10		115		10	
Sugar beet pulp	10		130		60	
Super phosphate	10		100		180	
Syrup						
– Turnip syrup	10	/ sand	130		110	
– Starch syrup	10	/ sand	115		60	
Tobacco	5		123		30	
Turnip seed	5		120		60	
Vegetables						
– Beans (ground)	10		105		120	/ no constancy
– Peas	10		105		120	/ no constancy
– Kale	10		105		120	/ no constancy
– Carrots	10		105		180	/ no constancy
– Kohlrabi	10		130		120	/ no constancy
– Leek	10		105		90	/ no constancy
– Parsley	10		105		240	
– Cabbage, red	10		105		120	/ no constancy
– Beans, cut	10		105		240	

Material	Sample weight [g]	Temperature [°C]	Drying time [min]	
– Celery	10	105	240	/ no constancy
– Spinach	10	130	50	
– Tomatoes	5	105	30	
– Tomato pulp	5	105	80	
– Cabbage, white	10	105	120	/ no constancy
– Savoy	10	105	120	/ no constancy
– Onions	10	105	240	/ no constancy
Vinegar	10	100	120	
Wheat*	10	130	60	
Wood	5	130	30	
Yeast	5	130	60	
Yolk powder	10	120	20	

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