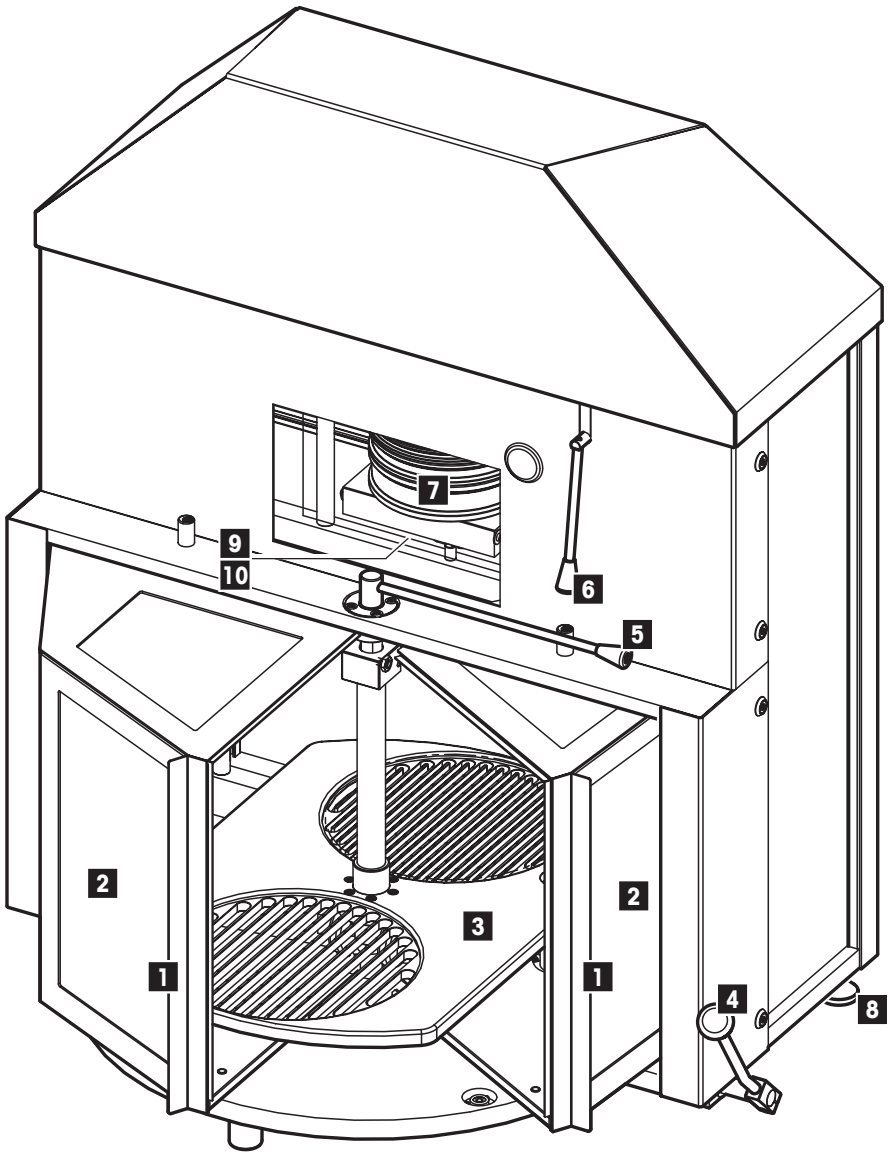
Operating Instructions

METTLER TOLEDO

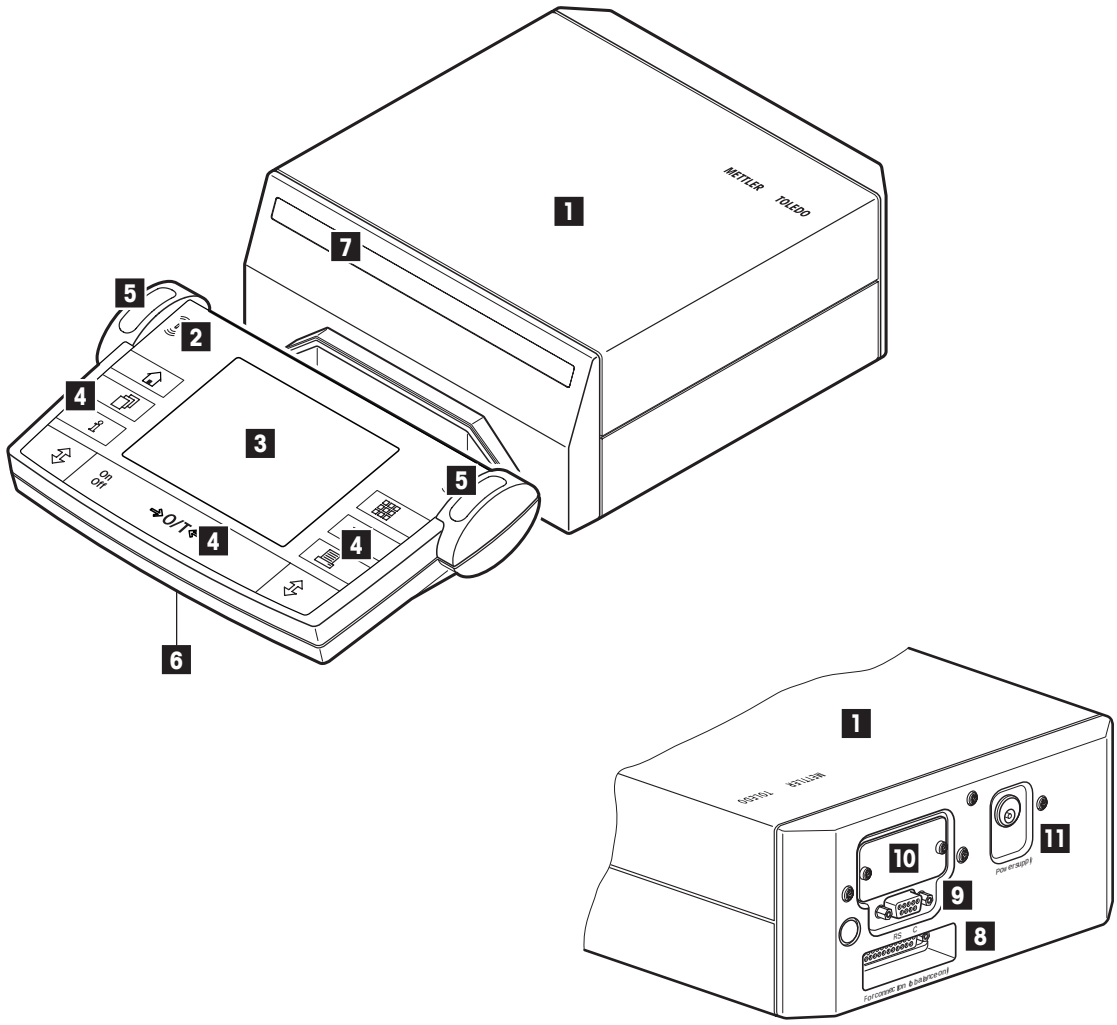
METTLER TOLEDO
AX12004 Comparator Balance

Overview of your AX12004 Comparator Balance



1 Door handle
2 Glass draft shield
3 Turntable
4 Operating lever to raise/lower the turntable (2 positions)
5 Operating lever to rotate the turntable
6 Operating lever to open the dial weights window
7 Dial weights
8 Leveling screw
9 Screw to place or lower the adjustment weight (not visible)
10 Adjustment weight (not visible)

Overview of your control unit



1 Control unit
2 Terminal (for details see Section 3)
3 Display
4 Operating keys
5 SmartSens sensors
6 Cover (cable compartment on underside of terminal)
7 Type name
8 Connecting socket for weighing cell
9 Connecting socket for interface RS232C
10 Slot for second interface (optional)
11 Socket for AC adapter balance

Contents

1 Getting to know your comparator balance

In this Section you will be given basic information about your comparator balance. Please read right through this Section carefully even if you already have experience with METTLER TOLEDO balances; please pay special attention to the safety warnings!

1.1 Introduction

Thank you for choosing a METTLER TOLEDO comparator balance.

To ensure that we can offer you personal service and provide you with the most efficient support, this product is accorded special treatment: Not only complete installation of the balance, but also the instruction are handled by a specialist from your country who has been specially trained on the appropriate balance. Adjustment work may be performed only by this specialist.

However, a top quality balance and optimal installation are not enough. To obtain the best possible measurement results, the environment of the balance must be given careful attention. We recommend a basement room which is as free from vibrations as possible and where the temperature and air humidity remain constant.

These Operating Instructions apply only to the AX12004 comparator balances. Please read these Operating Instructions carefully right through so that you can derive maximum benefit from all the possibilities your comparator balance offers.

You will find instructions for using the "WeighCom" application for mass comparison, which is delivered with the comparator balance, in the enclosed "WeighCom Application" Operating instructions.

The comparator balances combine a large number of weighing and adjustment possibilities with exceptionally convenient operation. With these balances software updates can be downloaded from the Internet and loaded into the balance.

1.2 Introducing the AX12004 comparator balances

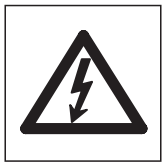
The following features are common to the AX12004 comparator balance:

- Built-in applications for mass comparison ("WeighCom") as well as for normal weighing. Further applications can be downloaded from the Internet onto your computer as required, and from there into the comparator balance.
- Integral RS232C interface.
- Touch-sensitive graphics terminal ("TouchScreen") for easy, convenient operation.
- Two programmable sensors for hands-off operation ("SmartSens") to speed up frequently recurring tasks.

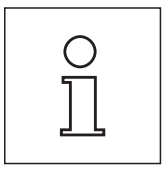
1.3 Conventions and symbols used in these operating instructions

The following conventions apply throughout these operating instructions:

- The illustrations in these operating instructions are based on the AX12004 comparator balance.
- Key designations are indicated by double angular parentheses (e.g. «**On/Off**» or «🗍»).



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



This symbol indicates additional information and notes which make using your comparator balance easier, and help you to use it correctly and efficiently.

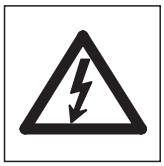
1.4 Safety first

To ensure safe and trouble-free operation of your comparator balance, please observe the following instructions:

Read right through these operating instructions carefully, even if you already have experience with METTLER TOLEDO balances. Always operate and use your comparator balance only in accordance with the instructions contained in this manual.

The instructions for setting up your new comparator balance must be strictly observed.

The comparator balance may only be used in enclosed interior rooms. It is not permitted to use the balance in hazardous environments.



Use only the AC adapters delivered with your balance, and check that the voltage printed on it is the same as your local power supply voltage. Only plug the adapters into a socket which is grounded.

Do not use sharply pointed objects to operate the keyboard of your comparator balance!

Although comparator balance is very ruggedly constructed, it is nevertheless a precision instrument. Treat it with corresponding care, and it will reward you with many years of trouble-free service.

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

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

Disposal: Defective instruments must be disposed of in accordance with applicable customer and national regulations.

2 Setting up the comparator balance

2.1 Unpacking and checking the delivered items

When you receive the comparator balance, please check that all parts have been delivered.
Open the packaging and carefully remove all the parts. The standard delivery comprises the following items:

- Balance with weight handler
- Control unit with terminal installed
- Weighing pan and draft cover
- Switching weights (5 kg/3 kg/2 kg/1 kg/1 kg) in wooden case
- AC adapter with country-specific power cable
- Connection cable for connecting the weighing cell to the control unit
- Cleaning brush
- Production certificate
- Operating instructions (this document)
- Operating instructions for application "WeighCom"
- Instructions for the "METTLER TOLEDO Standard Interface Command Set" (MT-SICS), in English

Please keep all parts of the packaging. This packaging provides the best guarantee of protection when transporting your balance.

2.2 Preparatory tasks

Use the cable delivered with the AX12004 comparator balance to connect the balance to the control unit and the weighing cell. The screws of the cable plug have drilled holes and can be sealed to prevent the control unit and weighing cell from becoming separated.

2.3 Selecting a location

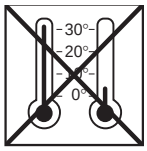
Your comparator balance is a precision instrument. Its accuracy and reliability depend on its being placed in an optimal location:

The surface on which the comparator balance stands should

- Transmit as few vibrations as possible,
- Not bend during the work,
- Be antimagnetic (no steel top),
- Be protected against static charging (not plastic or glass),
- Preferably be in a corner of the workroom, because the corners are the most rigid points in a building with the least amount of vibration.
- Be reserved as the work place for the comparator balance.

The workroom should

- Be as insensitive as possible to shocks and vibrations,
- Have only one door (drafts),
- Have as few windows as possible (hazard due to direct sunlight),
- Be as free from drafts as possible (important with air conditioning systems).

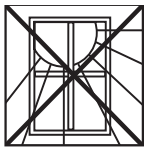


Temperature

- The room temperature should be as constant as possible to avoid temperature drift of the weighing result,
- Avoid weighing in the vicinity of radiators (temperature drifts, air currents).

Atmospheric humidity

- The relative humidity should be between 40 and 70 % (max. fluctuations: ±2 %).



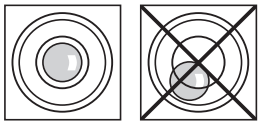
Light

- Avoid direct sunlight (e.g. wall without window).
- Light fixtures should be at a sufficient distance from the balance to avoid disturbances due to thermal radiation, particularly in the case of light bulbs. Fluorescent lamps are less critical.
- Always leave the light switched on.

Air

Avoid weighing,

- In the vicinity of air conditioning units or devices with fans (e.g. computers),
- Next to a door.



Leveling

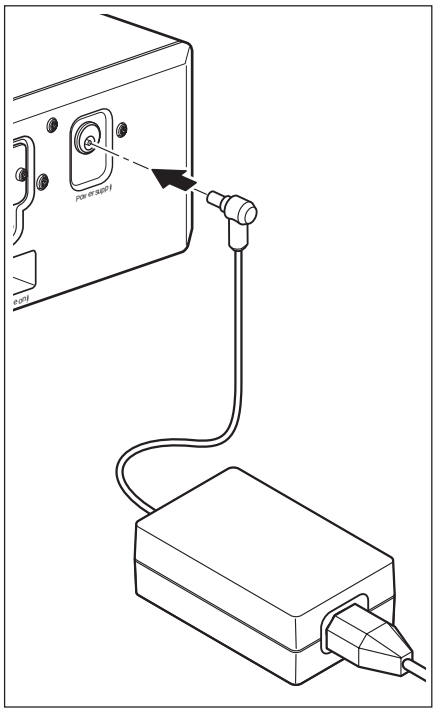
The comparator balance is adjusted to be level when it is delivered. The air bubble must always be in the inner circle of the level indicator.

If ever the air bubble is not in the inner circle of the level indicator, please contact the METTLER TOLEDO distributor responsible for the comparator balance.

2.4 Location change

Before any location change, please contact the METTLER TOLEDO organization or our distributor.

2.5 Power supply



Your balance is delivered complete with an AC adapter and a country-specific power supply cable. The AC adapter is suitable for all power supply voltages in the range:

100 – 250VAC, -10/+15%, 50 – 60Hz.

Check that the local power supply voltage is in this range. **If it is not, DO NOT connect the balance or the AC adapter to the power supply**, and contact your METTLER TOLEDO dealer.

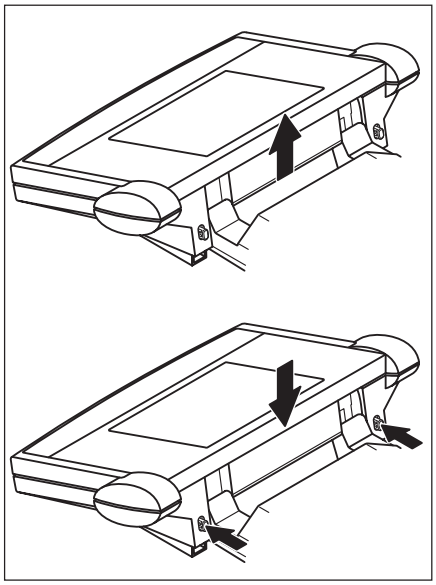
Plug the AC adapter into the socket in the back of your control unit and into the power supply (not illustrated).

Important: Guide the cables so that they cannot become damaged and will not be in your way during your daily work! Take care that the AC adapter cannot come into contact with liquids!

After the balance has been connected to the power supply, it carries out a self test and is then ready for operation.

2.6 Adjusting the terminal reading angle

So that you can work without fatigue, the reading angle of the terminal can be adjusted.



Adjusting the reading angle

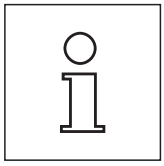
If you wish to have a steeper reading angle, grasp the back of the terminal and pull it slowly upward until it clicks into the desired position. Three different setting positions are provided.

If you wish to have a flatter reading angle, press the two stop buttons on the back of the terminal and press the terminal downward. Release the two stop buttons and the terminal will then click into the desired position.

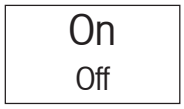
3 Your first weighing

This Section provides a first introduction to operating your comparator balance. To perform simple weighings you need only a few keys which we will introduce you to in this Section.

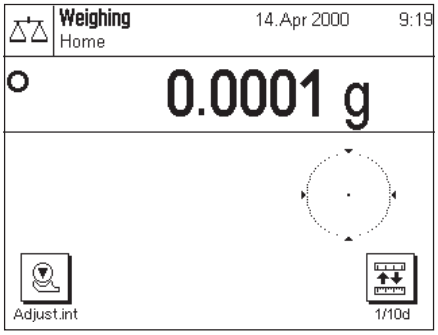
3.1 Switching the comparator balance on and off



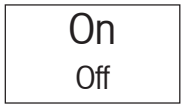
Note: Before the balance can be switched on and off from the terminal, the AC adapter must be connected to the power supply.



To switch the balance on: Briefly touch the «**On/Off**» key.



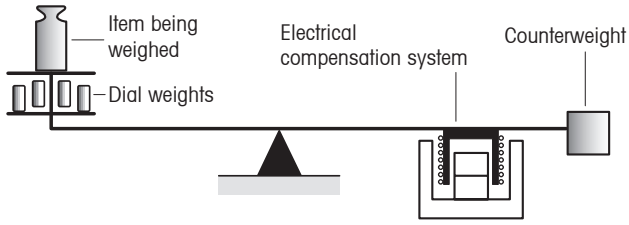
When the balance is **switched on for the first time**, the display shown at left appears.



To switch the balance off: Press the «**On/Off**» key until "OFF" appears in the display. The display then goes off, and the balance is switched off.

3.2 Setting the weight range

Schematic representation of substitution principle



To attain the exceptionally high resolutions (up to 100 million points), the substitution principle is employed.
A constant counterweight and dial weights are used to ensure that the weighing system is always under the same load.

AX12004	**Setting of the dial weights**				
Weight range	**5 kg**	**3 kg**	**2 kg**	**1 kg**	**1 kg**
0 g - 111 g	Added	Added	Added	Added	Added
1000 g - 1111 g	Added	Added	Added	Added	Not added
2000 g - 2111 g	Added	Added	Added	Not added	Not added
3000 g - 3111 g	Added	Added	Not added	Added	Not added
4000 g - 4111 g	Added	Added	Not added	Not added	Not added
5000 g - 5111 g	Added	Not added	Added	Not added	Not added
6000 g - 6111 g	Added	Not added	Not added	Added	Not added
7000 g - 7111 g	Added	Not added	Not added	Not added	Not added
8000 g - 8111 g	Not added	Added	Not added	Added	Not added
9000 g - 9111 g	Not added	Added	Not added	Not added	Not added
10000 g - 10111 g	Not added	Not added	Added	Not added	Not added
11000 g - 11111 g	Not added	Not added	Not added	Added	Not added
12000 g - 12111 g	Not added	Not added	Not added	Not added	Not added

3.2.1 Operating the dial weights

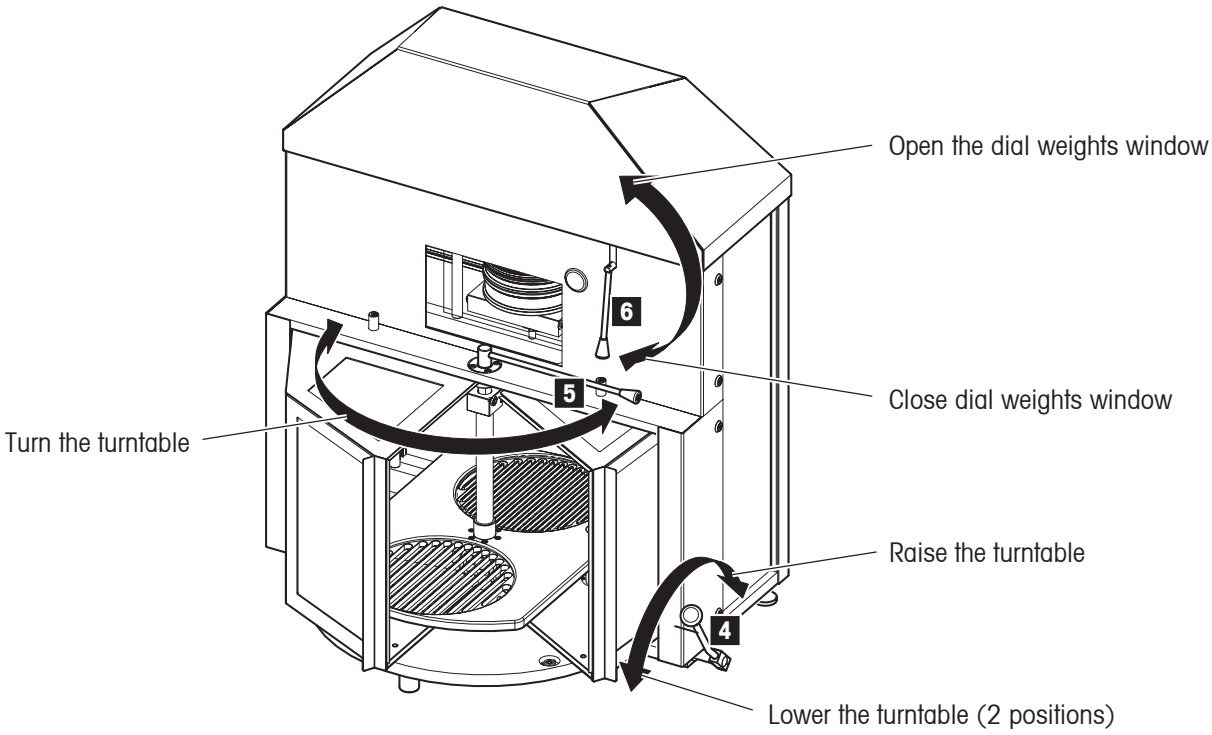
The AX12004 has an electrical weighing range of 111 g. This is adapted to the respective weighing range by adding the corresponding dial weights. The dial weights must be placed on the hanger by hand. To do this, proceed as follows:

– Turn the lever (6) upward. The window opens and any dial weights which have already been added are lifted off the hanger.
– Place the necessary dial weights (see table above) on the hanger.

Caution: The hanger for the dial weights and the weighing pan are mechanically interconnected and must never bear a joint load of more than 12 kg (dial weights + weight on the weighing pan = 12 kg, e.g. 2 kg + 10 kg).

– Turn the lever (6) downward. The window closes and the dial weights are lowered onto the hanger.

3.3 Operating the turntable of the AX12004

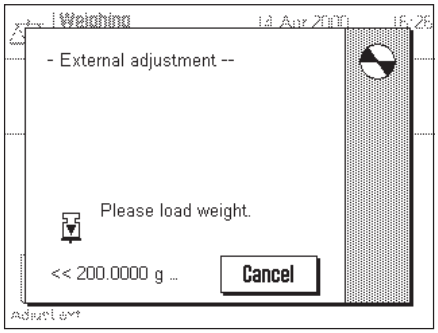


3.4 Adjusting the electrical range

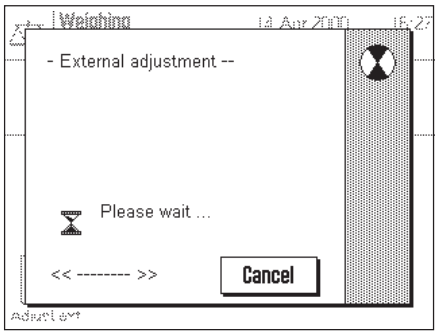
Before you can start the adjustment:

– The balance must be put into operation and acclimatized for at least 12 hours.
– Dial weights of 5 kg, 3 kg, 2 kg, and 1x 1 kg must be placed on the hanger.
– A 1 kg weight must be placed on the turntable and the weighing pan must be lowered.

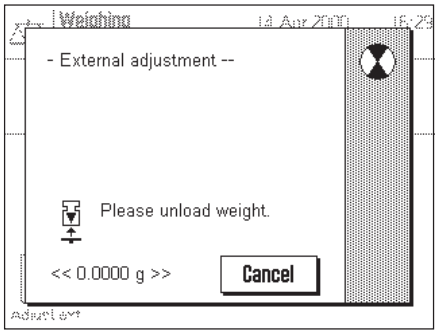
By touching this function key, you start adjustment (calibration) of the balance using an external calibration weight.



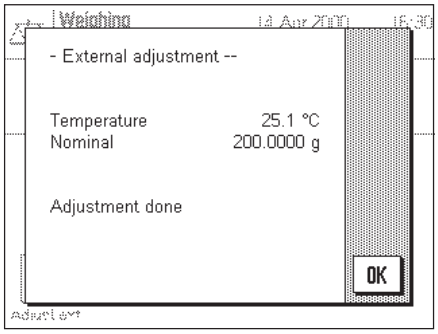
You are prompted to load the adjustment weight (10). To load the weight, turn the screw (9) clockwise until the adjustment weight (10) is on the pan (see photo below).



While adjustment is taking place, the window shown at left is opened. You can terminate the adjustment process at any time by touching the "Cancel" key.



When the adjustment process is complete, you will be prompted to unload the adjustment weight (10). To unload the weight, turn the screw (9) counterclockwise until the adjustment weight (10) is unloaded (see photo below).



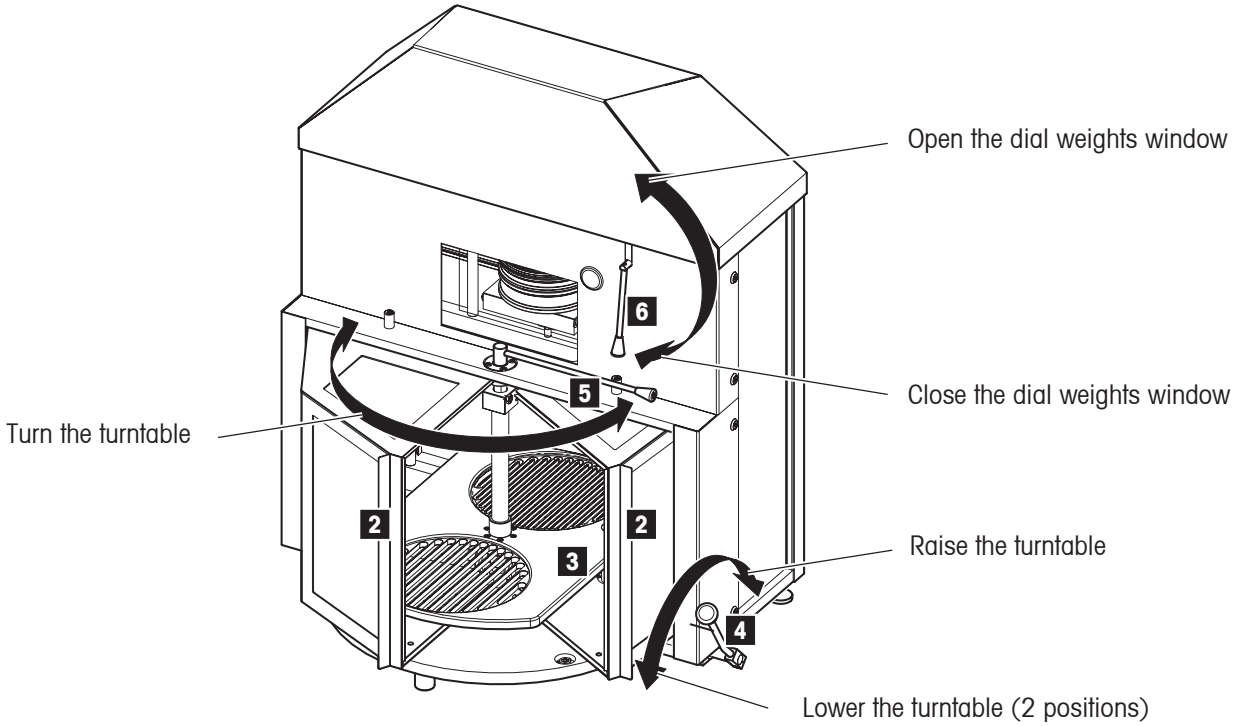
The balance confirms successful completion of the adjustment. Touch "OK" to return to the application.

If a printer is connected to the balance, a record of the adjustment is automatically printed according to the system settings you made for adjustment and test.

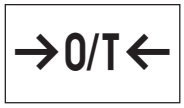
If an error occurs during adjustment, a corresponding message appears.

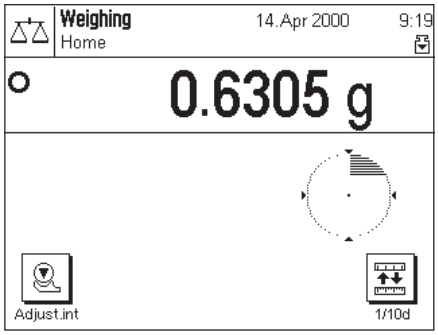
3.5 Performing a simple comparative weighing

Comparative weighing is as simple as this:



- Turn the lever (6) up to open the dial weight window and add dial weights according to the desired weight range (see Section 3.2). Then turn the lever (6) down to close the window again.
- Open the draft shield (2) by hand.
- Place the reference weight on the surface of the turntable (3).
  Important! Place the reference weight as centrally as possible on the surface of the turntable. This saves unnecessary centering operations.
- Turn the turntable through 180° with the lever (5). The reference weight is now over the weighing pan.
- Place the test weight(s) on the (free) surface of the turntable (3).
  Important! Place the test weight(s) as centrally as possible on the surface of the turntable. This saves unnecessary centering operations.
- Close the draft shield (2) by hand.
- **Center the reference weight.** Turn the lever (4) to lower the reference weight onto the weighing pan and wait until the weighing pan stops oscillating. Then turn the lever (4) to raise the weight again. Repeat this operation until the weighing pan no longer oscillates when the weight is placed on it, and the weight no longer changes its position. With good prepositioning this should be possible in about 3 operations.
- Turn the lever (4) to raise the turntable and then turn the lever (5) to turn the turntable through 180°. The test weight(s) is/are now over the weighing pan.





– **Center the test weight(s).** Turn the lever (4) to lower the test weight(s) onto the weighing pan and wait until the weighing pan stops oscillating. Then turn the lever (4) to raise the weight again. Repeat this operation until the weighing pan no longer oscillates when the weight is lowered onto it, and the weight no longer changes its position. With good prepositioning this should be possible in about 3 operations.
– Turn the lever (4) to raise the turntable and then turn the lever (5) to turn it through 180°. The reference weight is now over the weighing pan again.
– Turn the lever (4) to lower the weight onto the weighing pan. Then press the «**→0/T←**» key.
– As soon as the stability detector symbol (the small ring to the left of the weight display) goes out, the display is stable and you can read the weighing result. In the illustration at left, the stability detector symbol is still visible, and the weighing result is therefore not yet stable.
– Turn the lever (4) to raise the reference weight from the weighing pan. Then turn the lever (5) to turn the turntable through 180° and turn the lever (4) to lower the test weight(s) onto the weighing pan.
– As soon as the stability detector symbol (the small ring to the left of the weight display) goes out, the display is stable and you can read the weighing result. In the illustration at the side, the stability detector symbol is still visible, and the weighing result is therefore not yet stable.
– Test weight = reference weight + display value (conventional weighing values).

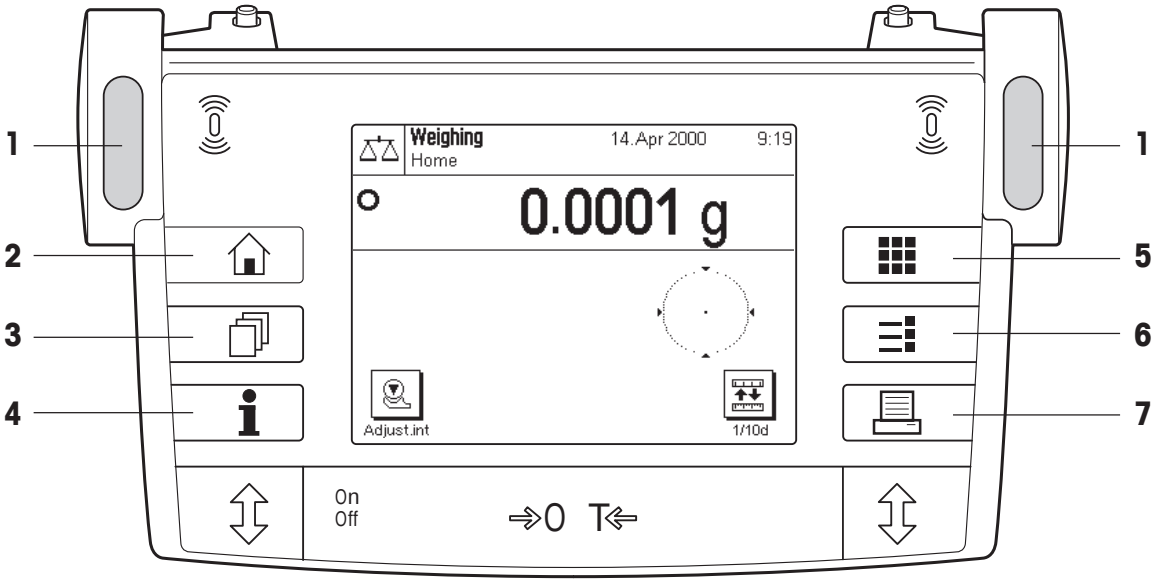
Note: If you are working with the "WeighCom" application, you will be guided through the mass comparison procedure (see separate operating instructions for the "WeighCom" application).

4 Basic operating concepts for the terminal and software

This Section describes the operating and display elements on your terminal and explains the concept for operating the software on your balance.

4.1 Overview of the terminal

In this Section, we will first describe the operating elements of the terminal, which comprise the "SmartSens" and the individual keys. In the next Section, you will find detailed information about the display.

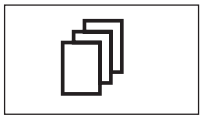


1 SmartSens

Each of these two hands-off sensors can be given a specific function. To trigger the respective function, move your hand over the corresponding sensor at a maximum distance of approximately 5 cm. The sensor beeps to confirm that it has recognized the command. Before leaving the factory, the two sensors are programmed "Off".

2 «⌂» key

You can use this key at any time to reset the current application to its starting status - in other words, to the status it has when you first call it up ("Home" profile).

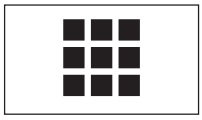


3 «🗐» key

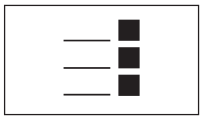
This key is used to call up the desired user profile. A user profile can be used to save specific settings. This makes it possible to adapt the balance optimally to a particular user or weighing task.

4 «i» key

With this key you can call up a context-sensitive help function at any point. The help text gives a brief explanation of the possibilities available to you at this point (e.g. in a menu). The help window appears over the top of the normal display.



5 «⊞» key
Before leaving the factory, your balance has been programmed with 2 standard applications (for normal weighing and comparative weighing). Use this key to select the application you wish to work with.



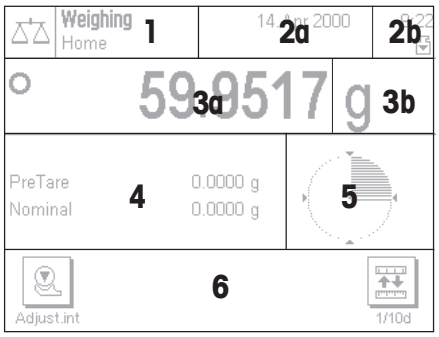
6 «☰» key
Each application has a large number of settings which can be used to adapt it optimally to the specific task. Use this key to call up the menus to configure the currently active application.

7 «🖶» key
When this key is pressed, the weighing result is transmitted via the interface to, for example, a printer. However, other devices, such as a PC, can also be connected. There are no restrictions on the data that can be transmitted.

The keys in the dark field at the bottom edge of the terminal are for carrying out the weighings.

4.2 The display

The illuminated graphics display of your terminal is a "TouchScreen", or in other words, a screen which is sensitive to touch. You can use it not only to read data and settings, but by touching the display surface you can also make settings and carry out functions.



The display is divided into a number of zones:

1 In the upper left-hand corner, the currently active application and the current user profile are displayed. By touching this zone, you can call up a menu in which you can select the desired application (you can also call up this menu with the «⊞» key).

2 In the top right-hand section, the date (**2a**) and time (**2b**) are displayed. By touching these zones, you can change the date and time.

3 In this zone the current weighing result is displayed. If you touch this zone (**3a**), a small menu appears in which you can select the font for displaying the weighing result. If you touch the weighing unit (**3b**), a window opens in which you can select the desired weighing unit.

4 This zone displays additional information (information fields), which make your work easier. Touching this zone opens a menu in which you can specify which information fields and function keys should be displayed (the same menu is also available under the «☰» key).

5 This zone displays the "SmartTrac", which is a graphical weighing-in aid that shows you at a glance how much of the weighing range has already been used and how much is still available. By touching this zone, you can choose between various different display styles for "SmartTrac", turn it off completely, or include a small **stopwatch** in the display.

6 This zone is reserved for the function keys, which give you direct access to frequently used functions and settings. If more than 5 function keys are activated, you can use the arrow keys to switch between them.

4.3 The software on your balance

The software controls all the functions of your balance. It also makes it possible to adapt the balance to your specific working environment. Please read the following Sections carefully; they form the basis for operating your balance.

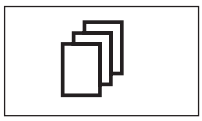
The software comprises the following levels:

- User profiles
- Applications
- Settings

User profiles

The purpose of user profiles is to adapt the balance and its applications to your personal way of working, or to specific weighing tasks. A user profile is a collection of settings which you can define yourself and which are available to you at a keystroke.

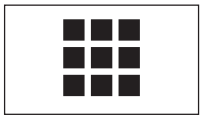
When the balance is switched on, it automatically loads the "Home" profile. The "Home" profile is a starting point to which you can return at any time by touching the «⌂» key. Before leaving the factory it has been programmed with standard settings which all users can work with.



As well as the "Home" profile, 8 other user profiles are available in which you can change the settings at will. (Two of the user profiles have been programmed at the factory for very fast and very accurate weighings and have been given the corresponding names "Fast" and "Accurate"). You can use the «🗍» key to call up the desired user profile.

Note: The "Home" profile can be changed at will in the same way as the 8 other profiles. However, we recommend you not to change the settings in the "Home" profile that were made at the factory, but to change one of the other 8 user profiles instead.

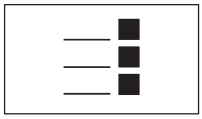
Applications



Applications are software modules for carrying out specific weighing tasks. 2 applications are loaded onto the balance before it leaves the factory (for normal weighing and comparative weighing "WeighCom"). When the balance is switched on, it starts the application for normal weighing. The other applications can be accessed with the «▦» key. You can also download additional applications from the Internet if required (see Section 6).

Settings

The software differentiates between two sorts of settings:



- **Application-dependent settings:** The range of available settings differs depending on the application selected. The multi-page menu for application-dependent settings can be accessed with the «⋮» key. You will find information about the individual settings that are possible in the chapters relating to the respective applications.

- **System settings** which are not application-dependent (e.g. the dialog language setting): The range of available settings of this type is the same in all applications. To call up the system settings touch the «⋮» or «▦» key and then the "System" button. You will find information about the individual settings that are possible in Section 5.

Both types of setting are assigned to the currently active user profile and stored with it.

The diagram below shows the interrelationships between the individual levels of the software and gives a first overview of the typical procedure for operating it.

Work step

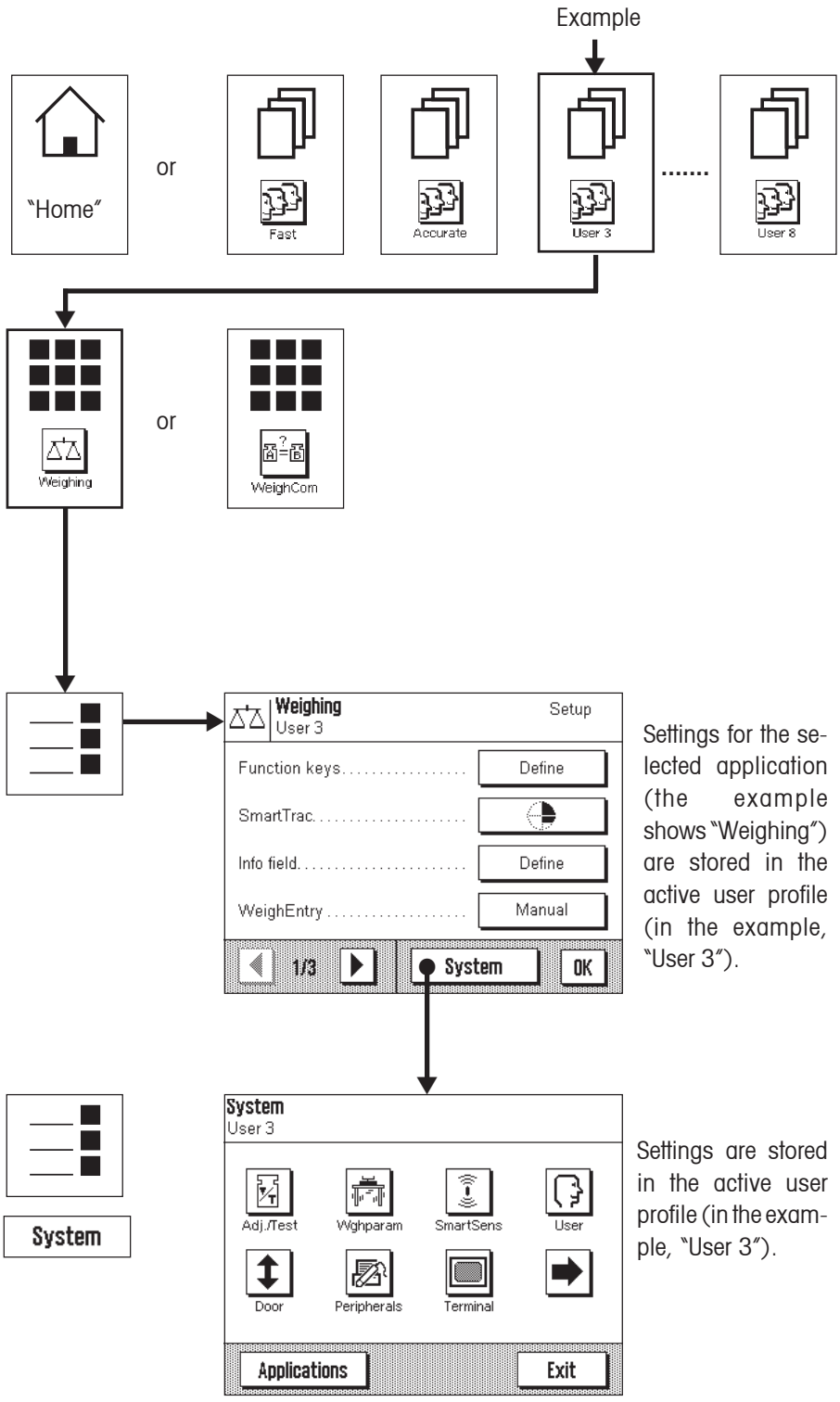
1. Select user profile

2. Select application

3. Work

4. If desired:
Change the settings for the selected application (application-dependent settings)

5. If desired:
Change the system settings



Settings for the selected application (the example shows "Weighing") are stored in the active user profile (in the example, "User 3").

Settings are stored in the active user profile (in the example, "User 3").

5 System settings

In this Section you will learn how you can adapt the weighing system to your requirements. There are **system settings** for each user profile, as well as for the "Home" profile. As long as a particular user profile is active, its system settings apply irrespective of which application is being used. **Note:** You will learn the settings for the different applications when the applications are described.

5.1 Calling up the system settings

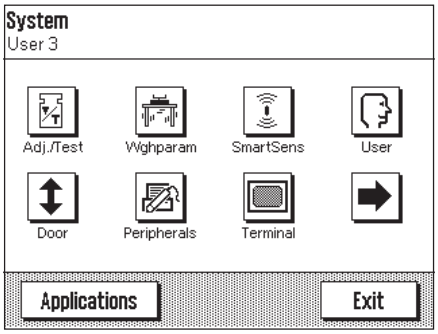
If you do not want your settings to be used as the "Home" profile, use the «» key to select one of the 8 user profiles.

System

You can call up the menu for the system setting either from the settings menu (key «») or from the application menu (key «»). In both menus, the "System" button can be used for this purpose.

5.2 Overview of the system settings

The system settings are represented by symbols. By clicking on the symbols you can call up the individual settings and change them. The various possible settings are described in the Sections following below.



The following system settings are available:

"Adjust/Test": Settings for the adjustment and for the test functions for checking the adjustment (Section 3.4).

"Weighing Parameters": Settings for adapting the balance to specific weighing tasks (Section 5.3).

"SmartSens": Programs the two "SmartSens" sensors (Section 5.4).

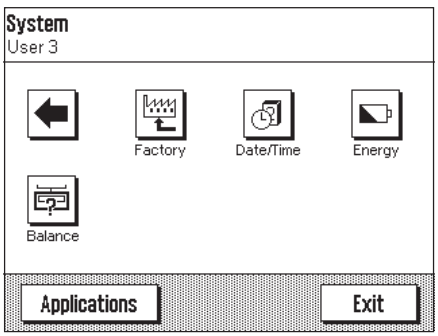
"User": Assigns a name to the user profile, selects the dialog language, and specifies a password (Section 5.5).

"Door": Has no function on the AX12004 comparator balance.

"Peripherals": Configures the interface for various peripheral devices (Section 5.6).

"Terminal": Settings for the display (brightness, etc.) and for the behavior of the terminal (Section 5.7).

By touching the button with the arrow symbol, you change over to the second menu page.



"Factory": For resetting to the factory settings (Section 5.8).

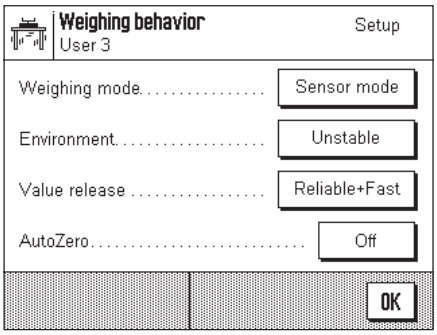
"Date/Time": To input the date and time, and select the desired display format (Section 5.9).

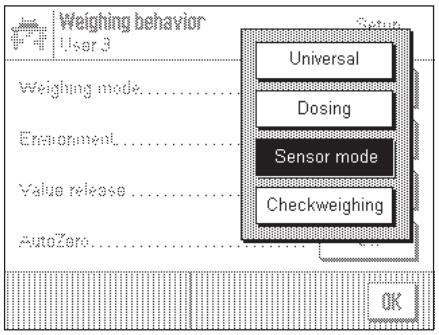
"Energy": Settings for standby mode and to display the next date for replacing the battery (Section 5.10).

"Balance": For specifying the balance identification and inquiring information about the balance (Section 5.11).

By touching the button with the arrow symbol, you can return to the first menu page. When you have made all the necessary settings, touch the "Exit" button to return to the application. We will explain the various system settings, and how to use the application, in the sections that follow below.

5.3 Specifiying the weighing parameters



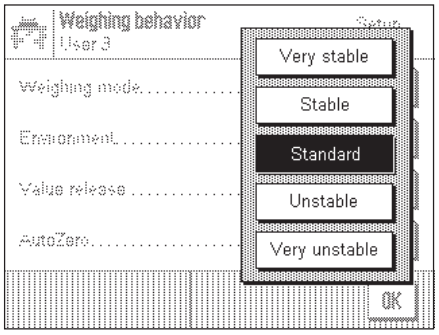


"Weighing mode"

You can use this setting to match the balance to the type of weighing. Select "Sensor mode" weighing mode. This setting delivers a slightly filtered weighing signal and is suitable for the used applications.

Note: "Universal", "Dosing" and "Checkweighing" have no function on the AX12004 comparator balance.

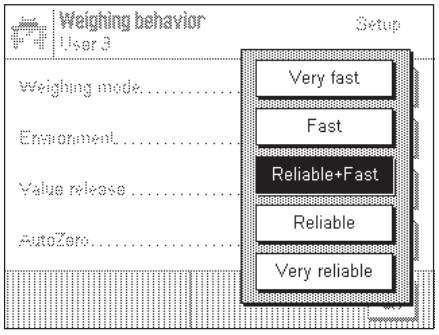
Factory setting: "Sensor mode"



"Environment"

You can use this setting to adapt the balance optimally to the environmental conditions at the workplace. If you work in surroundings which are practically free from temperature fluctuations, drafts, and vibrations, select "Very stable". On the other hand, if you work in surroundings where the conditions are constantly changing, select "Very unstable". In between these two settings there is a choice of three further settings.

Factory setting: "Standard"

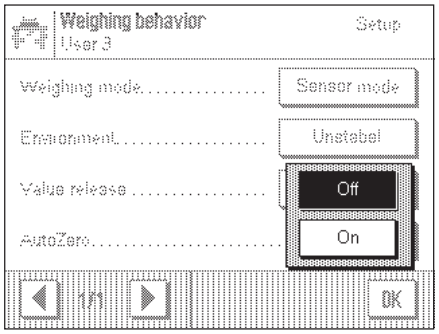


"Measurement release"

You can use this setting to specify how rapidly the balance considers the measurement value to be stable and releases it. The "Very fast" setting is recommended if you require rapid results and their repeatability is of secondary importance. The "Very reliable" setting gives very good repeatability of the measurement results, but lengthens the stabilization time. In between these two settings there is a choice of three further settings.

Note: If you choose a setting other than "Reliable + fast", a window appears with additional information about the selected setting.

Factory setting: "Reliable + fast"

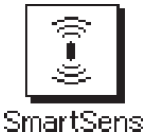


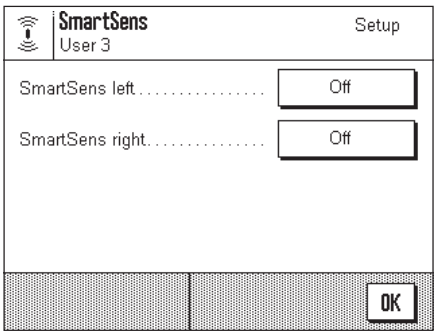
"**AutoZero**"

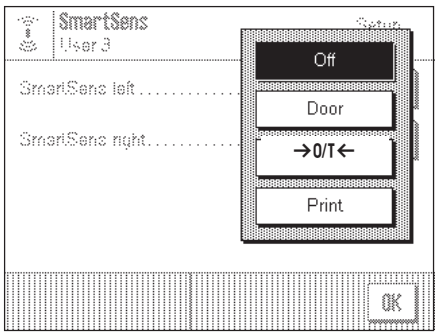
This switches auto-zeroing ("AutoZero") on and off. If auto-zeroing is switched on, the balance continually corrects any zero point drift that may occur.

Factory setting: "Off" (= switched off)

5.4 "SmartSens" settings







"**SmartSens left**", "**SmartSens right**"

You can use this setting to define the function of the left-hand and right-hand "SmartSens" sensors.

"**Off**": SmartSens is inactivated

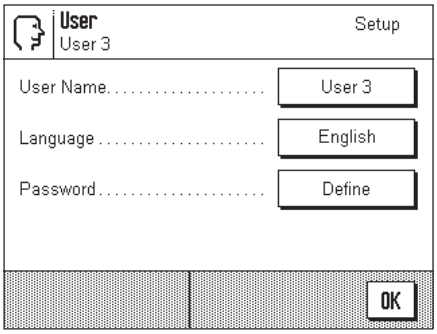
"**Door**": Has no function on the AX12004 comparator balance.

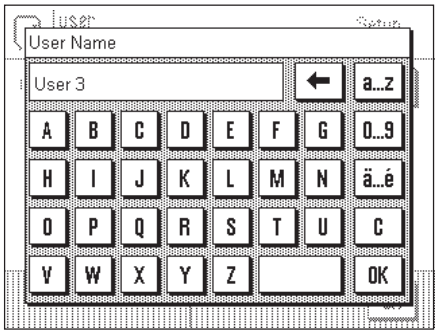
"**→0/T←**": Resets the display to zero

"**Print**": Prints out (same function as the «🖶» key).

Factory setting: "Off" (= switched off)

5.5 Renaming the user profile



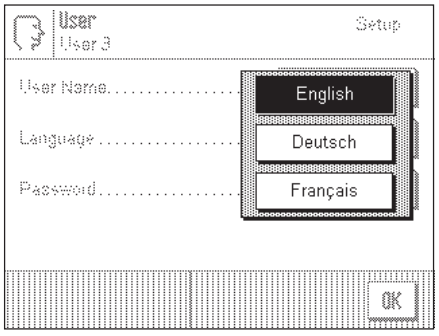


"User Name"

Here you can change the name of the current user profile. Both large and small letters, as well as figures, can be used for the name. The maximum length for the name is 20 characters. Use a name for the user profile that allows unambiguous identification.

Factory setting: "Fast", "Reliable", "User X" ("X" = 3 – 8)

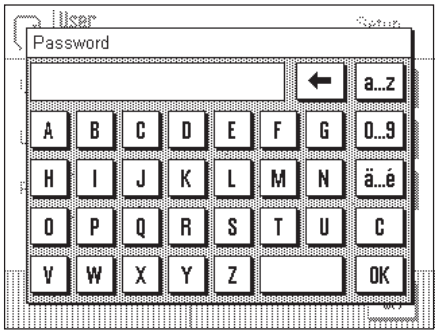
Note: At the factory, the first two user profiles have already been given settings for very fast and very reliable weighing, respectively. So that this is immediately clear, these two profiles have been given the names "Fast" and "reliable".



"Language"

Here you can select the language in which you wish the balance to communicate.

Factory setting: Depends on the language package which has been installed. The factory setting is usually the language of the destination country.



"Password"

Here you can specify the password for the current user profile. The password protects the following areas of the current user profile:

- Access to the system settings
- Calling up the user profile.

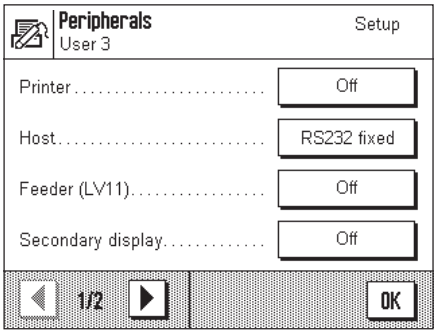
If one of these areas is called up, the corresponding password must first be entered. **Note:** If a password is defined for the "Home" profile, it only protects access to the system settings.

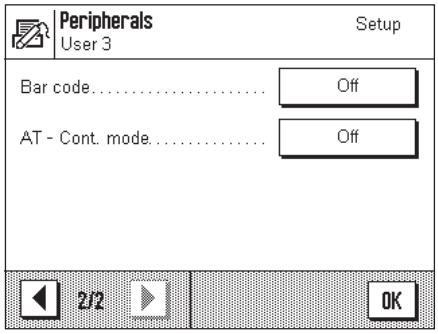
The password consists of a sequence of up to 18 characters. You can use the "Clear" button to delete the current password and thereby deactivate password protection. If no password is specified, "no password" appears in the display.

Warning: Make a note of your password! If you forget it, contact your METTLER TOLEDO dealer.

Factory setting: No password

5.6 Selecting peripheral devices



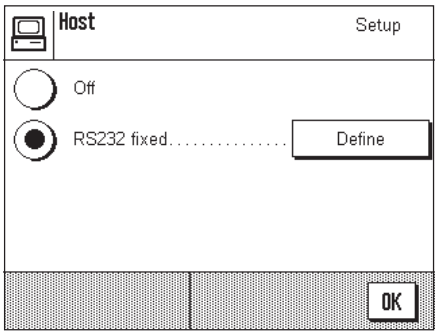


Various peripheral devices can be connected to your balance. In this menu you can specify which device should be connected. **Important: In contrast to the other system settings, these settings apply to all user profiles.**

The following settings can be selected:

- "**Printer**": Printer
- "**Host**": External computer (bidirectional commounication: the balance can send data to the PC and receive commands or data from it)
- "**Feeder (LV11)**": METTLER TOLEDO LV11 automatic feeder.
- "**Secondary display**": Secondary (auxiliary) display
- "**Bar code**": Bar code reader
- "**AT cont. mode**": Peripheral devices which use "AT Continuous Mode".

The same settings are available for each of these devices. "Off" means that no device of this type should be connected to the RS232C interface. "RS232 fixed" activates the interface for the selected device. **Important:** You can only activate one single device ("RS232 fixed"), all other devices must be deactivated ("Off"). If you activate another device, the device that was formerly selected is automatically deactivated.



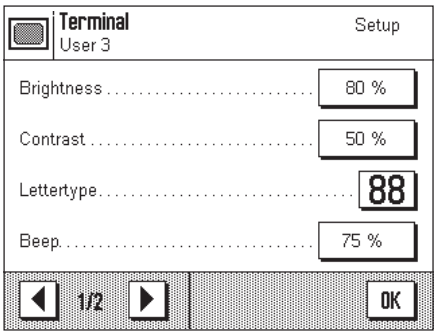
If you have activated a device, you can use the "Define" button to set the interface parameters for communication with this device (baud rate, parity, handshake, end-of-line characters, and font). The parameters are preset for the correspondingly optimal METTLER TOLEDO devices (for accessories and options, see Section 8).

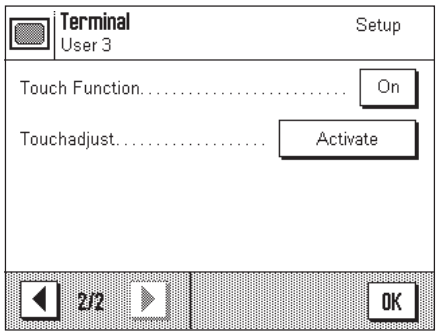
Note: No interface parameters can be defined for the "**Secondary display**" setting: they are preset to fixed values.

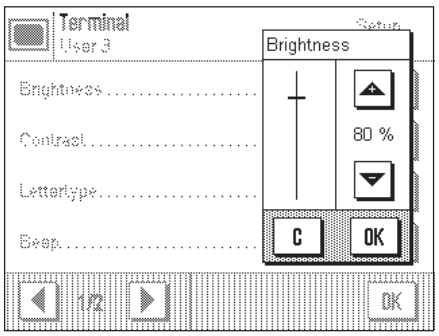
Factory setting: "Host"
(9600 baud, 8 data bits/no parity, XON/XOFF protocol, end-of-line characters <CR><LF> ANSI/WINDOWS-font)

Important: To enable correct printing of special characters (e.g. "°C") on METTLER TOLEDO printers, the **balance and printer** must both be set to **8 data bits**.

5.7 Terminal settings







"Brightness"

Here you can set the brightness of the display. Touch the arrow buttons to adjust the brightness in the range 0 % to 100 % as required. Each time one of the two arrow buttons is touched, the brightness is instantly adjusted so that the change can be seen immediately.

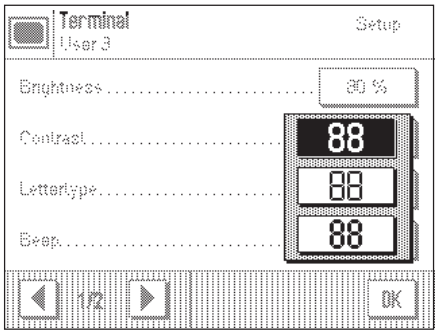
Factory setting: 80 %

Note: If the balance is not used for 15 minutes, the brightness of the display is automatically reduced. This increases the life of the backlighting. The next time either a key is touched or there is a change in weight, the brightness is changed back to the value selected here.

"Contrast"

Sets the contrast of the display in the range 0 % to 100 %. Adjustment is done in the same way as for brightness.

Factory setting: 50 %



"Font"

Selects the font for displaying the weighing result. There is a choice of 3 fonts.

Note: You can also make this adjustment directly in weighing mode by touching the weighing result. A window appears in which you can select the font directly.

Factory setting: Round letters (first setting at top of list)

"Beep"

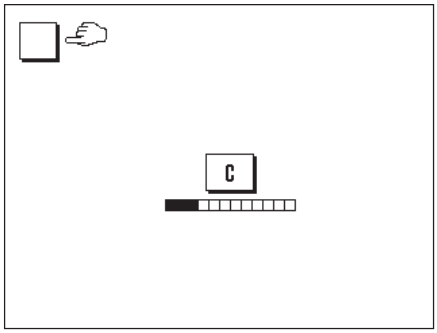
Sets the volume of the beep in the range 0 % to 100 %. Setting to 0 % switches the beep off. To make the setting, there is a sliding adjuster similar to those for setting the brightness and contrast.

Factory setting: 75 %

"**Touch Function**"

If you switch off the touch function for the "Touch Screen", the display no longer responds to touch in weighing mode, and so you can no longer make settings by touching the display (exception: function keys). **Important:** In setting mode the touch function is always active, because otherwise you can no longer make any settings.

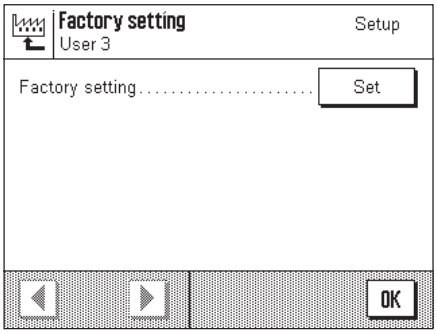
Factory setting: "On"



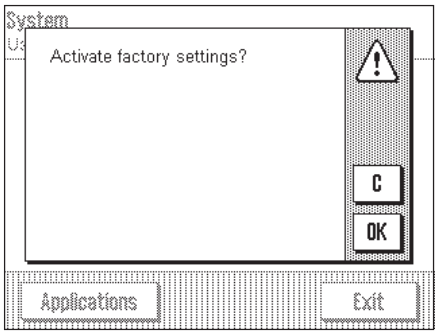
"**Touch adjustment**"

If you have the impression that the balance no longer reacts correctly, you can adjust the "Touch Screen" by touching a certain point of the display. When you touch the "**Activate**" key a window appears and you are prompted to touch the flashing surface. This operation can be repeated several times. (It can be terminated at any time with the "**C**" key.)

5.8 Resetting to the factory settings

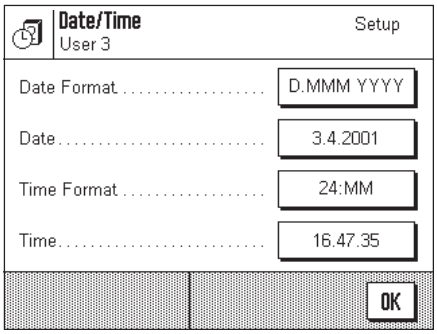


Here you can reset all the settings to the factory settings. **Important: Resetting affects all the settings (application-dependent settings and system settings) for the active user profile!**

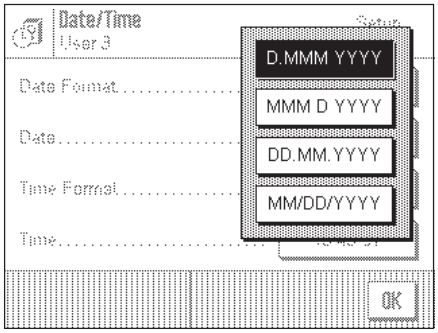


If you select "Set", for safety reasons you will be asked whether you really want to reset to the factory settings. Select either "OK" to reset to the factory settings or "C" to keep the existing settings.

5.9 Date and time



Important: In contrast to the other system settings, the settings for date and time apply to all user profiles!

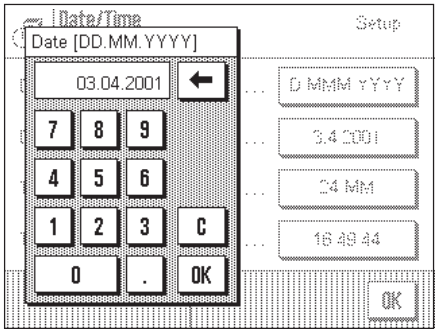


"**Date Format**" (for the display)

The following date formats are available:

"D.MMM.YYYY"	Example:	3. APR. 2001
"MMM D YYYY"	Example:	APR 3 2001
"DD.MM.YYYY"	Example:	03.04.2001
"MM/DD/YYYY"	Example:	04/03/2001

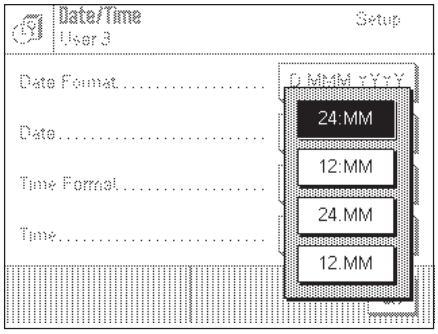
Factory setting: "D.MMM.YYYY"



"**Date**"

Sets the current date. An input window appears which looks like a pocket calculator and can be used like one. Enter the current date **in format day–month–year (DD.MM.YYYY)**, irrespective of which date format you selected for the display.

Note: You can also make this adjustment directly in weighing mode by touching the date. A window appears in which you can enter the date directly.

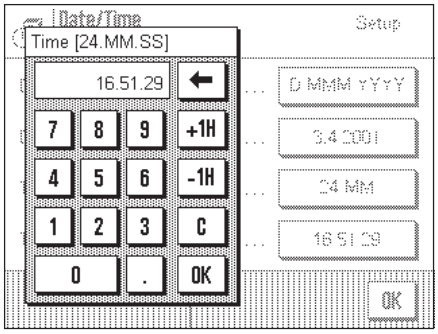


"**Time Format**" (for the display)

Here you can specify the format to be used for displaying the time. The following time formats are available:

"24:MM"	Example:	15:04
"12:MM"	Example:	3:04 PM
"24.MM"	Example:	15.04
"12.MM"	Example:	3.04 PM

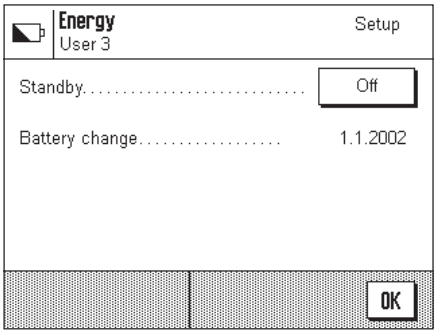
Factory setting: "24:MM"

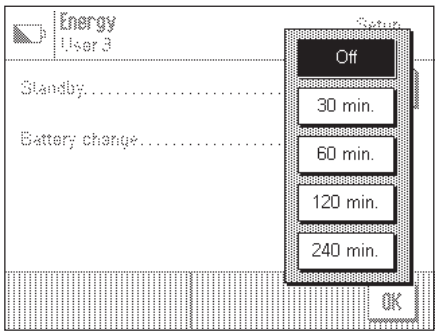


"**Time**"

Sets the current time. Enter the current time in **24-hour format (hh.mm.ss)**, irrespective of the time format you selected for the display. The input window is the same as for the date, except that there are two additional buttons "+1H" and "–1H" which can be used to put the time forward or back by one hour respectively. This makes it possible to change over quickly to summer time or winter (standard) time. **Note:** You can also set the time directly in weighing mode by touching the time in the display.

5.10 Energy-saving function and battery change date





"**Standby**"

Here you can specify how long the balance can remain unused before it switches over to "Standby" mode. "Standby" mode is the same status as when the balance is switched off with the «**On/Off**» key. To switch the balance on again, the «**On/Off**» key has to be pressed.

Factory setting: "Off" ("Standby" mode deactivated)

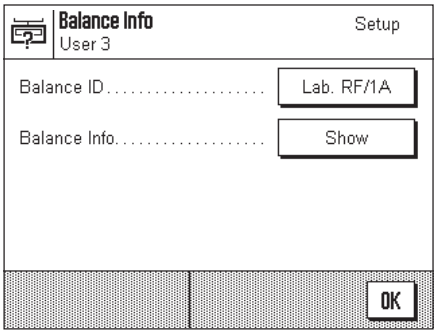
Note: Irrespective of the setting for "Standby" mode, the brightness of the display is automatically reduced if the balance is not used for 15 minutes. This increases the life of the backlighting. The next time either a key is touched or there is a change in weight, the brightness is automatically changed back to the value selected here.

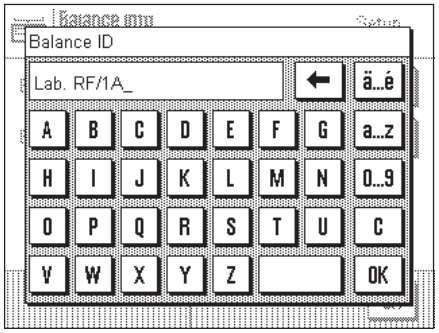
"**Battery change**"

Your balance has a memory which is protected by a battery so that all the settings are saved even if the balance is disconnected from the power supply. The average service life of the battery is about 5 years. The battery can only be changed by a service technician. After the battery has been changed, the service technician enters the date for the next battery change. When this date is reached, the battery symbol appears under the time display in weighing mode to remind you that the battery should be replaced.

You cannot make any changes in this field: You can only check the date when the next battery change is due.

5.11 Balance information



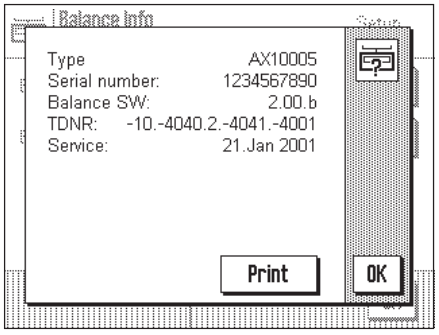


"**Balance ID**"

Here you can assign an identification to the balance (up to a maximum of 20 characters). This can be used, for example, to identify the balance within a network. The balance identification is also printed out on adjustment records and weighing reports. This makes it possible to link the records and reports to a specific balance.

Factory identification: No balance identification

Important: Unlike other system settings, the balance ID applies for all user profiles!



"**Balance information**"

This window displays important information about your balance, such as balance type, serial number, etc. You should always have this information ready when you contact your METTLER TOLEDO authorized representative. The date for the next service is also displayed.

5.12 Recording the system settings

```
----------------------
 Adj./Test
   History
     Selection
       Manual adjust.
       Temp. adjust.
       Time adjust.
   Protocol
     Date
     Time
     User
     Balance Type
```

When you are working in the system settings you can print them out at any time by touching the «🖶» key (provided a printer is connected and activated in the peripheral settings as output device).

The system settings printed are those for the currently active user profile.

The illustration at left shows part of a record of the system settings.

6 Loading Applications via the Internet

In the interest of our customers METTLER TOLEDO continuously develops new applications. The existing applications are also continuously developed further and improved. To make it as easy as possible for you as our customer to gain rapid benefit from these further developments METTLER TOLEDO provides the latest versions on the Internet. The software available on the Internet has been developed and tested by Mettler-Toledo GmbH in processes which comply with the guidelines of ISO 9001. However, Mettler-Toledo GmbH accepts no responsibility for any consequences of using this software.

6.1 Operating principle

You will find full information about your balance together with updates on the METTLER TOLEDO website at the following address:

www.mt.com/ax

We recommend you to put a bookmark in your web browser at this address so that in the future you can go direct to this Internet website.

The full packages contain not only applications but also the balance program. If the selected package contains an application which is not yet described in these operating instructions (or which has since been updated) you can also download the corresponding instructions in Adobe Acrobat® PDF format. To open PDF documents you need Adobe Acrobat Reader® which is already installed on many computers. If it is not installed on your computer, you can download this program free of charge from the Internet (e.g. from www.adobe.com).

Together with the application package the so-called e-Loader will also be loaded onto your computer. You can use this program to transfer the applications from your computer onto your balance. The e-Loader can also be used to backup you balance settings before the new application package is transferred to the balance. When the application has been transferred, you can reload the backed-up settings onto the balance.

In the Sections that follow below you will find detailed information about downloading application packages from the Internet and transferring the applications from you computer to the balance.

6.2 Prerequisites

To be able to download applications from the Internet and then onto your balance you need the following:

- PC with Microsoft Windows® operating system (version 95, 98, NT 4.0, or 2000)
- Internet connection and web browser
- computer-to-balance connection cable (RS232 cable, 9-pin sub-D plug m/f, order number 11101051)

6.3 Downloading the application package from the Internet

In a first step you must download the software from the Internet onto your computer as follows:

Connect your computer to the Internet.

In your browser select the Internet address **www.mt.com/ax** and then click on the "Software" link.

Click on the relevant application package in the language required.

Enter the data needed for registration.

Download the software package onto your computer.

6.4 Loading the application package onto your balance

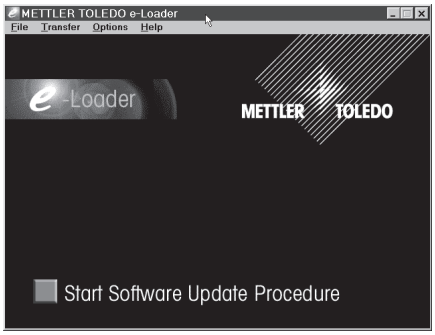
After you have downloaded the application package from the Internet, before you can transfer it to your balance you must connect the balance to the serial interface of your computer with the RS232 cable. **Note:** If your balance also has additional optional interfaces, take care that the cable is always connected to the **RS232C interface installed as standard**!

Set the interface on the balance to the following values (you will find detailed information about these settings in Section 4.6): for peripheral device select "Host", then set the following communication parameters: baud rate 9600; parity 8 bit/none; handshake none; end-of-line <CR><LF>.

Check that the corresponding communication parameters on your computer are set to the same values.

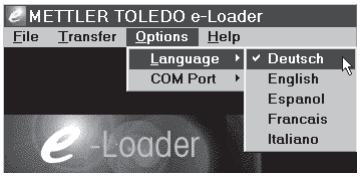
Start the e-LoaderVXXX installation program you have downloaded from the Internet ("XXX" represents the version number). This program installs the e-Loader on your computer.

Follow the step-by-step instructions which guide you through the installation.

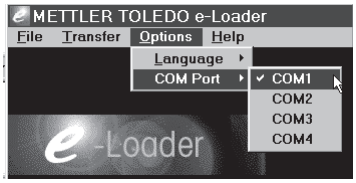


When the installation is complete, the e-Loader starts automatically. The illustration at left shows the startup screen of the e-Loader.

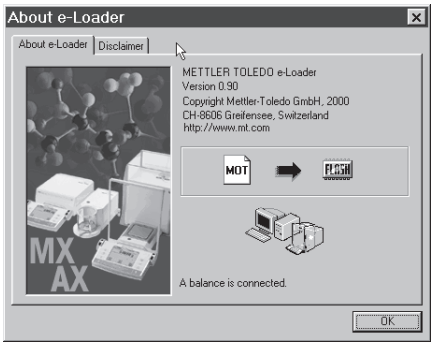
Before you update the softare on your balance, you should select the dialog language and check the settings described below.



Select the **language** in which you wish to be guided through the updating process. The e-Loader will display all the instructions and infomation in the dialog language you select.



Select the **interface** of the computer to which the balance is connected.



Use the "Help" menu to check that the communication with the balance is functioning (in the example at left, the e-Loader is confirming that a balance is connected).

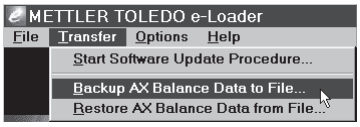
If the e-Loader indicates that no balance is connected, first check that the correct interface has been selected and then, if necessary, that the communication settings on the computer and on the balance are correct and identical.

When you have made the necessary settings and checked the connection, you can start the updating process. You do this by clicking on "Start Software Update Procedure". Follow the instructions of the e-Loader which will guide you through the updating procedure step by step. The e-Loader will ask you whether you wish to backup the current balance settings onto your computer. We recommend you to make this backup. It saves you having to input all your settings again by hand, because during the updating process they will be reset to the factory settings. When the updating process is complete, the e-Loader asks whether you wish to restore the backed-up data onto the balance.

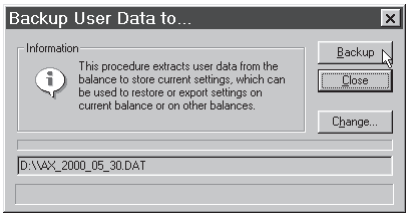
When the updating process is complete, you can close the e-Loader. Your balance now functions with the newly loaded software.

6.5 Backing up and restoring your balance settings

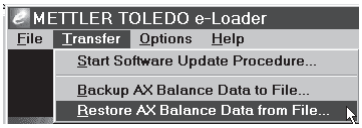
As well as updating the balance software, the e-Loader also has a data backup feature which can be used to make a backup copy of the current balance settings on a computer. If you use this you always have a backup copy of your settings which you can restore onto your balance any time you need it. This feature can also be used to copy the settings from one balance to another.



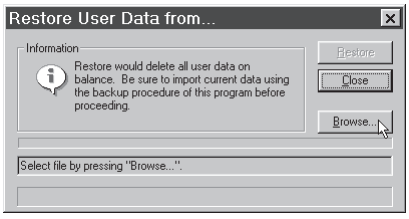
To backup the current settings from a balance onto a computer, start the e-Loader and call up the data backup function as shown in the illustration at left.



The dialog at left prompts you to confirm the data backup and to change the path for saving the backup file if necessary.



To restore the balance settings from the computer to the balance, call up the restore function as shown in the illustration at left.



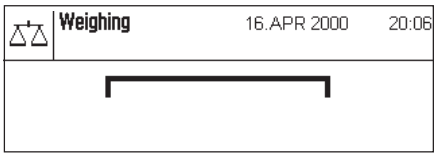
When you have started the restore function, you can use the "Browse" button to select the settings file -to be transferred to the balance. Remember that when you do this, all the current settings in the balance will be overwritten!

7 Further important information

7.1 Error messages occurring during normal operation

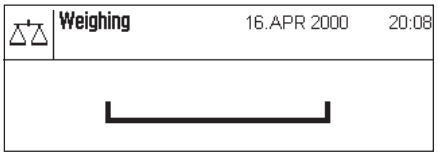
Most error messages appear in plain text directly in the respective application, and usually accompanied by a text describing how to correct the error. Error messages of this type are self-explanatory and therefore not mentioned below.

The following two error messages can appear instead of the weighing result:



Overload

The weight on the pan exceeds the weighing capacity of the balance. Reduce the weight on the weighing pan.



Underload

Ensure that the weighing pan is correctly in place, can move freely, and does not catch on the draft cover.

Error when switching on (weight display flashes)

When the balance was switched on (i.e. when it was connected to the power supply or switched on from standby mode) one or more limits were exceeded. The usual reason for this message to appear is when there is a weight on the weighing pan when the balance is switched on. Remove the weight.

Taring or zeroing was interrupted by touching the «On/Off» key

Taring or zeroing was interrupted by touching the «**On/Off**» key. The message is automatically extinguished after 3 seconds. Following this, tare/zero again.

7.2 Further error messages

During normal operation, the following error messages should not occur. If the message re-appears after switching the balance off and on again, please contact the customer service department of your dealer.

"ERROR 4"

Cause:	EAROM error
Occurs:	When switching on (connecting to the power supply or switching on from standby mode)
Correction:	Switch balance off and on again. If the message re-appears, notify customer services.

"ERROR 6"

Cause:	No primary calibration
Occurs:	When connecting the balance to the power supply
Correction:	Notify customer services.

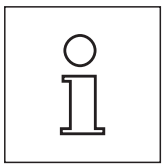
7.3 Cleaning and service

It must be ensured that only clean, dust-free weights are used. In particular, the area occupied by the weights must be checked for freedom from dust and if need be cleaned using a brush. The sliding doors of the balance should be opened only for changing the weights.

Weighing pan, hanger, dial weights and the entire weighing chamber can also be cleaned using a soft brush.

Your balance is made from high quality, resistant materials and can therefore be cleaned with a commercially available, mild cleaning agent. Observe the following instructions:

- Never use cleaning agents containing solvents or abrasives – this can cause damage to the foil cover of the terminal and the glass cover of the display!
- Take care that no liquids penetrate into the balance, the control unit, the terminal, or the AC adapter!
- Never open the balance, the terminal, the control unit, or the AC adapter: they do not contain any components that can be cleaned, repaired, or replaced by the user!



Ask your METTLER TOLEDO dealer about servicing possibilities – regular servicing by an authorized service technician guarantees consistent weighing accuracy for years and prolongs the service life of your mass comparator.

8 Technical data and accessories

In this Section you will find the most important technical data for your balance. Accessories from the METTLER TOLEDO range increase the functionality of your balance and open up additional areas of application. In this Section you will find a list of the options currently available.

8.1 General data

Power supply

- Power supply with AC/DC adapter: Primary: 100-240V, -15%/+10%, 50/60Hz, 0.7A
  Secondary: 12VDC ±5%, 2.08A (with electronic overload protection)
- Power supply cable: 3-core, with country-specific plug
- Power supply:  12 VDC ±5%, 2.08A, maximum ripple 120 mVpp
  Use only with a tested AC adapter with SELV output current.
  Ensure correct polarity 

Protection and standards

- Overvoltage category: Class II
- Degree of pollution: 2
- Standards for safety and EMC: See Declaration of Conformity (separate brochure 11780294)
- Range of application: For use only in closed interior rooms

Environmental conditions

- Height above mean sea level: Up to 4000 m
- Ambient temperature: 10 – 30 °C (±1 °C)
- Relative air humidity: 40 – 60 % (±2%)
- Warm-up time: At least 120 minutes after connecting the balance to the power supply; when switched on from standby-mode, the balance is ready for operation immediately.

Materials

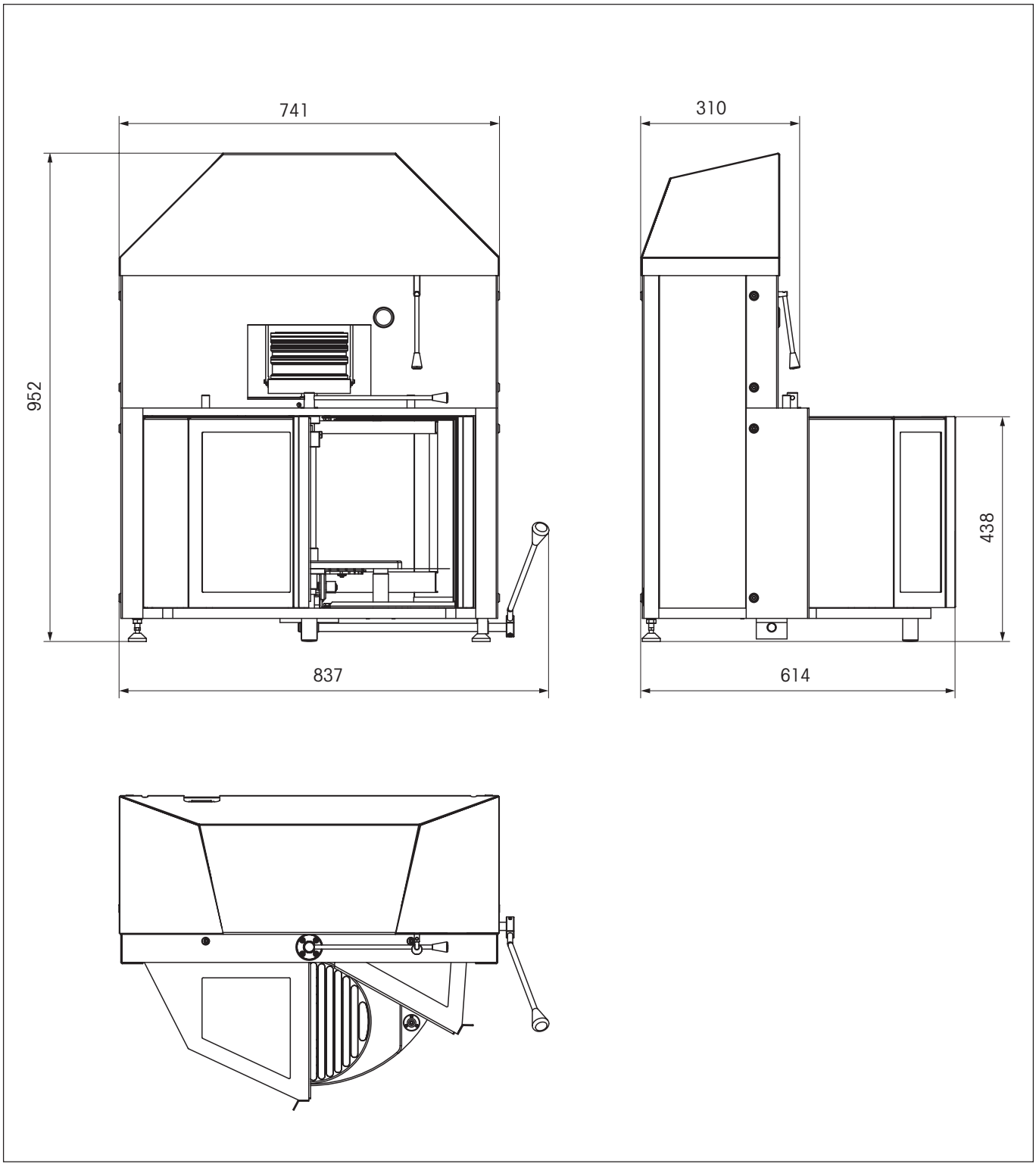
- Housing: Die-cast aluminum, lacquered
- Terminal: Die-cast zinc, lacquered, and plastic

8.2 Model-specific data

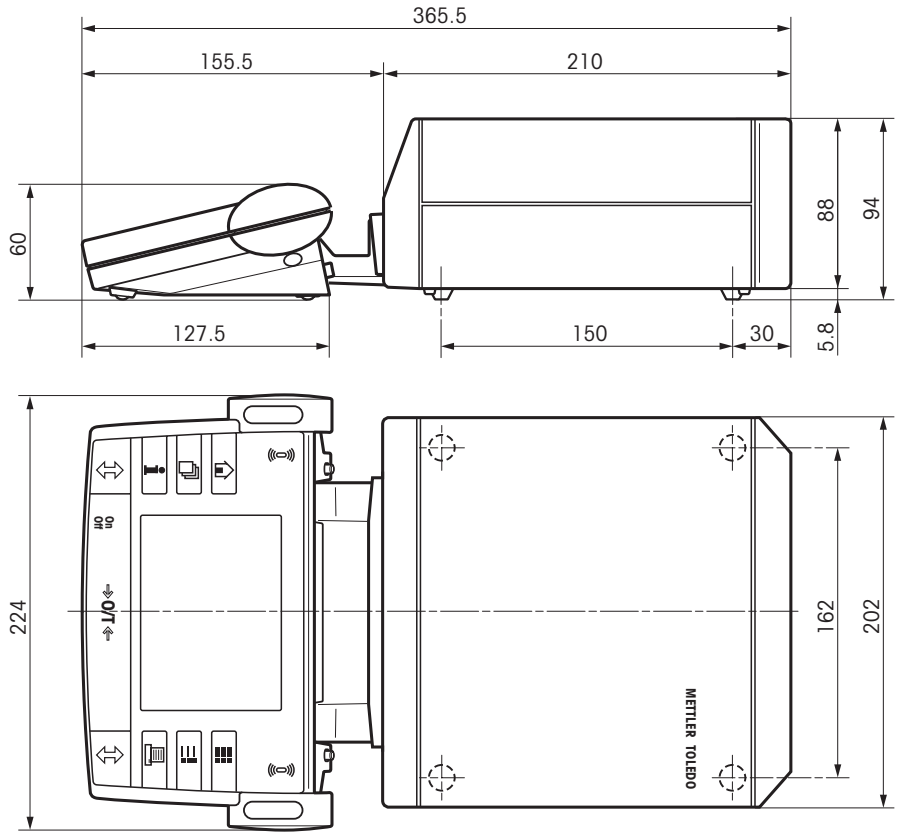
	AX12004 Comparator
Readability	0.1 mg
Maximum load	12111 g
Taring range	0…111 g
Repeatability (Standard deviation of 10 comparison weighings ABA after elimination of drift)	0.25 mg
Typical Repeatability	0.15 mg
Dial weights	5 kg, 3 kg, 2 kg, 1 kg, 1 kg
Linearity	0.6 mg
Stabilization time	20…40 s
Adjusting weights (Number of built-in weights)	1 x 100 g
Separation cell/electronics	separate
Dimensions of measuring weights	
Minimum diameter	34 mm
Maximum diameter	220 mm
Maximum Height	230 mm
Dimensions	
Balance with draft shield (B x T x H) [mm]	800 x 620 x 950
Control unit (B x T x H) [mm]	224 x 366 x 94
AC adapter [mm]	115 x 140 x 53

8.3 Dimensions

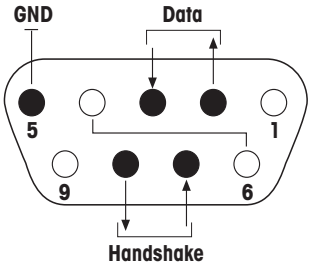
AX12004 mass comparator



Balance- /Handler control unit



8.4 Specifications of the RS232C interface

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:	150, 300, 600, 1200, 2400, 4800, 9600, 19200 (software selectable)	
Bits/parity:	7-bit/even, 7-bit/odd, 7-bit/none, 8-bit/none (software selectable)	
Stop bits:	1 stop bit	
Handshake:	None, XON/XOFF, RTS/CTS (software selectable)	
End-of-line:	<CR><LF>, <CR>, <LF> (software selectable)	
	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)	

8.5 MT-SICS Interface commands and functions

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

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

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

Basic information on data interchange with the balance

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

Command formats

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

- Enter commands only in uppercase.
- The possible parameters of the command must be separated from one another and from the command name by a space (ASCII 32 dec., in this description represented as ␣).
- The possible input for "text" is a sequence of characters of the 8-bit ASCII character set from 32 dec to 255 dec.
- Each command must be closed by C_RL_F (ASCII 13 dec., 10 dec.).

The characters C_RL_F, which can be inputted using the Enter or Return key of most entry keypads, are not listed in this description, but it is essential they be included for communication with the balance.

Example

`S` – Send stable weight value

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

Example

Command	`S`	Send a stable weight value.
Response	`S␣S␣␣␣␣␣␣100.00␣g`	
		The current, stable weight value is 100.00 g.

The MT-SICS commands listed below is a selected list of available commands. For additional commands and further information please refer to the Reference Manual "**METTLER TOLEDO Standard Interface Command Set 11780417**".

S – Send stable weight value

Command	`S`	Send the current stable net weight value.

SI – Send value immediately

Command	`SI`	Send the current net weight value, irrespective of balance stability.

SIR – Send weight value immediately and repeat

Command	`SIR`	Send the net weight values repeatedly, irrespective of balance stability.

Z – Zero

Command	`Z`	Zero the balance.

@ – Reset

Command	`@`	Resets the balance to the condition found after switching on, but without a zero setting being performed.

SR – Send weight value on weight change (Send and Repeat)

Command	`SR`	Send the current stable weight value and then send continuously the stable weight value after every weight change. The weight change must be at least 12.5 % of the last stable weight value, minimum = 30d.

ST – Send stable weight after pressing «🖶» key

Command	`ST␣1`	Send the current stable net weight value each time when «🖶» is pressed.
Response	`ST␣0`	Stop sending weight value when «🖶» is pressed. • `ST` function is not active: – after switching on the balance. – after the "Reset" command.

SU – Send stable weight value with currently displayed unit

Command	`SU`	As the "`S`" command, but with the currently displayed unit.

8.6 Accessories

You can increase the functionality of your mass comparator with accessories from the METTLER TOLEDO range. The following options are available:

Cable	
Extension cable between cell and electronic evaluation equipment, length 0.6 m	211535
Extension cable between cell and electronic evaluation equipment, length 5 m	11100080
Terminal accessories	
Terminal cable 5 m including cover plate	11100081
Protective cover	
Protective cover for terminal	11100830
Calibrated, traceable reference weights	
Example: Weight 10 kg E2 **without** calibration	11119310
Calibration for weight 10 kg E2	11119321
Representative wooden case	00015791
FDA compliant plastic case	11117572
Further calibratable weights and cases at "www.mt.com/weights" or in the METTLER TOLEDO catalog	

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METTLER TOLEDO Service assures the quality, measuring accuracy and preservation of value of all METTLER TOLEDO products for years to come.
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P11780693

Subject to technical changes and to changes in the accessories supplied with the instruments.

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