Operating Instructions

# Portable Balances

## PL-E Models


METTLER TOLEDO

## Table of Contents

# 1 Introduction

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

These operating instructions apply to PL-E models and are based on the initially installed firmware (software) version V 2.0.

▶ www.mt.com/precision-balances

## 1.1 Conventions and Symbols Used in These Operating Instructions

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

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

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

This symbol indicates a flashing display.

▼ This symbol indicates an automatic sequence.

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

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

## 2 Safety Information

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

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

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

For use only in dry interior rooms.

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

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

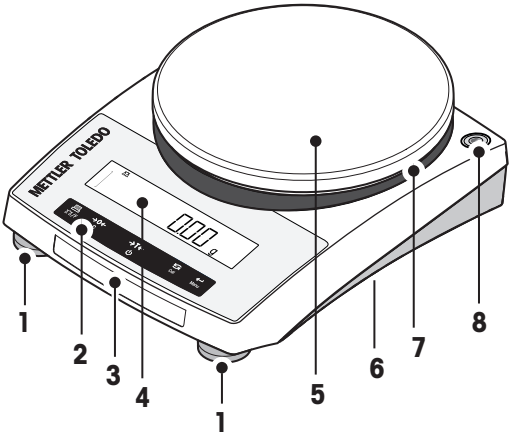
Use only balance accessories and peripheral devices from METTLER TOLEDO; they are optimally adapted to your balance.

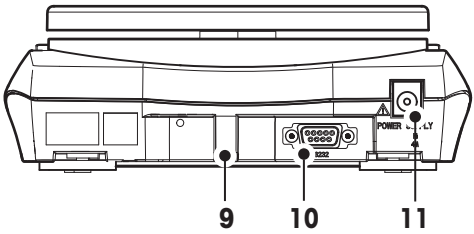
Use only the original universal AC adapter delivered with your balance.

# 3 Design and Function

## 3.1 Overview

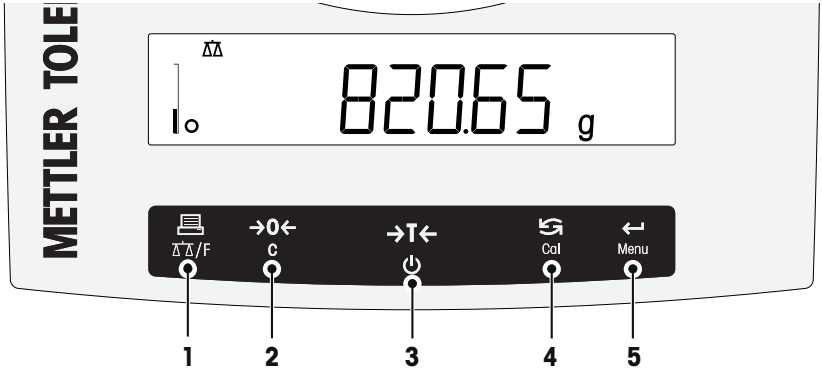
### 3.1.1 Components




| | | | |
|---|---|---|---|
| 1 | Levelling foot | 2 | Operation keys |
| 3 | Model sticker | 4 | Display |
| 5 | Weighing pan | 6 | Bottom of balance:<br>• Battery compartment<br>• Hanger opening for weighing below the balance |
| 7 | Adapter ring | 8 | Level indicator |
| 9 | Lug for optional antitheft device | 10 | RS232C interface |
| 11 | AC/DC adapter socket | | |

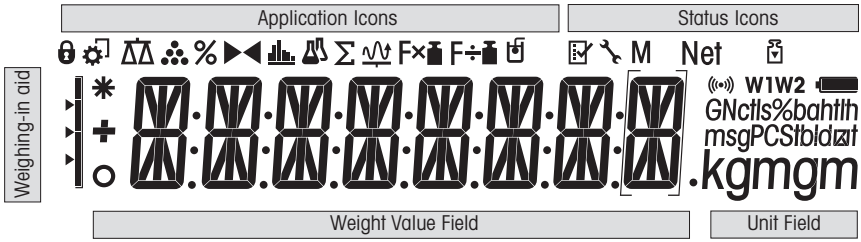
### 3.1.2 Operation Keys




**Key Functions**

| No. | Key | Press briefly (less than 1.5 s) | Press and hold (longer than 1.5 s) |
|---|---|---|---|
| 1 | /F | • Printout display value<br>• Transmit data<br>• To navigate backward in the menu or menu selection<br>• Decrease parameters in menu or applications | • Open the application list and scroll among the weighing applications in certain sequence for selecting an application<br>• Exits an active application and returns to the selection for weighing mode |
| 2 | →0← C | • Zero setting | • Cancel and leave menu without saving<br>• One step back in the menu<br>• Cancel or leave application setting |
| 3 | →T← | • Tare<br>• Switch on | • Switch off |
| 4 | Cal | • With entries, scroll down<br>• To navigate forward menu topics or menu selections<br>• To toggle between unit 1, recall value (if selected), unit 2 (if different from unit 1) and the application unit (if any)<br>• Increase parameters in menu or applications | • Execute predefined adjustment (calibration) procedure |
| 5 | Menu | • Enter or leave menu selection<br>• To enter application parameter and switch to next parameter<br>• To store parameter | • Enter or leave menu (parameter settings) |

### 3.1.3 Display panel




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

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

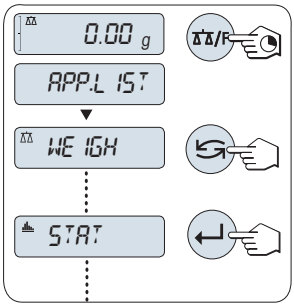
| Status Icons | | | |
|---|---|---|---|
| M | Indicates stored value (Memory) | | Feedback for pressed keys |
| Net | Indicates Net weight values | | Service reminder |
| | Adjustments (calibration) started | | |

| Weight Value Field and Weighing-in aid | | | |
|---|---|---|---|
| | Brackets to indicate uncertified digits (approved models only) | 100% 0% | SmartTrack (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 | | | | | | |
|---|---|---|---|---|---|---|
| GNctls%bahtlth msgPCStbidlzt kgmgm | **g** | gram | **ozt** | troy ounce | **tls** | Singapore taels |
| | **kg** | kilogram | **GN** | grain | **tlt** | Taiwan taels |
| | **mg** | milligram | **dwt** | pennyweight | **tola** | tola |
| | **ct** | carat | **mom** | momme | **baht** | baht |
| | **lb** | pound | **msg** | mesghal | | |
| | **oz** | ounce | **tlh** | Hong Kong taels | | |

## 3.2 Basic Principles for Operation

**Selection of simple weighing or applications**




1 Press and hold «**T/F**» until "**APP.LIST**" (application list) appears on the display.

⇨ After relasing the key, weighing mode "**WEIGH**" appears on the display.

2 Execute simple weighing by pressing «↵» or select an application by multiple pressing of the «⟳» key.

3 To execute selected application press «↵».

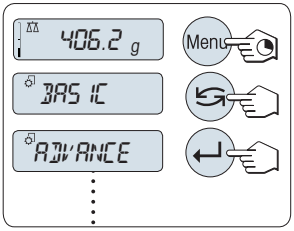
**Available applications**

| Display | Remark | Description |
|---|---|---|
| **WEIGH** | Weighing mode | **see** Weighing Made Simple (page 20) |
| **COUNT** | Piece counting | **see** Application "Piece Counting" (page 33) |
| **PERCENT** | Percent weighing | **see** Application "Percent Weighing" (page 36) |
| **CHECK** | Check weighing | **see** Application "Check Weighing" (page 38) |
| **STAT** | Statistics | **see** Application "Statistics" (page 40) |
| **FORMULA** | Formulation / Net-Total | **see** Application "Formulation" (Net Total Formulation) (page 42) |
| **TOTAL** | Totaling | **see** Application "Totaling" (page 45) |
| **DYNAMIC** | Dynamic weighing | **see** Application "Dynamic Weighing" (page 47) |
| **FACTOR.M** | Multiplication factor | **see** Application "Multiplication Factor Weighing" (page 49) |
| **FACTOR.D** | Division factor | **see** Application "Division Factor Weighing" (page 51) |

**Exiting a current application**

- During application setting, press and hold «**C**». The balance returns to the last active application.
- During working with the application, press and hold «**T/F**». The balance returns to the selection for the weighing mode.

**Entering the menu**



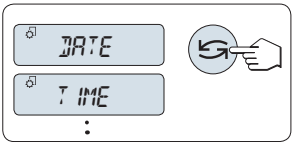

1 Press and hold «**Menu**» to enter main menu. The first menu "**BASIC**" is displayed (except menu protection is active).

2 Press «↻» repeatedly to change menu.

3 Press «↵» to confirm the selection.

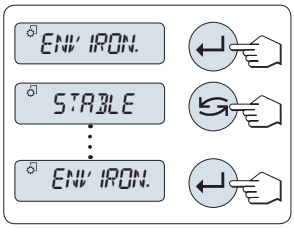
**Note**
Detailed description of the menu **see** The Menu.

**Selecting menu topics**




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

**Changing settings in selected menu topic**



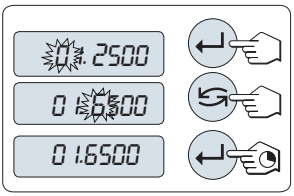

1 Press «↵».The display shows the current setting in the selected menu topic. Each time «↻» is pressed, the balance switches to the next selection. After the last selection, the first is shown again.

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

**Changing settings in a submenu selection**

The same procedure as for menu topics.

**Input principle of numerical values**

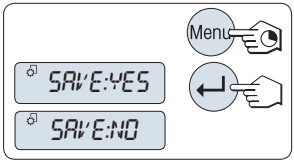



1 Press «↵» to select a digit (cyclically from left to right) or a value (depending on the application). The selected digit or the selected value is blinking.

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

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

**Saving settings and closing the menu**




1 Press and hold «**Menu**» to leave menu topic.

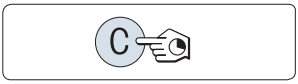
⇨ "**SAVE:YES**" appears on the display.

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

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

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

**Cancel**




▸ During menu operation

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

▸ During application operation

– To cancel settings press and hold «**C**».

⇨ The balance returns to the previous active application.

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

# 4 Installation and Putting Into Operation

## 4.1 Scope of delivery

1 Open the packaging and carefully remove all components.

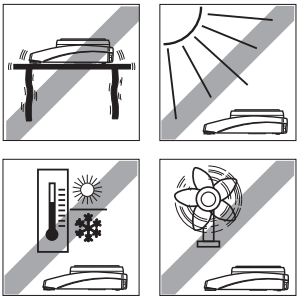
2 Check the delivered items.

The standard scope of delivery contains the following items:

- 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)
- Operating instructions printed or on CD-Rom depending on the country.
- Quick Guide (English) depending on the country.
- EC declaration of conformity

## 4.2 Selecting a location

The correct location makes an important contribution to the accuracy of the weighing results of precision balances. Select a stable, vibration-free position that is as horizontal as possible. The surface must be able to safely carry the weight of a fully loaded balance.

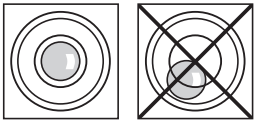


Observe ambient conditions see Technical Data (page 59).

Avoid the following:

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

## 4.3 Leveling the balace



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

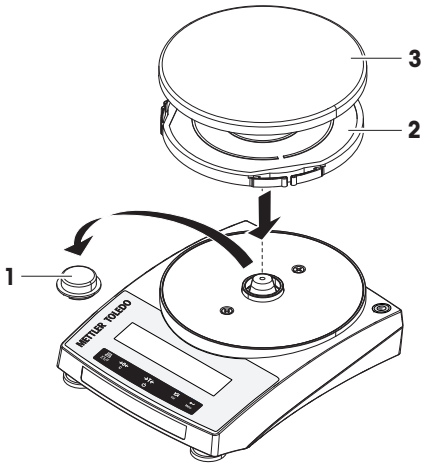
Align the balance horizontally by turning the leveling feet of the balance housing until the air bubble is in the inner circle of the level indicator.

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

## 4.4 Installing the components

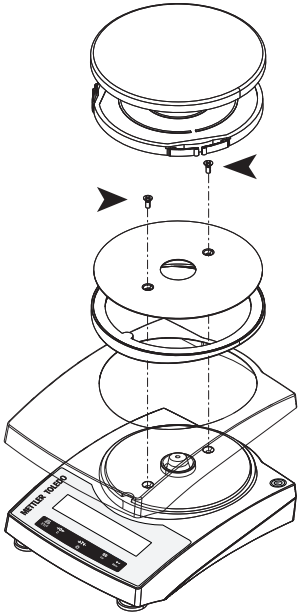
1 Remove the protective cover for weighing cone (1). Keep it for later use.

2 Place the following components on the balance in the specified order:
- Pan support (2)
- Weighing pan (3)



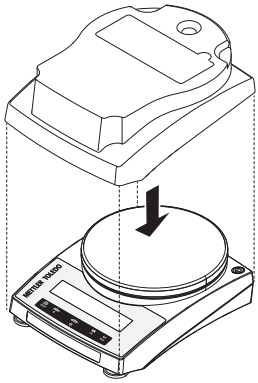

## 4.5 Installation of the protective cover

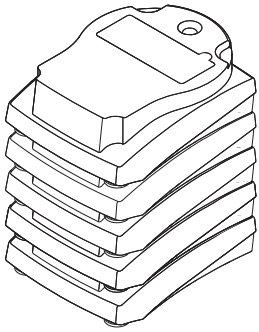
Install the protective cover according to the illustration on the right, using a screwdriver.



## 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 Power supply

### 4.7.1 AC operation

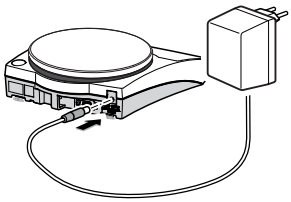
Your balance is supplied with an country-specific AC/DC adapter. The power supply is suitable for all line voltages in the range: 100 - 240 VAC, 50/60 Hz (for detailed specifications, see section "technical data").

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

**Important:**

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

Connect the AC adapter to the connection socket on the back of your balance (see figure) and to the power line.



### 4.7.2 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 fail-

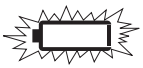
ure, the balance switches automatically to battery operation. Once the AC power supply is restored, the balance reverts automatically to AC operation.

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

battery full

2/3 full

1/3 full



battery empty

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.

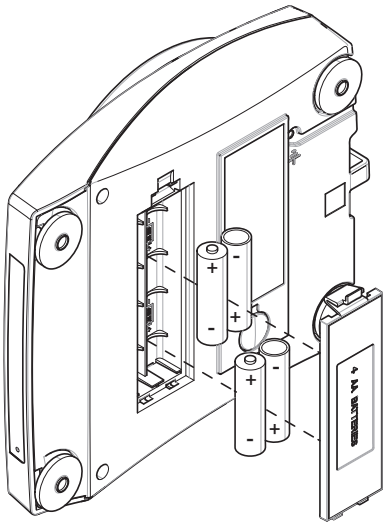
**Inserting / Replacing Batteries**

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

- Make sure that the balance is off before removing or inserting batteries.
- **Never put the balance on the weighing cone without mounted cone protection.** The load cell could be damaged.
- **Battery Warnings:** Read and follow all warnings and instructions supplied by the battery manufacturer.
- Do not mix different types or brands of batteries. Performance of batteries can vary very greatly depending on the manufacturer.
- If you don't operate the balance with batteries for an extended period, it is recommended to remove the batteries from the balance.
- Batteries must be disposed of in an environmentally responsible manner. No attempt must be made to incinerate or disassemble item.

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

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 General requirements

### 4.8.1 Switching on the Balance

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

### 4.8.2 Adjusting the Balance

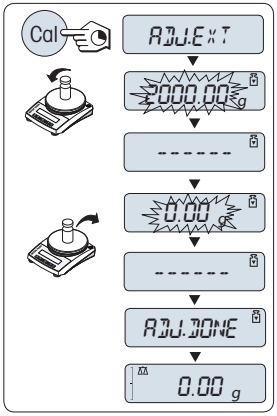
To obtain accurate weighing results, the balance must be adjusted to match the gravitational acceleration at its location and depending on the ambient conditions. After reaching the operation temperature, adjusting is necessary

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

## 4.9 Adjustment

### 4.9.1 Adjustment with external weight

**Note:**
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. See the detailed information delivered with this instrument.




- ▸ To carry out this operation, in the menu topic "**CAL**" (Adjustment) " of advanced menu **ADJ.EXT**" must be selected.
- 1 Have required adjustment weight ready.
- 2 Unload weighing pan.
- 3 Press and hold «**Cal**» to execute "External Adjustment". The required (predefined) adjustment weight value flashes in the display.
- 4 Place adjustment weight in center of pan. The balance adjusts itself automatically.
- 5 When "0.00 g" flashes, remove adjustment weight.
- ⇨ The adjusting is finished when the message "**ADJ.DONE**" appears briefly on the display. The balance returns to the last active application and is ready for operation.

**Sample adjustment printout using external weight:**

```
- External Adjustment --
21.Jan 2014         12:56

METTLER TOLEDO

Balance Type      PL1502E
SNR            1234567890

Temperature       22.5 °C
Nominal         1500.00 g
Actual          1499.99 g
Diff               6.7 ppm

Adjustment done

Signature


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

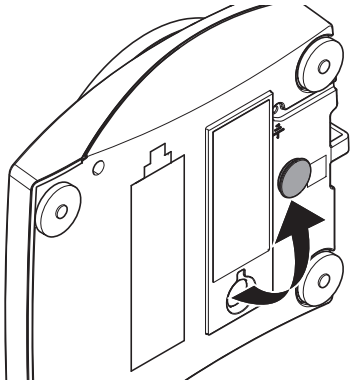
## 4.10 Weighing below the balance

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

**Attention**

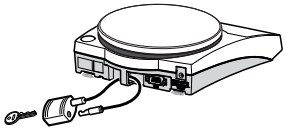
- **Do not place the balance on the pan support location bolt.**

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



## 4.11 Antitheft device

All models are provided with a lug for attaching an optional antitheft device, **see** Accessories and Spare Parts (page 64).

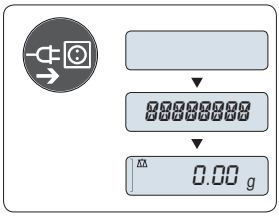


# 5 Weighing Made Simple

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

## 5.1 Switching the balance on or off

**Switching on**



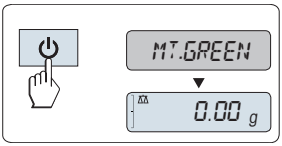

**Connecting to the mains**

1 Remove any load from weighing pan.

2 Connect balance via AC adapter to the mains.

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

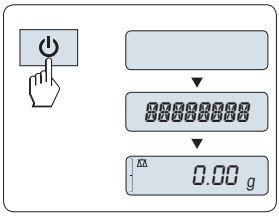
After the warm-up time, the balance is ready for weighing or for operation with the last active application, **see** General Requirements.




**Mains operated (standby mode)**

– Press «**On**».

The balance is ready for weighing or for operation with the last active application. Approved balances will execute an initial zero.




**Battery operated**

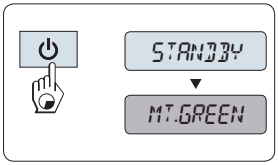
1 Remove any load from weighing pan.

2 Press and hold «**On**».

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, **see** General Requirements.

**Switching off**




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

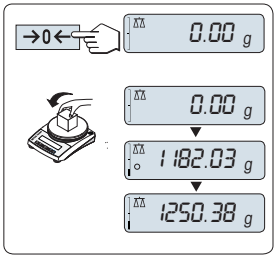
⇨ Mains operated balances switch into standby mode.

⇨ Battery operated balances switch off completely.

**Note:**

- After switching on from standby mode, your balance needs no warm-up time and is immediately ready for weighing.
- If your balance has been switched off after a preselected time, the display is dimly lit and shows **MT.GREEN**
- To completely switch off mains operated balances, they must be disconnected from the power supply.

## 5.2 Performing a simple weighing




▸ The balance is in the weighing mode.

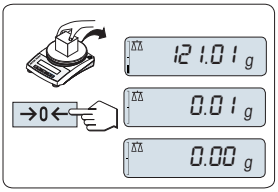
1 Press «→0←» to zero the balance.
**Note:** If your balance is not in the weighing mode, first press and hold the «⚖» key until "**WEIGH**" appears in the display. Press ↵. Your balance is in the weighing mode.

2 Place weighing sample on the weighing pan.

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

4 Read the result.

## 5.3 Zero setting / taring

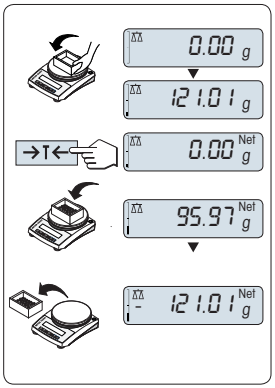



**Zero setting**

1 Unload the balance.

2 Press «→0←» to set the balance to zero. All weight values are measured in relation to this zero point.

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




**Taring**

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

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

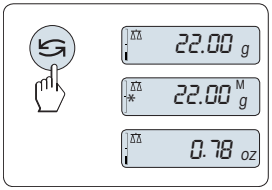
2 Press «→T←» to tare the balance.

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

**Note:**

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

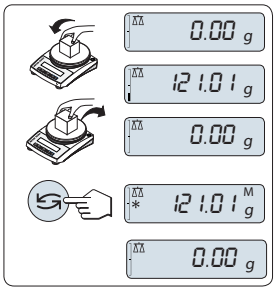
## 5.4 Switching weight units




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

## 5.5 Recall / recall weight value

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




1 Load weighing sample. The display shows weight value and stores stable value.

2 Remove weighing sample. When the weight is removed the Display shows zero.

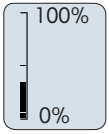
3 Press «⇆». The display shows last stored stable weight value for 5 seconds together with asterisk (*) and Memory (M) symbols. After 5 seconds the display goes back to zero. This can be repeated unlimited times.

**Delete last weight value**

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

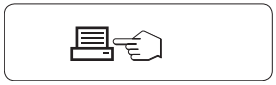
**Note:** If the power is switched off, the recall value is lost. The recall value can not be printed.

## 5.6 Weighing with the weighing-in aid




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

## 5.7 Print / transmit data



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

# 6 The Menu

## 6.1 What is in the Menu ?

The Menu allows you to match your balance to your specific weighing needs. In the menu you can change the settings of your balance and activate functions. The main menu has 4 different submenus and these contain 29 different topics, each of which allows you various selection possibilities.

**Note**
For Menu "PROTECT" **see** Main Menu (page 25).

**Menu "BASIC"**

| Topic | Explanation | Description |
|---|---|---|
| **DATE** | Setting the current date. | see (page 25) |
| **TIME** | Setting the current time. | see (page 25) |
| **1/10 D** | Setting display increment (1/10d function) | see (page 25) |
| **UNIT 1** | Specification of the 1st weight unit in which the balance should show the result. | see (page 25) |
| **UNIT 2** | Specification of the 2nd weight unit in which the balance should show the result. | see (page 26) |
| **SET ID** | Setting an identification. | see (page 26) |
| **PRT.MENU** | Printing the settings. | see (page 26) |
| **RESET** | Call up of the factory settings. | see (page 26) |

**Menu "ADVANCE."**

| Topic | Explanation | Description |
|---|---|---|
| **ENVIRON.** | Matching the balance to the ambient conditions. | see (page 27) |
| **CAL** | Settings for adjustment (calibration). | see (page 27) |
| **DATE.FRM** | Setting the date format. | see (page 27) |
| **TIME.FRM** | Preselection of the time format. | see (page 27) |
| **RECALL** | Switching the application "Recall" for storing stable weights on or off. | see (page 28) |
| **STANDBY** | Setting the time after which the balance should be switched off automatically. | see (page 28) |
| **B.LIGHT** | Switching on or off the display backlight. | see (page 28) |
| **A.ZERO** | Switching the automatic zero correction (Autozero) on or off. | see (page 28) |
| **SRV.ICON** | Switching the service reminder (service icon) on or off. | see (page 28) |
| **SRV.D.RST** | Reset service date and hours (service reminder) | see (page 28) |

**Menu "INT.FACE"**

| Topic | Explanation | Description |
|---|---|---|
| **RS232** | Matching the serial interface RS232C to a peripheral unit. | see (page 29) |
| **HEADER** | Setting the header for printout of individual values. | see (page 30) |
| **SINGLE** | Setting the information for printout of individual values. | see (page 30) |
| **SIGN.L** | Setting the footer for printout of individual values. | see (page 30) |
| **LN.FEED** | Setting line feed for printout of individual values. | see (page 30) |
| **ZERO.PRT** | Setting the auto print function for printing zero. | see (page 30) |
| **COM.SET** | Setting the data communication format of the serial interface RS232C. | see (page 30-31) |

| Topic | Explanation | Description |
|---|---|---|
| **BAUD** | Setting the transfer speed of the serial interface RS232C. | see (page 31) |
| **BIT.PAR.** | Setting the character format (Bit/Parity) of the serial interface RS232C. | see (page 31) |
| **STOPBIT** | Setting the character format (stop bit) of the serial interface RS232C. | see (page 32) |
| **HD.SHK** | Setting the transfer protocol (Handshake) of the serial interface RS232C. | see (page 32) |
| **RS.TX.E.O.L.** | Setting the end of line format of the serial interface RS232C. | see (page 32) |
| **RS.CHAR** | Setting the char set of the serial interface RS232C. | see (page 32) |
| **INTERVL.** | Selection of the time interval for the simulated print key press. | see (page 32) |

## 6.2 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. |

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

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

**"1/10 D" – Display increment 1/10 d**

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

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

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

**"UNIT 1" – Weight Unit 1**

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

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

**Units:**

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

**"UNIT 2" – Weight Unit 2**

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

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

**"SET ID" – Set identification**

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

"**SET ID**" Set identification

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

▸ "**SET ID**" is selected.

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

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

**"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**" and "**TIME**" settings.

## 6.4 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.<br>**Note:**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).<br>**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 |

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

**"STANDBY" – Automatic Standby**

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

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

**"B.LIGHT" – Backlight**

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

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

**"A.ZERO" – Automatic Zero Setting**

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

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

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

**"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 «↻».

## 6.5 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**)
**Note:**

- Only one printer possible.
- See recommended printer settings found in section "Appendix", as well as the printer-specific user's manual.

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

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

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

"**PC-DIR.**" Connection to a **PC**: the balance can send data (as a Keyboard) to the PC used for PC applications e.g. Excel.
**Note**

- The balance sends the weight value without the unit to the PC.

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

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

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

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

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

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

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

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

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

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

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

| | |
|---|---|
| "**NO**" | The header is not be printed (**Factory setting**) |
| "**DAT/TIM**" | Date and time are printed |
| "**D/T/BAL**" | Date, time and balance information (Balance type, SNR, Balance ID) are printed.<br>**Note:** Balance ID only if set. |

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

| | |
|---|---|
| "**NET**" | The value of the Net weight from the current weighing is printed (**Factory setting**) |
| "**G/T/N**" | The values of the Gross weight, the Tare weight and the Net weight are printed |

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

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

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

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

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

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

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

**COM.SET – Options for the Data Communication Format (RS232C)(HOST)**
This menu topic allows you to set the data format depending on which peripheral device is connected.
**Note:** This menu topic is only available if **HOST** setting was selected.

| | |
|---|---|
| "**MT-SICS**" | The MT-SICS data transfer formats is used. (**Factory setting**) For more information see section "MT-SICS Interface Commands and Functions". |
| "**SART**" | The following Sartorius commands are supported:<br>K Ambient conditions: very stable<br>L Ambient conditions: stable<br>M Ambient conditions: unstable |

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

*) may be inaccessible on verified balances/scales

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

**Functionality mapping**

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

**"BAUD" – Baud rate RS232C**

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

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

**Note:**

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

**"BIT.PAR." – Bit/Parity RS232C**

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

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

**Note:**

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

**"STOPBIT" – Stop Bits RS232C**
At this menu topic you can set the stop bits of the transmitted data to different RS232C serial receivers.

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

**"HD.SHK" – Handshake RS232C**
This menu topic allows you to match the data transmission to different RS232C serial receivers.

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

**Note:**

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

**"RS.TX.E.O.L." – End of Line RS232C**
At this menu topic you can set the "End of Line" character of the outgoing transmitted data to different RS232C serial receivers.

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

**Note:**

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

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

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

**Note:**

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

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

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

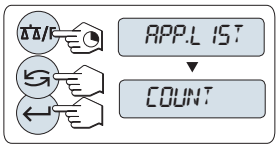
**Factory setting**: 0 sec

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

# 7 Applications

## 7.1 Application "Piece Counting"

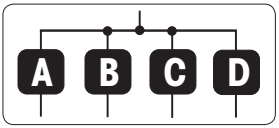
The "**Piece Counting**" application allows you to determine the number of pieces put on the weighing pan. All pieces must be of approximately equal weight, since the number of pieces is determined on the basis of average weight.




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

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

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



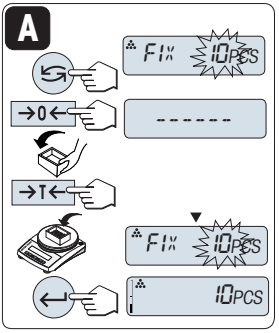

**Piece Counting first requires the setting of a reference weight, there are 4 possibilities:**

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

**B** Setting the reference **by multiple pieces with variable reference values**.

**C** Setting the reference **for 1 piece in weighing mode**.

**D** Setting the reference **for 1 piece in manual mode**.




Setting possibility

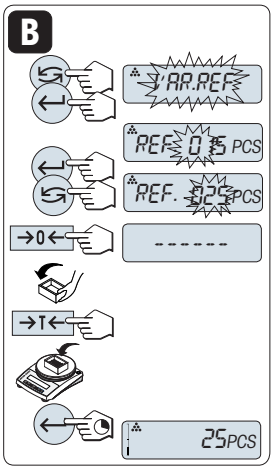
**A** **Setting the reference by multiple pieces with fix reference values.**

1 Select a number of reference pieces by scrolling with «↻». Possible numbers* are 5, 10, 20 and 50.
* with approved balances in selected countries: min 10

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

3 Add the selected number of reference pieces to container.

4 Press «↵» to confirm.




Setting possibility

**B** **Setting the reference by multiple pieces with variable reference values**

1 Select "**VAR.REF**" by scrolling with «↻». Press «↵» to confirm.

2 Select the number of reference pieces. Possible numbers are 1 to 999. With approved balances in selected countries: min 10

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

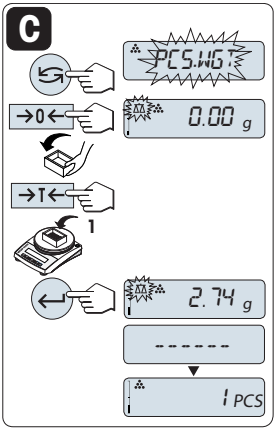
⇨ The selected digit is blinking.

4 To change the digit, press «↻».

5 Press «→0←» to zero. If needed: place empty container on the weighing pan and press «→T←» to tare.

6 Add the selected number of reference pieces to container.

7 Press and hold «↵» to confirm.




Setting possibility

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

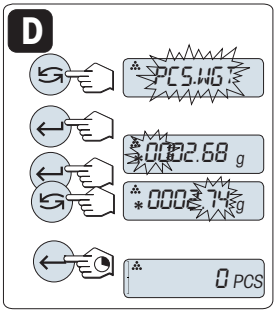
1 Select "**PCS.WGT**" by scrolling with «↻».

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

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

4 Press «↵» to confirm.

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




Setting possibility

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

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

2 Press «↵» to confirm.

3 Enter the final reference one piece weight.

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

⇨ The selected digit is blinking.

5 To change the digit, press «↻».

6 Press and hold «↵» to confirm.

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

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

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

**Note:**

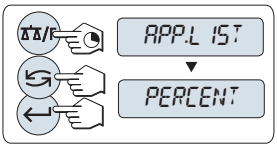
- The "**RECALL**" value is displayed with an asterisk (*) and icon "M" and can not be printed.
- Take into account minimum values: min. reference weight = 10d (10 digits), min. piece weight* = 1d (1 digit)!
  * with approved balances in selected countries: min 3e
- The current reference weight remains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

**Exit current application**

To exit the current application, press and hold «⌂/F» (longer than 1.5s).

## 7.2 Application "Percent Weighing"

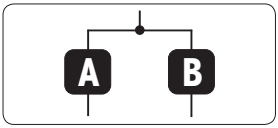
The "**Percent Weighing**" application allows you to check a sample weight as percentage to a reference target weight.




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

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

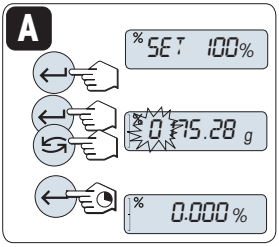
3 Activate function **PERCENT** by pressing «».




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

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

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




Setting possibility

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

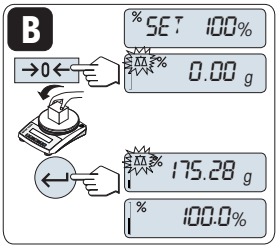
1 Press «» to activate manual mode.

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

⇨ The selected digit is blinking.

3 To change the digit, press «».

4 Press and hold «» to confirm the value.




Setting possibility

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

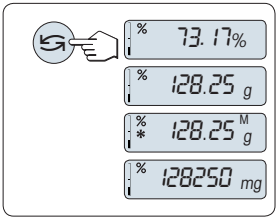
1 Press «**→0←**» to zero the balance and to activate the weighing mode. If needed: place empty container on the weighing pan and press «**→T←**» to tare.

2 Load the reference weight (100%).
**Note:** Reference weight must be at least +/- 10d.

3 Press «» to confirm.

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

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




**Switching between percent and weight display**

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

**Note:**

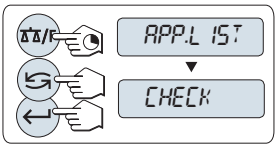
- The recall value is displayed with an asterisk (*) as well as icon "M" and can not be printed.
- The current set weight remains stored until it is redetermined.

**Exit current application**

To exit the current application, press and hold «⚖/F» (longer than 1.5s).

## 7.3 Application "Check Weighing"

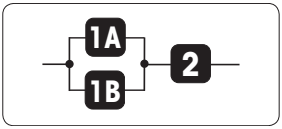
The "**Check weighing**" application allows you to check the deviation of a sample weight within a tolerance limit to a reference target weight.




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

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

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



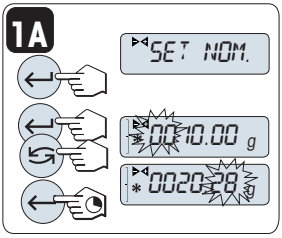

**Step 1: Check Weighing first requires the setting of a reference weight that should corresponds to the nominal weight, there are 2 possibilities:**

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

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

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

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




Setting possibility:

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

1 Press «» to activate manual mode.

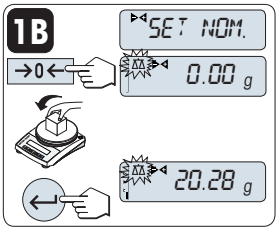
2 Select the reference target weight.

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

⇨ The selected digit is blinking.

4 To change the digit, press «».

5 Press and hold «» to confirm the nominal weight.



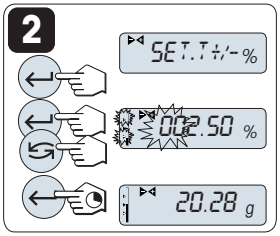

Setting possibility:

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

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

2 Load the nominal weight.

3 Press «» to confirm the nominal weight.




Step 2:

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

1 Press «↵» to start setting.

2 Press «↵» to confirm the default limit of +/- 2.5 % or enter the limit value.

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

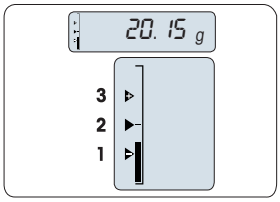
4 To change the digit, press «↻».

5 Press and hold «↵» to confirm the limits.

**Note:**

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

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




**Weighing-in-Aid**

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

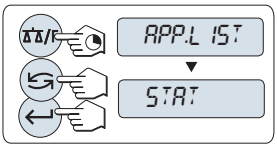
**1** Lower limit
**2** Target weight
**3** Upper limit

**Exit current application**

To exit the current application, press and hold «⍓/F» (longer than 1.5s).

## 7.4 Application "Statistics"

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




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

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

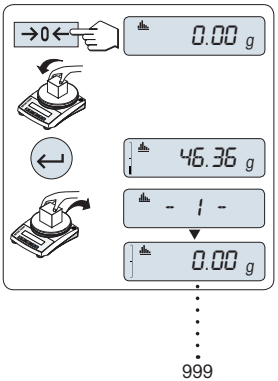
3 Activate function **STAT.** by pressing «↵».


**Memory clear question**

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

1 To continue the last statistics press «↵» to confirm "**CLR.M:NO**".

2 For a new statistical evaluation clear the memory. Press «↻» to select "**CLR.M:YES**" and press «↵» to confirm.




**Weighing the first sample weight:**

1 Press «**→0←**» to zero the balance.

2 Load the first sample weight.

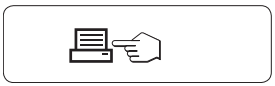
3 Press «↵». The display shows the sample count "- 1 -" and the current weight is stored as sample and the weight is printed out.
**Note:** When the sample counter is displayed you may press and hold «**C**» to undo (drop) this sample.

4 Unload the first sample weight.

**Weighing further sample weights:**

The same procedure as for the first sample weight.

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



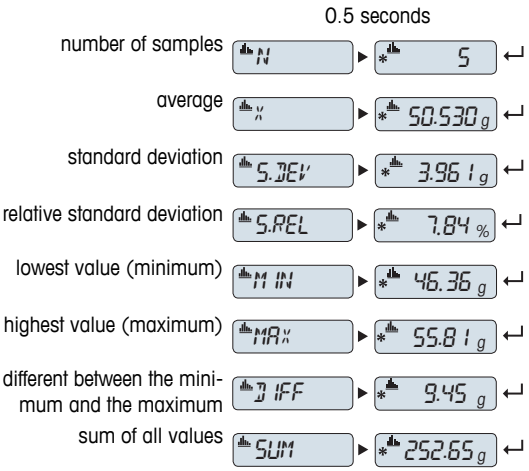
**Results:**

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

**Displayed results:**

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

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




**Printout:**

```
------ Statistics ------
21.Jan 2014         12:56

Balance Type      PL1502E
SNR            1234567890
------------------------
1                 46.36 g
2                 55.81 g
3                 47.49 g
4                 53.28 g
5                 49.71 g
n                      5
x                50.530 g
s dev             3.961 g
s rel              7.84 g
Min.              46.36 g
Max.              55.81 g
Diff               9.45 g
Sum              252.65 g
------------------------
```

**Exit current application**

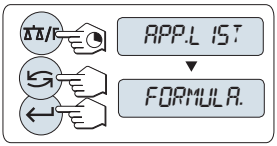
To exit the current application, press and hold «⌂/F» (longer than 1.5s).

## 7.5 Application "Formulation" (Net Total Formulation)

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

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

**Note**
Connect a printer or a PC if present.

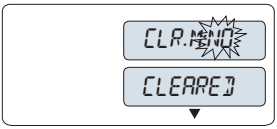



1 Call-up "**APP.LIST**" by pressing and holding «**F**».

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

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

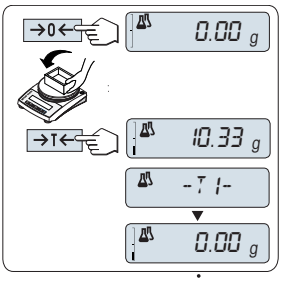
**Memory clear question**




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

1 To continue the last formulation weighing, press «» to confirm "**CLR.M:NO**".

2 For a new formulation clear the memory. Press «» to select "**CLR.M:YES**" and press «» to confirm.




**Tare container** (if used):

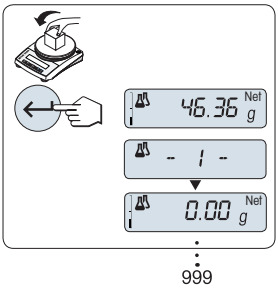
1 Press «**→0←**» to zero the balance if needed.

2 Place the empty container on the weighing pan.

3 Press «**→T←**» . The container is tared and the tare count "-T1 -" is displayed and the tare weight is printed.

**Note:**

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




**Weighing the first component weight:**

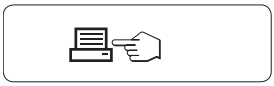
1 Load the first component weight.

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

**Weighing further component weights:**

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

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



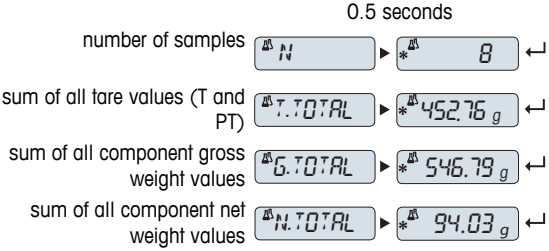
**Results:**

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

**Displayed results:**

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

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




**Printout:**

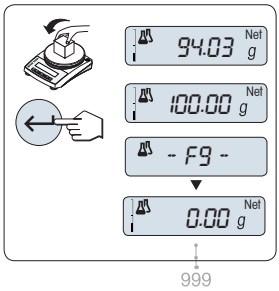
```
------ Formulation -----
21.Jan 2014         12:56

Balance Type      PL1502E
SNR            1234567890
------------------------
1 T               10.33 g
1 N                8.85 g
2 N                9.23 g
2 T               10.84 g
3 N                7.43 g
.
.
n                     8
T Total          452.76 g
G Total          546.79 g

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

**Function "FILL UP"**

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


**Starting the fill up function.**

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




**Filling up with an additional component weight:**

▸ The last total of the component weights is displayed.

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

2 Press «↵» to confirm.

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

**Filling up further additional component weights:**

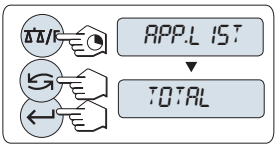
The same procedure, beginning with starting up the "**FILL UP**" function.

**Exit current application**

To exit the current application, press and hold «⏻/F» (longer than 1.5s).

## 7.6 Application "Totaling"

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




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

2 Select application **TOTAL** by scrolling with «».

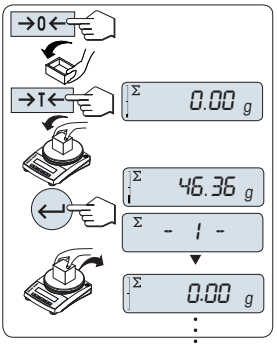
3 Activate function **TOTAL** by pressing «↵».


**Memory clear question**

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

1 To continue the totaling evaluation press «↵» to confirm "**CLR.M:NO**".

2 For a new totaling evaluation clear the memory. Press «» to select "**CLR.M:YES**" and press «↵» to confirm.




**Weighing in the sample weight:**

1 Press «→0←» to zero the balance if needed.

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

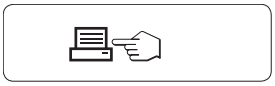
3 Load the first sample weight.

4 Press «↵». The display shows the sample count "- 1 -" and the current weight is stored.
**Note:** When the sample counter is displayed you may press and hold «**C**» to undo (drop) this sample.

5 Unload the first sample weight. The display shows zero.

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

- 1…999 samples are possible.



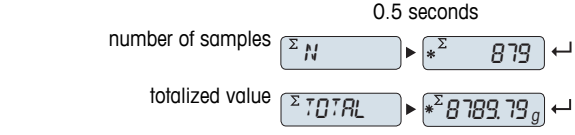
**Results:**

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

**Displayed results:**

1 Press «↵» briefly to show the totalized value.

2 Press and hold «**C**» to cancel.



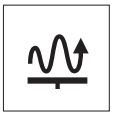
**Printout:**

```
------- Totaling -------
21.Jan 2014        12:56

Balance Type     PL1502E
SNR           1234567890
------------------------
1                46.36 g
2                55.81 g
3                47.49 g
4                53.28 g
5                49.71 g
6                53.93 g
.
.
.
n                    879
Total          8789.79 g
------------------------
```

**Exit current application**

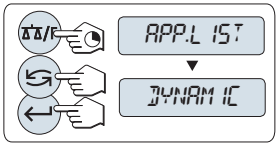
To exit the current application, press and hold «⌂/F» (longer than 1.5s).

## 7.7 Application "Dynamic Weighing"



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

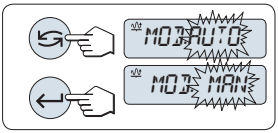
**Note:** "Switching Units" and "**RECALL**" Functions are not available in this Application.




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

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

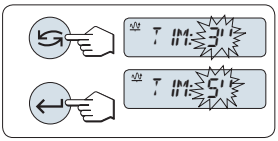
3 Activate function **DYNAMIC** by pressing «↵».




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

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

2 Press «↵» to confirm the selection.



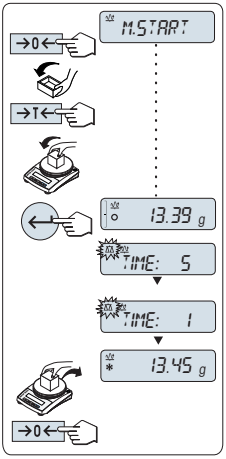

**2 Setting the weighing time:**

1 Press «↻» to select one of the available time intervals: 3 (default value), 5, 10, 20, 60 and 120 seconds.

2 Press «↵» to confirm the selected time interval.

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

**Your balance is now ready for dynamic weighing:**




1 Press «→**0**←» to zero if needed.

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

3 Load sample weight.

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

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

6 Unload sample weight.

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

**Note:**

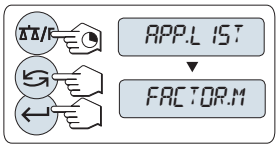
- The remaining weighing time (in seconds) is displayed continuously. You can cancel the countdown by pressing «**C**».
- The weight value remains in the display until the sample weight is removed from weighing pan ("Auto Start" only) or «→**0**←» is pressed.

**Exit current application**

To exit the current application, press and hold «**⌂/F**» (longer than 1.5s).

## 7.8 Application "Multiplication Factor Weighing"

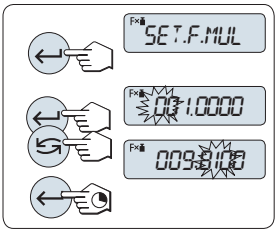
The "**Multiplication Factor Weighing**" application allows you to multiply the weight value (in grams) by a predefined factor (result = factor * weight) and have it calculated to a predefined number of decimal places.




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

2 Select application **FACTOR.M** by scrolling with «↻».

3 Activate function **FACTOR.M** by pressing «↵».




**1 Setting the factor value:**

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

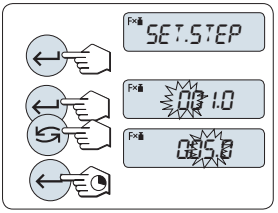
2 To select a digit, press «↵» (cyclically from left to right).

⇨ The selected digit is blinking.

3 To change the digit, press «↻».

4 Press and hold «↵» to confirm the selected factor (no automatic acceptance).

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




**2 Setting the step value:**

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

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

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

⇨ The selected digit is blinking.

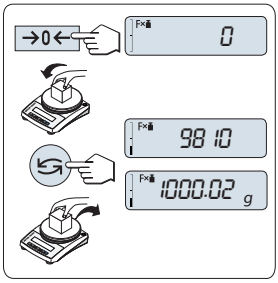
3 To change the digit, press «↻».

4 Press and hold «↵» to confirm the selected step (no automatic acceptance).

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

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

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




**Weighing procedure**

1 Press «→0←» to zero the balance.

2 Load sample weight on weighing pan.

3 Read the result. The appropriate calculation is then made using the weight of sample and the selected factor, the result being displayed with the selected display step.
**Note:** No units are displayed.

4 Unload sample weight.

**Toggling between displaying the calculated value and the measured weight:**

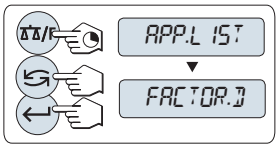
You can use the «⟲» key to toggle between the calculated Value, weight value "**UNIT 1**", "**RECALL**" value (if selected) and weight value "**UNIT 2**" (if different from "**UNIT 1**").

**Exit current application**

To exit the current application, press and hold «⍓/F» (longer than 1.5s).

## 7.9 Application "Division Factor Weighing"

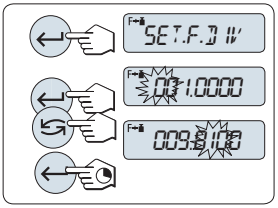

The "**Division Factor Weighing**" divide a predefined factor by the weight value (in grams) (result = factor / weight) and have it rounded to a predefined number of decimal places.




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

2 Select application **FACTOR.D** by scrolling with «↻».

3 Activate function **FACTOR.D** by pressing «↵».




**1 Setting the Factor Value:**

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

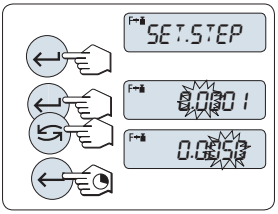
2 To select a digit, press «↵» (cyclically from left to right).

⇨ The selected digit is blinking.

3 To change the digit, press «↻».

4 Press and hold «↵» to confirm the selected factor (no automatic acceptance).

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




**2 Setting the step value:**

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

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

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

⇨ The selected digit is blinking.

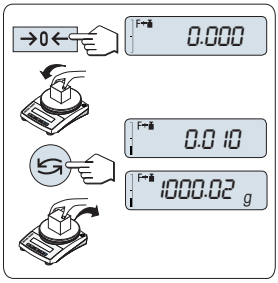
3 To change the digit, press «↻».

4 Press «↵» to confirm the selected step (no automatic acceptance).

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

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

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




**Weighing procedure**

1 Press «→0←» to zero the balance.

2 Load sample weight on weighing pan.

3 Read the result. The appropriate calculation is then made using the weight of sample and the selected factor, the result being displayed with the selected display step.
**Note:** No units are displayed. To avoid a division by zero, the factor division is not calculated at zero.

4 Unload sample weight.

**Toggling between displaying the calculated value and the measured weight:**

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

**Exit current application**

To exit the current application, press and hold «⍋⍋/F» (longer than 1.5s).

# 8 Communication with Peripheral Devices

## 8.1 Function PC-Direct

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

**Note:** The units will not be transferred.

**Requirements**

- PC with one of the Microsoft Windows® operating system 32bit/64bit: XP (SP3), Vista (SP2), Win 7 (SP1) or Win 8.
- Serial interface RS232.
- Administrator rights for installing software.
- Windows Application (e.g. Excel).
- Balance to PC connection with cable RS232.

**Settings at the balance:**
Balance Interface Settings (see Interface Menu):

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

**Settings at the PC:**

**Installing SerialPortToKeyboard**
Operation of PC-Direct via serial port RS232 requires the installation of **SerialPortToKeyboard** on your host computer.

**Using CD-ROM**

1 Insert the product CD in the CD/DVD drive of the host computer.

2 Double click the folder **SerialPortToKeyboard**.

**Using internet**

1 Go to the site http://www.mettler-toledo-support.com.

2 Log in to the METTLER TOLEDO Balance Support Site (registration with the serial number of a METTLER TOLEDO instrument required).

3 Click **Customer Support**

4 Click appropriate product folder and save the program file **SerialPortToKeyboard.exe** on your specified storage location.

**Installing procedure**

1 Right-click on **SerialPortToKeyboard.exe** and select **Run as Administrator** from the menu.

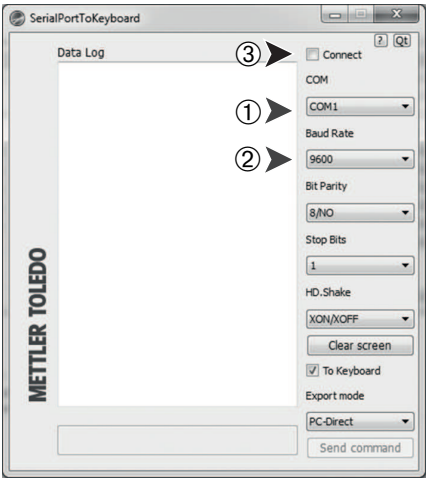
2 Follow the installer's instructions.

**Settings for SerialPortToKeyboard**

1 Select the serial port (COM) to be used for connection with the balance.
2 Set the baud rate to 9600.
3 Activate "Connect"

**Note**

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




**Checking operation**

1 Start **SerialPortToKeyboard** (RS232)
2 Start Excel (or another application) at the PC.
3 Activate a cell in Excel.

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

## 8.2 MT-SICS interface commands and functions

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

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

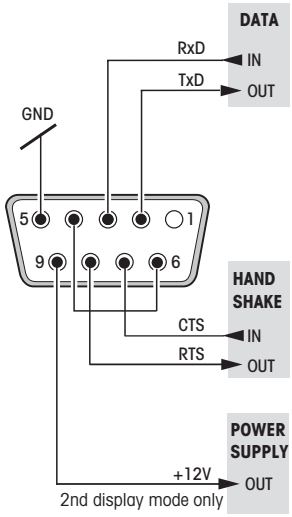
All new METTLER TOLEDO balances launched on the market support the standardized command set "METTLER TOLEDO Standard Interface Command Set" (MT-SICS). The commands available depending on the functionality of the balance.

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

▶ www.mt.com/sics-newclassic

## 8.3 RS232C interface

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

| Schematic | Item | Specification |
|---|---|---|
|  | Interface type | Voltage interface according to EIA RS-232C/DIN66020 CCITT V24/V.28) |
| | Max. cable length | 15 m |
| | Signal level | Outputs:<br>+5 V … +15 V (RL = 3–7 kΩ)<br>–5 V … –15 V (RL = 3–7 kΩ)<br>Inputs:<br>+3 V … +25 V<br>–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) |

# 9 Troubleshooting

## 9.1 Error messages

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

| Error Message | Cause | Rectification |
|---|---|---|
| **NO STABILITY** | No stability. | Ensure more stable ambient conditions. If not possible, check settings for environment. |
| **WRONG ADJUSTMENT WEIGHT** | Wrong adjustment weight on pan or none at all. | Place required adjustment weight in center of pan. |
| **REFERENCE TOO SMALL** | Reference for piece counting too small. | Increase reference weight. |
| **EEPROM ERROR - PLEASE CONTACT CUSTOMER SERVICE** | • EEPROM (memory) error.<br>• 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 adapter. | Use correct power adapter or replace the power adapter. |
|  | 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. |

| Error Message | Cause | Rectification |
|---|---|---|
| **ABOVE INITIAL ZERO RANGE** | Wrong weighing pan or pan is not empty. | Mount correct weighing pan or unload weighing pan. |
| **BELOW INITIAL ZERO RANGE** | Wrong weighing pan or pan is missing. | Mount correct weighing pan. |
| **MEM.FULL** | Memory full. | Clear the memory and start a new evaluation. |
| **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. |

**Attention**

In some countries, excessive mains voltage fluctuations and strong glitches may occur. This may affect the balance functions or damage the software. If this is the case, we recommend using the PowerPac-M-12V for stabilizing.

## 9.2 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**") |

# 10 Maintenance

## 10.1 Cleaning and Service

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

**Please observe the following notes:**

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

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

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

## 10.2 Disposal

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

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

Thank you for your contribution to environmental protection.

# 11 Technical Data

## 11.1 General data

**Power Supply**

| | |
|---|---|
| • AC/DC Adapter: | Primary: 100V–240 V, ±10%, 50/60 Hz, 0.3 A<br>Secondary: 12 V DC, 0.84 A (with electronic overload protection) |
| • Power supply to the balance: | 12VDC, 1.5W<br>⚠ Use only with a tested AC Adapter with SELV output current.<br>Ensure correct polarity ⊖—●—⊕ |
| • Power consumption in standby mode | < 1 W (**MT.GREEN**) |
| Battery operation | 4 standard AA (LR6) batteries (alkaline), > 8 h of use |

**Protection and Standards**

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

**Environmental conditions**

| | |
|---|---|
| • Height above mean sea level: | -50 m up to +4000 m |
| • Ambient temperature range: | Operating condition for ordinary lab application: +10 to 30 °C (operability guaranteed between +5 to 40 °C)<br>Storage condition: -25 to 70 °C |
| • Relative air humidity: | 10% to 80 % up to 31 °C, linearly decreasing to 50 % at 40 °C, noncondensing |
| • Environment | Non-erosive |

**Materials**

| | |
|---|---|
| • Housing: | Housing: Plastic (ABS/PC) |
| • Weighing pan: | Pan ø 160 mm: Stainless steel X5CrNi 18-10 (1.4301) |

## 11.2 Model-specific data

**Technical Data**

| | PL202E* | PL602E |
|---|---|---|
| **Limit values** | | |
| Maximum capacity | 220 g | 620 g |
| Readability | 0.01 g | 0.01 g |
| Repeatability (sd) | 0.01 g | 0.01 g |
| Linearity deviation | 0.02 g | 0.02 g |
| Sensitivity temperature drift (+10~+30°C) | 10 ppm/°C | 10 ppm/°C |
| **Typical values** | | |
| Repeatability (at nominal load) | 0.007 g | 0.007 g |
| Linearity deviation | 0.015 g | 0.015 g |
| Minimum sample weight (U=1 %, k=2) | 1.4 g | 1.4 g |
| Minimum sample weight OIML | 0.5 g | 0.5 g |
| Settling time | 2 s | 2 s |
| Adjustment | Ext. Cal | Ext. Cal |
| Interface | RS232 | RS232 |
| Balance dimensions (W x D x H) | 194x225x67 mm | 194x225x67 mm |
| Weighing pan dimensions | ø 160 mm | ø 160 mm |
| Weight of balance | 1.3 kg | 1.3 kg |
| **Weights for routine testing** | | |
| OIML CarePac | #11123001 | 11123007 |
| Weights | 200 g F2, 10 g F1 | 500 g F2, 20 g F1 |
| ASTM CarePac | #11123101 | #11123107 |
| Weights | 200 g 1, 10 g 1 | 500 g 1, 20 g 1 |

* available only in selected countries

| | PL1002E* | PL1502E |
|---|---|---|
| **Limit values** | | |
| Maximum capacity | 1020 g | 1520 g |
| Readability | 0.01 g | 0.01 g |
| Repeatability (sd) | 0.01 g | 0.01 g |
| Linearity deviation | 0.03 g | 0.03 g |
| Sensitivity temperature drift (+10~+30°C) | 10 ppm/°C | 10 ppm/°C |
| **Typical values** | | |
| Repeatability (at nominal load) | 0.007 g | 0.007 g |
| Linearity deviation | 0.015 g | 0.015 g |
| Minimum sample weight (U=1 %, k=2) | 1.4 g | 1.4 g |
| Minimum sample weight OIML | 0.5 g | 0.5 g |
| Settling time | 2 s | 2 s |
| Adjustment | Ext. Cal | Ext. Cal |
| Interface | RS232 | RS232 |
| Balance dimensions (W x D x H) | 194x225x67 mm | 194x225x67 mm |
| Weighing pan dimensions | ø 160 mm | ø 160 mm |
| Weight of balance | 1.3 kg | 1.3 kg |

| | PL1002E* | PL1502E |
|---|---|---|
| **Weights for routine testing** | | |
| OIML CarePac | #11123008 | #11123008 |
| Weights | 1000 g F2, 50 g F2 | 1000 g F2, 50 g F2 |
| ASTM CarePac | #11123108 | #11123108 |
| Weights | 1000 g 1, 50 g 1 | 1000 g 1, 50 g 1 |

* available only in selected countries

| | PL2001E* | PL6001E |
|---|---|---|
| **Limit values** | | |
| Maximum capacity | 2200 g | 6200 g |
| Readability | 0.1 g | 0.1 g |
| Repeatability (sd) | 0.1 g | 0.1 g |
| Linearity deviation | 0.2 g | 0.2 g |
| Sensitivity temperature drift (+10~+30°C) | 10 ppm/°C | 10 ppm/°C |
| **Typical values** | | |
| Repeatability (at nominal load) | 0.07 g | 0.07 g |
| Linearity deviation | 0.15 g | 0.15 g |
| Minimum sample weight (U=1 %, k=2) | 1.4 g | 1.4 g |
| Minimum sample weight OIML | 0.5 g | 0.5 g |
| Settling time | 1.5 s | 1.5 s |
| Adjustment | Ext. Cal | Ext. Cal |
| Interface | RS232 | RS232 |
| Balance dimensions (W x D x H) | 194x225x67 mm | 194x225x67 mm |
| Weighing pan dimensions | ø 160 mm | ø 160 mm |
| Weight of balance | 1.3 kg | 1.3 kg |
| **Weights for routine testing** | | |
| OIML CarePac | #11123009 | #11123011 |
| Weights | 2000 g F2, 100 g F2 | 5000 g F2, 200 g F2 |
| ASTM CarePac | #11123109 | #11123111 |
| Weights | 2000 g 1, 100 g 1 | 5000 g 4, 200 g 4 |

* available only in selected countries

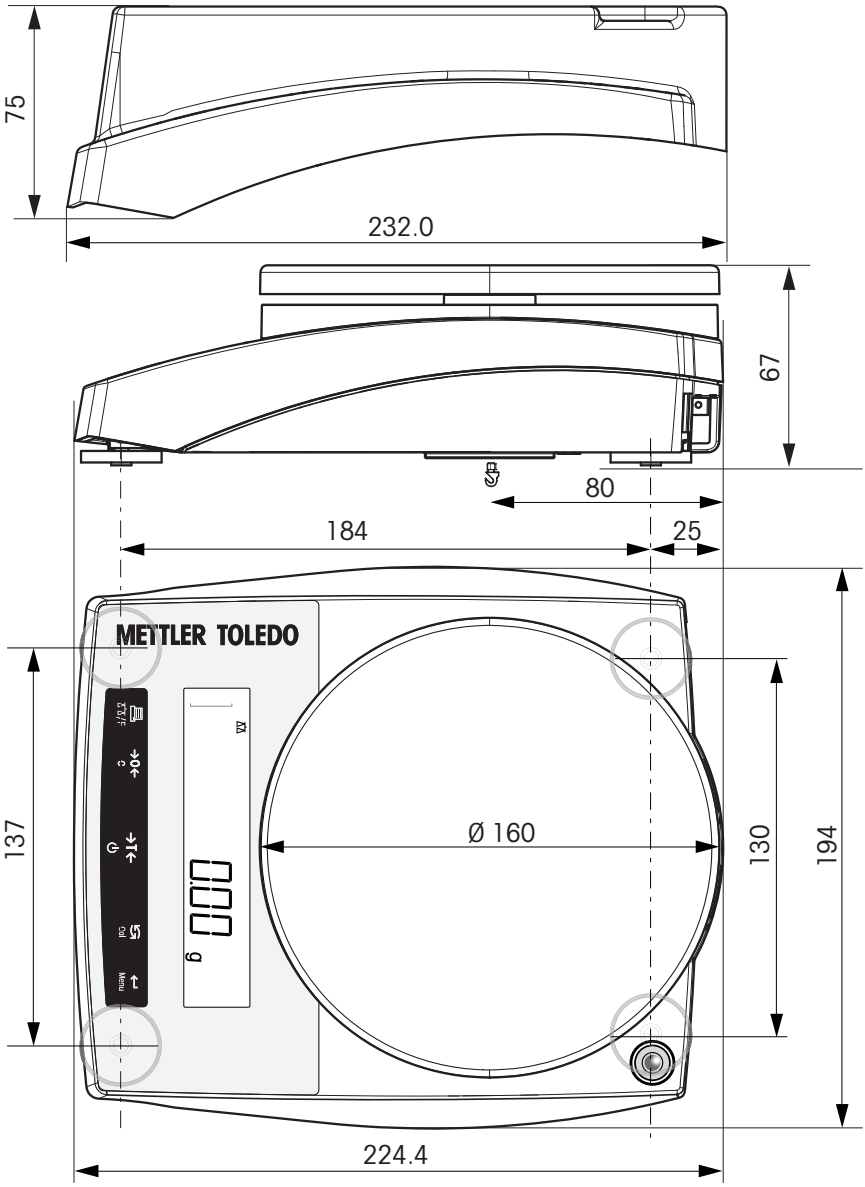
| | PL8001E* |
|---|---|
| **Limit values** | |
| Maximum capacity | 8200 g |
| Readability | 0.1 g |
| Repeatability (sd) | 0.1 g |
| Linearity deviation | 0.2 g |
| Sensitivity temperature drift (+10~+30°C) | 10 ppm/°C |
| **Typical values** | |
| Repeatability (at nominal load) | 0.07 g |
| Linearity deviation | 0.15 g |
| Minimum sample weight (U=1 %, k=2) | 1.4 g |
| Minimum sample weight OIML | 0.5 g |

| | **PL8001E*** |
|---|---|
| Settling time | 1.5 s |
| Adjustment | Ext. Cal |
| Interface | RS232 |
| Balance dimensions (W x D x H) | 194x225x67 mm |
| Weighing pan dimensions | ø 160 mm |
| Weight of balance | 1.3 kg |
| **Weights for routine testing** | |
| OIML CarePac | #11123011 |
| Weights | 5000 g F2, 200 g F2 |
| ASTM CarePac | #11123111 |
| Weights | 5000 g 4, 200 g 4 |

* available only in selected countries

## 11.3 Dimensions

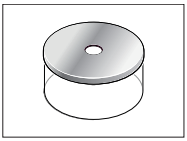
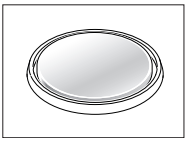
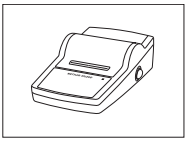
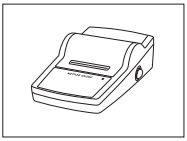
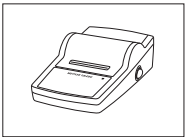
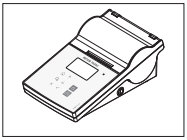
All dimensions in mm

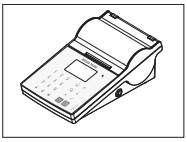



1) Draft shield (optional), see Accessories and Spare Parts (page 64).

# 12 Accessories and Spare Parts

## Accessories

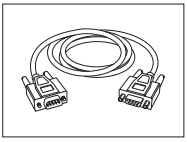
| | Description | Part No. |
|---|---|---|
| **Draft shields** | | |
|  | Glass cylinder draft shield. Weighing pan Ø 120 mm (#12102987) is needed for use. | 12102987 |
| **Weighing pans** | | |
|  | Weighing pan Ø 120 mm with pan support and draft shield element for operation without a Draft shield: necessary for use together with draft shield #12102988 | 12102987 |
| **Printers** | | |
|  | RS-P25 printer with RS232C connection to instrument | 11124300 |
| | Paper roll, set of 5 pcs | 00072456 |
| | Paper roll, self-adhesive, set of 3 pcs | 11600388 |
| | Ribbon cartridge, black, set of 2 pcs | 00065975 |
|  | RS-P26 printer with RS232C connection to instrument (with date and time) | 11124303 |
| | Paper roll, set of 5 pcs | 00072456 |
| | Paper roll, self-adhesive, set of 3 pcs | 11600388 |
| | Ribbon cartridge, black, set of 2 pcs | 00065975 |
|  | RS-P28 printer with RS232C connection to instrument (with date, time and applications | 11124304 |
| | Paper roll, set of 5 pcs | 00072456 |
| | Paper roll, self-adhesive, set of 3 pcs | 11600388 |
| | Ribbon cartridge, black, set of 2 pcs | 00065975 |
|  | P-56RUE thermal printer with RS232C, USB and ethernet connections, simple printouts, date and time, label printing (limited). | 30094673 |
| | Paper roll, white, set of 10 pcs | 30094723 |
| | Paper roll, white, self-adhesive, set of 10 pcs | 30094724 |
| | Paper roll, white, self-adhesive labels, set of 6 pcs | 30094725 |



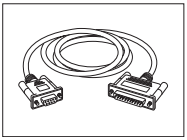
P-58RUE Thermal printer with RS232C, USB and ethernet connections, simple printouts, date and time, label printing, balance applications: statistics, formulation, totaling, 30094674

| | |
|---|---|
| Paper roll, white, set of 10 pcs | 30094723 |
| Paper roll, white, self-adhesive, set of 10 pcs | 30094724 |
| Paper roll, white, self-adhesive labels, set of 6 pcs | 30094725 |

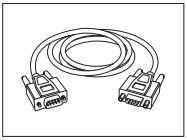
**Cables for RS232C interface**



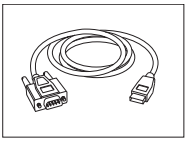
RS9 – RS9 (m/f): connection cable for PC, length = 1 m 11101051



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

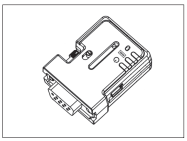


RS9 – RS9 (m/m): connection cable for devices with DB9 (f) socket, length = 1 m 21250066



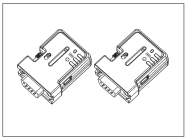
RS232 - USB converter cable – Cable with converter to connect a balance (RS232) to a USB port 64088427

**Cable replacement (wireless)**



Bluetooth RS232 serial adapter ADP-BT-S for wireless connection between **printer** and Excellence balance* or between **balance** and PC*. Fits printers P-56 / P-58 and the following balance models (SW V2.20 or higher required): MS, MS-S/L, ML, PHS, JP, JS. 30086494
* Bluetooth interface required

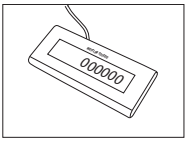
- 1 Bluetooth RS232 serial adapter (slave)
- 1 MT-DB9 male to female connector
- 1 MT-DB9 male to male connector



Bluetooth RS232 serial adapter set ADP-BT-P for wireless connection between printer and balance. Fits printers P-56 / P-58 and the following balance models (SW V2.20 or higher required): MS, MS-S/L, ML, PHS, JP, JS. 30086495

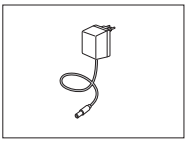
- 2 Bluetooth RS232 serial adapter paired (slave/master)
- 1 MT-DB9 male to female connector
- 1 MT-DB9 male to male connector

**Auxiliary displays**



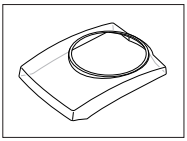

RS232 auxiliary display AD-RS-M7 12122381

**Power supplies**

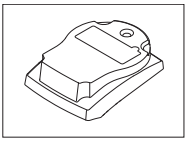


AC/DC universal adapter (EU, USA, AU, UK) 100–240 VAC, 50/60 Hz, 0.3 A, 12 VDC 0.84 A 11120270

**Protective covers**

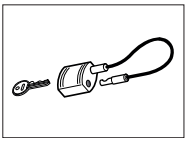


Protective cover 12102980



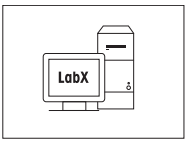
Stackable cover 30079407

**Anti-theft devices**



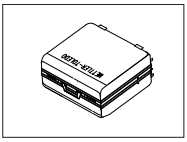
Cable with lock 00590101

**Software**




LabX direct balance (simple data transfer) 11120340

**Transport cases**

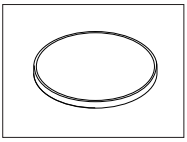


Transport case for PL-E models; accomodates balance, AC adapter, batteries and weights — 12102982

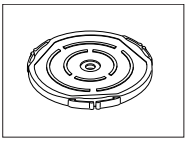
**Adjustment weights**

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

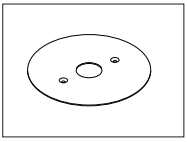
**Spare Parts**



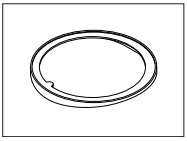
Weighing pan Ø 160 mm — 12102941



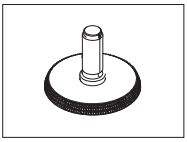
Pan support for weighing pan Ø 160 mm — 12102944



EMC plate — 12102948



Adapter ring — 12120338



Leveling foot — 12102923

# 13 Appendix

## 13.1 Menu Map

**Main Menu**

| Display | | Remark | Description |
|---|---|---|---|
| **BASIC** | ↵ | Basic Menu | see (page 68) |
| **ADVANCE.** | ↵ | Advanced Menu | see (page 68-69) |
| **INT.FACE** | ↵ | Interface Menu | see (page 69-70) |
| **PROTECT** | ↵ | Protection Menu | see (page 70) |

**Basic Menu "BASIC"**

| Topic | | Selection | | Selection | Remark | Description |
|---|---|---|---|---|---|---|
| **DATE** | ↵ | 01.01.12 | | | | see (page 25) |
| **TIME** | ↵ | **+1H** | | | 🏭 | see (page 25) |
| | | **-1H** | | | | |
| | | **SET.TIME** | ↵ | 12:00 | | |
| **1/10 D** | ↵ | **OFF** | | | 🏭 ⦿ | see (page 25) |
| | | **ON** | | | | |
| **UNIT 1** | ↵ | **g** | | | 🏭 ⓘ ⦿ | see (page 25) |
| | | ¦ | | | | |
| | | **kg** | | | | |
| **UNIT 2** | ↵ | **g** | | | ⓘ | see (page 26) |
| | | ¦ | | | | |
| | | **mg** | | | | |
| **SET ID** | ↵ | | | | | see (page 26) |
| **PRT.MENU** | ↵ | | | | ◇ | see (page 26) |
| **RESET** | ↵ | **NO ?** | | | | see (page 26) |
| | | **YES ?** | | | | |

**Advanced Menu "ADVANCE."**

| Topic | | Selection | | Selection | Remark | Description |
|---|---|---|---|---|---|---|
| **ENVIRON.** | ↵ | **STD.** | | | 🏭 | see (page 27) |
| | | **UNSTAB.** | | | | |
| | | **STABLE** | | | | |
| **CAL** | ↵ | **ADJ.OFF** | | | | see (page 27) |
| | | **ADJ.EXT** | ↵ | e.g. 200.00 g | 🏭 | |
| **DATE.FRM** | ↵ | **DD.MM.Y** | | | 🏭 | see (page 27) |
| | | **MM/DD/Y** | | | | |
| | | **Y-MM-DD** | | | | |
| | | **D.MMM Y** | | | | |
| | | **MMM D Y** | | | | |

| Topic | | Selection | | Selection | Remark | Description |
|---|---|---|---|---|---|---|
| **TIME.FRM** | ↵ | **24:MM** | | | | see (page 27) |
| | | **12:MM** | | | | |
| | | **24.MM** | | | | |
| | | **12.MM** | | | | |
| **RECALL** | ↵ | **OFF** | | | | see (page 28) |
| | | **ON** | | | | |
| **STANDBY** | ↵ | **A.ON** | ↵ | …60 min… | | see (page 28) |
| | | **A.OFF** | | | | |
| **B.LIGHT** | ↵ | **B.L.ON** | | | | see (page 28) |
| | | **B.L.OFF** | | | | |
| **A.ZERO** | ↵ | **ON** | | | ⊙ | see (page 28) |
| | | **OFF** | | | | |
| **SRV.ICON** | ↵ | **ON** | | | | see (page 28) |
| | | **OFF** | | | | |
| **SRV.D.RST** | ↵ | **NO**? | | | | see (page 28) |
| | | **YES**? | | | | |

**Interface Menu "INT.FACE"**

| Topic | | Selection | | Selection | Remark | Description |
|---|---|---|---|---|---|---|
| **RS232** | ↵ | **PRINTER** | ↵ | **PRT.STAB** | | see (page 29) |
| | | | | **PRT.AUTO** | | |
| | | | | **PRT.ALL** | | |
| | | **PC-DIR.** | ↵ | **PRT.STAB** | | |
| | | | | **PRT.AUTO** | | |
| | | | | **PRT.ALL** | | |
| | | **HOST** | ↵ | **SND.OFF** | | |
| | | | | **SND.STB** | | |
| | | | | **SND.CONT** | | |
| | | | | **SND.AUTO** | | |
| | | | | **SND.ALL** | | |
| | | **2.DISP** | ↵ | | | |
| **HEADER** | ↵ | **NO** | | | ◇ | see (page 30) |
| | | **DAT/TIM** | | | | |
| | | **D/T/BAL** | | | | |
| **SINGLE** | ↵ | **NET** | | | ◇ | see (page 30) |
| | | **G/T/N** | | | | |
| **SIGN.L** | ↵ | **OFF** | | | ◇ | see (page 30) |
| | | **ON** | | | | |
| **LN.FEED** | ↵ | **00** | | | ◇ | see (page 30) |

| Topic | | Selection | | Selection | Remark | Description |
|---|---|---|---|---|---|---|
| **ZERO.PRT** | ↵ | **OFF** | | | | see (page 30) |
| | | **ON** | | | | |
| **COM.SET** | ↵ | **MT-SICS** | | | | see (page 30-31) |
| | | **SART** | | | | |
| **BAUD** | ↵ | **9600** | | 600…3840-0 | | see (page 31) |
| | | ¦ | | | | |
| | | **4800** | | | | |
| **BIT.PAR.** | ↵ | **8/NO** | | | | see (page 31) |
| | | **7/NO** | | | | |
| | | **7/MARK** | | | | |
| | | **7/SPACE** | | | | |
| | | **7/EVEN** | | | | |
| | | **7/ODD** | | | | |
| **STOPBIT** | ↵ | **1 BIT** | | | | see (page 32) |
| | | **2 BITS** | | | | |
| **HD.SHK** | ↵ | **XON.XOFF** | | | | see (page 32) |
| | | **RTS.CTS** | | | | |
| | | **OFF** | | | | |
| **RS.TX.E.O.L.** | ↵ | **CR LF** | | | | see (page 32) |
| | | **CR** | | | | |
| | | **LF** | | | | |
| | | **TAB** | | | ◇ | |
| **RS.CHAR** | ↵ | **IBM.DOS** | | | | see (page 32) |
| | | **ANSI.WIN** | | | | |
| **INTERVL.** | ↵ | **00000** | | | | see (page 32) |

**Protection Menu "PROTECT"**

| Topic | | Selection | | Selection | Remark | Description |
|---|---|---|---|---|---|---|
| **PROTECT** | ↵ | **OFF** | | | | see (page 25) |
| | | **ON** | | | | |

**Legend**

- Factory setting
- ⓘ Only those weight units allowed by the appropriate national legislation are selectable
- ⊙ Not available with approved models
- ◉ Not available with approved models with e = d
- Settings are automatically set for the 2nd display
- ◇ Only visible if "**PRINTER**" is selected.

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

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

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

# Index

## GWP®

Good Weighing Practice™

GWP® is the global weighing standard, ensuring consistent accuracy of weighing processes, applicable to all equipment from any manufacturer. It helps to:

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

**www.mt.com/GWP**

**www.mt.com/precision-balances**

For more information

**Mettler-Toledo AG, Laboratory Weighing**
CH-8606 Greifensee, Switzerland
Tel. +41 (0)44 944 22 11
Fax +41 (0)44 944 30 60
www.mt.com


30130514A en