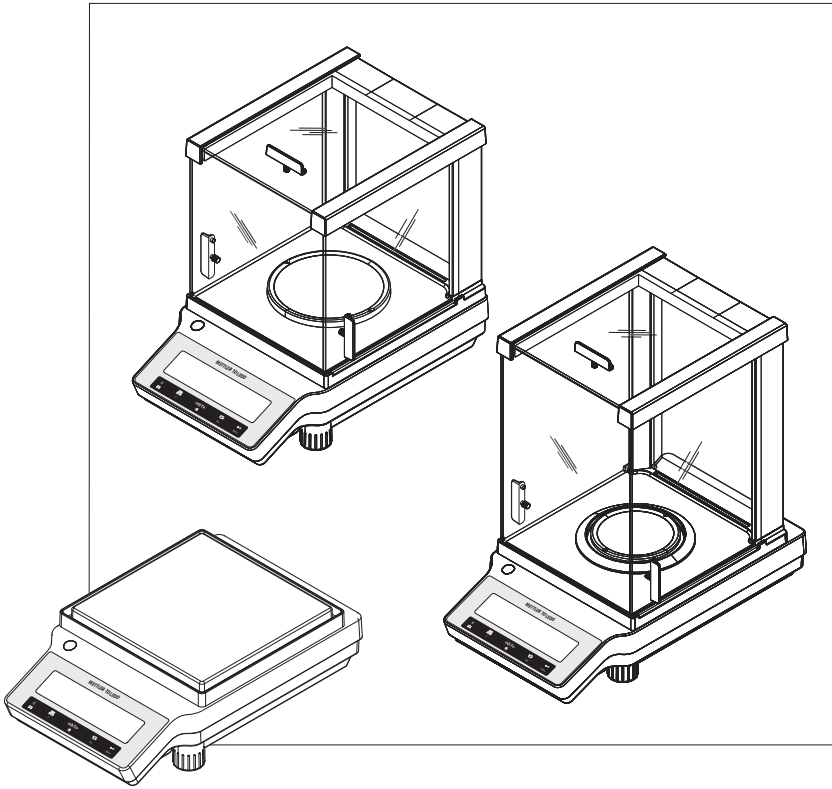
Operating Instructions

NewClassic Balances

ME Models



METTLER TOLEDO

Table of Contents

1 Introduction

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

These operating instructions apply to ME models in the NewClassic line and are based on the initially installed firmware (software) version V 1.0.

▶ www.mt.com/newclassic

1.1 Conventions and Symbols Used in These Operating Instructions

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

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.

▼ This symbol indicates an automatic sequence.

These symbols indicate safety notes and hazard warnings which, if ignored, can cause personal danger to the user, damage to the balance or other equipment, or malfunctioning of the balance.

This symbol indicates additional information and notes. These make working with your balance easier, as well as ensuring that you use it correctly and economically.

2 Safety Precautions

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

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

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

For use only in dry interior rooms.

Do not use sharply pointed objects to operate the keyboard of your balance! Although your balance is very ruggedly constructed, it is nevertheless a precision instrument. Treat it with corresponding care.

Do not open the balance: It does not contain any parts which can be maintained, repaired, or replaced by the user. If you ever have problems with your balance, contact your METTLER TOLEDO dealer.

Use only balance accessories and peripheral devices from METTLER TOLEDO; they are optimally adapted to your balance.

Use only the original universal AC adapter delivered with your balance.

Disposal

In conformance with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.

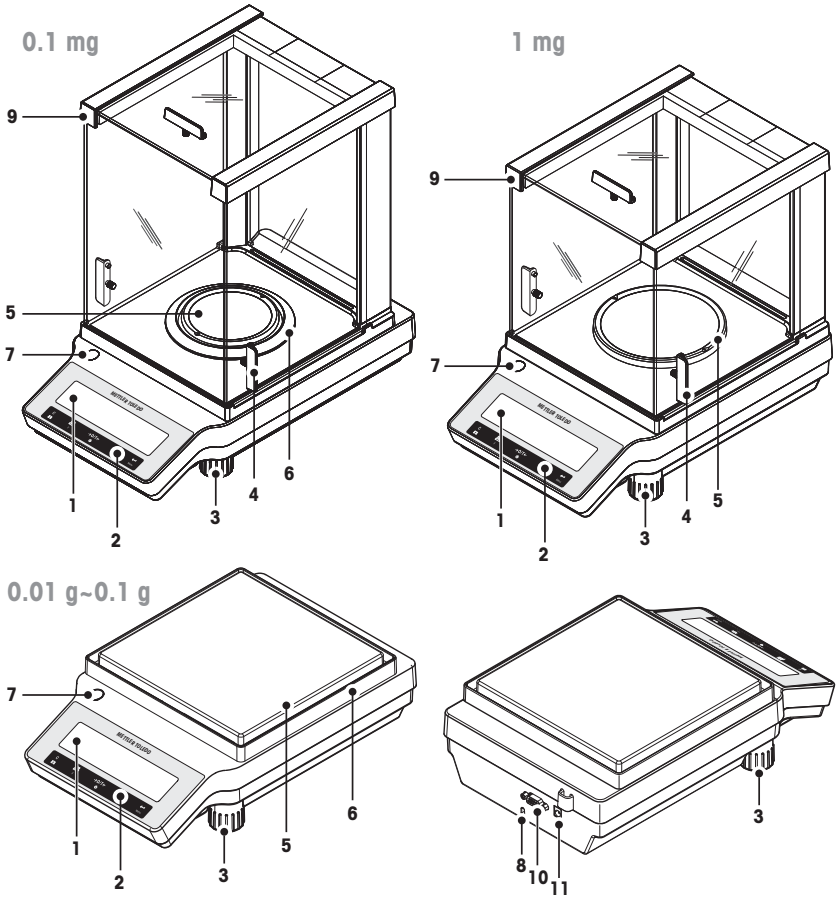
Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment. If you have any questions, please contact the responsible authority or the distributor from which you purchased this device. Should this device be passed on to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

Thank you for your contribution to environmental protection.

3 Design and Function

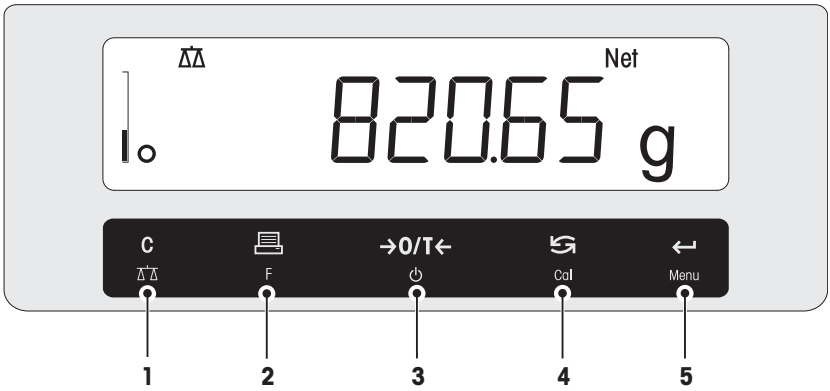
3.1 Overview

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		

3.1.2 Operation Keys



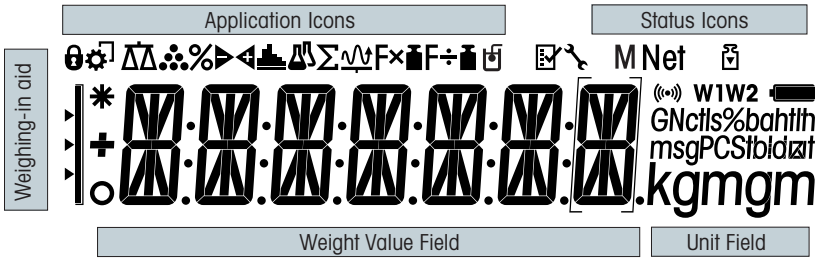
Key Functions

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 of 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 Panel



Application Icons			
	Application "Weighing"		Application "Totaling"
	Application "Piece counting"		Application "Dynamic weighing"
	Application "Percent weighing"	F×	Application "Multiplication factor"
	Application "Check weighing"	F÷	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)		Acoustic feedback for pressed keys activated
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		

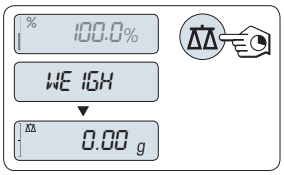
Weight Value Field and Weighing-in aid			
	Indicates negative values		Brackets to indicate uncertified digits (approved models only)
	Indicates unstable values		Marking of nominal or target weight
	Indicates calculated values		Marking of tolerance limit T+

Weight Value Field and Weighing-in aid			
			Marking of tolerance limit T-

Unit Field						
GNctls%bahtlh msgPCSfbldzt 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

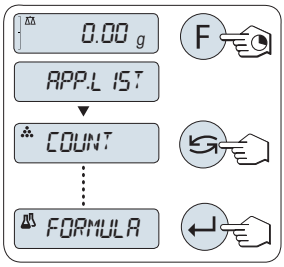
Selecting simple weighing or terminate application



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

Note
How to perform simple weighing **see** Switching the Balance On or Off (page 29).

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 «↵».

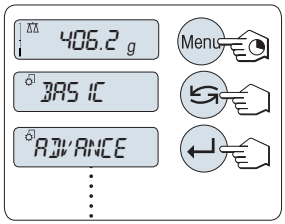
Also see:

- Switching the Balance On or Off (page 29)

Available applications

Display	Remark	Description
COUNT	Piece counting	**see** Application "Piece Counting" (page 43)
PERCENT	Percent weighing	**see** Application "Percent Weighing" (page 46)
CHECK	Checkweighing	**see** Application "Check Weighing" (page 48)
STAT	Statistics	**see** Application "Statistics" (page 50)
FORMULA	Formulation / Net-Total	**see** Application "Formulation" (Net Total Formulation) (page 52)
TOTAL	Totaling	**see** Application "Totaling" (page 56)
DYNAMIC	Dynamic weighing	**see** Application "Dynamic Weighing" (page 58)
FACTOR.M	Multiplication factor	**see** Application "Multiplication Factor Weighing" (page 60)
FACTOR.D	Division factor	**see** Application "Division Factor Weighing" (page 62)
DENSITY	Density	**see** Application "Density" (page 64)

Entering the menu



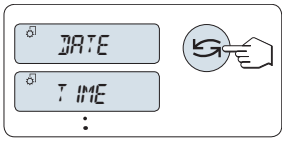
1 Press and hold «**Menu**» to enter main menu. The first menu "**BASIC**" is displayed (except menu protection is active).

2 Press «↻» repeatedly to change menu.

3 Press «↵» to confirm the selection.

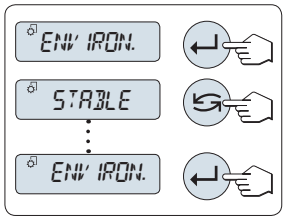
Note
Detailed description of the menu **see** The Menu (page 32).

Select menu topic



– 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



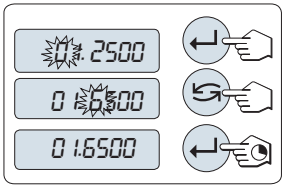
1 Press «↵».The display shows the current setting in the selected menu topic. Each time «↻» is pressed, the balance switches to the next selection. After the last selection, the first is shown again.

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

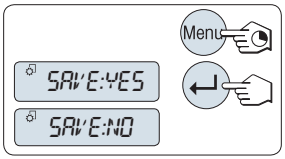


1 Press «↵» to select a digit (cyclically from left to right) or a value (depending on the application). The selected digit or the selected value is blinking.

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.

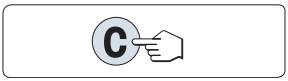
⇨ "**SAVE:YES**" appears on the display.

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**".

Also see:

- Switching the Balance On or Off (page 29)

4 Setting up the Balance

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.

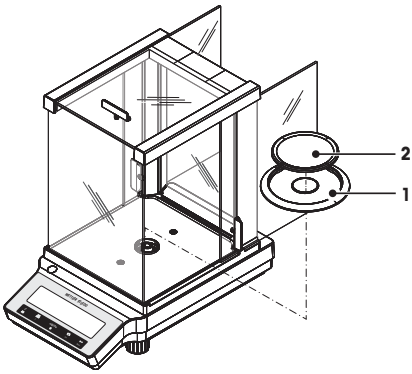
2 Check the delivered items.

The standard scope of delivery contains the following items:

Components		**Model**		
		0.1 mg	**1 mg**	**0.1 g / 0.01 g**
Draft shield	high, 235 mm	✓	–	–
	low, 170 mm	–	✓	–
Weighing pan with pan support	Ø 90 mm	✓	–	–
	Ø 120 mm	–	✓	–
	180 x 180 mm	–	–	✓
Draft shield element		✓	–	✓
Pan support		–	–	✓
Protective cover		✓	✓	✓
Universal AC adapter		✓	✓	✓
Declaration of conformity		✓	✓	✓
Quick Guide (English)		✓	✓	✓
Operating instructions: printed or on CD-ROM depending of the country.		✓	✓	✓

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.

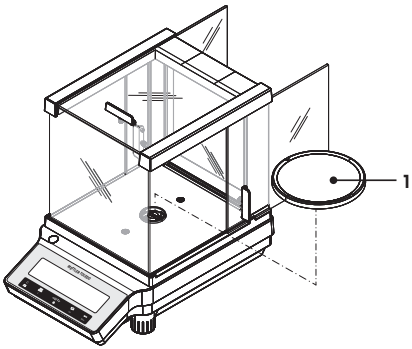
2 Place draft shield element (1).

3 Place weighing pan (2).

Note

Cleaning the draft shield **see** Cleaning and Service (page 78).

Balances with readability of 1 mg



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

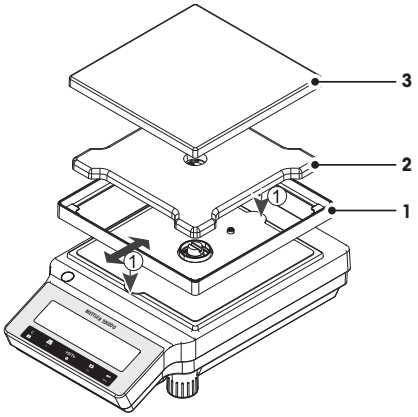
1 Push the side glass doors back as far as will go.

2 Place weighing pan (1).

Note

Cleaning the draft shield **see** Cleaning and Service (page 78).

Balances with readability of 0.01 g / 0.1 g



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.

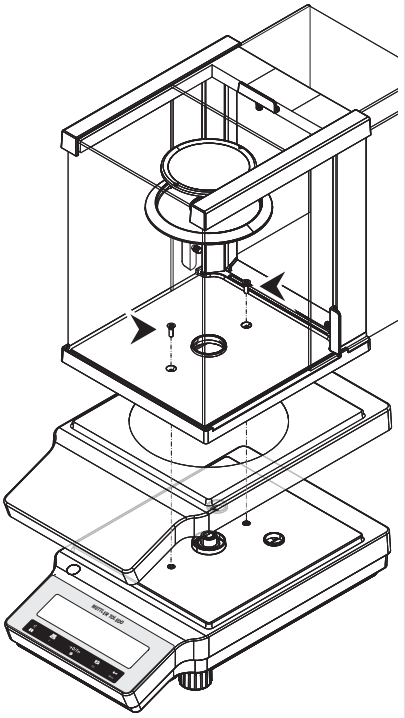
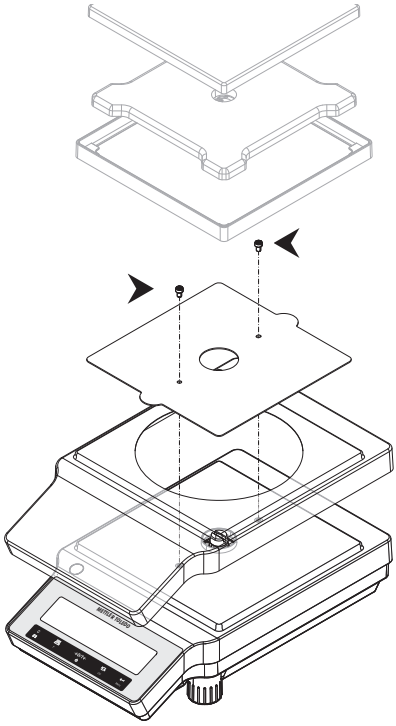
2 Insert pan support (2).

3 Place weighing pan (3).

4.3 Installing Protective Cover

Note

Make sure using the correct protective cover, **see** Accessories and Spare Parts (page 92)

Balances with readability of 0.1 mg / 1 mg	Balances with readability of 0.01 g / 0.1 g
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.
	

Also see:

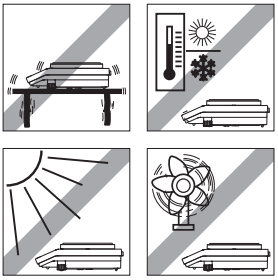
- Accessories and Spare Parts (page 92)

Also see:

- Accessories and Spare Parts (page 92)

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.

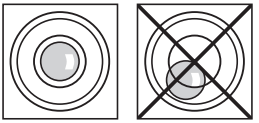


Observe ambient conditions see Technical Data (page 79).

Avoid the following:

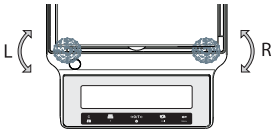
- Vibrations
- Excessive temperature fluctuations
- Direct sunlight
- Powerful drafts (e.g. from fans or air conditioners)

4.5 Leveling the Balance



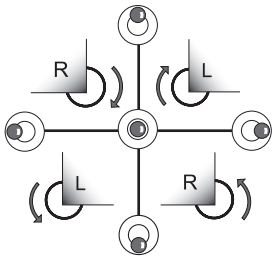
The balances have a level indicator and two or four adjustable leveling feet to compensate for slight irregularities in the surface of the weighing bench. The balance is exactly horizontal when the air bubble is in the middle of the level glass.

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



– Turn the two front leveling feet until the air bubble is in the center of the level indicator

L = left foot
R = right foot



Air bubble at	"12 o'clock"	turn both feet clockwise
Air bubble at	"3 o'clock"	turn left foot clockwise, right foot counterclockwise
Air bubble at	"6 o'clock"	turn both feet counterclockwise
Air bubble at	"9 o'clock"	turn left foot counterclockwise, right foot clockwise

4.6 Power Supply

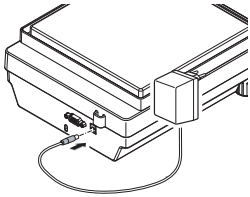
Your balance is supplied with an country-specific AC adapter or with a country-specific power cable. The power supply is suitable for all line voltages in the range: 100 - 240 VAC, 50/60 Hz. For detailed specifications, **see** Technical Data (page 79).

First, check the local line voltage is in the range 100 - 240 VAC, 50/60 Hz and whether the power plug fits your local power supply connection. **If this is not the case, on no account connect the balance or the AC adapter to the power supply**, but contact the responsible METTLER TOLEDO dealer.

Important:

- Before operating, check all cables for damage.
- Guide the cables so that they cannot become damaged or interfere with the weighing process!
- Take care that the AC adapter cannot come into contact with liquids!
- The power plug must be always accessible.

Allow your balance to warm up for 30 minutes (0.1 mg models 60 minutes) to enable it to adapt itself to the ambient conditions.



– 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.

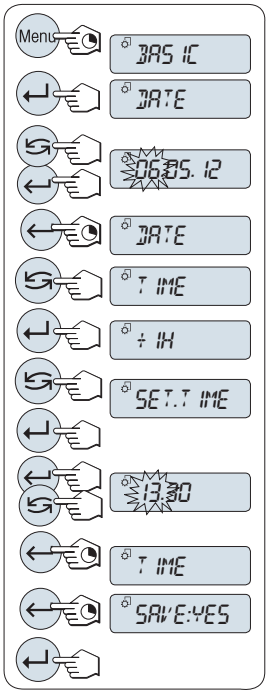
The balance is ready for use.

4.7 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.**", see (page 34).
- Set the current time according to the time format "**TIME.FRM**" in the menu "**ADVANCE.**", see (page 36).



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)

To obtain accurate weighing results, the balance must be adjusted to match the gravitational acceleration at its location. Adjusting is necessary:

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

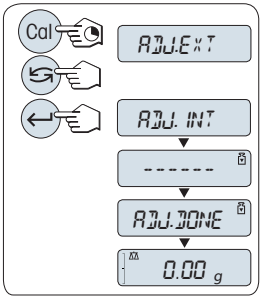
To obtain accurate results, the balance must be connected to the power supply for approximately,

- 30 minutes for balances with redability of 1 mg to 0.1 g
- 60 minutes for balances with redability of 0.1 mg

in order to reach operating temperature before adjusting.

4.8.1 Adjustment with Internal Weight

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



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".

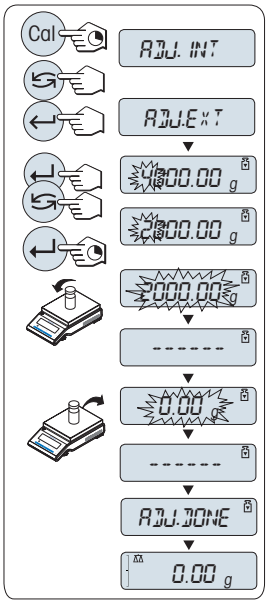
The balance adjusts itself automatically. The adjusting is finished when the message "**ADJ.DONE**" appears briefly on the display. The balance returns to the last active application and is ready for operation.

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

Attention

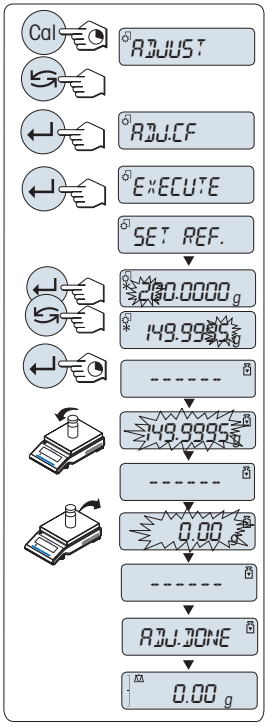
This function should be executed only by trained personnel.

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 Transporting the Balance

Switch off the balance and remove the power cable and any interface cable from the balance. Refer to the notes in Section "Selecting the location" regarding the choice of an optimal location.

Transporting Over Short Distances

For balances with a draft shield: Observe the following instructions to transport your balance over a short distance to a new location: **Never lift the balance using the glass draft shield. The draft shield is not sufficiently fastened to the balance.**

Transporting Over Long Distances

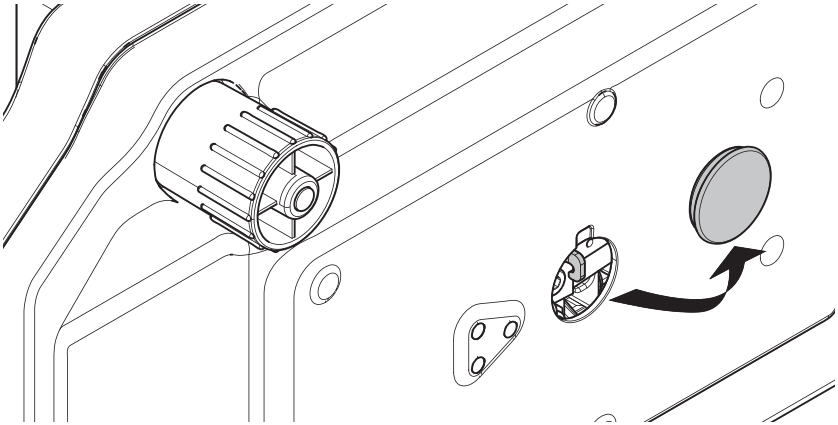
If you would like to transport or send your balance over long distances, **use the complete original packaging**.

4.10 Weighing Below the Balance

The balances are equipped with a hanger for carrying out weighings below the work surface (weighing below the balance).

Attention

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

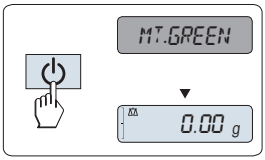


1 Switch off the balance and remove the power cable and any interface cable from the balance.
2 Remove weighing pan, pan support and draft shield element if present.
3 Turn the balance carefully on its side.
4 Remove the cap. Keep it for later use.
5 Turn the balance to its normal position and simply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

5 Weighing Made Simple

This section shows you how to perform simple weighings and how you can accelerate the weighing process.

5.1 Switching the Balance On or Off



Switching on

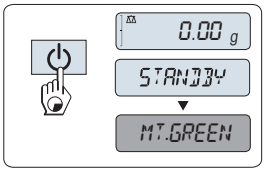
▶ The Balance is in "**STANDBY**" mode. "**MT.GREEN**" appears on the display.

– 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.



Switching off into standby mode

– Press and hold the «⏻» key until "**STANDBY**" appears on the display. Release the key.

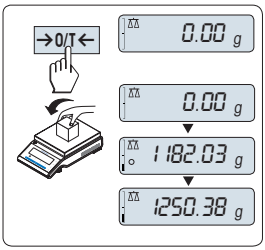
⇨ "**MT.GREEN**" appears on the display.

Note

- Once your balance has been switched off, it is in energy saver mode "**STANDBY**". In this case your balance needs no warm-up time in the standby mode and is immediately ready for weighing.

  If you wish to perform a weighing, you only need to place the sample on the weighing pan and the balance immediately displays the result. There is no need to switch it on with the «⏻» key (with approved balances only possible in selected countries)
- To completely switch off the balance, disconnect it from the power supply.

5.2 Performing a Simple Weighing



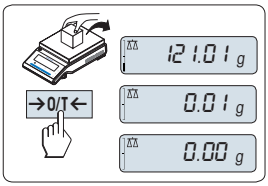
1 Press «→0/T←» to zero the balance.
Note: If your balance is not in the weighing mode, first press and hold the «⚖» key until "**WEIGH**" appears in the display. Release the key. Your balance is in the weighing mode.

2 Place weighing sample on the weighing pan.

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

4 Read the result.

5.3 Zero Setting / Taring

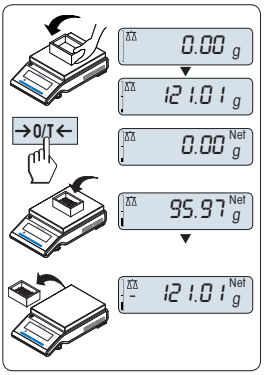


Zero setting

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**").

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



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.

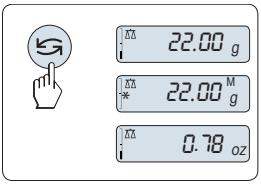
2 Press «→0/T←» to tare the balance.

"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.

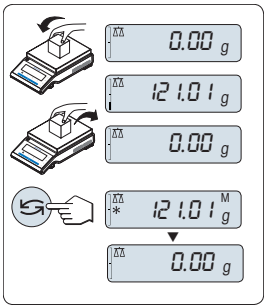
5.4 Switching Weight Units



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

5.5 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.

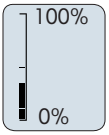
3 Press «↻». The display shows last stored stable weight value for 5 seconds together with asterisk (*) and Memory (M) symbols. After 5 seconds the display goes back to zero. This can be repeated unlimited times.

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.

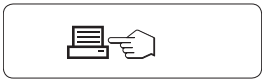
Note: If the power is switched off, the recall value is lost. The recall value can not be printed.

5.6 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 whether the load on the balance approaches the maximum load.

5.7 Print / Transmit Data



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

6 The Menu

6.1 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 33).

Note

See Quick Guide for the graphical overview of the menu or Menu Map (page 98) with all setting possibilities.

Menu "BASIC"

Topic	Explanation	Description
DATE	Setting the current date.	see (page 34)
TIME	Setting the current time.	see (page 34)
1/10 D	Setting display increment (1/10d function)	see (page 34)
UNIT 1	Specification of the 1st weight unit in which the balance should show the result.	see (page 34)
UNIT 2	Specification of the 2nd weight unit in which the balance should show the result.	see (page 35)
SET ID	Setting an identification.	see (page 35)
PRT.MENU	Printing the settings.	see (page 35)
RESET	Call up of the factory settings.	see (page 35)

Menu "ADVANCE."

Topic	Explanation	Description
ENVIRON.	Matching the balance to the ambient conditions.	see (page 35)
ADJ.LOCK	Switching the adjustment function on or off.	see (page 36)
DATE.FRM	Setting the date format.	see (page 36)
TIME.FRM	Preselection of the time format.	see (page 36)
RECALL	Switching the application "Recall" for storing stable weights on or off.	see (page 36)
STANDBY	Setting the time after which the balance should be switched off automatically.	see (page 36)
B.LIGHT	Switching on or off the display backlight.	see (page 37)
A.ZERO	Switching the automatic zero correction (Autozero) on or off.	see (page 37)
ZERO.RNG	Setting the zero limit of the zero/tare key.	see (page 37)
SRV.ICON	Switching the service reminder (service icon) on or off.	see (page 37)
SRV.D.RST	Reset service date and hours (service reminder)	see (page 37)

Also see:

- Interface Menu (page 37-38)
- Interface Menu (page 39)

Menu "INT.FACE"

Topic	Explanation	Description
RS232	Matching the serial interface RS232C to a peripheral unit.	see (page 37-38)
HEADER	Setting the header for printout of individual values.	see (page 39)
SINGLE	Setting the information for printout of individual values.	see (page 39)
SIGN.L	Setting the footer for printout of individual values.	see (page 39)
LN.FEED	Setting line feed for printout of individual values.	see (page 39)
ZERO.PRT	Setting the auto print function for printing zero.	see (page 39)
COM.SET	Setting the data communication format of the serial interface RS232C.	see (page 39-40)
BAUD	Setting the transfer speed of the serial interface RS232C.	see (page 40)
BIT.PAR.	Setting the character format (Bit/Parity) of the serial interface RS232C.	see (page 41)
STOPBIT	Setting the character format (stop bit) of the serial interface RS232C.	see (page 41)
HD.SHK	Setting the transfer protocol (Handshake) of the serial interface RS232C.	see (page 41)
RS.TX.E.O.L.	Setting the end of line format of the serial interface RS232C.	see (page 41)
RS.CHAR	Setting the char set of the serial interface RS232C.	see (page 41-42)
INTERVL.	Selection of the time interval for the simulated print key press.	see (page 42)

Also see:

- Interface Menu (page 37-38)
- Interface Menu (page 39)

6.2 Description of Menu Topics

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

6.2.1 Main Menu

Selecting the menu.

"**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.

Note:

- The menu selection "**BASIC**", "**ADVANCE.**" or "**INT.FACE**" can not be saved.
- To activate "**PROTECT**" "**ON**" or "**OFF**", this selection must be saved.

6.2.2 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 (to adjust summer or winter time). **(Factory setting)**
"**-1H**"	Set the current time backwards by 1 hour (to adjust summer or winter time).
"**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.
- Conversion table for weight units see chapter Appendix.

Units:

g [1)]	Gram	**dwt**	Pennyweight
kg [2)]	Kilogram	**mom**	Momme
mg	Milligram	**msg**	Mesghal
ct	Carat	**tlh**	Tael Hong Kong
lb [2)]	Pound	**tls** [3)]	Tael Singapore
oz	Ounce (avdp)	**tlt**	Tael Taiwan
ozt	Ounce (troy)	**tola**	Tola
GN	Grain	**baht**	Baht

[1)] factory setting
[2)] not with 0.1 mg balances
[3)] the Malaysian tael has the same value

"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.

6.2.3 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. (**Factory setting**)
A.ON		Automatic standby activated.
	"60"	Defines the time in minutes of inactivity for activating standby function. Setting range: 2...720 minutes

"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 after one Year or 8000 operating hours 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 and hours.
Note: This menu topic is only available if "**SRV.ICON**" setting "**ON**" was selected.

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

6.2.4 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 found in section "Appendix", as well as the printer-specific user's manual.
"**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. • Not available on Win7.
"**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, 19200 and 38400 bd. (default: **9600 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

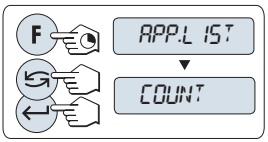
Factory setting: 0 sec

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

7 Applications

7.1 Application "Piece Counting"

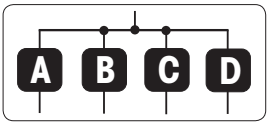
The "**Piece Counting**" application allows you to determine the number of pieces put on the weighing pan. All pieces must be of approximately equal weight, since the number of pieces is determined on the basis of average weight.



1 Call-up "**APP.LIST**" by pressing and holding «**F**».

2 Select application **COUNT** by scrolling with «↻».

3 Activate function **COUNT** by pressing «↵».



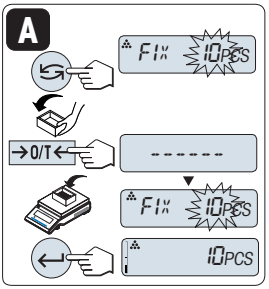
Piece Counting first requires the setting of a reference weight, there are 4 possibilities:

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

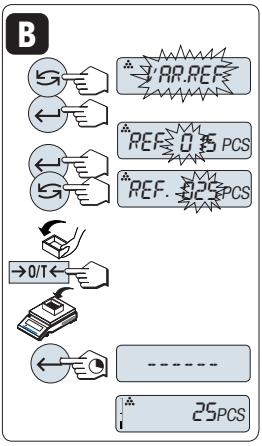
A **Setting the reference by multiple pieces with fix reference values.**

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 needed: place empty container on the weighing pan and 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

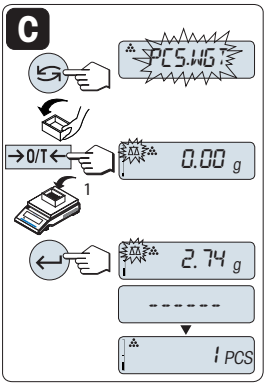
3 To select a digit, press «↵» (cyclically from left to right).
⇨ The selected digit is blinking.

4 To change the digit, press «↻».

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

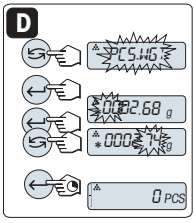
1 Select "**PCS.WGT**" by scrolling with «↻».

2 Press «→0/T←» to tare. If needed: place empty container on the weighing pan and 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 returns 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:

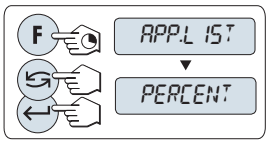
- The "**RECALL**" value is displayed with an asterisk (*) and icon "M" and can not be printed.
- Take into account minimum values: min. reference weight = 10d (10 digits), min. piece weight* = 1d (1 digit)!
  * with approved balances in selected countries: min 3e
- The current reference weight remains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

7.2 Application "Percent Weighing"

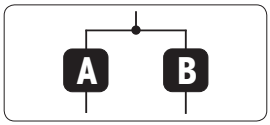
The "**Percent Weighing**" application allows you to check a sample weight as percentage to a reference target weight.



1 Call-up "**APP.LIST**" by pressing and holding «**F**».

2 Select application **PERCENT** by scrolling with «↻».

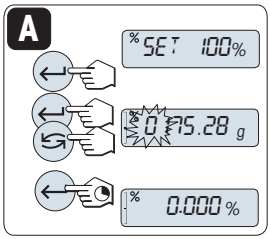
3 Activate function **PERCENT** by pressing «↵».



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

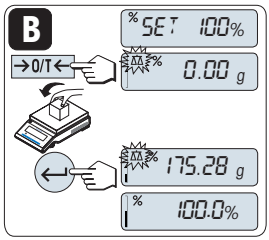
A **Setting the reference by manual mode (enter 100%)**

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%)**

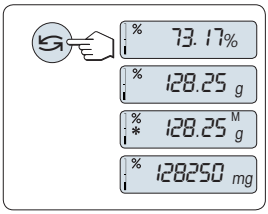
1 Press «→0/T←» to tare the balance and to activate the weighing mode. If needed: place empty container on the weighing pan and tare again.

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:

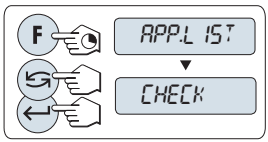
- The recall value is displayed with an asterisk (*) as well as icon "M" and can not be printed.
- The current set weight remains stored until it is redetermined.

Exit current application

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

7.3 Application "Check Weighing"

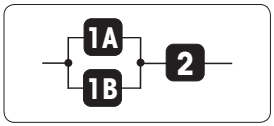
The "**Check weighing**" application allows you to check the deviation of a sample weight within a tolerance limit to a reference target weight.



1 Call-up "**APP.LIST**" by pressing and holding «**F**».

2 Select application **CHECK** by scrolling with «↻».

3 Activate function **CHECK** by pressing «↵».



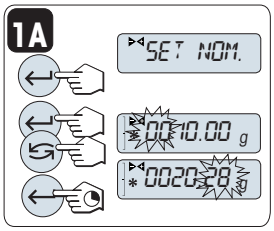
Step 1: Check Weighing first requires the setting of a reference weight that should corresponds to the nominal weight, there are 2 possibilities:

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**.



Setting possibility:

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

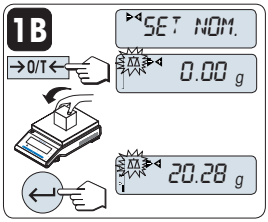
1 Press «↵» to activate manual mode.

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.



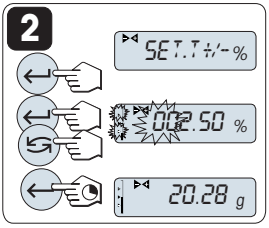
Setting possibility:

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

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 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.

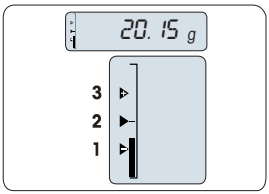
4 To change the digit, press «↻».

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.

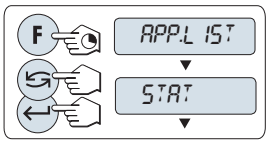
1 Lower limit
2 Target weight
3 Upper limit

Exit current application

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

7.4 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 «↻».

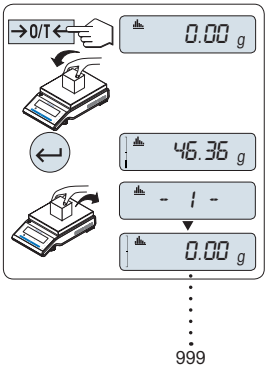
3 Activate function **STAT.** by pressing «↵».

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.

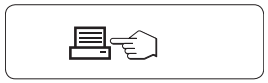
2 Load the first sample weight.

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.



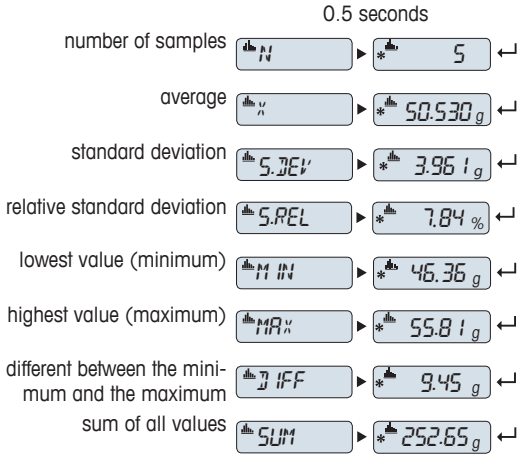
Results:

– 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.



Printout:

```
------ Statistics ------
21.Jan 2012         12:56

Balance Type       ME4002
SNR           1234567890
-----------------------
1                46.36 g
2                55.81 g
3                47.49 g
4                53.28 g
5                49.71 g
n                     5
x              50.530 g
s dev           3.961 g
s rel            7.84 g
Min.            46.36 g
Max.            55.81 g
Diff             9.45 g
Sum            252.65 g
-----------------------
```

Exit current application

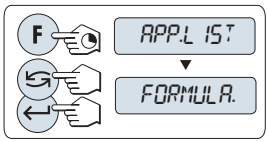
To exit the current application and to return to simple weighing mode, press and hold «⚖» (longer than 1.5s).

7.5 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.

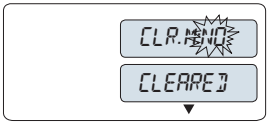
Note
Connect a printer or a PC if present.



1 Call-up "**APP.LIST**" by pressing and holding «**F**».

2 Select application **FORMULA.** by scrolling with «↻».

3 Activate function **FORMULA.** by pressing «↵».

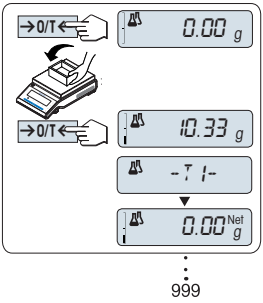


Memory clear question

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):

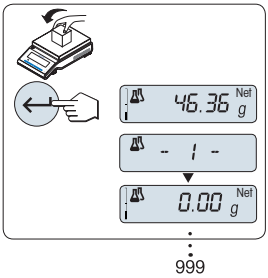
1 Press «→0/T←» to zero or tare the balance if needed.

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:

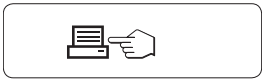
1 Load the first component weight.

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.



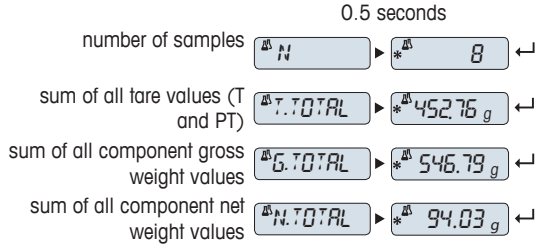
Displayed results:

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

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

Results:

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



Printout:

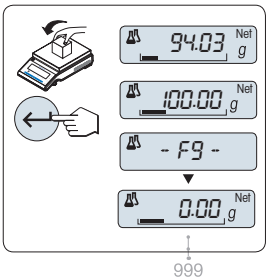
```
------ Formulation -----
21.Jan 2012         12:56

Balance Type       ME4002
SNR            1234567890
------------------------
1 T               10.33 g
1 N                8.85 g
2 N                9.23 g
2 T               10.84 g
3 N                7.43 g
.
.
n                     8
T Total          452.76 g
G Total          546.79 g

N Total           94.03 g
------------------------
```

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:

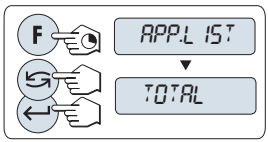
The same procedure, beginning with starting up the "**FILL UP**" function.

Exit current application

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

7.6 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 «↻».

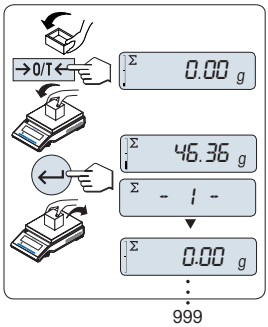
3 Activate function **TOTAL** by pressing «↵».

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.

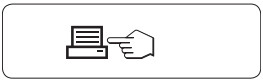
2 Load the first sample weight.

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.



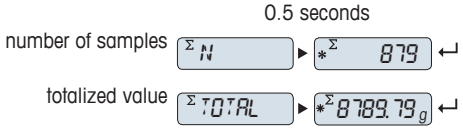
Results:

– 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.



Printout:

```
------- Totaling -------
21.Jan 2012        12:56

Balance Type       ME2002
SNR           1234567890
-----------------------
1                46.36 g
2                55.81 g
3                47.49 g
4                53.28 g
5                49.71 g
6                53.93 g
.
.
.
n                    879
Total          8789.79 g
-----------------------
```

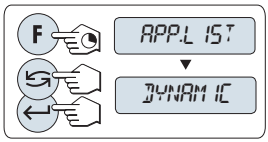
Exit current application

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

7.7 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.

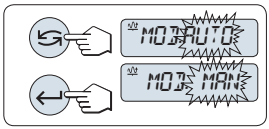
Note: "Switching Units" and "**RECALL**" Functions are not available in this Application.



1 Call-up "**APP.LIST**" by pressing and holding «**F**».

2 Select application **DYNAMIC** by scrolling with «↻».

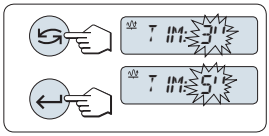
3 Activate function **DYNAMIC** by pressing «↵».



1 Setting "Auto Start" or "Manual Start":

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.



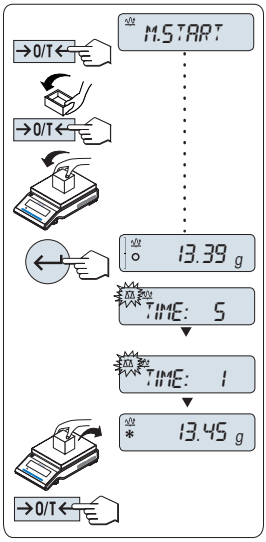
2 Setting the weighing time:

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 returns 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:

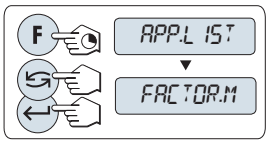
- The remaining weighing time (in seconds) is displayed continuously. You can cancel the countdown by pressing «**C**».
- The weight value remains in the display until the sample weight is removed from weighing pan ("Auto Start" only) or «→0/T←» is pressed.

Exit current application

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

7.8 Application "Multiplication Factor Weighing"

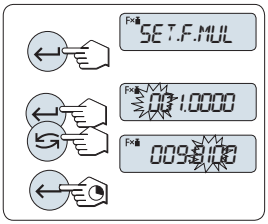
The "**Multiplication Factor Weighing**" application allows you to multiply the weight value (in grams) by a predefined factor (result = factor * weight) and have it calculated to a predefined number of decimal places.



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:

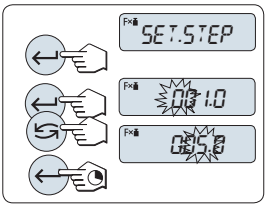
1 Press «» to execute "**SET.F.MUL**". Either the factor 1 appears as default value or the factor that was saved most recently.

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.

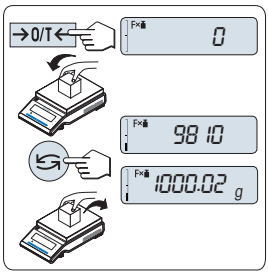
3 To change the digit, press «».

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 returns 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:

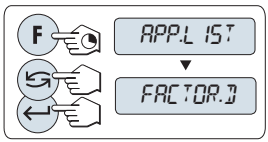
You can use the «⟲» key to toggle between the calculated Value, weight value "**UNIT 1**", "**RECALL**" value (if selected) and weight value "**UNIT 2**" (if different from "**UNIT 1**").

Exit current application

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

7.9 Application "Division Factor Weighing"

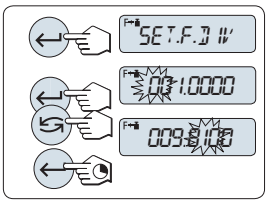
The "**Division Factor Weighing**" divide a predefined factor by the weight value (in grams) (result = factor / weight) and have it rounded to a predefined number of decimal places.



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:

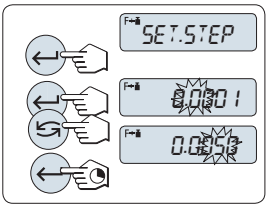
1 Press «↵» to execute "**SET.F.DIV**". Either the factor 1 appears as default value or the factor that was saved most recently.

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.

1 Press «↵» to execute "**SET.STEP**".

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

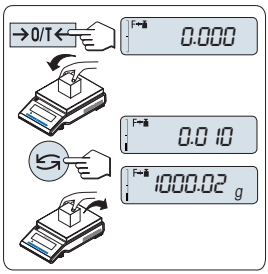
3 To change the digit, press «↻».

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 returns 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).

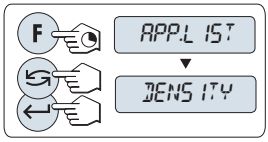
7.10 Application "Density"

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.

Note for performing of density determinations:

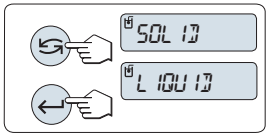
- You can also use the hanger for weighing below the balance which belongs to your balance.
- We recommend you to consult the operating instructions enclosed with the density kit.
- If a METTLER TOLEDO printer is attached to your balance, the settings will be automatically recorded.



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.

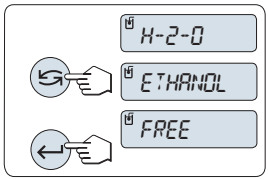
2 Press «↵» to confirm the selection

Exit current application

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

7.10.1 Density Determination of Solids

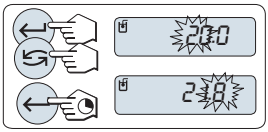
Requirement: The method "**SOLID**" is set.



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.

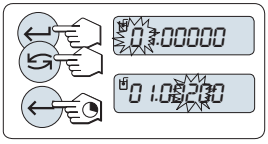
3 To select a digit, press «↵» (cyclically from left to right).

⇨ 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**".

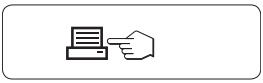
1 Load the solid.

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:

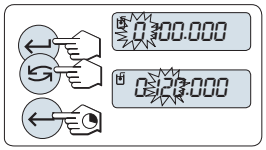
Press «  », the result will be printed.

Sample printout:

```
---- Density Solid -----
18.Mar 2012        20:14
Balance Type       ME204
SNR           1234567890
------------------------

ID:     ................

Liquid:
H-2-O      0.99822 g/cm3
Temp.         20.0 °C
Weight in air:
           60.0020 g
Weight in liquid:
           49.9997 g
Volume of solid:
             1.625 cm3

Density:     5.988 g/cm3
             ===========

Signature

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

7.10.2 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.

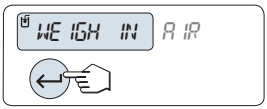
Note: If without any key press within 60 seconds or by pressing «**C**», the balance returns to the previous active application.

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**".

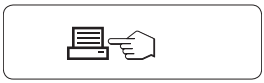
1 Pour the liquid into the beaker. Make sure that the sinker is immersed by al least 1 cm in the liquid, and that there are no air bubbles in the container.

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.

Sample printout:

```
---- Density Liquid -----
18.Mar 2012        20:14
Balance Type       ME204
SNR           1234567890
------------------------

ID:     ................

Temp. of liquid:
            ............

Displaced liquid:
           10.0023 g

Density:     1.000 g/cm3
             ===========

Signature

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

7.10.3 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

Density Table for Distilled Water

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

Density Table for Ethanol

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".

8 Communication with Peripheral Devices

8.1 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

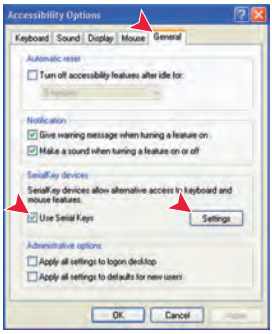
- PC with Microsoft Windows XP® operating system and serial interface RS232.
- Windows Application (e.g. Excel).
- Balance to PC connection with cable RS232 (e.g. No. 11101051 see chapter accessories).
- Balance Interface Setting (see Interface Menu):
  - Topic "**RS232**": set "**PC-DIR.**" and select the most appropriate option for the desired weighing result.
  - Save changes.

Settings at the PC

Note:

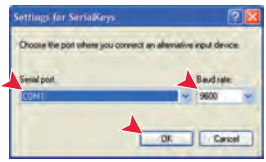
- With all country-specific keyboards, in which the "Shift" key must be pressed for entering numbers, "Caps Lock" must be activated for transferring of correct data (e.g. with french keyboards).
- The following examples are based on Windows XP.

1 Click "start".
2 Click "ControlPanel".
3 Click "Accessibility Options" in the Control Panel.



Accessibility Option

1 Click "General" Tab.
2 Enter a check mark at "Use Serial Keys".
3 Click "Settings".



Settings for SerialKeys

1 Select the serial port to be used for connection with the balance.
2 Set the baud rate to 9600
3 Click "OK".

Complete the settings

1 Click "Apply" when active (wait until active).

2 Click "OK" .

Note: If the "serial key" is enabled, applications that use the same port may not function correctly. Remove the check mark from the check box "Use Serial Keys" to disable serial key function.

Checking Operation

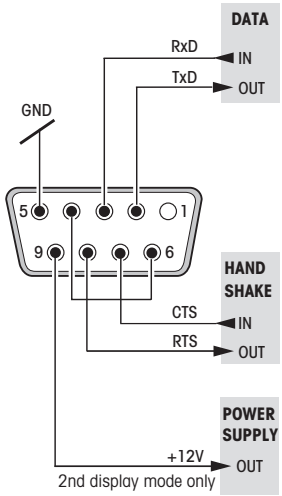
1 Start Excel (or another application) at the PC.

2 Activate a cell in Excel.

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

8.2 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)

8.3 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 depending on the functionality of the balance.

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

▶ www.mt.com/sics-newclassic

9 Firmware (Software) Updates

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

9.1 Operating Principle

You will find all the relevant information and updates for your balance on the METTLER TOLEDO website at the following address:

www.mettler-toledo-support.com

A program known as the "**e-Loader II**" is loaded onto your computer together with the firmware update. You can use this program to download the firmware to the balance. The "e-Loader II" can also save the settings in your balance before the new firmware is downloaded to it. You can reload the saved settings into the balance manually or automatically after the software is downloaded.

If the selected update includes an application that is not described in these instructions (or that has been updated in the meantime) you can download the corresponding instructions in Adobe Acrobat® PDF format.

Note

New applications might not be visible unless the type data are updated by a service technician.

Requirements

The minimum requirements for obtaining applications from the Internet and downloading them into your balance are as follows:

- PC with one of the following Microsoft Windows® operating system:
  - Microsoft® Windows® XP Home or Professional with Service Pack 3 (32 bit)
  - Microsoft® Windows Vista® Home Premium, Business, Ultimate, or Enterprise with Service Pack 2 (32 bit and 64 bit)
  - Microsoft® Windows 7 with Service Pack 1 Home Premium, Professional, Ultimate, or Enterprise (32 bit and 64 bit)
- Internet connection and web browser (e.g. MS Internet Explorer).
- PC to balance connection cable (e.g. No. 11101051 see chapter accessories)

9.2 Update Procedure

Installing the "e-Loader II" software from the Internet onto the PC.

1 Connect to the Internet.

2 Go to the site "**www.mettler-toledo-support.com**".

3 Enter the information required for registration on the METTLER TOLEDO Balance Support Site.

4 Click the "Customer Support" link and log in.

5 Click your Balance.

6 Click the firmware version you need and install it.

Loading the new firmware into the balance.

– Start the "e-Loader II" and follow the instructions, which will take you step-by-step through the installation.

10 Error and Status Messages

10.1 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.	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.

Error Message	Cause	Rectification
MEM.FULL	Memory full.	Clear the memory and start a new evaluation.
FACTOR OUT OF RANGE	Factor is outside the allow range.	Select a new factor.
STEP OUT OF RANGE	Step is outside the allow range.	Select a new step.
OUT OF RANGE	Sample weight is outside the allow range.	Unload the pan and load a new sample weight.

10.2 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**")

11 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, mild cleaning agent.

Please observe the following notes:

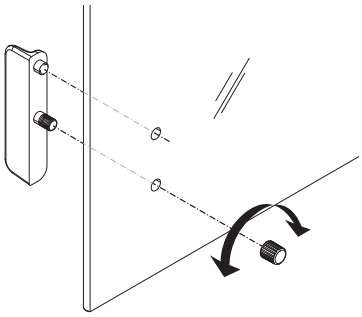
- The balance must be disconnected from the power supply
- Ensure that no liquid comes into contact with the balance or the AC adapter.
- Never open the balance or AC adapter – they contain no components, which can be cleaned, repaired or replaced by the user.

- On no account use cleaning agents which contain solvents or abrasive ingredients, as this can result in damage to the operation panel overlay.
- Do not use wet, but only damp cloth for cleaning.

Please contact your METTLER TOLEDO dealer for details of the available service options. Regular servicing by an authorized service engineer ensures constant accuracy for years to come and prolongs the service life of your balance.

11.1 Draft Shield

Removing or inserting sliding glass doors



It is possible to remove the sliding glass doors for cleaning or for replacing. In this case you have to remove the handle first. Installing the handle after insertion of the glass door.

Note
Front and rear glass panels cannot be removed.

12 Technical Data

12.1 General Data

Power Supply

• AC operation:	AC/DC Adapter Primary: 100V–240V, 50/60Hz, 0.3 A Secondary: 12VDC, 0.84A (with electronic overload protection) Power supply to the balance: 8–20VDC, 10W ⚠ Use only with a tested AC Adapter with SELV output current. Ensure correct polarity 
• Power consumption in standby mode	< 1 W (**MT.GREEN**)

Protection and Standards

• Overvoltage categorie:	Class II
• Degree of pollution:	2
• Degree of protection:	Protected against dust and water.
• Standards for safety and EMC:	See Declaration of Conformity
• Range of application:	For use only in dry interior rooms

Environmental conditions

• Height above mean sea level:	-50 m up to +4000 m
• Ambient temperature range:	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% to 80 % at 31 °C, linearly decreasing to 50 % at 40 °C, noncondensing

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)

12.2 Model-Specific Data

12.2.1 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)	0.24 g	0.24 g
Minimum sample weight (U=1 %, k=2)	0.016 g	0.016 g
Minimum sample weight OIML	0.01 g	0.01 g
Settling time	2.5 s	2.5 s
Adjustment	Int. Cal	Ext. Cal
Interface	1 RS232	1 RS232
Balance dimensions (W x D x H)	210x344x344 mm	210x344x344 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)	0.24 g	0.24 g
Minimum sample weight (U=1 %, k=2)	0.016 g	0.016 g
Minimum sample weight OIML	0.01 g	0.01 g

	ME104	ME104E
Settling time	2.5 s	2.5 s
Adjustment	Int. Cal	Ext. Cal
Interfaces	2 RS232	1 RS232
Balance dimensions (W x D x H)	210x344x344 mm	210x344x344 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)	0.24 g	0.24 g
Minimum sample weight (U=1 %, k=2)	0.016 g	0.016 g
Minimum sample weight OIML	0.01 g	0.01 g
Settling time	2 s	2 s
Adjustment	Int. Cal	Ext. Cal
Interfaces	2 RS232	1 RS232
Balance dimensions (W x D x H)	210x344x344 mm	210x344x344 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

12.2.2 Balances with Readability of 1 mg with Draft Shield

Technical Data

	ME103	ME103E
Limit values		
Maximum capacity	120 g	120 g
Readability	0.001 g	0.001 g
Repeatability (at nominal load)	0.001 g	0.001 g
Linearity deviation	0.002 g	0.002 g
Sensitivity temperature drift	3 ppm/°C	3 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)	0.24 g	0.24 g
Minimum sample weight (U=1 %, k=2)	0.016 g	0.016 g
Minimum sample weight OIML	0.01 g	0.01 g
Settling time	3 s	3 s
Adjustment	Int. Cal	Ext.Cal
Interface	1 RS232	1 RS232
Balance dimensions (W x D x H)	210x319x289 mm	210x319x289 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	0.001 g	0.001 g
Repeatability (at nominal load)	0.001 g	0.001 g
Linearity deviation	0.002 g	0.002 g
Sensitivity temperature drift	3 ppm/°C	3 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)	0.24 g	0.24 g
Minimum sample weight (U=1 %, k=2)	0.016 g	0.016 g
Minimum sample weight OIML	0.01 g	0.01 g
Settling time	3 s	3 s
Adjustment	Int. Cal	Ext.Cal

	ME203	ME203E
Interface	1 RS232	1 RS232
Balance dimensions (W x D x H)	210x319x289 mm	210x319x289 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	0.001 g	0.001 g
Repeatability (at nominal load)	0.001 g	0.001 g
Linearity deviation	0.002 g	0.002 g
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)	0.24 g	0.24 g
Minimum sample weight (U=1 %, k=2)	0.016 g	0.016 g
Minimum sample weight OIML	0.01 g	0.01 g
Settling time	2 s	2 s
Adjustment	Int. Cal	Ext.Cal
Interface	1 RS232	1 RS232
Balance dimensions (W x D x H)	210x319x289 mm	210x319x289 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	0.001 g	0.001 g

	ME403	ME403E
Repeatability (at nominal load)	0.001 g	0.001 g
Linearity deviation	0.002 g	0.002 g
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)	0.24 g	0.24 g
Minimum sample weight (U=1 %, k=2)	0.016 g	0.016 g
Minimum sample weight OIML	0.01 g	0.01 g
Settling time	2 s	2 s
Adjustment	Int. Cal	Ext.Cal
Interface	1 RS232	1 RS232
Balance dimensions (W x D x H)	210x319x289 mm	210x319x289 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

12.2.3 Balances with Readability of 0.01/0.1 g

Technical Data

	ME802	ME802E
Limit values		
Maximum capacity	820 g	820 g
Readability	0.01 g	0.01 g
Repeatability (at nominal load)	0.01 g	0.01 g
Linearity deviation	0.02 g	0.02 g
Sensitivity temperature drift	2 ppm/°C	2 ppm/°C
Typical values		
Repeatability (at nominal load)	0.007 g	0.007 g
Linearity deviation	0.06 g	0.06 g
Minimum sample weight (acc. to USP)	21 g	21 g
Minimum sample weight (U=1 %, k=2)	1.4 g	1.4 g
Minimum sample weight OIML	0.5 g	0.5 g
Settling time	1 s	1 s
Adjustment	Int. Cal	Ext.Cal
Interfaces	1 RS232	1 RS232
Balance dimensions (W x D x H)	200x319x100 mm	200x319x100 mm
Weighing pan dimensions	180x180 mm	180x180 mm

	ME802	ME802E
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	0.01 g	0.01 g
Repeatability (at nominal load)	0.01 g	0.01 g
Linearity deviation	0.02 g	0.02 g
Sensitivity temperature drift	2 ppm/°C	2 ppm/°C
Typical values		
Repeatability (at nominal load)	0.007 g	0.007 g
Linearity deviation	0.06 g	0.06 g
Minimum sample weight (acc. to USP)	21 g	21 g
Minimum sample weight (U=1 %, k=2)	1.4 g	1.4 g
Minimum sample weight OIML	0.5 g	0.5 g
Settling time	1 s	1 s
Adjustment	Int. Cal	Ext.Cal
Interfaces	1 RS232	1 RS232
Balance dimensions (W x D x H)	200x319x100 mm	200x319x100 mm
Weighing pan dimensions	180x180 mm	180x180 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	2200 g	2200 g
Readability	0.01 g	0.01 g
Repeatability (at nominal load)	0.01 g	0.01 g
Linearity deviation	0.02 g	0.02 g
Sensitivity temperature drift	2 ppm/°C	2 ppm/°C
Typical values		
Repeatability (at nominal load)	0.007 g	0.007 g

	ME2002	ME2002E
Linearity deviation	0.06 g	0.06 g
Minimum sample weight (acc. to USP)	21 g	21 g
Minimum sample weight (U=1 %, k=2)	1.4 g	1.4 g
Minimum sample weight OIML	0.5 g	0.5 g
Settling time	1 s	1 s
Adjustment	Int. Cal	Ext.Cal
Interfaces	1 RS232	1 RS232
Balance dimensions (W x D x H)	200x319x100 mm	200x319x100 mm
Weighing pan dimensions	180x180 mm	180x180 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	3200 g	3200 g
Readability	0.01 g	0.01 g
Repeatability (at nominal load)	0.01 g	0.01 g
Linearity deviation	0.02 g	0.02 g
Sensitivity temperature drift	2 ppm/°C	2 ppm/°C
Typical values		
Repeatability (at nominal load)	0.007 g	0.007 g
Linearity deviation	0.06 g	0.06 g
Minimum sample weight (acc. to USP)	21 g	21 g
Minimum sample weight (U=1 %, k=2)	1.4 g	1.4 g
Minimum sample weight OIML	0.5 g	0.5 g
Settling time	1 s	1 s
Adjustment	Int. Cal	Ext.Cal
Interface	1 RS232	1 RS232
Balance dimensions (W x D x H)	200x319x100 mm	200x319x100 mm
Weighing pan dimensions	180x180 mm	180x180 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	4200 g	4200 g
Readability	0.01 g	0.01 g
Repeatability (at nominal load)	0.01 g	0.01 g
Linearity deviation	0.02 g	0.02 g
Sensitivity temperature drift	2 ppm/°C	2 ppm/°C
Typical values		
Repeatability (at nominal load)	0.007 g	0.007 g
Linearity deviation	0.06 g	0.06 g
Minimum sample weight (acc. to USP)	21 g	21 g
Minimum sample weight (U=1 %, k=2)	1.4 g	1.4 g
Minimum sample weight OIML	0.5 g	0.5 g
Settling time	1 s	1 s
Adjustment	Int. Cal	Ext.Cal
Interface	1 RS232	1 RS232
Balance dimensions (W x D x H)	200x319x100 mm	200x319x100 mm
Weighing pan dimensions	180x180 mm	180x180 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

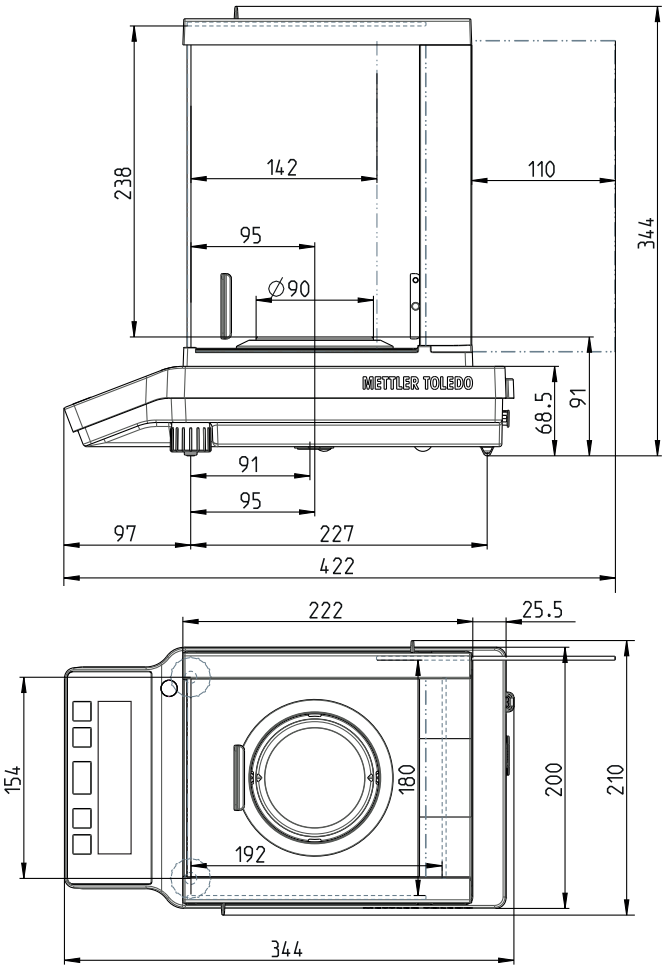
	ME4001	ME4001E
Limit values		
Maximum capacity	4200 g	4200 g
Readability	0.1 g	0.1 g
Repeatability (at nominal load)	0.1 g	0.1 g
Linearity deviation	0.2 g	0.2 g
Sensitivity temperature drift	2 ppm/°C	2 ppm/°C
Typical values		
Repeatability (at nominal load)	0.07 g	0.07 g
Linearity deviation	0.06 g	0.06 g
Minimum sample weight (acc. to USP)	210 g	210 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 x D x H)	200x319x100 mm	200x319x100 mm
Weighing pan dimensions	180x180 mm	180x180 mm

	ME4001	ME4001E
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

12.3 Dimensions

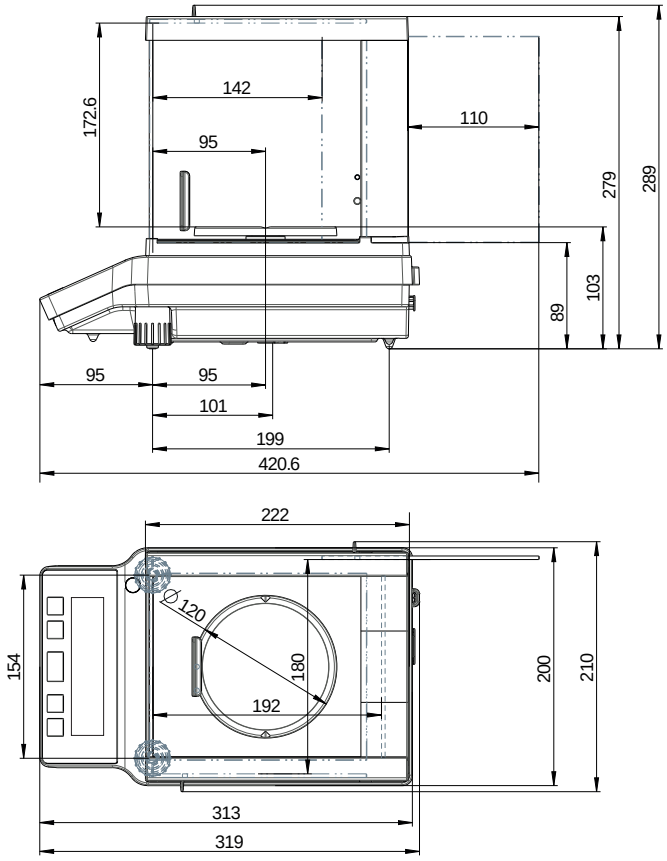
12.3.1 Balances with Readability of 0.1 mg with Draft Shield High

Models:
ME54
ME54E
ME104
ME104E
ME204
ME204E



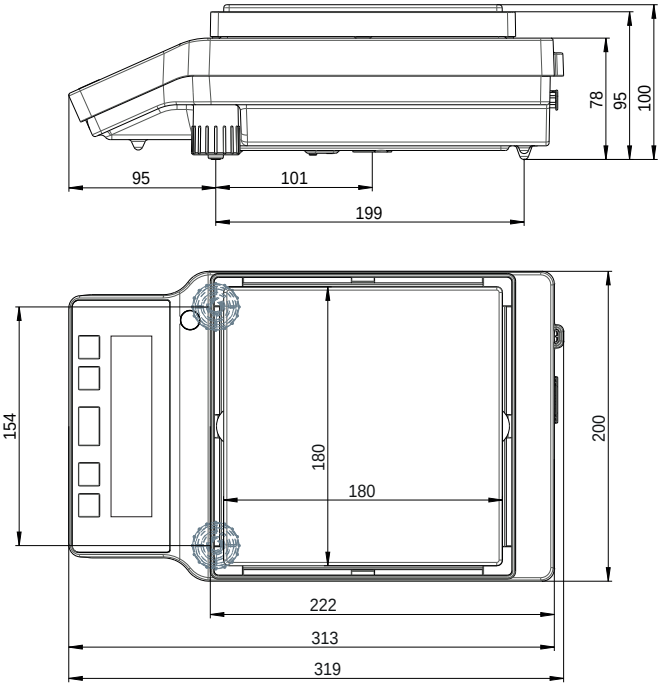
12.3.2 Balances with Readability of 1 mg with Draft Shield Low

Models:
ME203
ME203E
ME303
ME303E
ME403
ME403E



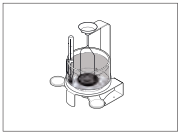
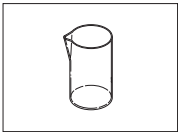
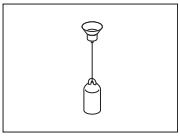
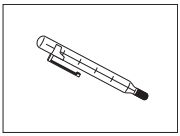
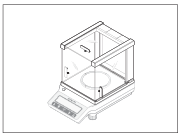
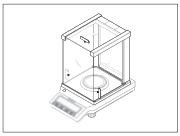
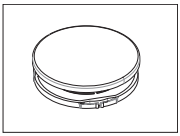
12.3.3 Balances with Readability of 0.01/0.1 g

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

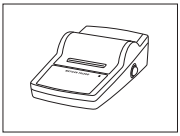


13 Accessories and Spare Parts

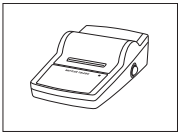
Accessories

	Description	Part No.
Density determination		
	Density kit ME-DNY-4 for NewClassic ME Balances 0.1 mg	30029886
	Glass beaker, height 100 mm, Ø 60 mm	00238167
	Sinker for density of liquids in conjunction with Density Kit Calibrated (sinker + certificate) Recalibrated (new certificate)	00210260 00210672 00210674
	Calibrated thermometer with certificate	11132685
Draft shields		
	Draft shield low with sliding doors "mg" (usable heigh 170 mm)	30046402
	Draft shield high with sliding doors "0.1 mg" (usable heigh 235 mm)	30046401
Weighing pans		
	Set of weighing pan Ø 160 mm with pan support for ME balances with readability of 0.01 g and 0.1 g using draft shield	30046407

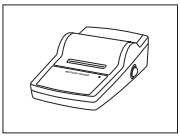
Printers



RS-P25 printer with RS232C connection to instrument	11124300
Paper roll, set of 5 pcs	00072456
Paper roll, self-adhesive, set of 3 pcs	11600388
Ribbon cartridge, black, set of 2 pcs	00065975

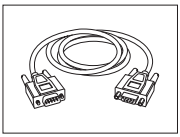


RS-P26 printer with RS232C connection to instrument (with date and time)	11124303
Paper roll, set of 5 pcs	00072456
Paper roll, self-adhesive, set of 3 pcs	11600388
Ribbon cartridge, black, set of 2 pcs	00065975

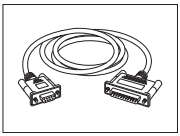


RS-P28 printer with RS232C connection to instrument (with date, time and applications	11124304
Paper roll, set of 5 pcs	00072456
Paper roll, self-adhesive, set of 3 pcs	11600388
Ribbon cartridge, black, set of 2 pcs	00065975

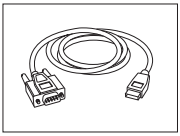
Cables for RS232C interface



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

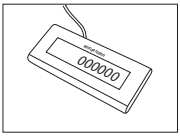


RS9 – RS25 (m/f): connection cable for PC, length = 1 m 11101052



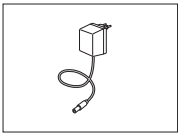
RS232 - USB converter cable – Cable with converter to connect a balance (RS232) to a USB port 64088427

Auxiliary displays

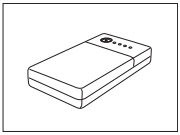


RS232 auxiliary display AD-RS-M7 12122381

Power supplies

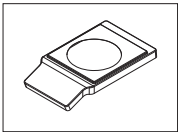


AC/DC universal adapter (EU, USA, AU, UK) 100–240 VAC, 50/60 Hz, 0.3 A, 12 VDC 0.84 A — 11120270

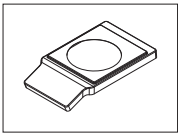


PowerPac-M-12V, for mains independent operation of balances, 12 VDC/1 A — 12122363

Protective covers

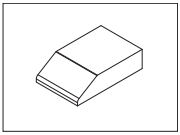


Protective cover for models with readability of 0.1 mg — 30026258

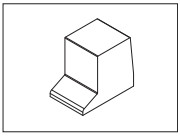


Protective cover for models with readability of 1 mg …0.1 g — 30026259

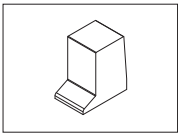
Dust covers



Dust cover for models without draft shield — 30029051



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

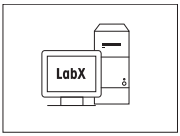


Dust cover for models with draft shield high (235 mm) — 30029049

Anti-theft devices

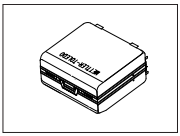
Steel cable 11600361

Software



LabX direct balance (simple data transfer) 11120340

Transport cases



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

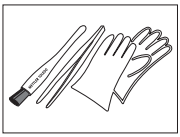
Transport case for models with draft shield low (1 mg, 170 mm) 30046405

Transport case for models without draft shield 30046406

Adjustment weights

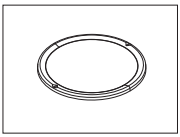
OIML / ASTM Weights (with calibration certificate)
see http://www.mt.com/weights

Miscellaneous

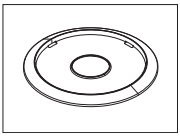


Tool kit, contains brush, tweezer and glove 30046403

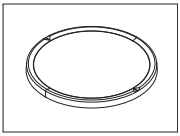
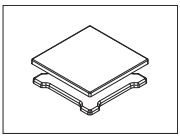
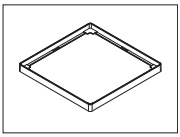
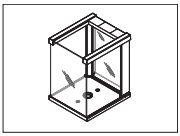
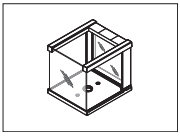
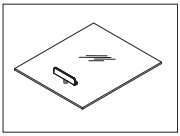
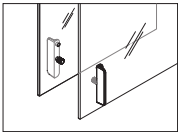
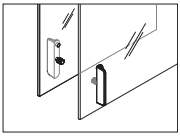
Spare Parts

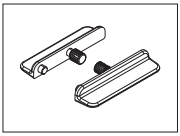


Weighing pan Ø 90 mm incl. pan support, 0.1 mg 30037737

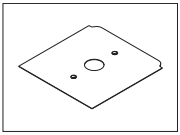


Draft shield element, 0.1 mg 12122043

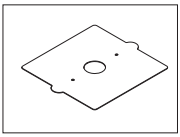
	Weighing pan Ø 120 mm incl. pan support, 1 mg	30042889
	Weighing pan 180 x 180 mm with pan support, 0.01 g and 0.1 g	30042895
	Draft shield element 180 x 180 mm, 0.01/0.1 g	30042897
	Draft shield high with mounted front and rear glass panels, without sliding doors, (0.1 mg, 235 mm)	30037731
	Draft shield low with mounted front and rear glass panels, without sliding doors, (1 mg, 170 mm)	30042884
	Sliding top door for draft shield high or low with mounted handle (170 mm or 235 mm)	30037733
	Pair of sliding side doors for draft shield high with mounted handles (left and right), 235 mm	30037732
	Pair of sliding side doors for draft shield low with mounted handles (left and right), 170 mm	30042885



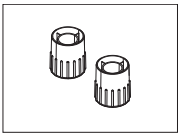
Pair of handles for sliding doors of draft shield 30037736



Bottom plate for draft shield 30037739



Bottom plate for models without draft shield 300042901



Pair of leveling feet 30037744

14 Appendix

14.1 Menu Map

Main Menu

Display		Remark	Description
BASIC	↵	Basic Menu	see (page 98)
ADVANCE.	↵	Advanced Menu	see (page 98-99)
INT.FACE	↵	Interface Menu	see (page 99-100)
PROTECT	↵	Protection Menu	see (page 100)

Basic Menu "BASIC"

Topic		Selection		Selection	Remark	Description
DATE	↵	01.01.12				see (page 34)
TIME	↵	**+1H**				see (page 34)
		-1H				
		SET.TIME	↵	12:00		
1/10 D	↵	**OFF**				see (page 34)
		ON				
UNIT 1	↵	**g**				see
		¦				
		kg				
UNIT 2	↵	**g**				see (page 35)
		¦				
		mg				
SET ID	↵					see (page 35)
PRT.MENU	↵				◇	see (page 35)
RESET	↵	**NO ?**				see (page 35)
		YES ?				

Also see:

- Basic Menu (page 34)

Advanced Menu "ADVANCE."

Topic		Selection		Selection	Remark	Description
ENVIRON.	↵	**STD.**				see (page 35)
		UNSTAB.				
		STABLE				
ADJ.LOCK	↵	**OFF**				see (page 36)
		ON				

Topic		Selection		Selection	Remark	Description
DATE.FRM	↵	**DD.MM.Y**				see (page 36)
		MM/DD/Y				
		Y-MM-DD				
		D.MMM Y				
		MMM D Y				
TIME.FRM	↵	**24:MM**				see (page 36)
		12:MM				
		24.MM				
		12.MM				
RECALL	↵	**OFF**				see (page 36)
		ON				
STANDBY	↵	**A.ON**	↵	…60 min…		see (page 36)
		A.OFF				
B.LIGHT	↵	**B.L.ON**				see (page 37)
		B.L.OFF				
A.ZERO	↵	**ON**			⊙	see (page 37)
		OFF				
ZERO.RNG	↵	21.00 g			⊙	see (page 37)
SRV.ICON	↵	**ON**				see (page 37)
		OFF				
SRV.D.RST	↵	**NO**?				see (page 37)
		YES?				

Interface Menu "INT.FACE"

Topic		Selection		Selection	Remark	Description
RS232	↵	**PRINTER**	↵	**PRT.STAB**		see (page 37-38)
				PRT.AUTO		
				PRT.ALL		
		PC-DIR.	↵	**PRT.STAB**		
				PRT.AUTO		
				PRT.ALL		
		HOST	↵	**SND.OFF**		
				SND.STB		
				SND.CONT		
				SND.AUTO		
				SND.ALL		
		2.DISP	↵			

Topic		Selection		Selection	Remark	Description
HEADER	↵	**NO**			◇	see (page 39)
		DAT/TIM				
		D/T/BAL				
SINGLE	↵	**NET**			◇	see (page 39)
		G/T/N				
SIGN.L	↵	**OFF**			◇	see (page 39)
		ON				
LN.FEED	↵	**00**			◇	see (page 39)
ZERO.PRT	↵	**OFF**			◈	see (page 39)
		ON				
COM.SET	↵	**MT-SICS**			◈	see (page 39-40)
		SART				
BAUD	↵	**9600**		600…384-00		see (page 40)
		⋮				
		4800				
BIT.PAR.	↵	**8/NO**				see (page 41)
		7/NO				
		7/MARK				
		7/SPACE				
		7/EVEN				
		7/ODD				
STOPBIT	↵	**1 BIT**				see (page 41)
		2 BITS				
HD.SHK	↵	**XON.XOFF**				see (page 41)
		RTS.CTS				
		OFF				
RS.TX.E.O.L.	↵	**CR LF**				see (page 41)
		CR				
		LF				
		TAB			◈	
RS.CHAR	↵	**IBM.DOS**				see (page 41-42)
		ANSI.WIN				
INTERVL.	↵	**00000**				see (page 42)

Protection Menu "PROTECT"

Topic		Selection		Selection	Remark	Description
PROTECT	↵	**OFF**				see (page 33)
		ON				

Legend

Factory setting

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

Not available with approved models

Not available with approved models with e = d

Settings are automatically set for the 2nd display

Only visible if "**PRINTER**" is selected.

Only visible if "**HOST**" is selected.

Only visible if "**PC-DIR.**" is selected.

Only visible if "**PRT.AUTO**" is selected.

Also see:

- Basic Menu (page 34)

14.2 Conversion Table for Weight Units

Kilogram	1 kg	=	1000.0	g	1 g	=	0.001	kg
Milligram	1 mg	=	0.001	g	1 g	=	1000.0	mg
Microgram	1 µg	=	0.000001	g	1 g	=	1000000.0	µg
Carat	1 ct	=	0.2	g	1 g	=	5.0	ct
Pound	1 lb	=	453.59237	g	1 g	≈	0.00220462262184-878	lb
Ounce (avdp)	1 oz	=	28.349523125	g	1 g	≈	0.03527396194958-04	oz
Ounce (troy)	1 ozt	=	31.1034768	g	1 g	≈	0.03215074656862-80	ozt
Grain	1 GN	=	0.06479891	g	1 g	≈	15.4323583529414	GN
Pennyweight	1 dwt	=	1.55517384	g	1 g	≈	0.643014931372560	dwt
Momme	1 mom	=	3.75	g	1 g	≈	0.266666666666667	mo-m
Mesghal	1 msg	≈	4.6083	g	1 g	≈	0.217	msg
Tael Hong Kong	1 tlh	=	37.429	g	1 g	≈	0.02671725132918-33	tlh
Tael Singapore (Malaysia)	1 tls	≈	37.7993641666-667	g	1 g	≈	0.02645547146218-53	tls
Tael Taiwan	1 tlt	=	37.5	g	1 g	≈	0.02666666666666-67	tlt

Tola	1 tola	=	11.6638038	g	1 g	≈	0.08573532418300-79	tola
Baht	1 baht	=	15.16	g	1 g	≈	0.06596306068601-58	baht

14.3 Recommended Printer Settings

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

Printer		Balance	Balance / Printer				
Model	**Char Set**	**Char Set**	**Baudrate**	**Bit / Parity**	**Stop Bits**	**Handshake**	**End of Line**
RS-P25/26/-28	ANSI/WIN Latin 1	ANSI/WIN	9600	8/NO	1	Xon/Xoff	<CR><LF> [1]
RS-P42/43/-45	IBM/DOS [1]	IBM/DOS	1200	8/NO	1	Xon/Xoff	<CR><LF> [1]

Brazil Portuguese

Printer		Balance	Balance / Printer				
Model	**Char Set**	**Char Set**	**Baudrate**	**Bit / Parity**	**Stop Bits**	**Handshake**	**End of Line**
RS-P25/26/-28	ANSI/WIN Latin 1	IBM/DOS	9600	8/NO	1	Xon/Xoff	<CR><LF> [1]
RS-P42/43/-45	— [2]	— [2]	— [2]	— [2]	— [2]	— [2]	— [2]

Russian

Printer		Balance	Balance / Printer				
Model	**Char Set**	**Char Set**	**Baudrate**	**Bit / Parity**	**Stop Bits**	**Handshake**	**End of Line**
RS-P25/26/-28	IBM/DOS Cyrillic	IBM/DOS	9600	8/NO	1	Xon/Xoff	<CR><LF> [1]
RS-P42/43/-45	— [2]	— [2]	— [2]	— [2]	— [2]	— [2]	— [2]

[1] Printer settings not available.

[2] Required font for this language not available.

15 Index

GWP® – Good Weighing Practice™

The global weighing guideline GWP® reduces risks associated with your weighing processes and helps to

- choose the appropriate balance
- reduce costs by optimizing testing procedures
- comply with the most common regulatory requirements

▶ www.mt.com/GWP

www.mt.com/newclassic

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