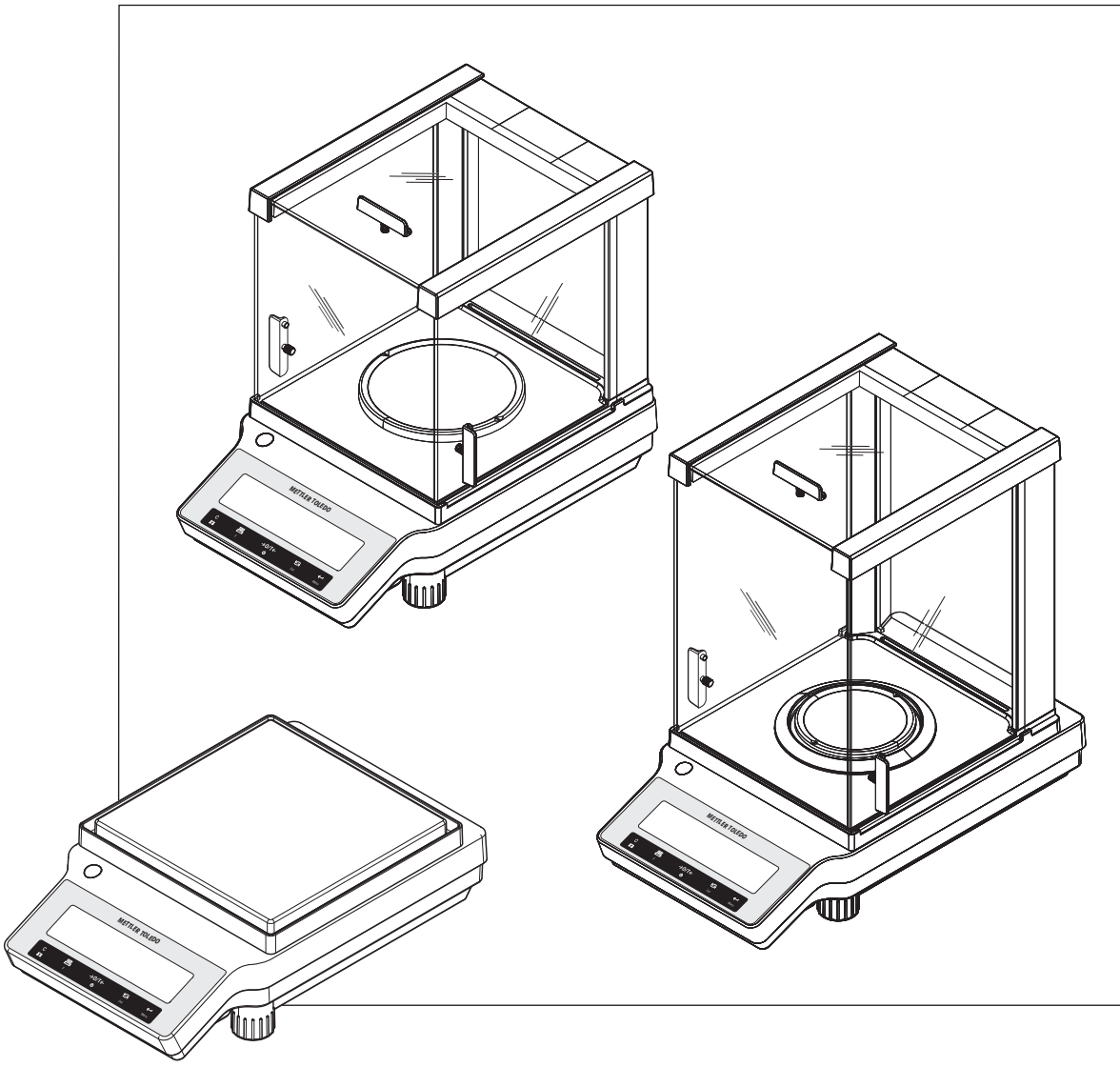
Operating Instructions

Precision and Analytical Balances

ME



METTLER TOLEDO

Table of Contents

1 Introduction

Thank you for choosing a METTLER TOLEDO balance. The balances combine a large number of weighing possibilities with easy operation.

The operating instructions are based on the initially installed terminal firmware (software) version V 1.00.

Finding more information

▶ www.mt.com/me-analytical

▶ www.mt.com/me-precision

1.1 Conventions and symbols used in these Operating Instructions

Key designations are indicated by double angular brackets (e.g. «⏎»).

These symbols indicate an instruction:

- prerequisites

1 steps

2 …

⇨ results

This symbol indicates press key briefly (less than 1.5 s).

This symbol indicates press and hold key down (longer than 1.5 s).

This symbol indicates a flashing display.

2 Safety Information

2.1 Definition of signal warnings and symbols

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

WARNING for a hazardous situation with medium risk, possibly resulting in death or severe injury if not avoided.

CAUTION for a hazardous situation with low risk, resulting in minor or moderate injury if not avoided.

NOTICE for a hazardous situation with low risk, resulting in damage to the balance, other material damage, malfunctions and erroneous results, or loss of data.

Note (no symbol)
for useful information about the product.

General hazard

Electrical shock

NOTICE

2.2 Product safety information

Intended use

This balance is designed to be used in analytical laboratories by qualified staff. Your balance is used for weighing. Use the balance exclusively for this purpose.

Any other type of use and operation beyond the limits of technical specifications without written consent from Mettler-Toledo GmbH, is considered as not intended.

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

General safety information

This balance complies with current industry standards and the recognized safety regulations; however, it can constitute a hazard in use. Do not open the balance housing: The balance contains no user-serviceable parts. In the event of problems, please contact a METTLER TOLEDO representative.

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

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

Staff safety

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

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

⚠ WARNING

Risk of electric shock

Use only the original universal AC/DC adapter delivered with your balance, and check that the voltage printed on it is the same as your local power supply voltage. Only plug the adapter into a socket which is grounded.

⚠ CAUTION

Damage to the balance

1 Only use indoors in dry locations.

2 Do not use pointed objects to operate the keyboard!
The balance is of a very sturdy design, but is still a precision instrument. It must be handled with care.

3 Do not open the balance:
The balance contains no user-serviceable parts. In the event of problems, please contact a METTLER TOLEDO representative.

4 Only use METTLER TOLEDO original accessories and peripheral devices for the balance.
These are specifically designed for the balance.

NOTICE

Damage of the balance or software

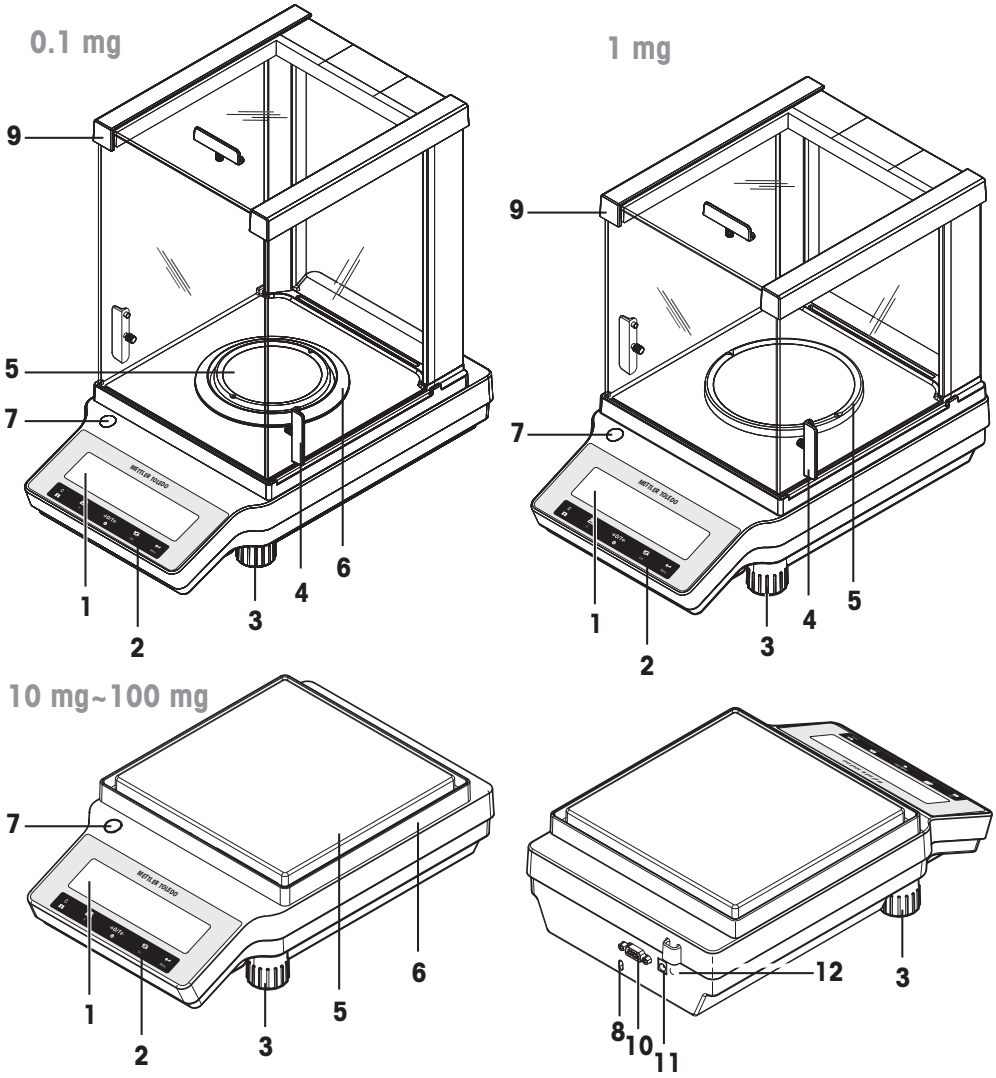
In some countries, excessive mains voltage fluctuations and strong glitches may occur. This may affect the balance functions or damage the software.

– Use the PowerPac-M-12V for stabilizing.

3 Design and Function

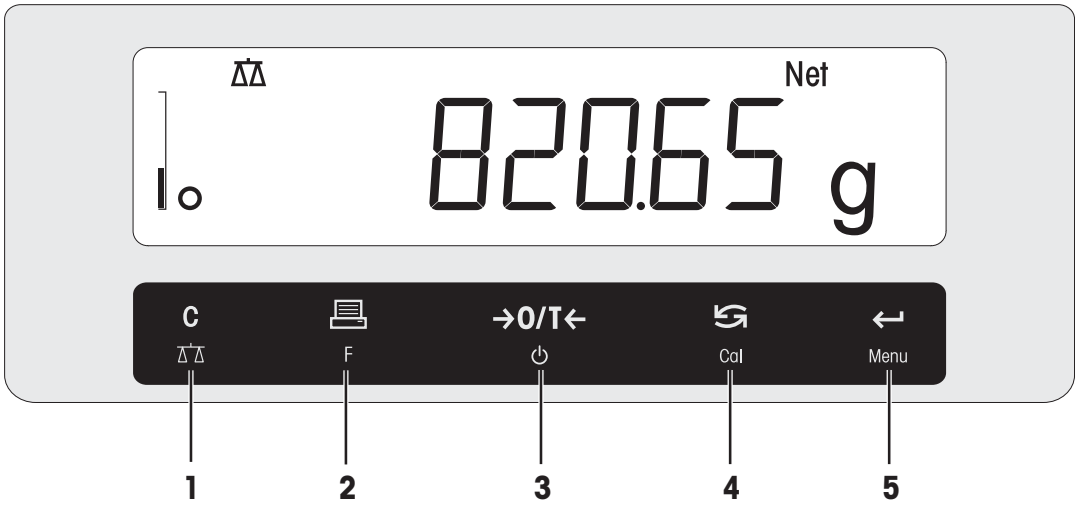
3.1 Overview

3.1.1 Components



1	Display	**2**	Operation keys
3	Leveling foot	**4**	Handle for operation of the draft shield door
5	Weighing pan	**6**	Draft shield element
7	Level indicator	**8**	Kensington slot for anti-theft purposes
9	Glass draft shield	**10**	RS232C serial interface
11	Socket for AC adapter	**12**	Legal for Trade (LFT) sealing

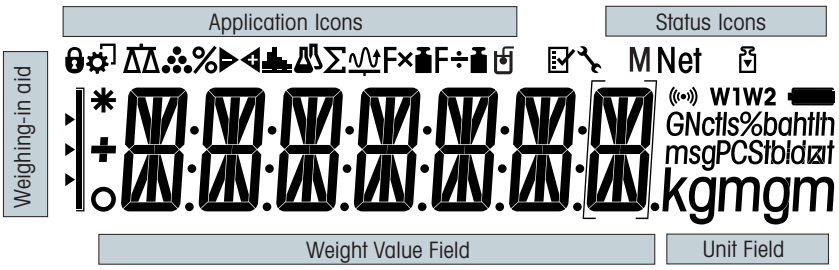
3.1.2 Operation keys



Legend key functions

No.	Key	Press briefly (less than 1.5 s)	Press and hold (longer than 1.5 s)
1	C	• Cancel or leave menu without saving • One step back in the menu	• Select the simple weighing application • Exit application
2	F	• Print display value • Transmit data • To navigate backwards in the menu or menu selection • Decrease parameters in menu or applications	• Open the application list for selecting an application
3	→0/T←	• Zero/Tare • Switch on	• Switch off into standby mode
4	Cal	• With entries, scroll down • To navigate forward menu topics or menu selections • To toggle between unit 1, recall value (if selected), unit 2 (if different from unit 1) and the application unit (if any) • Increase parameters in menu or applications.	• Select adjustment (calibration) – with internal weight * – with external weight – Customer fine adjustment * * On models with internal weight only
5	Menu	• Enter or leave menu selection • To enter application parameter digit and switch to next parameter digit • To accept parameter in menu selection.	• Enter or leave menu (parameter settings) • To store parameter • To accept numeric inputs in applications.

3.1.3 Display



Application Icons			
	Application "Weighing"		Application "Totaling"
	Application "Piece counting"		Application "Dynamic weighing"
	Application "Percent weighing"		Application "Multiplication factor"
	Application "Check weighing"		Application "Division factor"
	Application "Statistics"		Application "Density"
	Application "Formulation / Net-Total"		Menu locked

Note

While an application is running, the corresponding application icon appears at the top of the display.

Status Icons			
M	Indicates stored value (Memory)		Feedback for pressed keys
Net	Indicates Net weight values	**W1**	Weighing range 1 (Dual Range models only)
	Adjustments (calibration) started	**W2**	Weighing range 2 (Dual Range models only)
	Service reminder		

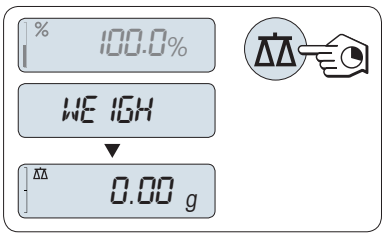
Weight Value Field and Weighing-in aid			
	Indicates negative values		Brackets to indicate uncertified digits (approved models only)
	Indicates unstable values		Marking of nominal or target weight
	Indicates calculated values		Marking of tolerance limit T+
			Marking of tolerance limit T-

Unit Field						
GNctls%bahtlh msgPCStbldzt kgmgm	**g**	gram	**ozt**	troy ounce	**tls**	Singapore taels
	kg	kilogram	**GN**	grain	**tlt**	Taiwan taels
	mg	milligram	**dwt**	pennyweight	**tola**	tola
	ct	carat	**mom**	momme	**baht**	baht
	lb	pound	**msg**	mesghal		
	oz	ounce	**tlh**	Hong Kong taels		

3.2 Basic principles for operation

Selecting simple weighing or terminate application

– Press and hold «⚖» until "**WEIGH**" appears on the display.
  ⇨ The balance returns to the simple weighing mode.

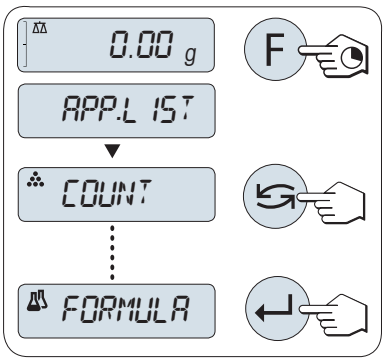


Note

How to perform simple weighing **see** [Performing a simple weighing ▸ Page 21].

Selecting an application

1 Press and hold «**F**» until "**APP.LIST**" (application list).
  ⇨ Last active application e.g. "**COUNT**" appears on the display.
2 Select an application by multiple pressing «↻».
3 To execute selected application press «↵».

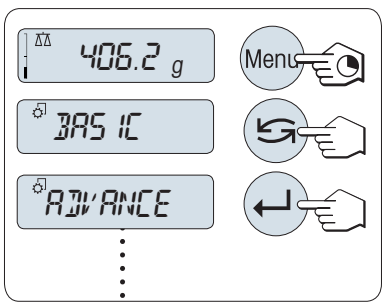


Available applications

Display	Remark	Description
COUNT	Piece counting	**see** [Application "Piece Counting" ▸ Page 33]
PERCENT	Percent weighing	**see** [Application "Percent Weighing" ▸ Page 35]
CHECK	Checkweighing	**see** [Application "Check Weighing" ▸ Page 36]
STAT	Statistics	**see** [Application "Statistics" ▸ Page 38]
FORMULA	Formulation / Net-Total	**see** [Application "Formulation" (Net Total Formulation) ▸ Page 40]
TOTAL	Totaling	**see** [Application "Totaling" ▸ Page 42]
DYNAMIC	Dynamic weighing	**see** [Application "Dynamic Weighing" ▸ Page 43]
FACTOR.M	Multiplication factor	**see** [Application "Multiplication Factor Weighing" ▸ Page 45]
FACTOR.D	Division factor	**see** [Application "Division Factor Weighing" ▸ Page 47]
DENSITY	Density	**see** [Application "Density" ▸ Page 49]

Entering the menu

1 Press and hold «**Menu**» to enter main menu. The first menu "**BASIC**" is displayed (except menu protection is active).
2 Press «↻» repeatedly to change menu.
3 Press «↵» to confirm the selection.

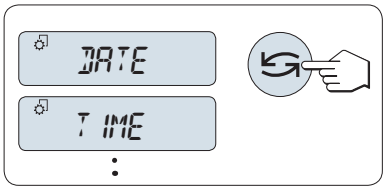


Note

Detailed description of the menu **see** [The Menu ▸ Page 24].

Selecting menu topics

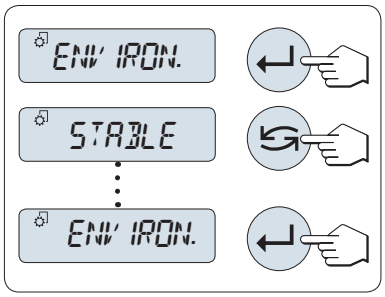
– Press «↻». The next menu topic appears in the display. Each time «↻» is pressed, the balance switches to the next menu topic.



Changing settings in selected menu topic

1 Press «↵».The display shows the current setting in the selected menu topic. Each time «↻» is pressed, the balance switches to the next selection. After the last selection, the first is shown again.

2 Press «↵» to confirm the setting. For store the setting see section **Saving Settings and Closing the Menu**.



Changing settings in a submenu selection

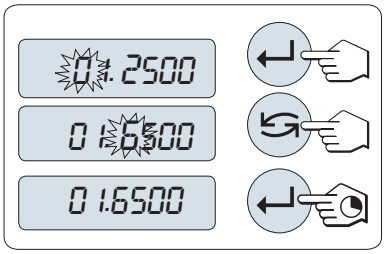
The same procedure as for menu topics.

Input principle of numerical values

1 Press «↵» to select a digit (cyclically from left to right) or a value (depending on the application). The selected digit or the selected value is blinking.

2 For changing blinking digits or values, press «↻» to increase or «**F**» to decrease.

3 Press and hold «↵» to accept the value.



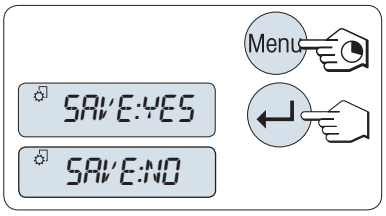
Saving settings and closing the menu

1 Press and hold «**Menu**» to leave menu topic.
⇨ "**SAVE:YES**" appears on the display.

2 Press «↻» to toggle between "**SAVE:YES**" and "**SAVE:NO**".

3 Press «↵» to execute "**SAVE:YES**". Changes are saved.

4 Press «↵» to execute "**SAVE:NO**". Changes are not saved.



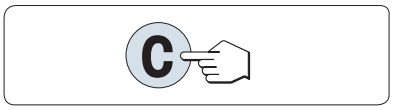
Cancel

- During menu operation

– To leave menu topic or menu selection without saving press «**C**» (one step back in the menu).

- During application operation

– To cancel settings press «**C**».
⇨ The balance returns to the previous active application.



Note: If no entry is made within 30 seconds, the balance reverts to last active application mode. Changes are not saved. If changes are made, the balance asks "**SAVE:NO**".

4 Installation and Putting into Operation

⚠ WARNING

Danger of death or serious injury due to electric shock!
The balance must be disconnected from the power supply when carrying out all setup and mounting work.

4.1 Unpacking and delivery inspection

1 Open the packaging and carefully remove all components.
2 Check the delivered items.

The standard scope of delivery contains the following items:

Components		Model		
		0.1 mg	1 mg	10 mg / 100 mg
Draft shield	high, 235 mm	✓	–	–
	low, 170 mm	–	✓	–
Weighing pan with pan support	ø 90 mm	✓	–	–
	ø 120 mm	–	✓	–
	180 × 180 mm	–	–	✓
Draft shield element		✓	–	✓
Pan support		–	–	✓
Protective cover		✓	✓	✓
Universal AC adapter		✓	✓	✓
EC declaration of conformity		✓	✓	✓
Operating instructions or User Manual; printed or on CD-ROM, depending on country of use		✓	✓	✓

4.2 Installing components

Balances with readability of 0.1 mg

Place the following components on the balance in the specified order:

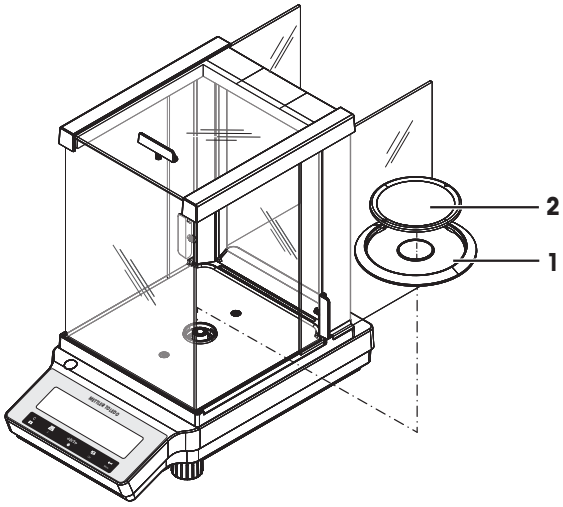
1 Push the side glass doors back as far as will go.

2 Place draft shield element (1).

3 Place weighing pan (2).

Note

Cleaning the draft shield **see** [Cleaning the draft shield ▸ Page 58].



Balances with readability of 1 mg

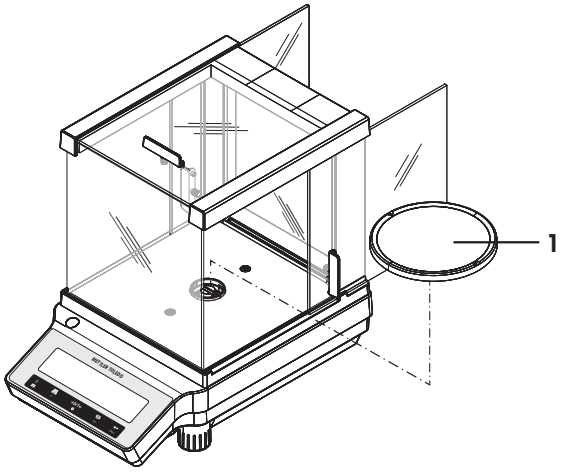
Place the following components on the balance in the specified order:

1 Push the side glass doors back as far as will go.

2 Place weighing pan (1).

Note

Cleaning the draft shield **see** [Cleaning the draft shield ▸ Page 58].



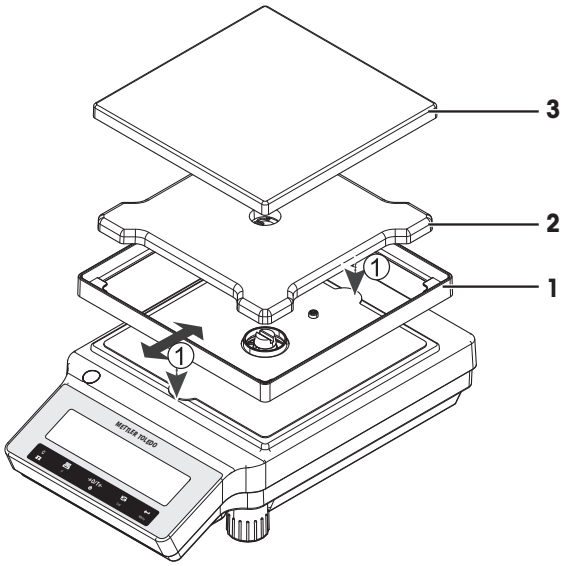
Balances with readability of 10 mg / 100 mg

Place the following components on the balance in the specified order:

1 Place draft shield element (1): carefully pull apart the draft shield element to fix it under the retaining plate.

2 Insert pan support (2).

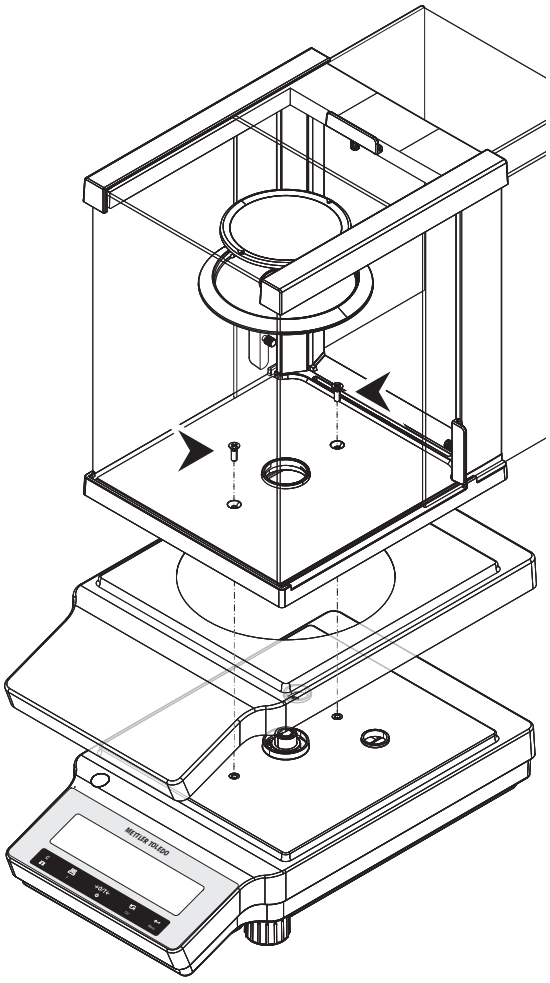
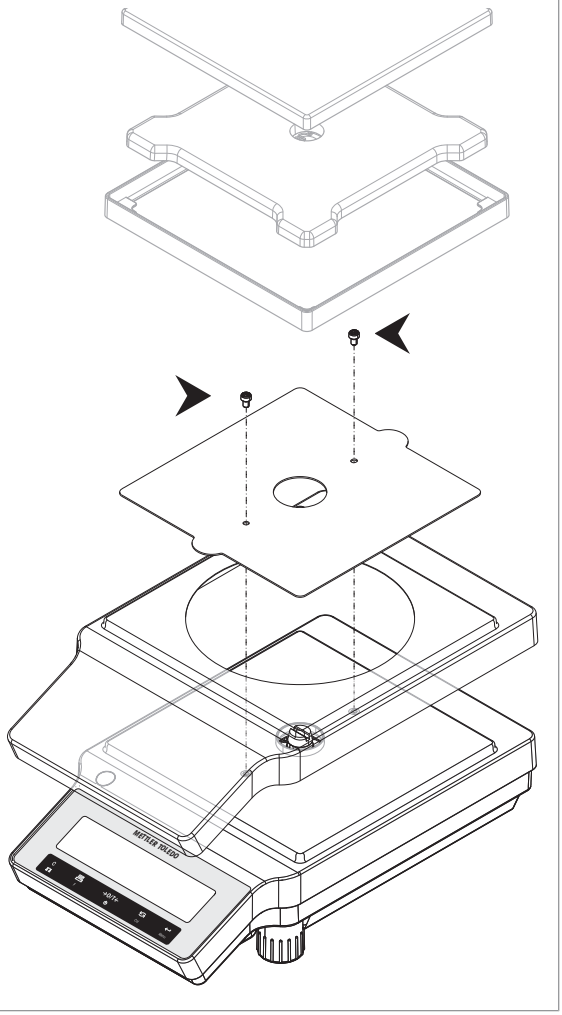
3 Place weighing pan (3).



4.3 Installing protective cover

Note

Make sure using the correct protective cover, **see** [Accessories and Spare Parts ▸ Page 75]

Balances with readability of 0.1 mg / 1 mg	Balances with readability of 10 mg / 100 mg
Install the protective cover according to the illustrations below, using a screwdriver Philips No. 2.	Install the protective cover according to the illustrations below, using a screwdriver Torx TX20.
	

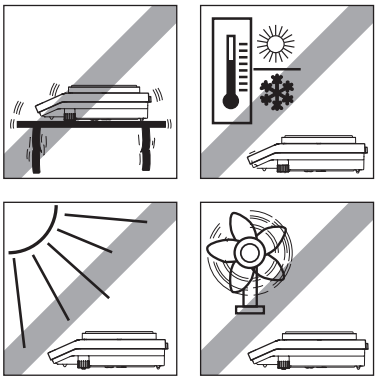
4.4 Selecting a location

Your balance is a precision instrument and will thank you for an optimum location with high accuracy and dependability. Select a stable, vibration-free position that is as horizontal as possible. The surface must be able to safely carry the weight of a fully loaded balance.

Observe ambient conditions see Technical Data.

Avoid the following:

- Vibrations
- Excessive temperature fluctuations
- Direct sunlight
- Powerful drafts (e.g. from fans or air conditioners)



4.5 Connecting the balance

⚠ WARNING

Risk of electric shock

1 Only connect the balance to a three-pin power socket with earthing contact.
2 Only standardized extension cable with equipment grounding conductor must be used for operation of the balance.
3 Intentional disconnection of the equipment grounding conductor is forbidden.

The balance is supplied with an universal AC adapter and a country-specific plug. The AC adapter is suitable for use with the following voltage range:

100 – 240 V AC, 50/60 Hz.

NOTICE

Danger of damage to the AC adapter due to overheating or incorrect voltage range!

If the AC adapter is covered or in a container, it is not sufficiently cooled and overheats.

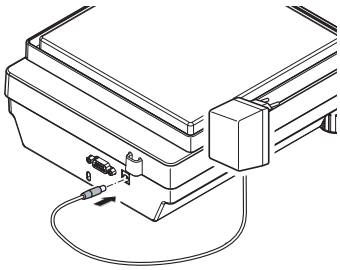
If the voltage is too high for the device in use, the device might be damaged or the cable might start to burn.

If the voltage is too low, use of the device might be restricted or the device might not function at all.

1 Do not cover the AC adapter.
2 Do not put the AC adapter in a container.
3 Check whether your local power supply falls within this range. If this is not the case, under no circumstances connect the AC adapter to the power supply, but contact a METTLER TOLEDO representative.
4 The power plug must be accessible at all times.
5 Prior to use, check the power cable for damage.
6 Route the cable in such a way that it cannot be damaged or cause a hindrance when working.
7 Ensure that no liquid comes into contact with the AC adapter.

– Connect the AC adapter to the connection socket on the back of your balance (see figure) and to the power line.
  ⇨ The balance performs a display test (all segments in the display light up briefly), "**WELCOME**", **Software version**, **Maximum load** and **Readability** appears briefly.

The balance is ready for use.



4.6 Setting up the balance

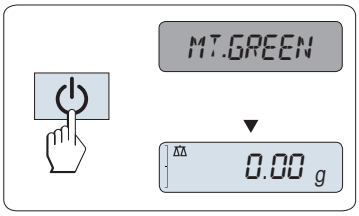
4.6.1 Switching on the balance

Before working with the balance, it must be warmed up in order to obtain accurate weighing results. To reach operating temperature, the balance must be connected to the power supply for at least 30 minutes (0.1 mg models 60 minutes).

Switching on

- The Balance is in "**STANDBY**" mode. "**MT.GREEN**" appears on the display.

– Press «⏻» or remove any load from weighing pan or tap on the weighing pan.



The balance is ready for weighing or for operation with the last active application.

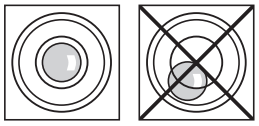
Note
Approved balances can only be switched on by pressing «⏻» in selected countries.

4.6.2 Leveling the balance

Note

The balance must be leveled and adjusted each time it is moved to a new location.

1 Align the balance horizontally.
2 Turning the two front leveling screws of the housing until the air bubble is in the inner circle of the level indicator.
  ⇨ The position of the air bubble illustrates which leveling screw you need to turn (L = left leveling screw, R = right leveling screw) and in which direction so that the air bubble moves to the center.



Example
In this example, turn the left leveling screw counterclockwise.

4.6.3 Adjusting the balance

To obtain accurate weighing results, the balance must be adjusted to match the gravitational acceleration at its location and depending on the ambient conditions. After reaching the operation temperature, adjusting is necessary

- before the balance is used for the first time.
- after a change of the location.
- at regular intervals during weighing service.

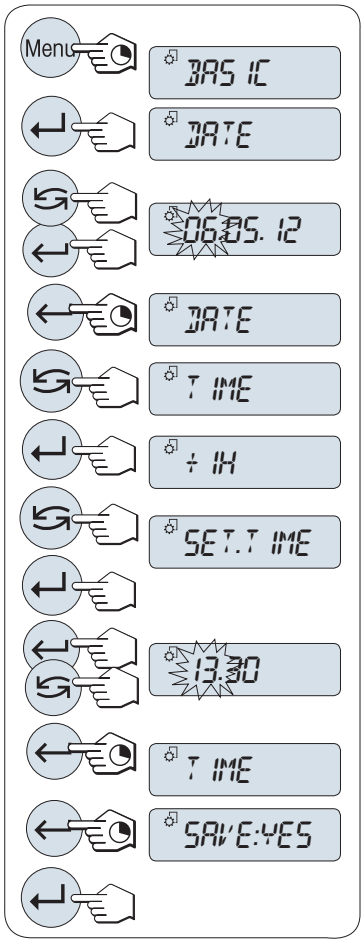
4.7 Setting date and time

When you put your new instrument into operation for the first time, you should enter the current date and time.

Note

- These settings are retained even if you disconnect your instrument from the power supply.
- A reset of the instrument will not change these settings.
- Set the current date according to the date format "**DATE.FRM**" in the menu "**ADVANCE.**".
- Set the current time according to the time format "**TIME.FRM**" in the menu "**ADVANCE.**".

1 Press and hold «**Menu**» until menu "**BASIC**" appears on the display.
2 Press «↵» to open menu "**BASIC**".
⇨ "**DATE**" appears.
3 Press «↵» to confirm.
4 **Set current date**. Press «↵» to select day, month or year; press «↻» to set current day, month or year.
5 Press and hold «↵» to confirm the settings.
⇨ "**DATE**" appears..
6 **Set current time**. Press «↻» to select "**TIME**".
7 Press «↵» to confirm.
⇨ "**+1H**" appears.
8 Select "**SET.TIME**" by pressing «↻».
9 Press «↵» to confirm.
10 Press «↵» to select hours or minutes; press «↻» to set current hours or minutes.
11 Press and hold «↵» to confirm the settings.
⇨ "**TIME**" appears.
12 Press and hold «↵» to store the settings.
⇨ "**SAVE:YES**" appears.
13 Press «↵» to confirm.



4.8 Adjustment (calibration)

NOTICE

Before adjusting the balance, it must be warmed up.

4.8.1 Adjustment with internal weight

Note: On models with internal weight only (see technical data).

- Weighing pan is unloaded.

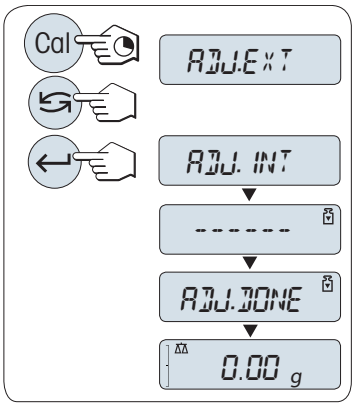
1 To carry out this operation press and hold «**CAL**» until "**ADJUST**" appears.

2 Select "**ADJ.INT**" by pressing «⟳».

⇨ "**ADJ.INT**" appears on the display.

3 Press «↵» to execute "Internal Adjustment".

The balance adjusts itself automatically. The adjusting is finished when the message "**ADJ.DONE**" appears briefly on the display. The balance returns to the last active application and is ready for operation.



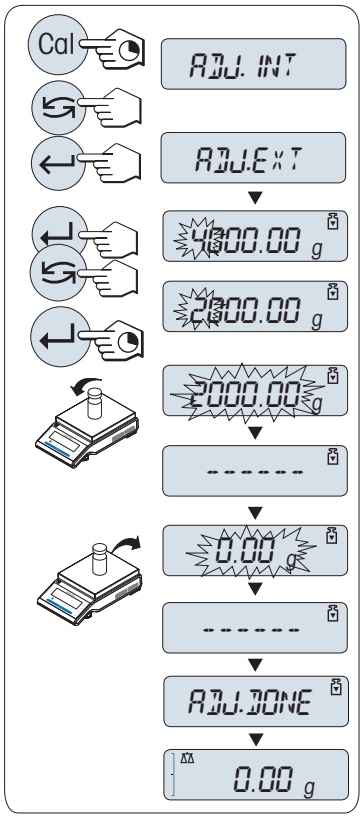
Sample adjustment printout using internal weight:

```
- Internal Adjustment --
21.Jan 2012          12:56

METTLER TOLEDO

Balance Type        ME4002
SNR             1234567890

Temperature        22.5 °C
Diff                 3 ppm

Adjustment done
-----------------------
```

4.8.2 Adjustment with external weight

Note: Because of certification legislation, the approved models cannot be adjusted with an external weight * (depend on selected countries' certification legislation).
* except OIML accuracy class I approved models.

1 Have required adjustment weight ready.
2 To carry out this operation press and hold «**CAL**» until "**ADJUST**" appears.
3 Select "**ADJ.EXT**" by pressing «».
⇨ "**ADJ.EXT**" appears on the display.
4 Unload weighing pan.
5 Optional: If necessary, you can define a different weight value. Press «» to change a digit (cyclically from left to right); press «» to change the blinking digit.
6 Press and hold «» to execute "External Adjustment".
⇨ The required adjustment weight value flashes in the display.
7 Place adjustment weight in center of pan.
⇨ The balance adjusts itself automatically.
8 When zero is flashing, remove adjustment weight.
⇨ The adjusting is finished when the message "**ADJ.DONE**" appears briefly on the display. The balance returns to the last active application and is ready for operation



Sample adjustment printout using external weight:

```
- External Adjustment --
21.Jan 2012          12:56

METTLER TOLEDO

Balance Type        ME4002
SNR            1234567890

Temperature       22.5 °C
Nominal         2000.00 g
Actual          1999.99 g
Diff                5 ppm

Adjustment done

Signature


.......................
-----------------------
```

4.8.3 Customer fine adjustment

NOTICE

This function should be executed only by trained personnel.

The function customer fine adjustment "**ADJ.CF**" allows you to adjust the value of the internal adjustment weight with your own adjustment weight. The adjustable range of the adjustment weight is possible only in a very small range. Customer fine adjustment impacts the function of internal adjustment. The customer fine adjustment can be deactivated at any time.

Note

- This feature is available on models with internal weight only.
- Because of certification legislation, approved models cannot be adjusted with customer fine adjustment (depending on selected countries' certification legislation).
- Use certificated weights.
- Balance and test weight have to be on operating temperature.
- Observe the correct environmental conditions.

Execute customer fine adjustment

- The balance is under measuring condition.

1 Have required adjustment weight ready.

2 Unload weighing pan

3 To carry out this operation press and hold «**CAL**» until "**ADJUST**" appears

4 Select "**ADJ.CF**" by pressing «↻».

⇨ "**ADJ.CF**" appears on the display.

5 Select "**EXECUTE**"

6 Start Adjustment with «↵»

⇨ "**SET REF.**" appears briefly.

⇨ The last saved value flashes on the display.

7 Select the target adjustment weight. Press «↵» to change a digit (cyclically from left to right); press «↻» to change the blinking digit.

8 Press and hold «↵» to confirm and execute "**ADJ.CF**".

⇨ The required adjustment weight value flashes in the display. This could take some time.

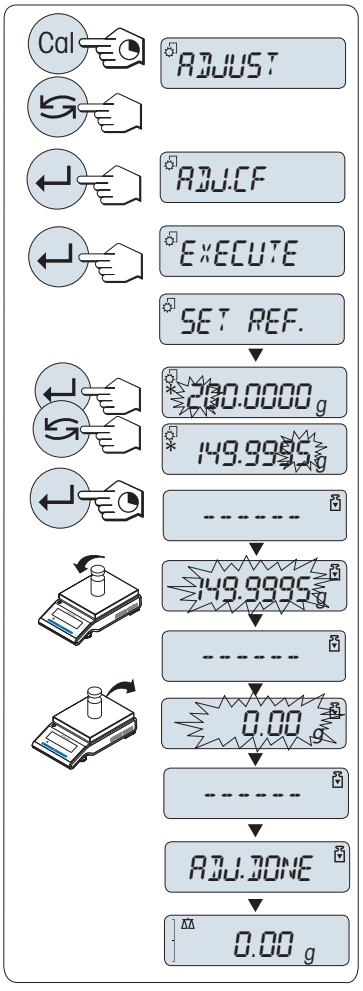
9 Place required adjustment weight in center of pan.

10 Remove adjustment weight when zero is flashing.

11 Wait until "**ADJ.DONE**" briefly appears.

⇨ The adjusting is finished when the message "**ADJ.DONE**" appears briefly on the display. The balance returns to the last active application and is ready for operation

⇨ If the error message "**WRONG ADJUSTMENT WEIGHT**" appears, the weight is not within the allowed value range and could not be accepted. "**ADJ.CF**" could not be executed.



Note
Storing the adjustment is not required.

Deactivate customer fine adjustment

1 To carry out this operation press and hold «**CAL**» until "**ADJUST**" appears

2 Select "**ADJ.CF**" by pressing «↻».

⇨ "**ADJ.CF**" appears on the display.

3 Select "**RESET**"

4 Start **RESET** by pressing «↵»

⇨ "**NO?**" appears.

5 Select "**YES?**" and confirm with«↵».

⇨ The adjusting is finished when the message "**ADJ.DONE**" appears briefly on the display. The balance returns to the last active application and is ready for operation with initial adjustment.

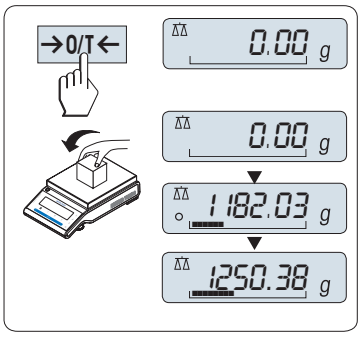
4.9 Performing a simple weighing

1 Press «→0/T←» to zero the balance.
Note: If your balance is not in the weighing mode, press and hold the «⚖» key down until "**WEIGHING**" appears in the display. Release the key. Your balance is in the weighing mode and set to zero.

2 Place weighing sample on the weighing pan.

3 Wait until the instability detector "○" disappears and the stability beep sounds.

4 Read the result.



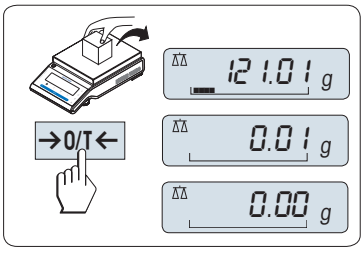
Zeroing

Zero setting

1 Unload the balance.

2 Press «→0/T←» to set the balance to zero. All weight values are measured in relation to this zero point (see menu topic "ZERO RNG").

Use the «→0/T←» zeroing key before you start with a weighing.



Taring

Taring

If you are working with a weighing container, first set the balance to zero.

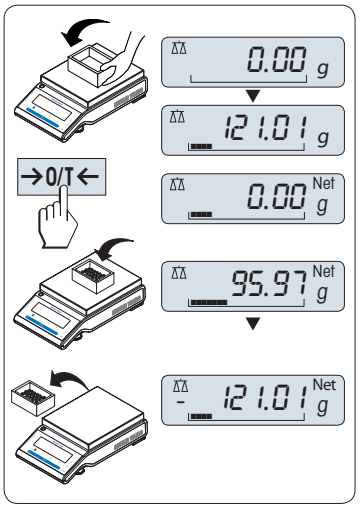
1 Place empty container on the balance. The weight is displayed.

2 Press «→0/T←» to tare the balance.

"0.00 g" and "**Net**" appears in the display. "**Net**" indicates that all weight values displayed are net values.

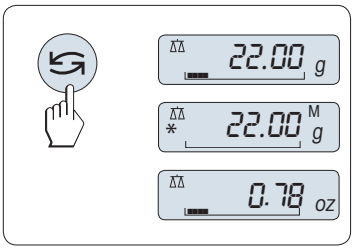
Note

- If the container is removed from the balance, the tare weight will be shown as a negative value.
- The tare weight remains stored until the «→0/T←» key is pressed again or the balance is switched off.
- With METTLER TOLEDO DeltaRange balances, the fine range with its 10 times smaller display increments (depending on the model) is available again after every taring operation.



Switching weight units

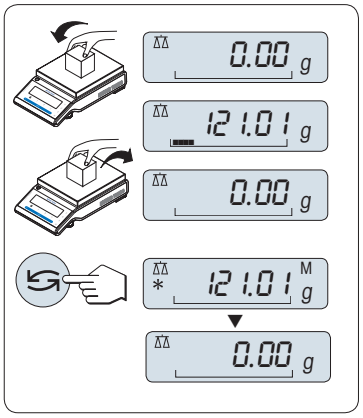
The «↻» key can be used at any time to toggle between weight unit "**UNIT 1**","**RECALL**" value (if selected) and weight unit "**UNIT 2**" (if different from weight unit 1) and the application unit (if any).



Recall / Recall weight value

Recall stores stable weights with an absolute display value bigger than 10d.
Requirement: The function "**RECALL**" must be activated in the menu.

1 Load weighing sample. The display shows weight value and stores stable value.
2 Remove weighing sample. When the weight is removed the Display shows zero.
3 Press «↻». The display shows last stored stable weight value for 5 seconds together with asterisk (*) and Memory (M) symbols. After 5 seconds the display goes back to zero. This can be repeated unlimited times.



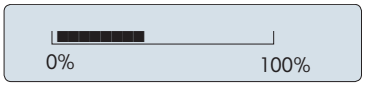
Delete last weight value

As soon a new stable weight value is displayed, the old recall value becomes replaced by the new weight value. When pressing «→0/T←», the recall value is set to 0.

Note: If the power is switched off, the recall value is lost. The recall value can not be printed.

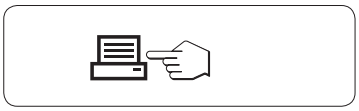
Weighing with the weighing-in aid

The weighing-in aid is a dynamic graphic indicator which shows the used amount of the total weighing range. You can thus recognize at a glance when the load on the balance approaches the maximum load.



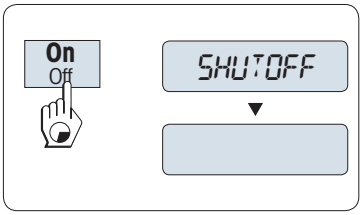
Print / Transmit data

Pressing the «🖶» key transmits the weighing results over the interface e.g. to a printer or a PC.



Switching off

– Press and hold the «**Off**» key until "**SHUTOFF**" appears on the display. Release the key.
⇨ Mains operated balances switch into standby mode.
⇨ Battery operated balances switch off completely.



Note

- After switching on from standby mode, your balance needs no warm-up time and is immediately ready for weighing.
- Standby mode is not possible with approved balances (only available in selected countries).
- If your balance has been switched off after a preselected time, the display is dimly lit and shows date, time, maximum load and readability.
- If your balance has been switched off manually, the display is off.
- To completely switch off mains operated balances, they must be disconnected from the power supply.

4.10 Weighing below the balance

Your balance is equipped with a hanger for carrying out weighings below the work surface (weighing below the balance).

NOTICE

Damage to balance

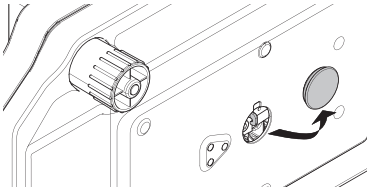
Do not place the balance on the pan support location bolt.

Switching off the balance

1 Press and hold [**ON/OFF**] key.
2 Disconnect the balance from the power supply.
3 Disconnect all interface cables.

ON/OFF
→0/T←

1 Remove weighing pan, pan support and draft shield element if present.
2 Turn the balance carefully on its side.
3 Remove the cap. Keep it for later use.
4 Turn the balance to its normal position and simply reinstall all components in the reverse order.



4.11 Transporting the balance

Observe the following instructions to transport your balance to a new location.

Switching off the balance

1 Press and hold [**ON/OFF**] key.
2 Disconnect the balance from the power supply.
3 Disconnect all interface cables.

ON/OFF
→0/T←

Transporting over long distances

The complete original packaging must be used for transportation or shipment of the balance over long distances or if it cannot be ensured that the balance will be transported upright.

5 The Menu

5.1 What is in the Menu ?

The Menu allows you to match your balance to your specific weighing needs. In the menu you can change the settings of your balance and activate functions. The main menu has 4 different menus and these contains 33 different topics, each of which allows you various selection possibilities.

For Menu "PROTECT" **see** [Main Menu ▸ Page 25].

Menu "BASIC"

Topic	Explanation	Description
DATE	Setting the current date.	[see ▸ Page 26]
TIME	Setting the current time.	[see ▸ Page 26]
1/10 D	Setting display increment (1/10d function)	[see ▸ Page 26]
UNIT 1	Specification of the 1st weight unit in which the balance should show the result.	[see ▸ Page 26]
UNIT 2	Specification of the 2nd weight unit in which the balance should show the result.	[see ▸ Page 26]
SET ID	Setting an identification.	[see ▸ Page 26]
PRT.MENU	Printing the settings.	[see ▸ Page 27]
RESET	Call up of the factory settings.	[see ▸ Page 27]

Menu "ADVANCE."

Topic	Explanation	Description
ENVIRON.	Matching the balance to the ambient conditions.	[see ▸ Page 27]
ADJ.LOCK	Switching the adjustment function on or off.	[see ▸ Page 27]
DATE.FRM	Setting the date format.	[see ▸ Page 27]
TIME.FRM	Preselection of the time format.	[see ▸ Page 27]
RECALL	Switching the application "Recall" for storing stable weights on or off.	[see ▸ Page 28]
STANDBY	Setting the time after which the balance should be switched off automatically.	[see ▸ Page 28]
B.LIGHT	Switching on or off the display backlight.	[see ▸ Page 28]
A.ZERO	Switching the automatic zero correction (Autozero) on or off.	[see ▸ Page 28]
ZERO.RNG	Setting the zero limit of the zero/tare key.	[see ▸ Page 28]
SRV.ICON	Switching the service reminder (service icon) on or off.	[see ▸ Page 28]
SRV.D.RST	Reset service date and hours (service reminder)	[see ▸ Page 29]

Menu "INT.FACE"

Topic	Explanation	Description
RS232	Matching the serial interface RS232C to a peripheral unit.	[see ▶ Page 29]
HEADER	Setting the header for printout of individual values.	[see ▶ Page 30]
SINGLE	Setting the information for printout of individual values.	[see ▶ Page 30]
SIGN.L	Setting the footer for printout of individual values.	[see ▶ Page 30]
LN.FEED	Setting line feed for printout of individual values.	[see ▶ Page 30]
ZERO.PRT	Setting the auto print function for printing zero.	[see ▶ Page 30]
COM.SET	Setting the data communication format of the serial interface RS232C.	[see ▶ Page 30]
BAUD	Setting the transfer speed of the serial interface RS232C.	[see ▶ Page 31]
BIT.PAR.	Setting the character format (Bit/Parity) of the serial interface RS232C.	[see ▶ Page 31]
STOPBIT	Setting the character format (stop bit) of the serial interface RS232C.	[see ▶ Page 32]
HD.SHK	Setting the transfer protocol (Handshake) of the serial interface RS232C.	[see ▶ Page 32]
RS.TX.E.O.L.	Setting the end of line format of the serial interface RS232C.	[see ▶ Page 32]
RS.CHAR	Setting the char set of the serial interface RS232C.	[see ▶ Page 32]
INTERVL.	Selection of the time interval for the simulated print key press.	[see ▶ Page 32]

5.2 Description of menu topics

In this section you will find information regarding the individual menu topics and the available selections.

5.2.1 Main Menu

Selecting the submenu.

"**BASIC**" The small "**BASIC**" menu for simple weighing is displayed.

"**ADVANCE.**" The extended "**ADVANCE.**" menu for further weighing settings is displayed.

"**INT.FACE**" The menu "**INT.FACE**" for all interface parameter settings for peripheral devices e.g. printer is displayed.

"**PROTECT**" Menu protection. Protection of balance configurations against unmeant manipulation.

- "**OFF**" Menu protection is off. (**Factory setting**)
- "**ON**" Menu protection is on. The menu **BASIC**, **ADVANCE.** and **INT.FACE** are not displayed. This is indicated with "🔒" in the display.

5.2.2 Basic Menu

"DATE" – Date

Setting the current date according to date format.

Note: A reset of the balance will not change this setting.

"TIME" – Time

Setting the current time according to time format

"**+1H**"	Set the current time forwards by 1 hour. **(Factory setting)**
"**-1H**"	Set the current time backwards by 1 hour.
"**SET.TIME**"	Enter the current time.

Note: A reset of the balance will not change this setting.

"1/10 D" – Display increment 1/10 d

This menu topic allows you to reduce the readability of the display.

Note: This menu topic is not available with models which are approved and e=d.

"**OFF**"	"**1/10 D**" Display increment is switched off (full resolution) **(Factory setting)**
"**ON**"	"**1/10 D**" switched on (low resolution)

Note: A reset of the balance will not change this setting.

"UNIT 1" – Weight unit 1

Depending on requirements, the balance can operate with the following units (depending on the model)

- Only those weight units allowed by the appropriate national legislation are selectable.
- With approved balances, this menu topic has a fixed setting and cannot be changed.

Units:			
g	Gram	**dwt**	Pennyweight
kg	Kilogram	**mom**	Momme
mg	Milligram	**msg**	Mesghal
ct	Carat	**tlh**	Tael Hong Kong
lb	Pound	**tls**	Tael Singapore
oz	Ounce (avdp)	**tlt**	Tael Taiwan
ozt	Ounce (troy)	**tola**	Tola
GN	Grain	**baht**	Baht

"UNIT 2" – Weight unit 2

If it is required to show the weighing results in weighing mode in an additional unit, the desired second weight unit can be selected in this menu topic (depending on the model). Units see "**UNIT 1**".

Note: Only those weight units allowed by the appropriate national legislation are selectable.

"SET ID" – Set identification

This menu topic allows you to set your own desired identification to the balance for the convenience of asset management or other purposes. The ID can be printed with other balance information. One ID can be set and max 7 alphanumeric characters are possible (blank, 0…9, A…Z).

"**SET ID**" Set identification

The setting starts from left to right and the display prompts the configurable position by flashing corresponding place.

- "**SET ID**" is selected.

1 Search through (blank, 0…9, A…Z) by pressing «↻».

2 After selecting the character, press «↵» to confirm and move to the next place. To store press and hold «↵».

Note: A reset of the balance will not change this setting.

"PRT.MENU" – Print menu

This menu topic allows you to execute a printout of the menu settings if a printer is connected. This topic is only visible if "**PRINTER**" mode is selected.

- **PRT.MENU** appears on the display and a printer is properly connected.

– To execute a printout press «↵».

"RESET" – Reset balance settings

This menu topic allows you to call-up the factory settings.

To toggle between "**YES**?" and "**NO**?" press «↻».

Note: A reset of the balance will not change "**DATE**", "**TIME**", "**1/10 D**", "**SET ID**" and "**ZERO.RNG**" settings.

5.2.3 Advanced Menu

"ENVIRON." – Environment settings

This setting can be used to match your balance to the ambient conditions.

"**STD.**"	Setting for an average working environment subject to moderate variations in the ambient conditions. (**Factory setting**)
"**UNSTAB.**"	Setting for a working environment where the conditions are continuously changing.
"**STABLE**"	Setting for a working environment which is practically free from drafts and vibrations.

"ADJ.LOCK" – Adjustment (calibration) lock

Under this menu topic you can lock function of the «**Cal**» key.

"**OFF**"	The adjustment lock is switched **off**. The adjustment function is on. The «**Cal**» key is activ. (**Factory setting**)
"**ON**"	The adjustment lock is switched **on**. The adjustment function is off. The «**Cal**» key has no function.

"DATE.FRM" – Date format

This menu topic allows you to preselect the date format.

The following date formats are available:

	Display examples	**Printing examples**
"**DD.MM.Y**"	01.02.09	01.02.2009
"**MM/DD/Y**"	02/01/09	02/01/2009
"**Y-MM-DD**"	09-02-01	2009-02-01
"**D.MMM Y**"	1.FEB.09	1.FEB 2009
"**MMM D Y**"	FEB.1.09	FEB 1 2009

Factory setting: "**DD.MM.Y**"

"TIME.FRM" – Time format

This menu topic allows you to preselect the time format.

The following date formats are available:

	Display examples
"**24:MM**"	15:04
"**12:MM**"	3:04 PM
"**24.MM**"	15.04
"**12.MM**"	3.04 PM

Factory setting: "**24:MM**"

"RECALL" – Recall

This menu topic allows you to switch the "**RECALL**" function on or off. When it is switched on recall stores the last stable weight if the absolute display value was bigger than 10d.

"**OFF**"	"**RECALL**" switched off **(Factory setting)**
"**ON**"	"**RECALL**" switched on

Note: The recall value is displayed with an asterisk and cannot be printed.

"STANDBY" – Automatic standby

If the automatic standby function is activated, the balance automatically switches itself after a pre selected time of inactivity into the energy saver mode "**STANDBY**" (e.g. with no key being pressed and no changes of weight occurring).

A.OFF	Automatic standby deactivated.
A.ON	Automatic standby activated (**Factory setting**).
"10"	Time in minutes of inactivity for activating standby function.

"B.LIGHT" – Backlight

Under this menu topic, the display backlight can be switched off or on.

"**B.L. ON**"	Backlight is always **on**. (**Factory setting**)
"**B.L. OFF**"	Backlight is always **off**.

"A.ZERO" – Automatic zero setting

This menu topic allows you to switch the automatic zero setting on or off.

"**ON**"	"**A.ZERO**" **switched on** (factory setting). The automatic zero setting continuously corrects possible variations in the zero point that might be caused through small amounts of contamination on the weighing pan.
"**OFF**"	"**A.ZERO**" **switched off**. The zero point is not automatically corrected. This setting is advantageous for special applications (e.g. evaporation measurements).

Note: With approved balances, this setting is not available (only available in selected countries).

"ZERO.RNG" – Zero range

This menu topic allows you to set a zero limit for the «→0/T←» key. Up to and including this limit the «→0/T←» key will execute a zero. Above this limit the «→0/T←» key will execute a tare.

"21g"	To set the upper limit of the zeroing range as weight in the definition unit of the balance. (**Factory setting:** 0.5% of weighing range) **Note:** With approved balances, this setting is not available and fixed to 3e (only available in selected countries).

Note: A reset of the balance will not change this setting.

"SRV.ICON" – Service reminder

This menu topic allows you to switch the service reminder "🔧" on or off.

"**ON**" Service reminder "🔧" **switched on**.You will be informed to call service for recalibration. This will be indicated by the flashing service icon: "🔧". **(Factory setting)**

"**OFF**" Service reminder "🔧" **switched off**.

"SRV.D.RST" – Service date reset

This menu topic allows you to reset service date.
Note: This menu topic is only available if ″**SRV.ICON**″ setting ″**ON**″ was selected.

To toggle between ″**YES**?″ and ″**NO**?″ press «↺».

5.2.4 Interface Menu

"RS232" – RS232C interface

At this menu topic you can select the peripheral device connected to the RS232C interface and specify how the data is transmitted.

"**PRINTER**" Connection to a **printer**. (**Factory setting**)
Note:
- Only one printer possible.
- See recommended printer settings in the printer-specific user's documentation.

"**PRT.STAB**" If the «🖶» key is pressed, the next stable weight value will be printed. (**Factory setting**)

"**PRT.AUTO**" Every stable weight value will be printed, without pressing the «🖶» key.

"**PRT.ALL**" If the «🖶» key is pressed, the weight value will be printed regardless of stability.

"**PC-DIR.**" Connection to a **PC**: the balance can send data (as a Keyboard) to the PC used for PC applications e.g. Excel.
Note:
- The balance sends the weight value without the unit to the PC.

"**PRT.STAB**" If the «🖶» key is pressed, the next stable weight value will be sent followed by an enter. (**Factory setting**)

"**PRT.AUTO**" Every stable weight value will be sent followed by an enter, without pressing the «🖶» key.

"**PRT.ALL**" If the «🖶» key is pressed, the weight value will be sent followed by an enter regardless of stability.

"**HOST**" Connection to a **PC**, Barcode Reader etc.: the balance can send data to the PC and receive commands or data from the PC.
Note: The balance sends the complete MT-SICS answer to the PC (see chapter "MT-SICS interface commands and functions".

"**SND.OFF**" Send mode switched off.(**Factory setting**)

"**SND.STB**" If the «🖶» key is pressed, the next stable weight value will be sent.

"**SND.CONT**" All weight value updates will be sent regardless of stability, without pressing the «🖶» key.

"**SND.AUTO**" Every stable weight value will be sent, without pressing the «🖶» key.

"**SND.ALL**" If the «🖶» key is pressed, the weight value will be sent regardless of stability.

"**2.DISP**" Connection of an **optional auxiliary display** unit.
Note: The transmission parameters cannot be selected. Settings are automatically set.

"HEADER" – Options for the printout header of individual values

This menu topic allows you to specify the information that is to be printed at the top of the printout for every individual weighing results (after pressing «🖶»).
Note: This menu topic is only available if "**PRINTER**" setting was selected.

"**NO**" The header is not be printed (**Factory setting**)

"**DAT/TIM**" Date and time are printed

"**D/T/BAL**" Date, time and balance information (Balance type, SNR, Balance ID) are printed.
Note: Balance ID only if set.

"SINGLE" – Options for printing out the result of individual values

This menu topic allows you to specify the information that is to be printed for every individual weighing result (after pressing «🖶»).
Note: This menu topic is only available if "**PRINTER**" setting was selected.

"**NET**" The value of the Net weight from the current weighing is printed (**Factory setting**)

"**G/T/N**" The values of the Gross weight, the Tare weight and the Net weight are printed

"SIGN.L" – Options for the printout footer for signature line of individual values

This menu topic allows you to set a footer for signature at the bottom of the printout for every individual weighing result (after pressing «🖶»).
Note: This menu topic is only available if "**PRINTER**" setting was selected.

"**OFF**" The signature footer is not be printed. (**Factory setting**)

"**ON**" The signature footer is printed

"LN.FEED" – Options for complete the printout of individual values

This menu topic allows you to specify the number of blank lines to complete the printout (line feed) for every individual weighing result (after pressing «🖶») .
Note: This menu topic is only available if "**PRINTER**" setting was selected.

"0" Possible numbers of blank lines: 0 to 99 (**Factory setting = 0**)

"ZERO.PRT" – Options for "PRT.AUTO"

This menu topic allows you to specify the auto print function "**PRT.AUTO**" for printing zero "**YES**" or "**NO**".

"**OFF**" Zero is not be printed (Zero +/- 3d) (**Factory setting**)

"**ON**" Zero is always printed

Note: This menu topic is only available if "**PRT.AUTO**" function of the "**PRINTER**" or "**PC-DIR.**" was selected.

COM.SET – Options for the data communication format (RS232C)(HOST)

This menu topic allows you to set the data format depending on which peripheral device is connected.
Note: This menu topic is only available if **HOST** setting was selected.

"**MT-SICS**" The MT-SICS data transfer formats is used. (**Factory setting**)
For more information see section "MT-SICS interface commands and functions".

"**SART**" The following Sartorius commands are supported:

K Ambient conditions: very stable

L Ambient conditions: stable

M Ambient conditions: unstable

N	Ambient conditions: very unstable
O	Block keys
P	Print key (print, auto print; activate or block)
R	Unblock keys
S	Restart/self-test
T	Tare key
W	Calibration/adjustment *)
Z	Internal calibration/adjustment **)
f1_	Function key (CAL)
s3_	C key
x0_	Perform internal calibration **)
x1_	Print balance/scale model
x2_	Print weighing cell serial number
x3_	Print software version

*) may be inaccessible on verified balances/scales

**) only on models with built-in motorized calibration weight

Functionality mapping

"**HOST**" settings:	**Sartorius printer settings:**
"**SND.OFF**"	not applicable
"**SND.STB**"	manually print with stability
"**SND.ALL**"	manually print without stability
"**SND.CONT**"	automatically print without stability
"**SND.AUTO**"	similar applicable to automatically print when load is changed

"BAUD" – Baud rate RS232C

This menu topic allows you to match the data transmission to different serial RS232C receivers. The baud rate (data transfer rate) determines the speed of transmission via the serial interface. For problem-free data transmission the sending and receiving devices must be set at the same value.

The following settings are available:
600 bd, 1200 bd, 2400 bd, 4800 bd, **9600 bd** (Factory setting), 19200 and 38400 bd.

Note

- Not visible for 2nd display.
- Each device has separate settings.

"BIT.PAR." – Bit/Parity RS232C

At this menu topic you can set the character format for the attached RS232C serial peripheral device.

"**8/NO**"	8 data bits/no parity (**Factory setting**)
"**7/NO**"	7 data bits/no parity
"**7/MARK**"	7 data bits/mark parity
"**7/SPACE**"	7 data bits/space parity
"**7/EVEN**"	7 data bits/even parity
"**7/ODD**"	7 data bits/odd parity

Note

- Not visible for 2nd display.
- Each device has separate settings.

"STOPBIT" – Stop bits RS232C

At this menu topic you can set the stop bits of the transmitted data to different RS232C serial receivers.

"**1 BIT**"	1 Stop bit (**Factory setting**)
"**2 BITS**"	2 Stop bits

"HD.SHK" – Handshake RS232C

This menu topic allows you to match the data transmission to different RS232C serial receivers.

"**XON.XOFF**"	Software handshake (XON/XOFF) (**Factory setting**)
"**RTS.CTS**"	Hardware handshake (RTS/CTS)
"**OFF**"	No handshake

Note

- Not visible for 2nd display.
- Each device has separate settings.

"RS.TX.E.O.L." – End of Line RS232C

At this menu topic you can set the "End of Line" character of the outgoing transmitted data to different RS232C serial receivers.

"**CR LF**"	<CR><LF> Carriage Return followed by Line feed (ASCII-Codes 013+010) (**Factory setting**)
"**CR**"	<CR> Carriage Return (ASCII-Code 013)
"**LF**"	<LF> Line feed (ASCII-Code 010)
"**TAB**"	<TAB> Horizontal tab (ASCII-Code 009) (only visible if "**PC-DIR.**" is selected)

Note

- Not visible for 2nd display.
- Each device has separate settings.

"RS.CHAR" – Char Set RS232C

At this menu topic you can set the "Character Set" of the transmitted data to different RS232C serial receivers.

"IBM.DOS"	Char Set **IBM/DOS** (**Factory setting**)
"ANSI.WIN"	Char Set **ANSI/WINDOWS**

Note

- Not visible for 2nd display.
- Each device has separate settings.

"INTERVL." – Print key simulation

At this menu topic you can activate a simulation of the «🖶» key. "**INTERVL.**" simulates a print key press every x seconds.

Range:	0 to 65535 seconds
0 sec:	disables the print key simulation

Factory setting: 0 sec

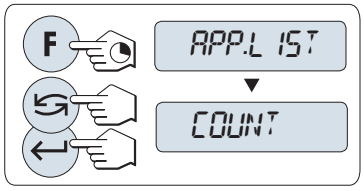
Note: The executed action is according to the configuration of the print key, (see interface setting).

6 Applications

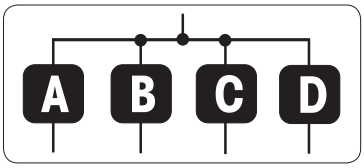
6.1 Application "Piece Counting"

The "**Piece Counting**" application allows you to determine the number of pieces put on the weighing pan. All pieces must be of approximately equal weight, since the number of pieces is determined on the basis of average weight.

1 Call-up "**APP.LIST**" by pressing and holding «**F**».
2 Select application **COUNT** by scrolling with «↻».
3 Activate function **COUNT** by pressing «↵».



Piece counting first requires the setting of a reference weight, there are 4 possibilities:

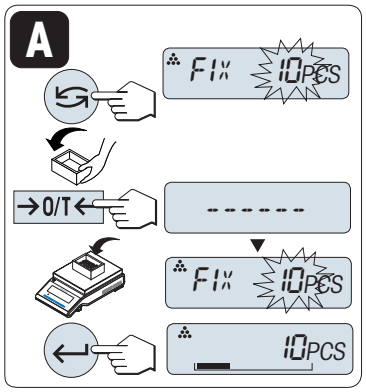


A Setting the reference **by multiple pieces with fix reference values**.
B Setting the reference **by multiple pieces with variable reference values**.
C Setting the reference **for 1 piece in weighing mode**.
D Setting the reference **for 1 piece in manual mode**.

Setting possibility

A Setting the reference by multiple pieces with fix reference values

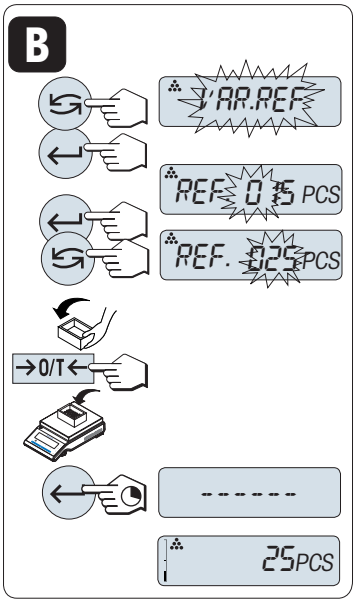
1 Select a number of reference pieces by scrolling with «↻». Possible numbers* are 5, 10, 20 and 50.
* with approved balances in selected countries: min 10
2 Press «→0/T←» to tare. If using: place empty container on the weighing pan first or tare again.
3 Add the selected number of reference pieces to container.
4 Press «↵» to confirm.



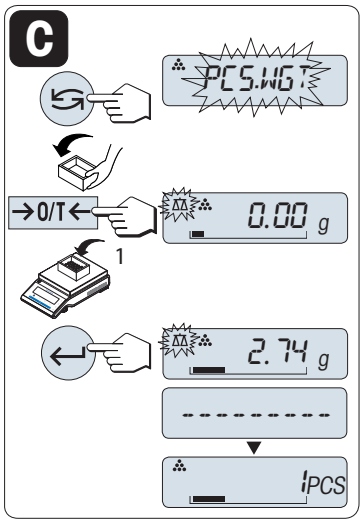
Setting possibility

B Setting the reference by multiple pieces with variable reference values

1 Select "**VAR.REF**" by scrolling with «↻». Press «↵» to confirm.
2 Select the number of reference pieces. Possible numbers are 1 to 999. With approved balances in selected countries: min 10
3 To select a digit, press «↵» (cyclically from left to right).
⇨ The selected digit is blinking.
4 To change the digit, press «↻».
5 Press «→0/T←» to zero/tare. If using: place empty container on the weighing pan first or zero/tare again.
6 Add the selected number of reference pieces to container.
7 Press and hold «↵» to confirm.



Setting possibility



C **Setting the reference for one piece in weighing mode**

1 Select "**PCS.WGT**" by scrolling with «⟲».

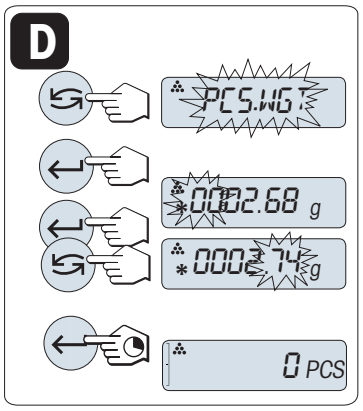
2 Press «→0/T←» to tare. If using: place empty container on the weighing pan first or tare again.

3 Add one reference piece to container. The weight of one piece is displayed.

4 Press «↵» to confirm.

Note: With approved balances, this setting is not available in selected countries.

Setting possibility



D **Setting the reference for one piece in manual mode**

1 Select "**PCS.WGT**" by scrolling with «⟲».

2 Press «↵» to confirm.

3 Enter the final reference one piece weight.

4 To select a digit, press «↵» (cyclically from left to right).
⇨ The selected digit is blinking.

5 To change the digit, press «⟲».

6 Press and hold «↵» to confirm.

Note: With approved balances, this setting is not available in selected countries.

Note: If without any key press within 60 seconds, the balance return to the previous active application. Press «**C**» to cancel and returns to the previous active application.

On completion of the setting procedure, your balance is ready for piece counting.

Note

- The "**RECALL**" value is displayed with an asterisk (*) and icon "M" and can not be printed.
- Take into account minimum values: min. reference weight = 10d (10 digits), min. piece weight* = 1d (1 digit)!
  * with approved balances in selected countries: min 3e
- The current reference weight remains stored until the reference setting is changed.

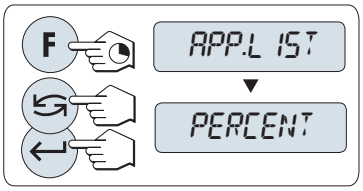
Exit current application

To exit the current application and to return to simple weighing mode, press and hold «⏢» (longer than 1.5s).

6.2 Application "Percent Weighing"

The "**Percent Weighing**" application allows you to check a sample weight as percentage to a reference target weight.

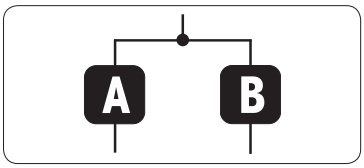
1 Call-up "**APP.LIST**" by pressing and holding «**F**».
2 Select application **PERCENT** by scrolling with «↻».
3 Activate function **PERCENT** by pressing «↵».



Percent weighing first requires the setting of a reference weight that should corresponds to 100%, there are 2 possibilities:

A Setting the reference **in manual mode (enter 100%)**.

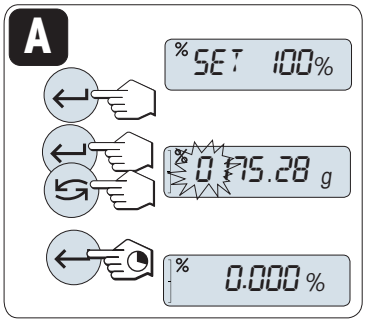
B Setting the reference **in weighing mode (weigh 100%)**.



Setting possibility

A Setting the reference by manual mode (enter 100%)

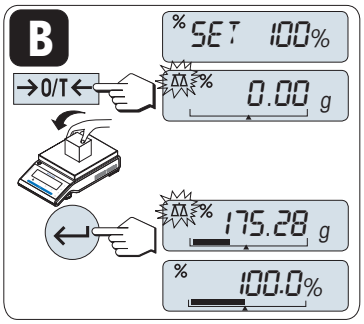
1 Press «↵» to activate manual mode.
2 To select a digit, press «↵» (cyclically from left to right).
⇨ The selected digit is blinking.
3 To change the digit, press «↻».
4 Press and hold «↵» to confirm the value.



Setting possibility

B Setting the reference by weighing mode (weigh 100%)

1 Press «→0/T←» to tare the balance and to activate the weighing mode. If needed: place empty container on the weighing pan and tare again.
2 Load the reference weight (100%).
Note: Reference weight must be at least +/- 10d.
3 Press «↵» to confirm.

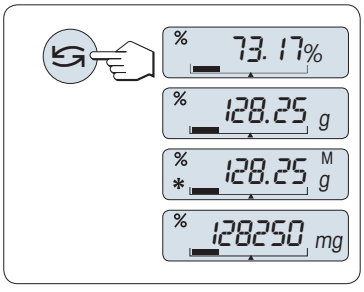


Note: If without any key press within 60 seconds, the balance returns to the previous active application.

On completion of the weighing-in procedure, your balance is ready for percent weighing.

Switching between percent and weight display

You can use the «↻» key at any time to switch the display between percent display, weighing unit "**UNIT 1**", "**RECALL**" value (if activated) and weighing unit "**UNIT 2**" (if different from **UNIT 1**).



Note

- The recall value is displayed with an asterisk (*) as well as icon "M" and can not be printed.
- The current set weight remains stored until it is redetermined.

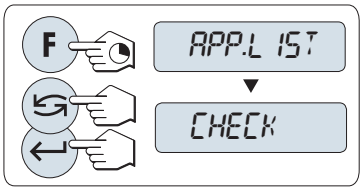
Exit current application

To exit the current application and to return to simple weighing mode, press and hold «⚖» (longer than 1.5s).

6.3 Application "Check Weighing"

The "**Check weighing**" application allows you to check the deviation of a sample weight within a tolerance limit to a reference target weight.

1 Call-up "**APP.LIST**" by pressing and holding «**F**».
2 Select application **CHECK** by scrolling with «⟳».
3 Activate function **CHECK** by pressing «↵».



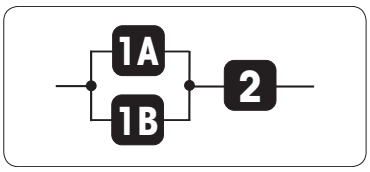
Step 1: Check Weighing first requires the setting of a reference weight that should corresponds to the nominal weight, there are 2 possibilities:

1A Setting the reference **in manual mode** (enter nominal weight).

1B Setting the reference **in weighing mode** (weigh nominal weight).

Step 2: Check weighing needs the upper and lower limits:

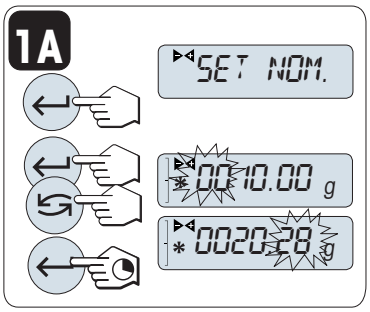
2 Setting the **upper and lower limits in percentage**.



Step 1, setting possibility:

1A **Setting the reference by manual mode** (enter nominal weight)

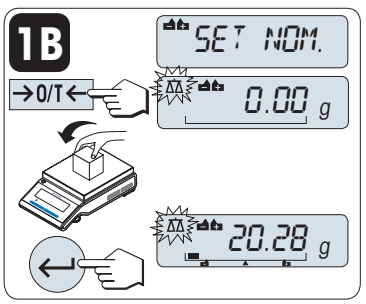
1 Press «↵» to activate manual mode.
2 Select the reference target weight.
3 To select a digit, press «↵» (cyclically from left to right).
⇨ The selected digit is blinking.
4 To change the digit, press «⟳».
5 Press and hold «↵» to confirm the nominal weight.



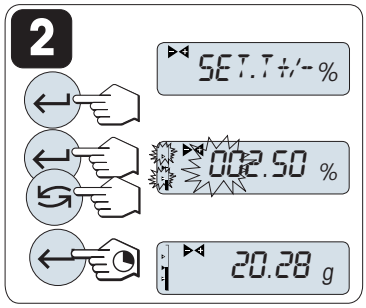
Step 1, setting possibility:

1B **Setting the reference by weighing mode** (weigh nominal weight)

1 Press «→0/T←» to tare the balance and to activate the weighing mode. If using: place empty container on the weighing pan first or tare again.
2 Load the nominal weight.
3 Press «↵» to confirm the nominal weight.



Step 2:



2 **Setting the upper and lower limits** (in percentage):

1 Press «↵» to start setting.
2 Press «↵» to confirm the default limit of +/- 2.5 % or enter the limit value.
3 To select a digit, press «↵» (cyclically from left to right).
   ⇨ The selected digit is blinking.
4 To change the digit, press «↻».
5 Press and hold «↵» to confirm the limits.

Note:

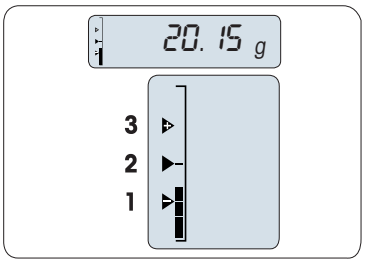
- If without any key press within 60 seconds, the balance returns to the previous active application. Press «**C**» to cancel and returns to the previous active application.
- The nominal weight must be at least 10 digit.

On completion of the setting procedure, your balance is ready for checkweighing.

Weighing-in-Aid

The Weighing-in-Aid helps you quickly determine the position of the sample weight regarding the tolerance.

1 Lower limit
2 Target weight
3 Upper limit



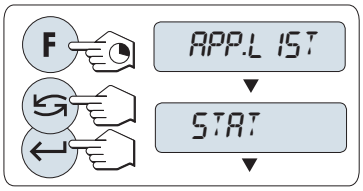
Exit current application

To exit the current application and to return to simple weighing mode, press and hold «⚖» (longer than 1.5s).

6.4 Application "Statistics"

The "**Statistics**" application allows you to generate statistics of a series of weighing values. 1 to 999 values are possible.

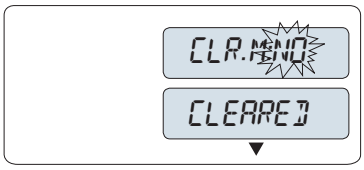
1 Call-up "**APP.LIST**" by pressing and holding «**F**».
2 Select application **STAT.** by scrolling with «↻».
3 Activate function **STAT.** by pressing «↵».



Memory clear question

If the memory is already cleared (sample counter is 0) the memory clear question will not be displayed.

1 To continue the last statistics press «↵» to confirm "**CLR.M:NO**".
2 For a new statistical evaluation clear the memory. Press «↻» to select "**CLR.M:YES**" and press «↵» to confirm.



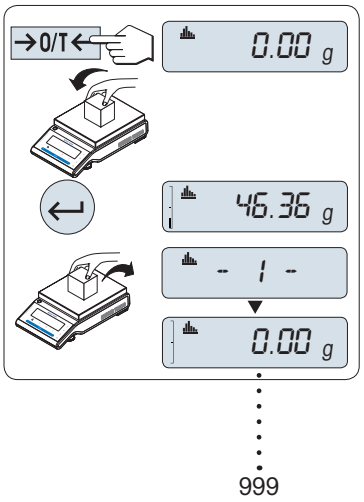
Weighing the first sample weight:

1 Press «→0/T←» to zero/tare the balance if needed.
2 Load the first sample weight.
3 Press «↵». The display shows the sample count "- 1 -" and the current weight is stored as sample and the weight is printed out.
Note: When the sample counter is displayed you may press «**C**» to undo (drop) this sample.
4 Unload the first sample weight.

Weighing further sample weights:

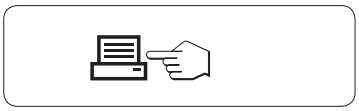
The same procedure as for the first sample weight.

- 1…999 samples are possible.
- The next value will be accepted if the sample weight is in the range 70% –130% of the current average value. "**OUT OF RANGE**" will be displayed if the sample is not accepted.



Results:

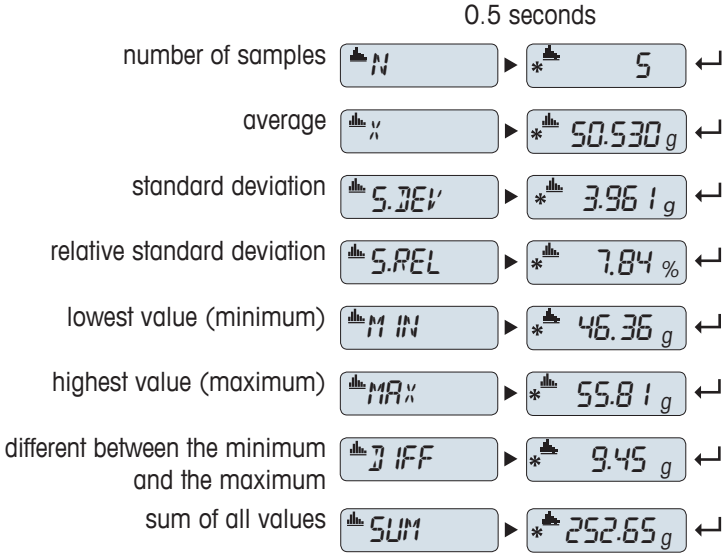
– If the numbers of sample are greater than or equal to 2, press «🖶», the results are displayed and printed.



Displayed results:

1 Press «↵» to show the next statistical value.

2 Press «**C**» to cancel displaying results and to continue weighing next sample.



Exit current application

To exit the current application and to return to simple weighing mode, press and hold «⚖» (longer than 1.5s).

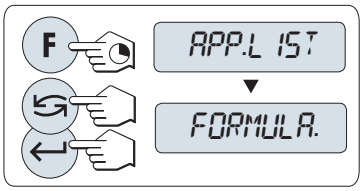
6.5 Application "Formulation" (Net Total Formulation)

The "**Formulation**" (Net Total) application allows you to

- weigh in (add and store) up to 999 individual component weights and displays the total. If a printer is connected, the component weights are printed individually and as a total.
- tare/pre-tare and store up to 999 container weights and displays the total. If a printer is connected, the tare weights are printed out individually and as a total.
- fill up the sum of all component net weight values by adding a further component to a higher value.

Note
Connect a printer or a PC if present.

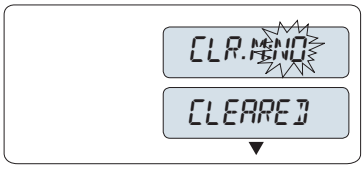
1 Call-up "**APP.LIST**" by pressing and holding «**F**».
2 Select application **FORMULA.** by scrolling with «↻».
3 Activate function **FORMULA.** by pressing «↵».



Memory clear question

If the memory is already cleared (sample counter is 0) the memory clear question will not be displayed.

1 To continue the last formulation weighing, press «↵» to confirm "**CLR.M:NO**".
2 For a new formulation clear the memory. Press «↻» to select "**CLR.M:YES**" and press «↵» to confirm.

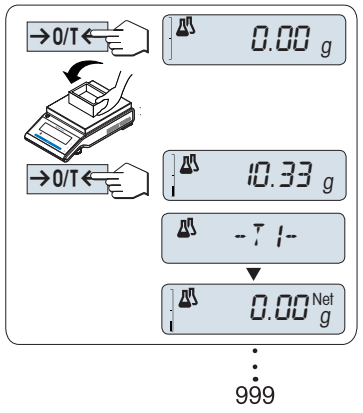


Tare container (if used):

1 Press «→0/T←» to zero or tare the balance if needed.
2 Place the empty container on the weighing pan.
3 Press «→0/T←» . The container is tared and the tare count "- T1 -" is displayed and the tare weight is printed.

Note

- If you pre-tare via MT-SICS (e.g. bar code reader) "- PT1 -" is displayed.
- Zero range setting (menu topic "**ZERO.RNG**") has no effect. The zero-limit is less than or equal 10d.



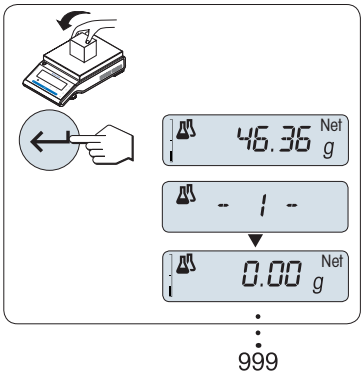
Weighing the first component weight:

1 Load the first component weight.
2 Press «↵». The display briefly shows the component count "- 1 -" , the current weight is stored as sample and the component weight is printed. The display is set back to zero.

Weighing further component weights:

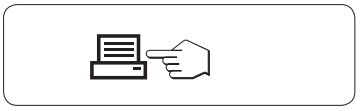
The same procedure as for the first component weight with the same or new container).

- 1…999 sample values are possible.
- max 999 tare values are possible.
- max 999 pre-tare values are possible.



Results:

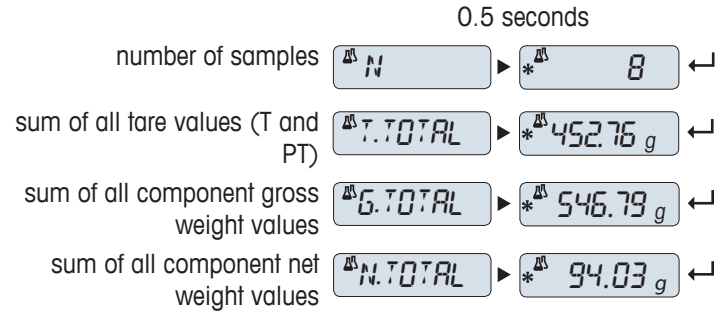
– If the numbers of sample are greater than or equal to 2, press «🖶», the results are displayed and printed.



Displayed results:

1 Press «↵» to show the next statistical value.

2 Press «**C**» to cancel displaying results and to continue weighing next component.



Function "FILL UP"

This function allows you to add an additional component weight to the total weight of all components to reach a desired target weight (Fill up).

Starting the fill up function.

– Activate or deactivate function "**FILL UP**" by pressing «↻» (toggle).

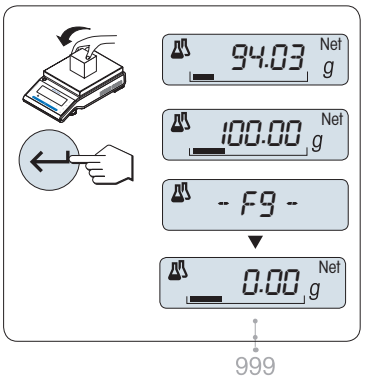
Filling up with an additional component weight:

- The last total of the component weights is displayed.

1 Add component weight until the desired target weight is reached.

2 Press «↵» to confirm.

⇨ The display briefly shows the next component count marked with "F ", the current weight is stored as sample and the component weight is printed. The display is set back to zero.



Filling up further additional component weights:

The same procedure, beginning with starting up the "**FILL UP**" function.

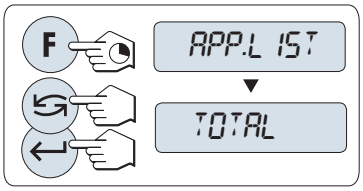
Exit current application

To exit the current application and to return to simple weighing mode, press and hold «⚖» (longer than 1.5s).

6.6 Application "Totaling"

The "**TOTALING**" application allows you to weigh in different samples to add their weight values and to totalize them. 1 to 999 samples are possible.

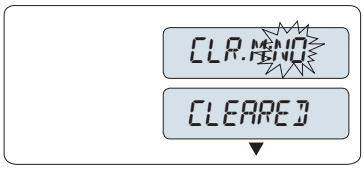
1 Call-up "**APP.LIST**" by pressing and holding «**F**».
2 Select application **TOTAL** by scrolling with «↻».
3 Activate function **TOTAL** by pressing «↵».



Memory clear question

If the memory is already cleared (sample counter is 0) the memory clear question will not be displayed.

1 To continue the totaling evaluation press «↵» to confirm "**CLR.M:NO**".
2 For a new totaling evaluation clear the memory. Press «↻» to select "**CLR.M:YES**" and press «↵» to confirm.

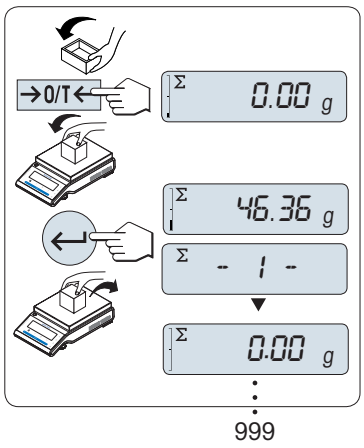


Weighing in the sample weight:

1 If using a container: place empty container on the weighing pan and press «→0/T←» to zero or tare the balance.
2 Load the first sample weight.
3 Press «↵». The display shows the sample count "- 1 -" and the current weight is stored.
Note: When the sample counter is displayed you may press «**C**» to undo (drop) this sample.
4 Unload the first sample weight. The display shows zero.

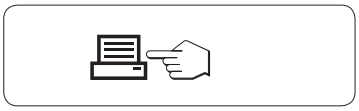
Weighing in further sample weights:
The same procedure as for the first sample weight.

- 1…999 samples are possible.



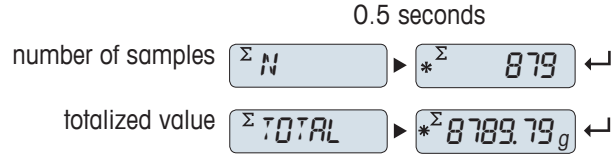
Results:

– If the numbers of sample are greater than or equal to 2, press «🖶», the results are displayed and printed.



Displayed results:

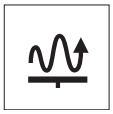
1 Press «↵» briefly to show the totalized value.
2 Press «**C**» briefly to cancel.



Exit current application

To exit the current application and to return to simple weighing mode, press and hold «⚖» (longer than 1.5s).

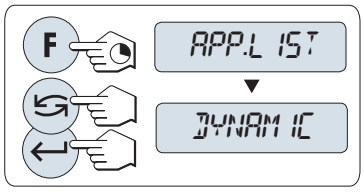
6.7 Application "Dynamic Weighing"



The "**Dynamic Weighing**" application allows you to determine the weights of unstable samples or to determine weights under unstable ambient conditions. The balance calculates the weight as the average of a number of weighing operations over a defined time.

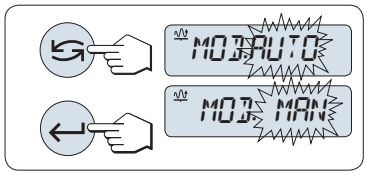
Note: "Switching Units" and "**RECALL**" Functions are not available in this Application.

1 Call-up "**APP.LIST**" by pressing and holding «**F**».
2 Select application **DYNAMIC** by scrolling with «⟳».
3 Activate function **DYNAMIC** by pressing «↵».



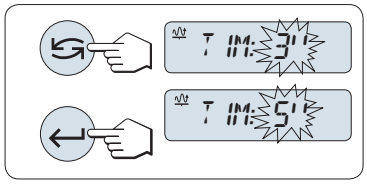
1 **Setting "Auto Start" or "Manual Start":** (enter nominal weight)

1 Press «⟳» to select the mode:
– "**Auto Start** ""**MOD.AUTO**" (default value). The weighing starts automatically on relative stability. However, the weighing sample must weigh at least 5 grams. For weighing samples below 5 g the weighing must be started manually.
– "**Manual Start**" "**MOD. MAN**"
2 Press «↵» to confirm the selection.



2 **Setting the weighing time:** (enter nominal weight)

1 Press «⟳» to select one of the available time intervals: 3 (default value), 5, 10, 20, 60 and 120 seconds.
2 Press «↵» to confirm the selected time interval.



Note: If without any key press within 60 seconds, the balance return to the previous active application. Press «**C**» to cancel and returns to the previous active application.

Your balance is now ready for dynamic weighing:

1 Press «→0/T←» to zero if needed.

2 If using a container: place empty container on weighing pan and press «→0/T←» to tare the balance.

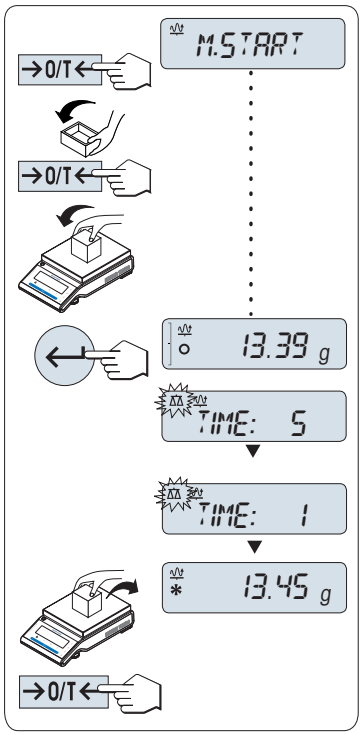
3 Load sample weight.

4 – If you have selected function "**Manual Start**" "**M.START**", press «↵» to start the weighing.
– If you have selected function "**Auto Start**" "**A.START**", the weighing starts automatically on relative stability. For weighing samples below 5 g the weighing must be started manually by pressing «↵».

5 Read off result. The result of the dynamic weighing is displayed with an asterisk (* = calculated value).

6 Unload sample weight.

7 "**Manual Start**" only, press «→0/T←» to zero and go back to "**M.START**".



Note

- The remaining weighing time (in seconds) is displayed continuously. You can cancel the countdown by pressing «**C**».
- The weight value remains in the display until the sample weight is removed from weighing pan ("Auto Start" only) or «→0/T←» is pressed.

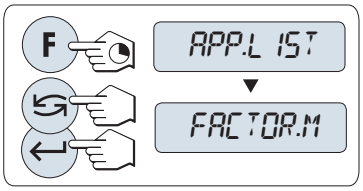
Exit current application

To exit the current application and to return to simple weighing mode, press and hold «⚖» (longer than 1.5s).

6.8 Application "Multiplication Factor Weighing"

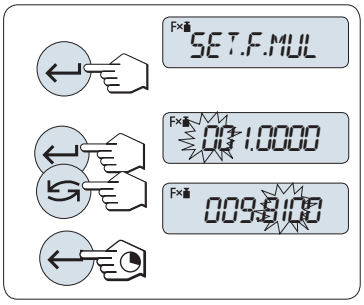
The "**Multiplication Factor Weighing**" application allows you to multiply the weight value (in grams) by a predefined factor (result = factor * weight) and have it calculated to a predefined number of decimal places.

1 Call-up "**APP.LIST**" by pressing and holding «**F**».
2 Select application **FACTOR.M** by scrolling with «↻».
3 Activate function **FACTOR.M** by pressing «↵».



1 Setting the factor value:

1 Press «↵» to execute "**SET.F.MUL**". Either the factor 1 appears as default value or the factor that was saved most recently.
2 To select a digit, press «↵» (cyclically from left to right).
   ⇨ The selected digit is blinking.
3 To change the digit, press «↻».
4 Press and hold «↵» to confirm the selected factor (no automatic acceptance).

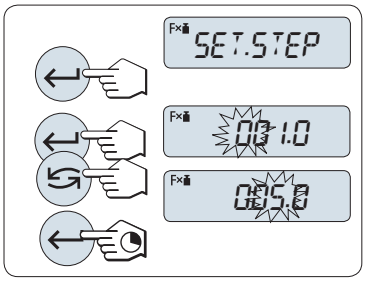


Note: Zero for multiplication factor value is outside the allowed range, the error message "**FACTOR OUT OF RANGE**" will be displayed.

2 Setting the step value:

"**SET.STEP**" appears in the display, and the program changes automatically to allow the display increments to be entered. The smallest possible display increment appears as default value, or the last value that was saved.

1 Press «↵» to execute "**SET.STEP**".
2 To select a digit, press «↵» (cyclically from left to right).
   ⇨ The selected digit is blinking.
3 To change the digit, press «↻».
4 Press and hold «↵» to confirm the selected step (no automatic acceptance).

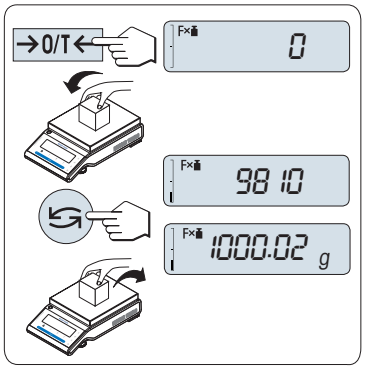


Note: The allowed range for the step depends on the factor and the resolution of the balance. If it is outside the allowed range the error message "**STEP OUT OF RANGE**" will be displayed.

Note: If without any key press within 60 seconds, the balance return to the previous active application. Press «**C**» to cancel and returns to the previous active application.

On completion of the setting procedure, your balance is ready for multiplication factor weighing.

Weighing procedure



1 Press «→0/T←» to zero/tare.
2 Load sample weight on weighing pan.
3 Read the result. The appropriate calculation is then made using the weight of sample and the selected factor, the result being displayed with the selected display step.
Note: No units are displayed.
4 Unload sample weight.

Toggling between displaying the calculated value and the measured weight:
You can use the «⇆» key to toggle between the calculated Value, weight value "**UNIT 1**", "**RECALL**" value (if selected) and weight value "**UNIT 2**" (if different from "**UNIT 1**").

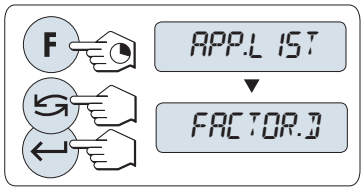
Exit current application

To exit the current application and to return to simple weighing mode, press and hold «⚖» (longer than 1.5s).

6.9 Application "Division Factor Weighing"

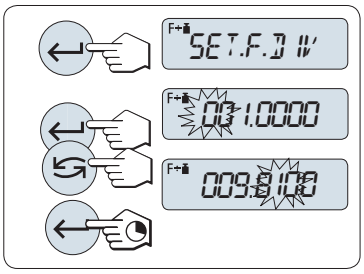
The "**Division Factor Weighing**" divide a predefined factor by the weight value (in grams) (result = factor / weight) and have it rounded to a predefined number of decimal places.

1 Call-up "**APP.LIST**" by pressing and holding «**F**».
2 Select application **FACTOR.D** by scrolling with «↻».
3 Activate function **FACTOR.D** by pressing «↵».



1 Setting the factor value:

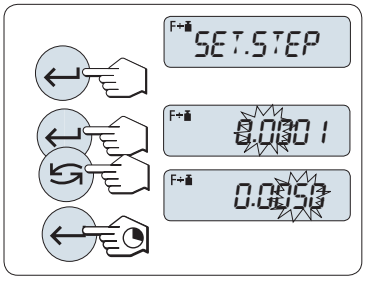
1 Press «↵» to execute "**SET.F.DIV**". Either the factor 1 appears as default value or the factor that was saved most recently.
2 To select a digit, press «↵» (cyclically from left to right).
   ⇨ The selected digit is blinking.
3 To change the digit, press «↻».
4 Press and hold «↵» to confirm the selected factor (no automatic acceptance).



Note: Zero for division factor value is outside the allowed range, the error message "**FACTOR OUT OF RANGE**" will be displayed.

2 Setting the step value:

"**SET.STEP**" appears in the display, and the program changes automatically to allow the display increments to be entered. The smallest possible display increment appears as default value, or the last value that was saved.



"**SET.STEP**" appears in the display, and the program changes automatically to allow the display increments to be entered. The smallest possible display increment appears as default value, or the last value that was saved.

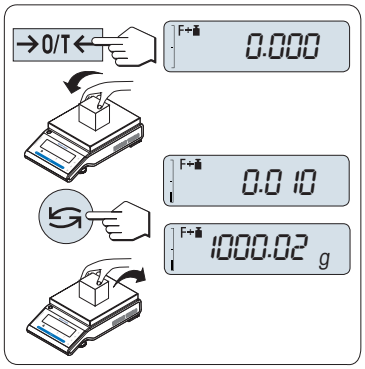
1 Press «↵» to execute "**SET.STEP**".
2 To select a digit, press «↵» (cyclically from left to right).
   ⇨ The selected digit is blinking.
3 To change the digit, press «↻».
4 Press «↵» to confirm the selected step (no automatic acceptance).

Note: The allowed range for the step depends on the factor and the resolution of the balance. If it is outside the allowed range the error message "**STEP OUT OF RANGE**" will be displayed.

Note: If without any key press within 60 seconds, the balance return to the previous active application. Press «**C**» to cancel and returns to the previous active application.

On completion of the setting procedure, your balance is ready for division factor weighing.

Weighing procedure



1 Press «→0/T←» to zero/tare.
2 Load sample weight on weighing pan.
3 Read the result. The appropriate calculation is then made using the weight of sample and the selected factor, the result being displayed with the selected display step.
Note: No units are displayed. To avoid a division by zero, the factor division is not calculated at zero.
4 Unload sample weight.

Toggling between displaying the calculated value and the measured weight:
You can use the «⇆» key to toggle between the calculated Value, weight value "**UNIT 1**", "**RECALL**" value (if selected) and weight value "**UNIT 2**" (if different from "**UNIT 1**").

Exit current application

To exit the current application and to return to simple weighing mode, press and hold «⚖» (longer than 1.5s).

6.10 Application "Density"

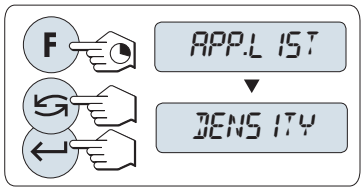
The "**Density**" application allows you to determine the density of solid bodies and liquids. Determination of the density uses **Archimedes' principle** according to which a body immersed in a fluid undergoes an apparent loss in weight which is equal to the weight of the fluid it displaces.

To determine the density of solid bodies, we recommend you to work with the optional density kit which contains all the attachments and aids needed for convenient and precise density determination. To determine the density of liquids, you additionally need a sinker which you can also obtain from your METTLER TOLEDO dealer.

Notefor performing of density determinations:

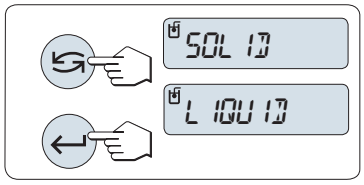
- You can also use the hanger for weighing below the balance which belongs to your balance.
- We recommend you to consult the operating instructions enclosed with the density kit.
- If a METTLER TOLEDO printer is attached to your balance, the settings will be automatically recorded.

1 Call-up "**APP.LIST**" by pressing and holding «**F**».
2 Select application **DENSITY** by scrolling with «↻».
3 Activate function **DENSITY** by pressing «↵».



Setting the method for density determination

1 Select:
"**SOLID**", the function for the density determination of solids, or
"**LIQUID**", the function for the density determination of liquids with a sinker.
2 Press «↵» to confirm the selection



Exit current application

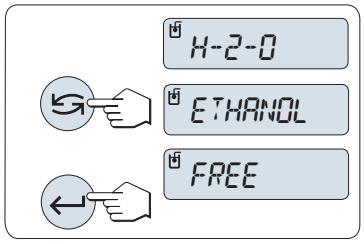
To exit the current application and to return to simple weighing mode, press and hold «⚖» (longer than 1.5s).

6.10.1 Density determination of solids

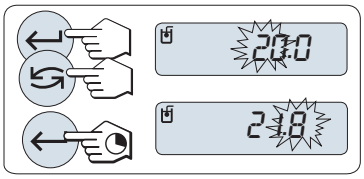
Requirement: The method "**SOLID**" is set.

Setting the parameter of the auxiliary liquid

1 Select the auxiliary liquid by scrolling with «↻»: "**H-2-O**" for distilled water , "**ETHANOL**" or "**FREE**" for a freely definable auxiliary liquid.
2 Press «↵» to confirm the selection.



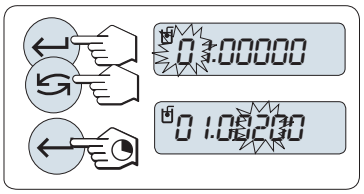
If you have selected water or ethanol as the auxiliary liquid:



1 Enter the current temperature of the auxiliary liquid (read off on thermometer).
2 Set the value in °C. The temperature ranges from 10 °C to 30.9 °C.
3 To select a digit, press «↵» (cyclically from left to right).
   ⇨ The selected digit is blinking.
4 To change the digit, press «↻».
5 Press and hold «↵» to confirm the value.

Note: The densities of distilled water and ethanol in the range 10 °C to 30.9 °C are stored in the balance.

If you have selected a freely definable auxiliary liquid:



1 Enter the density of the auxiliary liquid in g/cm³ at the current temperature (read off on thermometer).
2 To select a digit, press «↵» (cyclically from left to right).
   ⇨ The selected digit is blinking.
3 To change the digit, press «↻».
4 Press and hold «↵» to confirm the value.

Note: If without any key press within 60 seconds or by pressing «**C**», the balance returns to the previous active application.

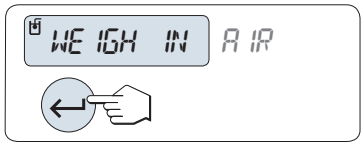
On completion of the settings, your balance is ready for performing the density determination of liquids.

Note: Taring the balance is possible at any time.

The balance prompts you: "**PRESS ENTER TO START**".

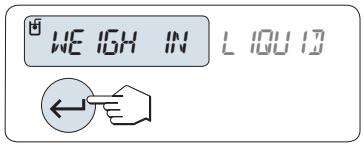
– Press «↵» to start. Tare/Zero is executed.

The balance prompts you to weigh the solid in air "**WEIGH IN AIR**".



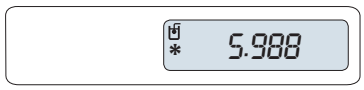
1 Load the solid.
2 Press «↵» to initiate the measurement.

The balance prompts you to weigh the solid in the auxilliary liquid "**WEIGH IN LIQUID**".



1 Load the solid.
2 Press «↵» to initiate the measurement.

The balance now shows the determined density of the solid in g/cm³.

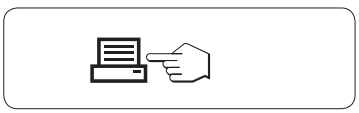


Note

- This result has already been corrected for the air buoyancy. The buoyancy caused by the two immersed wires (Ø 0.6 mm) can be neglected.
- By pressing «**C**», the balance returns to "**PRESS ENTER TO START**".

Result:

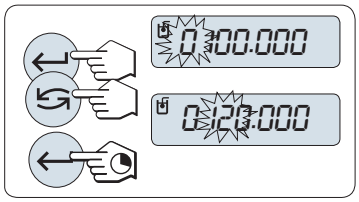
Press «🖶», the result will be printed.



6.10.2 Density determination of liquids

Requirement: The method "**LIQUID**" is set.

Setting the displacement volume of your sinker



Press and hold «↵» to confirm the default value of 10.0 cm^3 or change it if needed:

1 To select a digit, press «↵» (cyclically from left to right).
   ⇨ The selected digit is blinking.
2 To change the digit, press «↻».
3 Press and hold «↵» to confirm the value.

Note: If without any key press within 60 seconds or by pressing «**C**», the balance returns to the previous active application.

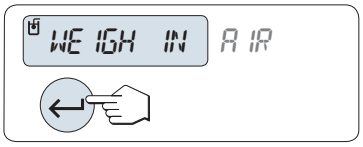
On completion of the settings, your balance is ready for performing the density determination of liquids.

Note: Taring the balance is possible at any time.

The balance prompts you: "**PRESS ENTER TO START**".

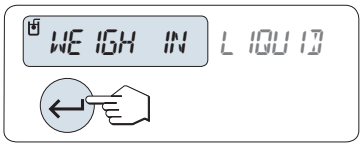
– Press «↵» to start.

The balance prompts you to weigh the sinker in air "**WEIGH IN AIR**".



1 Position the sinker.
2 Press «↵» to initiate the measurement.

The balance prompts you to weigh the sinker in the liquid "**WEIGH IN LIQUID**".



1 Pour the liquid into the beaker. Make sure that the sinker is immersed by al least 1 cm in the liquid, and that there are no air bubbles in the container.
2 Press «↵» to initiate the measurement.

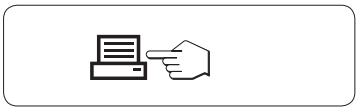
The balance now shows the determined density of the liquid at the current temperature (read off on the thermometer).

Note

- This result has already been corrected for the air buoyancy. The buoyancy caused by the immersed wire (ø 0.2 mm) of the sinker can be neglected.
- By pressing «**C**», the balance returns to "**PRESS ENTER TO START**".

Result:

Press «🖶», the result will be printed.



6.10.3 Formulae used to calculate density

The "**DENSITY**" Application is based on the formulae listed below.

Formulae for determining the density of solids with compensation for air density

$$\rho = \frac{A}{A-B}(\rho_0 - \rho_L) + \rho_L$$

$$V = \alpha \frac{A - B}{\rho_0 - \rho_L}$$

ρ = Density of the sample

A = Weight of the sample in air

B = Weight of the sample in the auxiliary liquid

V = Volume of the sample

ρ_0 = Density of the auxiliary liquid

ρ_L = Density of Air (0.0012 g/cm^3)

α = Weight correction factor (0.99985), to take the atmospheric buoyancy of the adjustment weight into account

Formula for determining the density of liquids with compensation for air density

$$\rho = \alpha \frac{P}{V} + \rho_L$$

ρ = Density of the liquid

P = Weight of the displaced liquid

V = Volume of the sinker

ρ_L = Density of air (0.0012 g/cm^3)

α = Weight correction factor (0.99985), to take the atmospheric buoyancy of the adjustment weight into account

T/°C	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
10.	0.99973	0.99972	0.99971	0.99970	0.99969	0.99968	0.99967	0.99966	0.99965	0.99964
11.	0.99963	0.99962	0.99961	0.99960	0.99959	0.99958	0.99957	0.99956	0.99955	0.99954
12.	0.99953	0.99951	0.99950	0.99949	0.99948	0.99947	0.99946	0.99944	0.99943	0.99942
13.	0.99941	0.99939	0.99938	0.99937	0.99935	0.99934	0.99933	0.99931	0.99930	0.99929
14.	0.99927	0.99926	0.99924	0.99923	0.99922	0.99920	0.99919	0.99917	0.99916	0.99914
15.	0.99913	0.99911	0.99910	0.99908	0.99907	0.99905	0.99904	0.99902	0.99900	0.99899
16.	0.99897	0.99896	0.99894	0.99892	0.99891	0.99889	0.99887	0.99885	0.99884	0.99882
17.	0.99880	0.99879	0.99877	0.99875	0.99873	0.99871	0.99870	0.99868	0.99866	0.99864
18.	0.99862	0.99860	0.99859	0.99857	0.99855	0.99853	0.99851	0.99849	0.99847	0.99845
19.	0.99843	0.99841	0.99839	0.99837	0.99835	0.99833	0.99831	0.99829	0.99827	0.99825
20.	0.99823	0.99821	0.99819	0.99817	0.99815	0.99813	0.99811	0.99808	0.99806	0.99804
21.	0.99802	0.99800	0.99798	0.99795	0.99793	0.99791	0.99789	0.99786	0.99784	0.99782
22.	0.99780	0.99777	0.99775	0.99773	0.99771	0.99768	0.99766	0.99764	0.99761	0.99759
23.	0.99756	0.99754	0.99752	0.99749	0.99747	0.99744	0.99742	0.99740	0.99737	0.99735
24.	0.99732	0.99730	0.99727	0.99725	0.99722	0.99720	0.99717	0.99715	0.99712	0.99710
25.	0.99707	0.99704	0.99702	0.99699	0.99697	0.99694	0.99691	0.99689	0.99686	0.99684
26.	0.99681	0.99678	0.99676	0.99673	0.99670	0.99668	0.99665	0.99662	0.99659	0.99657
27.	0.99654	0.99651	0.99648	0.99646	0.99643	0.99640	0.99637	0.99634	0.99632	0.99629
28.	0.99626	0.99623	0.99620	0.99617	0.99614	0.99612	0.99609	0.99606	0.99603	0.99600
29.	0.99597	0.99594	0.99591	0.99588	0.99585	0.99582	0.99579	0.99576	0.99573	0.99570
30.	0.99567	0.99564	0.99561	0.99558	0.99555	0.99552	0.99549	0.99546	0.99543	0.99540

T/°C	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
10.	0.79784	0.79775	0.79767	0.79758	0.79750	0.79741	0.79733	0.79725	0.79716	0.79708
11.	0.79699	0.79691	0.79682	0.79674	0.79665	0.79657	0.79648	0.79640	0.79631	0.79623
12.	0.79614	0.79606	0.79598	0.79589	0.79581	0.79572	0.79564	0.79555	0.79547	0.79538
13.	0.79530	0.79521	0.79513	0.79504	0.79496	0.79487	0.79479	0.79470	0.79462	0.79453
14.	0.79445	0.79436	0.79428	0.79419	0.79411	0.79402	0.79394	0.79385	0.79377	0.79368
15.	0.79360	0.79352	0.79343	0.79335	0.79326	0.79318	0.79309	0.79301	0.79292	0.79284
16.	0.79275	0.79267	0.79258	0.79250	0.79241	0.79232	0.79224	0.79215	0.79207	0.79198
17.	0.79190	0.79181	0.79173	0.79164	0.79156	0.79147	0.79139	0.79130	0.79122	0.79113
18.	0.79105	0.79096	0.79088	0.79079	0.79071	0.79062	0.79054	0.79045	0.79037	0.79028
19.	0.79020	0.79011	0.79002	0.78994	0.78985	0.78977	0.78968	0.78960	0.78951	0.78943
20.	0.78934	0.78926	0.78917	0.78909	0.78900	0.78892	0.78883	0.78874	0.78866	0.78857
21.	0.78849	0.78840	0.78832	0.78823	0.78815	0.78806	0.78797	0.78789	0.78780	0.78772
22.	0.78763	0.78755	0.78746	0.78738	0.78729	0.78720	0.78712	0.78703	0.78695	0.78686
23.	0.78678	0.78669	0.78660	0.78652	0.78643	0.78635	0.78626	0.78618	0.78609	0.78600
24.	0.78592	0.78583	0.78575	0.78566	0.78558	0.78549	0.78540	0.78532	0.78523	0.78515
25.	0.78506	0.78497	0.78489	0.78480	0.78472	0.78463	0.78454	0.78446	0.78437	0.78429
26.	0.78420	0.78411	0.78403	0.78394	0.78386	0.78377	0.78368	0.78360	0.78351	0.78343
27.	0.78334	0.78325	0.78317	0.78308	0.78299	0.78291	0.78282	0.78274	0.78265	0.78256
28.	0.78248	0.78239	0.78230	0.78222	0.78213	0.78205	0.78196	0.78187	0.78179	0.78170
29.	0.78161	0.78153	0.78144	0.78136	0.78127	0.78118	0.78110	0.78101	0.78092	0.78084
30.	0.78075	0.78066	0.78058	0.78049	0.78040	0.78032	0.78023	0.78014	0.78006	0.77997

Density of C_2H_5OH according to the "American Institute of Physics Handbook".

7 Communication with Peripheral Devices

7.1 Function PC-Direct

The numerical value displayed at the balance can be transferred to the cursor position in Windows Applications (e.g. Excel, Word) as by typing with the keyboard.

Note: The units will not be transferred.

Requirements

- PC with one of the Microsoft Windows® operating system 32bit/64bit: XP (SP3), Vista (SP2), Win 7 (SP1) or Win 8.
- Serial interface RS232 or USB.
- Administrator rights for installing software (for USB not required).
- Windows Application (e.g. Excel).
- Balance to PC connection with cable RS232 or USB.

Settings at the balance

NOTICE

Disconnect the USB connection from the balance prior to changing settings.

Balance interface settings, **see** Interface menu:

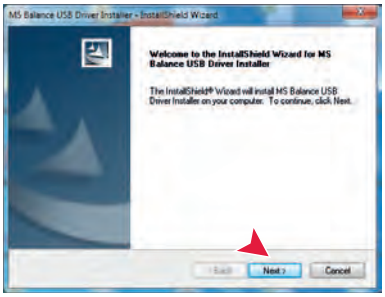
- Topic "**RS232**" or "**USB**": set "**PC-DIR.**" and select the most appropriate option for the desired weighing result.
- Topic "**RS.TX.E.O.L.**"/"**RS E.O.L.**" or "**USB E.O.L.**"/"**USB E.O.L**":
  – set **<TAB>** to write into the same row (e.g. in Excel).
  – set **<CR><LF>** to write into the same column (e.g. in Excel).
- Save changes.

Installing SerialPortToKeyboard

Operation of PC-Direct via serial port RS232 requires the installation of **SerialPortToKeyboard** on your host computer. The file **SerialPortToKeyboard.exe** can be found on the CD-ROM in the folder Software "Software «SerialPortToKeyboard» (en)". If you have any questions please contact a METTLER TOLEDO representative.

Download SerialPortToKeyboard

1 Insert the product CD in the CD/DVD drive of the host computer.
2 Tap **Software**.
3 Download and unpack the .exe file from the CD on your computer.
4 Click **Save** to download to your specified location.
5 Right-click on the downloaded install program: **SerialPort-ToKeyboard.exe** and select **Run as Administrator** from the menu.
6 If a safety warning appears, allow Windows to install.
7 Click **Next** and follow the installer's instructions.



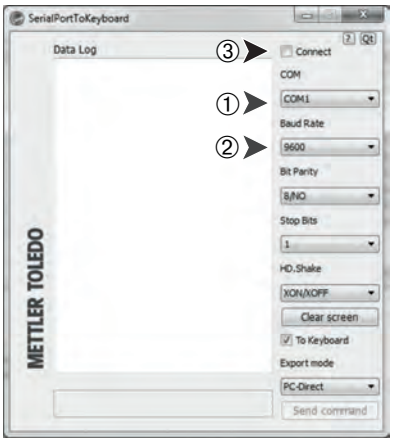
Settings at the PC

Settings for SerialPortToKeyboard

1 Select the serial port (COM) to be used for connection with the balance.

2 Set the baud rate to 9600.

3 Activate "Connect"



Note

- The window can be minimized.
- Closing of the window terminates the session.

Checking operation

1 Start **SerialPortToKeyboard** (RS232)

2 Start Excel (or another application) at the PC.

3 Activate a cell in Excel.

According to your selected "**PC-DIR.**" option, the displayed values will appear e.g. in the column one after the other one in the different rows.

8 Error and Status Messages

8.1 Error messages

Error messages in the display draw your attention to incorrect operation or that the balance could not execute a procedure properly.

Error message	Cause	Rectification
NO STABILITY	No stability.	Ensure more stable ambient conditions. If not possible, check settings for environment.
WRONG ADJUSTMENT WEIGHT	Wrong adjustment weight on pan or none at all.	Place required adjustment weight in center of pan.
REFERENCE TOO SMALL	Reference for piece counting too small.	Increase reference weight.
EEPROM ERROR - PLEASE CONTACT CUSTOMER SERVICE	• EEPROM (memory) error. • Excessive mains voltage fluctuation or strong glitches occurred.	Please contact METTLER TOLEDO customer service.
WRONG CELL DATA - PLEASE CONTACT CUSTOMER SERVICE	Wrong cell data.	Please contact METTLER TOLEDO customer service.
NO STANDARD ADJUSTMENT - PLEASE CONTACT CUSTOMER SERVICE	No standard calibration.	Please contact METTLER TOLEDO customer service.
PROGRAM MEMORY DEFECT - PLEASE CONTACT CUSTOMER SERVICE	Program memory defect.	Please contact METTLER TOLEDO customer service.
TEMP SENSOR DEFECT - PLEASE CONTACT CUSTOMER SERVICE	Temperature sensor defect.	Please contact METTLER TOLEDO customer service.
WRONG LOAD CELL BRAND - PLEASE CONTACT CUSTOMER SERVICE	Wrong load cell brand.	Please contact METTLER TOLEDO customer service.
WRONG TYPE DATA SET - PLEASE CONTACT CUSTOMER SERVICE	Wrong type data set.	Please contact METTLER TOLEDO customer service.
BATTERY BACKUP LOST - CHECK DATE TIME SETTINGS	Backup battery is empty. This battery ensures that the date and time are not lost when the balance is disconnected from power.	Connect the balance to the power supply for charging the battery (e.g. during the night) or contact METTLER TOLEDO customer service.
⌜-------⌝	Overload - The weight on the pan exceeds the weighing capacity of the balance.	Reduce the weight on the weighing pan.
⌞-------⌟	Underload	Check that the weighing pan is positioned correctly.
ABOVE INITIAL ZERO RANGE	Wrong weighing pan or pan is not empty.	Mount correct weighing pan or unload weighing pan.
BELOW INITIAL ZERO RANGE	Wrong weighing pan or pan is missing.	Mount correct weighing pan.
MEM.FULL	Memory full.	Clear the memory and start a new evaluation.

Error message	Cause	Rectification
FACTOR OUT OF RANGE	Factor is outside the allow range.	Select a new factor.
STEP OUT OF RANGE	Step is outside the allowed range.	Select a new step.
OUT OF RANGE	Sample weight is outside the allowed range.	Unload the pan and load a new sample weight.

8.2 Status messages

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

Status Icon	Signification
	**Service Reminder** Your balance is due for servicing. Contact your dealer's customer service department as soon as possible to have a technician service your balance. (See menu topic "**SRV.ICON**")

9 Maintenance

9.1 Cleaning and service

Every now and then, clean the weighing pan, draft shield element, bottom plate, draft shield (depending on the model) and housing of your balance. Your balance is made from high-quality, durable materials and can therefore be cleaned using a damp cloth or with a standard cleaning agent.

To thoroughly clean the draft shield glass panels, remove the draft shield from the balance. When reinstalling the draft shield, ensure that it is in the correct position.

Please observe the following notes:

⚠ WARNING

Risk of electric shock

1 Disconnect the balance from the power supply prior to cleaning and maintenance.
2 Only use METTLER TOLEDO power adapter, if these need to be replaced.
3 Ensure that no liquid comes into contact with the balance, terminal or AC adapter.
4 Do not open the balance or AC adapter.
These contain no user-serviceable parts.

⚠ CAUTION

Damage to balance

Under no circumstances use cleaning agents containing solvents or abrasive agents, as this can damage the operation panel overlay.

Do not clean the IP65 protected models using high-pressure or high-temperature water.

Important

Contact a METTLER TOLEDO representative to find about the service options available – regular maintenance by an authorized service engineer will ensure consistent weighing accuracy over the long term and extend the service life of the balance.

9.2 Cleaning the draft shield

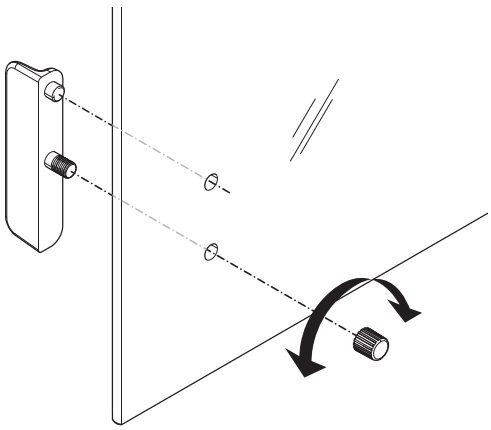
It is possible to remove the sliding glass doors for cleaning or for replacing.

Removing or inserting sliding glass doors

1 Remove the handle first.
2 Remove the sliding glass doors.
3 Install the handle after insertion of the glass door.

Note

Front and rear glass panels cannot be removed.



9.3 Disposal

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

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

Thank you for your contribution to environmental protection.

9.4 Firmware (Software) Updates

In the interest of its customers, METTLER TOLEDO continuously updates its internal software (firmware) for the balances. Inquire at your local METTLER TOLEDO office about upgrade and update options.

10 Technical Data

10.1 General data

⚠ CAUTION

Risk of damage

The balance must be used with a tested AC/DC adapter with SELV output current.
Ensure correct polarity ⊖—●—⊕

Standard power supply

AC adapter:	Primary: 100 – 240 V, ±10%, 50/60Hz, 0.3 A Secondary: 12 V DC, 0.84 A (with electronic overload protection)
Balance power supply:	12 V DC, 0.84 A Can be used up to 2000 m height above mean sea level.

NOTICE

If the balance is used above 2000 m mean sea level, the optional power supply must be used.

Optional power supply

AC adapter:	Primary: 100 – 240 V, ±10%, 50/60Hz Secondary: 12 V DC ±3%, 2.5 A (with electronic overload protection)
Cable for AC adapter:	3-core, with country-specific plug
Balance power supply:	12 V DC ±3%, 2.25 A, maximum ripple: 80 mVpp Can be used up to 4000 m height above mean sea level.

Protection and standards

Overvoltage category:	II
Degree of pollution:	2
Protection:	Protected against dust and water
Standards for safety and EMC:	See Declaration of Conformity
Range of application:	For use only in closed interior rooms

Environmental conditions

Height above mean sea level:	Depending on the power adapter (2000 - 4000 m) Except for China: max. 2000 m
Ambient temperature:	Operating condition for ordinary lab application: +10 to 30 °C (operability guaranteed between +5 to 40 °C) Storage condition: -25 to 70 °C
Relative air humidity:	10% up to 80% at 31 °C, linearly decreasing to 50% at 40 °C, non-condensing
Warm-up time:	At least **30** minutes (0.1 mg models **60** minutes) after connecting the balance to the power supply

Materials

Housing:	Top housing: Plastic (ABS) Bottom housing: Die-cast aluminum, lacquered
Weighing pan:	Pan ø 90 mm: Stainless steel X2CrNiMo 17-12-2 (1.4404) All others: Stainless steel X5CrNi 18-10 (1.4301)
Draft shield element:	0.1 mg models: Stainless steel X5CrNi 18-10 (1.4301)
Draft shield:	Plastic (ABS), glass
In-use-cover:	Plastic (PET)

10.2 Model-specific data

10.2.1 Balances with readability of 0.1 mg with draft shield

Technical data

	ME54	ME54E
Limit values		
Maximum capacity	52 g	52 g
Readability	0.1 mg	0.1 mg
Repeatability (at nominal load)	0.1 mg	0.1 mg
Linearity deviation	0.2 mg	0.2 mg
Sensitivity temperature drift	2 ppm/°C	2 ppm/°C
Typical values		
Repeatability (at nominal load)	0.08 mg	0.08 mg
Linearity deviation	0.06 mg	0.06 mg
Minimum sample weight (acc. to USP)	160 mg	160 mg
Minimum sample weight (U=1 %, k=2)	16 mg	16 mg
Minimum sample weight OIML	1 mg	1 mg
Settling time	2 s	2 s
Adjustment	Int. Cal	Ext. Cal
Interface	1 RS232	1 RS232
Balance dimensions (W×D×H)	210×344×344 mm	210×344×344 mm
Weighing pan dimensions	ø 90 mm	ø 90 mm
Usable height of draft shield	235 mm	235 mm
Weight of balance	4.7 kg	4.5 kg
Weights for routine testing		
OIML CarePac	#11123003	#11123003
Weights	50 g F2, 2 g E2	50 g F2, 2 g E2
ASTM CarePac	#11123103	#11123103
Weights	50 g 1, 2 g 1	50 g 1, 2 g 1

	ME104	ME104E
Limit values		
Maximum capacity	120 g	120 g
Readability	0.1 mg	0.1 mg
Repeatability (at nominal load)	0.1 mg	0.1 mg
Linearity deviation	0.2 mg	0.2 mg
Sensitivity temperature drift	2 ppm/°C	2 ppm/°C
Typical values		
Repeatability (at nominal load)	0.08 mg	0.08 mg
Linearity deviation	0.06 mg	0.06 mg
Minimum sample weight (acc. to USP)	160 mg	160 mg
Minimum sample weight (U=1 %, k=2)	16 mg	16 mg
Minimum sample weight OIML	1 mg	1 mg
Settling time	2 s	2 s
Adjustment	Int. Cal	Ext. Cal

	ME104	ME104E
Interfaces	1 RS232	1 RS232
Balance dimensions (W×D×H)	210×344×344 mm	210×344×344 mm
Weighing pan dimensions	ø 90 mm	ø 90 mm
Usable height of draft shield	235 mm	235 mm
Weight of balance	4.7 kg	4.5 kg
Weights for routine testing		
OIML CarePac	#11123002	#11123002
Weights	100 g F2, 5 g E2	100 g F2, 5 g E2
ASTM CarePac	#11123102	#11123102
Weights	100 g 1, 5 g 1	100 g 1, 5 g 1

	ME204	ME204E
Limit values		
Maximum capacity	220 g	220 g
Readability	0.1 mg	0.1 mg
Repeatability (at nominal load)	0.1 mg	0.1 mg
Linearity deviation	0.2 mg	0.2 mg
Sensitivity temperature drift	2 ppm/°C	2 ppm/°C
Typical values		
Repeatability (at nominal load)	0.08 mg	0.08 mg
Linearity deviation	0.06 mg	0.06 mg
Minimum sample weight (acc. to USP)	160 mg	160 mg
Minimum sample weight (U=1 %, k=2)	16 mg	16 mg
Minimum sample weight OIML	1 mg	1 mg
Settling time	2 s	2 s
Adjustment	Int. Cal	Ext. Cal
Interfaces	1 RS232	1 RS232
Balance dimensions (W×D×H)	210×344×344 mm	210×344×344 mm
Weighing pan dimensions	ø 90 mm	ø 90 mm
Usable height of draft shield	235 mm	235 mm
Weight of balance	4.7 kg	4.5 kg
Weights for routine testing		
OIML CarePac	#11123001	#11123001
Weights	200 g F2, 10 g F1	200 g F2, 10 g F1
ASTM CarePac	#11123101	#11123101
Weights	200 g 1, 10 g 1	200 g 1, 10 g 1

10.2.2 Balances with readability of 1 mg with draft shield

Technical data

	ME103	ME103E
Limit values		
Maximum capacity	120 g	120 g
Readability	1 mg	1 mg
Repeatability (at nominal load)	1 mg	1 mg
Linearity deviation	2 mg	2 mg
Sensitivity temperature drift	3 ppm/°C	3 ppm/°C
Typical values		
Repeatability (at nominal load)	0.7 mg	0.7 mg
Linearity deviation	0.6 mg	0.6 mg
Minimum sample weight (acc. to USP)	1.4 g	1.4 g
Minimum sample weight (U=1 %, k=2)	140 mg	140 mg
Minimum sample weight OIML	20 mg	20 mg
Settling time	1.5 s	1.5 s
Adjustment	Int. Cal	Ext. Cal
Interface	1 RS232	1 RS232
Balance dimensions (W×D×H)	210×319×289 mm	210×319×289 mm
Weighing pan dimensions	ø 120 mm	ø 120 mm
Usable height of draft shield	170 mm	170 mm
Weight of balance	4.6 kg	4.4 kg
Weights for routine testing		
OIML CarePac	#11123002	#11123002
Weights	100 g F2, 5 g E2	100 g F2, 5 g E2
ASTM CarePac	#11123102	#11123102
Weights	100 g 1, 5 g 1	100 g 1, 5 g 1

	ME203	ME203E
Limit values		
Maximum capacity	220 g	220 g
Readability	1 mg	1 mg
Repeatability (at nominal load)	1 mg	1 mg
Linearity deviation	2 mg	2 mg
Sensitivity temperature drift	3 ppm/°C	3 ppm/°C
Typical values		
Repeatability (at nominal load)	0.7 mg	0.7 mg
Linearity deviation	0.6 mg	0.6 mg
Minimum sample weight (acc. to USP)	1.4 g	1.4 g
Minimum sample weight (U=1 %, k=2)	140 mg	140 mg
Minimum sample weight OIML	20 mg	20 mg
Settling time	1.5 s	1.5 s
Adjustment	Int. Cal	Ext. Cal
Interface	1 RS232	1 RS232

	ME203	ME203E
Balance dimensions (W×D×H)	210×319×289 mm	210×319×289 mm
Weighing pan dimensions	ø 120 mm	ø 120 mm
Usable height of draft shield	170 mm	170 mm
Weight of balance	4.6 kg	4.4 kg
Weights for routine testing		
OIML CarePac	#11123001	#11123001
Weights	200 g F2, 10 g F1	200 g F2, 10 g F1
ASTM CarePac	#11123101	#11123101
Weights	200 g 1, 10 g 1	200 g 1, 10 g 1

	ME303	ME303E
Limit values		
Maximum capacity	320 g	320 g
Readability	1 mg	1 mg
Repeatability (at nominal load)	1 mg	1 mg
Linearity deviation	2 mg	2 mg
Sensitivity temperature drift	3 ppm/°C	3 ppm/°C
Typical values		
Repeatability (at nominal load)	0.7 mg	0.7 mg
Linearity deviation	0.6 mg	0.6 mg
Minimum sample weight (acc. to USP)	1.4 g	1.4 g
Minimum sample weight (U=1 %, k=2)	140 mg	140 mg
Minimum sample weight OIML	20 mg	20 mg
Settling time	1.5 s	1.5 s
Adjustment	Int. Cal	Ext. Cal
Interface	1 RS232	1 RS232
Balance dimensions (W×D×H)	210×319×289 mm	210×319×289 mm
Weighing pan dimensions	ø 120 mm	ø 120 mm
Usable height of draft shield	170 mm	170 mm
Weight of balance	4.6 kg	4.4 kg
Weights for routine testing		
OIML CarePac	#11123001	#11123001
Weights	200 g F2, 10 g F1	200 g F2, 10 g F1
ASTM CarePac	#11123101	#11123101
Weights	200 g 1, 10 g 1	200 g 1, 10 g 1

	ME403	ME403E
Limit values		
Maximum capacity	420 g	420 g
Readability	1 mg	1 mg
Repeatability (at nominal load)	1 mg	1 mg
Linearity deviation	2 mg	2 mg
Sensitivity temperature drift	3 ppm/°C	3 ppm/°C

	ME403	ME403E
Typical values		
Repeatability (at nominal load)	0.7 mg	0.7 mg
Linearity deviation	0.6 mg	0.6 mg
Minimum sample weight (acc. to USP)	1.4 g	140 mg
Minimum sample weight (U=1 %, k=2)	140 mg	0.14 g
Minimum sample weight OIML	20 mg	20 mg
Settling time	1.5 s	1.5 s
Adjustment	Int. Cal	Ext. Cal
Interface	1 RS232	1 RS232
Balance dimensions (W×D×H)	210×319×289 mm	210×319×289 mm
Weighing pan dimensions	ø 120 mm	ø 120 mm
Usable height of draft shield	170 mm	170 mm
Weight of balance	4.6 kg	4.4 kg
Weights for routine testing		
OIML CarePac	#11123000	#11123000
Weights	200 g F2, 20 g F1	200 g F2, 20 g F1
ASTM CarePac	#11123100	#11123100
Weights	200 g 1, 20 g 1	200 g 1, 20 g 1

10.2.3 Balances with readability of 10 mg / 100 mg

Technical data

	ME802	ME802E
Limit values		
Maximum capacity	820 g	820 g
Readability	10 mg	10 mg
Repeatability (at nominal load)	10 mg	10 mg
Linearity deviation	20 mg	20 mg
Sensitivity temperature drift	3 ppm/°C	3 ppm/°C
Typical values		
Repeatability (at nominal load)	7 mg	7 mg
Linearity deviation	6 mg	6 mg
Minimum sample weight (acc. to USP)	14 g	14 g
Minimum sample weight (U=1 %, k=2)	1.4 g	1.4 g
Minimum sample weight OIML	500 mg	500 mg
Settling time	1 s	1 s
Adjustment	Int. Cal	Ext. Cal
Interfaces	1 RS232	1 RS232
Balance dimensions (W×D×H)	200×319×100 mm	200×319×100 mm
Weighing pan dimensions	180×180 mm	180×180 mm
Weight of balance	3.8 kg	3.2 kg
Weights for routine testing		
OIML CarePac	#11123007	#11123007
Weights	500 g F2, 20 g F1	500 g F2, 20 g F1
ASTM CarePac	#11123107	#11123107
Weights	500 g 1, 20 g 1	500 g 1, 20 g 1

	ME1002	ME1002E
Limit values		
Maximum capacity	1200 g	1200 g
Readability	10 mg	10 mg
Repeatability (at nominal load)	10 mg	10 mg
Linearity deviation	20 mg	20 mg
Sensitivity temperature drift	3 ppm/°C	3 ppm/°C
Typical values		
Repeatability (at nominal load)	7 mg	7 mg
Linearity deviation	6 mg	6 mg
Minimum sample weight (acc. to USP)	14 g	14 g
Minimum sample weight (U=1 %, k=2)	1.4 g	1.4 g
Minimum sample weight OIML	500 mg	500 mg
Settling time	1 s	1 s
Adjustment	Int. Cal	Ext. Cal
Interfaces	1 RS232	1 RS232
Balance dimensions (W×D×H)	200×319×100 mm	200×319×100 mm

	ME1002	ME1002E
Weighing pan dimensions	180×180 mm	180×180 mm
Weight of balance	3.8 kg	3.2 kg
Weights for routine testing		
OIML CarePac	#11123008	#11123008
Weights	1000 g F2, 50 g F2	1000 g F2, 50 g F2
ASTM CarePac	#11123108	#11123108
Weights	1000 g 1, 50 g 1	1000 g 1, 50 g 1

	ME2002	ME2002E
Limit values		
Maximum capacity	2.2 kg	2.2 kg
Readability	10 mg	10 mg
Repeatability (at nominal load)	10 mg	10 mg
Linearity deviation	20 mg	20 mg
Sensitivity temperature drift	3 ppm/°C	3 ppm/°C
Typical values		
Repeatability (at nominal load)	7 mg	7 mg
Linearity deviation	6 mg	6 mg
Minimum sample weight (acc. to USP)	14 g	14 g
Minimum sample weight (U=1 %, k=2)	1.4 g	1.4 g
Minimum sample weight OIML	500 mg	500 mg
Settling time	1 s	1 s
Adjustment	Int. Cal	Ext. Cal
Interfaces	1 RS232	1 RS232
Balance dimensions (W×D×H)	200×319×100 mm	200×319×100 mm
Weighing pan dimensions	180×180 mm	180×180 mm
Weight of balance	3.8 kg	3.2 kg
Weights for routine testing		
OIML CarePac	#11123009	#11123009
Weights	2000 g F2, 100 g F2	2000 g F2, 100 g F2
ASTM CarePac	#11123109	#11123109
Weights	2000 g 1, 100 g 1	2000 g 1, 100 g 1

	ME3002	ME3002E
Limit values		
Maximum capacity	3.2 kg	3.2 kg
Readability	10 mg	10 mg
Repeatability (at nominal load)	10 mg	10 mg
Linearity deviation	20 mg	20 mg
Sensitivity temperature drift	3 ppm/°C	3 ppm/°C
Typical values		
Repeatability (at nominal load)	7 mg	7 mg
Linearity deviation	6 mg	6 mg

	ME3002	ME3002E
Minimum sample weight (acc. to USP)	14 g	14 g
Minimum sample weight (U=1 %, k=2)	1.4 g	1.4 g
Minimum sample weight OIML	500 mg	500 mg
Settling time	1 s	1 s
Adjustment	Int. Cal	Ext. Cal
Interface	1 RS232	1 RS232
Balance dimensions (W×D×H)	200×319×100 mm	200×319×100 mm
Weighing pan dimensions	180×180 mm	180×180 mm
Weight of balance	3.8 kg	3.2 kg
Weights for routine testing		
OIML CarePac	#11123009	#11123009
Weights	2000 g F2, 100 g F2	2000 g F2, 100 g F2
ASTM CarePac	#11123109	#11123109
Weights	2000 g 1, 100 g 1	2000 g 1, 100 g 1

	ME4002	ME4002E
Limit values		
Maximum capacity	4.2 kg	4.2 kg
Readability	10 mg	10 mg
Repeatability (at nominal load)	10 mg	10 mg
Linearity deviation	20 mg	20 mg
Sensitivity temperature drift	3 ppm/°C	3 ppm/°C
Typical values		
Repeatability (at nominal load)	7 mg	7 mg
Linearity deviation	6 mg	6 mg
Minimum sample weight (acc. to USP)	14 g	14 g
Minimum sample weight (U=1 %, k=2)	1.4 g	1.4 g
Minimum sample weight OIML	500 mg	500 mg
Settling time	1 s	1 s
Adjustment	Int. Cal	Ext. Cal
Interface	1 RS232	1 RS232
Balance dimensions (W×D×H)	200×319×100 mm	200×319×100 mm
Weighing pan dimensions	180×180 mm	180×180 mm
Weight of balance	3.8 kg	3.2 kg
Weights for routine testing		
OIML CarePac	#11123010	#11123010
Weights	2000 g F2, 200 g F2	2000 g F2, 200 g F2
ASTM CarePac	#11123110	#11123110
Weights	2000 g 4, 200 g 4	2000 g 4, 200 g 4

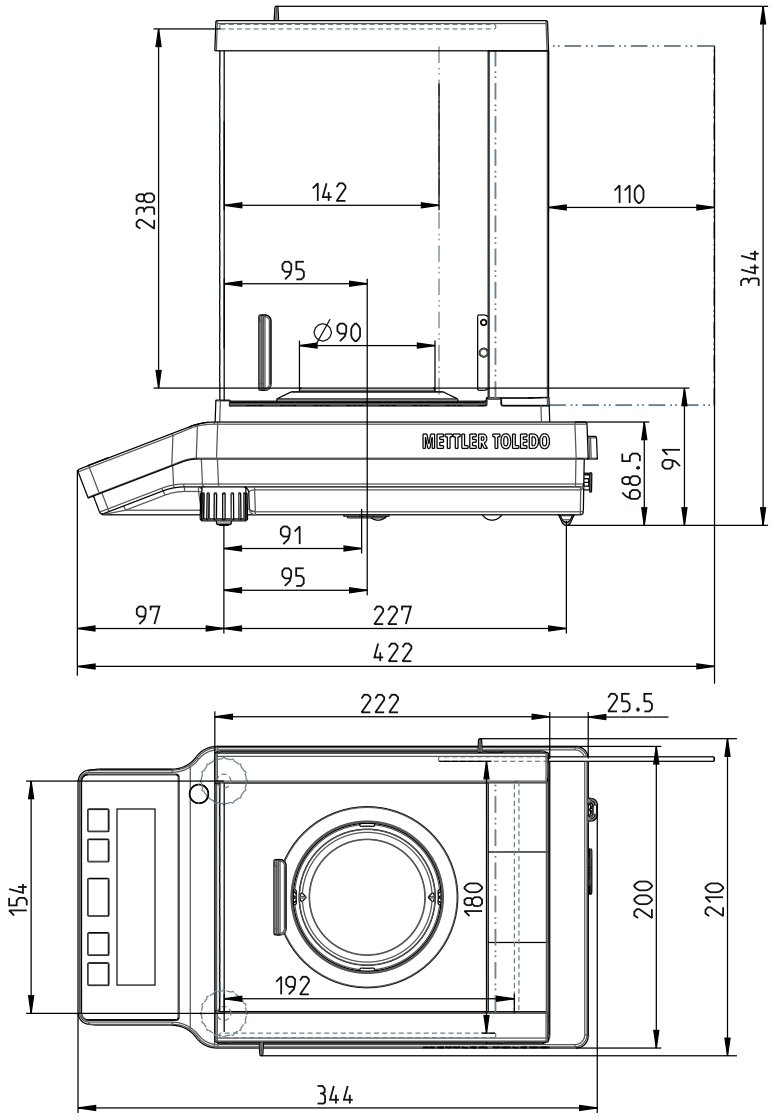
	ME4001	ME4001E
Limit values		
Maximum capacity	4.2 kg	4.2 kg

	ME4001	ME4001E
Readability	100 mg	100 mg
Repeatability (at nominal load)	100 mg	100 mg
Linearity deviation	200 mg	200 mg
Sensitivity temperature drift	3 ppm/°C	3 ppm/°C
Typical values		
Repeatability (at nominal load)	70 mg	70 mg
Linearity deviation	60 mg	60 mg
Minimum sample weight (acc. to USP)	140 g	140 g
Minimum sample weight (U=1 %, k=2)	14 g	14 g
Minimum sample weight OIML	5 g	5 g
Settling time	1 s	1 s
Adjustment	Int. Cal	Ext. Cal
Interface	1 RS232	1 RS232
Balance dimensions (W×D×H)	200×319×100 mm	200×319×100 mm
Weighing pan dimensions	180×180 mm	180×180 mm
Weight of balance	3.8 kg	3.2 kg
Weights for routine testing		
OIML CarePac	#11123010	#11123010
Weights	2000 g F2, 200 g F2	2000 g F2, 200 g F2
ASTM CarePac	#11123110	#11123110
Weights	2000 g 4, 200 g 4	2000 g 4, 200 g 4

10.3 Dimensions

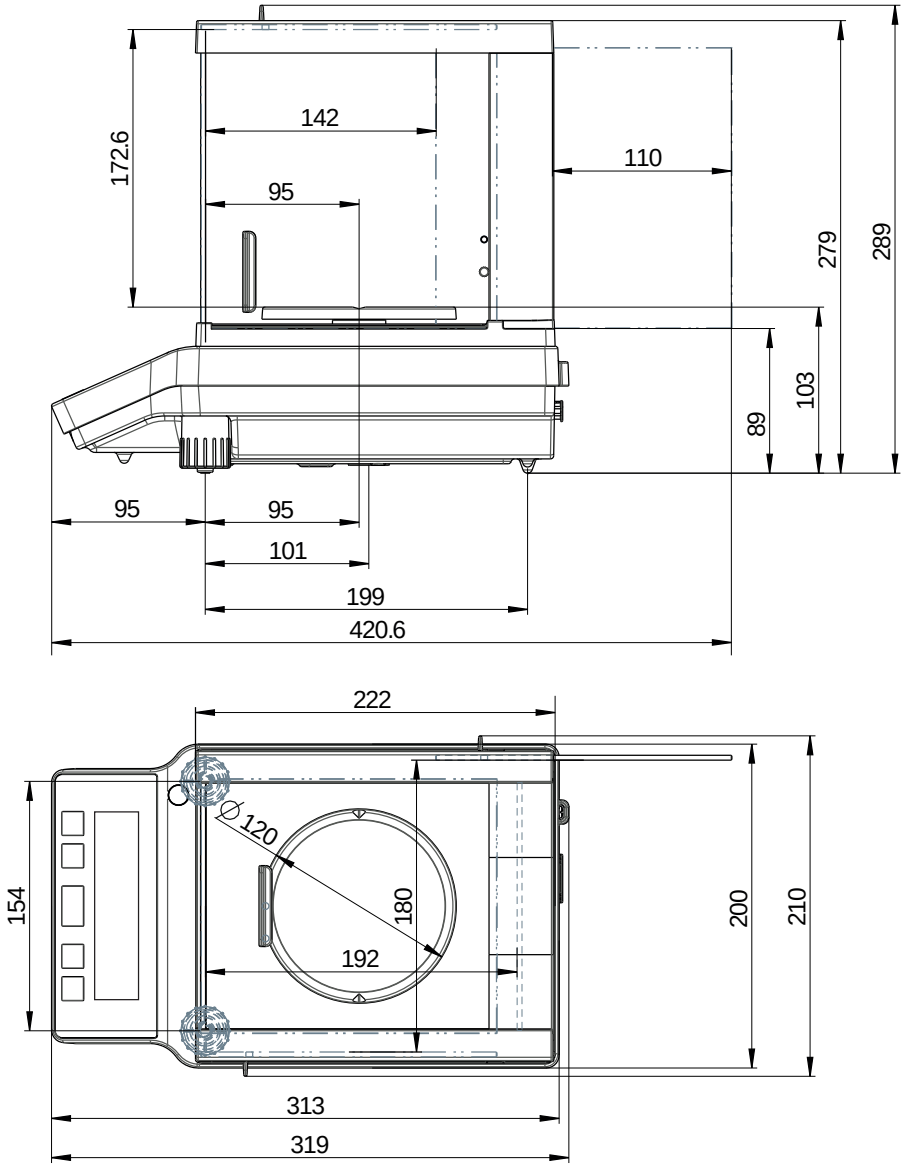
10.3.1 Balances with readability of 0.1 mg with draft shield high

Models:
ME54
ME54E
ME104
ME104E
ME204
ME204E



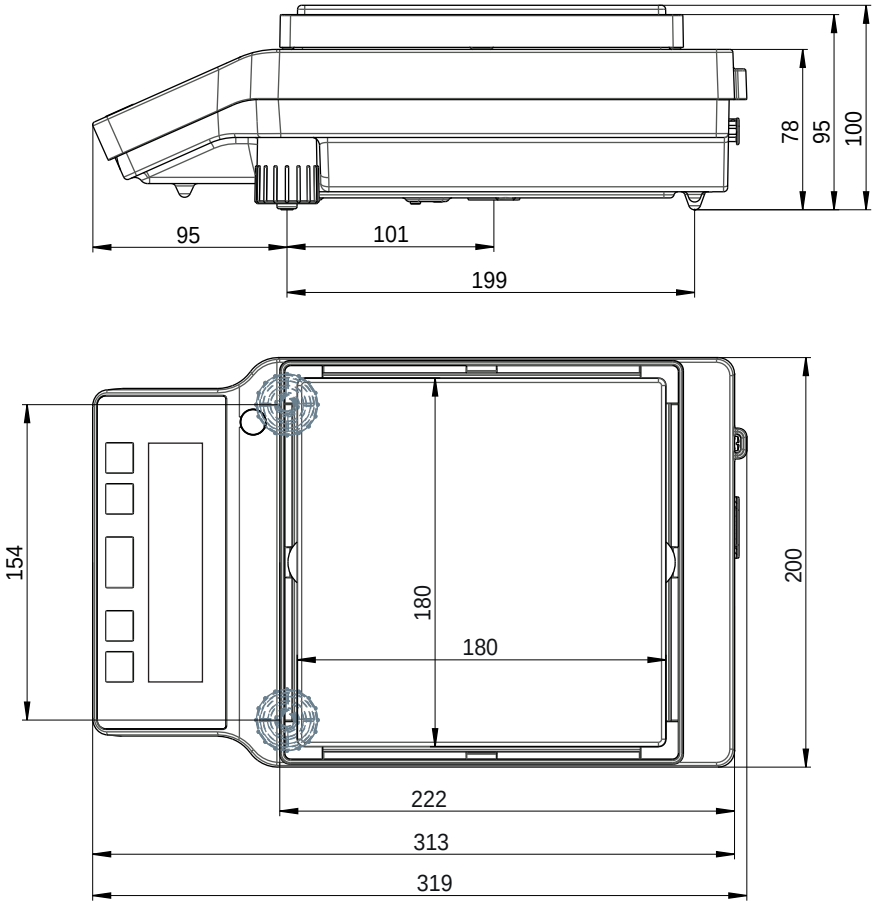
10.3.2 Balances with readability of 1 mg with draft shield low

Models:
ME103
ME103E
ME203
ME203E
ME303
ME303E
ME403
ME403E



10.3.3 Balances with readability of 10 mg / 100 mg

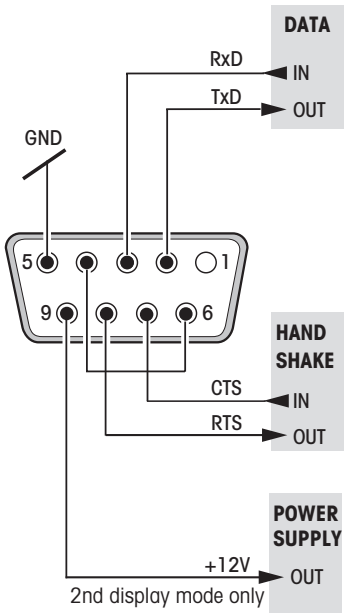
Models:
ME802
ME802E
ME1002
ME1002E
ME2002
ME2002E
ME3002
ME3002E
ME4002
ME4002E
ME4001
ME4001E



10.4 Interface specification

10.4.1 RS232C interface

Each balance is equipped with an RS232C Interface as standard for the attachment of a peripheral device (e.g. printer or computer).

Schematic	Item	Specification
	Interface type	Voltage interface according to EIA RS-232C/ DIN66020 CCITT V24/V.28)
	Max. cable length	15 m
	Signal level	Outputs: +5 V … +15 V (RL = 3–7 kΩ) –5 V … –15 V (RL = 3–7 kΩ) Inputs: +3 V … +25 V –3 V … -25 V
	Connector	Sub-D, 9-pole, female
	Operating mode	Full duplex
	Transmission mode	Bit-serial, asynchronous
	Transmission code	ASCII
	Baud rates	600, 1200, 2400, 4800, 9600, 19200, 38400 (software selectable)
	Bits/parity	7-bit/none, 7-bit/even, 7-bit/odd, 8-bit/none (software selectable)
	Stop bits	1 stop bit
	Handshake	None, XON/XOFF, RTS/CTS (software selectable)
	End-of-line	<CR><LF>, <CR>, <LF> (software selectable)
	Power supply for 2nd display	+ 12 V, max 40 mA (software selectable, 2nd display mode only)

10.4.2 MT-SICS interface commands and functions

Many of the instruments and balances used have to be capable of integration in a complex computer or data acquisition system.

To enable you to integrate balances in your system in a simple manner and utilize their capabilities to the full, most balance functions are also available as appropriate commands via the data interface.

All new METTLER TOLEDO balances launched on the market support the standardized command set "METTLER TOLEDO Standard Interface Command Set" (MT-SICS). The commands available depend on the functionality of the balance.

For further information please contact your METTLER TOLEDO representative.

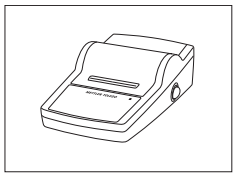
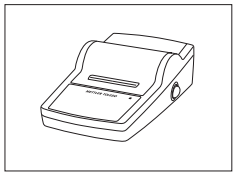
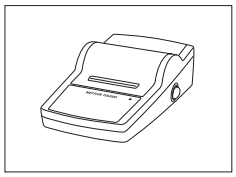
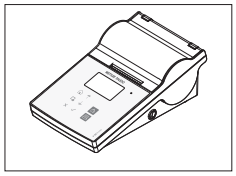
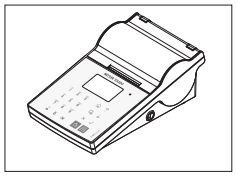
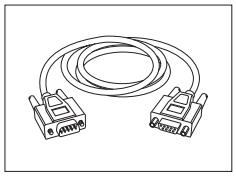
For further information please refer to the Reference Manual MT-SICS downloadable from the Internet under

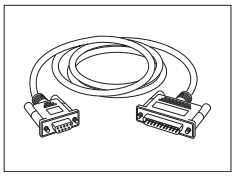
▶ www.mt.com/me-analytical

▶ www.mt.com/me-precision

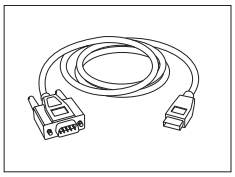
11 Accessories and Spare Parts

11.1 Accessories

	Description	Part No.
Printers		
	RS-P25 printer with RS232 connection to instrument	11124300
	Paper roll (length: 20 m), set of 5 pcs	00072456
	Paper roll (length: 13 m), self-adhesive, set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
	RS-P26 printer with RS232 connection to instrument (with date and time)	11124303
	Paper roll (length: 20 m), set of 5 pcs	00072456
	Paper roll, self-adhesive (length: 13 m), set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
	RS-P28 printer with RS232 connection to instrument (with date, time and applications)	11124304
	Paper roll (length: 20 m), set of 5 pcs	00072456
	Paper roll, self-adhesive (length: 13 m), set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
	P-56RUE thermal printer with RS232, USB and ethernet connections, simple printouts, date and time, label printing (limited).	30094673
	Paper roll, white (length: 27 m), set of 10 pcs	30094723
	Paper roll, white, self-adhesive (length: 13 m), set of 10 pcs	30094724
	Paper roll, white, self-adhesive labels (550 labels), set of 6 pcs	30094725
	P-58RUE thermal printer with RS232, USB and ethernet connections, simple printouts, date and time, label printing, balance applications: statistics, formulation, totaling,	30094674
	Paper roll, white (length: 27 m), set of 10 pcs	30094723
	Paper roll, white, self-adhesive (length: 13 m), set of 10 pcs	30094724
	Paper roll, white, self-adhesive labels (550 labels), set of 6 pcs	30094725
Cables for RS232 interface		
	RS9 – RS9 (m/f): connection cable for PC, length = 1 m	11101051

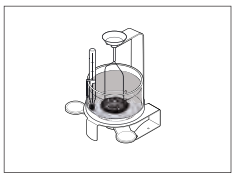


RS9 – RS25 (m/f): connection cable for PC, length = 2 m — 11101052

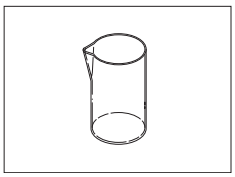


RS232 - USB converter cable – Cable with converter to connect a balance (RS232) to a USB port — 64088427

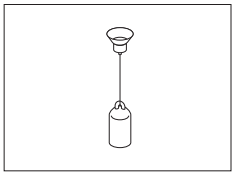
Density determination



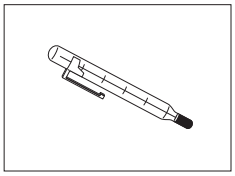
Density kit ME-DNY-4 for balances with readability of 0.01 mg / 0.1 mg — 30029886



Glass beaker, height 100 mm, ø 60 mm — 00238167

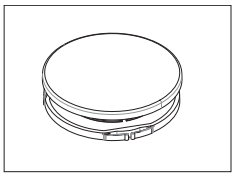


Sinker for density of liquids in conjunction with density kit — 00210260
Calibrated (sinker + certificate) — 00210672
Recalibrated (new certificate) — 00210674



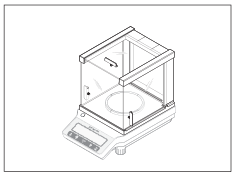
Calibrated thermometer with certificate — 11132685

Weighing pans



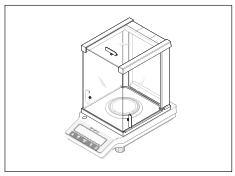
Set of weighing pan ø 160 mm with pan support for balances with readability of 10 mg and 100 mg using draft shield — 30042896

Draft shields



Draft shield low with sliding doors, usable heigh 170 mm. — 30042884

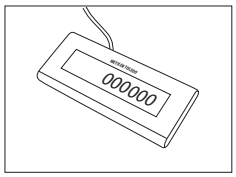
- for balances 0.1 mg or 1 mg
- for balances 10 mg or 100 mg, weighing pan ø 160 mm is needed (#30046407)



Draft shield high with sliding doors, usable heigh 235 mm — 30037731

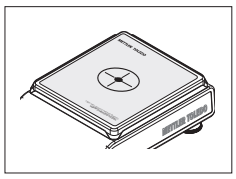
- for balances 0.1 mg or 1 mg
- for balances 10 mg or 100 mg, weighing pan ø 160 mm is needed (#30046407)

Auxiliary displays



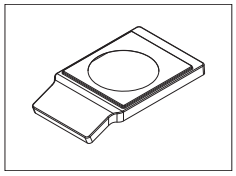
RS232 auxiliary display AD-RS-M7 — 12122381

Pan protections

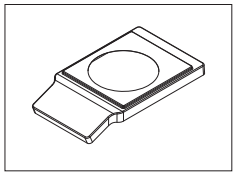


Protective foils, 175x175 mm, set of 20 pcs, pan protection for weighing pan 180x180 mm — 30113802

Protective covers

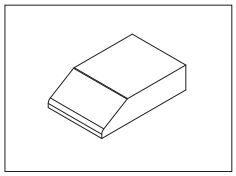


Protective cover for models with readability of 0.01 mg / 0.1 mg — 30037742

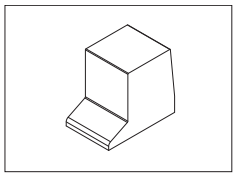


Protective cover for models with readability of 1 mg … 100 mg — 30042890

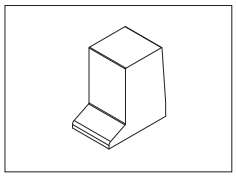
Dust covers



Dust cover for models without draft shield — 30029051

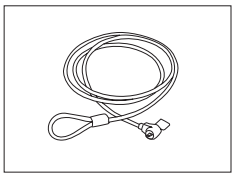


Dust cover for models with draft shield low (170 mm) — 30029050



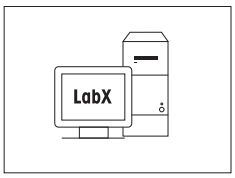
Dust cover for models with draft shield high (235 mm) — 30029049

Anti-theft devices



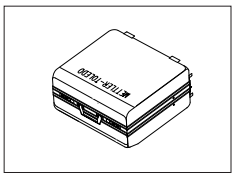
Anti-theft steel cable 11600361

Software



LabX direct balance (simple data transfer) 11120340

Transport cases

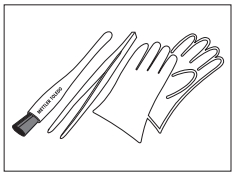


Transport case for models with draft shield high (0.01 mg / 0.1 mg, 235 mm) 30046404

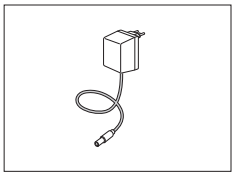
Transport case for models with draft shield low (1 mg, 170 mm) 30046405

Transport case for models without draft shield 30046406

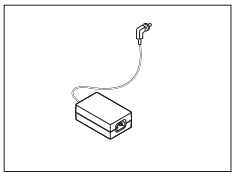
Various



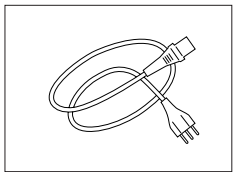
Tool kit, contains brush, tweezer and glove 30046403



AC/DC universal adapter (EU, USA, AU, UK) 100–240 VAC, 50/60 Hz, 0.5 A, 12 VDC 1 A 11120270



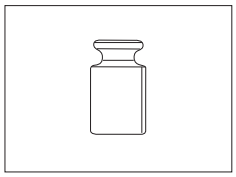
AC/DC adapter (without power cable) 100–240 V AC, 0.8 A, 50/60 Hz, 12 V DC 2.5 A 11107909



Country-specific 3-Pin power cable with grounding conductor.

Power cable AU	00088751
Power cable BR	30015268
Power cable CH	00087920
Power cable CN	30047293
Power cable DK	00087452
Power cable EU	00087925
Power cable GB	00089405
Power cable IL	00225297
Power cable IN	11600569
Power cable IT	00087457
Power cable JP	11107881
Power cable TH, PE	11107880
Power cable US	00088668
Power cable ZA	00089728

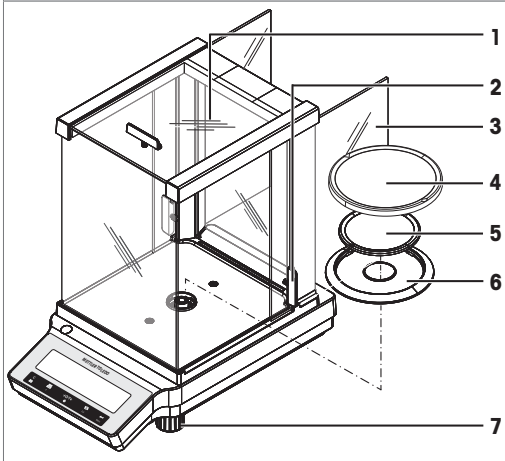
Adjustment weights



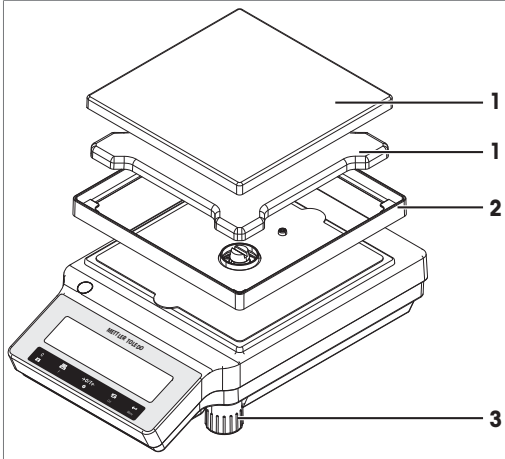
OIML / ASTM Weights (with calibration certificate)
see http://www.mt.com/weights

11.2 Spare parts

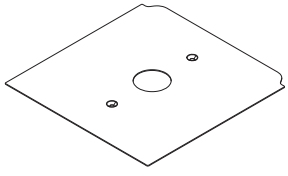
Balances with readability of 0.1 mg / 1 mg

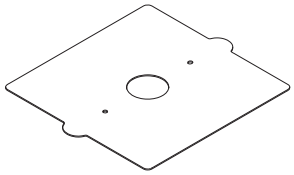
Drawing	Pos	Description	Part No.
	**1**	Sliding top door for draft shield high or low with mounted handle (170 mm or 235 mm)	30037733
	2	Pair of handles for sliding doors of draft shield	30037736
	3	Pair of sliding side doors for draft shield high with mounted handles (left and right), 235 mm	30037732
	3	Pair of sliding side doors for draft shield low with mounted handles (left and right), 170 mm	30042885
	4	Weighing pan ø 120 mm incl. pan support, 1 mg	30042889
	5	Weighing pan ø 90 mm incl. pan support, 0.1 mg	30037737
	6	Draft shield element, 0.1 mg	12122043
	7	Pair of leveling foot	30037744

Balances with readability of 10 mg / 100 mg

Drawing	Pos	Description	Part No.
	**1**	Weighing pan 180 × 180 mm with pan support, 10 mg and 100 mg	30042895
	2	Draft shield element 180 × 180 mm, 10 mg and 100 mg	30042897
	3	Pair of leveling foot	30037744

Miscellaneous

Drawing	Pos	Description	Part No.
		Bottom plate for draft shield	30037739

Drawing	Pos	Description	Part No.
		Bottom plate for models without draft shield	30042901

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