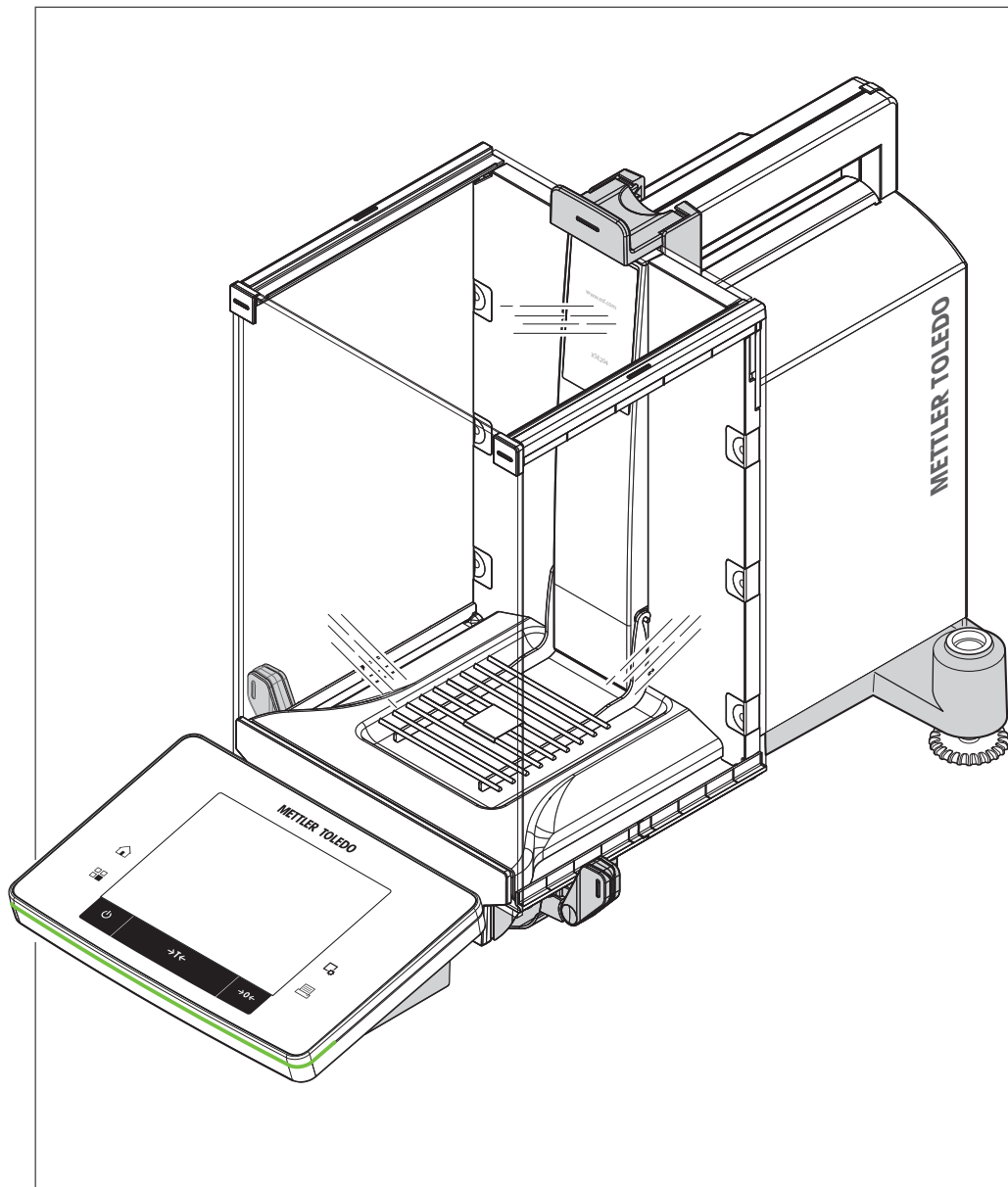


# Analytical Balances

XSE models



**METTLER TOLEDO**



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# 1 Introduction

Thank you for choosing a METTLER TOLEDO balance.

The balances offers numerous weighing and adjustment options with exceptional operating convenience.

The different models have different characteristics regarding equipment and performance. Special notes in the text indicate where this makes a difference to operation.

METTLER TOLEDO is a leading manufacturer of balances for laboratory and production use as well as analytical measuring instruments. A globally present customer service network with highly trained personnel is always available to assist with the selection of accessories or provide advice on the optimal use of the balance.

The balance conforms to current standards and directives. It supports requirements, work techniques and protocols as specified by all international quality assurance systems, e.g. GLP (Good Laboratory Practice), GMP (Good Manufacturing Practice). The balance has a CE Declaration of Conformity and METTLER TOLEDO, as the manufacturer, is certified to ISO 9001 and ISO 14001. This provides the assurance that your capital investment is protected in the long term by high product quality and a comprehensive service package (repairs, maintenance, servicing, adjustment service).


## Finding more information

► [www.mt.com/xse-analytical](http://www.mt.com/xse-analytical)

## Software version

The operating instructions are based on the initially installed terminal firmware (software) version V 2.20.

## 1.1 Conventions and symbols used in these operating instructions

Key and button designations are shown in graphic or text form in square brackets (e.g. [] or [**Define**]).

These symbols indicate an instruction:

▪ prerequisites

1 steps

2 ...

⇒ results



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



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

## 2 Safety Information

- Read and understand the instructions in this manual before you use the balance.
- Keep this manual for future reference.
- Include this manual if you pass on the balance to other parties.

If the balance is not used according to the instructions in this manual or if it is modified, the safety of the user may be impaired and Mettler-Toledo GmbH assumes no liability.

### 2.1 Definition of signal words and warning symbols

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

#### Signal words

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

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

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

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

#### Warning symbols



General hazard



Electrical shock

### 2.2 Product specific safety notes

Your balance represents state-of-the-art technology and complies with all recognized safety rules, however, certain hazards may arise in extraneous circumstances. Do not open the housing of the balance; it does not contain any parts that can be maintained, repaired or replaced by the user. If you experience problems with your balance, contact your authorized METTLER TOLEDO dealer or service representative.

The balance has been tested for the experiments and intended purposes documented in the appropriate manual. However, this does not absolve you from the responsibility of performing your own tests of the products supplied by us regarding their suitability for the methods and purposes you intend to use them for.

#### Intended use

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

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

#### Site requirements

The balance has been developed for indoor operation in a well-ventilated area. Avoid the following environmental influences:

- Conditions outside of the ambient conditions specified in the technical data
- Powerful vibrations
- Direct sunlight
- Corrosive gas atmosphere
- Explosive atmosphere of gases, steam, fog, dust and flammable dust

- Powerful electric or magnetic fields

### Staff qualification

Incorrect use of the balance or the chemicals used in the analysis can lead to death or injury. The following experience is needed for operating the balance.

- Knowledge and experience in working with toxic and caustic substances.
- Knowledge and experience in working with standard laboratory equipment.
- Knowledge and experience in working in accordance with general lab safety rules.

### Responsibilities of the balance owner

The balance owner is the person that uses the balance for commercial use or places the balance at the disposal of his staff. The balance owner is responsible for product safety and the safety of staff, user(s) and third party.

The operator has the following responsibilities:

- Know the rules for safety at the workplace that are in effect and enforce them.
- Ensure that only qualified staff uses the balance.
- Define the responsibilities for installation, operation, cleaning, troubleshooting and maintenance and ensure that the tasks are done.
- Train the staff in regular intervals and inform them about dangers.
- Provide the necessary protective gear for the staff.

### Shut down of the balance in emergency situations

- Pull the plug from the electrical outlet.

### Protective clothing

Wear protective clothing in the laboratory when working with hazardous or toxic substances.



Use appropriate gloves when handling chemicals or hazardous substances and check their integrity before use.

### Safety notes



#### **⚠ WARNING**

#### **Danger of death or serious injury due to electric shock!**

Contact with parts that contain a live current can lead to injury and death. If the balance cannot be shut down in an emergency situations, people can be injured or the balance can be damaged.

- 1 Only use the supplied three-core power cable with equipment grounding conductor to connect your balance.
- 2 Check that the voltage printed on it is the same as your local power supply voltage.
  - ⇒ If this is not the case, under no circumstances connect the AC adapter to the power supply, but contact a METTLER TOLEDO representative.
- 3 Only connect the balance to a three-pin power socket with earthing contact.
- 4 Only standardized extension cable with equipment grounding conductor must be used for operation of the balance.
- 5 Do not disconnection the equipment grounding conductor.
- 6 Check the cables and the plug for damage and replace damaged cables and plugs.
- 7 Make sure that the cables are arranged so that they cannot be damaged or interfere with the operation.
- 8 Keep all electrical cables and connections away from liquids.
- 9 Make sure that the power plug is accessible at all times.



## NOTICE

### Environment

Only use indoors in dry locations.



## NOTICE

### Danger of damaging the touch screen with pointed or sharp objects!

Do not use pointed or sharp objects to navigate on the touch screen. This may damage the surface of the touch screen.

- Operate the touch screen with your fingers.



## NOTICE

### Danger of damage to the balance!

Never open the balance. The balance contains no user-serviceable parts.

- In the event of problems, please contact a METTLER TOLEDO representative.



## NOTICE

### Danger of damage to the balance due to incorrect parts!

Using incorrect parts with the balance can damage the balance or cause the balance to malfunction.

- Only use parts supplied with the balance, listed accessories and spare parts from Mettler-Toledo GmbH.

### Finding more information



Refers to an external document.

### FCC Rules

This device complies with Industry Canada licence-exempt RSS standard(s) and part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

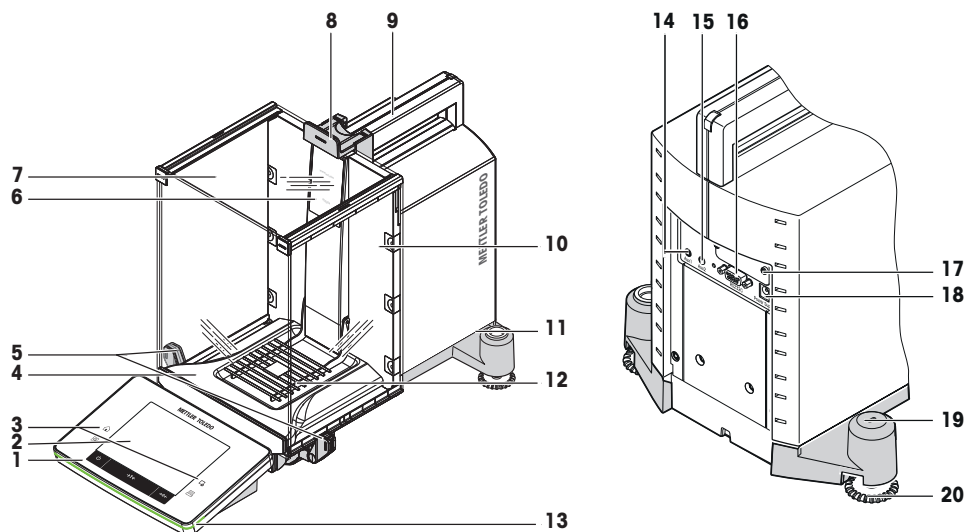
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## 3 Design and Function

### 3.1 Overview

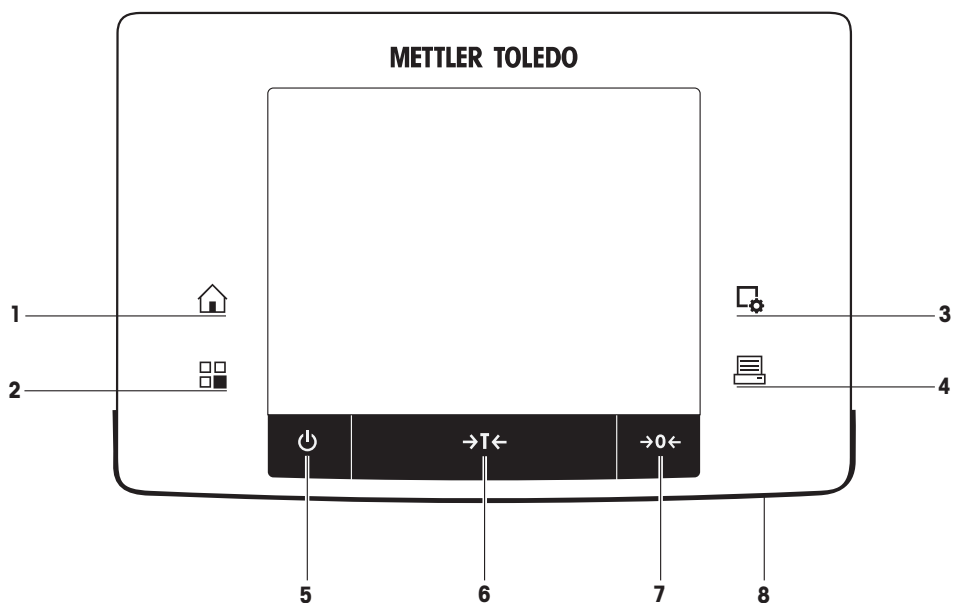
#### 3.1.1 Balance










#### Legend

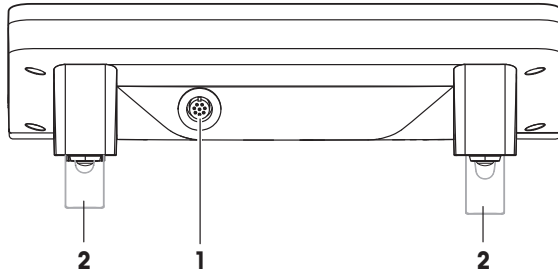
<b>1</b>	Terminal	<b>2</b>	Display ("Touch screen")
<b>3</b>	Operating keys	<b>4</b>	Drip tray
<b>5</b>	Handle for operating the draft shield side doors	<b>6</b>	Type designation
<b>7</b>	Glass draft shield	<b>8</b>	Handle for operation of the top draft shield door
<b>9</b>	Guide for top draft shield door and transport handle	<b>10</b>	Removable clips for feeding cables or tubes
<b>11</b>	Level indicator/Level sensor	<b>12</b>	SmartGrid weighing pan
<b>13</b>	StatusLight	<b>14</b>	Aux 1 (connection for "ErgoSens", hand or foot switch)
<b>15</b>	Aux 2 (connection for "ErgoSens", hand or foot switch)	<b>16</b>	RS232C serial interface
<b>17</b>	Slot for second interface (optional)	<b>18</b>	Socket for AC adapter
<b>19</b>	Fastening point for anti-theft device	<b>20</b>	Foot screw

### 3.1.2 Terminal



Key assignments and terminal connection.

		Designation	Explanation
1		Home	This key is used to return to the user profile from any menu level in any application. All changes made and confirmed up to this point are automatically stored.
2		Select application	This key is used to select a required application.
3		Configuration	For displaying menus for the configuration of a current application. The application can be adjusted to a specific task via numerous settings.
4		Print	This key is used to transfer data via the interface, e.g. to a printer. Other devices, e.g. a PC can also be connected. The data to be transferred can be freely defined.
5		On/Off	For switching the balance on and off (standby mode). <b>Important</b> It is recommended not to disconnect the balance from the power supply unless it is not used for an extended period.
6		Tare	This key is used to tare the balance manually (only necessary for normal weighings). When the balance has been tared, the <b>Net</b> symbol is displayed to indicate that all displayed weights are net.
7		Zeroing	This key is used for setting a new zero point manually (only required if the balance is used for normal weighings).
8		StatusLight	Indicates the current balance status. The status light shows that the balance is ready to use.



1	System connection (terminal cable)	2	Height adjustable feet
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## 3.2 User interface

### 3.2.1 Display



#### NOTICE

##### **Danger of damaging the touch screen with pointed or sharp objects!**

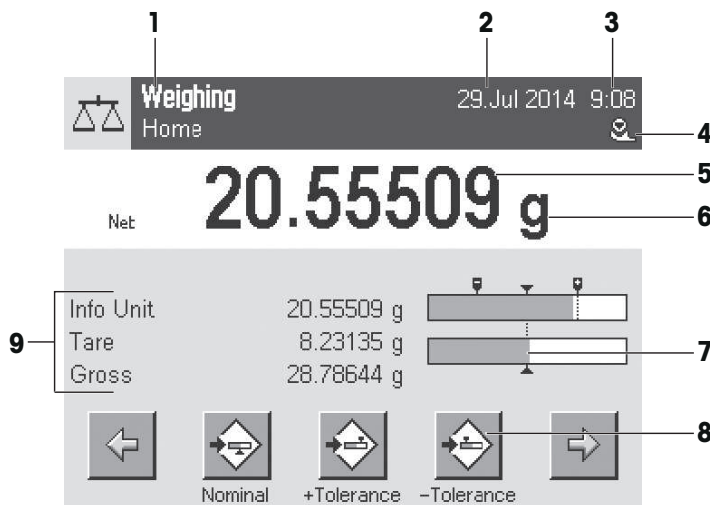
Do not use pointed or sharp objects to navigate on the touch screen. This may damage the surface of the touch screen.

- Operate the touch screen with your fingers.

The illuminated, color display of the terminal is a touch screen, i.e. a touch-sensitive screen. It can be used for displaying data, entering settings and selecting functions by tapping the screen.

#### Important

Depending on country-specific requirements, non-calibrated decimal places are highlighted on approved balances.



Designation	Explanation
<b>1</b> Application name	Select application. The application menu can be selected by touching this zone. The application can be selected here. This menu can also be displayed by pressing [Menu].
<b>2</b> Date	The date can be changed by tapping this zone.
<b>3</b> Time	The time can be changed by tapping this zone.
<b>4</b> Status icons	These status icons indicate special balance statuses (e.g. service due, adjustment required, battery replacement, out of level). If you tap the icon, the function is explained.

5	Weight value	Tapping the weight displays a window showing the result in a large format. This is useful for reading a weight from a certain distance.
6	Weighing unit	The required weighing unit can be changed by tapping the weighing unit, e.g. from <b>mg</b> to <b>g</b> .
7	SmartTrac	SmartTrac is a graphic weighing-in aid, which shows at a glance an already used and still available weighing range.
8	Function keys	This area is reserved for <b>Function Keys</b> enabling direct access to frequently required functions and application settings. If more than 5 function keys are activated, these can be selected with the arrow keys.
9	Information fields	This area is used for displaying additional information ( <b>information fields</b> ) relating to an active application. Tapping the information field enables <b>Information fields</b> and <b>Function Keys</b> to be displayed directly via menu selection. The leveling assistant can also be started.

### Large display

By pressing the function key [**Display**], the weighing result can be displayed larger and still allow the use of the terminal function keys.

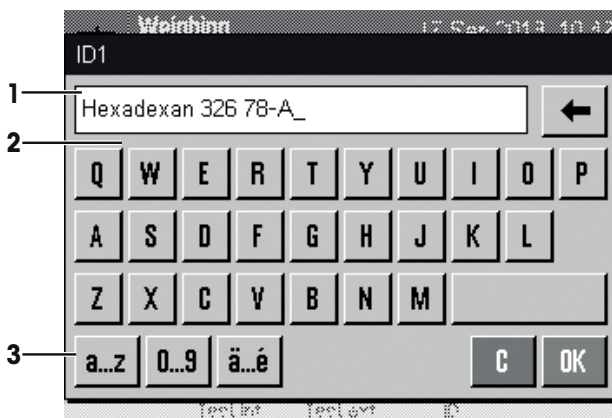


### Screen saver

If the balance is not used for 15 minutes, the display is automatically dimmed and the pixels are inverted about every 15 seconds. When the balance is used again (e.g. load weight, press key), the display returns to a normal state.

## 3.2.2 Input dialog boxes

The keyboard dialog box is used to enter characters such as letters, numbers and special characters.




	Designation	Explanation
1	Data field	Displays (entered) alphanumeric and numeric characters.



<b>2</b>	Keyboard	Data input area
<b>3</b>	Selection	Select various keyboard layouts.

- 1 Enter the designation.
- 2 Confirm with **[OK]**.

	Function
	Delete last character Tap once to place the cursor at the end of the data field.

### 3.2.3 Firmware

The firmware controls all balance functions. It enables the balance to be adjusted to a specific working environment.


The firmware is divided as follows:

- System settings
- User-specific settings
- Applications
- Application-specific settings

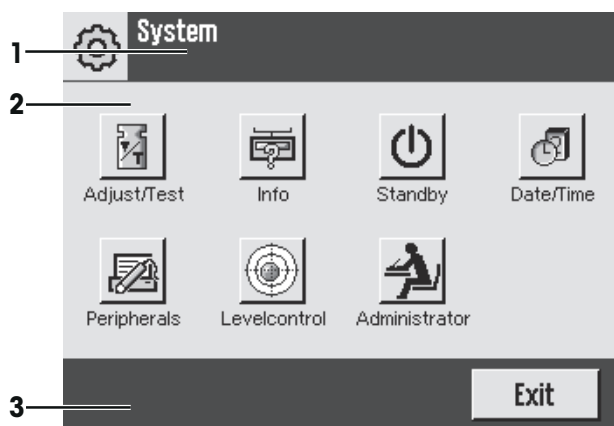
#### Note

A displayed menu can be left at any time by repressing the same menu key.

#### 3.2.3.1 System settings

System settings (e.g. settings for peripheral devices) are independent of the applications and apply to the entire weighing system. System settings can be displayed by pressing  and subsequently the **[System]** button.

Navigation:  > **System**



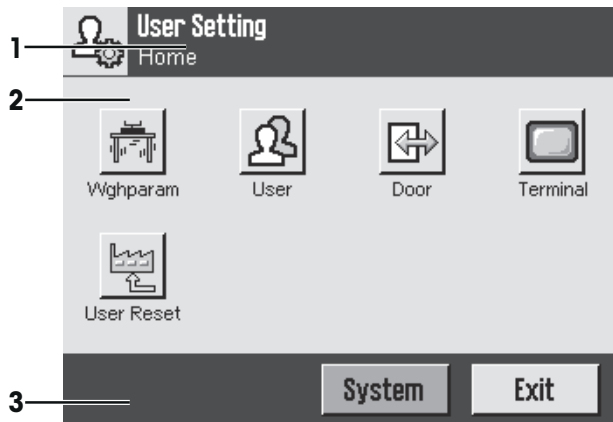
	Designation	Explanation
<b>1</b>	Title bar	The title bar displays elements for user orientation and information.
<b>2</b>	Contents area	The contents area is the main work area for menus and applications. The contents depend on the specific application or initiated action.
<b>3</b>	Action bar	The action bar contains action buttons for performing specific actions required in the active dialog box and are available (e.g. <b>[Exit]</b> , <b>[STD]</b> , <b>[C]</b> , <b>[OK]</b> ).

- 1 Settings can be changed by tapping the respective button.
- 2 To leave the settings, tap **[Exit]**.

#### 3.2.3.2 User-specific settings

These settings can be used to adjust the balance to suit the tasks and work techniques of user.

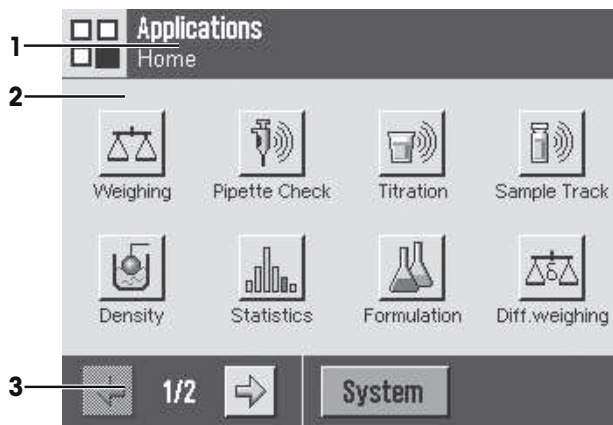
Navigation: [F4] > [System] > [User Setting]



### Applications

Applications are firmware modules for performing specific weighing tasks. The balance is delivered with various applications pre-installed. After switching on the balance, the last active user profile and last used application are loaded. The applications are available under the [F4] key. Instructions for working with standard applications are provided in the respective sections.

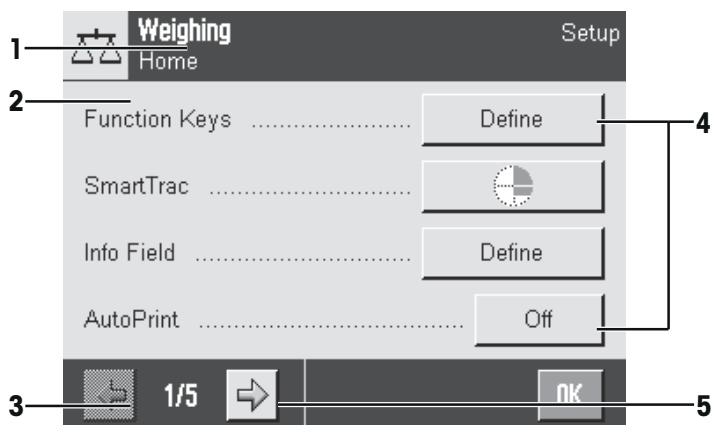
Navigation: [F4]



### Application-specific settings

These settings can be used to adjust the applications to suit specific requirements. The available setting options depend on the selected application. Pressing the [F5] key opens the multipage menu with settings for a currently active application. Information on the individual setting options is provided in the section relating to the respective application.

Navigation: [F5]



	Designation	Explanation
1	Title bar	The title bar displays elements for user orientation and information.
2	Contents area	The contents area is the main work area for menus and applications. The contents depend on the specific application or initiated action.
3	Action bar	The action bar contains action buttons for performing specific actions required in the active dialog box and are available (e.g. [ <b>Exit</b> ], [ <b>STD</b> ], [ <b>C</b> ], [ <b>OK</b> ]).
4	Button	Edit/Select settings (e.g. [ <b>Define</b> ], [ <b>On</b> ], [ <b>Off</b> ]). The contents depend on the application.
5	Arrow	The arrow buttons are used to page forward or back.

1 Settings can be changed by tapping the respective button.

2 Confirm with [**OK**].

3 To leave the settings, select [**Exit**].

4 To change the system settings, tap [**System**].

### 3.2.4 Security system



#### NOTICE

##### Remember IDs and passwords!

Protected menu areas cannot be accessed without ID or password.

- Note IDs and passwords and keep them in a safe place.

The balance has a comprehensive security system with which individual access rights can be defined at administrator and user level. Access to protected menu areas requires the entry of an identification (ID) and a password. On delivery of the balance, only the [**Administrator**] settings in the system settings are protected.

When an ID and password protected menu area is selected, an alphanumeric keyboard is initially displayed for entry of the ID.

1 Enter your ID.

- Case sensitive, tap the [**a...z**] and [**A...Z**] button to switch between upper and lower case.

- To enter numbers, tap the [**0...9**] button.

- Incorrect entries can be deleted character by character with the arrow key .

##### Note

Entry can be interrupted at any time by tapping [**C**].

2 After entering the full ID, tap [**OK**].

⇒ A further dialog box is displayed for entering the password.

3 Enter the password (for security reasons, this is displayed with asterisks instead of plain text) and confirm with [**OK**].

⇒ If the ID and password are correct, the selected menu area is displayed or the required action initiated. If these are incorrect, an error message is displayed with a request to enter them again.

## 4 Installation and Putting into Operation

### 4.1 Unpacking

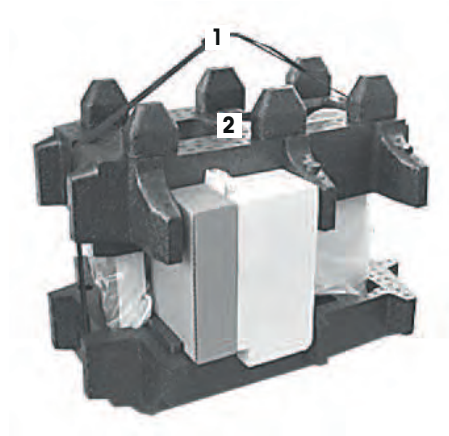
Open the balance packaging. Check the balance for transport damage. Immediately inform a METTLER TOLEDO representative in the event of complaints or missing accessories.

#### Important

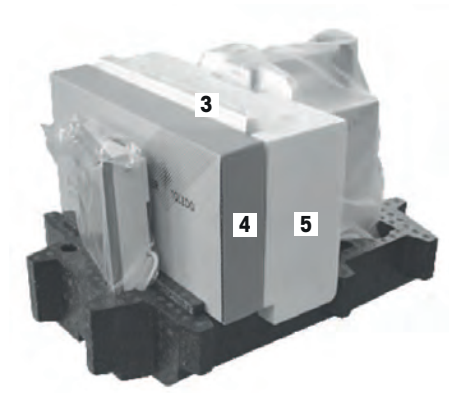
Retain all parts of the packaging. This packaging offers the best possible protection for transporting the balance.

- Use the lifting strap to lift the balance out of the packaging box.

- 1 Remove the lifting strap (1).
- 2 Remove the top packaging (2).



- 1 Remove the operating instructions (3).
- 2 Remove the set with AC adapter (4), power supply cable, drip tray, SmartGrid, SmartGrid cover, SmartPrep single-use funnel and ErgoClip "Basket" (basket for small weighing objects).
- 3 Remove the set with draft shield doors (5) and terminal support.



- 1 Carefully remove the terminal (6) from the bottom packaging.
- 2 Remove the protective cover.

**Note**

Since the terminal is connected to the balance with a cable, only withdraw the balance slightly from the packaging in order to remove the protective cover.



- 1 Place the terminal (6) at the front of the balance.
- 2 Hold the balance (7) by the guide or handle. Hold the terminal firmly with the other hand. Pull out both components together from the bottom packaging (8).



- 1 Place the balance with the terminal at the site of use.
- 2 Remove the cover from the balance.
- 3 Remove the transport protection (9) of the weighing pan support.



## 4.2 Scope of delivery



### NOTICE

**Danger of damage to the balance due to incorrect parts!**

Using incorrect parts with the balance can damage the balance or cause the balance to malfunction.

- Only use parts supplied with the balance, listed accessories and spare parts from Mettler-Toledo GmbH.

Check the delivery for completeness. The following accessories are part of the standard equipment of the balance:

- Balance with terminal

- RS232C interface
- Slot for second interface (optional)
- Feedthroughs for below-the-balance weighing and for anti-theft device
- Set with draft-shield doors and terminal support
- SmartGrid
- SmartGrid cover, chromium-nickel steel
- SmartPrep single-use funnel (2 pieces)
- Drip tray
- AC adapter with country-specific power cable
- Protective cover for the terminal
- Cleaning brush
- ErgoClip "Basket" (basket for small weighing objects)
- Production certificate
- CE declaration of conformity
- Operating instructions or User Manual; printed or on CD-ROM, depending on country of use

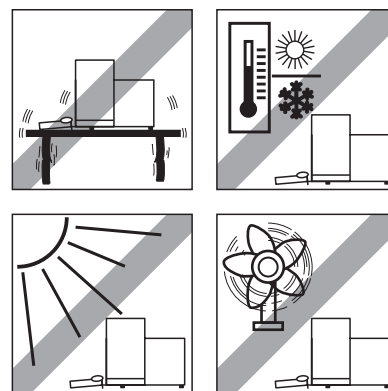
### 4.3 Selecting the location

An optimal location will ensure accurate and reliable operation of the balance. The surface must be able to safely take the weight of the balance when fully loaded. The following local conditions must be observed:

#### Important

If the balance is not horizontal at the outset, it must be leveled during commissioning.

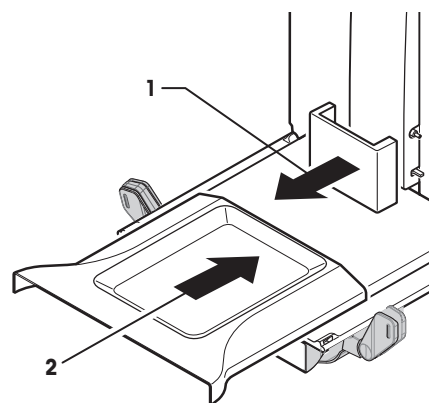
- The balance must only be used indoors and up to a maximum altitude of 4,000 m above sea level.
- Before switching on the balance, wait until all parts are at room temperature (+5 to 40 °C).  
The humidity must be between 10% and 80% non-condensing.
- The power plug must be accessible at all times.
- Firm, horizontal and vibration-free location.
- Avoid direct sunlight.
- No excessive temperature fluctuations.
- No strong drafts.



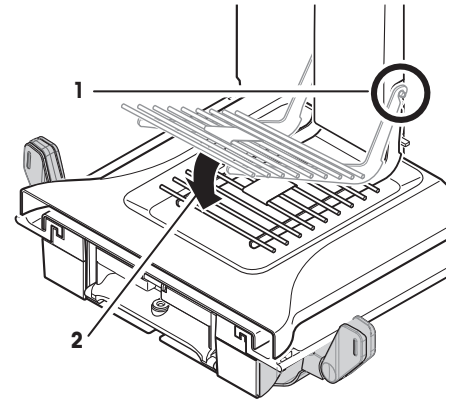
Further information can be found in Weighing the Right Way.

### 4.4 Assembling the balance

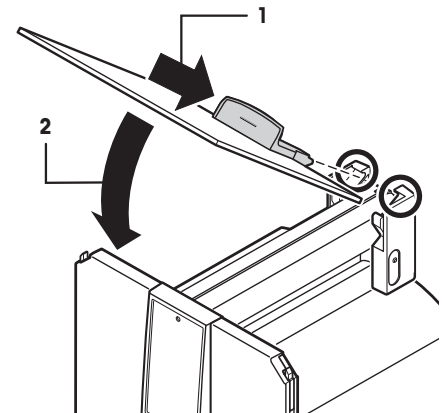
- 1 Remove the transport protection (1).
- 2 Insert the drip tray (2).  
Insert the tray from the front above the bottom plate up to the partition.



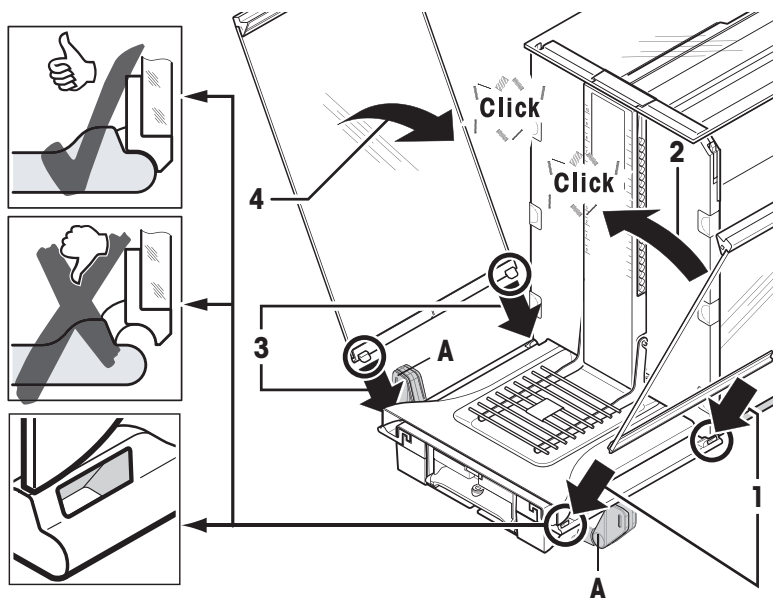
- 1 Insert the SmartGrid from the front.
- 2 Check that the SmartGrid (1) (2) is correctly hooked in on both sides.



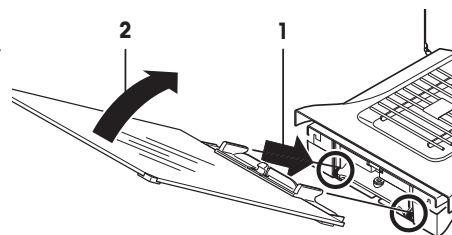
- 1 Insert the top draft shield door (1) at an angle (slightly below 30 degrees) into the **rear** guide.
- 2 Carefully fold the draft shield door (2) downwards, **see** figure.



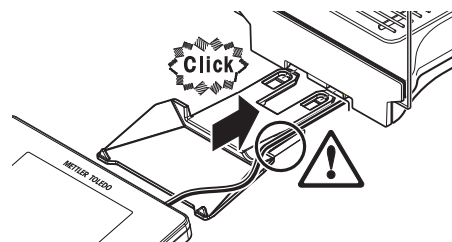
- The handles (A) must be folded outwards to mount the side draft shield doors.
- 1 Mount the draft shield side doors according to the following instructions, **see** figure below.
  - 2 Mount the side doors at an angle of about 30° in the 2 openings, **see** following figure.
  - 3 Check that the side doors are correctly mounted as described.
  - 4 Mount the side door so that it clicks in place in the balance.  
The side door will move easily when correctly mounted.
  - 5 Fold the handle of the side draft shield door inwards.
  - 6 Mount the second draft shield side door. The procedure is identical.
  - 7 Move the side doors fully back.



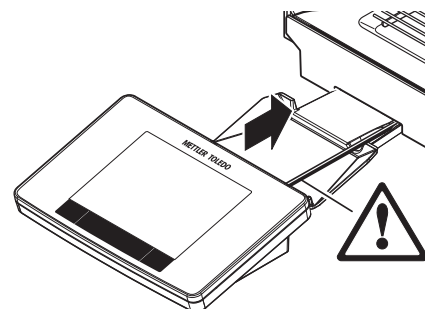
- 1 Fit the front draft shield glass (2).  
Insert the glass at an angle into the bottom of the balance at the front until the two hooks of the front draft shield glass rest on the rollers (1).
- 2 Move the front draft shield glass upwards until it engages.



- 1 Insert the terminal support.
- 2 Place the cable in the guide of the terminal support.
- 3 Insert the terminal support into the opening in the front draft shield glass.  
⇒ The terminal support must engage with a click.



- 1 Mount the terminal.
- 2 Place the terminal in the center of the support.
- 3 Push the terminal against the balance until it folds down easily at the front of the terminal support.
- 4 Insert the cable into the balance.



## NOTICE

### Danger of damage to the terminal!

The balance and terminal are not connected by the terminal support!  
– Always hold the balance and terminal firmly during transport.

### Note

The Terminal cable is of sufficient length to allow repositioning of the terminal in the area around the balance.



## 4.5 Connecting the balance



### **WARNING**

#### **Danger of death or serious injury due to electric shock!**

Contact with parts that contain a live current can lead to injury and death. If the balance cannot be shut down in an emergency situations, people can be injured or the balance can be damaged.

- 1 Only use the supplied three-core power cable with equipment grounding conductor to connect your balance.
- 2 Check that the voltage printed on it is the same as your local power supply voltage.
  - ⇒ If this is not the case, under no circumstances connect the AC adapter to the power supply, but contact a METTLER TOLEDO representative.
- 3 Only connect the balance to a three-pin power socket with earthing contact.
- 4 Only standardized extension cable with equipment grounding conductor must be used for operation of the balance.
- 5 Do not disconnection the equipment grounding conductor.
- 6 Check the cables and the plug for damage and replace damaged cables and plugs.
- 7 Make sure that the cables are arranged so that they cannot be damaged or interfere with the operation.
- 8 Keep all electrical cables and connections away from liquids.
- 9 Make sure that the power plug is accessible at all times.



### **NOTICE**

#### **Danger of damage to the AC adapter due to overheating!**

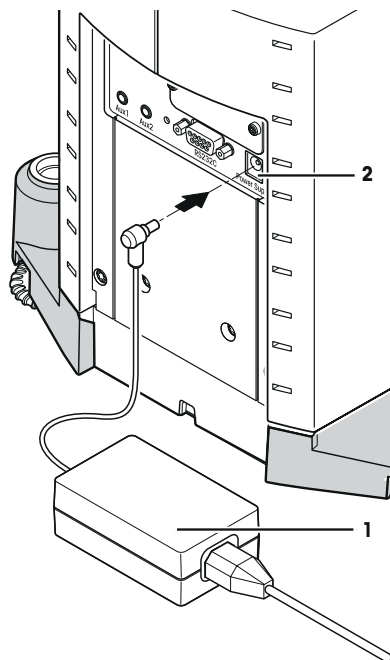
If the AC adapter is covered or in a container, it is not sufficiently cooled and overheats.

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

The balance is supplied with an AC/DC adapter and a country-specific power cable. The AC/DC adapter is suitable for use with the following voltage range:

100 – 240 V AC, 50/60 Hz.

- Balance and terminal are at the final location.
- 1 Connect the AC adapter (1) to the connection socket (2) at the rear of the balance.
- 2 Connect the AC adapter (1) to the power supply.
- ⇒ The balance performs a self-test after connection to the power supply and is then ready to use.



## 4.6 Setting up the balance

### Switching on the balance

- Balance is connected to the power supply.
- Terminal and balance are interconnected.
- To switch on, press [⏻].
- ⇒ Display appears.
- ⇒ Balance is ready to use.



### Leveling the balance

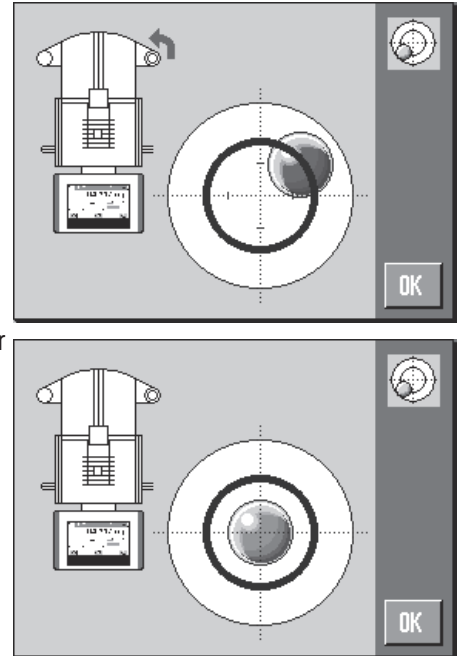
The balance has a built-in level sensor which permanently monitors correct horizontal alignment.

If the balance is not exactly level, a warning text is generated after switching on the balance with the request to level the balance.

If the level sensor detects incorrect leveling, the status light at the terminal shows red. A warning text is displayed and an audible warning generated. A status icon also appears in the top right corner of the display.



- 1 To start the leveling assistant, tap [**LevelGuide**] in the warning message.
  - ⇒ Window with level indicator is displayed in real-time.
- 2 Observe the level indicator on the screen.
  - ⇒ The air bubble in the level indicator shows red with incorrect alignment.
  - ⇒ The leveling assistant indicates with red arrows the direction in which the two foot screws at the rear of the balance must be turned.
- 3 Turn the foot screw until the air bubble is located in the inner circle of the level indicator.
  - ⇒ The air bubble in the level indicator shows green with correct alignment.
  - ⇒ The status light at the terminal shows green.
- 4 Tap [**OK**].
  - ⇒ A message recommending adjustment of the balance is displayed.
- 5 Tap [**Adjust.int**] to adjust the balance.



#### 4.6.1 Handle for operation of the side draft shield doors

The draft shield of the balance can be adjusted to the ambient conditions, weighing method and material to be weighed.

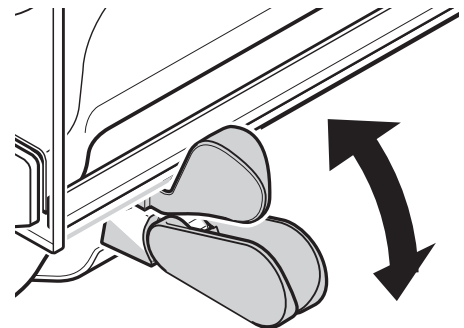
The position of the handles determines which draft shield doors (left, right or both) are opened.

Try out different combinations by moving the handles up or down. We recommend setting the glass draft shield so that only the door required for loading is opened. The balance then operates faster due to less disturbing air flows than with a fully open glass draft shield.

##### Note

It is recommended to make connections when the draft shield is closed.

- 1 Move the side door handle downwards.
- 2 Move the doors fully back.



#### 4.6.2 Performing a simple weighing

After commissioning of the new balance, the first weighing can be performed.

To perform a simple weighing, only the keys in the lower part of the terminal are required. The balance has separate keys for zeroing [**→0←**] and taring [**→T←**].

##### Zeroing

- Press [**→0←**].
- ⇒ Zeroing

After zeroing, all weights also the tare weight apply to this new zero point and the following apply: tare weight = 0, net weight = gross weight = 0.

## Taring

### Important

A negative weight is not permitted. An error message is generated. When the stability detector icon extinguishes (small ring left of the weight display), the indication is stable. The weight is displayed.

- If a weighing container is used, the balance must first be set to zero.

1 Place the container on the balance.

2 Press [**→T←**].

⇒ The balance is tared.

⇒ The weight of the container is set as the new tare weight and the previous tare (if available) is overwritten.

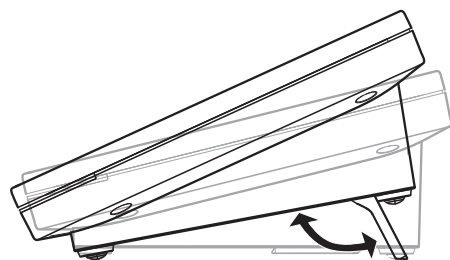
⇒ The **Net** display signals that all indicated weights are net weights.



## 4.6.3 Setting the reading angle and positioning the terminal

### 4.6.3.1 Changing the reading angle

To change the reading angle, fold out both tilting feet.



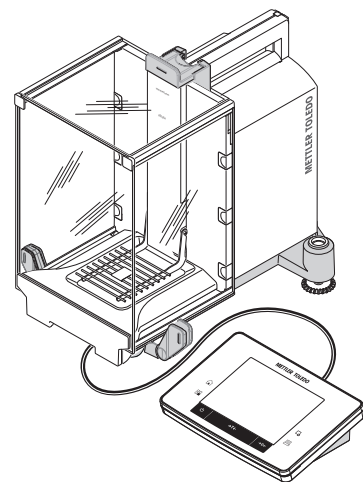
### 4.6.3.2 Place terminal separately

The terminal is connected to the balance with a cable. For ease of use, the terminal can be separated from the balance and positioned in a different location.

#### Note

The cable can also be led out from the rear of the balance. If this is more convenient, contact a METTLER TOLEDO representative who will help to modify the balance.

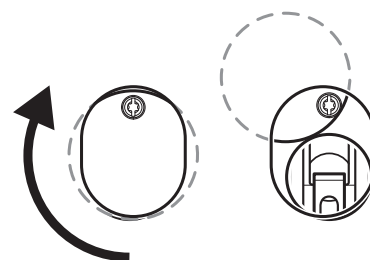
- 1 Switch off the balance with [**⏻**].
- 2 Carefully lift the terminal off the terminal support. The terminal support can be left on the balance or removed.
- 3 Carefully remove the cable from the balance if this is possible.
- 4 Position the balance in the required location.
- 5 Switch on the balance with [**⏻**].



#### 4.6.4 Below-the-balance weighing

The balance is provided with a hanger for below-the-balance weighing.

- 1 Switch off the balance with [⏻].
  - 2 Disconnect the AC adapter cable at the rear of the balance.
  - 3 Disconnect any interface cables.
  - 4 Push all glass draft shield doors back.
  - 5 Lift the terminal off the terminal support.
  - 6 Disconnect the connecting cable.
  - 7 Place the terminal at the side of the balance.
  - 8 Move the balance over the edge of the table until the opening is visible from below, **see** diagram on the left.
  - 9 Slacken the screw until the cover plate can be turned to the side and the hanger for weighing below the balance is easily accessible.
  - 10 Fix the cover plate in the new position with the screw, **see** diagram on the right.
  - 11 Move the balance back to its original position.
  - 12 Connect the terminal cable.
  - 13 Place the terminal in the terminal support.
  - 14 Move all glass draft shield doors to the front.
  - 15 Fix any interface cables.
  - 16 Plug the AC adapter into the power supply socket at the rear of the balance.
  - 17 Switch on the balance with [⏻].
- ⇒ The balance is now ready for mounting the below-the-balance weighing device.



#### 4.6.5 Mounting the ErgoClips

ErgoClips allow simple weighing directly in tare containers.

The supplied ErgoClip or an optional ErgoClip must be mounted as described below.


##### Important note

Before mounting an ErgoClip, the balance must be switched off with the [⏻] key.

If the balance is not switched off before mounting, the ProFACT function will not be activated.

##### Reason

The mounted ErgoClip causes the dead load tolerance range of the balance to be exceeded. As a result, the balance does not activate ProFACT so as not to interrupt an assumed weighing process.

When the  status icon is displayed, this means that: "The balance needs to activate ProFACT", but cannot.

- 1 Switch off the balance with [⏻].
- 2 Remove the SmartGrid from the balance.
- 3 Snap the ErgoClip on to the SmartGrid.
- 4 Place the SmartGrid with mounted ErgoClip on the balance.  
An optional "Flask" or "Tube" ErgoClip can be used.
- 5 Switch on the balance with [⏻].



## 4.6.6 Fitting the SmartGrid cover

For standard operation with conventional tare containers, we do not recommend using this weighing pan. Its use may affect the stabilization time and degree of accuracy. The listed specifications are reached without a SmartGrid cover.



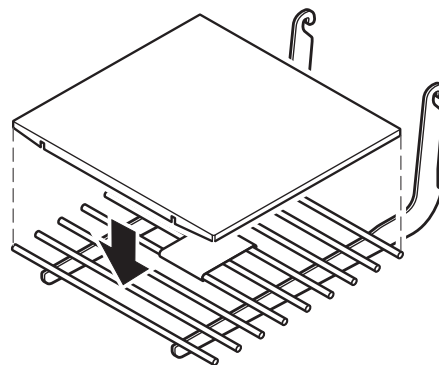
### NOTICE

#### Risk of and injuries!

Take care when handling the SmartGrid cover, the corners and edges are extremely sharp!  
– Gloves must be worn.

To fit the SmartGrid cover, remove the SmartGrid from the weighing chamber.

- 1 Remove the SmartGrid from the balance.
- 2 Gently press the SmartGrid cover on to the SmartGrid.
- 3 Place the SmartGrid with fitted SmartGrid cover on the balance.



## 4.7 Transporting the balance

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

### Switching off the balance

- 1 Press and hold [⏻] until **Off** appears in the display.
- 2 Disconnect the balance from the power supply.
- 3 Disconnect all interface cables.



### 4.7.1 Transport over short distances

To move the balance over a short distance to a new location, follow the instructions below.



### NOTICE

#### Danger of damage to the glass draft shield!

Glass parts of the balance can be damaged.  
– Never lift the balance by the glass draft shield.

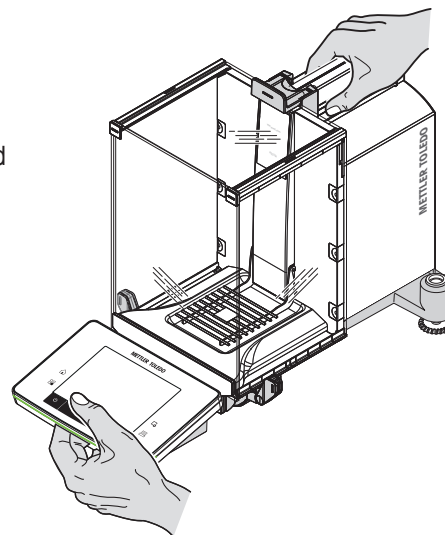


### NOTICE

#### Danger of damage to the terminal!

The balance and terminal are not connected by the terminal support!  
– Always hold the balance and terminal firmly during transport.

- 1 Hold the balance by the guide for the top draft shield door with one hand.
- 2 Hold the terminal with the other hand.  
Since the terminal is not permanently connected to the balance, both the balance and terminal must always be held with one hand.
- 3 Carefully lift the balance and carry it to its new location. **See** [Selecting the location ► Page 20].

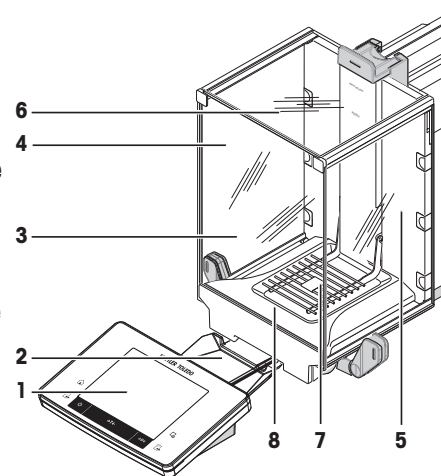


#### 4.7.2 Transport over long distances

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

##### Remove the following parts

- 1 Lift the terminal (1) out of the terminal support and place it next to the support.
- 2 Remove the terminal support (2) from the balance.
- 3 Tilt the draft shield front glass (3) away from the balance.
- 4 Carefully move the draft shield side doors (4+5) towards the respective handle and remove the side doors from the guide.
- 5 Lift the front of the top draft shield door (6) and remove it from the guide.
- 6 Carefully lift the front of the SmartGrid (7) and lift it out of the guide.
- 7 Remove the drip tray (8).

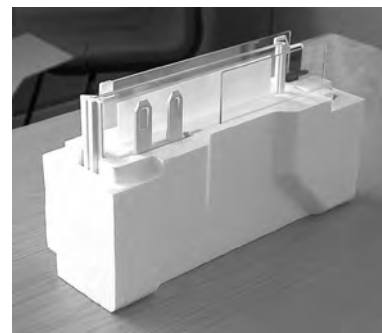


##### Pack the draft shield glass panels and terminal support (Item 2-6).

- Place these parts in the compartments provided in the original packaging.

##### Note

It is recommended to place paper between the side draft shield glass panels.



### Pack the AC adapter, power cord and individual components (Item 7+8)

- 1 Place the AC adapter and power cord in the packaging.
- 2 Place the drip tray (8) upside down in the packaging.
- 3 Place the SmartGrid (7) upside down on the drip tray.
- 4 Place the ErgoClip "Basket" in the packaging.



### NOTICE

#### **Danger of damage the balance due to improper packaging!**

Follow the instructions below to avoid damaging the balance or terminal when placing in the packaging.

- 1 Slide the transport protection along the weighing pan guide.
- 2 Move the guide of the top draft shield door to the front.
- 3 Move the handles for the draft shield side doors upwards and slide the doors to the front.



#### **Note**

The protective covers supplied with the balance and terminal can be used for packing. These are not shown in the diagrams in order to illustrate how the individual components must be positioned. The use of these protective covers is recommended.

- 1 Place the terminal on the balance, **see** diagram.
- 2 Carefully place the balance in the bottom packaging.

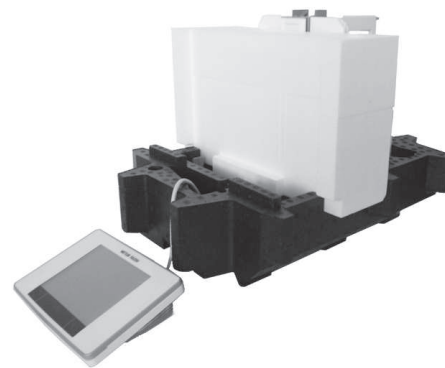


- Remove the terminal and place it in front of the packaging on the table.

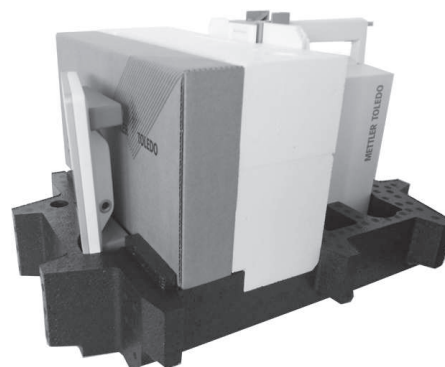




- Place the packaging set with the draft shield glass panels in the packaging, **see** diagram.



- 1 Place the set with the AC adapter in front of the set with draft shield glass panels.
- 2 Place the terminal in the packaging as illustrated.




- 1 Place the top packaging in position.
  - ⇒ Ensure that the packaging is correctly positioned.
- 2 Place the lifting strap around both parts of the packaging, **see** diagram.
- 3 Tighten the strap around the packaging.
  - ⇒ Lift the packed balance by the lifting strap and place in the transport box.





## 5 System Settings

**Navigation:**  > **[System]**

This section describes the procedure for adapting the weighing system to suit specific requirements. The system settings apply to the entire weighing system and therefore to all applications.

- The system settings can be displayed by pressing  and subsequently the **[System]** button.
  - ⇒ The **[System]** window is displayed.





### Printing all System settings






- A printer is connected and activated.
- If you are in the root of the **System** settings, press .
- The detail of the protocol depends on the point at which printout is activated in the system settings. When  is pressed in the uppermost level of the system settings, all system settings are recorded. If printing is started in the **[Peripherals]** submenu for example, only the settings for the peripheral devices are recorded.
- The **Test/Adj. Weights**, **Test Sequences** and **Tasks** submenus in the **[Adjust/Test]** menu must be printed separately.

### Example: Printout

System		Autom. ext. Adjust.		Test History	
Adjust/Test		Autom. ext. Adjust.		Adj. History	
ProFACT	On	Weekdays		Adj. History Selection	
ProFACT		Monday	x	Selection	
ProFACT		Tuesday	-	Manual adjust.	x
Weekdays		Wednesday	-	Temperature	x
Monday	x	Thursday	-	Time Adjust.	x
Tuesday	x	Friday	-	Display Datasets Last 50	
Wednesday	x	Saturday	-	Protocol	
Thursday	x	Sunday	-	Date/Time	x
Friday	x	Autom. ext. Test	Off	User	x
Saturday	x	Autom. ext. Test		Balance Type	x
Sunday	x	Weekdays		SNR	x
Time 1	9:00	Monday	x	SW-Version	-
ProFACT		Tuesday	-	Balance ID	-
Time		Wednesday	-	Weight ID	-
Time 2	Off	Thursday	-	Certificate No.	
ProFACT		Friday	-		
Time		Saturday	-		
Time 3	Off	Sunday	-		
ProFACT		Time	9:00		
Time		Time			
Temp.Criterion 1 Kelvin					
Protocol Trigger	On				
Autom. ext. Adjust.	Off				

### System settings overview

	Designation	Explanation
	<b>Adjust/Test</b>	Settings for adjustment and test functions for verification of adjustments.
	<b>Info</b>	Display/printing of balance information.
	<b>Standby</b>	Settings for the standby mode.
	<b>Date/Time</b>	Entry of date and time and selection of required display formats.

	<b>Peripherals</b>	Configuration of interface for various peripheral devices.
	<b>Option</b>	Configuration of the optional interface.
	<b>Levelcontrol</b>	Settings for the built-in level sensor.
	<b>User Setting</b>	Configuration of user settings.
	<b>Administrator</b>	Configuration of the security system of the balance with allocation of access rights and passwords for weighing functions and menus.

### Menu structure

Main menu	Submenu	Further information
<b>Adjust/Test</b>	<b>Test/Adj. Weights</b>	<b>See</b> [Settings for adjustments and tests ▶ Page 35]
	<b>Test Sequences</b>	<b>See</b> [Test sequences ▶ Page 37]
	<b>Tasks</b>	<b>See</b> [Tasks ▶ Page 45]
	<b>ProFACT / int. Adj.</b>	<b>See</b> [ProFACT/int. Adjustment ▶ Page 46]
	<b>Autom. ext. Adjust.</b>	<b>See</b> [Automatic adjustment with an external test weight ▶ Page 48]
	<b>Autom. ext. Test</b>	<b>See</b> [Testing the adjustment with an external test weight ▶ Page 48]
	<b>WeightLink</b>	<b>See</b> [Test with WeightLink ▶ Page 49]
	<b>Test History</b>	<b>See</b> [Test history ▶ Page 50]
	<b>Protocol</b>	<b>See</b> [Protocol – Definition of adjustment and test reports ▶ Page 50]
<b>Info</b>	<b>Balance ID</b>	<b>See</b> [Info ▶ Page 51]
	<b>Info</b>	
<b>Standby</b>	<b>Standby</b>	<b>See</b> [Standby ▶ Page 51]
<b>Date/Time</b>	<b>Date Format</b>	<b>See</b> [Date/Time ▶ Page 52]
	<b>Date</b>	
	<b>Time Format</b>	
	<b>Time</b>	
<b>Peripherals</b>	<b>Printer</b>	<b>See</b> [Peripherals ▶ Page 52]
	<b>Host</b>	
	<b>LabX</b>	
	<b>LabX Controlled Device</b>	
	<b>Secondary Display</b>	
	<b>Bar Code</b>	
	<b>RFID / Quantos</b>	
	<b>Label Printer</b>	

<b>Option</b>	<b>DHCP</b>	<b>See</b> [Option ▶ Page 54]
	<b>IP-Address</b>	
	<b>Subnet Mask</b>	
	<b>Standard Gateway</b>	
	<b>Domain Name Server</b>	
	<b>Hostname</b>	
<b>Levelcontrol</b>	<b>Off</b>	<b>See</b> [Level sensor ▶ Page 55]
	<b>Levelcontrol</b>	
<b>User Setting</b>	<b>Wghparam</b>	<b>See</b> [User settings ▶ Page 55]
	<b>User</b>	
	<b>Terminal</b>	
	<b>User Reset</b>	
<b>Administrator</b>	<b>Protected Area: Enter Administrator ID.</b>	<b>See</b> [Administrator ▶ Page 64]
	<b>Protected Area: Enter Admin. Password.</b>	
	<b>Administrator ID</b>	
	<b>Administrator Password</b>	
	<b>Master Reset</b>	
	<b>Home Rights</b>	
	<b>Passw. Change Date</b>	

## 5.1 Adjustment/Test

### Introduction for adjustment and tests

This section applies to the configuration of the balance for carrying out adjustments and tests.

- The balance is assembled and installed as stated in the operating instructions.
  - The balance is leveled.
- 1 Connect the printer to printout settings or reports.
  - 2 Activate the printer as an output device in the peripheral device settings.

### Principles for carrying out adjustments and tests

Balances play a decisive role in research, development, quality assurance and production. Weighing errors cost time and money and non-compliance with legal requirements can be detrimental to health. Good Weighing Practice™ (GWP®) is the science based global weighing standard for the efficient life cycle management of weighing systems. The risk-based approach allows you to improve control of your whole measuring process, which in turn helps to avoid costly out of specification results. Our Feasible Cost Savings Optimized routine testing based on your risk management ensures consistently good quality in critical applications. Additionally, a sound testing scheme saves costs by eliminating unnecessary tests in lower risk processes.

**Test Manager** was specially developed, as part of our balance firmware, to simplify routine tests. In combination with **GWP® Verification**, efficient balance testing is ensured and specific audit requirements can be fulfilled more easily.

▶ [www.mt.com/GWPVerification](http://www.mt.com/GWPVerification)

## Test Manager

**Test Manager** is a collection of security functions for the balance. These individually programmable functions help to maintain measuring accuracy via e.g. routine testing of the balance with external test weights. By providing active support with respect to test requests and predefined guided sequences will ensure that outstanding tests are not forgotten and complex tasks such as repeatability tests can be carried out easily.

Additional functions were developed to prevent measuring errors. These are, e.g. temperature sensors that can register possible temperature changes in the measuring cell and initiate adjustment by using internal weights which facilitate and maintain consistent accuracy.

The flexibility and customization of the test manager results in user guidance and appropriate messages, while performing specific operations, followed by complete records and documentation via printout or in conjunction with PC software.

### The configuration process

In order to prepare the balance for a routine test and adjustment, a straightforward 3-stage process is required:


- 1 Register the test weights.  
⇒ Information relating to all test weights is stored in a balance database.
- 2 Define the test sequence.  
⇒ Describes the type of test (method) and the test weight and tolerance to be carried out.
- 3 Carry out the test sequence.  
⇒ The task defines when and how the test sequence must be started and carried out.

### Documentation and storage

To ensure the traceability of adjustments and tests, it is important to print the settings and periodically the results of the test history.

The results are stored in the test history up to a maximum of 120 entries. When this limit is reached, the oldest results are overwritten.

Each time the test sequence is changed, the version number is increased and displayed in the right top corner of the display. It is recommended to print and file each new version in a folder.

A complete list of individual settings can be printed by pressing the  key while the respective menu is open.

## Settings for adjustments and tests

**Navigation:**  > [System] > [Adjust/Test]

This section describes all menu options and parameters relating to adjustment and testing of the balance.

For carrying out adjustments and tests, **see** [Balance adjustment and testing ▶ Page 90].

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Menu item	Explanation	Further information
<b>Test/Adj. Weights</b>	Define the test weights and parameters for adjustment. Procedures for testing or adjustment.	<b>See</b> [Test/Adjustment - weight settings ▶ Page 36]
<b>Test Sequences</b>	Defines the parameters of a test sequence for testing and behavior of the balance.	<b>See</b> [Test sequences ▶ Page 37]
<b>Tasks</b>	Defines the task of a test sequence.	<b>See</b> [Tasks ▶ Page 45]
<b>ProFACT / int. Adj.</b>	Fully automatic internal balance adjustment.	<b>See</b> [ProFACT/int. Adjustment ▶ Page 46]
<b>Autom. ext. Adjust.</b>	Automatic external adjustment.	<b>See</b> [Adjustment with external test weight ▶ Page 91]
<b>Autom. ext. Test</b>	Adjustment testing.	<b>See</b> [Testing the adjustment with an external test weight ▶ Page 48]

<b>WeightLink</b>	Activates/deactivates the <b>WeightLink</b> weight verification system.	<b>See</b> [Test with WeightLink ▶ Page 49]
<b>Test History</b>	Defines the settings for the test history.	<b>See</b> [Test history ▶ Page 50]
<b>Protocol</b>	Defines the settings for the adjustment and test protocols.	<b>See</b> [Protocol – Definition of adjustment and test reports ▶ Page 50]


### 5.1.1 Test/Adjustment - weight settings

**Navigation:**  > [System] > [Adjust/Test] > Test/Adj. Weights

This menu can be used to enter the designations or numbers of the certificate supplied with the respective test weight. This enables each external test weight to be clearly assigned to a specific certificate. Up to 12 external test weights can be configured. These test weights are used to carry out external tests and adjustments.

- 1 Tap [Define].  
⇒ **Test/Adj. Weights** window is displayed.
- 2 Select an undefined weight or the name of the weight, the parameters of which are to be updated.
- 3 Tap [Define].
- 4 Change the settings and confirm with [OK].  
⇒ The defined weights are available for selection in the test sequences.

#### Note

When the weight list is displayed, all parameters of the 12 test weights can be printed out with .

#### Test/Adj. Weight 1...Test/Adj. Weight12

You can define the following parameters:

Parameters	Explanation	Values
<b>Name</b>	Defines a name for a test weight (max. 20 characters).	Any (Test/Adj. Weights)*
<b>Weight ID</b>	Defines the identification (ID) of the weight (max. 20 characters).	Any
<b>Class</b>	Defines the class of the weight. <b>Own</b> = can be selected if no other class can be used.	<b>E1*</b>   <b>E2</b>   <b>F1</b>   <b>F2</b>   <b>M1</b>   <b>M2</b>   <b>M3</b>   <b>ASTM1</b>   <b>ASTM2</b>   <b>ASTM3</b>   <b>ASTM4</b>   <b>ASTM5</b>   <b>ASTM6</b>   <b>ASTM7</b>   <b>Own</b>   <b>ASTM0</b>   <b>ASTM00</b>   <b>ASTM000</b>
<b>Certificate No.</b>	Defines the certificate number of the external test weight used (max. 20 characters).	Any
<b>Weight Set No.</b>	Defines the identification number of the set of weights if the test weight belongs to a set of weights (max. 20 characters).	Any
<b>Actual Value</b>	Weight from the weight certificate. Irrespective of the type of balance, the full value should be taken over without taking the decimal places of the balance into account (e.g. 20.00124 g). Methods use the actual value; this is rounded to the maximum decimal places of the balance and used for calculation.	Weight (0 g)*
<b>Next Recalibration</b>	Entry of the date of the next weight calibration. If no weight calibration is planned, the default value (31.12.2099) should be maintained .	<b>DD.MM.YYYY</b> (31.12.2099)*

\* Factory setting

## 5.1.2 Test sequences


**Navigation:**  > [System] > [Adjust/Test] > Test Sequences

Test sequences define which test is carried out with which test weight. The user is guided through. The test should be carried out according to GWP® or another QM systems.

When **Test Sequences** is selected, a list of test sequences, the parameters of which can be adapted or overwritten, appears.

Up to 12 test sequences can be defined.

### Important

In the test sequence you define among others the type of the test (= **Method**) and the weights to be used for this method. Before these weights can be selected, they have to be defined in  > [System] > [Adjust/Test] > Test/Adj. Weights.

- The test weights are defined.
  - 1 Tap [Define].
    - ⇒ **Test Sequences** window appears.
  - 2 Select an undefined or existing test sequence, for example **Test Sequence 1** to be configured or adapted.
  - 3 Tap [Define].
    - ⇒ **Test Sequence** window appears.
  - 4 Enter the designations and parameters and confirm with [OK].
    - ⇒ The test sequence is stored in the **Test Sequence** menu.
    - ⇒ Each time a test sequence is stored, the version number is increased by 1. The version number is shown at the top right of the display.

The arrow buttons can be used to page forward or back to a menu page.

### Note

When the test sequence list is displayed, all parameters of the 12 test sequences can be printed with .

### Configuration of test sequence parameters

**Navigation:**  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1

You can define the following parameters:

Parameters	Explanation	Values
<b>Name</b>	Defines a designation for a test sequence (max. 20 characters). <b>Note</b> Choose a comprehensible name to enable clear identification and easy traceability.	Any ( <b>Test Sequence 1</b> )*
<b>Preparation Instructions</b>	Selection of preparatory instructions. <b>None</b> = no preparatory instructions are displayed in the test sequence. This is normally used for test sequences requiring no user actions, e.g. test sequences with the <b>SERVICE</b> method. <b>Standard</b> = the following preparatory instructions are displayed. These correspond to the typical SOP standard. 1 Clean the weighing pan. 2 Level the balance. 3 Switch on the printer. 4 Have the test weights ready. 5 Have the weight tweezers/fork ready.	<b>None*</b>   <b>Standard</b>

<b>Method</b>	Describes the type of test to be carried out and defines the main purpose of a test sequence. The test weights and respective tolerances to be used must be defined as part of the method.	<b>None   EC   RP1   RPT1   SE1   SE2   SERVICE   SET1   SET2</b>
<b>Action if Failure</b>	Defines how the balance should react if the test fails or is aborted.	<b>None   Warning   Attempt</b>
<b>Instructions if Failure</b>	Defines the instructions. This setting is independent of the parameters <b>Action if Failure</b> and is displayed each time a test sequence fails. <b>None</b> = the test sequence <b>Name</b> has failed. <b>Standard</b> = the test sequence <b>Name</b> has failed. The balance is outside the defined tolerances. Contact a responsible person within your company or METTLER TOLEDO service.	<b>None*   Standard</b>
<b>Code to Unblock</b>	System release. <b>Note</b> If <b>Action if Failure None</b> is selected, a failed test sequence will <b>never</b> block the balance.	Any (Z)*
<b>Entry in GWP History</b>	Defines whether the test result is stored in the GWP history. <b>Yes</b> = result of test sequence is stored. <b>No</b> = result of test sequence is not stored. <b>Important</b> If 120 entries are exceeded, the oldest result is overwritten with the newest result.	<b>Yes   No*</b>

\* Factory setting

For more details about **Method see** [Method ▶ Page 38], and **Action if Failure see** [Action if failure ▶ Page 44]

### 5.1.2.1 Method

**Navigation:**  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method

A method describes the type of test to be carried out and defines the main purpose of a test sequence. The test weights and respective tolerances to be used must be defined as part of the method. There are 8 different methods available.

You can define the following parameters:

Menu item	Explanation	Further information
<b>None</b>	No method has been selected.	
<b>EC</b>	Method for eccentric load test.	<b>See</b> [EC - eccentric load test ▶ Page 39]
<b>RP1</b>	Method for repeatability test.	<b>See</b> [RP1 - repeatability test ▶ Page 39]
<b>RPT1</b>	Method for repeatability test with tare weight.	<b>See</b> [RPT1 - repeatability test with tare weight ▶ Page 40]
<b>SE1</b>	Method for sensitivity test with one test weight.	<b>See</b> [SE1 - sensitivity test with one weight ▶ Page 41]
<b>SE2</b>	Method for sensitivity test with two test weights.	<b>See</b> [SE2 - sensitivity test with two weights ▶ Page 42]
<b>SERVICE</b>	Service method.	<b>See</b> [SERVICE - reminder ▶ Page 42]



<b>SET1</b>	Method for sensitivity test with tare weight and one test weight.	<b>See</b> [SET1 - sensitivity test with tare and one test weight ▶ Page 43]
<b>SET2</b>	Method for sensitivity test with tare weight and two test weights.	<b>See</b> [SET2 - sensitivity test with tare and two test weights ▶ Page 43]

#### 5.1.2.1.1 EC - eccentric load test

**Navigation:** [☰] > [System] > [Adjust/Test] > **Test Sequences** > **Test Sequence 1** > **Method** > [EC]

The purpose of the **EC** method (eccentric load test) is to ensure that every eccentric load deviation is within the necessary user SOP tolerances.

The method uses two test tolerances (method tolerances), **s T1** and **s T2**, which are applied to the test sequence result. They work exactly the same as the weight tolerances **T1** and **T2**.

##### Test Weight

**Navigation:** [☰] > [System] > [Adjust/Test] > **Test Sequences** > **Test Sequence 1** > **Method** > [EC] > **Test Weight**

You can define the following parameters:

Parameters	Explanation	Values
<b>Test/Adj. Weight</b>	Selects the predefined test weight. <b>Test/Adj. Weight 1 ... Test/Adj. Weight12</b> = defined in <b>Test/Adj. Weights</b> menu item.	<b>Test/Adj. Weight 1   Test/Adj. Weight 2   ...   Test/Adj. Weight12</b>
<b>Tolerances</b>	It is recommended to set the test weight tolerances to 100%. Because for this kind of test the test tolerance is relevant.	<b>Tolerance T1   Name T1   Tolerance T2   Name T2</b>

##### Tolerances for eccentric load deviation

**Navigation:** [☰] > [System] > [Adjust/Test] > **Test Sequences** > **Test Sequence 1** > **Method** > [EC] > **Test Weight** > **Tolerance for Eccentricity Dev.**

You can define the following parameters:

Parameters	Explanation	Values
<b>Tolerance EC T1</b>	Defines the tolerance EC T1 for the eccentric load deviation. If the result tolerance (method tolerance) EC T1 is exceeded, the eccentric load test is passed with a warning.	Any (0.10 g)*
<b>Name EC T1</b>	Defines a designation for EC T1 (max. 20 characters).	Any (Warn Limit)*
<b>Tolerance EC T2</b>	Defines the tolerance EC T2 for the eccentric load deviation. If the result tolerance (method tolerance) T2 is exceeded, the eccentric load test fails.	Any (0.10 g)*
<b>Name EC T2</b>	Defines a designation for EC T2 (max. 20 characters).	Any (Control Limit)*

\* Factory setting

#### 5.1.2.1.2 RP1 - repeatability test

**Navigation:** [☰] > [System] > [Adjust/Test] > **Test Sequences** > **Test Sequence 1** > **Method** > [RP1]

The **RP1** method calculates the mean and standard deviation (Symbol **s**) of a series of measurements with a single test weight in order to determine the repeatability of the balance.

The method uses two result tolerances (method tolerances), **s T1** and **s T2**, which are applied to the test sequence result. They function similar to **T1** and **T2**.

## Test Weight

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [RP1] > Test Weight > Test/Adj. Weight

You can define the following parameters:

Parameters	Explanation	Values
<b>Test/Adj. Weight</b>	Selects the predefined test weight. <b>Test/Adj. Weight 1 ... Test/Adj. Weight12</b> = defined in <b>Test/Adj. Weights</b> menu item.	<b>Test/Adj. Weight 1   Test/Adj. Weight 2   ...   Test/Adj. Weight12</b>
<b>Tolerances</b>	It is recommended to set the test weight tolerances to 100%. Because for this kind of test the test tolerance is relevant.	<b>Tolerance T1   Name T1   Tolerance T2   Name T2</b>

## Tolerances (s) for repeatability test

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [RP1] > Test Weight > Tolerances (s)

You can define the following parameters:

Parameters	Explanation	Values
<b>Tolerance s T1</b>	Defines the tolerance s T1 for the repeatability test. If the tolerance s T1 is exceeded, the repeatability test is passed with a warning.	Any (0.000 g)*
<b>Name s T1</b>	Defines a designation for s T1 (max. 20 characters).	Any (Warn Limit)*
<b>Tolerance s T2</b>	Define the tolerance s T2 for the repeatability test. If the tolerance s T2 is exceeded, the repeatability test fails.	Any (0.000 g)*
<b>Name s T2</b>	Defines a designation for s T2 (max. 20 characters).	Any (Control Limit)*

\* Factory setting

## Number of Repetitions

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [RP1] > Test Weight > Number of Repetitions

You can define the following parameters:

Parameters	Explanation	Values
<b>Number of Repetitions</b>	Defines the number of weight measurements of a series.	2 ... 15 (10)*

\* Factory setting

### 5.1.2.1.3 RPT1 - repeatability test with tare weight

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [RPT1]

The **RPT1** method calculates the mean and standard deviation (Symbol **s**) of a series of measurements with two test weights in order to determine the repeatability. In contrast to the **RP1** method, a second test weight is used to simulate the use of a tare container.

The method uses two test tolerances (method tolerances), **s T1** and **s T2**, which are applied to the test sequence result. They work exactly the same as the weight tolerances **T1** and **T2**.

## Tare Weight

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [RPT1] > Tare Weight > Test/Adj. Weight

You can define the following parameters:

Parameters	Explanation	Values
<b>Tare Weight</b>	Selects the predefined test weight corresponding to the tare container weight. <b>Test/Adj. Weight 1 ... Test/Adj. Weight12</b> = defined in <b>Test/Adj. Weights</b> menu item.	<b>Test/Adj. Weight 1   Test/Adj. Weight 2   ...   Test/Adj. Weight12</b>
<b>Tolerances</b>	It is recommended to set the tare weight tolerances to 100%.	<b>Tolerance T1   Name T1   Tolerance T2   Name T2</b>

### Test Weight

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [RPT1] > Test Weight > Test/Adj. Weight

You can define the following parameters:

Parameters	Explanation	Values
<b>Test/Adj. Weight</b>	Selects the predefined test weight. <b>Test/Adj. Weight 1 ... Test/Adj. Weight12</b> = defined in <b>Test/Adj. Weights</b> menu item.	<b>Test/Adj. Weight 1   Test/Adj. Weight 2   ...   Test/Adj. Weight12</b>
<b>Tolerances</b>	It is recommended to set the test weight tolerances to 100%. Because for this kind of test the test tolerance is relevant.	<b>Tolerance T1   Name T1   Tolerance T2   Name T2</b>

### Tolerances (s) for repeatability test

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [RPT1] > Test Weight > Tolerances (s)

You can define the following parameters:

Parameters	Explanation	Values
<b>Tolerance s T1</b>	Defines the tolerance s T1 for the repeatability test. If the tolerance s T1 is exceeded, the repeatability test is passed with a warning.	Any (0.000 g)*
<b>Name s T1</b>	Defines a designation for s T1 (max. 20 characters).	Any (Warn Limit)*
<b>Tolerance s T2</b>	Define the tolerance s T2 for the repeatability test. If the tolerance s T2 is exceeded, the repeatability test fails.	Any (0.000 g)*
<b>Name s T2</b>	Defines a designation for s T2 (max. 20 characters).	Any (Control Limit)*

\* Factory setting

### Number of Repetitions

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [RPT1] > Test Weight > Number of Repetitions

You can define the following parameters:

Parameters	Explanation	Values
<b>Number of Repetitions</b>	Defines the number of weight measurements of a series.	2 ... 15 (10)*

\* Factory setting

#### 5.1.2.1.4 SE1 - sensitivity test with one weight

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SE1]

The **SE1** method tests the sensitivity of the balance with one test weight.

## Test Weight

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SE1] > Test Weight > Test/Adj. Weight

You can define the following parameters:

Parameters	Explanation	Values
<b>Test/Adj. Weight</b>	Selects the predefined test weight. <b>Test/Adj. Weight 1 ... Test/Adj. Weight12</b> = defined in <b>Test/Adj. Weights</b> menu item.	<b>Test/Adj. Weight 1   Test/Adj. Weight 2   ...   Test/Adj. Weight12</b>
<b>Tolerances</b>	The test tolerances are used for the sensitivity test.	<b>Tolerance T1   Name T1   Tolerance T2   Name T2</b>

### 5.1.2.1.5 SE2 - sensitivity test with two weights

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SE2]

The **SE2** method tests the sensitivity of the balance with two test weights.

#### Test Weight 1 and Test Weight 2

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SE2] > Test Weight 1 or Test Weight 2 > Test/Adj. Weight

You can define the following parameters:

Parameters	Explanation	Values
<b>Test/Adj. Weight</b>	Selects the predefined test weight. <b>Test/Adj. Weight 1 ... Test/Adj. Weight12</b> = defined in <b>Test/Adj. Weights</b> menu item.	<b>Test/Adj. Weight 1   Test/Adj. Weight 2   ...   Test/Adj. Weight12</b>
<b>Tolerances</b>	The test tolerances are used for the sensitivity test.	<b>Tolerance T1   Name T1   Tolerance T2   Name T2</b>

### 5.1.2.1.6 SERVICE - reminder

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SERVICE]

The **SERVICE** method is more a reminder than a method. It is normally set to perform regular checks of various data (dates) in the background. It is used e.g. as a reminder for the next service date or MinWeigh date. The date is checked on a regular basis and a message appears when the defined task is due. The **SERVICE** method can also be used as early pre-warning.

The **SERVICE** method can also only be used for the display of **Preparation Instructions**. For example, the user is requested to level the balance on a daily basis. In this special case, the **Preparation Instructions** must be set in the test sequence setting to **Standard**. Ensure that no elements are selected in the method status.

#### Note

To enable this test sequence to be ended without user actions, **Preparation Instructions** must be set in the test sequence to **None**.

You can define the following parameters:

Parameters	Explanation	Values
<b>Status</b>	Defines the reminder target. This is either an event ( <b>Battery Change, Service...</b> ) or a defined task. Values can be <input type="checkbox"/> (deactivated) or <input checked="" type="checkbox"/> (activated).	<b>Battery Change   Service   MinWeigh   Weight Cal.   Task 01 ... Task 12</b>

<b>Early Warning Alert</b>	Defines the pre-warning time. <b>Note</b> With one <b>SERVICE</b> reminder, several dates can be checked simultaneously. The same pre-warning time applies to all dates however. If different pre-warning times are necessary, several <b>SERVICE</b> methods must be defined.	1 ... 365 days (7 days)*
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\* Factory setting

### 5.1.2.1.7 SET1 - sensitivity test with tare and one test weight

**Navigation:** [☰] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SET1]

The **SET1** method tests the sensitivity of the balance with two test weights. The first test weight is used to simulate a tare container.

#### Tare Weight

**Navigation:** [☰] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SET1] > Tare Weight > Test/Adj. Weight

You can define the following parameters:

Parameters	Explanation	Values
<b>Tare Weight</b>	Selects the predefined test weight corresponding to the tare container weight. <b>Test/Adj. Weight 1 ... Test/Adj. Weight12</b> = defined in <b>Test/Adj. Weights</b> menu item.	<b>Test/Adj. Weight 1</b>   <b>Test/Adj. Weight 2</b>   ...   <b>Test/Adj. Weight12</b>
<b>Tolerances</b>	It is recommended to set the tare weight tolerances to 100%.	<b>Tolerance T1</b>   <b>Name T1</b>   <b>Tolerance T2</b>   <b>Name T2</b>

#### Test Weight

**Navigation:** [☰] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SET1] > Test Weight > Test/Adj. Weight

You can define the following parameters:

Parameters	Explanation	Values
<b>Test/Adj. Weight</b>	Selects the predefined test weight. <b>Test/Adj. Weight 1 ... Test/Adj. Weight12</b> = defined in <b>Test/Adj. Weights</b> menu item.	<b>Test/Adj. Weight 1</b>   <b>Test/Adj. Weight 2</b>   ...   <b>Test/Adj. Weight12</b>
<b>Tolerances</b>	The test tolerances are used for the sensitivity test.	<b>Tolerance T1</b>   <b>Name T1</b>   <b>Tolerance T2</b>   <b>Name T2</b>

### 5.1.2.1.8 SET2 - sensitivity test with tare and two test weights

**Navigation:** [☰] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SET2]

The **SET2** method tests the sensitivity of the balance with three test weights. The first test weight (tare weight) is used to simulate a tare container.

#### Test Weight 1 and Test Weight 2

**Navigation:** [☰] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SET2] > Test Weight 1 or Test Weight 2 > Test/Adj. Weight

You can define the following parameters:

Parameters	Explanation	Values
<b>Test/Adj. Weight</b>	Selects the predefined test weight. <b>Test/Adj. Weight 1 ... Test/Adj. Weight12</b> = defined in <b>Test/Adj. Weights</b> menu item.	<b>Test/Adj. Weight 1</b>   <b>Test/Adj. Weight 2</b>   ...   <b>Test/Adj. Weight12</b>

<b>Tolerances</b>	The test tolerances are used for the sensitivity test.	<b>Tolerance T1   Name T1   Tolerance T2   Name T2</b>
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### Tare Weight

**Navigation:** [☰] > [System] > [Adjust/Test] > **Test Sequences** > **Test Sequence 1** > Method > [SET2] > **Tare Weight** > **Test/Adj. Weight**

You can define the following parameters:

Parameters	Explanation	Values
<b>Tare Weight</b>	Selects the predefined test weight corresponding to the tare container weight. <b>Test/Adj. Weight 1 ... Test/Adj. Weight12</b> = defined in <b>Test/Adj. Weights</b> menu item.	<b>Test/Adj. Weight 1   Test/Adj. Weight 2   ...   Test/Adj. Weight12</b>
<b>Tolerances</b>	It is recommended to set the tare weight tolerances to 100%.	<b>Tolerance T1   Name T1   Tolerance T2   Name T2</b>

### 5.1.2.2 Action if failure

Defines how the balance should react if the test fails or is aborted. There are 3 types of behavior.

#### Warning

**Navigation:** [☰] > [System] > [Adjust/Test] > **Test Sequences** > **Test Sequence 1** > **Action if Failure** > **Warning**

You can define the following parameters:

Parameters	Explanation	Values
<b>Warning Message</b>	Defines the warning dialog for the user. The user can work as normal, but receives repeated warnings that the test sequence has failed. The user is requested to restart the test sequence. <b>Standard</b> = the test sequence <b>Name</b> has failed. 1. To start the test sequence again, tap [ <b>Start</b> ]. <b>Advanced</b> = the test sequence <b>Name</b> has failed. Follow the steps below: 1. Check the weighing parameters. 2. To start the test sequence again, tap [ <b>Start</b> ]. <b>Note</b> If the [ <b>Start</b> ] button is grayed, the current user is not authorized to start the test sequence.	<b>Standard*   Advanced</b>
<b>Time Interval</b>	Defines the time (in hours) until the warning is displayed again.	1 ... 1000 h (1 h)*
<b>Max. Number Of Warnings</b>	Defines the maximum permitted number of warnings for this test sequence. When the maximum number is reached and the test sequence was not successfully completed, the balance is blocked.	1 ... 1000 (1)*

<b>Action after Failure</b>	<p>Defines how a test sequence (already in warning mode) should behave if it fails again or is aborted during the method sequence.</p> <p><b>None</b> = the test sequence is aborted and restarted after lapse of the next warning interval.</p> <p><b>See Max. Number Of Warnings.</b></p> <p><b>1 Attempt, 2 Attempts</b> or <b>3 Attempts</b> = in contrast to <b>None</b>, the balance does not return to the warning mode. The test sequence must be passed within the number of attempts defined here or the balance will be blocked.</p> <p><b>Until Passed</b> = permits an unlimited number of attempts. The balance does not return to the warning mode.</p> <p><b>Note</b> If <b>GWP History</b> is activated, only the last result and number of attempts are stored.</p>	<b>None*</b>   <b>1 Attempt</b>   <b>2 Attempts</b>   <b>3 Attempts</b>   <b>Until Passed</b>
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\* Factory setting

### Attempt

**Navigation:**  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Action if Failure > Attempt

Parameters	Explanation	Values
<b>Attempt</b>	<p>Defines how often a test may be carried out until it is passed.</p> <p><b>1, 2 or 3</b> = the test must be passed within the defined number of attempts or the balance is blocked.</p> <p>In contrast to <b>Warning</b>, it is not possible to continue to work between attempts, but only when the test has been passed.</p> <p><b>Until Passed</b> = permits an unlimited number of attempts.</p> <p><b>Note</b> If <b>GWP History</b> is activated, only the last result and number of attempts are stored.</p>	<b>1*</b>   <b>2</b>   <b>3</b>   <b>Until Passed</b>

\* Factory setting

### Note

On successful completion of the test sequence, no more warning dialogs are displayed. If a specific test sequence blocks the balance, the warning mode is cancelled on release so that no further warning messages are displayed.

## 5.1.3 Tasks

**Navigation:**  > [System] > [Adjust/Test] > Tasks

Tasks define when a test sequence must be carried out and how it is started.

Up to 12 tasks can be defined.

- The test sequence is defined in the **Test Sequence** menu.
- 1 Tap [**Define**].
    - ⇒ The **Tasks** window appears.
  - 2 Select the test sequence for the task.
    - ⇒ The **Task State** window appears.
    - ⇒ When a test sequence is assigned to a task, the name appears in the task list.
  - 3 Tap [**On**] and subsequently the associated button.
    - ⇒ **Task** window appears.

- 4 Define the settings and confirm with [OK].
    - ⇒ The date for carrying out the next test sequence is recalculated.
    - ⇒ The date for carrying out the next test is calculated at the end of each completed test sequence.
- The arrow buttons can be used to page forward or back to a menu page.

**Note**

When the task list is displayed, all parameters of the 12 tasks can be printed with .

### 5.1.3.1 Assigning a test sequence to a task.

**Navigation:**  > [System] > [Adjust/Test] > Tasks > Task 01 > [On]

When **Test Sequence** is selected, the user can assign a test sequence to a task from a list of already defined test sequences.

You can define the following parameters:

Parameters	Explanation	Values
<b>Test Sequence</b>	Selects a predefined test sequence. <b>Test Sequence 1 ... Test Sequence 12</b> = defined in <b>Test Sequences</b> menu item.	<b>Task 01   Task 02   Task 03   Task 04   Task 05   Task 06   Task 07   Task 08   Task 09   Task 10   Task 11   Task 12</b>
<b>Starting Method</b>	Defines the way how a test sequence is started. <b>Interval:</b> Define <b>Interval Start Time</b> : (08:00)*   <b>Interval</b> : (1 day)*.	<b>Manual   Interval   On Power On</b>
<b>Defined Days</b>	Defines the days on which the task can be performed. <b>Important</b> Test sequences with <b>Starting Method</b> > <b>Manual</b> or <b>Interval</b> appear in the test selection list only on the days defined here. If the day on which a test sequence is due is not defined, the test sequence is postponed until the next. Values can be <input type="checkbox"/> (deactivated) or <input checked="" type="checkbox"/> (activated)*.	<b>Monday*   Tuesday*   Wednesday*   Thursday*   Friday*   Saturday*   Sunday*</b>

### 5.1.4 ProFACT/int. Adjustment

**Navigation:**  > [System] > [Adjust/Test] > ProFACT / int. Adj.

**ProFACT** stands for Professional Fully Automatic Calibration Technology and offers fully automatic internal balance adjustment with an internal weight, based on preselected time and/or temperature criteria.

**ProFACT / int. Adj.** is switched on by default and can be switched off as required.

You can define the following parameters:

Parameters	Explanation	Values
<b>ProFACT / int. Adj.</b>	Activates and defines the behavior of the ProFACT adjustment function.	<b>Off   ProFACT / int. Adj.</b>

#### 5.1.4.1 Definition of parameters for ProFACT

**Navigation:**  > [System] > [Adjust/Test] > ProFACT / int. Adj. > [ProFACT / int. Adj.]

**Important**

With approved balances (according to OIML accuracy class II), **ProFACT / int. Adj.** cannot be switched off.

You can define the following parameters:



Parameters	Explanation	Values
<b>Weekdays</b>	Define the days on which fully automatic calibration is to be performed. Values can be <input type="checkbox"/> (deactivated) or <input checked="" type="checkbox"/> (activated)*. If time-controlled adjustment is not required, deactivate all days.	<b>Monday*</b>   <b>Tuesday*</b>   <b>Wednesday*</b>   <b>Thursday*</b>   <b>Friday*</b>   <b>Saturday*</b>   <b>Sunday*</b>
<b>Time 1</b>	1. Defines the time for automatic adjustment. <b>Note</b> Up to 3 different times can be defined for the selected days.	<b>Off</b>   <b>Time 1*</b> 0:00 ... 23:59 (9:00)*
<b>Time 2</b>	2. Defines the time for automatic adjustment.	<b>Off*</b>   <b>Time 2</b> 0:00 ... 23:59
<b>Time 3</b>	3. Defines the time for automatic adjustment.	<b>Off*</b>   <b>Time 3</b> 0:00 ... 23:59
<b>Temp.Criterion</b>	Defines the temperature difference, which initiates automatic adjustment.	<b>Off</b>   <b>0.5 Kelvin</b>   <b>1 Kelvin</b>   <b>2 Kelvin*</b>   <b>3 Kelvin</b>
<b>Protocol Trigger</b>	Defines when a protocol is to be printed automatically. <b>On</b> = protocol is automatically printed when automatic adjustment is initiated. <b>Off</b> = no printing.	<b>On*</b>   <b>Off</b>
<b>Advanced Options</b>	This function can be used to extend ProFACT and internal adjustment procedures with internal tests.	<b>Off*</b>   <b>On</b>

\* Factory setting

### Advanced options

**Navigation:**  > [System] > [Adjust/Test] > ProFACT / int. Adj. > [ProFACT / int. Adj.] > Advanced Options

Adjustment can be adapted to suit particular requirements by activating the advanced option function.

You can define the following parameters:

Parameters	Explanation	Values
<b>As Found</b>	Activates the input test. At the start of the adjustment sequence, an internal test (sensitivity) is performed to ascertain the actual status. The input test is automatically started when the adjustment sequence is activated and the result is displayed and recorded.	<b>No*</b>   <b>Yes</b>
<b>Levelcontrol</b>	Activates leveling. The level of the balance is checked. <b>Important</b> If no level sensor is available or the balance is not leveled, the user is requested to check the level of the balance. The adjustment sequence is stopped until the user confirms the request.	<b>No*</b>   <b>Yes</b>
<b>As Left</b>	Activates the output test. When adjustment is complete, an internal test (sensitivity) is performed from anew.	<b>No*</b>   <b>Yes</b>
<b>Tolerances</b>	Defines the tolerances. Defines the tolerances applied during the input test and output test, <b>see</b> [Method ▶ Page 38].	<b>Tolerance T1</b>   <b>Name T1</b>   <b>Tolerance T2</b>   <b>Name T2</b>

<b>Blocking</b>	Blocks the balance. Defines whether the balance is to be blocked after exceeding the tolerance T2 in the input test or output test or after aborting adjustment. If the balance is blocked, it cannot be used until it is released with the appropriate release code.	No*   Yes
<b>Code to Unblock</b>	Releases the balance. Defines the code required to release a balance that has been blocked due to an input test, adjustment or output test error.	Any (Z)*

\* Factory setting

### 5.1.5 Automatic adjustment with an external test weight

**Navigation:**  > [System] > [Adjust/Test] > Autom. ext. Adjust.

If work is carried out with an external test weight, this setting can be used to define days and times when the balance requests adjustment.

You can define the following parameters:

Parameters	Explanation	Values
<b>Autom. ext. Adjust.</b>	Activates and defines the behavior of the adjustment function.	On   Off

#### See also

 Adjustment with external test weight ▶ Page 91

#### 5.1.5.1 Definition of parameters for automatic adjustment

The behavior of the automatic external adjustment function can be set by tapping the [Define] button.

You can define the following parameters:

Parameters	Explanation	Values
<b>Weekdays</b>	Defines the days on which adjustment is to be carried out. Values can be <input type="checkbox"/> (deactivated) or <input checked="" type="checkbox"/> (activated)*.	Monday*   Tuesday   Wednesday   Thursday   Friday   Saturday   Sunday
<b>Time</b>	Defines the adjustment time. The time for automatic adjustment can be entered for the selected days.	0:00 ... 23:59 (8:00)*

\* Factory setting

### 5.1.6 Testing the adjustment with an external test weight

**Navigation:**  > [System] > [Adjust/Test] > Autom. ext. Test

This setting can be used to enter days and times when testing of the adjustment with an external test weight is to be performed and the balance displays a reminder message.

You can define the following parameters:

Parameters	Explanation	Values
<b>Autom. ext. Test</b>	Activates and defines the behavior of the test function.	On   Off

#### See also

 Adjustment with external test weight ▶ Page 91

#### 5.1.6.1 Definition of parameters for testing the adjustment

The behavior of the automatic external test function can be set by tapping the [Define] button.

You can define the following parameters:

Parameters	Explanation	Values
<b>Weekdays</b>	Defines the days on which the adjustment test is to be performed. Values can be <input type="checkbox"/> (deactivated) or <input checked="" type="checkbox"/> (activated)*.	<b>Monday*</b>   <b>Tuesday</b>   <b>Wednesday</b>   <b>Thursday</b>   <b>Friday</b>   <b>Saturday</b>   <b>Sunday</b>
<b>Time</b>	Defines the test time. The time can be entered for the selected days.	0:00 ... 23:59 (9:00)*

\* Factory setting

### 5.1.7 Test with WeightLink

**Navigation:**  > [System] > [Adjust/Test] > **WeightLink** > [Deactivated]


In this submenu you activate the **WeightLink** weight verification system. The description for the work with **WeightLink** and the recommended settings are described in the Operating Instructions **WeightLink**. For more information, please visit: <http://www.mt.com/weightlink>.

You can define the following parameters:

Parameters	Explanation	Values
<b>Activation Mode</b>	Defines the option <b>Activation Mode</b> <b>Deactivated</b> = the <b>WeightLink</b> procedure will not appear. <b>Activated</b> = the <b>WeightLink</b> procedure is part of the external adjustment or the external test and cannot be aborted. <b>Prompt</b> = the <b>WeightLink</b> procedure is part of the external adjustment or the external test, but can be skipped. It is possible to make a test without <b>WeightLink</b> .	<b>Deactivated*</b>   <b>Activated</b>   <b>Prompt</b>
<b>Scanner</b>	To select the scanner for the <b>WeightLink</b> procedure. The user can select between the <b>WeightLink</b> scanner and a standard data matrix scanner. <b>Important</b> The <b>eData</b> code can be verified by both standard and <b>WeightLink</b> scanners. The data matrix code on the <b>WeightLink</b> weights can only be verified with the <b>WeightLink</b> scanner. To verify the use of the correct weight, we recommend to use the <b>WeightLink</b> scanner.	<b>WeightLink</b>   <b>Standard*</b>
<b>Protocol</b>	Defines the information recorded in the test report.	<b>Weight Set No.</b>   <b>UIN</b>   <b>Calib. Date</b>   <b>Class</b>   <b>Conv. Mass</b>   <b>Customer Mark</b>   <b>Uncertainty</b>   <b>In Tolerance</b>   <b>Next Recalib.</b>
<b>Recalibration Date</b>	Defines, if the information <b>Recalibration Date</b> will be validated.	<b>Off*</b>   <b>Warning</b>   <b>Failure</b>
<b>Recalibration Interval</b>	Defines the option <b>Recalibration Interval</b> . <b>Note</b> The option <b>Recalibration Date</b> must be activated.	<b>1 Year*</b>   <b>2 Years</b>   <b>3 Years</b>
<b>Early Warning Recalibration</b>	Defines the option <b>Early Warning Recalibration</b> . The system automatically informs the user 0 to 60 days before the recalibration takes place.	<b>0 ... 60 Days</b> (1 day*)

\* Factory setting

## 5.1.8 Test history

**Navigation:**  > [System] > [Adjust/Test] > Test History


The balance always records all adjustment data and the required results of performed tests and stores these in a special fail-safe memory. The options in the test history allow the selection of results for documentation or printing.

### Important

When the memory is full (120 entries for the GWP history), the oldest entries are automatically deleted and overwritten by new entries. It is important to ensure that entries required for the documentation standards are printed and archived to ensure full traceability of the performed tests and adjustments.

Parameters	Explanation	Values
<b>Test History</b>	Selects history.	<b>Adj. History   Adj. History Selection   GWP History</b>

### Adj. History

A window with a list of performed adjustments can be displayed by tapping [**Show**]. Although the balance permanently records all adjustments made, only those selected for display in **Adj. History Selection** are listed. Specific data is displayed for each adjustment: date and time, type of adjustment, temperature, leveling. The complete list can be printed with .


### Adj. History Selection

You can define the following parameters:

Parameters	Explanation	Values
<b>Selection</b>	Selects the results to be stored. Select the adjustments to be displayed in the adjustment history. The list can be selectively shortened (including printout) for improved clarity. <b>NOTICE</b> The balance records all adjustment operations. The settings in this menu define the operations to be displayed in the list. Values can be <input type="checkbox"/> (deactivated) or <input checked="" type="checkbox"/> (activated)*.	<b>Adjust.int*   Adjust.ext   Temperature*   Time Adjust.*</b>
<b>Display Datasets</b>	Defines the number of displayed datasets.	<b>Last 50*   Last 40   Last 30   Last 20   Last 10</b>

\* Factory setting

### GWP History

A window with a list of test sequence results can be displayed by tapping [**Show**]. The displayed entry can be printed with . The GWP history can store maximum 120 entries. Only the results of test sequences are stored where the GWP history was set to [**Yes**].

## 5.1.9 Protocol – Definition of adjustment and test reports

**Navigation:**  > [System] > [Adjust/Test] > Protocol

Information to be printed in the adjustment and test reports can be defined in the settings.


The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Parameters	Explanation	Values
<b>Protocol</b>	Defines the information to be printed in the protocol. Values can be <input type="checkbox"/> (deactivated) or <input checked="" type="checkbox"/> (activated)*. <b>SNR</b> : stands for serial number	<b>Date/Time*</b>   <b>Balance Type*</b>   <b>SNR*</b>   <b>SW-Version</b>   <b>Balance ID</b>   <b>Weight ID</b>   <b>Certificate No.</b>   <b>Temperature</b>   <b>Nominal Weight*</b>   <b>Actual Weight*</b>   <b>Difference*</b>   <b>Levelcontrol*</b>   <b>Signature*</b>

\* Factory setting

## 5.2 Info

**Navigation:**  > [**System**] > [**Info**]

This menu can be used to define an identification for the balance and all balance information can be displayed.

### Note


The [**Info**] function key can be used as a shortcut for the [**Show**] key.

**See** [Selecting function keys ▶ Page 69].

You can define the following parameters:

Parameters	Explanation	Values
<b>Balance ID</b>	Defines a designation for the balance (max. 20 characters). This facilitates the identification of individual balances where several balances are used. This identification is also printed in the protocols. Alphanumeric characters can be entered in the input window.	Any
<b>Info</b>	Displays the balance information and built-in options. This information is of particular importance for the service engineer. This information should be available before contacting METTLER TOLEDO customer service.	<b>Show</b>

### Note

The balance information can be recorded (provided a printer is connected and activated as an output device in the peripheral device settings) by pressing the  button.

**See** [Peripherals ▶ Page 52].

## 5.3 Standby

**Navigation:**  > [**System**] > [**Standby**]

This menu can be used to define the time of balance inactivity after which the balance is automatically set to the standby mode.

### Important

The balance must be unloaded before it can change to standby mode.

Irrespective of the standby mode setting, the display brightness is automatically reduced if the balance remains inactive for 15 minutes. If the displayed value should change during the course of 15 minutes (e.g. due to vibrations), the balance waits a further 15 minutes until the display brightness is reduced.

You can define the following parameters:

Parameters	Explanation	Values
<b>Standby</b>	Defines the energy saving function The standby mode corresponds to the state the balance assumes after being switched off with the [⏻] button. The balance can be switched on again by pressing the [⏻] button.	<b>Off*</b>   <b>30 min.</b>   <b>60 min.</b>   <b>120 min.</b>   <b>240 min.</b>

\* Factory setting

## 5.4 Date/Time

**Navigation:** [☰] > [System] > [Date/Time]

This menu can be used to set the date and time.

You can define the following parameters:

Parameters	Explanation	Values
<b>Date Format</b>	Sets the date format. D = Day M = Month Y = Year	<b>D.MMM YYYY*</b>   <b>MMM D YYYY</b>   <b>DD.MM.YYYY</b>   <b>MM/DD/YYYY</b>   <b>YYYY-MM-DD</b>   <b>YYYY/MM/DD</b>
<b>Date</b>	Sets the date and time of the internal clock in the balance. A numeric input window is displayed. Enter the current date in the format day - month - year (DD.MM.YYYY), regardless of the date format selected for the display. <b>Note</b> This setting can also be made directly by tapping the date in weighing mode. A window is displayed in which the date can be directly entered.	<b>Day</b>   <b>Month</b>   <b>Year</b>
<b>Time Format</b>	Sets the time format.	<b>24:MM*</b>   <b>12:MM</b>   <b>24.MM</b>   <b>12.MM</b>
<b>Time</b>	Sets the time on the balance. M = Minutes  Enter the current time in a 24-hour format (24.MM.SS, entry of the seconds is optional), regardless of the time format selected for the display. The input window corresponds to that for the date. The [+1H] and [-1H] keys can also be used for setting the time an hour forward or back. This facilitates switching between summer and winter time. <b>Note</b> This setting can also be made directly by tapping the time display in the weighing mode.	<b>Hours</b>   <b>Minutes</b>

\* Factory setting

## 5.5 Peripherals

Various peripheral devices can be connected to the balance interface(s). This menu can be used to define the devices to be connected and interface parameters.

Each balance application supports specific peripheral devices. The control of peripheral devices can vary from application to application.

There are specific interface setting options for each of these devices. [Off] means that no device of this type is connected. [RS232 built-in] denotes the default installed RS232C interface. If further optional interfaces are available, they are automatically displayed in the menu. At this point, only the parameters of the default installed RS232C interface are described.

## Important

Only a single device can be activated for each available interface; all devices must be deactivated [**Off**]. When a new device is activated, the previously selected device is automatically deactivated.

The arrow buttons can be used to page forward or back to a menu page.

**Navigation:**  > [**System**] > [**Peripherals**]

You can define the following parameters:

Parameters	Explanation	Values
<b>Printer</b>	Printer.	<b>Off*</b>   <b>RS232 built-in</b>
<b>Host</b>	External computer (bidirectional communication; the balance can send data to the PC and receive commands or data from it).	<b>Off</b>   <b>RS232 built-in*</b>
<b>LabX</b>	METTLER TOLEDO LabX software enables the definition of complete dialog-based balance operations and can store and manage measured values as well as further data in a database on the PC.	<b>Off*</b>   <b>RS232 built-in</b>
<b>LabX Controlled Device</b>	This interface is only used with LabX. Connected devices (e.g. tablet feeder) communicate directly with LabX).	<b>Off*</b>   <b>RS232 built-in</b>
<b>Tablet Feeder</b>	METTLER TOLEDO tablet feeder.	<b>Off*</b>   <b>RS232 built-in</b>
<b>Secondary Display</b>	Remote display (Model-dependent)	<b>Off*</b>   <b>RS232 built-in</b>
<b>Bar Code</b>	Barcode reader.	<b>Off*</b>   <b>RS232 built-in</b>
<b>RFID / Quantos</b>	RFID reader/writer or Quantos Module.	<b>Off*</b>   <b>RS232 built-in</b>
<b>Label Printer</b>	Label printer.	<b>Off*</b>   <b>RS232 built-in</b>

\* Factory setting



Detailed information on optional interfaces and various peripheral devices can be found in the documentation supplied with these products.

When a device has been activated, the interface parameters for communication with this device, e.g. baud rate, data format, stop bits, handshake, end-of-line character, character set and **Continuous mode** (only for peripheral device **Host**) can be defined via the [**Define**] button.

These submenus are always displayed in English, irrespective of the dialog language selected.

You can define the following parameters:

Parameters	Explanation	Values
<b>Baudrate</b>	Defines the data transfer rate.	<b>600</b>   <b>1200</b>   <b>2400</b>   <b>4800</b>   <b>9600*</b>   <b>19200</b>
<b>Bit / Parity</b>	Defines the number of data bits and parity bits.	<b>7/No</b>   <b>7/Even</b>   <b>7/Odd</b>   <b>8/No*</b>
<b>Stop Bits</b>	Defines the stop bits for data transfer.	<b>1 Stopbit*</b>   <b>2 Stopbits</b>
<b>Handshake</b>	Defines the synchronization for data transfer	<b>None</b>   <b>Hardware</b>   <b>Xon/Xoff*</b>
<b>End of line</b>	Defines the end-of-line character	<b>&lt;CR&gt;&lt;LF&gt;*</b>   <b>&lt;CR&gt;</b>   <b>&lt;LF&gt;</b>
<b>Char Set</b>	Defines the character set	<b>Ansi/Win*</b>   <b>IBM/DOS</b>
<b>Continuous mode</b>	Defines the transfer of weighing data	<b>Off*</b>   <b>On</b>

\* Factory setting

### Information on Continuous mode

In **Continuous mode**, the weighing data is continuously transferred via the interface. The **Continuous mode** is only available for the peripheral device **Host** and default installed RS232C interface [**RS232 built-in**]. When the **Continuous mode** is activated, additional setting options are available.

You can define the following parameters:

Parameters	Explanation	Values
<b>Output Format</b>	<p><b>MT-SICS</b> = the data is transferred in MT-SICS format (Mettler Toledo Standard Interface Command Set). MT-SICS operates bidirectional, i.e. the balance can also receive confirmations or commands from the host. A separate reference manual is available for MT-SICS.</p> <p><b>PM</b> = emulates the data format of PM balances (unidirectional).</p> <p><b>AT/MT</b> = the data is transferred in the format of METTLER TOLEDO AT and MT balances (unidirectional).</p>	<b>MT-SICS*</b>   <b>PM</b>   <b>AT/MT</b>
<b>Updates/sec.</b>	Defines the number of datasets transferred via the interface per second.	<b>2</b>   <b>5*</b>   <b>6</b>   <b>10</b>

\* Factory setting

## 5.6 Option

**Navigation:**  > [**System**] > [**Option**]

After the installation of specific interface options (e.g. Ethernet), an additional icon is displayed in the system settings. Global interface settings can be made via [**Option**]. These are described in the instructions supplied with the optional interface. This menu item contains only some basic information to help with general communication problems.

### Important

These submenus are always displayed in English, irrespective of the dialog language selected.

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Parameters	Explanation	Values
<b>DHCP</b>	Activates/deactivates the Dynamic Host Configuration Protocol. The Dynamic Host Configuration Protocol is used to automatically assign to the client PC a currently unused IP address from an address pool. Other information such as the domain name, standard gateway and specific DNS server can also be transferred to the client.	<b>Off*</b>   <b>On</b>
<b>IP-Address</b>	Defines the IP address in the format "XXX.XXX.XXX.XXX" (X = 0 ... 255). The IP address must be distinctive within a corporate network and conform to the conventions for IP addresses.	Any
<b>Subnet Mask</b>	Defines the subnet in the format "XXX.XXX.XXX.XXX" (X = 0 ... 255). The subnet mask is used to inform the routers within a network which bits in the four quads in the IP address are significant for routing in the search for the addressed computer within a specific network.	Any



<b>Standard Gateway</b>	Defines the Standard Gateway Address in the format "XXX.XXX.XXX.XXX" (X = 0 ... 255). This may be necessary if the network is connected to another network via a router. A gateway denotes the transition between two networks. A gateway computer is a special computer connected to both networks. Different protocols are converted in certain circumstances. A gateway can also be a transition from a logical (often also purely organizational) network to another, whereby both used the same protocol.	Any
<b>Domain Name Server</b>	Defines the Domain Name Server Address in the format "XXX.XXX.XXX.XXX" (X = 0 ... 255). If domain names for calling network users are supported in the TCP/IP network, the domain name server address must be entered here.	Any
<b>Hostname</b>	Defines the computer or server. General computer or server (on which specific user services are normally provided). Often used for the computer to which a data link has been established.	<b>not available</b>

## 5.7 Level sensor

**Navigation:**  > **[System]** > **[Levelcontrol]**

The built-in level sensor permanently monitors the balance for correct horizontal alignment. This menu can be used to activate or deactivate the level sensor and define the settings for the generation of warnings within incorrect leveling.

Leveling information, **see** Leveling the balance.

### Important

- The level sensor depends on the type of balance
- The level sensor **cannot** be switched off on some balances.
- The level sensor is coupled with the backlighting of the level indicator above the right foot screw. The level indicator is illuminated when the level sensor is activated.

**Navigation:**  > **[System]** > **[Levelcontrol]** > **Levelcontrol** > **[Define]**

You can define the following parameters:



Parameters	Explanation	Values
<b>Warning Text</b>	Defines whether and how often a warning text is to be displayed if the balance is not precisely leveled.	<b>Off   Once*   Repeat</b>
<b>Warning Beep</b>	Defines if and how often an audible warning is to be generated if the balance is not precisely leveled.	<b>Off   Once*   Repeat</b>

\* Factory setting

## 5.8 User settings

**Navigation:**  > **[System]** > **[User Setting]**

This section describes the procedure for defining specific settings for each user. This allows the balance to be adapted to the respective work technique and specific tasks.

- A printer is connected and activated as an output device in the peripheral device settings.
- 1 To check the user settings, press .
  - 2 To print out the settings, press .

### Example: Printout

```


User Setting
Weighing parameters
Weighing Mode Universal
Environment Standard
Value Release
                Reliable+Fast
AutoZero On
User
User Name Home
Language English
User ID 1
Terminal
Brightness 80
Colour selection
                PaletteBlueCold
Sound 70
Touch Function On
Optical key feedback On
Speedread On
StatusLight On
Brightness 60
Green status On
    
```





## 5.8.1 Overview of user settings

The user-specific settings are displayed in the form of symbols. The individual settings can be displayed and changed by tapping the symbols.

### Important

If this menu has been protected by the administrator, the appropriate ID and password must be entered.

- The user profile is selected.
- 1 Tap, e.g. [**Terminal**].  
⇒ **Terminal** window appears.
  - 2 Select the required menu item (e.g. **Sound**).
  - 3 Change the settings and confirm with [**OK**].
  - 4 To abort, tap [**C**].
  - 5 To exit the menu item, tap [**OK**].
  - 6 To exit the [**User Setting**], tap [**Exit**] or press [].

	Designation	Explanation
	<b>Wghparam</b>	Settings for adjusting the balance to specific weighing conditions.
	<b>User</b>	Settings for user profile with the respective information (e.g. name, password, dialog box language).
	<b>Terminal</b>	Settings for the display (e.g. brightness) and for the behavior of the terminal.
	<b>User Reset</b>	Reset all settings for the user profile to the factory settings.

## Menu structure

Main menu	Submenu	Further information
<b>Wghparam</b>	<b>Weighing Mode</b>	<b>See</b> [Weighing parameters ▶ Page 57]
	<b>Environment</b>	
	<b>Value Release</b>	
	<b>AutoZero</b>	
<b>User</b>	<b>User Name</b>	<b>See</b> [User ▶ Page 59]
	<b>Language</b>	
	<b>User ID</b>	
	<b>Password</b>	
<b>Terminal</b>	<b>Brightness</b>	<b>See</b> [Terminal ▶ Page 61]
	<b>Colour selection</b>	
	<b>Sound</b>	
	<b>Touch Function</b>	
	<b>Touchadjust</b>	
	<b>Speedread</b>	
	<b>StatusLight</b>	
<b>User Reset</b>	no submenu	<b>See</b> [User factory settings ▶ Page 63]

## 5.8.2 Weighing parameters

**Navigation:** [☰] > [System] > [User Setting] > [Wghparam]

This menu can be used to adapt the balance to suit specific requirements.

### Important

If this menu is protected, the appropriate password must be entered.

You can define the following parameters:

Menu item	Explanation	Further information
<b>Weighing Mode</b>	Adapts the balance to the weighing mode.	<b>See</b> [Weighing mode ▶ Page 57]
<b>Environment</b>	Adapts the balance to the ambient conditions and location.	<b>See</b> [Ambient conditions ▶ Page 58]
<b>Value Release</b>	Defines how quickly a stable measured value is recognized by the balance as stable and released.	<b>See</b> [Measured value release ▶ Page 58]
<b>AutoZero</b>	Activates/deactivates automatic zero correction.	<b>See</b> [AutoZero ▶ Page 59]

### 5.8.2.1 Weighing mode

**Navigation:** [☰] > [System] > [User Setting] > [Wghparam] > **Weighing Mode**

This setting can be used to adapt the balance to the weighing mode.

You can define the following parameters:

Parameters	Explanation	Values
<b>Weighing Mode</b>	Defines the weighing mode.	<b>Universal*</b>   <b>Dosing</b>   <b>Sensor Mode</b>   <b>Check-weighing</b>

\* Factory setting

## Weighing mode settings

### Important

The number of available settings depends on the type of balance.

Values	Explanation
<b>Universal</b>	For all standard weighing applications.
<b>Dosing</b>	For dosing liquid or powdery products. With this setting, the balance responds very quickly to the smallest changes in weight.
<b>Sensor Mode</b>	Depending on the setting of the ambient conditions, this setting delivers a filtered weighing signal of varying strength. The filter has a linear characteristic in relation to time (not adaptive) and is suitable for continuous measured value processing.
<b>Checkweighing</b>	With this setting, the balance only reacts to significant changes in weight and the result is very stable.

### 5.8.2.2 Ambient conditions

**Navigation:** [Menu] > [System] > [User Setting] > [Wghparam] > Environment

With this setting, the balance can be optimally adapted to the ambient conditions at locations.

You can define the following parameters:

Parameters	Explanation	Values
<b>Environment</b>	Defines the ambient conditions	<b>Stable   Standard*   Unstable   Very unstable</b>

\* Factory setting

### Settings for ambient conditions

#### Important

The number of available settings depends on the type of balance.

Values	Explanation
<b>Stable</b>	For working in an environment that is virtually free from drafts and vibrations.
<b>Standard</b>	This setting corresponds to an average working environment subject to significant fluctuations of the ambient conditions.
<b>Unstable</b>	For an environment subject to constantly changing conditions.
<b>Very unstable</b>	For an environment with changing conditions.

### 5.8.2.3 Measured value release

**Navigation:** [Menu] > [System] > [User Setting] > [Wghparam] > Value Release

This setting can be used to define how quickly a measured value is recognized as stable by the balance and released.

You can define the following parameters:

Parameters	Explanation	Values
<b>Value Release</b>	Defines measured value release.	<b>Very fast   Fast   Reliable+Fast*   Reliable   Very reliable</b>

\* Factory setting

## Measured value settings

Values	Explanation
<b>Very fast</b>	For very fast results where repeatability is of less importance.
<b>Fast</b>	For fast results where repeatability is of less importance.
<b>Reliable+Fast</b>	This setting corresponds to an average stabilization time and repeatability.
<b>Reliable</b>	For good repeatability of measured results, the stabilization time is longer.
<b>Very reliable</b>	For very good repeatability of measured results, the stabilization is longer.

### 5.8.2.4 AutoZero

**Navigation:**  > [System] > [User Setting] > [Wghparam] > AutoZero

This menu item can be used to switch the automatic zero correction on or off.

#### Important

This menu item is not available for approved balances.

You can define the following parameters:

Parameters	Explanation	Values
<b>AutoZero</b>	Activates/deactivates the automatic zero correction. It corrects the zero deviations, e.g. that can occur due to slight fouling of the weighing pan.	<b>Off   On*</b>

\* Factory setting

#### Settings for automatic zero correction

Values	Explanation
<b>Off</b>	The automatic zero correction is switched off.
<b>On</b>	The automatic zero correction [ <b>AutoZero</b> ] continuously corrects zero deviations, e.g. that can occur due to slight fouling of the weighing pan.

### 5.8.3 User

**Navigation:**  > [System] > [User Setting] > [User]

This menu can be used to define the user name, dialog language and user access codes.

You can define the following parameters:


Menu item	Explanation	Further information
<b>User Name</b>	Changes the user name.	<b>See</b> [User name ▶ Page 59]
<b>Language</b>	Defines the dialog box language.	<b>See</b> [Language ▶ Page 60]
<b>User ID</b>	Changes the user ID.	<b>See</b> [User ID and password ▶ Page 60]
<b>Password</b>	Changes the user password.	

#### 5.8.3.1 User name

**Navigation:**  > [System] > [User Setting] > [User] > User Name

The name of the current user profile can be changed in this menu item. Alphanumeric characters can be entered in the input window.

#### Important

If the entered user name already exists, an error message is displayed. After changing the name, the user profile appears at the top left of the display and in the profile menu  under the new name. The user name is also printed in the protocols.

- The user profile is selected.
- 1 Beside **User Name**, tap the associated button.  
⇒ An alphanumeric input window appears.

2 Enter the designation and confirm with [OK].

You can define the following parameters:

Parameters	Explanation	Values
<b>User Name</b>	Changes the name of the current user profile (max. 20 characters).	Any e.g. ( <b>User 1</b> )*

\* Factory setting

### 5.8.3.2 Language

**Navigation:** [☰] > [System] > [User Setting] > [User] > **Language**

This menu item can be used to select the dialog language. The language is changed immediately. All windows and messages are displayed in the selected language.

Exception: interface parameters in the system settings are always in English.

#### Important

If the dialog language is changed, it is possible that administrator and user access codes (password and ID) cannot be entered. The ID and password must therefore always be entered in the defined language!

- The user profile is selected.
- 1 Beside **Language**, tap the associated button.  
⇒ A selection window appears.
  - 2 Tap the preferred language.
  - 3 To exit the menu item, tap [OK].

You can define the following parameters:

Parameters	Explanation	Values
<b>Language</b>	Defines the preferred language. <b>Note</b> The language is normally preset for the country of use.	<b>English   Deutsch   Français   Español   Italiano   Russian   Polski   Cestina   Magyar   Chinese   Japanese</b>

### 5.8.3.3 User ID and password

**Navigation:** [☰] > [System] > [User Setting] > [User] > **User ID** or **Password**

The current user access codes can be changed in these two menu items with identical dialogs. These codes are required for accessing menu areas that have been protected at user level by the administrator

If an existing ID or password is deleted and no new code is entered, an error message is displayed.

#### Important

If access to both of these menu items is protected by the administrator, the current ID and password must be entered before the code can be changed.


- The user profile is selected.
- 1 Beside **User ID** or **Password**, tap the associated button.  
⇒ An alphanumeric input window appears.
  - 2 Enter the designation and confirm with [OK].

You can define the following parameters:

Parameters	Explanation	Values
<b>User ID</b>	Changes the existing current user profile ID (max. 20 characters).	Any ( <b>Home = 0</b> )*
<b>Password</b>	Changes the existing current user profile password (max. 20 characters).	Any ( <b>Home = 0</b> )*

\* Factory setting

## 5.8.4 Terminal

**Navigation:**  > [System] > [User Setting] > [Terminal]

This menu can be used to adapt the terminal to suit specific requirements and the display adjusted.

- 1 Tap [Terminal].  
⇒ **Terminal** window is displayed.
- 2 Select the required menu item, e.g. **Brightness** and subsequently tap the associated button.  
⇒ **Brightness** window is displayed.
- 3 Tap the plus or minus arrow key and confirm with [OK].

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Menu item	Explanation	Further information
<b>Brightness</b>	Adjusts the display brightness.	<b>See</b> [Brightness ▶ Page 61]
<b>Colour selection</b>	Selects the display color.	<b>See</b> [Color selection ▶ Page 61]
<b>Sound</b>	Set the beep volume.	<b>See</b> [Beep ▶ Page 62]
<b>Touch Function</b>	Activates/deactivates the display touch function.	<b>See</b> [Touch function ▶ Page 62]
<b>Touchadjust</b>	Activates/deactivates the touch screen adjustment.	<b>See</b> [Touch adjustment ▶ Page 62]
<b>Speedread</b>	Activates/deactivates the weighing result display color selection.	<b>See</b> [Speedread ▶ Page 62]
<b>StatusLight</b>	Activates/deactivates the status light. Defines the brightness.	<b>See</b> [Status light ▶ Page 63]

### 5.8.4.1 Brightness

**Navigation:**  > [System] > [User Setting] > [Terminal] > **Brightness**

This menu item can be used to adjust the display brightness. The brightness is adjusted in 20% steps each time one of the two arrow keys is tapped.

You can define the following parameters:

Parameters	Explanation	Values
<b>Brightness</b>	Adjusts the display brightness (in 20% steps).	20 % ... 100 % (80 %)*

\* Factory setting

### 5.8.4.2 Color selection

**Navigation:**  > [System] > [User Setting] > [Terminal] > **Colour selection**

This menu item can be used to adjust the display color. The colors can be used for orientation. There are a total of 8 different colors. 4 different colors with low (left column) or high (right column) contrast.

#### Note

The high contrast colors make the display easier to read in poor lighting conditions.

You can define the following parameters:

Parameters	Explanation	Values
<b>Colour selection</b>	Color adjustment.	Color 1*   Color 2   Color 3   Color 4   Color 5   Color 6   Color 7   Color 8 (color 1, blue with low contrast)*

\* Factory setting

#### 5.8.4.3 Beep

**Navigation:** [Menu] > [System] > [User Setting] > [Terminal] > **Sound**

This menu item can be used to adjust the beep volume. The volume is increased in 10% steps each time one of the two arrow keys is tapped. Setting the volume to 0% switches off the beep.

You can define the following parameters:

Parameters	Explanation	Values
<b>Sound</b>	Adjusts the volume (in 10% steps)	0 % ... 100 % (70 %)*

\* Factory setting

#### 5.8.4.4 Touch function

**Navigation:** [Menu] > [System] > [User Setting] > [Terminal] > **Touch Function**

This menu item can be used to activate or deactivate the touch screen touch function. If the [Touch Function] is deactivated, the display will no longer respond to touch in weighing mode. Settings can no longer be made by tapping the display (exception: function keys).

##### Important

The touch function is always active in setting mode to allow settings to be made.

You can define the following parameters:

Parameters	Explanation	Values
<b>Touch Function</b>	Activates/deactivates the touch screen touch function.	<b>On   Off*</b>

\* Factory setting

#### 5.8.4.5 Touch adjustment

**Navigation:** [Menu] > [System] > [User Setting] > [Terminal] > **Touchadjust**

If the instrument does not respond correctly when a certain area of the display is tapped, the touch screen can be adjusted with [Touchadjust].

- 1 Tap [Activate].
  - ⇒ A window appears.
- 2 Tap the flashing area. This procedure must be repeated several times.
- 3 The procedure can be interrupted at any time by tapping [C].
  - ⇒ When all flashing areas have been selected, the window closes.

#### 5.8.4.6 Speedread

**Navigation:** [Menu] > [System] > [User Setting] > [Terminal] > **Speedread**

If this function is activated, the weighing result is displayed in a light color as long as it remains unstable. The result is displayed in a darker color when it is stable. If the [Speedread] function is deactivated, the weighing result is always displayed in the same color, irrespective of whether it is stable or not.

You can define the following parameters:



Parameters	Explanation	Values
<b>Speedread</b>	Activates/deactivates the color display of the weighing result.	<b>Off*</b>   <b>On</b>

\* Factory setting

### 5.8.4.7 Status light

**Navigation:**  > **[System]** > **[User Setting]** > **[Terminal]** > **StatusLight**

New intelligent safety tools monitor the balance ready status. This menu item can be used to activate or deactivate the status light. The built-in status light in the terminal shows that the balance is ready to use.

You can define the following parameters:

Parameters	Explanation	Values
<b>StatusLight</b>	Activates/deactivates the status light. Green = balance is ready to use. Flashing green = balance is busy. Example: Internal adjustment in progress. Yellow = task pending, balance can still be used. Example: Automatic internal adjustment pending. Red = balance cannot/must not be used. Example: Balance is not correctly leveled.	<b>Off</b>   <b>On*</b>

#### Status light settings

##### Menu structure

Main menu	Submenu	Further information
<b>Off</b>	no submenu	
<b>On</b>	<b>Brightness</b>	<b>See</b> Parameter table
	<b>Green status</b>	

You can define the following parameters:

Parameters	Explanation	Values
<b>Brightness</b>	Adjusts the display brightness (in 10% steps).	10 % ... 100 % (60 %)*
<b>Green status</b>	Activates/deactivates the green status icon. If the green status icon is deactivated, the status light does not light up when the balance is ready to use. The other status icons (flashing green, yellow, red) are displayed as normal.	<b>Off</b>   <b>On*</b>

\* Factory setting

### 5.8.5 User factory settings




#### NOTICE

##### **Danger of data loss due to user profile reset!**

After a reset, the balance is reset to the factory settings.

All data such as user and application-specific settings, system settings including administrator ID and password are deleted.

**Navigation:**  > **[System]** > **[User Setting]** > **[Factory]**

This menu can be used to reset all settings for an active user profile to the factory settings.

- The user profile is selected.
- 1 Tap **[User Reset]**.
  - ⇒ **User Reset** window is displayed.

- 2 Confirm with [OK].
  - 3 To abort, tap [C].
- ⇒ The balance restarts with the factory settings.

## 5.9 Administrator

**Navigation:** [Menu] > [System] > [Administrator]

This menu can be used to change the administrator ID and password. A general reset of all balance settings can be performed. Access rights for individual users can be allocated and specifications for recording safety-relevant procedures defined.

### Important

This menu is protected ex works with an ID and a password.

### 5.9.1 Configuration of the security system



#### NOTICE

##### Enter ID and password in the dialog language!

The ID and password must always be entered in the defined language.

- 1 If the dialog language is changed, it is possible that the access codes cannot be entered.
- 2 If the balance is controlled with commands via an external host, the password protection is deactivated.

**Navigation:** [Menu] > [System] > [Administrator]

- 1 Tap [Administrator].
  - ⇒ **Protected Area: Enter Administrator ID.** window appears.
- 2 Enter the ID. **Factory setting: Z.**
- 3 Confirm with [OK].
  - ⇒ **Protected Area: Enter Admin. Password.** window appears.
- 4 Enter the password. **Factory setting: Z.**
  - ⇒ **Administrator** window appears.

The arrow buttons can be used to page forward or back to a menu page.

Menu item	Explanation	Further information
<b>Administrator ID</b>	Changes the administrator ID.	<b>See</b> Changing the administrator ID and password
<b>Administrator Password</b>	Changes the administrator password.	<b>See</b> Changing the administrator ID and password
<b>Master Reset</b>	Resets the balance settings to the factory settings.	<b>See</b> Performing a master reset
<b>Rights Home</b>	Defines the access rights.	<b>See</b> [Definition of user access rights ▶ Page 65]
<b>Passw. Change Date</b>	Defines the date for changing a password.	<b>See</b> Reminder function for changing a password

#### 5.9.1.1 Changing the administrator ID and password



#### NOTICE

##### Remember IDs and passwords!

- Protected menu areas cannot be accessed without ID or password.
- Note IDs and passwords and keep them in a safe place.

**Navigation:** [Menu] > [System] > [Administrator]

The **Administrator ID** and **Administrator Password** menu items can be used to change the ID and password access codes defined by default.

### Important

Both an ID and a password must be defined. If the existing code is deleted and no new code is entered, an error message is displayed.

- 1 Tap **Administrator ID** and/or **Administrator Password** and subsequently the associated button.  
⇒ The **Administrator ID** and/or **Administrator Password** window appears.
- 2 Change the settings and confirm with [OK].

You can define the following parameters:

Parameters	Explanation	Values
<b>Administrator ID</b>	Creates a new ID or changes an existing ID (max. 20 characters).	Any (Z)*
<b>Administrator Password</b>	Creates new password or changes an existing password (max. 20 characters).	Any (Z)*

\* Factory setting

## 5.9.1.2 Performing a master reset



### NOTICE

#### Danger of data loss due to master reset!

After a master reset, the balance is reset to the factory settings.

All data such as user and application-specific settings, system settings including administrator ID and password are deleted.

**Navigation:** [Menu] > [System] > [Administrator] > **Master Reset**

This menu item can be used to reset all balance settings to the factory settings. The date and time settings and recorded adjustment operations are not affected.

- 1 Tap **Master Reset**.  
⇒ **Activate factory settings?** window appears.
  - 2 Confirm with [OK].
  - 3 To abort, tap [C].
  - 4 To exit the menu item, tap [OK].
- ⇒ The balance restarts with the factory settings.

You can define the following parameters:

Parameters	Explanation	Values
<b>Master Reset</b>	Resets the balance to the factory settings.	None


## 5.9.1.3 Definition of user access rights

**Navigation:** [Menu] > [System] > [Administrator] > **Rights Home**

This menu item can be used to define access rights and select applications for user profile.

You can define the following parameters:

Parameters	Explanation	Values
<b>Application Setup</b>	All application-specific settings [Lock].	<b>No Protection*</b>   <b>User Protect.</b>   <b>Adm. Protect.</b>

<b>Weighing parameters</b>	All weighing parameters available in the settings.	<b>No Protection*   User Protect.   Adm. Protect.</b>
<b>Adjustweight</b>	Definition of external adjustment weights in the <b>[Adjust/Test]</b> system settings menu	<b>No Protection*   User Protect.   Adm. Protect.</b>
<b>User</b>	Selects the user profile.	<b>No Protection*   User Protect.   Adm. Protect.</b>
<b>User ID/ Password</b>	Definition of ID and password in the menu <b>[User]</b> .	<b>No Protection*   User Protect.   Adm. Protect.</b>
<b>System</b>	All system settings	<b>No Protection*   User Protect.   Adm. Protect.</b>
<b>User Setting</b>	All user-specific settings.	<b>No Protection*   User Protect.   Adm. Protect.</b>
<b>Application</b>	Selects the application  .	<b>No Protection*   User Protect.   Adm. Protect.</b>
<b>Application Selection</b>	Defines the applications available for the user. Values can be <input type="checkbox"/> (deactivated) or <input checked="" type="checkbox"/> (activated)*.	<b>Weighing*   Piececounting*   Percent*   Formulation*   Titration*   Density*   Diff.weighing*   Pipette Check*   Statistics*</b>

\* Factory setting

#### 5.9.1.4 Reminder function for changing a password

**Navigation:**  > **[System]** > **[Administrator]** > **Passw. Change Date**

For security reasons, passwords should be changed regularly; this menu item can be used to define if and when the balance is to generate a reminder to change passwords.

- 1 Select **Request** and subsequently tap the associated button.  
⇒ A numeric input window appears.
  - 2 Enter the date for the change of password and confirm with **[OK]**.
  - 3 To abort, tap **[C]**.
  - 4 To exit the menu item, tap **[OK]**.
- ⇒ When the selected date is reached, the message **Administrator The password change date has been reached. Please arrange changes.** appears.

#### Important

The administrator must ensure that all passwords are changed. The balance does not check this. If the message is deleted with **[OK]**, it is displayed every 3 hours from anew until a new date is defined or the reminder function is deactivated.

You can define the following parameters:

Parameters	Explanation	Values
<b>Passw. Change Date</b>	Activates/deactivates the reminder function.	<b>Off*   On</b>

<b>Request</b>	Enter the date (in DD.MM.YYYY) on which the balance is to generate a reminder to change the password.	None
----------------	---	------

\* Factory setting


## 6 Weighing Application

Navigation:  > [Weighing]





This section provides information and descriptions of setting options for practical use of the application.


### Selecting the application

- 1 Press .
- 2 Tap the [Weighing] icon in the selection window.
  - ⇒ The selected application is active.
  - ⇒ The balance is ready for weighing.

### 6.1 Weighing application settings

Navigation:  > [Weighing] > 


The procedure for performing a simple weighing has already been described, **see** [Weighing for the first time ▶ Page 25]. In addition to the described procedures (zeroing, taring and performing a simple weighing), the balance offers a number of options for adjusting the application to suit specific requirements.

- 1 Press .
- ⇒ A window with application-dependent settings appears.
- 2 Select the required menu item (e.g. **Function Keys**).
- 3 Change the settings and confirm with [OK].
- 4 To exit the menu without saving, tap [C].
- 5 To restore the factory default settings, tap [STD].
- 6 To exit the menu item, tap [OK].

The arrow buttons can be used to page forward or back to a menu page.

#### Note

Settings can be printed out at any time in the application-dependent settings menu.


- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

#### Example: Printout

Weighing	
Function Keys	
ID	-
Nominal	-
+Tol	-
-Tol	-
Lotcounter	-
Adjust.int	1
Adjust.ext	-
Test int	-
Test ext	-
PreTare	-
Tare Store	-

You can define the following parameters:

Menu item	Explanation	Further information
<b>Function Keys</b>	Definition of function keys to appear at the bottom of the display. These keys enable direct access to specific functions.	<b>See</b> [Selecting function keys ▶ Page 69]

<b>SmartTrac</b>	Definition of the appearance of the graphic weighing-in aid.	<b>See</b> [Selecting SmartTrac ▶ Page 72]
<b>Info Field</b>	Definition of information fields to be displayed.	<b>See</b> [Selecting information fields ▶ Page 72]
<b>AutoPrint</b>	Activates/deactivates automatic weighing result printout.	<b>See</b> [Specifications for automatic protocol printout ▶ Page 73]
<b>Display Unit</b>	Definition of unit for result display.	<b>See</b> [Selecting weighing units ▶ Page 74]
<b>Info Unit</b>	Definition of an additional weighing unit. This appears in the respective display information field.	<b>See</b> [Selecting weighing units ▶ Page 74]
<b>Custom Unit 1</b>	Definition of a specific weighing unit.	<b>See</b> [Defining free weighing units ▶ Page 74]
<b>Custom Unit 2</b>	Definition of a second specific weighing unit.	<b>See</b> [Defining free weighing units ▶ Page 74]
<b>Protocol</b>	Selects data to be shown in the weighing protocols.	<b>See</b> [Protocol definition ▶ Page 75]
<b>Print Key</b>	Definition of the behavior of the  key for manual weighing result printout.	<b>See</b> [Specifications for manual protocol printout ▶ Page 77]
<b>Transfer Key</b>	Formats data output via the <b>[Transfer]</b> function key.	<b>See</b> [Output data formatting (transfer key) ▶ Page 77]
<b>Identification</b>	Defines identifications.	<b>See</b> [Definition of identifications and protocol headers ▶ Page 80]
<b>Bar Code</b>	Defines how barcode data is processed. These settings are only relevant if a barcode reader is connected.	<b>See</b> [Instructions for processing barcode data ▶ Page 80]
<b>MinWeigh</b>	Activates/deactivates the <b>MinWeigh</b> function The <b>MinWeigh</b> function ensures that the weighing results are within defined tolerances appropriate to the requirements of your quality assurance system.	<b>See</b> [MinWeigh function settings ▶ Page 81]
<b>Tare Store</b>	Predefines up to 10 selectable tare weights.	<b>See</b> [Tare memory definition and activation ▶ Page 82]
<b>AutoTare</b>	Activates/deactivates the tare function. The automatic tare function automatically stores the first stable weight as the tare weight.	<b>See</b> [Automatic taring function settings ▶ Page 83]
<b>ErgoSens</b>	Up to two external ErgoSens (optional) can be assigned a function in this menu.	<b>See</b> [ErgoSens settings ▶ Page 83]

### 6.1.1 Selecting function keys


**Navigation:**  > **[Weighing]** >  > **Function Keys**

Function keys enable direct access to specific functions and settings in the application. A function can be activated by tapping a key.










The function keys are displayed in the application at the bottom of the display. The numbers define the sequence in the display.

- Activate or deactivate function keys by tapping.
- To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.














The arrow buttons can be used to page forward or back to a menu page.

- Application is activated.
- 1 Press [].
  - ⇒ A window with application-dependent settings appears.
- 2 Tap **Function Keys** > [**Define**].
- 3 Select the **Function Keys** which you need.
  - ⇒ The function key is automatically numbered.
- 4 Change the settings and confirm with [**OK**].

### 6.1.1.1 Function key overview

	Designation	Explanation
	<b>ID</b>	This function key can be used for the assignment of individual weighing identifications (descriptive texts), which are also shown in the protocols. After tapping this function key, a window is displayed in which the ID can be selected and text entered. Information for the definition of identifications, <b>see</b> [Definition of identifications and protocol headers ▶ Page 80]. Information on practical working with identifications, <b>see</b> [Working with identifications ▶ Page 87].
	<b>Nominal</b>	Definition of the required nominal weight. This also serves as a reference for the tolerances. Information on nominal weight settings, <b>see</b> [Weighing-in to a nominal weight ▶ Page 88].
	<b>+Tol</b>	Definition of accuracy (tolerances) for weighing-in to a nominal weight. Information on tolerance settings, <b>see</b> [Weighing-in to a nominal weight ▶ Page 88].
	<b>-Tol</b>	Definition of accuracy (tolerances) for weighing-in to a nominal weight. Information on tolerance settings, <b>see</b> [Weighing-in to a nominal weight ▶ Page 88].
	<b>Lotcounter</b>	Activates the lot counter and defines a start value. Information on settings, <b>see</b> [Working with the lot counter ▶ Page 86].
	<b>Adjust.int</b>	Balance adjustment with internal adjustment weight. Information on making and recording adjustments, <b>see</b> [Adjustment with internal weight/ProFACT ▶ Page 91].
	<b>Adjust.ext</b>	Balance adjustment with an external adjustment weight. Information on making and recording adjustments, <b>see</b> [Adjustment with external test weight ▶ Page 91]. <b>Important</b> External adjustment is not available on certain legal-for-trade balances.
	<b>Test int</b>	Balance adjustment test with an internal test weight. Information on performing and recording tests, <b>see</b> [Testing the adjustment with internal weight ▶ Page 92].
	<b>Test ext</b>	Testing balance adjustment with an external test weight. Information on performing and recording tests, <b>see</b> [Testing the adjustment with external test weight ▶ Page 93].



	<b>PreTare</b>	Numerical entry of a fixed tare weight (subtraction of tare weight). Information on tare weight entry, <b>see</b> [Taring options ▶ Page 85].
	<b>Tare Store</b>	Displaying a predefined tare weight. Information on the definition of predefined tare weights, <b>see</b> [Tare memory definition and activation ▶ Page 82]. Information on practical working with the tare memory, <b>see</b> [Taring options ▶ Page 85].
	<b>1/2d ... 1/1000d</b>	Changes the resolution of the weighing result. Information on resolution settings, <b>see</b> [Changing the weighing result resolution ▶ Page 85]. <b>Important</b> For metrological reasons, resolution selection is not available on certain legal-for-trade balances.
	<b>Header</b>	Prints the protocol header. Information on weighing protocol settings, <b>see</b> [Protocol definition ▶ Page 75].
	<b>Footer</b>	Prints the protocol footer. Information on weighing protocol settings, <b>see</b> [Protocol definition ▶ Page 75].
	<b>Adj. History</b>	Displays the adjustment history. <b>Important</b> Adjustments made in the system settings are displayed. Information on settings, <b>see</b> [Settings for adjustments and tests ▶ Page 35].
	<b>Transfer</b>	Transfers the current weight, without further data (additional information) directly to a connected host computer. The output data can be formatted. Information on output data formatting, <b>see</b> [Output data formatting (transfer key) ▶ Page 77].
	<b>Test Sequence</b>	Displays a list of tasks set to [ <b>Manual</b> ]. Information on settings, <b>see</b> [Assigning a test sequence to a task. ▶ Page 46].
	<b>Info</b>	This function key is used as a shortcut for the [ <b>Show</b> ] key. Information on settings, <b>see</b> [Info ▶ Page 51].
	<b>GWP History</b>	Opens the history. All test results saved in the GWP history are displayed. Information on history settings, <b>see</b> [Test history ▶ Page 50].
	<b>Ionizer</b>	Activates/deactivates the connected ionizer, <b>see</b> [Settings for the optional anti-static kit (ionizer) ▶ Page 84].
	<b>Target&amp;Tol</b>	This function key is used as a shortcut for entering the nominal weight, +tolerance and -tolerance, <b>see</b> [SmartTrac dosing guide ▶ Page 72].
	<b>Display</b>	This function key is used as a shortcut for displaying the weighing result in a large size, <b>see</b> [Display ▶ Page 13].

**Factory setting:** [**Adjust.int**], [**Target&Tol**] and [**ID**] are enabled in this order.

## 6.1.2 Selecting SmartTrac

**Navigation:** [Menu] > [Weighing] > [SmartTrac] > **SmartTrac**

SmartTrac is a graphic remaining range display. It displays the already used and remaining weighing range. In certain applications, SmartTrac also facilitates weighing-in to a specific nominal weight.



SmartTrac is displayed below the weighing result on the right of the display, **see** [Display ▶ Page 13].

- 1 Press [SmartTrac].
  - ⇒ Window with application-dependent settings appears.
- 2 Tap the corresponding button.
- 3 Change the settings and confirm with [OK].

### Note

This menu can also be displayed directly from the application by tapping SmartTrac.

You can define the following parameters:

Parameters	Explanation	Values
<b>SmartTrac</b>	Activates/deactivates SmartTrac or defines the display mode.	No SmartTrac       *

\* Factory setting



### 6.1.2.1 SmartTrac dosing guide

**Navigation:** [Menu] > [Weighing] > [SmartTrac] > **Function Keys** > [Target&Tol]

In this menu item you can specify the settings of the function key [Target&Tol]. With the function key to set the nominal weight, the tolerance mode, the tolerances and the form of the SmartTrac.

- Function key is activated.
- 1 Press [Target&Tol].
    - ⇒ Window with application-dependent settings appears.
  - 2 Tap the corresponding button.
  - 3 Change the settings and confirm with [OK].

You can define the following parameters:

Parameters	Explanation	Values
<b>Nominal</b>	Definition of the required nominal weight.	Any
<b>Tolerance Mode</b>	Definition of the tolerance mode in symmetric or asymmetric form.	<b>Symmetric*</b>   <b>Asymmetric</b>
<b>+/- Tolerance</b>	Definition of accuracy (tolerances) for weighing-in to a nominal weight.	Any
<b>SmartTrac</b>	Activates/deactivates SmartTrac or defines the display mode.	No SmartTrac       *

\* Factory setting

## 6.1.3 Selecting information fields

**Navigation:** [Menu] > [Weighing] > [SmartTrac] > **Info Field**

The information fields in the display provide constant information on, e.g. set values, measured results.

The numbered fields are displayed in the application. The numbers define the information field sequence in the display (maximum 4 information fields).

- Information fields can be activated or deactivated by tapping.
- To redefine the sequence, all information fields must be deactivated and then activated in the required sequence.

- Application is activated.
- 1 Press [].
  - ⇒ A window with application-dependent settings appears.
- 2 Tap **Info Field** > [**Define**].
- 3 Select the information fields that you need.
  - ⇒ The information field is automatically numbered.
- 4 Change the settings and confirm with [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Parameters	Explanation	Values
<b>Info Field</b>	<p>Activates/deactivates the associated info fields (max. 4).</p> <p><b>Lotcounter</b> = displays the item counter status.</p> <p><b>RefTare</b> = if the <b>MinWeigh</b> function is activated, this information field displays the upper reference tare limit.</p> <p><b>MinWeigh</b> = if the <b>MinWeigh</b> function is activated, this information field displays the required minimum weight based on the reference tare.</p> <p><b>MW-Method</b> = if the <b>MinWeigh</b> function is activated, this information field displays which of the three MW methods are used for the QA standard.</p>	<p><b>Nominal*</b>   <b>+Tol</b>   <b>-Tol</b>    <b>Lotcounter</b>   <b>ID1*</b>    <b>ID2*</b>   <b>ID3</b>   <b>ID4</b>   <b>Info</b>  <b>Unit</b>   <b>Tare</b>   <b>Gross</b>    <b>RefTare</b>   <b>MinWeigh</b>    <b>MW-Method</b></p>

\* Factory setting

#### 6.1.4 Specifications for automatic protocol printout

**Navigation:** [] > [**Weighing**] > [] > **AutoPrint**

This menu item can be used to define whether and under which conditions the balance automatically records the weighing result. Information defined for recording single values is printed.

**See** [Protocol definition ▶ Page 75].

When this function is activated [**On**], the criteria for automatic entry can be defined via the [**Define**] button.

- 1 Press [].
  - ⇒ A window with application-dependent settings appears.
- 2 Beside **Autom. WeightEntry**, tap the associated button.
  - ⇒ **Autom. WeightEntry** window appears.
- 3 Tap [**On**] > [**Define**].
- 4 Change the settings and confirm with [**OK**].

You can define the following parameters:

Parameters	Explanation	Values
<b>Limit</b>	For automatic protocol printout, the defined limits must not be reached and subsequently exceeded.	Any
<b>Delay Time</b>	When the limits are exceeded, the [ <b>Delay Time</b> ] starts, after lapse of which the weight is recorded. With this setting, the weighing result can be printed with a defined delay if necessary.	Any (displayed in seconds)

**Factory setting:** [**Off**] Automatic entry disabled.

## 6.1.5 Selecting weighing units

**Navigation:** [☰] > [Weighing] > [⚙️] > **Display Unit** or **Info Unit**

The menu items **Display Unit** and **Info Unit** can be used to define the weighing units to be used. The weighing result can simultaneously be displayed in two different weighing units by selecting different units. The same units are available for selection under both menu items.

### Important

- The number of available units is model-dependent.
- All available units are either displayed together or shown as a rolling list.

After changing the **Display Unit**, the current weighing result as well as the values in the information fields **Tare** and **Gross** are displayed in the new weighing unit. The **Info Unit** is used for the information field with the same name.

**See** [Selecting information fields ▶ Page 72].

- 1 Press [⚙️].  
⇒ A window with application-dependent settings opens.
- 2 Beside **Display Unit** or **Info Unit**, tap the associated button.  
⇒ A selection window appears.
- 3 Change the settings and confirm with [OK].

You can define the following parameters:

Parameters	Explanation	Values
<b>Display Unit</b>	Defines the unit (model-dependent).	<b>g   kg   ct   lb   oz   ozt   GN   dwt   mom   msg   tih   tls   tlf   tola   baht</b>
<b>Info Unit</b>	Defines the unit (model-dependent).	<b>g   kg   ct   lb   oz   ozt   GN   dwt   mom   msg   tih   tls   tlf   tola   baht</b>

**Factory setting:** Model-dependent, for both units.

## 6.1.6 Defining free weighing units

**Navigation:** [☰] > [Weighing] > [⚙️] > **Custom Unit 1** or **Custom Unit 2**

A specific weighing unit can be defined under the menu items **Custom Unit 1** and **Custom Unit 2**. This allows calculations (e.g. surfaces or volumes) to be carried out directly during determination of the weighing result. The free weighing units are available in all menus and input fields in which weighing units can be selected (however, not for the entry of manual tare weights).

- 1 Press [⚙️].  
⇒ A window with application-dependent settings appears.
- 2 Tap **Custom Unit 1** or **Custom Unit 2** > [Off].  
⇒ **Custom Unit 1** or **Custom Unit 2** window appears.
- 3 Tap [On] > [Define].  
⇒ A selection window appears.
- 4 Change the settings and with [OK].

You can define the following parameters:

Parameters	Explanation	Values
<b>Formula</b>	<p>Defines how subsequently defined value for <b>[Factor]</b> is calculated. There are 2 formulae available, where F stands for the factor and <b>net</b> for the weight.</p> <p><b>F * Net</b> = multiplies the net weight by the factor.</p> <p><b>F / Net</b> = factor is divided by the net weight.</p> <p>The formula can be used, for example, to simultaneously take into account a known error factor while weighing.</p>	<b>F * Net   F / Net</b>
<b>Factor</b>	<p>Defines the factor (<math>-10^7 \dots 10^7</math>) with which the effective weighing result (net weight) is calculated via the previously selected formula.</p>	Any
<b>Name</b>	<p>Defines a designation for the free weighing unit (max. 4 characters).</p> <p><b>Important</b> The entry of weighing units is not permitted.</p>	Any
<b>Result Output Format</b>	<p>Defines the formatting for the weighing result.</p> <p><b>Example</b> A setting of "0.05" defines 2 places after the decimal point with rounding to 5. A determined result of 123.4777 is consequently displayed as 123.50.</p> <p><b>Important</b> This function can only be used to reduce the resolution of the weighing result. No value must therefore be entered that exceeds the maximum balance resolution! Values that are too small are automatically rounded off.</p>	Any


**Factory setting:** [Off].

### 6.1.7 Protocol definition

**Navigation:**  > [Weighing] >  > **Protocol**

This menu item can be used to define information to appear in the protocols. This extensive menu is divided into 3 submenus in which options for the header, recording of single values and the footer can be defined.

The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.
- Application is activated.
  - 1 Press .
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Protocol** > [Define].
    - ⇒ **Protocol** window appears.
  - 3 Tap (e.g. **Header**) > [Define].
  - 4 Select the information key which you need.
    - ⇒ The information key is automatically numbered.
  - 5 Confirm with [OK].

The arrow buttons can be used to page forward or back to a menu page.

#### Note

The results and data can be printed out at any time.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [⏏].

### Example: Printout

#### Header / Footer

```

----- Weighing -----
25.Jul 2013          17:30
T1
T2
Balance Type      XSE204
Balance ID        Lab A/1
ID1
Balance is levelled
Nominal           0.00 g
+Tol              2.50 %
-Tol              2.50 %
MW-Method         Off
Min.Weight by Tare
-----
Signature
.....

```

#### Single value

```

----- Weighing -----
25.Jul 2013          17:05
N           121.53 g
T           41.37 g
G           162.90 g
-----

```

#### Header line of protocols

This submenu can be used to define information to be printed in the protocol header (before the results). The header is automatically printed if it has been defined as part of the protocol.

However, the header can also be printed separately by tapping the [**Header**] function key.

#### Reporting of single values

This submenu can be used to define the information to be reported for each individual result.

Printing takes place by pressing the [⏏] key or automatically if the automatic print function is activated.

#### Protocol footer

This submenu can be used to define the information to be printed in the protocol footer after the results (single values).

The footer can be printed by tapping the [**Footer**] function key.

The footer options are identical with those of the header, only the **Levelcontrol** option is not available.

You can define the following parameters:

Parameters	Explanation	Values
<b>Header</b>	<p>Define the information to be printed in the protocol header (before the results).</p> <p><b>SNR</b> = the serial numbers of the balance and terminal are printed. The balance type is generated by the balance and cannot be changed by the user.</p> <p><b>Levelcontrol</b> = records whether or not the balance is correctly levelled.</p> <p><b>Nom.,+Tol,-Tol</b> = records the defined nominal weight and the defined plus and minus tolerances.</p> <p><b>MW-Method</b> = records the selected method for the minimum weight.</p>	<p><b>Appl. Name*   Title 1   Title 2   Date/Time*   User   Balance Type   SNR   Balance ID   Levelcontrol   ID1   ID2   ID3   ID4   Nom., +Tol,-Tol   MW-Method   Signature   Blank Line   Dash Line   3 Blank Lines</b></p>

<b>Single value</b>	Define the information to be reported for each single result.	<b>Appl. Name   Level-control   ID1   ID2   ID3   ID4   Nom., +Tol,-Tol   MW-Method   Tare   Net*   Gross   Info Unit   Signature   Blank Line   Dash Line   3 Blank Lines   Footer</b>
<b>Footer</b>	Define information to be printed in the protocol footer after the results (single values).	<b>Appl. Name   Title 1   Title 2   Date/Time   User   Balance Type   SNR   Balance ID   Levelcontrol   ID1   ID2   ID3   ID4   Nom., +Tol,-Tol   MW-Method   Signature*   Blank Line   Dash Line   3 Blank Lines</b>

\* Factory setting

### 6.1.8 Specifications for manual protocol printout

**Navigation:** [Menu] > [Weighing] > [Print] > **Print Key**

This menu item can be used to define the behavior of the [Print] key (protocol printout).

- 1 Press [Print].  
⇒ A window with application-dependent settings opens.
- 2 Beside **Print Key**, tap the associated button.  
⇒ A selection window appears.
- 3 Change the settings and confirm with [OK].

You can define the following parameters:

Parameters	Explanation	Values
<b>Print Key</b>	Define the behavior of the [Print] key. <b>Stable</b> = the protocol is only printed if the weighing result is stable. <b>Dynamic</b> = the protocol is printed immediately, regardless of whether the weighing result is stable.	<b>Stable*</b>   <b>Dynamic</b>   <b>Off</b>

\* Factory setting

### 6.1.9 Output data formatting (transfer key)

**Navigation:** [Menu] > [Weighing] > [Transfer] > **Transfer Key**

A stable weight can be transferred via the interface to a host computer with the [Transfer] function key. This menu item can be used to define the formatting for output values. This can be necessary if the balance is operated together with other instruments, programs or peripheral devices that use a specific data format. It can be defined whether data is output to the host or also to the printer.

- 1 Press [Transfer].  
⇒ A window with application-dependent settings appears.
- 2 Tap **Transfer Key** > [Define].  
⇒ **Transfer Key** window appears.
- 3 Change the settings and confirm with [OK].

## Menu structure

Main menu	Submenu	Further information
Data output format	Standard	See [Output format ▶ Page 78]
	Customise	
Data transfer to printer	Off	See [Data output to the printer ▶ Page 79]
	On	

### 6.1.9.1 Output format

Data output is set by default to a standard format that generally corresponds to the weight displayed at the terminal, followed by an end-of-line character defined for the host. Negative weights are displayed with a minus sign. The output weight is left-justified.

See [Peripherals ▶ Page 52].

**Example** (-12.8934 g):

1	2	3	4	5	6	7	8	9	10	11	12
-	1	2	.	8	9	3	4		g	C <sub>F</sub>	L <sub>F</sub>

#### Important

- If the resolution of the displayed value is reduced, the weight is also transferred with reduced resolution to the host.
  - If the balance has overload or underload at the time of data transfer, **UNDERLOAD** or **OVERLOAD** is transferred instead of the weight.
- 1 The output format can be changed by tapping the associated button under **Data output format**.
  - 2 Activate [**Customise**] and subsequently tap the [**Define**] button.

## Menu structure

Main menu	Submenu	Further information
Net indicator field	Off	See section Net weight icon
	Field length	
Weight field	Field length	See section Weight format
	No. of decimal digits	
	Sign	
	Sign position	
Unit field	Off	See section Weight unit field
	Field length	

#### Net weight icon

In the standard output format, net weights are not specially marked. To place an **N** in front of net weights, this function can be activated and also the field length defined. The net symbol is left-justified in the field.

You can define the following parameters:

Parameters	Explanation	Values
Off	Net weight icon deactivated.	None *
Field length	Activates the net weight icon. Defines the field length (max. 10 characters). <b>Important</b> If the balance was not tared, the net symbol is not transferred. Blank characters are transferred appropriate to the selected field length.	1 ... 10 (5 characters)*

\* Factory setting



## Weight format

You can define the following parameters:

Parameters	Explanation	Values
<b>Field length</b>	Defines the total length of the weight data field including sign, decimal point and decimal places (max. 20 characters). <b>Important</b> Irrespective of their setting, as many places are output as necessary for complete transfer of the weight displayed at the terminal. The weight is output right-justified.	1 ... 20 (10)*
<b>No. of decimal digits</b>	Defines the number of decimal places. If the set value has less than the number of decimal places displayed at the terminal, a rounded value with the selected number of decimal places is transferred.	0 ... 6 (max. number of places of the balance)*
<b>Sign</b>	Defines the sign. <b>Always</b> = each weight is preceded by a plus or minus sign. <b>Neg. values</b> = only negative values are preceded by a minus sign. Positive values are transferred without sign.	<b>Always   Neg. values*</b>
<b>Sign position</b>	Defines whether the sign should directly precede the weight (right-justified) or left-justified.	<b>-xxx.yy*   -xxx.yy</b>

\* Factory setting

## Weight unit field

In the standard output format, each weight is output with the weight unit (appropriate to the current display unit). This menu can be used to select whether weights are transferred with or without unit and also define the field length for the weight unit.

You can define the following parameters:

Parameters	Explanation	Values
<b>Off</b>	Defines whether weights are transferred with or without unit.	None (Output of weight unit activated)*
<b>Field length</b>	Defines the field length (max. 5 characters). Irrespective of their setting for the field length, as many places are output as necessary for complete transfer of the weight displayed at the terminal. The weight unit is output left-justified (separated from the weight by a space).	1 ... 5 (3)*

\* Factory setting

### 6.1.9.2 Data output to the printer

When the [**Transfer**] function key is pressed, the data is normally only transferred to the host. Data can also be sent to the printer by activating the setting.

#### Note

The previously described data formatting settings have no influence on data output to the printer. This is determined only by the protocol settings.

You can define the following parameters:

Parameters	Explanation	Values
<b>Data transfer to printer</b>	Activates/deactivates the data output to the printer.	<b>Off*   On</b>

\* Factory setting

## See also


 Protocol definition ▶ Page 75

### 6.1.10 Definition of identifications and protocol headers

**Navigation:**  > **[Weighing]** >  > **Identification**

This menu item can be used to activate the 4 identifications or change their designations available under the **[ID]** function key. Define two headers for the weighing protocols. The entered designations appear in the respective information fields (e.g. company name, customer) and can be printed out in the weighing protocols

Default ID designations are **[ID1]**, **[ID2]**, **[ID3]** and **[ID4]**. These can be replaced with specific designations (e.g. customer, order). The ID is subsequently available with the new designation under the **[ID]** function key.

- 1 Press .  
⇒ A window with application-dependent settings appears.
- 2 Tap **Identification** > **[Define]**.  
⇒ **Identification** window appears.
- 3 Settings can be changed by tapping the associated button.  
⇒ An alphanumeric input window appears.
- 4 Enter the designation and confirm with **[OK]**.

The arrow buttons can be used to page forward or back to a menu page.


Parameters	Explanation	Values
<b>Identification</b>	Activates/deactivates the 4 identifications or change their designations. Define two headers for the weighing protocols. <b>Title 1</b> ... <b>Title 2</b> = defines a designation for the protocol header (max. 20 characters). <b>ID1 Name</b> ... <b>ID4 Name</b> = defines the designation (max 20 characters).	<b>Title 1*</b>   <b>Title 2*</b>   <b>ID1 Name*</b>   <b>ID2 Name</b>   <b>ID3 Name</b>   <b>ID4 Name</b>

\* Factory setting

### 6.1.11 Instructions for processing barcode data

**Navigation:**  > **[Weighing]** >  > **Bar Code**

If a barcode reader or keyboard is connected to the balance, this menu can be used to define how the data is to be processed.

- The external device is appropriately configured in the **[Peripherals]** system setting.
- 1 Press .  
⇒ A window with application-dependent settings opens.
  - 2 Beside **Bar Code**, tap the associated button.  
⇒ A selection window appears.
  - 3 Change the settings and confirm with **[OK]**.

You can define the following parameters:

Parameters	Explanation	Values
<b>Bar Code</b>	<p>Defines how the data is be processed.</p> <p><b>ID1</b> ... <b>ID4</b> = the received barcode data is treated as identification texts and the corresponding identification assigned.</p> <p><b>PreTare</b> = the barcode data is interpreted as a value for the subtraction of tare weight.</p> <p><b>Host</b> = the data is transferred directly to a connected PC. If no PC is connected or this data cannot be received, it is ignored.</p> <p><b>Open Input</b> = the data is written in the currently open input window (e.g. lot counter, ID or PreTare). The window is automatically closed after the data is processed. If no input window is open, the data is ignored.</p>	<b>Off</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>PreTare</b>   <b>Host</b>   <b>Open Input*</b>

\* Factory setting

## 6.1.12 MinWeigh function settings

**Navigation:** > **[Weighing]** > > **MinWeigh**

### Important

The menu with the settings for the **MinWeigh** function is deactivated by default and not accessible. The **MinWeigh** function must be activated and programmed by a service engineer. If this function is required, but is not accessible in the menu, please contact your METTLER TOLEDO representative.

The **MinWeigh** function ensures that the weighing results are within defined tolerances appropriate to the requirements of your quality assurance system.

The service engineer will determine the required minimum weights based on your QA requirements and subsequently load these values into the balance. Up to 3 tare weights can be defined with the corresponding smallest net weights. The service engineer will set the weighing parameters to the values required for the maintenance of tolerances.

**See** [Weighing parameters ▶ Page 57].

### Important

After programming the balance, the service engineer will issue a certificate. This records the measurements and tolerances as well as corresponding tare and the smallest net weight. These settings cannot be changed by the user as long as the **MinWeigh** function is activated.

- The **MinWeigh** function is activated.
  - 1 Press .
    - ⇒ A window with application-dependent settings appears.
  - 2 Beside **MinWeigh**, tap the associated button.
    - ⇒ **MinWeigh** window appears.
  - 3 Tap **[On]** > **[Define]**.
  - 4 Change the settings and confirm with **[OK]**.

You can define the following parameters:

Parameters	Explanation	Values
<b>Method</b>	<p>Selects the method programmed by the service engineer according to your instructions.</p> <p>Up to 3 methods can be defined, e.g. <b>[USP]</b>.</p>	Any
<b>Info</b>	<p>Displays information relating to the <b>MinWeigh</b> function (method, date of next test by the service engineer and required minimum weights based on reference tare weights defined by the service engineer).</p> <p>The information can be printed out by pressing the  key.</p>	<b>Show</b>

Factory setting: [Off].

### 6.1.13 Tare memory definition and activation

Navigation: [☰] > [Weighing] > [☰] > Tare Store

This menu item can be used to define up to 10 tare weights available under the [Tare Store] function key and change their designations. The default designations for the tare memory are [T1] ... [T10]. These can be replaced by specific names, e.g. designation of a tare container. The tare memory is subsequently available with the new designation under the function key.

Information on working with the tare memory, see [Taring options ▶ Page 85].

#### Important

Deactivated tare memories [Off] cannot be selected under the [Tare Store] function key.

- 1 Press [☰].  
⇒ A window with application-dependent settings appears.
- 2 Beside **Tare Store**, tap the [Define] button.  
⇒ **Tare Store** window appears.
- 3 The settings, e.g. **T1** can be changed by tapping the associated button.
- 4 Tap [On] and subsequently the associated button.  
⇒ An alphanumeric input window appears.
- 5 Enter the designation and confirm with [OK].

The arrow buttons can be used to page forward or back to a menu page.

#### Menu structure

Main menu	Submenu	Further information
T1 ... T10	Off	See Parameter table
	On	

You can define the following parameters:

Parameters	Explanation	Values
Off	Deactivated tare memory.	None
On	Activates the tare memory. Defines a designation. Defines the weight.	Name   Value

You can define the following parameters:

Parameters	Explanation	Values
Name	Defines a designation for the tare memory (max. 20 characters). <b>Important</b> Although the designation can consist of up to 20 characters, it is recommended to use short designations. A maximum of 10 characters can be displayed under the [Tare Store] function key.	Any
Value	Defines a weight. <b>Note</b> Instead of entering the value, the respective tare container can be placed on the weighing pan and the button with the balance icon subsequently pressed. The weight is directly taken over.	Any

Factory setting: [Off].

## 6.1.14 Automatic taring function settings

**Navigation:** [Menu] > [Weighing] > [Settings] > **AutoTare**

This menu item can be used to define whether and under which conditions the balance automatically interprets the first applied weight after zeroing as the tare weight. If the **AutoTare** function is activated, [On], the weight criterion for the automatic taring function can be defined via the button.

Information on working with the automatic taring function, **see** [Taring options ▶ Page 85].

- 1 Press [Settings].
  - ⇒ A window with application-dependent settings appears.
- 2 Beside **AutoTare**, tap the associated button.
  - ⇒ **AutoTare** window appears.
- 3 Tap [On] and subsequently the associated button.
  - ⇒ A numeric input window appears.
- 4 Enter the value and confirm with [OK].

You can define the following parameters:

Parameters	Explanation	Values
<b>Off</b>	Deactivated <b>AutoTare</b> function.	None
<b>On</b>	Activates the automatic taring function.	<b>Limit</b>

You can define the following parameters:

Parameters	Explanation	Values
<b>Limit</b>	<p>This value defines the minimum weight that must be applied to the weighing pan so that it is automatically stored as the tare weight. If the weight is below the limits, it is not automatically transferred to the tare memory.</p> <p><b>Note</b> Instead of entering the weight, the lightest tare container can be placed on the weighing pan and the button with the balance icon subsequently pressed. The applied weight is directly taken over as a limit.</p>	Any

**Factory setting:** [Off].

## 6.1.15 ErgoSens settings

**Navigation:** [Menu] > [Weighing] > [Settings] > **ErgoSens**

External sensors connected to the connections "Aux 1" and "Aux 2" at the rear of the balance can be configured with the ErgoSens settings. ErgoSens is an optionally available external sensor. A maximum of 2 external ErgoSens can be connected to the balance.

Each of the two ErgoSens can be assigned one of the following functions by tapping the associated button.

- 1 Press [Settings].
  - ⇒ A window with application-dependent settings appears.
- 2 Tap **ErgoSens** > [Define].
  - ⇒ A selection window appears.
- 3 Select the required menu item (e.g. **ErgoSens 1 (Aux1)**).
  - ⇒ A selection window appears.
- 4 Select the function by tapping the button.
- 5 Change the settings and confirm with [OK].

You can define the following parameters:

Parameters	Explanation	Values
<b>ErgoSens 1 (Aux1)</b>	Activates/deactivates the ErgoSens 1. <b>PreTare</b> = opens the input window for numerical entry of a fixed tare weight (subtraction of tare weight). <b>Transfer</b> = transfers the stable, formatted weight via the interface. <b>AntiStatic Kit</b> = to activate the ionizer, it must be selected appropriate to the connection used.	<b>Off*</b>   ->0<-   ->T<-   <b>Print</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Header</b>   <b>Footer</b>   <b>PreTare</b>   <b>1/2d</b>   <b>1/5d</b>   <b>1/10d</b>   <b>1/100d</b>   <b>1/1000d</b>   <b>Transfer</b>   <b>AntiStatic Kit</b>
<b>ErgoSens 2 (Aux2)</b>	Activates/deactivates the ErgoSens 2.	<b>Off*</b>   ->0<-   ->T<-   <b>Print</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Header</b>   <b>Footer</b>   <b>PreTare</b>   <b>1/2d</b>   <b>1/5d</b>   <b>1/10d</b>   <b>1/100d</b>   <b>1/1000d</b>   <b>Transfer</b>   <b>AntiStatic Kit</b>

\* Factory setting

### 6.1.16 Settings for the optional anti-static kit (ionizer)

**Navigation:** > [Weighing] > > ErgoSens > ErgoSens 1 (Aux1) or ErgoSens 2 (Aux2) > [AntiStatic Kit]

The optional anti-static kit eliminates the build-up of electrostatic charges on weighing objects by ionization. The ionizer must be connected to one of the two connections "Aux 1" or "Aux 2" at the rear of the balance.

- 1 Switch on the balance .
- 2 Press .
- 3 Choose **ErgoSens** and tap the button [Define].  
⇒ A selection window appears.
- 4 Choose **ErgoSens 1 (Aux1)** or **ErgoSens 2 (Aux2)** and tap on the associated button.  
⇒ A selection window appears.
- 5 Tap in the scroll bar to select [AntiStatic Kit].
- 6 To save the settings, tap [OK].
- 7 Choose **Function Keys** and tap the button [Define].  
⇒ A selection window appears.
- 8 Tap [Ionizer].
- 9 To save the settings, tap [OK].  
⇒ The function key [Ionizer] is displayed in the application at the bottom of the display.  
⇒ Indicator light turns on and Status-Icon appears in the display when the Ionizer is working.

You can define the following parameters:

Parameters	Explanation	Values
<b>ErgoSens 1 (Aux1)</b>	Activates/deactivates the ErgoSens 1. <b>PreTare</b> = opens the input window for numerical entry of a fixed tare weight (subtraction of tare weight). <b>Transfer</b> = transfers the stable, formatted weight via the interface. <b>AntiStatic Kit</b> = to activate the ionizer, it must be selected appropriate to the connection used.	<b>Off*</b>   ->0<-   ->T<-   <b>Print</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Header</b>   <b>Footer</b>   <b>PreTare</b>   <b>1/2d</b>   <b>1/5d</b>   <b>1/10d</b>   <b>1/100d</b>   <b>1/1000d</b>   <b>Transfer</b>   <b>AntiStatic Kit</b>

<b>ErgoSens 2 (Aux2)</b>	Activates/deactivates the ErgoSens 2.	<b>Off*</b>   <b>-&gt;0&lt;-</b>   <b>-&gt;T&lt;-</b>   <b>Print</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Header</b>   <b>Footer</b>   <b>PreTare</b>   <b>1/2d</b>   <b>1/5d</b>   <b>1/10d</b>   <b>1/100d</b>   <b>1/1000d</b>   <b>Transfer</b>   <b>AntiStatic Kit</b>
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\* Factory setting

## 6.2 Working with the weighing application

**Navigation:**  > [Weighing]

This section describes the use of various functions of the **Weighing** application in practice.

### 6.2.1 Changing the weighing result resolution

The balance is set by default so that the weighing result is displayed with the maximum resolution, depending on the particular model (corresponding to 1d). The weighing result resolution can be changed at any time.

These function keys are inactive when the **MinWeigh** function is active or a free weighing unit is used.

- Function keys are activated.
- Tap the respective function key.
  - ⇒ When the respective function key is tapped again, the balance displays the result with normal resolution again.



<b>1/2d</b>	Displays the last decimal place in increments of 2.
<b>1/5d</b>	Displays the last decimal place in increments of 5.
<b>1/10d</b>	Displays the result in a 10x lower resolution.
<b>1/100d</b>	Displays the result in a 100x lower resolution.
<b>1/1000d</b>	Displays the result in a 1000x lower resolution.

### 6.2.2 Taring options

The tare weight is normally determined by placing the weighing container on the balance and subsequently pressing the **[→T←]** key. The balance offers further taring options, which facilitate daily working procedures.

#### Manual entry of the tare weight (subtraction of tare weight or PreTare)

If the same weighing container is used over an extended period, the weight can be entered manually. This saves taring when placing the weighing container on the balance. The tare weight is displayed as a negative value when the weighing container is removed. When the container is placed on the balance again, the display shows zero and the balance is immediately ready to use.



## PreTare

- Function key is activated.
  - 1 Tap [**PreTare**].
    - ⇒ A numeric input window is displayed.
  - 2 Enter the required tare weight.

Check the weighing unit, which is displayed to the right of the tare weight (free weighing units are not available for manual entry of the tare weight).  
A selection of available units can be displayed by tapping the weighing unit.
- NOTICE**  
Instead of entering the weight, place the tare container on the weighing pan and subsequently tap the button with the balance symbol. Wait until the displayed weight is stable before taking over with [**OK**]!
- 3 Confirm with [**OK**] to activate subtraction of the tare weight.
    - ⇒ The value for subtraction of the tare weight remains stored until a new value is entered, the [**→0←**] or [**→T←**] key is pressed or the balance is switched off.

### Using the automatic taring function

The balance can be configured to always automatically interpret the first applied weight as the tare weight.

- **AutoTare** function is activated.
- 1 Press [**→0←**] (otherwise the automatic acceptance of the tare weight will not function).
- 2 Place an empty container on the weighing pan.
  - ⇒ When the weight is stable, this is taken over as the tare weight.
  - ⇒ The weight display is set to zero and **Net** symbol is displayed.
- 3 Start weighing.
  - ⇒ When the full container is removed, the **Net** symbol extinguishes and the stored tare weight is deleted.

### Working with the tare memories

If different tare containers are used, their weights can be stored and displayed by pressing a button at any time whilst weighing. Up to 10 tare memories can be defined.

#### NOTICE

The memory designations correspond to those defined in the menu, e.g. [**Tare1**].



## Tare Store

- Function key is activated.
- Tare memories are defined and activated.
- 1 Tap [**Tare Store**].
  - ⇒ A selection window is displayed.
- 2 Tap the required memory.
  - ⇒ The associated tare weight is loaded.
- ⇒ The tare weight remains active until a new tare memory is selected, the [**→0←**] or [**→T←**] button is pressed, the application is changed, a different user profile is selected or the balance is switched off.

## 6.2.3 Working with the lot counter


The lot counter places a number in front of each weight during protocol printing, which is automatically incremented by 1 with each printout.

#### Note

When working with the lot counter, it is recommended to also activate the associated information field. This allows the current lot counter reading to be displayed at any time.

**See** [Selecting information fields ▶ Page 72].




Each time a printout is started with the  button, the weights are preceded by a lot counter, which is incremented by 1 with each new printout. When the lot counter reaches the maximum value of 999, the numbering starts at 1 again.

### Note

The lot counter also functions with automatic protocol printout.

**See** [Specifications for automatic protocol printout ▶ Page 73].

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

### Example: Printout

1	N	135.87 g
2	N	184.24 g
3	N	117.96 g



### Lotcounter

- Function key is activated.
- 1 Tap [**Lotcounter**].  
⇒ A numeric input window appears.
  - 2 Enter the start value for the lot counter (1 ... 999).  
The value 0 is preset by default, i.e. the lot counter is deactivated.
  - 3 Confirm with [**OK**] to activate the lot counter.

## 6.2.4 Working with identifications

Identifications are descriptive texts for individual weighing processes that allow perfect assignment of weighing objects to specific customer orders. The identifications are also printed on the protocols (or transferred to a connected computer).

The 4 identifications are designated by default with [**ID1**], [**ID2**], [**ID3**] and [**ID4**]. These designations can be replaced with other titles to suit the particular application (max. 20 characters). The selected designations (e.g. **customer** for the [**ID1**], **order** for the [**ID2**], **lot** for the [**ID3**] and **batch** for the [**ID4**]) are subsequently available under the [**ID**] function key.

### Important


If the IDs are deactivated, the function key is grayed and cannot be actuated. In this case, the IDs must first be activated before they can be used.

**See** [Definition of identifications and protocol headers ▶ Page 80].

When working with identifications, it is recommended to also activate the respective information fields. The information fields show the designations entered for the identifications.

**See** [Selecting information fields ▶ Page 72].

If the weighing protocol is defined in such a way that the identifications are also printed, the defined ID designations, e.g. [**Customer**] and the entered text, e.g. **METTLER TOLEDO** are printed out.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

### Example: Printout

```
----- Weighing -----
25.Jul 2014      17:21
Client
                METTLER TOLEDO
Order           MT-18/2004
Lot             18/2B
Sample         1/4
N              242.83 g
T              20.76 g
G              263.59 g
```



#### ID

- Function key is activated.
- 1 Tap [**ID**].
  - ⇒ A selection window with the available identifications appears.
- 2 Tap the associated button to be processed, e.g. [**Customer**].
  - ⇒ An alphanumeric input window appears.
- 3 Enter the designation, e.g. **METTLER TOLEDO** and confirm with [**OK**].
  - ⇒ When all entries have been made, the selected identifications can be rechecked against the information fields in the display.
  - ⇒ All identification texts remain stored until they are replaced with new ones.

## 6.2.5 Weighing-in to a nominal weight

The [**Weighing**] application offers additional functions that facilitate weighing-in to a defined nominal weight.

### Initial settings

To enter the nominal weight and the associated tolerance range, enable the function keys listed below. Also enable the data fields with the same names so that the defined values will be displayed.



#### Target&Tol

- Enable function keys.



#### Nominal



#### +Tolerance



#### -Tolerance

### Procedure with control center

- Function key are activated.
- 1 Tap [**Target&Tol**].
  - ⇒ A selection window appears.
- 2 Tap [**Nominal**].
  - ⇒ A numeric input window appears.
- 3 Enter the required value.
  - If a weight corresponding to the nominal weight is already on the balance, it can be directly taken over by tapping the button with the balance icon.
  - Check the weighing unit to the right of the nominal weight.
  - A selection of available units can be displayed by tapping the weighing unit.

### Important

Units are not converted automatically. When a value is entered in a unit, it is retained, even when the unit is changed.

- 4 Confirm with [**OK**] to activate the nominal weight.
- 5 Beside [**Tolerance Mode**], tap the [**Symmetric**] or [**Asymmetric**] button.  
⇒ A selection window appears.
- 6 Tap [**+/- Tolerance**] or [**+Tolerance**] and [**-Tolerance**]  
⇒ A numeric input window appears.
- 7 Enter the required value.  
Both tolerances are set to 2.5% by default. Instead of a percentage, an absolute tolerance can be entered in any unit, e.g. [**g**].
- 8 Confirm with [**OK**] to activate the tolerance.  
⇒ The **SmartTrac** graphic weighing-in aid with tolerance marks to facilitate weighing-in to the nominal weight appears.  
⇒ Samples can be roughly weighed until the lower tolerance limit is reached and subsequent additions made up to the nominal weight.

### Procedure without control center

- Function keys are activated.
- 1 Tap [**Nominal**].  
⇒ A numeric input window appears.
  - 2 Enter the required value.  
- If a weight corresponding to the nominal weight is already on the balance, it can be directly taken over by tapping the button with the balance icon.  
Check the weighing unit to the right of the nominal weight.  
A selection of available units can be displayed by tapping the weighing unit.

### Important

Units are not converted automatically. When a value is entered in a unit, it is retained, even when the unit is changed.

- 3 Confirm with [**OK**] to activate the nominal weight.
- 4 Tap [**+Tolerance**] and/or [**-Tolerance**]  
⇒ A numeric input window appears.
- 5 Enter the required value.  
Both tolerances are set to 2.5% by default. Instead of a percentage, an absolute tolerance can be entered in any unit, e.g. [**g**].
- 6 Confirm with [**OK**] to activate the tolerance.  
⇒ The **SmartTrac** graphic weighing-in aid with tolerance marks to facilitate weighing-in to the nominal weight appears.  
⇒ Samples can be roughly weighed until the lower tolerance limit is reached and subsequent additions made up to the nominal weight.


## 6.2.6 Working with the "MinWeigh" function


The **MinWeigh** function ensures that the weighing results are within defined tolerances appropriate to the requirements of your quality assurance system. This function must be activated and programmed by a service engineer.

It also recommended to activate the three information fields **MinWeigh**, **RefTare** and **Tare**.

### Important

If several reference tare weights (and the associated smallest net weights) were programmed by the service engineer, the required smallest net weight automatically changes appropriate to the applied tare weight.

The weighing result can be printed with the  key. The example printout shows part of a sample protocol containing specifications for the **MinWeigh** function (method, reference tare weight and required smallest net weight) as well as the current weights. The asterisk to the left of the net weight indicates that the smallest net weight in the example was not reached and the value does not satisfy the quality assurance requirements.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .



- **MinWeigh** function is activated.
  - 1 Activate the **MinWeigh**, **RefTare** and **Tare** information fields.
    - ⇒ The values and references are displayed in the information field.
    - ⇒ In the display to the left of the weighing result is a small weight icon with the character "<".
  - 2 Press [**→0←**].
    - ⇒ Sets the display to zero.
  - 3 Place the tare weight (weighing container) on the weighing pan and press [**→T←**] to tare the balance.
    - ⇒ The balance determines the tare weight and displays it in the **Tare** information field.
    - ⇒ The **Net** symbol (net weight) is displayed next to the weight display.
  - 4 Place the weighing object on the balance, e.g. 20 g.
    - ⇒ During the weighing operation, the weight is initially displayed in a light color to indicate that the smallest net weight has not yet been reached.
    - ⇒ When the required smallest net weight is reached, the weight is displayed in dark digits and the small weight icon extinguishes.



#### Important

If the status icon (small weight icon with clock) appears at the top right of the display (below the date and time), the next test for the **MinWeigh** function is due. Contact the relevant customer service department. A service engineer will perform the **MinWeigh test** as quickly as possible.

#### Example

When working according to GMP, the permissible tolerance is 1%, 2 s. When working according to USP, this is 0.1%, 2 s.

## 6.3 Balance adjustment and testing

**Navigation:**  > [**Weighing**]

Like any precision instrument, the balance must be adjusted at regular intervals. The balance offers extensive options for adjustment and testing.

Deviations must be able to be identified at an early stage and process tolerances checked. The risk can be minimized by regular testing.

The adjustment is intended for adjusting the sensitivity of the balance. For this purpose, at least one reference weight is placed on the weighing pan either manually or motorized. This is weighed and the indicated weight is stored. The sensitivity of the balance is subsequently corrected by the required amount.


The test is intended for testing the sensitivity of the balance.

**See** [Settings for adjustments and tests ▶ Page 35].

The balance is set to full automatic adjustment with ProFACT at the factory. ProFACT adjusts the balance fully automatically based on predefined criteria. Manual adjustments and/or tests can be carried out as required with the internal or an external weight.

If a printer is connected to the balance, the adjustments can be printed out according to user-specific settings.

**See** [Protocol – Definition of adjustment and test reports ▶ Page 50].

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

The following descriptions assume that the **[Adjust.int]**, **[Adjust.ext]**, **[Test int]** and **[Test ext]** function keys are activated for adjustment and tests.

## 6.3.1 Adjustment

### 6.3.1.1 Adjustment with internal weight/ProFACT

ProFACT adjusts the balance fully automatically based on predefined criteria.

#### Important

ProFACT is activated several times in the first 24 hours after connection to the power supply, irrespective of the selected criteria.



After meeting a predefined time and/or temperature criterion, the small ProFACT status icon appears at the top right of the display (below the date and time). The balance thus indicates the need to make a ProFACT adjustment.

- 1 Unload the balance.
- 2 Do not select any key for 2 minutes.
  - ⇒ Adjustment starts automatically.

During the adjustment, a window with information on the current adjustment is displayed. If the balance is in use at the time of adjustment, adjustment can be ended with the **[Cancel]** button. Adjustment is restarted by the balance at the next opportunity.

When adjustment is complete, the balance automatically returns to the application. The small weight icon at the top right of the display extinguishes. Each adjustment is automatically recorded based on the selections made in the system settings for recording adjustments

The described procedure is based on the factory setting. The procedure for internal adjustment can be extended with internal tests with **Advanced Options**.

**See** [Advanced options ▶ Page 47].

#### Manual adjustment activation



#### **Adjust.int**

Adjustment of the balance with the built-in weight can be initiated by tapping this function key. This can take place as required.

- **[Adjust.int]** function key is activated.
  - 1 Tap **[Adjust.int]**.
    - ⇒ An information window opens.
    - ⇒ The motorized lowering and lifting motion of the internal weight is audible.
  - 2 If **Adjustment done** appears, confirm with **[OK]**.
  - 3 If **Adjustment abort** appears:
    - If adjustment is aborted, confirm with **[OK]**.
    - If adjustment is aborted by the balance, tap **[Retry]**.

### 6.3.1.2 Adjustment with external test weight

#### Important

Depending on the country-specific requirements, adjustment with an external weight for calibration balances may not be available.



When a specific day or time is reached, the small adjustment icon appears at the top right of the display (below the date and time). This is an indication that the balance requires adjustment.

The balance then requests adjustment at the defined time. The last selected test weight is always used for automatic external adjustment.

- **Autom. ext. Adjust.** is activated.
  - **Test/Adj. Weight** are defined.
- 1 Tap [**Yes**] to start the adjustment sequence described below.
  - 2 When is [**Later**] tapped, a request for adjustment is repeated after 15 minutes.

**Note**

The small weight icon (status icon) for automatic external adjustment at the top right of the display, extinguishes after successful adjustment or if adjustment is declined at the second request [**No**]. The balance automatically returns to the application. Each adjustment is automatically recorded based on the selections made in the system settings for recording adjustments

**Manual adjustment activation**



**Adjust.ext**

Adjustment of the balance with an external test weight can be initiated by tapping this function key. This can take place as required.

**Adjustment sequence**

- [**Adjust.ext**] function key is activated.
  - **Test/Adj. Weight** are defined.
- 1 Tap [**Adjust.ext**].
    - ⇒ A list is displayed for selection of the test weight.
  - 2 Select a test weight by tapping.
    - ⇒ Adjustment starts.
  - 3 Use the correct test weight. The ID and certificate number of the respective test weight are displayed if available.

**Important**

Ensure that the correct test weight is used, otherwise the adjustment will be aborted with an error message.

- ⇒ The required weight flashes at the bottom of the window and adjustment takes place automatically.
- 4 Remove the test weight from the weighing pan when adjustment is complete.
    - ⇒ When the process is complete, one of the following messages appears.
  - 5 If **Adjustment done** is displayed, confirm with [**OK**].
  - 6 If **Adjustment abort** appears:
    - If adjustment is aborted, confirm with [**OK**].
    - If adjustment is aborted by the balance, tap [**Retry**].

**6.3.2 Testing**

**6.3.2.1 Testing the adjustment with internal weight**

The test is intended for testing the sensitivity of the balance.



**Test int**

The balance can be tested for correct adjustment using the internal weight by tapping this function key. This can be carried out as required.

- [**Test int**] function key is activated.
- 1 Tap [**Test int**].
    - ⇒ An information window opens.
    - ⇒ The motorized lowering and lifting motion of the internal weight is audible.
    - ⇒ When the process is complete, one of the following messages appears.

- 2 If **Test done** appears, confirm with **[OK]**.
- 3 If **Test Aborted!** appears:
  - If the test is aborted by the user, confirm with **[OK]**.
  - If the test aborted by the balance, tap **[Retry]**.

### 6.3.2.2 Testing the adjustment with external test weight



When a specific day or time is reached, the small test icon appears at the top right of the display (below the date and time). This is an indication that the balance requires testing.

For the automatic external test, the last selected test weight is always used.

- **Autom. ext. Test** is activated.
- **Test/Adj. Weight** are defined.

- 1 Tap **[Yes]** to start the test sequence described below.
- 2 When **[Later]** is tapped, a request for testing the adjustment is repeated after 15 minutes.

#### Note

The small weight icon (status icon) for automatic external adjustment at the top right of the display, extinguishes after successful testing or if the test is declined at the second request **[No]**.

#### Manual test activation



#### Test ext

The balance can be tested for correct adjustment with an external test weight by tapping this function key. This can be carried out as required.

- **[Test ext]** function key is activated.
  - **Test/Adj. Weight** are defined.
- 1 Tap **[Test ext]**.
    - ⇒ A list is displayed for selection of the test weight.
  - 2 Select a test weight by tapping.
    - ⇒ The test starts.
  - 3 Use the correct test weight. The ID and certificate number of the respective test weight are displayed if available.

#### Important

Ensure that the correct test weight is used, otherwise the test sequence will be aborted with an error message.

- ⇒ The required weight flashes at the bottom of the window and the test sequence takes place automatically.
- 4 Remove the test weight from the weighing pan when the test is complete.
    - ⇒ When the test is complete, one of the following messages appears.
  - 5 If **Adjustment done** is displayed, confirm with **[OK]**.
  - 6 If **Adjustment abort** appears:
    - If the test is aborted by the user, confirm with **[OK]**.
    - If the test aborted by the balance, tap **[Retry]**.

### 6.3.3 Protocols

The detail of the record depends on the selected settings.

**See** [Protocol – Definition of adjustment and test reports ▶ Page 50].

- **[Adj. History]** function key is activated.
- 1 Adjustments and tests can be displayed by tapping **[Adj. History]**.
    - ⇒ An information window opens.
  - 2 Press **[Print]** to print.
  - 3 To exit the menu item, tap **[OK]**.

### 6.3.3.1 Adjustment and test records (sample records)

#### Example: Printout

##### Internal or ProFACT adjustment protocol

```
- Internal adjustment --
25.Jul 2014          16:02

METTLER TOLEDO

WeighBridge SNR:
                  1234567890
Terminal SNR: 1234567891
Balance ID       Lab A/1

Temperature      21.2 °C

Adjustment done

Signature

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

#### NOTICE

No signature line is printed for a ProFACT adjustment.

##### External adjustment protocol

```
- External adjustment --
25.Jul 2014          16:12

METTLER TOLEDO

WeighBridge SNR:
                  1234567890
Terminal SNR: 1234567891
Balance ID       Lab A/1
Weight ID        ECW-6000/1
Certificate No.  MT-414/A
Temperature      20.8 °C
Nominal          200.00 g

Adjustment done

Signature

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

##### Internal test protocol

```
---- Internal test ----
25.Jul 2014          16:22

METTLER TOLEDO

WeighBridge SNR:
                  1234567890
Terminal SNR: 1234567891
Balance ID       Lab A/1
Temperature      19.8 °C
Nominal          100.0000 %
Actual           99.9981 %
Diff             -0.0019 %

Test done

Signature

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

##### External test protocol

```
---- External test ----
25.Jul 2014          16:32

METTLER TOLEDO

WeighBridge SNR:
                  1234567890
Terminal SNR: 1234567891
Balance ID       Lab A/1
Weight ID        ETW-200/1
Certificate No.  MT-806/5
Temperature      20.2 °C
Nominal          200.00 g
Actual           199.90 g
Diff             -0.10 g

Test done

Signature

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

## 6.4 Working with the test sequence function

**Navigation:** [F5] > [Weighing]

Define test sequences, test (method) and weight to be used. The user is guided through the test with the display of clear instructions. The test should be carried out according to GWP® or other QM systems.




All parameters and values for the test sequence have been defined and the test sequence assigned to a task. Define tasks - when and how the test sequence will be carried out. If standard is selected under the [**Preparation Instructions**] menu item, preparatory instructions are displayed in the test sequence. These correspond to the typical SOP standard. These instructions must be followed and confirmed with [**OK**] before the rest of the test sequence can be continued.

#### Note

The extensiveness of the test depends on the settings selected (e.g. **Preparation Instructions, Action if Failure, AutoZero**).

**See** [Test sequences ▶ Page 37] subsequence "Configuration of test sequence parameters".

On completion of the test, the measurements are printed together with the results.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [].

A method describes the type of test to be carried out and defines the main purpose of a test sequence. There are 8 different methods available.

### 6.4.1 Starting a task

A task can be started either automatically or manually depending on the particular settings.

#### GWP

When a specific day or time is reached, the small GWP icon appears at the top right of the display (below the date and time). This is an indication that the balance requires a task to be performed. An instruction window is simultaneously displayed, which guides the user through the test. These instructions must be followed.

- Test sequence is defined and assigned to a task.
  - 1 Follow the instructions and confirm with [**OK**].
  - 2 Remove all weights and confirm with [**OK**].
  - 3 Level the balance and confirm with [**OK**].
  - 4 Follow further instructions depending on the selected task.

#### Note

The instruction window is closed and the small GWP icon for the task at the top right of the display extinguishes on successful completion of the test.

#### Manual test activation



#### Test Sequence

A test sequence can be started manually by tapping the function key.

- [**Test Sequence**] function key is activated.
- Test sequence is defined and assigned to a task.
  - 1 Tap [**Test Sequence**].
    - ⇒ A selection window with test sequences appears.
  - 2 Tap the test sequence.
    - ⇒ An instruction window appears.

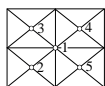
The test sequence was started  
Follow the instructions below:

      1. Clean the weighing pan.
      2. Level the balance.
      3. Switch on the printer if necessary.
      4. Have the test weights ready.
      5. Have the weight tweezers/fork ready.

When all instructions have been followed, confirm with [**OK**] and follow further test sequence instructions.
  - 3 Remove all weights and confirm with [**OK**].
  - 4 Level the balance and confirm with [**OK**].

#### 6.4.1.1 EC - eccentric load test

The purpose of the **EC** method (eccentric load test) is to ensure that every eccentric load deviation is within the necessary user SOP tolerances.



The result corresponds to the highest of the 4 determined eccentric load deviations.

##### Method

The procedure is as follows:

- 1 Zero the balance.
- 2 Place the test weight in the center and confirm with [**OK**].
- 3 Place the test weight at the front left and confirm with [**OK**].
- 4 Place the test weight at the rear left and confirm with [**OK**].
- 5 Place the test weight at the rear right and confirm with [**OK**].
- 6 Place the test weight at the front right and confirm with [**OK**].
- 7 Remove all weights and confirm with [**OK**].
- 8 Zero the balance.  
⇒ The test results are displayed together with the results.
- 9 To exit the menu item, tap [**OK**].
- 10 To abort, tap [**C**].  
⇒ The test is printed out.

#### 6.4.1.2 RP1 - repeatability test

The **RP1** method calculates the mean and standard deviation (Symbol  $s$ ) of a series of measurements with a single test weight in order to determine the repeatability of the balance.

##### Method

The procedure is as follows:

- 1 Zero the balance.
- 2 Place the test weight on the balance and confirm with [**OK**].
- 3 Remove the test weight and confirm with [**OK**].
- 4 Repeat steps 2 and 3.
- 5 Zero the balance.  
⇒ The test results are displayed together with the results.
- 6 To exit the menu item, tap [**OK**].
- 7 To abort, tap [**C**].  
⇒ The test is printed out.

#### 6.4.1.3 RPT1 - repeatability test with tare weight

The **RPT1** method calculates the mean and standard deviation (Symbol  $s$ ) of a series of measurements with two test weights in order to determine the repeatability. In contrast to the **RP1** method, a second test weight is used to simulate the use of a tare container.

##### Method

The procedure is as follows:

- 1 Zero the balance.
- 2 Place the tare weight on the balance and confirm with [**OK**].
- 3 Tare the balance.
- 4 Place the test weight on the balance and confirm with [**OK**].

- 5 Remove the test weight and confirm with **[OK]**.
- 6 Repeat steps 4 and 5.
- 7 Zero the balance.
  - ⇒ The test results are displayed together with the results.
- 8 To exit the menu item, tap **[OK]**.
- 9 To abort, tap **[C]**.
  - ⇒ The test is printed out.

#### 6.4.1.4 SE1 - sensitivity test with one weight

The **SE1** method tests the sensitivity of the balance with one test weight.

##### Method

The procedure is as follows:

- 1 Zero the balance.
- 2 Place the test weight on the balance and confirm with **[OK]**.
- 3 Remove the test weight and confirm with **[OK]**.
- 4 Zero the balance.
  - ⇒ The test results are displayed together with the results.
- 5 To exit the menu item, tap **[OK]**.
- 6 To abort, tap **[C]**.
  - ⇒ The test is printed out.

#### 6.4.1.5 SE2 - sensitivity test with two weights

The **SE2** method tests the sensitivity of the balance with two test weights.

##### Method

The procedure is as follows:

- 1 Zero the balance.
- 2 Place test weight 1 on the balance and confirm with **[OK]**.
- 3 Remove test weight 1 and confirm with **[OK]**.
- 4 Zero the balance.
- 5 Place test weight 2 on the balance and confirm with **[OK]**.
- 6 Remove test weight 2 and confirm with **[OK]**.
- 7 Zero the balance.
  - ⇒ The test results are displayed together with the results.
- 8 To exit the menu item, tap **[OK]**.
- 9 To abort, tap **[C]**.
  - ⇒ The test is printed out.

#### 6.4.1.6 SERVICE - reminder

The **SERVICE** method is more a reminder than a method. It is normally set to perform regular checks of various data (dates) in the background. It is used e.g. as a reminder for the next service date or MinWeigh date. The date is checked on a regular basis and a message appears when the defined task is due. The **SERVICE** method can also be used as early pre-warning.

- **[Test Sequence]** function key is activated.
- Test sequence is defined and assigned to a task.
  - Carry out the task.

#### 6.4.1.7 SET1 - sensitivity test with tare and one test weight

The **SET1** method tests the sensitivity of the balance with two test weights. The first test weight is used to simulate a tare container.

##### Method

The procedure is as follows:

- 1 Zero the balance.
- 2 Place the tare weight on the balance and confirm with [**OK**].
- 3 Tare the balance.
- 4 Place the test weight on the balance and confirm with [**OK**].
- 5 Remove the test weight and confirm with [**OK**].
- 6 Zero the balance.  
⇒ The test results are displayed together with the results.
- 7 To exit the menu item, tap [**OK**].
- 8 To abort, tap [**C**].  
⇒ The test is printed out.

#### 6.4.1.8 SET2 - sensitivity test with tare and two test weights


The **SET2** method tests the sensitivity of the balance with three test weights. The first test weight (tare weight) is used to simulate a tare container.

##### Method

The procedure is as follows:

- 1 Zero the balance.
- 2 Place test weight 1 on the balance and confirm with [**OK**].
- 3 Remove test weight 1 and confirm with [**OK**].
- 4 Zero the balance.
- 5 Place the tare weight on the balance and confirm with [**OK**].
- 6 Tare the balance.
- 7 Place test weight 2 on the balance and confirm with [**OK**].
- 8 Remove all weights and confirm with [**OK**].
- 9 Zero the balance.  
⇒ The test results are displayed together with the results.
- 10 To exit the menu item, tap [**OK**].
- 11 To abort, tap [**C**].  
⇒ The test is printed out.

## 7 Pipette Check Application

Navigation:  > [Pipette Check]



This application requires the use of the optional accessory EasyScan (RFID reader/writer) to use all functions.

RAININ pipette with embedded RFID tag can automatically use the application.

### Terms

Since pipette checks are subject to inaccuracy, **Sys. error E** and **Random Error s** can occur time and again. **Sys. error E** is a deviation between the nominal and mean value of measured test values.

**Random Error s** is a measure for the variation of determined volume values, i.e. denotes the relative standard deviation.

**Random errors** can be small if measured values are close together, however **systematic errors** can be large if the calculated mean value is far from the nominal value. This can also be the reverse. Ideally both measurement errors should be as small as possible.

### Options

The **Pipette Check** application offers various options:

#### Pipette Check

Quality management systems conforming to standards such as ISO 9000, GLP or GMP require regular testing of volumetric measuring devices. **Pipette Check** checks the accuracy of pipettes.

**Pipette Check** allows the accuracy of pipettes of any manufacturer.

When a configured RFID pipette or MethodCard is held at EasyScan, the application reads all data, checks dates and write new check data automatically.

#### Start Check

This allows to check any pipette without the use of RFID EasyScan.

#### Training

With this option, pipetting can be practiced or a system test of pipette, liquid and user can be performed. Before attempting to pipette with sensitive or expensive liquids, it may be necessary to check whether the required accuracy with a specific pipette can be achieved on a specific balance.

Training can be performed with pipettes of any manufacturer. An RFID tag is not required as it is not supported by the balance using the training option.

#### RFID tag configuration


Before using the RFID tag for the first time, the configuration data must be entered.

#### Other functions

The **Pipette Check** application offers no pipette calibration functions. If calibration is required after checking, contact the pipette manufacturer.

For the **Pipette Check** and **Training** options, we recommend the use of a precision thermometer, barometer, hygrometer and evaporation trap.

#### Selecting the application

- 1 Press .
  - 2 Tap the [Pipette Check] icon in the selection window.
    - ⇒ The selected application is active.
    - ⇒ Some of the specific function keys and protocol information for the pipette check are activated by default (factory defaults).
- ⇒ The balance is ready for the pipette check.

## 7.1 Settings for pipette check application

**Navigation:** [Menu] > [Pipette Check] > [Settings]

Various specific pipette check settings are available, which can be used to adapt the application to suit specific requirements.

Most of the settings are the same as the **Weighing** application. Only the pipette check specific settings are described below.

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Menu item	Explanation	Further information
<b>Pipette Check Options</b>	Defines the behavior of Quick-Check.	<b>See</b> [Specific pipette check option settings ▶ Page 100]
<b>Training Options</b>	Defines the training behavior.	<b>See</b> [Specific training option settings ▶ Page 100]
<b>RFID recognition beep</b>	Defines the behavior of the RFID recognition beep.	<b>See</b> [Specific RFID recognition beep settings ▶ Page 101]
<b>Function Keys</b>	Defines the function keys for the pipette check to appear at the bottom of the display. These keys enable direct access to specific functions.	<b>See</b> [Specific function keys for pipette check application ▶ Page 101]
<b>QuickCheck Protocol</b>	Selects information to be shown in the Quick-Check protocols.	<b>See</b> [Specific protocol information for pipette check ▶ Page 102]
<b>Training Protocol</b>	Selects information to be shown in the training protocols.	<b>See</b> [Specific protocol information for training ▶ Page 103]

### 7.1.1 Specific pipette check option settings

**Navigation:** [Menu] > [Pipette Check] > [Settings] > **Pipette Check Options** > [Define]

This menu can be used to define the behavior of pipette check.

You can define the following parameters:

Parameters	Explanation	Values
<b>Stabilization time</b>	Defines the stabilization time in seconds (numerical entry).	3 ... 100 (5)*
<b>Measurement end beep</b>	Activates/deactivates the beep at the end of measurement.	<b>Off   On*</b>
<b>Auto start next sample</b>	Activates/deactivates automatic start of pipetting detection. <b>Off:</b> To start pipetting the next sample, confirm the result with [OK].	<b>Off   On*</b>

\* Factory setting

### 7.1.2 Specific training option settings

**Navigation:** [Menu] > [Pipette Check] > [Settings] > **Training Options**

You can define the following parameters:

Parameters	Explanation	Values
<b>Stabilization time</b>	Defines the stabilization time in seconds (numerical entry).	3 ... 100 (5)*
<b>No. of measurements</b>	Defines the number of measurements for training (numerical entry).	1 ... 100 (5)*

<b>Training liquid</b>	Defines the liquid used for training.	<b>Water*</b>   <b>Others</b>
<b>Measurement end beep</b>	Activates/deactivates the beep at the end of measurement.	<b>Off</b>   <b>On*</b>
<b>Auto start next sample</b>	Activates/deactivates automatic start of pipetting detection. <b>Off:</b> To start pipetting the next sample, confirm the result with <b>[OK]</b> .	<b>Off</b>   <b>On*</b>

\* Factory setting

### 7.1.3 Specific RFID recognition beep settings

Navigation:  > **[Pipette Check]** >  > **RFID recognition beep**

Parameters	Explanation	Values
<b>RFID Recognition Beep</b>	Activates/deactivates the RFID recognition beep. The beep sounds when the RFID reader has scanned the RFID tag data.	<b>Off</b>   <b>On*</b>

\* Factory setting

### 7.1.4 Specific function keys for pipette check application

Navigation:  > **[Pipette Check]** >  > **Function Keys**

Function keys enable direct access to specific functions and settings in the application. A function can be activated by tapping a key.

The function keys are displayed in the application at the bottom of the display. The numbers define the sequence in the display.

- Activate or deactivate function keys by tapping.
- To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.

The arrow buttons can be used to page forward or back to a menu page.

- Application is activated.

1 Press .





⇒ A window with application-dependent settings appears.

2 Tap **Function Keys** > **[Define]**.

3 Select the **Function Keys** which you need.

⇒ The function key is automatically numbered.

4 Change the settings and confirm with **[OK]**.

	Designation	Explanation
	<b>Start Check</b>	Starts pipette check without using RFID.
	<b>Training</b>	Starts training.
	<b>Setup</b>	Starts setup.
	<b>HowTo</b>	Display pipetting instructions.

**Factory settings:** **[Start Check]**, **[Setup]** and **[HowTo]** activated, in this sequence.

## 7.1.5 Specific protocol information for pipette check

**Navigation:** [☰] > [Pipette Check] > [☰] > **Pipette Check Protocol** > [Define]

Here you define which data appears in the protocols. This large menu item is divided into three sub-menus. They enable you to make additional settings for the application. The rest of the available protocol data corresponds to the data for the **Weighing** application and is not described here.

The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
  - To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.
  - Application is activated.
- 1 Press [☰].
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Protocol** > [Define].
    - ⇒ **Protocol** window appears.
  - 3 Tap (e.g. **Header**) > [Define].
  - 4 Select the information key which you need.
    - ⇒ The information key is automatically numbered.
  - 5 Confirm with [OK].

The arrow buttons can be used to page forward or back to a menu page.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [☰].

### Header line of protocols

Use this sub-menu to define which data is printed in the protocol header (before the results).

### Recording of single values

This submenu can be used to define the information to be reported for each individual result.

### Protocol footer

This submenu can be used to define the information to be printed in the protocol footer after the results (single values).

You can define the following parameters:

Parameters	Explanation	Values
<b>Header</b>	Define the information to be printed in the protocol header (before the results). <b>Pipette model</b> = records the pipette type. <b>Pipette SNR</b> = records the pipette serial number. <b>Nominal vol.</b> = records the nominal volume of the pipette. <b>No. of measurements</b> = records the number of measurements. <b>Env. data</b> = records the air pressure, air temperature, water temperature and humidity. <b>Conv. factor Z</b> = records the conversion factor Z. <b>Overall result</b> = records whether pipette check was passed or failed.	<b>Appl. Name*</b>   <b>Title 1</b>   <b>Title 2</b>   <b>Date/Time*</b>   <b>User</b>   <b>Balance Type</b>   <b>SNR</b>   <b>Balance ID</b>   <b>Levelcontrol</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Pipette model*</b>   <b>Pipette SNR*</b>   <b>Nominal vol.</b>   <b>Comment</b>   <b>No. of</b> <b>measurements</b>   <b>Env.</b> <b>data</b>   <b>Conv. factor Z</b>   <b>Overall result</b>   <b>Signature</b>   <b>Blank Line</b> <b>  Dash Line</b>   <b>3 Blank</b> <b>Lines</b>



<b>Single value</b>	Define the information to be recorded for each single result. <b>Check vol.</b> = records the check volume. <b>Limit</b> = records the maximum permissible check volume system error and random error (tolerance limits). <b>Meas. details</b> = records details of the measurement (number and calculated volume of each sample). <b>Statistics</b> = records: <ul style="list-style-type: none"> <li>• average sample volume</li> <li>• check volume systematic error [µl] und [%]</li> <li>• check volume random error [µl] und [%]</li> <li>• calculated measurement uncertainty</li> </ul> <b>Result</b> = records the volume result (passed/failed).	<b>Check vol.*   Limit   Meas. details   Statistics   Result*</b>
<b>Footer</b>	Define information to be printed in the protocol footer after the results (single values).	<b>Appl. Name   Title 1   Title 2   Date/Time   User   Balance Type   SNR   Balance ID   Levelcontrol   ID1   ID2   ID3   ID4   Overall result*   Signature*   Blank Line   Dash Line   3 Blank Lines*</b>


\* Factory setting

## 7.1.6 Specific protocol information for training


**Navigation:**  > **[Pipette Check]** >  > **Training Protocol** > **[Define]**

Here you define which data appears in the protocols. This large menu item is divided into three sub-menus. They enable you to make additional settings for the application. The rest of the available protocol data corresponds to the data for the **Weighing** application and is not described here.

The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
  - To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.
    - Application is activated.
- 1 Press .
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Protocol** > **[Define]**.
    - ⇒ **Protocol** window appears.
  - 3 Tap (e.g. **Header**) > **[Define]**.
  - 4 Select the information key which you need.
    - ⇒ The information key is automatically numbered.
  - 5 Confirm with **[OK]**.

The arrow buttons can be used to page forward or back to a menu page.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

### Header line of protocols

Use this sub-menu to define which data is printed in the protocol header (before the results).

## Recording of single values

This submenu can be used to define the information to be reported for each individual result.

### Protocol footer


This submenu can be used to define the information to be printed in the protocol footer after the results (single values).

You can define the following parameters:

Parameters	Explanation	Values
<b>Header</b>	<p>Define the information to be printed in the protocol header (before the results).</p> <p><b>Liquid name</b> = records the name of the liquid.</p> <p><b>Env. data</b> = if <b>Training liquid: Water</b>, the air pressure, air temperature, water temperature and humidity are recorded. If <b>Training liquid: Others</b>, the density of the used liquid is recorded.</p> <p><b>Conv. factor Z</b> = if <b>Training liquid: Water</b>, the conversion factor Z is recorded.</p>	<p><b>Appl. Name*</b>   <b>Title 1</b>   <b>Title 2</b>   <b>Date/Time*</b>   <b>User</b>   <b>Balance Type</b>   <b>SNR</b>   <b>Balance ID</b>   <b>Levelcontrol</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>No. of measurements*</b>   <b>Liquid name*</b>   <b>Env. data</b>   <b>Conv. factor Z</b>   <b>Overall result</b>   <b>Signature</b>   <b>Blank Line</b>   <b>Dash Line</b>   <b>3 Blank Lines</b></p>
<b>Single value</b>	<p>Define the information to be recorded for each single result.</p> <p><b>Test vol.</b> = records the test volume.</p> <p><b>Meas. details</b> = records details of the measurement (number and calculated volume of each sample).</p> <p><b>Statistics</b> = records:</p>	<p><b>Test vol.*</b>   <b>Meas. details</b>   <b>Statistics*</b></p>
<b>Footer</b>	<p>Define information to be printed in the protocol footer after the results (single values).</p>	<p><b>Appl. Name</b>   <b>Title 1</b>   <b>Title 2</b>   <b>Date/Time</b>   <b>User</b>   <b>Balance Type</b>   <b>SNR</b>   <b>Balance ID</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Signature*</b>   <b>Blank Line</b>   <b>Dash Line</b>   <b>3 Blank Lines*</b></p>

\* Factory setting


## 7.2 Working with the pipette check application

**Navigation:**  > [**Pipette Check**]

This section describes working with the **Pipette Check** application. It is assumed that the **Pipette Check** application is selected and the application-specific settings have been made. If an evaporation trap is available, it should be installed. A precision thermometer, barometer and a hygrometer, if required, should be available.

### Important

Test liquid, sample container, pipette and pipette tip should be acclimatized.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

This application requires the use of the optional accessory EasyScan (RFID reader/writer) to use all functions.

### 7.2.1 Training


**Navigation:**  > [] > **Function Keys** > [**Define**] > **Training**

This section describes the training procedure. The training option can be used for pipette training or preparing for a complex or critical pipetting task.

### Preparation


- Activate the function key [**Training**].
- Pipette as directed by the [**HowTo**] function key.

### Training

- Application is activated.
- 1 Tap [**Training**].
    - ⇒ A window with test volume appears.
  - 2 Change the volume if necessary and confirm with [**OK**].
    - ⇒ A window with environmental data appears.
  - 3 Change the data if necessary and confirm with [**OK**].
  - 4 Place a container on the weighing pan and confirm with [**OK**].
    - ⇒ A window with instructions appears.
  - 5 Carry out the defined number of measurements.
    - If a measurement is carried out incorrectly, the last measurement can be cancelled or repeated any number of times (only when **Auto start next sample** is not active).
    - When **Auto start next sample** is active, start the next measurement directly with pipetting.
    - If **Auto start next sample** is not active, press [**OK**].
  - 6 The series of measurements is completed when the defined number is reached **No. of measurements**. To actively end the series of measurements, tap [**Finish**].
    - ⇒ The balance displays the final result.
  - 7 The test result can be printed by pressing [].
  - 8 Confirm with [**OK**] to close training procedure.
    - ⇒ Training is complete, all results are deleted automatically.

## 7.2.2 RFID tag configuration

### 7.2.2.1 RFID tag configuration for pipettes

**Navigation:** [] > [**Pipette Check**]

This section describes the setting options for a new pipette. New RFID tags do not contain any data. Before the RFID tag can be used, the required data must be entered.

- Application is activated.
  - The RFID tag of the pipette is empty.
- 1 Hold the pipette at RFID reader.
    - ⇒ The balance detects that the RFID tag is empty and opens the data input window.
  - 2 Enter all pipette and method data.
  - 3 Confirm data entry with [**OK**].
    - ⇒ The balance requests that the RFID pipette is held at RFID reader.
  - 4 Hold the pipette at RFID reader.
    - ⇒ The data is written to the RFID tag.
    - ⇒ The balance displays a message to confirm that the data has been successfully written to the tag.
  - 5 Confirm with [**OK**].

The following data can be edited:

Parameters	Explanation	Values
<b>Pipette SNR</b>	Pipette serial number.	Alphanumeric, max. 15 characters*

<b>Pipette model</b>	Type of pipette.	Alphanumeric, max. 15 characters*
<b>Nominal vol.</b>	Nominal pipette volume in microliters [ $\mu$ l].	Value* (200 $\mu$ l)
<b>Next Pipette Check</b>	Defines the next pipette check date.	Date* (Date)
<b>Comment field: Name</b>	Defines the free field name.	Alphanumeric, max. 10 characters*
<b>Comment field: Content</b>	Defines the free field content.	Alphanumeric, max. 15 characters
<b>Check interval</b>	Defines the pipette check interval (entry in days)	Value* (90)
<b>Pipette type</b>	Selects the pipette type (Single Channel or Multi Channel).	Selection field* ( <b>Single channel</b> )
<b>Evaporation trap</b>	Defines whether an evaporation trap is required.	Selection field* ( <b>No</b> )
<b>No. of measurements</b>	Defines the number of measurements for pipette check (valid for all volumes).	Value* (4)
<b>Volume 1</b>	Defines the pipette check test volume 1 (percentage of the nominal volume).	Value* (10 %)
<b>Volume 2</b>	Defines the pipette check test volume 2 (percentage of the nominal volume).	Value* (100 %)
<b>Volume 3</b>	Defines the pipette check test volume 3 (percentage of the nominal volume).	Value* (0 %) (0 = OFF)
<b>Sys. err. vol. 1</b>	Maximum permissible systematic error (tolerance limit) for pipette check test volume 1 (percentage of nominal volume).	Value* (8 %)
<b>Sys. err. vol. 2</b>	Maximum permissible systematic error (tolerance limit) for pipette check test volume 2 (percentage of nominal volume).	Value* (0.8 %)
<b>Sys. err. vol. 3</b>	Maximum permissible systematic error (tolerance limit) for pipette check test volume 3 (percentage of nominal volume).	Value* (0 %)
<b>Rand. err. vol. 1</b>	Maximum permissible random error (tolerance limit) for pipette check test volume 1 (percentage of nominal volume).	Value* (3 %)
<b>Rand. err. vol. 2</b>	Maximum permissible random error (tolerance limit) for pipette check test volume 2 (percentage of nominal volume).	Value* (0.3 %)
<b>Rand. err. vol. 3</b>	Maximum permissible random error (tolerance limit) for pipette check test volume 3 (percentage of nominal volume).	Value* (0 %)

\* Required field ( ) application default values

#### Default and copy RFID tag data

If the RFID tag was not read or written since the start of the application, the above default values are displayed.


The RFID tag data can easily be copied for the configuration of a new pipette.

- 1 Tap [**Setup**].
- 2 Hold the pipette with RFID data that must be copied at RFID reader.
- 3 Check or change data if needed and confirm with [**OK**].
- 4 Hold pipette with empty RFID tag at RFID reader to store data.
  - ⇒ The data is now copied and stored on RFID tag.

#### Test volume for pipette check

The pipette check can be carried out with 1 to 3 test volumes. A test volume of 0% means that this check volume is not used.

### 7.2.2.2 Editing RFID tag data

**Navigation:**  > [Pipette Check]

This section describes the procedure for editing the data of an RFID written tag.

- Application is activated.
- The pipette has an RFID tag.
- 1 Tap [**Setup**].
  - ⇒ The balance requests that the RFID pipette is held at RFID reader.
- 2 Hold the pipette at RFID reader.
  - ⇒ RFID reader reads the data from the RFID tag and opens the data input window.
- 3 Change the data in the respective data field.
- 4 Confirm the changes with [**OK**].
  - ⇒ The balance requests that the RFID pipette is held at RFID reader.
- 5 Hold the pipette at RFID reader.
  - ⇒ The data is written to the RFID tag.
  - ⇒ The balance displays a confirmation message.
- 6 Confirm with [**OK**].

The following data can be edited:

**See** [RFID tag configuration for pipettes ▶ Page 105].

### 7.2.3 Example protocol of a pipette check

The feasibility of a protocol depends on the selected protocol settings.

### Example: Printout

```
---- Pipette Check-----
25.Jul 2014          15:13
SNR                 12345678
Pipette model      ABC4711
Pipette SNR        87654321
Nominal vol.       100 µl
No. of measurements  4
Air press.         1013.0 hPa
Air temp.          20.0 C
Water temp.        20.0 C
Humidity           50.0 %
Con. factor Z      0.001003

Overall result      FAILED

Check vol.          10 µl

Error limit %E      1.0 %
Error limit %s      1.0 %

1:                  10.23 µl
2:                  10.04 µl
3:                   9.98 µl
4:                  10.19 µl

Average vol. x      10.11 µl
Sys.error E         0.11 µl
Sys. error %E       1.1 %
Random error s      0.11 µl
Random error %s     1.3 %
Uncertainty u       2.4 %
Result              FAILED

Overall result      FAILED

Signature
```

## 7.3 Calculations for pipette check

### Formulae

For the calculation of volume, Z-factor and measurement uncertainty, formulae according to ISO 8655-6 and ISO/TR 20461 are used.

### Rounding of values

- Values are rounded according to conventional rules ( $\geq 5$  -> rounded).
- Entered values, e.g. water temperature, air pressure, etc., are rounded to one decimal place.
- **Conv. factor Z** is rounded after calculation to 6 decimal places. This is used for conversion of weight to volume.
- The calculated volume is rounded to the resolution of the balance and shown in the protocol.
  - 6-place balance: Microliters with 3 decimal places
  - 5-place balance: Microliters with 2 decimal places
  - 4-place balance: Microliters with 1 decimal place

## 8 Titration Application


Navigation:  > [Titration]



The **Titration** application enables the automation of interaction between the balance and titrator. The optional RFID reader enables data to be read and written to an RFID tag. The RFID tag serves as a data carrier between the balance and titrator. The RFID tag placed on the base of a titrating beaker easily and reliably transfers the sample data, e.g. sample ID and weight.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

### Selecting the application

- 1 Press .
  - 2 Tap the [Titration] icon in the selection window.
    - ⇒ The selected application is active.
    - ⇒ Some of the specific titration function keys and information fields are activated by default (factory defaults).
- ⇒ The balance is ready for weighing.

## 8.1 Settings for titration application

Navigation:  > [Titration] > 

Various specific titration settings are available, which can be used to adapt the application to suit specific requirements.

Most of the setting options are the same as for the **Weighing** application. Only the settings that differ are described below.

The arrow buttons can be used to page forward or back to a menu page.


You can define the following parameters:

Menu item	Explanation	Further information
<b>RFID Options</b>	Defines the behavior of the application.	<b>See</b> [Specific RFID option settings ▶ Page 109]
<b>Identification</b>	Activates/deactivates and names identification fields.	<b>See</b> [Specific identifications for titration ▶ Page 110]
<b>Function Keys</b>	Defines the titration function keys to appear at the bottom of the display. These keys enable direct access to specific functions.	<b>See</b> [Specific function keys for titration ▶ Page 111]
<b>Protocol</b>	Selects information to be shown in the weighing protocols.	<b>See</b> [Specific protocol information for titration ▶ Page 112]

### 8.1.1 Specific RFID option settings

Navigation:  > [Titration] >  > **RFID Options**

This menu item can be used to configure certain behavior patterns of the application.

- Application is activated.
- 1 Press .
  - ⇒ A window with application-dependent settings appears.
  - 2 Tap **RFID Options** > [Define].
    - ⇒ A selection window appears.
  - 3 Select the required menu item.
  - 4 Tap [On].
  - 5 Confirm with [OK].

You can define the following parameters:

Parameters	Explanation	Values
<b>Auto start data editing</b>	Activates/deactivates automatic opening of the data editing window on detection of a new beaker. <b>See</b> [Specific identifications for titration ▶ Page 110].	<b>Off   On*</b>
<b>Auto increment ID1</b>	Activates/deactivates automatic step-by-step incrementation of ID 1. <b>See</b> [Specific identifications for titration ▶ Page 110].	<b>Off*   On</b>
<b>Auto print when writing</b>	Activates/deactivates automatic printing when writing data to the RFID tag.	<b>Off*   On</b>
<b>RFID recognition beep</b>	Activates/deactivates the RFID recognition beep. The beep sounds when the RFID reader has scanned the RFID tag data.	<b>Off   On*</b>

\* Factory setting

### 8.1.2 Specific identifications for titration

**Navigation:**  > [Titration] >  > Identification

The titration application provides (as with the **Weighing** application) 4 identifications. The available identifications have been adapted to the specific titration requirements.

Identifications can be configured here, i.e. named and activated/deactivated.

You can define the following parameters:

Parameters	Explanation	Values
<b>ID1 Name</b>	Defines a designation (max. 20 characters). This field is prepared for use as a sample identifier (details below). In contrast to the other identifications, identification 1 cannot be deactivated (identification is essential for interaction with the titrator).	Any <b>(ID 1)*</b>
<b>ID2 Name</b>	Activates/deactivates identification 2. Defines the designation (max. 20 characters).	<b>Off   On*</b> <b>(ID 2)*</b>
<b>ID3 Name</b>	Activates/deactivates the correction factor. Defines the designation (max. 20 characters). This numeric field is intended for entry of the correction factor to be used for titration.	<b>Off   On*</b> <b>(Corr. f.)*</b>
<b>ID4 Name</b>	Activates/deactivates the density. Defines the designation (max. 20 characters). This numeric field is intended for entry of the density to be used for titration.	<b>Off   On*</b> <b>(Density)*</b>

\* Factory setting

#### Identification management

Once the identifications have been configured, they can be assigned a content. The field content can be edited with the [Edit Data] function key. When this function key is tapped, a window is displayed in which the values of the activated identifications can be edited (the name allocated in the configuration is displayed as a parameter).

The activated identifications are written to the RFID tag together with the determined sample weight, when the [Write RFID] function key is tapped.

The following rules apply to data entry:



Parameters	Values
<b>ID 1</b>	Max. 20 alphanumeric characters
<b>ID 2</b>	Max. 20 alphanumeric characters
<b>Corr. f.</b>	Numerical value, 0 ... 1000000.0000 (1.0)*
<b>Density</b>	Numerical value, 0 ... 100.0000 (1.0)*

\* Factory setting

To automate the use of **ID 1** as a sample ID, the **Auto increment ID1** option can be activated. If this option is selected, the field content of **ID 1** is incremented by 1 after each completed weighing (if the last character is not numerical, a digit is added).

**See** [Specific RFID option settings ▶ Page 109].

The values of **Corr. f.** and **Density** are reset to the initial value 1.0 after each completed weighing. This prevents a once entered value from being unintentionally used for further samples.

If a larger number of samples are to be provided with the same correction factor and/or density, it is better and safer to enter this data in the respective titrator method.

#### Display as information fields

It is recommended to display (activated) identifications as information fields.

### 8.1.3 Specific function keys for titration


**Navigation:**  > [Titration] >  > **Function Keys**





Function keys enable direct access to specific functions and settings in the application. A function can be activated by tapping a key.

The function keys are displayed in the application at the bottom of the display. The numbers define the sequence in the display.

- Activate or deactivate function keys by tapping.
- To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.

The arrow buttons can be used to page forward or back to a menu page.

- Application is activated.
- 1 Press .
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Function Keys** > [Define].
  - 3 Select the **Function Keys** which you need.
    - ⇒ The function key is automatically numbered.
  - 4 Change the settings and confirm with [OK].

	Designation	Explanation
	<b>Edit Data</b>	Displays a window for editing identifications.
	<b>Write RFID</b>	Starts writing to the RFID tag.
	<b>Read RFID</b>	Reads the data to an RFID tag.
	<b>Start</b>	Starts the weighing process.

## 8.1.4 Specific protocol information for titration

**Navigation:** [☰] > [Titration] > [☰] > **Protocol**

Here you define which data appears in the protocols. This large menu item is divided into three sub-menus. They enable you to make additional settings for the application. The rest of the available protocol data corresponds to the data for the **Weighing** application and is not described here.

The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
  - To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.
    - Application is activated.
- 1 Press [☰].
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Protocol** > [Define].
    - ⇒ **Protocol** window appears.
  - 3 Tap (e.g. **Header**) > [Define].
  - 4 Select the information key which you need.
    - ⇒ The information key is automatically numbered.
  - 5 Confirm with [OK].

The arrow buttons can be used to page forward or back to a menu page.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [☰].

### Header line of protocols

Use this sub-menu to define which data is printed in the protocol header (before the results).

### Recording of single values

This submenu can be used to define the information to be reported for each individual result.

### Protocol footer

This submenu can be used to define the information to be printed in the protocol footer after the results (single values).

You can define the following parameters:

Parameters	Explanation	Values
<b>Header</b>	Define the information to be printed in the protocol header (before the results). <b>ID 1</b> and <b>ID2</b> = records the defined identification. <b>Corr. f.</b> = records the correction factor. <b>Density</b> = records the density.	<b>Appl. Name*</b>   <b>Title 1</b>   <b>Title 2</b>   <b>Date/Time*</b>   <b>User</b>   <b>Balance Type</b>   <b>SNR</b>   <b>Balance ID</b>   <b>Levelcontrol</b>   <b>ID1</b>   <b>ID2</b>   <b>Corr. f.</b>   <b>Density</b>   <b>Nom.,+Tol,-Tol</b>   <b>MW-Method</b>   <b>Signature</b>   <b>Blank Line</b>   <b>Dash Line</b>   <b>3 Blank</b> <b>Lines</b>

<b>Single value</b>	Define the information to be recorded for each single result.	<b>Appl. Name   Level-control   ID1   ID2   Corr. f.   Density   Nom.,+Tol,-Tol   MW-Method   Tare   Net*   Gross   Info Unit   Signature   Blank Line   Dash Line   3 Blank Lines   Footer</b>
<b>Footer</b>	Define information to be printed in the protocol footer after the results (single values).	<b>Appl. Name   Title 1   Title 2   Date/Time   User   Balance Type   SNR   Balance ID   Levelcontrol   ID1   ID2   Corr. f.   Density   Nom.,+Tol,-Tol   MW-Method   Signature*   Blank Line   Dash Line   3 Blank Lines</b>

\* Factory setting

## 8.2 Working with the titration application

**Navigation:**  > [Titration]

This application requires the use of the optional accessory SmartSample or EasyScan. The supplied drip tray and weighing pan of the optional accessory SmartSample must be changed according to the enclosed assembly instructions.

### Initial settings

To perform a weighing with RFID, at least 2 of the following function keys must be activated.



**Edit Data**

– Activate function keys.



**Write RFID**

### Important

When the application is started, the [Write RFID], [Read RFID] and [Start] function keys (if activated) are inactive and grayed out.

### Procedure

The procedure is very similar to the **Weighing** application. A brief description of the procedure and features of the **Titration** application is provided.

#### Procedure with SmartSample

- Application is activated.
  - SmartSample is connected and configured.
- 1 Place a beaker with RFID tag on the weighing pan.
    - ⇒ The balance detects and checks the RFID tag and activates the [Read RFID] function key (if activated).
    - ⇒ If the **Auto start data editing** option is selected, an identification editing window is opened. Relevant data can be entered here

- 2 Press [**→T←**].
  - ⇒ The balance is tared.
  - ⇒ The [**Write RFID**] function key is activated.
- 3 Place the sample in the beaker.
  - or
  - Remove the empty beaker from the weighing pan. Place the sample in the beaker. Place the beaker with the sample back on the weighing pan.
  - ⇒ The balance displays the sample weight.
- 4 Press [**Write RFID**] to write the data (activated identifications and weight) to the RFID tag of the beaker.
  - ⇒ The balance waits for a stable weight display.
  - ⇒ The data is written to the RFID tag of the beaker. If the **Auto print when writing** option is activated, the data is simultaneously printed on the printer (if a printer is connected).
  - ⇒ The balance displays a message confirming that the data has been successfully written (all written data is also displayed).
- 5 Remove the beaker from the weighing pan.
  - ⇒ The [**Read RFID**] and [**Write RFID**] function keys (if activated) are inactive and grayed.
  - ⇒ Weighing is complete.
    - The **Corr. f.** and **Density** fields are reset to 1.0.
    - If the **Auto increment ID1** option is activated, **ID 1** is incremented by 1.

#### Procedure with EasyScan

- Application is activated.
  - EasyScan is connected and configured.
- 1 Place a beaker with RFID tag on the EasyScan.
    - ⇒ The balance detects and checks the RFID tag and activates the [**Start**] and [**Read RFID**] function keys (if activated).
    - ⇒ If the **Auto start data editing** option is selected, an identification editing window is opened. Relevant data can be entered here
  - 2 Press [**Start**].
    - ⇒ The balance sets potentially present RFID data to invalid and activates the [**Write RFID**] function key.
  - 3 Place a beaker on the weighing pan.
    - ⇒ The balance checks the beaker presence.
  - 4 Press [**→T←**].
    - ⇒ The balance is tared.
    - ⇒ The [**Write RFID**] function key is activated.
  - 5 Place the sample in the beaker.
    - ⇒ The balance displays the sample weight. If the **Auto print when writing** option is activated, the data is simultaneously printed on the printer (if a printer is connected).
  - 6 Press [**Write RFID**] to write the data (activated identifications and weight) to the RFID tag of the beaker.
    - ⇒ The balance waits for a stable weight value and then stores temporarily Tare, Gross, Net values.
  - 7 Place the beaker on the EasyScan.
    - ⇒ The balance detect and check RFID tag and write data to the RFID tag on the beaker.
    - ⇒ The balance displays a message confirming that the data has been successfully written (all written data is also displayed).
  - 8 Remove the beaker from the EasyScan.
    - ⇒ The [**Read RFID**] and [**Write RFID**] function keys (if activated) are inactive and grayed.
    - ⇒ Weighing is complete.
      - The **Corr. f.** and **Density** fields are reset to 1.0.
      - If the **Auto increment ID1** option is activated, **ID 1** is incremented by 1.


Identifications can be edited at any time during this procedure (preferably before writing data to the RFID tag) with the **Edit Data** function key.

## 9 Sample Track Application

All application settings are saved under the active user profile.



The **Sample Track** application is used for manual dosing with content control management. The application is used together with the RFID reader and provides the opportunity to write data on RFID tags, copy data from one tag to another and control the information stored in the RFID tags. A RFID tag can either be a Smart Tag which can be stuck to any container or the integrated RFID tag of a dosing head, e.g. if the application is used with the HPD.

- 1 Press .
  - 2 Tap the **[Sample Track]** icon in the selection window.
    - ⇒ The selected application is active.
    - ⇒ Some of the specific function keys and data fields for Sample Track are activated by default (factory defaults).
- ⇒ The balance is ready for manual dosing with Sample Track.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

**Navigation:**  > **[Sample Track]**

### 9.1 Settings for sample track application

**Navigation:**  > **[Sample Track]** > 


Various specific sample track settings are available, which can be used to adapt the application to suit specific requirements.

Most of the setting options are the same as for the **Weighing** application. Only the settings that differ are described below.

Unlike the **Weighing** application, no custom unit can be specified.

The arrow buttons can be used to page forward or back to a menu page.

- Application is activated.

- 1 Press .
- ⇒ A window with application-dependent settings appears.
- 2 Select the required menu item.
- 3 Change the settings and confirm with **[OK]**.

You can define the following parameters:

Menu item	Explanation	Further information
<b>RFID Options</b>	Defines settings of the RFID reader.	<b>See</b> [Specifications for RFID options ▶ Page 116]
<b>Dosing data fields</b>	Defines steps of the manual dosing.	<b>See</b> [Specifications for dosing data fields ▶ Page 117]
<b>Data output</b>	Defines the data outputs of an RFID tag.	<b>See</b> [Defining data output ▶ Page 118]
<b>Function Keys</b>	Define which function keys for Sample Track are shown at the bottom of the display. These keys enable direct access to specific functions.	<b>See</b> [Specific function keys for sample track ▶ Page 122]
<b>Info Field</b>	Define which info fields are shown on the display.	<b>See</b> [Specific info fields for sample track ▶ Page 123]

#### 9.1.1 Specifications for RFID options

**Navigation:**  > **[Sample Track]** >  > **RFID Options** > **[Define]**

This menu item can be used to define the options of RFID tag and RFID reader.

- Application is activated.
- 1 Press [].
  - ⇒ A window with application-dependent settings appears.
- 2 Tap **RFID Options** > [**Define**].
  - ⇒ A selection window appears.
- 3 Select the required menu item.
- 4 Tap [**On**].
- 5 Confirm with [**OK**].

You can define the following parameters:

Parameters	Explanation	Values
<b>RFID recognition beep</b>	Activates/deactivates the RFID recognition beep. The beep sounds when the RFID reader has scanned the RFID tag data.	<b>Off   On*</b>
<b>Update RFID tag at end of series</b>	Defines, whether the RFID tag should be updated at the end of a series. <b>Off</b> During a series, you have to scan the RFID tag after every sample. <b>On</b> During a series, you have to scan the RFID tag only at the beginning and at the end of a series.	<b>Off* / On</b>
<b>RFID tag data fields</b>	Select following parameters if you want to be able to modify them when writing information on a RFID tag.	<b>Substance*   Lot ID*   Content*   Filling date*   Exp. date   Retest date   ID1*   ID2   ID3   ID4   Dose limit</b>

\* Factory setting

### 9.1.2 Specifications for dosing data fields

**Navigation:** [] > [**Sample Track**] > [] > **Dosing data fields** > [**Define**]

This menu item can be used to define the dosing steps which appear when dosing with the Sample Track option.

- Application is activated.
- 1 Press [].
  - ⇒ A window with application-dependent settings appears.
- 2 Tap **Dosing data fields** > [**Define**].
  - ⇒ A selection window appears.
- 3 Select the required menu item.
- 4 Confirm with [**OK**].

You can define the following parameters:

Parameters	Explanation	Values
<b>Dosing data fields</b>	Following parameters can be selected. The values for these parameters can be modified when dosing with the Sample Track option.	<b>Sample ID*   Target quantity*   User ID*   Samples*</b>

\* Factory setting

### 9.1.3 Defining data output

**Navigation:** [☰] > [Sample Track] > [⚙️] > **Data output** > [Define]

The balance can communicate with various peripheral devices. With the option **Data output** it can be defined which data will be sent to the peripheral device. Furthermore, the format of the output data can be modified whether the peripheral device is a label printer, common printer or data system.

#### Important

Data in XML format that are sent to a host computer can not be modified.

The values for data and head are almost the same.

Menu item	Explanation	Further information
<b>Sample label</b>	To specify the sample data to be printed on the labels. The sample labels are usually affixed to the sample container.	<b>See</b> [Specifying the contents of sample labels ▶ Page 118]
<b>Sample protocol</b>	To specify the sample data sent to a strip printer.	<b>See</b> [Specifying the contents of sample protocols ▶ Page 121]
<b>Sample data output</b>	To select the output of sample data to a particular device.	<b>See</b> [Defining the target devices for sample data ▶ Page 122]
<b>Sample data output mode</b>	To specify if data will be sent automatically or manually after dosing is complete.	<b>See</b> [Defining the output mode for sample data ▶ Page 122]
<b>RFID tag label</b>	To specify the content of the label printed on the label printer.	<b>See</b> [Specifying the contents of sample labels ▶ Page 118]
<b>RFID tag protocol</b>	Specifies the data sent to a strip printer.	<b>See</b> [Specifying the contents of sample protocols ▶ Page 121]
<b>RFID tag data output</b>	To select the output of data to a particular device, e.g. you can decide whether or not you want to print a label.	<b>See</b> [Defining the target devices for sample data ▶ Page 122]
<b>RFID tag data output mode</b>	To specify whether data is sent automatically or manually.	<b>See</b> [Defining the output mode for sample data ▶ Page 122]

#### 9.1.3.1 Specifying the contents of sample labels

**Navigation:** [☰] > [Sample Track] > [⚙️] > **Data output** > [Define] > **Sample label** > [Define]

If there is a label printer connected to the balance, dosing results can be printed on labels. The labels consists of a plain text section and a code section with a matrix code or a bar code. Text and code can be defined by the user.



Parameters	Explanation	Values
<b>Text</b>	To specify the text in the text section of the label. With code: max. of 5 label text items. Without code: max. of 8 label text items. For a detailed description of the values, <b>see</b> Values for text and matrix code. <b>Note</b> The parameters described are a maximum of all parameters possible. Not all parameters appear in each submenu. The factory settings depend on the selected submenu.	<b>Substance   Sample ID   Lot ID   Content   Tolerance   User ID   Dispense date   Filling date   Exp. date   Retest date   Label index   Target quantity   Balance ID   ID1 ... ID4   Title 1   Title 2   Validity   MinWeigh   Dose duration   Rem. dosages   Tag type   Tag ID</b>
<b>Matrix code</b>	Defines the matrix code. <b>Note</b> If no item is selected the code will not be printed. For a detailed description of the values, <b>see</b> Values for text and matrix code. <b>Note</b> The parameters described are a maximum of all parameters possible. Not all parameters appear in each submenu. The factory settings depend on the selected submenu.	
<b>Label layout</b>	Select a preset layout scheme for the label.	<b>Layout 1 - Layout 10 (Layout 7*)</b>
<b>Label quantity</b>	Specifies the amount of labels that are printed for each sample (max. 4 labels).	1 - 4 (1*)
<b>Label barcode</b>	Defines the content of the bar code type Code 128. <b>Note</b> With a code 128, only one of the following items is allowed: [Substance], [Sample ID], [Lot ID] or [Dos. value]. The factory settings depend on the selected menu <b>Sample label</b> or <b>Head label</b> .	<b>Substance   Sample ID   Lot ID   Dos. value</b>
<b>Cutter man. series</b>	Specifies whether the labels are cut after each dosing [Samples] or at the end of the dosing sequence [Series]. <b>Note</b> For dosing series with autosampler: all labels will be cut at the end of the dosing sequence.	<b>Series*   Samples</b>

\* Factory setting

#### Values for text and matrix code

Navigation:  > [Sample Track] >  > Data output > [Define] > Sample label > [Define]

#### Note

The parameters described are a maximum of all parameters possible. Not all parameters appear in each submenu.











Values	Explanation
<b>Substance</b>	Prints the identification of the substance (retrieved from the RFID tag).
<b>Sample ID</b>	Prints the <b>Sample ID</b> entered (either in the dosing steps or through the function key [Sample ID]).
<b>Lot ID</b>	Prints the Lot ID from the current RFID tag.
<b>Content</b>	Initial weight of the powder.
<b>Tolerance</b>	Specifies the accuracy specified for the current dosing (only powder dosing).
<b>User ID</b>	Prints the <b>User ID</b> entered (either in the dosing data fields or through the function key [User ID]).

<b>Dispense date</b>	Date of the current dosing
<b>Dispensetime</b>	Time of the current dosing
<b>Exp. date</b>	Expiry date of the substance in the current RFID tag.
<b>Retest date</b>	Retest date defined in the settings of the RFID tag.
<b>Balance ID</b>	Identification of the balance defined in [ <b>System</b> ] > [ <b>Info</b> ].
<b>ID1 ... ID4</b>	Prints the title and contents of the four customizable fields defined in the settings. <b>Note</b> <b>ID1 ... ID4</b> are just the default placeholders. They will be replaced with the field titles defined in the settings.
<b>Title 1, Title 2</b>	Prints the titles defined in the menu.
<b>Validity</b>	Indicates whether the result is <b>VALID</b> (within the tolerance) or <b>INVALID</b> (out of tolerance).
<b>MinWeigh</b>	Indicates whether the minimum weight criteria have been met ( <b>VALID</b> or <b>INVALID</b> ). If the <b>MinWeigh</b> function is not selected [ <b>Off</b> ] will be printed instead.
<b>Dose duration</b>	Prints the duration of the dosing cycle in seconds.
<b>Target quantity</b>	Prints the target quantity of the dosing.
<b>Label index</b>	Counts the number of labels printed for a particular sample. <b>Note</b> This information may be of interest for quality assurance and traceability.
<b>Tag type</b>	Type of RFID used for the current dosing.
<b>Tag ID</b>	Serial number of the RFID tag used for the current dosing.

### Defining the label layout

Navigation:  > [**Sample Track**] >  > **Data output** > [**Define**] > **Sample label** > [**Define**] > **Label layout**

The following 10 preset layout schemes are available:

No.	Specimen	Number of text rows	Font size	No.	Specimen	Number of text rows	Font size
1		5	large	6		5	small
2		5	small	7		8	large and small
3		5	large	8		3	small
4		8	small	9		3	large
5		10	small	10		6	small

### Note

The layout schemes respect the selected label text items and their printing order. If too many text items have been selected, the label may run out of space (especially with matrix code or bar code). In this case, the label will just contain the text items that fit into the available space. You may now rearrange the printing order of the text items in a way that the most important items are printed first (printing always starts with

item 1). Alternatively select another layout scheme that accommodates more text items, i.e. one with a smaller font size or one without a code. The above restrictions apply to text items only, the codes (matrix code or bar code) will always be complete.

### 9.1.3.2 Specifying the contents of sample protocols

**Navigation:**  > [Sample Track] >  > Data output > [Define] > Sample protocol > [Define]

If you have a strip printer connected to your balance you may record the results and other related information on paper.

Menu item	Explanation	Further information
<b>Header</b>	Define the information to be reported for each single result.	<b>See</b> Defining header and footer
<b>Single value</b>	Define the information to be reported for each single result.	<b>See</b> Defining single value
<b>Footer</b>	Define information to be printed in the protocol footer after the results (single values).	<b>See</b> Defining header and footer

#### Defining header and footer

**Navigation:**  > [Sample Track] >  > Data output > [Define] > Sample protocol > [Define]

#### Note

The parameters described are a maximum of all parameters possible. Not all parameters appear in each submenu.

The factory settings depend on the selected submenu.

You can define the following parameters:

Values	Explanation
<b>Appl. Name</b>	Prints the application name.
<b>Title 1, Title 2</b>	Prints the titles defined in the menu.
<b>Date/Time</b>	Prints date and time.
<b>User ID</b>	Prints the <b>User ID</b> entered in the dosing data fields or with function key [ <b>User ID</b> ]).
<b>Balance Type</b>	Balance type identification.
<b>SNR</b>	Serial number of terminal and modules.
<b>Balance ID</b>	Identification of the balance, defined in <b>Info</b> .
<b>Levelcontrol</b>	Indicates if the balance is correctly leveled.
<b>ID1 ... ID4</b>	Prints the title and contents of the four customizable fields defined in the settings. <b>Note</b> <b>ID1 ... ID4</b> are just the default placeholders. They will be replaced with the field titles defined in the settings.
<b>Last cal.</b>	Prints the date of the last calibration.
<b>Signature</b>	Prints a line for signature.
<b>Blank Line</b>	Prints a blank line.
<b>Dash Line</b>	Prints a dashed line. Two dash lines can be set.
<b>3 Blank Lines</b>	Prints 3 blank lines at the end of the printout.

#### Defining single value

**Navigation:**  > [Sample Track] >  > Data output > [Define] > Sample protocol > [Define] > Single value > [Define]

In this submenu the information printed for each individual dosing can be defined.

## Note

The parameters described are a maximum of all parameters possible. Not all parameters appear in each submenu.

The factory settings depend on the selected submenu.

You can define the following parameters:

Parameters	Explanation	Values
<b>Single value</b>	<p>In this submenu the information displayed on the screen when touching the function key <b>[Write RFID]</b> can be defined.</p> <p>For a detailed description of the values, <b>see</b> Values for text and matrix code.</p> <p><b>Note</b></p> <p>The parameters described are a maximum of all parameters possible. Not all parameters appear in each submenu. The factory settings depend on the selected submenu.</p> <p><b>Tag ID</b> = prints the tag identification data.</p>	<b>Header   ID1   ID2   ID3   ID4   Title 1   Title 2   Substance   Lot ID   Sample ID   Content   Tolerance   User ID   Dispense date   Exp. date   Retest date   Validity   MinWeigh   Dose duration   Target quantity   Signature   Tag ID   Blank Line   Dash Line   3 Blank Lines</b>

### 9.1.3.3 Defining the target devices for sample data

**Navigation:** [Menu] > [Sample Track] > [Device] > Data output > [Define] > Sample data output > [Define]

In this section the output of sample data to a particular device can be selected.

Values	Explanation
<b>Protocol*</b>	Sends sample data to the strip printer.
<b>Label*</b>	Sends sample data to the label printer.

\* Factory setting

#### Important

The balance always transmits the full XML data set to the host computer. The amount of data sent in XML format cannot be defined.

### 9.1.3.4 Defining the output mode for sample data

**Navigation:** [Menu] > [Sample Track] > [Device] > Data output > [Define] > Sample data output mode

Values	Explanation
<b>Manual*</b>	No automatic transfer of data. To transfer the dosing result to the selected devices, press [Print].
<b>Automatic</b>	Transfers the dosing result automatically to the selected devices after a dosing cycle has been completed.

\* Factory setting

### 9.1.4 Specific function keys for sample track


**Navigation:** [Menu] > [Sample Track] > [Device] > Function Keys

This menu item allows you to enable the specific function keys listed below for using statistics.







All other function keys are the same as for the **Weighing** application.

The function keys are displayed in the application at the bottom of the display. The numbers define the sequence in the display.

- Activate or deactivate function keys by tapping.

- To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.
- Application is activated.
- 1 Press [].
  - ⇒ A window with application-dependent settings appears.
- 2 Tap **Function Keys** > [**Define**].
- 3 Select the **Function Keys** which you need.
  - ⇒ The function key is automatically numbered.
- 4 Change the settings and confirm with [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

	Designation	Explanation
	<b>Write RFID</b>	To enter new date or to edit data of a used RFID tag.
	<b>Start</b>	Starts a dosing / weighing cycle.
	<b>Read RFID</b>	Displays the data of the current RFID tag.
	<b>Copy RFID</b>	Copies data from one RFID tag to another RFID tag.
	<b>Set content</b>	Stores the net weight of the powder that has been filled into the powder container. <b>Note</b> The net weight can be used to write the dosing head.
	<b>User ID</b>	To define the user ID.


**Factory settings:** [**Write RFID**], [**Start**], [**Read RFID**], [**Copy RFID**] and [**Set content**] activated, in this sequence.

### 9.1.5 Specific info fields for sample track

**Navigation:** [] > [**Sample Track**] > [] > **Info Field**

This menu item allows you to enable the specific info fields listed below for using Sample Track function.

All other info fields are the same as for the **Weighing** application.

- Information fields can be activated or deactivated by tapping.
- To redefine the sequence, all information fields must be deactivated and then activated in the required sequence.
- Application is activated.
- 1 Press [].
  - ⇒ A window with application-dependent settings appears.
- 2 Tap **Info Field** > [**Define**].
- 3 Select the information fields that you need.
  - ⇒ The information field is automatically numbered.
- 4 Change the settings and confirm with [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Values	Explanation
<b>Substance*</b>	Displays the identification of the substance.
<b>Samples*</b>	Displays the total number of samples.

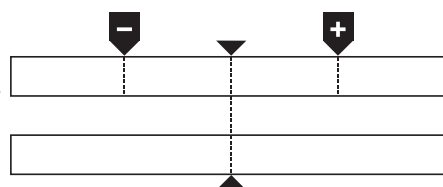
<b>Rem. samples*</b>	Counts and displays the number of samples remaining.
<b>Rem. dosages*</b>	Displays the number of dosing cycles.

\* Factory setting

## 9.2 Working with the sample track application

### 9.2.1 Dosing powder with a target quantity

- Application is activated.
  - RFID reader is installed and ready for use.
  - Dosing head or other container is filled and the RFID tag stores the information needed.
  - **Target quantity** is selected in [☰] > **Dosing data fields** > **Define**.
- 1 To start the dosing procedure, tap **[Start]**.
  - 2 Scan RFID tag on the RFID reader.
    - ⇒ RFID reader reads data.
    - ⇒ The data is being displayed.
  - 3 Remove RFID tag from the RFID reader.
  - 4 If dosing with HPD, install dosing head on HPD.
  - 5 To change the data displayed, tap on the corresponding text field.
  - 6 Enter the correct data and confirm with **[OK]**.
  - 7 Place sample vessel on the weighing pan and confirm with **[OK]**.
  - 8 Dose powder into the sample vessel manually.
    - ⇒ The SmartTrac graph assists you. This is the coarse range indicator that helps you dosing the powder quickly until you approach the target area. As soon as the upper bar (fine range indicator) starts moving to the right you should slow down the dosing procedure and carefully approach the target value in the middle between the two tolerance marks.
    - ⇒ As soon as the quantity is within tolerance both indicator bars turn from red to green.
  - 9 If the target quantity is reached, confirm with **[OK]**.
- If you have stored the **Content [g]** of your dosing head or container, you need to scan the RFID tag after dosing to update the **Content [g]** of your dosing head or container.
- 10 Scan RFID tag on the RFID reader.
    - ⇒ The RFID reader updates the data stored, e.g. the remaining amount of powder.
    - ⇒ The result of the manual dosing appears.
    - ⇒ The label and/or record are printed.



## 9.2.2 Dosing powder without target quantity

- Application is activated.
  - RFID reader is installed and ready for use.
  - Dosing head or other container is filled and the RFID tag stores the information needed.
  - **Target quantity** is deselected in [☰] > **Dosing data fields** > [Define].
- 1 To start the dosing procedure, tap [Start].
  - 2 Scan RFID tag on the RFID reader.
    - ⇒ RFID reader reads data.
    - ⇒ The data is being displayed.
  - 3 Remove RFID tag from the RFID reader.
  - 4 If dosing with HPD, install dosing head on HPD.
  - 5 To change the data displayed, tap on the corresponding text field.
  - 6 Enter the correct data and confirm with [OK].
  - 7 Dose powder into the sample vessel manually.
  - 8 If your target quantity is reached, confirm with [OK].
    - ⇒ The result of the manual dosing appears.
  - 9 Scan RFID tag on the RFID reader.
    - ⇒ The RFID reader updates the data stored, e.g. the remaining amount of powder.
- ⇒ The label and/or record are printed.

## 9.2.3 Working with sample counter

The function **Sample counter** is used to dose several samples with the same powder and quantity.

If you want to dose several samples with the same powder and quantity, **Update RFID tag at end of series** allows you to scan the RFID tag only at the beginning and at the end of a dosing series. If this option is deactivated, the RFID tag needs to be scanned before each sample.

- Application is activated.
  - RFID reader is installed and ready for use.
  - Dosing head or other container is filled and the RFID tag stores the information needed.
- 1 If you want to use the function **Update RFID tag at end of series**, make sure following setting is defined as **On**: [☰] > **RFID Options** > [Define] > **Update RFID tag at end of series** > [On].
  - 2 To start the dosing procedure, tap [Start].
  - 3 Scan RFID tag on the RFID reader.
    - ⇒ RFID reader reads data.
    - ⇒ The data is being displayed.
  - 4 Remove RFID tag from the RFID reader.
  - 5 If dosing with HPD, install dosing head on HPD.
  - 6 Enter the number of samples and confirm with [OK].
  - 7 To change other data displayed, tap on the corresponding text field.
  - 8 Enter the correct data and confirm with [OK].
  - 9 Place sample vessel on the weighing pan and confirm with [OK].
  - 10 Dose powder into the sample vessel manually.
  - 11 If the target quantity is reached, confirm with [OK].
    - ⇒ The result of the manual dosing appears.
  - 12 To continue with the next sample, tap [Next] and follow the instructions given. After the last sample, you will be asked to scan the RFID tag to update the data stored.
    - To abort procedure press [C].
- ⇒ The label and/or record are printed.

### After aborting an unfinished series

- You have aborted a running series.
  - You want to start a new series or continue with the aborted series.
- 1 Press [**Start**].
    - ⇒ You get the following options:
      - [**Continue actual series**]: To resume the current series starting with the next sample. The previously aborted sample will not be dosed again.
      - [**New series**]: To define a new series.
      - [**Cancel**]: To close the window temporarily; it will reappear when starting the next dosing.
  - 2 Select one of these options.

## 9.2.4 Displaying RFID tag information



The menu [**Read RFID**] displays information stored in the current dosing head.

- Function key [**Read RFID**] is active.
- 1 Tap [**Read RFID**].
  - 2 Scan RFID tag.
    - ⇒ The display shows the data stored in the dosing head.
  - 3 To return to the main window, tap [**OK**].

## 9.2.5 Copying data from one RFID tag to another



- Function key [**Copy RFID**] is active.
- 1 Tap [**Copy RFID**].
  - 2 Scan source RFID tag.
    - ⇒ The data is copied to the instrument's internal memory.
    - ⇒ A message to scan the target object appears.
  - 3 Scan target RFID tag.
  - 4 To make another copy, remove RFID tag from RFID reader and scan a second RFID tag. To return to the home screen, confirm with [**OK**] and remove RFID tag.
    - ⇒ The data is now copied from the instrument's internal memory to the new RFID tag.

## 9.2.6 Writing data on an RFID tag

### Set content of a container

You can store the weight of the amount of powder in the container in the internal memory of the instrument. When writing data on the new RFID tag, you can use the stored data.



- Function key [**Set content**] is active.
- 1 Put an empty powder container on weighing pan.
  - 2 To tare the instrument, press [**→T←**].
  - 3 Pour your powder into the powder container.
  - 4 Tap [**Set content**] to store the value on the value.
    - ⇒ The value is stored in the internal memory of the instrument. When writing to the RFID tag, the value is automatically entered in the text field **Content [g]**.

### Entering RFID data



- Function key [**Write RFID**] is active.
- 1 Tap [**Write RFID**].
  - 2 Scan target RFID tag.



- 1 Enter the name of the substance and confirm with **[OK]**, (max. of 20 characters).

**Note**

If a barcode reader is connected to your instrument and your substance provides a barcode, scan the product barcode instead of entering the name manually. The name of the substance appears in the respective information field and can be printed on the protocol or labels.

Enter the name of the substance and confirm with **[OK]**.

- 2 Enter the following data: **Substance**, **Lot ID**, **Filling date**, **Exp. date** and **Content [g]**.

**Note**

Once the **Exp. date** is reached an error message appears and you will not be able to continue dosing.

If you have stored the content in the internal memory, using **Set content**, the value is automatically written in the textfield **Content [g]**.

With the value **Content [g]** the counter calculates the remaining amount of substance.

- 3 To store data on the RFID tag, confirm with **[OK]**.
  - ⇒ The instrument is writing data on RFID tag.
  - ⇒ The data written on RFID tag is being displayed.
- 4 Confirm data with **[OK]**.
  - ⇒ The RFID tag is ready.

## 10 Density Application

Navigation:  > [Density]



The **Density** application is used for determining the density of solids and liquids as well as pasty substances. Each sample can be assigned an identification and the integrated statistics function can be used for statistical evaluation of measurements. Density determination is carried out based on **Archimedes' principle** according to which a body immersed in a fluid undergoes an apparent loss in weight which is equal to the weight of the fluid it displaces.

The hanger opening in the balance can be used for density determination. The optional density kit should be used for determining the density of solids. This includes all necessary accessories and aids for convenient and precise density determination. The density kit is supplied with separate instructions with a description of installation and use. A sinker is additionally required for determining the density of liquids and is available from a METTLER TOLEDO representative.

Alternatively, the **Density** application can also be used for determining the density of liquids using a pycnometer. Pycnometers are available from companies specializing in lab supplies.


A gamma sphere is required for determining the density of pasty substances. The names of suppliers can be obtained from an authorized representative.





Refer to the separate instructions supplied with the accessories. These contain useful information for working with these aids and their maintenance and use.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

### Selecting the application

- 1 Press .
  - 2 Tap the [Density] icon in the selection window.
    - ⇒ The selected application is active.
    - ⇒ Some of the specific function keys and information fields for density determination are activated by default (factory defaults).
- ⇒ The balance is ready for determining the density of solids using the auxiliary liquid, water.

## 10.1 Density application settings

Navigation:  > [Density] > 

Various specific density determination settings are available, which can be used for adapting applications to suit specific requirements.

Most of the setting options are the same as for the **Weighing** application. Only the settings that differ are described below.

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Menu item	Explanation	Further information
<b>Method</b>	Defines the density determination method.	<b>See</b> [Selecting the density determination method ▶ Page 129]
<b>Aux. Liquid</b>	Defines the auxiliary liquid.	<b>See</b> [Selecting an auxiliary liquid ▶ Page 129]
<b>Statistics</b>	Activates/deactivates the statistics for the selected method.	<b>See</b> [Activation or deactivation of statistics ▶ Page 129]
<b>Result Output Format</b>	Defines how the result of the density determination is calculated and displayed.	<b>See</b> [Specifications for calculation and result display ▶ Page 130]

<b>Function Keys</b>	Defines the function keys for density determination to appear at the bottom of the display.	<b>See</b> [Specific function keys for density determination ▶ Page 130]
<b>Info Field</b>	Defines the information fields displayed for density determination.	<b>See</b> [Specific information fields for density determination ▶ Page 131]
<b>Protocol</b>	Selects information to be shown in the weighing protocols.	<b>See</b> [Specific protocol information for density determination ▶ Page 132]
<b>ErgoSens</b>	Up to two external ErgoSens (optional) can be assigned a function in this menu.	<b>See</b> [Specific ErgoSens settings for density determination ▶ Page 134]

### 10.1.1 Selecting the density determination method

**Navigation:**  > [Density] >  > Method

This menu item can be used to define the density determination method.

You can define the following parameters:

Menu item	Explanation	Further information
<b>Solid</b>	Determines the density of non-porous solids using an auxiliary liquid.	<b>See</b> [Determination of the density of non-porous solids ▶ Page 135]
<b>Aux. Liquid</b>	Determines the density of liquids using a sinker.	<b>See</b> [Determination of the density of liquids using a sinker ▶ Page 136]
<b>Pasty Subst.</b>	Determines the density of pasty substances using a gamma sphere.	<b>See</b> [Determination of the density of pasty substances using a gamma sphere ▶ Page 137]
<b>Pycnometer</b>	Determines the density of liquids using a pycnometer.	<b>See</b> [Determination of the density of liquids using a pycnometer ▶ Page 138]
<b>Solid porous</b>	Determines the density of porous solids using an additional oil bath.	<b>See</b> [Determination of the density of porous solids ▶ Page 139]

**Factory setting:** [Solid] activated.

### 10.1.2 Selecting an auxiliary liquid

**Navigation:**  > [Density] >  > Aux. Liquid

This menu item can be used to define an auxiliary liquid. This setting is only used for determining the density of solids.

You can define the following parameters:

Values	Explanation
<b>Water</b>	The density of distilled water at temperatures from 10.0°C to 30.0°C is stored in the balance.
<b>Ethanol</b>	The density of ethanol at temperatures from 10.0°C to 30.0°C is stored in the balance.
<b>Others</b>	Any auxiliary liquid whose density at the current temperature must be known.

**Factory setting:** [Water] activated.

### 10.1.3 Activation or deactivation of statistics

**Navigation:**  > [Density] >  > Statistics

The balance can store specific statistics for each density determination method. When the statistics function is activated, a request is made at the end of each density determination to include the result in the statistics. This menu item can be used to activate or deactivate the statistics function.

### Important

To use the statistics, activate both [**Start**] and [**Temp.AL**] function keys.

You can define the following parameters:

Parameters	Explanation	Values
<b>Statistics</b>	Activates/deactivates the statistics function.	<b>On   Off*</b>

\* Factory setting

## 10.1.4 Specifications for calculation and result display

**Navigation:** [Menu] > [**Density**] > [Function] > **Result Output Format**

This menu item can be used to define the number of decimal places and unit used for calculation and display of the density determination result and also whether the air buoyancy is to be taken into account in calculation.

You can define the following parameters:

Parameters	Explanation	Values
<b>No. of decimal-points</b>	Defines the number of decimal places. The density determination result can be displayed and recorded with 1 to 5 decimal places.	<b>1   2   3*   4   5</b>
<b>Compensation</b>	Defines the correction factor for force calibration. <b>With</b> = the density determination result can be corrected by the force calibration correction factor and mean air density. <b>Without</b> = no correction takes place. <b>With/Without</b> = the corrected and uncorrected result is displayed and recorded.	<b>With*   Without   With/Without</b>
<b>Density Unit</b>	Defines the unit to be used for density determination. <b>g/cm<sup>3</sup></b> = grams per cm <sup>3</sup> . <b>kg/m<sup>3</sup></b> = kilograms per mkg/m <sup>3</sup> . <b>g/l</b> = grams per liter.	<b>g/cm<sup>3</sup>*   kg/m<sup>3</sup>   g/l</b>

\* Factory setting

## 10.1.5 Specific function keys for density determination

**Navigation:** [Menu] > [**Density**] > [Function] > **Function Keys**










This menu item can be used to activate the following specific function keys for density determination.

All other function keys are the same as for the **Weighing** application.

The function keys are displayed in the application at the bottom of the display. The numbers define the sequence in the display.

- Activate or deactivate function keys by tapping.
  - To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.
  - Application is activated.
- 1 Press [Function].  
⇒ A window with application-dependent settings appears.
  - 2 Tap **Function Keys** > [**Define**].
  - 3 Select the **Function Keys** which you need.  
⇒ The function key is automatically numbered.
  - 4 Change the settings and confirm with [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

	Designation	Explanation
	<b>Start</b>	Starts density determination.
	<b>DensityAL</b>	Defines the density of the auxiliary liquid. Only required for determining the density of solids and if an auxiliary liquid other than water or ethanol is used.
	<b>Temp.AL</b>	Entry of the auxiliary liquid temperature. Only required if distilled water or ethanol is used. For other liquids, the density at the current temperature must always be entered. For methods that do not require the use of an auxiliary liquid, the key for entering the current ambient temperature can be used. This is shown in the protocols.
	<b>Vol.Sinker</b>	Entry of the sinker volume (in cm <sup>3</sup> , max. 5 decimal places). Only required for determining the density of liquids using a sinker.
	<b>Vol.G. Sphere</b>	Entry of the gamma sphere volume (in cm <sup>3</sup> , max. 5 decimal places). Only required for determining the density of pasty substances using a gamma sphere.
	<b>Vol.Pycno</b>	Entry of the pycnometer volume (in cm <sup>3</sup> , max. 5 decimal places). Only required for determining the density of liquids using a pycnometer.
	<b>Wgt. Pycno</b>	Entry of the pycnometer weight. Only required for determining the density of liquids using a pycnometer.
	<b>Result</b>	Displays the statistics for the current density determination method. <b>Note</b> This function key only needs to be activated if the statistics function is also activated. If no results are available in the statistics, the key is inactive and cannot be actuated.
	<b>CL Result</b>	Clears the statistics for the current density determination to start a new series of measurements.

**Factory setting:** [Start] and [Temp.AL] activated in this sequence.


### 10.1.6 Specific information fields for density determination

**Navigation:**  > [Density] >  > Info Field

This menu item provides the following information fields for density determination.

All other data fields are the same as for the **Weighing** application.

The information fields in the display provide constant information on, e.g. set values, measured results.

- Information fields can be activated or deactivated by tapping.
- To redefine the sequence, all information fields must be deactivated and then activated in the required sequence.
- Application is activated.
  - 1 Press .
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Info Field** > [Define].

- 3 Select the information fields that you need.
  - ⇒ The information field is automatically numbered.
- 4 Change the settings and confirm with **[OK]**.

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Values	Explanation
<b>Method</b>	Shows the selected density determination method.
<b>Aux. Liquid</b>	Displays the selected auxiliary liquid (determination of the density of solids).
<b>Temp.AL</b>	Displays the temperature of the auxiliary liquid (distilled water, ethanol) entered via the function key with the same name.
<b>DensityAL</b>	Displays the density of the auxiliary liquid. For water or ethanol, is automatically selected from the integrated density tables. For other auxiliary liquids, the density entered via the function key with the same name is displayed.
<b>Vol.Sinker</b>	Displays the sinker volume (determination of the density of liquids using a sinker).
<b>Vol.Gamma</b>	Displays the gamma sphere volume (determination of the density of pasty substances using a gamma sphere).
<b>Vol.Pycno</b>	Displays the pycnometer volume (determination of the density of liquids using a pycnometer).
<b>Wgt. Pycno</b>	Displays the pycnometer weight (determination of the density of liquids using a pycnometer).


**Factory setting:** **[Method]**, **[Aux. Liquid]** and **[Temp.AL]** activated in this sequence.

### 10.1.7 Specific protocol information for density determination

**Navigation:**  > **[Density]** >  > **Protocol**

Here you define which data appears in the protocols. This large menu item is divided into three sub-menus. They enable you to make additional settings for the application. The rest of the available protocol data corresponds to the data for the **Weighing** application and is not described here.


The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.
- Application is activated.
  - 1 Press .
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Protocol** > **[Define]**.
    - ⇒ **Protocol** window appears.
  - 3 Tap (e.g. **Header**) > **[Define]**.
  - 4 Select the information key which you need.
    - ⇒ The information key is automatically numbered.
  - 5 Confirm with **[OK]**.

The arrow buttons can be used to page forward or back to a menu page.

#### Note

The results and data can be printed out at any time.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

### Header line of protocols

This submenu can be used to define information to be printed in the protocol header (before the results). The header is automatically printed if it has been defined as part of the protocol.

The header is printed automatically when a single value protocol is output.

### Recording of single values

This submenu can be used to define the information to be reported for each individual result.

Press  to print a single value protocol (protocol of a single density determination).

### Recording statistics

Press  to print a statistics protocol. Takes place when the statistics window is open.

You can define the following parameters:

Parameters	Explanation	Values
<b>Header</b>	<p>Define the information to be printed in the protocol header (before the results).</p> <p><b>Method</b> = records the selected density determination method.</p> <p><b>Aux. Liquid</b> = records the selected auxiliary liquid (determination of the density of solids).</p> <p><b>DensityAL</b> = records the density of the auxiliary liquid. Entry via the function key with the same name. For water or ethanol, the value selected from the integrated table is recorded.</p> <p><b>Temp.AL</b> = records the temperature of the auxiliary liquid (for water and ethanol) entered via the function key with the same name.</p> <p><b>Vol.Sinker</b> = records the sinker volume (determination of the density of liquids using a sinker) entered via the function key with the same name.</p> <p><b>Vol.Gamma</b> = records the gamma sphere volume (determination of the density of pasty substances using a gamma sphere) entered via the function key with the same name.</p> <p><b>Vol.Pycno</b> = records the pycnometer volume (determination of the density of liquids using a pycnometer) entered via the function key with the same name.</p> <p><b>Wgt. Pycno</b> =</p>	<p><b>Appl. Name*</b>   <b>Title 1</b>   <b>Title 2</b>   <b>Date/Time</b>   <b>User</b>   <b>Balance Type</b>   <b>SNR</b>   <b>Balance ID</b>   <b>Levelcontrol</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Method</b>   <b>Aux. Liquid</b>   <b>DensityAL</b>   <b>Temp.AL</b>   <b>Vol.Sinker</b>   <b>Vol.Gamma</b>   <b>Vol.Pycno</b>   <b>Wgt. Pycno</b>   <b>Signature</b>   <b>Blank Line</b>   <b>Dash Line</b>   <b>3 Blank Lines</b></p>
<b>Single value</b>	<p>Define the information to be recorded for each single result.</p> <p><b>Wgt. in Air</b> = records the weight of the sample in air (determination of the density of solids).</p> <p><b>Wgt. in Liquid</b> = records the weight of the sample in the auxiliary liquid (determination of the density of solids) or the weight of the sample substance displaced by the sinker or gamma sphere.</p> <p><b>Wgt. of content</b> = records the weight of the sample in the pycnometer (determination of the density of liquids using a pycnometer).</p> <p><b>Vol.Probe</b> = records the volume of the sample (calculated by the firmware).</p> <p><b>Density</b> = records the result of the current density determination.</p>	<p><b>Levelcontrol</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Method</b>   <b>Aux. Liquid</b>   <b>DensityAL</b>   <b>Temp.AL</b>   <b>Vol.Sinker</b>   <b>Vol.Gamma</b>   <b>Vol.Pycno</b>   <b>Wgt. Pycno</b>   <b>Wgt. in Air</b>   <b>Wgt. in Liquid</b>   <b>Wgt. of content</b>   <b>Vol.Probe</b>   <b>Density*</b>   <b>Blank Line</b>   <b>Dash Line</b>   <b>3 Blank Lines*</b>   <b>Signature</b></p>

<b>Statistics</b>	<p>Define the statistics to be recorded.</p> <p><b>n, x, s, s. rel =</b>  <b>n</b> = records the number of samples in the current series of measurements.  <b>x</b> = records the average density of all samples.  <b>s</b> = records the absolute standard deviation within the current series of measurements.  <b>s.rel</b> = records the relative standard deviation within the current series of measurements.</p> <p><b>Min, Max, Diff =</b></p> <p><b>Min</b> = records the lowest determined density within a series of measurements.  <b>Max</b> = records the highest determined density within a series of measurements.  <b>Diff.</b> = records the difference between the highest and lowest density within a series of measurements.</p>	<b>Appl. Name   Title 1   Title 2   Date/Time   User   Balance Type   SNR   Balance ID   Levelcontrol   ID1   ID2   ID3   ID4   Method   Aux. Liquid   n, x, s, s. rel*   Min, Max, Diff*   Signature*   Blank Line   Dash Line*   3 Blank Lines*</b>
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\* Factory setting

### 10.1.8 Specific ErgoSens settings for density determination

**Navigation:** [Menu] > [Density] > [ErgoSens]

Additional formulation settings are available for the ErgoSens sensors.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

- 1 Press [ErgoSens].  
⇒ A window with application-dependent settings appears.
- 2 Tap **ErgoSens** > [Define].  
⇒ A selection window appears.
- 3 Select the required menu item (e.g. **ErgoSens 1 (Aux1)**).  
⇒ A selection window appears.
- 4 Select the function by tapping the button.
- 5 Change the settings and confirm with [OK].

#### Menu structure

Main menu	Submenu	Further information
<b>ErgoSens 1 (Aux1)</b>	<b>Off   Print   Start   Result   OK   ID1   ID2   ID3   ID4   1/2d   1/5d   1/10d   1/100d   1/1000d   AntiStatic Kit</b>	<b>See</b> Parameter table
<b>ErgoSens 2 (Aux2)</b>	<b>Off   Print   Start   Result   OK   ID1   ID2   ID3   ID4   1/2d   1/5d   1/10d   1/100d   1/1000d   AntiStatic Kit</b>	<b>See</b> Parameter table

You can define the following parameters:

Values	Explanation
<b>Start</b>	Emulates the function key with the same name. Starts density determination.
<b>Result</b>	Emulates the function key with the same name. Opens the result window.
<b>OK</b>	Emulates pressing of the button with the same name in the dialogs (however not in the menus) for confirmation of entries and actions.



**Factory setting:** Both ErgoSens deactivated, [Off].

## 10.2 Working with the density application

**Navigation:** [Menu] > [Density]

This section describes working with the **Density** application and the different density determination methods.

### 10.2.1 Determination of the density of non-porous solids

**Navigation:** [Menu] > [Density] > [Method] > **Method** > [Solid]

For the determination of the density of non-porous solids, the solid is first weighed in air and then in the auxiliary liquid. The difference in weight results in the buoyancy from which the density is calculated by the firmware.

#### Note

- The hanger opening for weighing below the balance can be used for this purpose.



When working with the optional density kit, observe the information in the supplied instructions.

Select in the application-specific settings as **Method** [Solid]. Define the required auxiliary liquid, e.g. [Water].

If an auxiliary liquid other than water or ethanol is used, activate the [DensityAL] function key and the information field with the same name. Enter the density of the auxiliary liquid at the current temperature by pressing the [DensityAL] function key (in  $\text{g/cm}^3$ , max. 5 decimal places). This is required as density tables are stored in the balance only for water and ethanol. The entered value is displayed in the information field with the same name. The activated [Temp.AL] function key and information with the same name are not required for density determination with an auxiliary liquid other than water and ethanol. This function key can be used to enter the current ambient temperature. This is subsequently also printed on the protocols and shows the temperature at which the density was determined.

Activate the appropriate function keys and information fields.



**Start**

– Activate function keys.



**Temp.AL**





**DensityAL**

The result of the density determination can be printed with the [Print] key. The result is stored up to completion of the next density determination with the same method and can be printed again as required.

- A printer is connected and activated as an output device in the peripheral device settings.
  - To print out the settings, press [Print].
  - Function keys are activated.
- 1 Press [Method].
    - ⇒ A window with application-dependent settings appears.
  - 2 Beside **Method**, tap the associated button.
    - ⇒ A selection window with methods appears.
  - 3 Tap [Solid].
  - 4 Beside **Aux. Liquid**, tap the associated button.
    - ⇒ A selection window appears.
  - 5 Tap, e.g. [Water].

- 6 Tap [**Temp.AL**].
    - ⇒ A numeric input window appears.
  - 7 Enter the value (10 °C to 30 °C) and confirm with [**OK**].  
For water and ethanol, density tables for the temperature range 10 °C to 30 °C are stored in the balance.
  - 8 Tap [**Start**].
    - ⇒ The balance is automatically tared.
    - ⇒ The balance requests that the solid is weighed in air.
  - 9 Place the solid on the balance.  
When working with the optional density kit, observe the information in the supplied instructions.  
When working with the hanger opening, hang the solid on the hanging device.
    - ⇒ The weight of the solid appears at the bottom left corner of the window.
  - 10 Tap [**OK**] to enter the weight.
    - ⇒ The weighing result is stored.
    - ⇒ The balance requests that the solid is weighed in the auxiliary liquid.
  - 11 Place the solid on the balance.  
The solid must be immersed at least 1 cm in the liquid and no air bubbles must be present in the container.  
When working with the hanger opening, the container with the auxiliary liquid must be placed below the hanging device.
  - 12 Tap [**OK**] to enter the weight.
    - ⇒ The balance determines the density of the solid.
    - ⇒ The result window with compensated and/or uncompensated value appears.
- ⇒ Density determination is complete.

## 10.2.2 Determination of the density of liquids using a sinker

**Navigation:**  > [**Density**] >  > **Method** > [**Liquid**]

For the determination of the density of liquids, a sinker with a known volume is used. The sinker is initially tared in air and then weighed in the liquid whose density is to be determined. The difference in weight results in the buoyancy from which the density is calculated by the firmware.

### Note

- The hanger opening for weighing below the balance can be used for this purpose.



When working with the optional density kit, observe the information in the supplied instructions.

Select in the application-specific settings as **Method** [**Liquid**].

The activated [**Temp.AL**] function key and information field with the same name are not required for this density determination method. This function key can be used to enter the current ambient temperature. This is subsequently printed together with the protocols showing the temperature at which the density was determined.

Activate the appropriate function keys and information fields.




**Start** – Activate function keys.





**Vol.Sinker**



**Temp.AL**

The result of the density determination can be printed with the  key. The result is stored up to completion of the next density determination with the same method and can be printed again as required.

- A printer is connected and activated as an output device in the peripheral device settings.
  - To print out the settings, press .
  - Function keys are activated.
- 1 Press .
  - ⇒ A window with application-dependent settings appears.
  - 2 Beside **Method**, tap the associated button.
  - ⇒ A selection window with methods appears.
  - 3 Tap [**Liquid**].
  - 4 Tap [**Vol.Sinker**].
  - ⇒ A numeric input window appears.
  - 5 Enter the sinker volume, e.g. 10.00000 cm<sup>3</sup> and confirm with [**OK**].
  - 6 Tap [**Start**].
  - ⇒ The balance requests that the sinker is weighed in air.
  - 7 Place the sinker on the balance and confirm with [**OK**].  
When working with the optional density kit, observe the information in the supplied instructions.  
When working with the hanger opening, hang the sinker on the hanging device.
  - ⇒ The balance is automatically tared.
  - ⇒ The balance requests that the sinker is weighed in the liquid.
  - 8 Pour the liquid into the beaker.  
The sinker must be immersed at least 1 cm in the liquid and no air bubbles must be present in the container.  
When working with the hanger opening, place the container with the liquid below the hanging device.
  - ⇒ The buoyancy of the sinker appears with a negative sign at the bottom left corner of the window.
  - 9 Tap [**OK**] to enter the weight.
  - ⇒ The weighing result is stored.
  - ⇒ The balance requests that the solid is weighed in the auxiliary liquid.
  - 10 Place the solid on the balance.  
The sinker must be immersed at least 1 cm in the liquid and no air bubbles must be present in the container.  
When working with the hanger opening, place the container with the liquid below the hanging device.
  - 11 Tap [**OK**] to enter the weight.
  - ⇒ The balance determines the density of the liquid.
  - ⇒ The result window with compensated and/or uncompensated value appears.
- ⇒ Density determination is complete.

### 10.2.3 Determination of the density of pasty substances using a gamma sphere

**Navigation:**  > [**Density**] >  > **Method** > [**Pasty Subst.**]

For the determination of the density of pasty substances, a gamma sphere with a known volume is normally used. The pasty substance is initially tared without gamma sphere and then weighed with gamma sphere.

Select in the application-specific settings as **Method** [**Pasty Subst.**].

The activated [**Temp.AL**] function key and information field with the same name are not required for this density determination method. This function key can be used to enter the current ambient temperature. This is subsequently printed together with the protocols showing the temperature at which the density was determined.

Activate the appropriate function keys and information fields.




**Start** – Activate function keys.





**Vol.Gamma**





**Temp.AL**

The result of the density determination can be printed with the  key. The result is stored up to completion of the next density determination with the same method and can be printed again as required.

- A printer is connected and activated as an output device in the peripheral device settings.
  - To print out the settings, press .
  - Function keys are activated.
    - 1 Press .
      - ⇒ A window with application-dependent settings appears.
    - 2 Beside **Method**, tap the associated button.
      - ⇒ A selection window with methods appears.
    - 3 Tap [**Pasty Subst.**].
    - 4 Tap [**Vol.Gamma**].
      - ⇒ A numeric input window appears.
    - 5 Enter the gamma sphere volume, e.g. 10.00000 cm<sup>3</sup> and confirm with [**OK**].
    - 6 Tap [**Start**].
      - ⇒ The balance requests that the sample is weighed.
    - 7 Place the sample on the balance (without gamma sphere) and confirm with [**OK**].
      - ⇒ The balance is automatically tared.
      - ⇒ The sample weight appears at the bottom left corner of the window.
      - ⇒ The balance requests that the gamma sphere is immersed in the liquid.
    - 8 Immerse the gamma sphere in the liquid.
      - ⇒ The weight of the substance displaced by the gamma sphere appears at the bottom left corner of the window.
    - 9 Tap [**OK**] to enter the weight.
      - ⇒ The weight is stored.
      - ⇒ The balance determines the density of the pasty substance.
      - ⇒ The result window with compensated and/or uncompensated value appears.
- ⇒ Density determination is complete.

#### 10.2.4 Determination of the density of liquids using a pycnometer

**Navigation:**  > [**Density**] >  > **Method** > [**Pycnometer**]

For the determination of the density of liquids, a pycnometer is frequently used, i.e. a glass beaker with a known volume and weight. The liquid is filled into the pycnometer and weighed.

Select in the application-specific settings as **Method [Pycnometer]**.

The activated [**Temp.AL**] function key and information field with the same name are not required for this density determination method. This function key can be used to enter the current ambient temperature. This is subsequently printed together with the protocols showing the temperature at which the density was determined.

Activate the appropriate function keys and information fields.



**Start**

– Activate function keys.




**Wgt. Pycno**





**Vol. Pycno**



**Temp.AL**

The result of the density determination can be printed with the  key. The result is stored up to completion of the next density determination with the same method and can be printed again as required.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .
- Function keys are activated.

- 1 Press .
    - ⇒ A window with application-dependent settings appears.
  - 2 Beside **Method**, tap the associated button.
    - ⇒ A selection window with methods appears.
  - 3 Tap [**Pycnometer**].
  - 4 Tap [**Wgt. Pycno**].
    - ⇒ A numeric input window appears.
  - 5 Enter the pycnometer weight, e.g. 43.83 g and confirm with [**OK**].
  - 6 Tap [**Vol. Pycno**].
    - ⇒ A numeric input window appears.
  - 7 Enter the pycnometer volume, e.g. 50.331 cm<sup>3</sup> and confirm with [**OK**].
  - 8 Tap [**Start**].
    - ⇒ The balance requests that the filled pycnometer is placed on the balance.
    - ⇒ The pycnometer weight appears with a negative sign at the bottom left corner of the window.
  - 9 Place the filled pycnometer on the balance and confirm with [**OK**].
    - ⇒ The net weight of the sample appears at the bottom left corner of the window.
  - 10 Tap [**OK**] to enter the weight.
    - ⇒ The weight is stored.
    - ⇒ The balance determines the density of the liquid.
    - ⇒ The result window with compensated and/or uncompensated value appears.
- ⇒ Density determination is complete.

## 10.2.5 Determination of the density of porous solids

**Navigation:**  > [**Density**] >  > **Method** > [**Solid porous**]

For the determination of the density of porous solids, the solid is initially weighed in air. In contrast to non-porous solids, an additional oil bath is required to close the pores in the solid before being weighed in the auxiliary liquid.

### Note

- The hanger opening for weighing below the balance can be used for this purpose.



When working with the optional density kit, observe the information in the supplied instructions.

Select in the application-specific settings as **Method [Solid porous]**. Define the required auxiliary liquid, e.g. **[Water]**.

If an auxiliary liquid other than water or ethanol is used, activate the **[DensityAL]** function key and the information field with the same name. Enter the density of the auxiliary liquid at the current temperature by pressing the **[DensityAL]** function key (in **g/cm<sup>3</sup>**, max. 5 decimal places). This is required as density tables are stored in the balance only for water and ethanol. The entered value is displayed in the information field with the same name. The activated **[Temp.AL]** function key and information with the same name are not required for density determination with an auxiliary liquid other than water and ethanol. This function key can be used to enter the current ambient temperature. This is subsequently also printed on the protocols and shows the temperature at which the density was determined.

Activate the appropriate function keys and information fields.




**Start** – Activate function keys.





**Temp.AL**



**DensityAL**

The result of the density determination can be printed with the  key. The result is stored up to completion of the next density determination with the same method and can be printed again as required.

- A printer is connected and activated as an output device in the peripheral device settings.
  - To print out the settings, press .
  - Function keys are activated.
- 1 Press .
  - ⇒ A window with application-dependent settings appears.
  - 2 Beside **Method**, tap the associated button.
  - ⇒ A selection window with methods appears.
  - 3 Tap **[Solid]**.
  - 4 Beside **Aux. Liquid**, tap the associated button.
  - ⇒ A selection window appears.
  - 5 Tap, e.g. **[Water]**.
  - 6 Tap **[Temp.AL]**.
  - ⇒ A numeric input window appears.
  - 7 Enter the value (10 °C to 30 °C) and confirm with **[OK]**.  
For water and ethanol, density tables for the temperature range 10 °C to 30 °C are stored in the balance.
  - 8 Tap **[Start]**.
  - ⇒ The balance is automatically tared.
  - ⇒ The balance requests that the solid is weighed in air.
  - 9 Place the solid on the balance.  
When working with the optional density kit, observe the information in the supplied instructions.  
When working with the hanger opening, hang the solid on the hanging device.
  - ⇒ The weight of the solid appears at the bottom left corner of the window.
  - 10 Tap **[OK]** to enter the weight.
  - ⇒ The weight is stored.
  - ⇒ The balance requests that the solid is briefly immersed in the oil bath and placed on the balance again.
  - 11 Immerse the solid in the oil bath.
  - 12 Place the solid in the same position again.
  - ⇒ The weight of the solid appears at the bottom left corner of the window.


- 13 Tap **[OK]** to enter the weight.
- ⇒ The weight is stored.
  - ⇒ The balance requests that the solid wetted with oil is immersed in the auxiliary liquid. The solid must be immersed at least 1 cm in the liquid and no air bubbles must be present in the container. When working with the hanger opening, the container with the auxiliary liquid must be placed below the hanging device.
  - ⇒ The weight of the solid appears at the bottom left corner of the window.
- 14 Tap **[OK]** to enter the weight.
- ⇒ The balance determines the density of the solid.
  - ⇒ The result window with compensated and/or uncompensated value appears.
- ⇒ Density determination is complete.

## 10.2.6 Example protocol of a density determination

The detail of a protocol depends on the selected protocol settings. Only application-specific information is shown in the example printout.

The result protocol can be printed by pressing the  key with the result window.

### Important

The result remains stored up to completion of the next density determination. The result can be printed again by pressing the  key. This may be necessary if a second copy of a protocol is required or if the printer could not be used due to a lack of paper.

### Example: Printout

```

----- Density -----
25.Jul 2014          14:51

Method              Solid
Liquid              Water
Density AL
                   0.99800 g/cm3
Temperature         21.2 °C
Wgt. in Air         21.78 g
Wgt. in Liquid
                   16.90 g
Density             4.447 g/cm3
                   =====
Density uncomp.
                   4.451 g/cm3
                   =====

Signature
.....

```

## 10.3 Using density statistics

Statistics can be provided for each density determination method. Stored are all results (max. 651500) recorded in the statistics during density determination.

### Initial settings

The statistics can be used by activating the statistics function and the following function keys.

**See** [Activation or deactivation of statistics ▶ Page 129].

If there are no values in the statistics, the **[Result]** and **[CL Result]** function keys are inactive and cannot be actuated.



**Result** – Activate function keys.



**CL Result**

### Entry of values for statistics

If the statistics function is activated, a request is made at the end of each density determination to enter the results in the statistics.


- The statistics function is activated.
- Tap **[Yes]**.
  - ⇒ The results are entered in the statistics of the current method.
  - ⇒ Copying of the results is confirmed on the display.


If the results are not to be entered in the statistics, press **[No]**. The results are retained until the next measurement, but are not copied to the statistics.

### Statistics display and printing

The density determination method must be selected in order to display or print the associated statistics.

**See** [Selecting the density determination method ▶ Page 129].

Displayed in the statistics window are the values selected for recording statistics. The statistics protocol can be printed by pressing the  key with the statistics window open.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

### Example: Printout

```


----- Density -----
25.Jul 2014          14:55

Method              Solid
Liquid              Water
With Compensation
n                   5
x                   5.5004 g/cm3
s                   0.0942 g/cm3
s.rel               1.71 %
Without Compensation
n                   5
x                   5.5062 g/cm3
s                   0.0944 g/cm3
s.rel               1.72 %
With Compensation
Min                 5.423 g/cm3
Max                 5.603 g/cm3
Diff.               0.180 g/cm3
Without Compensation
Min                 5.429 g/cm3
Max                 5.609 g/cm3
Diff.               0.180 g/cm3

Signature
.....

```



- Function keys are activated.
  - The density determination method is selected.
  - Values are present in the statistics.
- 1 Tap [**Result**].
    - ⇒ The statistics window with compensated and/or uncompensated values appears.
    - ⇒ Only displayed are the values selected for recording statistics.
  - 2 Press [].
    - ⇒ The statistics protocol is printed.
  - 3 To exit the menu item, tap [**OK**].

### Deleting statistics

To end a series of measurements, press the [**CL Result**] function key. This clears the associated statistics. For security reasons, a request is displayed, which must be confirmed before the statistics are cleared.

### Important

The [**CL Result**] function key clears the statistics of the currently selected density determination method. The statistics of other methods are retained. Prior to clearing, it must be ensured that the density determination method, the statistics of which are to be cleared, is selected.

- Function keys are activated.
  - The density determination method is selected.
  - Values are present in the statistics.
- 1 Tap [**CL Result**].
    - ⇒ A confirmation window appears.
  - 2 To clear the statistics, tap [**Yes**].
    - ⇒ The statistics are cleared.
- ⇒ The function key is inactive and grayed.

## 10.4 Formulae used to calculate density

The **Density** application is based on the following formulae.

### 10.4.1 Formulae for determining the density of solids

#### With compensation for air density

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

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

#### Without compensation for air density

$$\rho = \frac{A \cdot \rho_0}{A-B}$$

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

- $\rho$  = Sample density  
 $A$  = Weight of the sample in air  
 $B$  = Weight of the sample in the auxiliary liquid  
 $V$  = Sample volume  
 $\rho_0$  = Density of the auxiliary liquid  
 $\rho_L$  = Air density (0.0012 g/cm<sup>3</sup>)

$\alpha$  = Balance correction factor (0.99985), takes into account the buoyancy of the adjustment weight

## 10.4.2 Formulae for determining the density of liquids and pasty substances

With compensation for air density

$$\rho = \frac{\alpha \cdot P}{V_0} + \rho_L$$

Without compensation for air density

$$\rho = \frac{P}{V_0}$$

$\rho$  = Density of liquid or pasty substance

$P$  = Weight of displaced liquid or pasty substance

$V_0$  = Sinkers or gamma sphere volume

$\rho_L$  = Air density (0.0012 g/cm<sup>3</sup>)

$\alpha$  = Balance correction factor (0.99985), takes into account the buoyancy of the adjustment weight

## 10.5 Density table for distilled water

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

## 10.6 Density table for ethanol

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

## 11 Statistics Application


Navigation:  > [Statistics]





The application allows you to generate and evaluate statistics for a series of weighings. It can handle 1 to 999 values.

The **Statistics** application has the same basic features as the **Weighing** application. However, it includes additional settings and functions for statistical data acquisition and evaluation of a series of weighings. Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

### Selecting the application

- 1 Press .
  - 2 Tap the [Statistics] icon in the selection window.
    - ⇒ The selected application is active.
    - ⇒ Some of the specific function keys and data fields for statistics are activated by default (factory defaults).
    - ⇒ The two function keys [Result] and [CL Result] are disabled and are therefore shown differently because there is no statistical data available at this point in time.
- ⇒ The balance is ready for weighing.

### 11.1 Settings for statistics application

Navigation:  > [Statistics] > 

Various specific statistic settings are available, which can be used to adapt the application to suit specific requirements.

Most of the setting options are the same as for the **Weighing** application. Only the settings that differ are described below.

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Menu item	Explanation	Further information
<b>Function Keys</b>	Define which function keys for statistics are shown at the bottom of the display. These keys enable direct access to specific functions.	<b>See</b> [Specific function keys for using statistics ▶ Page 146]
<b>Info Field</b>	Define which information fields for statistics are displayed.	<b>See</b> [Specific information fields for statistics ▶ Page 147]
<b>Autom. Weigh- tEntry</b>	Activates/deactivates automatic weight entry.	<b>See</b> [Specifications for automatic weight entry ▶ Page 148]
<b>Protocol</b>	Select data to be shown on the weighing protocol.	<b>See</b> [Specific protocol information for statistics ▶ Page 148]
<b>Additive Weighing</b>	Activates/deactivates the additive mode (series weighing with automatic taring).	<b>See</b> [Enable additive mode ▶ Page 150]
<b>PlausibilityCheck</b>	Define the limit values for plausible weighing results.	<b>See</b> [Define plausibility limits ▶ Page 151]
<b>Tablet Feeder</b>	Define the specifications for cooperation between the statistics function and the tablet feeder.	<b>See</b> [Settings for the tablet feeder ▶ Page 151]


#### 11.1.1 Specific function keys for using statistics

Navigation:  > [Statistics] >  > **Function Keys**









This menu item allows you to enable the specific function keys listed below for using statistics.

All other function keys are the same as for the **Weighing** application.

The function keys are displayed in the application at the bottom of the display. The numbers define the sequence in the display.

- Activate or deactivate function keys by tapping.
  - To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.
  - Application is activated.
- 1 Press [].
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Function Keys** > [**Define**].
  - 3 Select the **Function Keys** which you need.
    - ⇒ The function key is automatically numbered.
  - 4 Change the settings and confirm with [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

	Designation	Explanation
	<b>M+</b>	Enters the current value.
	<b>Result</b>	Opens the results window.
	<b>CL Result</b>	Clears the results memory.
	<b>CL Last</b>	Deletes the last saved value.
	<b>Nominal</b>	Defines the desired nominal weight. This also serves as a reference for the tolerances.
	<b>+Tol</b>	Defines the accuracy (tolerance range) for weighing to a nominal weight.
	<b>-Tol</b>	Defines the accuracy (tolerance range) for weighing to a nominal weight.
	<b>Max n</b>	Defines the maximum number of weighings in a series.

**Factory setting:** [**M+**], [**Result**] and [**CL Result**] activated, in this sequence.


### 11.1.2 Specific information fields for statistics

**Navigation:** [] > [**Statistics**] > [] > **Info Field**

This menu item provides the information fields listed below for displaying statistical values.

All other data fields are the same as for the **Weighing** application.

The information fields in the display provide constant information on, e.g. set values, measured results.

- Information fields can be activated or deactivated by tapping.
  - To redefine the sequence, all information fields must be deactivated and then activated in the required sequence.
  - Application is activated.
- 1 Press [].
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Info Field** > [**Define**].
  - 3 Select the information fields that you need.
    - ⇒ The information field is automatically numbered.

4 Change the settings and confirm with **[OK]**.

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Values	Explanation
<b>n</b>	Shows the number of weighings that have been made.
<b>x</b>	Shows the average weight of all weighings.
<b>s</b>	Shows the standard deviation as an absolute value.
<b>s.rel</b>	Shows the standard deviation as a percentage.
<b>Sum</b>	Shows the total weight of all individual weighings.
<b>&gt;T+</b>	Shows the number of weighings outside the upper weight tolerance.
<b>&lt;T-</b>	Shows the number of weighings outside the lower weight tolerance.
<b>Min</b>	Shows the lowest measured weight of the current series.
<b>Max</b>	Shows the highest measured weight of the current series.
<b>Diff.</b>	Shows the difference between the lowest and the highest weights.
<b>Nominal</b>	This function key displays the nominal weight.
<b>+Tol</b>	This function key displays the entered tolerance for weighing-in to nominal weight.
<b>-Tol</b>	This function key displays the entered tolerance for weighing-in to nominal weight.


**Factory setting:** **n**, **x** and **s** activated, in this sequence.

### 11.1.3 Specifications for automatic weight entry

**Navigation:**  > **[Statistics]** >  > **Autom. WeightEntry**

Here you define whether and under which conditions the balance should automatically enter stable weight values in the statistics. This saves you the effort of tapping the **[M+]** function key. The value is printed automatically.

When this function is activated **[On]**, the criteria for automatic entry can be defined via the **[Define]** button.

- 1 Press .
  - ⇒ A window with application-dependent settings appears.
- 2 Beside **Autom. WeightEntry**, tap the associated button.
  - ⇒ **Autom. WeightEntry** window appears.
- 3 Tap **[On]** > **[Define]**.
- 4 Change the settings and confirm with **[OK]**.

You can define the following parameters:

Parameters	Explanation	Values
<b>Limit</b>	This value defines which limit must be exceeded for automatic entry.	User-defined
<b>Delay Time</b>	When the limit is exceeded, the <b>Delay Time</b> is started, and when it times out the value is captured and entered in the statistics or transferred over the interface.	User-defined (displayed in seconds)

**Factory setting:** **[Off]** Automatic entry disabled.

### 11.1.4 Specific protocol information for statistics

**Navigation:**  > **[Statistics]** >  > **Protocol**

Here you define which data appears in the protocols. This large menu item is divided into three sub-menus. They enable you to make additional settings for the application. The rest of the available protocol data corresponds to the data for the **Weighing** application and is not described here.

The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.
- Application is activated.
  - 1 Press [].
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Protocol** > [**Define**].
    - ⇒ **Protocol** window appears.
  - 3 Tap (e.g. **Header**) > [**Define**].
  - 4 Select the information key which you need.
    - ⇒ The information key is automatically numbered.
  - 5 Confirm with [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

### Note

The results and data can be printed out at any time.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [].

### Header line of protocols

Use this sub-menu to define which data is printed in the protocol header (before the results).

The header is printed automatically for series weighings when the first weight value is entered in the statistics by tapping the [**M+**] function key.

However, the header can also be printed separately by tapping the [**Header**] function key.

### Recording of single values

This submenu can be used to define the information to be reported for each individual result.

Tap the [**M+**] function key to enable automatic printing of single values during a series of weighings.

A single value can also be printed separately by pressing the [] key.

### Recording of results

Here you can define which additional data is to be recorded in the results protocol.

The result protocol can be printed by pressing the [] key with the result window.

If a specific number of samples [**Max n**] is defined for a weighing series, the results protocol is automatically printed after the weight of the last sample has been entered in the statistics.

You can define the following parameters:

Parameters	Explanation	Values
<b>Header</b>	Define the information to be printed in the protocol header (before the results). <b>Plausibility</b> = records the defined limit for the plausibility of weight values. <b>Max n</b> = records the defined maximum number of weighings in the series. <b>Nom.,+Tol,-Tol</b> = records the defined nominal weight and the defined plus and minus tolerances.	<b>Appl. Name*</b>   <b>Title 1</b>   <b>Title 2</b>   <b>Date/Time*</b>   <b>User</b>   <b>Balance Type</b>   <b>SNR</b>   <b>Balance ID</b>   <b>Levelcontrol</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Plausibility</b>   <b>Max n</b>   <b>Nom.,+Tol,-Tol</b>   <b>MW-Method</b>   <b>Signature</b>   <b>Blank Line</b>   <b>Dash Line</b>   <b>3 Blank Lines</b>

<b>Single value</b>	Define the information to be recorded for each single result.	<b>Header   Levelcontrol   ID1   ID2   ID3   ID4   Plausibility   Max n   Nom.,+Tol,-Tol   MW-Method   Tare   Net*   Gross   Info Unit   Blank Line   Dash Line   3 Blank Lines</b>
<b>Result</b>	<p>Define which statistical data is to be recorded.</p> <p><b>&gt;Tol+,&lt;Tol-</b> = records the number of weighings that are outside the tolerance range.</p> <p><b>n</b> = records the number of weighed samples.</p> <p><b>x</b> = records the average weight of the total number of samples. The value is recorded with the current display unit. The resolution of the recorded value is ten times higher than the resolution of the measured value with the highest resolution in the series.</p> <p><b>Important</b></p> <p>The value <b>s</b> or <b>s.rel</b> are only recorded if there are at least three values in the statistics. Otherwise a dash is shown instead of a value.</p> <p><b>s</b> = records the standard deviation as an absolute value. The value is recorded with the current display unit. The resolution of the recorded value is ten times higher than the resolution of the measured value with the highest resolution in the series.</p> <p><b>s.rel</b> = records the relative standard deviation within the series as a percentage. The value is always recorded with a resolution of two decimal places.</p> <p><b>Min,Max,Diff = Max</b> = Records the highest measured weight of the current series. The number of decimal places and the unit are the same as those used to display the result when the measured value was entered.</p> <p><b>Min</b> = records the lowest measured weight of the current series. The number of decimal places and the unit are the same as those used to display the result when the measured value was entered.</p> <p><b>Diff.</b> = records the difference between the highest and lowest measured weights in the current series. The value is recorded with the current display unit. The number of decimal places of the recorded value corresponds to the number of decimal places of the highest or lowest weight with the highest resolution.</p> <p><b>Sum</b> = records the total weight of all saved individual weighings. The value is recorded with the current display unit. The number of decimal places corresponds to the number of decimal places of the measured value with the highest resolution in the series.</p>	<b>Appl. Name   Title 1   Title 2   Date/Time   User   Balance Type   SNR   Balance ID   Levelcontrol   ID1   ID2   ID3   ID4   Max n   Nom.,+Tol,-Tol   &gt;Tol+,&lt;Tol-   MW-Method   n*   x*   s*   s.rel*   Min,Max,Diff   Sum   Signature   Blank Line   Dash Line   3 Blank Lines</b>

\* Factory setting

### 11.1.5 Enable additive mode

**Navigation:**  > [Statistics] >  > **Additive Weighing**

You can use this menu item to enable or disable additive mode. When additive mode is activated, it is not necessary to remove the samples from the weighing pan during a series of weighings.



- 1 Press .
  - ⇒ A window with application-dependent settings opens.
- 2 Tap the **[On]** button for **Additive Weighing**.

You can define the following parameters:

Parameters	Explanation	Values
<b>Off</b>	Additive mode is disabled.	None
<b>On</b>	Additive mode is enabled. The balance is automatically tared after a weighing result has been entered in the statistics, either manually or automatically. The next sample can be weighed out without removing the previous sample from the weighing pan.	None

**Factory setting:** **[Off]**.

### 11.1.6 Define plausibility limits

**Navigation:**  > **[Statistics]** >  > **PlausibilityCheck**

Plausibility checking is a security precaution. It prevents the entry of incorrect values in the statistics. Here you can define the limit value (as percentage) for the plausibility of the weighing results.


#### Example

With a plausibility limit of 30%, all weight values that are within  $\pm 30\%$  of the nominal or average value are regarded as plausible and are entered in the statistics. All other weight values are ignored and excluded from the statistics.

#### Important

When you have defined a nominal weight value and tolerance limits, make sure that the plausibility limit for the weight is greater than the selected tolerance limits. Otherwise values that are actually within tolerance may not be entered in the statistics.

**See** [Weighing out to a nominal value ▶ Page 154].

- 1 Press .
  - ⇒ A window with application-dependent settings appears.
- 2 Beside **PlausibilityCheck**, tap the associated button.
  - ⇒ A numeric input window appears.
- 3 Enter the value and confirm with **[OK]**.

Parameters	Explanation	Values
<b>PlausibilityCheck</b>	Define the plausibility limit for measured values. The percentage relates to the defined nominal value. If no nominal value is defined, the limit relates to the average of the already weighed out samples of a weighing series.	Any (30 %)*

\* Factory setting

### 11.1.7 Settings for the tablet feeder

**Navigation:**  > **[Statistics]** >  > **Tablet Feeder**


If you use the METTLER TOLEDO tablet feeder, you can configure the settings for this peripheral device here.

#### Important

If you connect a tablet feeder to your balance, you have to configure the interface appropriately in the system settings.

**See** [Peripherals ▶ Page 52].

- **Tablet Feeder** is activated.

- 1 Press .
  - ⇒ A window with application-dependent settings appears.

- 2 Beside **Tablet Feeder**, tap the associated button.  
⇒ **Tablet Feeder** window appears.
- 3 Tap **[On]** > **[Define]**.  
⇒ **Tablet Feeder** window appears.
- 4 Change the settings and confirm with **[OK]**.

You can define the following parameters:

Parameters	Explanation	Values
<b>Feed Rate</b>	Defines the feed rate.	<b>slow   normal*   fast   very fast</b>
<b>Discharge Feeder</b>	Activates/deactivates the emptying function. <b>On</b> = the feed tray of the tablet feeder is automatically emptied after weighing the last sample of a weighing series. <b>Off</b> = no automatic emptying.	<b>On   Off*</b>

\* Factory setting

## 11.2 Working with the statistics application


**Navigation:**  > **[Statistics]**

This section describes how to use the **Statistics** application. Among other things, you can determine a tare weight, change the resolution of the weighing result or work with identifications.

You are probably already familiar with these options from the **Weighing** application. They are therefore not described again here.

### 11.2.1 Capturing statistics from a weighing series

For optimal use of the statistical functions, you should have a printer connected to your balance. Otherwise we recommend that you enable the four statistical data fields that are the most important for your application (e.g. **n**, **x**, **s** and **Sum**).

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

#### Initial settings

To use statistics, you must enable at least the following three function keys:



**M+** – Enable function keys.



**Result**



**CL Result**

We also recommend enabling the following two function keys: They allow you to delete incorrect values **[CL Last]** and to define the number of samples to be included in a series of weighings **[Max n]**.



**CL Last** – Enable additional function keys.



**Max n**

#### Procedure

##### Series weighing

If the number of samples to be weighed out for a series is specified, tap the [**Max n**] function key and enter the number of samples (1 to 999). The series is terminated automatically after the last sample has been weighed out. The result window is opened and the result log is printed. This function key is only active when no measurement data is present in the statistics. If you enter 0 (zero) for [**Max n**], the series does not have a defined limit and you can weigh out a maximum of 999 samples.

When working with a weighing container, place the container on the balance and press the [**→T←**] key to tare the balance.

Alternatively you can use the tare memory or the automatic taring function. These functions are described in the instructions for the **Weighing** application.

### Important

If you start a weighing series with a user-defined weighing unit, the unit cannot be changed until the series of measurements is finished.

**See** [Defining free weighing units ▶ Page 74].

- Function keys are activated.
  - The balance is tared [**→T←**].
- 1 Tap [**Max n**].
    - ⇒ A numeric input window appears.
  - 2 Enter the number and confirm with [**OK**].
  - 3 Load the first sample and tap the [**M+**] function key.
    - ⇒ When the weight is stable (the dashes disappear), it is entered in the statistics.
    - ⇒ The protocol header and the result (single value) of the current weighing are printed.
  - 4 Remove the first sample.


If the additive mode is activated, the sample can remain on the weighing pan. The balance is automatically tared after each weight is entered in the statistics.
  - 5 Load further samples in succession. Confirm each weight with the [**M+**] function key (unnecessary if automatic weight entry is activated).
  - 6 Remove the sample and tare the balance (unnecessary if additive mode is activated).
    - ⇒ Each value is automatically recorded after being entered in the statistics.
    - ⇒ After the last sample is weighed, the result window is automatically opened and printed.
    - ⇒ The result window contains the results of a series of weighings. The information selected for result recording appears.

If the result window consists of several screen pages, paging between the individual pages can take place with the two arrow keys.
  - 7 Tap [**CL Result**] to end measurement and clear the memory for the next series.
    - ⇒ A confirmation window appears.
  - 8 To delete the statistics, confirm with [**OK**].
    - ⇒ The statistics are deleted.
    - ⇒ The function key is inactive and grayed.

### Sample weighing

- Function keys are activated.
  - The balance is tared [**→T←**].
- 1 Load the sample and tap the [**M+**] function key.
    - ⇒ When the weight is stable (the dashes disappear), it is entered in the statistics.
    - ⇒ The protocol header and the result (single value) of the current weighing are printed.
  - 2 Remove the sample.
  - 3 Tap [**Result**].
    - ⇒ The result window appears.

If the result window consists of several screen pages, paging between the individual pages can take place with the two arrow keys.

- 4 Press  to print the result protocol.
- 5 Tap **[OK]** to exit the result window.
- 6 Tap **[CL Result]** to end measurement and clear the memory for the next series.
  - ⇒ A confirmation window appears.
- 7 To delete the statistics, confirm with **[OK]**.
  - ⇒ The statistics are deleted.
  - ⇒ The function key is inactive and grayed.

### Important

An error message is displayed if you tap the **[M+]** function key but no weight change has occurred. This prevents you from accidentally acquiring the sample twice.

If you have mistakenly weighed out an incorrect amount and stored the weighing result, you can use the **[CL Last]** function key to cancel the last value. It is only available if values are already present in the memory; otherwise the key is grayed out and cannot be actuated. The key is disabled after a value is deleted and is not enabled again until the next value has been entered in the statistics.

If a weight value is outside the plausibility limit, a corresponding error message is displayed after the **[M+]** key is tapped. The value cannot be entered in the statistics. No error message is displayed if automatic weight entry is activated. However, the value is not entered in the statistics and it does not appear in the statistics protocol.

## 11.2.2 Weighing out to a nominal value

The **Statistics** application provides additional functions that simplify weighing out samples to a defined nominal value. You can use these functions for individual weighings or for series weighings with statistics.

### Initial settings

To enter the nominal weight and the associated tolerance range, enable the function keys listed below. Also enable the data fields with the same names so that the defined values will be displayed.



**Nominal** – Enable function keys.



**+Tolerance**



**-Tolerance**

### Procedure

#### Important

Ensure that the plausibility limit is greater than the defined tolerance values. Weights that are within the tolerance range but greater than the plausibility limit cannot be entered in the statistics. If necessary, change the plausibility limit for the weight values.

**See** [Define plausibility limits ▶ Page 151].

#### Important

The function keys for entering the nominal weight and the tolerance range are disabled if values are already present in the statistics. In this case, you must clear the statistics with the **[CL Last]** function key before you can define the nominal weight and the tolerance range.

- Function keys are activated.
  - Statistics are deleted.
- 1 Tap the **[Nominal]** function key.
    - ⇒ A numeric input window appears.
  - 2 Enter the required value.
    - If a weight corresponding to the nominal weight is already on the balance, it can be directly taken over by tapping the button with the balance icon.

Check the weighing unit to the right of the nominal weight.

A selection of available units can be displayed by tapping the weighing unit.

**Note**

Units are not converted automatically. When a value is entered in a unit, it is retained, even when the unit is changed.

3 Confirm with [**OK**] to activate the nominal weight.

4 Tap the [**+Tolerance**] and/or [**-Tolerance**] function key.

⇒ A numeric input window appears.

5 Enter the required value.

Both tolerances are set to 2.5% by default. Instead of a percentage, an absolute tolerance can be entered in any unit, e.g. [**g**].

6 Confirm with [**OK**] to activate the tolerance.

**Note**

Samples outside the tolerance range are specifically marked with **>T+** or **<T-** when single values are recorded.

⇒ The **SmartTrac** graphic weighing-in aid with tolerance marks to facilitate weighing-in to the nominal weight appears.

⇒ Samples can be roughly weighed until the lower tolerance limit is reached and subsequent additions made up to the nominal weight.

### 11.2.3 Example log with statistical values

The detail of a protocol depends on the selected protocol settings. Only application-specific information is shown in the example printout.

**Important information for the interpretation of recorded results**

The **x** and **s** values are calculated results that are shown with higher resolution than the individual measured values. The significance of the last decimal place cannot be assured with a relatively small measurement series (fewer than 10 or so measured values) with small weight differences.

### Example: Printout

```
----- Statistics -----
25.Jul 2014      16:40
WeighBridge SNR
                1234567890
Terminal SNR    1234567891
Balance ID      Lab A/1
Balance is levelled
Plausibility    30 %
Nominal         24.20 g
+Tol           2.5 %
-Tol           2.5 %
 1              24.21 g
 2              24.67 g
 3>T           24.91 g
 4              24.18 g
n               4
x               24.493 g
s               0.357 g
s.rel          1.46 %
Min.           24.18 g
Max.           24.91 g
Diff           0.73 g
Sum            97.97 g

-----
Signature
.....
-----
```

## 11.2.4 Formulas used for the calculation of statistical values

### Calculation of mean value and standard deviation

#### Notation

$x_i$  = Individual measured value of a series of  $n$  measured values  $i = 1..n$

$\bar{x}$  = Mean value and  $s$  standard deviation of these measured values

The mean value is given by:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i \quad (1)$$

The commonly used formula for the calculation of the standard deviation  $s$

$$s = \sqrt{\frac{1}{n-1} \sum (x_i - \bar{x})^2} \quad (2)$$

(2) not suitable for numerical calculation, since in measurements where deviations between single values are very small, the square of the difference (between the single value and mean value) can lead to cancellation. In addition, when using this formula, each single measured value must be stored before the standard deviation can be finally determined.

The following formula is mathematically equivalent, but much more stable numerically. It can be derived by appropriate transformation from (1) and (2):

$$s = \sqrt{\frac{1}{n-1} \left\{ \sum_{i=1}^n x_i^2 - \frac{1}{n} \left( \sum_{i=1}^n x_i \right)^2 \right\}}$$

For the calculation of the mean value and standard deviation, only  $n$ ,  $\Sigma x_i$  and  $\Sigma x_i^2$  need to be stored for the use of this formula.

### Standard deviation

The numerical stability can be further improved by measured value scaling.

With  $\Delta x_i = x_i - X_0$  whereby  $X_0$  (depending on the application) is either the first measured value of a series of measurements or the nominal value of a series of measurements, the following is obtained:

$$s = \sqrt{\frac{1}{n-1} \left\{ \sum_{i=1}^n (\Delta x_i)^2 - \frac{1}{n} \left( \sum_{i=1}^n \Delta x_i \right)^2 \right\}}$$

### Mean value

The mean value is calculated accordingly:

$$\bar{x} = X_0 + \frac{1}{n} \sum_{i=1}^n \Delta x_i$$

### Relative standard deviation

The relative standard deviation can be calculated using the formula:

$$s_{rel} = \frac{s}{\bar{x}} 100 \quad \text{percent}$$

### Number of digits in the results

The mean and standard deviation are always displayed and printed with one decimal place more than the corresponding single measured values. To be noted for interpretation of the results is that this additional decimal place has no significance for small series of measurements (less than about 10 measured values).

This applies similarly to percentages (e.g. relative standard deviation), which always has two decimal places (e.g. 13.45 percent). The significance of the decimal places depends similarly on the magnitude of the original values!

## 12 Formulation Application

Navigation:  > [Formulation]




The **Formulation** application can be used for weighing in components that are to be combined in a specific ratio. Databases are available for permanently storing all relevant parameters for formulae and components. The selected formula is processed automatically in the formulation operation and the balance weighs in all components step by step. Naturally, it is also possible to "free formulate" without using formulae from the database. The result can be printed in detail at the end of a formulation.

The component and formulation databases are independent of the user profile; there is only one database for all users.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

### Selecting the application

- 1 Press .
  - 2 Tap [Formulation].
    - ⇒ The selected application is active.
    - ⇒ Some of the specific formulation function keys and information fields are activated by default (factory defaults).
    - ⇒ Both [Result] and [CL Result] function keys are inactive and therefore grayed out as no formulation is currently active.
- ⇒ The balance is ready for formulation.

### 12.1 Settings for formulation application

Navigation:  > [Formulation] > 

Various specific formulation settings are available, which can be used to adapt the application to suit specific requirements. In this application, the **Info Unit** is not available.

Most of the setting options are the same as for the **Weighing** application. Only the settings that differ are described below.

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Menu item	Explanation	Further information
<b>Recipe</b>	Definition of formulations.	<b>See</b> [Definition and activation of formulations ▶ Page 165]
<b>Component</b>	Definition of components.	<b>See</b> [Definition of components ▶ Page 164]
<b>Autom. Zeroing</b>	Activates/deactivates automatic zeroing.	<b>See</b> [Activation or deactivation of automatic zeroing ▶ Page 159]
<b>Function Keys</b>	Defines the formulation function keys that appear at the bottom of the display. These keys enable direct access to specific functions.	<b>See</b> [Specific function keys for formulation ▶ Page 159]
<b>Info Field</b>	Defines the formulation information fields to be displayed.	<b>See</b> [Specific information fields for formulation ▶ Page 160]
<b>Protocol</b>	Selects data to be shown in the weighing protocols.	<b>See</b> [Specific protocol information for formulation ▶ Page 161]
<b>Identification</b>	Defines identifications.	<b>See</b> [Specific identifications for formulation ▶ Page 163]




<b>ErgoSens</b>	Up to two external ErgoSens (optional) can be assigned a function in this menu.	<b>See</b> [Specific SmartSens and ErgoSens settings for formulation ▶ Page 163]
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### 12.1.1 Activation or deactivation of automatic zeroing

**Navigation:**  > [Formulation] >  > **Autom. Zeroing**

This menu item can be used to define whether the display is automatically reset to zero after removal of the tare container.

- 1 Press the  key.  
⇒ A window with application-dependent settings opens.
- 2 Beside **Autom. Zeroing**, tap on the associated button.
- 3 Activate or deactivate **Autom. Zeroing** and confirm with [OK].

You can define the following parameters:

Parameters	Explanation	Values
<b>On</b>	Activates automatic zeroing. When the container is removed after taring the weighing container and weighing-in a component, the display is automatically reset to zero.	None
<b>Off</b>	Deactivates automatic zeroing.	None


**Factory setting:** [Off].

### 12.1.2 Specific function keys for formulation





**Navigation:**  > [Formulation] >  > **Function Keys**






This menu item can be used to activate the following specific formulation function keys.

All other function keys are the same as for the **Weighing** application.

- Activate or deactivate function keys by tapping.
  - To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.
  - Application is activated.
- 1 Press .  
⇒ A window with application-dependent settings appears.
  - 2 Tap **Function Keys** > [Define].
  - 3 Select the **Function Keys** which you need.  
⇒ The function key is automatically numbered.
  - 4 Change the settings and confirm with [OK].

The arrow buttons can be used to page forward or back to a menu page.

	Designation	Explanation
	<b>M+</b>	Stores the net weight of a weighed component and resets the weight display to zero.
	<b>Result</b>	Opens the results window.
	<b>CL Result</b>	Clears the results memory.
	<b>Recipe</b>	Opens the recipe database for selecting a recipe.

	<b>Abs/Diff</b>	Switches the weight display between the weighed quantity (Abs = absolute) and the residual quantity to be weighed, until the nominal weight (Diff = difference) is reached.
	<b>Nominal</b>	Defines the desired nominal weight. This also serves as a reference for the tolerances.
	<b>CompDB</b>	Opens the component database for selecting a component.
	<b>+Tol</b>	Defines the accuracy (tolerance range) for weighing to a nominal weight.
	<b>-Tol</b>	Defines the accuracy (tolerance range) for weighing to a nominal weight.

**Factory setting:** [M+], [Result], [CL Result], [ID] and [Nominal] activated, in this sequence.


### 12.1.3 Specific information fields for formulation

**Navigation:**  > [Formulation] >  > Info Field

This menu item contains the following formulation information fields.

All other data fields are the same as for the **Weighing** application.

The information fields in the display provide constant information on, e.g. set values, measured results.

- Information fields can be activated or deactivated by tapping.
  - To redefine the sequence, all information fields must be deactivated and then activated in the required sequence.
  - Application is activated.
- 1 Press .
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Info Field** > [**Define**].
  - 3 Select the information fields that you need.
    - ⇒ The information field is automatically numbered.
  - 4 Change the settings and confirm with [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Values	Explanation
<b>Comp. Weight</b>	Displays the current component weight.
<b>Nominal</b>	This function key displays the nominal weight.
<b>Net Tot</b>	Displays the total net weight of all weighed components.
<b>&gt;T+</b>	Shows the number of weighings outside the upper weight tolerance.
<b>&lt;T-</b>	Shows the number of weighings outside the lower weight tolerance.
<b>+Tol</b>	This function key displays the entered tolerance for weighing-in to nominal weight.
<b>-Tol</b>	This function key displays the entered tolerance for weighing-in to nominal weight.
<b>Comp. Counter</b>	Displays the current component counter reading (consecutive number of current component).
<b>Recipe Name</b>	Shows the name of the current formulation.
<b>Recipe ID</b>	Displays the identification entered via the [ID] function key. <b>Note</b> The identification designations <b>ID1</b> are set to the factory defaults, but can be changed.

<b>Comp. Name</b>	Displays the name of the current component.
<b>Comp. ID</b>	Displays the identification entered via the [ID] function key. <b>Note</b> The identification designations <b>ID2</b> are set to the factory defaults, but can be changed.
<b>Lot ID</b>	Displays the identification entered via the [ID] function key. <b>Note</b> The identification designations <b>ID3</b> are set to the factory defaults, but can be changed.
<b>Additional ID</b>	Displays the identification entered via the [ID] function key. <b>Note</b> The identification designations <b>ID4</b> are set to the factory defaults, but can be changed.


**Factory setting:** **Recipe ID**, **Tare**, **Gross** and **Nominal** activated, in this sequence.

### 12.1.4 Specific protocol information for formulation

**Navigation:**  > [Formulation] >  > Protocol

Here you define which data appears in the protocols. This large menu item is divided into three sub-menus. They enable you to make additional settings for the application. The rest of the available protocol data corresponds to the data for the **Weighing** application and is not described here.


The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
  - To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.
  - Application is activated.
- 1 Press .
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Protocol** > [Define].
    - ⇒ **Protocol** window appears.
  - 3 Tap (e.g. **Header**) > [Define].
  - 4 Select the information key which you need.
    - ⇒ The information key is automatically numbered.
  - 5 Confirm with [OK].

The arrow buttons can be used to page forward or back to a menu page.

#### Note

The results and data can be printed out at any time.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

#### Header line of protocols

Use this sub-menu to define which data is printed in the protocol header (before the results).

The header is printed automatically when the weight of the first component has been stored during formulation by tapping the [M+] function key.

#### Recording of single values


This submenu can be used to define the information to be reported for each individual result.

Single values are automatically printed during formulation by tapping the [M+] function key.

A single value can also be printed separately by pressing the  key.

## Recording of results

Here you can define which additional data is to be recorded in the results protocol.

The result protocol can be printed by pressing the  button with the result window open or automatically after taking over the last component of a formulation.

You can define the following parameters:

Parameters	Explanation	Values
<b>Header</b>	<p>Define the information to be printed in the protocol header (before the results).</p> <p><b>Recipe Name</b> = records the name of the current formulation.</p> <p><b>Recipe ID</b> = records the identification of the current formulation entered via the [ID] function key.</p> <p><b>Nominal Tot</b> = records the total nominal weight of all components of the current formulation.</p> <p><b>Comp.</b> = records the number of components of the current formulation.</p>	<p><b>Appl. Name*   Title 1   Title 2   Date/Time*   User   Balance Type*   SNR*   Balance ID   Levelcontrol   Recipe Name   Recipe ID*   Nominal Tot   Comp.   MW-Method   Signature   Blank Line   Dash Line   3 Blank Lines</b></p>
<b>Single value</b>	<p>Define the information to be recorded for each single result.</p> <p><b>Comp. ID</b> = records the identification of the current component entered via the [ID] function key <b>ID3</b>.</p> <p><b>Lot ID</b> = records the identification of the current component entered via the [ID] function key <b>ID2</b>.</p> <p><b>Additional ID</b> = records the identification of the current component entered via the [ID] function key <b>ID4</b>.</p> <p><b>Comp. Name</b> = records the name of the current component.</p> <p><b>Comp. Counter</b> = records the current component counter reading (consecutive number of current component).</p> <p><b>Net %</b> = records the weight of the current component in % of the nominal weight.</p> <p><b>Diff. %</b> = records the percentage deviation of the actual weight of the current component from its nominal weight.</p>	<p><b>Header   Levelcontrol   Recipe Name   Recipe ID   Nominal Tot   Comp.   MW-Method   Comp. ID   Lot ID   Additional ID   Comp. Name   Comp. Counter   Nom.,+Tol,-Tol   Tare   Net*   Gross   Net %   Diff.   Diff. %   Blank Line   Dash Line   3 Blank Lines</b></p>
<b>Result</b>	<p>Define which statistical data is to be recorded.</p> <p><b>&gt;Tol+, &lt;Tol-</b> = records the number of weighings that are outside the tolerance range.</p> <p><b>Net Tot</b> = records the total net weight of all weighed components.</p>	<p><b>Appl. Name   Title 1   Title 2   Date/Time   User   Balance Type   SNR   Balance ID   Levelcontrol   Recipe Name   Recipe ID   Nominal Tot   Comp.   MW-Method   Comp. Counter   &gt;Tol+, &lt;Tol-   Tare*   Gross*   Net Tot*   Signature*   Blank Line   Dash Line*   3 Blank Lines*</b></p>

\* Factory setting

## 12.1.5 Specific identifications for formulation

**Navigation:** [☰] > [Formulation] > [⚙️] > Identification

This menu item can be used to activate the 4 identifications available for formulation via the [ID] function key. Individual identifications can be deactivated or their designations replaced with specific texts (max. 20 characters). The entered designations also appear as information field designations and are printed in weighing protocols. The two headers for the weighing protocols can be defined here; these are printed in the weighing protocols.

### Important

The [Recipe ID] and [Comp. ID] are not required for the automatic processing of predefined formulations. These are automatically taken over from the formulation or component database. Further IDs can be activated if additional designations are required for formulation.

For free formulation (without using the databases), the [Recipe ID] and [Comp. ID] can be activated to assign a designation to the formulations and components.

- 1 Press [⚙️].
  - ⇒ A window with application-dependent settings appears.
- 2 Tap **Identification** > [Define].
  - ⇒ **Identification** window appears.
- 3 Settings can be changed by tapping the associated button.
  - ⇒ An alphanumeric input window appears.
- 4 Enter the designation and confirm with [OK].

The arrow buttons can be used to page forward or back to a menu page.

### Menu structure

Main menu	Submenu	Further information
Title 1	T1	See [Definition of identifications and protocol headers ▶ Page 80]
Title 2	T2	
ID1 Name	Recipe ID	See section Identifications
ID2 Name	Comp. ID	
ID3 Name	Lot ID	
ID4 Name	Additional ID	

### Identifications

The following designations are defined by default for the 4 identifications.

You can define the following parameters:

Parameters	Explanation	Values
<b>Recipe ID</b>	Activates/deactivates the ID and designation (max. 20 characters).	Off   On*
<b>Comp. ID</b>	Activates/deactivates the ID and designation (max. 20 characters).	Off*   On
<b>Lot ID</b>	Activates/deactivates the ID and designation (max. 20 characters).	Off*   On
<b>Additional ID</b>	Activates/deactivates the ID and designation (max. 20 characters).	Off*   On

\* Factory setting

## 12.1.6 Specific SmartSens and ErgoSens settings for formulation

**Navigation:** [☰] > [Formulation] > [⚙️] > ErgoSens

Additional formulation settings are available for the ErgoSens sensors.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

### Important

The settings [**Recipe ID**], [**Comp. ID**], [**Lot ID**] and [**Additional ID**] correspond to the identifications [**ID1**] ... [**ID4**], which are also available in the **Weighing** application.

- 1 Press [].  
⇒ A window with application-dependent settings appears.
- 2 Tap **ErgoSens** > [**Define**].  
⇒ A selection window appears.
- 3 Select the required menu item (e.g. **ErgoSens 1 (Aux1)**).  
⇒ A selection window appears.
- 4 Select the function by tapping the button.
- 5 Change the settings and confirm with [**OK**].

### Menu structure

Main menu	Submenu	Further information
<b>ErgoSens 1 (Aux1)</b>	<b>Off</b>   <b>-&gt;0&lt;-</b>   <b>-&gt;T&lt;-</b>   <b>Print</b>   <b>Result</b>   <b>M+</b>   <b>OK</b>   <b>Recipe ID</b>   <b>Comp. ID</b>   <b>Lot ID</b>   <b>Additional ID</b>   <b>AntiStatic Kit</b>	<b>See</b> Parameter table
<b>ErgoSens 2 (Aux2)</b>	<b>Off</b>   <b>-&gt;0&lt;-</b>   <b>-&gt;T&lt;-</b>   <b>Print</b>   <b>Result</b>   <b>M+</b>   <b>OK</b>   <b>Recipe ID</b>   <b>Comp. ID</b>   <b>Lot ID</b>   <b>Additional ID</b>   <b>AntiStatic Kit</b>	<b>See</b> Parameter table

You can define the following parameters:

Values	Explanation
<b>Result</b>	Emulates the function key with the same name. Opens the result window.
<b>M+</b>	Emulates the function key with the same name. Takes over the current value.
<b>OK</b>	Emulates pressing of the button with the same name in the dialogs (however not in the menus) for confirmation of entries and actions.

**Factory setting:** Both ErgoSens deactivated, [**Off**].

## 12.2 Definition of components

**Navigation:** [] > [**Formulation**] > [] > **Component**

Each formulation consists of one or more components. The components must be defined prior to formulation. The balance contains a component database. This database can store up to 100 components. Each component consists of a name and identification (ID). The firmware checks the entries for plausibility. If a name or ID already used by another component is entered, an error message is displayed. This section describes the procedure for the definition of components.

For subsequently changing already defined components, **see** [Information on changing existing components and formulations ▶ Page 176].

The contents of the component database can be recorded at any time by pressing the [] button. The component names and numbers are printed.

- A printer is connected and activated as an output device in the peripheral device settings.
  - To print out the settings, press [].
- 1 Press [].  
⇒ A window with application-dependent settings appears.

- 2 Tap **Component** > [**Define**].  
The arrow keys can be used to page between individual pages.  
or  
Tap the button [**Go to**] and enter the component number. All of the 100 components can be directly selected in this way.  
⇒ The first page of the component database appears.  
The database contains a total of 20 pages with 5 components respectively.
- 3 Tap the components to be defined.
- 4 Beside **Component Name**, tap the associated button.  
⇒ An alphanumeric input window appears.
- 5 Enter the designation and confirm with [**OK**].
- 6 Beside **Comp. ID**, tap the associated button.  
⇒ An alphanumeric input window appears.
- 7 Enter the designation and confirm with [**OK**].

You can define the following parameters:

Parameters	Explanation	Values
<b>Component Name</b>	Definition of a designation (max. 20 characters). <b>Note</b> The current designation of the respective product can be used as a name.	Any
<b>Comp. ID</b>	Definition of an identification (max. 20 characters). <b>Note</b> The ID is frequently scanned via a barcode reader for clear assignment of the components to the corresponding product.	Any

## 12.3 Definition and activation of formulations

**Navigation:** [☰] > [**Formulation**] > [☰] > **Recipe**

The balance contains a formulation database in which a maximum of 8 formulations with up to 12 components respectively can be stored. To fully define formulations, the respective components must be available in the component database. Each formulation is stored under a name. The definition of an identification (ID) is only required when work is carried out with **Security Check** or if the ID is to be included in the weighing protocols. The firmware checks the entries for plausibility. If a name or an ID already used by another formulation is entered, an error message is displayed. This section describes the procedure for the definition of formulations.

For subsequently changing already defined components, **see** [Information on changing existing components and formulations ▶ Page 176].

### 12.3.1 Formulation with fixed components (absolute nominal weights)

**Navigation:** [☰] > [**Formulation**] > [☰] > **Recipe** > [**Define**] > **Recipe 2** > [**Fix Component**]

As long as the menu for the definition of a specific formulation is active, current formulation settings and data can be recorded at any time by pressing the [☰] key.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [☰].

### Example: Printout

```
Recipe 2   Fix Component
Name      Eraphtene
ID        ERA-1
Security Check   Off
Procedure   1 Tare
Component 1
Name      Renith 80 o/o
ID        R80
Component Weight
          24.16 g
+Tolerance  2.50 %
-Tolerance  2.50 %
Component 2
Name      Lorine-BR
ID        LBR
Component Weight
          16.45 g
+Tolerance  2.50 %
-Tolerance  2.50 %
Component 3
Name      Alcohol 90 o/o
ID        Alco 90
Component Weight
          77.00 g
+Tolerance  2.50 %
-Tolerance  2.50 %
```

- 1 Press [**⏏**].  
⇒ A window with application-dependent settings appears.
- 2 Tap **Recipe** > [**Define**].  
⇒ **Formulation** window appears.
- 3 Tap, e.g. **Recipe 2** > [**Off**].  
⇒ **Recipe 2** window appears.
- 4 Tap [**Fix Component**] > [**Define**].  
⇒ A window with application-dependent settings appears.
- 5 Beside **Recipe Name**, tap the associated button.  
⇒ An alphanumeric input window appears.
- 6 Enter the designation and confirm with [**OK**].
- 7 Beside **Recipe ID**, tap the associated button.  
⇒ An alphanumeric input window appears.
- 8 Enter the designation and confirm with [**OK**].
- 9 Beside **Security Check**, tap the associated button.
- 10 Activate/deactivate **Security Check**.
- 11 Beside **Procedure**, tap the associated button.
- 12 Select a process.
- 13 Change the menu page with the arrow keys.
- 14 Tap the button of the component to be included in the formulation.  
⇒ A window is displayed in which the component can be activated.
- 15 Tap [**Component**] > [**Define**].  
⇒ A selection window appears.



16 Beside **Component Name** or **Comp. ID**, tap the associated button.

⇒ A window with the component database appears.

17 Select the component by tapping.

18 Beside **Component Weight**, tap the associated button.

⇒ A numeric input window appears.

19 Enter the value and confirm with [OK].

20 Beside **+Tolerance** and/or **-Tolerance** tap the associated button.

⇒ A numeric input window appears.

21 Enter the value and confirm with [OK].

The arrow buttons can be used to page forward or back to a menu page.

### Formulation parameters

You can define the following parameters:

Parameters	Explanation	Values
<b>Recipe Name</b>	Definition of a designation (max. 20 characters).	Any
<b>Recipe ID</b>	Definition of an identification (max. 20 characters). <b>Note</b> The definition of an identification (ID) is only required when work is carried out with <b>Security Check</b> or the ID is to be included in the weighing protocols.	Any
<b>Security Check</b>	With <b>Security Check</b> activated, the entry of a formulation ID (and component IDs) is required for each formulation. Formulation is only continued when these correspond to the formulation data. This ensures that work is carried out with the correct formulation and the correct components are weighed.	On   Off*
<b>Procedure</b>	<b>1 Tare</b> = all components are weighed in 1 container. Only a single taring is necessary at the start of formulation. <b>n Tare</b> = each component is weighed in its own container. Taring must be performed prior to each weighing-in operation.	<b>1 Tare*</b>   <b>n Tare</b>

\* Factory setting

### Component parameters

You can define the following parameters:

Parameters	Explanation	Values
<b>Component Name</b>	Definition of components from the component database (max. 100 components).	Component database
<b>Comp. ID</b>	Definition of components from the component database (max. 100 components).	Component database
<b>Component Weight</b>	Definition of the required nominal weight.	Any (0.00 g)*
<b>+Tolerance</b>	Definition of accuracy (tolerances) for weighing-in to a nominal weight.	Any (2.50%)*
<b>-Tolerance</b>	Definition of accuracy (tolerances) for weighing-in to a nominal weight.	Any (2.50%)*

\* Factory setting

## 12.3.2 Formulation with % components (relative nominal weights)

**Navigation:** [☰] > [Formulation] > [☑] > **Recipe** > [Define] > **Recipe 3** > [% Component]

The definition of formulations with components with relative nominal weights, differs only slightly from that for formulations with absolute components. Instead of an absolute nominal weight, a percentage nominal weight must be entered. This refers, depending on the selected **Basis**, to either the total formulation weight or the first component.

### Important

For formulations with relative nominal component values, no formulation process can be selected as all components are weighed in 1 container.

As long as the menu for the definition of a specific formulation is active, current formulation settings and data can be recorded at any time by pressing the [☰] key.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [☰].

### Example: Printout

**with relative nominal weights based on the total weight**

Recipe 3	% Component
Name	Iorex-MP
ID	IORX
Security Check	Off
Basis	Total weight
Component 1	
Name	UM Powder A
ID	UPA
Component %	22.6 %
+Tolerance	2.00 %
-Tolerance	2.00 %
Component 2	
Name	UM Powder B
ID	UPB
Component %	77.4 %
+Tolerance	3.00 %
-Tolerance	3.00 %

**with relative nominal weights based on the first component**

Recipe 4	% Component
Name	Meranit-411
ID	ME-411
Security Check	Off
Basis	1. Comp. Weight
Component 1	
Name	RF Subst. A
ID	RF-A
Component %	75.0 %
+Tolerance	2.50 %
-Tolerance	2.50 %
Component 2	
Name	Sirine Liq. 16
ID	SI-LIQ
Component %	40.0 %
+Tolerance	1.50 %
-Tolerance	1.00 %

- 1 Press [☑].  
⇒ A window with application-dependent settings appears.
- 2 Tap **Recipe** > [Define].  
⇒ **Formulation** window appears.
- 3 Tap, e.g. **Recipe 3** > [Off].  
⇒ **Recipe 3** window appears.
- 4 Tap [% Component] > [Define].  
⇒ A window with application-dependent settings appears.
- 5 Beside **Recipe Name**, tap the associated button.  
⇒ An alphanumeric input window appears.
- 6 Enter the designation and confirm with [OK].
- 7 Beside **Recipe ID**, tap the associated button.  
⇒ An alphanumeric input window appears.
- 8 Enter the designation and confirm with [OK].
- 9 Beside **Security Check**, tap the associated button.

- 10 Activate/deactivate **Security Check**.
  - 11 Beside **Basis**, tap the associated button.
  - 12 Select a process.
  - 13 Change the menu page with the arrow keys.
  - 14 Tap the button of the component to be included in the formulation.
    - ⇒ A window is displayed in which the component can be activated.
  - 15 Tap [**Component**] > [**Define**].
    - ⇒ A selection window appears.
  - 16 Beside **Component Name** or **Comp. ID**, tap the associated button.
    - ⇒ A window with the component database appears.
  - 17 Select the component by tapping.
  - 18 Beside **Component %**, tap the associated button.
    - ⇒ A numeric input window appears.
  - 19 Enter the value and confirm with [**OK**].
  - 20 Beside **+Tolerance** and/or **-Tolerance**, tap the associated button.
    - ⇒ A numeric input window appears.
  - 21 Enter the value and confirm with [**OK**].
- The arrow buttons can be used to page forward or back to a menu page.

### Formulation parameters

You can define the following parameters:

Parameters	Explanation	Values
<b>Recipe Name</b>	Definition of a designation (max. 20 characters).	Any
<b>Recipe ID</b>	Definition of an identification (max. 20 characters). <b>Note</b> The definition of an identification (ID) is only required when work is carried out with <b>Security Check</b> or the ID is to be included in the weighing protocols.	Any
<b>Security Check</b>	With <b>Security Check</b> activated, the entry of a formulation ID (and component IDs) is required for each formulation. Formulation is only continued when these correspond to the formulation data. This ensures that work is carried out with the correct formulation and the correct components are weighed.	<b>On   Off*</b>

<b>Basis</b>	<p><b>Total weight</b> = the nominal percentage of each component is based on the total weight (final weight) of the formulation. For formulation, the required final weight must be entered first. The nominal weights of the individual components are additionally automatically calculated in percent.</p> <p><b>Note</b> For formulations with nominal percentages based on the total weight. The balance does not check whether the total percentage of all components is 100%. If this value is above or below 100%, the calculated percentages or the nominal weights to be weighed are automatically adjusted during the weighing operation, as illustrated in the following <b>example</b>: <b>Formulation data:</b> nominal weight of first component: 80%, nominal weight of second component: 40%, final weight: 100 g. <b>Automatic calculation of the nominal weights to be weighed:</b> First component: <math>80\%/120\% \cdot 100\text{ g} = 66.67\text{ g}</math> Second component: <math>40\%/120\% \cdot 100\text{ g} = 33.33\text{ g}</math></p> <p><b>1.Comp.Weight</b> = for formulation, the nominal weight of the first component must be entered. This weight corresponds to the percentage defined in the formulation definition. The nominal weights of the further components are subsequently calculated automatically in relation to the first component.</p> <p><b>Example of a formulation with two components</b> 75% is defined for the first component. 40% is defined for the second component. For formulation, a nominal weight of 100 g is defined for the first component. The balance now calculates for the second component a nominal weight of 53.33 g (<math>100\text{ g}/75\% \cdot 40\% = 53.33\text{ g}</math>).</p>	<b>Total weight*   1.Comp.Weight</b>
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\* Factory setting

### Component parameters

You can define the following parameters:

Parameters	Explanation	Values
<b>Component Name</b>	Definition of components from the component database (max. 100 components).	Component database
<b>Comp. ID</b>	Definition of components from the component database (max. 100 components).	Component database
<b>Component %</b>	Definition of the required nominal weight.	Any (0.00 g)*
<b>+Tolerance</b>	Definition of accuracy (tolerances) for weighing-in to a nominal weight.	Any (2.50%)*
<b>-Tolerance</b>	Definition of accuracy (tolerances) for weighing-in to a nominal weight.	Any (2.50%)*

\* Factory setting


## 12.4 Working with the formulation application

**Navigation:**  > [Formulation]

This section describes the procedure for working with the application **Formulation** and recording the results.

## 12.4.1 Initial settings

A printer must be connected to the balance for recording formulations.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

The most important information fields for the application must also be activated (e.g. **Recipe Name**, **Comp. Name**, **Nominal** and **Comp. ID** for the automatic processing of formulations.

Depending on the type of formulation, further function keys must be activated.

For each formulation, at least the three following functions keys must be activated.



**M+** – Enable function keys.



**Result**



**CL Result**

For free formulation without using formulations from the database, the following function keys must also be activated. The respective values can be entered via these keys.



**Nominal** – Enable function keys.



**+Tolerance**



**-Tolerance**

For free formulation, the **ID** function key must be activated. This allows specific designations to be assigned to the formulations and components. The activation of this function key can also be useful for automatic formulation processing for the assignment of one or two specific IDs to components in addition to those already predefined, e.g. a **Lot ID**.



**ID** – Function key activation.

When working with components from the component database for free formulation, the **CompDB** function key must also be activated. This function key can be used to display components from the database.



**CompDB** – Function key activation.

For the automatic processing of formulations from the database, the **Recipe** function key must be activated, which can also be used for formulation display.



**Recipe** – Function key activation.

The **Abs/Diff** function key should also be activated. This allows the weight display to be switched between an already weighed quantity of a component and the remaining quantity to be weighed.



**Abs/Diff** – Function key activation.

## 12.4.2 Free formulation (formulation without using the formulation database)

For using one or several components from the data base for free formulation, the [**CompDB**] function key must be activated. This function key can be used for directly accessing the component database and selecting the required component. In this case, no component ID needs to be entered; this is taken over directly from the database.

When working with a weighing container, place the container on the balance and press the [**→T←**] key to tare the balance.

### Important

The weight display can be switched between an already weighed component quantity and the remaining quantity to be weighed with the [**Abs/Diff**] function key at any time.

If the remaining quantity display (difference) has been selected with the [**Abs/Diff**] function key prior to entering the nominal weight, the nominal weight is displayed with a negative sign (weighing-in against zero).

- Function keys are activated.
  - The balance is tared [**→T←**].
- 1 Tap [**ID**].  
or  
Tap [**CompDB**].  
⇒ An alphanumeric input window appears.
  - 2 Enter the designation and confirm with [**OK**].
  - 3 To exit the menu without saving, tap [**C**].
  - 4 Tap the [**Nominal**] function key.  
⇒ A numeric input window appears.
  - 5 Enter the required value for the first component.  
- If a weight corresponding to the nominal weight is already on the balance, it can be directly taken over by tapping the button with the balance icon.  
Check the weighing unit to the right of the nominal weight.  
A selection of available units can be displayed by tapping the weighing unit.
  - 6 Confirm with [**OK**] to activate the nominal weight.
  - 7 Tap the [**+Tolerance**] and/or [**-Tolerance**] function key.  
⇒ A numeric input window appears.
  - 8 Enter the required value.
  - 9 Confirm with [**OK**] to activate the tolerance.  
**Note**  
Samples outside the tolerance range are specifically marked with **>T+** or **<T-** when single values are recorded.  
⇒ The **SmartTrac** graphic weighing-in aid with tolerance marks to facilitate weighing-in to the nominal weight appears.
  - 10 Weigh the first component.
  - 11 When the nominal weight is reached or the weight is within the tolerances, tap the [**M+**] function key to store the value.  
The weight must be previously verified again as the balance does not check whether the weighed value corresponds to the nominal weight.  
⇒ The protocol header and the result (single value) of the current component are printed.  
⇒ The balance is ready for weighing the second component.
  - 12 If a new weighing container is used, the container with the first component must be removed and the balance zeroed [**→0←**]. Place a new container on the balance and tare the balance [**→T←**].  
If the second component is weighed in the same container, taring is unnecessary.
  - 13 Define the nominal weight and tolerances.
  - 14 Weigh the second component.
  - 15 The result can be stored by tapping the [**M+**] function key.  
⇒ The determined single value is automatically recorded based on specific requirements.

16 Tap [**Result**]. Only available when values are stored, otherwise the key is grayed and cannot be actuated.

⇒ The result window appears.

The information selected for result recording appears.

17 Press [] to print the formulation.

18 Tap [**OK**] to exit the result window.

19 Tap [**CL Result**] to end the formulation and delete the memory for the next formulation.

⇒ A confirmation window appears.

20 Confirm deletion of the formulation with [**OK**].

⇒ The formulation is deleted.

⇒ The function key is inactive and grayed.

#### **Weighing further components**

The procedure is the same as for the second component with the same or new weighing container.

### **12.4.3 Automatic formulation processing with "fixed components" (absolute nominal weights)**

It is assumed that the relevant formulation has been defined and the required function keys and information fields are activated.

If the formulation definition requires that each component is weighed in its own container, a request is made prior to weighing the second component to place the new weighing container on the balance and press the [**→T←**] key. If the formulation definition requires that all components are weighed in the same container, taring does not need to be repeated. If automatic zeroing is activated, the display is automatically set to zero when the tare container is removed.

When working with a weighing container, place the container on the balance and press the [**→T←**] key to tare the balance.

#### **Important**

The user is responsible for ensuring that the weights are within the defined tolerances as the balance does not check this automatically. If an incorrect weight is taken over with the [**M+**] function key, the formulation result will also be incorrect.

Once a formulation is displayed, neither the identification of the formulation **Recipe ID** nor those of the components **Comp. ID** can be changed as these are part of the respective formulation or component definition in the databases.

If the [**Recipe**] function key is grayed, a new formulation cannot be selected as a formulation is being processed. In this case, tap the [**CL Result**] function key to end the current formulation.

The weight display can be switched between an already weighed component quantity and the remaining quantity to be weighed with the [**Abs/Diff**] function key at any time.

- Function keys are activated.
- Formulations are defined.

1 Tap [**Recipe**].

⇒ A selection window appears.

2 Select a formulation from the formulation database by tapping. The formulation is processed immediately after selection.

⇒ An instruction window appears.

3 Place the weighing container on the balance and press the [**→T←**] key.

⇒ The balance is tared and ready for weighing the first component.

4 Weigh the first component.

Refer to the graphic **SmartTrac** weighing-in aid with tolerance marks to facilitate weighing-in to the nominal weight. This display must be closely observed as the balance does not check for correspondence between the weighed and nominal weight.

- 5 When the nominal weight is reached or the weight is within the tolerances, tap the **[M+]** function key to store the value.
  - ⇒ The protocol header and the result (single value) of the current component are printed.
  - ⇒ The balance is ready for weighing the second component.
  - ⇒ The **[Result]** function key is active and the result window can be opened. Information on the current formulation status appears.
- 6 Weigh the second component.
- 7 The result can be stored by tapping the **[M+]** function key.
  - ⇒ The determined single value is automatically recorded based on specific requirements.
  - ⇒ When all formulation components have been weighed, the formulation result window is automatically displayed. The information selected for result recording appears. The formulation protocol is simultaneously completed.
- 8 Tap **[OK]** to exit the result window.
- 9 Tap **[CL Result]** to end the formulation and delete the memory for the next formulation.
  - ⇒ A confirmation window appears.
- 10 Confirm deletion of the formulation with **[OK]**.
  - ⇒ The formulation is deleted.
  - ⇒ The function key is inactive and grayed.

#### **Weighing further components**

The procedure is the same as for the second component with the same or new weighing container.

### **12.4.4 Automatic formulation processing with "% components" (relative nominal weights)**

Automatic formulation processing with **% Component** is basically the same as for formulations with **Fix Component**.

Depending on the component weighing method in the formulation definition, a request is initially made after selecting the formulation to enter the required final weight of the formulation or nominal weight of the first component.

The weight display can be switched between an already weighed component quantity and the remaining quantity to be weighed with the **[Abs/Diff]** function key at any time.

- Function keys are activated.
  - Formulations are defined.
- 1 Tap **[Recipe]**.
    - ⇒ A selection window appears.
  - 2 Select a formulation from the formulation database by tapping. The formulation is processed immediately after selection.
    - ⇒ An instruction window appears.
  - 3 Tap the **[Enter]** button
  - 4 Enter the required value for the first component.
    - If a weight corresponding to the nominal weight is already on the balance, it can be directly taken over by tapping the button with the balance icon.
    - Check the weighing unit to the right of the nominal weight.
    - A selection of available units can be displayed by tapping the weighing unit.
  - 5 Confirm with **[OK]** to activate the nominal weight.
    - ⇒ An instruction window appears.
  - 6 Place the weighing container on the balance and press the **[→T←]** button.
    - ⇒ The balance is tared and ready for weighing the first component.
    - ⇒ The nominal weight is displayed in the **Nominal** information field. SmartTrac supports weighing-in to the nominal weight.



- 7 When the nominal weight is reached or the weight is within the tolerances, tap the **[M+]** function key to store the value.
  - ⇒ The protocol header and the result (single value) of the current component are printed.
  - ⇒ The balance is ready for weighing the second component.
  - ⇒ The **[Result]** function key is active and the result window can be opened. Information on the current formulation status appears.
- 8 Weigh the second component.
- 9 The result can be stored by tapping the **[M+]** function key.
  - ⇒ The determined single value is automatically recorded based on specific requirements.
  - ⇒ When all formulation components have been weighed, the formulation result window is automatically displayed. The information selected for result recording appears. The formulation protocol is simultaneously completed.
- 10 Tap **[OK]** to exit the result window.
- 11 Tap **[CL Result]** to end the formulation and delete the memory for the next formulation.
  - ⇒ A confirmation window appears.
- 12 Confirm deletion of the formulation with **[OK]**.
  - ⇒ The formulation is deleted.
  - ⇒ The function key is inactive and grayed.

#### **Weighing further components**

The procedure is the same as for the second component with the same or new weighing container.

### **12.4.5 Sample protocol of a formulation**

The detail of a protocol depends on the selected protocol settings. Only application-specific information is shown in the example printout.

### Example: Printout

```
----- Formulation -----
25.Jul 2014          12:40
Recipe              Iorex-MP
Recipe ID           IORX
Num. of Comp.      2
Nominal Tot        84.30 g
Comp. ID           UPA
Comp               1/2
Nominal            19.22 g
+Tol               0.38 g
-Tol               0.38 g
 1 N               19.24 g
 1 N               100.1 %
 1 Diff            0.02 g
 1 Diff            0.1 %
Comp. ID           UPB
Comp               2/2
Nominal            65.08 g
+Tol               1.95 g
-Tol               1.95 g
 2 N               65.21 g
 2 N               100.2 %
 2 Diff            0.13 g
 2 Diff            0.2 %
Net Tot            84.45 g

Signature
.....
-----
```

## 12.5 Information on changing existing components and formulations

Stored formulation and component definitions can be changed. The following rules apply.

- While a formulation is being processed, neither stored formulations nor components can be changed.
- If a component which is part of a formulation is changed, the error message **This component cannot be changed. It is used by** is displayed. However, if components need to be changed, these must first be deactivated in all respective formulations. If components are to be included again in respective formulations after being changed, the components must be explicitly selected from the component database. Activate the components in the formulation and re-enter the nominal weights and tolerances. Subsequently change the formulation name and ID. This avoids confusion with previous formulations with the old definition.
- Components can be removed from the database by deleting their name or ID. However, this is only possible if the component is not part of a formulation.
- Formulations cannot be deleted from the database. Formulations that are no longer required must be deactivated. If a formulation is no longer required, it can only be removed from the database by overwriting it with a new formulation.

## 13 Differential Weighing Application

Navigation:  > [Differential weighing]



For **Differential weighing**, one or several samples are checked for weight variations. The first step consists of determining the initial weight of the sample (initial weighing). Certain sample components are subsequently removed or added. Processes, e.g. drying, centrifuging, filtering, incineration, evaporation and coating are also possible options. After processing, the sample is weighed again (residual weighing). The balance subsequently determines the difference between the two values.



### NOTICE

#### Danger of data loss when editing or deleting a series!

All series and results are stored in a single database available to all users.

- 1 Series must be edited or deleted with due care.
- 2 Other application users must be consulted.


The specific data for differential weighing (definition and designation of, e.g. series and samples) and the results are stored in a database.

Up to 99 series can be defined. Each series can consist of several samples (the balance can manage up to 500 samples in total). Each sample can be tared, initially weighed and residually weighed up to 3 times.

An automatic or manual procedure can also be defined for each series. With the automatic procedure, the user is guided through all steps of differential weighing for all samples (taring, initial weighing, residual weighing). With the manual procedure, the sample processing sequence can be selected by the user. Irrespective of the selected procedure, the balance continuously stores the current status for each sample. This prevents processes from being repeated by mistake. It is not possible to initially weigh the same sample twice for example.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

#### Selecting the application

- 1 Press .
  - 2 Tap the [Differential weighing] icon in the selection window.
    - ⇒ The selected application is active.
    - ⇒ Some of the specific function keys and information fields for statistics are activated by default (factory defaults).
- ⇒ The balance is ready for weighing.

### 13.1 Settings for differential weighing application

Navigation:  > [Differential weighing] > 

Various specific differential weighing settings are available, which can be used to adapt the application to suit specific requirements.


All function keys are inactive as there are no specific settings for series and samples. Only a single series is predefined by default; however this does not contain any samples (**Series 1** with 0 samples).

Most of the setting options are the same as for the **Weighing** application. Only the settings that differ are described below.

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Menu item	Explanation	Further information
<b>Series</b>	Defines new series, processes and deletes existing series, selects a series for differential weighing.	<b>See</b> [Defining, editing, deleting and selecting series ▶ Page 182]

<b>Function Keys</b>	Defines the function keys for differential weighing shown at the bottom of the display. These keys enable direct access to specific functions.	<b>See</b> [Specific function keys for differential weighing ▶ Page 178]
<b>Info Field</b>	Defines the information fields to be displayed for differential weighing.	<b>See</b> [Specific information fields for differential weighing ▶ Page 179]
<b>Protocol</b>	Selects information to be shown in the weighing protocols.	<b>See</b> [Specific protocol information for differential weighing ▶ Page 179]
<b>Print Key</b>	Defines whether the values of the selected sample or the complete series is printed when the  key is pressed.	<b>See</b> [Behavior of the Print key ▶ Page 181]
<b>Bar Code</b>	Defines the settings for processing barcode data.	<b>See</b> [Specific setting for processing barcode data ▶ Page 182]


### 13.1.1 Specific function keys for differential weighing

**Navigation:**  > [Differential weighing] >  > **Function Keys**








This menu item can be used to activate the following specific function keys for differential weighing.





All other function keys are the same as for the **Weighing** application.

The function keys are displayed in the application at the bottom of the display. The numbers define the sequence in the display.

- Activate or deactivate function keys by tapping.
- To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.
- Application is activated.
  - 1 Press .
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Function Keys** > [Define].
  - 3 Select the **Function Keys** which you need.
    - ⇒ The function key is automatically numbered.
  - 4 Change the settings and confirm with [OK].

The arrow buttons can be used to page forward or back to a menu page.

	Designation	Explanation
	<b>Sample ID</b>	Defines a designation (max. 20 characters). Each sample of the current series can be assigned a designation.
	<b>CL sample</b>	Clears all measured values of a sample and changes the sample designation back to the standard text. The sample itself remains in the series.
	<b>Series</b>	Selects the series.
	<b>Tare</b>	Tares the sample container in a separate operation.
	<b>T &amp; wgh. in</b>	Initiates taring of the sample container with subsequent initial weighing of the sample.
	<b>Initial weighing</b>	Initially weighs a sample in a separate operation.
	<b>Residual wgh</b>	Starts residual weighing of a sample.

	<b>Info</b>	Displays information relating to the current series (designations, measured values, results).
	<b>No tare</b>	Performs differential weighings without tare. This key should only be activated to measure a complete series without tare.
	<b>Copy tare</b>	Copies the tare weight of the first sample and for all further samples of the current series, the tare of which has not yet been determined.
	<b>CL value</b>	Clears the previously determined weight (tare, initial or residual weight).

**Factory setting:** [T & wgh. in], [Residual wgh], [Series], [Info] und [CL value] activated in this sequence.


### 13.1.2 Specific information fields for differential weighing

**Navigation:**  > [Differential weighing] >  > **Info Field**

This menu item contains the following information fields for differential weighing.

All other data fields are the same as for the **Weighing** application.

The information fields in the display provide constant information on, e.g. set values, measured results.

- Information fields can be activated or deactivated by tapping.
- To redefine the sequence, all information fields must be deactivated and then activated in the required sequence.
- Application is activated.
  - 1 Press .
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Info Field** > [Define].
  - 3 Select the information fields that you need.
    - ⇒ The information field is automatically numbered.
  - 4 Change the settings and confirm with [OK].

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Values	Explanation
<b>Series ID</b>	Displays the designation of the selected series.
<b>Procedure</b>	Displays the procedure for the selected series (automatic or manual).
<b>Number of samples</b>	Displays the number of samples of the selected series.

**Factory setting:** **Series ID**, [Procedure] and **Number of samples** activated in this sequence.

### 13.1.3 Specific protocol information for differential weighing

**Navigation:**  > [Differential weighing] >  > **Protocol**

Here you define which data appears in the protocols. This large menu item is divided into three sub-menus. They enable you to make additional settings for the application. The rest of the available protocol data corresponds to the data for the **Weighing** application and is not described here.

The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.

- Application is activated.
  - 1 Press [].
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Protocol** > [**Define**].
    - ⇒ **Protocol** window appears.
  - 3 Tap (e.g. **Header**) > [**Define**].
  - 4 Select the information key which you need.
    - ⇒ The information key is automatically numbered.
  - 5 Confirm with [**OK**].
- The arrow buttons can be used to page forward or back to a menu page.

**Note**

The results and data can be printed out at any time.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [].

**Header line of protocols**

Use this sub-menu to define which data is printed in the protocol header (before the results).

**Recording of single values**

This submenu can be used to define the information to be reported for each individual result.

**Recording of results**

This submenu can be used to define the form in which the differential weighing results are printed.

The result protocol can be printed by pressing the [] key if the Print key has been configured for printing series data.

The results are recorded in the selected display unit.

The formulae, on which the settings are based, can be found under - Formulae used for the calculation of differential weighing results.

**Protocol footer**

This submenu can be used to define the information to be printed in the protocol footer after the results (single values).

**Number of decimal places**

This submenu can be used to define the number of decimal places with which the differential weighing results are recorded.

**Note**

This setting refers only to the differential weighing results calculated by the application. In contrast, weights (tare, initial weighing, residual weighing) are always recorded in the maximum resolution of the respective balance.

You can define the following parameters:

Parameters	Explanation	Values
<b>Header</b>	Define the information to be printed in the protocol header (before the results). <b>Series ID</b> = records the series designation.	<b>Appl. Name*</b>   <b>Title 1</b>   <b>Title 2</b>   <b>Date/Time*</b>   <b>User</b>   <b>Balance Type</b>   <b>SNR</b>   <b>Balance ID</b>   <b>Levelcontrol</b>   <b>Series ID</b>   <b>Recipe ID*</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Signature</b>   <b>Blank Line</b>   <b>Dash Line</b>   <b>3 Blank Lines</b>

<b>Single value</b>	<p>Define the information to be recorded for each single result.</p> <p><b>Sample ID</b> = records the sample designation.</p> <p><b>Tare time</b> = records the tare date and time.</p> <p><b>Tare</b> = records the tare weight.</p> <p><b>Weighing in time</b> = records the date and time of the initial weighing.</p> <p><b>Weighing in</b> = records the initial weight.</p> <p><b>Time 1 res.wgh</b> = records the date and time of the first residual weighing.</p> <p><b>1.Residual wgh</b> = records the net weight of the first residual weighing.</p> <p><b>Time 2 res.wgh</b> = records the date and time of the second residual weighing.</p> <p><b>2.Residual wgh</b> = records the net weight of the second residual weighing.</p> <p><b>Time 3 res.wgh</b> = records the date and time of the third residual weighing.</p> <p><b>3.Residual wgh</b> = records the net weight of the third residual weighing.</p>	<p><b>Header   Series ID   Sample ID*   Tare time   Tare*   Weighing in time   Weighing in*   Time 1 res.wgh   1.Residual wgh*   Time 2 res.wgh   2.Residual wgh   Time 3 res.wgh   3.Residual wgh   ID1   ID2   ID3   ID4   Signature   Blank Line   Dash Line   3 Blank Lines   Footer</b></p>
<b>Result</b>	<p>Define which statistical data is to be recorded.</p> <p><b>Diff.</b> = records the absolute difference in weight between initial weighing and residual weighing.</p> <p><b>Diff. %</b> = records the difference between initial weighing and residual weighing as a percentage of the initial weight.</p> <p><b>Abs. %</b> = records the residual weight as a percentage of the initial weight.</p> <p><b>Atro AM</b> = records the moisture content of the sample as a percentage of the dry weight (<b>ATRO Moisture Content</b>).</p> <p><b>Atro AD</b> = records the wet weight of the sample as a percentage of the dry weight (<b>ATRO Dry Content</b>).</p>	<p><b>Diff.*   Diff. %*   Abs. %*   Atro AM*   Atro AD</b></p>
<b>Footer</b>	<p>Define information to be printed in the protocol footer after the results (single values).</p>	<p><b>Appl. Name   Title 1   Title 2   Date/Time   User   Balance Type   SNR   Balance ID   Levelcontrol   Series ID   ID1   ID2   ID3   ID4   Signature*   Blank Line   Dash Line   3 Blank Lines*</b></p>
<b>No. of decimal-points</b>	<p>Display the results in the protocol with the selected number of decimal places.</p>	<p><b>1   2   3*   4   5</b></p>

\* Factory setting

### 13.1.4 Behavior of the Print key

**Navigation:**  > **[Differential weighing]** >  > **Print Key**

This menu item can be used to define the data to be printed when the  key is pressed.



- Application is activated.

1 Press .

⇒ A window with application-dependent settings appears.

- 2 Tap **Print Key** and subsequently the associated button.  
⇒ A selection window appears.
- 3 Tap (e.g. **Sample**) and confirm with **[OK]**.

You can define the following parameters:

Values	Explanation
<b>Sample</b>	Printing the sample. When the  key is pressed, a selection window displaying all samples of the current series is displayed. Select the sample to print the data.
<b>Series</b>	Printing data. When the  key is pressed, the data of all samples of the current series is printed.

**Factory setting:** **[Sample]** activated.


### 13.1.5 Specific setting for processing barcode data

**Navigation:**  > **[Differential weighing]** >  > **Bar Code**

This menu item contains an additional setting for differential weighing. The scanned barcode is interpreted as the sample identification. If the current series contains a sample with this ID, the associated sample is selected and is directly available for the next process step. If the current series does not contain the sample ID, an appropriate message is displayed.

#### Note

If a series contains several samples with identical ID, the first sample with an ID corresponding to the scanned barcode is selected.

- Application is activated.
- 1 Press .  
⇒ A window with application-dependent settings appears.
  - 2 Tap **Bar Code** and subsequently the associated button.  
⇒ A selection window appears.
  - 3 Tap **Sample ID** and confirm with **[OK]**.

#### Menu structure

Main menu	Submenu	Further information
<b>Bar Code</b>	<b>Off   ID1   ID2   ID3   ID4   PreTare   Host   Open Input*   Sample ID</b>	<b>See</b> table of values


\* Factory setting

You can define the following parameters:

Values	Explanation
<b>Sample ID</b>	Interprets the barcode as the sample identification.

## 13.2 Defining, editing, deleting and selecting series

**Navigation:**  > **[Differential weighing]** >  > **Series**

In order to perform a differential weighing, at least one series with minimum one sample must be defined. Press the  key and select the menu for the definition of series. There are options for creating a new series as well as for editing and deleting existing series. Select the required series in the last menu item. These options are described in the following sections.

#### Note

When the application is started, the balance checks that at least 1 series is present. If this is not the case, the application automatically generates the series 1.



- Application is activated.
  - Function keys are selected and activated.
- 1 Press [**☰**].
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Series** > [**Define**].
    - ⇒ A window with application-dependent settings appears.
  - 3 To exit the menu item, tap [**OK**].

### 13.2.1 Defining a new series

**Navigation:** [**☰**] > [**Differential weighing**] > [**☰**] > **Series** > [**New**]

This submenu can be used to define a new series.

- Application is activated.
  - Function keys are activated.
- 1 Press [**☰**].
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Series** > [**New**].
    - ⇒ **Series editor** window appears.
  - 3 Tap **Designation** and subsequently the associated button.
    - ⇒ An alphanumeric input window appears.
    - ⇒ The series are consecutively numbered by default (series x).
  - 4 Enter the designation and confirm with [**OK**].
  - 5 Tap **Number of samples** and subsequently the associated button.
    - ⇒ A numeric input window appears.
  - 6 Enter the number of samples and confirm with [**OK**].
  - 7 Tap **Procedure** and subsequently the associated button.
    - ⇒ A selection window appears.
  - 8 Tap, e.g. [**Automatic**].
  - 9 Tap **Sample ID** and subsequently the associated button.
    - ⇒ A selection window appears.
  - 10 Enter the sample.
    - ⇒ An alphanumeric input window appears.
    - ⇒ The samples are consecutively numbered by default (sample x).
  - 11 Enter the designation and confirm with [**OK**].

You can define the following parameters:

Values	Explanation
<b>Designation</b>	Defines the series designation (max 20 characters).
<b>Number of samples</b>	Defines the number of samples of the series (max. 500 samples). <b>Important</b> The balance can manage a maximum of 500 samples in total. Available for each series therefore is a maximum of 500 samples, minus the number already used. If a value that exceeds the number of available samples is entered, an appropriate error message is displayed (this can take some time).
<b>Procedure</b>	Selects between an automatic or manual procedure. <b>Automatic</b> = the user is guided through all steps of differential weighing (taring, initial weighing, residual weighing). <b>Manual</b> = the user can select the sample processing sequence.

<b>Sample ID</b>	Defines the sample designation (max. 20 characters). <b>Note</b> If the function key with the same name is activated, the sample designations can be directly changed.
------------------	--

### 13.2.2 Editing an existing series

**Navigation:** [☰] > [Differential weighing] > [⌂] > **Series** > [Edit]

This submenu can be used to edit an existing series. After tapping **Series [Edit]**, a selection window is displayed. Select the series to be edited. The same options are available for editing as for the definition of a new series.



#### NOTICE

##### **Danger of data loss when editing a series!**

All series are stored in a single database available to all users. Series created by other users can also be edited.

- 1 Series must be edited with due care.
- 2 Other application users must be consulted.

#### **Important**

The number of samples of a series can only be reduced to the extent that no samples for which measured values are already available can be deleted. Example: If the number of samples of a series is reduced from 20 to 10 and measured values are already available for sample 15, the number of samples can only be reduced to 15. A further reduction is only possible after the measured values of the respective samples have been cleared (in this example, the measured values of samples 11 – 15).

- Application is activated.
  - 1 Press [⌂].
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Series** > [Edit].
    - ⇒ A selection window appears.
  - 3 Tap a series.
    - ⇒ **Series editor** window appears.
  - 4 Settings can be changed by tapping the associated button.
  - 5 To exit the menu item, tap [OK].

### 13.2.3 Deleting a series

**Navigation:** [☰] > [Differential weighing] > [⌂] > **Series** > [CL Last]

This submenu can be used to delete an existing series. After tapping **Series [CL Last]**, a selection window is displayed. Select the series to be deleted. A request is displayed prior to deletion. If the request is confirmed with the [Yes] key, the series with all recorded measured values and calculated results is deleted.




#### NOTICE

##### **Danger of data loss when deleting a series!**

All series are stored in a single database available to all users. Series created by other users can also be deleted.


- 1 Series must be deleted with due care.
- 2 Other application users must be consulted.

- Application is activated.
- 1 Press [].
  - ⇒ A window with application-dependent settings appears.
- 2 Tap **Series** > [**CL Last**].
  - ⇒ A selection window appears.
- 3 Tap a series.
  - ⇒ A confirmation window **Do you really want to delete this serie?** appears.
- 4 To delete the series confirm with [**Yes**].
  - ⇒ The series is deleted.
- 5 To exit the menu item, tap [**OK**].

### 13.2.4 Selecting a series for differential weighing

**Navigation:** [] > [**Differential weighing**] > [] > **Series** > [**Selection**]

This submenu can be used to select a series for differential weighing. After tapping **Series** [**Selection**], a selection window is displayed. Select the required series. If the [**Series**] function key is activated, the series can be directly selected by pressing the key.

- Application is activated.
- Function key is activated.
- 1 Press [].
  - ⇒ A window with application-dependent settings appears.
- 2 Tap **Series** > [**CL Last**].
  - ⇒ A selection window appears.
- 3 Tap a series.
  - ⇒ A confirmation window **Do you really want to delete this serie?** appears.
- 4 To delete the series confirm with [**Yes**].
  - ⇒ The series is deleted.
- 5 To exit the menu item, tap [**OK**].

## 13.3 Working with the differential weighing application

**Navigation:** [] > [**Differential weighing**]

This section describes the procedure for working with the **Differential weighing** application and recording the results.

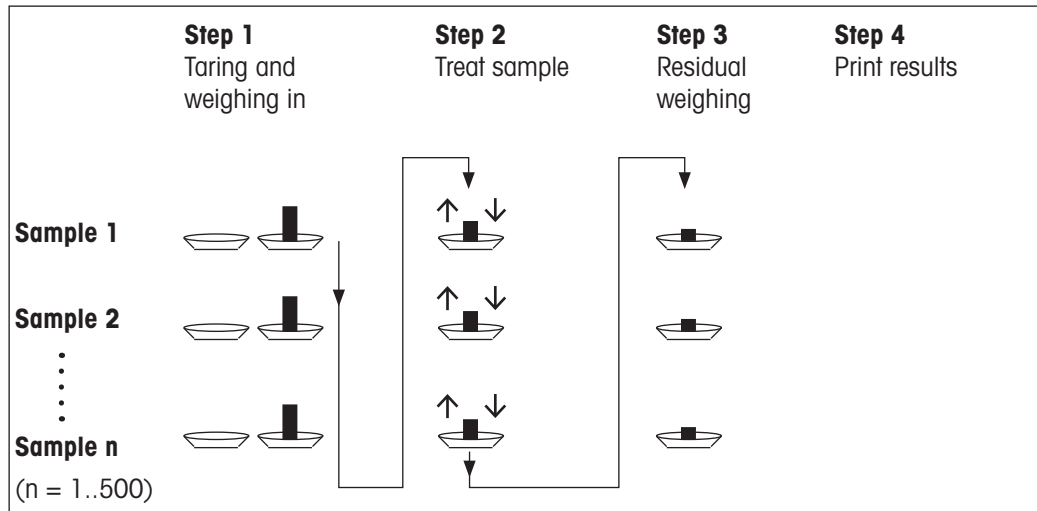
### 13.3.1 The various differential weighing methods

There are three different working methods for differential weighing which are supported by the **Differential weighing** application. These three working methods are described below.

#### **Method 1 (with taring and initial weighing in a single cycle)**

This is the simplest method as the tare weight of the sample container and the initial weight (net weight) of the sample are determined in a single operation.

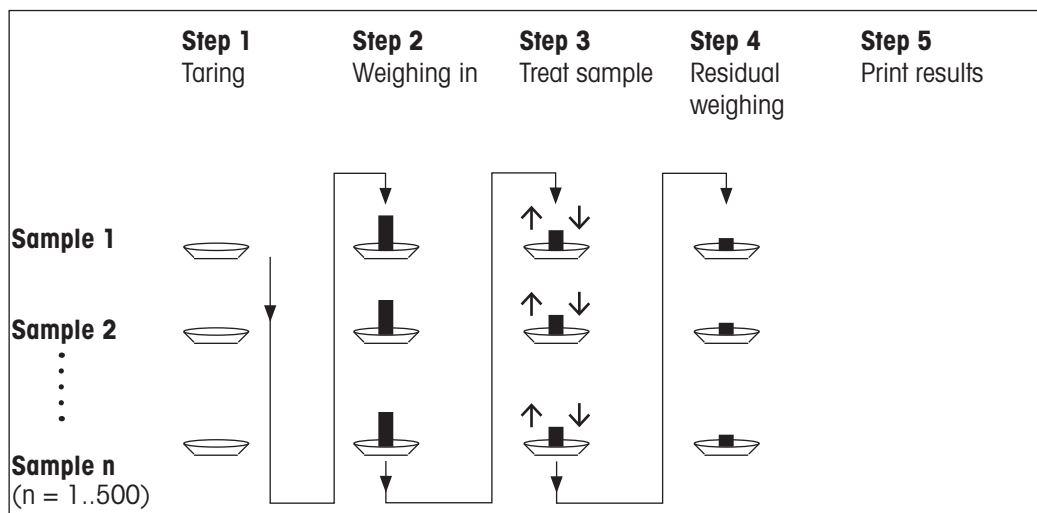
For this method, activate the [T & wgh. in] and [Residual wgh] function keys.



### Method 2 (with separate taring and initial weighing)

With this method, the sample container weight (tare weight) and the initial weight (net weight) of the sample are determined in separate operations. With this method, all weighing containers can initially be tared before all weighings are performed in a second operation.

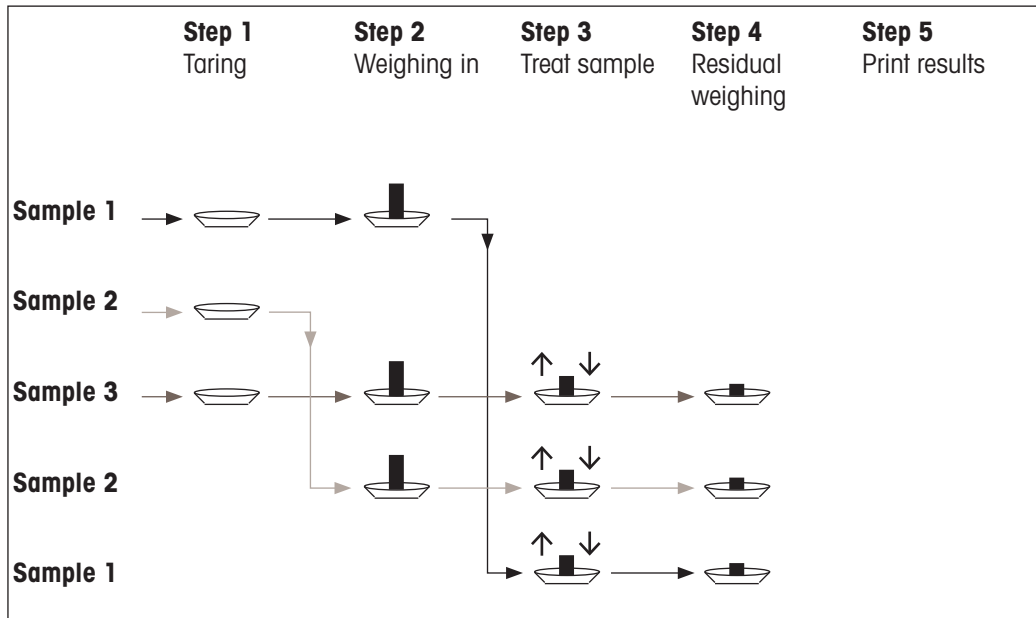
For this method, activate the [Tare], [Initial weighing] and [Residual wgh] function keys].



### Method 3 (free working)

Whereas methods 1 and 2 progress from one sample to the next, method 3 allows free working. Taring, initial weighing and residual weighing can be performed as single steps for each sample. Not all 3 steps need to be performed for a specific sample before the next sample is processed. The following diagram is a free working example:

For this method, activate the [**Tare**], [**Initial weighing**] and [**Residual wgh** function keys].



### 13.3.2 Initial settings

Depending on the working method, appropriate initial settings should be made.

Irrespective of the working method, the 2 following function keys must be activated for each differential weighing. This selects the series and performs a residual weighing. The series can also be selected via the menu.



**Series**

– Activate function keys.



**Residual wgh**

The following function keys must also be activated in order to:

- change the sample designation (also possible via the menu);
- display already existing measured values for the current series;
- clear the last determined value.



**ID**

– Activate function keys.



**Info**



**CL value**

When working with method 1, the following function key must also be activated.



**T & wgh. in**

– Activate function key.

When working with method 2 or method 3, the following function keys must also be activated.



**Tare**

– Activate function keys.



**Initial weighing**

The following function keys must be activated for specific cases. This enables the first tare weight to be copied to all further samples and differential weighing of a series without tare.



**Copy tare**

– Activate function keys.



**No tare**

### 13.3.3 Differential weighing with automatic procedure

In this description, it is assumed that the automatic procedure has been selected for the series to be processed. The automatic procedure guides the user through methods 1 or 2. The automatic procedure can be left at any time and a change to a manual procedure made. A change from a manual to an automatic procedure is also possible at any time.

#### Preparatory work

The currently active series is displayed in the **Series ID** information field. Another series can be processed by tapping the [**Series**] function key and selecting the required series. To avoid operating errors, only those function keys are active that are available for the next working step. The other keys are grayed and not accessible.

A standard sample designation can be changed by tapping the **Sample ID** function key if the change has not already been made in the definition of the series. The required designation must be entered for each sample of a series. The selected designations are also shown in the protocols.

The current differential weighing result can be printed with the [≡] key. Depending on the settings, either the selected sample or complete series is recorded. A selection window is displayed prior to printing. Select the sample for which values are to be recorded.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [≡].

#### Taring and initial weighing of samples

Taring and initial weighing can be carried out in a single operation with the [**T & wgh. in**] function key. Taring and initial weighing can be separated by defining a specific [**Tare**] and [**Initial weighing**] function key.

The arrow keys can be used to page between the previous and next sample.

#### Important

Taring or initial weighing can be interrupted at any time; the previously determined weights remained stored. When the [**T & wgh. in**] function key is pressed again, the balance automatically displays the first sample for which no tare or initial weight is available.

- Function keys are activated.
  - The automatic procedure is activated.
- 1 Tap [**T & wgh. in**].
    - ⇒ The balance displays the first sample of the series for which no tare and initial weight is available.
  - 2 Confirm with [**OK**].
    - ⇒ The balance requests that the weighing container (tare weight) for the first sample is placed on the balance.
  - 3 Place the sample on the balance and confirm with [**OK**].
    - ⇒ The balance determines the weight.
    - ⇒ The balance requests initial weighing.
  - 4 Place the sample in the weighing container and confirm with [**OK**].
    - ⇒ The balance determines the weight.
    - ⇒ The balance requests that the sample is removed.

- 5 Remove the sample container with the sample and confirm with **[OK]**.
  - ⇒ Initial weighing of the first sample of the series is complete.
  - ⇒ The balance subsequently automatically starts the above described taring and initial weighing of all further samples of the series.
  - ⇒ The balance displays the next sample of the series for which no tare and initial weight are available.
- 6 Confirm with **[OK]**.
  - ⇒ The balance requests that the weighing container (tare weight) for the sample is placed on the balance.
- 7 Place the sample on the balance and confirm with **[OK]**.
  - ⇒ The balance determines the weight.
  - ⇒ The balance requests initial weighing.
- 8 Place the sample in the weighing container and confirm with **[OK]**.
  - ⇒ The balance determines the weight.
  - ⇒ The balance requests that the sample is removed.
- 9 Remove the sample container with the sample and confirm with **[OK]**.
  - ⇒ The balance confirms that taring and initial weighing has been carried out for all samples of the series.
- 10 Confirm with **[OK]**.
  - ⇒ The balance is ready for residual weighing.

### **Residual weighing of samples**

Each sample can be residually weighed up to 3 times (e.g. for samples where components are removed or added in several working steps). A window is displayed where residual weighing can be selected. Since no residual weighing has been carried out in the following example, only the first residual weighing is currently available.

The balance displays the first sample of the series for which no corresponding residual weight is available. Another sample can be residually weighed by tapping one of the arrow keys. Paging can take place between the previous and next sample.

A further residual weighing can be carried out by tapping the **[Residual wgh]** function key. The required residual weighing can be selected from the displayed list. A maximum of 3 residual weighings per sample can be made.

### **Important**

Each residual weighing can be interrupted at any time; the previously determined weights remain stored. The balance automatically displays the first sample for which no residual weight is available when the **[Residual wgh]** function key is subsequently tapped again.

- Function keys are activated.
  - The automatic procedure is activated.
- 1 Tap **[Residual wgh]**.
  - 2 Tap the **[1.Residual wgh]** button.
    - ⇒ The balance displays the first residual weighing for which no residual weight is available.
  - 3 Confirm with **[OK]**.
    - ⇒ The balance requests that the residual weight for the first sample is placed on the balance.
  - 4 Place the residual weight on the balance and confirm with **[OK]**.
    - ⇒ The balance determines the residual weight.
    - ⇒ The balance requests that the sample is removed.

- 5 Remove the sample and confirm with **[OK]**.
  - ⇒ Residual weighing of the first sample of the series is complete.
  - ⇒ The balance subsequently automatically starts the above described operation for residual weighing of all further samples of the series.
  - ⇒ The balance displays the next sample of the series for which no residual weight is available.
- 6 Confirm with **[OK]**.
  - ⇒ The balance requests that the residual weight for the sample is placed on the balance.
- 7 Place the sample on the balance and confirm with **[OK]**.
  - ⇒ The balance determines the residual weight.
  - ⇒ The balance requests that the sample is removed.
- 8 Remove the sample and confirm with **[OK]**.
  - ⇒ The balance confirms that residual weighing has been carried out for all samples of the series.
- 9 Confirm with **[OK]**.
  - ⇒ Differential weighing is complete.

### Displaying differential weighing results

The differential weighing results can be displayed at any time with the **[Info]** function key. The results for the first sample are displayed. The results and further samples can be displayed at the bottom right of the window by tapping one of the arrow keys. If the results of a sample include several windows, selection can be made between the individual result windows with the scroll keys at the bottom left corner of the window. The formulae, on which the settings are based, can be found under - Formulae used for the calculation of differential weighing results.

### Important

If several residual weighings have been carried out, these are displayed as **NR 2** or **NR 3**. The results are also displayed with the corresponding numbers, e.g. **Diff. 1**.

Values	Explanation
<b>Series ID</b>	Records the series designation.
<b>Sample ID</b>	Records the sample designation.
<b>T</b>	Reports the tare weight of the sample.
<b>NE</b>	Reports the initial weight.
<b>NR 1</b>	Reports the net weight of the first residual weighing.
<b>Diff. 1</b>	Reports the absolute difference in weight between initial weighing and the first residual weighing of the sample.
<b>Diff. % 1</b>	Reports the difference between initial weighing and residual weighing as a percentage of the initial weight.
<b>Abs. % 1</b>	Reports the residual weight as a percentage of the initial weight.
<b>Atro AM 1</b>	Reports the moisture content of the sample as a percentage of the dry weight.
<b>Atro AD 1</b>	Reports the wet weight of the sample as a percentage of the dry weight.

### 13.3.4 Differential weighing with manual sequence

Differential weighing with a manual sequence differs from the automatic sequence in that the sample processing sequence can be defined by the user.

When differential weighing is started with the **[T & wgh. in]** function key, a selection window is initially displayed. Select the sample for taring and weighing.

In contrast to the automatic sequence, the application does not automatically return to the first sample, the value of which is not yet available. The sample to be processed must be selected by the user. The sequence after taring and initial weighing of the first sample is ended and not automatically restarted. Further samples can now either be tared and initially weighed or residual weighing carried out for the first sample with the **[Residual wgh]** function key. The sample selection window is also displayed for residual weighing.




## Note


The sample selection window only displays the samples for which the appropriate operation has not yet been carried out.

## Preparatory work

The currently active series is displayed in the **Series ID** information field. Another series can be processed by tapping the [**Series**] function key and selecting the required series. To avoid operating errors, only those function keys are active that are available for the next working step. The other keys are grayed and not accessible.

A standard sample designation can be changed by tapping the **Sample ID** function key if the change has not already been made in the definition of the series. The required designation must be entered for each sample of a series. The selected designations are also shown in the protocols.

The current differential weighing result can be printed with the [] key. Depending on the settings, either the selected sample or complete series is recorded. A selection window is displayed prior to printing. Select the sample for which values are to be recorded.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [].

## Taring and initial weighing of samples

Taring and initial weighing can be carried out in a single operation with the [**T & wgh. in**] function key. Taring and initial weighing can be separated by defining a specific [**Tare**] and [**Initial weighing**] function key.

The arrow keys can be used to page between the previous and next sample.

- Function keys are activated.
- 1 Tap [**T & wgh. in**].
    - ⇒ A selection window is displayed.
  - 2 Tap the sample to be processed.
    - ⇒ The balance requests that the weighing container (tare weight) for the first sample is placed on the balance.
  - 3 Place the sample on the balance and confirm with [**OK**].
    - ⇒ The balance determines the weight.
    - ⇒ The balance requests initial weighing.
  - 4 Place the sample in the weighing container and confirm with [**OK**].
    - ⇒ The balance determines the weight.
    - ⇒ The balance requests that the sample is removed.
  - 5 Remove the sample container with the sample and confirm with [**OK**].
    - ⇒ Initial weighing of the first sample of the series is complete.
  - 6 Tap [**T & wgh. in**].
    - ⇒ A selection window is displayed.
  - 7 Tap the sample to be processed.
    - ⇒ The balance requests that the weighing container (tare weight) for the sample is placed on the balance.
  - 8 Place the sample on the balance and confirm with [**OK**].
    - ⇒ The balance determines the weight.
    - ⇒ The balance requests initial weighing.
  - 9 Place the sample in the weighing container and confirm with [**OK**].
    - ⇒ The balance determines the weight.
    - ⇒ The balance requests that the sample is removed.

10 Remove the sample container with the sample and confirm with **[OK]**.

⇒ Taring and initial weighing is complete.

⇒ The balance is ready for residual weighing.

### Residual weighing of samples

Each sample can be residually weighed up to 3 times (e.g. for samples where components are removed or added in several working steps). A window is displayed where residual weighing can be selected. Since no residual weighing has been carried out in the following example, only the first residual weighing is currently available.

The balance displays the first sample of the series for which no corresponding residual weight is available. Another sample can be residually weighed by tapping one of the arrow keys. Paging can take place between the previous and next sample.

A further residual weighing can be carried out by tapping the **[Residual wgh]** function key. The required residual weighing can be selected from the displayed list. A maximum of 3 residual weighings per sample can be made.

▪ Function keys are activated.

1 Tap **[Residual wgh]**.

2 Tap the **[1.Residual wgh]** button.

⇒ A selection window appears.

3 Tap the sample to be processed.

⇒ The balance requests that the residual weight for the first sample is placed on the balance.

4 Place the residual weight on the balance and confirm with **[OK]**.

⇒ The balance determines the residual weight.

⇒ The balance requests that the sample is removed.

5 Remove the sample and confirm with **[OK]**.

⇒ Residual weighing of the first sample of the series is complete.

6 Tap **[Residual wgh]**.

7 Tap the **[1.Residual wgh]** button.

8 Tap the sample to be processed.

⇒ The balance requests that the residual weight for the sample is placed on the balance.

9 Place the sample on the balance and confirm with **[OK]**.

⇒ The balance determines the residual weight.

⇒ The balance requests that the sample is removed.

10 Remove the sample and confirm with **[OK]**.

⇒ Residual weighing is complete.

⇒ Differential weighing is complete.

### Displaying differential weighing results

The differential weighing results can be displayed at any time with the **[Info]** function key. The results for the first sample are displayed. The results and further samples can be displayed at the bottom right of the window by tapping one of the arrow keys. If the results of a sample include several windows, selection can be made between the individual result windows with the scroll keys at the bottom left corner of the window.

The formulae, on which the settings are based, can be found under - Formulae used for the calculation of differential weighing results.

### Important


If several residual weighings have been carried out, these are displayed as **NR 2** or **NR 3**. The results are also displayed with the corresponding numbers, e.g. **Diff. 1**.

Values	Explanation
Series ID	Records the series designation.

<b>Sample ID</b>	Records the sample designation.
<b>T</b>	Reports the tare weight of the sample.
<b>NE</b>	Reports the initial weight.
<b>NR 1</b>	Reports the net weight of the first residual weighing.
<b>Diff. 1</b>	Reports the absolute difference in weight between initial weighing and the first residual weighing of the sample.
<b>Diff. % 1</b>	Reports the difference between initial weighing and residual weighing as a percentage of the initial weight.
<b>Abs. % 1</b>	Reports the residual weight as a percentage of the initial weight.
<b>Atro AM 1</b>	Reports the moisture content of the sample as a percentage of the dry weight.
<b>Atro AD 1</b>	Reports the wet weight of the sample as a percentage of the dry weight.

### 13.3.5 Example of a differential weighing protocol

The detail of a protocol depends on the selected protocol settings. Only application-specific information is shown in the example printout.

The current differential weighing result can be printed with the  key. Depending on the settings, either the selected sample or complete series is recorded. A selection window is displayed prior to printing. Select the sample for which values are to be recorded.

#### Example: Printout

```

- Differential weighing-
25.Jul 2014           15:49
Sample ID           M414/1
T                   6.7125 g
NE                  17.0930 g
NR 1                15.6778 g
Diff. 1             -1.4152 g
Diff. % 1           -8.279 %
Abs. % 1            91.721 %
Atro AM 1           -9.027 %

Signature
.....

```

### 13.3.6 Further options

Further options for the **Differential weighing** application are described in this section.

#### Clearing a single value

If an error is noticed after determining a weight (tare, initial weighing, residual weighing), the last determined value can be cleared with the **[CL value]** function key. However, this is only possible if no menu has been selected and the application has not been left. After changing a sample or series, the last determined value can no longer be cleared.

- Function key is activated.
  - 1 Tap the **[CL value]** function key.
    - ⇒ A confirmation window **Are you sure you want to clear this entry?** appears.
  - 2 To clear the value, tap **[Yes]**.
    - ⇒ The value is cleared.
    - ⇒ **Entry cleared** window appears.
  - 3 Confirm with **[OK]**.
    - ⇒ The value is cleared.

### Clearing all values of a sample

If an error is made during differential weighing, all measured values of a single sample can be cleared. To clear the values of a sample, the **[CL sample]** function key must be activated.



## NOTICE

### Danger of data loss when deleting series and samples!

All series and samples are stored in a single database available to all users. The series and samples defined by other users can be cleared.

- 1 Series and samples must be cleared with due care.
- 2 Other application users must be consulted.

- Function key is activated.
- 1 Tap the **[CL sample]** function key.
    - ⇒ A selection window appears.
  - 2 Tap on the sample to be cleared.
    - ⇒ A confirmation window **Are you sure you want to clear all entries of this sample?** appears.
  - 3 To clear values, tap **[Yes]**.
    - ⇒ Values are cleared.
    - ⇒ **Sample cleared** window appears.
  - 4 Confirm with **[OK]**.
    - ⇒ Values are cleared.

### Copy tare

The tare weight of the first sample can be copied for all further samples of the series for which no tare weight is available with the **[Copy tare]** function key (existing tare weights are retained!). This can save time if the same tare container is used for all samples.

### Note

The function key is inactive as long as no tare weight has been determined for the first sample or if samples of the series already have a tare weight.

- Function key is activated.
  - Tare weight for sample is copied.
- 1 Tap the **[Copy tare]** function key.
    - ⇒ A confirmation window **Are you sure you want to copy the first tare weight to all free samples?** appears.
  - 2 To copy the tare weight, tap **[Yes]**.
    - ⇒ Tare weight is copied.
    - ⇒ **Copy tare weight done** window appears.
  - 3 Confirm with **[OK]**.
    - ⇒ Tare weight is copied.

### Differential weighing without tare

For specific applications where no tare containers are used (e.g. filter weighings), the tare can be suppressed for the complete series. This saves time. To process a series without tare, the **[No tare]** function key must be activated.


If tare is suppressed, this applies to all samples of the series for which no tare weight is available. Existing tare weights are retained. All not yet available tare weights are set to zero. If a tare weight is nonetheless determined for a specific sample of this series, all measured values of the respective sample must initially be cleared.

- Function key is activated.
- 1 Tap the [**No tare**] function key.
  - ⇒ A confirmation window **Are you sure you do not need a tare for this series?** appears.
- 2 Confirm with [**Yes**].
  - ⇒ Tare weight is cleared.
  - ⇒ **No tare function done** window appears.
- 3 Confirm with [**OK**].
  - ⇒ Tare weight is cleared.

### 13.4 Formulae used for the calculation of differential weighing results

<b>Diff.</b>	$\text{Residual weight} - \text{Initial weight}$
<b>Diff. %</b>	$\frac{(\text{Residual weight} - \text{Initial weight}) \cdot 100\%}{\text{Initial weight}}$
<b>Abs. %</b>	$\frac{\text{Residual weight} \cdot 100\%}{\text{Initial weight}}$
<b>Atro AM</b> [0 ... 1000 %]	$- \frac{[\text{Initial weight (wet weight)} - \text{Residual weight (dry weight)}] \cdot 100\%}{\text{Residual weight (dry weight)}}$
<b>Atro AD</b> [110 ... 1000 %]	$\frac{\text{Initial weight (wet weight)} \cdot 100\%}{\text{Residual weight (dry weight)}}$

## 14 Percent Weighing Application


Navigation:  > [Percentweighing]



The **Percentweighing** application enables weighing to a predefined weight (100%) and identification of deviations from this nominal weight.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

### Selecting the application

- 1 Press .
  - 2 Tap the [Percentweighing] icon in the selection window.
    - ⇒ The selected application is active.
    - ⇒ Some of the specific function keys and information fields for percent weighing are activated by default (factory defaults).
- ⇒ The balance is ready for weighing.

### 14.1 Settings for percent weighing application

Navigation:  > [Percentweighing] > 

Various specific percent weighing settings are available, which can be used to adapt the application to suit specific requirements.

Most of the setting options are the same as for the **Weighing** application. Only the settings that differ are described below.

Unlike the **Weighing** application, no custom unit can be specified.

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Menu item	Explanation	Further information
<b>Function Keys</b>	Defines the function keys for percent weighing to appear at the bottom of the display. These keys enable direct access to specific functions.	<b>See</b> [Specific function key for percent weighing ▶ Page 196]
<b>Info Field</b>	Defines the information fields to be displayed for percent weighing.	<b>See</b> [Specific information fields for percent weighing ▶ Page 197]
<b>Display Unit</b>	Defines the unit for result display.	<b>See</b> [Additional unit for percent weighing ▶ Page 198]
<b>Info Unit</b>	Defines an additional weighing unit. This is displayed in the respective information field.	<b>See</b> [Additional unit for percent weighing ▶ Page 198]
<b>Protocol</b>	Selects information to be displayed in the weighing protocols.	<b>See</b> [Specific protocol information for percent weighing ▶ Page 198]
<b>ErgoSens</b>	Up to two external ErgoSens (optional) can be assigned a function in this menu.	<b>See</b> [Specific ErgoSens settings for percent weighing ▶ Page 199]

#### 14.1.1 Specific function key for percent weighing


Navigation:  > [Percentweighing] >  > **Function Keys**

This menu item can be used to activate the following specific function keys for percent weighing.






All other function keys are the same as for the **Weighing** application.

The function keys are displayed in the application at the bottom of the display. The numbers define the sequence in the display.

- Activate or deactivate function keys by tapping.

- To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.
  - Application is activated.
- 1 Press [].
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Function Keys** > [**Define**].
  - 3 Select the **Function Keys** which you need.
    - ⇒ The function key is automatically numbered.
  - 4 Change the settings and confirm with [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

	Designation	Explanation
	<b>Set100%</b>	Defines the current weight as a reference (100%).
	<b>VarRef%</b>	Assigns the current weight a variable reference.
	<b>Nominal</b>	Defines the desired nominal weight. This also serves as a reference for the tolerances.
	<b>+Tol</b>	Defines the accuracy (tolerances) for percent weighing.
	<b>-Tol</b>	Defines the accuracy (tolerances) for percent weighing.

**Factory setting:** [**Set100%**] and [**VarRef%**] activated in this sequence.


### 14.1.2 Specific information fields for percent weighing

**Navigation:** [] > [**Percentweighing**] > [] > **Info Field**

This menu item contains the following information fields for percent weighing.

All other data fields are the same as for the **Weighing** application.

The information fields in the display provide constant information on, e.g. set values, measured results.

- Information fields can be activated or deactivated by tapping.
  - To redefine the sequence, all information fields must be deactivated and then activated in the required sequence.
  - Application is activated.
- 1 Press [].
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Info Field** > [**Define**].
  - 3 Select the information fields that you need.
    - ⇒ The information field is automatically numbered.
  - 4 Change the settings and confirm with [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Values	Explanation
<b>Reference%</b>	Displays the reference weight in percent.
<b>Reference</b>	Displays the absolute weight of the reference.
<b>Nominal</b>	This function key displays the nominal weight.
<b>+Tol</b>	This function key displays the entered tolerance for weighing-in to nominal weight.

<b>-Tol</b>	This function key displays the entered tolerance for weighing-in to nominal weight.
-------------	---

**Factory setting:** **Reference%** and **Reference** activated in this sequence.

### 14.1.3 Additional unit for percent weighing

**Navigation:** [☰] > [Percentweighing] > [☒] > **Display Unit** or **Info Unit**

The unit % (percent) is additionally displayed in the **Display Unit** and **Info Unit** menu items next to the known weighing units. This assumes that a reference has already been determined.

#### Note

The unit % does not need to be explicitly selected for percent weighing as the unit is always switched automatically to % when determining the reference. The required unit can subsequently be selected as required.

- 1 Press [☒].  
⇒ A window with application-dependent settings opens.
- 2 Beside **Display Unit** or **Info Unit**, tap the associated button.  
⇒ A selection window appears.
- 3 Change the setting and confirm with [OK].

**Factory setting:** **g** (Grams) for **Display Unit** and **Info Unit**.

### 14.1.4 Specific protocol information for percent weighing

**Navigation:** [☰] > [Percentweighing] > [☒] > **Protocol**

Here you define which data appears in the protocols. This large menu item is divided into three sub-menus. They enable you to make additional settings for the application. The rest of the available protocol data corresponds to the data for the **Weighing** application and is not described here.

The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.
- Application is activated.

- 1 Press [☒].  
⇒ A window with application-dependent settings appears.
- 2 Tap **Protocol** > [Define].  
⇒ **Protocol** window appears.
- 3 Tap (e.g. **Header**) > [Define].
- 4 Select the information key which you need.  
⇒ The information key is automatically numbered.
- 5 Confirm with [OK].

The arrow buttons can be used to page forward or back to a menu page.

#### Note

The results and data can be printed out at any time.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [☰].

#### Header line of protocols

Use this sub-menu to define which data is printed in the protocol header (before the results).

The header is automatically printed if defined as part of the weighing protocol (in recording single values submenu).



However, the header can also be printed separately by tapping the [**Header**] function key.

### Recording of single values

This submenu can be used to define the information to be reported for each individual result.

Printing takes place by pressing the [] key or automatically if the automatic print function is activated.

### Protocol footer

This submenu can be used to define the information to be printed in the protocol footer after the results (single values).

The footer can be printed by tapping the [**Footer**] function key.

You can define the following parameters:

Parameters	Explanation	Values
<b>Header</b>	Define the information to be printed in the protocol header (before the results). <b>Ref%, Ref.</b> = records the reference in percent and weight. <b>Nom.,+Tol,-Tol</b> = records the defined nominal weight and determined plus/minus tolerances.	<b>Appl. Name*</b>   <b>Title 1</b>   <b>Title 2</b>   <b>Date/Time*</b>   <b>User</b>   <b>Balance Type</b>   <b>SNR</b>   <b>Balance ID</b>   <b>Levelcontrol</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Ref%, Ref.</b>   <b>Nom.,+Tol,-Tol</b>   <b>Signature</b>   <b>Blank Line</b>   <b>Dash Line</b>   <b>3 Blank Lines</b>
<b>Single value</b>	Define the information to be recorded for each single result. <b>Diff.</b> = records the deviation from the nominal weight as a weight. <b>Diff. %</b> = records the deviation from the nominal weight in percent.	<b>Header</b>   <b>Levelcontrol</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Ref%, Ref.</b>   <b>Nom.,+Tol,-Tol</b>   <b>Tare</b>   <b>Net*</b>   <b>Gross</b>   <b>Info Unit</b>   <b>Diff.</b>   <b>Diff. %</b>   <b>Signature</b>   <b>Blank Line</b>   <b>Dash Line</b>   <b>3 Blank Lines</b>   <b>Footer</b>
<b>Footer</b>	Define information to be printed in the protocol footer after the results (single values).	<b>Appl. Name</b>   <b>Title 1</b>   <b>Title 2</b>   <b>Date/Time</b>   <b>User</b>   <b>Balance Type</b>   <b>SNR</b>   <b>Balance ID</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Ref %</b> , <b>Ref.</b>   <b>Nom.,+Tol,-Tol</b>   <b>Signature*</b>   <b>Blank Line</b>   <b>Dash Line</b>   <b>3 Blank Lines*</b>


\* Factory setting

## 14.1.5 Specific ErgoSens settings for percent weighing

**Navigation:** [] > [**Percentweighing**] > [] > **ErgoSens**

Additional formulation settings are available for the ErgoSens sensors.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

- 1 Press [].  
⇒ A window with application-dependent settings appears.
- 2 Tap **ErgoSens** > [**Define**].  
⇒ A selection window appears.

- 3 Select the required menu item (e.g. **ErgoSens 1 (Aux1)**).  
⇒ A selection window appears.
- 4 Select the function by tapping the button.
- 5 Change the settings and confirm with **[OK]**.

#### Menu structure

Main menu	Submenu	Further information
<b>ErgoSens 1 (Aux1)</b>	<b>Off</b>   <b>-&gt;0&lt;-</b>   <b>-&gt;T&lt;-</b>   <b>Print</b>   <b>VarRef</b>   <b>%</b>   <b>Set100%</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Header</b>   <b>Footer</b>   <b>PreTare</b>   <b>1/2d</b>   <b>1/5d</b>   <b>1/10d</b>   <b>1/100d</b>   <b>1/1000d</b>   <b>AntiStatic Kit</b>	<b>See</b> Parameter table
<b>ErgoSens 2 (Aux2)</b>	<b>Off</b>   <b>-&gt;0&lt;-</b>   <b>-&gt;T&lt;-</b>   <b>Print</b>   <b>VarRef</b>   <b>%</b>   <b>Set100%</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Header</b>   <b>Footer</b>   <b>PreTare</b>   <b>1/2d</b>   <b>1/5d</b>   <b>1/10d</b>   <b>1/100d</b>   <b>1/1000d</b>   <b>AntiStatic Kit</b>	<b>See</b> Parameter table

You can define the following parameters:

Values	Explanation
<b>VarRef%</b>	Emulates the function key with the same name. Assigns the current weight a variable reference.
<b>Set100%</b>	Emulates the function key with the same name. Defines the current weight as a reference (100%).

**Factory setting:** Both ErgoSens deactivated, **[Off]**.

## 14.2 Working with the percent weighing application

**Navigation:**  > **[Percentweighing]**

This section describes working with the **Percentweighing** application. Among other things, you can determine a tare weight, change the resolution of the weighing result or work with identifications.

You are probably already familiar with these options from the **Weighing** application. They are therefore not described again here.

### 14.2.1 Simple percent weighing

#### Initial settings

To perform a percent weighing, the two following function keys must be activated.



**VarRef%** – Activate function keys.




**Set100%**


#### Determining the reference

Place the reference weight on the weighing pan. If the applied reference weight is to correspond to 100%, press the **[Set100%]** function key. When the weighing result is stable, the determined weight is taken over as a reference. The reference weight (100%) is shown in the result display and information field **Reference %**. The absolute reference weight is displayed in the **Reference** information field.

If the applied weight is assigned a variable reference, press the **[VarRef%]** function key. Displayed is an input field in which the percentage (e.g. 60%) is defined corresponding to the applied weight.


#### Performing a percent weighing

The measured single value can be printed out with the  key.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

### Note

If the weight of the product is to be displayed instead of the percentage, tap the unit [%]. Tap the required weighing unit from the selection window.




- Function keys are activated.
  - 1 Place the reference weight on the weighing pan.
  - 2 Tap [**Set100%**].
    - ⇒ When the result is stable (horizontal lines disappear), the determined weight is taken as a reference.
    - ⇒ The reference weight (100%) is shown in the result display and information field **Reference%**.
    - ⇒ The absolute reference weight appears in the **Reference** information field.
  - 3 Place the product on the balance.
  - 4 Press  to print the percent weighing result.
  - 5 Tap [**Footer**] to print the footer.
- ⇒ Percent weighing is complete.

## 14.2.2 Percent weighing to a nominal weight

The **Percent** application offers additional functions to facilitate weighing to a defined nominal weight. It is assumed that the reference for percent weighing has already been determined.

### Initial settings

To enter the nominal value and the associated tolerance range, activate the function keys listed below. Also activate the data fields with the same names so that the defined values will be displayed.

-  **Nominal** – Enable function keys.
-  **+Tolerance**
-  **-Tolerance**

### Procedure

#### Important

Units are not converted automatically. If a value is entered in a unit, this value is maintained even if the unit is changed.

- Function keys are activated.
  - 1 Tap [**Nominal**].
    - ⇒ A numeric input window appears.
  - 2 Enter the required value, e.g. 130%.
    - If a weight corresponding to the nominal weight is already on the balance, it can be directly taken over by tapping the button with the balance icon.
    - Check the weighing unit to the right of the nominal weight.
    - A selection of available units, including % (percent) can be displayed by tapping the weighing unit.

#### Important

The unit % is only available after the reference has been determined.

- 3 Confirm with [**OK**] to activate the nominal weight.
- 4 Tap [**+Tolerance**] and/or [**-Tolerance**]
  - ⇒ A numeric input window appears.
- 5 Enter the required value.
  - Both tolerances are set to 2.5% by default. Instead of a percentage, an absolute tolerance can also be entered in any unit, e.g. [%].

6 Confirm with [OK] to activate the tolerance.

**Important**

Percent weighings outside the tolerances are specifically marked with **>T+** or **<T-** when recording single values.

- ⇒ The **SmartTrac** graphic weighing-in aid with tolerance marks to facilitate weighing-in to the nominal weight appears.
- ⇒ Products can be roughly weighed until the tolerance is reached and subsequently finely dosed up to the nominal weight.

### 14.2.3 Sample protocol of a percent weighing


The detail of a protocol depends on the selected protocol settings. Only application-specific information is shown in the example printout.

**Example: Printout**

```
---- Percentweighing ---
25.Jul 2014      13:51
Reference%      100.00 %
Reference       27.05 g
Nominal         130 %
+Tol           2.50 %
-Tol           2.50 %
               129.06 %
Diff.%         -0.94 %

Signature
.....
```

## 15 Piece Counting Application


Navigation:  > [Piececounting]



The **Piececounting** application allows you to determine the number of pieces put on the weighing pan. It is advantageous if all pieces are of approximately equal weight, since the unit quantity is determined on the basis of average weight. Various methods can be used to determine the reference unit weight.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

### Selecting the application

- 1 Press .
  - 2 Tap the [Piececounting] icon in the selection window.
    - ⇒ The selected application is active.
    - ⇒ Some of the specific function keys and data fields for piece counting are activated by default (factory defaults).
- ⇒ The balance is ready for piece counting.

### 15.1 Settings for piece counting application

Navigation:  > [Piececounting] > 

Various specific piece counting settings are available, which can be used to adapt the application to suit specific requirements.

Most of the setting options are the same as for the **Weighing** application. Only the settings that differ are described below.

Unlike the **Weighing** application, no custom unit can be specified.

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Menu item	Explanation	Further information
<b>FixPcs</b>	Definition of a fixed reference unit quantity.	<b>See</b> [Defining the fixed reference unit quantity ▶ Page 204]
<b>Function Keys</b>	Defines which function keys for piece counting are shown at the bottom of the display. These keys enable direct access to specific functions.	<b>See</b> [Specific function keys for piece counting ▶ Page 204]
<b>Info Field</b>	Defines which information fields for piece counting are displayed.	<b>See</b> [Specific information fields for piece counting ▶ Page 205]
<b>Autom. WeightEntry</b>	Activates/deactivates automatic weight entry.	<b>See</b> [Specifications for automatic weight entry ▶ Page 206]
<b>Display Unit</b>	Define the unit for the result display.	<b>See</b> [Additional unit for piece counting ▶ Page 206]
<b>Info Unit</b>	Define an additional weighing unit. This appears in the corresponding data field on the display.	<b>See</b> [Additional unit for piece counting ▶ Page 206]
<b>Protocol</b>	Select data to be shown on the weighing protocol.	<b>See</b> [Specific protocol information for piece counting ▶ Page 207]
<b>ErgoSens</b>	Up to two external ErgoSens (optional) can be assigned a function in this menu.	<b>See</b> [Specific ErgoSens settings for piece counting ▶ Page 208]

### 15.1.1 Defining the fixed reference unit quantity

**Navigation:**  > **[Piececounting]** >  > **FixPcs**


Here you define which fixed reference quantity the function key **[FixPcs]** refers to.

When carrying out piece counting, each time the function key **[FixPcs]** is tapped, the weight is divided by the defined, fixed reference unit quantity. This determines the reference unit weight on which the piece counting is based.

#### Important

The function key **[FixPcs]** is labeled with **[Fix n]**, with **n** being the selected number of reference units.

**Example:** **[Fix 10]**.

- 1 Press .
  - ⇒ A window with application-dependent settings appears.
- 2 Beside **FixPcs**, tap the associated button.
  - ⇒ A numeric input window appears.
- 3 Change the settings and confirm with **[OK]**.
  - ⇒ Function key is labeled with a new reference unit quantity.

**Factory setting:** **[Fix 10]** PCS.

### 15.1.2 Specific function keys for piece counting


**Navigation:**  > **[Piececounting]** >  > **Function Keys**

This menu item allows you to activate the specific function keys listed below for piece counting.







All other function keys are the same as for the **Weighing** application.








The function keys are displayed in the application at the bottom of the display. The numbers define the sequence in the display.

- Activate or deactivate function keys by tapping.
- To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.
- Application is activated.

- 1 Press .
  - ⇒ A window with application-dependent settings appears.
- 2 Tap **Function Keys** > **[Define]**.
- 3 Select the **Function Keys** which you need.
  - ⇒ The function key is automatically numbered.
- 4 Change the settings and confirm with **[OK]**.

The arrow buttons can be used to page forward or back to a menu page.

	Designation	Explanation
	<b>FixPcs</b>	Determines the reference unit weight with a defined, fixed number of pieces.
	<b>VarPcs</b>	Selects the reference unit quantity.
	<b>PcsWgt</b>	Enters the known weight of a reference unit.
	<b>RefOpt</b>	Performs reference optimization.
	<b>M+</b>	Saves the current unit quantity to the memory.
	<b>Result</b>	Opens the results window.

	<b>CL Result</b>	Clears the results memory.
	<b>CL Last</b>	Deletes the last saved value.
	<b>Nominal</b>	Defines the desired nominal unit quantity. This also serves as a reference for the tolerances.
	<b>Abs/Diff</b>	Switches the weight display between the unit quantity already weighed in and the number of units still to be weighed in until the nominal unit quantity is reached.
	<b>+Tol</b>	Defines the accuracy (tolerance range) for piece counting.
	<b>-Tol</b>	Defines the accuracy (tolerance range) for piece counting.
	<b>Max n</b>	Defines the maximum number of piece counts in a series.

**Factory setting:** [PcsWgt], [FixPcs], [VarPcs] and [Nominal] are activated in this order.


### 15.1.3 Specific information fields for piece counting

**Navigation:**  > [Piececounting] >  > **Info Field**

This menu item provides the information fields listed below for piece counting.

All other data fields are the same as for the **Weighing** application.

The information fields in the display provide constant information on, e.g. set values, measured results.

- Information fields can be activated or deactivated by tapping.
- To redefine the sequence, all information fields must be deactivated and then activated in the required sequence.
- Application is activated.
  - 1 Press .
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Info Field** > [Define].
  - 3 Select the information fields that you need.
    - ⇒ The information field is automatically numbered.
  - 4 Change the settings and confirm with [OK].

The arrow buttons can be used to page forward or back to a menu page.

You can define the following parameters:

Values	Explanation
<b>RefPcs</b>	Shows the selected reference unit quantity.
<b>PcsWgt</b>	Shows the reference unit weight.
<b>n</b>	Shows the number of piece counts carried out in a series.
<b>x</b>	Shows the average unit quantity of all piece counts in a series.
<b>s</b>	Shows the standard deviation as an absolute value.
<b>s.rel</b>	Shows the standard deviation as a percentage.
<b>Sum</b>	Shows the unit quantity of all counts in a series.
<b>&gt;T+</b>	Shows the number of piece counts outside the upper weight tolerance.
<b>&lt;T-</b>	Shows the number of piece counts outside the lower weight tolerance.
<b>Min</b>	Shows the smallest measured unit quantity in a series of piece counts.
<b>Max</b>	Shows the largest measured unit quantity in a series of piece counts.

<b>Diff.</b>	Shows the difference between the smallest and largest unit quantity in a series of piece counts.
<b>Nominal</b>	This function key displays the nominal unit quantity.
<b>+Tol</b>	This function key displays the entered tolerance for piece counting.
<b>-Tol</b>	This function key displays the entered tolerance for piece counting.

**Factory setting:** **PcsWgt** activated.

### 15.1.4 Specifications for automatic weight entry

**Navigation:** [☰] > [Piececounting] > [⚙️] > **Autom. WeightEntry**

Here you define whether and under which conditions the balance should automatically enter stable weight values in the statistics. This saves you the effort of tapping the [M+] function key. The value is printed automatically.

When this function is activated [On], the criteria for automatic entry can be defined via the [Define] button.

- 1 Press [⚙️].  
⇒ A window with application-dependent settings appears.
- 2 Beside **Autom. WeightEntry**, tap the associated button.  
⇒ **Autom. WeightEntry** window appears.
- 3 Tap [On] > [Define].
- 4 Change the settings and confirm with [OK].

You can define the following parameters:

Parameters	Explanation	Values
<b>Limit</b>	This value defines which limit must be exceeded for automatic entry.	User-defined
<b>Delay Time</b>	When the limit is exceeded, the <b>Delay Time</b> is started, and when it times out the value is captured and entered in the statistics or transferred over the interface.	User-defined (displayed in seconds)

**Factory setting:** [Off] Automatic entry disabled.

### 15.1.5 Additional unit for piece counting

**Navigation:** [☰] > [Piececounting] > [⚙️] > **Display Unit** or **Info Unit**

The **PCS** unit (piece) is also available beside the known weighing units in the **Display Unit** and **Info Unit** menu topics, provided that a reference unit weight has already been determined.

#### Note

You do not explicitly need to select the **PCS** unit for piece counting, since the display unit is always automatically switched to **PCS** when the reference unit weight is being determined. Afterwards, you can select the desired unit again at any time, unless you have already saved a value to the memory for a series of piece counts. In this case, switching between **PCS** and the other weighing units is only possible after deleting the results.

- 1 Press [⚙️].  
⇒ A window with application-dependent settings opens.
- 2 Beside **Display Unit** or **Info Unit**, tap the associated button.  
⇒ A selection window appears.
- 3 Change the setting and confirm with [OK].

**Factory setting:** **g** (Grams) for **Display Unit** and **Info Unit**.




## 15.1.6 Specific protocol information for piece counting

**Navigation:**  > [**Piececounting**] >  > **Protocol**

Here you define which data appears in the protocols. This large menu item is divided into three sub-menus. They enable you to make additional settings for the application. The rest of the available protocol data corresponds to the data for the **Weighing** application and is not described here.


The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
  - To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.
    - Application is activated.
- 1 Press .
    - ⇒ A window with application-dependent settings appears.
  - 2 Tap **Protocol** > [**Define**].
    - ⇒ **Protocol** window appears.
  - 3 Tap (e.g. **Header**) > [**Define**].
  - 4 Select the information key which you need.
    - ⇒ The information key is automatically numbered.
  - 5 Confirm with [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

### Note

The results and data can be printed out at any time.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

### Header line of protocols

Use this sub-menu to define which data is printed in the protocol header (before the results).


The header is printed automatically for piece counts when the first count is entered in the statistics by tapping the [**M+**] function key.

However, the header can also be printed separately by tapping the [**Header**] function key.

### Recording of single values

This submenu can be used to define the information to be reported for each individual result.

Tap the [**M+**] function key to activate automatic printing of single values during a series of counts.

A single value can also be printed separately by pressing the  key.

### Recording of results

Here you can define which additional data is to be recorded in the results protocol.

The result protocol can be printed by pressing the  key with the result window.

If a specific number of counts [**Max n**] is defined for a series of piece counts, the results protocol is automatically printed after the weight of the last count has been entered in the statistics.

You can define the following parameters:

Parameters	Explanation	Values
<b>Header</b>	<p>Define the information to be printed in the protocol header (before the results).</p> <p><b>Max n</b> = records the defined maximum number of piece counts in the series.</p> <p><b>Nom.,+Tol,-Tol</b> = records the defined nominal unit quantity and the defined plus and minus tolerances.</p>	<b>Appl. Name*</b>   <b>Title 1</b>   <b>Title 2</b>   <b>Date/Time*</b>   <b>User</b>   <b>Balance Type*</b>   <b>SNR*</b>   <b>Balance ID</b>   <b>Levelcontrol</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Max n</b>   <b>Nom.,+Tol,-Tol</b>   <b>Signature</b>   <b>Blank Line</b>   <b>Dash Line</b>   <b>3 Blank Lines</b>
<b>Single value</b>	<p>Define the information to be recorded for each single result.</p> <p><b>RefPcs</b> = records the selected reference unit quantity.</p> <p><b>PcsWgt</b> = records the defined reference unit weight.</p> <p><b>NetPcs</b> = records the measured net unit quantity.</p>	<b>Header</b>   <b>Levelcontrol</b>   <b>ID1*</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Nom.,+Tol,-Tol*</b>   <b>RefPcs</b>   <b>PcsWgt</b>   <b>NetPcs*</b>   <b>Tare</b>   <b>Net*</b>   <b>Gross</b>   <b>Info Unit</b>   <b>Blank Line</b>   <b>Dash Line</b>   <b>3 Blank Lines</b>   <b>Footer</b>
<b>Result</b>	<p>Define which statistical data is to be recorded.</p> <p><b>&gt;Tol+,&lt;Tol-</b> = records the number of counts that are outside the tolerance range.</p> <p><b>n</b> = records the number of piece counts carried out in a series.</p> <p><b>x</b> = records the average unit quantity of all counts in a series.</p> <p><b>s</b> = records the standard deviation as an absolute value.</p> <p><b>Important</b> The value is only recorded if there are at least three values in the statistics. Otherwise a dash is shown instead of a value.</p> <p><b>s.rel</b> = records the relative standard deviation within the series as a percentage. The value is always recorded with a resolution of two decimal places.</p> <p><b>Important</b> The value is only recorded if there are at least three values in the statistics. Otherwise a dash is shown instead of a value.</p> <p><b>Min,Max,Diff =</b> <b>Min</b> = records the smallest measured unit quantity of the current series. <b>Max</b> = records the largest measured unit quantity of the current series. <b>Diff.</b> = records the difference between the smallest and largest unit quantity of the current series.</p> <p><b>Sum</b> = records the total value of all saved individual weighings.</p> <p><b>SumPcs</b> = records the total unit quantity of all saved individual counts.</p>	<b>Appl. Name</b>   <b>Title 1</b>   <b>Title 2</b>   <b>Date/Time</b>   <b>User</b>   <b>Balance Type</b>   <b>SNR</b>   <b>Balance ID</b>   <b>Levelcontrol</b>   <b>ID1</b>   <b>ID2</b>   <b>ID3</b>   <b>ID4</b>   <b>Max n</b>   <b>Nom.,+Tol,-Tol</b>   <b>&gt;Tol+,&lt;Tol-</b>   <b>n*</b>   <b>x*</b>   <b>s*</b>   <b>s.rel*</b>   <b>Min,Max,Diff*</b>   <b>Sum*</b>   <b>SumPcs*</b>   <b>Signature*</b>   <b>Blank Line</b>   <b>Dash Line</b>   <b>3 Blank Lines*</b>

\* Factory setting

### 15.1.7 Specific ErgoSens settings for piece counting

**Navigation:**  > **[Piececounting]** >  > **ErgoSens**

Additional formulation settings are available for the ErgoSens sensors.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

- 1 Press [].  
⇒ A window with application-dependent settings appears.
- 2 Tap **ErgoSens** > [**Define**].  
⇒ A selection window appears.
- 3 Select the required menu item (e.g. **ErgoSens 1 (Aux1)**).  
⇒ A selection window appears.
- 4 Select the function by tapping the button.
- 5 Change the settings and confirm with [**OK**].

### Menu structure

Main menu	Submenu	Further information
<b>ErgoSens 1 (Aux1)</b>	<b>Off   -&gt;0&lt;-   -&gt;T&lt;-   Print   FixPcs   Result   M+   OK   ID1   ID2   ID3   ID4   Header   1/2d   1/5d   1/10d   1/100d   1/1000d   AntiStatic Kit</b>	<b>See</b> Parameter table
<b>ErgoSens 2 (Aux2)</b>	<b>Off   -&gt;0&lt;-   -&gt;T&lt;-   Print   FixPcs   Result   M+   OK   ID1   ID2   ID3   ID4   Header   1/2d   1/5d   1/10d   1/100d   1/1000d   AntiStatic Kit</b>	<b>See</b> Parameter table

You can define the following parameters:

Values	Explanation
<b>FixPcs</b>	Emulates the same function key. Determines the reference unit weight with a defined, fixed number of pieces.
<b>Result</b>	Emulates the function key with the same name. Opens the result window.
<b>M+</b>	Emulates the function key with the same name. Takes over the current value.
<b>OK</b>	Emulates pressing of the button with the same name in the dialogs (however not in the menus) for confirmation of entries and actions.

**Factory setting:** Both ErgoSens deactivated, [**Off**].

## 15.2 Working with the piece counting application

**Navigation:** [] > [**Piececounting**]

This section describes how to work with the **Piececounting** application. Among other things, you can determine a tare weight, change the resolution of the weighing result or work with identifications.

You are probably already familiar with these options from the **Weighing** application. They are therefore not described again here.

### 15.2.1 Simple piece counting

#### Initial settings

To carry out a simple piece counting, you must activate at least the following three function keys:



**FixPcs**

– Activate function keys.



**VarPcs**



**PcsWgt**

Also activate the data fields **PcsWgt** (Reference unit weight) and **RefPcs** (Reference unit quantity) so that the defined values will be displayed.

### Determining the reference

Place the desired number of reference units on the weighing pan. Using these reference units, the balance measures the average piece weight. This serves as a basis for the piece counting.


If the number of reference units placed on the balance corresponds exactly to the number that is programmed for the function key [**FixPcs**], tap it. As soon as the weighing result is stable, the measured average piece weight is accepted as a reference. The average weight of the reference units (the number of decimal points depends on the model) and the reference unit quantity appears in the data fields.

If a different number of reference units is placed on the balance, and it does not correspond to the function key [**FixPcs**], e.g. 32 pieces, tap the function key [**VarPcs**] (variable unit quantity). It appears in the input field in which the number of pieces is typed. After confirming the unit quantity, the balance determines the reference. The average weight of the reference units and the reference unit quantity appear in the data fields.

If the piece weight is known, this can be entered directly. To do this, tap the function key [**PcsWgt**]. A data field appears in which the piece weight is typed in the desired unit. Since the balance does not have to determine a reference for this method, after confirming the piece weight, the result of the piece counting is displayed immediately (number of pieces currently placed on the balance). The entered reference unit weight and the reference unit quantity "1" (since you have entered the weight of an individual part) appear in the data fields.


### Performing the piece counting

The measured single value can be printed out with the  key.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

#### Note

If the weight of the piece on the balance is displayed instead of the unit quantity, tap the [**PCS**] unit. Tap the desired weighing unit from the selection window.

- Function keys are activated.
  - 1 Load the reference units on the weighing pan.
  - 2 Tap, e.g. [**FixPcs**].
    - ⇒ The measured average piece weight is saved as the reference.
  - 3 Place the pieces to be counted on the balance and tap the [**M+**] function key.
    - ⇒ When the result is stable (the dashes disappear), it is entered in the statistics.
    - ⇒ The protocol header and the result (single value) of the current weighing are printed.
  - 4 Tap [**Result**].
    - ⇒ The result window appears.  
If the result window consists of several screen pages, paging between the individual pages can take place with the two arrow keys.
  - 5 Press  to print the result protocol.
  - 6 Tap [**OK**] to exit the result window.
  - 7 Tap [**CL Result**] to end the counting series and delete the memory for the next series.
    - ⇒ A confirmation window appears.
  - 8 To delete the statistics, confirm with [**OK**].
    - ⇒ The statistics are deleted.
    - ⇒ The function key is inactive and grayed.

## 15.2.2 Totalizing and acquiring statistics from piece counts

### Initial settings

In order for you to totalize and acquire statistics, you must activate at least the following three function keys:



**M+** – Enable function keys.




**Result**



**CL Result**

We also recommend activating the following two function keys. They allow you to delete incorrect values [**CL Last**] and to define the number of piece counts to be included in a series [**Max n**].

For optimal use of the statistics functions, a printer should be connected to the balance. If a printer is not connected, the four most important statistics information fields for your application should be activated (e.g. **n**, **x**, **Min** and **Max**).

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .


### Procedure

If the number of piece counts for a series is specified, press the [**Max n**] function key and enter the number of counts (1 to 999). The series is terminated automatically after the last count has been completed. The result window is opened and the result protocol is printed. This function key is only active when no value is present in the statistics. If you enter 0 (zero) for [**Max n**], the series does not have a defined limit and you can statistically record a maximum of 999 piece counts.

When working with a weighing container, place the container on the balance and press the [**→T←**] key to tare the balance.

Alternatively you can use the tare memory or the automatic taring function. These functions are described in the instructions for the **Weighing** application.

Determine the reference with the desired method. Fixed reference unit quantity, variable reference unit quantity or entry of a known piece weight.

- Function keys are activated.
  - The balance is tared [**→T←**].
- 1 Load the reference units on the weighing pan.
  - 2 Tap, e.g. [**VarPcs**].
    - ⇒ A numeric input window appears.
  - 3 Enter the number of reference units and confirm with [**OK**].
  - 4 Place the pieces to be counted on the balance and tap the [**M+**] function key.
    - ⇒ When the result is stable (the dashes disappear), it is entered in the statistics.
    - ⇒ The protocol header and the result (single value) of the current weighing are printed.
  - 5 Remove the pieces from the first count.
  - 6 Place the pieces for the second count on the balance and tap the [**M+**] function key.
  - 7 Tap [**Result**].
    - ⇒ The result window appears.
      - If the result window consists of several screen pages, paging between the individual pages can take place with the two arrow keys.
  - 8 Press  to print the result protocol.
  - 9 Tap [**OK**] to exit the result window.
  - 10 Tap [**CL Result**] to end the counting series and delete the memory for the next series.
    - ⇒ A confirmation window appears.
  - 11 To delete the statistics, confirm with [**OK**].
    - ⇒ The statistics are deleted.
    - ⇒ The function key is inactive and grayed.

### Important

An error message is displayed if you tap the **[M+]** function key but no weight change has occurred. This prevents you from accidentally acquiring the same result twice.

If the automatic weight entry function is activated, the **[M+]** key does not need to be pressed for the result to be acquired. The value is automatically entered in the statistics.

If you have mistakenly saved an incorrect piece count result, you can use the **[CL Last]** function key to delete it. It is only available if values are already present in the memory; otherwise the key is grayed out and cannot be actuated. The key is deactivated after a result is deleted and is not activated again until the next result has been entered in the statistics.

## 15.2.3 Counting to a nominal value

The **Piececounting** application provides additional functions that simplify counting to a defined nominal value. You can use these functions for individual counts or for series counts with statistics. It is assumed that the reference for the piece count has already been determined.

### Initial settings

To enter the nominal value and the associated tolerance range, activate the function keys listed below. Also activate the data fields with the same names so that the defined values will be displayed.



**Nominal**

– Enable function keys.



**+Tolerance**



**-Tolerance**

We also recommend activating the **Abs/Diff** function key. This allows the results display to be switched at any time, between the amount already weighed and the remaining amount still to be weighed until the nominal value is reached.



**Abs/Diff**

– Function key activation.

### Procedure

#### Important

The function keys for entering the nominal value and the tolerance range are deactivated if values are already present in the statistics. In this case, you must clear the statistics with the **[CL Last]** function key before you can define the nominal value and the tolerance range.

The **[PCS]** unit is only available if a reference unit weight has already been determined.

- Function keys are activated.
  - Statistics are deleted.
- 1 Tap the **[Nominal]** function key.
    - ⇒ A numeric input window appears.
  - 2 Enter the required value.
    - If a weight corresponding to the nominal weight is already on the balance, it can be directly taken over by tapping the button with the balance icon.
    - Check the weighing unit to the right of the nominal weight.

A selection of available units, including **[PCS]** (pieces) can be displayed by tapping the weighing unit.

#### Note

Units are not converted automatically. When a value is entered in a unit, it is retained, even when the unit is changed.

- 3 Confirm with **[OK]** to activate the nominal weight.
- 4 Tap the **[+Tolerance]** and/or **[-Tolerance]** function key.
  - ⇒ A numeric input window appears.

- 5 Enter the required value.  
Both tolerances are set to 2.5% by default. Instead of a percentage, an absolute tolerance can be entered in any unit, e.g. [**PCS**].
- 6 Confirm with [**OK**] to activate the tolerance.

**Note**

Piece counts outside the tolerance range are specifically marked with **>T+** or **<T-** when single values are recorded.

- ⇒ The **SmartTrac** graphic weighing-in aid with tolerance marks to facilitate weighing-in to the nominal weight appears.
- ⇒ Samples can be roughly weighed until the lower tolerance limit is reached and subsequent additions made up to the nominal weight.

## 15.2.4 Reference optimization

Reference optimization leads to more precise results for piece counting. With each reference optimization, the average piece weight (reference) is recalculated. Since the newly placed parts enlarge the basis for the calculation, the reference and the result of the piece count will be more precise.


Determine the reference with the desired method (fixed or variable reference unit quantity). Reference optimization can be carried out any number of times. The reference and the counting result will be more precise after each optimization.


**Important**

Reference optimization is only possible if:

- The number of placed parts is greater than the reference unit quantity.
- The number of placed parts is not greater than twice the last saved reference unit quantity.
- **Fixed reference unit quantity** or **variable reference unit quantity** are used as a method for determining the reference. Reference optimization is not possible when entering a known reference unit weight (function key [**PcsWgt**]).

In the case of a series of piece counts, reference optimization is only possible before the result of the first count is saved with the [**M+**] function key. The [**RefOpt**] function key is then grayed out and can no longer be pressed, since changing the calculation basis (Reference unit weight) is not permitted during an ongoing series.

The measured single value can be printed out with the [] key.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [].


To use reference optimization, activate the following function key.



**RefOpt**

– Activate function key.

- Function keys are activated.
  - Statistics are deleted.
- 1 Load the reference units on the weighing pan.
  - 2 Tap, e.g. [**FixPcs**].
    - ⇒ The measured average piece weight is saved as the reference.
  - 3 Place the pieces to be counted on the balance and tap the [**RefOpt**] function key.
    - ⇒ When the weight is stable (dashes disappear), the weighed quantity is used as the new reference quantity. The reference unit weight is recalculated on this basis.
    - ⇒ After reference optimization, the [**RefOpt**] function key remains inactive until further pieces are placed on the balance.
  - 4 Place further pieces on the balance, tap the [**RefOpt**] function key.
    - ⇒ The weighed quantity is used as the new reference quantity.

- 5 Tap [**M+**] to enter the result in the statistics.
  - ⇒ The protocol header and the result (single value) of the current weighing are printed.
- 6 Tap [**Result**].
  - ⇒ The result window appears.  
If the result window consists of several screen pages, paging between the individual pages can take place with the two arrow keys.
- 7 Press [,] to print the result protocol.
- 8 Tap [**OK**] to exit the result window.
- 9 Tap [**CL Result**] to end the counting series and delete the memory for the next series.
  - ⇒ A confirmation window appears.
- 10 To delete the statistics, confirm with [**OK**].
  - ⇒ The statistics are deleted.
  - ⇒ The function key is inactive and grayed.

### 15.2.5 Example protocol of a piece count with statistical values

The detail of a protocol depends on the selected protocol settings. Only application-specific information is shown in the example printout.

#### Note

The values for **x**, **s**, **Min**, **Max**, **Diff.** and **Sum** are displayed in the current display unit; this does not necessarily have to be **PCS** (pieces).

#### Important information for the interpretation of recorded results

The **x** and **s** values are calculated results that are shown with higher resolution than the individual measured values. The significance of the last decimal place cannot be assured with a relatively small measurement series (fewer than 10 or so measured values) with small weight differences.



### Example: Printout

```
----- Piececounting -----  
25.Jul 2014      12:40  
WeighBridge SNR  
                1234567890  
Terminal SNR    1234567891  
Nominal        110.00 PCS  
+Tol           3 PCS  
-Tol           1 PCS  
Max n          3  
  1            110 PCS  
NetPcs         110 PCS  
RefPcs         10 PCS  
PcsWgt         2.314 g  
  2            109 PCS  
NetPcs         109 PCS  
RefPcs         10 PCS  
PcsWgt         2.314 g  
  3>T          114 PCS  
NetPcs         114 PCS  
RefPcs         10 PCS  
PcsWgt         2.314 g  
n              3  
x              111.000 PCS  
s              2.600 PCS  
s.rel          2.34 %  
Min            109 PCS  
Max            114 PCS  
Diff           5 PCS  
Sum            333.00 PCS  
SumPcs        333 PCS  
>T+           1  
<T-           0  
  
Signature  
.....
```

## 16 Maintenance

### 16.1 Cleaning

Periodically clean the weighing pan, the drip tray, the housing, and the terminal of your balance using the brush supplied with it. The maintenance interval depends on your standard operating procedure (SOP).

**Please observe the following notes:**



#### **WARNING**

##### **Danger of death or serious injury due to electric shock!**

Contact with parts that contain a live current can lead to injury and death. If the balance cannot be shut down in an emergency situations, people can be injured or the balance can be damaged.

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



#### **NOTICE**

##### **Danger of damage to the balance due to inappropriate cleaning methods!**

The balance is made from high quality, resistant materials and can be damaged by certain cleaning agents, solvents or abrasives. If liquids enter the housing they can damage the balance.

- 1 Use only water and a mild detergent to clean the balance or terminal.
- 2 Wipe off any spills immediately.
- 3 Make sure that no liquid enters the interior of the balance.

#### **Cleaning**

Your balance is made from high quality, resistant materials and can therefore be cleaned with a commercially available, mild cleaning agent.

#### **Important**

All removable non-coated parts of the outer draft shield are dishwasher safe to 80 degrees.

- 1 To clean the weighing chamber thoroughly, swing out the draft shield glass panels from the balance and remove them from their fastening points.
- 2 Carefully lift the front of the weighing pan and lift it out of the guide.
- 3 Remove the drip tray from the balance.
- 4 Ensure that these parts are correctly positioned when refitted.

#### **Important**

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

## 16.2 Disposal

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

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

Thank you for your contribution to environmental protection.



## 16.3 Firmware (Software) Updates

METTLER TOLEDO is continuously improving its balance firmware (software) for the benefit of customers. Contact a METTLER TOLEDO representative for the latest firmware update.

## 17 Troubleshooting

### 17.1 Error messages

The majority of error messages are displayed in plain text in the respective application accompanied by remedial instructions. Error messages of this type are self-explanatory and therefore are not mentioned below. The following error messages can be displayed instead of the weighing result.


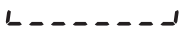

#### Other error messages

If error messages are displayed other than those described below ("Error x"), contact a METTLER TOLEDO representative.

#### See also

 RFID tag configuration ▶ Page 105

#### 17.1.1 General error messages

Error message	Cause	Remedy
<b>Weight display</b>		
	Overload – the applied weight exceeds the weighing capacity of the balance.	– Reduce the sample weight.
	<b>Underload</b> – sample pan holder is missing.	– Check that the weighing pan is positioned correctly, moves freely and does not scrape against the draft cover.
	<b>Weight display flashes/Out of zero range</b> – when one or several range limits are exceeded when the balance is switched on or zeroed. This message is always displayed when a weight is present in the weighing pan when the balance is switched on.	– Remove the weight.
<b>Timeout</b>	<b>Taring or zeroing was aborted</b> due to a lack of stability.	<ol style="list-style-type: none"> <li>1 Close the draft shield doors and check the location (draft, vibrations).</li> <li>2 Confirm with <b>[OK]</b>.</li> <li>3 Repeat the procedure.</li> </ol>









#### 17.1.2 RFID error messages




Error message	Cause	Remedy
<b>Data could not be read from RFID tag. RFID unit not responding!</b>	RFID unit failed to respond and was timed out. RFID unit incorrectly connected or configured.	<ol style="list-style-type: none"> <li>1 Check that the RFID unit is correctly connected.</li> <li>2 Check the RFID configuration</li> </ol>
<b>Data could not be written to RFID tag. RFID unit not responding!</b>	See above	See above
<b>Data could not be read from RFID tag. RFID error!</b>	Hardware problem	– Use a different RFID tag.

Error message	Cause	Remedy
<b>Data could not be written to RFID tag. RFID error!</b>	See above	See above
<b>RFID tag is not compatible with this application.</b>	RFID tag contains data of other applications, e.g. Pipette Check, Titration or Sample Track.	– Use a different RFID tag.
<b>No RFID tag detected.</b>	RFID tag removed from balance during read operation.	– Place the beaker with the RFID tag on the balance again.
	RFID tag removed from balance during write operation.	See above

For RFID configuration, **see** [RFID tag configuration ► Page 105].

## 17.2 Status messages/Status icons

	Cause	Solution
	Automatic <b>ProFACT Adjustment</b> is currently not possible as the balance is busy.	1 Unload the balance. 2 Do not select any key for 2 minutes. The display stabilizes. ⇒ The status icon extinguishes after successful adjustment.
	A request for automatic adjustment with an <b>external weight</b> was defined in the system settings.	– Carry out the adjustment. ⇒ The status icon extinguishes after successful adjustment or if adjustment is declined.
	A request for automatic <b>testing of the adjustment with an external weight</b> was defined in the system settings.	– Carry out the test. ⇒ The status icon extinguishes after a successful test or if the test is declined.
	The <b>MinWeigh</b> function is active. This indicates that the minimum weight for the current tare was not yet reached.	– Ensure that the minimum weight is reached. ⇒ The status icon extinguishes.
	The next <b>test for the MinWeigh function</b> is due.	– Contact a METTLER TOLEDO representative as soon as possible. ⇒ A service engineer will carry out the test as soon as possible.
	The balance <b>battery</b> must be replaced. This battery ensures that the date and time are retained when the balance is disconnected from the power supply.	– Contact a METTLER TOLEDO representative as soon as possible. ⇒ The battery can be replaced by a service engineer.
	The balance is due for a <b>service</b> .	– Contact a METTLER TOLEDO representative as soon as possible. ⇒ The balance can be serviced by a service engineer.
	The built-in level sensor has detected that the balance is not correctly leveled.	– Immediately level the balance. ⇒ The status icon extinguishes as soon as the balance is correctly leveled.
<b>GWP</b>	A request for automatic performance of a task was defined in the system settings.	– Carry out the task. ⇒ The status icon extinguishes after the task is carried out.

	<p>The Antistatic Kit is active, i.e. the ionizer is on.</p> <p>This icon only indicates that the Antistatic Kit is active, however this does not mean that the Antistatic Kit is actually switched on and ready to use.</p>	<ul style="list-style-type: none"> <li>▪ The control cable of the Antistatic Kit is connected to the balance and the balance is connected to the power supply and switched on.</li> <li>– For zeroing, taring, dosing and adjustment, the ionizer is deactivated and the status icon extinguishes as the ionizer could disturb these operations. When these operations have been completed, tap the [<b>Ionizer</b>] function key to activate the ionizer again.</li> </ul>
	<p>The RFID unit is active.</p> <p>This icon appears when the RFID unit detects an RFID tag, provided you have activated the RFID unit in the system settings.</p>	<p>The control cable of the RFID reader is connected to the balance and the balance is connected to the power supply and switched on.</p>
	<p>Electrostatic detection is running.</p> <p>This icon appears when the electrostatic detection is running.</p>	<p>The balance is connected to the power supply and switched on.</p>

### 17.3 What to do if....?

Symptom	Possible solution
Display remains dark after switching on	<ul style="list-style-type: none"> <li>• It must be ensured that the terminal is correctly connected to the balance.</li> <li>• Ensure that the balance is connected to the power supply and switched on.</li> <li>• If the problem persists, contact a METTLER TOLEDO representative.</li> </ul>
Keys and buttons do not respond	<ul style="list-style-type: none"> <li>• Reboot the system by disconnecting and reconnecting it to the power supply.</li> <li>• If the problem persists, contact a METTLER TOLEDO representative.</li> </ul>
The connected printer does not print	<ul style="list-style-type: none"> <li>• Ensure that the printer is switched on and activated in the menu. <b>See</b> [Peripherals ▶ Page 52].</li> <li>• Check the printer settings. <b>See</b> [Recommended printer settings ▶ Page 242].</li> </ul>
Incorrect characters are printed	<ul style="list-style-type: none"> <li>• Change the bit/parity settings of the printer and balance to <b>8/No</b>.</li> <li>• Check that both devices have the same baud rate setting. <b>See</b> [Peripherals ▶ Page 52].</li> <li>• Use the appropriate character sets. <b>See</b> [Recommended printer settings ▶ Page 242].</li> </ul>
Unstable error appears after each StaticDetect measurement	<ul style="list-style-type: none"> <li>• Ensure a strong stable surface free from all vibrations - especially low frequency vibrations.</li> <li>• Choose [ ] &gt; [<b>System</b>] &gt; [ ] &gt; [<b>Wghparam</b>] &gt; <b>Weighing Mode</b> &gt; <b>Checkweighing</b>.</li> </ul>

## 18 Technical Data


### 18.1 General data



#### **WARNING**

##### **Danger of death or serious injury due to electric shock!**

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

- 1 Only use an approved AC adapter with a current-limited SELV output.
- 2 Ensure correct polarity 

#### **Power supply**

AC adapter:	Primary: 100 – 240 V AC, -15%/+10%, 50/60 Hz Secondary: 12 V DC $\pm 3\%$ , 2.5 A (with electronic overload protection)
Cable for AC adapter:	3-core, with country-specific plug
Balance power supply:	12 V DC $\pm 3\%$ , 2.5 A, maximum ripple: 80 mVpp

#### **Protection and standards**

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

#### **Environmental conditions**

Height above mean sea level:	Up to 4000 m
Ambient temperature:	5–40 °C
Relative air humidity:	Max. 80% up to 31 °C, linearly decreasing to 50% at 40 °C, noncondensing
Warm-up time:	At least <b>120</b> minutes after connecting the balance to the power supply; when switched on from standby-mode, the balance is ready for operation immediately

#### **Materials**

Housing:	Die-cast aluminum, plastic, chrome steel and glass
Terminal:	Die-cast zinc, chromed and plastics
SmartGrid:	Chrome-Nickel-Molybdenum steel X2CrNiMo17

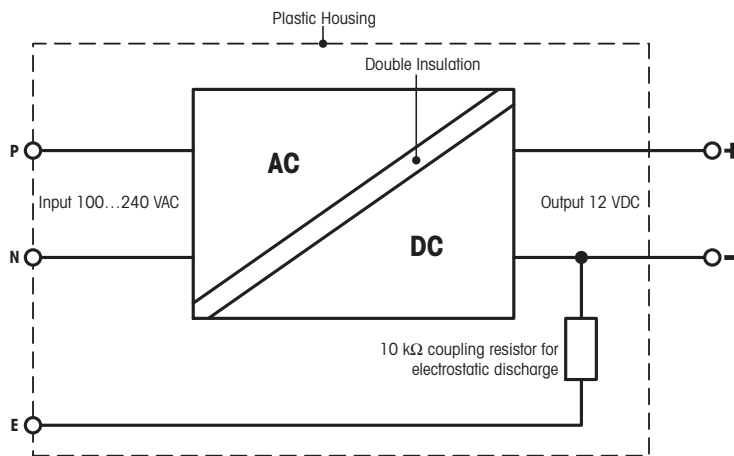
## 18.2 Explanatory notes for the METTLER TOLEDO AC adapter

The certified external power supply which conforms to the requirements for Class II double insulated equipment is not provided with a protective earth connection but with a functional earth connection for EMC purposes. This earth connection IS NOT a safety feature. Further information about conformance of our products can be found in the brochure "Declaration of Conformity" which is coming with each product.

In case of testing with regard to the European Directive 2001/95/EC the power supply and the balance have to be handled as Class II double insulated equipment.

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

Because the balance are sensitive to static charges a leakage resistor, typically 10 k $\Omega$ , is connected between the earth connector and the power supply output terminals. The arrangement is shown in the equivalent circuit diagram. This resistor is not part of the electrical safety arrangement and does not require testing at regular intervals.



Equivalent circuit diagram



## 18.3 Model-specific data

		XSE105DU	XSE205DU
<b>Limit values</b>			
Maximum capacity		120 g	220 g
Readability		0.1 mg	0.1 mg
Tare range (from...to)		0 ... 120 g	0 ... 220 g
Maximum capacity in fine range		41 g	81 g
Readability in fine range		0.01 mg	0.01 mg
Repeatability (at nominal load)	sd	0.1 mg (100 g)	0.1 mg (200 g)
Repeatability (at low load)	sd	0.05 mg (5 g)	0.05 mg (10 g)
Repeatability in fine range (at low load)	sd	0.02 mg (5 g)	0.02 mg (10 g)
Linearity deviation		0.2 mg	0.2 mg
Eccentricity deviation (test load) <sup>1)</sup>		0.3 mg (50 g)	0.3 mg (100 g)
Sensitivity offset (test weight)		0.8 mg (100 g)	0.8 mg (200 g)
Sensitivity temperature drift <sup>2)</sup>		0.00015%/°C	0.00015%/°C
Sensitivity stability <sup>3)</sup>		0.0002%/a	0.0002%/a
<b>Typical values</b>			
Repeatability	sd	0.04 mg (5 g)	0.04 mg (10 g)
Repeatability in fine range	sd	0.01 mg (5 g)	0.01 mg (10 g)
Linearity deviation		0.06 mg	0.06 mg
Eccentricity deviation (test load) <sup>1)</sup>		0.15 mg (50 g)	0.15 mg (100 g)
Sensitivity offset (test weight)		0.2 mg (100 g)	0.16 mg (200 g)
Minimum weight (according to USP)		82 mg	82 mg
Minimum weight (according to USP) in fine range		20 mg	20 mg
Minimum weight (U=1%, k=2)		8.2 mg	8.2 mg
Minimum weight (U=1%, k=2) in fine range		2 mg	2 mg
Setting time		1.5 s	1.5 s
Setting time in fine range		3 s	3 s
Interface update rate		23 1/s	23 1/s
Usable height of draft shield		235 mm	235 mm
Weight of balance		9.1 kg	9.1 kg
Number of built-in reference weights		2	2
<b>Dimensions</b>			
Balance dimensions (W × D × H)		263 × 482 × 322 mm	263 × 482 × 322 mm
Weighing pan dimensions		78 × 73 mm (W × D)	78 × 73 mm (W × D)
<b>Typical uncertainties and supplementary data</b>			
Repeatability	sd	0.04 mg + 0.00003%·Rgr	0.04 mg + 0.000015%·Rgr
Repeatability in fine range	sd	0.01 mg + 0.000025%·Rgr	0.01 mg + 0.000012%·Rgr
Differential linearity deviation	sd	$\sqrt{(40 \text{ pg} \cdot \text{Rnt})}$	$\sqrt{(20 \text{ pg} \cdot \text{Rnt})}$
Differential eccentric load deviation	sd	0.0003%·Rnt	0.00015%·Rnt
Sensitivity offset	sd	0.0002%·Rnt	0.00008%·Rnt
Minimum weight (according to USP)		82 mg + 0.06%·Rgr	82 mg + 0.03%·Rgr
Minimum weight (according to USP) in fine range		20 mg + 0.05%·Rgr	20 mg + 0.024%·Rgr
Minimum weight (U=1%, k=2)		8.2 mg + 0.00006%·Rgr	8.2 mg + 0.00003%·Rgr
Minimum weight (U=1%, k=2) in fine range		2 mg + 0.005%·Rgr	2 mg + 0.0024%·Rgr
Weighing time		4 s	4 s
Weighing time in fine range		6 s	6 s
<b>Weights for routine testing</b>			
OIML CarePac		100 g F2, 5 g E2	200 g F2, 10 g F2
	Weights	#11123002	#11123001

ASTM CarePac	Weights	100 g 1, 5 g 1 #11123102	200 g 1, 10 g 1 #11123101
--------------	---------	-----------------------------	------------------------------

sd = Standard deviation

Rnt = Net weight (sample weight)

Rgr = Gross weight

a = Year (annum)

<sup>1)</sup> According to OIML R76

<sup>2)</sup> In the temperature range 10 ... 30 °C

<sup>3)</sup> After putting into operation for the first time, with the self-adjustment function activated (ProFACT or FACT)

		XSE104	XSE204
<b>Limit values</b>			
Maximum capacity		120 g	220 g
Readability		0.1 mg	0.1 mg
Tare range (from...to)		0 ... 120 g	0 ... 220 g
Maximum capacity in fine range		–	–
Readability in fine range		–	–
Repeatability (at nominal load)	sd	0.1 mg (100 g)	0.1 mg (200 g)
Repeatability (at low load)	sd	0.07 mg (5 g)	0.07 mg (10 g)
Repeatability in fine range (at low load)	sd	–	–
Linearity deviation		0.2 mg	0.2 mg
Eccentricity deviation (test load) <sup>1)</sup>		0.3 mg (50 g)	0.3 mg (100 g)
Sensitivity offset (test weight)		1 mg (100 g)	1 mg (200 g)
Sensitivity temperature drift <sup>2)</sup>		0.00015%/°C	0.00015%/°C
Sensitivity stability <sup>3)</sup>		0.0002%/a	0.0002%/a

<b>Typical values</b>			
Repeatability	sd	0.04 mg (5 g)	0.04 mg (10 g)
Repeatability in fine range	sd	–	–
Linearity deviation		0.1 mg	0.1 mg
Eccentricity deviation (test load) <sup>1)</sup>		0.15 mg (100 g)	0.15 mg (100 g)
Sensitivity offset (test weight)		0.2 mg (100 g)	0.3 mg (200 g)
Minimum weight (according to USP)		82 mg	82 mg
Minimum weight (according to USP) in fine range		–	–
Minimum weight (U=1 %, k=2)		8.2 mg	8.2 mg
Minimum weight (U=1 %, k=2) in fine range		–	–
Setting time		1.5 s	1.5 s
Setting time in fine range		–	–
Interface update rate		23 1/s	23 1/s
Usable height of draft shield		235 mm	235 mm
Weight of balance		9.1 kg	9.1 kg
Number of built-in reference weights		2	2

<b>Dimensions</b>			
Balance dimensions (W × D × H)		263 × 482 × 322 mm	263 × 482 × 322 mm
Weighing pan dimensions		78 × 73 mm (W × D)	78 × 73 mm (W × D)

		XSE104	XSE204
<b>Typical uncertainties and supplementary data</b>			
Repeatability	sd	0.04 mg + 0.00003%·Rgr	0.04 mg + 0.000015%·Rgr
Repeatability in fine range	sd	–	–
Differential linearity deviation	sd	√(40 pg·Rnt)	√(20 pg·Rnt)
Differential eccentric load deviation	sd	0.0003%·Rnt	0.00015%·Rnt
Sensitivity offset	sd	0.0002%·Rnt	0.00012%·Rnt
Minimum weight (according to USP)		82 mg + 0.06%·Rgr	82 mg + 0.03%·Rgr
Minimum weight (according to USP) in fine range		–	–
Minimum weight (U=1 %, k=2)		8.2 mg + 0.00006%·Rgr	8.2 mg + 0.00003%·Rgr

	<b>XSE104</b>	<b>XSE204</b>
Minimum weight (U=1%, k=2) in fine range	–	–
Weighing time	4 s	4 s
Weighing time in fine range	–	–

<b>Weights for routine testing</b>		
OIML CarePac	100 g F2, 5 g E2	200 g F2, 10 g F1
Weights	#11123002	#11123001
ASTM CarePac	100 g 1, 5 g 1	200 g 1, 10 g 1
Weights	#11123102	#11123101

sd = Standard deviation

Rgr = Gross weight

<sup>1)</sup> According to OIML R76

<sup>3)</sup> After putting into operation for the first time, with the self-adjustment function activated (ProFACT or FACT)

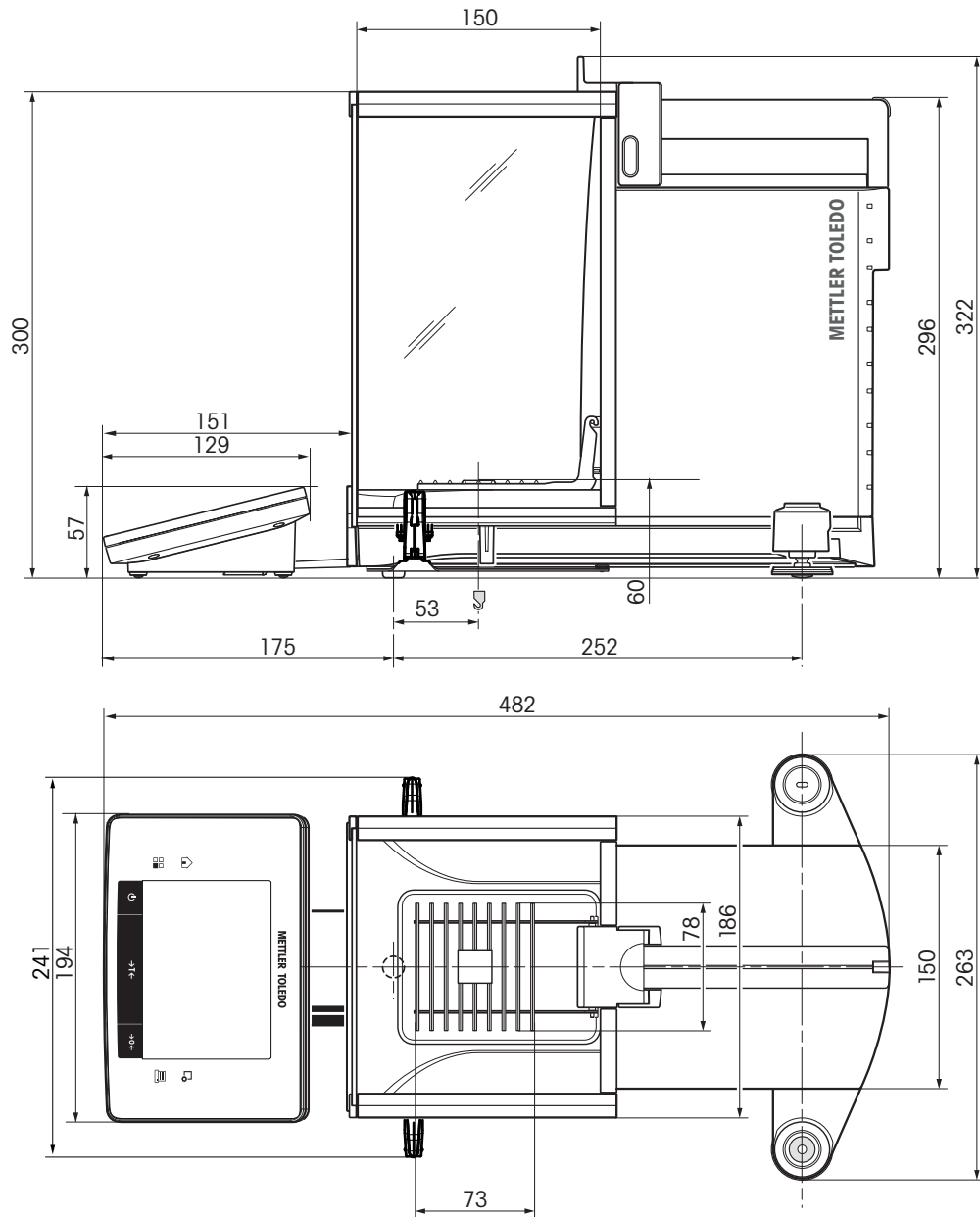
Rnt = Net weight (sample weight)

a = Year (annum)

<sup>2)</sup> In the temperature range 10 ... 30 °C

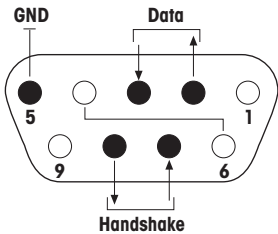
## 18.4 Dimensions

Dimensions in mm.



## 18.5 Interfaces

### 18.5.1 Specifications of RS232C

Interface type:	Voltage interface according to EIA RS-232C/DIN 66020 (CCITT V24/V.28)	
Max. cable length:	15 m	
Signal level:	Outputs: +5 V ... +15 V (RL = 3 – 7 kΩ) –5 V ... –15 V (RL = 3 – 7 kΩ)	Inputs: +3 V ... 25 V –3 V ... 25 V
Connector:	Sub-D, 9-pole, female	
Operating mode:	Full duplex	
Transmission mode:	Bit-serial, asynchronous	
Transmission code:	ASCII	
Baud rates:	600, 1200, 2400, 4800, 9600, 19200, 38400 <sup>1)</sup> (firmware selectable)	
Bits/parity:	7-bit/even, 7-bit/odd, 7-bit/none, 8-bit/none (firmware selectable)	
Stop bits:	1 stop bit	
Handshake:	None, XON/XOFF, RTS/CTS (firmware selectable)	
End-of-line:	<CR><LF>, <CR>, <LF> (firmware selectable)	
		Pin 2: Balance transmit line (TxD) Pin 3: Balance receive line (RxD) Pin 5: Ground signal (GND) Pin 7: Clear to send (hardware handshake) (CTS) Pin 8: Request to send (hardware handshake) (RTS)

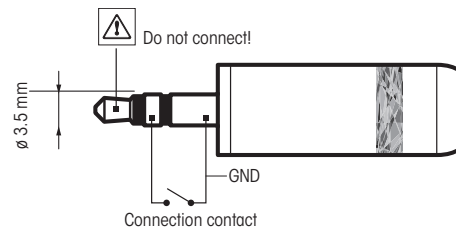
- <sup>1)</sup> 38400 baud is only possible in special cases, such as:
- Weighing platform without terminal, or
  - Weighing platform with terminal, only via the optional RS232C interface.

### 18.5.2 Specifications of "Aux" connection

You can connect the METTLER TOLEDO "ErgoSens" or an external switch to sockets "Aux 1" and "Aux 2". This allows you to start functions such as taring, zeroing, printing and others.

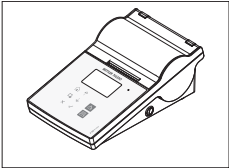

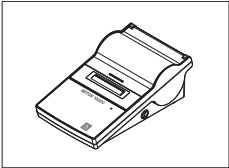
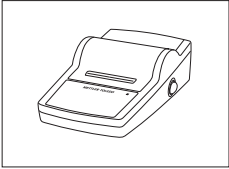
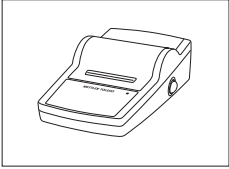
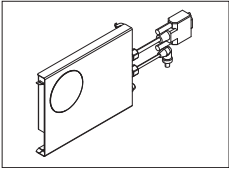
#### External connection

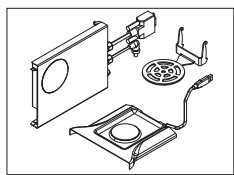
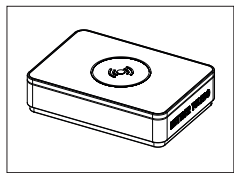

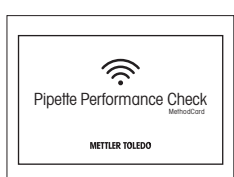
Connector:	3.5 mm stereo jack connector	
Electrical data:	Max. voltage	12 V
	Max. current	150 mA



## 19 Accessories and Spare Parts

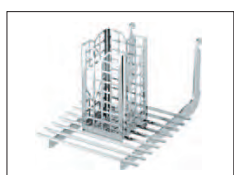



### 19.1 Accessories

	Description	Part No.
<b>Printers</b>		
	P-56RUE thermal printer with RS232, USB and ethernet connections, simple printouts, date and time, label printing (limited).	30094673
	Paper roll, white (length: 27 m), set of 10 pcs	30094723
	Paper roll, white, self-adhesive (length: 13 m), set of 10 pcs	30094724
	Paper roll, white, self-adhesive labels (550 labels), set of 6 pcs	30094725
	P-58RUE thermal printer with RS232, USB and ethernet connections, simple printouts, date and time, label printing, balance applications: statistics, formulation, totaling,	30094674
	Paper roll, white (length: 27 m), set of 10 pcs	30094723
	Paper roll, white, self-adhesive (length: 13 m), set of 10 pcs	30094724
	Paper roll, white, self-adhesive labels (550 labels), set of 6 pcs	30094725
	P-52RUE dot matrix printer with USB, RS232, and ethernet connections	30237920
	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-P25 printer with RS232 connection to instrument	11124300
	Paper roll (length: 20 m), set of 5 pcs	00072456
	Paper roll (length: 13 m), self-adhesive, set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
	RS-P26 printer with RS232 connection to instrument (with date and time)	11124303
	Paper roll (length: 20 m), set of 5 pcs	00072456
	Paper roll, self-adhesive (length: 13 m), set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
<b>RFID reader / writer / card</b>		
	EasyScan Module, accessory for pipette check application. Reads and writes RFID tags.	30078900

	<p>SmartSample, accessory for titration application for transferring sample information from the balance to the titrator. Reads and writes RFID tags. The kit includes:</p> <ul style="list-style-type: none"> <li>• EasyScan</li> <li>• SmartSample drip tray</li> <li>• SmartSample SmartGrid</li> </ul>	30078901
	<p>EasyScan Flex, accessory for pipette check application. Reads and writes RFID tags.</p>	30215407
	<p>Smart Tag</p> <p>Set of 50 pieces</p> <p>Set of 200 pieces</p>	<p>30101517</p> <p>30101518</p>
	<p>MethodCard</p> <p>Set of 5 pieces</p> <p>Set of 25 pieces</p>	<p>30300929</p> <p>30300930</p>

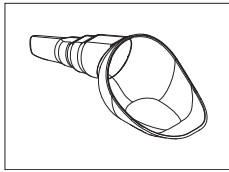
### ErgoClips

Weighing kit for various weighing containers

	ErgoClip Basket	11106747
	ErgoClip Titration Basket	11106883
	ErgoClip Weighing Boat	11106748
	ErgoClip Round-Bottom Flask	11106746

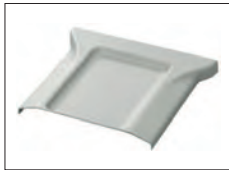
	ErgoClip small Flask	11140180
	ErgoClip Filter holder	11140185
	ErgoClip Vial	30260822
	ErgoClip Stand	11140170
	ErgoClip Flask	11106764
	ErgoClip Tube	11106784
	ErgoClip Syringe	30008288
	Single-use aluminium weighing pans, 10 units	11106711
	SmartGrid cover, chromium-nickel steel	11106709





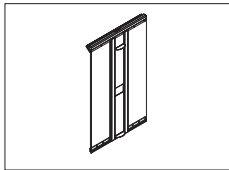
SmartPrep, single-use funnel for quick and easy sample preparation. For flask sizes 10/19, 12/21, 14/23. 50 pcs

30061260



Grey drip tray

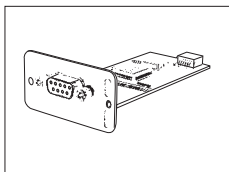
30038741



MinWeigh door

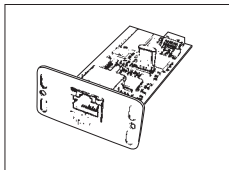
11106749

### Optional interfaces



Second RS232C Interface

11132500



Ethernet Interface for connection to an Ethernet network

11132515



BT2 Option: Bluetooth Interface, single-point connection with other Bluetooth device e.g. computer

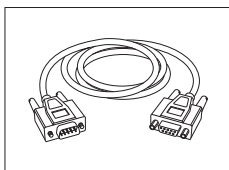
30237796



BT2 Paired Option: Bluetooth Interface for single point connection with RS232 device e.g. Rs-P25, P-56RUE or P-58RUE

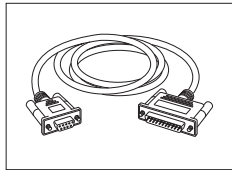
30237797

### Cables for RS232 interface



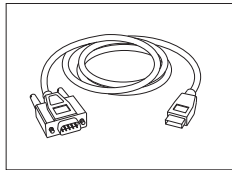
RS9 – RS9 (m/f): connection cable for PC, length = 1 m

11101051



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

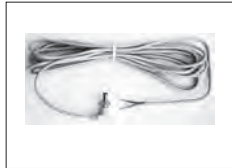
11101052



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

64088427

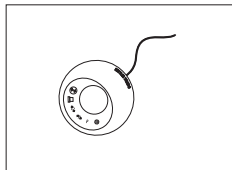
**Cable, one-sided open (2-pin)**



Cable between balance and AC adapter, length = 4 m

11132037

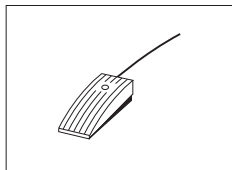
**Sensors**



ErgoSens, optical sensor for hands-free operation

11132601

**Footswitches**



Footswitch with selectable function for balances (Aux 1, Aux 2)

11106741

**Filling-process control**



LV11 automatic feeder for automatic loading of small items on the balance

21900608

LV11 Draft shield door

11106715

SQC14 filling process control

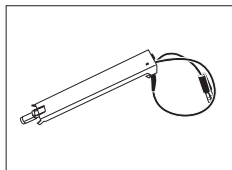
Compact instrument with printer for control of up to 16 articles

00236210

Compact instrument with printer for control of up to 60 articles

00236211

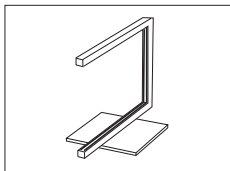
**AntiStatic kit**



Compact Antistatic Kit. Eliminates the build-up of electrostatic charges on containers and samples.

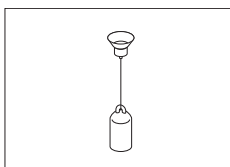
30090337

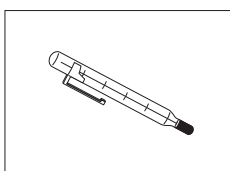
**Note:** For the operation of 2 compact Antistatic Kits, an additional AC adapter can be ordered.

	Universal AntiStatic Kit complete (U-shaped), including electrode and power supply	11107767
	Optional: Second U-electrode* for universal AntiStatic Kit	11107764
	* Power supply for optional, second U-elektrode (11107764)	11107766


### Density determination


	Density kit	11106706
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	Sinker for density of liquids in conjunction with density kit Calibrated (sinker + certificate) Recalibrated (new certificate)	00210260 00210672 00210674
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	Calibrated thermometer with certificate	11132685
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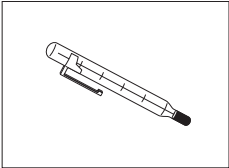
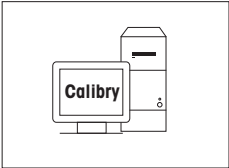
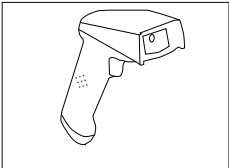
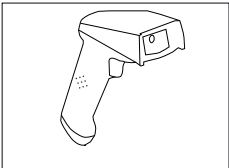
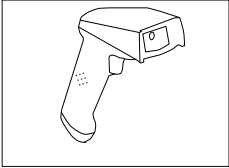
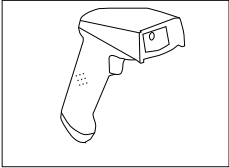
### Pipette calibration

	Evaporation Trap, incl. adapter	11140043
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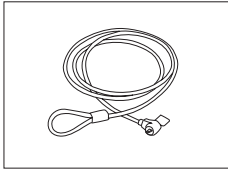
	Evaporation Trap large	11138440
---	------------------------	----------

	1-channel suction pump complete Hose 2 m for suction pump	11138268 11138132
---	--	----------------------

	Reagent reservoirs, 5 pcs.	11600616
---	----------------------------	----------

	Barometer	11600086
	Calibrated thermometer with certificate	11132685
	Calibry PC Software Calibry Light; for single channel pipettes	11138423
<b>Barcode reader</b>		
	<b>RS232C Barcode Reader</b> The following accessories are needed for operation (not included): RS232 F cable Null modem adapter Plus one of the following: AC adapter 5 V for EU AC adapter 5 V for US AC adapter 5 V for GB AC adapter 5 V for AU	21901297 21901305 21900924 21901370 21901372 21901371 21901370 + 71209966
	<b>RS232C Barcode Reader – Cordless</b> The following accessories are needed for operation (not included): Cradle RS232 F cable Null modem adapter Plus one of the following: AC adapter 12 V for EU AC adapter 12 V for US AC adapter 12 V for GB AC adapter 12 V for AU	21901299 21901300 21901305 21900924 21901373 21901375 21901374 21901373 + 71209966
	<b>PS/2 Barcode Reader, without cable</b> PS/2 wedge single cable	21901297 21901307
	<b>PS/2Y Barcode Reader, without cable</b> PS/2 wedge twin (Y) cable	21901297 21901308

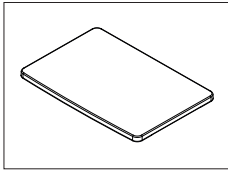
### Anti-theft devices



Anti-theft steel cable

11600361

### Protective covers



Protective cover for terminal

30059776

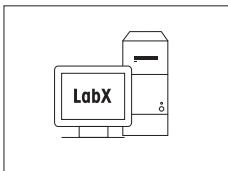
### Dust covers



Dust cover

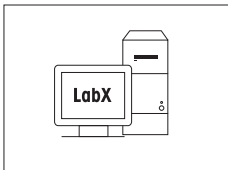
30035838

### Software



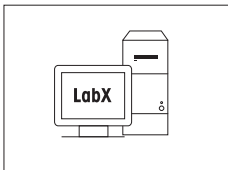
LabX direct balance (simple data transfer)

11120340



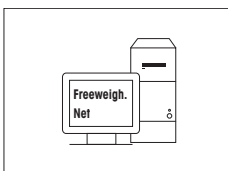
LabX balance express (standalone system)

11153120



LabX balance server (server edition)

11153121



Freeweigh.Net

21900895

### WeightLink



WeightLink DMC Scanner  
WeightLink DMC Scanner + RS232 option

30268560

30304696



**WeightLink CarePac**

For example:

Weight 1: Nominal weight 200 g, Class F2 + Weight 2:  
Nominal weight 10 g, Class F1

30293476



**Individual WeightLink Weights**

For example:

10 g Class E2  
10 g Class F1

30293505

30293564

Other **WeightLink** CarePacs and individual WeightLink weights are available under:

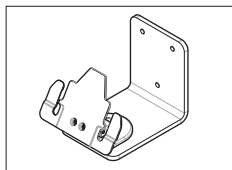
► [www.mt.com/weightlink](http://www.mt.com/weightlink)

**Various**



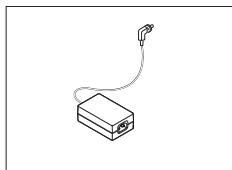
Terminal and printer stand, mounting on balance

11106730



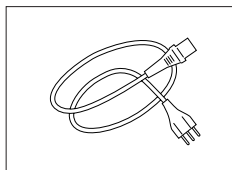
Wall fixture for terminal

30138798



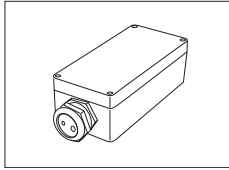
AC/DC adapter (without power cable) 100–240 V AC, 0.8 A,  
50/60 Hz, 12 V DC 2.5 A

11107909



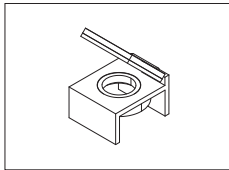
Country-specific 3-Pin power cable with grounding  
conductor.

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



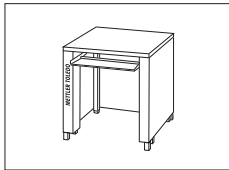
IP54 protective housing for AC adapter

11132550



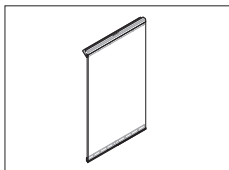
Level bubble mirror

11140150



Weighing table

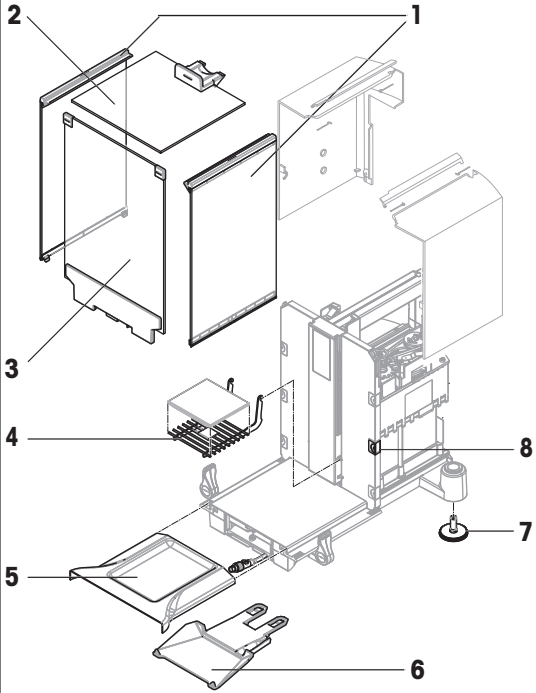

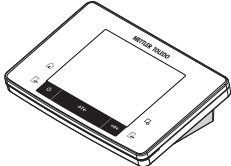
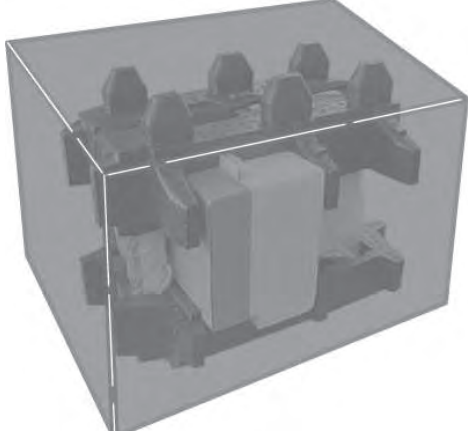
11138042



Side door conductive

11106263

## 19.2 Spare parts

	No.	Designation	Part No.
	1	Side panel	11106841
	2	Top draft shield door	30096752
	3	Front glass panel	11106843
	4	SmartGrid	11106333
	5	Drip tray	11106449
	6	Terminal support	30059773
	7	Foot screw	11106323
	8	Clip	11106511
		Brush	00071650
		Terminal complete with firmware	30087554
		Packaging complete	30096766



	No.	Designation	Part No.
		Export box	30087807

## 20 Appendix

### 20.1 MT-SICS interface commands and functions

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

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

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

For further information please contact your METTLER TOLEDO representative.

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

► [www.mt.com/xse-analytical](http://www.mt.com/xse-analytical)

### 20.2 Procedure for certified balances

#### Preface

Certified balances are subject to the national, legal requirements of "non-automatic balances".

#### Switching on the balance

- **Switching on**
  - Immediately after being switched on, the balance displays 0.000.. g.
  - The balance is always started up with the "Factory setting" unit.
- **Switch-on range**
  - At maximum 20% of the type load, otherwise overload is displayed (OIML R76 4.5.1).
- **Stored value as switch-on zero point**
  - It is not permissible to use a stored value as a switch-on zero point; the MT-SICS M35 command is not available (OIML R76 T.5.2).

#### Display

- **Display of the weight value**
  - The "e" certification value is always shown in the display and is specified at the model designation plate (OIML R76 T.3.2.3 and 7.1.4).
  - If the display increment is lower than the "e" certification value, this is variably displayed for the net, gross and weighed tare. (Graying of the digits or certification brackets) (OIML R76 T.2.5.4 and 3.4.1).
- In accordance with guidelines, the tested display increment (certification value) is never lower than 1 mg (OIML R76 T.3.4.2).
- At balances with  $d = 0.1$  mg, the digits below 1 mg are displayed in gray. These digits in brackets are printed. In accordance with legal metrology requirements, this illustration does not affect the accuracy of the weighing results.
- **Units of measurement**
  - The display and info unit are firmly set to g or mg (depending on the model).
  - The following applies for the "Custom unit":
    - No certification brackets.
    - The following names are blocked, this applies to upper and lower case letters.
      - All official units (g, kg, ct etc.).
      - c, ca, car, cm, crt, cart, kt, gr, gra, gram, grm, k, kilo, to, ton.
      - All names with "o" which can be replaced by a zero (Oz, Ozt etc.).
- **Identification of the weight display**

- Gross, net, tare and other weight values are accordingly marked (OIML R76 4.6.5).
  - Net for net when a tare value has been used.
  - B or G for gross.
  - T for the weighed tare.
  - PT for the specified tare.
  - \* or diff for the difference between the net or gross.

- **Info field**

- The info weight value is handled metrologically in the same way as the weight value in the main display.

**Printout (OIML R76 4.6.11)**

- If a tare value is entered manually (PreTare), the PreTare value is always printed along with the net value (PT 123.45 g) (not for XS models).
- The printed weight values are identified in the same way as the weight value on the display. I.e. N, B or G, T, PT, diff or \*, with differentiation.

Example:

Single-range balance.

N	123.4[5] g
PT	10.00 g → for PreTare
G	133.4[5] g

DR balance with 100.00 g fine range.

N	80.4[0] g
T	22.5[6] g → for weighed tare
G	102.9[ ] g

**Balance functions**

- **Reset to zero**

- The zero range is limited to a maximum of  $\pm 2\%$  of the full load (OIML R76 4.5.1).

- **Tare**

- No negative tare values are permitted.
- Tare immediate (TI) is not permitted, the MT-SICS  $\text{T}\bar{\text{I}}$  command is not available (OIML R76 4.6.4).

- **1/xd**

- **e = d**  
The 1/xd switchover is not permitted (OIML R76 3.1.2).
- **e = 10d**  
This is only permitted in the case of the 1/10d switchover.
- **e = 100d**  
Only the 1/10d and 1/100d switchover are permitted.

## 20.3 Recommended printer settings

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

Printer		Balance	Balance/Printer				
Model	Char Set	Char Set	Baud rate	Bit/Parity	Stop bits	Handshake	End of Line
RS-P25/26/28	Ansi/Win Latin 1	Ansi/Win	9600	8/No	1	Xon/Xoff	<CR><LF> <sup>1)</sup>
P-56RUE P-58RUE	Ansi/Win Latin 1	Ansi/Win	9600	8/No	1	Xon/Xoff	<CR><LF> <sup>1)</sup>
RS-P42	IBM/DOS <sup>1)</sup>	IBM/DOS	1200	8/No	1	None	<CR><LF> <sup>1)</sup>

Russian

Printer		Balance	Balance/Printer				
Model	Char Set	Char Set	Baud rate	Bit/Parity	Stop bits	Handshake	End of Line
RS-P25/26/28	IBM/DOS Cyrillic	Ansi/Win	9600	8/No	1	Xon/Xoff	<CR><LF> <sup>1)</sup>
P-56RUE, P-58RUE	IBM/DOS Cyrillic	Ansi/Win	9600	8/No	1	Xon/Xoff	<CR><LF> <sup>1)</sup>
RS-P42	___ <sup>2)</sup>	___ <sup>2)</sup>	___ <sup>2)</sup>	___ <sup>2)</sup>	___ <sup>2)</sup>	___ <sup>2)</sup>	___ <sup>2)</sup>

Chinese

Printer		Balance	Balance/Printer				
Model	Char Set	Char Set	Baud rate	Bit/Parity	Stop bits	Handshake	End of Line
RS-P25/26/28	Ansi/Win Latin 1	Ansi/Win	9600	8/No	1	Xon/Xoff	<CR><LF> <sup>1)</sup>
P-56RUE, P-58RUE	Ansi/Win Latin 1	Ansi/Win	9600	8/No	1	Xon/Xoff	<CR><LF> <sup>1)</sup>
RS-P42	___ <sup>2)</sup>	___ <sup>2)</sup>	___ <sup>2)</sup>	___ <sup>2)</sup>	___ <sup>2)</sup>	___ <sup>2)</sup>	___ <sup>2)</sup>

Japanese

Printer		Balance	Balance/Printer				
Model	Char Set	Char Set	Baud rate	Bit/Parity	Stop bits	Handshake	End of Line
RS-P25/26/28	Ansi/Win Latin 1	Ansi/Win	9600	8/No	1	Xon/Xoff	<CR><LF> <sup>1)</sup>
P-56RUE, P-58RUE	Ansi/Win Japanese	Ansi/Win	9600	8/No	1	Xon/Xoff	<CR><LF> <sup>1)</sup>
RS-P42	___ <sup>2)</sup>	___ <sup>2)</sup>	___ <sup>2)</sup>	___ <sup>2)</sup>	___ <sup>2)</sup>	___ <sup>2)</sup>	___ <sup>2)</sup>

Katakana

Printer		Balance	Balance/Printer				
Model	Char Set	Char Set	Baud rate	Bit/Parity	Stop bits	Handshake	End of Line
RS-P25/26/28	Ansi/Win Japanese	Ansi/Win	9600	8/No	1	Xon/Xoff	<CR><LF> <sup>1)</sup>
P-56RUE, P-58RUE	Ansi/Win Latin 1	Ansi/Win	9600	8/No	1	Xon/Xoff	<CR><LF> <sup>1)</sup>
RS-P42	Ansi/Win <sup>1)</sup>	Ansi/Win	1200	8/No	1	None	<CR><LF> <sup>1)</sup>

<sup>1)</sup> Printer settings not available.

<sup>2)</sup> Required font for this language not available.

## Glossary

### Actual value

---

Weight from the weight certificate of a test weight.

### Actual weight

---

The actual recorded weight of an external test weight. Irrespective of balance model.

### Adjustment

---

Adjusts the balance sensitivity. For this purpose, at least one reference weight is placed on the weighing pan either manually or motorized. This is weighed and the indicated weight is stored. The sensitivity of the balance is subsequently corrected by the required amount.

### Adjustment weight

---

External test weight for adjustment.

### Calibration

---

Verification of the test weight with the issuance of a certificate.

### Control limit

---

Tolerance of a process with respect to its set value. Exceeding the tolerance is a violation of quality requirements and therefore requires a correction of the process.

### Eccentric load deviation

---

Deviation of weight indications caused by eccentric loads.

### Eccentric load test

---

The purpose of the EC method (eccentric load test) is to ensure that every eccentric load deviation is within the necessary user SOP tolerances. The result corresponds to the highest of the 4 determined eccentric load deviations.

### External adjustment weight

---

External test weight for adjustment.

### External test weight

---

Traceable weight for adjustment or testing.

### External test weight

---

External test weight for testing the adjustment.

### FACT

---

FACT (Fully Automatic Calibration Technology) adjusts the balance based on a preselected temperature criterion fully automatically.

### GWP History

---

History of test sequences carried out.

### GWP Test Manager

---

List of safety functions for XS/XP balances. The balance provides active support with test requests and previously defined guided sequences.

### GWP® Verification

---

Service providing a personalized document with precise suggestions for routine balance testing: • how should the balance be tested and how often • which weights should be used • which tolerances are appropriate

### Internal adjustment weight

---

Built-in weight for adjustment.

### Internal test weight

---

Built-in weight for testing the adjustment.

### Internal weight

---

Built-in weight.

### Method

---

A method describes the type of test to be carried out and defines the main purpose of a test sequence. The weights to be used and corresponding test or method tolerances must be defined as part of the method.

### Method tolerances

---

Method result deviation tolerance limit.

### Minimum weight

---

Minimum weight required for weighing with relative accuracy (MinWeigh).

### ProFACT

---

ProFACT (Professional Fully Automatic Calibration Technology) adjusts the balance based on a preselected temperature criterion fully automatically.

### Repeatability

---

The capability of a balance to display corresponding weights with repeated weighings of the same object in the same manner under the same conditions.

### Repeatability test

---

Verification of the repeatability.

### Result tolerances

---

The same as method tolerance.

### Routine test

---

Test carried out routinely.

### Routine test

---

Performance of different (routine) tests for testing the balance.

**Sensitivity**

---

A change in weight divided by the causal change in load.

**Sensitivity test**

---

Sensitivity verification.

**Task**

---

Tasks define when a test sequence must be carried out and how it is started and, for XP balances, who should carry out the test sequence. Before a task can be defined, the test sequence must already be defined.

**Test**

---

Collective term for testing a single function or an entire device.

**Test history**

---

Record of test results saved in a special fail-safe memory. The options in the test history allow the selection of results for documentation or printing.

**Test sequence**

---

Describes the type of test (method) and the weight with which this test must be carried out. It also defines the balance behavior if the test is not passed.

**Test tolerances**

---

Weight tolerance deviation limit for testing.

**Test weight**

---

An external weight used as a reference weight.

**Testing the adjustment**

---

According to GWP Test Manager nomenclature, corresponds to a sensitivity test.

**Warning limit**

---

An upper or lower limit, which if exceeded or not reached, makes more stringent process monitoring necessary.

**Weight tolerances**

---

a) Tolerances of certified test weights or b) Tolerances relating to a weighed weight (e.g. tare weight).

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# 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](http://www.mt.com/GWP)

[www.mt.com/xse-analytical](http://www.mt.com/xse-analytical)

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