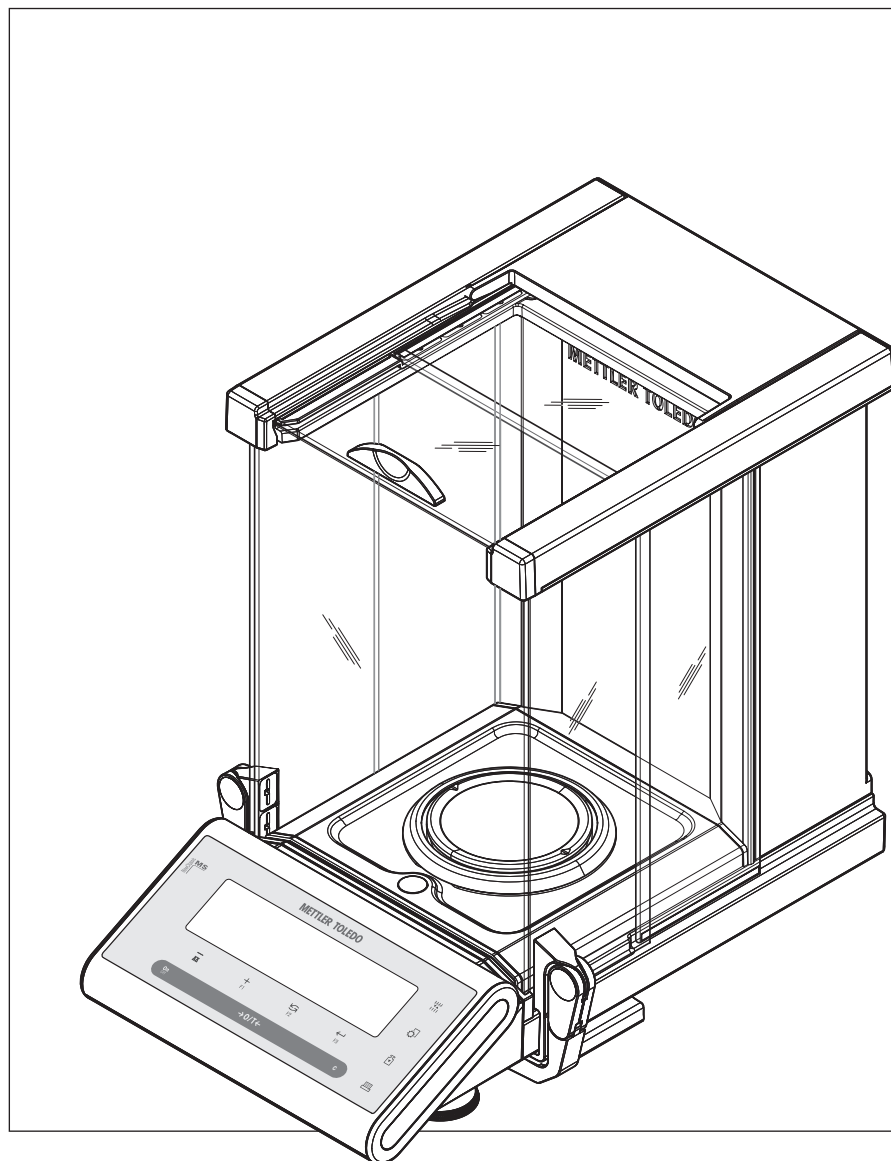


NewClassic Semi-Micro Balances

0.01 mg MS Models



METTLER TOLEDO

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1 Introduction

Thank you for choosing a METTLER TOLEDO balance.


The semi-micro balances of the NewClassic line combine a large number of weighing possibilities with easy operation.

These operating instructions apply to semi-micro balance MS 5-place models in the NewClassic line.

Please observe the following notes:

Some illustrations in these operating instructions are based on MS-S/MS-L models. They therefore might differ in some cases. However, functionality is not affected.

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).



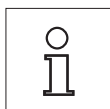
This symbol indicates a flashing display.



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 hazardous environments.



For use only in dry interior rooms.

Use only the original AC adapter delivered with your balance.

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.



Hazard of electric shock if the power cable is damaged! Check the power cable for damage regularly. Unplug the power cord immediately if the power cable is damaged.



Disposal

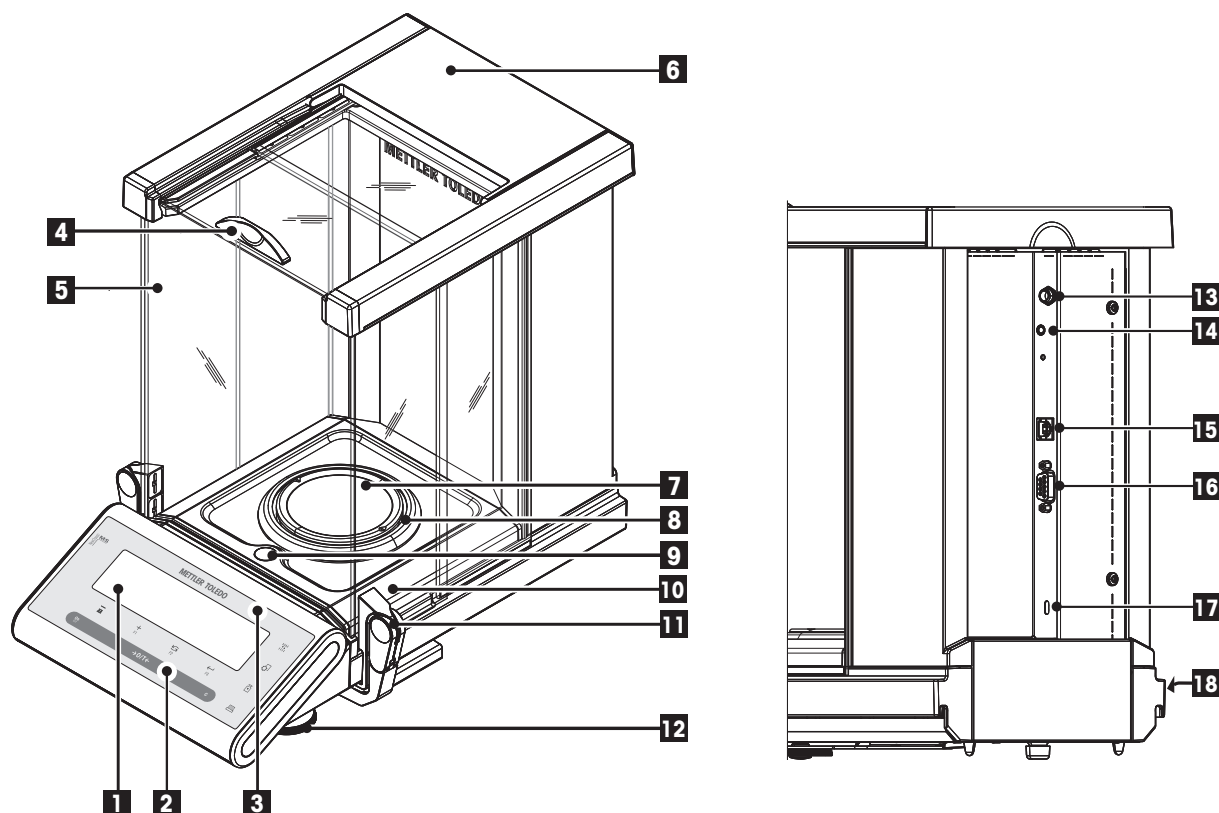
In conformance with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.

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.

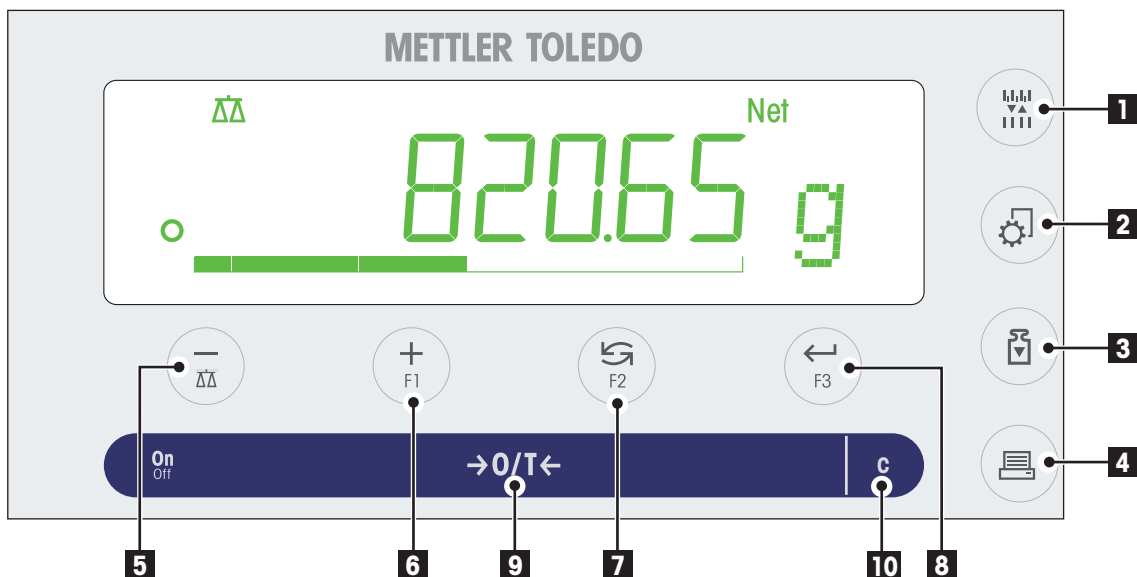
3 Overview

3.1 Components

















Name and Function of Components			
1	Display	10	Drip tray
2	Operation keys	11	Handle/Coupling element for the operation of the draft shield doors
3	Model sticker (with approved models only)	12	Leveling feet
4	Handle for operation of the draft shield top door	13	Socket for AC Adapter
5	Glass draftshield	14	Aux (connection for "ErgoSens" or foot-switch)
6	Top cover	15	USB device interface
7	Weighing pan	16	RS232C serial interface
8	Draft ring	17	Kensington slot for anti-theft purposes
9	Level indicator	18	Product label

3.2 Operation Keys

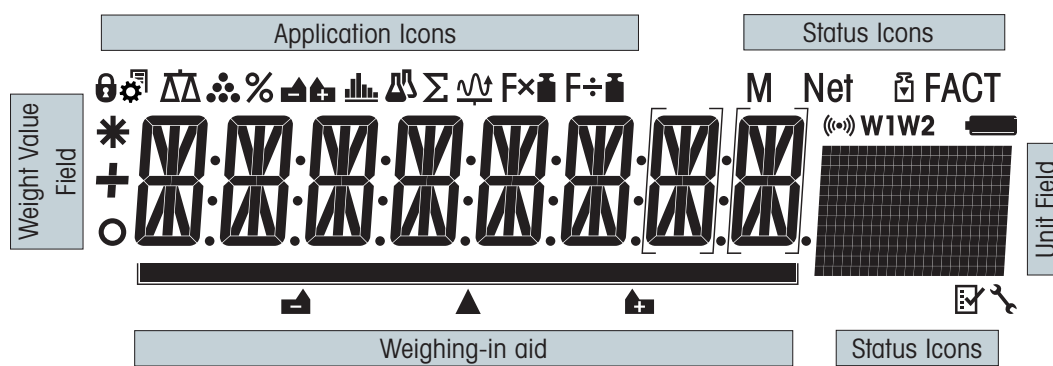






















Key Functions



No.	Key	Press briefly (less than 1.5 s) 	Press and hold (longer than 1.5 s) 
1		<ul style="list-style-type: none"> To change display resolution (1/10d function) while application is running 	no function
2		<ul style="list-style-type: none"> Enter or leave menu (Parameter settings) 	no function
3		<ul style="list-style-type: none"> Execute predefined adjusting (calibration) procedure 	no function
4		<ul style="list-style-type: none"> Printout display value Printout active user menu settings Transfer data 	no function
5		<ul style="list-style-type: none"> To navigate back (scroll up) within menu topics or menu selections Decrease (numerical) parameters within menu and in applications 	<ul style="list-style-type: none"> To select the weighing application Decrease (numerical) parameters quickly within menu and in applications
6		<ul style="list-style-type: none"> To navigate forward (scroll down) within menu topics or menu selections Increase (numerical) parameters within menu and in applications 	<ul style="list-style-type: none"> To select assigned F1 application and entering the parameter settings of application. Default F1 application assignment: Piece counting Increase (numerical) parameters quickly within menu and in applications








No.	Key	Press briefly (less than 1.5 s) 	Press and hold (longer than 1.5 s) 
7	 F2	<ul style="list-style-type: none"> With entries: scroll down To navigate through 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) 	<ul style="list-style-type: none"> To select assigned F2 application and entering the parameter settings of application. Default F2 application assignment: Percent weighing
8	 F3	<ul style="list-style-type: none"> To enter or leave menu selection (from / to menu topic) To enter application parameter or switch to next parameter To store parameter 	<ul style="list-style-type: none"> To select assigned F3 application and entering the parameter settings of application. Default F3 application assignment: Statistics
9	 →0/T←	<ul style="list-style-type: none"> Switch on Zero/Tare 	<ul style="list-style-type: none"> Switch off
10	 C	<ul style="list-style-type: none"> Cancel and to leave menu without saving (one step back in the menu). 	no function


3.3 Display Panel



Application Icons			
	Menu locked		Application "Statistics"
	Menu setting activated		Application "Formulation / Net-Total"
	Application "Weighing"		Application "Totaling"
	Application "Piece counting"		not used
	Application "Percent weighing"		Application "Multiplication factor"
	Not used		Application "Division factor"
Status Icons			
	Indicates stored value (Memory)		Applications "Diagnostics" and "Routine Test"
	Indicates Net weight values		Acoustic feedback for pressed keys activated
	Adjustments (calibration) started		Weighing range 1 (Dual Range models only)
	FACT activated		Weighing range 2 (Dual Range models only)

Status Icons			
	Service reminder		Not used

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		Not used
			Not used

Unit Field						
	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		

4 Setting up the Balance



The balance must be disconnected from the power supply when carrying out all setup and mounting work.

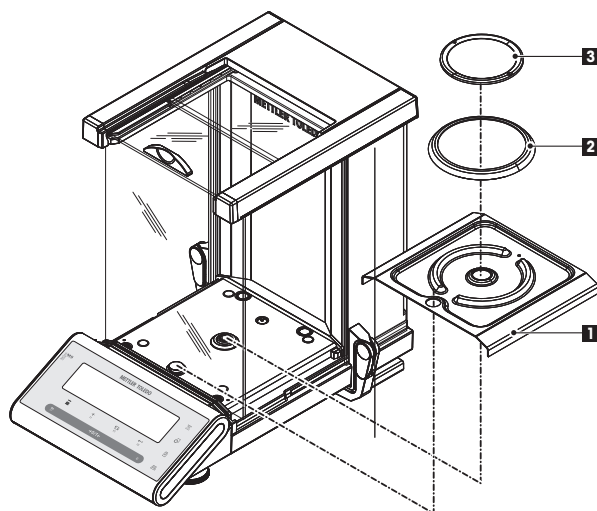
4.1 Unpacking and Delivery Inspection

- a) Open the packaging and carefully remove all components.
- b) Check the delivered items.

The standard scope of delivery contains the following items:

- Balance with Draftshield
- Weighing pan with pan support
- Draft ring
- Drip tray
- Protective cover
- AC adapter
- Country specific power cable
- Operating instructions (this document)
- Quick Guide
- EC declaration of conformity

4.2 Installing the Components



Push the side glass doors back as far as will go and place the following components on the balance in the specified order:

- a) Place the drip tray (1) into the correct position.
- b) Place the weighing pan (3).
- c) Place the draft ring (2).

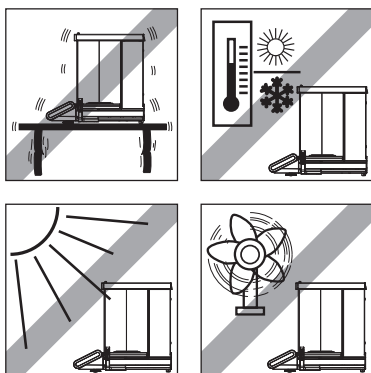
Note: Cleaning the draft shield see section "Maintenance and cleaning".

4.3 Selecting the Location and Leveling the Balance

Your balance is a precision instrument and will thank you for an optimum location with high accuracy and dependability.

4.3.1 Selecting the Location

Select a stable, vibration-free position that is as horizontal as possible. The surface must be able to safely carry the weight of a fully loaded balance.

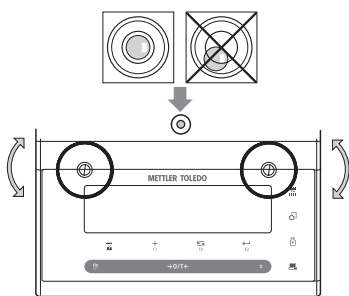


Observe ambient conditions (see Technical Data).

Avoid the following:

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

4.3.2 Leveling the Balance



The balance has a level indicator and two 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.

Adjust the two leveling feet appropriately until the air bubble comes to rest exactly in the middle of the glass:

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

4.3.3 Power Supply

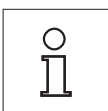
Your balance is supplied with an AC adapter with a country-specific power cable. The power supply is suitable for all line voltages in the range: 100 - 240 VAC, 50/60 Hz (for exact specifications, see section "technical data").



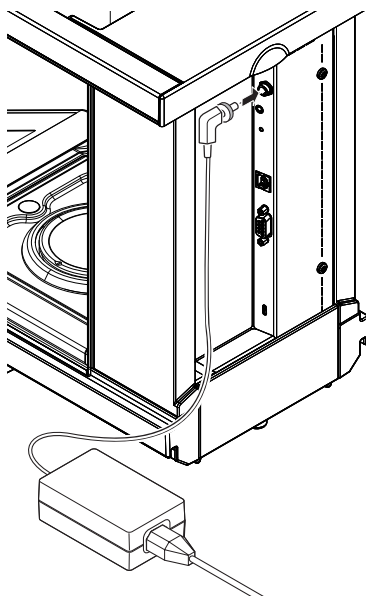
- First, check the local line voltage is in the range 100 - 240 VAC, 50/60 Hz and whether the power plug fits your local power supply connection. **If this is not the case, on no account connect the balance or the AC adapter to the power supply**, but contact the responsible METTLER TOLEDO dealer.
-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

**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.

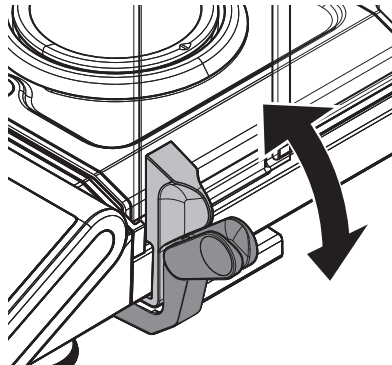


Allow your balance to warm up for 60 minutes to enable it to adapt itself to the ambient conditions.



Connect the AC adapter to the connection socket on the back of the balance (see figure) and to the power line. Secure the connection to the balance by screwing the plug tight.

4.3.4 Left/Right Operating of the Glass Draft Shield

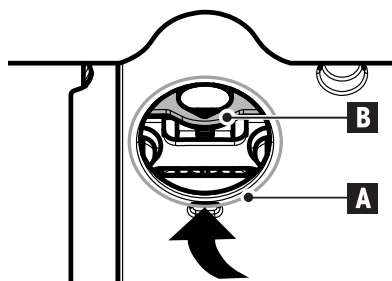


The glass draft shield of your balance can be adapted to the environmental conditions and your weighing style, as well as to the type of weighing and loading.

The position of the handles determines which door(s) of the draft shield (left, right, or both) is/are opened.

Try various different combinations by moving the external handles into the upper or lower position. We recommend you to set up the glass draft shield so that it only opens on the side where the balance is loaded. Your balance then works faster, because there are fewer troublesome currents of air than when both doors of the draft shield are opened together.

4.3.5 Weighing Below the Balance

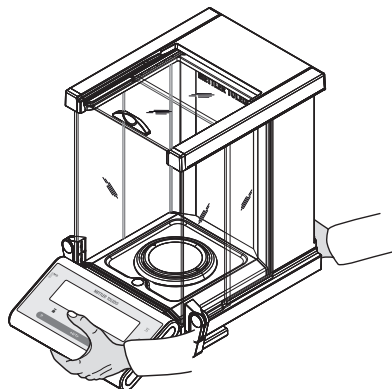


So that weighings can be carried out below the working surface (below-the-balance weighing), your balance is provided with a special hanger.

- Switch off the balance and unplug the cable of the AC adapter from the back of the balance.
- Remove any interface cable.
- Push the side doors and the top door of the glass draft shield completely to the back. **Note:** Top cover must be closed.
- Remove the weighing pan, the draft ring and the drip tray.
- Carefully tip the balance over backwards, until it is lying on its back.
- Remove the cap (A) and retain it. The hanger (B) for weighing below the balance is easily accessible now.
- Carefully turn the balance to its normal position and reinstall all components in the reverse order.

4.3.6 Transporting the Balance

Transporting over short distances



- Switch off the balance and remove the power cable and any other cables from the balance.
- Hold the balance with both hands as shown. Carefully lift the balance and carry it to its new location.
- Refer to the notes in Section "Selecting the location" regarding the choice of an optimal location.



Caution:

Please do not lift the balance by the glass draft shield as not to damage it.

Transporting over long distances

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

4.4 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.
- the balance must be connected to the power supply for approximately,
 - 30 minutes for balances with readability of 1 mg to 5 g
 - 60 minutes for balances with readability of 0.01 mg to 0.1 mg
 in order to reach operating temperature before adjusting.

4.4.1 Fully Automatic Adjustment FACT

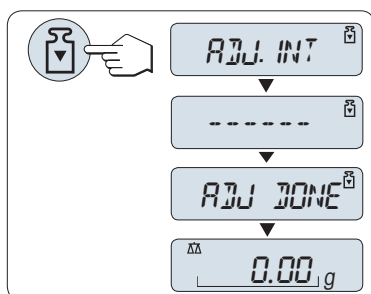
Note: On models with FACT only.

The **factory setting** is fully automatic adjustment **FACT** (**F**ully **A**utomatic **C**alibration **T**echnology) with the internal weight (see also section "The Menu"). In this setting, you have no need worry about adjusting your balance.

The balance adjusts itself automatically:

- after the warm-up phase on connection to the power supply.
- when a change in the ambient conditions, e.g. the temperature, could lead to a noticeable deviation in the measurement.
- on a predefined time. (see menu topic "FACT")
- time interval. (with OIML accuracy class II approved models)

4.4.2 Manual Adjustment with Internal Weight



Requirement: To carry out this operation, in the menu topic "CAL" (Adjustment) of advanced menu "ADJ.INT" must be selected.

- Unload weighing pan
- 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 2009      12:56

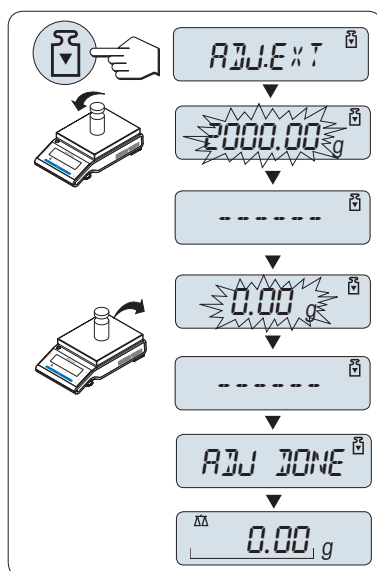
METTLER TOLEDO

Balance Type      MS4002S
SNR               1234567890


Temperature       22.5 °C
Diff              3 ppm

Adjustment done
-----
    
```

4.4.3 Manual Adjustment with External Weight



Requirement: To carry out this operation, in the menu topic "CAL" (Adjustment) of advanced menu "ADJ.EXT" must be selected.

- Have required adjustment weight ready.
- Unload weighing pan.
- Press «» briefly to execute "External Adjustment". The required (pre-defined) adjustment weight value flashes on the display.
- Place adjustment weight in center of pan. The balance adjusts itself automatically.
- When "0.00 g" flashes, 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 2009 12:56

METTLER TOLEDO

Balance Type MS4002S
SNR 1234567890

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

Adjustment done

Signature

.....

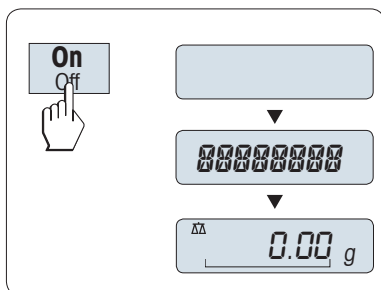
5 Weighing Made Simple



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

5.1 Switching the Balance On and Off

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

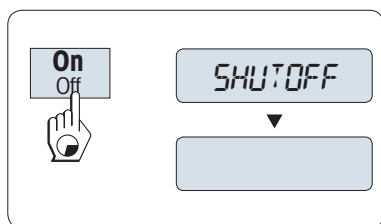


Switching On

- Remove any load from weighing pan.
- Press «On».

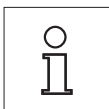
The balance performs a display test (all segments in the display light up briefly), "WELCOME", Software version, Maximum load and Readability appears briefly. (Startup "FULL" mode only)

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



Switching Off

Press and hold the «Off» key until "SHUTOFF" appears on the display. Release the key.



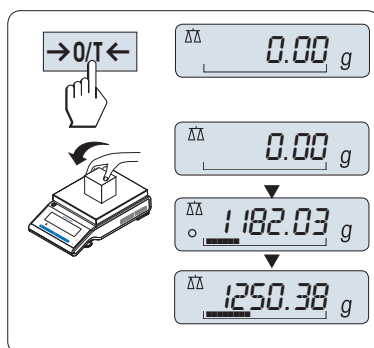
After it has been switched off, your balance is in the standby mode. The display shows date, time, maximum load and readability. As your balance needs no warm-up time in the standby mode and is immediately ready for weighing.

When Quickstart "QUICK" (Advanced menu, topic "STARTUP") is selected: If you wish to perform a weighing, you need now only place the sample on the weighing pan and the balance immediately displays the result. There is no need to switch it on with the «On/Off» key.

Note:

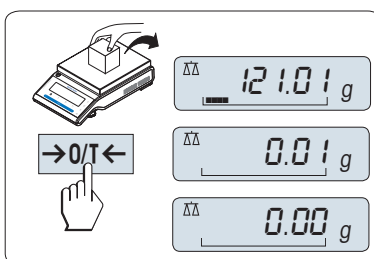
- Quickstart is not possible with approved balances (only available in selected countries).
- Standby mode is available on line powered balances only.

5.2 Performing a Simple Weighing



- Press «→0/T←» to zero the balance.
Note: If your balance is not in the weighing mode, press and hold the « $\Delta\Delta$ » key down until "WEIGHING" appears in the display. Release the key. Your balance is in the weighing mode and set to zero.
- Place weighing sample on the weighing pan.
- Wait until the instability detector "O" disappears and the stability beep sounds.
- Read the result.

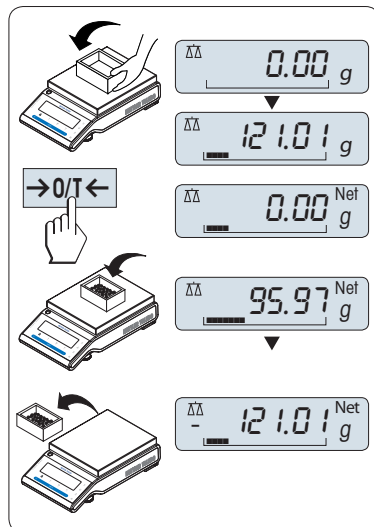
5.3 Zero Setting / Taring



Zero setting

- Unload the balance.
- 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.

- Place empty container on the balance. The weight is displayed.
- Press «→0/T←» to tare the balance.

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

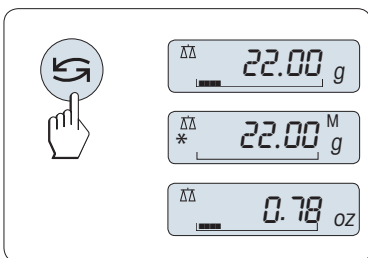
Note:

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

5.4 METTLER TOLEDO DualRange Balances

METTLER TOLEDO DualRange balances have two ranges. These models have a fix fine (semi-micro) range between 0 g and "Maximum load, fine range". In this fine range the balance shows the result with a higher resolution, i.e. with one decimal place more.

5.5 Switching Weight Units

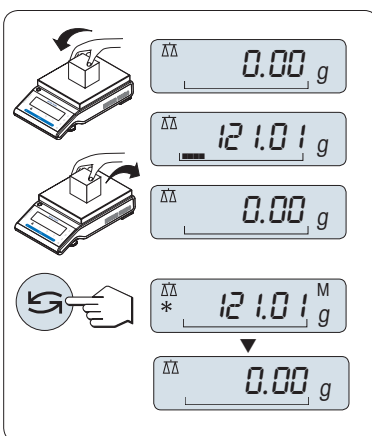


The «G» key can be used at any time to toggle between weight unit "UNIT 1", "RECALL" value (if selected) and weight unit "UNIT 2" (if different from weight unit 1) and the application unit (if any).

5.6 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.



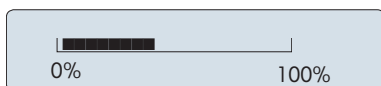
- Load weighing sample. The display shows weight value and stores stable value.
- Remove weighing sample. When the weight is removed the Display shows zero.
- Press «G». The display shows last stored stable weight value for 5 seconds together with asterisk (*) and Memory (M) symbols. After 5 seconds 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 «→O/T←», the recall value is set to 0.

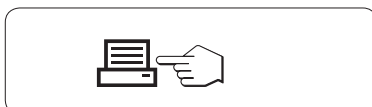
Note: If the power is switched off, the recall value is lost. The recall value can not be printed.

5.7 Weighing with the Weighing-in Aid



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

5.8 Print / Transmit Data



Pressing the «Print» 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 45 different **topics**, each of which allows you various **selection** possibilities. For Menu "PROTECT" see chapter "Description of menu topics" section "Main menu".

Note: See Quick Guide for the graphical overview of the menu (Menu Map) with all setting possibilities.

Menu "BASIC"

Topic	Description
DATE	Setting the current date.
TIME	Setting the current time.
UNIT 1	Specification of the 1 st weight unit in which the balance should show the result.
UNIT 2	Specification of the 2 nd weight unit in which the balance should show the result.
KEY BEEP	Setting the key beep level.
STAB.BEEP	Setting the stability beep level.
RESET	Call up of the factory settings.

Menu "ADVANCED"

Topic	Description
ENVIRON.	Matching the balance to the ambient conditions.
CAL	Settings for the type of adjustment (calibration).
FACT	Settings for fully automatic balance adjustment based on a selected time.
FACT PRT.	Switching the automatic FACT printout on or off.
DATE.FORM	Setting the date format.
TIME.FORM	Preselection of the time format.
RECALL	Switching the application "Recall" for storing stable weights on or off.
STARTUP	Setting the mode which the balance powers up ("FULL" or "QUICK").
SHUTOFF	Setting the time after which the balance should be switched off automatically.
BCKLIGHT	Setting the time after which the display backlight should be switched off automatically.
DISPLAY	Adjusting the brightness and contrast of the display.
AUTOZERO	Switching the automatic zero correction (Autozero) on or off.
ZERO RNG	Setting the zero limit of the zero/tare key.
LANGUAGE	Setting the preferred language.
ASSIGN:F1	Selection of assigned F1 key application and entering their parameter settings.
ASSIGN:F2	Selection of assigned F2 key application and entering their parameter settings.
ASSIGN:F3	Selection of assigned F3 key application and entering their parameter settings.
DIAGNOSE	Starting a diagnostic application.
SERV.ICON	Switching the service icon (service reminder) on or off.
SRV.D.RST	Reset service date and hours (service reminder).

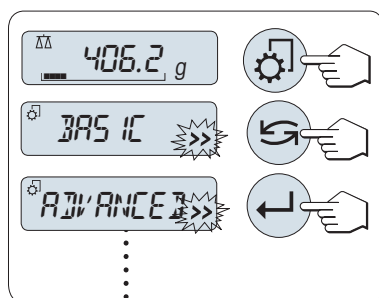
Menu "INT.FACE"

Topic	Description
RS232	Matching the serial interface RS232C to a peripheral unit.
HEADER	Setting the header for printout of individual values.




Topic	Description
SINGLE	Setting the information for printout of individual values.
SIGN.L	Setting the footer for printout of individual values.
LINE.FEED	Setting line feed for printout of individual values.
ZERO PRT.	Setting the auto print function for printing zero.
COM.SET	Setting the data communication format of the serial interface RS232C.
BAUDRATE	Setting the transfer speed of the serial interface RS232C.
BIT/PAR.	Setting the character format (Bit/Parity) of the serial interface RS232C.
HD.SHAKE	Setting the transfer protocol (Handshake) of the serial interface RS232C.
RS E.O.L.	Setting the end of line format of the serial interface RS232C.
RS CHAR	Setting the char set of the serial interface RS232C.
USB	Matching the USB interface to a peripheral unit.
USB COM.S.	Setting the data communication format of the USB interface.
USB E.O.L.	Setting the end of line format of the USB interface.
USB CHAR	Setting the char set of the USB interface.
INTERVAL	Selection of the time interval for the simulated print key press.
ERGOSENS	Settings for external key e.g. METTLER TOLEDO "ErgoSens"

6.2 Menu Operation

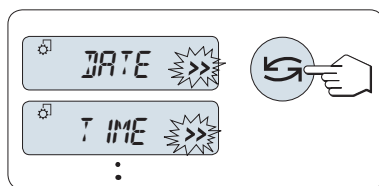
In this section you will learn how to work with the menu.





Select Menu

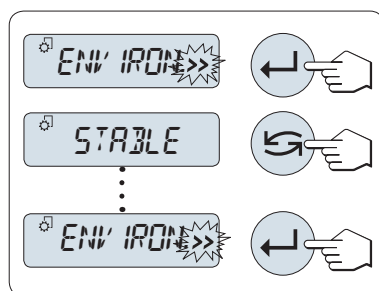
- Press «» to activate main menu. The first menu "BASIC" is displayed (except menu protection is active).
- Press «» repeatedly to change menu (Scrolling down/up «+» / «-» keys).
- Press «» to confirm the selection.

Note: The menu selection "BASIC", "ADVANCED" or "INT.FACE" can not be saved. The selection "PROTECT" must be saved.






Select Menu Topic

Press «». The next menu topic appears in the display. Each time the «» or the «+» key is pressed, the balance switches to the next menu topic; the «-» key to the previous menu topic.



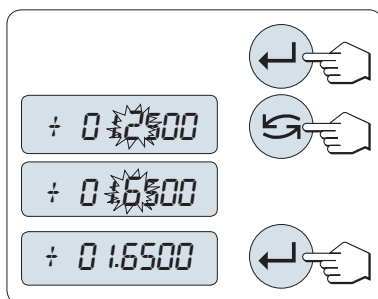
Change Settings in a Selected Menu Topic

The ">>" flashing symbol in the display indicates selectable options available.

- Press «». The display shows the current setting in the selected menu topic. Each time «» or «+» is pressed, the balance switches to the next selection; press «-» to the previous selection. After the last selection, the first is shown again.
- Press «», the selected setting is accepted but not yet executed. The settings are executed only after "SAVE:YES" has been confirmed.

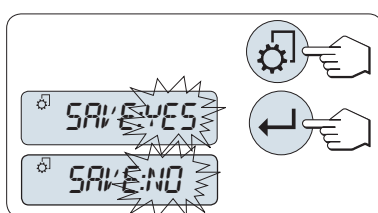
Change Settings in a Submenu Selection

The same procedure as for menu topics.



Input Principle of Numerical Values

- Press «←» for input of numerical values.
- Press «→» to select a digit or a value (depending on the application). The selected digit or the selected value is blinking.
- For changing digits or values, press «+» to scroll up or «-» to scroll down.
- Press «←» to confirm the input.



Saving Settings and Closing the Menu

- Press «⚙» briefly to leave menu topic.
- Press «←» to execute "SAVE:YES". Changes are saved.
- Press «←» to execute "SAVE:NO". Changes are not saved. To toggle between "SAVE:YES" and "SAVE:NO" press «→».



Cancel

For leaving menu topic or menu selection without saving press «C» (one step back in the menu).

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".

6.3 Description of Menu Topic

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

6.3.1 Main Menu

Selecting the menu.

"BASIC"	The small "BASIC" menu for simple weighing is displayed.
"ADVANCED"	The extended "ADVANCED" 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, ADVANCED and INT.FACE are not displayed. This is indicated with "⚙" in the display.

Note:

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

6.3.2 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.

"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 ³⁾	Milligram	msg	Mesghal
ct	Carat	tlh	Tael Hong Kong
lb	Pound	tls ⁴⁾	Tael Singapore
oz	Ounce (avdp)	tlt	Tael Taiwan
ozt	Ounce (troy)	tola	Tola
GN	Grain	baht	Baht

¹⁾ factory setting

²⁾ not with 0.01 mg, 0.1 mg and 1 mg balances

³⁾ with 0.01 mg, 0.1 mg and 1 mg balances

⁴⁾ 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". Select "NO", if you do not want to use "UNIT 2".

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

"KEY BEEP" – Key Beep

This menu topic allows you to select the volume of the key beep. The according key beep is emitted during the setting.

"MED"	Medium level (Factory setting)
"HIGH"	High level
"OFF"	Beep switched off
"LOW"	Low level

"STAB.BEEP" – Stability Beep

If the unstable symbol disappears, the stability beep becomes active. This menu topic allows you to preselect the volume of the stability beep.

"MED"	Medium level (Factory setting)
"HIGH"	High level
"OFF"	Beep switched off
"LOW"	Low level

"RESET" – Reset Balance Settings

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

To toggle between "YES?" and "NO?" press «» (or «+» or «-»).

Note: A reset of the balance will not change the "DATE", "TIME" and "ZERO RNG" settings.



6.3.3 Advanced Menu


"ENVIRON." – Environment Settings

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

"STANDARD"	Setting for an average working environment subject to moderate variations in the ambient conditions. (Factory setting)
"UNSTABLE"	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.

"CAL" – Adjustment (calibration)

In this menu topic you can preselect the function of the «» key. Your balance can be adjusted with internal or external weights by pressing the «» key. If you have attached a printer to your balance, the data of the adjustment (calibration) are printed out.

"ADJ.OFF"	The adjustment is switched off . The «  » key has no function.
"ADJ.INT"	Internal adjustment: adjustment is performed at a keystroke with the built-in weight (depending on the model, see technical data).
"ADJ.EXT"	External adjustment: adjustment is performed at a keystroke with a selectable external weight.

"100.00 g"

Defining the external adjustment weight: define the weight of the external adjustment weight (in grams).

Factory setting: depends on the model.

"FACT" – Fully Automatic Adjustment

Fully automatic internal adjustment (calibration) **FACT** (Fully Automatic Calibration Technology) provides fully automatic balance adjustment based on temperature criteria and on preselected time. (depending on the model, see technical data)

"TIME"

Execute FACT (with selected time).

"12:00"

Specify the time for a fully automatic adjustment to take place every day.

Factory setting: 12:00 (according to time format)

"OFF"

FACT is **switched off**.

"FACT PRT." – Protocol Trigger for Fact

This setting specifies whether an adjustment report should be printed automatically.

Note: This menu topic does not affect the printing of adjustments with an internal or external adjustment weight.

"OFF"

Protocol switched off: if the balance adjusts automatically (FACT), a protocol is not printed out.

"ON"

Protocol switched on: a record is printed out after every automatic adjustment of the balance (FACT).

Note: The protocol is printed out without a line for signatures.

"DATE.FORM" – 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"	01.02.2009	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.FORM" – 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.

"STARTUP" – Startup Mode

You can set your balance such that it either immediately starts from the standby mode when you load a weight or it must be switched on with the «ON/OFF» key after which it then performs a display test.

Note: This topic is not visible with approved balances (only available in selected countries).

"QUICK"	"Quickstart": The balance can be started directly from the standby mode and is immediately ready for weighing. You can load the weight in the standby mode and the balance immediately shows the current weighing result. This is the Factory setting
	Note: Standby mode is available on line powered balances only.
"FULL"	Start with display test: You must switch on the balance with the «ON/OFF» key. After it has been switched on, it performs a display test for approx. 2 sec. in which all display elements light up, it shows "WELCOME", software version, maximum load and readability. The balance is ready for weighing.

"SHUTOFF" – Automatic Shutoff

If the automatic shutoff function is activated, the balance automatically switches itself off after a preselected time of inactivity (i.e. with no key being pressed or changes of weight occurring etc.) and is switched to the standby mode.

"A.OFF 10" min	Automatic shutoff after 10 minutes of inactivity. (Factory setting)
"A.OFF –"	Automatic shutoff not activated.
"A.OFF 2" min	Automatic shutoff after 2 minutes of inactivity.
"A.OFF 5" min	Automatic shutoff after 5 minutes of inactivity.

"BCKLIGHT" – Backlight

Under this menu topic, the display backlight can be switched off automatically. If the automatic switch-off is activated, the backlight will turn off automatically after the selected period of inactivity has elapsed. The backlight is reactivated when a key is pressed or the weight is changed.

"B.L. ON"	Backlight is always on . (Factory setting)
"B.L. 30" s	Automatic switch-off after 30 seconds inactivity.
"B.L. 1" min	Automatic switch-off after 1 minute inactivity.
"B.L. 2" min	Automatic switch-off after 2 minutes inactivity.
"B.L. 5" min	Automatic switch-off after 5 minutes inactivity.

"DISPLAY" – Display Settings

This menu topic allows you to adjust brightness and contrast of the display.

"BRIGHTN"	To set the brightness in 1 % steps.
"50%"	Factory setting: 50%
"CONTRAST"	To set the contrast in 1 % steps.
"75%"	Factory setting: 75%

"AUTOZERO" – Automatic Zero Setting

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

"ON"	"AUTOZERO" 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"	"AUTOZERO" 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.

"1.2 g"	To set the upper limit of the zero setting 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.

"LANGUAGE" – Language

Factory setting: Generally, the language of the destination country (if available) or English is set.

The following languages are available:

"ENGLISH"	English	"ITALIANO"	Italian
"DEUTSCH"	German	"POLSKI"	Polish
"FRANCAIS"	French	"CESKY"	Czech
"ESPANOL"	Spanish	"MAGYAR"	Hungarian

"ASSIGN:F1" – Assign Application Key F1

At this menu topic you can assign an application to the «F1» key. The following applications are available (depending on the model):

"COUNTING"	Piece counting (Factory setting)
"PERCENT"	Percent weighing
"STAT"	Statistics
"FORMULA"	Formulation / Net-Total

"TOTALING"	Totaling
"FACTOR M"	Multiplication factor
"FACTOR D"	Division factor

"ASSIGN:F2" – Assign Application Key F2

At this menu topic you can assign an application to the «**F2**» key. The following applications are available (depending on the model):

"PERCENT"	Percent weighing (Factory setting)
"STAT"	Statistics
"FORMULA"	Formulation / Net-Total
"TOTALING"	Totaling
"FACTOR M"	Multiplication factor
"FACTOR D"	Division factor
"COUNTING"	Piece counting

"ASSIGN:F3" – Assign Application Key F3

At this menu topic you can assign an application to the «**F3**» key. The following applications are available (depending on the model):

"STAT"	Statistics (Factory setting)
"FORMULA"	Formulation / Net-Total
"TOTALING"	Totaling
"FACTOR M"	Multiplication factor
"FACTOR D"	Division factor
"R. TEST"	Routine test
"COUNTING"	Piece counting
"PERCENT"	Percent weighing

"DIAGNOSE" – Diagnostics Application

At this menu topic you can start a diagnostic application. For more information see chapter application "Diagnostics".

The following diagnostics are available:

"REPEAT.T"	Repeatability test (models with internal weights only)
"DISPLAY"	Display test
"KEYPAD T"	Key test
"CAL.MOT. T"	Motor test (models with internal weights only)
"BAL.HIST"	Balance history
"CAL.HIST"	Calibration history
"BAL.INFO"	Balance information
"PROVIDER"	Service provider information

"SERV.ICON" – Service Reminder

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

"ON"	Service reminder "🔧" switched on (factory setting). You will be informed after a preset time (e.g. 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 "SERV.ICON" setting "ON" was selected.

To toggle between "YES?" and "NO?" press «↶» (or «+» or «-»)


6.3.4 Interface Menu**"RS232" – RS232C Interface ¹⁾**

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.
"PRT.STAB"	If the «  » key is pressed, the next stable weight value will be printed. (Factory setting)
"PRT.AUTO"	Every stable weight value will be printed, without pressing the «  » key.
"PRT.ALL"	If the «  » key is pressed, the weight value will be printed regardless of stability.
"PC-DIR."	Connection to a PC : the balance can send data (as a Keyboard) to the PC used for PC applications e.g. Excel. Note: The balance sends the weight value without the unit to the PC.
"PRT.STAB"	If the «  » key is pressed, the next stable weight value will be sent followed by an enter. (Factory setting)
"PRT.AUTO"	Every stable weight value will be sent followed by an enter, without pressing the «  » key.
"PRT.ALL"	If the «  » key is pressed, the weight value will be sent followed by an enter regardless of stability.
"HOST"	Connection to a PC , Barcode Reader etc.: the balance can send data to the PC and receive commands or data from the PC).
"SEND.OFF"	Send mode switched off. (Factory setting)
"SEND.STB"	If the «  » key is pressed, the next stable weight value will be sent.
"SEND.CONT"	All weight value updates will be sent regardless of stability, without pressing the «  » key.
"SEND.AUTO"	Every stable weight value will be sent, without pressing the «  » key.

"SEND.ALL "	If the «  » key is pressed, the weight value will be sent regardless of stability.
"2.DISPLAY"	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

"LINE.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" ¹⁾

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")¹⁾

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".																												
"MT-PM"	The following PM balance commands are supported: <table><tr><td>S</td><td>Send value</td></tr><tr><td>SI</td><td>Send Immediate value</td></tr><tr><td>SIR</td><td>Send value and repeat</td></tr><tr><td>SR</td><td>Send next value and repeat</td></tr><tr><td>SNR</td><td>Send immediate value and repeat</td></tr><tr><td>T</td><td>Tare</td></tr><tr><td>TI</td><td>Tare Immediately</td></tr><tr><td>B</td><td>Base</td></tr><tr><td>MI</td><td>Modify ambient vibration</td></tr><tr><td>MZ</td><td>Modify Auto Zero</td></tr><tr><td>M</td><td>Modified settings reset</td></tr><tr><td>ID</td><td>Identify</td></tr><tr><td>CA</td><td>Calibrate</td></tr><tr><td>D</td><td>Display (only symbol N and G available)</td></tr></table>	S	Send value	SI	Send Immediate value	SIR	Send value and repeat	SR	Send next value and repeat	SNR	Send immediate value and repeat	T	Tare	TI	Tare Immediately	B	Base	MI	Modify ambient vibration	MZ	Modify Auto Zero	M	Modified settings reset	ID	Identify	CA	Calibrate	D	Display (only symbol N and G available)
S	Send value																												
SI	Send Immediate value																												
SIR	Send value and repeat																												
SR	Send next value and repeat																												
SNR	Send immediate value and repeat																												
T	Tare																												
TI	Tare Immediately																												
B	Base																												
MI	Modify ambient vibration																												
MZ	Modify Auto Zero																												
M	Modified settings reset																												
ID	Identify																												
CA	Calibrate																												
D	Display (only symbol N and G available)																												

"BAUDRATE" – Baud rate RS232C¹⁾

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 RS232C¹⁾

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/EVEN"	7 data bits/even parity
"7/ODD"	7 data bits/odd parity

Note:

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

"HD.SHAKE" – Handshake RS232C¹⁾

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 E.O.L." – End of Line RS232C ¹⁾

At this menu topic you can set the "End of Line" character of the 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)

Note:

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

"RS CHAR" – Char Set RS232C ¹⁾

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.

"USB" – USB Interface

At this menu topic you can select the mode of the "USB Device" interface and specify how the data is transmitted.

"USB"	Select the mode of the "USB Device" interface
"SEND.OFF"	Send mode switched off (Factory setting)
"SEND.STB"	If the «  » key is pressed, the next stable weight value will be sent.
"SEND.CONT"	All weight value updates will be sent regardless of stability, without pressing the «  » key.
"SEND.AUTO"	Every stable weight value will be sent, without pressing the «  » key.
"SEND.ALL"	If the «  » key is pressed, the weight value will be sent regardless of stability.

Note: This port is not usable for printers or displays.

"USB COM.S." – Options for the Data Communication Format (USB)

This menu topic allows you to set the data format depending on which peripheral device is connected.

"MT-SICS"	The MT-SICS data transfer format is used. (Factory setting) For more information see section "MT-SICS Interface Commands and Functions".																												
"MT-PM"	The following PM balance commands are supported: <table> <tr><td>S</td><td>Send value</td></tr> <tr><td>SI</td><td>Send Immediate value</td></tr> <tr><td>SIR</td><td>Send value and repeat</td></tr> <tr><td>SR</td><td>Send next value and repeat</td></tr> <tr><td>SNR</td><td>Send immediate value and repeat</td></tr> <tr><td>T</td><td>Tare</td></tr> <tr><td>TI</td><td>Tare Immediately</td></tr> <tr><td>B</td><td>Base</td></tr> <tr><td>MI</td><td>Modify ambient vibration</td></tr> <tr><td>MZ</td><td>Modify Auto Zero</td></tr> <tr><td>M</td><td>Modified settings reset</td></tr> <tr><td>ID</td><td>Identify</td></tr> <tr><td>CA</td><td>Calibrate</td></tr> <tr><td>D</td><td>Display (only symbol N and G available)</td></tr> </table>	S	Send value	SI	Send Immediate value	SIR	Send value and repeat	SR	Send next value and repeat	SNR	Send immediate value and repeat	T	Tare	TI	Tare Immediately	B	Base	MI	Modify ambient vibration	MZ	Modify Auto Zero	M	Modified settings reset	ID	Identify	CA	Calibrate	D	Display (only symbol N and G available)
S	Send value																												
SI	Send Immediate value																												
SIR	Send value and repeat																												
SR	Send next value and repeat																												
SNR	Send immediate value and repeat																												
T	Tare																												
TI	Tare Immediately																												
B	Base																												
MI	Modify ambient vibration																												
MZ	Modify Auto Zero																												
M	Modified settings reset																												
ID	Identify																												
CA	Calibrate																												
D	Display (only symbol N and G available)																												

Note: This menu topic is not available with MSxxxKLIPE models.

"USB E.O.L." – End of Line USB

At this menu topic you can set the "End of Line" character of the transmitted data to USB device.


"(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)

"USB CHAR" – Char Set USB

At this menu topic you can set the "Character Set" of the transmitted data to USB device.

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

"INTERVAL" – Print Key Simulation

At this menu topic you can activate a simulation of the  key. "INTERVAL" 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)

"ERGOSENS" – Settings for external key

The METTLER TOLEDO **ErgoSens** or external contact switches (optional, see section accessories) can be connected to the "Aux" connection and these can be used to execute certain weighing functions.

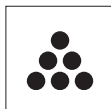
"OFF"	Deactivate (Factory setting)
-------	---------------------------------------

"->0<-"	Zero setting
"->T<-"	Taring
"PRINT"	Print «  »

1) Note for 2nd RS232C Interface

- If an optional 2nd interface is installed, the menu topic is displayed for each interface, e.g
"BAUDRATE.1" for standard interface
"BAUDRATE.2" for optional 2nd interface
 - Only one printer can be set if two RS232 interfaces are existing.
-

7 Application "Piece Counting"

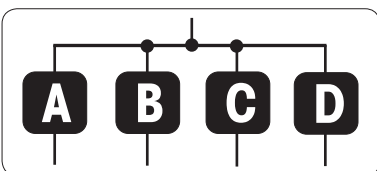


The **"Piece Counting"** application allows you to determine the number of pieces put on the weighing pan.

Requirement: The function "COUNTING" must be assigned to an «Fx» key (see advanced menu topic "ASSIGN:Fx", factory setting: F1).

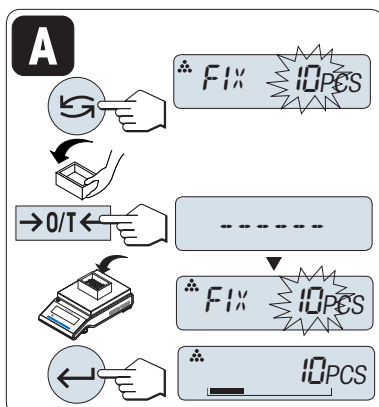


Activate function "COUNTING" by pressing and holding the appropriate assigned «Fx» key (factory setting: F1).



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

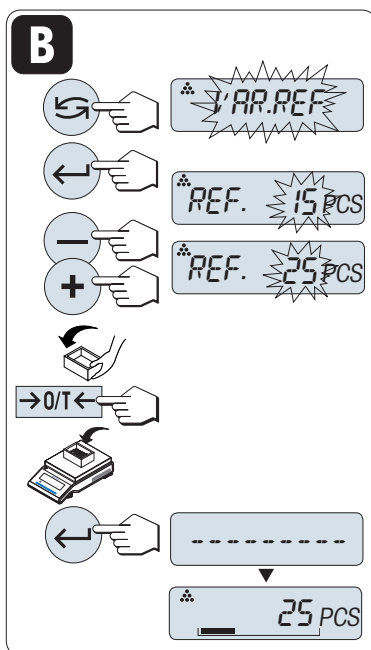
- A** Setting the reference **by multiple pieces with fix reference values.**
- B** Setting the reference **by multiple pieces with variable reference values.**
- C** Setting the reference **for 1 piece in weighing mode.**
- D** Setting the reference **for 1 piece in manual mode.**



Setting possibility

A Setting the reference by multiple pieces with fix reference values

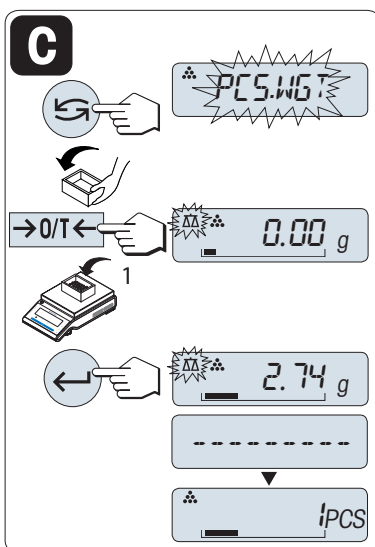
- a) Select a number of reference pieces by scrolling with «». Possible numbers* are 5, 10, 20 and 50.
* with approved balances in selected countries: min 10
- b) Press «0/T» to tare. If using: place empty container on the weighing pan first or tare again.
- c) Add the selected number of reference pieces to container.
- d) Press «» to confirm.



Setting possibility

B Setting the reference by multiple pieces with variable reference values

- Select "VAR.REF" by scrolling with «→». Press «←» to confirm.
- Select a number of reference pieces by scrolling up («+» key) or down («-» key). Speed up by press and hold. Possible numbers* are 1 to 999.
* with approved balances in selected countries: min 10
- Press «→0/T←» to tare. If using: place empty container on the weighing pan first or tare again.
- Add the selected number of reference pieces to container.
- Press «←» to confirm.

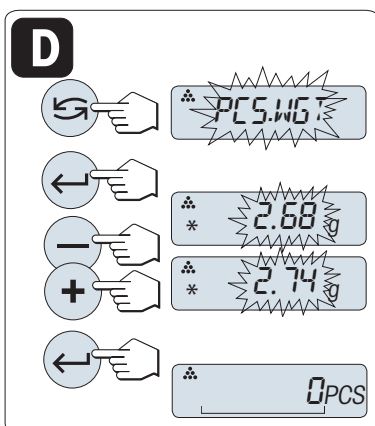


Setting possibility

C Setting the reference for one piece in weighing mode

- Select "PCS.WGT" by scrolling with «→».
- Press «→0/T←» to tare. If using: place empty container on the weighing pan first or tare again.
- Add one reference piece to container. The weight of one piece is displayed.
- Press «←» to confirm.

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

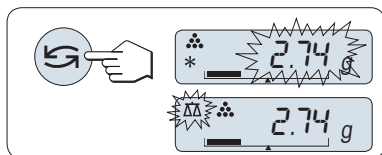


Setting possibility

D Setting the reference for one piece in manual mode

- Select "PCS.WGT" by scrolling with «→».
- Press «←» to confirm.
- Enter the final reference one piece weight by scrolling up («+» key) or down («-» key). Speed up by press and hold.
- Press «←» to confirm.

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



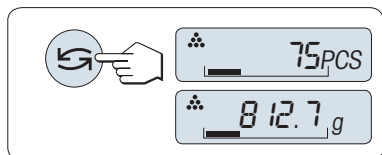
Switching between manual mode and weighing mode

Press «G» to switch between manual and weighing mode.

Note: By switching from weighing mode to manual mode the weight value will be transferred and can be changed manually.

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.



Switching between piece count and weight display.

You can use the «G» key at any time to switch the display between piece 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 (*) 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.

8 Application "Percent Weighing"

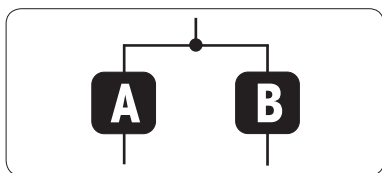


The **"Percent Weighing"** application allows you to check a sample weight as percentage to a reference target weight.

Requirement: The function "PERCENT" must be assigned to an «Fx» key (see advanced menu topic "ASSIGN:Fx", factory setting: F2).

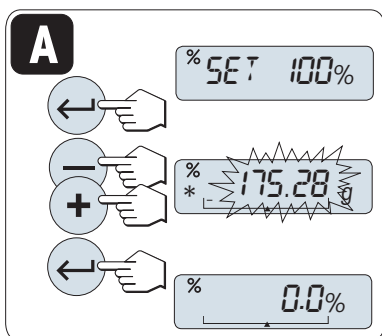


Activate function percent weighing "PERCENT" by pressing and holding the appropriate assigned «Fx» key (factory setting: F2).



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

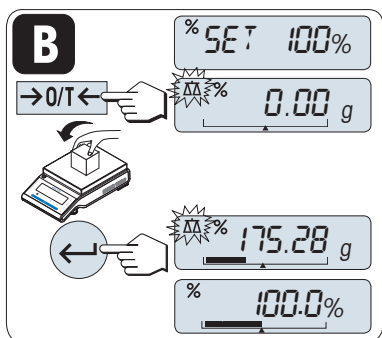
- A** Setting the reference in manual mode (enter 100%).
- B** Setting the reference in weighing mode (weigh 100%).



Setting possibility

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

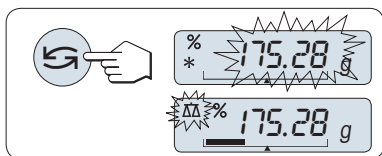
- a) Press «←» to activate manual mode.
- b) Select the reference target weight (100%) by scrolling up («+» key) or down («-» key). Speed up by press and hold.
- c) Press «←» to confirm.



Setting possibility

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

- a) 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.
- b) Load the reference weight (100%).
Note: Reference weight must be at least +/- 10d.
- c) Press «←» to confirm.



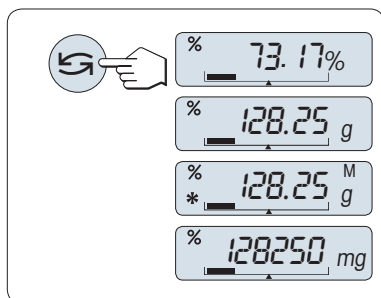
Switching between manual mode and weighing mode

Press «↺» to switch between manual and weighing mode.

Note: By switching from weighing mode to manual mode the weight value will be transferred and can be changed manually.

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 «G» 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).

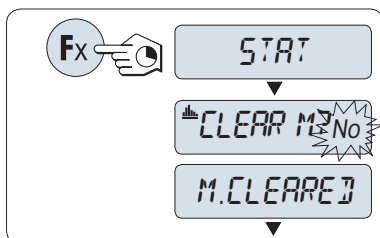
Note:

- 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.

9 Application "Statistics"

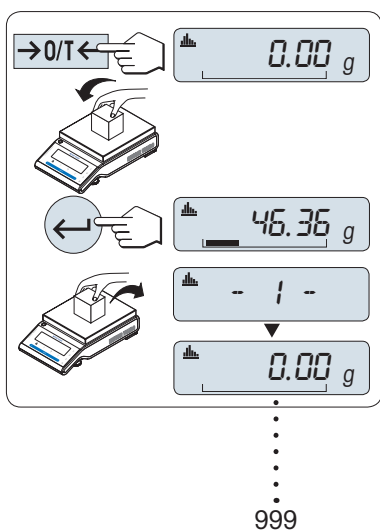


The "Statistics" application allows you to generate statistics of weighing values. 1 to 999 values are possible. **Requirement:** The function "STAT" must be assigned to an «Fx» key (see advanced menu topic "ASSIGN:Fx"). Connect a printer or a PC if present.



- Activate function "STAT" by pressing and holding the appropriate assigned «Fx» key.
- To continue the last statistics press «←». For a new statistical evaluation press «↶» to select "Yes" and press «←» to clear the memory.

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



Weighing the first sample weight:

- Press «→0/T←» to zero/tare the balance if needed.
- Load the first sample weight.
- 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.
- 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.




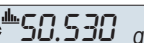

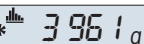

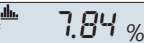

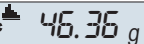


Results:

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

Displayed results:

- Press «←» to show the next statistical value.
- Press «C» to cancel displaying results and to continue weighing next sample.

		0.5 seconds
number of samples		
average		
standard deviation		
relative standard deviation		
lowest value (minimum)		

highest value (maximum)

 **MAX** ►  **55.81 g** ◀
different between the minimum
and the maximum
 **DIFF** ►  **9.45 g** ◀

sum of all values

 **SUM** ►  **252.65 g** ◀
Printout:

```

----- Statistics -----
21.Jan 2009           12:56

METTLER TOLEDO

Balance Type      MS4002S
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
-----

```

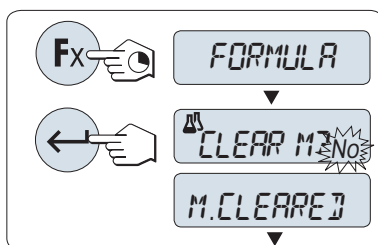
10 Application "Formulation" (Net Total Formulation)



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.

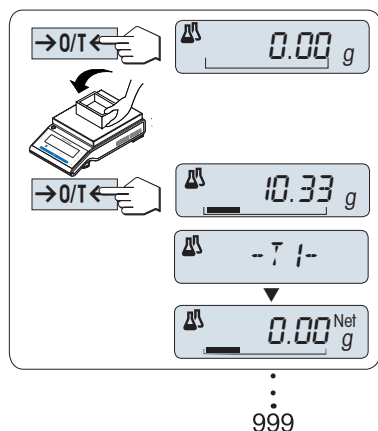
Requirement: The function "FORMULA" must be assigned to an «Fx» key (see advanced menu topic "ASSIGN:Fx"). Connect a printer or a PC if present.



a) Activate function formulation "FORMULA" by pressing and holding the appropriate assigned «Fx» key.

b) Press «←» to continue formulation weighing. For a new formulation press «↺» (or «+» or «-») to select "Yes" and press «←» to clear the memory.

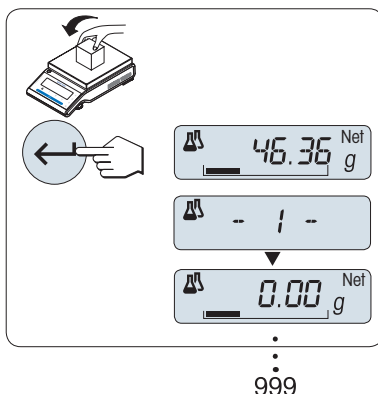
Note: If the memory is already cleared (sample and tare/pre-tare counter is zero) the memory clear question will be not displayed.



Tare container (if used):

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

Note: If you pre-tare via MT-SICS (e.g. bar code reader) "- PT1 -" is displayed.



Weighing the first component weight:


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

Weighing further component weights:


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



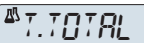



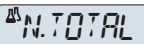

- 1...999 sample values are possible.
- max 999 tare values are possible.
- max 999 pre-tare values are possible.

**Results:**

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

Displayed results:

- Press «» to show the next statistical value.
- Press «**C**» to cancel displaying results and to continue weighing next component.

	0.5 seconds
number of samples	 N ►  8 ◀
sum of all tare values (T and PT)	 T.TOTAL ►  452.76 g ◀
sum of all component gross weight values	 G.TOTAL ►  546.79 g ◀
sum of all component net weight values	 N.TOTAL ►  94.03 g ◀

Printout:

```

----- Formulation -----
21.Jan 2009      12:56

METTLER TOLEDO

Balance Type      MS4002S
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
-----

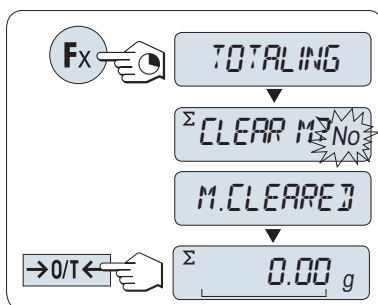
```

11 Application "Totaling"

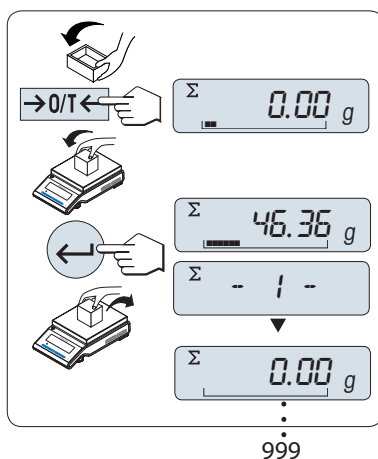


The "**TOTALING**" application allows you to weigh in different samples to add their weight values and to totalize them. 1 to 999 samples are possible.

Requirement: The function "TOTALING" must be assigned to an «Fx» key (see advanced menu topic "ASSIGN:Fx").



- Activate function "TOTALING" by pressing and holding the appropriate assigned «Fx» key.
- For a new totaling evaluation press «↶» (or «+» or «-») to enter "Yes" and press «↵» to clear the memory.
Note: If the memory is already cleared (sample counter is 0) the memory clear question will not be displayed.
- Press «→0/T←» to zero or tare the balance.



Weighing in the sample weight:


- If using a container: place empty container on the weighing pan and press «→0/T←» to zero or tare the balance.
- Load the first sample weight.
- 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.
- Unload the first sample weight. The display shows zero.

Weighing in further sample weights:

The same procedure as for the first sample weight.

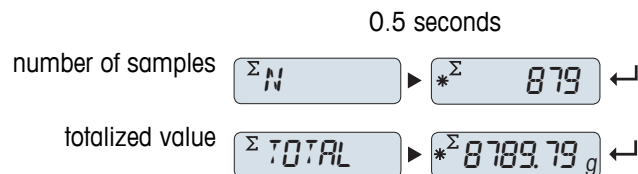
- 1...999 samples are possible.

Results:

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

Displayed results:

- Press «↶» briefly to show the totaled value.
- Press «C» briefly to cancel.



Printout:

```
----- Totaling -----  
21.Jan 2009          12:56  
  
METTLER TOLEDO  
  
Balance Type      MS1602S  
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  
-----
```


12 Application "Multiplication Factor Weighing"

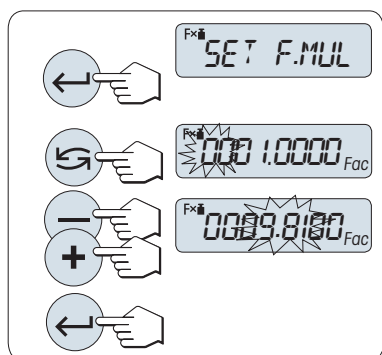


The "**Multiplication Factor Weighing**" application allows you to multiply the weight value (in grams) by a predefined factor (result = factor * weight) and have it calculated to a predefined number of decimal places.

Requirement: The function "FACTOR M" must be assigned to an «Fx» key (see advanced menu topic "ASSIGN:Fx").



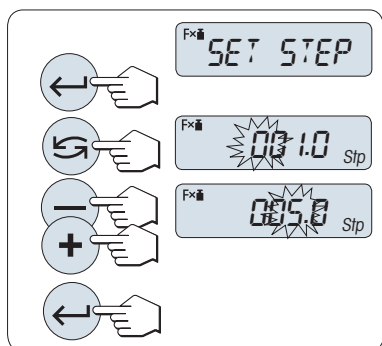
Activate function "FACTOR M" by pressing and holding the appropriate assigned «Fx» key.



1 Setting the factor value:

- Press «←» to execute "SET F.MUL". Either the factor 1 appears as default value or the factor that was saved most recently.
- Press «→» to select a digit. The selected digit is blinking.
- For changing digits, press «+» to scroll up or «-» to scroll down.
- Press «←» 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:

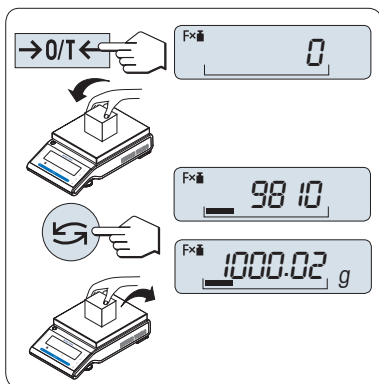
"SET STEP" appears in the display, and the program changes automatically to allow the display increments to be entered. The smallest possible display increment appears as default value, or the last value that was saved.

- Press «←» to execute "SET STEP".
- Press «→» to select a digit. The selected digit is blinking.
- For changing digits, press «+» to scroll up or «-» to scroll down.
- 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.

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



Weighing procedure

- Press «→0/T←» to zero/tare.
- Load sample weight on weighing pan.
- 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.
- 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").

13 Application "Division Factor Weighing"

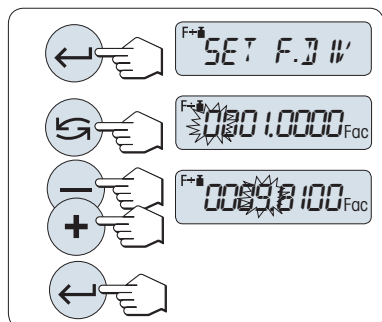


The "Division Factor Weighing" divide a predefined factor by the weight value (in grams) (result = factor / weight) and have it rounded to a predefined number of decimal places.

Requirement: The function "FACTOR D" must be assigned to an «Fx» key (see advanced menu topic "ASSIGN:Fx").



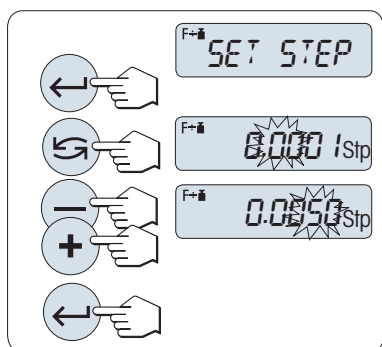
Activate function "FACTOR D" by pressing and holding the «Fx» key.



1 Setting the Factor Value:

- Press «←» to execute "SET F.DIV". Either the factor 1 appears as default value or the factor that was saved most recently.
- Press «→» to select a digit. The selected digit is blinking.
- For changing digits, press «+» key to scroll up or «-» to scroll down.
- Press «←» briefly 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:

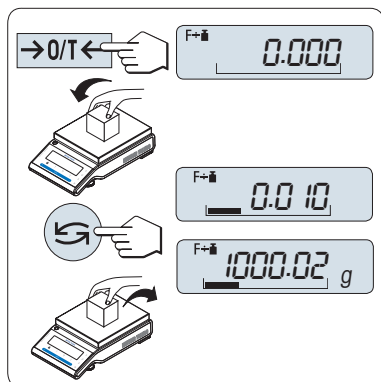
"SET STEP" appears in the display, and the program changes automatically to allow the display increments to be entered. The smallest possible display increment appears as default value, or the last value that was saved.

- Press «←» to execute "SET STEP".
- Press «→» to select a digit. The selected digit is blinking.
- For changing digits, press «+» to scroll up or «-» to scroll down.
- 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

- Press «→0/T←» to zero/tare.
- Load sample weight on weighing pan.
- 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.
- 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").

14 Application "Routine Test"



The "**Routine Test**" application allows you to determine the sensitivity of the balance. More about periodic sensitivity tests (routine tests) see: **GWP®** (Good Weighing Practice) on www.mt.com/gwp.

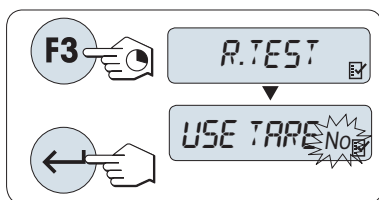
GWP gives clear recommendation for routine testing:

- how should I test my balance?
- how often?
- where can I reduce efforts?

More about test weights see www.mt.com/weights.

Requirement:

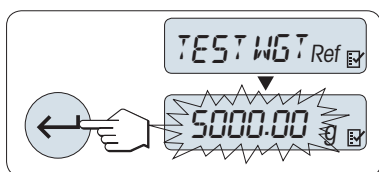
- The function "R. TEST" must be assigned to «F3» key (see advanced menu topic "ASSIGN:F3").
- It is recommended to connect a printer or a PC to the balance for showing the results.



- Activate function "R. TEST" by pressing and holding the assigned «F3» key.
- Select "No" (no tare weight used).
If a tare weight is used during the test select "Yes" (use a tare weight). To toggle between "Yes" and "No" use «↔» (or «+» or «-»).
- Press «←» to confirm the selection.

Note:

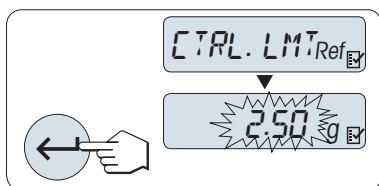
- It is recommended to test the sensitivity without tare load. (factory setting "No").
- If using tare: Make sure that tare weight plus test weight is not exceeding max. load.



Setting the reference test weight value

The default value of the test weight: Next smaller OIML weight than the maximum load of your balance according to the GWP® recommendation.

- For changing the value, press «+» to scroll up or «-» to scroll down. Progressing speed by press and hold.
- Press «←» to confirm the value.



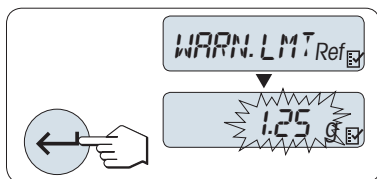
Setting the Control Limit

The default value of the control limit:

Test weight x weighing process tolerance / 2

Example: 5000 g x 0.1% / 2 = 2.50 g.

- For changing the value, press «+» to scroll up or «-» to scroll down. Progressing speed by press and hold.
- Press «←» to confirm the value.



Setting the Warning Limit

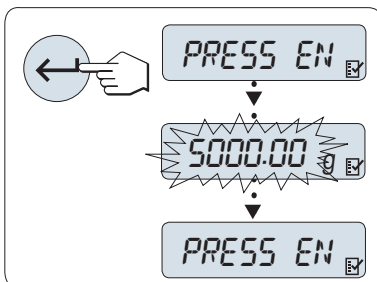
The default value of the warning limit:

Warning limit = control limit / safety factor

Example: $2.5 \text{ g} / 2 = 1.25 \text{ g}$.

- For changing the value, press «+» to scroll up or «-» to scroll down. Progressing speed by press and hold.
- Press «←» to confirm the value.

Note: The default values of control limit and the warning limit are evaluated according to the GWP recommendation. These are based under the assumption that the weighing process tolerance is 0.1% and the safety factor is 2.



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

Note: The test weight must be acclimatized to the ambient temperature of the balance.

- Press «←» to start the test.
- Follow the instructions on the display. If the test weight value is flashing: Load the test weight (displayed value).

The printout starts after the weighing pan is unloaded.

Exit the current test procedure:

Press and hold «ΔΔ», «F1», «F2» for executing a new application.

Printout:

```

----- Routine Test -----
21.Jan 2009      12:56

METTLER TOLEDO

Balance Type  MS6002S/01
SNR           1234567890

Sensitivity:
Test weight   5000.00 g
Value         5000.11 g
Warning L.    1.25 g
Control L.    2.50 g
Warning L.    OK
Control L.    OK

Signature
.....
-----

```

What if Warning Limit or Control Limit are "FAILED"?

The "SOP for Periodic Sensitivity Tests (Routine Tests)" provides information about measures when routine tests fail. Find a download version of these SOPs on www.mt.com/gwp, link "GWP® The Program / Routine Operation".

Content of SOP:



- Preparation
- Test procedure
- Evaluation
- Deviation
 - If Warning Limit "FAILED"
 - If Control Limit "FAILED"

15 Application "Diagnostics"



The "**Diagnostics**" application allows you to carry out predefined diagnostics tests and to view or print predefined sets of balance information. This diagnostics tool helps you find errors faster and more efficiently.








Requirement: A printer or a PC is connected to the balance for showing the results.

- a) Activate "ADVANCED" menu. (See section menu operation)
- b) Activate function "DIAGNOSE" by pressing «».
- c) Use «» to select appropriate tests.

15.1 Repeatability Test

The repeatability test allows you to repeat tests with internal weight for a given number of times.

Note: On models with internal weights only.

- a) Press «» to activate repeatability test "REPEAT.T". "R. TST. 10" appears on the Display.
- b) Enter the number of times (blinking) by pressing «» or «». Possible values are 5, 10 (default), 20, 50, 100 times.
- c) Press «» to start the test. The message "RUNNING REPEAT TEST" is displayed till the tests are completed.
- d) Press «» to print the test information..
- e) Press «» to scroll forward through the displayed list.
- f) Press «» to cancel the test procedure. The balance will return to the topic "DIAGNOSE".

Sample Information Displayed:

Displayed for 0.5 s	Display
"S DEV"	* 0.004 g
"MAX. TEMP"	21.2 °C
"MIN. TEMP"	21.0 °C
"MEAN. TEMP"	21.1 °C
"TOT.TIME"	00:01:26

Sample Printout:

```

-- Repeatability Test --
21.Jan 2009          11:34

METTLER TOLEDO

Balance Type  MS6002S/01
SNR          1234567890
SW           V1.00
Temperature   21.3 °C
No. of tests  10
-----
1. Time       00:00:00
1. Temp.      21.3 °C
2. Time       00:00:04
2. Temp.      21.3 °C
.
.
.
-----
s Dev.        0.004 g
Max Temp.     21.2 °C
Min Temp.     21.0 °C
Mean Temp.    21.1 °C
Total Time    00:00:44
-----

```



Examples:

Repeatability test is a tool to do functional check with the balance. It may be performed:

- **To check function of balance**
 - during installation to store print out with installation documents.
 - after preventative maintenance to store print out with installation maintenance report.
 - when remarkable decrease of weighing performance occurs, so that you can email/fax print out to service support provider for diagnose purposes.
- **To develop the optimal environment settings** (see menu topic "ENVIRON.").
Measure the time you need to perform repeatability test with each "STABLE", "STANDARD" and "UNSTABLE" setting. The setting with the fastest total time suits best for the existing environmental conditions.

15.2 Display Test

The display test allows you to test the display of the balance.

- a) Press «» to start "DISPLAY".
All possible segments and icons on the display will illuminate.
- b) Press «» to print the test information.
- c) Press «**C**» to cancel the test procedure. The balance will return to the topic "DIAGNOSE".

Sample Printout:

```

----- Display Test -----
21.Jan 2009          11:34


METTLER TOLEDO

Balance Type      MS204S
SNR              1234567890
SW               V1.00
Display Test      DONE
-----










```

15.3 Key Test

The key test allows you to test the keys of the balance.

- Press «» to start "KEYPAD T".
- The message "KEY TEST - PRESS KEY TO BE TESTED" is displayed scrolling during the duration of the key test. Press every Key briefly. Each press of a key beeps and echoes with "OK" on the display.
- Second press «**C**» key to print the test information. The test procedure will be cancelled and the balance will return to the topic "DIAGNOSE". If a key has not been tested before printing, then the test results will be indicated with a "-----" line.

Sample Information Displayed:

Key	Display
«  »	1/10 D OK
«  »	MENU OK
«  »	CAL OK
«  »	PRINT OK
«  »	MINUS OK
«  »	PLUS OK
«  »	TOGGLE OK
«  »	ENTER OK
« C »	C OK
«  »	O/T OK

Sample Printout:

```

----- Key Test -----
21.Jan 2009          11:34

METTLER TOLEDO



Balance Type      MS204S
SNR              1234567890
SW              V1.00
1/10 d Key       OK
Menu Key         OK
Cal Key          OK
Print Key        OK
Minus Key        OK
Plus Key         OK
Toggle Key       OK
Enter Key        OK
Zero/Tare Key    OK
Cancel Key       OK
-----

```

15.4 Motor Test

The motor test allows you to test the calibration motor of the balance.

Note: On models with internal weight only.

- a) Press «» to start "CAL.MOT. T".
"RUNNING" is displayed during the Motor Test. A motor test is deemed successful when all the motor positions have been successfully tested. At the end of the test, the test information will be printed.
- b) Press «» for printout.
- c) Press «**C**» to cancel the test procedure. The balance will return to the topic "DIAGNOSE".

Sample Printout:

```

----- Motor Test -----
21.Jan 2009          11:34



METTLER TOLEDO



Balance Type      MS204S
SNR              1234567890
SW              V1.00
Motor Test        OK
-----

```

15.5 Balance History

The balance history function allows you to view and print the history of the balance.

- a) Press «» to start "BAL.HIST".
- b) Press «» for printout.

- c) Press «» to scroll forward through the displayed list of balance history information.
- d) Press «» to cancel the test procedure. The balance will return to the topic "DIAGNOSE".

Sample Information Displayed:

Information	Display
Operation Time (year:day:hour)	00:018:04
Total load kg	115.7191 kg
Number of weighings	1255
Number of key pressed	4931
Number of motor movements	1012
Backlight time (year:day:hour)	00:018:04
Next service due date	01:01:2010

Sample Printout:

```

--- Statistical Info ---
21.Jan 2009      11:34





METTLER TOLEDO

Balance Type      MS4002S
SNR               1234567890
SW               V1.00
-----
Operating time
                  18d 4h
Total weight loaded
                  115.7191 kg
Number of weighings
                  1255
Number of key presses
                  4931
Motor movements
                  1012
Backlight operating time
                  18d 4h
Next service due date
                  01.01.2010
-----

```

15.6 Calibration History

The "Calibration History" function allows you to view and print information of the last 30 (thirty) balance adjustment. Adjustments made by a service technician and normal user are counted together.

- a) Press «» to start "CAL.HIST".
- b) Press «» for printout.
- c) Press «» key to scroll forward through the displayed list of Adjustments history information.
- d) Press «» to cancel the test procedure. The balance will return to the topic "DIAGNOSE".

Sample Information Displayed:

Note	Display	
S = External adjusted service	05:03:09S	01
F = FACT	05:03:09F	02
	.	.
	.	.
	.	.
I = Internal adjusted	04:03:09I	28
E = External adjusted user	03:03:09E	29
F = FACT	02:03:09F	30

Sample Printout:

```

----- Calibration -----
05.Mar 2009      11:34



METTLER TOLEDO



Balance Type      MS204S
SNR               1234567890
SW               1.00
-----
01 05.Mar 2009    11:34
External ADJ SERVICE
                100.0000 g
                23.5°C
-----
02 05.Mar 2009    09:00
FACT
                22.4°C
-----
.
.
.
28 03.Mar 2009    10:59
Internal ADJ
                22.6°C
-----
29 02.Mar 2009    16:34
External ADJ USER
                100.0000 g
                24.6°C
-----
30 02.Mar 2009    18:36
FACT
                22.4°C
-----

```

15.7 Balance Information

The balance information function allows you to view and print information about your balance.

- Press «» to start "BAL.INFO".
- Press «» for printout.

- c) Press «» to scroll forward through the displayed list of Balance information.
- d) Press «» to cancel the test procedure. The balance will return to the topic "DIAGNOSE".

Sample information displayed:

Information	Display
Balance type	TYPE MS6002S
Max. load	MAX 6200 g
Software platform	PLATFORM RAINBOW
Serial number	SNR 1234567890
Type definition number	TDNR 9.6.3.411
Software version	SOFTWARE V1.00
Cell ID	CELL ID 1172400044
Cell type	CELL TYPE MMAI6000G2
Tolerance revision number	TOLERANCE NO2
Language	LANGUAGE ENGLISH

Sample Printout:



```
-- Balance Information -
05.Mar 2009      11:34

METTLER TOLEDO

Balance Type      MS6002S
SNR               1234567890
SW               V1.00
Max. Load        6200 g
Platform          Rainbow
TDNR              9.6.3.411.2-03
Cell ID           1172400044
Cell Type         MMAI6000G2
Tolerance Rev.no. 2
Language          English
-----
```

15.8 Service Provider Information

The service provider Information function allows you to print information about your service provider.

- a) Press «» to start "PROVIDER". The service provider information will be displayed.
- b) Press «». The service provider information will be printed and the balance will return to the topic "DIAGNOSE".

Sample Printout:

```
--- Service Provider ---  
21.Jan 2009           11:34
```

```
METTLER TOLEDO  
Im Langacher  
CH-8606 Greifensee  
Switzerland  
(+41) 044 944 22 11  
-----
```

16 Communication with Peripheral Devices

16.1 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

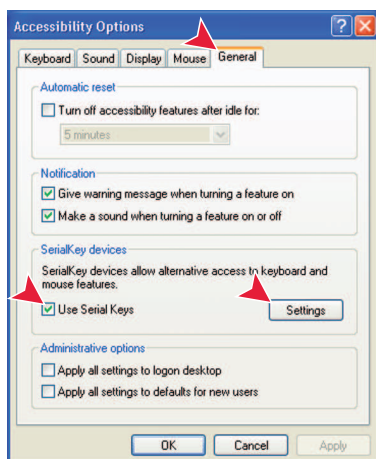
- PC with Microsoft Windows® operating system and serial interface RS232.
- Windows Application (e.g. Excel).
- Balance to PC connection with cable RS232 (e.g. No. 11101051 see chapter accessories).
- Balance Interface Setting (see Interface Menu):
 - Topic "RS232": set "PC-DIR." and select the most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

Settings at the PC

Note: The following examples are based on Windows XP.

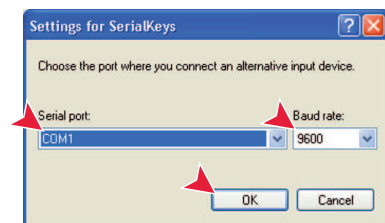


- Click "start".
- Click "ControlPanel".
- Click "Accessibility Options" in the Control Panel.



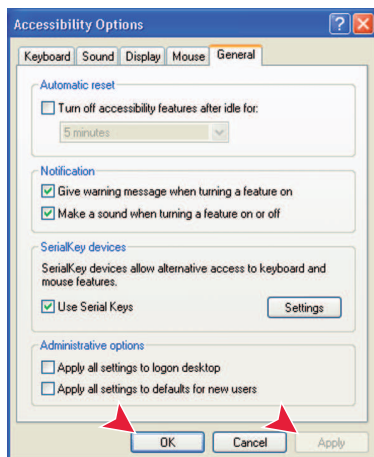
Accessibility Option

- Click "General" Tab.
- Enter a check mark at "Use Serial Keys".
- Click "Settings".



Settings for SerialKeys

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



Complete the settings

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

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

16.2 Installing USB Device Interface

To perform the functionality "HOST" with a PC equipped only with a USB Interface, you have to assign an appropriate USB Driver on the PC first. You can find the "NewClassic Balance USB Installer" on the METTLER-TOLEDO web-site at the following address:

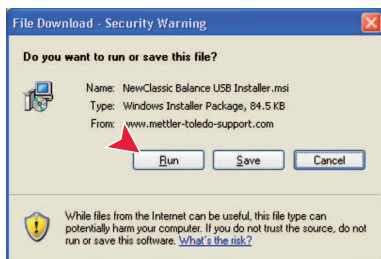
www.mt.com/newclassic

Requirements

- Balance with USB Device Interface.
- PC with Microsoft Windows® operating system (Version , XP SP2 or Vista 32).
- Internet connection and web browser (e.g. MS Internet Explorer).
- PC to balance USB connection cable.

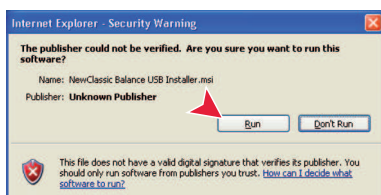
Installing the "NewClassic Balance USB Installer" on the PC.

- Connect to the Internet.
- Go to the site "**www.mt.com/newclassic**".
- Click "Support" tab on the NewClassic Balance Site.
- Click "Download Center"
- Click "USB Driver"

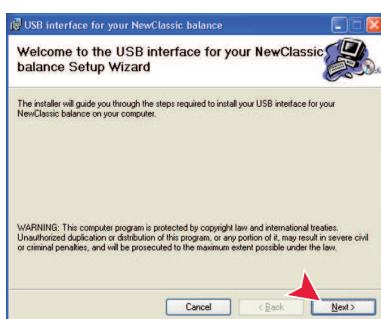


Install "NewClassic Balance USB Installer.msi"

- Click "Run" to install (recommended) or
- Click "Save" to download.



Click "Run".



Click "Next" and follow the Installer's instructions.



Install your Balance

- Switch the Balance "off".
- Connect the Balance to the preferred USB Port on the PC.
- Switch the Balance "on".
- Follow the instructions of the Wizard and install the Software automatically (recommended)

Note: The Wizard appears again for each USB port, either on your PC or if another balance is connected.

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

17 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.

17.1 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.

Requirements

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

- PC with Microsoft Windows® operating system (Version 98, 98SE, ME, NT4.0, 2000, XP or Vista).
- Internet connection and web browser (e.g. MS Internet Explorer).
- PC to balance connection cable (e.g. No. 11101051 see chapter accessories)

17.2 Update Procedure

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

- a) Connect to the Internet.
- b) Go to the site "**www.mettler-toledo-support.com**".
- c) Enter the information required for registration on the METTLER TOLEDO Balance Support Site.
- d) Click the "Customer Support" link and log in.
- e) Click your Balance.
- f) 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.

18 Error and Status Messages


18.1 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.	Battery must be replaced. Please 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.
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.

18.2 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 "SERV.ICON")

19 Cleaning and Service

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

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

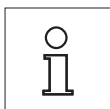
Please observe the following notes:



- 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.

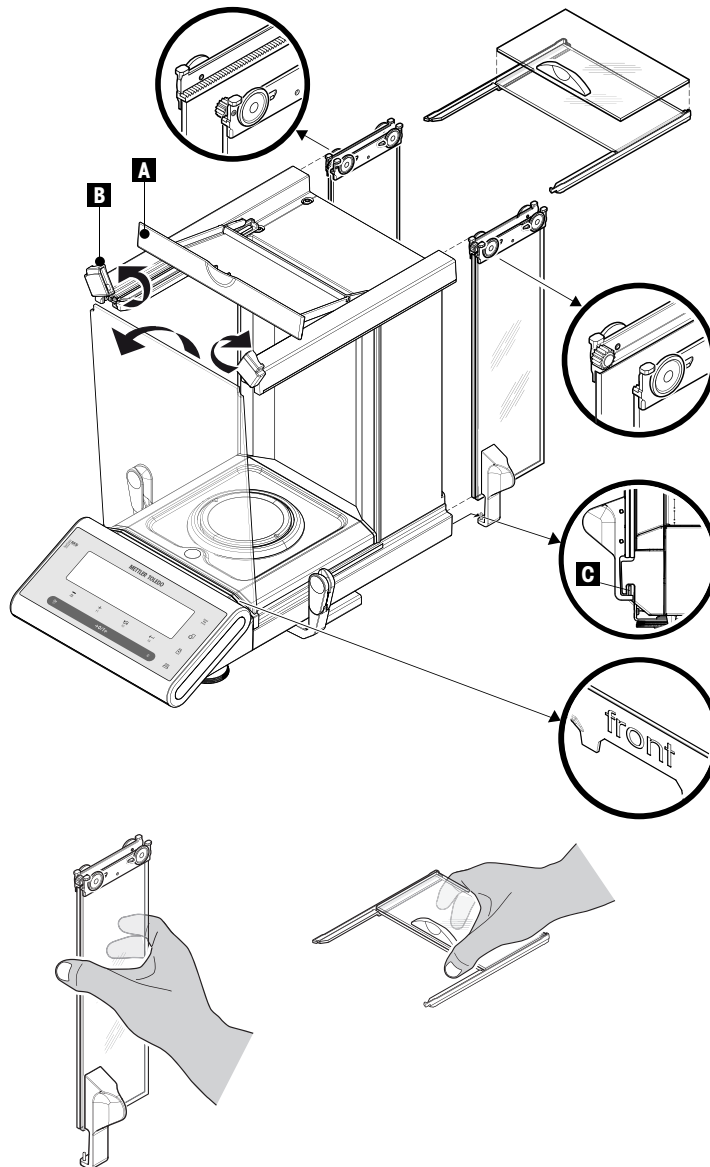


- On no account use cleaning agents which contain solvents or abrasive ingredients, as this can result in damage to the operation panel overlay.



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.

19.1 Cleaning the Glass Draft Shield



Important note

Removing and inserting the side door glass panels and top door glass panels:

Always hold the 2 parallel guided glass panels **together and parallel with one hand** (see illustrations).

- Push all the glass panels as far as they will go to the back.
- Turn the top cover (A) to the front.
- Pull the side door glass panels and the top door glass panels towards the back and off. (observe the important note above)
- Turn the two lock covers (B) on the front as far as they will go to unlock the front glass.
- Tilt the front glass forward and pull it out.
- Remove draft ring.
- Remove weighing pan.
- Remove drip tray.

After cleaning reinstall all components in reverse order through the observance of the important notes.

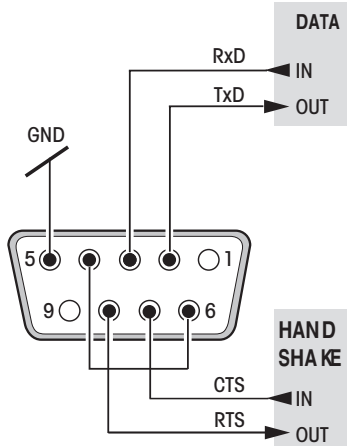
Important note

- Side door glass panels: The guide pin must be placed in the guide slot (C).
- After inserting the glass doors (side and top), close the top cover so that they can not fall out.
- Front glass: The writing "front" must be show forwards.

20 Interface Specification

20.1 RS232C Interface

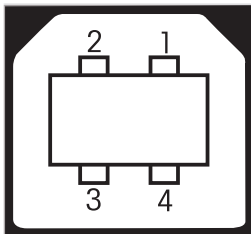
Each balance is equipped with an RS232C Interface as standard for the attachment of a peripheral device (e.g. printer or computer).

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

20.2 USB Device Interface

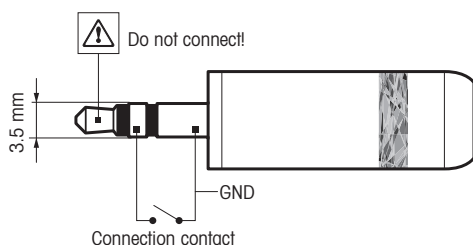
Each balance is equipped with an "USB Device" Interface as standard for the attachment of a peripheral device (e.g. computer).

Note: This interface is not suitable to communicate with a Printer.

Schematic	Item	Specification										
 <table data-bbox="367 523 654 689"><tr><td>1</td><td>VBUS (+5 VDC)</td></tr><tr><td>2</td><td>D- (Data -)</td></tr><tr><td>3</td><td>D+ (Data +)</td></tr><tr><td>4</td><td>GND (Ground)</td></tr><tr><td>Shield</td><td>Shield</td></tr></table>	1	VBUS (+5 VDC)	2	D- (Data -)	3	D+ (Data +)	4	GND (Ground)	Shield	Shield	Standard	In conformity with USB Specification Revision 1.1
	1	VBUS (+5 VDC)										
	2	D- (Data -)										
	3	D+ (Data +)										
	4	GND (Ground)										
Shield	Shield											
Speed	Full speed 12 Mbps (requires shielded cable)											
Function	CDC (Communication Device Class) serial port emulation											
Power usage	Suspended device: Max 10 mA											
Connector	Type B											

20.3 Aux Connection

You can connect the METTLER TOLEDO "ErgoSens" or an external switch to socket Aux. This allows you to start functions such as taring, zeroing or printing.



External connection

Connector:
3.5 mm stereo jack connector

Electrical data:
Max. voltage 12 V
Max. current 150 mA

20.4 MT-SICS Interface Commands and Functions

Many of the balances and scales 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.

Basic information on data interchange with the balance

The balance receives commands from the system and acknowledges the command with an appropriate response.

Command formats

Commands sent to the balance comprise one or more characters of the ASCII character set. Here, the following must be noted:

- Enter commands only in uppercase.
- The possible parameters of the command must be separated from one another and from the command name by a space (ASCII 32 dec., in this description represented as).
- The possible input for "text" is a sequence of characters of the 8-bit ASCII character set from 32 dec to 255 dec.

- Each command must be closed by C_{RLF} (ASCII 13 dec., 10 dec.). The characters C_{RLF} , which can be inputted using the Enter or Return key of most entry keypads, are not listed in this description, but it is essential they be included for communication with the balance.

Example

S – Send stable weight value

Command	S	Get the current stable net weight value.
Response	S S WeightValue Unit	Current stable weight value in unit actually set under unit 1.
	S I	Command not executable (balance is currently executing another command, e.g. taring, or time-out as stability was not reached).
	S +	Balance in overload range.
	S -	Balance in underload range.

Example

Command	S	Query a stable weight value.
Response	S S S S S S 100.00 g	The current stable weight value is 100.00 g.

The available MT-SICS commands are listed in the table (depending on the model). For further information please refer to the Reference Manual "MT-SICS 11780711" downloadable from the Internet under www.mt.com/sics-new-classic.

	Description		Description
@	Cancel (Reset)	M46	Print interval
C0	Query/Set adjustment settings	PW	Piece counting: Query/Set piece weight
C1	Start adjustment according to current settings	PWR	Power on/off (PWR 0 means switch off completely, if balance is powered by battery)
C2	Start adjustment with external weight	S	Send stable weight value
C3	Start adjustment with internal weight	SI	Send weight value immediately
D	Display text sent to balance	SIR	Send weight value immediately and repeat
DAT	Date query/set	SIRU	Send weight value with currently displayed unit immediately and repeat
DW	Display weight	SIU	Send weight value with currently displayed unit immediately
I0	Commands implemented	SM0	Dynamic weighing: cancel all SMx commands
I1	MT-SICS level and MT-SICS versions	SM1	Dynamic weighing: Start immediately and send the result
I2	Balance data	SM2	Dynamic weighing: start after a minimum load is exceeded and send result
I3	Software version, type definition number	SM3	Dynamic weighing: start after a minimum load is exceeded, send result and repeat
I4	Query serial number (SNR)	SM4	Dynamic weighing: query/set time interval
I5	Query SW-identification number	SNR	Send stable weight value and repeat on weight change
I10	Query/set balance ID	SNRU	Send stable weight value with currently displayed unit and repeat on weight change
I11	Query balance type	SR	Send weight value on weight change

	Description		Description
I14	Query balance information	SRU	Send stable weight value with currently displayed unit on weight change
K	Keys: set configuration	ST	Send stable weight value on pressing (print) key
M02	Query/set environment	SU	Send stable weight value with currently displayed unit
M03	Query/set AutoZero	T	Tare
M08	Display brightness	TA	Get/Set tare weight value
M09	Display contrast	TAC	Clear tare value
M11	Beeper: Query/set volume	TI	Tare immediately
M14	List available language	TIM	Query/set time
M15	Query/set language	TST0	Query/set test function settings
M17	FACT: query/set single time criteria (no possibility to set "weekday")	TST1	Start test function according to current settings
M22	Custom unit definition Remarks: no possibility to set "name" of unit	TST2	Start test function with external weight
M25	Get application list	TST3	Start test function with internal weight
M26	Get/set current application	UPD	Query/set update rate of the host interface
M27	Adjustment history	Z	Zero
M30	+/- settings with nominal and tolerance	ZI	Zero immediately

21 Technical Data

21.1 General Data

Power Supply

Power input balance:	12VDC, 2.25A
AC/DC adapter:	Primary: 100V–240VAC, -15%/+10%, 50/60Hz Secondary: 12VDC \pm 3%, 2.25 A (with electronic overload protection)



Use only with a tested AC Adapter with SELV output current.
Ensure correct polarity \ominus \oplus

Cable to AC/DC adapter:	3-core, with country-specific plug
-------------------------	------------------------------------

Protection and Standards

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

Environmental conditions

• Height above mean sea level:	up to 4000 m
• Ambient temperature range:	10 to 30 °C
• Relative air humidity:	10% to 80 % at 31 °C, linearly decreasing to 50 % at 40 °C, noncondensing

Materials

• Housing/Terminal:	Die-cast aluminum / Plastic (PA12)
• Weighing pan:	Stainless steel X2CrNiMo 17-12-2 (1.4404)
• Draft shield element:	Stainless steel X2CrNiMo 17-12-2 (1.4404)
• Draft shield:	Plastic (PBT), glass
• In-use-cover:	Plastic (PET)

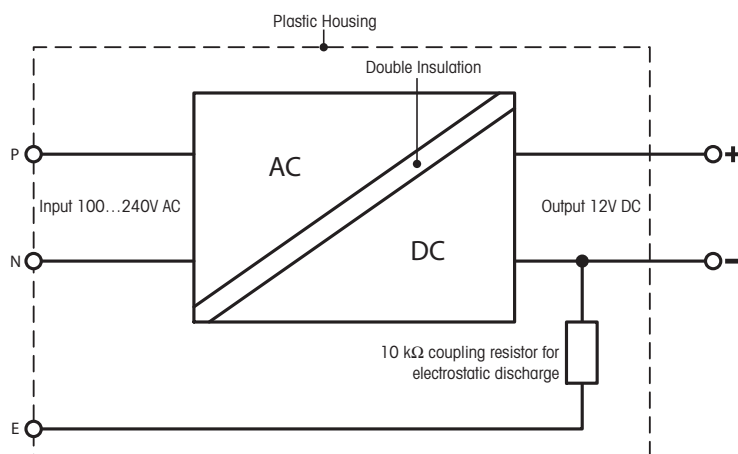
21.2 Explanatory Notes for the METTLER TOLEDO AC Adapter

METTLER TOLEDO Balances are operated with a certified external power supply which conforms to the requirements for Class II double insulated equipment and it is not provided with a protective earth connection but with a functional earth connection for EMC purposes. Information about conformance of our products can be found in the "Declaration of Conformity" which is coming with each product.

Consequently an earth bonding test is not required. Similarly it is not necessary to carry out an earth bonding test between the supply earth conductor and any exposed metalwork on the balance.

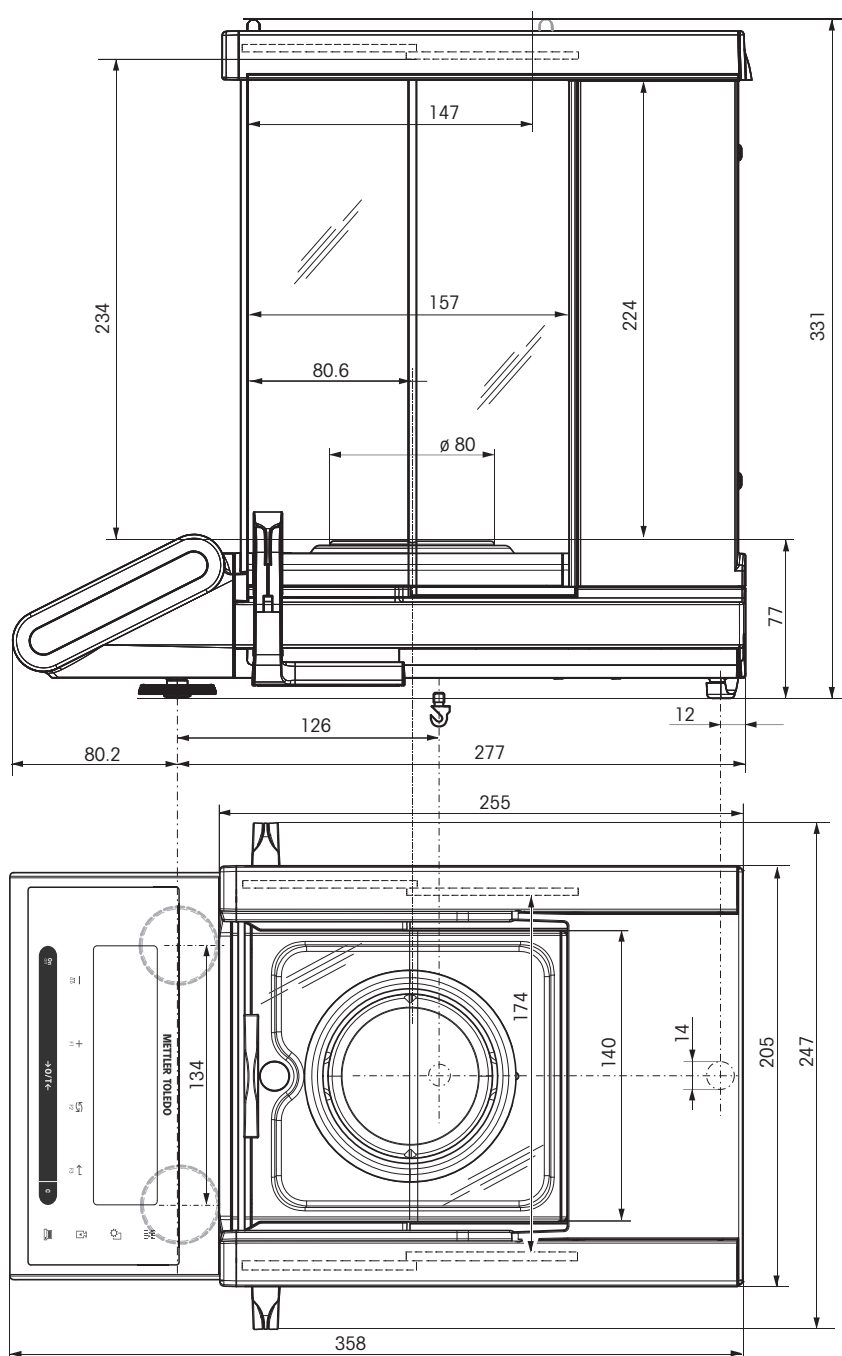
In case of testing with regard to the European Directive on general product safety the power supply and the balance has to be handled as Class II double insulated equipment.

Because high resolution balances can be sensitive to static charges a leakage resistor, typically 10 kOhm, is connected between the earth connector and the power supply output terminals. The arrangement is shown in the equivalent circuit diagram. This resistor is not part of the electrical safety arrangement and does not require testing at regular intervals.

Equivalent circuit diagram**21.3 Model-Specific Data****Technical Data**

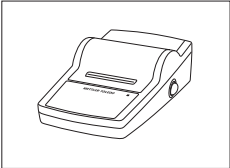
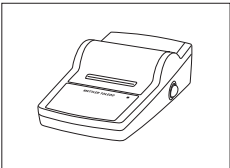
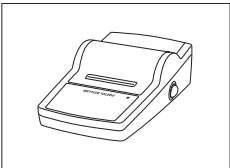
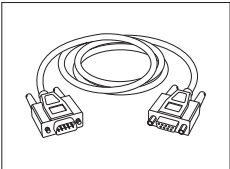
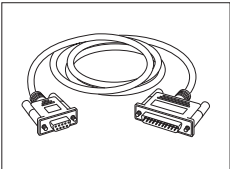
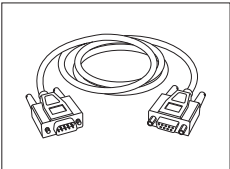
Model	MS105	MS105DU	MS205DU
Maximum load	120 g	120 g	220 g
Maximum load, fine range	—	42 g	82 g
Readability	0.01 mg	0.1 mg	0.1 mg
Readability, fine range	—	0.01 mg	0.01 mg
Taring range	0...120 g	0...120 g	0...220 g
Repeatability (sd)	0.04 mg	0.08 mg	0.08 mg
Repeatability (sd) at low load (20 g)	0.02 mg	—	—
Repeatability (sd), fine range	—	0.03 mg	0.05 mg
Repeatability (sd), fine range at low load (20 g)	—	0.02 mg	0.02 mg
Linearity	0.1 mg	0.15 mg	0.2 mg
Linearity within 10 g	0.02 mg	0.02 mg	0.02 mg
Sensitivity temperature drift (10...30°C)	2 ppm/°C	2 ppm/°C	2 ppm/°C
Internal adjustment	yes, FACT	yes, FACT	yes, FACT
Adjustment range with external weights	1.2...120 g	1.2...120 g	2.2...220 g
Weights for routine testing			
Large Weight/Class OIML/ASTM	100 g / F2/4	100 g / F2/4	200 g / F2/4
Small Weight/Class OIML/ASTM	5 g / E2/2	5 g / E2/2	10 g / F1/3
Minimum weight (acc. to USP)	45 mg	45 mg	45 mg
Minimum weight (U=1%, k=2)	3 mg	3 mg	3 mg
Minimum weight (OIML)	1 mg	1 mg	1 mg
Settling time, typ. (fine range)	8 s	4 s (8 s)	4 s (8 s)
Usable height of draft shield [mm]	234	234	234
Weighing pan dimensions (WxD) [mm]	Ø 80	Ø 80	Ø 80
Balance dimensions (WxDxH) [mm]	247x358x331	247x358x331	247x358x331
Net Weight [kg]	6.6	6.6	6.6

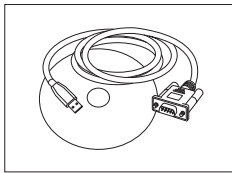
0.01 mg MS Models



22 Accessories and Spare Parts

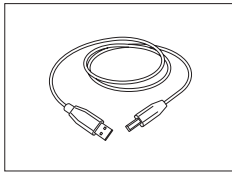
22.1 Accessories

	Description	Part No.
Printers		
	RS-P25 printer with RS232C connection to balance	11124300
	RS-P26 printer with RS232C connection to balance (with date and time)	11124303
	RS-P28 printer with RS232C connection to balance (with date, time and applications)	11124304
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
	RS9 – RS9 (m/m): connection cable for devices with DB9 (f) socket, length = 1 m	21250066



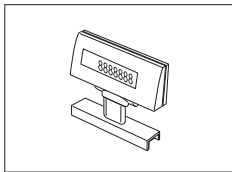
RS232 - USB converter – intelligent expansion module for connection to PC 11103691

Cables for USB Interface



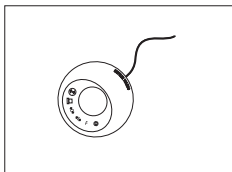
USB (A –B) connection cable for connection to PC, length = 1 m 12130716

Auxiliary Displays

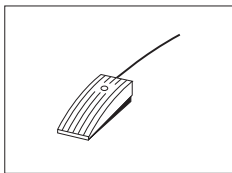


LC/RS-BLD auxiliary display on bench stand, backlit (incl. RS cable and separate AC adapter) 00224200

External Switches

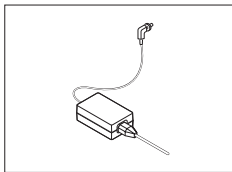


ErgoSens, optical sensor for hands-free operation 11132601



Auxiliary Footswitch with selectable function for balances 11106741

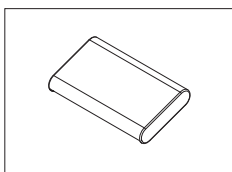
AC Adapters



AC/DC adapter (without power cable) 100–240 VAC, 50/60HZ, 0.3 A, 12 VDC 2.25 A 11107909

- Power cable CH 00087920
- Power cable EU 00087925
- Power cable USA 00088668
- Power cable IT 00087457
- Power cable DK 00087452
- Power cable GB 00089405
- Power cable AUS 00088751
- Power cable SA 00089728

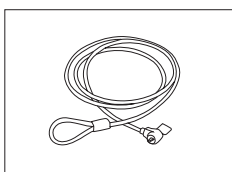
Protective Covers



Protective cover for semi micro balances

11142306

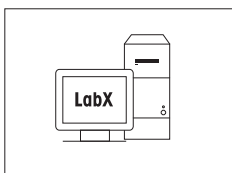
Anti-theft Devices



Steel cable

11600361

Software



LabX direct balance (simple data transfer)

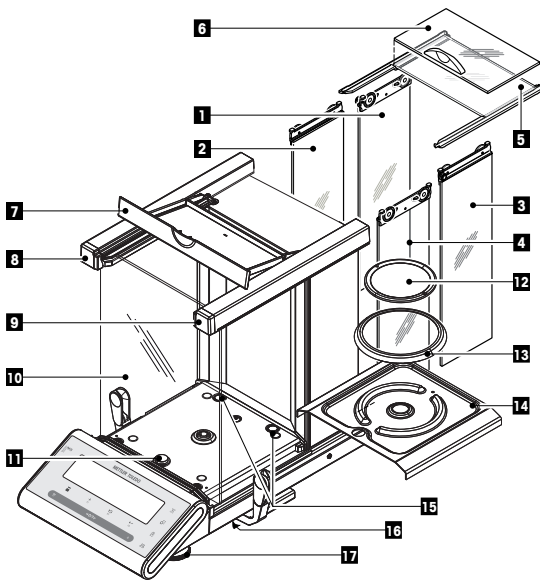
11120340

Adjustment Weights



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

22.2 Spare Parts

Drawing	Pos	Description	Part No.
	1	Side door back, left	11133079
	2	Side door front, left with handle	30003678
	3	Side door back, right	11133077
	4	Side door front, right with handle	30003677
	5	Top door back	11133081
	6	Top door front with handle	11133082
	7	Top cover	11142244
	8	Front glass lock, left	11142228
	9	Front glass lock, right	11142229
	10	Front glass panel	30003679
	11	Level window	11142253
	12	Weighing pan	30003777
	13	Draft ring	11142206
	14	Drip tray	30003778
	15	Plastic cap	11122623
	16	Weighing below balance cap	12104936
	17	Leveling foot	11106323

23 Appendix

23.1 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	≈	0.00220462262184878	lb
Ounce (avdp)	1 oz	=	28.349523125	g	1 g	≈	0.0352739619495804	oz
Ounce (troy)	1 oz _t	=	31.1034768	g	1 g	≈	0.0321507465686280	oz _t
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	≈	0.2666666666666667	mom
Mesghal	1 msg	≈	4.6083	g	1 g	≈	0.217	msg
Tael Hong Kong	1 tlh	=	37.429	g	1 g	≈	0.0267172513291833	tlh
Tael Singapore (Malaysia)	1 tfs	≈	37.7993641666667	g	1 g	≈	0.0264554714621853	tfs
Tael Taiwan	1 tlt	=	37.5	g	1 g	≈	0.0266666666666667	tlt
Tola	1 tola	=	11.6638038	g	1 g	≈	0.0857353241830079	tola
Baht	1 baht	=	15.16	g	1 g	≈	0.0659630606860158	baht

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