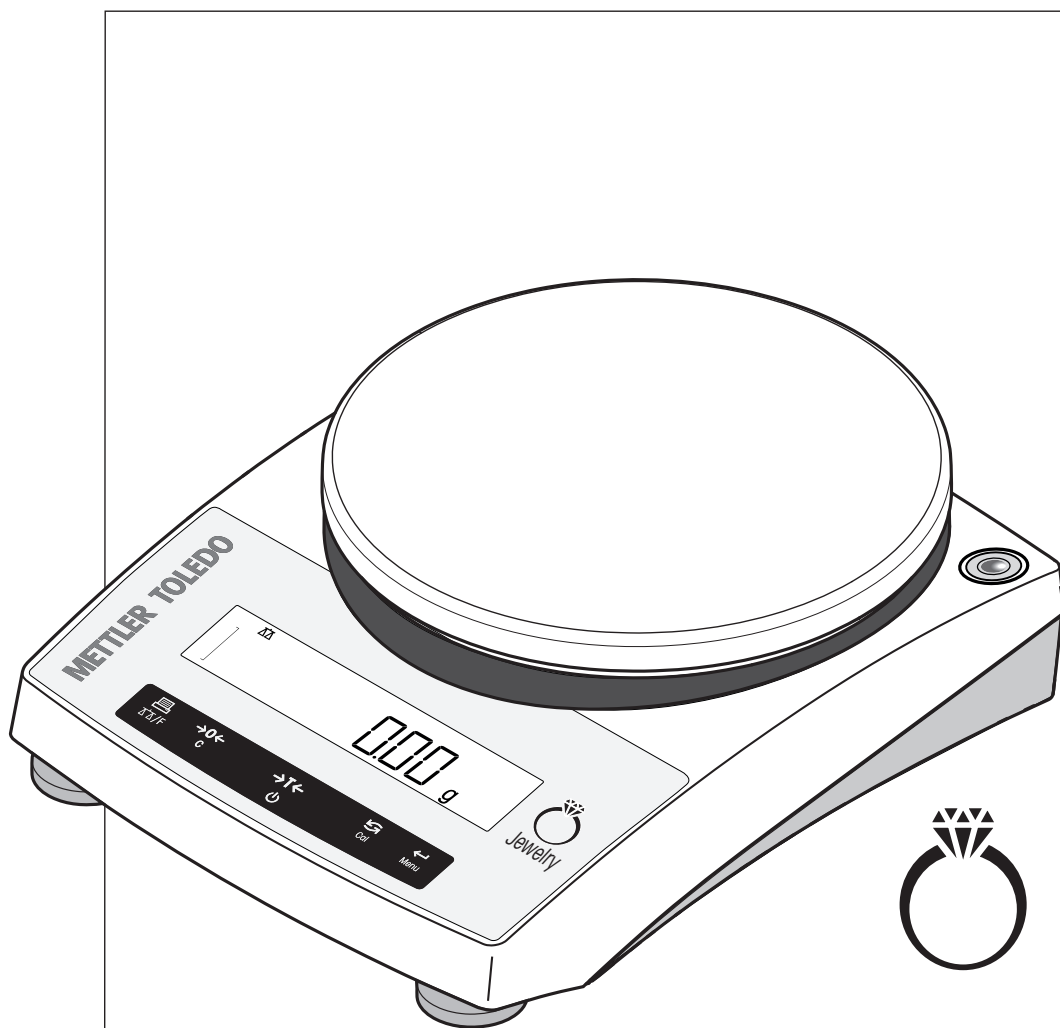


Jewelry Balances

JL-GE



METTLER TOLEDO

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1 Introduction

Thank you for choosing a METTLER TOLEDO balance. The portable precision balances offer dependable, go-anywhere weighing and are resilient, compact and lightweight.

This document is based on the software version V 2.00.

Finding more information

► www.mt.com/jewelry

Search for documents

► www.mt.com/library

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

► www.mt.com/contact

Conventions and symbols



Refers to an external document.

Key and/or button designations and display texts are shown in graphic or in bold text (e.g.  **DATE**).



Note For useful information about the product.



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.

Elements of instructions

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

- Prerequisites that must be fulfilled before the individual steps can be executed.

1 Step 1

⇒ Intermediate result

2 Step 2

⇒ Result

2 Safety Information

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

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

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

2.1 Definitions of signal warnings and warning symbols

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

Signal words

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

Warning symbols



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



Electrical shock



Notice

2.2 Product specific safety notes

Intended use

This instrument is designed to be used by trained staff. The instrument is intended for weighing purposes.

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

Responsibilities of the instrument owner

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

METTLER TOLEDO assumes that the instrument owner trains users to safely use the instrument in their workplace and deal with potential hazards. METTLER TOLEDO assumes that the instrument owner provides the necessary protective gear.



 **WARNING**

Death or serious injury due to electric shock

Contact with parts that carry a live current can lead to death or injury.

- 1 Only use the METTLER TOLEDO power supply cable and AC adapter designed for your instrument.
- 2 Connect the power cable to a grounded power outlet.
- 3 Keep all electrical cables and connections away from liquids and moisture.
- 4 Check the cables and the power plug for damage and replace damaged cables and power plugs.



NOTICE

Damage to the instrument due to the use of unsuitable parts

Using unsuitable parts with the instrument can damage the instrument or cause it to malfunction.

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



NOTICE

Damage to the instrument or software

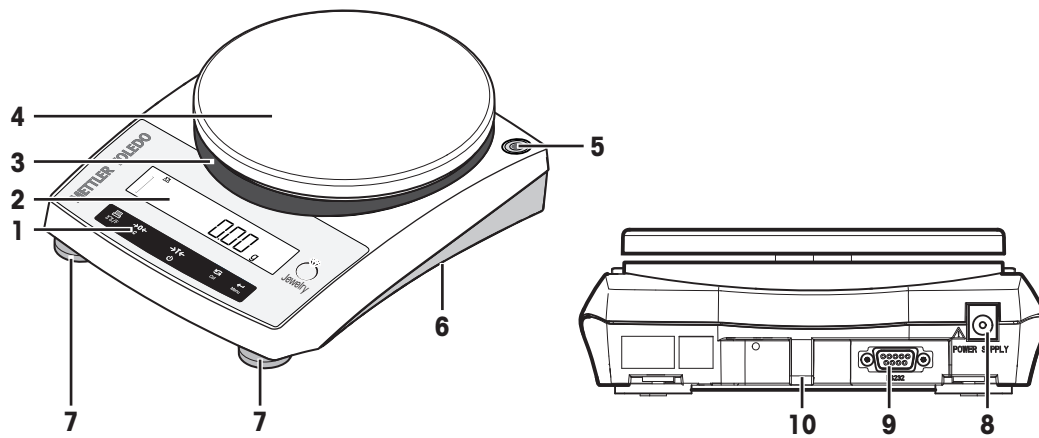
In some countries, excessive mains voltage fluctuations and strong glitches may occur. This may affect the instrument functions or damage the software.

- Use a voltage regulator for stabilizing.

3 Design and Function

3.1 Overview

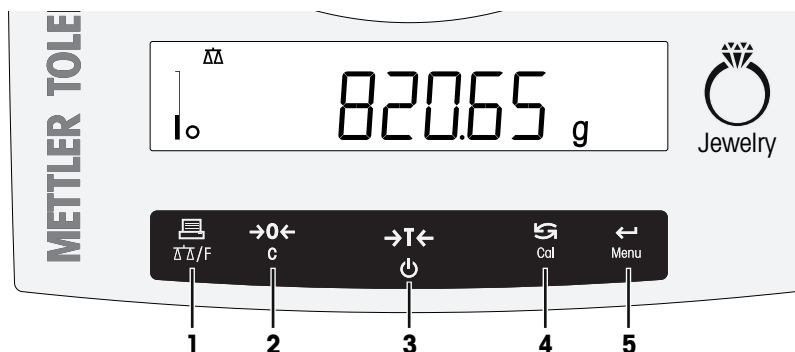
3.1.1 Components








Components overview legend

1	Operation keys	2	Display
3	Adapter ring	4	Weighing pan
5	Level indicator	6	Bottom of balance: <ul style="list-style-type: none"> Battery compartment Weighing hook opening for weighing below the balance
7	Leveling feet	8	Socket for AC/DC Adapter
9	RS232C serial interface	10	Lug for optional antitheft device

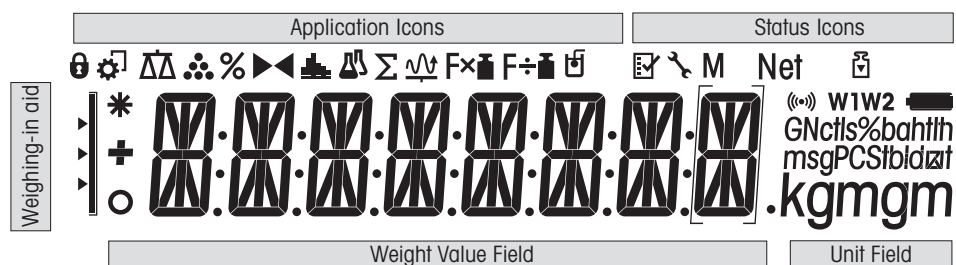
3.1.2 Operation keys



Legend key functions

No.	Key	Press briefly (less than 1.5 s)	Press and hold (longer than 1.5 s)
1	 ΔΔ/F	<ul style="list-style-type: none"> Printout display value Transmit data To navigate backward in the menu or menu selection Decrease parameters in menu or applications 	<ul style="list-style-type: none"> Open the application list and scroll among the weighing applications in certain sequence for selecting an application Exits an active application and returns to the selection for weighing mode
2	 C	<ul style="list-style-type: none"> Zero setting 	<ul style="list-style-type: none"> Cancel and leave menu without saving One step back in the menu Cancel or leave application setting
3		<ul style="list-style-type: none"> Tare Switch on 	<ul style="list-style-type: none"> Switch off
4	 Cal	<ul style="list-style-type: none"> With entries, scroll down To navigate forward menu topics or menu selections To toggle between unit 1, recall value (if selected), unit 2 (if different from unit 1) and the application unit (if any) Increase parameters in menu or applications 	<ul style="list-style-type: none"> Execute predefined adjustment (calibration) procedure
5	 Menu	<ul style="list-style-type: none"> Enter or leave menu selection To enter application parameter and switch to next parameter To store parameter 	<ul style="list-style-type: none"> Enter or leave menu (parameter settings)

3.1.3 Display



Application icons			
	Application weighing		Application totaling
	Application piece counting		Application multiplication factor
	Application percent weighing		Application division factor
	Application check weighing		Menu locked
	Application statistics		

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

Status icons			
	Indicates stored value (Memory)		Feedback for pressed keys
	Indicates net weight values		Service reminder
	Adjustments (calibration) started		

Weight value field and weighing-in aid			
	Brackets to indicate uncertified digits (approved models only)		SmartTrac (weighing-in aid) shows how much of the entire weighing range has been used.
	Indicates negative values		Marking of nominal or target weight
	Indicates unstable values		Marking of tolerance limit T+
	Indicates calculated values		Marking of tolerance limit T-

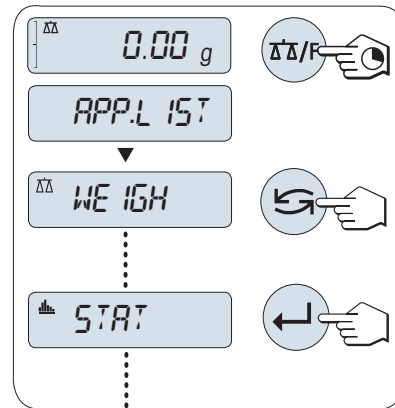
Unit field						
	g	gram	ozt	troy ounce	tls	Singapore tals
	kg	kilogram	GN	grain	tlf	Taiwan tals
	mg	milligram	dwt	pennyweight	tola	tola
	ct	carat	mom	momme	baht	baht
	lb	pound	msg	mesghal		
	oz	ounce	tlh	Hong Kong tals		

3.2 Basic principles for operation

Selection of simple weighing or applications

- 1 Press and hold $\Delta\Delta/F$ until **APP.LIST** (application list) appears on the display.
⇒ After releasing the key, weighing mode **WEIGH** appears on the display.
- 2 Press \leftarrow to execute the simple weighing or press \rightarrow several times to select another application.
- 3 Press \leftarrow to execute the selected application.

Available applications



Display	Remark	Description
WEIGH	Weighing mode	See performing a simple weighing
COUNT	Piece counting	See application piece counting
PERCENT	Percent weighing	See application percent weighing
CHECK	Check weighing	See application check weighing
STAT	Statistics	See application statistics
TOTAL	Totaling	See application totaling
FACTOR.M	Multiplication factor	See application multiplication factor weighing
FACTOR.D	Division factor	See application division factor weighing

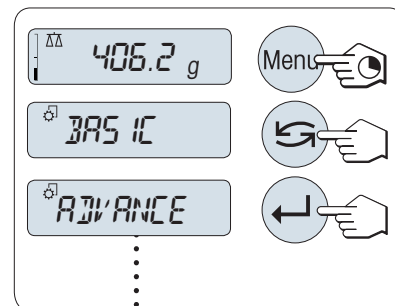
Terminating a current application

- 1 Press and hold **C**, during the application setting.
⇒ The balance returns to the last active application.
- 2 Press and hold $\Delta\Delta/F$, during working with the application.
⇒ The balance returns to the selection for the weighing mode.

Entering the menu

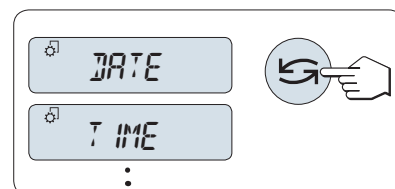
- 1 Press and hold **Menu** to enter main menu.
⇒ The first menu **BASIC** is displayed (except menu protection is active).
- 2 Press \rightarrow repeatedly to change menu.
- 3 Press \leftarrow to confirm the selection.

Detailed description of the menu **see** chapter The Menu.



Selecting menu topics

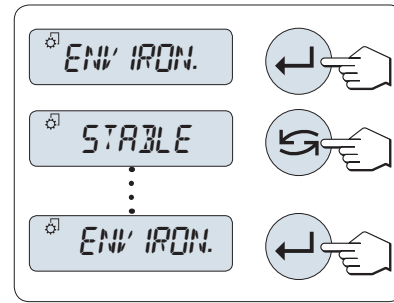
- 1 Press \rightarrow .
⇒ The next menu topic appears in the display.
- 2 Press \rightarrow repeatedly, the balance switches to the next menu topic.



Changing settings in selected menu topic

- 1 Press .
 - ⇒ The display shows the current setting in the selected menu topic.
- 2 Press repeatedly, the balance switches to the next selection.
 - ⇒ After the last selection, the first is shown again.
- 3 Press to confirm the setting.

For store the setting see "Saving settings and closing the menu".

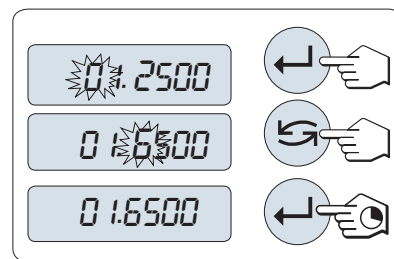


Changing settings in a submenu selection

The same procedure as for menu topics.

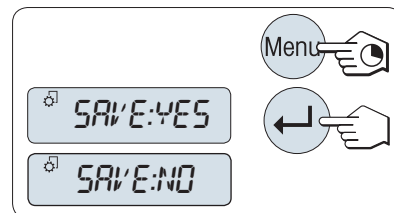
Input principle of numerical values

- 1 Press to select a digit (cyclically from left to right) or a value (depending on the application).
 - ⇒ The selected digit or the selected value is blinking.
- 2 Press to increase or to decrease for changing blinking digits or values.
- 3 Press and hold to confirm the value.



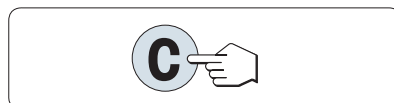
Saving settings and closing the menu

- 1 Press and hold **Menu** to leave menu topic.
 - ⇒ appears on the display.
- 2 Press to toggle between and .
- 3 Press to execute .
 - ⇒ Changes are saved.
- 4 Press to execute .
 - ⇒ Changes are not saved.



Cancel

- During menu operation
 - 1 Press **C** for leaving menu topic or menu selection without saving (one step back in the menu).
 - 2 To leave menu topic or menu selection without saving press **C** (one step back in the menu).
- During application operation
 - Press **C** to cancel settings.
 - ⇒ The balance returns to the previous active application.



Note

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

4 Installation and Putting Into Operation

4.1 Selecting the location

A balance is a sensitive precision instrument. The location where it is placed will have a profound effect on the accuracy of the weighing results.

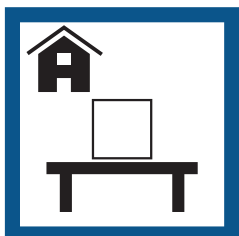
Requirements of the location

Place indoors on stable table

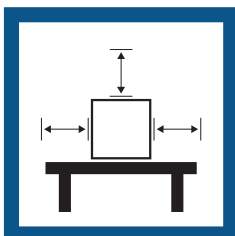
Ensure sufficient spacing

Level the instrument

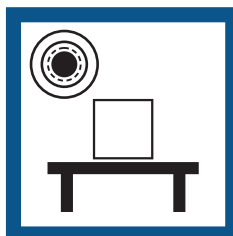
Provide adequate lighting



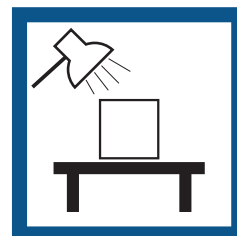
Avoid direct sunlight



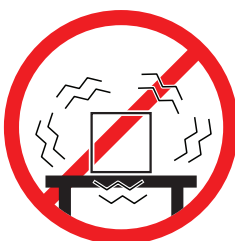
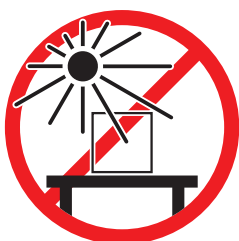
Avoid vibrations



Avoid strong drafts



Avoid temperature fluctuations



Sufficient distance for balance > 15 cm next to the instrument.

Take into account the environmental conditions. See "Technical Data".

4.2 Scope of delivery



NOTICE

Damage to the instrument due to the use of unsuitable parts

Using unsuitable parts with the instrument can damage the instrument or cause it to malfunction.

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

- Balance
- Weighing pan and weighing pan support
- Protective cover for load cell cone (mounted)
- Protective cover (mounted)
- Stackable cover
- Universal AC/DC adapter (country specific)
- User Manual
- Declaration of conformity

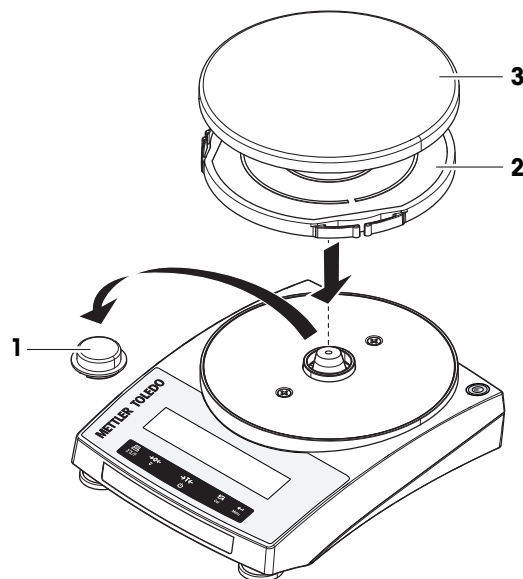
4.3 Unpacking

Open the balance packaging. Check the balance for transport damage. Immediately inform a METTLER TOLEDO representative in the event of complaints or missing accessories.

Retain all parts of the packaging. This packaging offers the best possible protection for transporting the balance.

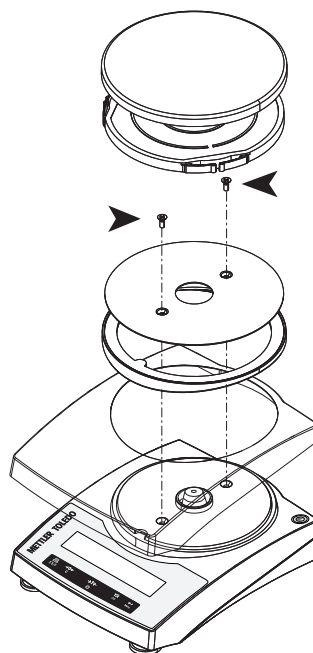
4.4 Installing the components

- 1 Remove the protective cover for weighing cone (1).
Keep it for later use.
- 2 Place the following components on the balance in the specified order:
 - Pan support (2)
 - Weighing pan (3)



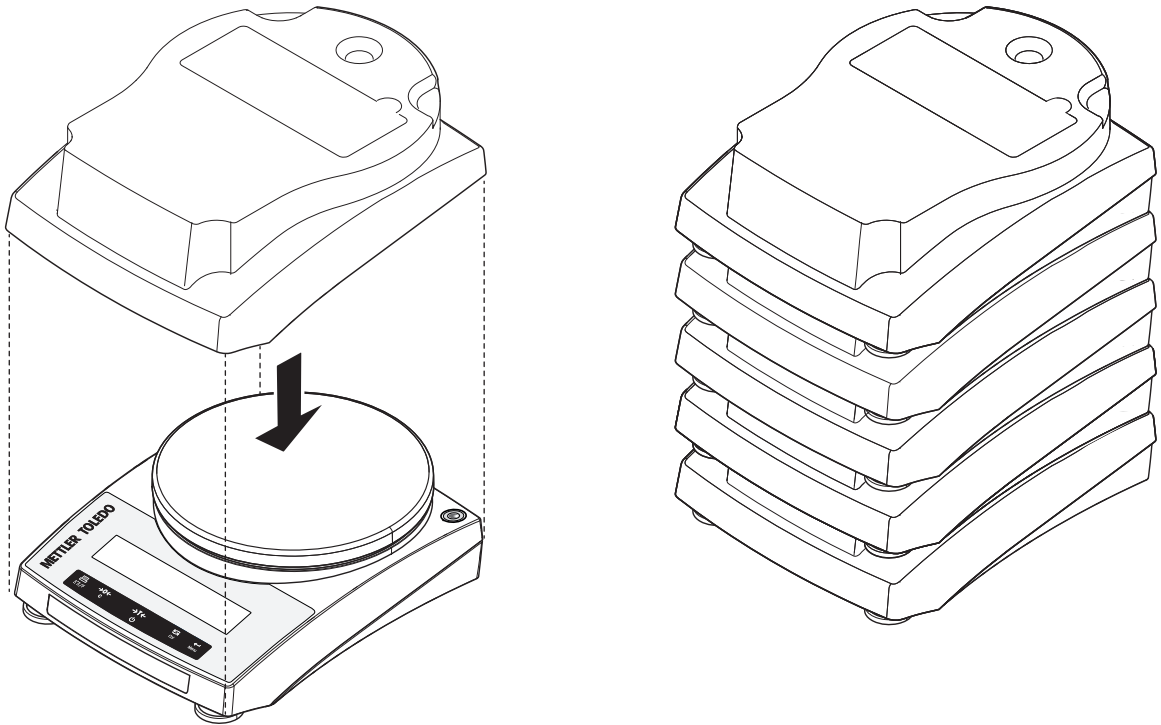
4.5 Installation of the protective cover

- Install the protective cover according to the illustration, using a screwdriver.



4.6 Using the stackable cover

The stackable cover can be placed on the balance. It protects the balance from dust when it is not used and allows you to stack up a maximal number of 5 balances.



4.7 Connecting the balance



WARNING

Death or serious injury due to electric shock

Contact with parts that carry a live current can lead to death or injury.

- 1 Only use the METTLER TOLEDO power supply cable and AC adapter designed for your instrument.
- 2 Connect the power cable to a grounded power outlet.
- 3 Keep all electrical cables and connections away from liquids and moisture.
- 4 Check the cables and the power plug for damage and replace damaged cables and power plugs.



NOTICE

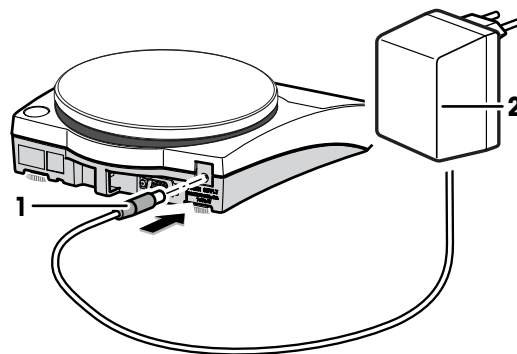
Damage to the AC/DC adapter due to overheating

If the AC/DC adapter is covered or in a container, it is not sufficiently cooled and will overheat.

- 1 Do not cover the AC/DC adapter.
- 2 Do not put the AC/DC adapter in a container.

- Install the cables so that they cannot be damaged or interfere with operation.
- Insert the power cable in a grounded power outlet that is easily accessible.

- 1 Connect the AC/DC adapter (1) to the connection socket on the back of your balance.
- 2 Connect the power cable (2) to the power socket.
 - ⇒ The balance performs a display test (all segments in the display light up briefly), , **Software version**, **Maximum load** and **Readability** appears briefly.
 - ⇒ The balance is ready for use.



Note

Always connect the AC/DC adapter to the balance before connecting to the power.

Do not connect the instrument to a power outlet controlled by a switch. After switching on the instrument, it must warm up before giving accurate results.

4.7.1 Battery operation

The balance can also operate with batteries. Under normal operation conditions, the balance works independently of the AC power line for about 8 to 15 hours (using alkaline batteries).

Immediately after the AC power supply is interrupted, e.g., by withdrawing the power plug or if there is a power failure, the balance switches automatically to battery operation. Once the AC power supply is restored, the balance reverts automatically to AC operation.

It is also possible to use rechargeable batteries. Charging batteries inside the balance is **not** possible.

Your balance uses 4 standard AA (LR6) batteries (alkaline batteries preferred).

When the balance is operating on its batteries, the battery symbol in the display lights up. The number of segments that are lit is an indicator of battery condition (3 = fully charged, 0 = discharged).

When the batteries are almost completely discharged, the battery symbol flashes.



battery full



2/3 full



1/3 full



battery empty

Inserting / replacing batteries



WARNING

Death or serious injury due to electric shock

Contact with parts that contain a live current can lead to injury and death.

- Disconnect the instrument from the power supply when replacing batteries.



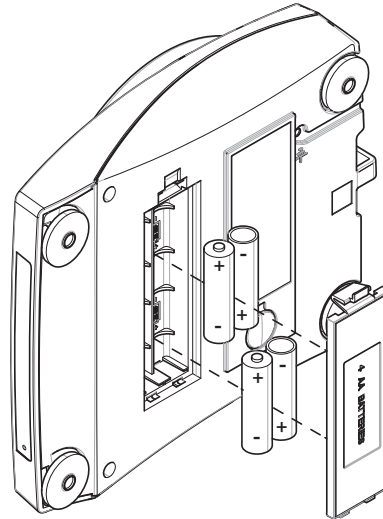
NOTICE

Damage to the instrument

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

- Read and follow all warnings and instructions supplied by the battery manufacturer.
- Do not mix different types or brands of batteries. Performance of batteries varies depending on the manufacturer.

- Remove the batteries from the balance if the balance is not used for a long period of time.
 - Batteries must be disposed of properly, according to local regulations.
 - Make sure that the balance is off before removing or inserting batteries.
- 1 Remove weighing pan and pan support.
 - 2 Turn the balance carefully on its side.
 - 3 Open and remove the battery-chamber cover.
 - 4 Insert / replace the batteries with the correct polarity as shown in the battery holder.
 - 5 Insert and close the battery-chamber cover.
 - 6 Turn the balance carefully to its normal position.
 - 7 Reinstall all components in the reverse order.




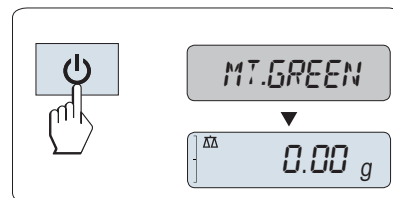
4.8 Setting up the balance

4.8.1 Switching on the balance


Before using the balance, it must be warmed up in order to obtain accurate weighing results. To reach operating temperature, the balance must be acclimatized and connected to the power supply for at least 30 minutes.

Mains operated (standby mode)

- The balance is connected to the power supply.
- Press .
 - ⇒ The balance performs a display test. All segments in the display light up briefly, **WELCOME**, Software version, **Maximum load** and **Readability** appears briefly.
 - ⇒ The balance is ready for weighing or for operation with the last active application.



Battery operated

- 1 Remove any load from weighing pan.
- 2 Press .
 - ⇒ The balance performs a display test (all segments in the display light up briefly), **WELCOME**, Software version, **Maximum load** and **Readability** appears briefly.
 - ⇒ After the warm-up time, the balance is ready for weighing or for operation with the last active application.

Legal-for-trade

Approved balances will execute an initial zero.

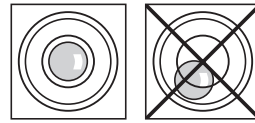
4.8.2 Leveling the balance

Exact horizontal and stable positioning are essential for repeatable and accurate weighing results.

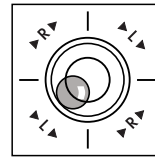
There are two adjustable leveling feet to compensate for slight irregularities in the surface of the weighing bench.

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

- 1 Position the balance at the selected location.
- 2 Align the balance horizontally.
- 3 Turning the leveling feet of the housing until the air bubble is in the middle of the glass.



- 4 In this example, turn the left leveling feet counterclockwise.



Example

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.



4.8.3 Adjusting the balance

To obtain accurate weighing results, the balance must be adjusted to match the gravitational acceleration at its location. This is also dependent on the ambient conditions. After reaching the operating temperature, it is important to adjust the balance in the following cases:

- Before the balance is used for the first time.
- If the balance has been disconnected from the power supply or in the event of power failure.
- After significant environmental changes, e.g., temperature, humidity, air draft or vibrations.
- At regular intervals during weighing service.

See also

Adjustment with external weight ► Page 16

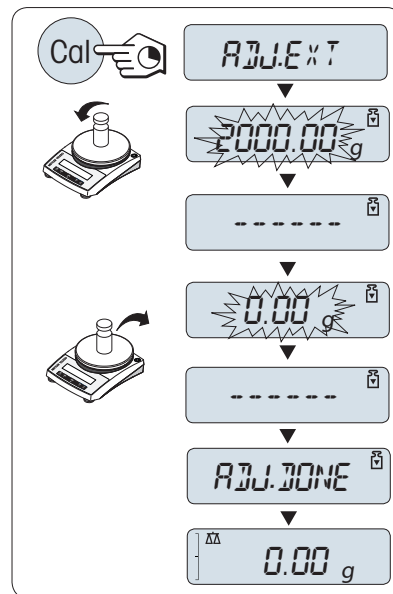
4.9 Adjustment with external weight

Legal-for-trade

Approved models must be adjusted at the place of operation. Before putting in operation, and depending on particular country certification legislation, the balance will then have to be checked and sealed by authorized personnel.

- In the menu topic **CAL** (Adjustment) of advanced menu **ADJ.EXT** must be selected.
- Required adjustment weight is ready.
- Weighing pan is unloaded.

- 1 Press and hold **CAL** to execute external adjustment.
 - ⇒ The required (predefined) adjustment weight value flashes on the display.
- 2 Place adjustment weight in center of pan.
 - ⇒ The balance adjusts itself automatically.
- 3 Remove adjustment weight, when **0.00 g** flashes.
 - ⇒ 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.



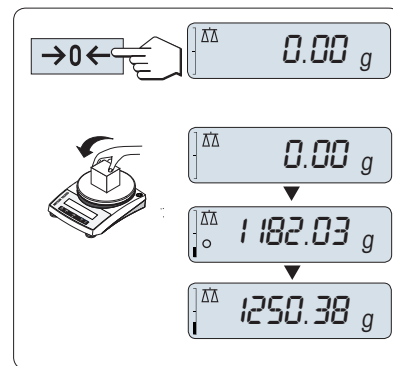
4.10 Performing a simple weighing



The weighing application allows you to perform simple weighings and how you can accelerate the weighing process.

If your balance is not in the weighing mode, press and hold the **ΔΔ/F** key down until **WEIGH** appears in the display. Press **←↓**. Your balance is in the weighing mode.

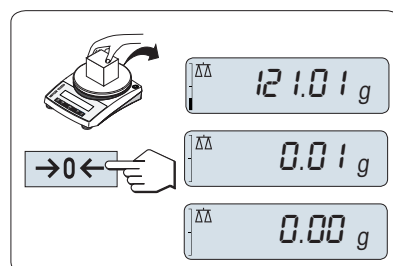
- 1 Press **→0←** to zero the balance.
- 2 Place the sample on the weighing pan.
- 3 Wait until the instability detector **○** disappears.
- 4 Read the result.



Zeroing

Use the **→0←** zeroing key before you start with a weighing.

- 1 Unload the balance.
- 2 Press **→0←** to zero the balance.
 - ⇒ All weight values are measured in relation to this zero point.

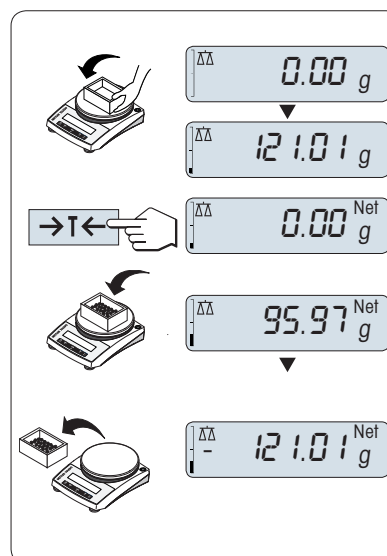


Taring

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

- 1 Place empty container on the weighing pan.
⇒ The weight is displayed.
- 2 Press **→T←** to tare the balance.
⇒ **0.00 g** and **Net** appears in the display. **Net** indicates that all weight values displayed are net values.
- 3 Place the sample in the container.
⇒ The result appears in the display.

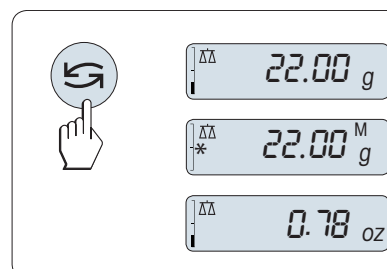
If the container is removed from the balance, the tare weight will be shown as a negative value.



Switching weight units

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

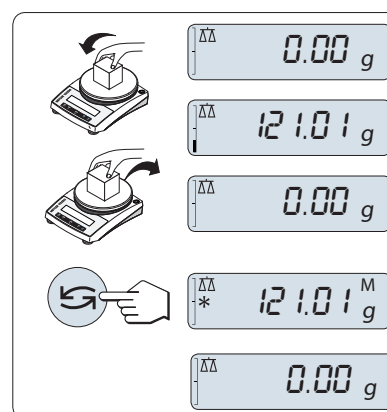
- Press **↺** to set weight unit or recall value.



Recall / recall weight value

Recall stores stable weights with an absolute display value bigger than 10d.

- Function **RECALL** is in the menu activated.
- 1 Load weighing sample.
⇒ The display shows weight value and stores stable value.
 - 2 Remove weighing sample.
⇒ The display shows zero.
 - 3 Press **↺**.
⇒ The display shows last stored stable weight value for 5 seconds together with asterisk (*) and memory (M) symbols. After 5 seconds the display goes back to zero. This can be repeated unlimited times.



Delete last weight value

As soon a new stable weight value is displayed, the old recall value becomes replaced by the new weight value.

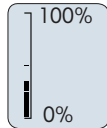
– Press →0/T←.

⇒ The recall value is set to 0.

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

Weighing with the weighing-in aid

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



Print / transmit data

Press the  key to transmit the weighing results over the interface, e.g., to a printer or a PC.

4.11 Weighing below the balance


Your balance is equipped with a weighing hook for performing weighing operations below the work surface (weighing below the balance).

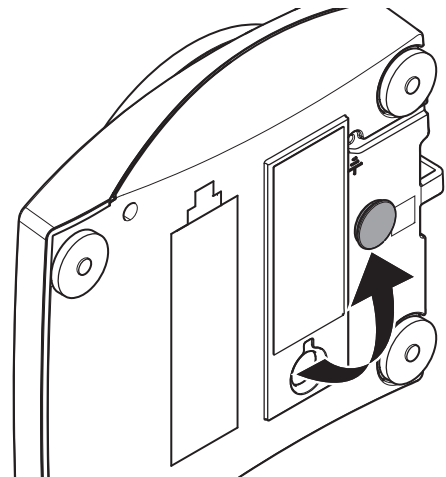


NOTICE

Damage to balance

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

- 1 Press and hold the  key.
- 2 Disconnect the balance from the power supply.
- 3 Disconnect all interface cables.
- 1 Remove weighing pan and pan support.
- 2 Turn the balance carefully on its side.
- 3 Remove the cap. Keep it for later use.
- 4 Turn the balance to its normal position and simply reinstall all components in the reverse order.



5 The Menu

5.1 What is in the menu ?

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

For menu **PROTECT**, see [Main menu ► Page 21].

Menu BASIC

Topic	Description
DATE	Setting the current date.
TIME	Setting the current time.
1/10 D	Setting display increment (1/10d function)
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.
SET ID	Setting an identification.
PRT.MENU	Printing the settings.
RESET	Call up of the factory settings.

Menu ADVANCE.

Topic	Description
ENVIRON.	Matching the balance to the ambient conditions.
CAL	Settings for adjustment (calibration).
DATE.FRM	Setting the date format.
TIME.FRM	Preselection of the time format.
RECALL	Switching the application recall for storing stable weights on or off.
STANDBY	Setting the time after which the balance should be switched off automatically.
B.LIGHT	Switching on or off the display backlight.
A.ZERO	Switching the automatic zero correction (Autozero) on or off.
SRV.ICON	Switching the service reminder (service icon) 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.
SINGLE	Setting the information for printout of individual values.
SIGN.L	Setting the footer for printout of individual values.
LN.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.
BAUD	Setting the transfer speed of the serial interface RS232C.
BIT.PAR.	Setting the character format (Bit/Parity) of the serial interface RS232C.
STOPBIT	Setting the character format (stop bit) of the serial interface RS232C.
HD.SHK	Setting the transfer protocol (Handshake) of the serial interface RS232C.
RS.TX.E.O.L.	Setting the end of line format of the serial interface RS232C.

Topic	Description
RS.CHAR	Setting the char set of the serial interface RS232C.
INTERVL.	Selection of the time interval for the simulated print key press.

5.2 Main menu

Selecting the submenu.

BASIC	The small BASIC menu for simple weighing is displayed.
ADVANCE.	The extended ADVANCE. menu for further weighing settings is displayed.
INT.FACE	The menu INT.FACE for all interface parameter settings for peripheral devices e.g. printer is displayed.
PROTECT	Menu protection. Protection of balance configurations against unmeant manipulation.
OFF	Menu protection is off. (Factory setting)
ON	Menu protection is on. The menu BASIC , ADVANCE. and INT.FACE are not displayed. This is indicated with Ⓜ in the display.

5.3 Basic menu

DATE – Date

Setting the current date according to date format.



Note

A reset of the balance will not change this setting.

TIME – Time

Setting the current time according to time format

+1H	Set the current time forwards by 1 hour (to adjust summer or winter time). (Factory setting)
-1H	Set the current time backwards by 1 hour (to adjust summer or winter time).
SET TIME	Enter the current time.



Note

A reset of the balance will not change this setting.

1/10 D – Display increment 1/10 d

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

Legal-for-trade

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

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

UNIT 1 – Weight unit 1

Depending on requirements, the balance can operate with the following units (country and model specific).

Legal-for-trade

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

Units:

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

UNIT 2 – Weight unit 2

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

Legal-for-trade

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




SET ID – Set identification

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

SET ID


Set identification

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

- **SET ID** is selected.
- 1 Search through (blank, 0...9, A...Z) by pressing .
- 2 After selecting the character, press  to confirm and move to the next place. To store press and hold .

PRT.MENU – Print menu

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

- **PRT.MENU** appears on the display and a printer is properly connected.
- To execute a printout press .

RESET – Reset balance settings

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

To toggle between **YES?** and **NO?** press .



Note

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

5.4 Advanced menu

ENVIRON. – Environment settings

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

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

CAL – Adjustment (calibration)

In this menu topic you can preselect the function of the **Cal** key. Your balance can be adjusted with internal or external weights by pressing the **Cal** 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 Cal key has no function.
ADJ.EXT	External adjustment: adjustment is performed at a keystroke with a selectable external weight. Legal-for-trade This function is not available for approved balances * (depend on selected countries' certification legislation). * except OIML accuracy class I approved models. 200.00 g Defining the external adjustment weight: define the weight of the external adjustment weight (in grams). Factory setting: depending on the model.

DATE.FRM – Date format

This menu topic allows you to preselect the date format.

The following date formats are available:

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

Factory setting: DD.MM.Y

TIME.FRM – Time format

This menu topic allows you to preselect the time format.

The following date formats are available:

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

Factory setting: 24:MM

RECALL – Recall

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

OFF	RECALL switched off. (Factory setting)
ON	RECALL switched on.

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

STANDBY – Automatic standby

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

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

B.LIGHT – Backlight

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

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

A.ZERO – Automatic zero setting

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




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

Legal-for-trade

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

SRV.ICON – Service reminder

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

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

SRV.D.RST – Service date reset

This menu topic allows you to reset service date.



Note












This menu topic is only available if **SRV.ICON** setting **ON** was selected.

To toggle between **YES?** and **NO?** press .


5.5 Interface menu

RS232 – RS232C interface

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

PRINTER	Connection to a printer. (Factory setting) Only one printer possible.  Refer to your printer documentation for recommended printer settings.
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. <ul style="list-style-type: none">• The balance sends the weight value without the unit to the PC.• Not available on Win7.
PRT.STAB	If the  key is pressed, the next stable weight value will be sent followed by an enter. (Factory setting)
PRT.AUTO	Every stable weight value will be sent followed by an enter, without pressing the  key.
PRT.ALL	If the  key is pressed, the weight value will be sent followed by an enter regardless of stability.
HOST	Connection to a PC, barcode reader etc.: the balance can send data to the PC and receive commands or data from the PC. The balance sends the complete MT-SICS answer to the PC, see chapter "MT-SICS interface commands and functions".
SND.OFF	Send mode switched off. (Factory setting)
SND.STB	If the  key is pressed, the next stable weight value will be sent.
SND.CONT	All weight value updates will be sent regardless of stability, without pressing the  key.
SND.AUTO	Every stable weight value will be sent, without pressing the  key.
SND.ALL	If the  key is pressed, the weight value will be sent regardless of stability.
2.DISP	Connection of an optional auxiliary display unit. 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.
	Balance ID only if set.

SINGLE – Options for printing out the result of individual values

This menu topic allows you to specify the information that is to be printed for every individual weighing result (after pressing .



Note

This menu topic is only available if **PRINTER** setting was selected.

NET	The value of the net weight from the current weighing is printed. (Factory setting)
G/T/N	The values of the gross weight, the tare weight and the net weight are printed.

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

This menu topic allows you to set a footer for signature at the bottom of the printout for every individual weighing result (after pressing .




Note

This menu topic is only available if **PRINTER** setting was selected.

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

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

This menu topic allows you to specify the number of blank lines to complete the printout (line feed) for every individual weighing result (after pressing .



Note

This menu topic is only available if **PRINTER** setting was selected.

0	Possible numbers of blank lines: 0 to 99. (Factory setting = 0)
----------	--

ZERO.PRT – Options for PRT.AUTO 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)

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 "MT-SICS interface commands and functions".
SART	The following Sartorius commands are supported: K Ambient conditions: very stable L Ambient conditions: stable

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

*) May be inaccessible on verified balances/scales

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

Functionality mapping

HOST settings:

Sartorius printer settings:

SND.OFF

not applicable

SND.STB

manually print with stability

SND.ALL

manually print without stability

SND.CONT

automatically print without stability

SND.AUTO

similar applicable to automatically print when load is changed

BAUD – Baud rate RS232C

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

The following settings are available:

600 bd, 1200 bd, 2400 bd, 4800 bd, **9600 bd (Factory setting)**, 19200 and 38400 bd.



Note

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

BIT.PAR. – Bit/Parity RS232C

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

8/NO

8 data bits/no parity (**Factory setting**)

7/NO

7 data bits/no parity

7/MARK

7 data bits/mark parity

7/SPACE

7 data bits/space parity

7/EVEN

7 data bits/even parity

7/ODD

7 data bits/odd parity



Note

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

STOPBIT – Stop bits RS232C

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

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

HD.SHK – Handshake RS232C

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

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



Note

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

RS.TX.E.O.L. – End of line RS232C

At this menu topic you can set the end of line character of the outgoing transmitted data to different RS232C serial receivers.

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



Note

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

RS.CHAR – Char set RS232C

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


IBM.DOS	Char set IBM/DOS (Factory setting)
ANSI.WIN	Char set ANSI/WINDOWS



Note

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

INTERVL. – Print key simulation

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

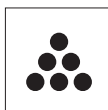
Range:	0 to 65535 seconds
0 sec:	Disables the print key simulation

Factory setting: 0 sec

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

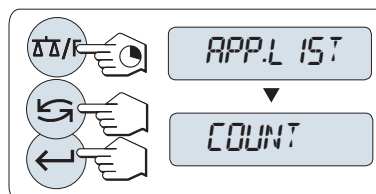
6 Applications

6.1 Application piece counting



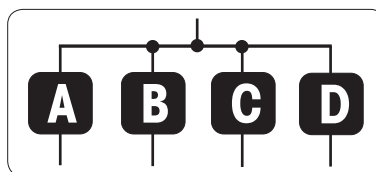
The **Piece counting** application allows you to determine the number of pieces put on the weighing pan.

- 1 Press and hold $\Delta\Delta/F$ to call-up **APP.LIST**.
- 2 Select application **COUNT** by scrolling with \curvearrowright .
- 3 Press \leftarrow to activate the function.



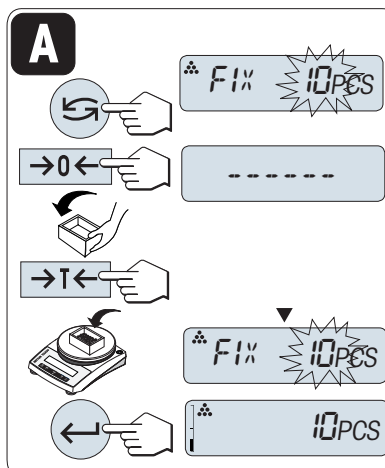
Piece counting first requires the setting of a reference weight, there are 4 possibilities

- **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 the reference by multiple pieces with fix reference values




- 1 Select a number of reference pieces by scrolling with \curvearrowright . Possible numbers* are 5, 10, 20 and 50.
- 2 Press $\rightarrow 0 \leftarrow$ to zero the balance. If using: place empty container on the weighing pan and press $\rightarrow T \leftarrow$ to tare the balance.
- 3 Add the selected number of reference pieces to container.
- 4 Press \leftarrow to confirm.

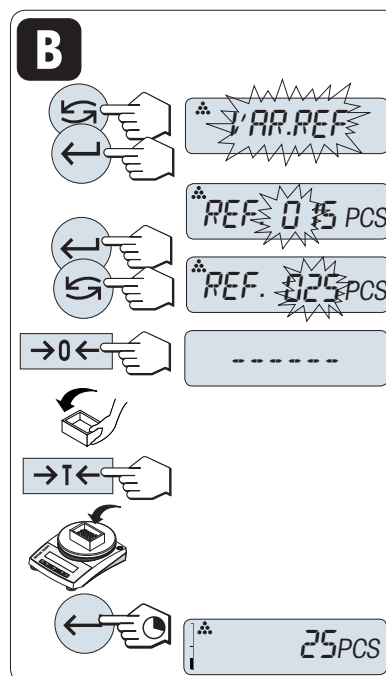


Legal-for-trade

* with approved balances in selected countries: min 10.

Setting the reference by multiple pieces with variable reference values



- 1 Select **VAR.REF** by scrolling with .
- 2 Press  to confirm.
- 3 Select a number of reference pieces by scrolling up **+** key or down **-** key. Possible numbers* are 1 to 999.
- 4 Press **→0←** to zero the balance. If using: place empty container on the weighing pan and press **→T←** to tare the balance.
- 5 Add the selected number of reference pieces to container.
- 6 Press  to confirm.

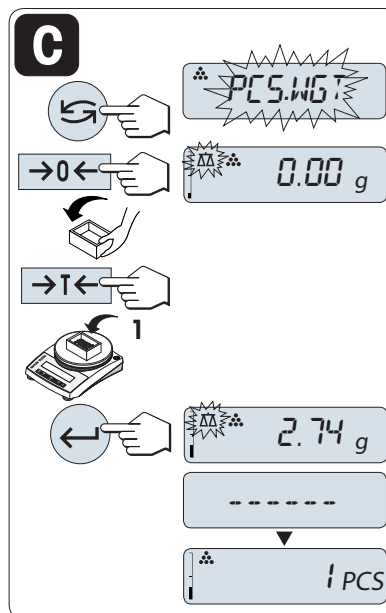


Legal-for-trade

* with approved balances in selected countries: min 10.

Setting the reference for one piece in weighing mode






- 1 Select **PCS.WGT** by scrolling with .
- 2 Press **→0/T←** to zero the balance. If using: place empty container on the weighing pan and press **→0/T←** to tare the balance.
- 3 Add one reference piece to container.
⇒ The weight of one piece is displayed.
- 4 Press  to confirm.

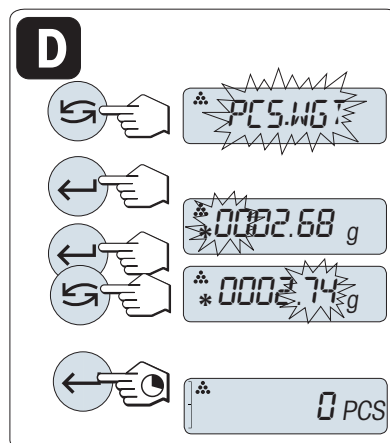


Legal-for-trade

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

Setting the reference for one piece in manual mode

- 1 Select **PCS.WGT** by scrolling with .
- 2 Press  to confirm.
- 3 Enter the final reference one piece weight.
- 4 Press  to select a digit (cyclically from left to right).
⇒ The selected digit is blinking.
- 5 Press  to change the digit.
- 6 Press and hold  to confirm.



Legal-for-trade

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



Note

if without any key press within 60 seconds or by pressing and holding **C**, the balance returns to the previous active application.

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

- 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.

Terminate the application

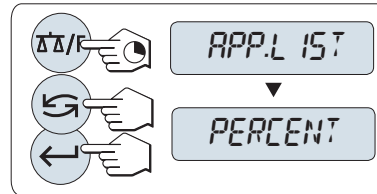
Press and hold **ΔT/F** to terminate the current application.

6.2 Application percent weighing



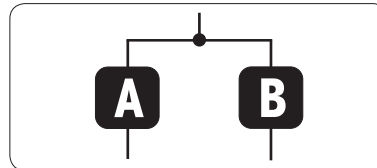
The **Percent weighing** application allows you to check a sample weight as percentage to a reference target weight.

- 1 Press and hold **ΔΔ/F** to call-up **APP.LIST**.
- 2 Select application **PERCENT** by scrolling with **↶**.
- 3 Press **↵** to activate the function.



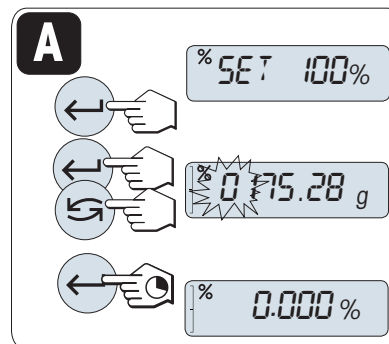
Percent weighing first requires the setting of a reference weight that should corresponds to 100%, there are 2 possibilities

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



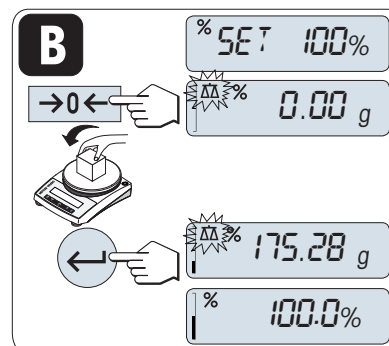
Setting the reference by manual mode (enter 100%)

- 1 Press **↵** to activate manual mode.
- 2 Press **↶** to select a digit (cyclically from left to right).
⇒ The selected digit is blinking.
- 3 Press **↶** to change the digit.
- 4 Press and hold **↵** to confirm.



Setting the reference by weighing mode (weigh 100%)

- 1 Press **→0←** to zero the balance. If using: place empty container on the weighing pan and press **→T←** to tare the balance.
- 2 Load the reference weight (100%). Reference weight must be at least +/- 10d.
- 3 Press **↵** to confirm.




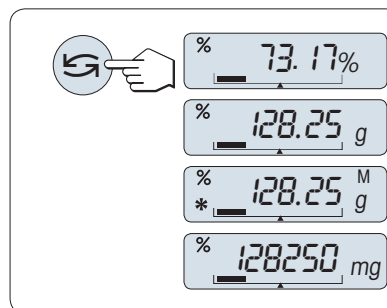
Note

if without any key press within 60 seconds or by pressing and holding **C**, the balance returns to the previous active application.

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

Switching between percent and weight display

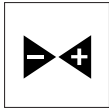
- Press  key at any time to switch the display between percent display, weighing unit **UNIT 1**, **RECALL** value (if activated) and weighing unit **UNIT 2** (if different from **UNIT 1**).
- The **RECALL** value is displayed with an asterisk (*) and icon **M** and can not be printed.
- The current set weight remains stored until it is redetermined.



Terminate the application

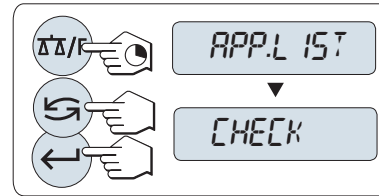
Press and hold  to terminate the current application.

6.3 Application check weighing



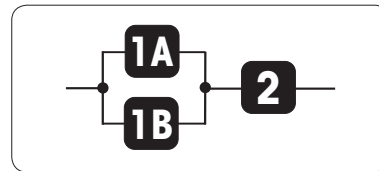
The **Check weighing** application allows you to check the deviation of a sample weight within a tolerance limit to a reference target weight.

- 1 Press and hold $\Delta\Delta/F$ to call-up **APP.LIST**.
- 2 Select application **CHECK** by scrolling with \leftarrow .
- 3 Press \leftarrow to activate the function.



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

- **1A** Setting the reference in **manual mode** (enter nominal weight).
- **1B** Setting the reference in **weighing mode** (weigh nominal weight).

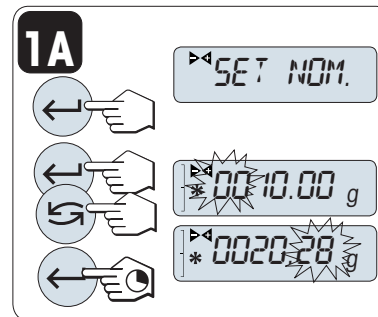


Step 2: Check weighing needs the upper and lower limits

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

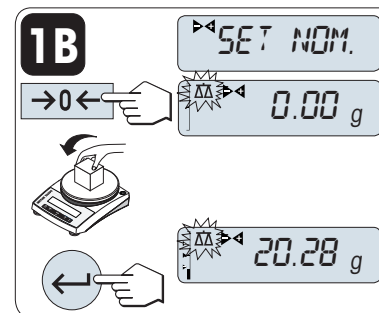
Setting the reference by manual mode (enter nominal weight)

- 1 Press \leftarrow to activate manual mode.
- 2 Select the reference target weight.
- 3 Press \leftarrow to select a digit (cyclically from left to right).
⇒ The selected digit is blinking.
- 4 Press \leftarrow to change the digit.
- 5 Press and hold \leftarrow to confirm.








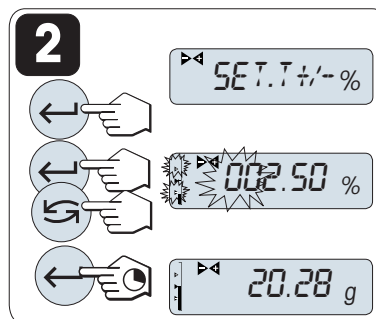
Setting the reference in weighing mode (weigh nominal weight)

- 1 Press $\rightarrow 0 \leftarrow$ to zero the balance. If using: place empty container on the weighing pan and press $\rightarrow T \leftarrow$ to tare the balance.
- 2 Load the nominal weight.
- 3 Press \leftarrow to confirm.



Setting the upper and lower limits (in percentage)

- 1 Press  to start setting.
- 2 Press  to confirm the default limit of +/- 2.5% or enter the limit value.
- 3 Press  to select a digit (cyclically from left to right).
⇒ The selected digit is blinking.
- 4 Press  to change the digit.
- 5 Press and hold  to confirm.



Note

if without any key press within 60 seconds or by pressing and holding **C**, the balance returns to the previous active application.

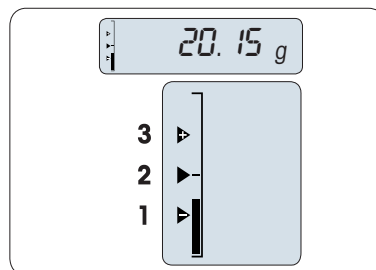
The nominal weight must be at least 10 digit.

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

Weighing-in-aid

The weighing-in-aid helps you quickly determine the position of the sample weight regarding the tolerance.

- **1** Lower limit
- **2** Target weight
- **3** Upper limit



Terminate the application

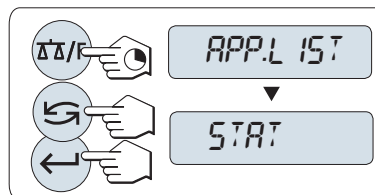
Press and hold  to terminate the current application.

6.4 Application statistics



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

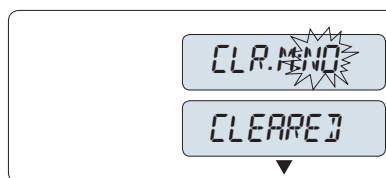
- 1 Press and hold **⇧**/**F** to call-up **APP.LIST**.
- 2 Select application **STAT.** by scrolling with **↺**.
- 3 Press **↵** to activate the function.



Memory clear question

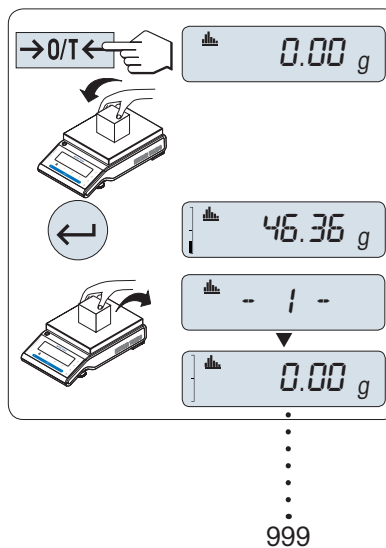
If the memory is already cleared (sample counter is 0) the memory clear question will not be displayed.

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



Weighing the first sample weight

- 1 Press **→0/←** to zero the balance.
- 2 Load the first sample weight.
- 3 Press **↵**.
⇒ The display shows the sample count - 1 - and the current weight is stored as sample and the weight is printed out.
- 4 When the sample counter is displayed you may press and hold **C** to undo (drop) this sample.
- 5 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

- Press **≡**, if the numbers of sample are greater than or equal to 2.
⇒ The results are displayed and printed.



Displayed results

- 1 Press  to show the next statistical value.
- 2 Press and hold **C** to cancel displaying results and to continue weighing next sample.

		0.5 seconds
number of samples		 5 
average		 50.530 g 
standard deviation		 3.961 g 
relative standard deviation		 7.84 % 
lowest value (minimum)		 46.36 g 
highest value (maximum)		 55.81 g 
different between the minimum and the maximum		 9.45 g 
sum of all values		 252.65 g 

Terminate the application

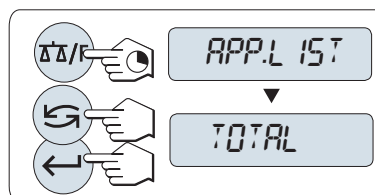
Press and hold  **T**/F to terminate the current application.

6.5 Application totaling



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

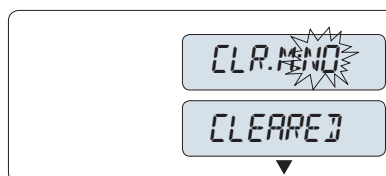
- 1 Press and hold $\Delta\Delta/F$ to call-up **APP.LIST**.
- 2 Select application **TOTAL** by scrolling with \curvearrowright .
- 3 Press \leftarrow to activate the function.



Memory clear question

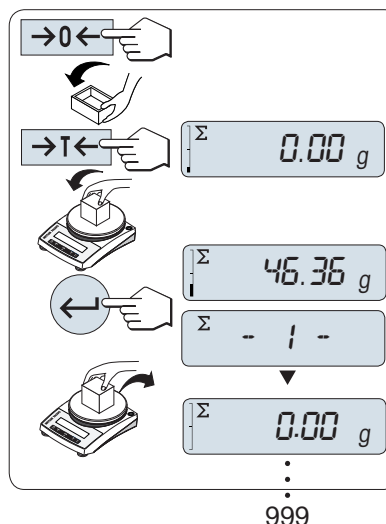
If the memory is already cleared (sample counter is 0) the memory clear question will not be displayed.

- 1 To continue the totaling evaluation, press \leftarrow to confirm **CLR.M:NO**.
- 2 For a new totaling evaluation clear the memory. Press \curvearrowright to select **CLR.M:YES** and press \leftarrow to confirm.



Weighing in the sample weight

- 1 Press $\rightarrow 0 \leftarrow$ to zero the balance. If using: place empty container on the weighing pan and press $\rightarrow T \leftarrow$ to tare the balance.
- 2 Load the first sample weight.
- 3 Press \leftarrow .
 \Rightarrow The display shows the sample count - 1 - and the current weight is stored.
- 4 When the sample counter is displayed you may press and hold **C** to undo (drop) this sample.
- 5 Unload the first sample weight.
 \Rightarrow The display shows zero.




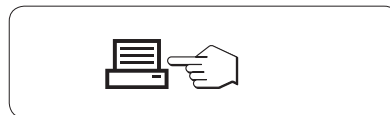
Weighing in further sample weights

The same procedure as for the first sample weight.


- 1...999 samples are possible.

Results

- Press  if the numbers of sample are greater than or equal to 2.
 - ⇒ The results are displayed and printed.



Displayed results

- 1 Press  to show the totaled value.
- 2 Press and hold **C** to cancel.

0.5 seconds

number of samples	ΣN	▶	Σ	\ast	879	←
totalized value	$\Sigma TOTAL$	▶	Σ	\ast	8789.79 _g	←

Terminate the application

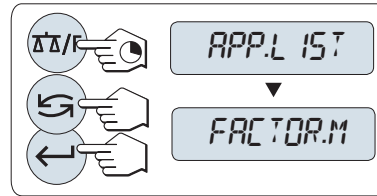
Press and hold **ΔΔ/F** to terminate the current application.

6.6 Application multiplication factor weighing



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

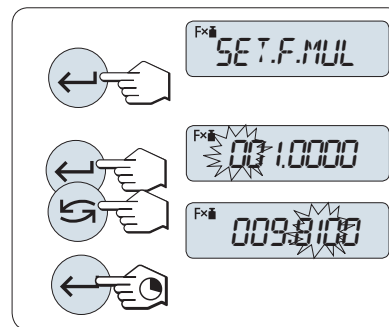
- 1 Press and hold $\Delta\Delta/F$ to call-up **APP.LIST**.
- 2 Select application **FACTOR.M** by scrolling with \leftarrow .
- 3 Press \leftarrow to activate the function.



Setting the factor value

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

- 1 Press \leftarrow to execute **SET.F.MUL**.
 \Rightarrow Either the factor 1 appears as default value or the factor that was saved most recently.
- 2 Press \leftarrow to select a digit (cyclically from left to right).
 \Rightarrow The selected digit is blinking.
- 3 Press \rightarrow to change the digit.
- 4 Press and hold \leftarrow to confirm (no automatic acceptance).

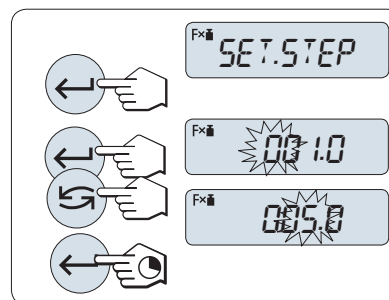


Setting the step value

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.

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.

- 1 Press \leftarrow to execute **SET.STEP**.
- 2 Press \leftarrow to select a digit (cyclically from left to right).
 \Rightarrow The selected digit is blinking.
- 3 Press \rightarrow to change the digit.
- 4 Press and hold \leftarrow to confirm (no automatic acceptance).



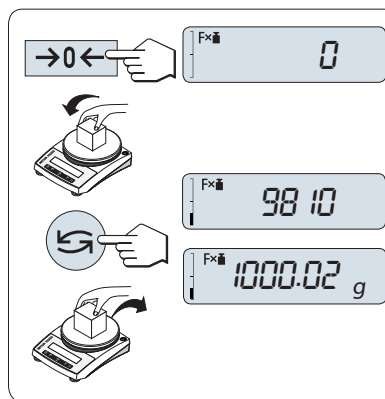
Note

if without any key press within 60 seconds or by pressing and holding **C**, the balance returns to the previous active application.

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

Weighing procedure

- 1 Press **→0←** to zero the balance.
- 2 Load sample weight.
- 3 Read the result.
 - ⇒ The appropriate calculation is then made using the weight of sample and the selected factor, the result being displayed with the selected display step. No units are displayed.
- 4 Unload sample weight.



Toggling between displaying the calculated value and the measured weight

- Press **↺** 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**).

Terminate the application

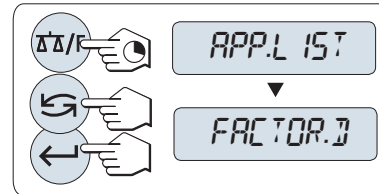
Press and hold **↺** to terminate the current application.

6.7 Application division factor weighing



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

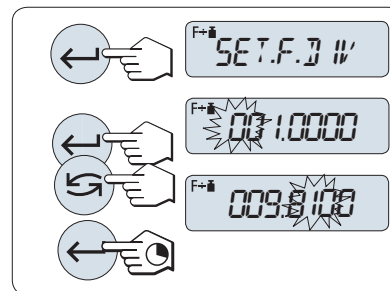
- 1 Press and hold $\Delta\Delta/F$ to call-up **APP.LIST**.
- 2 Select application **FACTOR.D** by scrolling with \leftarrow .
- 3 Press \leftarrow to activate the function.



Setting the factor value

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

- 1 Press \leftarrow to execute **SET.F.DIV**.
 \Rightarrow Either the factor 1 appears as default value or the factor that was saved most recently.
- 2 Press \leftarrow to select a digit (cyclically from left to right).
 \Rightarrow The selected digit is blinking.
- 3 Press \leftarrow to change the digit.
- 4 Press and hold \leftarrow to confirm (no automatic acceptance).

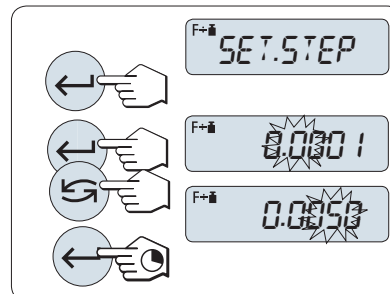


Setting the step value

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.

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.

- 1 Press \leftarrow to execute **SET.STEP**.
- 2 Press \leftarrow to select a digit (cyclically from left to right).
 \Rightarrow The selected digit is blinking.
- 3 Press \leftarrow to change the digit.
- 4 Press and hold \leftarrow to confirm (no automatic acceptance).



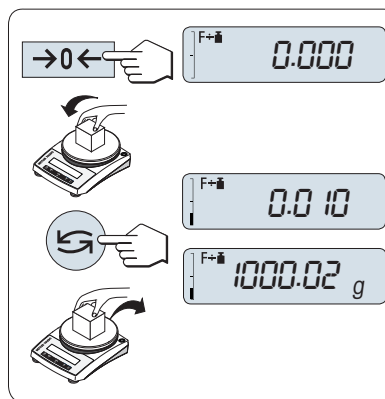
Note

if without any key press within 60 seconds or by pressing and holding **C**, the balance returns to the previous active application.

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

Weighing procedure

- 1 Press **→0←** to zero the balance.
- 2 Load sample weight.
- 3 Read the result.
 - ⇒ The appropriate calculation is then made using the weight of sample and the selected factor, the result being displayed with the selected display step. No units are displayed.
- 4 Unload sample weight.



Toggling between displaying the calculated value and the measured weight

- Press **↺** 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**).

Terminate the application

Press and hold **↺/F** to terminate the current application.

7 Communication with Peripheral Devices

7.1 Send weight value via RS232 to a PC using PC-Direct

The numerical value displayed at the balance can be transferred to the cursor position in windows applications, e.g., Excel, Word in the same way as typing with the keyboard.

The data is transferred via the serial RS232 interface.

The weight value without the unit will be transferred.

Requirements

- PC with one of the following Microsoft Windows® 32-bit/64-bit operating systems: Win 7 (SP1), Win 8 or Win 10
- Serial interface RS232
- Administrator rights for installing the SerialPortToKeyboard software (if data transfer is via RS232)
- Windows application (e.g. Excel)
- Connection between balance and PC via cable RS232 or USB

Transfer values

- 1 Start LabX Direct Balance on your PC.
- 2 Select the correct COM port used by the balance.
- 3 Configure all settings according to the user requirements.
⇒ The weighing result (and additional data) is transferred to the PC program either automatically.

7.1.1 Installing SerialPortToKeyboard software

The operation of PC-Direct via serial port RS232C requires the installation of **SerialPortToKeyboard** on your host computer. The file **SerialPortToKeyboard** can be found on www.mt.com/labweighing-software-download. If you have any questions, please contact a METTLER TOLEDO representative.

Download SerialPortToKeyboard

- 1 Connect to the internet.
- 2 Go to the site www.mt.com/labweighing-software-download.
- 3 Click **Download Software and Instructions** in section **SerialPortToKeyboard software for Advanced and Standard level laboratory balances**.
⇒ A pop-up window with interactions appears.
- 4 Click, e.g., **Open**.
⇒ The extract screen appears.
- 5 Extract the file **SerialPortToKeyboard_V_x.xx_installer_and_instructions.zip** to your specified location.
- 6 Right-click on the downloaded installation program **SerialPortToKeyboard_V_x.xx.exe** and select **Run as Administrator**.
- 7 If a safety warning appears, confirm windows to perform the installation.
- 8 Click **Next** and follow the installer's instructions.

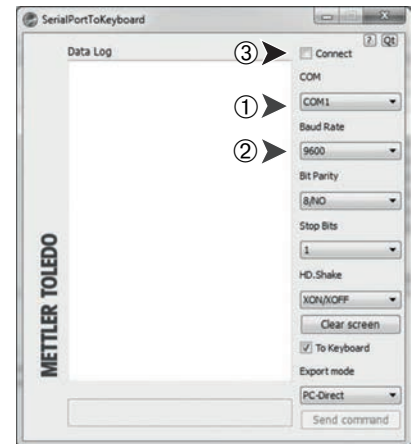
Checking operation

- 1 Start **SerialPortToKeyboard** (RS232C)
- 2 Start Excel (or another application) at the PC.
- 3 Activate a cell in Excel.

Settings at the PC

Settings for SerialPortToKeyboard

- 1 Select the serial port **COM** for the connection with the balance.
 - 2 Set the **Baud Rate** to **9600**.
 - 3 Activate **Connect**.
- Closing the window terminates the session.



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

7.1.2 Settings on the balance

Balance interface settings, **see** chapter "Interface menu".

Topic RS232

- Set and select the most appropriate option for the desired weighing result.

Topic RS.TX.E.O.L./RS E.O.L.

- 1 Set **TAB** to write into the same row (e.g. in Excel).
- 2 Set **CR LF** to write into the same column (e.g. in Excel).
- 3 Save changes.

7.1.3 Installing SerialPortToKeyboard software

The operation of PC-Direct via serial port RS232 requires the installation of **SerialPortToKeyboard** on your host computer. The file **SerialPortToKeyboard** can be found on the CD shipped with the balance. If you have any questions, please contact a METTLER TOLEDO representative.

Download SerialPortToKeyboard

- 1 Insert the product CD in the CD/DVD drive of the host computer.
- 2 Tap **Software**.
- 3 Tap **Download Software SerialPortToKeyboard (zip)**.
 - ⇒ An extract screen appears.
- 4 Extract the file to your specified location.
- 5 Right-click on the downloaded installation program **SerialPortToKeyboard.exe** and select **Run as Administrator**.
- 6 If a safety warning appears, confirm Windows to perform the installation.
- 7 Click **Next** and follow the installer's instructions.

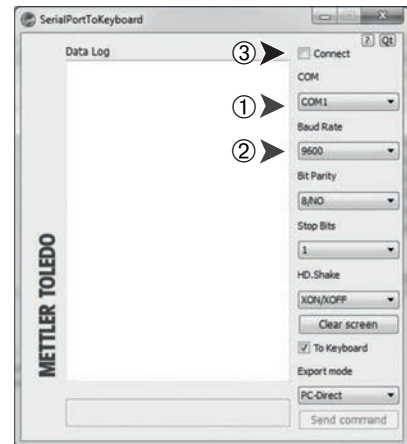
Checking operation

- 1 Start **SerialPortToKeyboard** (RS232C)
- 2 Start Excel (or another application) at the PC.
- 3 Activate a cell in Excel.

Settings at the PC

Settings for SerialPortToKeyboard

- 1 Select the serial port **COM** for the connection with the balance.
 - 2 Set the **Baud Rate** to **9600**.
 - 3 Activate **Connect**.
- Closing the window terminates the session.





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

8 Troubleshooting

8.1 Error messages


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

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

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

8.2 Status messages

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

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

9 Maintenance

9.1 Cleaning



WARNING

Death or serious injury due to electric shock

Contact with parts carrying a live current can lead to injury and death.

- 1 Disconnect the instrument from the power supply prior to cleaning and maintenance.
- 2 Prevent liquid from entering the instrument, terminal or AC/DC adapter.

9.1.1 Cleaning the balance



NOTICE

Damage due to improper cleaning

Improper cleaning can damage the load cell or other essential parts.

- 1 Do not use any cleaning agents other than the ones specified in the "Reference Manual" or "Cleaning Guide".
- 2 Do not spray or pour liquids on the instrument. Always use a moistened lint-free cloth or a tissue.
- 3 Always wipe out from inside to outside of the instrument.

Cleaning around the balance

- Remove any dirt or dust around the balance and avoid further contaminations.

Cleaning the removable parts

- Clean the removed part with a damp cloth or a tissue and a mild cleaning agent.

Cleaning the balance



- 1 Disconnect the balance from the AC/DC adapter.
- 2 Use a lint-free cloth moistened with a mild cleaning agent to clean the surface of the balance.
- 3 Remove powder or dust at first with a disposable tissue.
- 4 Remove sticky substances with a damp lint-free cloth and a mild solvent.



Note

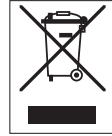
Useful details to avoid soiling the instrument are described in the Mettler-Toledo GmbH "SOP for Cleaning a Balance".

9.1.2 Putting into operation after cleaning

- 1 Reassemble the balance.
 - 2 Check the functionality of the draft shield.
 - 3 Press  to switch on the balance.
 - 4 Warm up the balance. Wait 1 h for the acclimatization, before starting the tests.
 - 5 Check the level status, level the balance if necessary.
 - 6 Perform an internal adjustment.
 - 7 Perform a routine test due to the internal regulations of your company. METTLER TOLEDO recommends to perform a repeatability test after cleaning the balance.
 - 8 Press  to zero the balance.
- ⇒ The balance has been putting into operation and is ready to use.

9.2 Disposal

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



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

Battery disposal

Batteries contain heavy metals and therefore cannot be disposed of in the normal refuse.

- Observe local regulations on the disposal of materials that are hazardous to the environment.

10 Technical Data

10.1 General data

Standard power supply

AC/DC adapter:

Primary: 100 – 240 V AC, $\pm 10\%$, 50-60 Hz, 0.5 A

Secondary: 12 V DC, 1.0 A (with electronic overload protection)

Balance power consumption:

12 V DC, 0.84 A

Polarity:



Mean sea level:

Can be used up to 2000 m above mean sea level

Battery operation:

8 standard AA batteries (alkaline or lithium) for 8–15 hours of use

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

Optional power supply

AC/DC adapter:

Primary: 100 – 240 V AC, $\pm 10\%$, 50-60 Hz, 0.8 A

Secondary: 12 V DC, 2.5 A (with electronic overload protection)

Cable for AC/DC adapter:

3-core, with country-specific plug

Balance power consumption:

12 V DC, 0.84 A

Mean sea level:

Can be used up to 4000 m above mean sea level

Protection and standards

Overvoltage category:

II

Degree of pollution:

2

Protection:

Protected against dust and water

Standards for safety and EMC:

See Declaration of Conformity

Range of application:

Use only indoors in dry locations

Environmental conditions

Height above mean sea level:

Depending on the power adapter (up to 2000 or 4000 m)

Ambient temperature:

Operating conditions for ordinary lab application: +10 to 30 °C
(operability guaranteed between +5 and 40 °C)

Relative air humidity:

Max. 80% up to 31 °C, linearly decreasing to 50% at 40 °C, noncondensing

Warm-up time:

At least **30** minutes after connecting the balance to the power supply

Materials

Housing:

Plastic (ABS/PC)

Weighing pan:

Pan \varnothing 160 mm: Stainless steel X5CrNi 18-10 (1.4301)

Model-specific data

	JL602GE	JL1502GE	JL6001GE
Limit values			
Capacity	620 g	1520 g	6.2 kg
Nominal load	600 g	1500 g	6 kg
Readability	10 mg	10 mg	100 mg
Repeatability	10 mg	10 mg	100 mg
Linearity deviation	30 mg	30 mg	300 mg
Eccentricity deviation (at test load)	20 mg (200 g)	200 mg (500 g)	200 mg (2000 g)
Sensitivity temperature drift ²⁾	0.001 %/°C	0.001 %/°C	0.001 %/°C
Typical values			
Repeatability	7 mg	7 mg	70 mg
Linearity deviation	15 mg	15 mg	150 mg
Eccentricity deviation (at test load)	6 mg (200 g)	60 mg (500 g)	60 mg (2000 g)
Minimum weight (tolerance = 1%) ³⁾	1.4 g	1.4 g	14 g
Settling time	2 s	2 s	1.5 s
Adjustment	External	External	External
Dimensions & other specifications			
Balance dimensions (W×D×H)	194×225×67 mm	194×225×67 mm	194×225×67 mm
Weighing pan diameter	160 mm	160 mm	160 mm
Balance weight	1300 g	1300 g	1300 g
Weights for routine testing			
Weights (OIML class)	20 g (F2)/ 500 g (F2)	50 g (F2)/ 1000 g (F2)	200 g (F2)/ 5000 g (F2)
Weights (ASTM class)	20 g (ASTM 1)/ 500 g (ASTM 1)	50 g (ASTM 1)/ 1000 g (ASTM 1)	200 g (ASTM 4)/ 5000 g (ASTM 4)

²⁾ in the temperature range 10 °C ... 30 °C

³⁾ determined at 5% load, k = 2

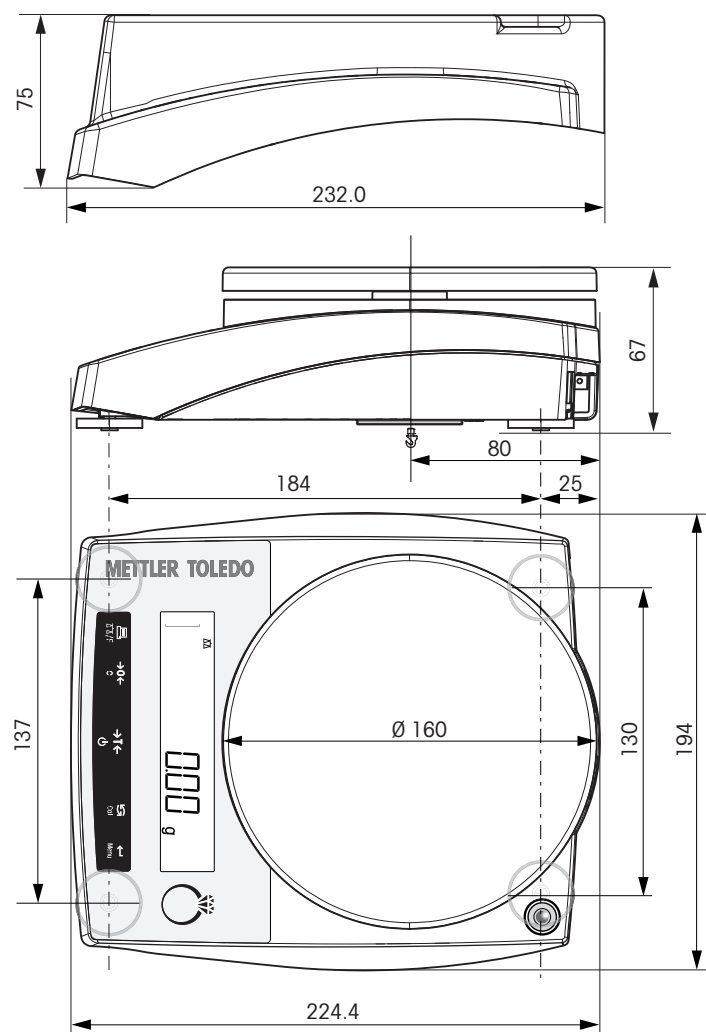
	JL601GE/AED	JL1501GE/AED	JL6000GE/AED
Limit values			
Capacity	620 g	1520 g	6.2 kg
Nominal load	600 g	1500 g	6 kg
Readability	100 mg	100 mg	1000 mg
Repeatability	70 mg	70 mg	700 mg
Linearity deviation	50 mg	50 mg	500 mg
Eccentricity deviation (at test load)	100 mg (200 g)	100 mg (500 g)	1 g (2000 g)
Sensitivity temperature drift ²⁾	0.001 %/°C	0.001 %/°C	0.001 %/°C
Typical values			
Repeatability	40 mg	40 mg	400 mg
Linearity deviation	30 mg	30 mg	300 mg
Eccentricity deviation (at test load)	30 mg (200 g)	30 mg (500 g)	300 mg (2000 g)
Minimum weight (tolerance = 1 %) ³⁾	8 g	8 g	80 g
Settling time	2 s	2 s	1.5 s
Adjustment	External	External	External
Dimensions & other specifications			
Balance dimensions (WxDxH)	194x225x67 mm	194x225x67 mm	194x225x67 mm
Weighing pan diameter	160 mm	160 mm	160 mm
Balance weight	1300 g	1300 g	1300 g
Weights for routine testing			
Weights (OIML class)	20 g (F2)/ 500 g (F2)	50 g (F2)/ 1000 g (F2)	200 g (F2)/ 5000 g (F2)
Weights (ASTM class)	20 g (ASTM 1)/ 500 g (ASTM 1)	50 g (ASTM 1)/ 1000 g (ASTM 1)	200 g (ASTM 4)/ 5000 g (ASTM 4)

²⁾ in the temperature range 10 °C ... 30 °C

³⁾ determined at 5% load, k = 2

10.2 Dimensions

All dimensions in mm



10.3 Interface specifications

10.3.1 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 RS232C/ DIN66020 CCITT V24/V.28)
	Max. cable length	15 m
	Signal level	Outputs: +5 V ... +15 V (RL = 3–7 kΩ) –5 V ... –15 V (RL = 3–7 kΩ) Inputs: +3 V ... +25 V –3 V ... –25 V
	Connector	Sub-D, 9-pole, female
	Operating mode	Full duplex
	Transmission mode	Bit-serial, asynchronous
	Transmission code	ASCII
	Baud rates	600, 1200, 2400, 4800, 9600, 19200, 38400 (software selectable)
	Bits/parity	7-bit/none, 7-bit/even, 7-bit/odd, 8-bit/none (software selectable)
	Stop bits	1 stop bit
	Handshake	None, XON/XOFF, RTS/CTS (software selectable)
	End-of-line	<CR><LF>, <CR>, <LF> (software selectable)
	Power supply for 2nd display	+ 12 V, max 40 mA (software selectable, 2nd display mode only)

10.3.2 MT-SICS interface commands and functions

Many of the instruments and balances used have to be able to integrate into a complex computer or data acquisition system.

To easily integrate a balance into a system and utilize its capacity to the full extent, most balance functions are also available as corresponding commands via the data interface.

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

For further information, please contact your METTLER TOLEDO representative.





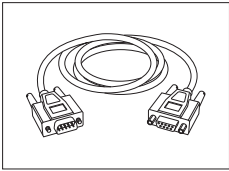
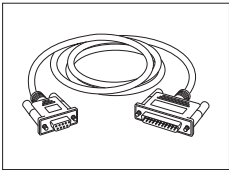



Refer to the MT-SICS Reference Manual which can be downloaded from the Internet at

► www.mt.com/library

11 Accessories and Spare Parts

11.1 Accessories

	Description	Part No.
Printers		
	RS-P28/11 printer with RS232C connection to balance (with date, time and applications)	11124309
	Paper roll (length: 20 m), set of 5 pcs	00072456
	Paper roll (length: 13 m), self-adhesive, set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
	USB-P25/01 (EMEA) printer with USB connection to instrument	11124301
	Paper roll (length: 20 m), set of 5 pcs	00072456
	Paper roll (length: 13 m), self-adhesive, set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
	USB-P25/02 (Asia-Pacific) printer with USB connection to instrument	11124311
	Paper roll (length: 20 m), set of 5 pcs	00072456
	Paper roll (length: 13 m), self-adhesive, set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
	USB-P25/03 (Northern America) printer with USB connection to instrument	11124321
	Paper roll (length: 20 m), set of 5 pcs	00072456
	Paper roll (length: 13 m), self-adhesive, set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
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 = 2 m	11101052
	USB-RS232 cable (to connect a balance via RS232C to a USB port)	64088427

Auxiliary displays



RS232 auxiliary display AD-RS-J7

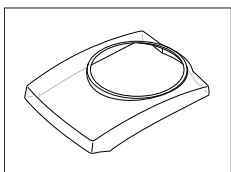
12122380



RS232 auxiliary display with backlit RS-AD-L7

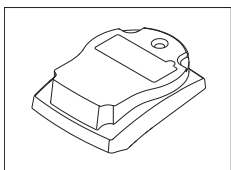
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Protective covers



Protective cover

12102980



Stackable cover

30079407

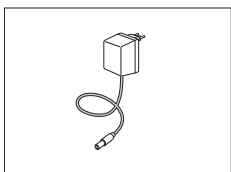
Transport cases



Transport case for portable models (PL-E, JL-GE)

12102982

Various



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

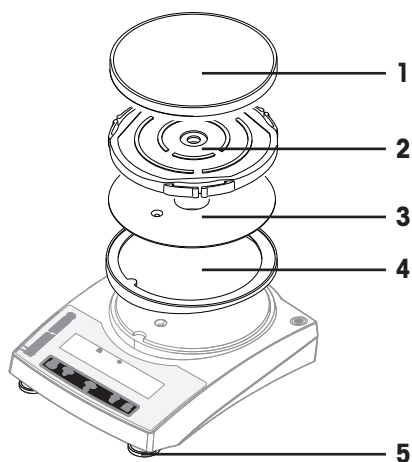
11120270

Adjustment weights



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

11.2 Spare parts



	Order no.	Designation	Remarks
12102941	12102941	Weighing pan Ø 160 mm	—
12102944	12102944	Pan support for weighing pan Ø 160 mm	—
12102948	12102948	EMC plate	—
12120338	12120338	Adapter ring	—
12102923	12102923	Leveling foot	—

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- Choose the appropriate balance or scale
- Calibrate and operate your weighing equipment with security
- Comply with quality and compliance standards in laboratory and manufacturing

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